HSNO 637905

REPORT NUMBER 207-GTL-05-003

FMVSS NO. 207
INDICANT TEST

GENERAL MOTORS OF CANADA LTD.
2005 BUICK LACROSSE, PASSENGER CAR
NHTSA NO. C50103

GENERAL TESTING LABORATORIES, INC.
1623 LEEDSTOWN ROAD
COLONIAL BEACH, VIRGINIA 22443

JUNE 24, 2005

FINAL REPORT

PREPARED FOR

U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ENFORCEMENT
OFFICE OF VEHICLE SAFETY COMPLIANCE
400 SEVENTH STREET, SW
ROOM 6111 (NVS-220)
WASHINGTON, D.C. 20590

Prepared By: Debbie Messick

Approved By: [signature]

Approval Date: 6/24/05

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: [signature]

Acceptance Date: 7/1/05

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4. Title and Subtitle Final Report of FMVSS 207 Indicant Testing of 2005 BUICK LACROSSE PASSENGER CAR NHTSA No. C50103		5. Report Date June 24, 2005 6. Performing Organ. Code GTL
7. Author(s) Grant Farrand, Project Engineer Debbie Messick, Project Manager		8. Performing Organ. Rep# GTL-DOT-05-207-003
9. Performing Organization Name and Address General Testing Laboratories, Inc. 1623 Leedstown Road Colonial Beach, Va 22443		10. Work Unit No. (TRAIS) N/A 11. Contract or Grant No. DTNH22-01-C-11025
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Admin. Enforcement Office of Vehicle Safety Compliance (NVS-220) 400 7th Street, S.W., Room 6115 Washington, DC 20590		13. Type of Report and Period Covered Final Test Report June 15, 2005 14. Sponsoring Agency Code NVS-220

15. Supplementary Notes

16. Abstract

Indicant tests were conducted on the subject 2005 Buick Lacrosse passenger car in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-207-09 for the determination of FMVSS 207 compliance.
Test failures identified were as follows:
NONE

17. Key Words Compliance Testing Safety Engineering FMVSS 207	18. Distribution Statement Copies of this report are available from NHTSA Technical Information Services (TIS) Room 2336 (NPO-405) 400 7th St., S.W. Washington, DC 20590 Telephone No. (202) 366-4947		
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SECTION 1

INTRODUCTION

1.0 PURPOSE OF INDICANT TEST

A 2005 Buick Lacrosse 4-door passenger car was subjected to the following tests to determine the effects of the newly developed FMVSS 207/210 force application devices (FAD) (a.k.a. Tommy (FAD 1) and Tommy Jr (FAD 2) as compared to the current FMVSS 207/210 seat belt body blocks.

1.1 TEST VEHICLE

The test vehicle was a 2005 Buick Lacrosse 4-door passenger car. Nomenclature applicable to the test vehicle are:

A. Vehicle Identification Number: 2G4WC532051308692

B. NHTSA No.: C50103

C. Manufacturer: GENERAL MOTORS OF CANADA LTD.

D. Manufacture Date: 04/05

1.2 TEST DATE

The test vehicle was subjected to testing on June 15, 2005.

SECTION 2
TEST PROCEDURE AND SUMMARY OF RESULTS

2.0 GENERAL

The 2005 Buick Lacrosse 4-door passenger car, NHTSA No. C50103, was subjected to testing on June 15, 2005.

2.1 TEST PROCEDURE

FAD Positioning Procedure:

1. Place seat in full rearward and full downward position.
2. Set seatback angle per manufacturers recommendation.
3. Identify and mark the centerline of the seat and seat back for each seating position.
4. Place the FAD so the midsagittal plane of the FAD contains the centerline for both the seat and back support of the seat. (Centerline of Body aligns with the centerline of the seat)
5. Rotate torso forward.
6. Push on pelvis parallel to surface of seating surface so the back of the pelvis is solidly against the seat back.
7. Rotate the torso up against the seatback while holding the pelvis in place.
8. Push on torso at center of gravity, perpendicular to the seat back with a force of 40 pounds.
9. Attach seatbelt and position the seatbelt so lap belt is over the FAD's hips and the shoulder strap over the torso (chest).
10. If seatbelts need to be replaced with wire rope, install ratchet-type-belt tensioner on B-pillar between D-Ring and retractor and remove excess belt from the retractor. If a second retractor is installed on the lap belt, install a second ratchet type-belt tensioner between the FAD and the lap belt retractor.
11. Attach one actuator to the torso pull yoke and one to the pelvis eyelet.

Pull Test Procedure:

1. Connect load cells and actuators to the FAD's so they pull in a plane that is inclined 10° ± 4° above the horizontal. The applied load shall be parallel to the vehicle's centerline ± 3°. Also connect the standard test blocks in accordance with FMVSS 207/210 compliance testing.
2. Take pre-test photographs.
3. Ramp to holding load within 30 seconds.
4. Take photographs
5. Hold the maximum force for a period of not less than ten seconds.
6. Take post test photographs.

SECTION 2 Continued

Test Configuration for Buick Lacrosse 5 Passenger Sedan:

1. LF FAD1
2. RF Standard Blocks
3. LR Standard Blocks
4. CR FAD2
5. RR FAD1

2.2 SUMMARY OF RESULTS

The test results are provided in Section 3, Test Data.

SECTION 3
TEST DATA

3.0 DATA

The following items were noted during the conduct of these tests.

1. The new FMVSS 207/210 FAD (Tommy Blocks) are much easier to position and set for lap and shoulder belts than the current FMVSS 207/210 body blocks.

2. The current FMVSS 207/210 shoulder belt body block wants to slide down and rest on top of the lower body block. This is no longer a problem with the new FMVSS 207/210 FAD (Tommy Blocks).

3. The new FMVSS 207/210 FAD (Tommy Blocks) appear to be more "seat belt friendly" than the current FMVSS 207/210 body blocks. ie: A remote chance of breakage of the lap belt buckle due to bending around the corner of the current FMVSS 207/210 lap belt body block and less pay-out of shoulder belt during the test due to the torso being connected to the lap on the new FMVSS 207/210 FAD (Tommy Blocks).

4. Using existing body block, pay-out of seat belt webbing due to load limiters causes hydraulic test load application cylinders to bottom-out and test cannot be completed without resetting and starting the test over again. The resetting of the hydraulic test load application cylinders was not necessary using the new proposed FMVSS 207/210 FAD (Tommy Blocks).

5. This vehicle appears to meet the requirements of FVMSS 210 when tested with current FMVSS 207/210 body blocks and the proposed FMVSS 207/210 FAD force application device (a.k.a.) Tommy (FAD 1) and Tommy Jr. (FAD 2).

DATA SHEET 1
LAP AND SHOULDER BELT ASSEMBLY ANCHORAGE LOADING

VEHICLE MAKE/MODEL/BODY STYLE: 2005 BUICK LACROSSE PASSENGER CAR
VEHICLE NHTSA NO.: C50103 ; VIN: 2G4WC532051308692
LABORATORY: GENERAL TESTING LABORATORIES
TEST DATE: 06/15/05
OBSERVERS: G. Farrand, J. Latane

SEAT	BELT ASSEMBLY TESTED	MAXIMUM LOAD REQUIREMENT	APPLIED LOAD
FRONT GTL TEST #5310*	Left Lap	3000 lbs, -10, -50	2991
	Left Shoulder	3000 lbs, -10, -50	2972
	Right Lap	3000 lbs, -10, -50	2957
	Right Shoulder	3000 lbs, -10, -50	2428
FRONT GTL TEST #5311 RETEST OF 5310	Left Lap	3000 lbs, -10, -50	2963
	Left Shoulder	3000 lbs, -10, -50	2964
	Right Lap	3000 lbs, -10, -50	2968
	Right Shoulder	3000 lbs, -10, -50	2972
REAR GTL TEST #5312	Left Lap	3000 lbs, -10, -50	2986
	Left Shoulder	3000 lbs, -10, -50	2997
	Right Lap	3000 lbs, -10, -50	2972
	Right Shoulder	3000 lbs, -10, -50	2973
	Center Lap	3000 lbs, -10, -50	2972
	Center Shoulder	3000 lbs, -10, -50	2977

REMARKS: *Passenger side shoulder belt hydraulic ram bottomed out due to spool-out of the shoulder belt retractor on test #5310. Hydraulic rams were re-hooked and test was continued. See Test #5311.

RECORDED BY: G. Farrand DATE: 06/15/05

APPROVED BY: D. Messich

DATA SHEET 2
SEAT BELT ASSEMBLY LOAD ANGLE MEASUREMENT

VEHICLE MAKE/MODEL/BODY STYLE: 2005 BUICK LACROSSE PASSENGER CAR
VEHICLE NHTSA NO.: C50103 ; VIN: 2G4WC532051308692
LABORATORY: GENERAL TESTING LABORATORIES
TEST DATE: 06/15/05
OBSERVERS: G. Farrand, J. Latane

TYPE	ANGLE MEASURED	ANGLE REFERENCE	ANGLE AT 10% LOAD (degrees)					
			LEFT DSP		CENTER DSP		RIGHT DSP	
			FRT	RR	FRT	RR	FRT	RR
LAP BELT	Load Application Angle (degrees)	From Side View Horizontal 10 ± 4	10°	8°	N/A	8°	10°	8°
		From Plan View Vehicle Centerline 0 ± 3	0°	0°	N/A	0°	0°	0°
SHOULDER BELT	Load Application Angle (degrees)	From Side View Horizontal 10 ± 4	11°	9°	N/A	9°	11°	9°
		From Plan View Vehicle Centerline 0 ± 3	0°	0°	N/A	0°	0°	0°

REMARKS:

RECORDED BY: L. Farrand DATE: 06/15/05

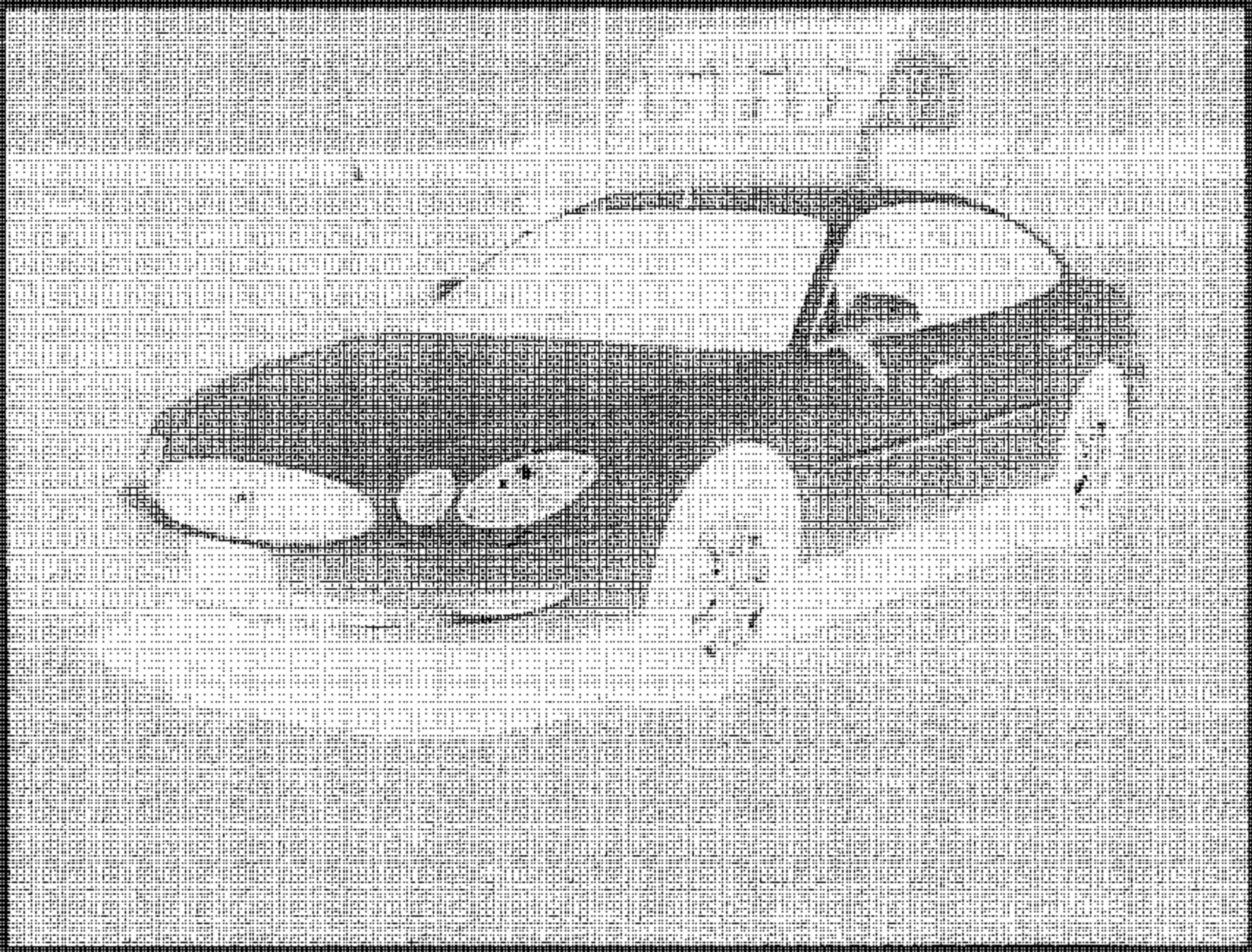
APPROVED BY: D. Musick

SECTION 4
INSTRUMENTATION AND EQUIPMENT LIST

TABLE 1 - INSTRUMENTATION & EQUIPMENT LIST

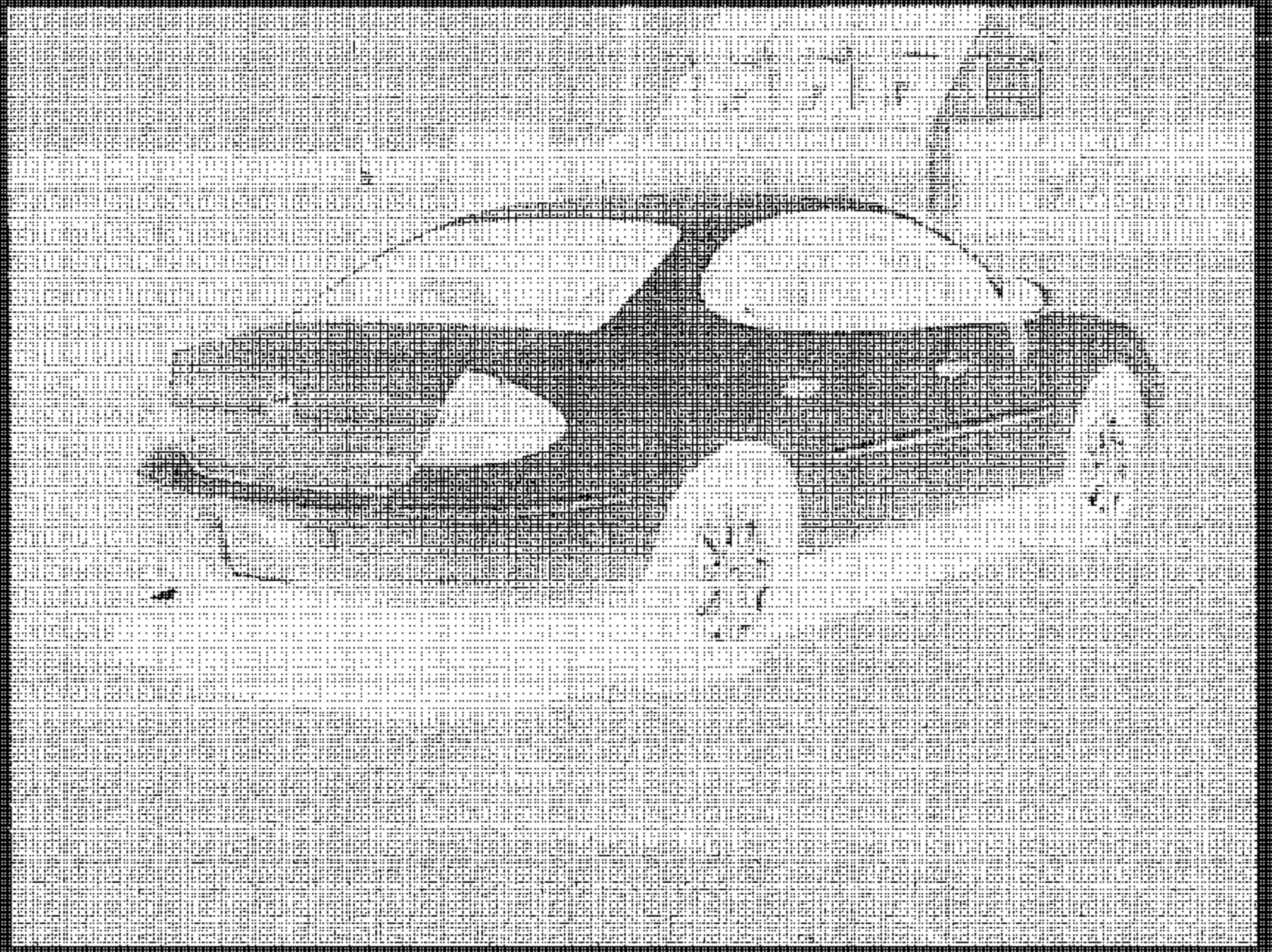
EQUIPMENT	DESCRIPTION	MODEL/ SERIAL NO.	CAL. DATE	NEXT CAL. DATE
COMPUTER	AT&T	486DX266	N/A	N/A
TEST FIXTURE	GTL	N/A	BEFORE USE	BEFORE USE
SIGNAL CONDITIONER	METRABYTE	EXP-RES	BEFORE USE	BEFORE USE
LOAD CELL	REVERE	46021	01/05	01/06
LOAD CELL	REVERE	46022	01/05	01/06
LOAD CELL	REVERE	46023	01/05	01/06
LOAD CELL	REVERE	46024	01/05	01/06
LOAD CELL	REVERE	46025	01/05	01/06
LOAD CELL	REVERE	44243	01/05	01/06

SECTION 5
PHOTOGRAPHS



2005 BUICK LACROSSE
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 5.1
¾ FRONTAL LEFT SIDE VIEW OF VEHICLE



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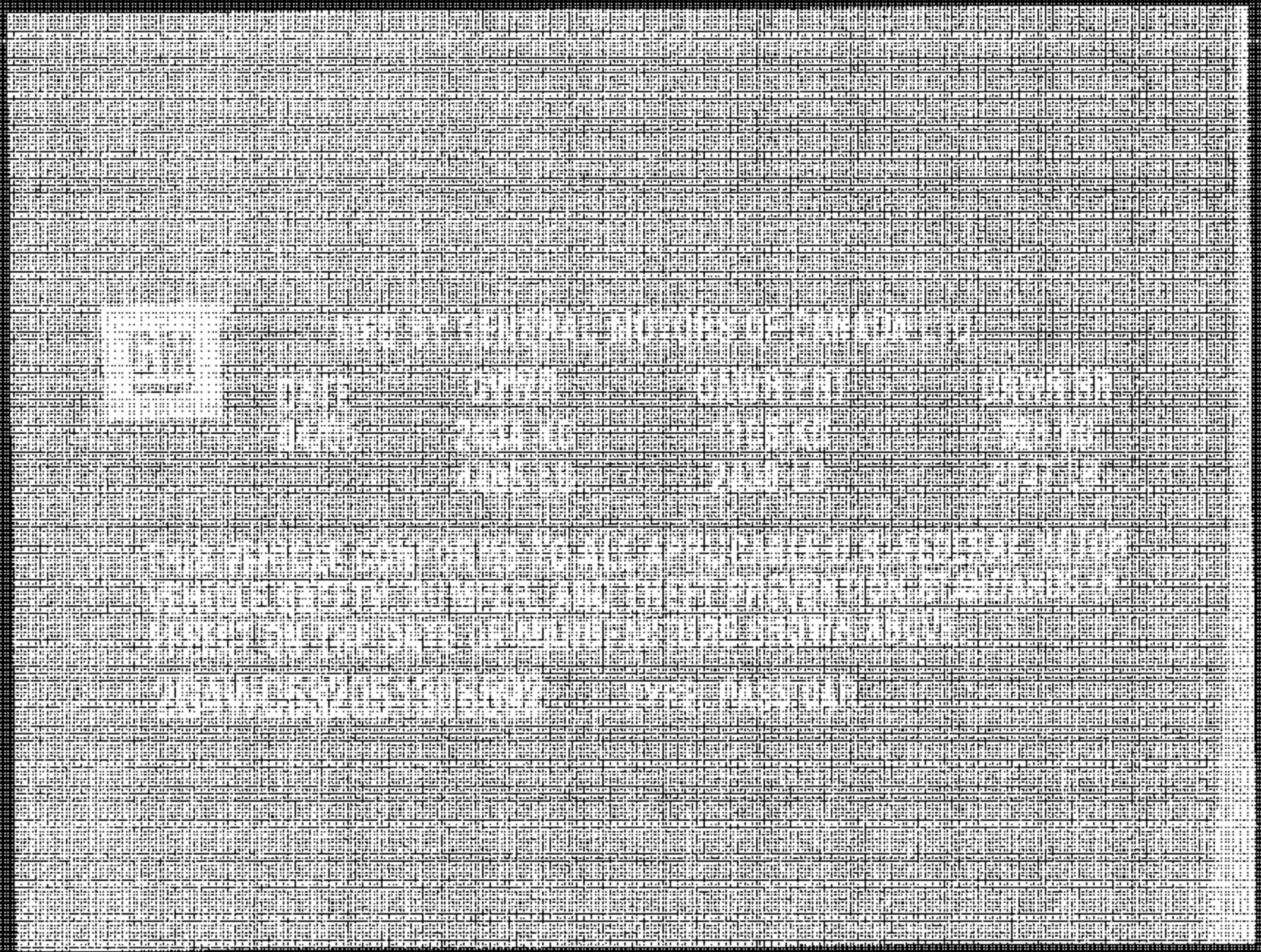
NHTSA NO. C5C103
FMVSS NO. 210

FIGURE 5.2
¾ REAR RIGHT SIDE VIEW OF VEHICLE



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NHTSA NO. C50102
FMVSS NO. 210

FIGURE 5.3
VEHICLE CERTIFICATION LABEL

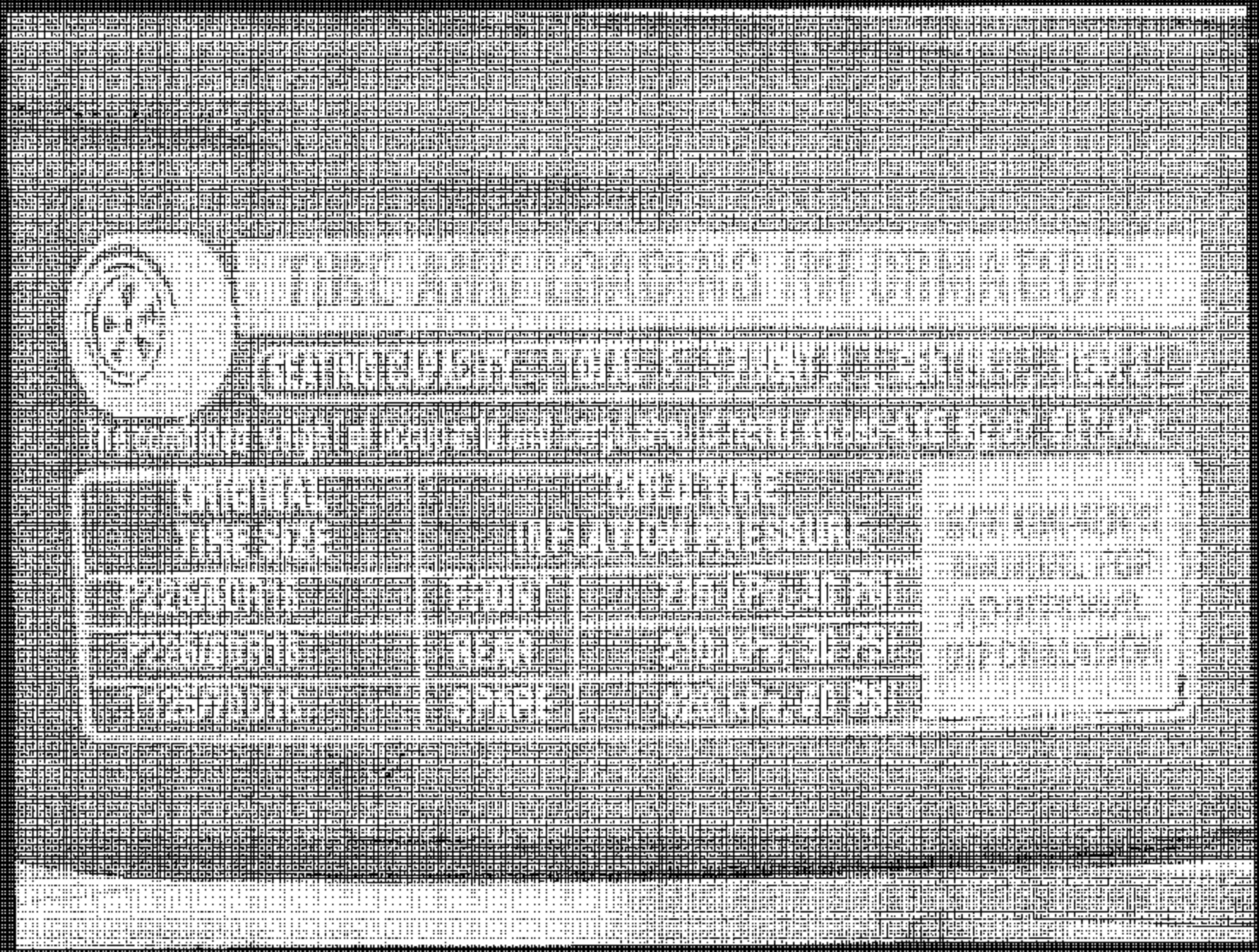

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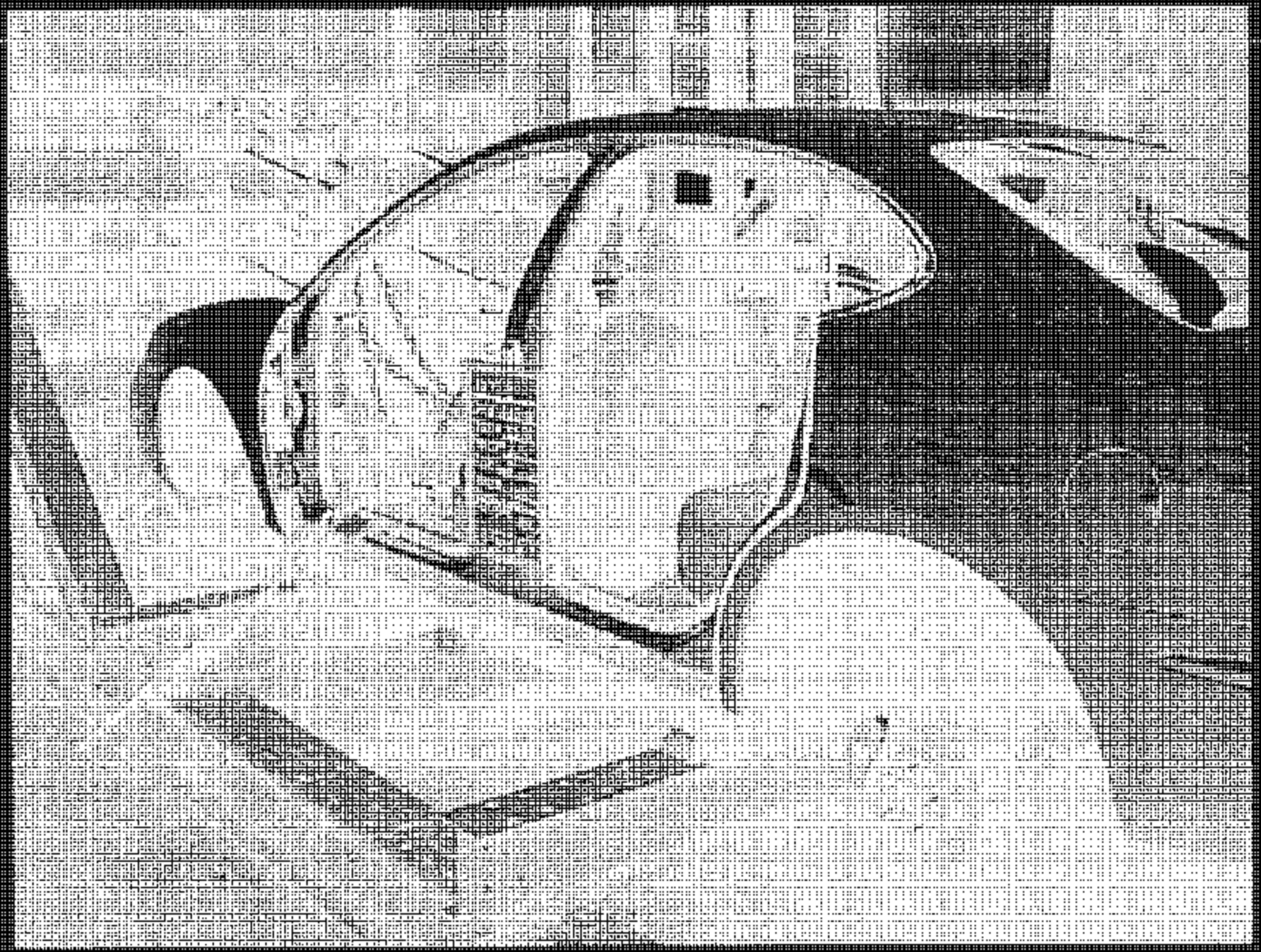
FIGURE 5.4
VEHICLE TIRE INFORMATION LABEL



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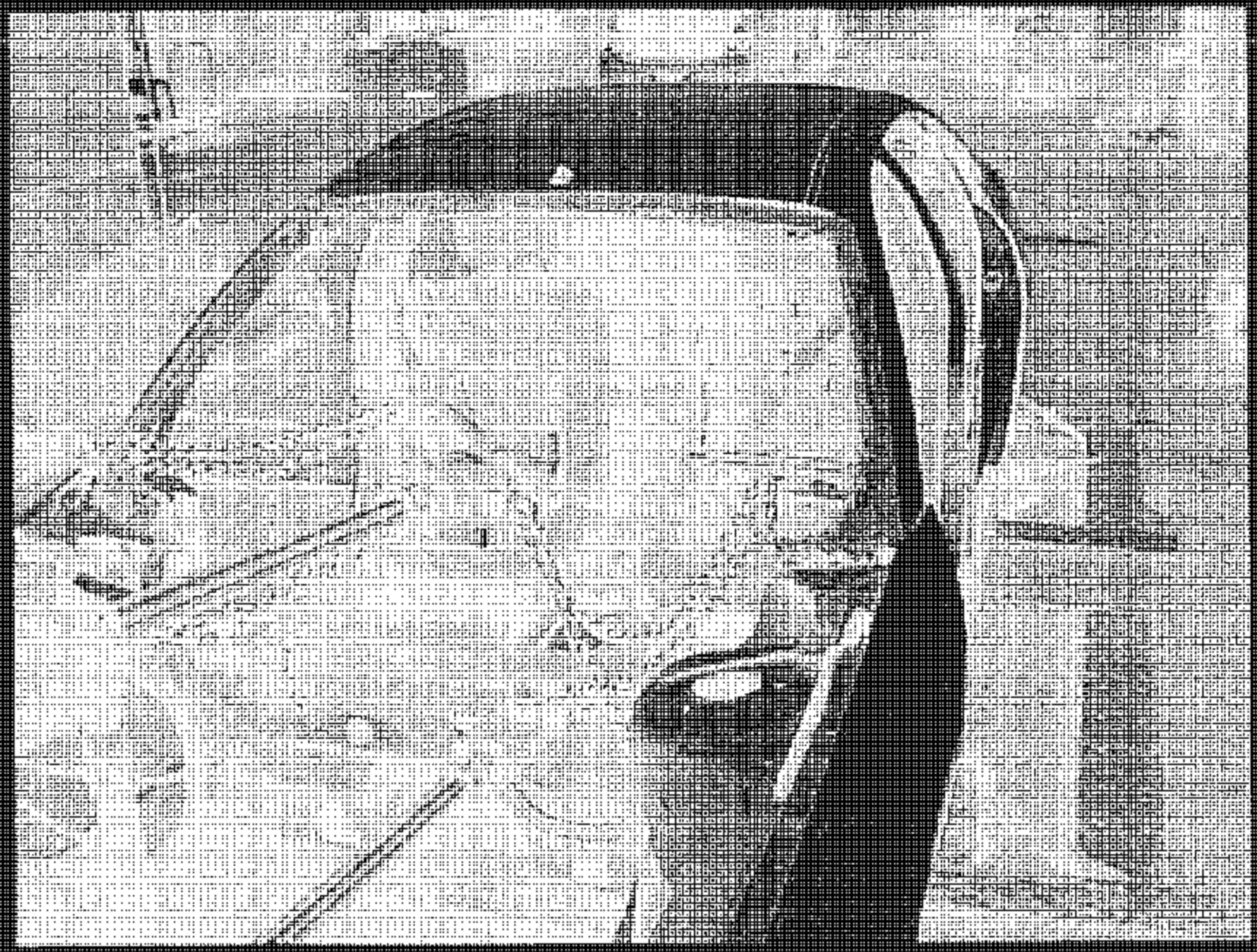
NHTSA NO. C60103
FMVSS NO. 210

FIGURE 5.5
¾ LEFT REAR VIEW OF TEST VEHICLE IN TEST RIG



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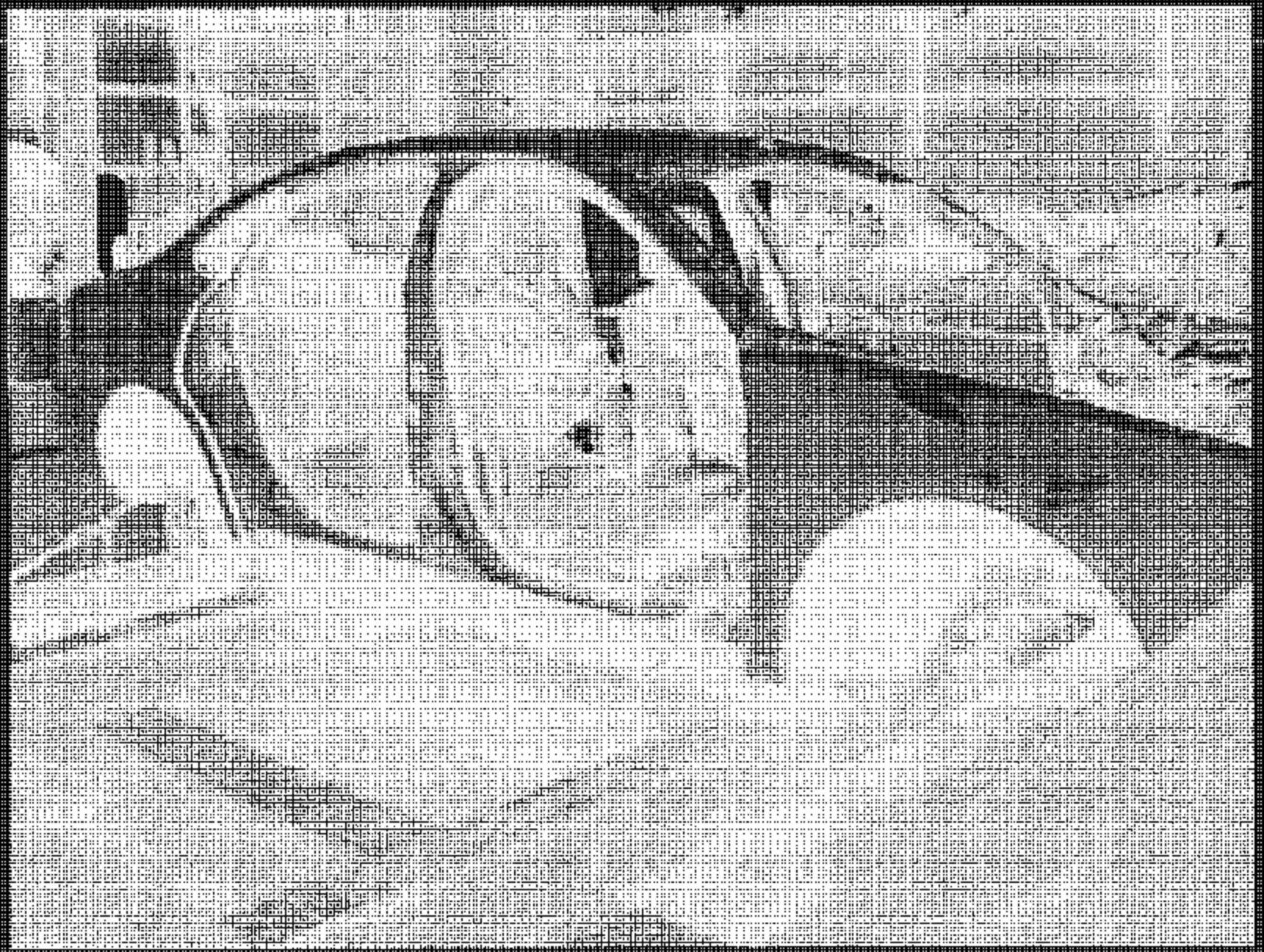
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 5.6
¾ LEFT FRONT VIEW OF VEHICLE IN TEST RIG



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FMVSS NO. 210

FIGURE 6.7
¾ RIGHT FRONT VIEW OF VEHICLE IN TEST RIG

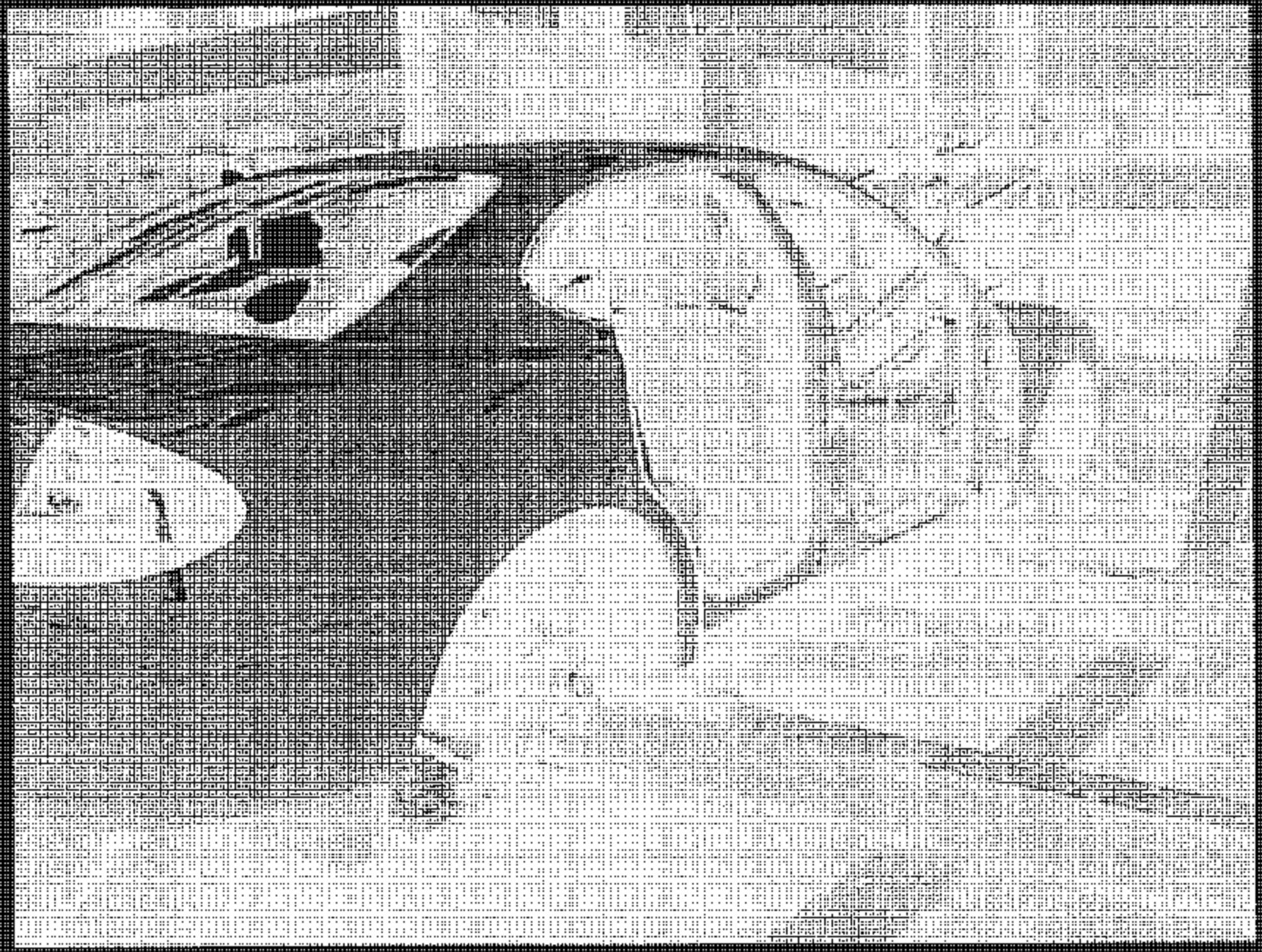

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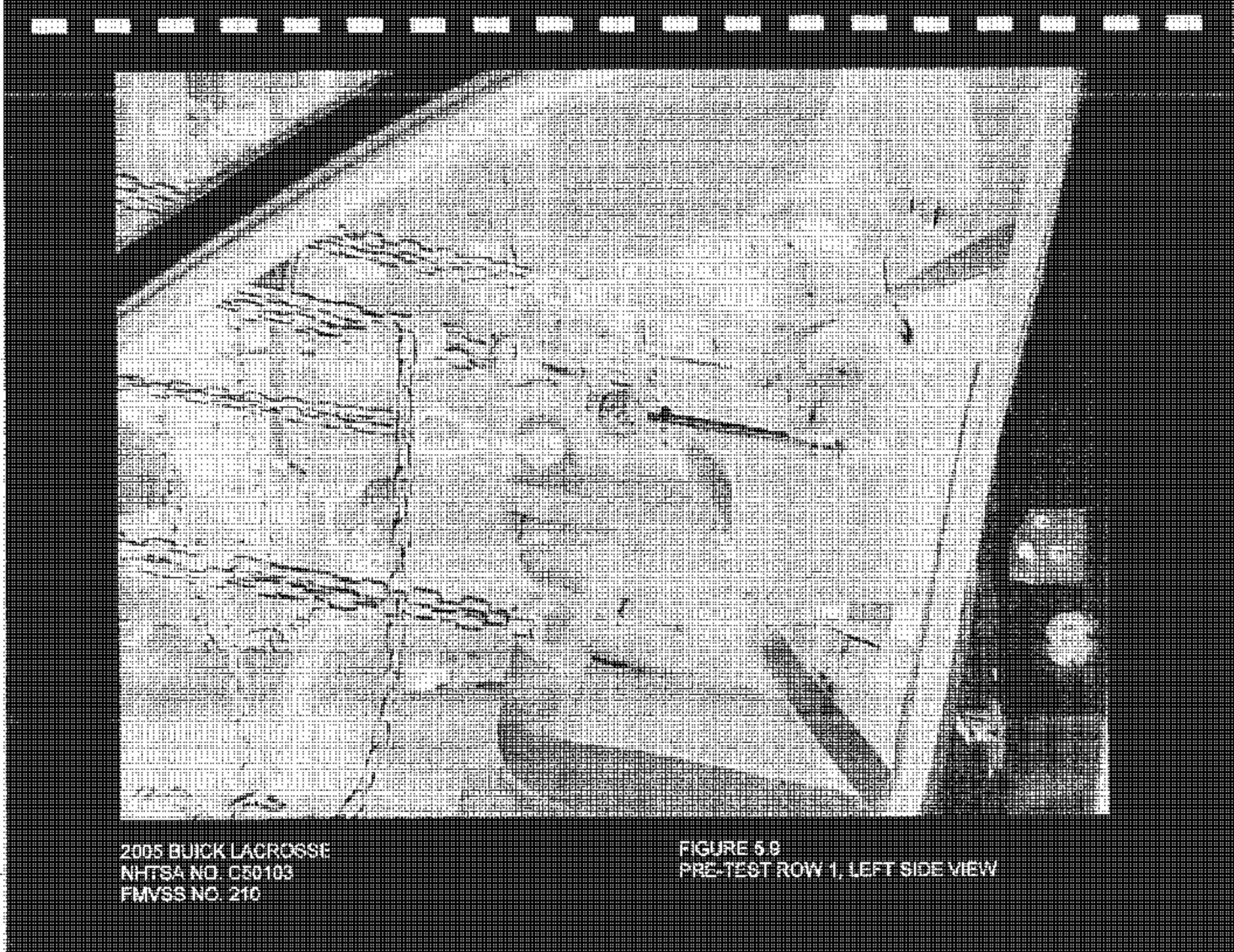
FIGURE 5.8
¾ RIGHT REAR VIEW OF VEHICLE IN TEST RIG



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FMVSS NO. 210

FIGURE 5.9
PRE-TEST ROW 1, LEFT SIDE VIEW

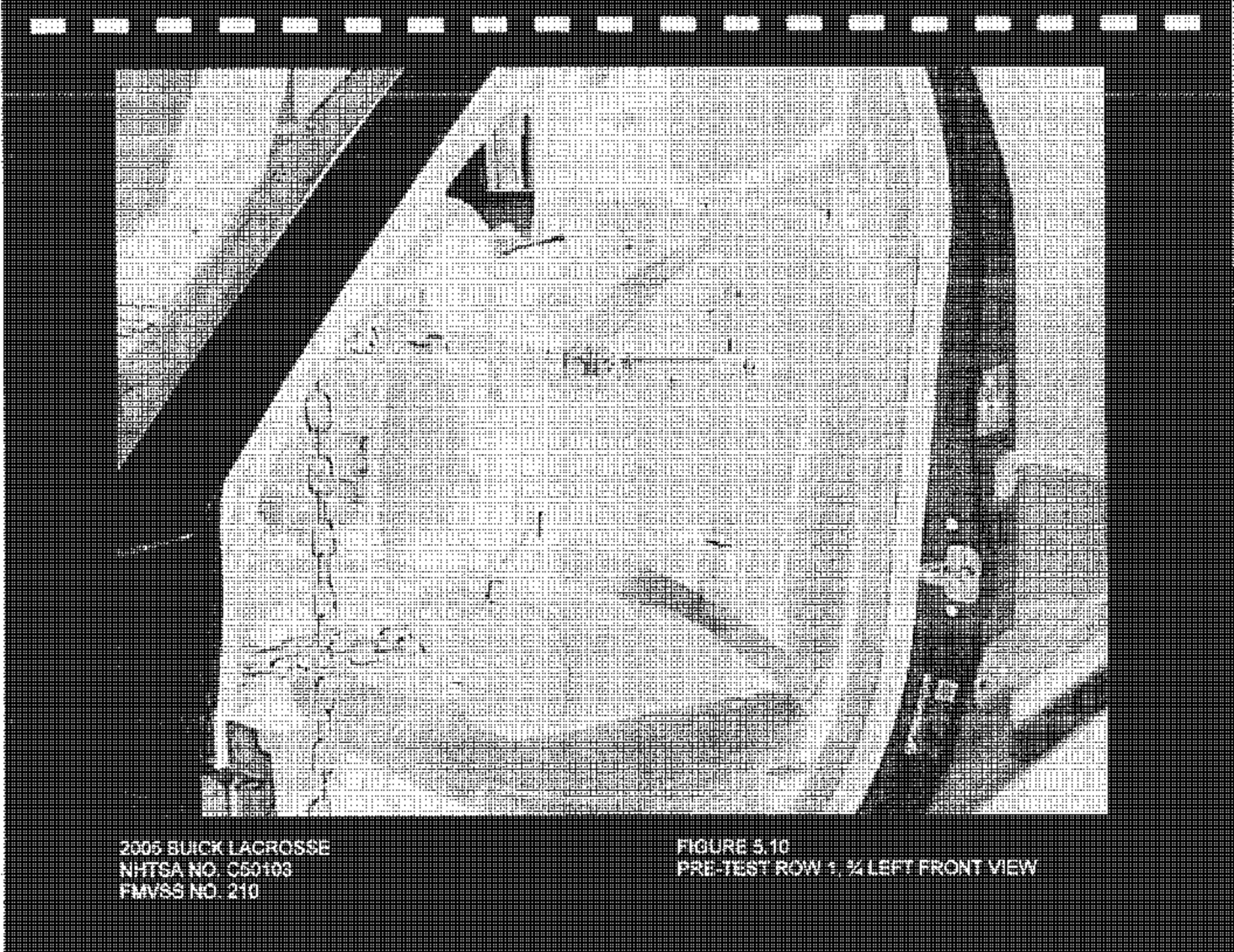

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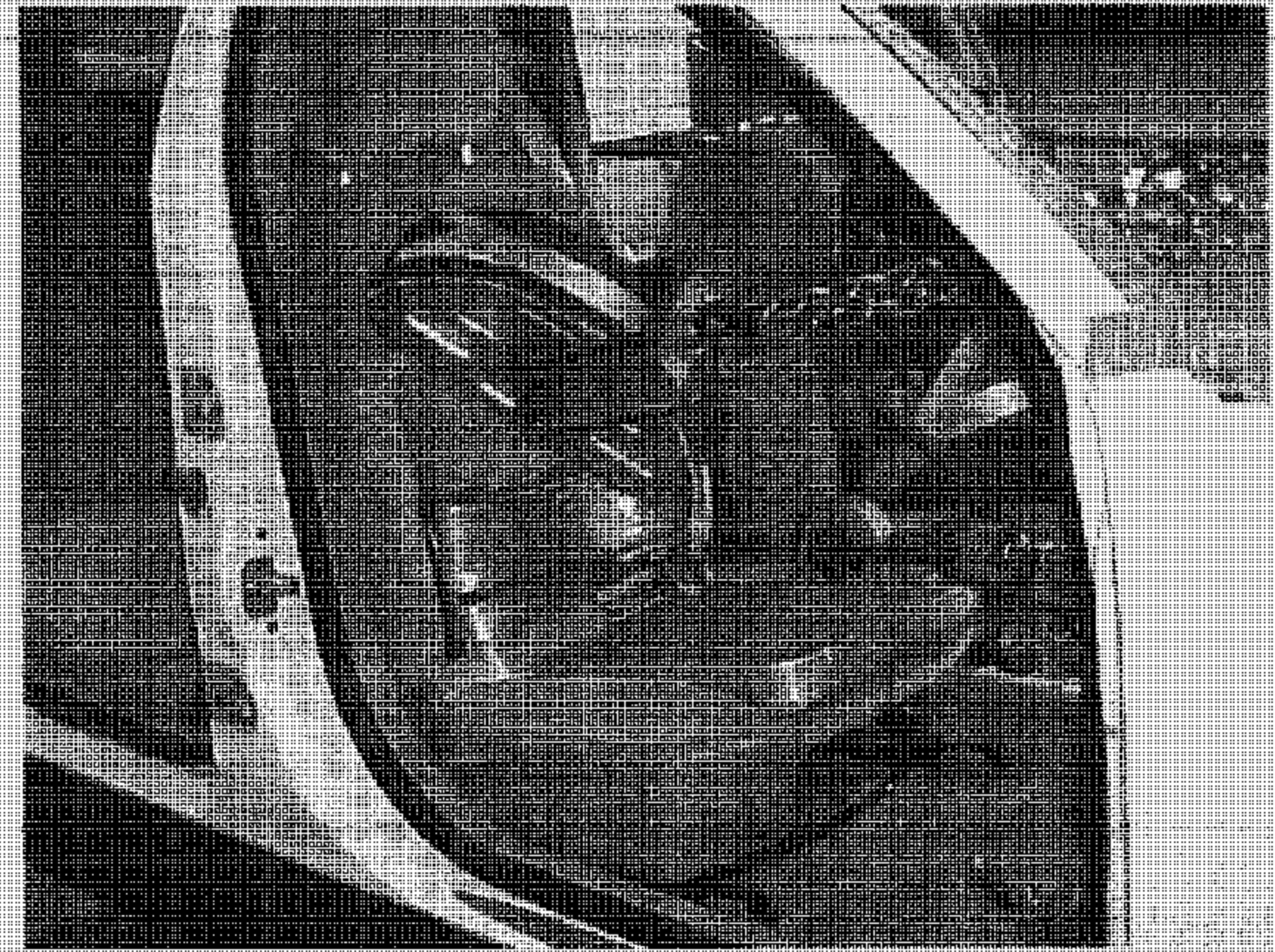
FIGURE 5.10
PRE-TEST ROW 1, ¾ LEFT FRONT VIEW



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FMVSS NO. 210

FIGURE 5.11
PRE-TEST ROW 1, ¾ RIGHT FRONT VIEW

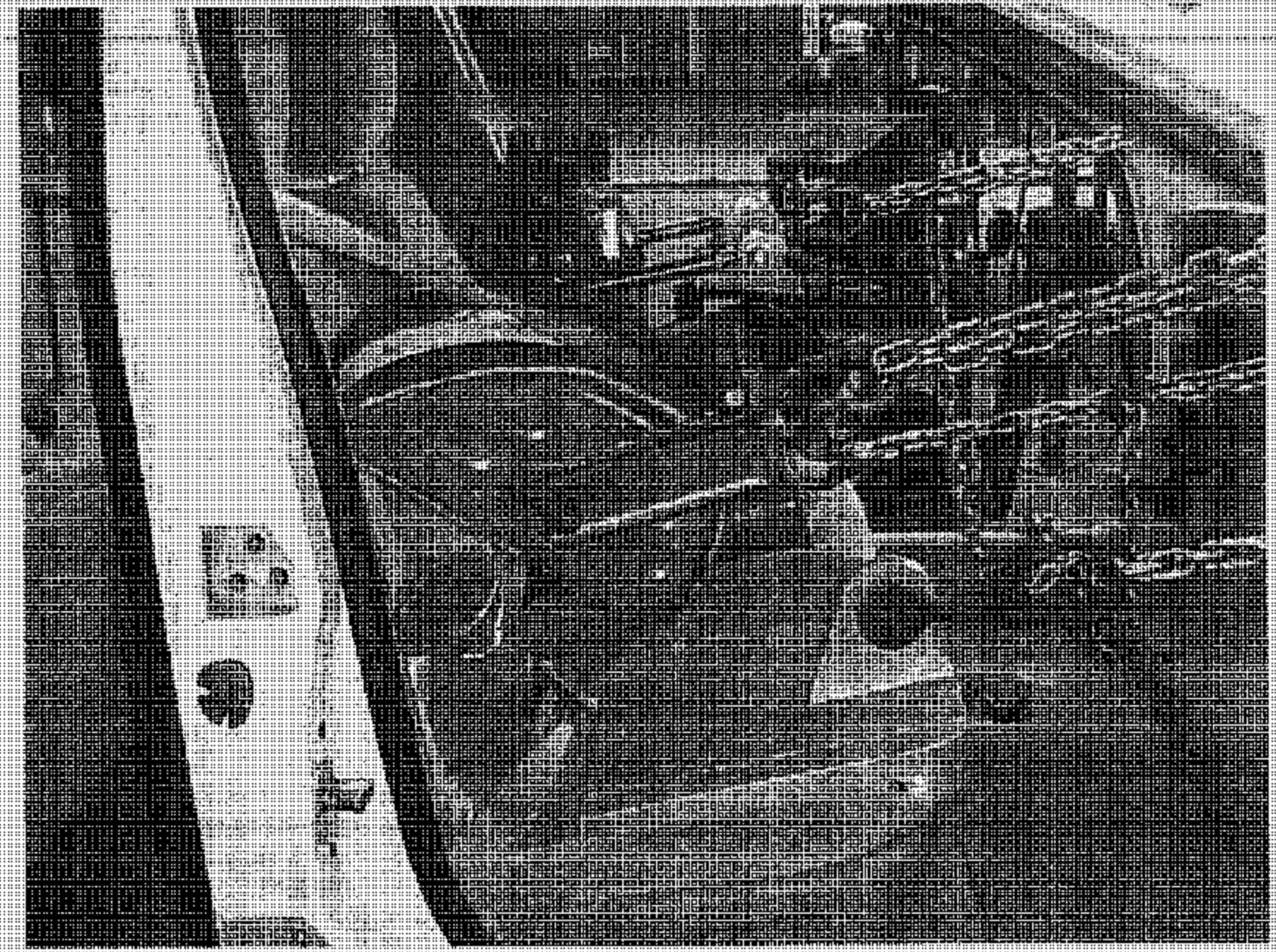

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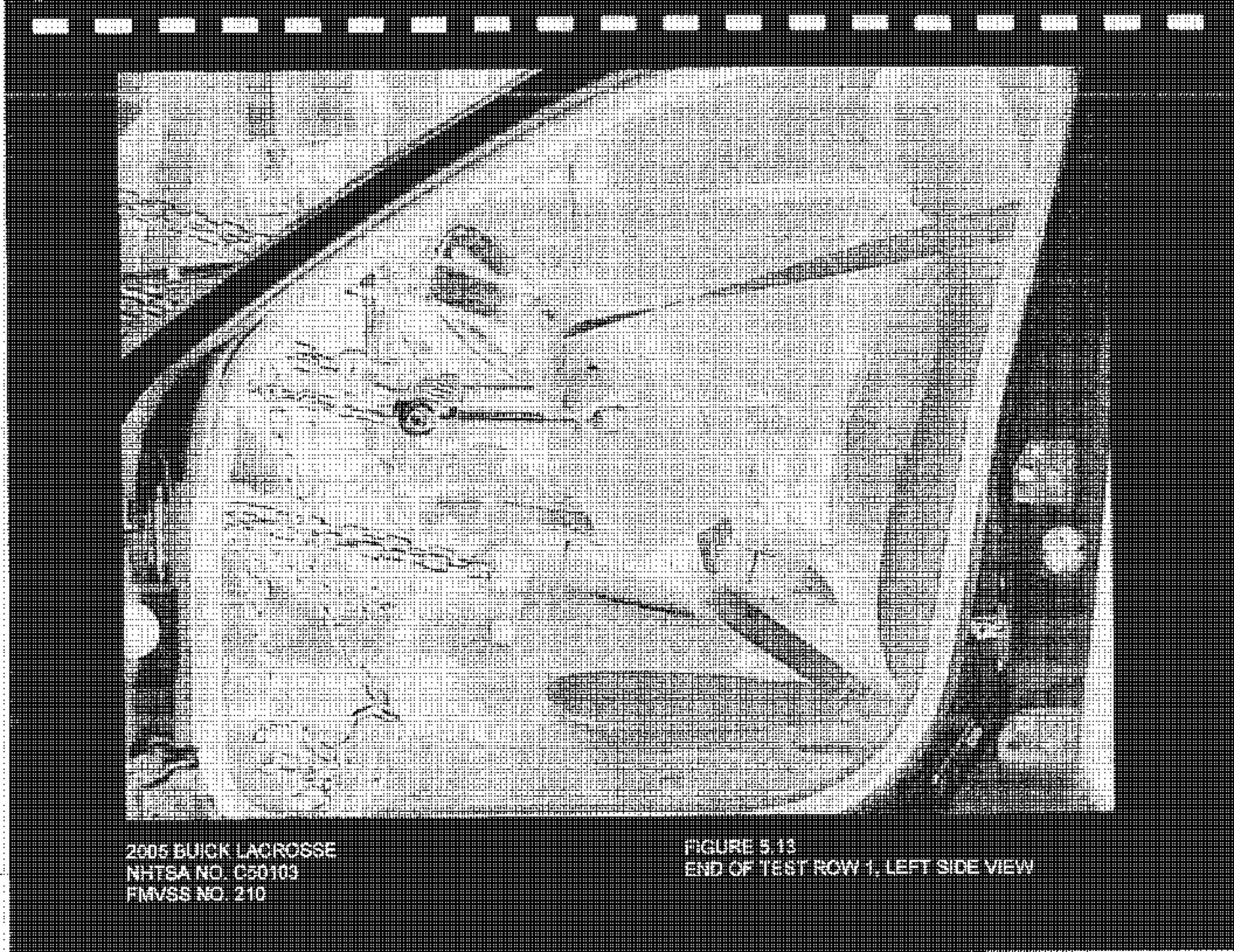
FIGURE 5.12
PRE-TEST ROW 1, RIGHT SIDE VIEW



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NHTSA NO. C50109
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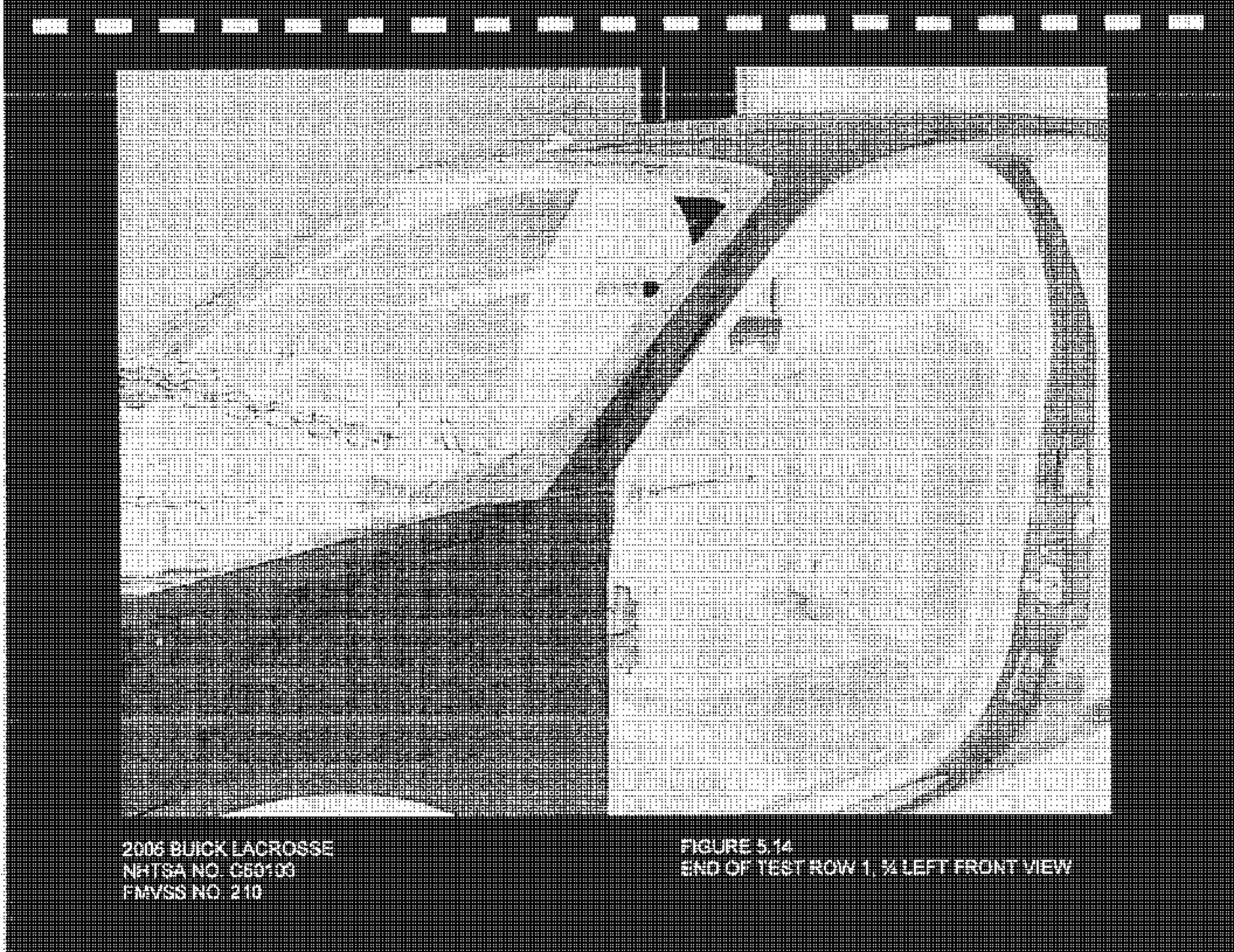
FIGURE 5.13
END OF TEST ROW 1, LEFT SIDE VIEW



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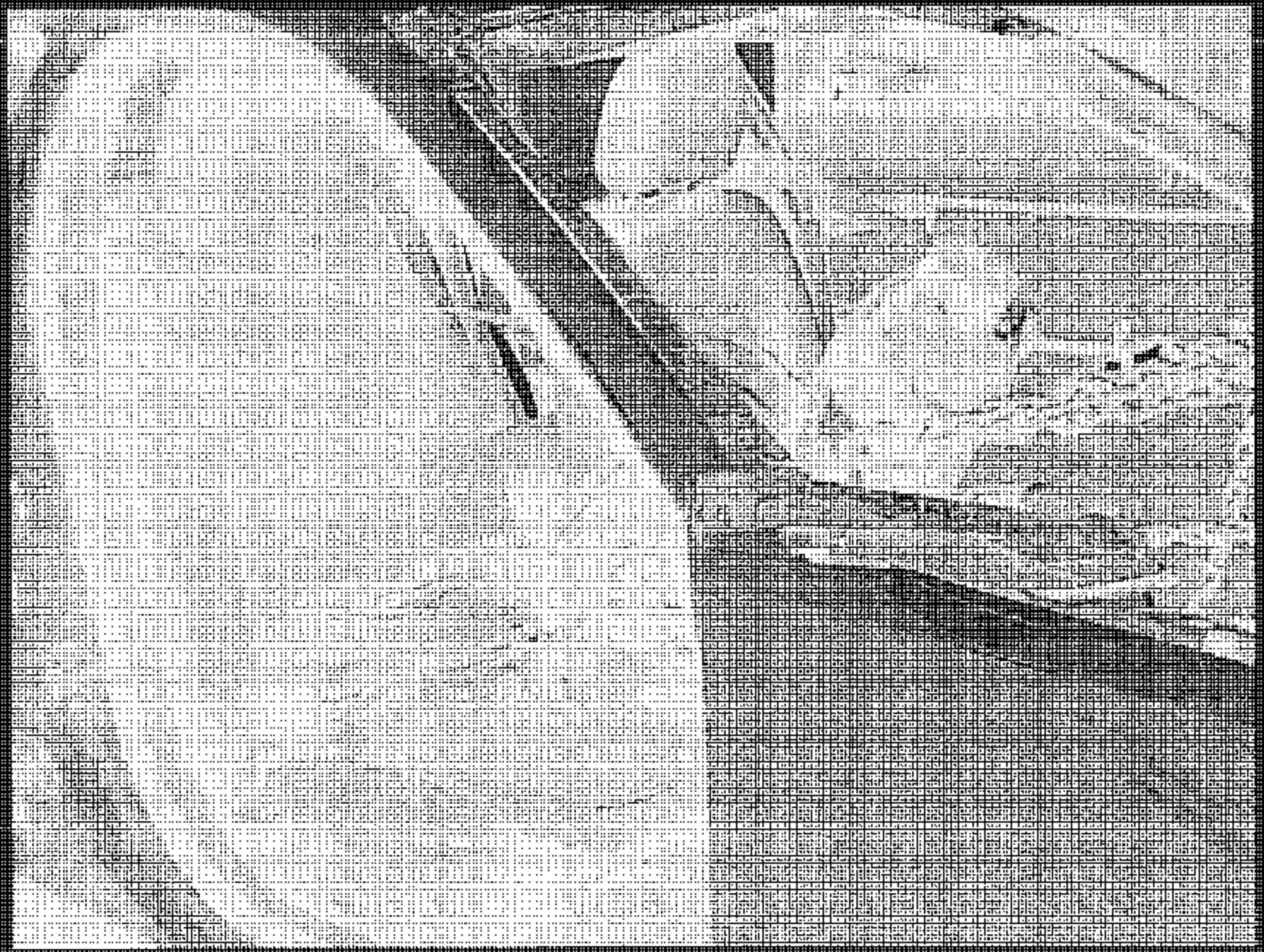
FMVSS NO. 210

FIGURE 5.14
END OF TEST ROW 1, ¾ LEFT FRONT VIEW



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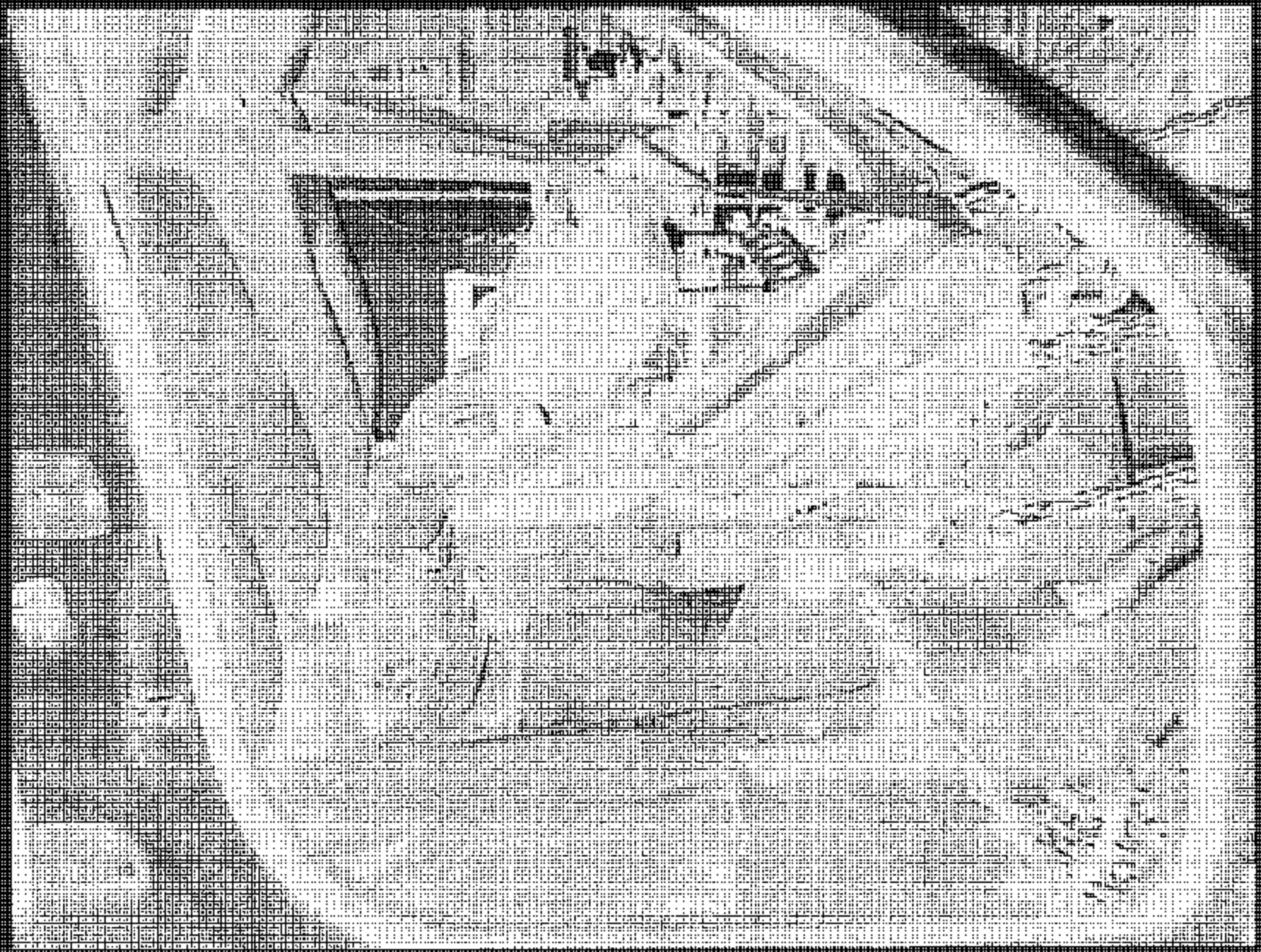
FMVSS NO. 210

FIGURE 5.15
END OF TEST ROW 1, X RIGHT FRONT VIEW



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NHTSA NO. C50106
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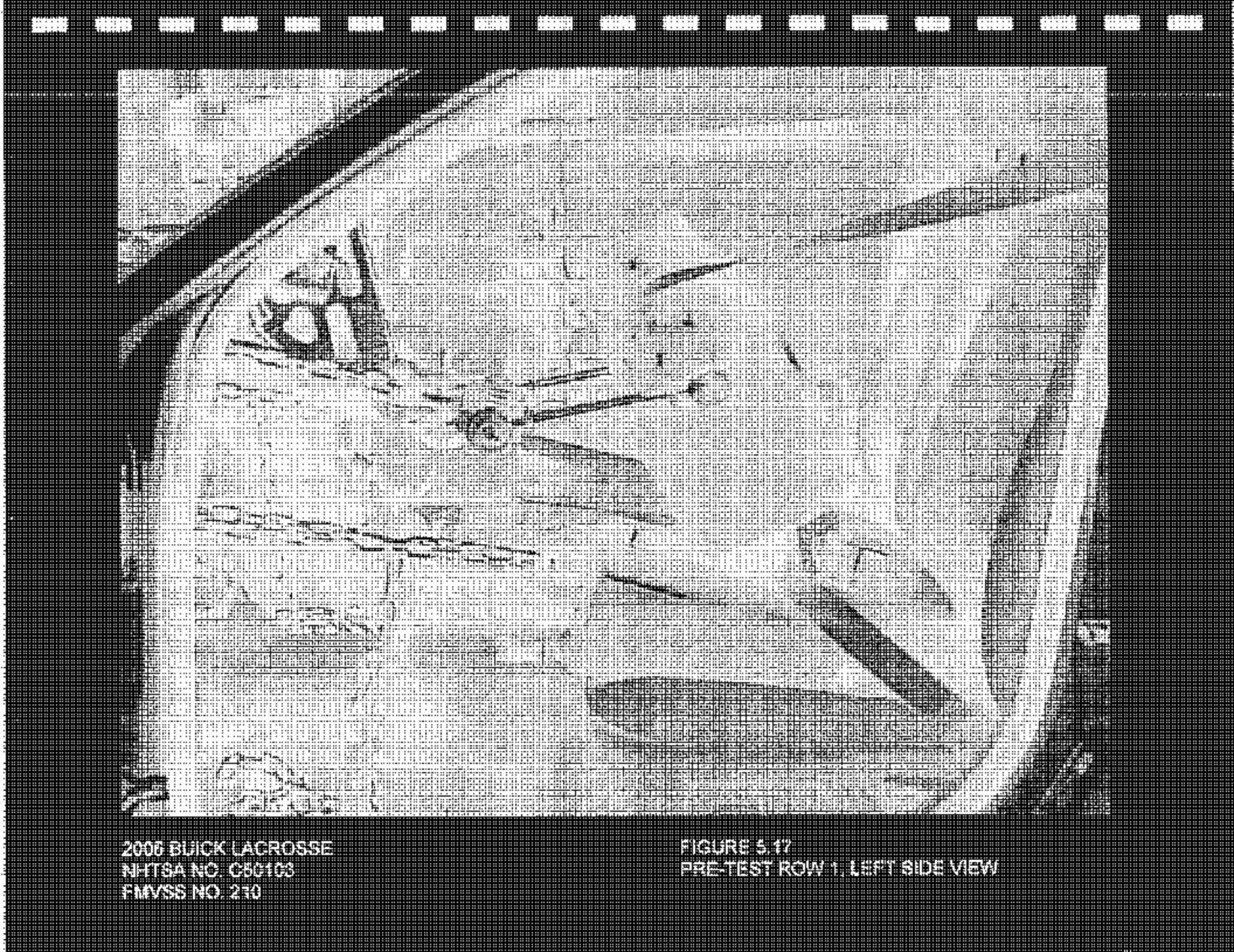
FIGURE 5.16
END OF TEST ROW 1, RIGHT SIDE VIEW



2008 BUICK LACROSSE
NHTSA NO. C80108
FMVSS NO. 210

FIGURE 5.17
PRE-TEST ROW 1, LEFT SIDE VIEW

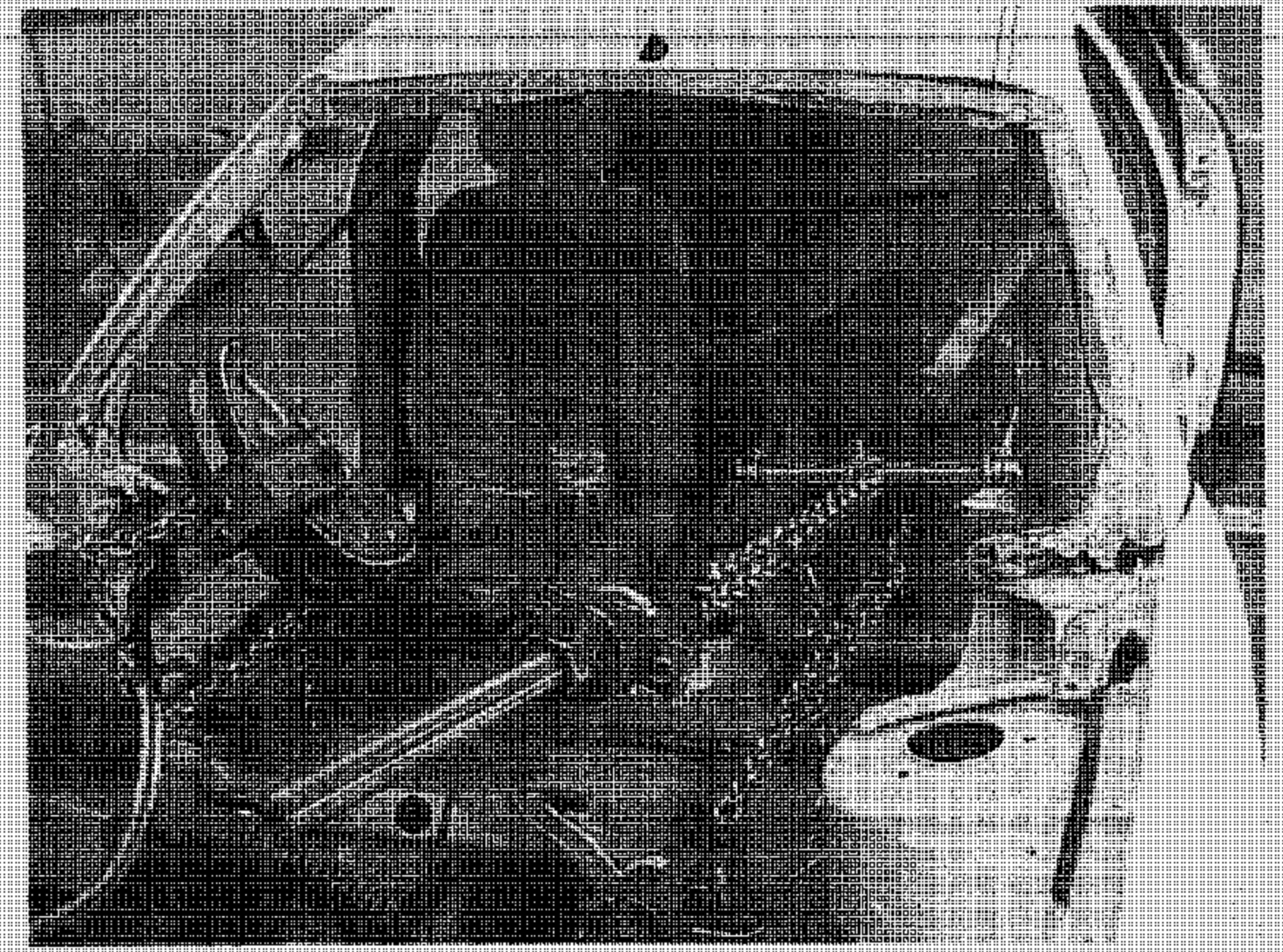


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FIGURE 6.16
PRE-TEST ROW 1, ¾ LEFT FRONT VIEW

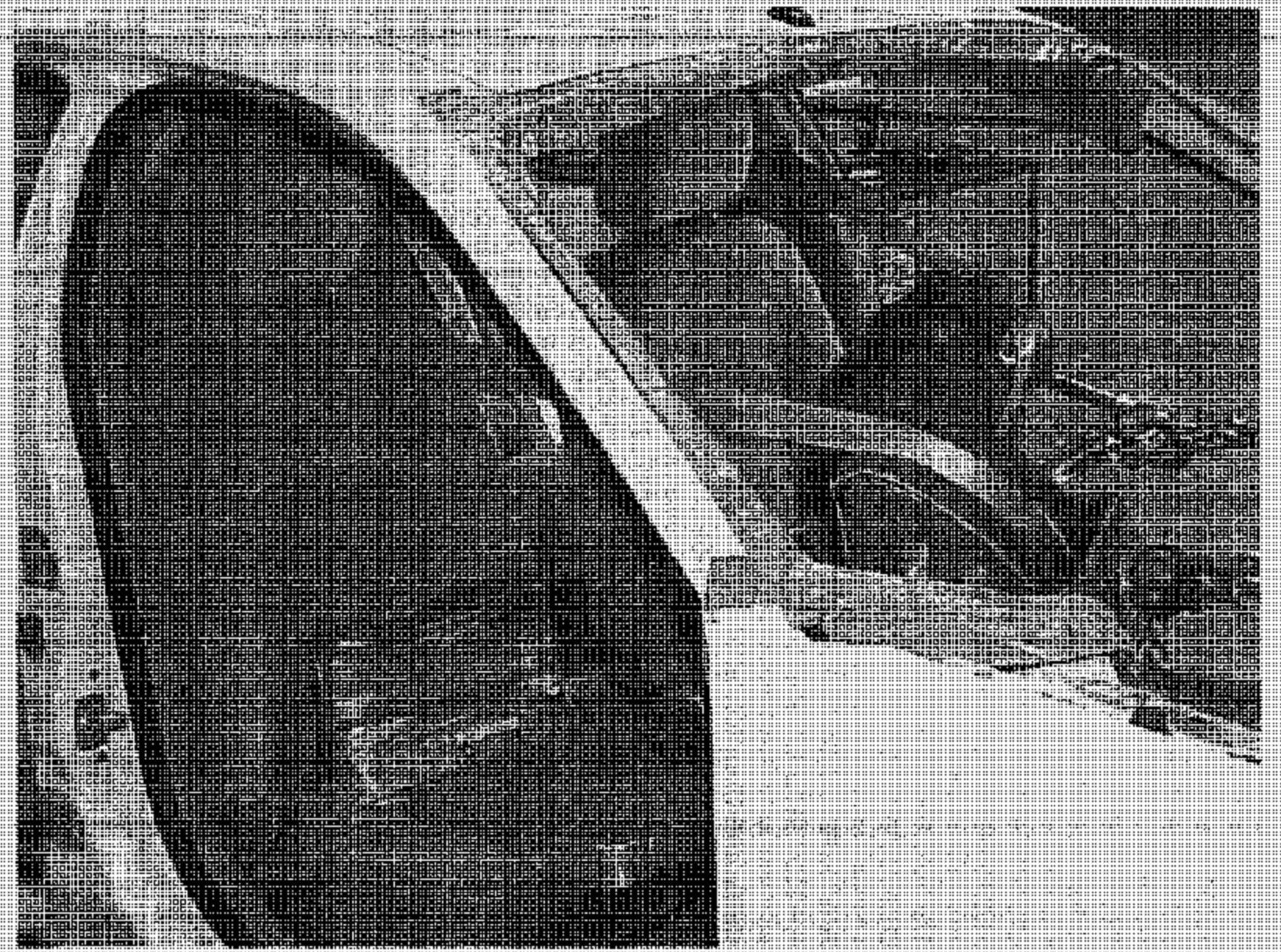

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FIGURE 5.19
PRE-TEST ROW 1, ¾ RIGHT FRONT VIEW

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FIGURE 5.20
PRE-TEST ROW 1, RIGHT SIDE VIEW

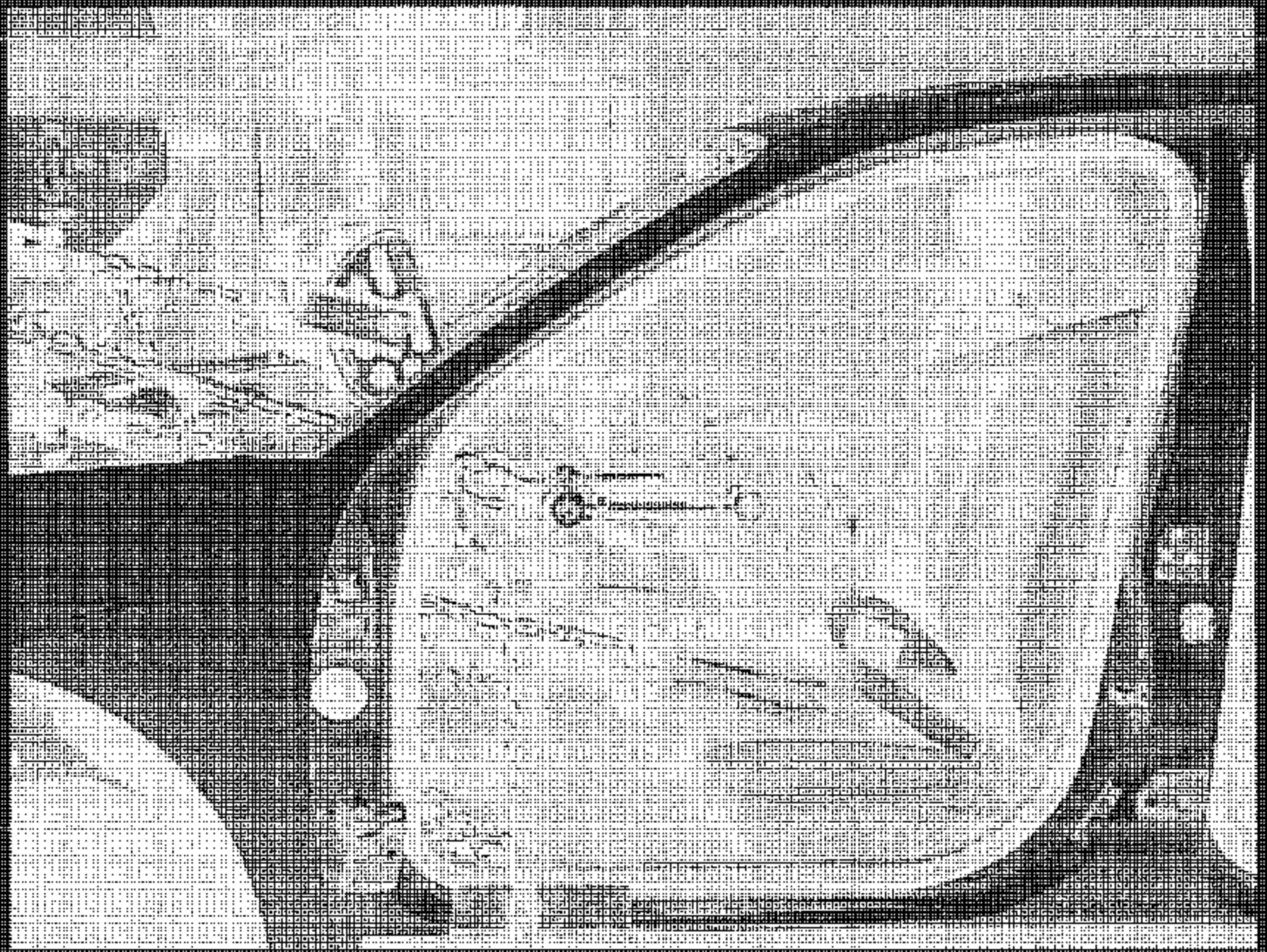

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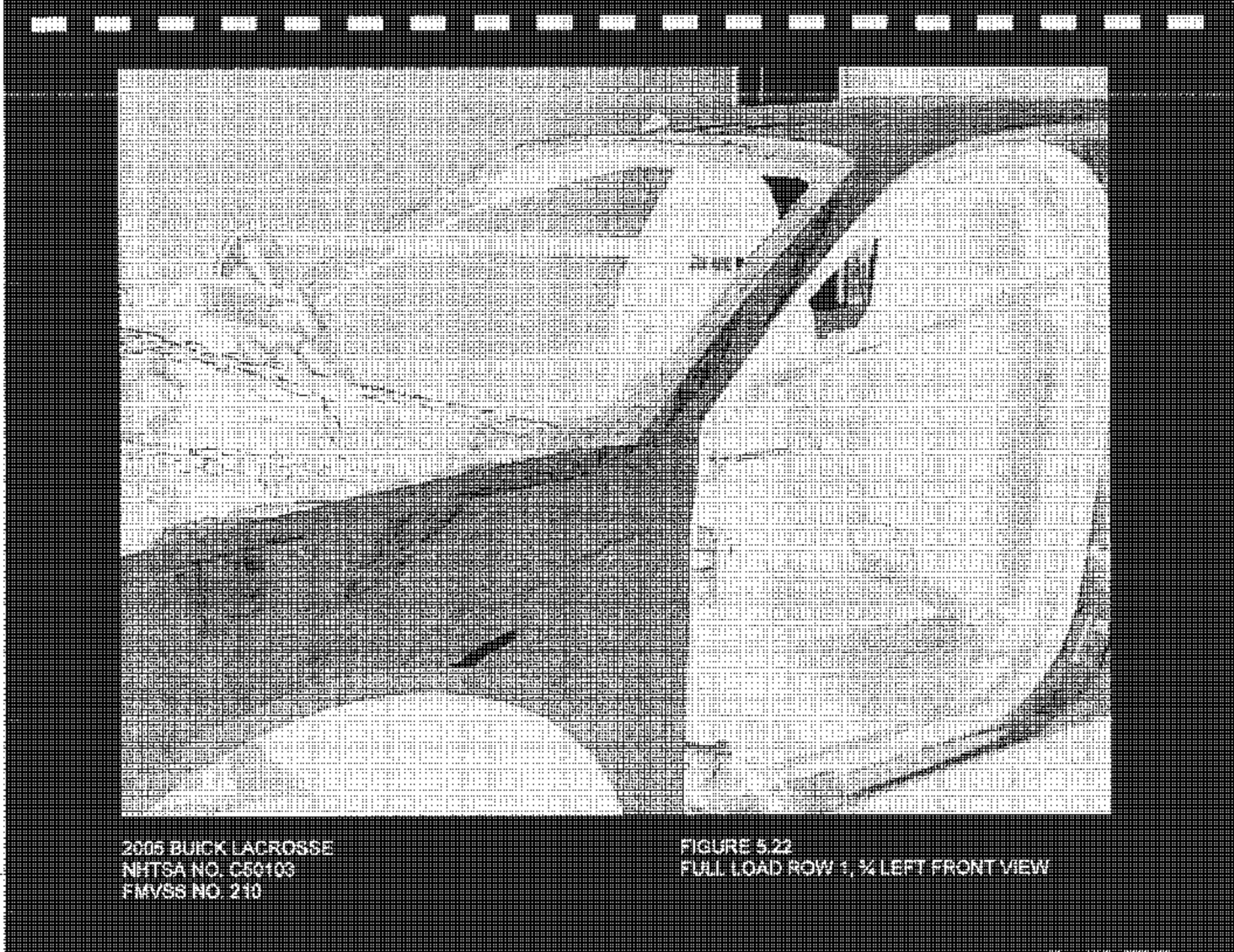
FIGURE 5-21
FULL LOAD ROW 1, LEFT SIDE VIEW



2005 BUICK LACROSSE
NHTSA NO. C50103
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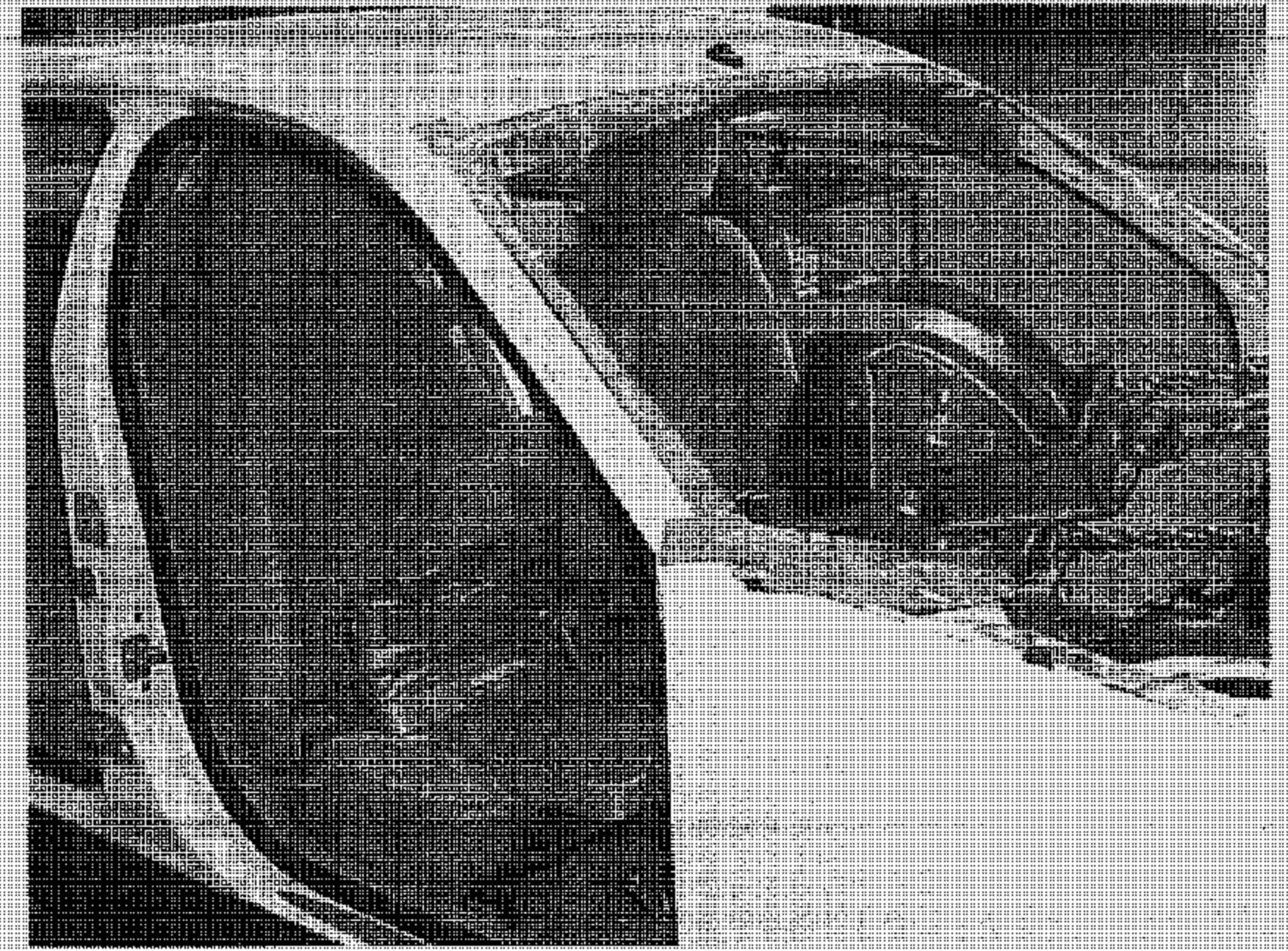
FIGURE 5.22
FULL LOAD ROW 1, ¾ LEFT FRONT VIEW



2006 BUICK LACROSSE
NHTSA NO. C50103
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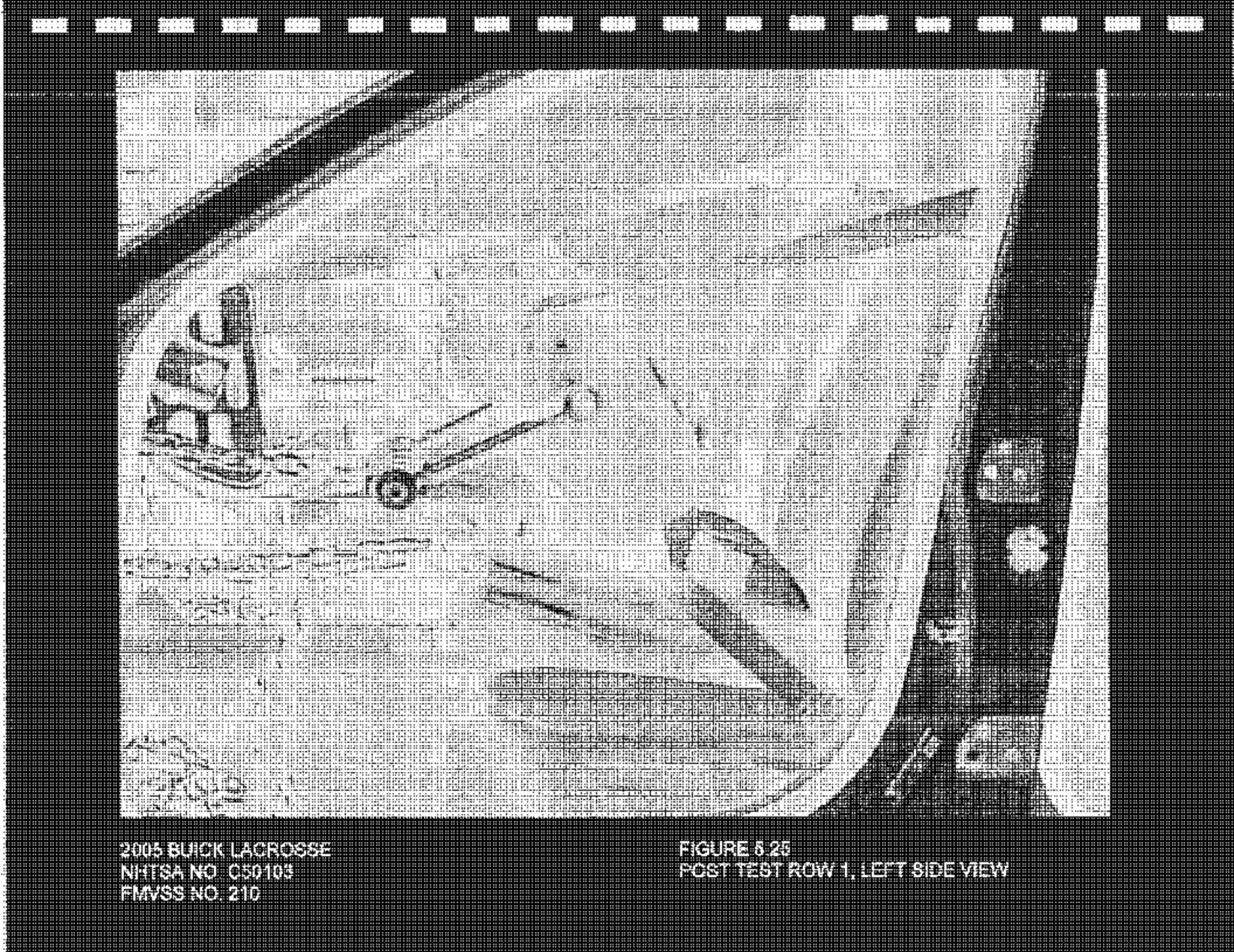
FIGURE 5.23
FULL LOAD ROW 1, ¾ RIGHT FRONT VIEW

2005 BUICK LACROSSE
NHTSA NO. CS0101
FMVSS NO. 210

FIGURE 5.24
FULL LOAD ROW 1, RIGHT SIDE VIEW



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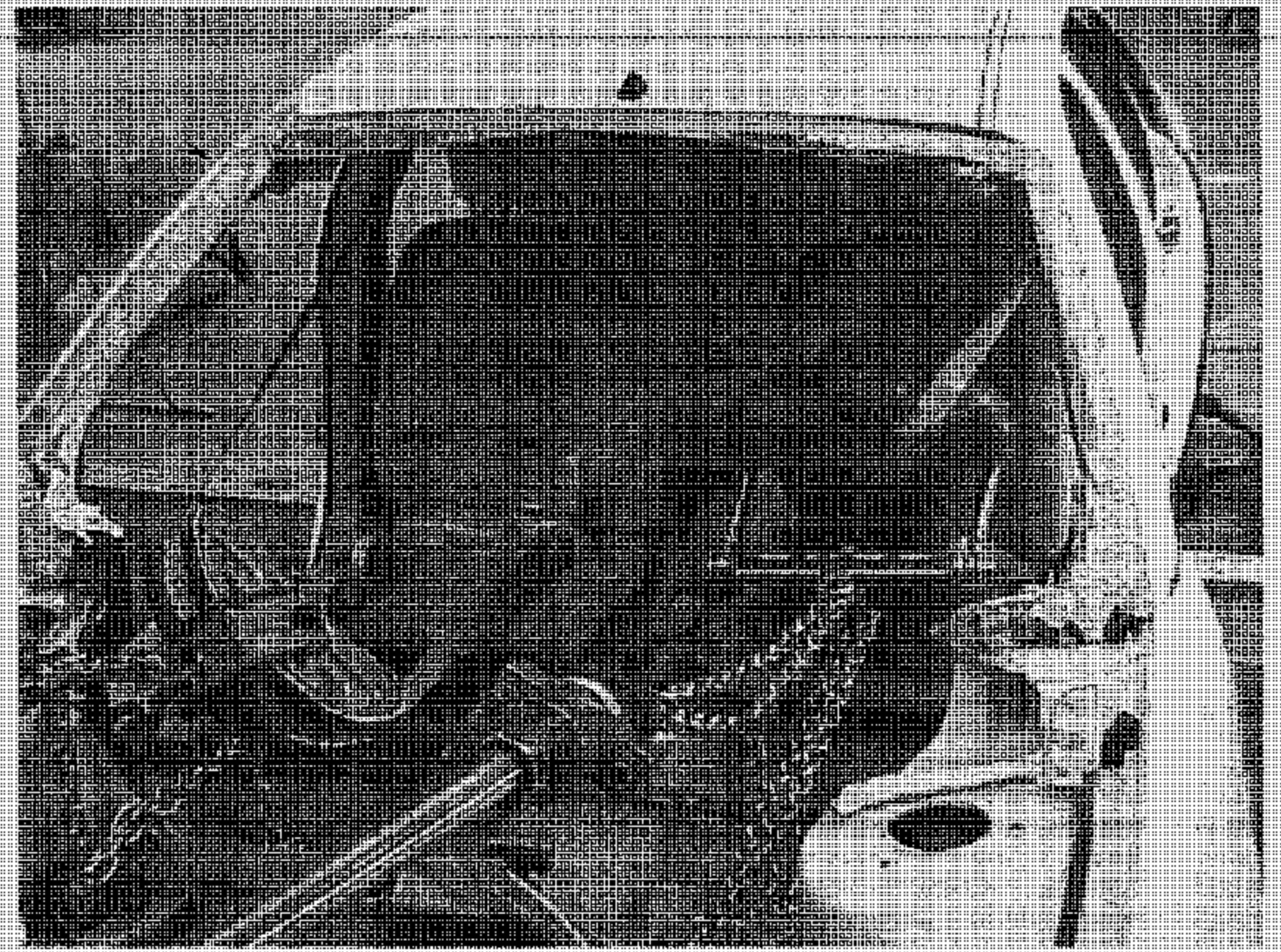
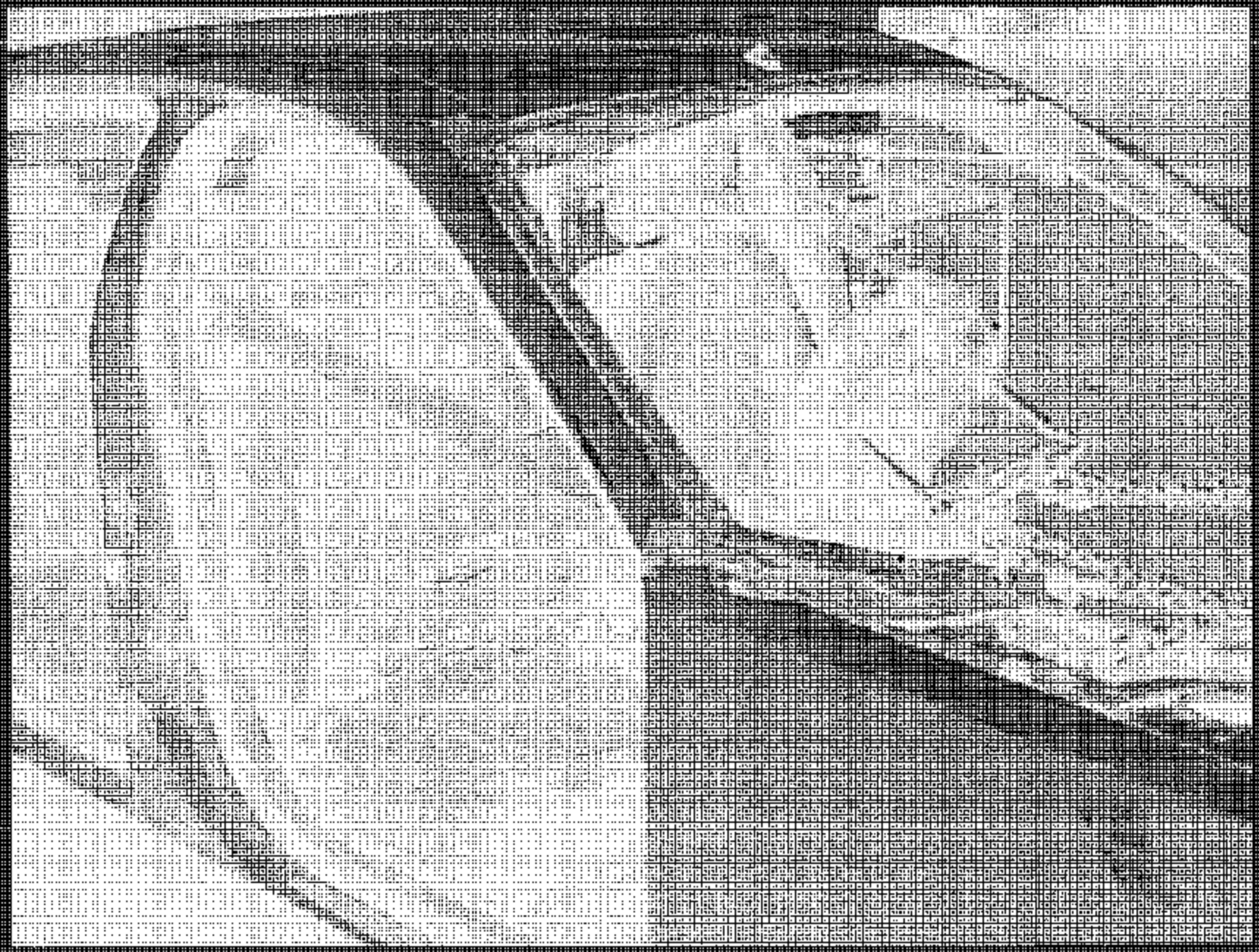
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 6-25
POST TEST ROW 1, LEFT SIDE VIEW



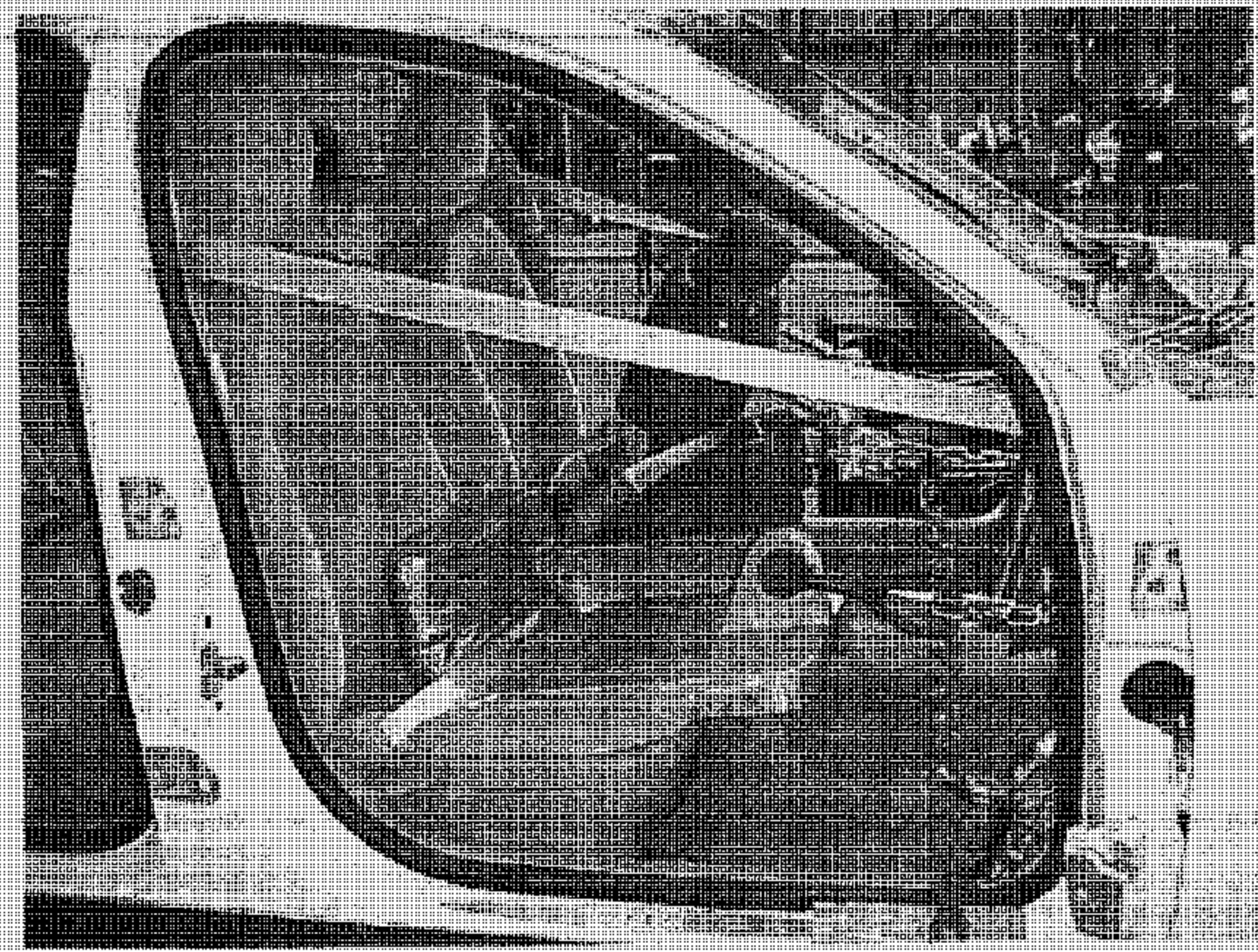
2005 BUICK LACROSSE
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 5.26
POST TEST ROW 1, ¾ LEFT FRONT VIEW



2005 BUICK LACROSSE
NHTSA NO. C50105
FMVSS NO. 210

FIGURE 5.27
POST TEST ROW 1, ¾ RIGHT FRONT VIEW



2005 BUICK LACROSSE
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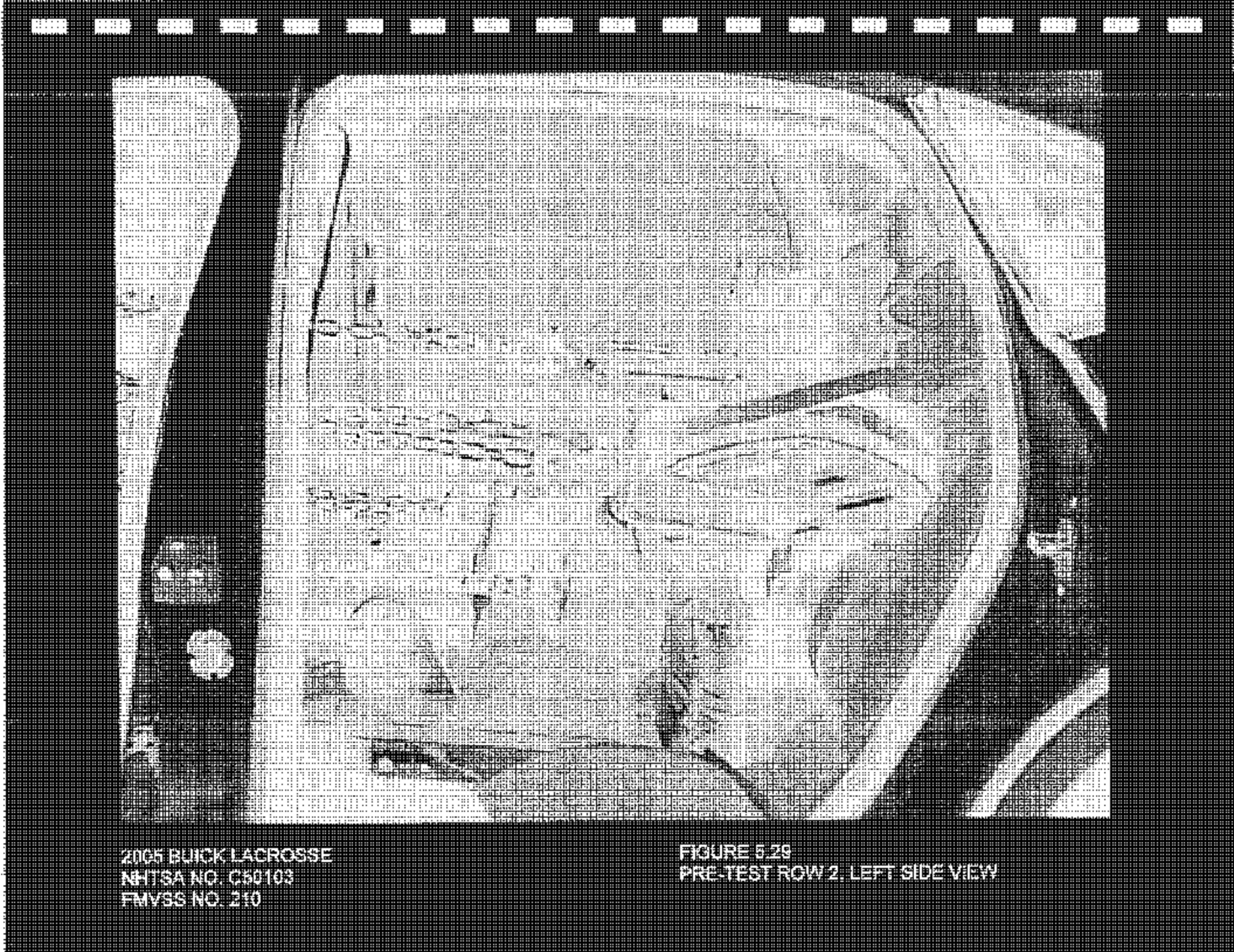
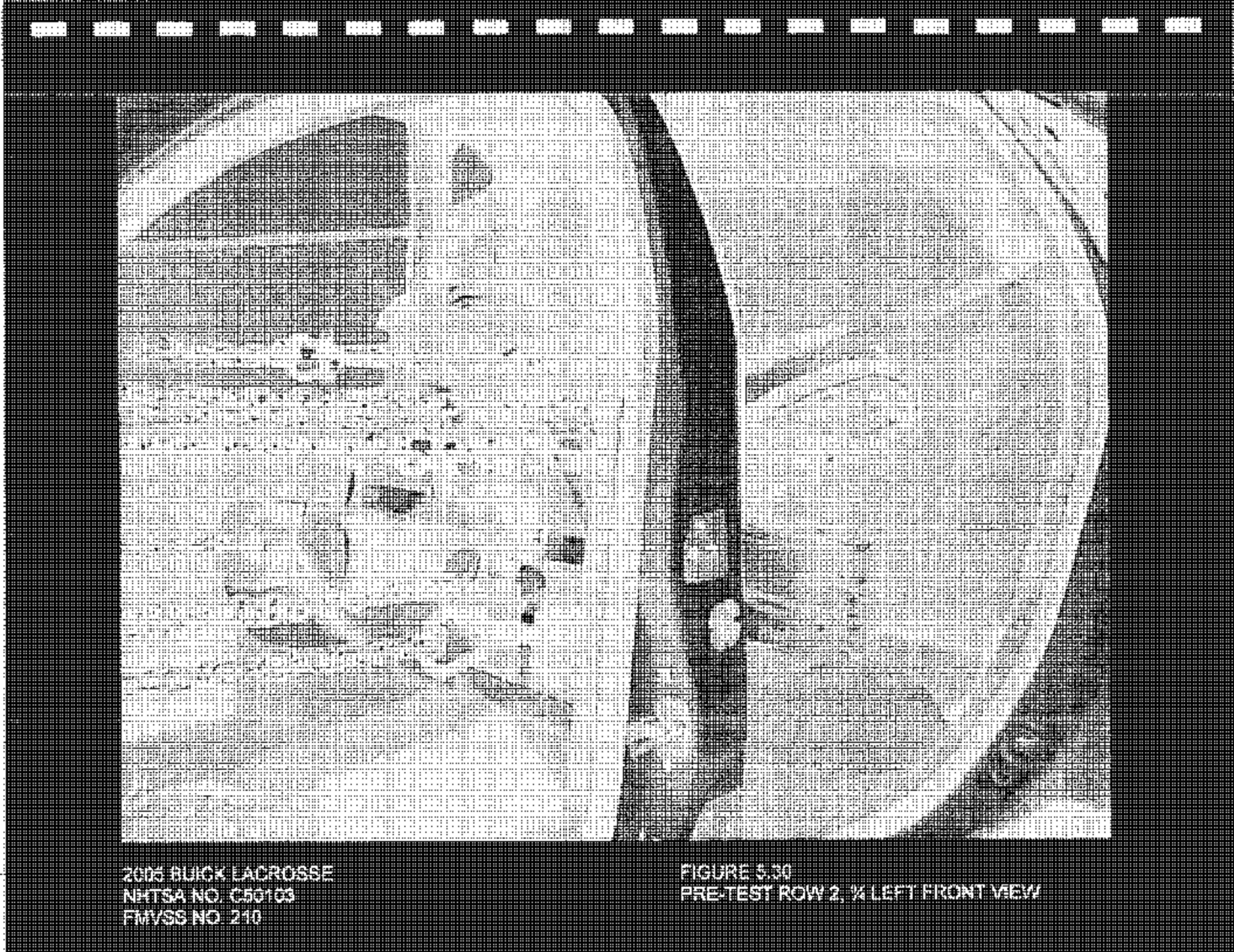
FIGURE 5.26
POST TEST ROW 1, RIGHT SIDE VIEW



2005 BUICK LACROSSE
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 5.29
PRE-TEST ROW 2, LEFT SIDE VIEW



2005 BUICK LACROSSE
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 3.30
PRE-TEST ROW 2, ¾ LEFT FRONT VIEW

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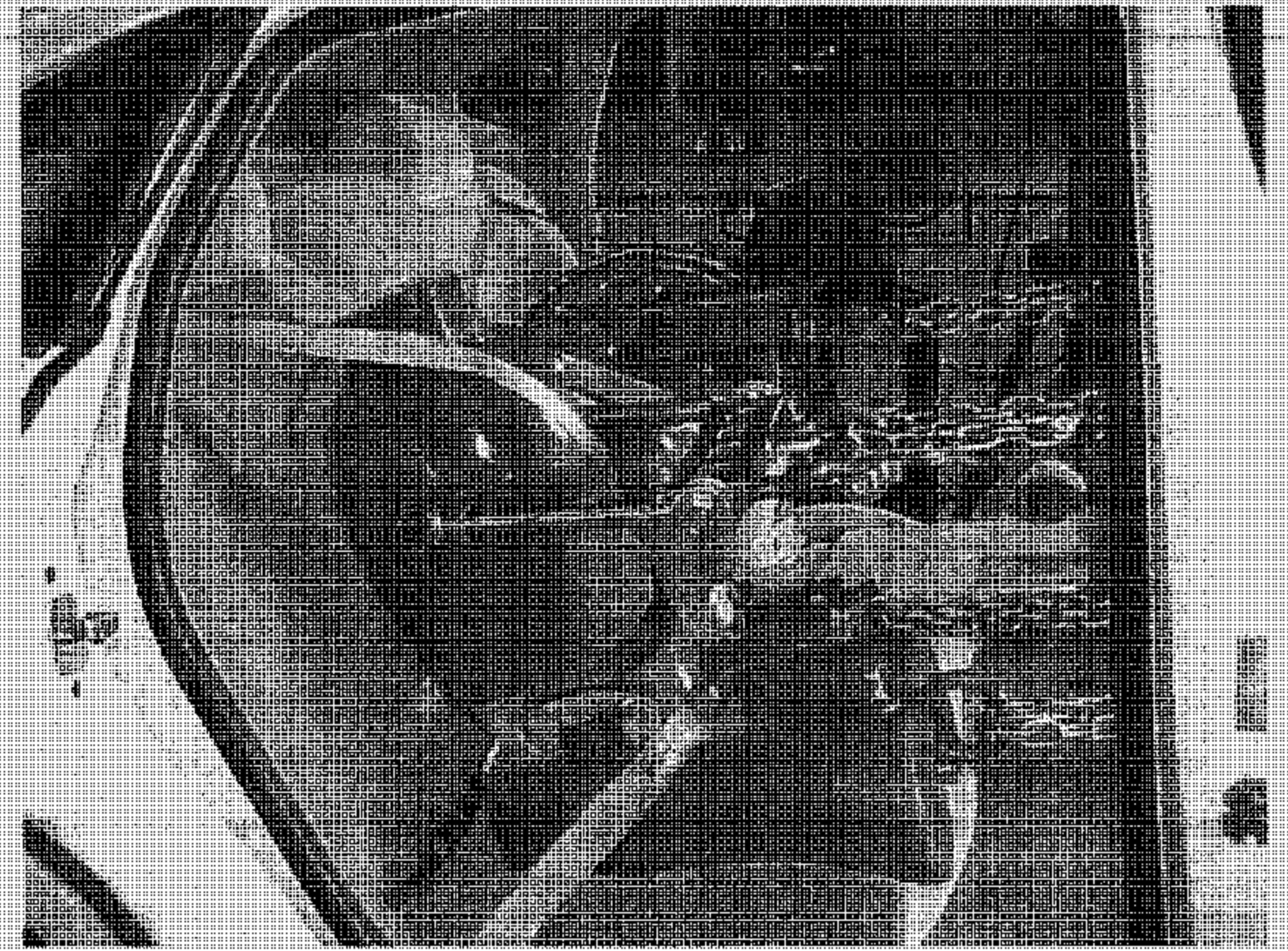
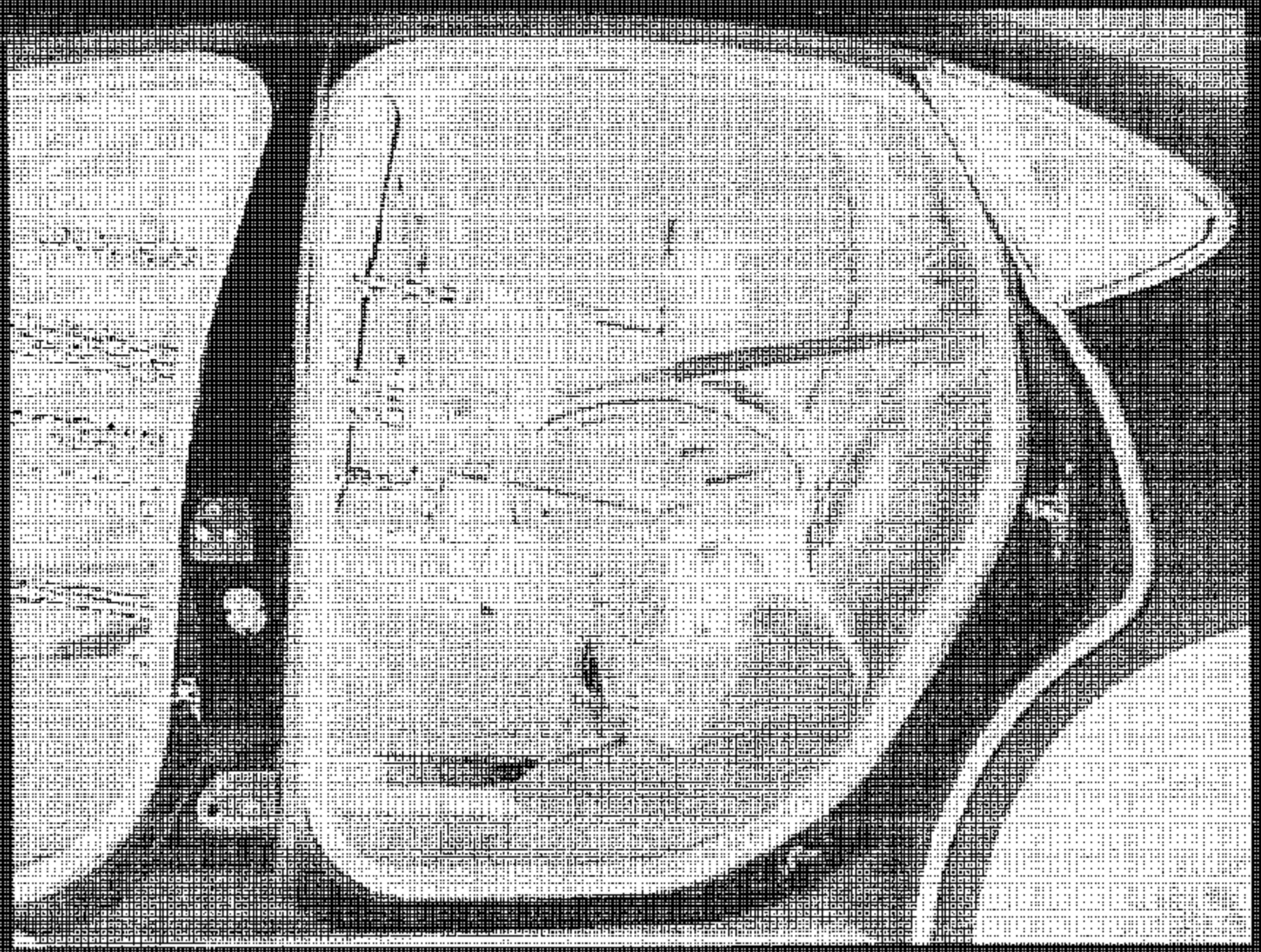
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 5.31
PRE-TEST ROW 2 ¾ RIGHT FRONT VIEW



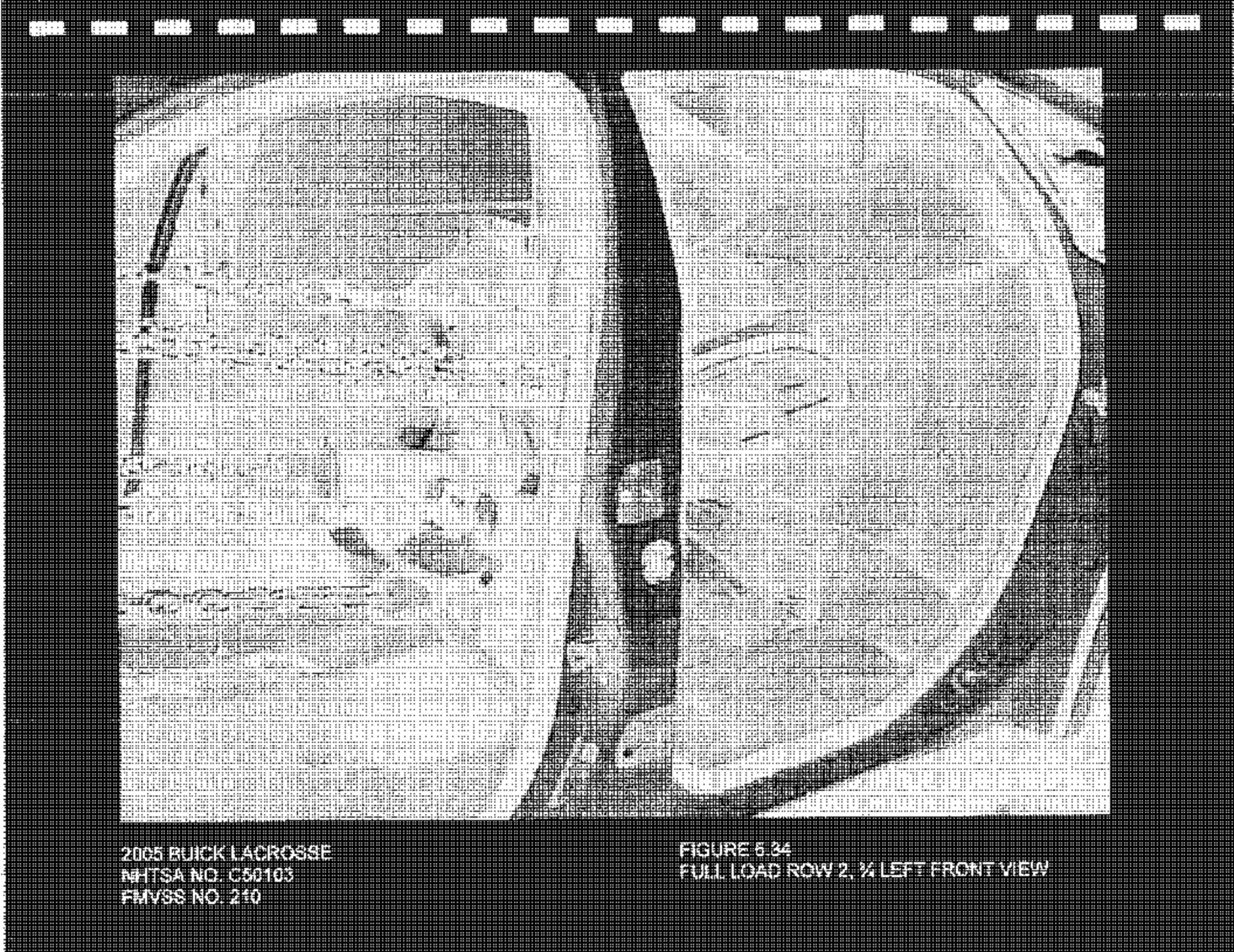
2005 BUICK LACROSSE
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 6.32
PRE-TEST ROW 2, RIGHT SIDE VIEW



2005 BUICK LACROSSE
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 5.38
FULL LOAD ROW 2, LEFT SIDE VIEW



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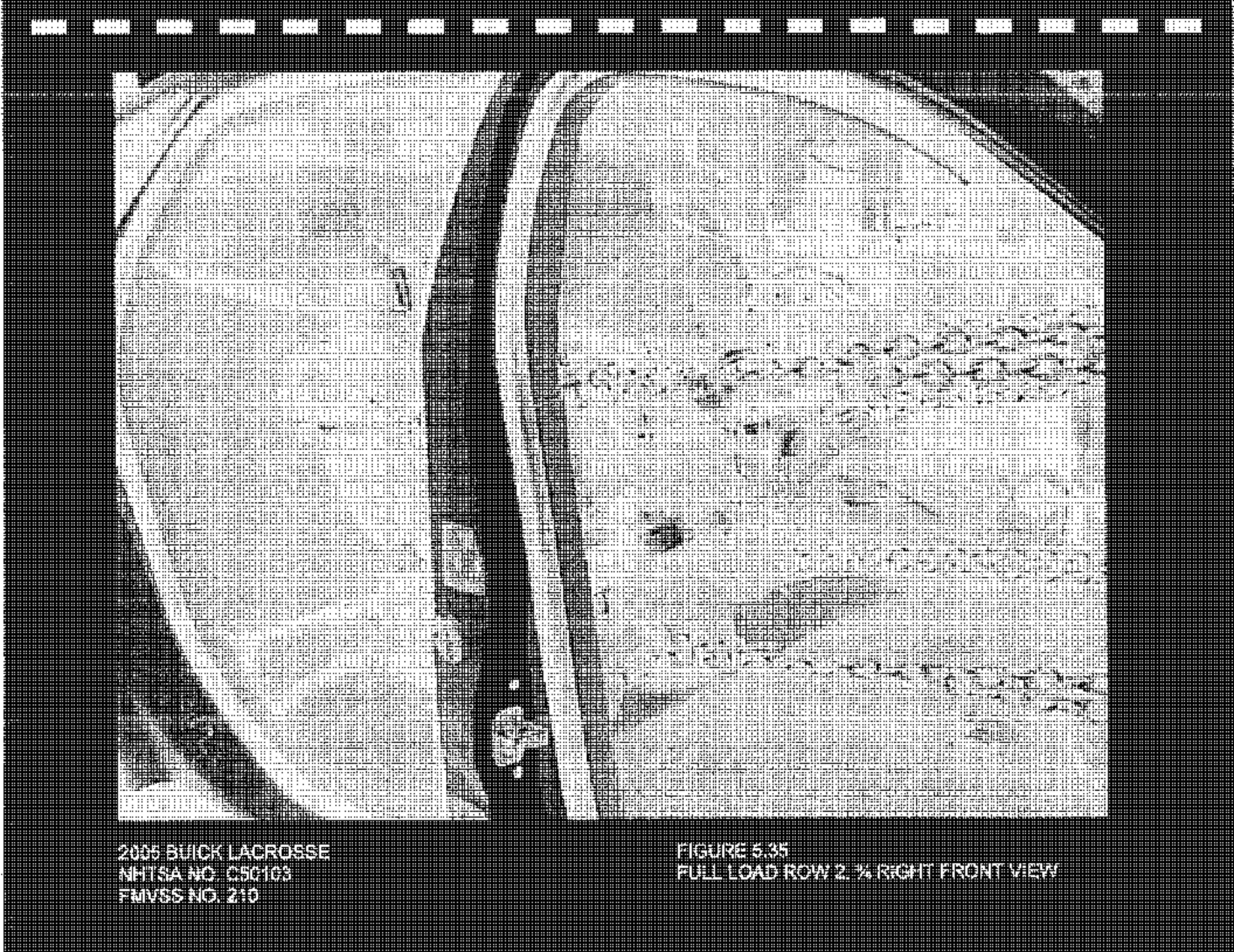
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 6.24
FULL LOAD ROW 2, ¾ LEFT FRONT VIEW



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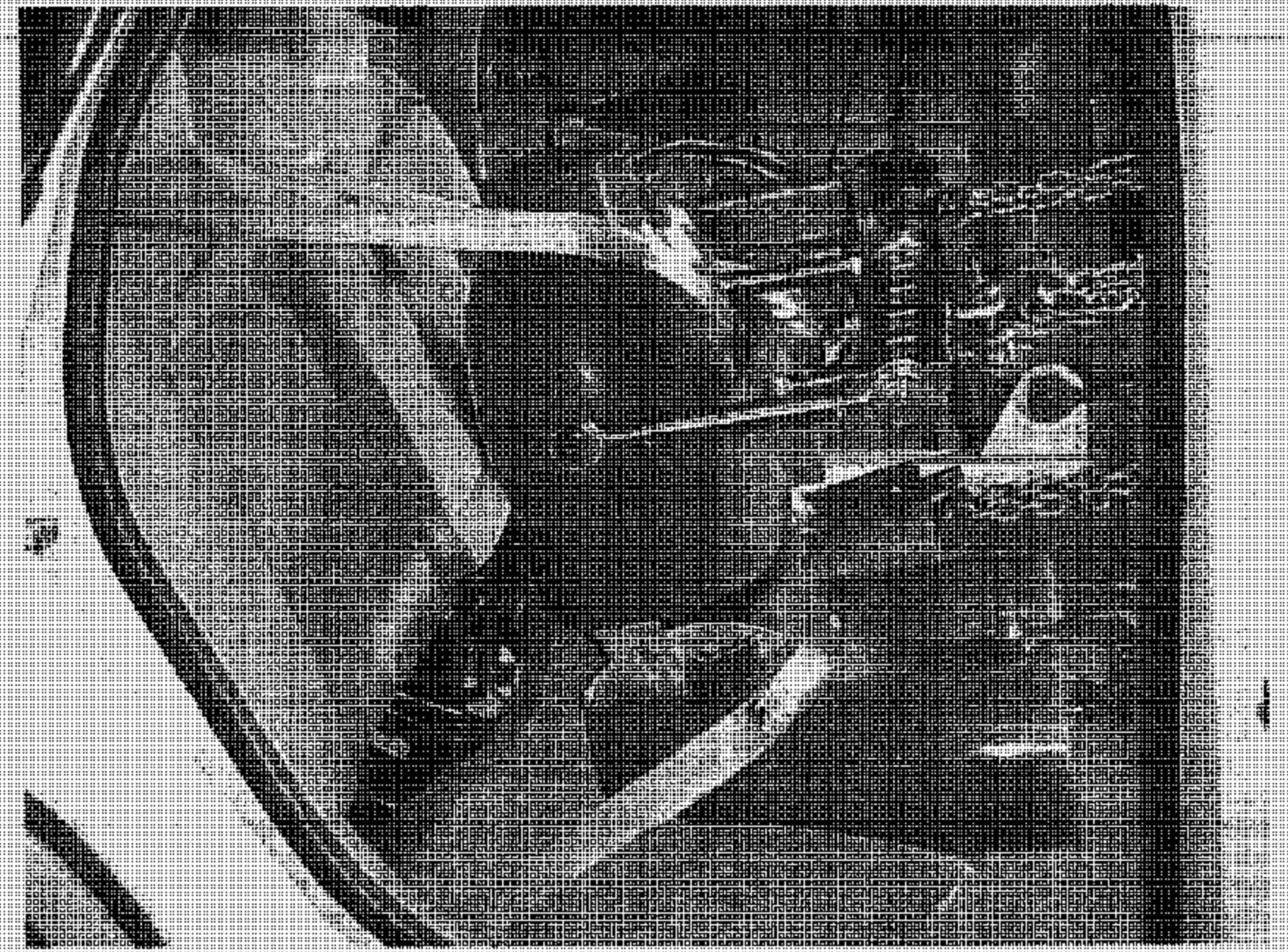
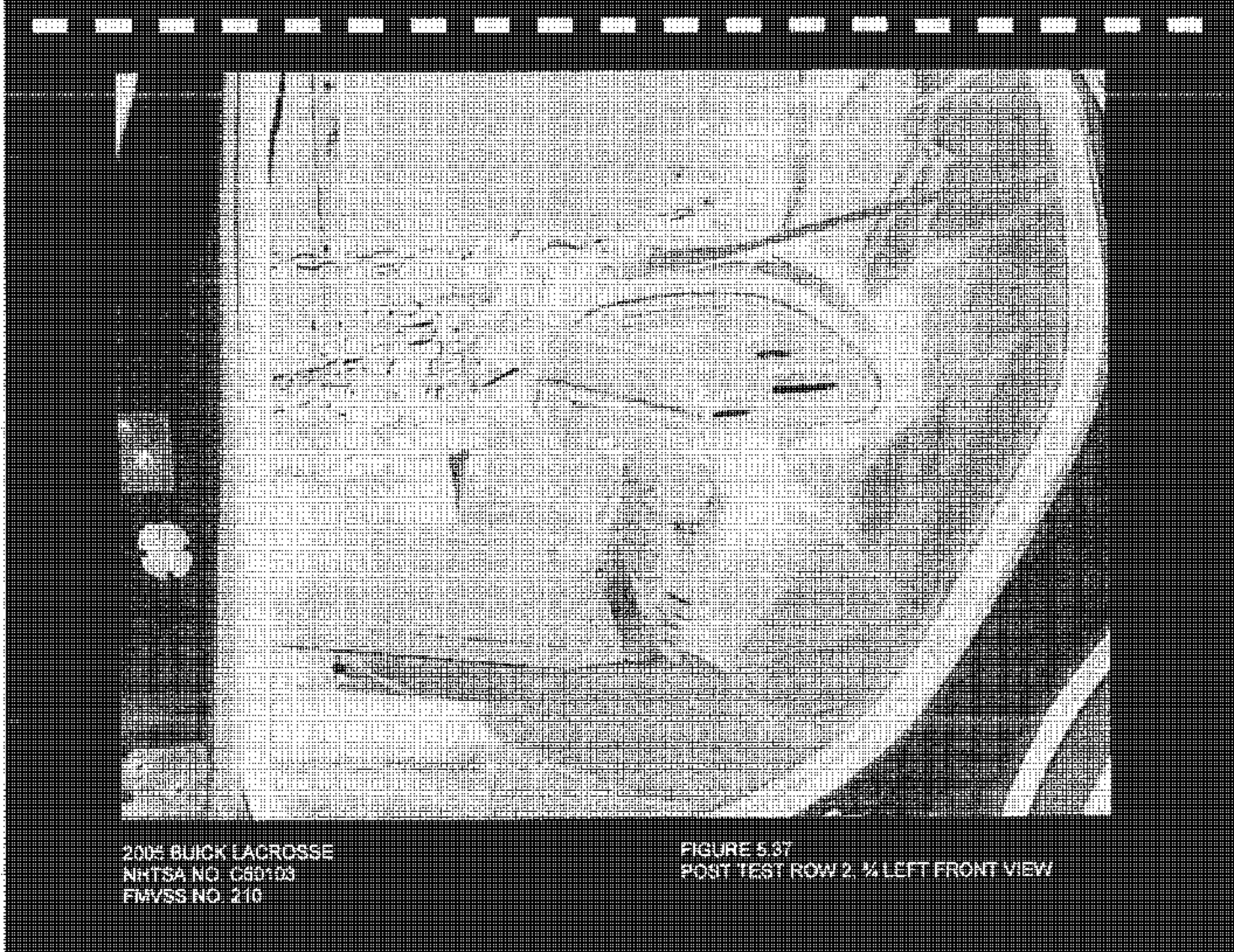
NHTSA NO. C5C103
FMVSS NO. 210

FIGURE 5.35
FULL LOAD ROW 2, ¾ RIGHT FRONT VIEW



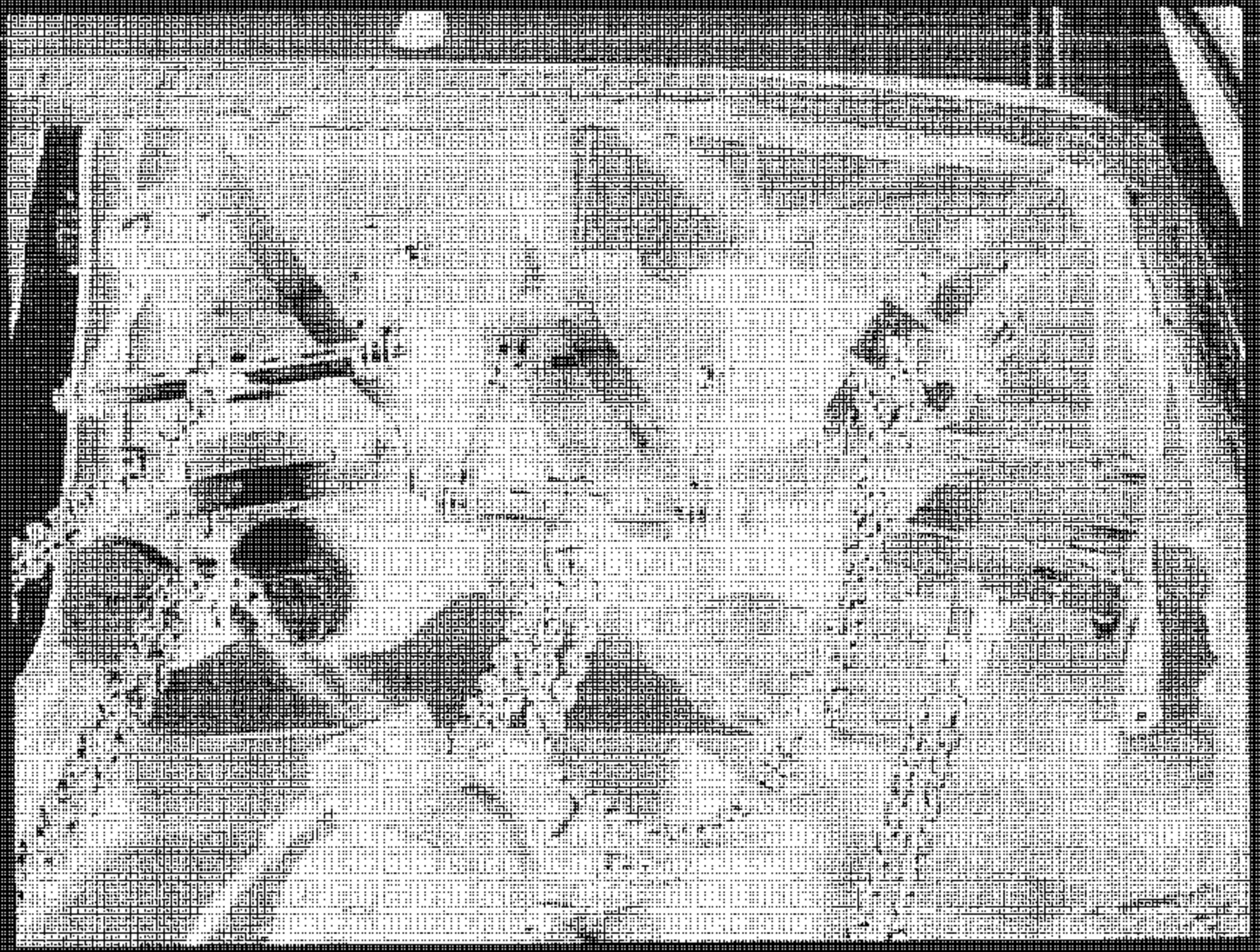
2005 BUICK LACROSSE
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 5.36
FULL LOAD ROW 2, RIGHT SIDE VIEW



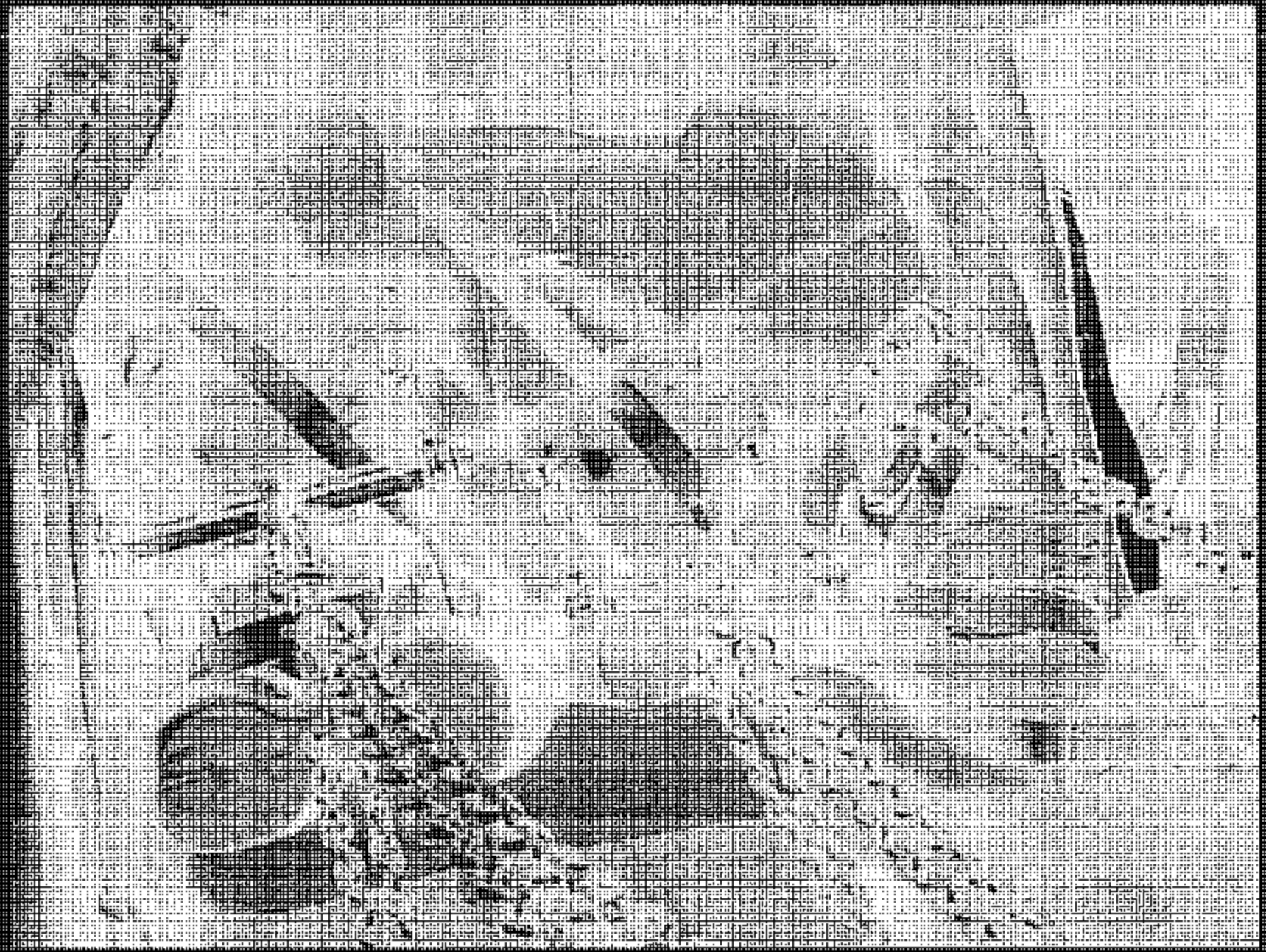
2004 BUICK LACROSSE
NHTSA NO. C60103
FMVSS NO. 210

FIGURE 5.37
POST TEST ROW 2, ¾ LEFT FRONT VIEW



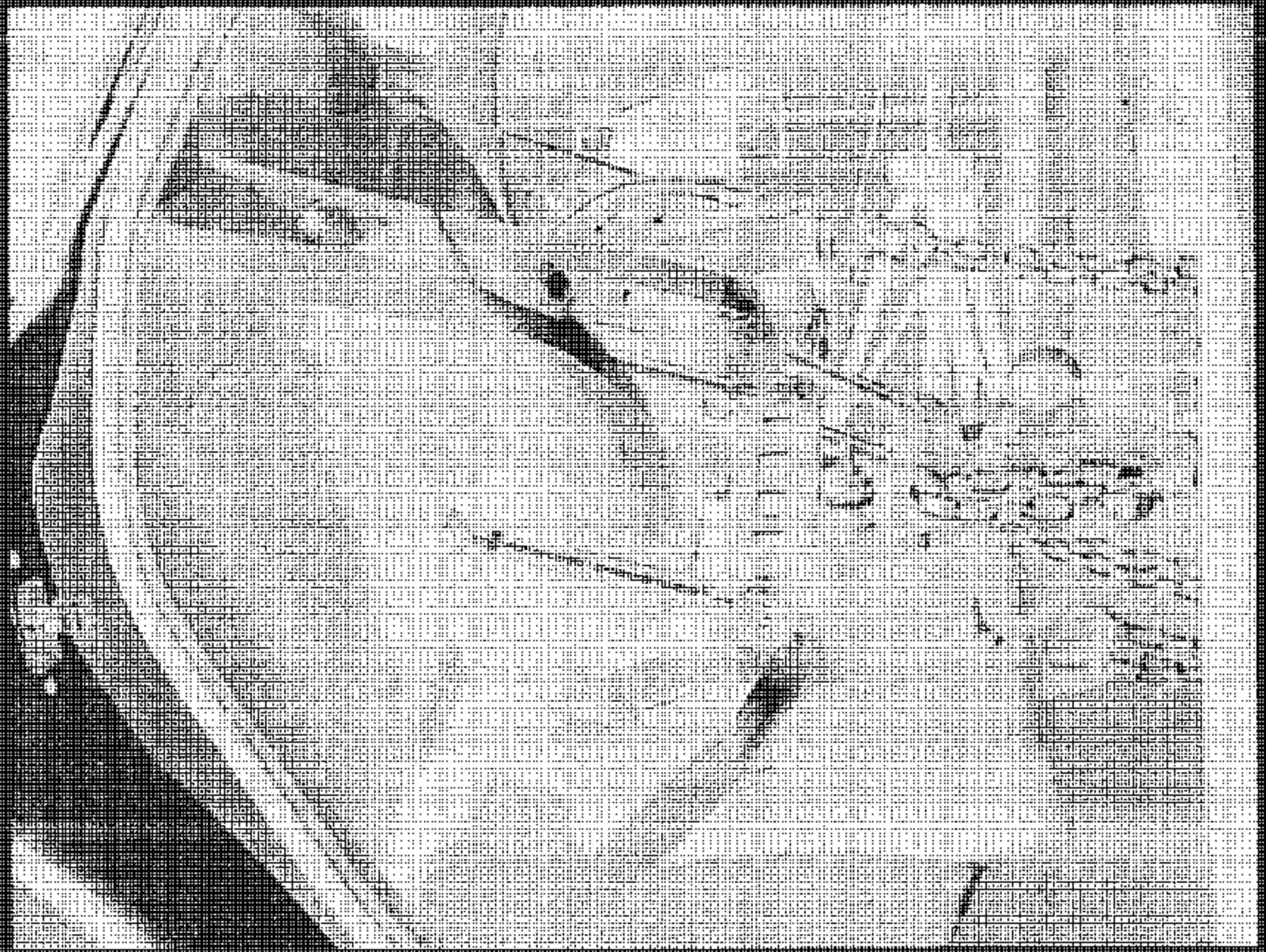
2005 BUICK LACROSSE
NHTSA NO. C50103
FMVSS NO. 210

FIGURE 5.38
POST TEST ROW 2, ¾ LEFT FRONT VIEW



2005 BUICK LACROSSE
NHTSA NO. C50103
FMVSS NO. 210

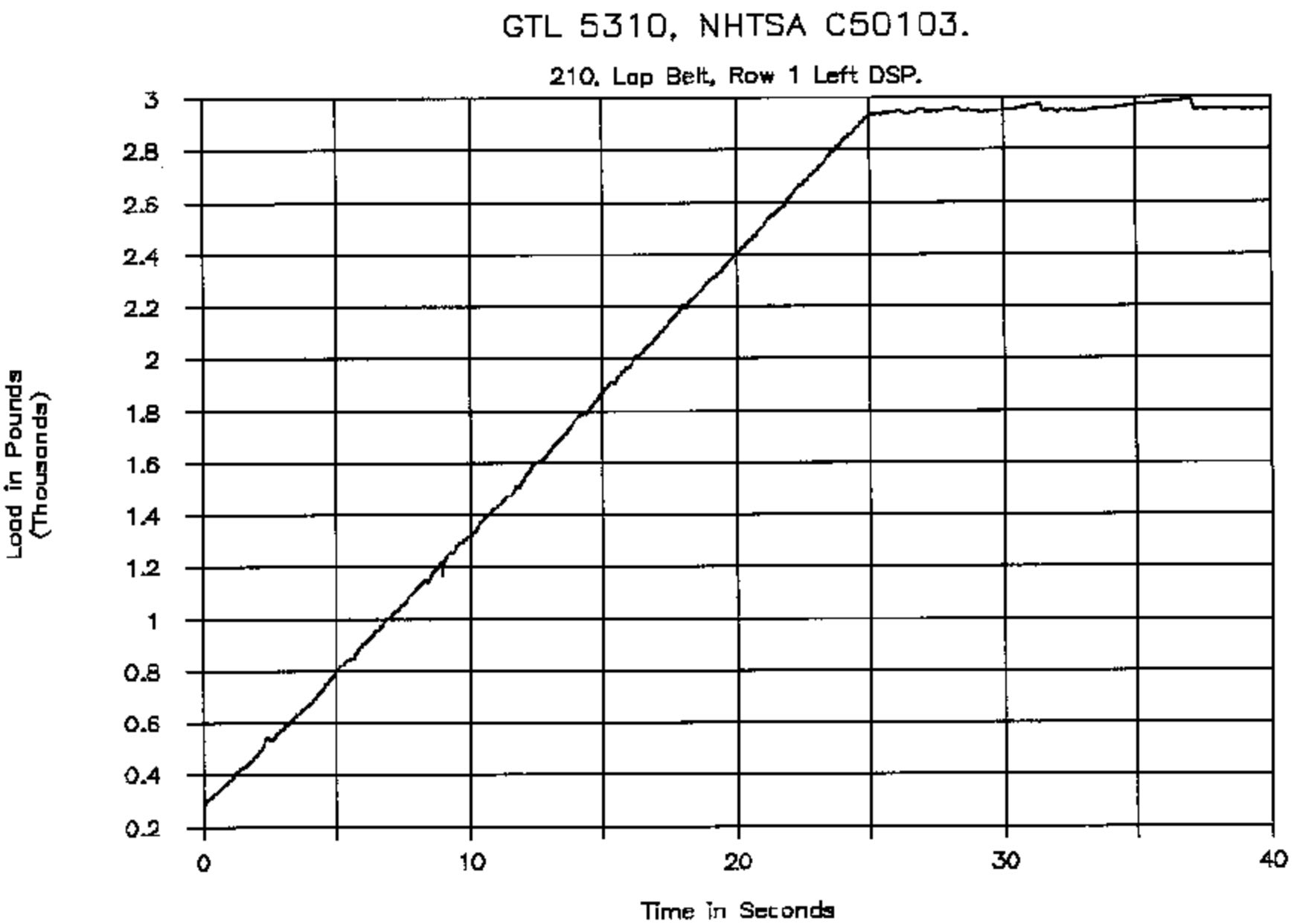
FIGURE 6.38
POST TEST ROW 2, ¾ RIGHT FRONT VIEW

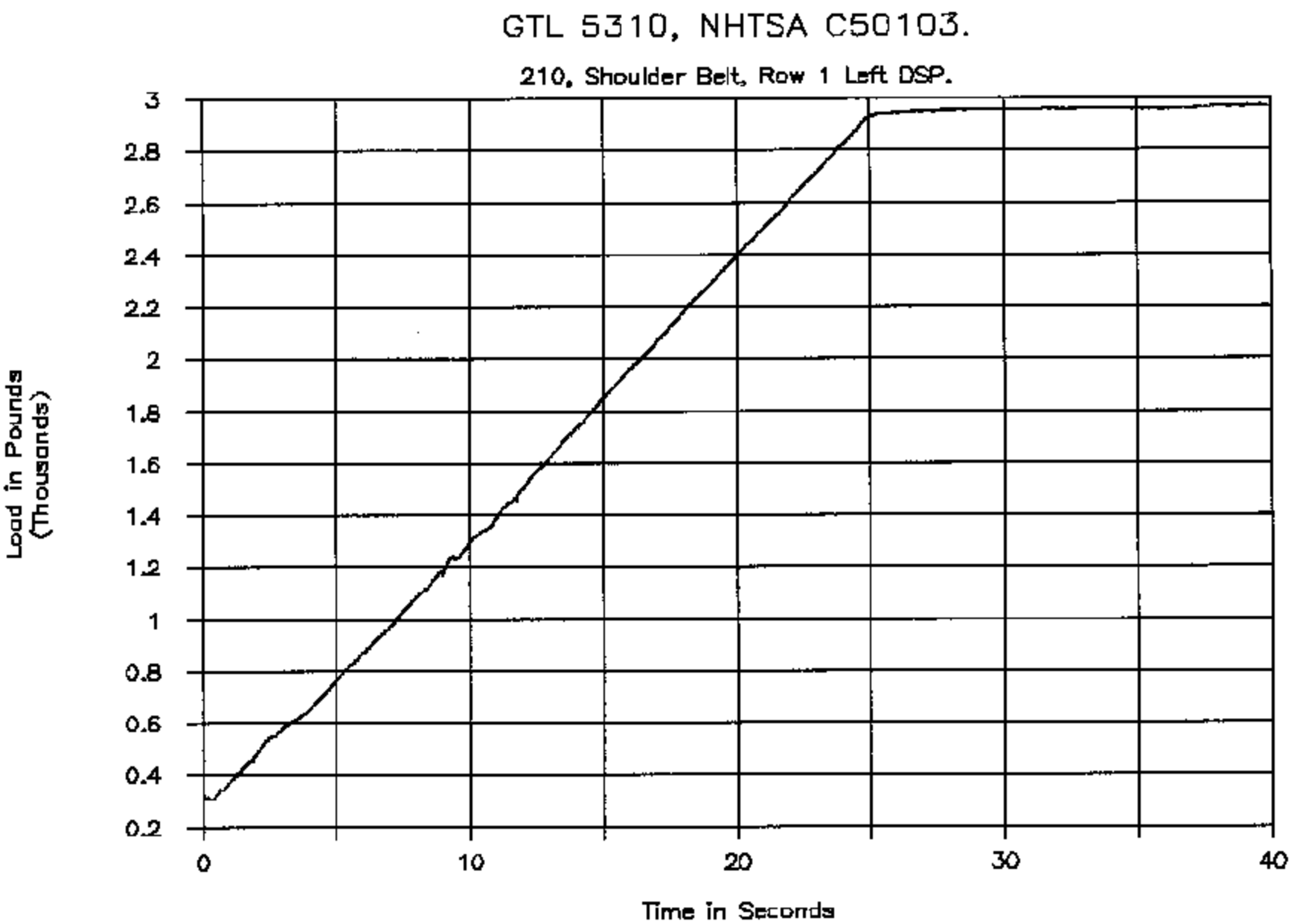


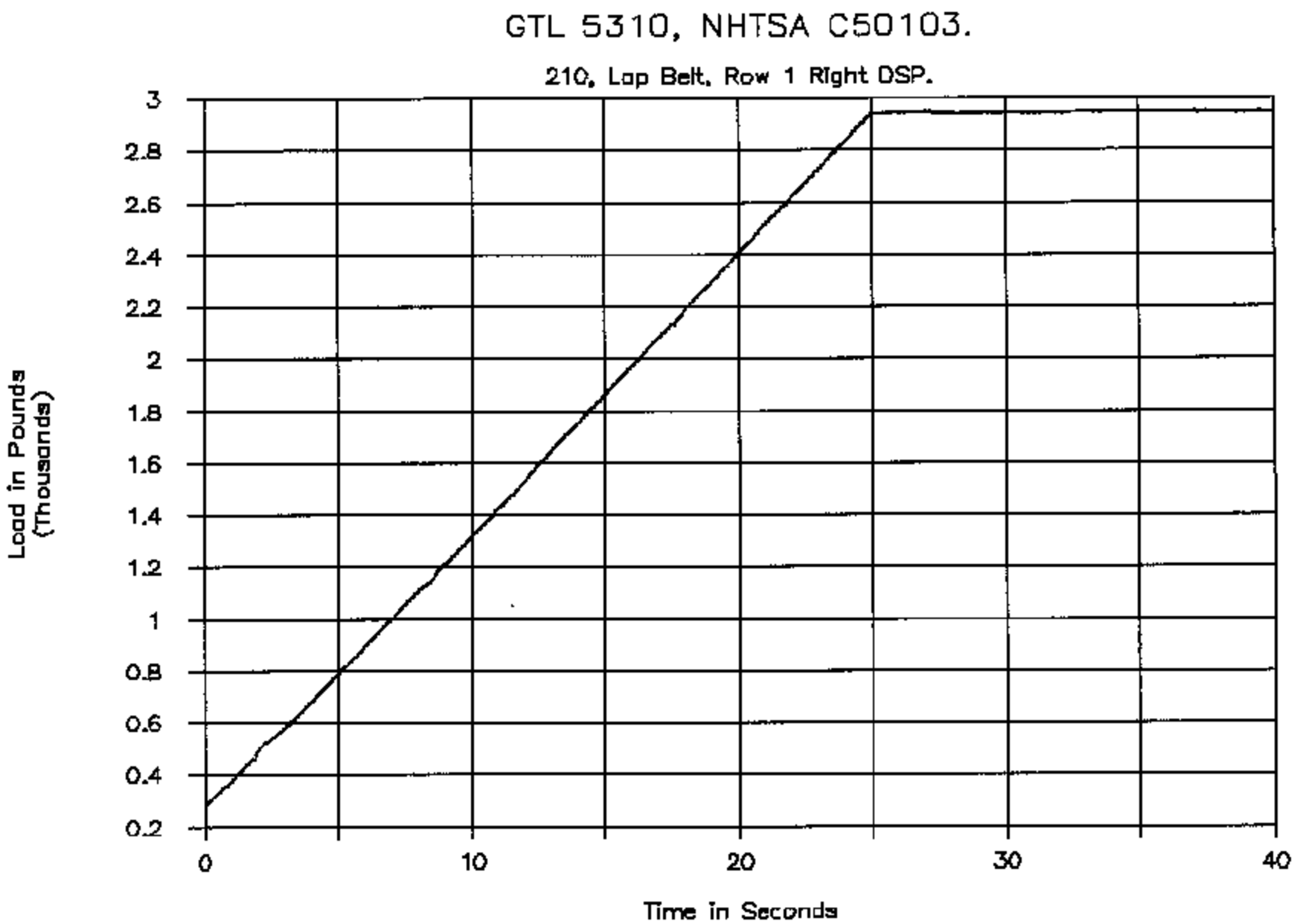
2004 BUICK LACROSSE
NHTSA NO. C50103
FMVSS NO. 210

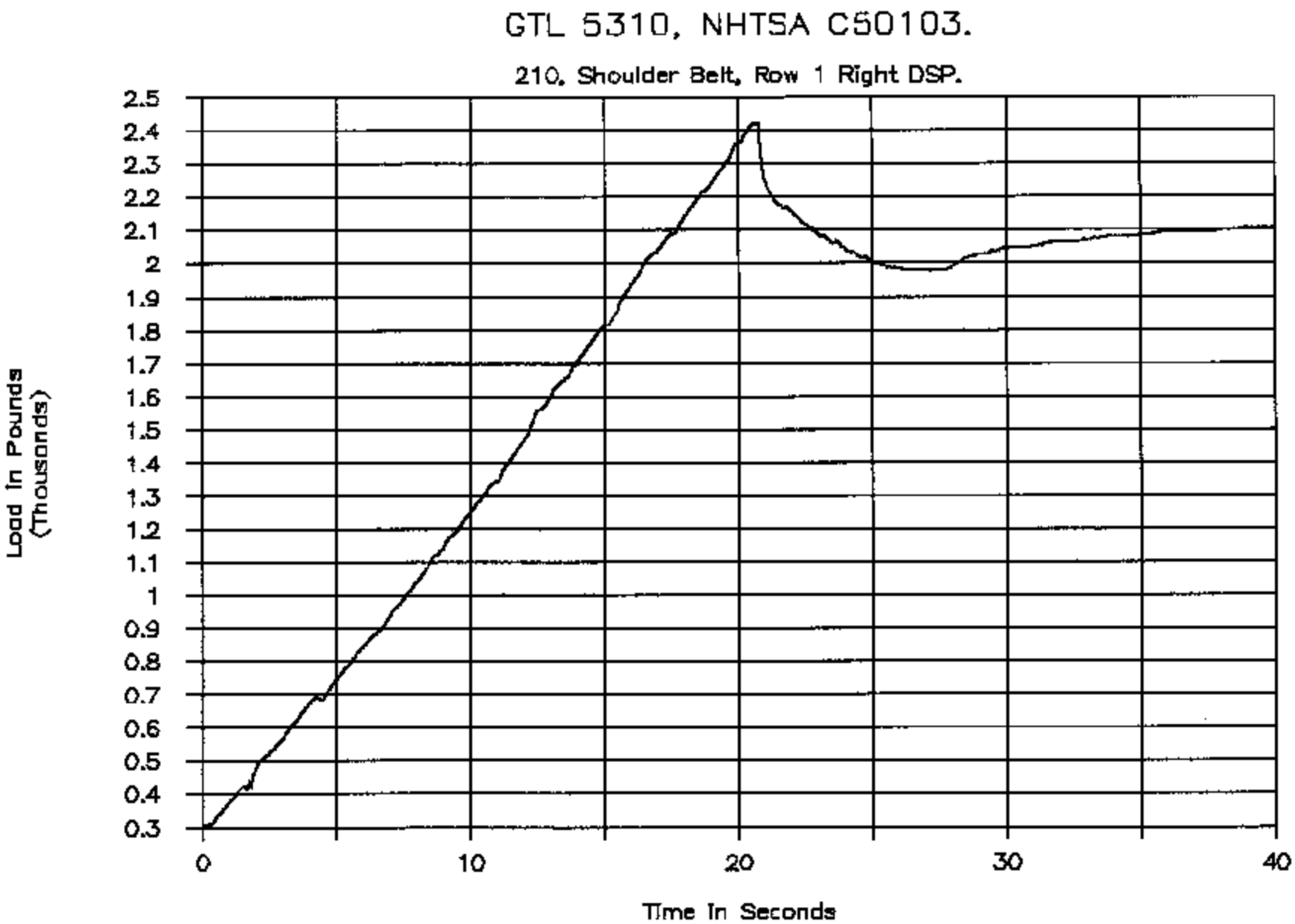
FIGURE S.40
POST TEST ROW 2, RIGHT SIDE VIEW

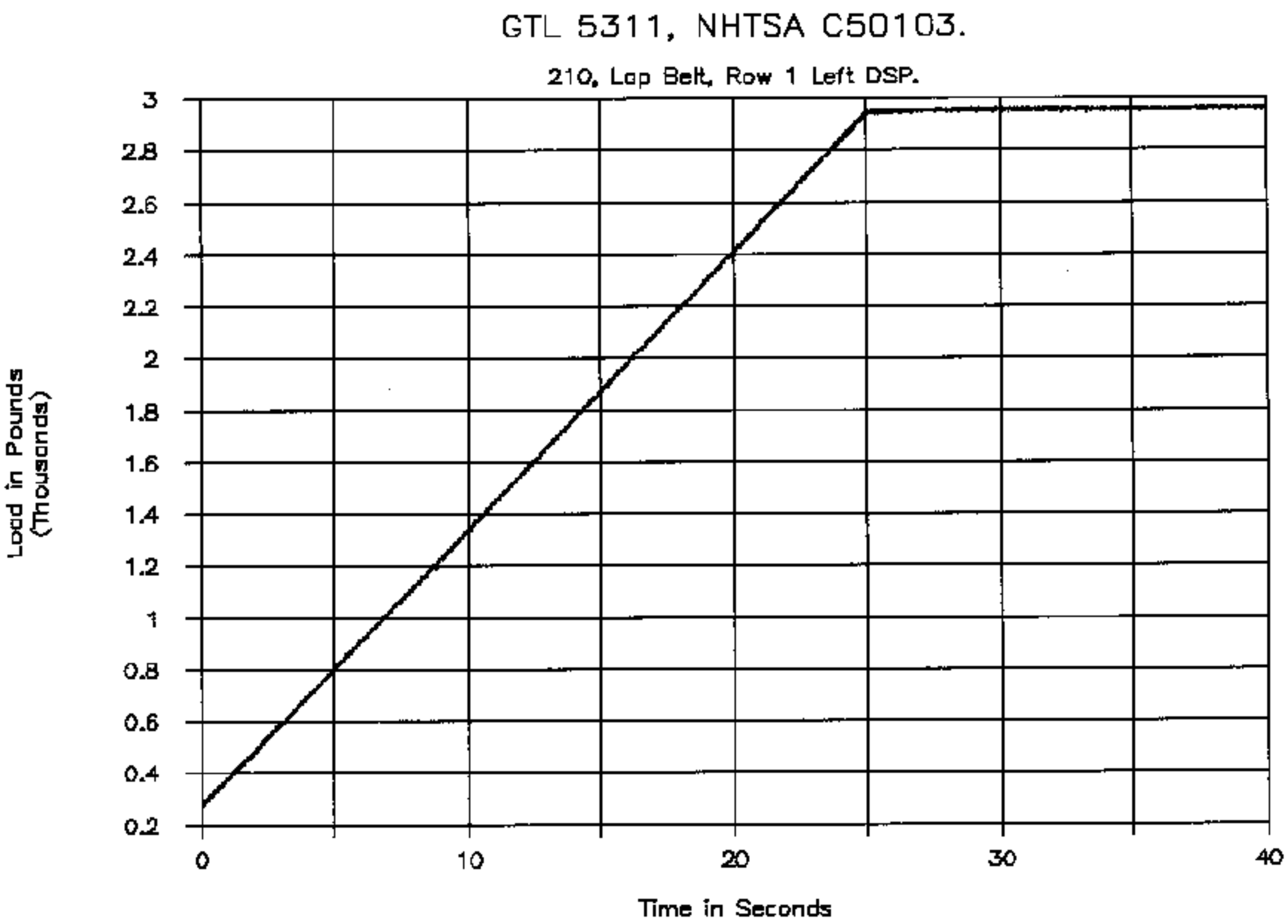
SECTION 6
TEST PLOTS

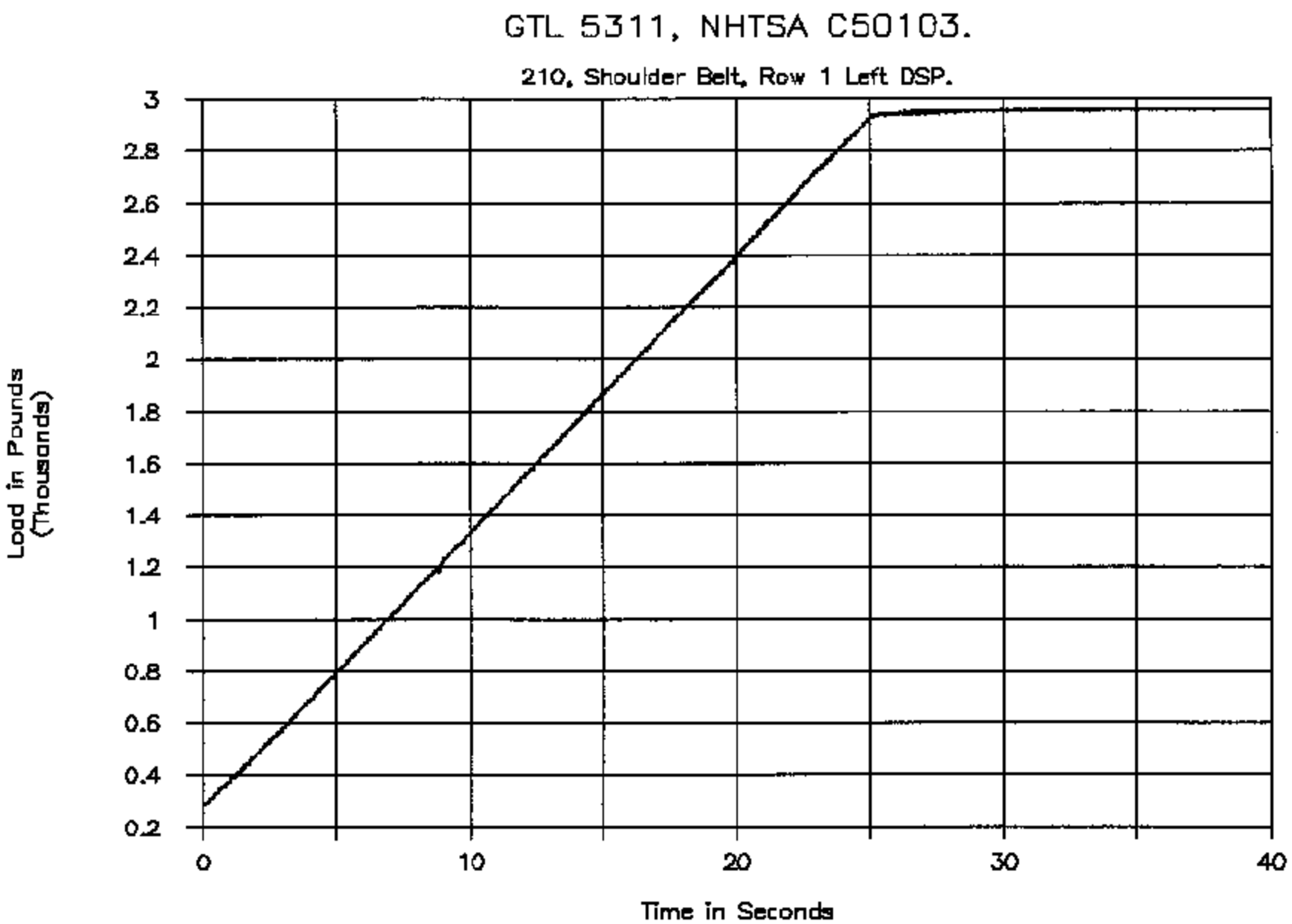

GTL 5310, NHTSA C50103.
210, Lap Belt, Row 1 Left DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds

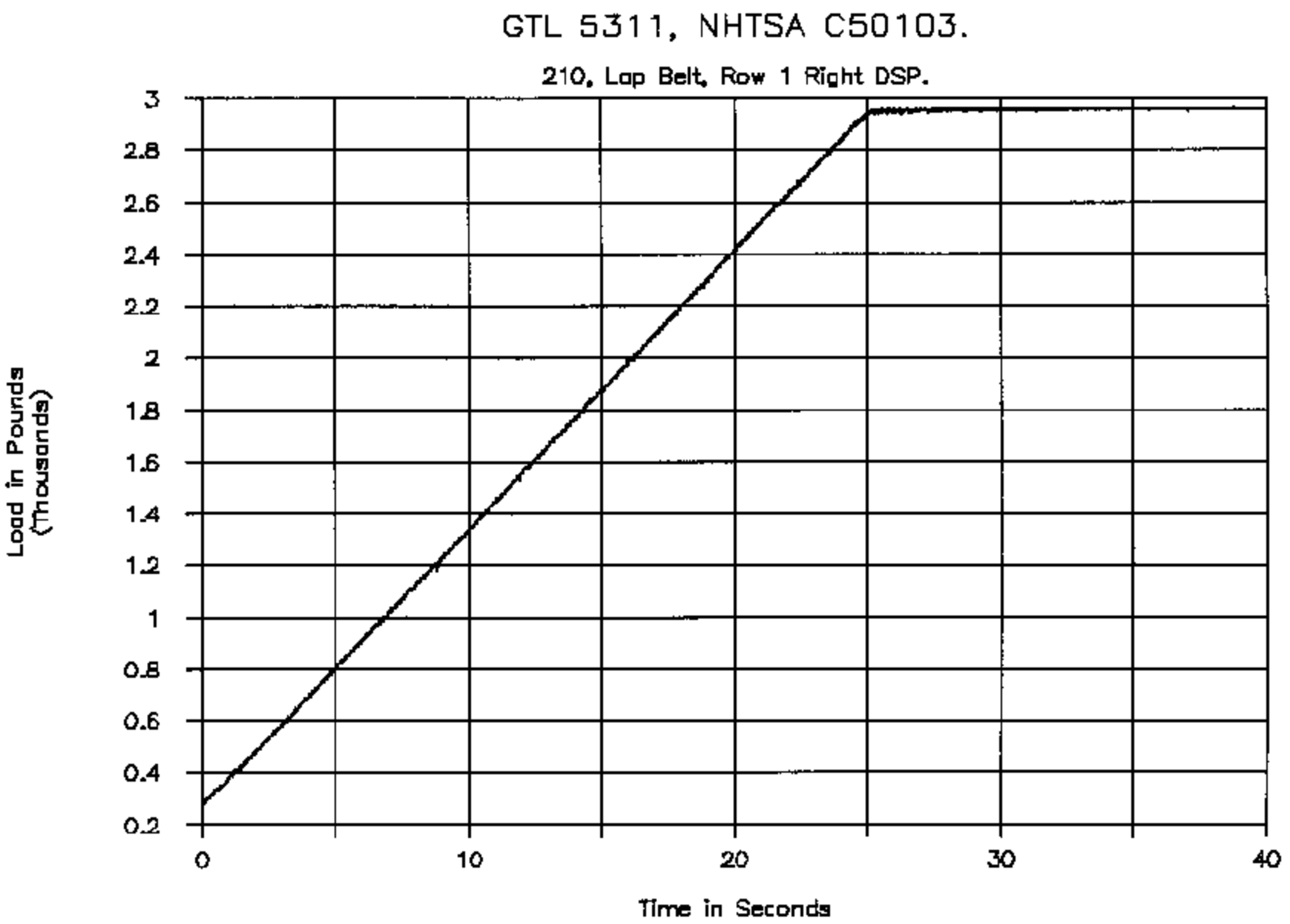

GTL 5310, NHTSA C50103.
210, Shoulder Belt, Row 1 Left DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds

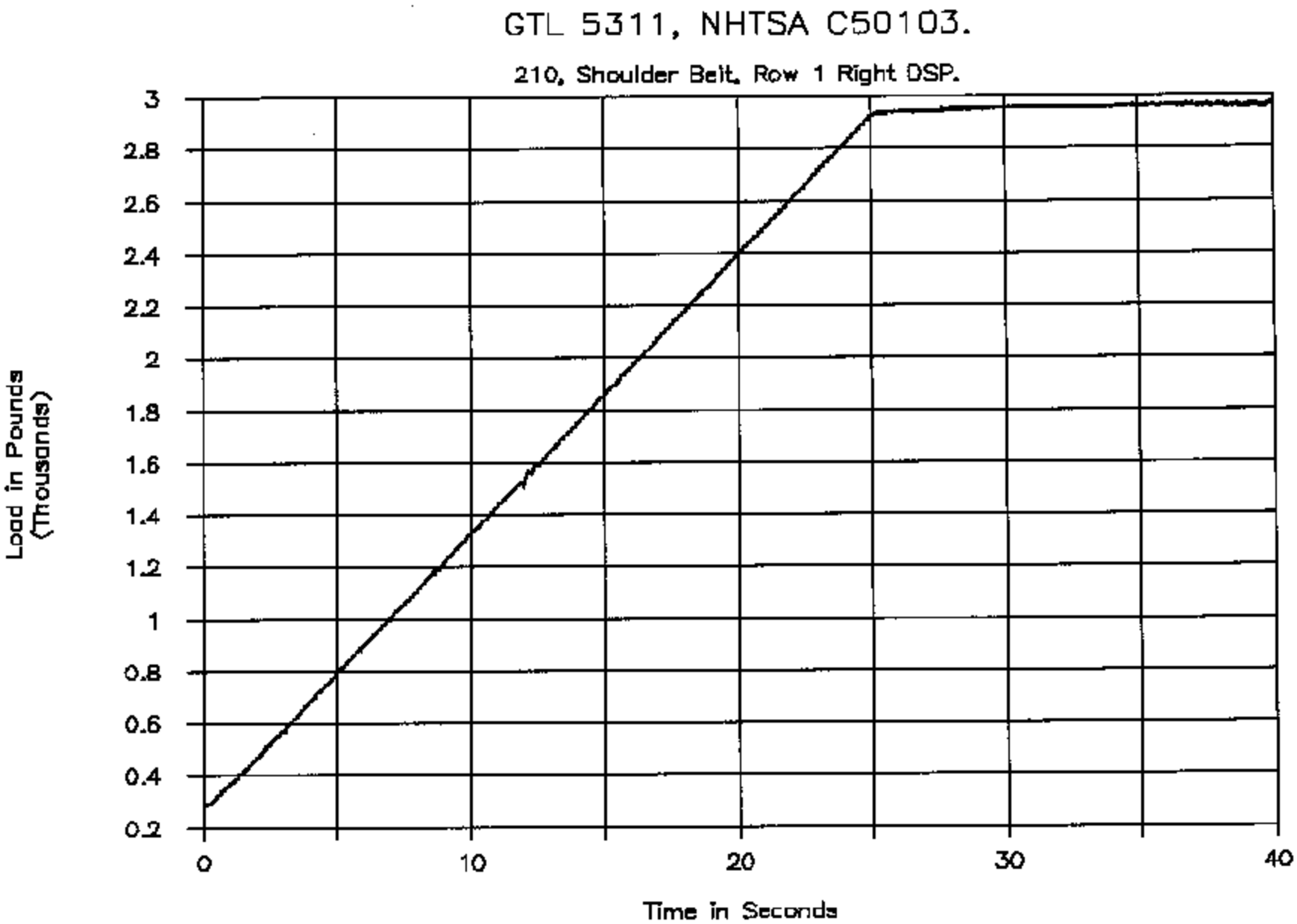

GTL 5310, NHTSA C50103.
210, Lap Belt, Row 1 Right DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds

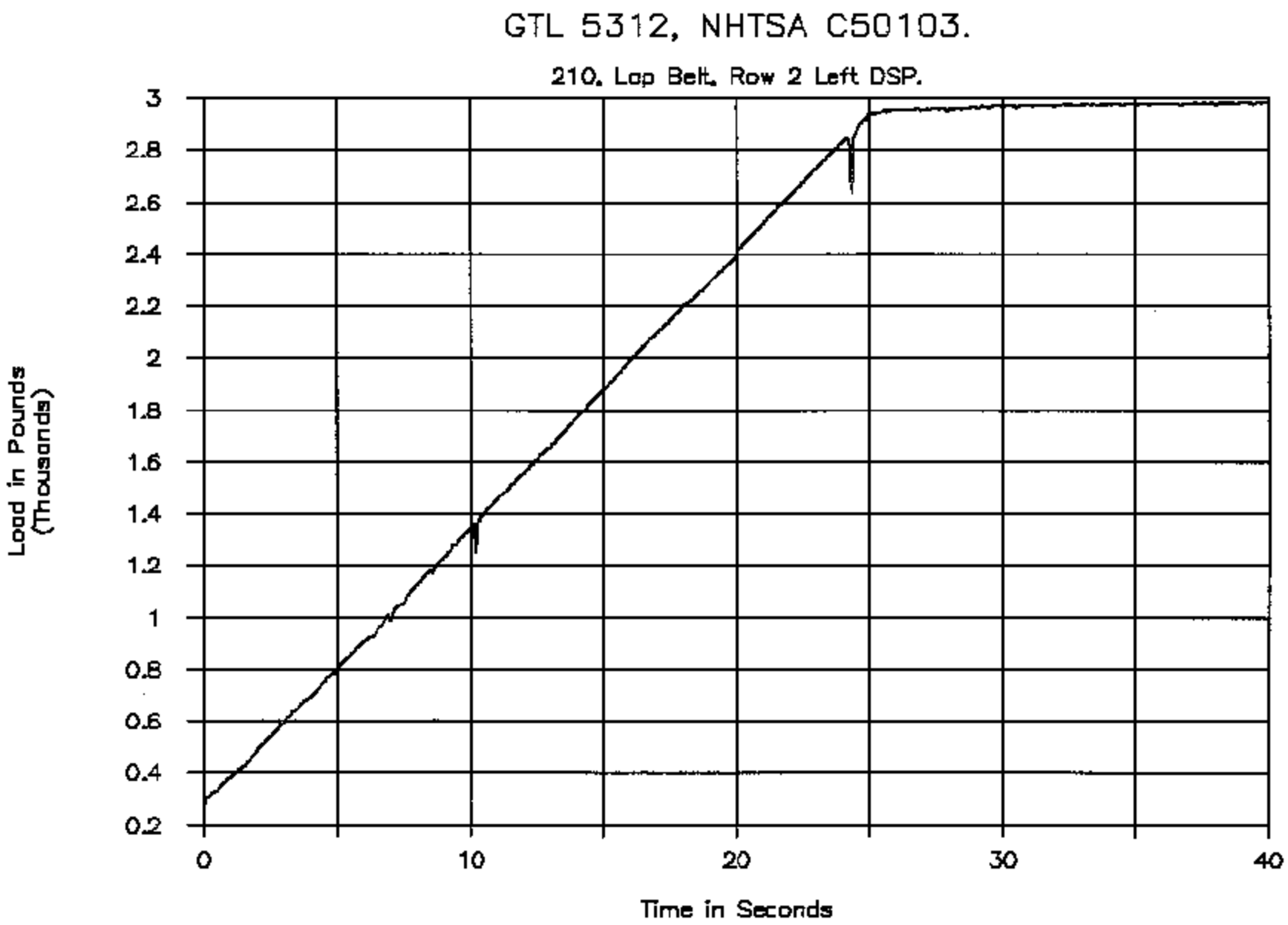

GTL 5310, NHTSA C50103.
210, Shoulder Belt, Row 1 Right DSP.
Load In Pounds (Thousands)
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0
10
20
30
40
Time In Seconds

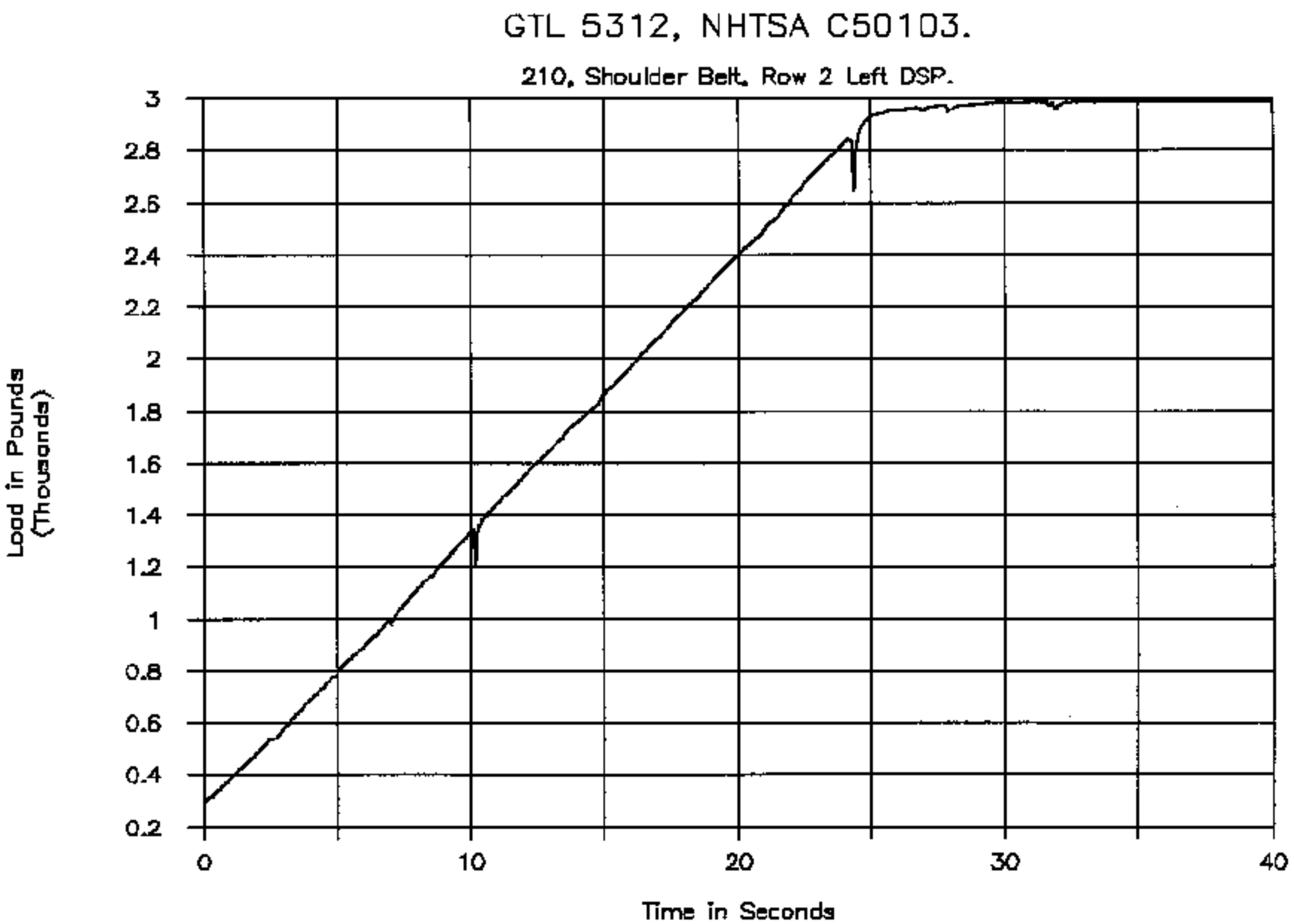

GTL 5311, NHTSA C50103.
210, Lap Belt, Row 1 Left DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds

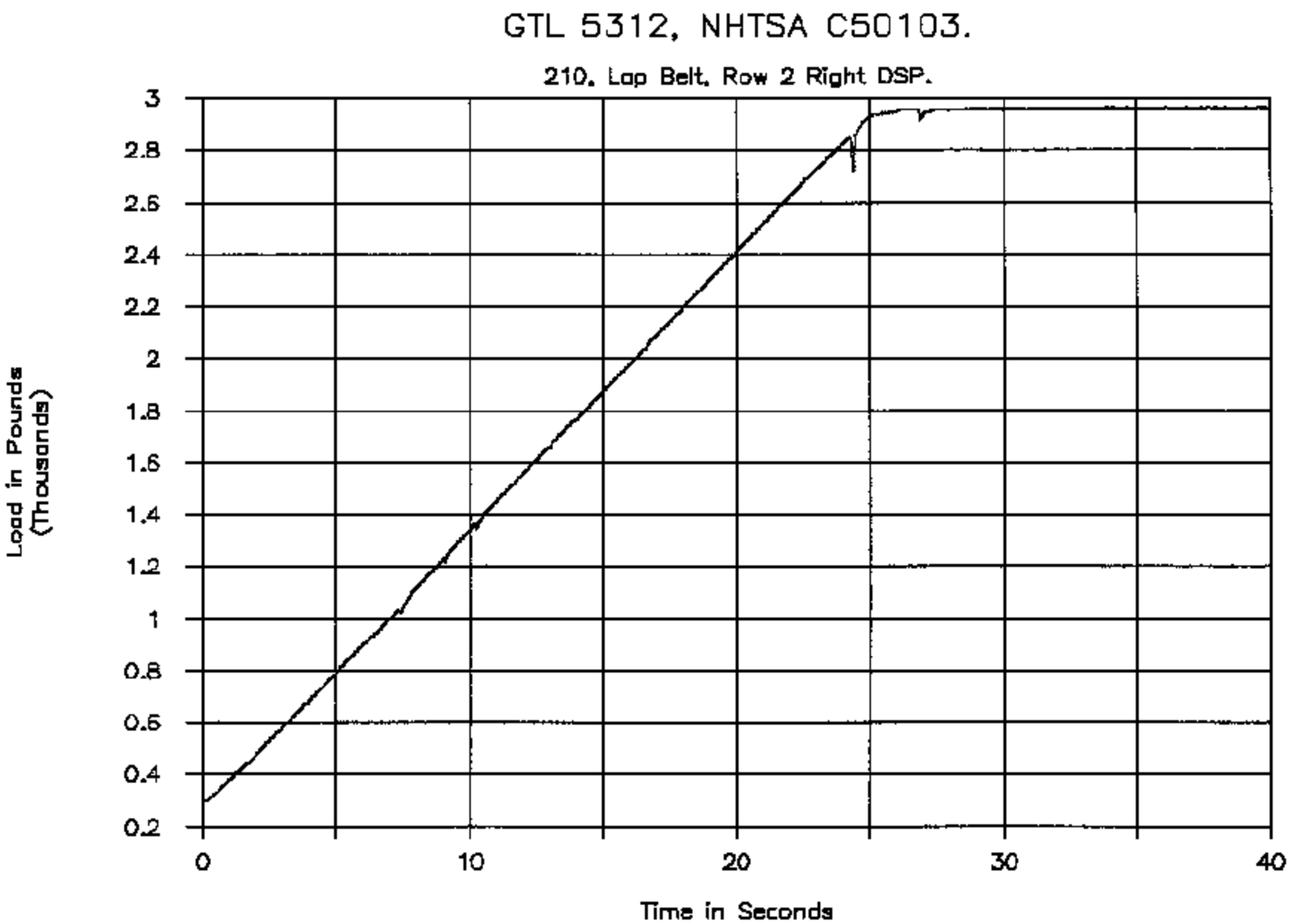

GTL 5311, NHTSA C50103.
210, Shoulder Belt, Row 1 Left DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds

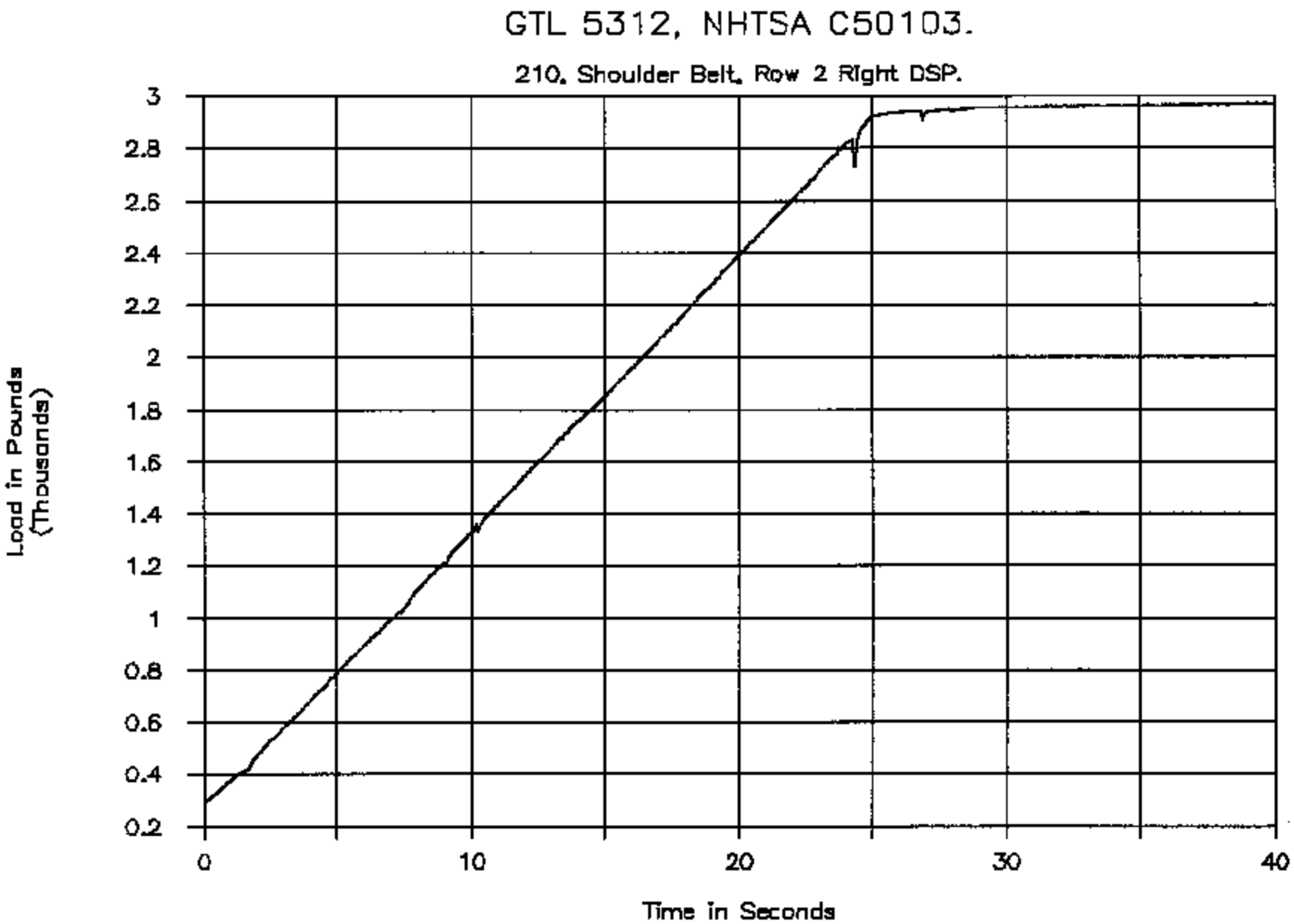

GTL 5311, NHTSA C50103.
210, Lap Belt, Row 1 Right DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds

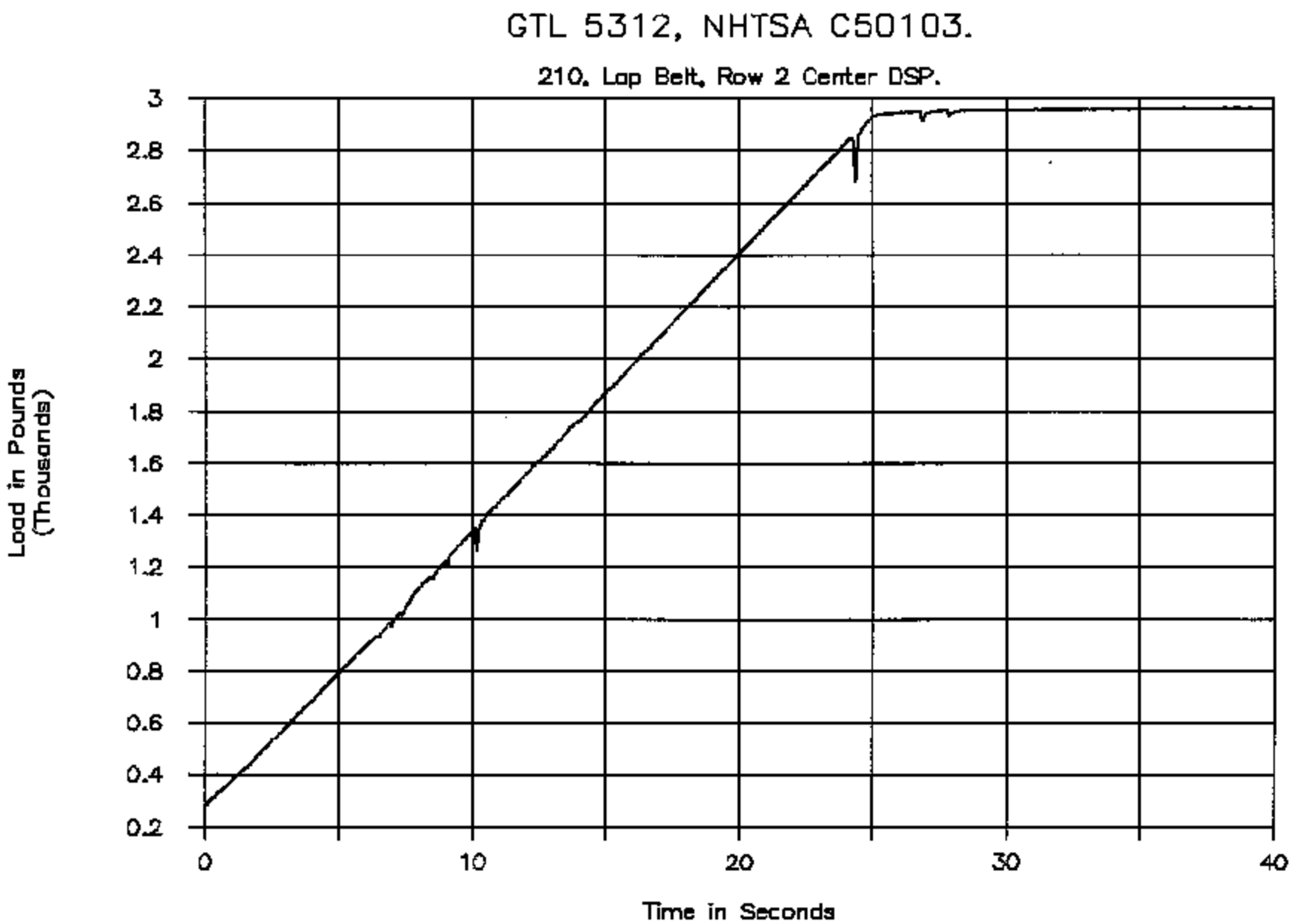

GTL 5311, NHTSA C50103.
210, Shoulder Belt, Row 1 Right DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds

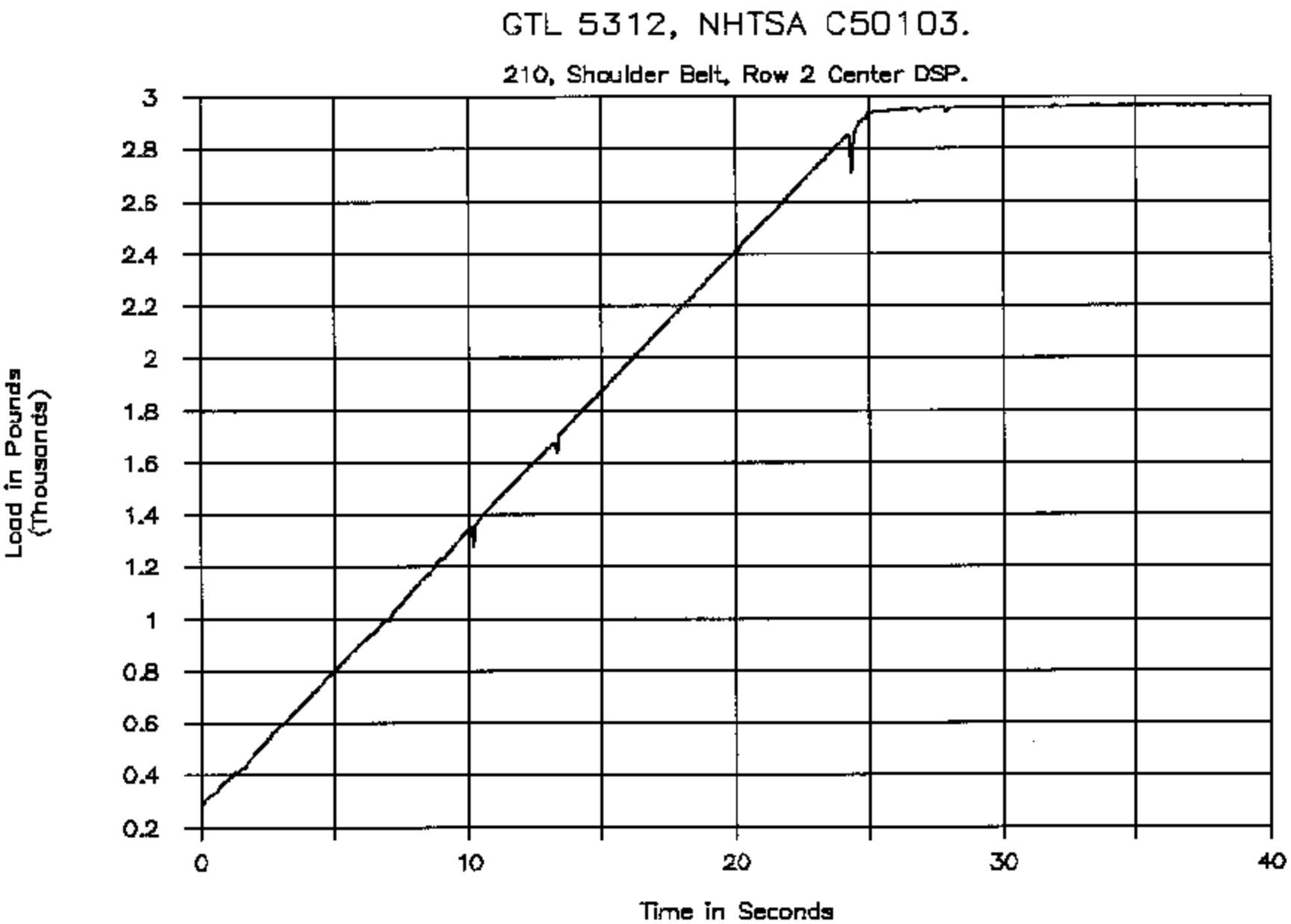

GTL 5312, NHTSA C50103.
210. Lap Belt, Row 2 Left DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds


GTL 5312, NHTSA C50103.
210, Shoulder Belt, Row 2 Left DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds


GTL 5312, NHTSA C50103.
210, Lap Belt, Row 2 Right DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds


GTL 5312, NHTSA C50103.
210. Shoulder Belt, Row 2 Right DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds


GTL 5312, NHTSA C50103.
210. Lap Belt, Row 2 Center DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds


GTL 5312, NHTSA C50103.
210, Shoulder Belt, Row 2 Center DSP.
Load in Pounds (Thousands)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
10
20
30
40
Time in Seconds