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212-TRC-94-010
301-TRC-94-010

Vehicle Safety Compliance Testing
for Occupant Crash Protection,
Windshield Mounting, Windshield Zone Intrusion (partial),
and Fuel System Integrity

Ford Motor Company
1994 Ford Mustang
2-door coupe
NHTSA Number: CR0209
TRC Test Number: 940216

Transportation Research Center Inc.
10820 State Route 347
East Liberty, Ohio 43319



March 4, 1994

Final Report

Prepared For:
U.S. Department of Transportation
National Highway Traffic Safety Administration
Office of Vehicle Safety Compliance (NEF-30)
400 Seventh Street, S.W., Room No. 6115
Washington, DC 20590

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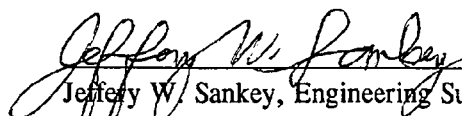
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16. Abstract A 30 mph flat frontal barrier impact test was conducted on a 1994 Ford Mustang 2-door coupe, NHTSA No. CR0209, at Transportation Research Center Inc. on February 16, 1994. This test was conducted to determine compliance with Federal Motor Vehicle Safety Standards: FMVSS 208, "Occupant Crash Protection"; 212, "Windshield Mounting"; 219 (partial), "Windshield Zone Intrusion"; and 301 "Fuel System Integrity." The barrier impact velocity was 29.3 mph. The vehicle's maximum static crush was 12.6 inches. The ambient temperature was 74° F. The driver's head injury criteria (HIC) was 111. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 39.6 g. The driver's chest maximum deflection was 1.1 inches. The driver's left and right femur maximum axial forces were 1278 pounds and 1018 pounds, respectively. The passenger's HIC was 207. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 30.6 g. The passenger's chest maximum deflection was 0.9 inches. The passenger's left and right femur maximum axial forces were 1293 pounds and 1251 pounds, respectively. The vehicle appears to comply with the applicable requirements of FMVSS 208, 212, 219 (partial), and 301.					
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 Available from: NHTSA Technical Reference Division Room 5108, (NAD-52) 400 Seventh Street, S.W. Washington, DC 20590 Attn: Mr. Robert Hornickle		
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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
qt	pints	0.47	liters	l
gal	quarts	0.95	liters	l
ft ³	gallons	3.8	liters	l
yd ³	cubic feet	0.03	cubic meters	m ³
	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 exactly. For other exact conversions and more detailed tables, see NBS NISTC Pub. 280, Units of Weights and Measures, FPL 92-25, SD Catalog No. C13.10206.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	ac
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	st
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	36	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

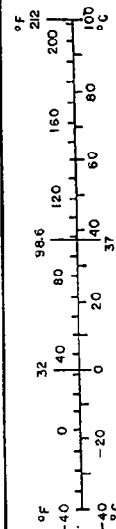


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Section 1.0

Purpose and Test Procedure

Purpose

This 30 mph flat frontal barrier impact test is part of the Federal Motor Vehicle Safety Standards (FMVSS) 208, 212, 219 (partial), and 301 compliance test program conducted for the National Highway Traffic Safety Administration (NHTSA) by the Transportation Research Center Inc. (TRC) under Contract No. DTNH22-93-D-01089. The purpose of this test was to determine if the subject vehicle, a 1994 Ford Mustang 2-door coupe, NHTSA No. CR0209, 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. 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 flat frontal barrier.

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 procedure 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 a six-axis neck load cell to measure longitudinal, lateral and vertical forces and moments.

The thirty-eight (38) data channels were multiplexed and recorded on a 14-track tape drive. The data was digitally sampled at 12,500 samples per second and processed per Sections 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 one (1) real-time motion picture camera.

The vehicle and occupant data are summarized in Section 2.0. The FMVSS 208, 212, 219 (partial) and 301 data are presented in Section 3.0. The vehicle, occupant, and camera measurements are presented in Section 4.0. 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 2.0

Frontal Barrier Impact Test Summary

Test Results Summary

This flat frontal barrier test was conducted at TRC on February 16, 1994.

The test vehicle, a 1994 Ford Mustang 2-door coupe, NHTSA No. CR0209, 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 airbags at the driver's and right front passenger's seating positions. The vehicle's test weight was 3510 pounds. The vehicle's impact speed was 29.3 mph. The vehicle's maximum static crush was 12.6 inches.

The driver's HIC was 111. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 39.6 g. The driver's chest maximum deflection was 1.1 inches. The driver's left and right femur maximum compressive forces were 1278 pounds and 1018 pounds, respectively.

The right front passenger's HIC was 207. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 30.6 g. The right front passenger's chest maximum deflection was 0.9 inches. The right front passenger's left and right femur maximum compressive forces were 1293 pounds and 1251 pounds, respectively.

There was loss of windshield periphery retention from 9 to 13 inches along the lower edge of the windshield measured from the lower left corner.

There was 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.

Data Acquisition Explanations

The dash panel center X-axis accelerometer, DPCXG1, recorded a data spike at 127 milliseconds. The data spike was a result of the vehicle's rear view mirror breaking loose during the impact and striking the accelerometer.

Table 1 Crash Test Summary

NHTSA number:	CR0209
Test type:	Frontal barrier impact
Test date:	02/16/94
Test time:	1347
Ambient temperature at impact area:	74° F
Vehicle year/make/ model/body style:	1994/Ford/Mustang/2-door coupe
Vehicle test weight:	3510 lb
Impact angle ¹ :	0°
Impact velocity ² :	
Primary:	29.3 mph
Secondary:	29.3 mph
Maximum static crush:	12.6 in
Average rebound:	64.7 in
Number of cameras:	
Real-time:	2
High-speed:	14
Door opening data:	
Left:	Easy
Right:	Easy

¹ With respect to tow track centerline.

² Speed trap measurement ($\pm$.05 mph accuracy)

Table 1 Crash Test Summary, Cont'd.

Dummies:	<u>Driver #314</u>	<u>Passenger #230</u>
Type:	Part 572 E	Part 572 E
Location:	Left front	Right front
Restraint:	Airbag	Airbag
Number of data channels:	15	15
Front seat data:		
Seat track failure:	None	None
Seat back failure:	None	None
Visible dummy contact points:		
Head:	Airbag & sun visor	Airbag & sun visor
Chest:	Airbag	Airbag
Abdomen:	None	None
Left knee:	Instrument panel	Instrument panel
Right knee:	Instrument panel	Instrument panel

Table 2 Test Vehicle Information

Vehicle year/make/
model/body style: 1994/Ford/Mustang/2-door coupe

Color: Blue

VIN: 1FALP4048RF124293

NHTSA number: CR0209

Engine data:

Placement: Longitudinal/inline

Cylinders: 6

Displacement: 3.8 liters

Transmission data: 5 speed, X manual, ___ automatic, ___ overdrive

Final drive: ___ fwd, X rwd, ___ 4wd

Date vehicle received: 01/31/94

Odometer reading: 140

Dealer's name
and address: West-Herr Ford
5025 Camp Rd.
Hamburg, NY 14075

Accessories:

Power steering	Yes	Automatic transmission	No
Power brakes	Yes	Automatic speed control	No
Power seats	No	Tilting steering wheel	Yes
Power windows	No	Telescoping steering wheel	No
Tinted glass	Yes	Air conditioning	Yes
Radio	Yes	Anti-skid brake	No
Clock	Yes	Rear window defroster	Yes
Power door locks	No	Other	No

Certification data from vehicle's label:

Vehicle manufactured by: Ford Motor Company

Date of manufacture: 10/93

VIN: 1FALP4048RF124293

GVWR: 4419 lb

GAWR: Front: 2364 lb

Rear: 2072 lb

Table 2 Vehicle Information, Cont'd.

Size of tires on vehicle: P205/65R15

Tire pressure with maximum
capacity vehicle load:

Front: 44 psi

Rear: 44 psi

Spare tire: Space saver

Type of front seats: Bucket

Tire & capacity data from vehicle's label:

Recommended tire size: P205/65R15

Recommended cold tire pressure:

Front: 35 psi

Rear: 35 psi

Designated seating capacity:

Front: 2

Rear: 2

Total: 4

Vehicle capacity weight: 700 lbs.

Test vehicle attitudes:

Delivered attitude: LF: 28.6 in. RF: 28.5 in LR: 29.0 in RR: 28.9 in

Fully loaded attitude: LF: 27.8 in RF: 27.8 in LR: 27.2 in RR: 26.9 in

Pre-test attitude: LF: 27.8 in RF: 27.8 in LR: 27.7 in RR: 27.1 in

Table 2 Test Vehicle Information, Cont'd.

Weight of test vehicle as received (with maximum fluids):

Right front	867	lb	Right rear	673	lb
Left front	905	lb	Left rear	651	lb
Total front weight	1772	lb	(57.2% of total vehicle weight)		
Total rear weight	1324	lb	(42.8% of total vehicle weight)		
Total delivered weight	3096	lb			

Calculation of test vehicle's target test weight:

RCLW¹ = Rated Cargo and Luggage Weight

UDW = Unloaded Delivered Weight (3096 lb)

VCW = Vehicle Capacity Weight (700 lb)

DSC = Designated Seating Capacity (4)

RCLW¹ = VCW - 150 (DSC) = 700 - 150(4) = 100 lb

Target test weight = UDW + RCLW¹ + (Number of Hybrid III dummies
x 167 lb per dummy)

Target test weight = 3096 + 100 + 334 = 3530 lb

Weight of test vehicle with required dummies and 80 lb of cargo weight:

Right front	953	lb	Right rear	799	lb
Left front	974	lb	Left rear	784	lb
Total front weight	1927	lb	(54.9% of total vehicle weight)		
Total rear weight	1583	lb	(45.1% of total vehicle weight)		
Total test weight	3510	lb	(0.6% under target test weight)		

Weight of ballast secured in vehicle cargo area: 0 lb

Components removed to meet target test weight: Rear bumper

CG rearward of front wheel centerline: 45.6 in

Vehicle Wheelbase: 101.0 in

¹ Cargo weight for multi-purpose passenger vehicles, trucks, 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

Test number: 940216
NHTSA number: CR0209
Test date: 02/16/94
Test time: 1347
Test type: Frontal barrier impact
Impact angle: 0°
Ambient temperature
at impact area: 74° F
Temperature in
occupant compartment: 70° F
Impact velocity:
Primary: 29.3 mph
Secondary 29.3 mph
Specified range: 28.9 to 29.9 mph

Distance from vehicle to barrier:

Entering velocity trap: 14.0 in
Exiting velocity trap: 2.0 in

Test vehicle static crush:

Overall length of test vehicle:

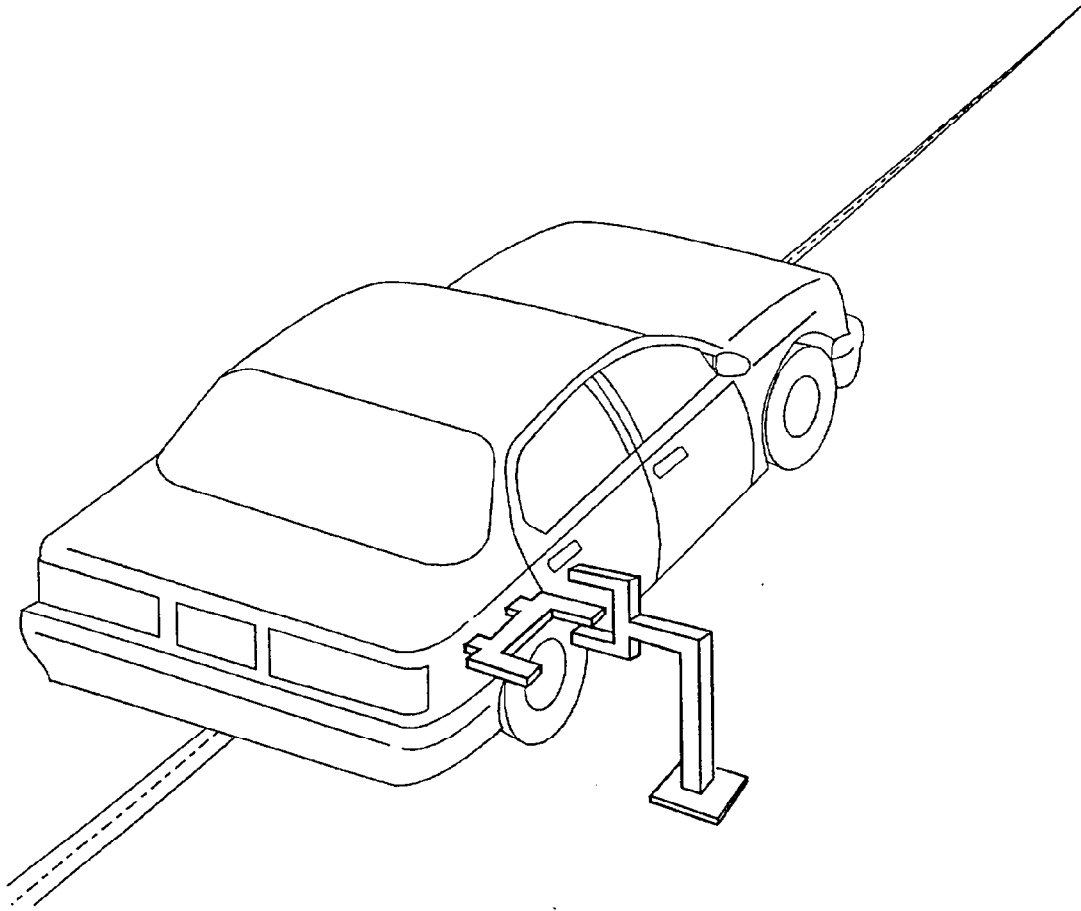
Pre-test:	L:	176.2 in	C:	180.6 in	R:	176.5 in
Post-test:	L:	165.8 in	C:	168.0 in	R:	168.0 in
Total crush:	L:	10.4 in	C:	12.6 in	R:	8.5 in
Average crush:		10.5 in				

Test vehicle rebound from flat barrier:

Distance from test vehicle to barrier:

Post-test:	L:	65.4 in	C:	65.6 in	R:	63.0 in
Average rebound:		64.7 in				

Figure 1 Impact Velocity Measurement System



The final vane clears emitter/receiver two inches before impact.
The vanes have a one-foot spacing.

Figure 2 Accident Investigation Division Data for 30 mph Frontal Barrier Impact

NHTSA number: CR0209
 Test date: 02/16/94
 Vehicle year/make/
 model/body style: 1994/Ford/Mustang/2-door coupe
 Vehicle size category: Sub-compact
 VIN: 1FALP4048RF124293
 Build date: 10/93
 Test weight: 3510 lb
 Vehicle wheelbase: 101.0 in
 Maximum width: 72.0 in
 Front overhang: 40.4 in

Collision Deformation

Classification (CDC) Code: 12FDEW2

Crush depth
 measurements:

C1:	10.4 in
C2:	12.5 in
C3:	12.5 in
C4:	12.3 in
C5:	11.0 in
C6:	8.5 in

Midpoint of damage: D: Vehicle Longitudinal Centerline

Length of damaged
 region:

L:	57.5 in
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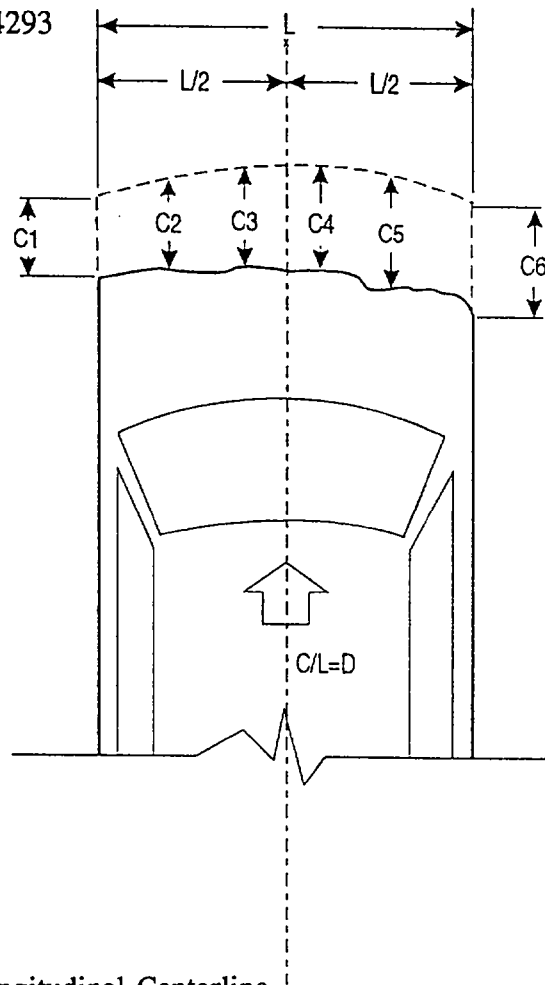


Table 4 Post-test Airbag Data

NHTSA number: CR0209
Test date: 02/16/94
Technician: Markusic
Vehicle year/make/
model/body style: 1994/Ford/Mustang/2-door coupe

A. Number of airbag vent holes:

Driver: 2
Passenger: 1

B. Size of airbag vent holes:

Driver: 0.8 in dia
Passenger: 2.4 in dia

C. Total airbag vent area:

Driver: 1.0 in²
Passenger: 4.5 in²

D. Deflated airbag length and width dimensions or, if round, diameter

Driver:	Length	NA
	Width	NA
	Diameter	25.6
Passenger:	Length:	32.5
	Width:	34.0
	Diameter:	NA

Table 4 Post-test Airbag Data, Cont'd.

E. Is the airbag tethered?

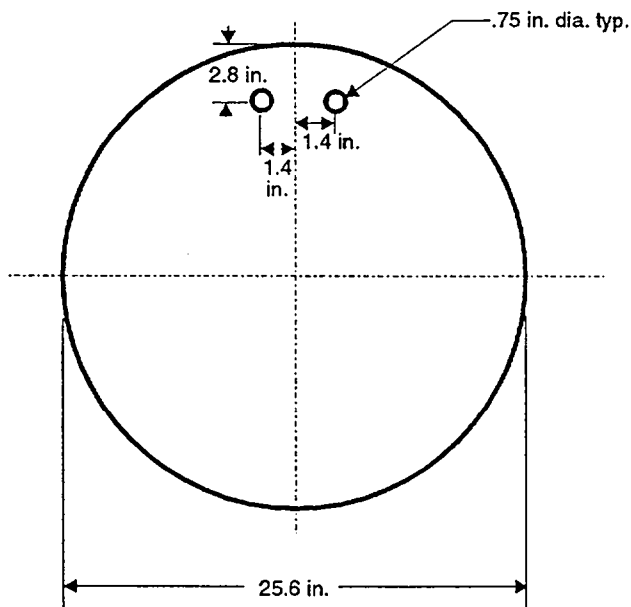
Driver: No

If yes, record length of tether: NA

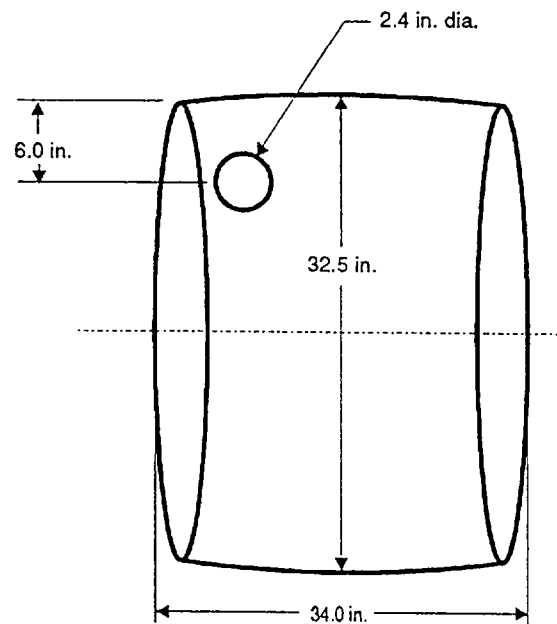
Passenger: No

If yes, record length of tether: NA

Driver's airbag:



Passenger's airbag:

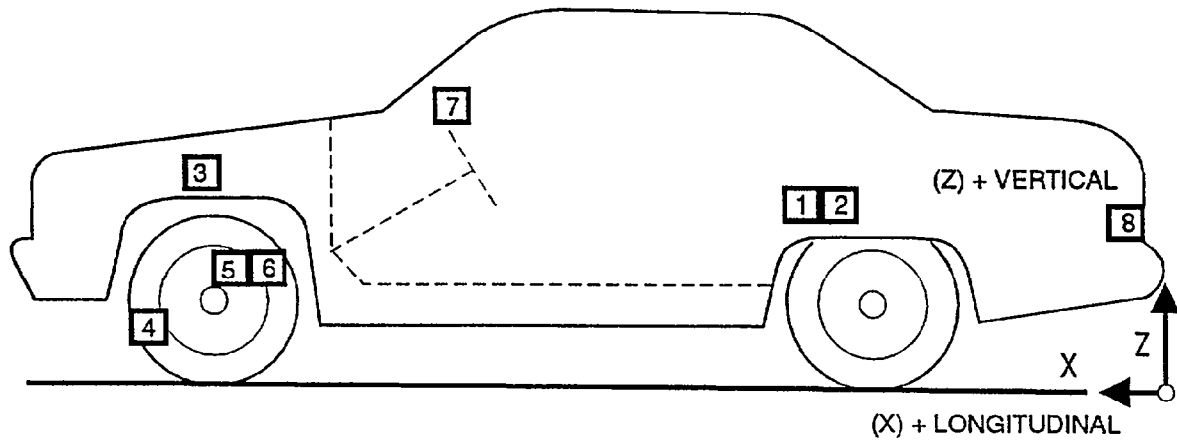


F. Airbag and gas generator part numbers and manufacturer's names.

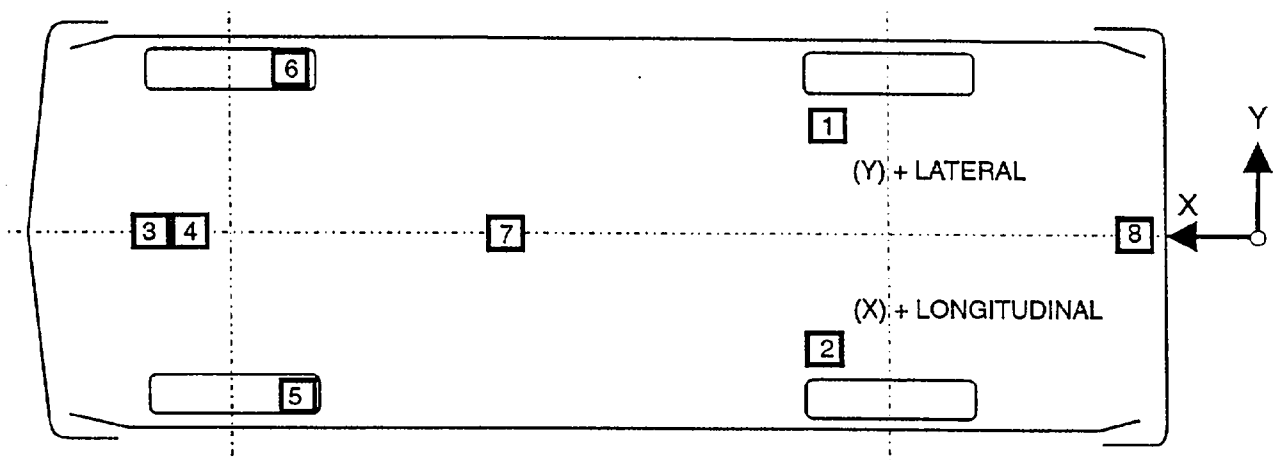
Driver: Mfr.: NA; Airbag: PUT12168-016; Gen: FBADX93UBFZ

Passenger: Mfr.: NA; Airbag: F4ZB-63044R74AJYCDV; Gen: MP5B299G20215

Figure 3 Vehicle Accelerometer Placement



SIDE VIEW



BOTTOM VIEW

Table 5 Vehicle Accelerometer Locations and Data Summary

No. LOCATION	X		Y		Z		POSITIVE DIRECTION		NEGATIVE DIRECTION	
1 LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	PRE	66.5 in	20.2 in	18.2 in						
	POST	67.2 in	20.2 in	17.9 in	1.5 g	@ 141.4 ms	29.9 g	@ 63.5 ms		
2 RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	PRE	66.0 in	-20.8 in	18.2 in						
	POST	67.2 in	-20.2 in	18.2 in	2.6 g	@ 138.5 ms	31.4 g	@ 63.7 ms		
3 ENGINE TOP LONGITUDINAL	PRE	139.4 in	1.4 in	33.8 in						
	POST	136.0 in	1.8 in	33.0 in	16.8 g	@ 63.5 ms	58.4 g	@ 47.0 ms		
4 ENGINE BOTTOM LONGITUDINAL	PRE	135.2 in	3.5 in	8.1 in						
	POST	135.1 in	3.1 in	9.1 in	31.1 g	@ 60.2 ms	53.7 g	@ 45.6 ms		
5 RIGHT BRAKE CALIPER LONGITUDINAL	PRE	137.2 in	-26.5 in	12.8 in						
	POST	137.2 in	-25.8 in	13.0 in	6.1 g	@ 162.6 ms	39.1 g	@ 66.5 ms		
6 LEFT BRAKE CALIPER LONGITUDINAL	PRE	137.0 in	26.5 in	12.8 in						
	POST	137.2 in	25.8 in	13.5 in	15.2 g	@ 56.1 ms	47.7 g	@ 39.8 ms		
7 INSTRUMENT PANEL CENTER LONGITUDINAL ¹	PRE	116.4 in	0.0 in	37.2 in						
	POST	116.0 in	0.0 in	36.1 in	20.9 g	@ 25.0 ms	55.1 g	@ 68.7 ms		
8 VEHICLE REAR CENTER VERTICAL	PRE	9.2 in	0.0 in	20.9 in						
	POST	9.9 in	0.0 in	23.8 in	21.5 g	@ 122.6 ms	27.5 g	@ 117.8 ms		

REFERENCE: X: + FORWARD FROM REAR BUMPER
Y: + LEFTWARD FROM VEHICLE CENTERLINE
Z: + UPWARD FROM GROUND LEVEL

¹See DATA ACQUISITION EXPLANATIONS

Report of Vehicle Condition at the Completion of Testing

Contract number: DTNH22-93-D-01089
From: Transportation Research Center Inc.
10820 State Route 347
East Liberty, OH 43319

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 Industrial Property Manager/NAD-30, with a carbon copy to the responsible testing office. The vehicle is again inspected, after the above test has been conducted, and all changes are noted below. The final condition of the vehicle is also noted in detail.

NHTSA number: CR0209
Vehicle year/make/
model/body style: 1994/Ford/Mustang/ 2-door coupe
Body color: Blue
VIN: 1FALP4048RF124293
Odometer (arrival): 140 Date: 01/31/94
Odometer (completion): 145 Date: 02/16/94
Cost: \$14,525.00

Air conditioner	Yes	Console	Yes	Brakes	Power
Tinted glass	Yes	Tachometer	Yes	Front	Disc
Power steering	Yes	Speed control	No	Rear	Disc
Power windows	No	Rear window def.	Yes	Front seats	Adjustable
Power door locks	No	Sun/moon roof	No	Seat type	Front-Bucket
Radio	Yes	T-top	No		Rear-Bench
Clock	Yes	Tilt steering wheel	Yes	Number of seats	4
Roof rack	No	Other options:	No		

Report of Vehicle Condition at the Completion of Testing, Cont'd.

Engine data:

Cylinders: 6
Displacement: 3.8 liters
Transmission: Manual
Final drive: RWD
Tire size: P205/65R15
Gasoline type: Unleaded

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

rear seat
spare tire
trunk trim
rear bumper

Explanation:

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

VEHICLE CONDITION: Vehicle was subjected to a 30 mph crash test. There is severe structural damage. Various interior and exterior portions of the vehicle have been painted and have had holes drilled to facilitate attachment of instrumentation. Various trim and body parts have been removed including the rear seats. 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 3.0

FMVSS 208, 212, 219 (partial), and 301 Data

Table 6 Dummy Injury Criteria

Maximum Acceleration

	Head				Chest		
	X	Y	Z	R	X	Y	Z
Driver	-36.7 g	-6.7 g	20.2 g	37.0 g	-36.3 g	-10.1 g	-16.6 g
Passenger	-47.1 g	-11.3 g	-19.1 g	48.7 g	-30.1 g	6.5 g	-9.4 g

Maximum Femur Compressive Force

	Left femur	Right femur
Driver	1278 lbf	1018 lbf
Passenger	1293 lbf	1251 lbf

Head Injury Criteria¹

	HIC	Time t_1	Time t_2
Driver	111	55.0 ms	87.8 ms
Passenger	207	53.2 ms	77.8 ms

Chest Maximum Resultant Acceleration²

	Accelerometer	Time t_1	Time t_2
Driver	39.6 g	84.8 ms	87.8 ms
Passenger	30.6g	81.3 ms	84.3 ms

Maximum Chest Deflection

Driver	1.1 in
Passenger	0.9 in

¹ As defined in FMVSS No. 208

² Defined as equal to or exceeding 0.003 sec. duration

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 impacted the airbag and sun visor rotating slightly rearward as the dummy's chest impacted the airbag. The driver dummy was restrained by the airbag. The dummy rebounded rearward into the seat back as the dummy's head rotated first slightly forward and then rearward. The driver dummy came to rest in the driver's 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 impacted the airbag rotating rearward and to the left as the dummy's chest impacted the airbag. The right front passenger dummy was restrained by the airbag. The dummy rebounded slightly rearward as the dummy's head rotated rearward and to the right. The right front passenger dummy came to rest in the right front passenger's seat, leaning slightly forward.

Table 7 FMVSS 208 Seat Belt Comfort and Convenience Test Summary

Front Outboard Designated Seating Positions

NHTSA number: CR0209

Vehicle model year/make/model/body style: 1994/Ford/Mustang/2-door coupe

Date of comfort/convenience check: 02/03/94

Technician performing check: Markusic

GVWR: 4419 lb

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 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 is not equipped with automatic seat belts.

Table 7 FMVSS 208 Seat Belt Comfort and Convenience Test Summary
Front Outboard Designated Seating Positions, Cont'd.

NHTSA number: CR0209

Vehicle model year/make/model/body style: 1994/Ford/Mustang/2-door coupe

Date of comfort/convenience check: 02/03/94

Technician performing check: Markusic

GVWR: 4419 lb

Webbing Tension-Relieving Device (S7.4.2):

The front outboard seating position assemblies do not have webbing tension-relieving devices.

Belt Contact Force (S7.4.3):

The belt contact force on the chest of the test dummy is 0.2 pounds.

Latchplate Access (S7.4.4):

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

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

Retraction (S7.4.5):

The seat belt automatically retracts when the seat belt latchplate is released.

The stowed seat belt webbing and hardware are not pinched when the door is closed.

Table 7 FMVSS 208 Seat Belt Comfort and Convenience Test Summary
Front Outboard Designated Seating Positions, Cont'd.

NHTSA number: CR0209

Vehicle model year/make/model/body style: 1994/Ford/Mustang/2-door coupe

Date of comfort/convenience check: 02/03/94

Technician performing check: Markusic

GVWR: 4419 lb

Seat Belt Guides and Hardware (S7.4.6):

The seat cushion is movable but the seat back does not serve a function other than seating.

The seat is not removable.

The seat is movable but the space formerly occupied by the seat cannot be used for a secondary function.

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

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

The restraint system does not provide guides.

The inboard receptacle end of the outboard seating position's seat belt is accessible with the center arm rest in any position to which it can be adjusted without moving the arm rest for access.

Table 8 FMVSS 208 Equipment Data

FMVSS 208 Seat Belt Warning System Data

With an occupant in the driver's position and the lap belt/unibelt in stowed position and ignition switch placed in the "start/on" position the duration of audible warning signal is 6 s and the reminder light operates 6 s.

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 is 0 s and the duration of the reminder light operation is 6 s.

NOTE: the audible warning should not operate.

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

Table 8 FMVSS 208 Equipment Data, Cont'd.

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's and passenger's sun visors.

No airbag maintenance is required.

Appropriate instructions concerning maintenance and/or replacement of this system were provided in the owner's manual on page 47.

A description of the functional operation of the system was provided in the owner's manual on pages 46 - 49.

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

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 46 - 49.

Table 8 FMVSS 208 Equipment Data, Cont'd.

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 lower center 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 46.

All rear outboard seating positions had Type 2 seat belts.

Figure 4 FMVSS 212 Test Data

Details of windshield mounting such as retention method, trim type, etc.:

Plastic trim around outer perimeter and adhesive around inner perimeter.

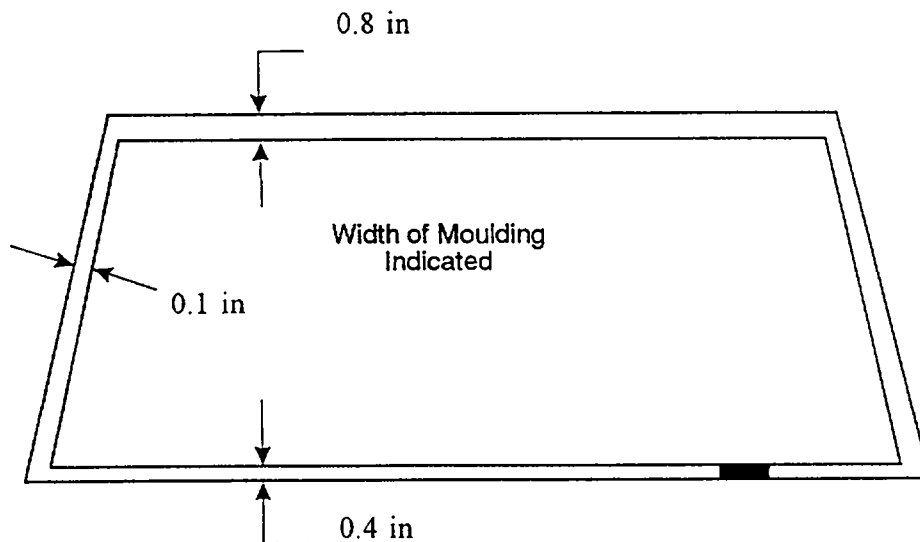
Clips or brackets used to retain windshield: None

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.

Windshield periphery measurements:

	Pre-test	Post-test	Percent Retention
Right side	81.5 in	81.5 in	100.0
Left side	81.5 in	77.5 in	95.1
Total	163.0 in	159.0 in	97.5

Pre-test windshield mounting material temperature: 70° F



Front view of windshield¹

Loss of windshield retention lengths: There was windshield periphery retention loss from 9 to 13 inches along the lower edge of the windshield measured from the lower left corner.

¹ Indicate areas of loss of retention, if any, on windshield diagram.

Figure 5 FMVSS 219 Test Data

Protected zone lower edge requirement:

The lower edge of the protected zone is determined by placing a 6.5-inch diameter 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 contactable by the sphere across the width of the instrument panel. From the outermost contactable 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 0.5 inch 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: 48.2 in

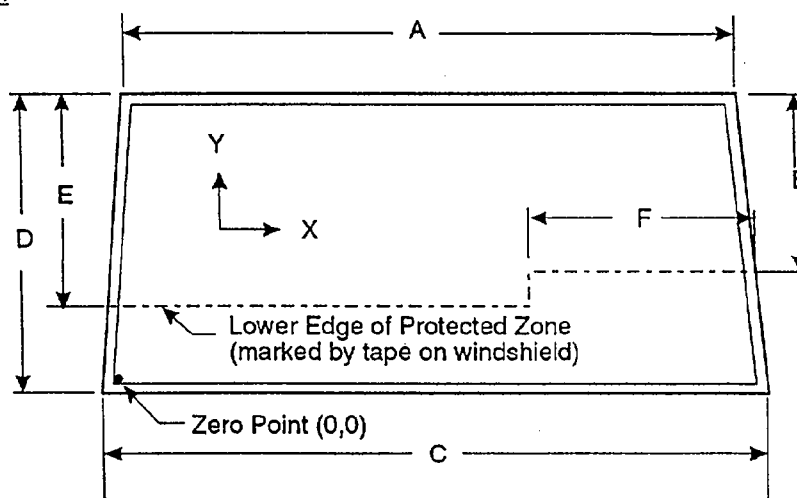
B: 15.0 in

C: 62.2 in

D: 27.4 in

E: 16.8 in

F: 22.9 in



FRONT VIEW

Method of adhering protected zone template to windshield:

NA

Areas of windshield template penetration greater than 0.25 in:

NA

Coordinates

	X	Y
1.		
2.		
3.		

1.

2.

3.

Areas of windshield penetration, below the protected zone, through the inner surface of the windshield:

None

1.

2.

3.

Table 9 Fuel System Data

Vehicle year/make/ model/body style:	1994/Ford/Mustang/2-door coupe
NHTSA number:	CR0209
Fuel system capacity:	15.4 gal (from owner's manual)
Usable capacity:	15.4 gal (furnished by COTR)
Test volume range:	14.2 gal to 14.5 gal (92-94% of usable)
Actual test volume:	14.3 gal (with entire fuel system filled)
Test fluid type:	Stoddard solvent
Specific gravity:	0.764
Kinematic viscosity:	0.99 centistokes
Test fluid color:	purple
Type of fuel pump:	electric

The electric fuel pump does not operate with ignition switch "on" and the engine not operating.

Details of fuel system:

The fuel tank is located behind the rear axle. The fuel filler neck is located on the right side.

The fuel lines run along the right side to the front.

Table 10 FMVSS 301 Post-Impact Test Data

NHTSA number: CR0209
Test date: 02/16/94
Vehicle year/make/
model/body style: 1994/Ford/Mustang/2-door coupe

Test requirements:

Test vehicle 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 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's/passenger's) side
☐ Rear moving barrier (30 mph)
☐ Lateral moving barrier (20 mph)

Fuel system fluid spillage measurements:

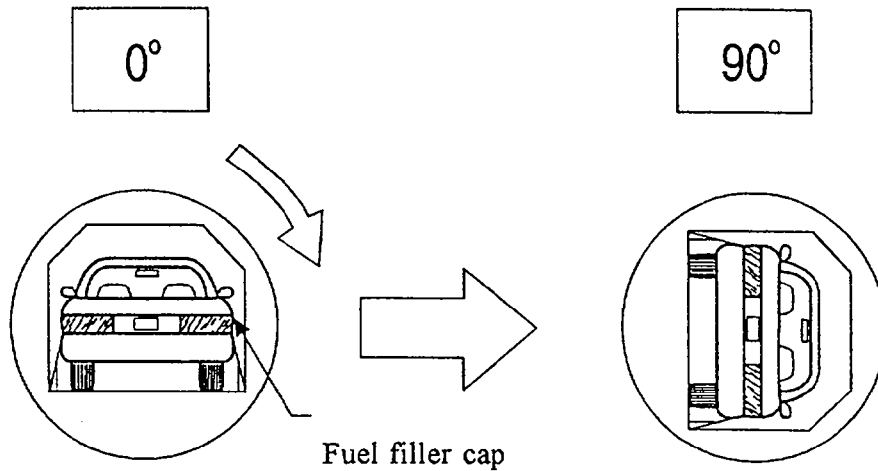
	Test Results	Maximum Allowable
1. From impact until vehicle motion ceases	0 oz	1 oz
2. 5-Minute period after vehicle motion ceases	0 oz	5 oz
3. Next 25 minutes after 5-minute period	0 oz	1 oz/1 min

Fuel system fluid spillage location(s): None

Figure 6 FMVSS 301 Static Rollover Test Data

NHTSA number: CR0209

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds

FMVSS 301 position hold time = 5 minutes, 0 seconds

Total = 7 minutes, 0 seconds

Next whole minute interval = 7 minutes

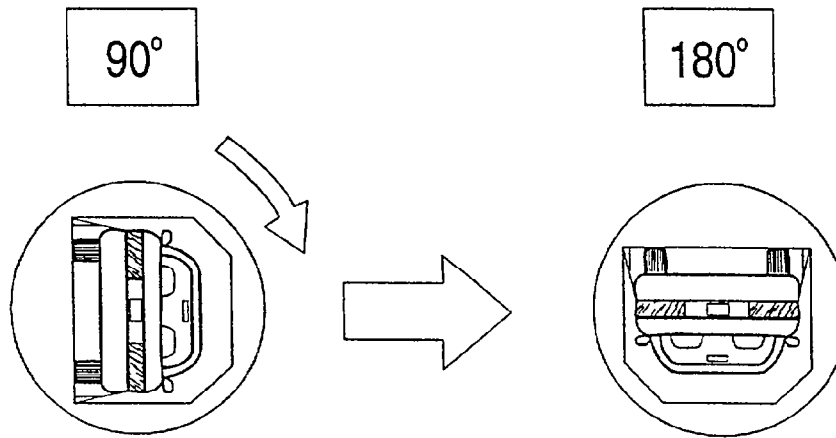
Fuel system fluid spillage measurements:

	Test Results	Maximum Allowable
<u>0° to 90° rotation (fuel filler cap down)</u>		
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

Fuel system fluid spillage location(s): None

Figure 6 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds
 FMVSS 301 position hold time = 5 minutes, 0 seconds
 Total = 7 minutes, 0 seconds
 Next whole minute interval = 14 minutes

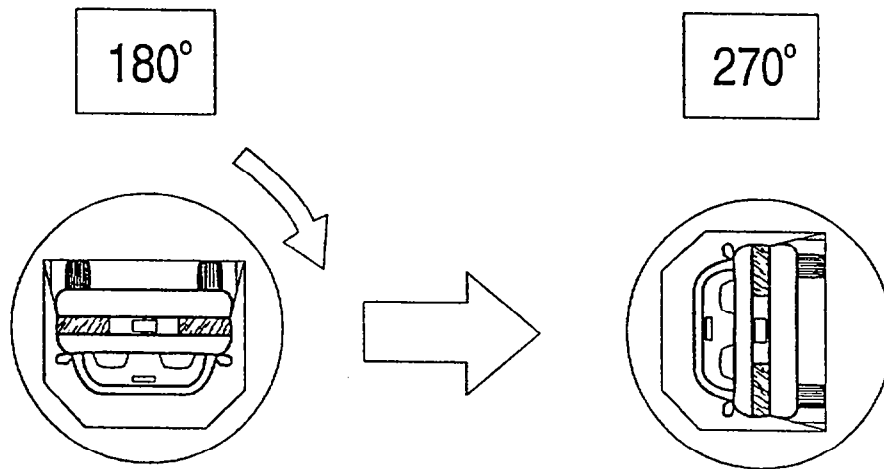
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

Figure 6 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds
 FMVSS 301 position hold time = 5 minutes, 0 seconds
 Total = 7 minutes, 0 seconds
 Next whole minute interval = 21 minutes

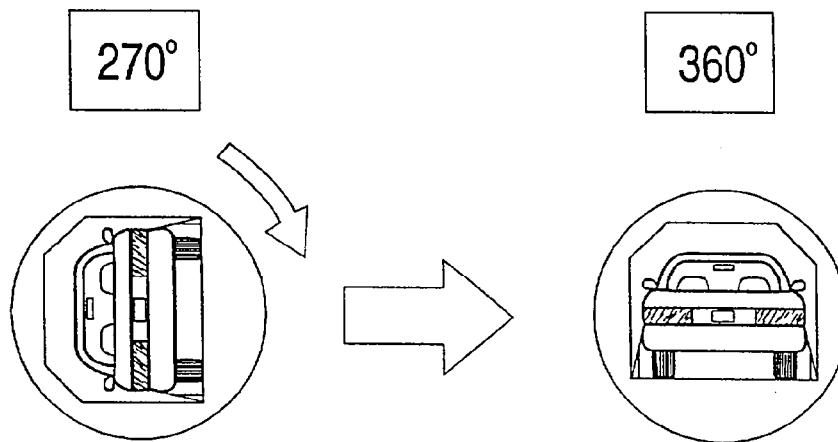
Fuel system fluid spillage measurements:

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

Fuel system fluid spillage location(s): None

Figure 6 FMVSS 301 Static Rollover Test Data, Cont'd.

Test phase



Static rollover machine rotation time information: (specified range is 1-3 minutes)

Time required for machine to rotate 90° = 2 minutes, 0 seconds

FMVSS 301 position hold time = 5 minutes, 0 seconds

Total = 7 minutes, 0 seconds

Next whole minute interval = 28 minutes

Fuel system fluid spillage measurements:

<u>270° to 360° rotation</u>		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

Fuel system fluid spillage location(s): None

Section 4.0

Vehicle, Occupant, and Camera Measurements

Figure 7 Pre-test and Post-test Measurement Points

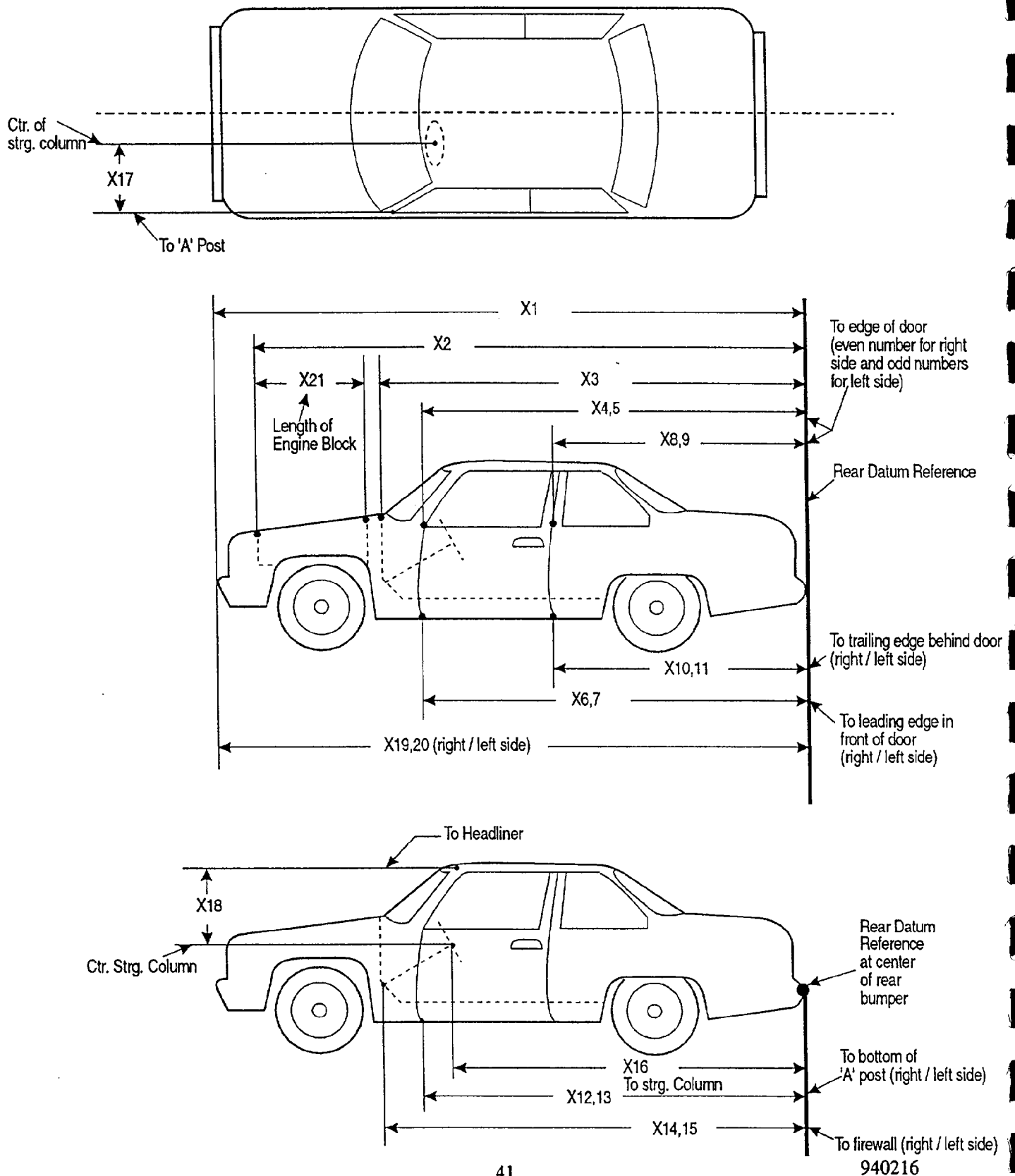


Table 11 Impacted Vehicle Measurements

Vehicle year/make/model/body style: 1994/Ford/Mustang/2-door coupe

Test number: 940216

No.	Type of Measurement	Pre-test	Post-test	Difference
X1	Total length of vehicle at centerline	180.6 in	168.0 in	12.6 in
X2	Rear surface of vehicle to front of engine block	144.1 in	139.8 in	4.3 in
X3	Rear surface of vehicle to firewall	128.2 in	128.0 in	0.2 in
X4	Rear surface of vehicle to upper leading edge of right door	115.5 in	115.9 in	-0.4 in
X5	Rear surface of vehicle to upper leading edge of left door	116.5 in	117.4 in	-0.9 in
X6	Rear surface of vehicle to lower leading edge of right door	116.2 in	115.9 in	0.3 in
X7	Rear surface of vehicle to lower leading edge of left door	116.5 in	116.1 in	0.4 in
X8	Rear surface of vehicle to upper trailing edge of right door	65.7 in	66.3 in	-0.6 in
X9	Rear surface of vehicle to upper trailing edge of left door	65.8 in	66.7 in	-0.9 in
X10	Rear surface of vehicle to lower trailing edge of right door	67.2 in	66.9 in	0.3 in
X11	Rear surface of vehicle to lower trailing edge of left door	67.4 in	67.2 in	0.2 in
X12	Rear surface of vehicle to bottom of "A" post on right side	115.0 in	114.2 in	0.8 in
X13	Rear surface of vehicle to bottom of "A" post on left side	114.8 in	114.8 in	0.0 in
X14	Rear surface of vehicle to firewall - right side	127.8 in	127.2 in	0.6 in
X15	Rear surface of vehicle to firewall - left side	128.5 in	126.2 in	2.3 in
X16	Rear surface of vehicle to steering wheel center	101.2 in	104.6 in	-3.4 in
X17	Center of steering column to "A" post	12.6 in	11.9 in	0.7 in
X18	Center of steering column to headliner	16.5 in	18.0 in	-1.5 in
X19	Rear surface of vehicle to right side of front bumper	176.5 in	168.0 in	8.5 in
X20	Rear surface of vehicle to left side of front bumper	176.2 in	165.8 in	10.4 in
X21	Length of engine block	23.0 in	23.0 in	0.0 in

Figure 8 Vehicle Target Locations

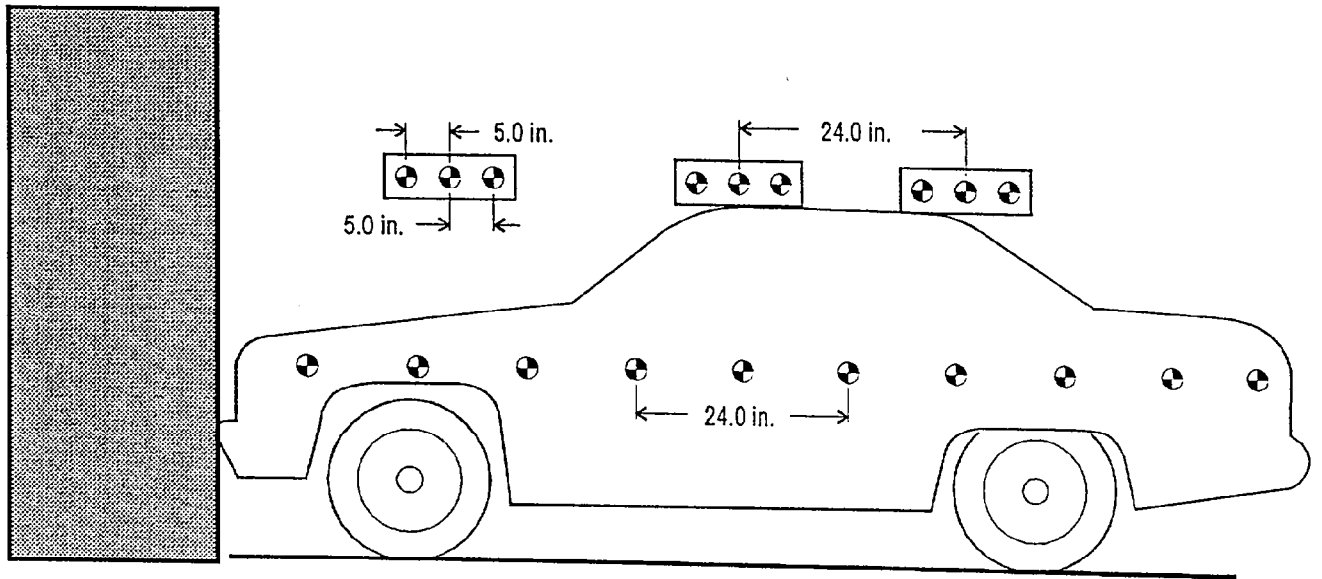
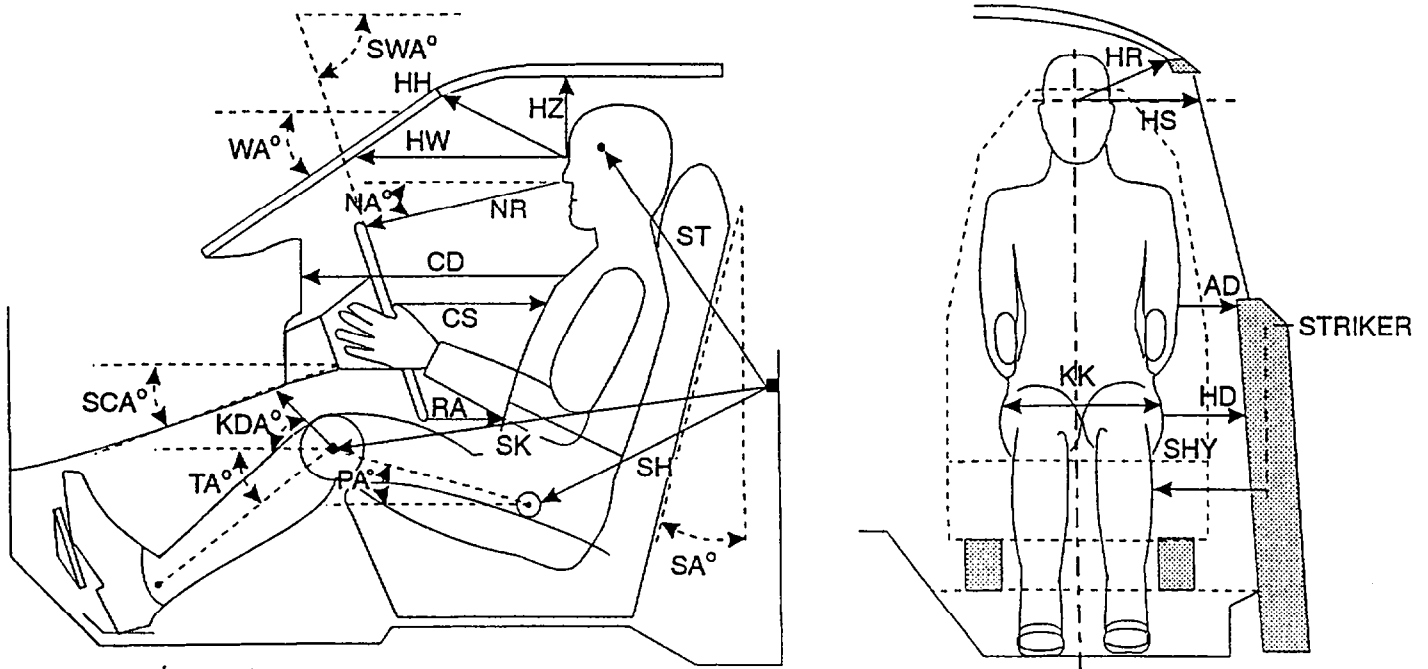
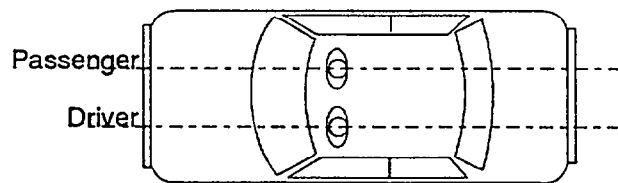


Figure 9 Dummy Measurement Locations for Front Seat Occupants



VERTICAL LONGITUDINAL PLANE



VERTICAL TRANSVERSE PLANE

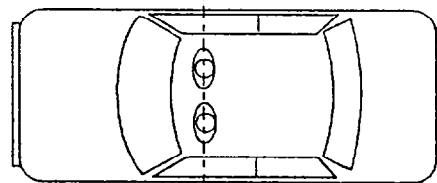


Table 12 Dummy Measurement Data for Front Seat Occupants

Designation	Type of Measurement	Driver (Serial #314)	Passenger (Serial #230)
WA	Windshield angle	26°	NA
SWA	Steering wheel angle	23°	NA
SCA	Steering column angle	67°	NA
SA	Seat back angle	22°	21°
HZ	Head to roof	6.1 in	5.4 in
HH	Head to header	10.6 in	11.1 in
HW	Head to windshield	17.9 in	17.8 in
HR	Head to side header	7.2 in	8.2 in
NR	Nose to rim	14.0 in	NA
NA	Nose to rim angle	11°	NA
CD	Chest to dash	20.2 in	20.2 in
CS	Steering wheel to chest	9.3 in	NA
RA	Rim to abdomen	6.2 in	NA
KDL	Left knee to dash	2.8 in	5.4 in
KDR	Right knee to dash	2.4 in	6.1 in
KDA	Outboard knee to dash angle	35°	36°
PA	Pelvic angle	21°	24.5°
TA	Tibial angle	40°	35°
KK	Knee to knee	10.5 in	10.0 in
ST ¹	Striker to head	25.1 in	25.8 in
	Striker to head angle	-52°	-55°
SK ¹	Striker to knee	35.4 in	37.6 in
	Striker to knee angle	0°	-1°
SH ¹	Striker to H-point	21.6 in	21.2 in
	Striker to H-point angle	15°	8°
SHY	Striker to H-point (Y dir.)	10.2 in	9.2 in
HS	Head to side window	10.0 in	12.0 in
HD	H-point to door	5.9 in	4.4 in
AD	Arm to door	3.2 in	3.0 in

The seat back angle (SA°) is measured relative to vertical, all other angles are measured relative to horizontal.

¹ A negative angle indicates the measurement point was located above the striker.

Figure 10 Camera Positions

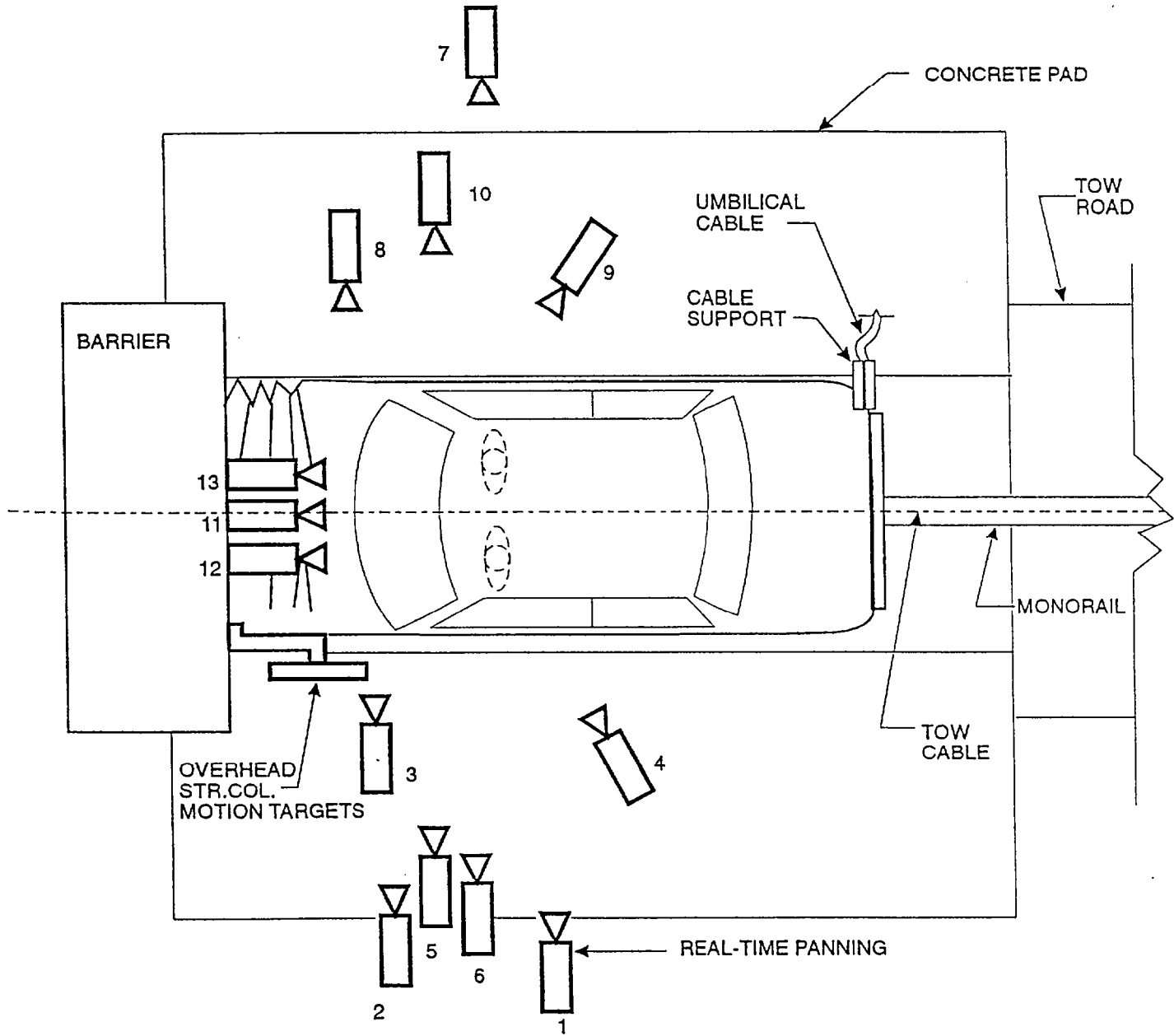


Figure 10 Camera Positions, Cont'd.

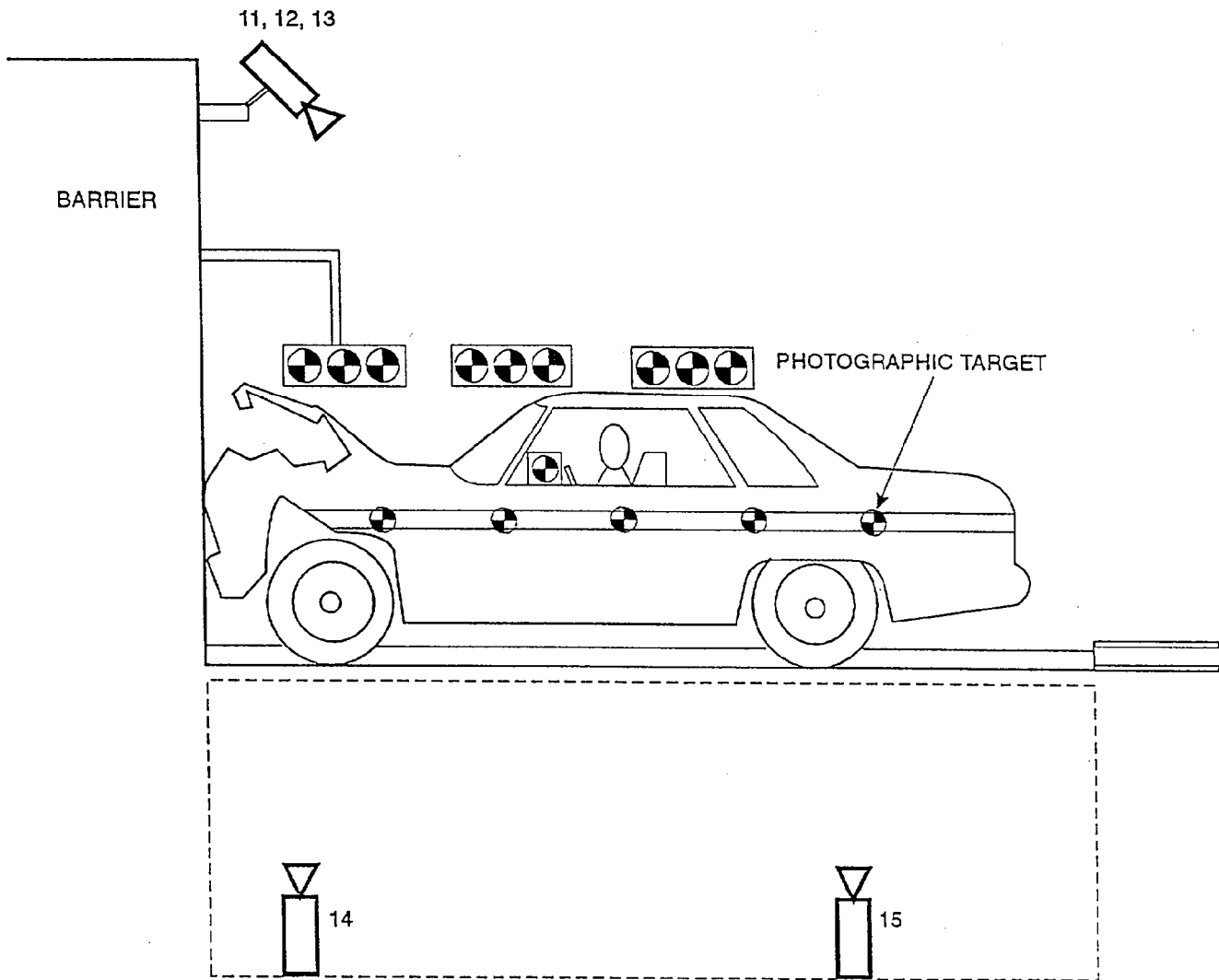


Table 13 Motion Picture Camera Locations

Vehicle year/make/model/body style: 1994/Ford/Mustang/2-door coupe

Test number: 940210

Camera Number	View	Camera Positions ¹			Camera Angle ²	Film Plane to Head Target	Camera Lens	Film Speed
		X	Y	Z				
1	Real-time panning	-142.0 in	504.0 in	61.0 in	NA	NA	16 mm	24 frames/s
2	Left vehicle crush	-41.5 in	295.0 in	44.0 in	-4°	225 in	25 mm	1002 frames/s
3	Left windshield intrusion	-53.0 in	309.4 in	42.3 in	0°	NA	50 mm	1005 frames/s
4	Driver kinematics	-157.3 in	116.0 in	87.0 in	-27°	105 in	25 mm	998 frames/s
5	Steering column motion	-109.0 in	286.0 in	103.0 in	-14°	NA	25 mm	1012 frames/s
6	Steering column motion	-109.0 in	286.0 in	75.1 in	-9°	NA	25 mm	998 frames/s
7	Right overall	-81.3 in	-266.4 in	37.1 in	-2°	NA	13 mm	1002 frames/s
8	Right windshield intrusion	-38.1 in	-306.1 in	44.0 in	0°	NA	50 mm	998 frames/s
9	Passenger kinematics	-152.1 in	-116.0 in	87.0 in	-26°	107 in	25 mm	998 frames/s
10	Passenger kinematics	-38.8 in	-293.0 in	45.3 in	-4°	207 in	25 mm	995 frames/s
11	Windshield front view	-6.0 in	0.0 in	85.0 in	-40°	NA	13 mm	1020 frames/s
12	Driver - front view	-6.8 in	14.5 in	93.0 in	-50°	NA	17 mm	973 frames/s
13	Passenger - front view	-4.5 in	-13.8 in	93.0 in	-50°	NA	17 mm	1005 frames/s
14	Pit - front position	-50.5 in	0.0 in	-92.4 in	90°	NA	13 mm	998 frames/s
15	Pit - rear position	-99.3 in	0.0 in	-99.0 in	90°	NA	13 mm	1002 frames/s
16	Real-time documentation	NA	NA	NA	NA	NA	12-120 mm	24 frames/s

¹ +X: Film plane forward of barrier face

+Y: Film plane to left of monorail centerline

+Z: Film plane above ground level

² +Angle: Film plane angled upward from horizontal plane

Appendix A

Photographs

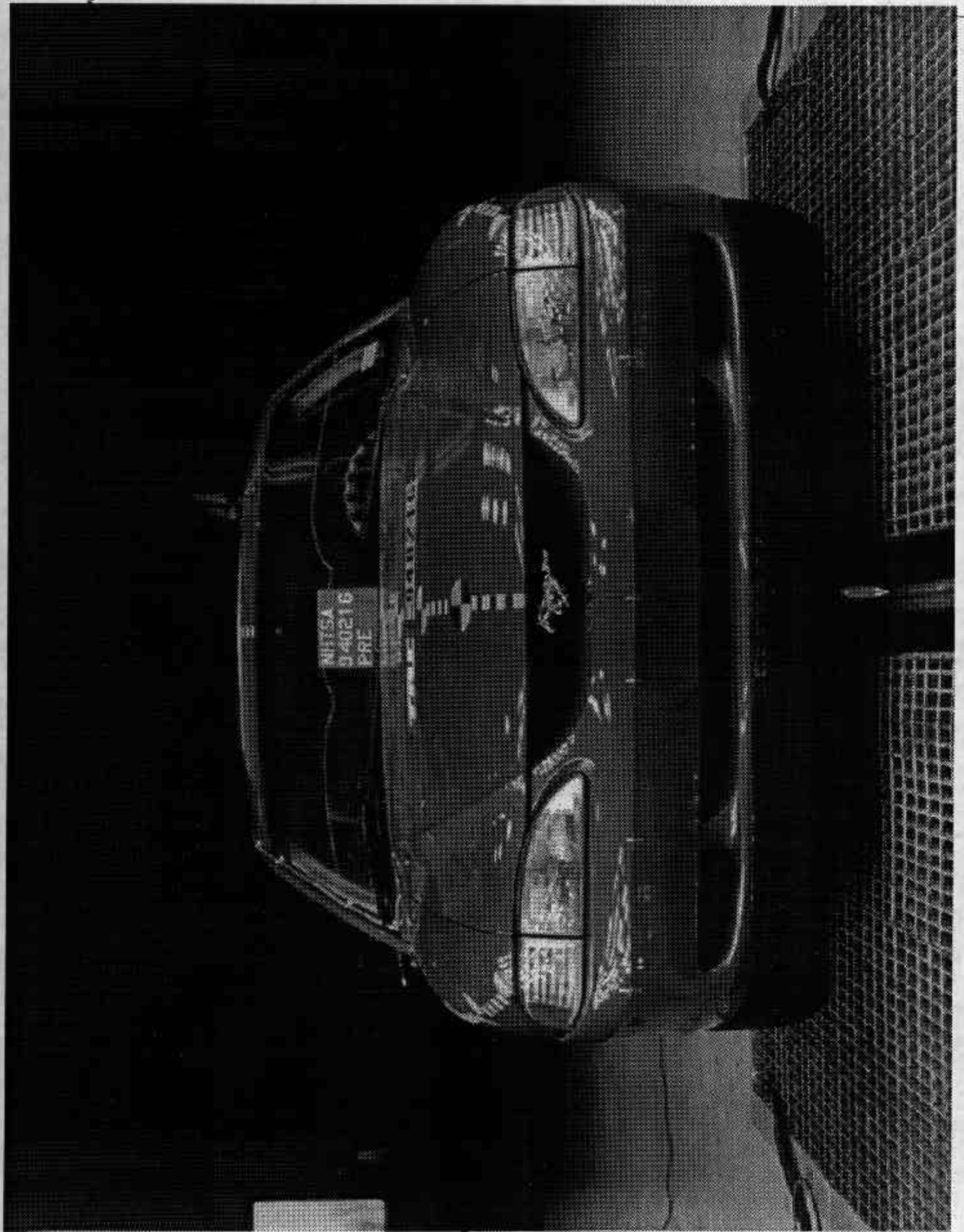


Figure A-1. PRE-TEST FRONT VIEW
A-2

940216

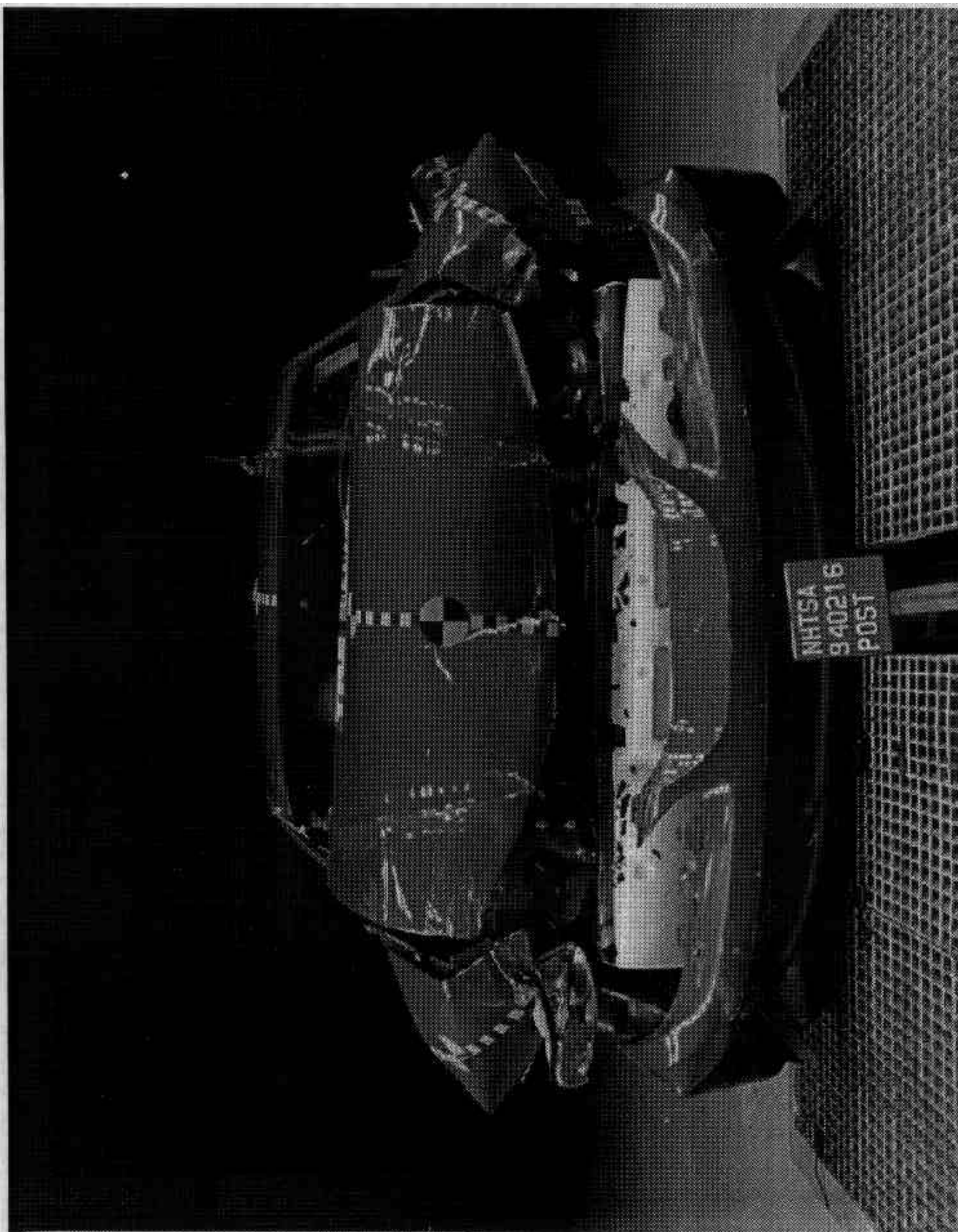


Figure A-2. POST-TEST FRONT VIEW

A-3

940216

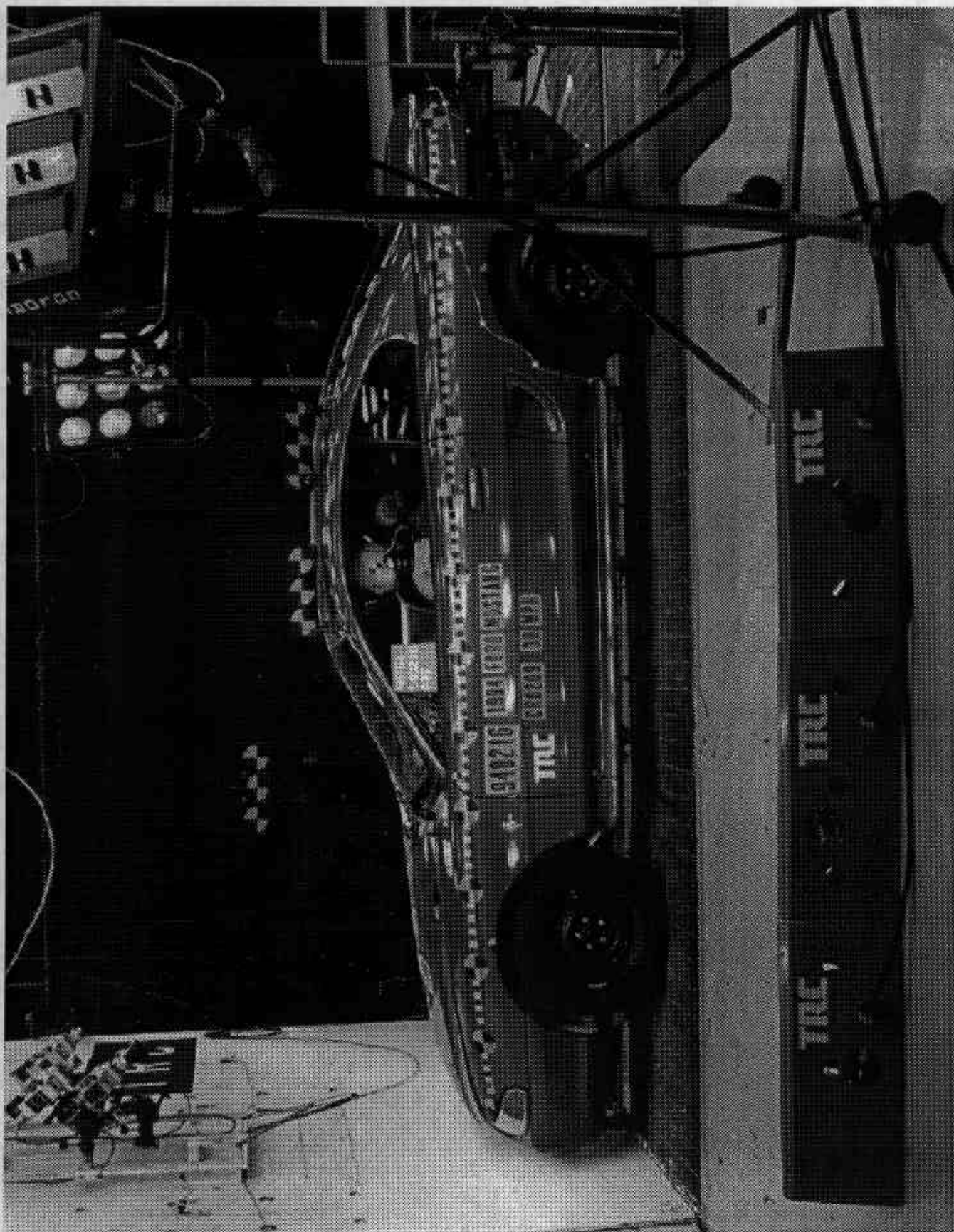


Figure A-3. PRE-TEST LEFT SIDE VIEW

A-4

940216

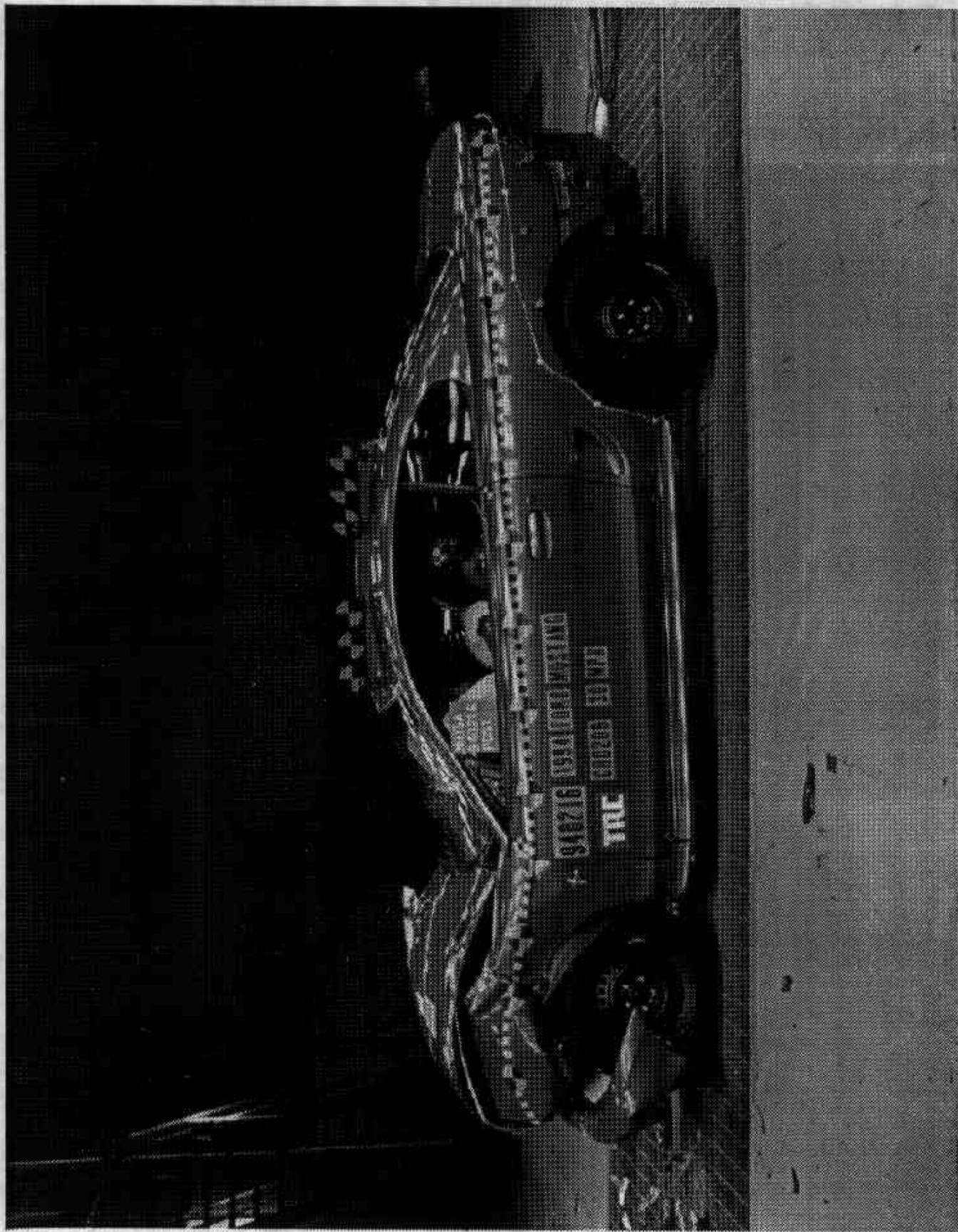


Figure A-4. POST-TEST LEFT SIDE VIEW

A-5

940216

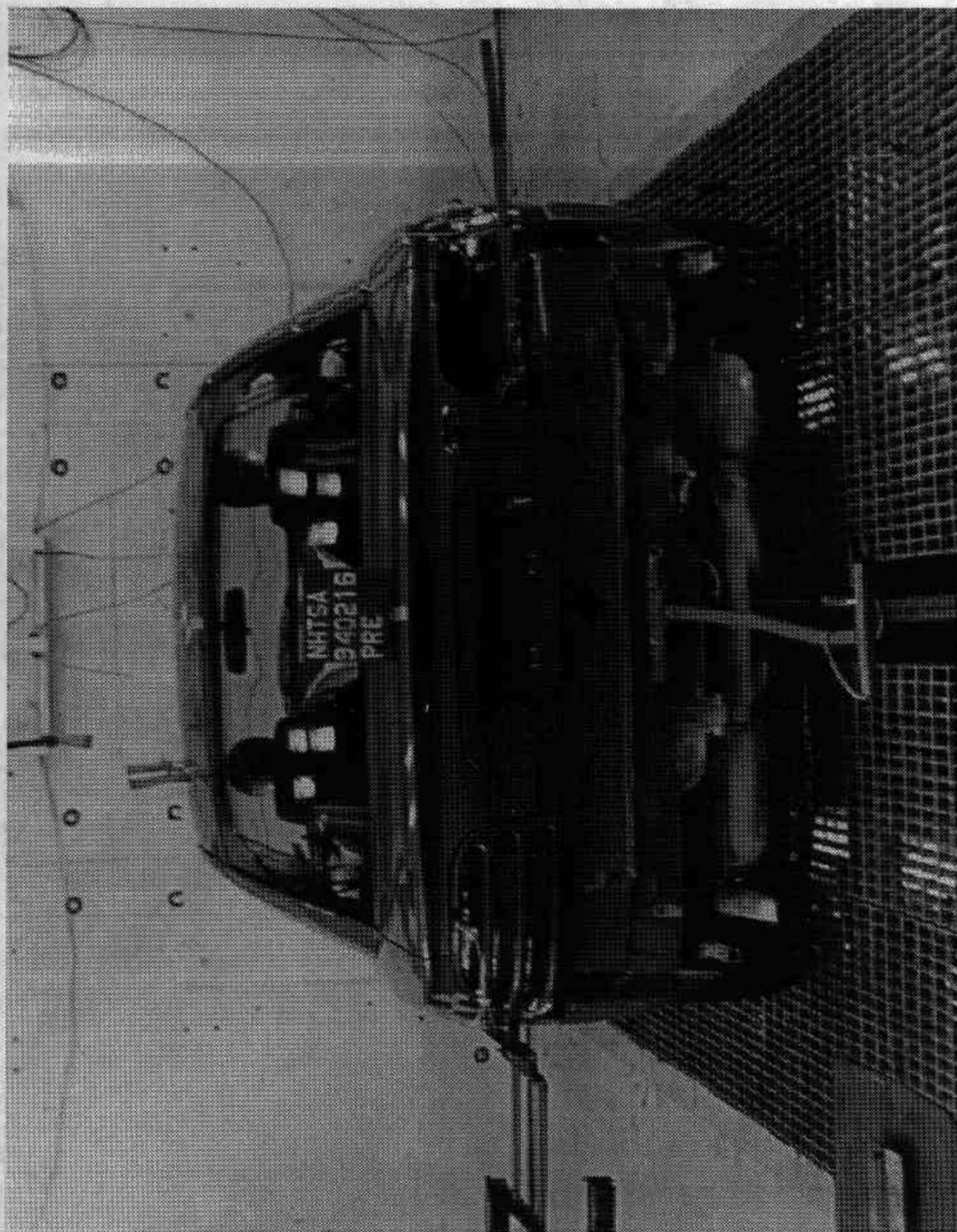


Figure A-5. PRE-TEST REAR VIEW

A-6

940216

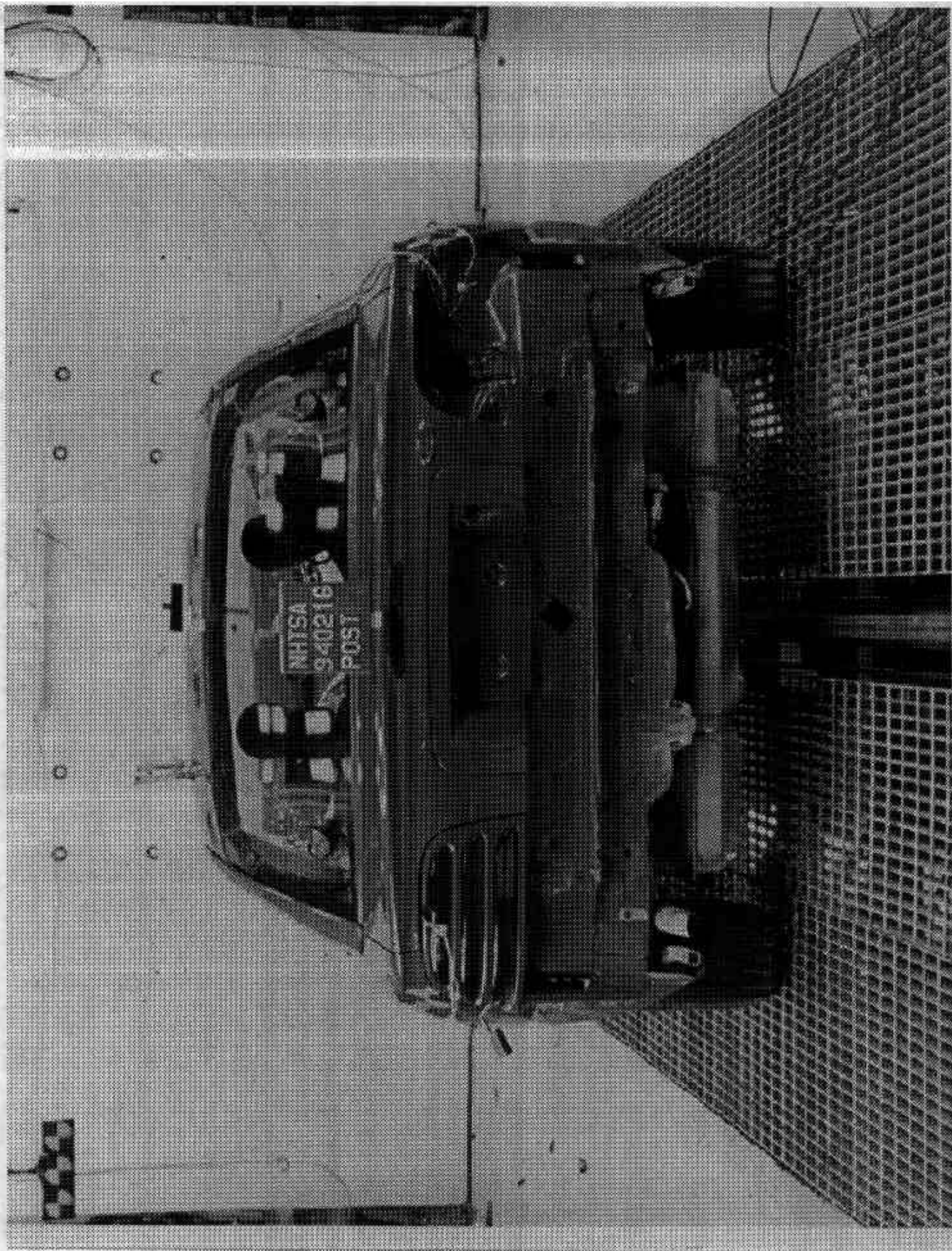


Figure A-6. POST-TEST REAR VIEW

A-7

940216

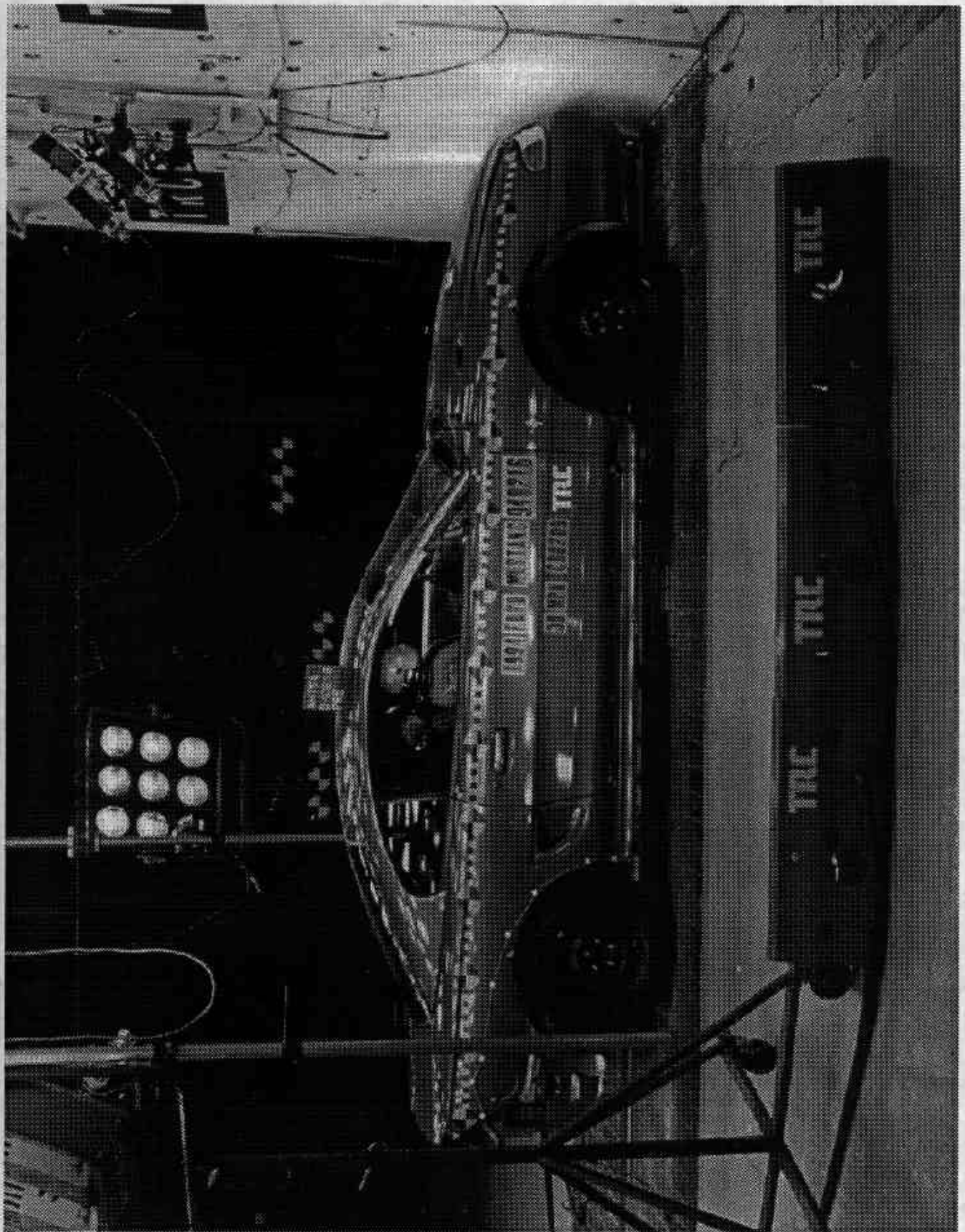


Figure A-7. PRE-TEST RIGHT SIDE VIEW
A-8

940216

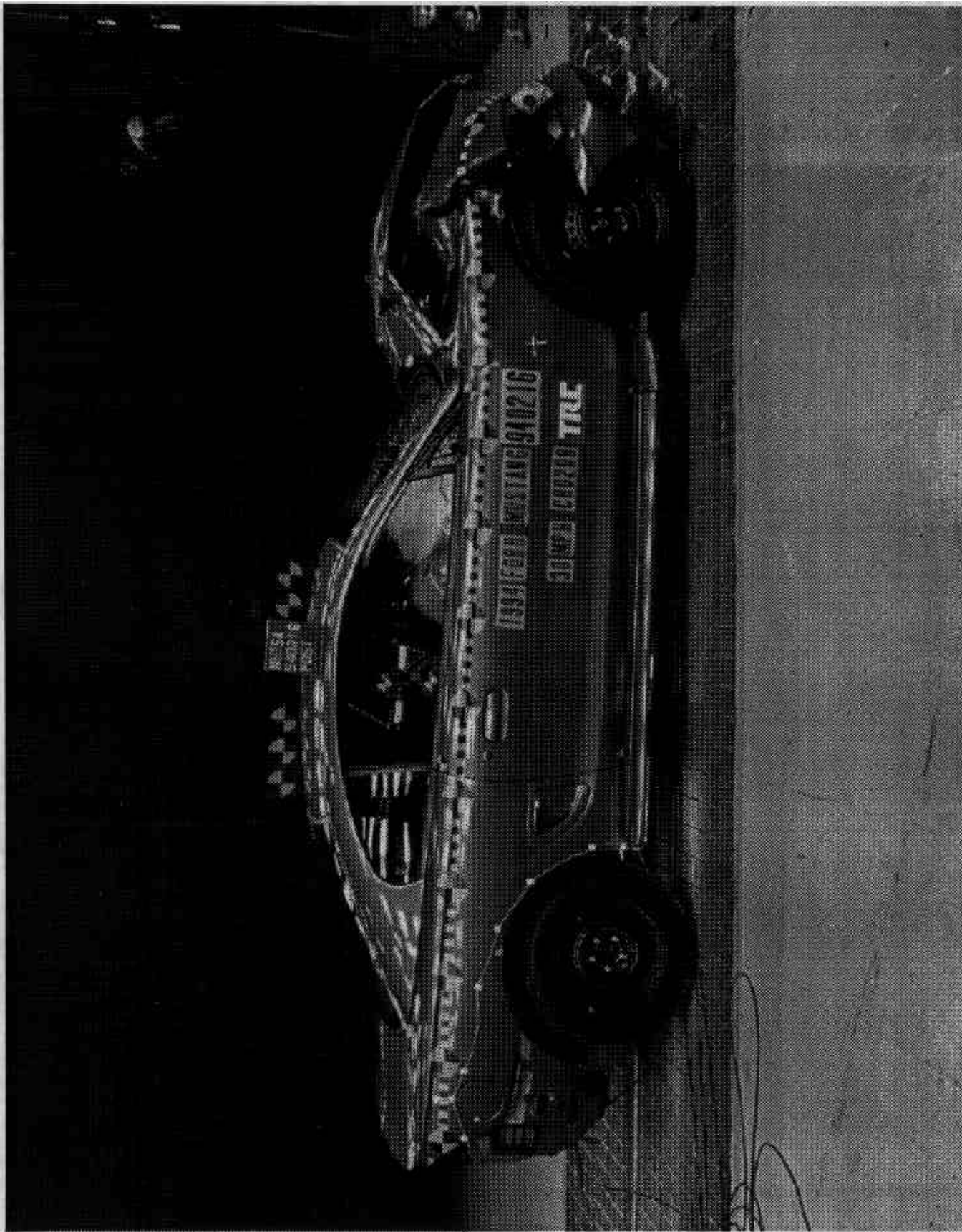


Figure A-8. POST-TEST RIGHT SIDE VIEW

A-9

940216



Figure A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW
A-10

940216

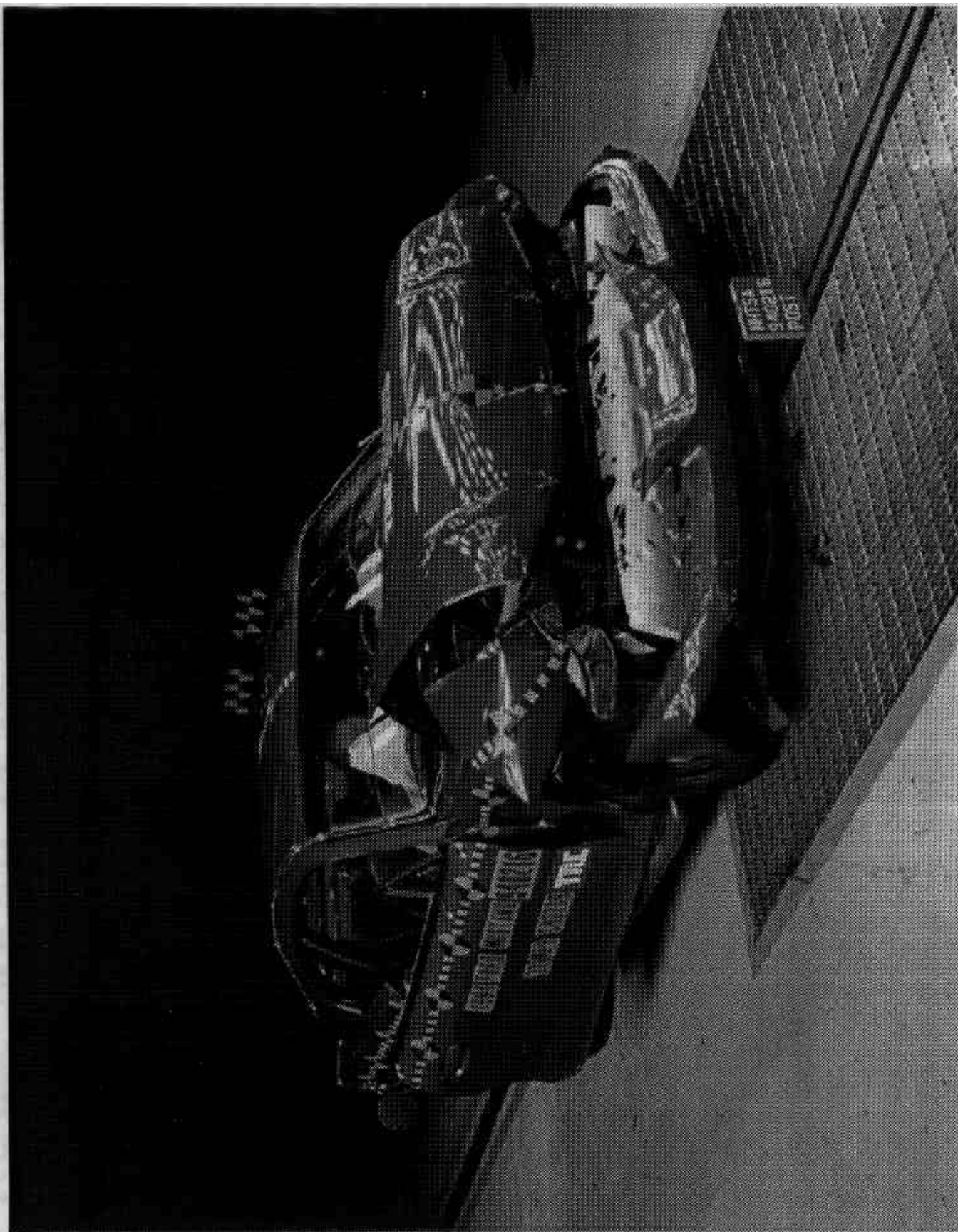


Figure A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-11

940216

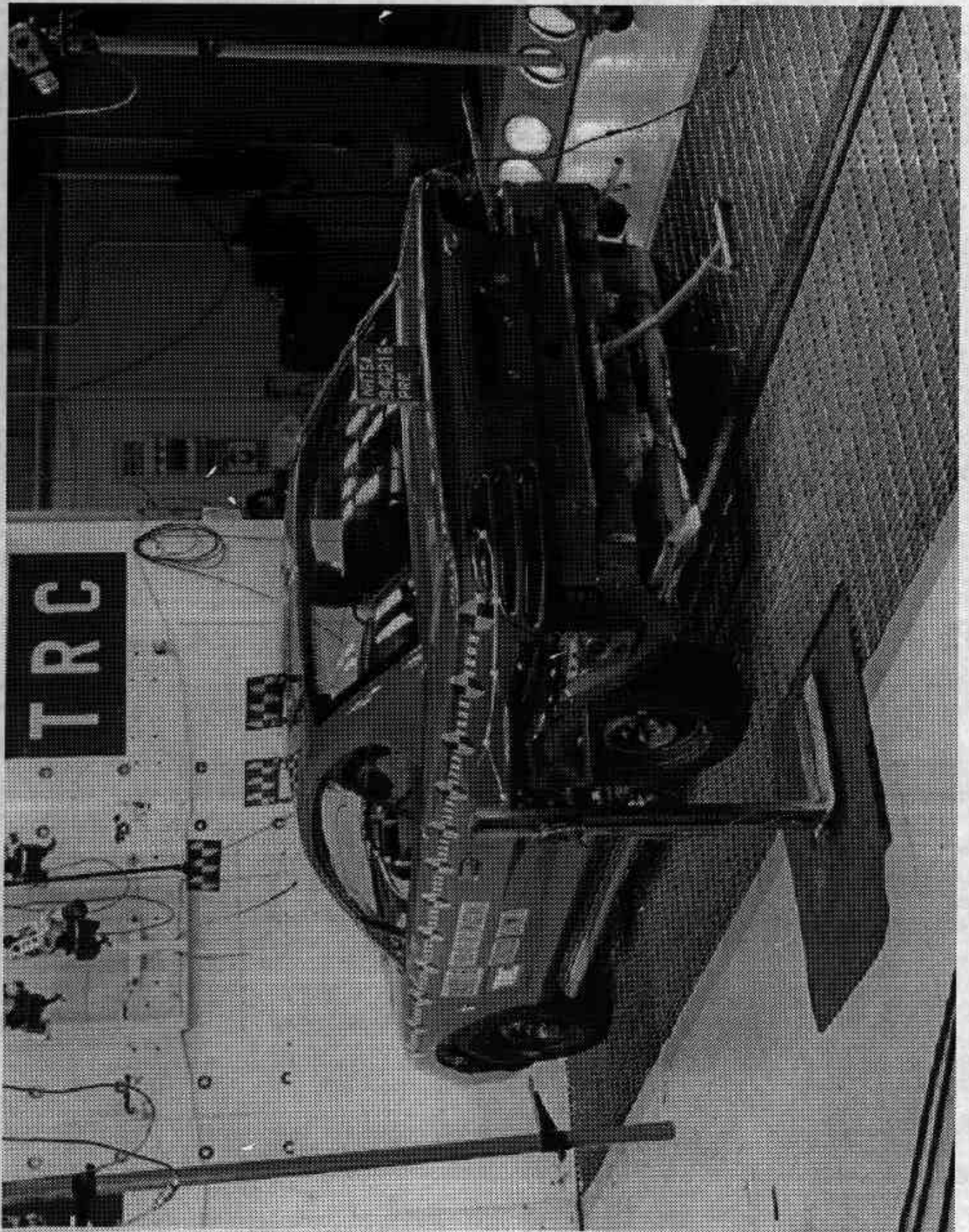


Figure A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW
A-12

940216

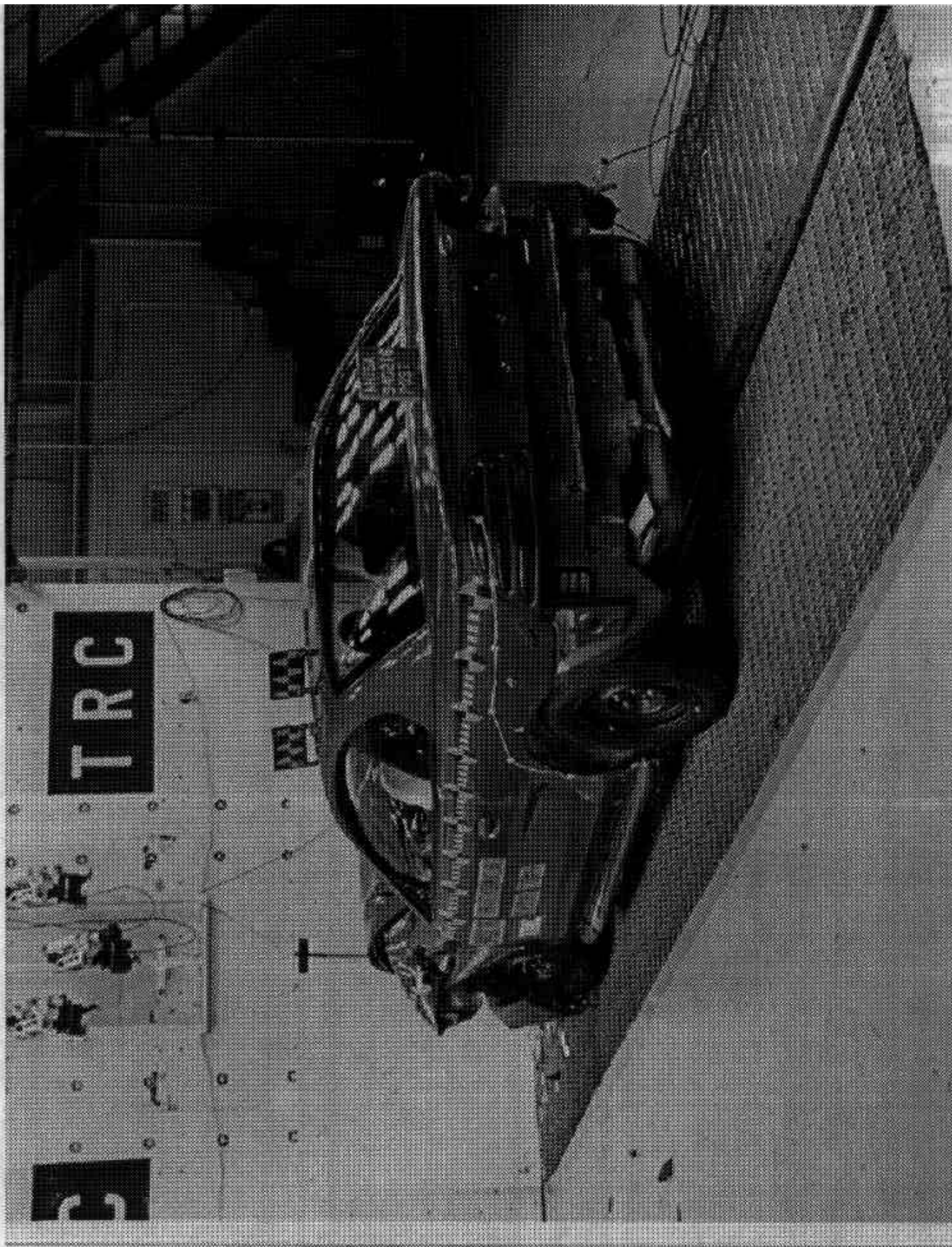


Figure A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW

A-13

940216

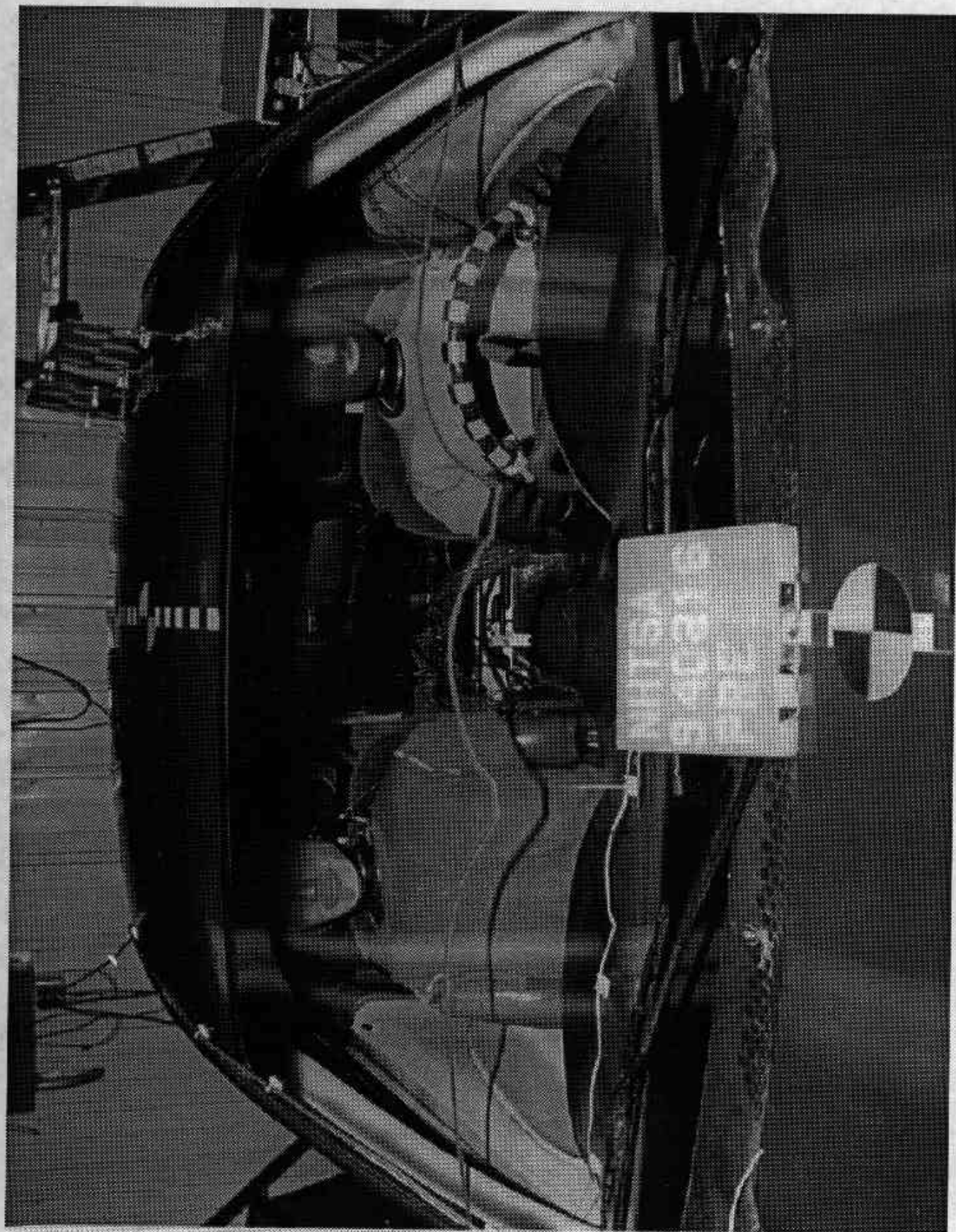


Figure A-13. PRE-TEST WINDSHIELD VIEW

A-14

940216

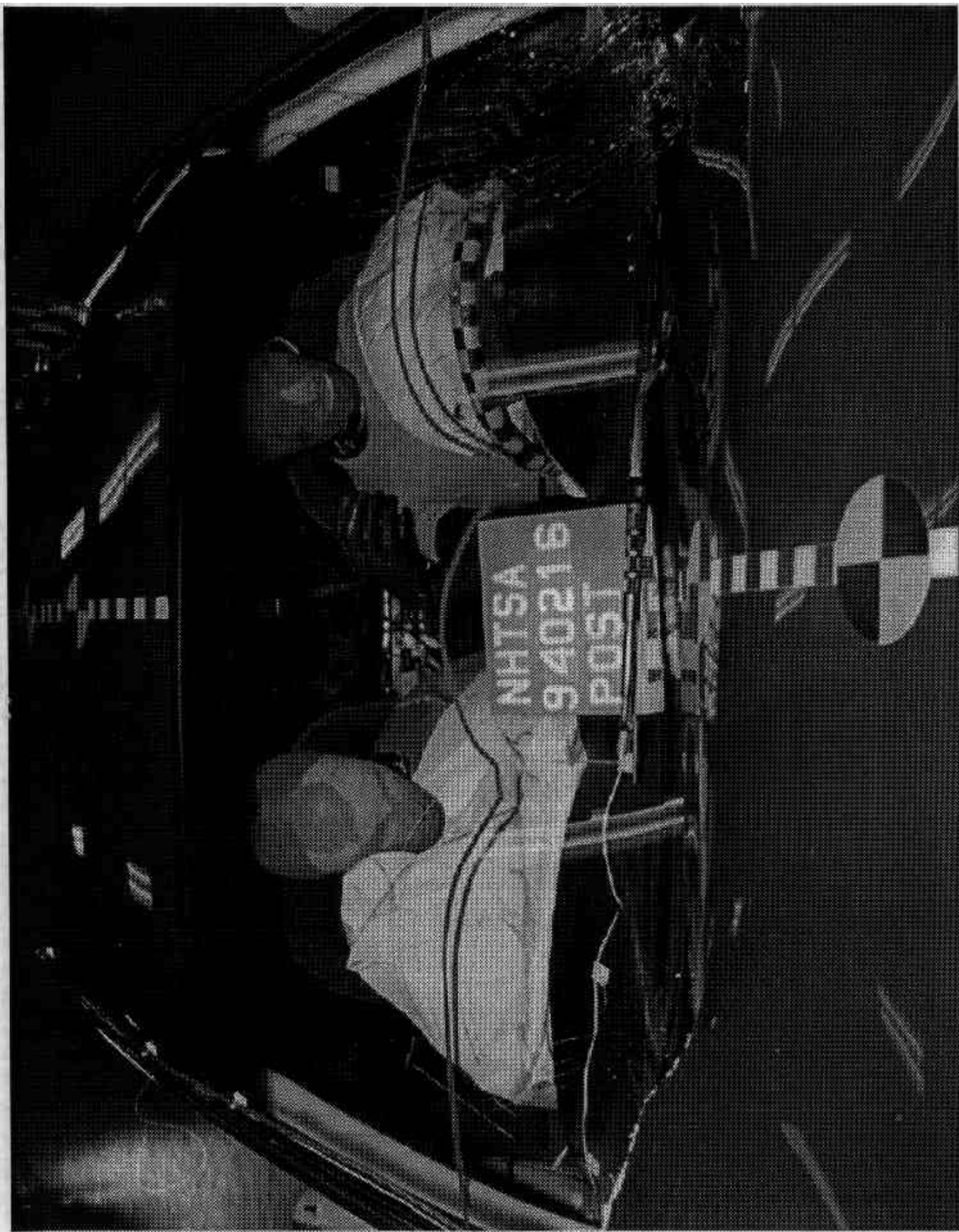


Figure A-14. POST-TEST WINDSHIELD VIEW
A-15

940216

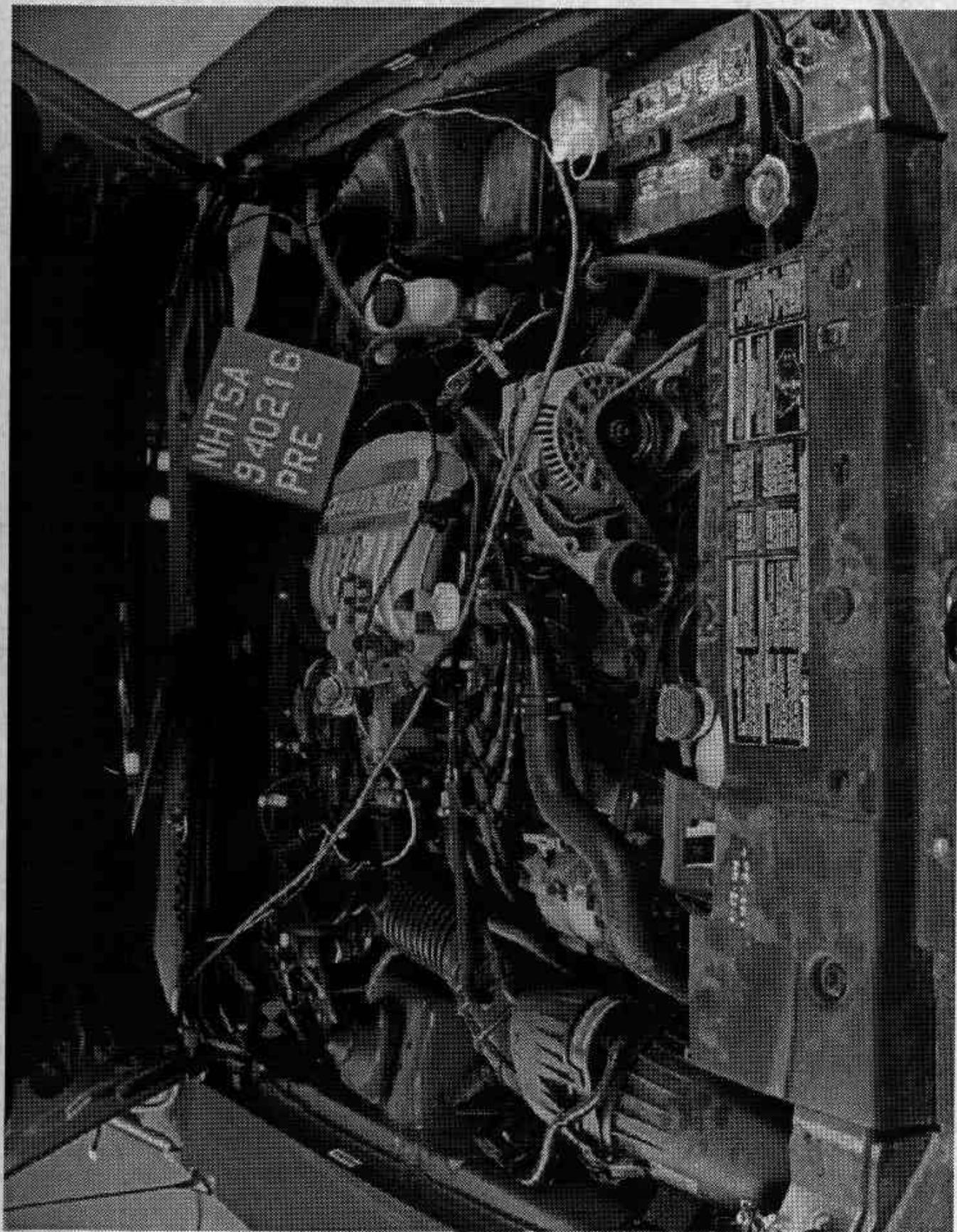


Figure A-15. PRE-TEST ENGINE COMPARTMENT VIEW

A-16

940216



Figure A-16. POST-TEST ENGINE COMPARTMENT VIEW

A-17

940216

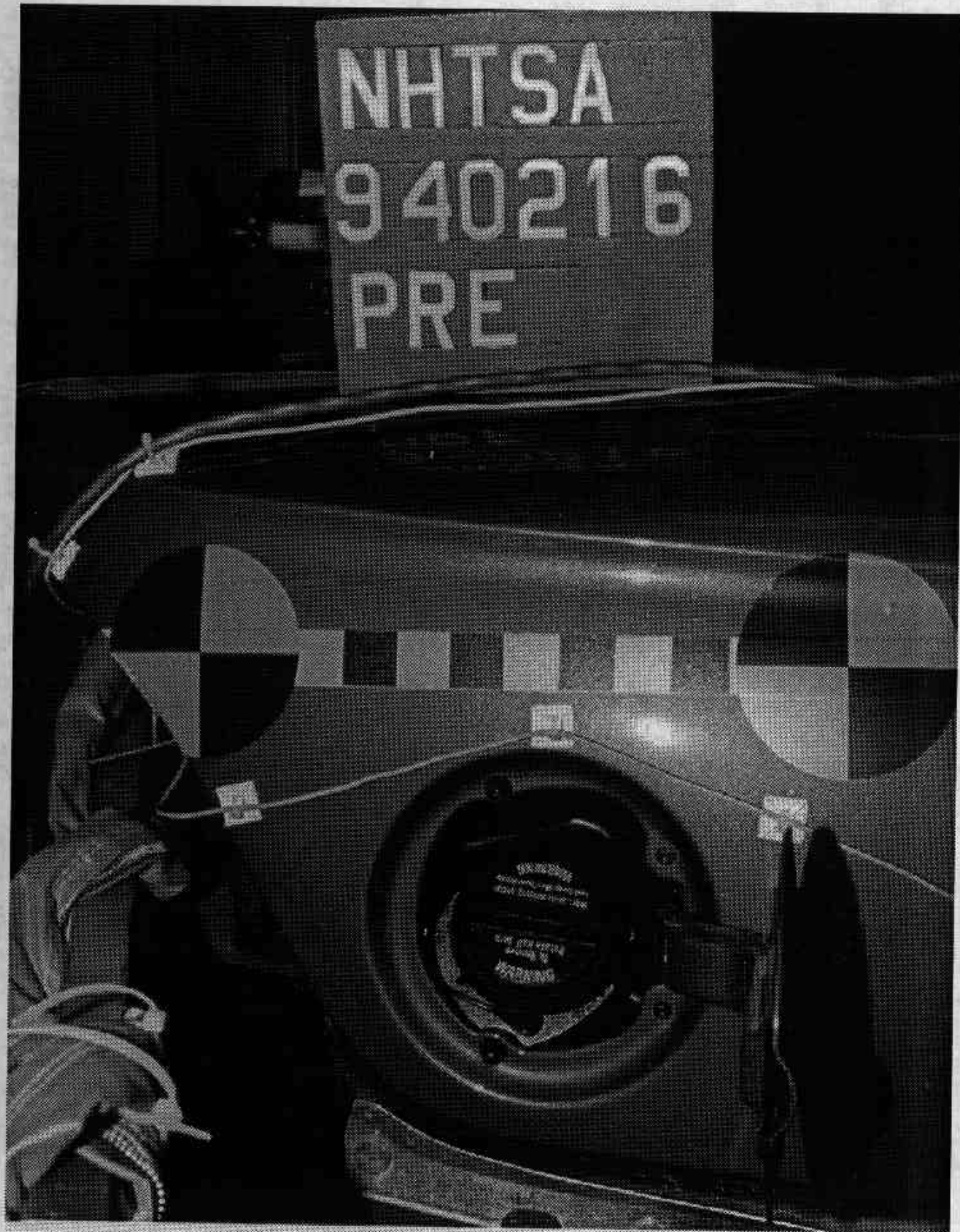


Figure A-17. PRE-TEST FUEL FILLER CAP VIEW
A-18

940216



Figure A-18. POST-TEST FUEL FILLER CAP VIEW
A-19

940216



Figure A-19. PRE-TEST FUEL FILLER NECK VIEW
A-20

940216



Figure A-20. POST-TEST FUEL FILLER NECK VIEW
A-21

940216

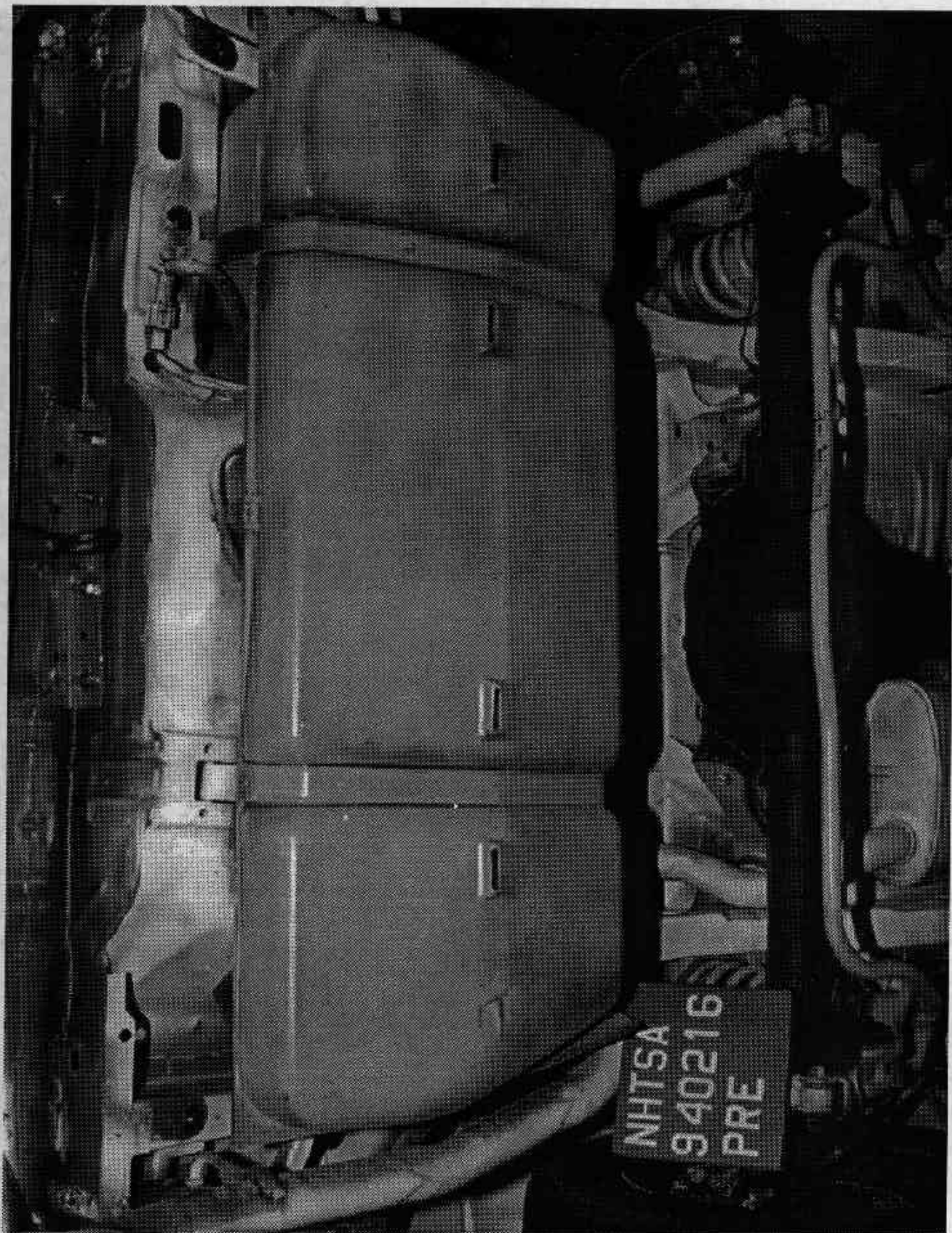


Figure A-21. PRE-TEST FUEL TANK VIEW
A-22

940216

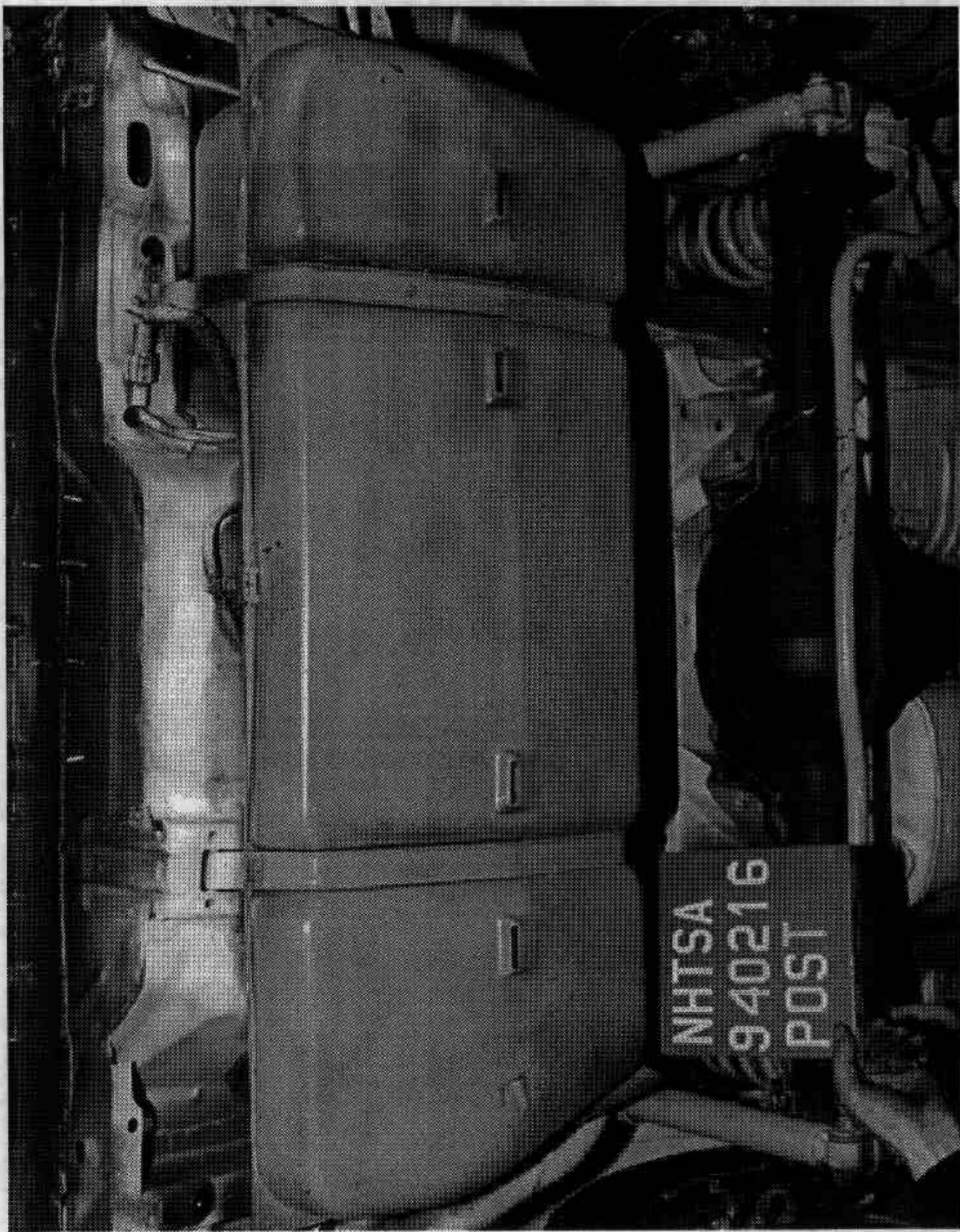


Figure A-22. POST-TEST FUEL TANK VIEW
A-23

940216

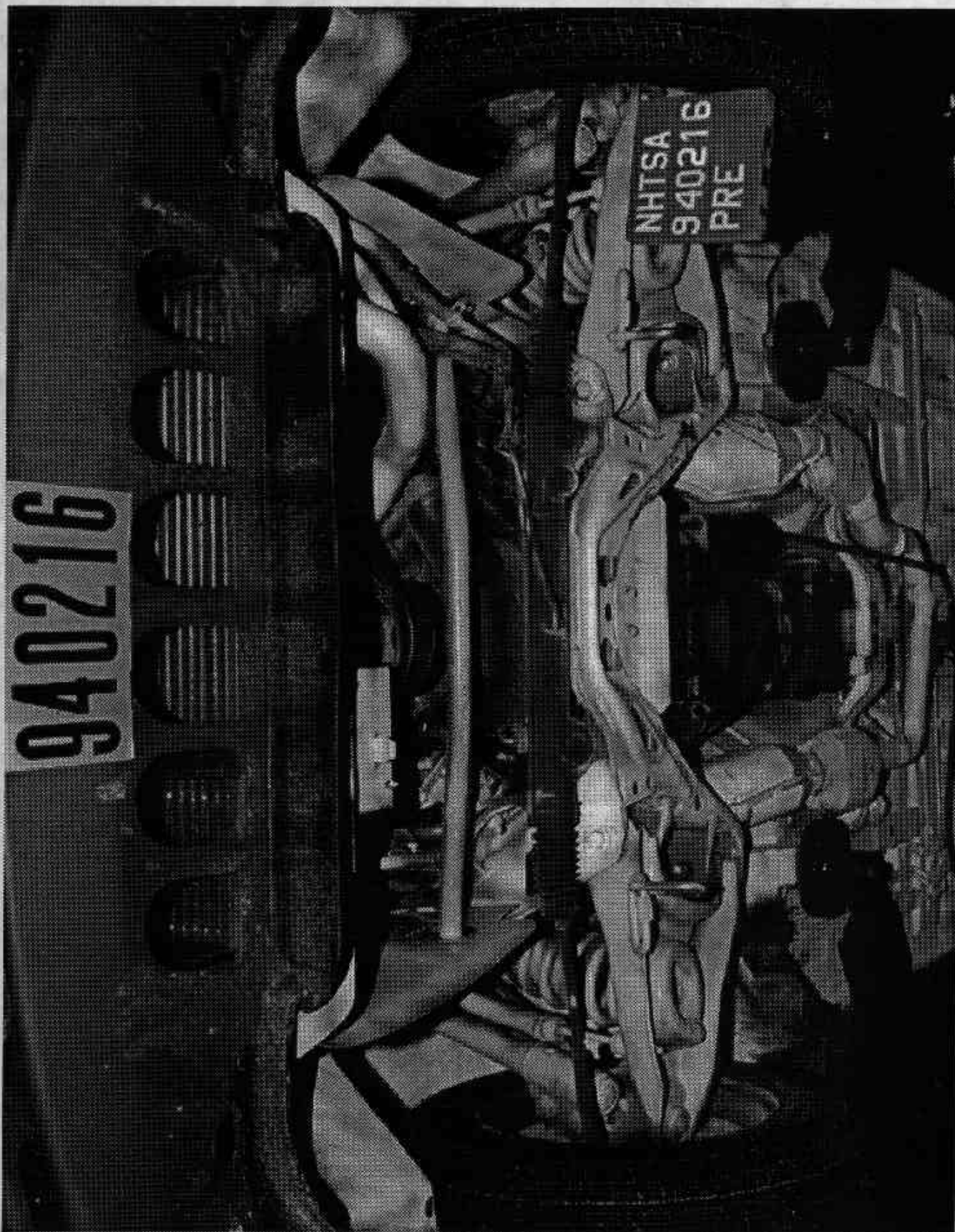


Figure A-23. PRE-TEST FRONT UNDERBODY VIEW
A-24

940216

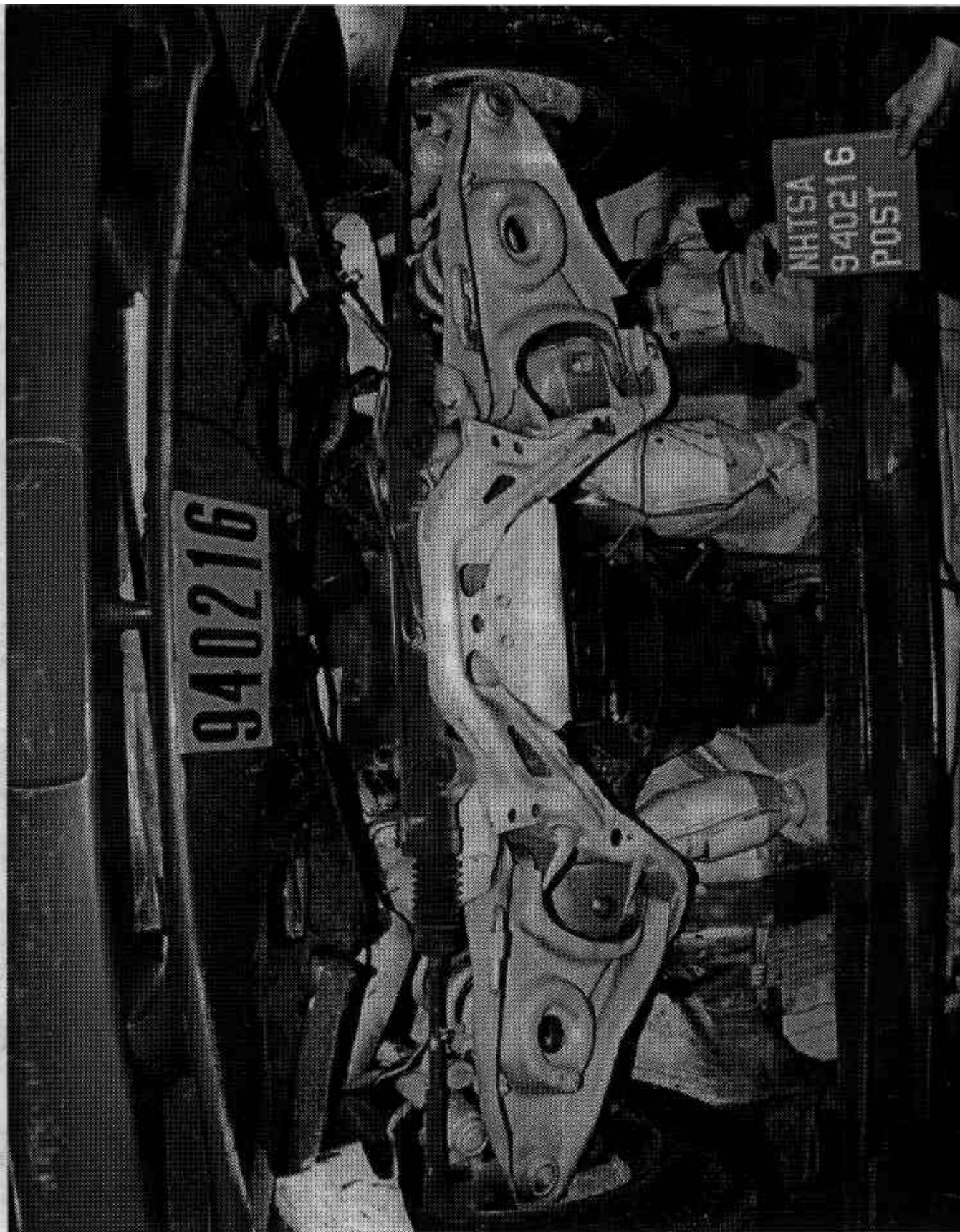


Figure A-24. POST-TEST FRONT UNDERBODY VIEW

A-25

940216

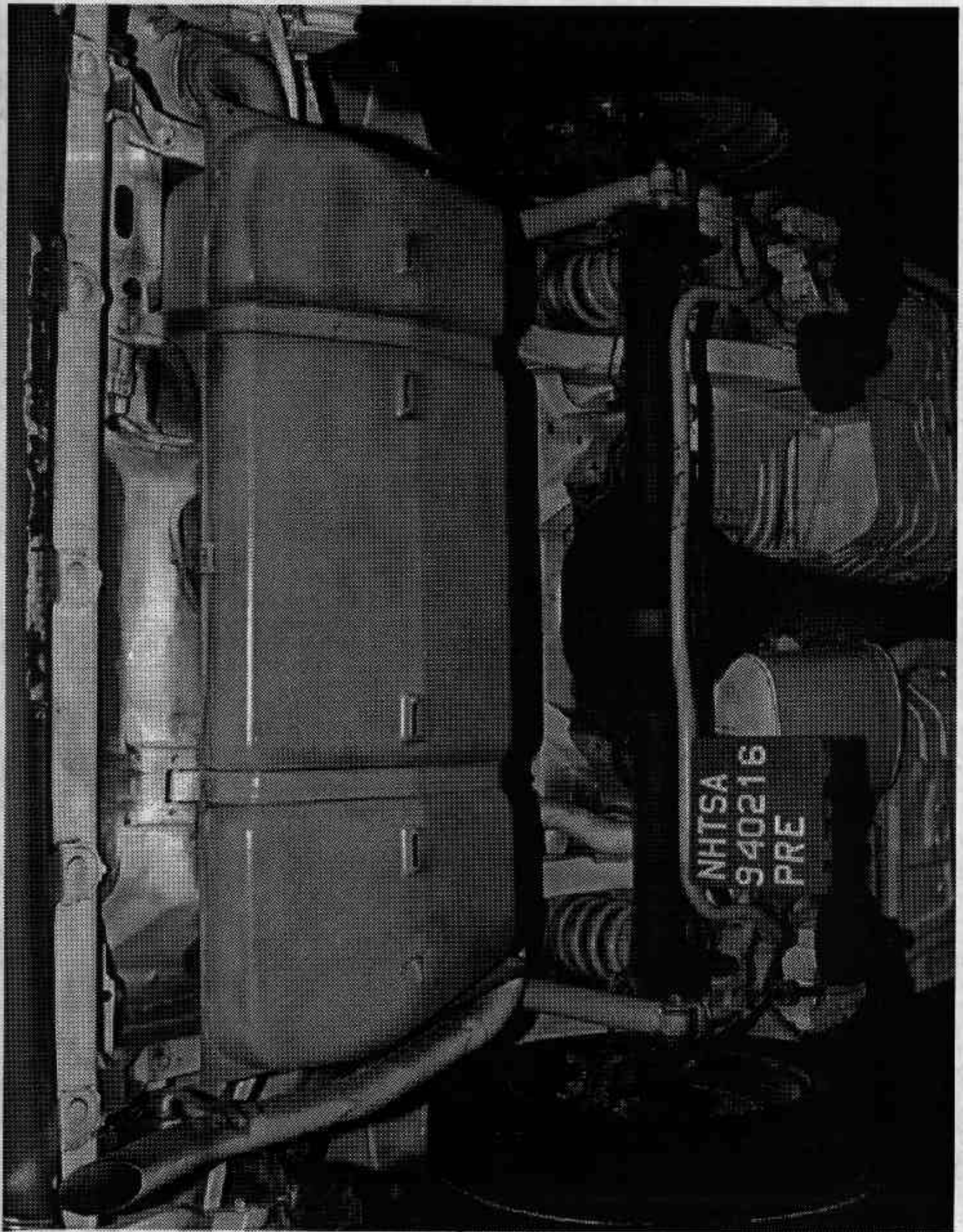


Figure A-25. PRE-TEST REAR UNDERBODY VIEW
A-26

940216

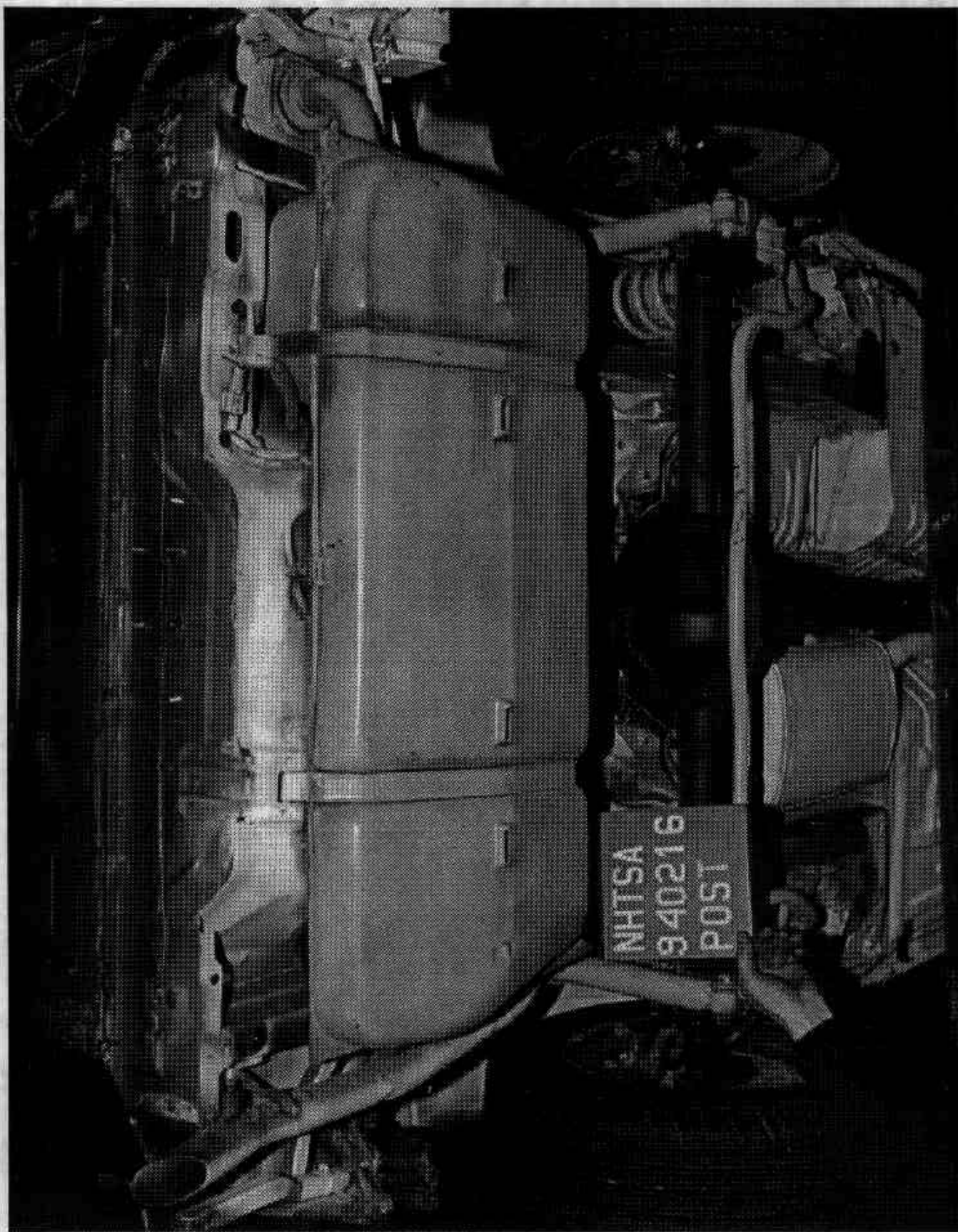


Figure A-26. POST-TEST REAR UNDERBODY VIEW
A-27

940216

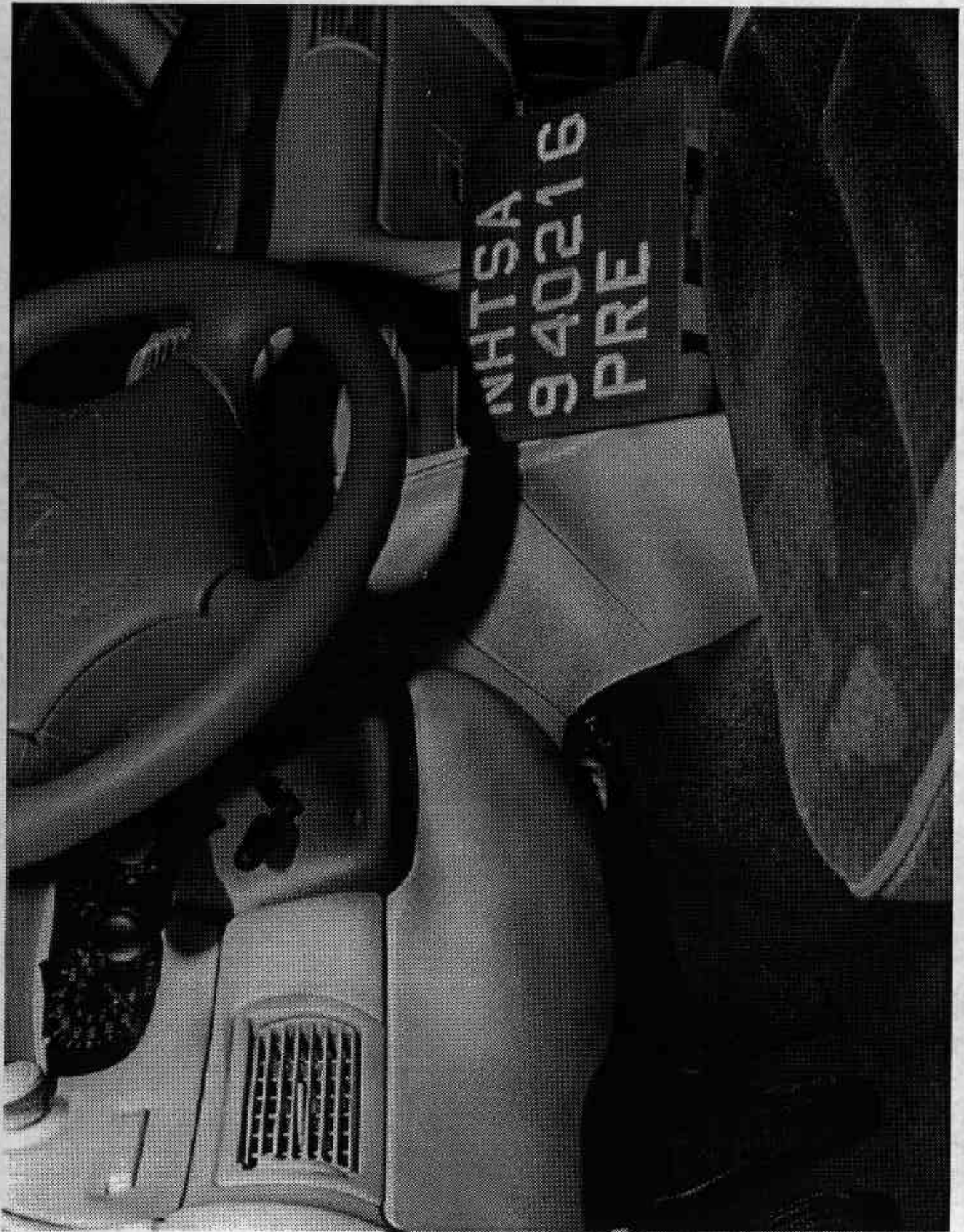


Figure A-27. PRE-TEST DRIVER'S KNEE BOLSTER VIEW

A-28

940216



Figure A-28. PRE-TEST PASSENGER'S KNEE BOLSTER VIEW

A-29

940216



Figure A-29. PRE-TEST STEERING COLUMN AT FIREWALL VIEW



Figure A-30. POST-TEST STEERING COLUMN AT FIREWALL VIEW

A-31

940216

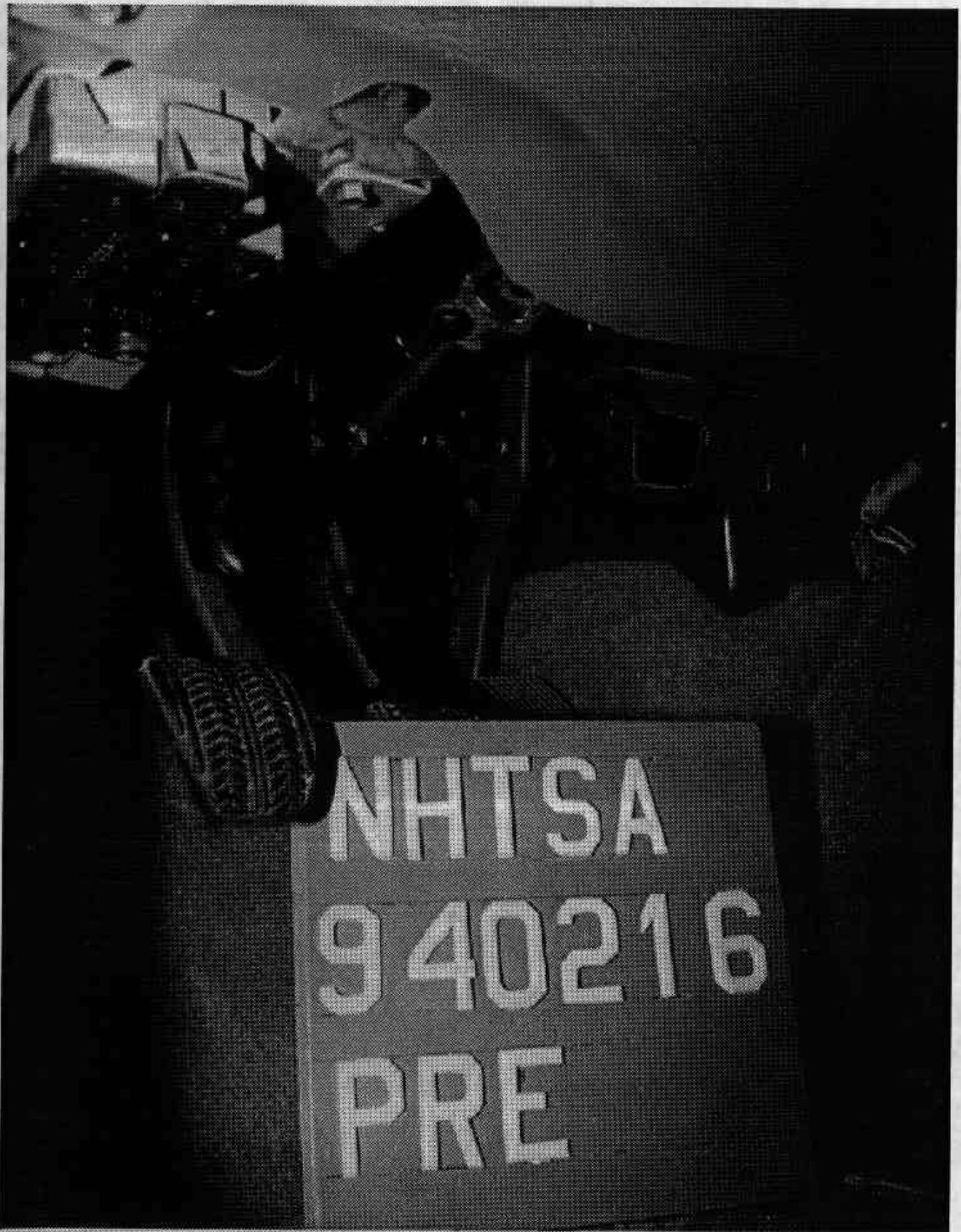


Figure A-31. PRE-TEST STEERING COLUMN AT FIREWALL VIEW - INTERIOR

A-32

940216

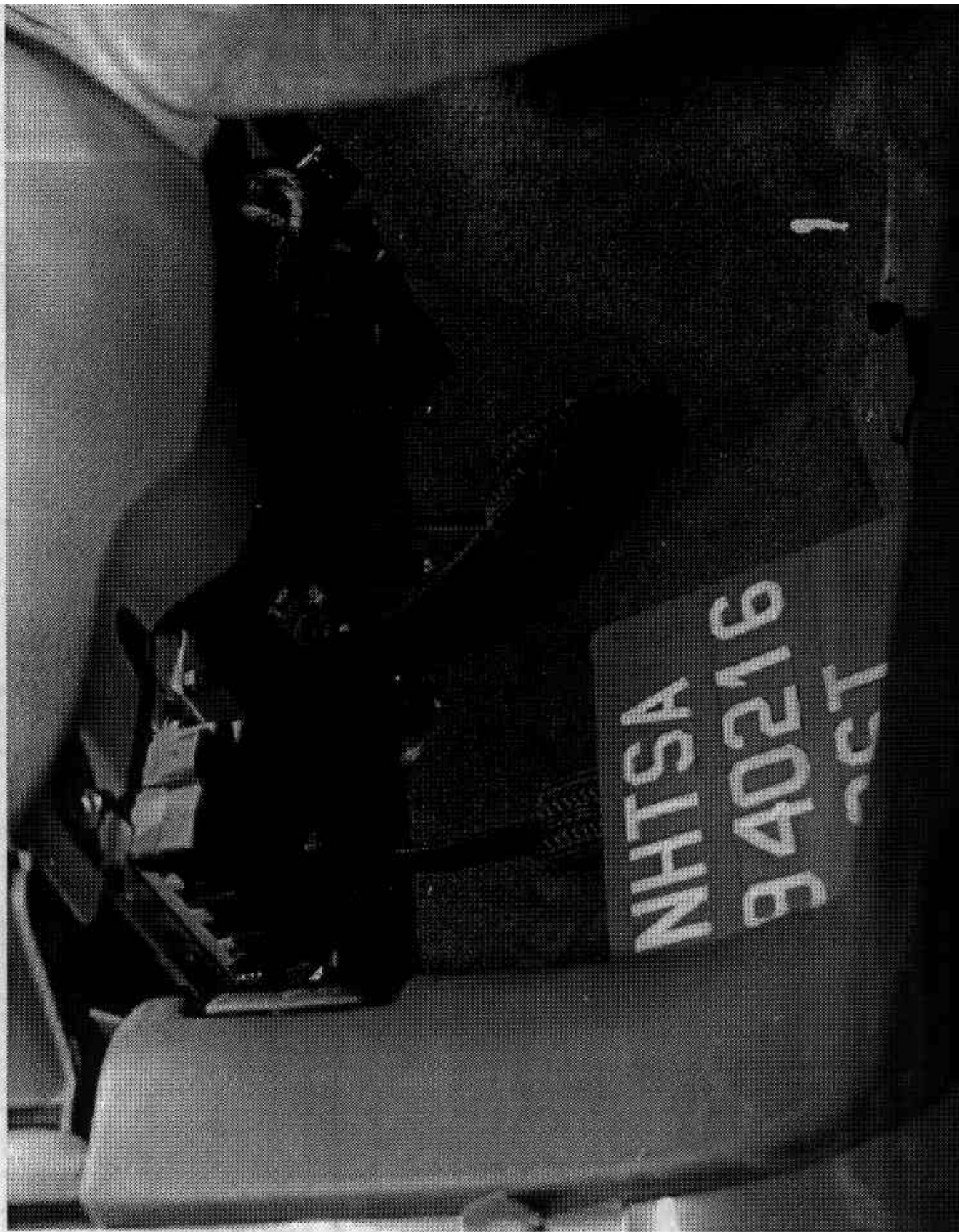


Figure A-32. POST-TEST STEERING COLUMN AT FIREWALL VIEW - INTERIOR

A-33

940216

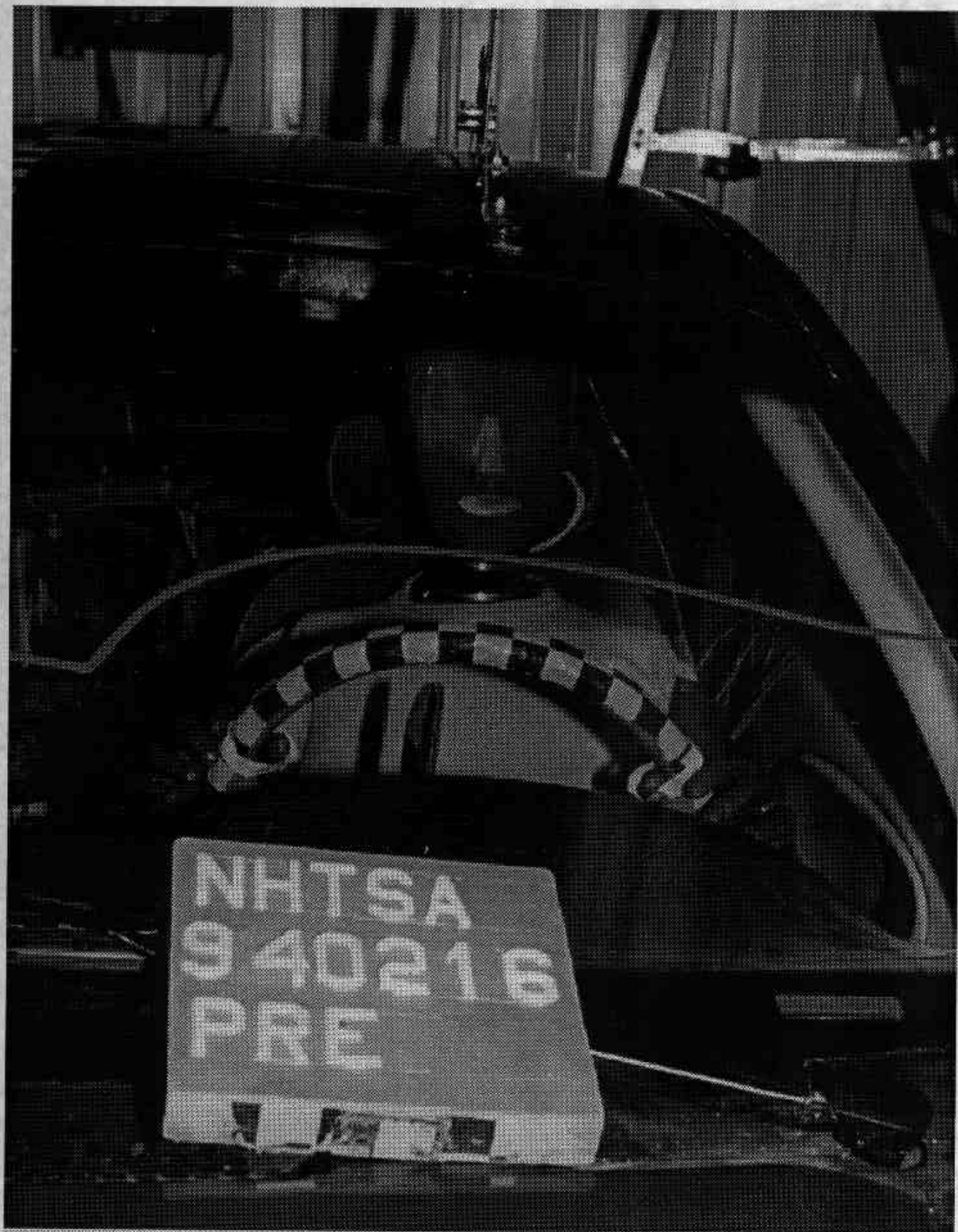


Figure A-33. PRE-TEST DRIVER DUMMY POSITION - VIEW 1

A-34

940216

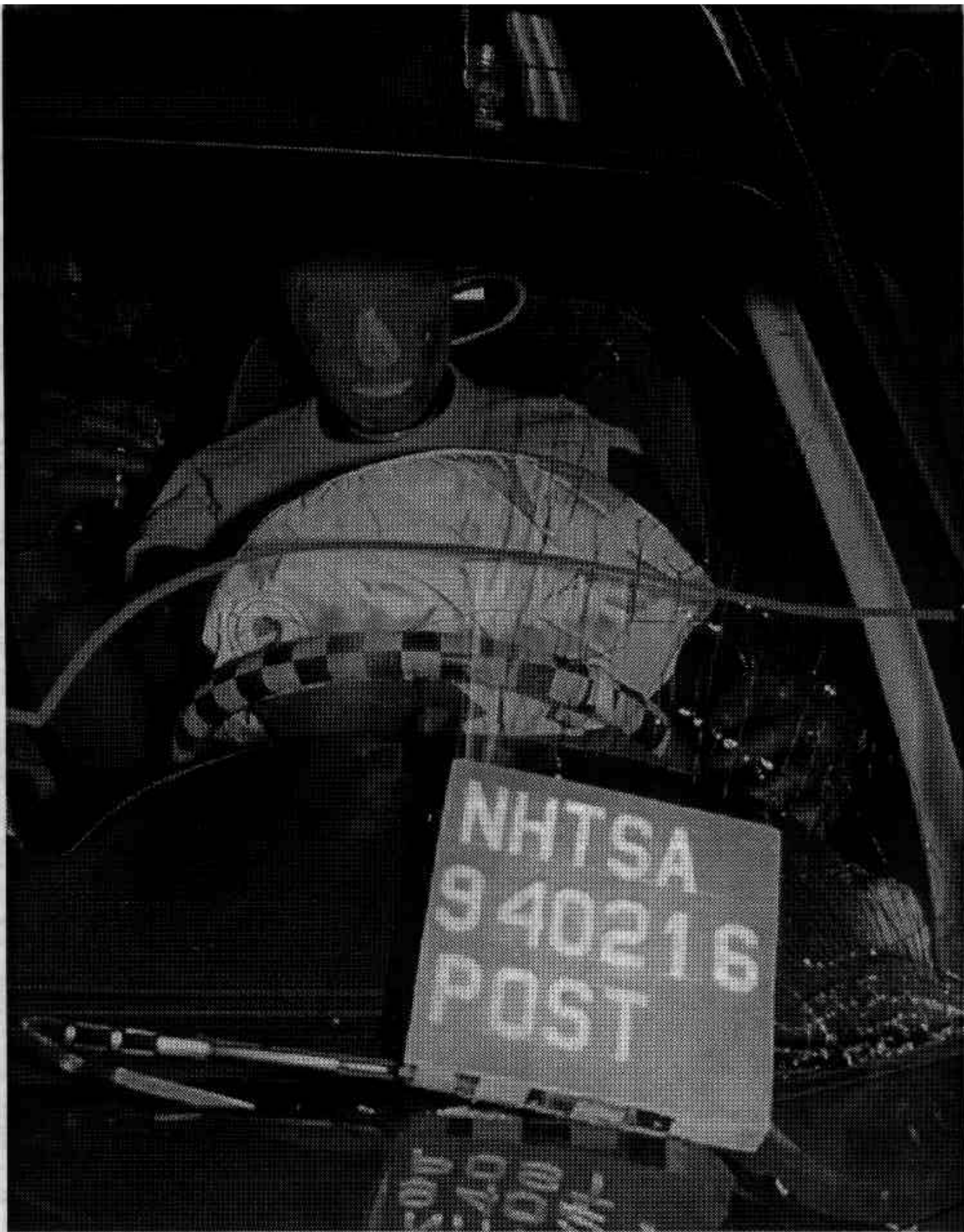


Figure A-34. POST-TEST DRIVER DUMMY POSITION - VIEW 1

A-35

940216



Figure A-35. PRE-TEST DRIVER DUMMY POSITION - VIEW 2

A-36

940216

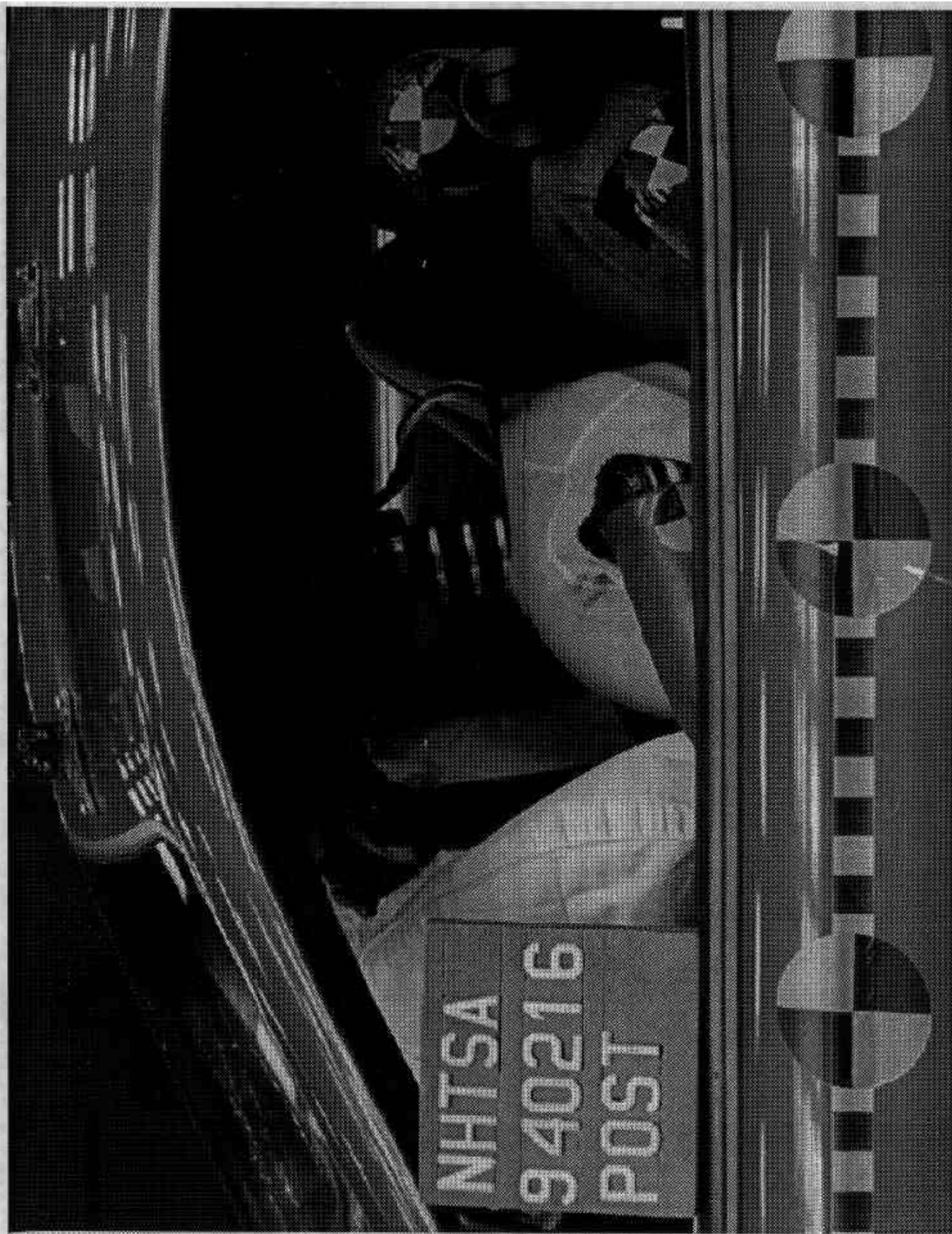


Figure A-36. POST-TEST DRIVER DUMMY POSITION - VIEW 2

A-37

940216

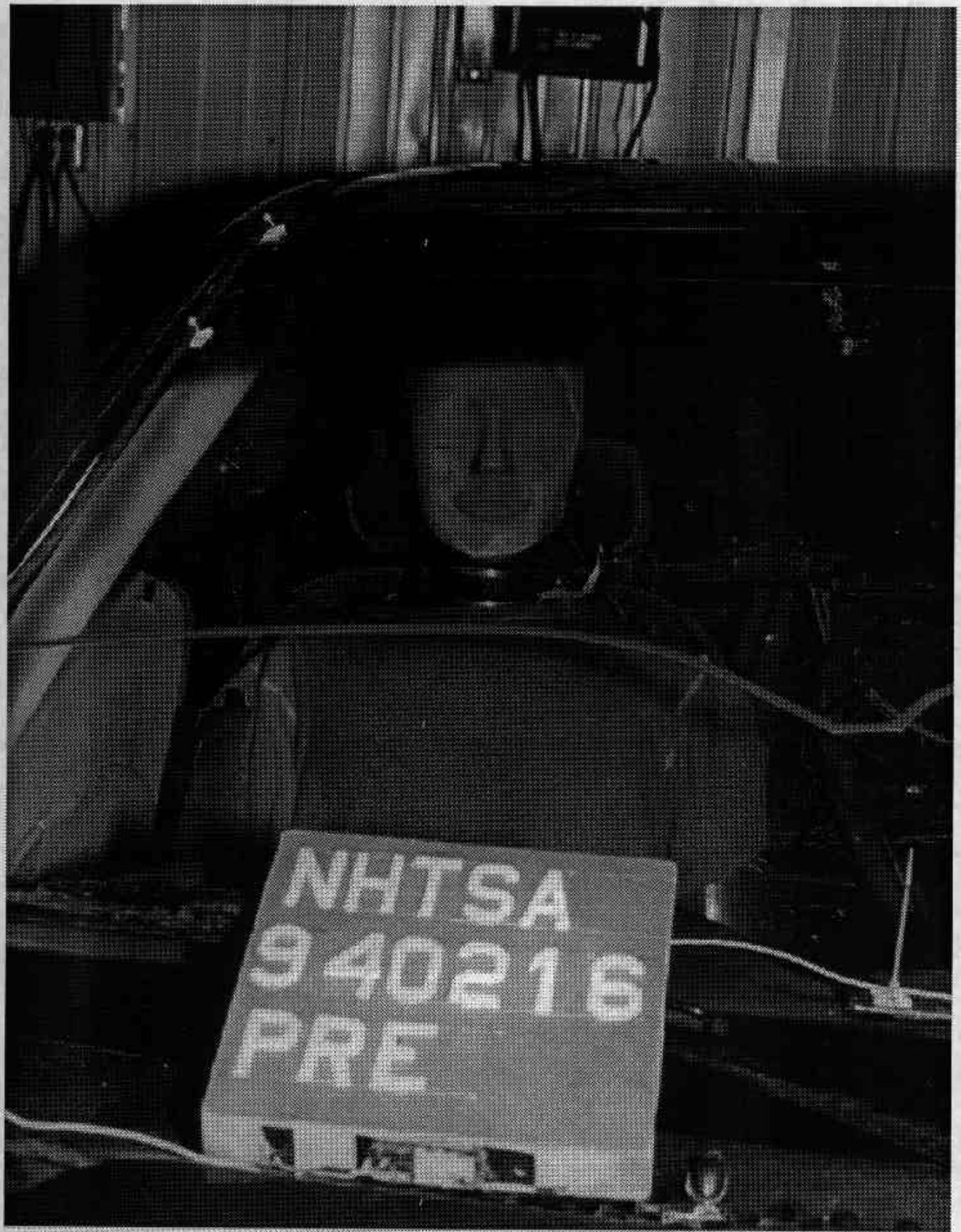


Figure A-37. PRE-TEST PASSENGER DUMMY POSITION - VIEW 1

A-38

940216

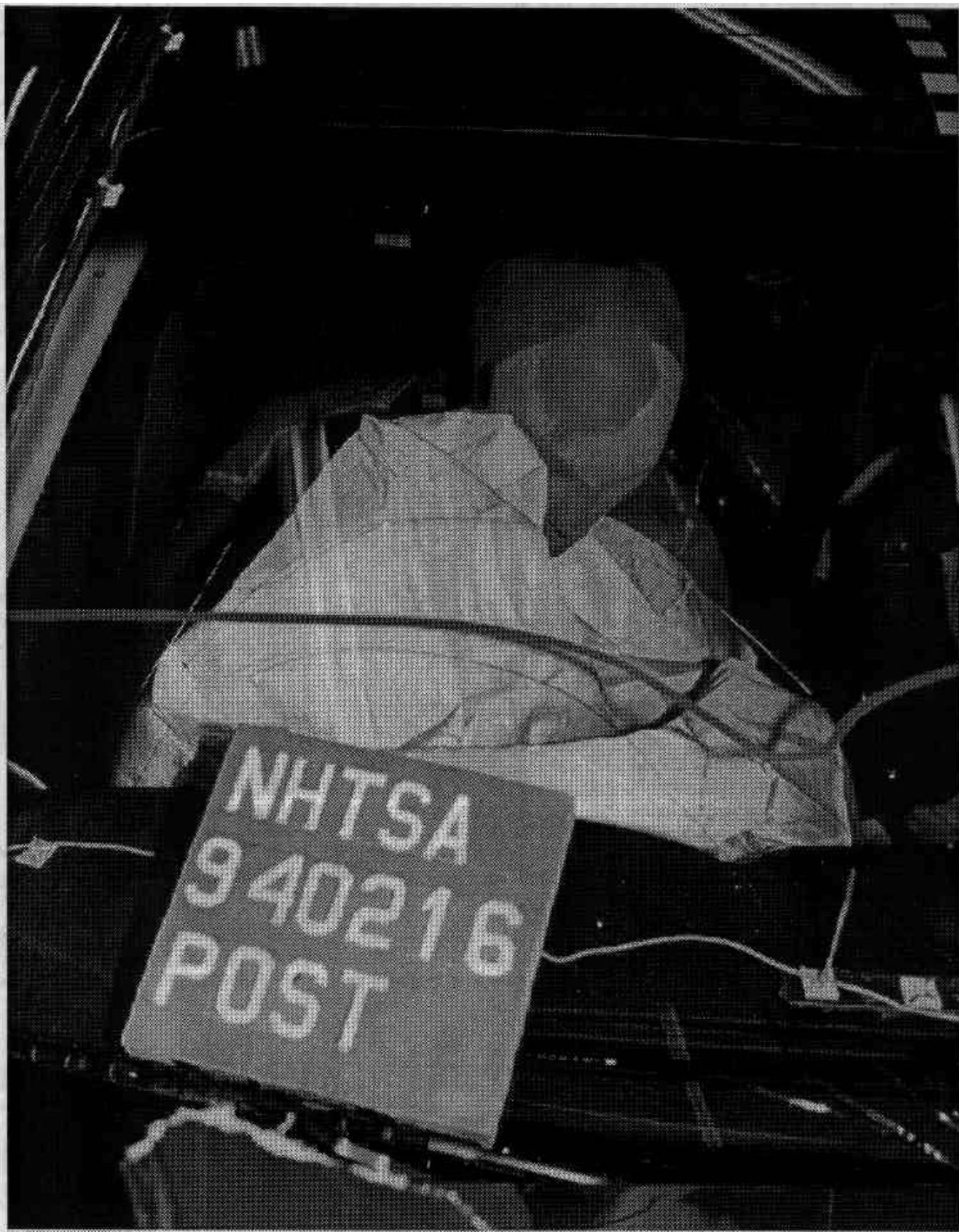


Figure A-38. POST-TEST PASSENGER DUMMY POSITION - VIEW 1

A-39

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Figure A-39. PRE-TEST PASSENGER DUMMY POSITION - VIEW 2

A-40

940216



Figure A-40. POST-TEST PASSENGER DUMMY POSITION - VIEW 2

A-41

940216

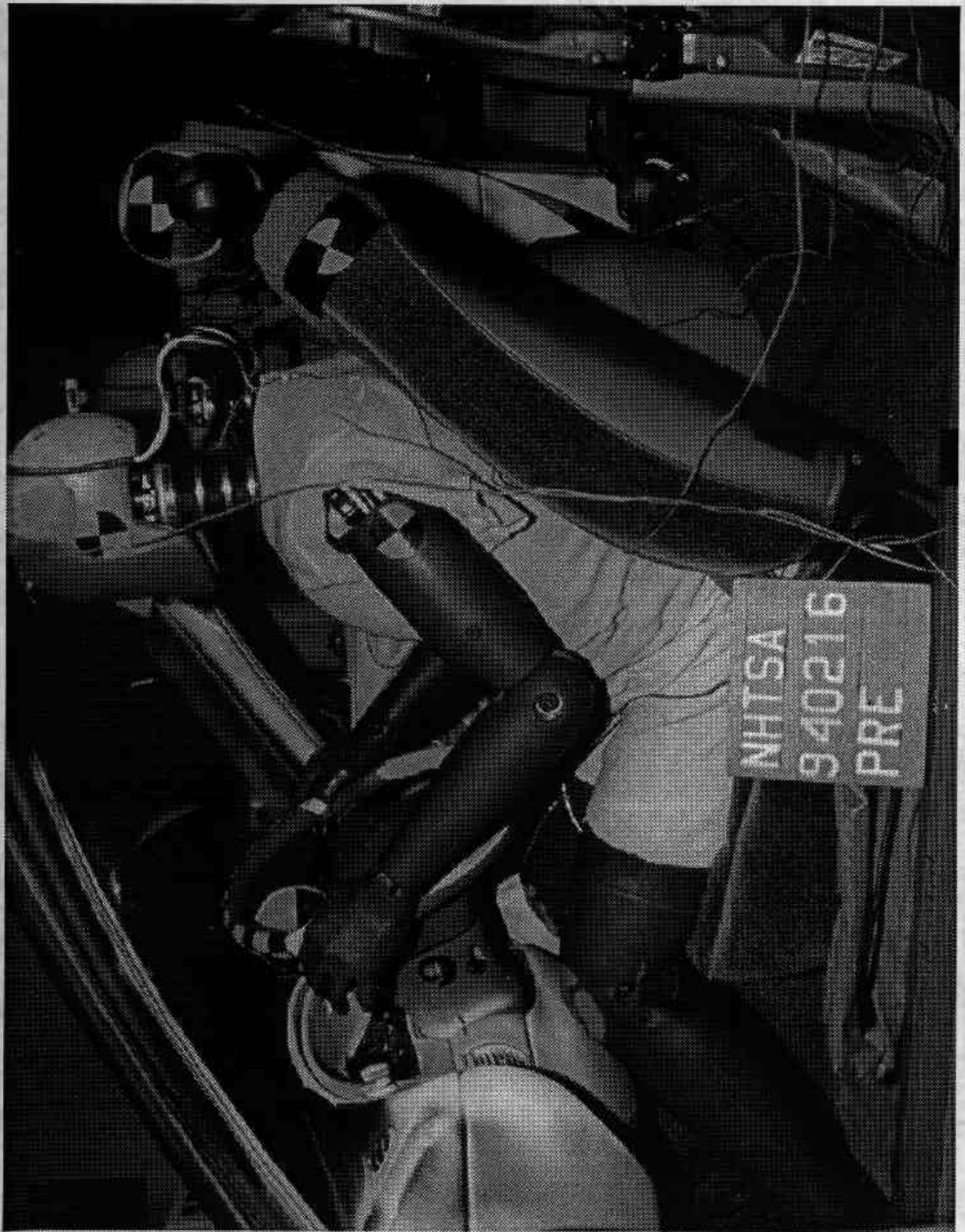


Figure A-41. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
A-42 940216



Figure A-42. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
A-43 940216

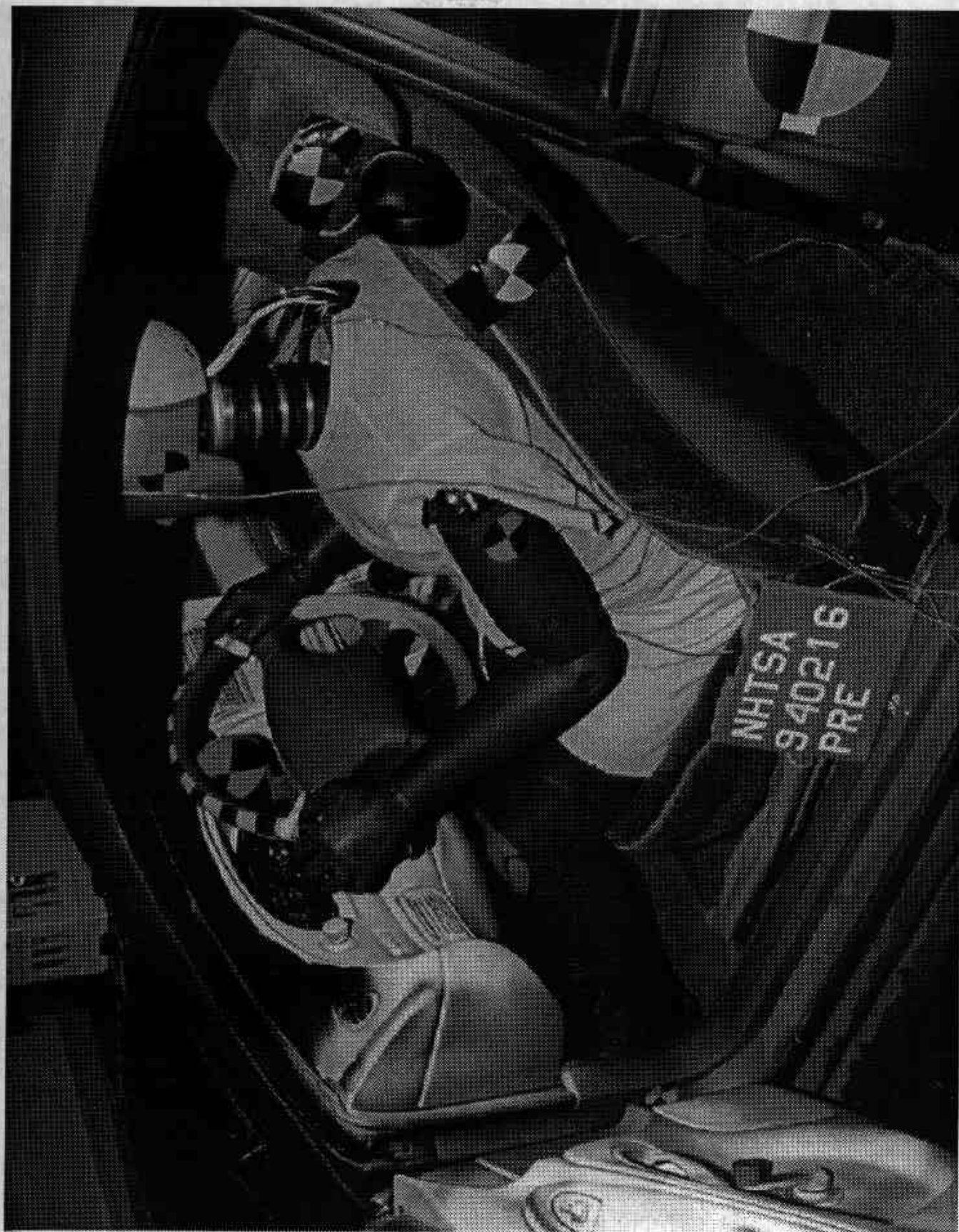


Figure A-43. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

A-44

940216

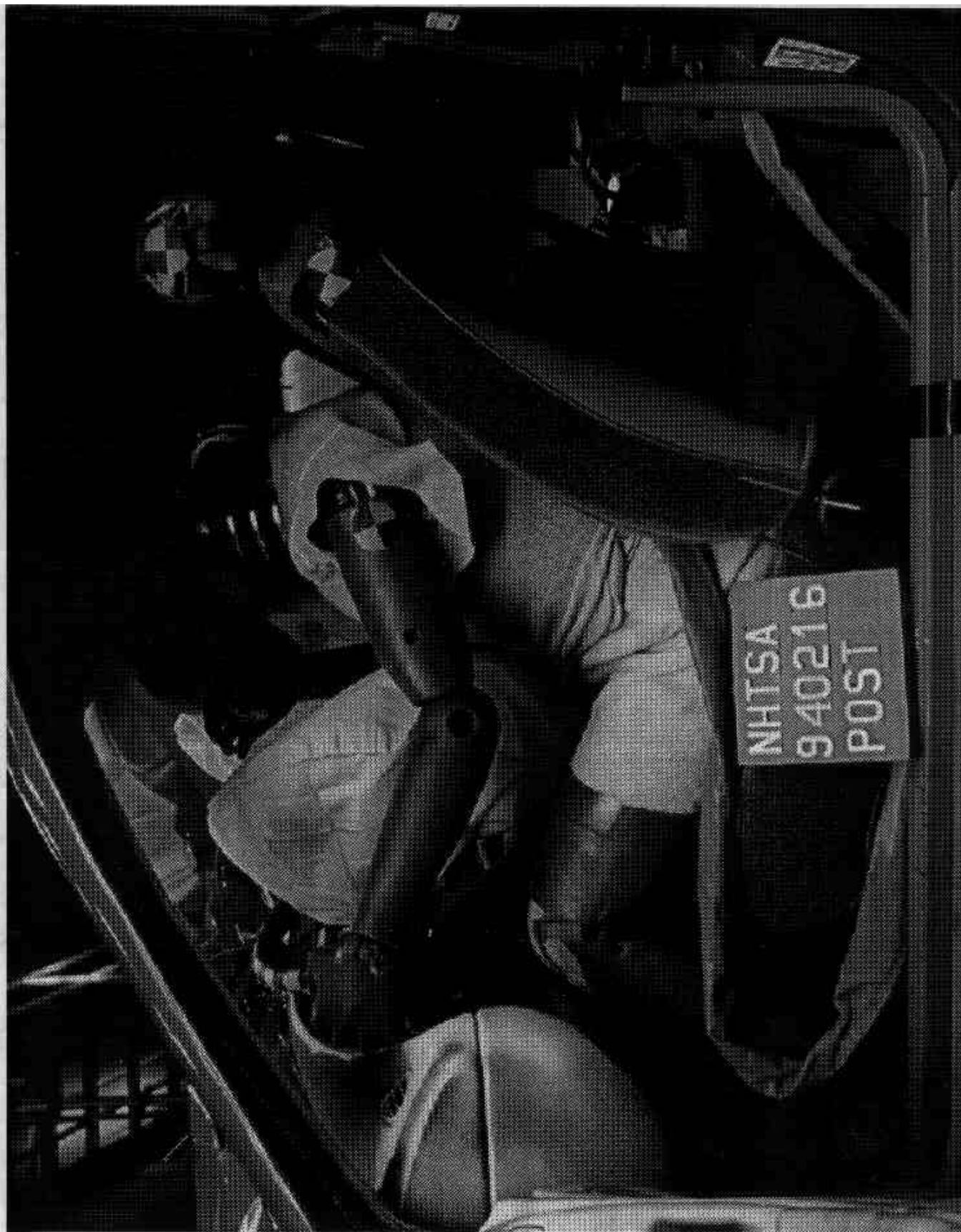


Figure A-44. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2
A-45 940216



Figure A-45. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1

A-46

940216



Figure A-46. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2

A-47

940216

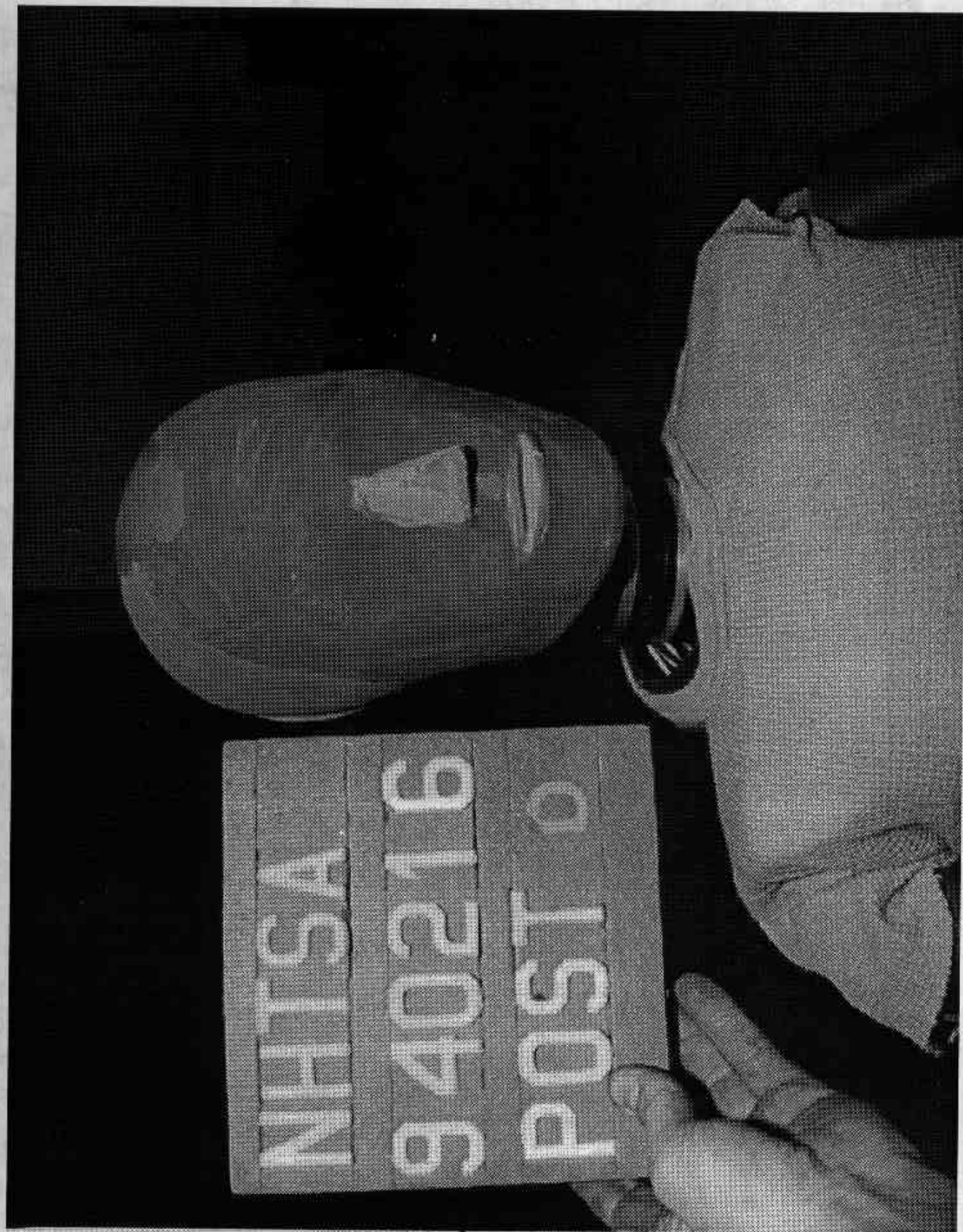


Figure A-47. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1

A-48

940216

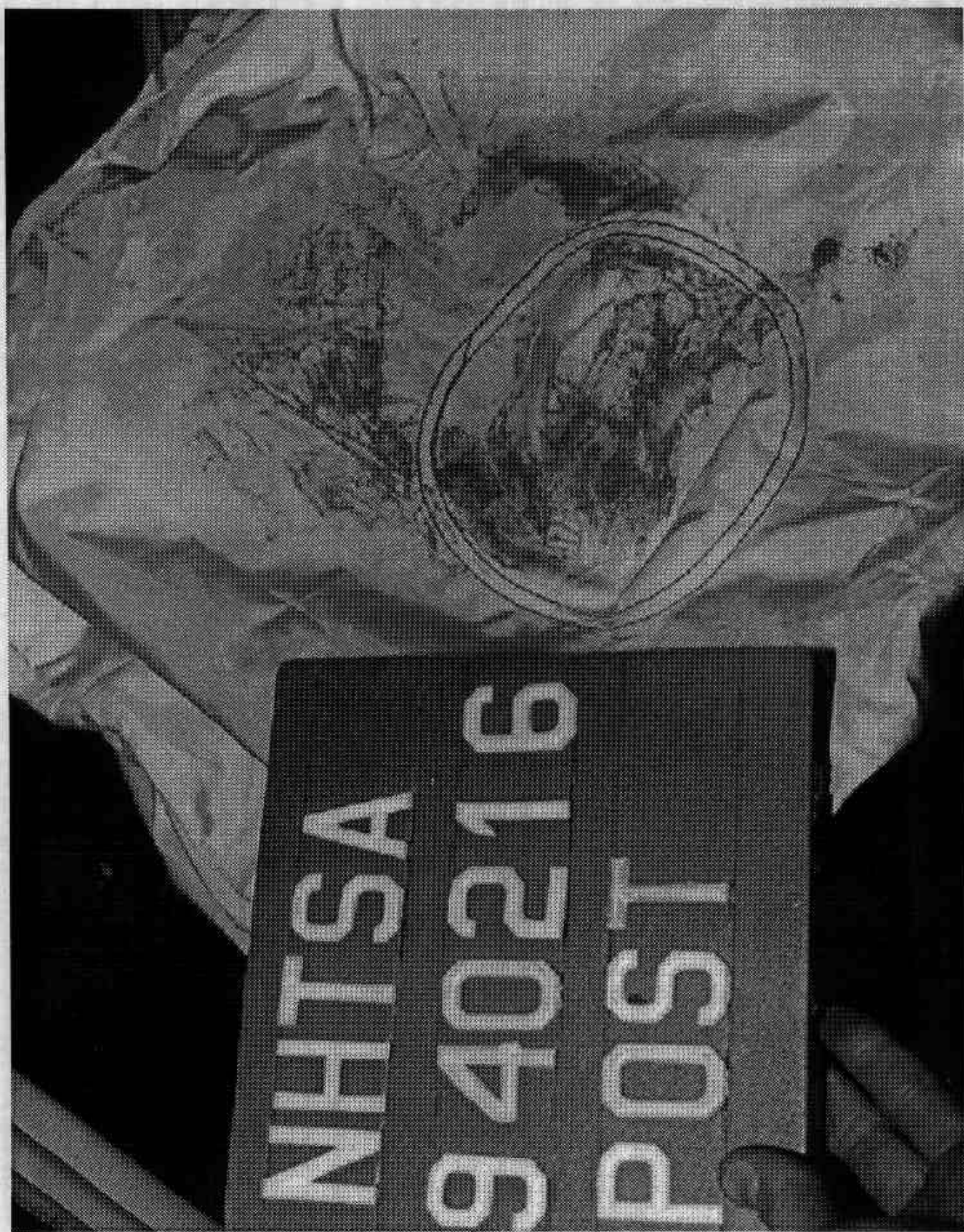


Figure A-48. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2

A-49

940216



Figure A-49. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 3

A-50

940216

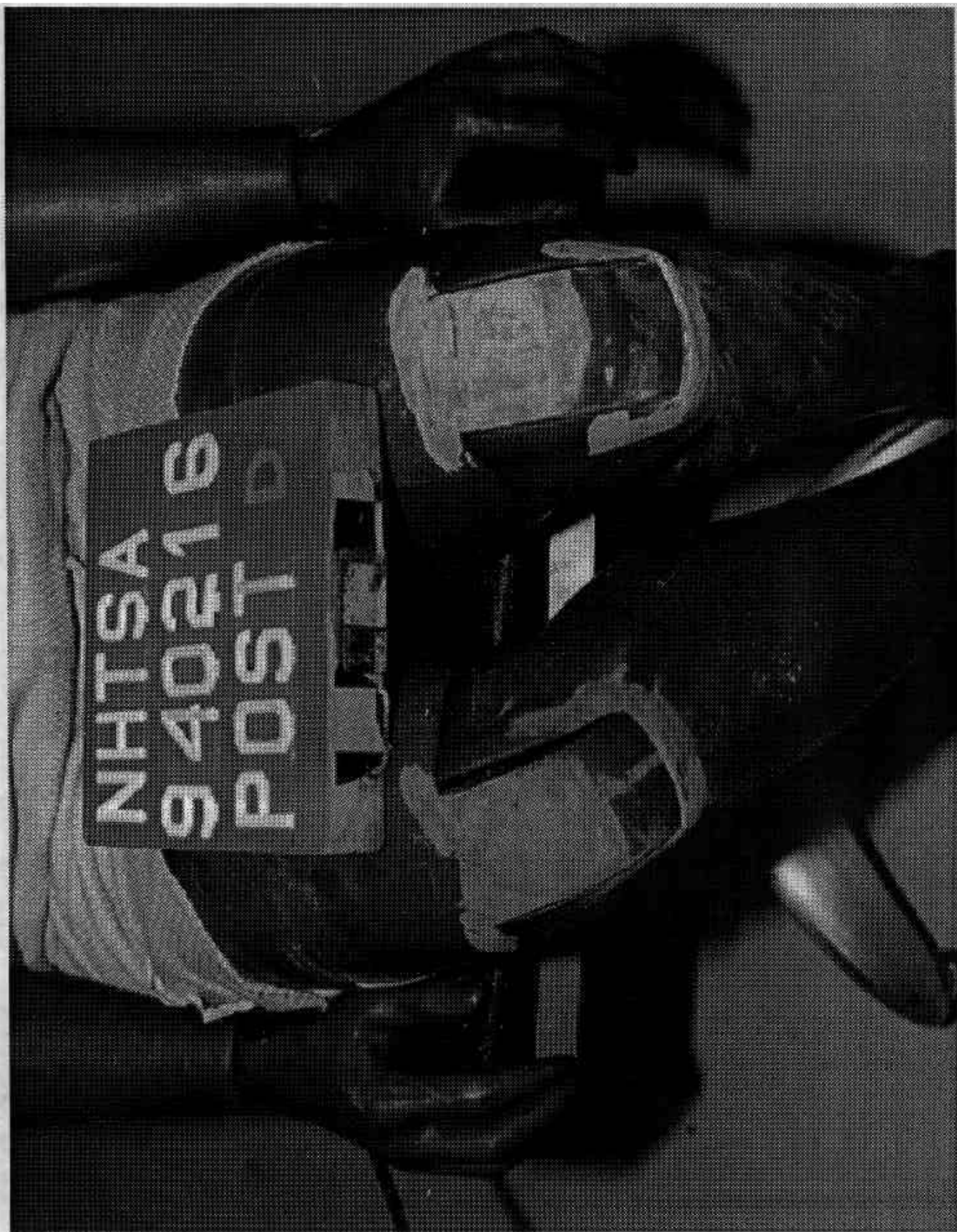


Figure A-50. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1

A-51

940216

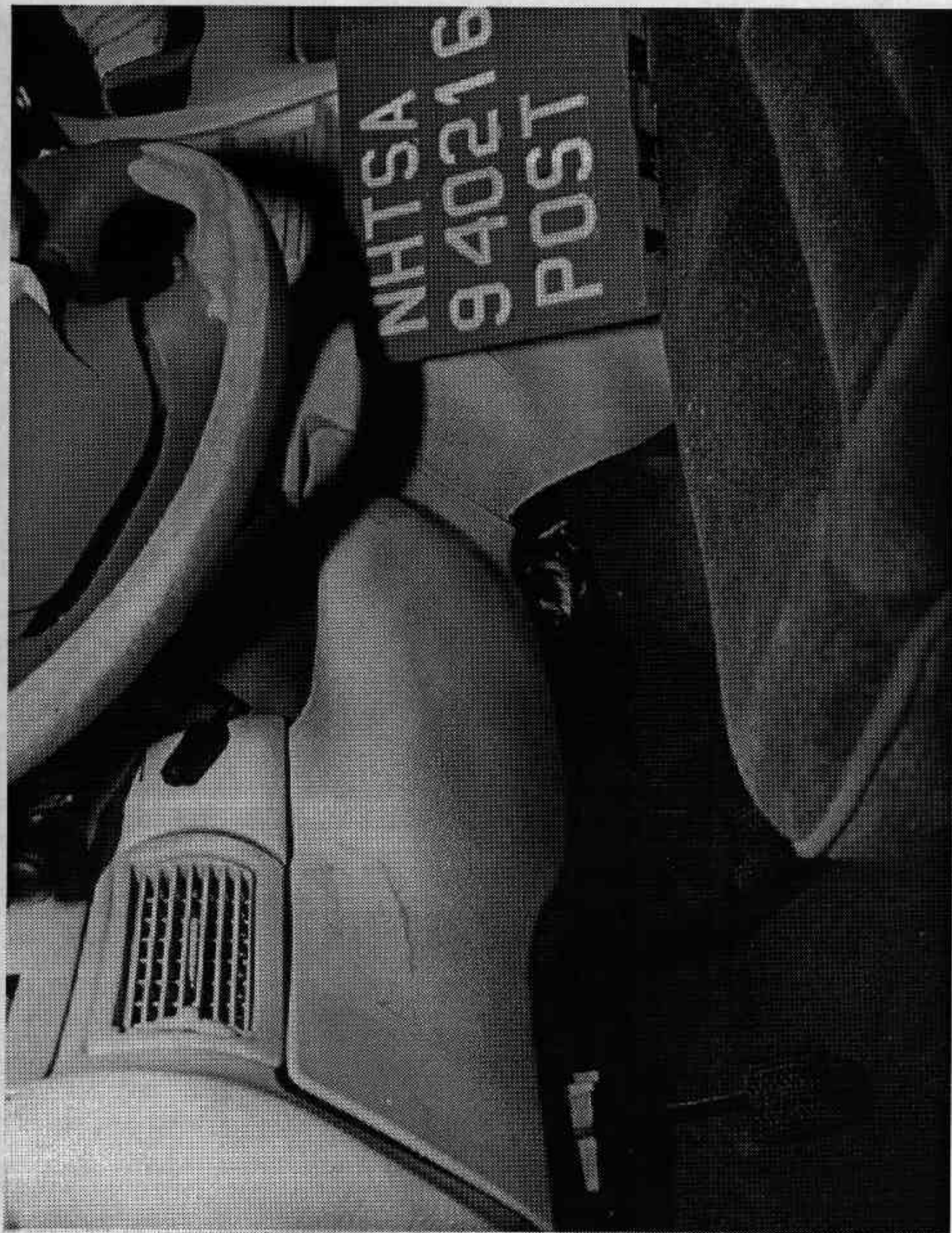


Figure A-51. POST-TEST DRIVER DUMMY KNEE CONTACT- VIEW 2

A-52

940216

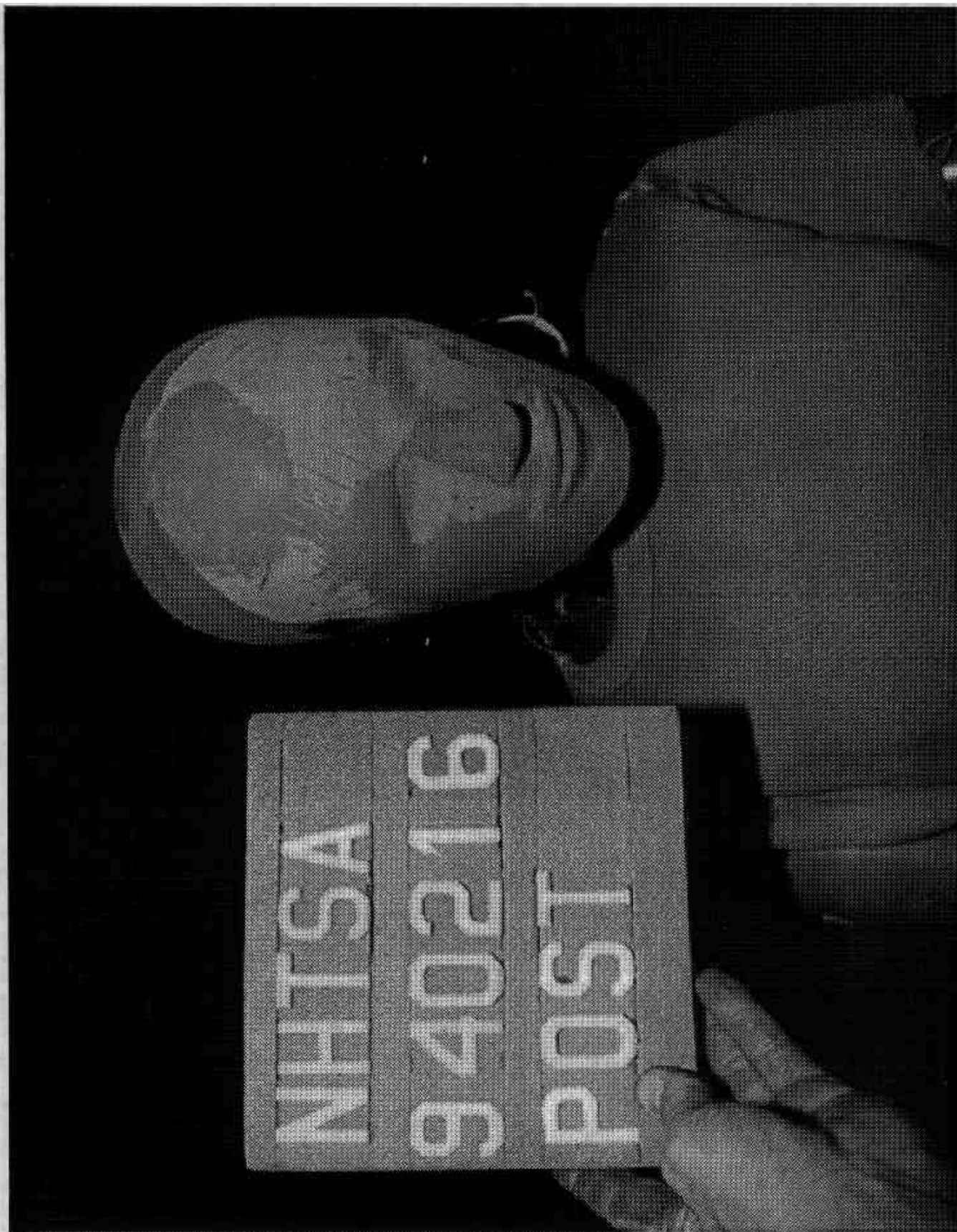


Figure A-52. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 1

A-53

940216

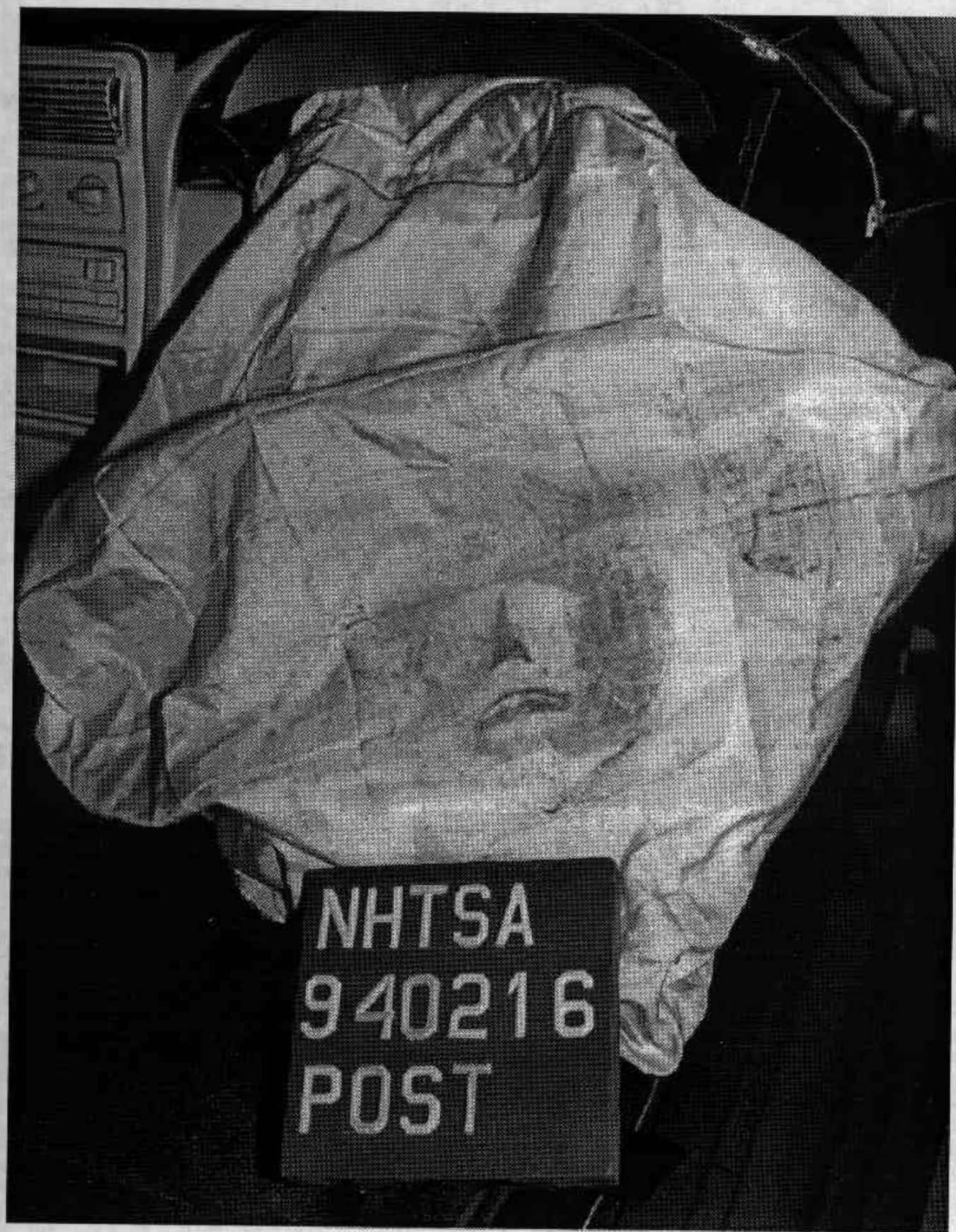


Figure A-53. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 2
A-54 940216

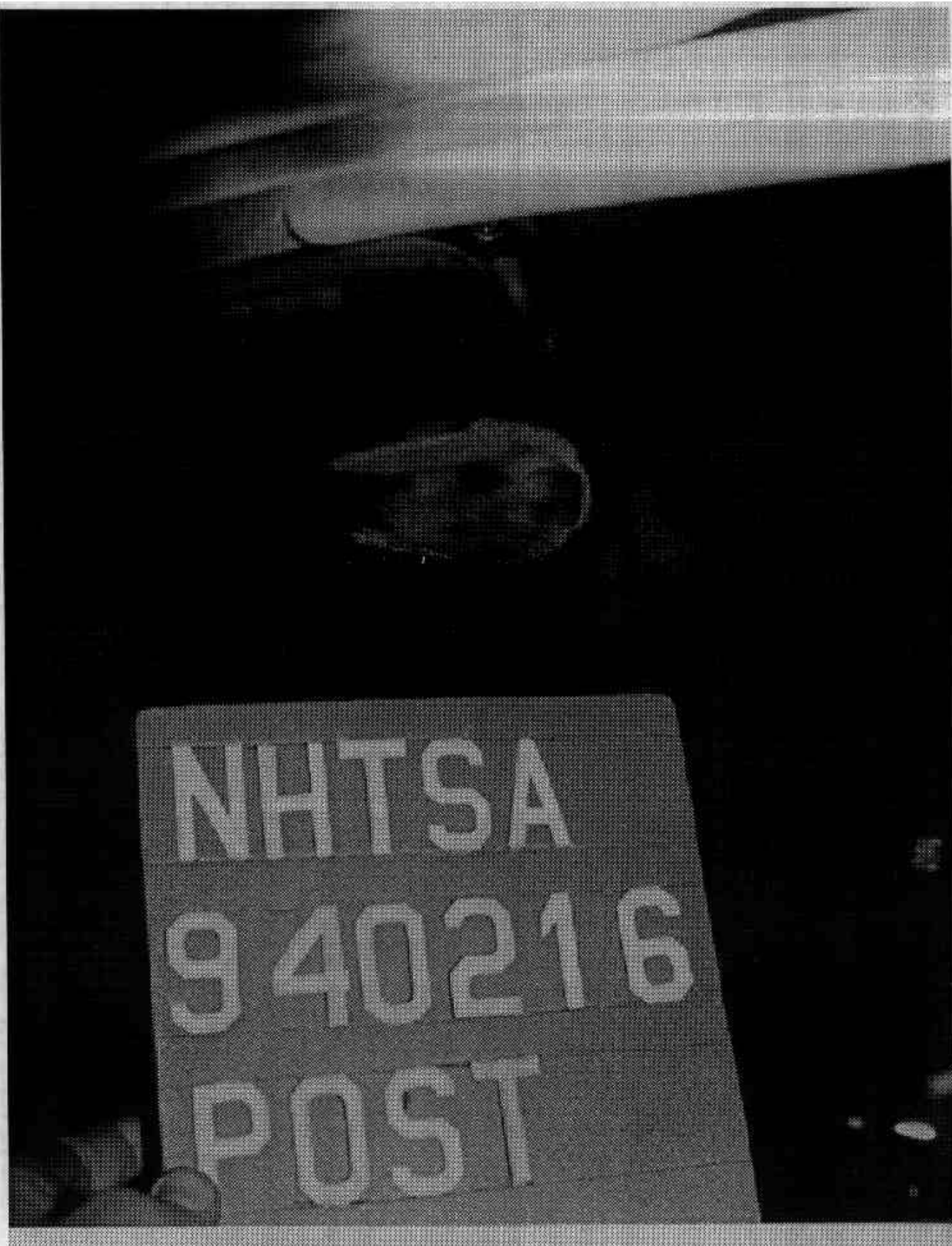


Figure A-54. POST-TEST PASSENGER DUMMY HEAD CONTACT - VIEW 3
A-55 940216

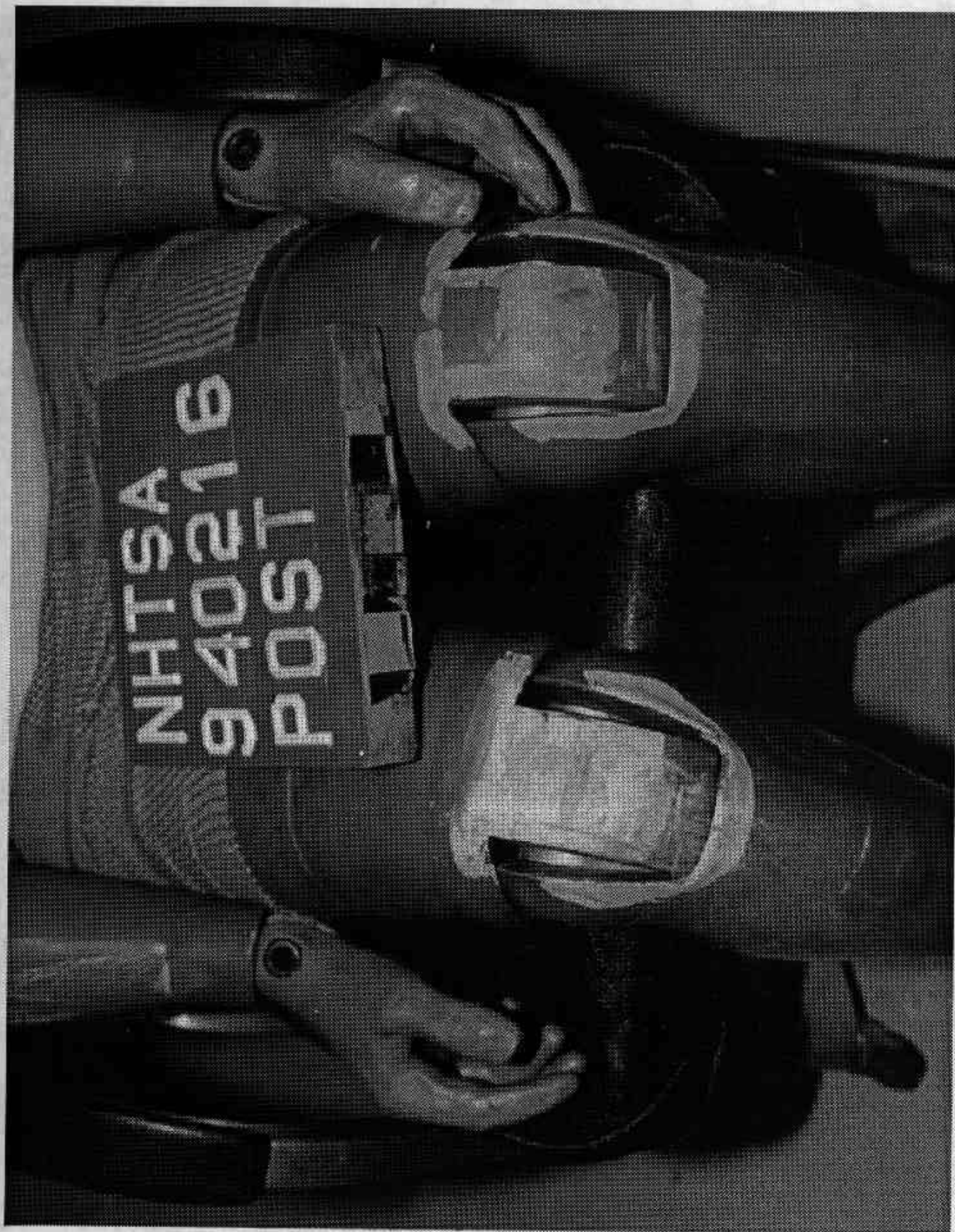


Figure A-55. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1

A-56

940216



Figure A-56. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2

A-57

940216

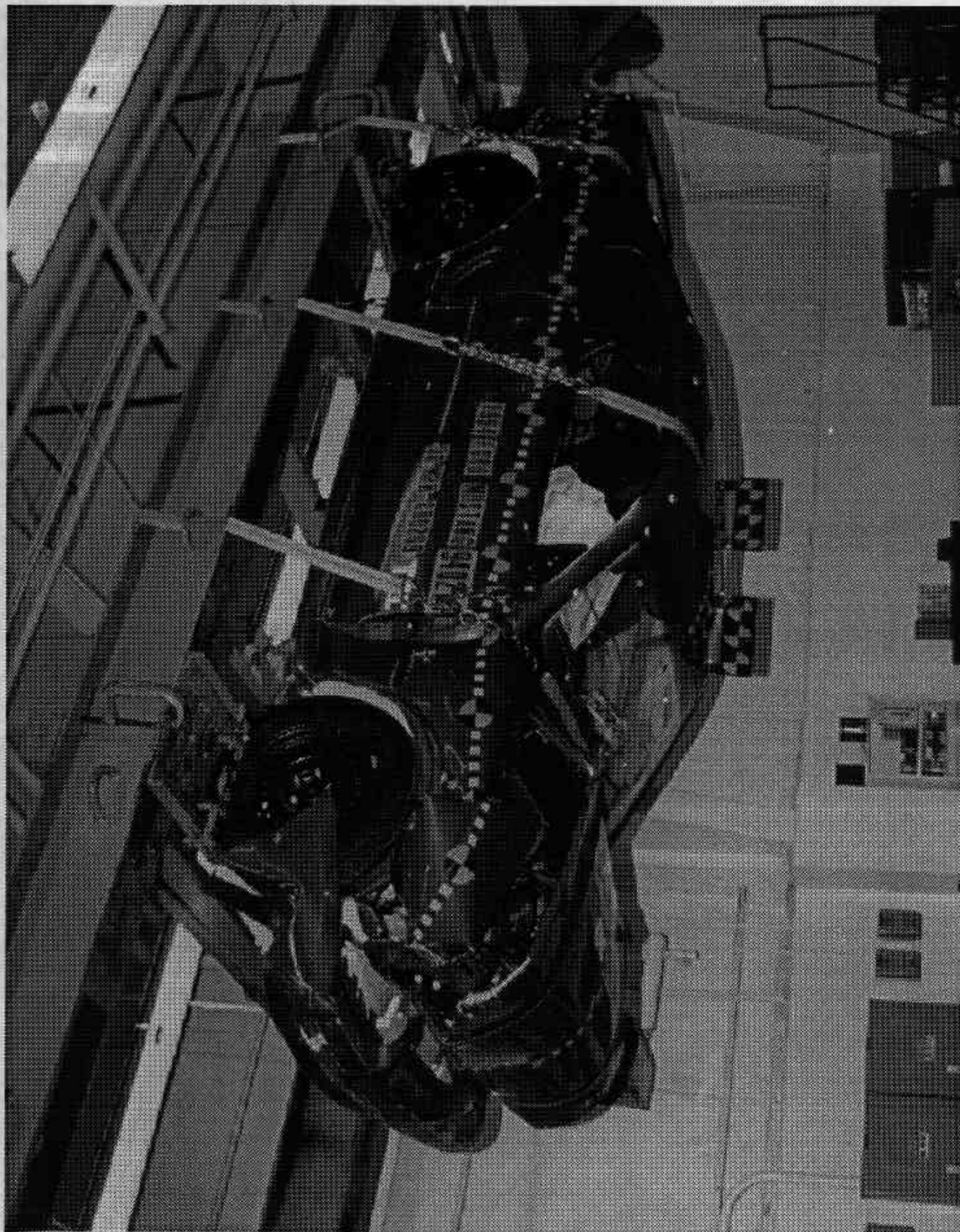


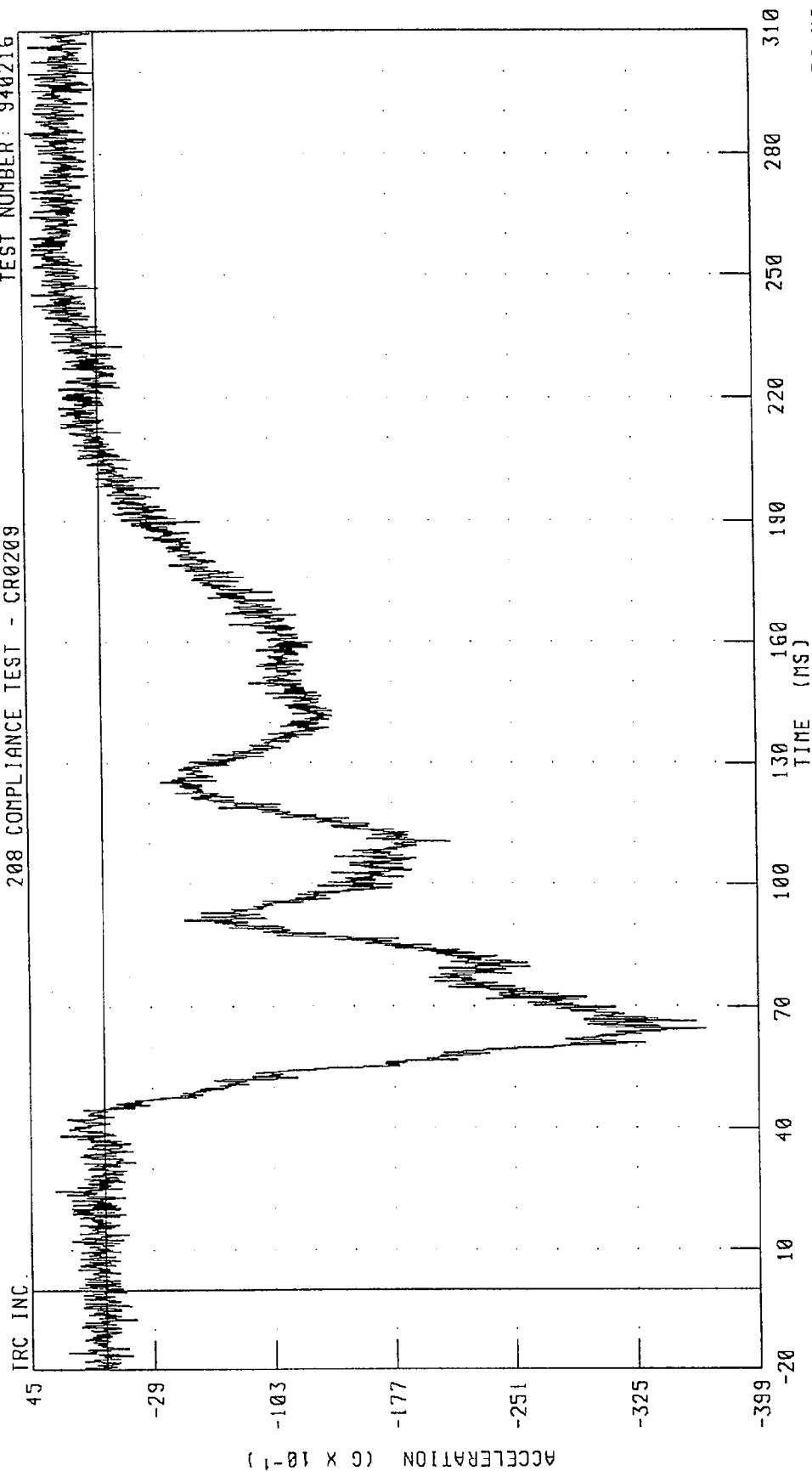
Figure A-59. POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW
A-60 940216

Appendix B

Data Plots

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 DRIVER HEAD X-AXIS ACCELERATION
 208 COMPLIANCE TEST - CR0209

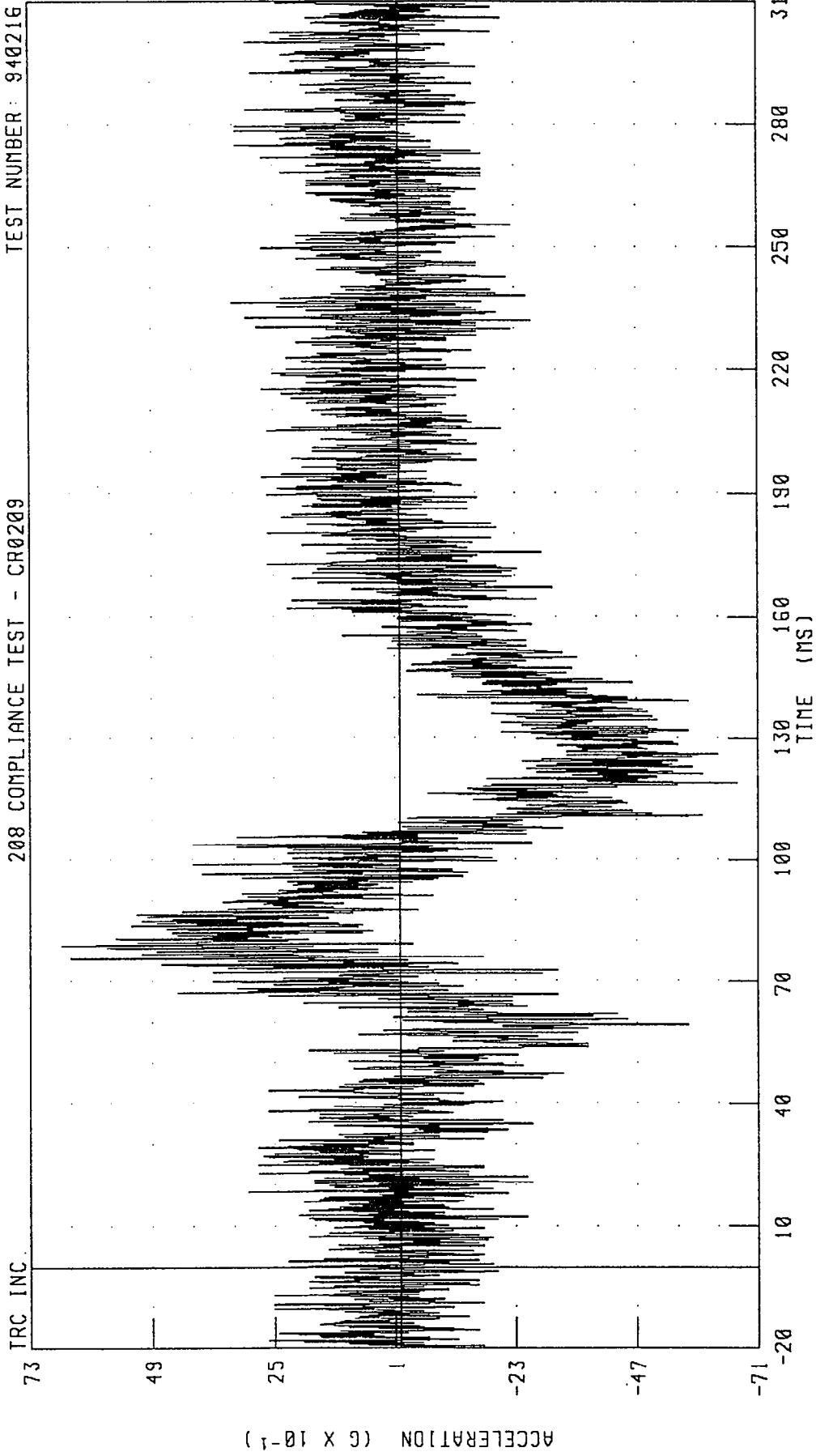
TEST NUMBER: 940216



CHANNEL: HEDXG1 FILTER: CH. CLASS 1000

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 DRIVER HEAD Y-AXIS ACCELERATION
 208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216

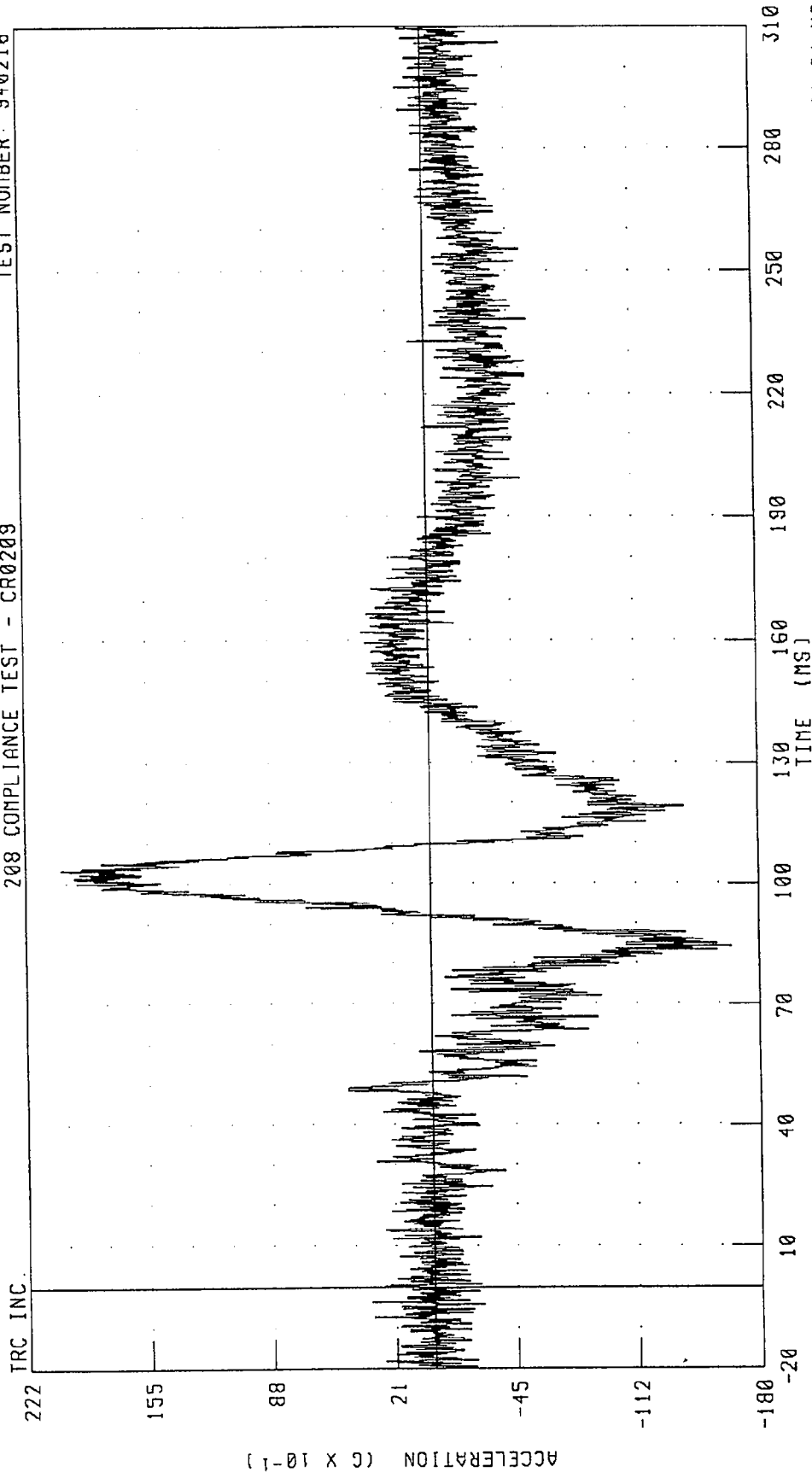


CHANNEL: HEDYG1 FILTER: CH. CLASS 1000

PEAK DATA: 6.69 G @ 78.88 MS; -6.69 G @ 119.04 MS

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 DRIVER HEAD Z-AXIS ACCELERATION
 208 COMPLIANCE TEST - CR0209

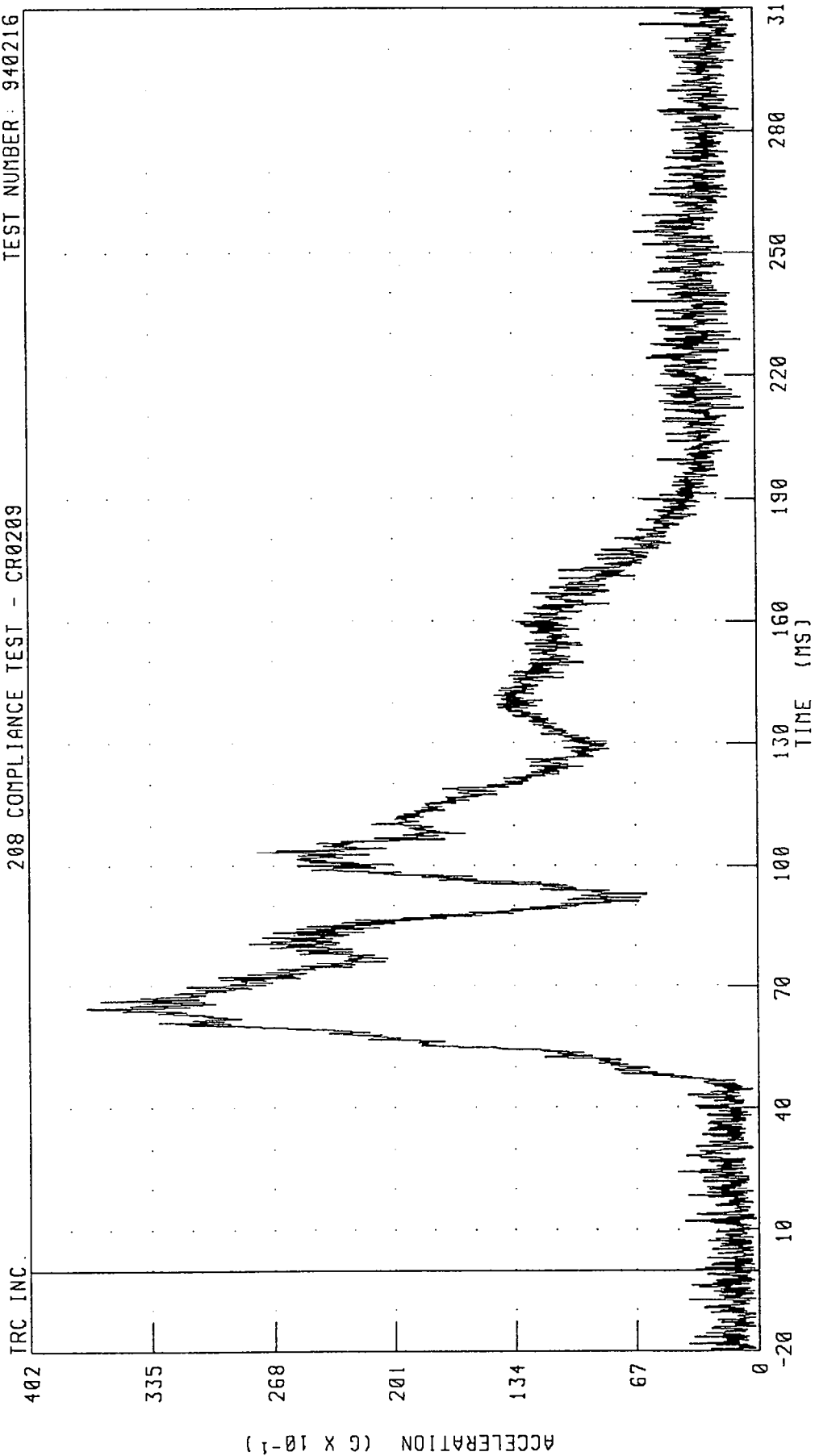
TEST NUMBER: 940216



CHANNEL: HEDZG1 FILTER: CH. CLASS 1000

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 DRIVER HEAD RESULTANT ACCELERATION
 208 COMPLIANCE TEST - CR0209

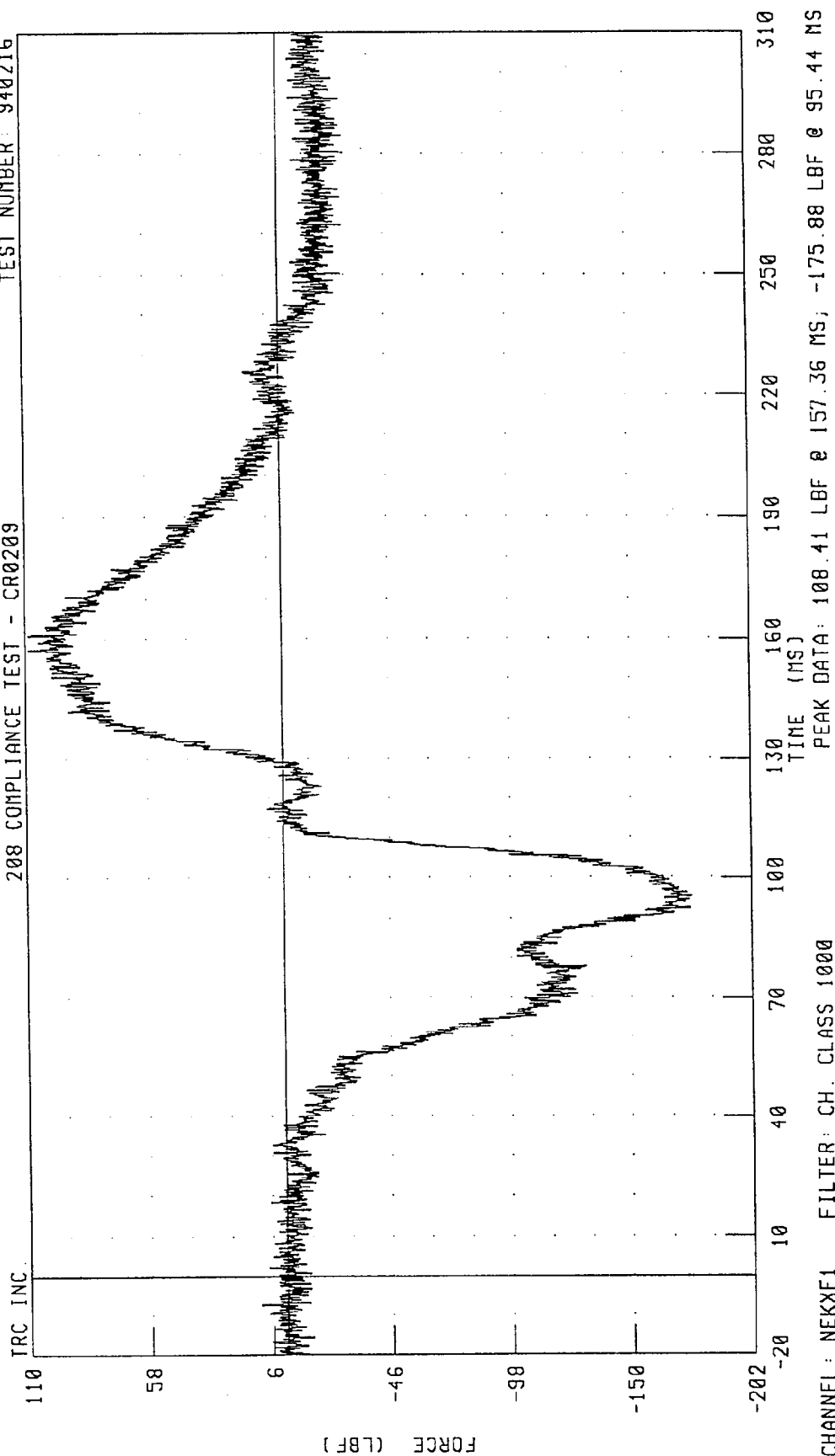
TEST NUMBER: 940216



CHANNEL: HEDRG1 FILTER: CH. CLASS 1000

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
DRIVER NECK X-AXIS SHEAR FORCE
208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216

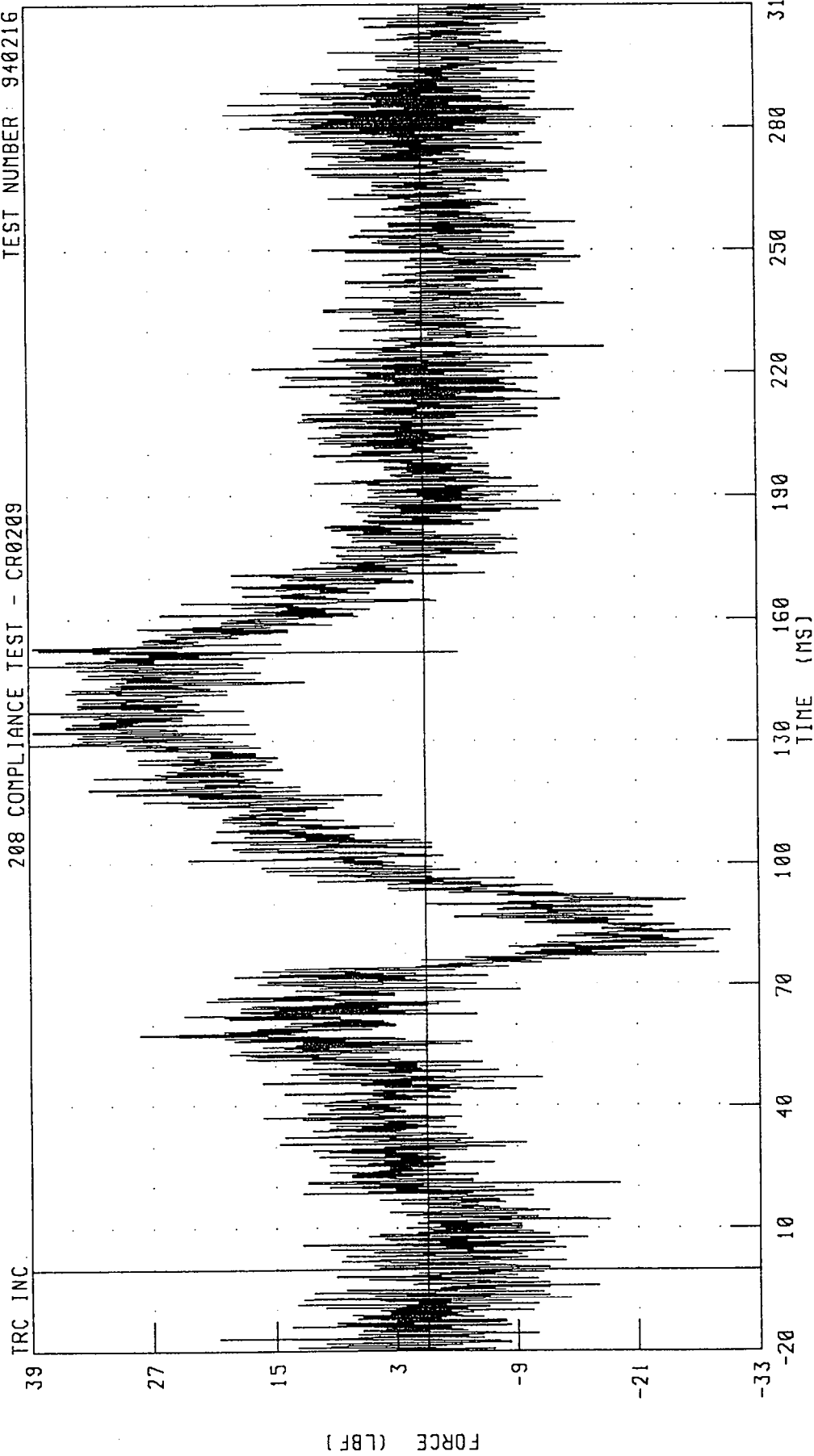


1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER

DRIVER NECK Y-AXIS SHEAR FORCE

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216

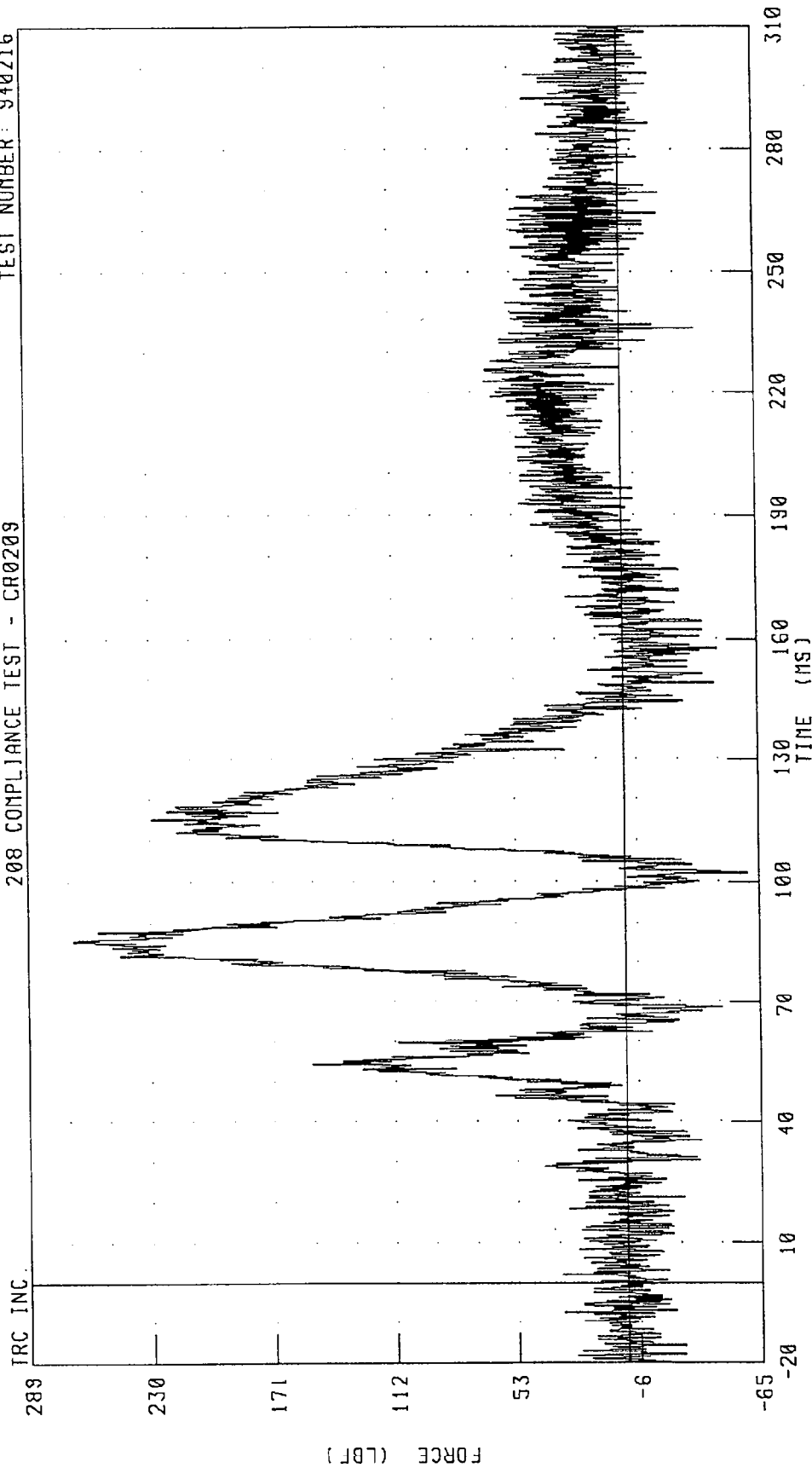


CHANNEL: NEKYF1 FILTER: CH CLASS 1000

PEAK DATA: 40.17 LBF @ 129.44 MS; -30.08 LBF @ 83.44 MS

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 DRIVER NECK Z-AXIS AXIAL FORCE
 208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216



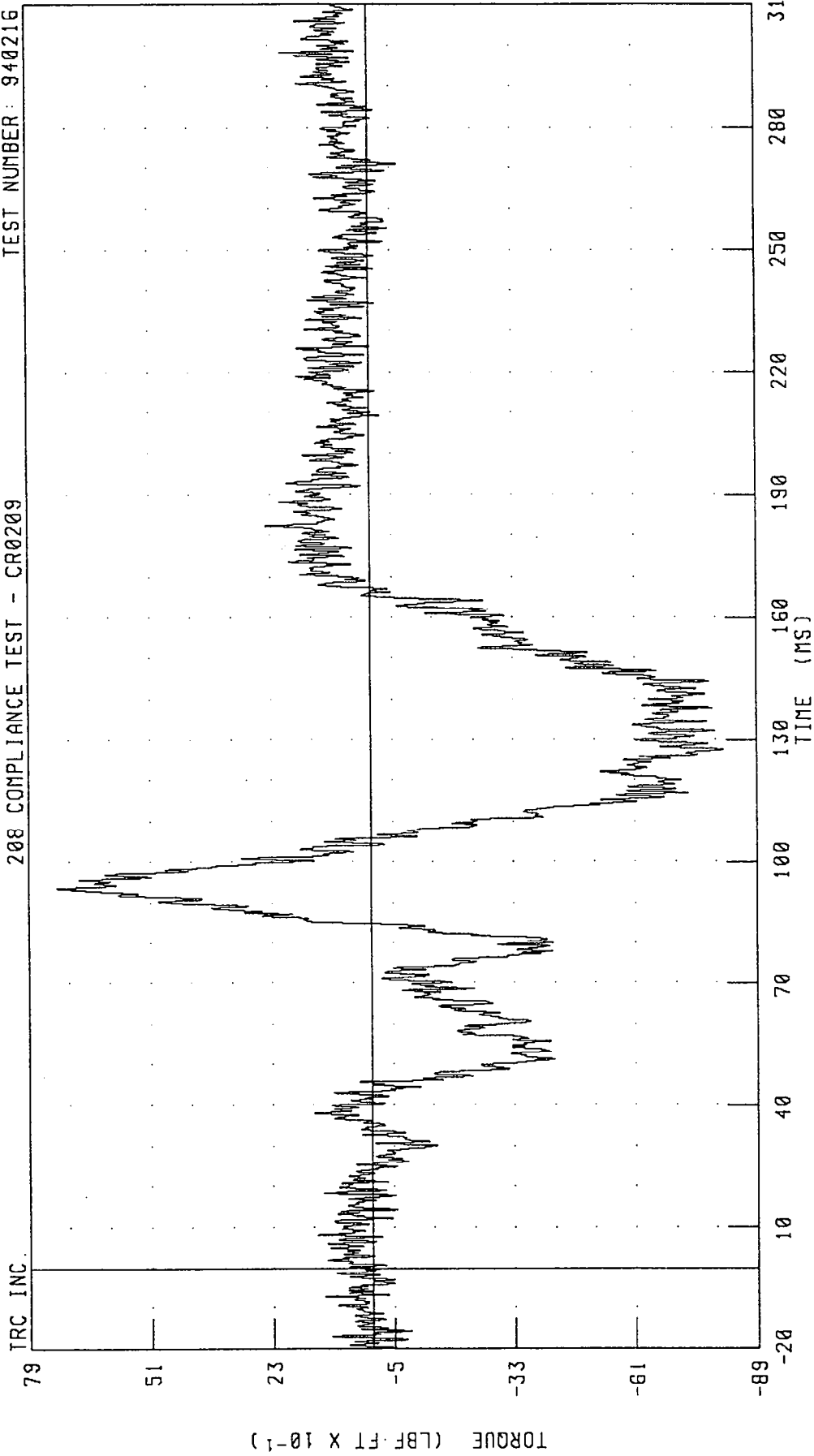
PEAK DATA: 267.32 LBF @ 85.36 MS; -59.17 LBF @ 102.08 MS

CHANNEL: NEKZF1 FILTER: CH. CLASS 1000

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT X AXIS

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216

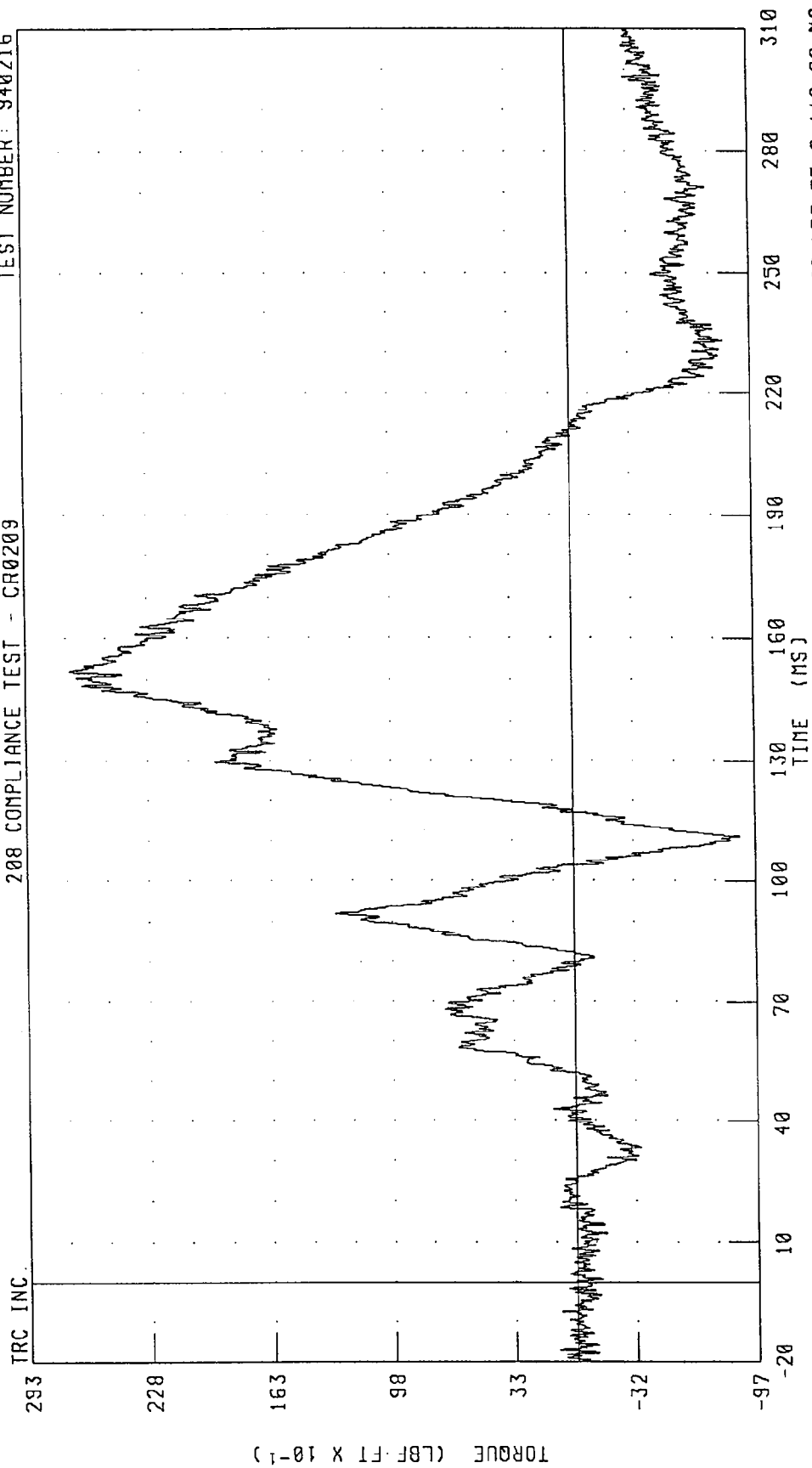


PEAK DATA: 7.24 LBF·FT @ 93.76 MS; -8.13 LBF·FT @ 127.60 MS

CHANNEL: NEKXM1 FILTER: CH. CLASS 600

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
DRIVER NECK MOMENT ABOUT Y AXIS
208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216



PEAK DATA: 26.92 LBF-FT @ 152.08 MS, -8.88 LBF-FT @ 110.96 MS

CHANNEL: NEKYM1 FILTER: CH. CLASS 600

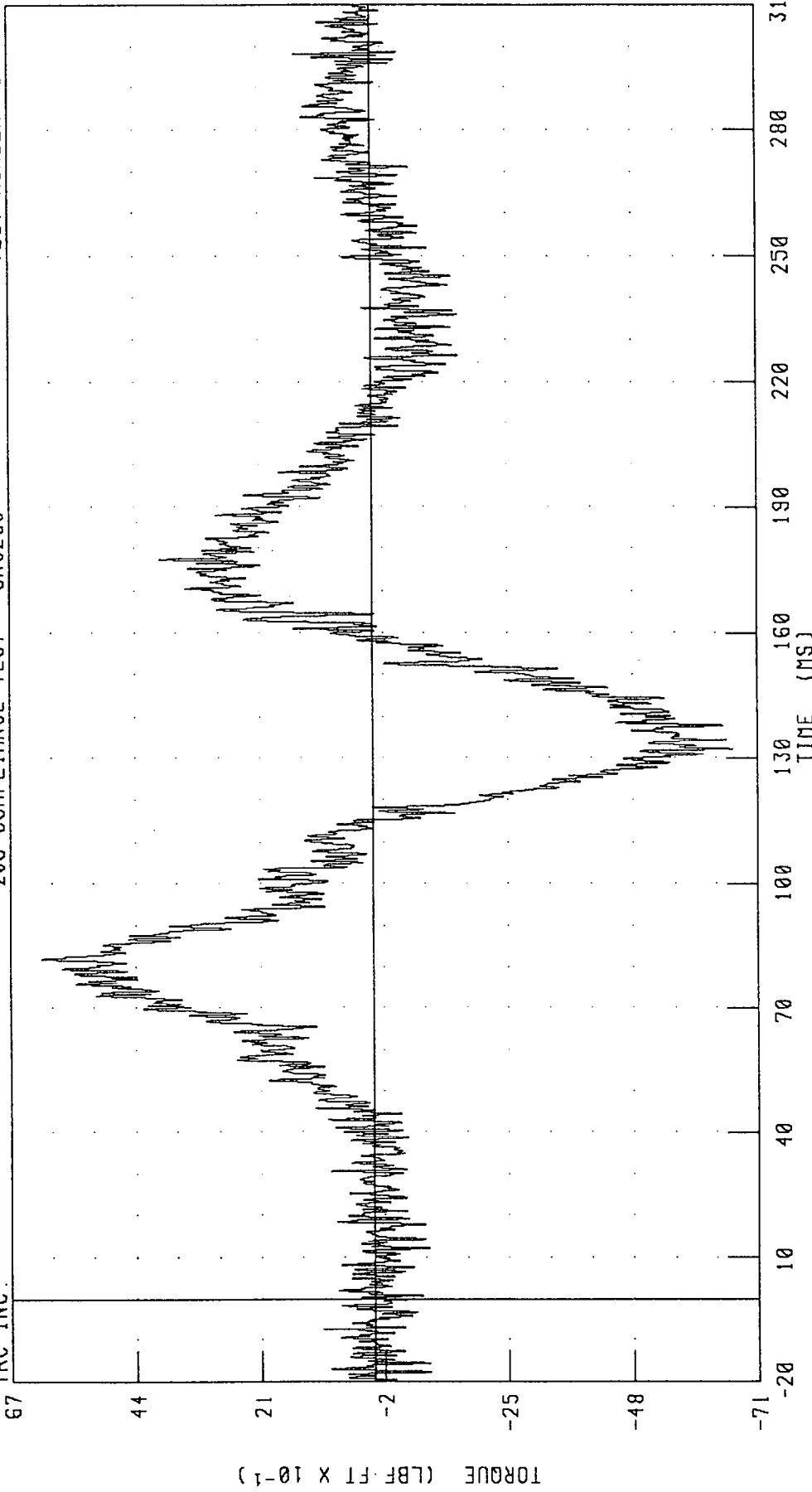
1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER

DRIVER NECK MOMENT ABOUT Z AXIS

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216

TRC INC.

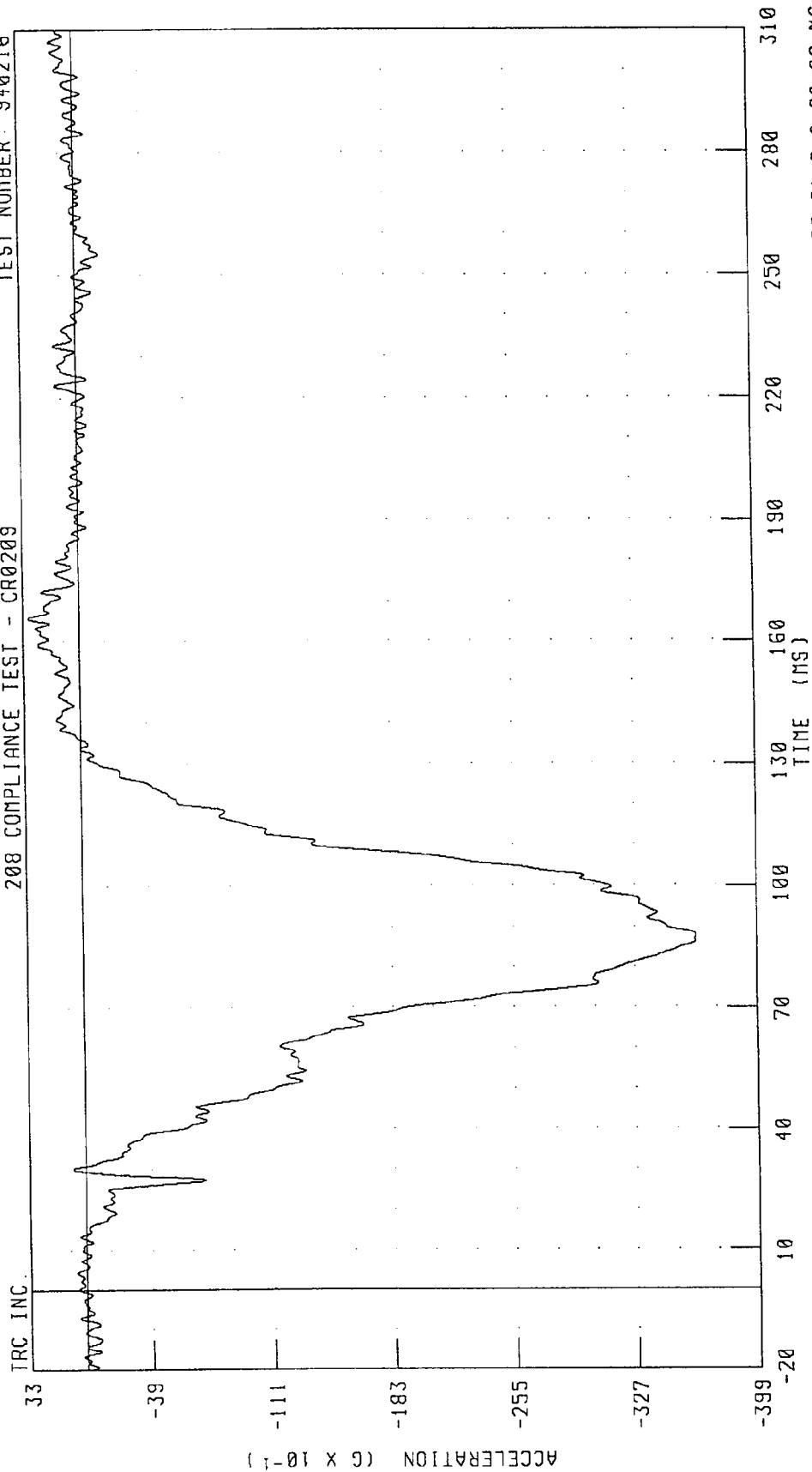


PEAK DATA: 6.13 LBF·FT @ 81.92 MS, -6.64 LBF·FT @ 132.24 MS

CHANNEL: NEKZM1 FILTER: CH. CLASS 600

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 DRIVER CHEST X-AXIS ACCELERATION
 208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216



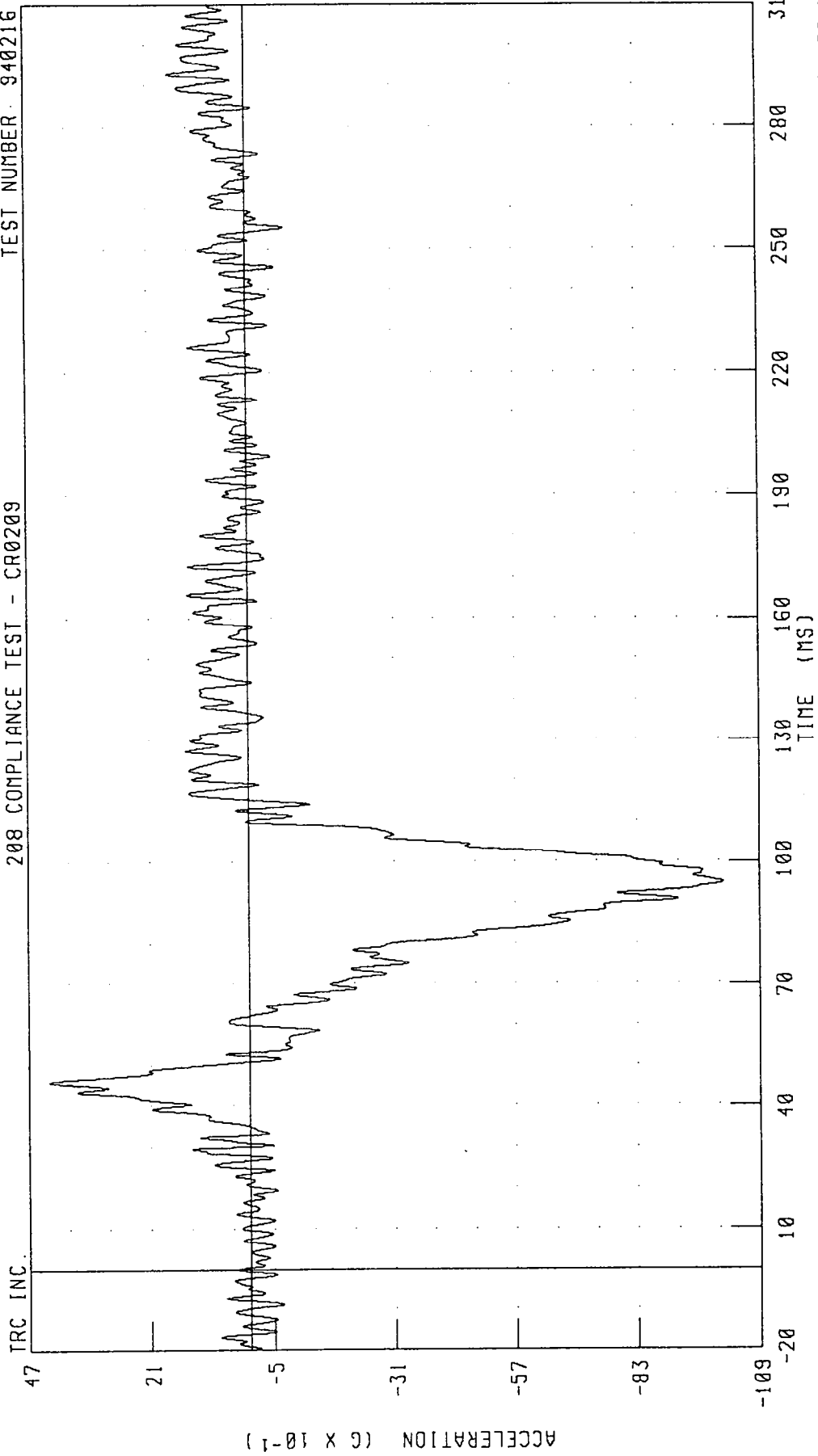
PEAK DATA: 3.01 G @ 165.76 MS; -36.31 G @ 86.08 MS

CHANNEL: CSTXG1 FILTER: CH. CLASS 180

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
DRIVER CHEST Y-AXIS ACCELERATION

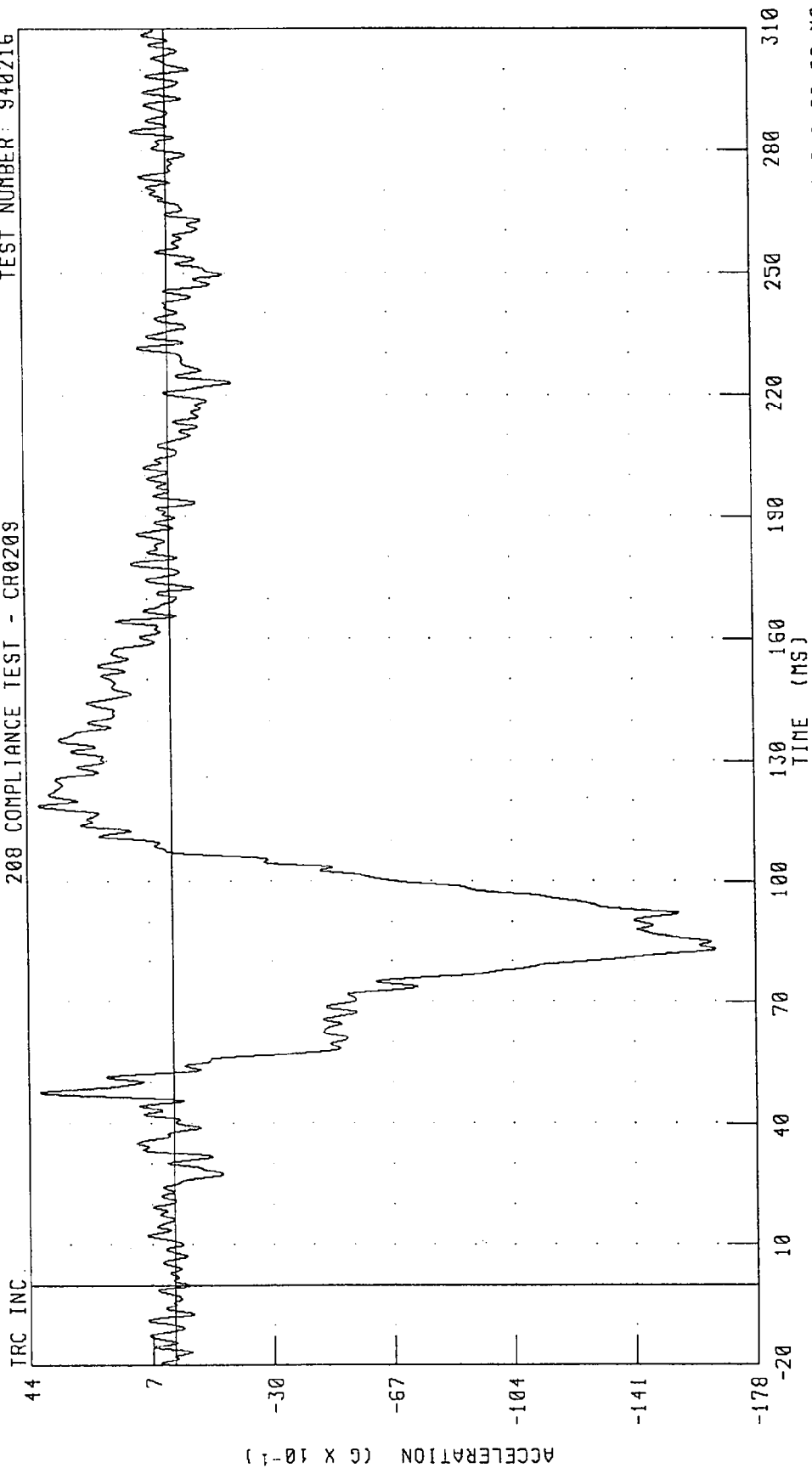
TEST NUMBER: 940216

208 COMPLIANCE TEST - CR0209



1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 DRIVER CHEST Z-AXIS ACCELERATION
 200 COMPLIANCE TEST - CR0209

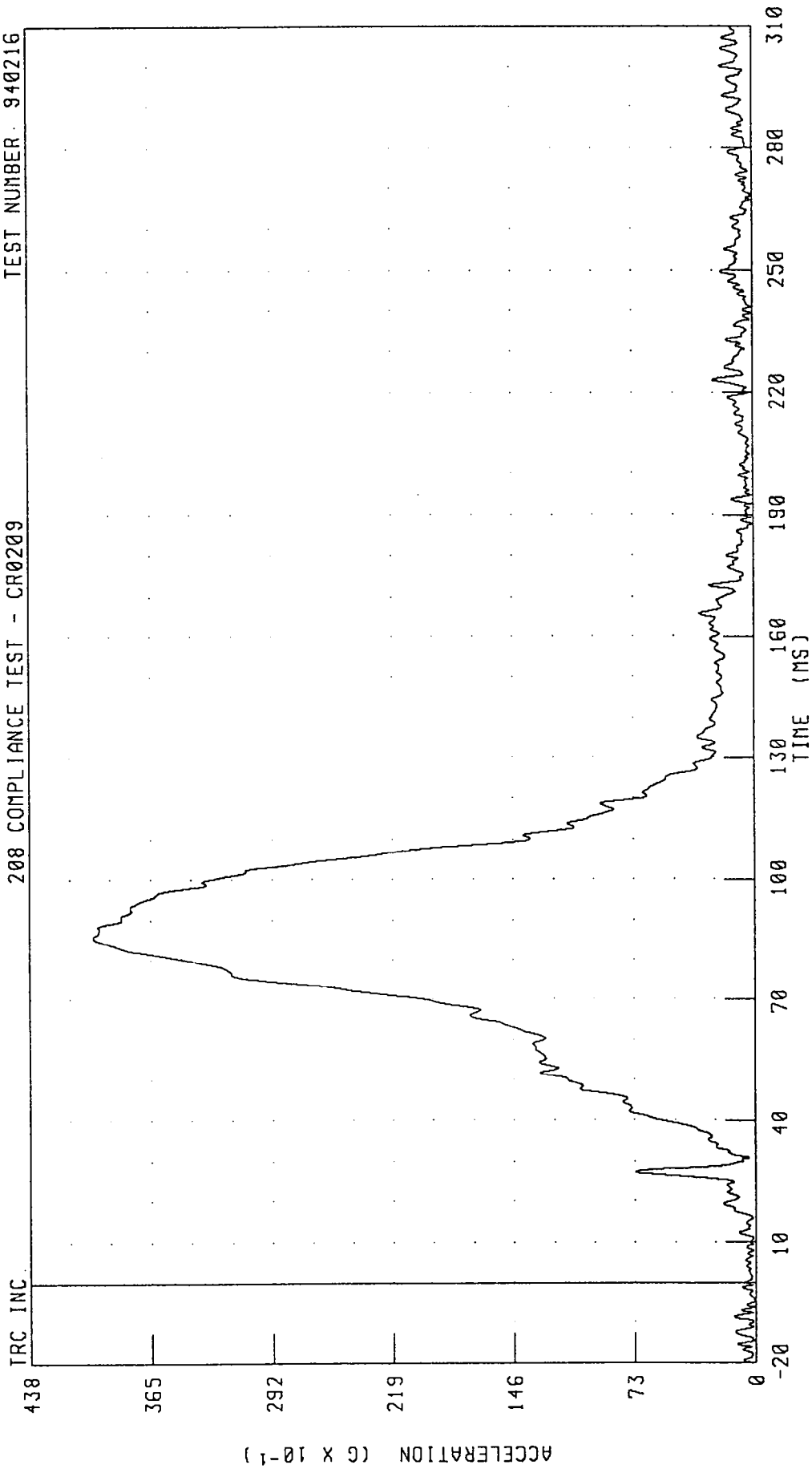
TEST NUMBER: 940216



CHANNEL: CSTZG1 FILTER: CH. CLASS 180

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 DRIVER CHEST RESULTANT ACCELERATION
 208 COMPLIANCE TEST - CR0209

TEST NUMBER 940216



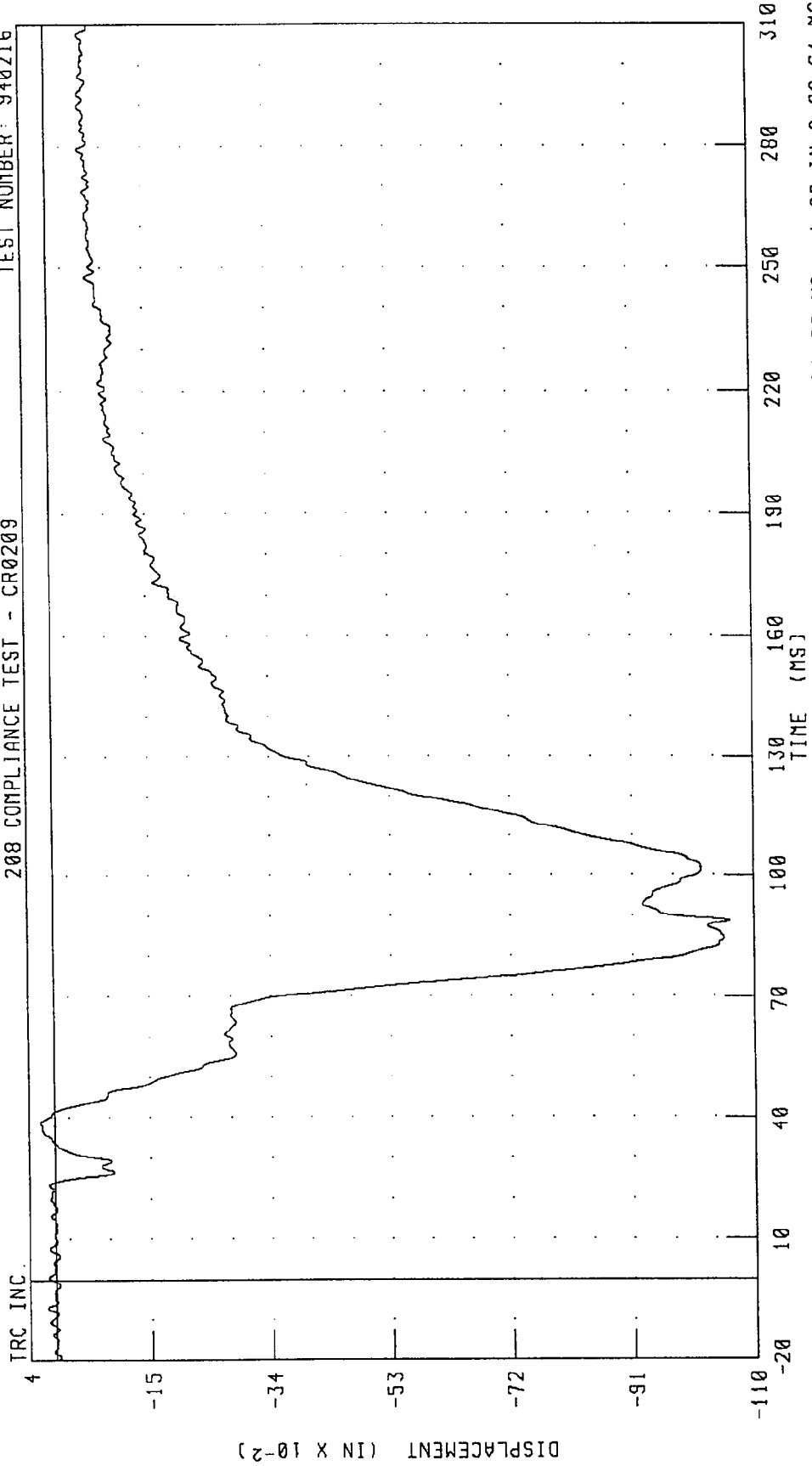
CHANNEL: CSTRG1 FILTER: CH. CLASS 180

PEAK DATA: 39.98 G @ 85.84 MS; 0.04 G @ -20.00 MS

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
DRIVER CHEST DEFLECTION

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216



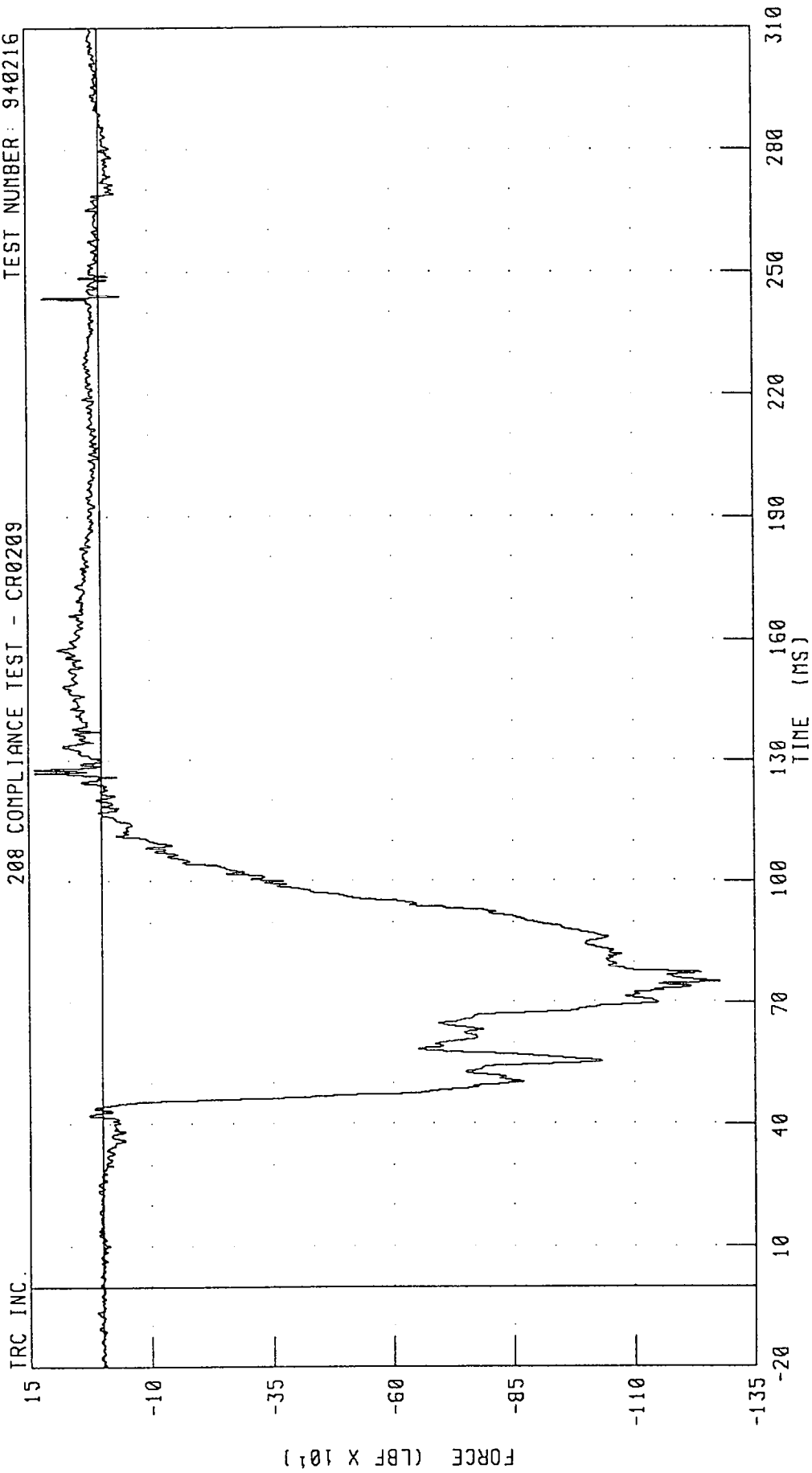
CHANNEL: CSTXD1 FILTER: CH. CLASS 180

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER

DRIVER LEFT FEMUR FORCE

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216



CHANNEL: LFMF1 FILTER: CH. CLASS 600

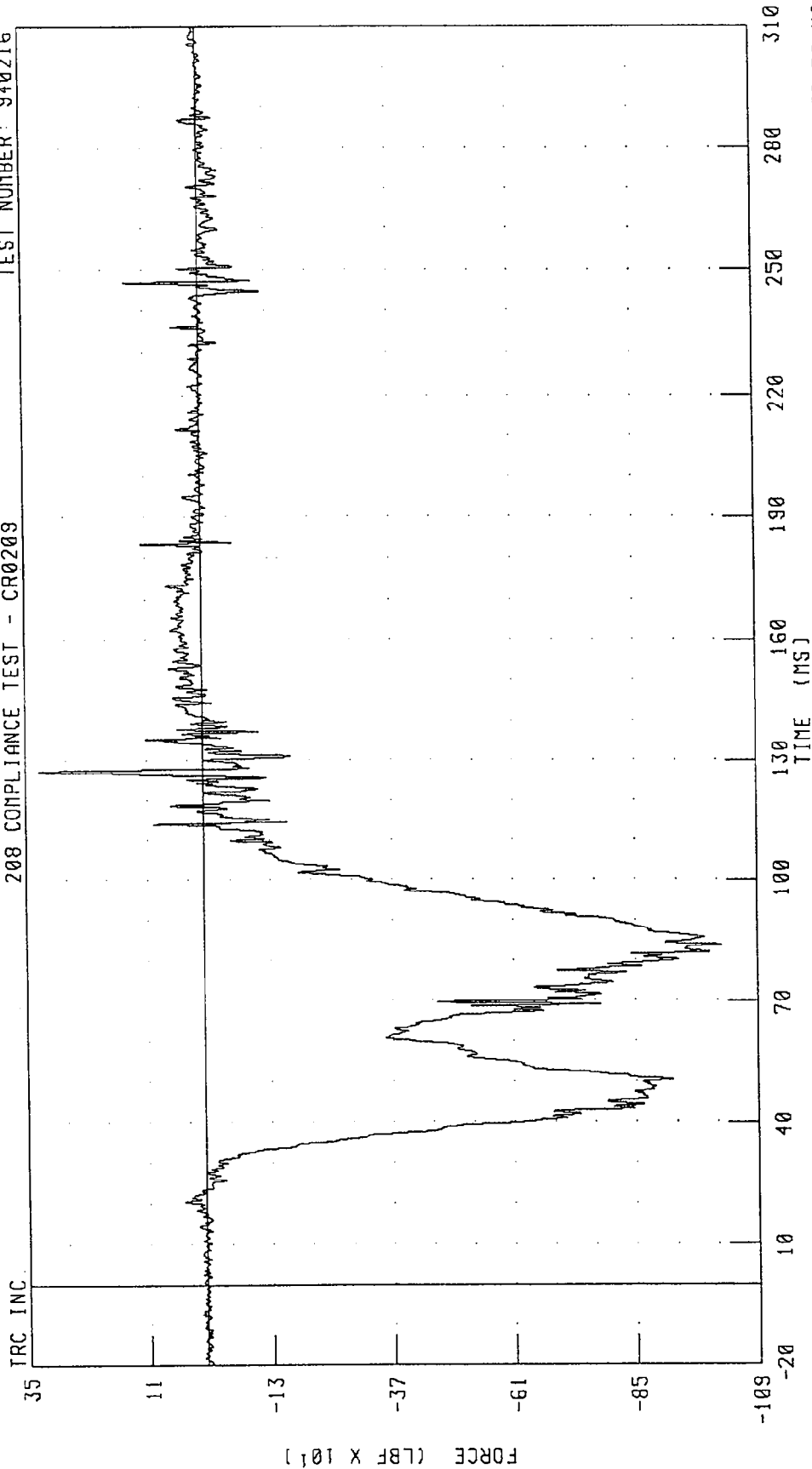
PEAK DATA: 137.94 LBF @ 127.84 MS; -1277.69 LBF @ 75.12 MS

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER

DRIVER RIGHT FEMUR FORCE

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216

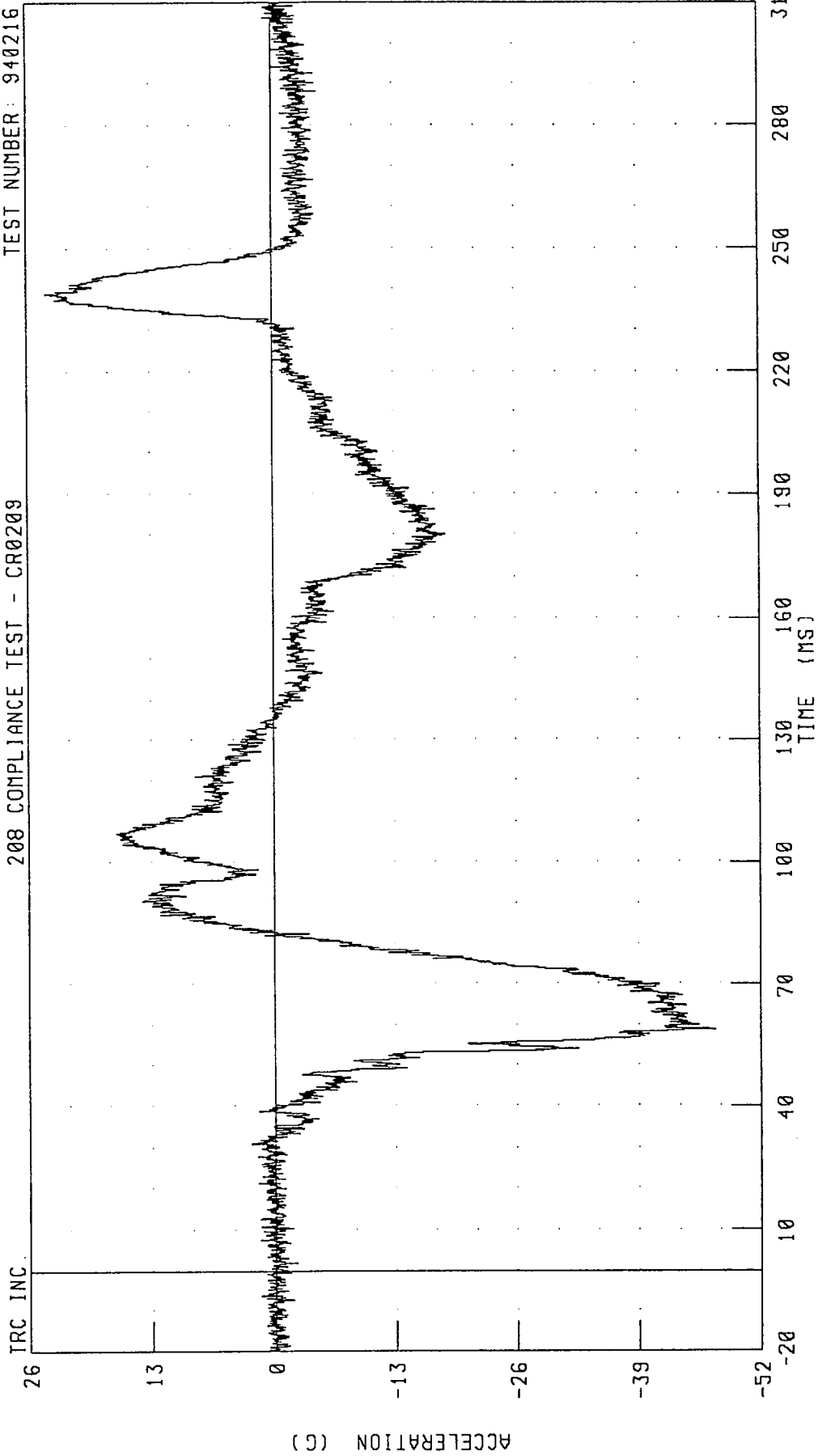


CHANNEL: RFMF1 FILTER: CH. CLASS 600

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD X-AXIS ACCELERATION

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216

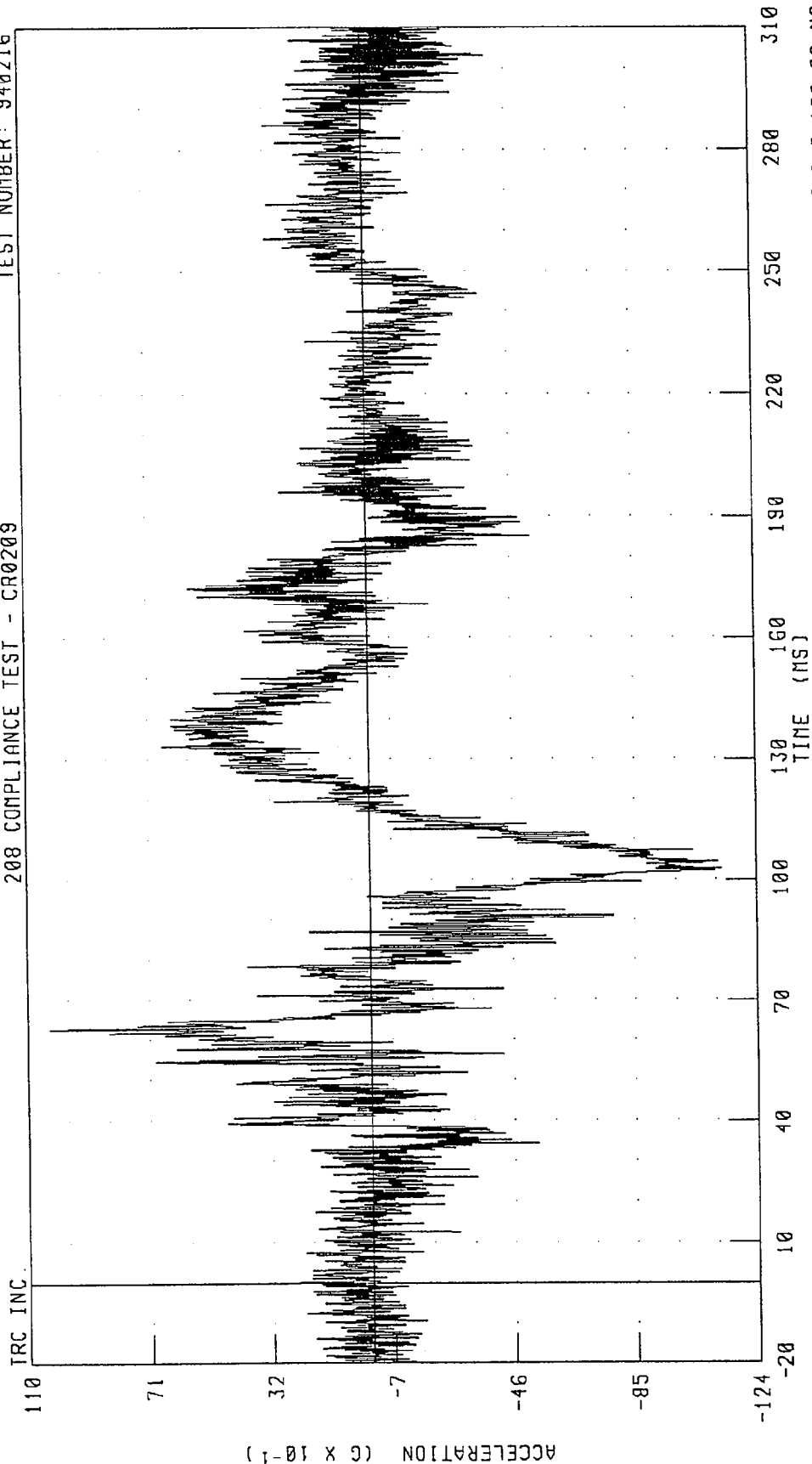


CHANNEL: HEDXG2 FILTER: CH. CLASS 1000

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

TEST NUMBER: 940216

208 COMPLIANCE TEST - CR0209

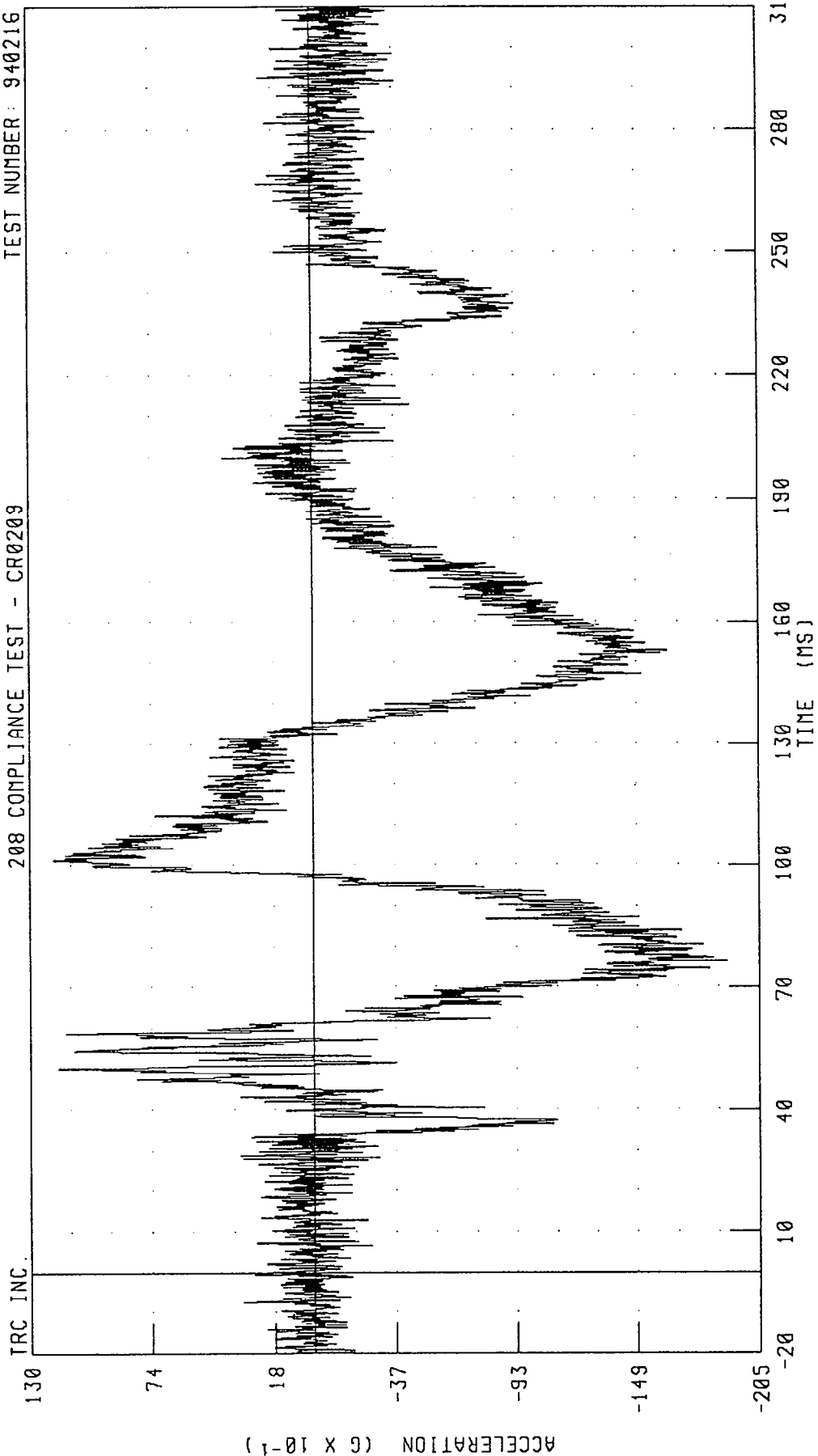


CHANNEL: HEDYG2 FILTER: CH. CLASS 1000

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

TEST NUMBER: 940216

208 COMPLIANCE TEST - CR0209

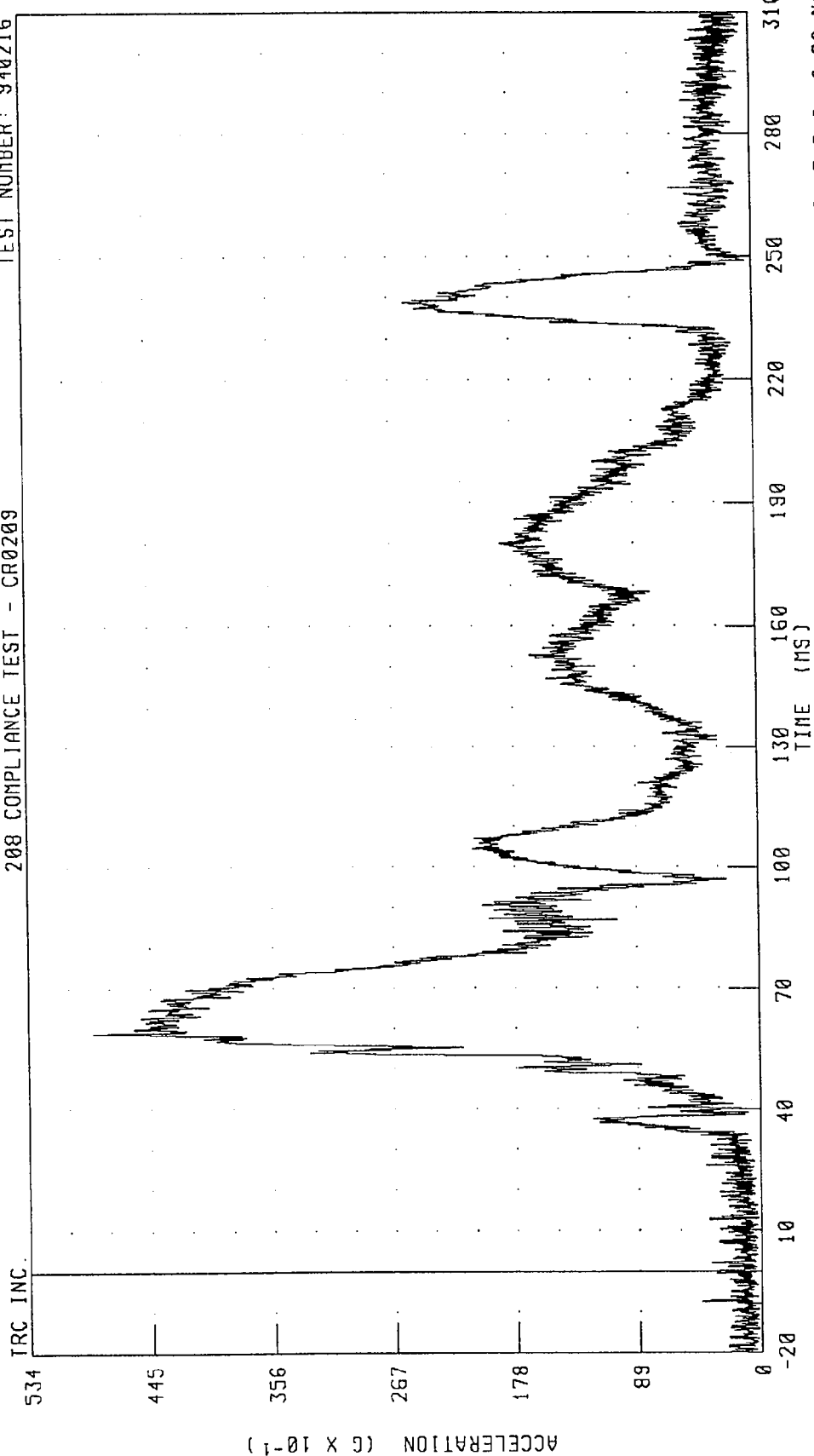


CHANNEL: HEDZG2 FILTER: CH. CLASS 1000

PEAK DATA: 11.90 G @ 101.36 MS; -19.12 G @ 76.48 MS

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 RIGHT FRONT PASSENGER HEAD RESULTANT ACCELERATION
 208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216



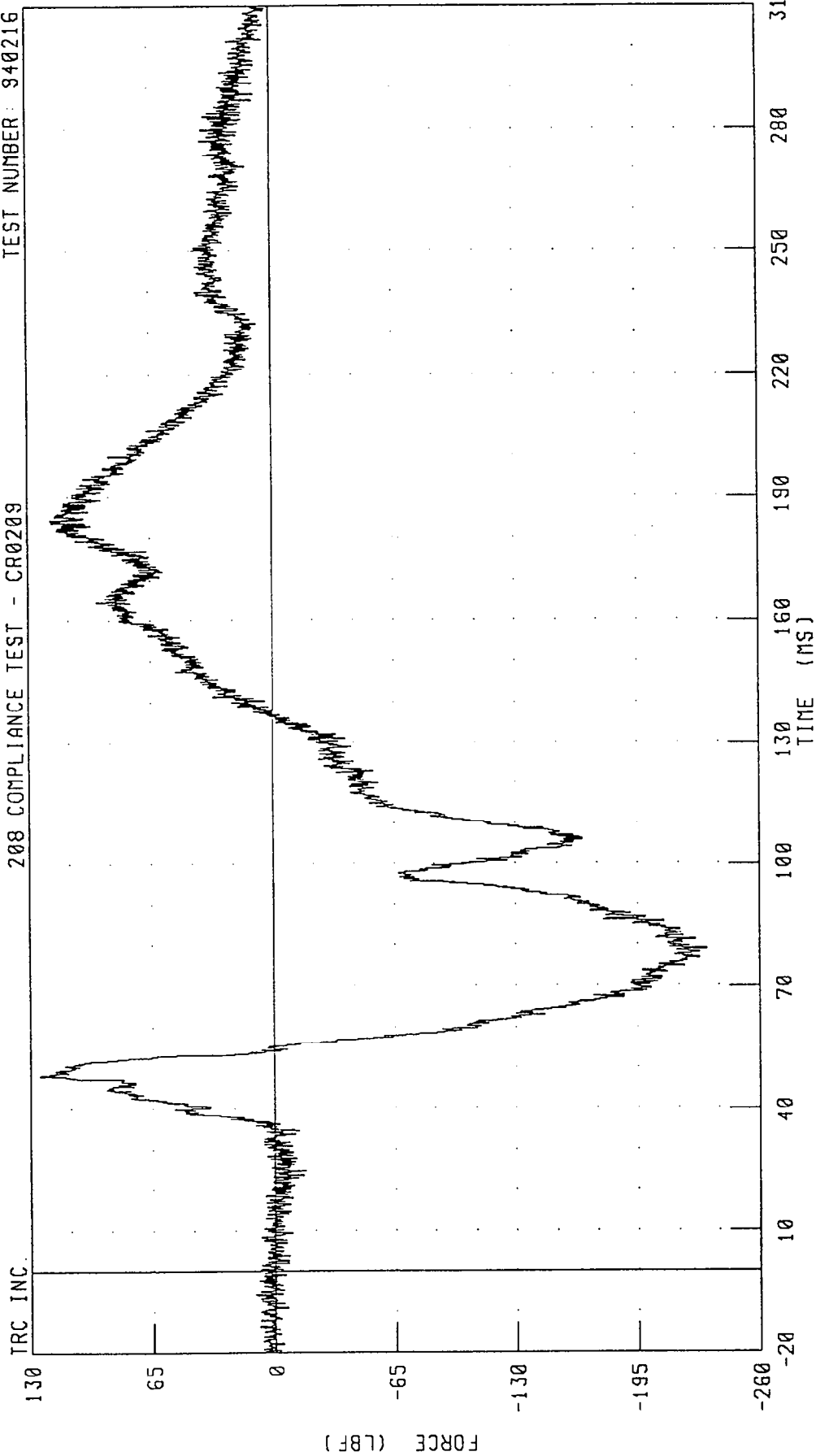
PEAK DATA: 48.73 G @ 58.88 MS; 0.15 G @ -8.08 MS

CHANNEL: HEDRG2 FILTER: CH. CLASS 1000

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK X-AXIS SHEAR FORCE

TEST NUMBER: 940216

208 COMPLIANCE TEST - CR0209

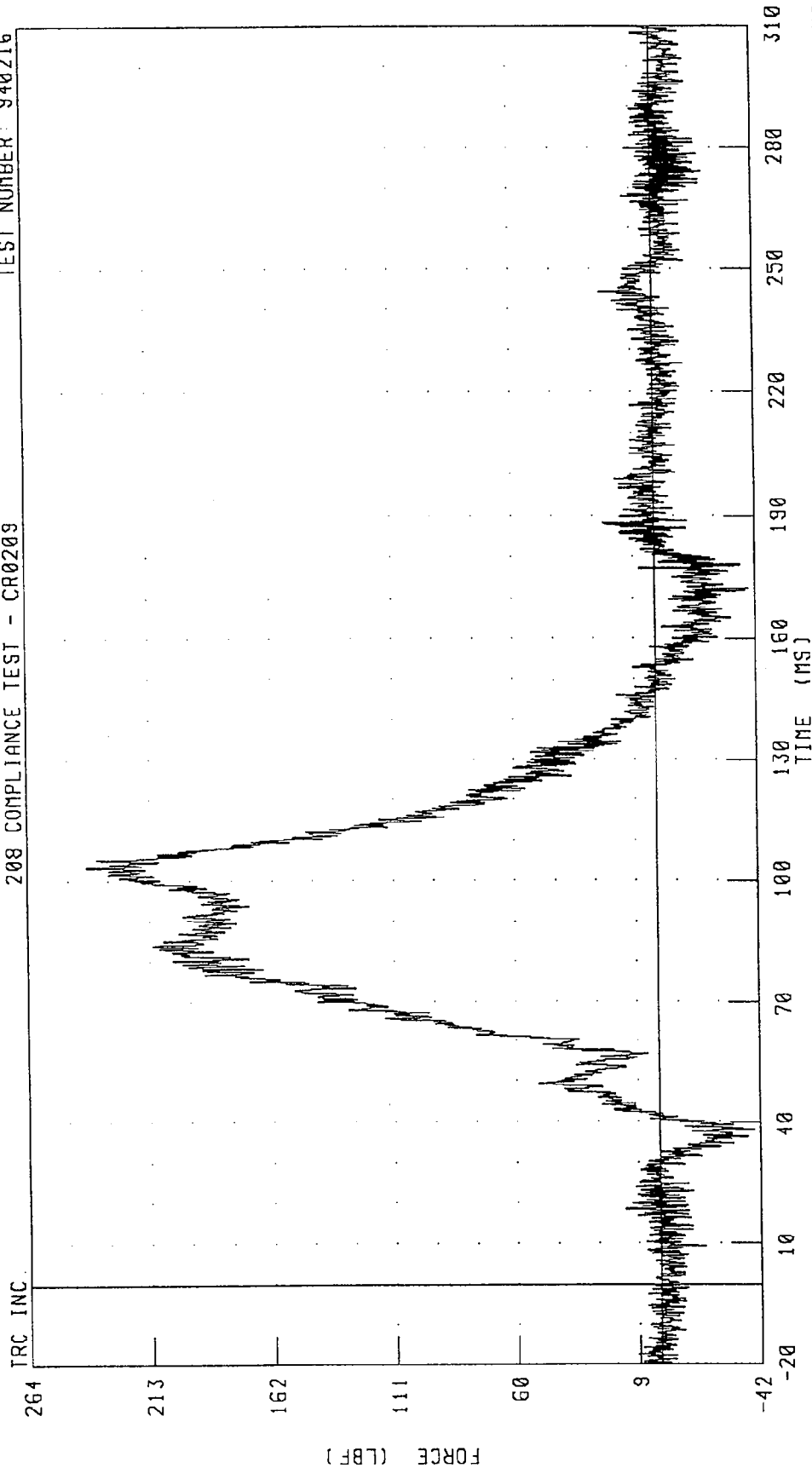


CHANNEL: NEKXF2 FILTER: CH. CLASS 1000

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK Y-AXIS SHEAR FORCE

TEST NUMBER: 940216

208 COMPLIANCE TEST - CR0209

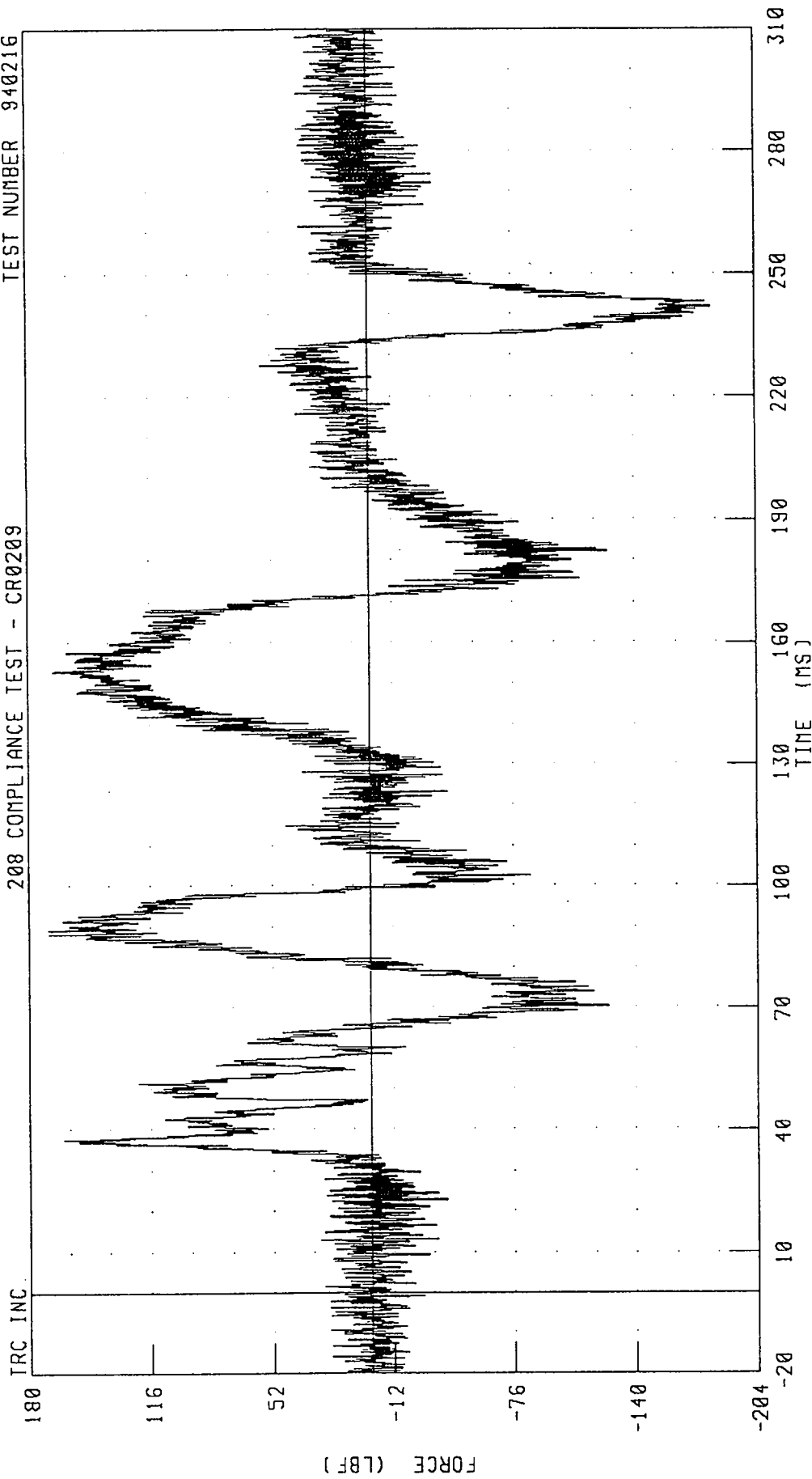


CHANNEL: NEKYF2 FILTER: CH. CLASS 1000

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK Z-AXIS AXIAL FORCE

TEST NUMBER 940216

208 COMPLIANCE TEST - CR0209



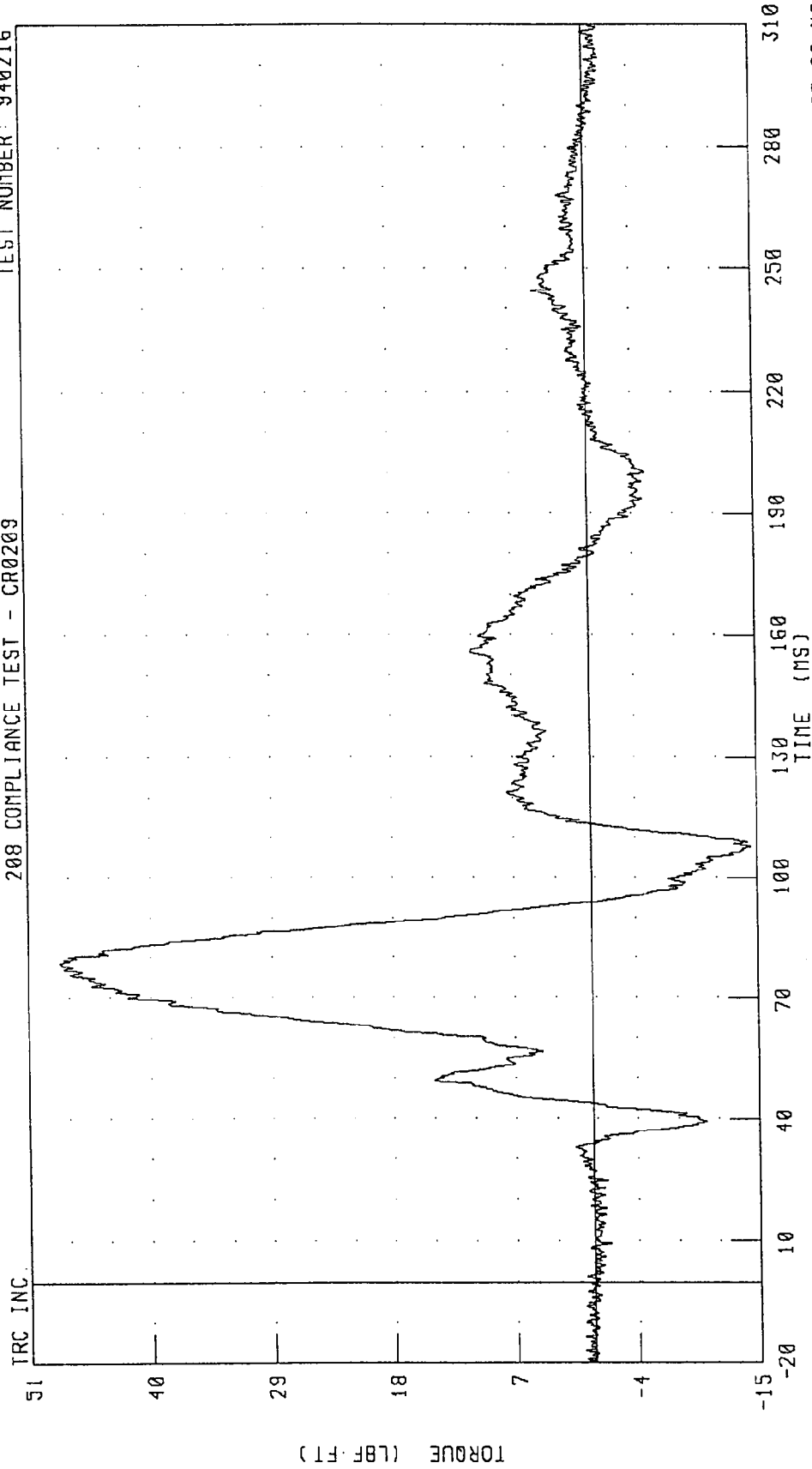
PEAK DATA: 169.39 LBF @ 88.24 MS; -180.37 LBF @ 241.76 MS

CHANNEL: NEKZF2 FILTER: CH. CLASS 1000

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK MOMENT ABOUT X AXIS

TEST NUMBER: 940216

208 COMPLIANCE TEST - CR0209



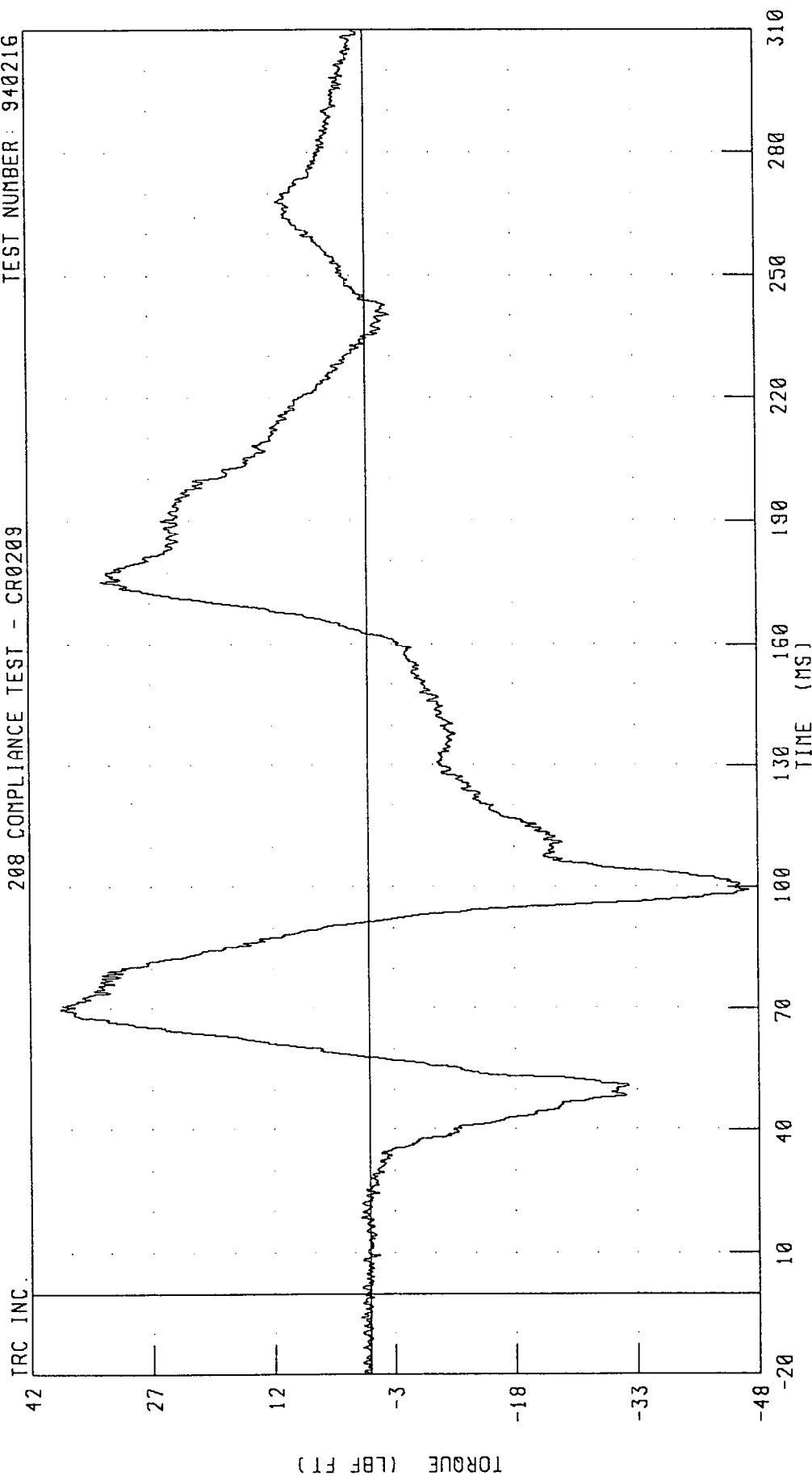
PEAK DATA: 48.19 LBF-FT @ 78.48 MS; -14.43 LBF-FT @ 107.68 MS

CHANNEL: NEKXM2 FILTER: CH. CLASS 600

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Y AXIS

TEST NUMBER: 940216

208 COMPLIANCE TEST - CR0209

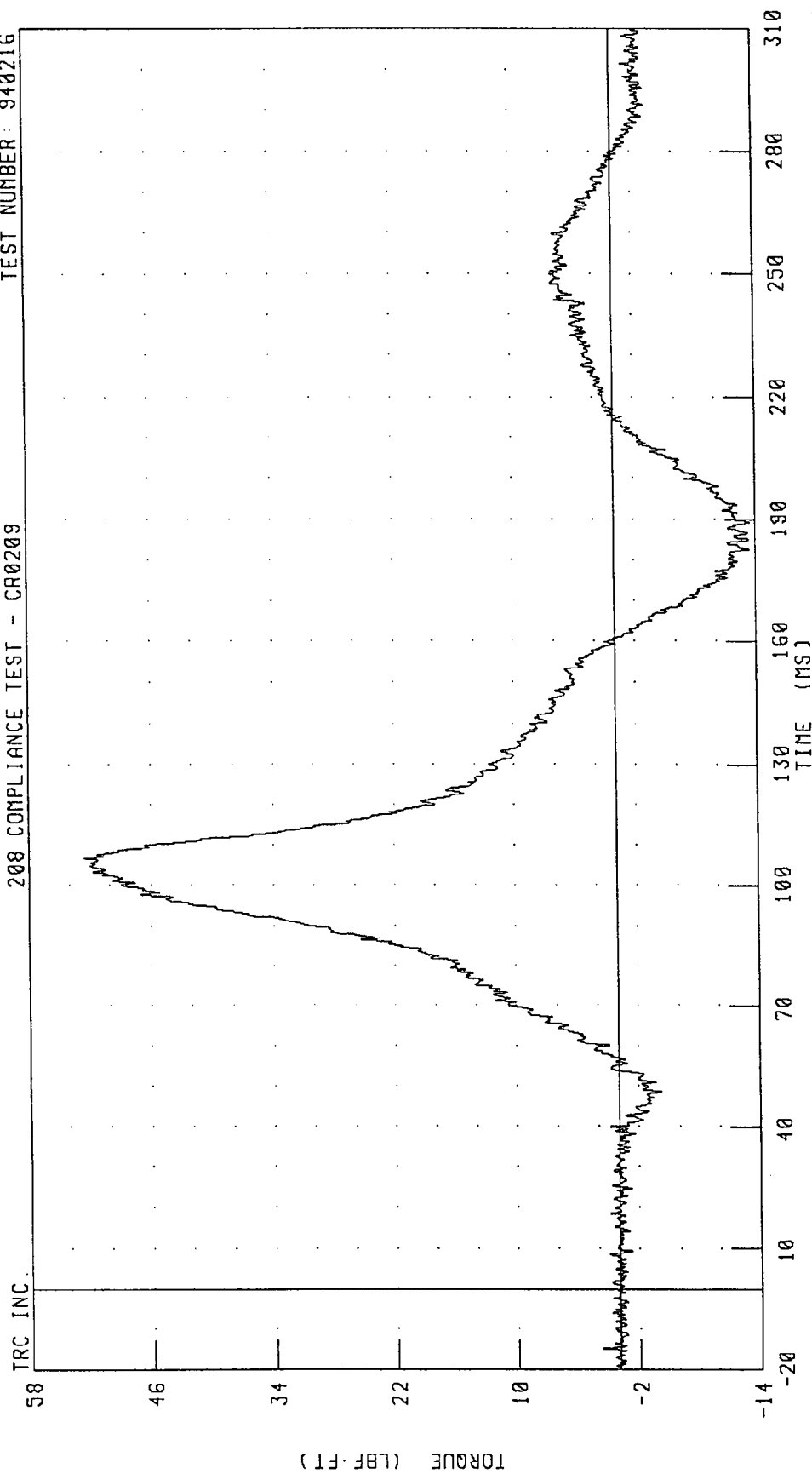


PEAK DATA: 38.29 LBF FT @ 69.84 MS, -46.76 LBF FT @ 99.20 MS

CHANNEL: NEKYM2 FILTER: CH. CLASS 600

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER NECK MOMENT ABOUT Z AXIS

208 COMPLIANCE TEST - CR0209 TEST NUMBER: 940216

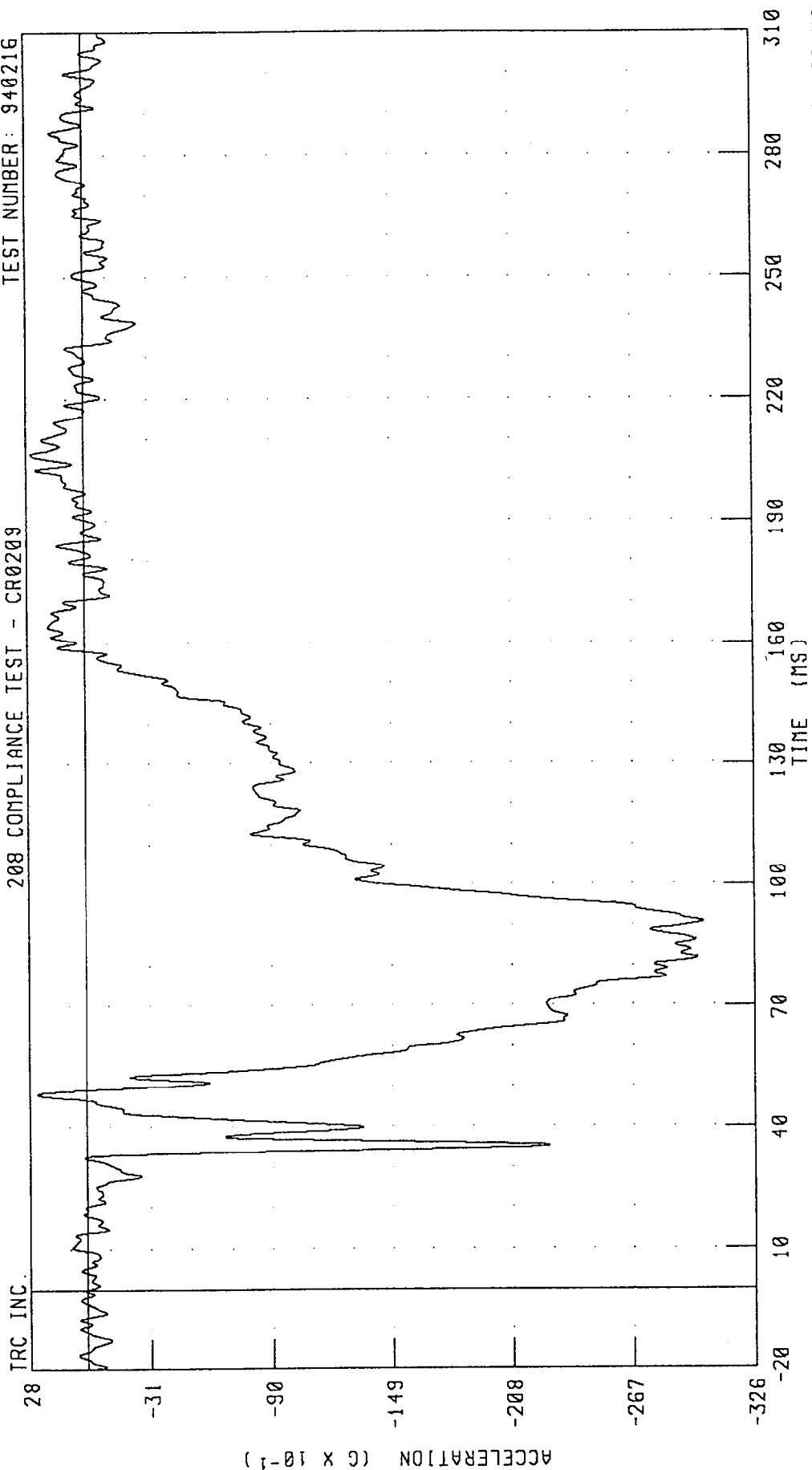


CHANNEL: NEKZM2 FILTER: CH. CLASS 600 PEAK DATA: 52.55 LBF·FT @ 106.72 MS; -13.50 LBF·FT @ 189.20 MS

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216



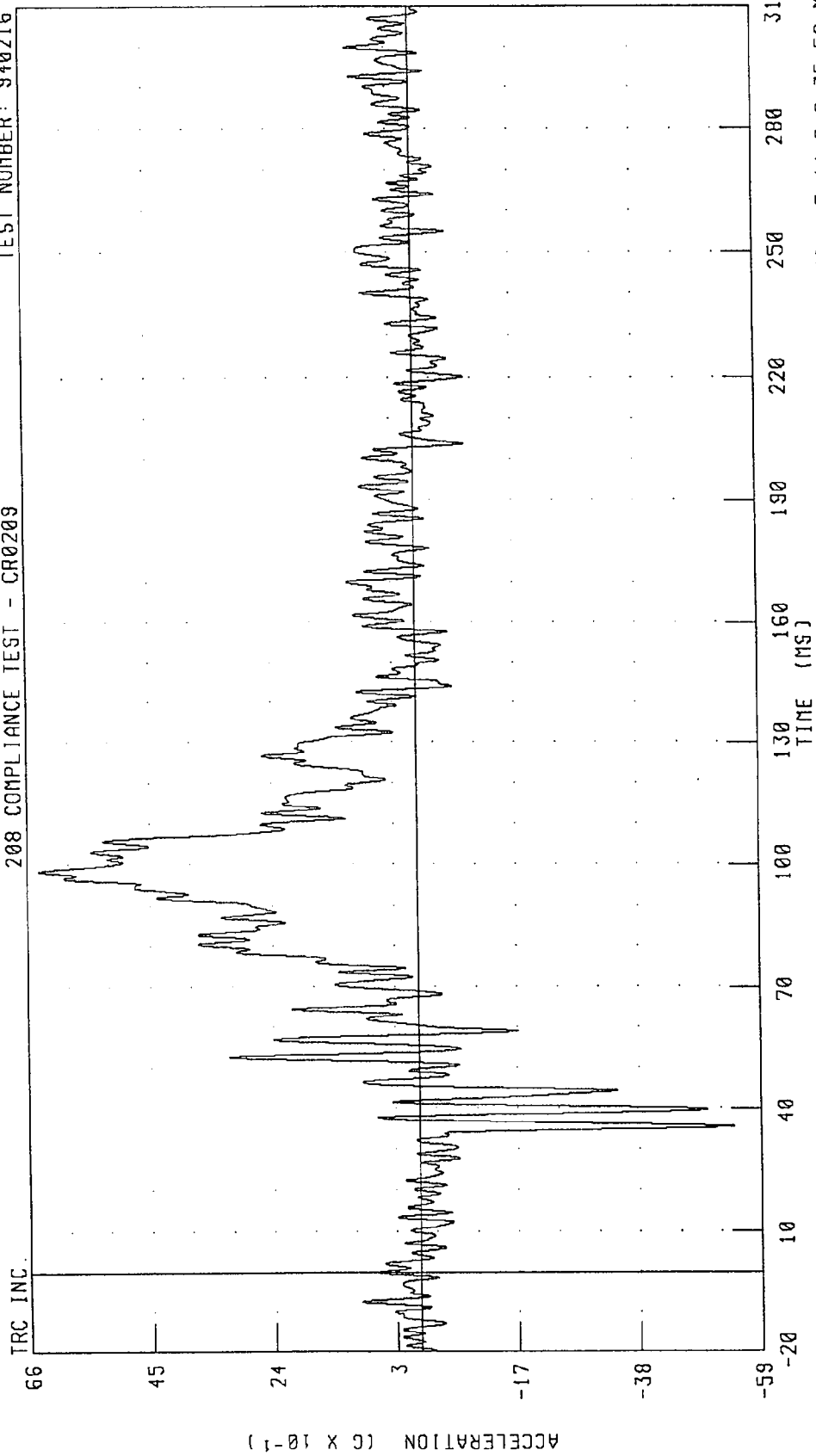
PEAK DATA: 2.56 G @ 206.32 MS; -30.11 G @ 90.80 MS

CHANNEL: CSTXC2 FILTER: CH. CLASS 180

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TEST NUMBER: 940216

208 COMPLIANCE TEST - CR0209



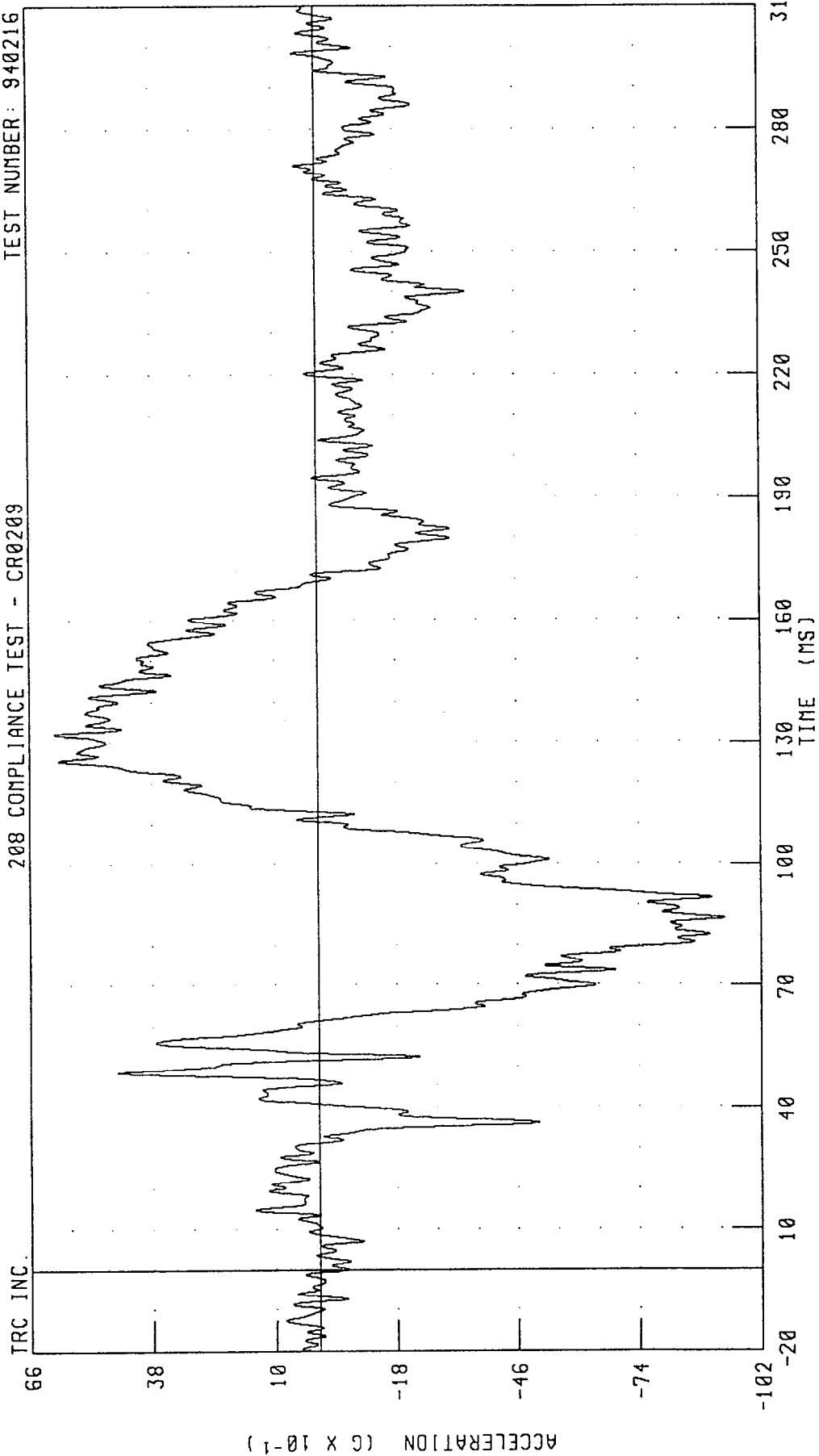
CHANNEL: CSTYG2 FILTER: CH. CLASS 180

PEAK DATA: 6.51 G @ 98.32 MS; -5.44 G @ 35.52 MS

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TEST NUMBER: 940216

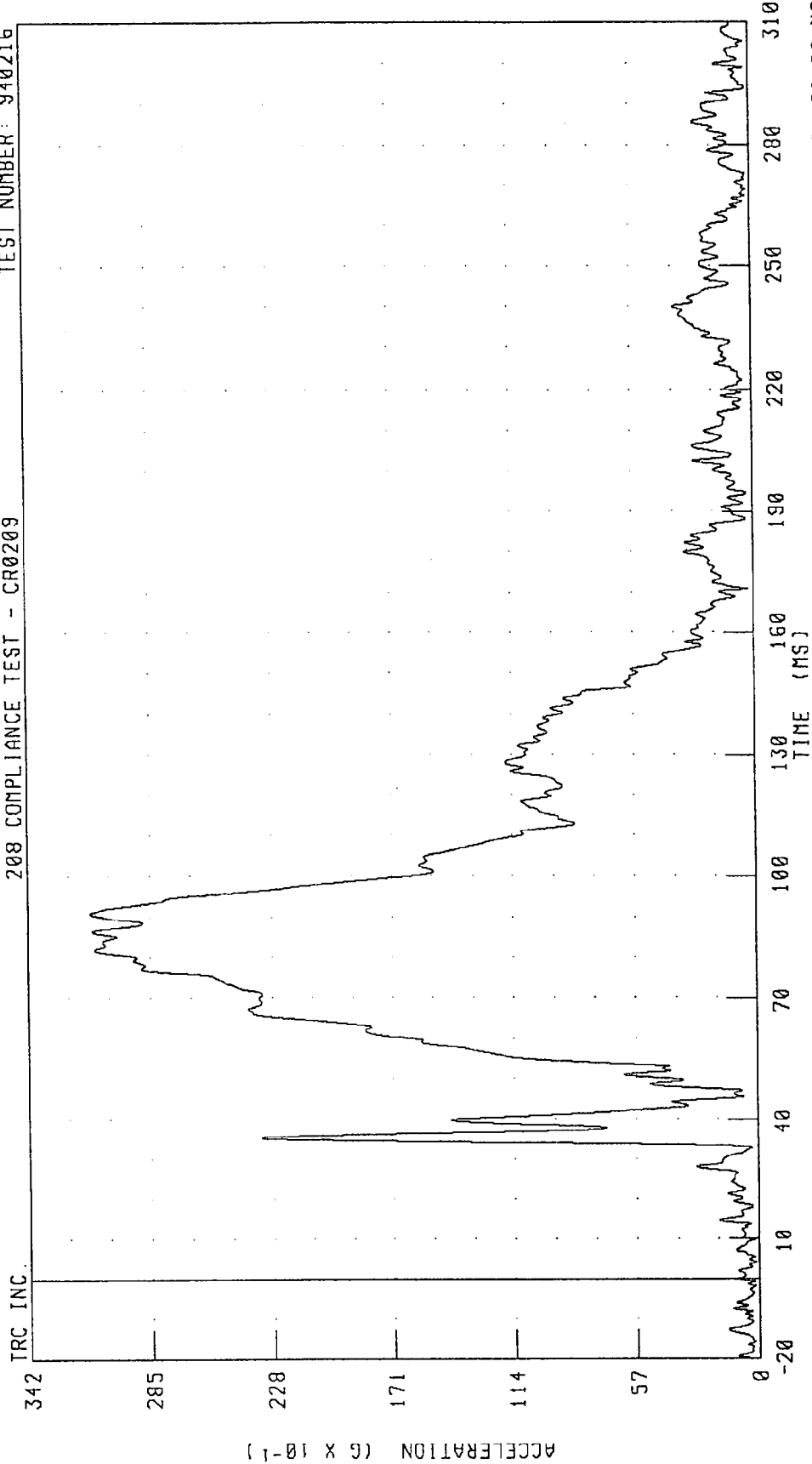
208 COMPLIANCE TEST - CR0209



CHANNEL: CSTZG2 FILTER: CH. CLASS 180

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

208 COMPLIANCE TEST - CR0209 TEST NUMBER: 940216

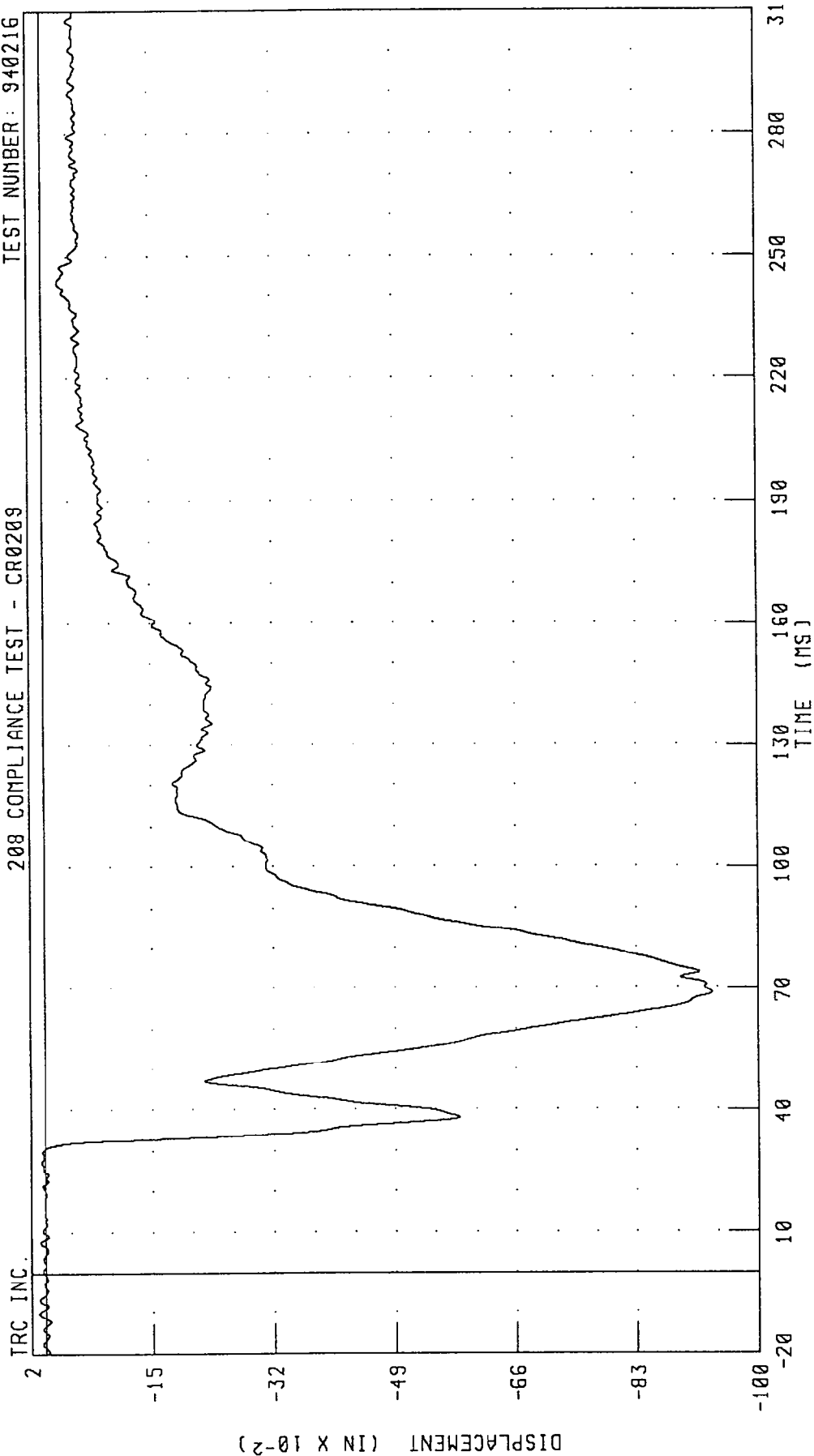


PEAK DATA: 31.29 G @ 90.96 MS; 0.14 G @ -20.00 MS

CHANNEL: CSTRC2 FILTER: CH. CLASS 180

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 RIGHT FRONT PASSENGER CHEST DEFLECTION
 208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216

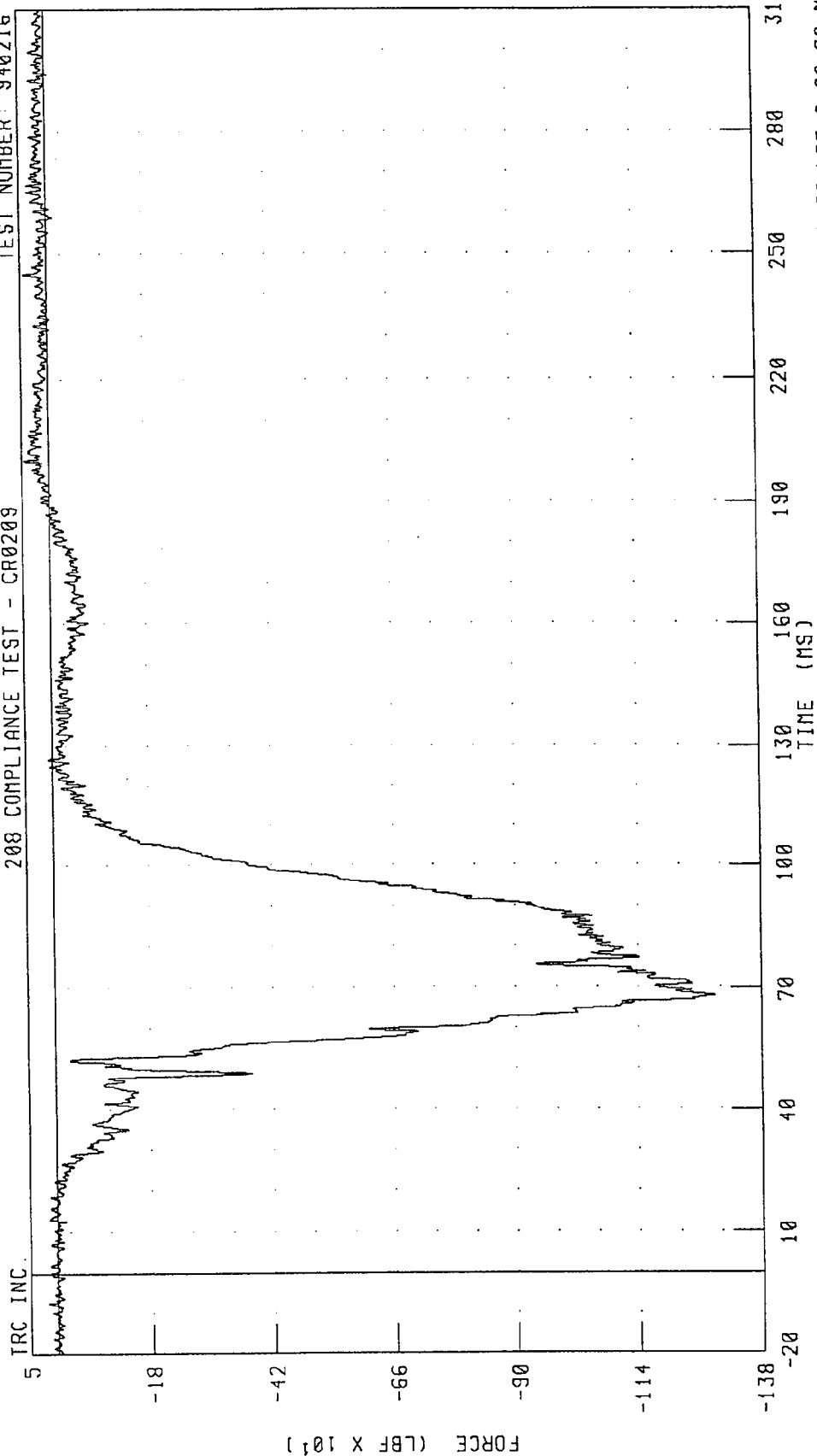


CHANNEL: CSTXD2 FILTER: CH. CLASS 180

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER LEFT FEMUR FORCE

TEST NUMBER: 940216

208 COMPLIANCE TEST - CR0209

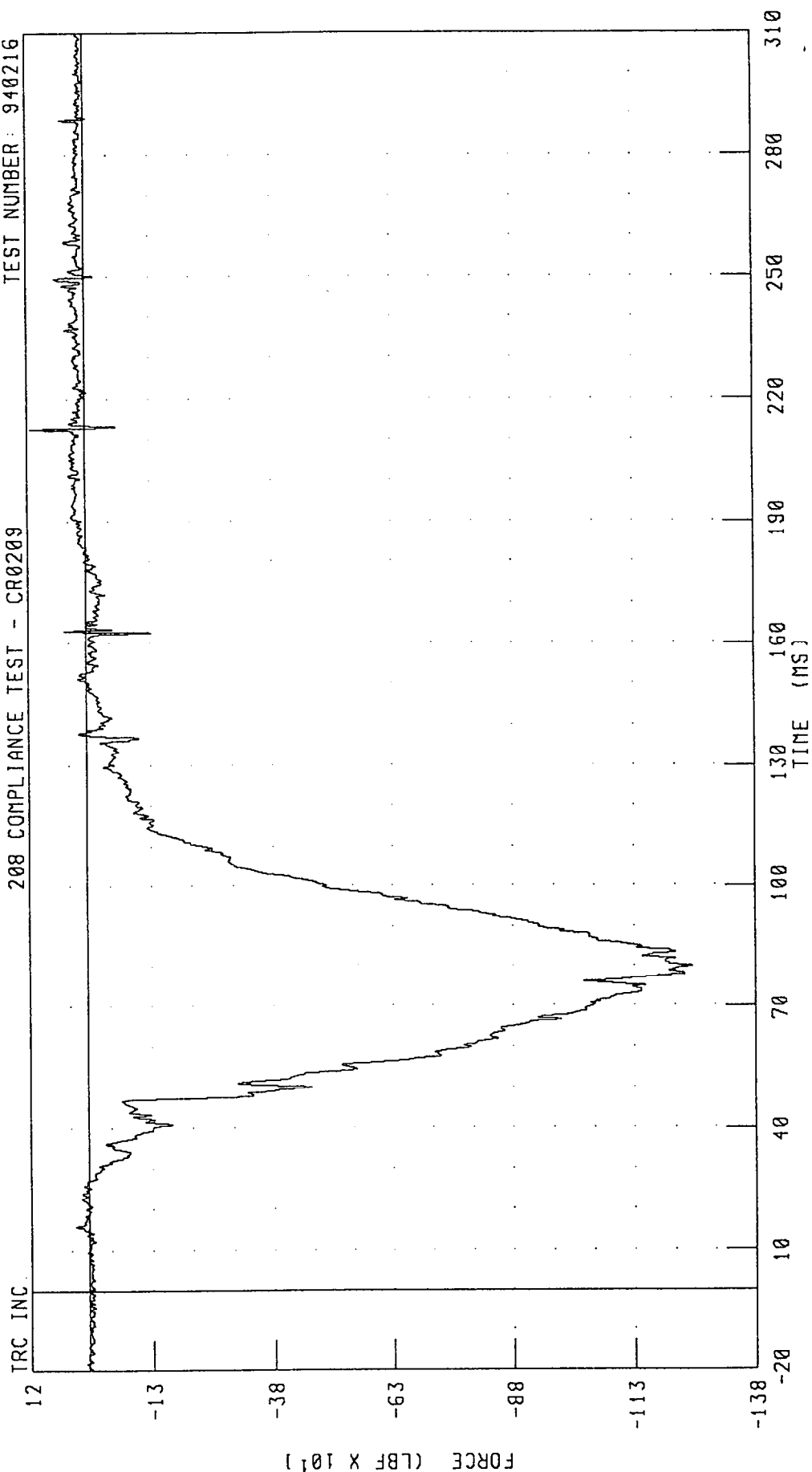


CHANNEL: LFMF2 FILTER: CH. CLASS 600

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER RIGHT FEMUR FORCE

208 COMPLIANCE TEST - CR0209

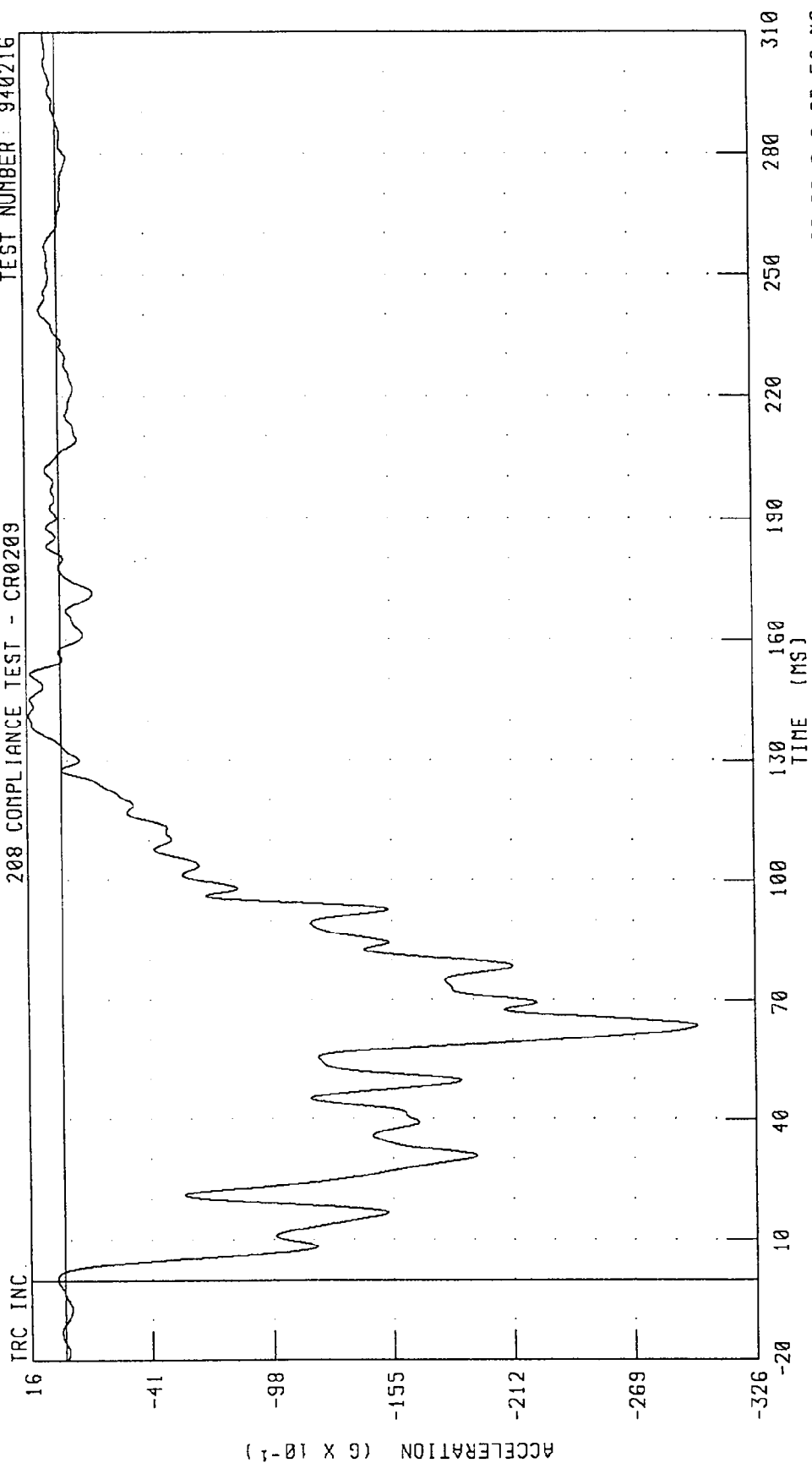
TEST NUMBER: 940216



CHANNEL: RFMF2 FILTER: CH. CLASS 600

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 LEFT REAR SEAT X-AXIS ACCELERATION
 208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216



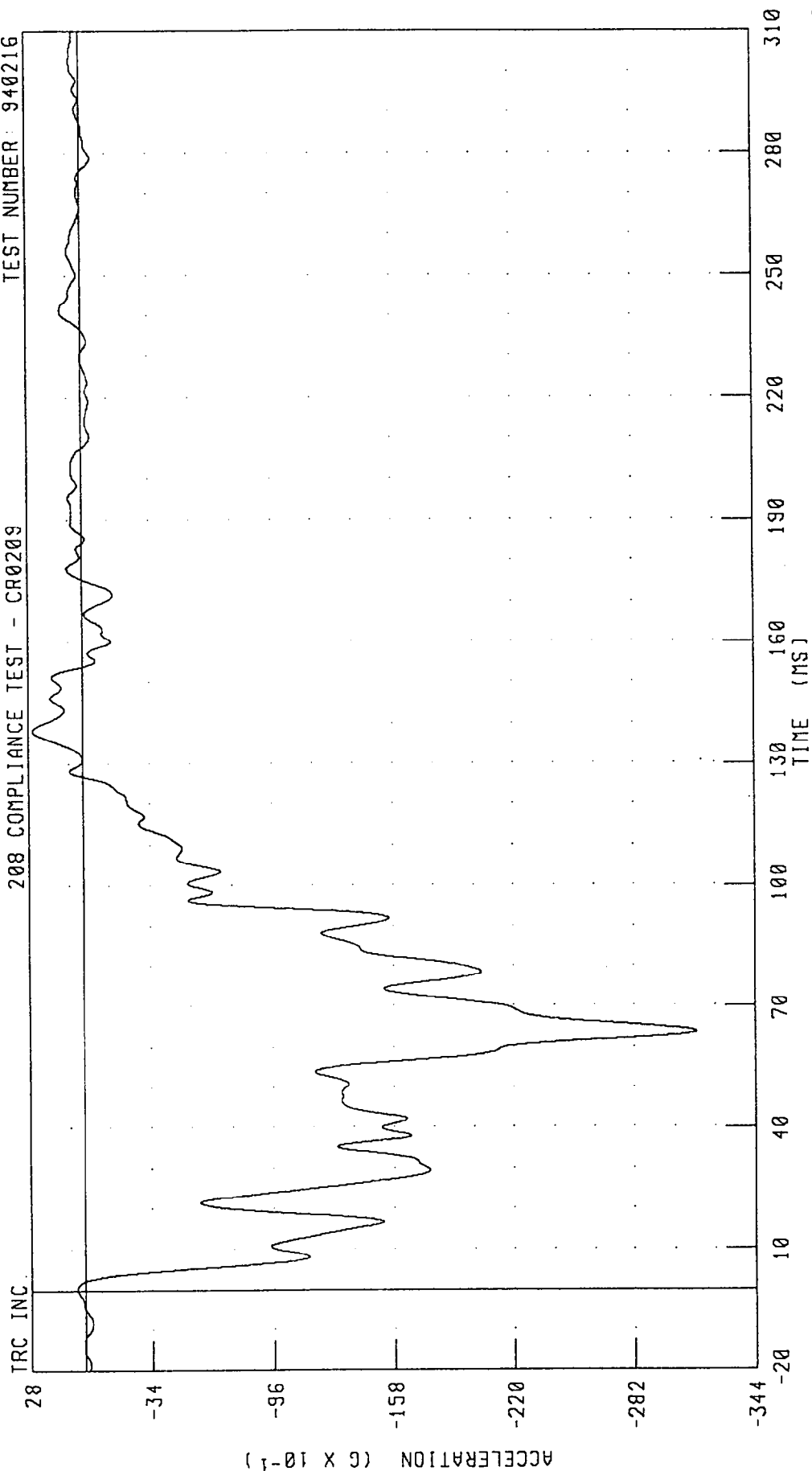
PEAK DATA: 1.50 G @ 141.36 MS; -29.89 G @ 63.52 MS

CHANNEL: TLRXG1 FILTER: CH. CLASS 60

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216



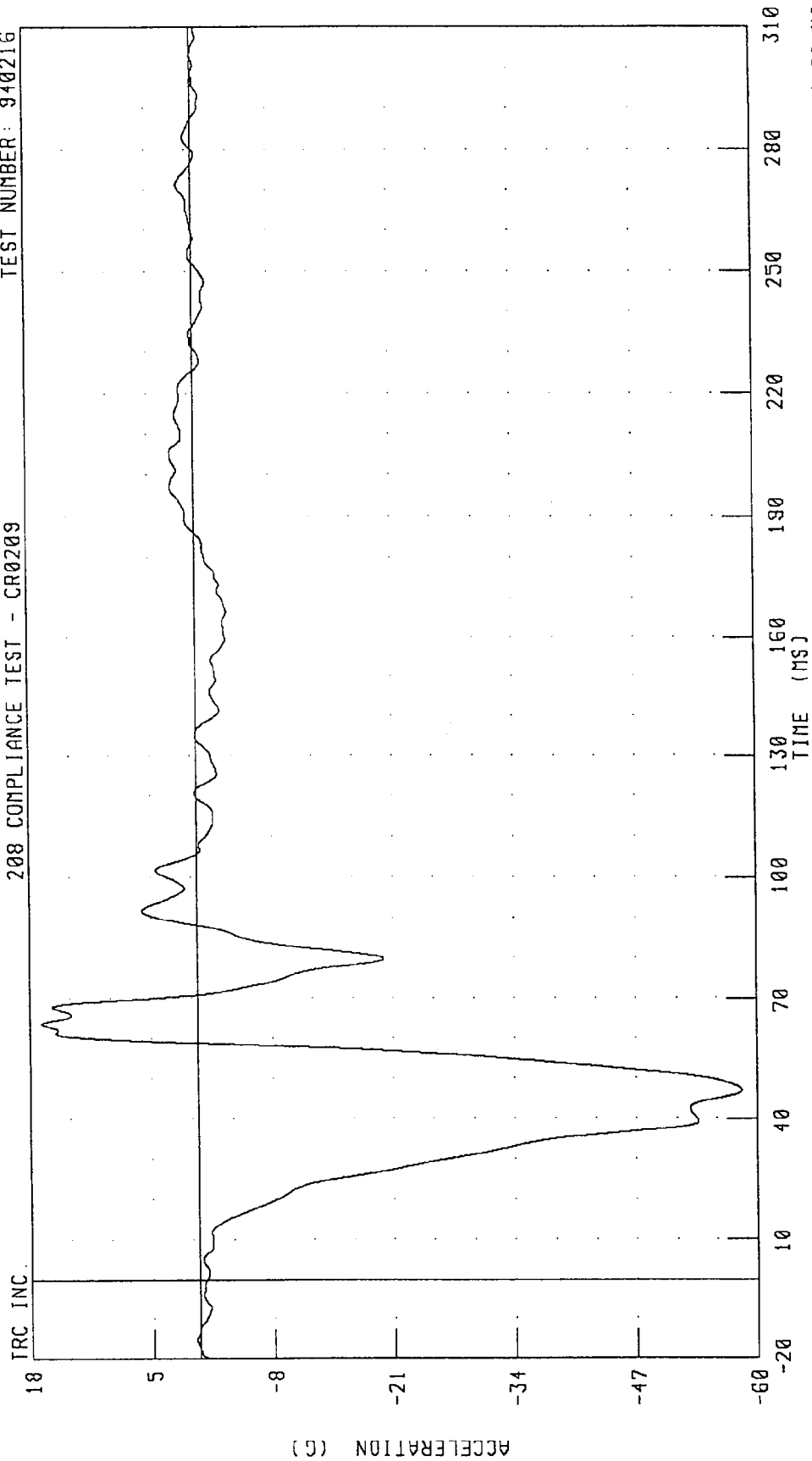
PEAK DATA: 2.60 G @ 138.48 MS; -31.41 G @ 63.68 MS

CHANNEL: TRRXG1 FILTER: CH. CLASS 60

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
ENGINE UPPER BLOCK X-AXIS ACCELERATION

TEST NUMBER: 940216

208 COMPLIANCE TEST - CR0209

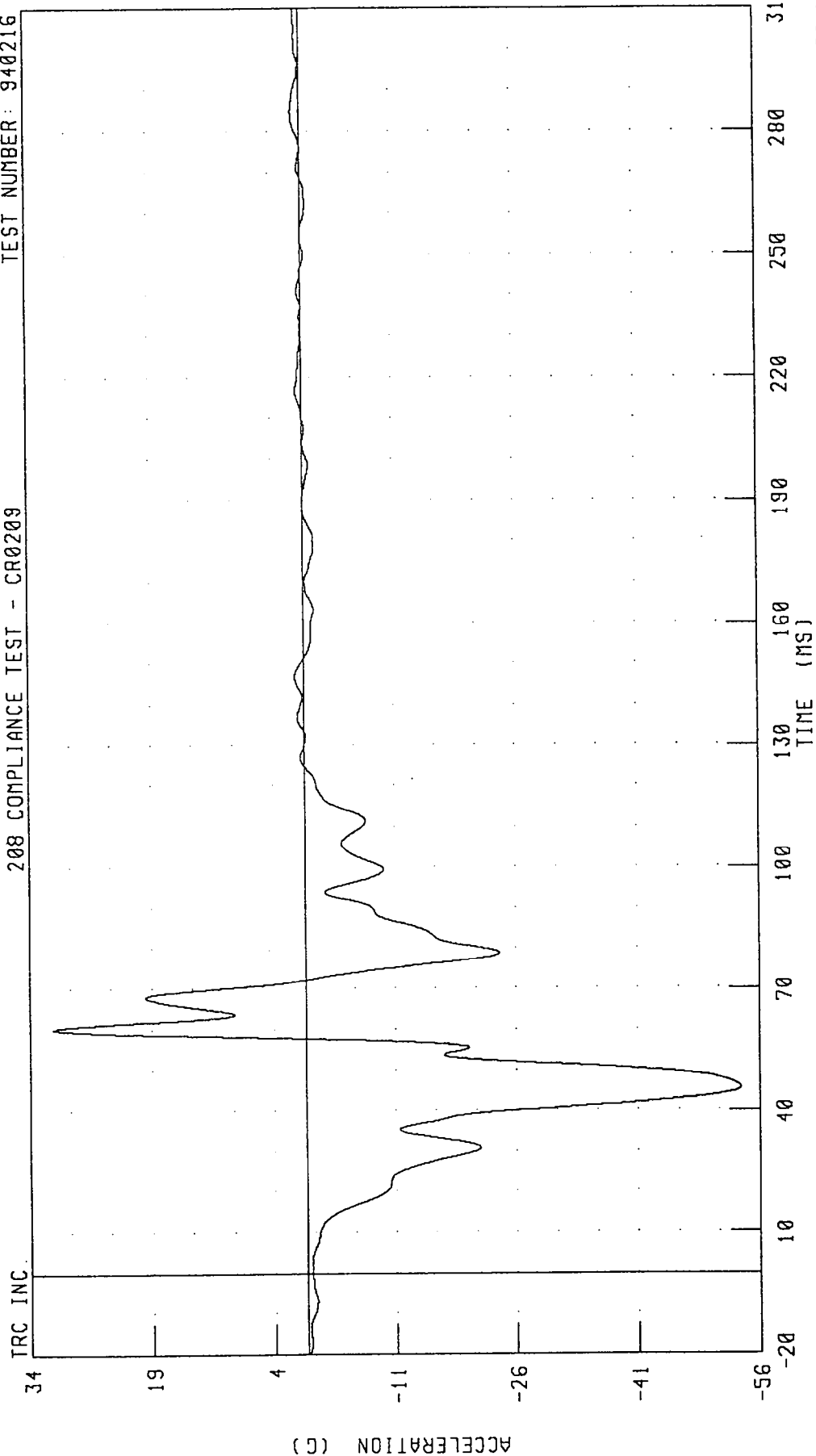


CHANNEL: ENGXC1 FILTER: CH. CLASS 60

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
ENGINE BOTTOM BLOCK X-AXIS ACCELERATION

208 COMPLIANCE TEST - CR0209

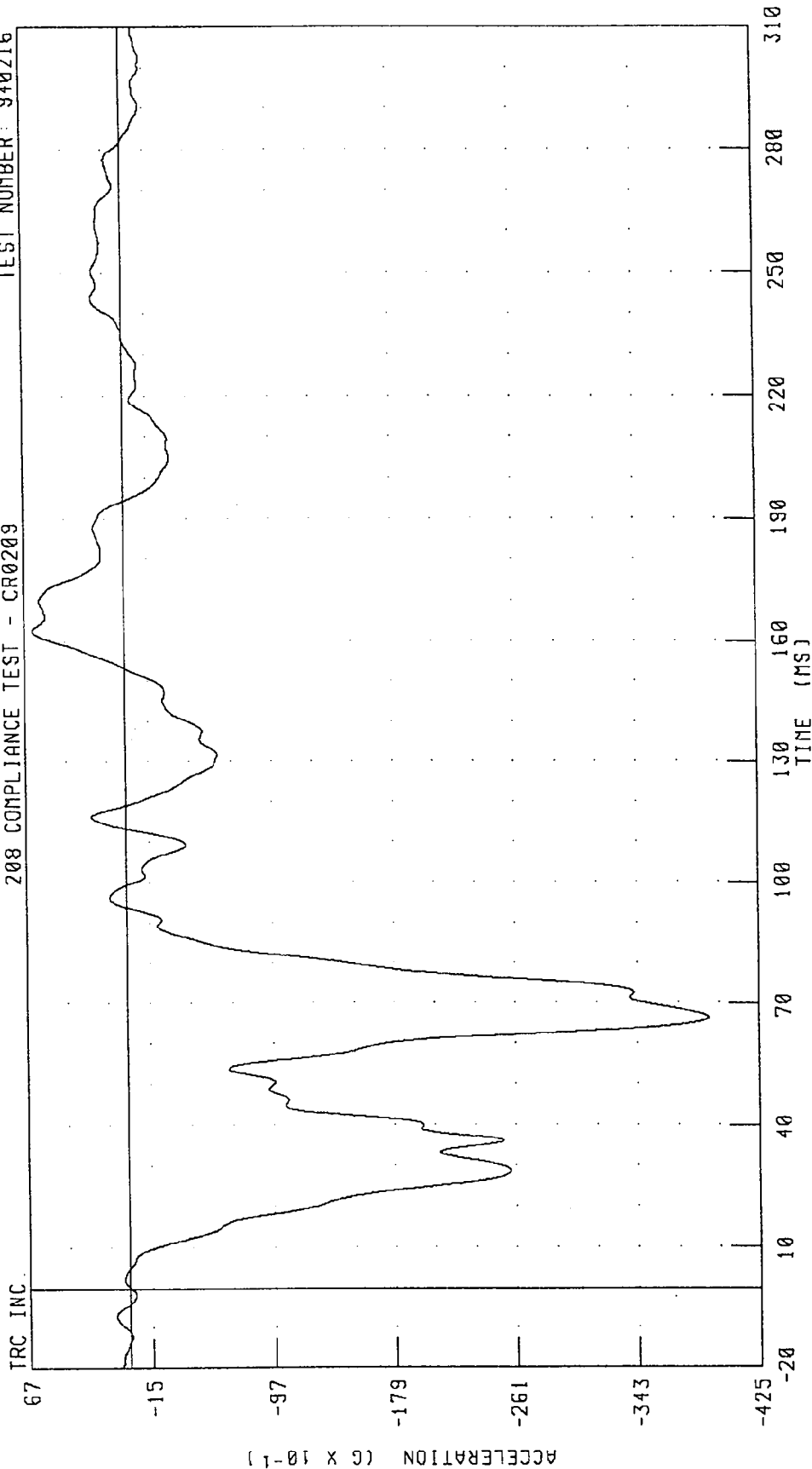
TEST NUMBER: 940216



CHANNEL: ENGXC2 FILTER: CH. CLASS 60

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
 RIGHT BRAKE CALIPER X-AXIS ACCELERATION
 208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216

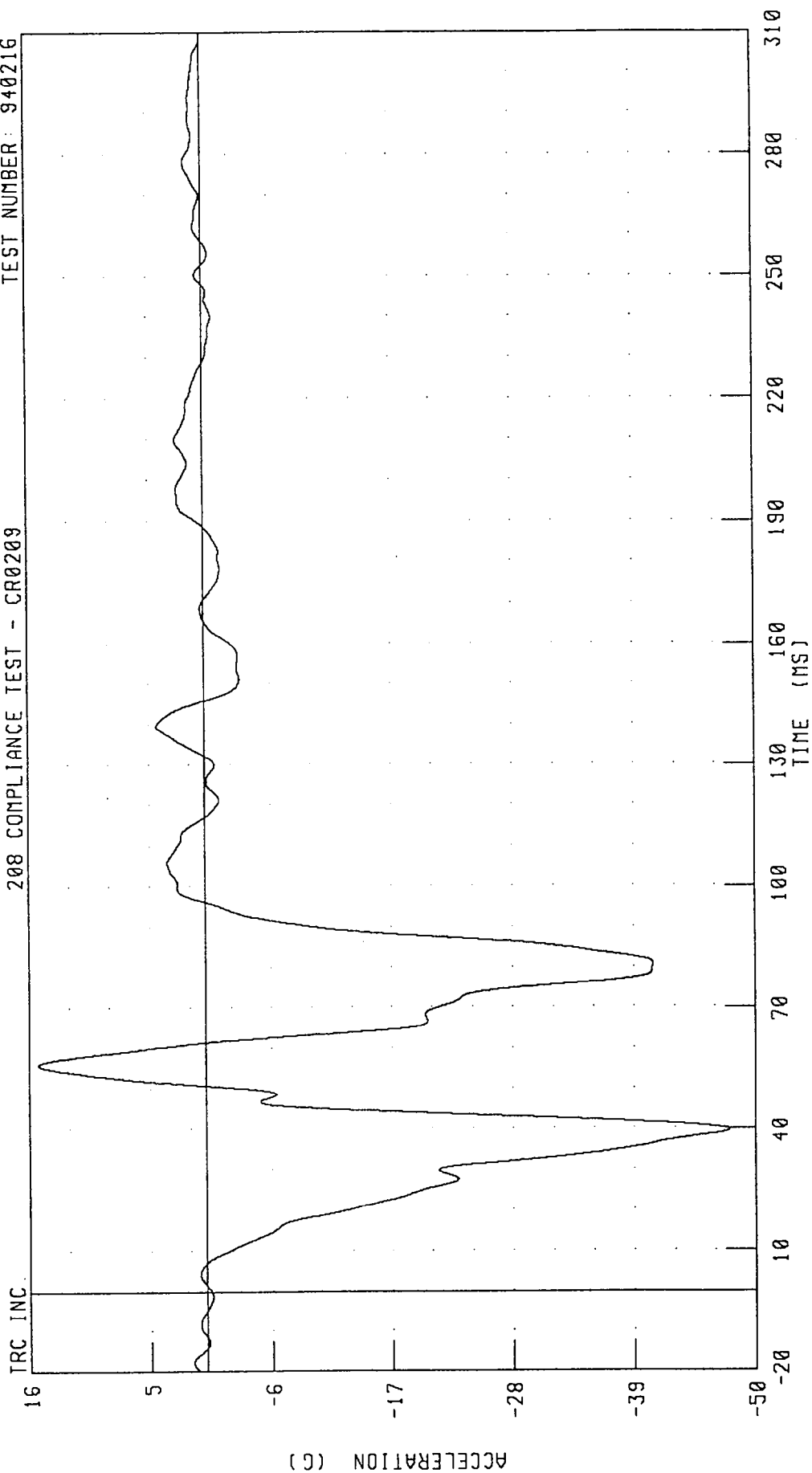


CHANNEL: BCRXG1 FILTER: CH. CLASS 60

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216

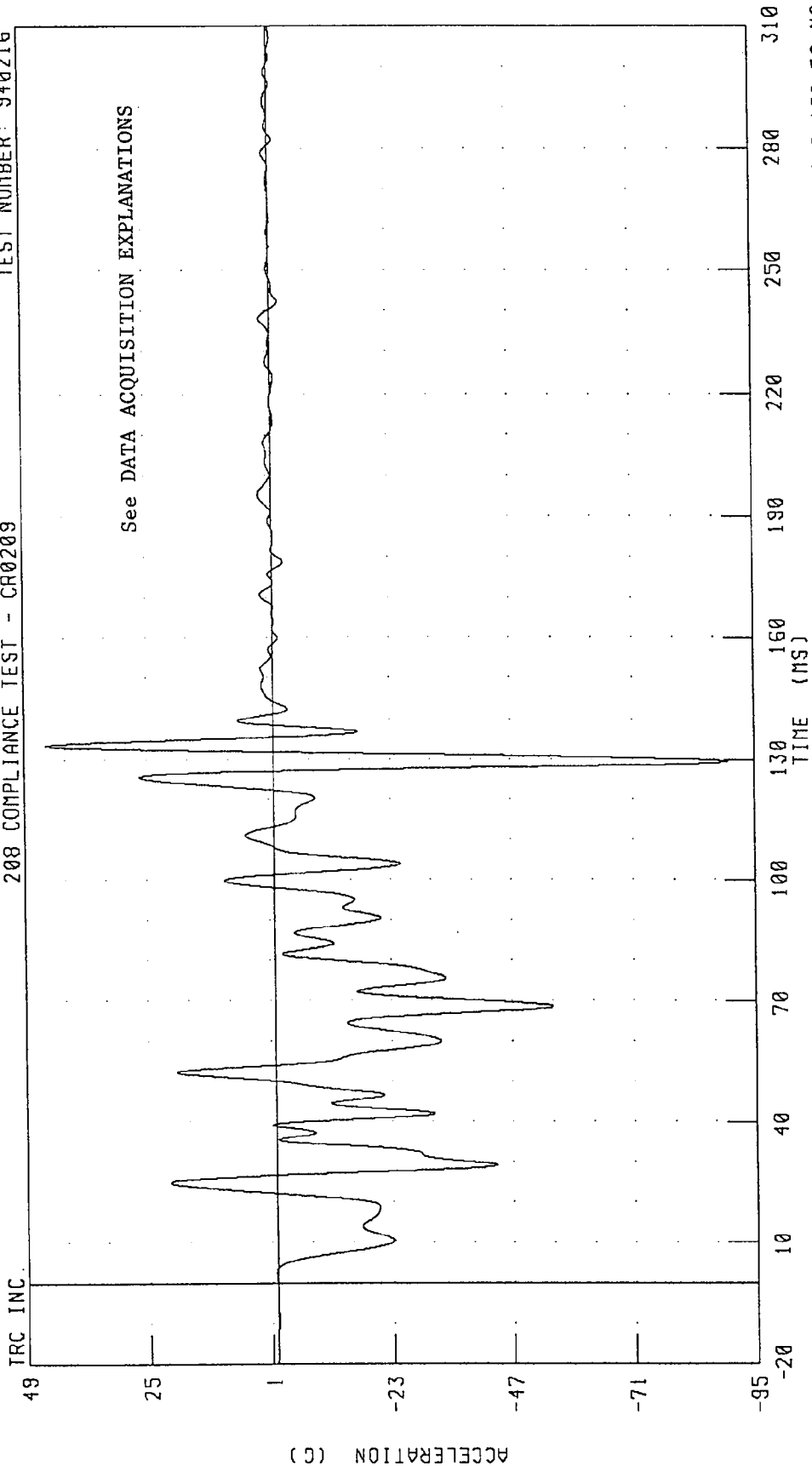


CHANNEL: BCLXG1 FILTER: CH. CLASS 60

PEAK DATA: 15.17 G @ 56.08 MS; -47.68 G @ 39.76 MS

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
DASH PANEL CENTER X-AXIS ACCELERATION

208 COMPLIANCE TEST - CR0209 TEST NUMBER: 940216

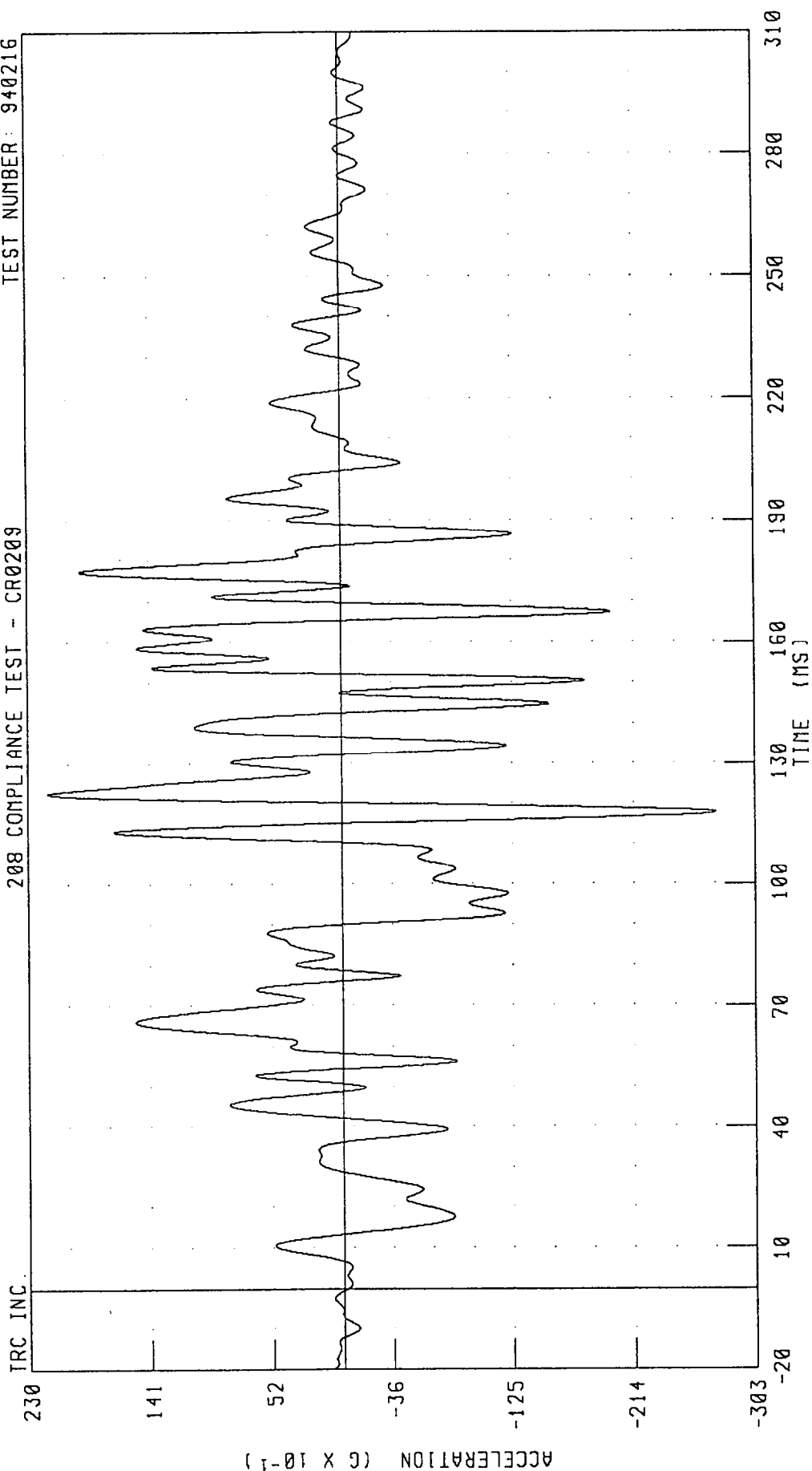


CHANNEL: DPCXG1 FILTER: CH. CLASS 60

1994 FORD MUSTANG INTO FLAT FRONTAL BARRIER
VEHICLE REAR CENTER Z-AXIS ACCELERATION

208 COMPLIANCE TEST - CR0209

TEST NUMBER: 940216



CHANNEL: RDKZG1 FILTER: CH. CLASS 60

PEAK DATA: 21.52 G @ 122.64 MS; -27.54 G @ 117.76 MS

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 10, 1993

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 1327

This is in response to your letter of July 16, 1993 requesting information relative to possible FMVSS 208 testing by OVSC of a 1994 model year Ford Mustang equipped with a driver and passenger air bag restraint system. Ford's responses to your several requests for information are set out below.

Request No. 1

"Please inform OVSC whether the 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 system provided at the driver's and passenger's seating positions of the 1994 Mustang was 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 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 automatic restraint system provided at the driver's and passenger's seating positions was not installed in the 1994 Mustang 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 belt provided with the supplemental driver's and passenger's air bag restraint systems in the 1994 Mustang was installed to meet the requirements of S4.1.2.1(c)(2) of FMVSS No. 208. Attachments I and II contain copies of those portions of the final test reports for Crash Tests 8724 (sedan) and 8841 (convertible), 90 degree front fixed barrier impact tests with the manual safety belt unfastened, relevant to S4.1.2.1(c)(2). Attachments III and IV contain copies of those portions of the final test reports for Crash Tests 8849 (sedan) and 8864 (convertible), 90 degree front fixed barrier impact tests with the manual safety belt fastened, relevant to S4.1.2.1(c)(2). Ford relied on the results of these tests as a basis for certifying compliance of 1994 Mustang vehicles equipped with the supplemental driver's and passenger's air bag 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 provided at the driver's and passenger's seating positions of the 1994 Mustang was installed to meet the requirements of S4.1.2.1(c)(2) of FMVSS No. 208.

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 1994 Mustang does not use a pressure vessel to inflate the supplemental driver and passenger air bags.

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 V contains the engineering analyses and TRW test report demonstrating compliance to S9.2 of FMVSS No. 208 of the supplemental driver and passenger air bag restraint system module assemblies for the 1994 Mustang.

Request No. 7

"State, for any automatic safety belt system in this vehicle, whether or not it is equipped with a tension-relieving device. Provide a copy of the information furnished in accordance with S7.4.2, if the tension-relieving device is used."

Answer

The 1994 Mustang is not equipped with automatic safety belt systems.

September 10, 1993

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

Frontal crash tests upon which Ford relies as a basis for certification of 1994 Mustang vehicles were conducted with all movable windows and vents fully open.

Request No. 9

"FMVSS No. 208, S5.1 provides a manufacturer with the option of using either a Part 572(B) or Part 572(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 of the test vehicles in those front barrier crash tests on which Ford relies as a basis for certification of 1994 Mustang vehicles to FMVSS No. 208. Attachment VI contains dummy placement measurements applicable to the 1994 Mustang.

The 1994 Mustang has a foot rest for the driver.

The 1994 Mustang 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."

Answer

Attachment VII 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 front barrier impact testing of the 1994 Mustang.

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 1994 Mustang is not equipped with adjustable seat belt anchorages.

Request No. 12

"Provide the speed at impact, vehicle test weight, and resulting injury criteria (i.e., HIC, chest acceleration, 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 each 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 VIII includes the speed at impact, vehicle test weight, and injury criteria values recorded in compliance tests of the 1994 Mustang to the requirements FMVSS No. 208, S4.1.2.1.

Attachment IX contains resultant head and chest acceleration versus time plots and femur loads versus time plots for each dummy for Crash Test 8819. These plots together with the plots from Crash Tests 8724, 8841, 8849, and 8864, which were provided in response to Request No. 3, represent all the full front barrier (90 degree) impact tests that were used to certify the 1994 Mustang to FMVSS No. 208. For Crash Test 8819, the L. F. dummy HIC calculation was computed after the removal of intermittent data in the vertical head acceleration record. This plot and the original plot with the intermittent data are provided.

In response to your request for items 12.1 through 12.7, Ford does not normally record this data in the manner requested as 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 it's 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
- Rear facia, bumper, tail lamps, etc.
- Luggage compartment trim
- Speakers, amplifier, etc. (in trunk / package tray)
- Rear seat and back
- Quarter panel trim, speakers if any
- Deck lid
- Quarter window glass
- Door glass

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."

"Provide a diagram of the steering control system and describe how the components of the steering control system work to provide energy management in a frontal impact."

Answer

Attachment X incorporates the engineering analysis that formed a principal foundation on which the judgment that the 1994 Mustang properly could be certified to the requirements of FMVSS No. 204 was based.

FMVSS No. 204 does not contain any requirements for the steering control system "to provide energy management". Rather, as the agency is aware, the standard sets a limit on the allowable rearward displacement of the upper end of the column. Ford does not have available any description or diagram describing the vehicle and column characteristics which serve to enable compliance with FMVSS No. 204 and must therefore respectfully decline to submit a description of this operation.

We believe the information and test reports contained herein are otherwise fully responsive to your request. If you have any questions, please call Mr. R. A. Nevi on (313) 594-7688.

Very truly yours,

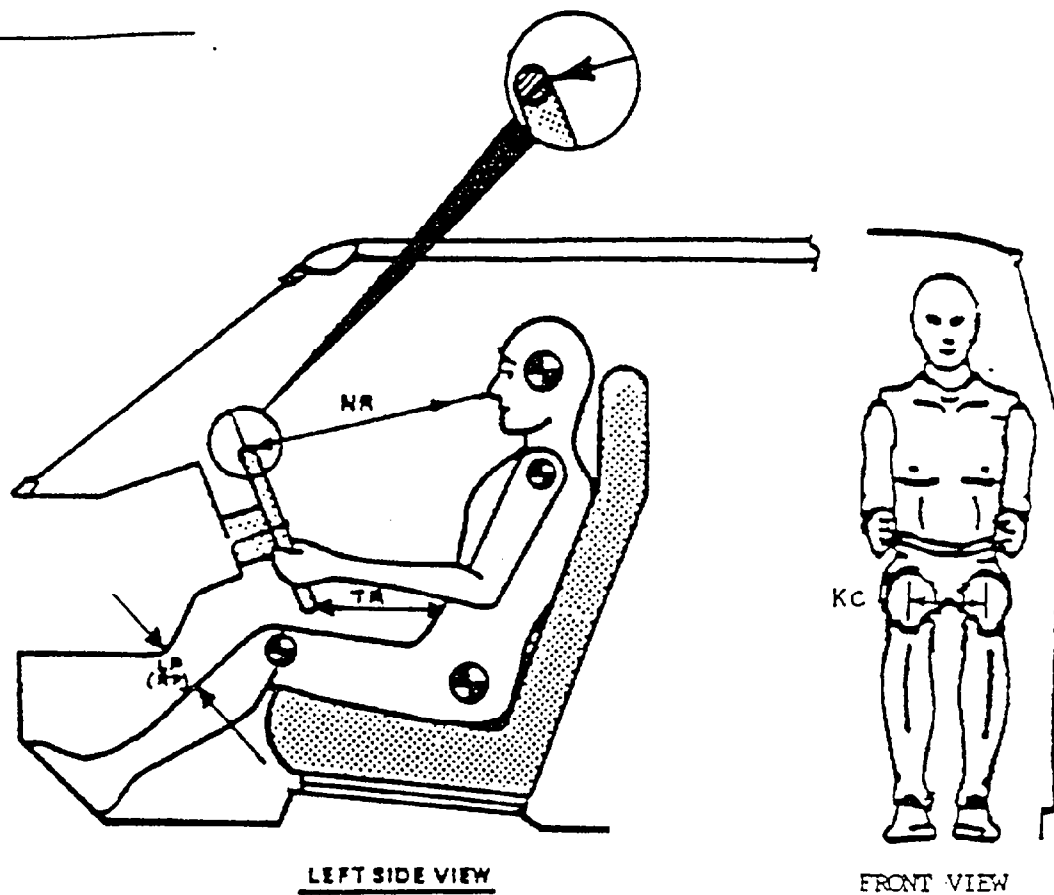

R. H. Munson

Attachments

DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSY. REFERENCE DIMENSIONS

VEHICLE 1994 Ford Mustang

IR# 1327



HYBRID III DUMMY PLACEMENT REFERENCE DIMENSIONS

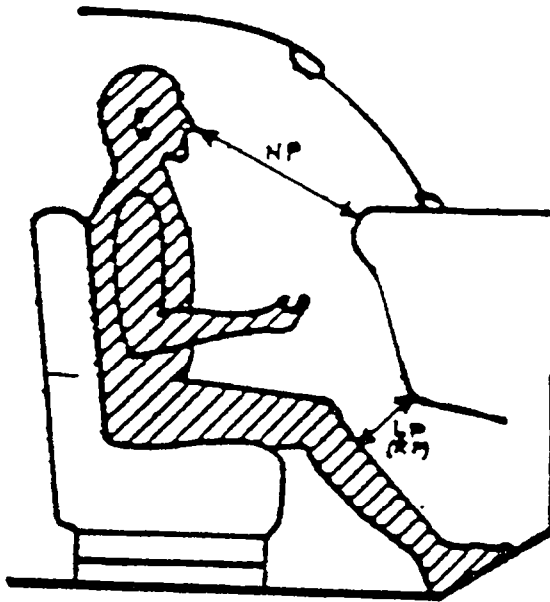
	MEASUREMENTS (ALL DISTANCES IN INCHES)	
	TARGET	RANGE
NR - Distance from tip of dummy's nose to top rear surface of steering wheel rim.	14.3	13.2 - 15.3
TR - Horizontal distance from bottom rear surface of steering wheel rim to dummy's torso.	6.4	5.9 - 6.9
LP - Perpendicular distance from dummy's left lower leg surface to closest point on instrument panel surface.	3.0	2.3 - 3.8
RP - Perpendicular distance from dummy's right lower leg surface to closest point on instrument panel surface.	2.3	1.0 - 3.0
KC - Distance between centerline of dummy's legs measured at top of knee pivot joint.	8.6	8.0 - 10.0

Note: The 1994 Mustang has a foot rest for the driver's left foot.

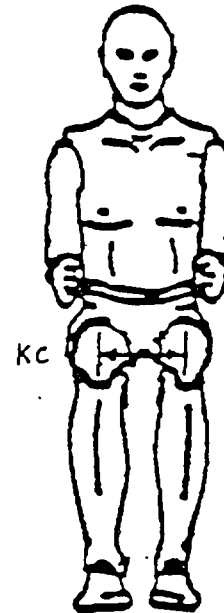
PASSENGER DUMMY PLACEMENT REFERENCE DIMENSIONS

VEHICLE 1994 Ford Mustang

IR# 1327



RIGHT SIDE VIEW



FRONT VIEW

HYBRID III DUMMY PLACEMENT REFERENCE DIMENSIONS

	MEASUREMENTS (ALL DISTANCES IN INCHES)	
	TARGET	RANGE
P - Distance from tip of dummy's nose to closest point on surface of instrument panel.	22.4	21.5 - 23.2
P - Perpendicular distance from dummy's left lower leg surface to closest point on instrument panel surface.	3.4	2.2 - 4.6
P - Perpendicular distance from dummy's right lower leg surface to closest point on instrument panel surface.	3.4	2.1 - 4.4
K - Distance between centerline of dummy's legs measured at top of knee pivot joint.	7.8	7.6 - 8.3

Vehicle Model Year & Make: 1994 Ford
Vehicle Model & Body Style: Mustang

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"?).

Seat back angle for driver's seat = * degrees.

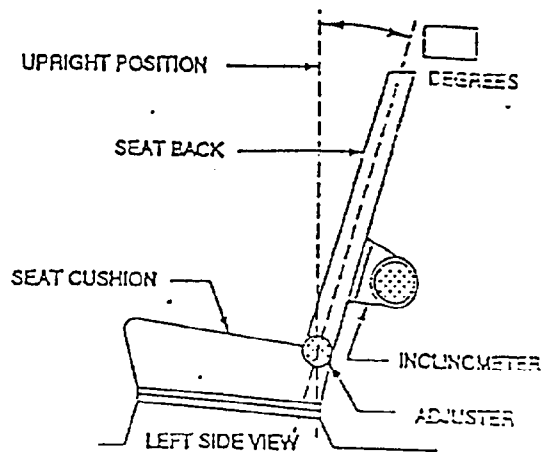
Measurement Instructions:

* See attached sheet

Seat back angle for passenger's seat = * degrees.

Measurement Instructions:

* See attached sheet



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:

Reference points are chosen on the seat and the seat track, total seat travel is measured, and the seat is then positioned at the center of seat travel.

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

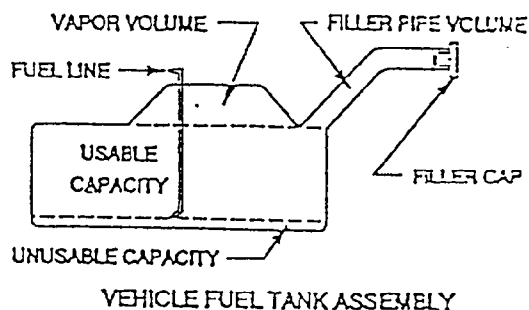
Same method as for driver

3. FUEL TANK CAPACITY DATA --

3.1 A. "Usable Capacity" of standard equipment fuel tank = 15.4 gallons.

B. "Usable Capacity" of optional equipment fuel tank = N/A gallons.

C. "Usable Capacity" of vehicle(s) used for certification testing to requirements of FMVSS 301 = 15.4 gallons.



Operational Instructions:

VEHICLE INFORMATION

Amount of Stoddard solvent added to vehicle(s) used for certification test(s) = 14.6 gallons

Is vehicle equipped with electric fuel pump? ☒ YES ☐ NO

If YES, explain the vehicle operating conditions under which the fuel pump will pump fuel.

See note below

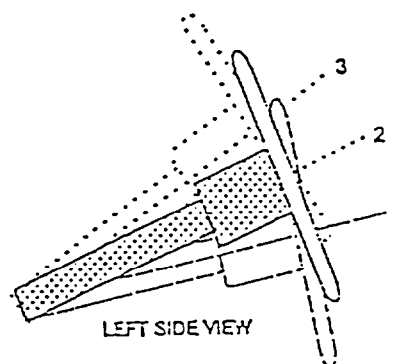
STEERING COLUMN ADJUSTMENTS --

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:

Mid position or No. 3 position



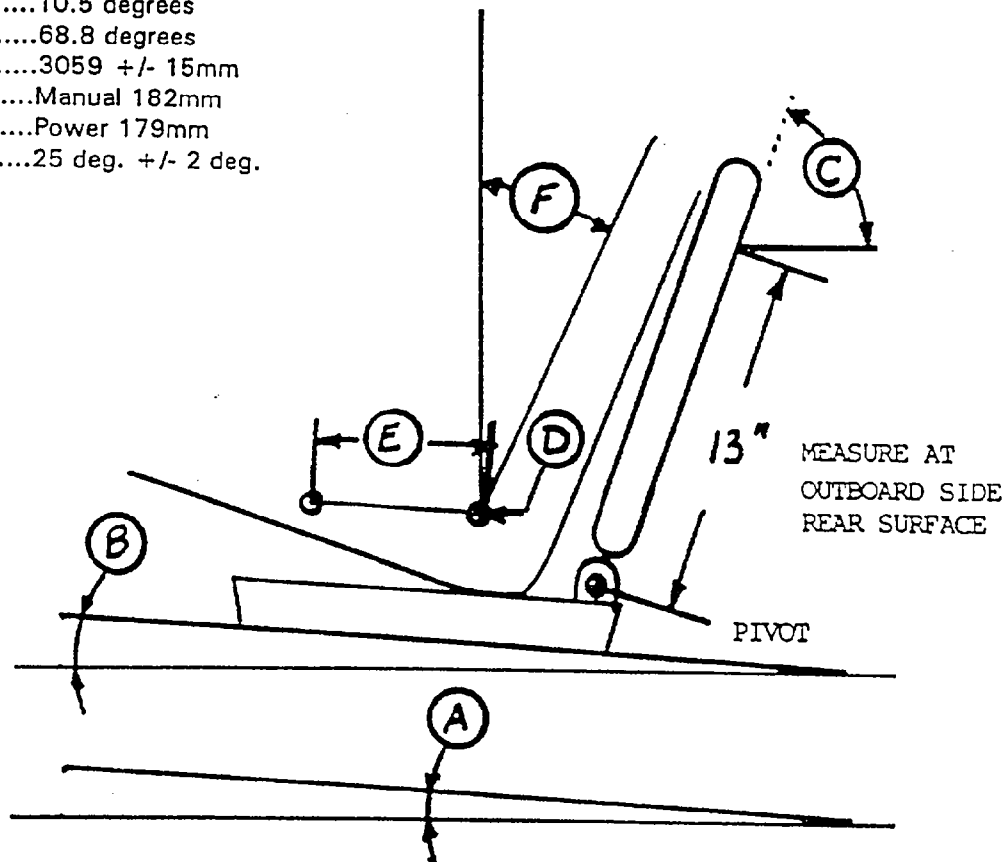
STEERING COLUMN ASSEMBLY

Note: ELECTRIC FUEL PUMP OPERATION

The electric fuel pump operates for 2 seconds to pressurize the fuel system following 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, if the vehicle sustains an impact (e.g., in an accident) a fuel pump shut-off switch is tripped.

1994 MUSTANG
All front bucket seats

- A.....0 deg. 45 min.
B.....10.5 degrees
C.....68.8 degrees
D.....3059 +/- 15mm
E.....Manual 182mm
E.....Power 179mm
F.....25 deg. +/- 2 deg.



A - SILL ANGLE

B - DESIGN CUSHION FRAME ANGLE

C - DESIGN SEAT BACK FRAME ANGLE

D - REARMOST 'H' POINT

E - TRACK TRAVEL

F - MANIKIN BACK ANGLE