

REPORT NOS. 208-TRC-93-009

212-TRC-93-009

301-TRC-93-009

VEHICLE SAFETY COMPLIANCE TESTING
FOR OCCUPANT CRASH PROTECTION,
WINDSHIELD MOUNTING, WINDSHIELD ZONE
INTRUSION, AND FUEL SYSTEM INTEGRITY

TOYOTA MOTOR CORPORATION

1993 TOYOTA CELICA

2-DOOR COUPE

NHTSA NO. CP5103

TRC TEST NO. 921230

TRANSPORTATION RESEARCH CENTER INC.

10820 STATE ROUTE 347

EAST LIBERTY, OHIO 43319



JANUARY 15, 1993

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF VEHICLE SAFETY COMPLIANCE (NEF-31)
400 SEVENTH STREET, S.W., ROOM NO. 6111
WASHINGTON, DC 20590

This Final Test Report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-90-C-21003. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

This publication is distributed by the U. S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

REPORT PREPARED BY:

Craig A. Markusic
Craig A. Markusic, Project Engineer
Transportation Research Center Inc.

Date 1/14/93

REPORT APPROVED BY:

C. Kay Latimer
C. Kay Latimer, Project Manager
Transportation Research Center Inc.

Date 1-19-93

FINAL REPORT ACCEPTED BY:

Charles R. Can
Contracting Officer's Technical Representative (COTR),
NHTSA, Office of Vehicle Safety Compliance

Date 4/8/93

1. Report No. 208-TRC-93-009 212-TRC-93-009 301-TRC-93-009		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle FINAL REPORT OF FMVSS NOS. 208, 212, 219 (PARTIAL), AND 301 COMPLIANCE TESTING OF A 1993 TOYOTA CELICA 2-DOOR COUPE, NHTSA NO. CP5103				5. Report Date JANUARY 15, 1993	
				6. Performing Organization Code	
				8. Performing Organization Report No. 208-TRC-93-009 212-TRC-93-009 301-TRC-93-009	
7. Author(s) Craig A. Markusic, Project Engineer, TRC				9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, Ohio 43319	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Vehicle Safety Compliance (NEF-31) 400 Seventh St., S.W., Washington, DC 20590				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. DTNH22-90-C-21003	
				13. Type of Report and Period Covered FINAL REPORT DECEMBER 1992 - JANUARY 1993	
				14. Sponsoring Agency Code NEF-30	
15. Supplementary Notes					
16. Abstract A 30 mph flat frontal barrier impact test was conducted on a 1993 Toyota Celica 2-door coupe, NHTSA No. CP5103, at Transportation Research Center Inc. on December 30, 1992. This test was conducted to determine compliance with Federal Motor Vehicle Safety Standards: FMVSS 208, "Occupant Crash Protection"; FMVSS 212, "Windshield Mounting"; FMVSS 219 (partial), "Windshield Zone Intrusion"; FMVSS 301, "Fuel System Integrity." The barrier impact velocity was 29.3 mph. The vehicle's maximum static crush was 18.1 inches. The ambient temperature was 72° F. The driver's head injury criteria (HIC) was 309. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 49.1 g. The driver's left and right femur maximum axial forces were 1477 pounds and 1192 pounds, respectively. The passenger's head injury criteria (HIC) was 272. The passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 27.4 g (See DATA ACQUISITION EXPLANATIONS). The passenger's left and right femur maximum axial forces were 573 pounds and 548 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 219P, "Windshield Zone Intrusion" FMVSS 301, "Fuel System Integrity"			18. Distribution Statement Available from: NHTSA Technical Reference Division Room 5108, (NAD-52) 400 Seventh Street, SW Washington, DC 20590 Attn: Mr. Robert Hornickle		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 130	22. Price

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
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³

TEMPERATURE (exact)

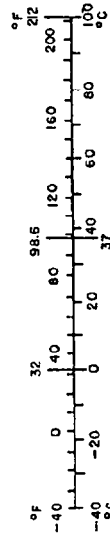
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
----	------------------------	----------------------------	---------------------	----

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	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
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	35	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
----	---------------------	-------------------	------------------------	----



*1 in. ± 2.54 exactly. For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10-286.

TABLE OF CONTENTS

<u>SECTION</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1.0	PURPOSE & TEST PROCEDURE	1-1
2.0	FRONTAL BARRIER IMPACT TEST SUMMARY	2-1
3.0	FMVSS 208, 212, 219 (PARTIAL), & 301 DATA	3-1
4.0	VEHICLE, OCCUPANT, & CAMERA MEASUREMENTS	4-1
APPENDIX A	PHOTOGRAPHS	A-1
APPENDIX B	DATA PLOTS	B-1

LIST OF TABLES

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1	CRASH TEST SUMMARY	2-4
2	TEST VEHICLE INFORMATION	2-5
3	POST-IMPACT DATA	2-8
4	VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY	2-12
5	DUMMY INJURY CRITERIA	3-2
6	POST-IMPACT DUMMY/VEHICLE DATA	3-3
7	FMVSS 208 COMFORT AND CONVENIENCE DATA FOR MANUAL SEAT BELTS	3-5
8	FMVSS 208 SEAT BELT WARNING SYSTEM DATA	3-8
9	FMVSS 208 LABELING AND DRIVER'S MANUAL DATA	3-9
10	FMVSS 208 READINESS INDICATOR DATA	3-10
11	FUEL SYSTEM DATA	3-13
12	FMVSS 301 POST-IMPACT TEST DATA	3-14
13	IMPACTED VEHICLE MEASUREMENTS	4-3
14	DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS	4-6
15	MOTION PICTURE CAMERA LOCATIONS	4-10

LIST OF FIGURES

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1	IMPACT VELOCITY MEASUREMENT SYSTEM	2-9
2	ACCIDENT INVESTIGATION DIVISION DATA FOR 30 MPH FRONTAL BARRIER IMPACT	2-10
3	VEHICLE ACCELEROMETER PLACEMENT	2-11
4	FMVSS 212 TEST DATA	3-11
5	FMVSS 219 TEST DATA	3-12
6	FMVSS 301 STATIC ROLLOVER TEST DATA	3-15
7	PRE-TEST AND POST-TEST MEASUREMENT POINTS	4-2
8	VEHICLE TARGET LOCATIONS	4-4
9	DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS	4-5
10	SEAT BELT POSITIONING DATA	4-7
11	CAMERA POSITIONS	4-8

LIST OF PHOTOGRAPHS

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
A-1.	PRE-TEST FRONT VIEW	A-2
A-2.	POST-TEST FRONT VIEW	A-3
A-3.	PRE-TEST LEFT SIDE VIEW	A-4
A-4.	POST-TEST LEFT SIDE VIEW	A-5
A-5.	PRE-TEST REAR VIEW	A-6
A-6.	POST-TEST REAR VIEW	A-7
A-7.	PRE-TEST RIGHT SIDE VIEW	A-8
A-8.	POST-TEST RIGHT SIDE VIEW	A-9
A-9.	PRE-TEST RIGHT FRONT THREE-QUARTER VIEW	A-10
A-10.	POST-TEST RIGHT FRONT THREE-QUARTER VIEW	A-11
A-11.	PRE-TEST LEFT REAR THREE-QUARTER VIEW	A-12
A-12.	POST-TEST LEFT REAR THREE-QUARTER VIEW	A-13
A-13.	PRE-TEST WINDSHIELD VIEW	A-14
A-14.	POST-TEST WINDSHIELD VIEW	A-15
A-15.	PRE-TEST ENGINE COMPARTMENT VIEW	A-16
A-16.	POST-TEST ENGINE COMPARTMENT VIEW	A-17
A-17.	PRE-TEST FUEL FILLER CAP VIEW	A-18
A-18.	POST-TEST FUEL FILLER CAP VIEW	A-19
A-19.	PRE-TEST FUEL FILLER NECK VIEW	A-20
A-20.	PRE-TEST FUEL TANK VIEW	A-21
A-21.	POST-TEST FUEL TANK & FUEL FILLER NECK VIEW	A-22
A-22.	PRE-TEST FRONT UNDERBODY VIEW	A-23
A-23.	POST-TEST FRONT UNDERBODY VIEW	A-24
A-24.	PRE-TEST REAR UNDERBODY VIEW	A-25
A-25.	POST-TEST REAR UNDERBODY VIEW	A-26
A-26.	PRE-TEST DRIVER DUMMY POSITION VIEW	A-27
A-27.	POST-TEST DRIVER DUMMY POSITION VIEW	A-28
A-28.	PRE-TEST PASSENGER DUMMY POSITION VIEW	A-29
A-29.	POST-TEST PASSENGER DUMMY POSITION VIEW	A-30
A-30.	PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1	A-31
A-31.	POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1	A-32
A-32.	PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2	A-33

LIST OF PHOTOGRAPHS, CONT'D.

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
A-33.	POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2	A-34
A-34.	PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1	A-35
A-35.	POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1	A-36
A-36.	PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2	A-37
A-37.	POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2	A-38
A-38.	POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1	A-39
A-39.	POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2	A-40
A-40.	POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1	A-41
A-41.	POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2	A-42
A-42.	POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 3	A-43
A-43.	POST-TEST PASSENGER DUMMY HEAD CONTACT VIEW	A-44
A-44.	POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1	A-45
A-45.	POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2	A-46
A-46.	PRE-TEST VEHICLE CERTIFICATION LABEL VIEW	A-47
A-47.	PRE-TEST VEHICLE RECOMMENDED TIRE PRESSURE LABEL VIEW	A-48
A-48.	POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW	A-49

SECTION 1.0

PURPOSE & 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 Transportation Research Center Inc. (TRC) under Contract No. DTNH22-90-C-21003. The purpose of this test was to determine if the subject vehicle, a 1993 Toyota Celica 2-door coupe, NHTSA No. CP5103, 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-208-08. 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. 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 B 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 Appendices B and 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-three (23) data channels were multiplexed and recorded on a 14-track tape drive. The data was digitally sampled at 8000 samples per second and processed per sections 12.8 and 12.9 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.

SECTION 2.0

FRONTAL BARRIER IMPACT TEST SUMMARY

TEST RESULTS SUMMARY

This flat frontal barrier test was conducted at TRC on December 30, 1992.

The test vehicle, a 1993 Toyota Celica 2-door coupe, NHTSA No. CP5103, 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 axial forces transmitted through the upper legs did not exceed 2,250 pounds as measured by Part 572 B 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 was 100 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 a 1.6 liter, transverse engine, manual transmission, power steering, and power brakes. The vehicle's test weight was 2996 pounds. The vehicle's impact speed was 29.3 mph. The vehicle's maximum static crush was 18.1 inches.

The driver's head injury criteria (HIC) was 309. The driver's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 49.1 g. The driver's left and right femur maximum axial forces were 1477 pounds and 1192 pounds, respectively.

The right front passenger's HIC was 272. The right front passenger's chest maximum resultant acceleration with three (3) milliseconds minimum duration was 27.4 g. (See DATA ACQUISITION EXPLANATIONS.) The right front passenger's left and right femur maximum axial forces were 573 pounds and 548 pounds, respectively.

There was no loss of windshield periphery retention.

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 driver's head Y- and Z-axis accelerometers, HEDYG1, and HEDZG1, recorded a questionable data spike at 240 milliseconds. This data spike affected the driver's head resultant acceleration calculation. The data acquisition circuits were checked immediately after the impact. The circuits appeared normal. In addition, the dummy's head passed the post-test calibration head drop test. The cause of the spikes could not be identified.

The right brake caliper X-axis accelerometer, BCRXG1, lost data at 55 milliseconds resulting from the accelerometer cable being cut by the vehicle's crush upon impact.

The right front passenger's chest X-axis accelerometer recorded questionable data from 0 to 170 milliseconds. The questionable data affected the right front passenger's maximum chest resultant acceleration with a duration of 3 milliseconds or greater calculation and the chest resultant acceleration calculation. The accelerometer data cable, electrical connectors, and data acquisition circuit were checked after the impact. The accelerometer was recalibrated. All items appeared normal. The cause of the questionable data could not be identified.

TABLE 1 CRASH TEST SUMMARY

NHTSA NO.: CP5103 TEST TYPE: Frontal Barrier Impact

TEST DATE: 12/30/92 TEST TIME: 1412 AMBIENT TEMP. (°F): 72

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1993/Toyota/Celica/2-door coupe

VEHICLE TEST WEIGHT (LBS): 2996

IMPACT ANGLE (DEG)*: 0

IMPACT VELOCITY (MPH)**: PRIMARY = 29.3 SECONDARY = 29.3

MAXIMUM STATIC CRUSH (IN): 18.1

AVERAGE REBOUND (IN): 45.3

DUMMIES: Driver #1173 Passenger #353

TYPE: Part 572 B Part 572 B

LOCATION: Left front Right front

RESTRAINT: Airbag 3-point unbelt

NUMBER OF DATA CHANNELS: 23

NUMBER OF CAMERAS: HIGH-SPEED 14 REAL-TIME 2

*With respect to tow track centerline.
**Speed trap measurement ($\pm$.05 mph accuracy)

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Toyota Motor Corporation

MAKE/MODEL: Toyota/Celica

VIN: JT2AT86FXP0097605

BODY STYLE: 2-door coupe

MODEL YEAR: 1993

NHTSA NO.: CP5103

COLOR: Black

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT: 1.6 liter

TRANSMISSION DATA: 5 SPEED, X MANUAL, AUTOMATIC, X FWD, RWD, 4WD

DATE VEHICLE RECEIVED: 09/29/92

ODOMETER READING: 54

DEALER'S NAME AND ADDRESS: Germain Toyota of Columbus
5777 Scarborough Blvd.
Columbus, OH 43232

ACCESSORIES:

POWER STEERING Yes
POWER BRAKES Yes
POWER SEATS No
POWER WINDOWS No
TINTED GLASS Yes
RADIO Yes
CLOCK Yes
OTHER None

AUTOMATIC TRANSMISSION No
AUTOMATIC SPEED CONTROL No
TILTING STEERING WHEEL Yes
TELESCOPING STEERING WHEEL No
AIR CONDITIONING Yes
ANTI-SKID BRAKE No
REAR WINDOW DEFROSTER Yes

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Toyota Motor Corporation

DATE OF MANUFACTURE: 08/92

VIN: JT2AT86FXP0097605

GVWR: 3565 LBS

GAWR: FRONT: 2005 LBS., REAR: 1850 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Michelin, LX1, P185/65R14

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 35 PSI
REAR: 35 PSI

SPARE TIRE (MFR., LINE, SIZE): Bridgestone, T115/70D14

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manually adjustable

MAXIMUM WIDTH: 66.8 INCHES

WHEELBASE: 98.5 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA:

The label was located in the glovebox

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P185/65R14

RECOMMENDED COLD TIRE PRESSURE: FRONT: 29 PSI; REAR: 28 PSI

DESIGNATED SEATING CAPACITY: 2 FRONT 2 REAR 4 TOTAL

VEHICLE CAPACITY WEIGHT: 725 LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 26.0; RF 26.0; LR 25.6; RR 25.6

FULLY LOADED ATTITUDE: LF 25.4; RF 25.4; LR 24.2; RR 24.2

PRE-TEST ATTITUDE: LF 25.5; RF 25.6; LR 24.3; RR 24.7

POST-TEST ATTITUDE: LF 27.0; RF 27.1; LR 23.0; RR 23.6

TABLE 2 TEST VEHICLE INFORMATION CONT'D

WEIGHT OF TEST VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS):

RIGHT FRONT	803 LBS.	RIGHT REAR	464 LBS.
LEFT FRONT	819 LBS.	LEFT REAR	468 LBS.
TOTAL FRONT WEIGHT	1622 LBS.	(63.5% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	932 LBS.	(36.5% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 2554 LBS.			

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (2554 LBS)

VCW = VEHICLE CAPACITY WEIGHT (725 LBS)

DSC = DESIGNATED SEATING CAPACITY (4)

$RCLW = VCW - 150 (DSC) = 125$

$TARGET\ TEST\ WEIGHT = UDW + RCLW + (NO.\ OF\ HYBRID\ II\ DUMMIES\ X\ 164\ LBS/DUMMY)$

$TARGET\ TEST\ WEIGHT = 2554 + 125 + 328$

$TARGET\ TEST\ WEIGHT = 3007\ LBS$

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 114 LBS. OF CARGO WEIGHT:

RIGHT FRONT	882 LBS.	RIGHT REAR	606 LBS.
LEFT FRONT	897 LBS.	LEFT REAR	611 LBS.
TOTAL FRONT WEIGHT	1779 LBS.	(59.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1217 LBS.	(40.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	2996 LBS.	(0.4% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 0 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 40.0 INCHES REARWARD OF FRONT WHEEL CENTERLINE

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

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 921230 NHTSA NO.: CP5103
TEST DATE: 12/30/92 TEST TIME: 1412
TEST TYPE: Frontal Barrier Impact IMPACT ANGLE: 0
AMBIENT TEMPERATURE AT IMPACT AREA: 72° F
TEMPERATURE IN OCCUPANT COMPARTMENT: 72° 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 = 26.0 IN.

EXITING VELOCITY TRAP = 2.0 IN.

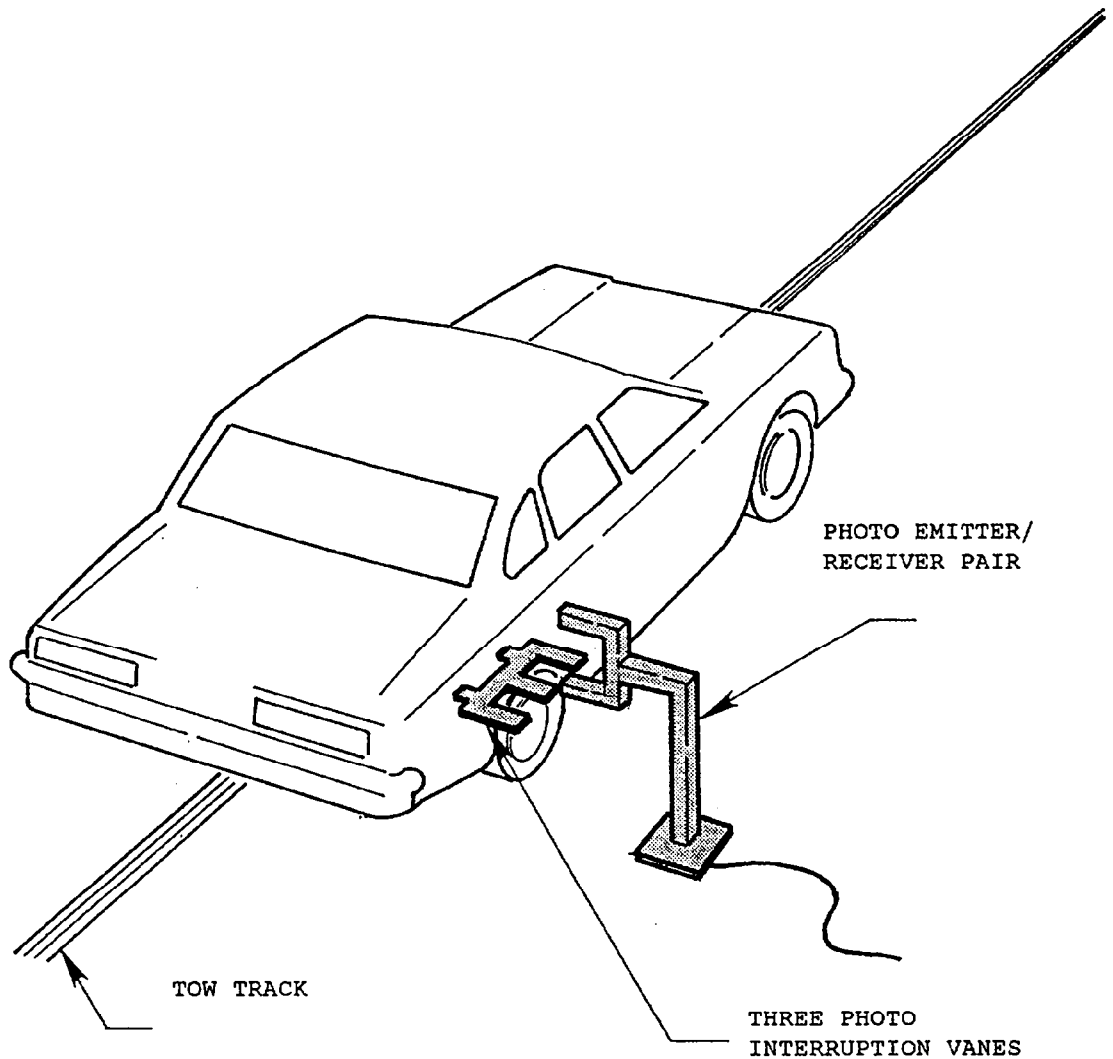
TEST VEHICLE STATIC CRUSH (ALL MEASUREMENTS ARE IN INCHES):

OVERALL LENGTH OF TEST VEHICLE: PRE-TEST: L 170.5; C 176.5; R 170.5
POST-TEST: L 156.9; C 158.4; R 156.1
TOTAL CRUSH: L 13.6; C 18.1; R 14.4
AVERAGE CRUSH: 15.4

TEST VEHICLE REBOUND FROM FLAT BARRIER (ALL MEASUREMENTS ARE IN INCHES):

DISTANCE FROM TEST VEHICLE TO BARRIER: L 47.0; C 43.9; R 45.0; AVG. 45.3

FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears the final emitter/receiver pair two inches before impact.

The vanes have one foot spacing.

FIGURE 2 ACCIDENT INVESTIGATION DIVISION DATA
FOR 30 MPH FRONTAL BARRIER IMPACT

VEHICLE MAKE/MODEL/BODY STYLE: Toyota/Celica/2-door coupe

VEHICLE NHTSA NO.: CP5103; VIN: JT2AT86FXP0097605

MODEL YEAR: 1993; BUILD DATE: 08/92; TEST DATE: 12/30/92

VEHICLE SIZE CATEGORY: Sub-compact; TEST WEIGHT: 2996 LBS.

VEHICLE WHEELBASE: 98.5 INCHES

MAXIMUM WIDTH: 66.8 INCHES

FRONT OVERHANG: 39.8 INCHES

COLLISION DEFORMATION
CLASSIFICATION (CDC) CODE: 12FDEW2

CRUSH DEPTH
MEASUREMENTS:

C1 = 13.6 INCHES

C2 = 16.4 INCHES

C3 = 17.6 INCHES

C4 = 17.8 INCHES

C5 = 18.0 INCHES

C6 = 14.4 INCHES

MIDPOINT OF DAMAGE: D = VEHICLE CENTERLINE
(LONGITUDINAL)

LENGTH OF DAMAGED
REGION: L = 50.0 INCHES

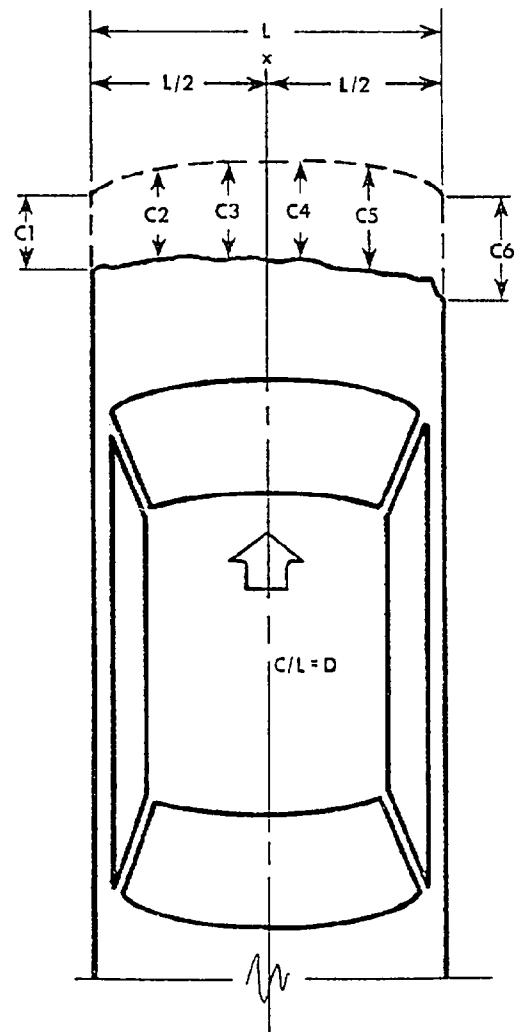
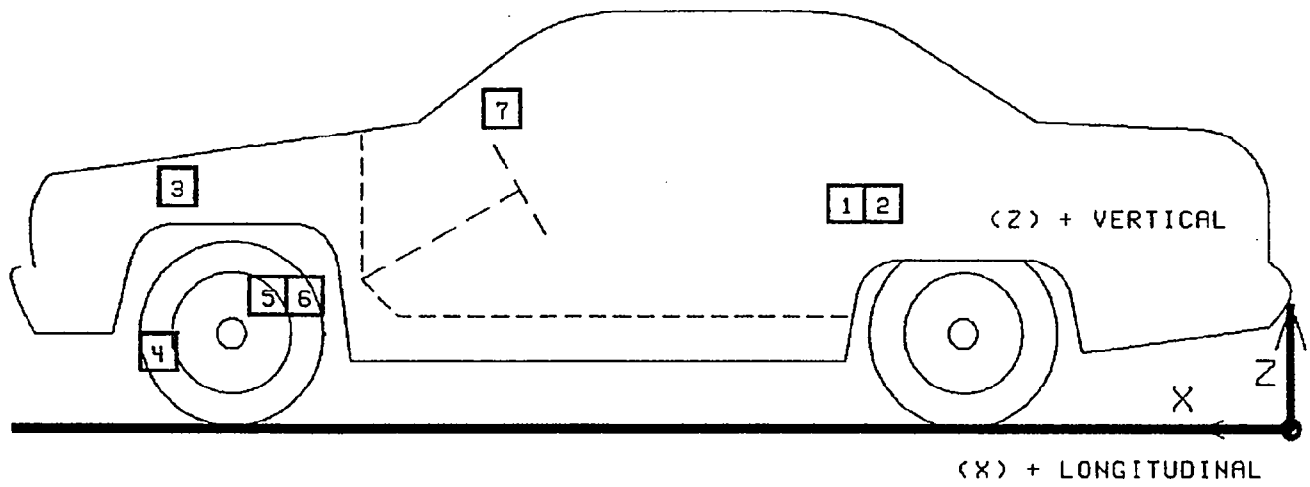
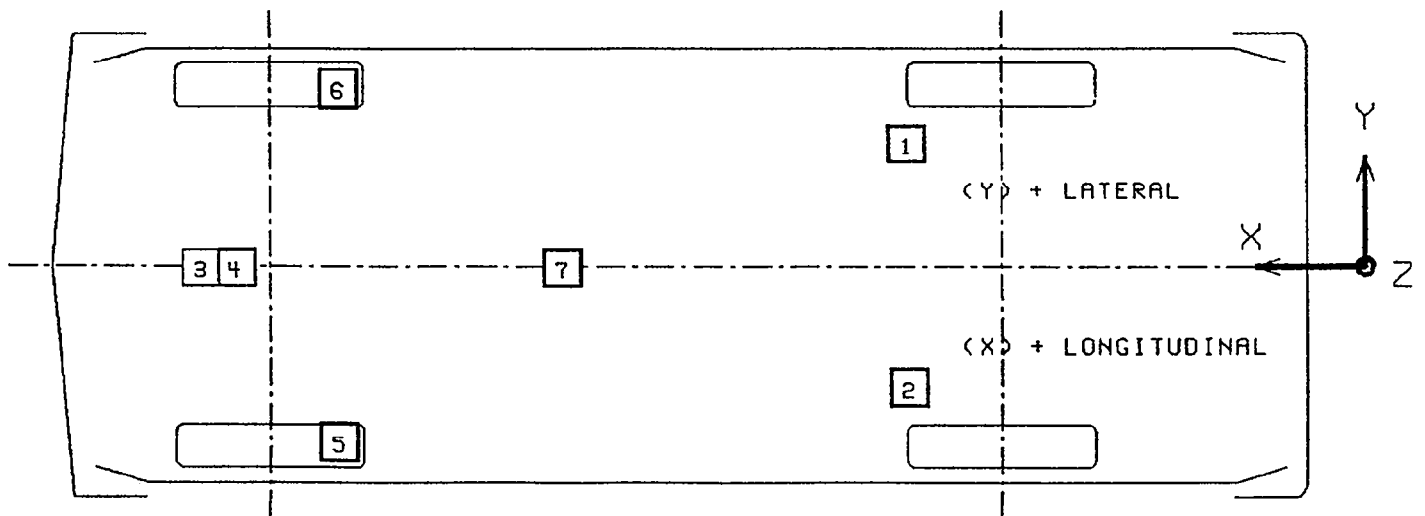


FIGURE 3

VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

TABLE 4

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 921230

No.	LOCATION		X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
						MAX G MSEC		MAX G MSEC	
1	LEFT REAR SEAT CROSSMEMBER LONGITUDINAL	PRE	66.2	15.5	13.2				
		POST	66.2	15.5	13.9				
						1.3	103.0	27.1	57.6
2	RIGHT REAR SEAT CROSSMEMBER LONGITUDINAL	PRE	66.0	-16.0	13.4				
		POST	66.0	-15.5	14.0				
						1.3	145.9	26.6	60.8
3	ENGINE TOP LONGITUDINAL	PRE	145.5	-1.9	29.8				
		POST	141.4	-3.5	29.4				
						27.0	57.0	83.6	43.0
4	ENGINE BOTTOM LONGITUDINAL	PRE	141.0	-10.0	9.0				
		POST	137.0	-11.4	8.3				
						22.3	55.9	85.8	33.4
5	RIGHT BRAKE CALIPER LONGITUDINAL	PRE	140.5	-25.8	11.8				
		POST	139.1	-25.5	12.2				
						---	---Y	---	---Y
6	LEFT BRAKE CALIPER LONGITUDINAL	PRE	140.5	25.8	11.8				
		POST	139.2	25.5	11.8				
						2.6	132.8	43.1	54.0
7	INSTRUMENT PANEL CENTER LONGITUDINAL	PRE	113.5	0.0	33.8				
		POST	113.8	0.0	33.2				
						22.5	94.8	46.5	73.4

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

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

Y See DATA ACQUISITION EXPLANATIONS

REPORT OF VEHICLE CONDITION AT THE COMPLETION OF TESTING

CONTRACT NO.: DTNH22-90-C-21003
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 NO.: CP5103
MAKE/MODEL/BODY STYLE: Toyota/Celica/2-door coupe
MODEL YEAR: 1993 BODY COLOR: Black
VIN: JT2AT86FP0097605
ODOMETER (ARRIVAL): 54 DATE: 09/29/92
ODOMETER (COMPLETION): 60 DATE: 12/30/92
COST: \$14,021.50

☒ AIR CONDITIONER	☐ CONSOLE	BRAKES: ☒ POWER
☒ TINTED GLASS	☐ TACHOMETER	FRONT: Disc
☒ POWER STEERING	☐ SPEED CONTROL	REAR: Drum
☐ POWER WINDOWS	☒ REAR WINDOW DEF.	
☐ POWER DOOR LOCKS	☐ SUN/MOON ROOF	FRONT SEATS: ☐ POWER
☒ RADIO	☐ T-TOP	SEAT TYPE: Bucket
☒ CLOCK	☒ TILT STEERING WHEEL	NO. OF SEATS: 4
☐ ROOF RACK	☐ OTHER OPTIONS: _____	

ENGINE: 4 CYLINDERS; 1.6 LITERS
TRANSMISSION: manual; DRIVE TYPE: Front wheel drive
TIRE SIZE: P185/65R14
GASOLINE TYPE: Unleaded

EQUIPMENT THAT IS NO LONGER ON THE VEHICLE AS NOTED ABOVE: None

EXPLANATION: NA

VEHICLE CONDITION: Vehicle has been subjected to a 30 mph frontal
barrier crash test.

SECTION 3.0

FMVSS 208, 212, 219 (partial), & 301 DATA

TABLE 5 DUMMY INJURY CRITERIA

MAXIMUM ACCELERATION (G)

	HEAD				CHEST		
	X	Y	Z	R	X	Y	Z
DRIVER	-54.7	-13.0 Y	-21.4 Y	58.0 Y	-51.6	3.7	13.9
PASSENGER	-26.8	5.2	-44.2	48.9	28.6 Y	12.3	19.2

MAXIMUM FEMUR COMPRESSIVE FORCE (LBS)

	LEFT FEMUR	RIGHT FEMUR
DRIVER	1477	1192
PASSENGER	573	548

HEAD INJURY CRITERIA**

	HIC	TIME t_1 (MSEC)	TIME t_2 (MSEC)
DRIVER	309	69.9	101.5
PASSENGER	272	68.9	104.9

CHEST MAXIMUM RESULTANT ACCELERATION*

	ACCEL. (G)	TIME t_1 (MSEC)	TIME t_2 (MSEC)
DRIVER	49.1	83.9	87.0
PASSENGER	27.4 Y	59.8	62.8

*Defined as equal to or exceeding 0.003 sec. duration

**As defined in FMVSS No. 208

Y See DATA ACQUISITION EXPLANATIONS

TABLE 6 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #1173	PASSENGER #353
HEAD	<u>Airbag/header</u>	<u>None</u>
CHEST	<u>Airbag</u>	<u>None</u>
	<u>Lower</u>	
ABDOMEN	<u>steering wheel rim</u>	<u>None</u>
LEFT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>
RIGHT KNEE	<u>Instrument panel</u>	<u>Instrument panel</u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>Easy</u>	<u>Easy</u>
REAR	<u>NA</u>	<u>NA</u>

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	<u>None</u>	<u>None</u>
REAR	<u>NA</u>	<u>NA</u>

GLAZING DAMAGE:

None

OTHER NOTABLE IMPACT EFFECTS:

None

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 header as the dummy's chest contacted the airbag. The dummy's abdomen contacted the lower steering wheel rim. The driver dummy was restrained by the airbag. The dummy rebounded rearward into the seat back as the dummy's head rotated rearward impacting the head restraint. 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 rotated downward. The right front passenger dummy was restrained by the three-point unbelt. The dummy rebounded rearward into the seat back as the dummy's head rotated rearward impacting the head restraint. The right front passenger dummy came to rest in the right front passenger's seat restrained by the three-point unbelt.

TABLE 7 FMVSS 208 COMFORT AND CONVENIENCE DATA FOR MANUAL SEAT BELTS

MAKE/MODEL: Toyota/Celica

VIN: JT2AT86FXP0097605

BODY STYLE: 2-door coupe

NHTSA NO.: CP5103

DATE OF MANUFACTURE: 08/92

WEBBING TENSION - RELIEVING DEVICE:

DO OUTBOARD SEATING POSITION SEAT BELTS HAVE WEBBING TENSION - RELIEVING DEVICES?(check one): NO

IF YES:

MAXIMUM SLACK RECOMMENDED IN OWNER'S MANUAL: _____ INCHES

DOES OWNER'S MANUAL WARN THAT INTRODUCING SLACK BEYOND THE AMOUNT SPECIFIED CAN SIGNIFICANTLY REDUCE THE EFFECTIVENESS OF THE SHOULDER BELT? _____ YES _____ NO

IF NO, EXPLAIN:

THE WEBBING TENSION - RELIEVING DEVICE IS CANCELLED WHEN

(check one): _____ The adjacent door is opened.

_____ The latch plate is released from the buckle.

_____ A manual means is activated on a open-body vehicle without doors.

OPEN-BODY VEHICLE (without doors): DOES THE MANUAL MEANS TO CANCEL

THE WEBBING TENSION - RELIEVING DEVICE OPERATE PROPERLY? _____ YES

_____ NO

IF NO, EXPLAIN:

BELT CONTACT FORCE:

BELT CONTACT FORCE ON CHEST OF TEST DUMMY: 0.1 POUNDS

_____ NOT APPLICABLE, THE VEHICLE'S SEAT BELT SYSTEM INCLUDED A WEBBING TENSION - RELIEVING DEVICE.

TABLE 7 FMVSS 208 COMFORT & CONVENIENCE DATA FOR MANUAL SEAT BELTS, CONTD.

MAKE/MODEL: Toyota/Celica

VIN: JT2AT86FXP0097605

BODY STYLE: 2-door coupe

NHTSA NO.: CP5103

DATE OF MANUFACTURE: 08/92

LATCHPLATE ACCESS:

ARE THE SEAT BELT LATCHPLATES, IN THEIR NORMAL STOWED POSITION, WITHIN
THE REACH ENVELOPE? YES

DOES THE CLEARANCE TEST BLOCK MOVE UNHINDERED TO THE LATCHPLATE OR
BUCKLE? YES

RETRACTION:

SEAT BELT AUTOMATICALLY RETRACTS WHEN

(check one): X The adjacent vehicle door is open and the seat belt
latchplate is released.

 The seat belt latchplate is released.

ARE THE STOWED SEAT BELT WEBBING AND HARDWARE PINCHED WHEN THE DOOR IS
CLOSED? NO

OPEN-BODY VEHICLE (without doors): DOES THE SEAT BELT SYSTEM FULLY
RETRACT WHEN THE WEBBING TENSION-RELIEVING DEVICE IS MANUALLY
DEACTIVATED? YES NO

ACCESSIBILITY:

IS THE SEAT CUSHION REMOVABLE SO THE SEAT BACK SERVES A FUNCTION OTHER
THAN SEATING? NO

IS THE SEAT REMOVABLE? NO

IS THE SEAT MOVABLE SO THE SPACE FORMERLY OCCUPIED BY THE SEAT CAN BE
USED FOR A SECONDARY FUNCTION? NO

NOTE: IF ANY OF THE ABOVE ANSWERS ARE "YES", THE ACCESSIBILITY
REQUIREMENTS DO NOT APPLY.

TABLE 7 FMVSS 208 COMFORT & CONVENIENCE DATA FOR MANUAL SEAT BELTS, CONT'D

MAKE/MODEL: Toyota/Celica
BODY STYLE: 2-door coupe
DATE OF MANUFACTURE: 08/92

VIN: JT2AT86FXP0097605
NHTSA NO.: CP5103

ACCESSIBILITY, CONT'D:

IF WEBBING IS DESIGNED TO PASS THROUGH THE SEAT CUSHION OR BETWEEN THE CUSHION AND SEAT BACK ARE ONE OF THE FOLLOWING PARTS NORMALLY ON TOP OF OR ABOVE THE SEAT CUSHION: LATCHPLATE, BUCKLE, WEBBING?
Not Applicable, the webbing is not designed to pass through the seat cushion or between the cushion and seat back.

ARE THE REMAINING TWO PARTS ACCESSIBLE UNDER NORMAL CONDITIONS?
Not Applicable, the webbing is not designed to pass through the seat cushion or between the cushion and seat back.

DO THE LATCHPLATE AND BUCKLE PASS THROUGH THE GUIDES PROVIDED AND FALL BEHIND THE SEAT WHEN THE BELT IS COMPLETELY RETRACTED (OR DETACHED IF NOT RETRACTABLE); THE SEAT IS MOVED TO ANY POSITION; AND THE SEAT BACK, IF FOLDABLE, IS FOLDED FORWARD AS FAR AS POSSIBLE AND THEN MOVED BACKWARD INTO POSITION?
Not Applicable, the restraint system does not provide guides.

IS THE INBOARD RECEPTACLE END OF THE OUTBOARD SEATING POSITION'S SEAT BELT ACCESSIBLE WITH THE CENTER ARM REST IN ANY POSITION TO WHICH IT CAN BE ADJUSTED WITHOUT MOVING THE ARM REST FOR ACCESS? YES

TABLE 8 FMVSS 208 SEAT BELT WARNING SYSTEM DATA

WITH OCCUPANT IN DRIVER'S POSITION AND UNIBELT IN STOWED POSITION AND
IGNITION SWITCH PLACED IN "START/ON" POSITION:

Duration of audible warning signal = 6 sec.

Duration of reminder light operation = continuous sec.

WITH OCCUPANT IN DRIVER'S POSITION AND UNIBELT IN USE AND THE IGNITION
SWITCH PLACED IN "START/ON" POSITION:

Duration of audible warning signal = 0 sec.

(NOTE: audible warning should not operate)

Duration of reminder light operation = 0 sec.

WORDING OF VISUAL WARNING:

 Fasten Seat Belt

 Fasten Belt

 X Symbol 101-80

 Other: _____

TABLE 9 FMVSS 208 LABELING AND DRIVER'S MANUAL DATA

DESCRIBE LOCATION OF LABEL WHICH DESCRIBES MANUFACTURER'S MAINTENANCE OR REPLACEMENT SCHEDULE FOR CRASH-DEPLOYED OCCUPANT PROTECTON SYSTEM: The label was located on the driver's sun visor.

THE MANUFACTURER'S RECOMMENDED SCHEDULE IS TO: (check one)

- ☐ Replace
☐ Repair
☒ Other: System requires maintenance

This system: (check one)

- ☐ a. by ☐ month, ☐ year
☐ b. by ☐ miles
☒ c. or after a time interval of ☐ months or 10 years.
☐ d. other: _____

WERE APPROPRIATE INSTRUCTIONS CONCERNING MAINTENANCE AND/OR REPLACEMENT OF THIS SYSTEM PROVIDED? YES, label on vehicle

WAS A DESCRIPTION OF THE FUNCTIONAL OPERATION OF THE SYSTEM PROVIDED?
YES, owner's manual, page 26

IS THERE A REFERENCE TO THE INSTRUCTIONS AND DESCRIPTION OF THE SYSTEM ON THE LABEL? YES

WAS AN OWNER'S MANUAL PROVIDED? YES

DID THE OWNER'S MANUAL CONTAIN APPROPRIATE INFORMATION CONCERNING MAINTENANCE AND/OR REPLACEMENT AND A DESCRIPTION OF THE FUNCTIONAL OPERATION OF THE SYSTEMS? YES, page 26

TABLE 10 FMVSS 208 READINESS INDICATOR DATA

AN OCCUPANT RESTRAINT SYSTEM THAT DEPLOYS IN THE EVENT OF A CRASH SHALL HAVE A MONITORING SYSTEM WITH A READINESS INDICATOR. A TOTALLY MECHANICAL SYSTEM IS EXEMPT FROM THIS REQUIREMENT.

IS THE SYSTEM TOTALLY MECHANICAL? NO

IF NO:

DESCRIBE THE LOCATION OF THE READINESS INDICATOR: The readiness indicator was located in the lower left corner of the instrument cluster.

IS THE READINESS INDICATOR CLEARLY VISIBLE TO THE DRIVER? YES

IS A LIST OF THE ELEMENTS IN THE OCCUPANT RESTRAINT SYSTEM, BEING MONITORED BY THE READINESS INDICATOR, PROVIDED?

YES, owner's manual, page 47

FIGURE 4 FMVSS 212 TEST DATA

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

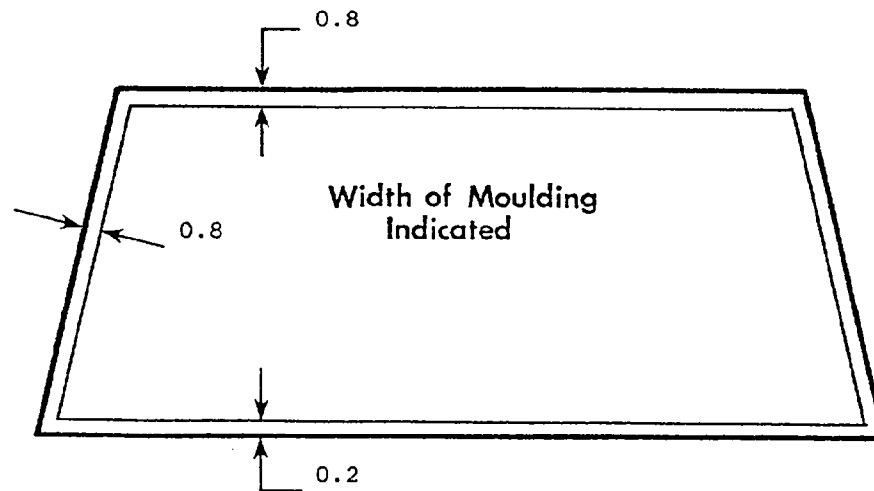
Plastic trim around outer perimeter, adhesive around inner perimeter.

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	73.5	73.5	100
LEFT SIDE	73.5	73.5	100
TOTAL	147.0	147.0	100

PRE-TEST WINDSHIELD MOUNTING MATERIAL TEMPERATURE: 72° F



FRONT VIEW OF WINDSHIELD*

LOSS OF WINDSHIELD RETENTION LENGTHS: None

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

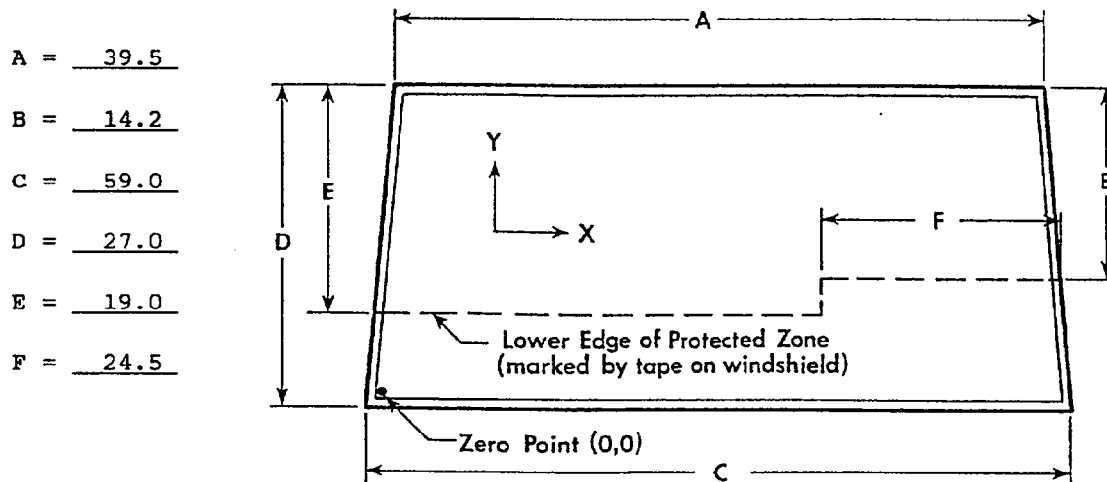
*INDICATE AREAS OF LOSS OF RETENTION, IF ANY, ON WINDSHIELD DIAGRAM.

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:



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.	

AREAS OF WINDSHIELD PENETRATION, BELOW THE PROTECTED ZONE,
THROUGH THE INNER SURFACE OF THE WINDSHIELD: None

1.
2.
3.

ALL MEASUREMENTS ARE IN INCHES.

TABLE 11 FUEL SYSTEM DATA

MAKE/MODEL: Toyota/Celica
NHTSA NO.: CP5103
FUEL SYSTEM CAPACITY: 15.9 GALLONS (FROM OWNER'S MANUAL)
USABLE CAPACITY: 15.6 GALLONS (FURNISHED BY COTR)
TEST VOLUME RANGE: 14.4 GALLONS TO 14.7 GALLONS (92-94% OF USABLE)
ACTUAL TEST VOLUME: 14.5 GALLONS (WITH ENTIRE FUEL SYSTEM FILLED)
TEST FLUID TYPE: STODDARD SOLVENT
SPECIFIC GRAVITY: 0.764
KINEMATIC VISCOSITY: 0.99 CENTISTOKES
TEST FLUID COLOR: PURPLE

DETAILS OF FUEL SYSTEM: The fuel tank is in front of the rear axle.
The fuel lines run along the left side to the front. The fuel filler
is located on the left side.

ELECTRIC FUEL PUMP: Yes FUEL INJECTION: Yes

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? No

TABLE 12 FMVSS 301 POST-IMPACT TEST DATA

TEST VEHICLE NHTSA NO.: CP5103; TEST DATE: 12/30/92

VEHICLE MAKE/MODEL/BODY STYLE: Toyota/Celica/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:

 X FRONTAL (30 MPH)
 OBLIQUE (30 MPH) WITH ° BARRIER FACE
 FIRST CONTACTING (DRIVER/PASS.) SIDE.
 REAR MOVING BARRIER (30 MPH)
 LATERAL MOVING BARRIER (20 MPH)

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

	<u>TEST</u> <u>RESULTS</u>	<u>MAXIMUM</u> <u>ALLOWABLE</u>
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.

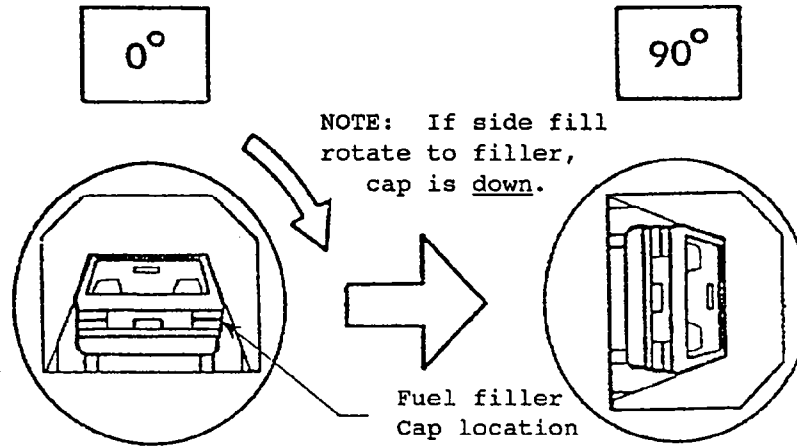
FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA

NHTSA NO.: CP5103

TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds

FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds

TOTAL - - - - - = 7 minutes, 00 seconds

NEXT WHOLE MINUTE INTERVAL - - - - = 7 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

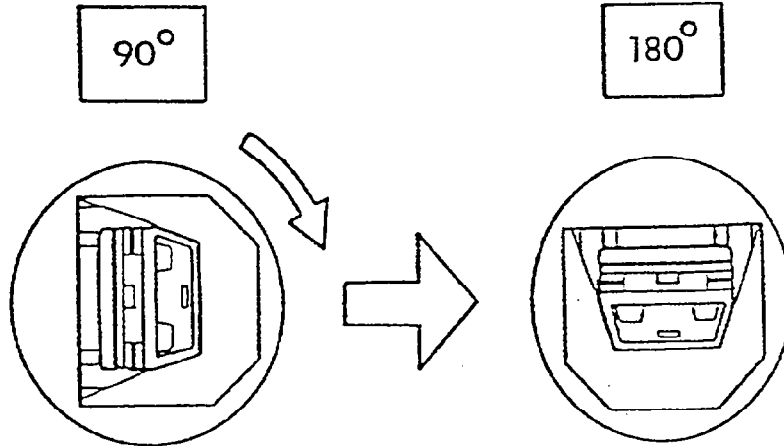
<u>0° TO 90° ROTATION (FUEL FILLER CAP DOWN)</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: CP5103
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds
FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds
TOTAL - - - - - = 7 minutes, 00 seconds
NEXT WHOLE MINUTE INTERVAL - - - - - = 14 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

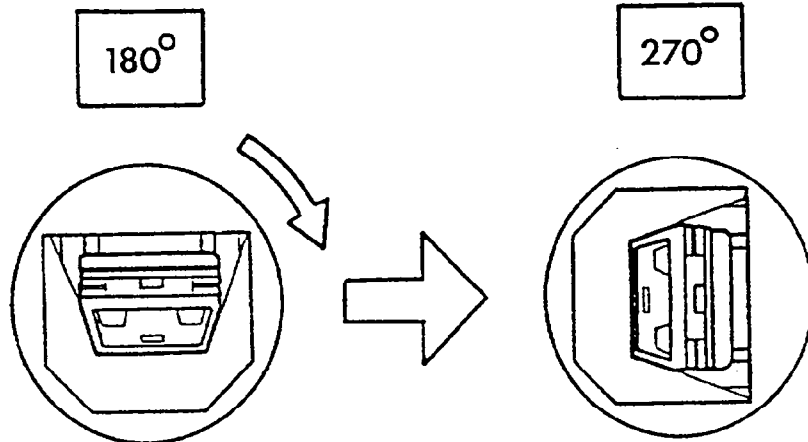
<u>90° TO 180° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: CP5103
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds
FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds
TOTAL - - - - - = 7 minutes, 00 seconds
NEXT WHOLE MINUTE INTERVAL - - - - = 21 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

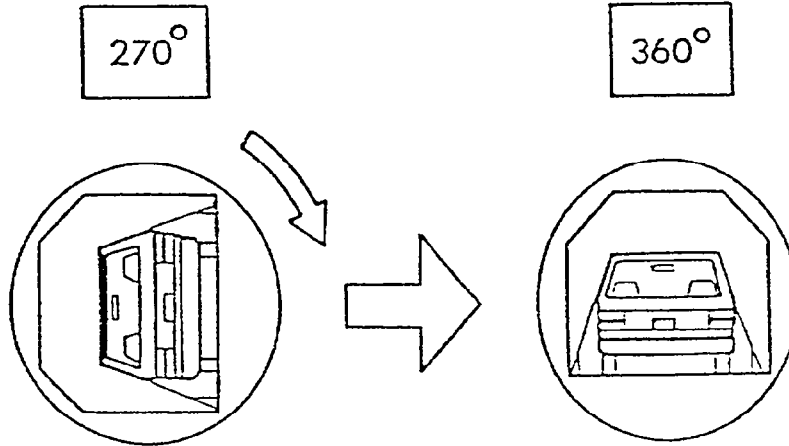
<u>180° TO 270° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 6 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

NHTSA NO.: CP5103
TEST PHASE



STATIC ROLLOVER MACHINE ROTATION TIME INFORMATION: (Spec. Range = 1-3 min.)

TIME REQ. FOR MACHINE TO ROTATE 90° = 2 minutes, 00 seconds
FMVSS 301 POSITION HOLD TIME = 5 minutes, 00 seconds
TOTAL - - - - - = 7 minutes, 00 seconds
NEXT WHOLE MINUTE INTERVAL - - - - - = 28 minutes

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

<u>270° TO 360° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH 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

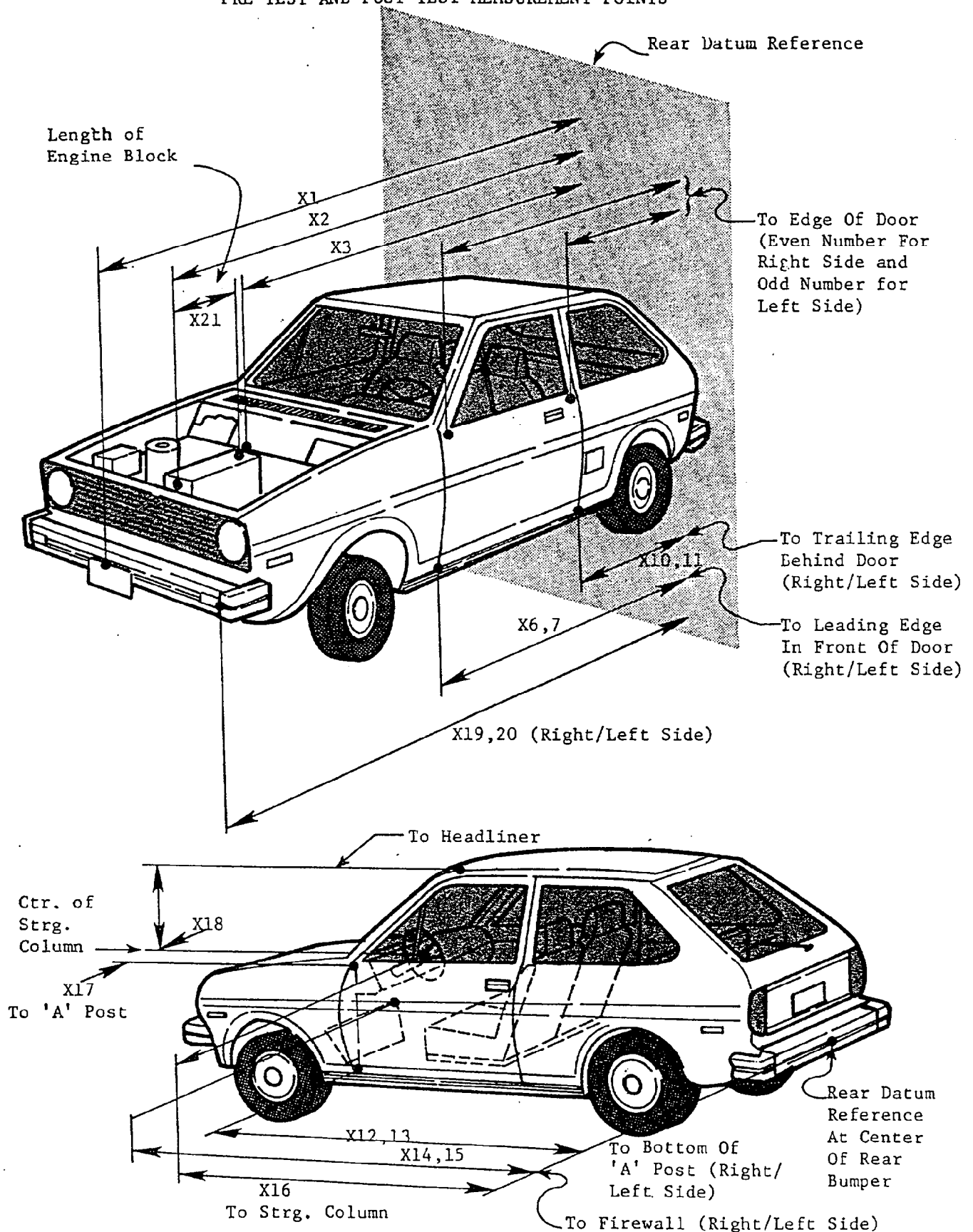
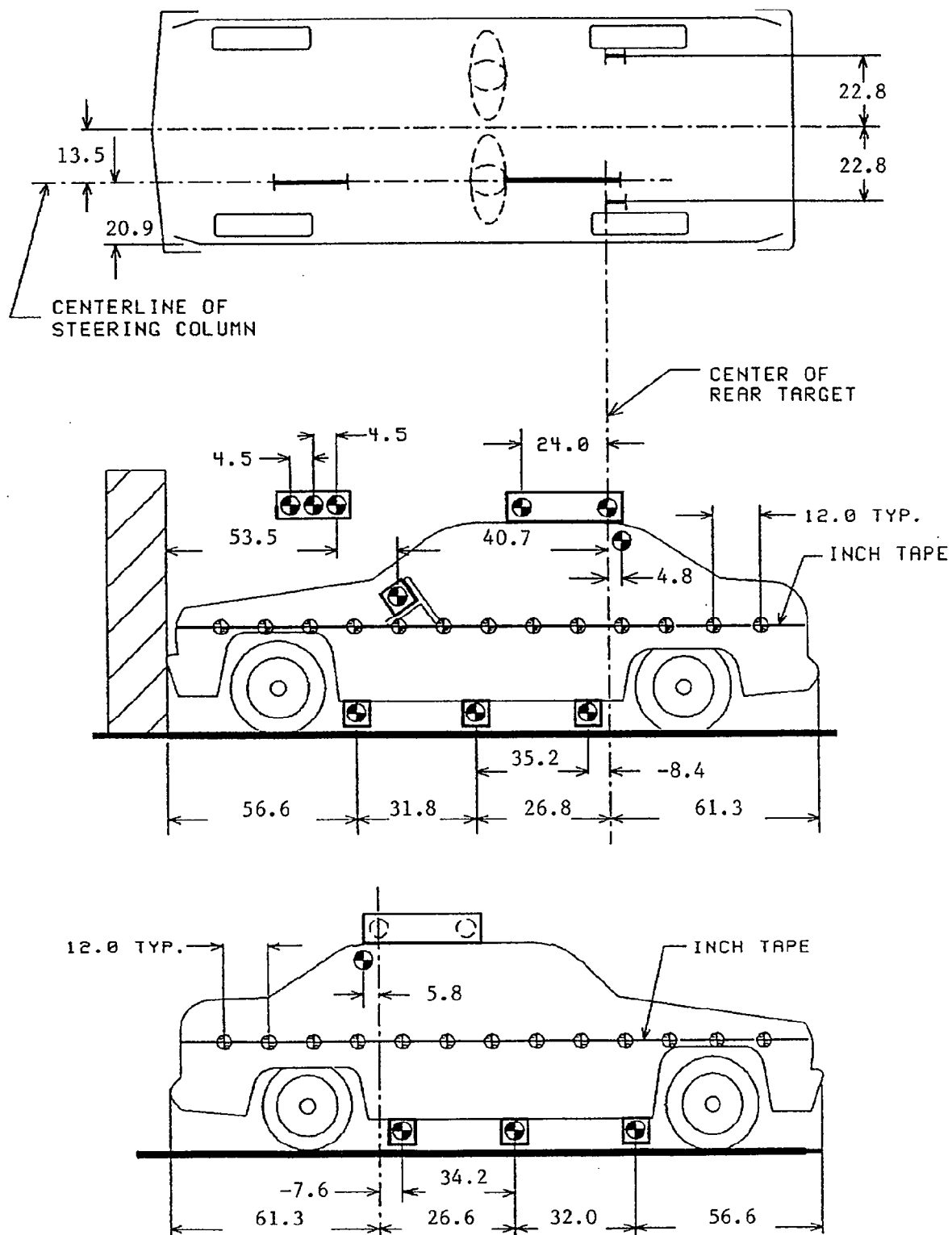


TABLE 13 IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Toyota/Celica		TEST NUMBER: 921230	ALL MEASUREMENTS ARE IN INCHES			
NO.	TYPE OF MEASUREMENT		PRE-TEST	POST-TEST	DIFF.	
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE		176.5	158.4	18.1	
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK		148.2	144.1	4.1	
X3	REAR SURFACE OF VEHICLE TO FIREWALL		127.0	126.6	0.4	
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR		114.2	114.4	-0.2	
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR		114.5	114.8	-0.3	
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR		115.2	114.9	0.3	
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR		115.2	114.9	0.3	
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR		68.9	69.5	-0.6	
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR		68.8	69.0	-0.2	
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR		69.4	69.0	0.4	
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR		69.5	69.0	0.5	
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE		114.8	115.8	-1.0	
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE		114.8	114.5	0.3	
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE		125.2	124.4	0.8	
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE		124.5	125.1	-0.6	
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER		97.1	100.9	-3.8	
X17	CENTER OF STEERING COLUMN TO "A" POST		11.0	11.5	-0.5	
X18	CENTER OF STEERING COLUMN TO HEADLINER		16.2	15.1	1.1	
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER		170.5	156.1	14.4	
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER		170.5	156.9	13.6	
X21	LENGTH OF ENGINE BLOCK		16.1	16.1	0.0	

FIGURE 8

VEHICLE TARGET LOCATIONS



ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 9
DUMMY MEASUREMENT LOCATIONS FOR FRONT SEAT OCCUPANTS

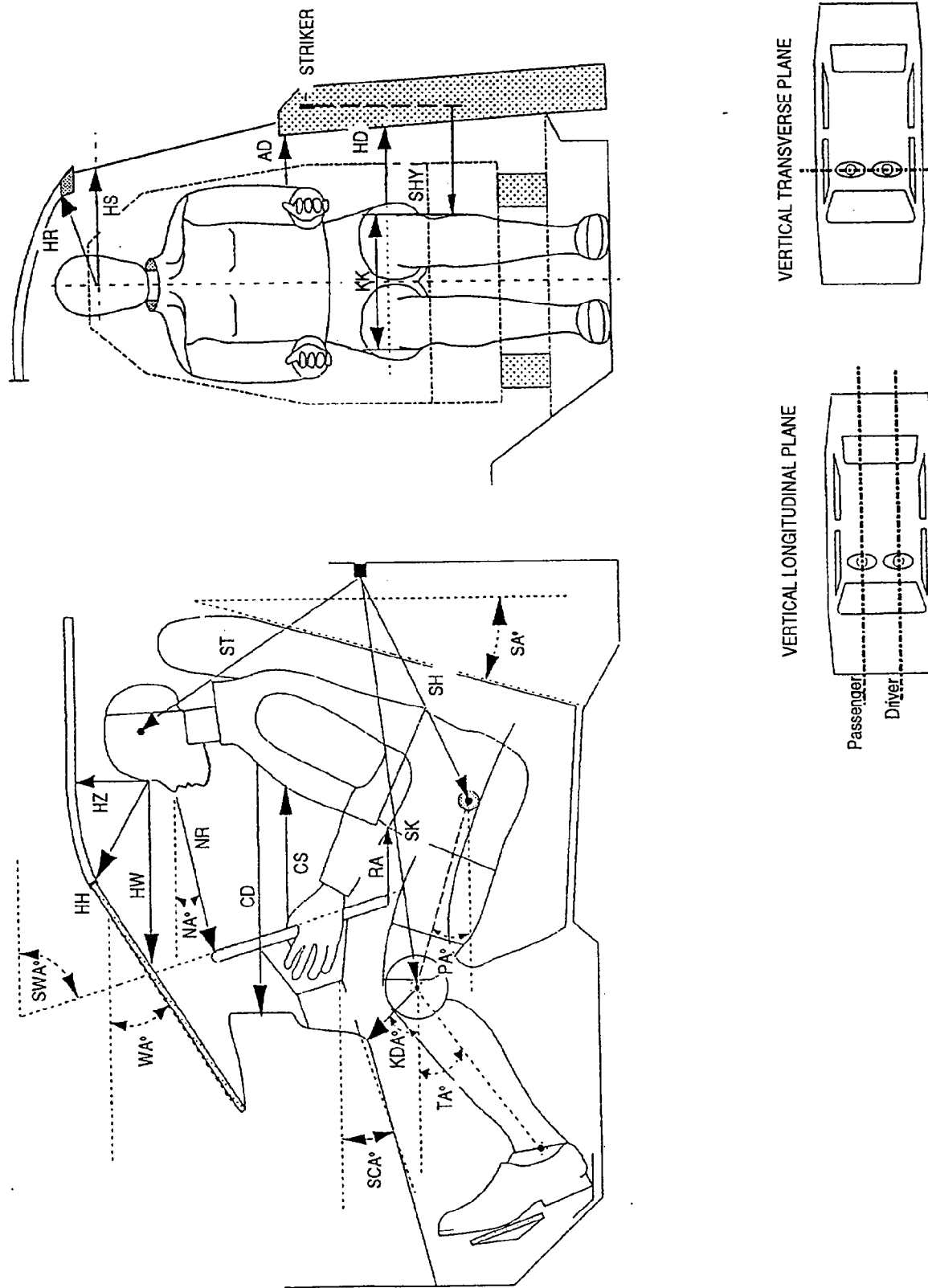


TABLE 14 DUMMY MEASUREMENT DATA FOR FRONT SEAT OCCUPANTS

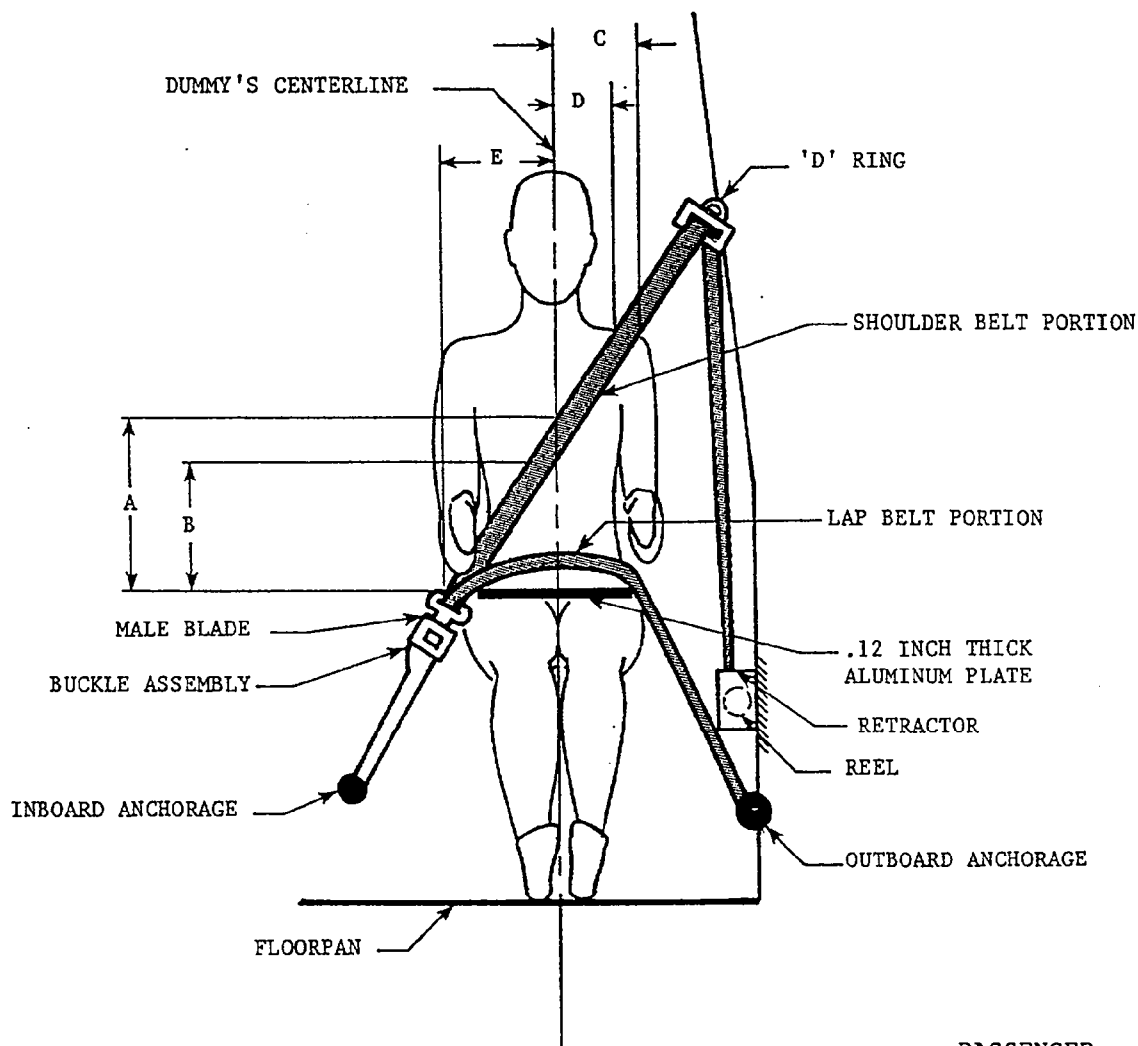
DESIGNATION	TYPE OF MEASUREMENT	DRIVER (SERIAL #1173)	PASSENGER (SERIAL #353)
WA°	WINDSHIELD ANGLE	27°	27°
SWA°	STEERING WHEEL ANGLE	20°	NA
SCA°	STEERING COLUMN ANGLE	24°	NA
SA°	SEAT BACK ANGLE	20°	20°
HZ	HEAD TO ROOF	5.4	6.2
HH	HEAD TO HEADER	13.2	13.1
HW	HEAD TO WINDSHIELD	20.2	24.2
HR	HEAD TO SIDE HEADER	6.1	6.2
NR	NOSE TO RIM	17.2	NA
NA	NOSE TO RIM ANGLE	12°	NA
CD	CHEST TO DASH	22.4	23.4
CS	STEERING WHEEL TO CHEST	12.5	NA
RA	RIM TO ABDOMEN	7.8	NA
KDL	LEFT KNEE TO DASH	8.4	8.1
KDR	RIGHT KNEE TO DASH	8.0	8.4
KDA	OUTBOARD KNEE TO DASH ANGLE	35°	41°
PA°	PELVIC ANGLE	19°	15°
TA°	TIBIAL ANGLE	30°	33°
KK	KNEE TO KNEE	12.9	9.8
ST*	STRIKER TO HEAD	18.9	18.6
	STRIKER TO HEAD ANGLE	-25°	-24°
SK*	STRIKER TO KNEE	30.8	32.2
	STRIKER TO KNEE ANGLE	8°	8°
SH*	STRIKER TO H-POINT	17.9	17.9
	STRIKER TO H-POINT ANGLE	29°	23°
SHY	STRIKER TO H-POINT (Y DIR.)	9.8	9.8
HS	HEAD TO SIDE WINDOW	9.5	10.7
HD	H-POINT TO DOOR	4.8	6.0
AD	ARM TO DOOR	2.8	3.0

THE SEAT BACK ANGLE (SA°) IS MEASURED RELATIVE TO VERTICAL, ALL OTHER ANGLES ARE MEASURED RELATIVE TO HORIZONTAL.

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

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 10 SEAT BELT POSITIONING DATA



	PASSENGER DUMMY
A - TOP SURFACE OF ALUM. PLATE TO BELT UPPER EDGE	15.2
B - TOP SURFACE OF ALUM. PLATE TO BELT LOWER EDGE	12.2
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	1.8
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	10.8

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

FIGURE 11 CAMERA POSITIONS

4, 7, 8

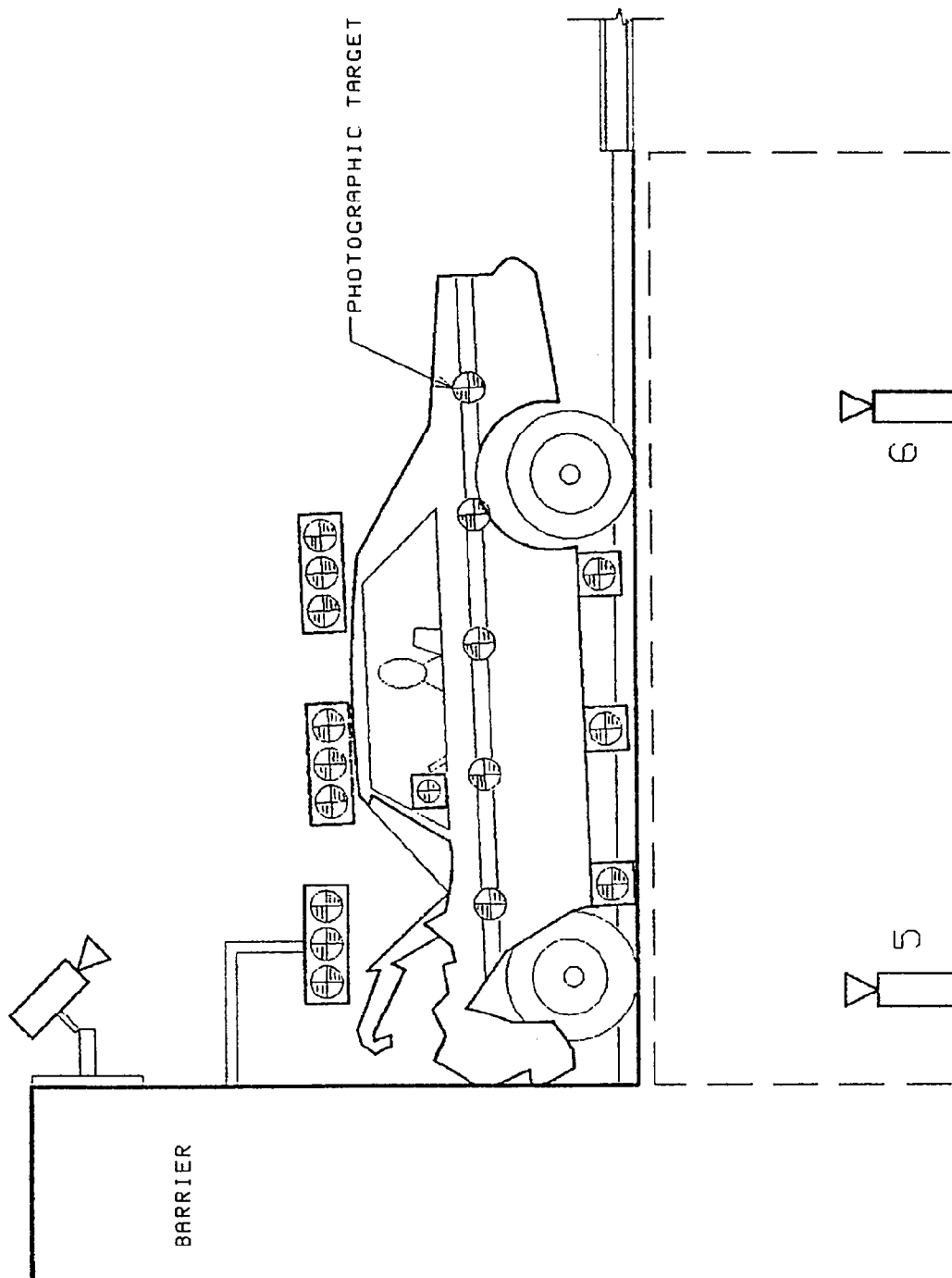


FIGURE 11 CAMERA POSITIONS, CONT'D.

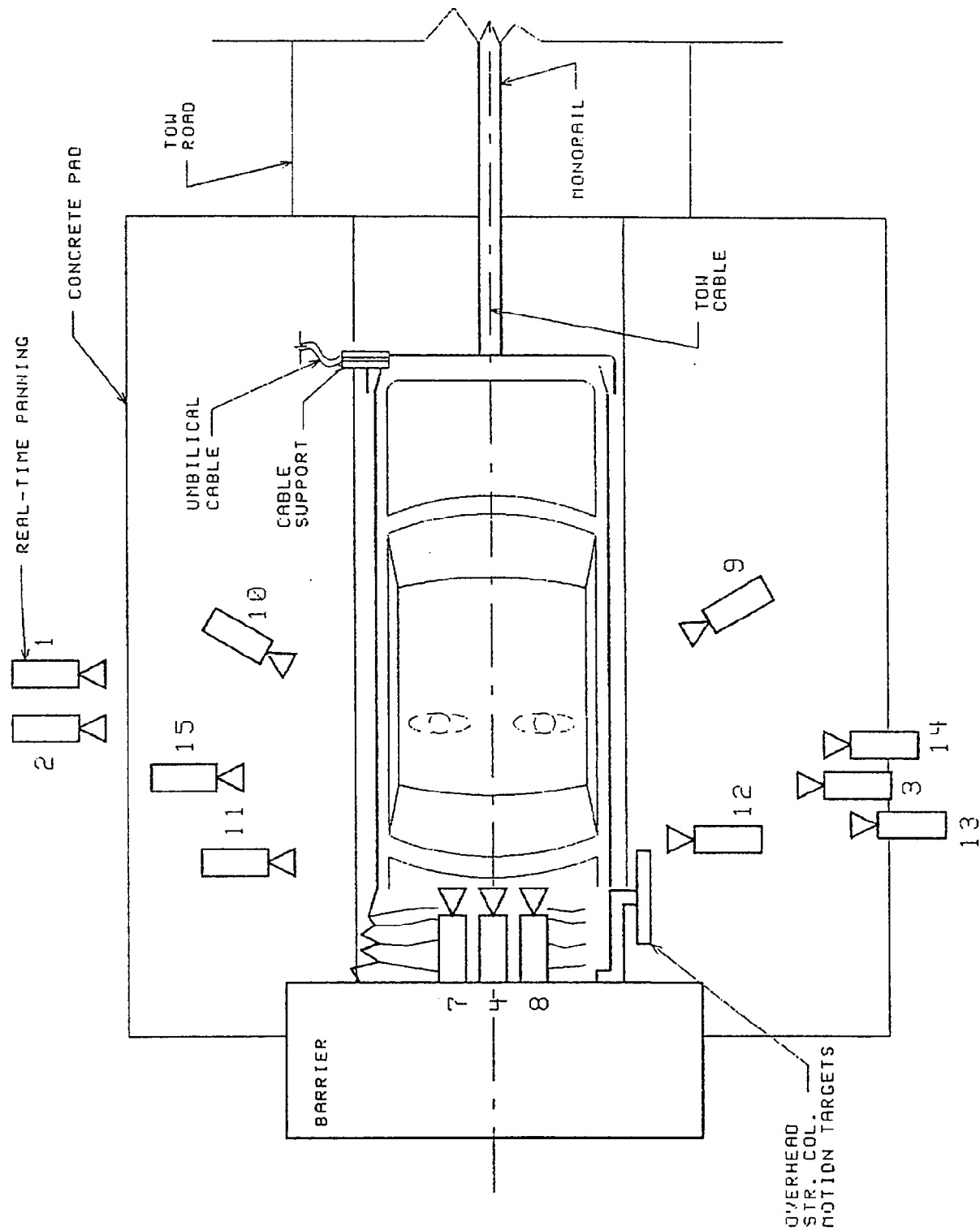


TABLE 15 MOTION PICTURE CAMERA LOCATIONS

TEST NO.: 921230		VEHICLE: Toyota Celica 2-door coupe		CAMERA POSITIONS (IN)*		ANGLE** (DEG)	FILM PLANE		FILM SPEED (FPS)
CAMERA NO.	VIEW	X	Y	Z			TO HEAD TARGET(IN)	LENS (MM)	
1	Real-time panning	-142.0	-504.0	61.0	NA		NA	16	24
2	Right overall	-81.3	-266.4	37.1	-2		NA	13	498
3	Left vehicle crush	-41.5	295.0	44.0	-4		225.0	25	1020
4	Windshield front view	-6.0	0.0	85.0	-40		NA	13	468
5	Pit-left subframe sidemember	-8.0	29.0	-16.0	90		NA	13	1002
6	Pit-right subframe sidemember	-7.0	30.0	-12.0	90		NA	13	495
7	Passenger front view	-4.5	-13.8	93.0	-50		NA	17	508
8	Driver front view	-6.8	14.5	93.0	-50		NA	17	508
9	Driver kinematics	-157.3	116.0	87.0	-27		95.0	25	500
10	Passenger kinematics	-152.1	-116.0	87.0	-26		92.0	25	505
11	Right windshield intrusion	-38.1	-306.1	44.0	0		NA	50	502
12	Left windshield intrusion	-53.0	309.4	42.3	0		NA	50	502
13	Steering column motion	-122.0	285.0	103.0	-14		NA	25	495
14	Steering column motion	-122.0	285.0	75.1	-9		NA	25	500
15	Passenger kinematics	-38.8	-293.0	45.3	-4		227.0	25	1018
16	Real-time documentation	NA	NA	NA	NA		NA	12-120	24

* +X = Film plane forward of barrier face

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

** +Angle = Film plane angled upward from horizontal plane

APPENDIX A

PHOTOGRAPHS

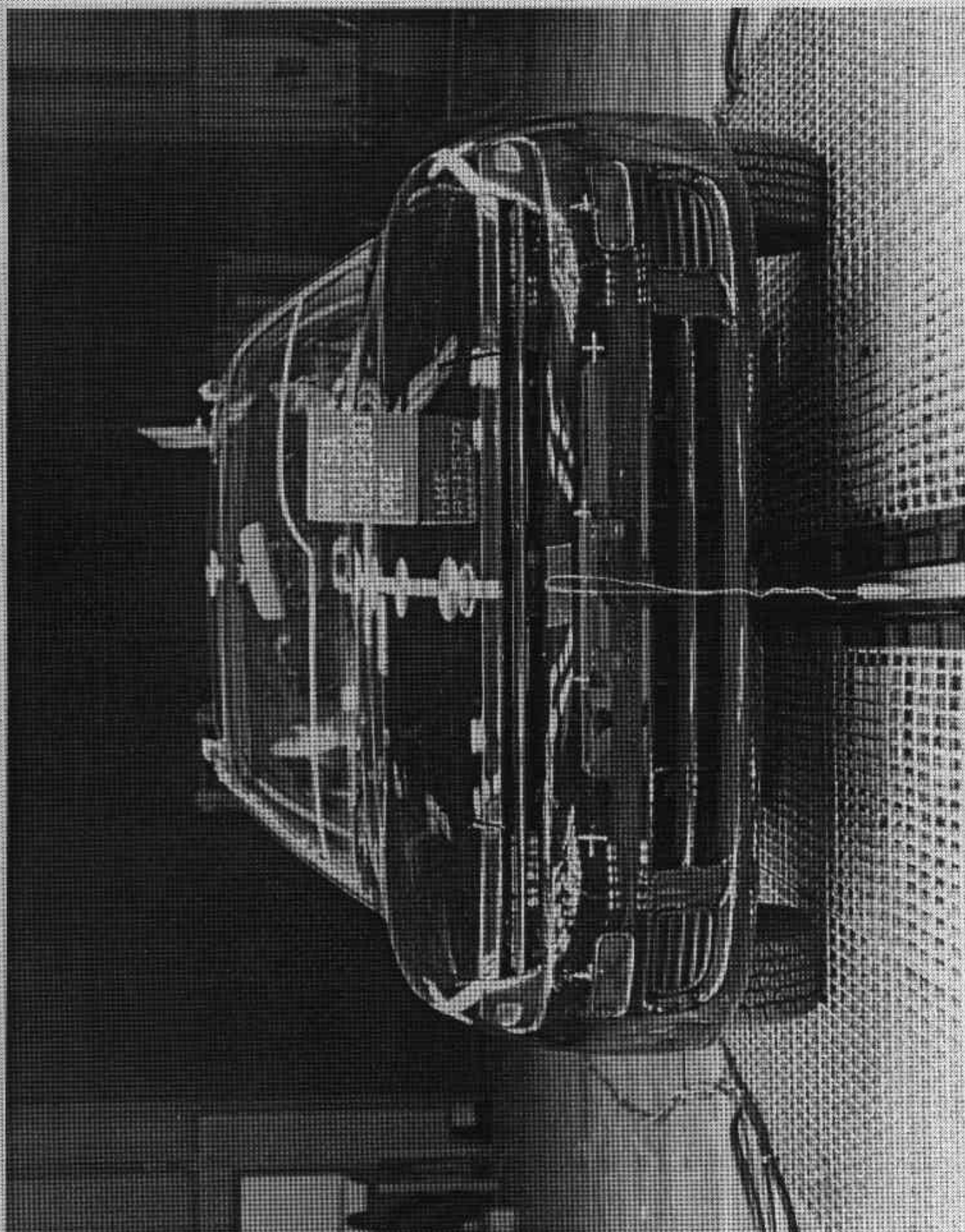


Figure A-1. PRE-TEST FRONT VIEW

A-2

921230

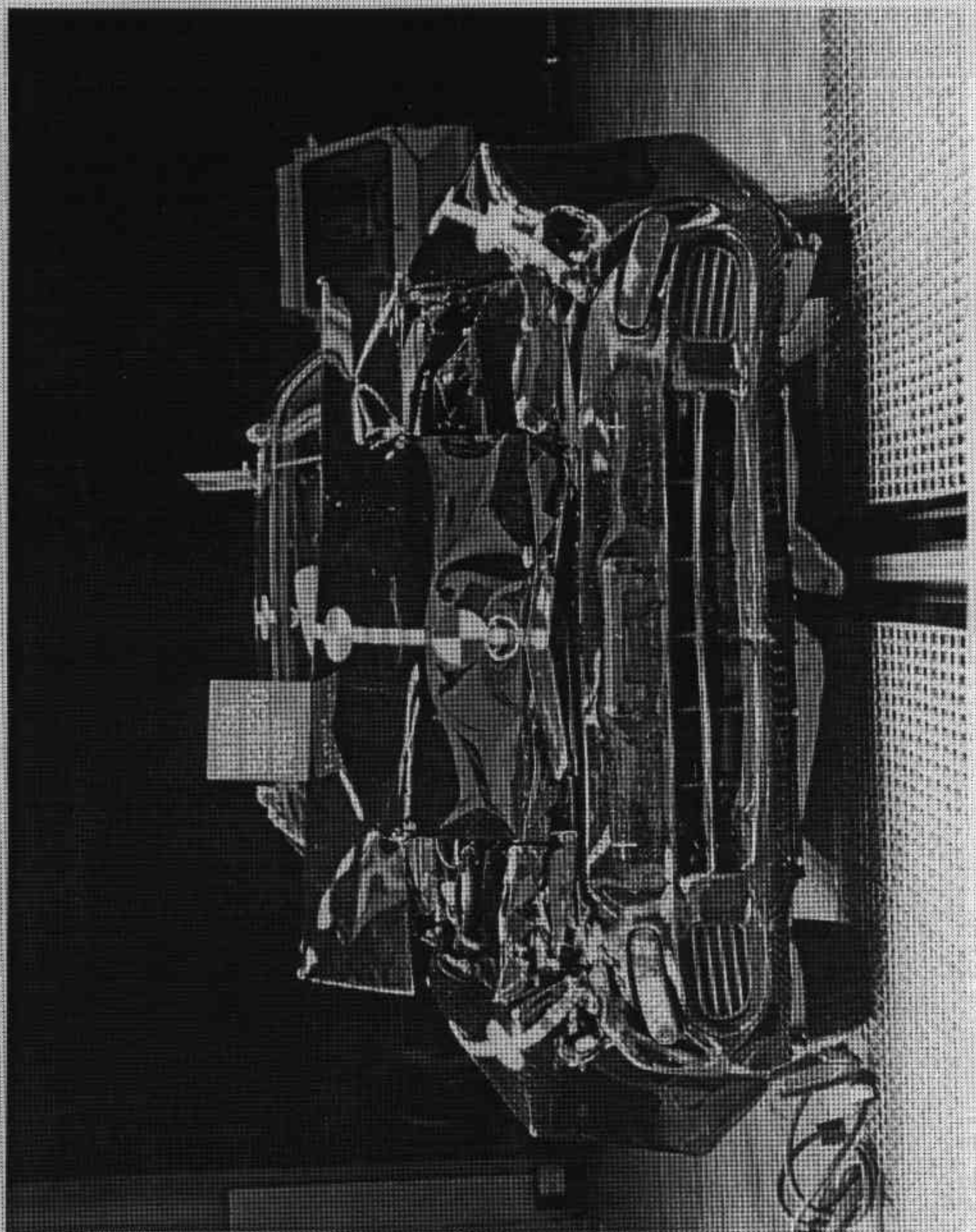


Figure A-2. POST-TEST FRONT VIEW
A-3

921230

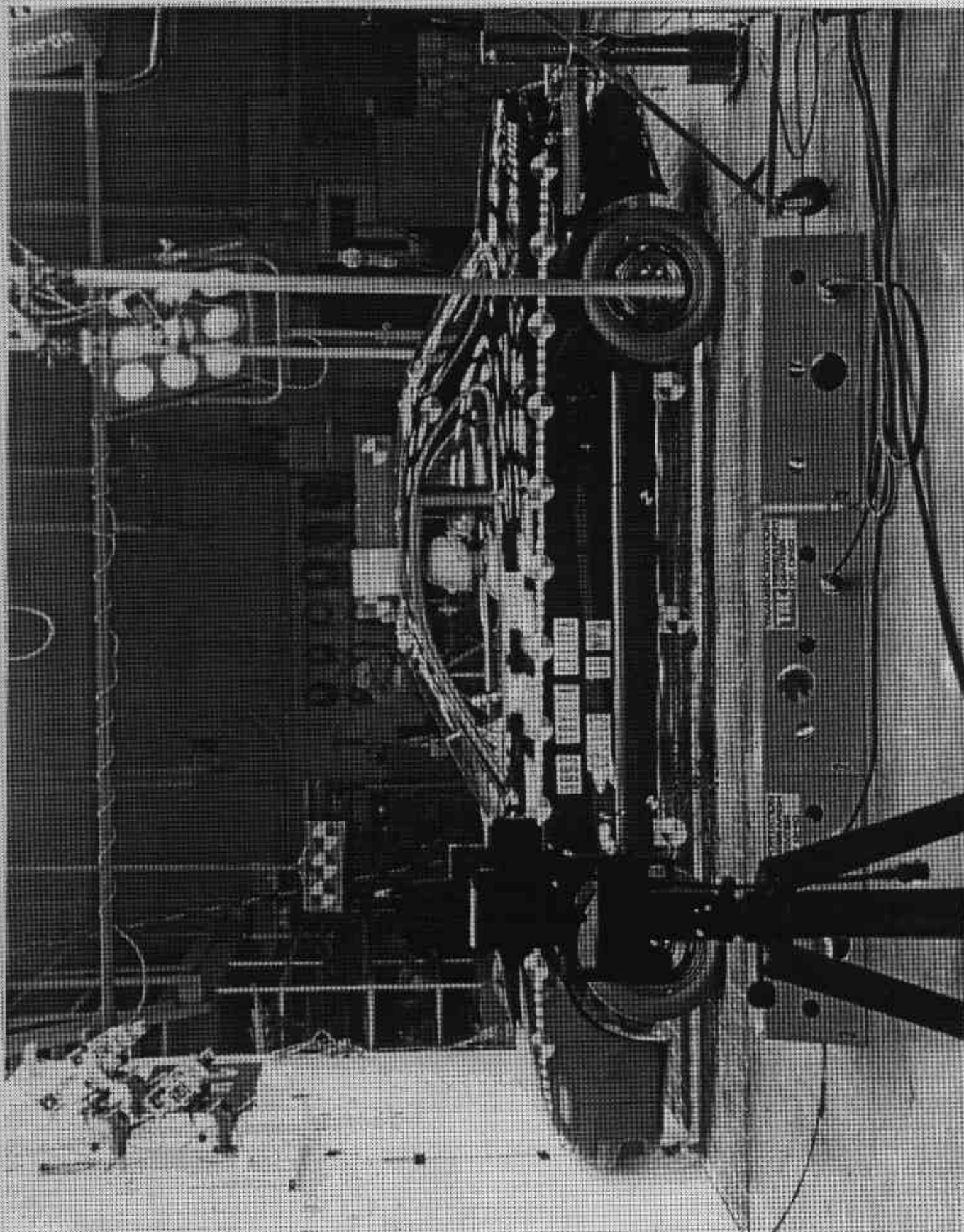


Figure A-3. PRE-TEST LEFT SIDE VIEW
A-4

921230

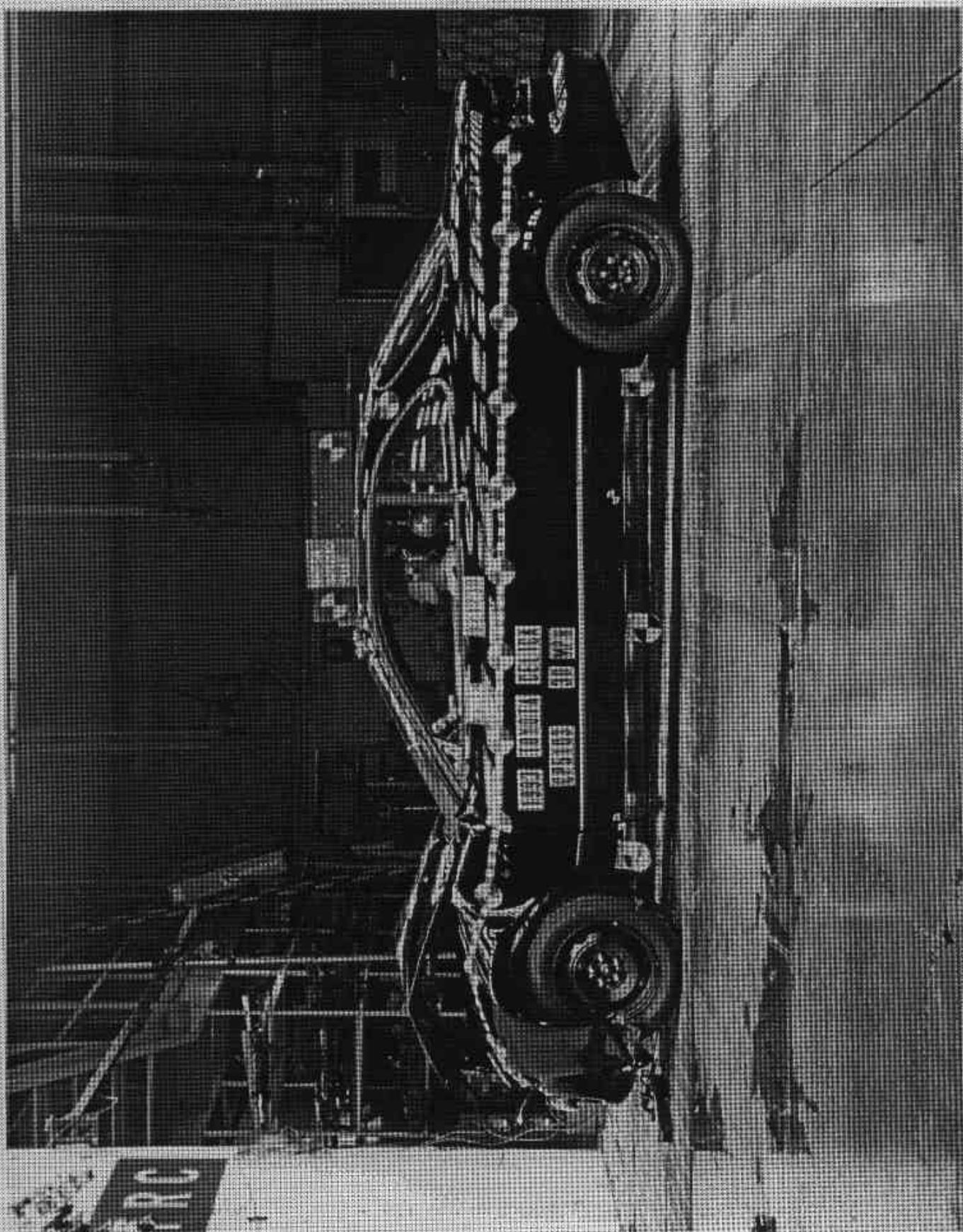


Figure A-4. POST-TEST LEFT SIDE VIEW

A-5

921230

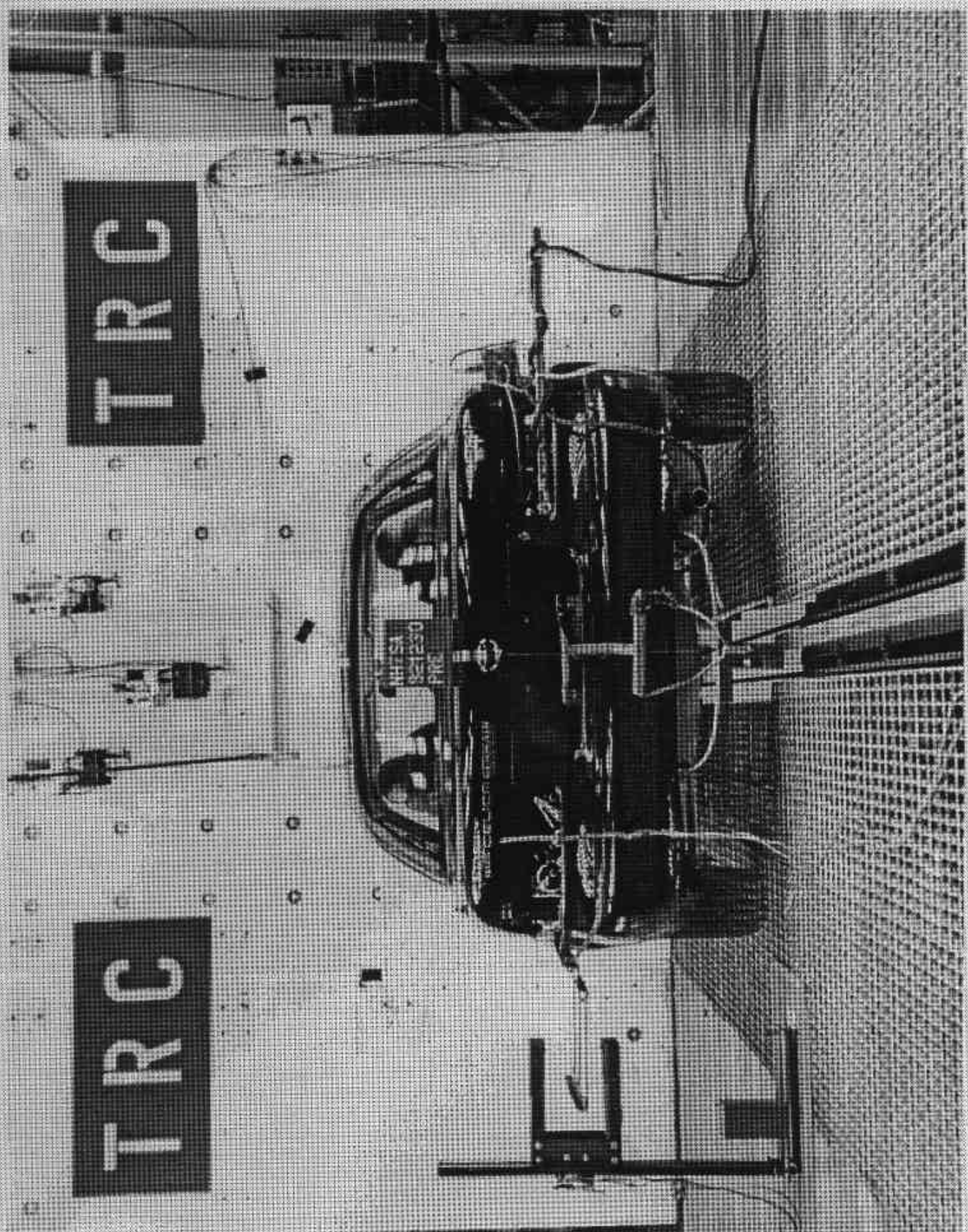


Figure A-5. PRE-TEST REAR VIEW

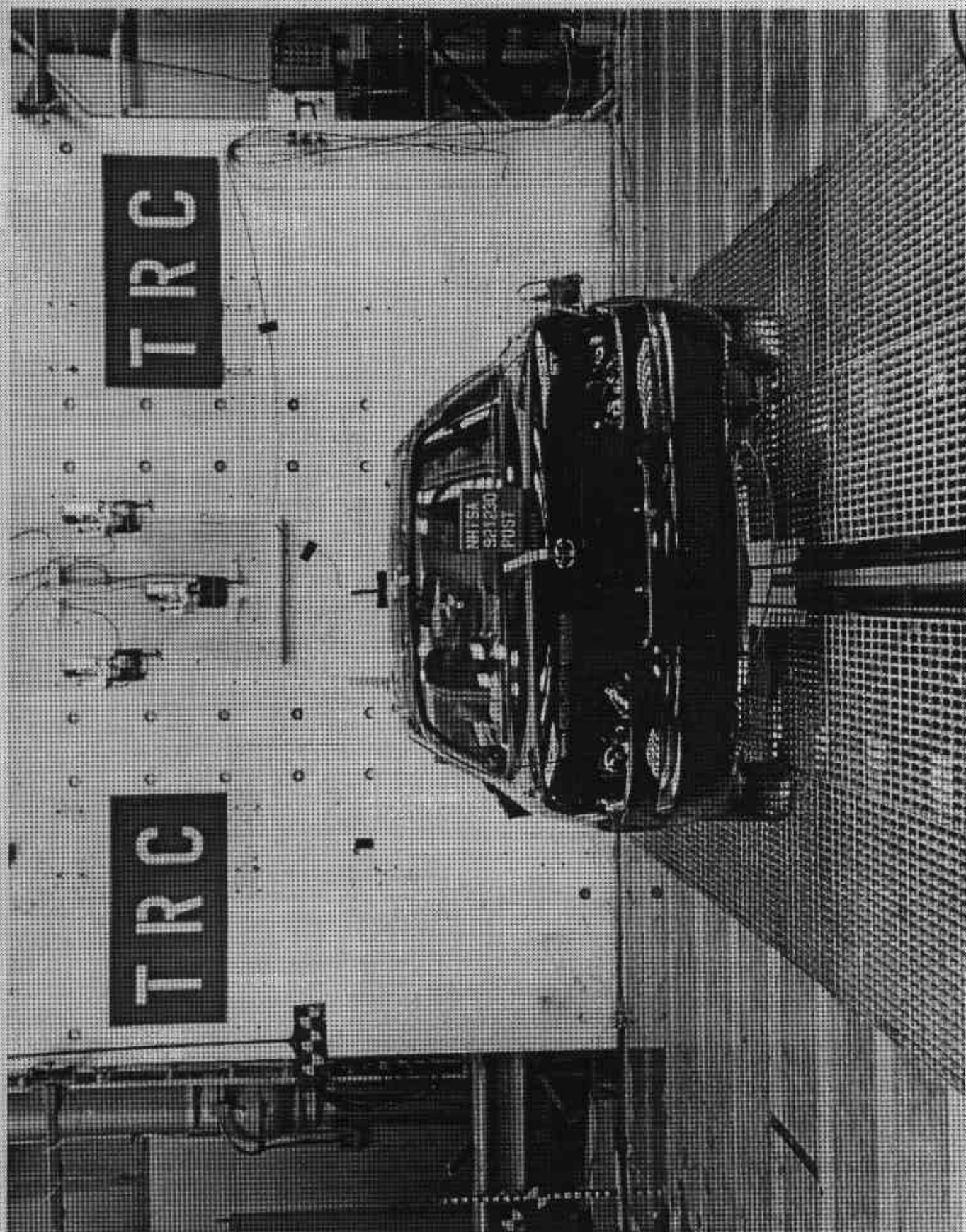


Figure A-6. POST-TEST REAR VIEW

A-7

921230

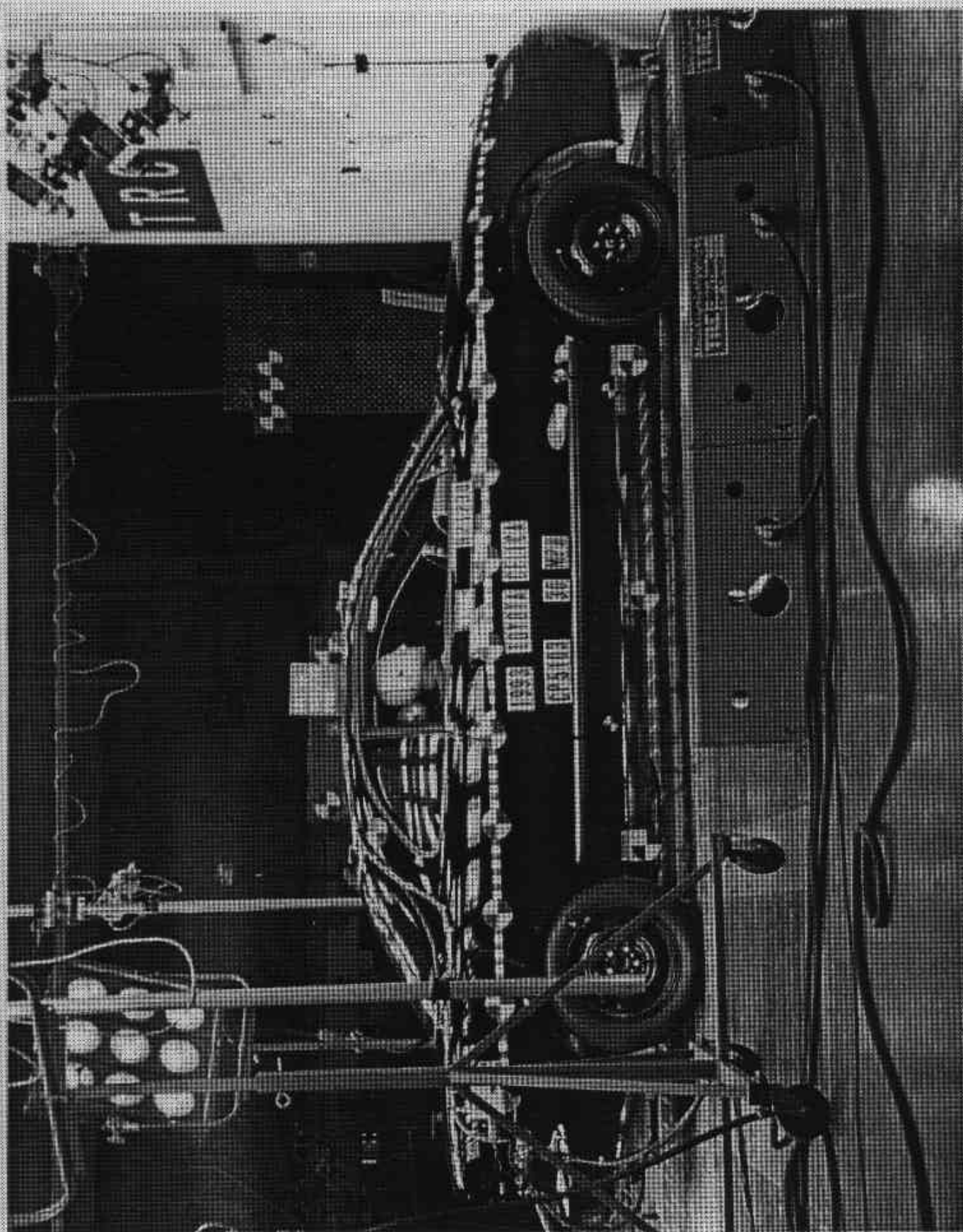


Figure A-7. PRE-TEST RIGHT SIDE VIEW
A-8

921230

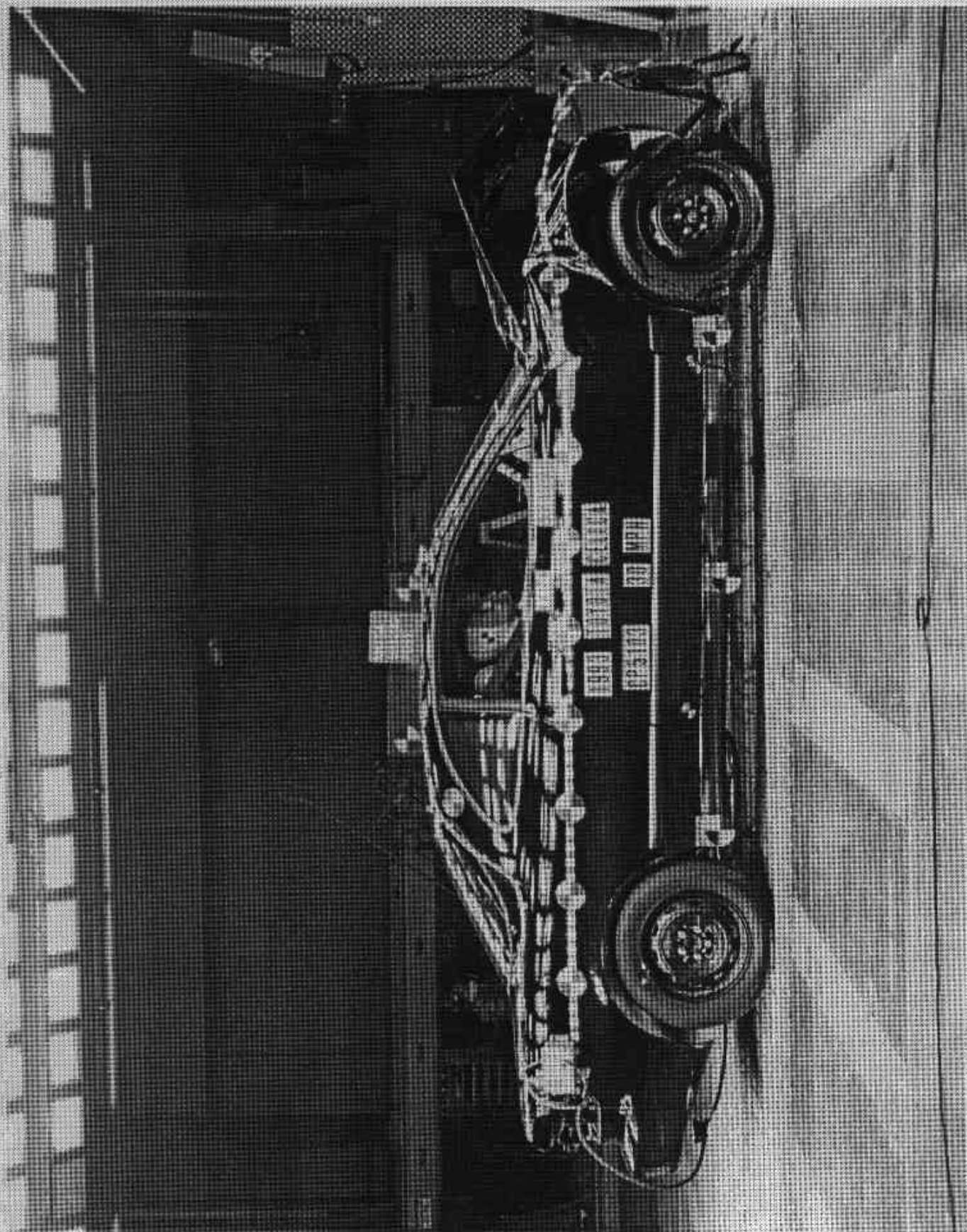


Figure A-8. POST-TEST RIGHT SIDE VIEW
A-9

921230

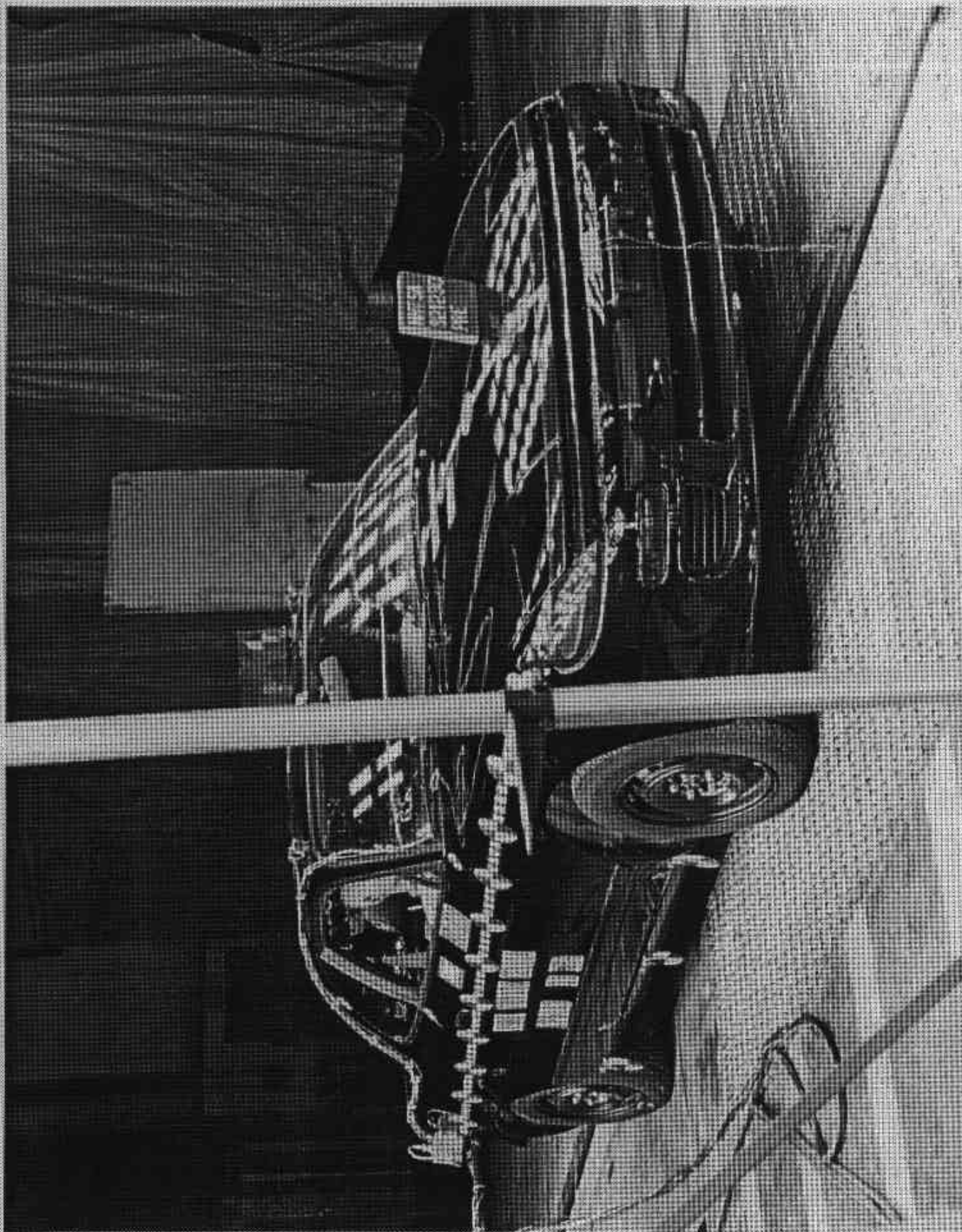


Figure A-9. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW

A-10

921230

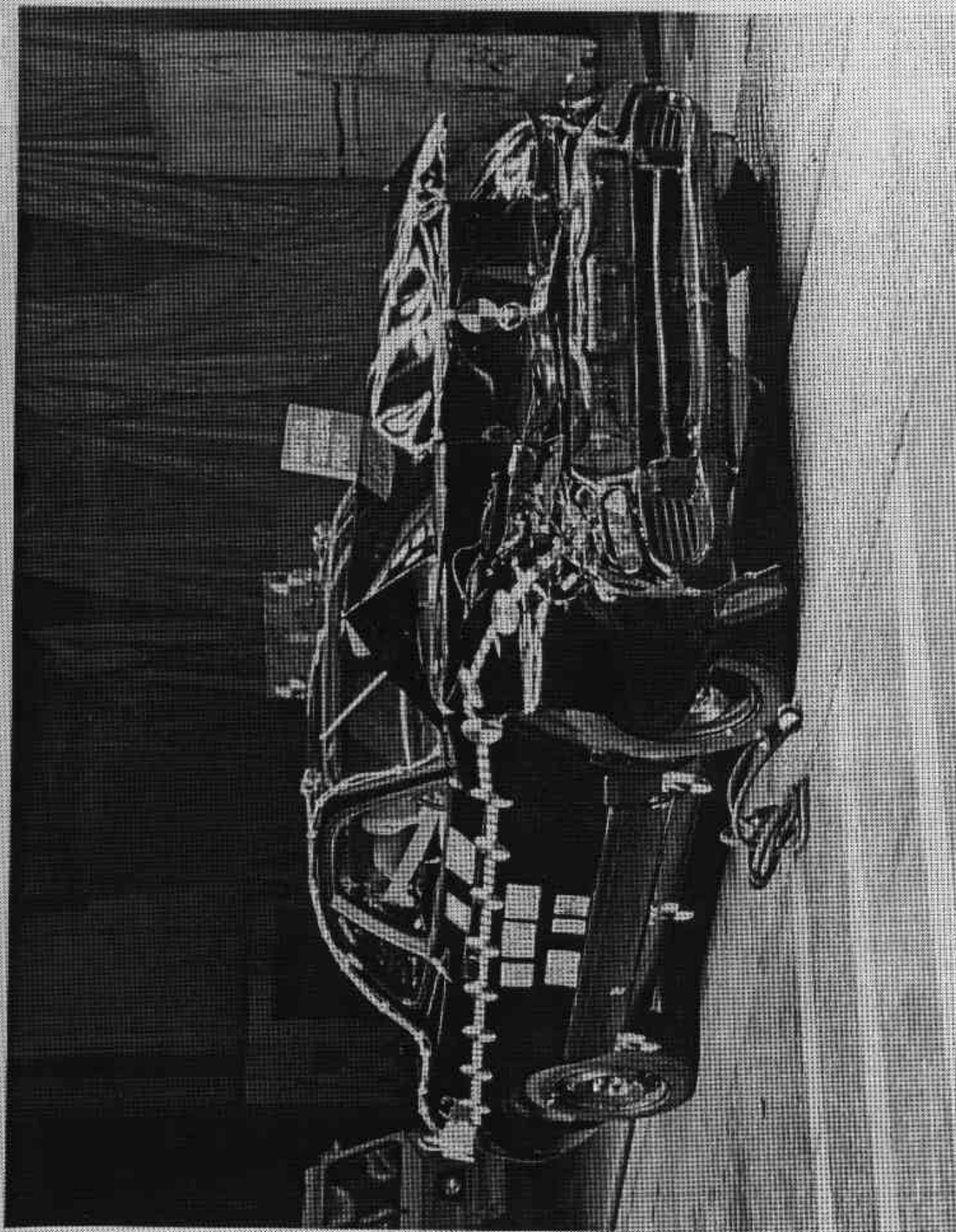


Figure A-10. POST-TEST RIGHT FRONT THREE-QUARTER VIEW

A-11

921230

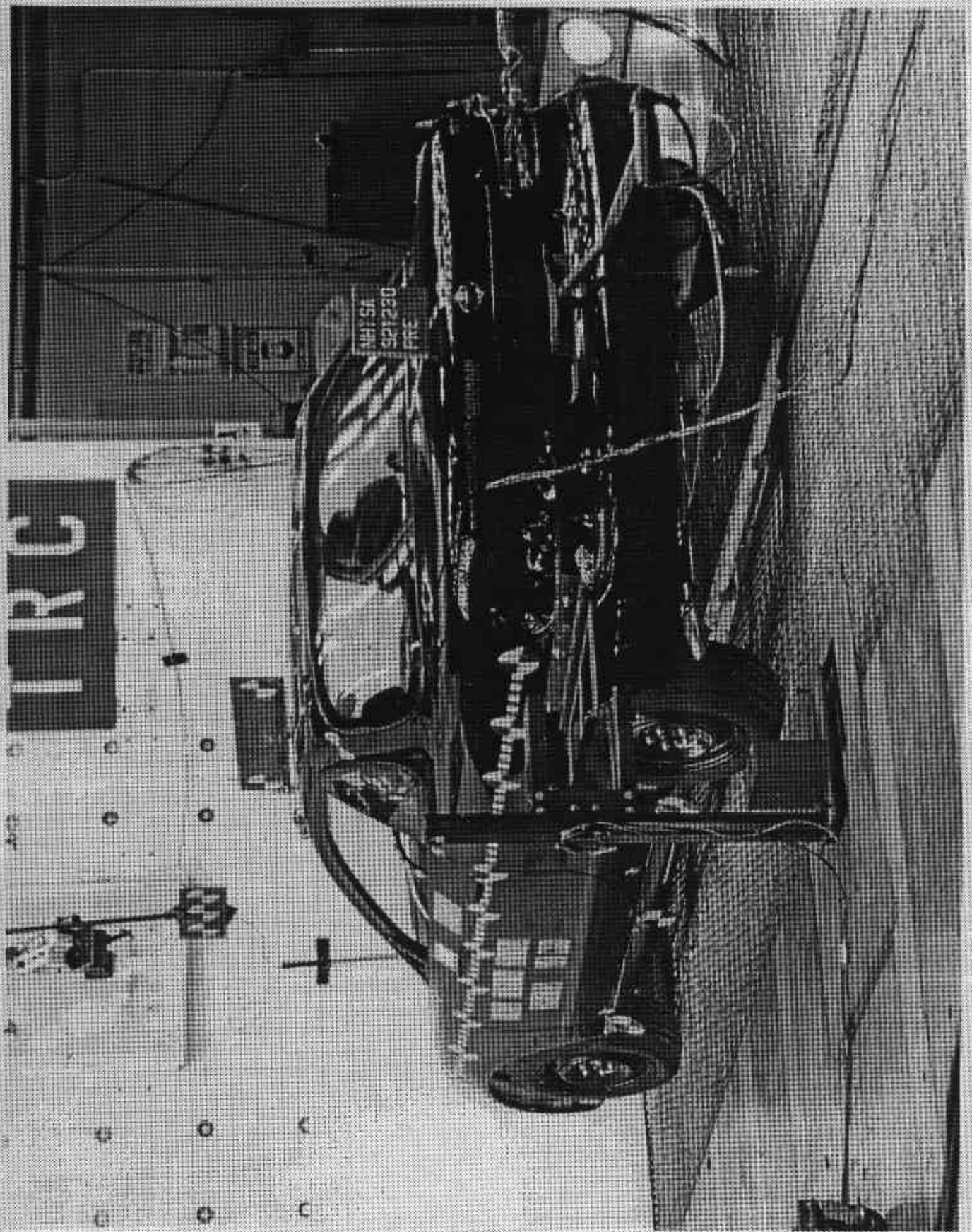


Figure A-11. PRE-TEST LEFT REAR THREE-QUARTER VIEW
A-12

921230

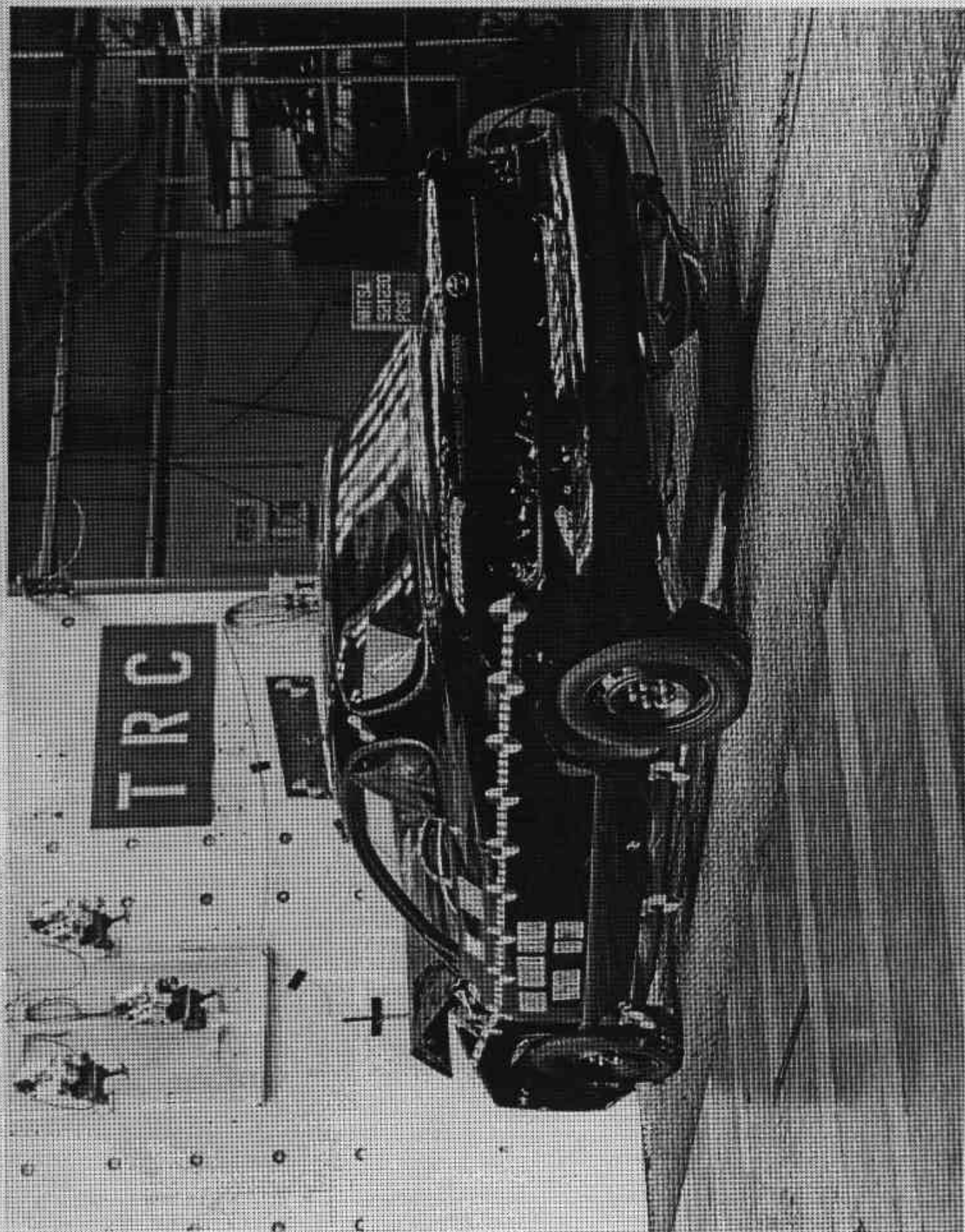


Figure A-12. POST-TEST LEFT REAR THREE-QUARTER VIEW

A-13

921230

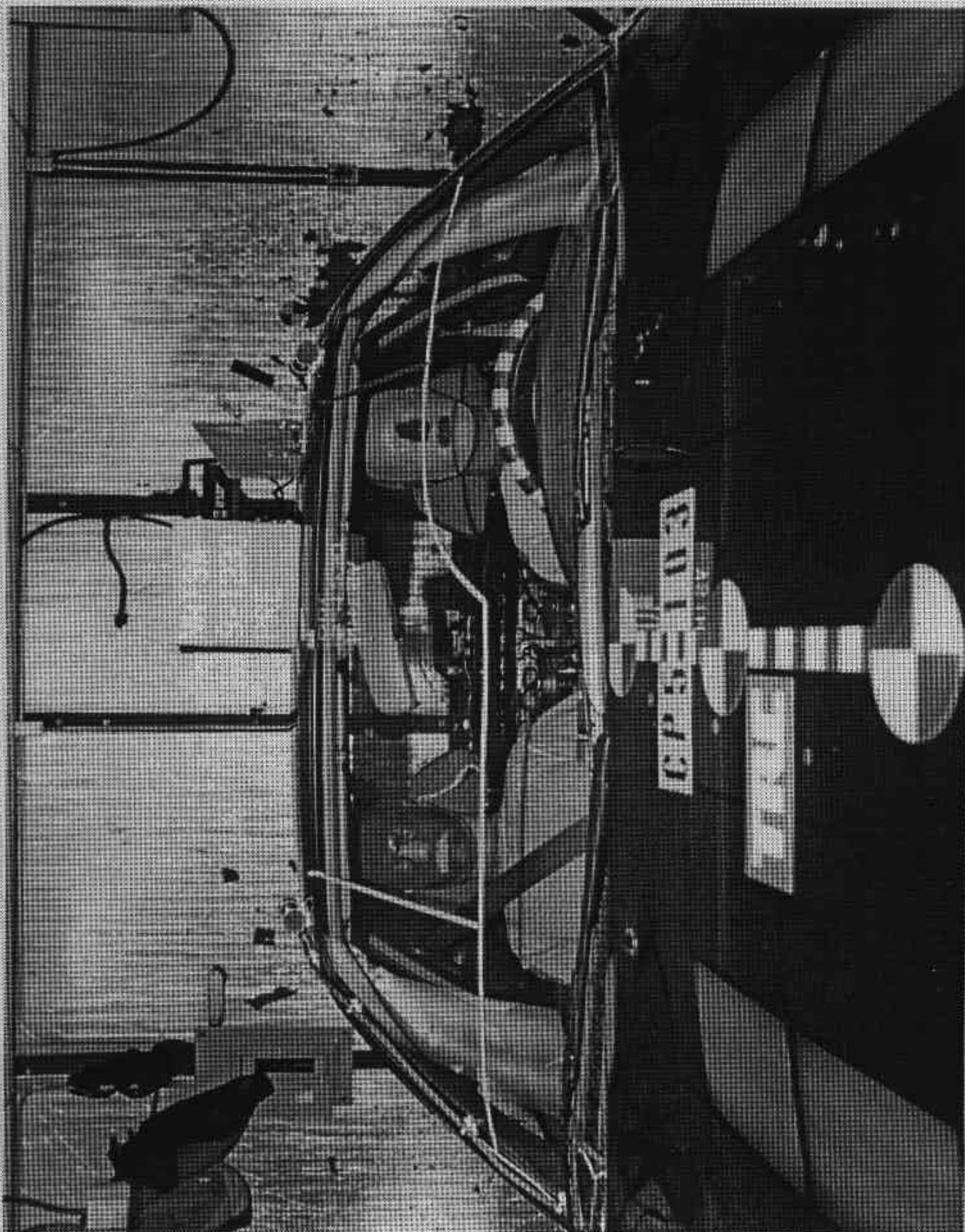


Figure A-13. PRE-TEST WINDSHIELD VIEW
A-14

921230

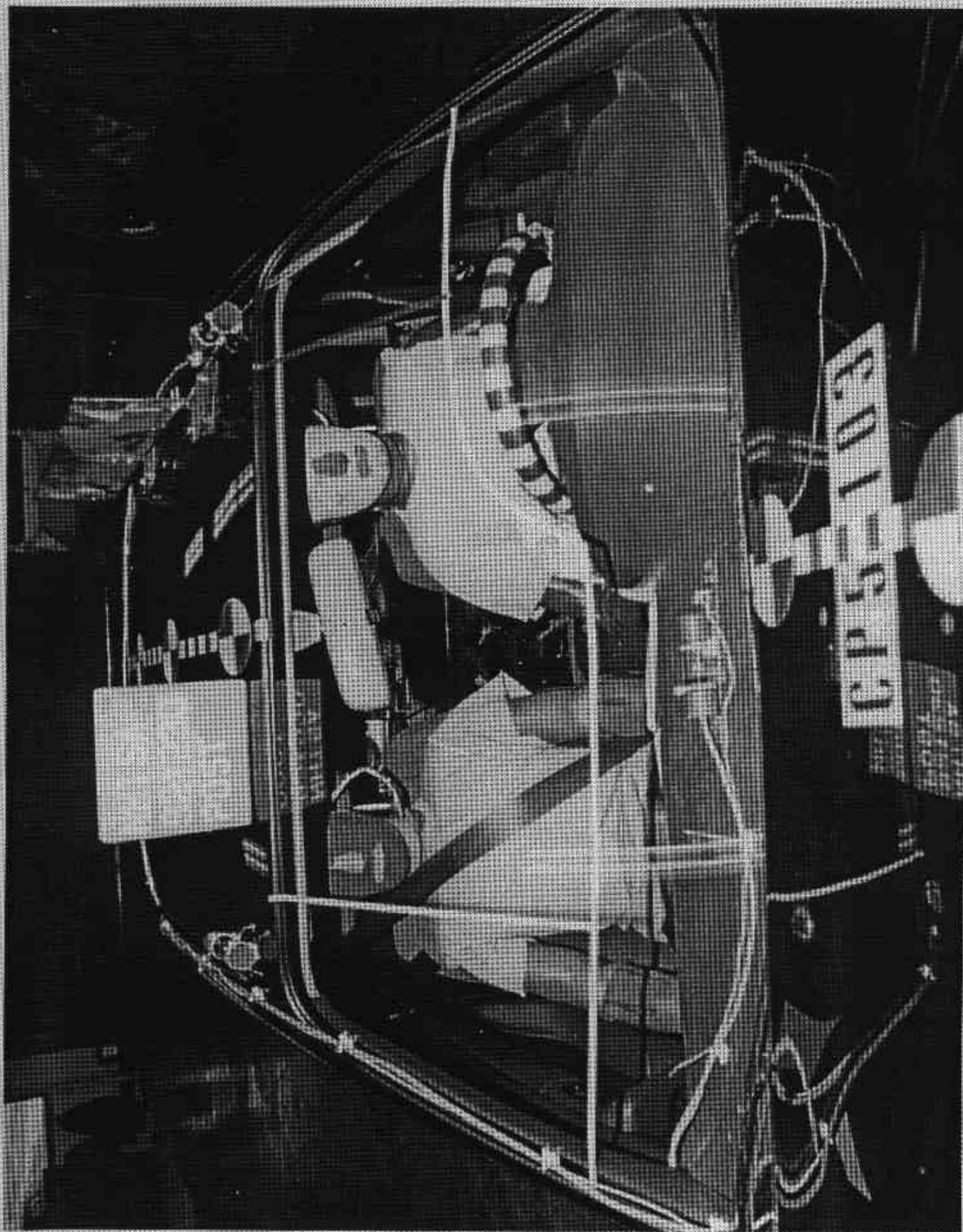


Figure A-14. POST-TEST WINDSHIELD VIEW
A-15

921230

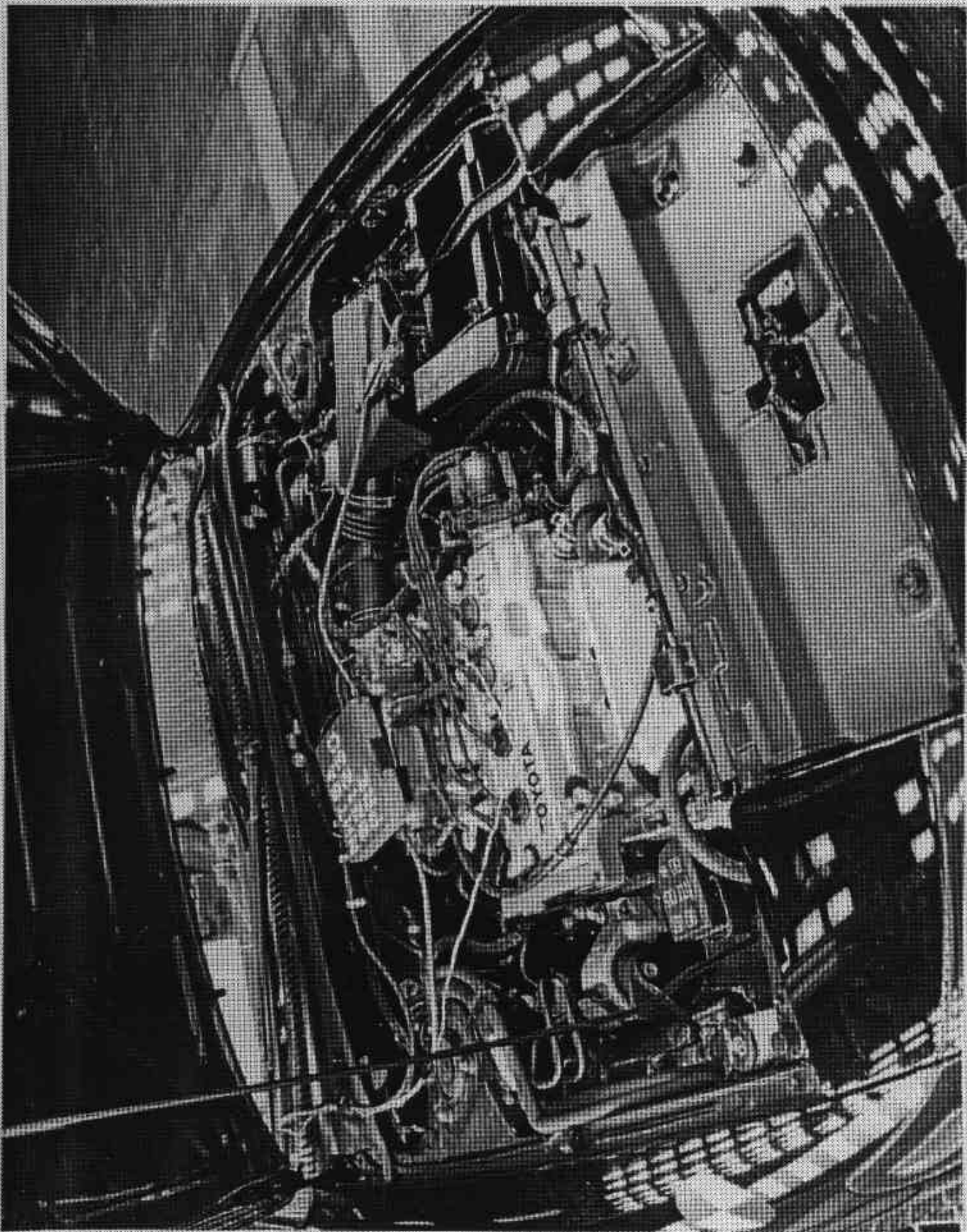


Figure A-15. PRE-TEST ENGINE COMPARTMENT VIEW
A-16

921230

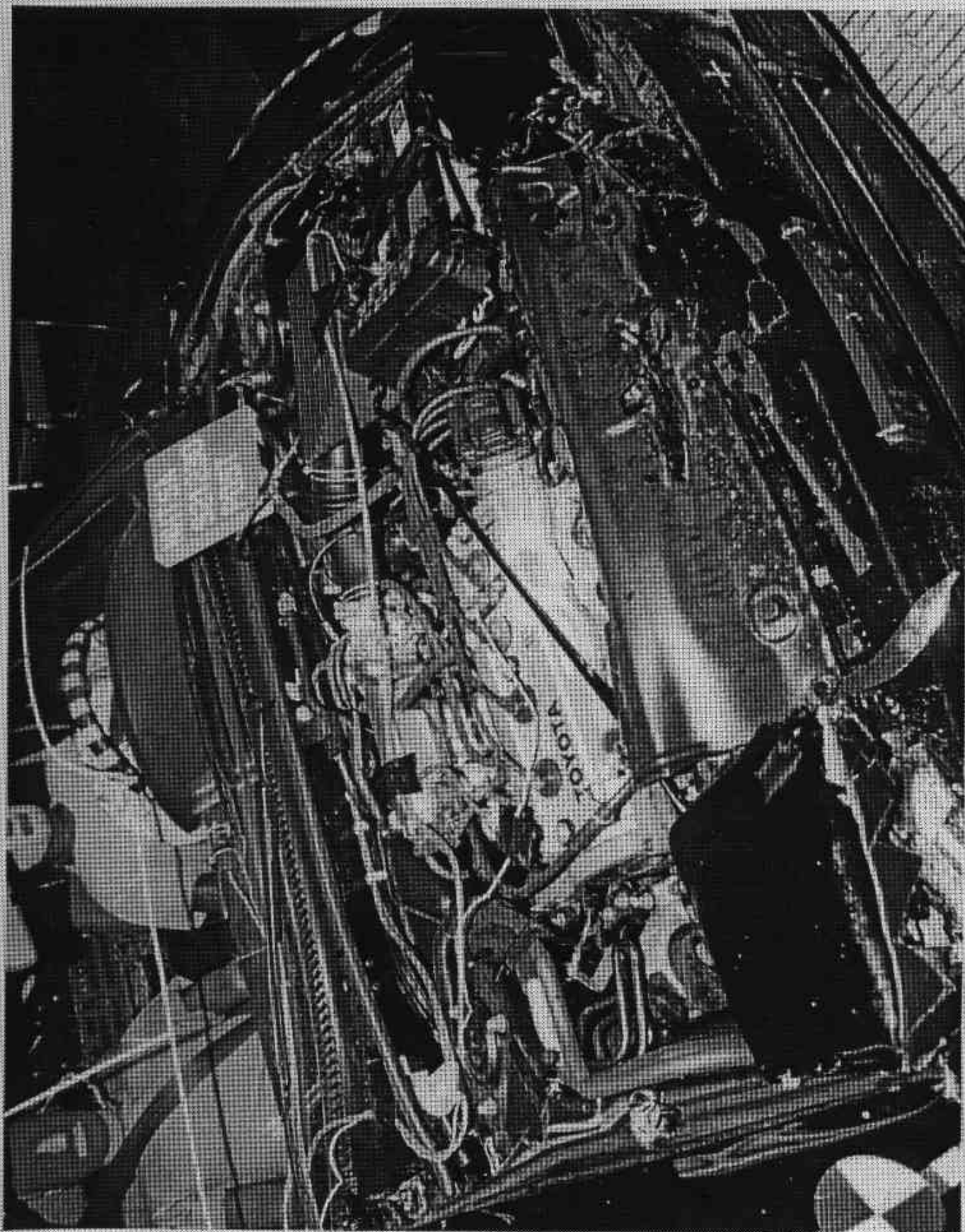


Figure A-16. POST-TEST ENGINE COMPARTMENT VIEW
A-17

921230



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

921230



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

921230

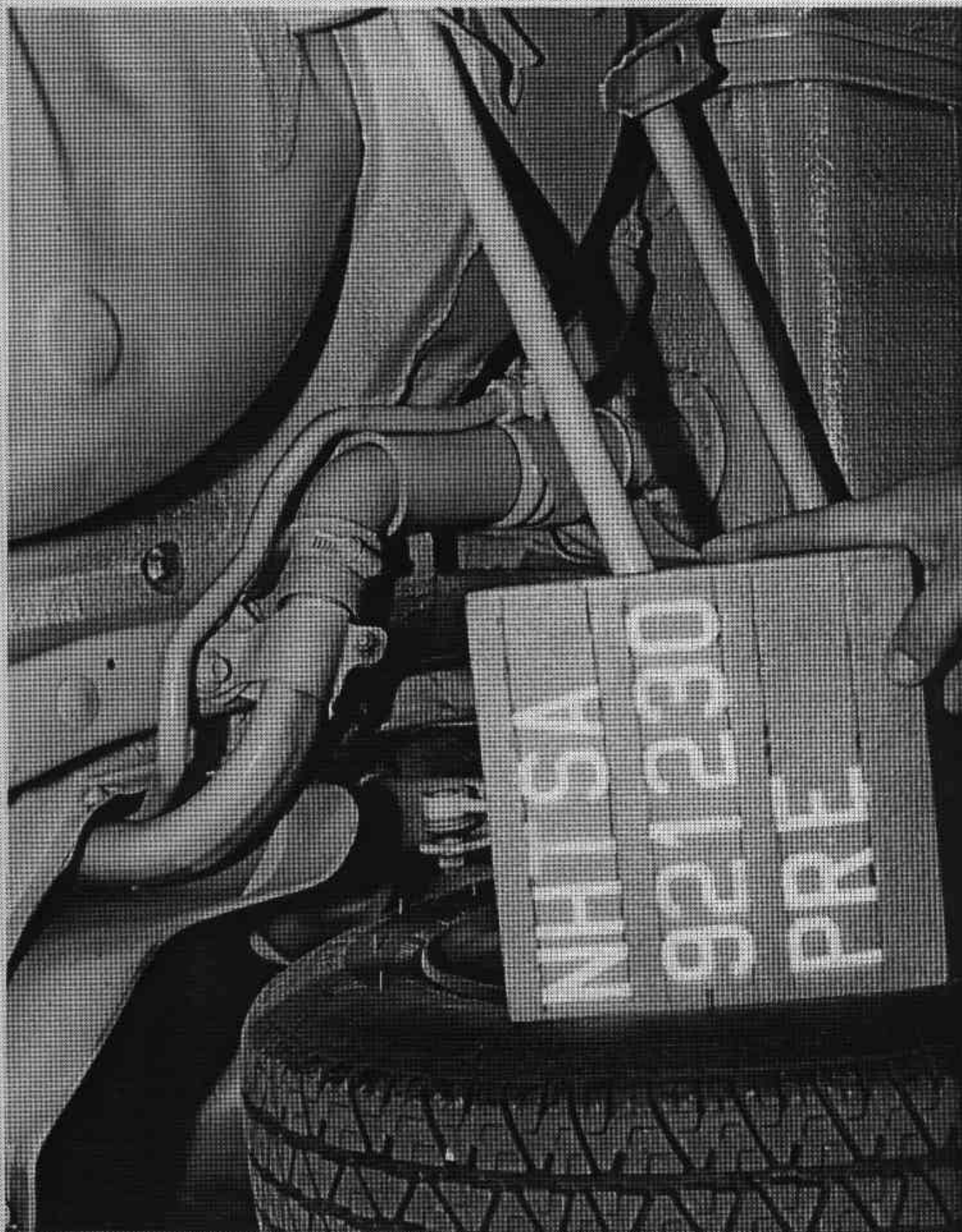


Figure A-19. PRE-TEST FUEL FILLER NECK VIEW

A-20

921230



Figure A-20. PRE-TEST FUEL TANK VIEW
A-21

921230



Figure A-21. POST-TEST FUEL TANK & FUEL FILLER NECK VIEW

A-22

921230

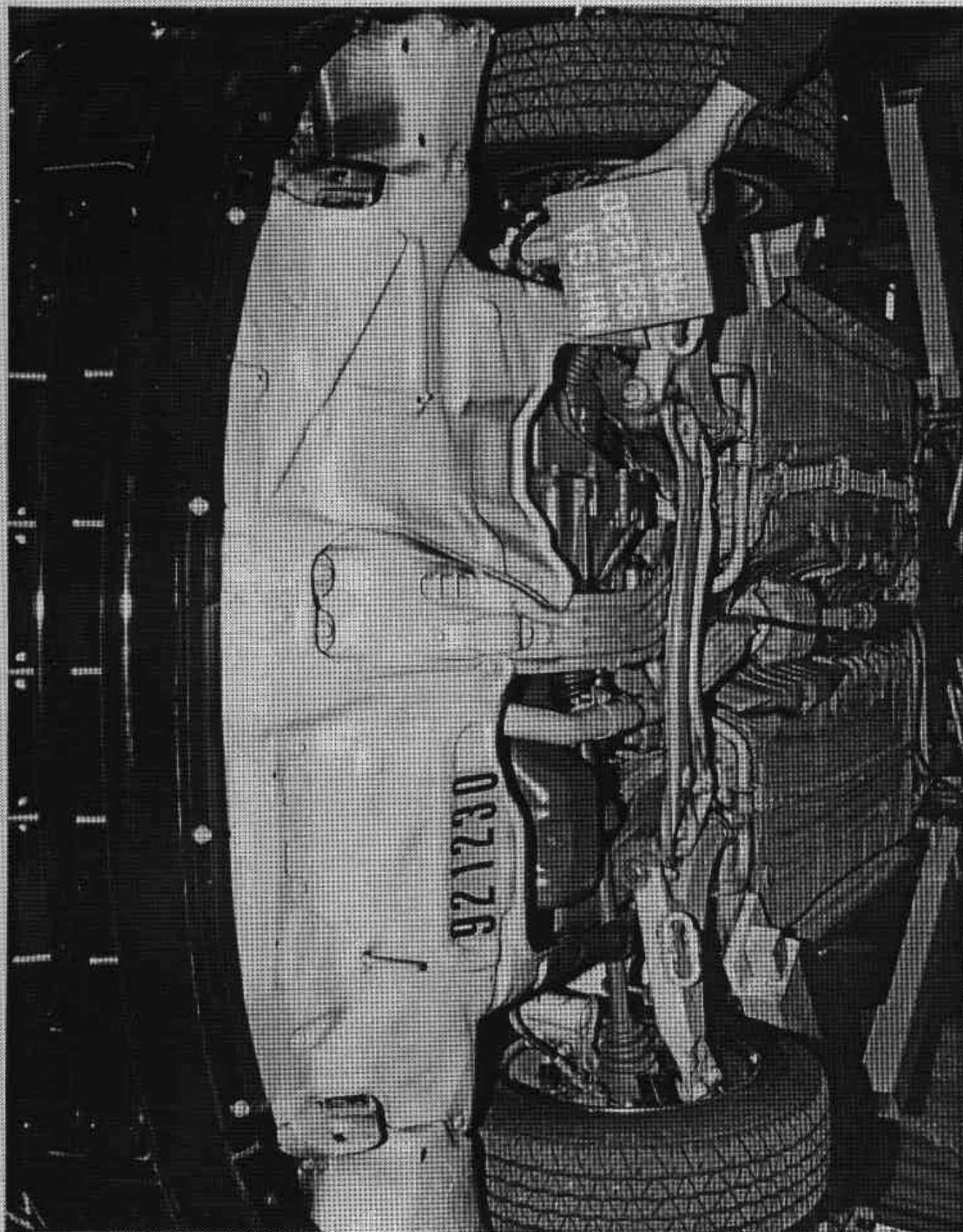


Figure A-22. PRE-TEST FRONT UNDERBODY VIEW

A-23

921230

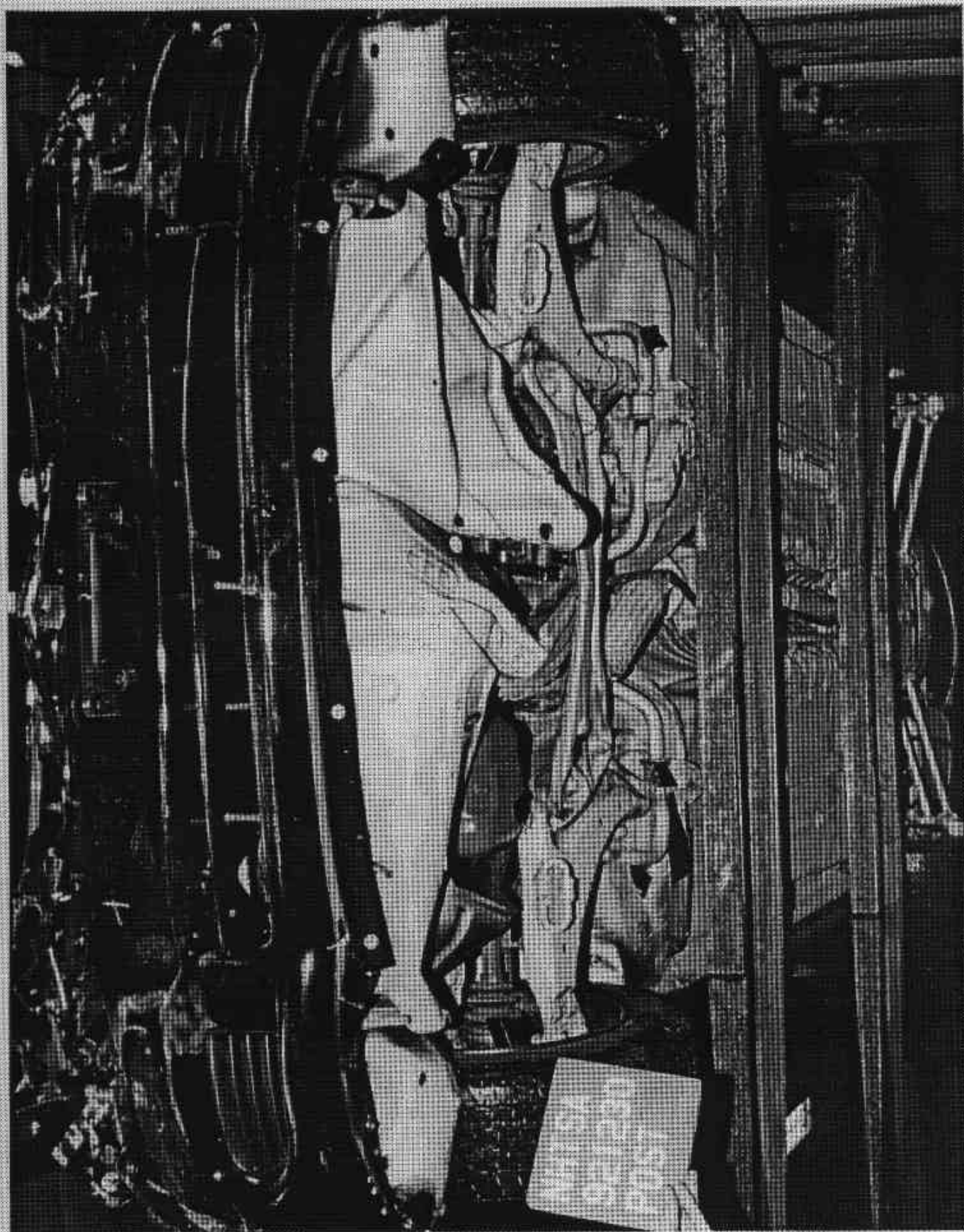


Figure A-23. POST-TEST FRONT UNDERBODY VIEW
A-24

921230

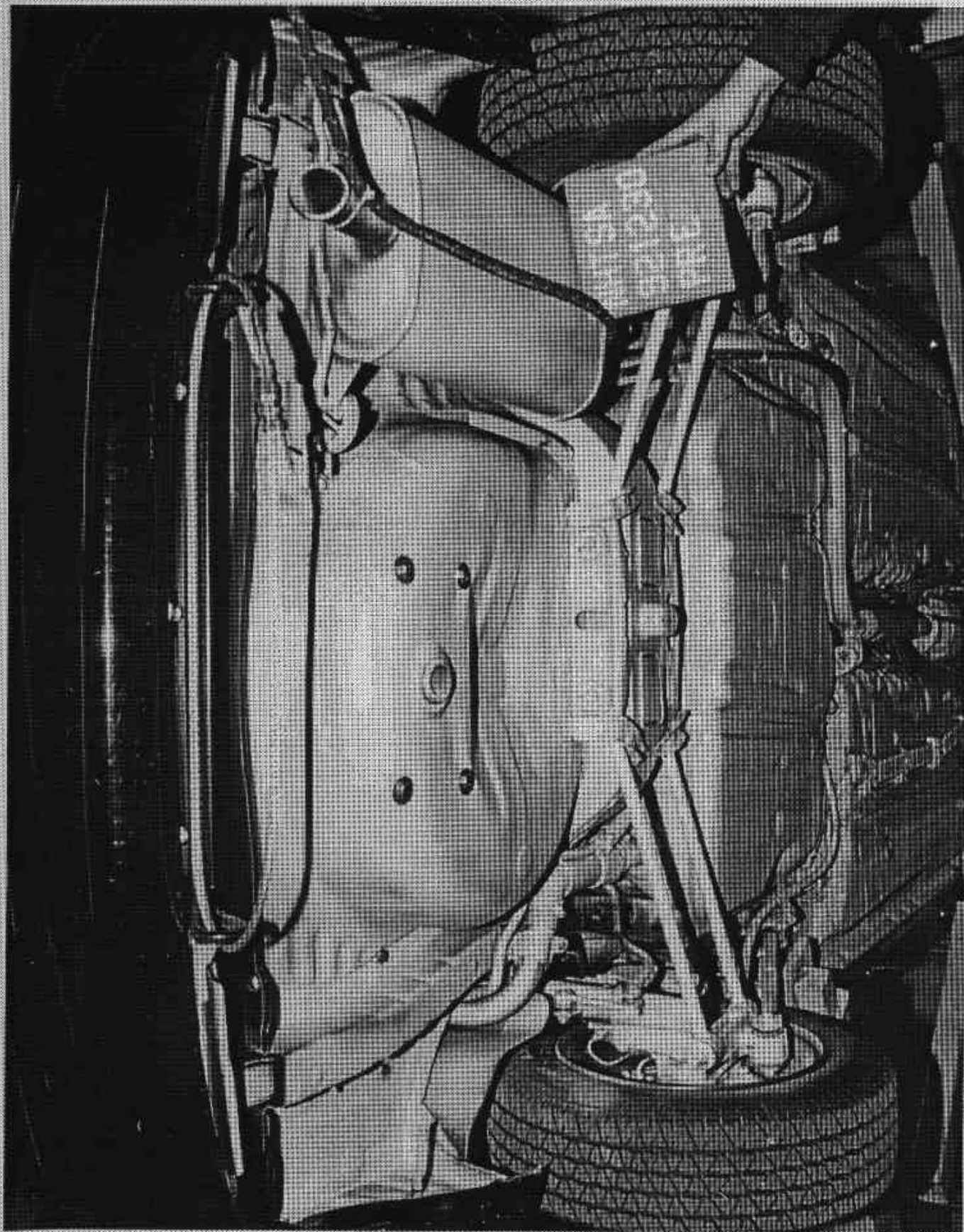


Figure A-24. PRE-TEST REAR UNDERBODY VIEW

A-25

921230

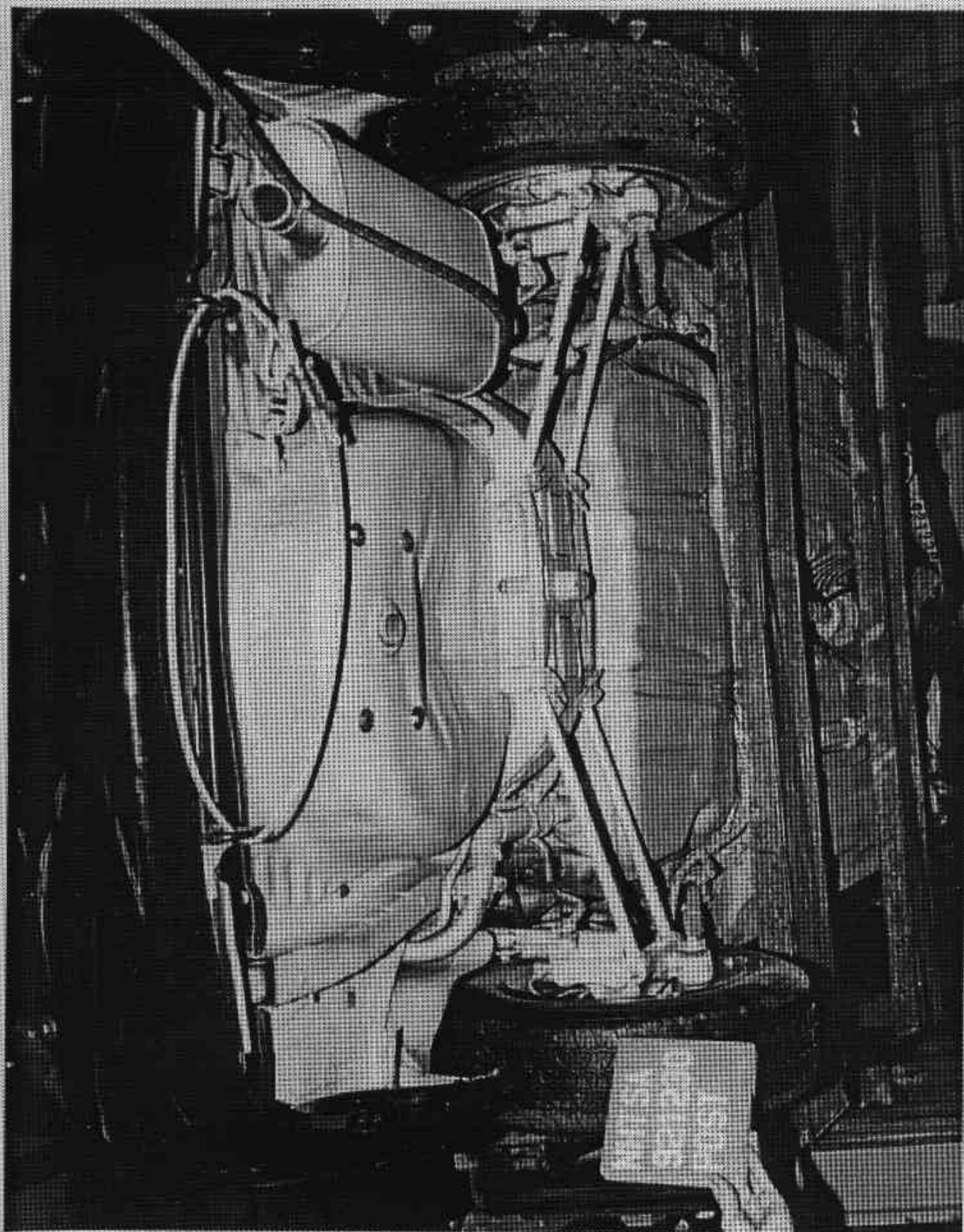


Figure A-25. POST-TEST REAR UNDERBODY VIEW
A-26

921230

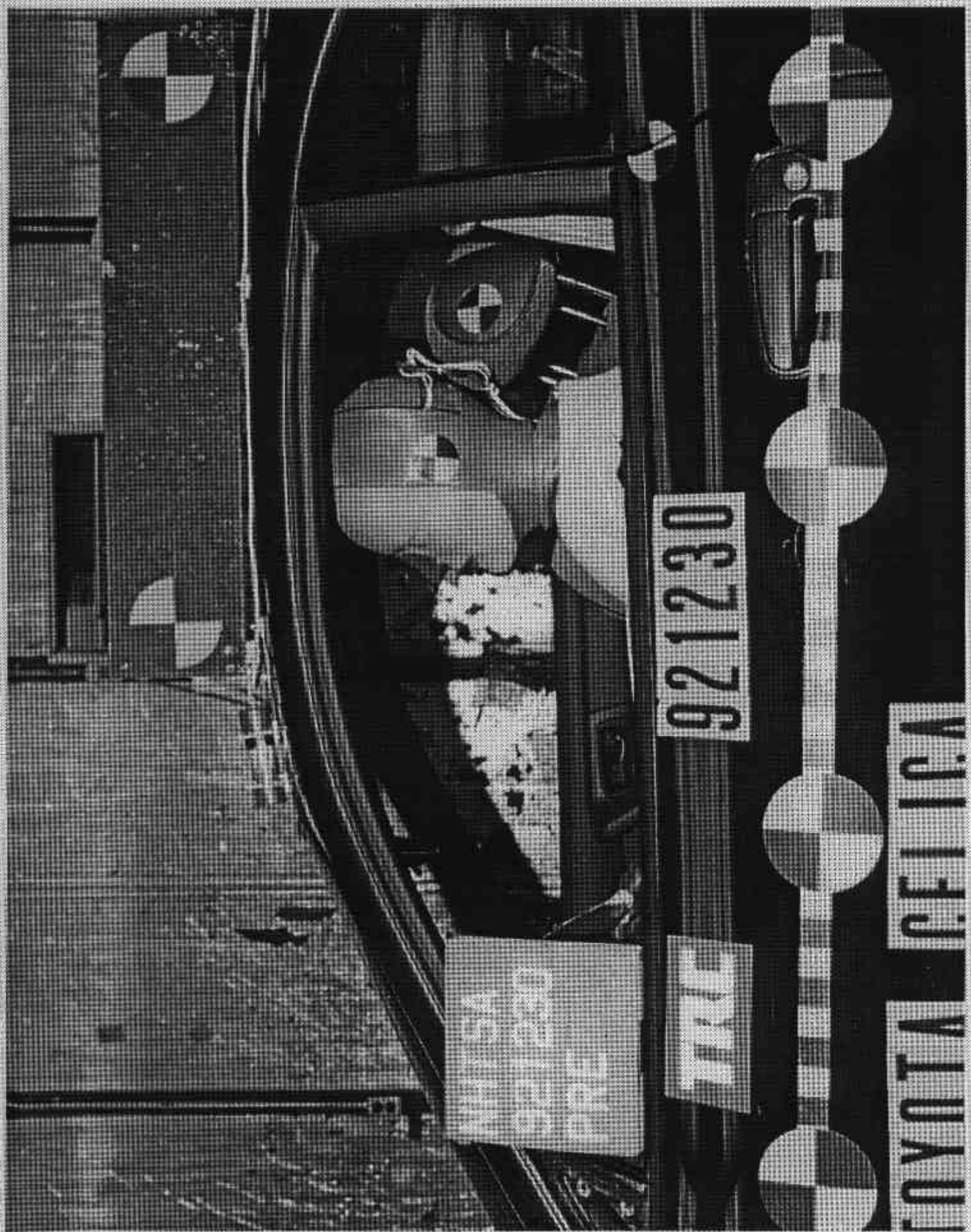


Figure A-26. PRE-TEST DRIVER DUMMY POSITION VIEW
A-27

921230

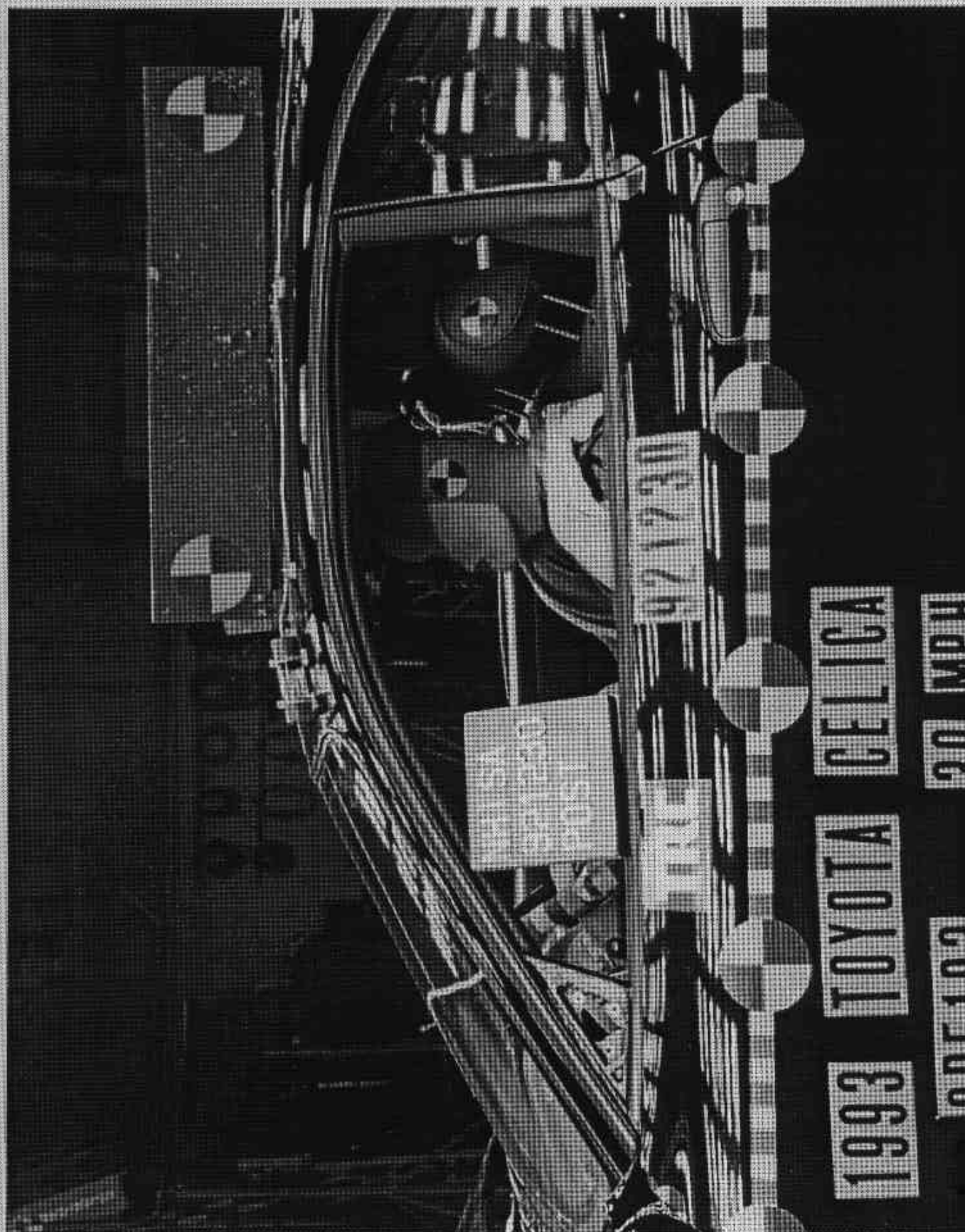


Figure A-27. POST-TEST DRIVER DUMMY POSITION VIEW
A-28

921230



Figure A-28. PRE-TEST PASSENGER DUMMY POSITION VIEW
A-29

921230

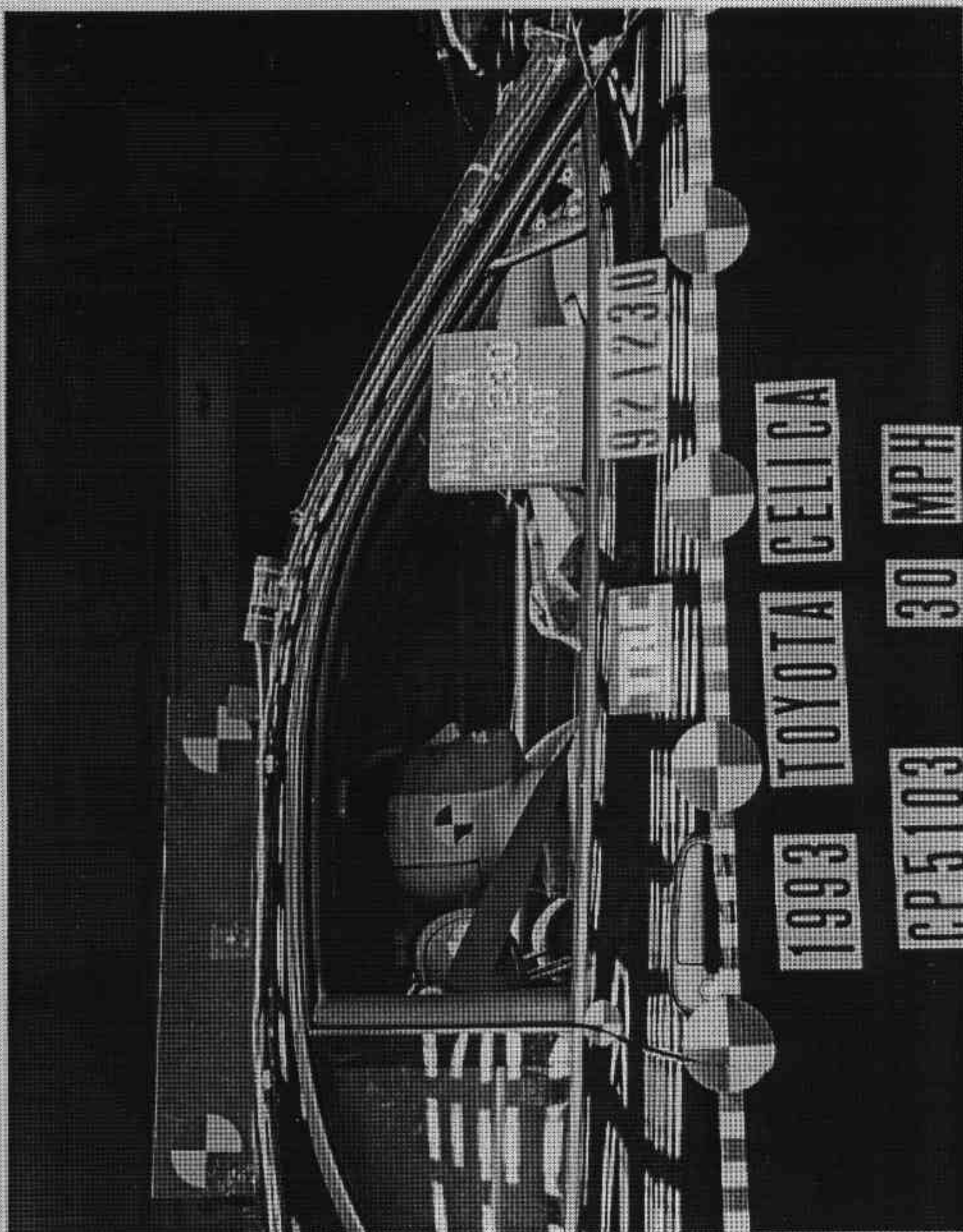


Figure A-29. POST-TEST PASSENGER DUMMY POSITION VIEW
A-30

921230



Figure A-30. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
A-31 921230



Figure A-31. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 1
A-32 921230

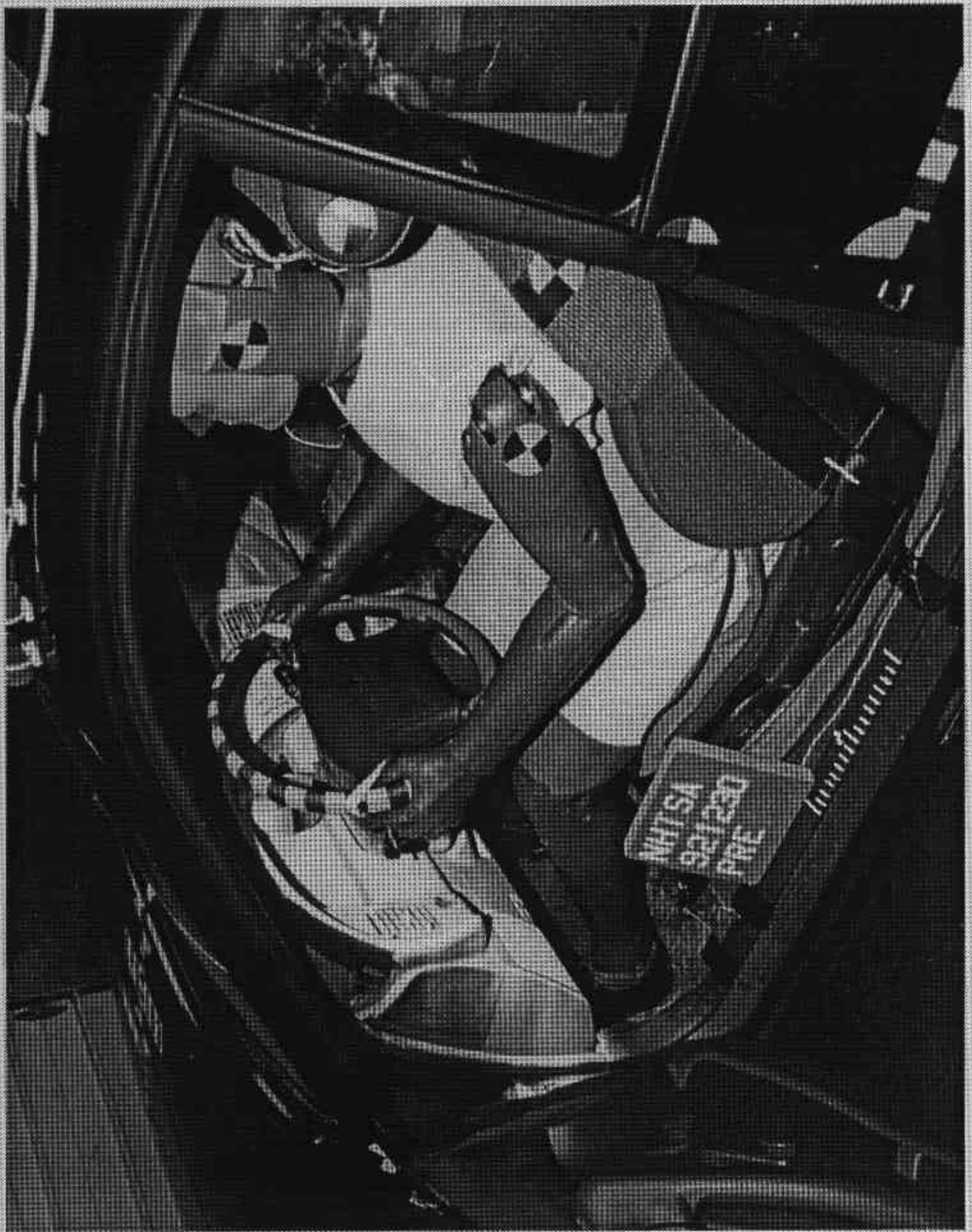


Figure A-32. PRE-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2
A-33 921230



Figure A-33. POST-TEST DRIVER DUMMY & VEHICLE INTERIOR - VIEW 2

A-34

921230

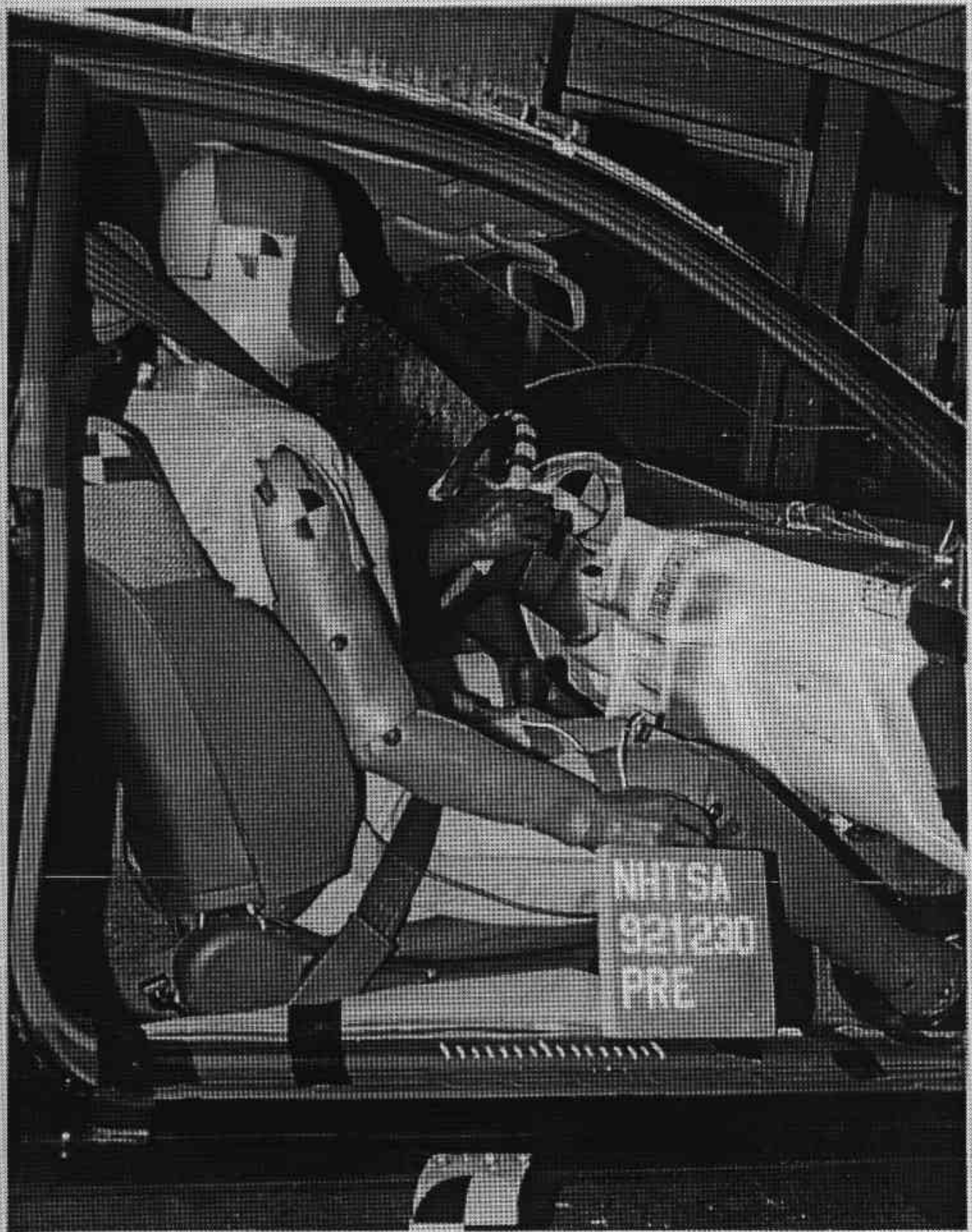


Figure A-34. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1
A-35 921230



Figure A-35. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 1
A-36 921230



Figure A-36. PRE-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2
A-37 921230



Figure A-37. POST-TEST PASSENGER DUMMY & VEHICLE INTERIOR - VIEW 2
A-38 921230

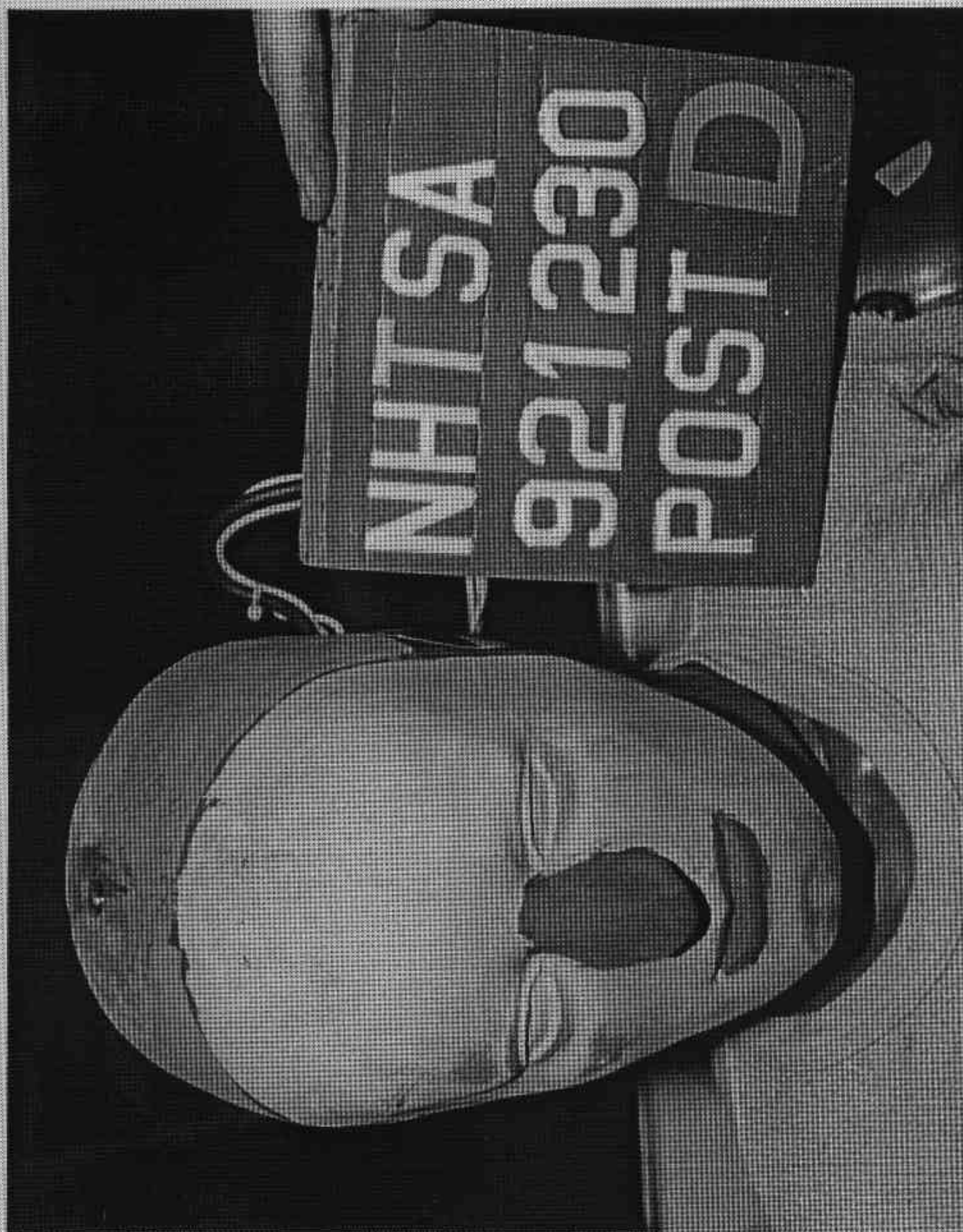


Figure A-38. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 1

A-39

921230



Figure A-39. POST-TEST DRIVER DUMMY HEAD CONTACT - VIEW 2

A-40

921230

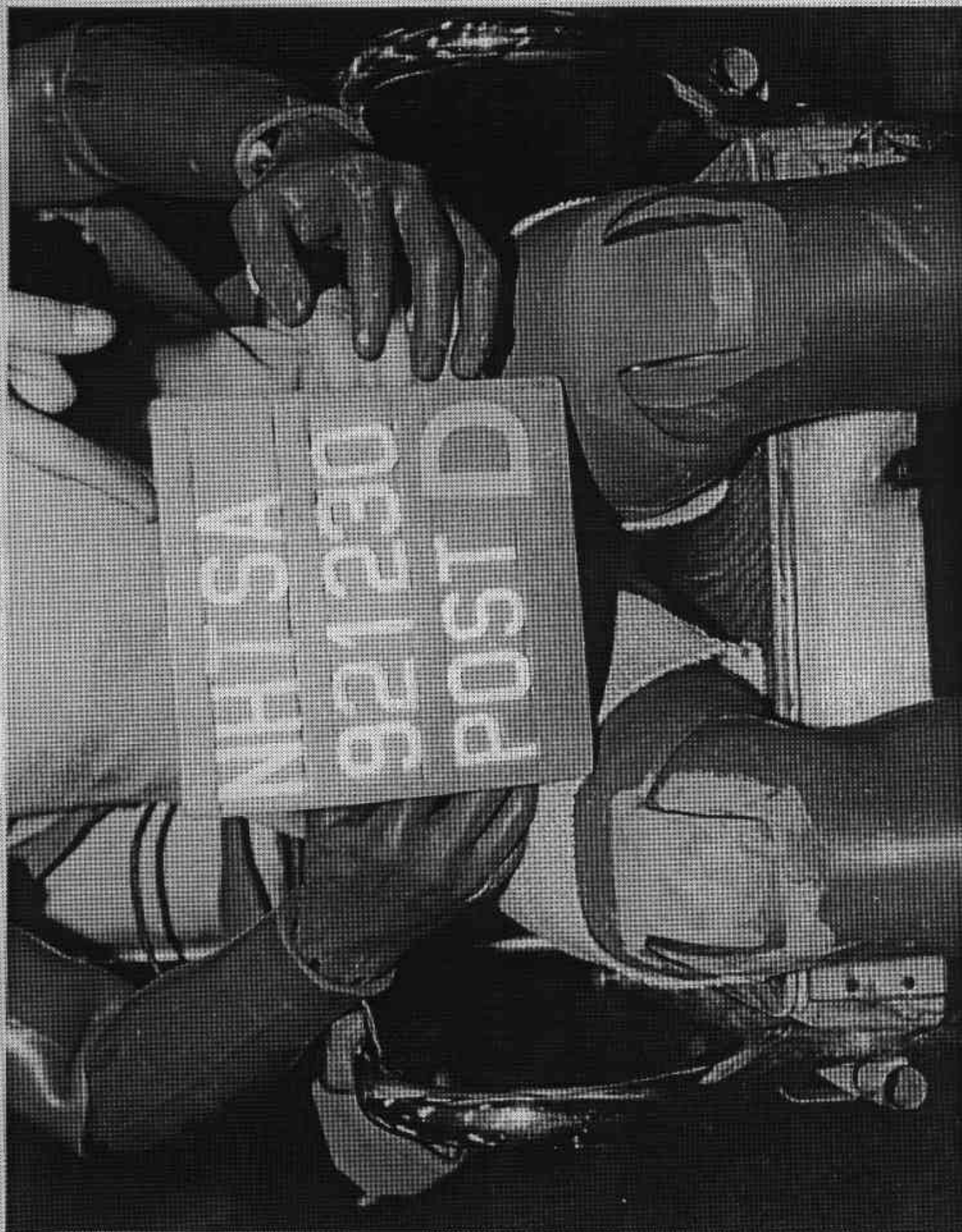


Figure A-40. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 1

A-41

921230



Figure A-41. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 2

A-42

921230



Figure A-42. POST-TEST DRIVER DUMMY KNEE CONTACT - VIEW 3

A-43

921230

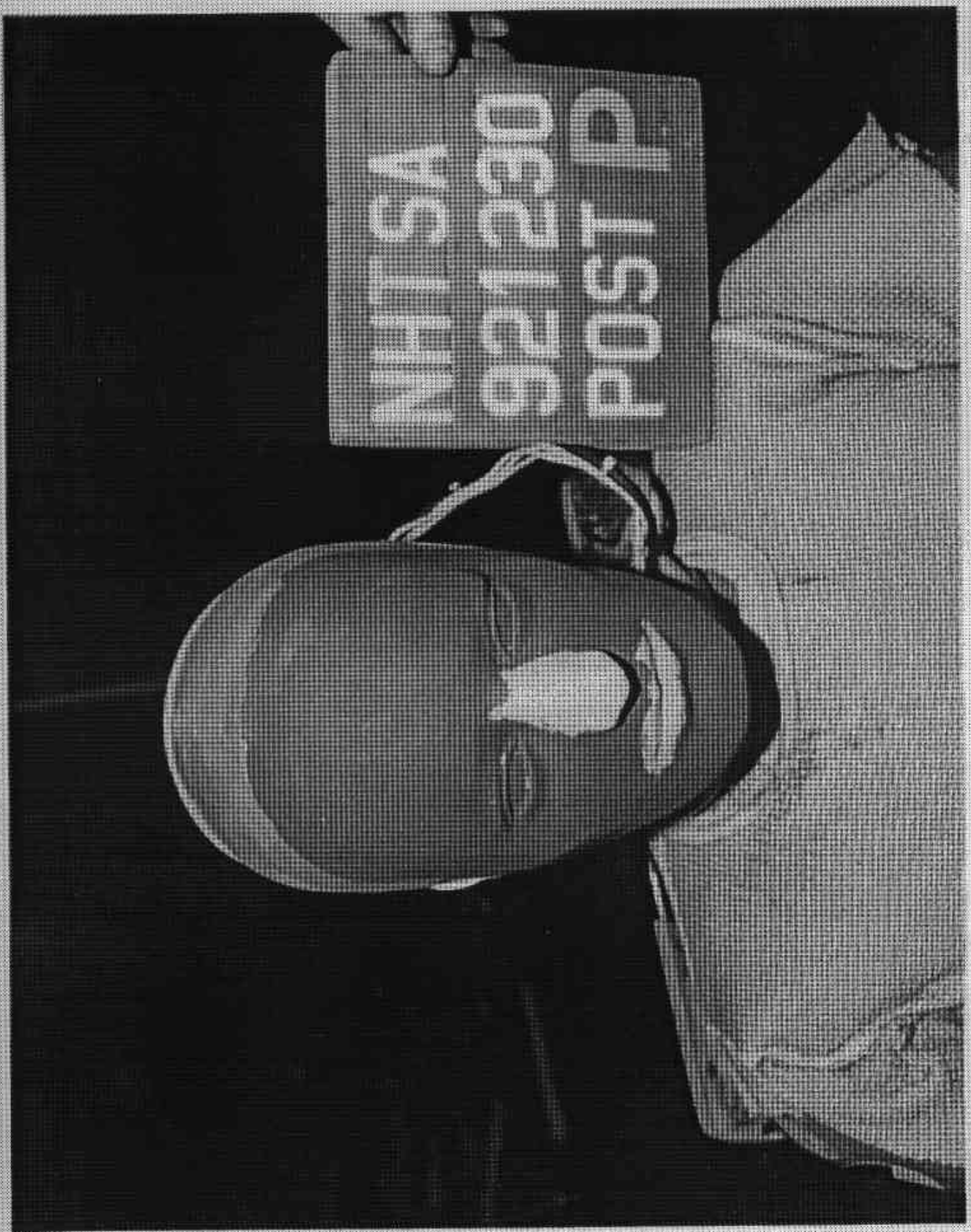


Figure A-43. POST-TEST PASSENGER DUMMY HEAD CONTACT VIEW

A-44

921230

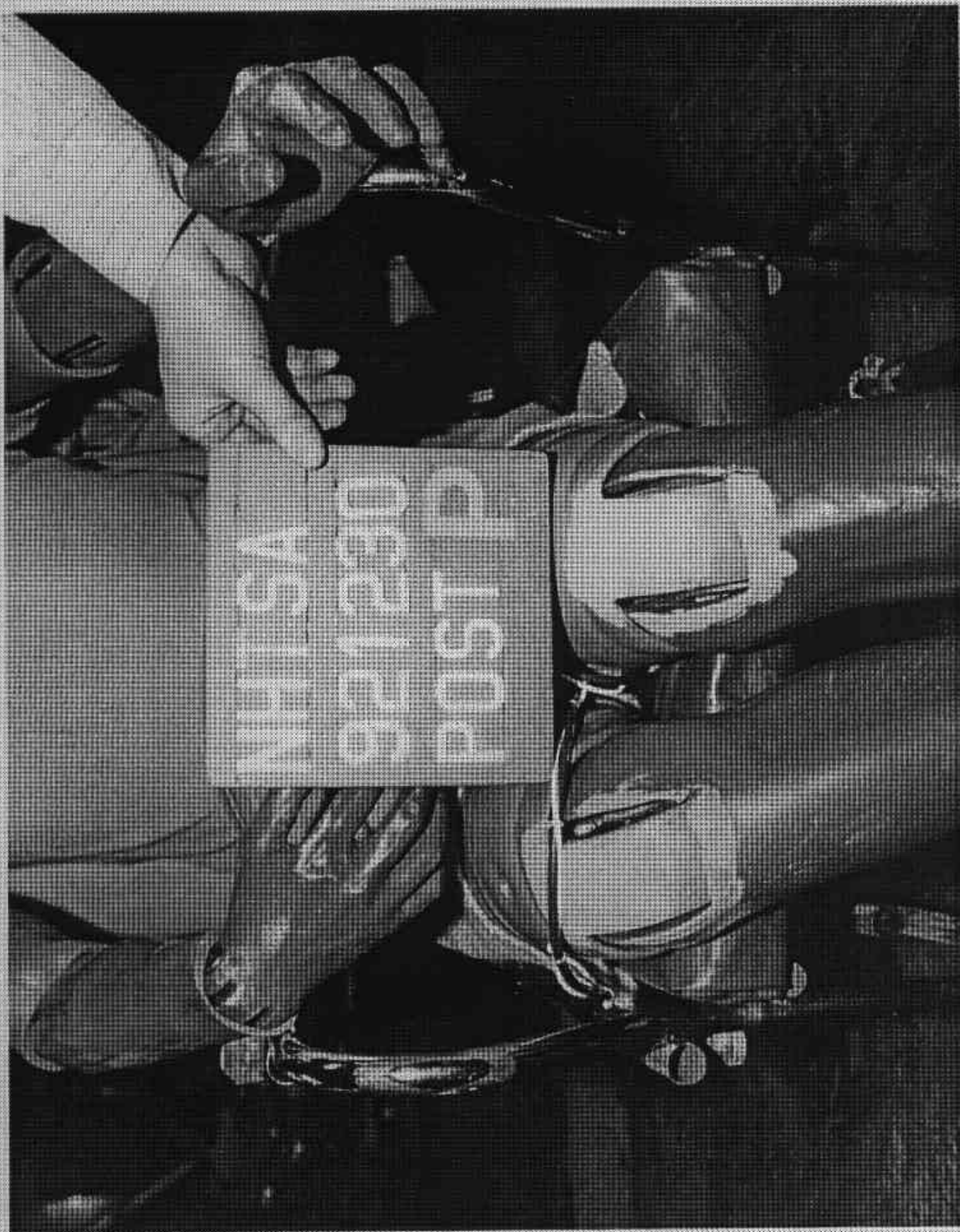


Figure A-44. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 1
A-45 921230

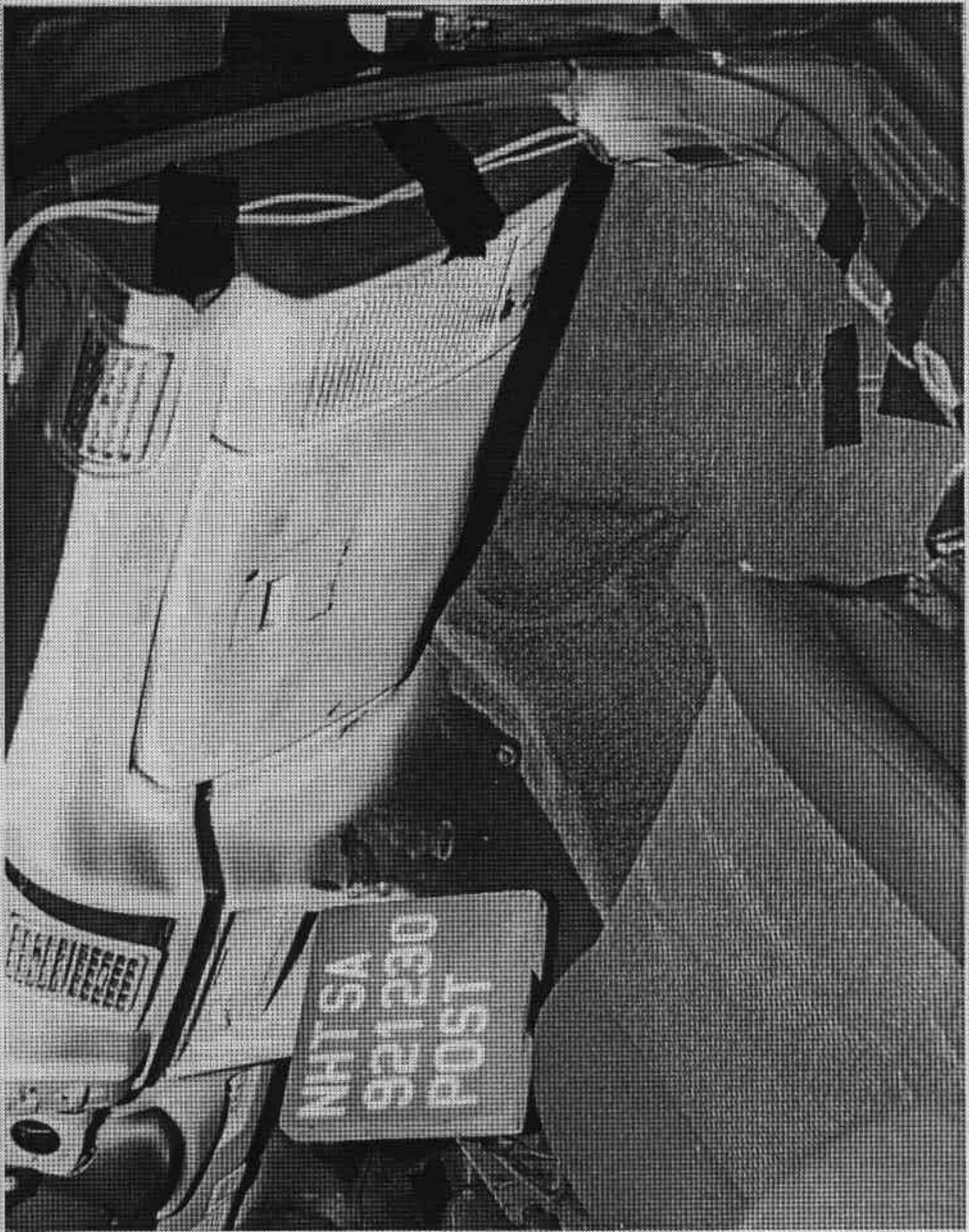


Figure A-45. POST-TEST PASSENGER DUMMY KNEE CONTACT - VIEW 2
A-46 921230



Figure A-46. PRE-TEST VEHICLE CERTIFICATION LABEL VIEW

TOYOTA CELICA									
VEHICLE CAPACITY WEIGHT (LBS)		725							
DESIGNATED SEATING CAPACITY TOTAL (FRONT SEAT)									
RECOMMENDED TIRE SIZE									
ST									
GT									
GT-S	185/65R14 85S	P185/65R14							
GT-S	205/55R15 87V								
RECOMMENDED COLD TIRE INFLATION PRESSURES (PSI)									
GT-S	215/50R15 88V								
VEHICLE CAPACITY WEIGHT									
		S		T		GT-S		TURBO	
		FRONT		REAR		FRONT		REAR	
185/40R14 85S									
P185/65 R14		20		20					
205/55R15 87V									
215/50R15 88V				23		32			
COMPACT SPARE TIRE									
TIRE COLD INFLATION PRESSURE (PSI)									
GT		FRONT		REAR		FRONT		REAR	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	
GT		20		20		23		32	

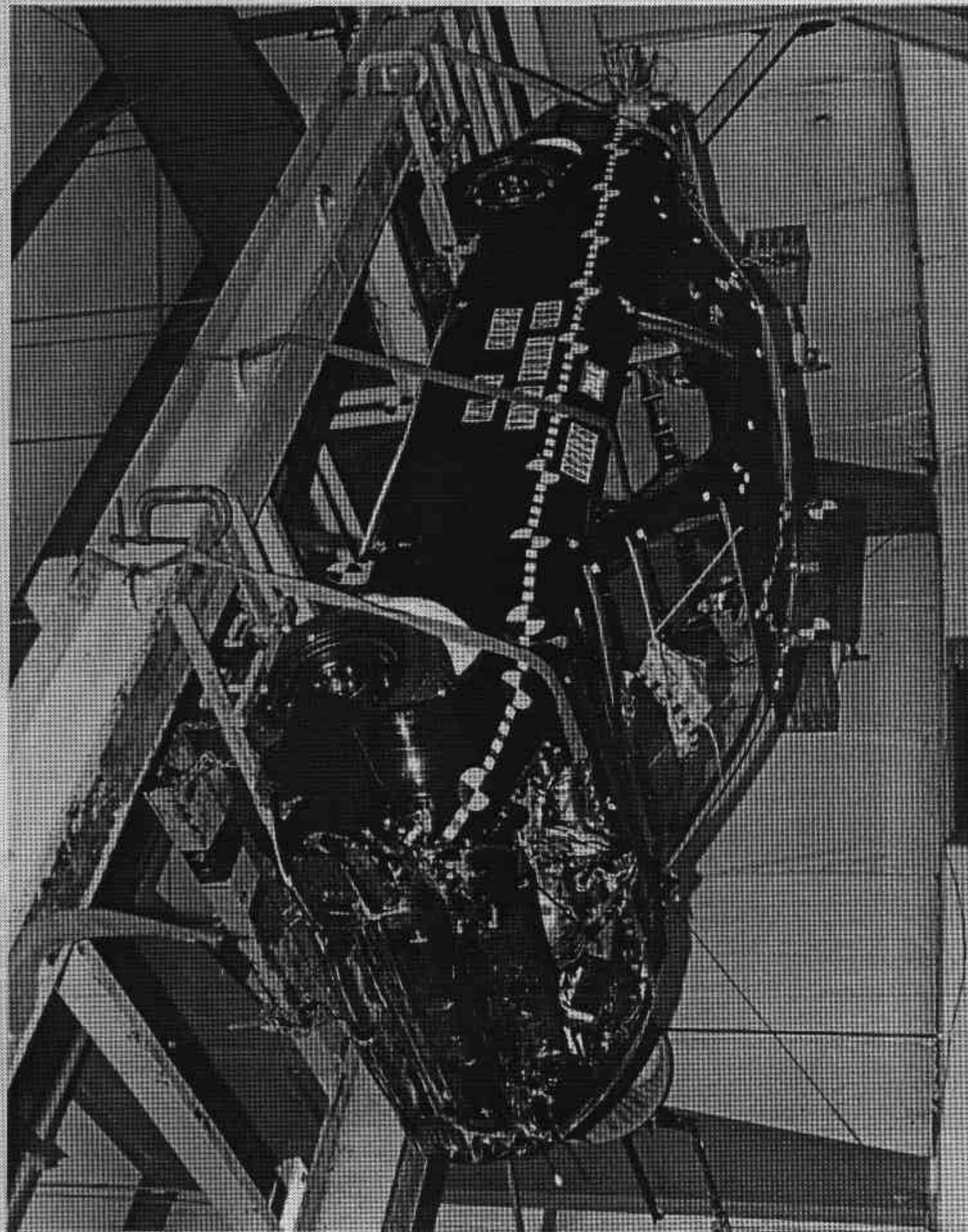


Figure A-48. POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW

A-49

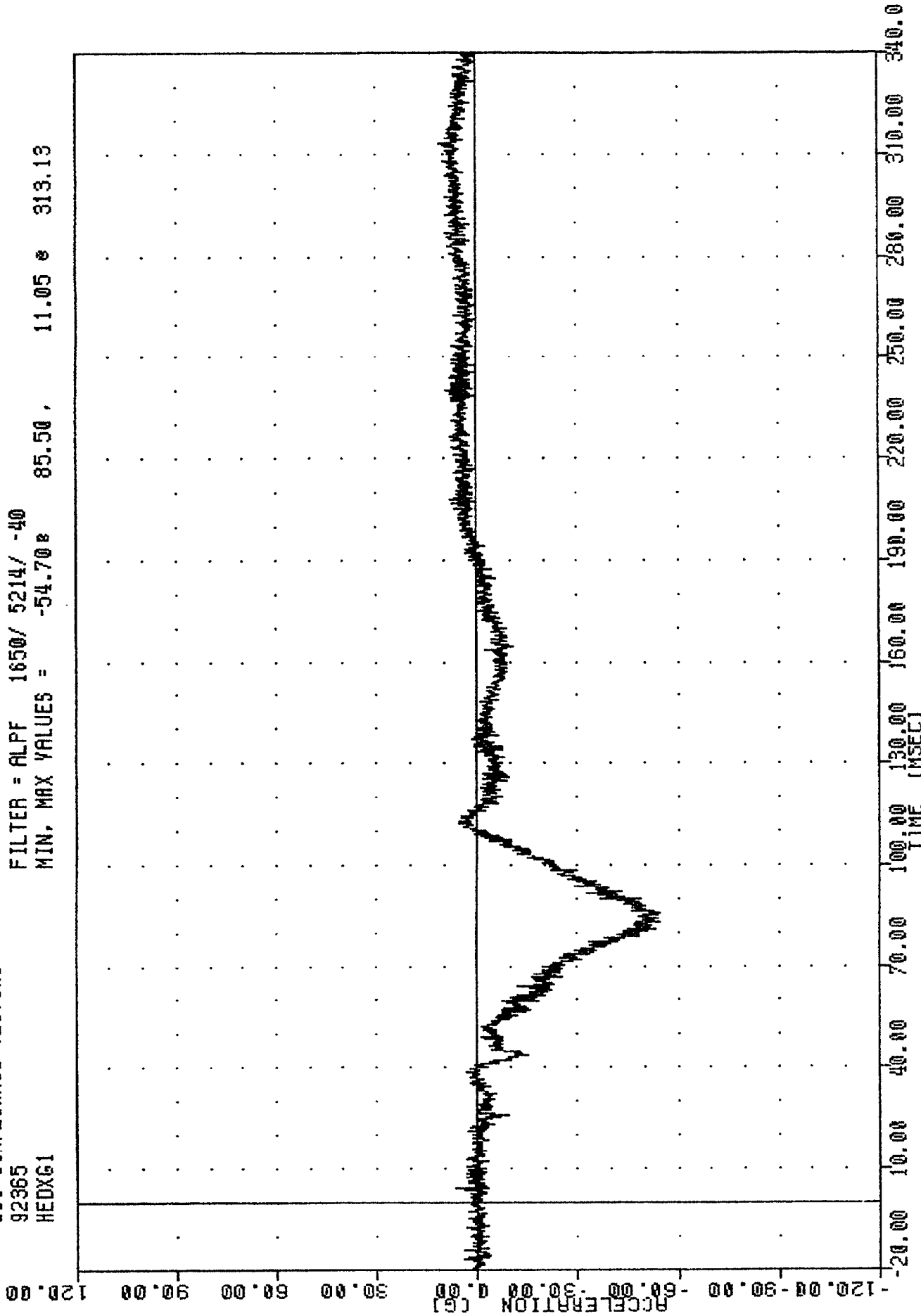
921230

APPENDIX B

DATA PLOTS

TRC , 921230
208 COMPLIANCE TESTING
92365
HEDXG1

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -54.70 85.50 , 11.05 313.13

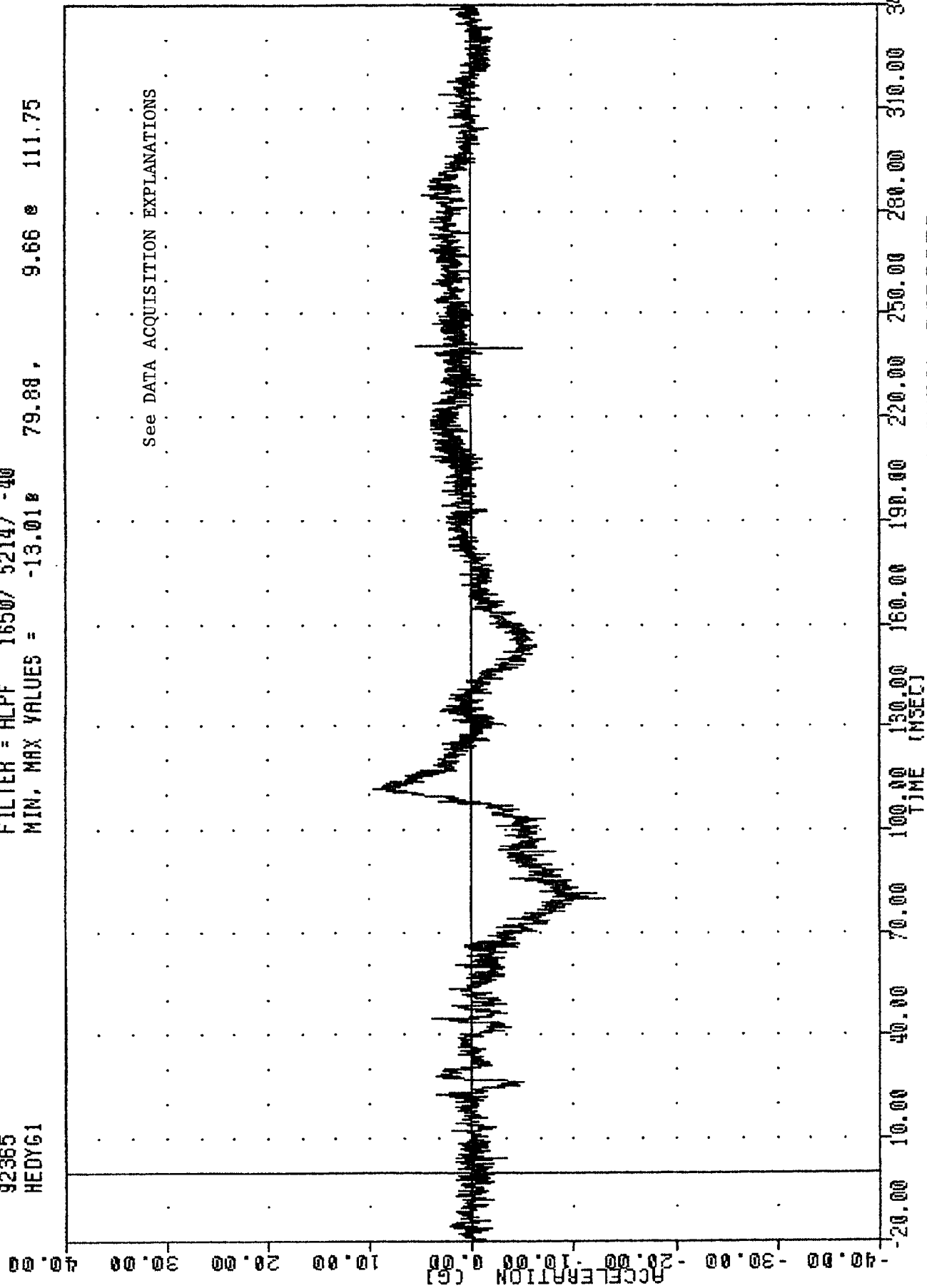


1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
DRIVER HEAD X-AXIS ACCELERATION

TRC
208 COMPLIANCE TESTING
92365
HEDYG1

921230

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -13.010 79.88, 9.66 e 111.75



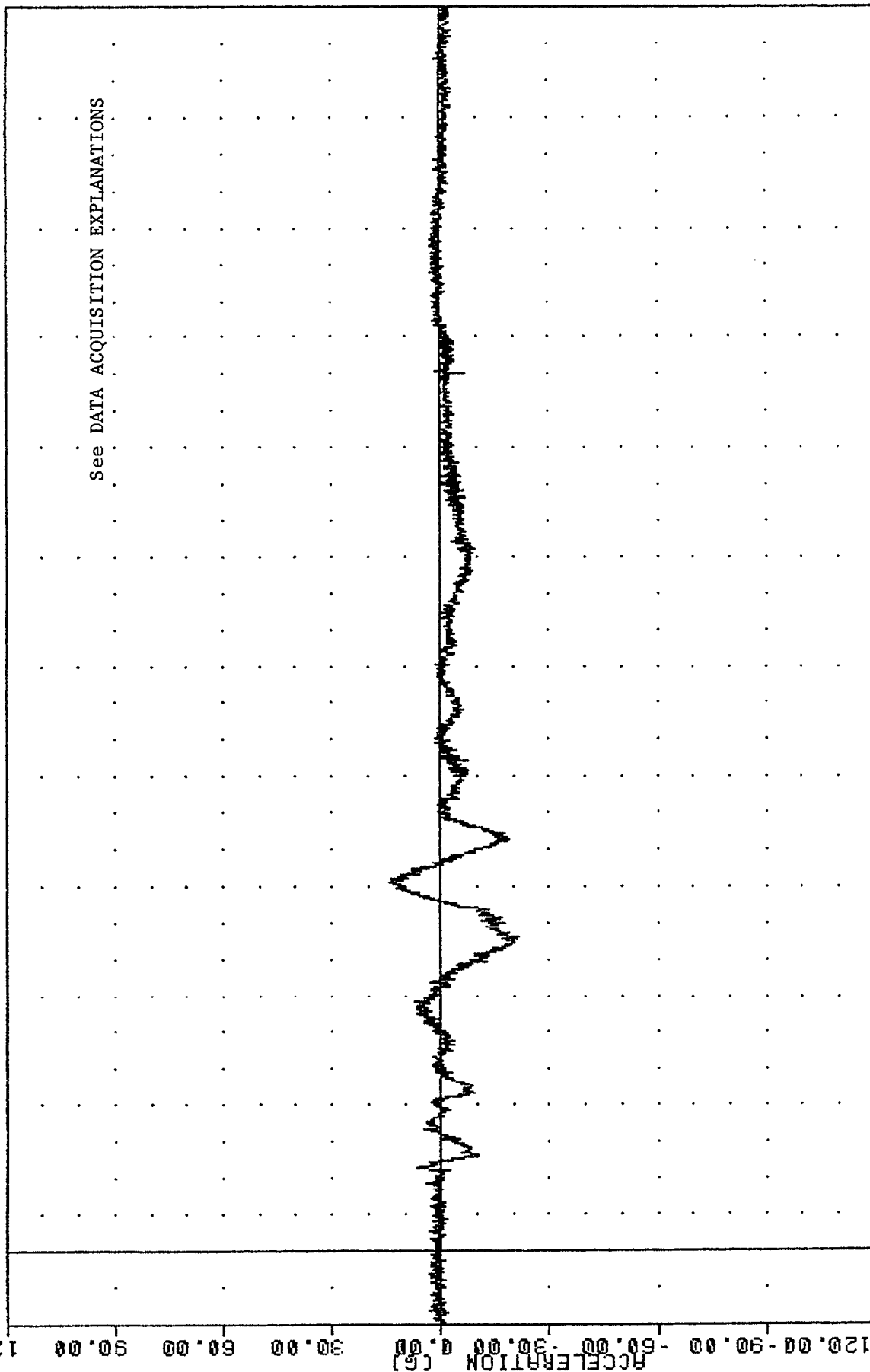
1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
DRIVER HEAD Y-AXIS ACCELERATION

TRC
208 COMPLIANCE TESTING
92385
HEDZ61

, 921230

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -21.43 86.25, 14.44 101.13

120.00



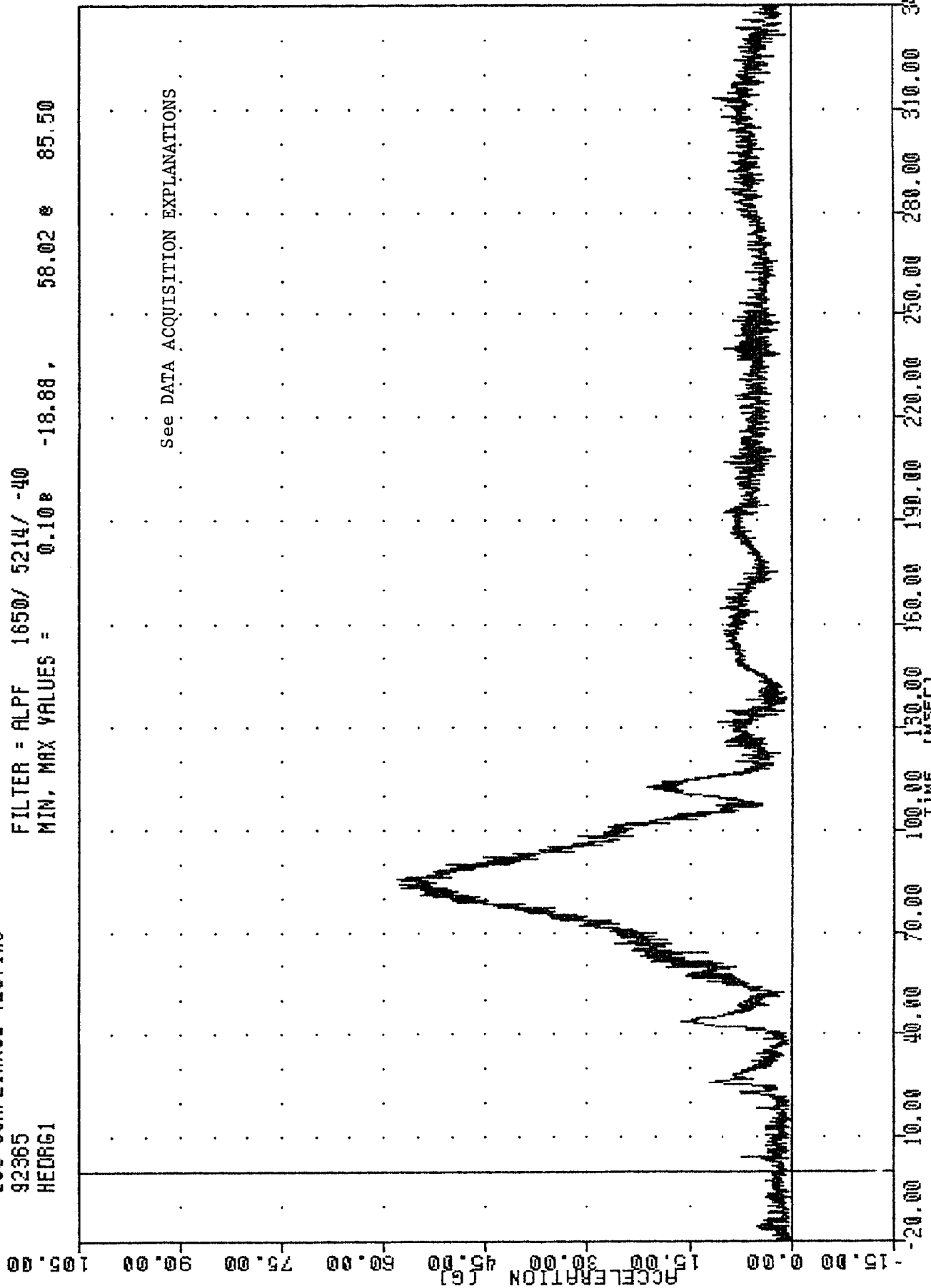
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00

TIME (msec)

1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
DRIVER HEAD Z-AXIS ACCELERATION

TRC 921230
 208 COMPLIANCE TESTING
 92365
 HEDRG1

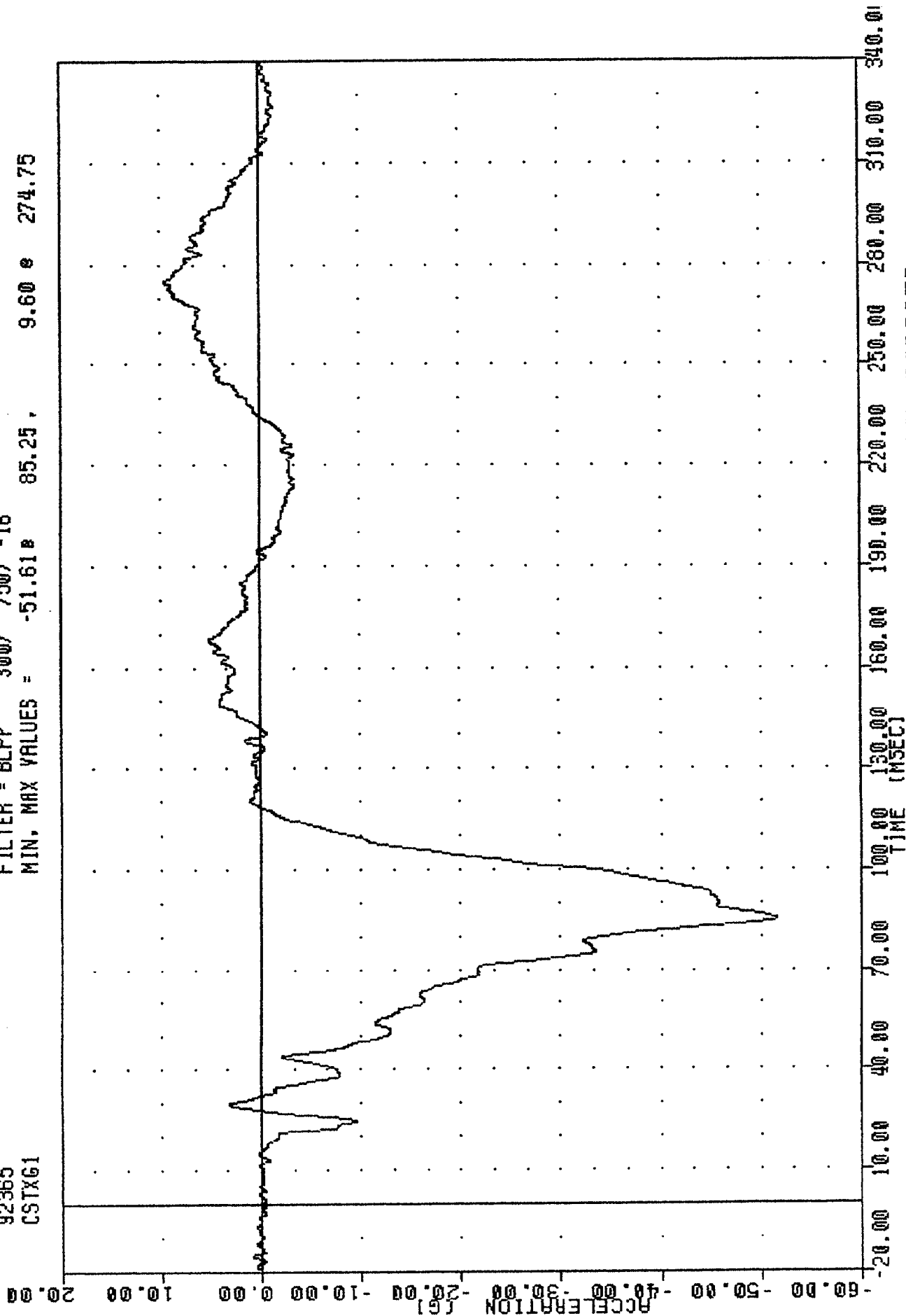
FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = 0.10e -18.88, 58.02 e 85.50



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
 DRIVER HEAD RESULTANT ACCELERATION

TRC 921230
208 COMPLIANCE TESTING
92365
CSTXG1

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -51.61 85.25, 9.60 e 274.75

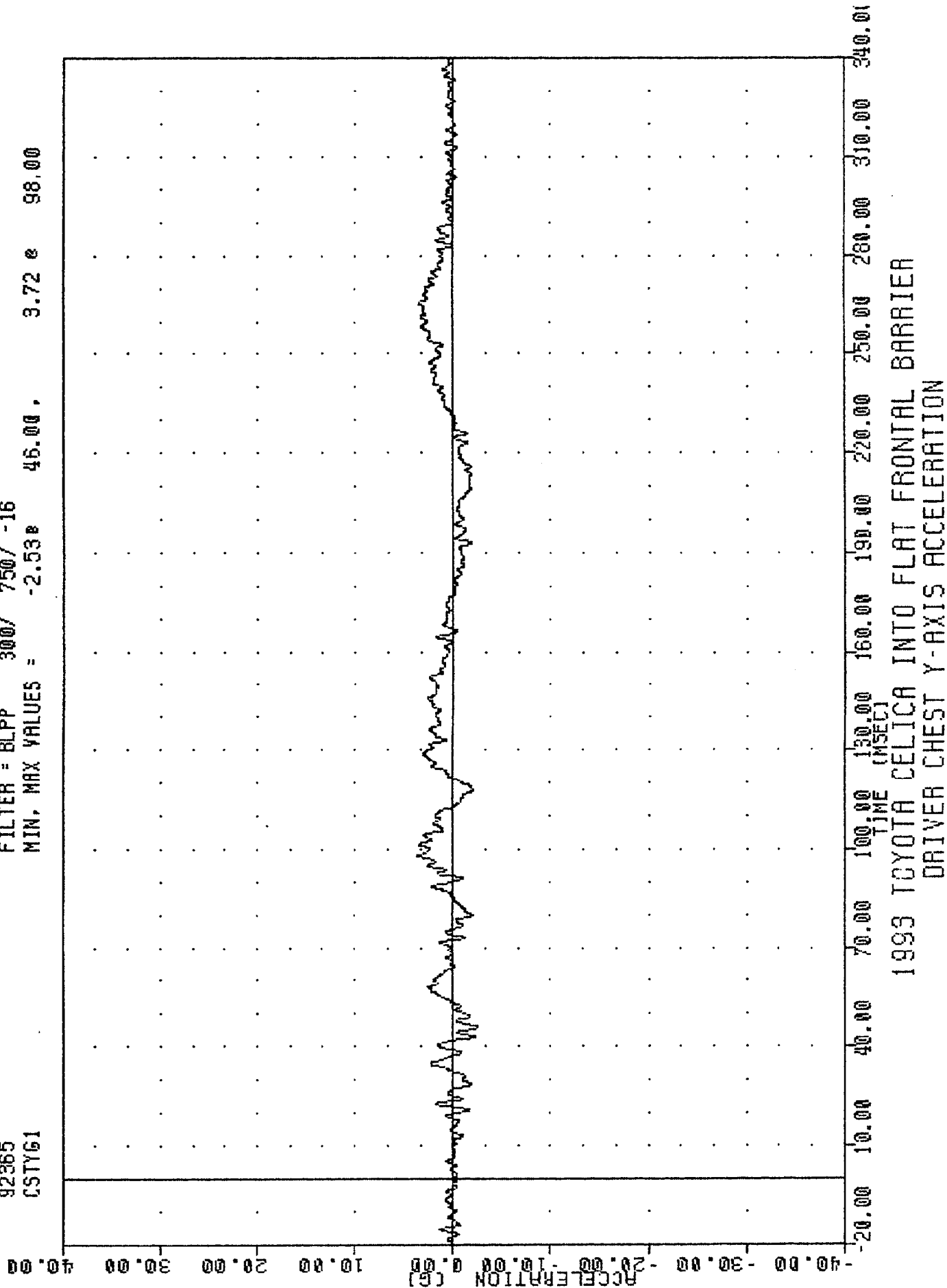


1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
DRIVER CHEST X-AXIS ACCELERATION

TRC
 208 COMPLIANCE TESTING
 92365
 CSTY61

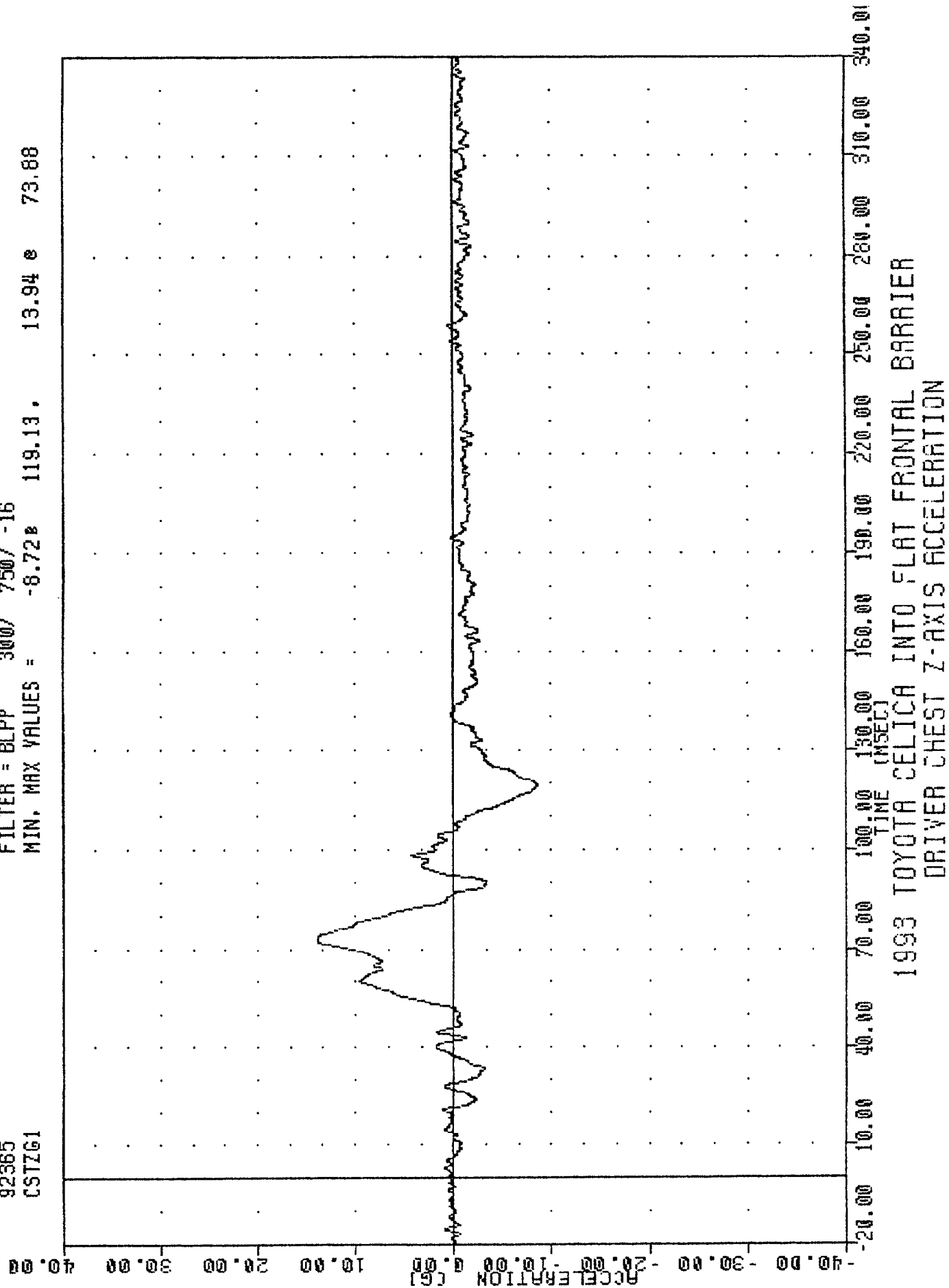
921230

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -2.53e 46.00, 3.72 e 98.00



TRC 921230
 208 COMPLIANCE TESTING
 92365
 CSTIG1

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -8.72 119.13 13.94 73.88

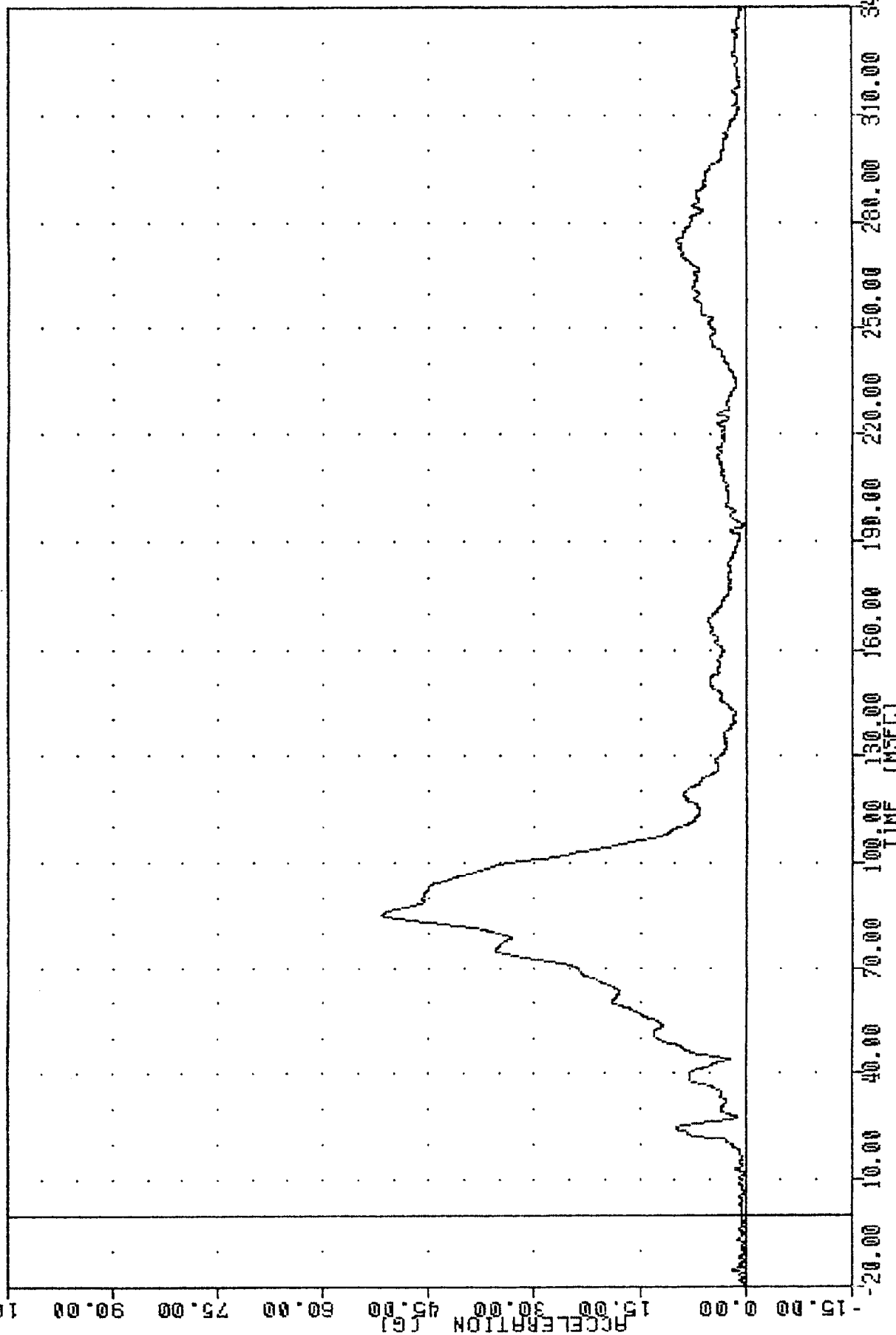


TRC
200 COMPLIANCE TESTING
92365
CSTRG1

, 921230

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = 0.02% -7.75, 51.61 e 85.25

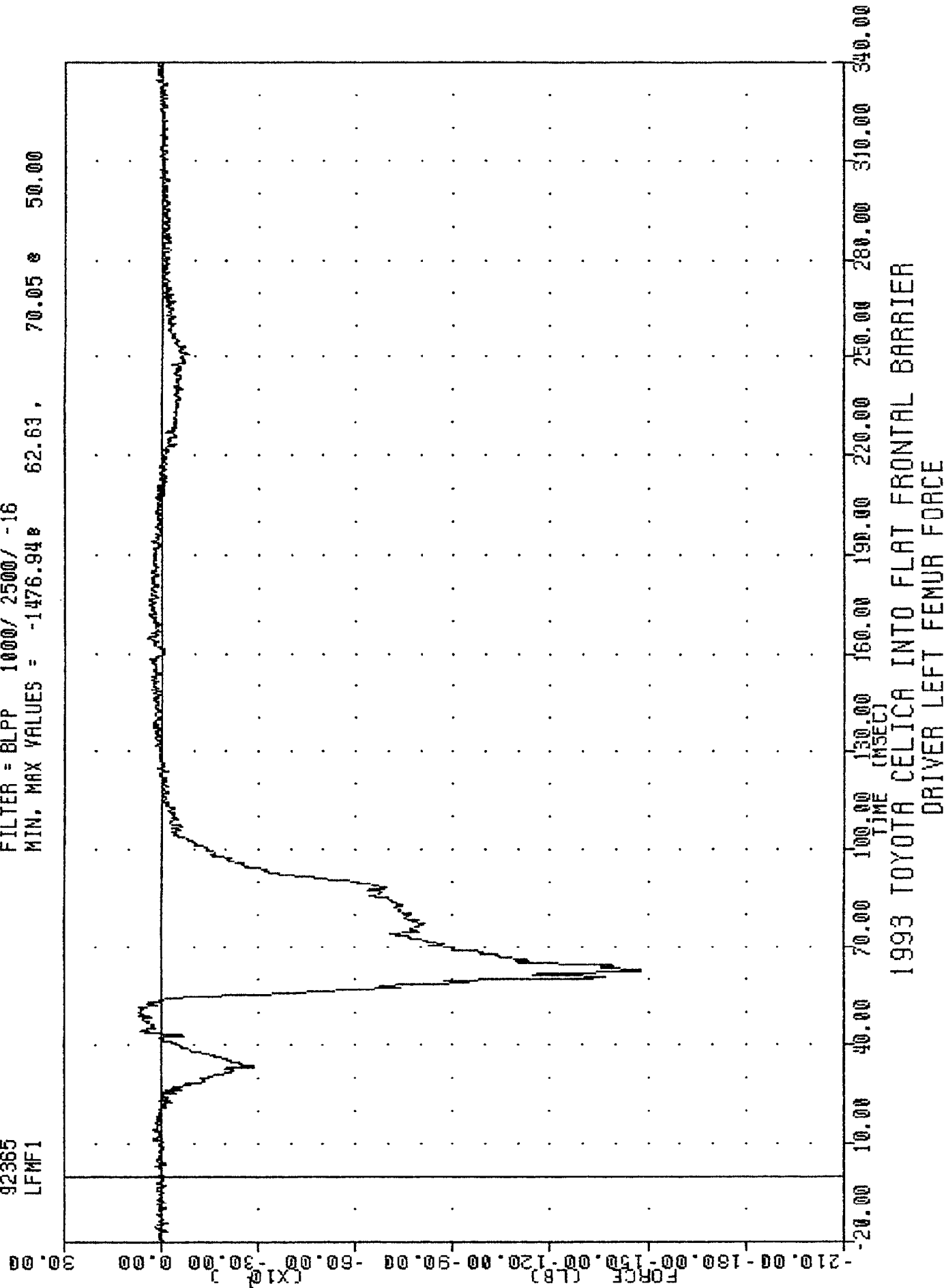
105.00



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
DRIVER CHEST RESULTANT ACCELERATION

IHC 921230
 208 COMPLIANCE TESTING
 92365
 LFMF1

FILTER = BLPP 1000/ 2500/ -16
 MIN. MAX VALUES = -1476.94 62.63 70.05 50.00

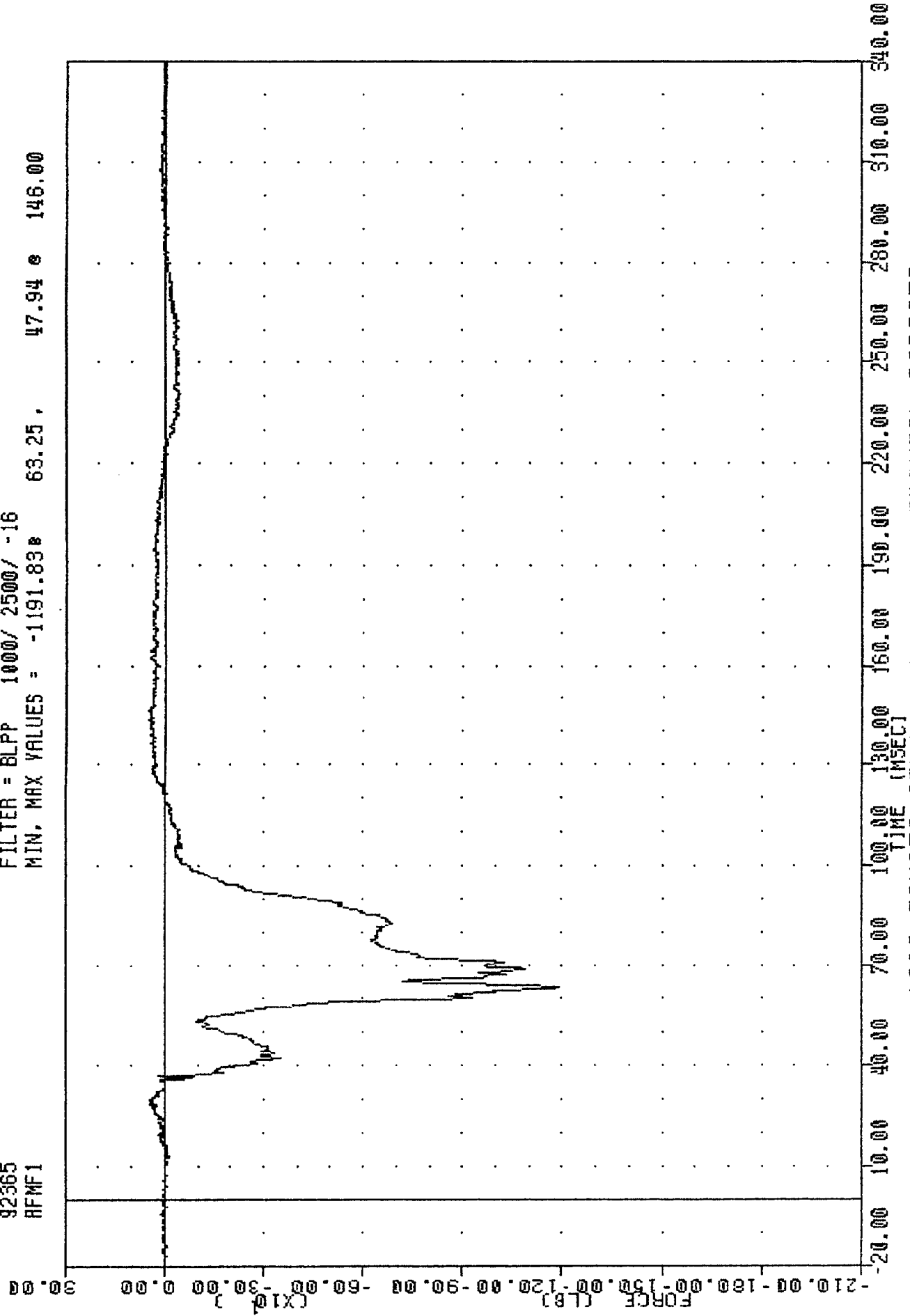


1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
 DRIVER LEFT FEMUR FORCE

TRC
200 COMPLIANCE TESTING
92365
AFMF1

921230

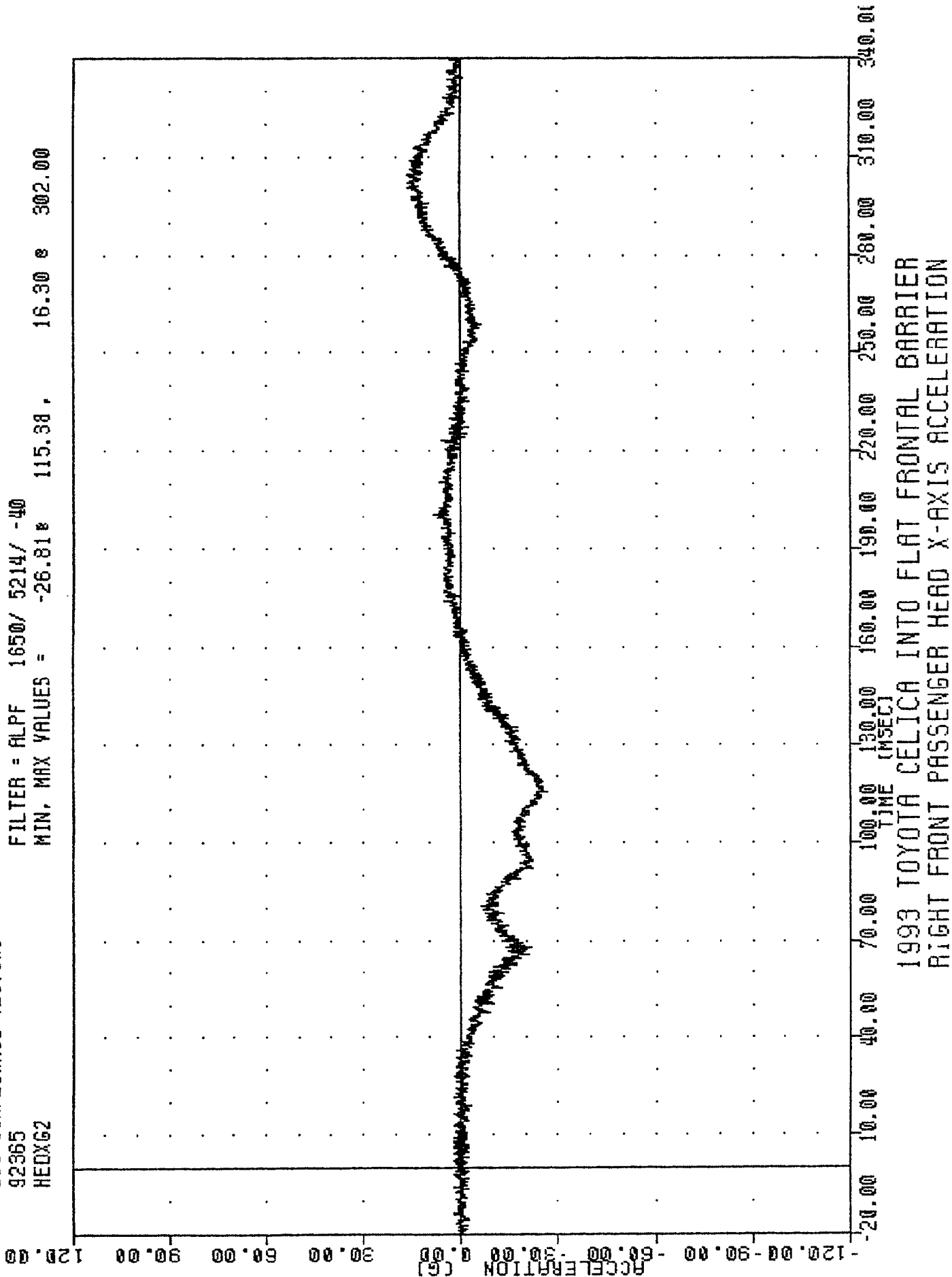
FILTER = BLPP 1000/ 2500/ -16
MIN, MAX VALUES = -1191.83 63.25, 47.94 146.00



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
DRIVER RIGHT FEMUR FORCE

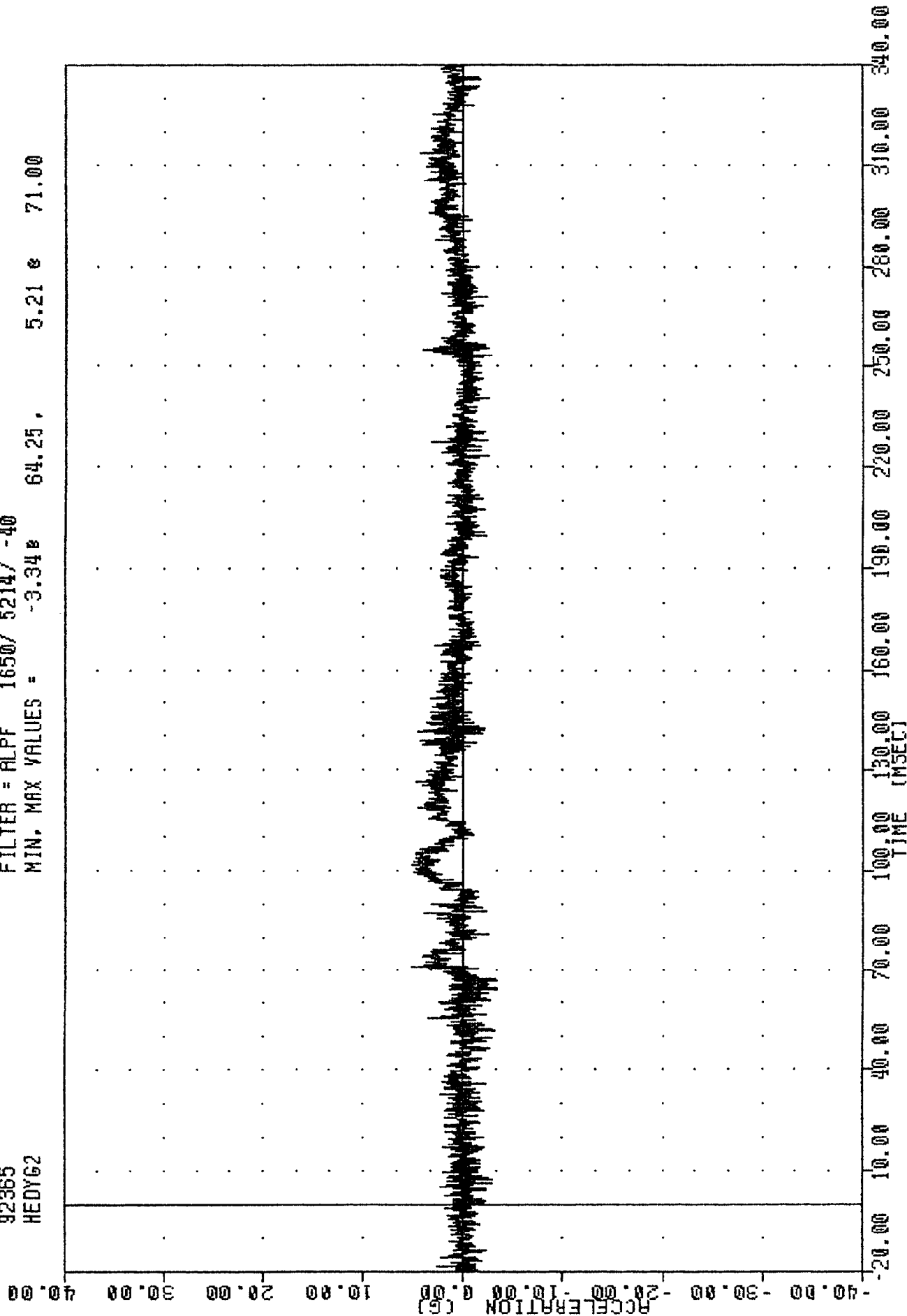
TRC
 200 COMPLIANCE TESTING
 92365
 HEDXG2

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -26.81e 115.38, 16.30 e 302.00



THC 921230
208 COMPLIANCE TESTING
92365
HEDYG2

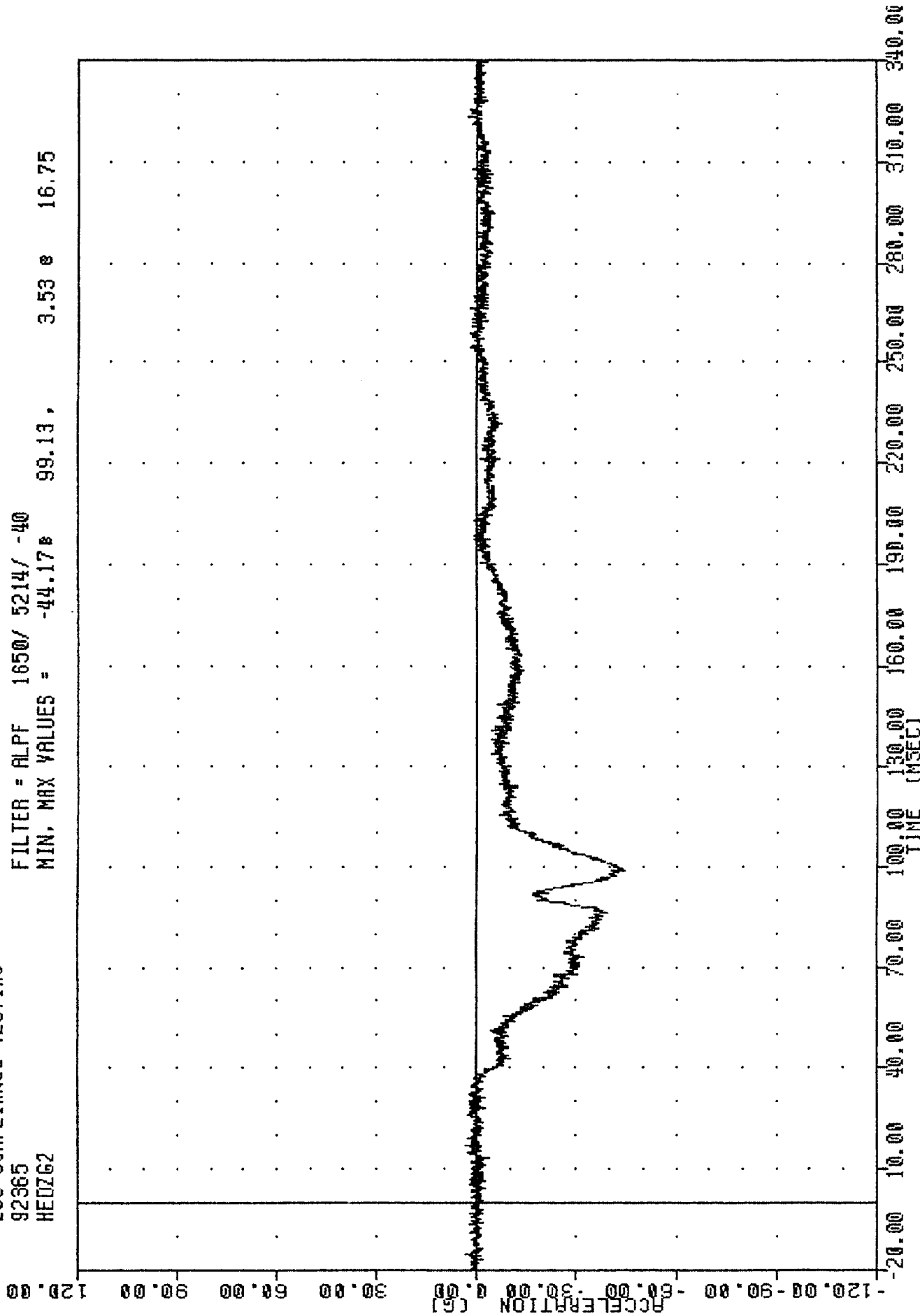
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -3.34g 64.25, 5.21 g 71.00



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Y-AXIS ACCELERATION

THC 921230
200 COMPLIANCE TESTING
92365
HE0262

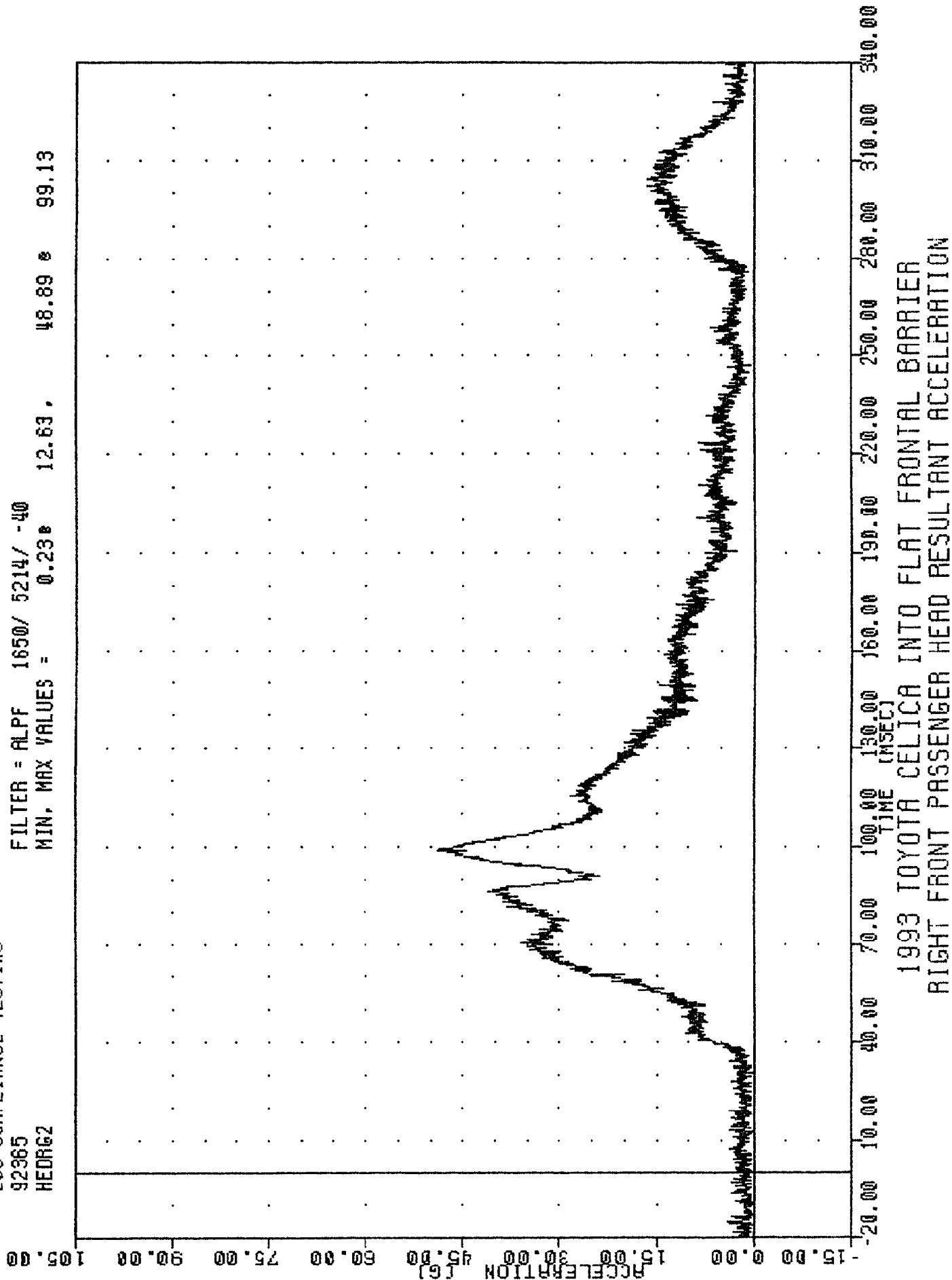
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -44.178 99.13, 3.53 e 16.75



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER HEAD Z-AXIS ACCELERATION

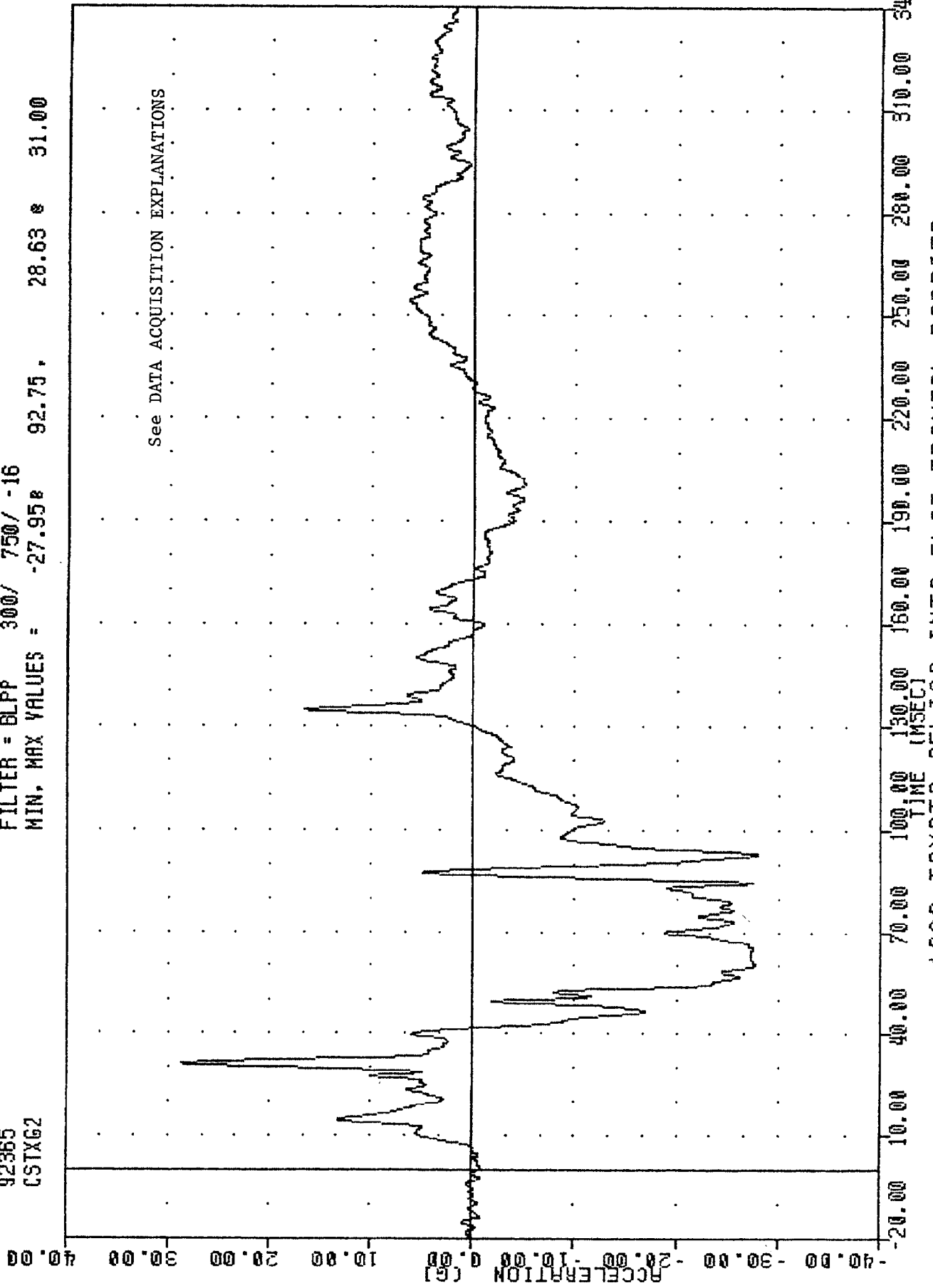
IRC
 200 COMPLIANCE TESTING
 92365
 HEDRG2

FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = 0.23 12.63, 48.89 99.13



TAC 921230
208 COMPLIANCE TESTING
92365
CSTXG2

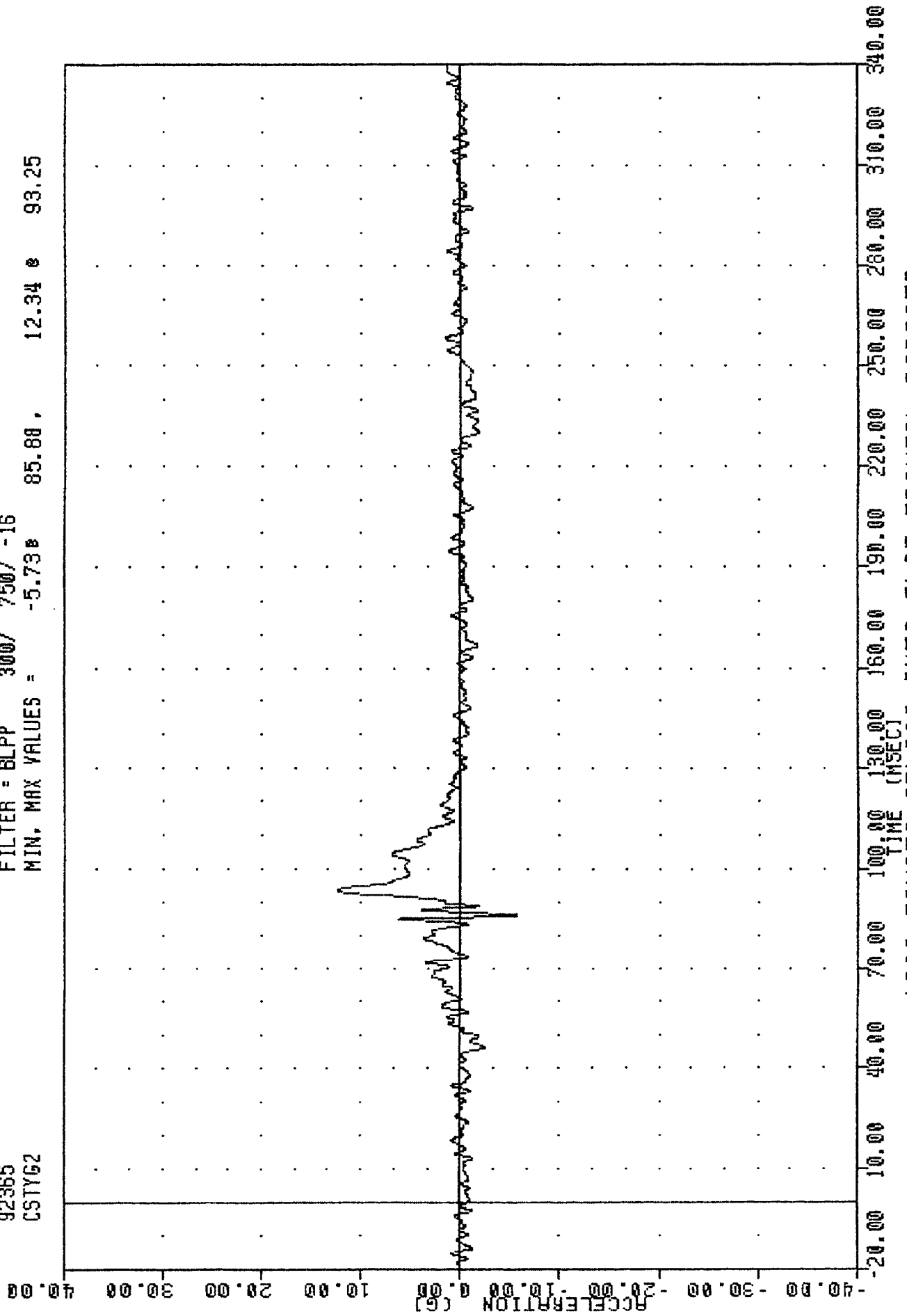
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -27.95 92.75, 28.63 31.00



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST X-AXIS ACCELERATION

TRC , 921230
200 COMPLIANCE TESTING
92365
CSTY62

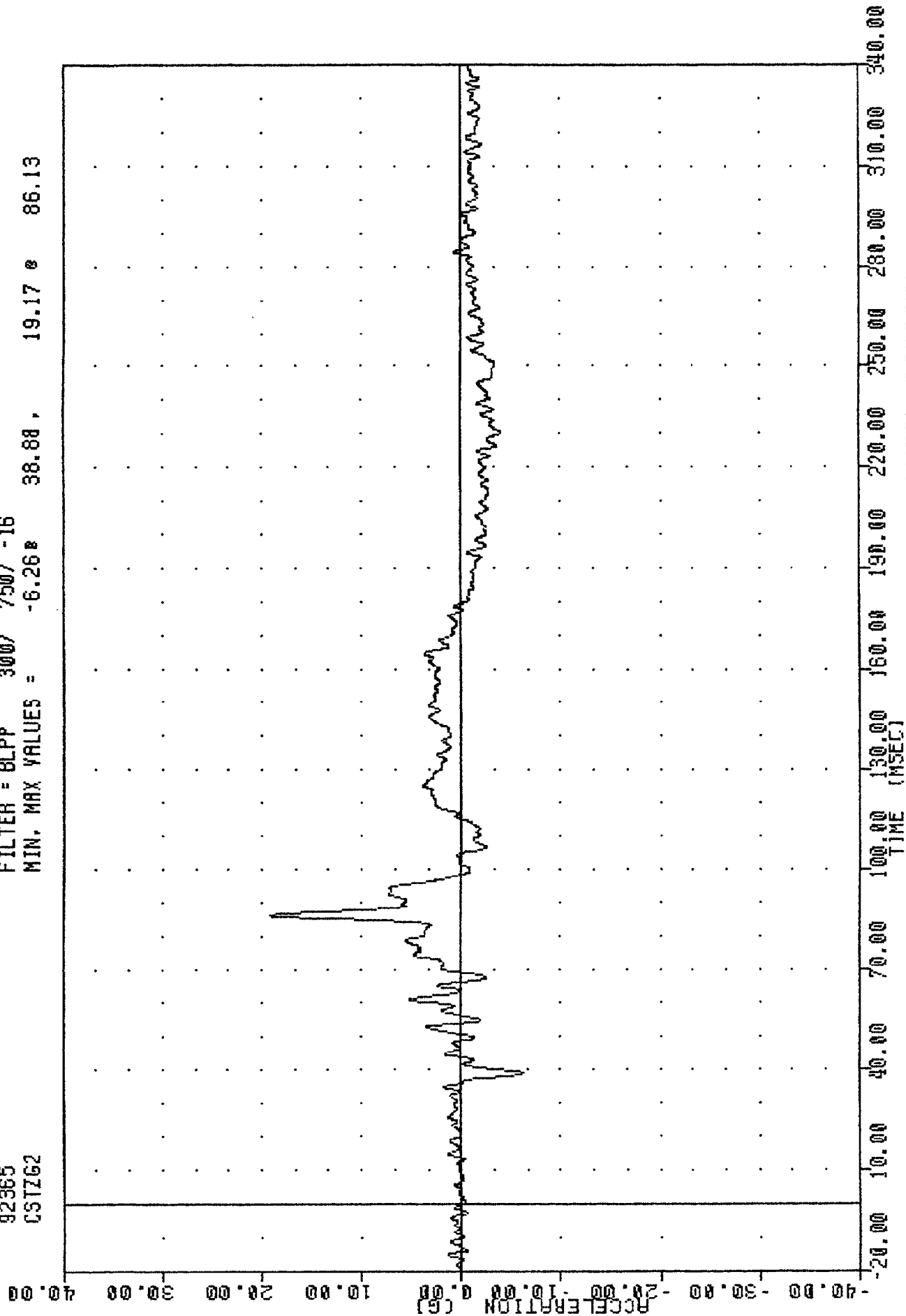
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -5.73e 85.88 , 12.34 e 93.25



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
RIGHT FRONT PASSENGER CHEST Y-AXIS ACCELERATION

TRC 921230
 208 COMPLIANCE TESTING
 92365
 CSTZ62

FILTER = BLPP 300/ 750/ -16
 MIN, MAX VALUES = -6.26 38.88 , 19.17 86.13

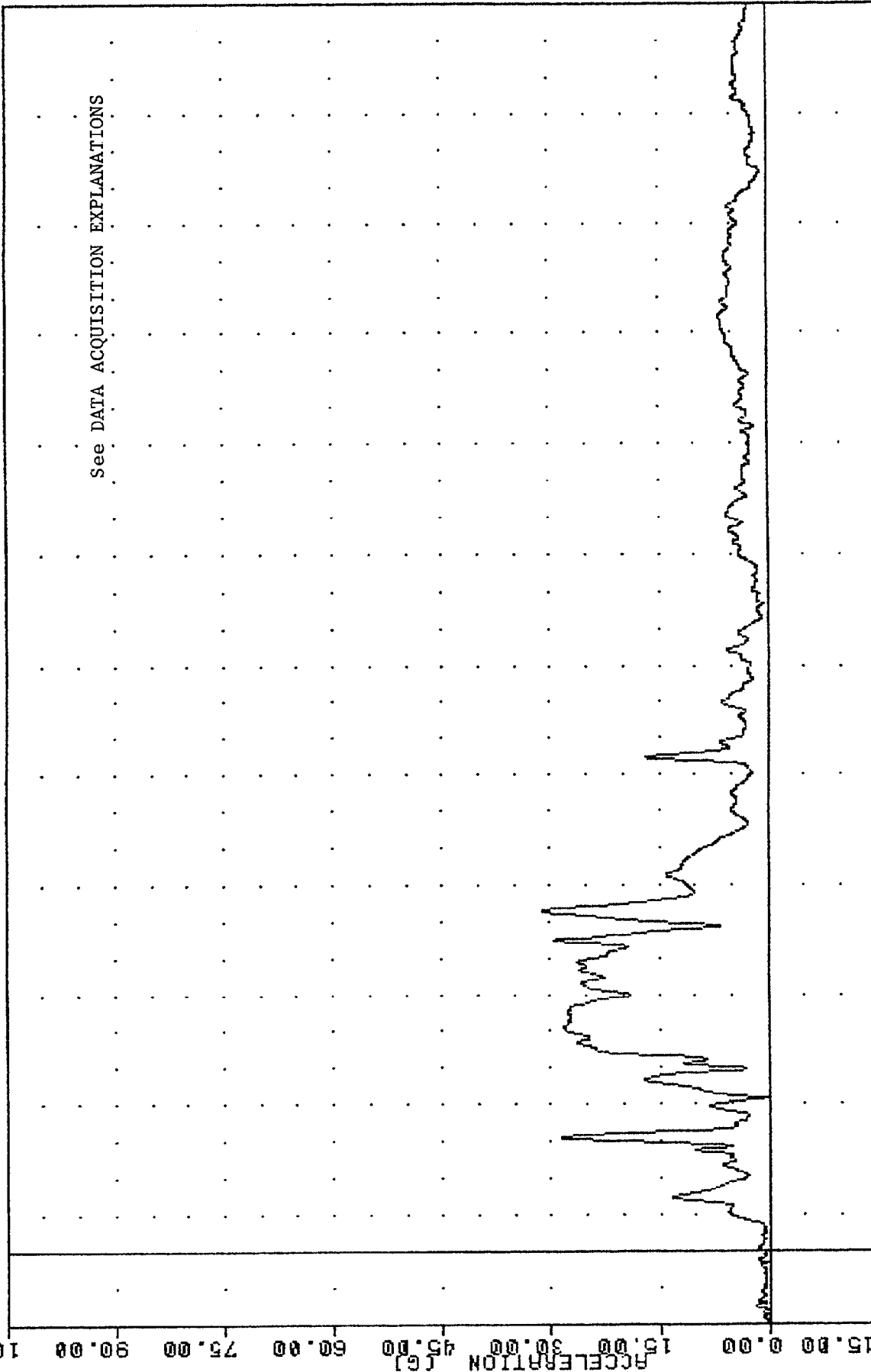


1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
 RIGHT FRONT PASSENGER CHEST Z-AXIS ACCELERATION

TRC . 921230
 208 COMPLIANCE TESTING
 92365
 CSTRG2

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = 0.038 -20.00 , 31.18 e 92.88

105.00

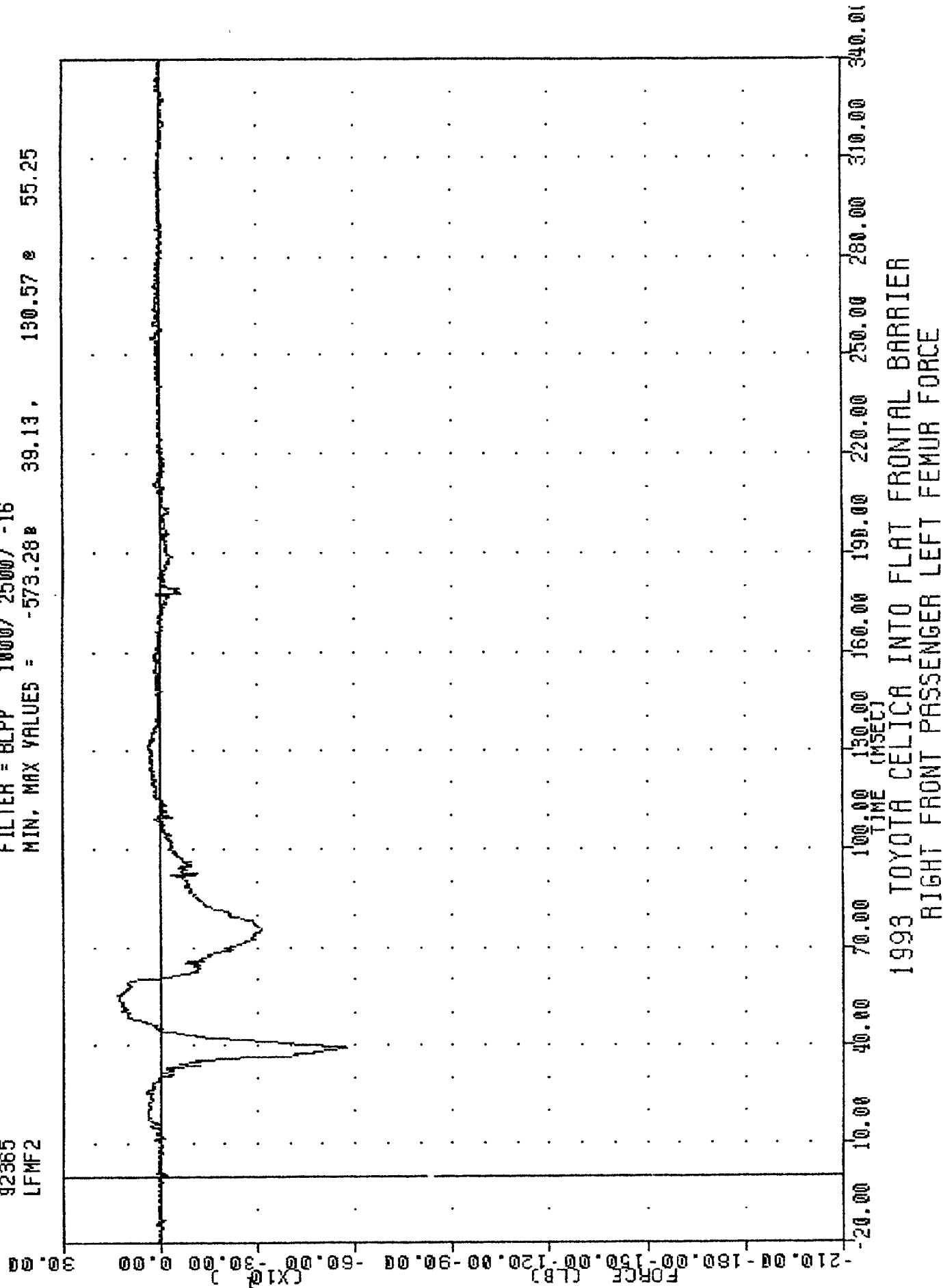


-15.00 0.00 15.00 30.00 45.00 60.00 75.00 90.00 105.00
 -20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
 TIME (msec)

1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
 RIGHT FRONT PASSENGER CHEST RESULTANT ACCELERATION

TRC
208 COMPLIANCE TESTING
92365
LFMF2

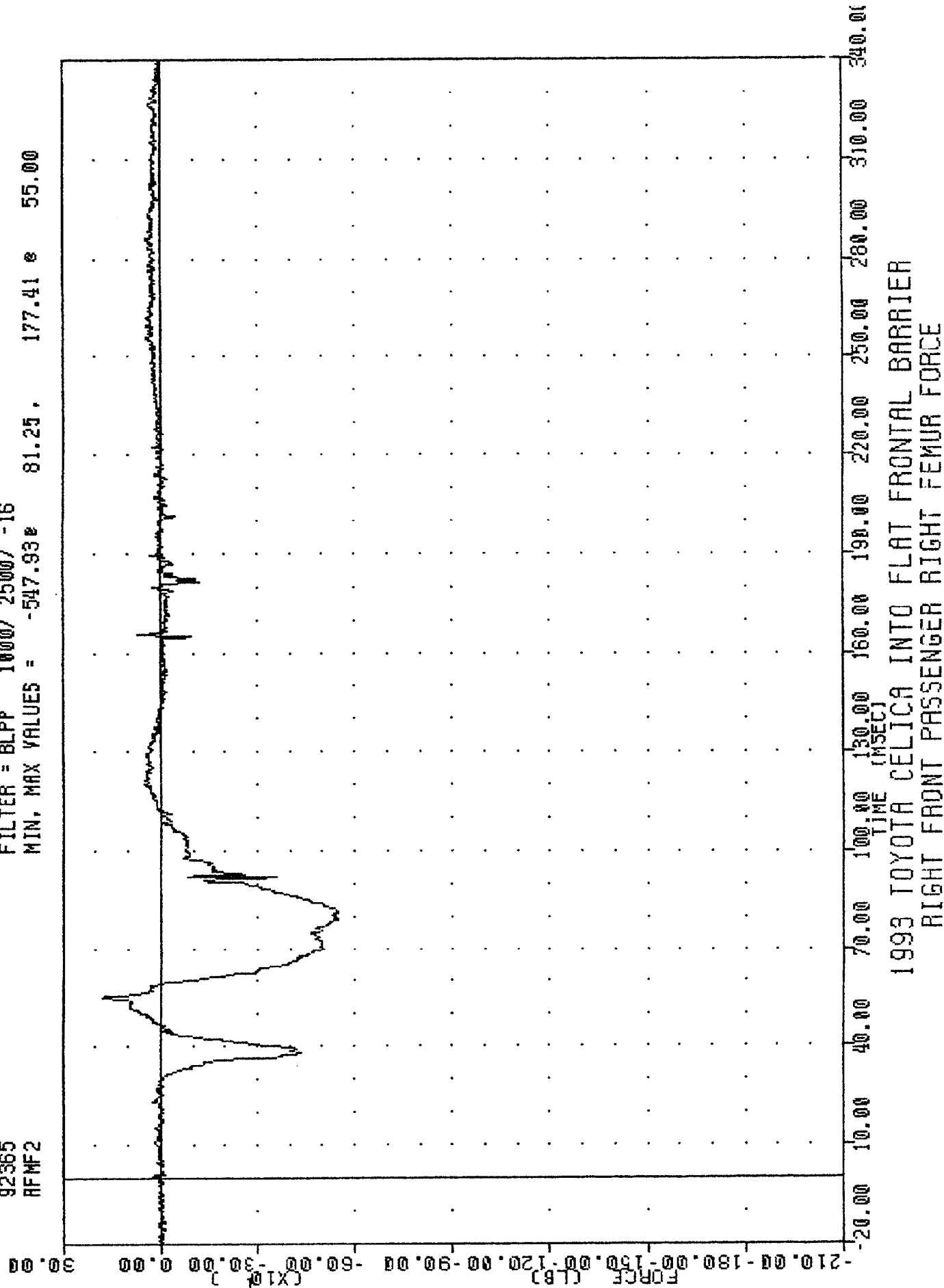
FILTER = BLPP 1000/ 2500/ -16
MIN, MAX VALUES = -573.28 39.13, 130.57 55.25



TRC
200 COMPLIANCE TESTING
92365
RFMF2

, 921230

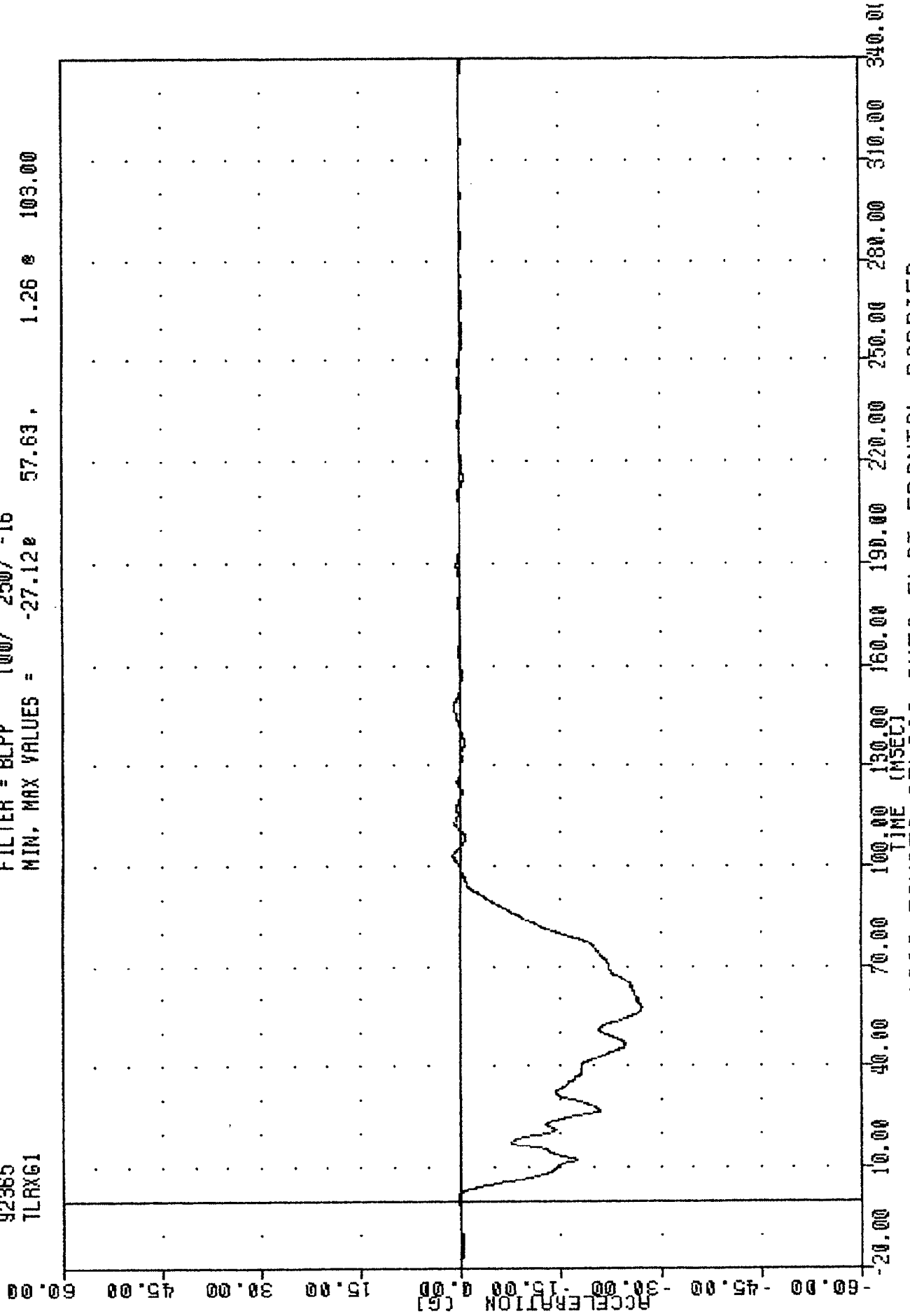
FILTER = BLPP 1000/ 2500/ -16
MIN, MAX VALUES = -547.93e 81.25, 177.41 e 55.00



TRC
208 COMPLIANCE TESTING
92385
TLRX61

, 921230

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -27.12e 57.63, 1.26 e 103.00

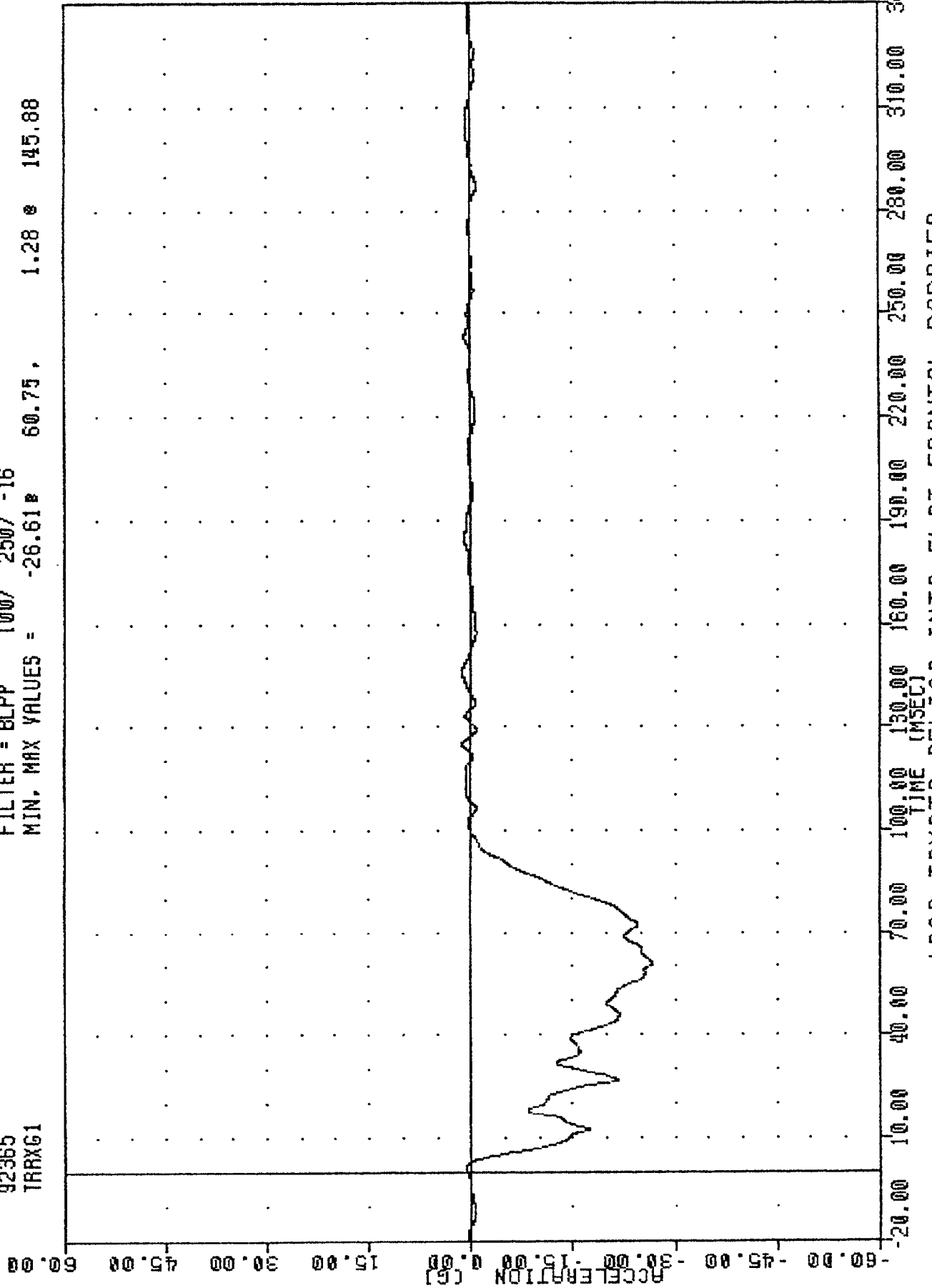


1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
LEFT REAR SEAT X-AXIS ACCELERATION

TRC
208 COMPLIANCE TESTING
92365
TRRXG1

, 921230

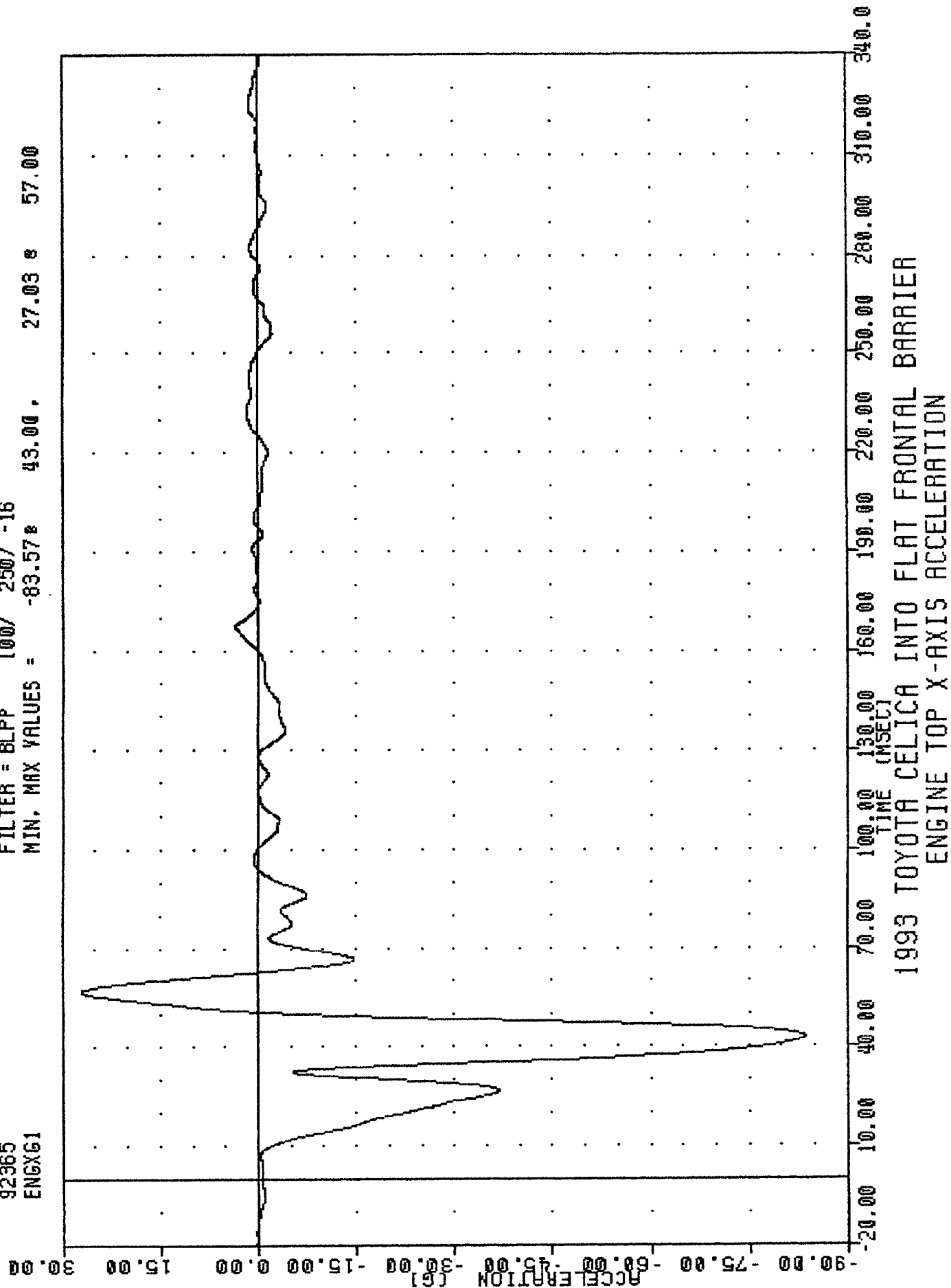
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -26.61 60.75, 1.28 145.88



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
RIGHT REAR SEAT X-AXIS ACCELERATION

TRC , 921230
200 COMPLIANCE TESTING
92365
ENGX61

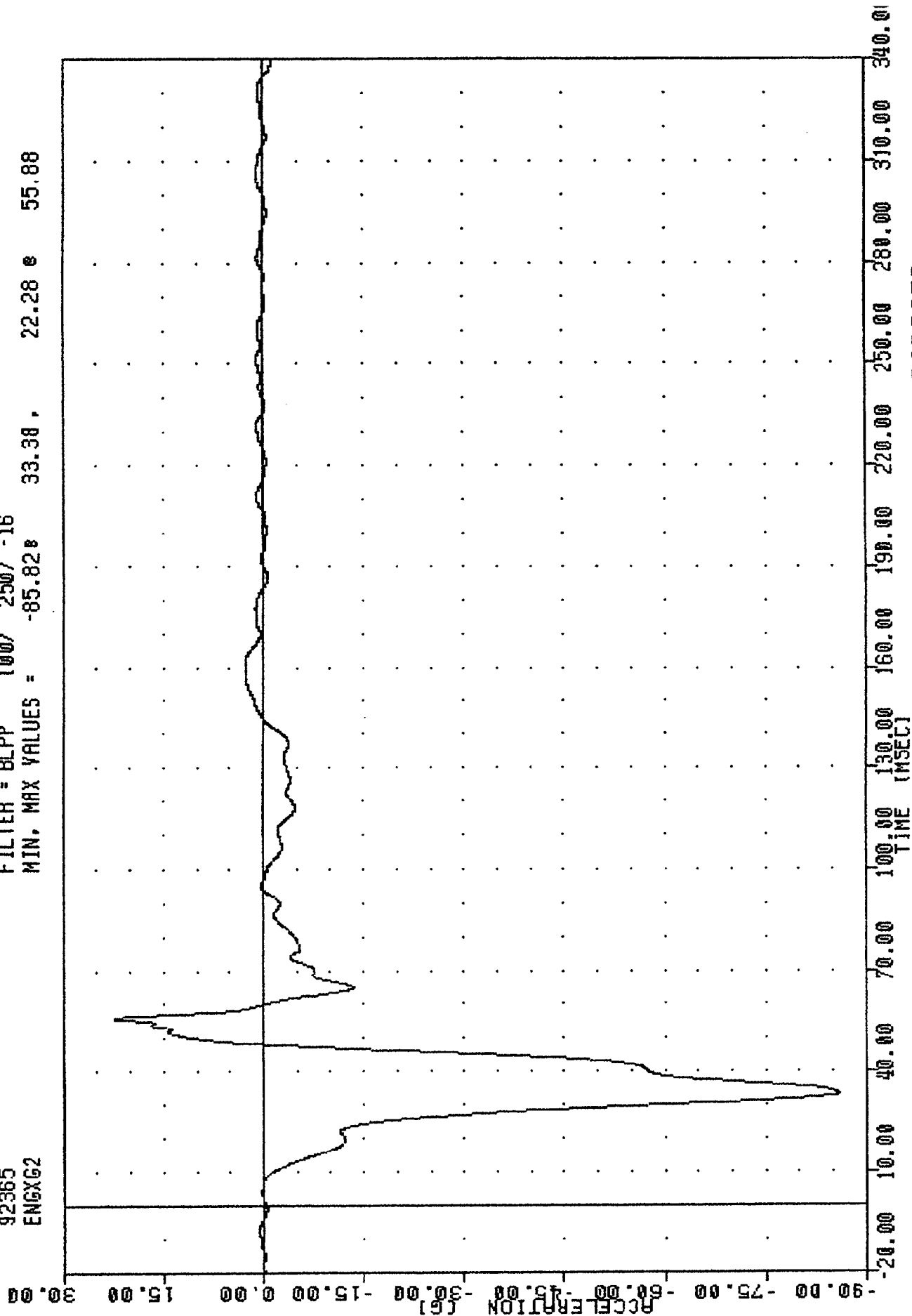
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -83.57% 43.00% 27.03% 57.00



TRC
208 COMPLIANCE TESTING
92365
ENGXG2

, 921230

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -85.82 33.38 22.28 55.88

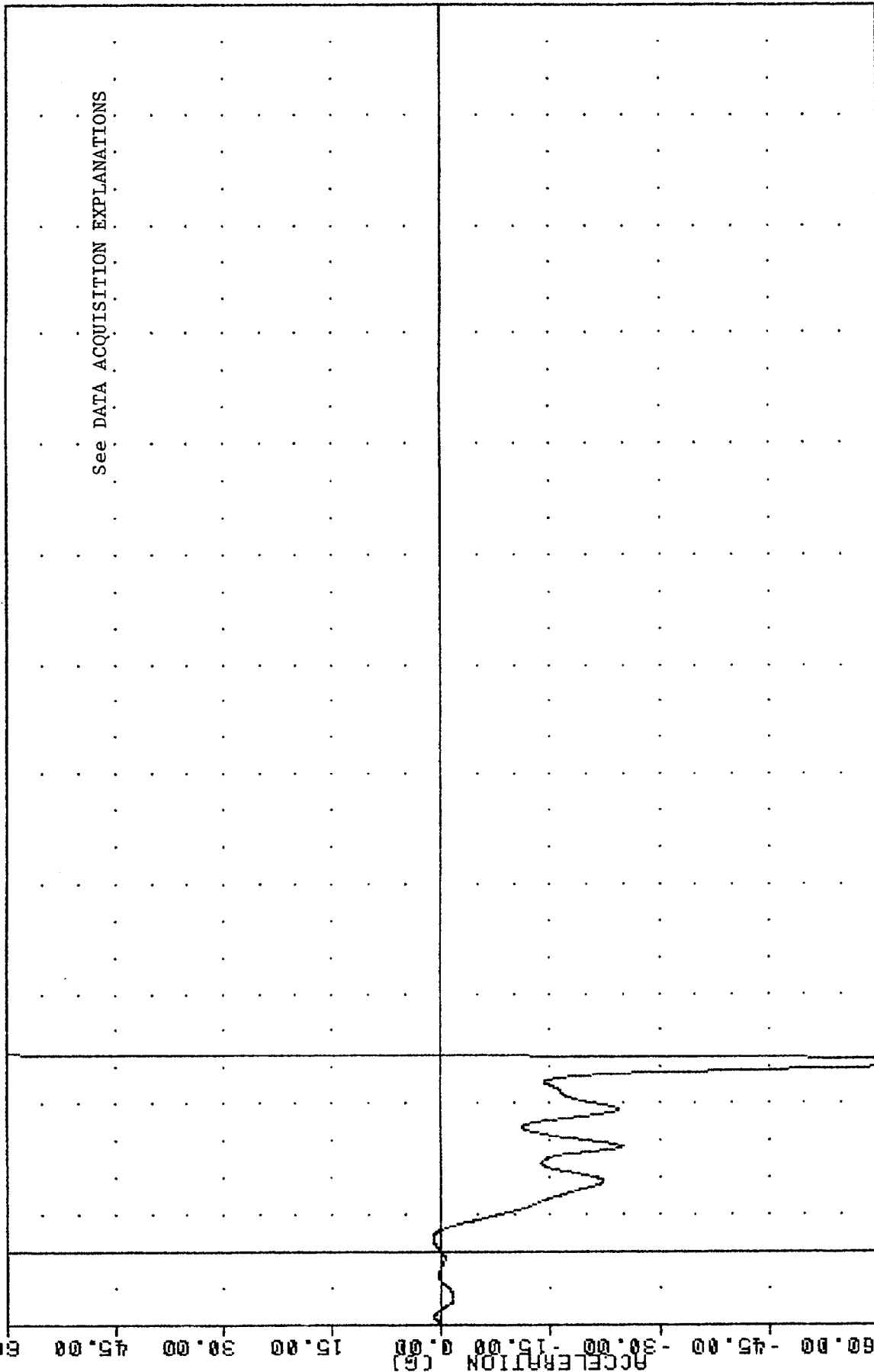


TRC 921230
 200 COMPLIANCE TESTING
 92365
 BCRX61

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -80.10 51.38 1048.80 251.13

ACCELERATION (G)
 60.00
 45.00
 30.00
 15.00
 0.00
 -15.00
 -30.00
 -45.00
 -60.00

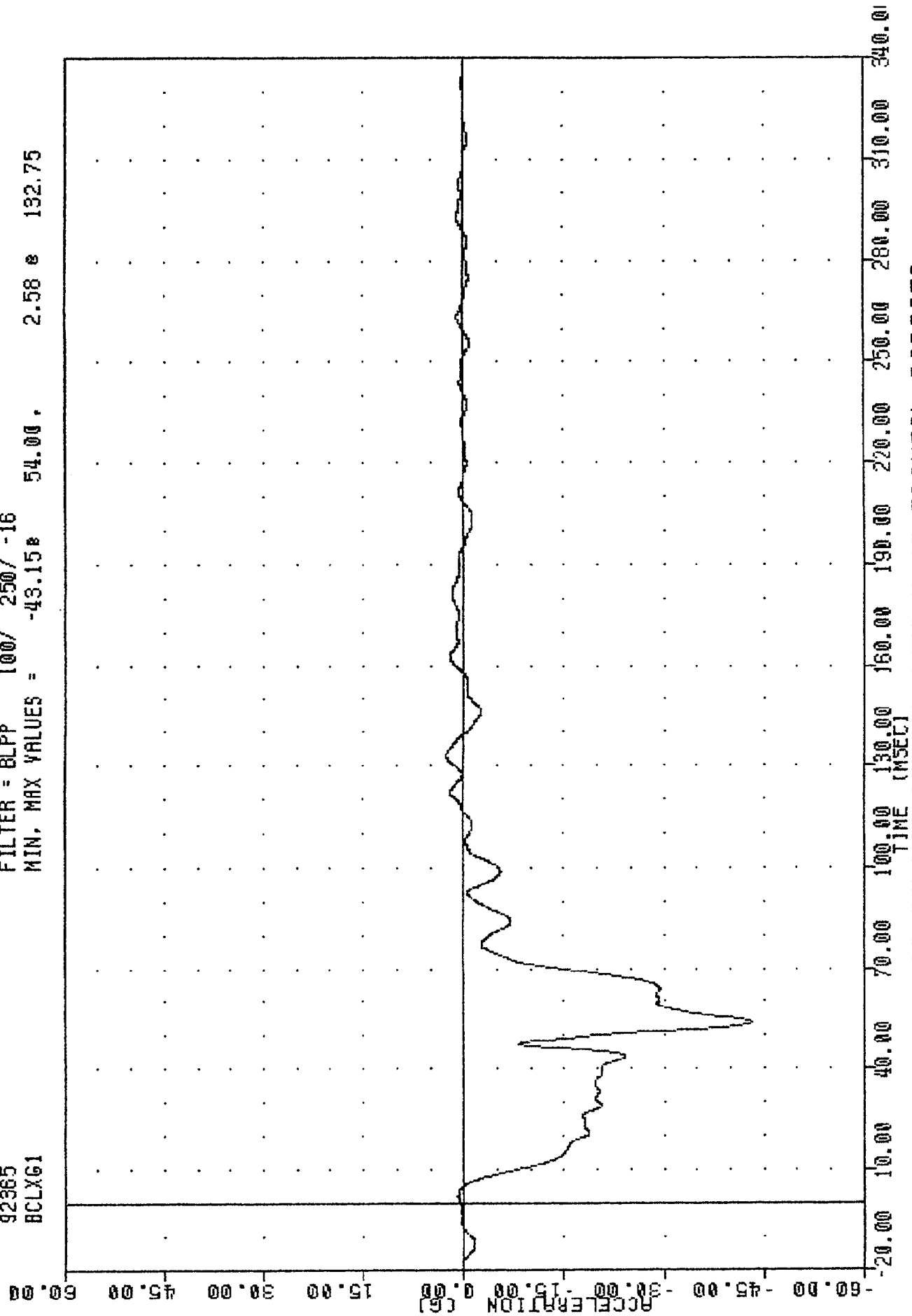
See DATA ACQUISITION EXPLANATIONS



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
 RIGHT BRAKE CALIPER X-AXIS ACCELERATION

TRC
921230
208 COMPLIANCE TESTING
92365
BCLXG1

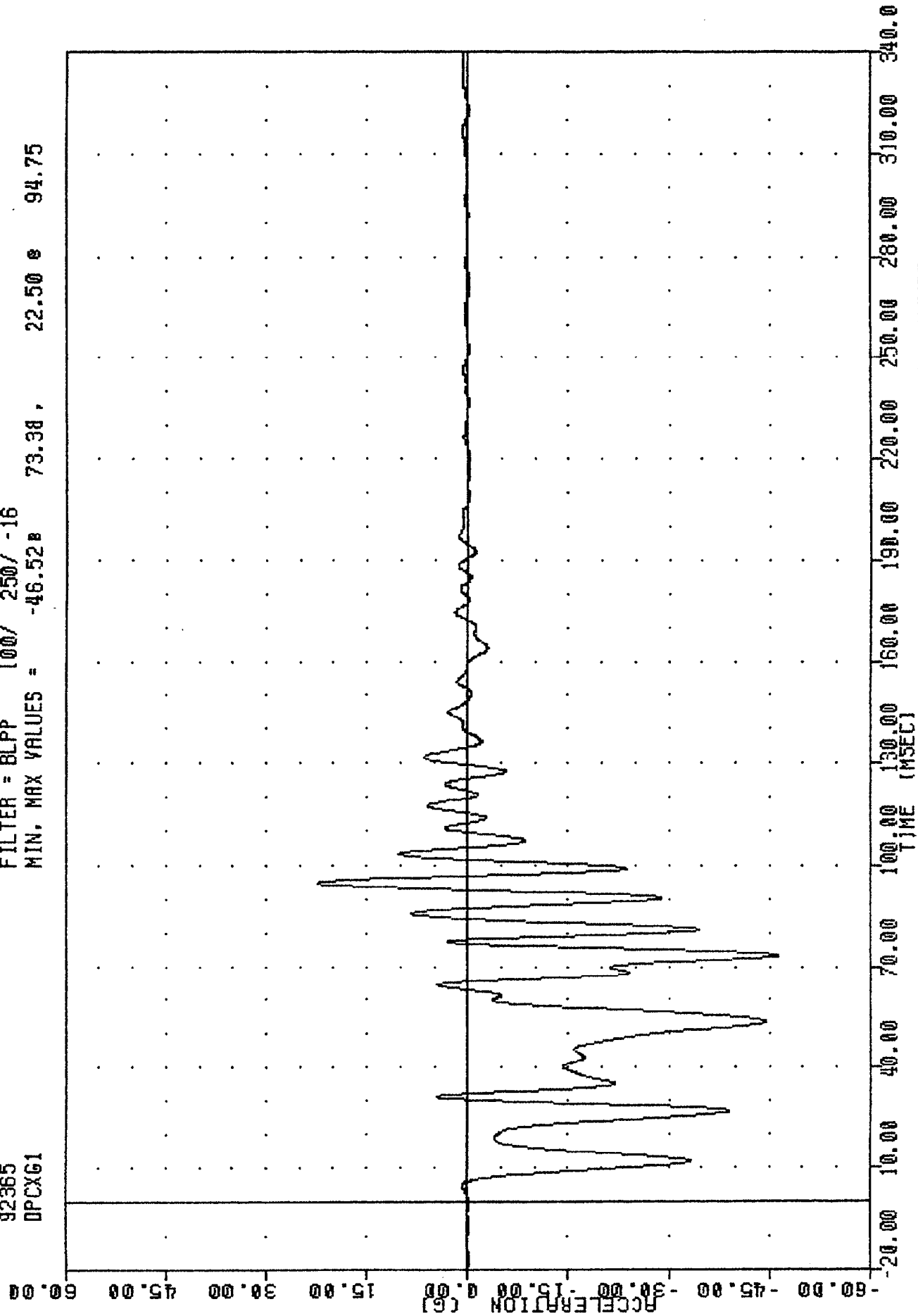
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -43.158 54.00 2.58 e 132.75



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
LEFT BRAKE CALIPER X-AXIS ACCELERATION

TRC
208 COMPLIANCE TESTING
92365
DPCXG1

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -46.52 73.38, 22.50 94.75



1993 TOYOTA CELICA INTO FLAT FRONTAL BARRIER
INSTRUMENT PANEL CENTER X-AXIS ACCELERATION