

REPORT NUMBER: 301S-MGA-03-002

SAFETY COMPLIANCE TESTING FOR  
FMVSS NO. 301S  
FUEL SYSTEM INTEGRITY – SCHOOL BUSES

2003 Blue Bird All American  
School Bus  
NHTSA No.: C30900

PREPARED BY:  
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Final Report Date: May 8, 2003

FINAL REPORT

PREPARED FOR:  
U.S. DEPARTMENT OF TRANSPORTATION  
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION  
ENFORCEMENT  
OFFICE OF VEHICLE SAFETY COMPLIANCE  
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**Technical Report Documentation Page**

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		15. Supplementary Notes			
16. Abstract A compliance test was conducted on the subject 2003 Blue Bird All American School Bus, NHTSA No. C30900 in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-301-02 for the determination of FMVSS 301S compliance.					
17. Key Words  Compliance Testing Safety Engineering FMVSS 301S		18. Distribution Statement Copies of this report are available from: NHTSA Technical Information Services (TIS) Room 5108, (NPO-230) 400 Seventh Street, S.W. Washington, D.C. 20590 (202) 366-4946			
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**SECTION 1**  
**PURPOSE OF COMPLIANCE TEST AND SUMMARY**

A fuel system integrity test was conducted on a MY2003 Blue Bird All American School Bus, NHTSA No. C30900, in accordance with the specifications of the Office of Vehicle Safety Compliance (OVSC) Test Procedures TP-301-02 to determine compliance to the requirements of Federal Motor Vehicle Safety Standards (FMVSS) 301S, "Fuel System Integrity - School Buses".

Based on the tests performed, the MY2003 Blue Bird All American School Bus, NHTSA No. C30900 appears to meet the requirements of FMVSS 301S testing.

This program is sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-02-D-01057.

**SECTION 2**  
**COMPLIANCE TEST DATA**

The following data sheets document the results of testing on the MY2003 Blue Bird All American School Bus, NHTSA No. C30900.

**DATA SHEET 1  
SCHOOL BUS DATA**

**GENERAL VEHICLE IDENTIFICATION**

School Bus Manufacturer:	Blue Bird	
School Bus Model:	2003 Blue Bird All American	
Build Date:	August 2002	
Incomplete Vehicle Manufactured By:	—	
Build Data for Bus Chassis:	—	
School Bus GVWR (kg):	13511	
School Bus GAWR Front (kg):	4926	
School Bus GAWR Rear (kg):	8585	
School Bus VIN:	1BABNBPA33F210494	
No. of Designated Seating Positions (DSP) including Driver:	85	
School Bus NHTSA No.:	C30900	
Bus Body Color:	Yellow	
Engine Displacement	5.9 L	
No. of Cylinders:	6	
Fuel Pump Actuation:	Mechanical Pump "ON" with engine	
School Bus Width (mm):	2452	
School Bus Length (mm):	12344	
Bus Unloaded Vehicle Weight (LJVW) (kg):	9038	
Bus Occupant Load:	4536 kg – Passenger 68 kg – Driver 4604 kg - Total	
Target Bus Test Weight (SBTW) (kg):	13642	
Actual (SBTW) (kg):	13642	
School Bus Tire Manufacturer:	Michelin	
	Front	Rear
Rec. Cold Tire Inflation Pressure (kpa):	793	793
Tire Size:	11R/22.5	11R/22.5
Load Range:	H	H

**DATA SHEET 1 (CONTINUED)**

**SCHOOL BUS DATA**

Test Vehicle: **2003 Blue Bird All American School Bus**  
 Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C30900**  
 Test Date: **4/23/03**

**GENERAL VEHICLE IDENTIFICATION**

**SCHOOL BUS ATTITUDE**

	Units	LF	RF	LR	RR
As Received:	mm	NR	NR	NR	NR
Pre-Test:	mm	1074	1077	1129	1157
Post-Test:	mm	1070	1077	1127	1153

NR=Not Recorded

Weight of Fuel	3.19 kg/liter (7.03 lbs./gallon)
Fuel Tank Capacity (liters/kg):	382 liters/321 kg (101 gallons/710 lbs.)
Tank Test Volume (gallons/kg):	352 liters/295.7 kg (93 gallons/653.8 lbs.)

**TEST VEHICLE WEIGHTS**

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	1648	3006		2565	4337	
Right	kg	1560	2824		2451	4289	
Ratio	%	35.5	64.5		36.8	63.2	
Totals	kg	3208	5830	9038	5016	8626	13642

COMMENTS: NONE

Recorded By: Chris Hand

Approved By: Michael J. [Signature]

Date: May 8, 2003

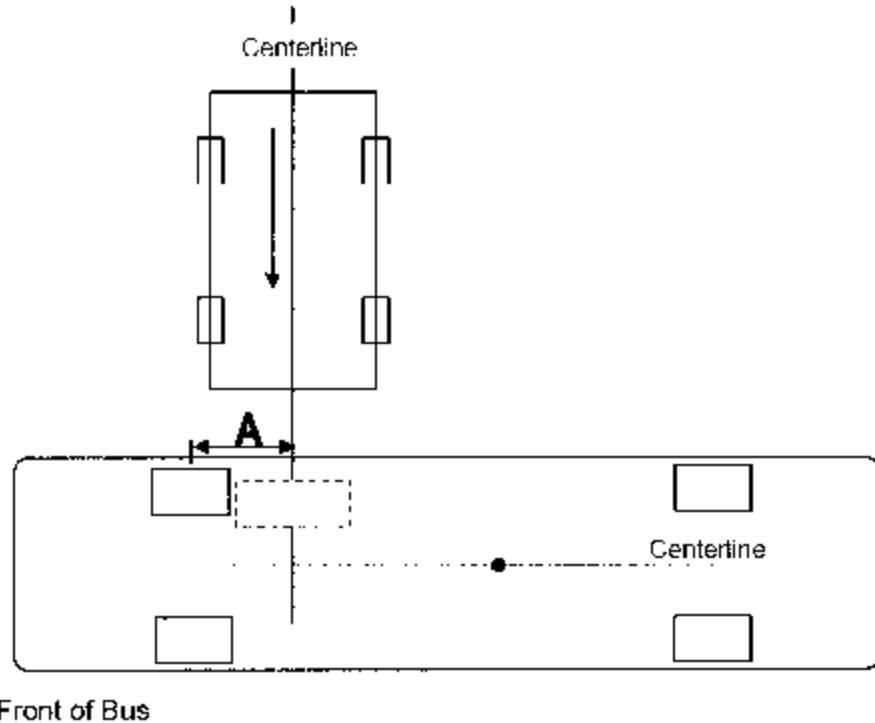


**DATA SHEET 2**  
**SCHOOL BUS IMPACT DATA**

Test Vehicle:	2003 Bluebird All American School Bus	NHTSA No.:	C30900
Test Lab:	MGA Research-Wisconsin Operations	Test Date:	4/23/03

Time of Impact:	9:52 am
Ambient Temperature (°C)	21.1 °C
Barrier Velocity – Speed Trap 1 (kph):	47.5
Barrier Velocity – Speed Trap 2 (kph):	Not Recorded
Barrier Penetration:	918 mm

**INDICATE IMPACT POINT BELOW:**



**LEGEND:** Red dotted line indicates location of fuel tank  
 Arrow indicates point and angle of barrier impact (CL of arrow coincides with CL of monorail).  
 A = Distance from Front Axle CL to Barrier CL = 730 mm  
 Impact Point Deviation: 5 mm UP, 2 mm LEFT

**DATA SHEET 2 (CONTINUED)**  
**SCHOOL BUS IMPACT DATA**

Fuel Spillage Noted.	No
Failure, if applicable:	None

**Stoddard Solvent Spillage Measurements**

Timeframe	Description	Allowable Spillage	Measured Spilled	Results
T <sub>0</sub> - T <sub>1</sub>	Time Zero to Cessation of Motion	31 grams (1 ounce)	0	PASS
T <sub>1</sub> - T <sub>2</sub>	Cessation of Motion to 5 minutes after Cessation of Motion	156 grams (5 ounces)	0	PASS
T <sub>2</sub> - T <sub>3</sub>	5 Minutes after Cessation of Motion to 30 minutes after Cessation of Motion	31 grams (1 ounce) per minute 933 grams (30 ounces) Total Allowed	0	PASS

ADDITIONAL FAILURE DETAILS: None

Recorded By: Chris Hand

Approved By: [Signature]

Date: May 8, 2003

**SECTION 4**  
**INSTRUMENTATION AND EQUIPMENT LIST**

Test Vehicle: **2003 Bluebird All American School Bus**  
Test Lab: **MGA Research-Wisconsin Operations**

NHTSA No.: **C30900**  
Test Date: **4/23/03**

Equipment	Description	Serial No.	Cal. Date	Next Cal. Date
Counter/Timer	DCI	939095	10/25/02	10/25/03
Counter/Timer	DCI	939094	10/25/02	10/25/03
Stop Watch	Cole Farmer	9441013	3/28/03	3/28/04
Vehicle Scales	GSE	212091 & 212092	12/26/02	6/26/03
Tire Pressure Gauge	Dill	MGA06133	10/16/02	10/16/03
Tape Measure	Stanley Powerlock 5M	146	4/9/03	10/9/03
Temp. Indicator	Fluke Probe with Multimeter	944939	10/16/02	10/16/03
Fluke Meter	Fluke	76270715	10/8/02	10/8/03

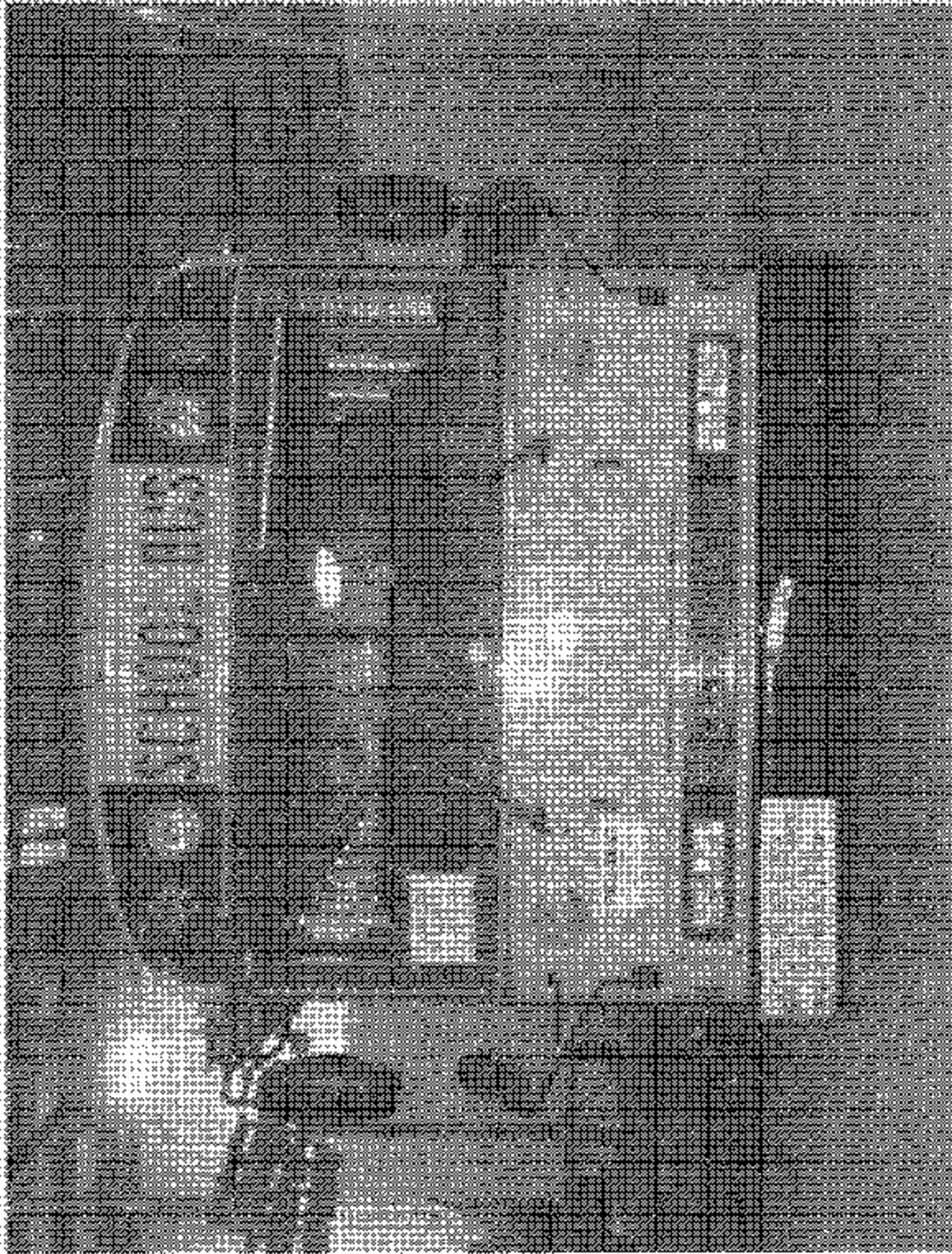
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Test Vehicle: 2003 Blue Ford All American  
Procedure: FMVSS 301 Side Impact Test

Test Date: April 16, 2008



Pre-Test Front View of School Bus

Test Vehicle: 2008 Buick Wildcat All-terrain  
Procedure: FMVSS 301 Side-Impact Test

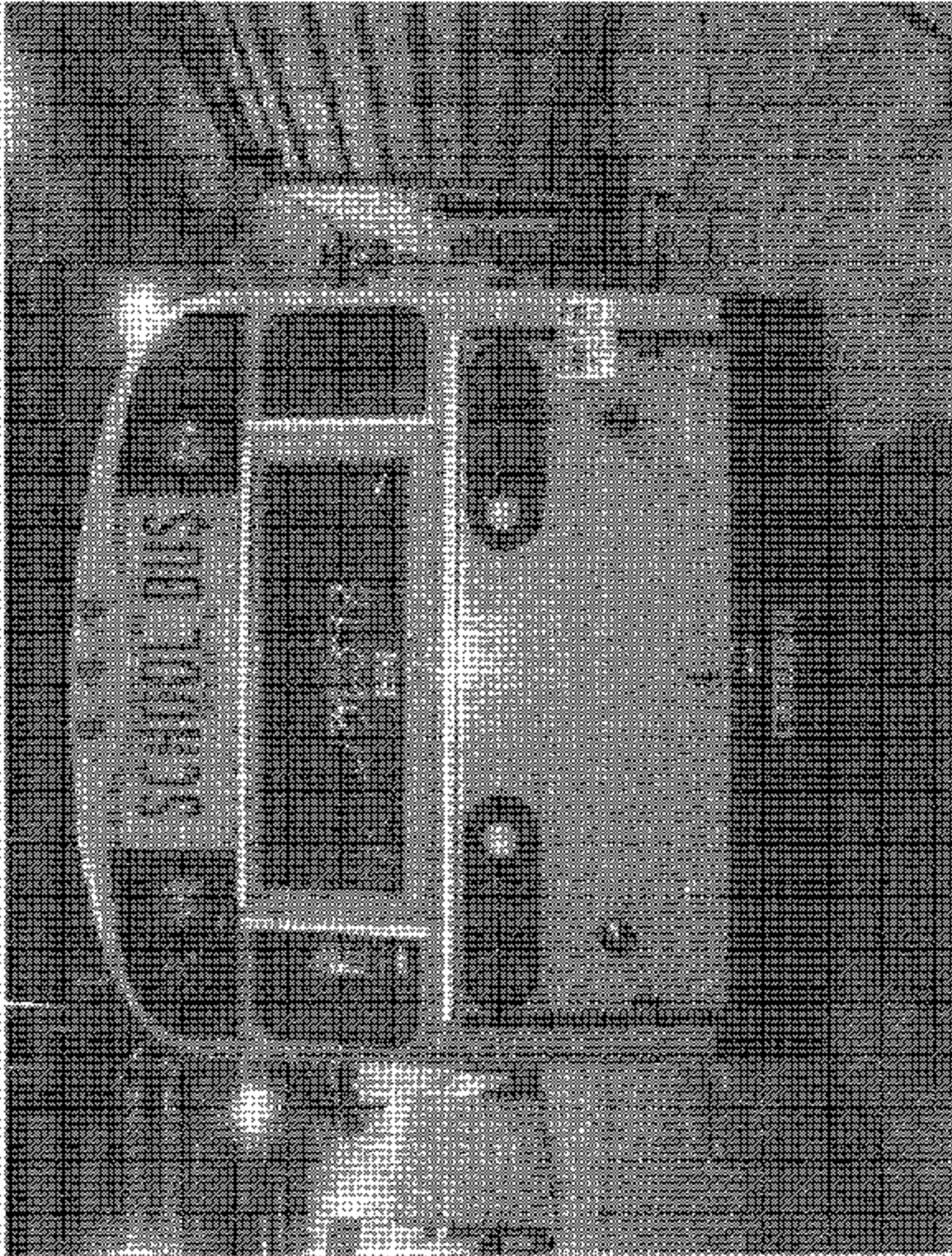
Test Date: April 23, 2008



Post-Test Front View of School Bus

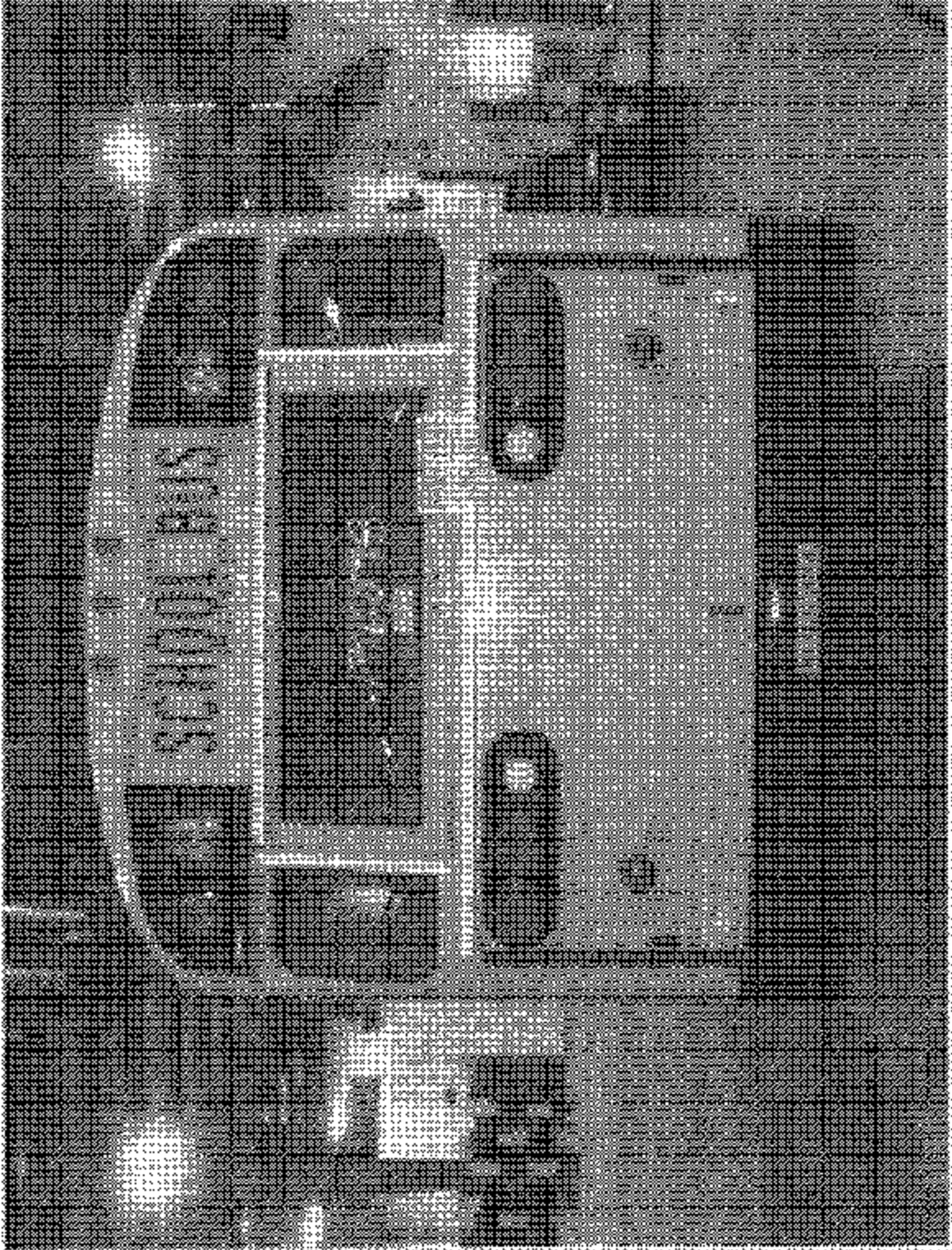
Test Vehicle: 2002 Blue Bird All American  
Procedure: FMVSS 301 Side Impact Test

Test Date: April 28, 2003



Test Vehicle: 2003 Blue Ford All American  
Procedure: FMVSS 501 Side Impact Test

Test Date: April 23, 2003

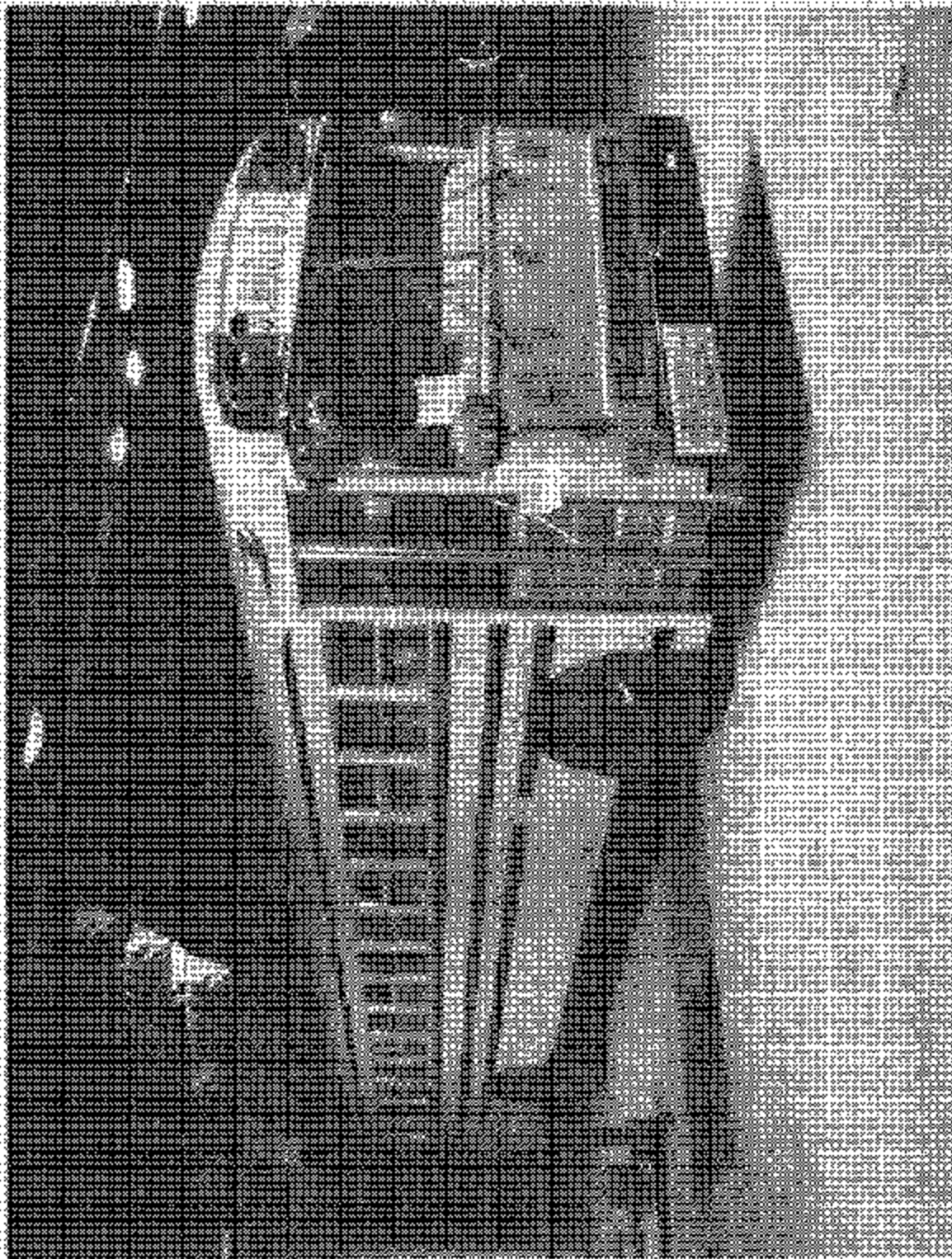


Pos. Test Rear View of School Bus



Test Vehicle: 2003 Blue Bird All American  
Procedure: FMVSS 301 Side Impact Test

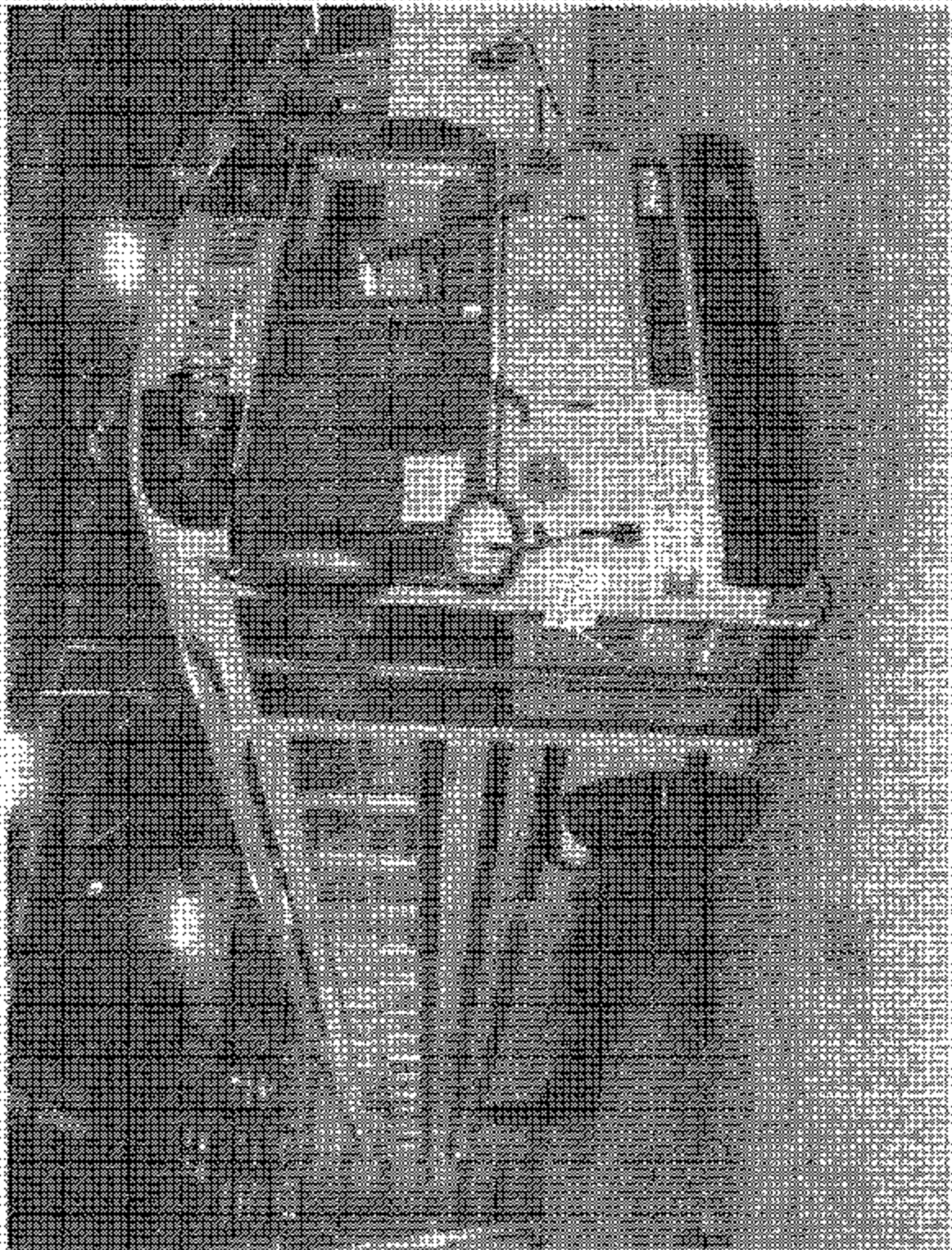
Test Date: April 23, 2008



Pre-Test View of School Bus

Test Vehicle: 2003 Blue Bird 40' American  
Procedure: FMVSS 301 Side Impact Test

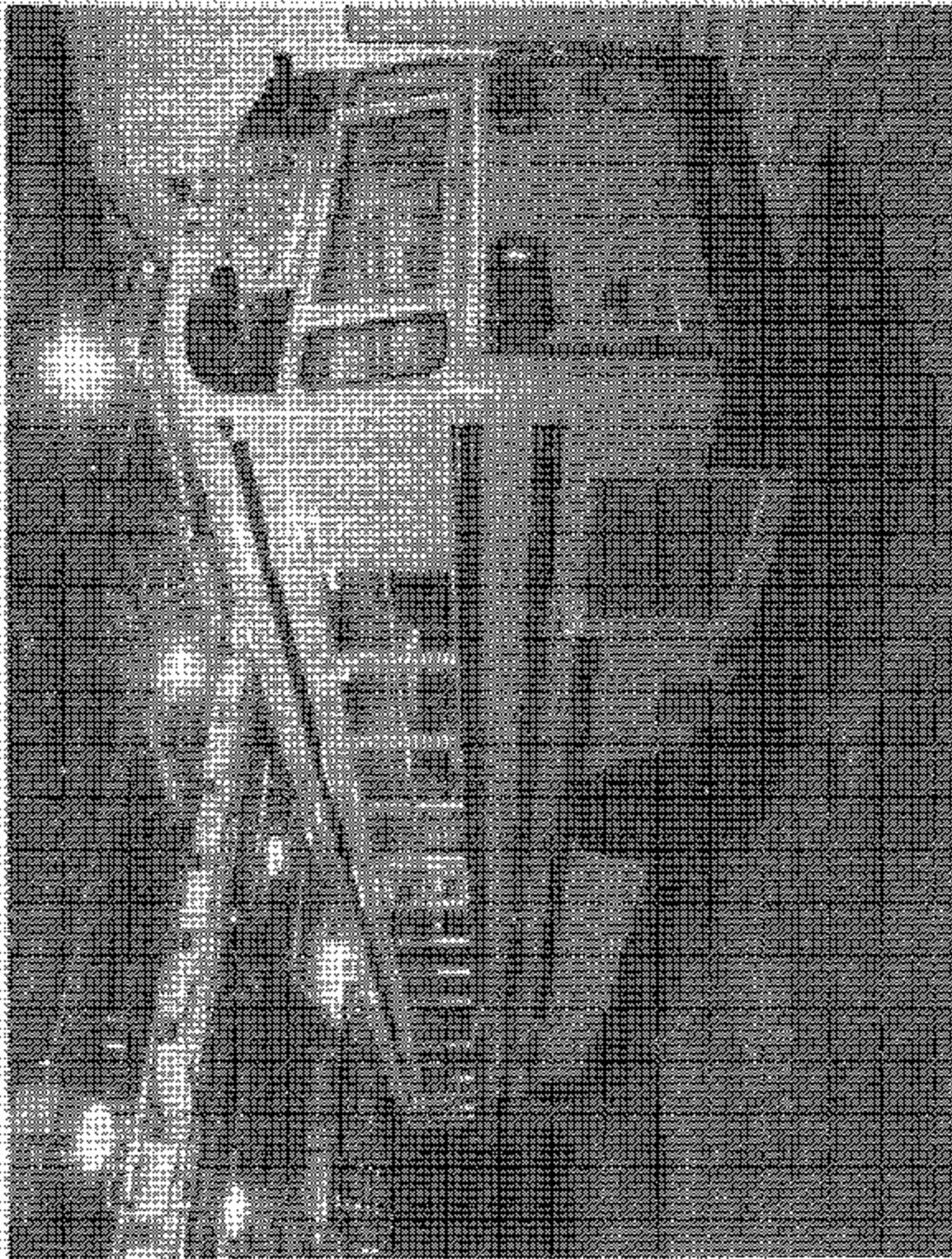
Test Date: April 23, 2003



Post Test Right Front View of Series Bus

Test Vehicle: 2003 Blue Bird All American  
Procedure: FMVSS 301 Side Impact Test

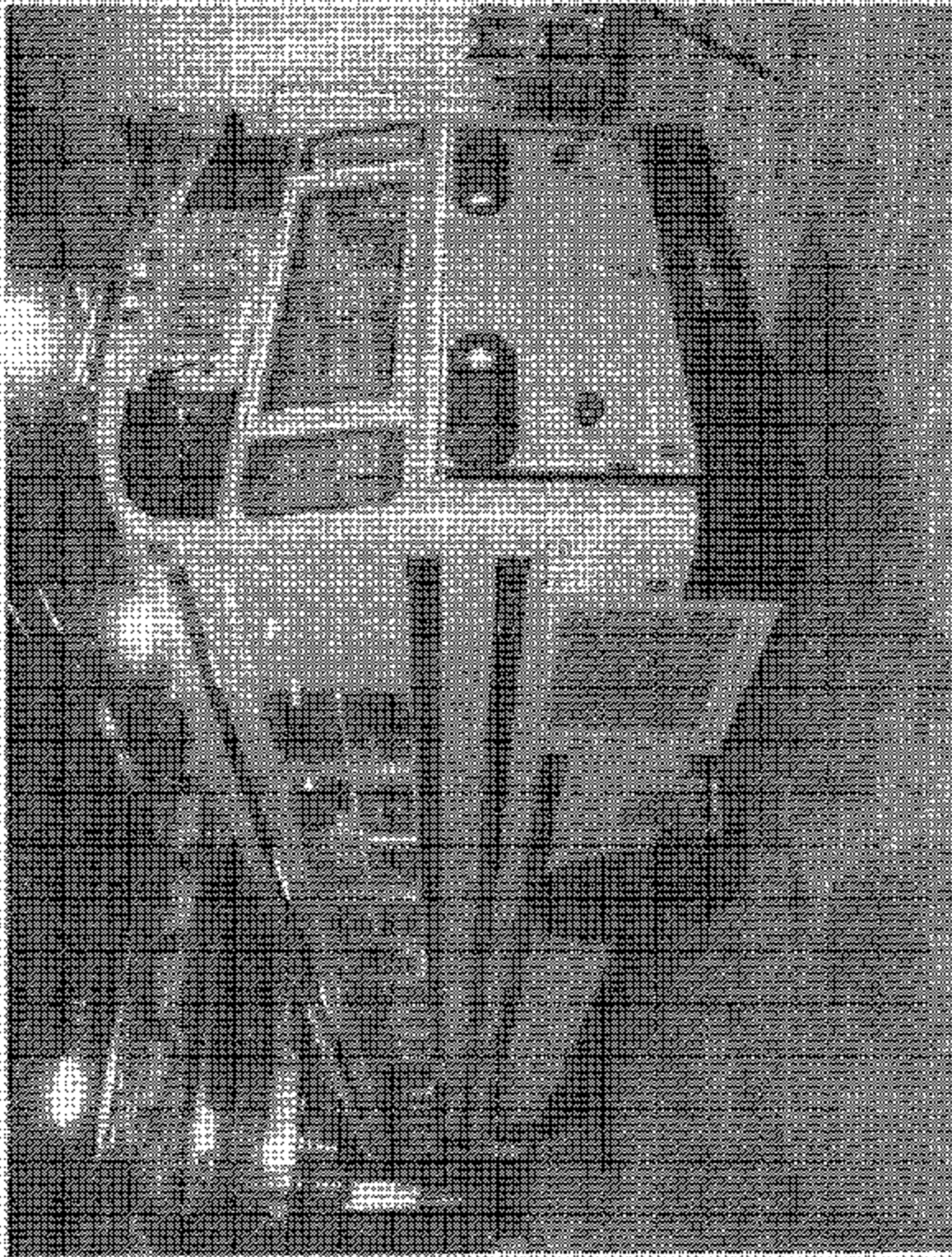
Test Date: April 23, 2003



Pre-Test Left Rear 3/4 View of Subject Bus

Test Vehicle: 2009 Buick Wild All American  
Program: FMVSS 501 Side Impact Test

Test Date: April 23, 2008



Post-Test Left Rear 1/4 View of Subject Bus

Test Vehicle: 2003 Blue Bird All American  
Procedure: FMVSS 301 Side Impact Test

Test Date: April 23, 2003

**MANUFACTURED BY**  
**BLUE BIRD BODY COMPANY**

DATE OF MFR. [REDACTED]

SUITABLE TIRE - RIM CHOICE

GVWR [REDACTED]

GAWR: FRONT [REDACTED] WITH [REDACTED] TIRES

[REDACTED] RIMS, AT [REDACTED] PSI COLD SINGLE

GAWR: REAR [REDACTED] WITH [REDACTED] TIRES

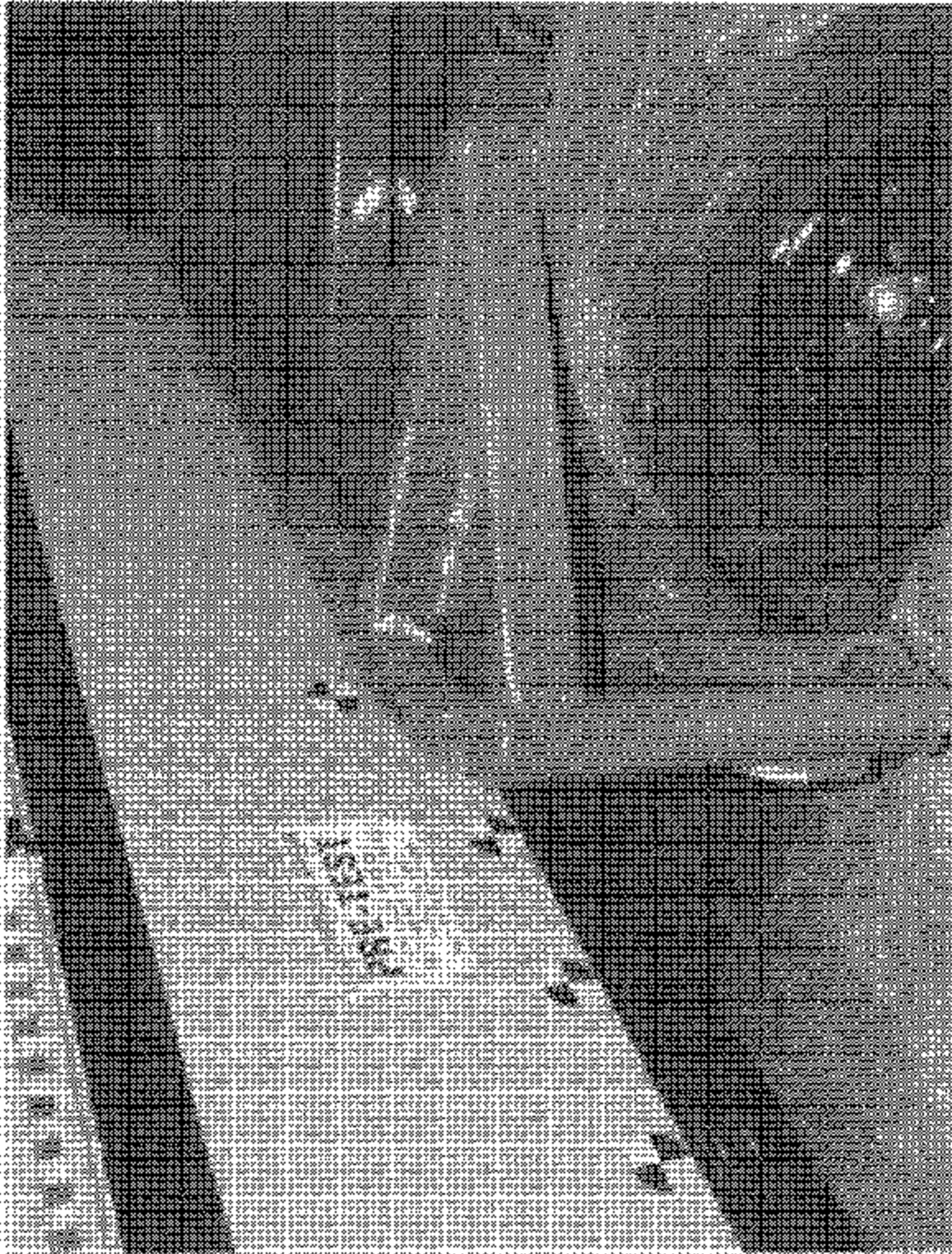
[REDACTED] RIMS, AT [REDACTED] PSI COLD DUAL

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S.  
FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN  
EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

V.I.N. [REDACTED] CLASSIFICATION [REDACTED]

Test Vehicle: 2007 Blue Bird AR Amorticoax  
Procedure: FMVSS 301 Side Impact Test

Test Date: April 23, 2008



Pre-Test Impact Target

Test Vehicle: 2003 Blue Bird All American  
Procedure: FMVSS 301 Side Impact Test

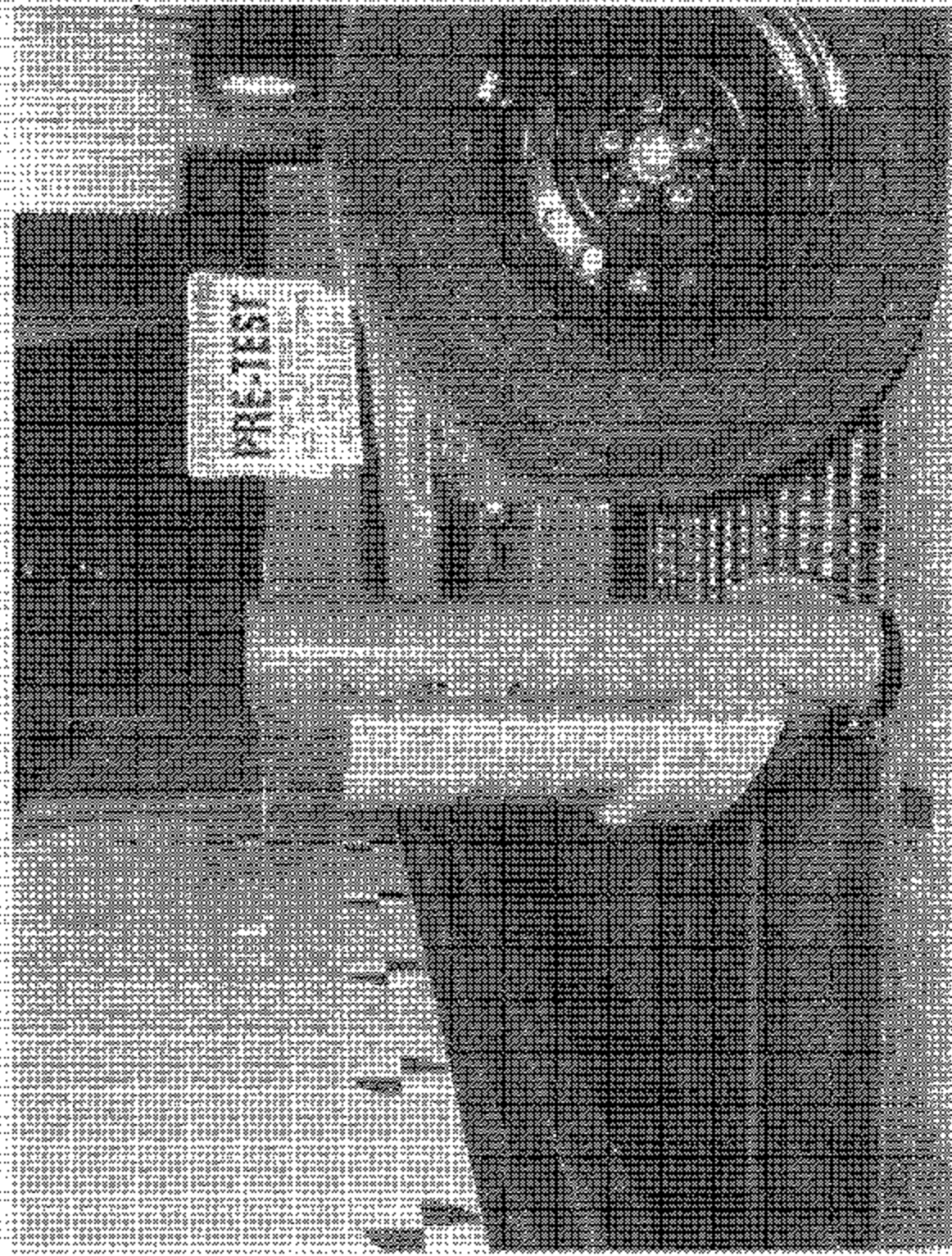
Test Date: April 23, 2003



Post-Test of Impact Location

Test Vehicle: 2003 Blue Bird All American  
Procedure: FMVSS 301 Side Impact Test

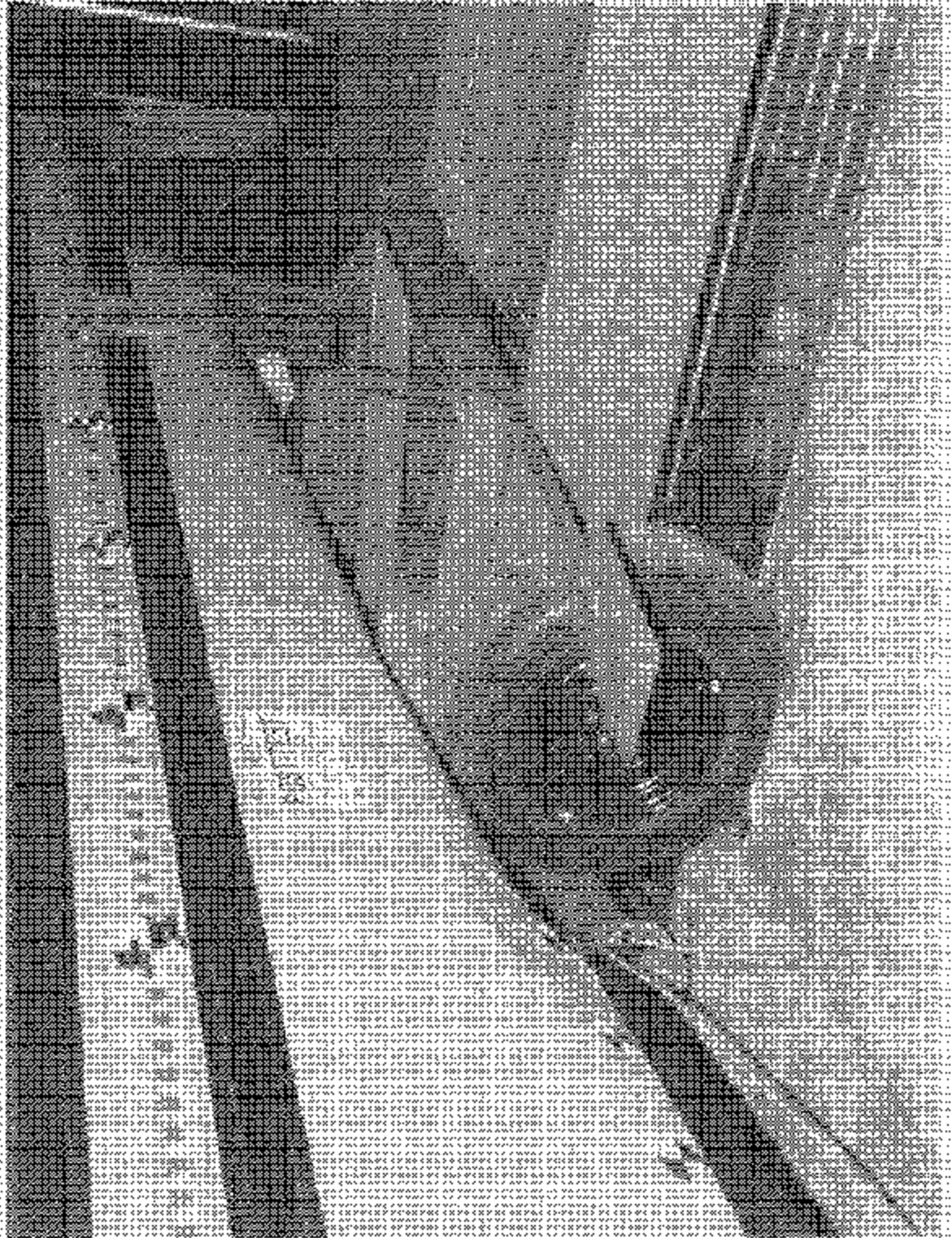
Test Date: April 23, 2008



Pre-Test of Barrier (Bus side)



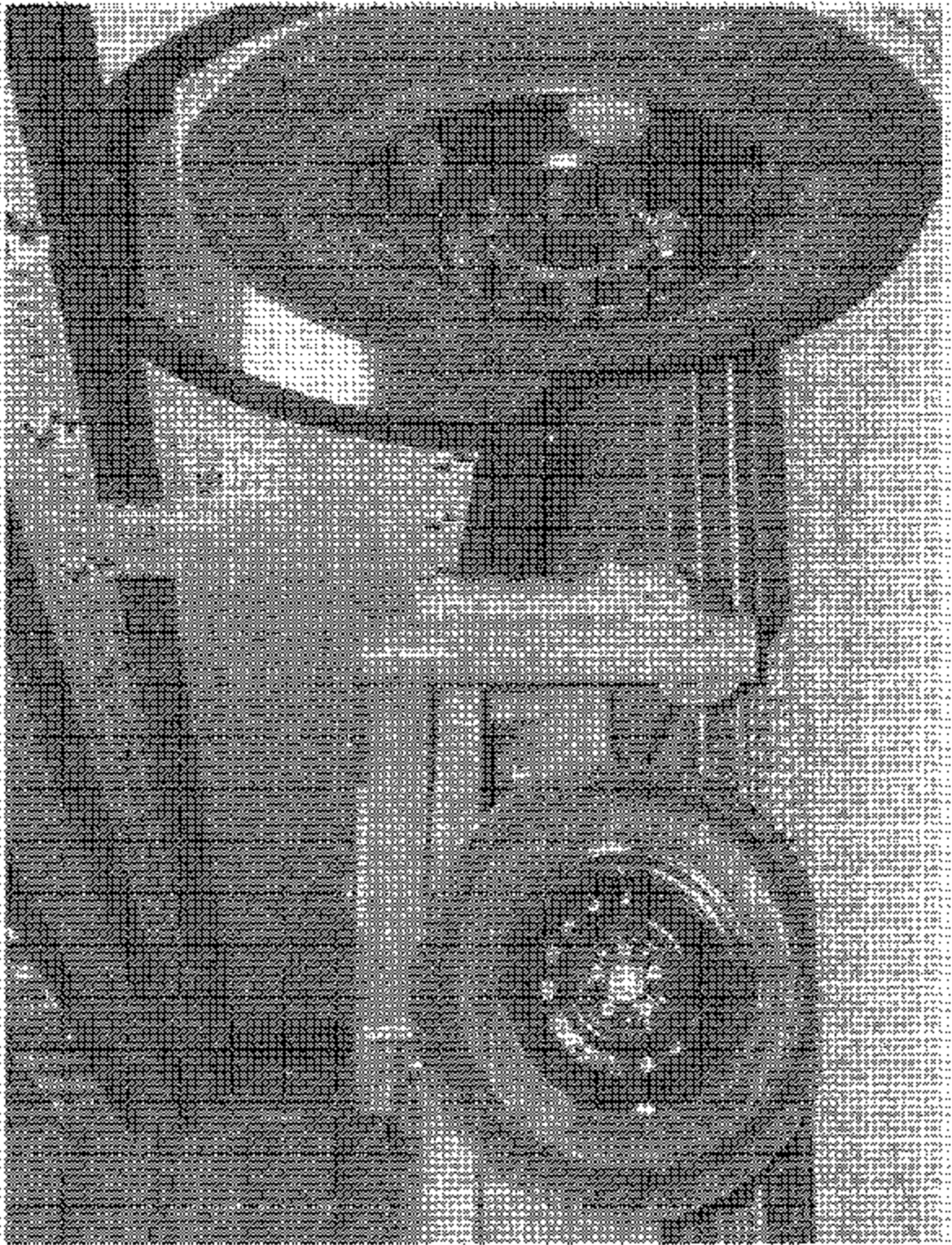
Test Vehicle: 2003 Blue Buick All American  
Procedure: FMVSS 301 Side Impact Test  
Test Date: April 28, 2003



Position of Buick All American 2003

Test Vehicle: 2003 Blue Buick All American  
Procedure: FMVSS 301 Side Impact Test

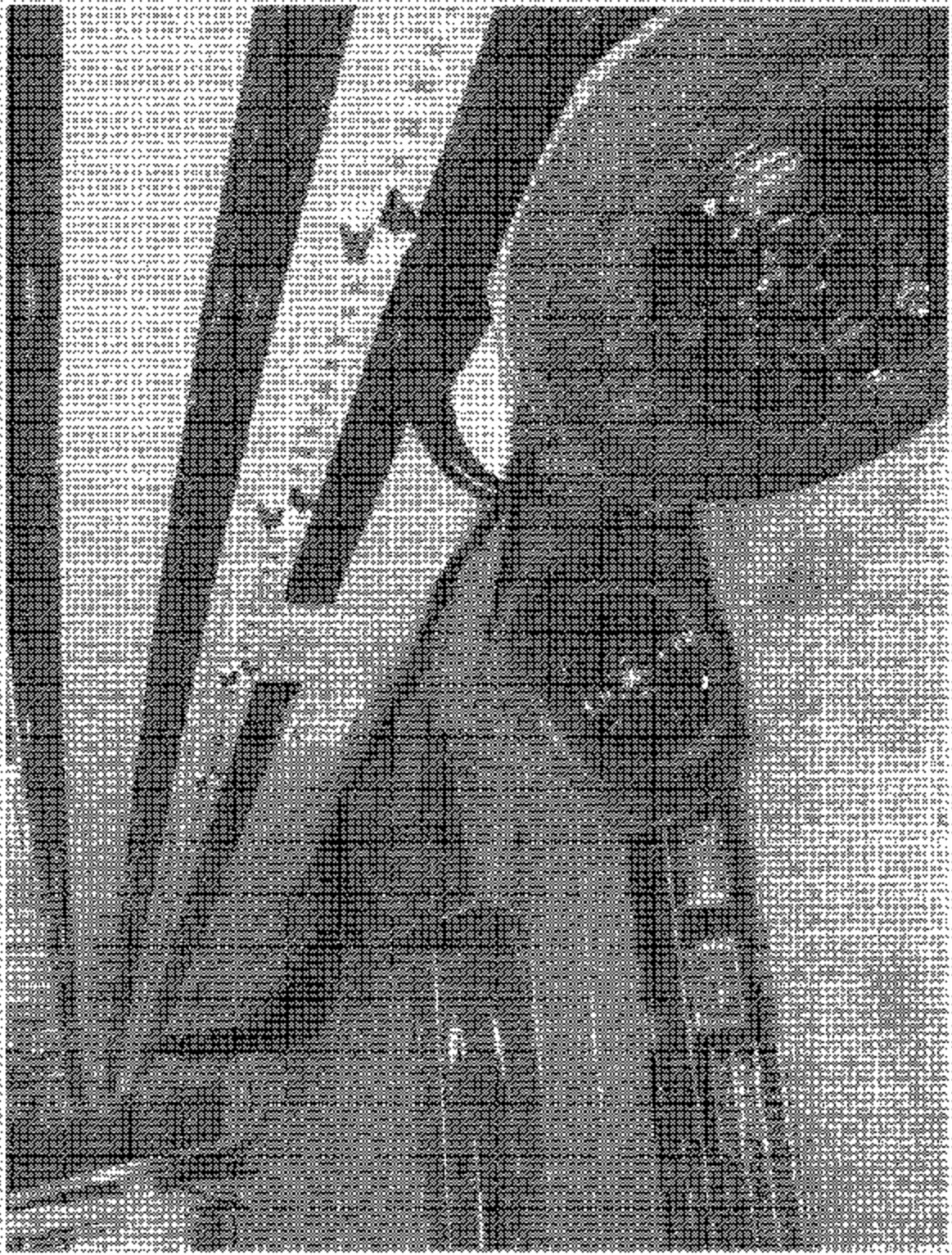
Test Date: April 22, 2003



Pre-Test of Driver's Right Side

Task Version: 2005 Blue Grid All American  
Procedure: FMVSS 301 Side Impact Test

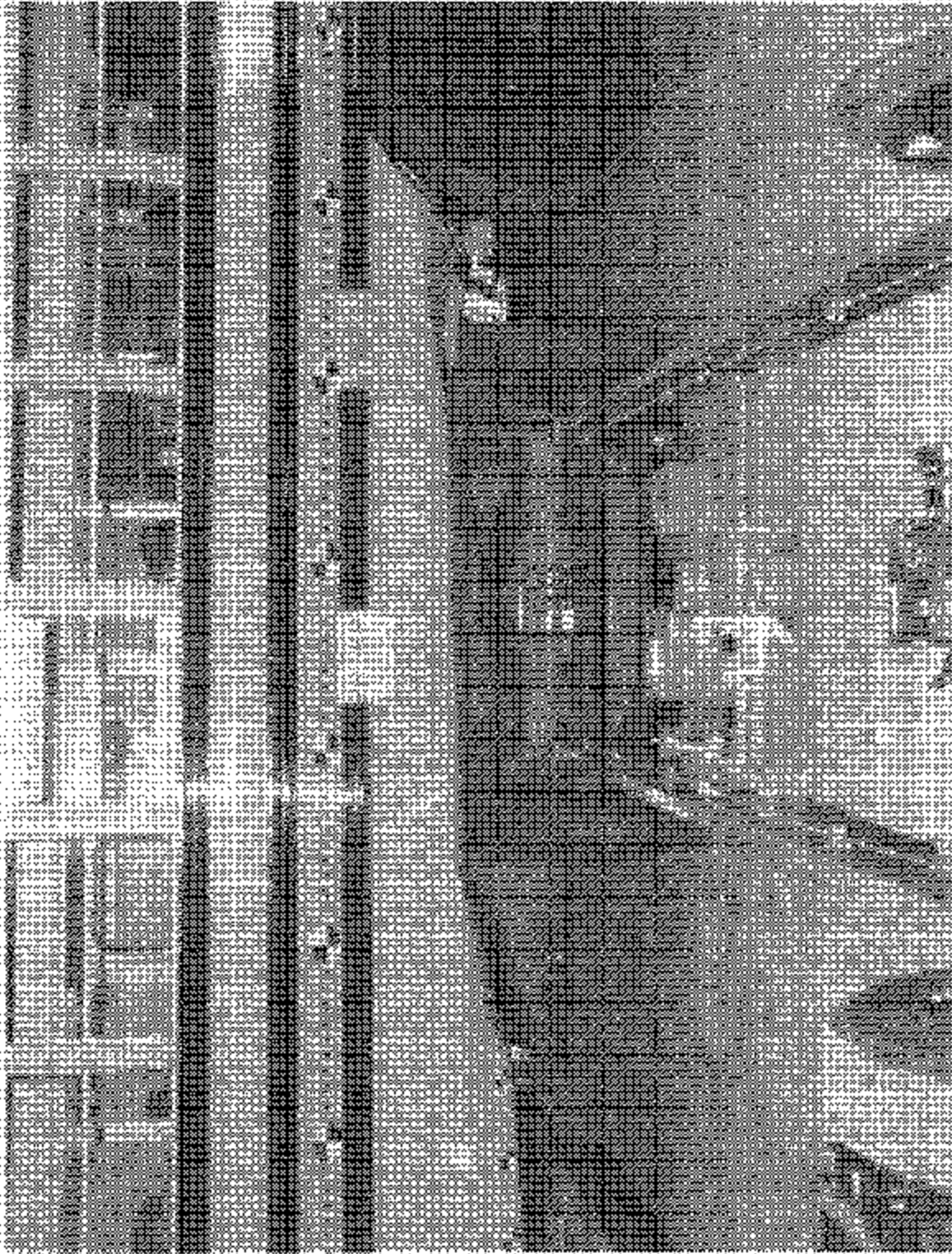
Task Date: April 28, 2003



Post Test of Barbed-tight sway

Test Vehicle: 2009 Escalade Bird All American  
Purchase: FMVSS 501 Side Impact Test

Test Date: April 23, 2008



Post-Test of Saver Evaluation

Test Vehicle: 2003 Blue Bird All American  
Procedure: FMVSS 301 Side Impact Test

Test Date: April 23, 2003

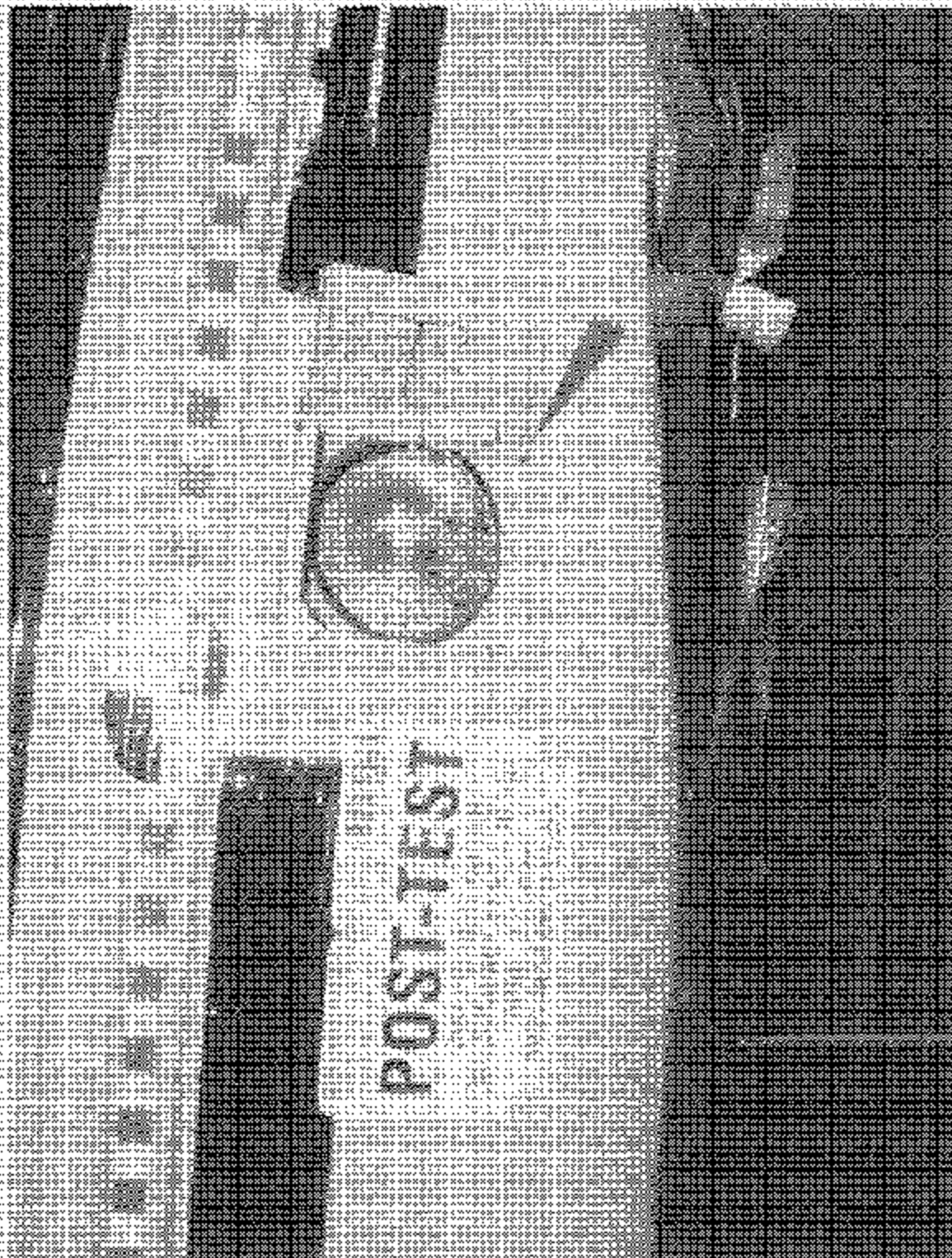


# PRE-TEST

2003 BLUE BIRD BUS  
301S IMPACT TEST CE9000  
APRIL 23, 2003

NGA RESEARCH CORP.

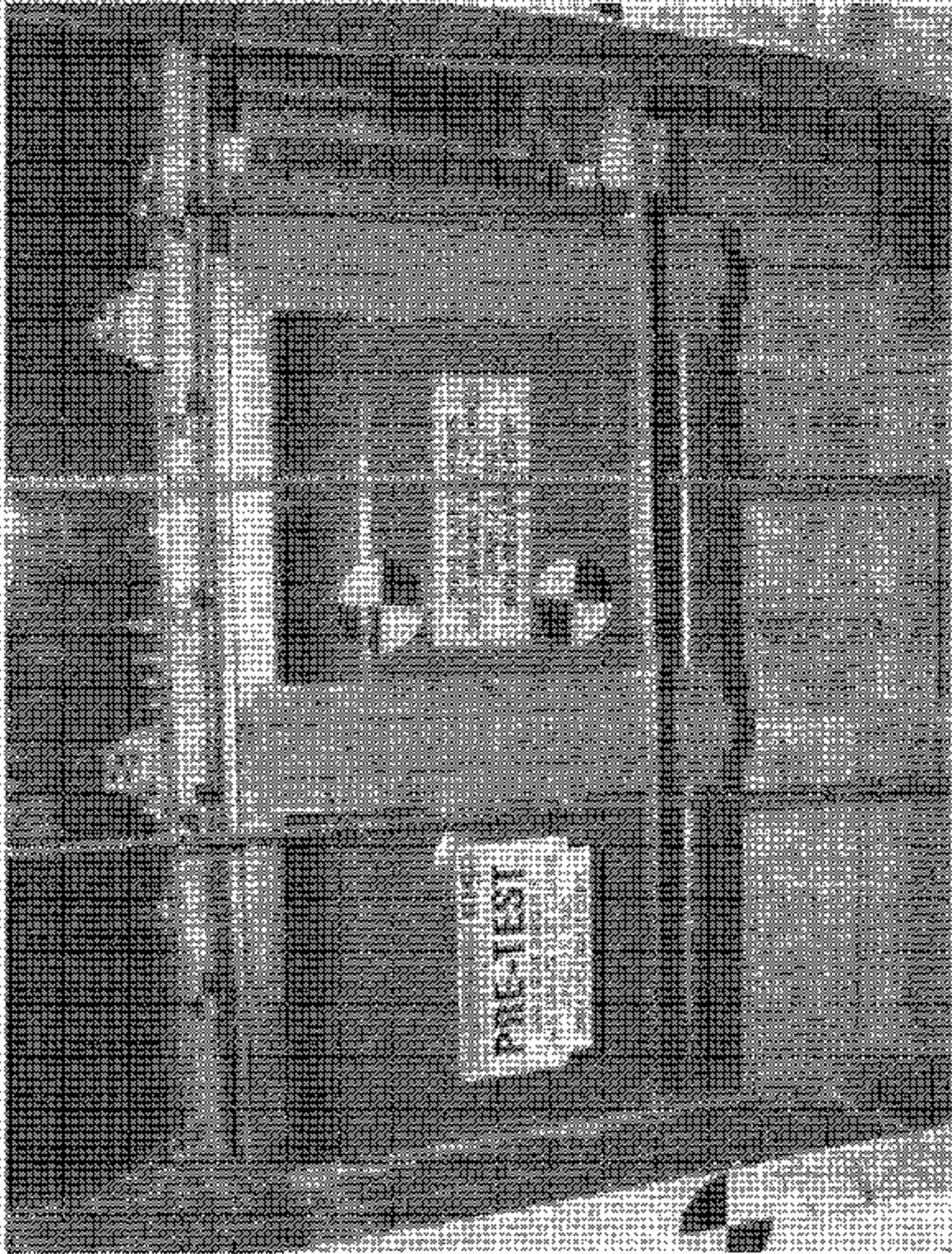
Test Vehicle: 2003 Blue Bird All American  
Procedure: FMVSS 301 Side Impact Test  
Test Date: April 23, 2005



Post-Test of East-Cab and Toric Cages

Test Vehicle: 2003 Blue Bird All American  
Platefile: FMVSS 301 Side Impact Test

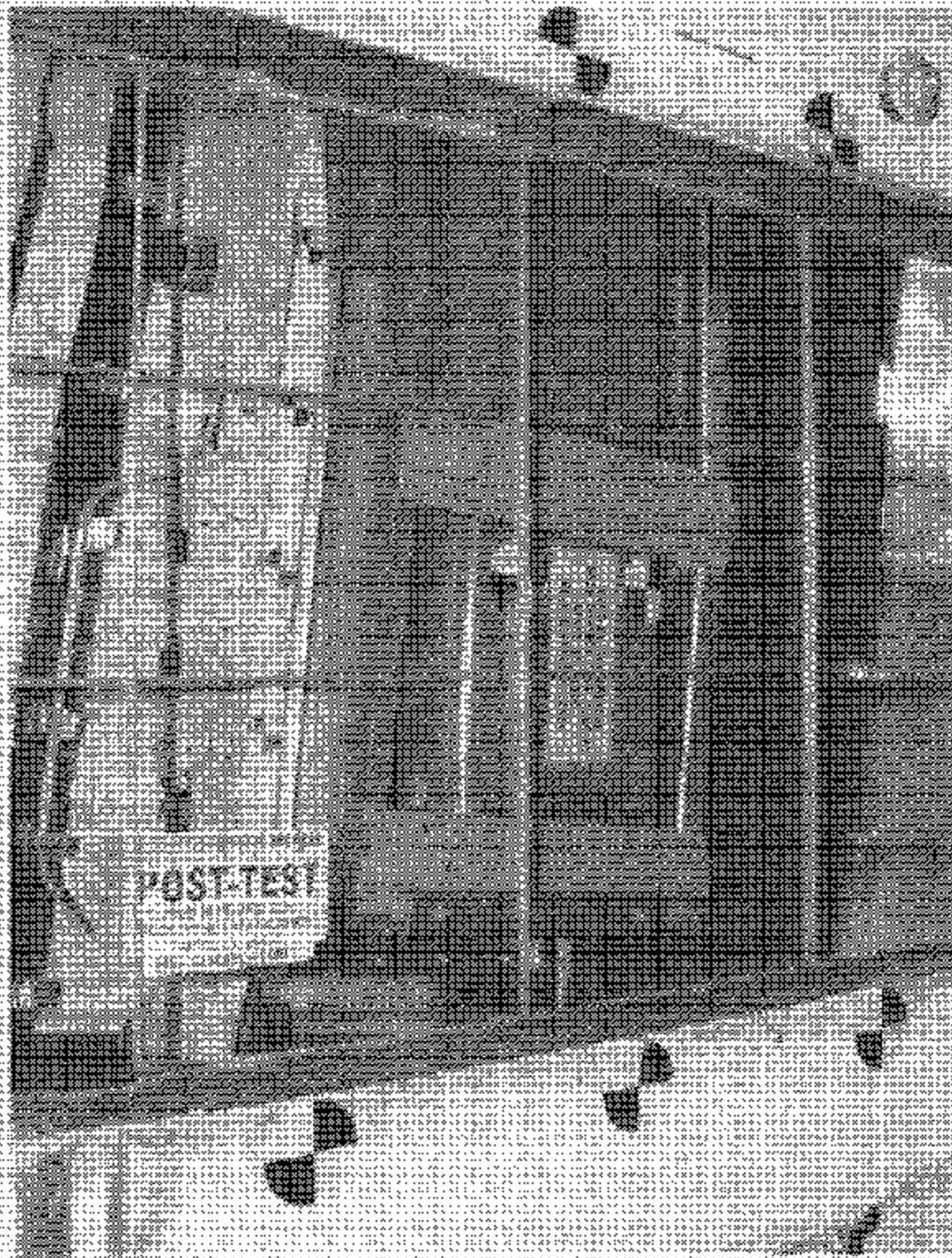
Test Date: April 23, 2003



Pre-Test of Fire Tank Configuration

Test Vehicle: 2003 Blue Bird All American  
Procedure: FMVSS 301 Side Impact Test

Test Date: April 23, 2008

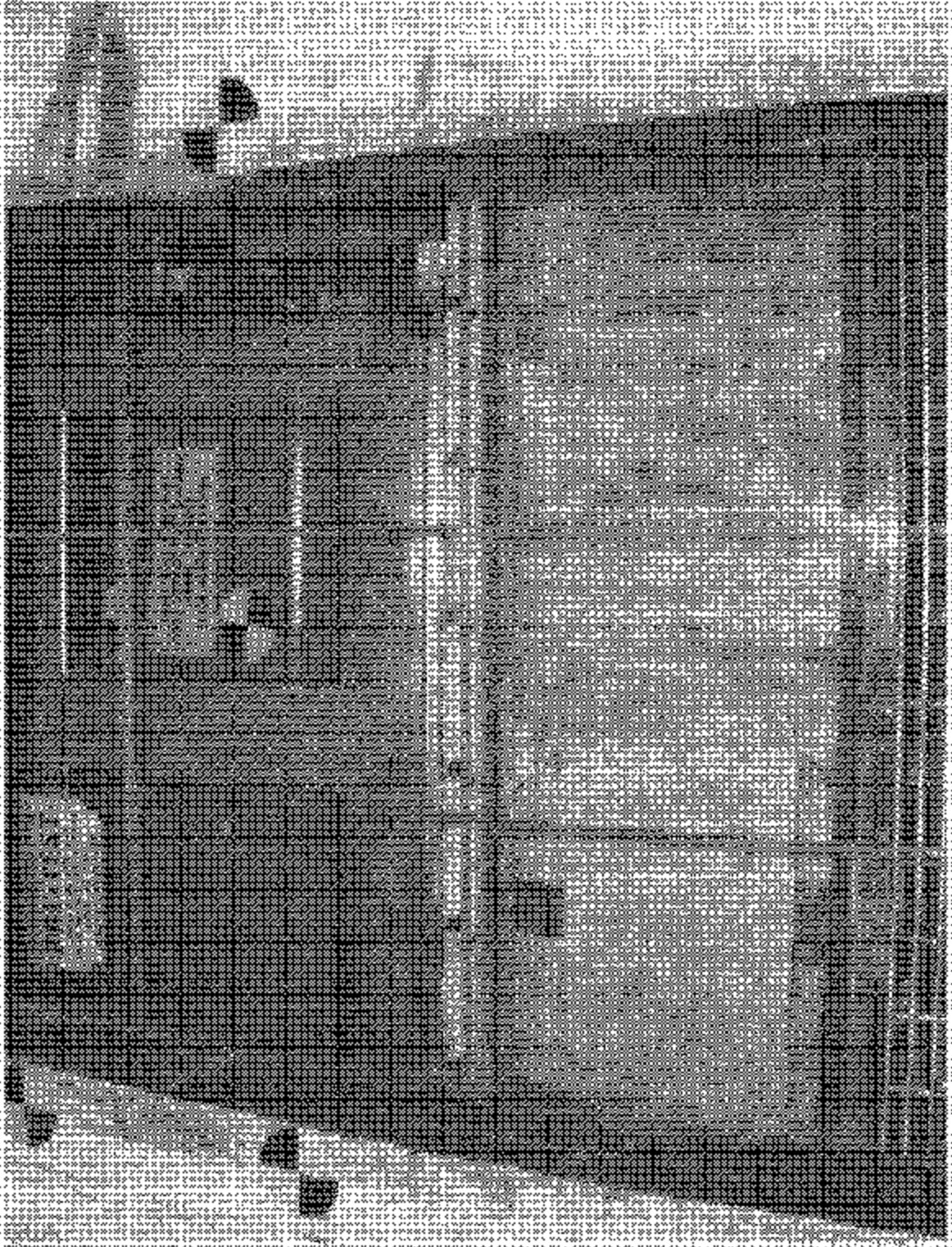


Post-Test of Fuel Tank Cage (View #1)



Test Vehicle: 2003 Blue Ford All American  
Procedure: FMVSS 301 Side Impact Test

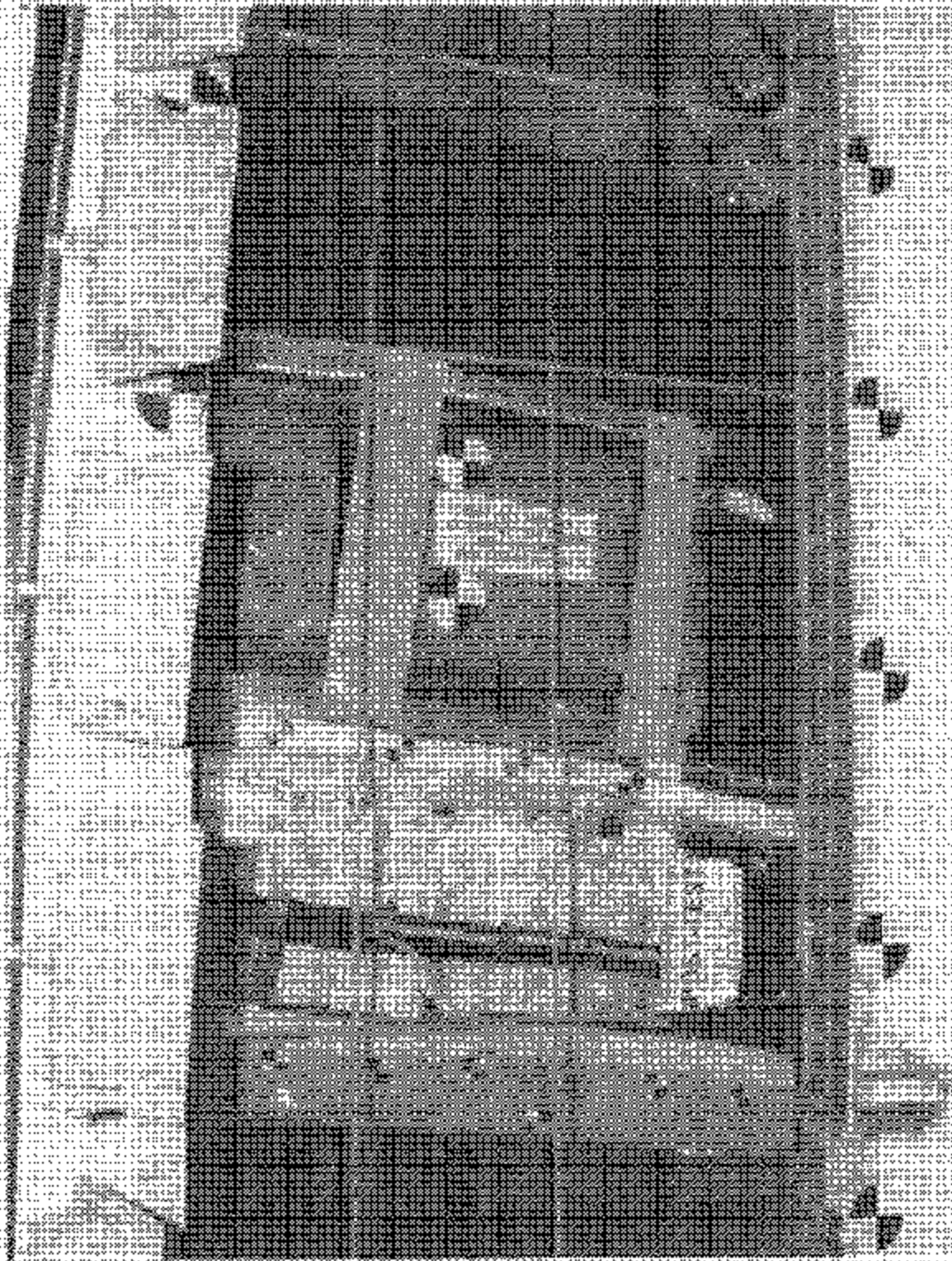
Test Date: April 28, 2003



Pre-Test of Ford Truck Cavity (View #2)

Test Vehicle: 2003 Blue Bird All American  
Procedure: FMVSS 101 Side Impact Test

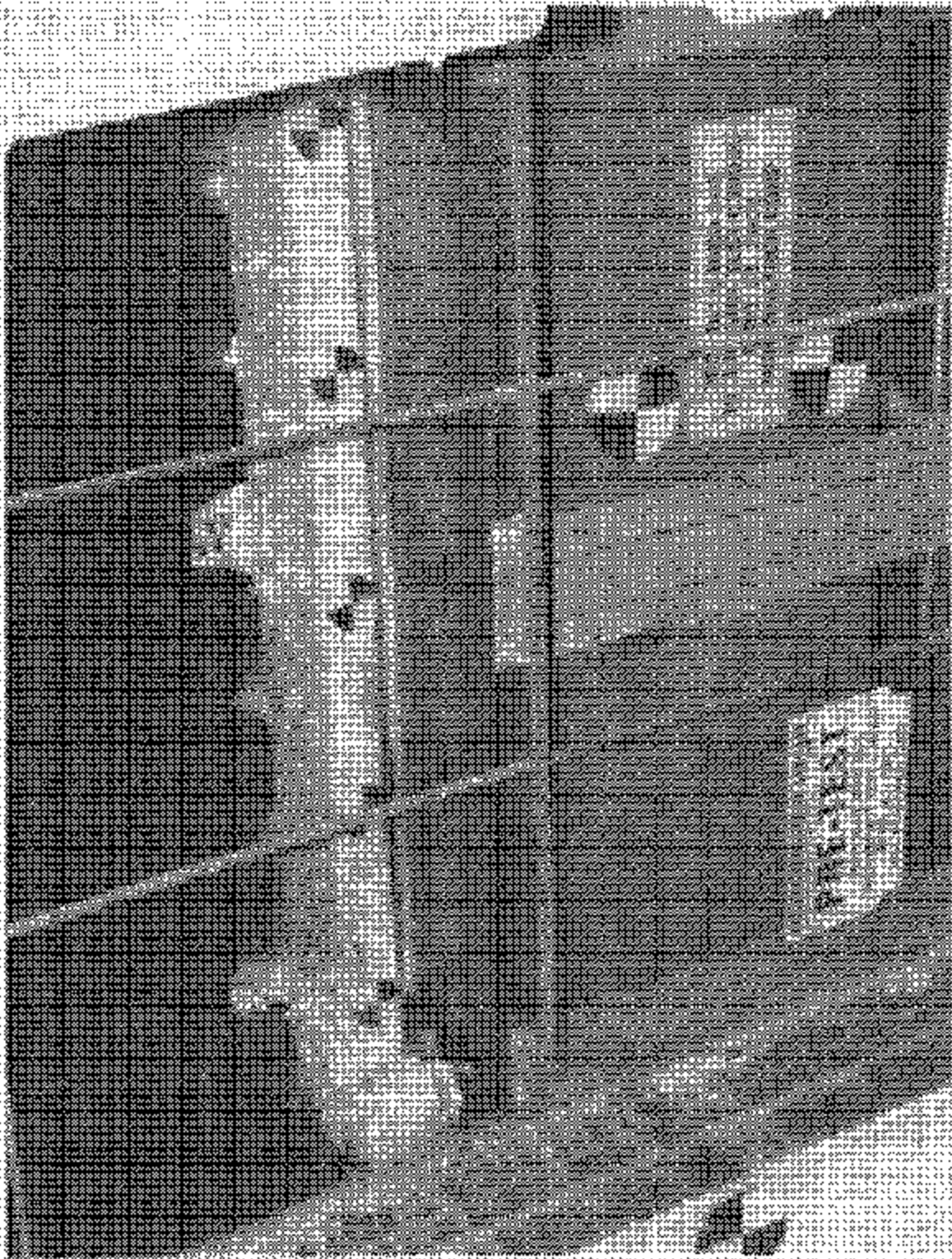
Test Date: April 23, 2003



Post-Test of Fuel Tank Cage (View #2)

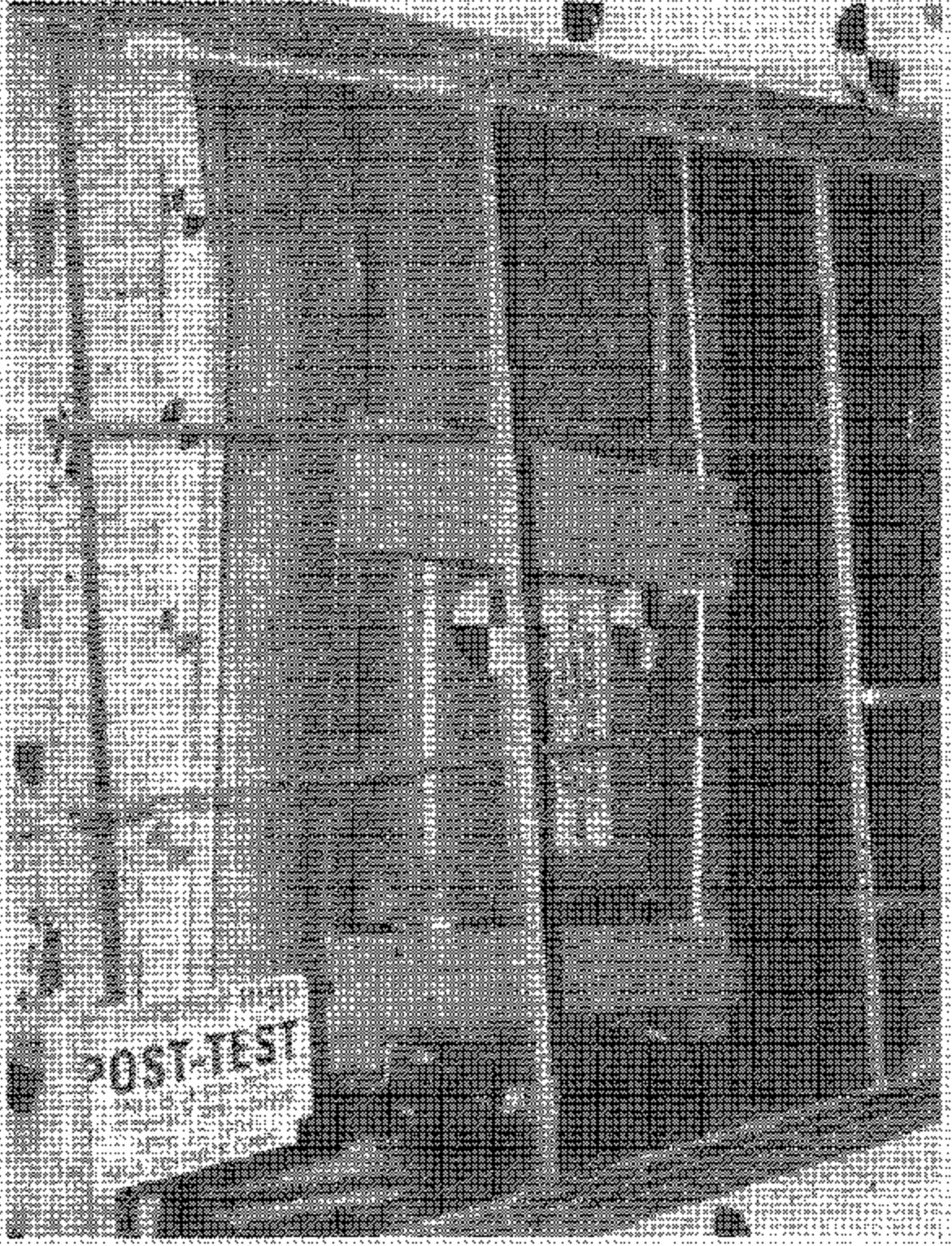
Test Vehicle: 2007 Buick Enclave All American  
Procedure: FMVSS 501 Side Impact Test

Test Date: April 23, 2008



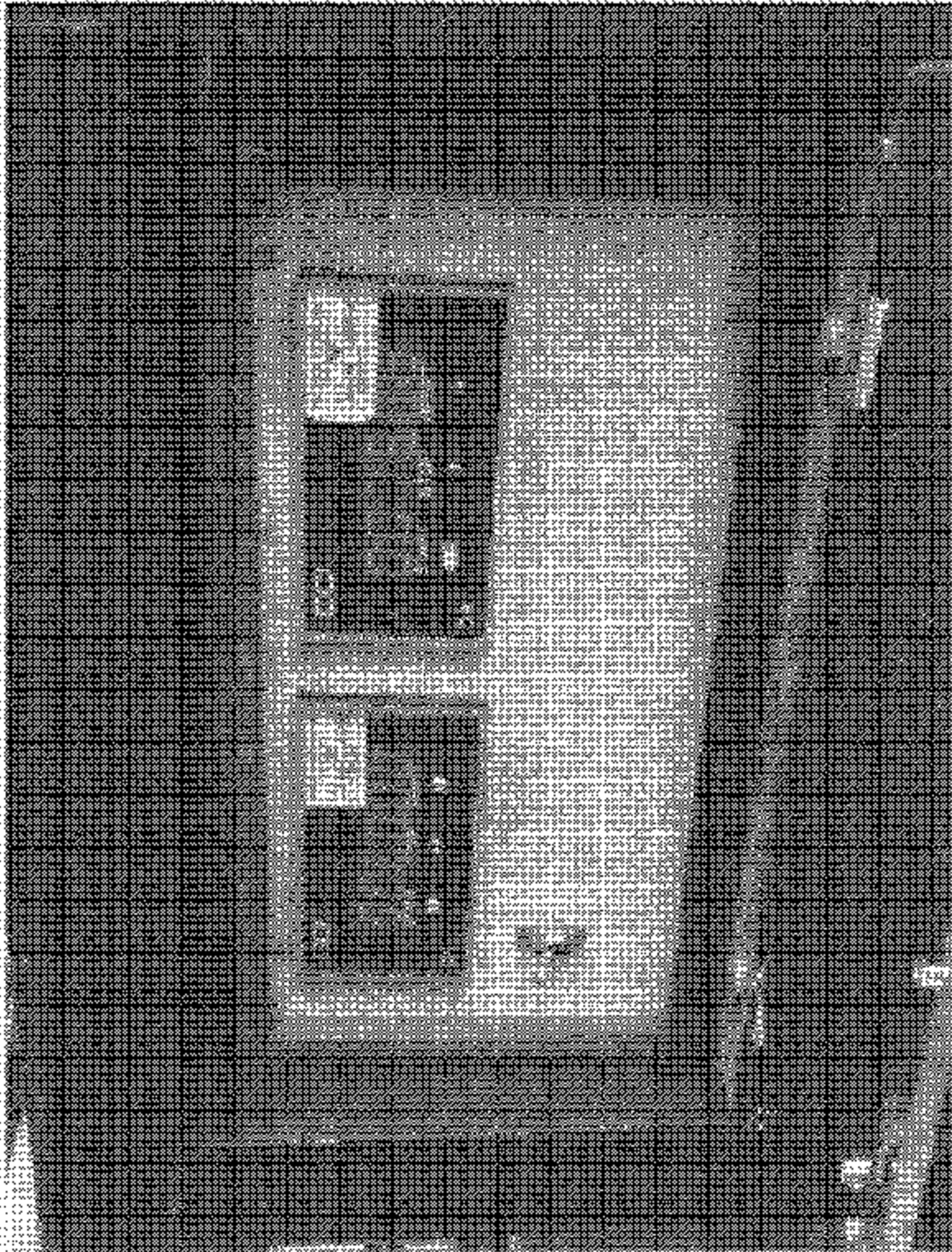
Pre-Test of Side Impact (View #1)

Test Vehicle: 2003 Blue Bird AJ American  
Procedure: FMVSS 301 Side Impact Test  
Test Date: April 29, 2003



Post-Test of Fuel Tank Cages View #3

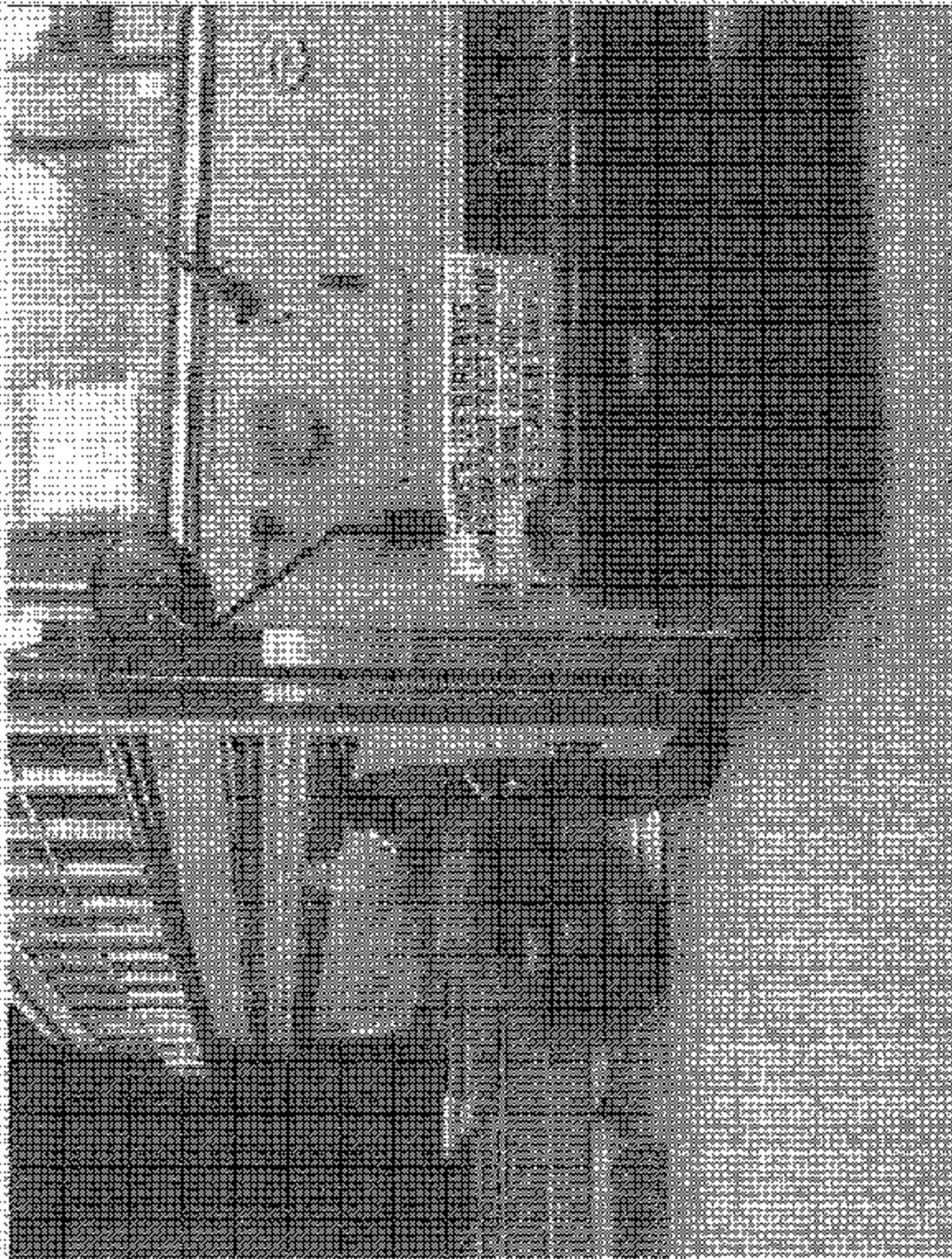
Test Vehicle: 2003 Blue Ford All American  
Procedure: FMVSS 301 Side Impact Test  
Test Date: April 22, 2003



Specific Trap Counter Display

Test Vehicle: 2002 Blue Bird All Arsenoax  
Procedure: FMVSS 301 Side Impact Test

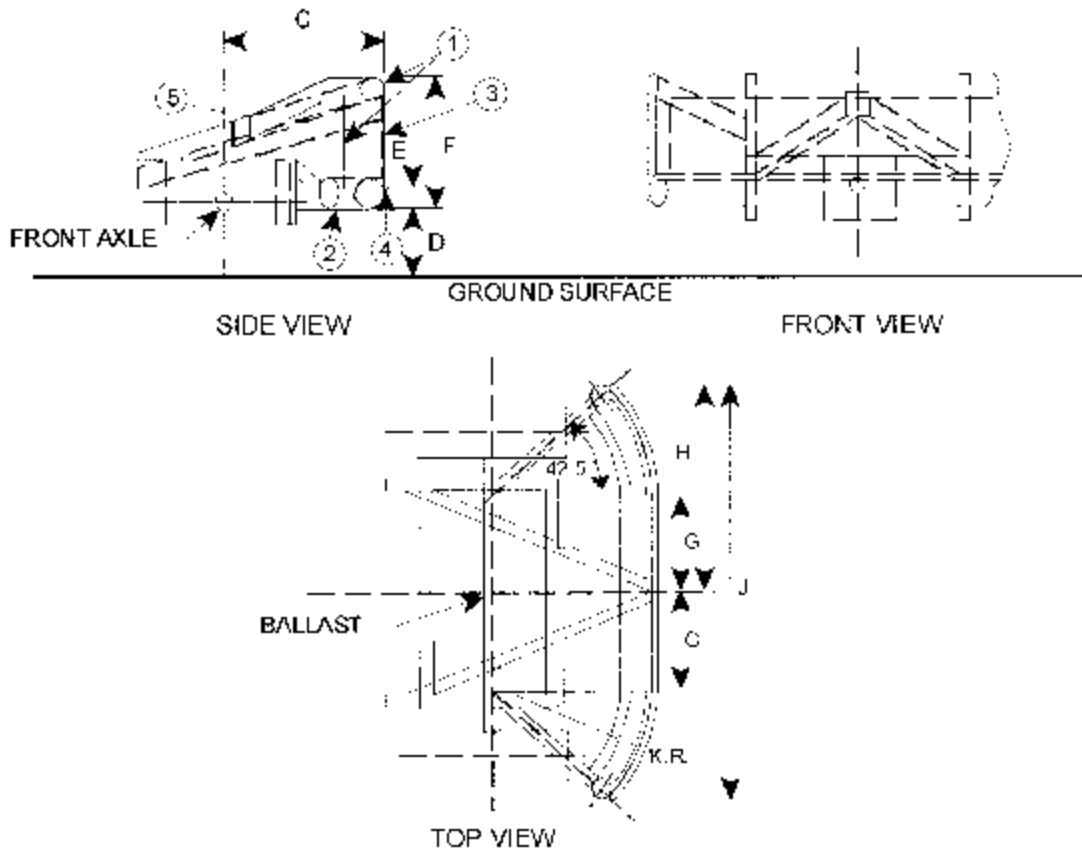
Test Date: April 23, 2003



Impact

**SECTION 6  
BARRIER INFORMATION**

## CONTOURED IMPACT SURFACE FOR COMMON CARRIAGE



DIMENSIONS SHOWN IN TABLE ON NEXT PAGE

**NOTES:**

1. Upper Frame 4.0 in. dia x 0.25 in. wall (102 mm dia x 6 mm wall)  
Steel Tubing (3 Sides)
2. Lower Frame 6.0 in. dia x 0.50 in. wall (152 mm dia x 13 mm wall)  
Steel Tubing
3. Face Plate 0.75 in. (19 mm) thick cold rolled steel
4. Leading Edge 1.0 s 4.0 in. (25 x 102 mm) steel band, sharp  
edges broken
5. All Inner Reinforcements 4.0 x 2.0 x 0.19 in. (102 x 51 x 5 mm)  
steel tubing

Total Weight = 4,000 ± 50 lbs (1,814.1 ± 22.7 kg)

Weight at each Rear Wheel =  
900 ± 25 lbs (408.2 ± 11.3 kg)

Weight at each Front Wheel =  
1,100 ± 25 lbs (499.0 ± 11.3 kg)

**Moments of Inertia:**

$I_x = 271 \pm 13.6 \text{ slug-ft}^2 (367 \pm 18.4 \text{ kg-m}^2)$

$I_z = 3,475 \pm 174 \text{ slug-ft}^2 (4,711 \pm 236 \text{ kg-m}^2)$



DIMENSIONS FOR CONTOURED IMPACT SURFACE

LETTER	INCHES	MILLIMETERS
A	54.0	1372
B	15.8	401
C	30.0	762
D	5.25	133
E	3.75	95
F	24.75	629
G	18.0	457
H	39.0	991
J	78.0	1981
K	30.0	762

# S.E.A., Inc. VIMF

## Vehicle Inertia Measurement Facility

Test Date 04-01-2003  
Date Printed 04-01-2003

Year 2003  
Make MGA  
Model FMVSS 301

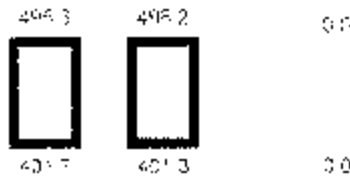
Project # MGA  
VIN

VIMF Test # 1750  
Track Width 1527.8  
Roof Height 769.6  
Wheel Base 3044.2

Description Bus cart, Tire pressure RF 26 psi, LF, RR, LR 24 psi

### Load

Left Front Right Front Front Pressure



Lateral CG 0 mm



Long. CG = 1362 mm

**Total Weight  
1794.4**

Left Rear Right Rear Rear Pressure Tire Description Goodyear Power Steak G78 15

Applied Weights (kg)	Platform Angle (deg)	Motion Relative to Platform (mm)	CG Height (mm)
0.0	0.047	0.000	0.0
167.1	4.022	-9.410	401.0
306.0	7.757	-9.935	401.1
167.1	-3.962	0.264	401.0
306.0	-7.615	0.841	401.0

**401.3 SSF = 1.904**

Period (sec)	Platform Amplitude (deg)	Relative Motion (mm)	Pitch Inertia (kg-m <sup>2</sup> )
4.978	3.987	0.316	4540
4.978	4.113	0.350	4540
4.978	4.033	0.320	4540
			<b>4540</b>

Period (sec)	Platform Amplitude (deg)	Relative Motion (mm)	Yaw Inertia (kg-m <sup>2</sup> )	Roll/Yaw Product (kg m <sup>2</sup> )
3.756	3.119	0.220	4859	.7
3.268	3.012	0.717	4850	.6
3.255	3.121	0.220	4854	.7
			<b>4859</b>	<b>-7</b>

Period (sec)	Platform Amplitude (deg)	Relative Motion (mm)	Roll Inertia (kg-m <sup>2</sup> )
1.103	2.795	1.069	383
1.105	2.734	1.194	383
1.105	2.648	1.177	382
			<b>383</b>