

V 2242

REPORT NO.: 208-MGA-95-006
212-MGA-95-006
301-MGA-95-006

VEHICLE SAFETY COMPLIANCE TESTING
FOR
FMVSS 208, OCCUPANT CRASH PROTECTION

FMVSS 212, WINDSHIELD MOUNTING

FMVSS 219, WINDSHIELD INTRUSION (PARTIAL)

FMVSS 301, FUEL SYSTEM INTEGRITY

FORD MOTOR COMPANY
1995 Ford Contour 4 Door
NHTSA NO. CS0206

MGA PROVING GROUNDS
5000 WARREN ROAD
BURLINGTON, WI 53105



Test Date: December 16, 1994

Report Date: January 19, 1995

FINAL REPORT

Prepared For:

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
MAIL CODE: NEF-30
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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 Ford Contour Sedan, NHTSA No. CS0206, 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 572E 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.

The twenty-six (26) data channels were multiplexed and recorded on three IBM PC compatible computers with Metrobyte 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 December 16, 1994.

The test vehicle, a 1995 Ford Contour, NHTSA No. CS0206, 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 572E dummies seated in the front outboard designated seating positions. 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 system with passive shoulder belts in the front outboard designated seating positions. Both dummies were restrained by the shoulder belt and the airbag during the test. The vehicle's test weight was 3294 pounds. The vehicle's impact speed was 29.8 mph. The vehicle's maximum static crush was 13.1 inches.

The driver's HIC was 266.4. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 45.9 g's. The driver's chest maximum deflection was 1.9 inches. The driver's left and right femur maximum compressive forces were 1504 pounds and 1191 pounds, respectively.

The right front passenger's HIC was 194.5. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 48.2 g's. The right front passenger's chest maximum deflection was .9 inches. The right front passenger's left and right femur maximum compressive forces were 1141 pounds and 1202 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

The Passenger Head X channel did not record any valid data from .04 seconds to .05 seconds. That appeared to be before any large acceleration responses occurred.

TABLE 1 CRASH TEST SUMMARY

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

Vehicle NHTSA No.: CS0206 Test Type: Frontal Barrier Impact

Test Date: 12/16/94 Time: 6:07 Temp: 68°F

Vehicle Test Weight: 3294 lbs. Vehicle/Barrier Impact Angle: 0°

Impact Velocity: 29.8 mph Maximum Static Crush: 13.1 inches

Vehicle Rebound: 27.1 inches

Dummies:	Driver	Passenger
Dummy Type	<u>Part 572E</u>	<u>Part 572E</u>
Serial Number	<u>403</u>	<u>401</u>
Restraint System	<u>Airbag</u>	<u>Airbag</u>
No. of Data Channels	<u>26</u>	<u>26</u>

Number of Cameras: 1 Real Time
14 High Speed

Door Opening Data: Left Front: Yes; Right Front: 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 and Sunvisor</u>	<u>Airbag</u>
Chest	<u>Airbag</u>	<u>Airbag</u>
Left Knee	<u>Instrument Panel</u>	<u>Instrument Panel</u>
Right Knee	<u>Instrument Panel</u>	<u>Instrument Panel</u>

TABLE 2 GENERAL TEST AND VEHICLE PARAMETER DATA

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

NHTSA No: CS0206 VIN: 1FALP6539SK116339 Body Color: Blue

Engine: 4 Cylinders; C.I.D.; 2.0 liters; CC

X 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; Tilt Wheel; Anti-skid Brakes; X Cruise Control; Other

Date Received: 11/18/94; Odometer Reading: 291 miles

Dealer's Name/Address: Jack Safo Ford Inc.
1000 E. Summit Avenue
Oconomowoc, WI 53066

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: Ford Motor Company

Date of Manufacture: 9/94; VIN: 1FALP6539SK116339

GVWR: 4078 lbs; GAWR Front: 2149 lbs. GAWR Rear: 1955 lbs.

DATA FROM TIRE PLACARD:

Tire Pressure with maximum capacity vehicle load: Front 34 psi; Rear 34 psi

Recommended Tire Size: P185/70R14

Recommended Cold Tire Pressure: Front 34 psi; Rear 34 psi

Tires on Vehicle: P185/70R14; 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; Lever; X Rot. Knob

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

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

Right Front = 885 lbs Right Rear = 534 lbs
Left Front = 905 lbs Left Rear = 507 lbs
TOTAL FRONT WEIGHT = 1790 lbs (63.2% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1041 lbs (36.8% of Total Vehicle Weight)
TOTAL UNLOADED DELIVERED WEIGHT (UDW) = 2831 lbs

CALCULATION FOR TARGET TEST WEIGHT:

UDW (Unloaded Delivered Weight) = 2831 lbs
VCW (Vehicle Capacity Weight) = 880 lbs
DSC (Designated Seating Capacity) = 5
RCLW*(Rated Cargo/Luggage Weight) = VCW - 150 (DSC) = 830 - 150 (5) = 130 lbs
Target Test Weight = UDW + RCLW + (2 Dummies x Dummy Weight)
Target Test Weight = 2831 + 130 + 344 = 3305 lbs

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND CARGO WEIGHT:

Right Front = 973 lbs Right Rear = 688 lbs
Left Front = 970 lbs Left Rear = 663 lbs
TOTAL FRONT WEIGHT = 1943 lbs (59.0% of Total Vehicle Weight)
TOTAL REAR WEIGHT = 1351 lbs (41.0% of Total Vehicle Weight)
TOTAL TEST WEIGHT = 3294 lbs
Weight of ballast secured in vehicle = 0 lbs
Vehicle components removed to meet target weight or to install instrumentation: Rear seat
and seat belts, spare tire and jack, trunk interior, rear tail lights, sideview mirrors.

VEHICLE ATTITUDE (all dimensions in inches):

Delivered Attitude: RF 27.4 LF 27.3 RR 27.1 LR 27.1
Fully Loaded Attitude: RF 26.8 LF 26.6 RR 25.6 LR 25.6
Test Attitude: RF 26.8 LF 26.8 RR 25.5 LR 25.4
Wheel Base: 106.3 in; C.G. = 43.6 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: 12/16/94 Time: 6:07 Temperature: 68° F
Vehicle NHTSA No.: CS0206 VIN: 1FALP6539SK116339

BARRIER IMPACT VELOCITY

Required Impact Velocity Range: 28.9 to 29.9 mph
Impact Velocity: Primary = 29.8mph; Secondary = 29.8mph
Distance From Front Bumper to Barrier Face When
 Entering Speed Trap: 52 inches
 Exiting Speed Trap: 8 inches

VEHICLE STATIC CRUSH AND REBOUND (inches):

Vehicle Length:	Pre-test	= R	<u>177.3</u>	C _L	<u>183.6</u>	L	<u>177</u>
	Post-test	= R	<u>166.2*</u>	C _L	<u>170.7*</u>	L	<u>167.3*</u>
	Crush	= R	<u>11.1</u>	C _L	<u>12.9</u>	L	<u>9.7</u>
	Average	=	<u>11.2</u>				

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

R 28.3 in C_L 24.4 in L 28.6 in

* The post-test measurements were taken from the metal bumper. The plastic fascia covering separated from the bumper during impact. The fascia is approximately .3 inches thick.

** Taken to bumper fascia.

TABLE 4 ACCIDENT INVESTIGATION DIVISION DATA

Vehicle Year/Make/Model/Body Style: 1995/Ford/Contour/4 Door
 Veh. NHTSA No.: CS0206; VIN: 1FALP6539SK116339
 Build Date: 9/94; Test Date: 12/16/94
 Veh. Size Category: Mid; Test Weight: 3294 lbs
 Veh. Wheelbase: 106.3 in; Front Overhang: 37.0 in
 Overall Width: 70.9 in

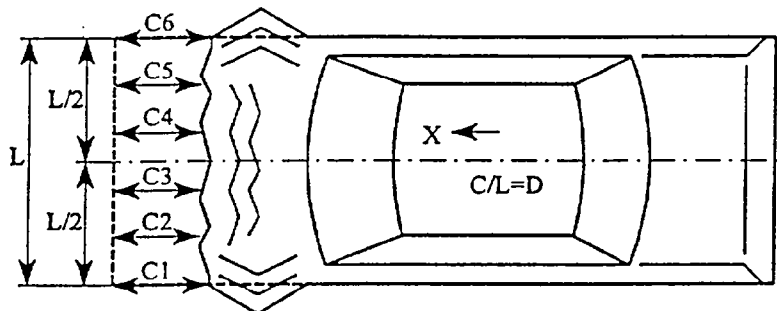
ACCELEROMETER DATA:

Location: As per measurements on pages 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 = 9.7 inches
 Dimensions: C2 = 12.7 inches
 C3 = 12.6 inches
 C4 = 12.2 inches
 C5 = 13.1 inches
 C6 = 11.1 inches



Midpoint of Damage: D = Vehicle Longitudinal Centerline

Length of Damaged Region: L = 57 inches

* The post-test measurements were taken from the metal bumper. The plastic fascia covering separated from the bumper during impact. The fascia is approximately .3 inches thick.

TABLE 5 POST TEST AIRBAG DATA

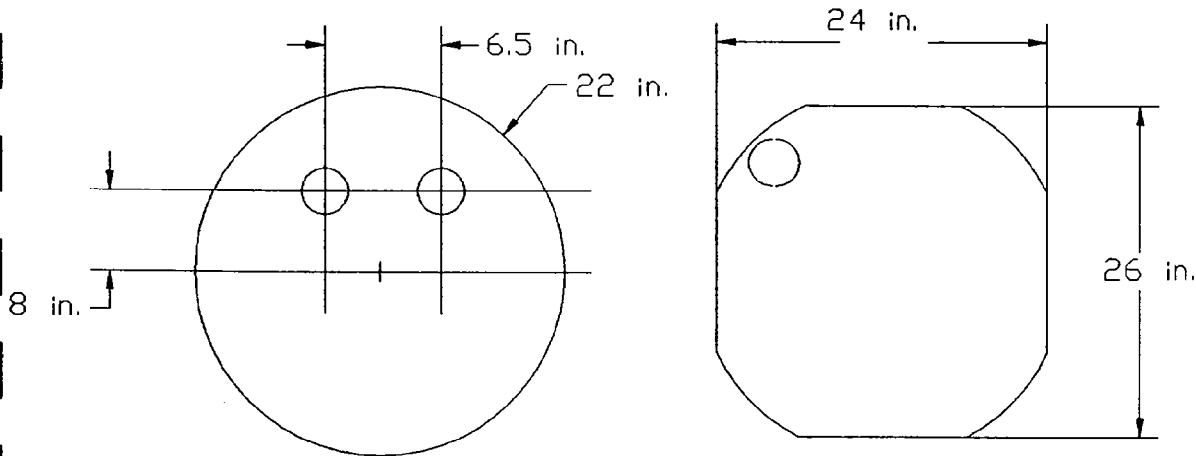
Vehicle Year/Make/Model/Body Style: 1995/Ford/Contour/4 Door

NHTSA No: CS0206; Test Date: 12/16/94; Technician: Gary Strassburg

- A. No of Vent Holes: Driver 2; Passenger 1
- B. Size of Vent Holes: Driver 1 in. dia.; Passenger 3 in. dia.
- C. Total Vent Area: Driver 1.6 in²; Passenger 7.1 in²
- D. Deflated Airbag Length and Width Dimensions or, if Round, Diameter
 Driver; Length ; Width ; Diameter 22 in
 Passenger; Length 24; Width 26; Diameter
- E. Is the Airbag Tethered?
 Driver; X Yes; No; If yes, record length of tether 9 in
 Passenger; X Yes; No; If yes, record length of tether 12.5 in

Driver Airbag

Passenger Airbag



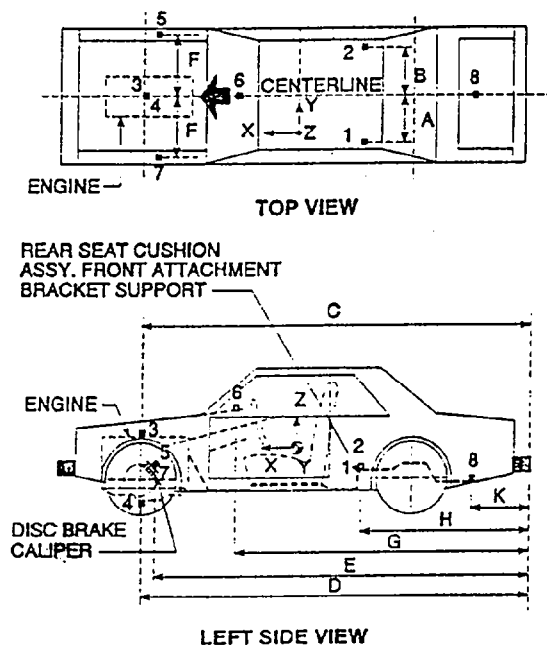
There were two (2) tethers in passenger airbag. The bag had two compartments. The tethers went from outside the inflator cannister to the center of the two compartments.

- F. Part Numbers and Manufacture Name of Airbag and Gas Generator
 Driver; Mfr TRW; Airbag 94BB-F042B85-AJKZAT; 94BBF042B84AN
 Passenger; Mfr TRW; Airbag 1PLE224H10453; 942412733

TABLE 6 VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Vehicle Year/Make/Model/Body Style: 1995/Ford/Contour/4 Door

Vehicle NHTSA No.: CS0206; Test Date: 12/16/94



ACCELEROMETER LOCATION (inches)		
	PRE-TEST	POST-TEST
A	17.9	17.9
B	17.9	17.9
C	154.4	150.2
D	154.3	147.0
E	142.3	142.1
F	26.6	26.8
G	126.6	126.3
H	69.7	69.7
K	7.8	7.8

ACCELEROMETER DATA SUMMARY (Filtered at 100 hertz cutoff)					
No.	DESCRIPTION	MAXIMUM (g's)	TIME (msec)	MINIMUM (g's)	TIME (msec)
1	Left Rear Seat Crossmember	3.9	88	-37.8	45
2	Right Rear Seat Crossmember	3.2	87	-38.6	46
3	Top of Engine Block	15.2	46	-84.4	32
4	Bottom of Engine	15.6	43	-79.1	26
5	Right Disc Brake Caliper	26.0	71	-90.0	48
6	Instrument Panel	27.6	31	-64.6	47
7	Left Disc Brake Caliper	20.1	70	-52.1	47
8	Trunk	15.2	46	-7.3	75

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. All variances have been reported within 2 working days of vehicle arrival, by letter, to the NHTSA Industrail Property Manager/NAD-30, with a carbon copy of the responsible testing office. The vehicle is again inspected and all changes are noted below. The final condition of the vehicle is also noted in detail.

Vehicle Year/Make/Model/Body Style: 1995/Ford/Contour/4 Door
Vehicle NHTSA No.: CS0206 Body Color: Blue
VIN: 1FALP6539SK116339 Cost: \$14,915.00
Odometer: Arrival Date: 11/18/94 Reading: N/A miles
Completion Date: 12/23/94 Reading: 291 miles
Engine: 4 Cylinders; 2 Liters; Gas; Diesel
Transmission: 5 Speed; X Manual; Automatic
Final Drive: X Front Wheel; Rear Wheel; Four Wheel
Tire Size: P185/70R14; Manufacturer: General

Air Conditioner	<u>Yes</u>	Console	<u>Yes</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>Yes</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:AM/FM Tape	<u>Yes</u>	T-Top	<u>No</u>		Rear <u>Bench</u>
Clock	<u>Yes</u>	Tilt Steering Wheel	<u>No</u>		
Roof Rack	<u>No</u>	Other Options:	<u>No</u>	No. of Seats	<u>3</u>

Equipment that is no longer on the vehicle as noted above:
Rear Seat

Explanation:
Items removed to allow installation of data acquisition system.

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/Ford/Contour/4 Door

Veh. NHTSA No.: CS0206 Test Date: 12/16/94

MAXIMUM ACCELERATION VALUES: (g's)	DRIVER DUMMY #403	PASSENGER DUMMY #401
Head Channel X	-41.8	-36.8
Head Channel Y	-7.8	-12.1
Head Channel Z	15.5	21.5
HEAD RESULTANT	42.5	40.3
Chest Channel X	-47.1	-46.9
Chest Channel Y	5.5	-3.4
Chest Channel Z	-9.6	19.2
CHEST RESULTANT	47.4	49.3

**HEAD INJURY CRITERIA
(HIC) VALUES:**

HIC	266.4	194.5
$t_1 =$ (msec)	58.8	53.7
$t_2 =$ (msec)	94.8	83.4

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

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

CLIP	45.9	48.2
$t^1 =$ (msec)	59.68	52.46
$t^2 =$ (msec)	62.62	55.52

**MAX. COMPRESSIVE
FEMUR FORCES: (lbs)**

Left Side	1504	1141
Right Side	1191	1202

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 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 instrument panel. 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 with the dummy's head contacting the head restraint. 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/Ford/Contour/4 Door
NHTSA No.: CS0206 ; Date of Comfort/Convenience Check: 12/15/94
Technician Performing Check: Homyoung Kim
GVWR: 2806 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 in 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 0.2 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 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 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/Ford/Contour/4 Door

Vehicle NHTSA No.: CS0206 Date of Check: 12/15/94

Technician Performing Check: Homyoung Kim

GVWR: 2806 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 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 remainder 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 24.

A description of the functional operation of the system was provided in the owner's manual on page 36.

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 20 through 58.

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 bottom area of the instrument cluster.

The readiness indicator was clearly visible to the driver.

Descriptions of the seat belt and airbag indicators is found on pages 81 and 84 of the owner's manual.

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

Vehicle Year/Make/Model/Body Style: 1995/Ford/Contour/4 Door

Vehicle NHTSA No.: CS0206 Test Date: 12/16/94

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

Rubber molding with glue retention

CLIPS OR BRACKETS USED TO RETAIN WINDSHIELD: None

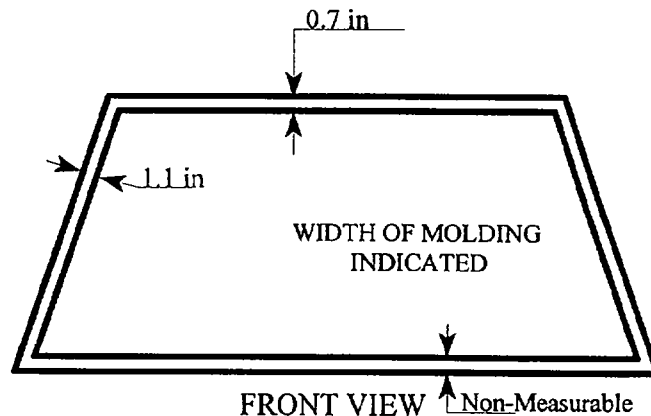
FMVSS 212 REQUIREMENTS:

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	82.8	82.8	100%
LEFT SIDE	82.8	82.8	100%
TOTAL	165.6	165.6	100%

Pre-Test Windshield Mounting Material Temperature: °F



FAILURE DETAILS: None

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

Vehicle Year/Make/Model/Body Style: 1995/Ford/Contour/4 Door

Vehicle NHTSA No.: CS0206 Test Date: 12/16/94

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= 43.1 in

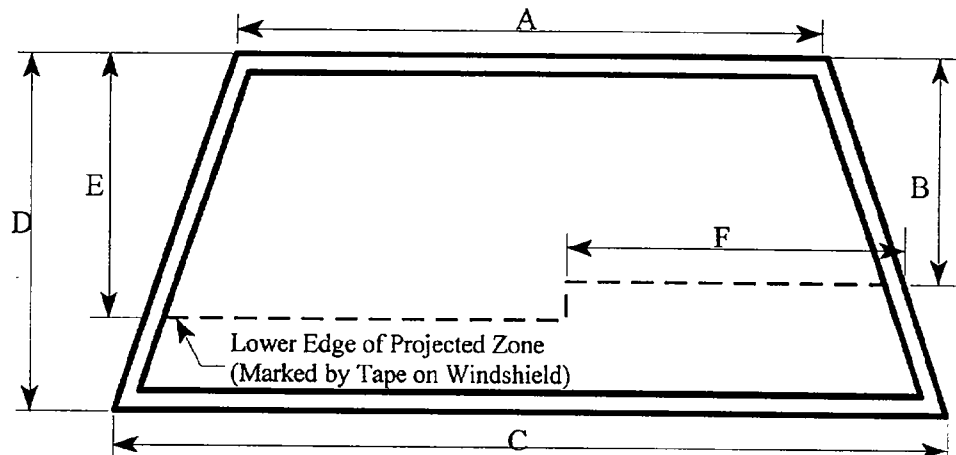
B= 18.2 in

C= 58.3 in

D= 32.0 in

E= 20.9 in

F= 27.4 in



FRONT VIEW

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/Ford/Contour/4 Door

Vehicle NHTSA No.: CS0206 Test Date: 12/16/94

Fuel System Capacity from Owner's Manual = 14.5 gallons

Usable Capacity Figure Furnished by COTR = 14.53 gallons

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

= 13.37 to 13.66 gallons

Actual Test Volume = 13.4 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:

The fuel tank was located in front of the rear axle. The fuel filler pipe
was located on the right side. The fuel lines ran along the right side to
the front.

TABLE 15 FMVSS 301 POST IMPACT TEST DATA

Vehicle Year/Make/Model/Body Style: 1995/Ford/Contour/4 Door

Vehicle NHTSA No.: CS0206 Test Date: 12/16/94

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 572^E 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

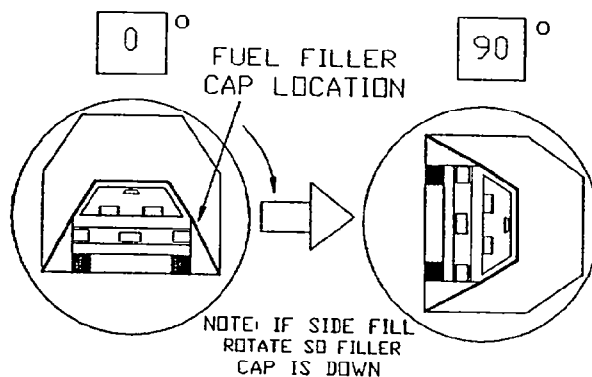
FUEL SPILLAGE LOCATION(S): None

TABLE 16 FMVSS 301 STATIC ROLLOVER TEST DATA

Vehicle Year/Make/Model/Body Style: 1995/Ford/Contour/4 Door

Vehicle NHTSA No.: CS0206 Test Date: 12/16/94

TEST PHASE: 0° - 90°



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 TIME = 7 minutes 47 seconds

Next Whole Minute Interval = 8 minutes

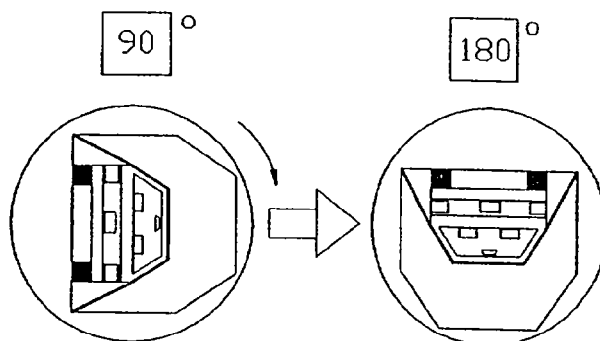
FUEL SPILLAGE MEASUREMENT:

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 30 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 30 seconds

Next Whole Minute Interval = 8 minutes

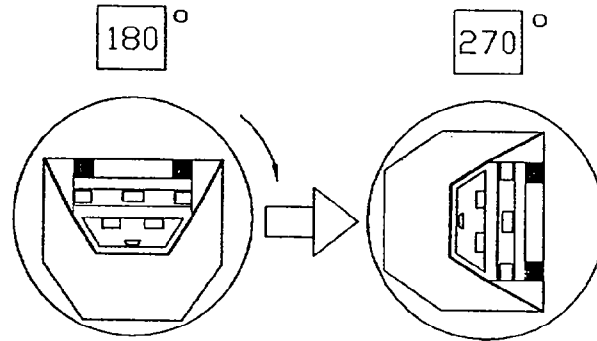
FUEL SPILLAGE MEASUREMENT:

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 13 seconds
(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 13 seconds

Next Whole Minute Interval = 8 minutes

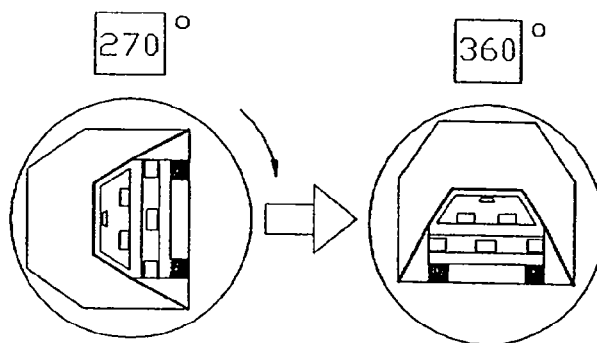
FUEL SPILLAGE MEASUREMENT:

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 (Cont'd)

TEST PHASE: 270° - 360°



DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time = 2 minutes 28 seconds

(Spec. Range = 1 to 3 minutes)

FMVSS 301 Position Hold Time = 5 minutes 0 seconds

TOTAL TIME = 7 minutes 28 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/Ford/Contour/4 Door

Vehicle NHTSA No.: CS0206 Test Date: 12/16/94

NOMINAL DESIGN RIDING POSITION:

Driver Seat: Seat Back Angle = 24°

The seat back angle was measured on the seat back frame with an inclinometer.

Passenger Seat: Same as driver's seat.

SEAT FORE AND AFT POSITIONS:

Driver Seat: The seat track had 15 detents and was positioned at the 8th 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 non-adjustable. The angle of the steering column was 23.8°.

FIGURE 1 DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS

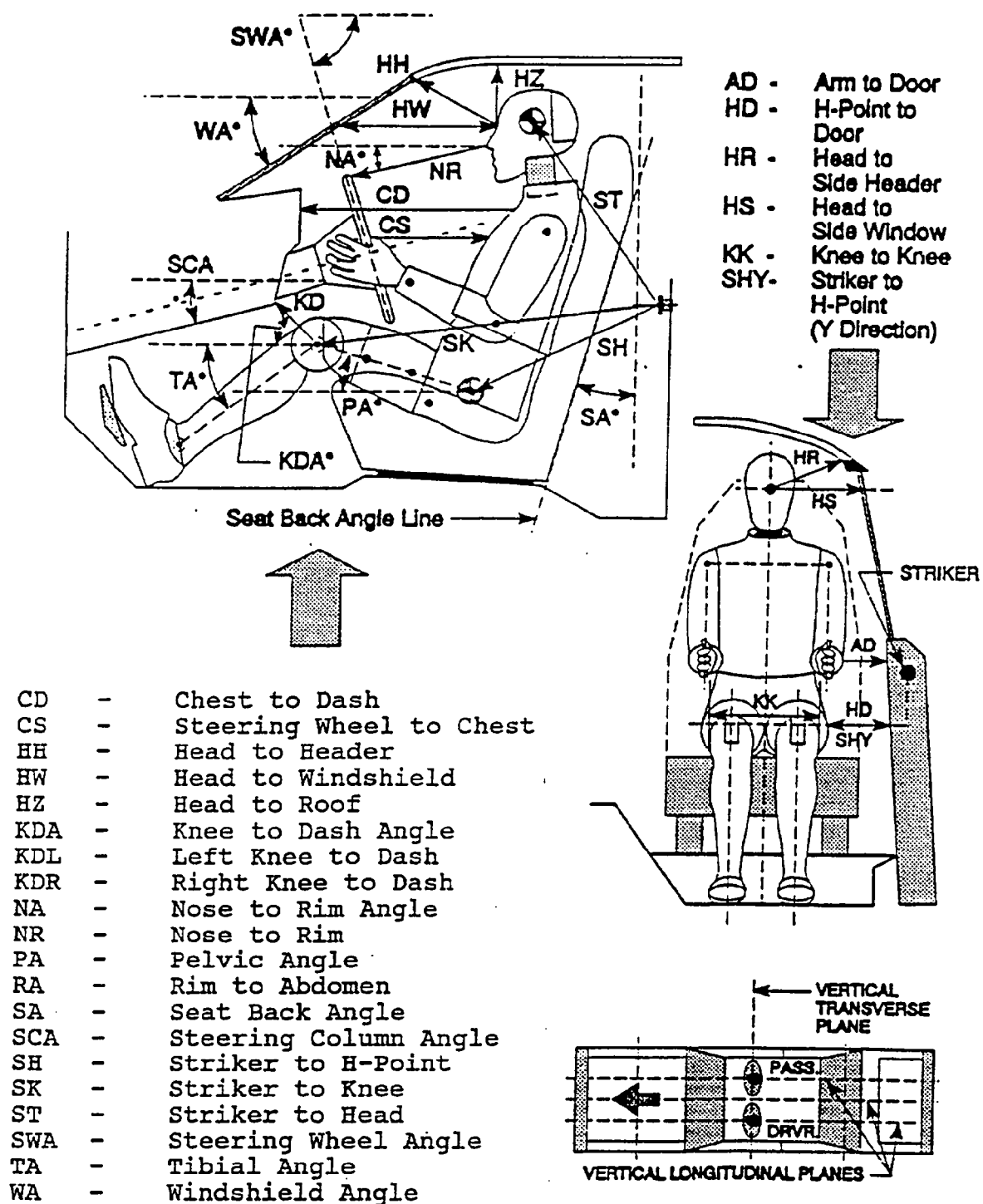


TABLE 18 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

Vehicle Year/Make/Model/Body Style: 1995/Ford/Contour/4 Door

Vehicle NHTSA No.: CS0206 Test Date: 12/16/94

	DRIVER (Serial #403)	PASSENGER (Serial #401)
WA°	28°	
SWA°	66.2°	N/A
SCA°	23.8°	N/A
SA°	24°	24 °
HZ	6 in	5.6 in
HH	13.4 in	12.4 in
HW	22.5 in	20.9 in
HR	9 in	8.2 in
NR	15.9 in Angle (NA) 15.4°	N/A
CD	21.8 in	19.8 in
CS	12.3 in	N/A
RA	8 in	N/A
KDL	6.5 in Angle (KDA) 23.1°	5.0 in
KDR	4.8 in	5.1 in Angle (KDA) 22.4°
PA°	23.4°	23.6°
TA°	37.8°	45.6°
KK	12.8 in	9.8 in
ST*	21.5 in Angle 82.3°	21.6 in Angle 88.2°
SK*	22.8 in Angle -3°	24.2 in Angle .2°
SH*	8.5 in Angle -13.9°	9.6 in Angle 27°
SHY	9 in	9.3 in
HS	12.5 in	11.6 in
HD	5.1 in	4.4 in
AD	4 in	3.5 in

N/A Not Applicable
 * degree's from horizontal

FIGURE 3 VEHICLE TARGET LOCATIONS

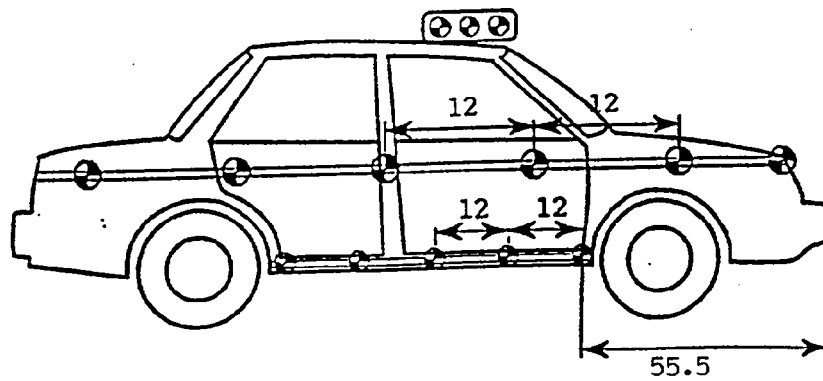
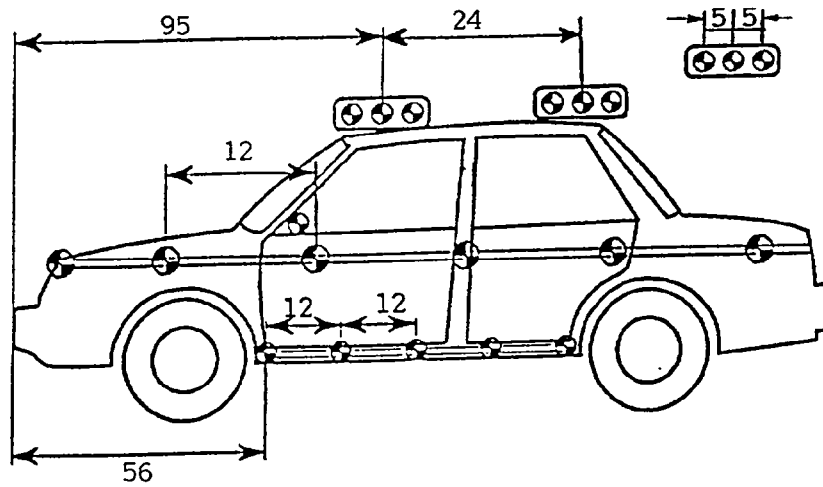
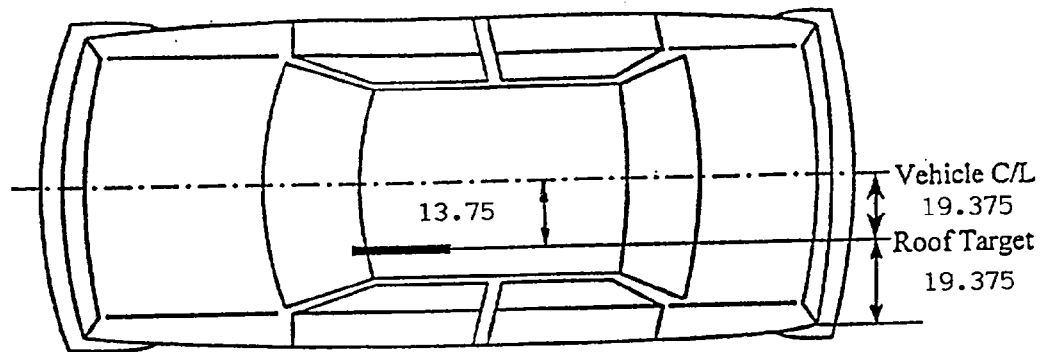


FIGURE 4 CAMERA POSITIONS

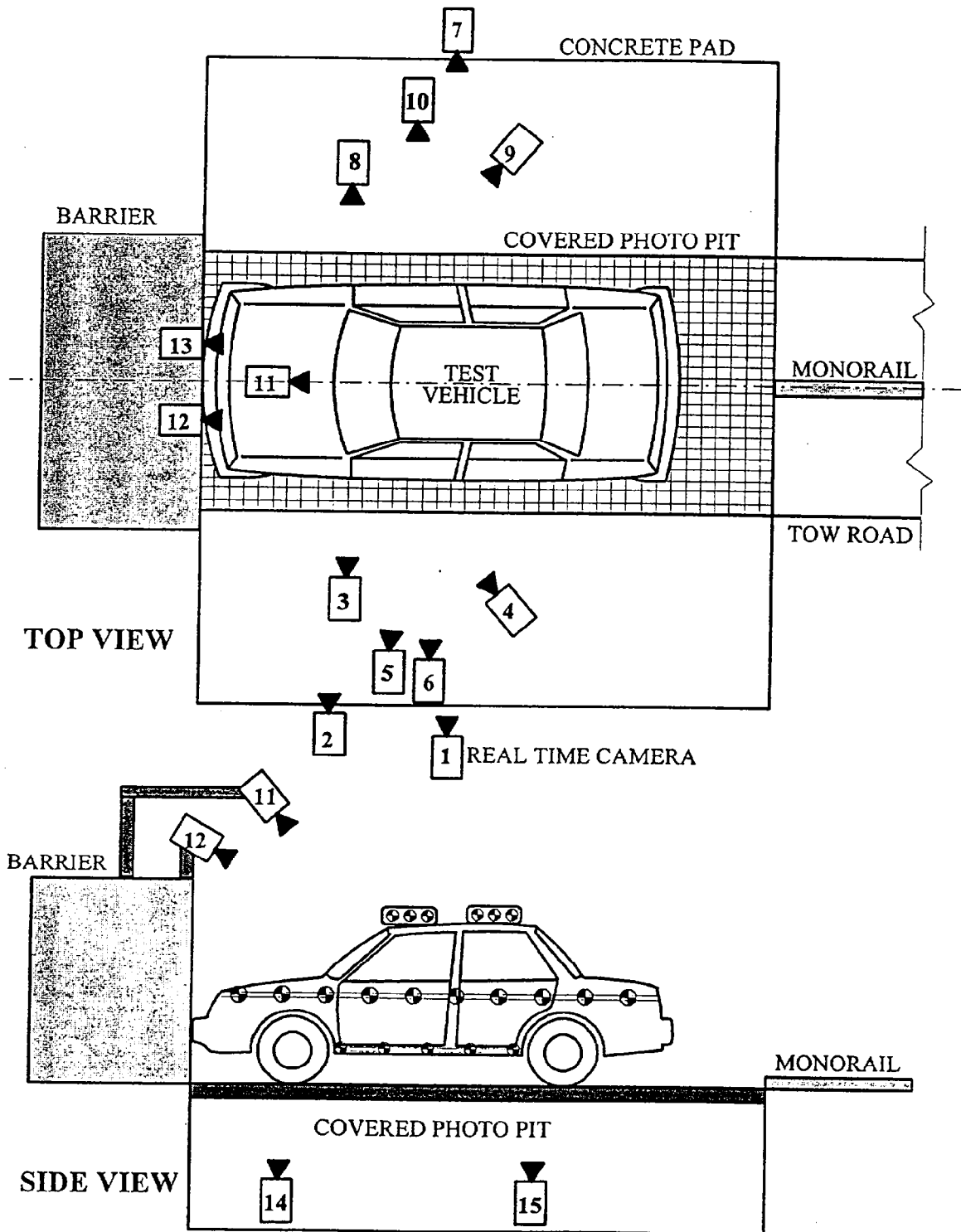


TABLE 19 CAMERA LOCATIONS

Veh. Year/Make/Model/Body Style: 1995/Ford/Contour/4 Door

Vehicle NHTSA No.: CS0206 ; Test Date: 12/16/94

	VIEW	CAMERA POSITIONS (inches)*			ANGLE (deg)	FILM PLANE TO HEAD TARGET	LENS (mm)	SPEED (fps)
		X	Y	Z				
1	Real-Time Left Side View				90°		10	24
2	Left Front	970	7830	1110	90°	7410	25	1031
3	Left Close-Up Driver	1400	6550	1560	90°	6130	50	926
4	Left Angle	4270	4930	1960	50°		35	1111
5	Left Steering Column Top	1820	7000	1560	90°	6580	25	966
6	Left Steering Column Bottom	1820	7000	1030	90°	6580	25	971
7	Right Overall	2240	-7470	1050	90°	7050	13	1111
8	Right Close-up Passenger	1370	-6480	1090	90°	6060	50	913
9	Right Angle	4230	-5270	2110	50°		35	943
10	Right Passenger	1620	-6220	1120	90°	5800	25	1015
11	Top Overall	350	0	4375			13	1220
12	Top Driver	-330	380	2410			13	971
13	Top Passenger	-310	-410	2430			13	1117
14	Pit Engine	1200	0	-3135			13	1020
15	Pit Fuel Tank	2440	0	-3115			13	1010

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

** See TEST NOTES on page 2-3 in this report.

APPENDIX A
PHOTOGRAPHS

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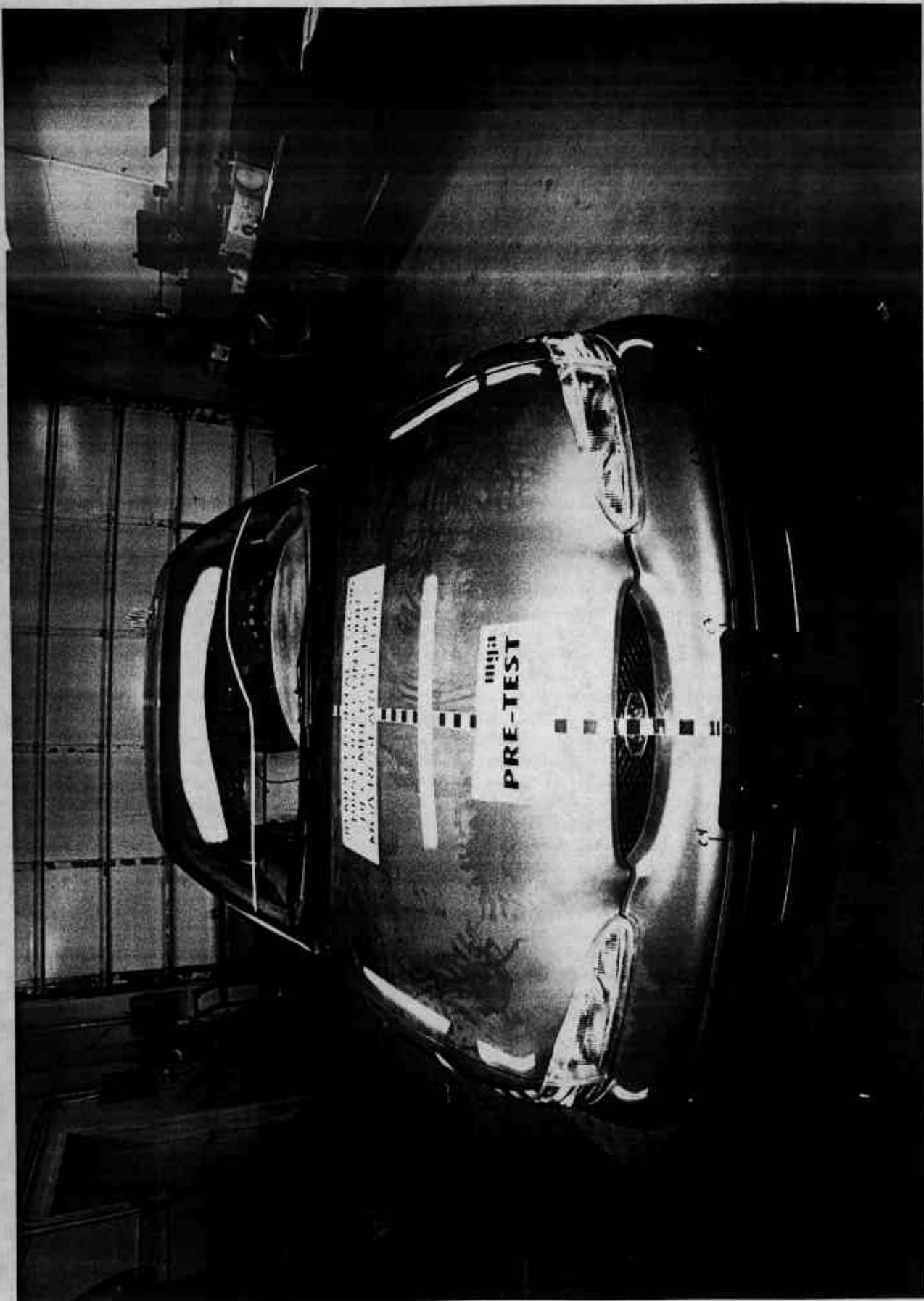


Photo No. A-1 - Pre-Test Front View

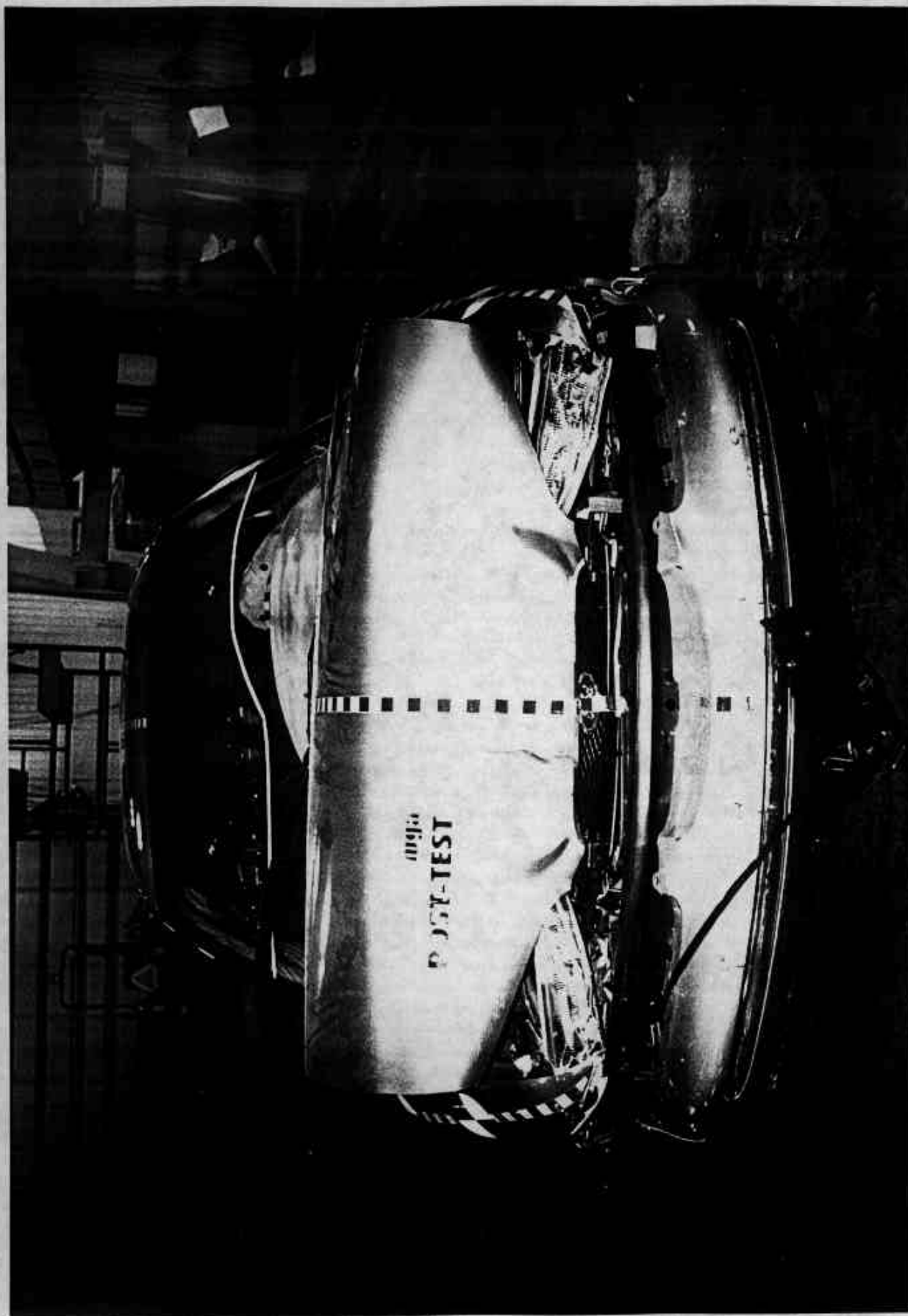


Photo No. A-2 - Post-Test Front View

A-2

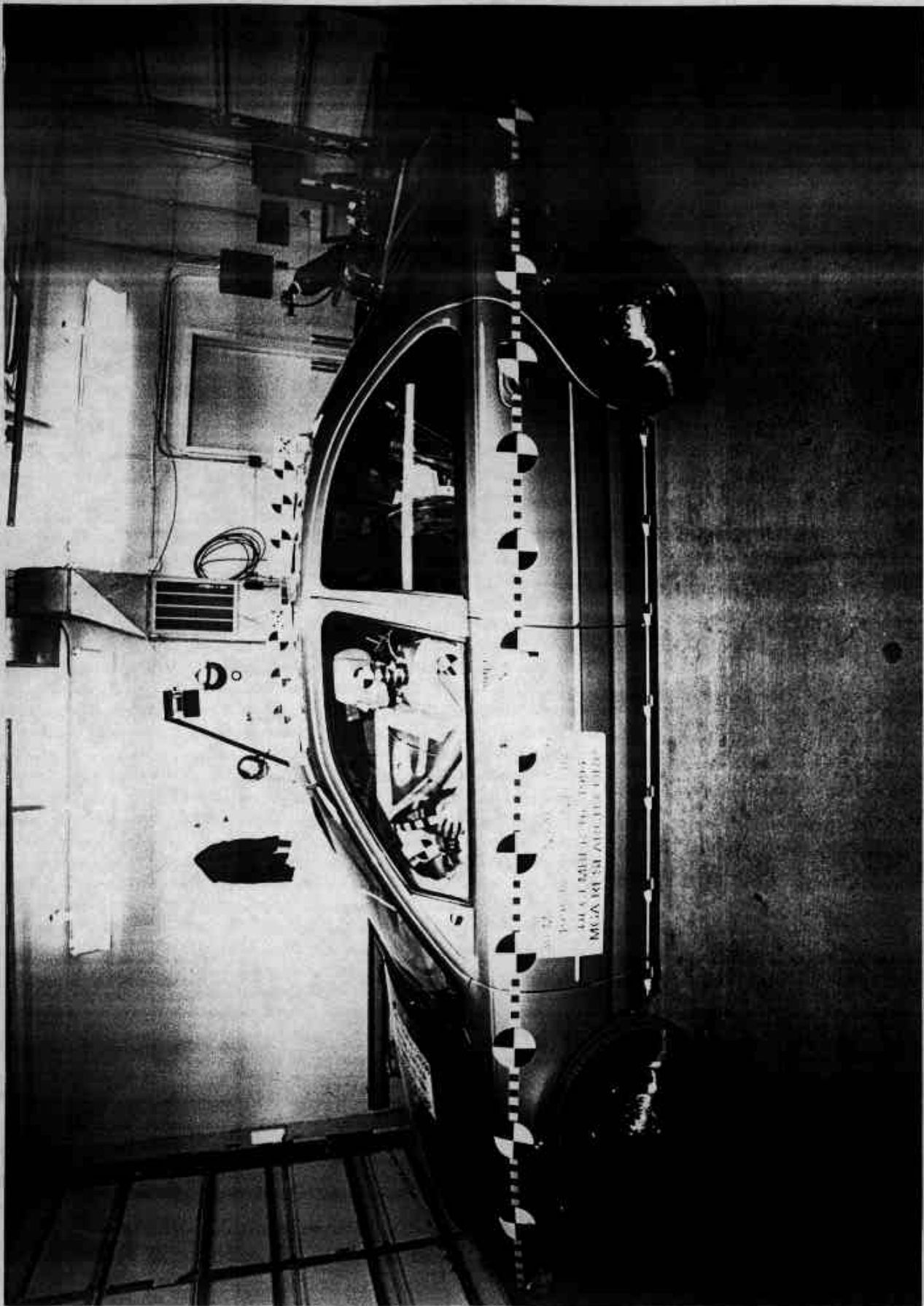
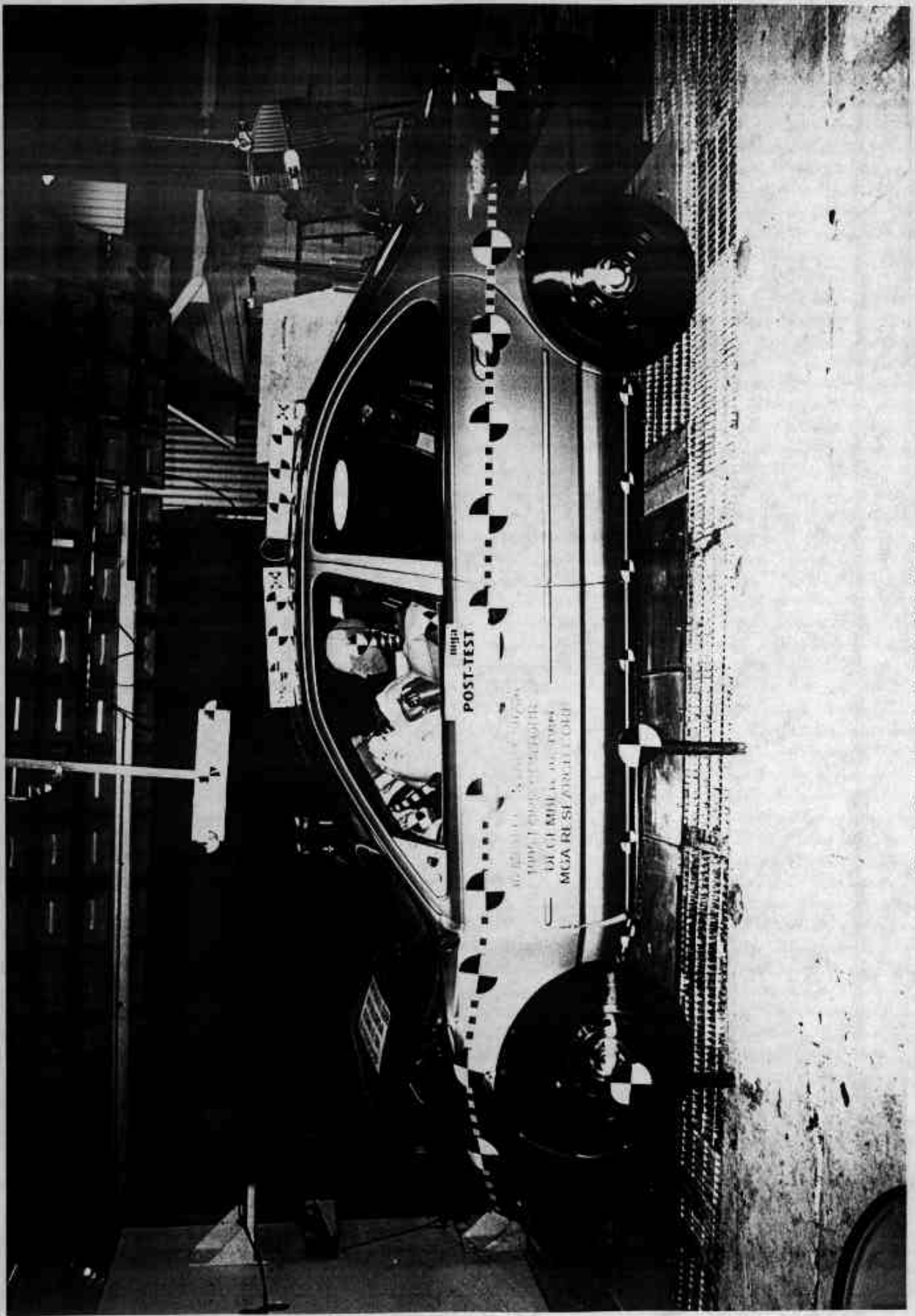


Photo No. A-3 - Pre-Test Left Side View



A-4

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

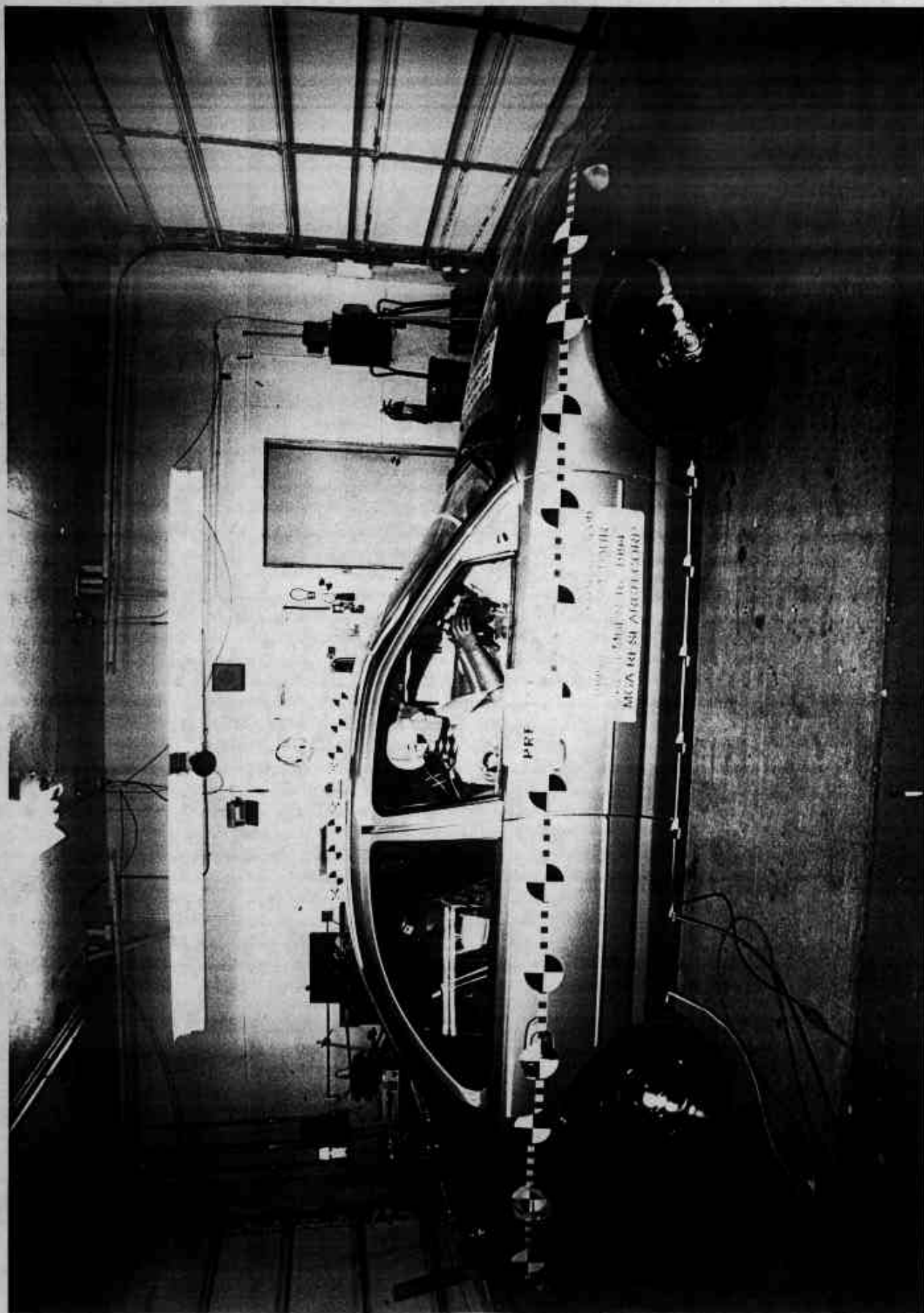
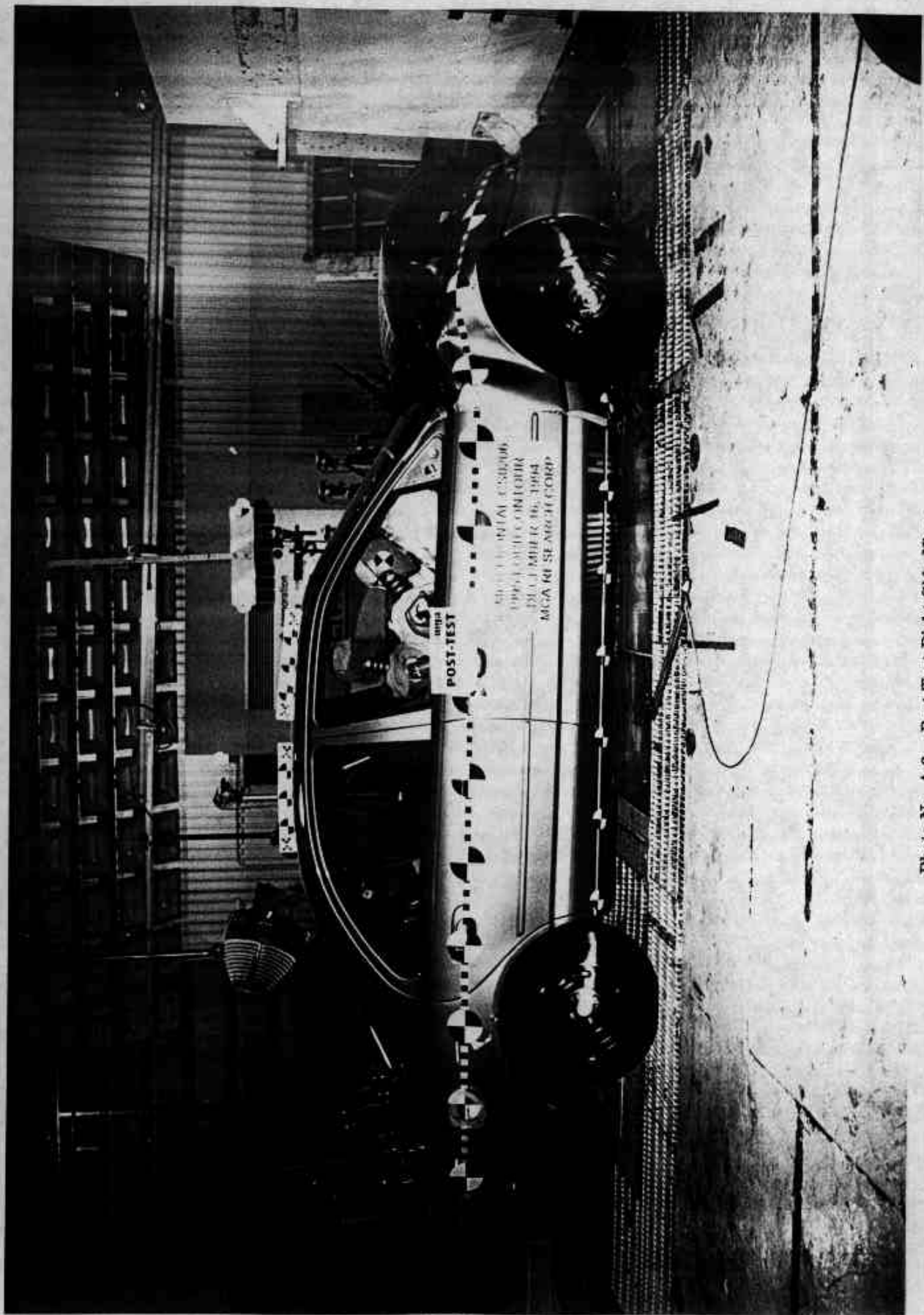


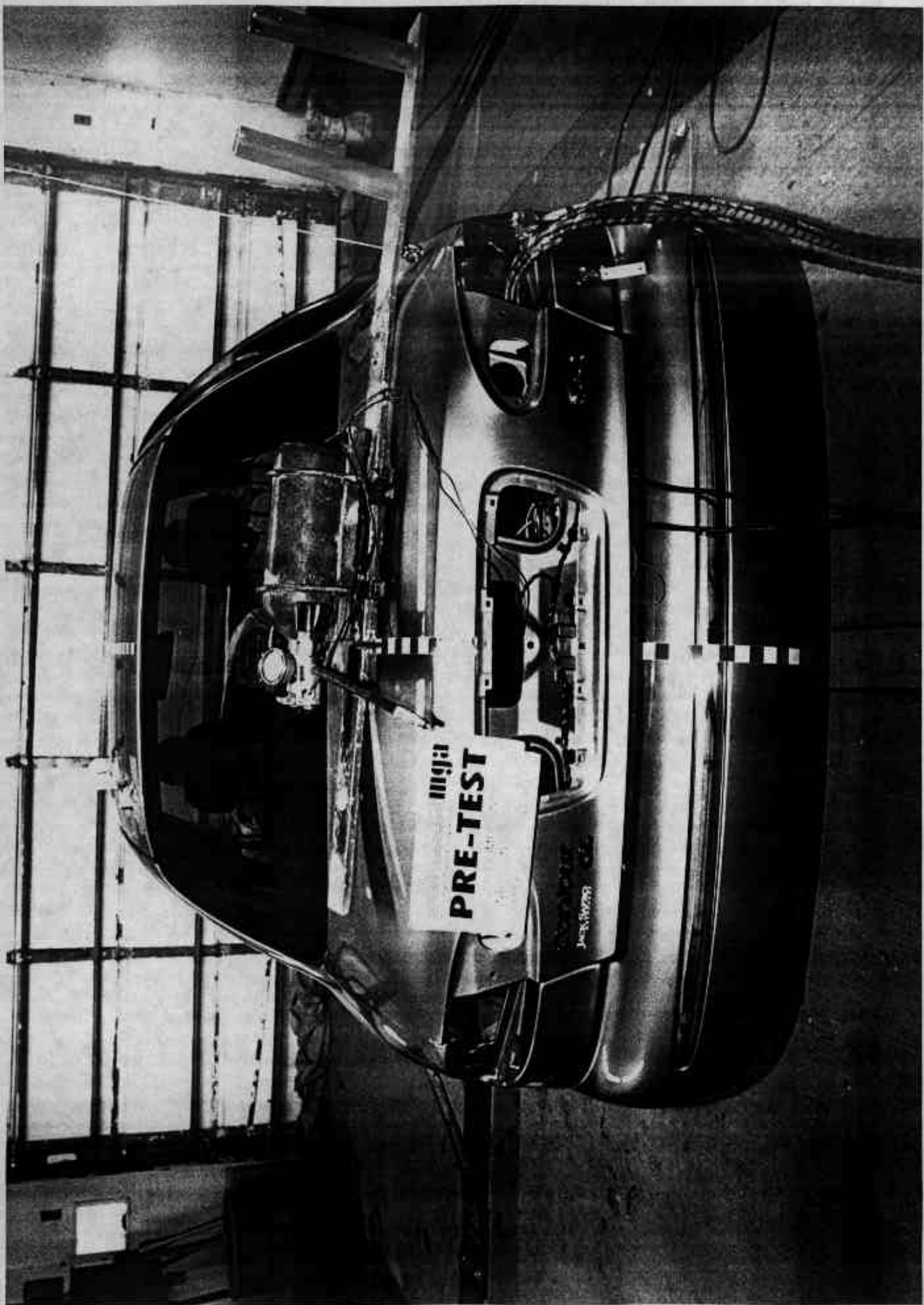
Photo No. A-5 - Pre-Test Right Side View

A-5



A-6

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



A-7

Photo No. A-7 - Pre-Test Rear View

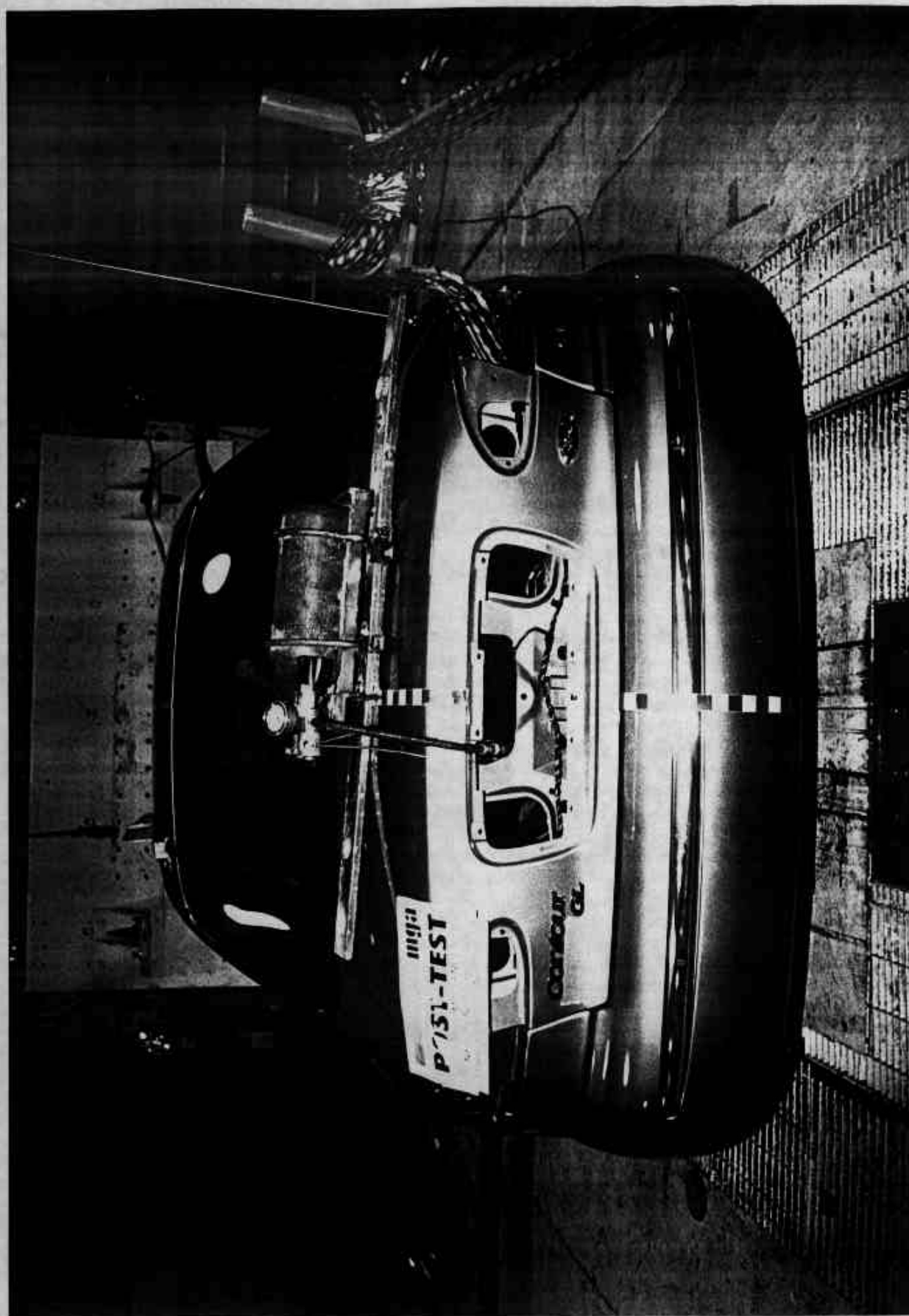


Photo No. A-8 - Post-Test Rear View

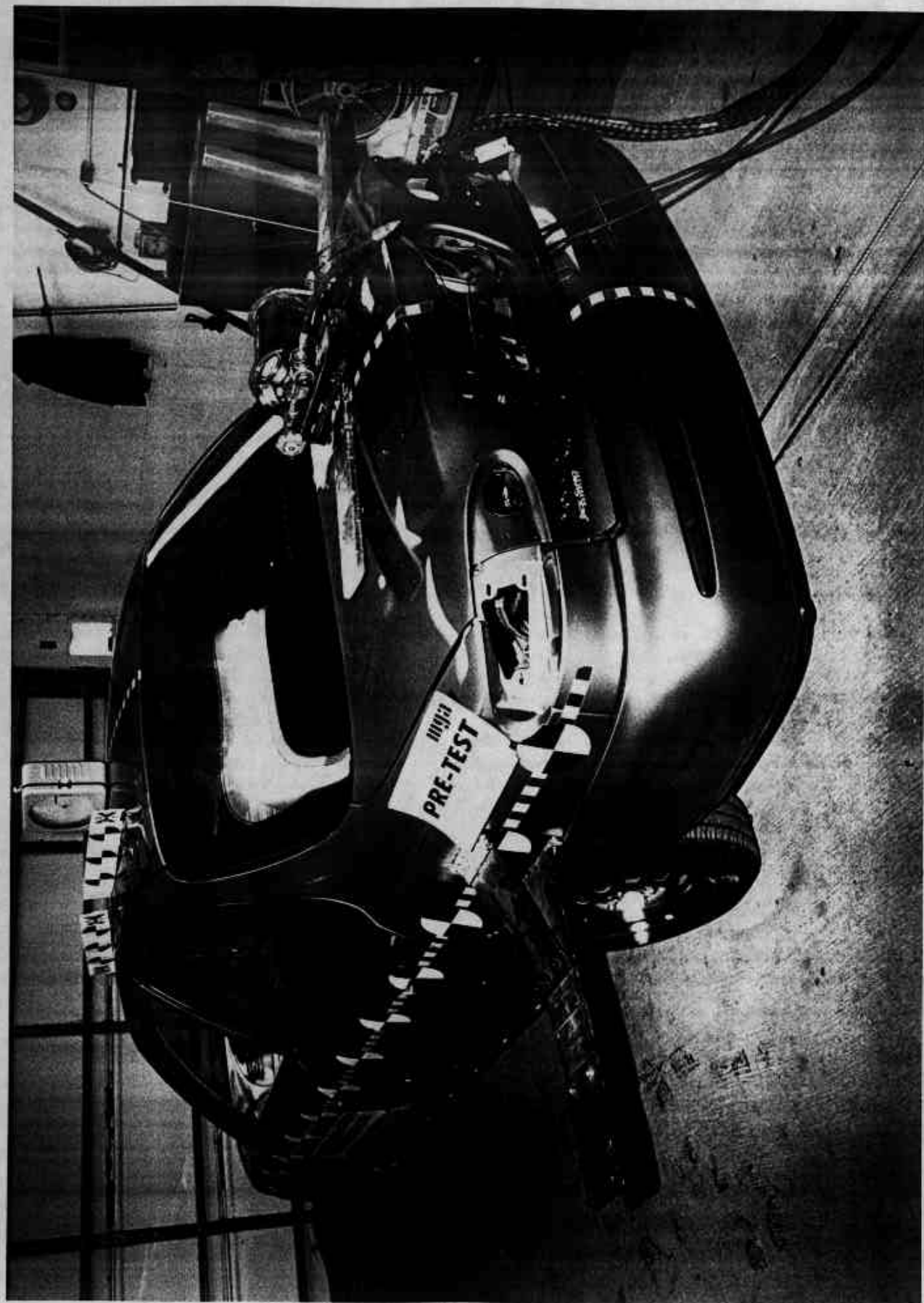


Photo No. A-9 - Pre-Test Left Rear 3/4 View

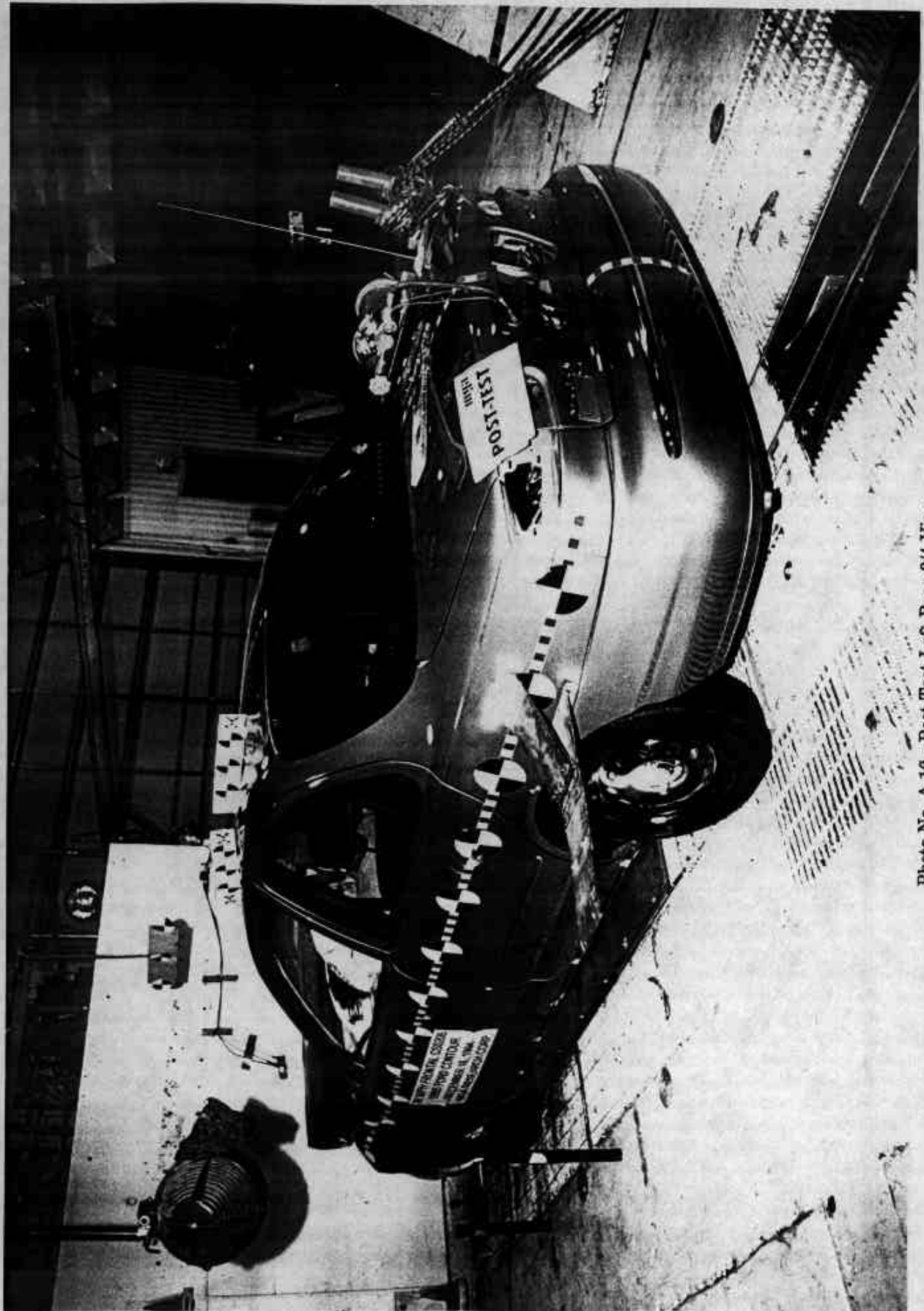


Photo No. A-10 - Post-Test Left Rear 3/4 View

A-10

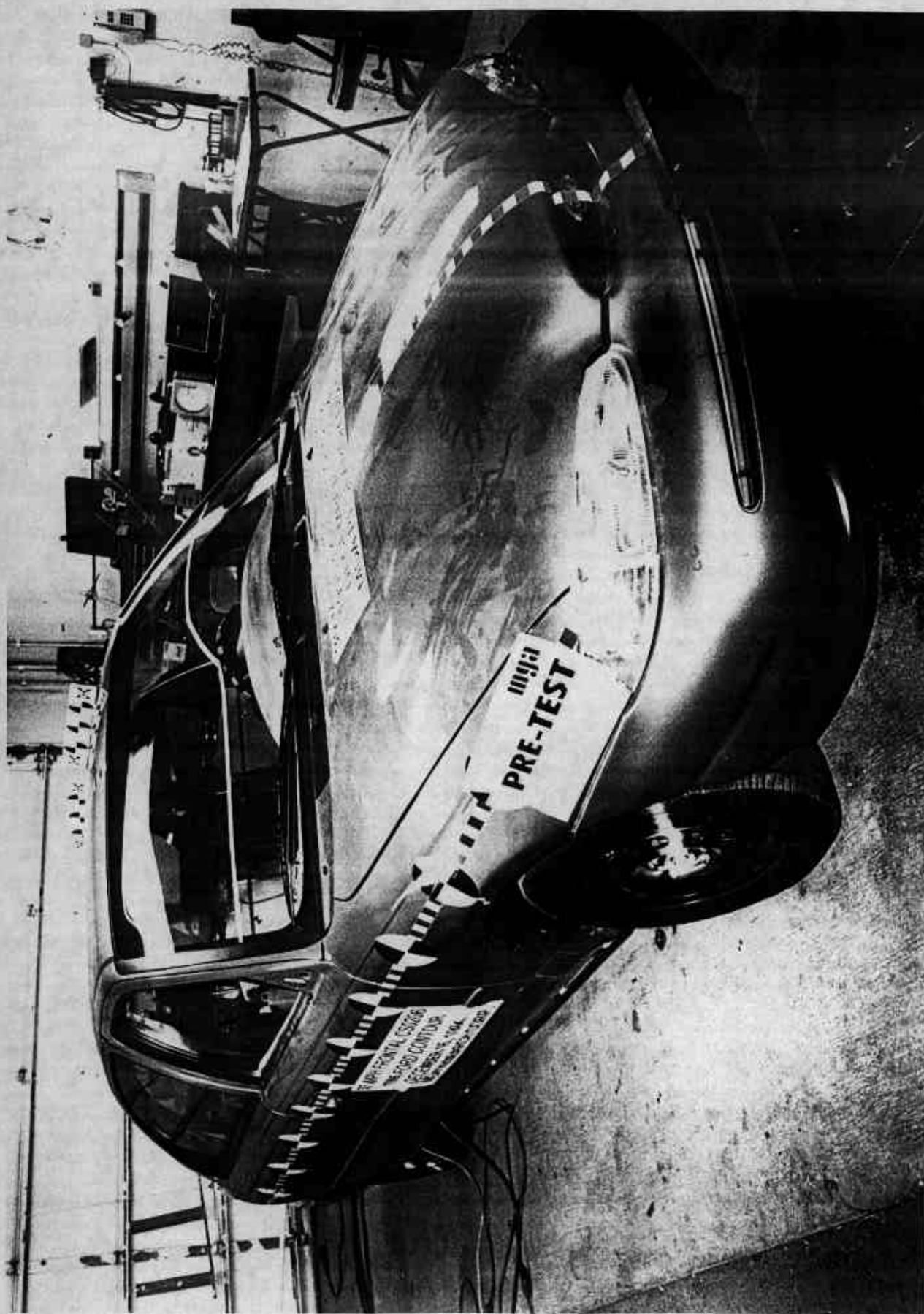


Photo No. A-11 - Pre-Test Right Front 3/4 View

A-11

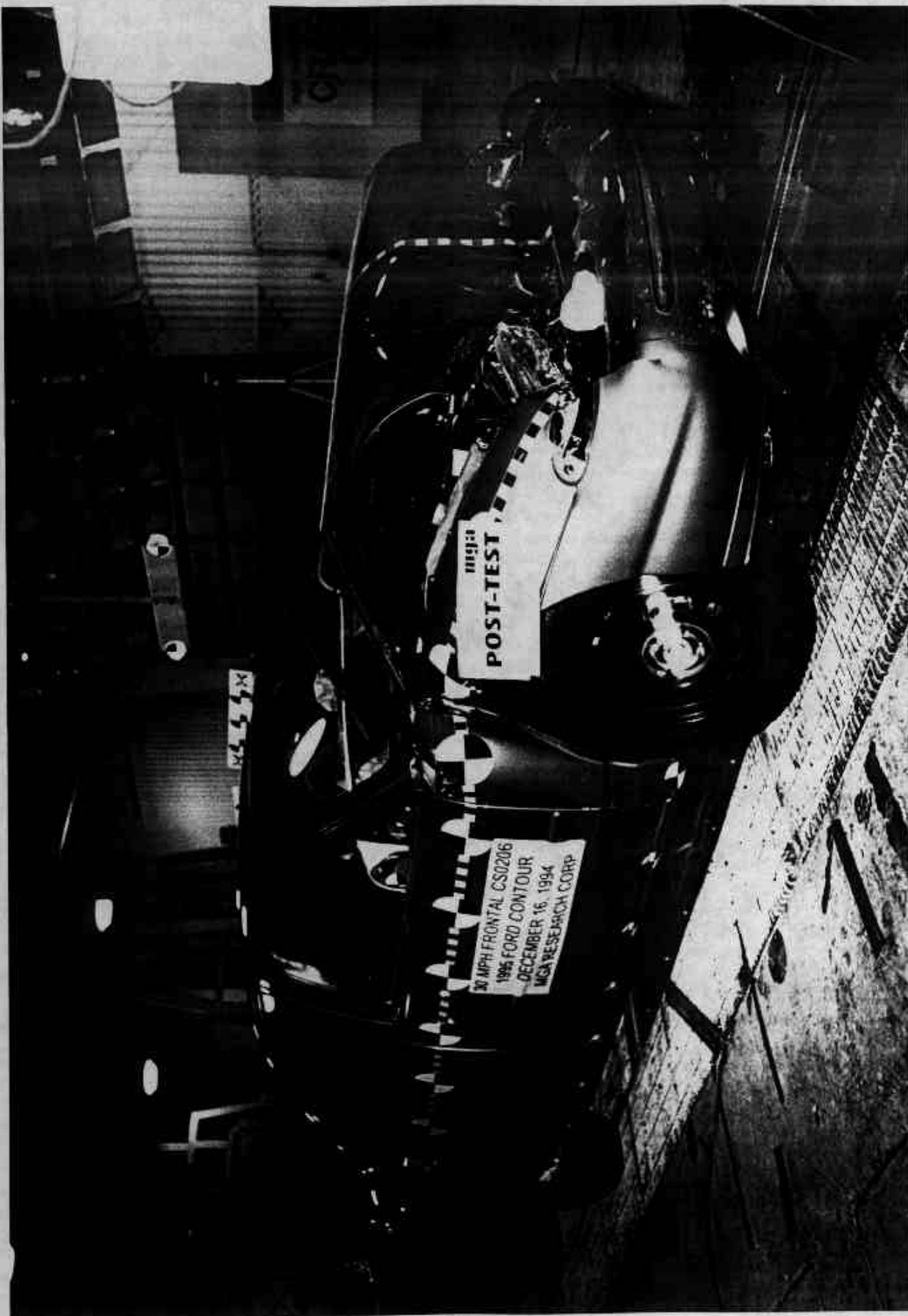
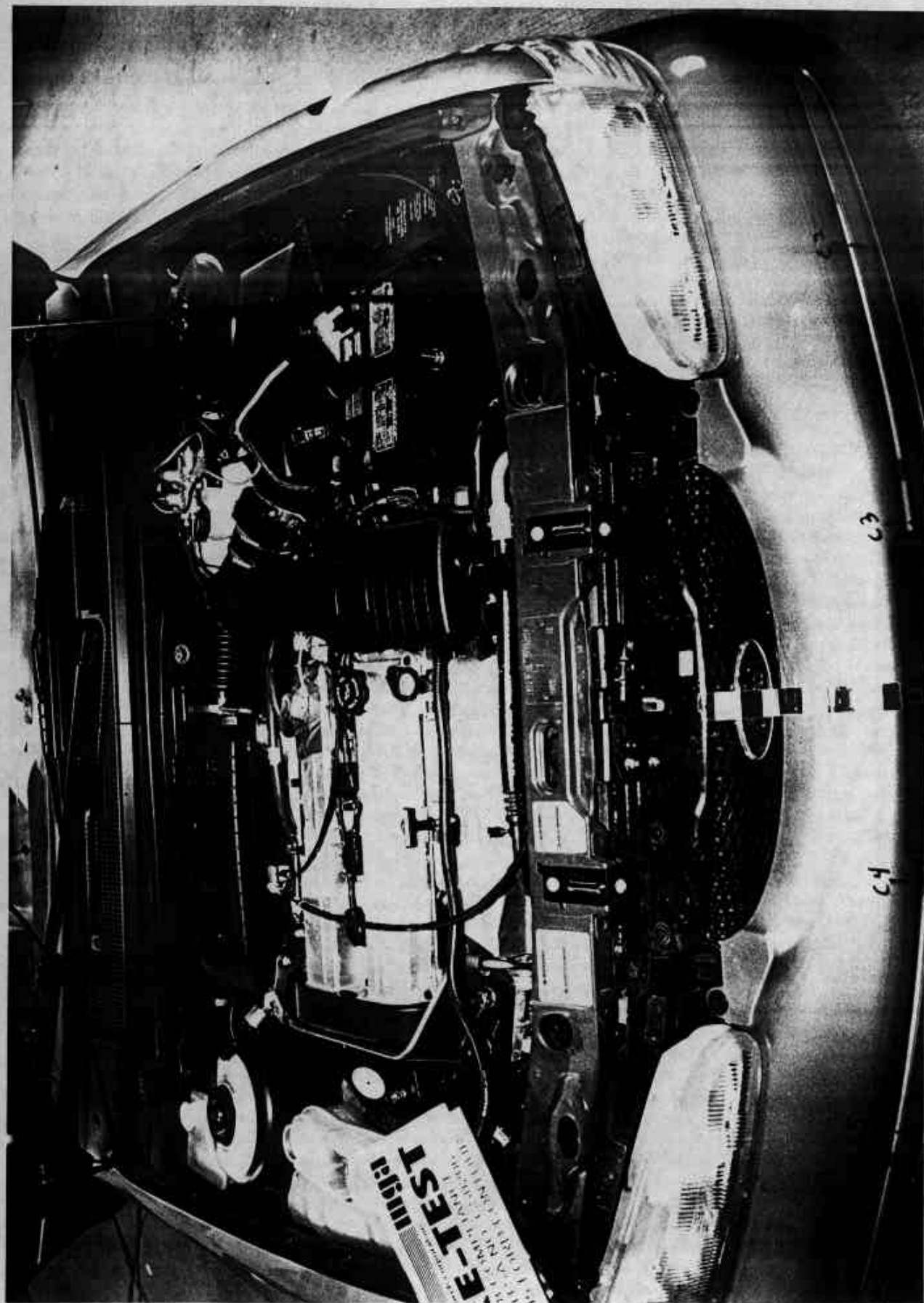


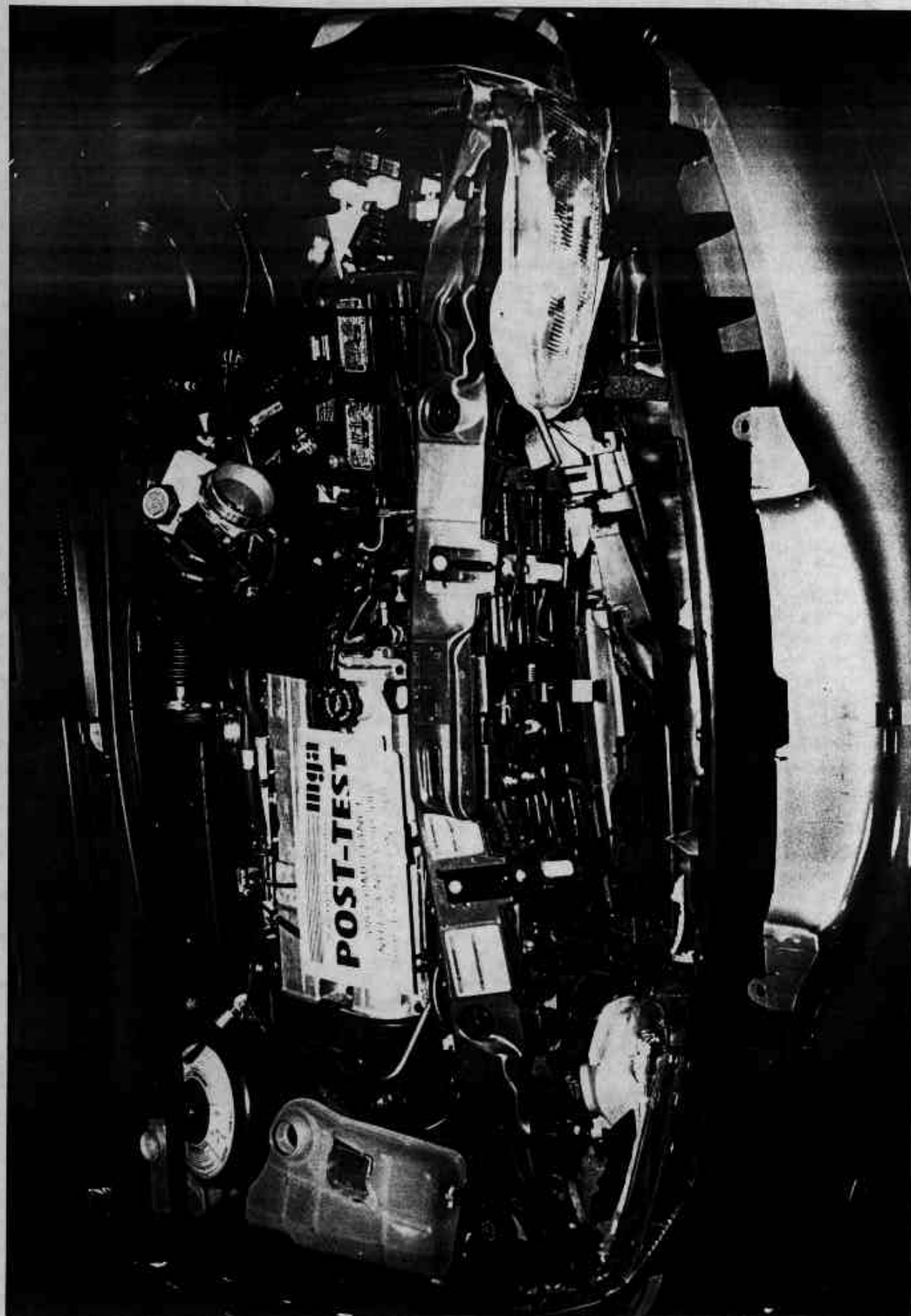
Photo No. A-12 - Post-Test Right Front 3/4 View

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A-13

Photo No. A-13 - Pre-Test Engine Compartment View



A-14

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



A-15

Photo No. A-15 - Pre-Test Fuel Filler Cap View



POST-TEST

A-16

Photo No. A-16 - Post-Test Fuel Filler Cap View

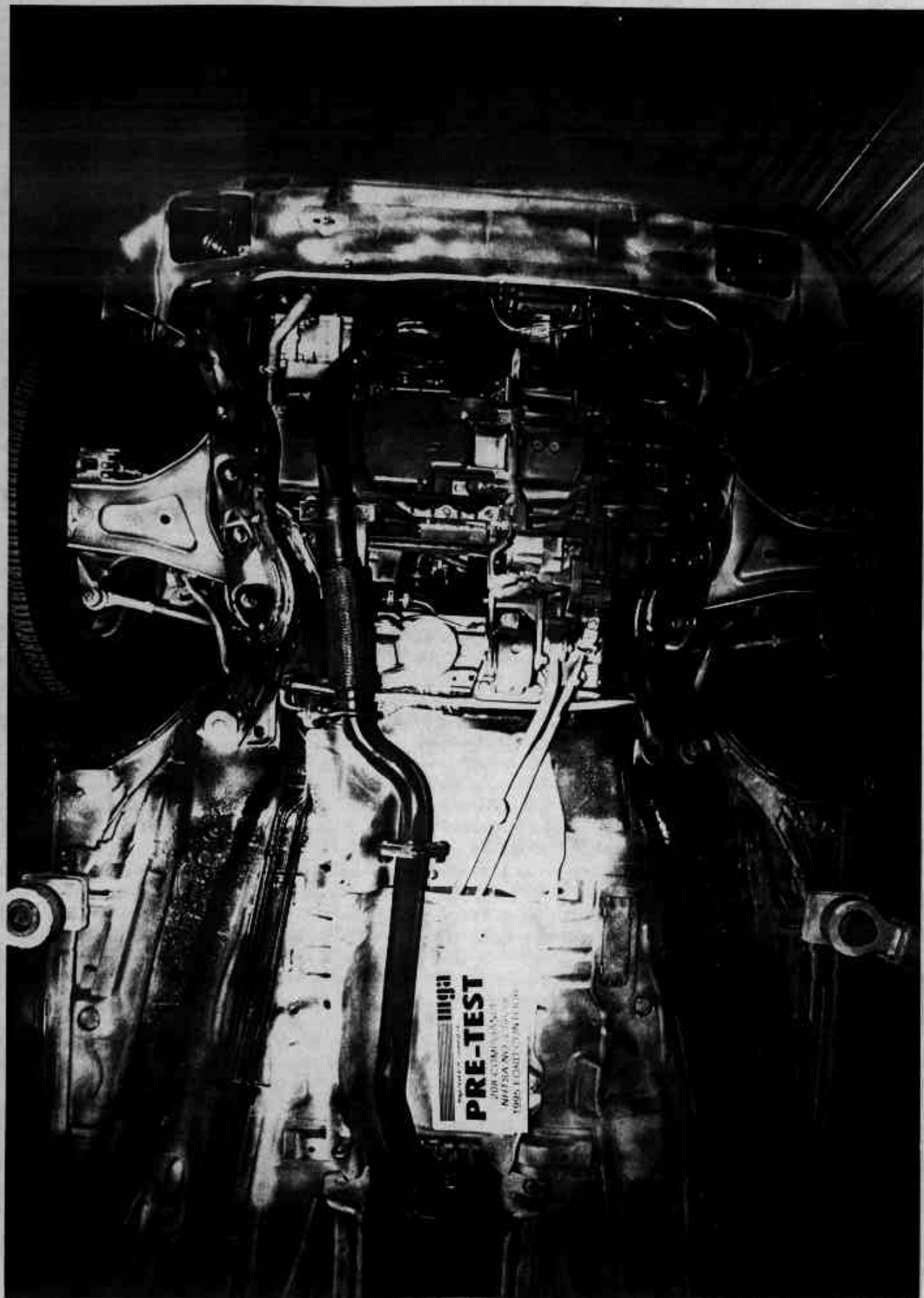


Photo No. A-17 - Pre-Test Front Underbody View

A-17

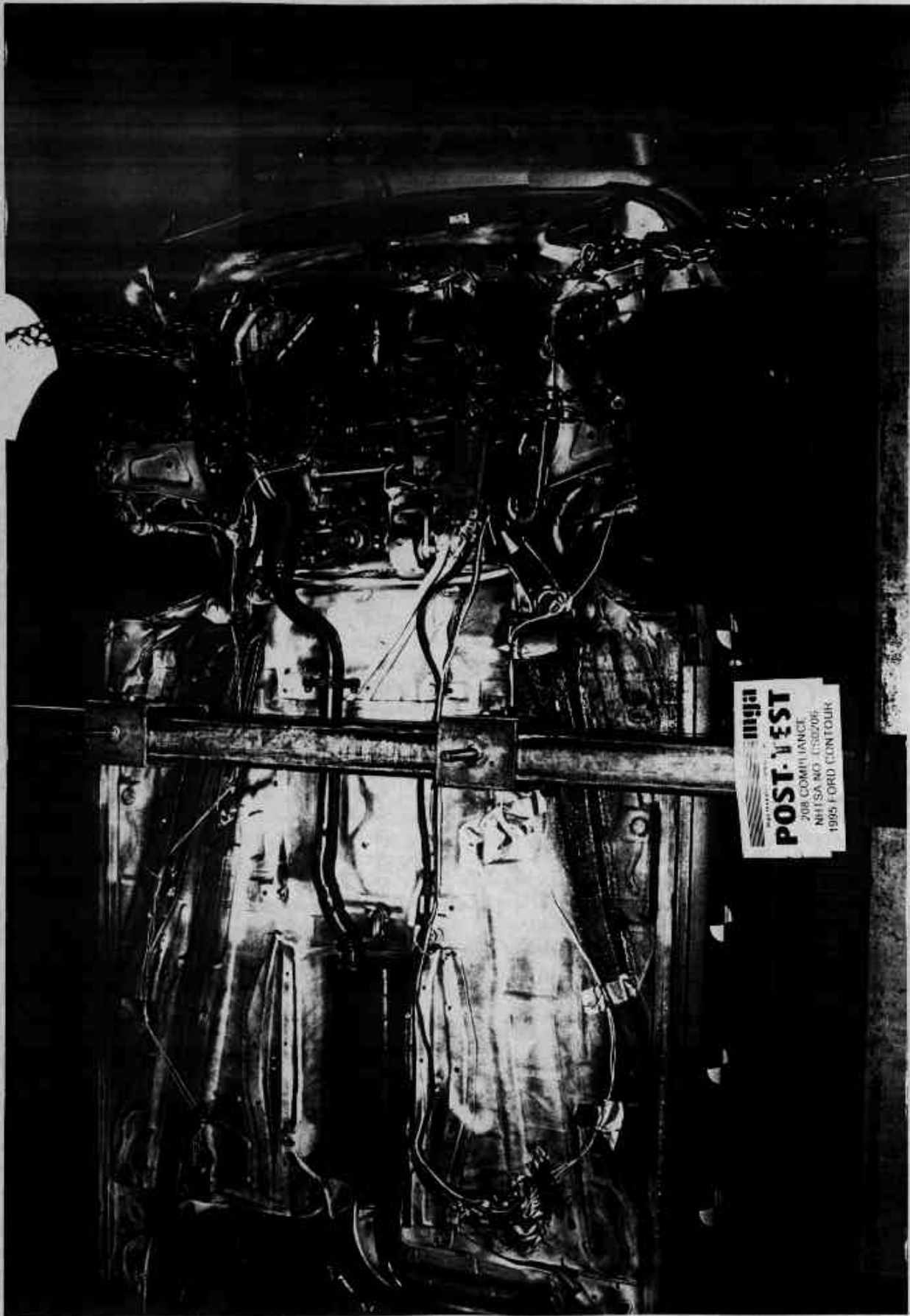


Photo No. A-18 - Post-Test Front Underbody View

A-18



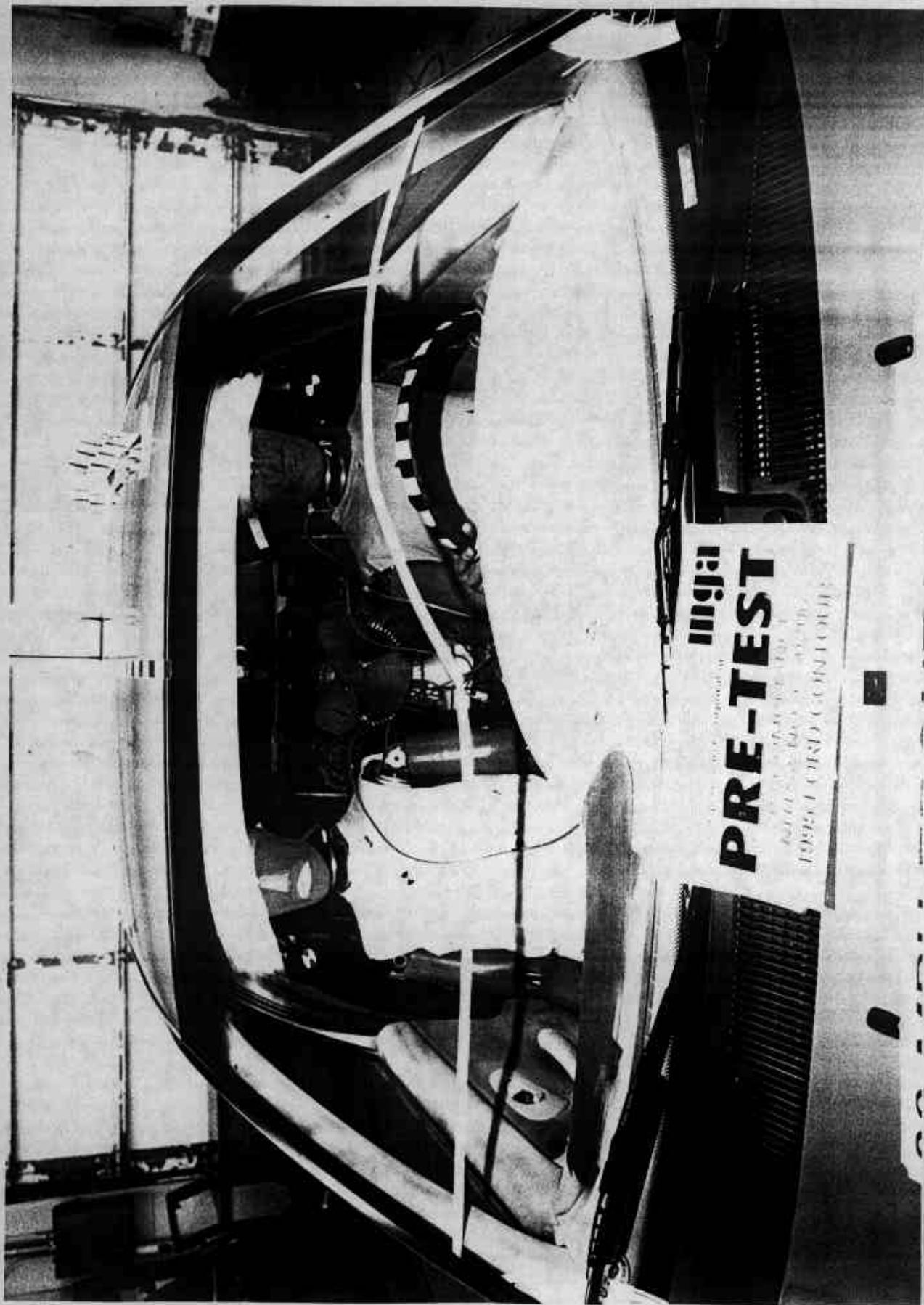
Photo No. A-19 - Pre-Test Rear Underbody View

A-19



Photo No. A-20 - Post-Test Rear Underbody View

A-20



A-21

Photo No. A-21 - Pre-Test Front Windshield View

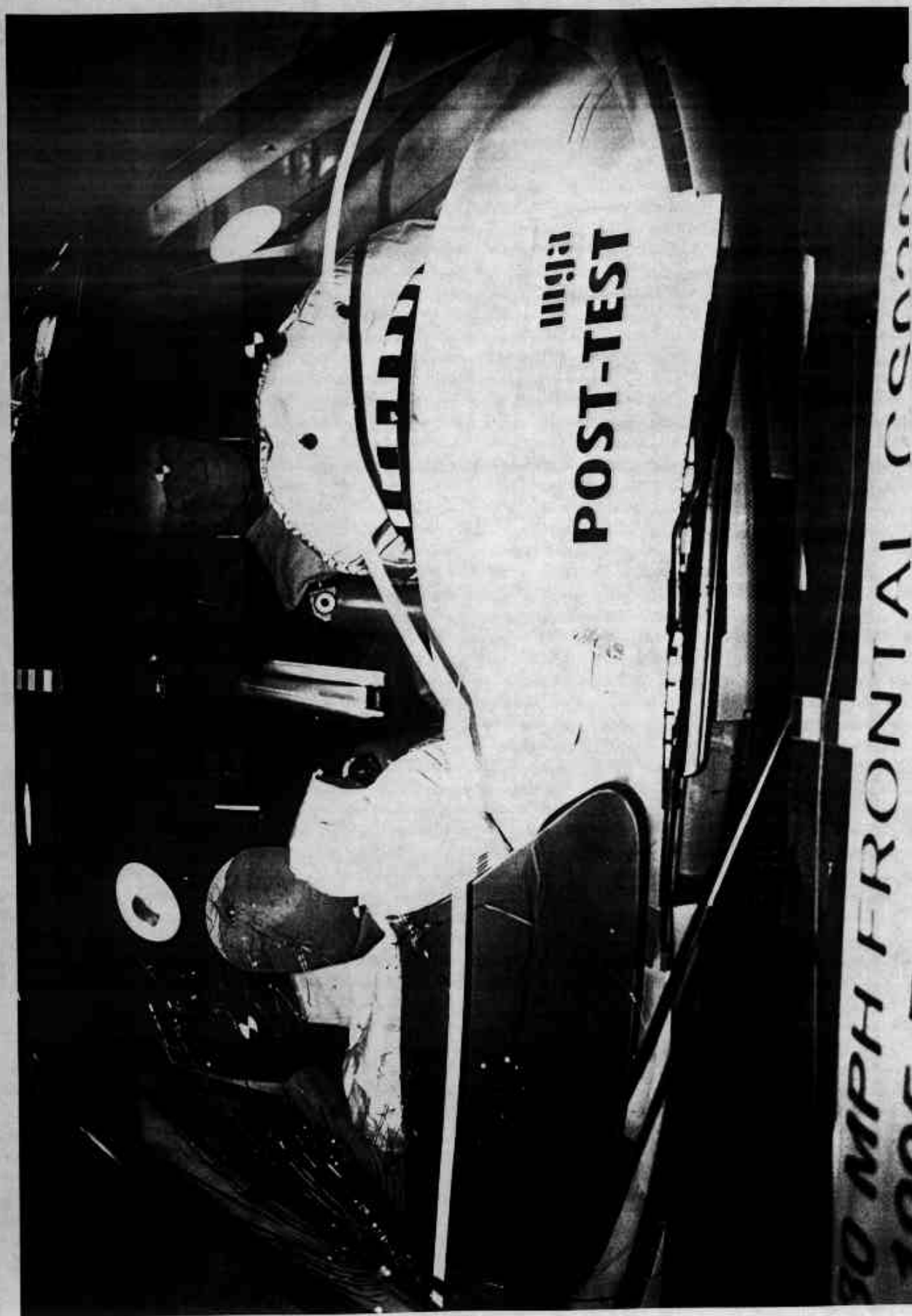


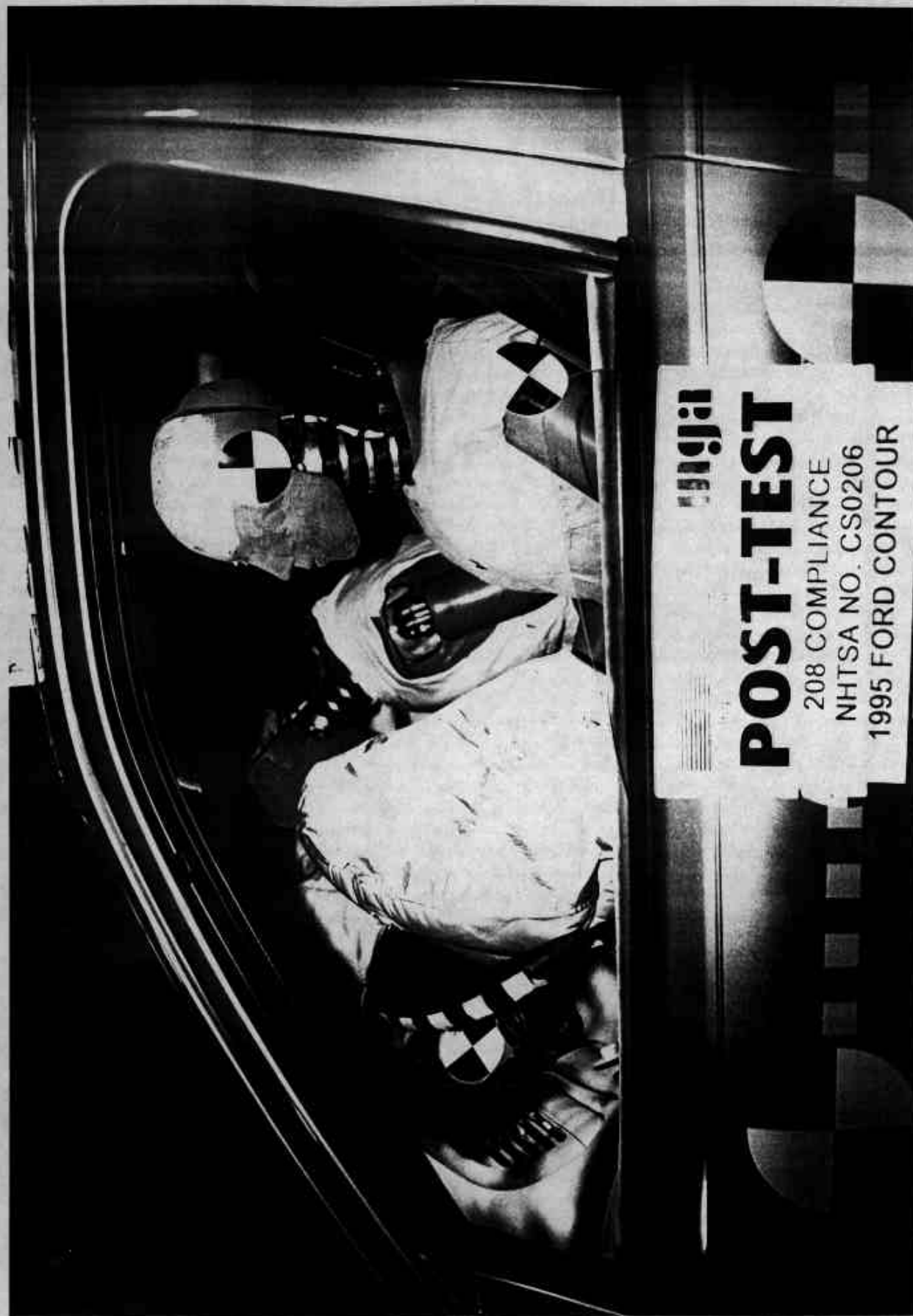
Photo No. A-22 - Post-Test Front Windshield View

A-22



A-23

Photo No. A-23 - Pre-Test Driver Dummy Position View



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208 COMPLIANCE

NHTSA NO. CS0206

1995 FORD CONTOUR

Photo No. A-24 - Post-Test Driver Dummy Position View

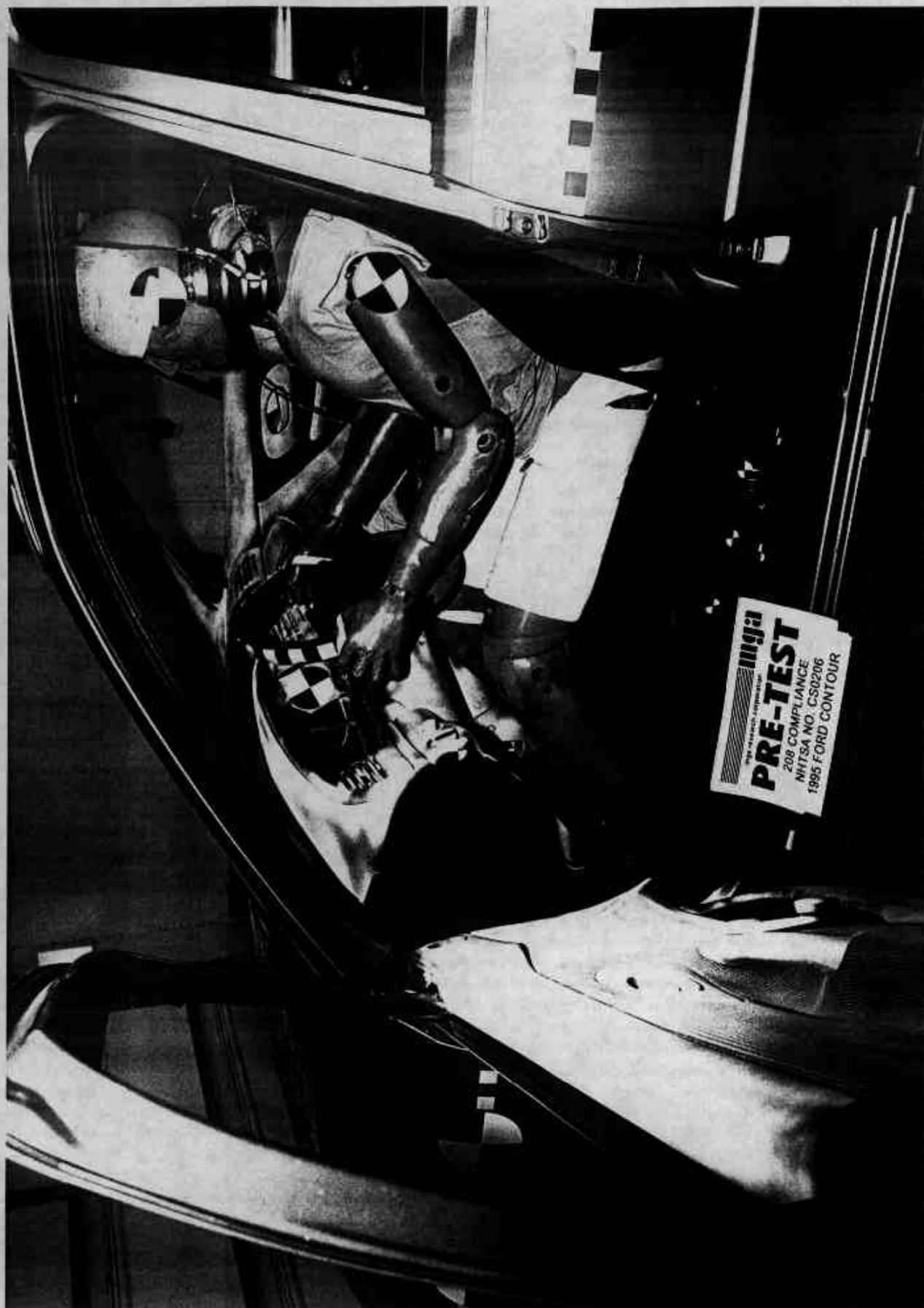


Photo No. A-25 - Pre-Test Driver Dummy Position View (Door Open)

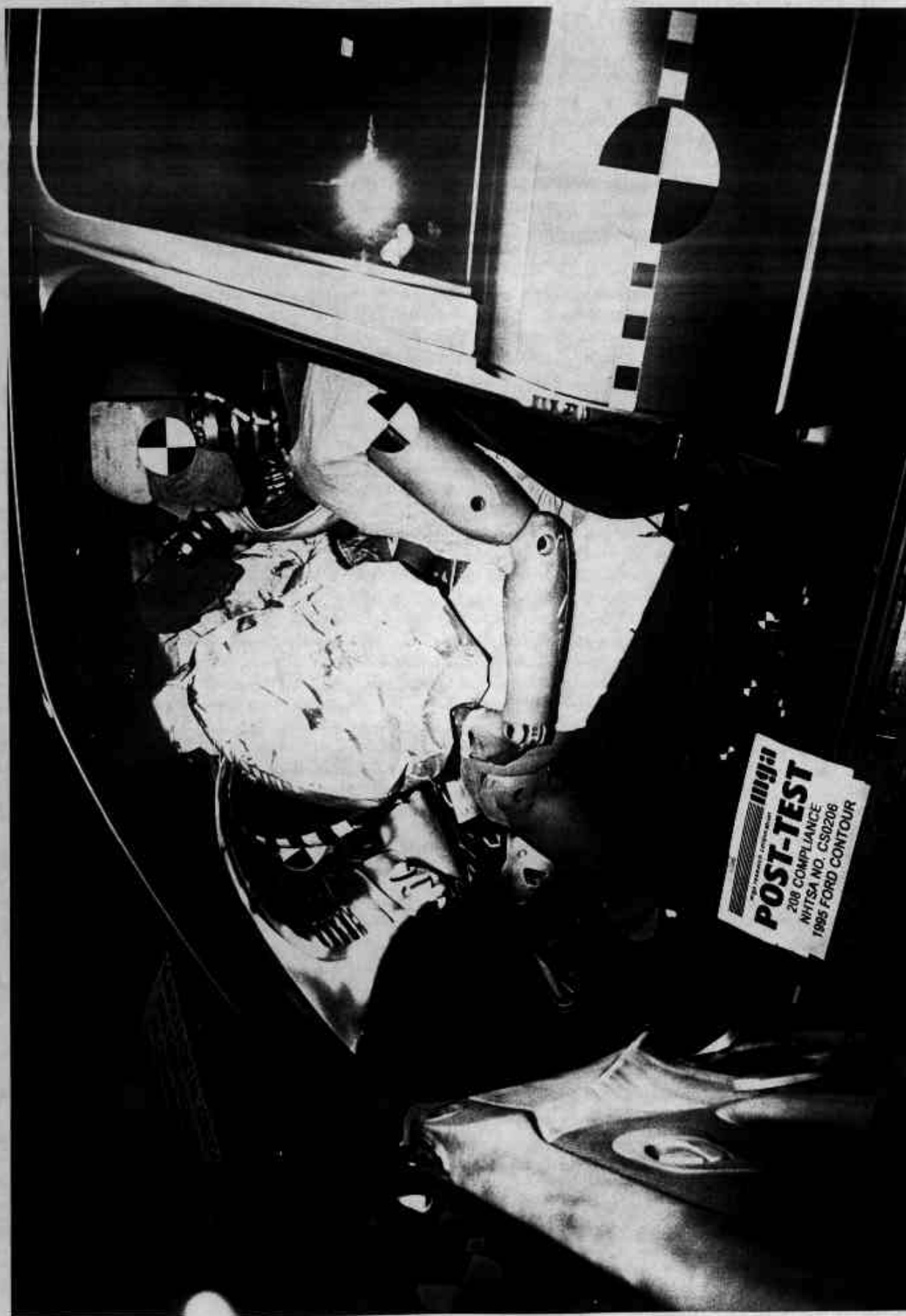


Photo No. A-26 - Post-Test Driver Dummy Position View (Door Open)



A-27

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

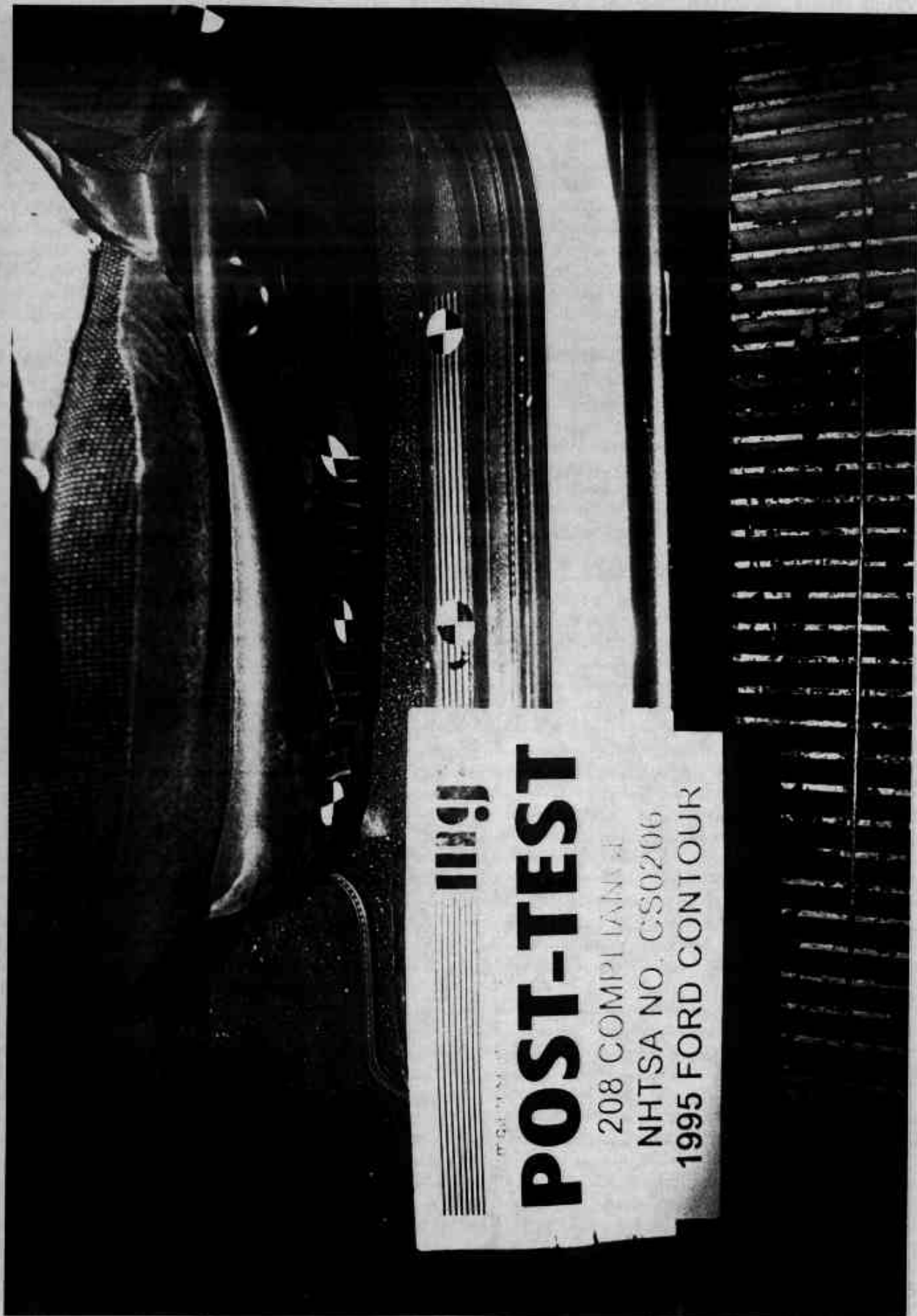


Photo No. A-28 - Post-Test Driver Seat Position View

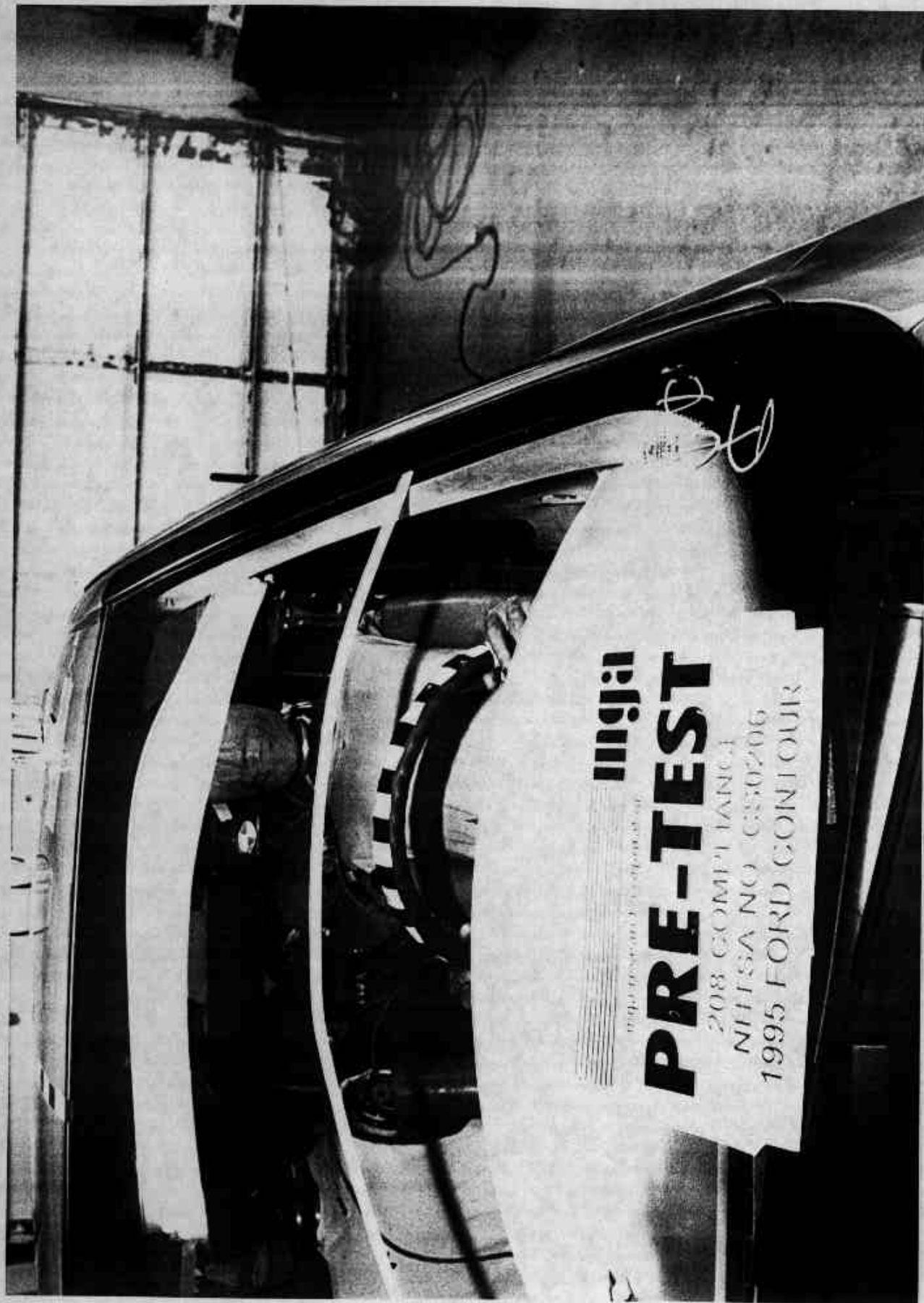
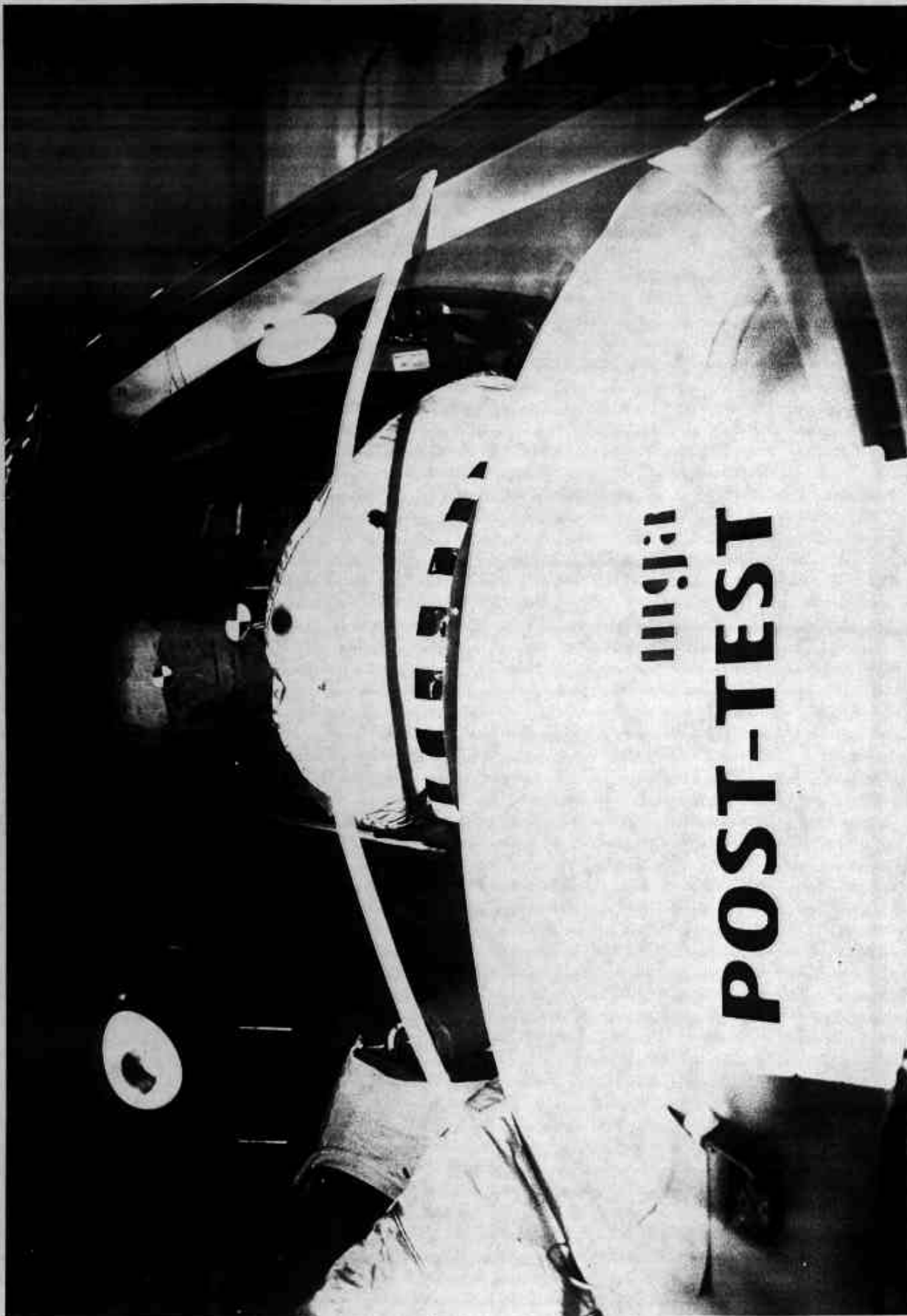


Photo No. A-29 - Pre-Test Driver Windshield View



POST-TEST

A-30

Photo No. A-30 - Post-Test Driver Windshield View

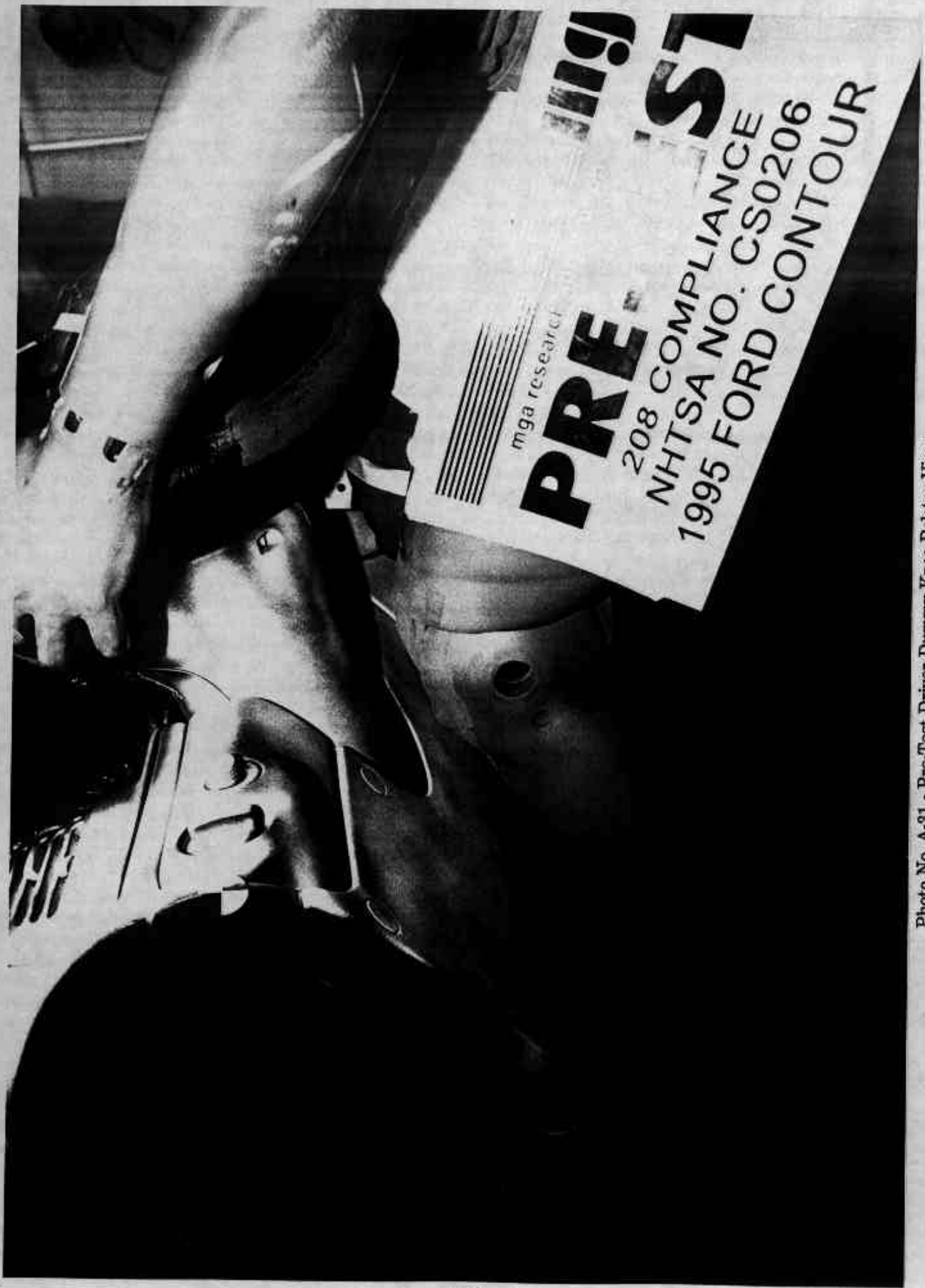


Photo No. A-31 - Pre-Test Driver Dummy Knee Bolster View

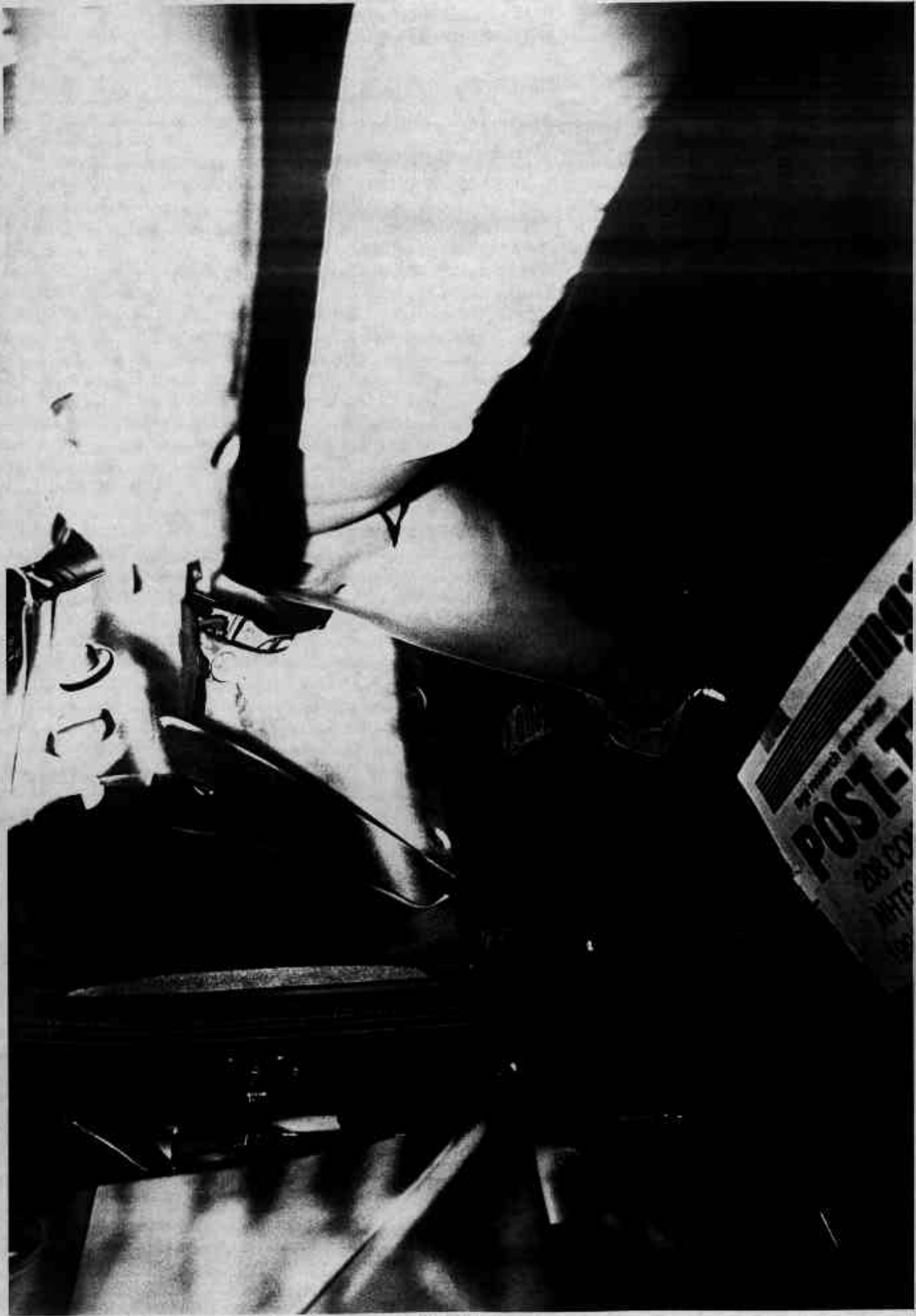


Photo No. A-32 - Post-Test Driver Dummy Knee Bolster View

A-32



Photo No. A-33 - Post-Test Driver Head Contact View (Airbag)



Photo No. A-34 - Post-Test Driver Head Contact View



A-35

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

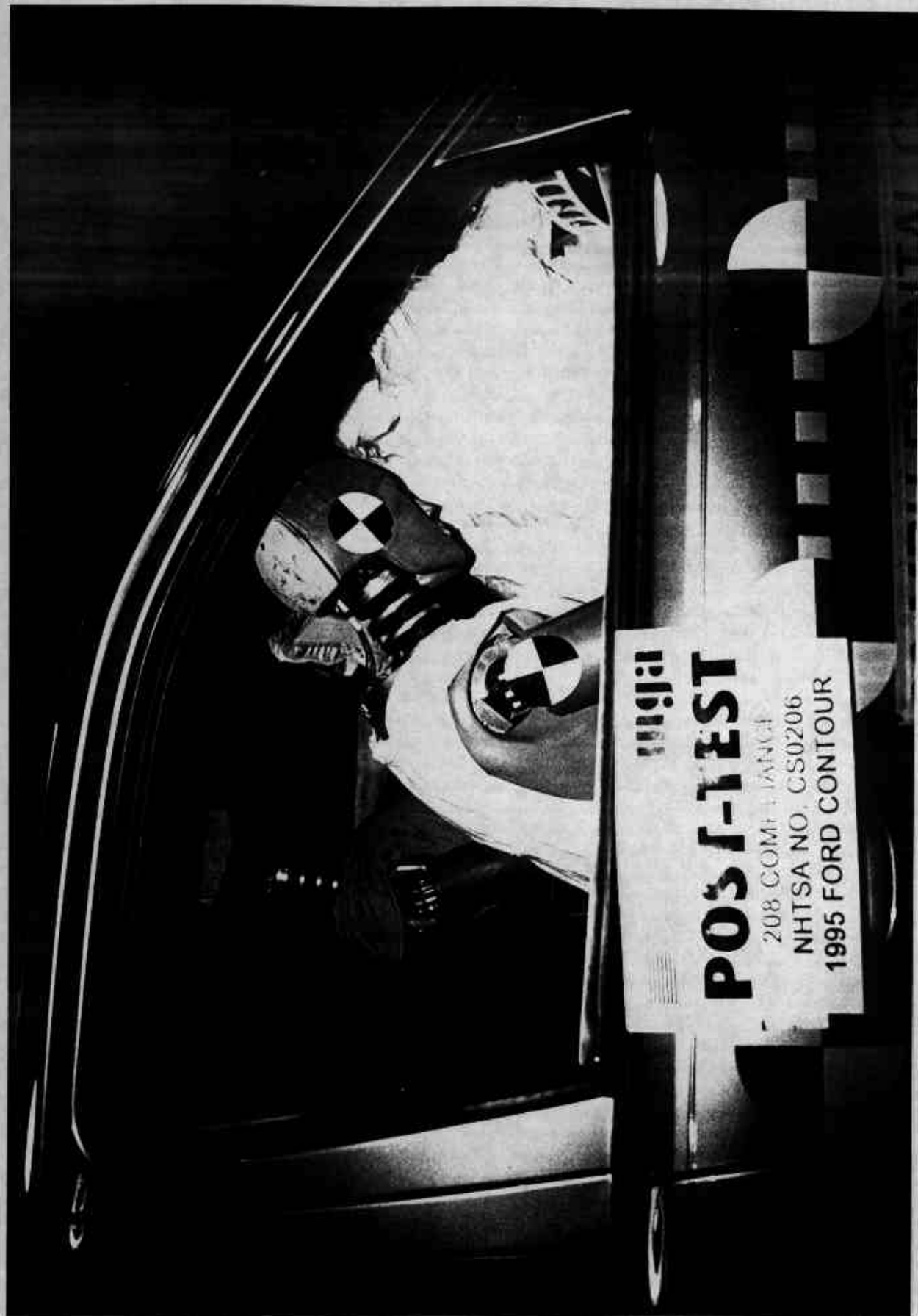


Photo No. A-36 - Post-Test Passenger Dummy Position View



Photo No. A-37 - Pre-Test Passenger Dummy Position View (Door Open)

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Photo No. A-38 - Post-Test Passenger Dummy Position View (Door Open)



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Photo No. A-39 - Pre-Test Passenger Seat Position View



Photo No. A-40 - Post-Test Passenger Seat Position View



Photo No. A-41 - Pre-Test Passenger Windshield View

A-41



POST-TEST

Photo No. A-42 - Post-Test Passenger Windshield View

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A-43

Photo No. A-43 - Pre-Test Passenger Dummy Knee Bolster View



Photo No. A-44 - Post-Test Passenger Dummy Knee Bolster View



Photo No. A-45 - Post-Test Passenger Head Contact View (Airbag)

A-45

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1995
DEC
MGA

mga

mga corporation

POST TEST

208 COMPLIANCE

NHTSA NO. CS0206

1995 FORD CONTOUR

Photo No. A-46 • Post-Test Passenger Knee Contact View

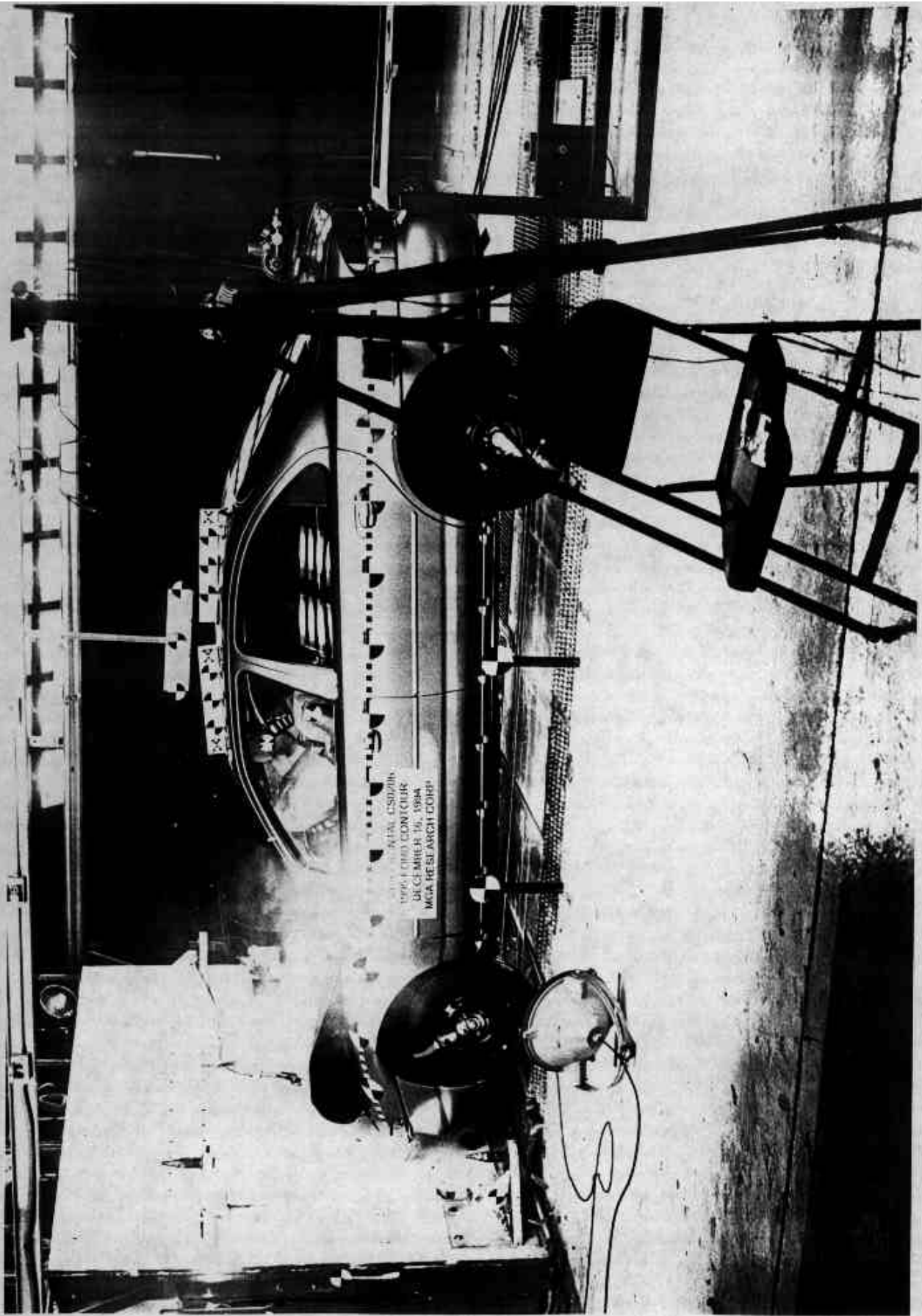


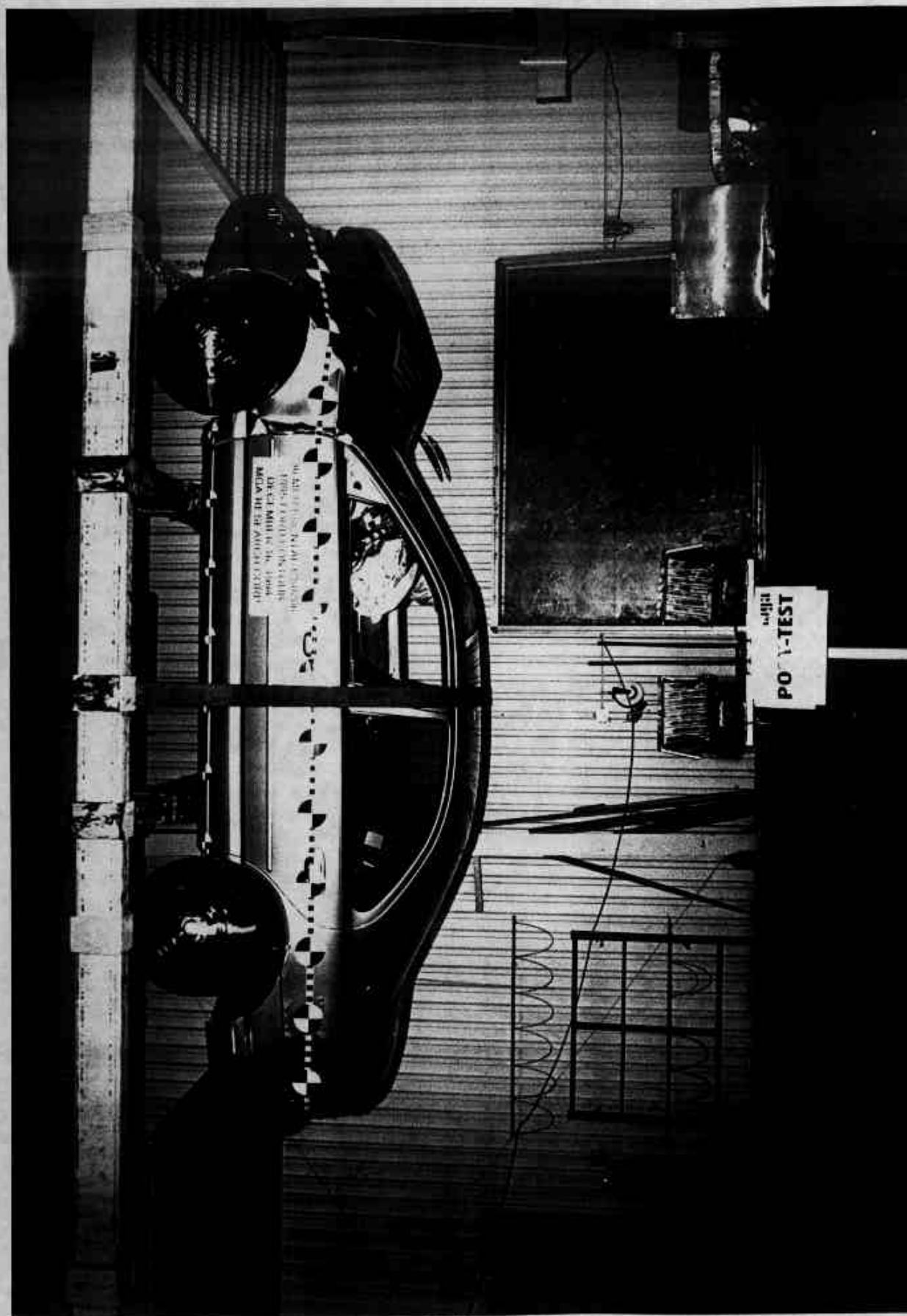
Photo No. A-47 - Vehicle Impact

A-47



A-48

Photo No. A-48 - Vehicle Rollover - 90°



A-49

Photo No. A-49 - Vehicle Rollover - 180°

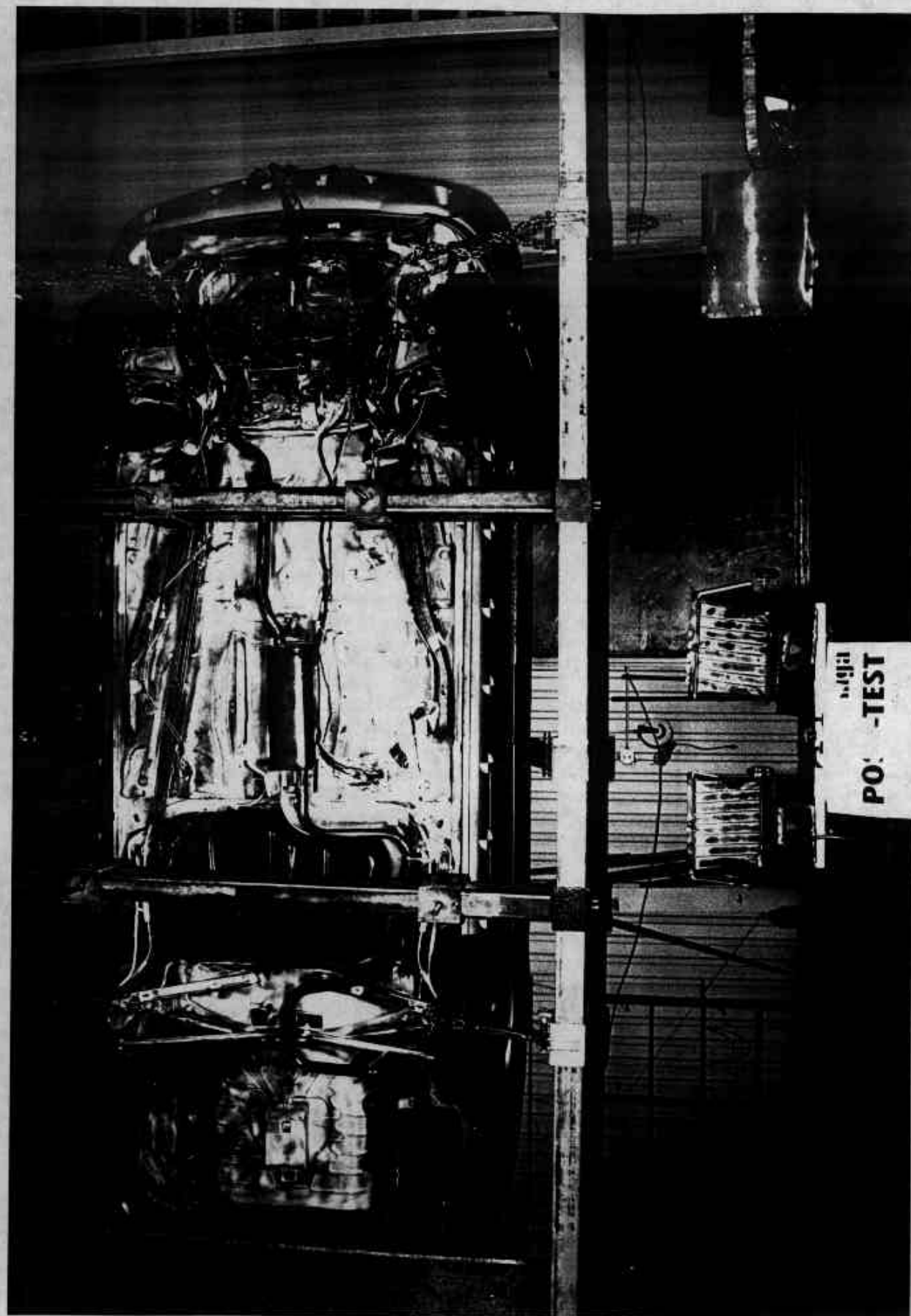


Photo No. A-50 - Vehicle Rollover - 270°

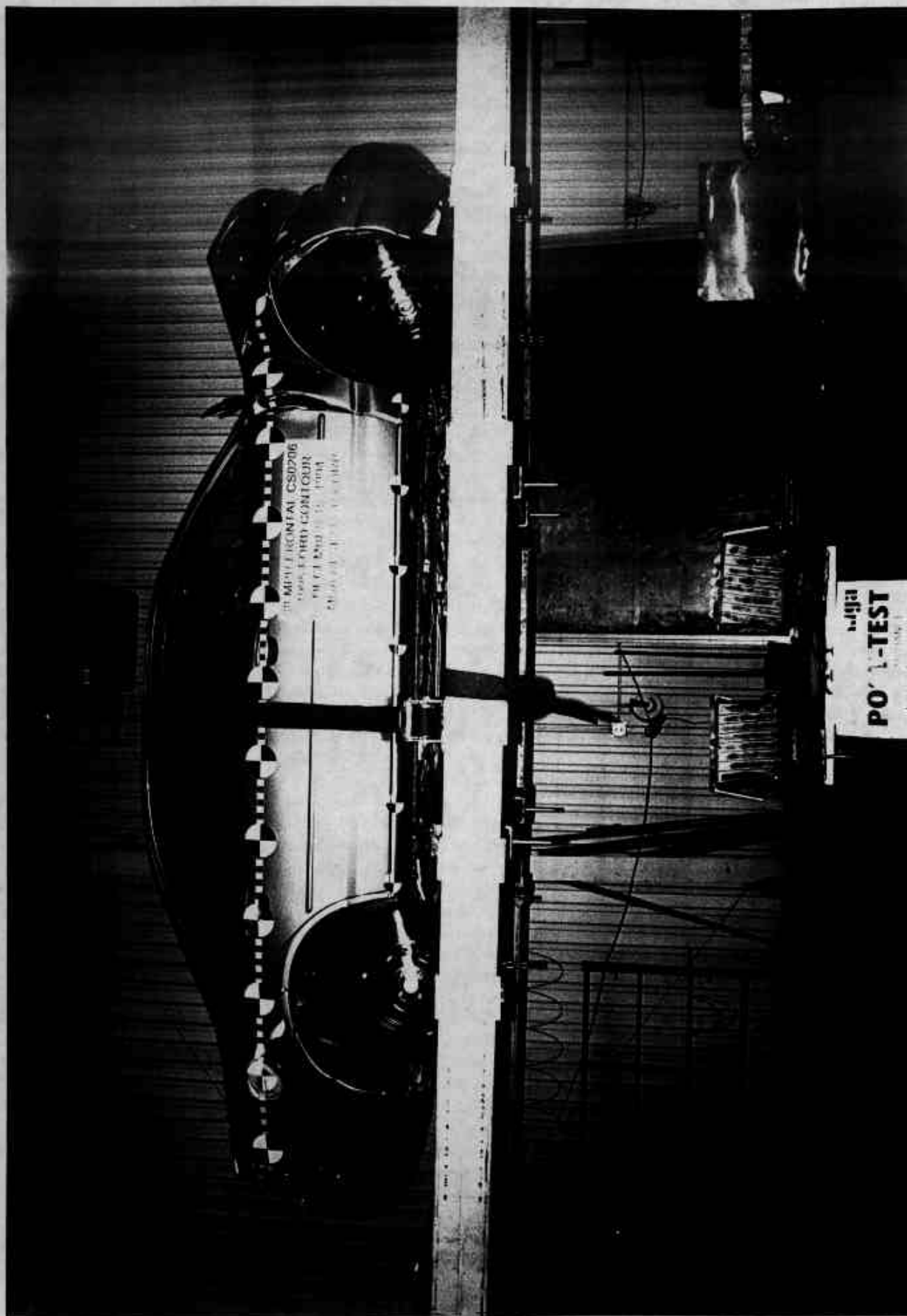


Photo No. A-51 - Vehicle Rollover - 360°

A-51

MFD. BY FORD MOTOR CO., IN U.S.A.

GVWR: 4078LB/1849KG

DATE: 09/94

974KG

2149LB

FRONT GAWR:

886KG

1955LB

REAR GAWR:

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

VIN: 1FALP6539SK116339

TYPE: PASSENGER

F0165
R0194



FOR MORE INFORMATION, CONTACT YOUR FORD DEALER OR FORD MOTOR COMPANY
1 FORD MOTOR COMPANY, FORD, MI 48033-3000

Photo No. A-52 - Vehicle Certification Label

CONTOURMYSTIQUE

RECOMMENDED TIRE SIZE AND INFLATION PRESSURE (COLD)
DIMENSIONS DES PNEUS ET PRESSIONS DE GONFLAGE RECOMMANDÉES (À FROID)

A

TIRE SIZE DIMENSIONS DES PNEUS	LOAD RANGE CHARGE NOMINALE	PRESSURE		REMARKS
		FRONT - AVANT	REAR - ARRIÈRE	
P185/70R14 87T •	ALL	34 psi 235kPa	34 psi 235kPa	
P195/65R14 88T •	ALL	34 psi 235kPa	34 psi 235kPa	
P205/60R15 90T •	ALL	34 psi 235kPa	34 psi 235kPa	
T135/80R15 TEMPORAL SPARE PNEU DE SECOURS PROVISIONNEL	ALL	34 psi 235kPa	34 psi 235kPa	
• MUST BE REPLACED WITH AN EQUIVALENT TIRE BEFORE THE VEHICLE IS DRIVEN • NE REMPLACER UN PNEU PAR UN PNEU EQUIVALENT AVANT DE CONDUIRE LE VEHICULE				
TOTAL LOAD - CHARGE TOTALE				
MAXIMUM LOAD	TOTAL WEIGHT			
CHARGE MAXIMALE	Poids total			
800 lb / 363 kg				
FOR TRAILERS AND LOADS				
CONSULT OWNER'S MANUAL				
CONSULTEZ LE MANUEL				

Photo No. A-53 - Vehicle Tire Placard

APPENDIX B
DATA PLOTS

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Figure B-4 - Driver Head Resultant Acceleration vs. Time	1000	B-4
Figure B-5 - Driver Chest X Acceleration vs. Time	180	B-5
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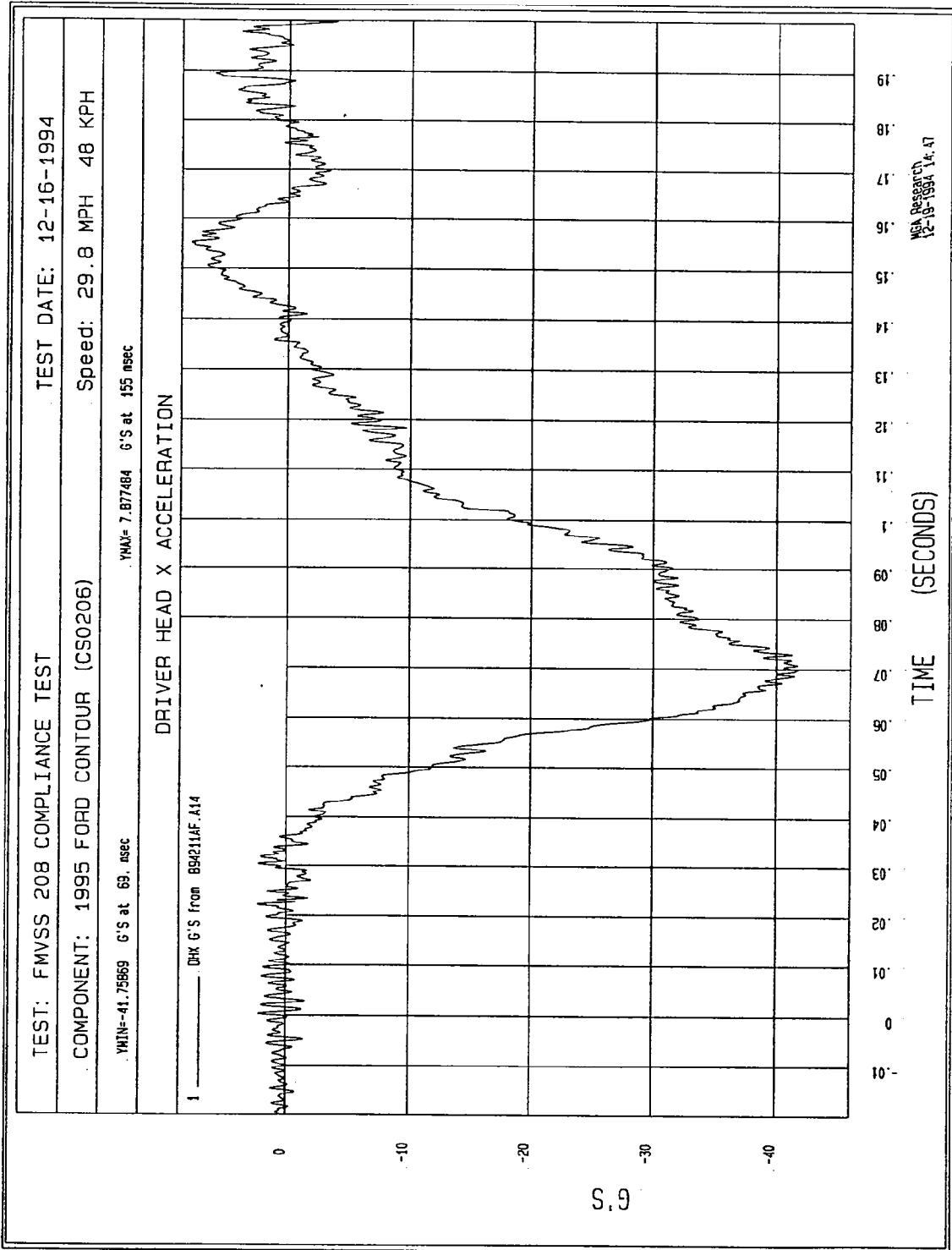


Figure B-1 - Driver Head X Acceleration vs. Time

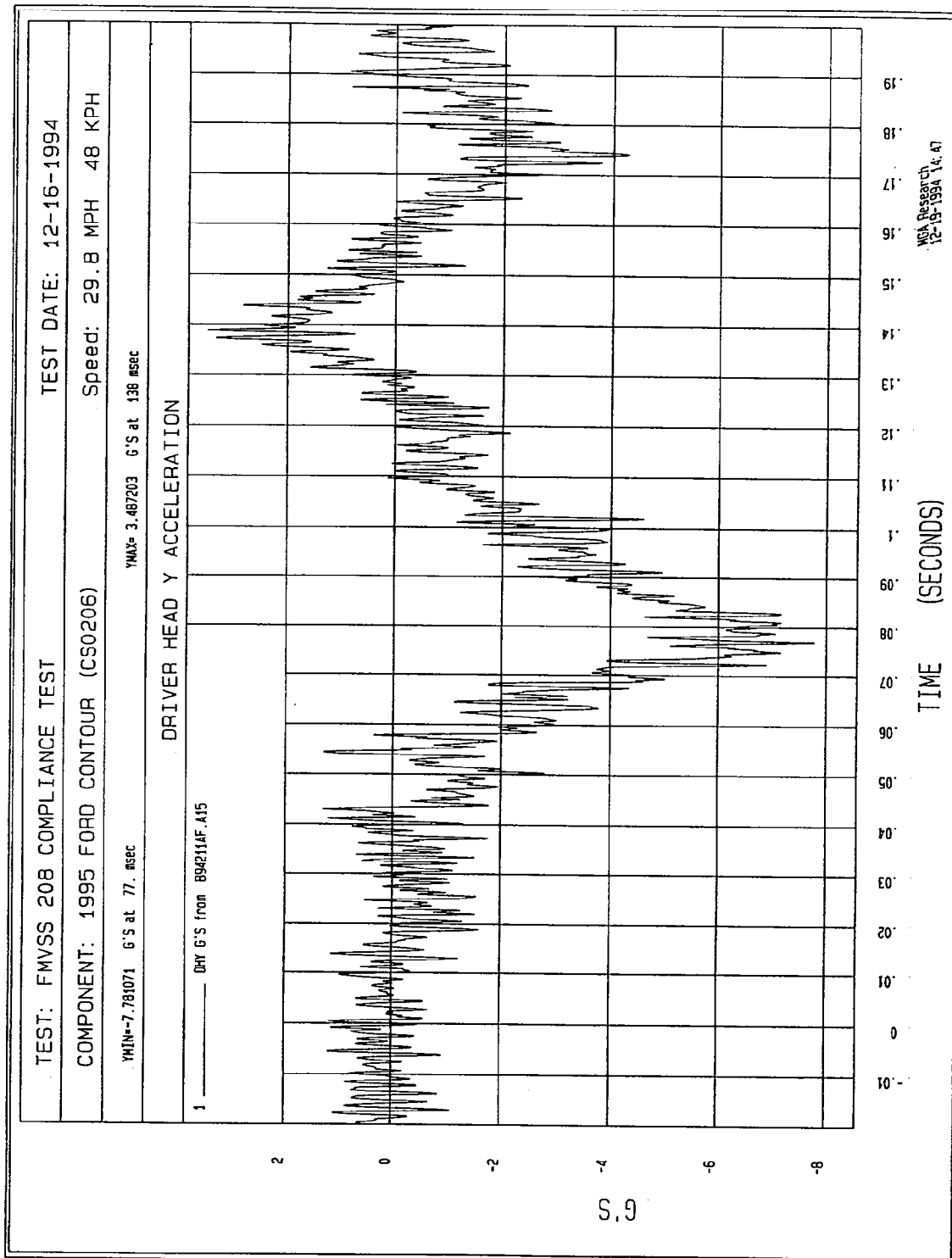


Figure B-2 - Driver Head Y Acceleration vs. Time

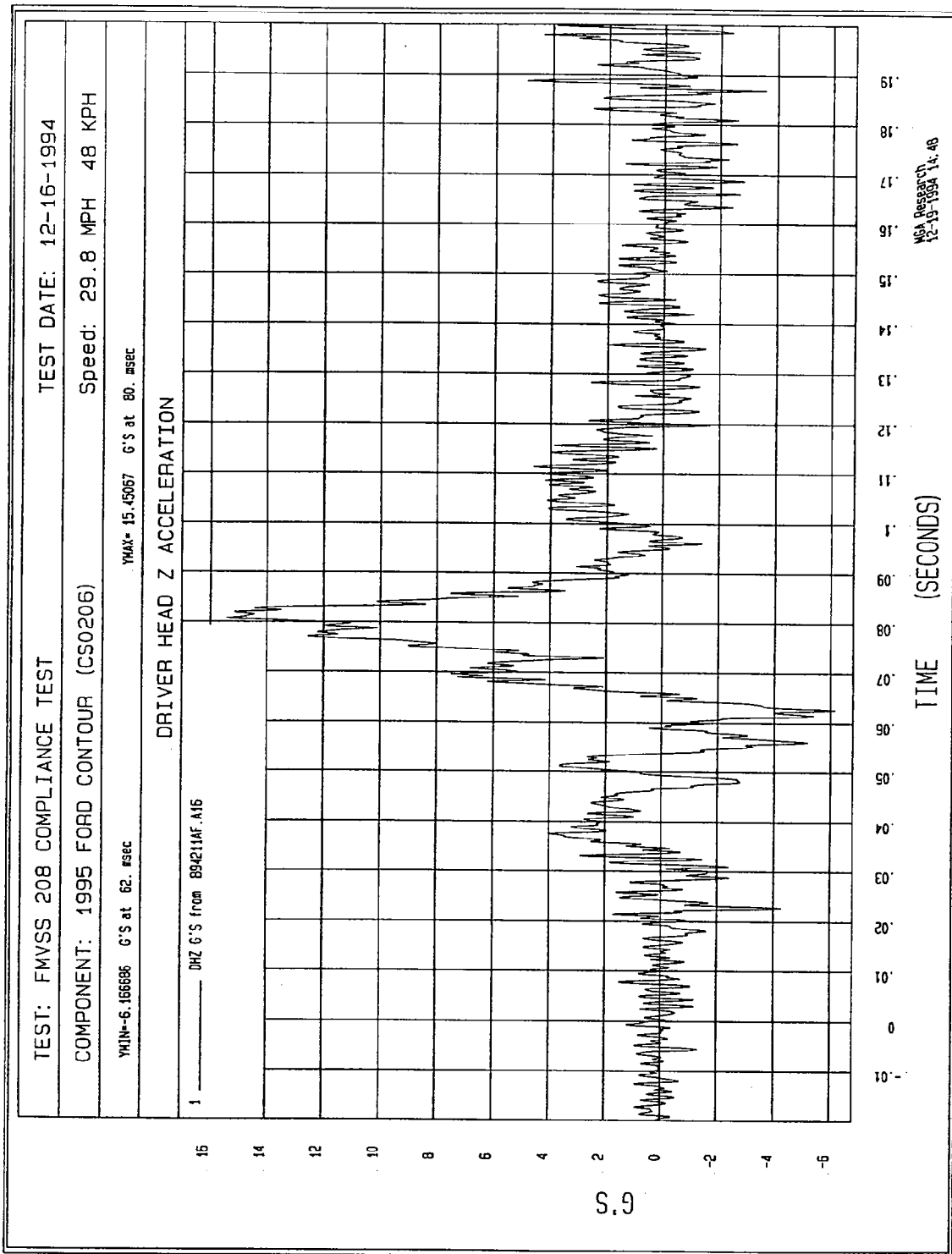


Figure B-3 - Driver Head Z Acceleration vs. Time

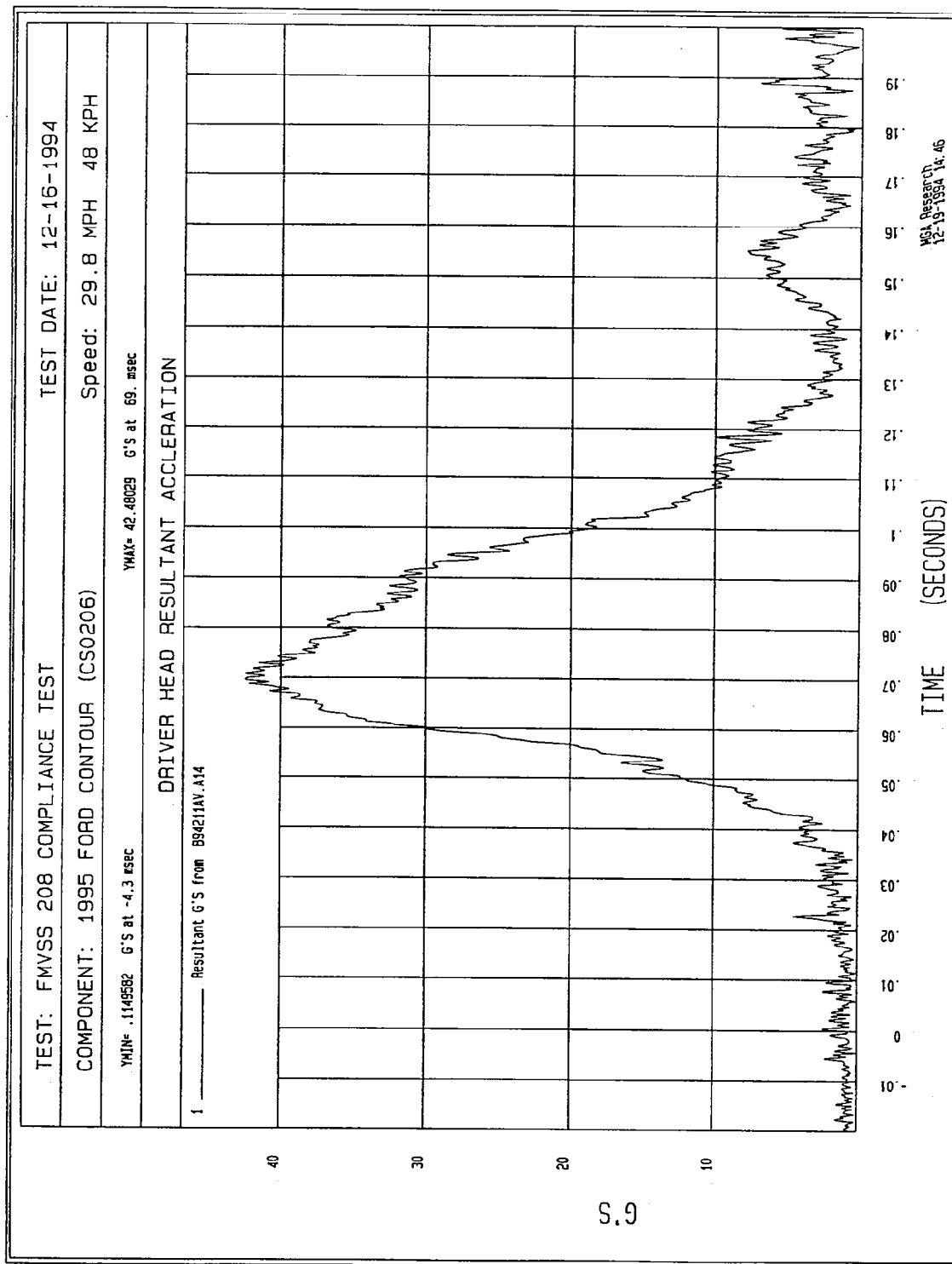


Figure B-4 - Driver Head Resultant Acceleration vs. Time

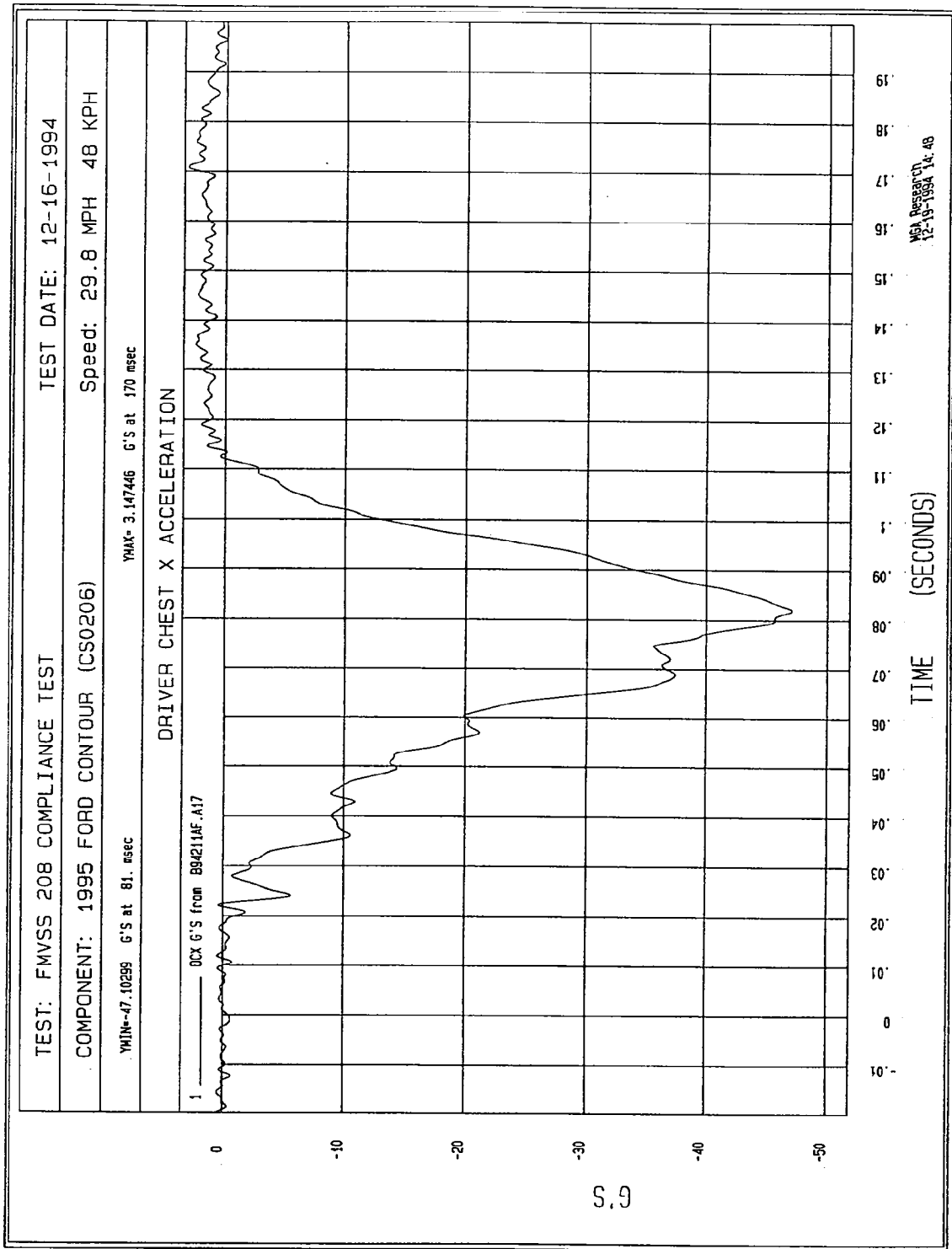


Figure B-5 - Driver Chest X Acceleration vs. Time

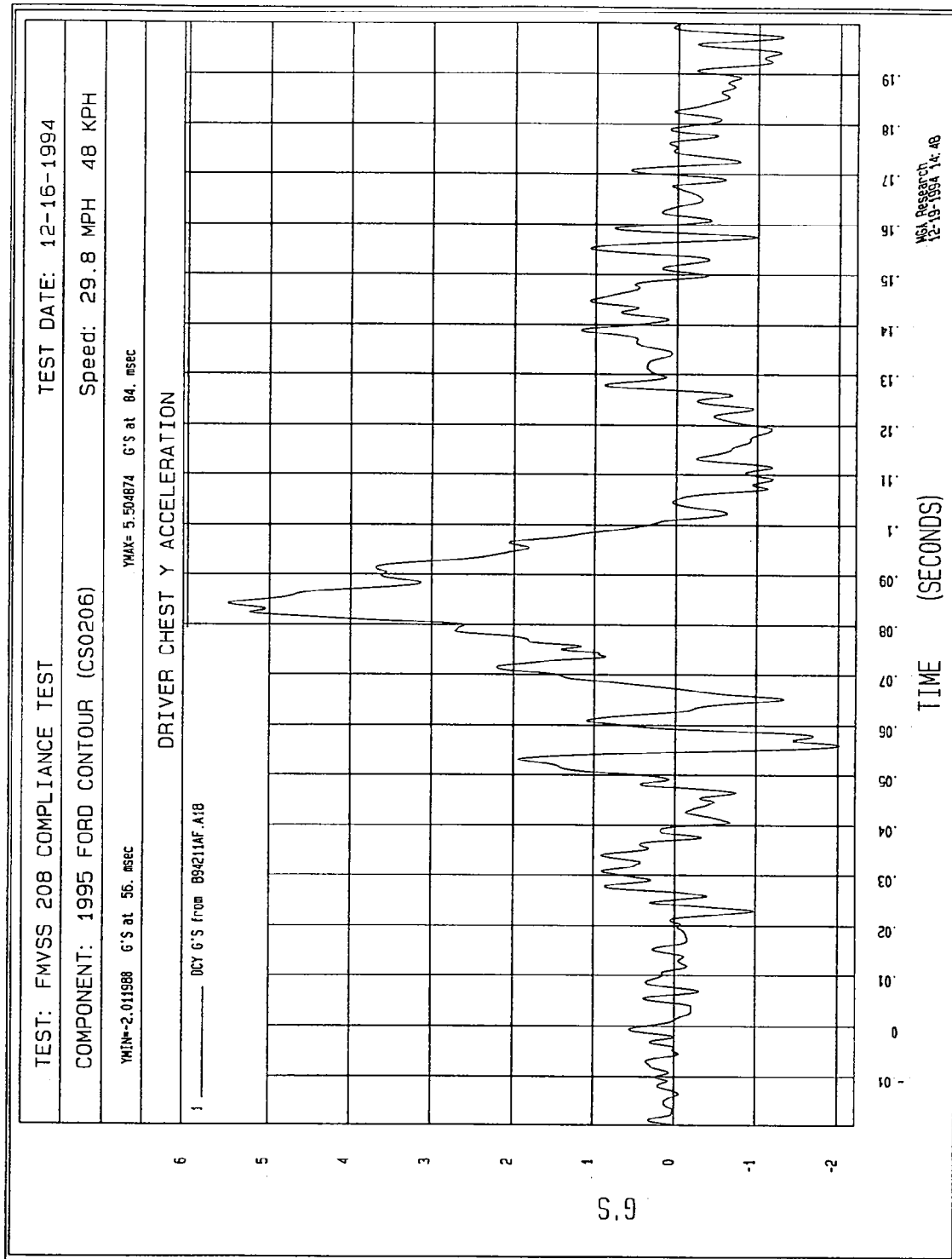


Figure B-6 - Driver Chest Y Acceleration vs. Time

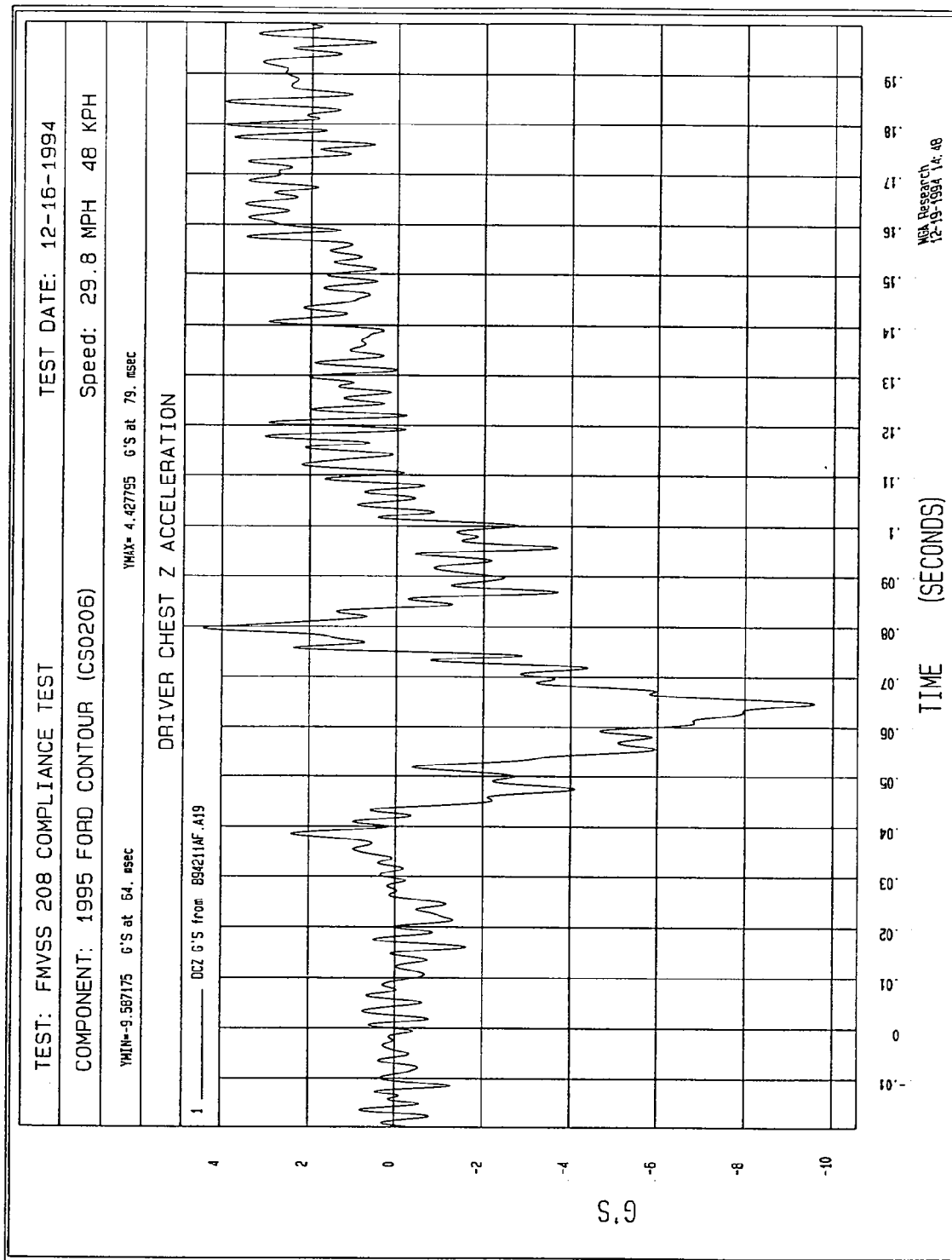


Figure B-7 - Driver Chest Z Acceleration vs. Time

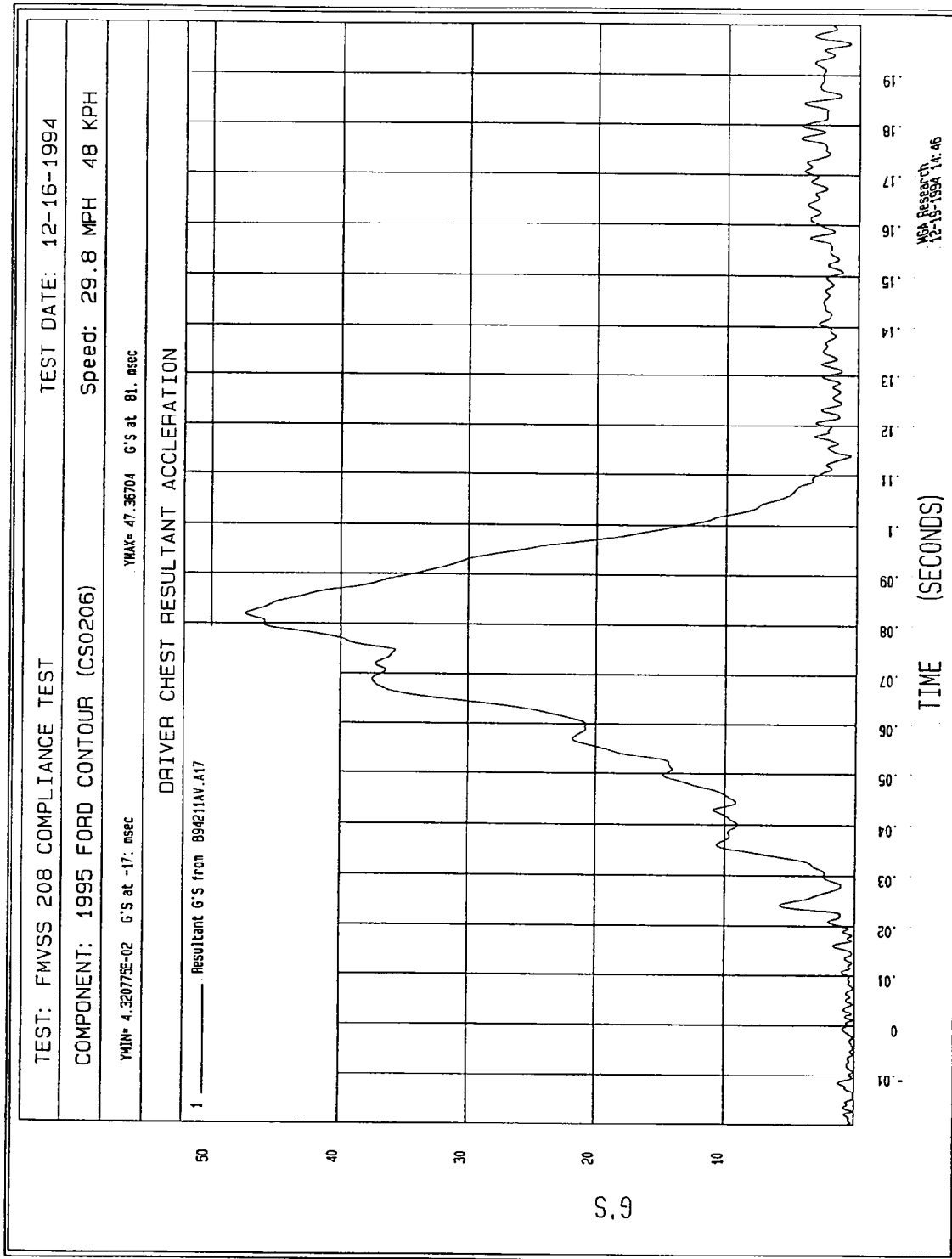


Figure B-8 - Driver Chest Resultant Acceleration vs. Time

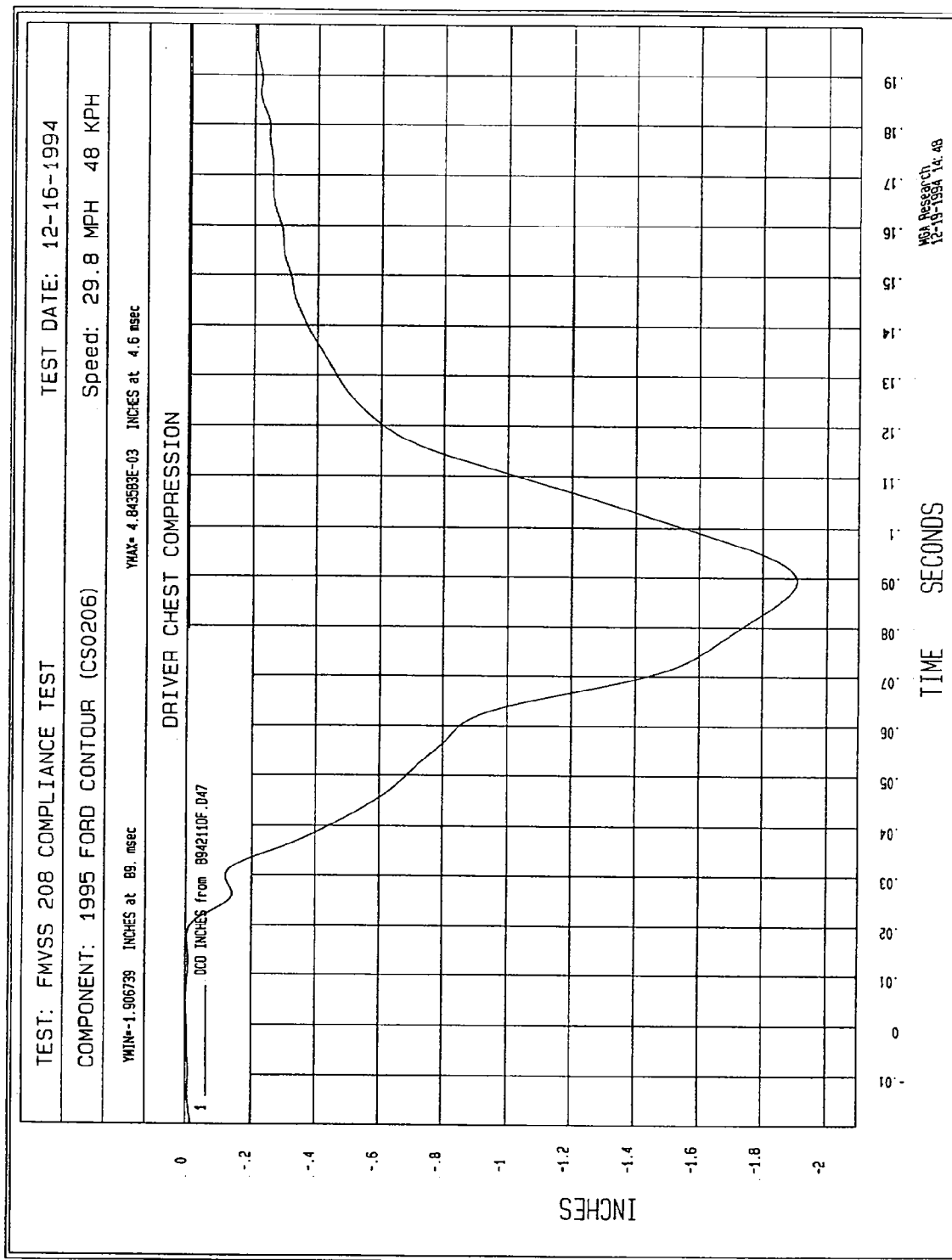


Figure B-9 - Driver Chest Compression vs. Time

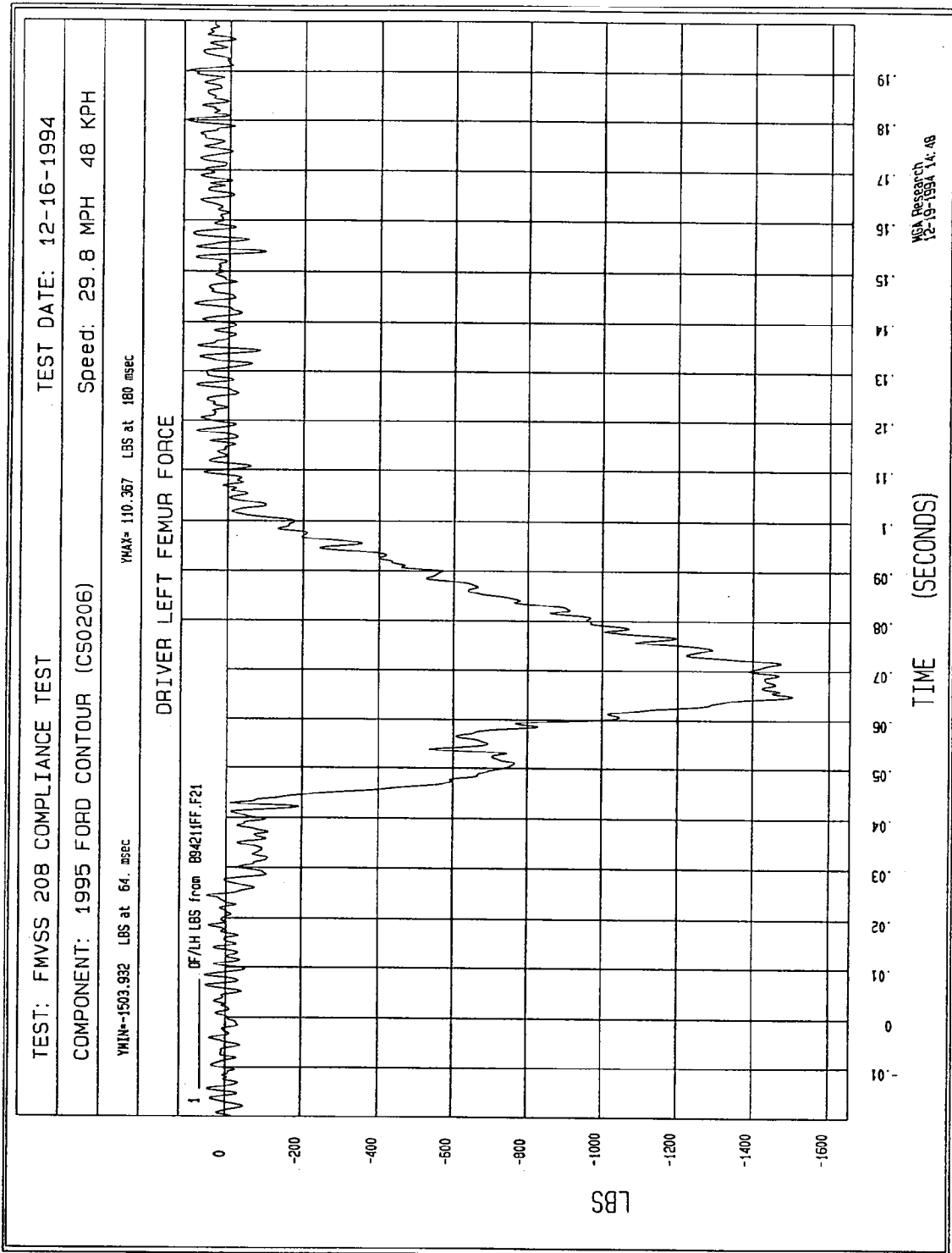


Figure B-10 - Driver Left Femur Force vs. Time

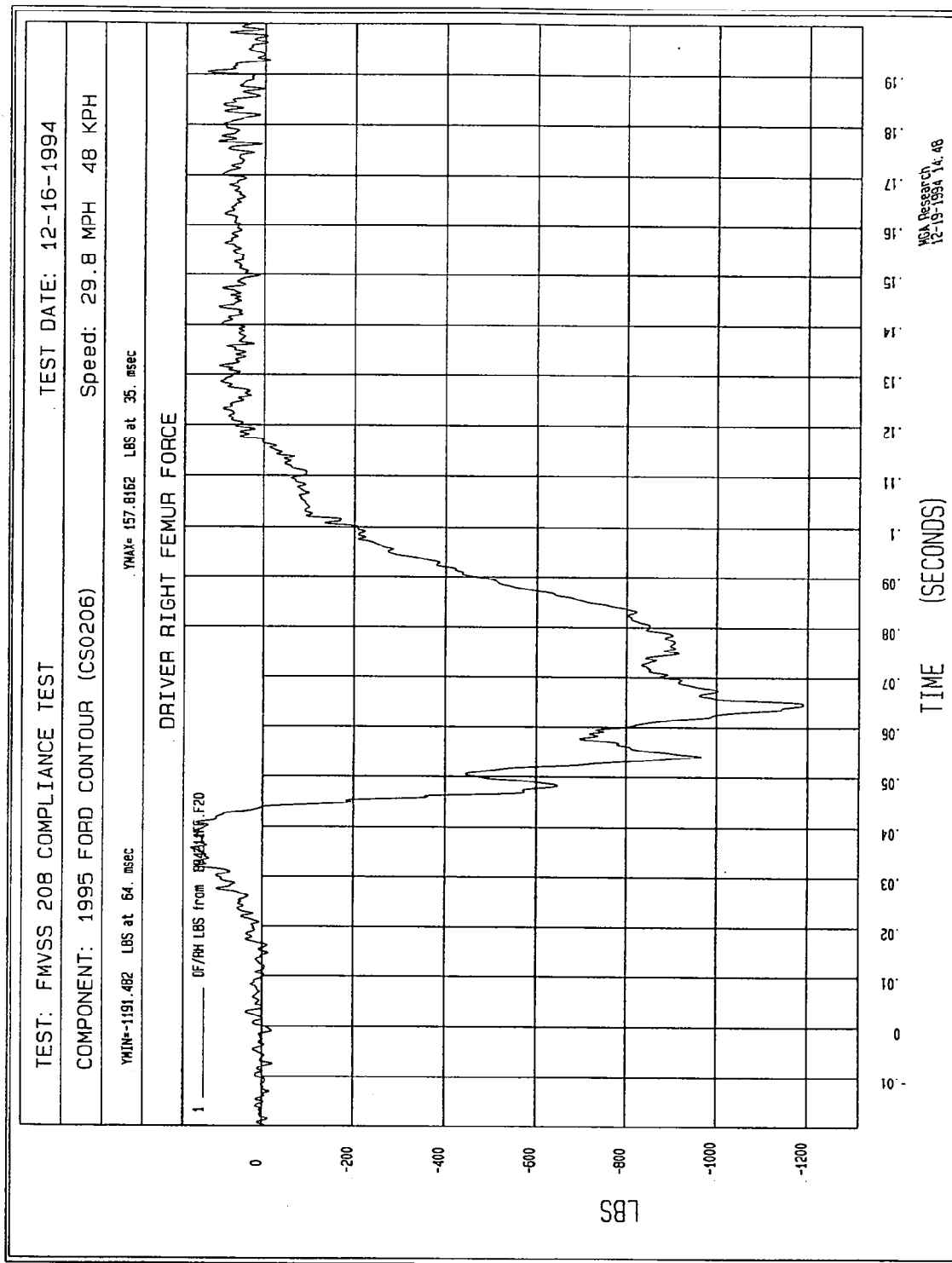


Figure B-11 - Driver Right Femur Force vs. Time

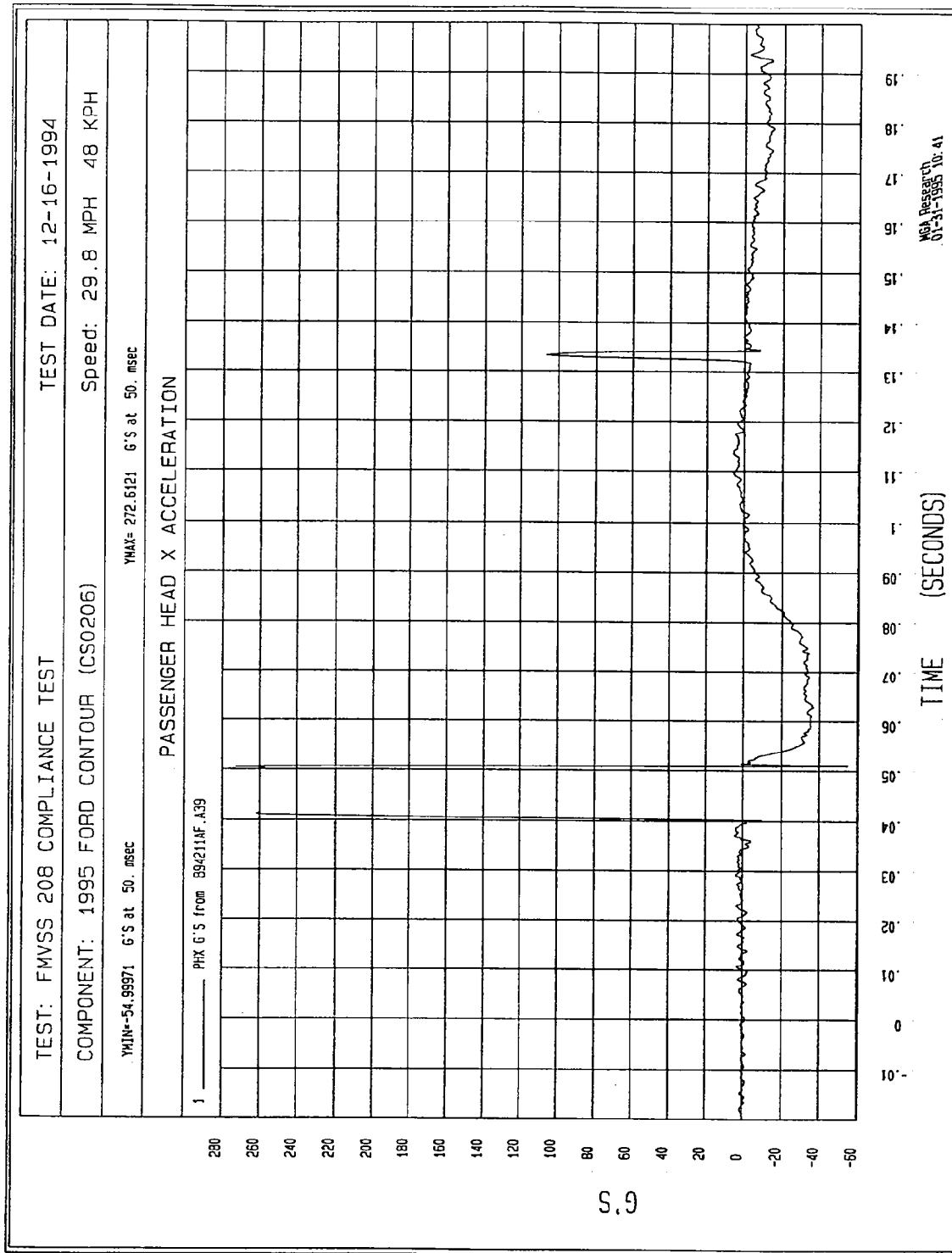


Figure B-12 - Passenger Head X Acceleration vs. Time

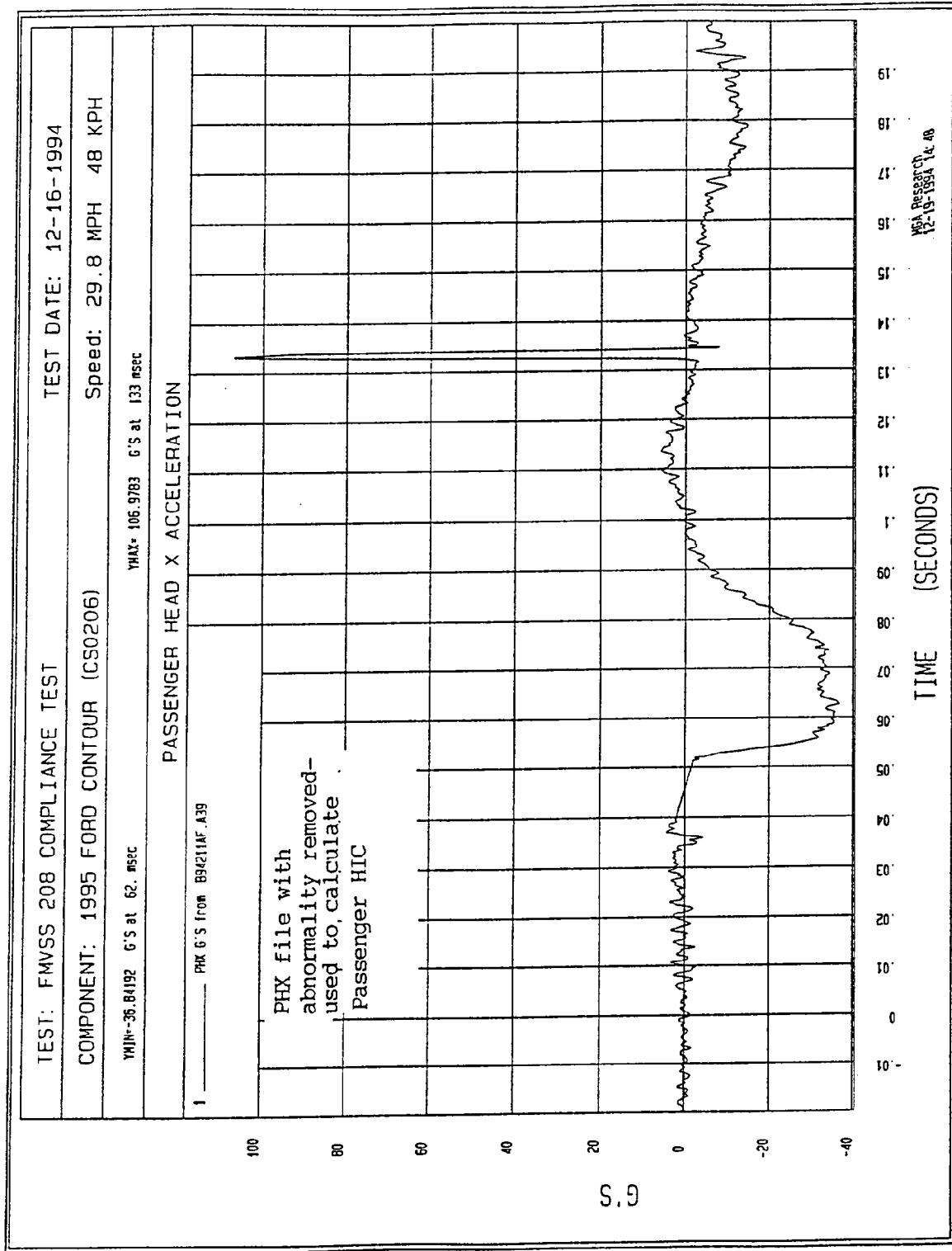


Figure B-13 - Passenger Head X Acceleration vs. Time

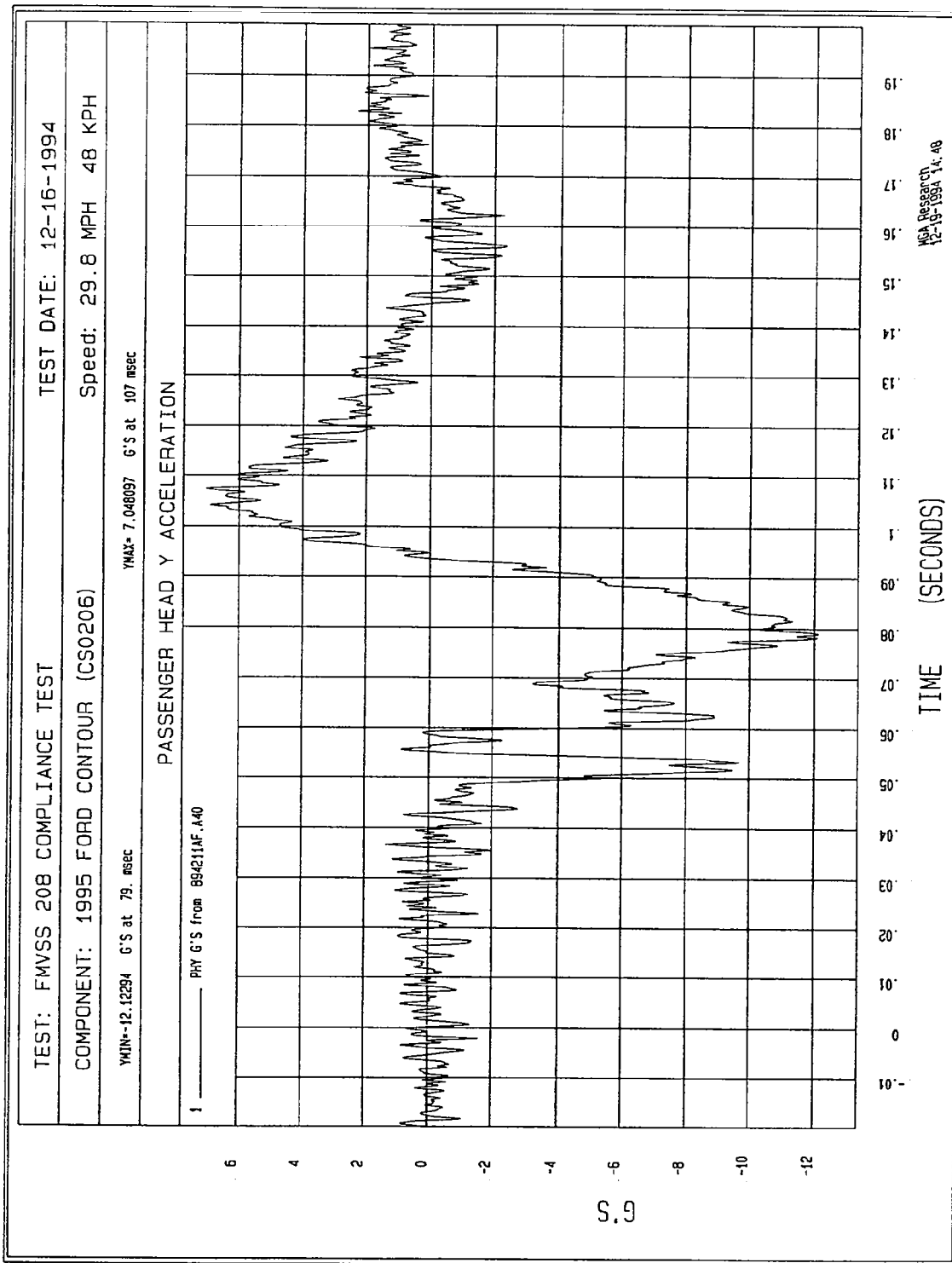


Figure B-14 - Passenger Head Y Acceleration vs. Time

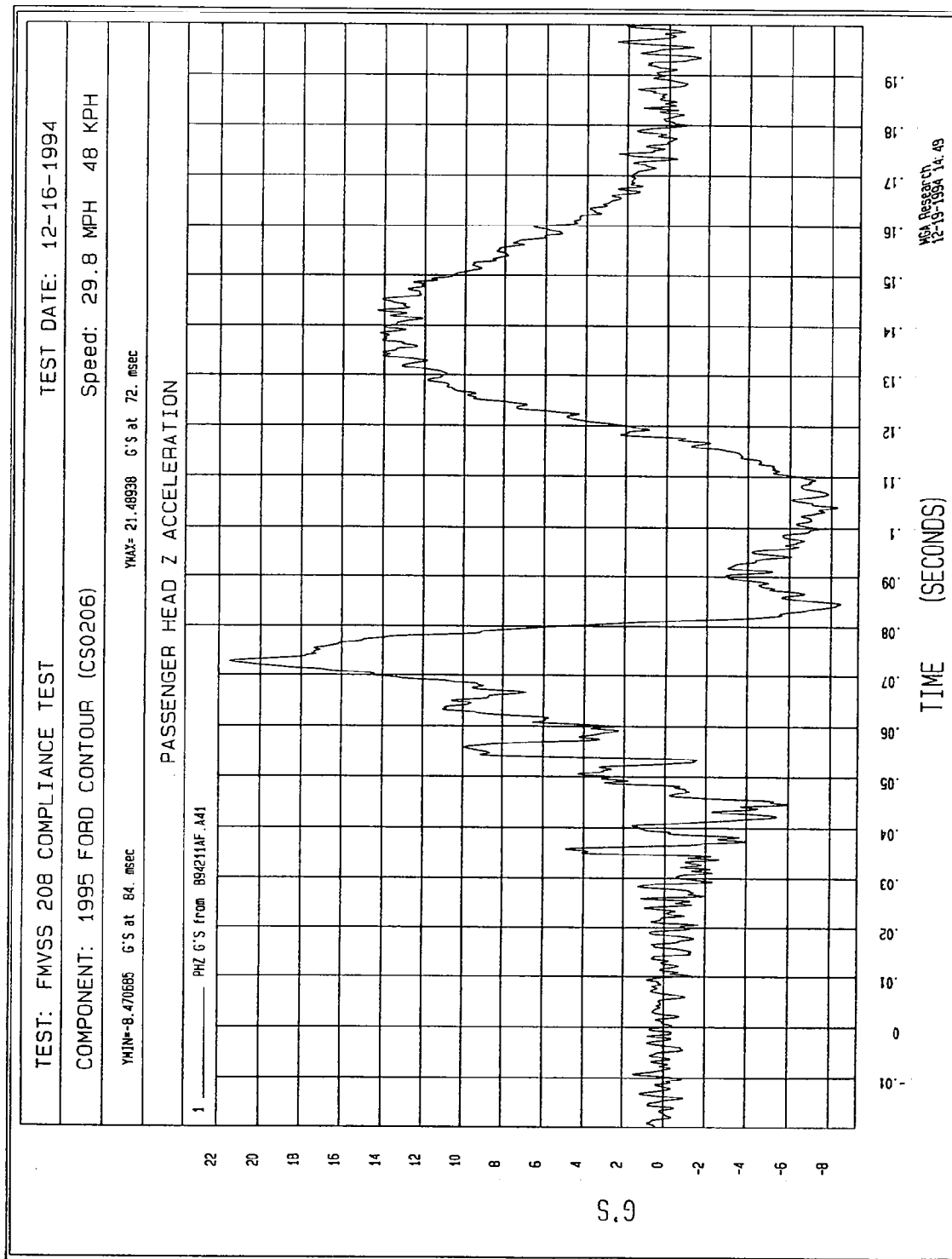


Figure B-15 - Passenger Head Z Acceleration vs. Time

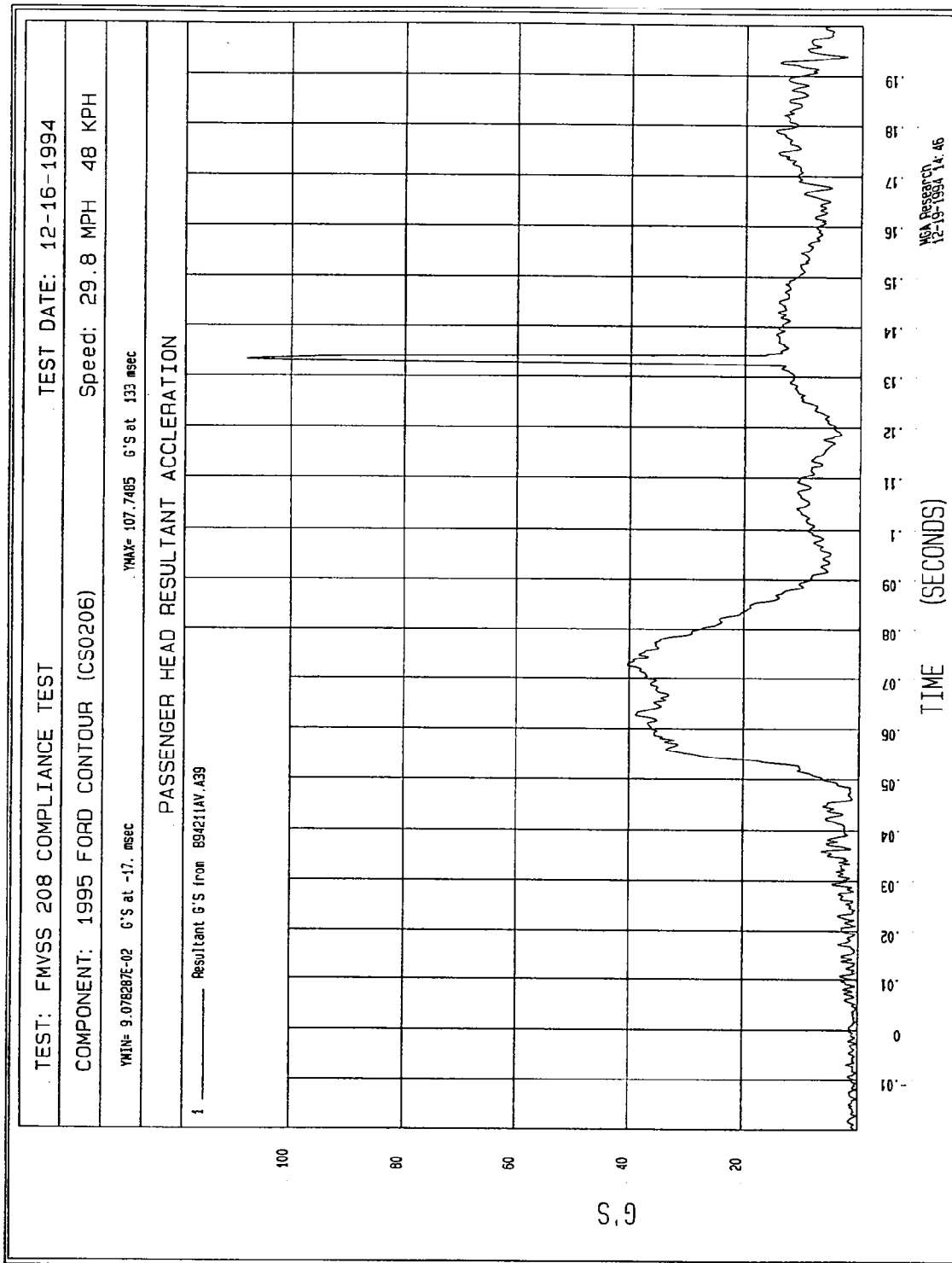


Figure B-16 - Passenger Head Resultant Acceleration vs. Time

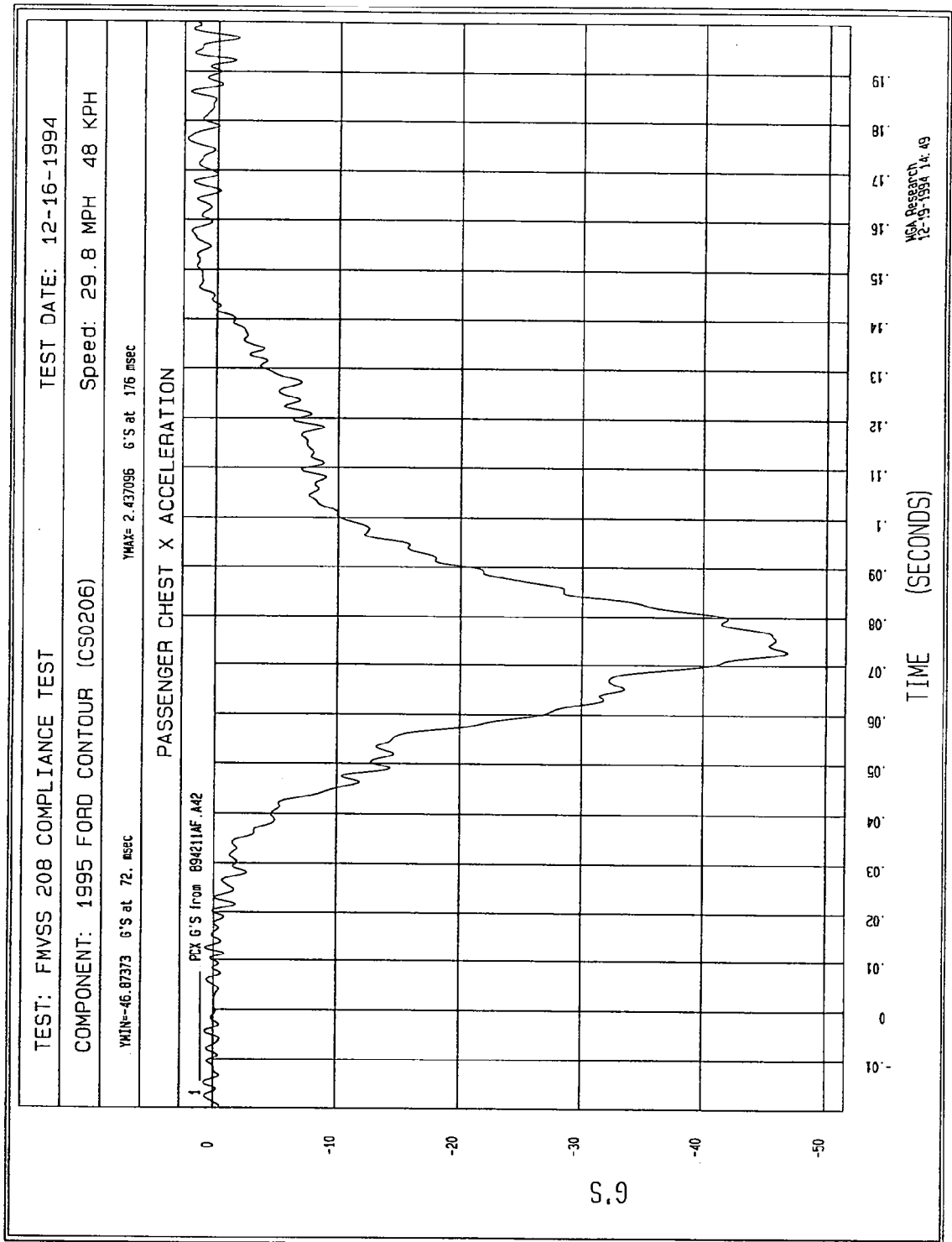
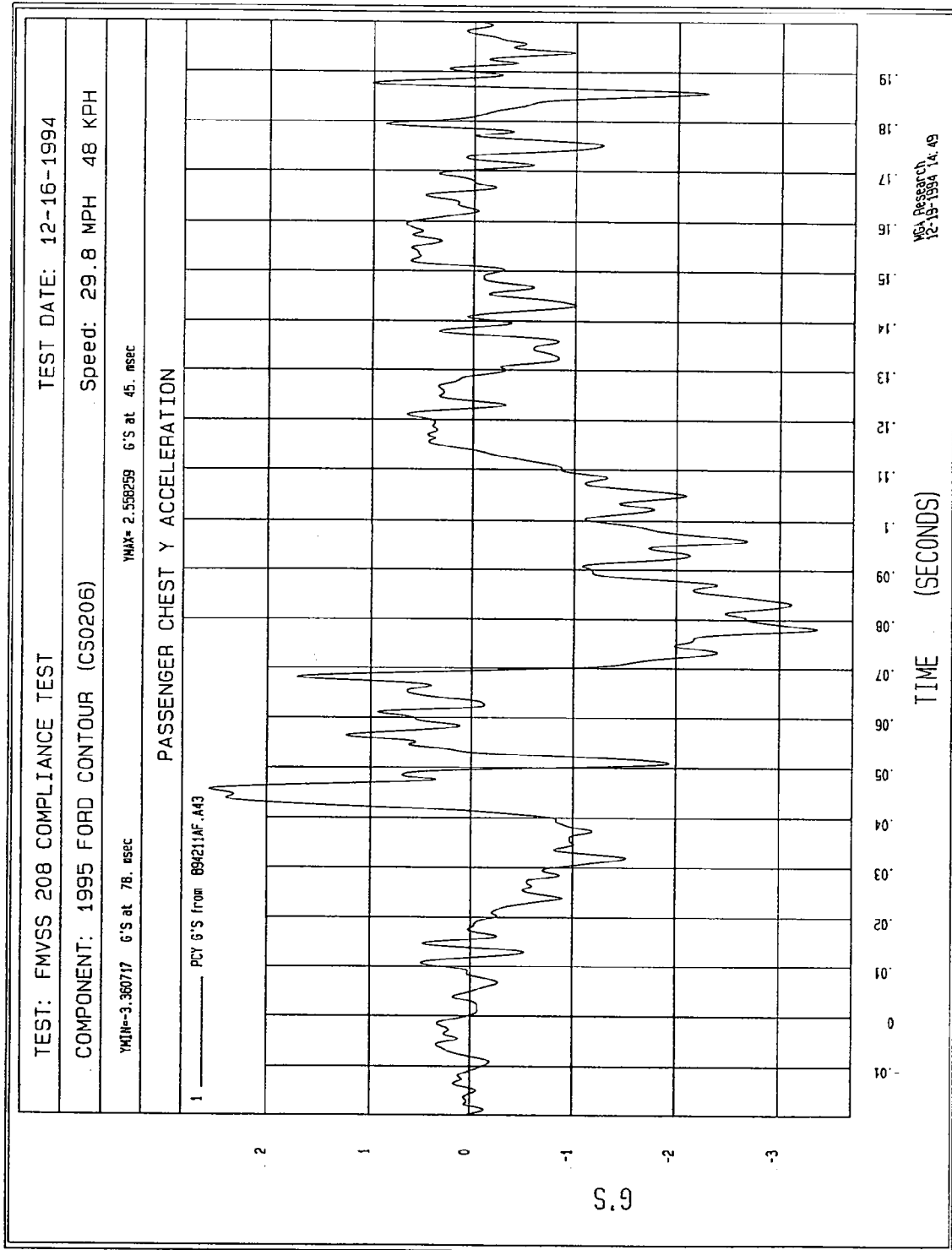


Figure B-17 - Passenger Chest X Acceleration vs. Time



B-18

Figure B-18 - Passenger Chest Y Acceleration vs. Time

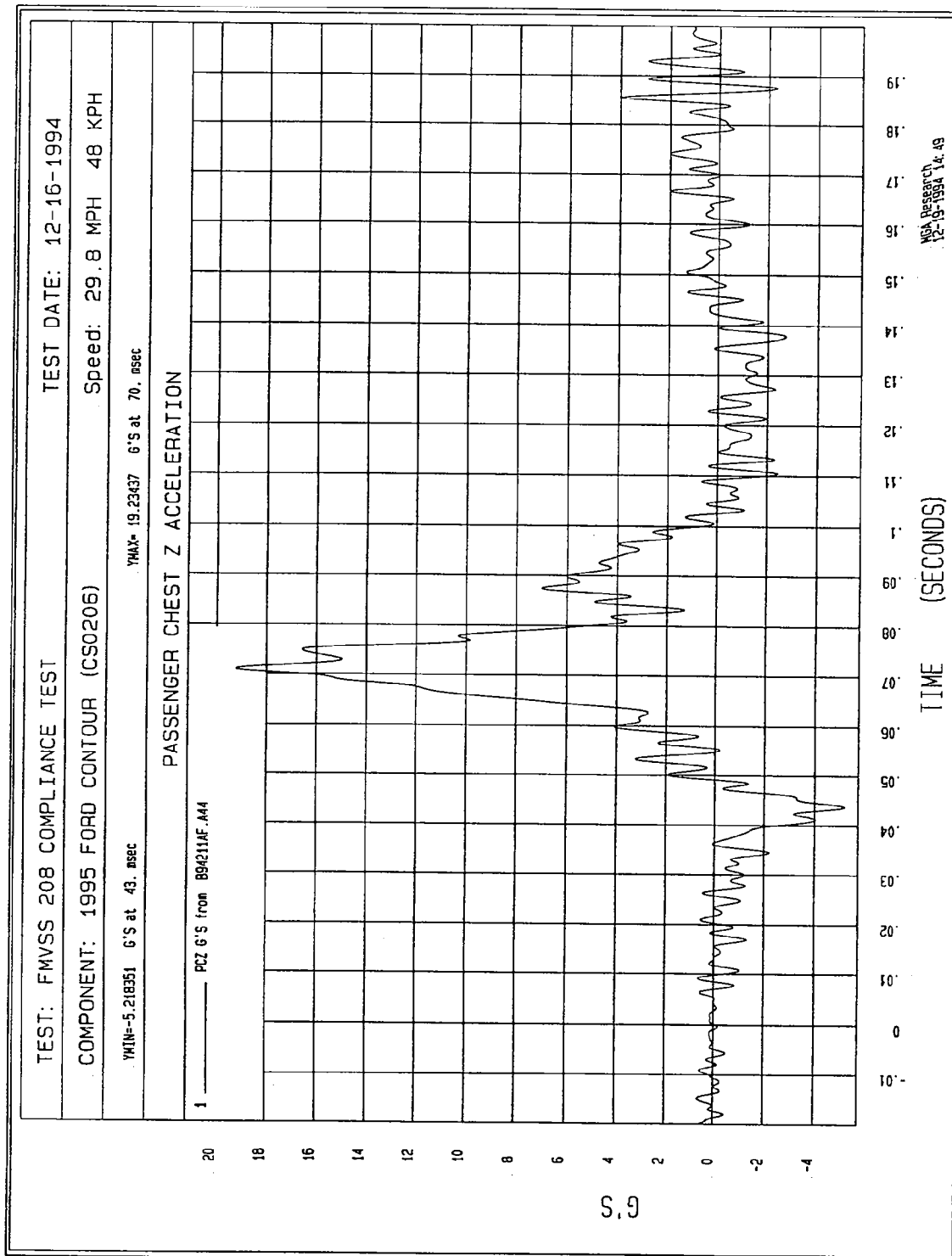


Figure B-19 - Passenger Chest Z Acceleration vs. Time

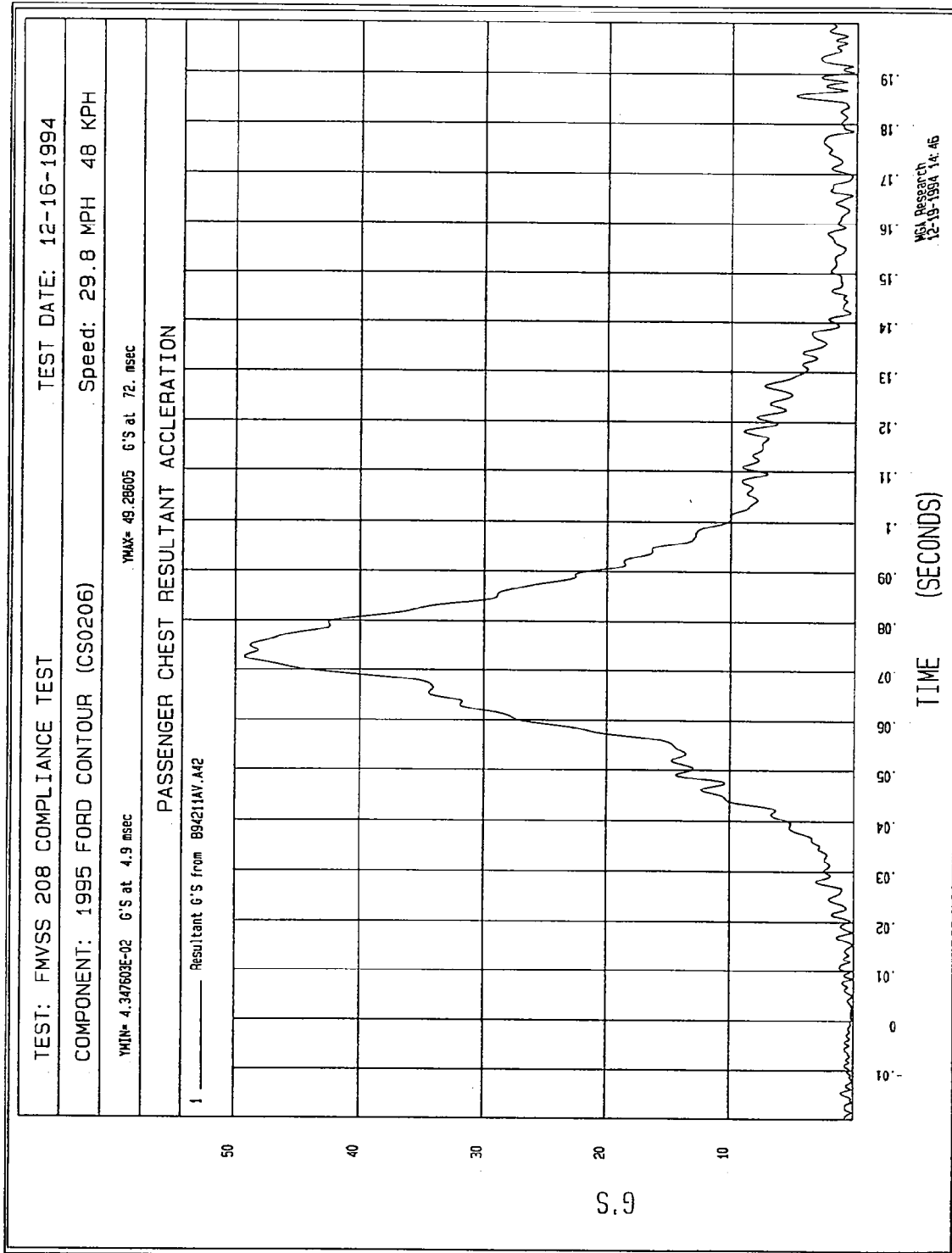
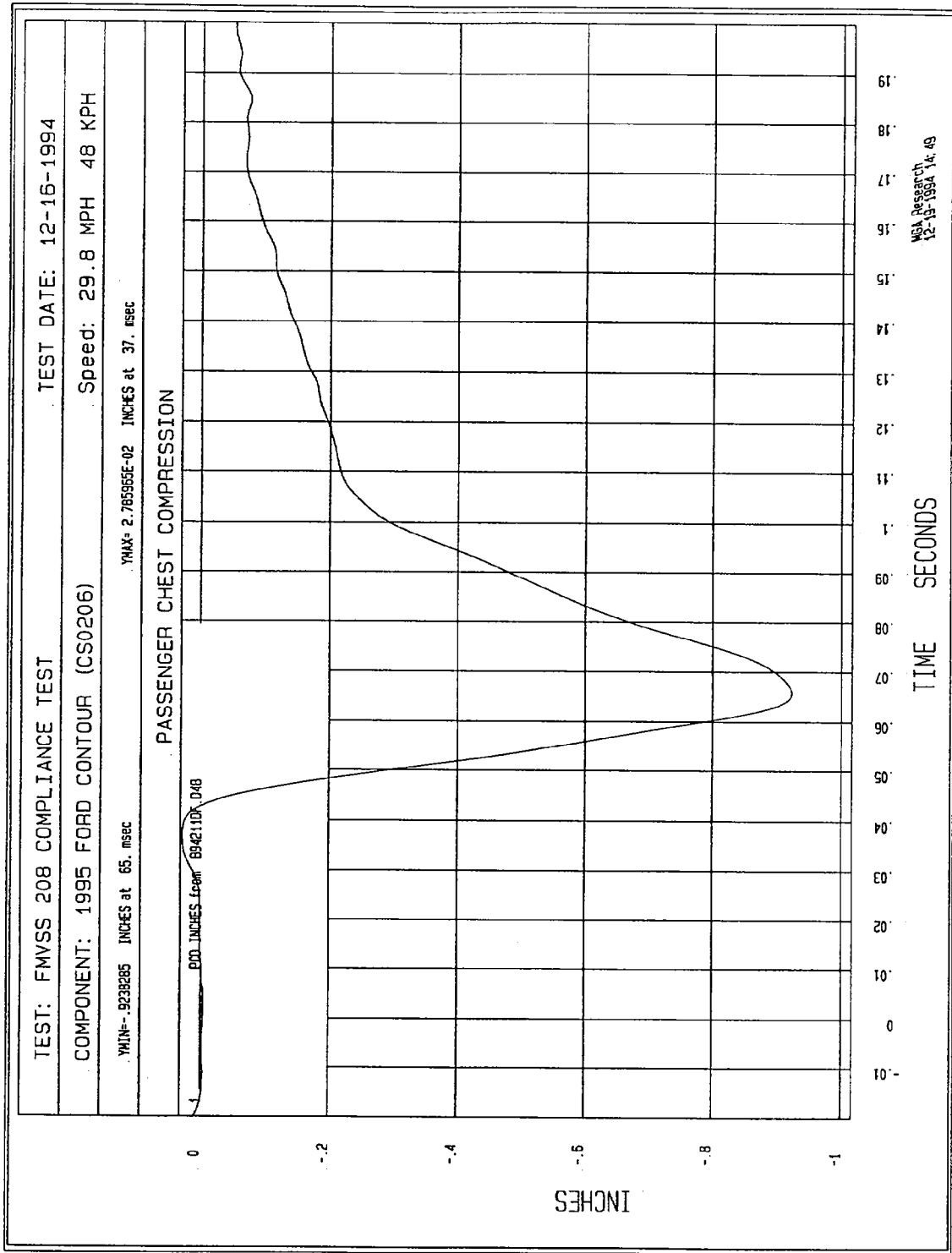


Figure B-20 - Passenger Chest Resultant Acceleration vs. Time



B-21

Figure B-21 - Passenger Chest Compression vs. Time

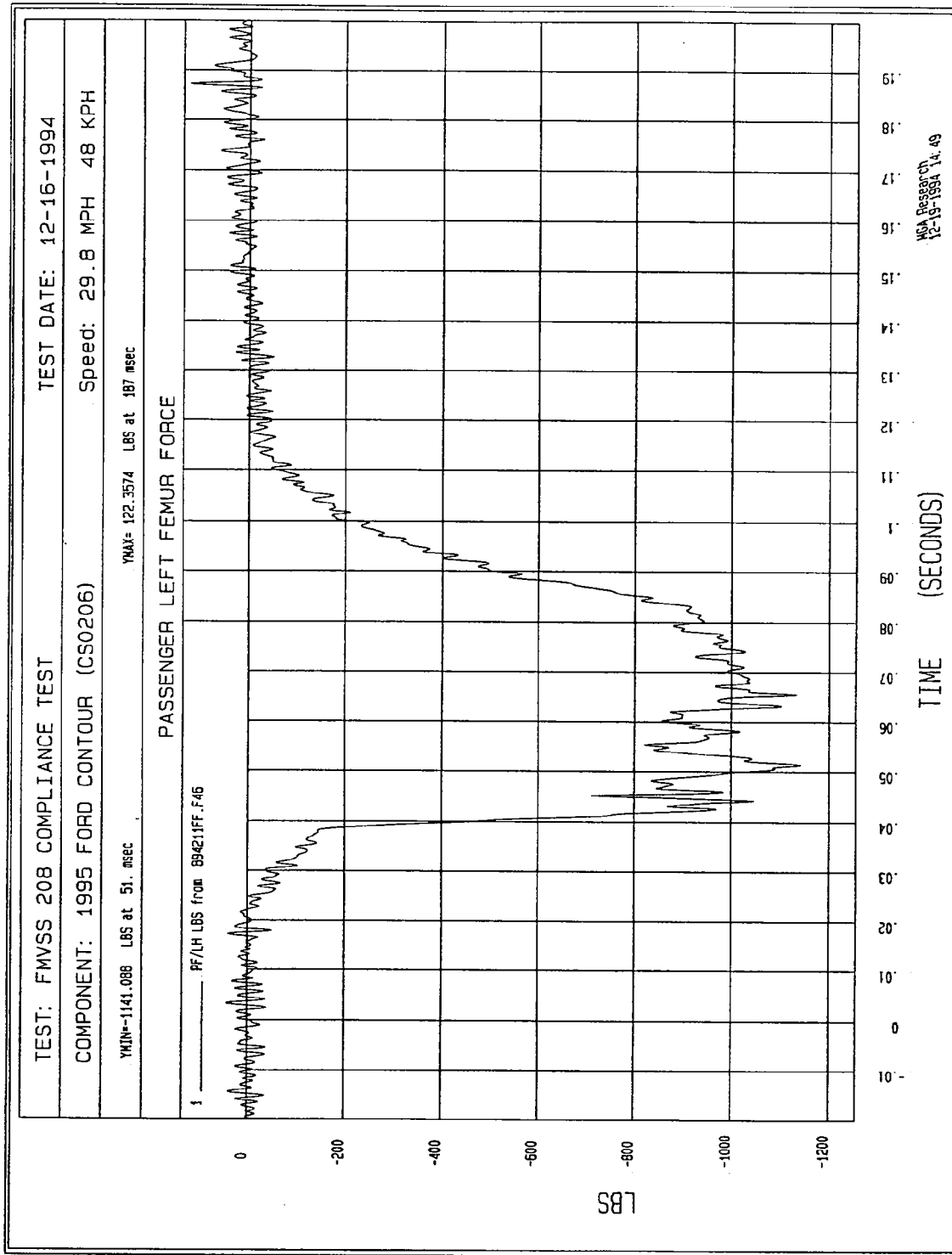


Figure B-22 - Passenger Left Femur Force vs. Time

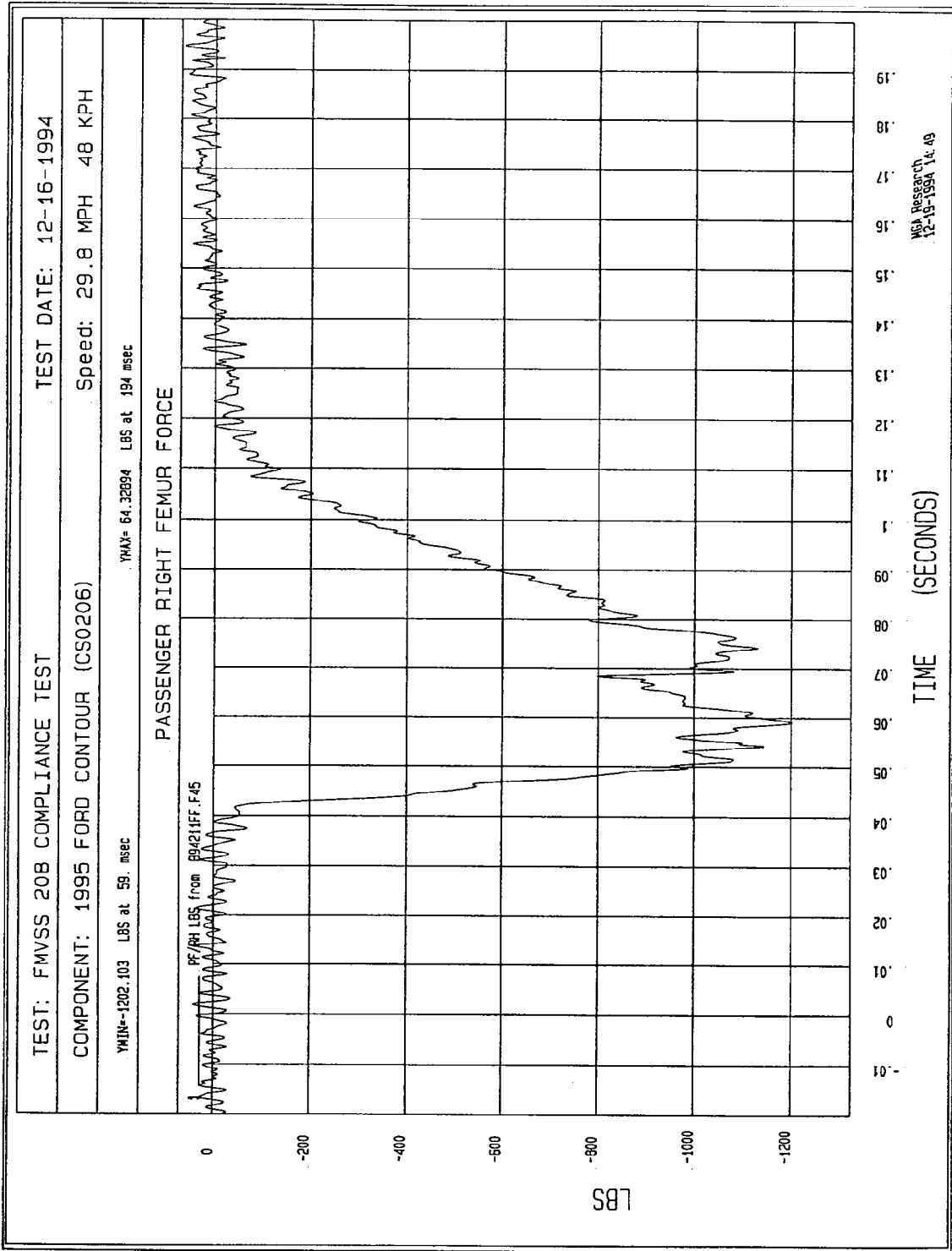


Figure B-23 - Passenger Right Femur Force vs. Time

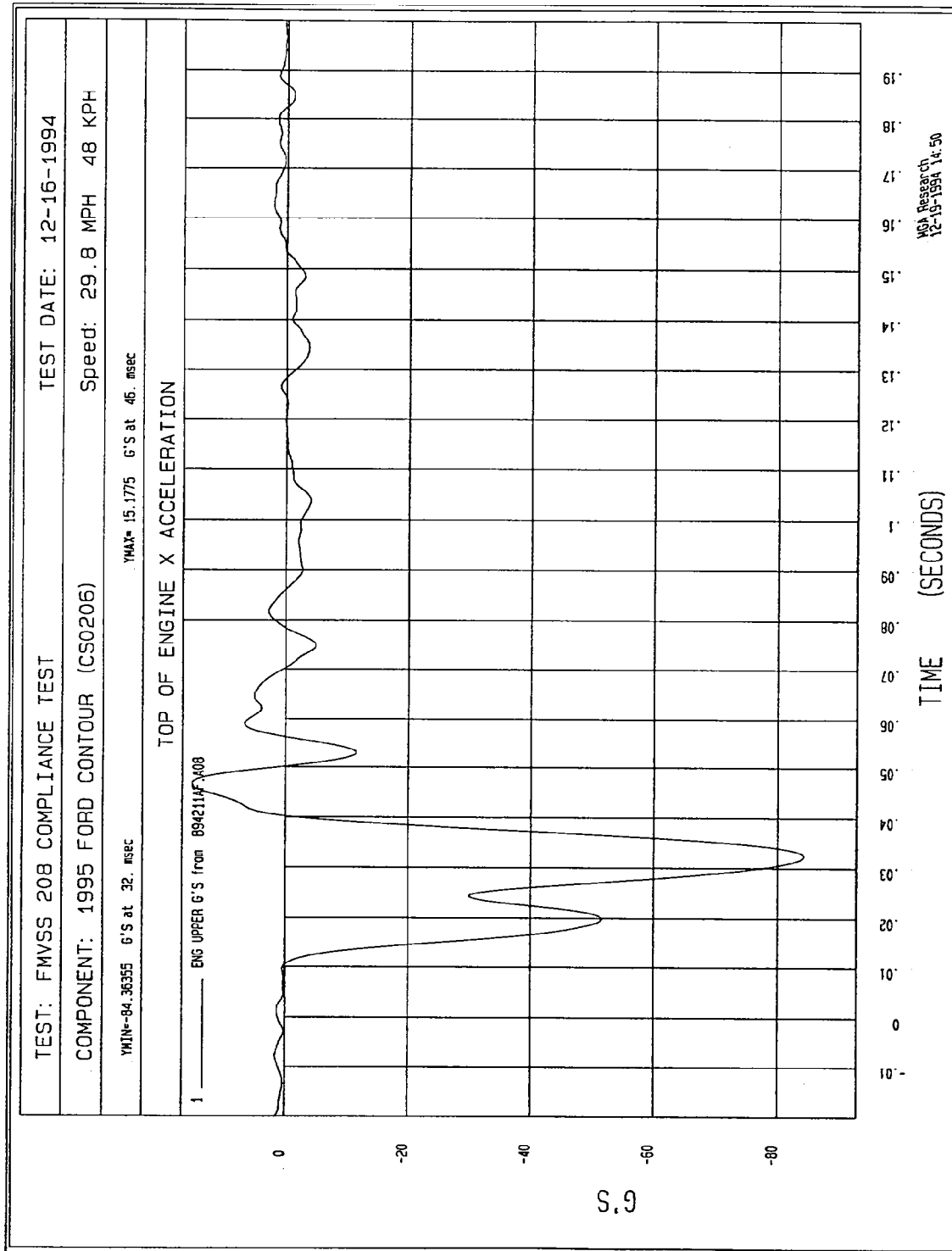


Figure B-24 - Top of Engine Block X Acceleration vs. Time

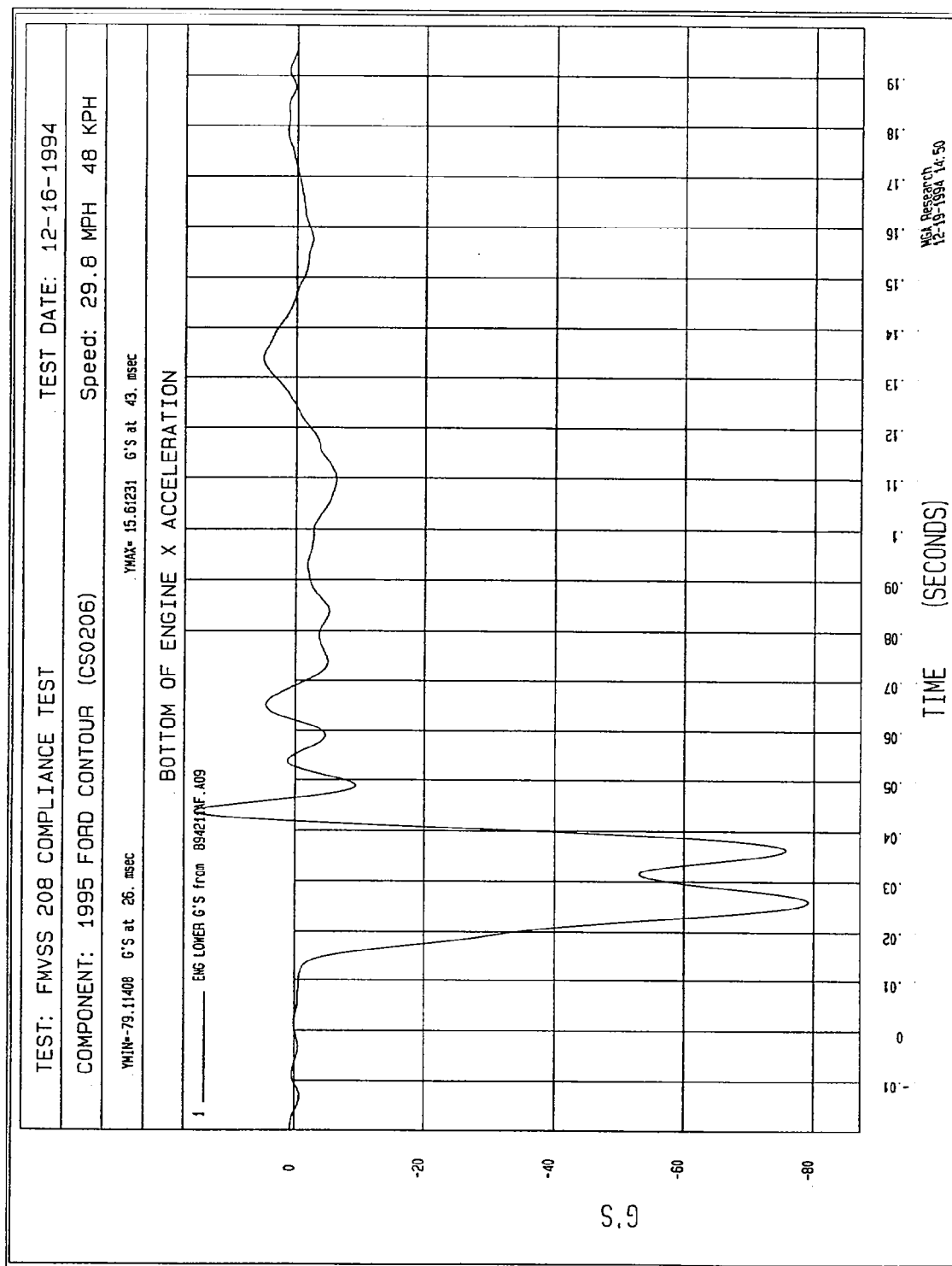


Figure B-25 - Bottom of Engine Block X Acceleration vs. Time

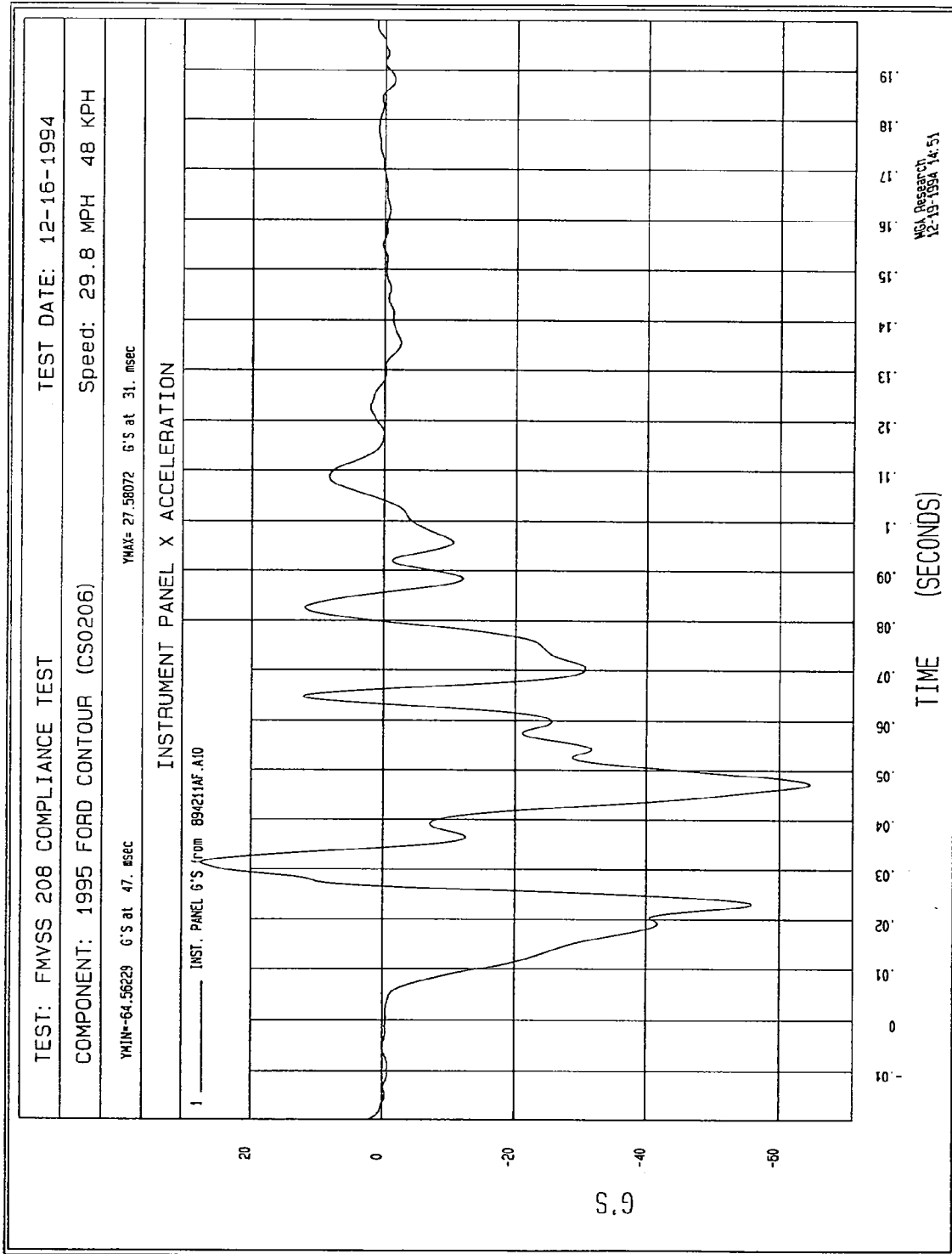


Figure B-26 - Instrument Panel X Acceleration vs. Time

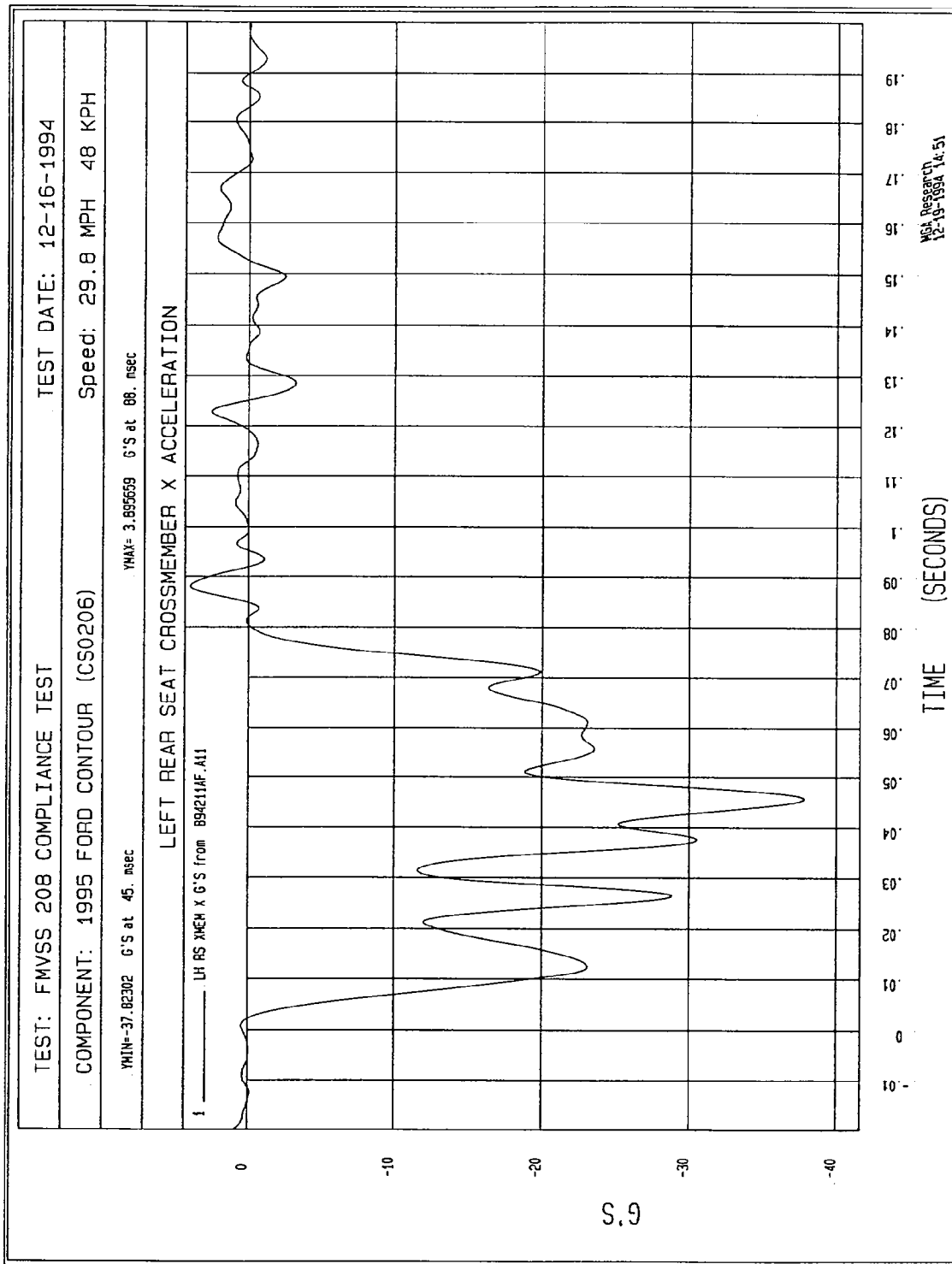


Figure B-27 - Left Rear Seat Crossmember X Acceleration vs. Time

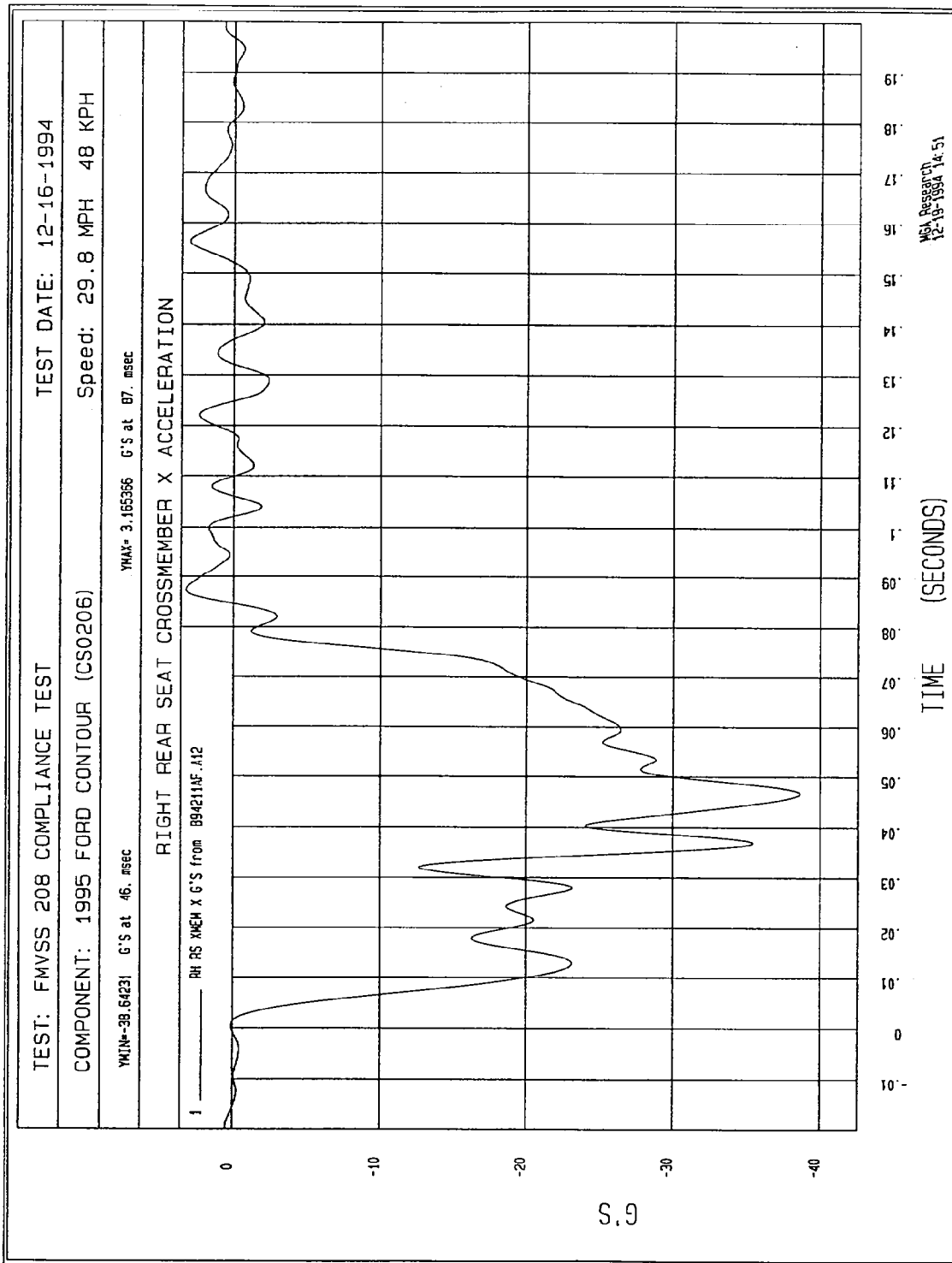


Figure B-28 - Right Rear Seat Crossmember X Acceleration vs. Time

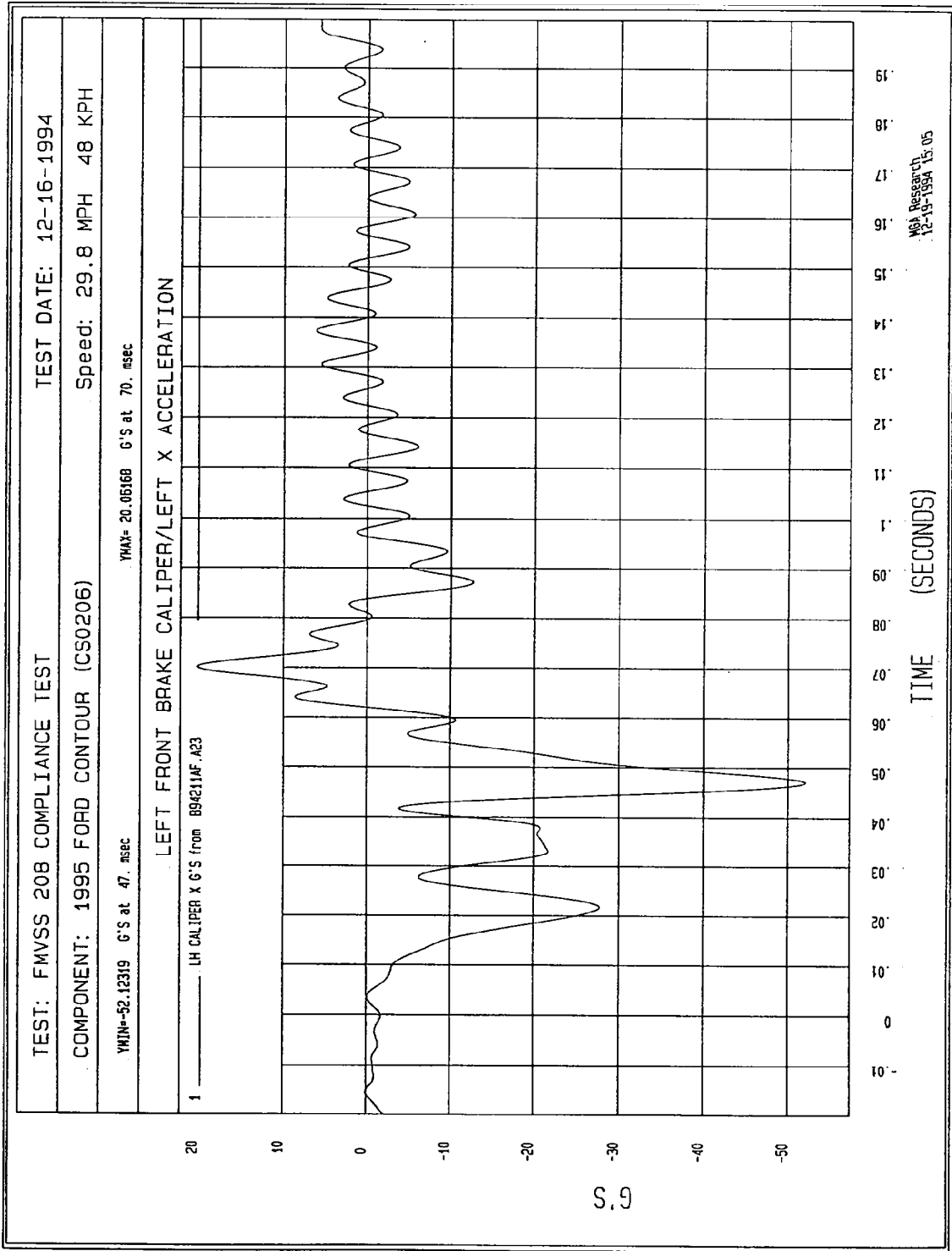


Figure B-29 - Left Brake Caliper X Acceleration vs. Time

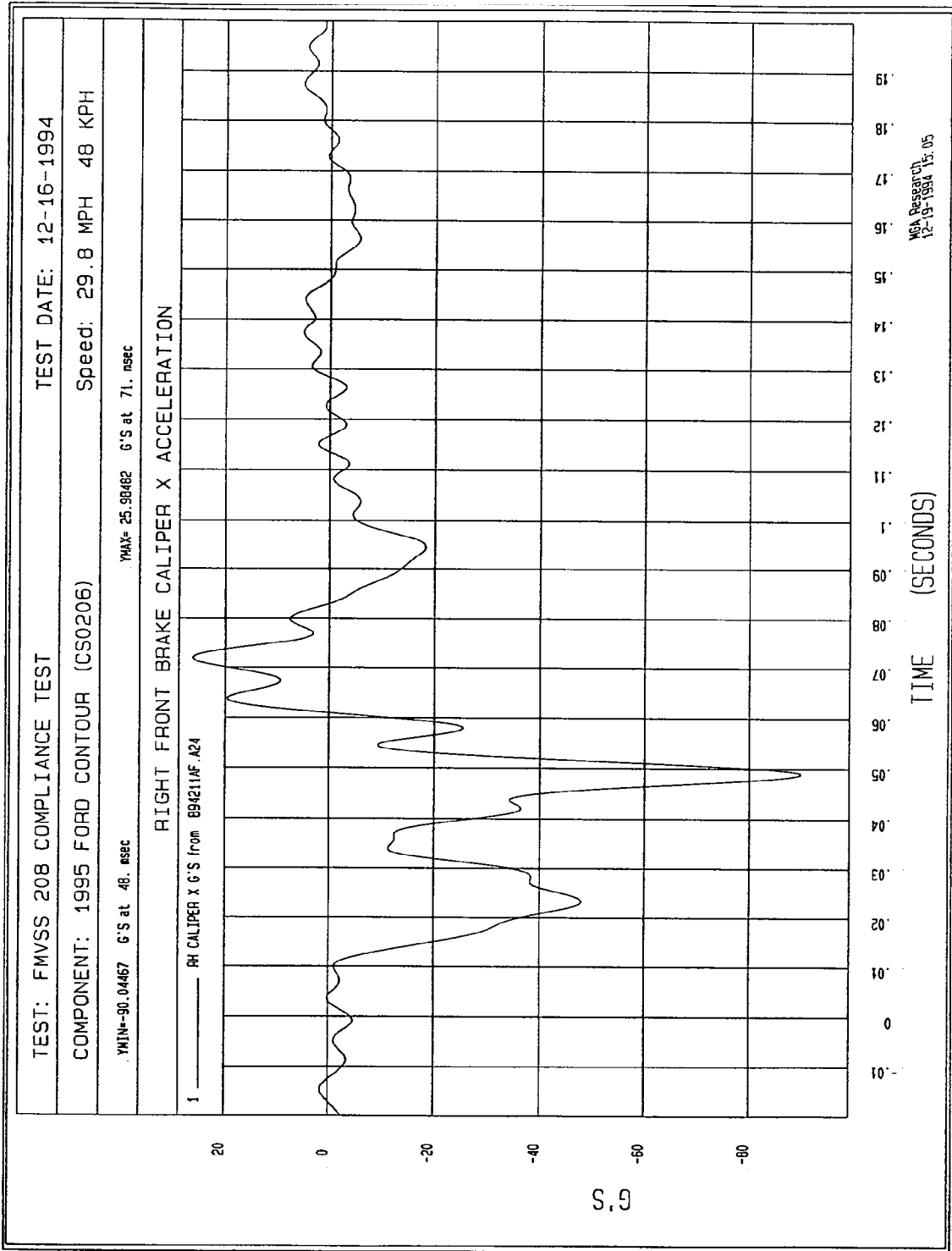


Figure B-30 - Right Brake Caliper X Acceleration vs. Time

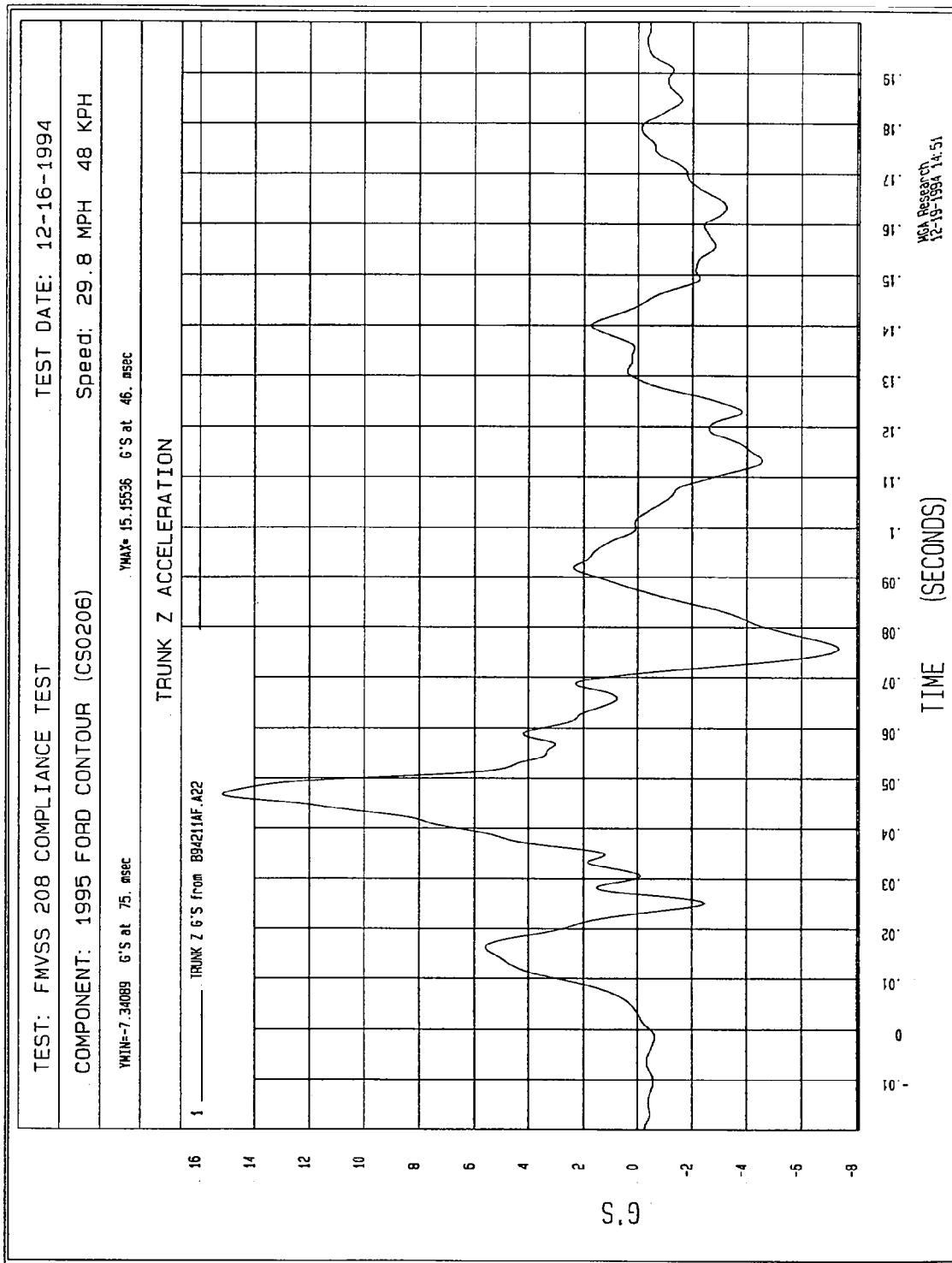


Figure B-31 - Trunk Floor Z Acceleration vs. Time

APPENDIX C
MANUFACTURER'S VEHICLE INFORMATION



Robert H. Munson
Executive Director
Automotive Safety and Engineering Standards Office
Environmental and Safety
Engineering Staff

Ford Motor Company
330 Town Center Drive
Dearborn, Michigan 48126

September 12, 1994

Mr. Robert F. Hellmuth
Director
Office of Vehicle Safety Compliance
National Highway Traffic
Safety Administration
400 Seventh Street, S.W.
Washington, DC 20590

Dear Mr. Hellmuth:

Reference: NEF-31CCa; IR 1517

This is in response to your letter of July 15, 1994 requesting information relative to possible FMVSS 208 testing by OVSC of a 1995 model year Ford Contour (all models) equipped with a driver and passenger air bag restraint system. Ford's responses to your requests for information are set out below.

Request No. 1

"Please inform OVSC whether air bag automatic restraint system provided at the driver's and passenger's seating positions in your vehicle is certified to meet the requirements of S4.1.2.1(c)(1) or S4.1.2.1(c)(2) for FMVSS No. 208."

Answer

The supplemental air bag automatic restraint systems provided at the driver's and passenger's seating positions of all models of the 1995 Contour were installed to meet the requirements of S4.1.2.1(c)(2) of FMVSS No. 208.

Request No. 2

"If the automatic restraint system provided at the driver's and passenger's seating positions in the subject vehicle was

September 12, 1994

installed to meet the requirements of S4.1.2.1(c)(1), please provide a copy of the certification test reports for each of the test configurations required by that section of the standard (i.e., moving barrier lateral impact and dynamic rollover) and a copy of the certification reports for the frontal/angular barrier impact test required by S4.1.2.1."

Answer

The supplemental airbag automatic restraint systems provided at the driver's and passenger's seating positions were not installed in the 1995 Contour vehicles to meet the requirements of S4.1.2.1(c)(1).

Request No. 3

"If a manual 3-point safety belt is provided with the driver's and passenger's automatic restraint system in order to meet the requirements of S4.1.2.1(c)(2), please provide a copy of the certification test reports for each of the test configurations required by that section of the standard (i.e., frontal/angular barrier impact test of the automatic restraint system with the manual safety belt unfastened and frontal/angular barrier impact test of the automatic restraint system with the manual safety belt fastened)."

Answer

The manual three-point safety belts provided with the driver's and passenger's supplemental air bag restraint systems in all models of the 1995 Contour were provided to meet the requirements of S4.1.2.1(c)(2) of FMVSS No. 208. Attachments I and II contain portions of the final test reports relevant to the requirements of S4.1.2.1(c)(2) for Ford Crash Tests 1772, a 90 degree front fixed barrier impact with the driver's and passenger's manual three-point safety belts unfastened, and Crash Test 1775, a 90 degree front fixed barrier impact with the driver's and passenger's manual belts fastened. Both tests were of 1995 model year CDW-27 Mercury (Mystique) vehicles, which, with respect to compliance to FMVSS 208, S4.1.2.1, are essentially identical to the Contours (CDW-27 Fords). Therefore, the results of these tests were relied on as a basis for certifying compliance of all models of the 1995 Contour vehicles equipped with driver's and passenger's supplemental air bag automatic restraint systems with S4.1.2.1.

Request No. 4

"If the manual safety belt provided at the driver's and passenger's seating positions was not installed to meet the requirements of S4.1.2.1(c)(2), please provide a copy of a crash test report or engineering analysis showing that the use of the manual safety belt with the automatic restraint system does not affect the ability of the vehicle to meet the requirements of FMVSS No. 208."

Answer

As noted in our response to Request No. 3, the manual safety belt systems provided at the driver's and passenger's seating positions of the 1995 Contour were installed to meet the requirements of FMVSS No. 208 S4.1.2.1(c)(2).

Request No. 5

"If the vehicle uses a pressure vessel to inflate the air bag, provide a copy of the test reports or engineering analysis to demonstrate that it meets all the requirements of S9.1."

Answer

The 1995 Contour driver's and passenger's supplemental air bag restraint systems do not use a pressure vessel.

Request No. 6

"If the vehicle uses an explosive device to inflate the air bag, provide a copy of the test reports or engineering analysis to demonstrate that it meets all the requirements of paragraph S9.2."

Answer

Attachment III contains the engineering analysis and test data from TRW Vehicle Safety Systems, Inc., demonstrating compliance to S9.2 of FMVSS 208 for the driver and passenger air bag restraint module assemblies for all models of the 1995 model year Contour.

Request No. 7

"State, for any safety belt system in this vehicle, whether or not it is equipped with a tension-relieving device."

September 12, 1994

Provide a copy of the information furnished in accordance with S7.4.2, if the tension-relieving device is used."

Answer

The 1995 Contour driver's and passenger's three point safety belt systems do not use a tension-relieving device.

Request No. 8

"FMVSS No. 208, S8.1.5 allows the manufacturer the option of having movable vehicle windows and vents placed in the closed position. State whether the vehicle's movable windows and vents were opened or closed for the certification tests."

Answer

Attachment IV identifies the window positions in Ford's FMVSS 208 frontal certification crash tests of the Contour and Mystique vehicles.

Request No. 9

"FMVSS No. 208, S5.1 provides a manufacturer with the option of using either a Part 572(B) or Part (E) test dummy. Please inform OVSC which test dummy was used in each seat for each certification test. Submit dummy placement measurements, including diagrams or photographs which show exactly where measurements were taken. Enclosed is a diagram of some of OVSC's dummy measurements. Where possible, use the dimension shown in the diagram to provide the individual dummy placement measurements."

"State whether the vehicle has a foot rest for the driver."

"If the vehicle can be equipped with a split front bench seat, state whether the driver dummy was located so that the midsagittal plane was centered on the steering wheel rim or the center of the seat cushion. Also, state whether the passenger dummy was located so that the midsagittal plane was centered the same distance from the longitudinal centerline of the vehicle as the driver dummy or in the center of the seat cushion."

Answer

Part 572(E) (Hybrid III) test dummies were used at both front outboard designated seating positions in the frontal barrier

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crash tests of the 1995 Contour vehicles identified in response to Request No. 12. Attachment V contains illustrations and dummy placement measurements for the driver and passenger seating positions in these tests.

The 1995 Contour vehicle has a footrest for the driver.

The 1995 Contour vehicle is not available with a split front bench seat.

Request No. 10

"Provide the seat positioning, steering column positioning, and fuel tank data on the enclosed form. If more than one front seating configuration, steering column or fuel tank are available on this vehicle, provide separate information for each."

Answer

Attachment VI contains the NHTSA form enclosed with your letter, completed with the requested seat positioning, steering column positioning, and fuel tank data applicable to FMVSS No. 208 frontal barrier impact testing of the 1995 Contour.

Request No. 11

"If the vehicle is equipped with adjustable seat belt anchorages, provide the manufacturer's nominal design position for a 50th percentile adult male occupant."

Answer

The manual three-point safety belt systems at the front outboard seating positions of 1995 Contour vehicles have adjustable seat belt anchorages. At the B-pillar, the D-ring has a four position (notch) height adjuster, and the buckle ends of the safety belt systems are rigidly secured to the seat frame and thus move with the adjustable seat tracks. In the Ford crash tests identified in response to Request No. 12, the D-ring adjustment was set at one notch below the highest, and the seat was located in the mid fore/aft position. These adjustments are nominal for the 50th percentile adult male occupant.

Request No. 12

"Provide the speed at impact, vehicle test weight, and resulting injury criteria (i.e., HIC, chest acceleration,

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chest compression for the Part 572(E) dummy and femur loads) recorded for all certification tests conducted to meet the requirements of S4.1.2.1."

"In addition, include each dummy's head and chest acceleration versus time plots and femur loads versus time plots for the full frontal barrier impact tests. Mark these plots to indicate when the following and any other significant events occur:

- 12.1 Driver and passenger knee contact with knee bolster
- 12.2 Collapse of the driver and passenger knee bolsters
- 12.3 Steering column stroke (when it starts and when it ends)

12.4 Driver: Contact of the head with the air bag, steering wheel, hub, windshield, header and any other contact points

Passenger: Contact of the head with the air bag, instrument panel, windshield, header and any other contact points

12.5 Contact of the driver's torso with the air bag, steering wheel and hub

12.6 Time during event when the air bag starts to deploy and when it is fully deployed

12.7 Mark on the plots any unexpected events, like steering wheel fracture, windshield contact, windshield header contact, that affected the normal loading characteristics."

Answer

The listing contained in Attachment VII includes the speed at impact, vehicle test weight, and injury criteria values recorded in FMVSS 208, S4.1.2.1 compliance tests conducted by Ford applicable to all models of the 1995 Contour.

Resultant head and chest acceleration versus time plots and femur loads versus time plots for the driver and passenger dummies for Crash Test 1772 and 1775 are included in the crash test reports being provided in response to Request No. 3. These plots, together with the driver and passenger dummy plots from Crash Tests 1752, 1753, 1761, 1762 and 1765 which are included in Attachment VIII represent all full frontal barrier (90 degree) impact tests that were used as a basis for certification of the 1995-Contour to FMVSS No. 208. Note that for Crash Test 1765, the R. F. passenger chest deflection data was invalid and therefore is not available.

In response to your request for items 12.1 through 12.7, Ford does not normally record this data in the manner requested as

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part of our test analysis. In the absence of any known relevance or need related to the stated purpose of your inquiry, we must respectfully decline to undertake the substantial effort required to analyze this data in the manner requested. Should the agency require this information subsequent to its compliance testing, Ford, of course, will provide all necessary and relevant information.

Request No. 13

"When vehicle components must be removed to obtain the proper test weight, what components do you recommend for removal and in what priority order do you recommend removal?"

Answer

The following is a suggested list of items that may be removed from the test vehicle for frontal FMVSS No. 208 testing. This list below is in order of removal priority:

- Spare tire and jack
- Wheel covers
- Luggage compartment trim
- Decklid
- Rear bumper
- Taillamps
- Rear seat and back
- Quarter panel trim, speakers if any, rear seat belts

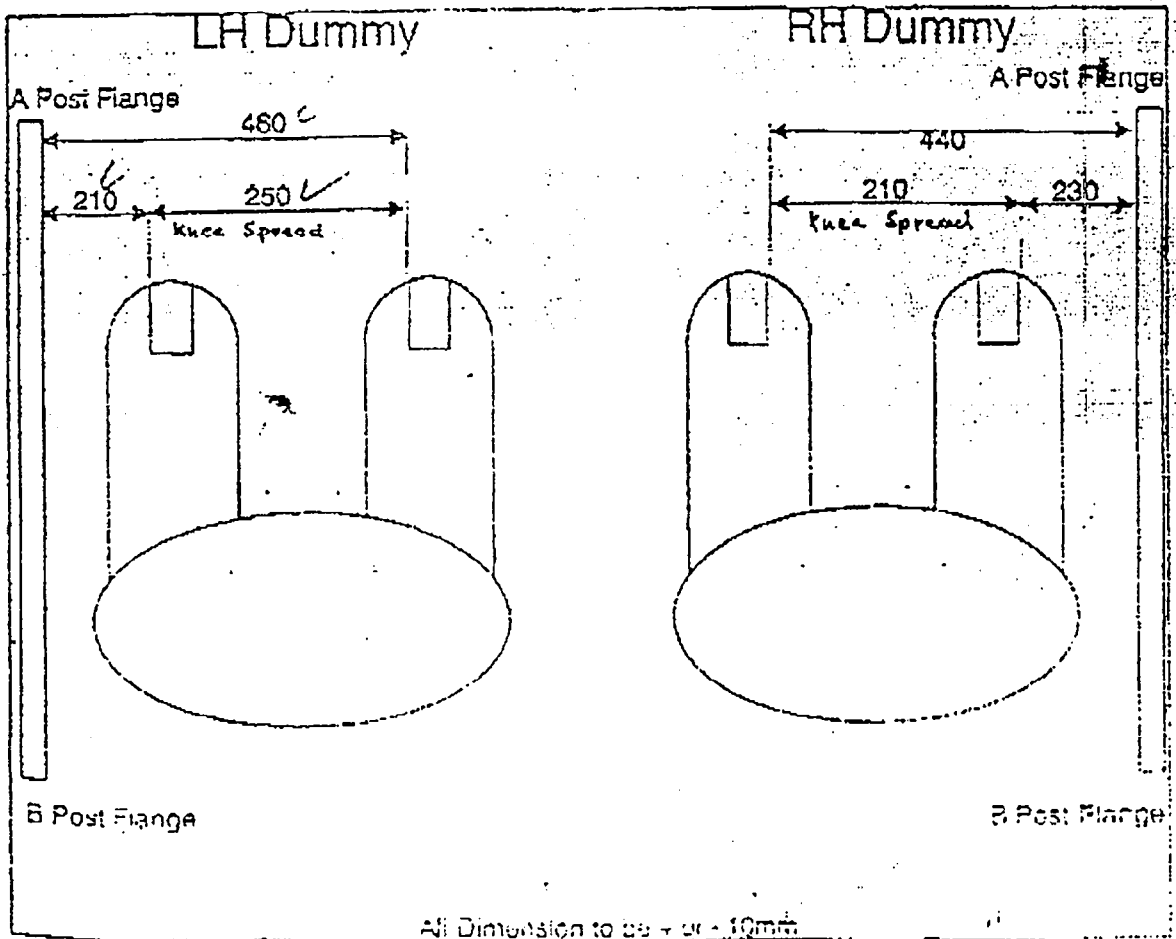
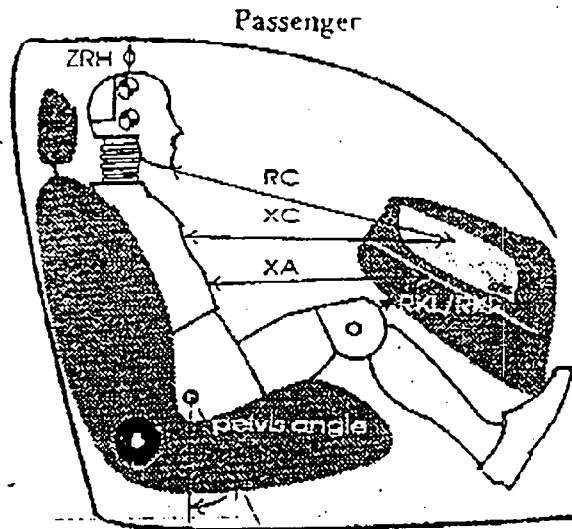
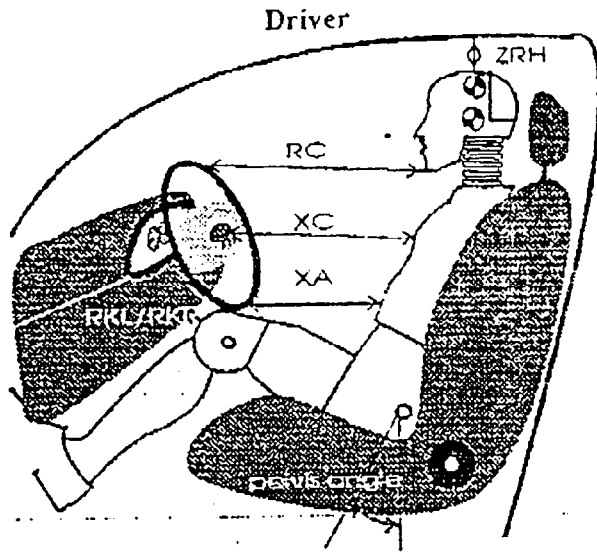
All onboard instrumentation should be included in the vehicle test weight.

Request No. 14

"Please provide FMVSS No. 204, "Steering Control Rearward Displacement" certification data. Include a copy of the test report and any engineering analysis forming the basis of the certification. The report should document the vehicle test weight, impact velocity, and the horizontal and vertical displacements of the steering control. Pre and post test photographs are also requested."

"Discuss the test procedure detailing the vehicle preparation and the measurement technique used to determine the steering control rearward displacement."

Dummy Placement Sketch



Dummy Placement Table

	Driver						Passenger					
	ZRH	RC	XC	XA	Knee Spread	Pelvis Angle	ZRH	RC	XC	XA	Knee Spread	Pelvis Angle
Test-No.												
1752	100	355	250	173		24	82	650	570	435		25
1753	102	354	290	175	250	22	90	684	583	447	210	25
1754	153	354		178	250	22	140	691	599	446	210	24
1755	120	365	221	170	250	22	100	703	622	442	210	25
1757	98	383	270	185	250	23	105	684	480	440	212	24
1761		368		188	250	25	135	673	582	444	210	25
1762	124	380	257	180	255	24	95	695	585	450	210	25
1766	110	385	294	190		22	88	680	608	444		23
1772	155	357		180	250	23	145	668	583	446	210	25
1773	96	374		182		21	92	689	610	450		24
1775	108	375	265	188	255	23	105	695	598	460	210	24

TEST VEHICLE INFORMATION

Vehicle Model Year & Make: 1995 MY FORD CONTOUR

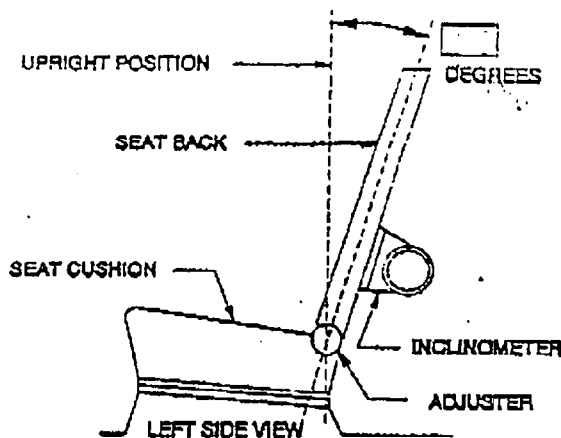
Vehicle Model & Body Style: CONTOUR/MYSTIQUE 4 DOOR SEDAN

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 = 4 degrees.
Measurement Instructions:

* SEE ATTACHED SHEET 3



Seat back angle for passenger's seat = degrees.
Measurement Instructions:

SAME AS DRIVER SIDE

2. SEAT FORE & 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:

NON-POWER SEAT: ADJUST SEAT TRACK TO THE 7TH LATCH POSITION FROM THE FORWARD-MOST POSITION. THE FIRST DETENT OF THE FORWARD-MOST POSITION IS "0".

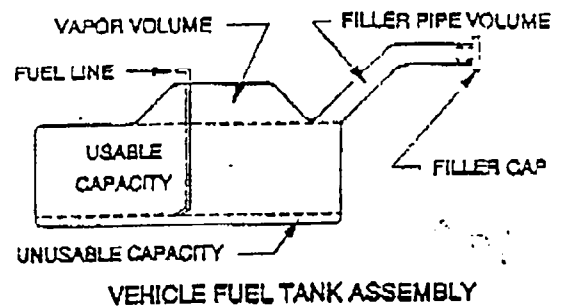
POWER SEAT: ADJUST THE SEAT TRACK TO 4.13 INCHES (105 mm) FROM THE FORWARD-MOST POSITION.

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

SAME AS DRIVER SIDE

3. FUEL TANK CAPACITY DATA --

- 3.1 A. "Usable Capacity" of standard equipment fuel tank = 14.53 gallons. (55 LTRS)
- B. "Usable Capacity" of optional equipment fuel tank = gallons.
- C. "Usable Capacity" of vehicle(s) used for certification testing to requirements of FMVSS 301 = 14.53 gallons.



Operational Instructions:

- 3.2 Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 13.5 gallons
(50 LTRS)
- 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.

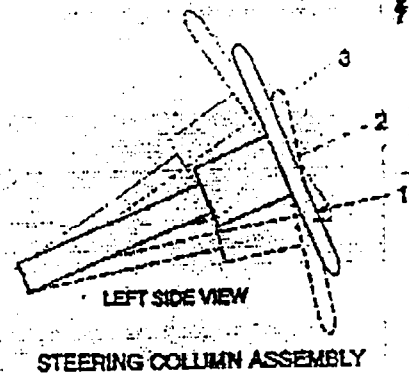
SEE ATTACHED SHEET 3

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:

MEASURE (MARK) THE POSITION OF THE
STEERING COLUMN WHEN IT IS IN THE UPPER-
MOST AND LOWER-MOST POSITION.
CALCULATE THE MID-POINT POSITION FROM
THE TWO MEASURED POSITIONS. ADJUST
THE COLUMN TO THE NEAREST POSITION
TO THE CALCULATED POSITION.



Seat Back Measurement

An H point machine, as described in SAE J826 (June 1992), was used to position the seat back. The machine H point was set to its position in the vehicle within the allowed tolerance. The set-up criteria specified within section 4.3 of J826, such as seat temperature soak times, pelvis axial alignment using the lateral level, etc. were observed. The vehicle rocker sill reference angle is 0 degrees.

It was ensured that the H point machine back angle level indicated a level position; the seat back was then adjusted until the machine's back angle quadrant showed an angle of 24 degrees.

The seat back adjuster wheel was marked on its face and edge, and a corresponding mark placed on the seat back, which would indicate whether any change in seat back angle had occurred when removing the machine and setting up the dummy prior to crash.

Note: ELECTRIC FUEL PUMP OPERATION

The electric fuel pump operates for 2 seconds to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 2 seconds following ignition actuation, the fuel pump will shut off. The fuel pump operates continuously while the engine is running. If the engine stalls, the fuel pump is inactivated. Also, a fuel pump shut-off switch is provided, designed to stop fuel flow to the engine if the vehicle sustains an impact above a certain magnitude.