

NHTSA 7-57

#1522

Y

VEHICLE AND OCCUPANT ROLLOVER DYNAMICS
1988 NISSAN PICKUP TRUCK DRIVER'S SIDE CURB ROLLOVER
INTO RIGID POLE AT 30 MPH

PREPARED BY:
THE TRANSPORTATION RESEARCH CENTER OF OHIO
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SEPTEMBER - OCTOBER, 1990
TEST REPORT

PREPARED FOR:
SYSTEMS RESEARCH LABORATORIES, INC.
2800 INDIAN RIPPLE ROAD
DAYTON, OHIO 45440

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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	0.9	metric ton	t
		(2000 lb)		

		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
in ³	cubic inches	16	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	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C

Approximate Conversions From Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		

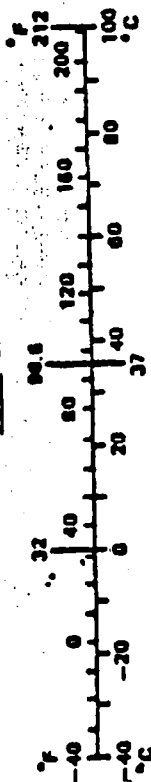
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi

		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	2.5	acres	
		(10 000 m ²)		

		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton	1.1	short tons	
		(1000 kg)		

		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
ml	milliliters	0.06	cubic inches	in ³
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	degrees Celsius	9/5 (then degrees add 32)	Fahrenheit	°F



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SECTION 1.0

PURPOSE AND TEST SUMMARY

This rollover crash test has the main objective of investigating both vehicle and occupant dynamics during automobile rollover crashes.

This test, a driver's side, curb rollover, was conducted with a 1988 Nissan pickup truck, containing a driver dummy. The vehicle was oriented so that its left side impacted a curb. The roof and left side were intended to impact a rigid pole during the roll induced by the curb. The vehicle was propelled laterally at a velocity of 30 mph. The test vehicle contained an instrumented Part 572E dummy restrained with a three-point unbelt.

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

PART 572

16-SEP-85

TEMPERATURE 69 F
RIGHT KNEE
NHTSA ROLL RK88002

RELATIVE HUMIDITY 54 %
572 SN 880 R.KNEE IMP CAL 02

TEST PARAMETER	SPECIFICATION	TEST RESULTS
PROBE VELOCITY	6.76 - 7.04 FT/SEC	6.90 FT/SEC
PEAK KNEE IMPACT FORCE	1850 - 2500 LBS.	2371.72 LBS.
DURATION ABOVE 1000 LBS.	>=1.7 MS.	1.80 MS.

DUMMY MEETS SPECIFICATIONS

TECHNICIAN

Mary L. Phelps

TEST SUPERVISOR

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SECTION 2.0

SUMMARY OF ROLLOVER CRASH TEST

A 1988 Nissan pickup truck, containing one instrumented Part 572E test dummy, was propelled laterally so that the driver's side impacted into a rigid curb. The vehicle rolled so that its roof and right side impacted a rigid, vertical, instrumented pole at 30 mph. This driver's side curb rollover into pole crash test was conducted by the Transportation Research Center of Ohio in East Liberty, Ohio on September 14, 1990.

The Part 572E 50th percentile adult male anthropomorphic test device (dummy) was placed in the driver's designated seating position according to the seating procedure in FMVSS 208 Notice 60. The dummy was instrumented with head, chest, and pelvis triaxial accelerometers, a six-axis neck load cell, and a chest displacement potentiometer. The crash event was recorded by thirty-four channels of data on one 14-track tape drive. The analog data was digitally sampled at 8000 samples per second. The data was digitally filtered per SAE J211 OCT88.

The crash event was filmed by six high-speed motion picture cameras operating at approximately 500 frames per second and one real-time panning motion picture camera.

Section 1.0 contains the purpose and test summary. Section 2.0 contains a summary of the rollover crash test. Section 3.0 contains the general test and vehicle parameter data. Section 4.0 contains the occupant information. Appendix A contains the pre-test and post-test still photographs. Appendix B contains the final data plots. Appendix C contains the pre-test and post-test IPMD vehicle data sheets.

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POLE LOAD CELL LOCATIONS AND DATA SUMMARY

TEST NUMBER 900914

No. LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
				MAX	SEC	MAX	SEC
1 POLE LEFT TOP FORCE (lbs) LONGITUDINAL	16.2	3.3	73.5	739.8	0.5	1836.7	0.6
2 POLE RIGHT TOP FORCE (lbs) LONGITUDINAL	16.2	-3.5	73.6	254.2	0.1	3955.8	0.5
3 POLE LEFT BOTTOM FORCE (lbs) LONGITUDINAL	16.2	3.2	5.0	3949.0	0.5	1573.9	0.6
4 POLE RIGHT BOTTOM FORCE (lbs) LONGITUDINAL	16.2	-3.3	5.0	1479.5	0.6	4887.5	0.5

* ALL MEASUREMENTS OF POLE LOAD CELL LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM RELEASE BLOCK
 Y: + LEFTWARD FROM POLE CENTERLINE
 Z: + UPWARD FROM GROUND LEVEL
 FORCE: + TENSION

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FINAL RESTING LOCATIONS OF PARTS AND VEHICLE

<u>DESCRIPTION OF VEHICLE</u>	<u>X. DISTANCE *</u>	<u>Y. DISTANCE *</u>
1988 Nissan pickup truck:		
Left rear corner	135.5	100.0
Right rear corner	156.6	44.0
Left front corner	-21.2	35.0
Right front corner	2.0	-22.0

DESCRIPTION OF PARTS

Left rear tire, rim and hub	59.0	44.0
Rear window & window moulding	77.5	57.8

*REFERENCE: +X: FORWARD FROM RELEASE BLOCK
 +Y: LEFTWARD FROM CENTER RELEASE BLOCK

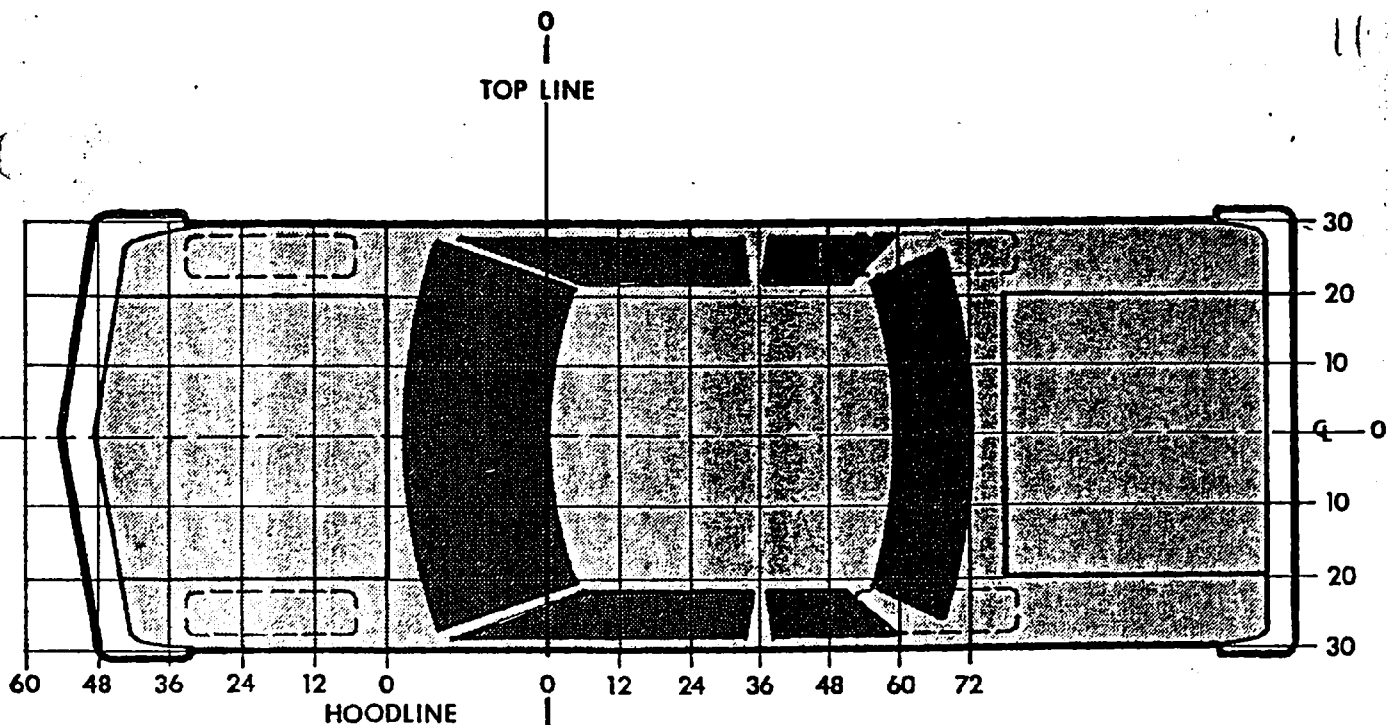
ALL MEASUREMENTS ARE IN INCHES.

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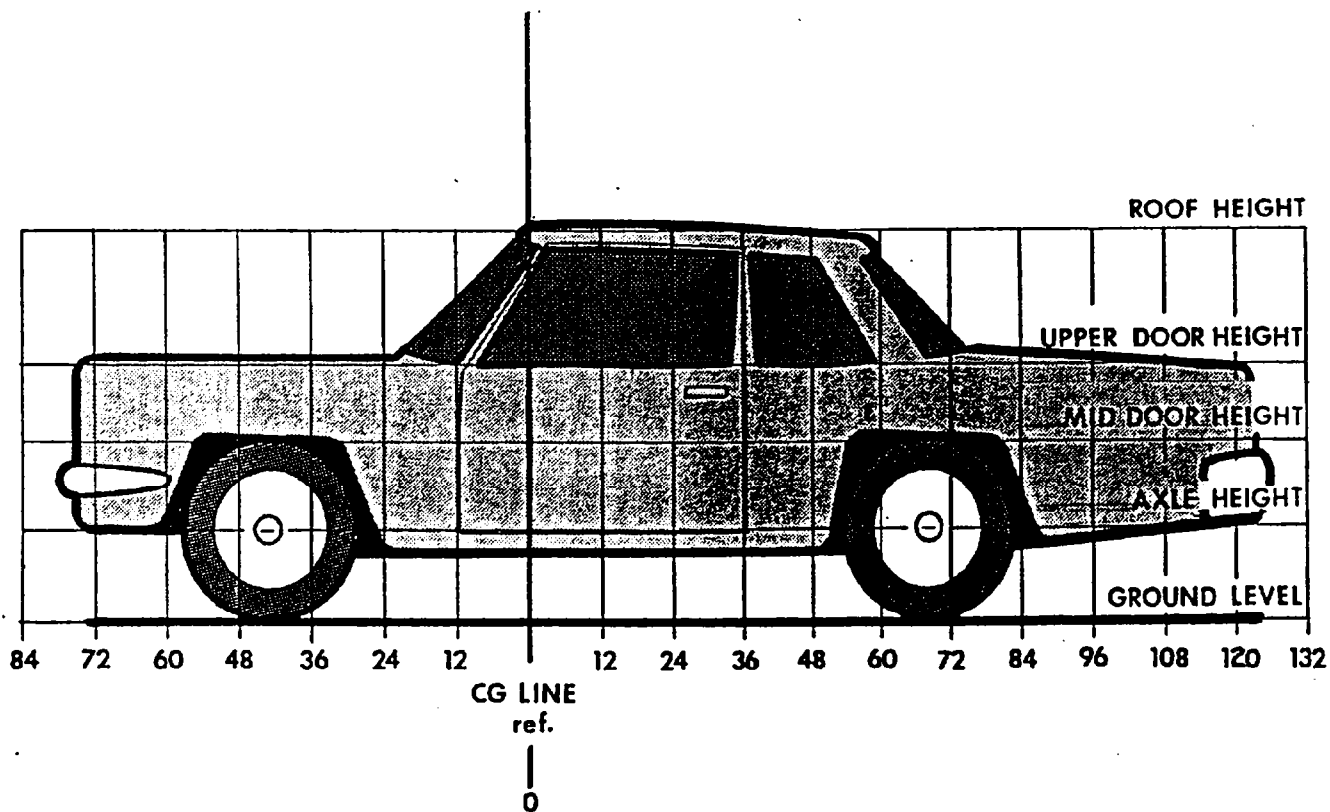
VEHICLE INTERIOR MEASUREMENTS

<u>DESCRIPTION</u>	<u>PRE</u>	<u>POST</u>	<u>DIFF</u>
Floor board to top of left "A" post	40.8	35.5	5.3
Floor board to top of right "A" post	40.6	30.8	9.8
Door sill to top of left "B" post	42.8	39.5	3.3
Door sill to top of right "B" post	42.8	30.2	12.6
Door sill to top of left door opening	43.1	37.5	5.6
Door sill to top of right door opening	42.9	28.5	14.4
Floor tunnel to windshield header	35.6	25.0	10.6
Floor tunnel to center of roof	38.5	24.5	14.0
Rear of floor tunnel to roof	41.2	NA	NA
Maximum width at "B" post	48.0	56.0	-8.0
Maximum width at "A" post	49.4	56.0	-6.6
Maximum width at top of door opening	48.5	41.0	7.5

ALL MEASUREMENTS ARE IN INCHES



HOOD AND ROOF STATIC CRUSH LOCATIONS



LEFT AND RIGHT SIDE STATIC CRUSH LOCATIONS

**VEHICLE HOOD EXTERIOR PROFILES
ZERO DISTANCE AT VEHICLE HOOD CENTERLINE***

LOCATION	30	20	10	0	10	20	30
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)							
Trailing edge of cowl at centerline	X	42.0	42.1	42.4	42.2	41.9	X
Trailing edge of cowl + 12 inches***	X	40.6	40.8	41.0	40.6	40.4	X
Trailing edge of cowl + 24 inches	X	38.5	38.8	39.0	38.8	38.5	X
Trailing edge of cowl + 36 inches	X	X	X	X	X	X	X
Trailing edge of cowl + 48 inches	X	X	X	X	X	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)							
Trailing edge of cowl at centerline	X	42.4	41.6	40.6	39.1	37.9	X
Trailing edge of cowl + 12 inches	X	41.8	40.1	39.0	37.9	37.0	X
Trailing edge of cowl + 24 inches	X	40.5	39.5	38.5	37.1	35.5	X
Trailing edge of cowl + 36 inches	X	X	X	X	X	X	X
Trailing edge of cowl + 48 inches	X	X	X	X	X	X	X
STATIC CRUSH (IN)							
Trailing edge of cowl at centerline	X	0.4	-0.5	-1.8	-3.1	-4.0	X
Trailing edge of cowl + 12 inches	X	1.2	-0.7	-2.0	-2.7	-3.4	X
Trailing edge of cowl + 24 inches	X	2.0	0.7	-0.5	-1.7	-3.0	X
Trailing edge of cowl + 36 inches	X	X	X	X	X	X	X
Trailing edge of cowl + 48 inches	X	X	X	X	X	X	X

- * Column readings are left to right from left to right on vehicle.
- ** Reference plane is a horizontal plane at ground level.
- *** Longitudinal distance from trailing edge of cowl at centerline forward to measurement plane.
- + Static crush means vehicle structure is bowed upward.
- Static crush means vehicle structure is crushed.

VEHICLE ROOF EXTERIOR PROFILES
ZERO DISTANCE AT VEHICLE ROOF CENTERLINE*

LOCATION	20	10	0	10	20
<u>PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)</u>					
Longitudinal Center of Gravity	X	59.1	59.0	58.6	X
Longitudinal Center of Gravity + 12 inches***	60.4	61.0	60.7	60.6	60.1
Longitudinal Center of Gravity + 24 inches	60.5	61.2	61.2	61.0	60.2
Longitudinal Center of Gravity + 36 inches	X	X	X	X	X
Longitudinal Center of Gravity + 48 inches	X	X	X	X	X
Longitudinal Center of Gravity + 60 inches	X	X	X	X	X
<u>POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)</u>					
Longitudinal Center of Gravity	X	48.5	45.1	46.8	X
Longitudinal Center of Gravity + 12 inches	45.1	46.4	40.5	43.2	46.6
Longitudinal Center of Gravity + 24 inches	44.8	43.5	38.0	38.8	46.5
Longitudinal Center of Gravity + 36 inches	X	X	X	X	X
Longitudinal Center of Gravity + 48 inches	X	X	X	X	X
Longitudinal Center of Gravity + 60 inches	X	X	X	X	X
<u>STATIC CRUSH (IN)</u>					
Longitudinal Center of Gravity	X	-10.6	-13.9	-11.8	X
Longitudinal Center of Gravity + 12 inches	-15.3	-14.6	-20.2	-17.4	-13.5
Longitudinal Center of Gravity + 24 inches	-15.7	-17.7	-23.2	-22.2	-13.7
Longitudinal Center of Gravity + 36 inches	X	X	X	X	X
Longitudinal Center of Gravity + 48 inches	X	X	X	X	X
Longitudinal Center of Gravity + 60 inches	X	X	X	X	X

- * Column readings are left to right from left to right on vehicle.
- ** Reference plane is a horizontal plane at ground level.
- ***Longitudinal distance from center of gravity rearward to measurement plane.
- + Static crush means vehicle structure is bowed upward.
- Static crush means vehicle structure is crushed.

VEHICLE LEFT SIDE EXTERIOR PROFILES AND STATIC CRUSH
ZERO DISTANCE AT VEHICLE LONGITUDINAL CENTER OF GRAVITY*

LOCATION	HEIGHT(IN)	72	60	48	36	24	12	0	12	24	36	48	60	72	84	96
----------	------------	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----

PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)

Roof Height	59.5	X	X	X	X	X	X	22.9	22.9	X	X	X	X	X	X	X
Upper Door	39.5	X	18.0	17.9	17.4	17.4	17.5	17.3	17.1	17.0	17.1	17.2	17.5	17.5	17.3	X
Mid Door	27.0	17.4	X	X	15.8	16.1	16.0	15.6	15.8	15.7	15.8	X	X	16.1	16.1	X
Axle Height	14.6	X	X	X	X	18.2	18.2	18.0	18.1	17.9	17.8	X	X	X	X	X

POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)

Roof Height	59.5	X	X	X	X	X	X	14.5	10.2	X	X	X	X	X	X	X
Upper Door	39.5	X	15.8	15.0	14.6	12.2	10.2	9.2	9.5	15.8	15.5	15.5	15.5	15.0	14.7	X
Mid Door	27.0	17.0	X	X	14.4	14.0	12.9	11.2	11.8	15.8	15.6	X	X	14.9	14.8	X
Axle Height	14.6	X	X	X	X	18.1	18.1	18.2	18.5	19.4	19.6	X	X	X	X	X

STATIC CRUSH (IN)

Roof Height	59.5	X	X	X	X	X	X	-8.4	-12.7	X	X	X	X	X	X	X
Upper Door	39.5	X	-2.2	-2.9	-2.8	-5.2	-7.3	-8.1	-7.6	-1.2	-1.6	-1.7	-2.0	-2.5	-2.6	X
Mid Door	27.0	-0.4	X	X	-1.4	-2.1	-3.1	-4.4	-4.0	0.1	-0.2	X	X	-1.2	-1.3	X
Axle Height	14.6	X	X	X	X	-0.1	-0.1	0.2	0.4	1.5	1.8	X	X	X	X	X

* Center of gravity is located 53.3 inches rearward of vehicle front wheels. Column readings are left to right from front to rear on vehicle.

** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

+ Static crush means that vehicle structure is crushed.

- Static crush means that vehicle structure is bowed/outward.

VEHICLE RIGHT SIDE EXTERIOR PROFILES AND STATIC CRUSH
ZERO DISTANCE AT VEHICLE LONGITUDINAL CENTER OF GRAVITY*

LOCATION	HEIGHT (IN)	72	60	48	36	24	12	0	12	24	36	48	60	72	84	96
----------	-------------	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----

PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)

Roof Height	59.5	X	X	X	X	X	X	23.2	23.2	X	X	X	X	X	X	X
Upper Door	39.5	X	18.2	17.9	17.2	17.2	16.8	17.1	16.9	17.2	17.0	16.9	17.1	17.1	17.2	X
Mid Door	27.0	17.6	X	X	15.8	15.8	15.6	15.9	15.6	16.0	15.6	X	X	16.1	16.2	X
Axle Height	14.6	X	X	X	X	17.8	17.8	17.9	17.9	17.9	17.9	X	X	X	X	X

POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)

Roof Height	59.5	X	X	X	X	X	X	32.8	33.0	X	X	X	X	X	X	X
Upper Door	39.5	X	22.7	21.5	21.0	21.6	24.4	26.0	19.4	19.1	18.9	18.9	19.2	19.4	18.6	X
Mid Door	27.0	18.6	X	X	17.0	17.3	20.9	19.4	16.0	16.5	16.2	X	X	16.6	16.4	X
Axle Height	14.6	X	X	X	X	18.0	17.9	18.0	17.9	17.4	17.5	X	X	X	X	X

STATIC CRUSH (IN)

Roof Height	59.5	X	X	X	X	X	X	9.6	9.8	X	X	X	X	X	X	X
Upper Door	39.5	X	4.5	3.6	3.8	4.4	7.6	8.9	2.5	1.9	1.9	2.0	2.1	2.3	1.4	X
Mid Door	27.0	1.0	X	X	1.2	1.5	5.3	3.5	0.4	0.5	0.6	X	X	0.5	0.2	X
Axle Height	14.6	X	X	X	X	0.2	0.1	0.1	0.0	-0.5	-0.4	X	X	X	X	X

* Center of gravity is located 53.3 inches rearward of vehicle front wheels. Column readings are left to right from front to rear on vehicle.

** Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

+ Static crush means that vehicle structure is crushed.

- Static crush means that vehicle structure is bowed outward.

IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Nissan Pickup

TEST NUMBER: 900914

NO.	TYPE OF MEASUREMENT	ALL MEASUREMENTS ARE IN INCHES		
		PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	179.6	179.0	0.6
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	160.9	160.0	0.9
X3	REAR SURFACE OF VEHICLE TO FIREWALL	141.2	140.4	0.8
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	132.3	130.8	1.5
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	132.2	131.8	0.4
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	131.1	132.0	-0.9
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	131.2	131.0	0.2
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	86.9	90.8	-3.9
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	86.8	86.2	0.6
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	86.9	88.0	-1.1
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	87.2	87.0	0.2
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	131.5	131.0	0.5
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	131.4	130.8	0.6
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	141.2	140.5	0.7
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	141.8	141.0	0.8
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	112.9	113.5	-0.6
X17	CENTER OF STEERING COLUMN TO "A" POST	10.9	16.0	-5.1
X18	CENTER OF STEERING COLUMN TO HEADLINER	17.6	8.8	8.8
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	178.2	178.5	-0.3
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	178.3	177.0	1.3
X21	LENGTH OF ENGINE BLOCK	19.5	19.5	0.0

TEST ANOMALIES

The vehicle's left rear suspension displacement, SRLD1, data was lost after 0.17 seconds, due to the impact breaking the string potentiometer's axle attachment.

The following data channels recorded anomalous noise spikes at 1.47 seconds, due to a pinched cable:

SFRD1, vehicle's right front suspension displacement
SFLD1, vehicle's left front suspension displacement
SRRD1, vehicle's right rear suspension displacement
VCGXG1, vehicle's center of gravity X-axis accelerometer
VCGYG1, vehicle's center of gravity Y-axis accelerometer
VCGZG1, vehicle's center of gravity Z-axis accelerometer

The vehicle's center of gravity resultant acceleration, VCGRG1, contained a spike at 1.47 seconds, due to the above anomalies.

EVENT TIMES

TEST DATE: 09/14/90

EVENT DESCRIPTION	TIME, SEC.
CONTACT RELEASE BLOCK	-0.082
START COLLECTING DATA	-1.375
STOP COLLECTING DATA	3.600
ZERO TIME FOR DATA	0.0
STROBE LIGHTS FLASH	0.225*
CAMERA L E D GOES OFF	0.225**
PIN RELEASES (ROLLOVER CART)	NA
CYLINDERS START (ROLLOVER CART)	NA

*Locate frame where event strobe lights flash. Put projector into reverse mode and go backwards 112 frames. This frame is T-zero for the data. The switch for the event strobes and camera LED was located on the pole. Time-zero is the time at which the vehicle's tires struck the curb as determined from the Y-axis acceleration data.

**Locate frame where event LED stripe ends. Put projector into reverse mode and go backwards (4 + 112) frames. This frame is time-zero for the data. The event LED is exposed on the film 4 frames prior to the image.

SECTION 3.0

GENERAL TEST AND VEHICLE PARAMETER DATA

The following data sheets describe the General Test and Vehicle Parameter Data.

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Nissan Motor Co. Ltd.

MAKE/MODEL: Nissan pickup

VIN: 1N6ND11SXJC314235

BODY STYLE: Truck

MODEL YEAR: 1988

NHTSA NO.: NA

COLOR: Red

ENGINE DATA: TYPE: inline CYLINDERS: 4 DISPLACEMENT: 2.4 liter

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

DATE VEHICLE RECEIVED: 8/10/90

ODOMETER READING: 174,105

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

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

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

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: Nissan Motor Co. Ltd.

DATE OF MANUFACTURE: 11/87

VIN: 1N6ND11SXJC314235

GVWR: 4000 LBS

GAWR: FRONT: 2200 LBS., REAR: 2200 LBS.

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TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Firestone FR480 P205/70R14

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

SPARE TIRE (MFR., LINE, SIZE): T135-70D16 Goodyear Temp.

TYPE OF SEATS: FRONT: Bench
REAR: NA

TYPE OF FRONT SEAT BACKS: Non-adjustable

MAXIMUM WIDTH: 64.5 INCHES

WHEELBASE: 104.5 INCHES

LOCATION OF "RECOMMENDED TIRE PRESSURE" LABEL: GLOVEBOX

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL:

RECOMMENDED TIRE SIZE: P185/75R14

RECOMMENDED COLD TIRE PRESSURE: FRONT: 26 PSI; REAR: 35 PSI

SEATING CAPACITY: ____FRONT ____REAR ____TOTAL*

CARGO LOAD: _____ LBS. VEHICLE CAPACITY WEIGHT: _____ LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE:	LF	28.6	;RF	29.2	;LR	29.4	;RR	29.6
FULLY LOADED ATTITUDE:	LF	28.2	;RF	28.6	;LR	28.2	;RR	28.5
PRE-TEST ATTITUDE:	LF	28.1	;RF	28.5	;LR	27.9	;RR	28.2
POST-TEST ATTITUDE:	LF	24.0	;RF	32.0	;LR	21.6	;RR	28.2

*VEHICLE DID NOT CONTAIN CAPACITY DATA.

TEST VEHICLE INFORMATION CONT'DWEIGHT OF TEST VEHICLE AS RECEIVED (HALF TANK):

RIGHT FRONT	774 LBS.	RIGHT REAR	600 LBS.
LEFT FRONT	739 LBS.	LEFT REAR	612 LBS.
TOTAL FRONT WEIGHT	1513 LBS.	(55.5% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1212 LBS.	(44.5% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 2725 LBS.			

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (2725 LBS)

VCW = VEHICLE CAPACITY WEIGHT (NA LBS)

DSC = DESIGNATED SEATING CAPACITY (NA)

$RCLW^* = VCW - 150 (DSC) = 300$

TARGET TEST WEIGHT = $UDW + RCLW^* + (NO. OF HYBRID III DUMMIES \times 167 \text{ LBS/DUMMY})$

TARGET TEST WEIGHT = $2725 + 300 + 167$

TARGET TEST WEIGHT = 3192 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 302 LBS. OF CARGO WEIGHT:

RIGHT FRONT	771 LBS.	RIGHT REAR	780 LBS.
LEFT FRONT	790 LBS.	LEFT REAR	853 LBS.
TOTAL FRONT WEIGHT	1561 LBS.	(48.9% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1633 LBS.	(51.1% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT 3194 LBS. (2 POUNDS OVER TARGET TEST WEIGHT)			

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 100 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 53.3 INCHES REARWARD OF FRONT WHEEL CENTERLINE

*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.

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TEST CONDITIONS

TEST NUMBER: 900914

TEST DATE: 9/14/90

TEST TEMPERATURES:

IMPACT AREA: 72°F;

DRIVER DUMMY 71°F;

OCCUPANT COMPARTMENT 72°F

PASSENGER DUMMY: NA°F

VEHICLE, POLE, AND CURB DATA

	ACTUAL	INTENDED
VEHICLE TEST WEIGHT (lbs.):	3194	3192
VEHICLE VELOCITY (mph)*:	30	30
IMPACT SIDE:	Driver	Driver
CURB HEIGHT:	8	8
CURB TO POLE DISTANCE:	75.5	75.5
POLE DIAMETER:	12	12
POLE OFFSET**:	-2	-2

VEHICLE MEASUREMENTS

MAXIMUM LENGTH:	179.6	WHEELBASE:	104.3
MAXIMUM WIDTH:	65.0	TOP WIDTH:	50.8
C.G. REARWARD OF FRONT WHEEL CENTERLINE:	53.3		
C.G. HEIGHT ABOVE GROUND LEVEL:	22.6		

VEHICLE TEST CONDITIONS

LEFT FRONT:	DOOR - LOCKED	WINDOW - UP
LEFT REAR:	DOOR - NA	WINDOW - NA
RIGHT FRONT:	DOOR - UNLOCKED	WINDOW - UP
RIGHT REAR:	DOOR - NA	WINDOW - NA
EMERGENCY BRAKE:	ON	TRANSMISSION: IN PARK
HEADRESTS:	DRIVER - MOST UP	PASSENGER - MOST UP
TIRE PRESSURE:	FRONT - 35 PSI;	REAR - 35 PSI

DUMMY INFORMATION

TYPE:	Part 572E
POSITION:	Driver
SERIAL NO.:	907
INSTRUMENTATION:	
HEAD ACCELEROMETERS:	3
NECK LOAD CELLS:	6
CHEST ACCELEROMETERS:	3
CHEST DISPLACEMENT	
POTENTIOMETER:	1
PELVIS ACCELEROMETERS:	3
RIB DISPLACEMENT	
POTENTIOMETER:	--
RESTRAINT SYSTEM:	Three-point unbelt

REMARKS:

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

*AS MEASURED OVER FINAL ONE FOOT OF TRAVEL.

**AS MEASURED FROM VEHICLE'S C.G. (POSITIVE DENOTES VEHICLE IMPACTS THE POLE IN FRONT OF THE VEHICLE'S C.G.)

VEHICLE INSTRUMENTATION LOCATIONS AND DATA SUMMARY

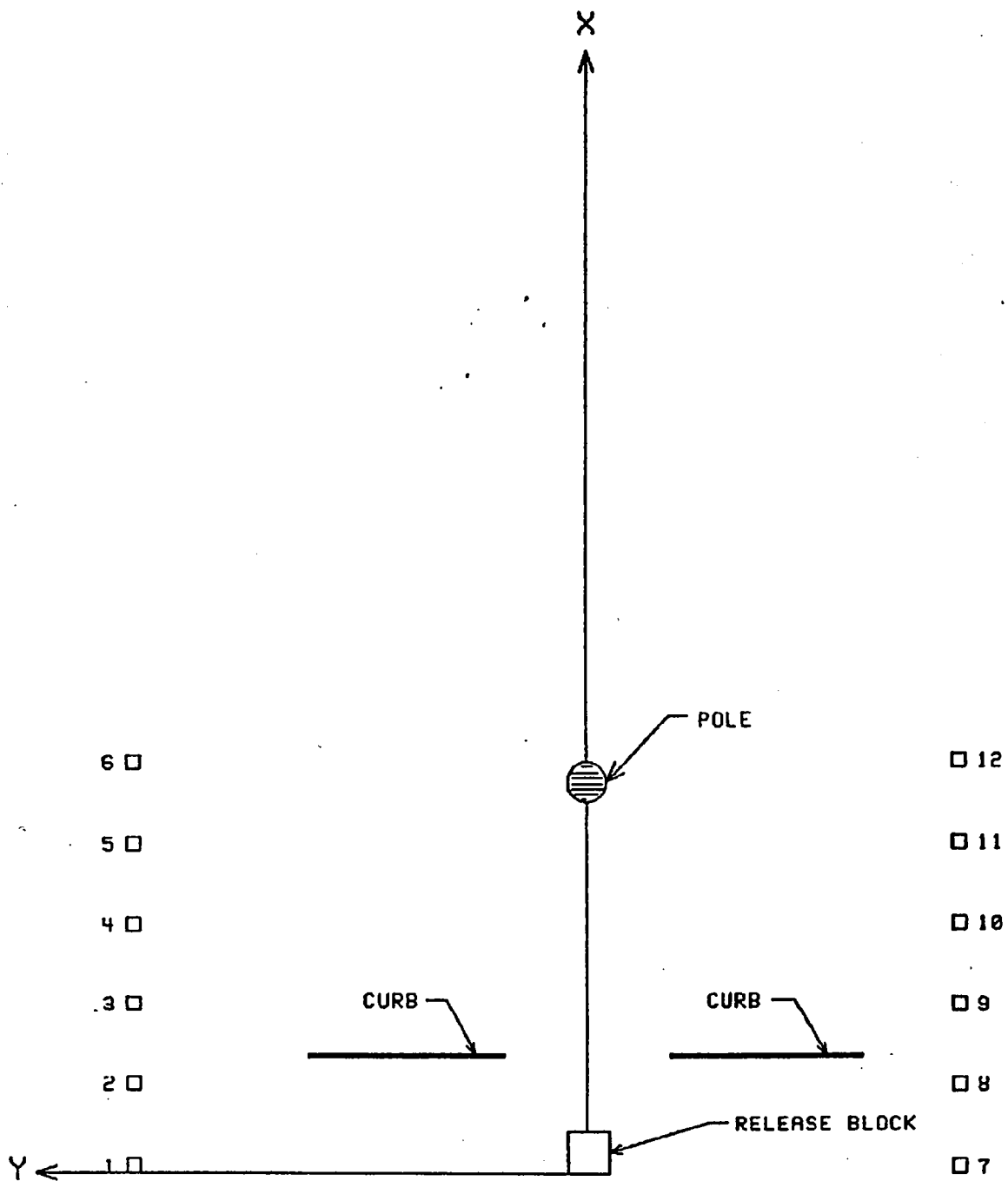
TEST NUMBER 900914

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX	SEC	MAX	SEC
1	CENTER OF GRAVITY	87.2	0.0	24.8				
	ACCELERATION (g)							
	LONGITUDINAL				9.2	0.1	11.8	0.1
	LATERAL				6.8	1.5	31.2	0.0
	VERTICAL				12.4	0.1	11.4	0.4
	RESULTANT				31.3	0.0		
2	CENTER OF GRAVITY	88.5	0.0	20.9				
	ROLL (X-AXIS)				31.2	2.0	433.9	0.1
	PITCH (Y-AXIS)				158.5	0.1	110.7	0.1
	YAW (Z-AXIS)				81.9	1.0	155.1	0.1
3	LEFT FRONT SUSPENSION	151.6	21.8	33.4				
	DISPLACEMENT (in)							
	VERTICAL				1.6	0.2	3.7	0.1
4	RIGHT FRONT SUSPENSION	151.4	-21.2	32.4				
	DISPLACEMENT (in)							
	VERTICAL				3.4	0.1	0.2	0.0
5	LEFT REAR SUSPENSION	46.9	21.8	34.8				
	DISPLACEMENT (in)							
	VERTICAL				---	---	---	---
6	RIGHT REAR SUSPENSION	47.0	-21.8	34.8				
	DISPLACEMENT (in)							
	VERTICAL				5.4	0.2	0.0	0.0
7	SHOULDER BELT	88.2	14.6	19.2				
	DISPLACEMENT (in)							
	DRIVER				2.1	0.1	0.0	0.0

* ALL MEASUREMENTS OF INSTRUMENTATION LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM VEHICLE'S REAR BUMPER
Y: + LEFTWARD FROM VEHICLE'S CENTERLINE
Z: + UPWARD FROM GROUND LEVEL
ROLL: + TO RIGHT
PITCH: + FRONT DOWNWARD
YAW: + COUNTERCLOCKWISE
DISPLACEMENT: + OUTWARD

Y See TEST ANOMALIES



STADIA POLE LAYOUT AND NUMBERING SYSTEM

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STADIA POLE LOCATIONS

<u>POLE NO.</u>	<u>X DISTANCE, *</u>	<u>Y DISTANCE, *</u>
1	2.0	12.4
2	4.0	12.4
3	6.0	12.4
4	8.0	12.4
5	10.0	12.4
6	12.0	12.4
7	2.0	-9.5
8	4.0	-9.5
9	6.0	-9.5
10	8.0	-9.5
11	10.0	-9.5
12	12.0	-9.5

RIGID, INSTRUMENTED POLE LOCATION

CENTER OF POLE	9.2	0.0
----------------	-----	-----

STEEL CURB LOCATIONS

CENTER OF LEFT		
CURB SECTION	3.0	4.7
CENTER OF RIGHT		
CURB SECTION	3.0	-4.7

*REFERENCE: +X: FORWARD FROM RELEASE BLOCK

+Y: LEFTWARD FROM CENTER RELEASE BLOCK

ALL MEASUREMENTS ARE IN FEET.

NOTES: INSTRUMENTED POLE OUTSIDE DIAMETER: 12"

STEEL CURB: 5' LONG, 8" HIGH, 8.5" WIDE AT BASE

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Panning	Kodak	25	24	Real-time documentation
2	Left	Photosonic 1B	25	502	Vehicle dynamics
3	Right	Photosonic 1B	8.5	500	Vehicle dynamics
4	Downstream	Photosonic 1B	25	500	Vehicle dynamics
5	Overhead	Photosonic 1B	17	492	Vehicle dynamics
6	Onboard - front	Photosonic 1B	8	495	Dummy kinematics
7	Documentary	Beaulieu	12-120	24	Pre & post-test documentation

HIGH SPEED CAMERA LOCATION

OFFBOARD

CAMERA NO.	X*	Y*	Z*
2	8.0	42.1	5.1
3	8.0	-22.1	4.2
4	51.2	0.0	3.5

*Reference:

- +X: Forward from release block
- +Y: Leftward from the centerline of the release block
- +Z: Upward from the ground level

ONBOARD

CAMERA NO.	X**	Y**	Z**
6	1.5	-1.1	0.8

**Reference:

- +X: Forward from the C.G. of vehicle
- +Y: Leftward from centerline of vehicle
- +Z: Upward from floor of vehicle

ALL MEASUREMENTS ARE IN FEET.

SECTION 4.0

OCCUPANT INFORMATION

POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #907	PASSENGER #NA
HEAD	<u>Roof, left-pillar and left front door</u>	<u>NA</u>
CHEST	<u>Left front door</u>	<u>NA</u>
ABDOMEN	<u>None</u>	<u>NA</u>
LEFT KNEE	<u>Left front door</u>	<u>NA</u>
RIGHT KNEE	<u>Steering wheel</u>	<u>NA</u>

DOOR OPENING:

	LEFT	RIGHT
FRONT	<u>Difficult</u>	<u>Difficult</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:

Upon impact the entire glasses on the vehicle's left
and right sides were shattered. The entire
windshield was cracked upon impact.

OTHER NOTABLE IMPACT EFFECTS:

The left rear axle was broken at impact separating
the rear wheel from the axle.

DUMMY KINEMATIC SUMMARYDriver Dummy

Upon the vehicle's impact with the ground, the driver dummy's head struck the roof, left B-pillar and left front door. The dummy's upper torso contacted the left front door. The left knee contacted the left front door and the right knee contacted the steering column. The dummy's lower torso remained in contact with the left door. The dummy's head came to rest against the roof and the upper torso came to rest against the left front door, restrained with a three-point unbelt.

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle and dummy were left inside the temperature controlled building eight hours prior to the time the dummy was loaded into the vehicle. The temperature was controlled to the last minute before launching of the vehicle.

One Part 572E dummy was instrumented for this test. The dummy instrumentation consisted of triaxial accelerometers in the head, chest, and pelvis, a displacement potentiometer in the chest, and six (6) load cells in the neck. Prior to seating the dummy, the driver's seat was positioned in the mid-adjustment notch of the seat track. The seat back angle was non-adjustable. The dummy was positioned in the seat using NHTSA's Notice #60 seating procedure. The H-point location of the seat was obtained by using the SAE J211 OCT88 H-point machine as specified in the Notice #60. The driver dummy was restrained with a three-point unbelt.

DUMMY DATA SUMMARY

TEST NUMBER 900914

DRIVER DUMMY

SN: 907

	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	MAX	SEC	MAX	SEC
HEAD ACCELERATION (g)				
LONGITUDINAL	24.5	0.1	15.7	0.2
LATERAL	8.5	0.2	71.5	0.1
VERTICAL	6.6	0.2	48.9	0.1
RESULTANT	84.1	0.1		
HIC 36 MSEC	425.5 FROM 119.0 TO 147.0			
NECK FORCES (lbs)				
LONGITUDINAL	64.5	0.1	149.5	1.5
LATERAL	222.9	0.1	94.1	1.5
VERTICAL	468.2	0.1	946.8	1.5
NECK MOMENT (in-lbs)				
ABOUT LONG.	39.2	1.6	38.2	0.1
ABOUT LATERAL	26.1	1.6	16.2	1.0
ABOUT VERTICAL	15.0	0.1	11.9	0.2
CHEST ACCELERATION (g)				
LONGITUDINAL	25.5	0.1	9.0	0.1
LATERAL	5.2	0.2	52.9	0.1
VERTICAL	7.6	0.1	15.1	1.5
RESULTANT	54.0	0.1		
3 MSEC	49.6 FROM 106.0 TO 109.0			
CHEST DISPLACEMENT (in)				
LONGITUDINAL	0.0	1.6	0.9	0.1
PELVIS ACCELERATION (g)				
LONGITUDINAL	18.2	0.1	13.2	0.1
LATERAL	3.3	1.0	50.3	0.1
VERTICAL	4.2	0.1	12.3	0.1
RESULTANT	50.8	0.1		

POSITIVE DIRECTION

LONGITUDINAL: FORWARD
LATERAL: LEFTWARD
VERTICAL: UPWARD

NEGATIVE DIRECTION

LONGITUDINAL: REARWARD
LATERAL: RIGHTWARD
VERTICAL: DOWNWARD

See APPENDIX D for neck load cell polarities.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

MFR./MAKE/MODEL: Nissan/pickup truck

SEAT TYPE: X Bench
 Bucket
 Split bench

ADJUSTER TYPE: X Manual
 Power
 Non-adjustable

STEERING COLUMN: X Non-adjustable

TECHNICIANS:

BUCKET SEAT BACK TYPE: X Non-adjustable

1. D. Carpenter

 Adjustable reclining

2. M. Garrison

POSITIONING DATE: 9/14/90

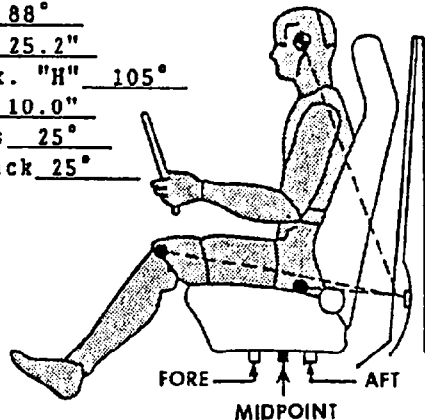
3.

AMBIENT TEMP. 68° F TIME: 1030

4.

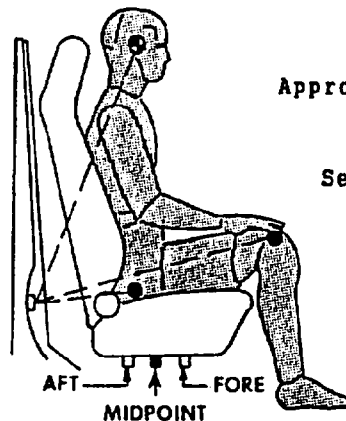
DRIVER DUMMY* # 907 TYPE: HIII

Head 14°
 Target 21.0"
 Knee 88°
 Joint 25.2"
 Approx. "H" 105°
 Point 10.0"
 Pelvis 25°
 Seatback 25°



PASSENGER DUMMY* # NA TYPE:

Head
 Target
 Knee
 Joint
 Approx. "H"
 Point
 Pelvis
 Seatback



A = 54.5"
 B = NA
 C = 13.3"
 D = NA

DOOR GLASS
 HEIGHT = 10.3"

LATERAL BAR

ADJUSTABLE
 POINTER

LEFT
 FRONT
 DOOR

DRIVER
 DUMMY

PASSENGER
 DUMMY

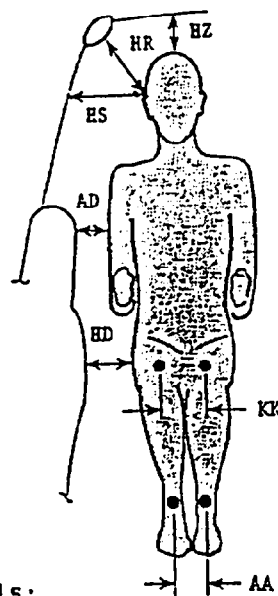
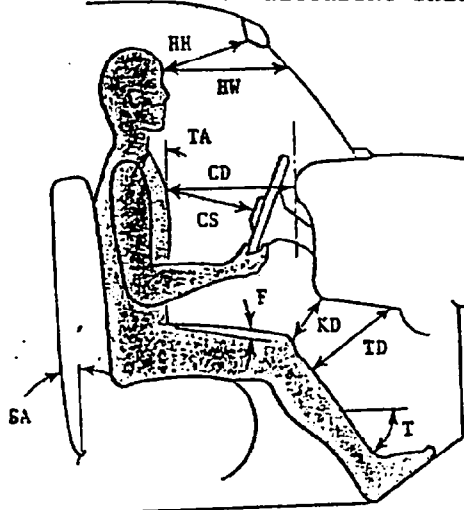
DOOR GLASS
 HEIGHT = NA

RIGHT
 FRONT
 DOOR

*Dummy measurements are referenced to top of striker bolt and all angles are referenced to vertical.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

	DRIVER	PASSENGER
HH	16.2	NA
HW	24.4	NA
CD	23.1	NA
CS	12.9	NA
KDL	5.9	NA
KDR	6.1	NA
TA	12°	NA
SA	25°	NA
HA	19.2	NA
FL	18°	NA
FR	21°	NA
TDL	4.6	NA
TDR	4.8	NA
TL	36°	NA
TR	40°	NA
HZ	4.9	NA
HR	8.9	NA
HS	10.4	NA
AD	4.1	NA
HD	5.9	NA
KK	8.5	NA
AA	11.0	NA



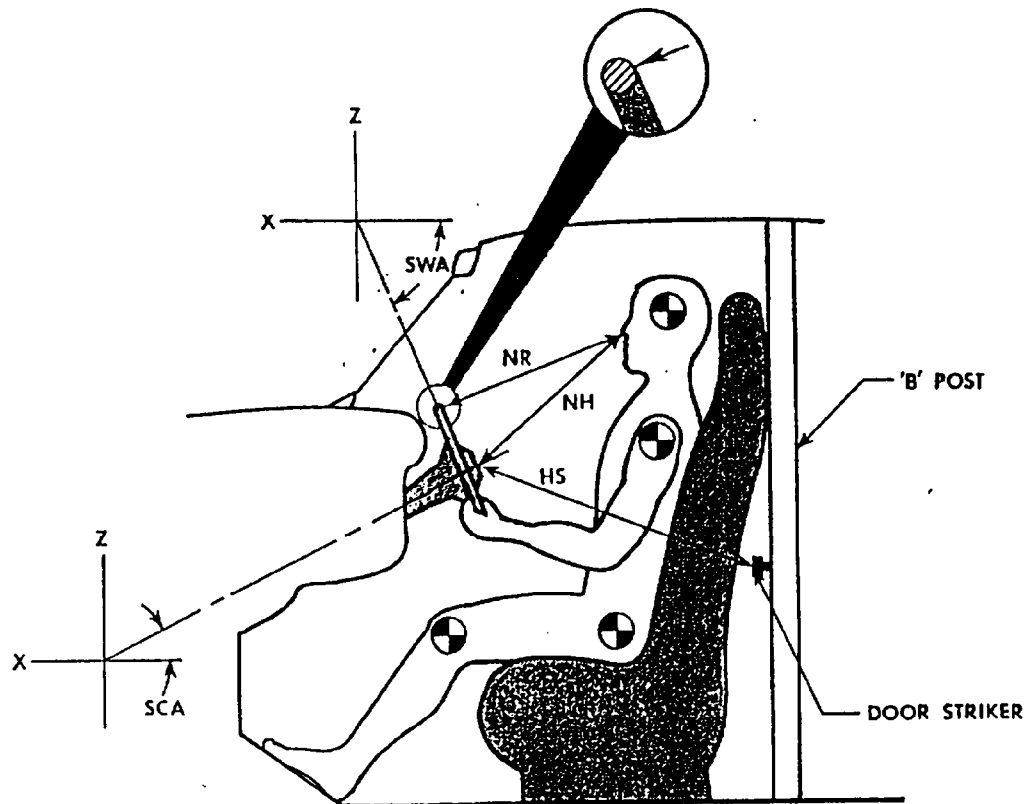
Knee outer clevis to outer clevis:
Driver = 10.6" Passenger = NA

HH = Head to Windshield Header
HW = Head to Windshield
CD = Chest to Dash
CS = Chest to Steering Wheel
KD = Knee to Dash
TA = Torso Angle
SA = Seat Back Angle
HA = Head to A-Pillar
FL = Femur Left
FR = Femur Right
TDL = Tibia Dash Left

TDR = Tibia Dash Right
TL = Tibia Left
TR = Tibia Right
HZ = Head to Roof
HR = Head to Side Roof
HS = Head to Side Window
AD = Arm to Door
HD = Hip to Door
KK = Knee to Knee
AA = Ankle to Ankle

Torso and seat back angles are relative to vertical.
Femur and tibia angles are relative to horizontal.
ALL DISTANCE MEASUREMENTS ARE IN INCHES.

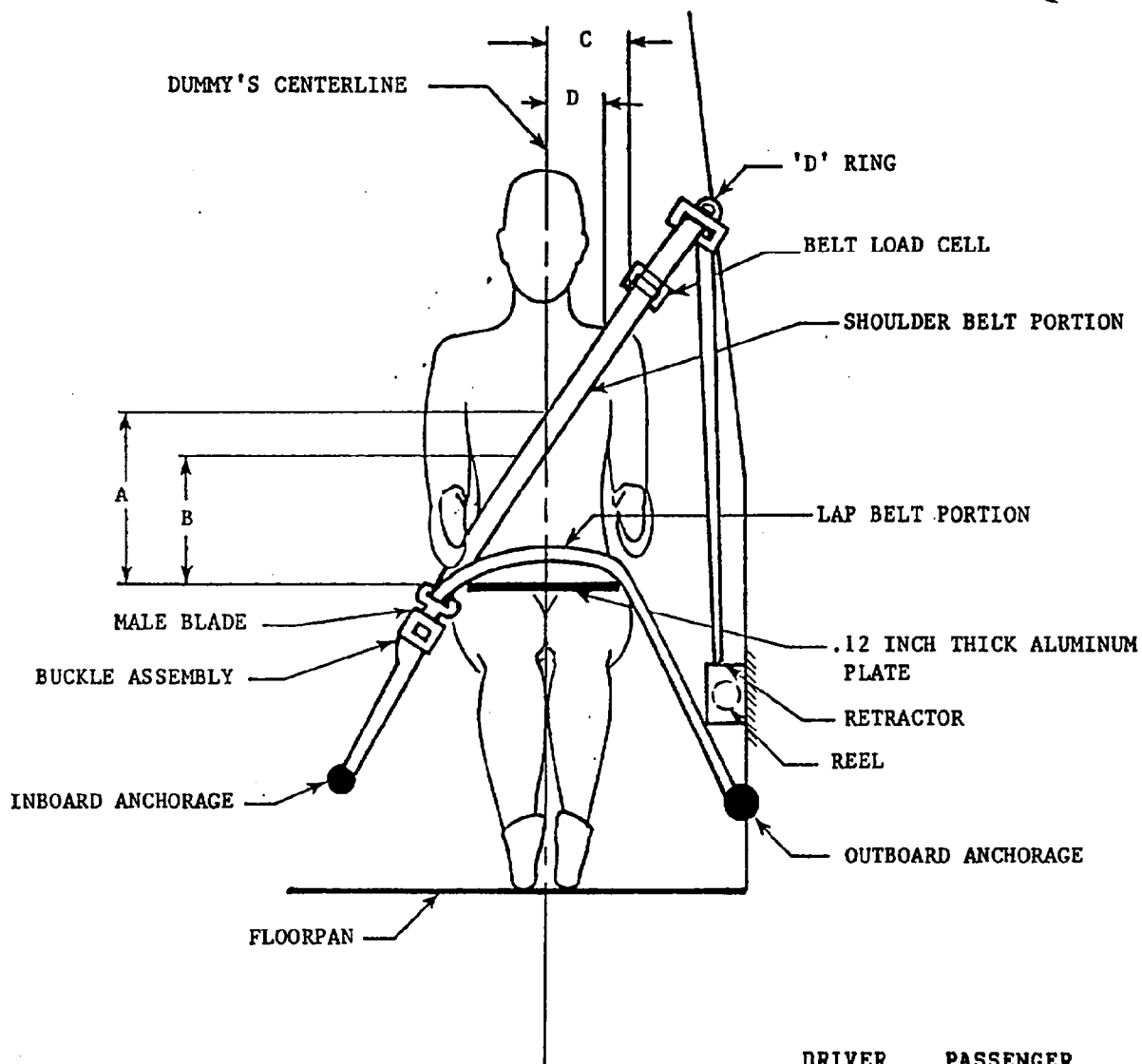
DRIVER DUMMY TO STEERING COLUMN/WHEEL ASSEMBLY DATA



POSITION OF STEERING COLUMN TILTING AND TELESCOPING ADJUSTMENTS, IF ANY:
Non-adjustable

<u>MEASUREMENTS</u>		
NR	- DISTANCE FROM TIP OF DUMMY'S NOSE TO TOP REAR SURFACE OF STEERING WHEEL RIM.	15.8
NH	- DISTANCE FROM TIP OF DUMMY'S NOSE TO CENTER OF STEERING COLUMN HUB.	16.8
HS	- DISTANCE FROM CENTER OF STEERING COLUMN HUB TO THE FORWARD SURFACE OF THE DOOR LOCK STRIKER PIN.	25.6
SCA	- ANGLE OF STEERING COLUMN RELATIVE TO THE HORIZONTAL X AXIS	24°
SWA	- ANGLE OF STEERING WHEEL RELATIVE TO THE HORIZONTAL X AXIS	66°

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

SEAT BELT POSITIONING DATA

	DRIVER DUMMY	PASSENGER DUMMY
A - TOP SURFACE OF ALUMINUM PLATE TO BELT UPPER EDGE	10.5	NA
B - TOP SURFACE OF ALUMINUM PLATE TO BELT LOWER EDGE	7.8	NA
C - DUMMY CENTERLINE TO OUTER EDGE OF BELT AT CHEST FLESH TOP	6.0	NA
D - DUMMY CENTERLINE TO INNER EDGE OF BELT AT CHEST FLESH TOP	3.2	NA

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

APPENDIX A

PHOTOGRAPHS



Figure A-1. PRE-TEST FRONT VIEW



Figure A-2. PRE-TEST LEFT SIDE VIEW



Figure A-3. PRE-TEST REAR VIEW

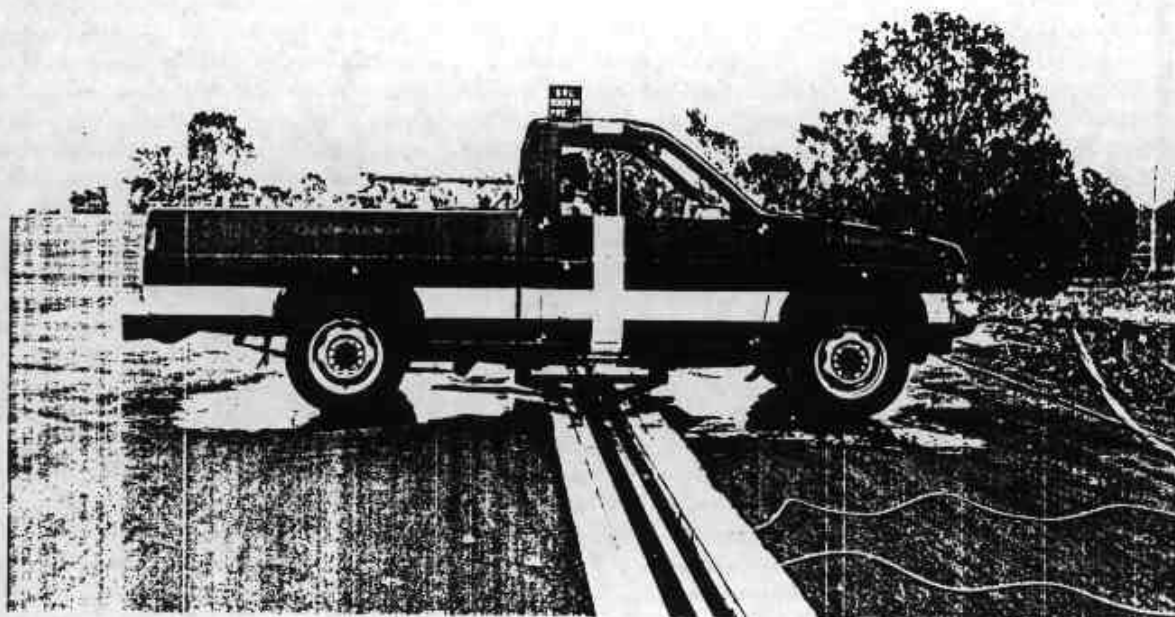


Figure A-4. PRE-TEST RIGHT SIDE VIEW



Figure A-5. PRE-TEST DRIVER DUMMY - VIEW 1

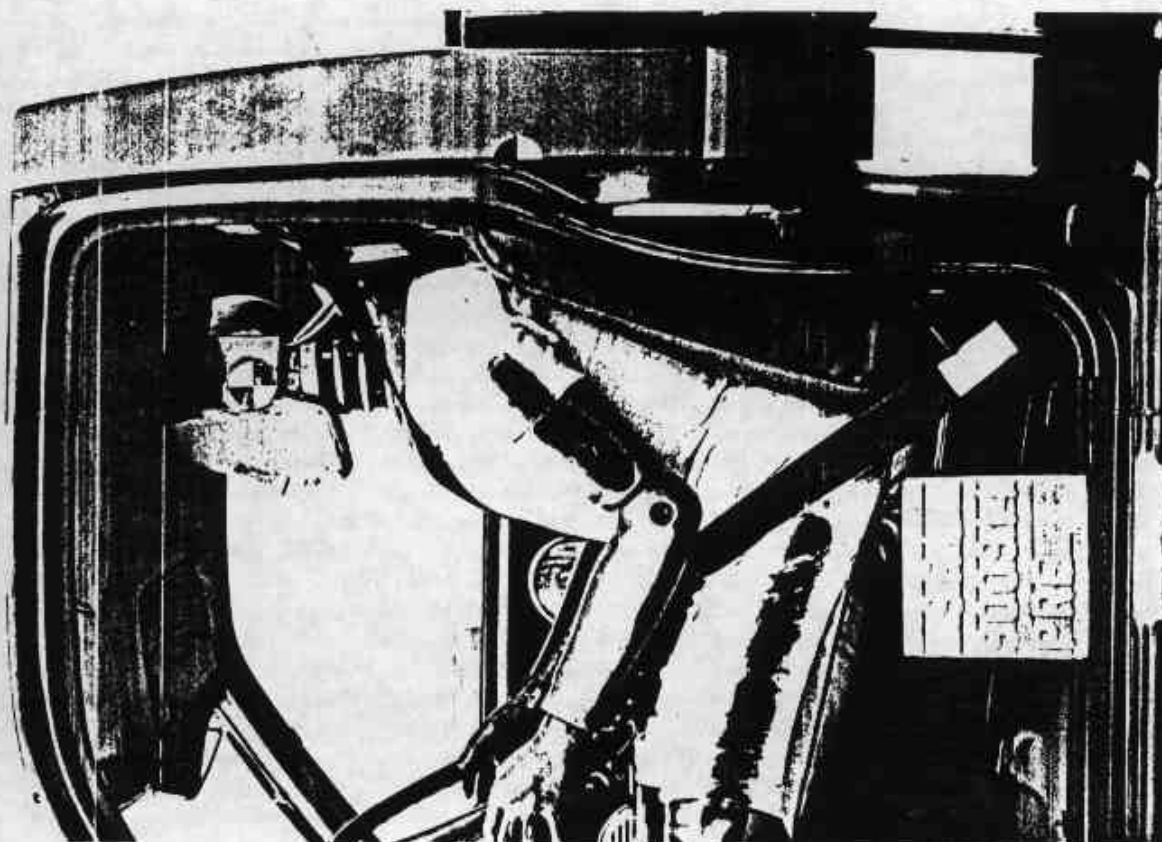


Figure A-6. PRE-TEST DRIVER DUMMY - VIEW 2

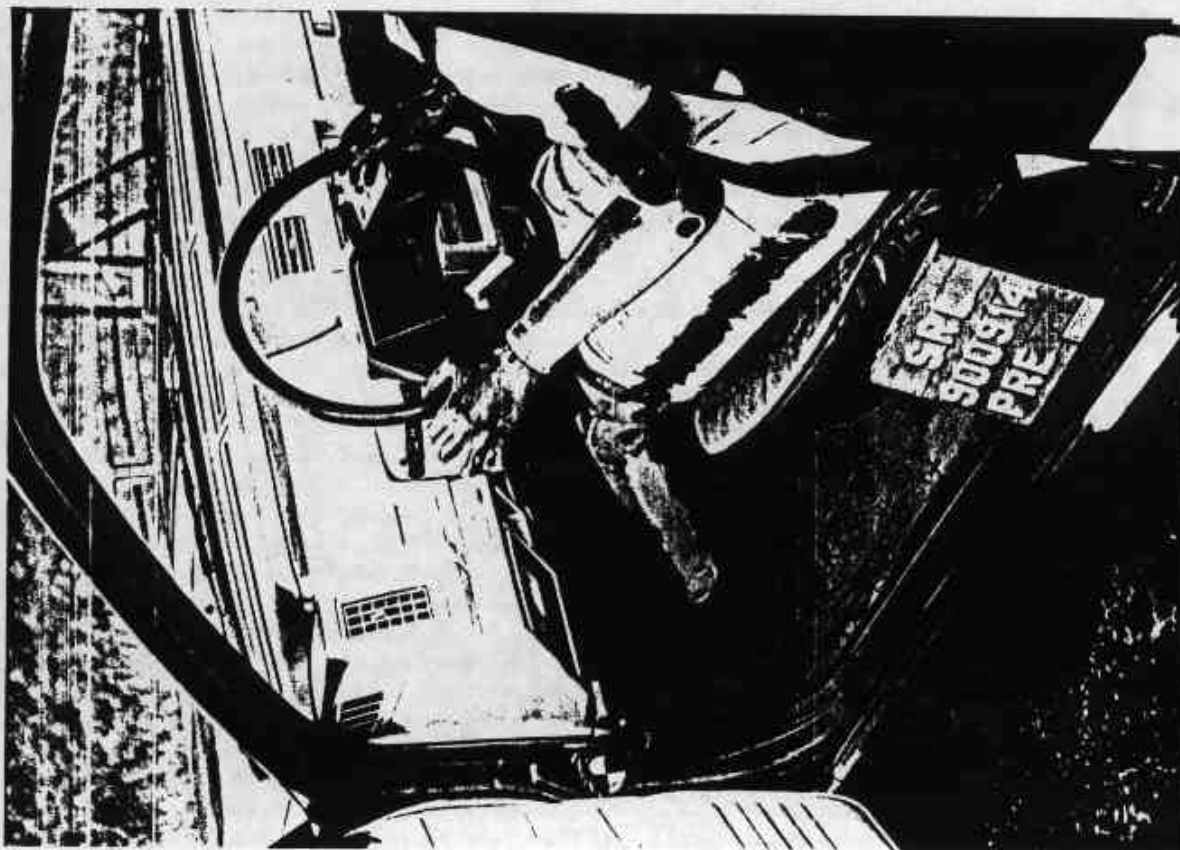


Figure A-7. PRE-TEST DRIVER DUMMY - VIEW 3

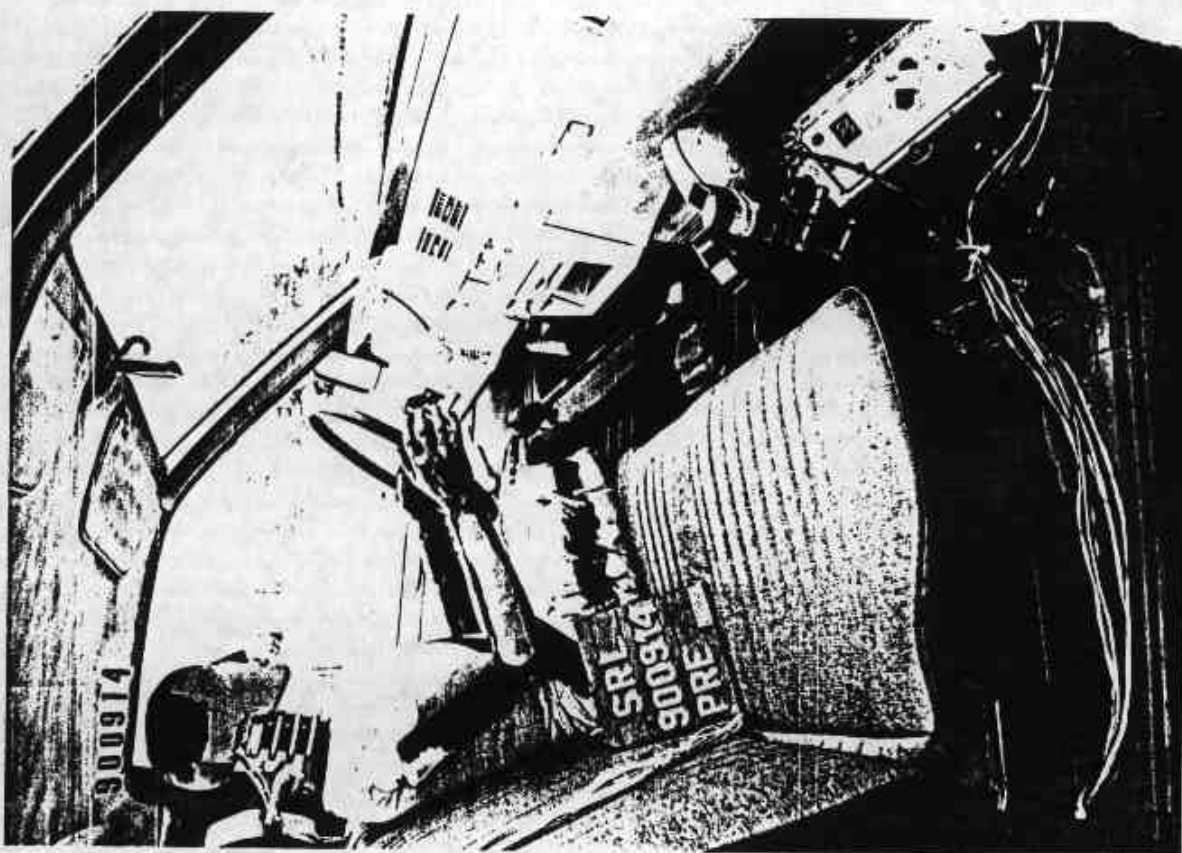


Figure A-8. PRE-TEST DRIVER DUMMY AND VEHICLE VIEW

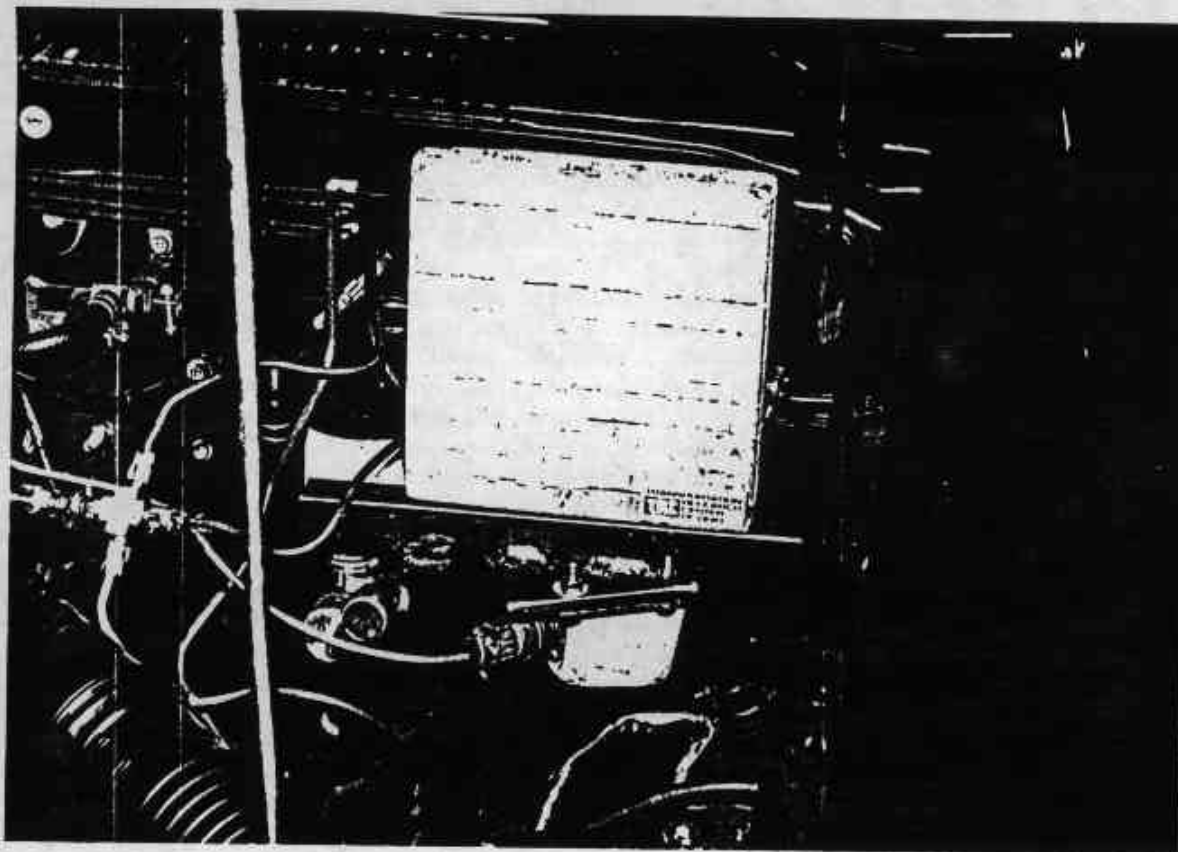


Figure A-9. PRE-TEST LEFT FRONT SUSPENSION STRING POTENTIOMETER VIEW

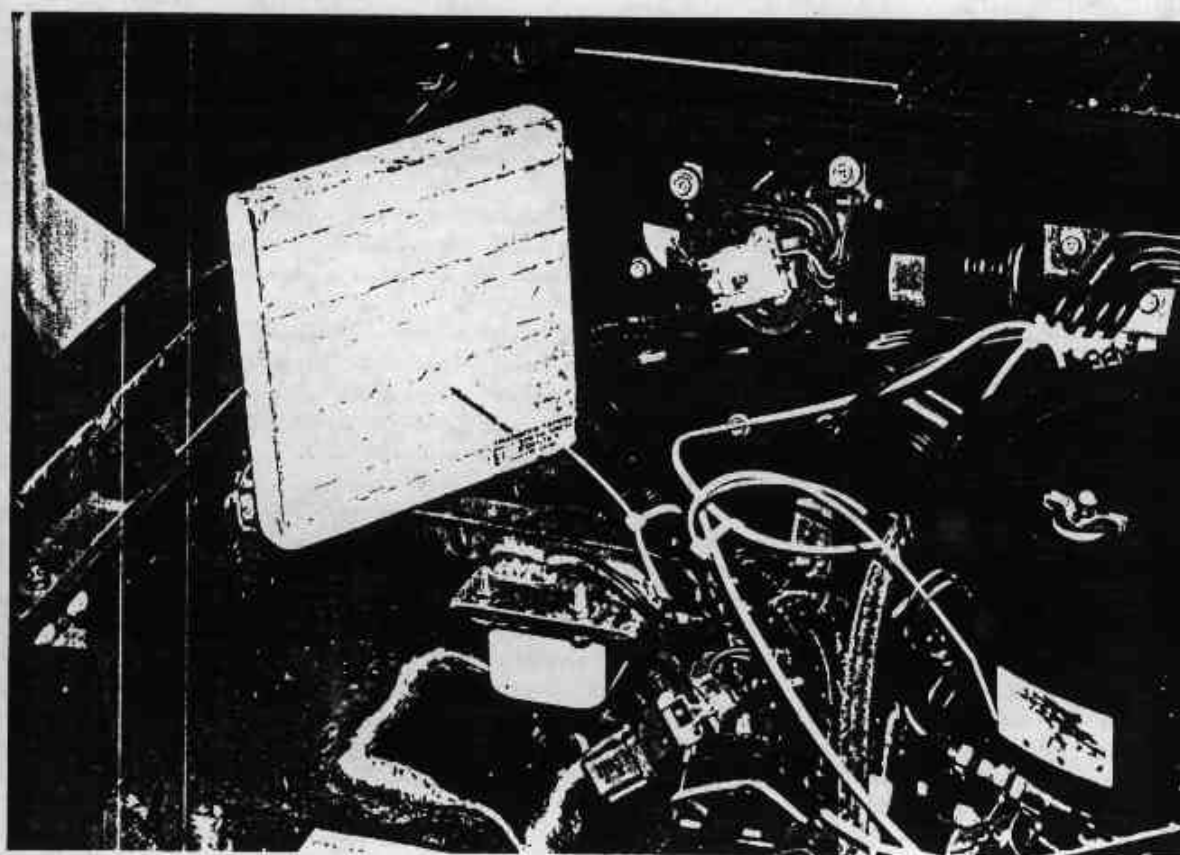


Figure A-10. PRE-TEST RIGHT FRONT SUSPENSION STRING POTENTIOMETER VIEW

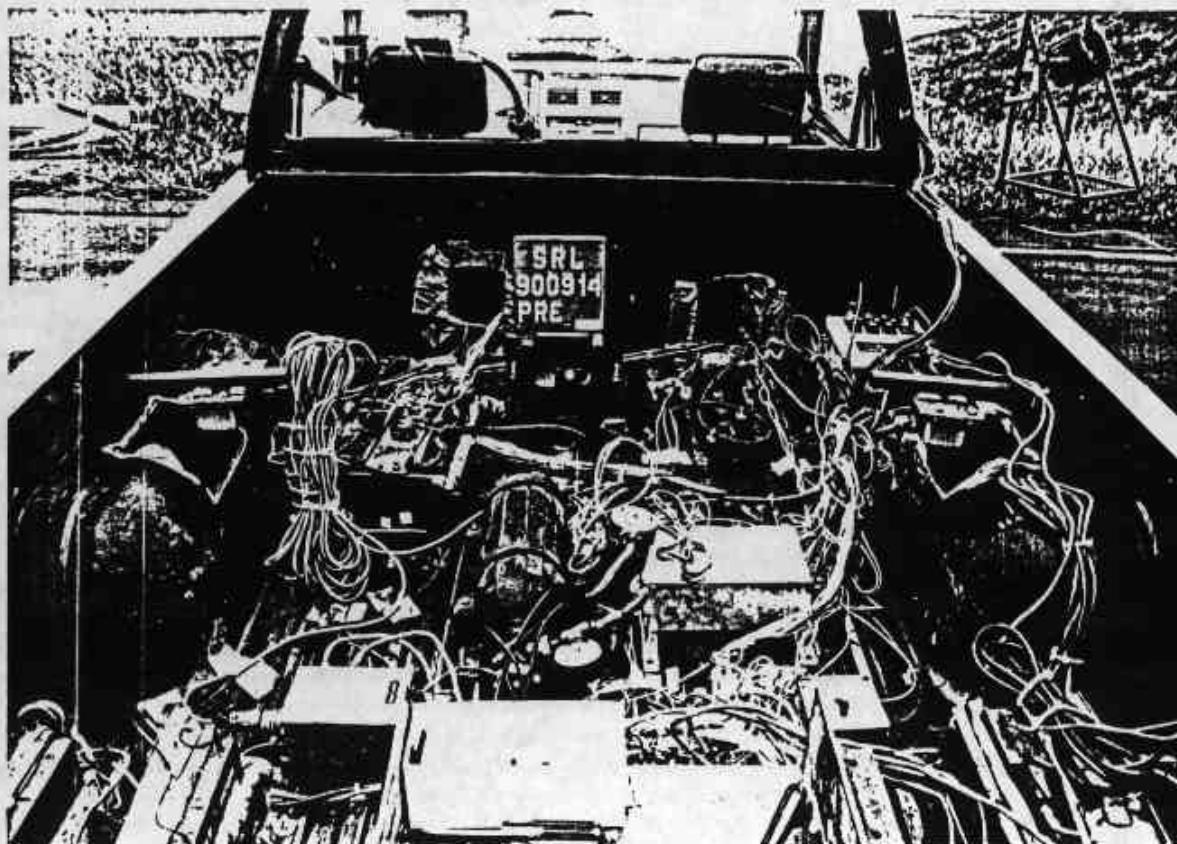


Figure A-11. PRE-TEST VEHICLE INSTRUMENTATION AND BALLAST LOCATION

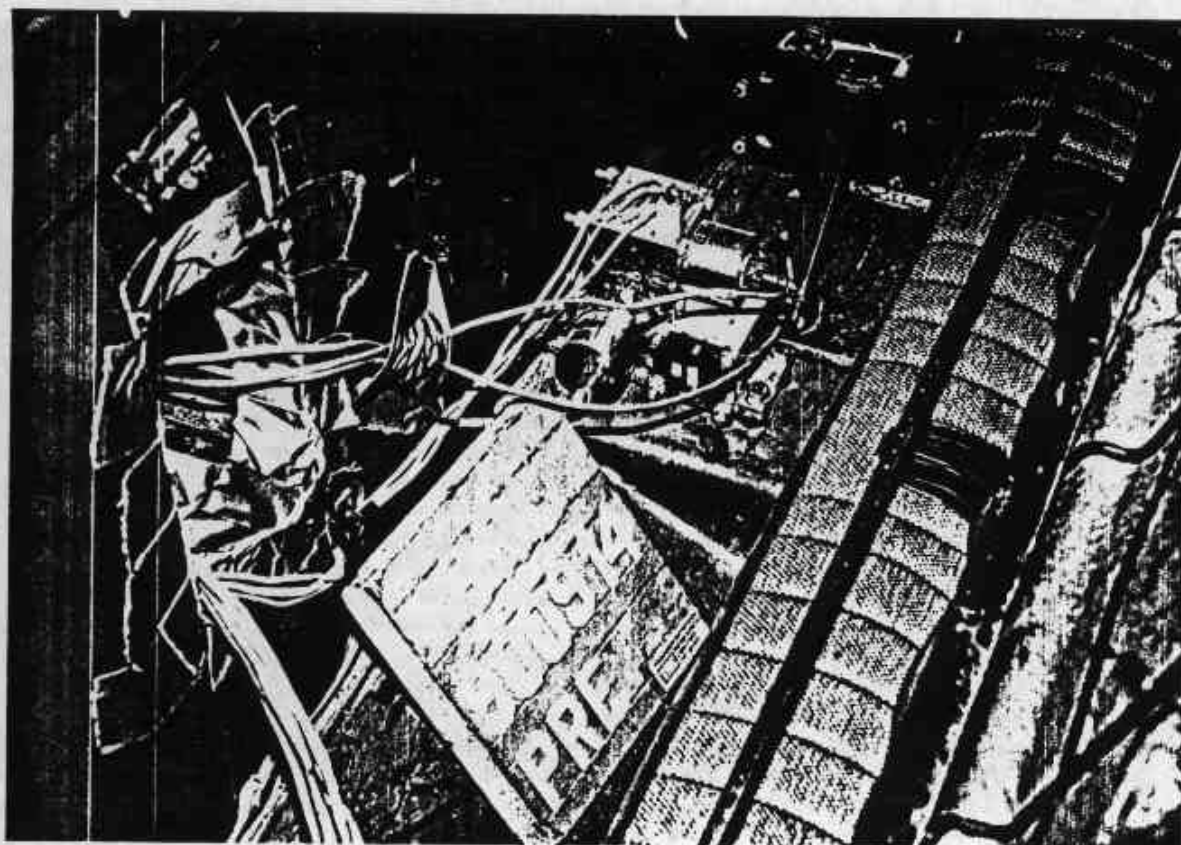


Figure A-12. PRE-TEST LEFT GYROSCOPE PLACEMENT VIEW



Figure A-13. POST-TEST FRONT - VIEW 1



Figure A-14. POST-TEST FRONT - VIEW 2



Figure A-15. POST-TEST LEFT SIDE - VIEW 1

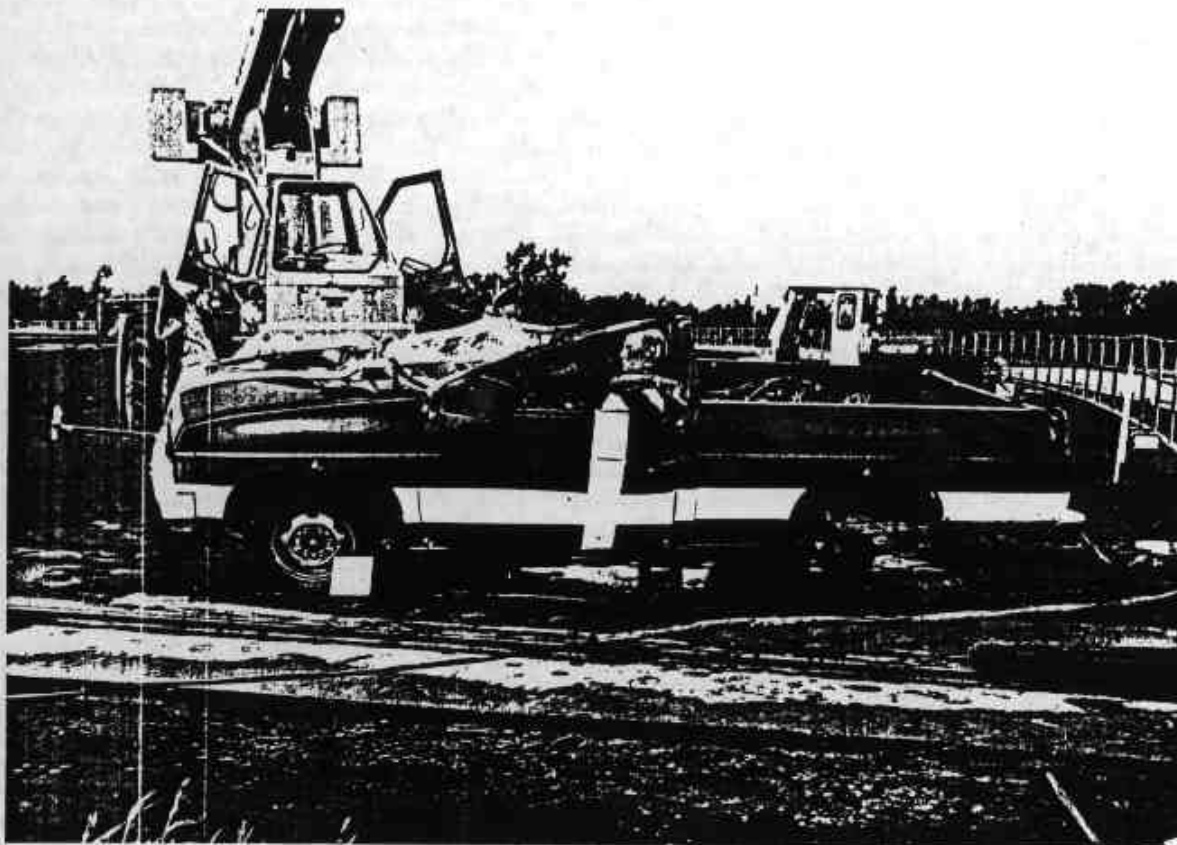


Figure A-16. POST-TEST LEFT SIDE - VIEW 2

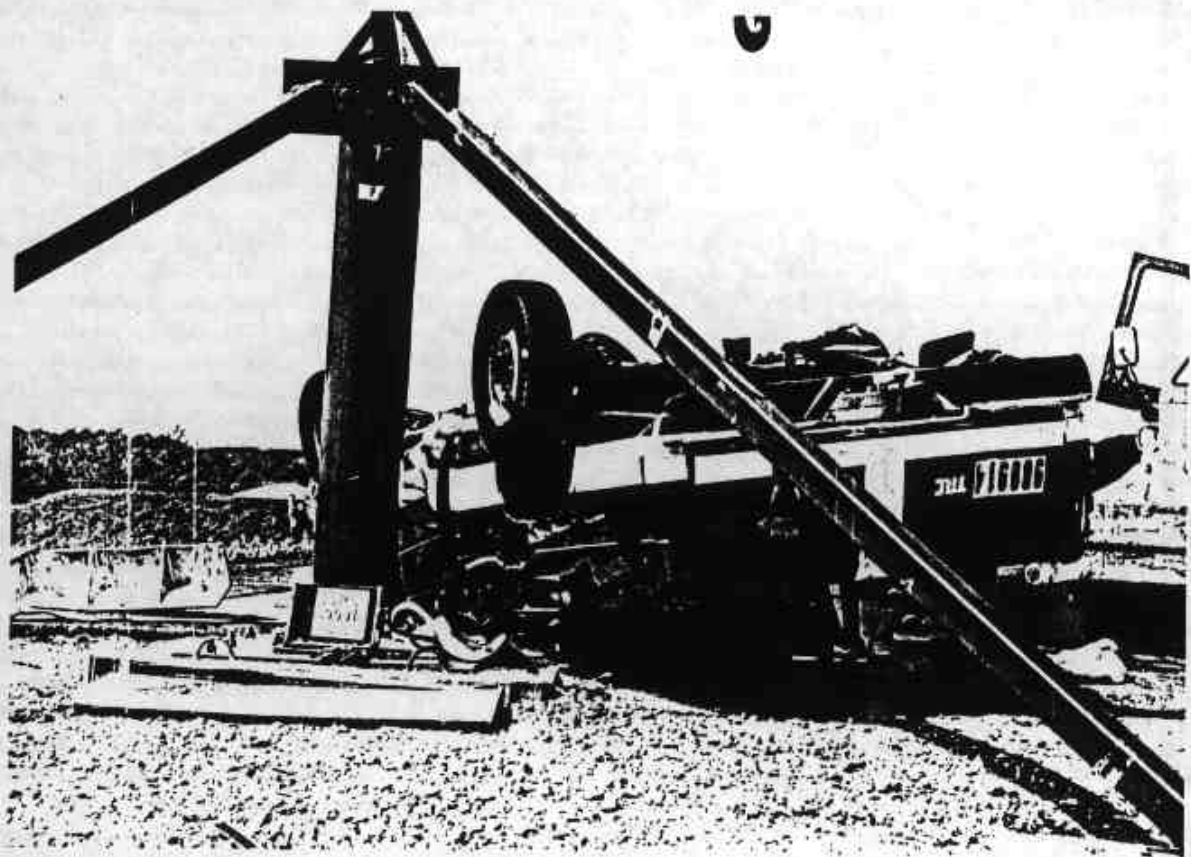


Figure A-17. POST-TEST REAR - VIEW 1

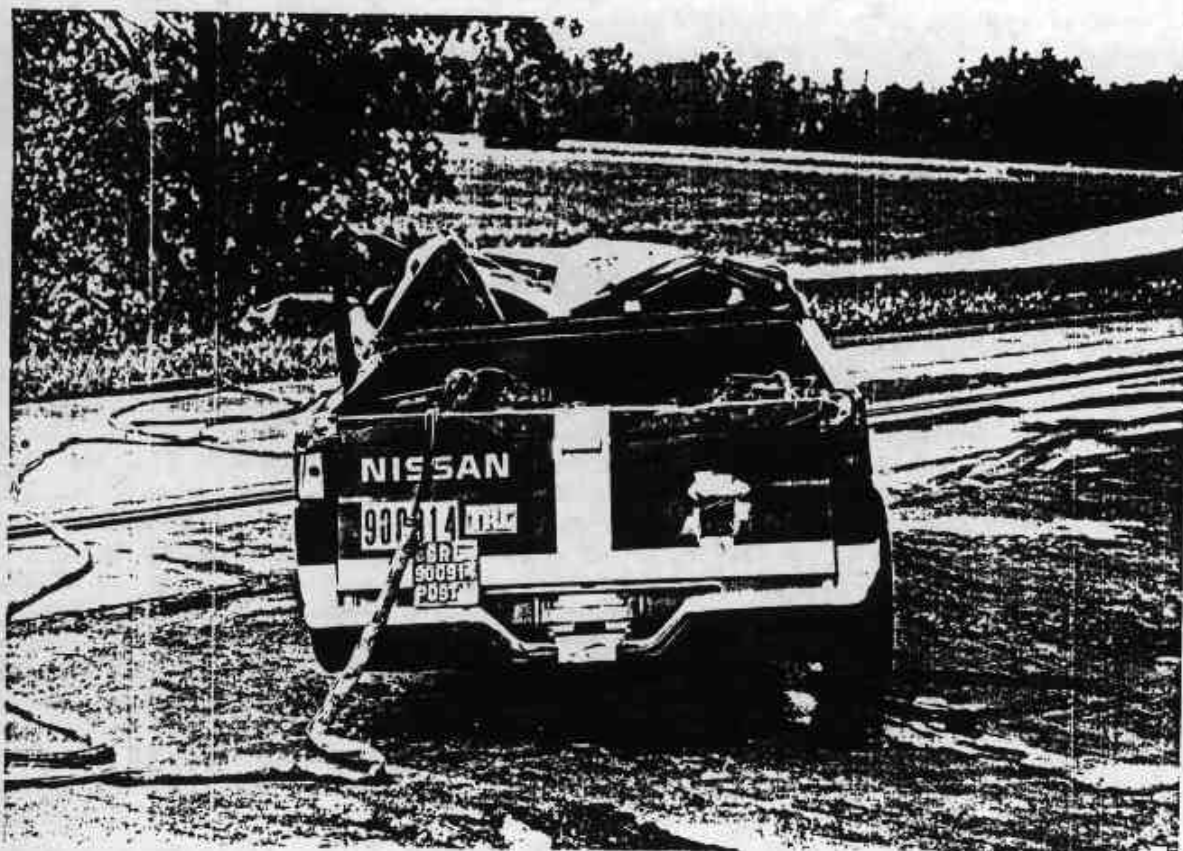


Figure A-18. POST-TEST REAR - VIEW 2



Figure A-19. POST-TEST RIGHT SIDE - VIEW 1



Figure A-20. POST-TEST RIGHT SIDE - VIEW 2

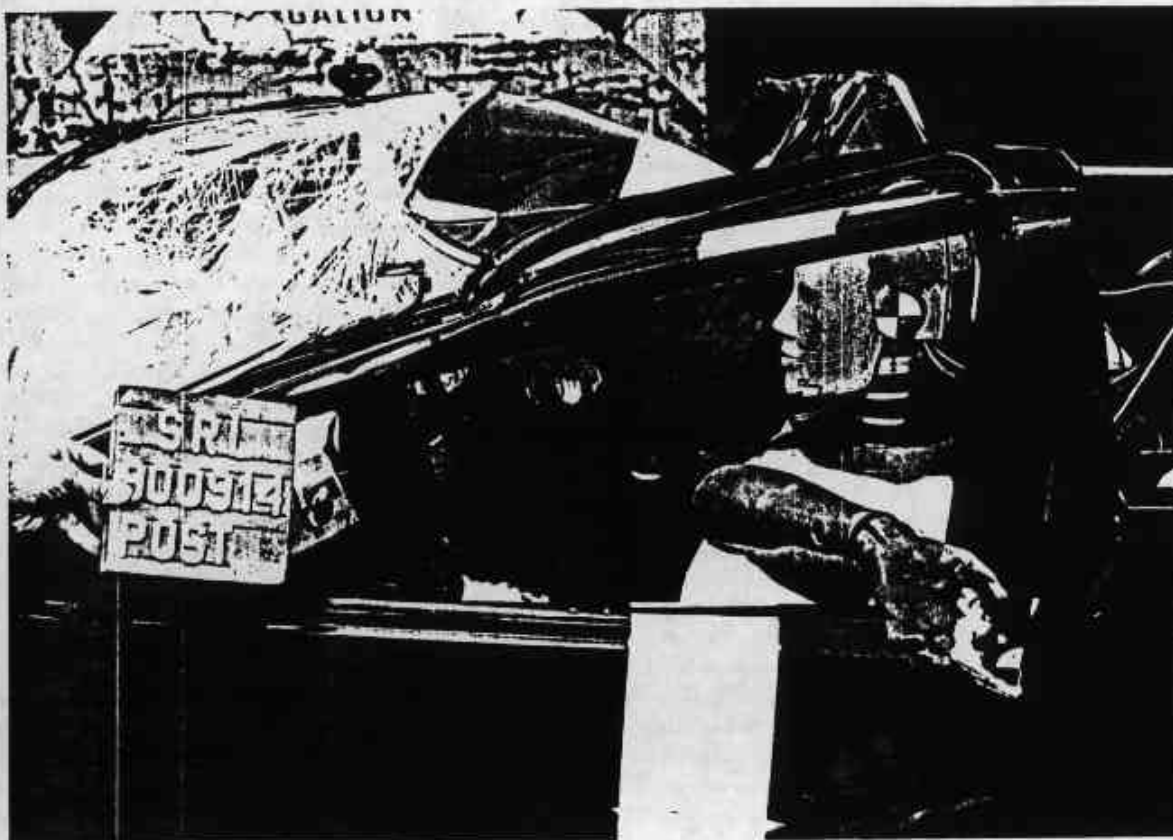


Figure A-21. POST-TEST DUMMY AND VEHICLE VIEW

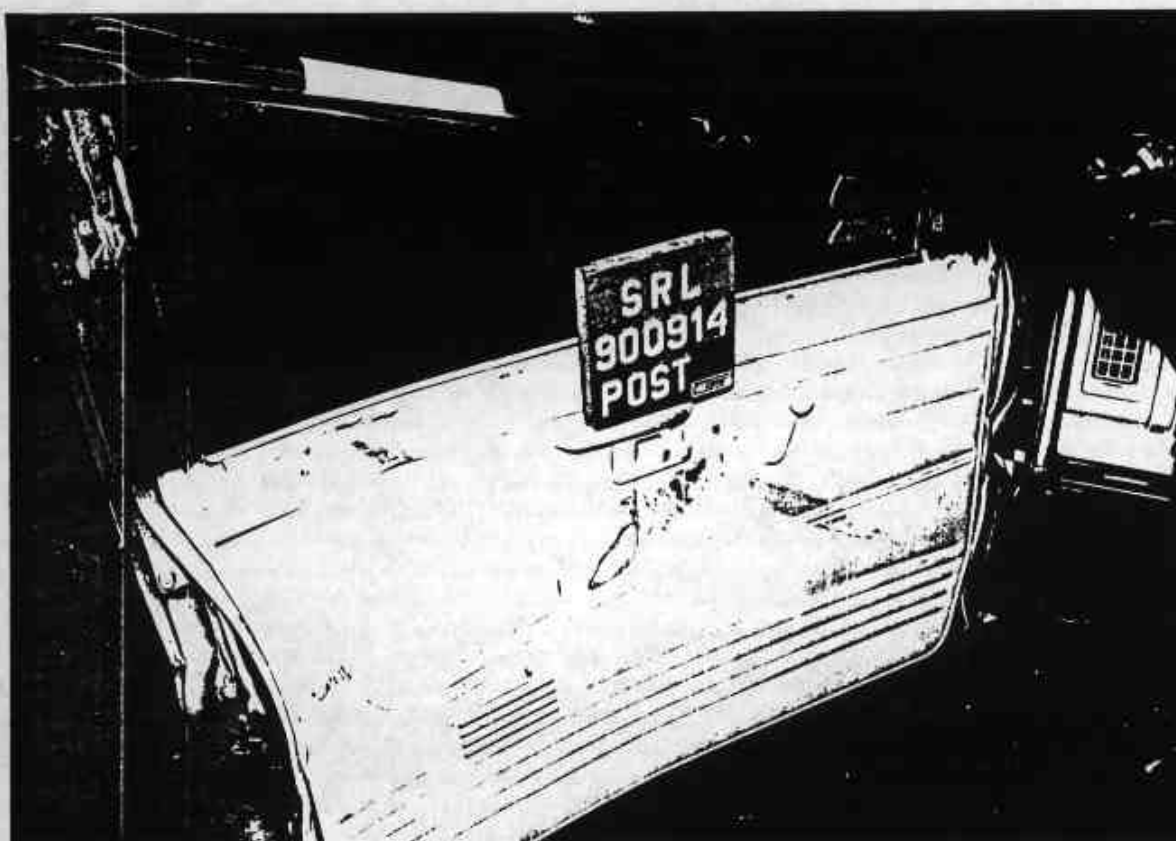


Figure A-22. POST-TEST DRIVER DUMMY CONTACT - VIEW 1



Figure A-23. POST-TEST DRIVER DUMMY CONTACT - VIEW 2

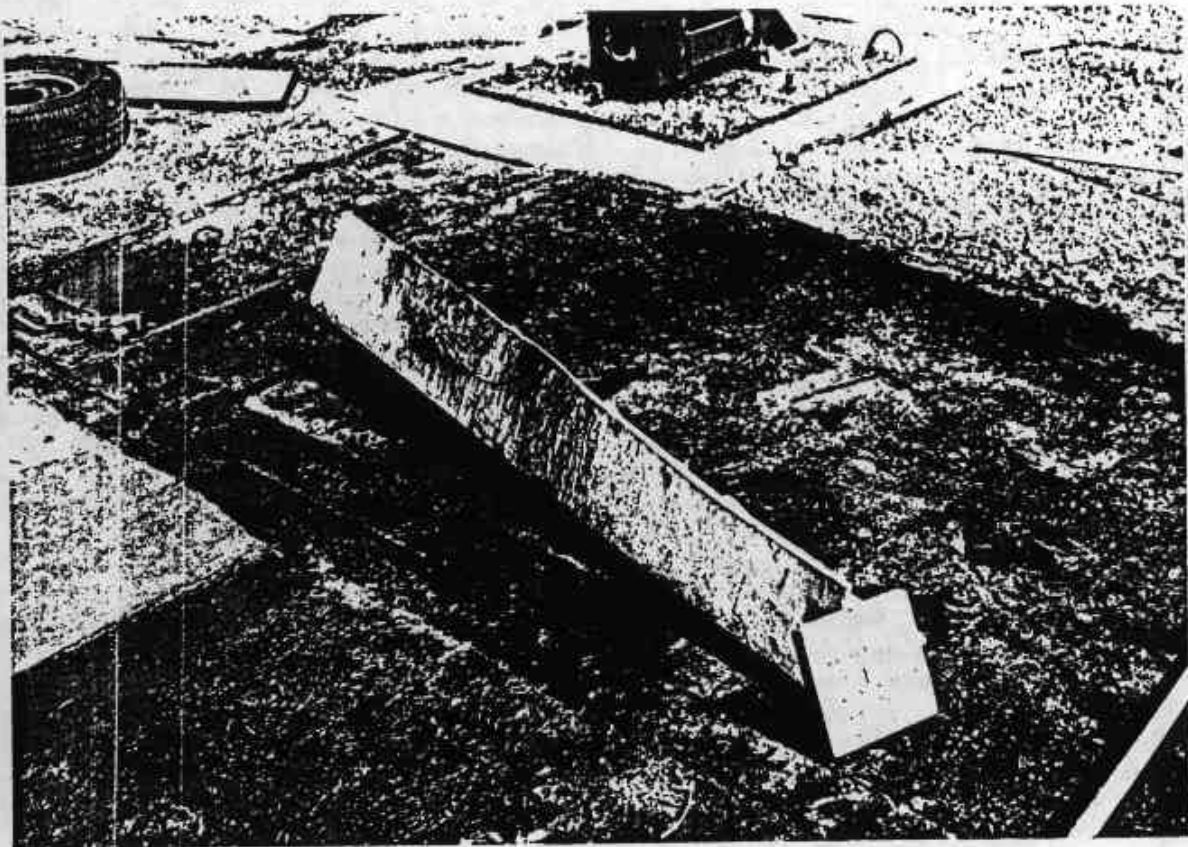


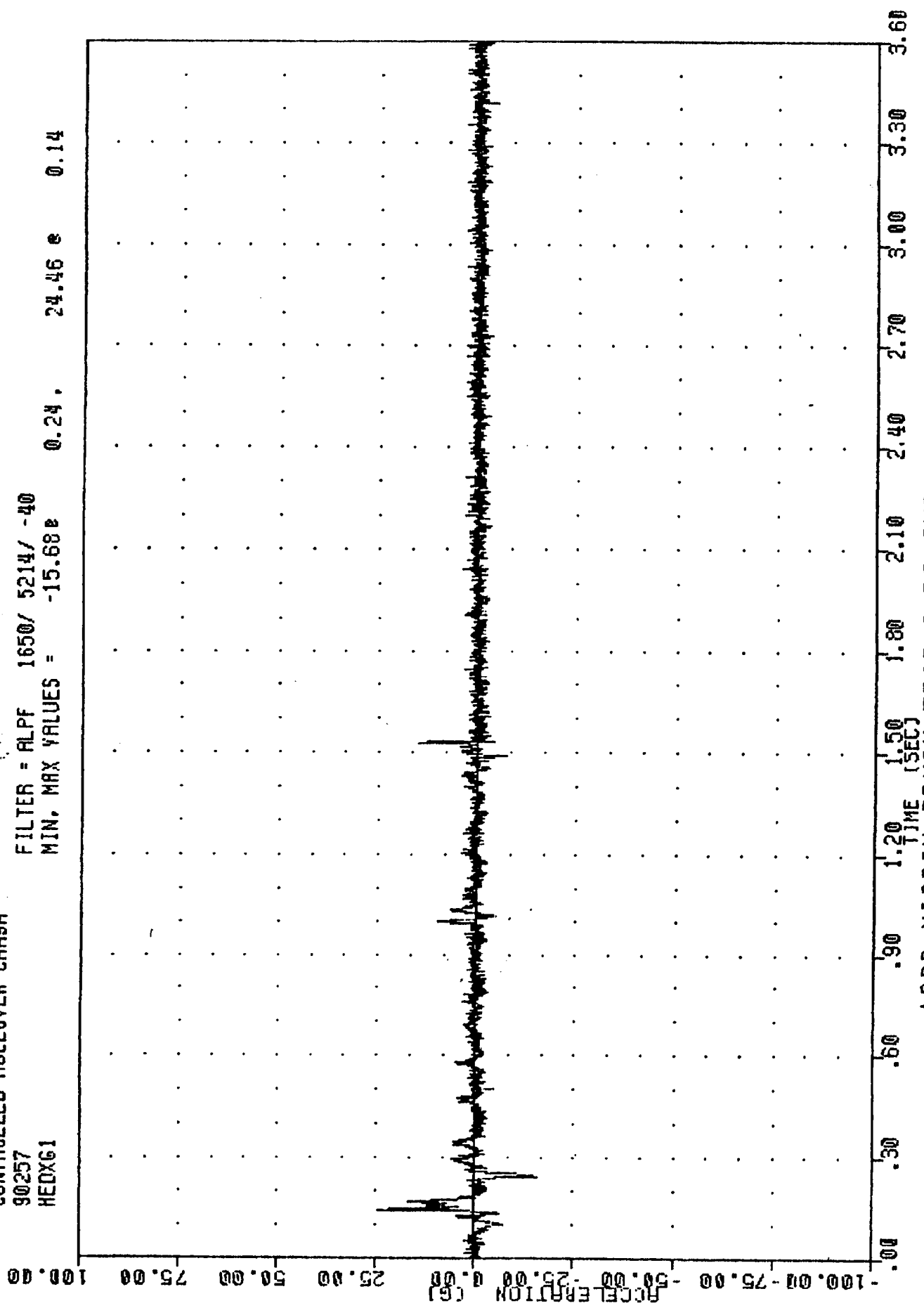
Figure A-24. POST-TEST RIGHT CURB DAMAGE VIEW

APPENDIX B

DATA PLOTS

L. NHTSA 900914
 CONTROLLED ROLLOVER CRASH
 90257
 HEDXG1

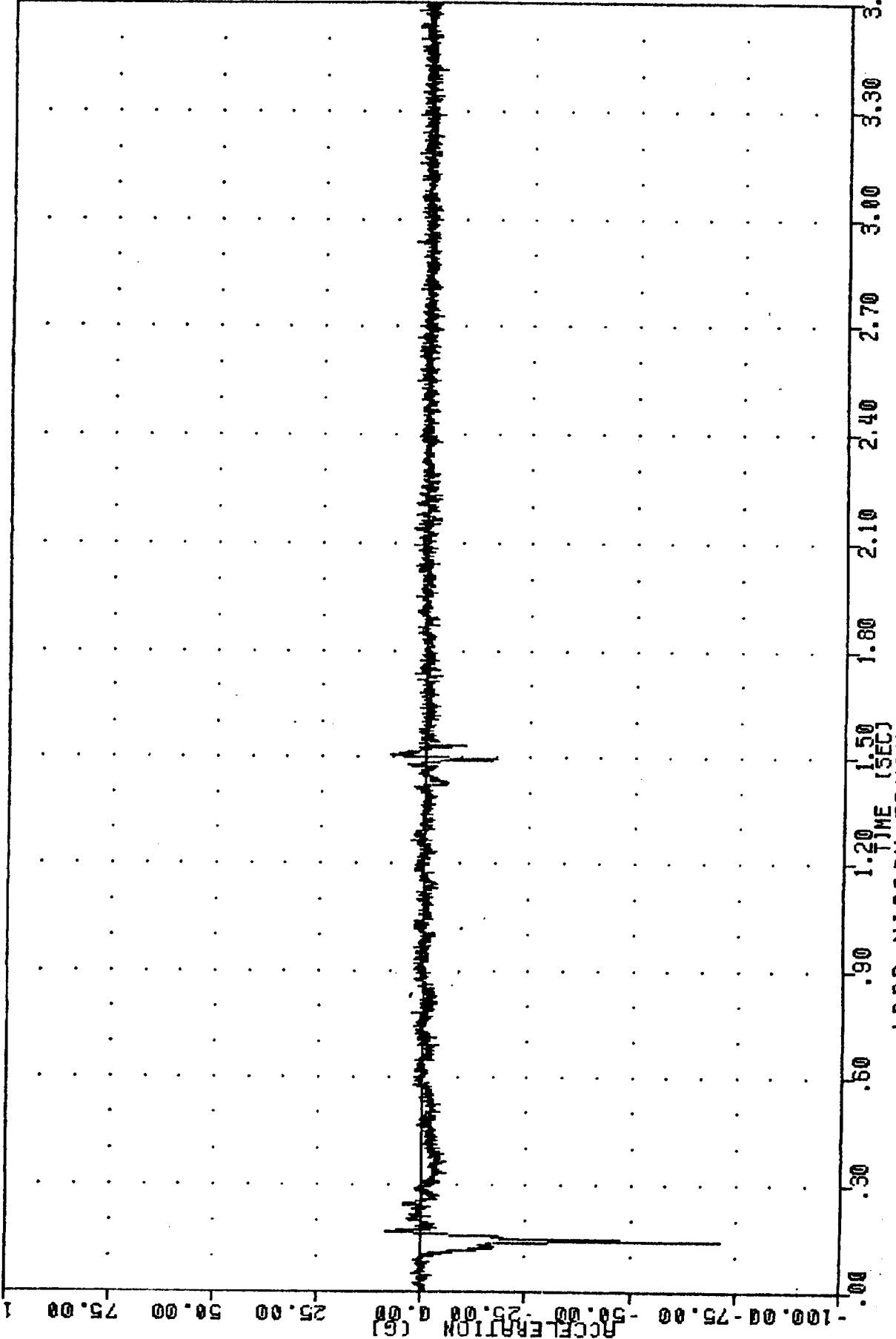
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -15.68 e 0.24. 24.46 e 0.14



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 DRIVER HEAD X AXIS ACCELERATION

1 NHTSA 900914
CONTROLLED ROLLOVER CRASH
90257
HEDYG1

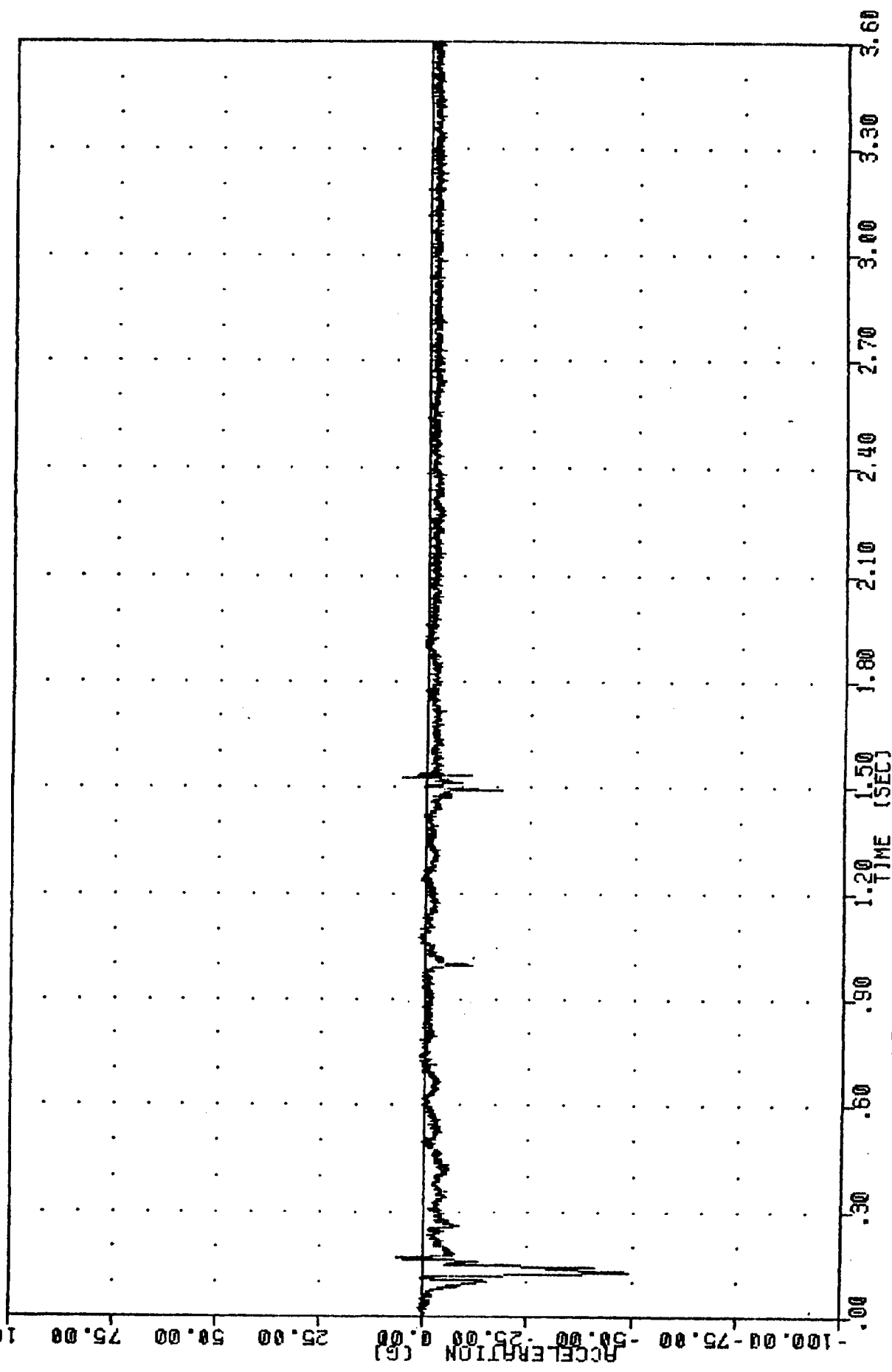
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -71.50 8.55 e 0.17



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER HEAD Y AXIS ACCELERATION

T NHTSA 900914
 CONTROLLED ROLLOVER CRASH
 90257
 HEDZG1

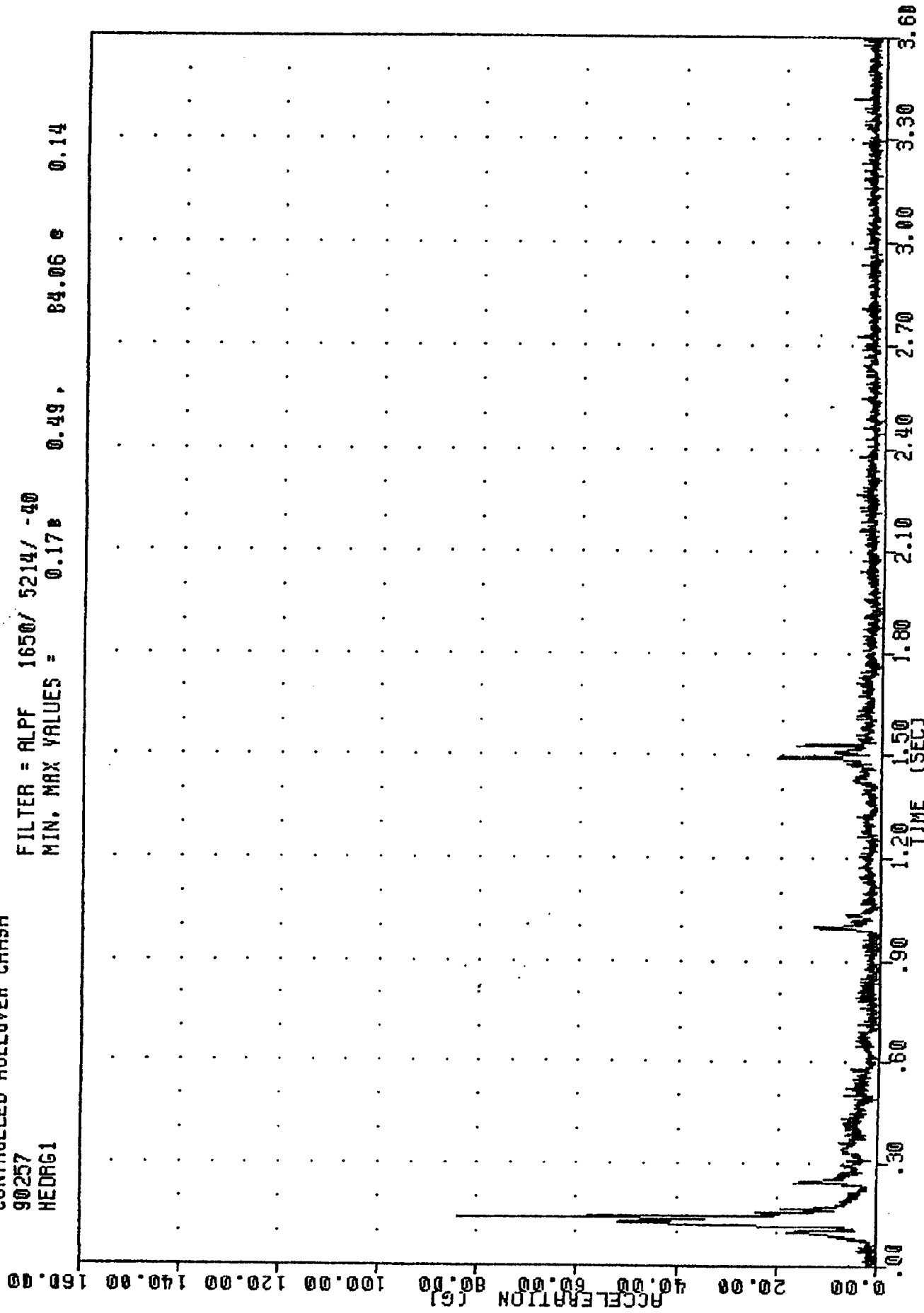
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -48.94 e 0.13, 6.64 e 0.17



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 DRIVER HEAD Z AXIS ACCELERATION

NHTSA 900914
CONTROLLED ROLLOVER CRASH
90257
HEADG1

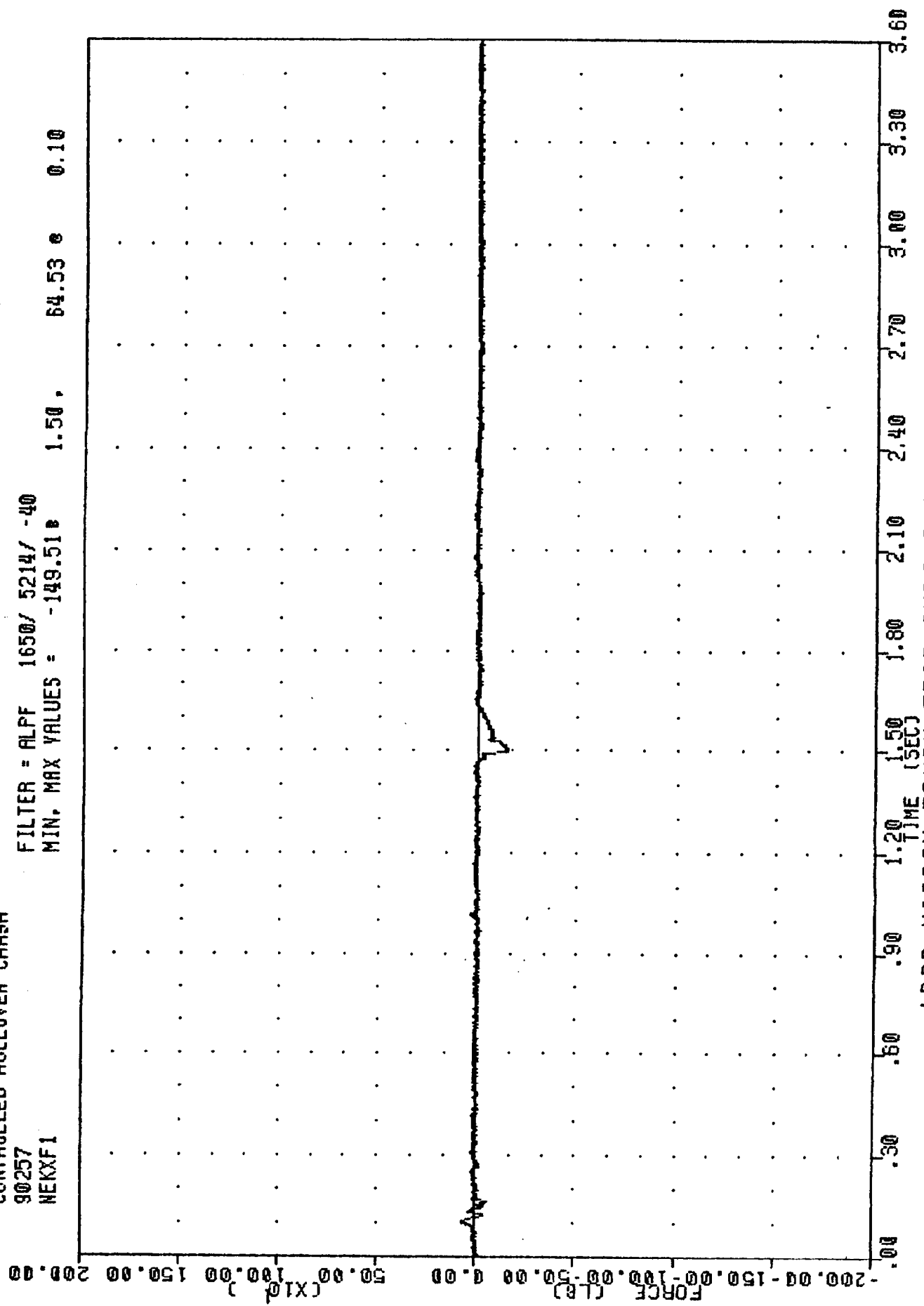
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 0.17 0.49 84.06 0.14



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER HEAD RESULTANT ACCELERATION

NHTSA 300914
 CONTROLLED ROLLOVER CRASH
 90257
 NEKXF1

FILTER = ALPF 1650/ 5214/ -40
 MIN, MAX VALUES = -149.51 1.50, 64.53 0.10

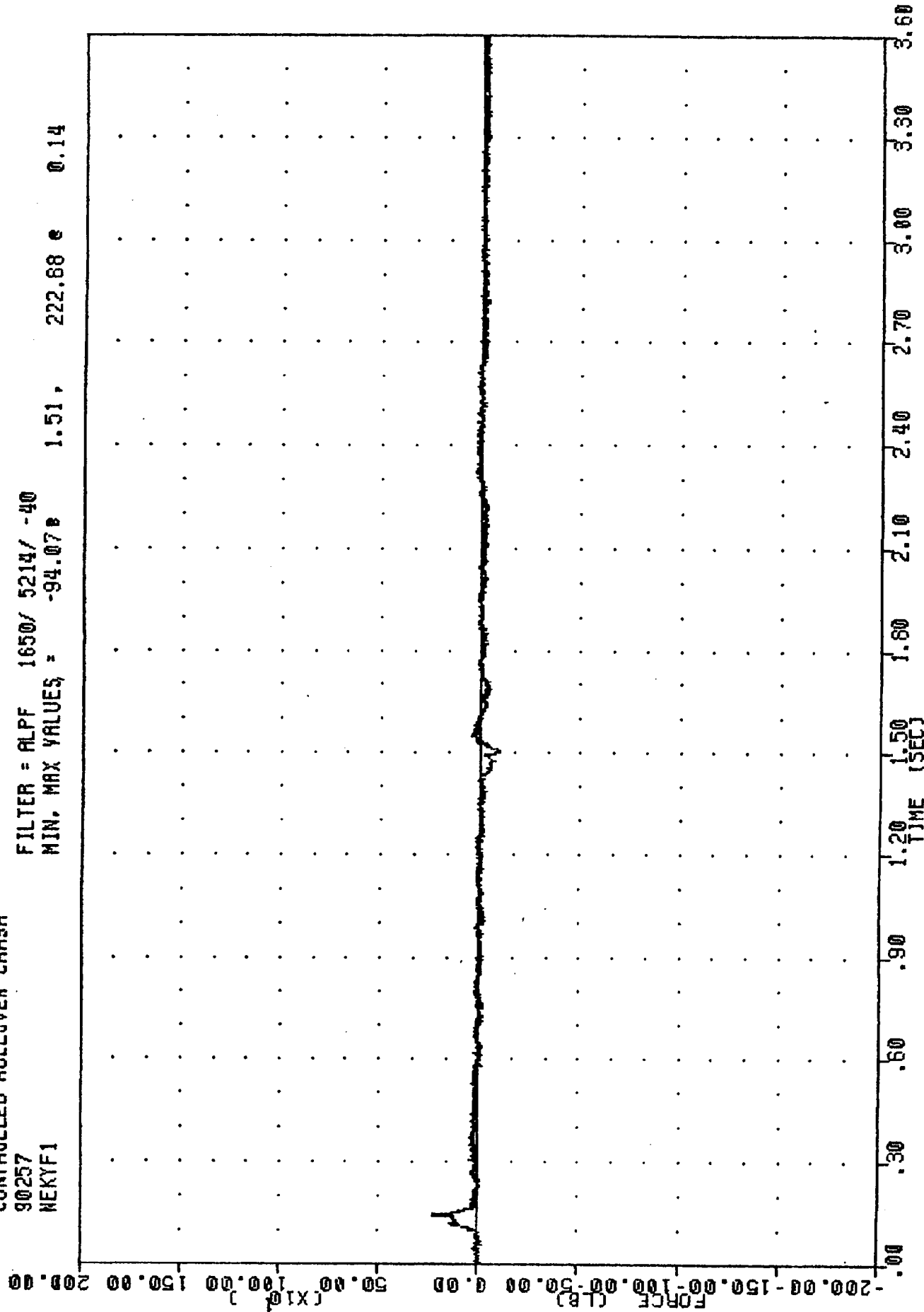


1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 DRIVER NECK SHEAR FORCE X AXIS

CONTROLLED ROLLOVER CRASH
90257
NEKYF1

1 NHTSA 300914

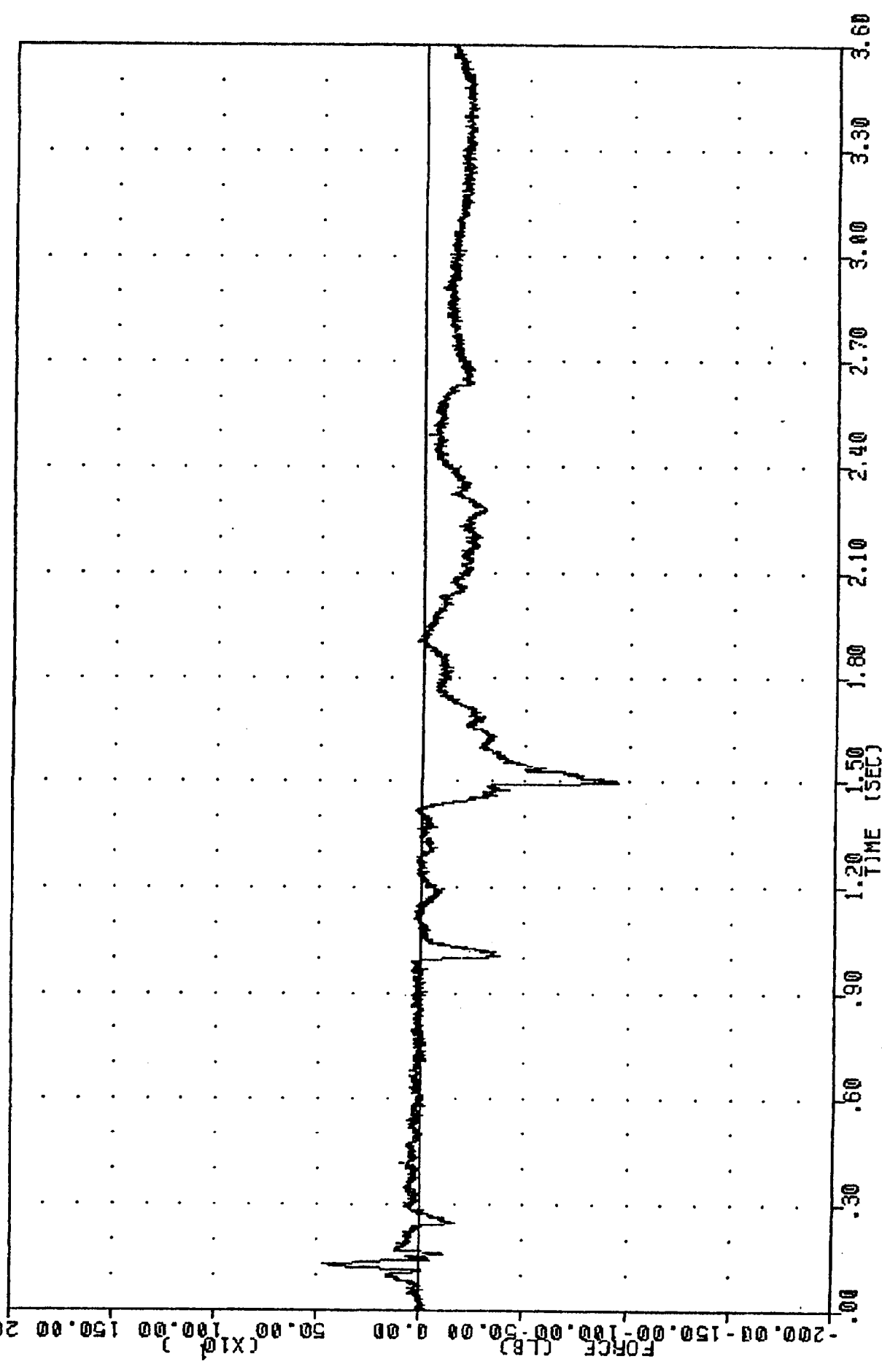
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -94.07 222.68 e 0.14



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER NECK SHEAR FORCE Y AXIS

CONTROLLED ROLLOVER CRASH
 90257
 NEKZF1

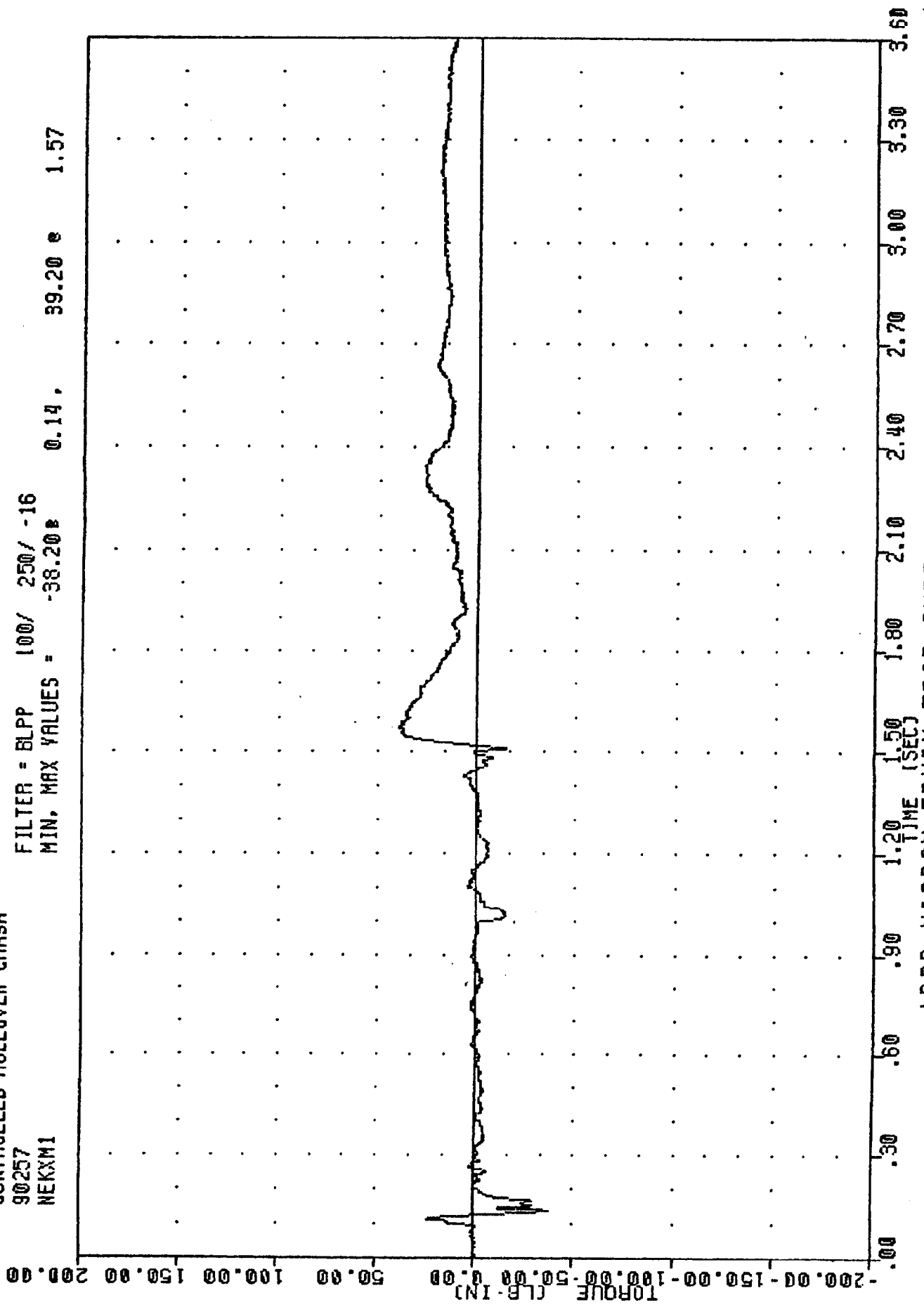
FILTER = ALPF 1650/ 5214/ -40
 MIN. MAX VALUES = -946.77 468.17 e 0.13



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 DRIVER NECK AXIAL FORCE Z AXIS

JT HTSH 900914
CONTROLLED ROLLOVER CRASH
90257
NEKXM1

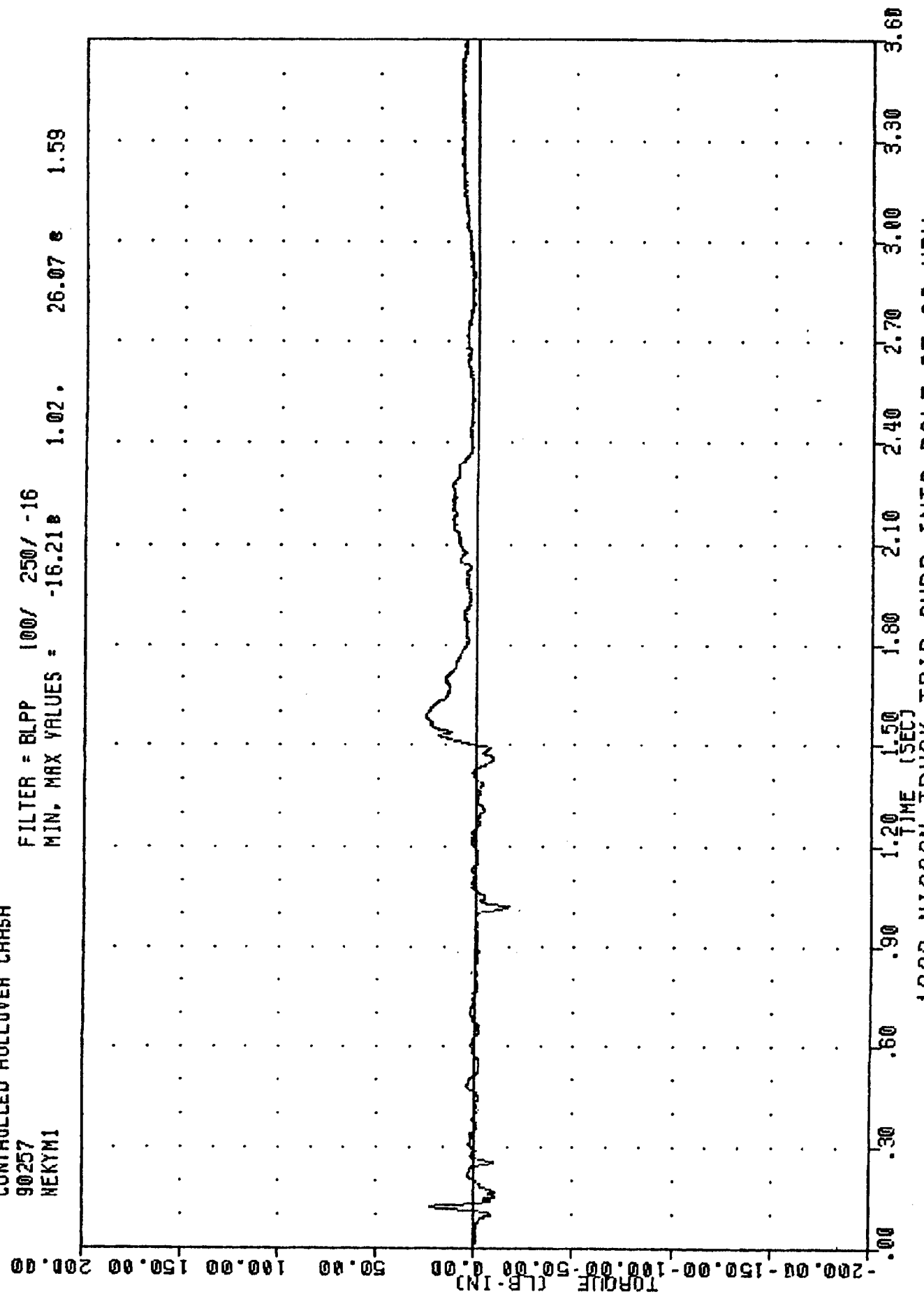
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -38.20 0.14, 39.20 e 1.57



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER NECK MOMENT ABOUT X AXIS

CONTROLLED ROLLOVER CRASH
90257
HEKYM1

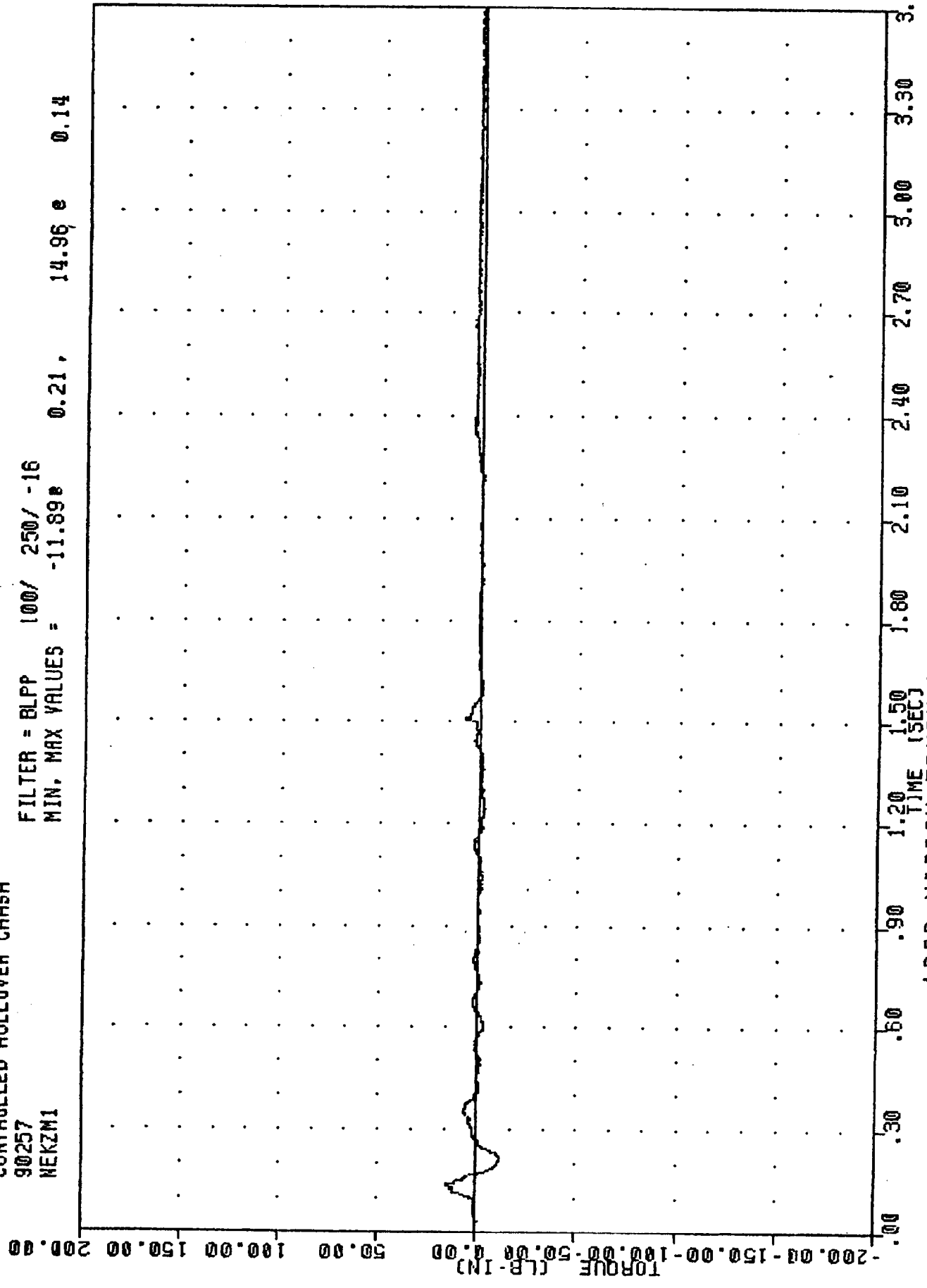
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -16.21 1.02 26.07 1.59



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER NECK MOMENT ABOUT Y AXIS

HTSH 900914
 CONTROLLED ROLLOVER CRASH
 90257
 NEKZM1

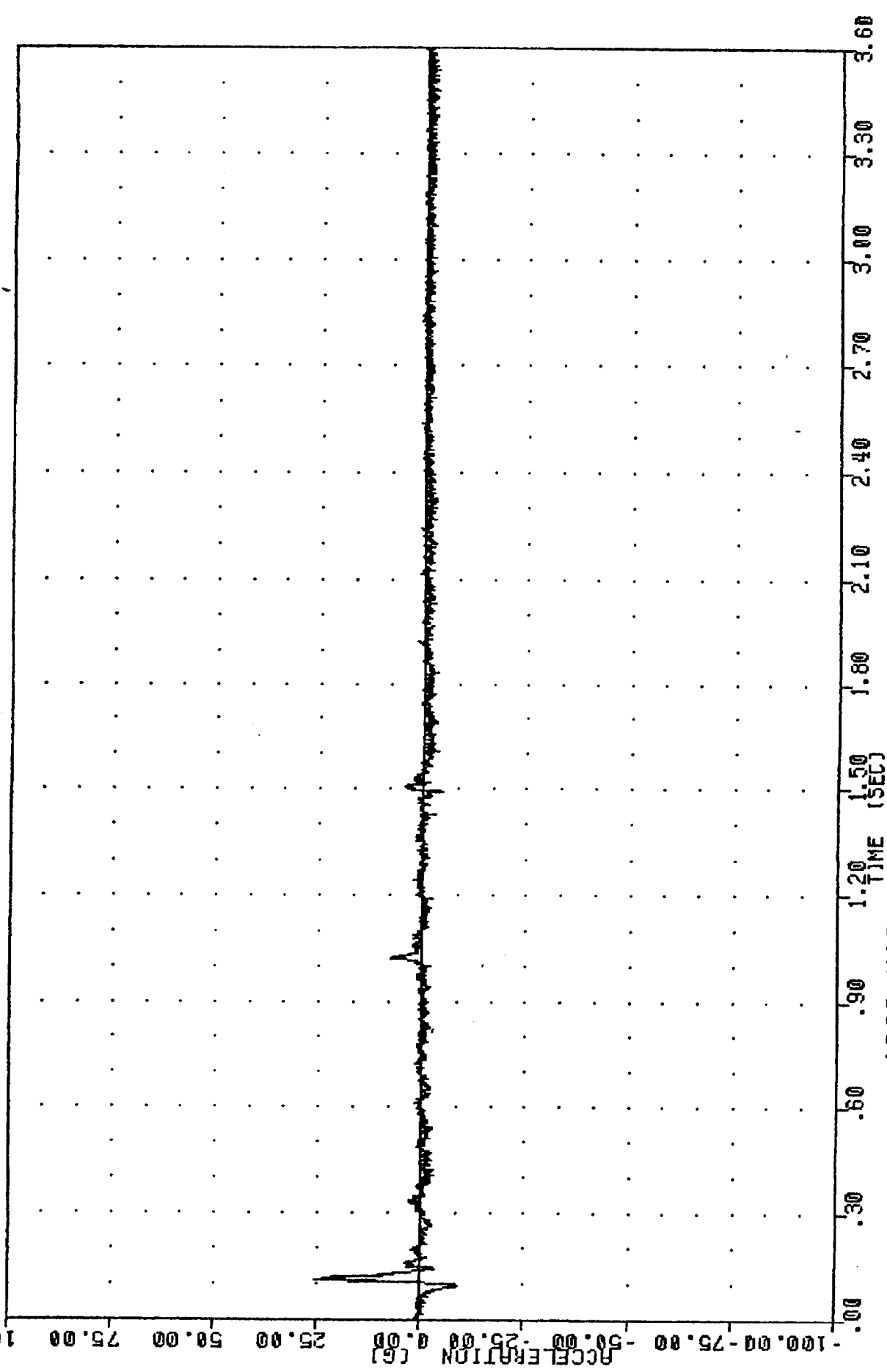
FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -11.89e 0.21, 14.96 e 0.14



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 DRIVER NECK MOMENT ABOUT Z AXIS

900914
UNCONTROLLED ROLLOVER CRASH
90257
CSTXG1

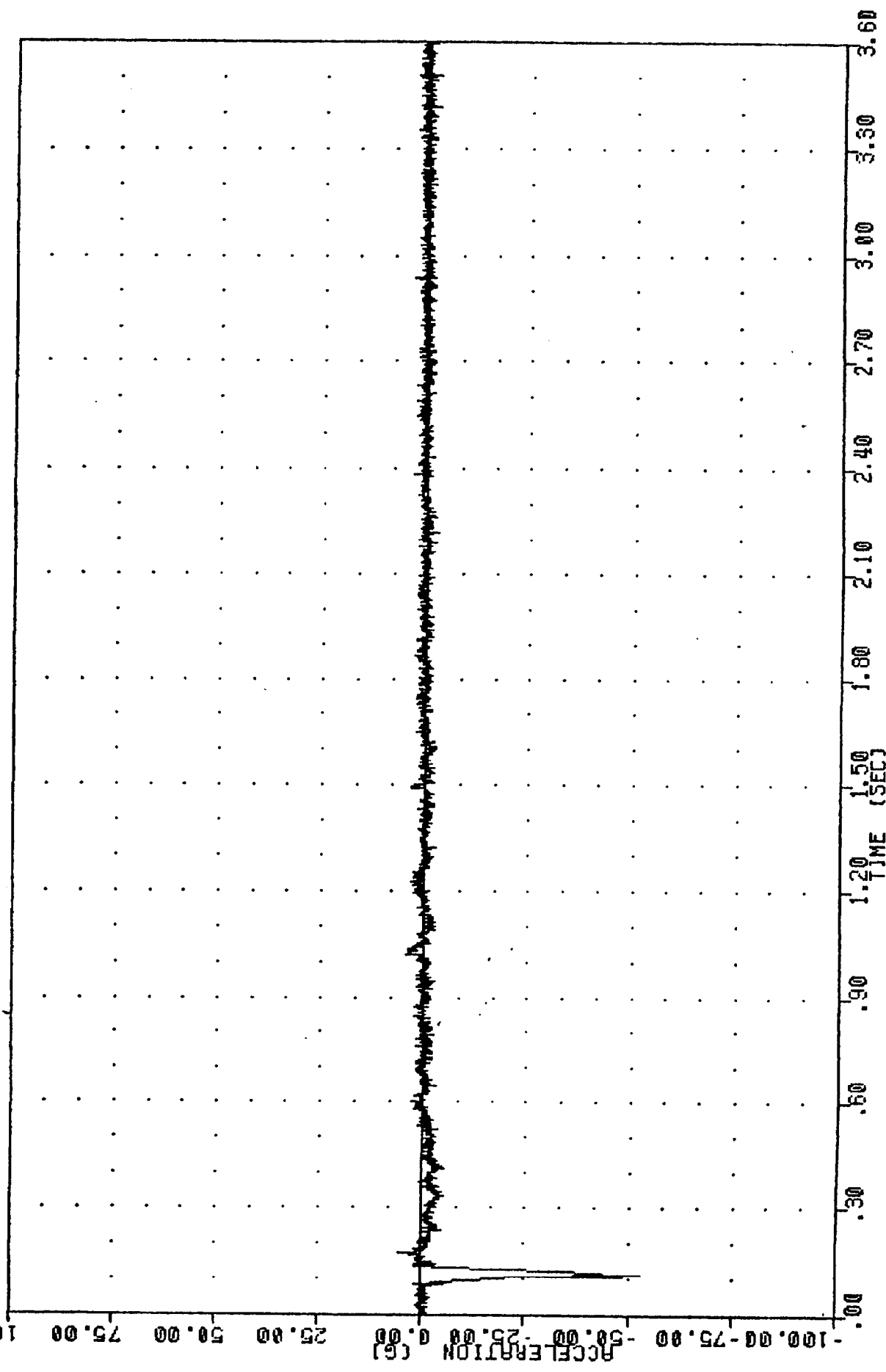
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -8.96 0.09 25.50 0.11



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER CHEST X AXIS ACCELERATION

900914
 CONTROLLED ROLLOVER CRASH
 90257
 CSTY61

FILTER = BLPP 300/ 750/ -16
 MIN. MAX VALUES = -52.94 0.11, 5.21 0 0.17

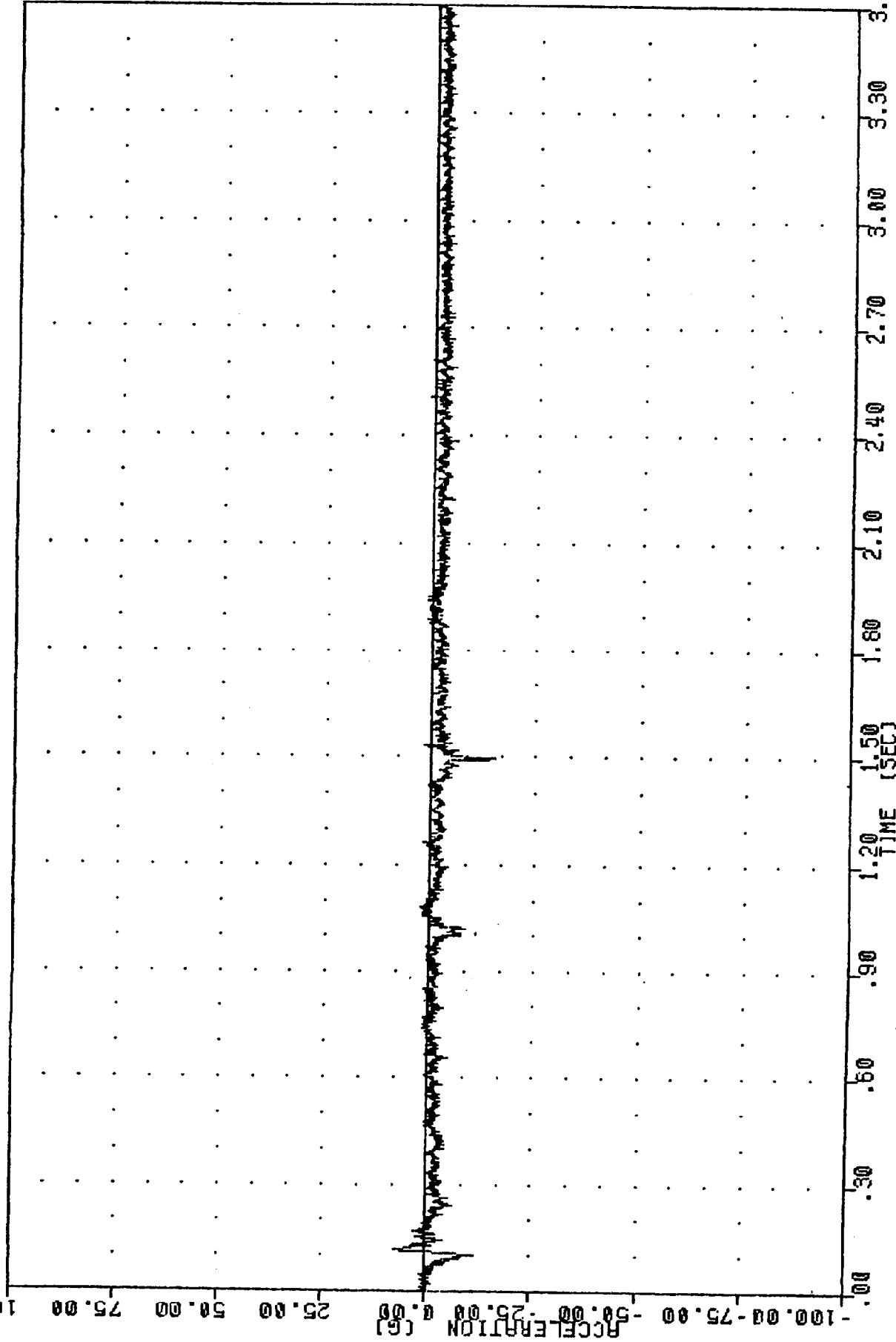


1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 DRIVER CHEST Y AXIS ACCELERATION

OF MHTSH
CONTROLLED ROLLOVER CRASH
90257
CSTZ61

FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -15.11e 1.49,

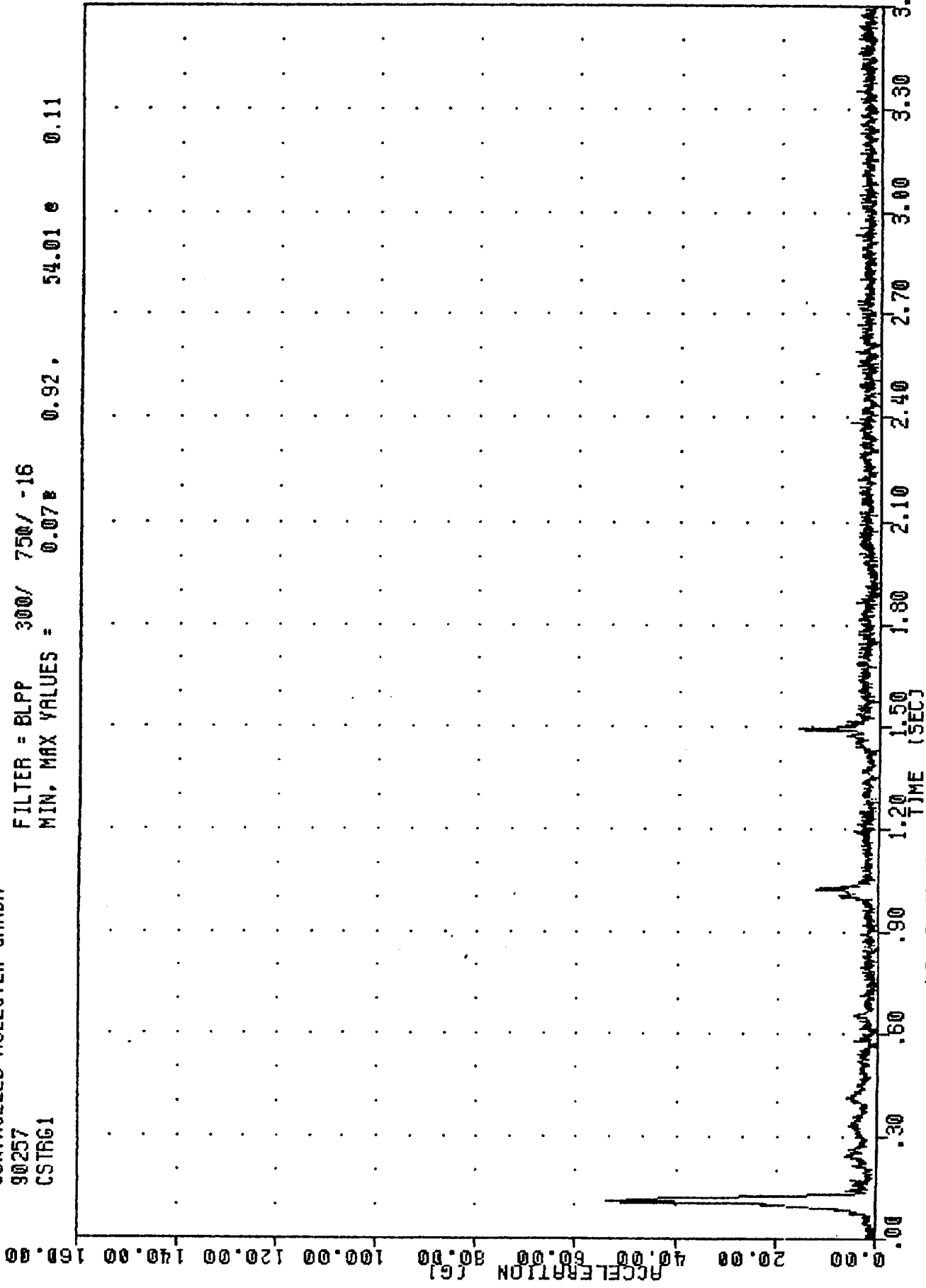
7.59 e 0.11



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER CHEST Z AXIS ACCELERATION

NTSH 900914
CONTROLLED ROLLOVER CRASH
90257
CSTRG1

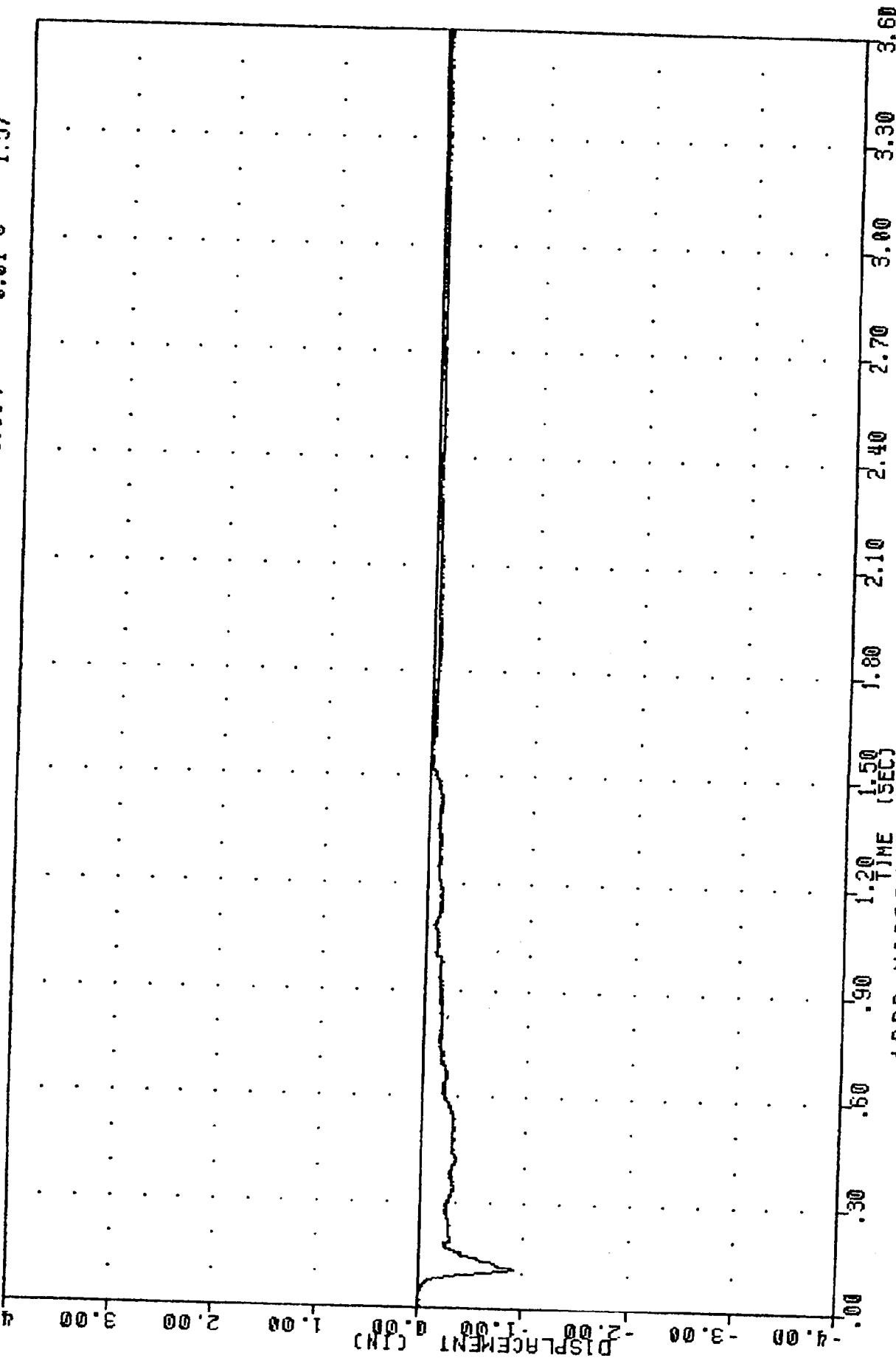
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = 0.07 e 0.92 . 54.01 e 0.11



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER CHEST RESULTANT ACCELERATION

UNIT 10110101
CONTROLLED ROLLOVER CRASH
90257
CSTXD1

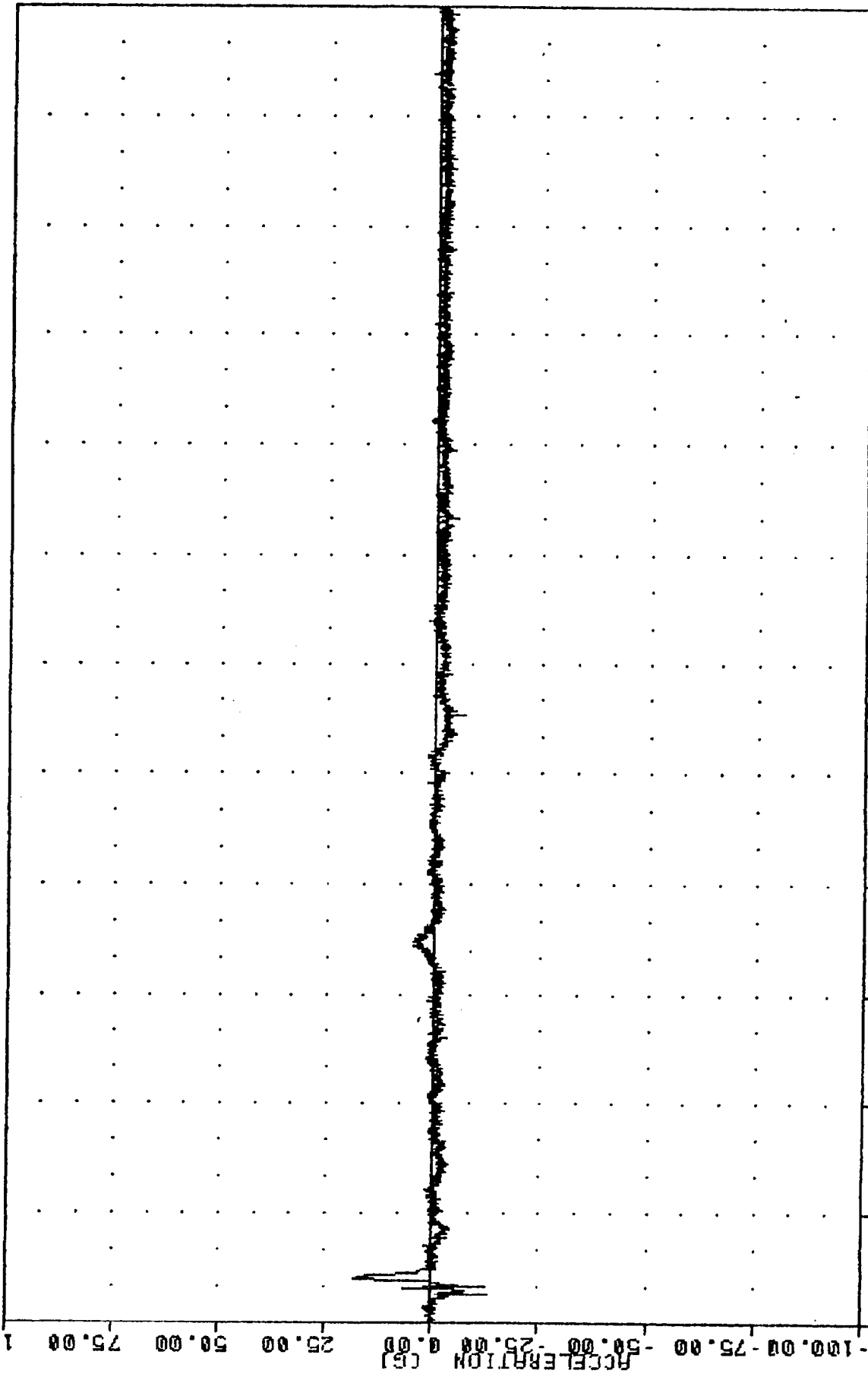
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -0.91 0.11, 0.01 e 1.57



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER CHEST X AXIS DISPLACEMENT

90257
PEVXG1
CONTROLLED ROLLOVER CRASH
900914

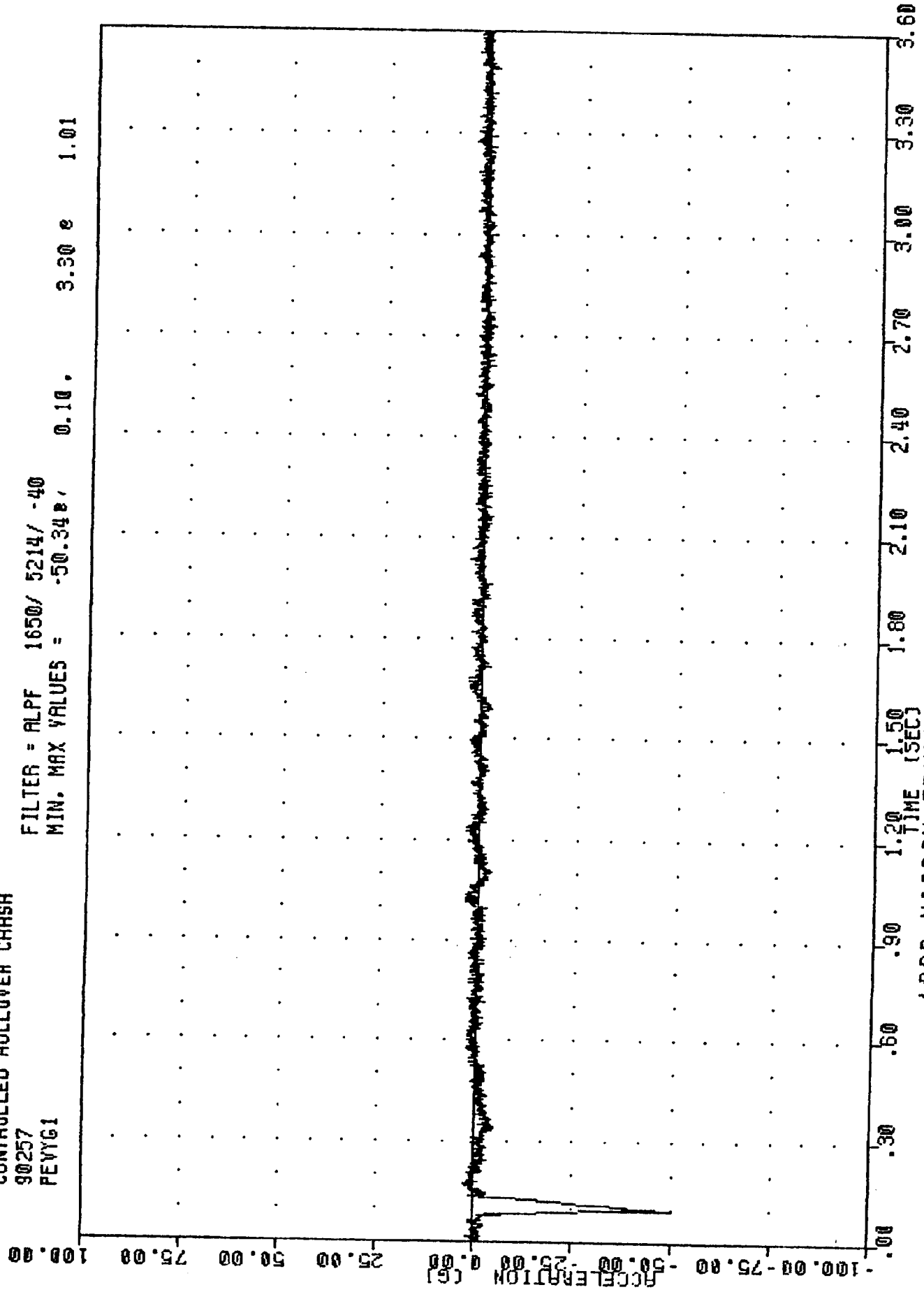
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -13.19e / 0.08 . 18.21 e 0.12



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER PELVIS X AXIS ACCELERATION

CONTROLLED ROLLOVER CRASH
90257
PEVYG1

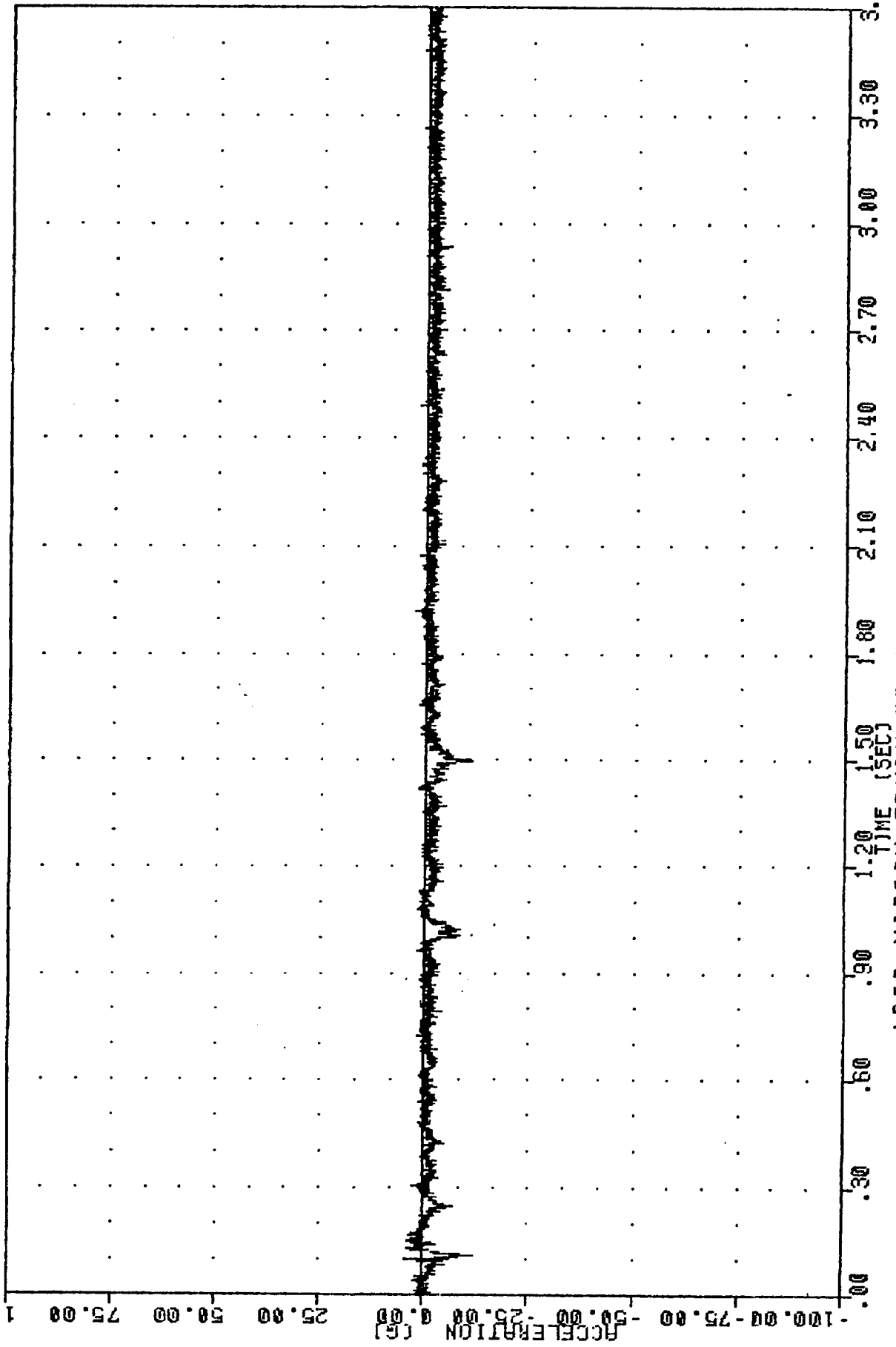
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -50.34 e 1.01



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER PELVIS Y AXIS ACCELERATION

90257
PEVZG1
CONTROLLED ROLLOVER CRASH
900914

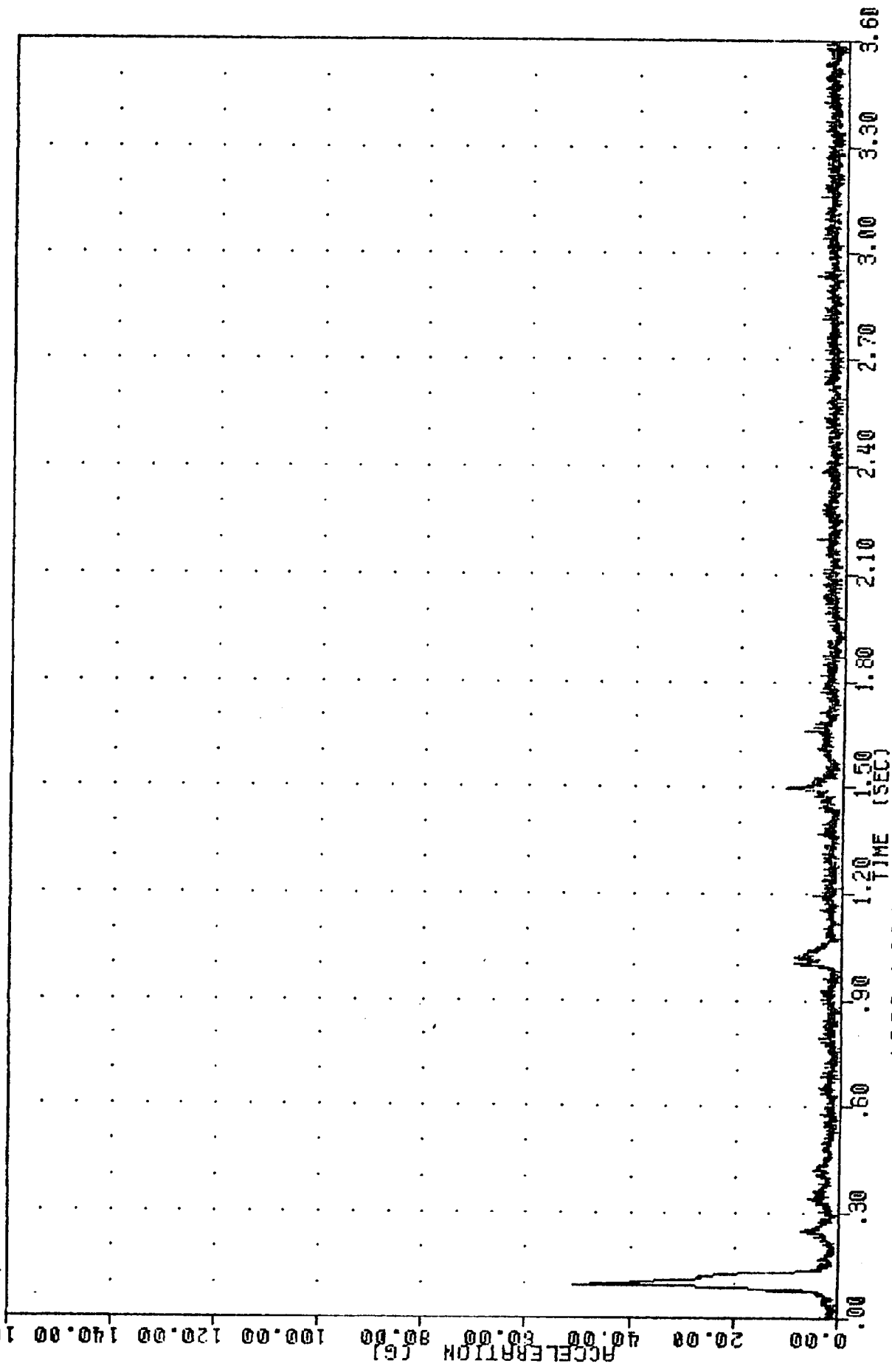
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 0.11, 4.17 e 0.10



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER PELVIS Z AXIS ACCELERATION

UNCONTROLLED ROLLOVER CRASH
90257
PEVRG1

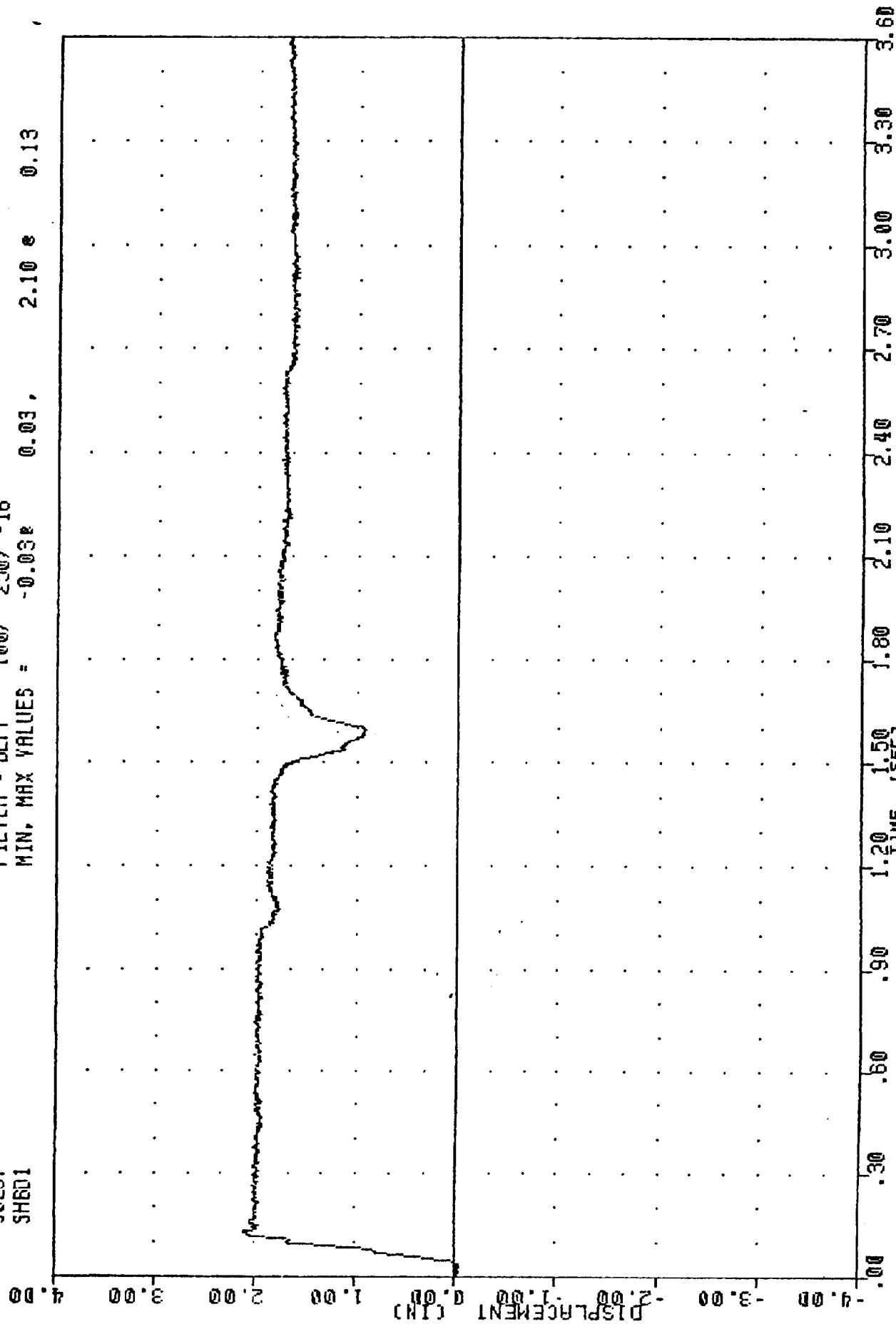
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 0.20e 1.21. 50.80 e 0.10



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER PELVIS RESULTANT ACCELERATION

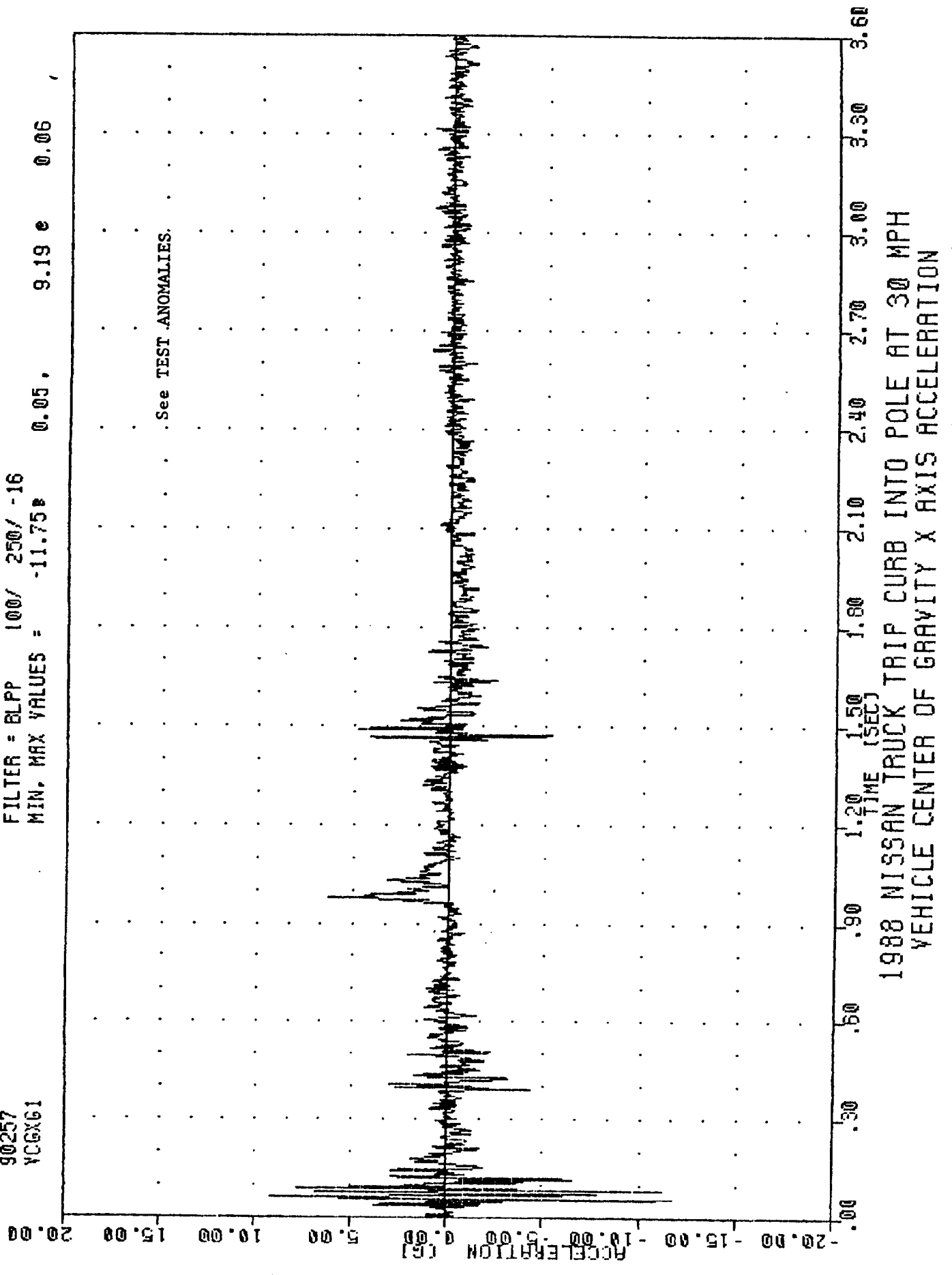
1 HITSH, 800914
CONTROLLED ROLLOVER CRASH
90257
SH601

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -0.03 0.03, 2.10 0.13



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
DRIVER SHOULDER BELT DISPLACEMENT

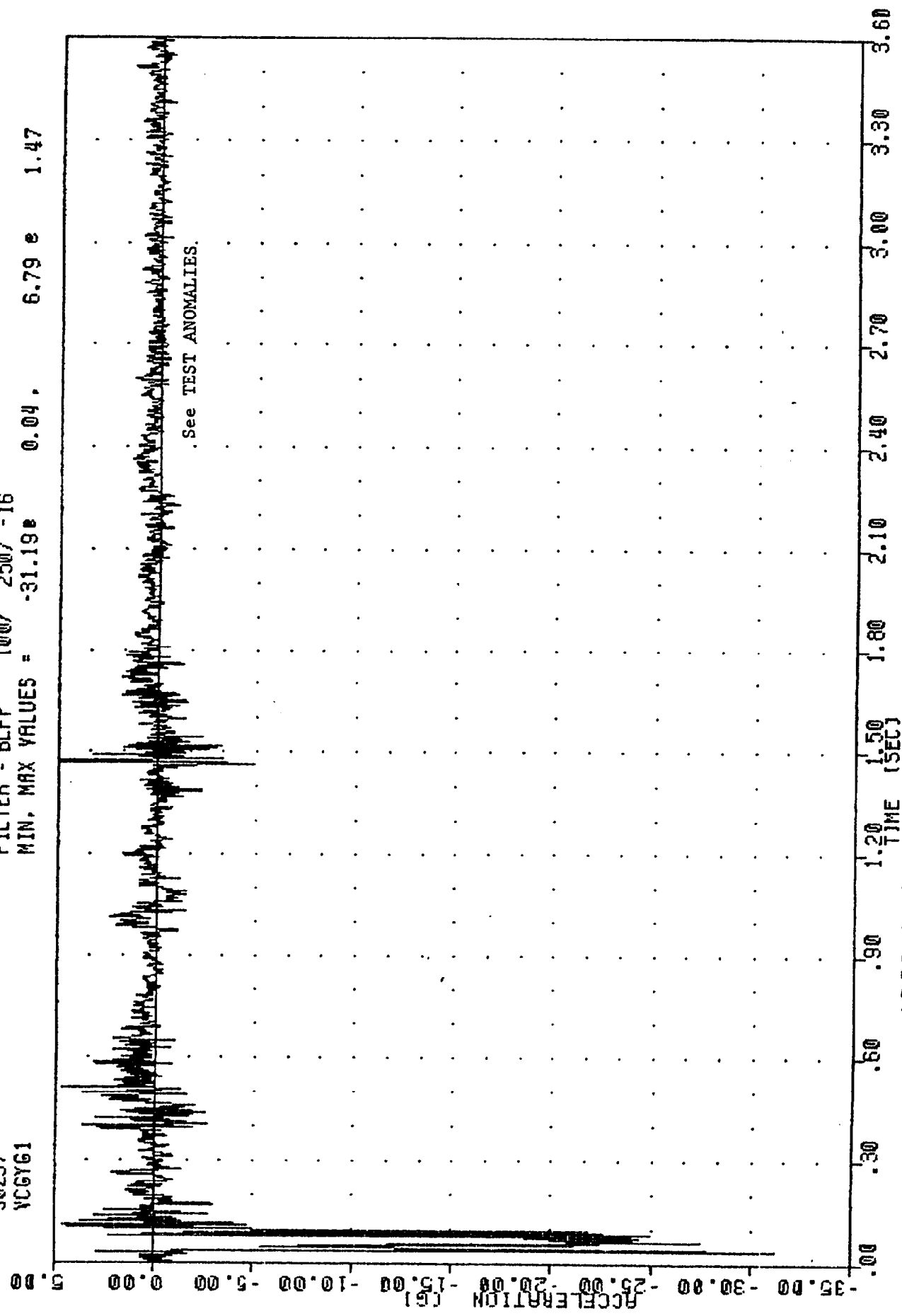
UNCONTROLLED ROLLOVER CRASH
 90257
 VC6X61
 FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -11.75 0.05 9.19 e 0.06



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 VEHICLE CENTER OF GRAVITY X AXIS ACCELERATION

JT NHTSA 900914
 CONTROLLED ROLLOVER CRASH
 90257
 YCGY61

FILTER = BLPP 100/ 250/ -16
 MIN, MAX VALUES = -31.19e 0.04. 6.79 e 1.47



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 VEHICLE CENTER OF GRAVITY Y AXIS ACCELERATION

UNIVERSITY OF MICHIGAN
CONTROLLED ROLLOVER CRASH

90257

VC6Z61

FILTER = BLPP 100/ 250/ -16

MIN. MAX VALUES = -11.39 0.39

12.44 e 0.07

20.00

15.00

10.00

5.00

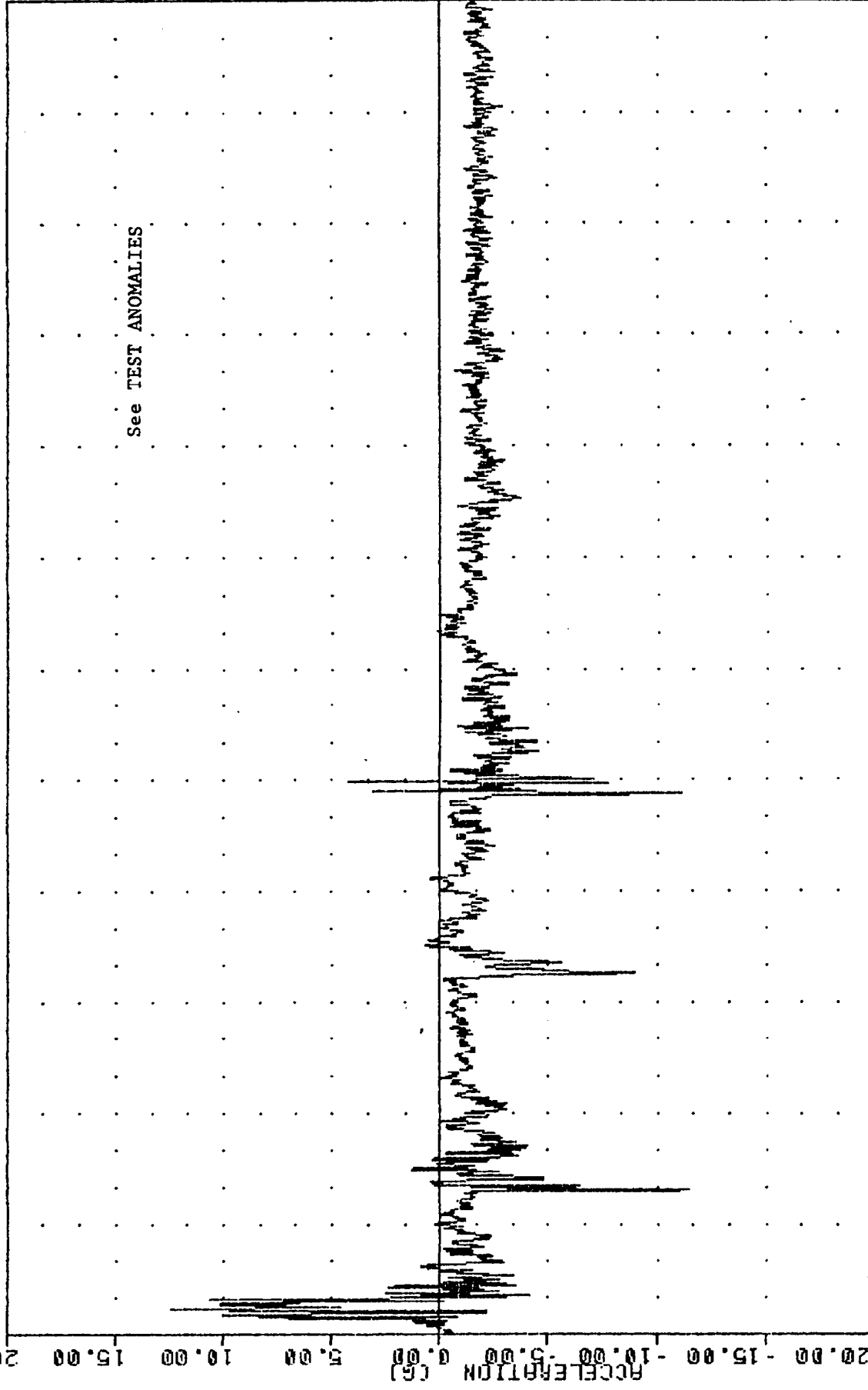
0.00

-5.00

-10.00

-15.00

-20.00



ACCELERATION (CG) 20.00 15.00 10.00 5.00 0.00 -5.00 -10.00 -15.00 -20.00

TIME (SEC) 0.00 0.30 0.60 0.90 1.20 1.50 1.80 2.10 2.40 2.70 3.00 3.30 3.60

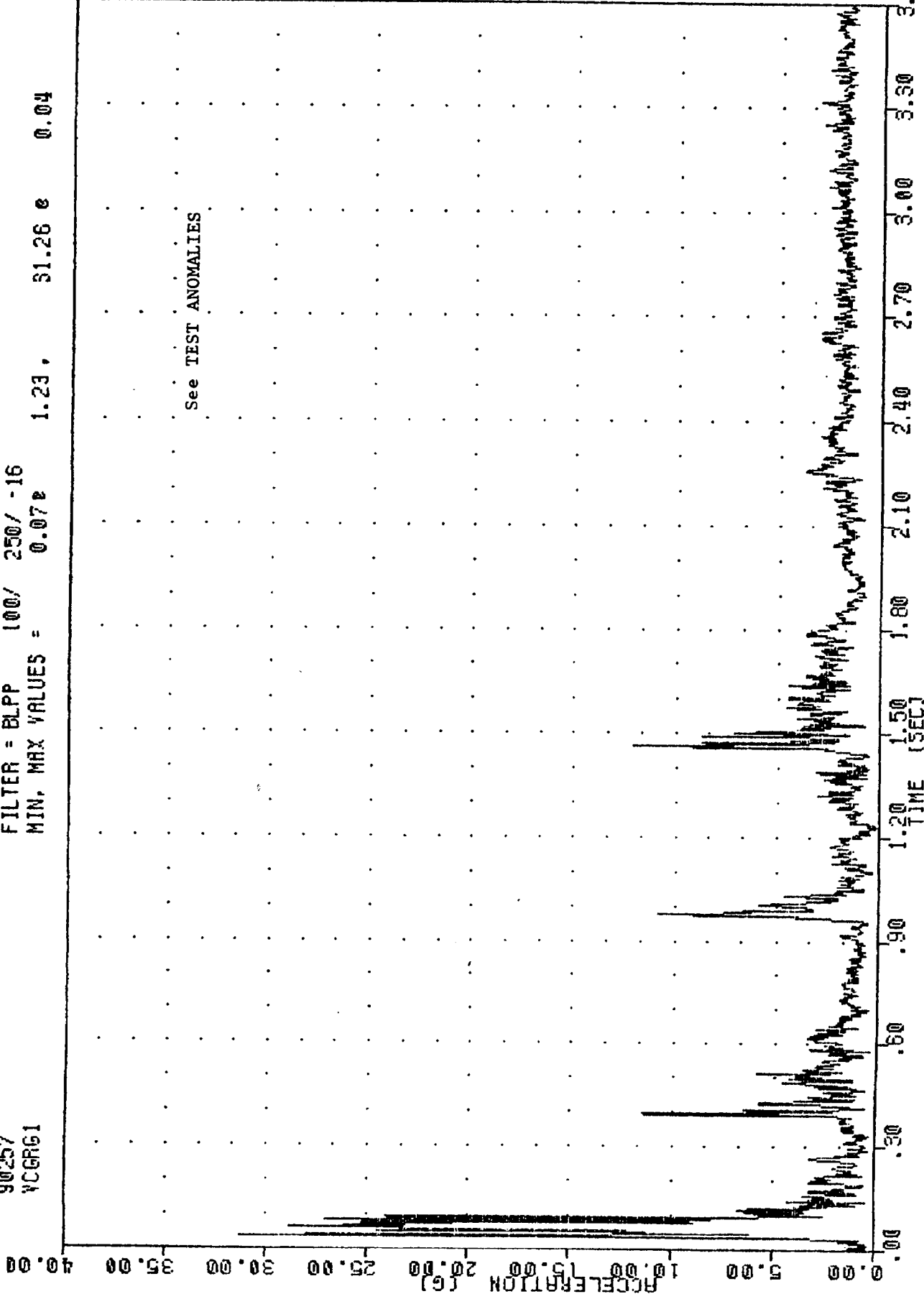
1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
VEHICLE CENTER OF GRAVITY Z AXIS ACCELERATION

74

1988 NISSAN TRUCK
CONTROLLED ROLLOVER CRASH
90257
VCGR61

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = 0.07 1.23

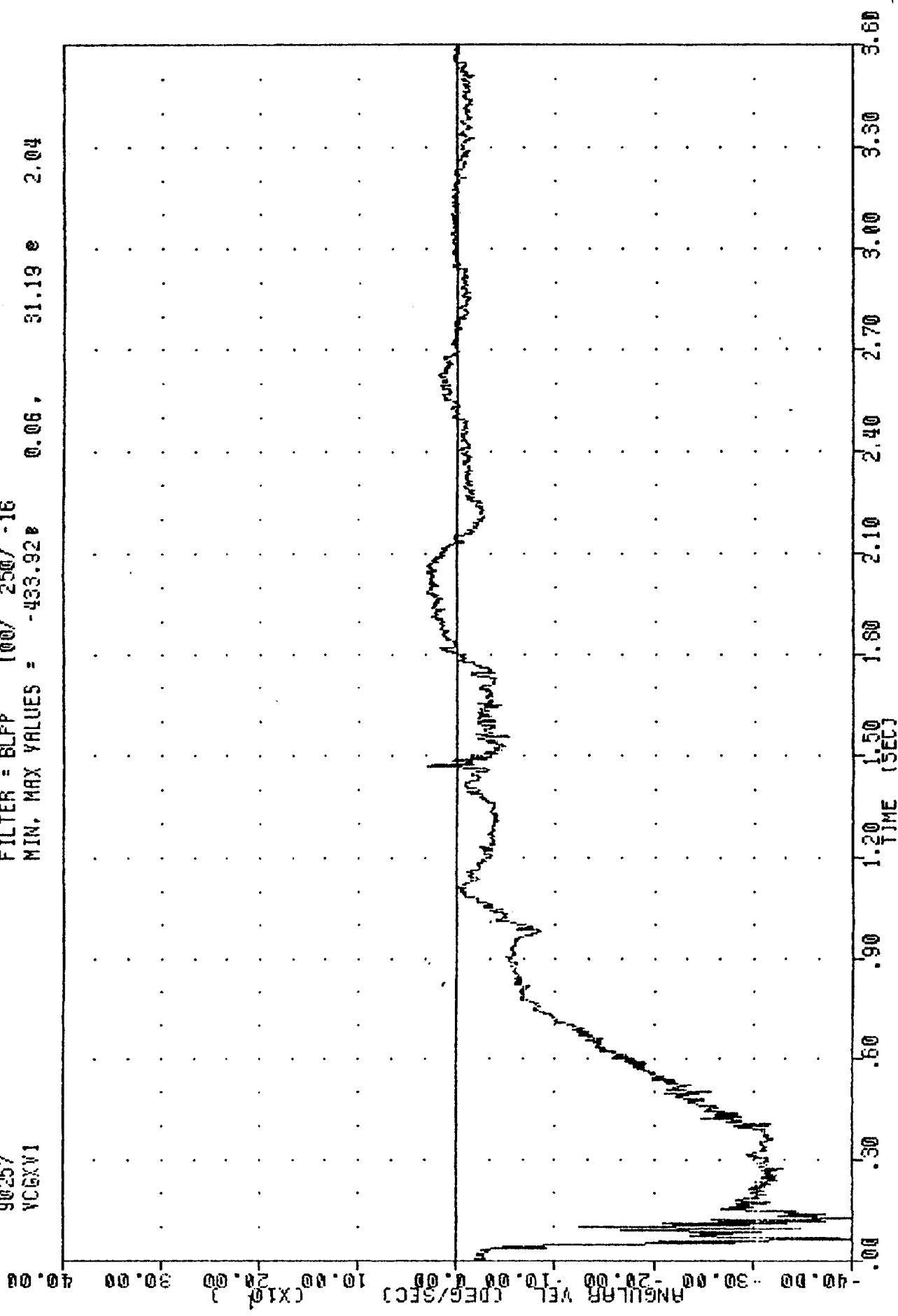
31.26 0.04



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION

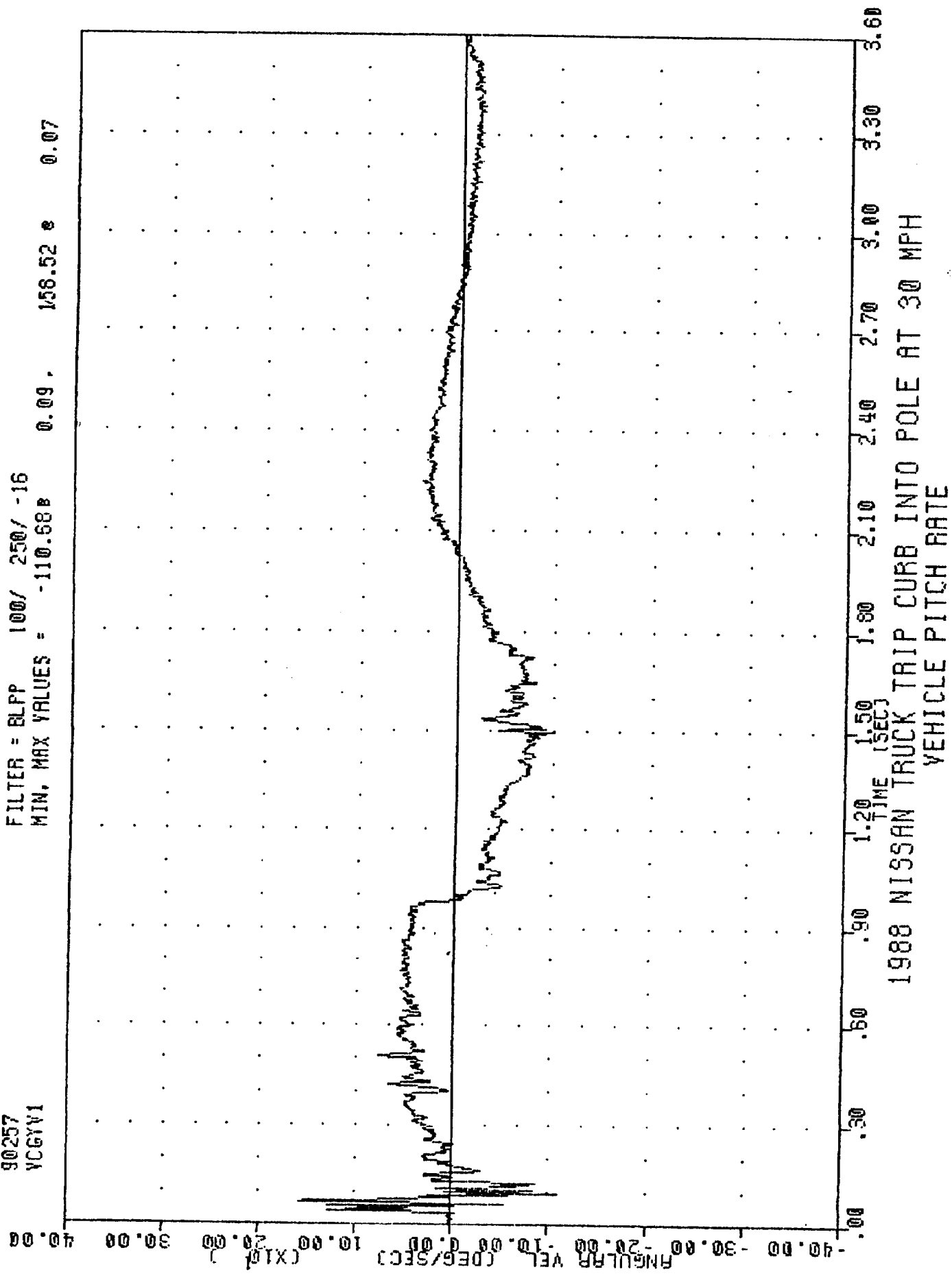
900914
CONTROLLED ROLLOVER CRASH
90257
VCGXV1

FILTER = BLFP 100/ 250/ -16
MIN. MAX VALUES = -433.92 0.06, 31.19 e 2.04



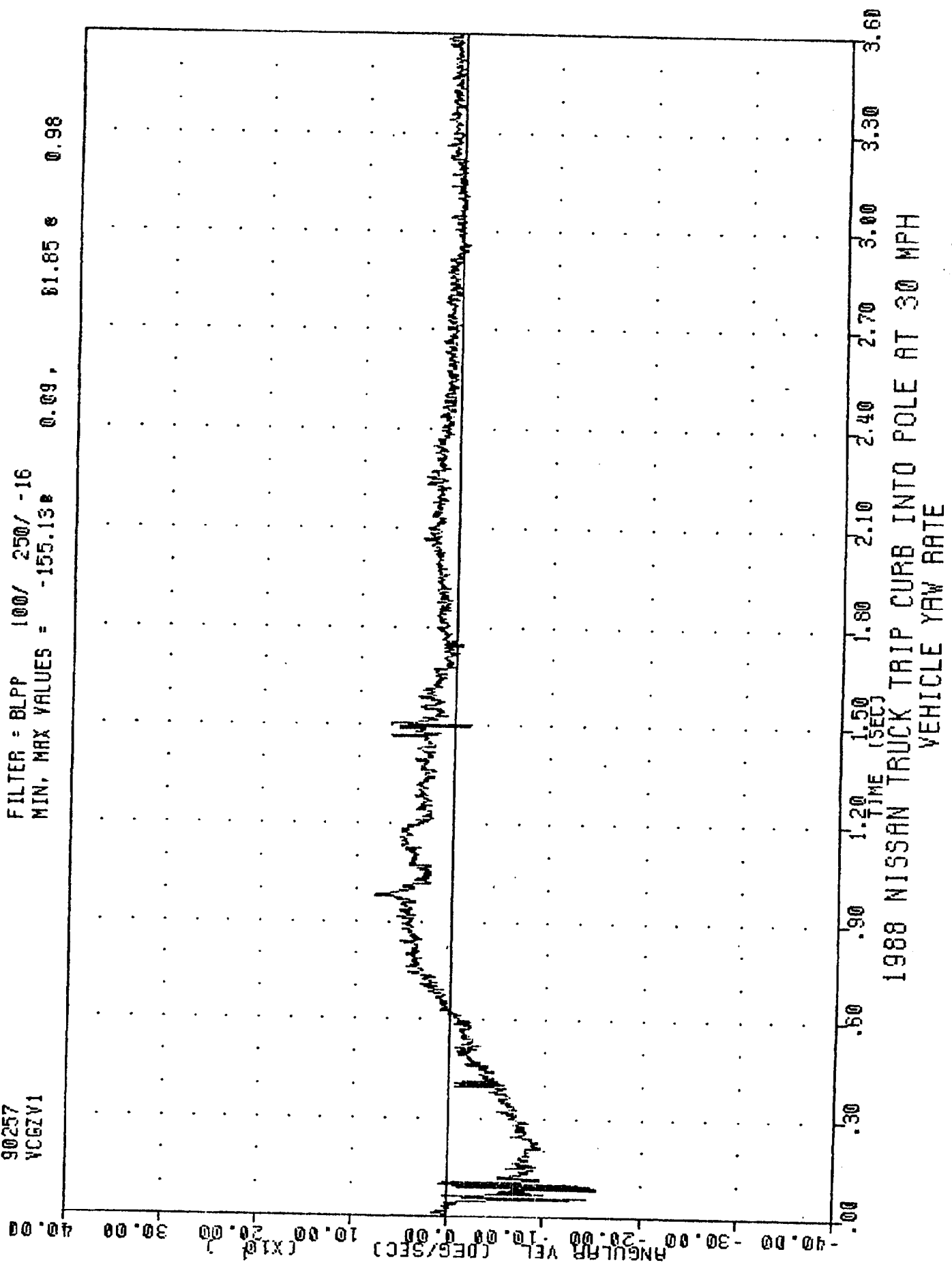
1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
VEHICLE ROLL RATE

90257
 YCGV1
 CONTROLLED ROLLOVER CRASH
 100/ 250/ -16
 MIN. MAX VALUES = -110.68 0.09, 158.52 0.07



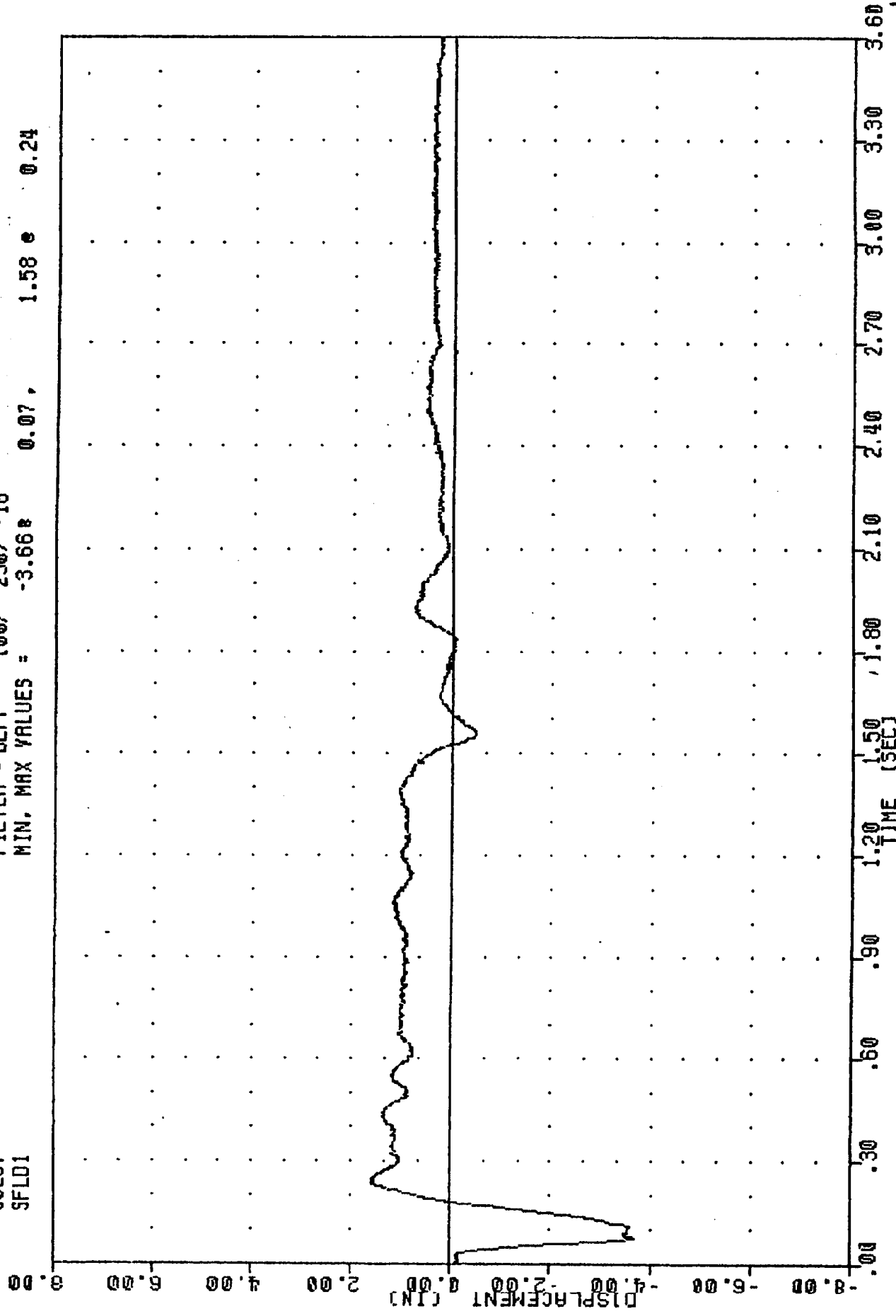
CONTROLLED ROLLOVER CRASH
90257
VCGZV1

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -155.13 0.09, 81.85 0.98



DOT NHTSA 900314
CONTROLLED ROLLOVER CRASH
90257
SFLO1

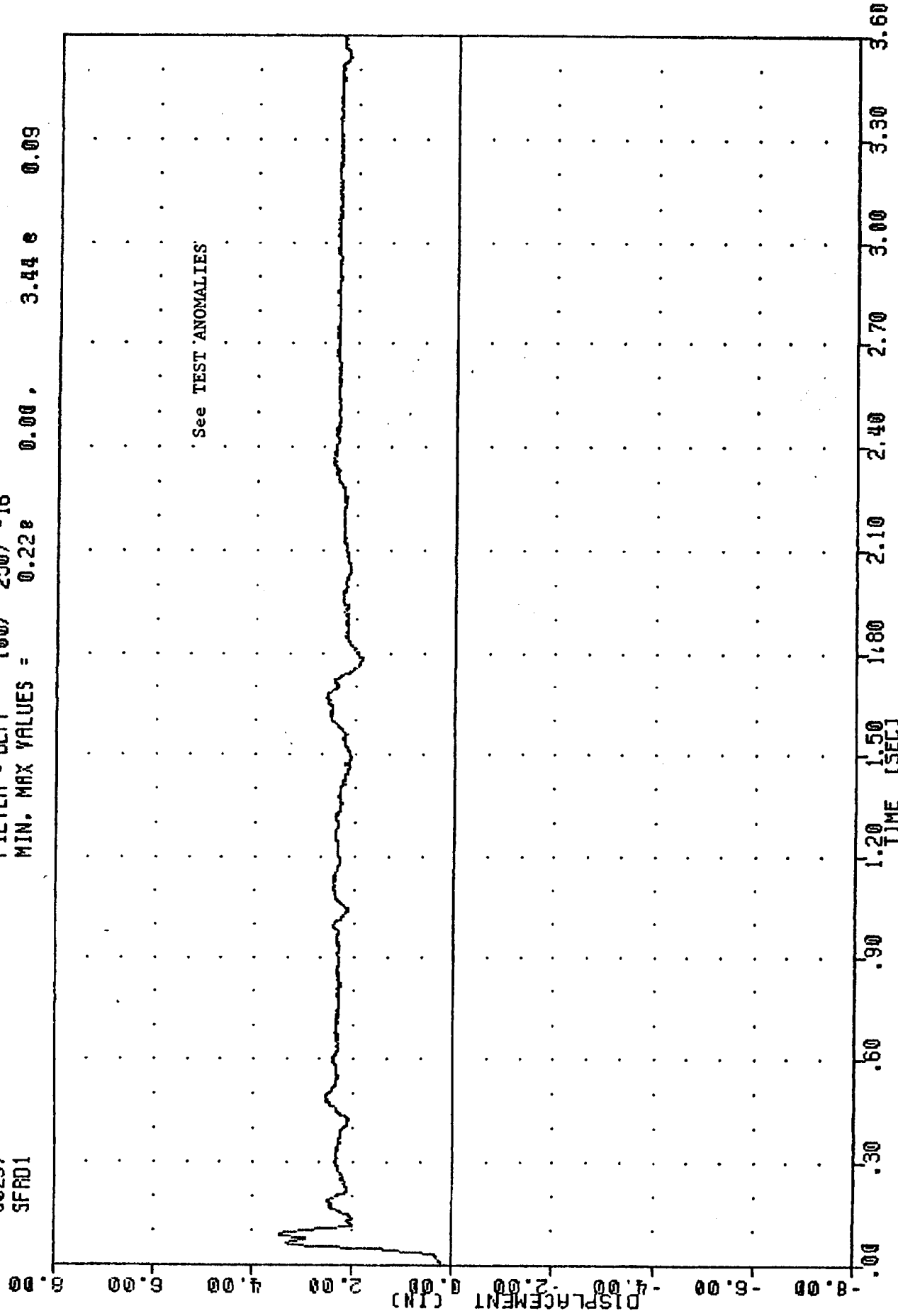
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = 0.07, 1.58 e 0.24



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
VEHICLE LEFT FRONT SUSPENSION DISPLACEMENT

DOT NHTSA 900914
CONTROLLED ROLLOVER CRASH
90257
SFR01

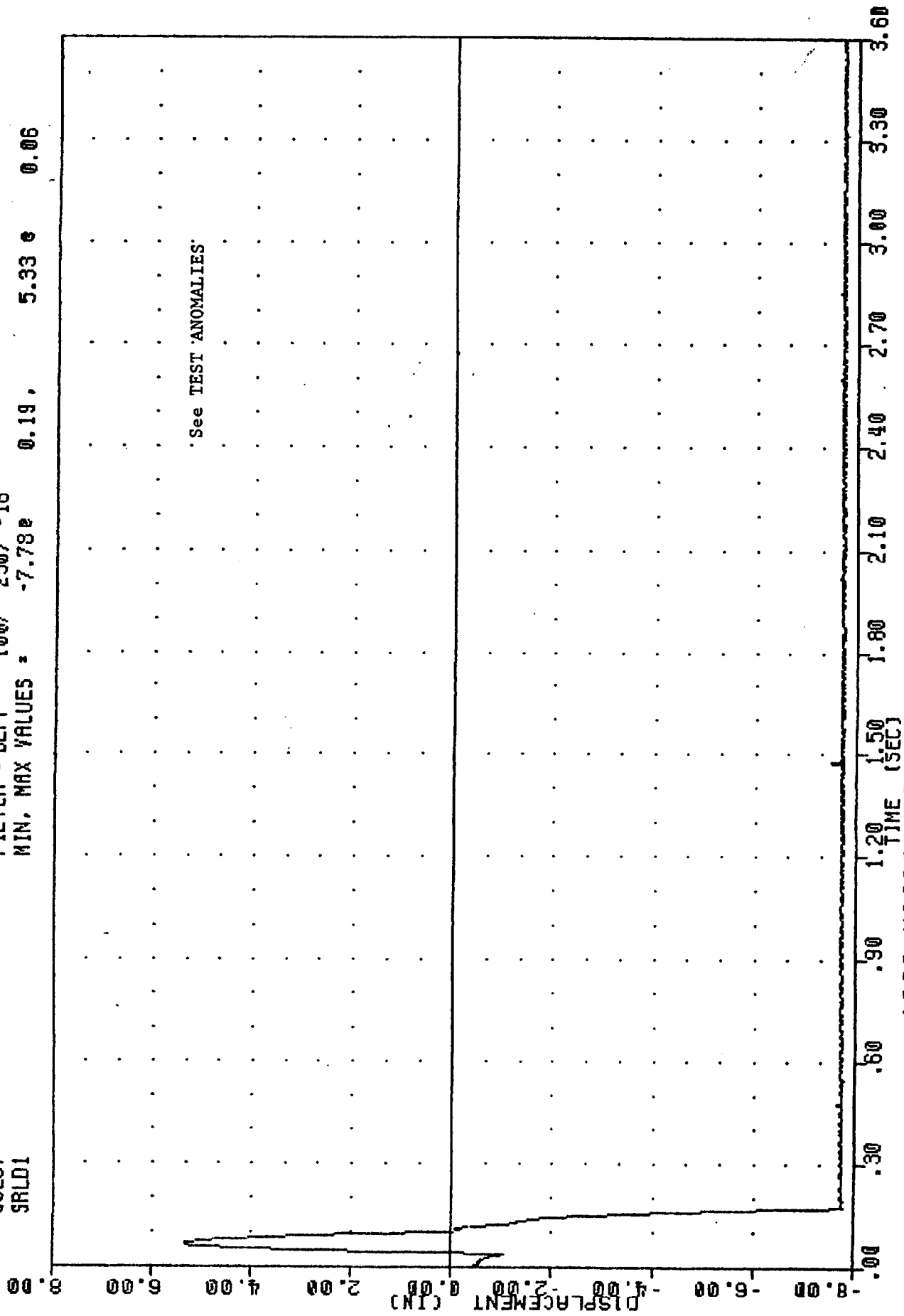
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = 0.00 3.44 0.09



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
VEHICLE RIGHT FRONT SUSPENSION DISPLACEMENT

DOT NHTSA 900914
CONTROLLED ROLLOVER CRASH
90257
SRD1

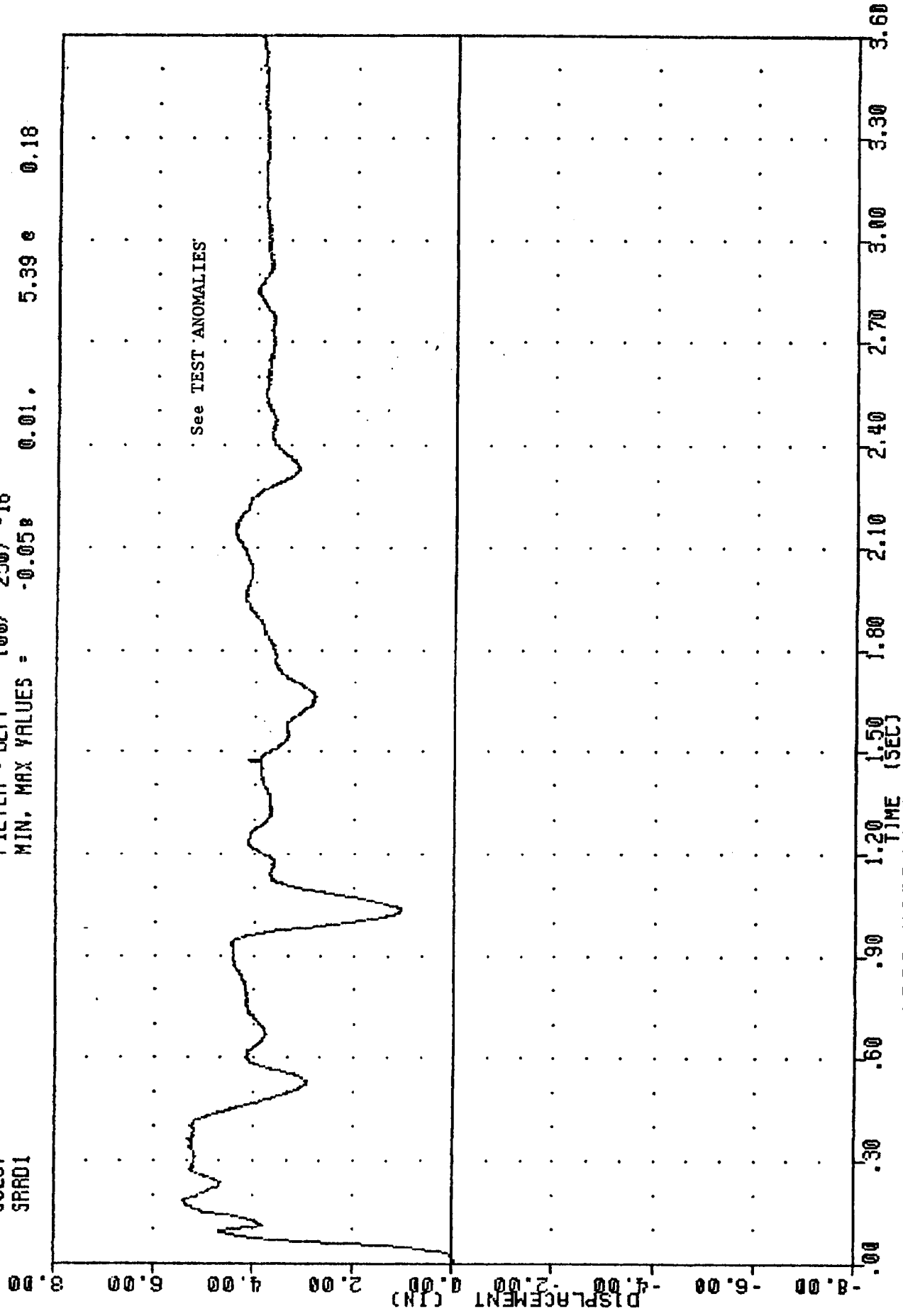
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -7.78 0.19 5.33 0.06



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
VEHICLE LEFT REAR SUSPENSION DISPLACEMENT

DOT NHTSA 300914
CONTROLLED ROLLOVER CRASH
90257
SRR01

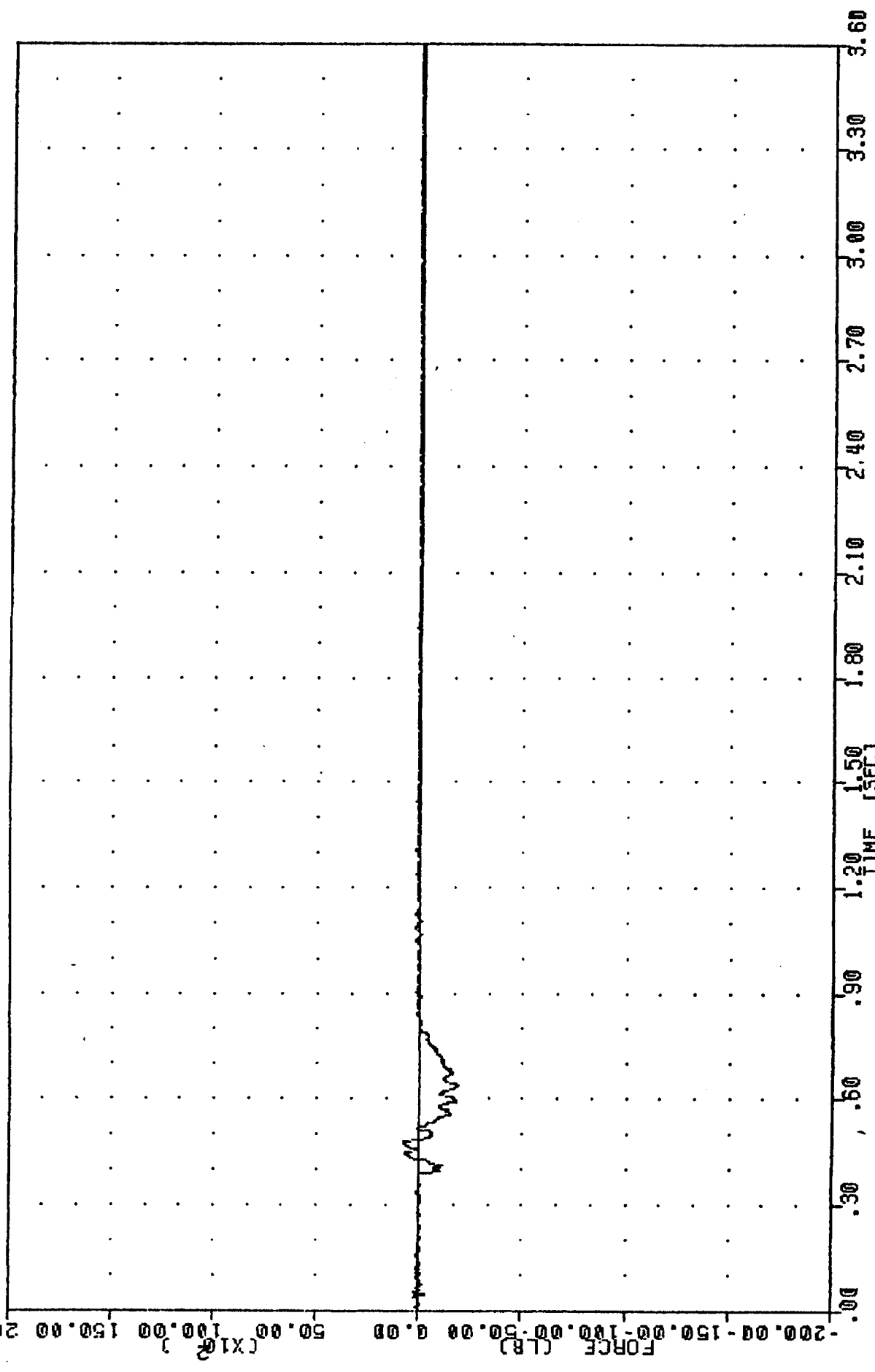
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -0.05 0.01 5.39 0.18



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
VEHICLE RIGHT REAR SUSPENSION DISPLACEMENT

DC, HTS, J 50914
 CONTROLLED ROLLOVER CRASH
 90257
 POLTL

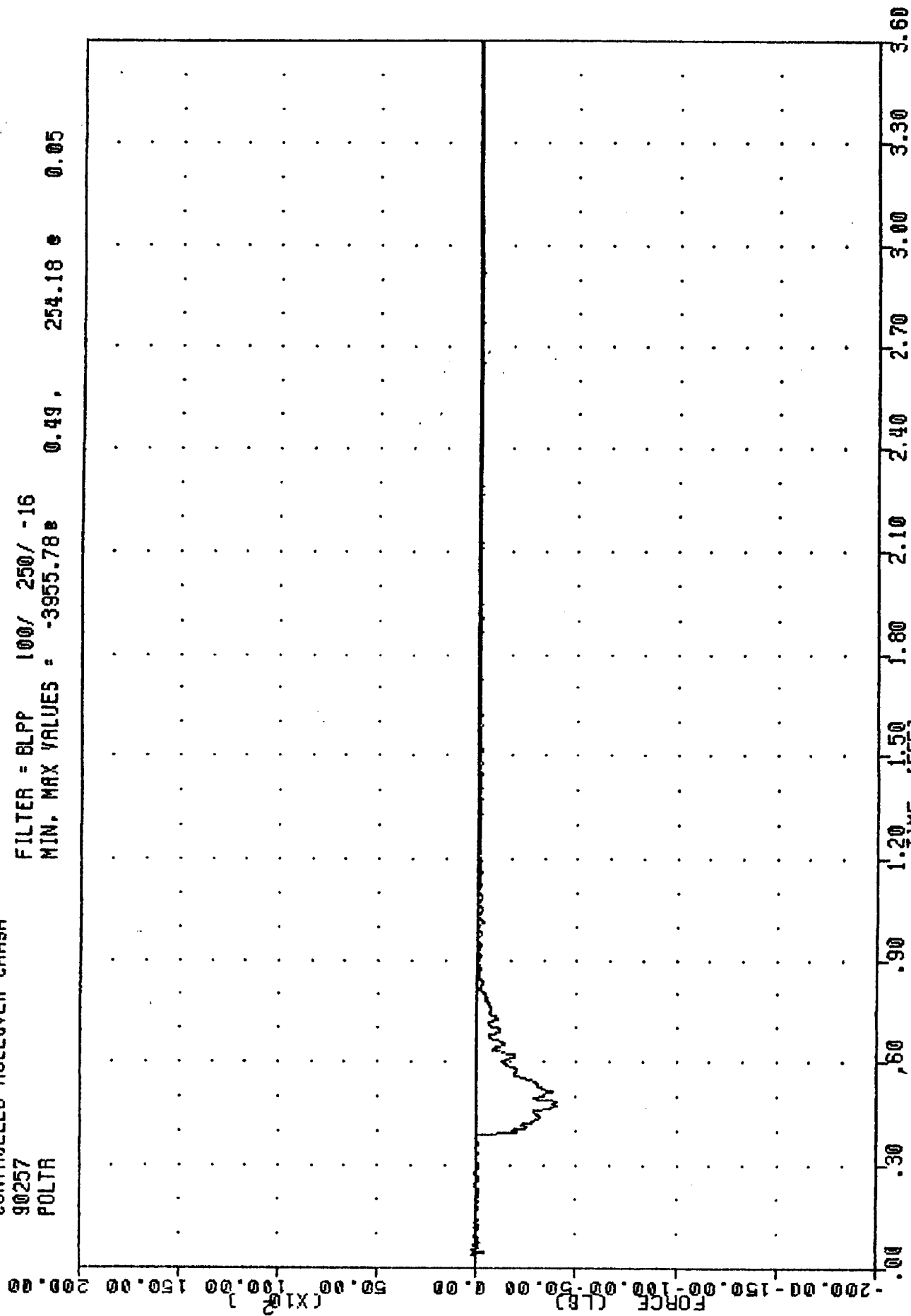
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -1836.73 0.64, 739.78 0.48



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 POLE TOP LEFT LOAD CELL FORCE

001 NHTSA 1900314
 CONTROLLED ROLLOVER CRASH
 90257
 POLTR

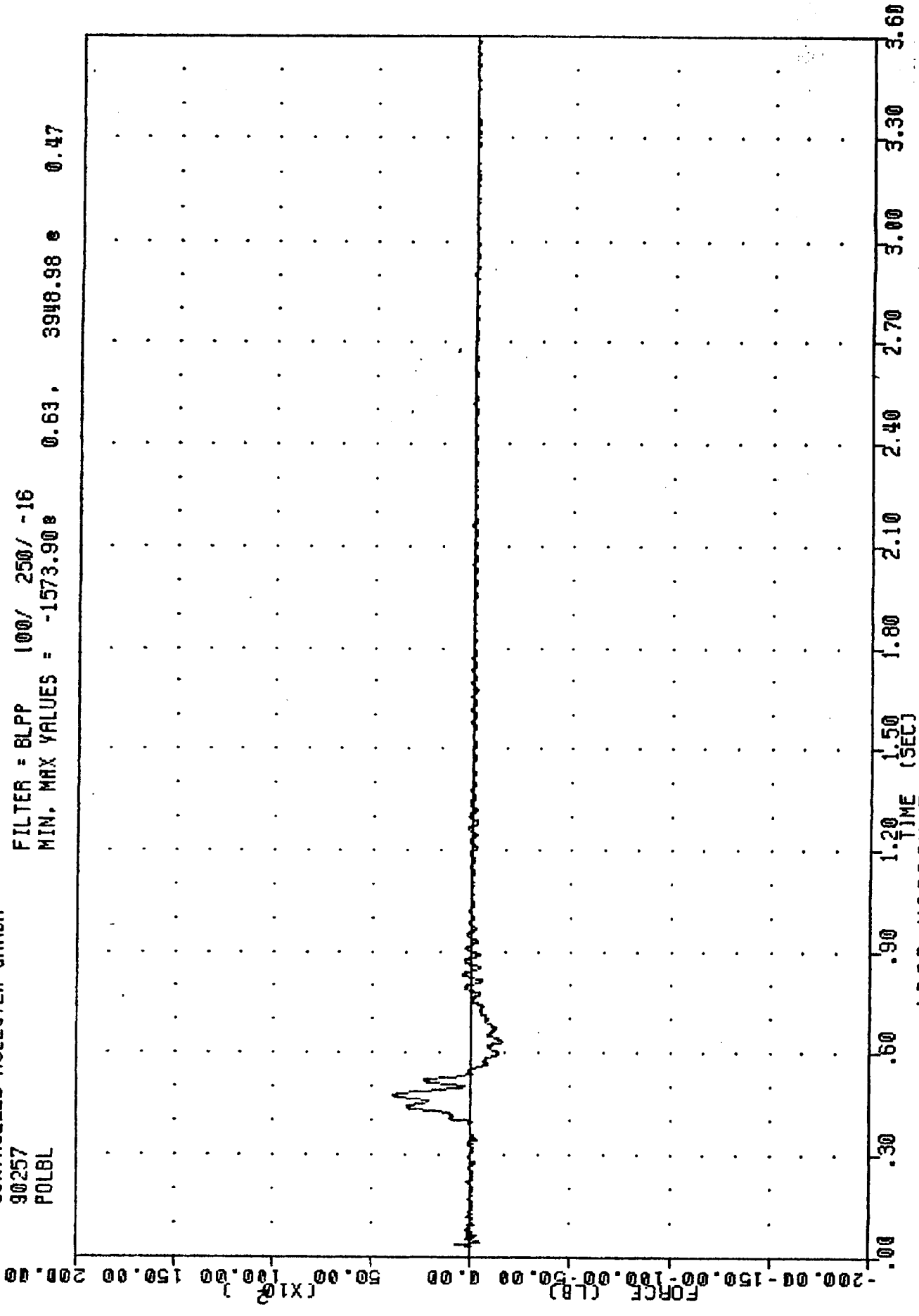
FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -3955.78 0.49, 254.18 0.05



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 POLE TOP RIGHT LOAD CELL FORCE

001 WHTSN
CONTROLLED ROLLOVER CRASH
90257
POLBL

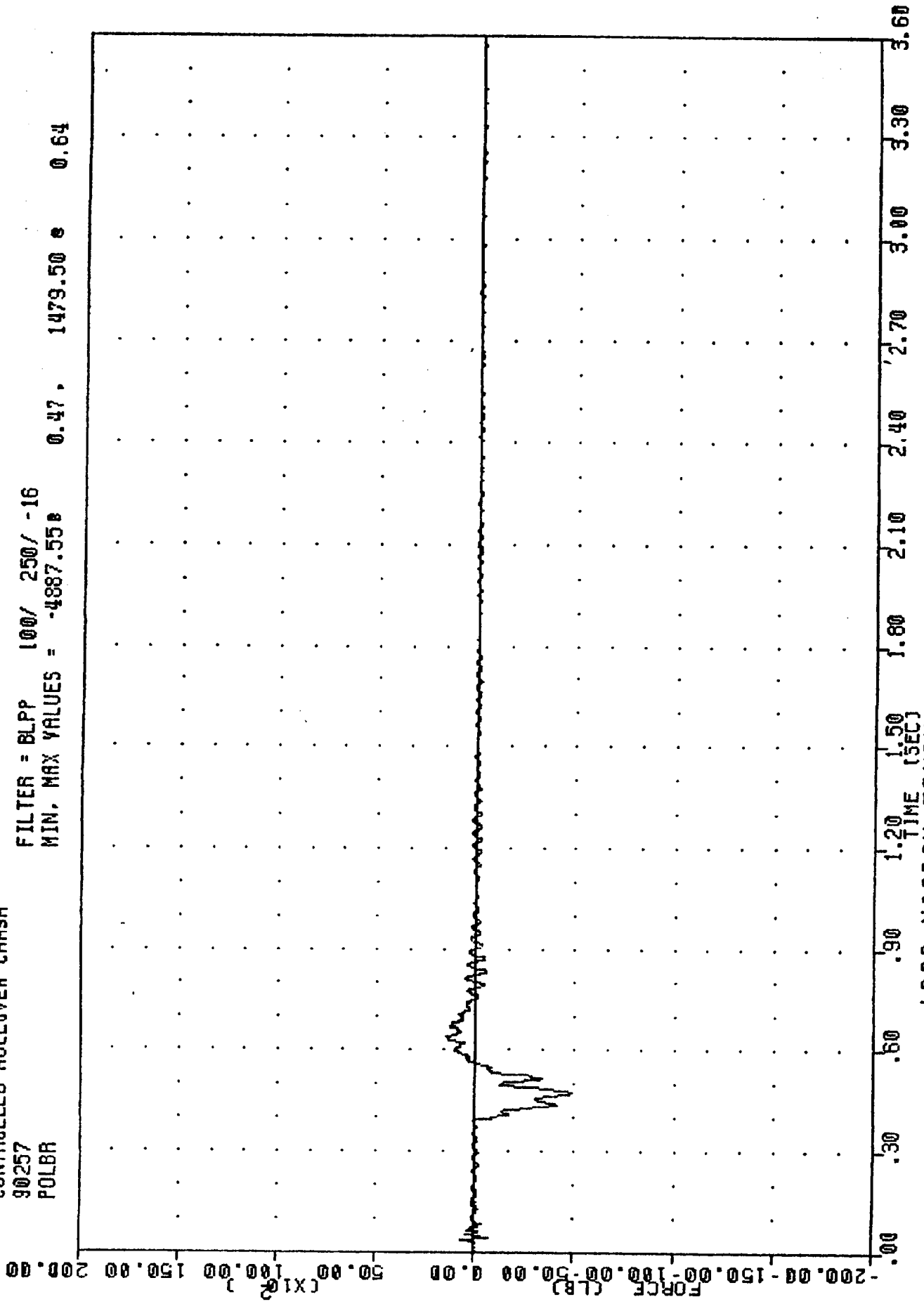
FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -1573.90 0.63, 3948.98 0.47



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
POLE BOTTOM LEFT LOAD CELL FORCE

DC, MHT5n 1500914
CONTROLLED ROLLOVER CRASH
90257
POLBR

FILTER = BLPP 100/ 250/ -16
MIN. MAX VALUES = -4987.55 0.47 1479.50 0.64



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
POLE BOTTOM RIGHT LOAD CELL FORCE

APPENDIX C

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENTATION PLACEMENT
DUMMY MANUFACTURER & S/N: HUMANOID #907
SEATING POSITION: DRIVER

LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
HEAD ACCELERATION	X	ENDEVCO	7264	BG96J	FRONT
HEAD ACCELERATION	Y	ENDEVCO	7264	AA05	LEFT
HEAD ACCELERATION	Z	ENDEVCO	7264	BG94J	UP
NECK FORCE	X	DENTON	1716	085-FX	**
NECK FORCE	Y	DENTON	1716	085-FY	**
NECK FORCE	Z	DENTON	1716	085-FZ	**
NECK MOMENT	X	DENTON	1716	085-MX	**
NECK MOMENT	Y	DENTON	1716	085-MY	**
NECK MOMENT	Z	DENTON	1716	085-MZ	**
CHEST ACCELERATION	X	ENDEVCO	7264	AA19	REAR
CHEST ACCELERATION	Y	ENDEVCO	7264	AN03	LEFT
CHEST ACCELERATION	Z	ENDEVCO	7264	BF28J	DOWN
CHEST DISPLACEMENT		VERNITECH	81422-A	87313-91	OUTWARD
PELVIS ACCELERATION	X	ENDEVCO	7264	BD88J	REAR
PELVIS ACCELERATION	Y	ENDEVCO	7264	AC44	LEFT
PELVIS ACCELERATON	Z	ENDEVCO	7264	BD75J	UP

**See SIGN CONVENTION sheet for positive sensing orientation of neck load channels.

VEHICLE INSTRUMENTATION PLACEMENT

LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
CENTER OF GRAVITY ACCEL	X	ENDEVCO	7264	DB14H	REAR
CENTER OF GRAVITY ACCEL	Y	ENDEVCO	7264	BP26J	LEFT
CENTER OF GRAVITY ACCEL	Z	ENDEVCO	7264	CY23H	UP
CENTER OF GRAVITY ROLL	X	HUMPHREY	RG28-0128-1	H-14	RIGHT
CENTER OF GRAVITY PITCH	Y	HUMPHREY	RG28-0128-1	H-16	UP
CENTER OF GRAVITY YAW	Z	HUMPHREY	RG28-0128-1	H-21	LEFT
DRIVER'S SHOULDER BELT DISPLACEMENT		CELESCO	PT-101-50A	A02465	OUTWARD
LEFT FRONT SUSPENSION DISPLACEMENT		CELESCO	PT-101-40A	A12898	OUTWARD
RIGHT FRONT SUSPENSION DISPLACEMENT		CELESCO	PT-101-40A	A12899	OUTWARD
LEFT REAR SUSPENSION DISPLACEMENT		CELESCO	PT-101-50A	0275534	OUTWARD
RIGHT REAR SUSPENSION DISPLACEMENT		CELESCO	PT-101-40A	0586135	OUTWARD

IPMD VEHICLE DATA SHEET

Filled Out By: Bob Dotson Date: 9/5/90
Checked By: _____ Date: _____

VEHICLE DATA

Vehicle Make and Model (written out): Nissan pickup

NHTSA ID Code (7 characters): _____ / Model Year (2 digits): 88

Vehicle Make (2 characters): 64

- | | | |
|-------------------|-----------------|-----------------|
| 11 - American | 02 - Ford | 64 = Nissan |
| 12 = Audi | 40 = GMC | 48 = Odyssey |
| 53 = Battronics | 23 = Honda | 06 = Oldsmobile |
| 27 = BMW | 34 = Hyundai | 14 = Peugeot |
| 04 = Buick | 41 = IH | 05 = Plymouth |
| 10 = Cadillac | 42 = Isuzu | 03 = Pontiac |
| 35 = Champion | 44 = Jeep | 17 = Renault |
| 36 = Checker | 54 = Jet | 30 = Saab |
| 01 = Chevrolet | 22 = Lectra | 26 = Subaru |
| 37 = Chinook | 59 = Lectric | 33 = Suzuki |
| 21 = Chrysler | 13 = Lincoln | 16 = Toyota |
| 29 = Comuta | 18 = Mazda | 31 = Triumph |
| 15 = Datsun | 28 = Mercedes | 56 = UM |
| 38 = Delorean | 09 = Mercury | 08 = Volkswagen |
| 07 = Dodge | 25 = MG | 20 = Volvo |
| 58 = Eva | 62 = Mitsubishi | 60 = Winnebago |
| 19 = Fiat | 32 = NHTSA | 24 = Yugo |
| 99 = Other: _____ | | |

Vehicle Model (2 characters = see appendix B): _____

Body Style (2 characters): PU

- | | |
|-----------------------|-------------------|
| 2C = 2 Door Coupe | SW = Stationwagon |
| 2S = 2 Door Sedan | PU = Pickup Truck |
| 3H = 3 Door Hatchback | TR = Truck |
| 4S = 4 Door Sedan | VN = Van |
| 5H = 5 Door Hatchback | BU = Bus |
| OH = Other: _____ | MP = Multipurpose |
| | UT = Utility |

VIN Number (20 characters): 1N6ND11SXJC314235

Odometer Reading: <u>174108.9</u>	Thousands of Miles: <u>174.1089</u>
Overall Length: <u>180.0</u>	(in) x 25.4 =: <u>4572</u> (mm)
Wheelbase: <u>104.5</u>	(in) x 25.4 =: <u>2654</u> (mm)
Front Track: <u>55.0</u>	(in) x 25.4 =: <u>1397</u> (mm)
Rear Track: <u>54.5</u>	(in) x 25.4 =: <u>1384</u> (mm)
Roof Height: <u>60.6</u>	(in) x 25.4 =: <u>1539</u> (mm)

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IPMD VEHICLE DATA SHEET

G.V.W.R.: 4000 (lbs) x 4.45 =: 17800 (N)
 FRONT G.A.W.R.: 2200 (lbs) x 4.45 =: 9790 (N)
 REAR G.A.W.R.: 2200 (lbs) x 4.45 =: 9790 (N)

The following tire loadings are measured with vehicle at Curb Weight.

Weight on RF Tire: 799 (lbs) x 4.45 =: 3556 (N)
 Weight on LF Tire: 815 (lbs) x 4.45 =: 3627 (N)
 Weight on LR Tire: 807 (lbs) x 4.45 =: 3591 (N)
 Weight on RR Tire: 743 (lbs) x 4.45 =: 3306 (N)
 Vehicle Test Weight: 3164 (lbs) x 4.45 =: 14080 (N)

Lateral and Longitudinal Center of Gravity Location.

From Front Axle: 51.19 (in) x 25.4 =: 1300 (mm)
 From Center Line: -0.70 (in) x 25.4 =: -17.8 (mm)
 Engine Displacement: 145.8 (cu in) x 0.0164 =: 2.4 (L)

Engine Type (2 characters): L4
 L3 F4 L4
 V4 F6 L6
 V6 V8 RT = Rotary
 L5 OT = Other: _____

Engine Location (1 character): F

F = Front M = Mid R = Rear

Engine Orientation (1 character): L

L = Longitudinal T = Transverse

Transmission Type: (1 character): M

M = Manual A = Automatic

Drive Axle (1 character): R

F = Front R = Rear 4 = Four Wheel Drive

Vehicle Comments (30 characters): Pre-test IPMD

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Suspension Number (4 digits): _____

Front/Rear Flag (1 character): _____ F _____

Axle Type (1 character): _____ I _____

I = Independent S = Solid

Suspension Type (1 character): _____ A _____

A = Unequal A Arm

L = Leaf

M = Multiple Link

Q = Torque Arm

S = Strut

O = Other: _____

T = Semi-Trailing Arm

W = Twist

4 = 4 Link

3 = 3 Link

I = Twin I Beam

Spring Type (2 characters): _____ TB _____

CO = Coil

LL = Longitudinal Leaf

OT = Other: _____

TB = Torsion Bar

TL = Transverse Leaf

Brake Type (2 characters): _____ DI _____

DI = Disk

DS = Duo-Servo Shoe

OT = Other: _____

LT = Leading-Trailer Shoe

Suspension Modified (1 character): _____ N _____

N = No

Y = Yes

Suspension Modification

R = Raised

L = Lowered

S = Stiffened

W = Widened

O = Other

1 = _____

2 = _____

d 7

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Tire Manufacturer (10 characters): Firestone

Tire Size Code (10 characters): P205/70R14

Tire Construction (2 characters): SB

BB = Bias Belted

GP = Glass Belted Radial

BP = Bias Ply

SB = Steel Belted Radial

OT = Other: _____

Tire Rim width: 5.0 (in) X 25.4 =: 127 (mm)

Axle Height: 11.3 (in) X 25.4 =: 287 (mm)

Tire Pressure: 26.0 (psi) X 6.897 =: 179.3 (kpa)

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Suspension Number (4 digits): _____

Front/Rear Flag (1 character): _____ R _____

Axle Type (1 character): _____ S _____

I = Independent S = Solid

Suspension Type (1 character): _____ L _____

A = Unequal A Arm

T = Semi-Trailing Arm

L = Leaf

W = Twist

M = Multiple Link

4 = 4 Link

Q = Torque Arm

3 = 3 Link

S = Strut

I = Twin I Beam

O = Other: _____

Spring Type (2 characters): _____ LL _____

CO = Coil

TB = Torsion Bar

LL = Longitudinal Leaf

TL = Transverse Leaf

OT = Other: _____

Brake Type (2 characters): _____ DS _____

DI = Disk

LT = Leading-Trailer Shoe

DS = Duo-Servo Shoe

OT = Other: _____

Suspension Modified (1 character): _____ N _____

N = No

Y = Yes

Suspension Modification

R = Raised

L = Lowered

S = Stiffened

W = Widened

O = Other

1 = _____

2 = _____

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Tire Manufacturer (10 characters): Firestone

Tire Size Code (10 characters): P205/70R14

Tire Construction (2 characters): SB

BB = Bias Belted

GP = Glass Belted Radial

BP = Bias Ply

SB = Steel Belted Radial

OT = Other: _____

Tire Rim Width: 5.0

(in) X 25.4 =: 127 (mm)

Axle Height: 11.5

(in) X 25.4 =: 292 (mm)

Tire Pressure: 34.0

(psi) X 6.897 =: 234.5 (kpa)

06

IPMD MEASURED DATA

VEHICLE # AND RUN # 3061 DATE: 09-05-90 TIME: 16:28:07

Pitch Inertia:

Run #	Period (Sec)	Platform Motion Amplitude (Deg.)	Relative Motion Amplitude (In.)	Individual
				Pitch Calc. (Ft. Lb. Sec ²)
1	3.945	10.46	0.155	1899.6
2	3.945	10.35	0.156	1897.8
3	3.940	10.36	0.156	1891.5
Average Pitch Inertia:				1896.3

Roll Inertia:

Distance between ramps (in.): 45.00

Run #	Period (Sec)	Platform Motion Amplitude (Deg.)	Relative Motion Amplitude (In.)	Individual
				Roll Calc. (Ft. Lb. Sec ²)
1	2.375	7.62	0.186	348.0
2	2.400	8.19	0.201	367.5
3	2.375	7.69	0.185	348.7
Average Roll Inertia:				354.7

Yaw Inertia:

String Pot Offset from platform center (in.): 74.00

Run #	Period (Sec)	Platform Motion Amplitude (Deg.)	Relative Motion Amplitude (In.)	Individual
				Yaw Calc. (Ft. Lb. Sec ²)
1	2.400	10.24	0.12	2007.1
2	2.400	10.47	0.11	2010.4
3	2.400	10.11	0.13	2005.3
Average Yaw Inertia:				2007.6

IPMD MEASURED DATA

Vehicle # and Run #: 3061 Date: 09-05-90 Time: 16:28:07
 Vehicle Weight: 3164 Roof Height: 60.60 Load Config: Driver
 Fuel Load: empty Vehicle Type: pu

IPMD Calibration Check (no vehicle)

Applied Weight (lbs.)	Schaevitz, Output (Deg.)	System C.G. Pivot (in.)
0	-0.22	0.00
100	-5.62	33.15
200	-10.91	33.23
0	-0.22	0.00
-100	5.18	33.17
-200	10.50	33.16
0	-0.22	0.00
Average System C.G. Pivot		33.18

C.G. Height:

Applied Weight (lbs.)	Schaevitz Output (Deg.)	Resultant Longitudinal Movement (In.)	Individual C.G. Values (In.)
0	0.00	0.000	0.00
100	-3.46	0.058	22.51
200	-6.96	0.115	22.75
0	0.03	0.017	0.00
-100	3.47	-0.053	22.67
-200	6.95	-0.115	22.67
0	0.03	-0.004	0.00
Average calculated C.G. Height:			22.65

IPMD VEHICLE DATA SHEET

Filled Out By: B. Dotson Date: 10/05/90
Checked By: _____ Date: _____

VEHICLE DATA

Vehicle Make and Model (written out): Nissan pickup

NHTSA ID Code (7 characters): V90306 / Model Year (2 digits): 88

Vehicle Make (2 characters): 64

- | | | |
|-------------------|-----------------|-----------------|
| 11 - American | 02 - Ford | 64 = Nissan |
| 12 = Audi | 40 = GMC | 48 = Odyssey |
| 53 = Battronics | 23 = Honda | 06 = Oldsmobile |
| 27 = BMW | 34 = Hyundai | 14 = Peugeot |
| 04 = Buick | 41 = IH | 05 = Plymouth |
| 10 = Cadillac | 42 = Isuzu | 03 = Pontiac |
| 35 = Champion | 44 = Jeep | 17 = Renault |
| 36 = Checker | 54 = Jet | 30 = Saab |
| 01 = Chevrolet | 22 = Lectra | 26 = Subaru |
| 37 = Chinook | 59 = Lectric | 33 = Suzuki |
| 21 = Chrysler | 13 = Lincoln | 16 = Toyota |
| 29 = Comuta | 18 = Mazda | 31 = Triumph |
| 15 = Datsun | 28 = Mercedes | 56 = UM |
| 38 = Delorean | 09 = Mercury | 08 = Volkswagen |
| 07 = Dodge | 25 = MG | 20 = Volvo |
| 58 = Eva | 62 = Mitsubishi | 60 = Winnebago |
| 19 = Fiat | 32 = NHTSA | 24 = Yugo |
| 99 = Other: _____ | | |

Vehicle Model (2 characters = see appendix B): _____

Body Style (2 characters): PU

- | | |
|-----------------------|-------------------|
| 2C = 2 Door Coupe | SW = Stationwagon |
| 2S = 2 Door Sedan | PU = Pickup Truck |
| 3H = 3 Door Hatchback | TR = Truck |
| 4S = 4 Door Sedan | VN = Van |
| 5H = 5 Door Hatchback | BU = Bus |
| OH = Other: _____ | MP = Multipurpose |
| | UT = Utility |

VIN Number (20 characters): 1N6ND11SXJC314235

Odometer Reading: <u>174,111.0</u>	Thousands of Miles: <u>174.111</u>
Overall Length: <u>180.0</u>	(in) x 25.4 =: <u>4572</u> (mm)
Wheelbase: <u>104.0</u>	(in) x 25.4 =: <u>2642</u> (mm)
Front Track: <u>53.0</u>	(in) x 25.4 =: <u>1346</u> (mm)
Rear Track: <u>52.0</u>	(in) x 25.4 =: <u>1321</u> (mm)
Roof Height: <u>56.0</u>	(in) x 25.4 =: <u>1422</u> (mm)

Q. 5.

The following tire loadings are measured with vehicle at Curb Weight.

Lateral and Longitudinal Center of Gravity Location.

Engine Type (2 characters): L4

Engine Location (1 character): F

Engine Orientation (1 character): L

Transmission Type: (1 character): M

Drive Axle (1 character): R

Vehicle Comments (30 characters): Post-test IPMD

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Suspension Number (4 digits): _____

Front/Rear Flag (1 character): F

Axle Type (1 character): I
I = Independent S = Solid

Suspension Type (1 character): A
A = Unequal A Arm T = Semi-Trailing Arm
L = Leaf W = Twist
M = Multiple Link 4 = 4 Link
Q = Torque Arm 3 = 3 Link
S = Strut I = Twin I Beam
O = Other: _____

Spring Type (2 characters): TB
CO = Coil TB = Torsion Bar
LL = Longitudinal Leaf TL = Transverse Leaf
OT = Other: _____

Brake Type (2 characters): DI
DI = Disk LT = Leading-Trailer Shoe
DS = Duo-Servo Shoe
OT = Other: _____

Suspension Modified (1 character): N
N = No Y = Yes

Suspension Modification
R = Raised L = Lowered
S = Stiffened W = Widened
O = Other
1 = _____
2 = _____

IPMD VEHICLE DATA SHEETFRONT SUSPENSIONTire Manufacturer (10 characters): FirestoneTire Size Code (10 characters): P205/70R14Tire Construction (2 charactrs): SB

BB = Bias Belted

GP = Glass Belted Radial

BP = Bias Ply

SB = Steel Belted Radial

OT = Other: _____

Tire Rim width: 5.0 (in) X 25.4 =: 127 (mm)Axle Height: 11.3 (in) X 25.4 =: 287 (mm)Tire Pressure: 26.0 (psi) X 6.897 =: 179 (kpa)

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Suspension Number (4 digits): _____

Front/Rear Flag (1 character): R

Axle Type (1 character): S

I = Independent S = Solid

Suspension Type (1 character): L

A = Unequal A Arm

T = Semi-Trailing Arm

L = Leaf

W = Twist

M = Multiple Link

4 = 4 Link

Q = Torque Arm

3 = 3 Link

S = Strut

I = Twin I Beam

O = Other: _____

Spring Type (2 characters): LL

CO = Coil

TB = Torsion Bar

LL = Longitudinal Leaf

TL = Transverse Leaf

OT = Other: _____

Brake Type (2 characters): DS

DI = Disk

LT = Leading-Trailer Shoe

DS = Duo-Servo Shoe

OT = Other: _____

Suspension Modified (1 character): N

N = No

Y = Yes

Suspension Modification

R = Raised

L = Lowered

S = Stiffened

W = Widened

O = Other

1 = _____

2 = _____

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IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Tire Manufacturer (10 characters): Firestone
Tire Size Code (10 characters): P205/70R14
Tire Construction (2 characters): SB

BB = Bias Belted

GP = Glass Belted Radial

BP = Bias Ply

SB = Steel Belted Radial

OT = Other: _____

Tire Rim Width: 5.0 (in) X 25.4 =: 127 (mm)
Axle Height: 11.5 (in) X 25.4 =: 292 (mm)
Tire Pressure: 34.0 (psi) X 6.897 =: 234 (kpa)

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IPMD MEASURED DATA

VEHICLE # AND RUN # 3062 DATE: 10-05-90 TIME: 14:10:06

Pitch Inertia:

		Platform Motion	Relative Motion	Individual Pitch Calc.
Run #	Period (Sec)	Amplitude (Deg.)	Amplitude (In.)	(Ft. Lb. Sec ²)
1	3.760	9.61	0.036	1842.1
2	3.760	9.96	0.039	1841.3
3	3.760	9.75	0.035	1842.6
Average Pitch Inertia:				1842.0

Roll Inertia:

Distance between ramps (In.): 43.20

		Platform Motion	Relative Motion	Individual Roll Calc.
Run #	Period (Sec)	Amplitude (Deg.)	Amplitude (In.)	(Ft. Lb. Sec ²)
1	2.255	7.77	0.061	313.7
2	2.245	7.47	0.041	308.9
3	2.265	7.55	0.044	324.9
Average Roll Inertia:				315.8

Yaw Inertia:

		Platform Motion	Relative Motion	Individual Yaw Calc.
Run #	Period (Sec)	Amplitude (Deg.)	Amplitude (In.)	(Ft. Lb. Sec ²)
1	2.385	10.01	0.09	1985.6
2	2.385	9.40	0.09	1985.2
3	2.385	9.46	0.09	1985.4
Average Yaw Inertia:				1985.4

IPMD MEASURED DATA

Vehicle # and Run #: 3062 Date: 10-05-90 Time: 14:10:06

Vehicle Weight: 3070 Rood Height: 56.00 Load Config: driver

Fuel Load: empty Vehicle Type: pu

IPMD Calibration Check (no vehicle)

Applied Weight (Lbs.)	Schaevitz Output (Deg.)	System C.G. Pivot (In.)
0	-0.22	0.00
100	-5.62	33.15
200	-10.91	33.23
0	-0.22	0.00
-100	5.18	33.17
-200	10.50	33.16
0	-0.22	0.00
Average System C.G. Pivot:		33.18

C.G. Height:

Applied Weight (Lbs.)	Schaevitz Output (Deg.)	Resultant Longitudinal Movement (In.)	Individual C.G. Values (In.)
0	-0.03	0.000	0.00
100	-3.19	0.030	20.20
200	-6.42	0.041	20.71
0	-0.09	0.037	0.00
-100	3.16	0.005	20.85
-200	6.39	-0.031	20.91
0	-0.00	-0.005	0.00
Average calculated C.G. Height:			20.67

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SIGN CONVENTION

ACCELEROMETERS:

+X: FORWARD
+Y: LEFTWARD
+Z: UPWARD

POTENTIOMETERS:

+CHEST DISPLACEMENT: OUTWARD
+SEAT BELT DISPLACEMENT: OUTWARD
+SEAT BELT EXTENSION: ENLONGATION
+VEHICLE DISPLACEMENT: OUTWARD

LOAD CELLS:

+FEMUR FORCE: TENSION
+SEAT BELT FORCE: TENSION
+BARRIER FORCE: TENSION

NECK LOAD CELLS:

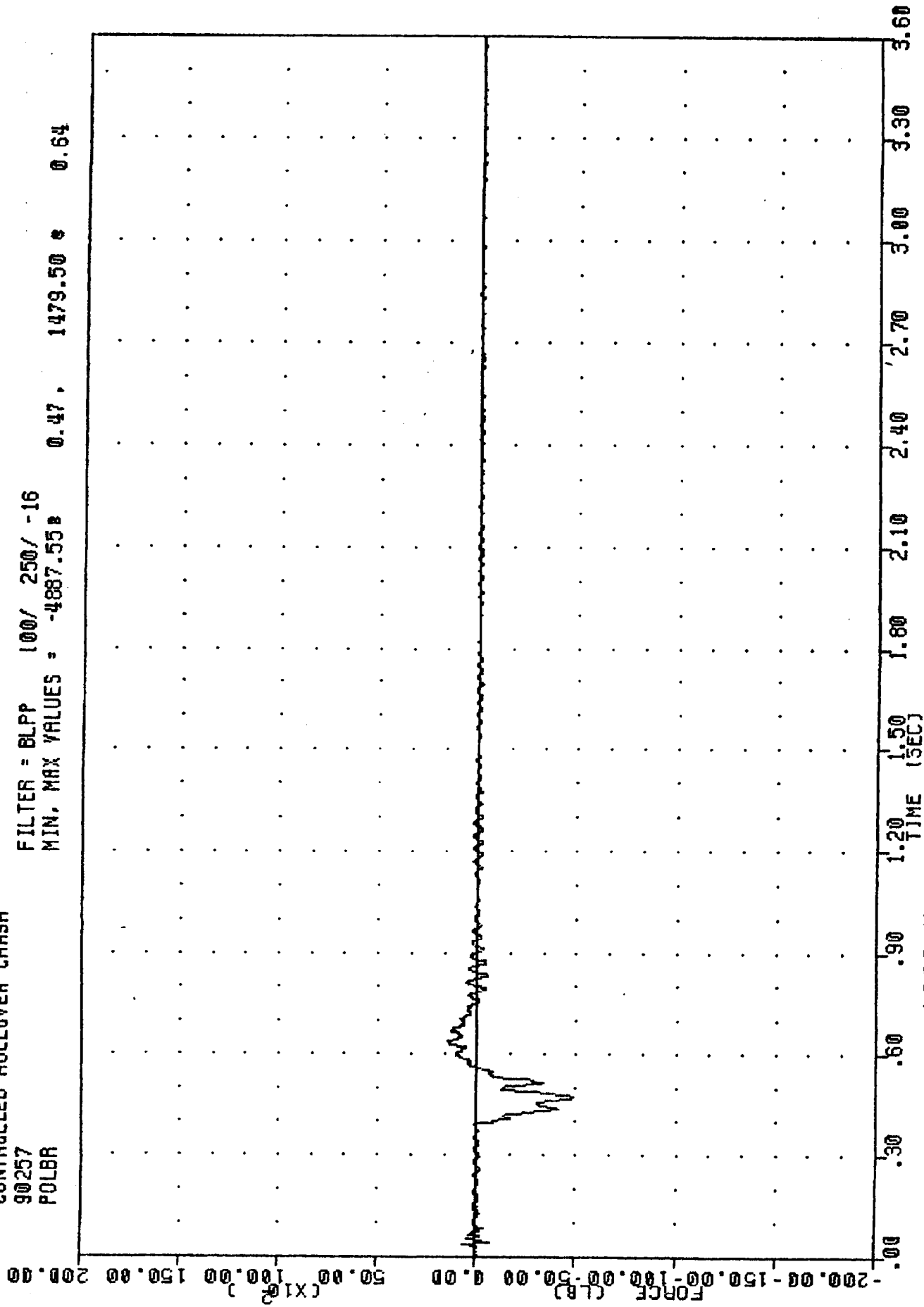
+X FORCE: HEAD FORWARD
+Y FORCE: HEAD RIGHTWARD
+Z FORCE: HEAD UPWARD (TENSION ON NECK)
+X MOMENT: RIGHT EAR TO RIGHT SHOULDER
+Y MOMENT: HEAD ROTATING FORWARD
+Z MOMENT: HEAD ROTATING LEFTWARD

GYROSCOPES:

+X ROLL: TO RIGHT
+Y PITCH: FRONT DOWN
+Z YAW: COUNTERCLOCKWISE

061 MHTSM 1300914
 CONTROLLED ROLLOVER CRASH
 90257
 POLBR

FILTER = BLPP 100/ 250/ -16
 MIN. MAX VALUES = -4887.55B 0.47, 1479.50E 0.64



1988 NISSAN TRUCK TRIP CURB INTO POLE AT 30 MPH
 POLE BOTTOM RIGHT LOAD CELL FORCE

APPENDIX C

MISCELLANEOUS TEST INFORMATION

DUMMY INSTRUMENTATION PLACEMENT
DUMMY MANUFACTURER & S/N: HUMANOID #907
SEATING POSITION: DRIVER

<u>LOCATION</u>	<u>AXIS</u>	<u>MFR</u>	<u>MODEL</u>	<u>S/N</u>	<u>ORIENTATION (+ SENSING)</u>
HEAD ACCELERATION	X	ENDEVCO	7264	BG96J	FRONT
HEAD ACCELERATION	Y	ENDEVCO	7264	AA05	LEFT
HEAD ACCELERATION	Z	ENDEVCO	7264	BG94J	UP
NECK FORCE	X	DENTON	1716	085-FX	**
NECK FORCE	Y	DENTON	1716	085-FY	**
NECK FORCE	Z	DENTON	1716	085-FZ	**
NECK MOMENT	X	DENTON	1716	085-MX	**
NECK MOMENT	Y	DENTON	1716	085-MY	**
NECK MOMENT	Z	DENTON	1716	085-MZ	**
CHEST ACCELERATION	X	ENDEVCO	7264	AA19	REAR
CHEST ACCELERATION	Y	ENDEVCO	7264	AN03	LEFT
CHEST ACCELERATION	Z	ENDEVCO	7264	BF28J	DOWN
CHEST DISPLACEMENT		VERNITECH	81422-A	87313-91	OUTWARD
PELVIS ACCELERATION	X	ENDEVCO	7264	BD88J	REAR
PELVIS ACCELERATION	Y	ENDEVCO	7264	AC44	LEFT
PELVIS ACCELERATON	Z	ENDEVCO	7264	BD75J	UP

**See SIGN CONVENTION sheet for positive sensing orientation of neck load channels.

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VEHICLE INSTRUMENTATION PLACEMENT

LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+ SENSING)
CENTER OF GRAVITY ACCEL	X	ENDEVCO	7264	DB14H	REAR
CENTER OF GRAVITY ACCEL	Y	ENDEVCO	7264	BP26J	LEFT
CENTER OF GRAVITY ACCEL	Z	ENDEVCO	7264	CY23H	UP
CENTER OF GRAVITY ROLL	X	HUMPHREY	RG28-0128-1	H-14	RIGHT
CENTER OF GRAVITY PITCH	Y	HUMPHREY	RG28-0128-1	H-16	UP
CENTER OF GRAVITY YAW	Z	HUMPHREY	RG28-0128-1	H-21	LEFT
DRIVER'S SHOULDER BELT DISPLACEMENT		CELESCO	PT-101-50A	A02465	OUTWARD
LEFT FRONT SUSPENSION DISPLACEMENT		CELESCO	PT-101-40A	A12898	OUTWARD
RIGHT FRONT SUSPENSION DISPLACEMENT		CELESCO	PT-101-40A	A12899	OUTWARD
LEFT REAR SUSPENSION DISPLACEMENT		CELESCO	PT-101-50A	0275534	OUTWARD
RIGHT REAR SUSPENSION DISPLACEMENT		CELESCO	PT-101-40A	0586135	OUTWARD

IPMD VEHICLE DATA SHEET

Filled Out By: Bob Dotson Date: 9/5/90

Checked By: _____ Date: _____

VEHICLE DATA

Vehicle Make and Model (written out): Nissan pickup

NHTSA ID Code (7 characters): _____ / Model Year (2 digits): 88

Vehicle Make (2 characters): 64

11 - American	02 - Ford	64 = Nissan
12 = Audi	40 = GMC	48 = Odyssey
53 = Battronics	23 = Honda	06 = Oldsmobile
27 = BMW	34 = Hyundai	14 = Peugeot
04 = Buick	41 = IH	05 = Plymouth
10 = Cadillac	42 = Isuzu	03 = Pontiac
35 = Champion	44 = Jeep	17 = Renault
36 = Checker	54 = Jet	30 = Saab
01 = Chevrolet	22 = Lectra	26 = Subaru
37 = Chinook	59 = Lectric	33 = Suzuki
21 = Chrysler	13 = Lincoln	16 = Toyota
29 = Comuta	18 = Mazda	31 = Triumph
15 = Datsun	28 = Mercedes	56 = UM
38 = Delorean	09 = Mercury	08 = Volkswagen
07 = Dodge	25 = MG	20 = Volvo
58 = Eva	62 = Mitsubishi	60 = Winnebago
19 = Fiat	32 = NHTSA	24 = Yugo
99 = Other: _____		

Vehicle Model (2 characters = see appendix B): _____

Body Style (2 characters): PU

2C = 2 Door Coupe
2S = 2 Door Sedan
3H = 3 Door Hatchback
4S = 4 Door Sedan
5H = 5 Door Hatchback
OH = Other: _____

SW = Stationwagon
PU = Pickup Truck
TR = Truck
VN = Van
BU = Bus
MP = Multipurpose
UT = Utility

VIN Number (20 characters): 1N6ND11SXJC314235

Odometer Reading: 174108.9

Thousands of Miles: 174.1089

Overall Length: 180.0

(in) x 25.4 =: 4572 (mm)

Wheelbase: 104.5

(in) x 25.4 =: 2654 (mm)

Front Track: 55.0

(in) x 25.4 =: 1397 (mm)

Rear Track: 54.5

(in) x 25.4 =: 1384 (mm)

Roof Height: 60.6

(in) x 25.4 =: 1539 (mm)

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IPMD VEHICLE DATA SHEET

G.V.W.R.: 4000 (lbs) x 4.45 =: 17800 (N)
 FRONT G.A.W.R.: 2200 (lbs) x 4.45 =: 9790 (N)
 REAR G.A.W.R.: 2200 (lbs) x 4.45 =: 9790 (N)

The following tire loadings are measured with vehicle at Curb Weight.

Weight on RF Tire: 799 (lbs) x 4.45 =: 3556 (N)
 Weight on LF Tire: 815 (lbs) x 4.45 =: 3627 (N)
 Weight on LR Tire: 807 (lbs) x 4.45 =: 3591 (N)
 Weight on RR Tire: 743 (lbs) x 4.45 =: 3306 (N)
 Vehicle Test Weight: 3164 (lbs) x 4.45 =: 14080 (N)

Lateral and Longitudinal Center of Gravity Location.

From Front Axle: 51.19 (in) x 25.4 =: 1300 (mm)
 From Center Line: -0.70 (in) x 25.4 =: -17.8 (mm)
 Engine Displacement: 145.8 (cu in) x 0.0164 =: 2.4 (L)

Engine Type (2 characters): L4

L3	F4	L4
V4	F6	L6
V6	V8	RT = Rotary
L5	OT = Other: _____	

Engine Location (1 character): F

F = Front M = Mid R = Rear

Engine Orientation (1 character): L

L = Longitudinal T = Transverse

Transmission Type: (1 character): M

M = Manual A = Automatic

Drive Axle (1 character): R

F = Front R = Rear 4 = Four Wheel Drive

Vehicle Comments (30 characters): Pre-test IPMD

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Suspension Number (4 digits): _____

Front/Rear Flag (1 character): F

Axle Type (1 character): I

I = Independent S = Solid

Suspension Type (1 character): A

A = Unequal A Arm

T = Semi-Trailing Arm

L = Leaf

W = Twist

M = Multiple Link

4 = 4 Link

Q = Torque Arm

3 = 3 Link

S = Strut

I = Twin I Beam

O = Other: _____

Spring Type (2 characters): TB

CO = Coil

TB = Torsion Bar

LL = Longitudinal Leaf

TL = Transverse Leaf

OT = Other: _____

Brake Type (2 characters): DI

DI = Disk

LT = Leading-Trailer Shoe

DS = Duo-Servo Shoe

OT = Other: _____

Suspension Modified (1 character): N

N = No

Y = Yes

Suspension Modification

R = Raised

L = Lowered

S = Stiffened

W = Widened

O = Other

1 = _____

2 = _____

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IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Tire Manufacturer (10 characters): Firestone

Tire Size Code (10 characters): P205/70R14

Tire Construction (2 charactrs): SB

BB = Bias Belted

GP = Glass Belted Radial

BP = Bias Ply

SB = Steel Belted Radial

OT = Other: _____

Tire Rim width: 5.0 (in) X 25.4 =: 127 (mm)

Axle Height: 11.3 (in) X 25.4 =: 287 (mm)

Tire Pressure: 26.0 (psi) X 6.897 =: 179.3 (kpa)

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IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Suspension Number (4 digits): _____

Front/Rear Flag (1 character): _____ R _____

Axle Type (1 character): _____ S _____

I = Independent S = Solid

Suspension Type (1 character): _____ L _____

A = Unequal A Arm

T = Semi-Trailing Arm

L = Leaf

W = Twist

M = Multiple Link

4 = 4 Link

Q = Torque Arm

3 = 3 Link

S = Strut

I = Twin I Beam

O = Other: _____

Spring Type (2 characters): _____ LL _____

CO = Coil

TB = Torsion Bar

LL = Longitudinal Leaf

TL = Transverse Leaf

OT = Other: _____

Brake Type (2 characters): _____ DS _____

DI = Disk

LT = Leading-Trailer Shoe

DS = Duo-Servo Shoe

OT = Other: _____

Suspension Modified (1 character): _____ N _____

N = No

Y = Yes

Suspension Modification

R = Raised

L = Lowered

S = Stiffened

W = Widened

O = Other

1 = _____

2 = _____

5

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Tire Manufacturer (10 characters): Firestone

Tire Size Code (10 characters): P205/70R14

Tire Construction (2 characters): SB

BB = Bias Belted

GP = Glass Belted Radial

BP = Bias Ply

SB = Steel Belted Radial

OT = Other: _____

Tire Rim Width: 5.0

(in) X 25.4 =: 127 (mm)

Axle Height: 11.5

(in) X 25.4 =: 292 (mm)

Tire Pressure: 34.0

(psi) X 6.897 =: 234.5 (kpa)

IPMD MEASURED DATA

VEHICLE # AND RUN # 3061 DATE: 09-05-90 TIME: 16:28:07

Pitch Inertia:

Run #	Period (Sec)	Platform Motion Amplitude (Deg.)	Relative Motion Amplitude (In.)	Individual
				Pitch Calc. (Ft. Lb. Sec ²)
1	3.945	10.46	0.155	1899.6
2	3.945	10.35	0.156	1897.8
3	3.940	10.36	0.156	1891.5
Average Pitch Inertia:				1896.3

Roll Inertia:

Distance between ramps (in.): 45.00

Run #	Period (Sec)	Platform Motion Amplitude (Deg.)	Relative Motion Amplitude (In.)	Individual
				Roll Calc. (Ft. Lb. Sec ²)
1	2.375	7.62	0.186	348.0
2	2.400	8.19	0.201	367.5
3	2.375	7.69	0.185	348.7
Average Roll Inertia:				354.7

Yaw Inertia:

String Pot Offset from platform center (in.): 74.00

Run #	Period (Sec)	Platform Motion Amplitude (Deg.)	Relative Motion Amplitude (In.)	Individual
				Yaw Calc. (Ft. Lb. Sec ²)
1	2.400	10.24	0.12	2007.1
2	2.400	10.47	0.11	2010.4
3	2.400	10.11	0.13	2005.3
Average Yaw Inertia:				2007.6

IPMD MEASURED DATA

Vehicle # and Run #: 3061 Date: 09-05-90 Time: 16:28:07

Vehicle Weight: 3164 Roof Height: 60.60 Load Config: Driver

Fuel Load: empty Vehicle Type: pu

IPMD Calibration Check (no vehicle)

Applied Weight (lbs.)	Schaevitz Output (Deg.)	System C.G. Pivot (in.)
0	-0.22	0.00
100	-5.62	33.15
200	-10.91	33.23
0	-0.22	0.00
-100	5.18	33.17
-200	10.50	33.16
0	-0.22	0.00
Average System C.G. Pivot		33.18

C.G. Height:

Applied Weight (lbs.)	Schaevitz Output (Deg.)	Resultant Longitudinal Movement (In.)	Individual C.G. Values (In.)
0	0.00	0.000	0.00
100	-3.46	0.058	22.51
200	-6.96	0.115	22.75
0	0.03	0.017	0.00
-100	3.47	-0.053	22.67
-200	6.95	-0.115	22.67
0	0.03	-0.004	0.00
Average calculated C.G. Height:			22.65

IPMD VEHICLE DATA SHEET

Filled Out By: B. Dotson Date: 10/05/90
Checked By: _____ Date: _____

VEHICLE DATA

Vehicle Make and Model (written out): Nissan pickup

NHTSA ID Code (7 characters): V90306 / Model Year (2 digits): 88

Vehicle Make (2 characters): 64

- | | | |
|-------------------|-----------------|-----------------|
| 11 - American | 02 - Ford | 64 = Nissan |
| 12 = Audi | 40 = GMC | 48 = Odyssey |
| 53 = Battronics | 23 = Honda | 06 = Oldsmobile |
| 27 = BMW | 34 = Hyundai | 14 = Peugeot |
| 04 = Buick | 41 = IH | 05 = Plymouth |
| 10 = Cadillac | 42 = Isuzu | 03 = Pontiac |
| 35 = Champion | 44 = Jeep | 17 = Renault |
| 36 = Checker | 54 = Jet | 30 = Saab |
| 01 = Chevrolet | 22 = Lectra | 26 = Subaru |
| 37 = Chinook | 59 = Lectric | 33 = Suzuki |
| 21 = Chrysler | 13 = Lincoln | 16 = Toyota |
| 29 = Comuta | 18 = Mazda | 31 = Triumph |
| 15 = Datsun | 28 = Mercedes | 56 = UM |
| 38 = Delorean | 09 = Mercury | 08 = Volkswagen |
| 07 = Dodge | 25 = MG | 20 = Volvo |
| 58 = Eva | 62 = Mitsubishi | 60 = Winnebago |
| 19 = Fiat | 32 = NHTSA | 24 = Yugo |
| 99 = Other: _____ | | |

Vehicle Model (2 characters = see appendix B): _____

Body Style (2 characters): PU

- | | |
|-----------------------|-------------------|
| 2C = 2 Door Coupe | SW = Stationwagon |
| 2S = 2 Door Sedan | PU = Pickup Truck |
| 3H = 3 Door Hatchback | TR = Truck |
| 4S = 4 Door Sedan | VN = Van |
| 5H = 5 Door Hatchback | BU = Bus |
| OH = Other: _____ | MP = Multipurpose |
| | UT = Utility |

VIN Number (20 characters): 1N6ND11SXJC314235

Odometer Reading: <u>174,111.0</u>	Thousands of Miles: <u>174.111</u>
Overall Length: <u>180.0</u>	(in) x 25.4 =: <u>4572</u> (mm)
Wheelbase: <u>104.0</u>	(in) x 25.4 =: <u>2642</u> (mm)
Front Track: <u>53.0</u>	(in) x 25.4 =: <u>1346</u> (mm)
Rear Track: <u>52.0</u>	(in) x 25.4 =: <u>1321</u> (mm)
Roof Height: <u>56.0</u>	(in) x 25.4 =: <u>1422</u> (mm)

IPMD VEHICLE DATA SHEET

G.V.W.R.: 4000 (lbs) x 4.45 =: 17800 (N)
FRONT G.A.W.R.: 2200 (lbs) x 4.45 =: 9790 (N)
REAR G.A.W.R.: 2200 (lbs) x 4.45 =: 9790 (N)

The following tire loadings are measured with vehicle at Curb Weight.

Weight on RF Tire: 221 (lbs) x 4.45 =: 983 (N)
Weight on LF Tire: 1338 (lbs) x 4.45 =: 5954 (N)
Weight on LR Tire: 493 (lbs) x 4.45 =: 2194 (N)
Weight on RR Tire: 1018 (lbs) x 4.45 =: 4530 (N)
Vehicle Test Weight: 3070 (lbs) x 4.45 =: 13662 (N)

Lateral and Longitudinal Center of Gravity Location.

From Front Axle: 51.19 (in) x 25.4 =: 1300 (mm)
From Center Line: -5.01 (in) x 25.4 =: 127.2 (mm)
Engine Displacement: 145.80 (cu in) x 0.0164 =: 2.4 (L)

Engine Type (2 characters): L4

L3	F4	L4
V4	F6	L6
V6	V8	RT = Rotary
L5	OT = Other: _____	

Engine Location (1 character): F

F = Front M = Mid R = Rear

Engine Orientation (1 character): L

L = Longitudinal T = Transverse

Transmission Type: (1 character): M

M = Manual A = Automatic

Drive Axle (1 character): R

F = Front R = Rear 4 = Four Wheel Drive

Vehicle Comments (30 characters): Post-test IPMD

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Suspension Number (4 digits): _____

Front/Rear Flag (1 character): _____ F _____

Axle Type (1 character): _____ I _____
I = Independent S = Solid

Suspension Type (1 character): _____ A _____

- | | |
|-------------------|-----------------------|
| A = Unequal A Arm | T = Semi-Trailing Arm |
| L = Leaf | W = Twist |
| M = Multiple Link | 4 = 4 Link |
| Q = Torque Arm | 3 = 3 Link |
| S = Strut | I = Twin I Beam |
| O = Other: _____ | |

Spring Type (2 characters): _____ TB _____

- | | |
|------------------------|----------------------|
| CO = Coil | TB = Torsion Bar |
| LL = Longitudinal Leaf | TL = Transverse Leaf |
| OT = Other: _____ | |

Brake Type (2 characters): _____ DI _____

- | | |
|---------------------|---------------------------|
| DI = Disk | LT = Leading-Trailer Shoe |
| DS = Duo-Servo Shoe | |
| OT = Other: _____ | |

Suspension Modified (1 character): _____ N _____

- N = No Y = Yes

Suspension Modification

- | | |
|---------------|-------------|
| R = Raised | L = Lowered |
| S = Stiffened | W = Widened |
| O = Other | |

1 = _____
2 = _____

IPMD VEHICLE DATA SHEETFRONT SUSPENSIONTire Manufacturer (10 characters): FirestoneTire Size Code (10 characters): P205/70R14Tire Construction (2 characters): SB

BB = Bias Belted

GP = Glass Belted Radial

BP = Bias Ply

SB = Steel Belted Radial

OT = Other: _____

Tire Rim width: 5.0 (in) X 25.4 =: 127 (mm)Axle Height: 11.3 (in) X 25.4 =: 287 (mm)Tire Pressure: 26.0 (psi) X 6.897 =: 179 (kpa)

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Suspension Number (4 digits): _____

Front/Rear Flag (1 character): _____ R _____

Axle Type (1 character): _____ S _____

I = Independent S = Solid

Suspension Type (1 character): _____ L _____

A = Unequal A Arm

T = Semi-Trailing Arm

L = Leaf

W = Twist

M = Multiple Link

4 = 4 Link

Q = Torque Arm

3 = 3 Link

S = Strut

I = Twin I Beam

O = Other: _____

Spring Type (2 characters): _____ LL _____

CO = Coil

TB = Torsion Bar

LL = Longitudinal Leaf

TL = Transverse Leaf

OT = Other: _____

Brake Type (2 characters): _____ DS _____

DI = Disk

LT = Leading-Trailer Shoe

DS = Duo-Servo Shoe

OT = Other: _____

Suspension Modified (1 character): _____ N _____

N = No

Y = Yes

Suspension Modification

R = Raised

L = Lowered

S = Stiffened

W = Widened

O = Other

1 = _____

2 = _____

10.8

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Tire Manufacturer (10 characters): Firestone

Tire Size Code (10 characters): P205/70R14

Tire Construction (2 characters): SB

BB = Bias Belted

GP = Glass Belted Radial

BP = Bias Ply

SB = Steel Belted Radial

OT = Other: _____

Tire Rim Width: 5.0

(in) X 25.4 =: 127 (mm)

Axle Height: 11.5

(in) X 25.4 =: 292 (mm)

Tire Pressure: 34.0

(psi) X 6.897 =: 234 (kpa)

low

IPMD MEASURED DATA

VEHICLE # AND RUN # 3062 DATE: 10-05-90 TIME: 14:10:06

Pitch Inertia:

Run #	Period (Sec)	Platform Motion Amplitude (Deg.)	Relative Motion Amplitude (In.)	Individual
				Pitch Calc. (Ft. Lb. Sec ²)
1	3.760	9.61	0.036	1842.1
2	3.760	9.96	0.039	1841.3
3	3.760	9.75	0.035	1842.6
Average Pitch Inertia:				1842.0

Roll Inertia:

Distance between ramps (in.): 43.20

Run #	Period (Sec)	Platform Motion Amplitude (Deg.)	Relative Motion Amplitude (In.)	Individual
				Roll Calc. (Ft. Lb. Sec ²)
1	2.255	7.77	0.061	313.7
2	2.245	7.47	0.041	308.9
3	2.265	7.55	0.044	324.9
Average Roll Inertia:				315.8

Yaw Inertia:

Run #	Period (Sec)	Platform Motion Amplitude (Deg.)	Relative Motion Amplitude (In.)	Individual
				Yaw Calc. (Ft. Lb. Sec ²)
1	2.385	10.01	0.09	1985.6
2	2.385	9.40	0.09	1985.2
3	2.385	9.46	0.09	1985.4
Average Yaw Inertia:				1985.4

IPMD MEASURED DATA

Vehicle # and Run #: 3062 Date: 10-05-90 Time: 14:10:06

Vehicle Weight: 3070 Rood Height: 56.00 Load Config: driver

Fuel Load: empty Vehicle Type: pu

IPMD Calibration Check (no vehicle)

Applied Weight (Lbs.)	Schaevitz Output (Deg.)	System C.G. Pivot (In.)
0	-0.22	0.00
100	-5.62	33.15
200	-10.91	33.23
0	-0.22	0.00
-100	5.18	33.17
-200	10.50	33.16
0	-0.22	0.00
Average System C.G. Pivot:		33.18

C.G. Height:

Applied Weight (Lbs.)	Schaevitz Output (Deg.)	Resultant	
		Longitudinal Movement (In.)	Individual C.G. Values (In.)
0	-0.03	0.000	0.00
100	-3.19	0.030	20.20
200	-6.42	0.041	20.71
0	-0.09	0.037	0.00
-100	3.16	0.005	20.85
-200	6.39	-0.031	20.91
0	-0.00	-0.005	0.00
Average calculated C.G. Height:			20.67

SIGN CONVENTIONACCELEROMETERS:

+X: FORWARD
+Y: LEFTWARD
+Z: UPWARD

POTENTIOMETERS:

+CHEST DISPLACEMENT: OUTWARD
+SEAT BELT DISPLACEMENT: OUTWARD
+SEAT BELT EXTENSION: ENLONGATION
+VEHICLE DISPLACEMENT: OUTWARD

LOAD CELLS:

+FEMUR FORCE: TENSION
+SEAT BELT FORCE: TENSION
+BARRIER FORCE: TENSION

NECK LOAD CELLS:

+X FORCE: HEAD FORWARD
+Y FORCE: HEAD RIGHTWARD
+Z FORCE: HEAD UPWARD (TENSION ON NECK)
+X MOMENT: RIGHT EAR TO RIGHT SHOULDER
+Y MOMENT: HEAD ROTATING FORWARD
+Z MOMENT: HEAD ROTATING LEFTWARD

GYROSCOPES:

+X ROLL: TO RIGHT
+Y PITCH: FRONT DOWN
+Z YAW: COUNTERCLOCKWISE