1471

VEHICLE AND DUMMY KINEMATICS IN A CONTROLLED ROLLOVER CRASH 1989 DODGE COLT 3-DOOR HATCHBACK

PREPARED BY:
THE TRANSPORTATION RESEARCH CENTER OF OHIO
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EAST LIBERTY, OHIO 43319

TEST REPORT
SEPTEMBER - OCTOBER, 1989

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

V 1471

ERRATA (as of Nov 93)
Test Number 890918

1. The following channel on the Sign Convention Sheet at the end of Appendix D should read:

   Neck Load Cells: +Y Force: Head Pushed Leftward

2. All neck load cell moments should be labeled lb-ft, instead of lb-in, including:

   Dummy Data Summary Sheet, page 3-6.
   Plots, Appendix B
   - Driver Neck Moment About X Axis
   - Driver Neck Moment About Y Axis
   - Driver Neck Moment About Z Axis

NOTICE

The Transportation Research Center of Ohio does not endorse or certify products of manufacturers. The manufacturer's name appears solely to identify the test article. The Transportation Research Center assumes no liability for the report or use thereof. It is responsible for the facts and the accuracy of the data presented herein. This report does not constitute a standard, specification, or regulation.

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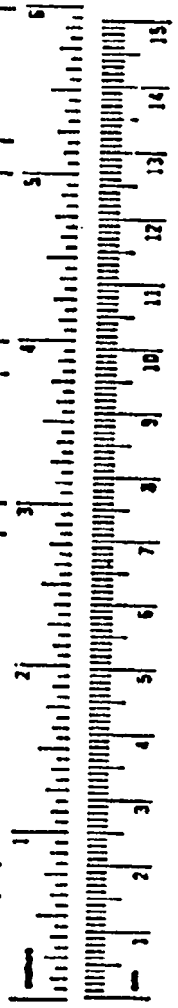
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	metric ton	t
	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 (10 000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton (1000 kg)	1.1	short tons	
	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 add 32)	degrees Fahrenheit	°F

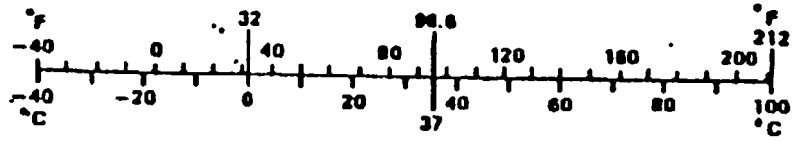


TABLE OF CONTENTS

Section	Description	Page
1.0	PURPOSE AND TEST SUMMARY	1-1
2.0	SUMMARY OF ROLLOVER CRASH TEST	2-1
3.0	GENERAL TEST AND VEHICLE PARAMETER DATA	3-1
4.0	OCCUPANT INFORMATION	4-1
APPENDIX A	PHOTOGRAPHS	A-1
APPENDIX B	DATA PLOT PRESENTATION	B-1
APPENDIX C	DUMMY CERTIFICATION	C-1
APPENDIX D	MISCELLANEOUS TEST INFORMATION	D-1

LIST OF PHOTOGRAPHS

Title	Figure
PRE-TEST OVERALL FRONT VIEW	A-1
PRE-TEST OVERALL LEFT VIEW	A-2
PRE-TEST OVERALL REAR VIEW	A-3
PRE-TEST OVERALL RIGHT VIEW	A-4
PRE-TEST CLOSE-UP FRONT VIEW	A-5
PRE-TEST DRIVER DUMMY - VIEW 1	A-6
PRE-TEST DRIVER DUMMY - VIEW 2	A-7
PRE-TEST LEFT FRONT SUSPENSION STRING POTENTIOMETER - VIEW 1	A-8
PRE-TEST LEFT FRONT SUSPENSION STRING POTENTIOMETER - VIEW 2	A-9
PRE-TEST RIGHT FRONT SUSPENSION STRING POTENTIOMETER - VIEW 1	A-10
PRE-TEST RIGHT FRONT SUSPENSION STRING POTENTIOMETER - VIEW 2	A-11
PRE-TEST LEFT REAR SUSPENSION STRING POTENTIOMETER - VIEW 1	A-12
PRE-TEST LEFT REAR SUSPENSION STRING POTENTIOMETER - VIEW 2	A-13
PRE-TEST RIGHT REAR SUSPENSION STRING POTENTIOMETER - VIEW 1	A-14
PRE-TEST RIGHT REAR SUSPENSION STRING POTENTIOMETER - VIEW 2	A-15
PRE-TEST VEHICLE INSTRUMENTATION AND CAMERA LOCATION	A-16
PRE-TEST GYRO PLACEMENT VIEW	A-17
POST-TEST OVERALL FRONT - VIEW 1	A-18
POST-TEST OVERALL FRONT - VIEW 2	A-19
POST-TEST OVERALL FRONT - VIEW 3	A-20
POST-TEST OVERALL LEFT - VIEW 1	A-21
POST-TEST OVERALL LEFT - VIEW 2	A-22
POST-TEST OVERALL REAR - VIEW 1	A-23
POST-TEST OVERALL REAR - VIEW 2	A-24
POST-TEST OVERALL RIGHT - VIEW 1	A-25
POST-TEST OVERALL RIGHT - VIEW 2	A-26
POST-TEST OVERALL RIGHT - VIEW 3	A-27
POST-TEST CLOSE-UP FRONT VIEW	A-28
POST-TEST DUMMY AND VEHICLE - VIEW 1	A-29
POST-TEST DUMMY AND VEHICLE - VIEW 2	A-30
POST-TEST DUMMY AND VEHICLE - VIEW 3	A-31
POST-TEST DUMMY AND VEHICLE - VIEW 4	A-32
POST-TEST DUMMY AND VEHICLE - VIEW 5	A-33

SECTION 1.0

PURPOSE AND TEST PROCEDURE

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

This test was conducted by placing a 1989 Dodge Colt 3-door hatchback on the NHTSA rollover cart moving at 30 mph, releasing the vehicle with it's roll axis parallel to direction of rollover cart motion, and first contacting the vehicle's passenger side. The test vehicle contained an instrumented Part 572E dummy unrestrained.

right side

SECTION 2.0

SUMMARY OF ROLLOVER CRASH TEST

A 1989 Dodge Colt 3-door hatchback containing one Part 572E instrumented test dummy was placed upon the rollover test device at 30 degrees above the horizontal and was released when the device had reached 30 mph. The device was attached to the tow cable of the drive system. After the vehicle had been released the device was brought to a stop with an auxiliary brake system. After release the vehicle impacted the ground on its right side. The vehicle made one-half of a roll and came to rest on its roof. The rollover crash test was conducted by the Transportation Research Center of Ohio in East Liberty, Ohio on September 18, 1989.

The Part 572E 50th percentile adult male anthropomorphic test device (ATD) was placed in the driver's designated seating position according to the seating procedure in FMVSS 208 Notice 45. The ATD was instrumented with head, chest, and pelvis traixial 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.

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 procedure. 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 dummy calibrations. Appendix D contains the pre-test and post-test IPMD vehicle data sheet.

TEST NUMBER 890918

VEHICLE ROLL CART DATA SUMMARY

No.	LOCATION	POSITIVE DIRECTION MAX	POSITIVE DIRECTION SEC	NEGATIVE DIRECTION MAX	NEGATIVE DIRECTION SEC
1	CENTER OF GRAVITY ACCELERATION (g)				
	LONGITUDINAL	1.6	0.7 Y	4.9	0.6 Y
	LATERAL	---	--- Y	---	--- Y
	VERTICAL	4.7	0.6 Y	4.1	0.6 Y
	RESULTANT	10.8	0.6 Y		
2	PLATFORM DISPLACEMENT (in)				
	LEFT SIDE	23.8	1.4	0.1	0.3
	RIGHT SIDE	24.6	3.5	0.2	0.2
3	VEHICLE/ROLL CART SEPARATION TIMES:				
			UPPER SWITCH:	0.8 SEC	
			LOWER SWITCH:	--- SEC Y	

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

Y See TEST ANOMALIES

FINAL RESTING PLACES OF PARTS AND CARS

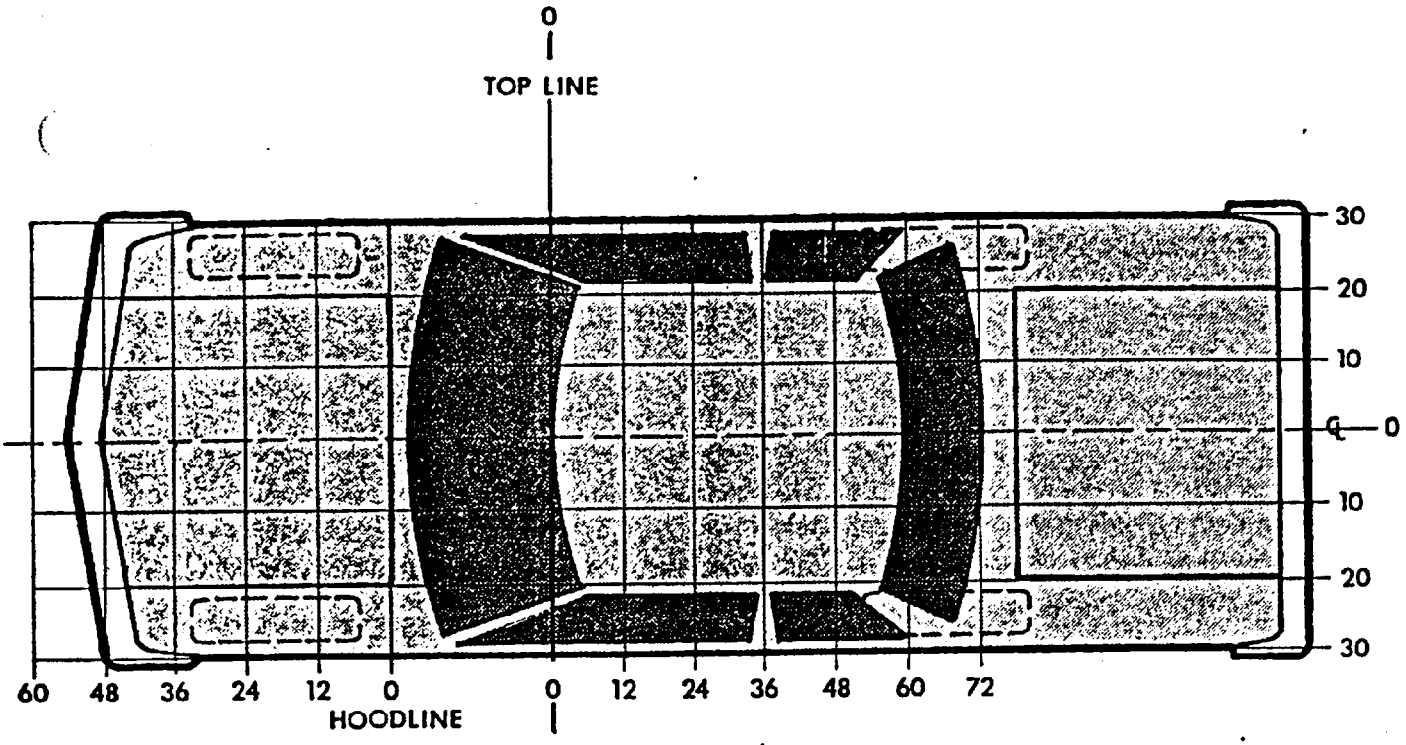
DESCRIPTION OF PART	DISTANCE, FT*	DISTANCE, FT*
1989 Dodge Colt	115.7	-23.3

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

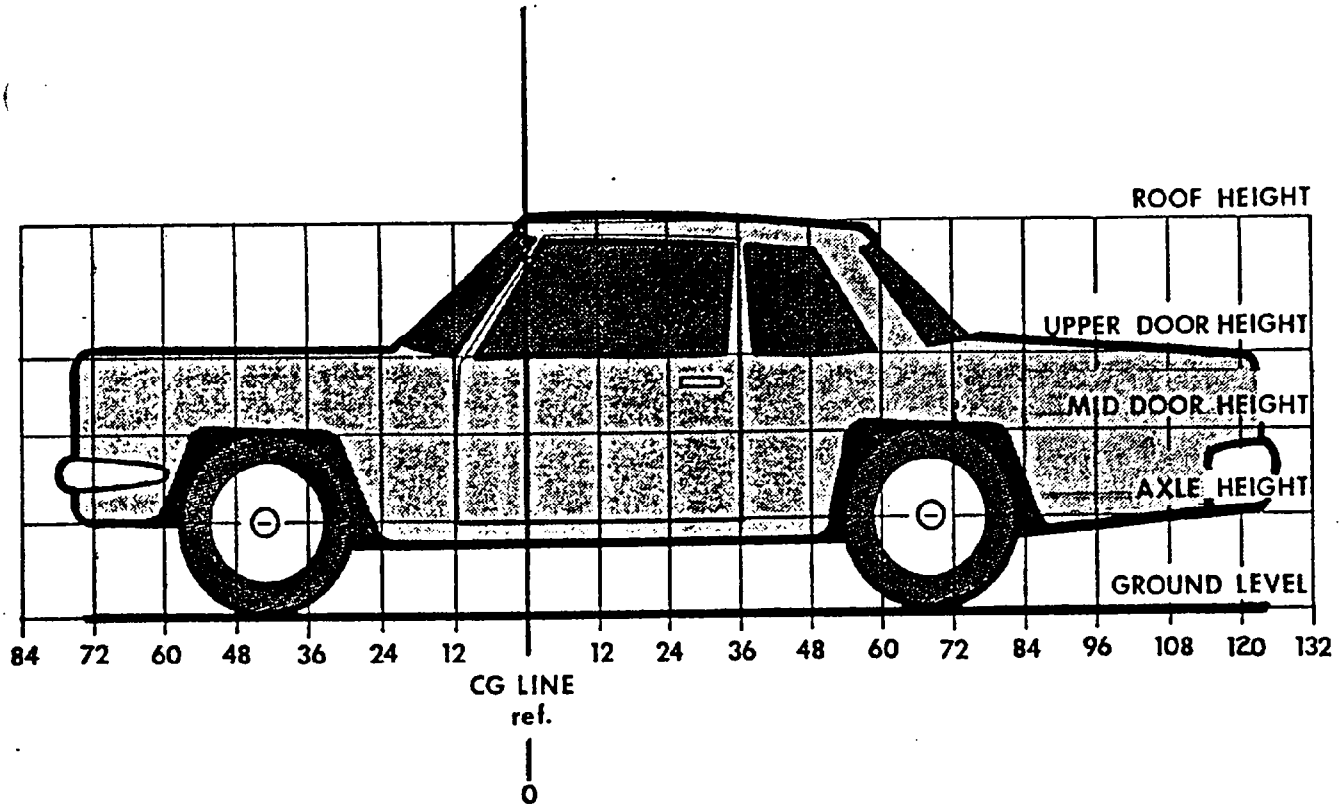
VEHICLE INTERIOR MEASUREMENTS

DESCRIPTION	PRE	POST	DIFF
Floor board to top of left "A" post	41.0	35.0	6.0
Floor board to top of right "A" post	41.0	36.6	4.4
Door sill to top of left "B" post	39.5	38.9	0.6
Door sill to top of right "B" post	39.5	39.9	-0.4
Door sill to top of left door opening	39.7	37.6	2.1
Door sill to top of right door opening	39.7	39.1	0.6
Floor tunnel to windshield header	34.4	32.0	2.4
Floor tunnel to center of roof	32.6	29.6	3.0
Rear of floor tunnel to roof	42.8	44.1	-1.3
Maximum width at "B" post	61.1	57.2	3.9
Maximum width at "A" post	44.5	41.0	3.5
Maximum width at top of door opening	39.4	38.5	0.9

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	34.9	35.9	35.8	35.8	34.9	X
Trailing edge of cowl + 12 inches***	X	33.7	34.2	34.2	34.0	33.3	X
Trailing edge of cowl + 24 inches	X	31.6	32.1	32.3	32.0	31.3	X
Trailing edge of cowl + 36 inches	X	28.7	29.3	29.3	29.1	28.3	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	35.3	36.1	36.3	35.9	35.5	X
Trailing edge of cowl + 12 inches	X	32.9	33.7	34.3	34.4	33.8	X
Trailing edge of cowl + 24 inches	X	29.3	30.8	31.5	32.1	31.7	X
Trailing edge of cowl + 36 inches	X	26.0	27.0	27.7	28.2	28.2	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	0.2	0.5	0.1	0.6	X
Trailing edge of cowl + 12 inches	X	-0.8	-0.5	0.1	0.4	0.5	X
Trailing edge of cowl + 24 inches	X	-2.3	-1.3	-0.8	0.1	0.4	X
Trailing edge of cowl + 36 inches	X	-2.7	-2.3	-1.6	-0.9	-0.1	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.
***Longutudinal 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
PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)					
Longitudinal Center of Gravity	X	51.1	51.3	51.0	X
Longitudinal Center of Gravity + 12 inches***	52.1	53.1	53.3	53.1	52.0
Longitudinal Center of Gravity + 24 inches	X	53.6	53.8	53.6	X
Longitudinal Center of Gravity + 36 inches	52.7	53.8	54.0	53.7	52.6
Longitudinal Center of Gravity + 48 inches	52.4	53.4	53.5	53.2	52.2
Longitudinal Center of Gravity + 60 inches	X	X	X	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)					
Longitudinal Center of Gravity	X	47.5	49.4	52.1	X
Longitudinal Center of Gravity + 12 inches	49.8	49.0	51.0	53.8	51.8
Longitudinal Center of Gravity + 24 inches	X	53.8	54.6	55.9	X
Longitudinal Center of Gravity + 36 inches	53.4	55.4	56.2	55.8	53.6
Longitudinal Center of Gravity + 48 inches	53.6	55.2	55.5	55.2	53.5
Longitudinal Center of Gravity + 60 inches	X	X	X	X	X
STATIC CRUSH (IN)					
Longitudinal Center of Gravity	X	-3.6	-1.9	1.1	X
Longitudinal Center of Gravity + 12 inches	-2.3	-4.1	-2.3	0.7	-0.2
Longitudinal Center of Gravity + 24 inches	X	0.2	0.8	2.3	X
Longitudinal Center of Gravity + 36 inches	0.7	1.6	2.2	2.1	1.0
Longitudinal Center of Gravity + 48 inches	1.2	1.8	2.0	2.0	1.3
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	51.0	X	X	X	X	X	X	X	27.8	27.5	27.0	27.0	26.9	X	X	X
Upper Door	32.8	X	X	X	18.6	17.6	17.1	17.2	17.2	17.0	16.9	17.0	17.2	18.1	X	X
Mid Door	21.8	X	X	X	X	15.8	15.7	15.7	15.6	15.6	15.6	X	X	X	X	X
Axle Height	10.5	X	X	X	X	18.2	18.7	18.0	18.1	18.0	18.0	X	X	X	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Roof Height	51.0	X	X	X	X	X	X	X	28.0	26.5	26.1	25.9	25.7	X	X	X
Upper Door	32.8	X	X	X	17.4	16.2	15.6	15.8	15.9	15.8	16.0	16.1	16.5	17.8	X	X
Mid Door	21.8	X	X	X	X	15.4	14.6	14.8	14.9	14.9	14.9	X	X	X	X	X
Axle Height	10.5	X	X	X	X	17.2	17.2	17.3	17.4	17.6	17.8	X	X	X	X	X
STATIC CRUSH (IN)																
Roof Height	51.0	X	X	X	X	X	X	X	0.2	-1.0	-0.9	-1.1	-1.2	X	X	X
Upper Door	32.8	X	X	X	-1.2	-1.4	-1.5	-1.4	-1.3	-1.2	-0.9	-0.9	-0.7	-0.3	X	X
Mid Door	21.8	X	X	X	X	-0.4	-1.1	-0.9	-0.7	-0.7	-0.7	X	X	X	X	X
Axle Height	10.5	X	X	X	X	-1.0	-1.5	-0.7	-0.7	-0.4	-0.2	X	X	X	X	X

* Center of gravity is located 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 stucture 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	51.0	X	X	X	X	X	X	X	27.8	27.5	27.0	27.0	26.9	X	X	X
Upper Door	32.8	X	X	X	18.1	17.0	16.8	16.9	16.8	16.4	16.2	16.3	16.7	17.5	X	X
Mid Door	21.8	X	X	X	X	15.4	15.3	15.5	15.3	15.2	15.1	X	X	X	X	X
Axle Height	10.5	X	X	X	X	17.9	17.9	17.9	17.9	17.9	18.0	X	X	X	X	X
POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**)																
Roof Height	51.0	X	X	X	X	X	X	X	28.2	27.9	28.3	28.1	28.6	X	X	X
Upper Door	32.8	X	X	X	22.5	22.1	20.5	20.9	21.0	20.1	20.8	20.2	20.6	21.1	X	X
Mid Door	21.8	X	X	X	X	18.2	17.2	16.9	16.6	16.5	17.2	X	X	X	X	X
Axle Height	10.5	X	X	X	X	18.4	18.6	18.5	18.5	18.6	18.5	X	X	X	X	X
STATIC CRUSH (IN)																
Roof Height	51.0	X	X	X	X	X	X	X	0.4	0.4	1.3	1.1	1.7	X	X	X
Upper Door	32.8	X	X	X	4.4	5.1	3.7	4.0	4.2	3.7	4.6	3.9	3.9	3.6	X	X
Mid Door	21.8	X	X	X	X	2.8	1.9	1.4	1.3	1.3	2.1	X	X	X	X	X
Axle Height	10.5	X	X	X	X	0.5	0.7	0.6	0.6	0.7	0.5	X	X	X	X	X

* Center of gravity is located 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 stucture is bowed outward.

IMPACTED VEHICLE MEASUREMENTS

VEHICLE MAKE/MODEL: Dodge/Colt TEST NUMBER: 890918

NO.	TYPE OF MEASUREMENT	DIMENSIONS IN INCHES PRE-TEST	POST-TEST	DIFF.
X1	TOTAL LENGTH OF VEHICLE AT CENTERLINE	159.5	158.0	1.5
X2	REAR SURFACE OF VEHICLE TO FRONT OF ENGINE BLOCK	136.5	135.0	1.5
X3	REAR SURFACE OF VEHICLE TO FIREWALL	115.2	114.0	1.2
X4	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF RIGHT DOOR	104.4	104.0	0.4
X5	REAR SURFACE OF VEHICLE TO UPPER LEADING EDGE OF LEFT DOOR	104.6	105.0	-0.4
X6	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF RIGHT DOOR	104.4	103.6	0.8
X7	REAR SURFACE OF VEHICLE TO LOWER LEADING EDGE OF LEFT DOOR	104.6	104.4	0.2
X8	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF RIGHT DOOR	54.2	54.2	0.0
X9	REAR SURFACE OF VEHICLE TO UPPER TRAILING EDGE OF LEFT DOOR	54.4	54.7	-0.3
X10	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF RIGHT DOOR	55.6	55.0	0.6
X11	REAR SURFACE OF VEHICLE TO LOWER TRAILING EDGE OF LEFT DOOR	55.3	55.0	0.3
X12	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON RIGHT SIDE	102.9	102.6	0.3
X13	REAR SURFACE OF VEHICLE TO BOTTOM OF "A" POST ON LEFT SIDE	103.1	102.2	0.9
X14	REAR SURFACE OF VEHICLE TO FIREWALL - RIGHT SIDE	115.2	114.5	0.7
X15	REAR SURFACE OF VEHICLE TO FIREWALL - LEFT SIDE	115.0	115.0	0.0
X16	REAR SURFACE OF VEHICLE TO STEERING WHEEL CENTER	89.7	87.5	2.2
X17	CENTER OF STEERING COLUMN TO "A" POST	14.8	16.6	-1.8
X18	CENTER OF STEERING COLUMN TO HEADLINER	17.4	13.0	4.4
X19	REAR SURFACE OF VEHICLE TO RIGHT SIDE OF FRONT BUMPER	155.6	156.8	-1.2
X20	REAR SURFACE OF VEHICLE TO LEFT SIDE OF FRONT BUMPER	155.6	156.8	-1.2
X21	LENGTH OF ENGINE BLOCK	10.0	10.0	0.0

TEST ANOMALIES

The following data channels recorded anomalous noise spikes at 0.06, 0.08, 0.17 and 0.18 seconds, cause unknown:

VCGXG2, Rollcart Center of Gravity X-axis Accelerometer

VCGYG2, Rollcart Center of Gravity Y-axis Accelerometer

VCGZG2, Rollcart Center of Gravity Z-axis Accelerometer

The Rollcart Center of Gravity Resultant Acceleration calculation, VCGRG2, was affected by the above anomalies.

The Rollcart Center of Gravity Y-axis Accelerometer, VCGYG2, data was shifted at 0.21 seconds.

The Vehicle/Rollcart separation time - lower switch, OTH2, disengaged at 5.8 seconds before the event.

The Driver's Chest Displacement, CSTXD1, data was not recorded due to inadvertently not being connected to the data recorder.

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: Mitsubishi Motors Corporation

MAKE/MODEL: Dodge/Colt VIN: JB3CU14X2KU061846

BODY STYLE: 3-door hatchback MODEL YEAR: 1989

NHTSA NO.: NA COLOR: Light blue

ENGINE DATA: TYPE: Transverse CYLINDERS: 4 DISPLACEMENT: 1.5 liter

TRANSMISSION DATA: 4 SPEED, X MANUAL, ____AUTOMATIC, X FWD, ____RWD, ____4WD

DATE VEHICLE RECEIVED: 8/31/89 ODOMETER READING: 22

DEALER'S NAME AND ADDRESS: Martin Chrysler, Plymouth, Dodge
11687 Johnstown Utica Road
Johnstown, Ohio

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	No
POWER BRAKES	Yes	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	Yes	AIR CONDITIONING	No
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	No	REAR WINDOW DEFROSTER	No
OTHER	None		

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: OK

DATA FROM CERTIFICATION LABEL ON LEFT DOOR FACE OR "B" POST:

VEHICLE MANUFACTURED BY: Mitsubishi Motor Corporation

DATE OF MANUFACTURE: 9/88

GVWR: 3157 LBS

GAWR: FRONT 1650 LBS., REAR 1584 LBS.

TEST VEHICLE INFORMATION CONT'D

DATA FROM "RECOMMENDED TIRE PRESSURE" LABEL ON DOOR, POST, GLOVEBOX, ETC.

VEHICLE LOAD (UP TO CAPACITY): FRONT 32 psi; REAR 29 psi

RECOMMENDED TIRE SIZE: P155/80R13 & P145SR13 LOAD RANGE X B, C, D

TIRES ON VEHICLE (MFR., LINE, SIZE): GT Special 350 145SR13

IS SPARE TIRE A "SPACE SAVER": Yes

IS SPARE TIRE STANDARD EQUIPMENT: Yes

VEHICLE CAPACITY: TYPES OF SEATS: FRONT: Buckets
REAR: Bench

TYPE OF FRONT SEAT BACKS: Manual

NUMBER OF OCCUPANTS 2 FRONT 3 REAR 5 TOTAL

CARGO LOAD 77 LBS. TOTAL 827 LBS.

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

RIGHT FRONT	656 lbs.	RIGHT REAR	431 lbs.
LEFT FRONT	675 lbs.	LEFT REAR	410 lbs.

TOTAL FRONT WEIGHT 1331 lbs. (61.3% OF TOTAL VEHICLE WEIGHT)

TOTAL REAR WEIGHT 841 lbs. (38.7% OF TOTAL VEHICLE WEIGHT)

TOTAL DELIVERED WEIGHT 2172 lbs.

CALCULATION FOR TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT

UDW = UNLOADED DELIVERED WEIGHT (2172 LBS)

VCW = VEHICLE CAPACITY WEIGHT (827 LBS)

DSC = DESIGNATED SEATING CAPACITY (5)

RCLW = VCW - 150 (DCS) = 827 -150 (5) = 77

TARGET TEST WEIGHT = UDW + RCLW + (1 DUMMY X 167 LBS/DUMMY)

= 2172 + 77 + 167 LBS

TARGET TEST WEIGHT = 2416 LBS

TEST VEHICLE INFORMATION CONT'D

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 109 LBS. CARGO

RIGHT FRONT	689 lbs.	RIGHT REAR	507 lbs.
LEFT FRONT	717 lbs.	LEFT REAR	535 lbs.

TOTAL FRONT WEIGHT 1406 lbs. (57.4% OF TOTAL VEHICLE WEIGHT)

TOTAL REAR WEIGHT 1042 lbs. (42.6% OF TOTAL VEHICLE WEIGHT)

TOTAL TEST WEIGHT 2448 lbs. (1.3% OVER TARGET WEIGHT)

WEIGHT OF BALLAST SECURED IN VEHICLE TRUNK AREA: None

COMPONENTS REMOVED TO MEET TARGET WEIGHT: None

VEHICLE ATTITUDE (ALL DIMENSIONS IN INCHES):

DELIVERED ATTITUDE:	LF 25.3	;RF 25.3	;LR 25.4	;RR 25.4
PRE-TEST ATTITUDE:	LF 24.8	;RF 24.9	;LR 23.2	;RR 23.5
POST-TEST ATTITUDE:	LF 24.1	;RF 24.2	;LR 23.5	;RR 23.7

WHEELBASE: 93.6 INCHES

CG = 39.5 INCHES REARWARD OF FRONT WHEEL CENTERLINE

VEHICLE REBOUND AND CRUSH (ALL DIMENSIONS IN INCHES):

OVERALL LENGTH OF TEST VEHICLE:	PRE-TEST:	L 155.6	;C 159.5	;R 155.6
	POST-TEST:	L 156.8	;C 158.0	;R 156.8
	TOTAL CRUSH:	L -1.2	;C 1.5	;R -1.2

TEST CONDITIONS

TEST NUMBER: 890918

DATE OF TEST: 9/18/89 TIME OF TEST: 1515

WIND VELOCITY: NA HUMIDITY: NA

AMBIENT TEMPERATURE AT IMPACT AREA: 72°F

TEMPERATURE IN OCCUPANT COMPARTMENT: 73°F

DRIVER DUMMY TEMPERATURE: 72°F

SUBJECT VEHICLE DATA

	ACTUAL	INTENDED
TEST WEIGHT (lbs.)	2448	2416
VEHICLE ORIENTATION (deg.) YAW*	0	0
VEHICLE ORIENTATION (deg.) ROLL**	30	30
VEHICLE VELOCITY (mph)	30	30

DUMMIES

DRIVER

TYPE:	Part 572E
SERIAL NO.:	192
INSTRUMENTATION:	
HEAD ACCEL.:	3
NECK L.C.'C.:	6
CHEST ACCEL.:	3
PELVIS ACCEL.:	3
CHEST DISPLACEMENT POTENTIOMETER:	1
RESTRAINT SYSTEM:	None

REMARKS:

*AS MEASURED CLOCKWISE FROM THE DIRECTION OF TRAVEL.

**AS MEASURED FROM THE HORIZONTAL.

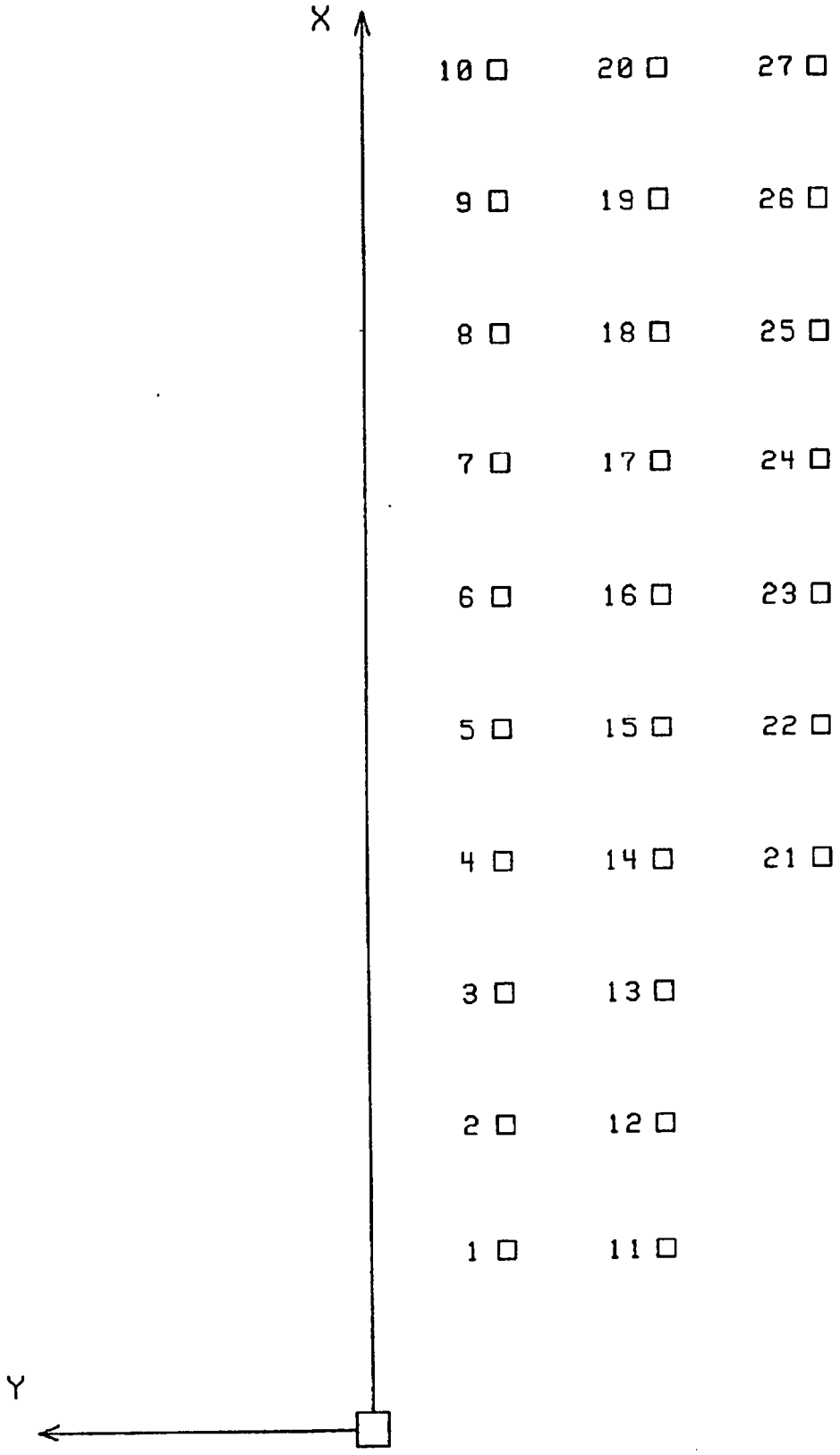
DUMMY DATA SUMMARY

TEST NUMBER 890918

	DRIVER DUMMY SN: 192			
	POSITIVE DIRECTION		NEGATIVE DIRECTION	
	MAX	SEC	MAX	SEC
HEAD ACCELERATION (g)				
LONGITUDINAL	18.9	1.6	15.5	1.4
LATERAL	44.3	1.4	9.8	1.4
VERTICAL	119.6	1.4	19.6	1.4
RESULTANT	120.2	1.4		
HIC 36 MSEC	80.5 FROM 1347 TO 1373 MSEC			
NECK FORCES (lbs)				
LONGITUDINAL	69.6	1.4	153.5	1.4
LATERAL	209.9	1.4	46.0	1.3
VERTICAL	205.3	1.4	787.9	1.4
NECK MOMENT (in-lbs)				
ABOUT LONG.	10.9	1.5	44.4	1.4
ABOUT LATERAL	18.7	1.5	22.4	1.4
ABOUT VERTICAL	32.3	1.4	11.4	1.5
CHEST ACCELERATION (g)				
LONGITUDINAL	7.8	1.7	6.0	1.4
LATERAL	11.2	1.4	5.4	1.4
VERTICAL	6.8	1.7	15.9	1.4
RESULTANT	16.4	1.4		
3 MSEC CLIP	11.3 FROM 1354 TO 1357 MSEC			
CHEST DISPLACEMENT (in)				
LONGITUDINAL	---	--- Y	---	--- Y
PELVIS ACCELERATION (g)				
LONGITUDINAL	8.4	1.4	11.1	1.3
LATERAL	9.9	1.3	7.4	1.3
VERTICAL	4.9	1.7	10.0	1.4
RESULTANT	12.1	1.3		

See APPENDIX B for sign convention

Y See TEST ANOMALIES



STADIA POLE LAYOUT AND NUMBERING SYSTEM

STADIA POLE LOCATIONS

POLE NO.	X DISTANCE, FT. *	Y DISTANCE, FT. *
1	38.0	-8.0
2	46.0	-8.0
3	54.0	-8.0
4	62.0	-8.0
5	70.0	-8.0
6	78.0	-8.0
7	86.0	-8.0
8	94.0	-8.0
9	102.0	-8.0
10	110.0	-8.0
11	38.0	-18.0
12	46.0	-18.0
13	54.0	-18.0
14	62.0	-18.0
15	70.0	-18.0
16	78.0	-18.0
17	86.0	-18.0
18	94.0	-18.0
19	102.0	-18.0
20	110.0	-18.0
21	62.0	-28.0
22	70.0	-28.0
23	78.0	-28.0
24	86.0	-28.0
25	94.0	-28.0
26	102.0	-28.0
27	110.0	-28.0

*REFERENCE: +X: FORWARD FROM RELEASE BLOCK

+Y: LEFTWARD FROM CENTER RELEASE BLOCK

CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right panning	Kodak	16	24	Real Time
2	Left wide	Photosonic 1B	25	495	Vehicle Kinematics
3	Left wide	Photosonic 1B	13	495	Vehicle Kinematics
4	Left angle	Photosonic 1B	25	505	Vehicle Kinematics
5	Front wide	Photosonic 1B	25	502	Vehicle Kinematics
6	Onboard - rear	Photosonic 1B	8	501	Dummy Kinematics
7	Onboard - floor	Photosonic 1B	8	495	Dummy Kinematics
8	Documentary	Bealieu	12-120	24	Pre-test and Post-test Documentation

HIGH SPEED CAMERA INFORMATION

CAMERA NO.	X* (ft.)	Y* (ft.)	Z* (ft.)
3	107.6	420.8	5.0
4	107.6	235.5	5.1
5	240.8	81.9	3.8
6	221.2	0.4	2.5

*Reference:

+X = Forward from release block

+Y = Leftward from center release block

+Z = Upward from ground level

SECTION 4.0

OCCUPANT INFORMATION

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #177	PASSENGER #NA
Head	Roof continuous	NA
Chest	None	NA
Abdomen	None	NA
Left knee	Instrument panel	NA
Right knee	Passenger front seat	NA

DOOR OPENING:

	LEFT	RIGHT
Front	Easy	Easy
Rear	NA	NA

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
Front	None	None
Rear	NA	NA

GLAZING DAMAGE:

The entire windshield was cracked upon impact.

OTHER NOTABLE IMPACT EFFECTS:

The entire rear glass and left and right rear glasses were shattered upon impact.

DUMMY KINEMATIC SUMMARY

Driver Dummy

Upon the vehicle's impact with the ground, the driver dummy's head struck the roof continuously. As the vehicle rolled onto its roof, the dummy's head remained in contact with the roof and the dummy's upper torso remained near the right door. The vehicle came to rest on its roof with the driver dummy's head resting against the roof. The dummy was not restrained.

TEST NUMBER 890918

VEHICLE DATA SUMMARY

No.	LOCATION	POSITIVE DIRECTION MAX	POSITIVE DIRECTION SEC	NEGATIVE DIRECTION MAX	NEGATIVE DIRECTION SEC
1	CENTER OF GRAVITY ACCELERATION (g)				
	LONGITUDINAL	8.2	1.4	17.9	1.3
	LATERAL	17.8	1.3	4.2	0.6
	VERTICAL	7.8	0.5	12.9	1.3
	RESULTANT	23.1	1.3		
2	CENTER OF GRAVITY				
	ROLL (X-AXIS)	233.9	1.3	57.1	2.2
	PITCH (Y-AXIS)	292.0	1.3	344.6	1.3
	YAW (Z-AXIS)	171.2	0.5	275.5	1.3
3	LEFT FRONT SUSPENSION DISPLACEMENT (in)				
	VERTICAL	0.3	1.3	1.0	1.8
4	RIGHT FRONT SUSPENSION DISPLACEMENT (in)				
	VERTICAL	0.1	1.3	1.1	1.4
5	LEFT REAR SUSPENSION DISPLACEMENT (in)				
	VERTICAL	0.1	1.4	2.5	1.4
6	RIGHT REAR SUSPENSION DISPLACEMENT (in)				
	VERTICAL	0.1	1.8	1.8	1.3

REFERENCE:
X: +FORWARD FROM REAR BUMPER
Y: +LEFTWARD FROM VEHICLE CENTERLINE
Z: +UPWARD FROM GROUND LEVEL
ROLL: + TO RIGHT
PITCH: + NOSE DOWNWARD
YAW: + COUNTER CLOCKWISE
DISPLACEMENT: + OUTWARD

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. After the vehicle had been positioned on the rollover device it was towed outside for launch.

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 set at 26°. The dummy was positioned in the seat using NHTSA's Notice #45 seating procedure. The H-point location of the seat was obtained by using the SAE J826 H-point machine as specified in the Notice #45. The driver dummy was unrestrained.

DUMMY IN-VEHICLE POSITION RECORDING SHEET

MFR./MAKE/MODEL: Mitsubishi/Dodge/Colt 3-door Hatchback

SEAT TYPE: ____Bench
__X__Bucket
____Split bench

ADJUSTER TYPE: __X__Manual
____Power
____Non-adjustable

BUCKET SEAT BACK TYPE: ____Non-adjustable
__X__Adjustable reclining

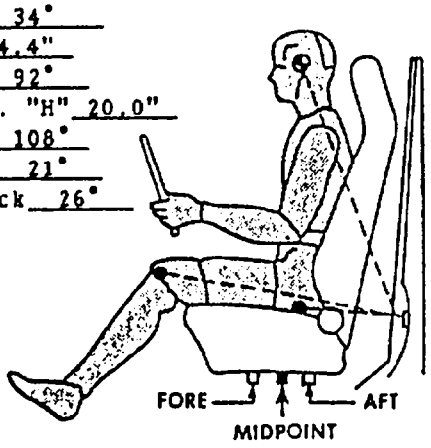
POSITIONING DATE: 9/18/89

AMBIENT TEMP. 72°F TIME: 1515

TECHNICIANS:
1. P. Cummins
2. D. Carpenter
3. R. Benavides
4. _____

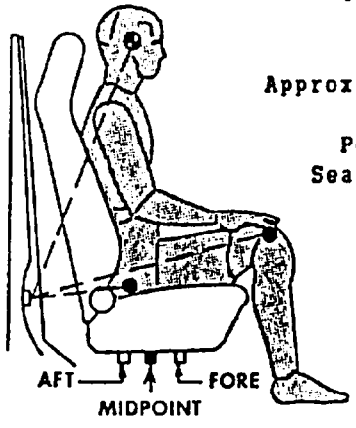
DRIVER DUMMY* # 192 TYPE: HIII

Head 24.2"
Target 34°
Knee 34.4"
Joint 92°
Approx. "H" 20.0"
Point 108°
Pelvis 21°
Seatback 26°

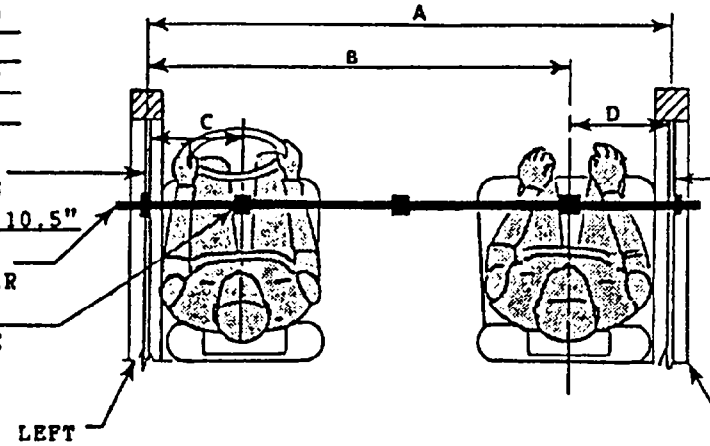


PASSENGER DUMMY* # NA TYPE: NA

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



A = 59.5"
B = NA
C = 12.8"
D = NA



DOOR GLASS HEIGHT = 10.5"

LATERAL BAR

ADJUSTABLE POINTER

DOOR GLASS HEIGHT = _____

LEFT FRONT DOOR

DRIVER DUMMY

PASSENGER DUMMY

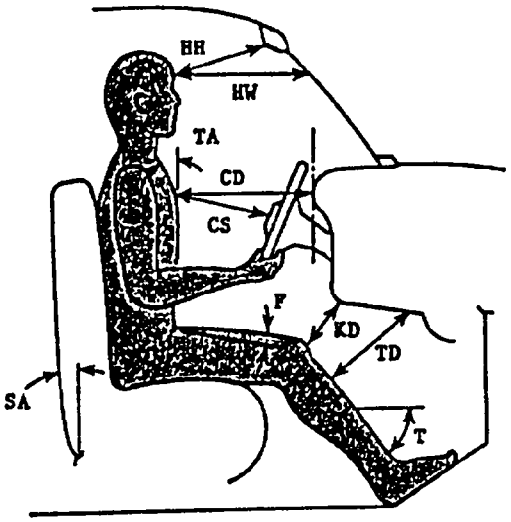
RIGHT FRONT DOOR

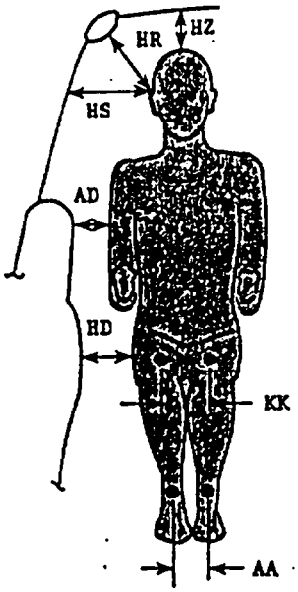
*Dummy measurements are referenced to top of striker bolt and all angles are referenced to vertical.

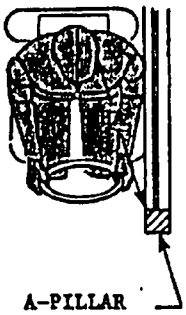
DUMMY IN-VEHICLE POSITION RECORDING SHEET

	DRIVER	PASSENGER
HH	11.1	
HW	18.0	
CD	20.2	
CS	12.8	
KDL	3.7	
KDR	4.0	
TA	15°	
SA	26°	
HA	18.0	
FL	12°	
FR	14°	
TDL	2.1	
TDR	2.2	
TL	41°	
TR	42°	
HZ	2.6	
HR	5.2	
HS	10.0	
AD	4.3	
HD	6.1	
KK	8.8	
AA	10.8	

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.

APPENDIX A

PHOTOGRAPHS

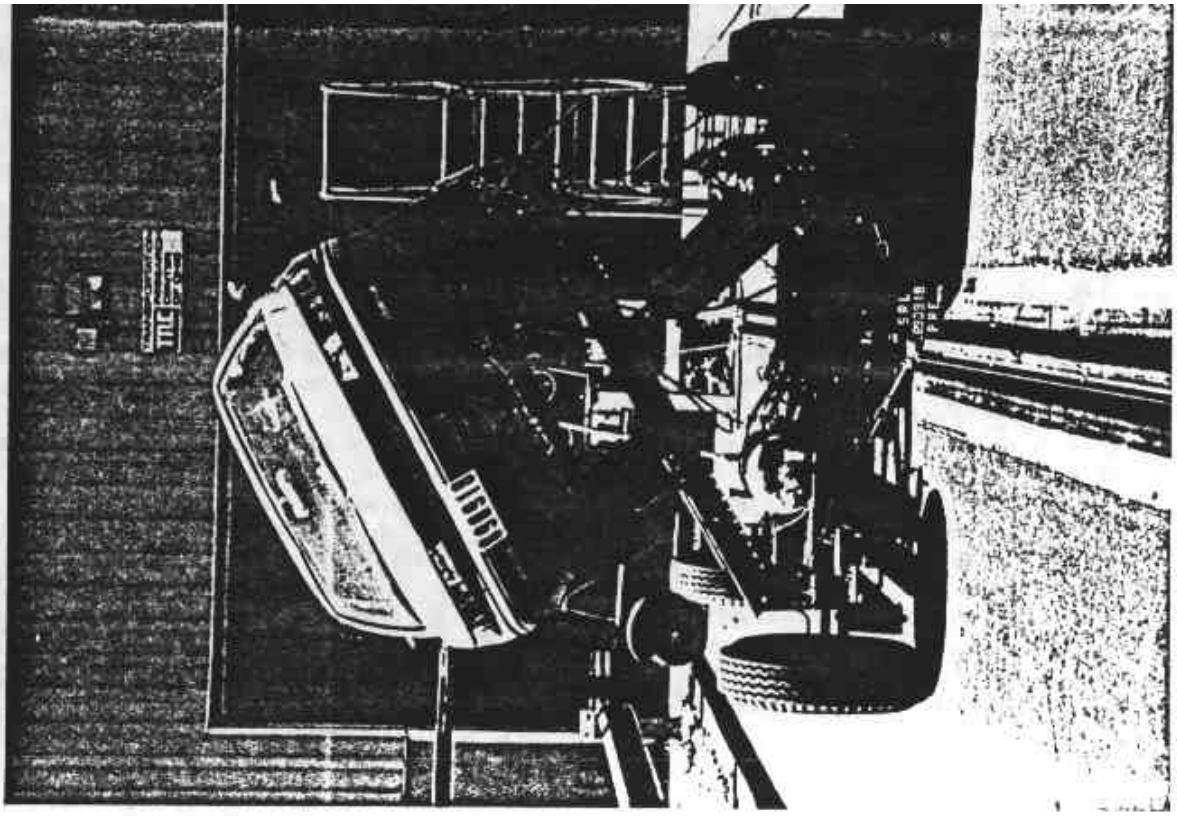


Figure A-1. PRE-TEST OVERALL FRONT VIEW

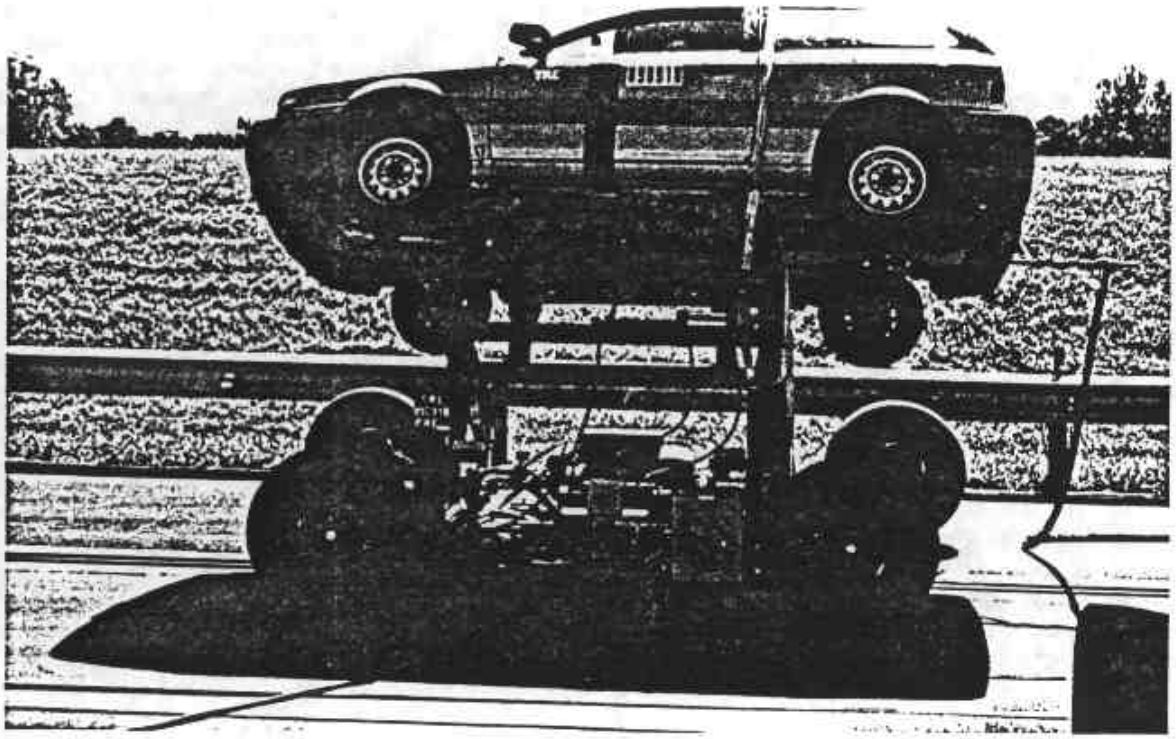


Figure A-2. PRE-TEST OVERALL LEFT VIEW

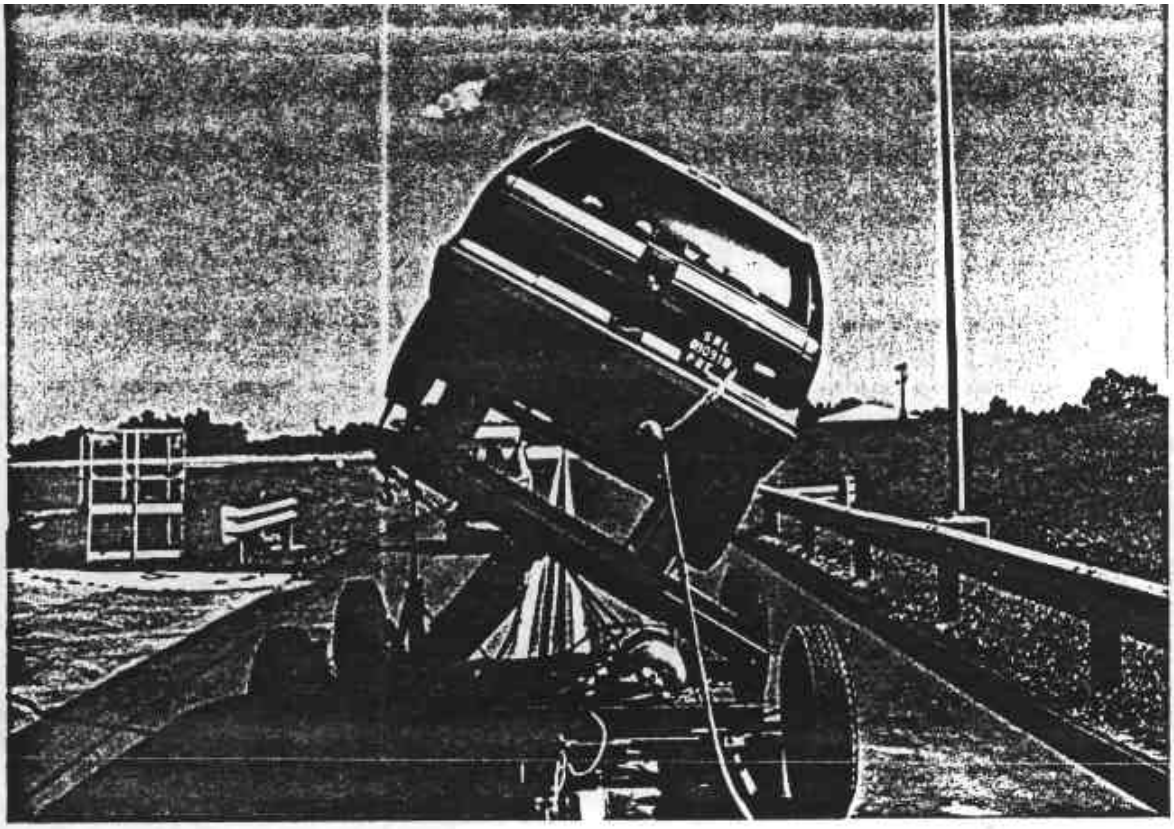


Figure A-3. PRE-TEST OVERALL REAR VIEW

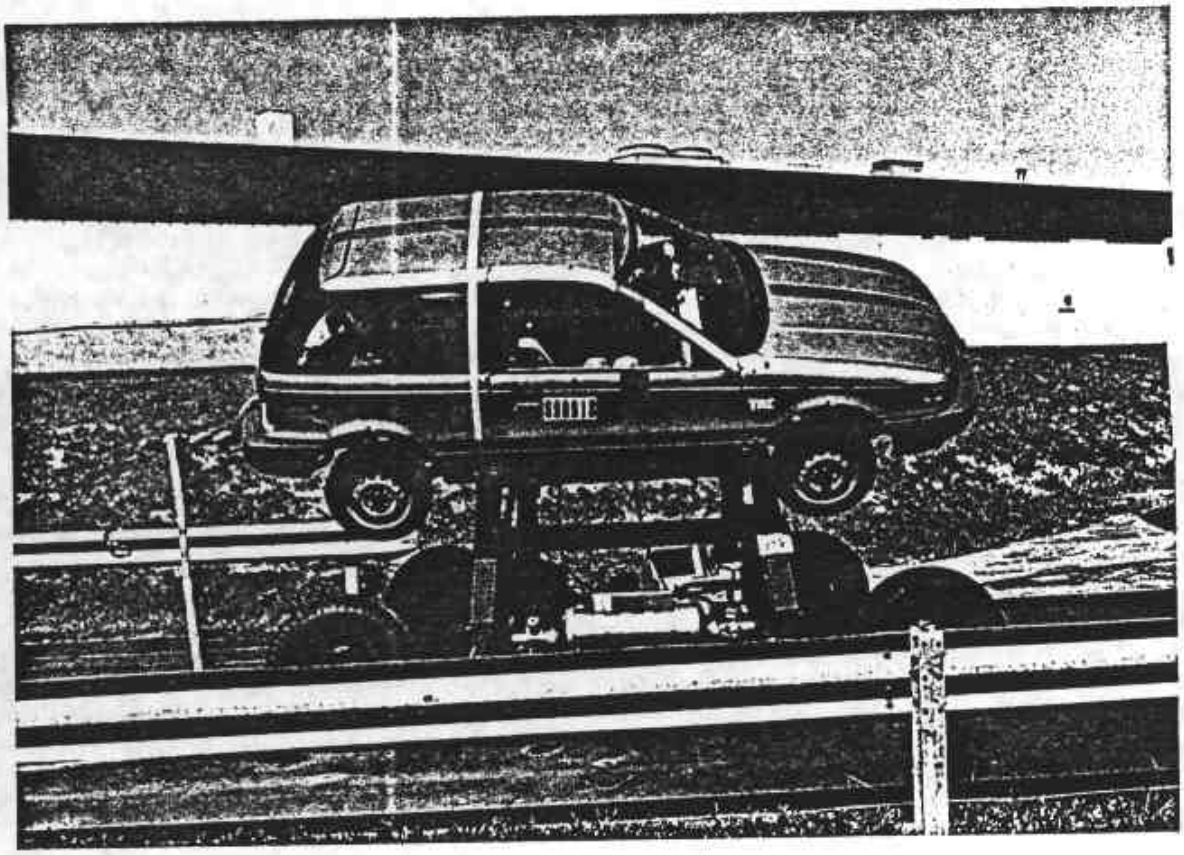


Figure A-4. PRE-TEST OVERALL RIGHT VIEW

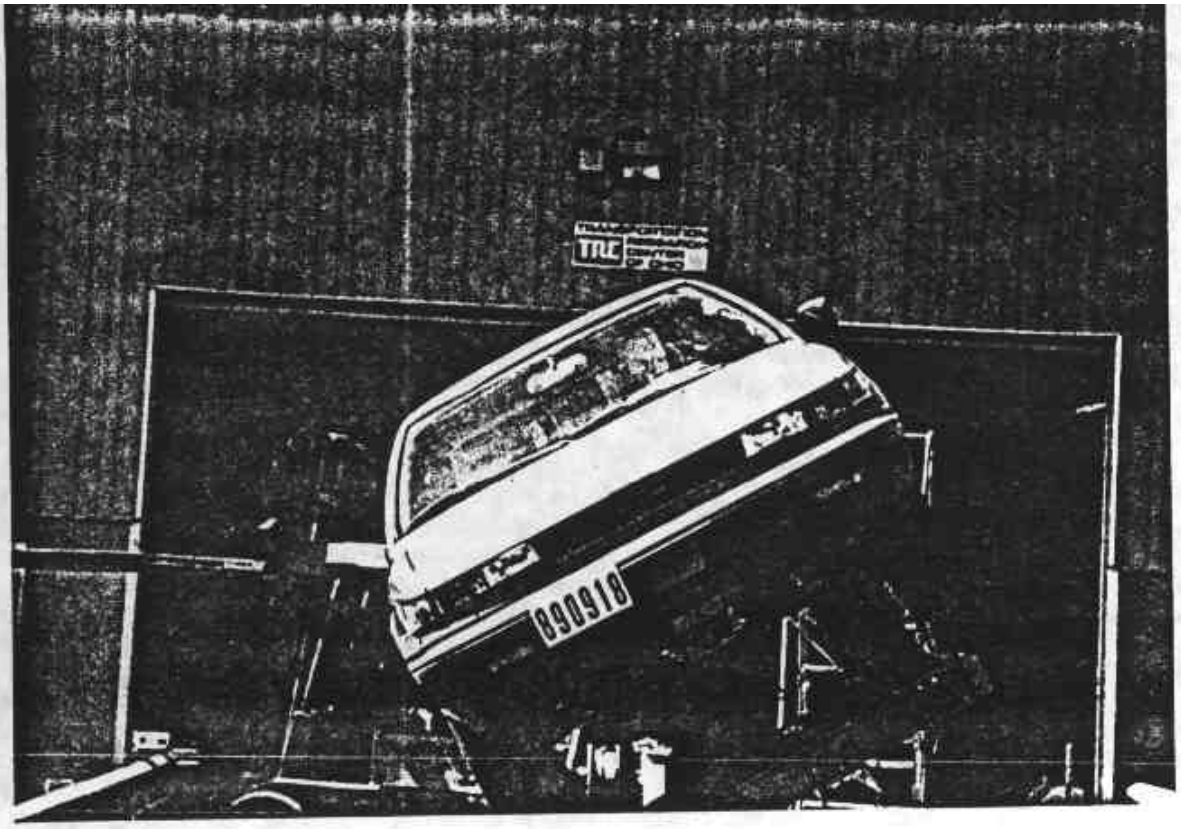


Figure A-5. PRE-TEST CLOSE-UP FRONT VIEW

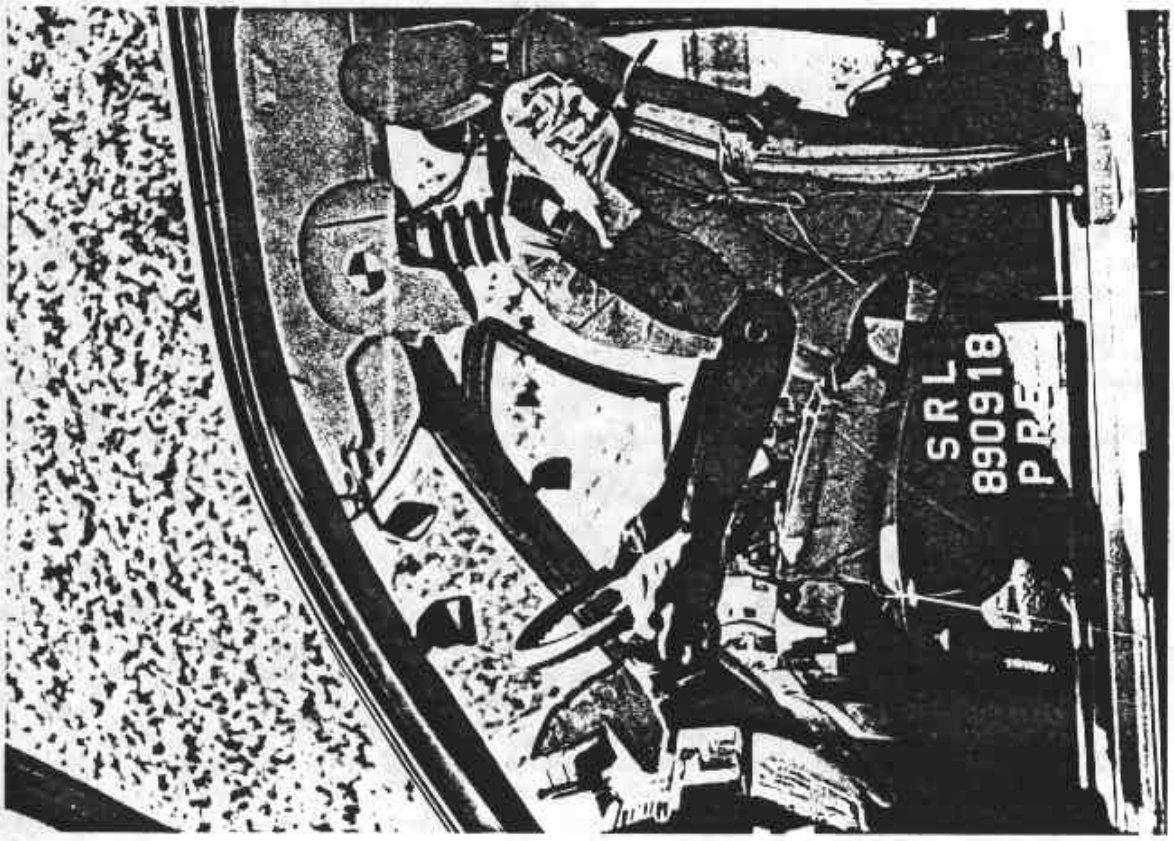


Figure A-6. PRE-TEST DRIVER DUMMY - VIEW 1

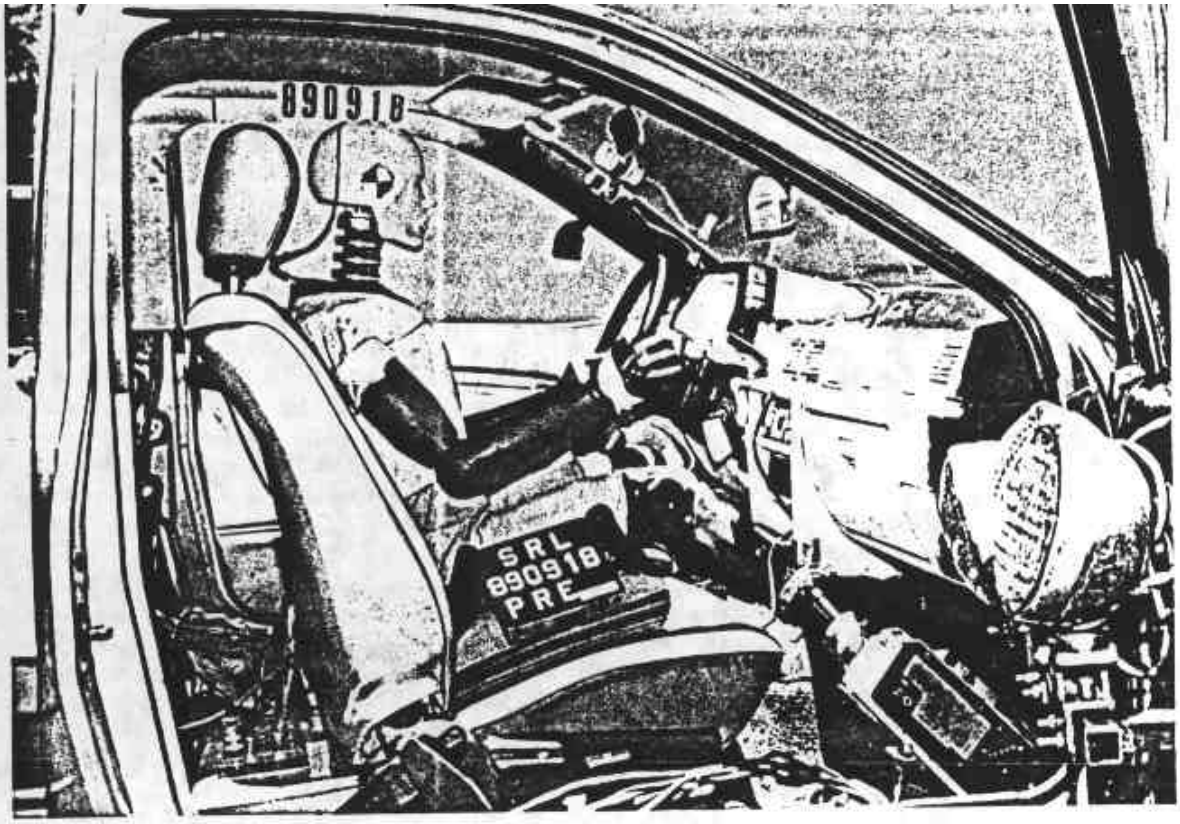


Figure A-7. PRE-TEST DRIVER DUMMY - VIEW 2

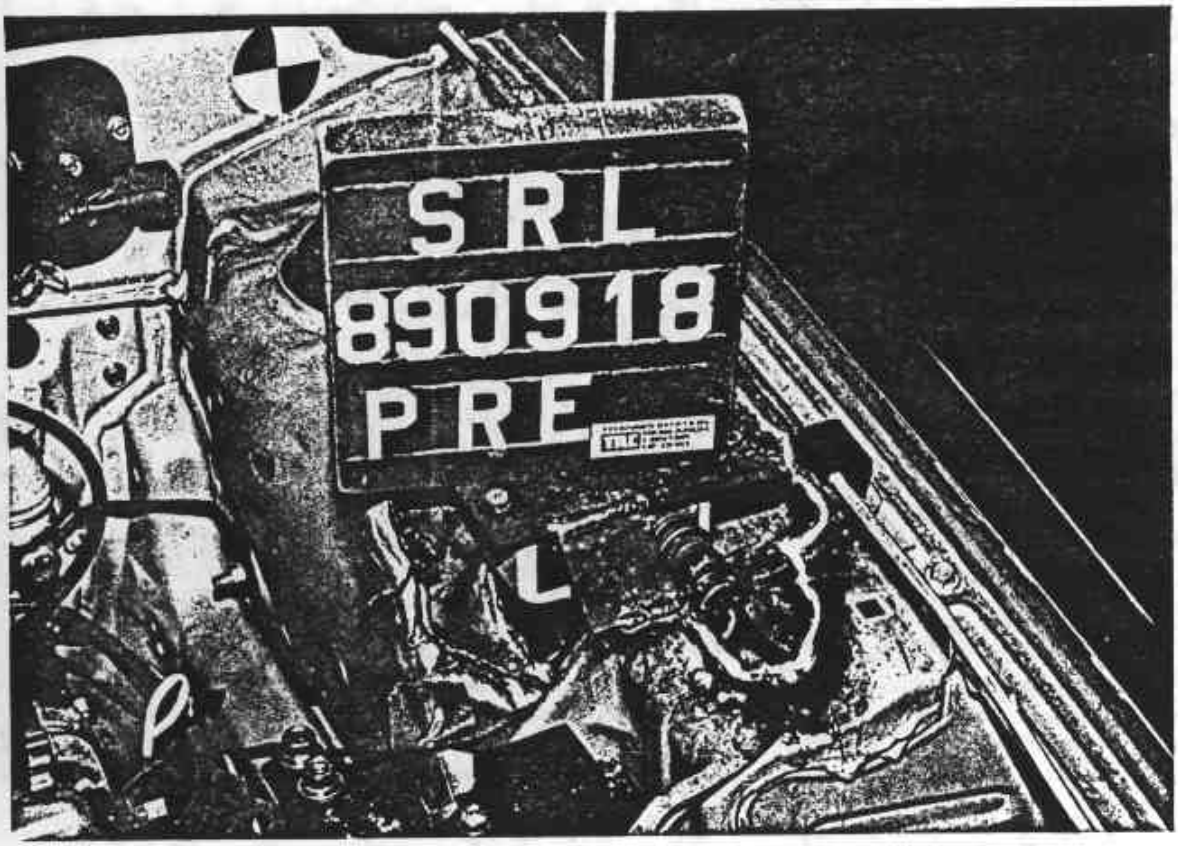


Figure A-8. PRE-TEST LEFT FRONT SUSPENSION STRING POTENTIOMETER - VIEW 1

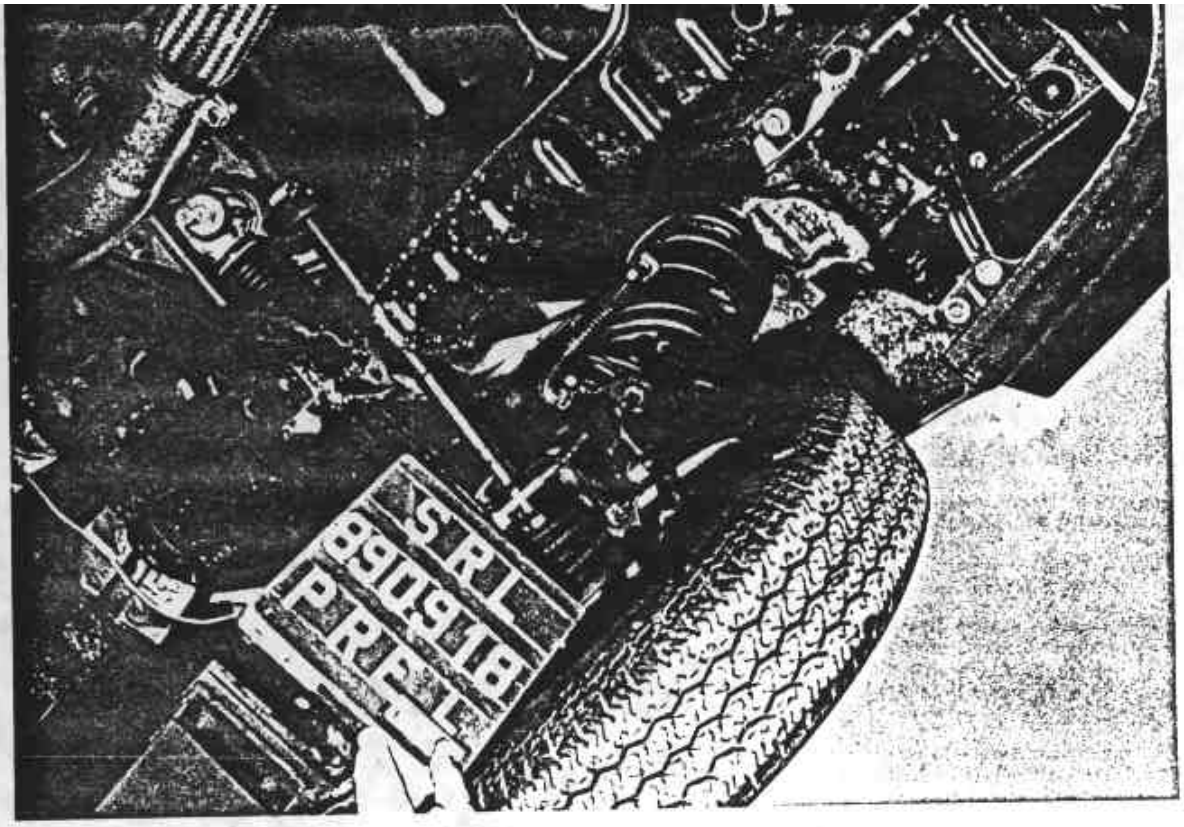


Figure A-9. PRE-TEST LEFT FRONT SUSPENSION STRING POTENTIOMETER - VIEW 2

Figure A-10. PRE-TEST RIGHT FRONT SUSPENSION STRING POTENTIOMETER - VIEW 1

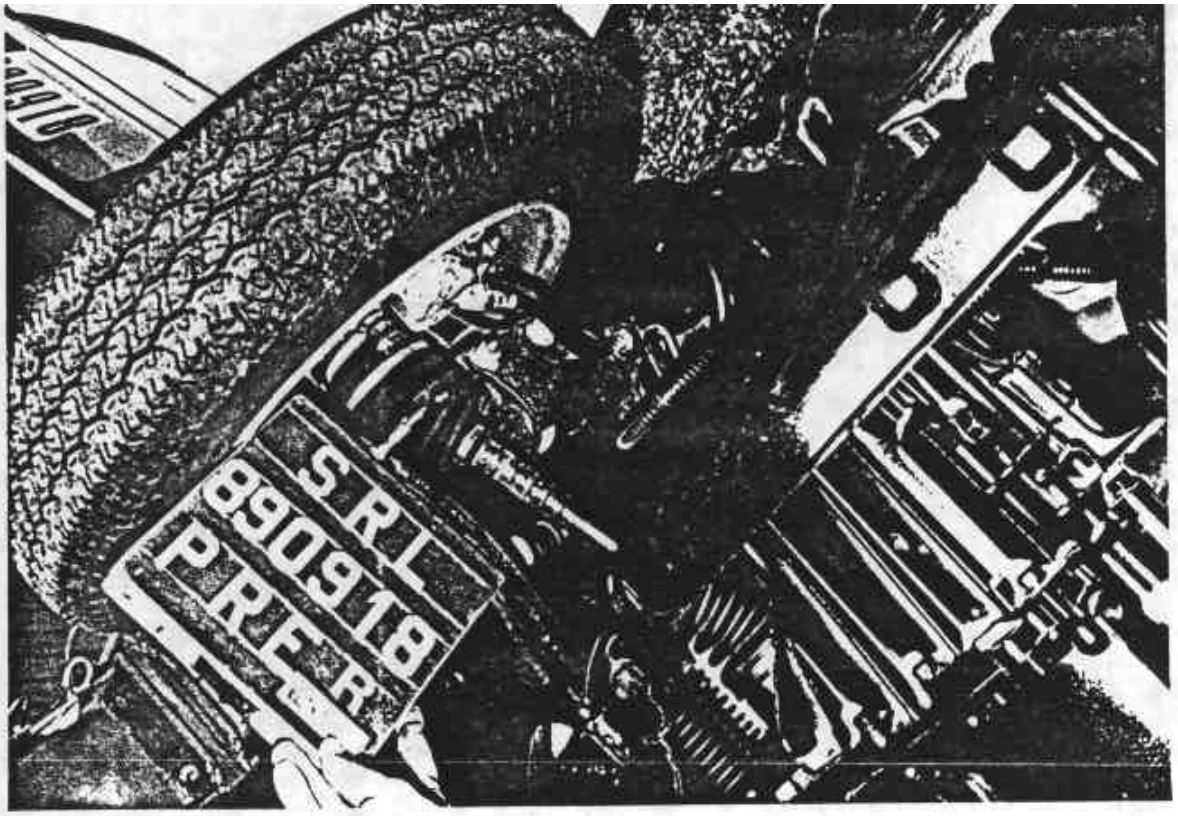


Figure A-11. PRE-TEST RIGHT FRONT SUSPENSION STRING POTENTIOMETER - VIEW 2

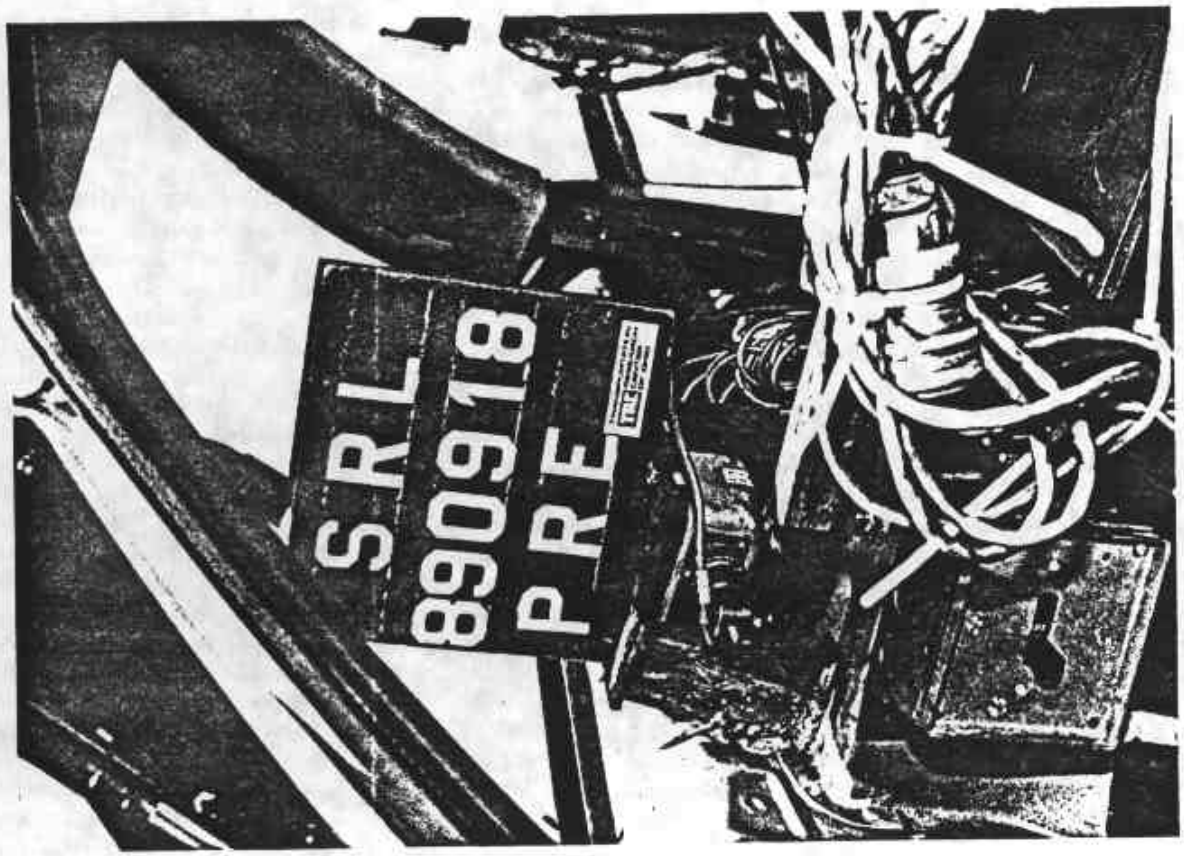


Figure A-12. PRE-TEST LEFT REAR SUSPENSION STRING POTENTIOMETER - VIEW 1

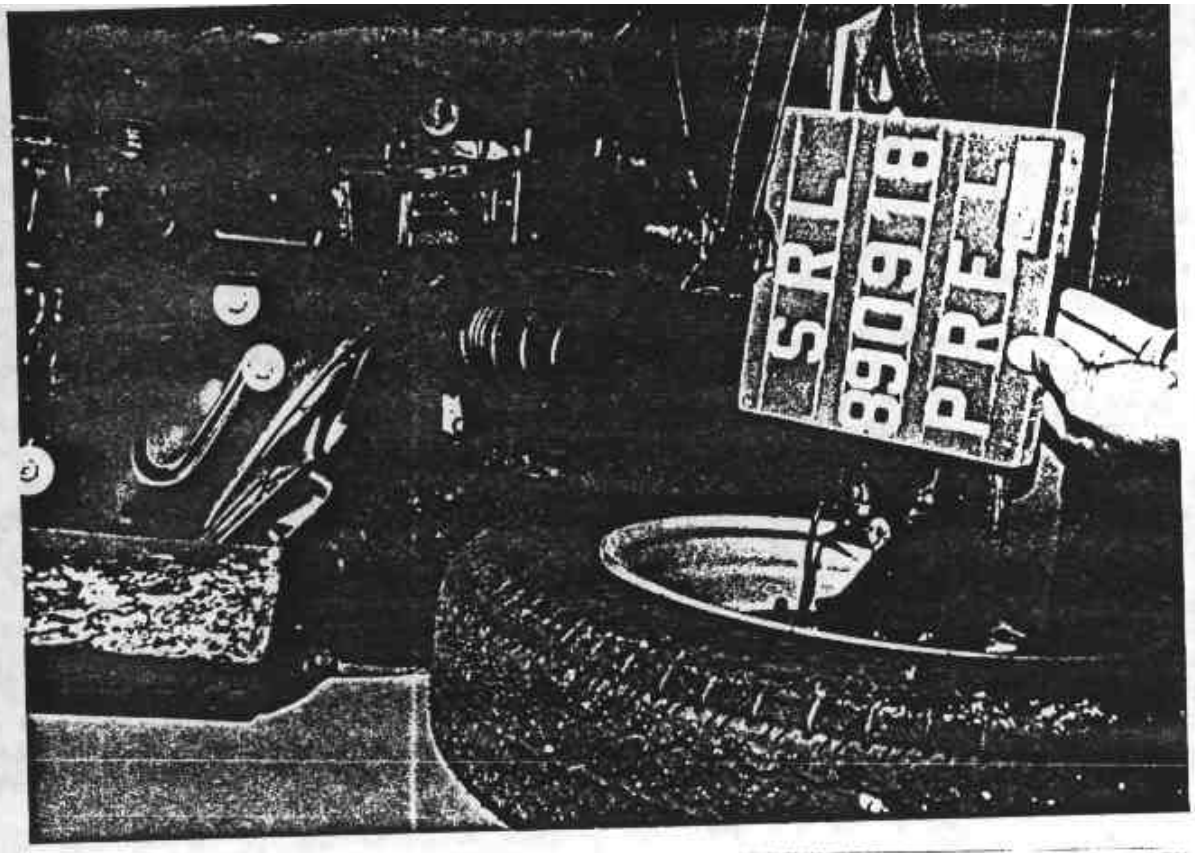


Figure A-13. PRE-TEST LEFT REAR SUSPENSION STRING POTENTIOMETER - VIEW 2

Figure A-14. PRE-TEST RIGHT REAR SUSPENSION STRING POTENTIOMETER - VIEW 1

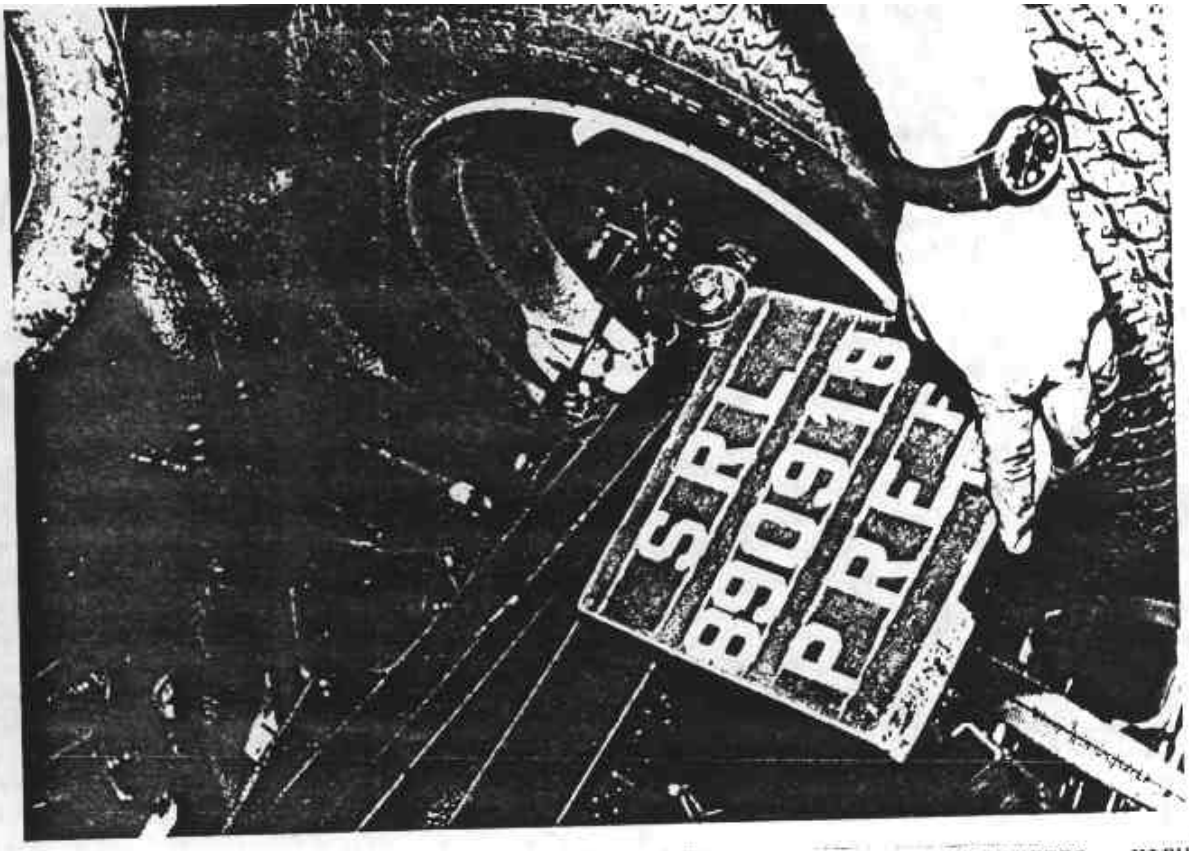


Figure A-15. PRE-TEST RIGHT REAR SUSPENSION STRING POTENTIOMETER - VIEW 2

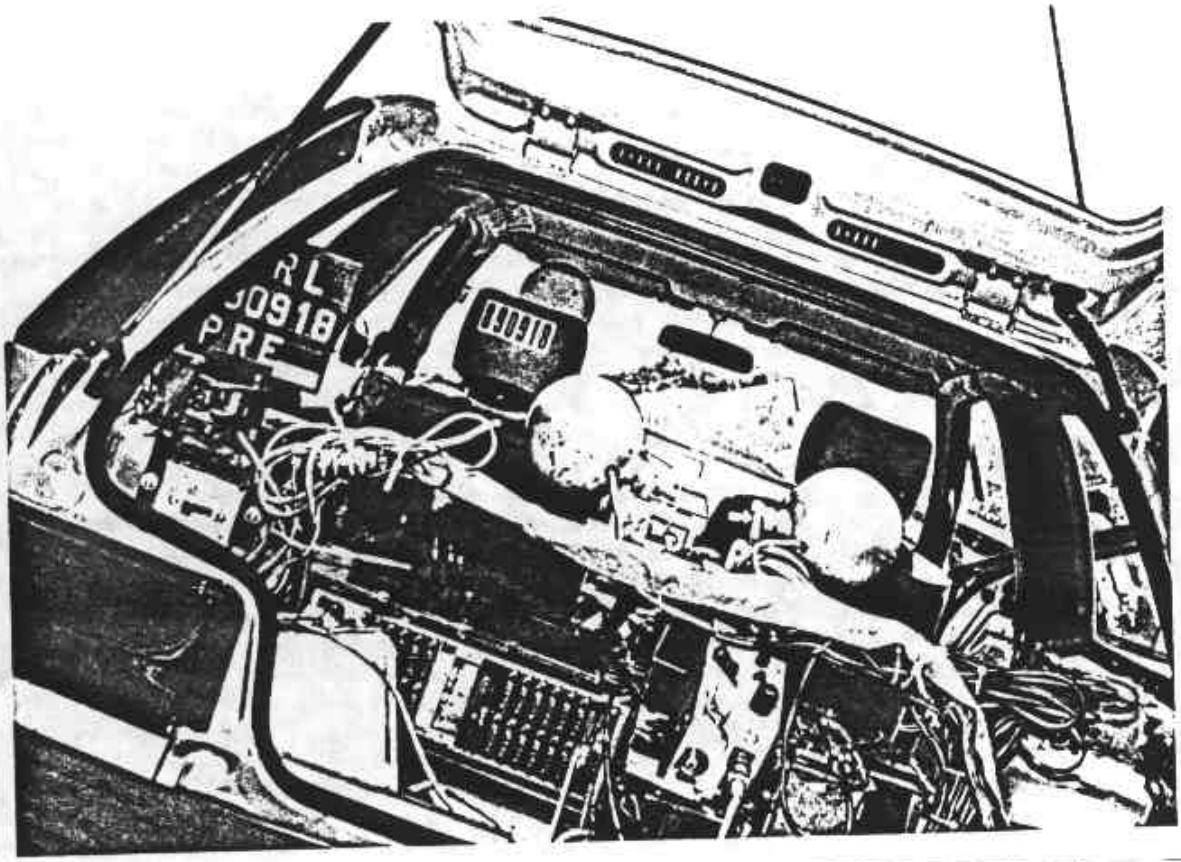


Figure A-16. PRE-TEST VEHICLE INSTRUMENTATION AND CAMERA LOCATION

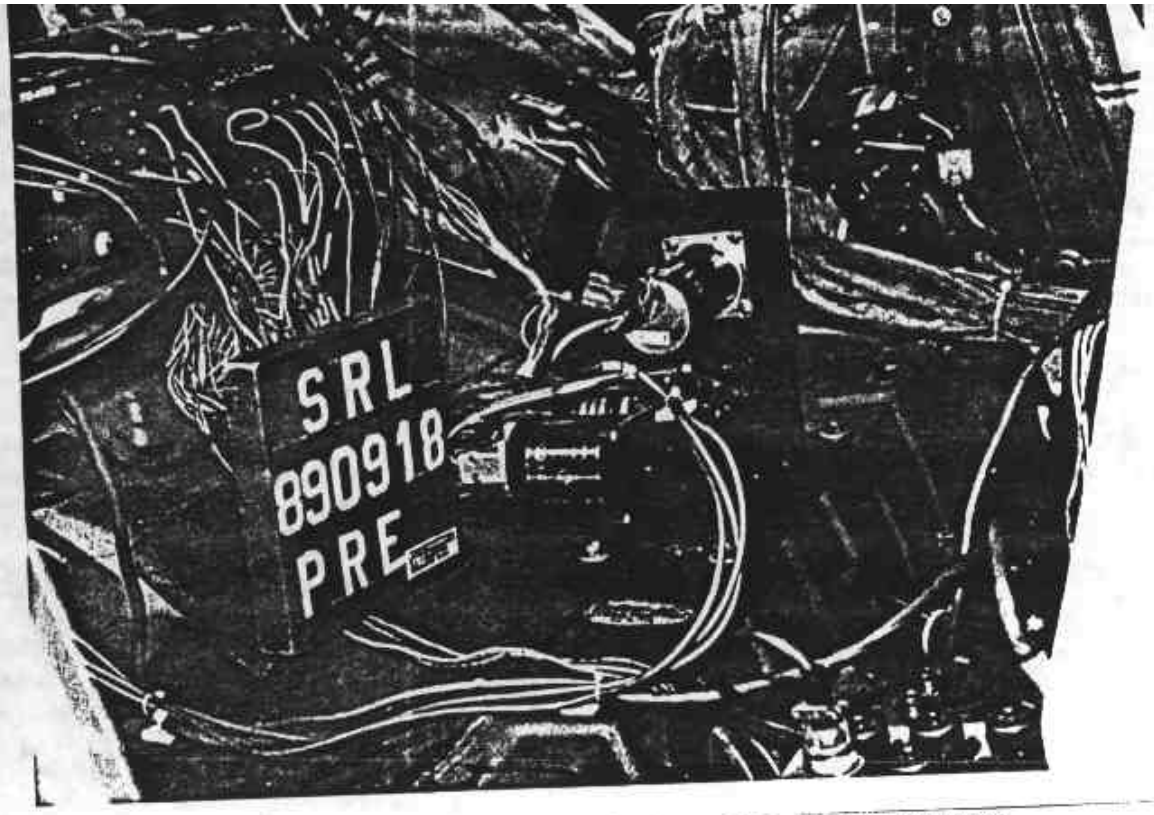


Figure A-17. PRE-TEST GYRO PLACEMENT VIEW

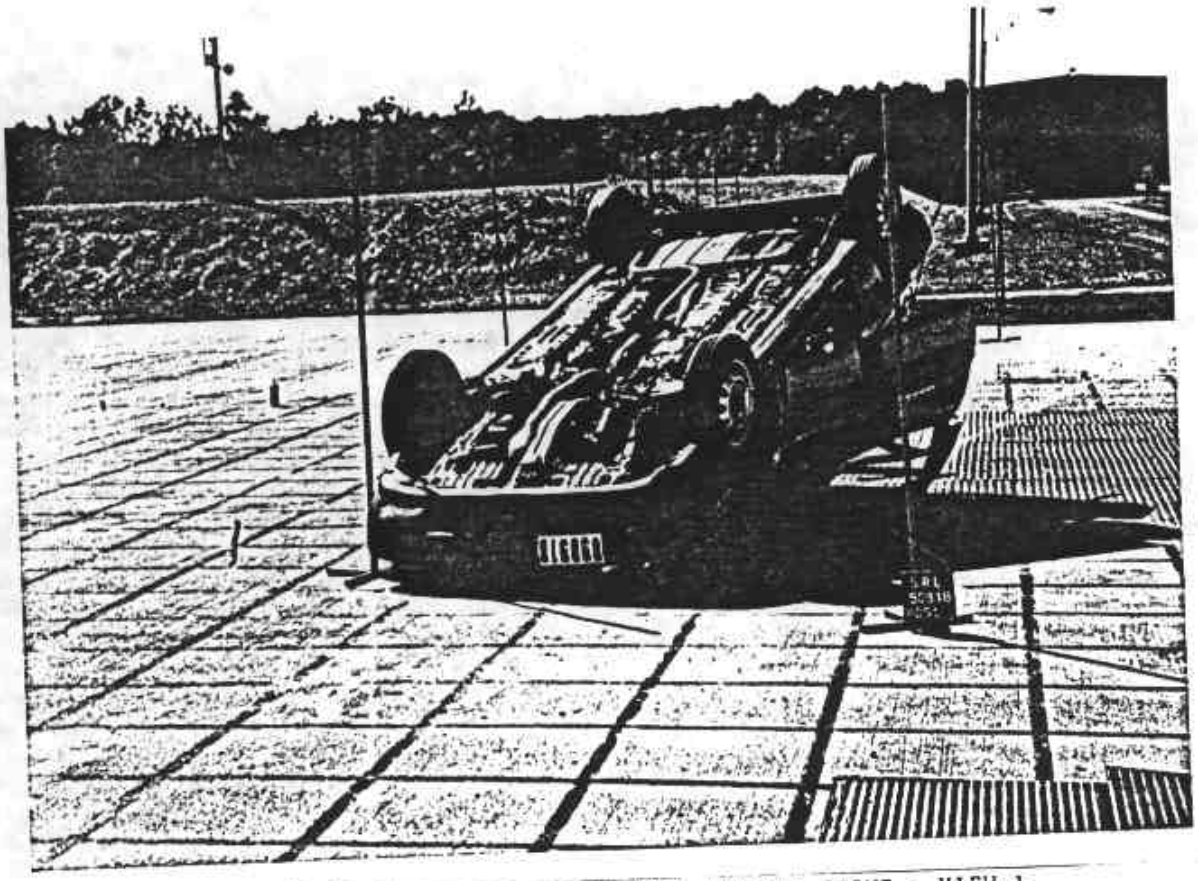


Figure A-18. POST-TEST OVERALL FRONT - VIEW 1

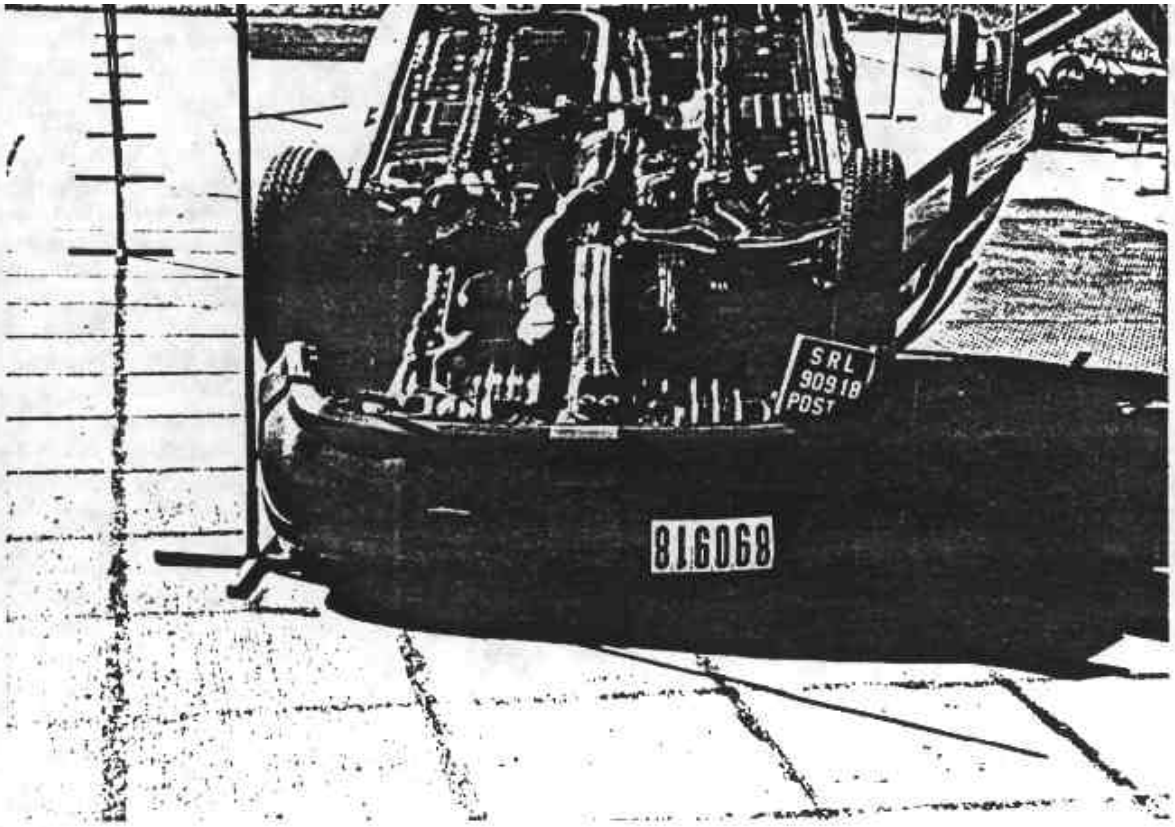


Figure A-19. POST-TEST OVERALL FRONT - VIEW 2

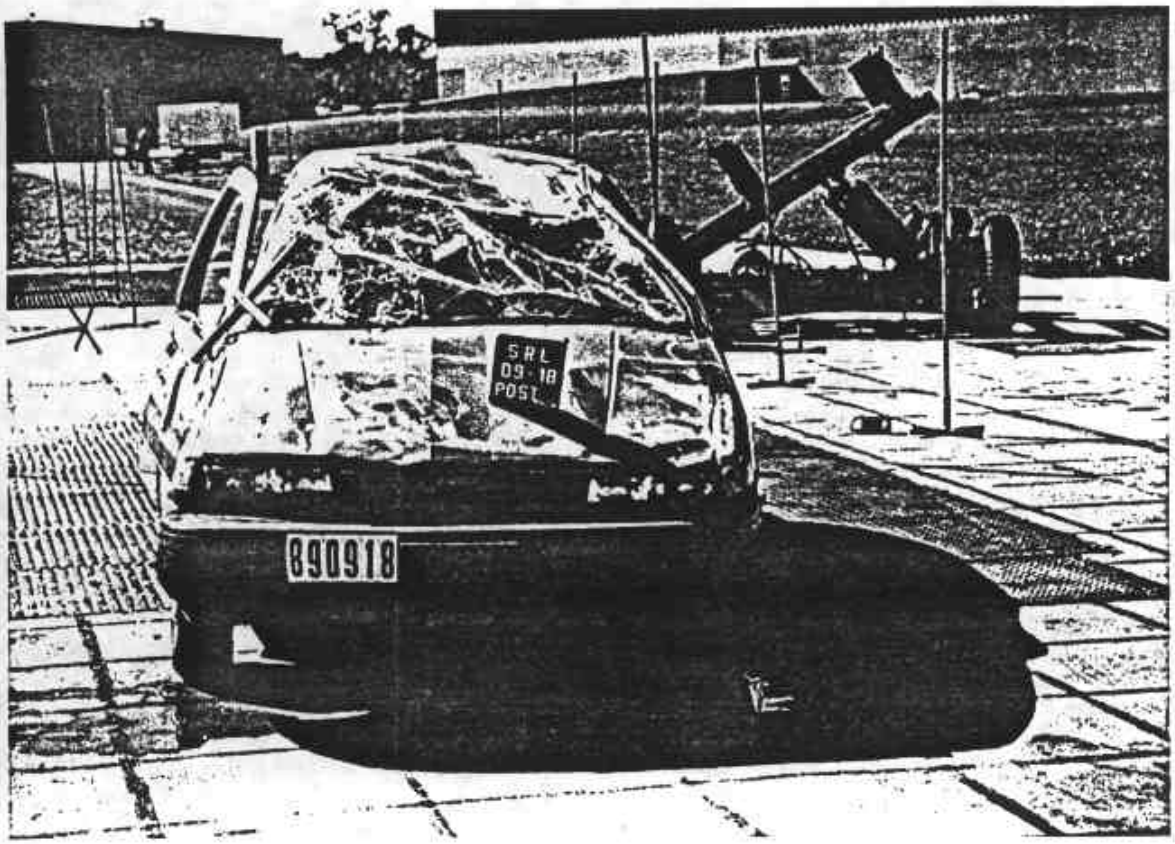


Figure A-20. POST-TEST OVERALL FRONT - VIEW 3

Figure A-21. POST-TEST OVERALL LEFT - VIEW 1

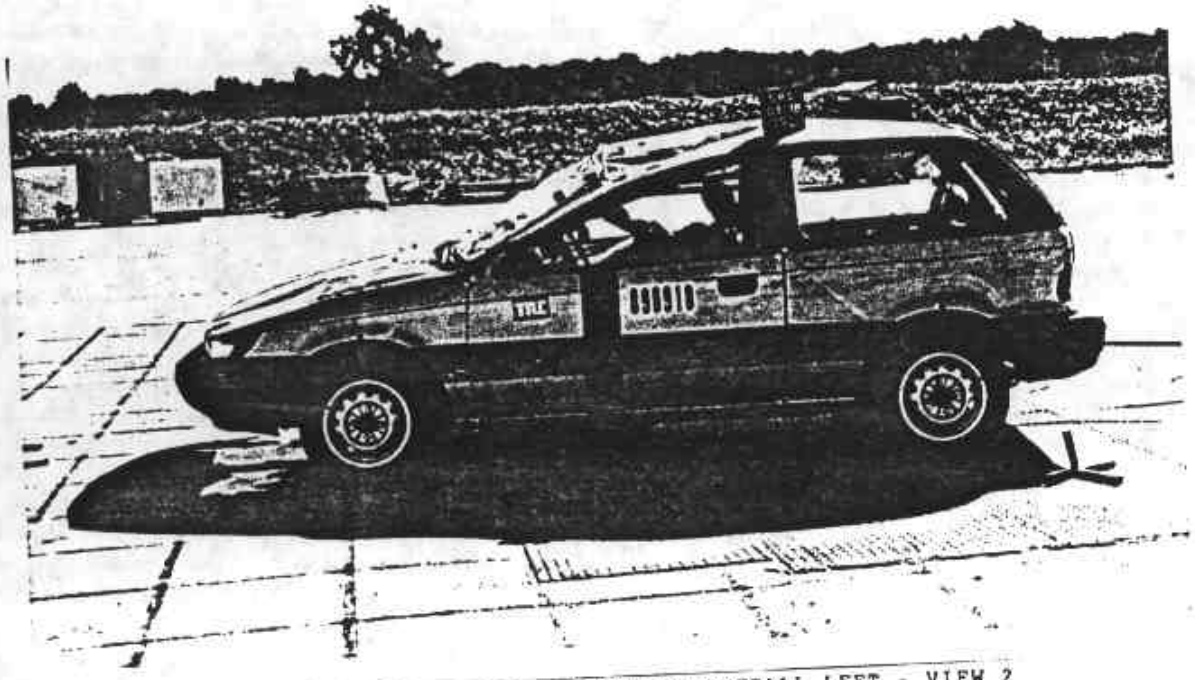


Figure A-22. POST-TEST OVERALL LEFT - VIEW 2

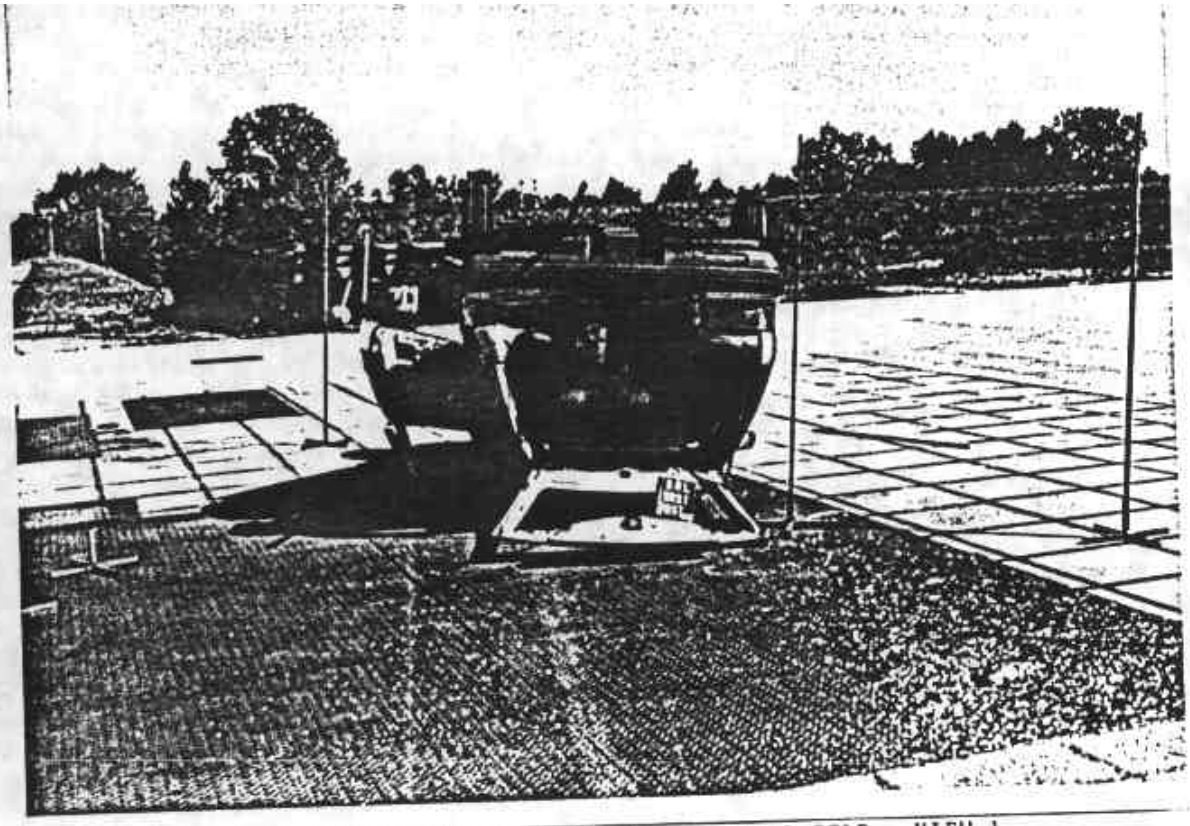


Figure A-23. POST-TEST OVERALL REAR - VIEW 1

Figure A-24. POST-TEST OVERALL REAR - VIEW 2

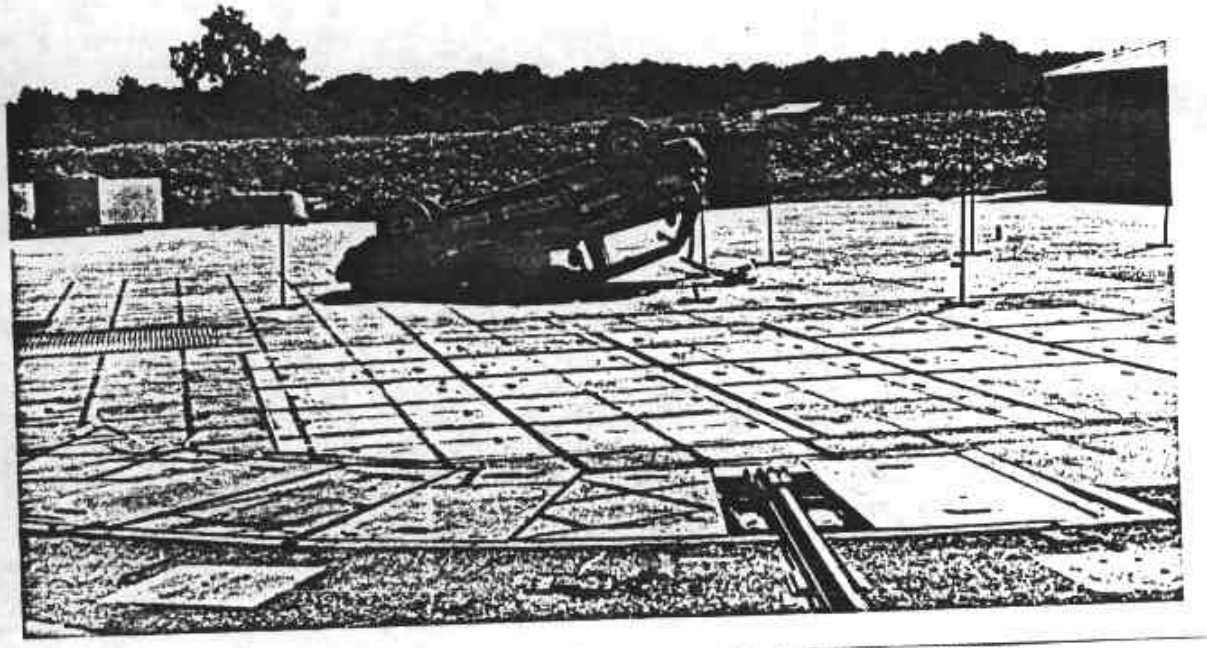


Figure A-25. POST-TEST OVERALL RIGHT - VIEW 1

Figure A-26. POST-TEST OVERALL RIGHT - VIEW 2

Figure A-27. POST-TEST OVERALL RIGHT - VIEW 3

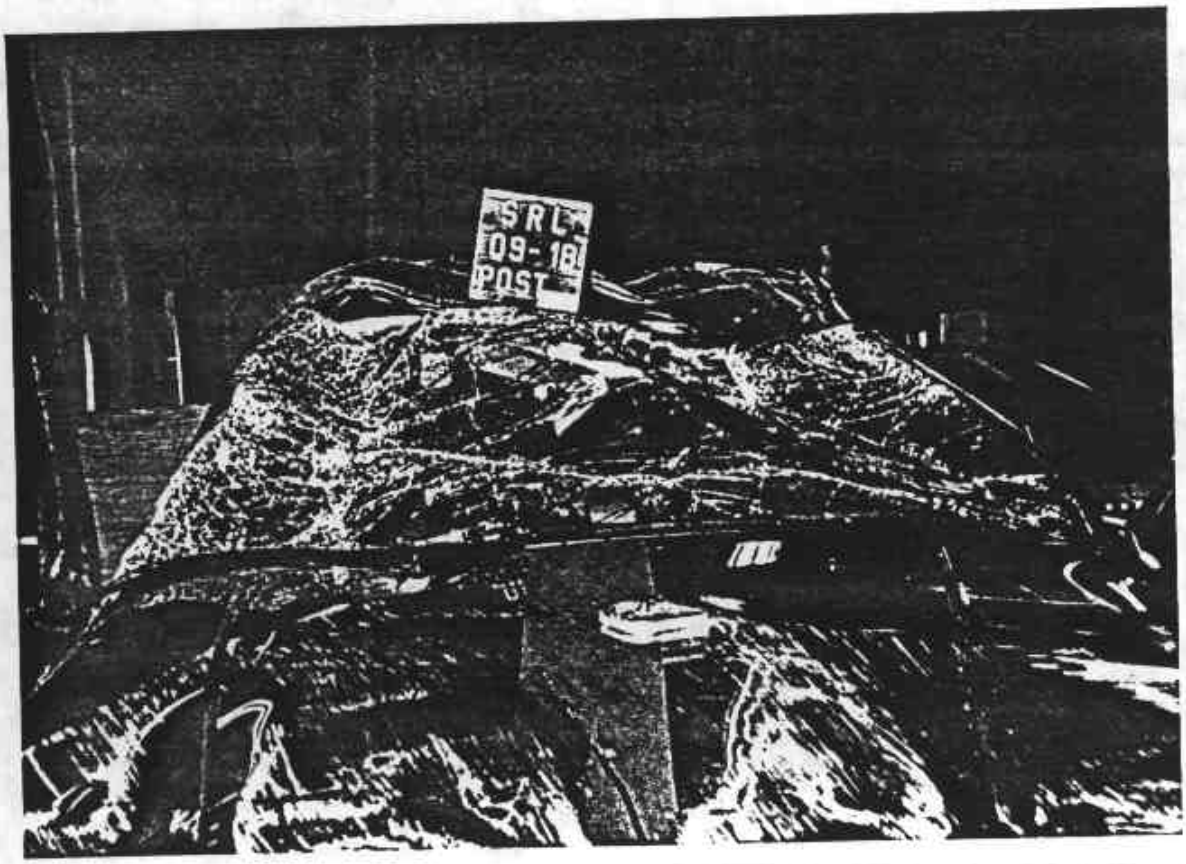


Figure A-28. POST-TEST CLOSE-UP FRONT VIEW

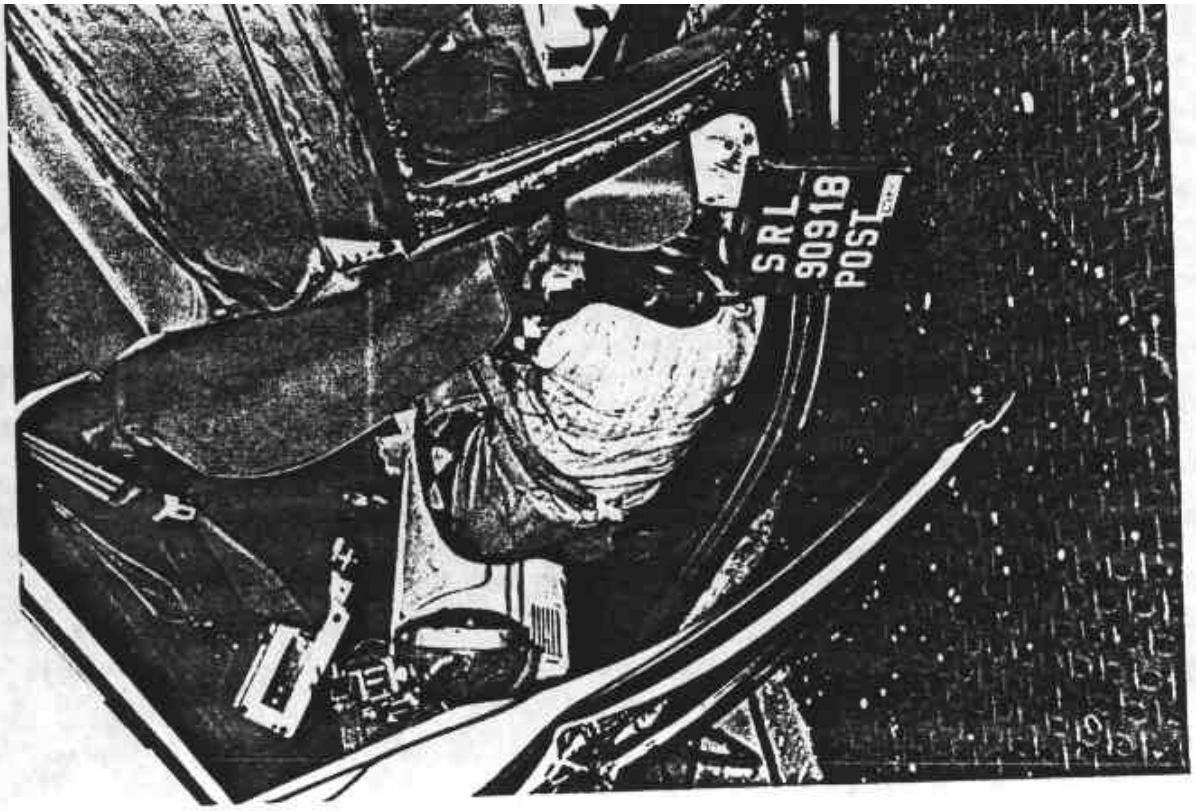


Figure A-29. POST-TEST DUMMY AND VEHICLE - VIEW 1

Figure A-30. POST-TEST DUMMY AND VEHICLE - VIEW 2

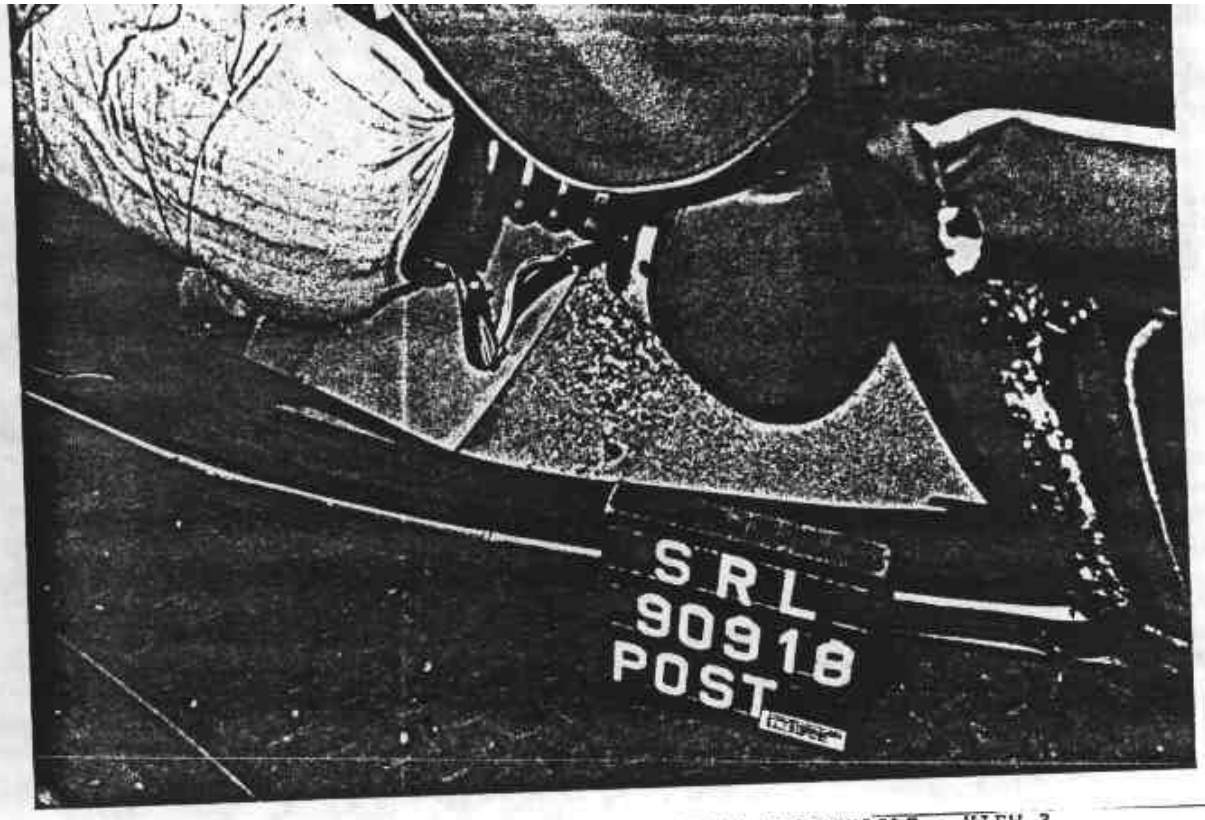


Figure A-31. POST-TEST DUMMY AND VEHICLE - VIEW 3

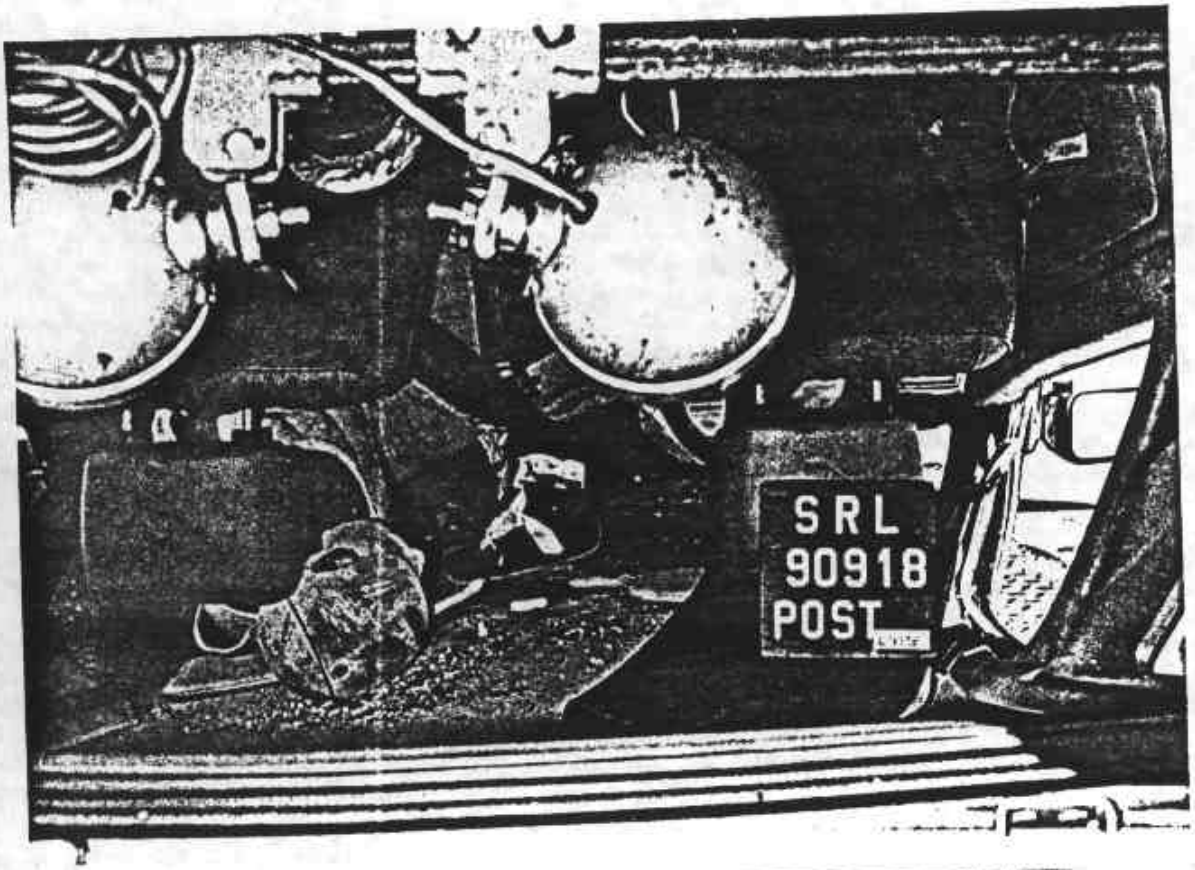


Figure A-32. POST-TEST DUMMY AND VEHICLE - VIEW 4

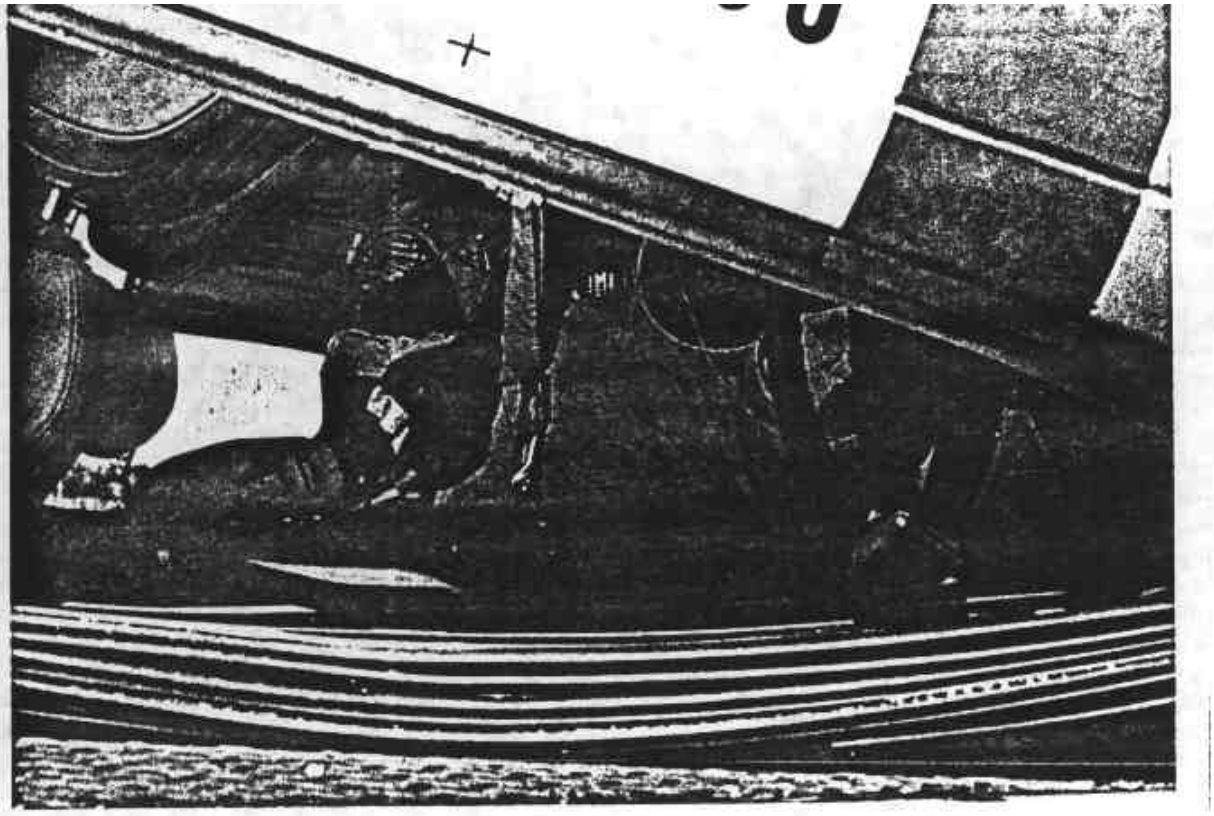
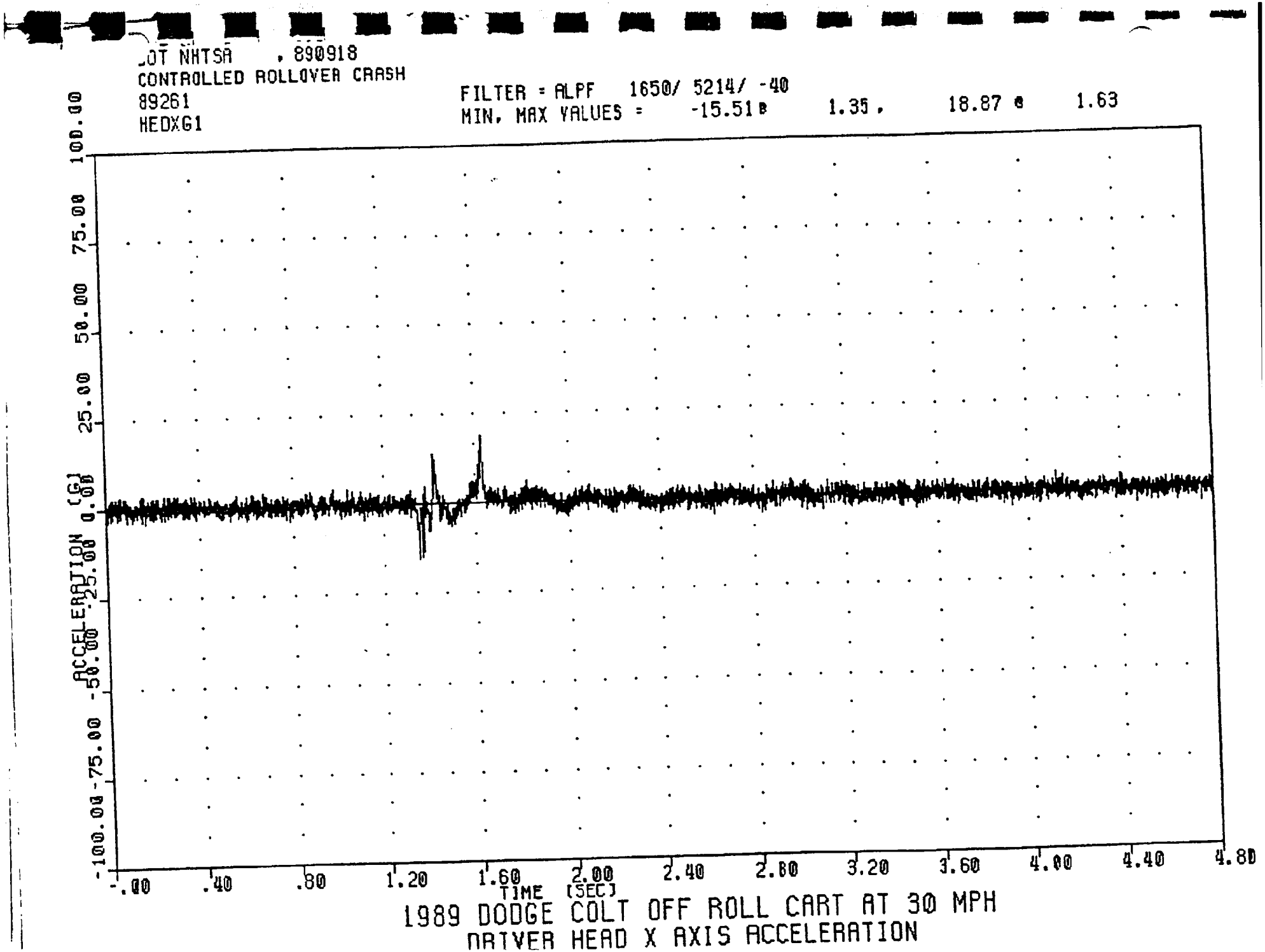


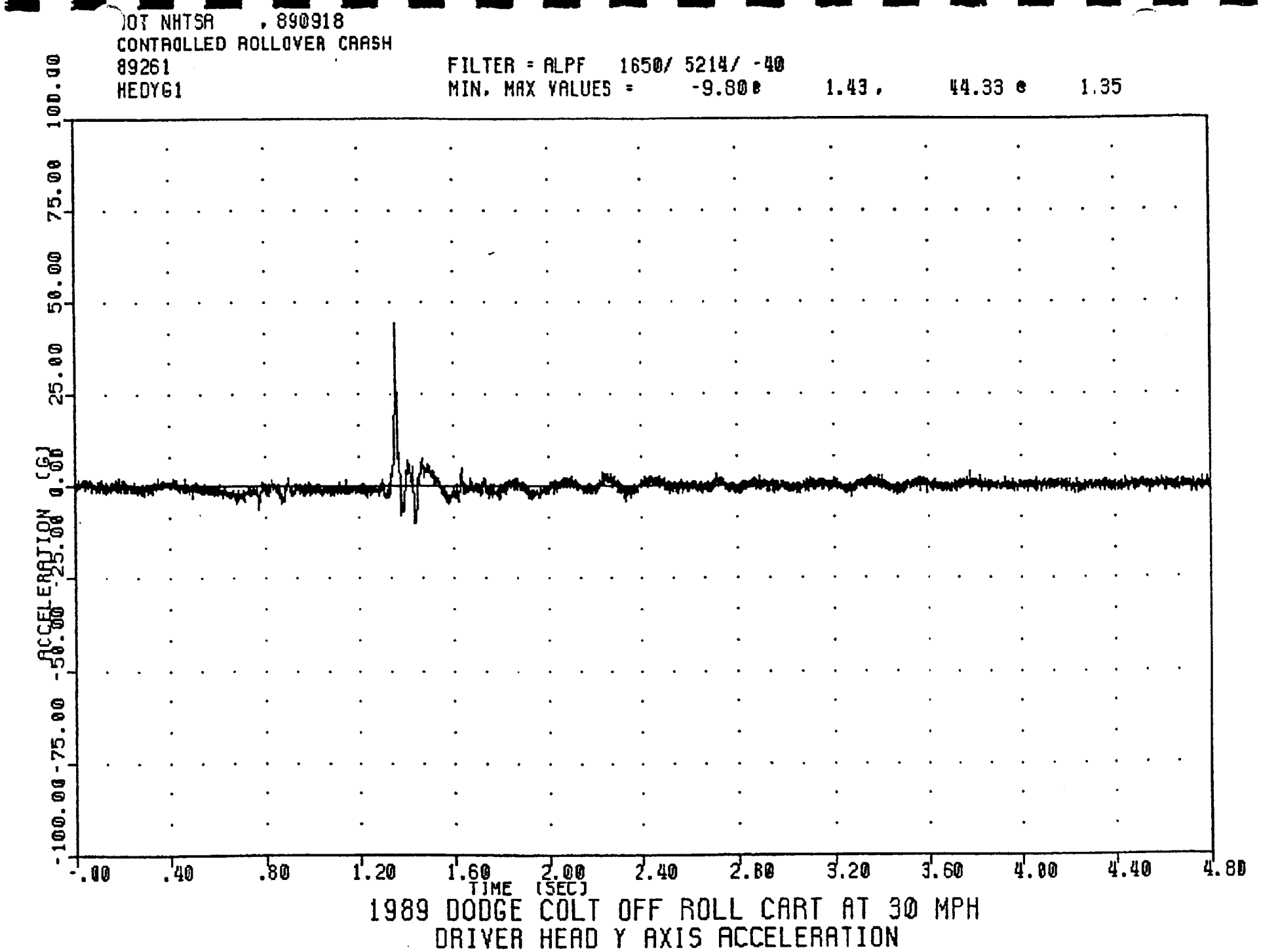
Figure A-34. POST-TEST DUMMY AND VEHICLE - VIEW 5

APPENDIX B

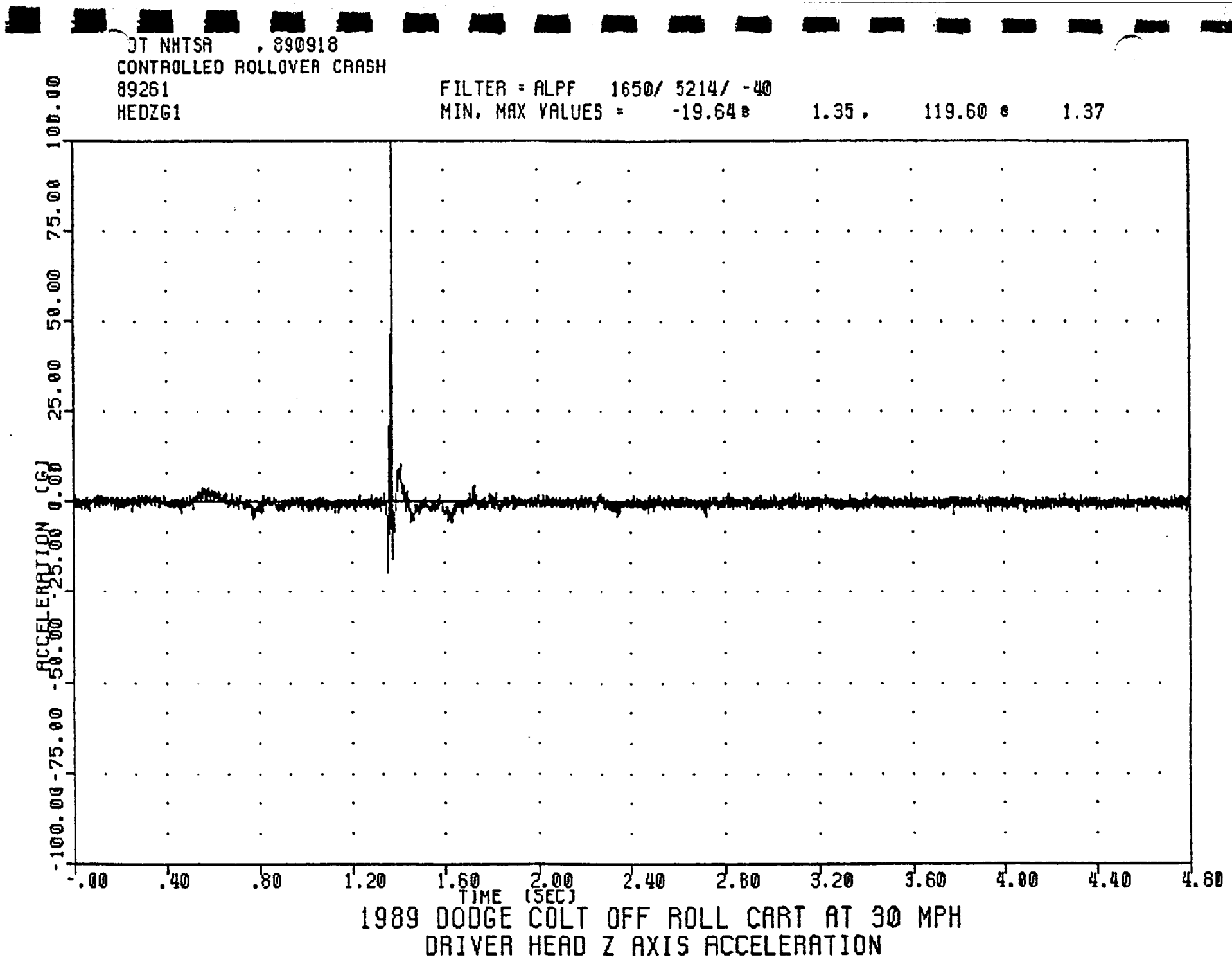
DATA PLOT PRESENTATION



1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER HEAD X AXIS ACCELERATION

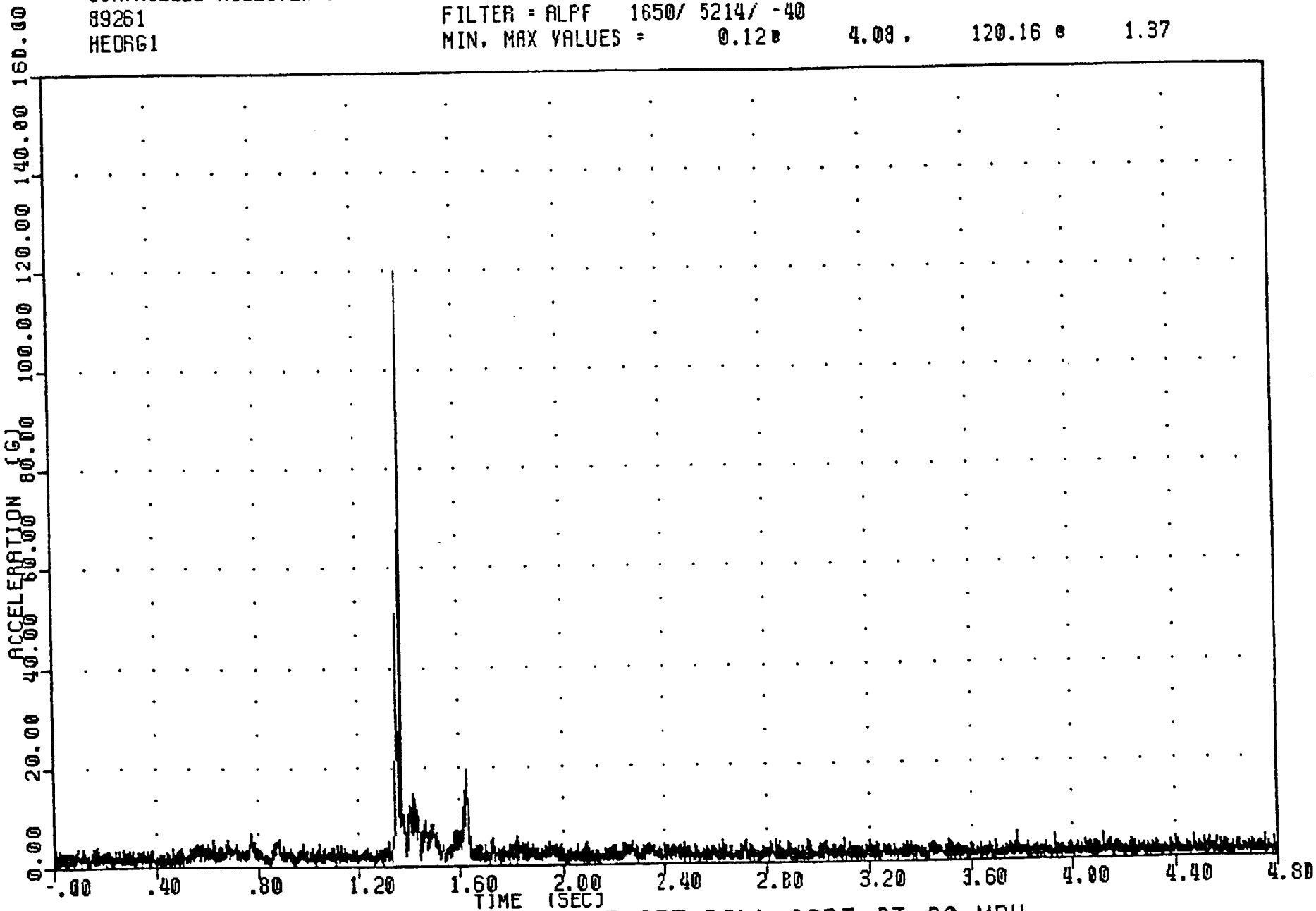


1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER HEAD Y AXIS ACCELERATION

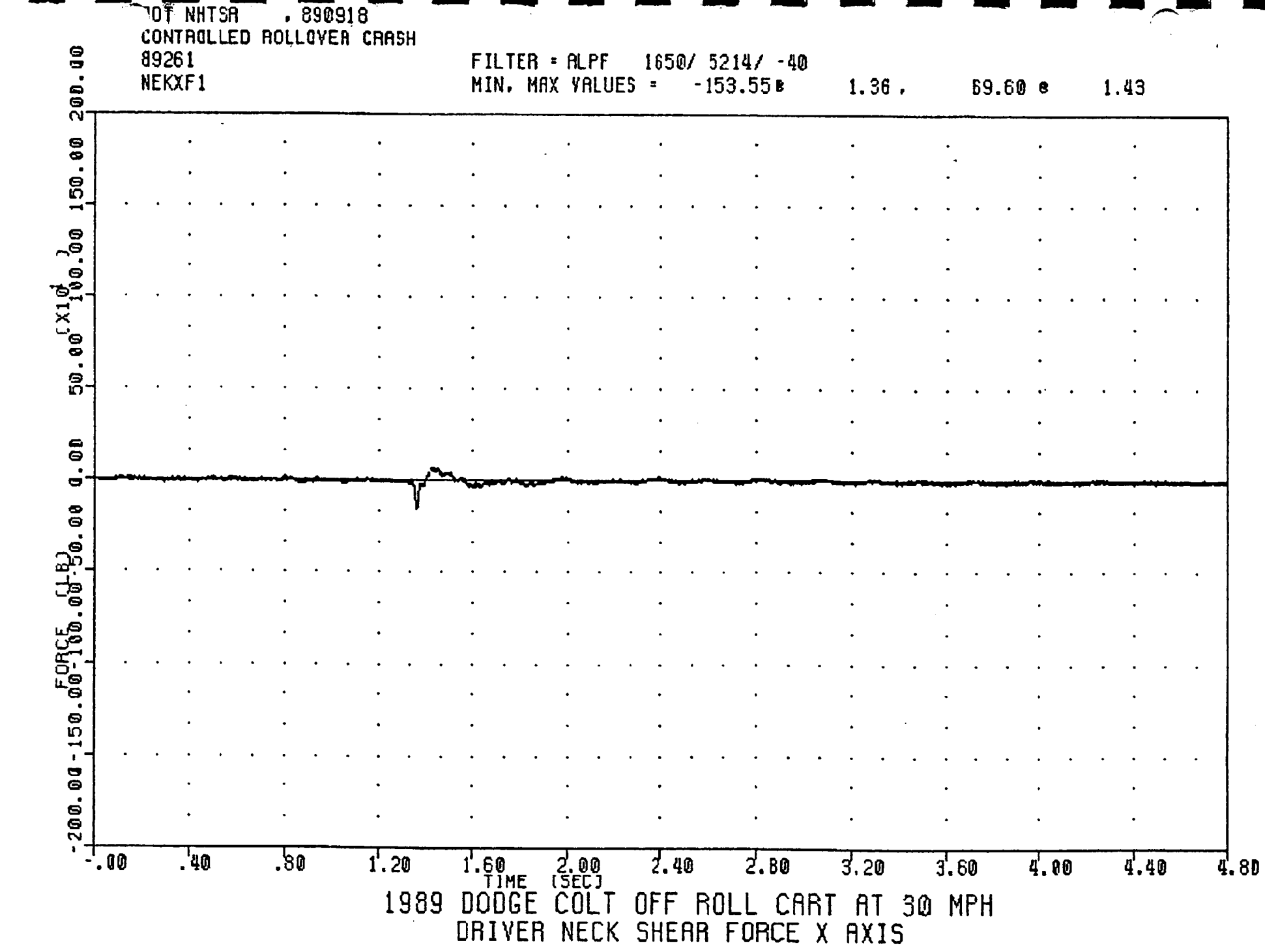


1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER HEAD Z AXIS ACCELERATION

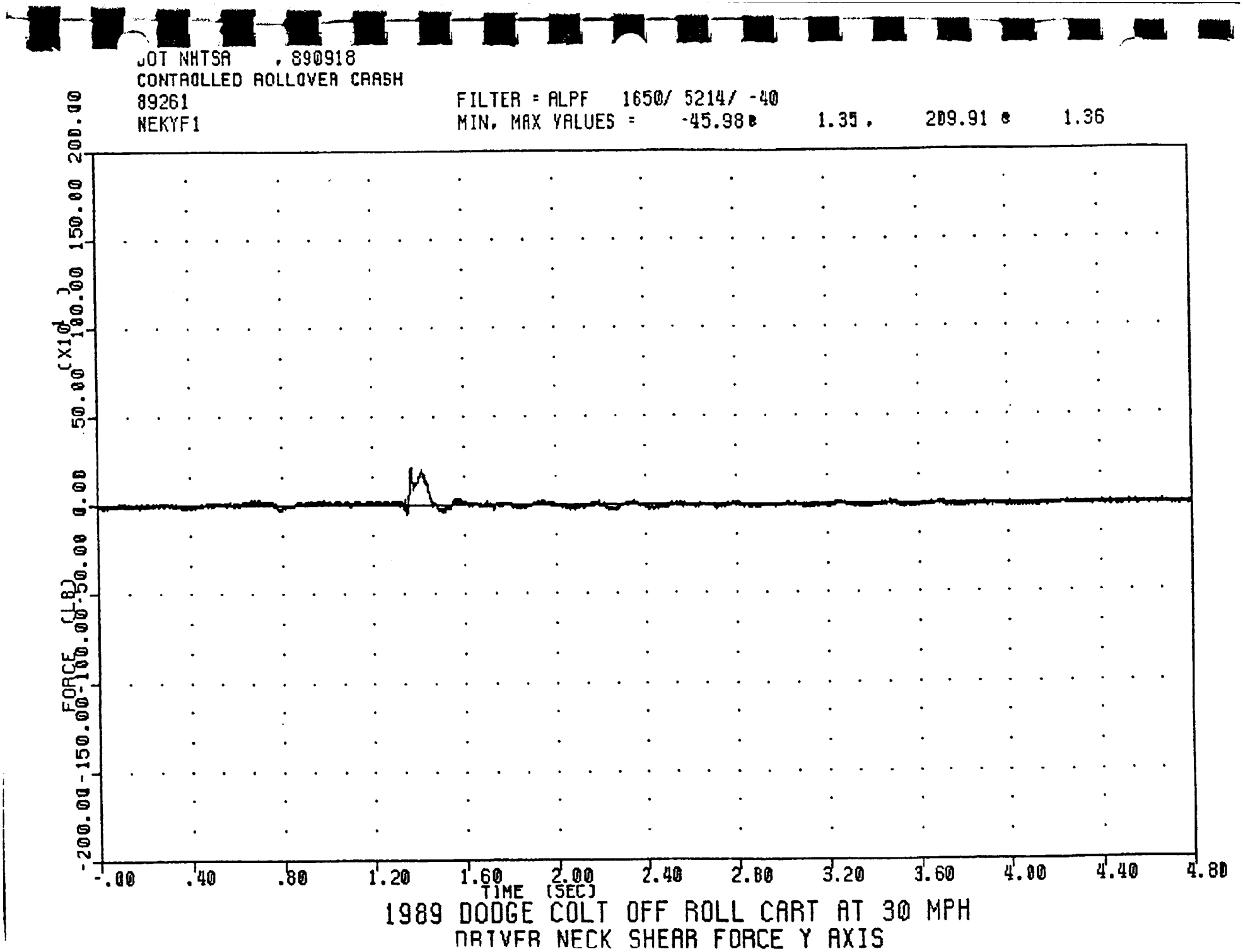
[redacted]



1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER HEAD RESULTANT ACCELERATION

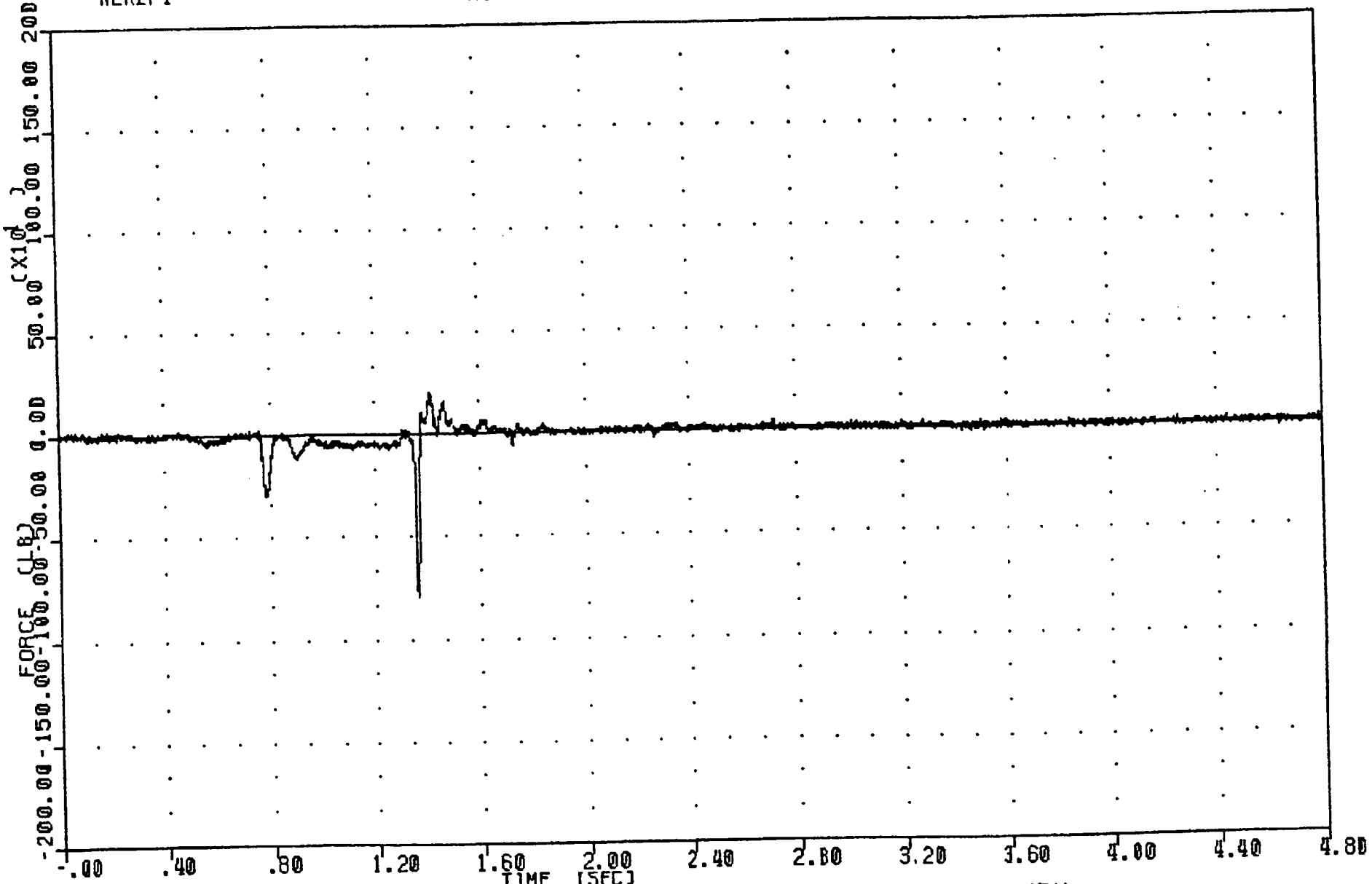


1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER NECK SHEAR FORCE X AXIS

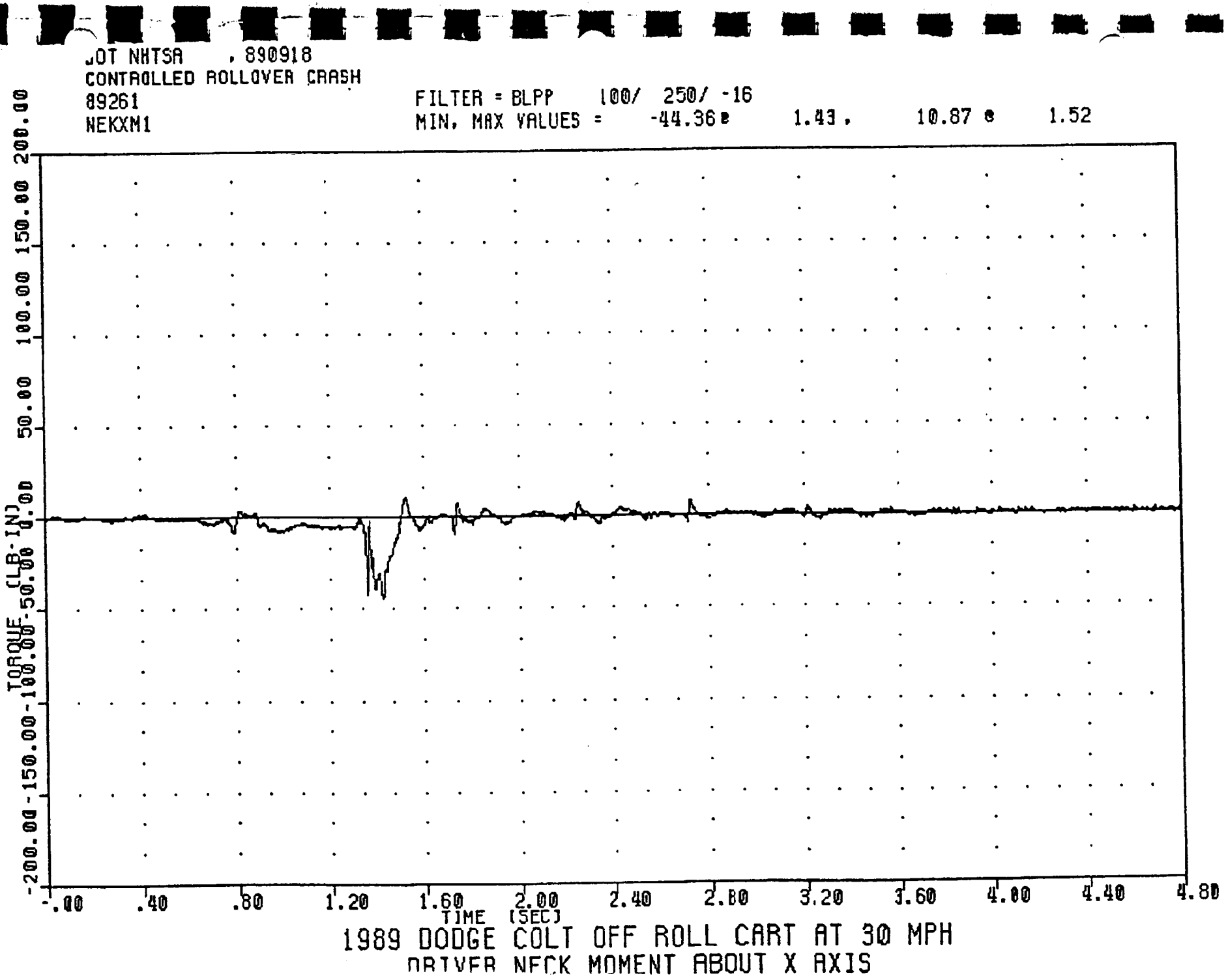

JOT NHTSA , 890918
CONTROLLED ROLLOVER CRASH
89261
NEKYF1
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -45.98 @ 1.35 , 209.91 @ 1.36
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
FORCE (LB) (X10)
.00
.40
.80
1.20
1.60
2.00
2.40
2.80
3.20
3.60
4.00
4.40
4.80
TIME (SEC)
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER NECK SHEAR FORCE Y AXIS

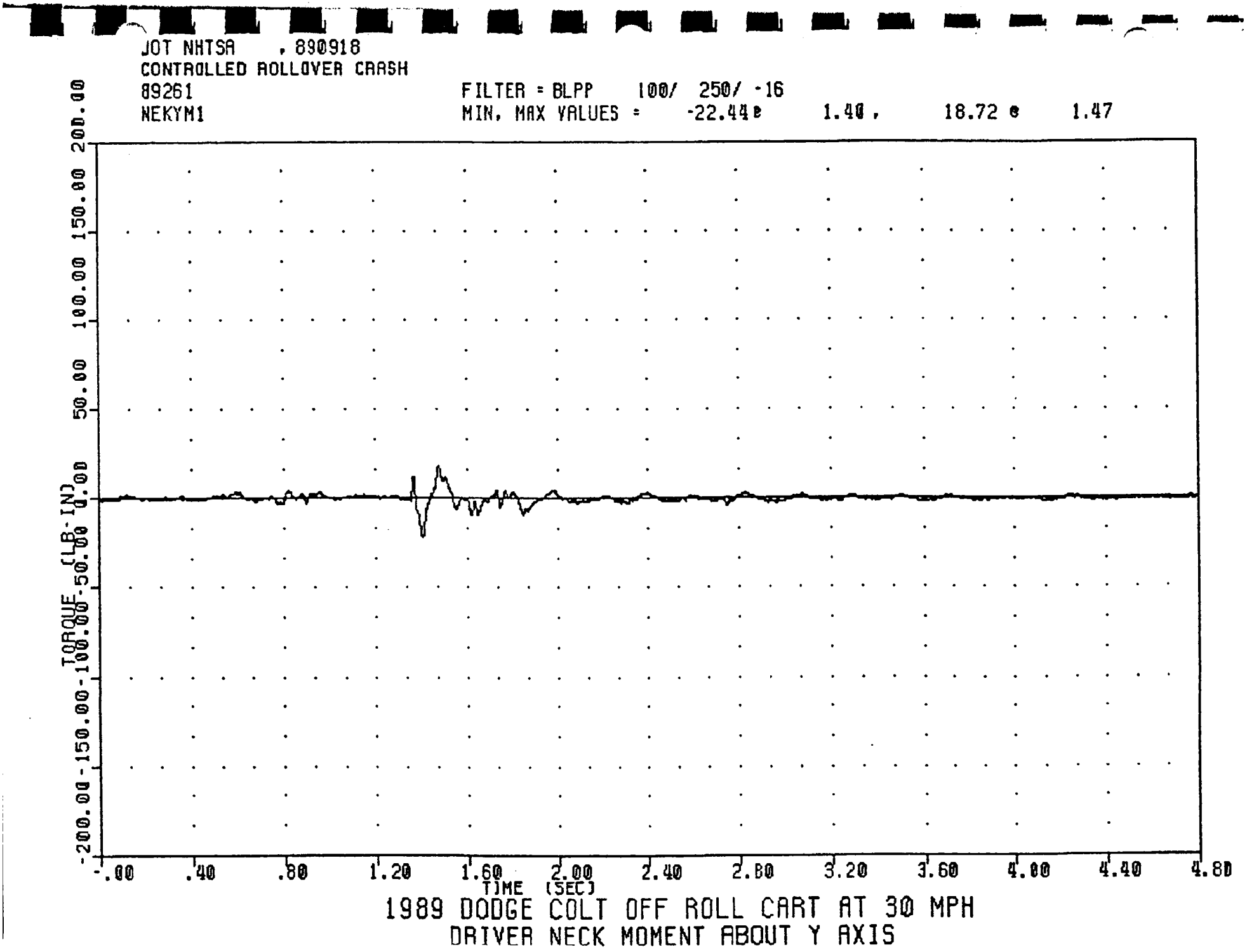
DOT NHTSA . 890918
CONTROLLED ROLLOVER CRASH
89261
NEKZF1

FILTER = RLPF 1650/ 5214/ -40
MIN, MAX VALUES = -787.85 @ 1.36 , 205.29 @ 1.41

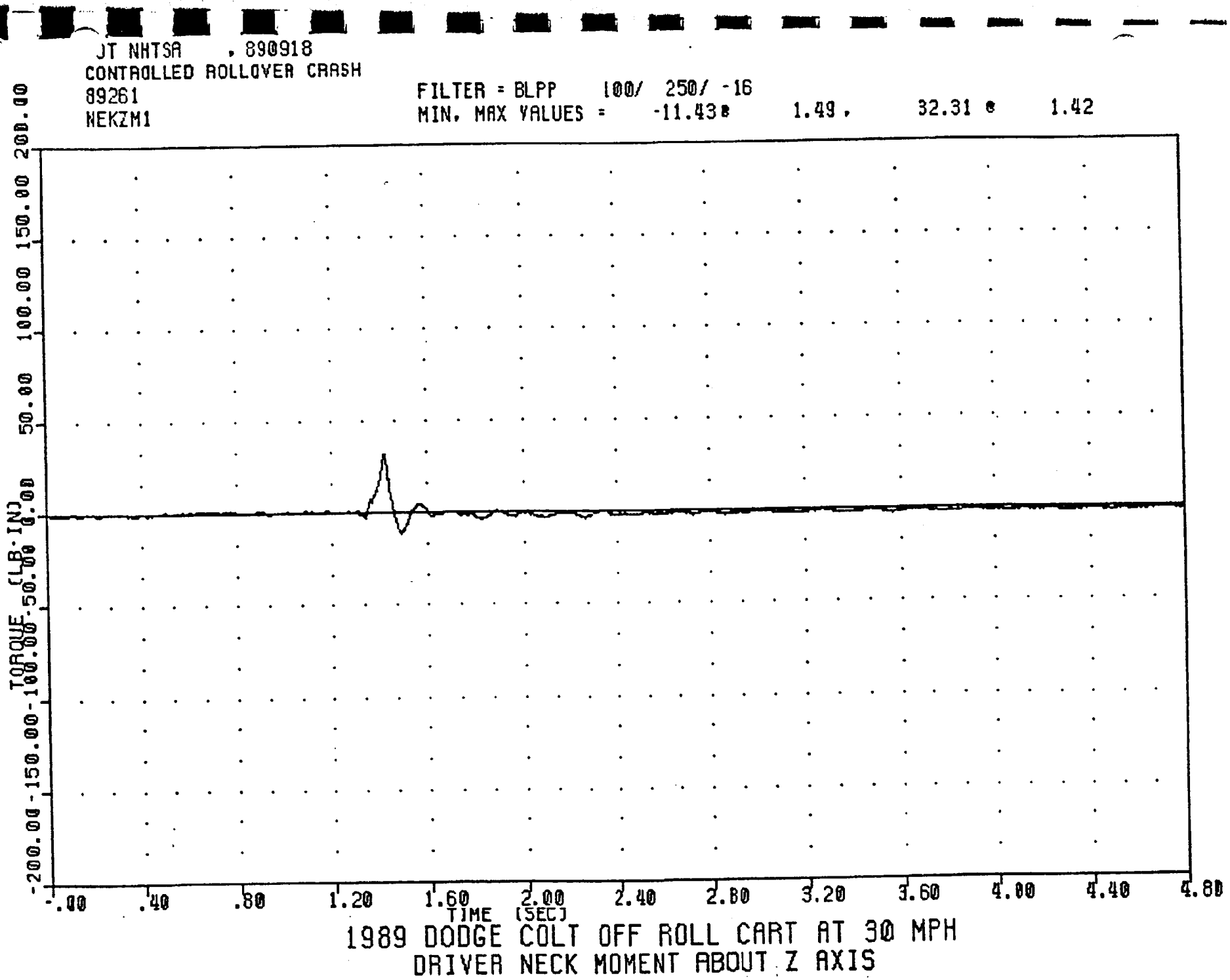


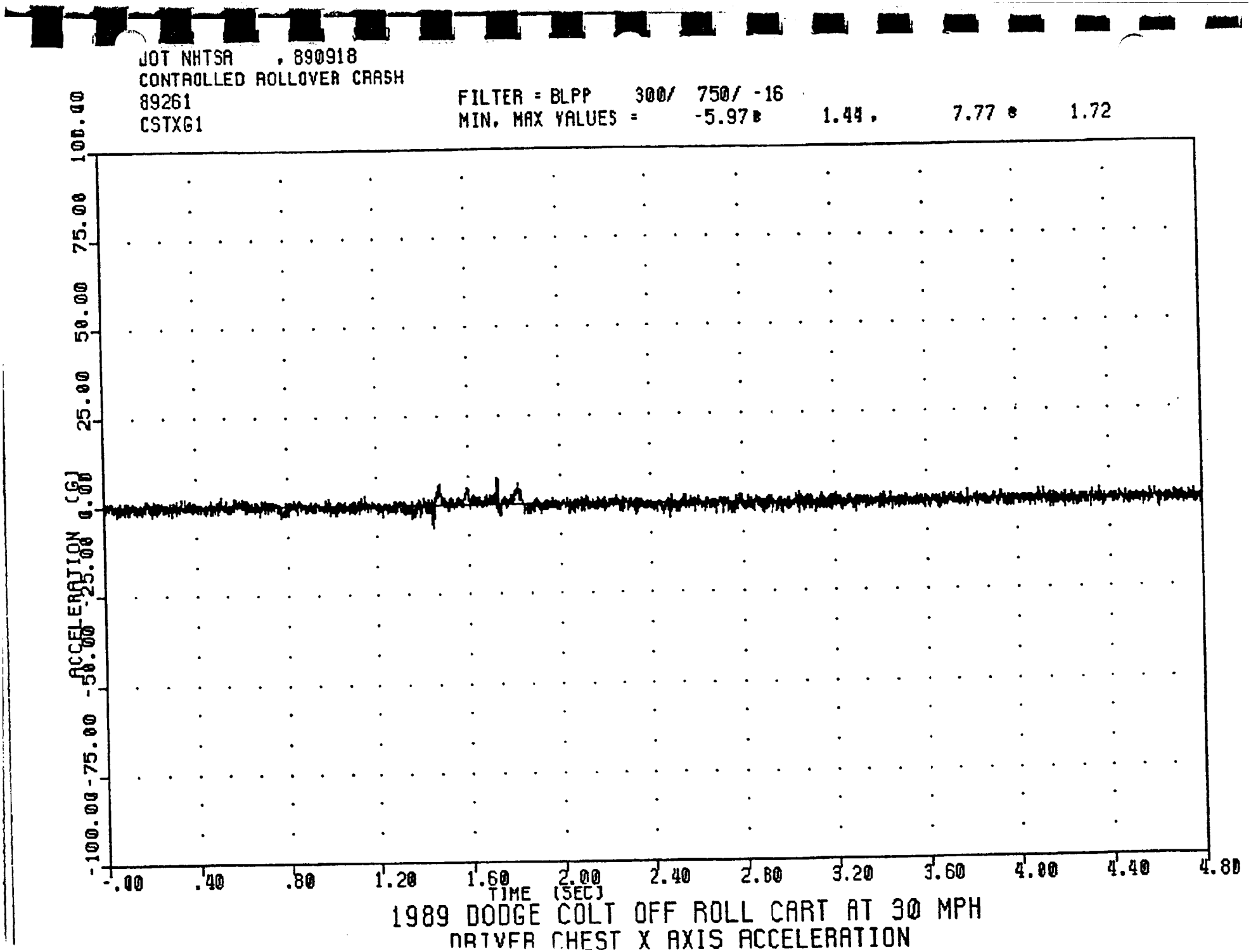
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER NECK AXIAL FORCE Z AXIS

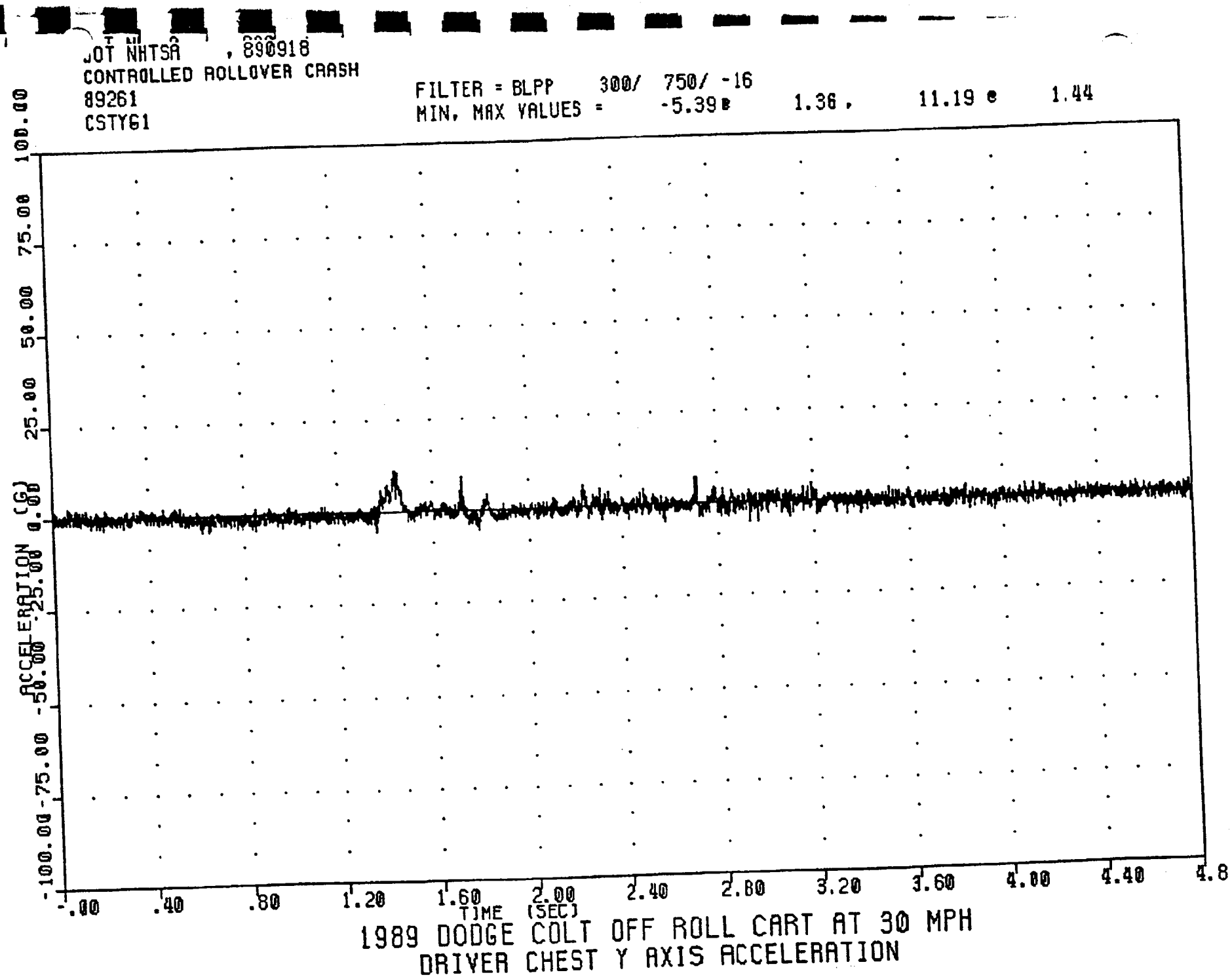

DOT NHTSA , 890918
CONTROLLED ROLLOVER CRASH
89261
NEKXM1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -44.36 @ 1.43 , 10.87 @ 1.52
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
TORQUE (LB-IN)
.00
.40
.80
1.20
1.60
2.00
2.40
2.80
3.20
3.60
4.00
4.40
4.80
TIME (SEC)
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER NECK MOMENT ABOUT X AXIS



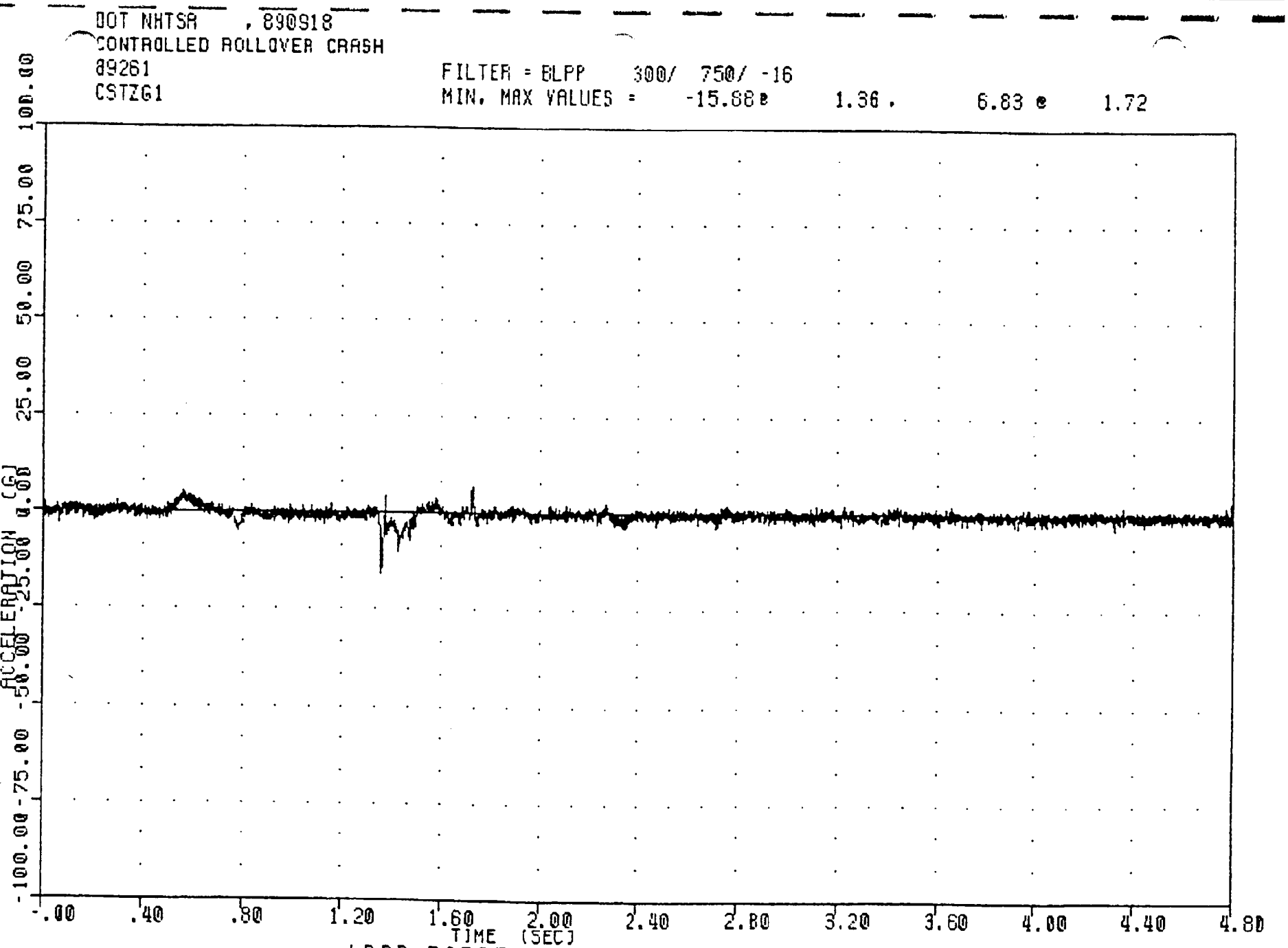
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER NECK MOMENT ABOUT Y AXIS


JT NHTSA , 890918
CONTROLLED ROLLOVER CRASH
89261
NEKZM1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -11.43 @ 1.49 , 32.31 @ 1.42
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
TORQUE (LB-IN)
.00
.40
.80
1.20
1.60
2.00
2.40
2.80
3.20
3.60
4.00
4.40
4.80
TIME (SEC)
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER NECK MOMENT ABOUT Z AXIS

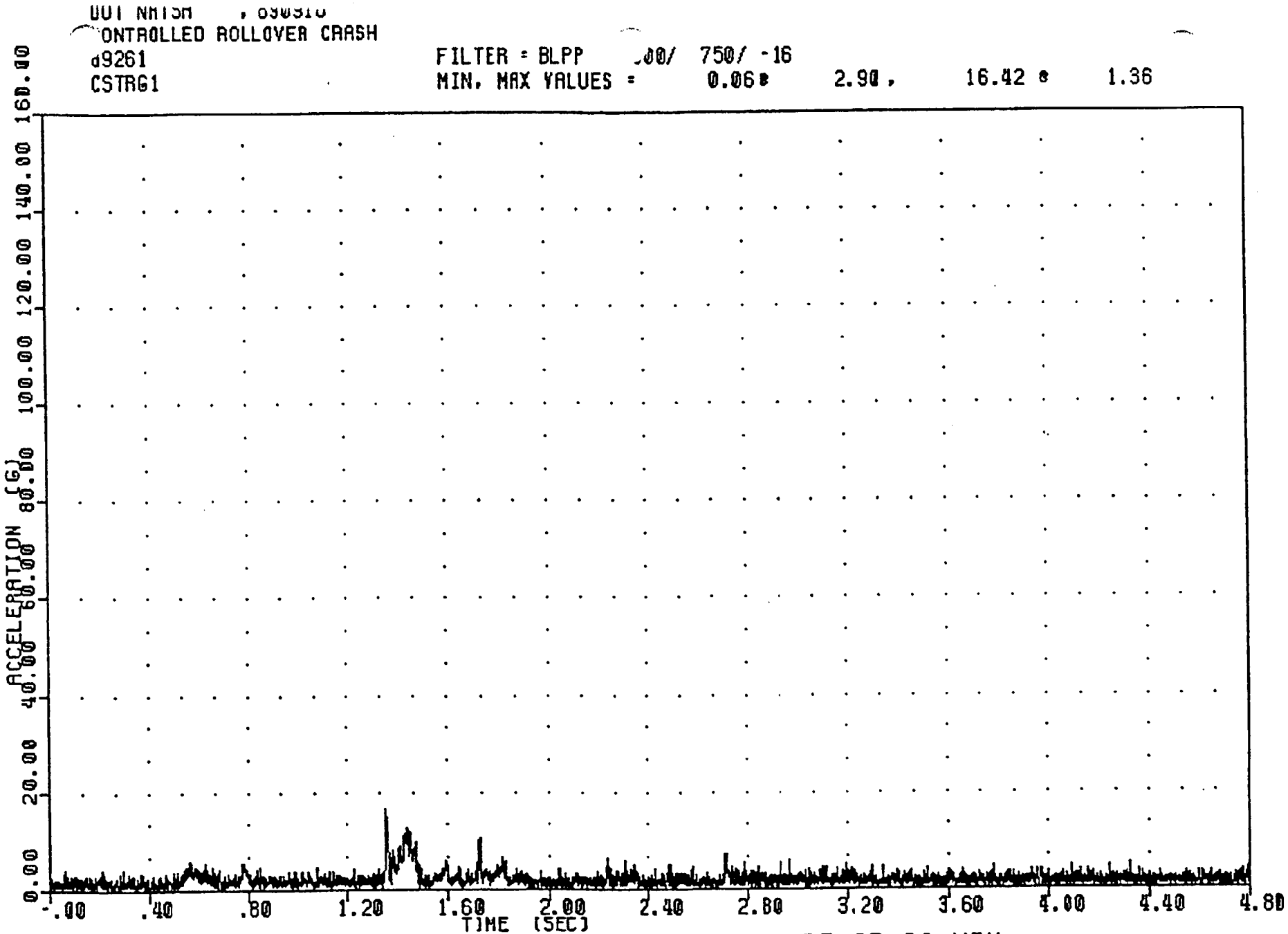

JOT NHTSA , 890918
CONTROLLED ROLLOVER CRASH
89261
CSTXG1
FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -5.97 @ 1.44 , 7.77 @ 1.72
100.00
75.00
50.00
25.00
0.00
-25.00
-50.00
-75.00
-100.00
ACCELERATION (G)
.00
.40
.80
1.20
1.60
2.00
2.40
2.80
3.20
3.60
4.00
4.40
4.80
TIME (SEC)
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER CHEST X AXIS ACCELERATION



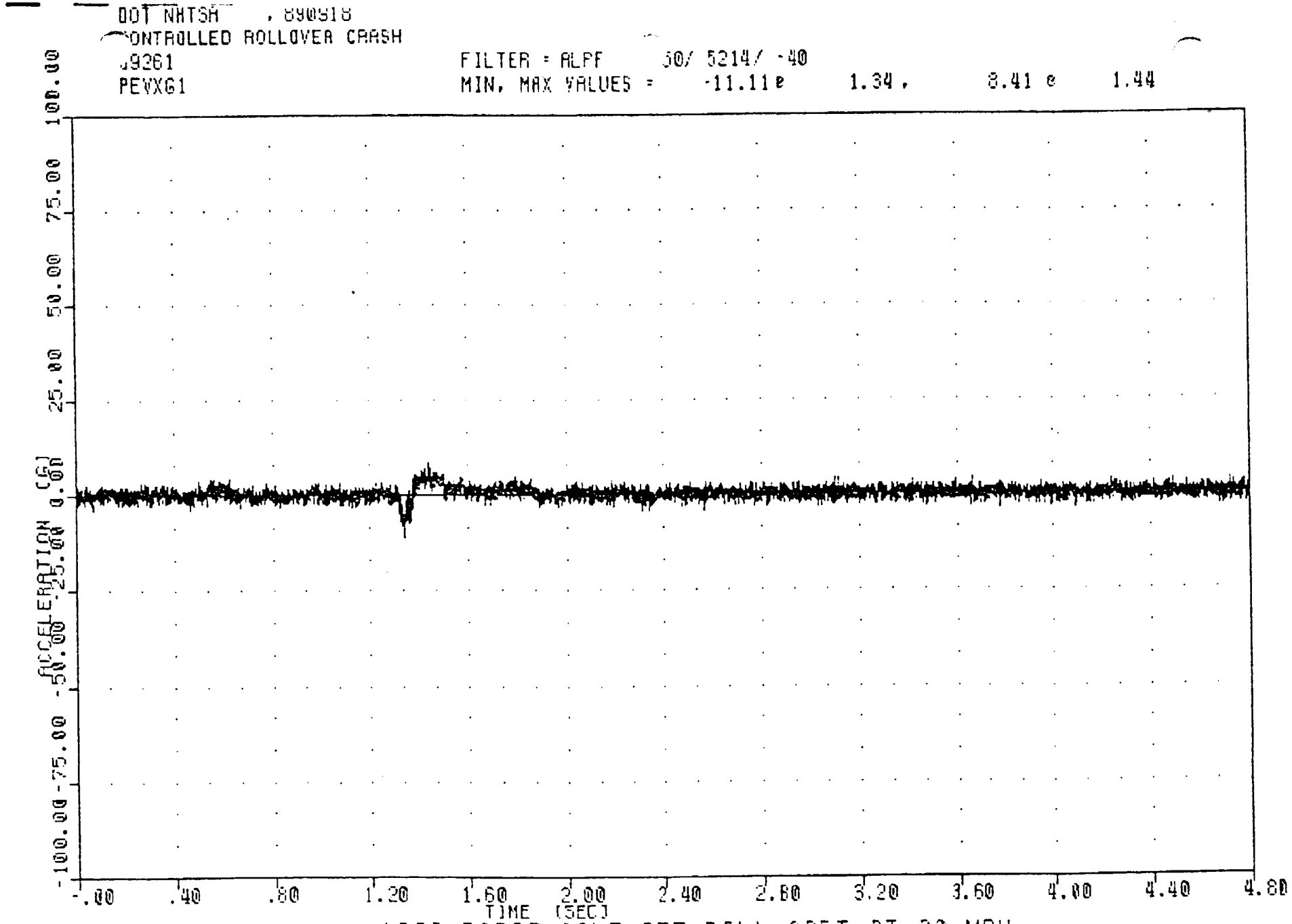
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER CHEST Y AXIS ACCELERATION



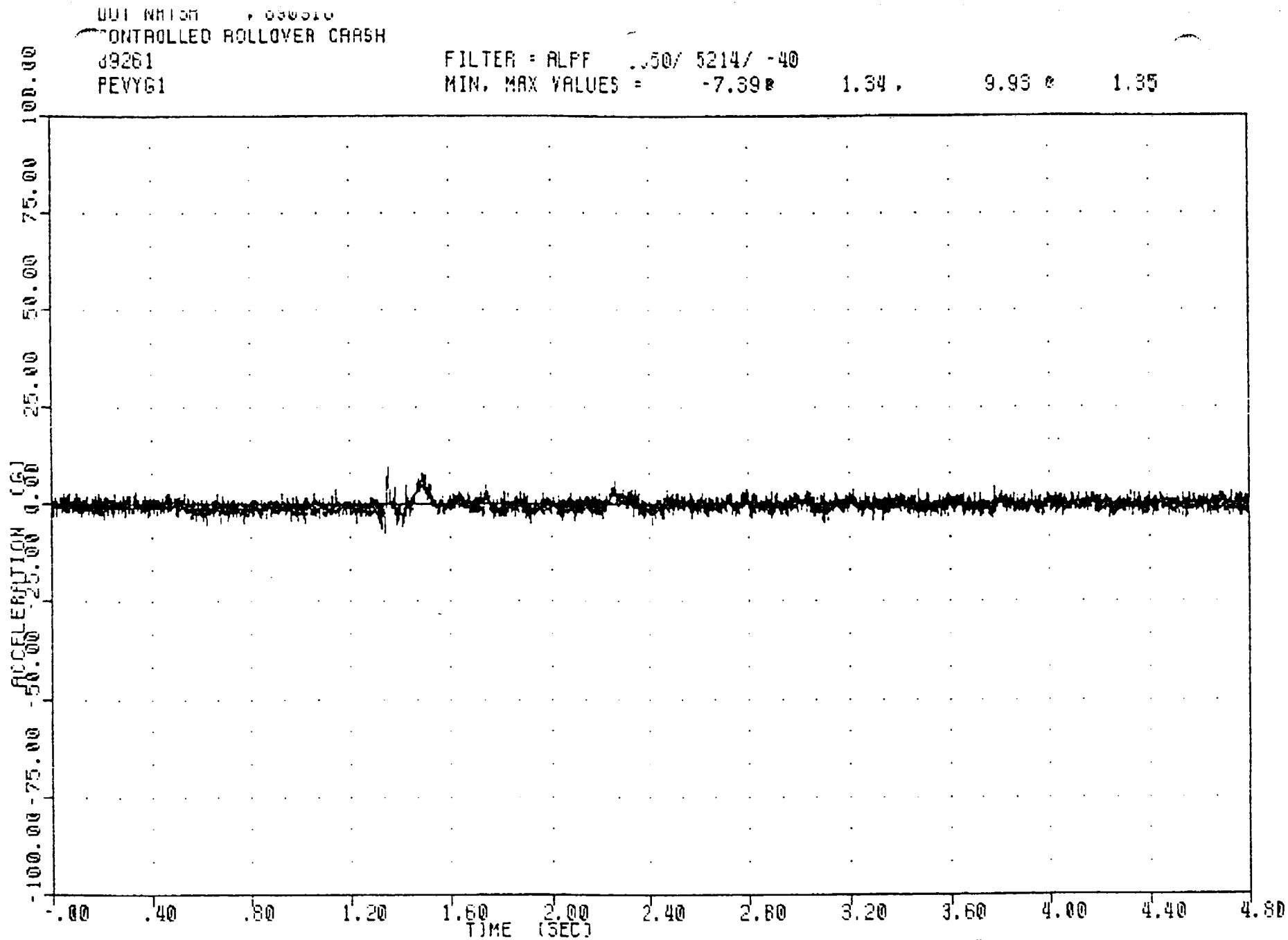
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER CHEST Z AXIS ACCELERATION



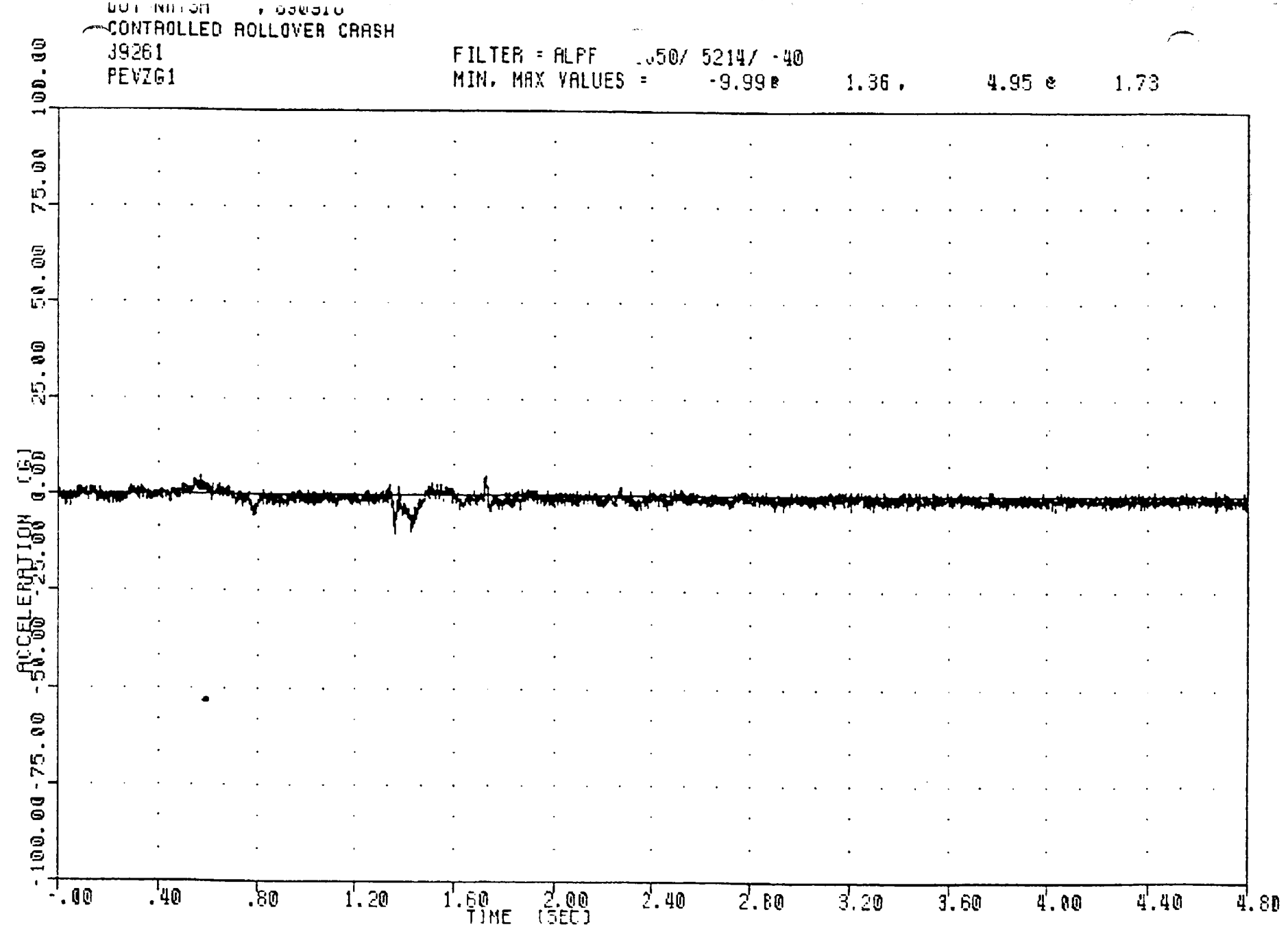
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER CHEST RESULTANT ACCELERATION



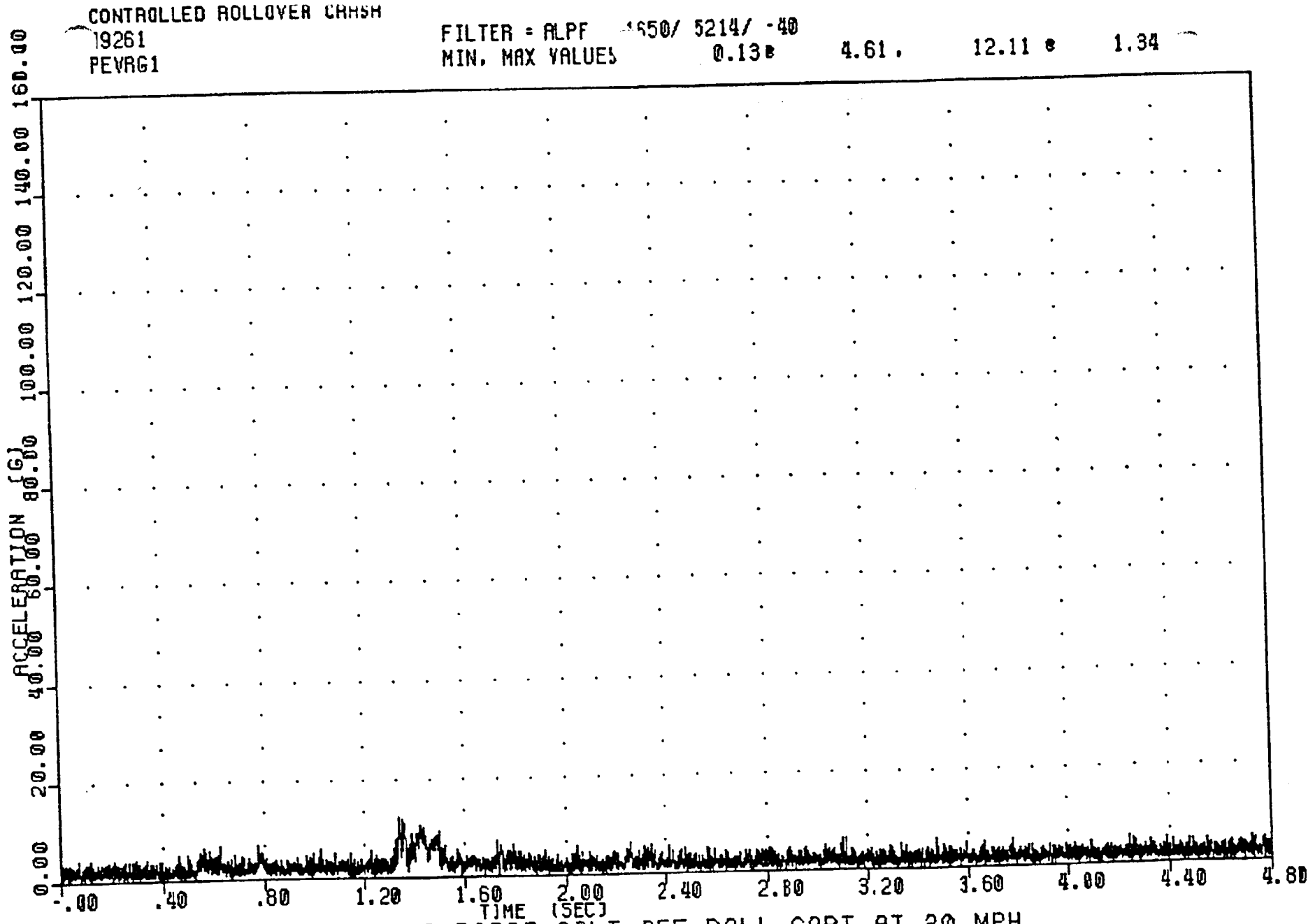
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER PELVIS X AXIS ACCELERATION



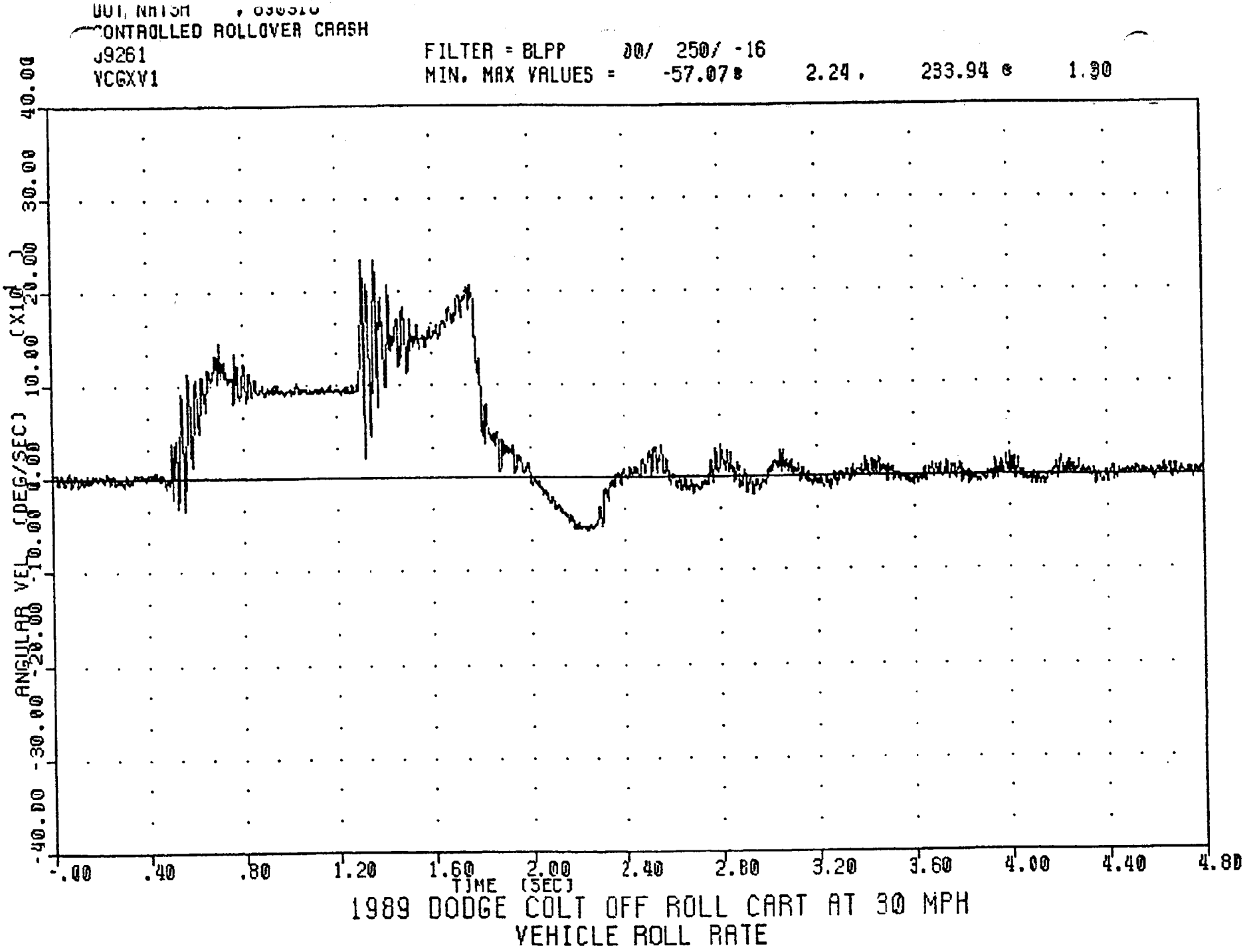
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER PELVIS Y AXIS ACCELERATION



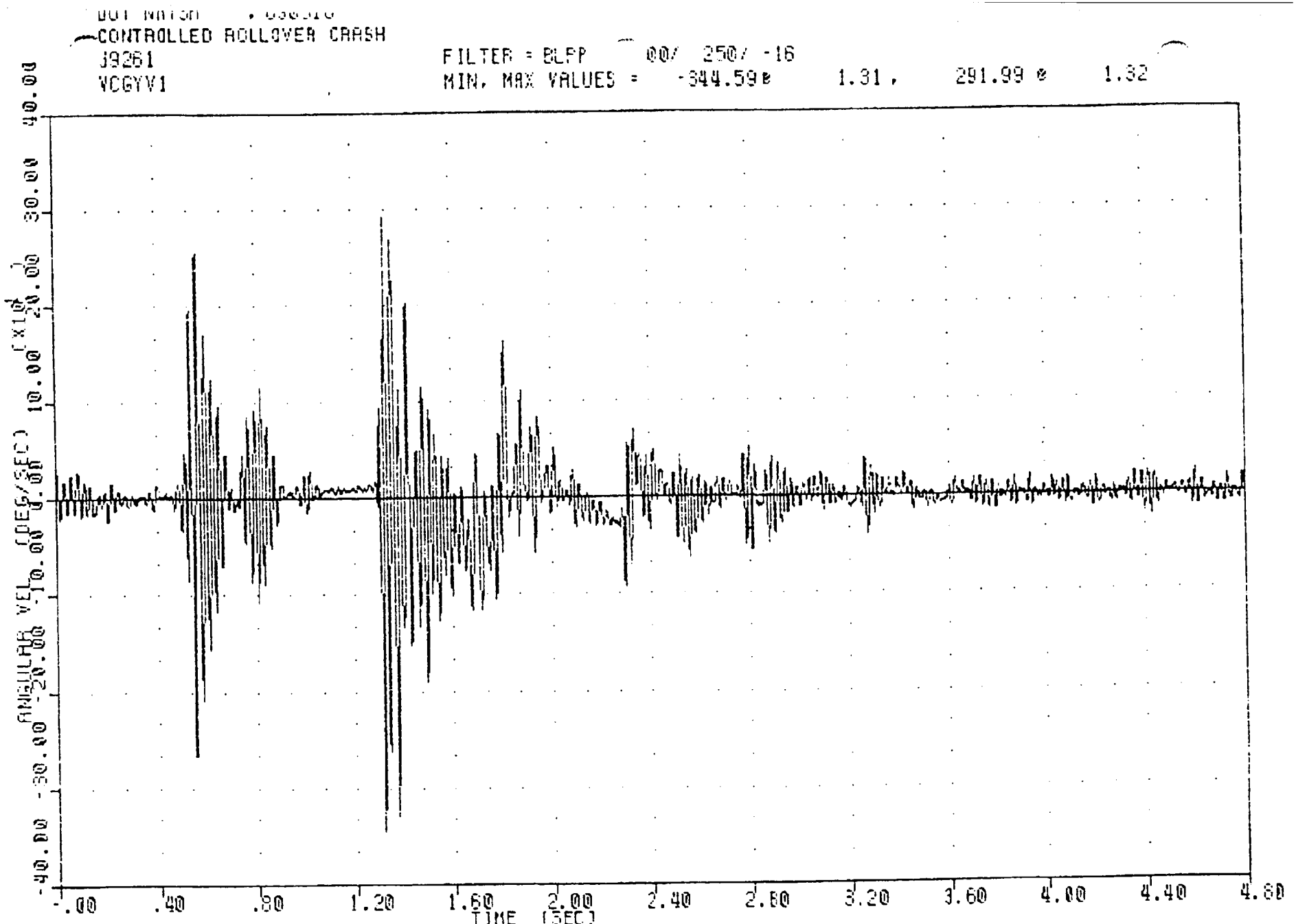
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER PELVIS Z AXIS ACCELERATION



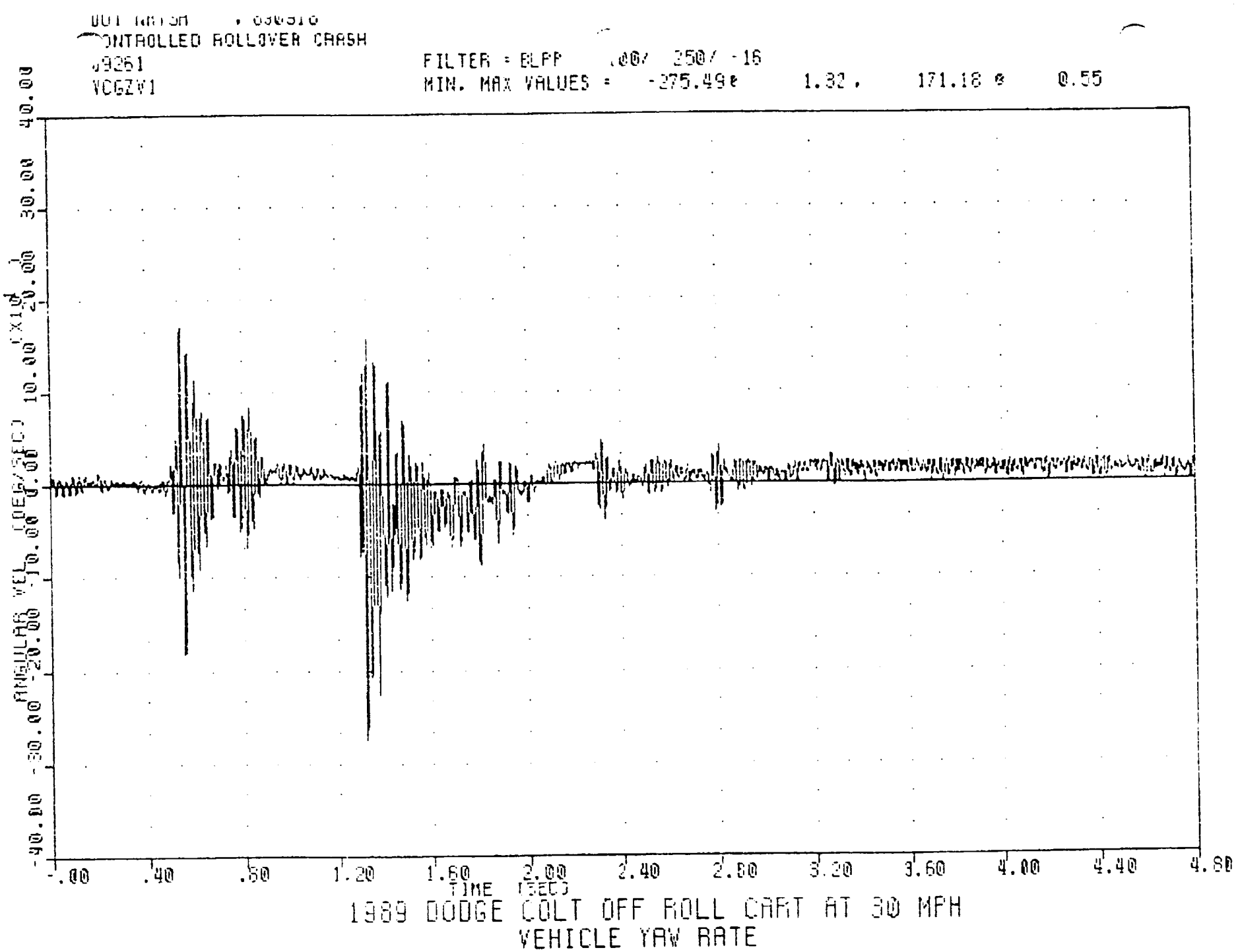
1989 DODGE COLT OFF ROLL CART AT 30 MPH
DRIVER PELVIS RESULTANT ACCELERATION



1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE ROLL RATE

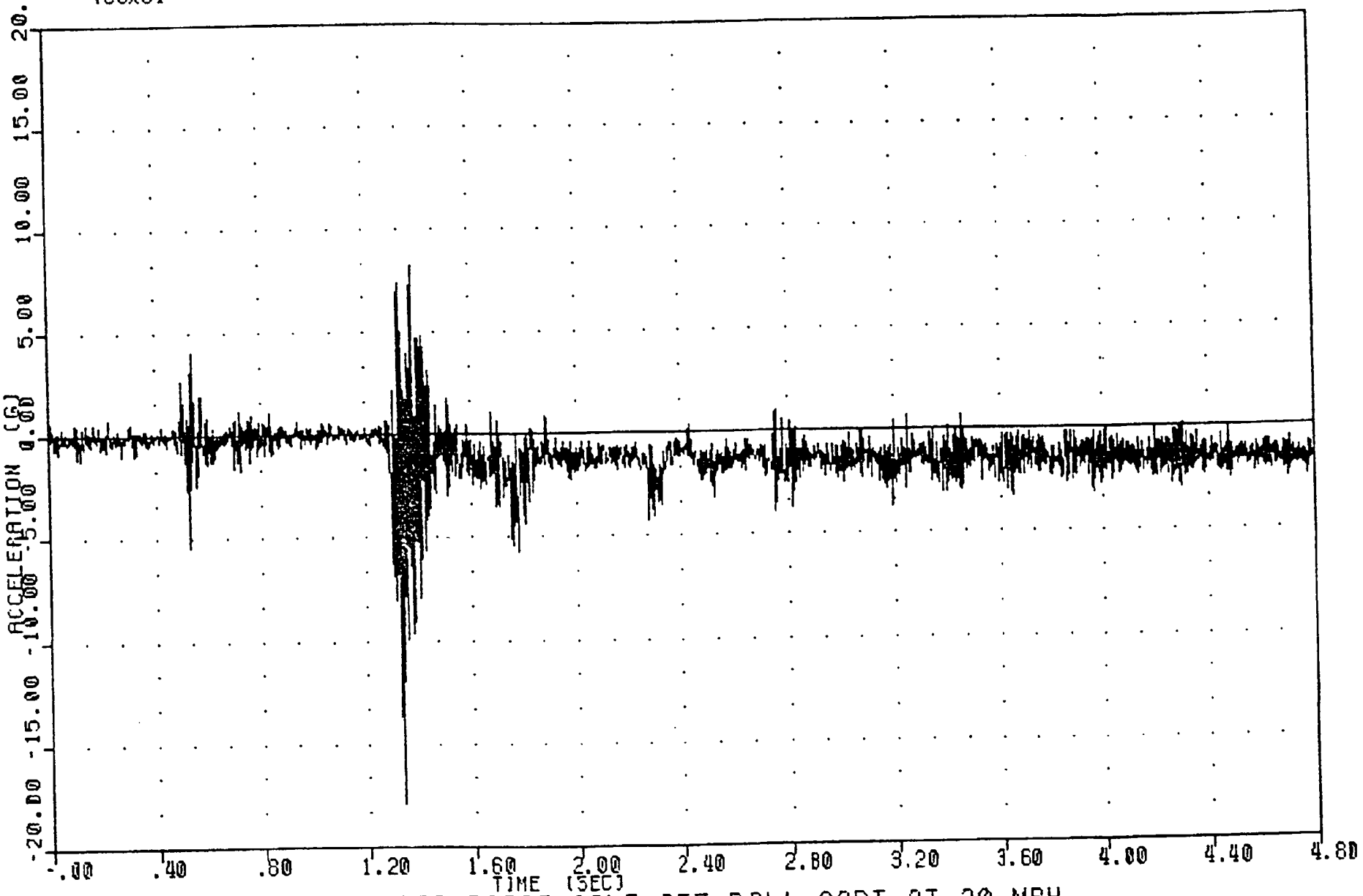


1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE PITCH RATE

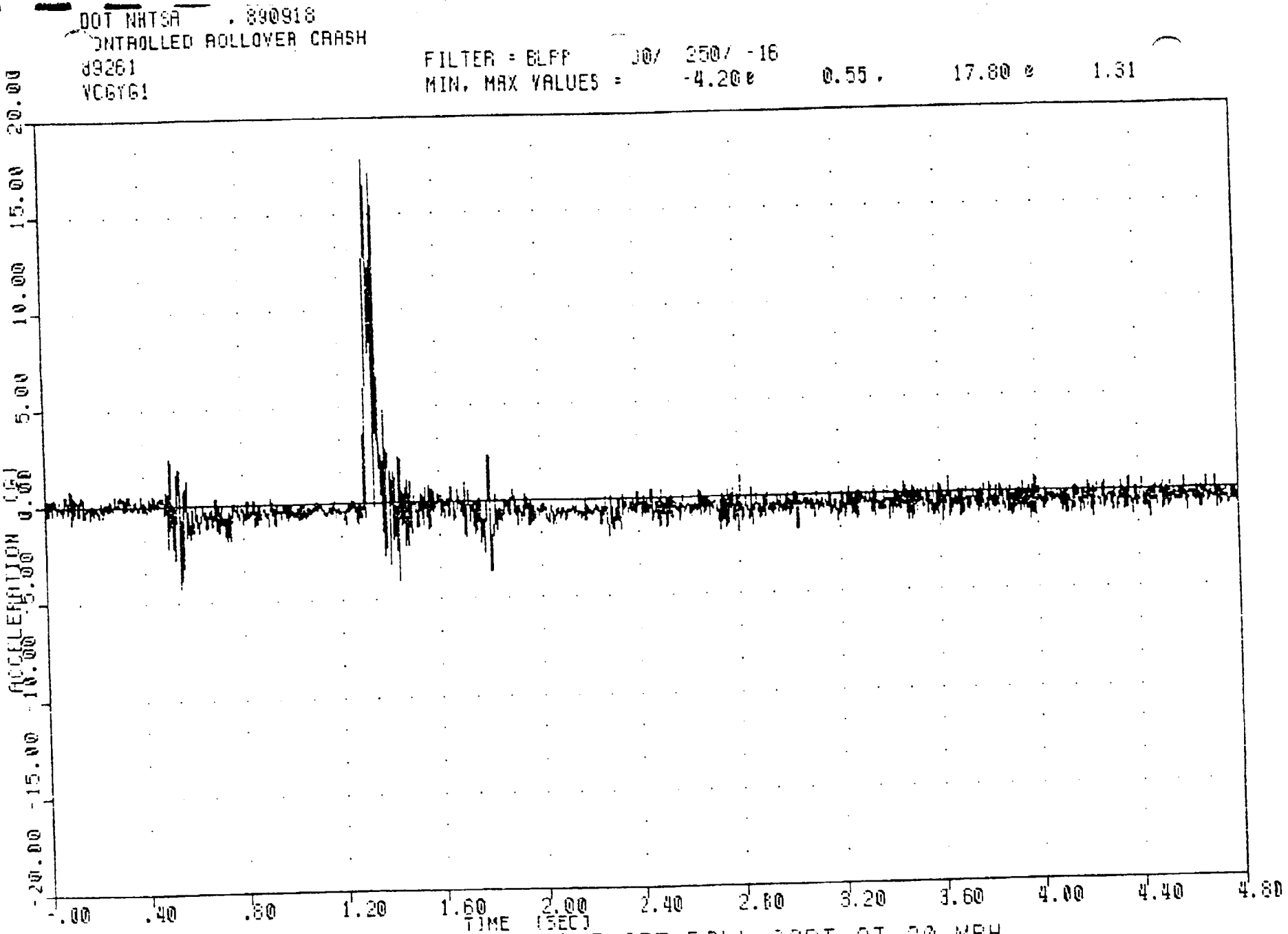


1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE YAW RATE

[redacted] 890918
CONTROLLED ROLLOVER CRASH
89261
YCGXG1
FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = -17.88 @ 1.33 , 8.22 @ 1.38

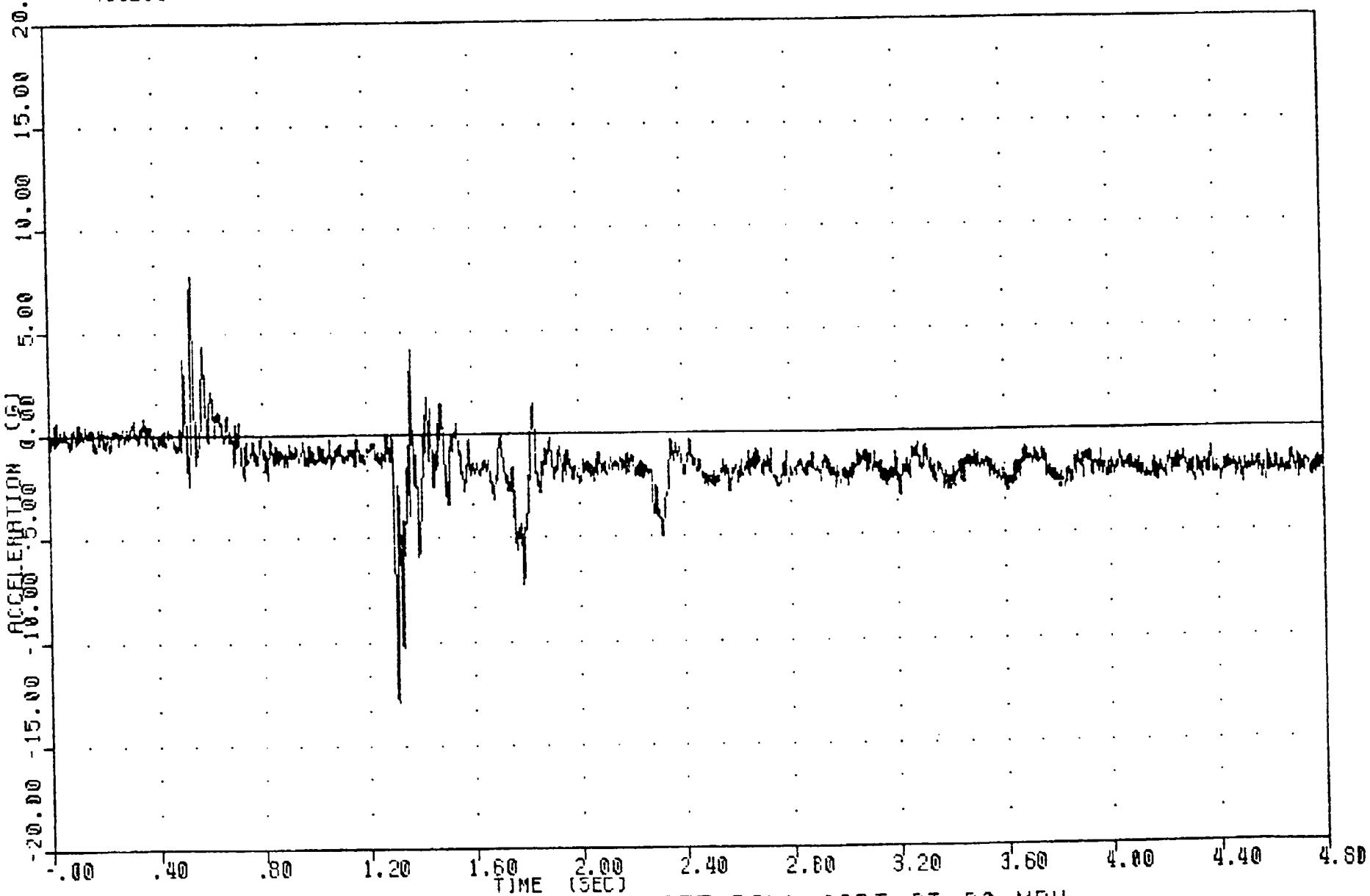


1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE CENTER OF GRAVITY X AXIS ACCELERATION



1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE CENTER OF GRAVITY Y AXIS ACCELERATION

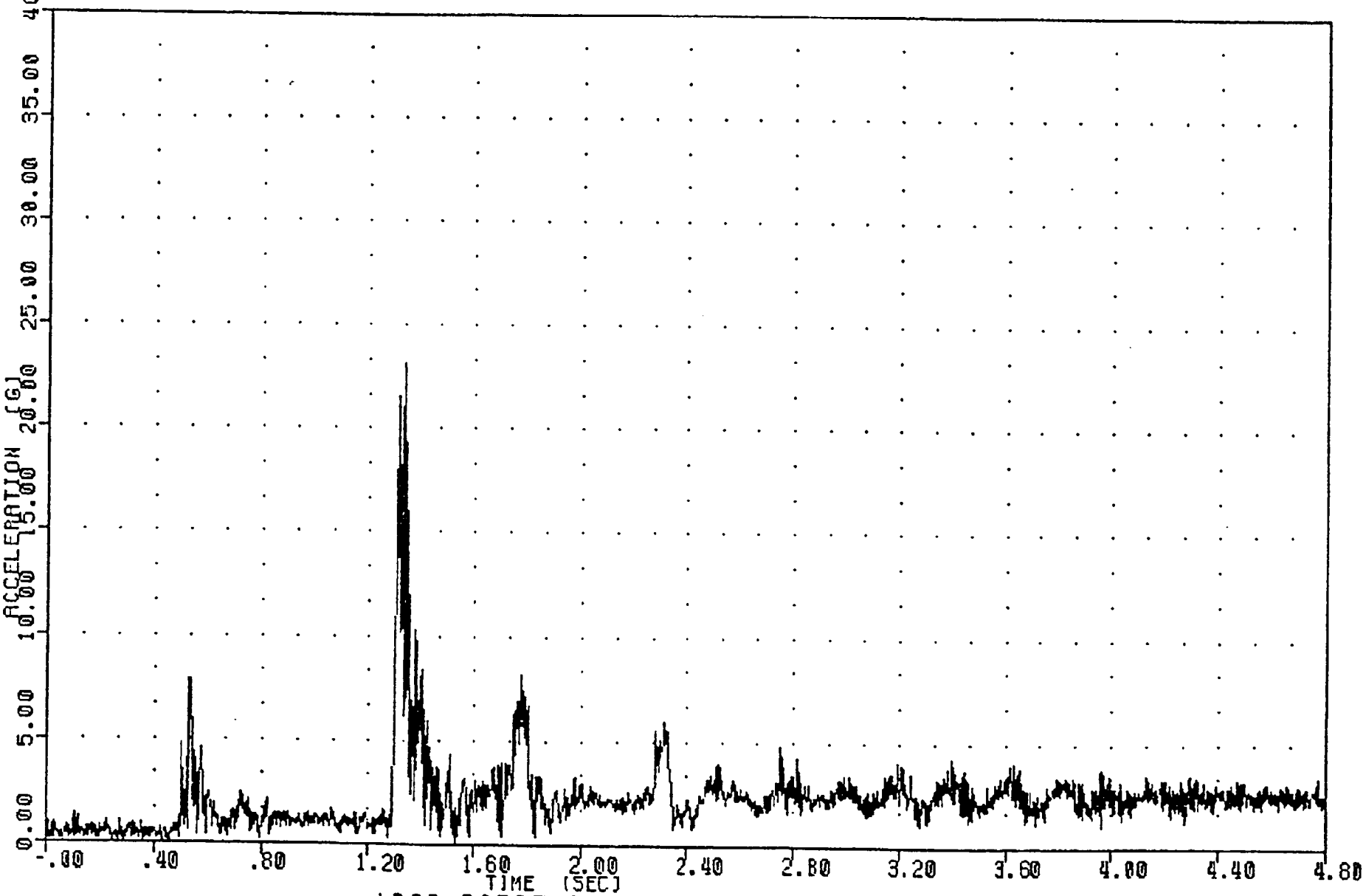
DOT NHTSA . 890918
NTROLLED ROLLOVER CRASH
89261
YCGZG1
FILTER = BLPF .00/ 250/ -16
MIN, MAX VALUES = -12.91@ 1.31, 7.76@ 0.53



1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE CENTER OF GRAVITY Z AXIS ACCELERATION

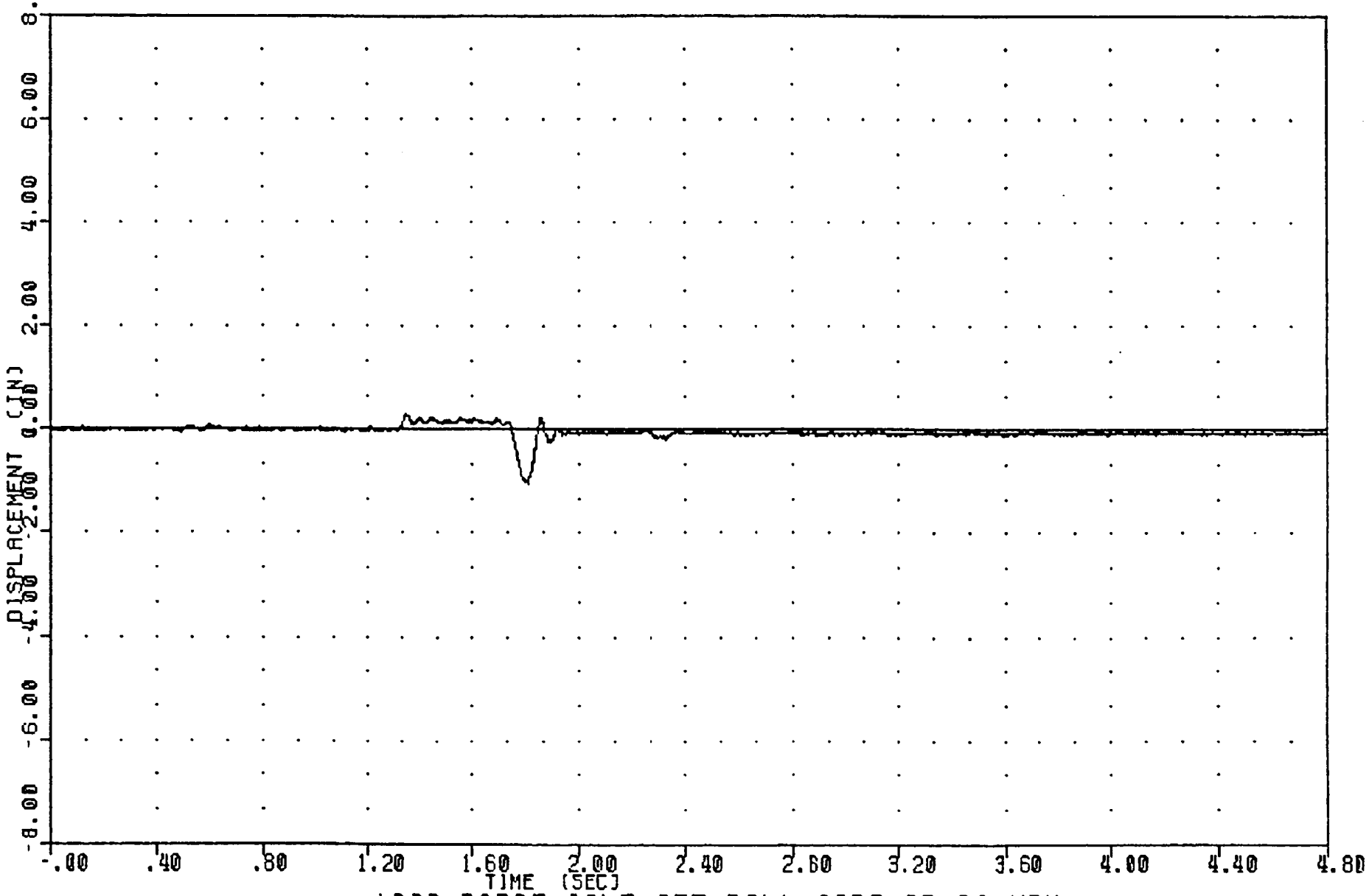
DOT NHTSH , 890918
CONTROLLED ROLLOVER CRASH
d9261
VCGRG1

FILTER = BLPP 100/ 250/ -16
MIN, MAX VALUES = 0.04 @ 1.53 , 23.07 @ 1.33

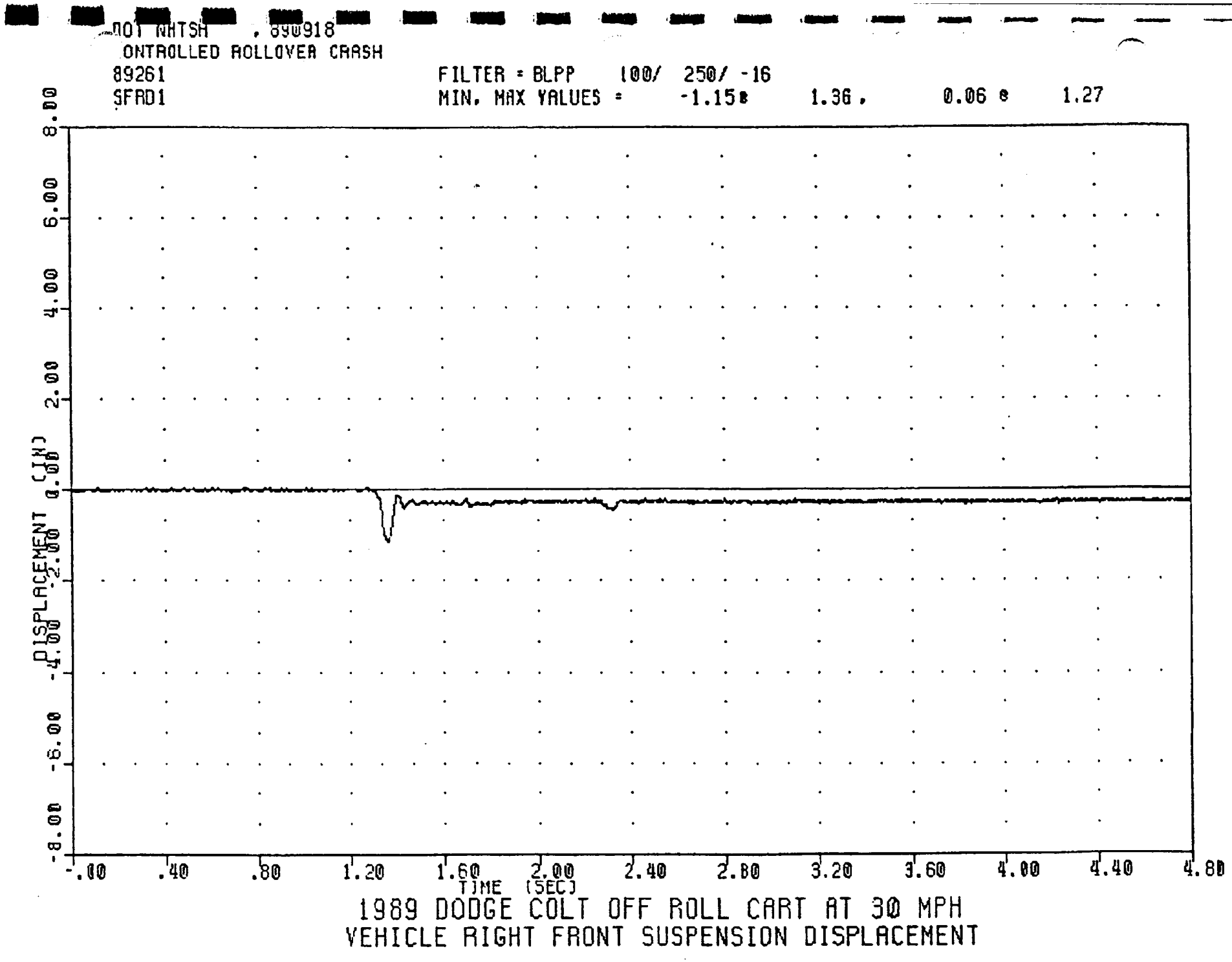


1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE CENTER OF GRAVITY RESULTANT ACCELERATION

DOT NHTSA , 890918
ONTROLLED ROLLOVER CRASH
89261
SFLD1
FILTER = BLPF 100/ 250/ -16
MIN, MAX VALUES = -1.03 @ 1.81 , 0.31 @ 1.35



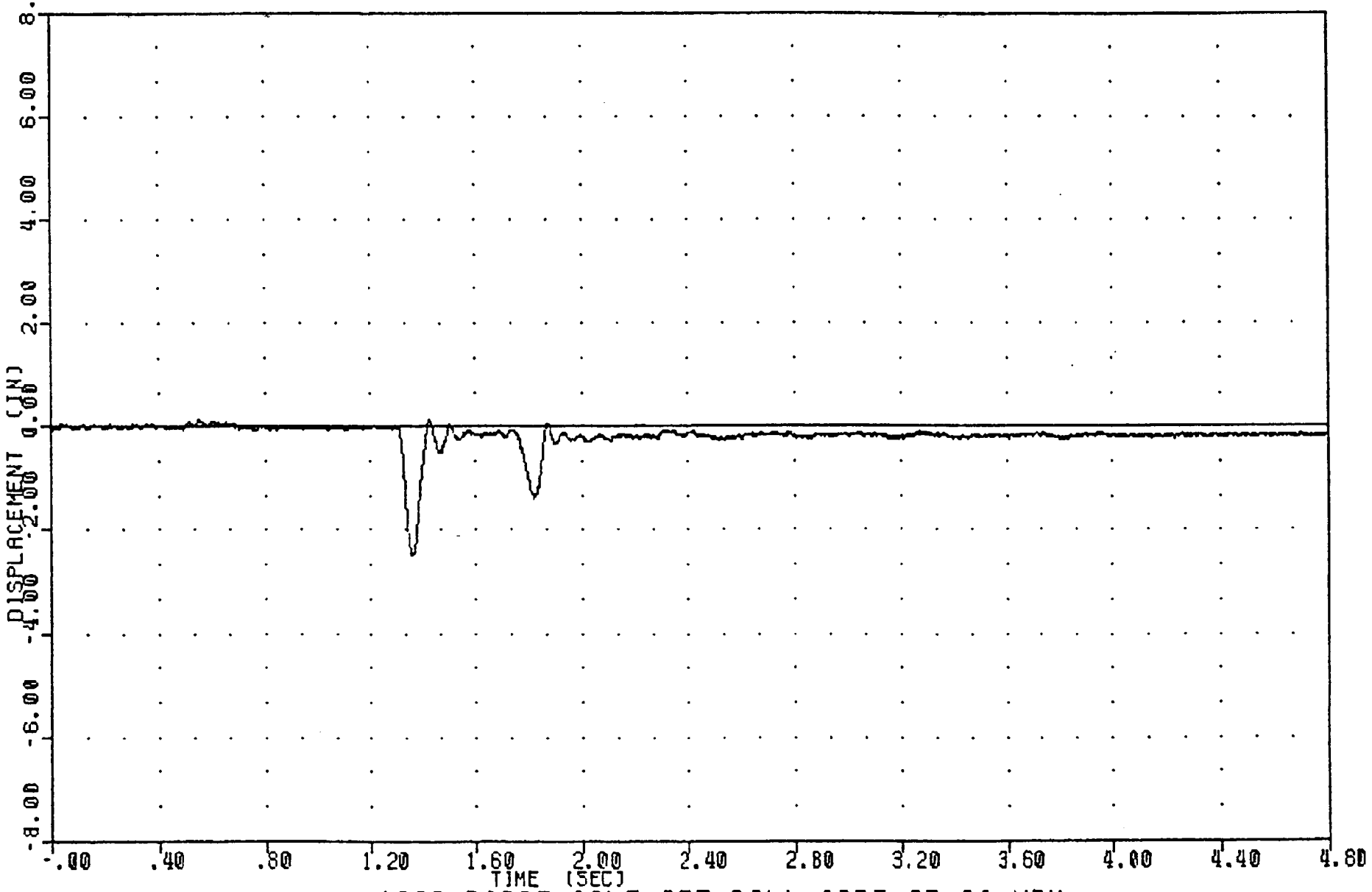
1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE LEFT FRONT SUSPENSION DISPLACEMENT



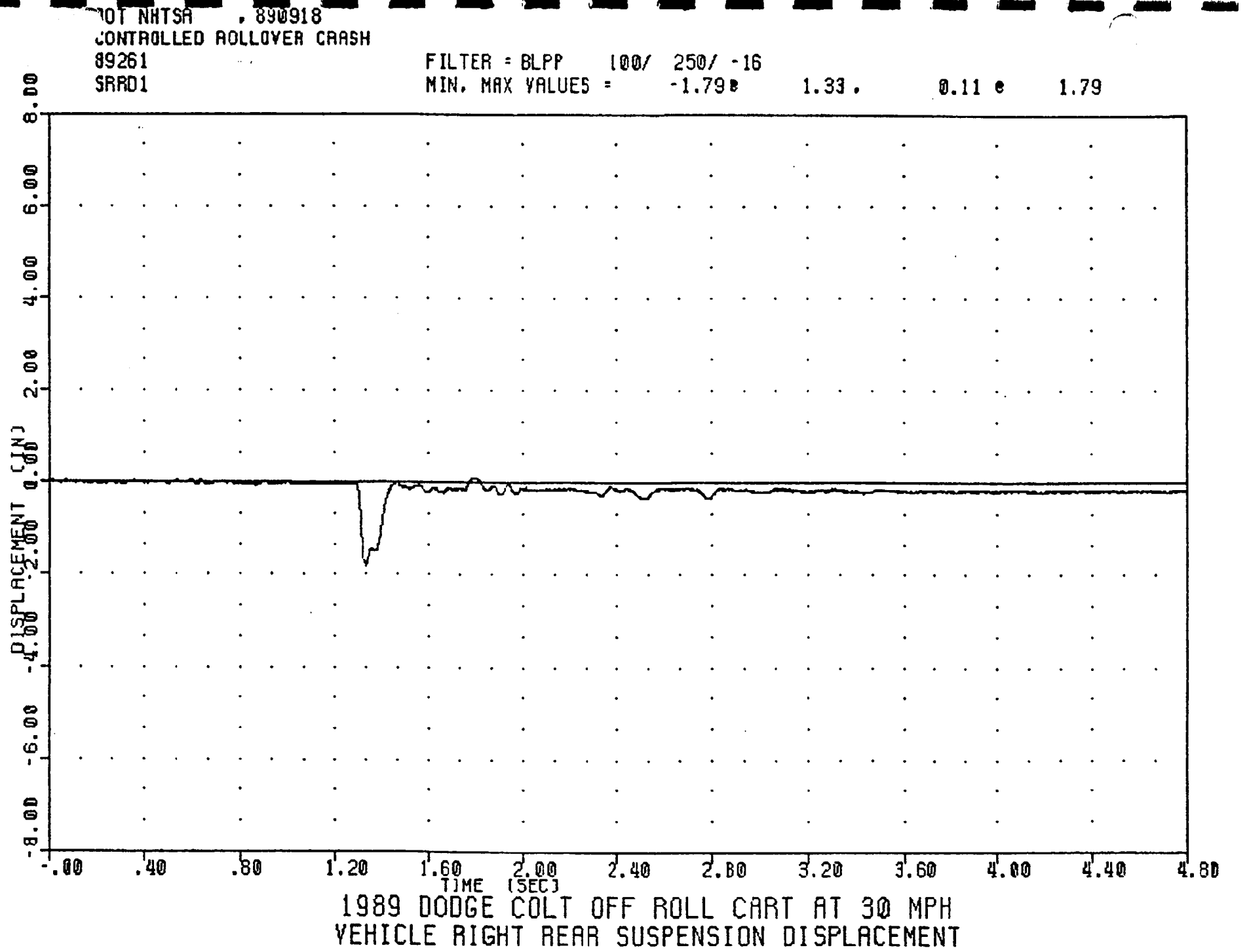
1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE RIGHT FRONT SUSPENSION DISPLACEMENT

DOT NHTSA , 890918
CONTROLLED ROLLOVER CRASH
89261
SRLD1

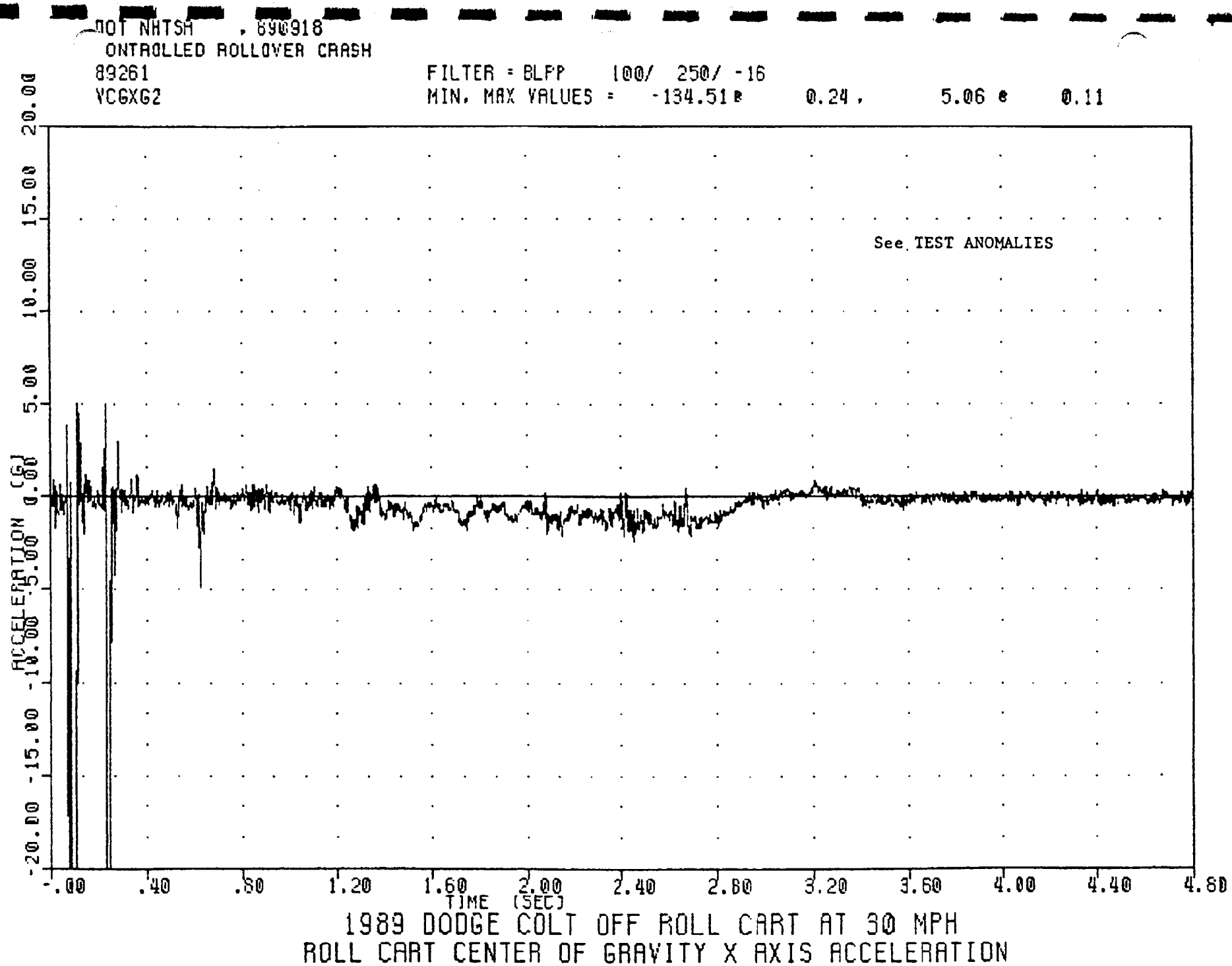
FILTER = BLPP (00/ 250/ -16
MIN, MAX VALUES = -2.49 @ 1.35 , 0.14 @ 1.42



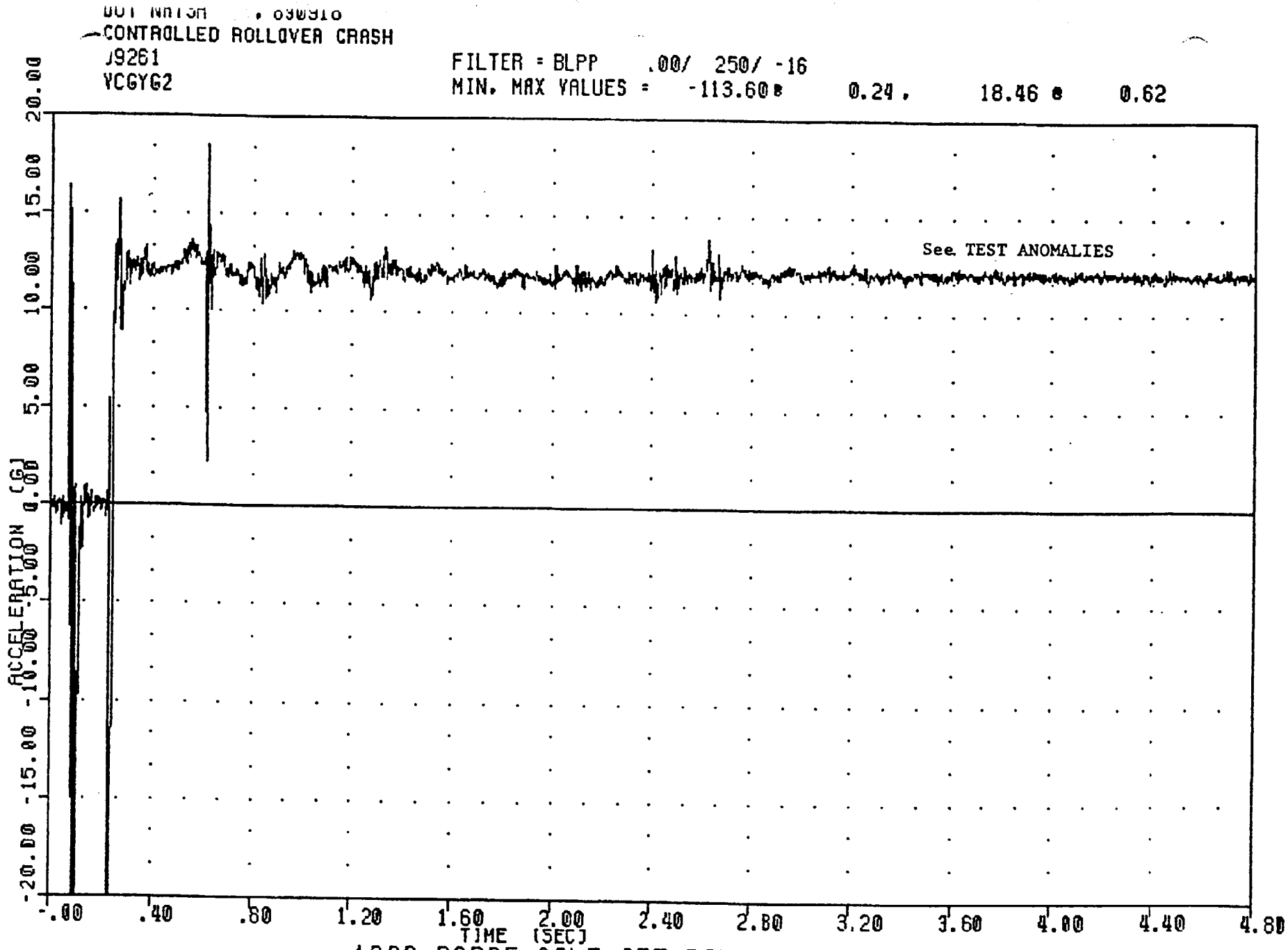
1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE LEFT REAR SUSPENSION DISPLACEMENT



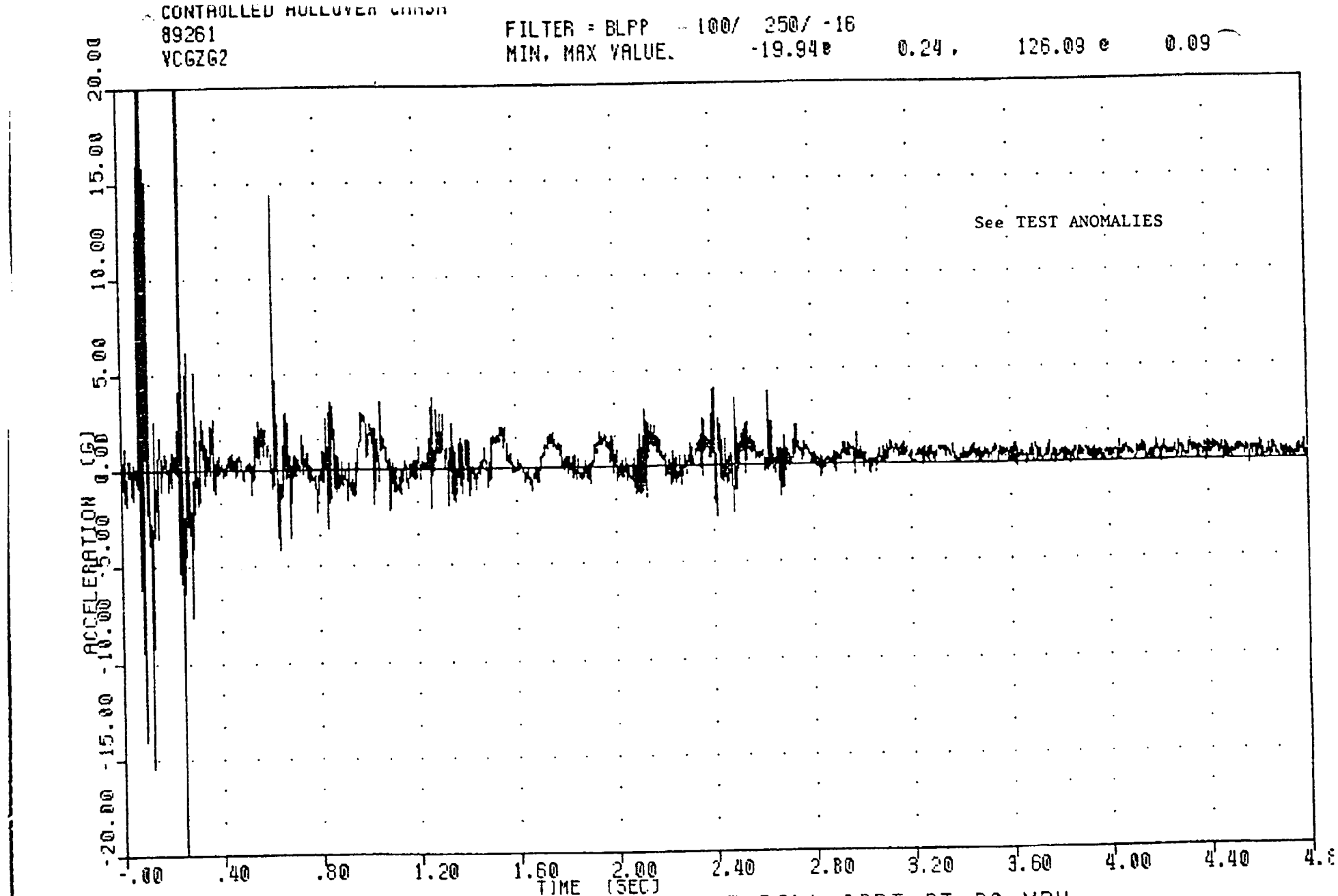
1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE RIGHT REAR SUSPENSION DISPLACEMENT



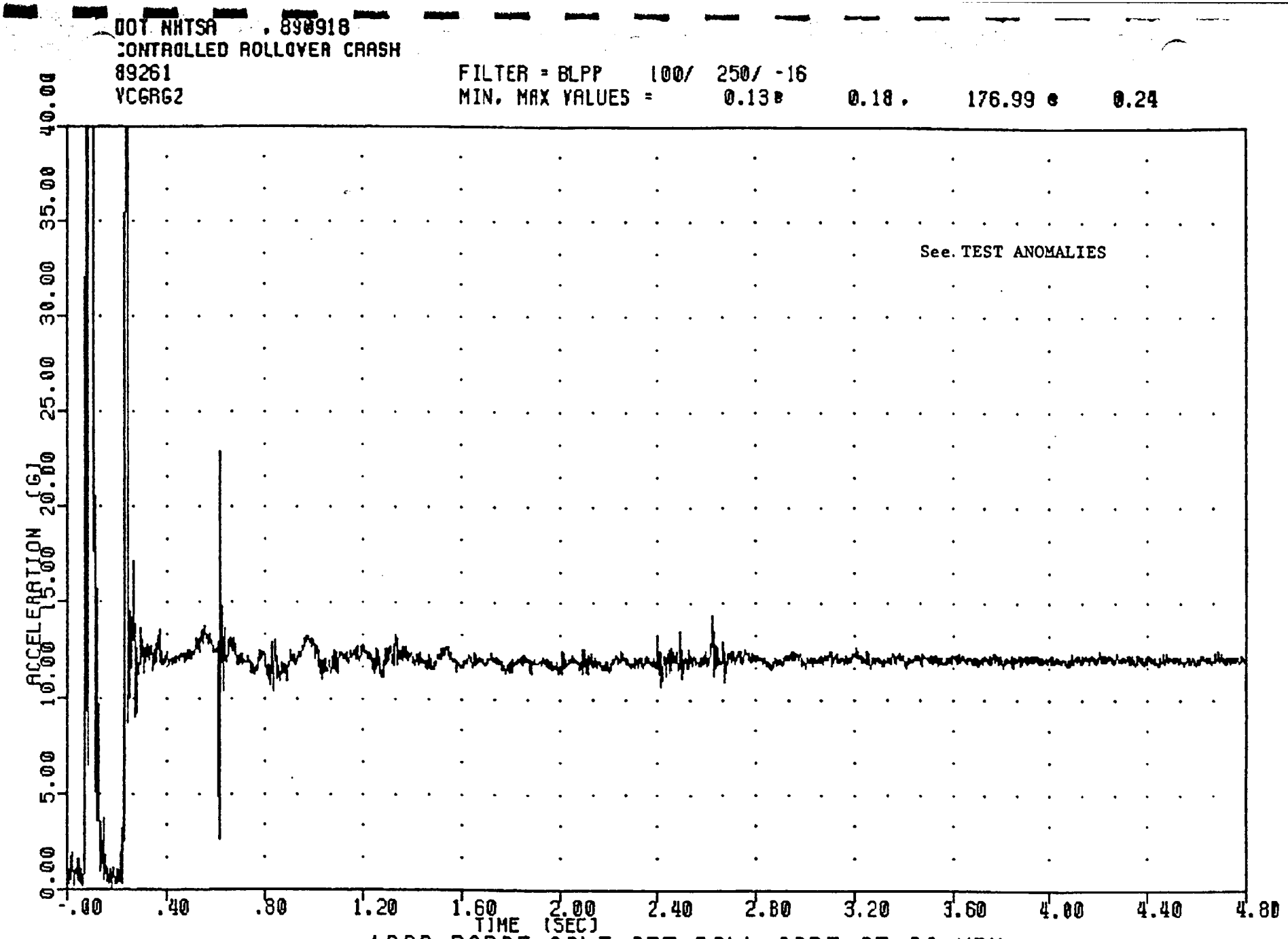
1989 DODGE COLT OFF ROLL CART AT 30 MPH
ROLL CART CENTER OF GRAVITY X AXIS ACCELERATION



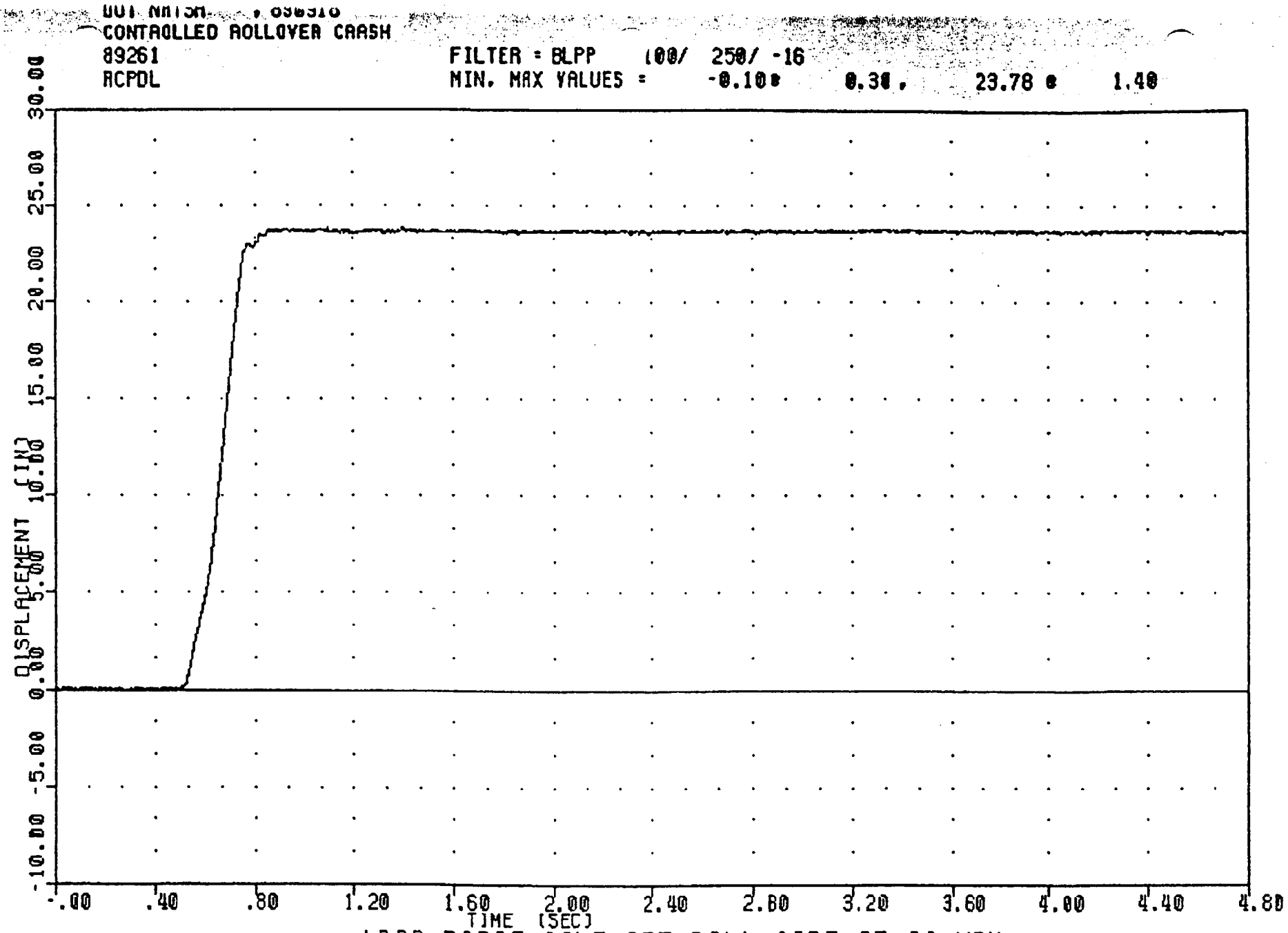
1989 DODGE COLT OFF ROLL CART AT 30 MPH
ROLL CART CENTER OF GRAVITY Y AXIS ACCELERATION



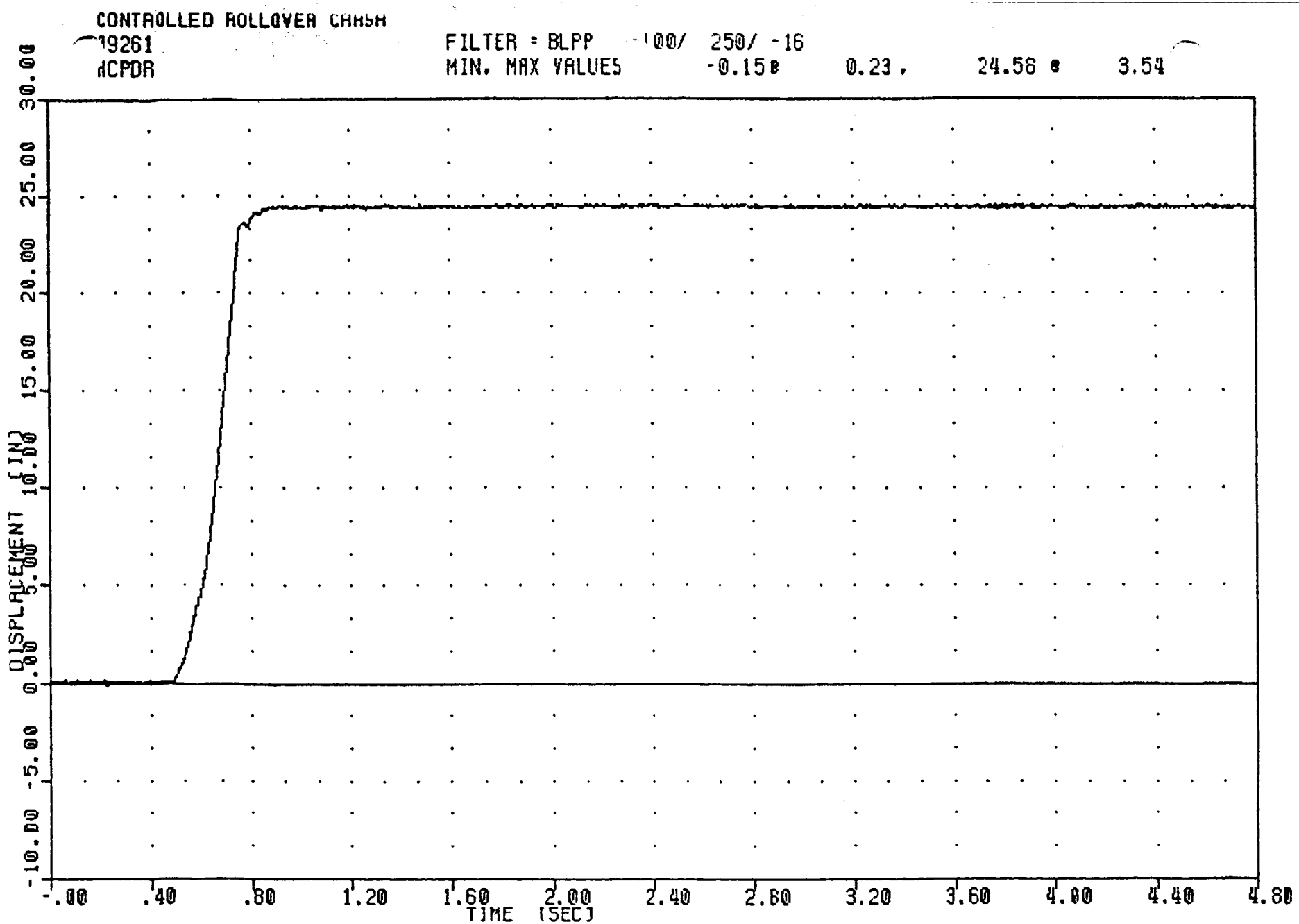
1989 DODGE COLT OFF ROLL CART AT 30 MPH
ROLL CART CENTER OF GRAVITY Z AXIS ACCELERATION



1989 DODGE COLT OFF ROLL CART AT 30 MPH
ROLL CART CENTER OF GRAVITY RESULTANT ACCELERATION



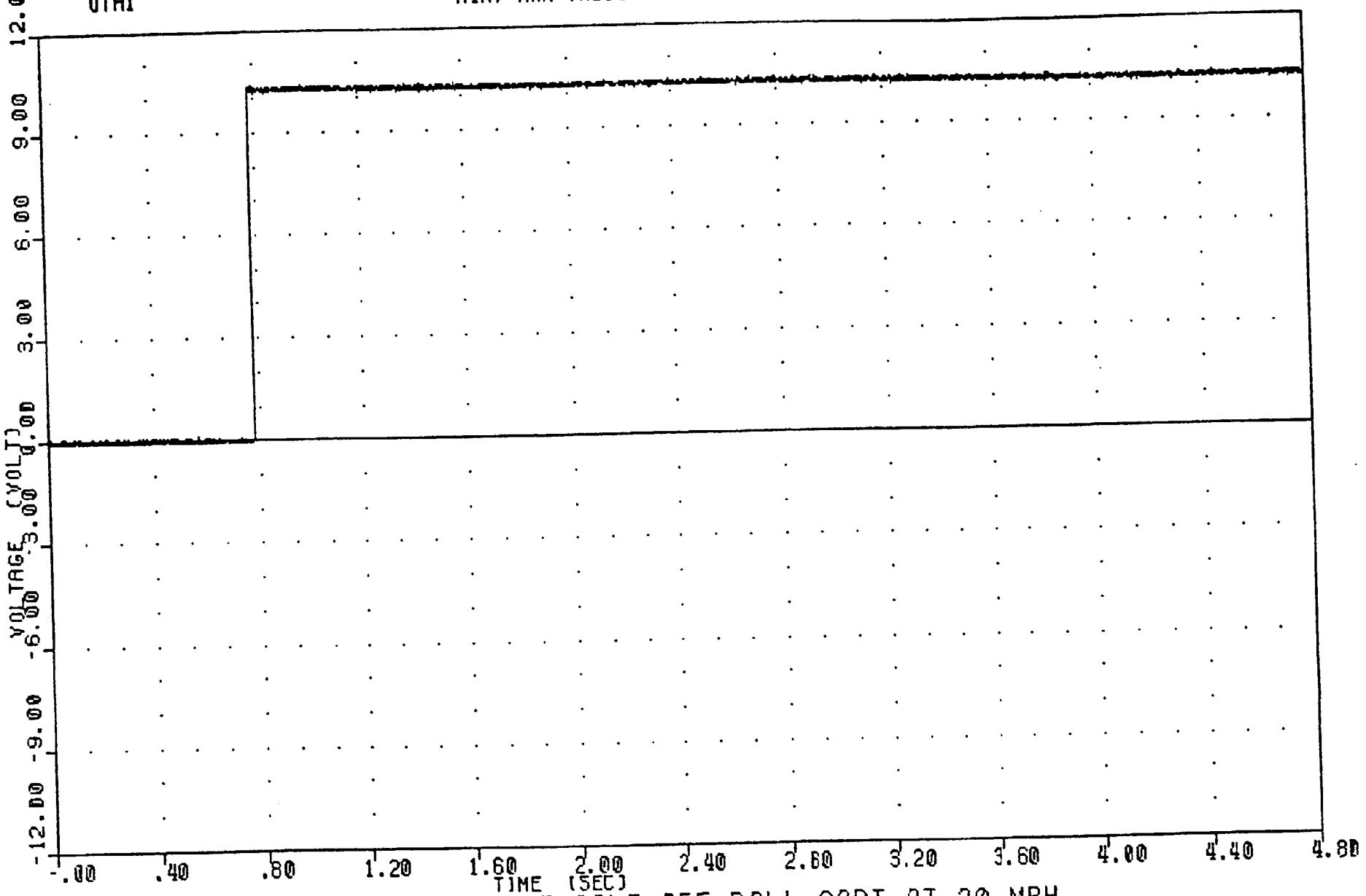
1989 DODGE COLT OFF ROLL CART AT 30 MPH
ROLL CART LEFT CYLINDER DISPLACEMENT



1989 DODGE COLT OFF ROLL CART AT 30 MPH
ROLL CART RIGHT CYLINDER DISPLACEMENT

[redacted] [redacted] [redacted] , 890918
DOT NHTSA
CONTROLLED ROLLOVER CRASH
89261
DTH1

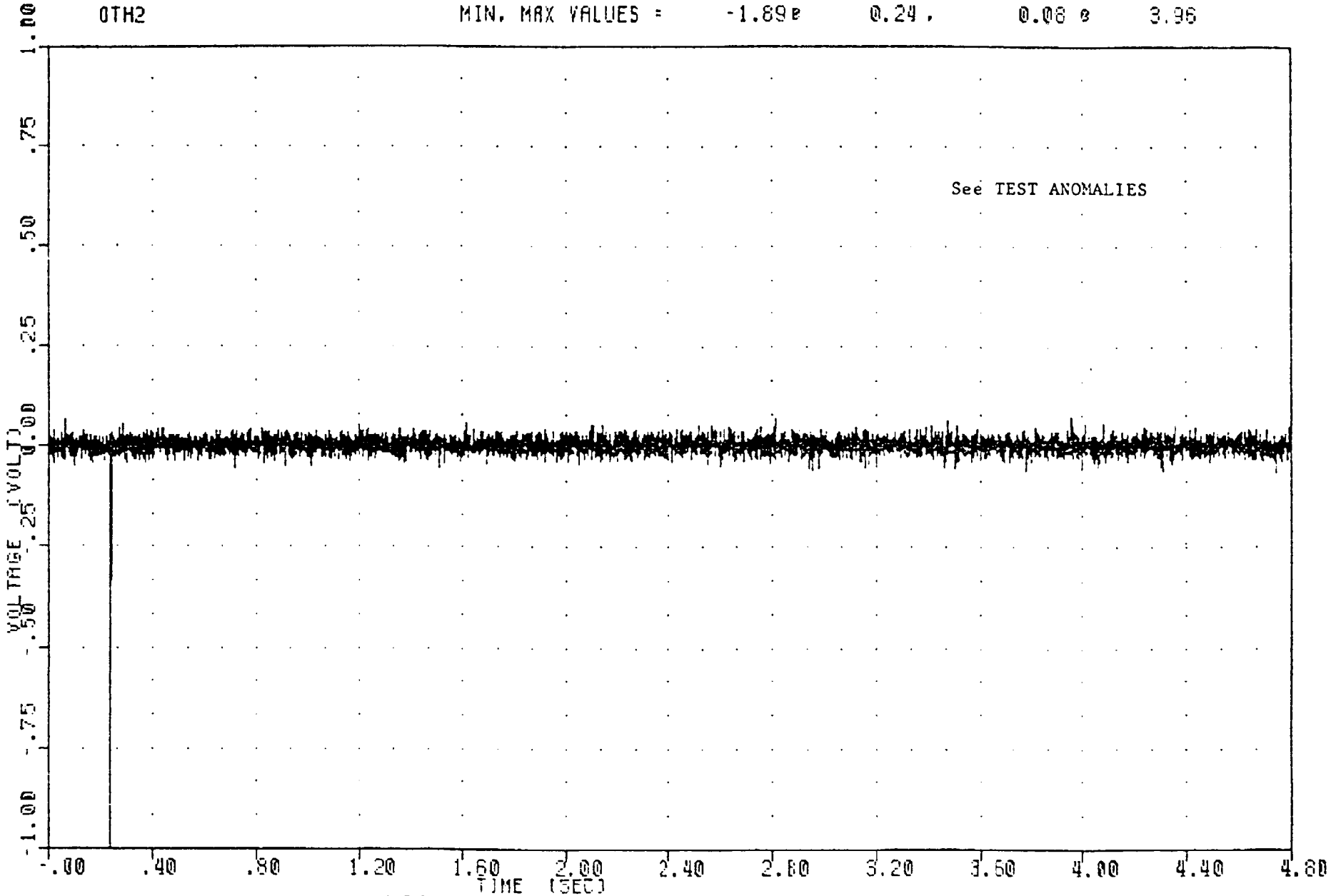
FILTER = ALPF .50/ 5214/ -40
MIN, MAX VALUES = -0.03 @ 0.00 , 10.39 @ 3.54



1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE/ROLL CART SEPARATION TIME - UPPER SWITCH

DOT NHTSA . 890918
CONTROLLED ROLLOVER CRASH
89261
OTH2

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -1.89 @ 0.24 , 0.08 @ 3.96



1989 DODGE COLT OFF ROLL CART AT 30 MPH
VEHICLE/ROLL CART SEPARATION TIME - LOWER SWITCH

APPENDIX C

DUMMY CERTIFICATION

TRANSPORTATION RESEARCH CENTER OF OHIO

HEAD DROP TEST

HYBRID III 07-Sep-89

SRL 192C3HD1 572E SN192 HEAD DROP CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	68.00 %
PEAK RESULTANT ACCELERATION	225 - 275 G	242.15 G
PEAK LATERAL ACCELERATION	15 G MAX	-3.11 G
IS ACCELERATION CURVE UNIMODAL?	YES	YES

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK FLEXION TEST

HYBRID III 29-Aug-89

3 AXIS NECK TRANSDUCER
SRL 192C3NF1 572E SN192 NECK FLEXION CAL03

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY		10% - 70%	63.00 %
IMPACT VELOCITY		22.6-23.4 FT/SEC	23.08 FT/SEC
PENDULUM DECELERATION	10 MS	22.50 - 27.50 G	22.95 G
	20 MS	17.60 - 22.60 G	19.54 G
	30 MS	12.50 - 18.50 G	15.20 G
MAX PENDULUM G ABOVE 30 MS		29 G MAX	15.10 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		34 - 42 MS	38.75 MS
D PLANE ROTATION	MAX	64 - 78 DEG.	71.40 DEG.
	TIME	57 - 64 MS	58.38 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MAX	65 - 80 FT.LBS	76.12 FT.LBS
	TIME	47 - 58 MS	52.75 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		113 - 128 MS	113.00 MS
POSITIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		97 - 107 MS	97.25 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Chas. Riddle

TRANSPORTATION RESEARCH CENTER OF OHIO

NECK EXTENSION TEST

HYBRID III

30-Aug-89

3 AXIS NECK TRANSDUCER
SRL 192C3NE1

572E SN192 NECK EXT. CAL3

TEST PARAMETER		SPECIFICATION	TEST RESULTS
TEMPERATURE		69 - 72 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY		10% - 70%	69.00 %
IMPACT VELOCITY		19.50-20.30 FT/SEC	19.67 FT/SEC
PENDULUM DECELERATION	10 MS	17.20 - 21.20 G	18.53 G
	20 MS	14.00 - 19.00 G	17.01 G
	30 MS	11.00 - 16.00 G	14.26 G
MAX PENDULUM G ABOVE 30 MS		22 G MAX	14.23 G
DECELERATION-TIME CURVE DECAY TIME TO 5 G		38 - 46 MS	38.13 MS
D PLANE ROTATION	MAX	81 - 106 DEG.	97.48 DEG.
	TIME	72 - 82 MS	74.25 MS
MOMENT ABOUT OCCIPITAL CONDYLE	MIN	-59.0/-39.0 FT.LBS	-54.70 FT.LBS
	TIME	65 - 79 MS	70.75 MS
ROTATION ANGLE-TIME CURVE DECAY TIME TO ZERO		147 - 174 MS	152.00 MS
NEGATIVE MOMENT-TIME CURVE DECAY TIME TO ZERO		120 - 148 MS	135.00 MS

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleton

TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT TEST

HYBRID III 30-Aug-89

SRL 192C3TH1 572E SN192 H.S.THORAX CAL03

TEST PARAMETER	HIGH SPEED TEST SPECIFICATION	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	62.00 %
PENDULUM VELOCITY	21.6-22.4 FT/SEC	21.92 FT/SEC
MAXIMUM DEFLECTION	2.50 - 2.86 IN	2.63 IN
MAXIMUM RESISTIVE FORCE	1160 - 1325 LBS	1200.0 LBS
INTERNAL HYSTERESIS	69% - 85%	75.2%

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

29-Aug-89

LEFT KNEE
SRL 192C3LK1

572E SN192 L.KNEE 11LB CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	65.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.84 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1277.24 LBS
PROBE WEIGHT	11.0 LBS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet

TRANSPORTATION RESEARCH CENTER OF OHIO

KNEE IMPACT TEST

HYBRID III

29-Aug-89

RIGHT KNEE
SRL 192C3RK1

572E SN192 R.KNEE 11LB CAL 03

TEST PARAMETER	SPECIFICATION	TEST RESULTS
TEMPERATURE	66 - 78 DEG. F	70.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	65.00 %
PROBE VELOCITY	6.8 - 7.0 FT/SEC	6.87 FT/SEC
PEAK KNEE IMPACT FORCE	1060 - 1300 LBS	1279.22 LBS
PROBE WEIGHT	11.0 LBS	

DUMMY COMPONENT MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlet

APPENDIX D

MISCELLANEOUS TEST INFORMATION

INERTIA PARAMETERS DATA

IPND VEHICLE DATA SHEET

Filled Out By: B. Dotson Date: 9/7/89

Checked By: J. Chrstos Date: 9/11/89

VEHICLE DATA

Vehicle Make and Model (written out): 1989 Dodge Colt

NHTSA ID Code (7 characters): V89233 / Model Year (2 digits): 89

Vehicle Make (2 characters): 07

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): 99

Body Style (2 characters): 3H

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): JB3CU14X2KU061846

Odometer Reading: 25.0 Thousands of Miles: 0.025

Overall Length: 152.5 (in) x 25.4 =: 3874 (mm)

Wheelbase: 93.8 (in) x 25.4 =: 2383 (mm)

Front Track: 56.5 (in) x 25.4 =: 1435 (mm)

Rear Track: 56.0 (in) x 25.4 =: 1422 (mm)

Roof Height: 53.6 (in) x 25.4 =: 1361 (mm)

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Suspension Number (4 digits): F233

Front/Rear Flag (1 character): F

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

Suspension Type (1 character): S

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): CO

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 = _____

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Tire Manufacturer (10 characters): Yokohama

Tire Size Code (10 characters): 145SR13

Tire Construction (2 characters): SB

BB = Bias Belted
BP = Bias Ply
OT = Other: _____
GP = Glass Belted Radial
SB = Steel Belted Radial

Tire Rim width: 4.5 (in) X 25.4 =: 114.3 (mm)

Axle Height: 10.2 (in) X 25.4 =: 259.1 (mm)

Tire Pressure: 32.0 (psi) X 6.897 =: 220.7 (kpa)

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Suspension Number (4 digits): R233

Front/Rear Flag (1 character): R

Axle Type (1 character): S

I = Independent S = Solid

Suspension Type (1 character): S

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): CO

CO = Coil
LL = Longitudinal Leaf
OT = Other: _____

TB = Torsion Bar
TL = Transverse Leaf

Brake Type (2 characters): DS

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 = _____

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Tire Manufacturer (10 characters): Yokohama

Tire Size Code (10 characters): 145SR13

Tire Construction (2 characters): SB

BB = Bias Belted
BP = Bias Ply
OT = Other: _____

GP = Glass Belted Radial
SP = Steel Belted Radial

Tire Rim Width: 4.5 (in) X 25.4 =: 114.3 (mm)

Axle Height: 10.5 (in) X 25.4 =: 266.7 (mm)

Tire Pressure: 32.0 (psi) X 6.897 =: 220.7 (kpa)

IPMD MEASURED DATA

IPMD Calibration Check (no vehicle):

Applied Weight (lbs)	Schaevitz Output (Volts)
0	0.116
+100	1.058
+200	1.965
0	0.116
-100	-0.818
-200	-1.734
0	0.114

C.G. HEIGHT:

Applied Weight (lbs)	Schaevitz Output (Volts)	Resultant Longitudinal Movement (mv)
0	0.060	3.356
+100	0.675	3.434
+200	1.283	3.481
0	0.063	3.395
-100	-0.553	3.314
-200	-1.178	3.243
0	0.054	3.348

Calculated C.G. Height (in): 20.3

Pitch Inertia:

Run	Period (sec)	*Amplitude (mv)	Relative Motion Amplitude (mv)
1	3.42	265	91
2	3.42	265	94
3	3.42	265	85

Pitch Inertia (ft. lb. sec2): 1209.198

IPMD MEASURED DATA

Roll Inertia:

Distance between ramps (in): 47.2

Run	Period (sec)	*Amplitude (mv)	Amplitude (mv)
1	2.31	210	146
2	2.31	208	141
3	2.31	212	147

Roll Inertia (ft. lb. sec2): 281.200

Yaw Inertia:

Distance betwee ramps (in): 47.2

String Pot Offset from platform center (in): 62

Run	Period (sec)	*Amplitude (mv)	Relative Motion
1	1.97	99	193
2	1.97	85	209
3	1.96	81	191

Yaw Inertia (ft. lb. sec2): 1239.519

IPMD VEHICLE DATA SHEET

Filled Out By: B. Dotson Date: 9/21/89

Checked By: J. Chrstos Date: 9/26/89

VEHICLE DATA

Vehicle Make and Model (written out): 1989 Dodge Colt

NHTSA ID Code (7 characters): V89233 / Model Year (2 digits): 89

Vehicle Make (2 characters): 07

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): 99

Body Style (2 characters): 3H

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): JB3CU14X2KU061846

Odometer Reading: 30.0 Thousands of Miles: 0.030

Overall Length: 152.5 (in) x 25.4 =: 3874 (mm)

Wheelbase: 93.8 (in) x 25.4 =: 2383 (mm)

Front Track: 56.8 (in) x 25.4 =: 1443 (mm)

Rear Track: 56.4 (in) x 25.4 =: 1433 (mm)

Roof Height: 55.6 (in) x 25.4 =: 1412 (mm)

IPMD VEHICLE DATA SHEET

G.V.W.R.: 3157 (lbs) x 4.45 =: 14049 (N)

FRONT G.A.W.R.: 1650 (lbs) x 4.45 =: 7343 (N)

REAR G.A.W.R.: 1584 (lbs) x 4.45 =: 7049 (N)

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

Weight on RF Tire: 621 (lbs) x 4.45 =: 2763 (N)

Weight on LF Tire: 746 (lbs) x 4.45 =: 3320 (N)

Weight on LR Tire: 467 (lbs) x 4.45 =: 2078 (N)

Weight on RR Tire: 535 (lbs) x 4.45 =: 2381 (N)

Vehicle Test Weight: 2369 (lbs) x 4.45 =: 10542 (N)

Lateral and Longitudinal Center of Gravity Location.

From Front Axle: 39.7 (in) x 25.4 =: 1008.4 (mm)

From Center Line: -0.68 (in) x 25.4 =: -17.3 (mm)

Engine Displacement: 89.6 (cu in) x 0.0164 =: 1.5 (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): T

L = Longitudinal T = Transverse

Transmission Type: M

M = Manual A = Automatic

Drive Axle (1 character): F

F = Front R = Rear 4 = Four Wheel Drive

Vehicle Comments (30 characters): Equipped for rollover post-test.

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Suspension Number (4 digits): F233

Front/Rear Flag (1 character): F

Axle Type (1 character): I

I = Independent S = Solid

Suspension Type (1 character): S

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): CO

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 = _____

IPMD VEHICLE DATA SHEET

FRONT SUSPENSION

Tire Manufacturer (10 characters): Yokohama

Tire Size Code (10 characters): 145SR13

Tire Construction (2 characters): SB

BB = Bias Belted
BP = Bias Ply
GP = Glass Belted Radial
SB = Steel Belted Radial
OT = Other: _____

Tire Rim width: 4.5 (in) X 25.4 =: 114.3 (mm)

Axle Height: 10.2 (in) X 25.4 =: 259.1 (mm)

Tire Pressure: 32.0 (psi) X 6.897 =: 220.7 (kpa)

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Suspension Number (4 digits): F233

Front/Rear Flag (1 character): R

Axle Type (1 character): S

I = Independent S = Solid

Suspension Type (1 character): S

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): CO

CO = Coil
LL = Longitudinal Leaf
OT = Other:_____

TB = Torsion Bar
TL = Transverse Leaf

Brake Type (2 characters): DS

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 = _____

IPMD VEHICLE DATA SHEET

REAR SUSPENSION

Tire Manufacturer (10 characters): Yokahama

Tire Size Code (10 characters): 145SR13

Tire Construction (2 characters): SB

BB = Bias Belted
BP = Bias Ply
OT = Other: _____

GP = Glass Belted Radial
SP = Steel Belted Radial

Tire Rim Width: 4.3 (in) X 25.4 =: 114.3 (mm)

Axle Height: 10.5 (in) X 25.4 =: 266.7 (mm)

Tire Pressure: 32.0 (psi) X 6.897 =: 220.7 (kpa)

IPMD MEASURED DATA

IPMD Calibration Check (no vehicle):

Applied Weight (lbs)	Schaevitz Output (Volts)
0	0.112
+100	1.049
+200	1.961
0	0.111
-100	-0.828
-200	-1.744
0	0.112

C.G. HEIGHT:

Applied Weight (lbs)	Schaevitz Output (Volts)	Resultant Longitudinal Movement (mv)
0	0.030	3.438
+100	0.647	3.478
+200	1.259	3.521
0	0.032	3.442
-100	-0.586	3.395
-200	-1.196	3.343
0	0.027	3.422

Calculated C.G. Height (in): 20.1

Pitch Inertia:

Run	Period (sec)	*Amplitude (mv)	Relative Motion Amplitude (mv)
1	3.39	291	82
2	3.39	290	86
3	3.39	287	88

Pitch Inertia (ft. lb. sec2): 1168.499

IPMD MEASURED DATA

Roll Inertia:

Distance between ramps (in): 46.6

Run	Period (sec)	*Amplitude (mv)	Amplitude (mv)
1	2.28	229	95
2	2.28	225	89
3	2.28	226	94

Roll Inertia (ft. lb. sec2): 258.803

Yaw Inertia:

Distance betwee ramps (in): 46.6

String Pot Offset from platform center (in): 52.8

Run	Period (sec)	*Amplitude (mv)	Amplitude (mv)
1	2.00	82	111
2	2.00	86	114
3	2.00	87	112

Yaw Inertia (ft. lb. sec2): 1285.451

SIGN CONVENTION

Compession on barrier face load cells is positive.

Compression on femur load cells is positive.

Tension on seat belt load cells is positive.

Outward chest displacmeent is positive.

All accelerometers:

+X: FORWARD

+Y: LEFTWARD

+Z: UPWARD

Neck load cell:

+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