Test # R280

SAFETY COMPLIANCE TEST FOR 301-75 REAR IMPACT

1988 NISSAN KINGCAB PICKUP

NHTSA NO. CJ0601

MOBILITY SYSTEMS AND EQUIPMENT COMPANY
9920 LA CIENEGA BOULEVARD SUITE 708
INGLEWOOD, CALIFORNIA 90301

FEBRUARY 1989

FINAL REPORT

Prepared Under Contract No. DTNH22-88-D-01039

For

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Vehicle Safety Compliance
400 Seventh Street, S.W.
Washington, DC 20590

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APPROVED BY: [signature]

DATE: 2/14/89

FINAL REPORT ACCEPTED BY:

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Contracting Officer Technical Representative
Office of Vehicle Safety Compliance

3/3/89
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16. Abstract

Test were conducted on the subject 1988 Nissan King Cab Pickup vehicle in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure TP-301-75-02 for determination of FMVSS 301-75 Rear Compliance. Test failures identified were: None.

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TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION 1

INTRODUCTION

This report presents information on tests conducted on a 1988 Nissan King Cab Pickup, NHTSA No. CJ0601 to determine compliance with the requirements of FMVSS 301-75 Rear impact testing. All tests were conducted in accordance with the National Highway Traffic Safety Administration (NHTSA) Office of Vehicle Safety Compliance (OVSC) Laboratory Procedure TP-301-75-02 (Rear) and the corresponding Mobility Systems and Equipment Company Test Procedure MSE-TP-301-75-02 dated August 1988, which is approved by NHTSA officials.

Section 2 of the report describes the test procedure and presets the summary data. Section 3 of the report shows all the test results.

No test failures related to FMVSS 301-75 (Rear) were identified for the 1988 Nissan King Cab Pickup.

SECTION 2

TEST PROCEDURE AND SUMMARY DATA

The 1988 Nissan King Cab Pickup, NHTSA No. CJ0601 was subjected to FMVSS 301-75 Rear testing on 13 January 1989. The vehicle is shown in pretest condition in Figures 2-1 to 2-4. Manufacturer's and tire placard labels are shown in Figures 2-5 and 2-6.

The vehicle was inspected, measured, weighed, marked, photographed and tested in accordance with the procedure requirements. A triaxial accelerometer was mounted at the vehicle c.g. to measure the acceleration characteristics of the vehicle during impact. The triaxial accelerometer is shown in Figure 2-7 mounted in the test vehicle. Two part 572 dummies were installed in the vehicle in the driver and right front passenger positions.

High speed cameras were setup as required in the test procedure. The camera positions for the FMVSS 301-75 Rear test are as shown in Figure 2-8. Position descriptions are presented in Table 2-1. All high speed cameras were set to run at a minimum of 500 frames per second, the test vehicle was checked for fuel system leaks for a twenty-five minute period after the initial impact and for successive 5 to 8 minutes periods afterwards at 90°, 180°, 270°, and 360° rollover attitudes.

The test velocity of the impact sled was 29.29 mph. The 1988 Nissan King Cab Pickup NHTSA No. CJ0601 had no fuel system leaks and appears to have passed all requirements of the FMVSS 301-75 Rear.

FIGURE 2-1 FULL LEFT SIDE VIEW - PRETEST

FIGURE 2-2 FULL FRONT VIEW - PRETEST

FIGURE 2-3 FULL RIGHT SIDE VIEW – PRETEST

FIGURE 2-4 FULL REAR VIEW - PRETEST

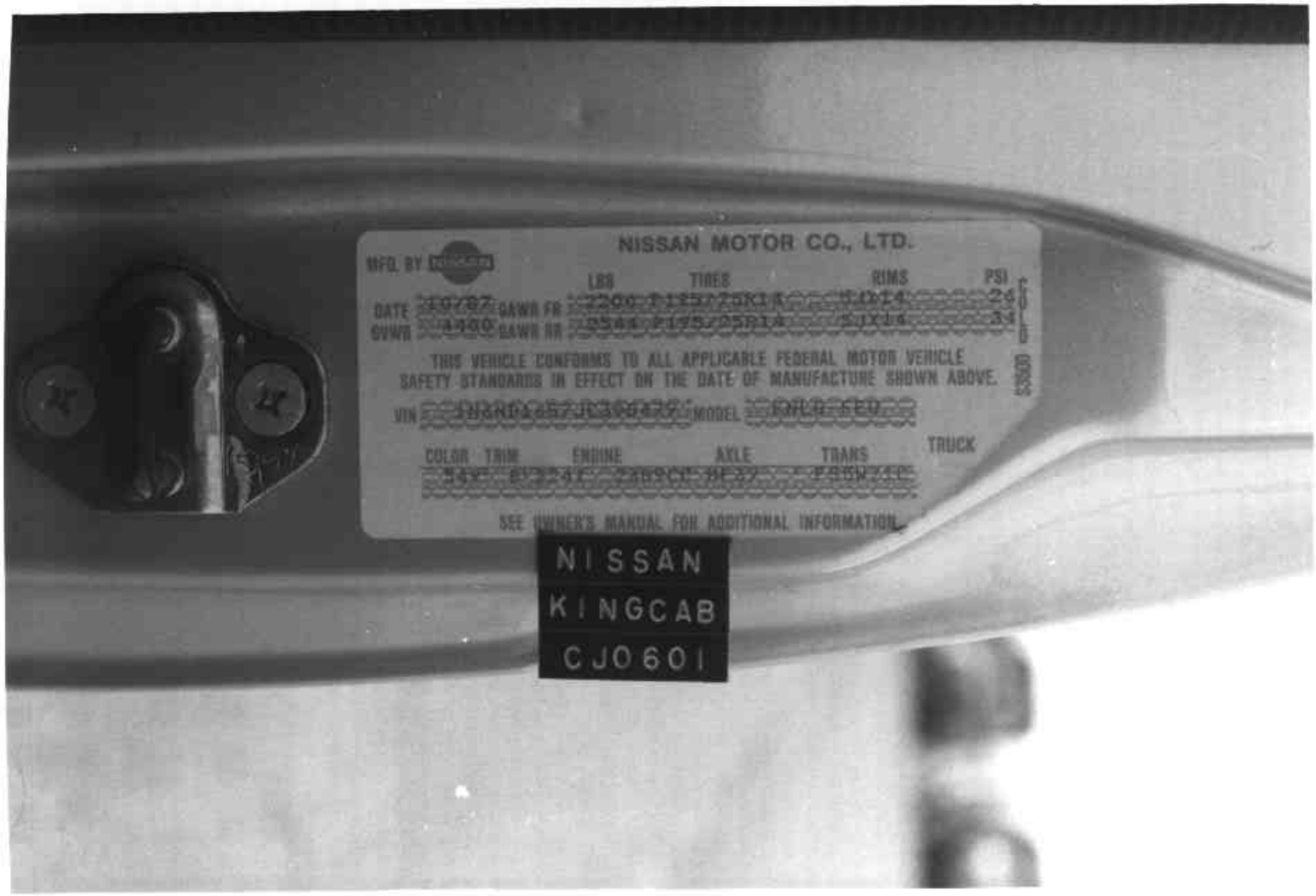


FIGURE 2-5 MANUFACTURER'S CERTIFICATION AND TIRE PLACARD LABEL

FIGURE 2-6 TRIAXIAL ACCELEROMETER MOUNTED AT VEHICLE C.G.

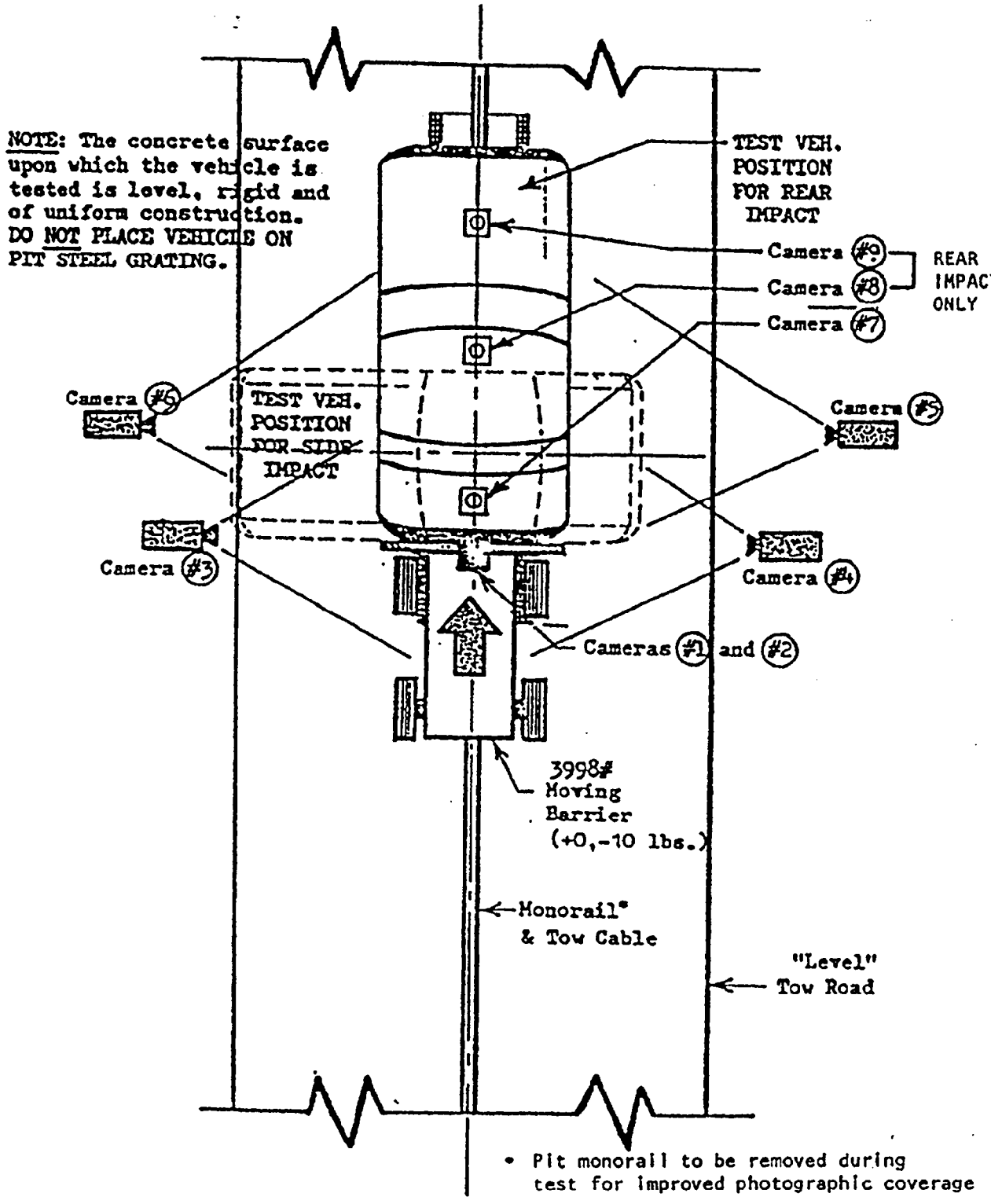


FIGURE 2-8 CAMERA POSITIONS FOR 301-75 (REAR)

TABLE 2-1 CAMERA LOCATION FOR FIGURE 1 (REAR) FOR STANDARD FMVSS 301-75

LOCATION	CAMERA NUMBER	DESCRIPTION
Overhead	1	A high speed camera will be moving barrier showing the front face of the barrier contacting the test vehicle.
	2	A second high speed camera will be suspended over the impact area to record the entire impact event.
Surface	3 & 4	Side views of event using high speed cameras. The view should concentrate on recording fuel system leakage.
	5	A "real time" (24 fps) camera will follow the moving barrier down the track and through the the impact.
	6	A handled "real time" camera will be available to photo-graph any fuel system fluid leakage and its collection.
Pit	7	A high speed camera will be placed beneath the fuel tank area to record the entire impact event.
	8	A second high speed camera will be placed approximately six feet from Camera 7 to record barrier/vehicle interaction.
	9	A third high speed camera may be placed six feet from Camera 8 for continued coverage of the impact event.

SECTION 3

COMPLIANCE TEST RESULTS

The results of the FMVSS 301-75 Rear compliance tests on the 1988 Nissan King Cab Pickup, NHTSA No. CJ0601 are presented in this section.

The test vehicle was inspected on receipt. Vehicle pretest information, delivered and test weights and attitudes, fitted tires and pressures, and fuel system capacities were recorded and are presented in Table 3-1. The location of the triaxial accelerometer mounted in the test vehicle is given in Table 3-2.

The test velocity of the rear impact sled was 29.29 mph. Test velocity information and posttest crush details are given in Table 3-3. Posttest left side, front, right side, and rear views of the test vehicle are given in Figures 3-1 to 3-4.

No solvent leaked from any part of the vehicle's fuel system during impact or for approxiamately 30 minutes after the impact event. The vehicle was then placed on the static rollover machine and rotated to the 90°, 180°, 270° and 360° positions successively at the required time intervals. No fuel system leaks were detected at any of the rollover positions. The details of the rollover test sequence and fuel spillage details are presented in Table 3-4. Pre and posttest views of the underbody fuel system components are shown in Figures 3-5 to 3-7.

The acceleration of the test vehicle due to the impact was measured by a triaxial accelerometer placed at the approximate vehicle c.g. Plots of acceleration versus time for the x, y, and z vehicle axes and resultant acceleration are shown in Figures 3-8 to 3-11.

TABLE 3-1 TEST VEHICLE INFORMATION

Vehicle Manufacturer: NISSAN MOTOR COMPANY, LTD.

Make/Model: NISSAN KING CAB PICKUP

Body Style: PICKUP Model Year: 1988

VIN: 1N6ND16S7JC308479 Build Date: 10/87

NHTSA No.: CJ0601 Color: SILVER

Engine Data: 4 Cylinders: 145 (in3) / cc Displacement

Transmission Data: 5 Speed (X) Manual / ( ) Automatic

Date Vehicle Received by Laboratory: 12/05/88

DATA FROM CERTIFICATION LABEL ON LEFT DOOR REAR FACE OR 'B' POST

Vehicle Manufactured By: NISSAN MOTOR COMPANY, LTD.

Date of Manufacturer: 10/87 VIN: 1NGND16S7JC308479

GVWR: 4400 lbs. GAWR: Front = 2200 lbs. Rear = 2544

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

Vehicle Load: Up to Capacity	FRONT psi	REAR psi
	26	34

RECOMMENDED TIRE SIZE:	LOAD RANGE
P195/75R14	(B) C D

Vehicle Capacity:

Type of Seats - X Bench
___ Bucket
___ Split Bench

CARGO LOAD = 300 lbs

TOTAL = 750 lbs

Number of Occupants = 3 Front
(Designated Seating 0 Rear
Capacity) 3 Total

WEIGHT OF TEST VEHICLE AS RECEIVED FROM DEALER (with max. fluids):

Right Front = 791 lb
Left Front = 825 lbs
TOTAL FRONT WEIGHT = 1616 lbs
TOTAL REAR WEIGHT = 1220 lbs
TOTAL DELV. WEIGHT = 2836 lbs

Right Rear = 612 lbs
Left Rear = 608 lbs
(57 % of Total Vehicle Weight)
(43 % of Total Vehicle Weight)

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 300 lbs. CARGO:

Right Front = 963 lbs
Left Front = 1003 lbs
TOTAL FRONT WEIGHT = 1996 lbs
TOTAL REAR WEIGHT = 1498 lbs
TOTAL TEST. WEIGHT = 3464 lbs

Right Rear = 752 lbs
Left Rear = 746 lbs
(56.8 % of Total Vehicle Weight)
(43.2 % of Total Vehicle Weight)

Weight of ballast secured in vehicle trunk area = 300 lbs

TOTAL CONDITIONS:

Date of Test: 01/13/89 Time of Test: 3:45 am / (pm)

Ambient Temperature: 62 °F at Impact area.

Temp. In Occ. Compart.: 62 °F: W/Shld. Mldg. Temp.: 62 °F.

TABLE 3-1 TEST VEHICLE INFORMATION (Cont'd)

VEHICLE ATTITUDE (all dimensions in inches)

Delivered Attitudes: RF 29.2 LF 29.0 RR 30.8 LR 30.7

Test Attitudes: RF 27.4 LF 27.8 RR 29.4 LR 29.4

VEHICLE TIRE DATA

Recommended Cold Tire Pressure: Front = 26 psi

Rear = 34 psi

Recommended Tire Size: P195/75R14

Load Range: B

Tire on Vehicle: Firestone UR-12 P195/75R14

Is Spare Tire a "Space Saver": Yes (yes/no)

Is Spare Tire Standard Equipment: Yes (yes/no)

TEST FLUID DATA

Test Fluid Type: Red Stoddard Solvent Spec Grav.: 0.764

Kinematic Viscosity: As per ASTM Standard D484-71

Test Volume: 14.0 Gallons (92 to 94% of Man. Cap.)

Fuel System Capacity (data from Owner's Manual): 15.3 gal.

Details of Fuel System: Fuel tank is located on the right hand side extending from behind the passenger rearwards underneath the bed. Filler tube runs in front of the right rear wheel well.

Electric Fuel Pump X Yes ___ No; Fuel Injection: ___ Yes X No

Does electric fuel pump operate with ignition switch switch "on" and the engine not operating: X Yes ___ No

VEHICLE REBOUND AND CRUSH

Overall Length of Test Vehicle: Pretest = R 190.0 in

Crush = R 11.0 Posttest = R 179.0 in

FOR FRONTAL IMPACTS, distance from front of test vehicle to the barrier after impact = NA inches

* With entire fuel system filled from fuel tank through carburetor bowl.

TEST ENGINEER: S. D. Pruitt TECHNICIAN: P. Puzzuto/T, Kippen

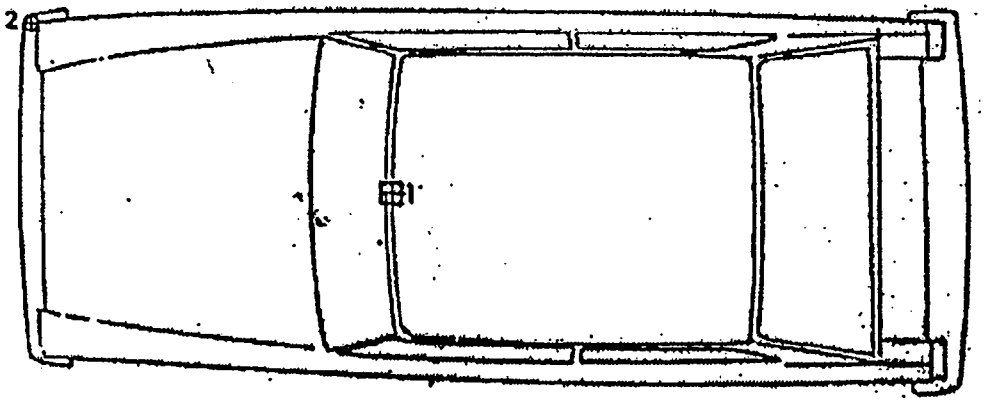
Signature of Approving Laboratory Official

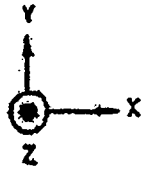
2/14/85
Date

TABLE 3-2 ACCELEROMETER LOCATIONS

Vehicle: NISSAN KING CAB PICKUP **Test Date:** 01/13/89

No. Location	X Distance From Front of Bumper Inches	Y Distance From Centerline Inches	Z Distance Above Ground Inches
1 Vehicle c.g.	98.5	0.0	18.2





⊕ - Single Axis

⊞ - Triaxial

TEST VEHICLE MAKE NISSAN KING CAB PICKUP

NHTSA NO.: CJ0601

VIN: 1N6ND16S7JC308479

TEST ENGINEER: S. D. Pruitt TECHNCIAN: P. Puzzuto/T. Kippen

Signature of Laboratory Approving Official

2/14/89
Date

TABLE 3-3 POST IMPACT DATA STANDARD 301-75 REAR IMPACT

TYPE OF TEST: ___ Frontal (90°) Impact

___ Oblique (__°) Impact on __ Left (Driver's) Side
__ Right Side

___ Lateral or Side Impact on __ Left (Driver's) Side
__ Right Side

_X_ Rear Impact

DATE OF TEST: 01/13/89 TIME: 3:45 PM TEMP.: 62 °F

VEH. NHTSA NO.: CJ0601 VIN: 1N6ND16S7JC308479

REQUIRED VEH. VELOCITY RANGE: 28.9 to 29.9 MPH

IMPACT VELOCITY: (traps within 5 feet of impact event)

Trap #1 = 29.29 mph; Trap #2 = 29.25 mph

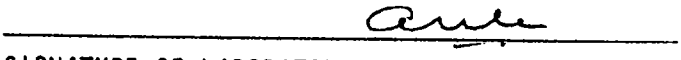
Distance from the vehicle's front bumper to the barrier face
entering the vehicle velocity measurement device = 6.0 ft
exiting the vehicle velocity measurement device = 2.0 ft

VEHICLE STATIC CRUSH:

Driver's Side = 11.0 in Passenger's Side = 11.0 in
Average = 11.0 inches

Crush Details:
The fuel tank and filler neck were not damaged or deformed in any way. All other fuel system components are also undamaged. The impact force buckled the rear 10 inches of the bed downwards and pushed the bed into the cab area.

TEST ENGINEER: S. D. Pruitt TECHNICIAN: P. Puzzuto/T. Kippen



SIGNATURE OF LABORATORY APPROVING OFFICIAL

2/14/89
DATE

FIGURE 3-1 FULL LEFT SIDE VIEW - POSTTEST

FIGURE 3-2 FULL FRONT VIEW - POSTTEST

FIGURE 3-3 FULL RIGHT SIDE VIEW - POSTTEST

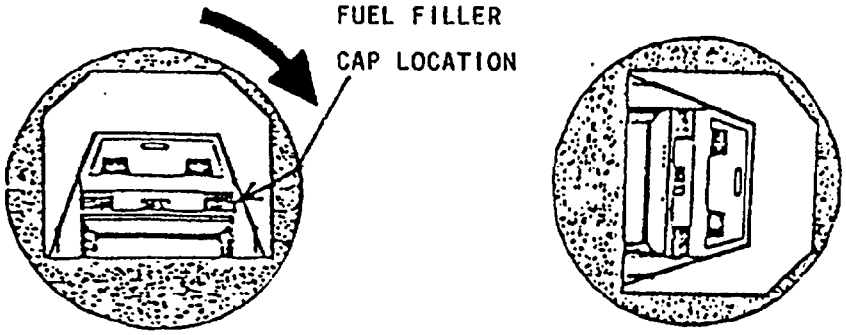
FIGURE 3-4 FULL REAR VIEW - POSTTEST

TABLE 3-4 FMVSS 301-75 STATIC ROLLOVER DATA SHEET

TEST VEHICLE NHTSA NO. CJ0601 TEST DATE 01/13/89

VEH. MFR/MAKE/MODEL 1988 NISSAN/KING CAB/PICKUP

TEST PHASE: 0° **0** 0° **90**



NOTE: IF SIDE FILL ROTATE SO FILLER CAP IS DOWN

I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

	minutes	seconds
Rollover Fixture 90° Rotation Time - - = (Spec. Range = 1 to 3 minutes)	1	20
FMVSS 301-75 Position Hold Time - - - -=	5	00
TOTAL - - - - - - - - - - - - - - - - - -=	6	20
Next Whole Minute Interval - - - - - -=	7	

II. FMVSS 301-75 REQUIREMENTS:

(1) Time Period—

First 5 min. FROM onset of rotation	6th min.	7 min.	8th min. if red.

(2) Maximum Allowable Solvent Spillage —

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0 ounces	0 ounces	0 ounces	N/A

NOTE: Record spillage for whole minute intervals only as determine above.

IV. SOLVENT SPILLAGE LOCATION(S):

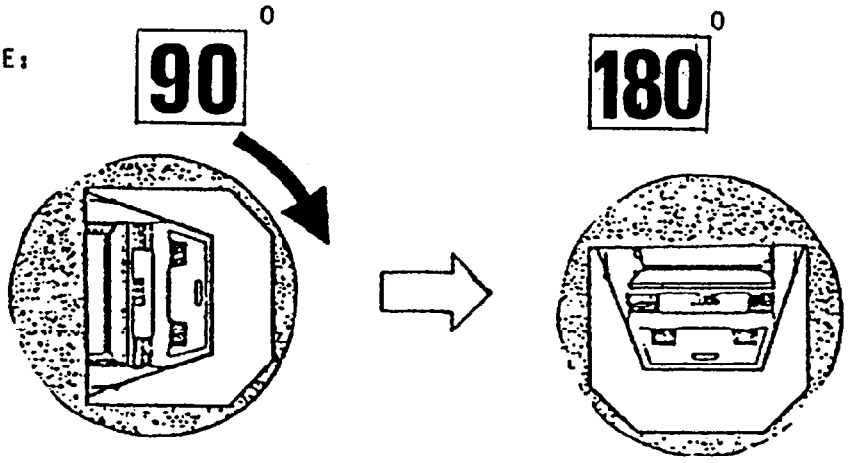
None.

TABLE 3-4 FMVSS 301-75 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST VEHICLE NHTSA NO. CJ0601 TEST DATE 01/13/89

VEH. MFR/MAKE/MODEL NISSAN/KING CAB/PICKUP

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

	minutes	seconds
Rollover Fixture 90° Rotation Time - - = (Spec. Range = 1 to 3 minutes)	1	20
FMVSS 301-75 Position Hold Time - - - -=	5	00
TOTAL - - - - - - - - - - - - - - - - - -=	6	20
Next Whole Minute Interval - - - - - -=	7	

II. FMVSS 301-75 REQUIREMENTS:

(1) Time Period—

First 5 min. FROM onset of rotation	6th min.	7 min.	8th min. if red.

(2) Maximum Allowable Solvent Spillage —

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0 ounces	0 ounces	0 ounces	N/A

NOTE: Record spillage for whole minute intervals only as determine above.

IV. SOLVENT SPILLAGE LOCATION(S):

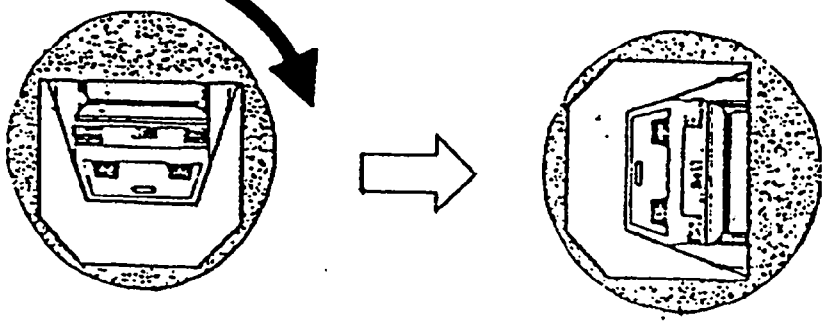
None.

TABLE 3-4 FMVSS 301-75 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST VEHICLE NHTSA NO. CJ0601 TEST DATE 01/13/89

VEH. MFR/MAKE/MODEL 1988/NISSAN/KING CAB/PICKUP

TEST PHASE: 0 180 0 270



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

	minutes	seconds
Rollover Fixture 90° Rotation Time - - = (Spec. Range = 1 to 3 minutes)	1	20
FMVSS 301-75 Position Hold Time - - - - =	5	00
+ TOTAL - - - - - - - - - - - - - - - - - - =	6	20
Next Whole Minute Interval - - - - - - =	7	

II. FMVSS 301-75 REQUIREMENTS:

(1) Time Period—

First 5 min. FROM onset of rotation	6th min.	7 min.	8th min. if red.

(2) Maximum Allowable Solvent Spillage —

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0 ounces	0 ounces	0 ounces	N/A

NOTE: Record spillage for whole minute intervals only as determine above.

IV. SOLVENT SPILLAGE LOCATION(S):

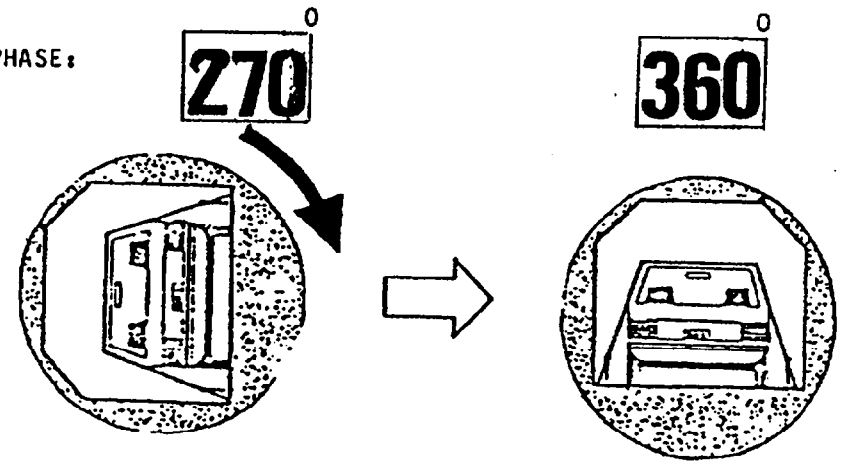
None.

TABLE 3-4 FMVSS 301-75 STATIC ROLLOVER DATA SHEET (Cont'd)

TEST VEHICLE NHTSA NO. CJ0601 TEST DATE 01/13/89

VEH. MFR/MAKE/MODEL NISSAN/KING CAB/PICKUP

TEST PHASE:



I. DETERMINATION OF SOLVENT COLLECTION TIME PERIOD:

Rollover Fixture 90° Rotation Time - - = (Spec. Range = 1 to 3 minutes)	1	minutes	2 0	seconds
FMVSS 301-75 Position Hold Time - - - -=	5	minutes	0 0	seconds
TOTAL - - - - - - - - - - - - - - - - - -=	6	minutes	2 0	seconds
Next Whole Minute Interval - - - - - -=	7	minutes		

II. FMVSS 301-75 REQUIREMENTS:

(1) Time Period—

First 5 min. FROM onset of rotation	6th min.	7 min.	8th min. if red.

(2) Maximum Allowable Solvent Spillage —

5 ounces	1 ounce	1 ounce	1 ounce

III. ACTUAL TEST VEHICLE SOLVENT SPILLAGE

0 ounces	0 ounces	0 ounces	N/A

NOTE: Record spillage for whole minute intervals only as determine above.

IV. SOLVENT SPILLAGE LOCATION(S):

NONE.

TABLE 3-4 FMVSS 301-75 STATIC ROLLOVER DATA SHEET (Continued)

TEST VEHICLE NHTSA NO. CJ0601 TEST DATE 01/13/89

VEH. MFR/MAKE/MODEL NISSAN/KING CAB/PICKUP

Test vehicle fuel tank filled to 92 to 94% capacity with Stoddard Solvent and with electric fuel pump operating (if it will operate without engine operation. Part 572 test dummies located at each front designated seating position.

A. TEST VEHICLE IMPACT TYPE

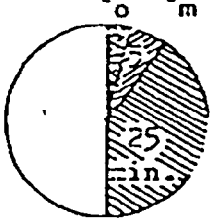
___ Frontal (35 mph)

___ Oblique (35) with ___° barrier face first contacting ____ (driver/passenger) side

X Rear Moving Barrier (30 mph)

___ Lateral Moving Barrier (20 mph)

FUEL SPILLAGE MEASUREMENT - - -



	ACTUAL	MAX. ALLOW.
1. From impact until vehicle motion ceases - - - - - -	0 oz.	1 oz.
2. For 5 minute period after veh. motion ceases - - -	0 oz.	5 oz.
3. For next 25 minutes - - -	0 oz.	1 oz./1 min.

B. TEST VEHICLE STATIC ROLLOVER

DETAILED TEST RESULTS ARE RECORDED ON THE FOLLOWING DATA SHEETS:

(1) Rollover data for 0° to 90° test phase.
(2) Rollover data for 90° to 180° test phase.
(3) Rollover data for 180°to 270° test phase.
(4) Rollover data for 270° to 360° test phase.

C. SOLVENT SPILLAGE DETAILS

No Spillage.

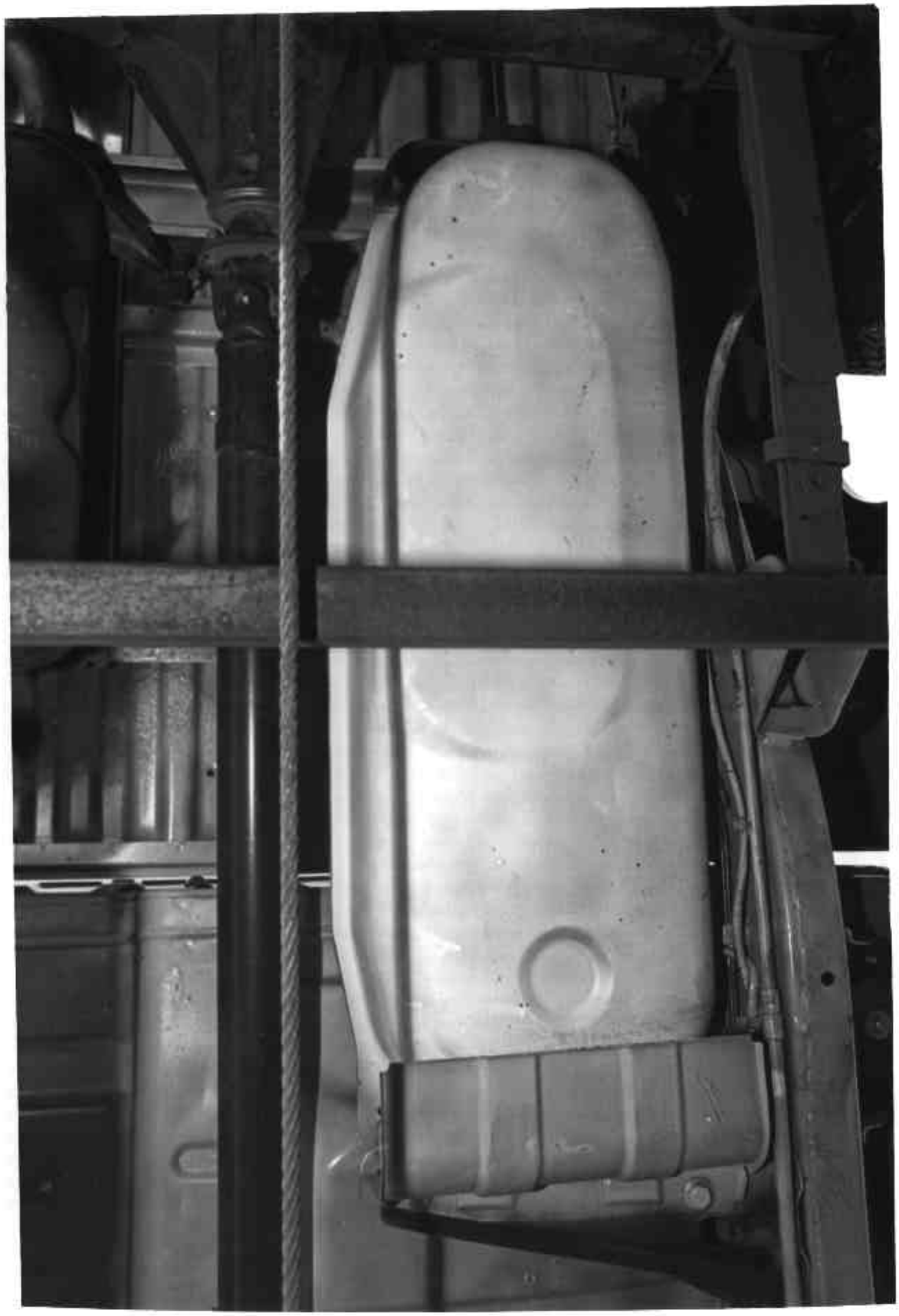


FIGURE 3-5 CLOSEUP VIEW OF FUEL TANK - PRETEST

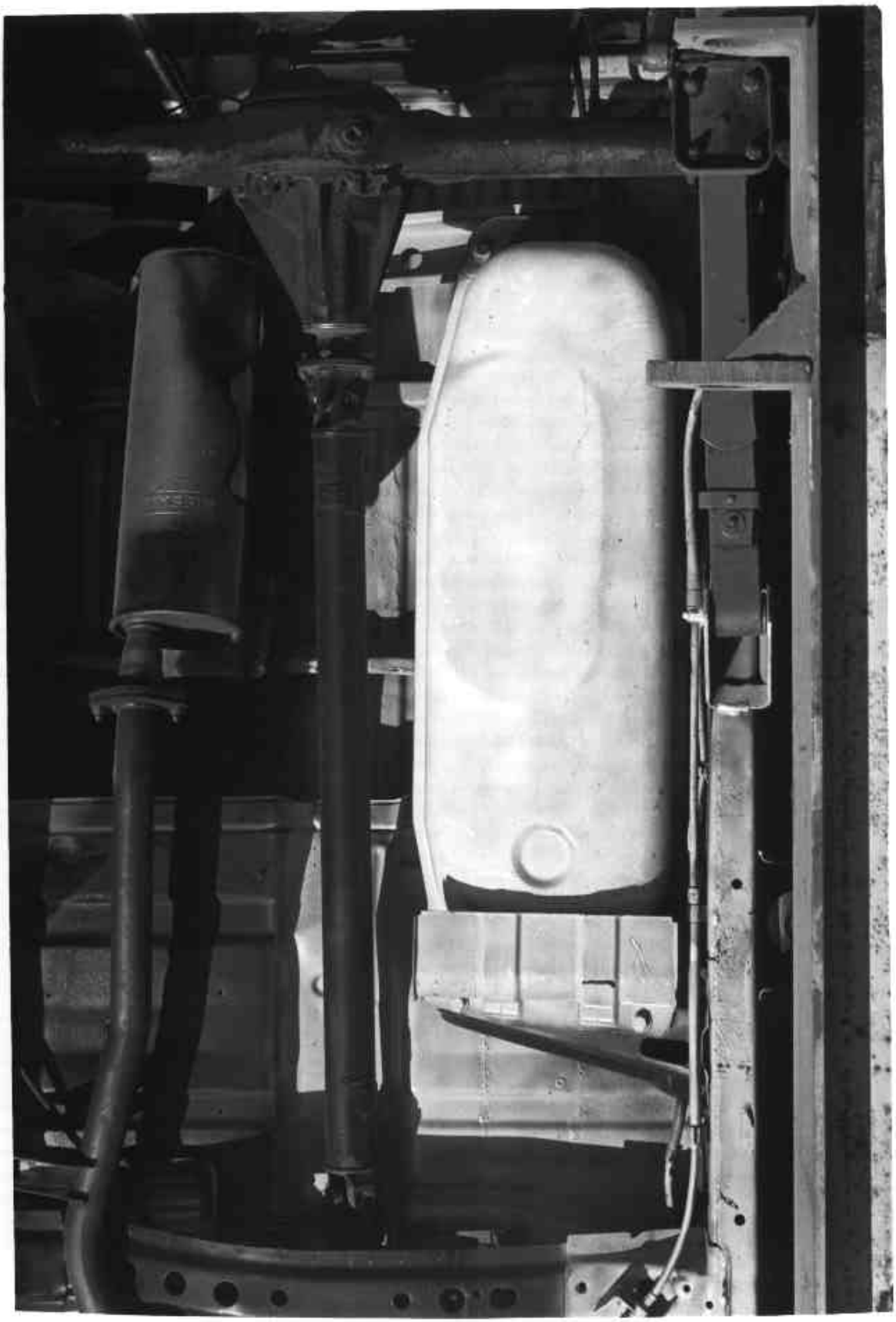


FIGURE 3-6 CLOSEUP VIEW OF FUEL TANK - POSTTEST

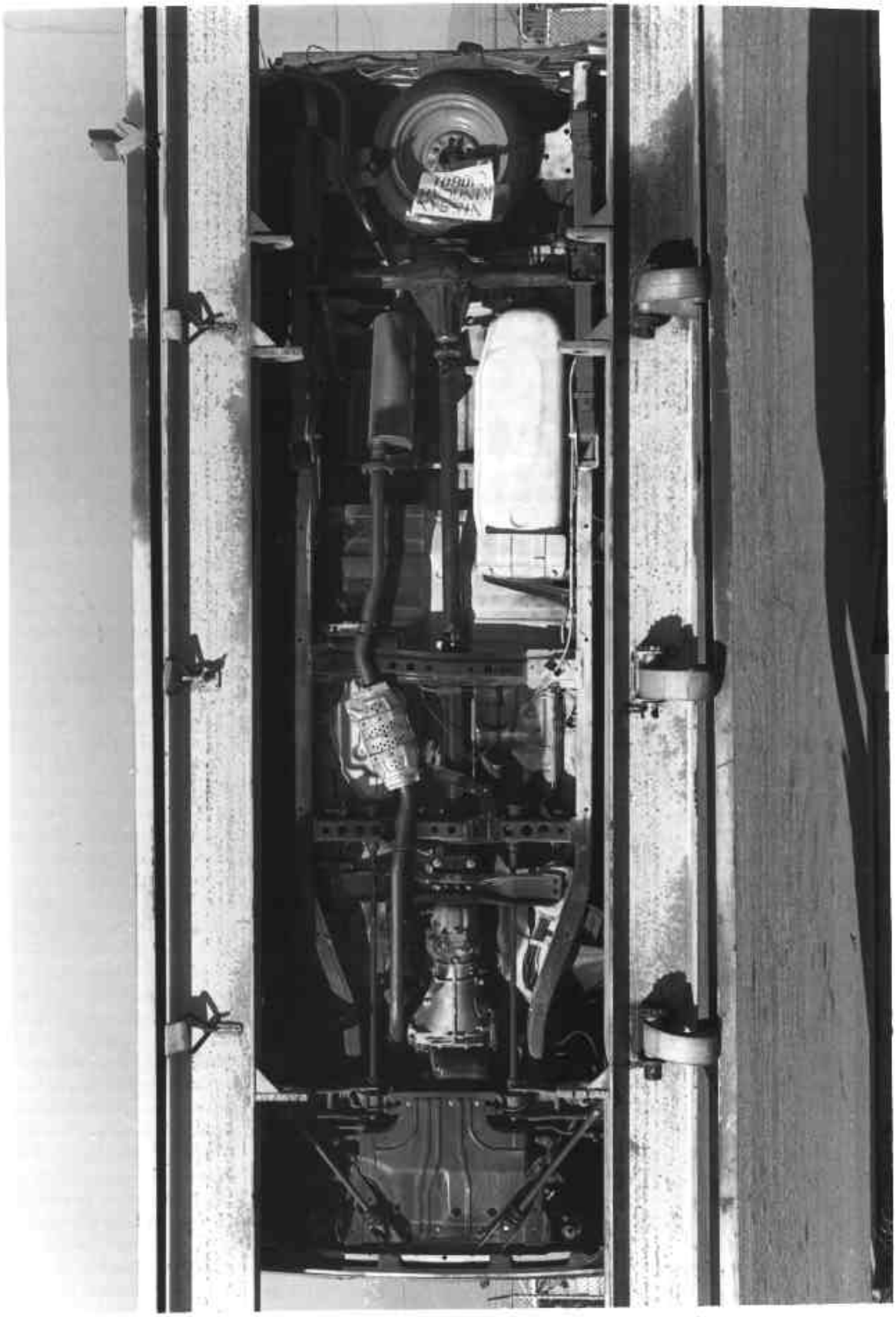
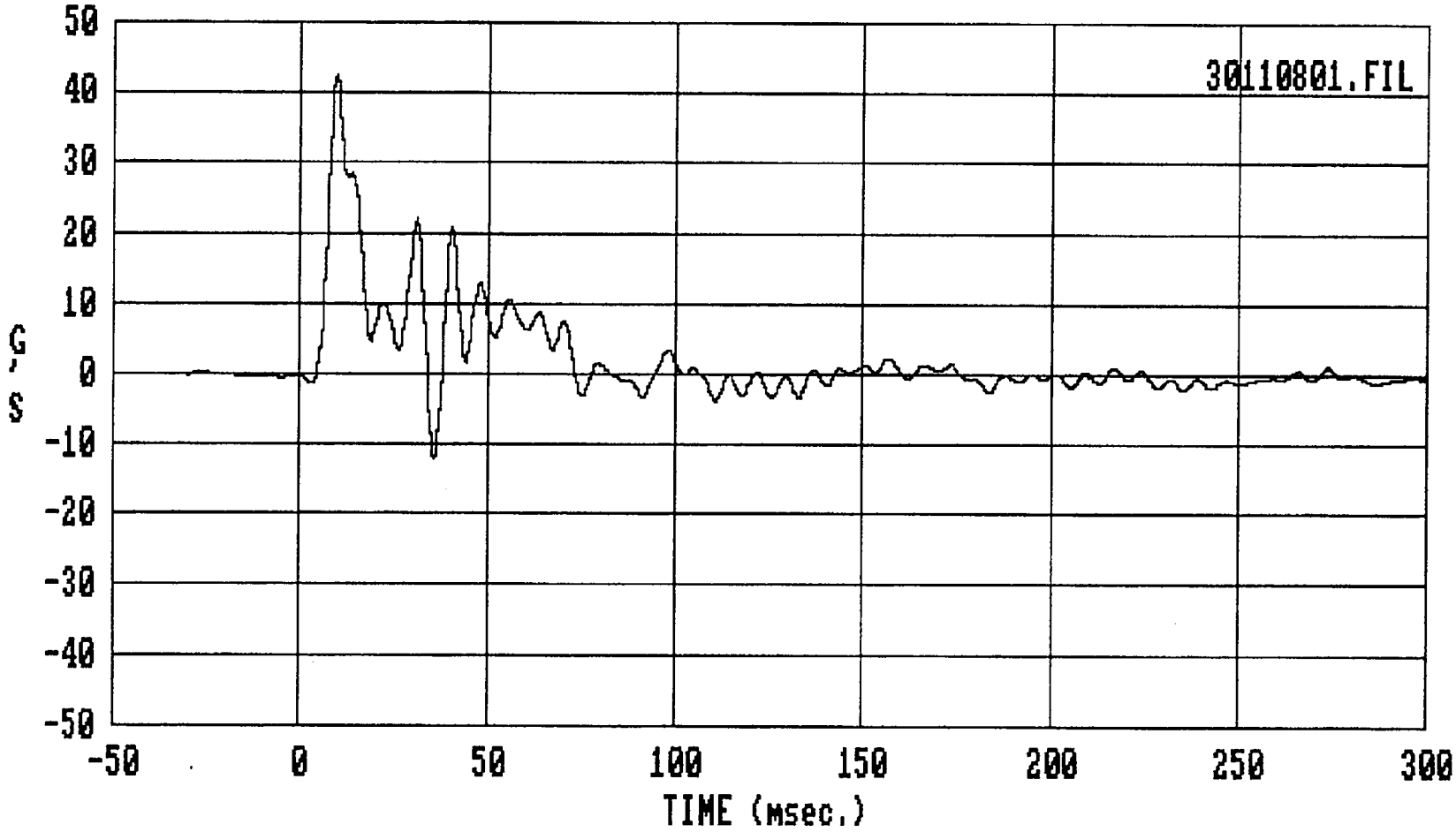


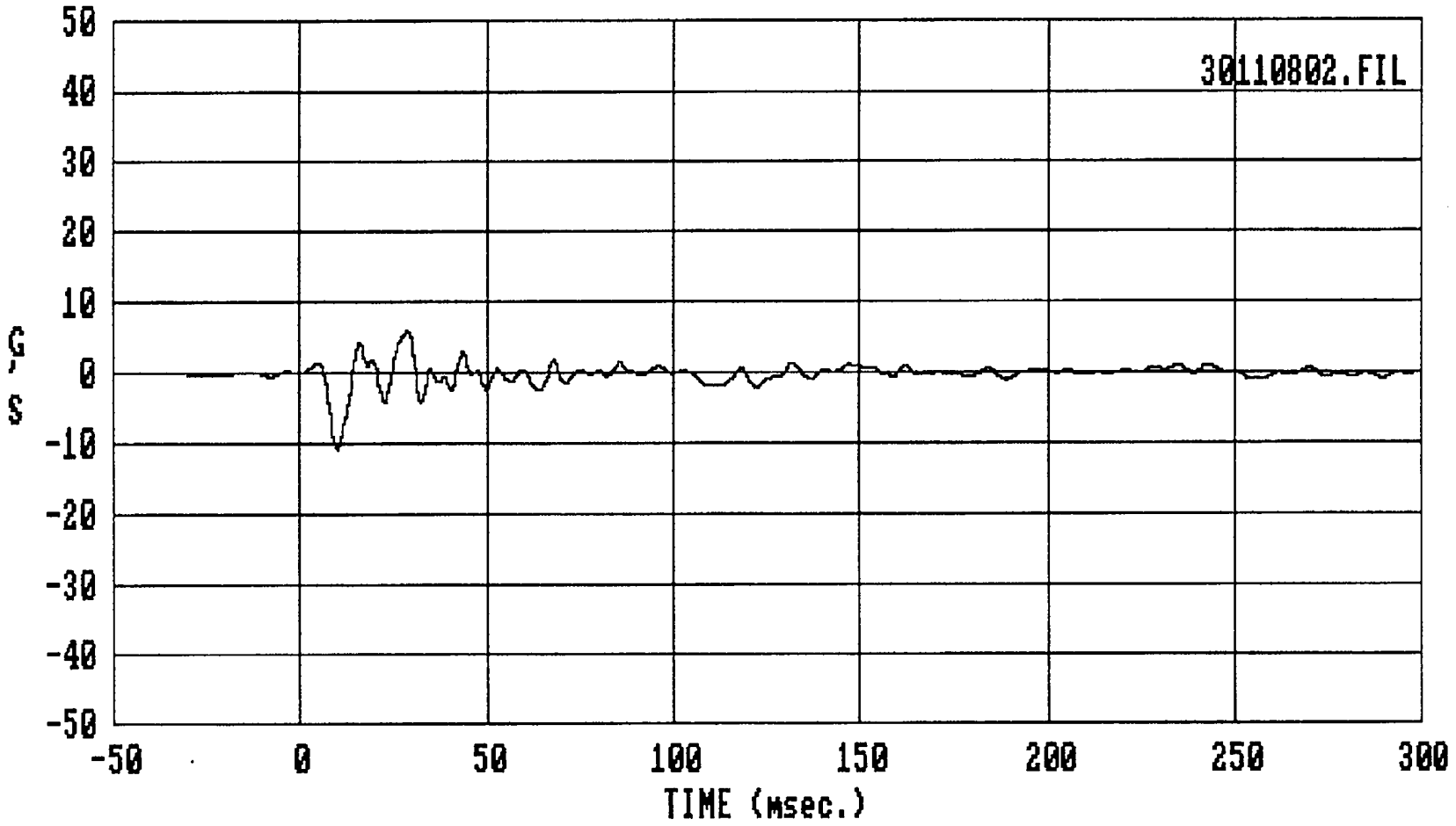
FIGURE 3-7 UNDERBODY VIEW – POSTTEST



Filter: SAE CLASS 60 Max = 42.374 Min = -11.968

MSE 01/13/89 -- 1988 Nissan Pickup : C/G acceleration, X-axis

FIGURE 3-8



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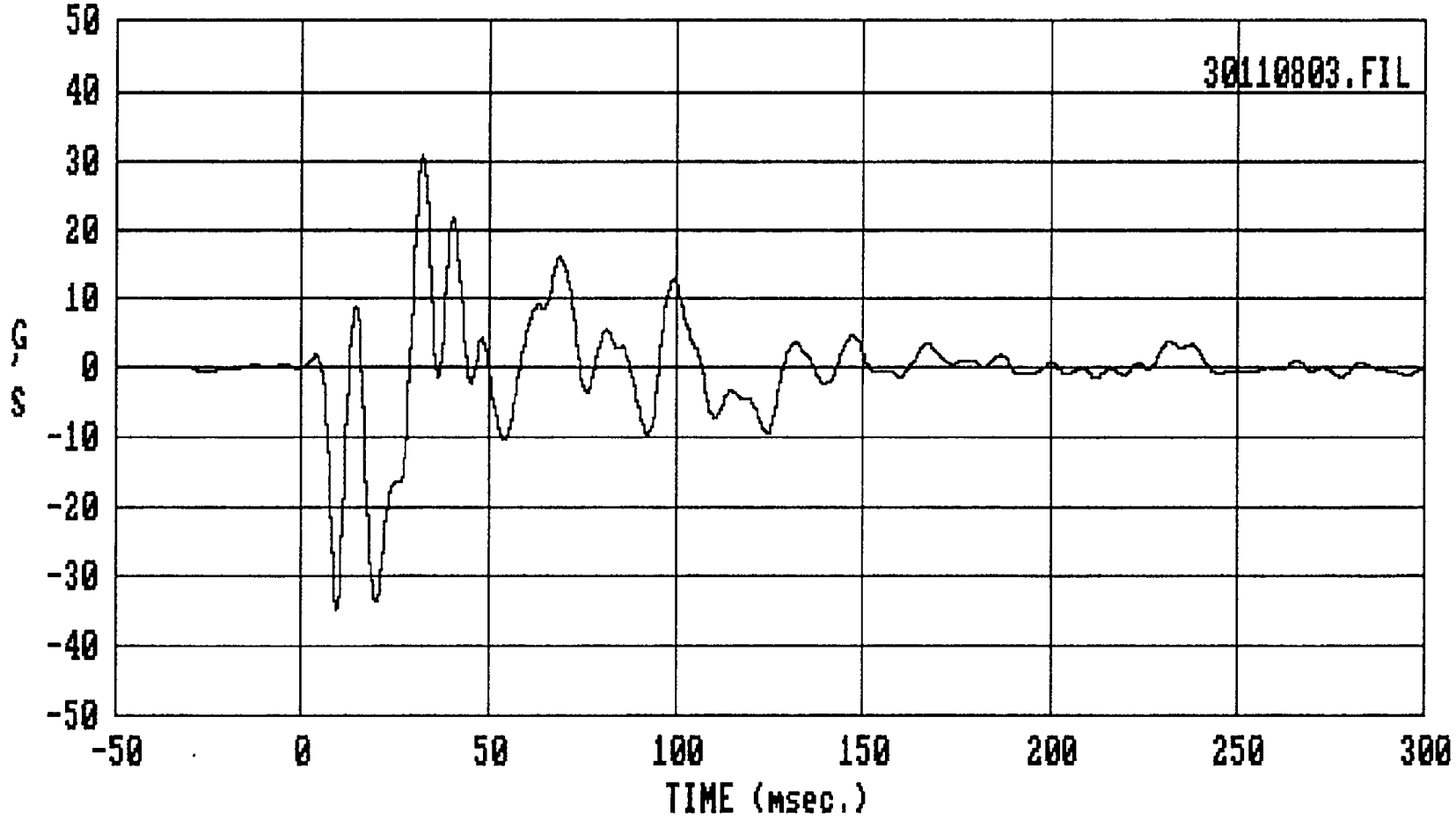
MSE 01/13/89 -- 1988 Nissan Pickup : C/G acceleration, Y-axis

FIGURE 3-9



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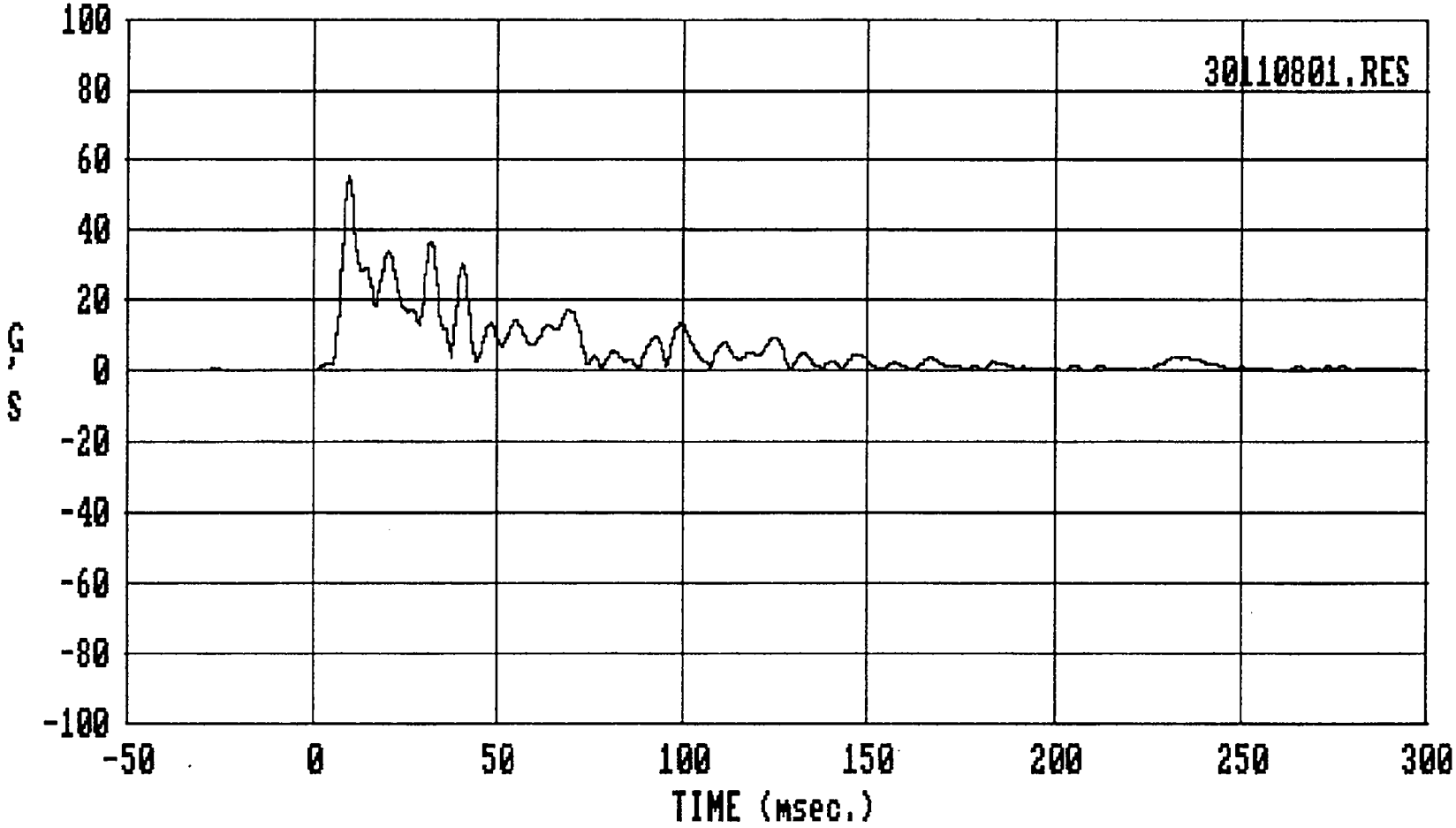
MSE 01/13/89 -- 1988 Nissan Pickup : C/G acceleration, Z-axis

FIGURE 3-10



Filter: SAE CLASS 60 Max = 55.744 Min = .85840E-01

MSE 01/13/89 -- 1988 Nissan Pickup : C/G resultant acceleration

FIGURE 3-11

Detailed pre and posttest measurements of the test vehicle dimensions are presented in Table 3-5. Detailed posttest rear end crush measurements are given in Table 3-6.

No test failures relative to FMVSS 301-75 (Rear) were identified for 1988 Nissan King Cab Pickup.

TABLE 3-5 TEST VEHICLE MEASUREMENTS

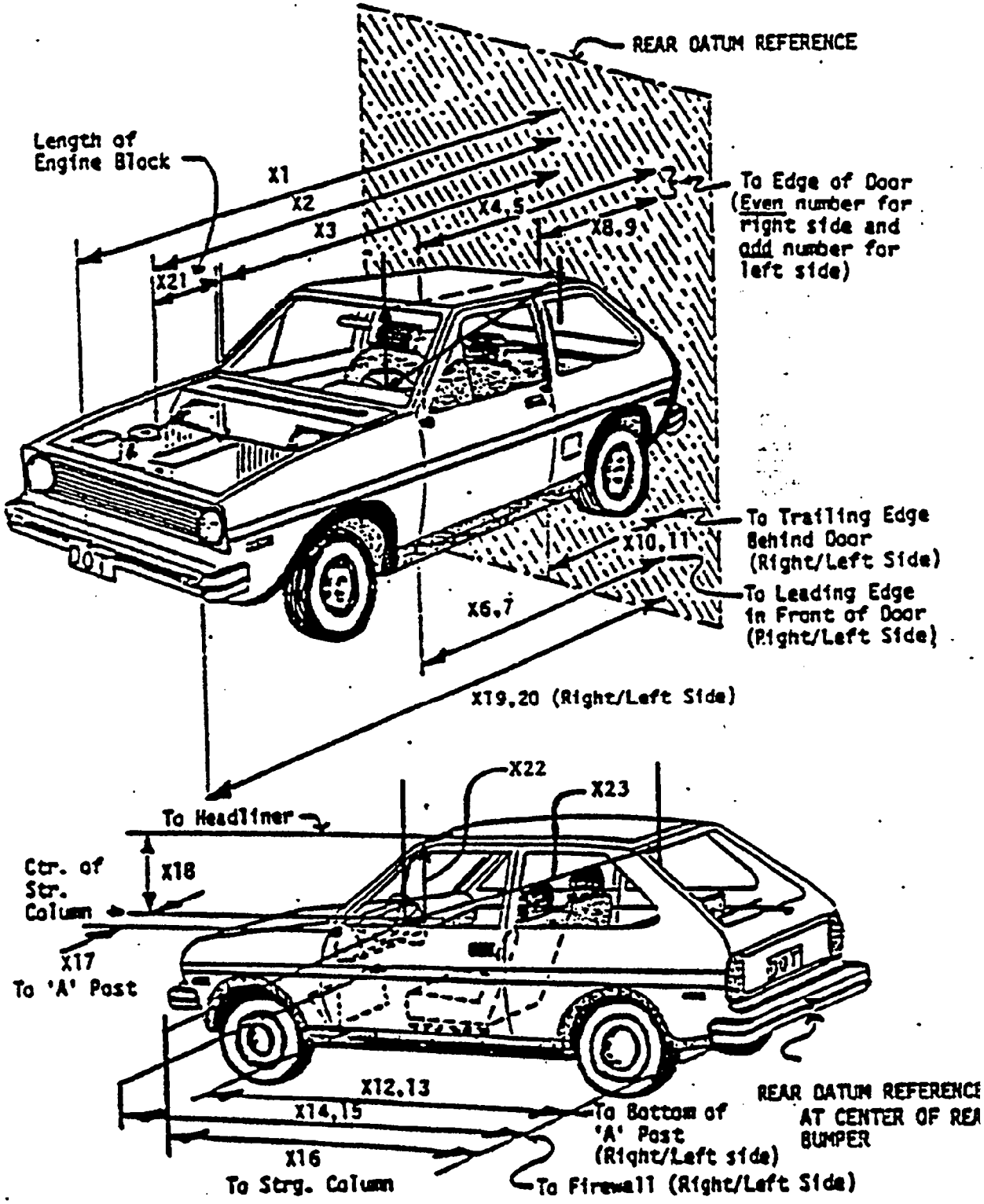


TABLE 3-5 TEST VEHICLE MEASURMENTS (Cont'd)

NO.	MEASUREMENT DESCRIPTION	Pre-Test (in.)	Post-Test (in.)	Diff. (in.)
X1	Total Length of Test Vehicle at Centerline	190.0	179.0	11.0
X2	Rear Surface of Vehicle to Front of Engine	173.2	162.2	11.0
X3	Rear Surface of Vehicle to Firewall	151.5	140.5	11.0
X4	Rear Surface to Upr. Leading Edge of Right Door	143.6	131.7	11.9
X5	Rear Surface to Upr. Leading Edge of Left Door	143.7	131.4	12.3
X6	Rear Surface to Lwr. Leading Edge of Right Door	142.5	130.9	11.6
X7	Rear Surface to Lwr. Leading Edge of Left Door	142.2	131.4	10.8
X8	Rear Surface to Upr. Trailing Edge of Right Door	97.4	85.6	11.8
X9	Rear Surface to Upr. Trailing Edge of Left Door	97.5	85.1	12.4
X10	Rear Surface to Lwr. Trailing Edge of Right Door	97.0	86.3	10.7
X11	Rear Surface to Lwr. Trailing Edge of Left Door	97.0	86.3	10.7
X12	Rear Surface to Bottom 'A' Post on Right Side	139.5	128.7	10.8
X13	Rear Surface to Bottom 'A' Post on Left Side	139.5	129.0	10.5
X14	Rear Surface to Firewall on Right Side	151.0	140.3	10.7
X15	Rear Surface to Firewall on Left Side	150.8	140.2	10.6
X16	Rear Surface to Steering Column	125.0	113.5	11.5
X17	Center of Steering Column to 'A' Post	15.5	15.5	0.0
X18	Center Steering Column to Headlining	19.0	19.0	0.0
X19	Rear Surface to Right Side of Front Bumper	188.4	177.4	11.0
X20	Rear Surface to Left Side of Front Bumper	188.4	177.4	11.0
X21	Length of Engine Block	17.0	17.0	0.0

TABLE 3-6 REAR CRUSH DETAILS

VEHICLE MAKE/MODEL/BODY STYLE: NISSAN/KINGCAB/PICKUP

VEH. NHTSA NO.: CJ0601 ; VIN: 1N6ND16S7JC308479

MODEL YEAR: 1988 BUILD DATE: 10/87 ; TEST DATE: 01/13/89

COLLISION DEFORMATION CLASSIFICATION (CDC) CODE:
f (Frontal)

CRUSH DEPTH DIMENSIONS:

C1 = 11.5 inches
C2 = 11.0 inches
C3 = 11.0 inches
C4 = 11.2 inches
C5 = 11.1 inches
C6 = 12.4 inches

MIDPOINT OF DAMAGE: D = Vehicle Centerline (Longitud.)

LENGTH OF DAMAGED REGION: L = 65.4 inches