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VEHICLE RESEARCH AND TEST CENTER

MOVING BARRIER
INTO THE LEFT SIDE OF A
1985 FORD F150 PICKUP TRUCK
TRC TEST NO. 921217-1

PREPARED BY:
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FINAL REPORT
DECEMBER 1992 - JANUARY 1993

PREPARED FOR:
U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
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16. Abstract A 20 mph left side moving barrier impact test was conducted on a 1985 Ford F150 pickup at Transportation Research Center Inc. on December 17, 1992. This test was conducted to determine compliance with Federal Motor Vehicle Safety Standard (FMVSS) 301, "Fuel System Integrity." The moving barrier's impact velocity was 19.3 mph. The vehicle's maximum crush was 10.9 inches. The ambient temperature was 41° F.		14. Sponsoring agency Code DOT/NHTSA/VRTC	
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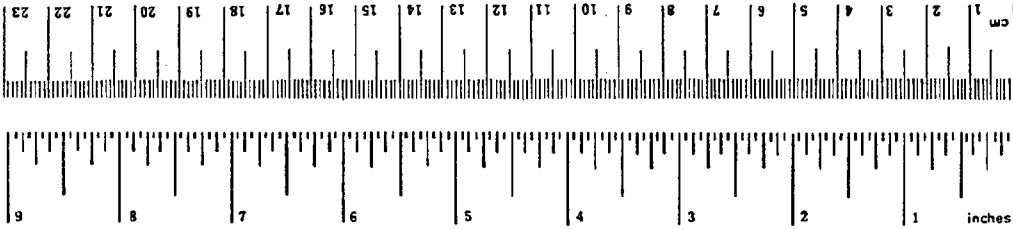
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.54	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³

TEMPERATURE (exact)

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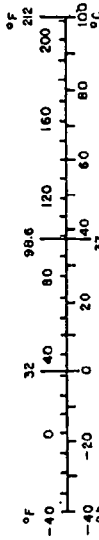


Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³

TEMPERATURE (exact)

°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F
----	---------------------	-------------------	------------------------	----



*1 in. = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.25, SD Catalog No. C13.10286.

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SECTION 1.0

PURPOSE & TEST PROCEDURE

PURPOSE

This 20 mph moving barrier left side impact test was conducted for the Vehicle Research & Test Center (VRTC) by Transportation Research Center Inc. (TRC). The purpose of this test was to determine the performance of the subject vehicle, a 1985 Ford F150 pickup, relative to the requirements of Federal Motor Vehicle Safety Standard (FMVSS) 301, "Fuel System Integrity," in the left side impact mode.

TEST PROCEDURE

This test was conducted in accordance with NHTSA's Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure No. TP-301-00. Data was obtained relative to FMVSS 301, "Fuel System Integrity," performance.

The moving barrier impacted the test vehicle's left side in the specified impact velocity range of 18.9 to 19.9 mph. The intended impact point was 66 inches rearward of the vehicle's front wheel centerline.

The test vehicle contained two (2) uninstrumented Part 572 B 50th percentile adult male anthropomorphic test devices (dummies) positioned in the front outboard designated seating positions.

The crash event was recorded by one (1) real-time panning motion picture camera and five (5) high-speed motion picture cameras. Pre-test and post-test conditions were recorded by one (1) real-time motion picture camera.

The vehicle and moving barrier data are summarized in Section 2.0. The FMVSS 301 data are presented in Section 3.0. The camera measurements are presented in Section 4.0. Appendix A contains the still photographic prints.

SECTION 2.0

MOVING BARRIER LEFT SIDE IMPACT TEST SUMMARY

TEST RESULTS SUMMARY

This moving barrier left side impact test was conducted at TRC on December 17, 1992.

The test vehicle, a 1985 Ford F150 pickup, appeared to comply with the performance requirements of FMVSS 301 in the moving barrier left side impact mode. No fluid spilled from the vehicle's fuel system following the impact or during the static rollover test.

The test vehicle was equipped with a 4.9-liter, 6-cylinder, inline engine, automatic transmission, power steering, and power brakes. The vehicle's test weight was 4461 pounds. The vehicle's maximum static crush was 10.9 inches. The moving barrier's test weight was 3967 pounds. The moving barrier's impact speed was 19.3 mph.

No fluid spilled from the vehicle's fuel system following the crash test event or during the static rollover test.

TABLE 1 CRASH TEST SUMMARY

TEST TYPE: Left Side Impact

TEST DATE: 12/17/92 TEST TIME: 1307 AMBIENT TEMP. (°F): 41

VEHICLE YEAR/MAKE/MODEL/BODY STYLE: 1985/Ford/F150/pickup

VEHICLE TEST WEIGHT (LBS): 4461

MOVING BARRIER TEST WEIGHT (LBS): 3967

IMPACT ANGLE (DEG)*: 270

IMPACT VELOCITY (MPH)**: PRIMARY = 19.3 SECONDARY = 19.3

MAXIMUM STATIC CRUSH (IN): 10.9

DUMMIES:	Driver.	Passenger
TYPE:	Part 572 B	Part 572 B
LOCATION:	Left front	Right front
RESTRAINT:	3-point unbelt	3-point unbelt

NUMBER OF DATA CHANNELS: 0

NUMBER OF CAMERAS: HIGH-SPEED 5 REAL-TIME 2

*With respect to tow track centerline.

**Speed trap measurement ($\pm .05$ mph accuracy). The velocity measurement system contains two (2) independent photo emitter/receiver pairs (See Figure 1) which each measure the impact velocity.

TABLE 2 TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Ford Motor Company

MAKE/MODEL: Ford/F150

VIN: 1FTDF15Y0FLA56595

BODY STYLE: pickup truck

MODEL YEAR: 1985

COLOR: Brown

ENGINE DATA: TYPE: inline CYLINDERS: 6 DISPLACEMENT: 4.9

TRANSMISSION DATA: 3 SPEED, MANUAL, X AUTOMATIC, FWD, X RWD, 4WD

DATE VEHICLE RECEIVED: NA

ODOMETER READING: 89,471

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	Yes	AUTOMATIC TRANSMISSION	Yes
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	Yes
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: Good

CERTIFICATION DATA FROM VEHICLE'S LABEL:

VEHICLE MANUFACTURED BY: Ford Motor Company

DATE OF MANUFACTURE: 02/85

VIN: 1FTDF15Y0FLA56595

GVWR: 5450 LBS

GAWR: FRONT: 2800 LBS., REAR: 2894 LBS.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Guardsman, Response, 235/75R15

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 35 PSI
REAR: 41 PSI

SPARE TIRE (MFR., LINE, SIZE): Firestone, Supreme, P235/75R15

TYPE OF SEATS: FRONT: Bench
REAR: NA

TYPE OF FRONT SEAT BACKS: Non-adjustable

MAXIMUM WIDTH: 77.0 INCHES

WHEELBASE: 132.0 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA:
The label was located on the driver's B-pillar.

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL: *

RECOMMENDED TIRE SIZE:

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

DESIGNATED SEATING CAPACITY: _____FRONT _____REAR _____TOTAL

VEHICLE CAPACITY WEIGHT: _____ LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES): **

DELIVERED ATTITUDE: LF 32.1; RF 32.3; LR 32.8; RR 33.3

PRE-TEST ATTITUDE: LF 31.2; RF 31.3; LR 31.4; RR 31.4

POST-TEST ATTITUDE: LF 32.2; RF 30.8; LR 32.3; RR 31.5

*The vehicle did not contain a label stating tire and capacity data.
**Measurements taken from ground to the target at the center top of the wheel well opening.

TABLE 2 TEST VEHICLE INFORMATION CONT'D

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

RIGHT FRONT	1132 LBS.	RIGHT REAR	794 LBS.
LEFT FRONT	1125 LBS.	LEFT REAR	796 LBS.
TOTAL FRONT WEIGHT	2257 LBS.	(58.7% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	1590 LBS.	(41.3% OF TOTAL VEHICLE WEIGHT)	
TOTAL DELIVERED WEIGHT 3847 LBS.			

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (3847 LBS)

VCW = VEHICLE CAPACITY WEIGHT (NA LBS)

DSC = DESIGNATED SEATING CAPACITY (NA)

RCLW* = VCW - 150 (DSC) = 300

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

TARGET TEST WEIGHT = 3847 + 300 + 328

TARGET TEST WEIGHT = 4475 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 286 LBS. OF CARGO WEIGHT:

RIGHT FRONT	1205 LBS.	RIGHT REAR	1044 LBS.
LEFT FRONT	1188 LBS.	LEFT REAR	1024 LBS.
TOTAL FRONT WEIGHT	2393 LBS.	(53.6% OF TOTAL VEHICLE WEIGHT)	
TOTAL REAR WEIGHT	2068 LBS.	(46.4% OF TOTAL VEHICLE WEIGHT)	
TOTAL TEST WEIGHT	4461 LBS.	(0.3% UNDER TARGET TEST WEIGHT)	

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 286 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 61.2 INCHES REARWARD OF FRONT WHEEL CENTERLINE

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

TABLE 3 POST-IMPACT DATA

TEST NUMBER: 921217-1

TEST DATE: 12/17/92

TEST TIME: 1307

TEST TYPE: Left Side Impact

IMPACT ANGLE: 270

AMBIENT TEMPERATURE AT IMPACT AREA:

41° F

TEMPERATURE IN OCCUPANT COMPARTMENT:

41° F

IMPACT VELOCITY*: PRIMARY = 19.3 MPH

SECONDARY = 19.3 MPH

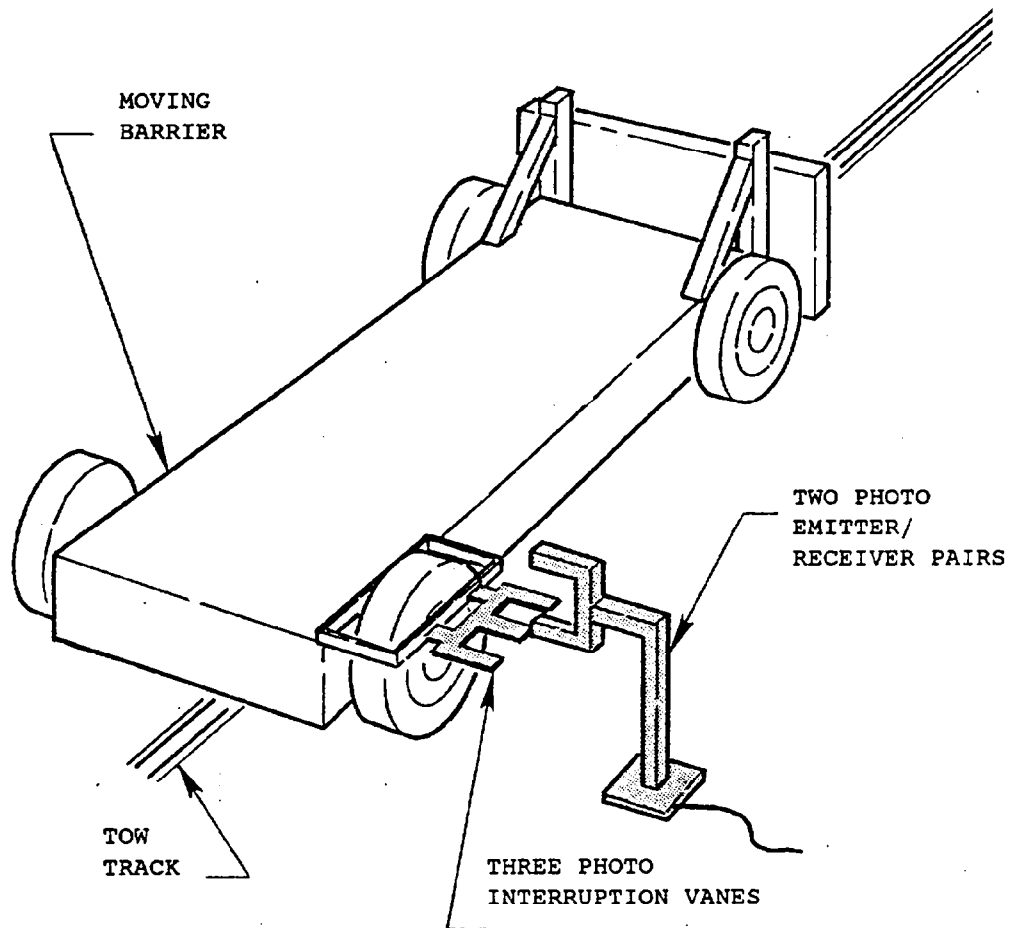
(SPECIFIED RANGE = 18.9 TO 19.9 MPH)

DISTANCE FROM VEHICLE TO BARRIER: ENTERING VELOCITY TRAP = 26.0 IN.

EXITING VELOCITY TRAP = 2.0 IN.

*The velocity measurement system contains two (2) independent photo emitter/receiver pairs (See Figure 1) which each measure the impact velocity.

FIGURE 1 IMPACT VELOCITY MEASUREMENT SYSTEM



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

The vanes have one foot spacing.

TABLE 4 POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER	PASSENGER
HEAD	NA	NA
CHEST	NA	NA
ABDOMEN	NA	NA
LEFT KNEE	NA	NA
RIGHT KNEE	NA	NA

DOOR OPENING:

	LEFT	RIGHT
FRONT	Tools required	Opened w/difficulty
REAR	NA	NA

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	None	None
REAR	NA	NA

GLAZING DAMAGE:

The driver's side door glass broke on impact.

The left side of the windshield cracked on impact.

OTHER NOTABLE IMPACT EFFECTS:

None

TABLE 5 VEHICLE LEFT SIDE EXTERIOR PROFILES AND STATIC CRUSH
ZERO DISTANCE AT WHEELBASE MID-POINT

LOCATION	HEIGHT (IN)	42	36	30	24	18	12	6	0	6	12	18	24	30	36	42
<u>PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE*)</u>																
Roof Height	70.0	X	X	X	X	19.5	18.9	18.8	19.0	19.1	X	X	X	X	X	X
Upper Door	47.0	12.0	11.6	11.8	11.8	11.5	11.8	11.5	11.4	11.1	11.2	11.2	11.2	11.1	11.2	11.2
Mid Door	32.5	9.9	9.8	9.8	9.6	9.6	9.5	9.6	9.5	9.5	9.5	9.8	9.6	9.4	9.5	9.5
Axle Height	17.2	11.2	11.6	11.6	11.6	11.6	11.6	11.5	11.5	11.4	11.5	11.5	11.5	11.5	11.5	11.4
<u>POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE*)</u>																
Roof Height	69.0	X	X	X	X	24.2	23.8	23.8	23.9	23.9	X	X	X	X	X	X
Upper Door	47.0	17.2	17.2	18.2	18.8	19.8	19.8	19.5	19.1	18.5	18.9	18.4	18.2	19.2	18.6	17.1
Mid Door	31.9	16.8	17.4	17.5	18.2	19.4	18.9	18.5	18.5	18.5	19.1	19.2	19.8	20.1	19.5	17.1
Axle Height	14.2	17.4	18.2	18.6	18.8	19.0	19.0	19.2	19.4	19.5	19.8	22.4	21.5	21.1	21.6	18.2
<u>STATIC CRUSH (IN)</u>																
Roof Height	69.0	X	X	X	X	4.7	4.9	5.0	4.9	4.8	X	X	X	X	X	X
Upper Door	47.0	5.2	5.6	6.4	7.0	8.3	8.0	8.0	7.7	7.4	7.7	7.2	7.0	8.1	7.4	5.9
Mid Door	31.9	6.9	7.6	7.7	8.6	9.8	9.4	8.9	9.0	9.0	9.6	9.4	10.2	10.7	10.0	7.6
Axle Height	14.2	6.2	6.6	7.0	7.2	7.4	7.4	7.7	7.9	8.1	8.3	10.9	10.0	9.6	10.1	6.8

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

+ Static crush means that vehicle structure is crushed.

- Static crush means that vehicle structure is bowed outward.

Column readings are left to right from front to rear on vehicle.

SECTION 3.0

FMVSS 301 DATA

TABLE 6 FUEL SYSTEM DATA

MAKE/MODEL: Ford/F150 pickup truck

FUEL SYSTEM CAPACITY: NA*

USABLE CAPACITY: 19.0 GALLONS (Nominal)

TEST VOLUME RANGE: 17.5 GALLONS TO 17.9 GALLONS (92-94% OF USABLE)

ACTUAL TEST VOLUME: 17.7 GALLONS (WITH ENTIRE FUEL SYSTEM FILLED)

TEST FLUID TYPE: STODDARD SOLVENT

SPECIFIC GRAVITY: 0.764

KINEMATIC VISCOSITY: 0.99 CENTISTOKES

TEST FLUID COLOR: PURPLE

DETAILS OF FUEL SYSTEM: The fuel filler neck was on the left side. The fuel tank was in front of the rear axle and inside the left frame rail. The fuel lines run along the left frame rail to the front.

ELECTRIC FUEL PUMP: No FUEL INJECTION: No

DOES ELECTRIC FUEL PUMP OPERATE WITH IGNITION SWITCH "ON" AND THE ENGINE NOT OPERATING? NA

*An owner's manual was not provided with the test vehicle.

TABLE 7 FMVSS 301 POST-IMPACT TEST DATA

TEST DATE: 12/17/92

VEHICLE MAKE/MODEL/BODY STYLE: Ford/F150/pickup truck

TEST INFORMATION:

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

TEST VEHICLE IMPACT TYPE:

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

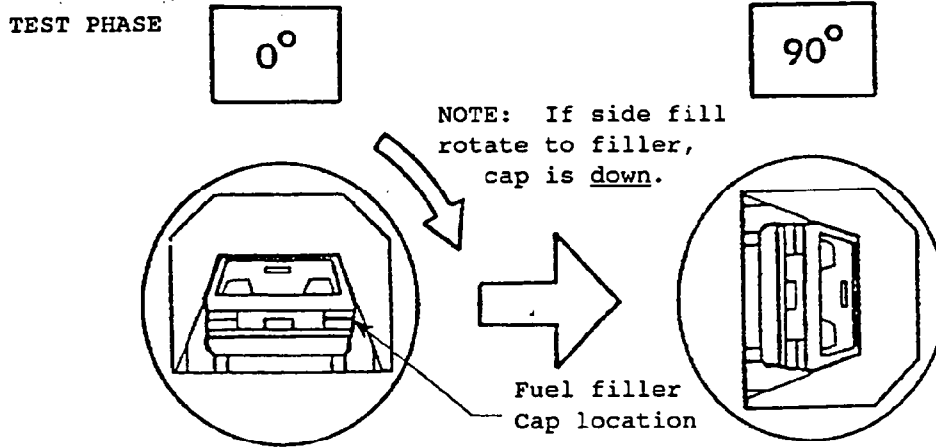
FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FROM IMPACT UNTIL VEHICLE MOTION CEASES - - -	0 OZ.	1 OZ.
2. 5 MINUTE PERIOD AFTER VEHICLE MOTION CEASES -	0 OZ.	5 OZ.
3. NEXT 25 MINUTES AFTER 5 MINUTE PERIOD - - - -	0 OZ.	1 OZ./1 MIN.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 2 FMVSS 301 STATIC ROLLOVER TEST DATA



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

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

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

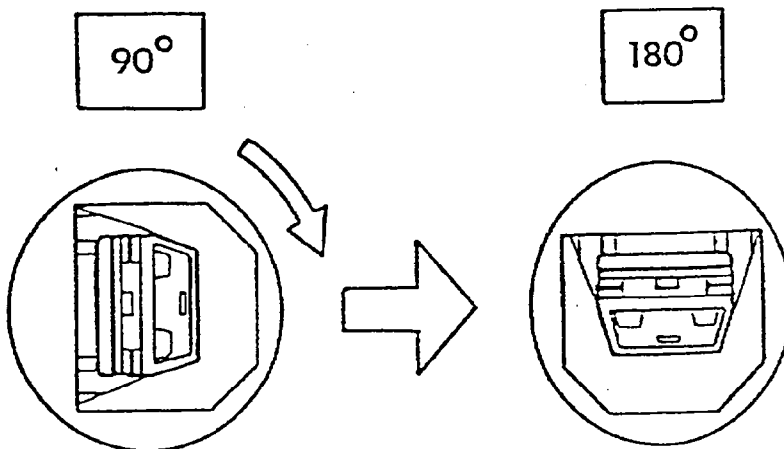
<u>0° TO 90° ROTATION (FUEL FILLER CAP DOWN)</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 2 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

TEST PHASE



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

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

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

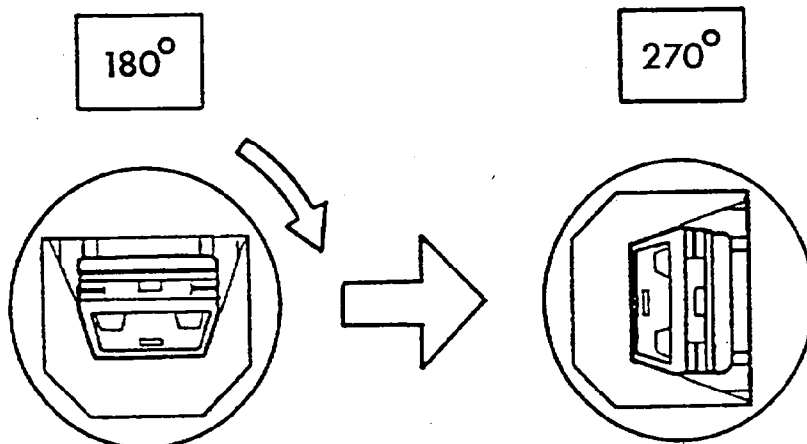
<u>90° TO 180° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 2 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

TEST PHASE



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

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

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

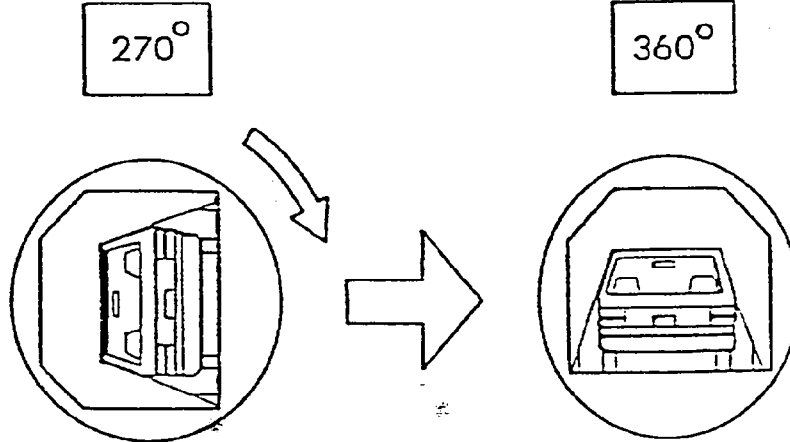
<u>180° TO 270° ROTATION</u>	<u>TEST RESULTS</u>	<u>MAXIMUM ALLOWABLE</u>
1. FIRST 5 MINUTES FROM ONSET OF ROTATION - - - - -	0 oz.	5 oz.
2. 6TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.
3. 7TH MINUTE FROM ONSET OF ROTATION - - - - -	0 oz.	1 oz.

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

FIGURE 2 FMVSS 301 STATIC ROLLOVER TEST DATA, CONT'D.

TEST PHASE



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

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

FUEL SYSTEM FLUID SPILLAGE MEASUREMENTS:

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

FUEL SYSTEM FLUID SPILLAGE LOCATION(S):

None

SECTION 4.0

CAMERA MEASUREMENTS

FIGURE 3

CAMERA POSITIONS

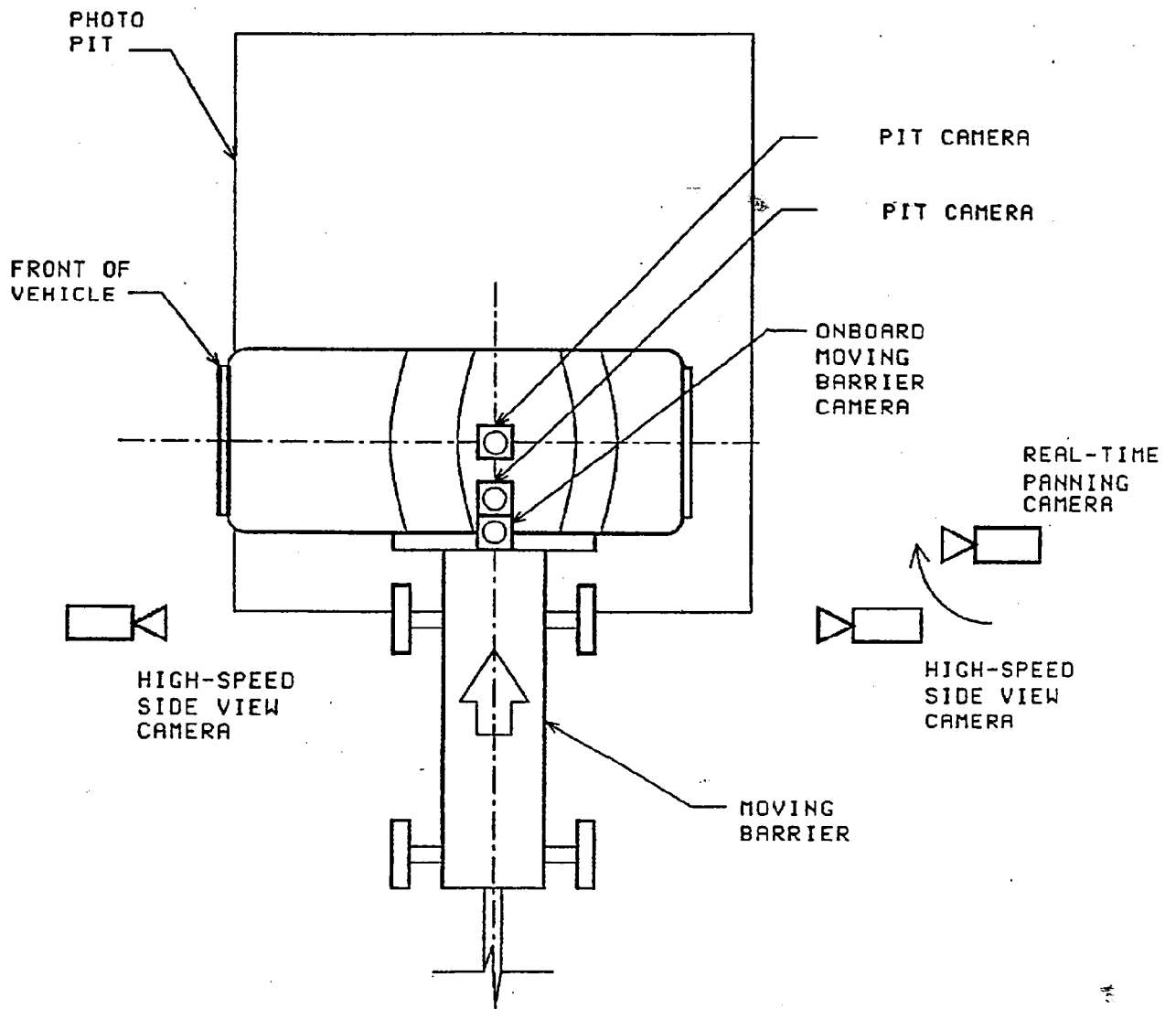


TABLE 8 MOTION PICTURE CAMERA LOCATIONS

TEST NO.:	921217-1	VEHICLE:	1985 Ford F150 pickup truck			CAMERA POSITIONS (IN)*			ANGLE** (DEG)	LENS (MM)	FILM SPEED (FPS)
						X	Y	Z			
CAMERA NO.	VIEW										
1	Left Overall		48.0	204.0	37.0	0	25	500			
2	Right Overall		38.0	-338.0	37.0	0	25	498			
3	Onboard Moving Barrier		NA	NA	NA	-90	13	508			
4	Pit Left Position		-12.0	0.0	-148.0	90	17	805			
5	Pit Right Position		-12.0	-36.0	-148.0	90	25	800			
6	Real-Time Panning		-156.0	-504.0	61.0	NA	16	24			
7	Real-Time Documentation		NA	NA	NA	NA	12-120	24			

* +X = Film plane forward of impact

+Y = Film plane to left of monorail centerline

+Z = Film plane above ground level

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

APPENDIX A

PHOTOGRAPHS



Figure A-1. POST-TEST FRONT VIEW



Figure A-2. PRE-TEST LEFT SIDE VIEW

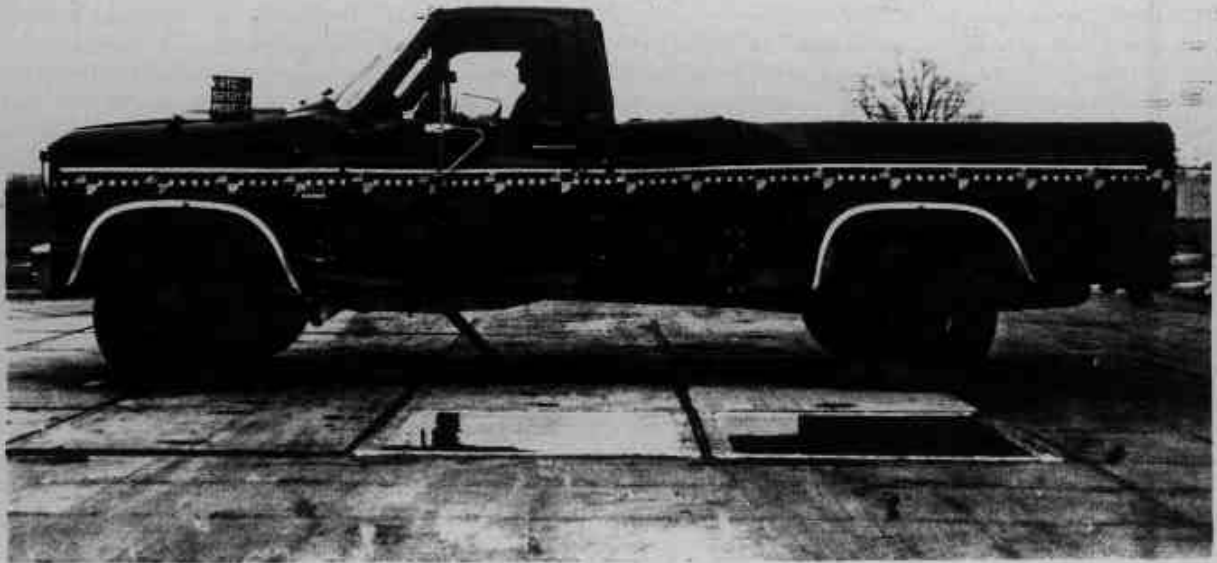


Figure A-3. POST-TEST LEFT SIDE VIEW



Figure A-4. PRE-TEST REAR VIEW



Figure A-5. POST-TEST REAR VIEW



Figure A-6. PRE-TEST RIGHT SIDE VIEW



Figure A-7. POST-TEST RIGHT SIDE VIEW



Figure A-8. PRE-TEST RIGHT FRONT THREE-QUARTER VIEW



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



Figure A-10. PRE-TEST LEFT REAR THREE-QUARTER VIEW



Figure A-11. POST-TEST LEFT REAR THREE-QUARTER VIEW

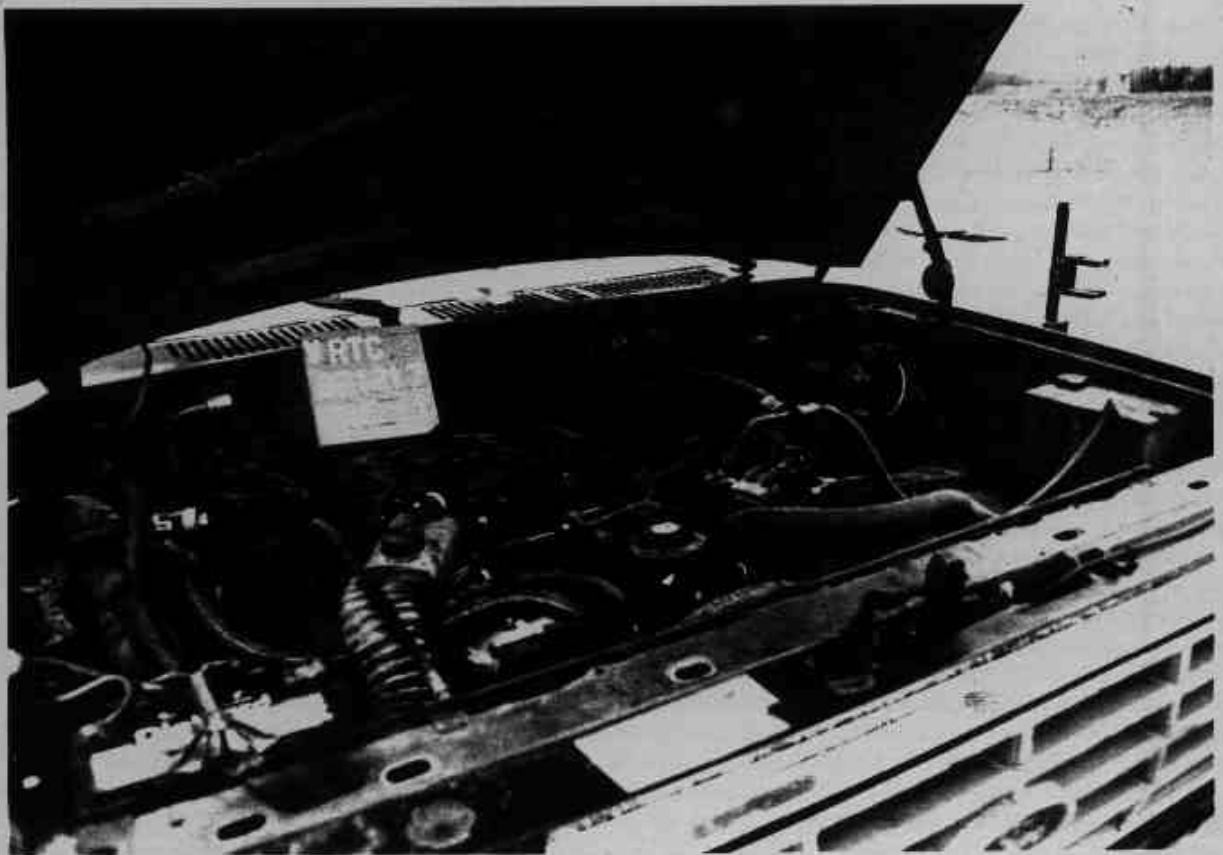


Figure A-12. PRE-TEST ENGINE COMPARTMENT VIEW

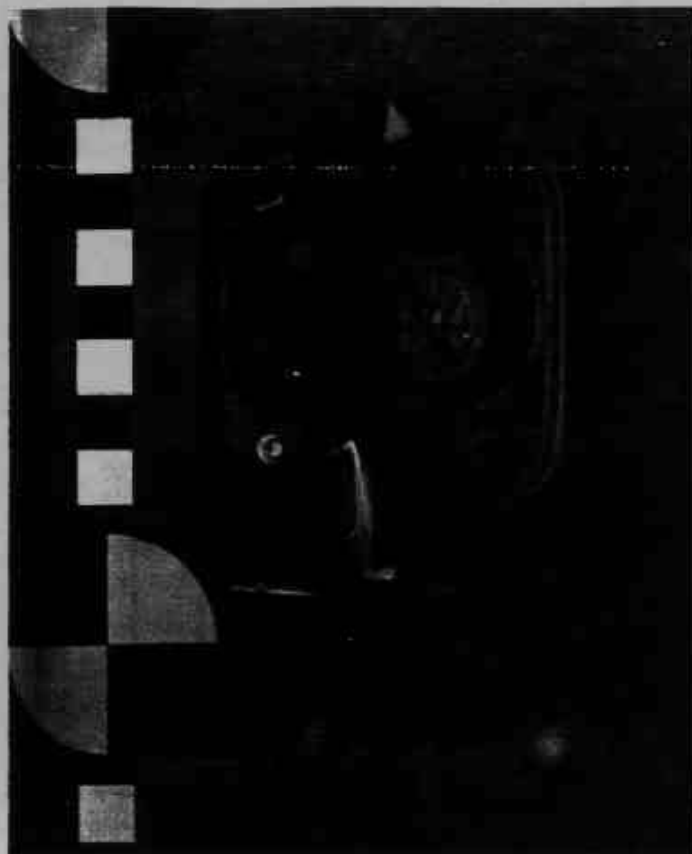


Figure A-13. PRE-TEST FUEL FILLER CAP VIEW



Figure A-14. POST-TEST FUEL FILLER CAP VIEW

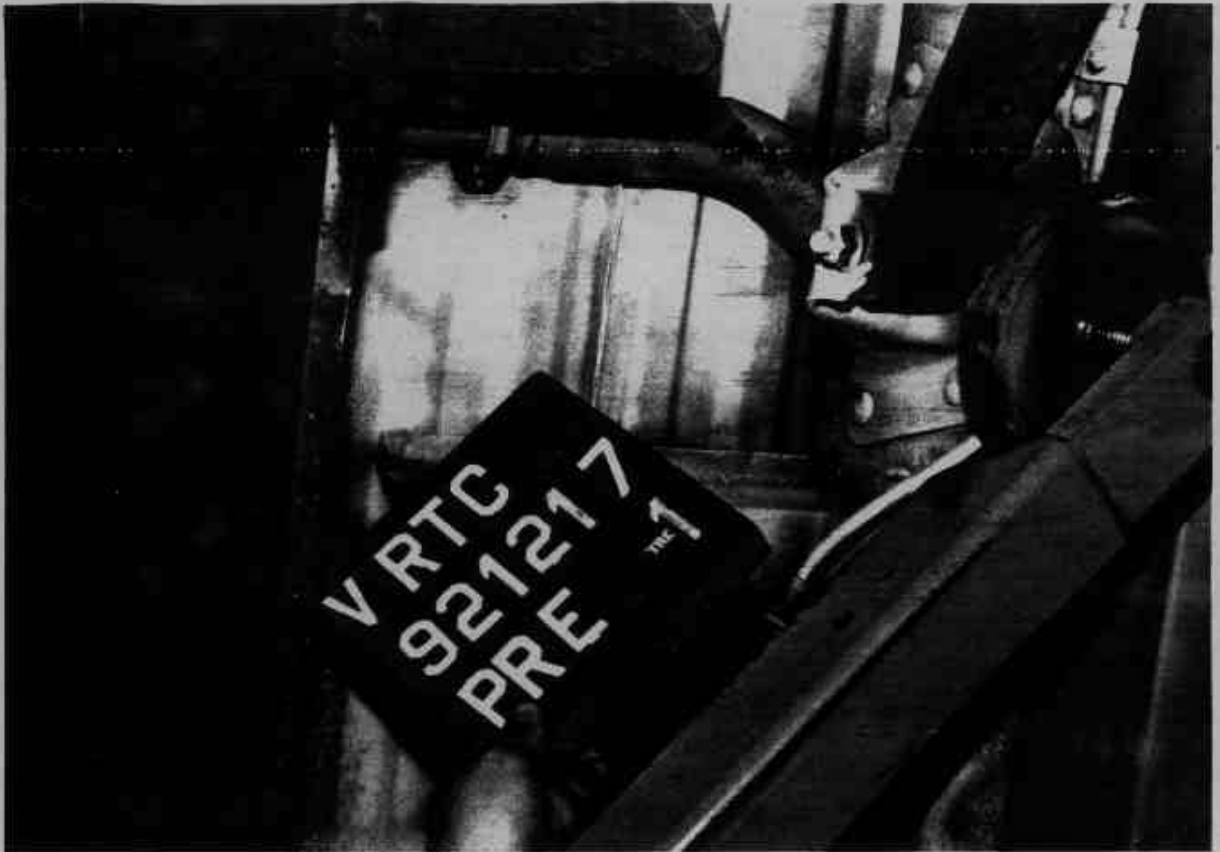


Figure A-15. PRE-TEST FUEL FILLER NECK VIEW



Figure A-16. PRE-TEST FUEL TANK VIEW



Figure A-17. POST-TEST FUEL TANK - VIEW 1



Figure A-18. POST-TEST FUEL TANK - VIEW 2



Figure A-19. POST-TEST FUEL TANK - VIEW 3

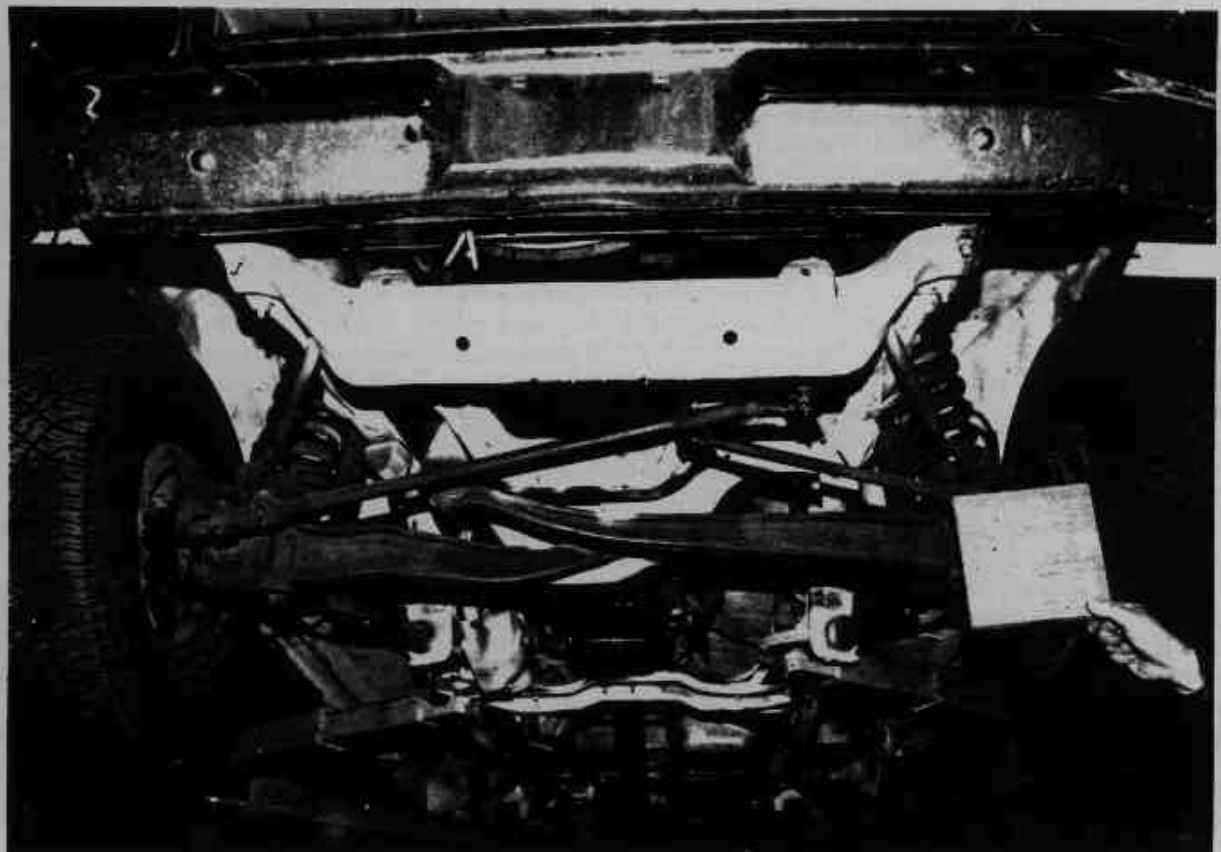


Figure A-20. PRE-TEST FRONT UNDERBODY VIEW

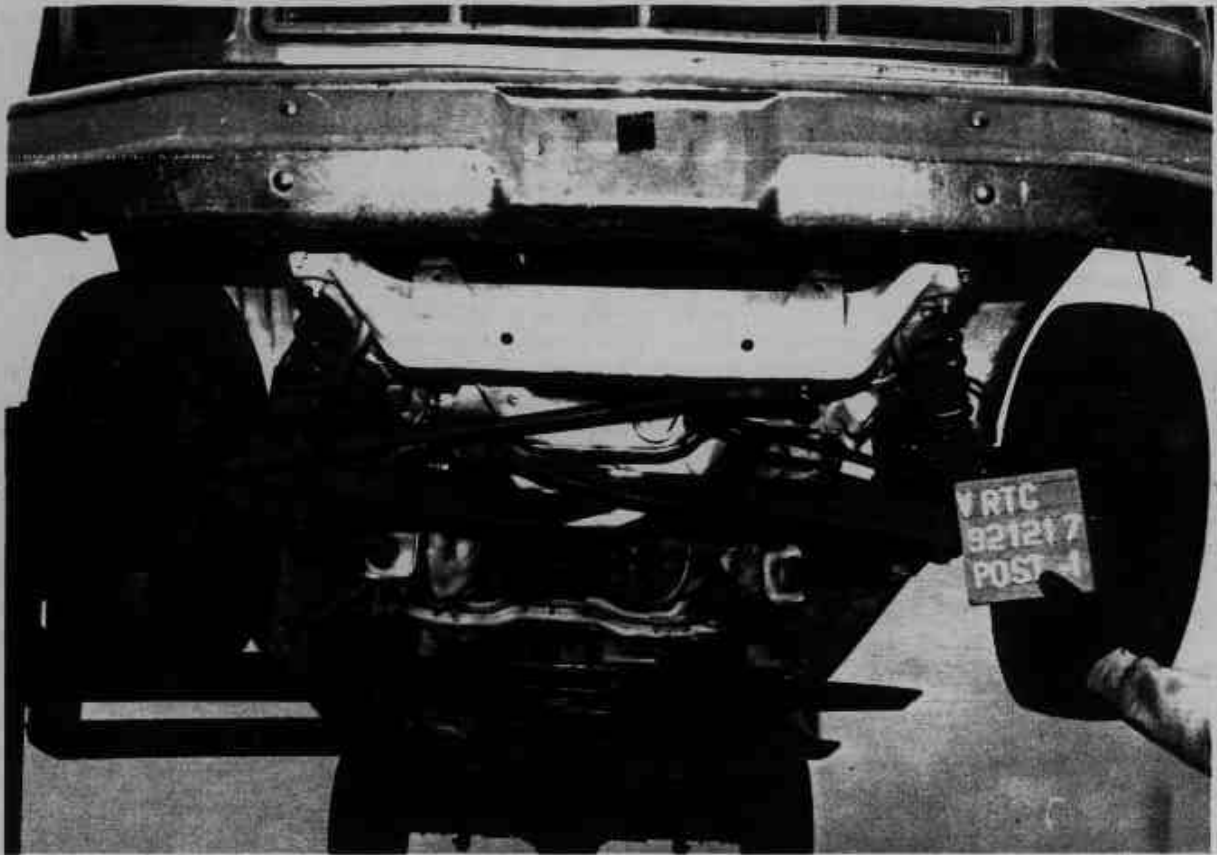


Figure A-21. POST-TEST FRONT UNDERBODY VIEW

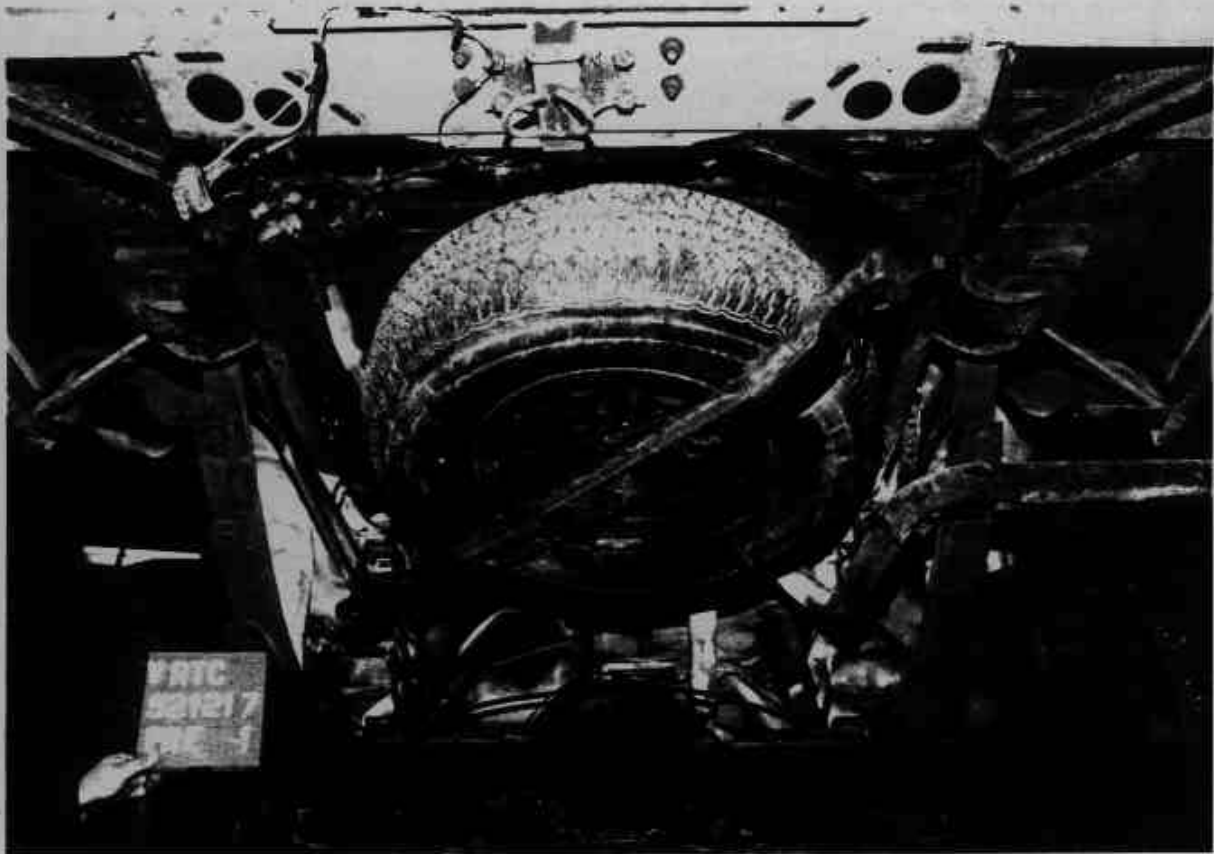


Figure A-22. PRE-TEST REAR UNDERBODY VIEW

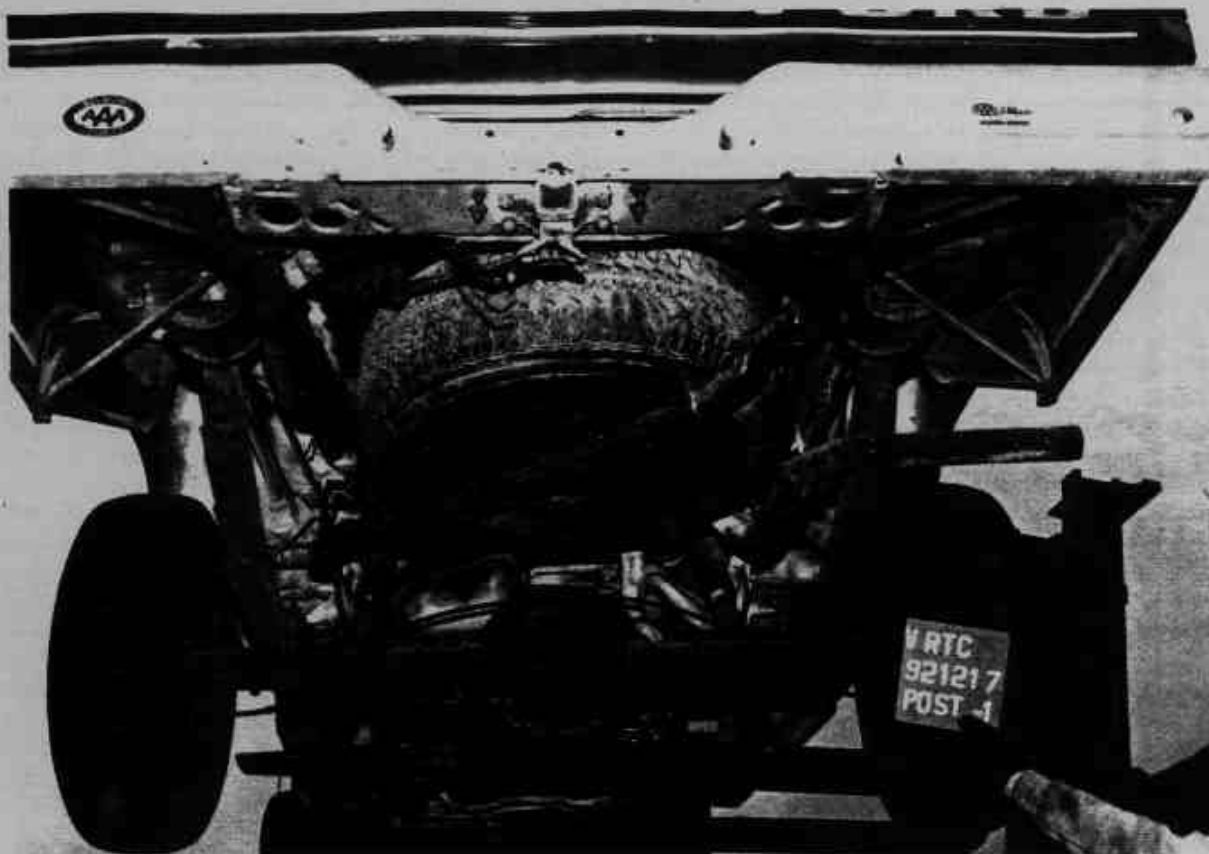


Figure A-23. POST-TEST REAR UNDERBODY VIEW



Figure A-24. PRE-TEST BALLAST LOCATION VIEW

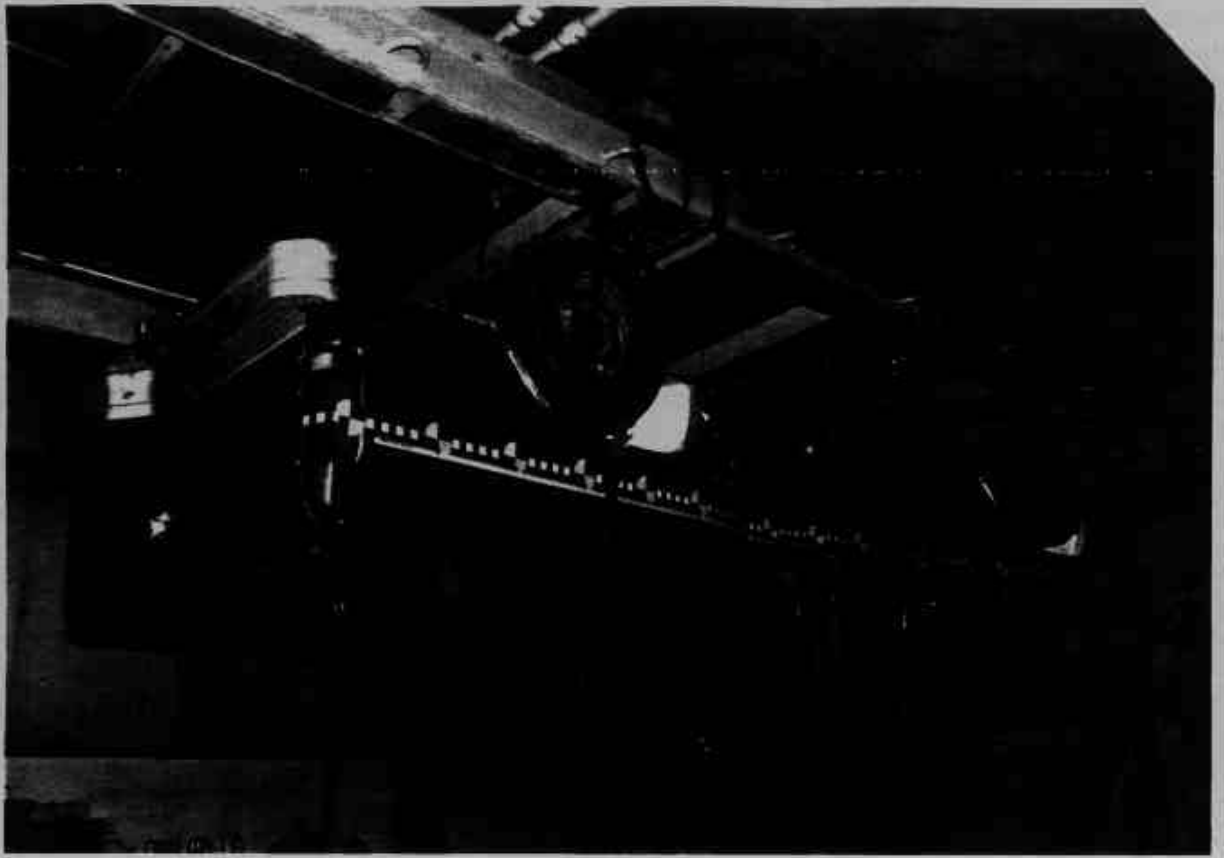


Figure A-25. POST-TEST VEHICLE ON STATIC ROLLOVER MACHINE VIEW