3052-01 DOT0050
3052-02 DOT0014
3052-03 DOT0019
3052-04 DOT0011
3052-05 DOT0191
3052-06 DOT0192
~~3052-07~~
~~3052-08~~

Dynamic Science Inc.

A SUBSIDIARY OF TALLEY INDUSTRIES

1850 WEST PINNACLE PEAK ROAD · PHOENIX, ARIZONA

Report No. (to be assigned by NHTSA)

VAN CRASHWORTHINESS AND AGGRESSIVITY STUDY

TEST REPORT 1

VAN-TO-NHTSA FIXED TEST DEVICE HEAD-ON IMPACT TESTS

APPENDICES

VOLUME II

R. Yee
R. Cropper
S. Davis

Contract No. DOT-HS-8-01942
$111,121

June 1979

TEST REPORT

Document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
WASHINGTON, D.C. 20590

Prepared for the Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DOT-HS-8-01942.
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle VAN CRASHWORTHINESS AND AGGRESSIVITY STUDY TEST REPORT I, VAN-TO-NHTSA FIXED TEST DEVICE HEAD-ON IMPACT TESTS - VOLUME II		5. Report Date June 1979
		6. Performing Orgn Code
7. Author(s) R. Yee, R. Cropper, S. Davis		8. Performing Orgn Rpt No. 3052-79-95B
9. Performing Organization Name and Address Dynamic Science, Inc. A Talley Industries Company 1850 West Pinnacle Peak Road Phoenix, Arizona 85027		10. Work Unit No.
		11. Contract or Grant No. DOT-HS-8-01942, T.O. #4
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration 2100 Second Street, S.W. Washington, D.C. 20590		13. Type of Report and Period Covered TEST REPORT April - June 1979
		14. Sponsoring Agency Code

15. Supplementary Notes

Tests 1-6 of a series of 8 tests. Volume I contains all test data gathered for each test.

16. Abstract

A series of eight full-scale van crash tests was conducted under Task 2 of DOT-HS-8-01942, "Van Crashworthiness and Aggressivity Study." This report presents the results of Tests 3052-1 through 3052-6, symmetric head-on Van-to-NHTSA Fixed Test Device crash tests. Two different model vans were crashed at test speeds of 15, 25, and 30 mph. Tests 3052-1 through 3052-3 were conducted using 1979 Ford E-150 Econoline Vans while Tests 3052-4 through 3052-6 were conducted using 1979 Dodge B-200 Vans.

The objective of these tests was to study the aggressivity of vans, to provide baseline test data to support extension of FMVSS No. 208 to vans, and to provide initial information for the future FMVSS 400 series standards upgrading.

This report contains all Calcomp plots of vehicle and NHTSA Test Device electronic data gathered for each test. Volume I contains all test results tabulated, pre- and post-test vehicle dimensions, accelerometer location identification, summaries of electronic data and summaries of simulated occupant data.

17. Key Words	18. Distribution Statement
NHTSA Fixed Test Device Ford Econoline E-150 Van, Dodge B-200 Van, Aggressivity, Crashworthiness	Document available through the National Technical Information Service, Springfield, Virginia 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. Pages	22. Price
Unclassified	Unclassified	281	

Form DOT F 1700.7 (8-69)

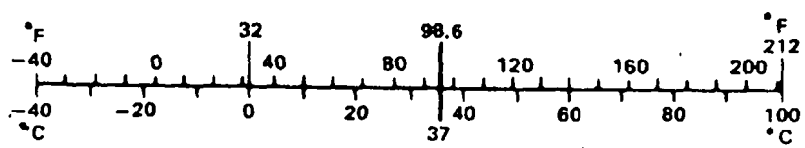
METRIC CONVERSION FACTORS

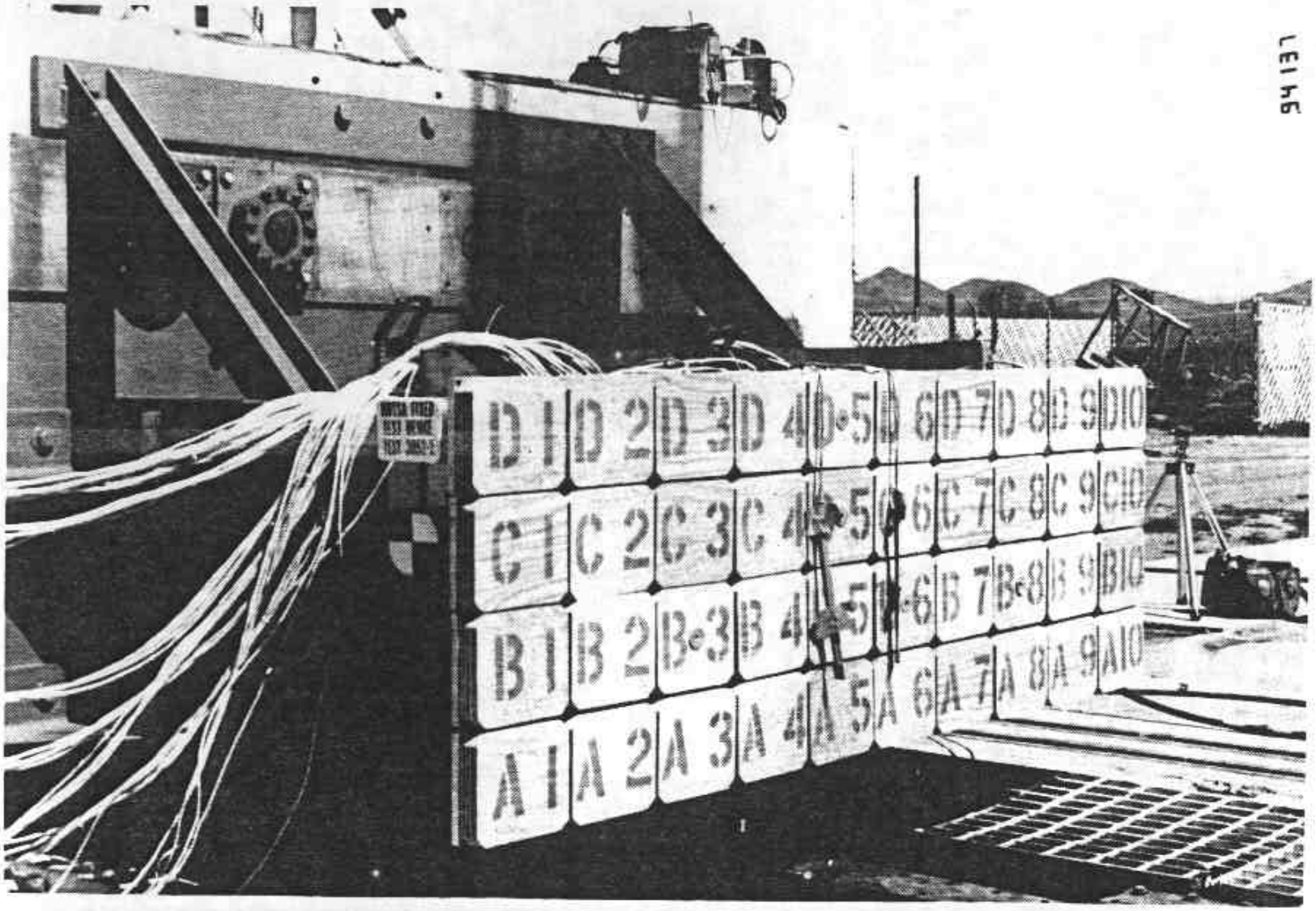
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	metric ton	t
		VOLUME		
tsp	teaspoons	5	milliliters	mL
Tbsp	tablespoons	15	milliliters	mL
in^3	cubic inches	16	milliliters	mL
fl oz	fluid ounces	30	milliliters	mL
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10 000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton (1000 kg)	1.1	short tons	
		VOLUME		
mL	milliliters	0.03	fluid ounces	fl oz
mL	milliliters	0.06	cubic inches	in^3
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F





NHTSA Fixed Test Device With Plywood Face,

TABLE OF CONTENTS

Page

APPENDIX A - CALCOMP PLOTS FOR TEST 3052-1 . . . . . A-1

APPENDIX B - CALCOMP PLOTS FOR TEST 3052-2 . . . . . B-1

APPENDIX C - CALCOMP PLOTS FOR TEST 3052-3 . . . . . C-1

APPENDIX D - CALCOMP PLOTS FOR TEST 3052-4 . . . . . D-1

APPENDIX E - CALCOMP PLOTS FOR TEST 3052-5 . . . . . E-1

APPENDIX F - CALCOMP PLOTS FOR TEST 3052-6 . . . . . F-1

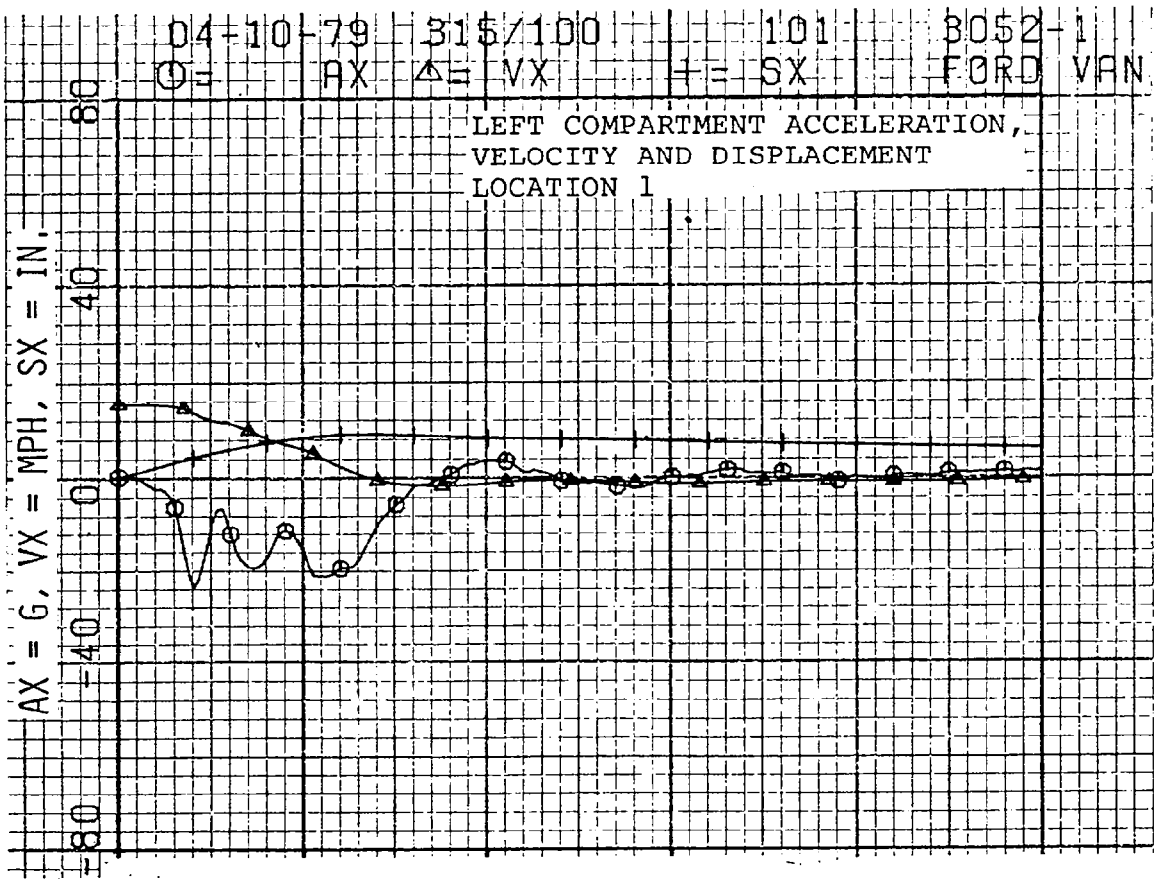
APPENDIX A

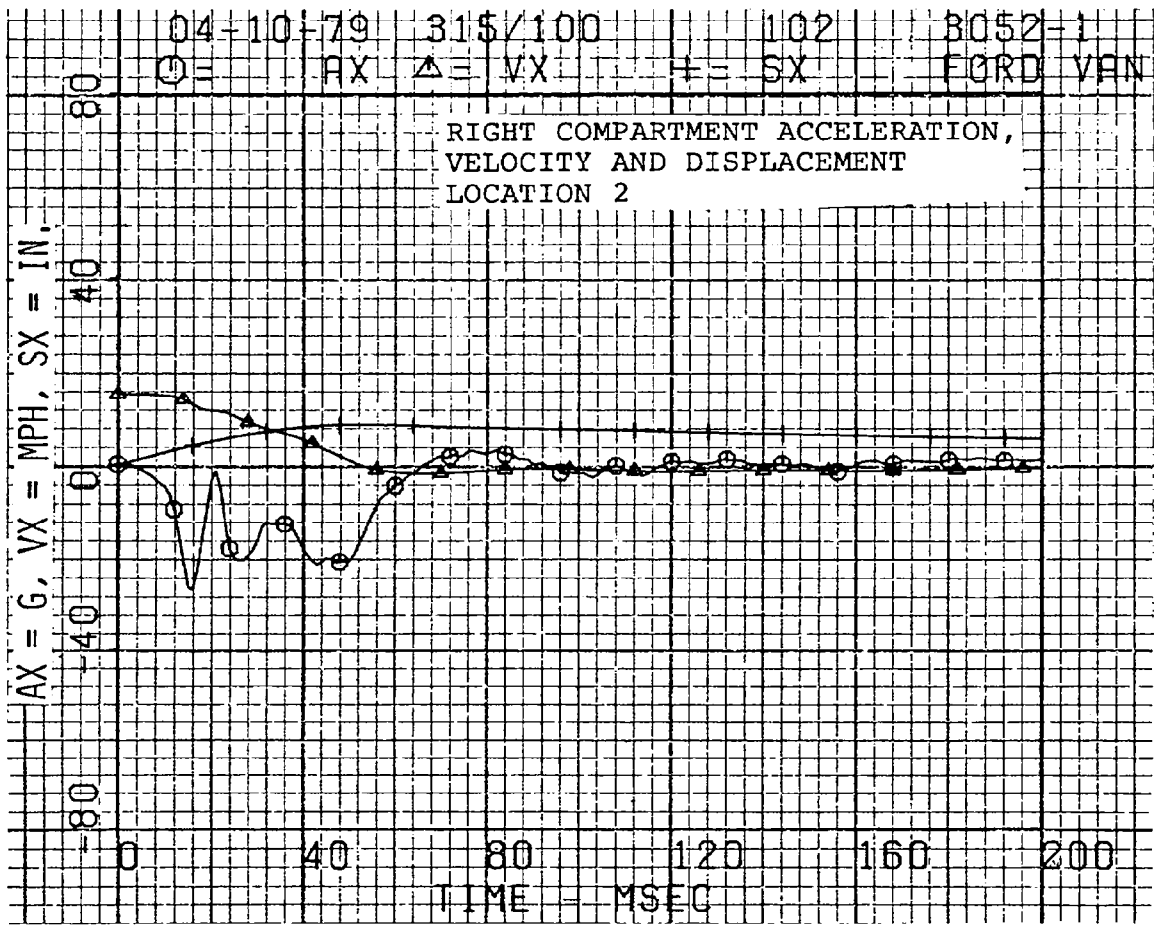
CALCOMP PLOTS FOR
TEST 3052-1

FORD E-150 ECONOLINE VAN-TO-NHTSA FIXED TEST DEVICE
SYMMETRIC HEAD-ON IMPACT

TEST SPEED: 15.25 MPH

TEST DATE: APRIL 10, 1979


04-10-79 315/100 101 3052-1
O= AX △= VX += SX FORD VAN
LEFT COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT
LOCATION 1
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80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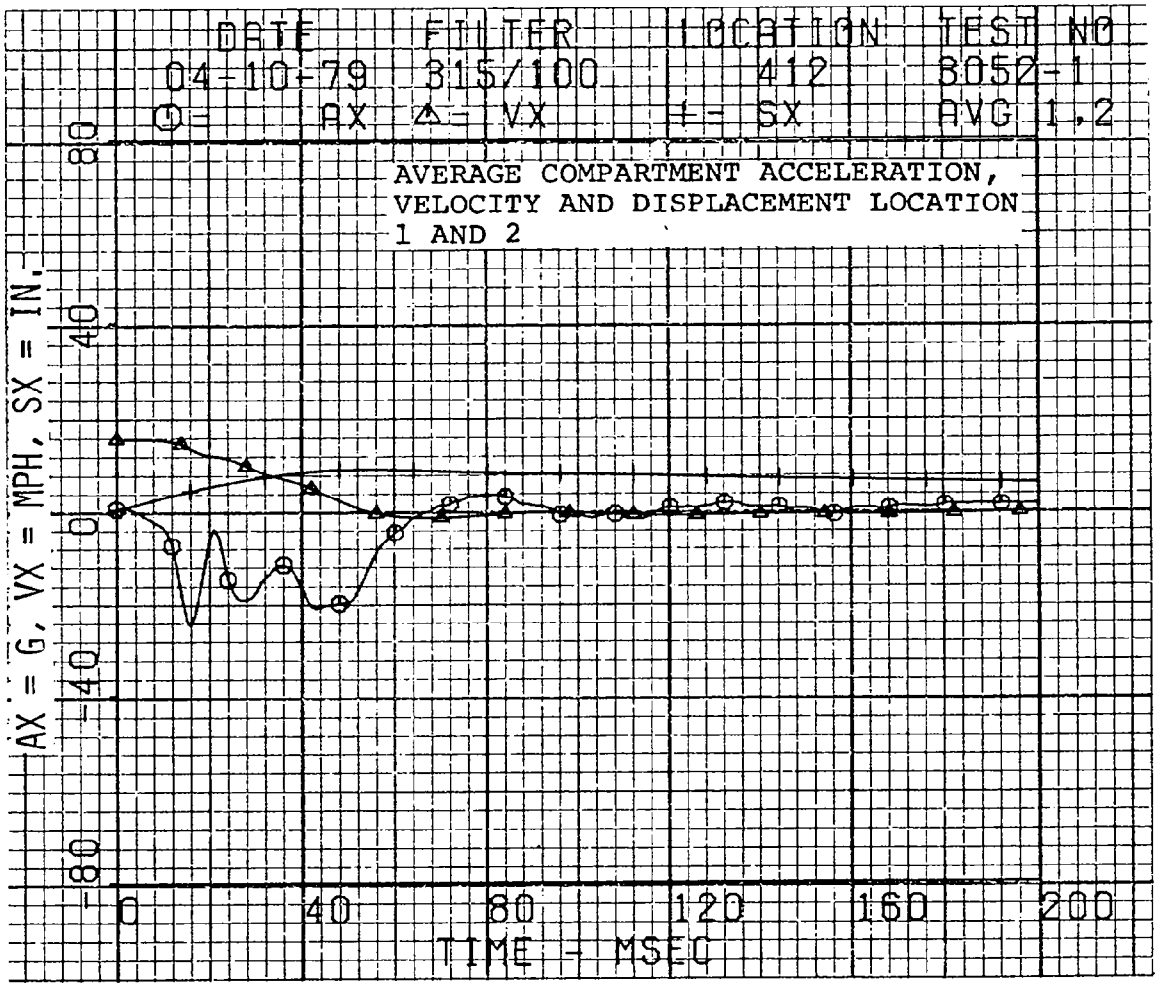
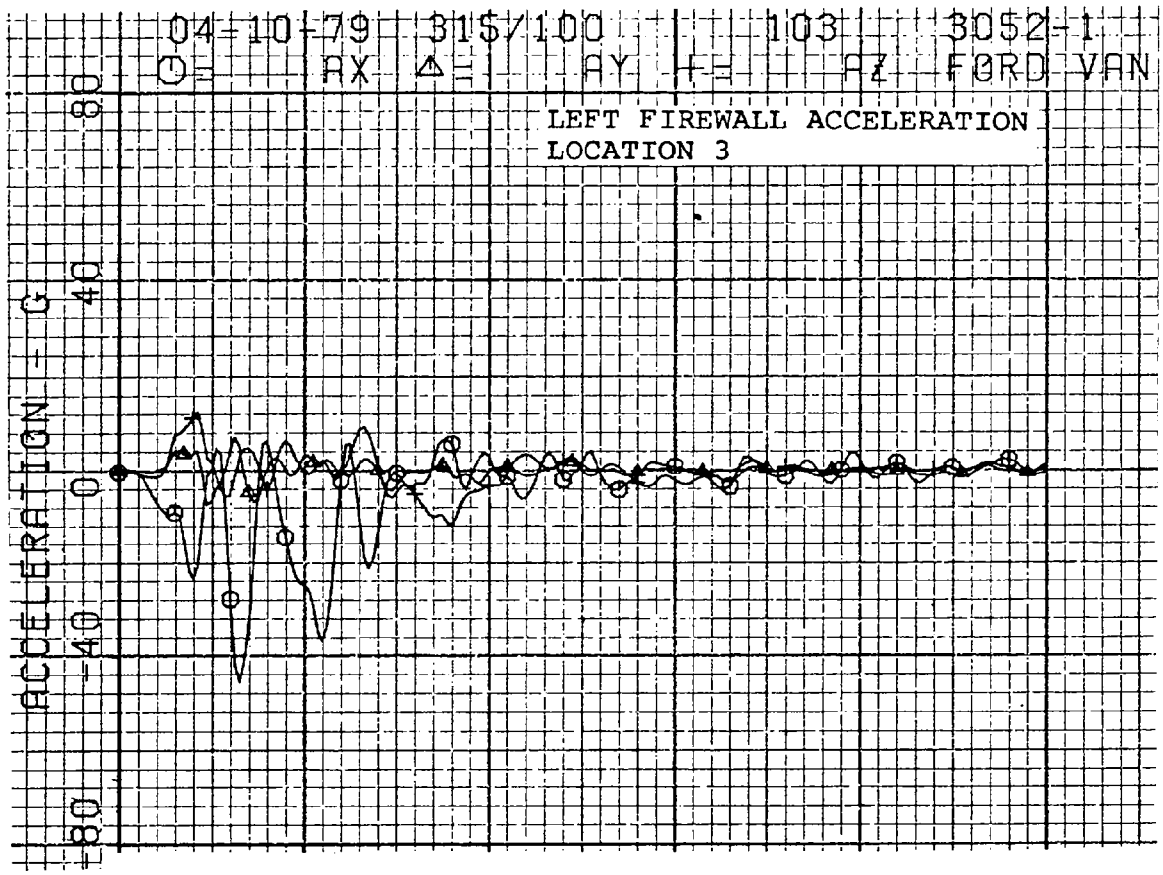
O= AX △= VX += SX FORD VAN
RIGHT COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT
LOCATION 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC


DATE
04-10-79
FILTER
315/100
LOCATION
412
TEST NO
8052-1
⊙- AX
△- VX
+- SX
AVG 1.2
AVERAGE COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT LOCATION
1 AND 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC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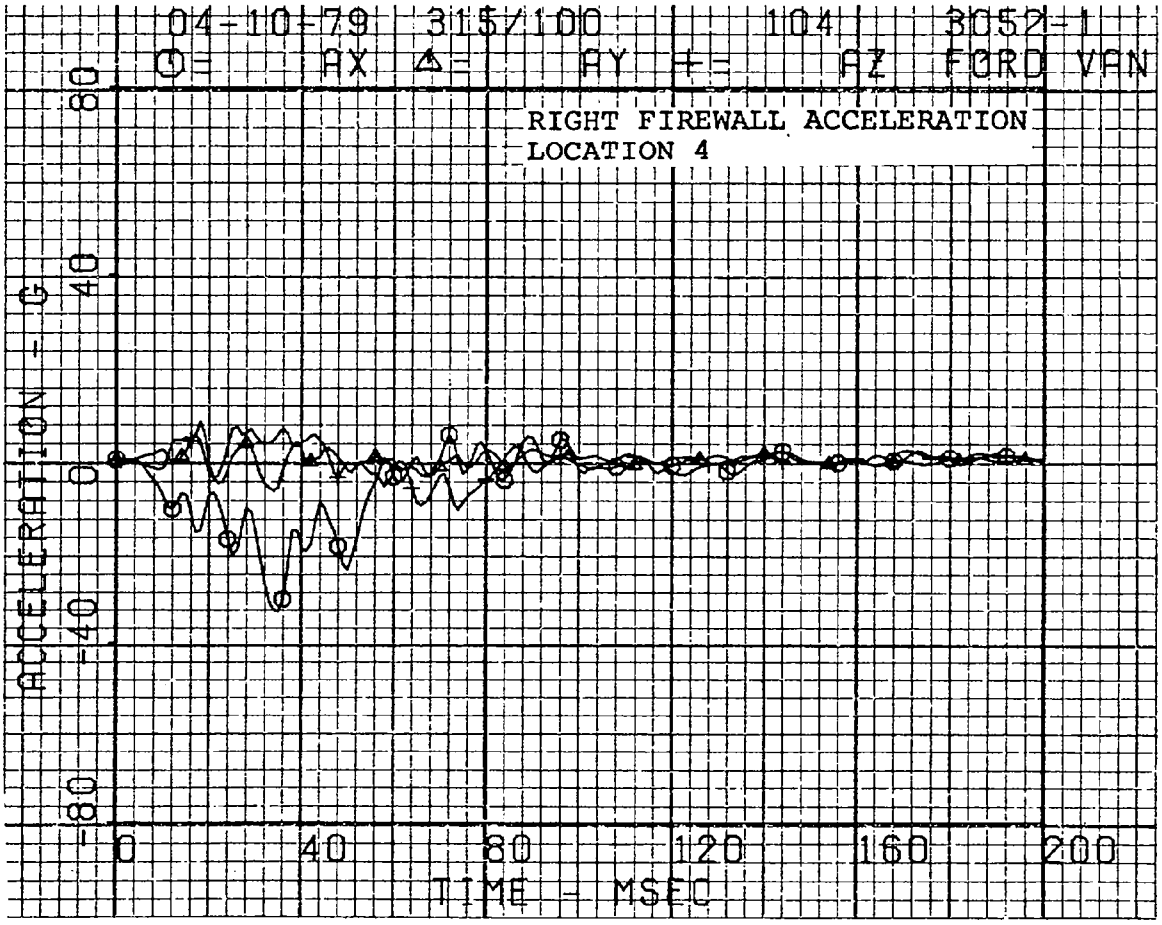
O= AX Δ= AY += AZ FORD VAN
LEFT FIREWALL ACCELERATION
LOCATION 3
ACCELERATION - G
80
40
0
-40
-80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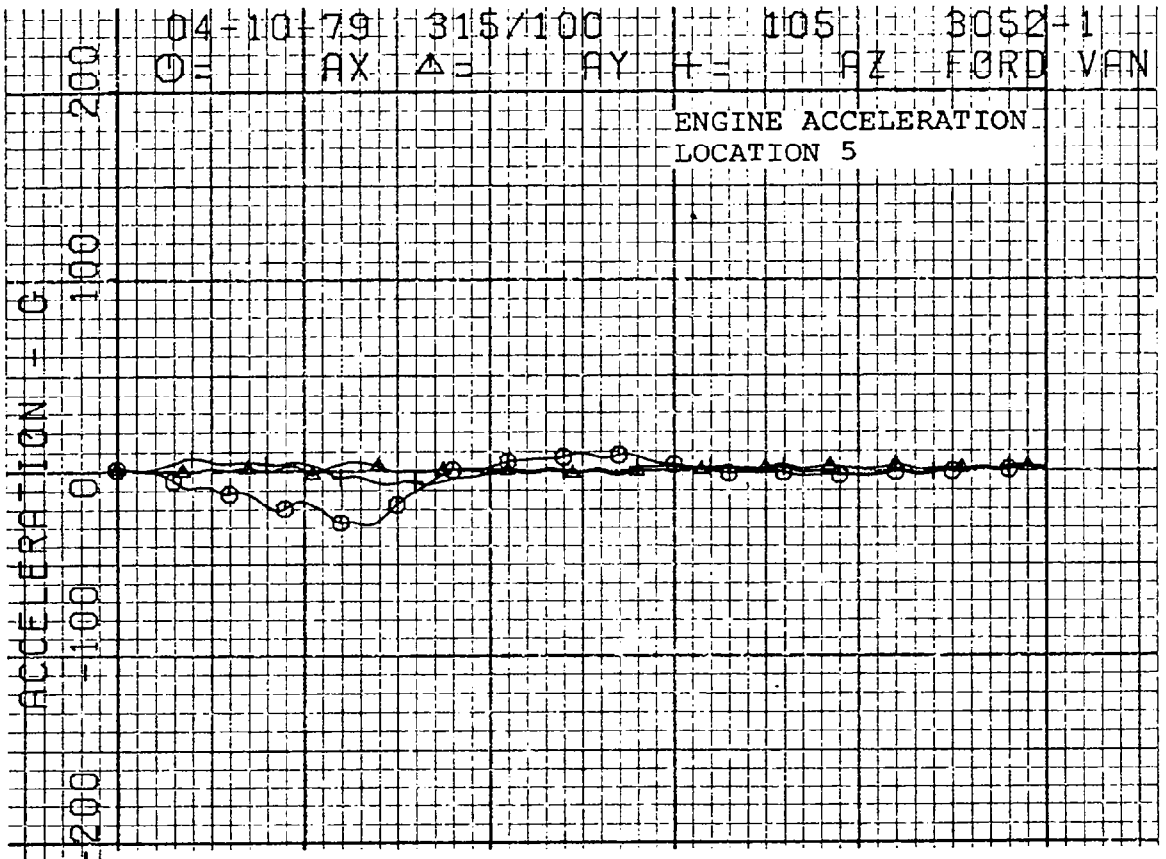
O= AX Δ= AY += AZ FORD VAN
RIGHT FIREWALL ACCELERATION
LOCATION 4
ACCELERATION - G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC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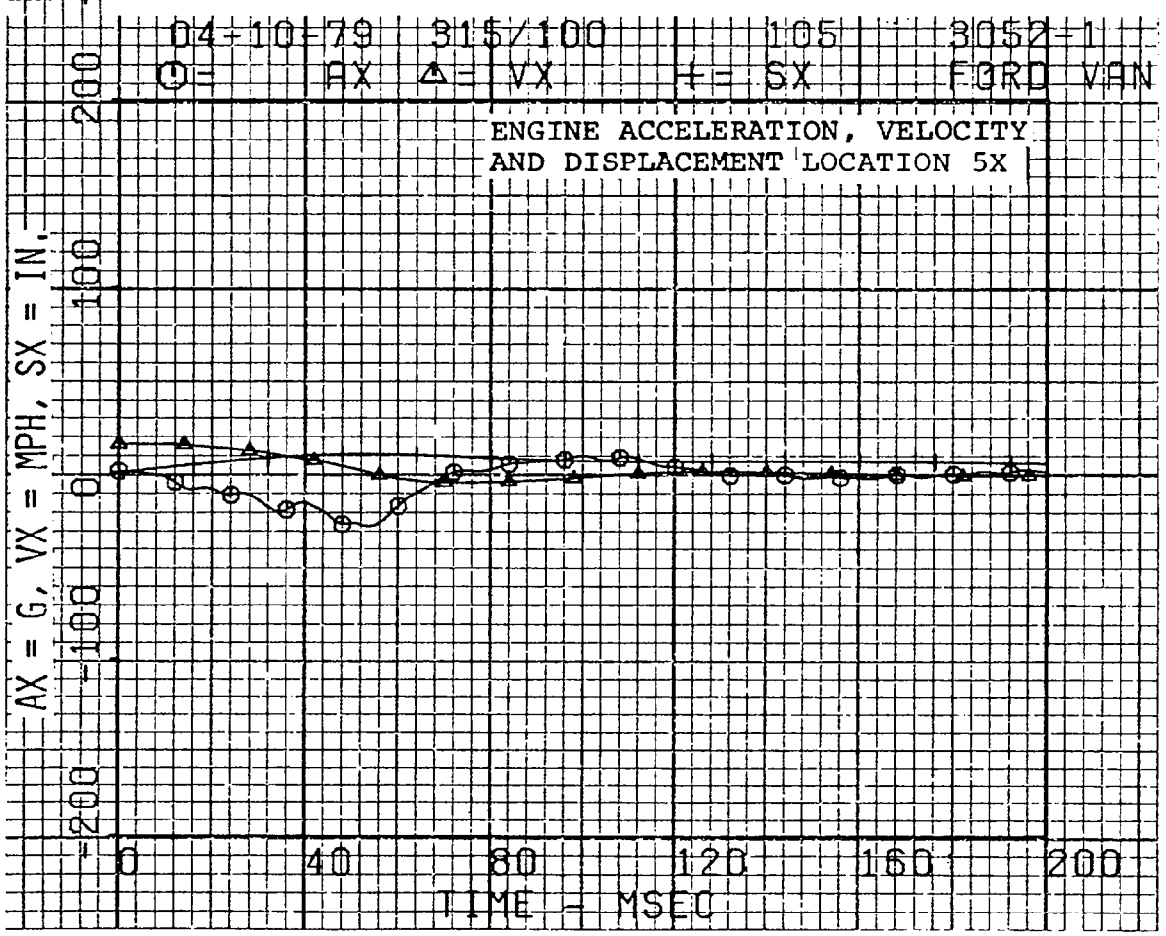
O= AX △= AY += AZ FORD VAN
ENGINE ACCELERATION
LOCATION 5
ACCELERATION = G
200
100
0
-100
-200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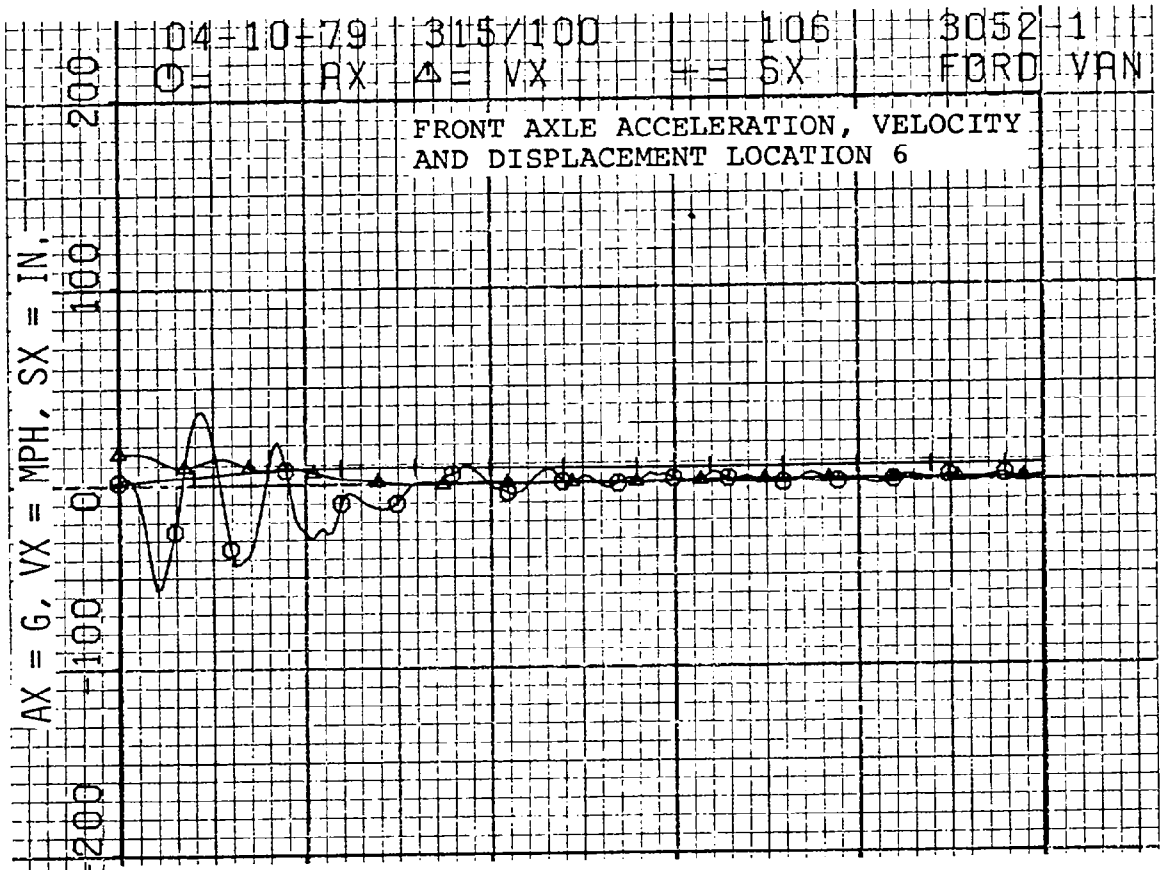
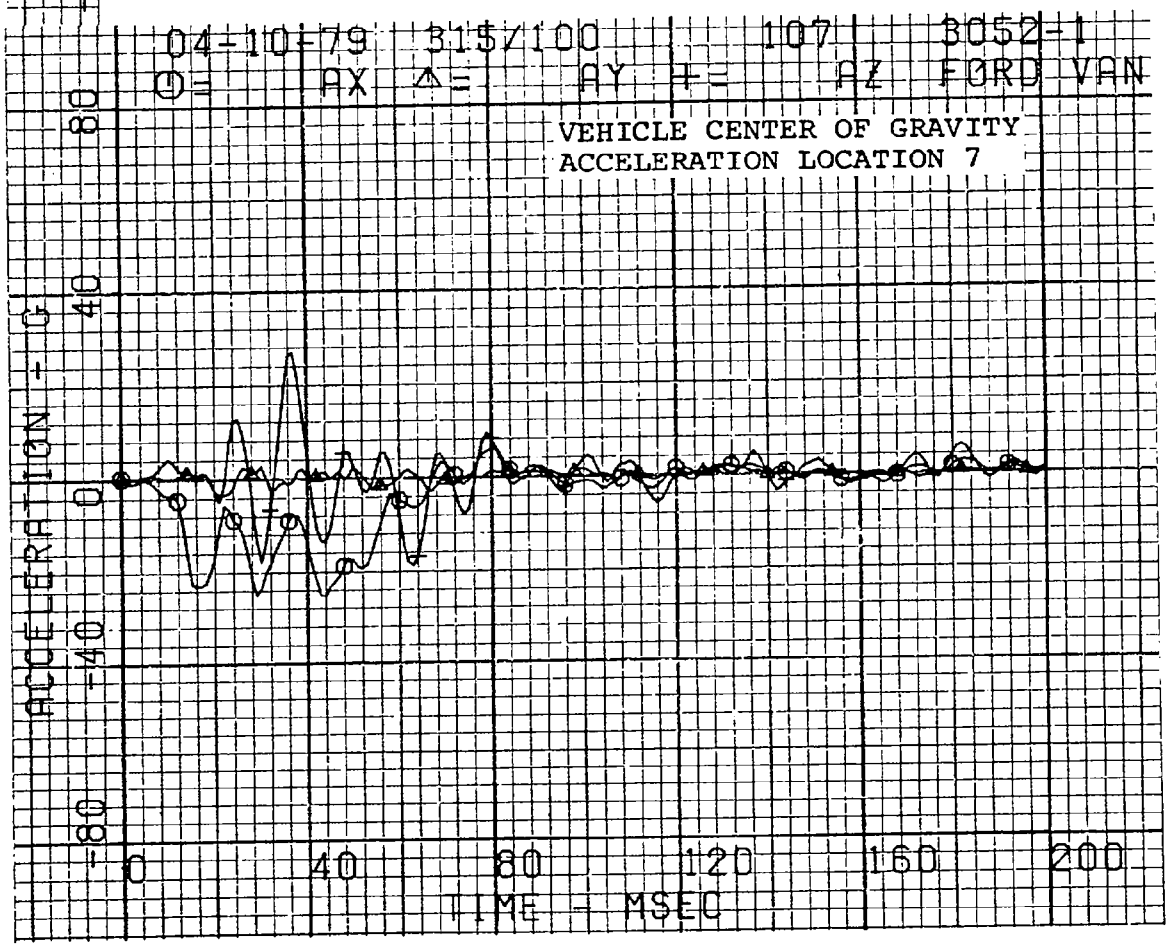
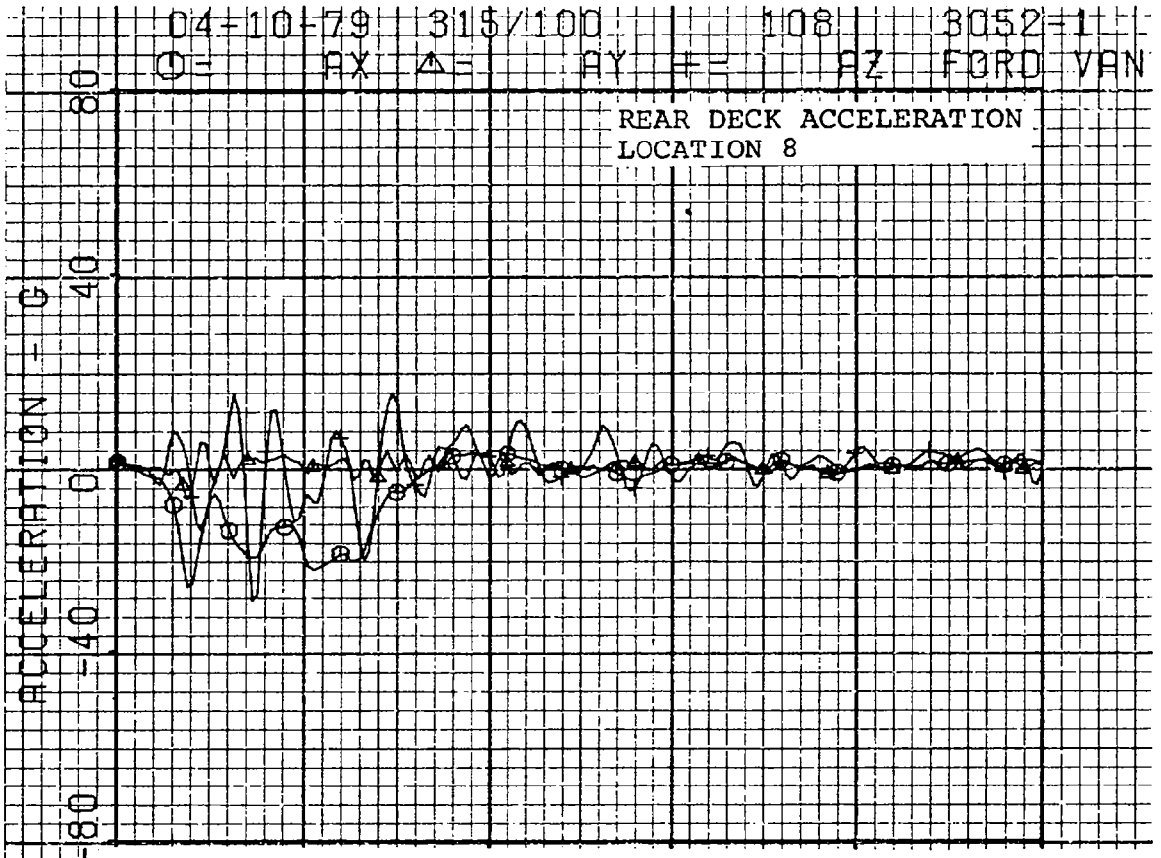
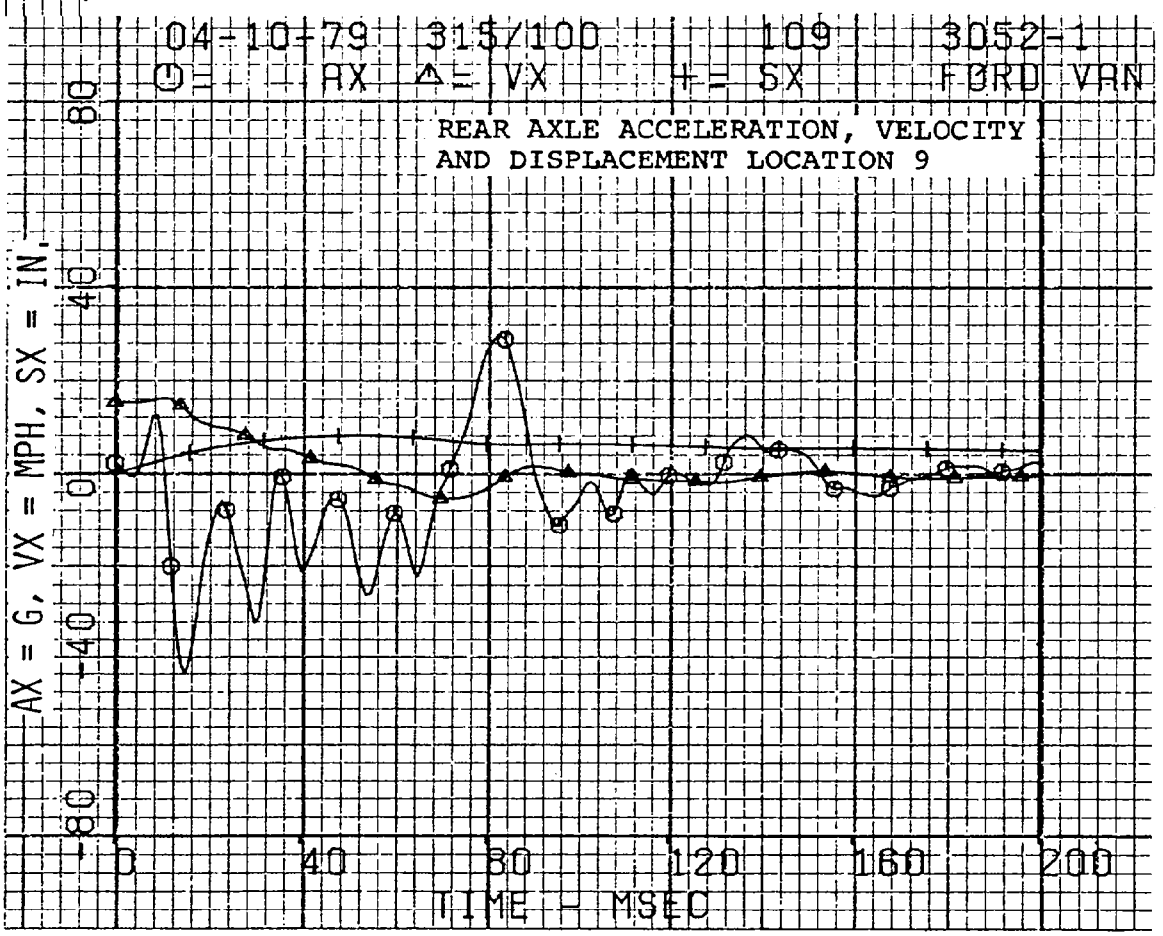
O= AX △= VX += SX FORD VAN
ENGINE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 5X
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200
0
40
80
120
160
200
TIME - MSEC


04-10-79 315/100 106 3052-1
O= AX Δ= VX + = SX FORD VAN
FRONT AXLE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 6
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200


04-10-79 315/100 107 3052-1
O= AX Δ= AY + = AZ FORD VAN
VEHICLE CENTER OF GRAVITY
ACCELERATION LOCATION 7
ACCELERATION - G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC


04-10-79 315/100 108 3052-1
O= AX Δ= AY += AZ FORD VAN
REAR DECK ACCELERATION
LOCATION 8
ACCELERATION - G
80
40
0
-40
-80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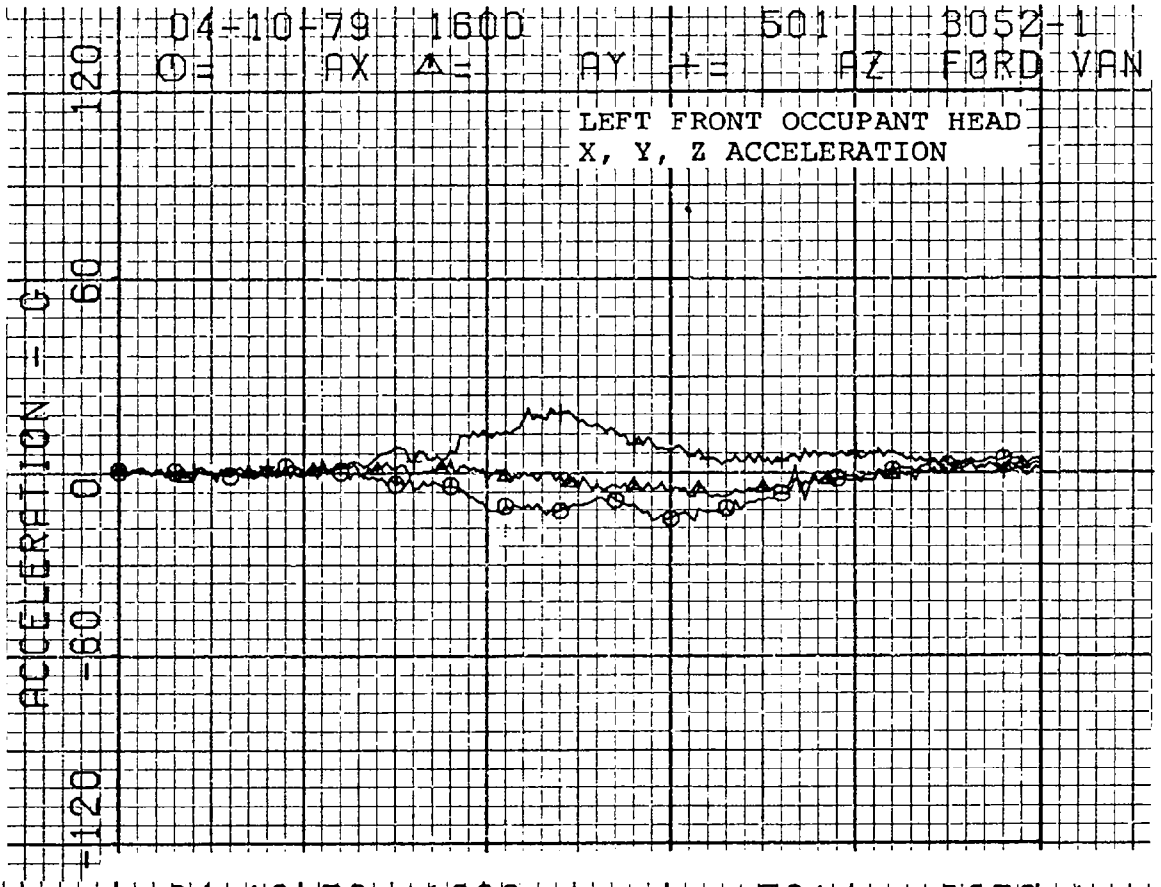
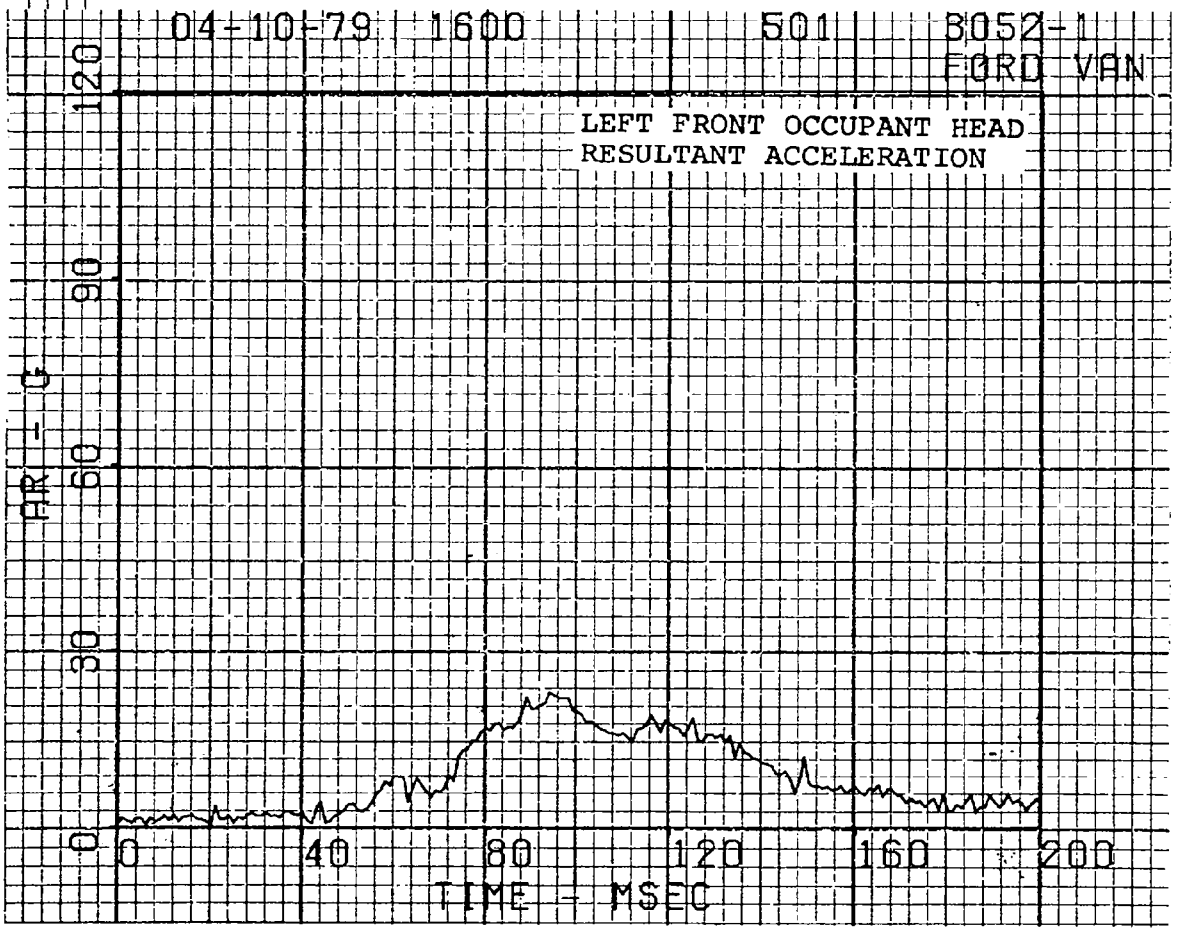
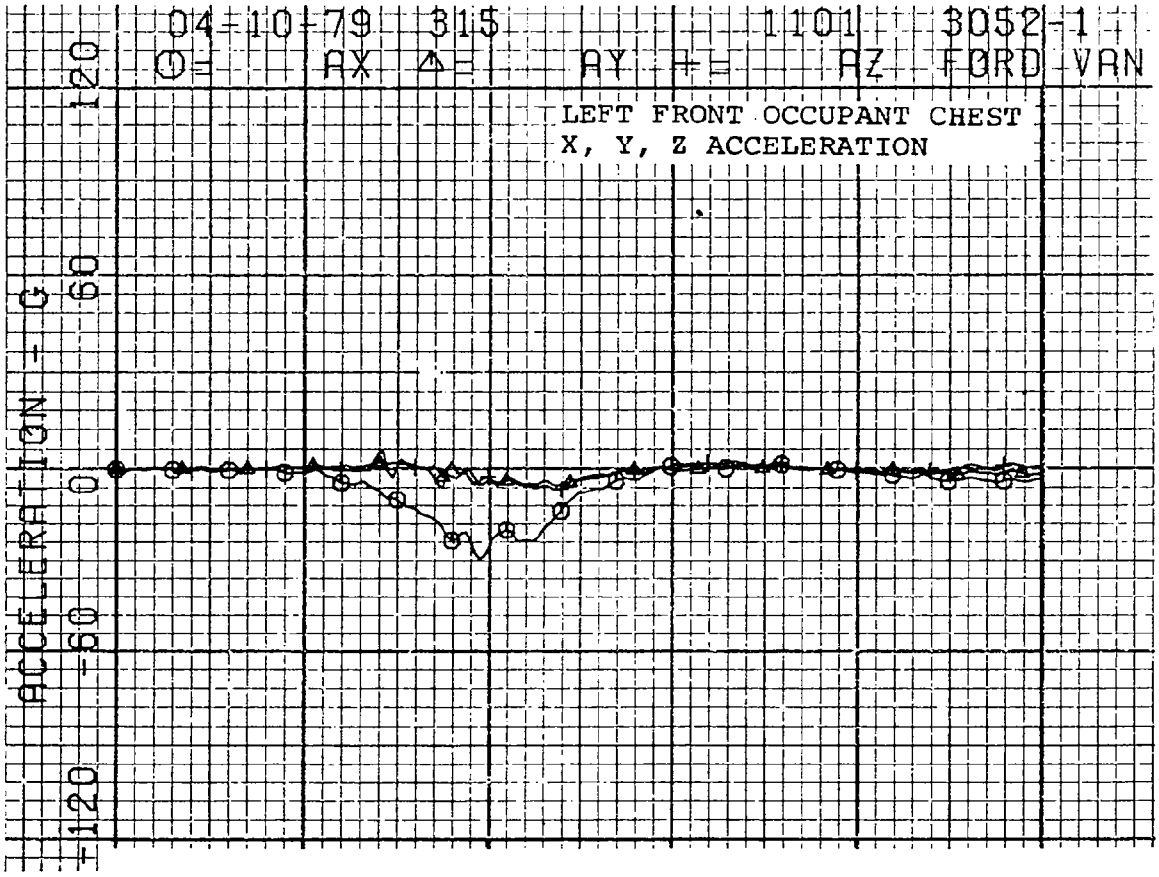
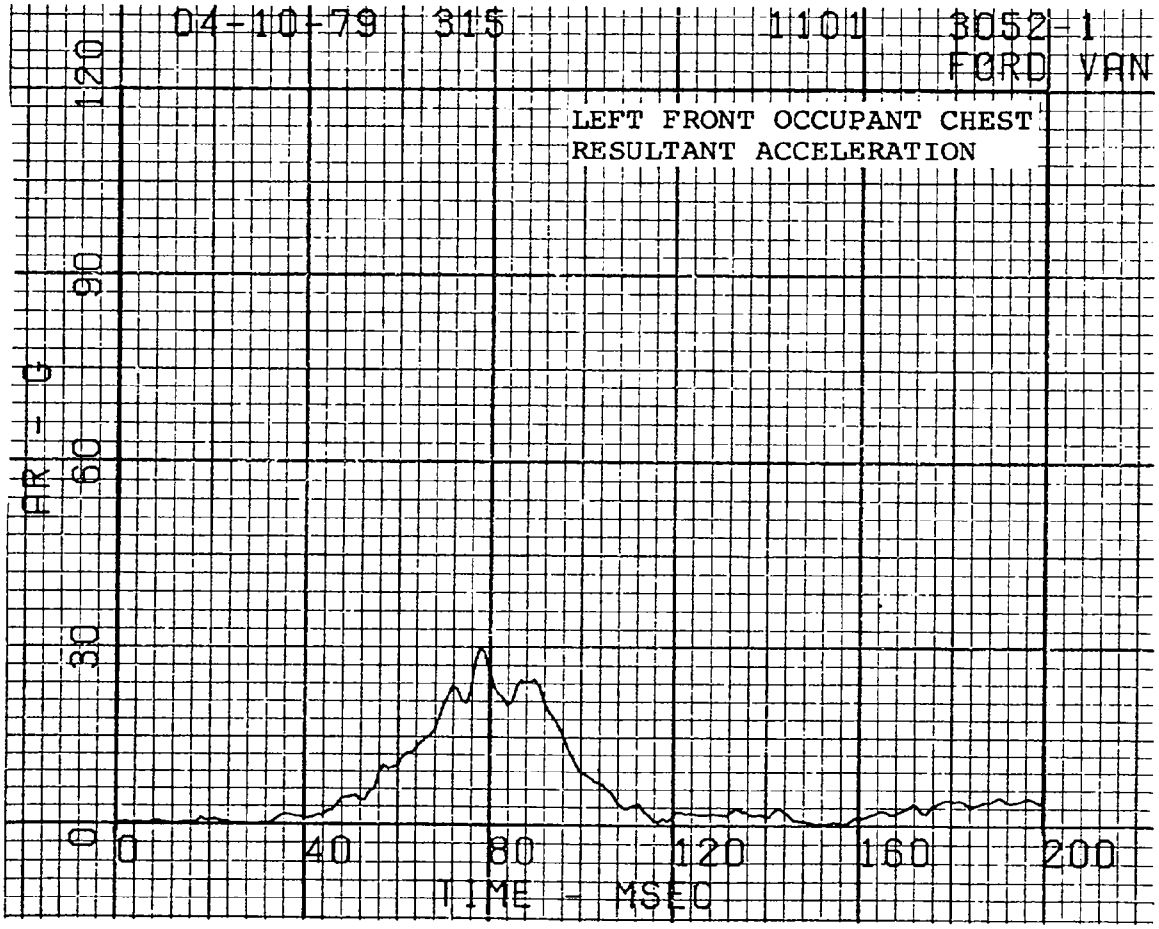
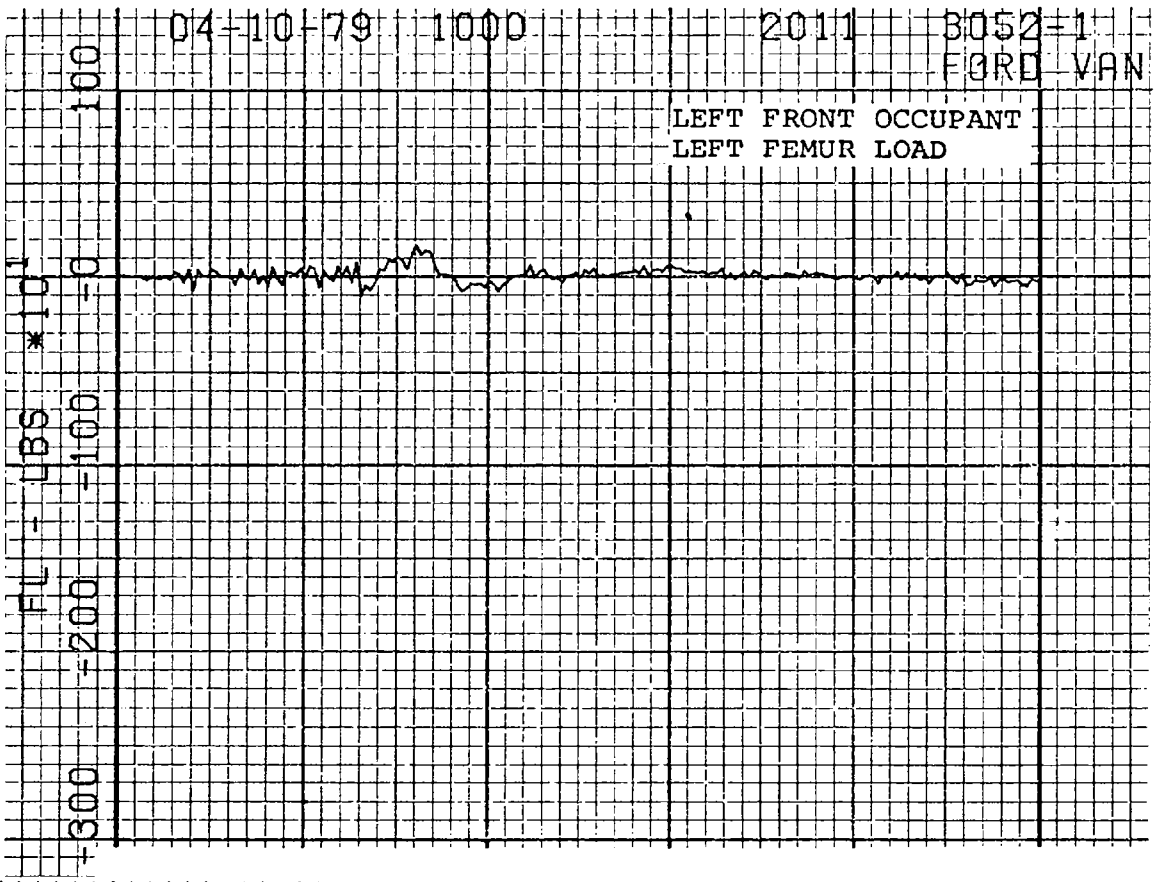
O= AX Δ= VX += SX FORD VAN
REAR AXLE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 9
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC


04-10-79 1600 501 3052-1
O= AX △= AY += AZ FORD VAN
LEFT FRONT OCCUPANT HEAD
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120


04-10-79 1600 501 3052-1
FORD VAN
LEFT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC


04-10-79 315 1101 3052-1
AX AY AZ FORD VAN
LEFT FRONT OCCUPANT CHEST
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120


04-10-79 315 1101 3052-1
FORD VAN
LEFT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC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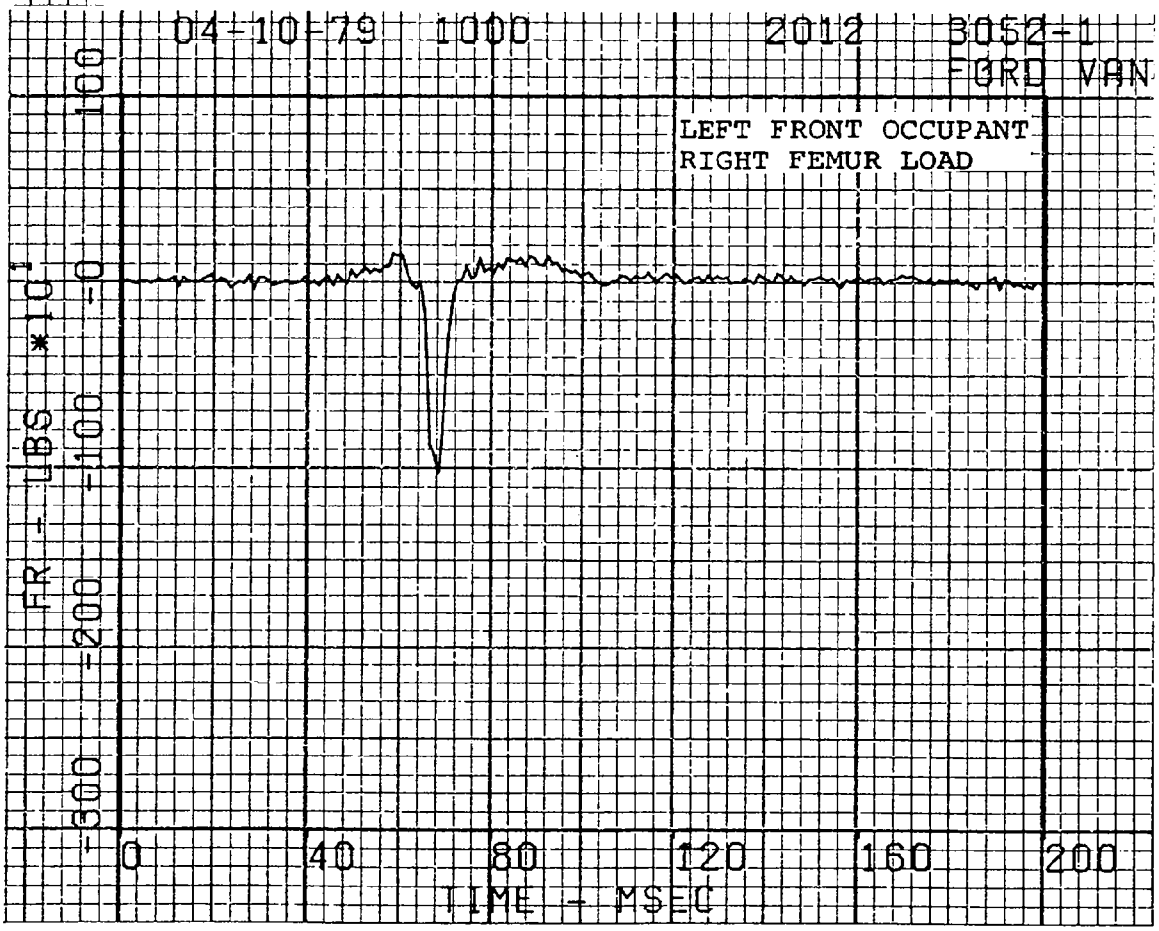
FORD VAN
LEFT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10¹
100
0
-100
-200
-300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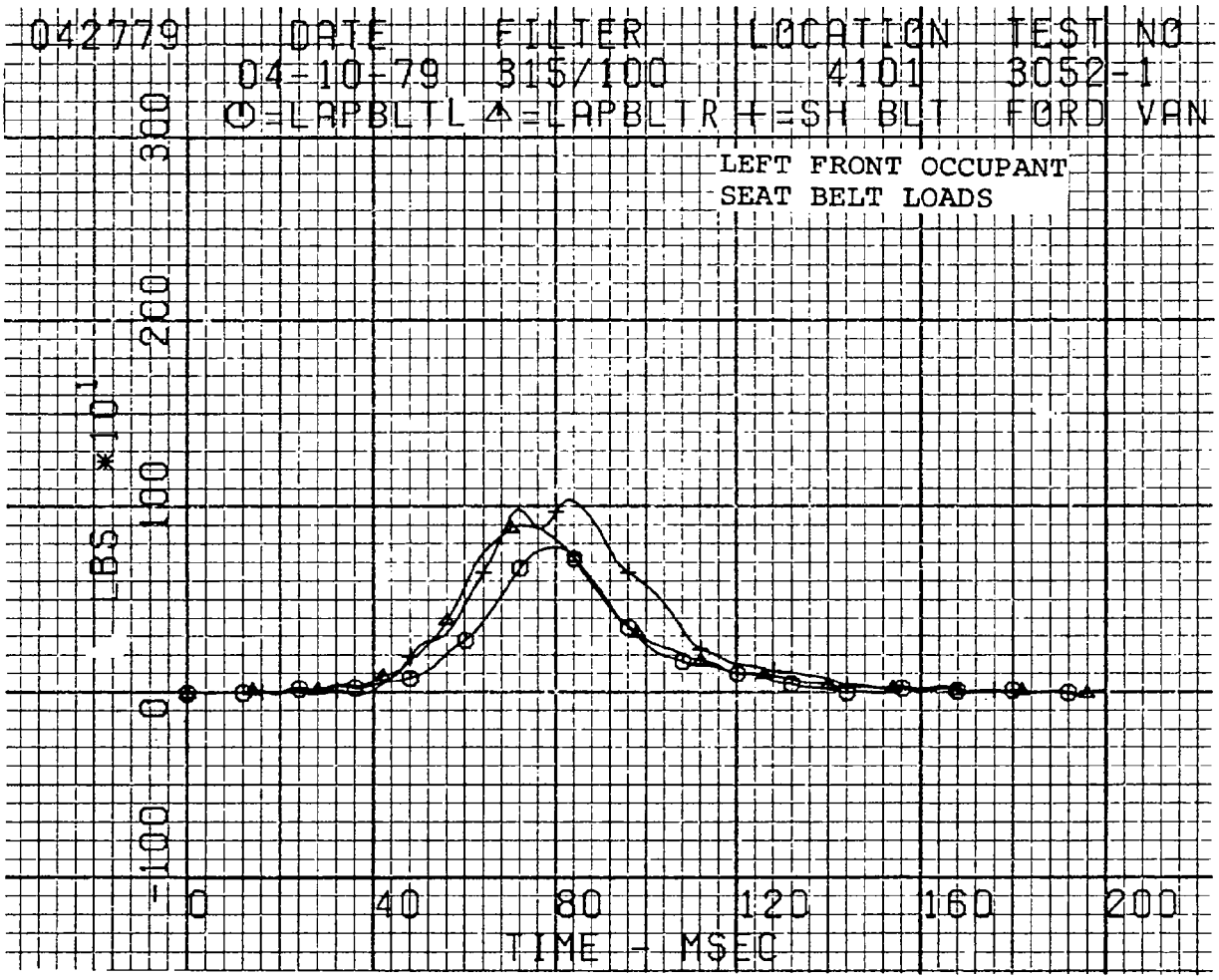
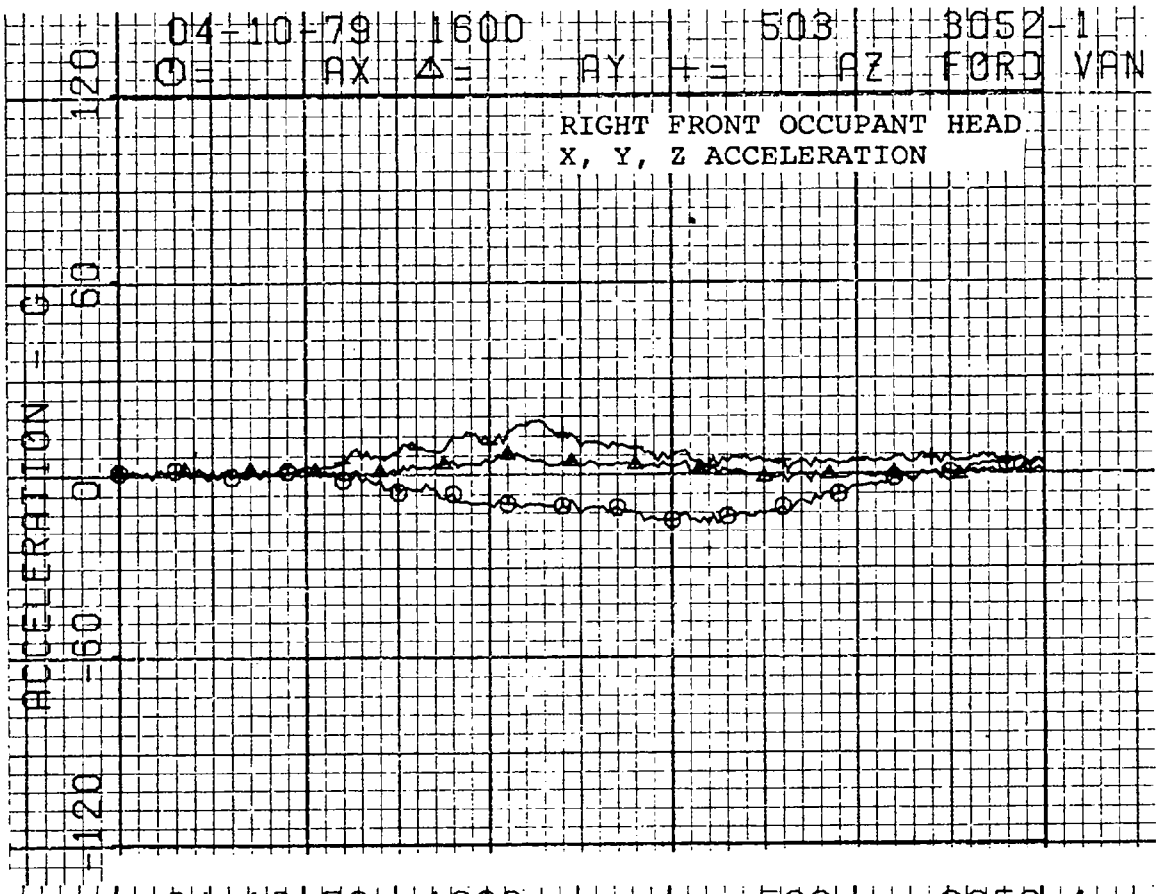
FORD VAN
LEFT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10¹
100
0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC


042779
DATE
04-10-79
FILTER
315/100
LOCATION
4101
TEST NO
3052-1
O=LAPBLTL △=LAPBLTR +=SH BLT
FORD VAN
LEFT FRONT OCCUPANT
SEAT BELT LOADS
LBS *10
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC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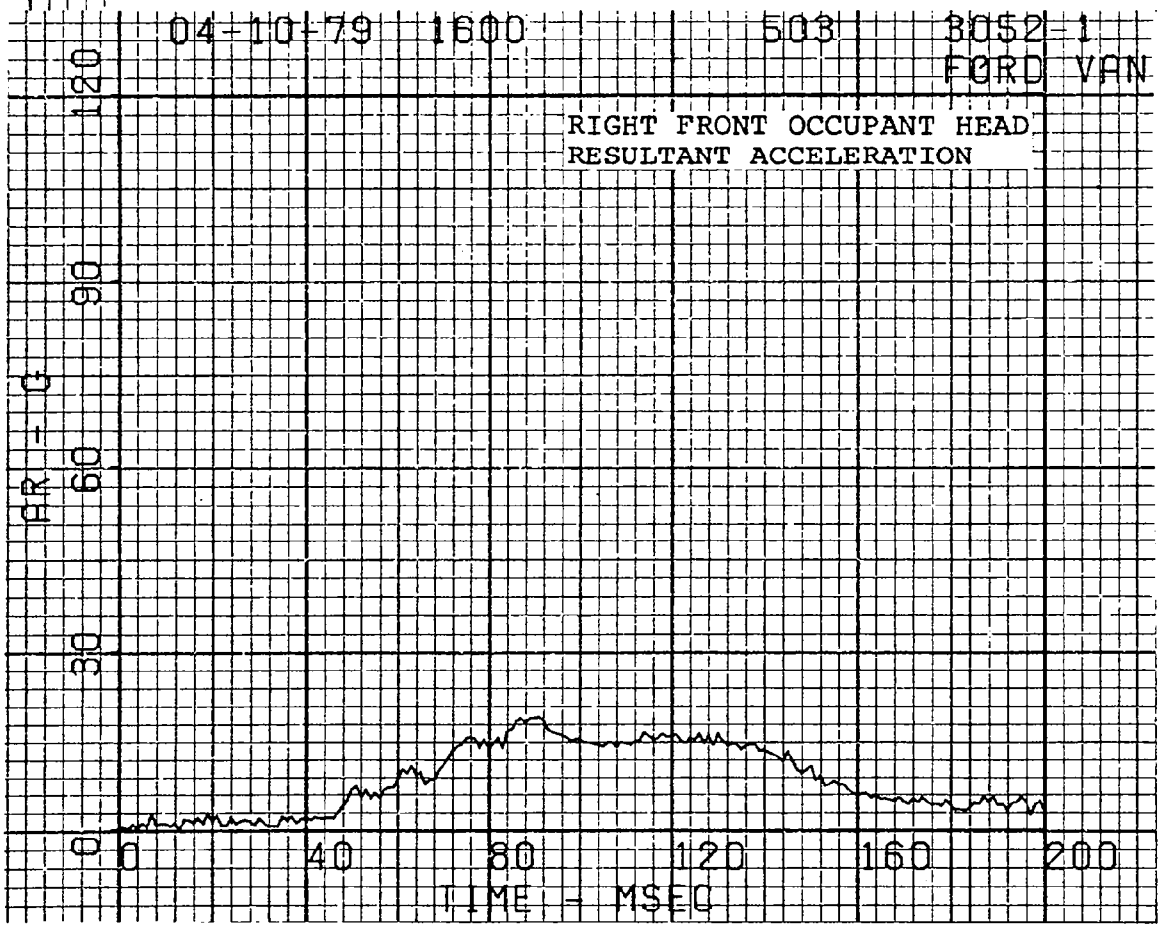
⊖= AX △= AY += AZ FORD VAN
RIGHT FRONT OCCUPANT HEAD
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120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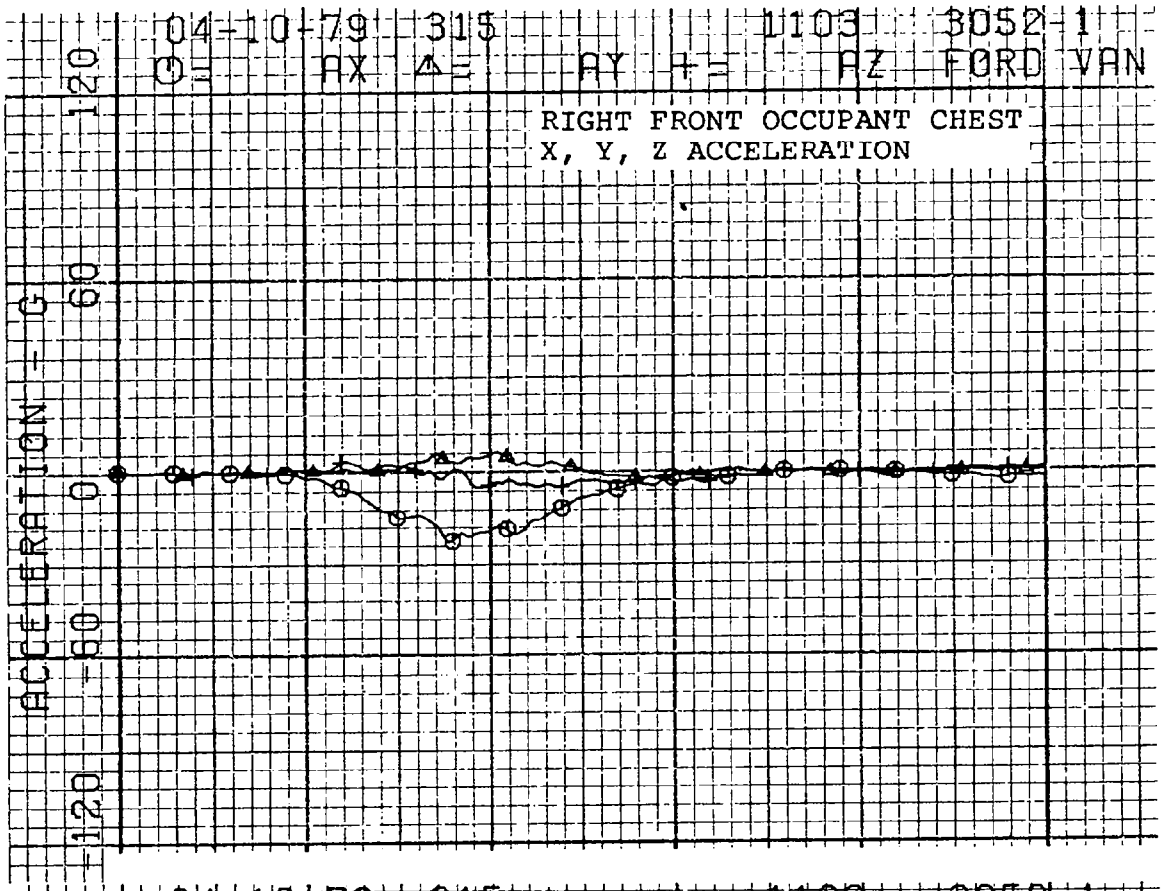
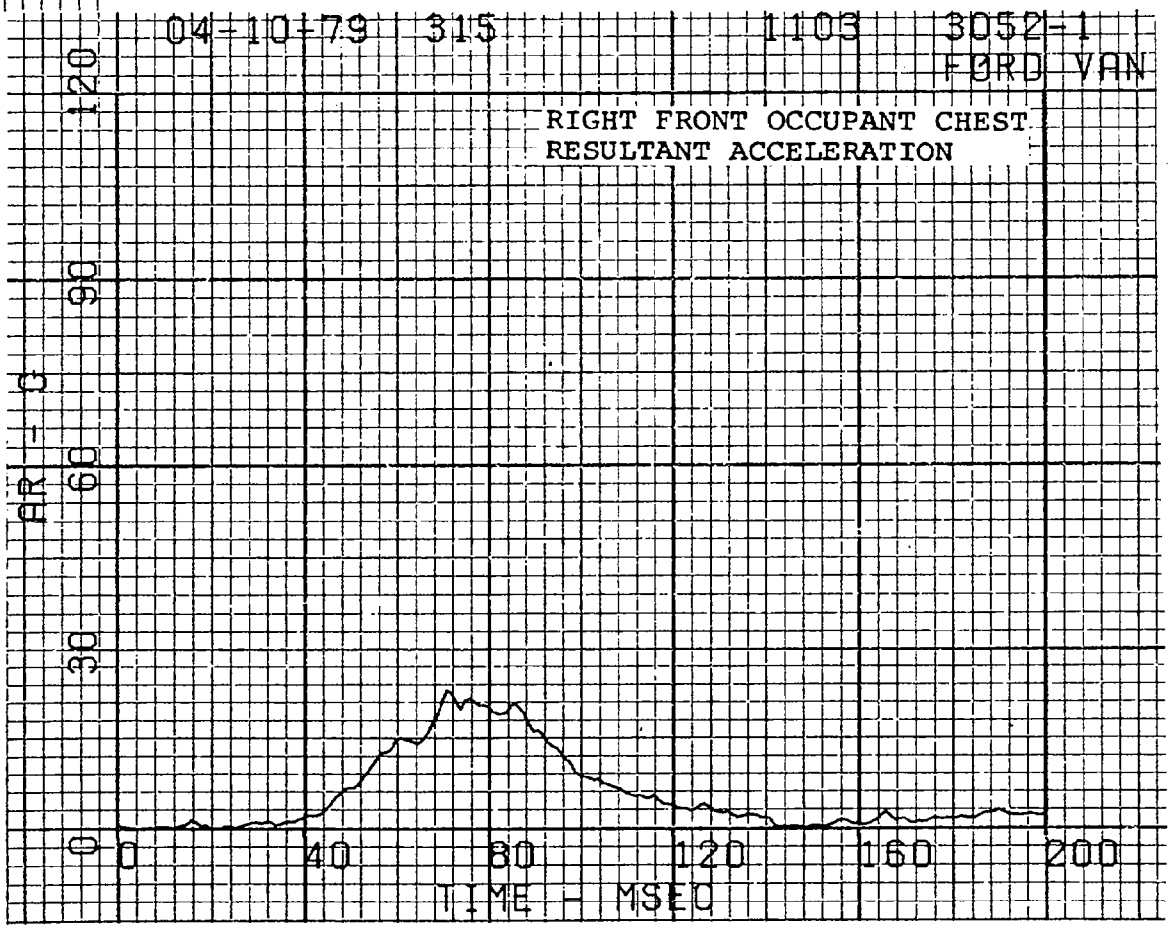
FORD VAN
RIGHT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC


04-10-79 315 1103 3052-1
O= AX Δ= AY += AZ FORD VAN
RIGHT FRONT OCCUPANT CHEST
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120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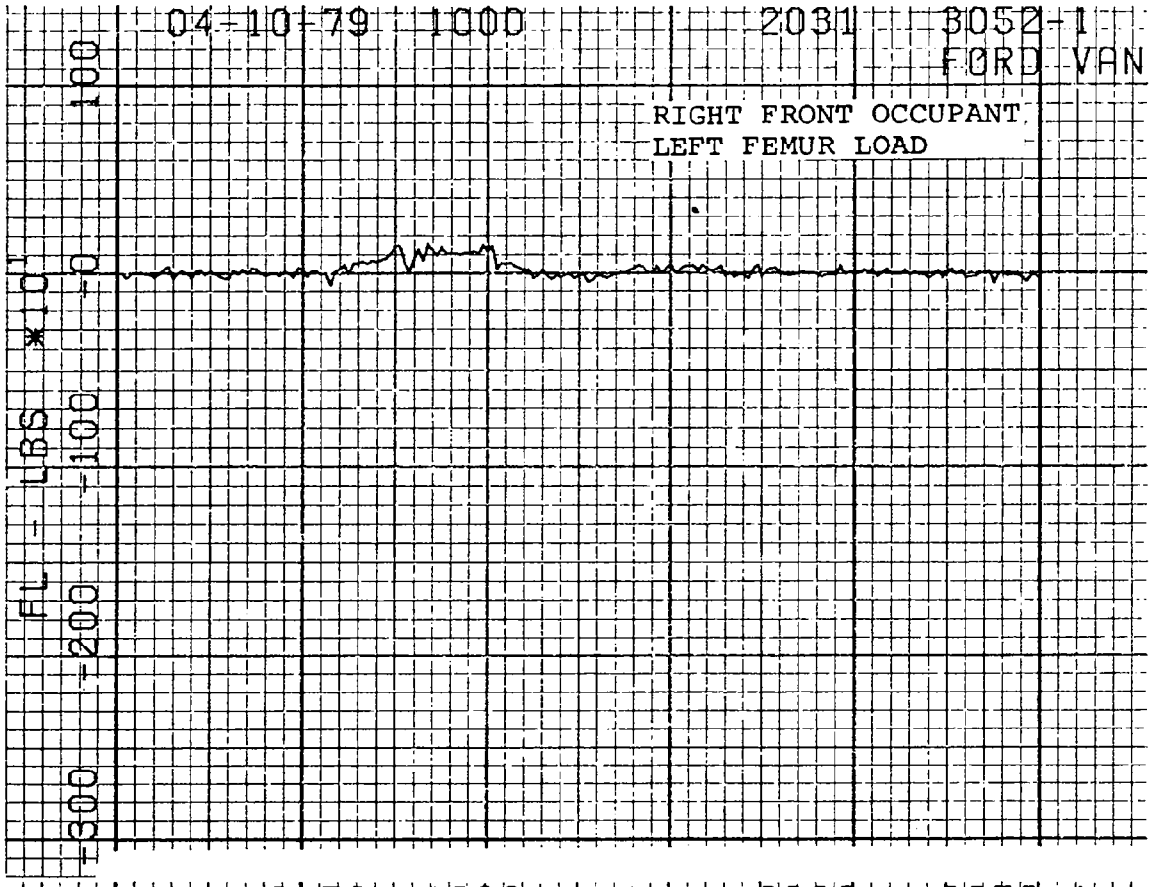
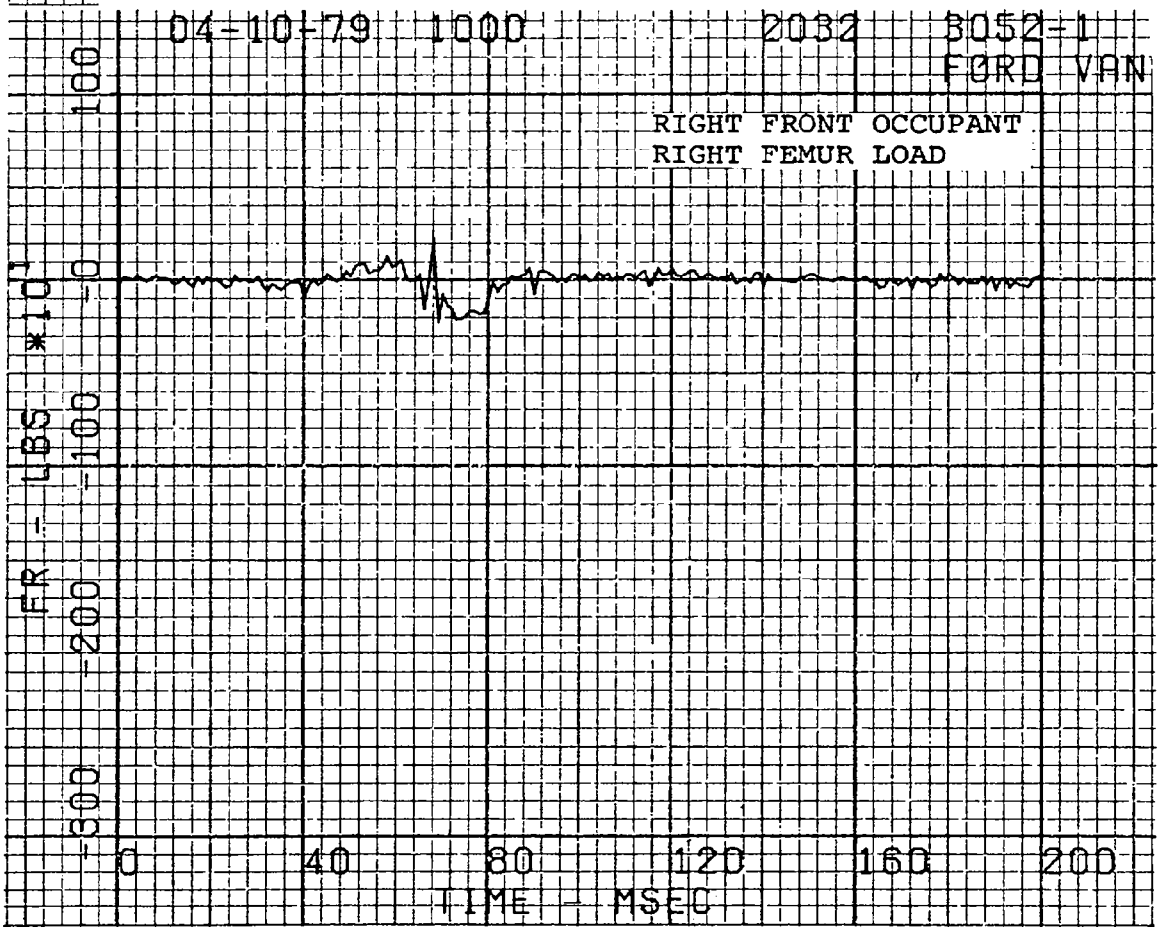
FORD VAN
RIGHT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC


04-10-79 1000 2031 3052-1
FORD VAN
RIGHT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
0
-100
-200
-300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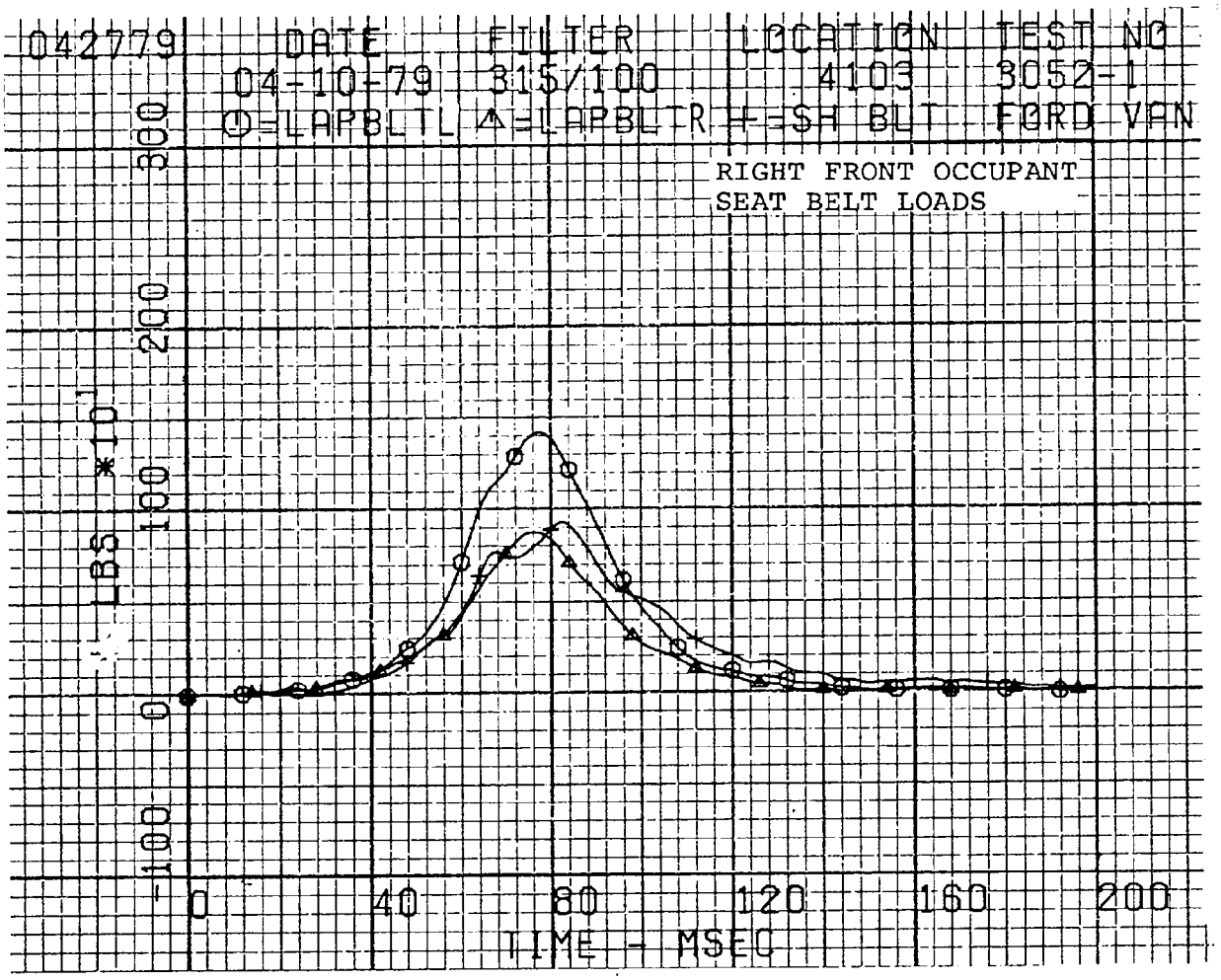
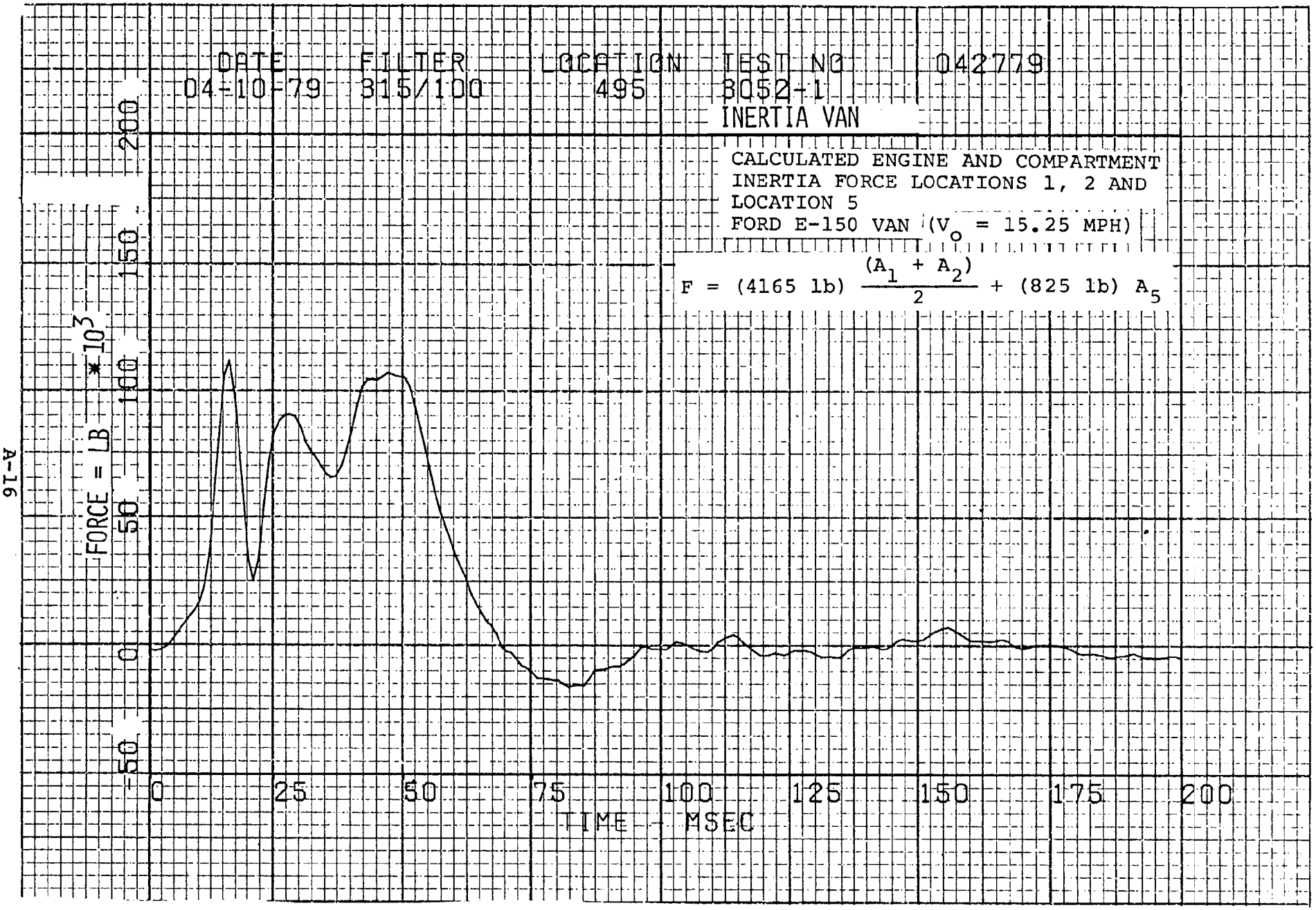
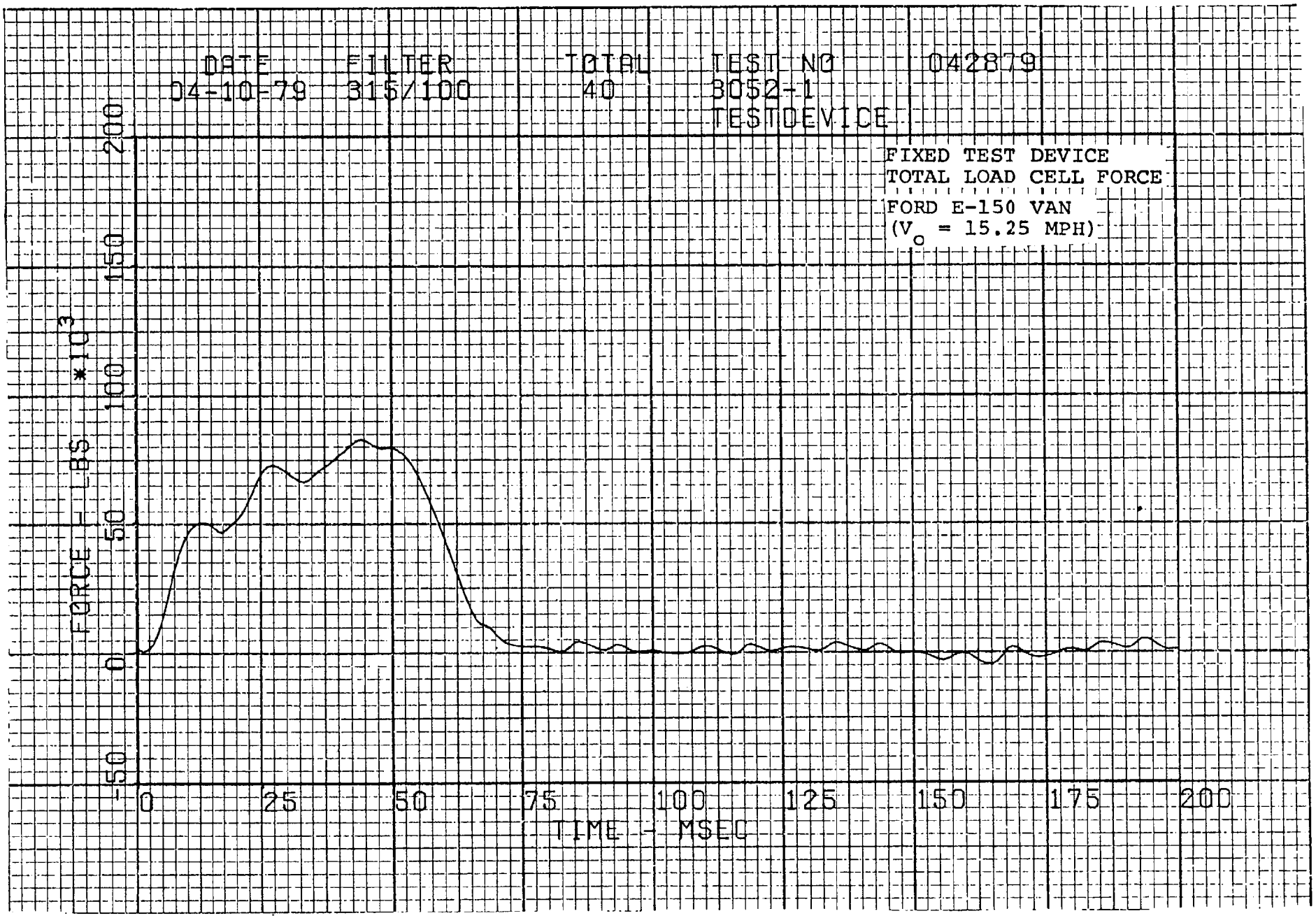
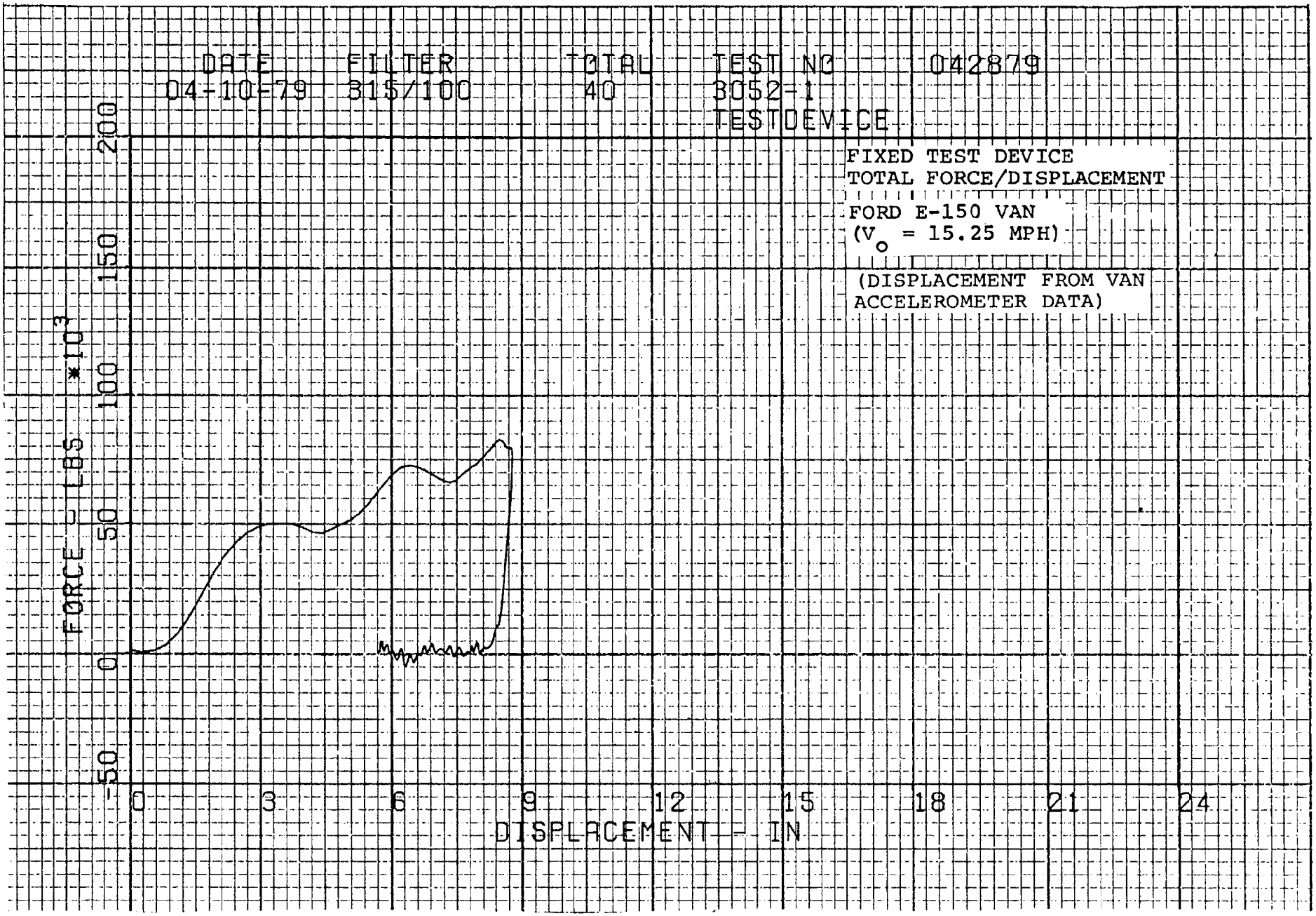
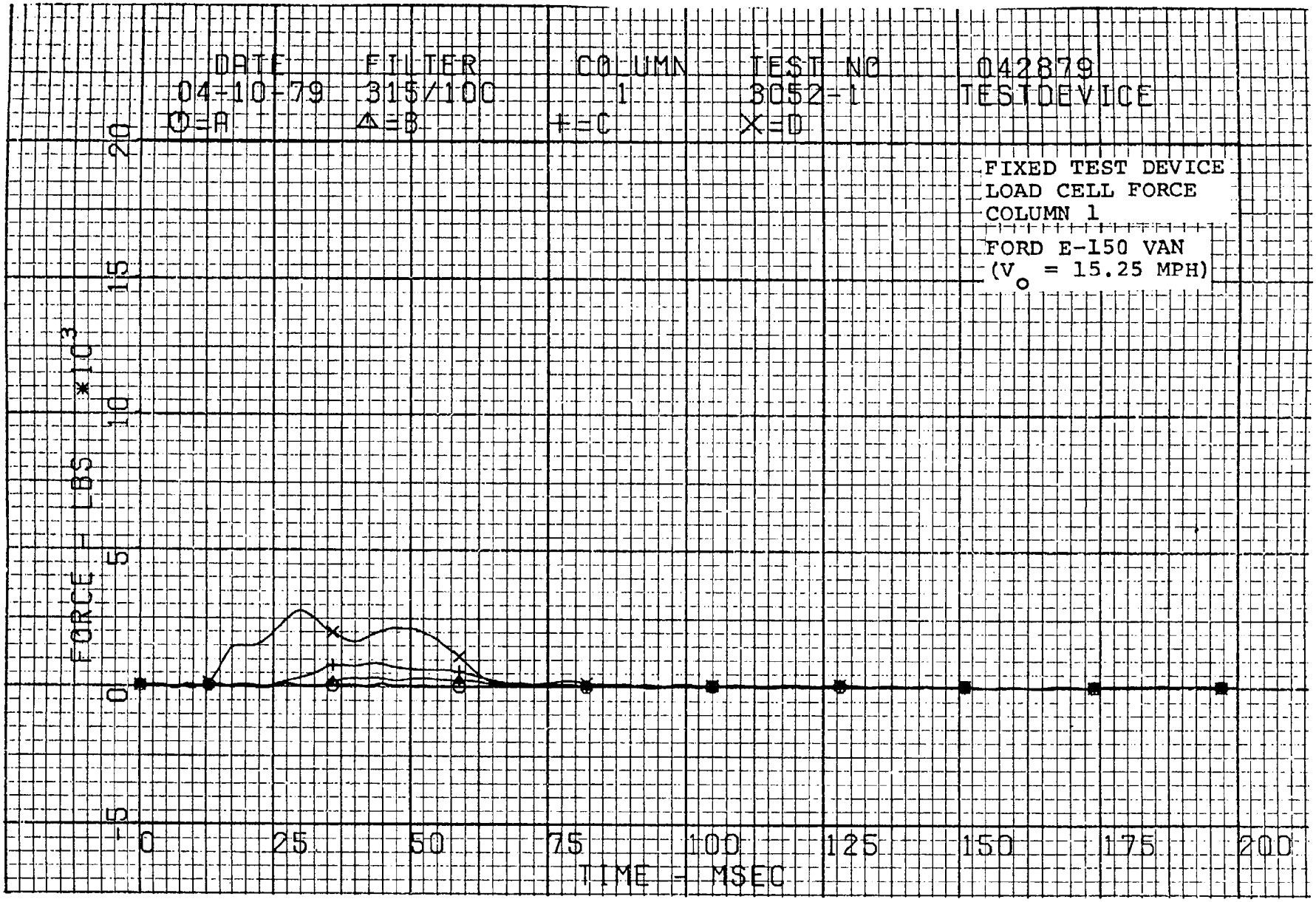
FORD VAN
RIGHT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

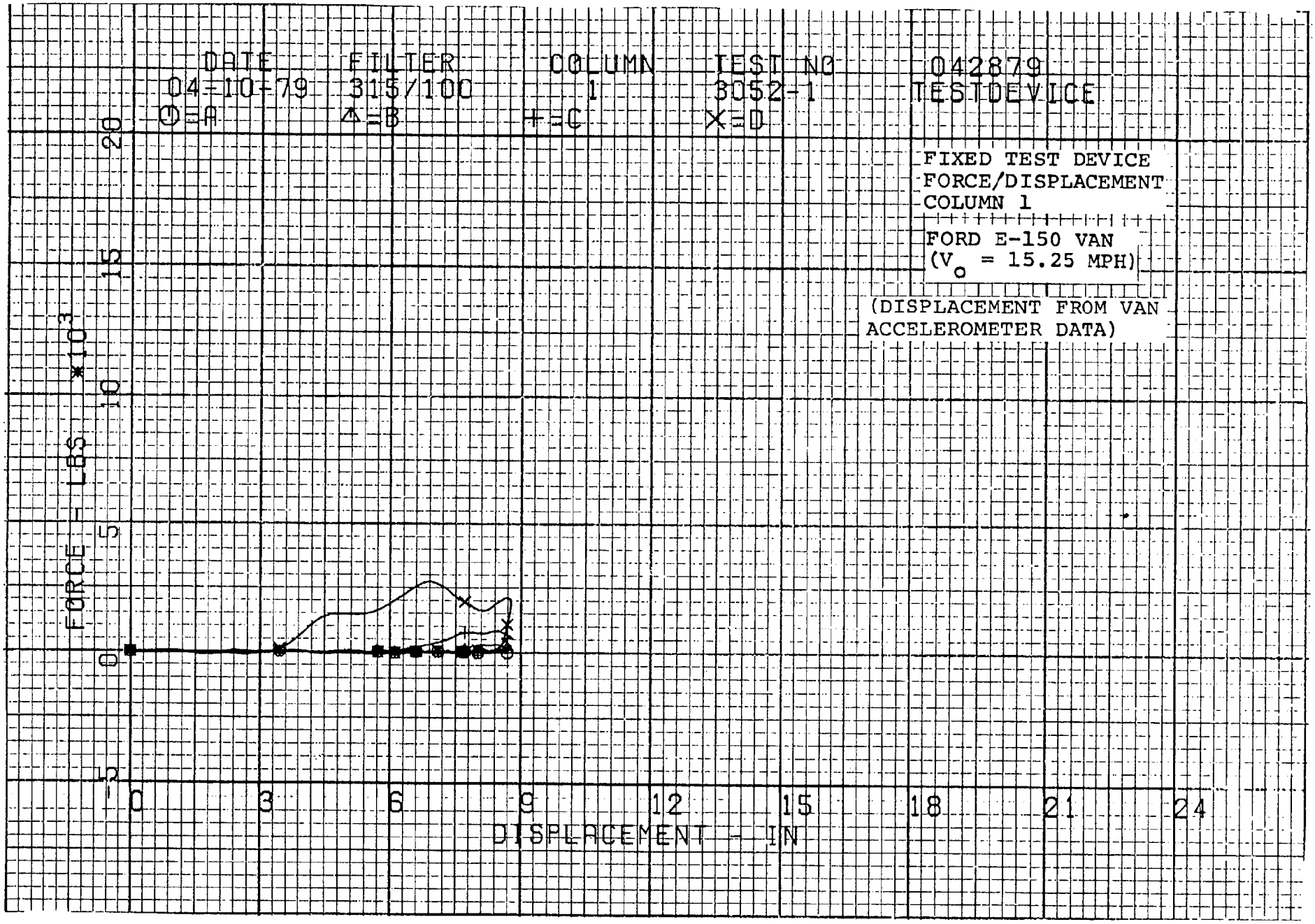

042779
DATE
04-10-79
FILTER
315/100
LOCATION
4103
TEST NO
3052-1
O=LAPBLTL ▲=LAPBLTR +=SH BLT
FORD VAN
RIGHT FRONT OCCUPANT
SEAT BELT LOADS
LBS *10
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC

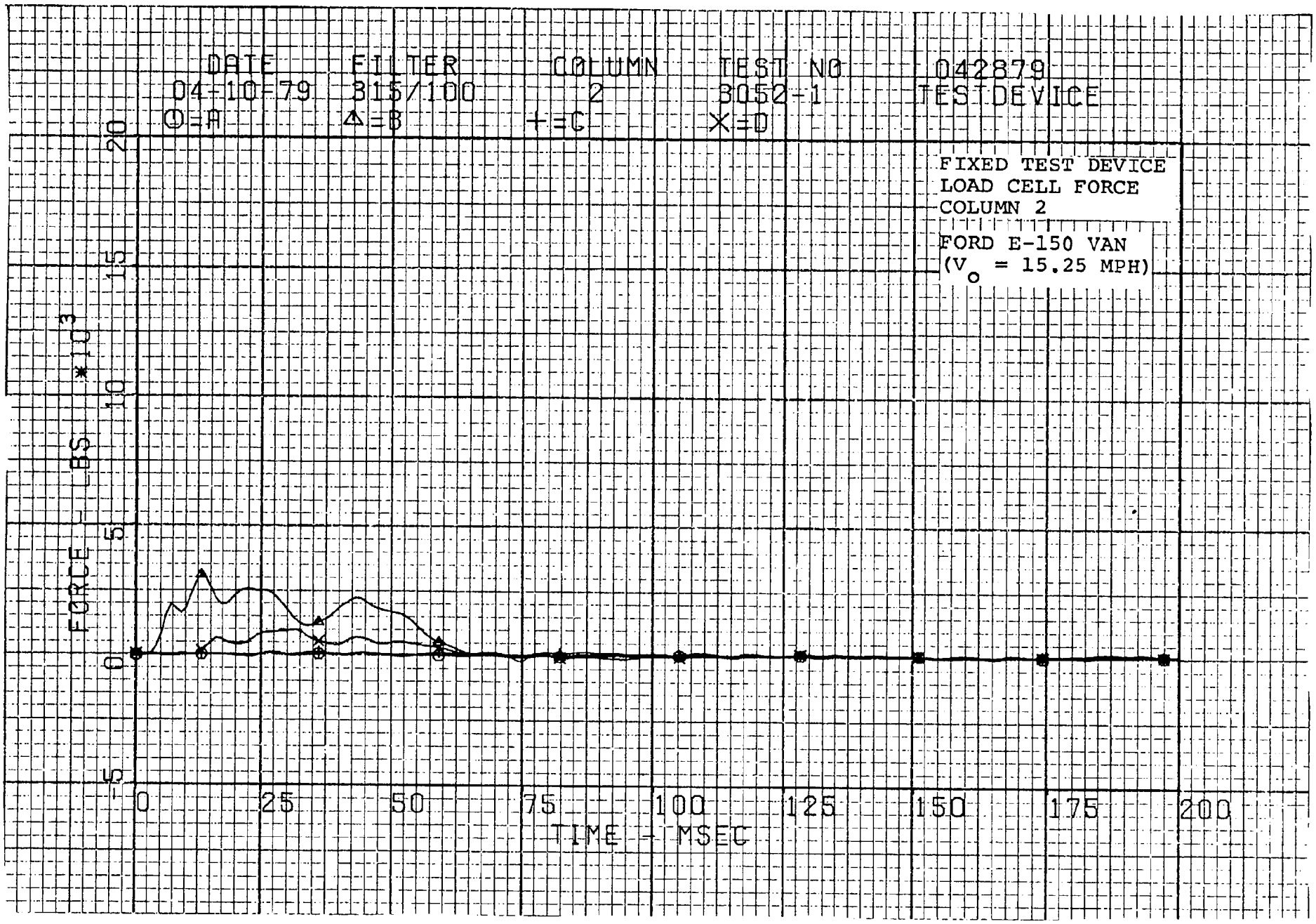

DATE
04-10-79
FILTER
315/100
LOCATION
495
TEST NO
3052-1
042779
INERTIA VAN
CALCULATED ENGINE AND COMPARTMENT
INERTIA FORCE LOCATIONS 1, 2 AND
LOCATION 5
FORD E-150 VAN (V_o = 15.25 MPH)
$F = (4165\ lb)\ \frac{(A_1 + A_2)}{2} + (825\ lb)\ A_5$
FORCE = LB * 10^3
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME - MSEC

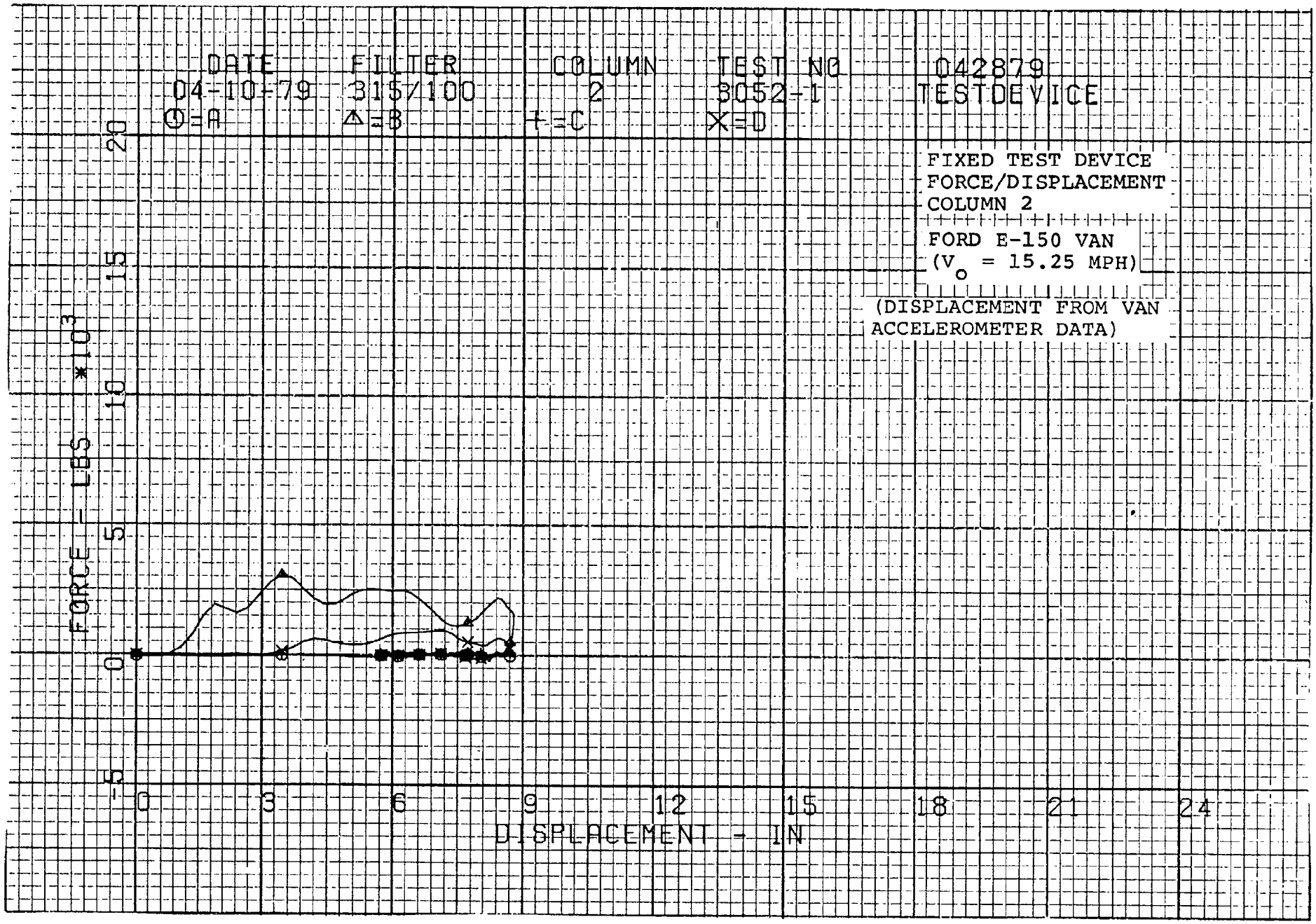

DATE
04-10-79
FILTER
315/100
TOTAL
40
TEST NO
3052-1
TESTDEVICE
042879
FIXED TEST DEVICE
TOTAL LOAD CELL FORCE
FORD E-150 VAN
(V_o = 15.25 MPH)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME - MSEC

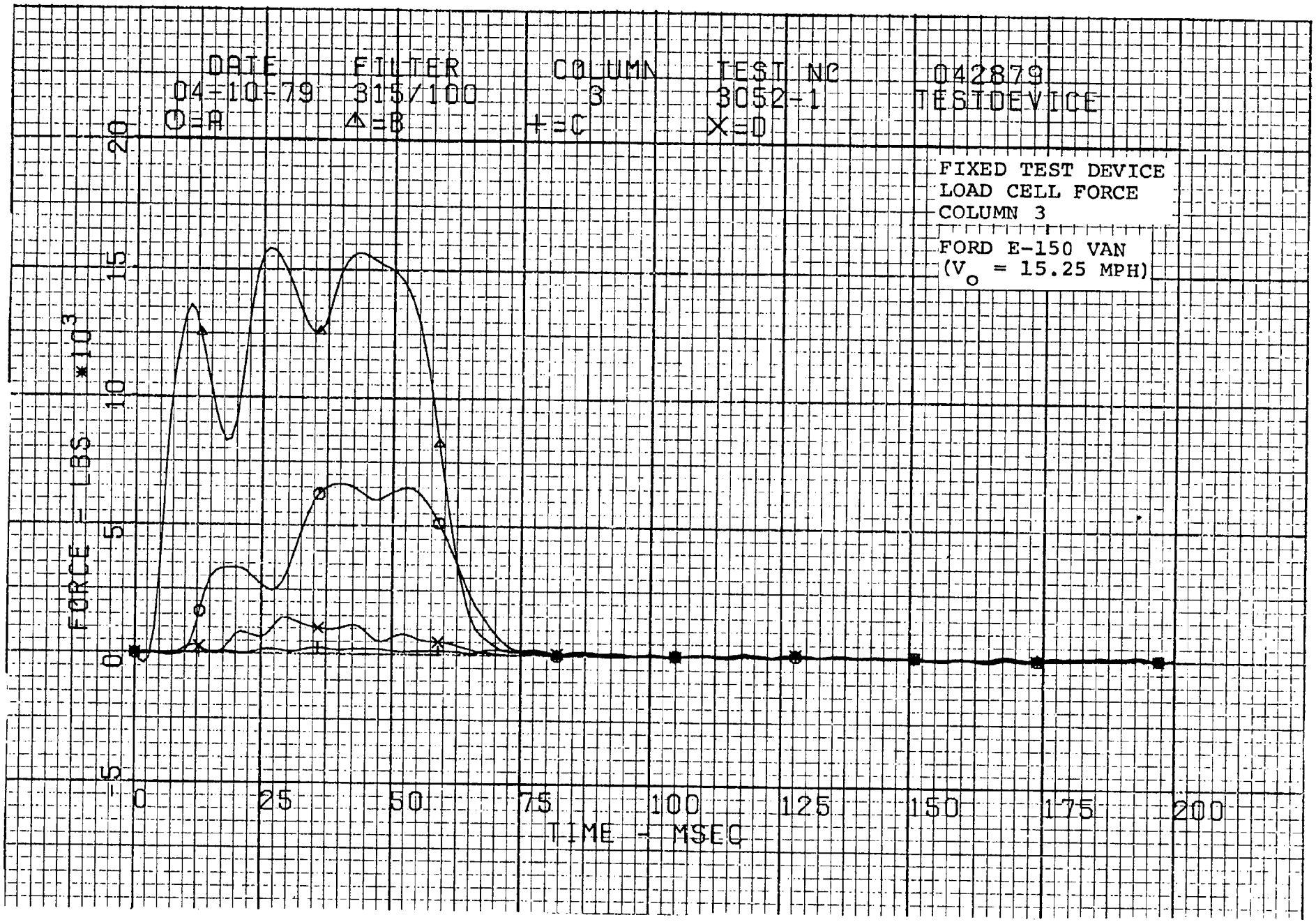

DATE
04-10-79
FILTER
315/100
TOTAL
40
TEST NO
3052-1
TESTDEVICE
042879
FIXED TEST DEVICE
TOTAL FORCE/DISPLACEMENT
FORD E-150 VAN
(V o = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10 3
-50
0
50
100
150
200
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

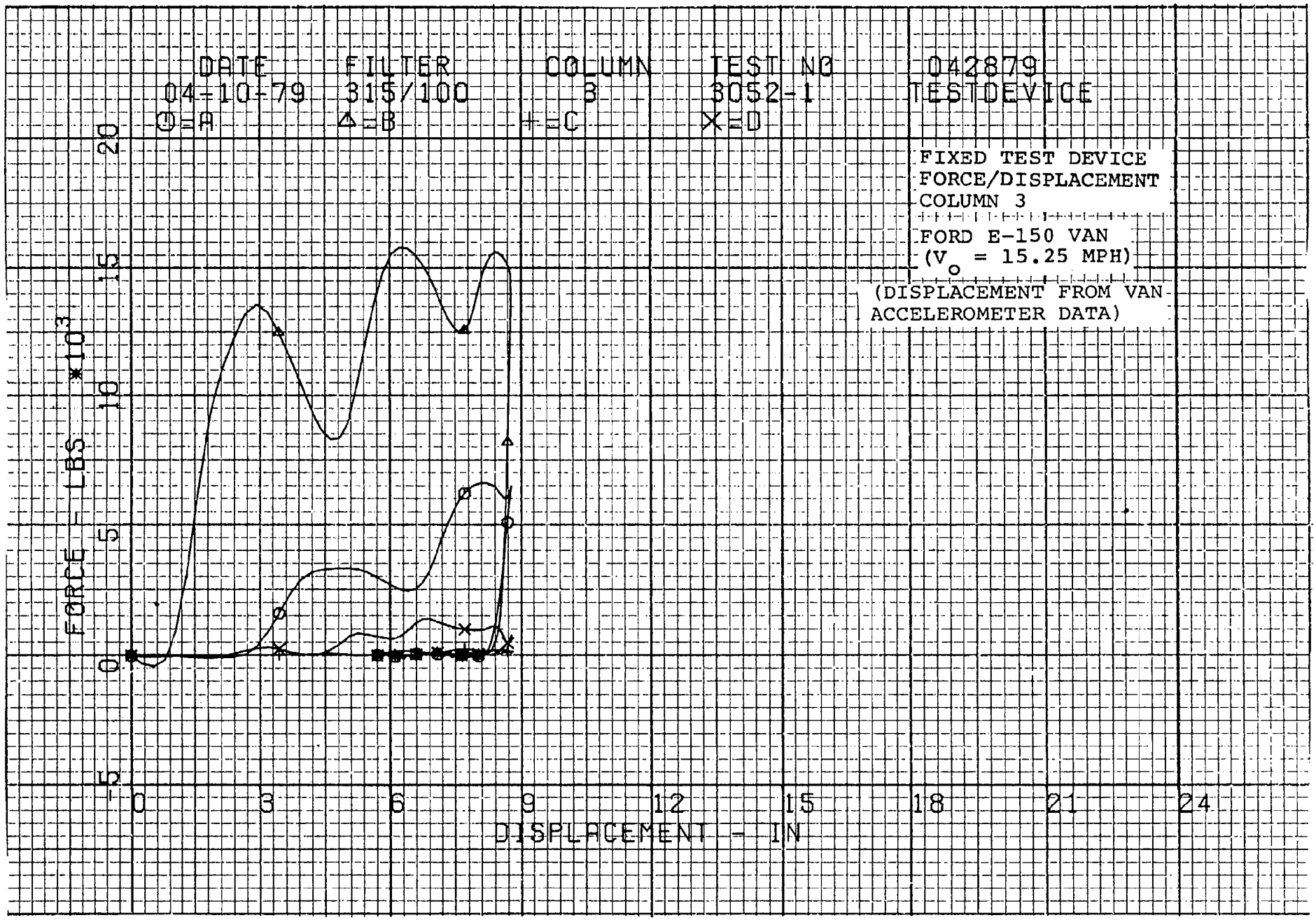

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
1
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 1
FORD E-150 VAN
(V o = 15.25 MPH)
FORCE - LBS *10 3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

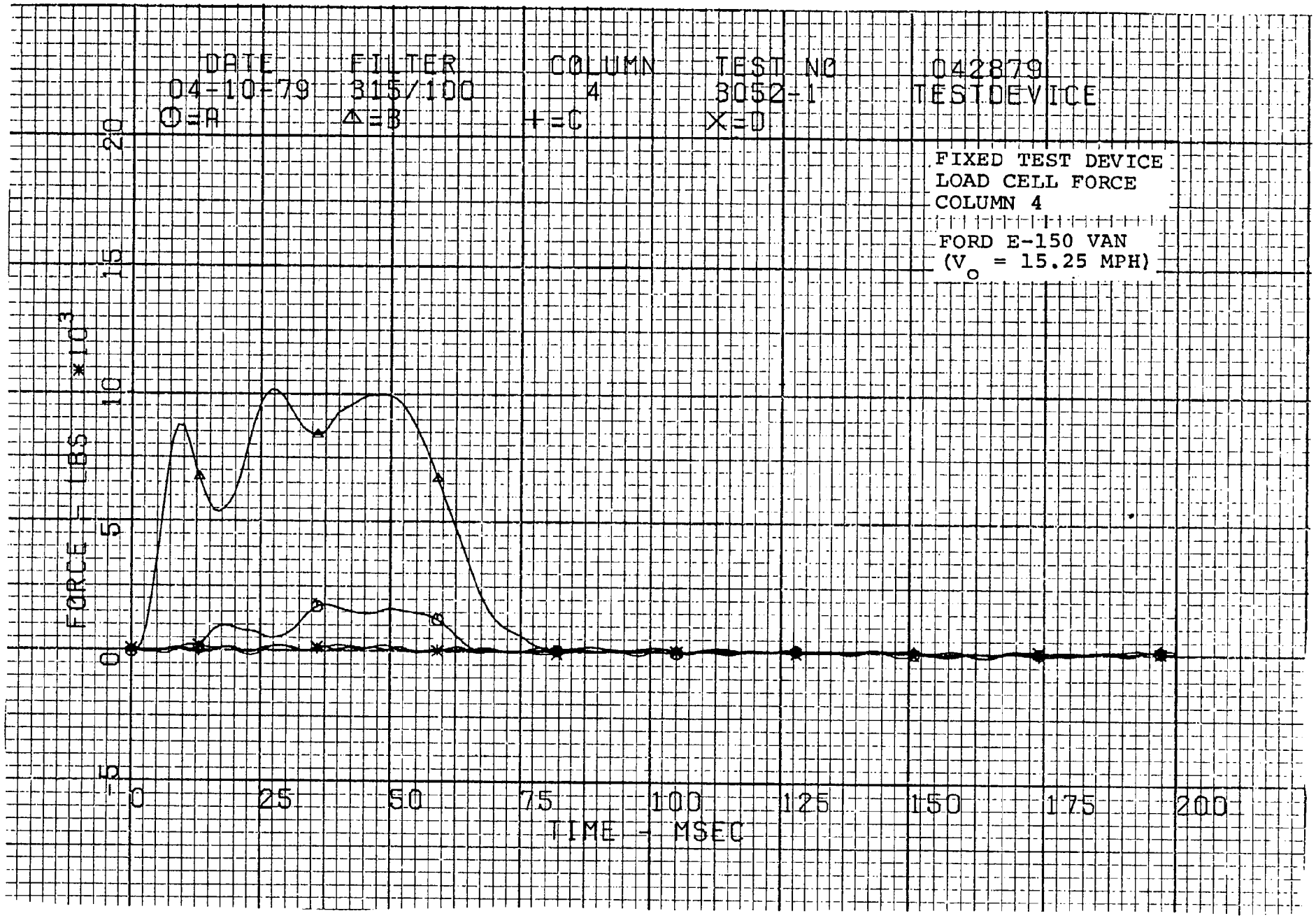

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
1
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 1
FORD E-150 VAN
(V_o = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

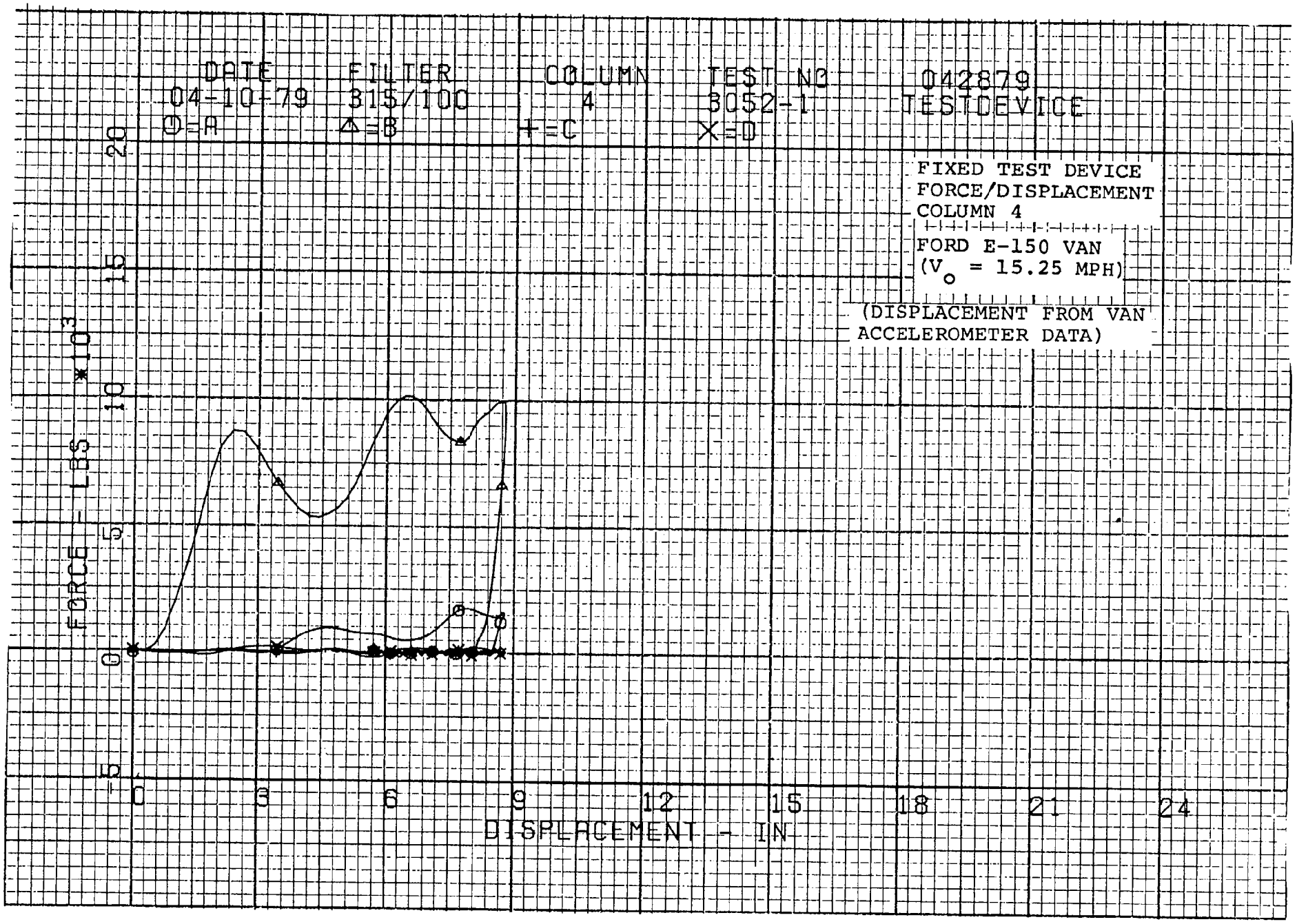

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
2
+=C
TEST NO
3052-1
X=D
042879
TES DEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 2
FORD E-150 VAN
(V o = 15.25 MPH)
FORCE - LBS * 10 3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

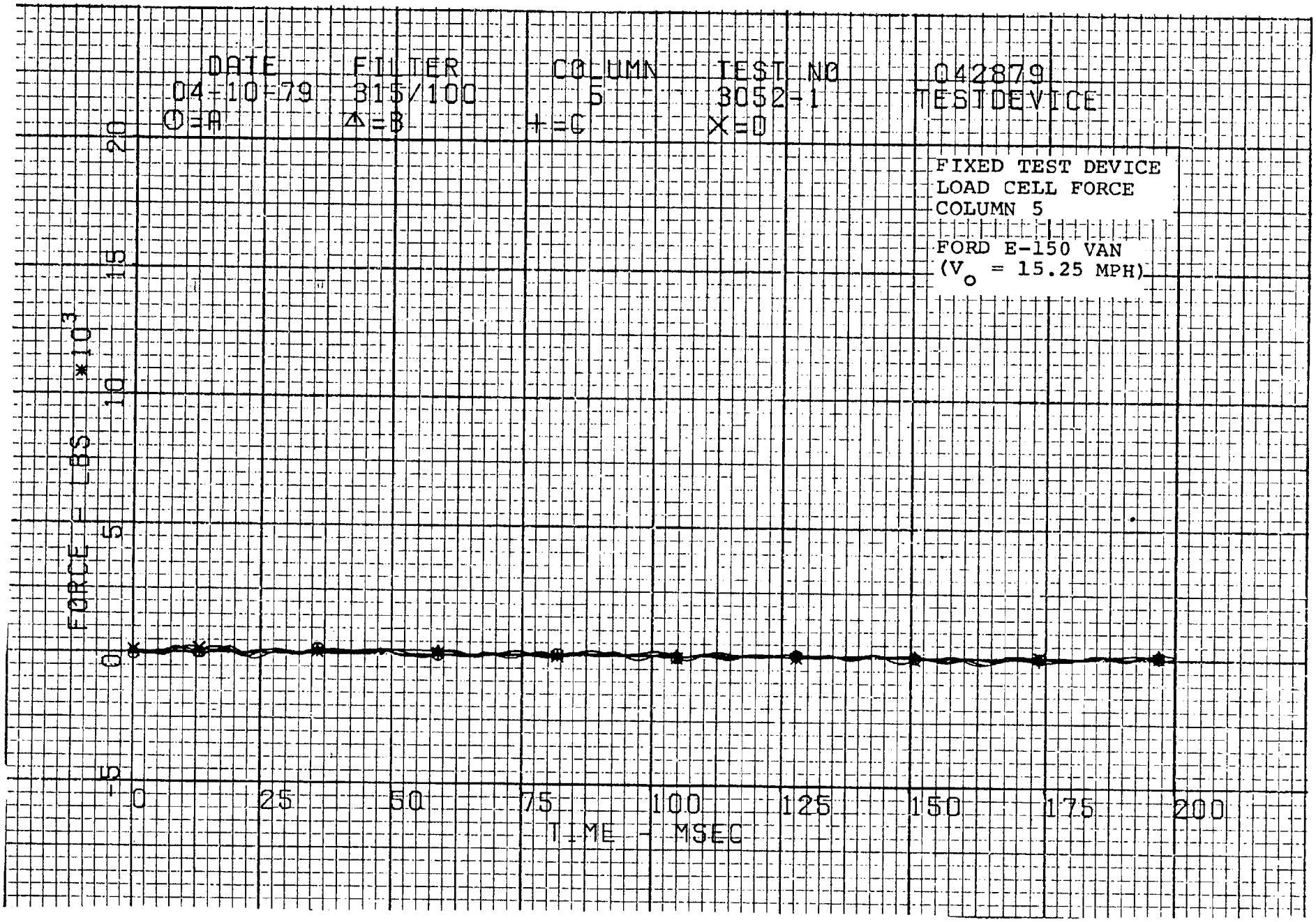

DATE
04-10-79
FILTER
315/100
COLUMN
2
TEST NO
3052-1
042879
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 2
FORD E-150 VAN
(V o = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

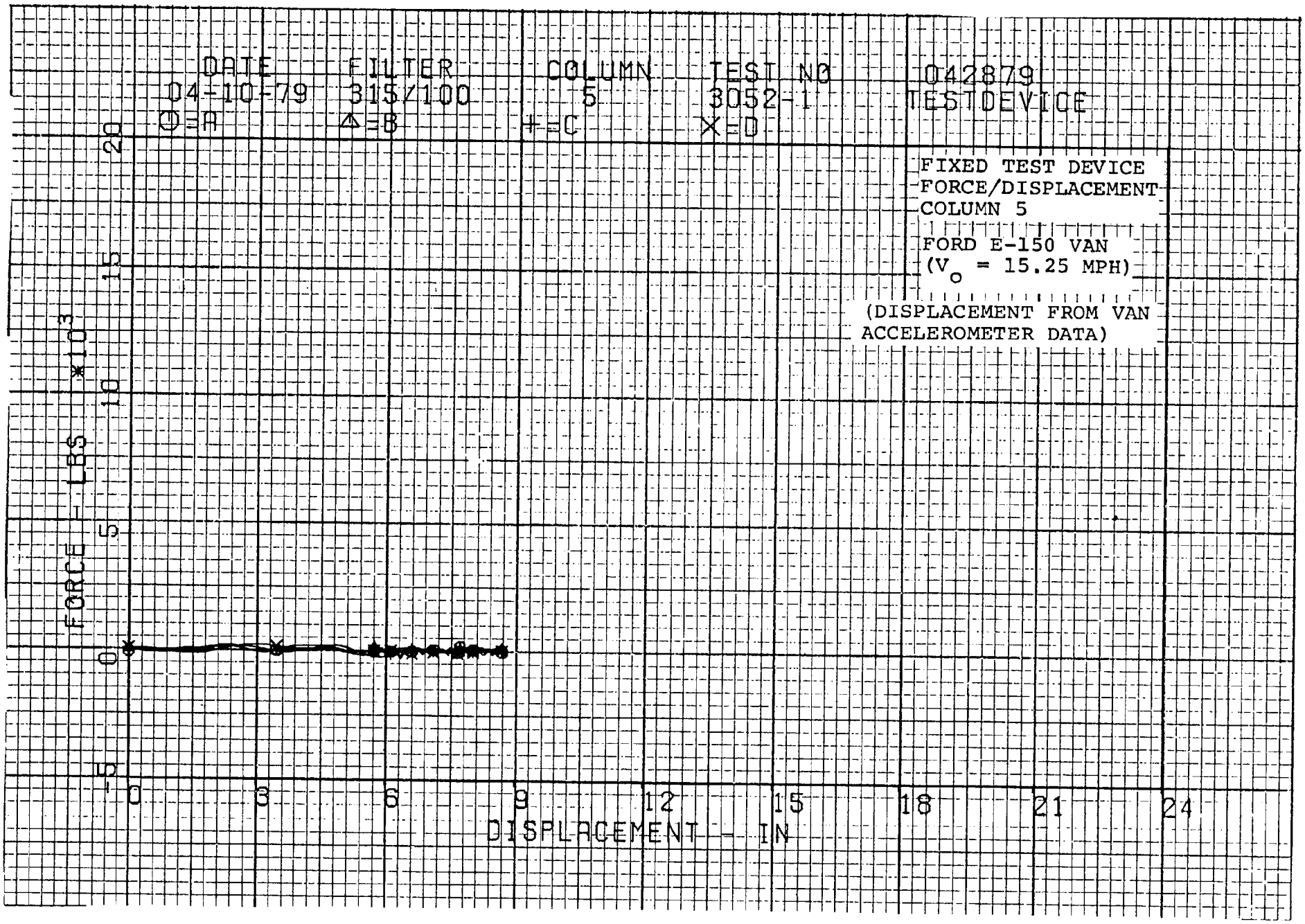

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
3
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 3
FORD E-150 VAN
(V_o = 15.25 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

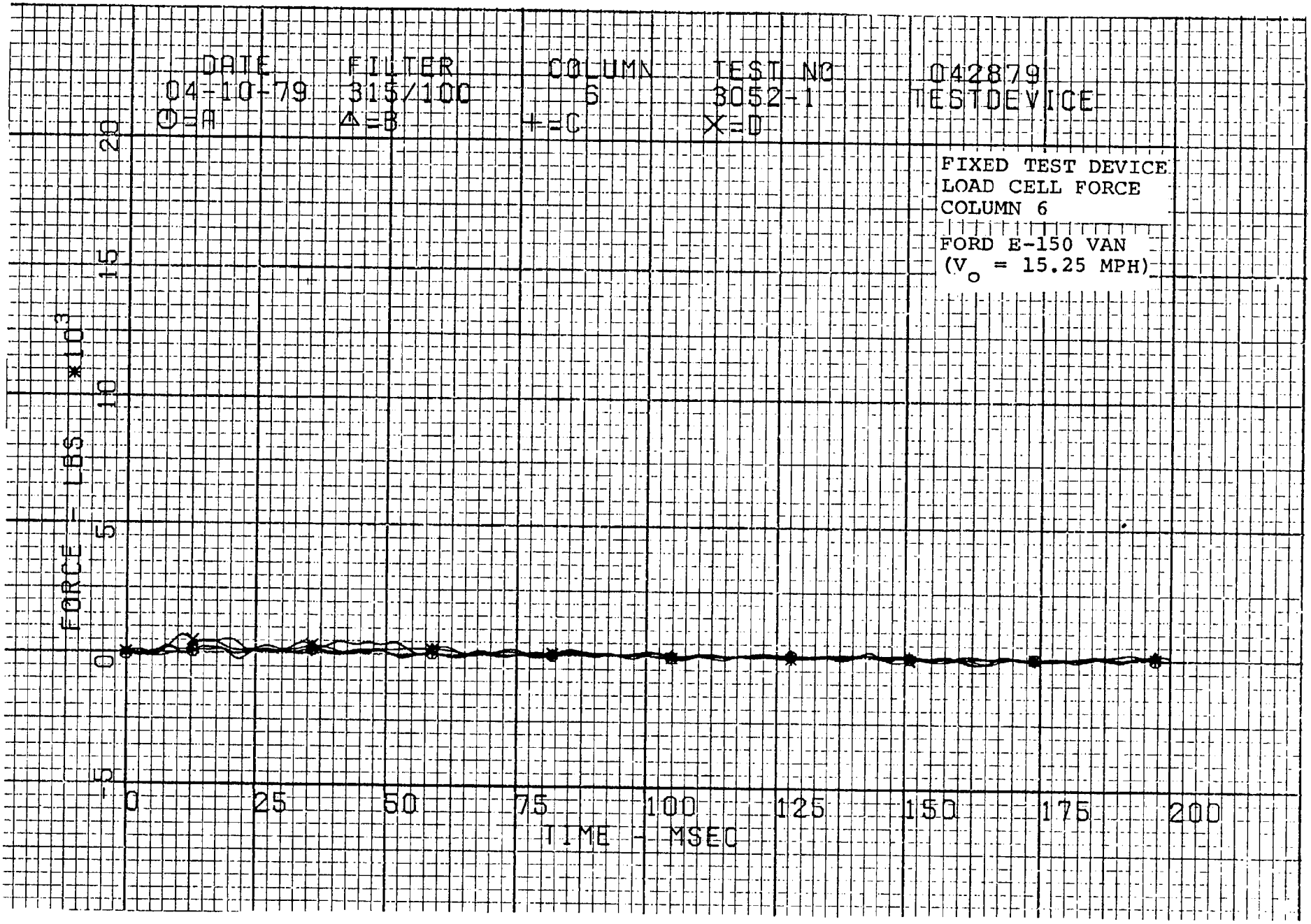

DATE
04-10-79
FILTER
315/100
COLUMN
3
TEST NO
3052-1
042879
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 3
FORD E-150 VAN
(V o = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

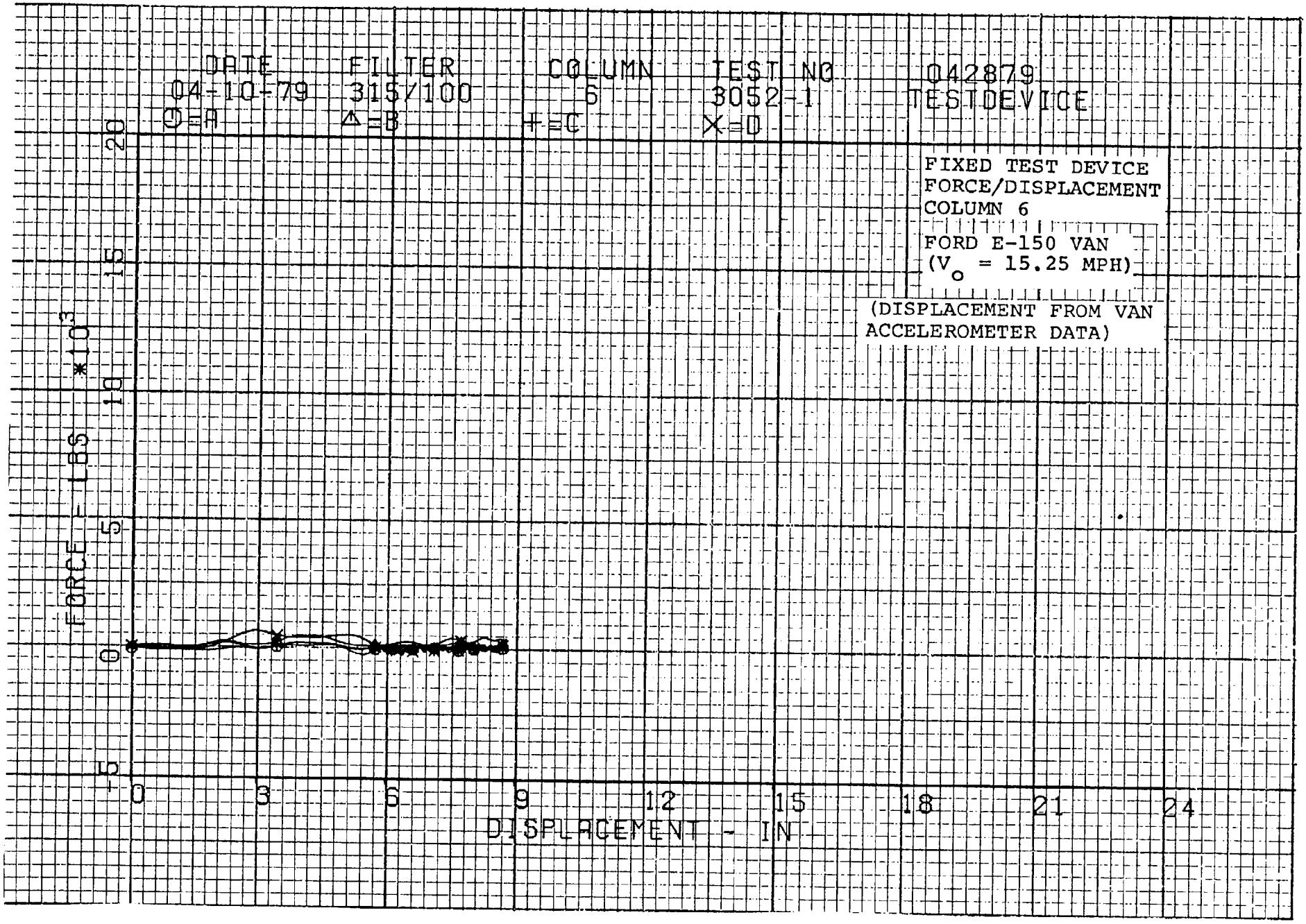

DATE
04-10-79
O=A
FILTER
315/100
△=B
COLUMN
4
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 4
FORD E-150 VAN
(V_o = 15.25 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

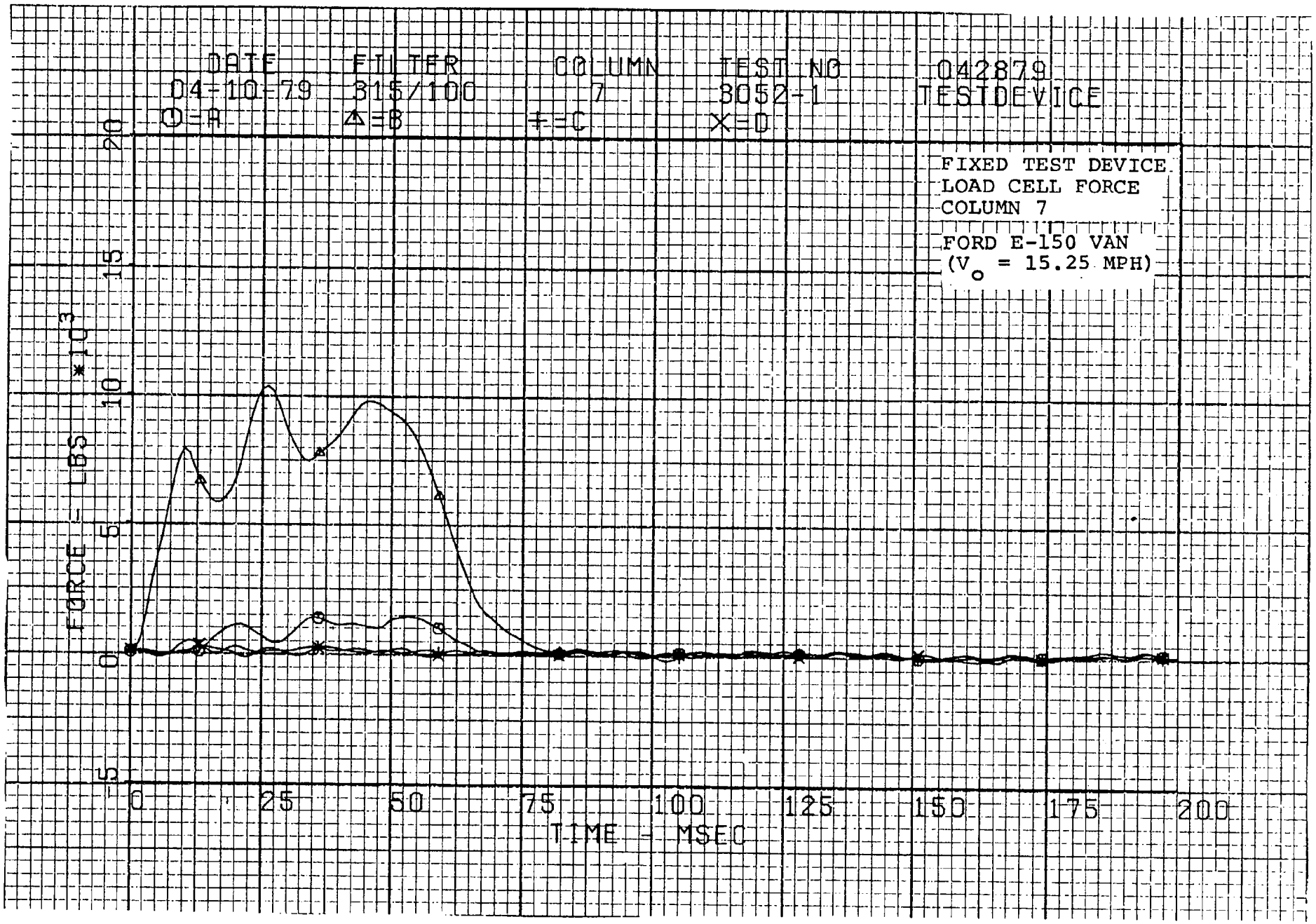

DATE
04-10-79
FILTER
315/100
COLUMN
4
TEST NO
3052-1
042879
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 4
FORD E-150 VAN
(V$_o$ = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS * 10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

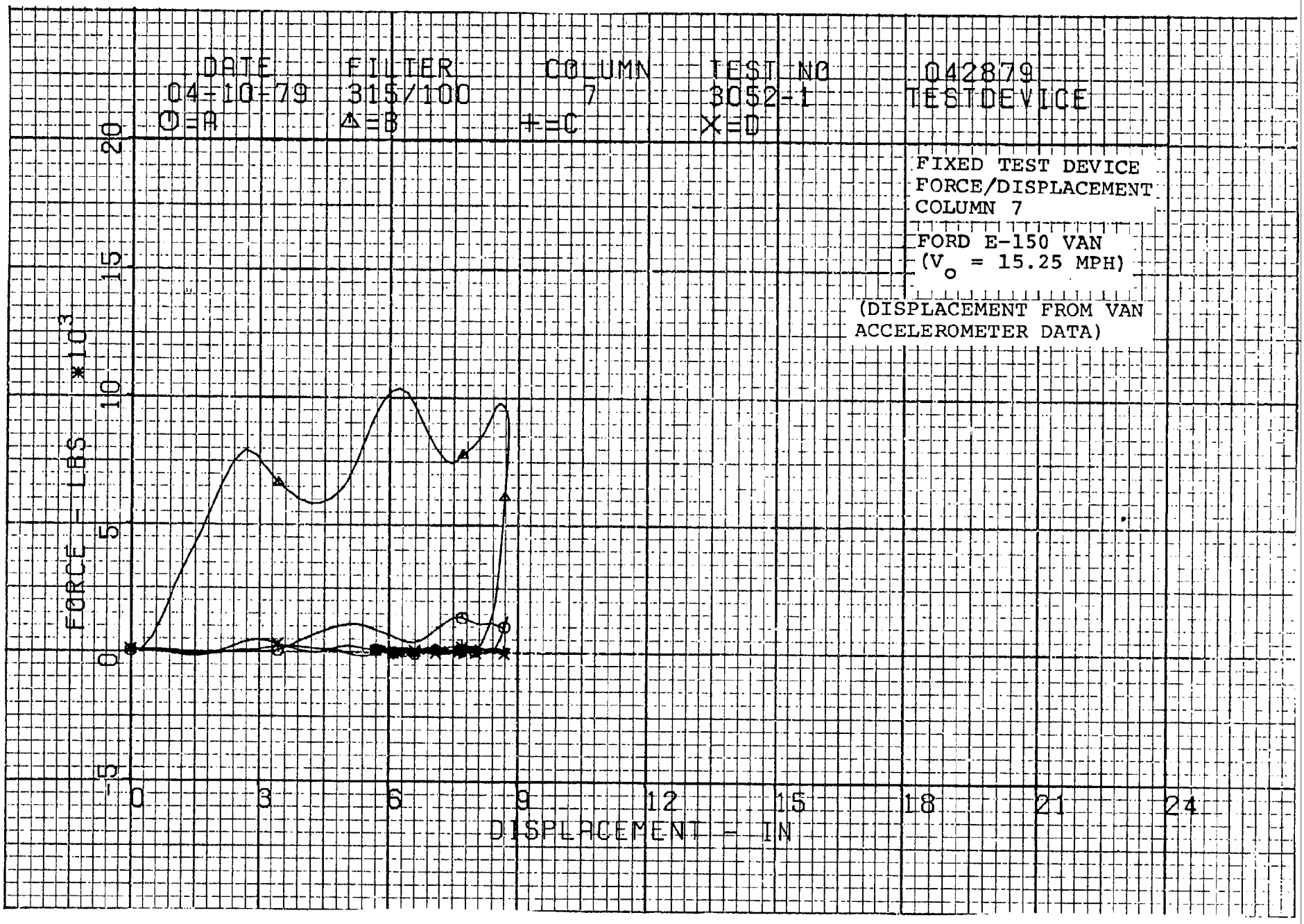

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
5
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 5
FORD E-150 VAN
(V$_o$ = 15.25 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

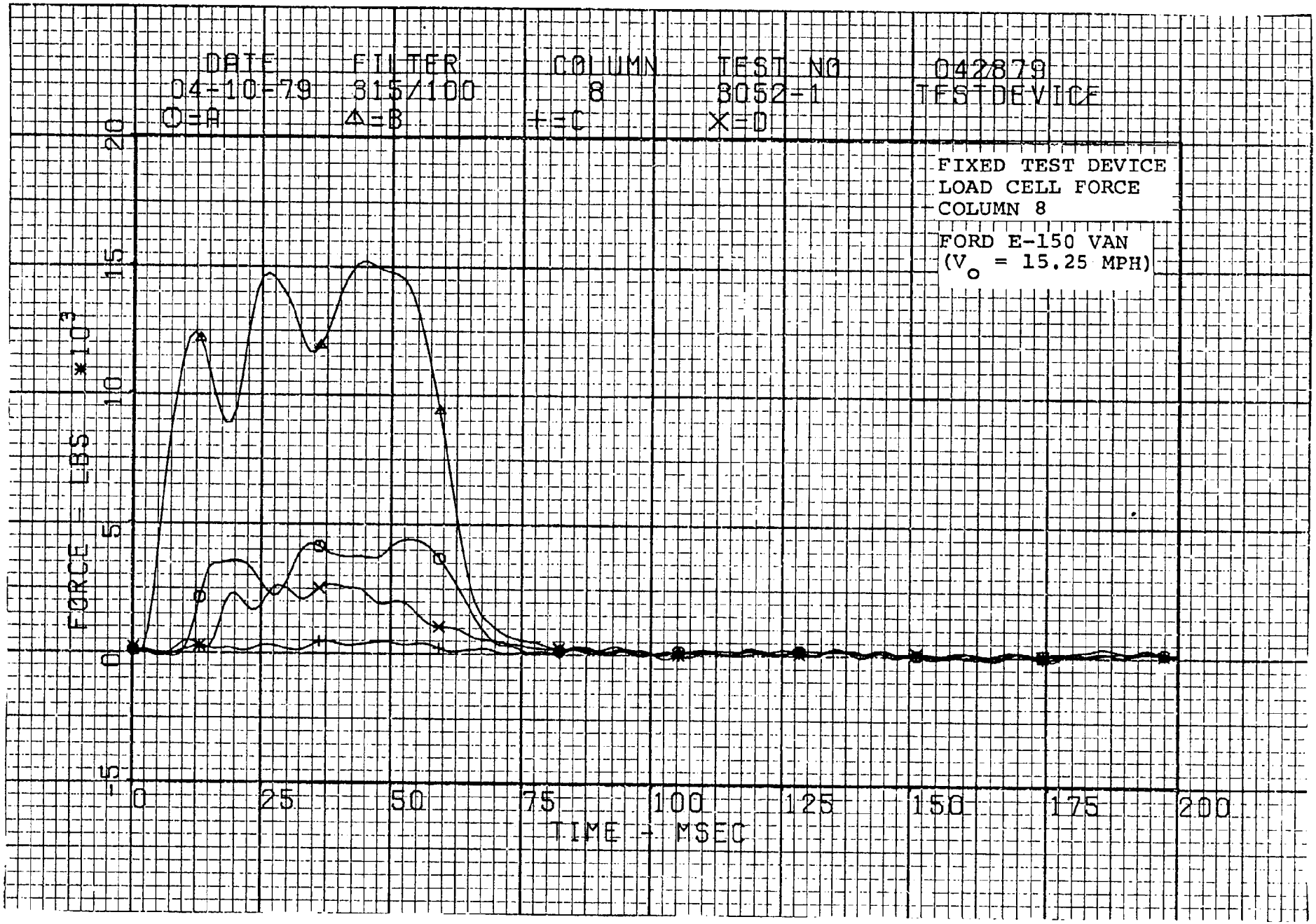

DATE
04-10-79
FILTER
315/100
COLUMN
5
TEST NO
3052-1
042879
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 5
FORD E-150 VAN
(V_o = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

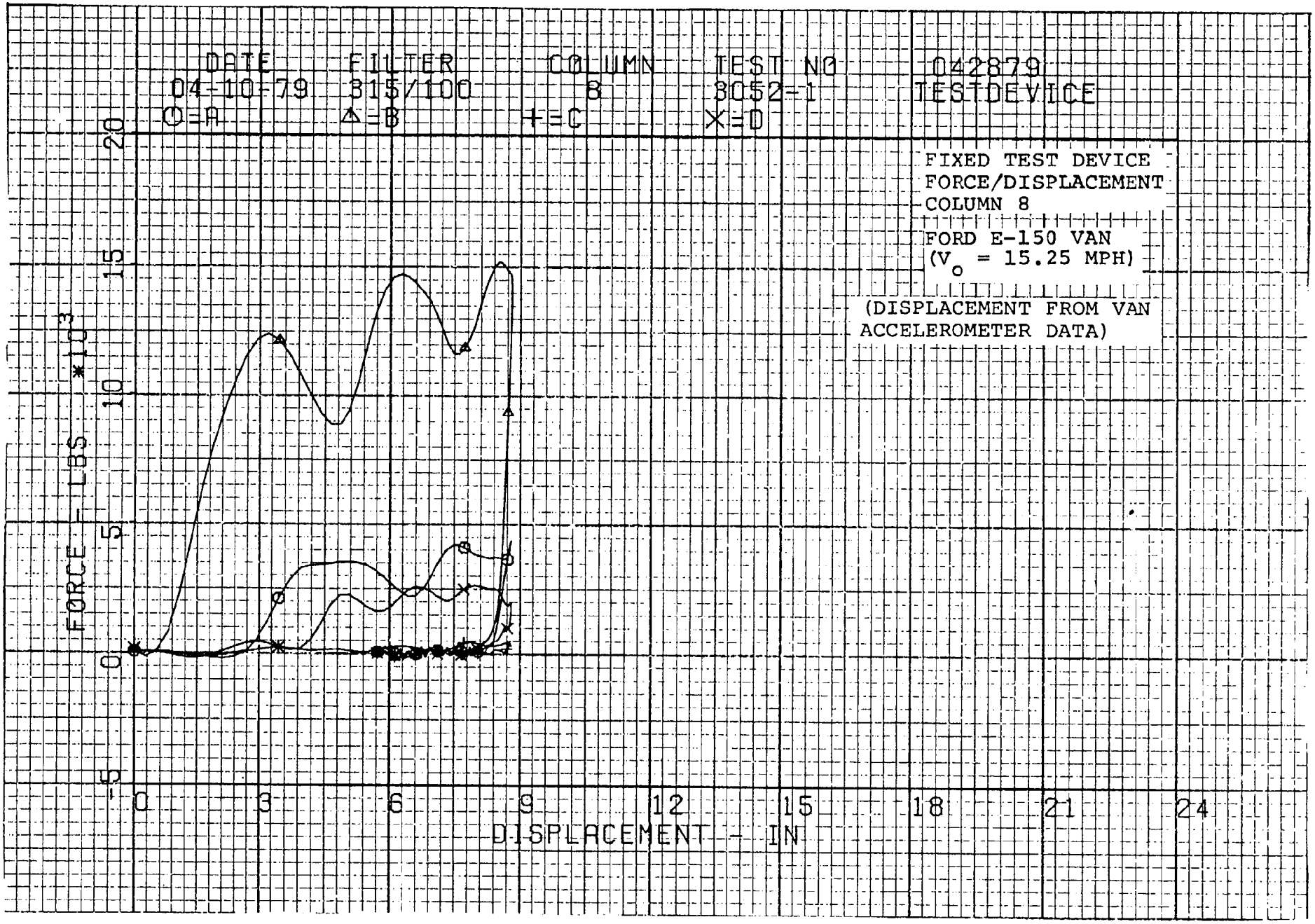

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
6
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 6
FORD E-150 VAN
(V_o = 15.25 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

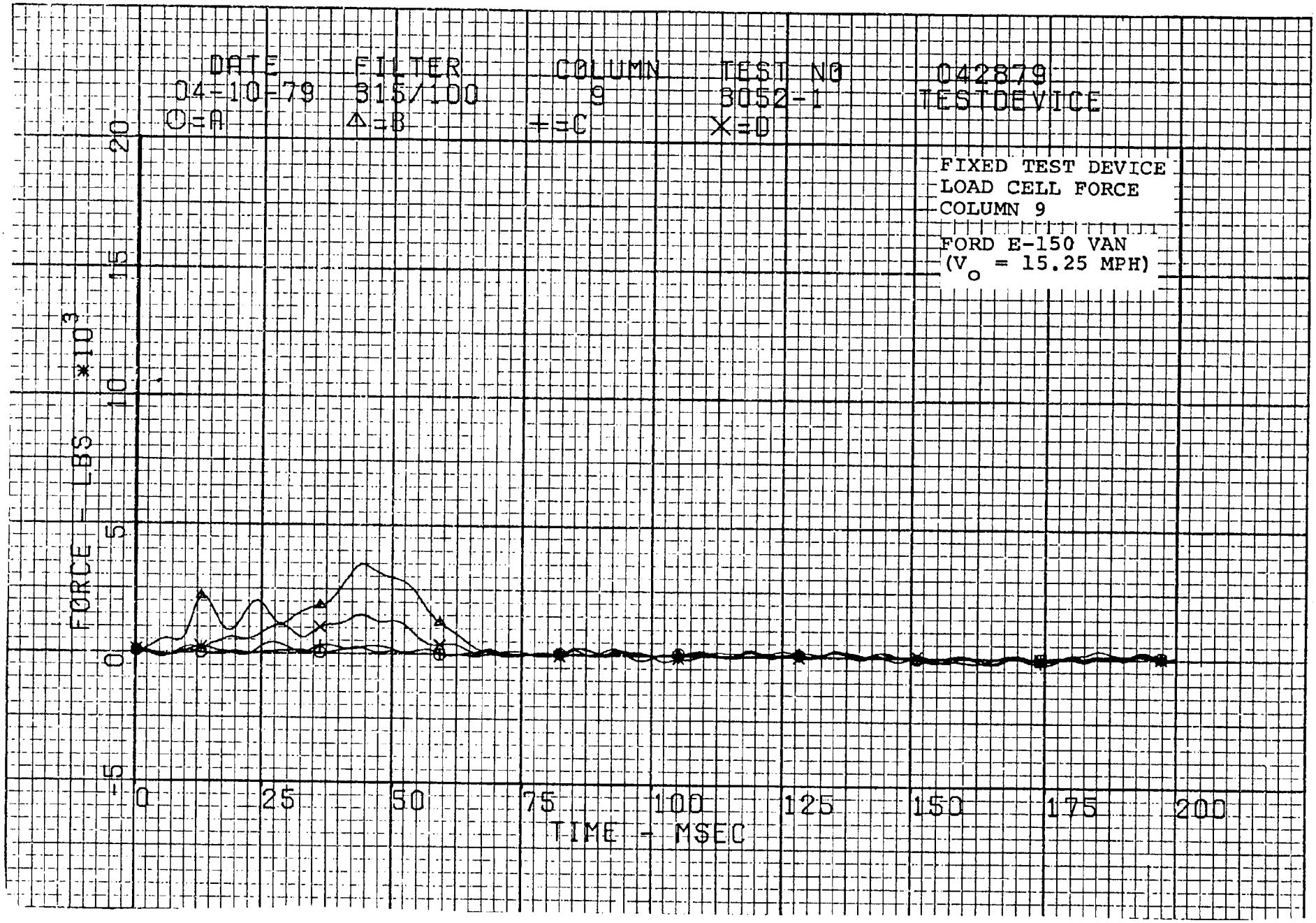

DATE
04-10-79
FILTER
315/100
COLUMN
6
TEST NO
3052-1
042879
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 6
FORD E-150 VAN
(V_o = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

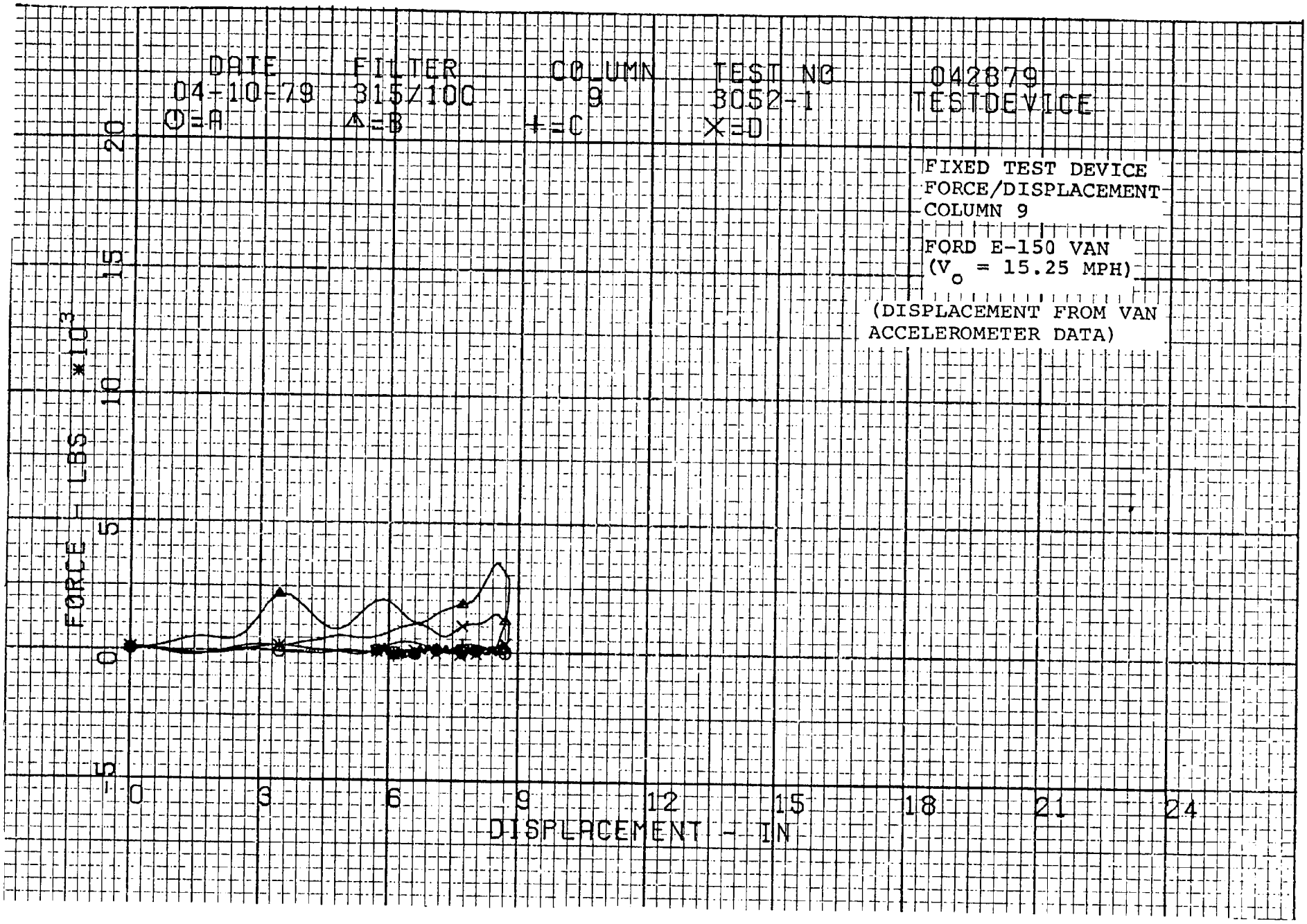

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
7
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 7
FORD E-150 VAN
(V_o = 15.25 MPH)
FORCE - LBS * 10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

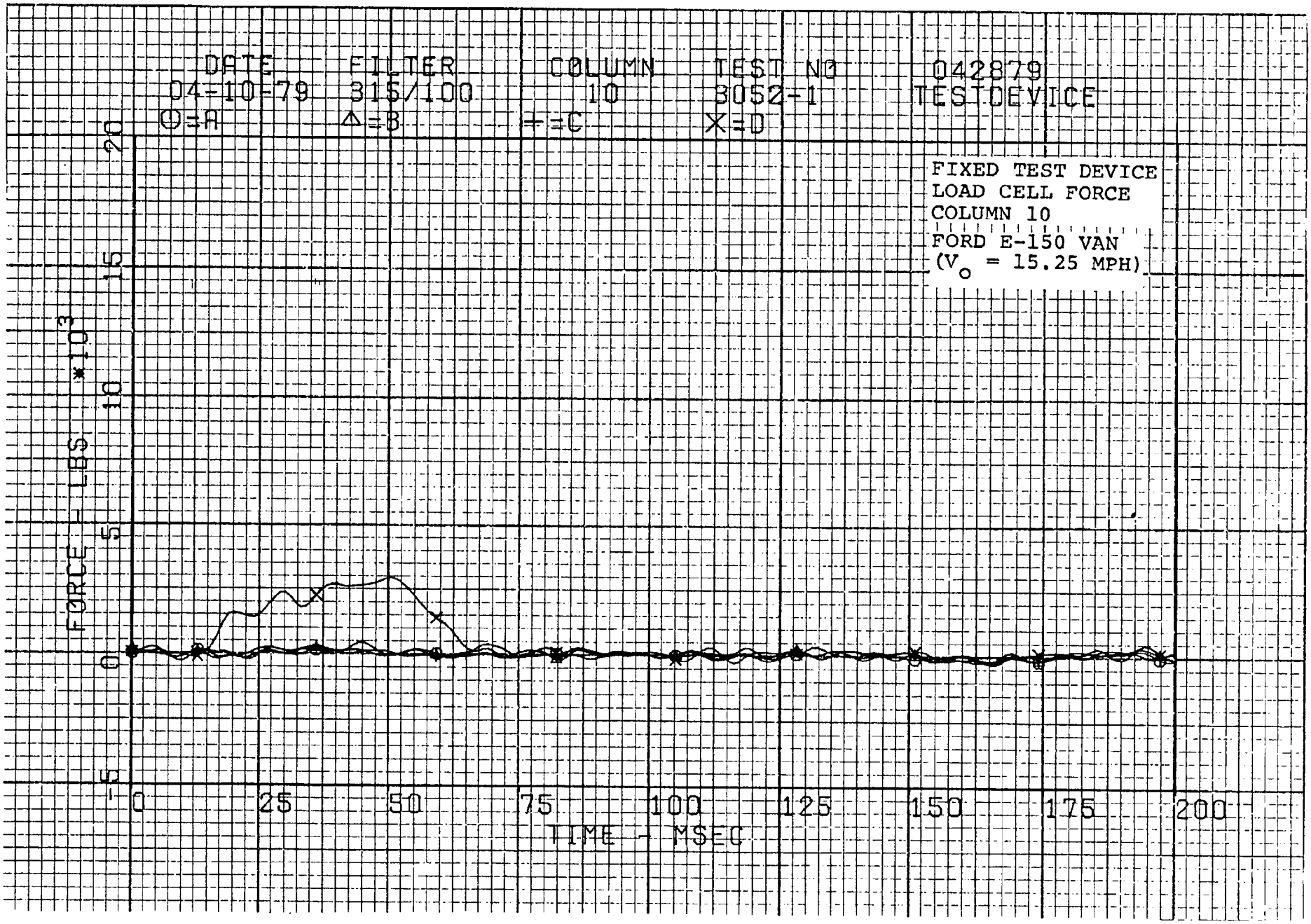

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
7
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 7
FORD E-150 VAN
(V$_o$ = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

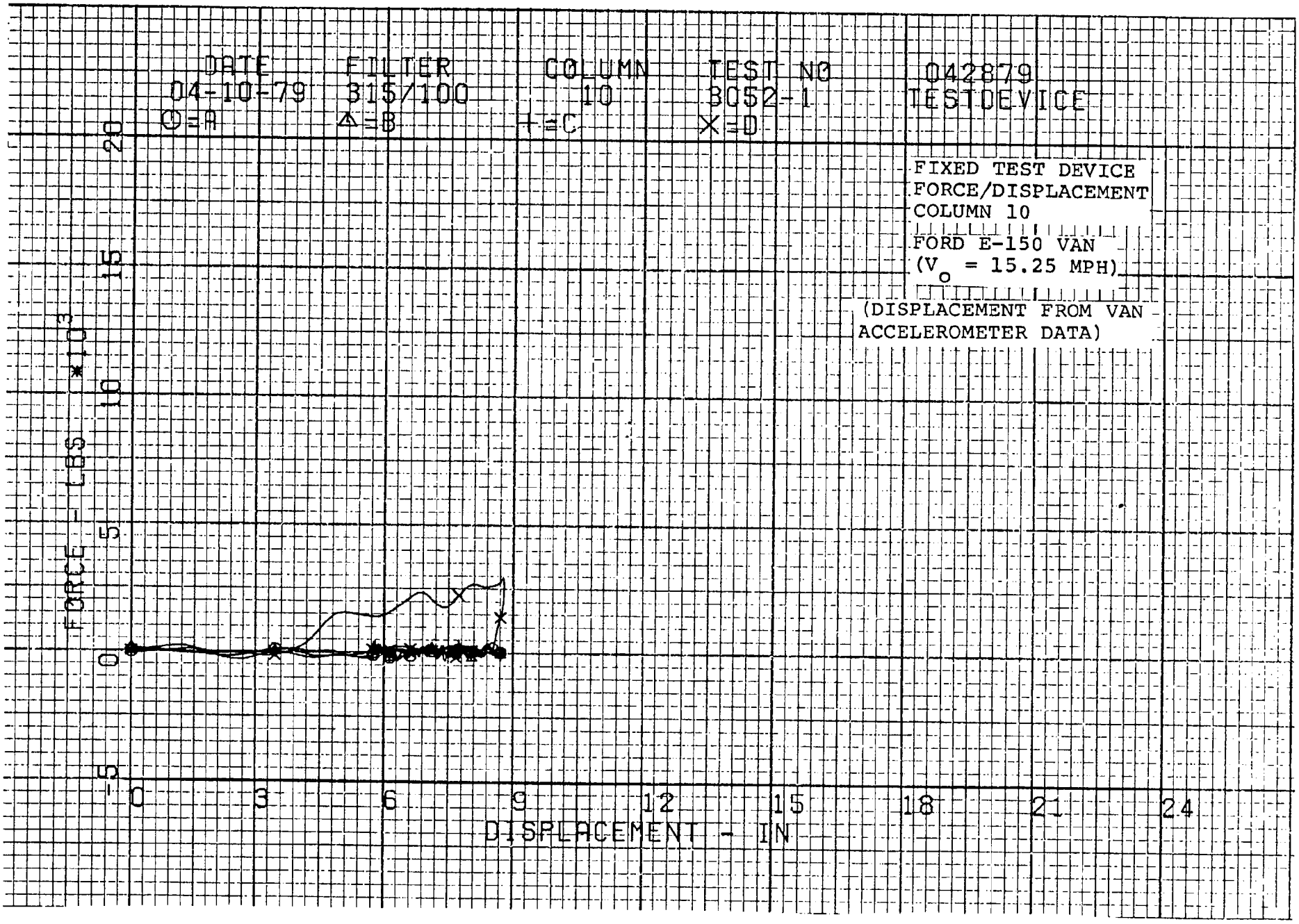

DATE
04-10-79
O=A
FILTER
315/100
△=B
COLUMN
8
+=C
TEST NO
3052-1
X=D
042879
TEST DEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 8
FORD E-150 VAN
(V_o = 15.25 MPH)
FORCE - LBS *10³
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

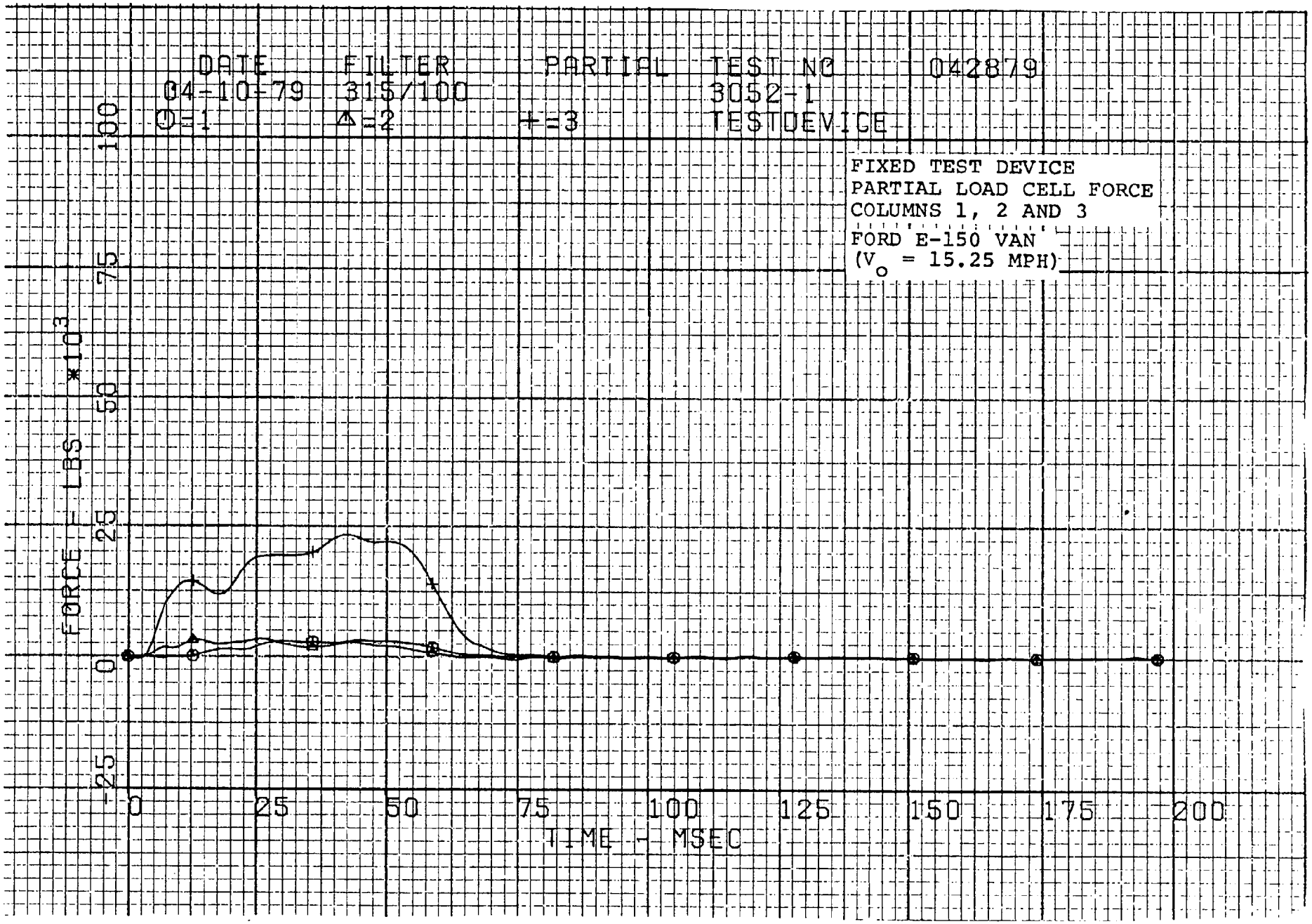

DATE
04-10-79
FILTER
315/100
COLUMN
8
TEST NO
3052-1
042879
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 8
FORD E-150 VAN
(V_o = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

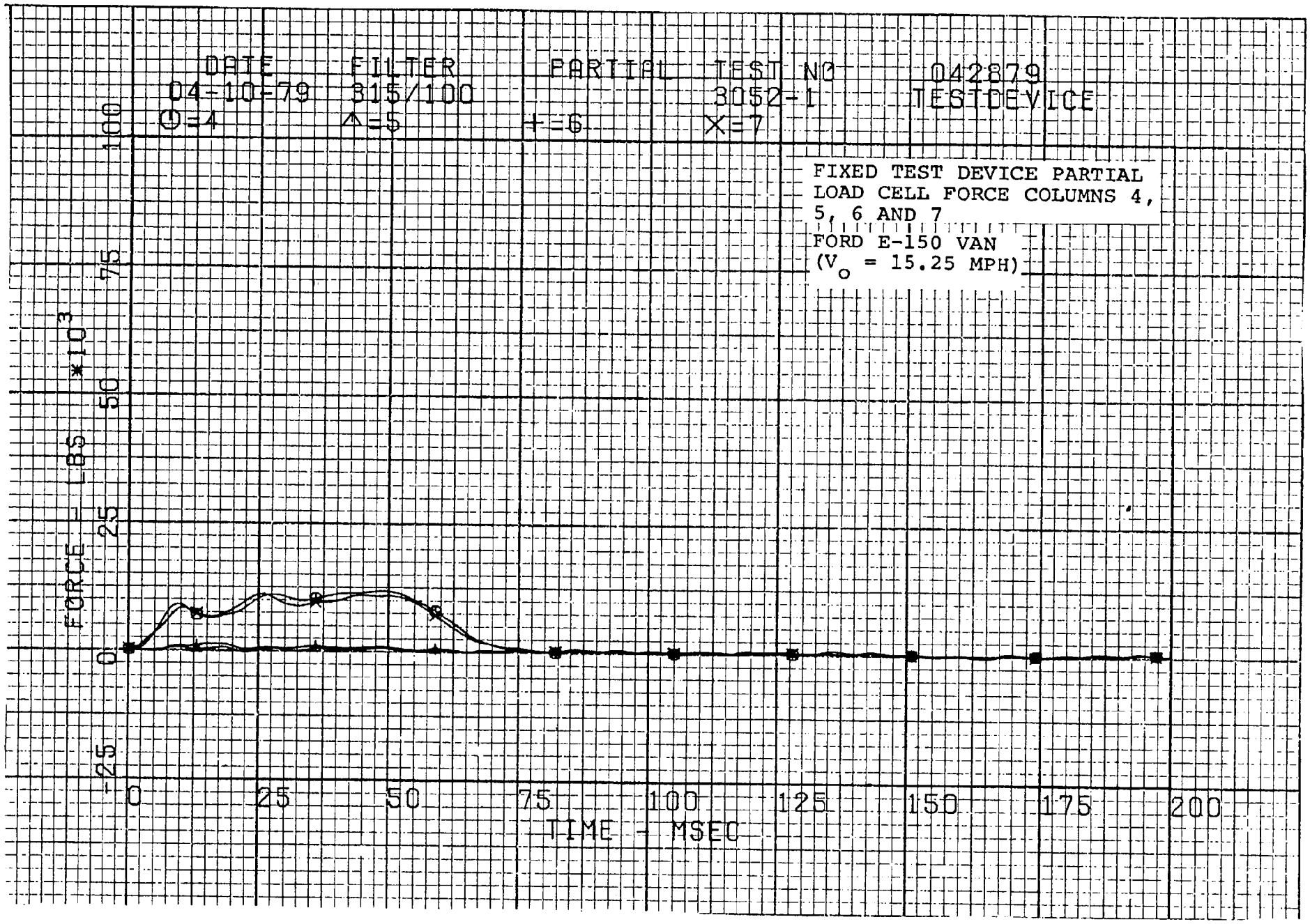

DATE
04-10-79
FILTER
315/100
COLUMN
9
TEST NO
3052-1
042879
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 9
FORD E-150 VAN
(V o = 15.25 MPH)
FORCE - LBS *10 3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

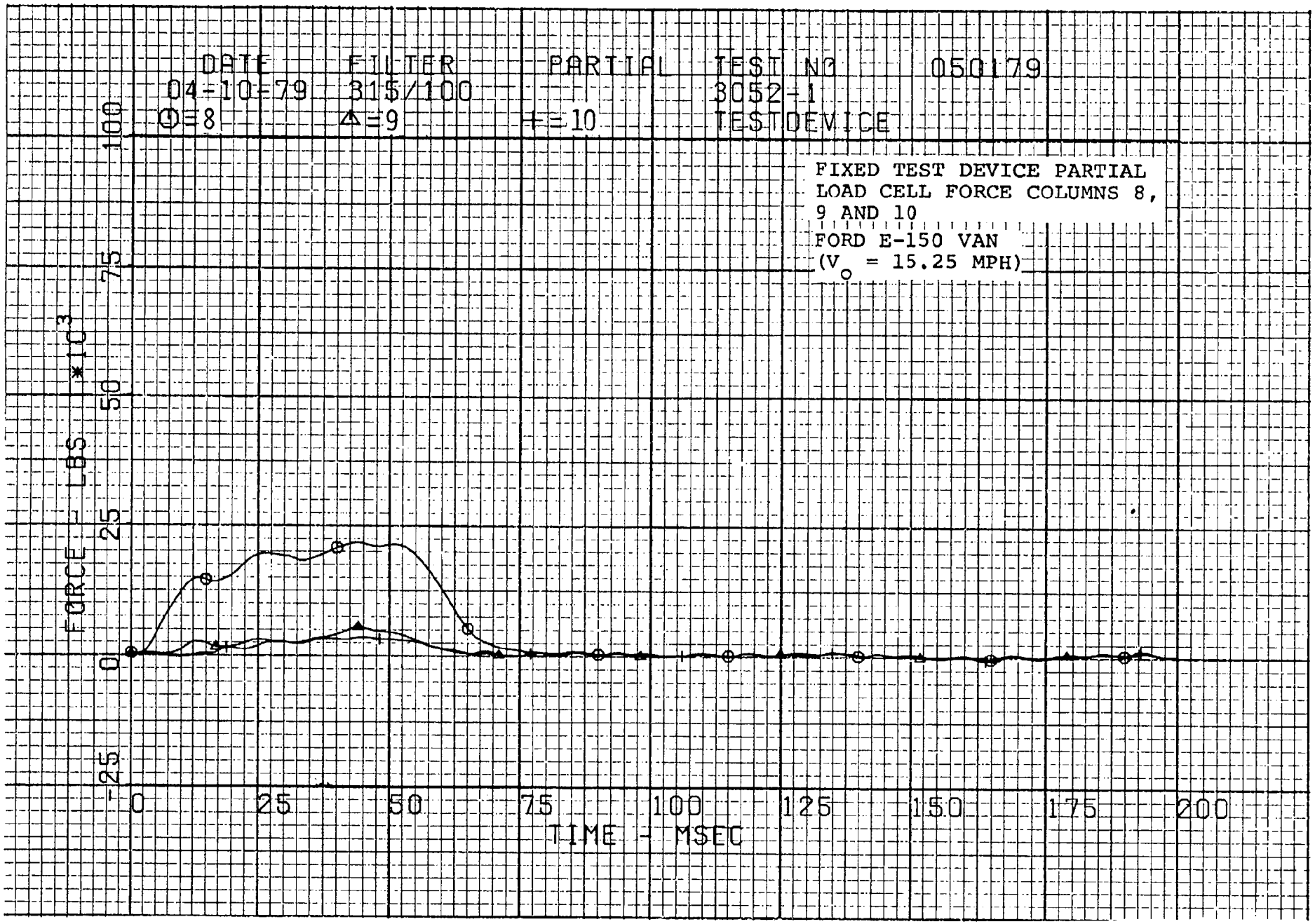

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
9
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 9
FORD E-150 VAN
(V_o = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

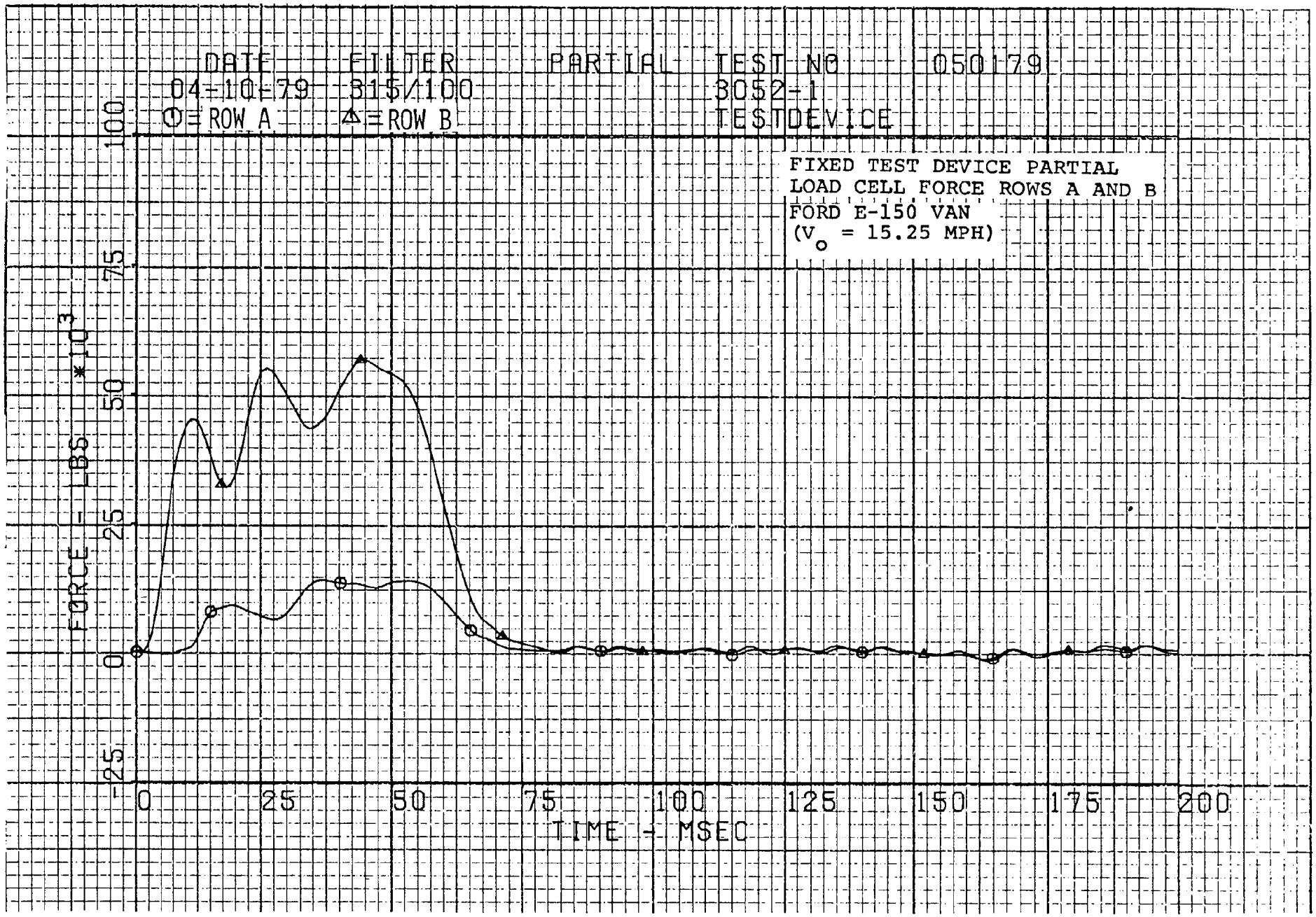

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
10
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 10
FORD E-150 VAN
(V$_o$ = 15.25 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

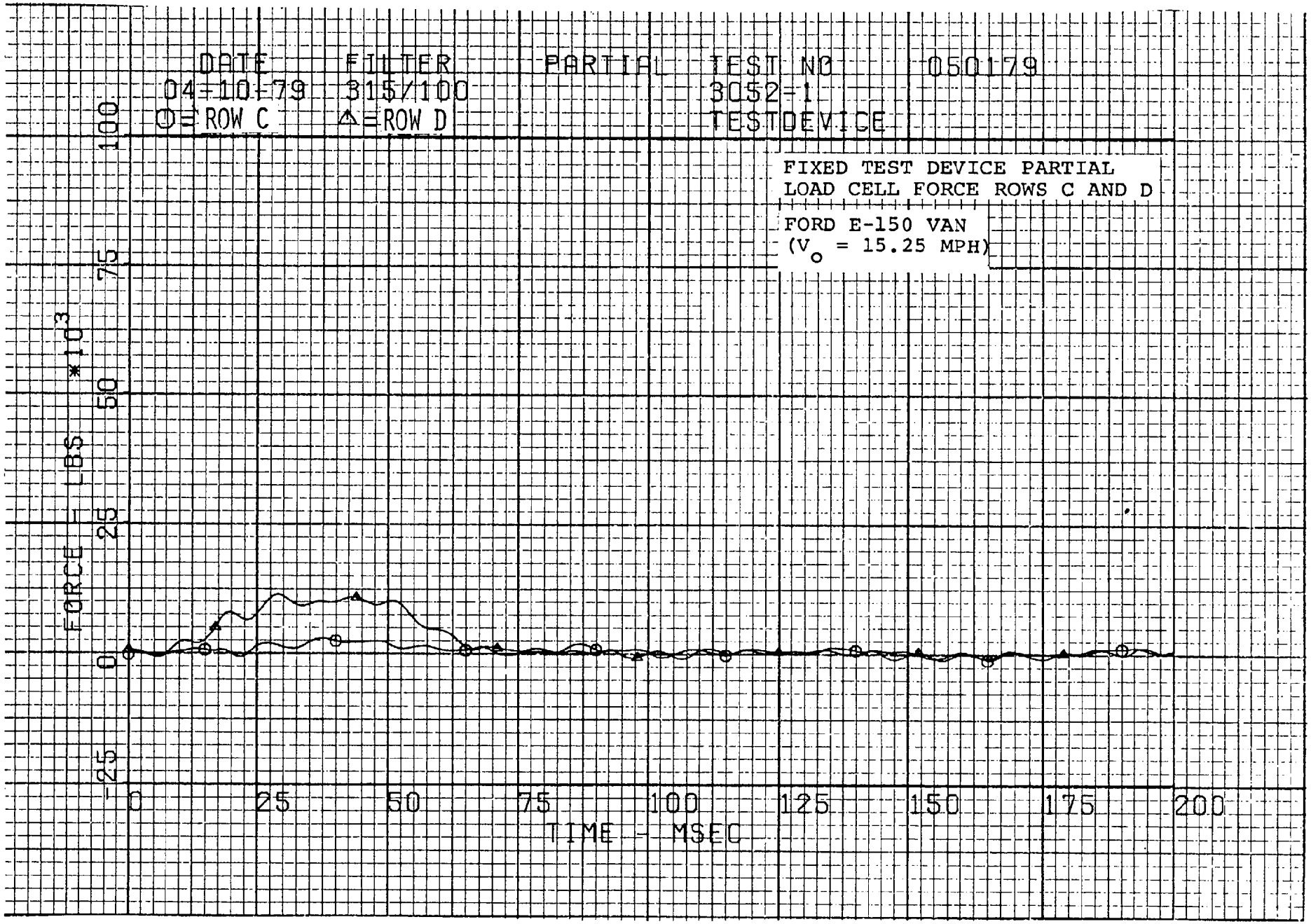

DATE
04-10-79
O=A
FILTER
315/100
Δ=B
COLUMN
10
+=C
TEST NO
3052-1
X=D
042879
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 10
FORD E-150 VAN
(V_o = 15.25 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS * 10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

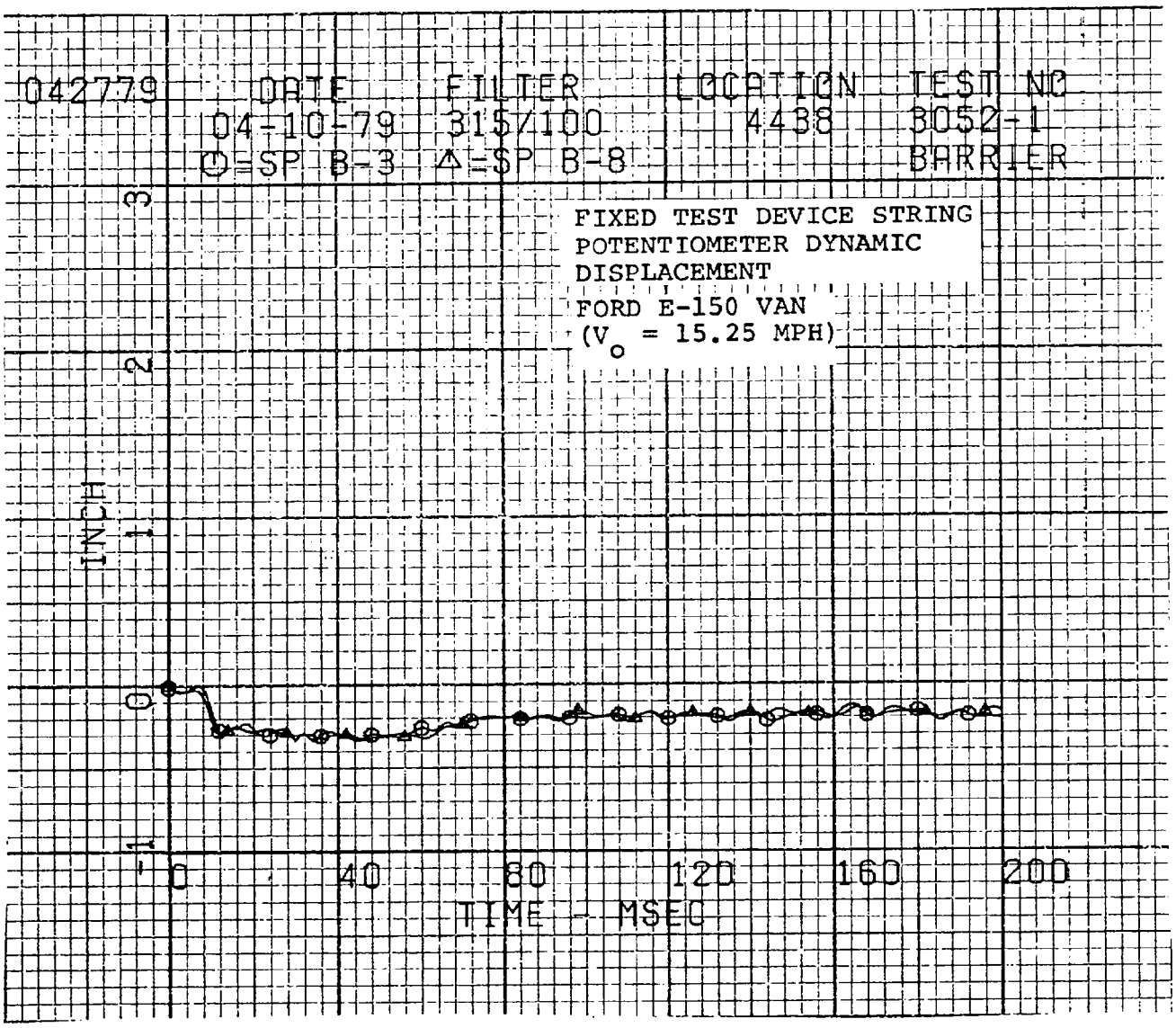

DATE
04-10-79
FILTER
315/100
PARTIAL
TEST NO
042879
3052-1
TESTDEVICE
O=1
Δ=2
+=3
FIXED TEST DEVICE
PARTIAL LOAD CELL FORCE
COLUMNS 1, 2 AND 3
FORD E-150 VAN
(V_o = 15.25 MPH)
FORCE F LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

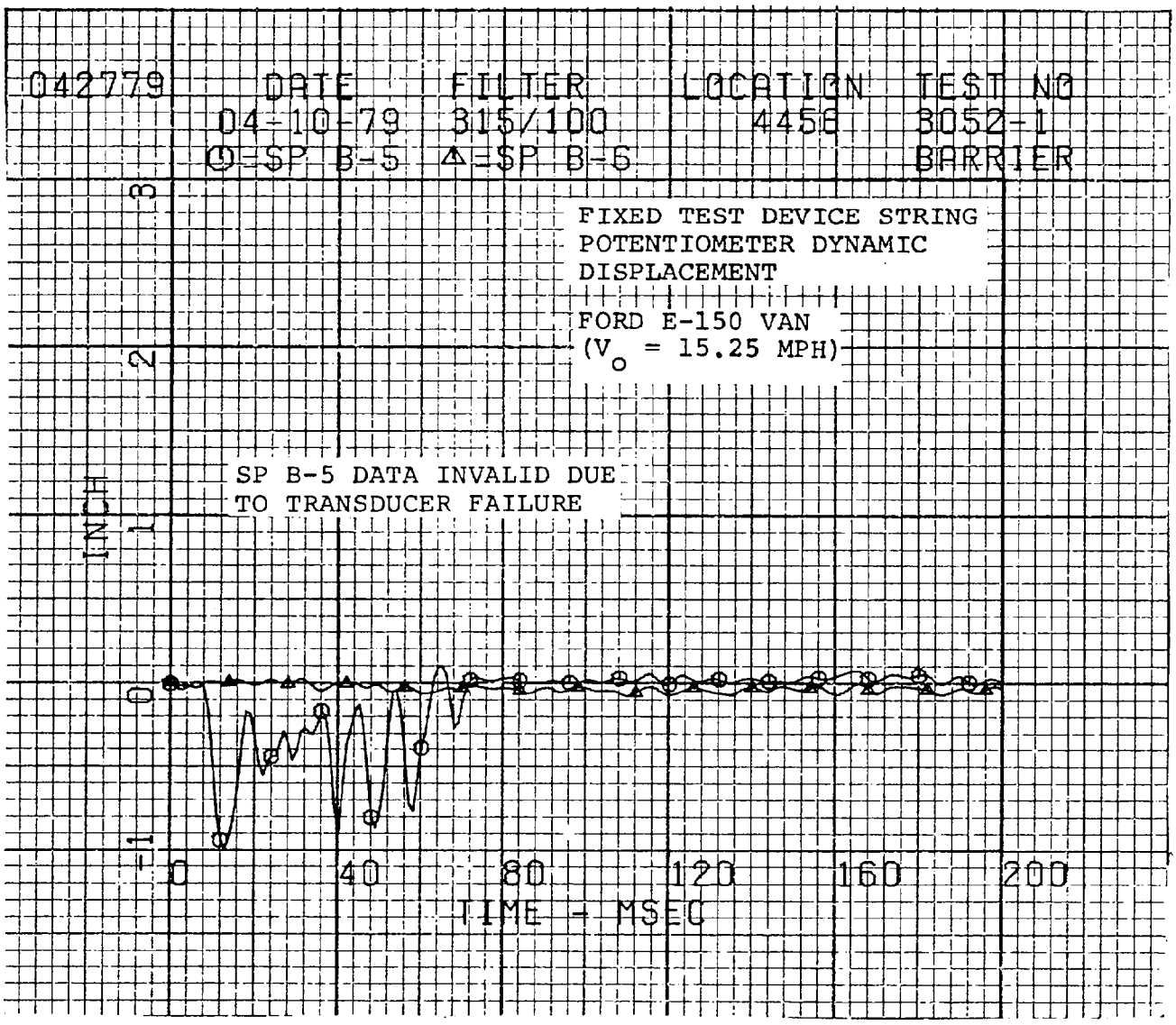

DATE
04-10-79
FILTER
315/100
PARTIAL
TEST NO
3052-1
042879
TESTDEVICE
⊙=4
△=5
+=6
X=7
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE COLUMNS 4,
5, 6 AND 7
FORD E-150 VAN
(V_o = 15.25 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

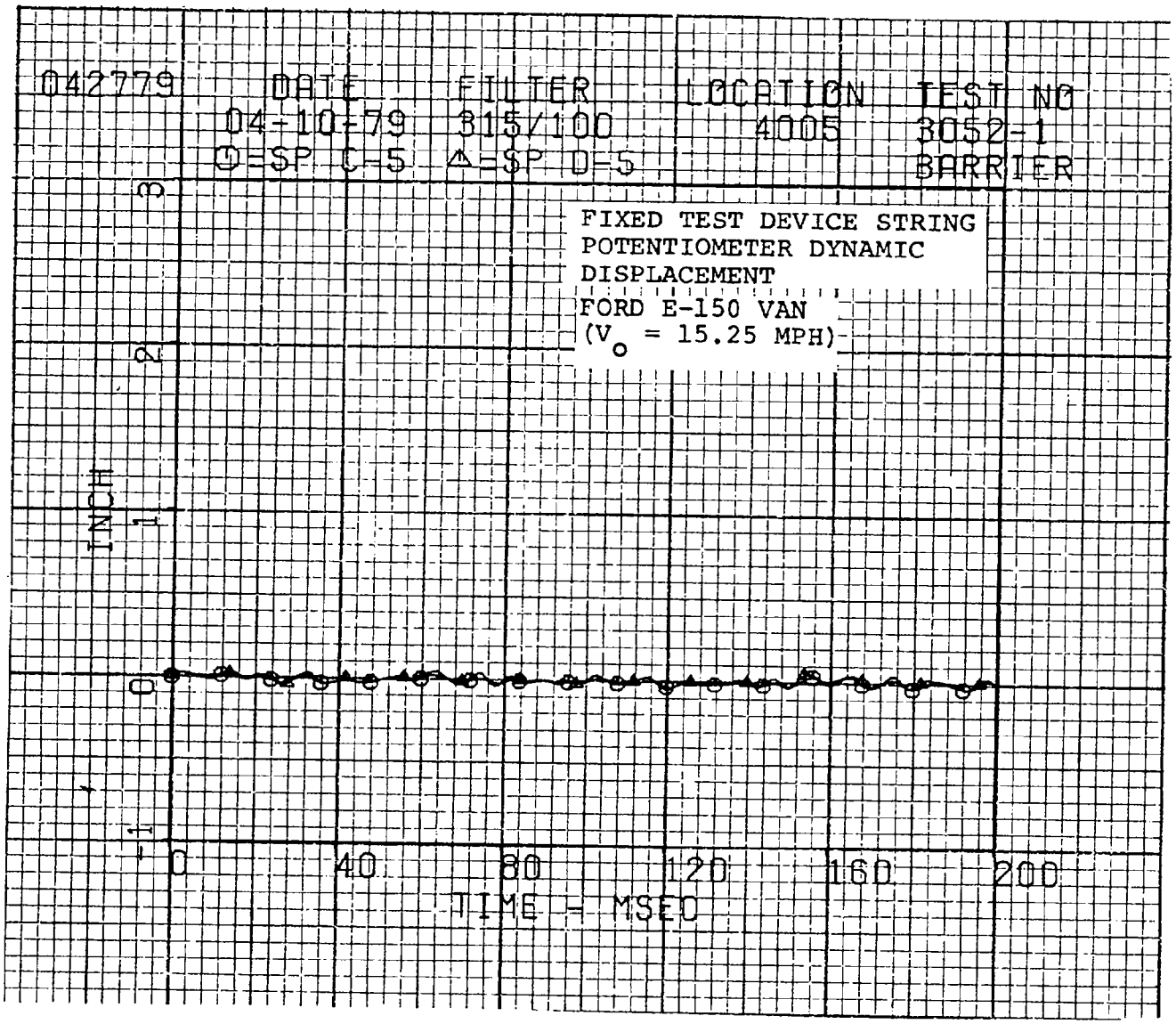

DATE
04-10-79
FILTER
315/100
PARTIAL
TEST NO
050179
3052-1
TESTDEVICE
O=8
Δ=9
+=10
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE COLUMNS 8,
9 AND 10
FORD E-150 VAN
(V$_o$ = 15.25 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-10-79
FILTER
315/100
PARTIAL
TEST NO
3052-1
050179
TESTDEVICE
O ≡ ROW A
Δ ≡ ROW B
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE ROWS A AND B
FORD E-150 VAN
(V o = 15.25 MPH)
FORCE - LBS * 10 3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-10-79
O≡ROW C
FILTER
315/100
△≡ROW D
PARTIAL
TEST NO
050179
3052-1
TESTDEVICE
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE ROWS C AND D
FORD E-150 VAN
(V$_o$ = 15.25 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


042779
DATE
04-10-79
FILTER
315/100
LOCATION
4438
TEST NO
3052-1
BARRIER
O=SP B-3 Δ=SP B-8
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
FORD E-150 VAN
(V o = 15.25 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC


042779
DATE
04-10-79
FILTER
315/100
LOCATION
4458
TEST NO
3052-1
BARRIER
⊙=SP B-5 △=SP B-6
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
FORD E-150 VAN
(V$_o$ = 15.25 MPH)
SP B-5 DATA INVALID DUE
TO TRANSDUCER FAILURE
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC


042779
DATE
04-10-79
FILTER
315/100
LOCATION
4005
TEST NO
3052-1
BARRIER
⊙=SP C-5 △=SP D-5
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
FORD E-150 VAN
(V o = 15.25 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC

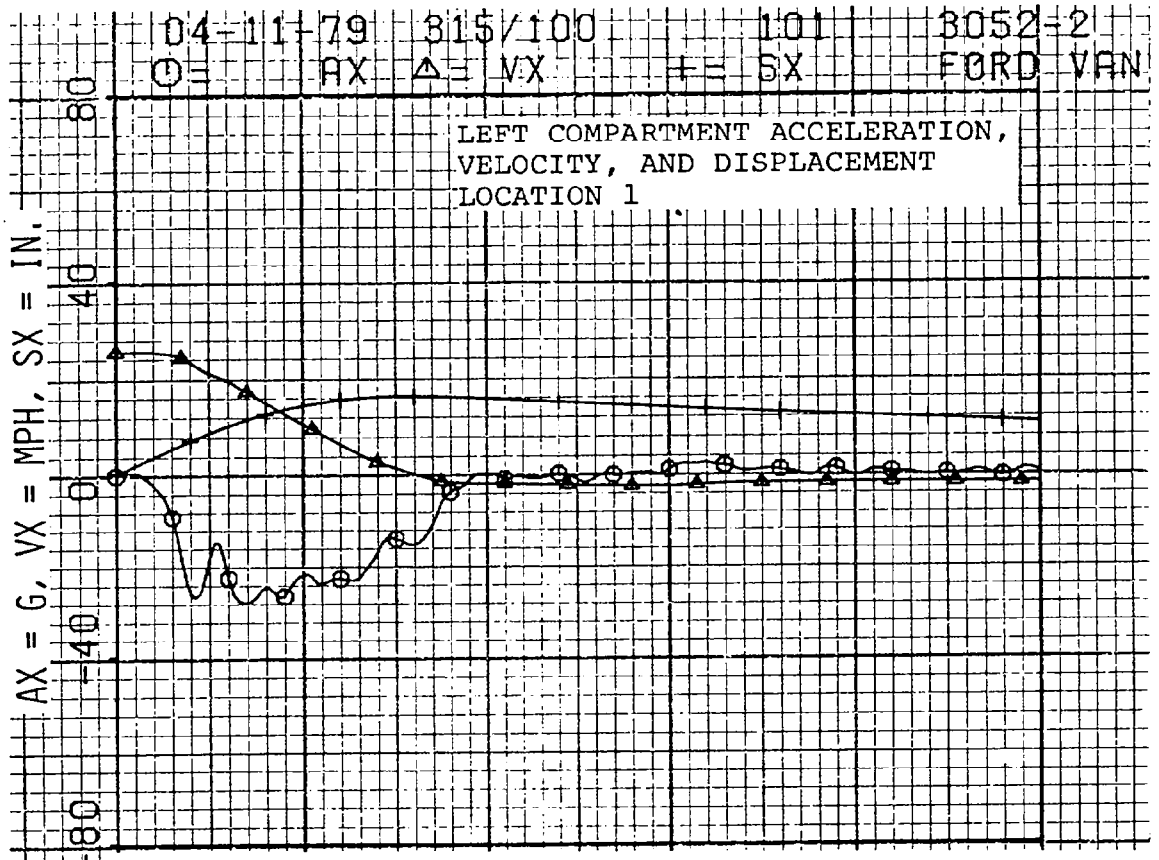
APPENDIX B

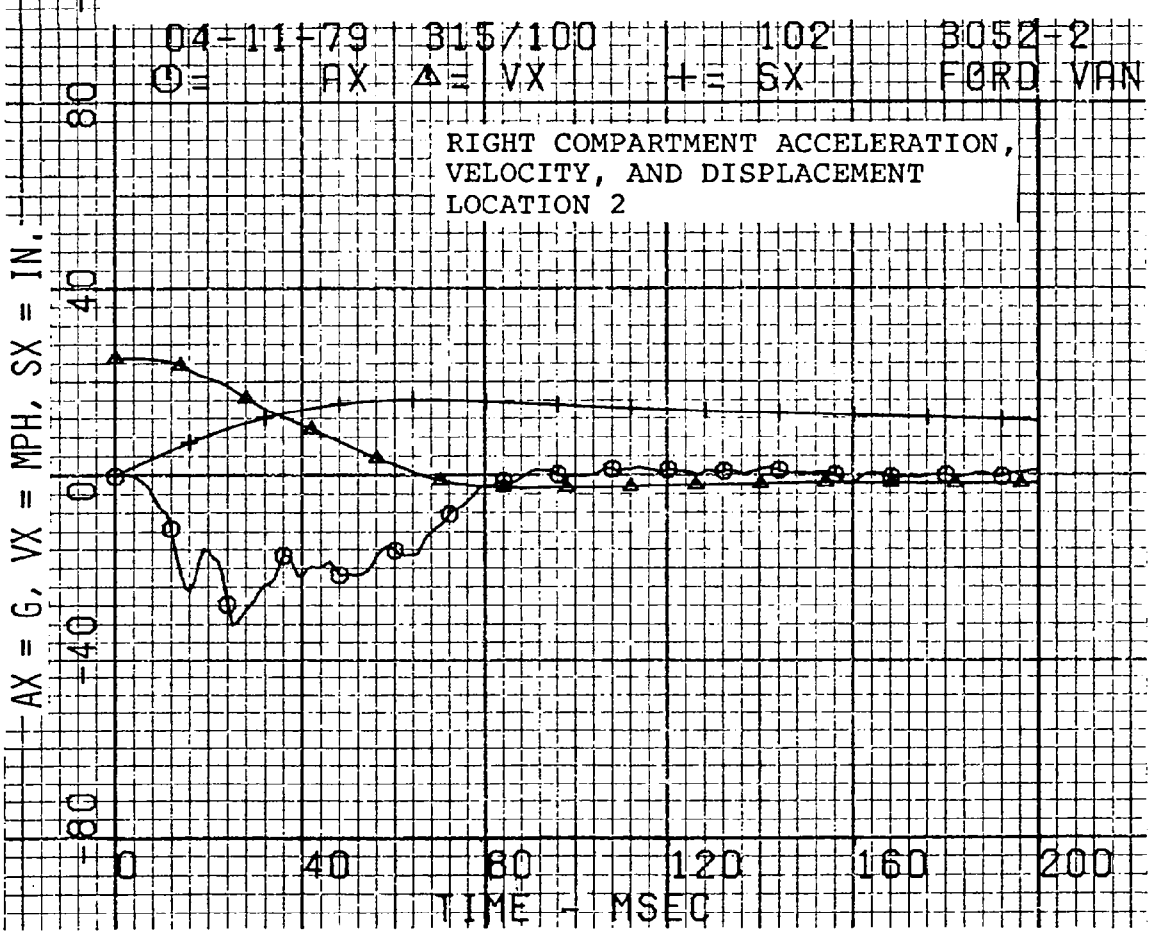
CALCOMP PLOTS FOR
TEST 3052-2

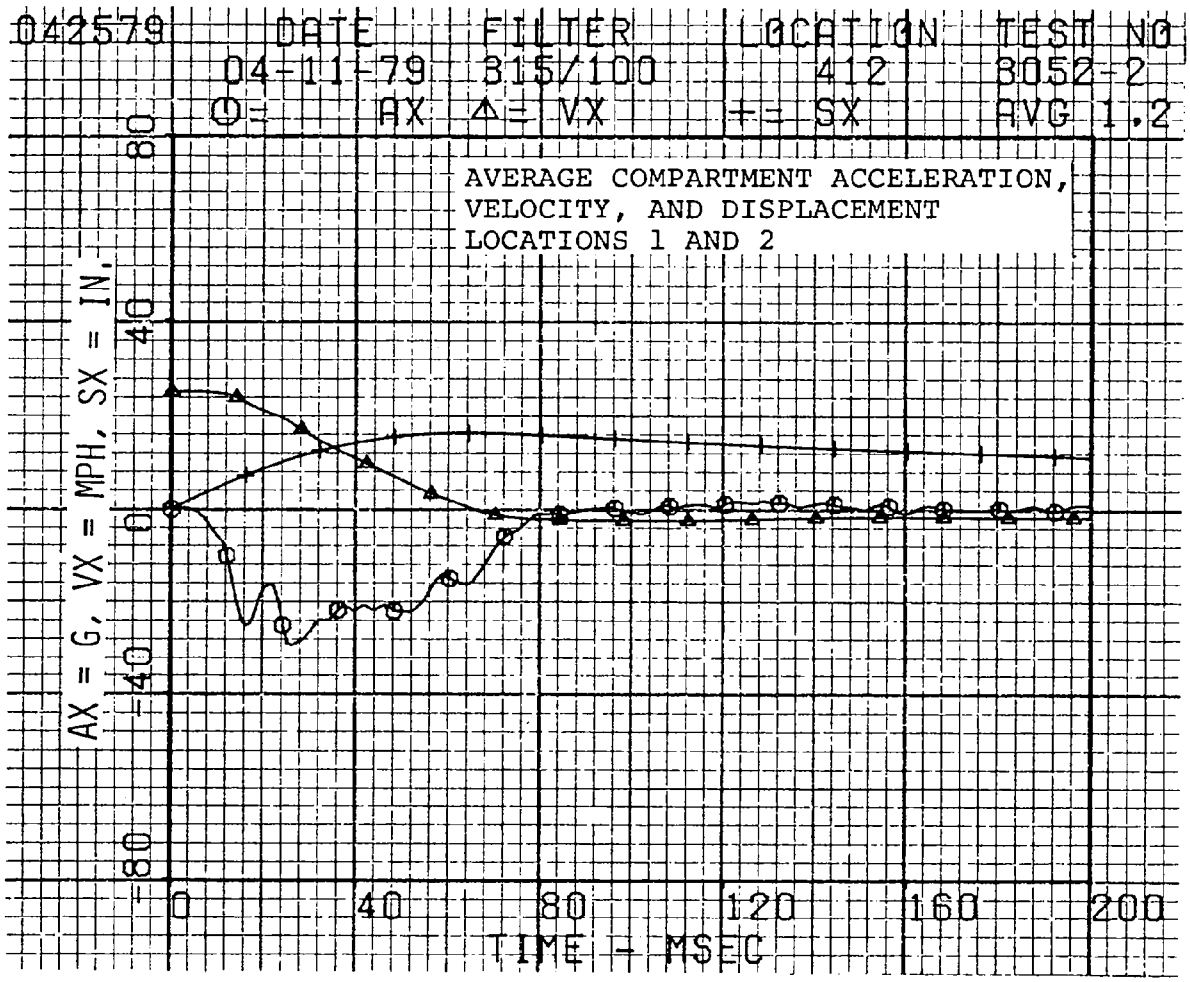
FORD E-150 ECONOLINE VAN-TO-NHTSA FIXED TEST DEVICE
SYMMETRIC HEAD-ON IMPACT

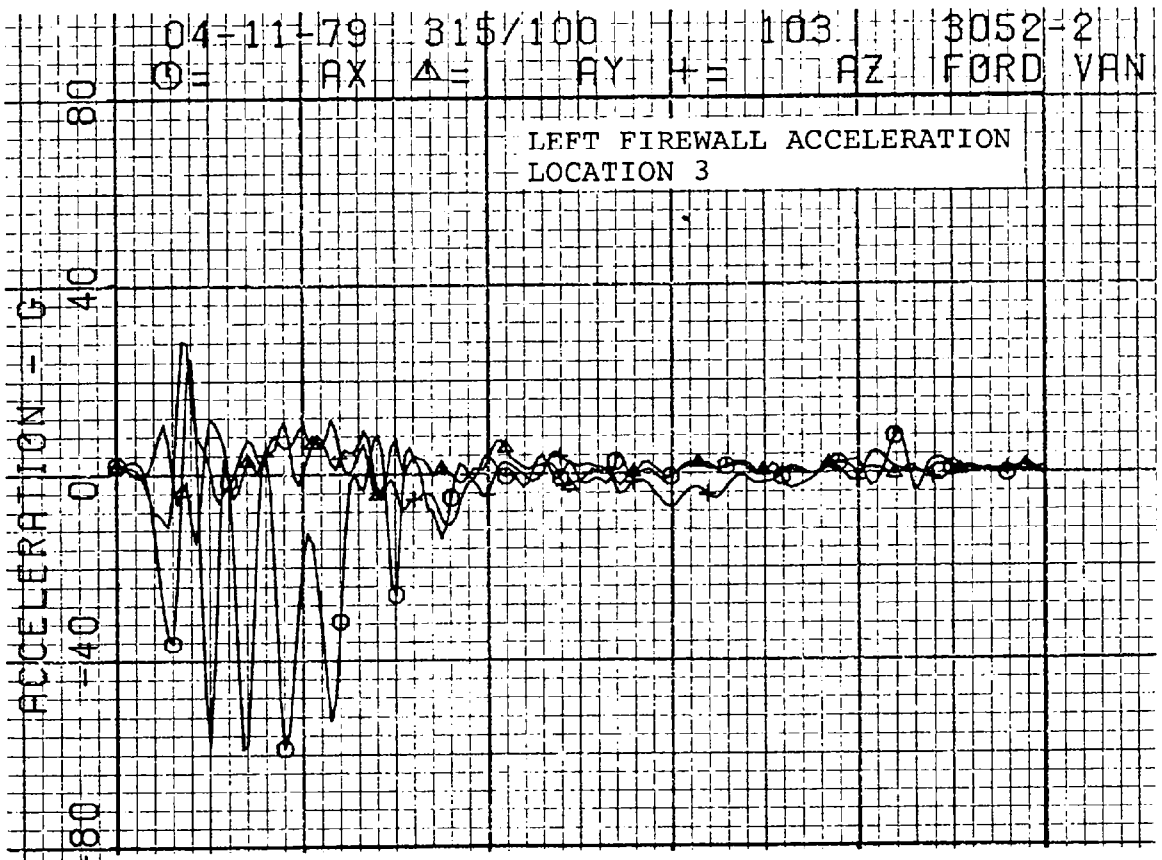
TEST SPEED: 25.10 MPH

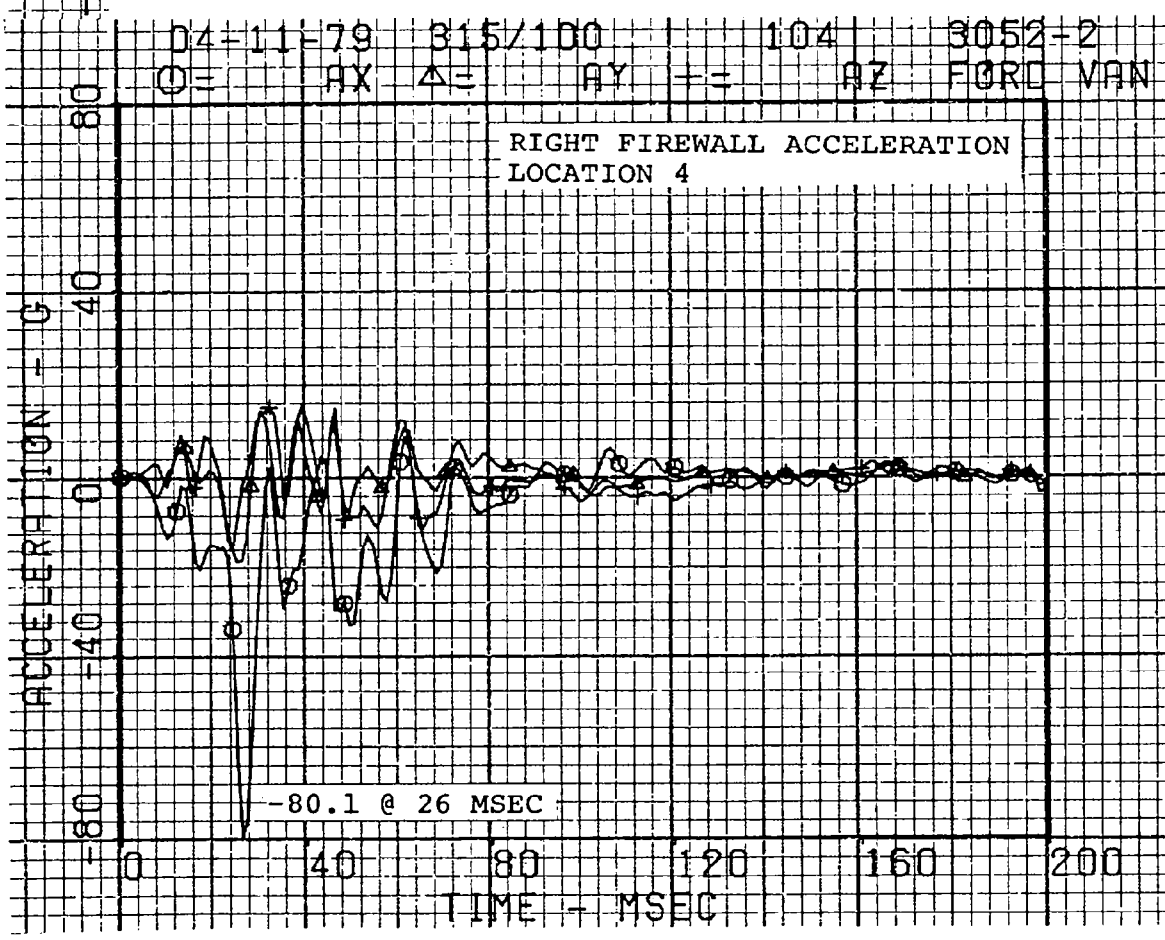
TEST DATE: APRIL 11, 1979

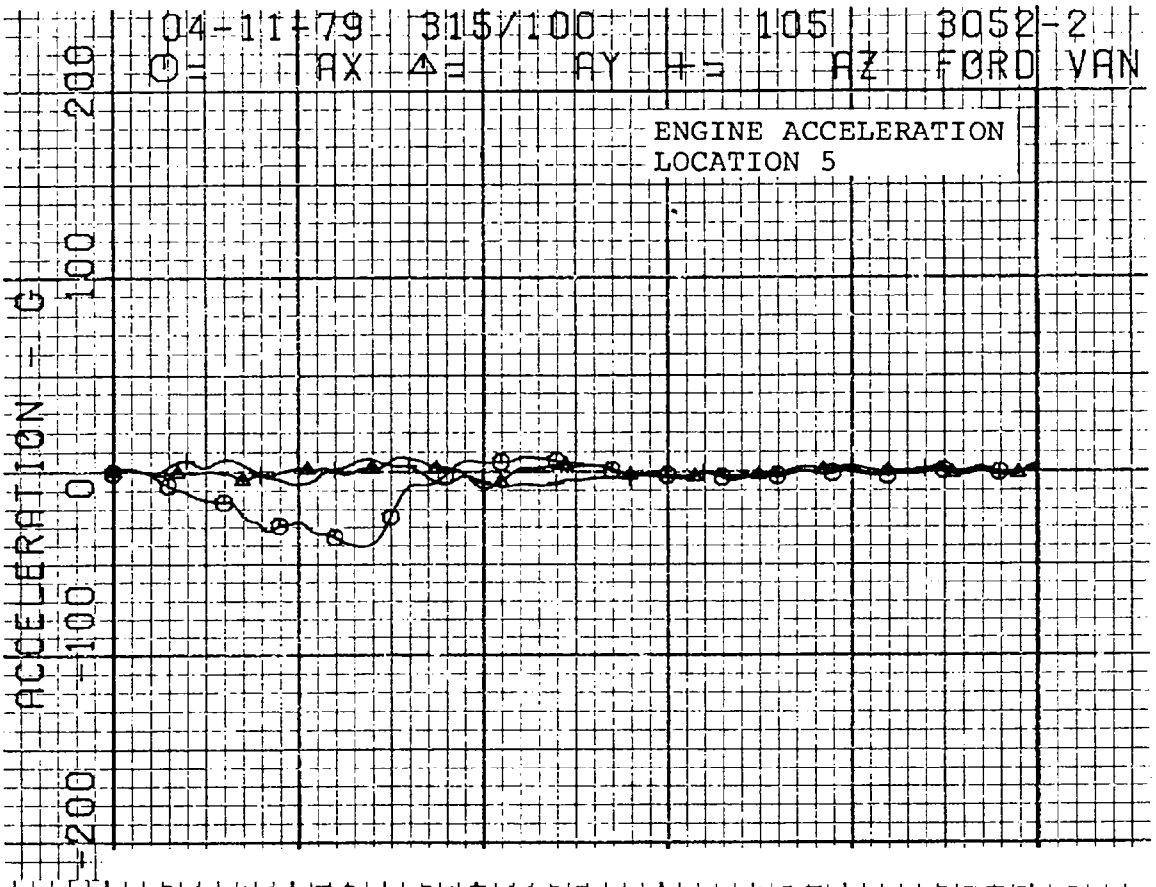

04-11-79 315/100 101 3052-2
O= AX Δ= VX += SX FORD VAN
LEFT COMPARTMENT ACCELERATION,
VELOCITY, AND DISPLACEMENT
LOCATION 1
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80

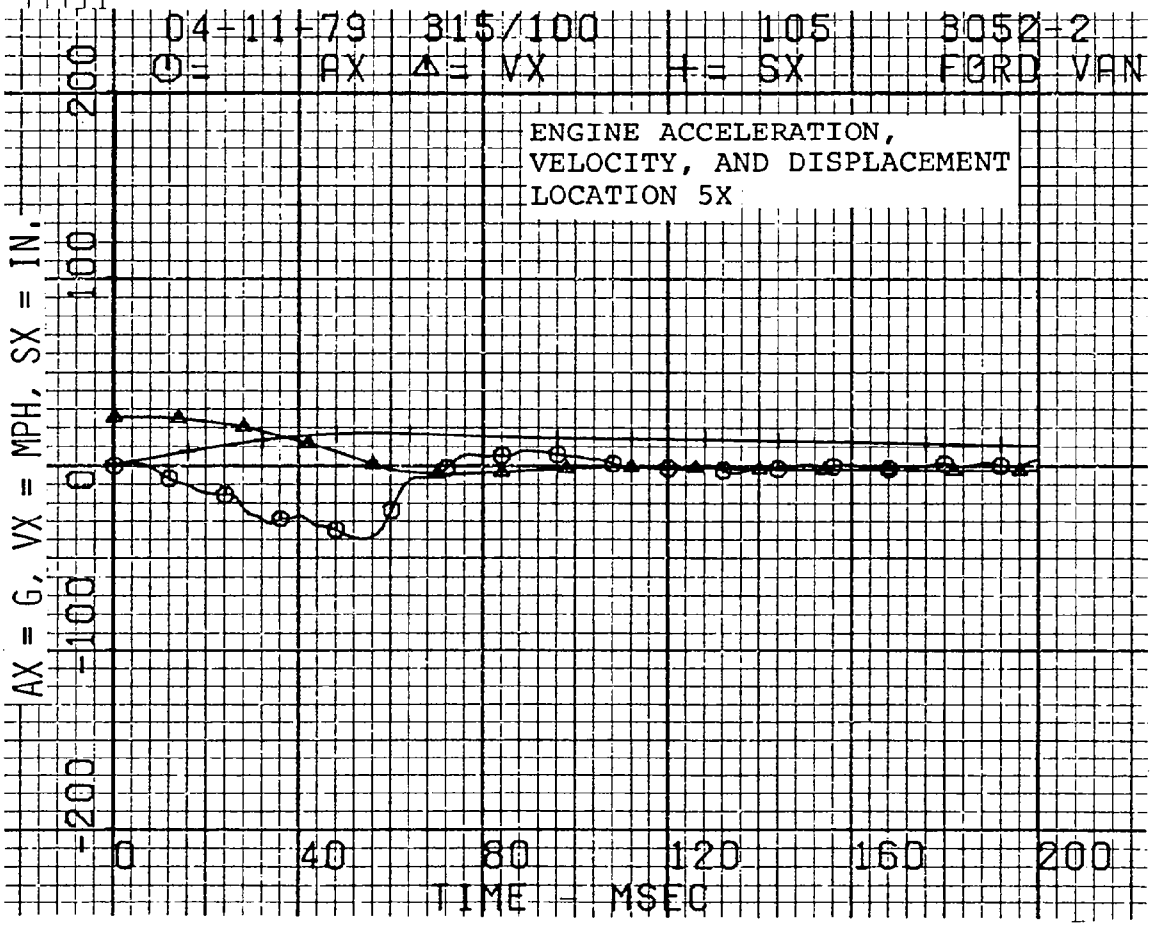

04-11-79 315/100 102 3052-2
O= AX Δ= VX += SX FORD VAN
RIGHT COMPARTMENT ACCELERATION,
VELOCITY, AND DISPLACEMENT
LOCATION 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

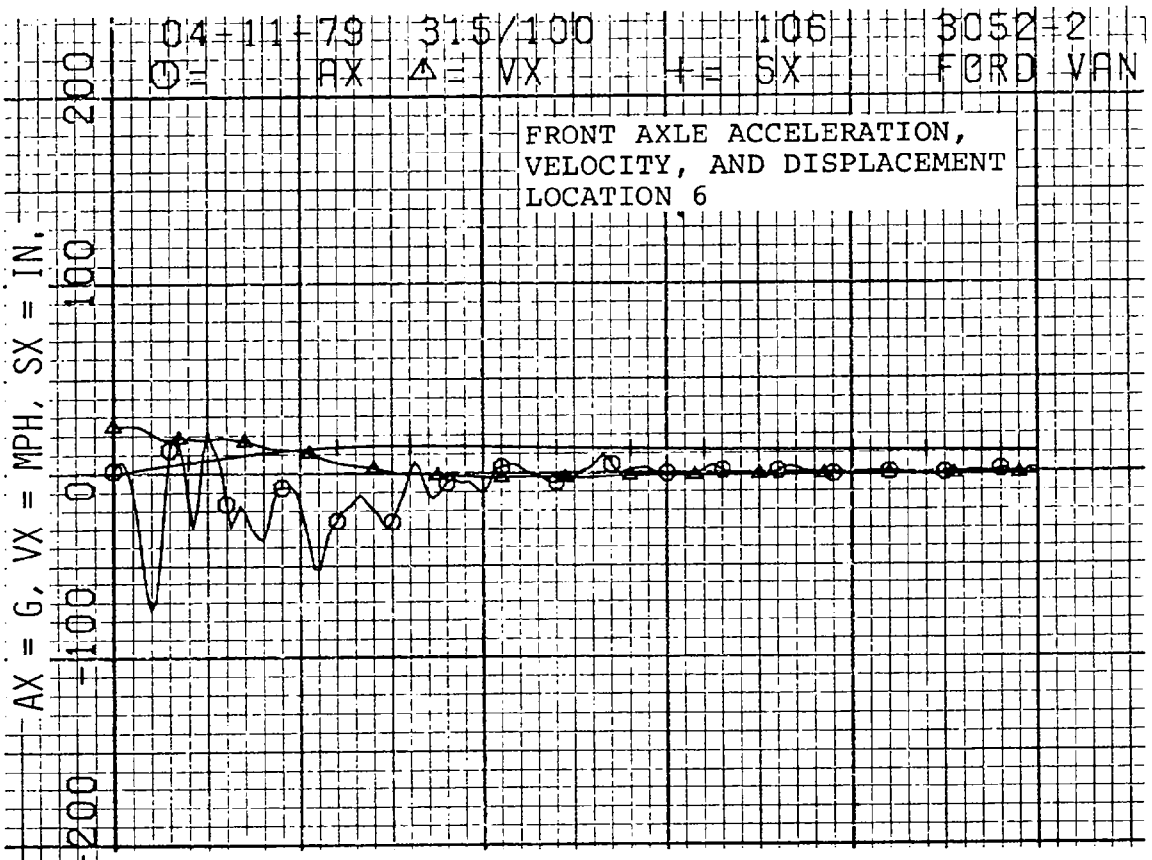

042579
DATE
04-11-79
FILTER
315/100
LOCATION
412
TEST NO
8052-2
O= AX
Δ= VX
+= SX
AVG 1.2
AVERAGE COMPARTMENT ACCELERATION,
VELOCITY, AND DISPLACEMENT
LOCATIONS 1 AND 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

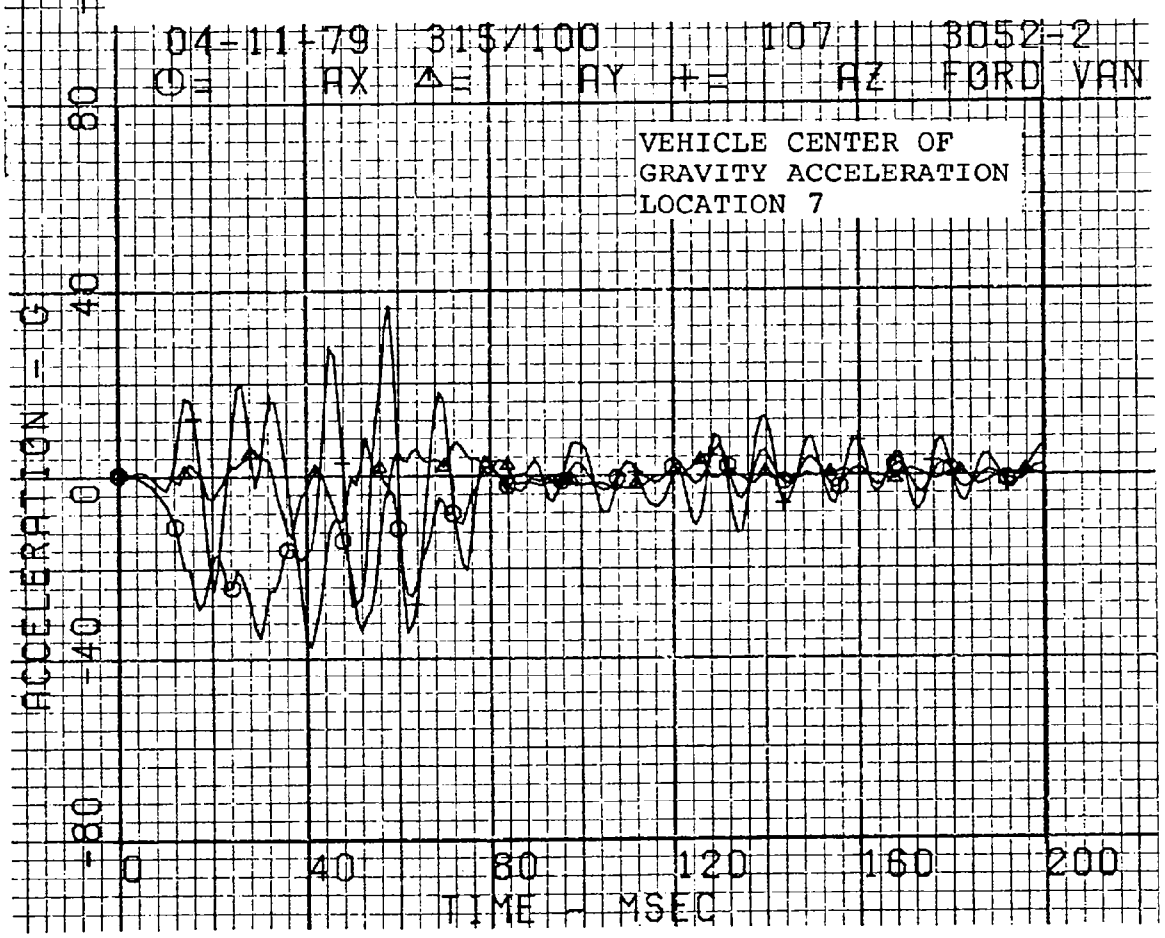

04-11-79 315/100 103 3052-2
⊙= AX △= AY += AZ FORD VAN
LEFT FIREWALL ACCELERATION
LOCATION 3
ACCELERATION - G
80
40
0
-40
-80

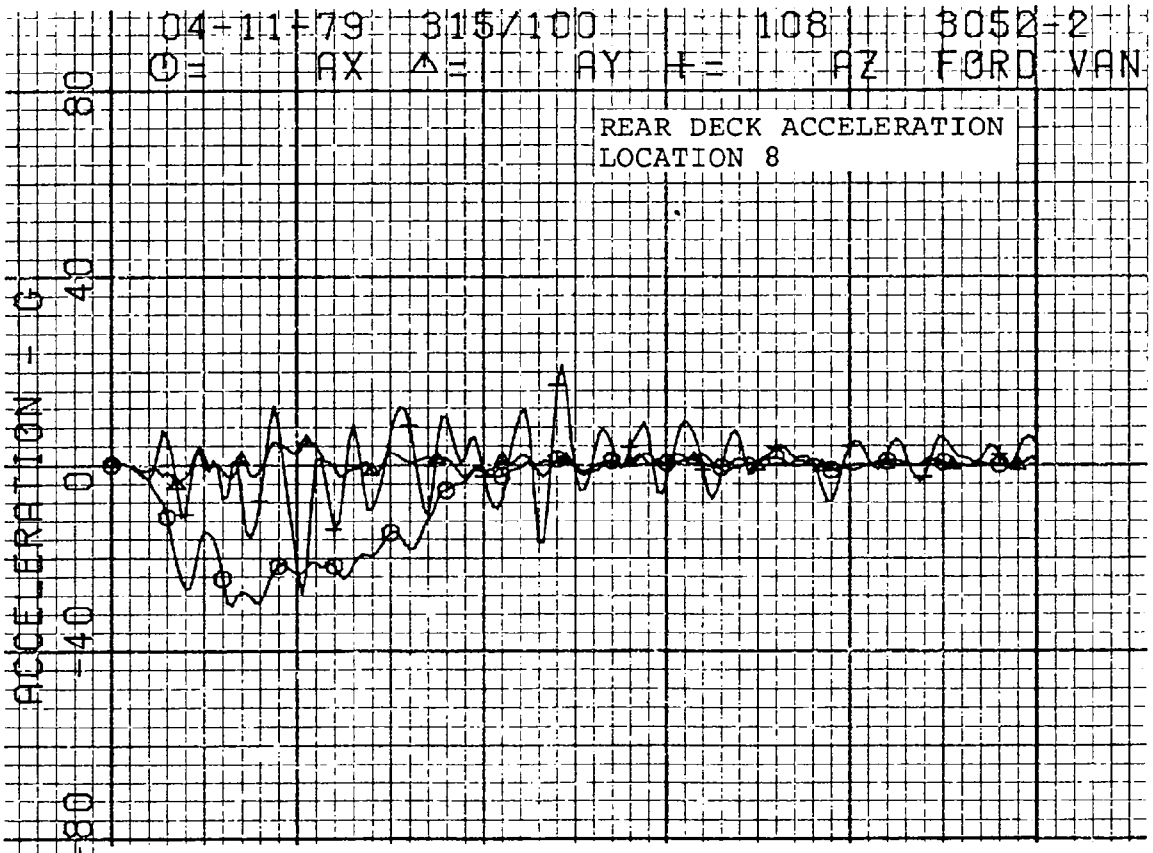

04-11-79 315/100 104 3052-2
⊙= AX △= AY += AZ FORD VAN
RIGHT FIREWALL ACCELERATION
LOCATION 4
ACCELERATION - G
80
40
0
-40
-80
-80.1 @ 26 MSEC
0
40
80
120
160
200
TIME - MSEC

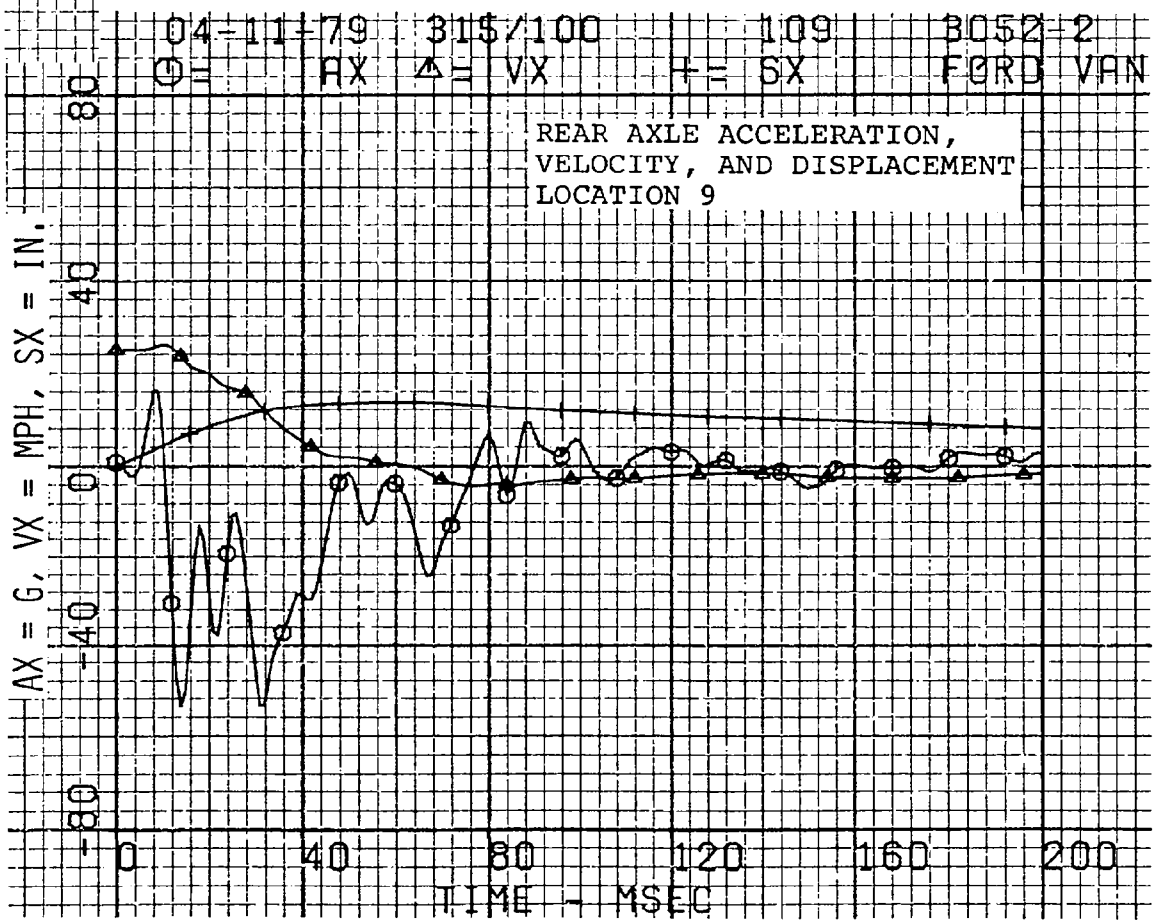

04-11-79 315/100 105 3052-2
O= AX △= AY += AZ FORD VAN
ENGINE ACCELERATION
LOCATION 5
ACCELERATION = G
200
100
0
-100
-200

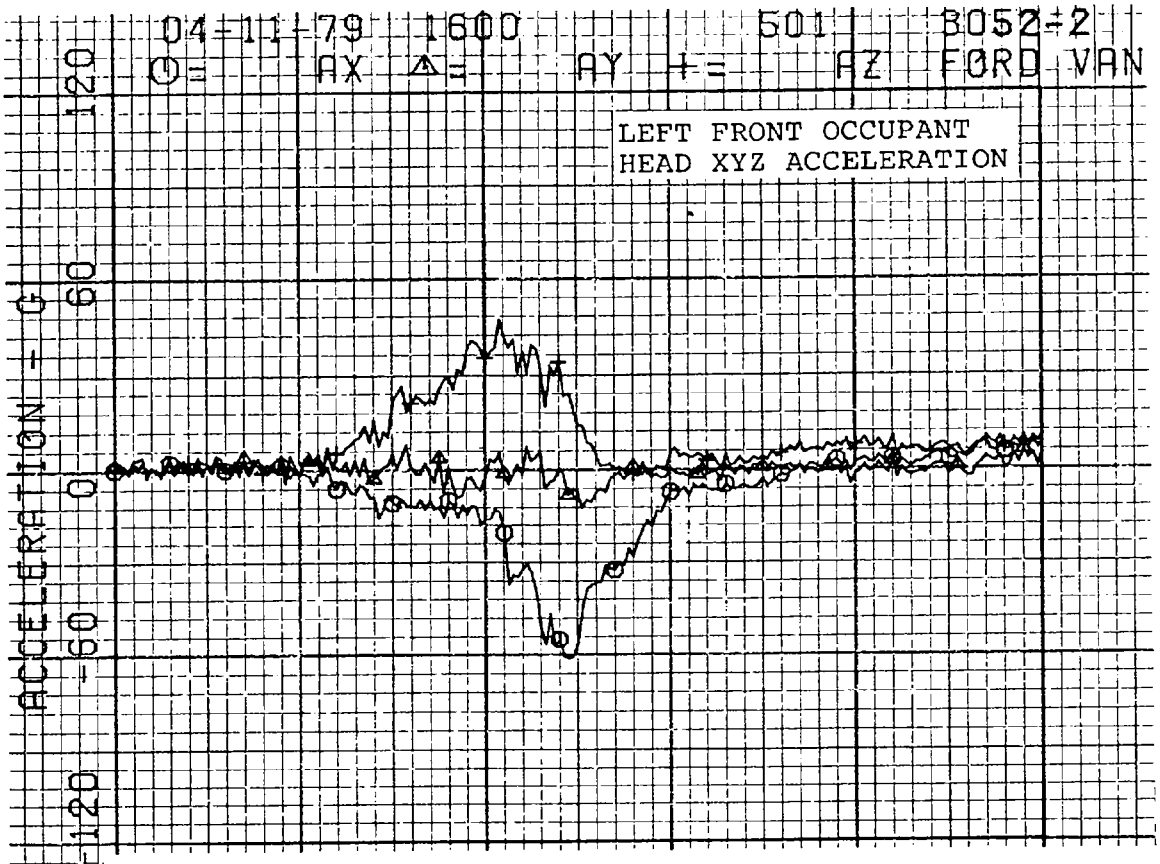

04-11-79 315/100 105 3052-2
O= AX △= VX += SX FORD VAN
ENGINE ACCELERATION,
VELOCITY, AND DISPLACEMENT
LOCATION 5X
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200
0
40
80
120
160
200
TIME - MSEC

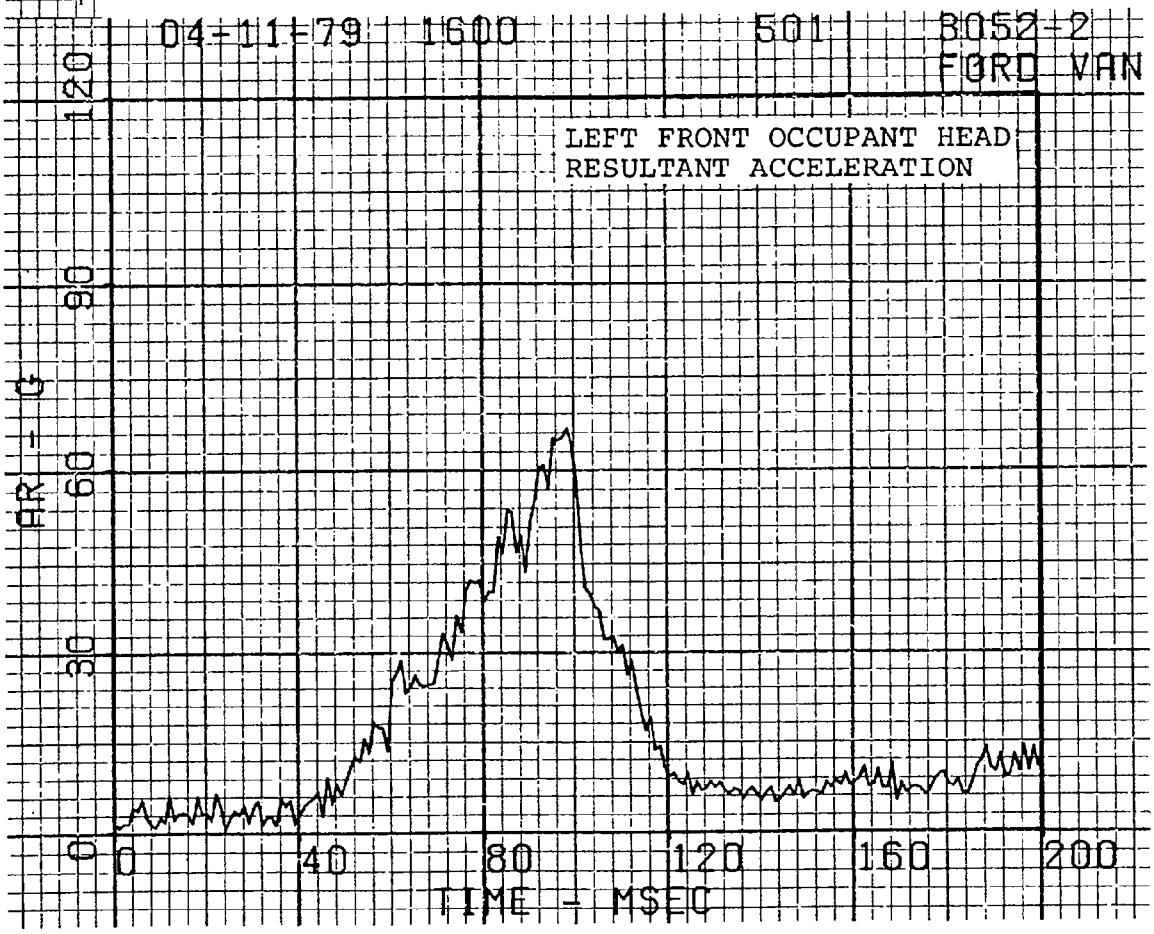

04-11-79 315/100 106 3052-2
O= AX △= VX += SX FORD VAN
FRONT AXLE ACCELERATION, VELOCITY, AND DISPLACEMENT LOCATION 6
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200

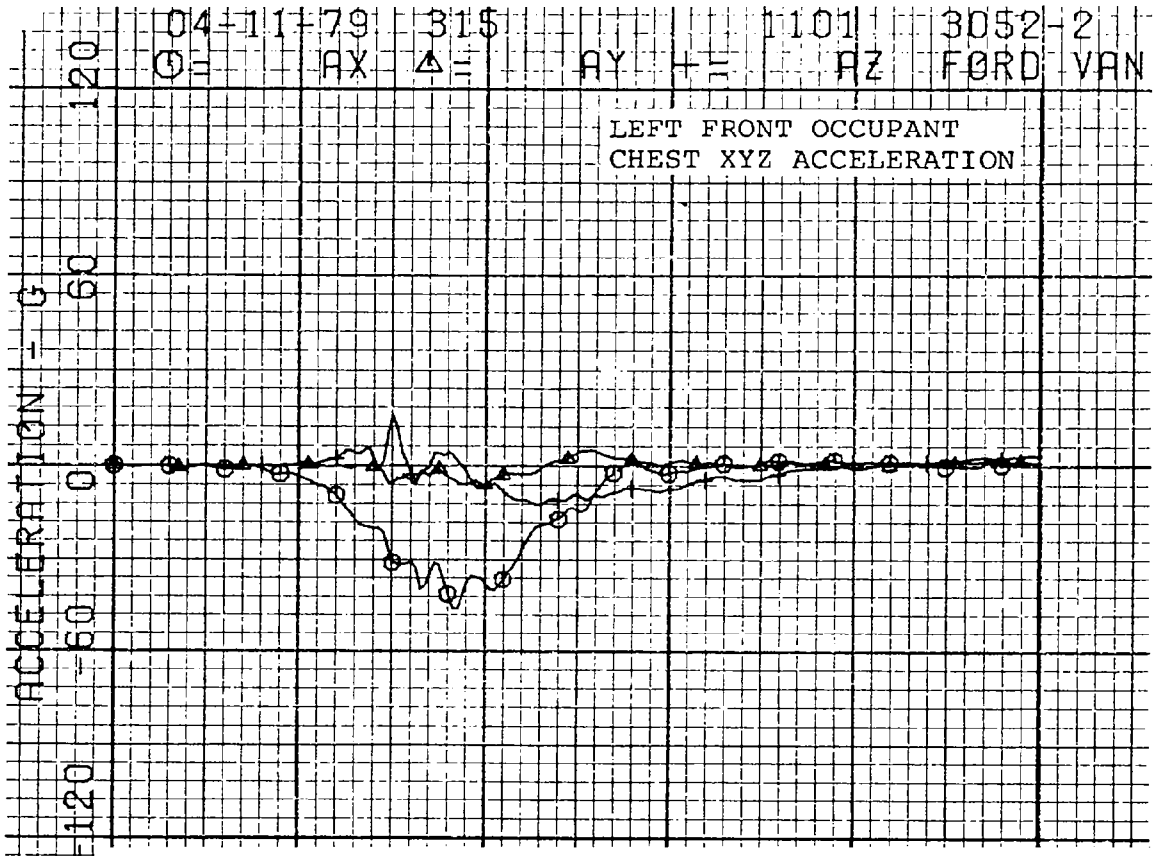

04-11-79 315/100 107 3052-2
O= AX △= AY += AZ FORD VAN
VEHICLE CENTER OF GRAVITY ACCELERATION LOCATION 7
ACCELERATION - G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

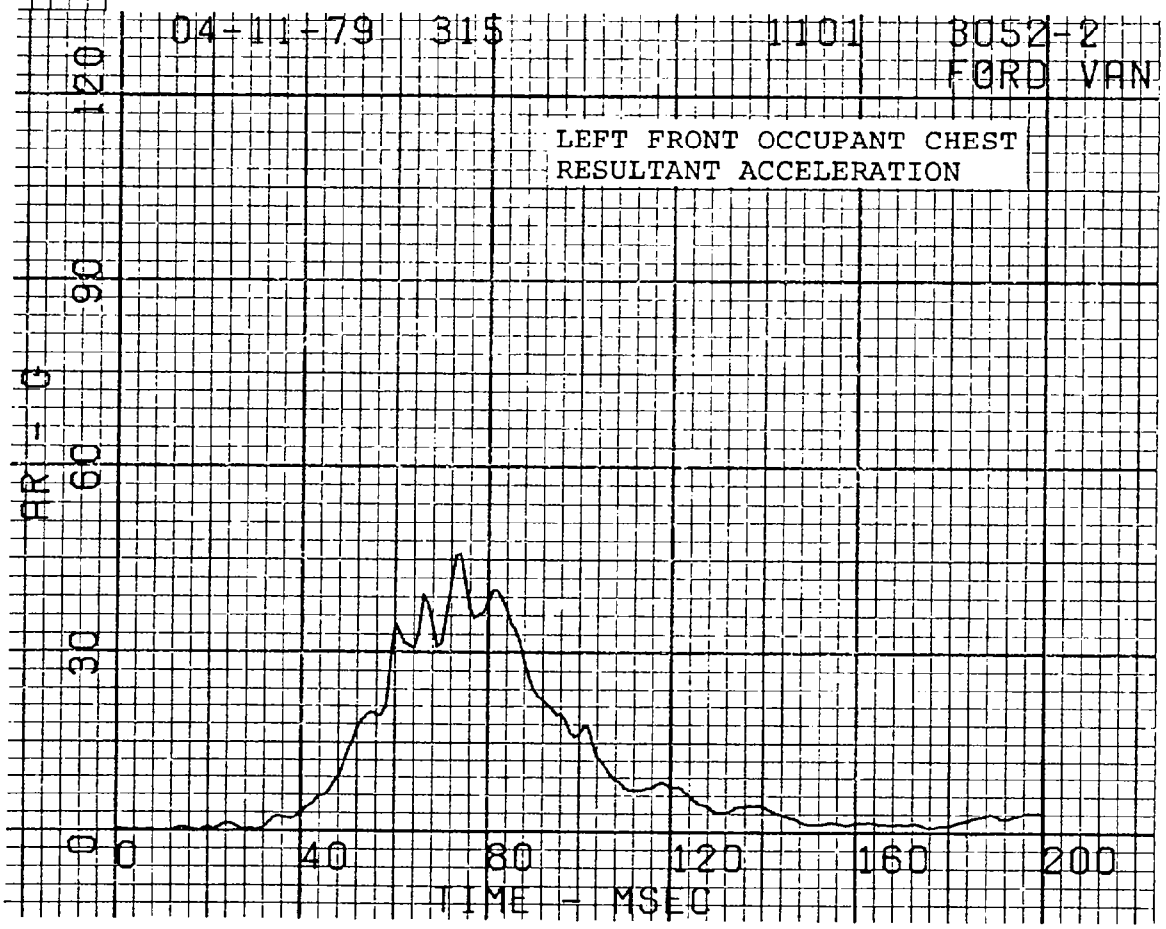

04-11-79 315/100 108 3052-2
⊙= AX △= AY += AZ FORD VAN
REAR DECK ACCELERATION
LOCATION 8
ACCELERATION - G
80
40
0
-40
-80

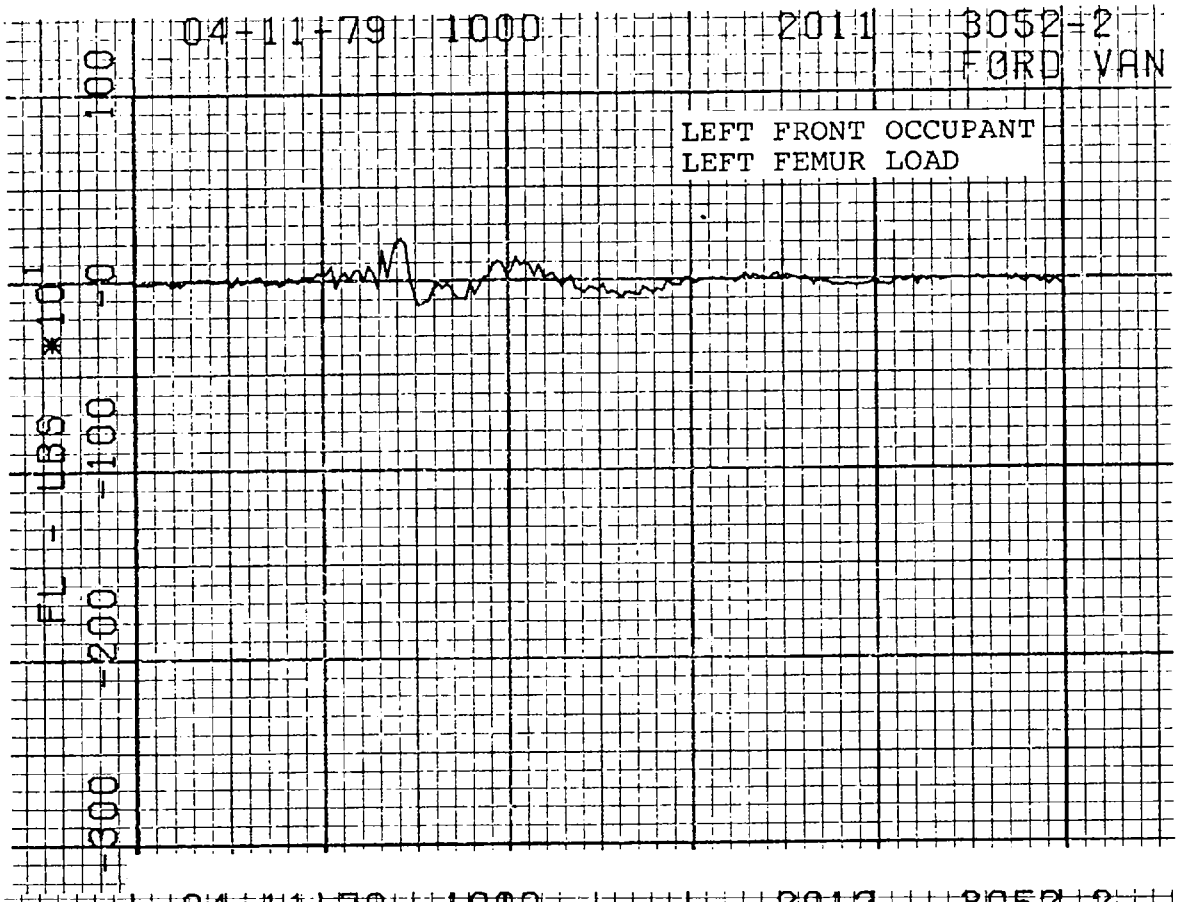

04-11-79 315/100 109 3052-2
⊙= AX △= VX += SX FORD VAN
REAR AXLE ACCELERATION,
VELOCITY, AND DISPLACEMENT
LOCATION 9
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

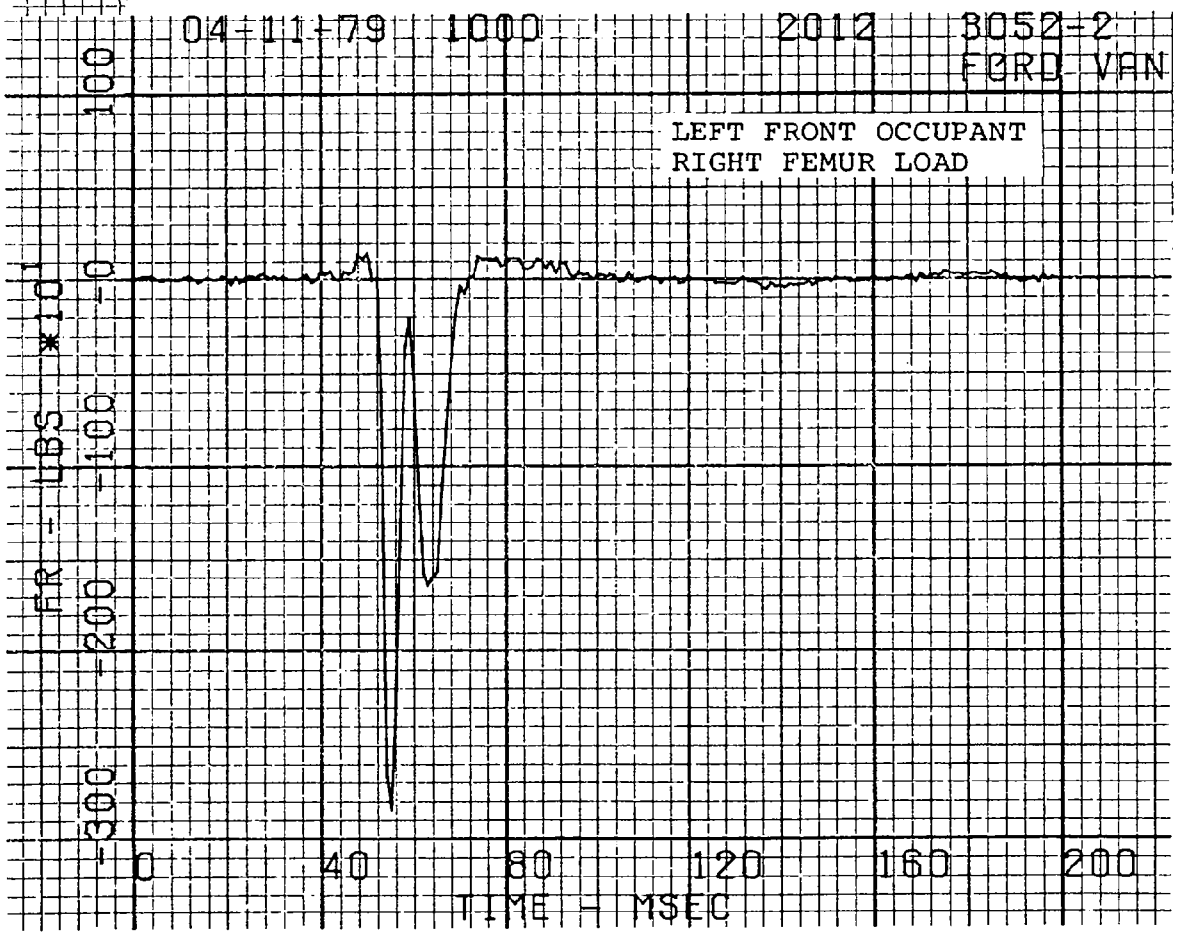

04-11-79 1600 501 3052-2
O= AX △= AY += AZ FORD VAN
LEFT FRONT OCCUPANT
HEAD XYZ ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

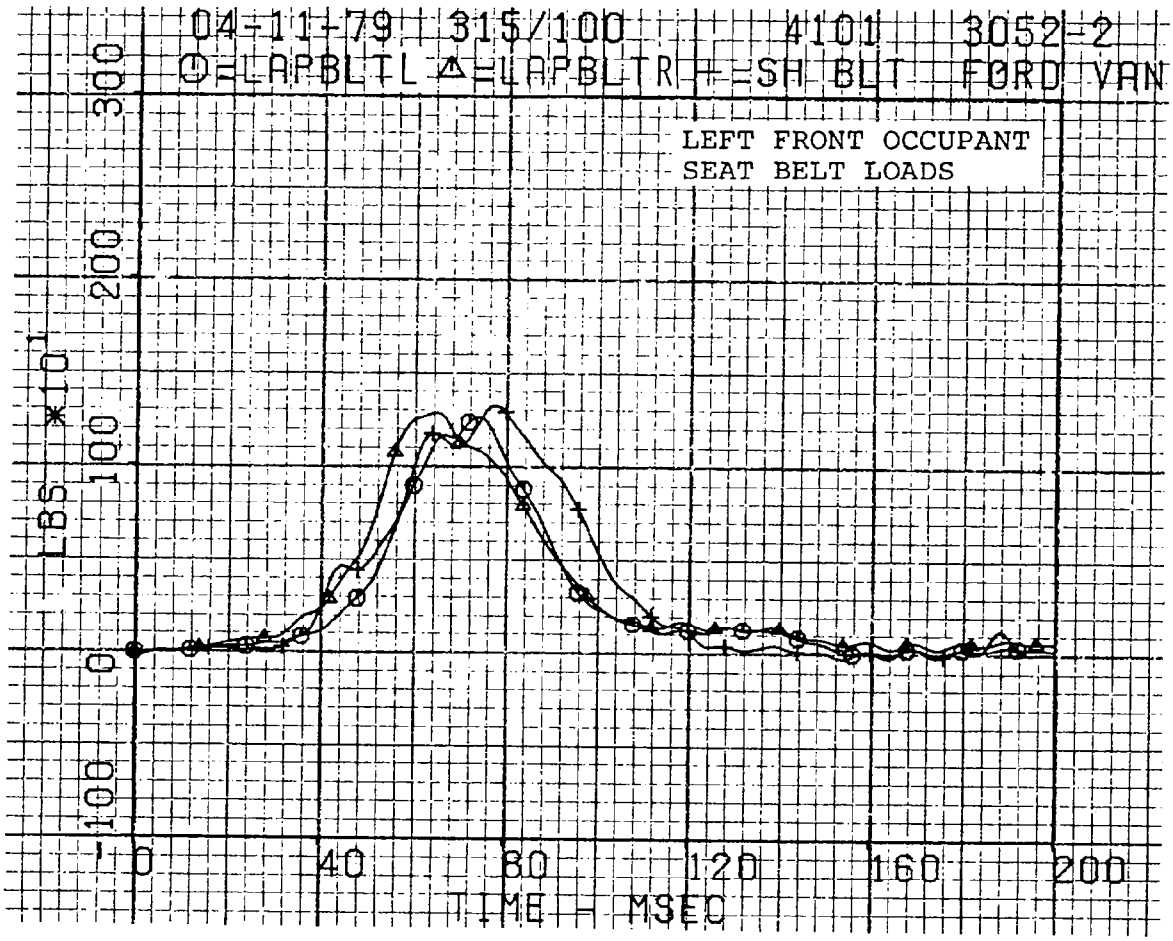

04-11-79 1600 501 3052-2
FORD VAN
LEFT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

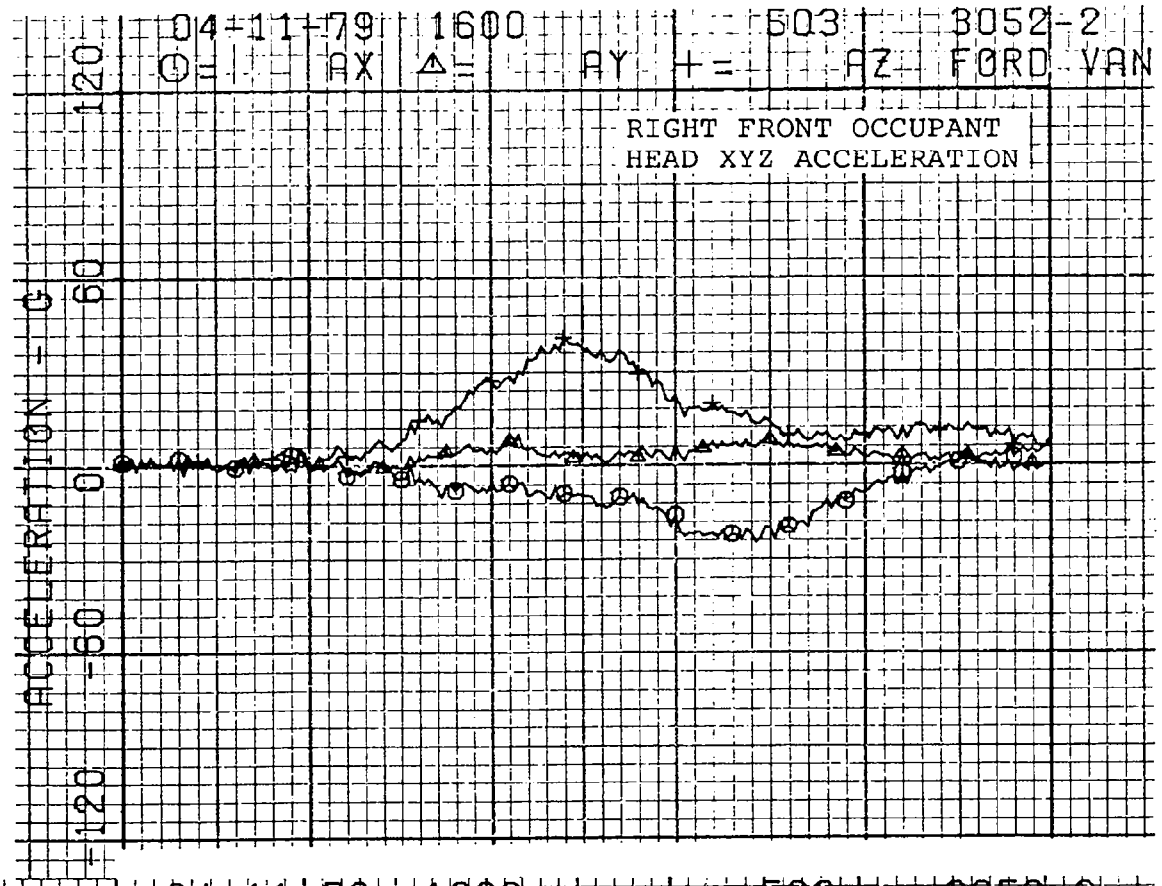

04-11-79 31$ 1101 3052-2
O= AX Δ= AY += AZ FORD VAN
LEFT FRONT OCCUPANT
CHEST XYZ ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

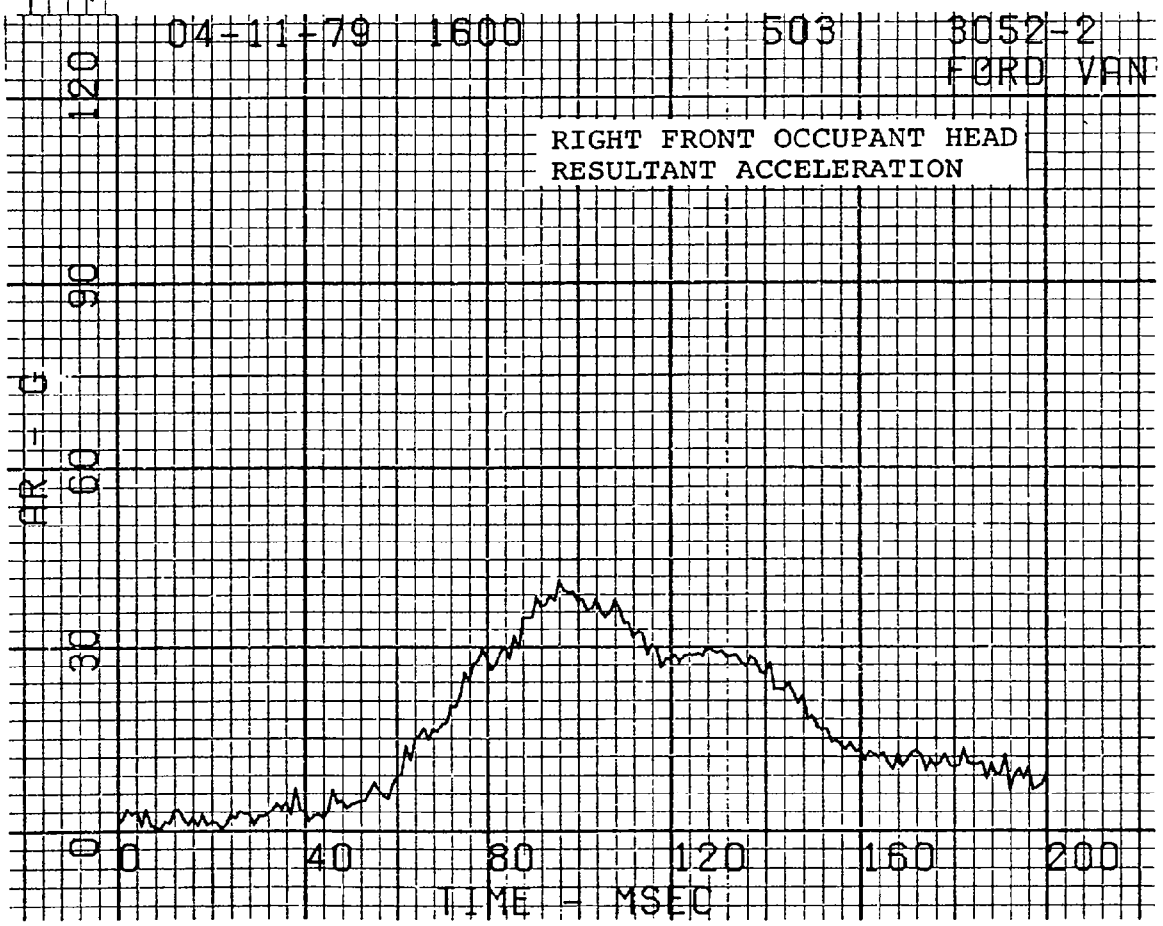

04-11-79 31$ 1101 3052-2
FORD VAN
LEFT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

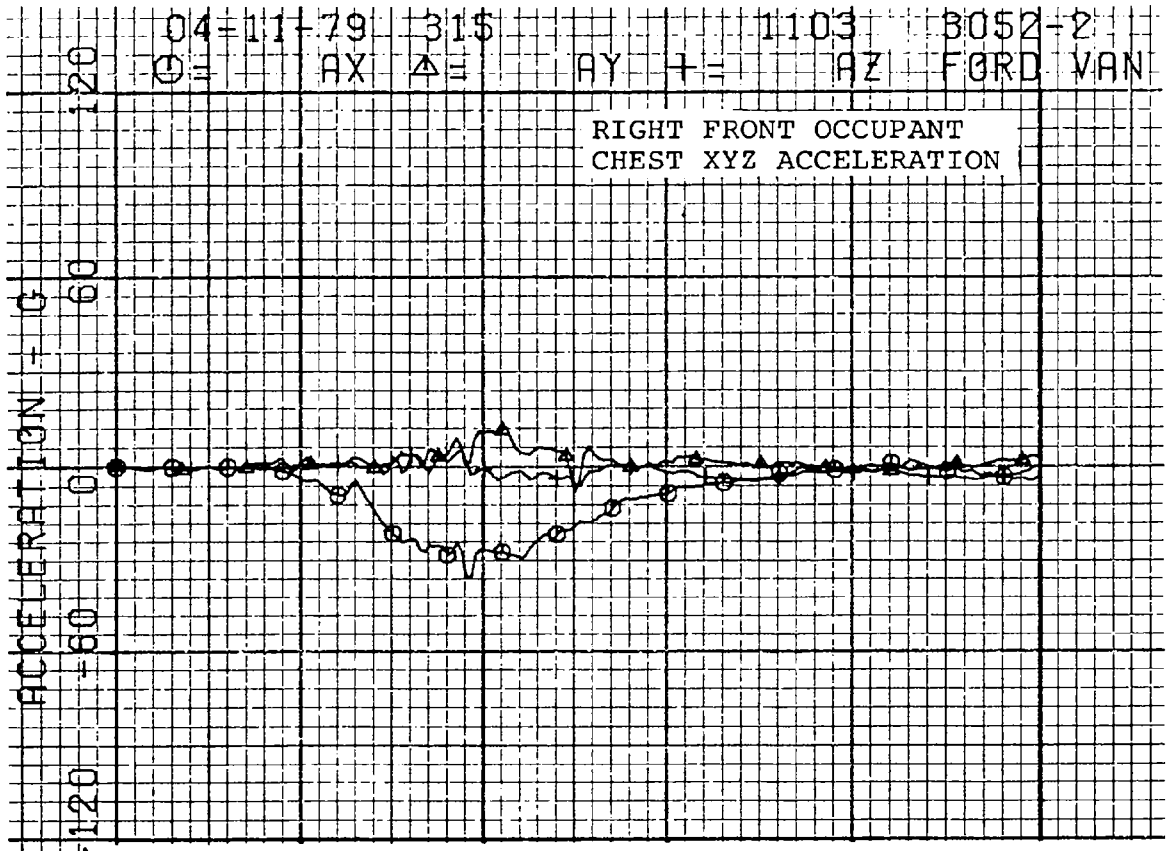

04-11-79 1000 2011 3052-2
FORD VAN
LEFT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
0
-100
-200
-300

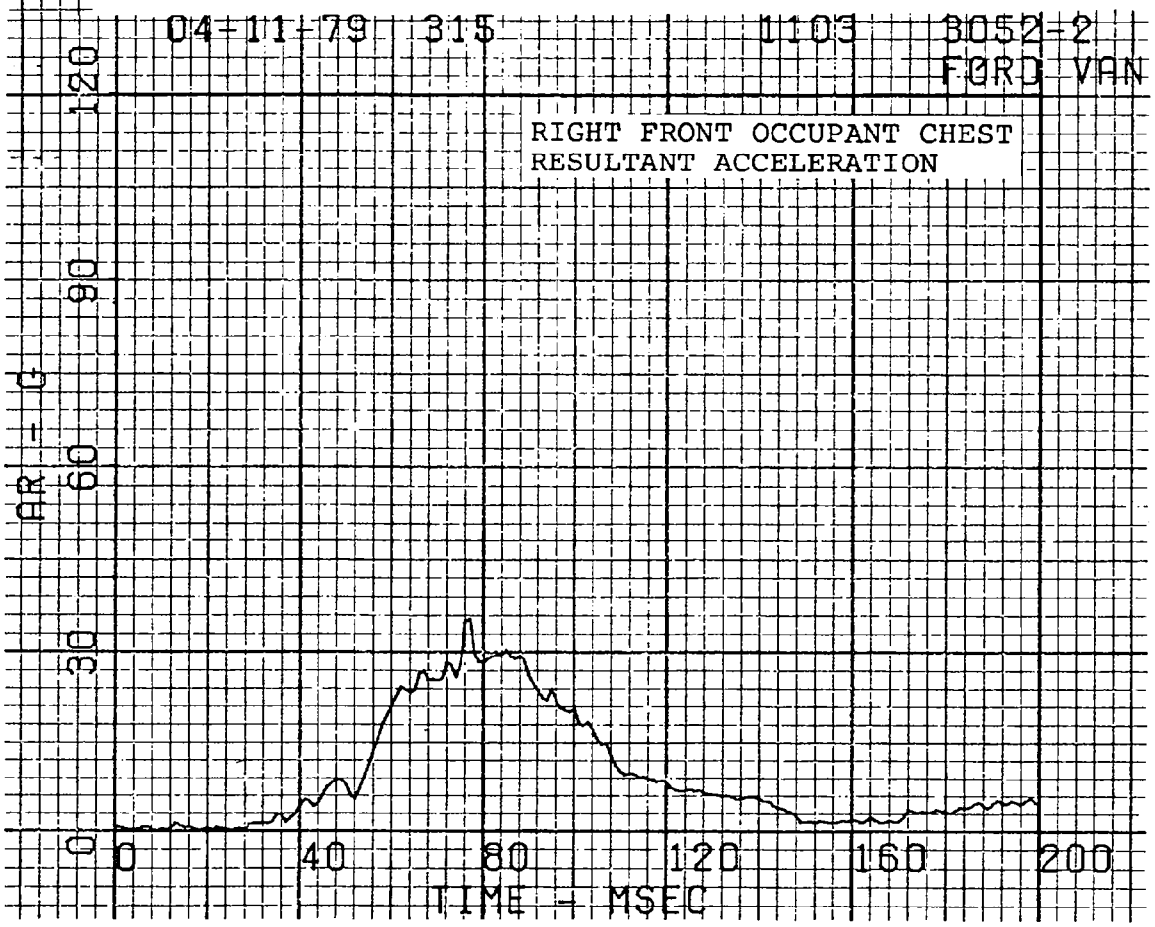

04-11-79 1000 2012 3052-2
FORD VAN
LEFT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

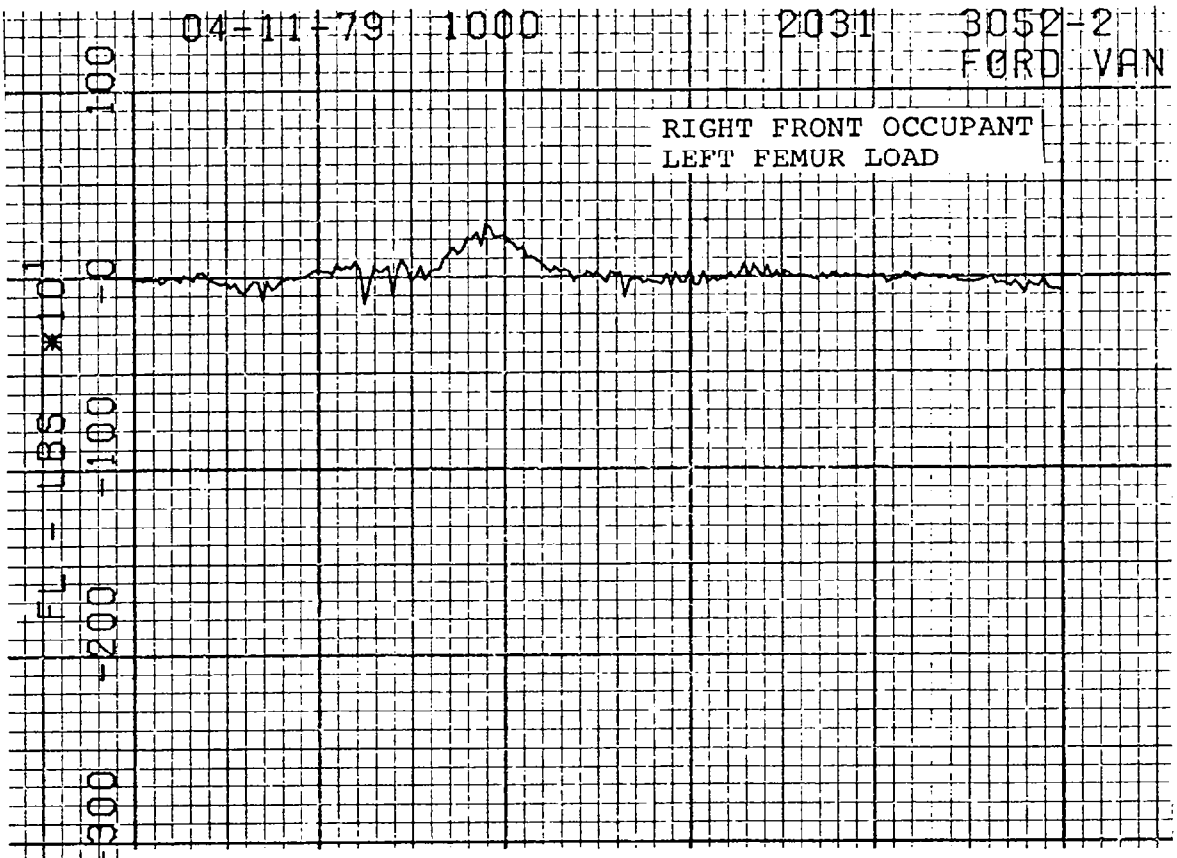

04-11-79 31$/100 4101 3052-2
O=LAPBLTL △=LAPBLTR +=SH BLT FORD VAN
LEFT FRONT OCCUPANT
SEAT BELT LOADS
LBS *10¹
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC

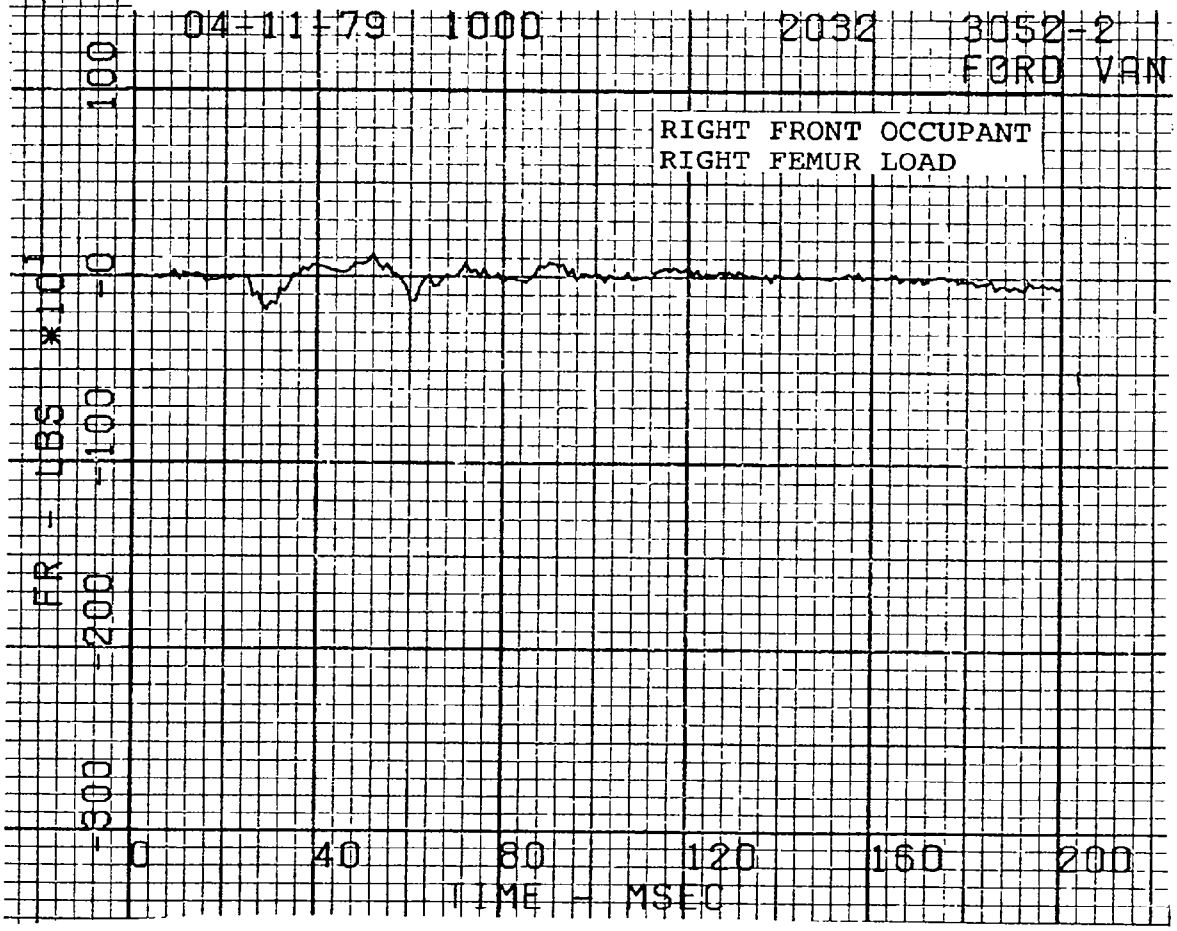

04-11-79 1600 503 3052-2
O= AX Δ= AY + = AZ FORD VAN
RIGHT FRONT OCCUPANT
HEAD XYZ ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

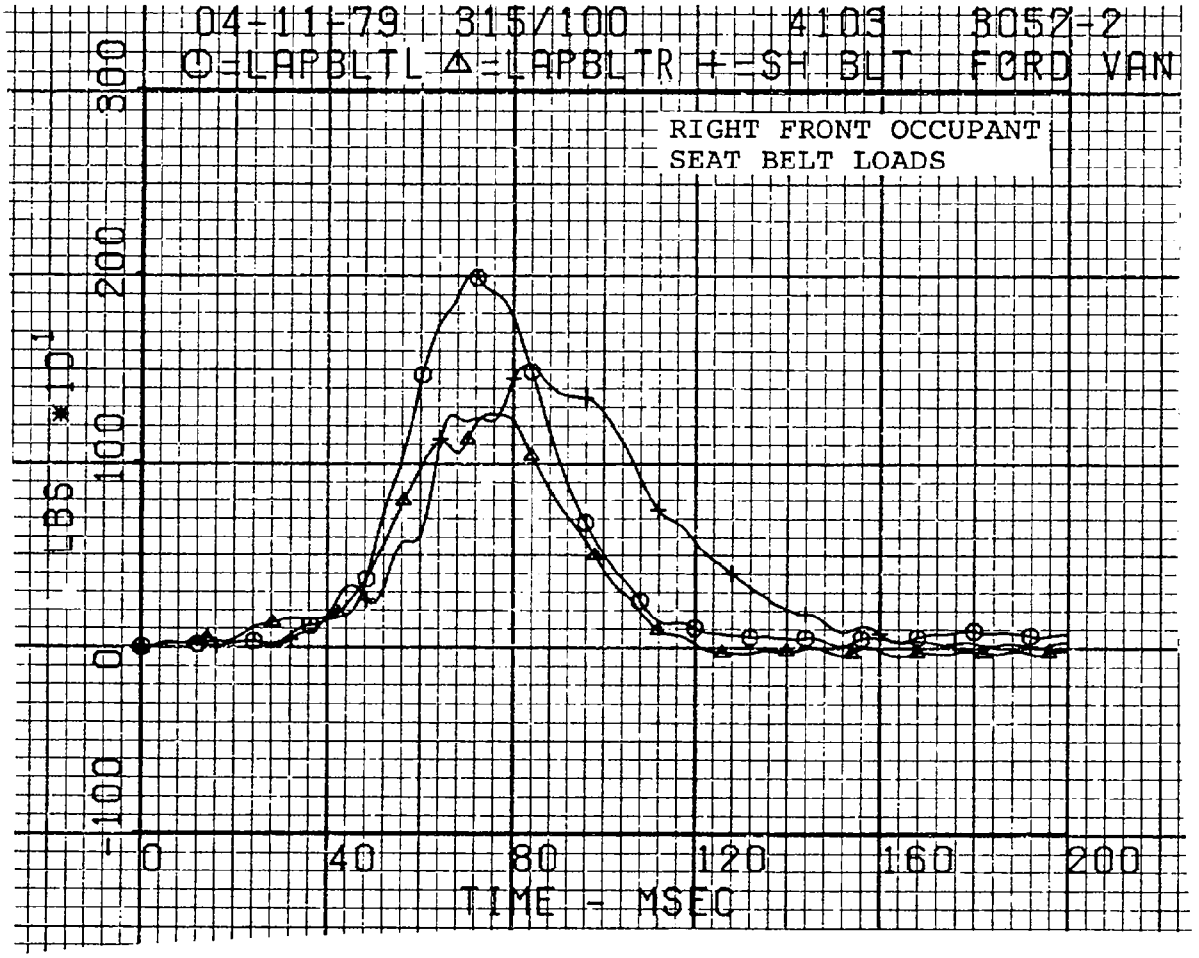

04-11-79 1600 503 3052-2
FORD VAN
RIGHT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

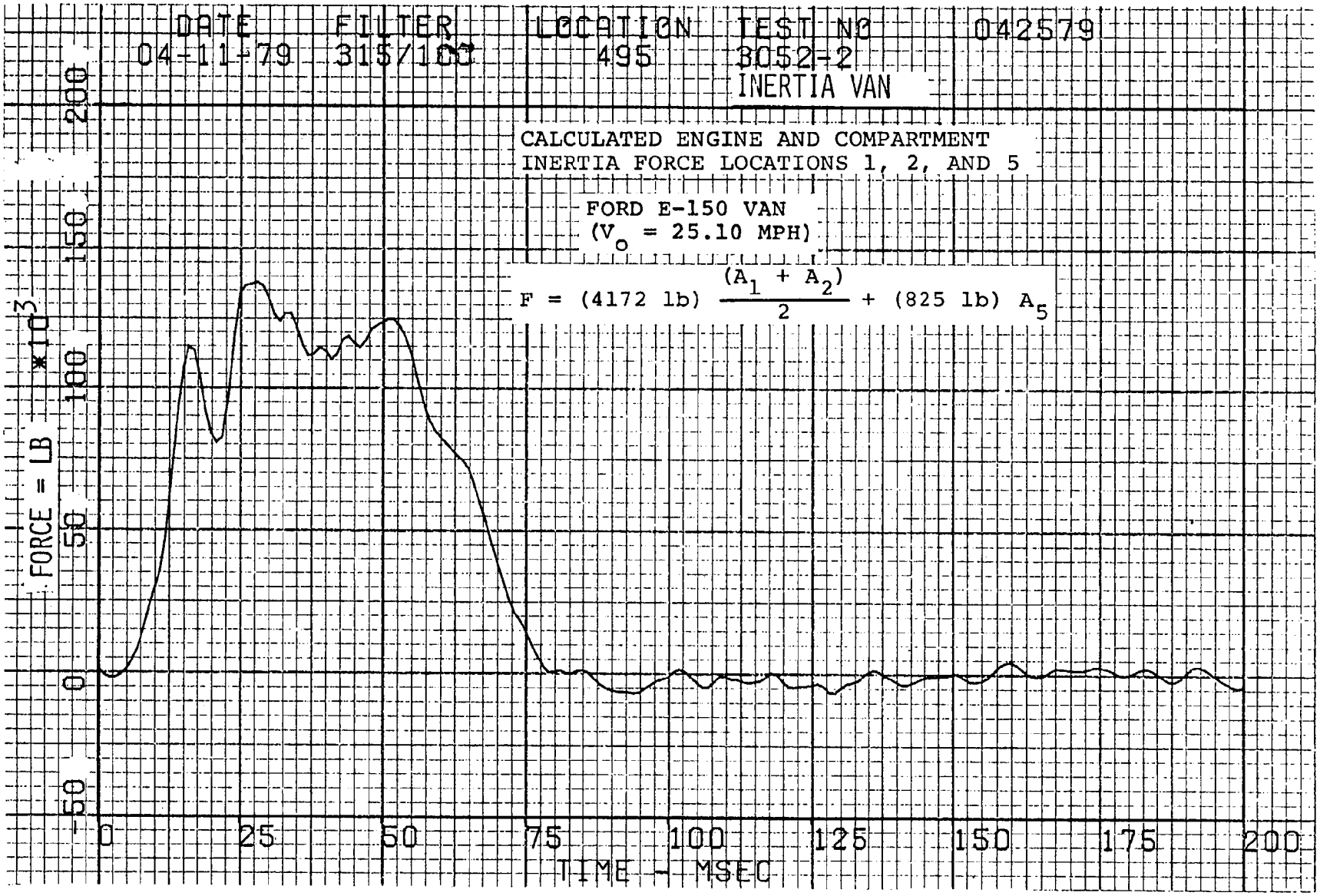

04-11-79 315 1103 3052-2
⊙= AX △= AY += AZ FORD VAN
RIGHT FRONT OCCUPANT
CHEST XYZ ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

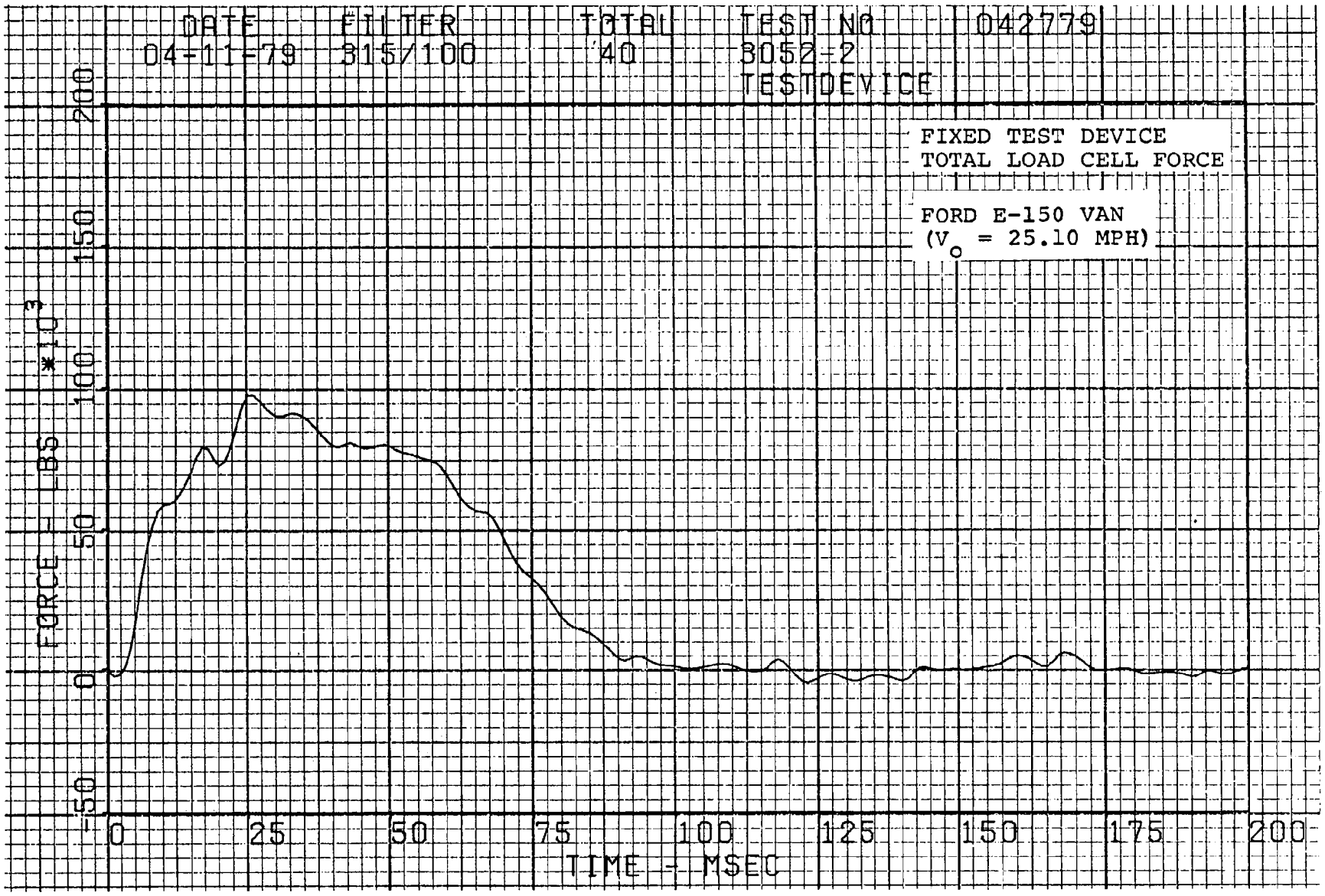

04-11-79 315 1103 3052-2
FORD VAN
RIGHT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

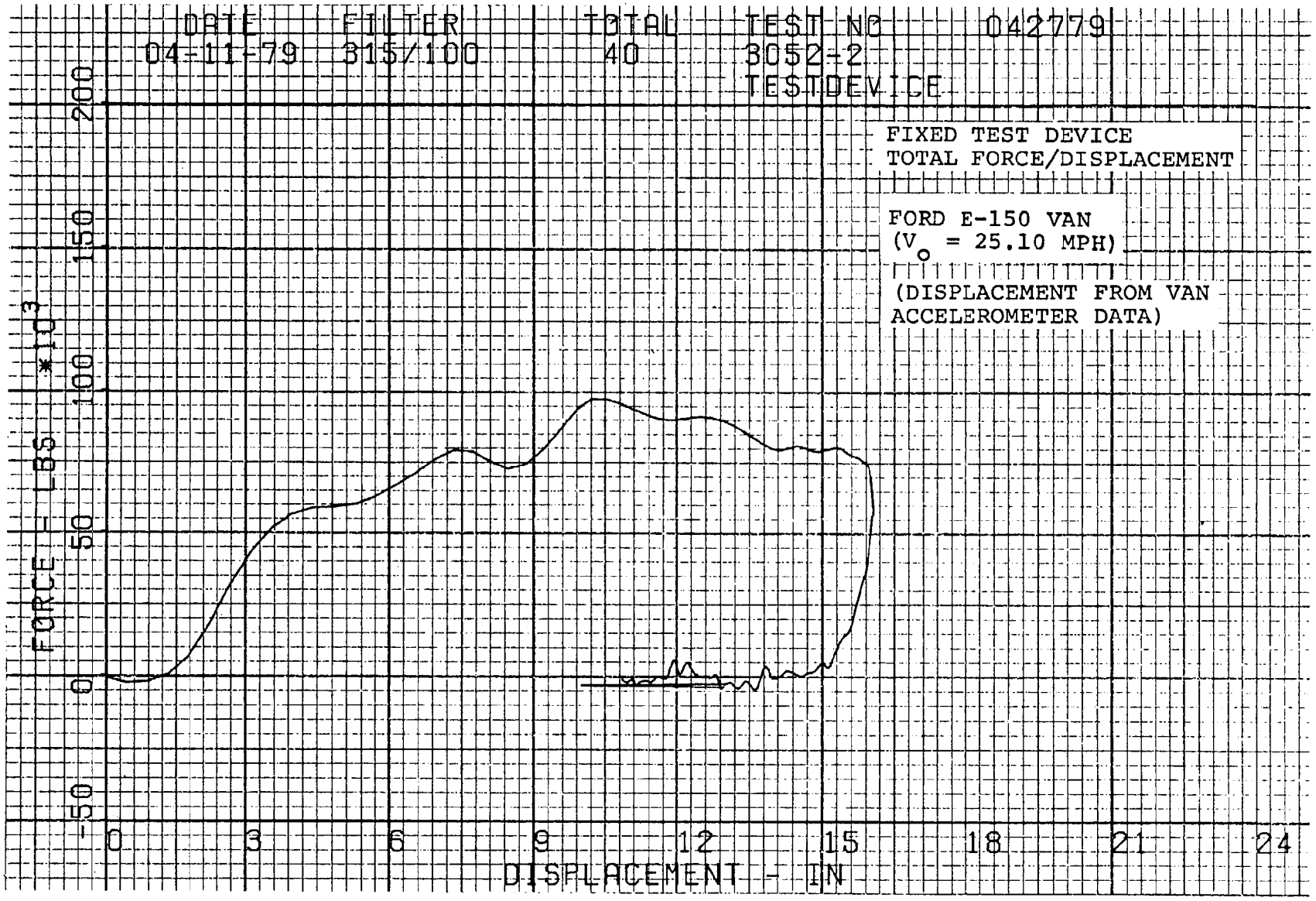

04-11-79 1000 2031 3052-2
FORD VAN
RIGHT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
0
-100
-200
-300

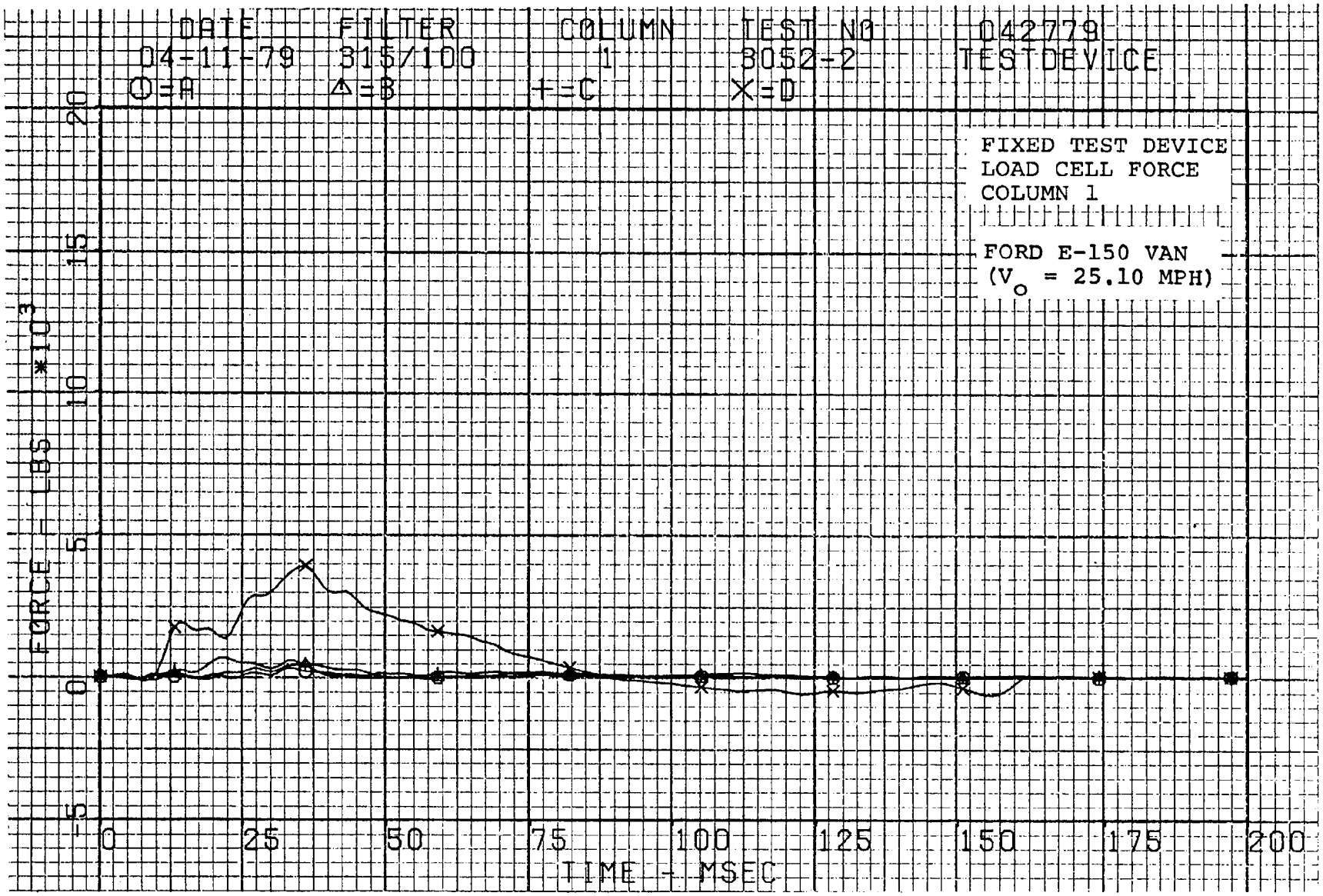

04-11-79 1000 2032 3052-2
FORD VAN
RIGHT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

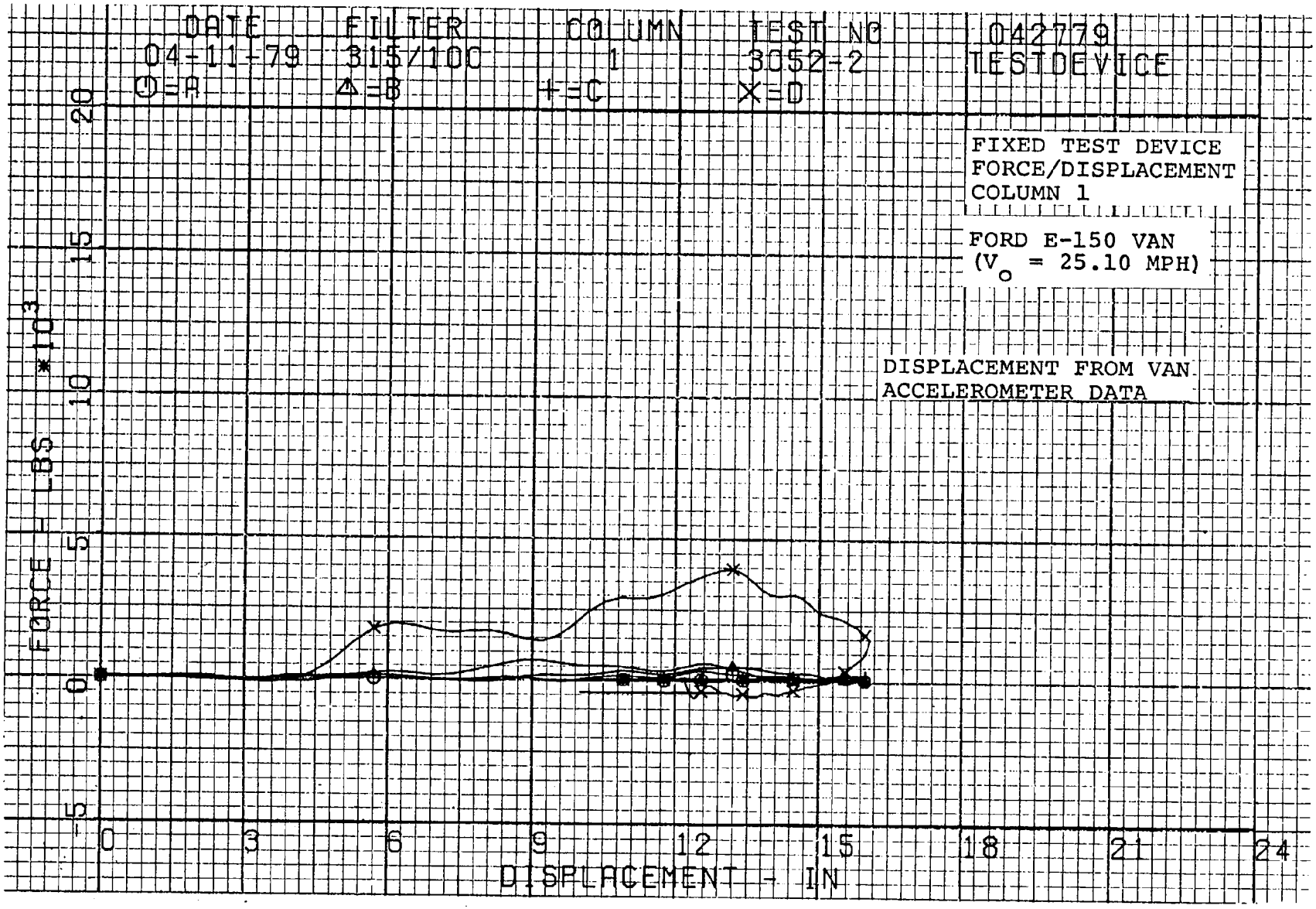

04-11-79 315/100 4103 3052-2
O=LAPBLTL Δ=LAPBLTR +=SH BLT FORD VAN
RIGHT FRONT OCCUPANT
SEAT BELT LOADS
LBS * 10
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC

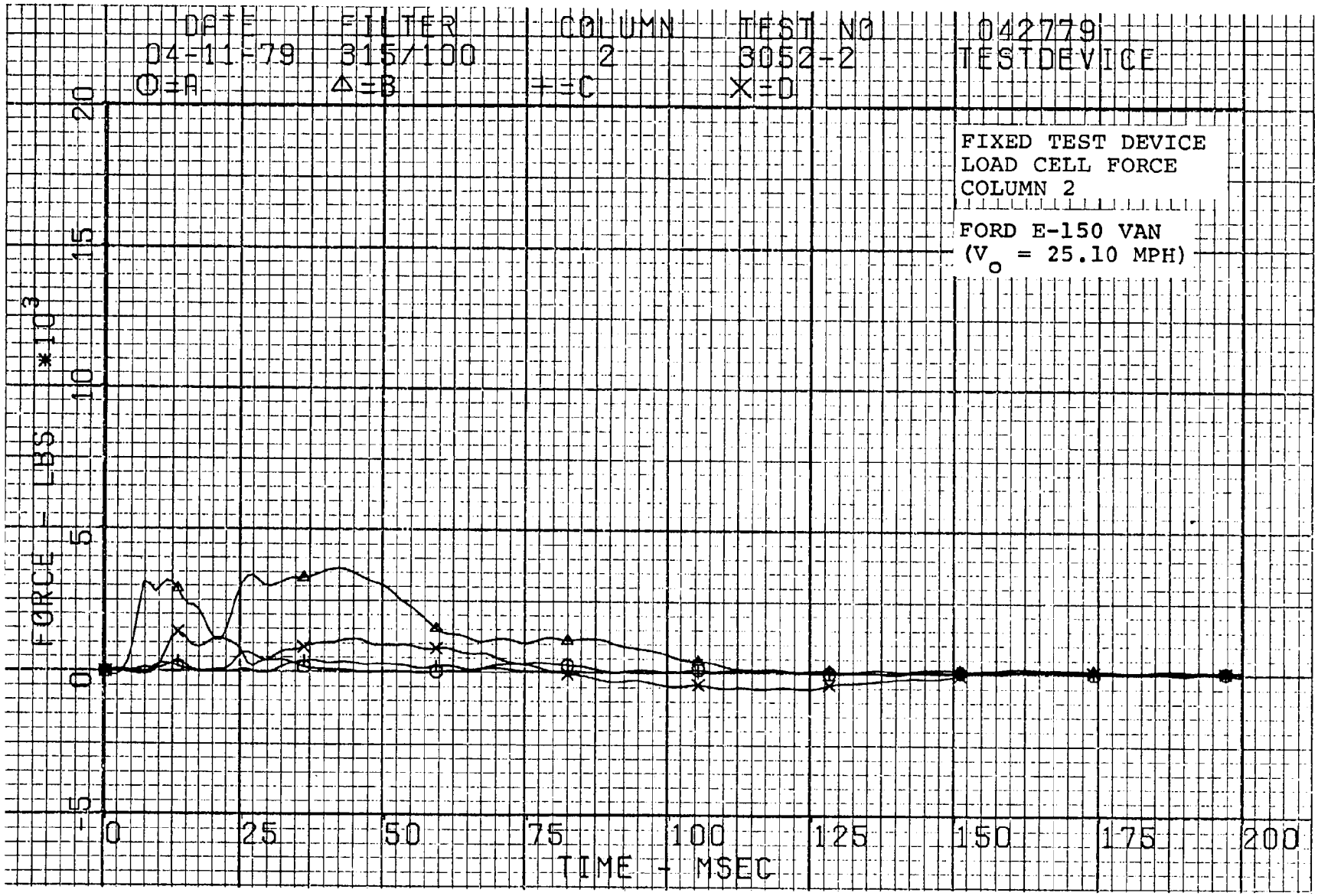

DATE
04-11-79
FILTER
315/100
LOCATION
495
TEST NO
3052-2
INERTIA VAN
042579
CALCULATED ENGINE AND COMPARTMENT
INERTIA FORCE LOCATIONS 1, 2, AND 5
FORD E-150 VAN
(V_o = 25.10 MPH)
$F = (4172\ lb)\ \frac{(A_1 + A_2)}{2} + (825\ lb)\ A_5$
FORCE = LB $\times 10^3$
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME - MSEC

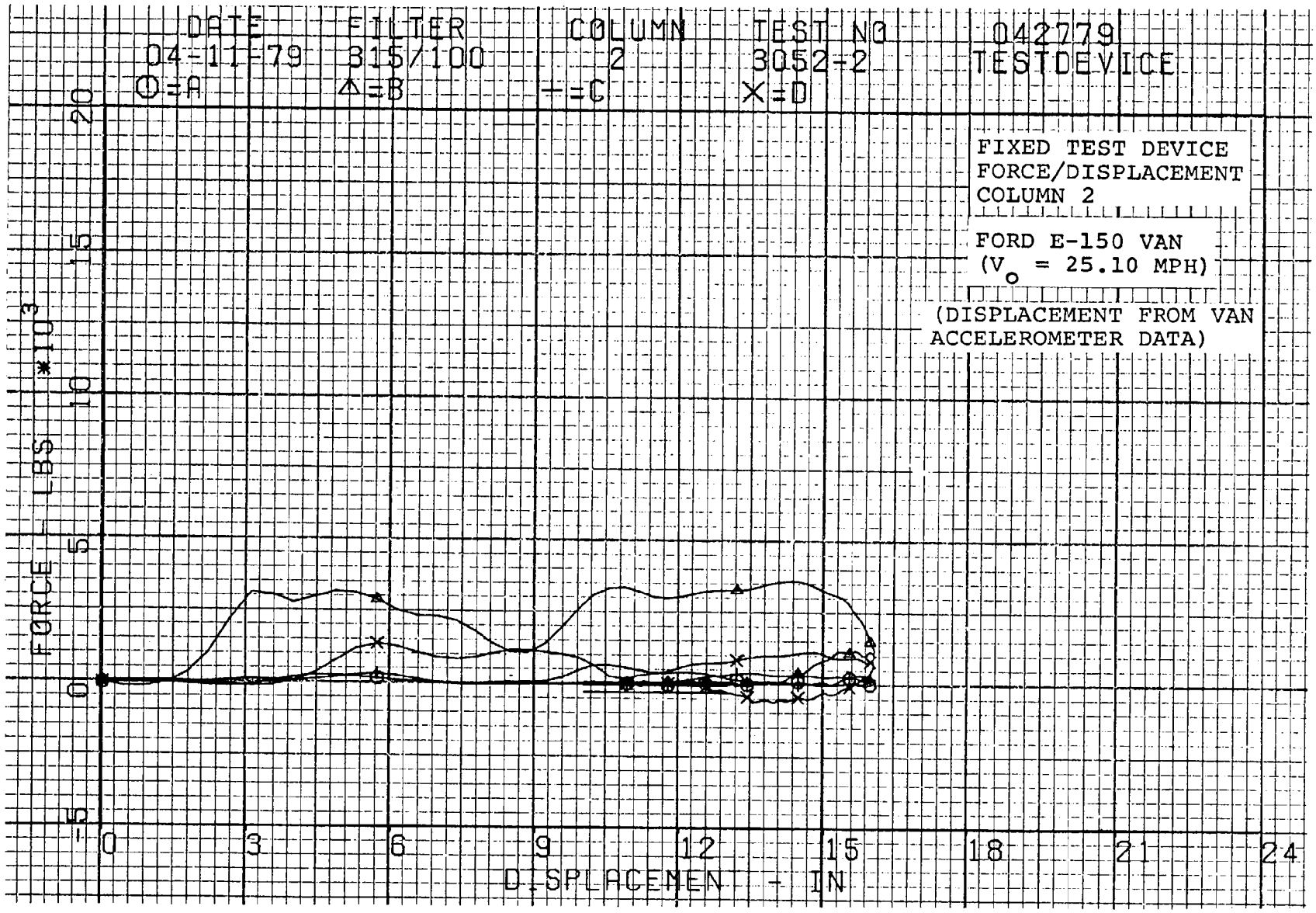

DATE
04-11-79
FILTER
315/100
TOTAL
40
TEST NO
3052-2
042779
TESTDEVICE
FIXED TEST DEVICE
TOTAL LOAD CELL FORCE
FORD E-150 VAN
(V_o = 25.10 MPH)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME - MSEC

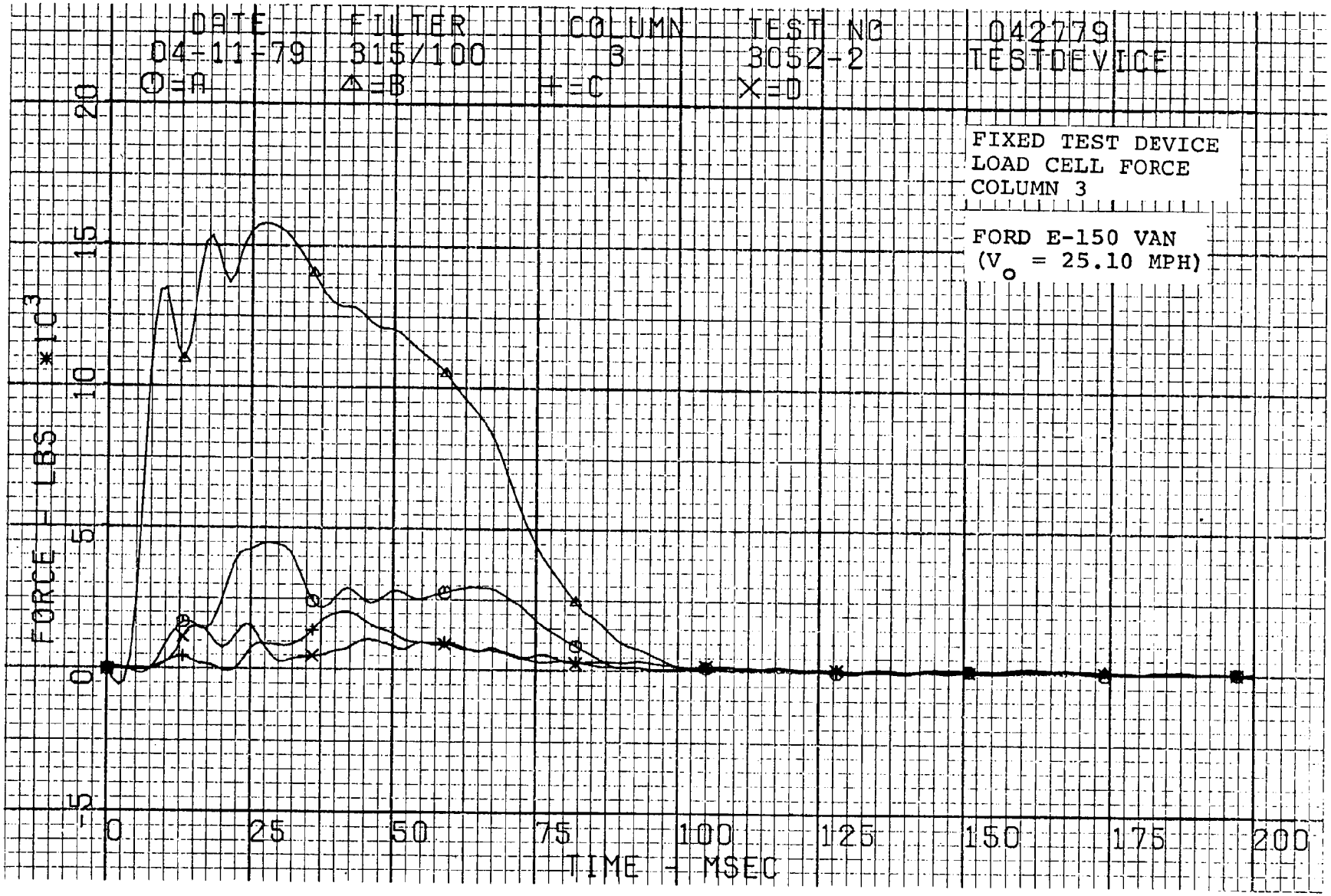

DATE
04-11-79
FILTER
315/100
TOTAL
40
TEST NO
3052-2
TESTDEVICE
042779
FIXED TEST DEVICE
TOTAL FORCE/DISPLACEMENT
FORD E-150 VAN
(V_o = 25.10 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

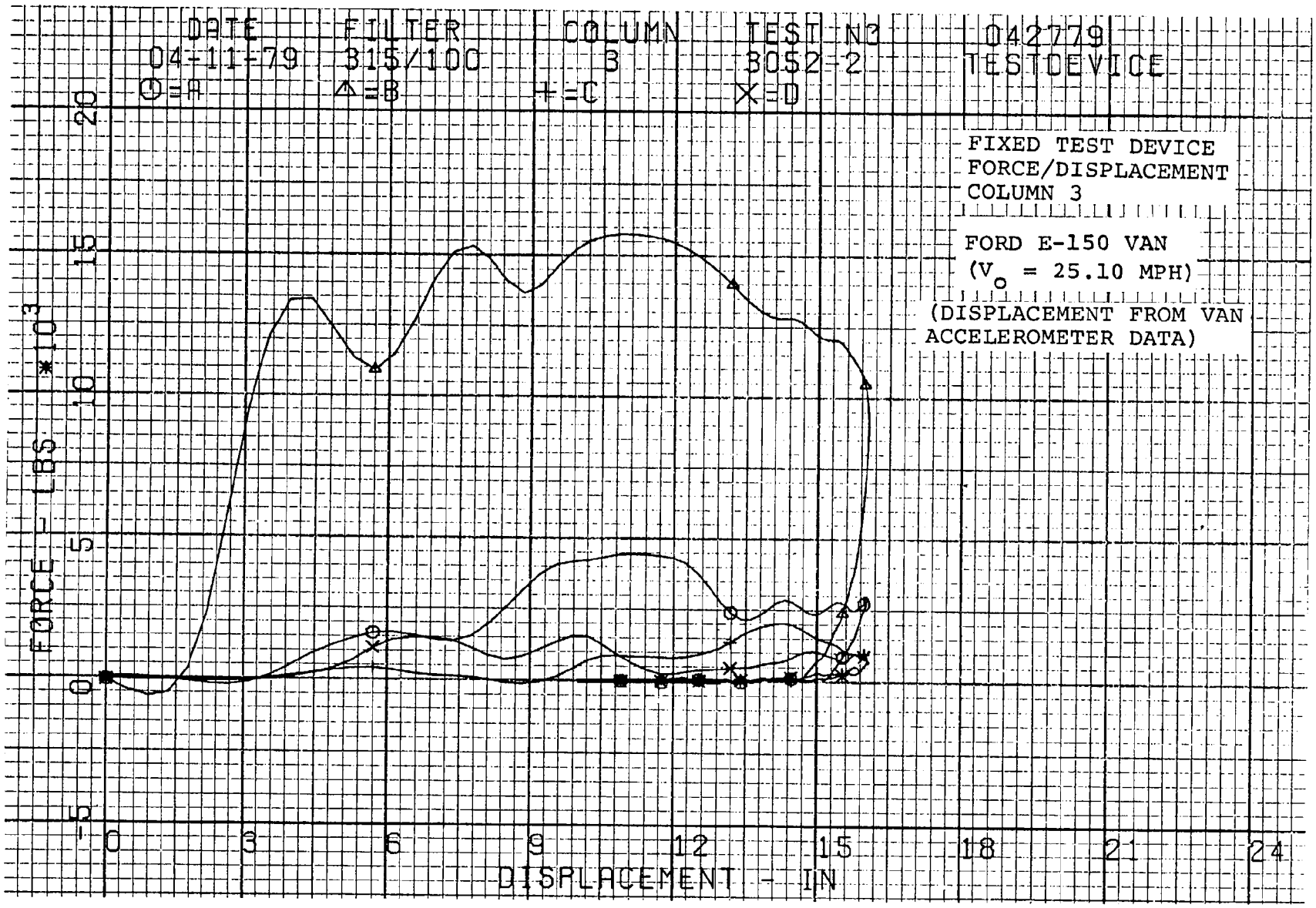

DATE
04-11-79
FILTER
315/100
COLUMN
1
TEST NO
3052-2
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 1
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

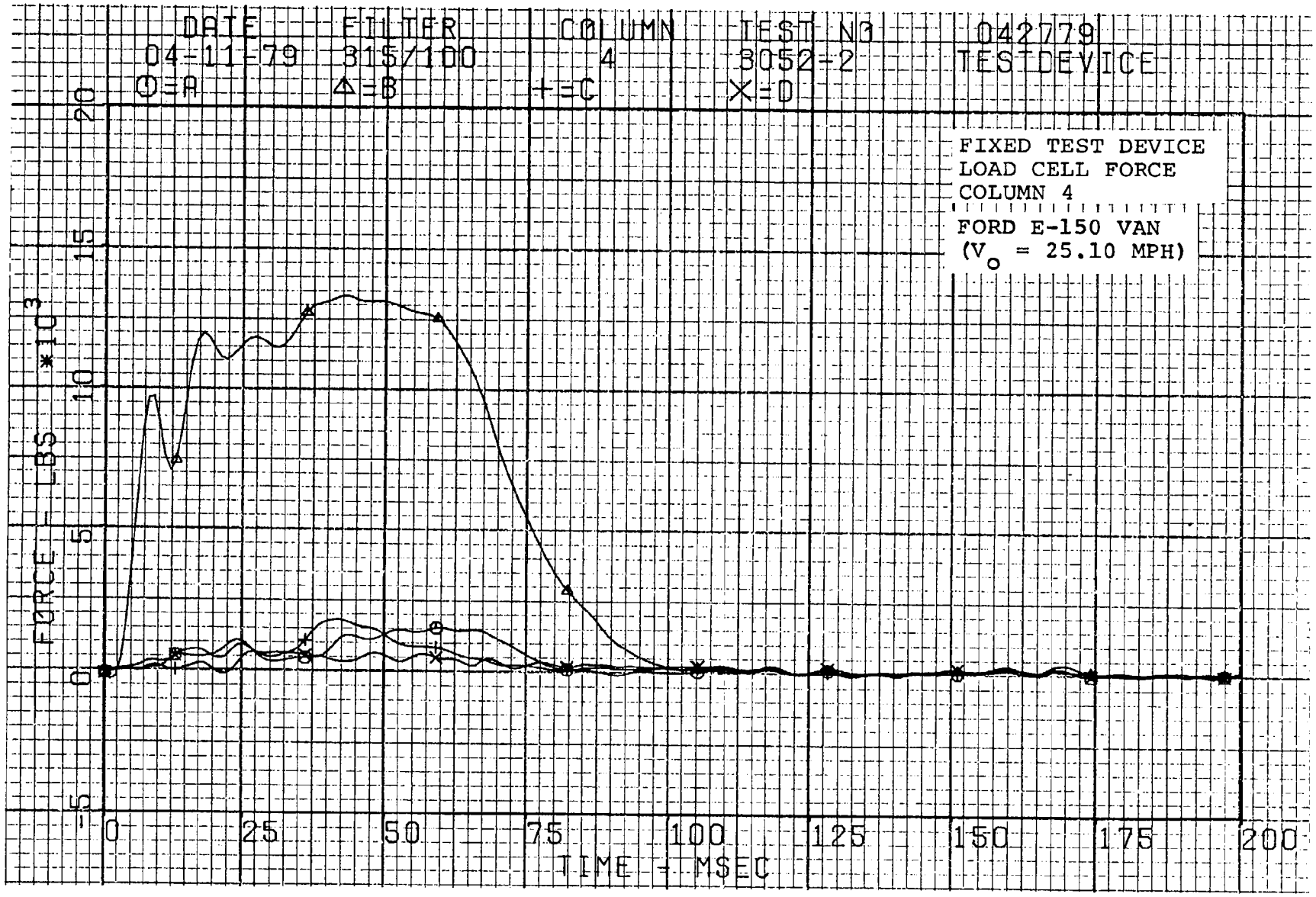

DATE
04-11-79
FILTER
315/100
COLUMN
1
TEST NO
3052-2
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 1
FORD E-150 VAN
(V_o = 25.10 MPH)
DISPLACEMENT FROM VAN
ACCELEROMETER DATA
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

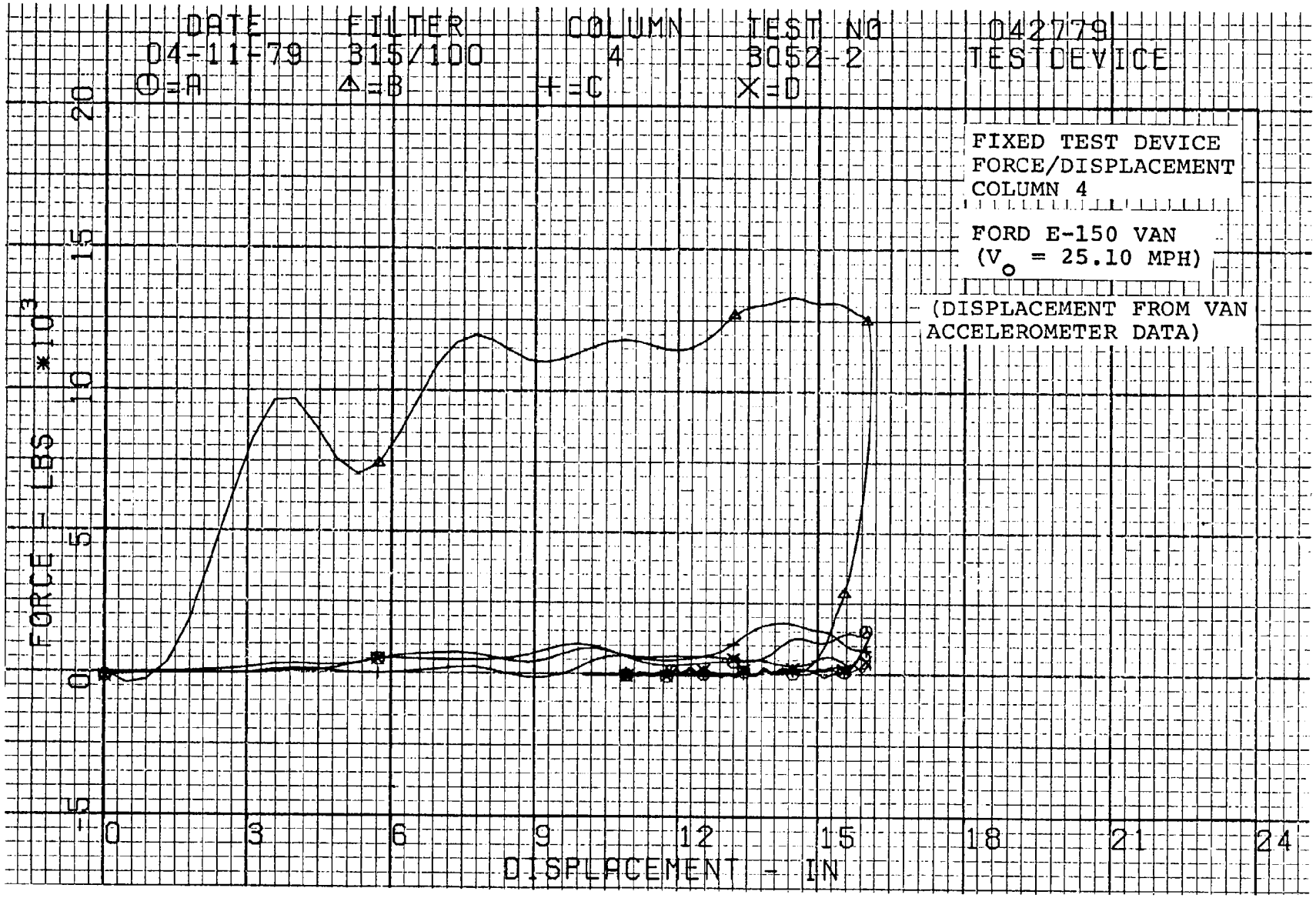

DATE
04-11-79
O=A
FILTER
315/100
Δ=B
COLUMN
2
+=C
TEST NO
3052-2
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 2
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

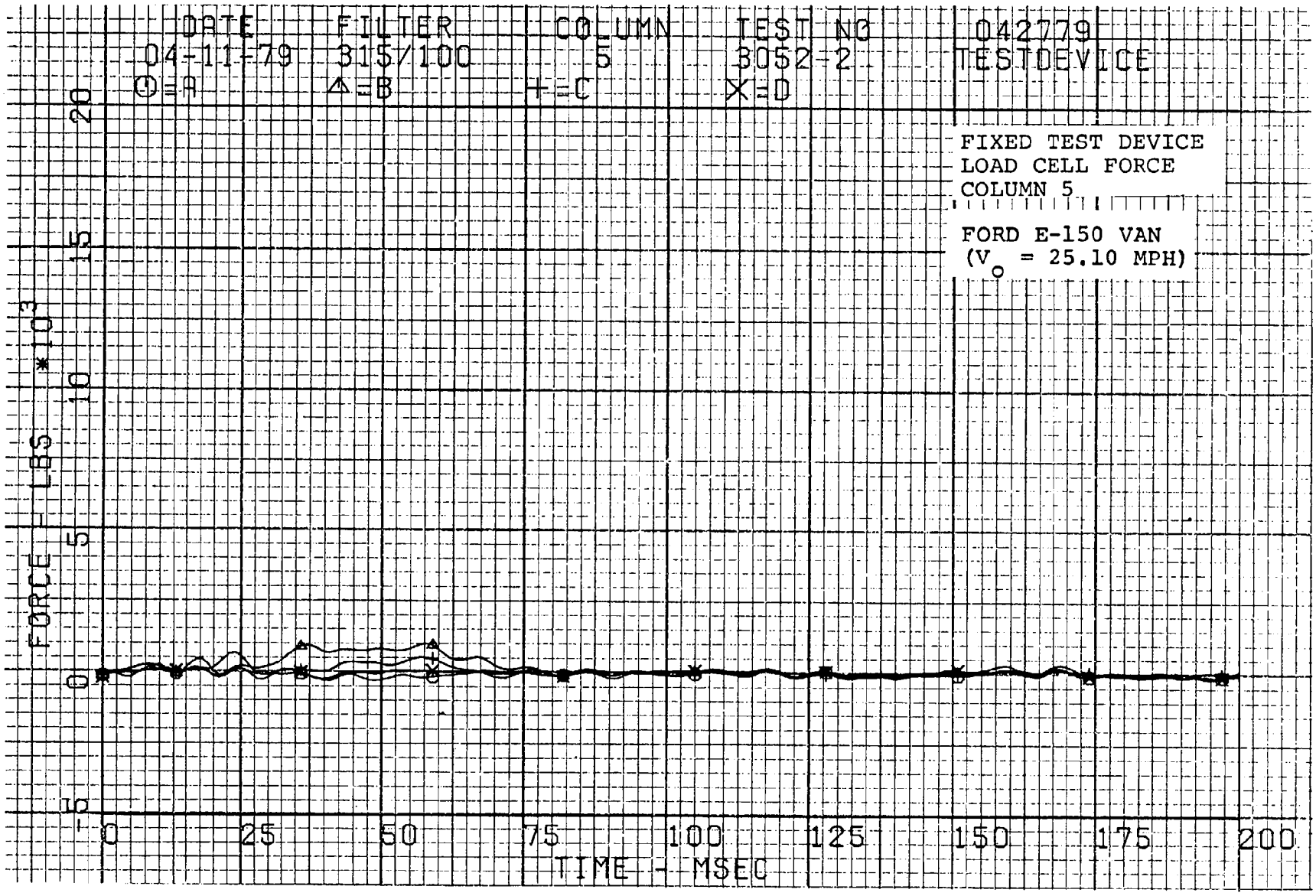

DATE
04-11-79
FILTER
315/100
COLUMN
2
TEST NO
3052-2
042779
TESTDEVICE
O=A
△=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 2
FORD E-150 VAN
(V o = 25.10 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10 3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMEN - IN

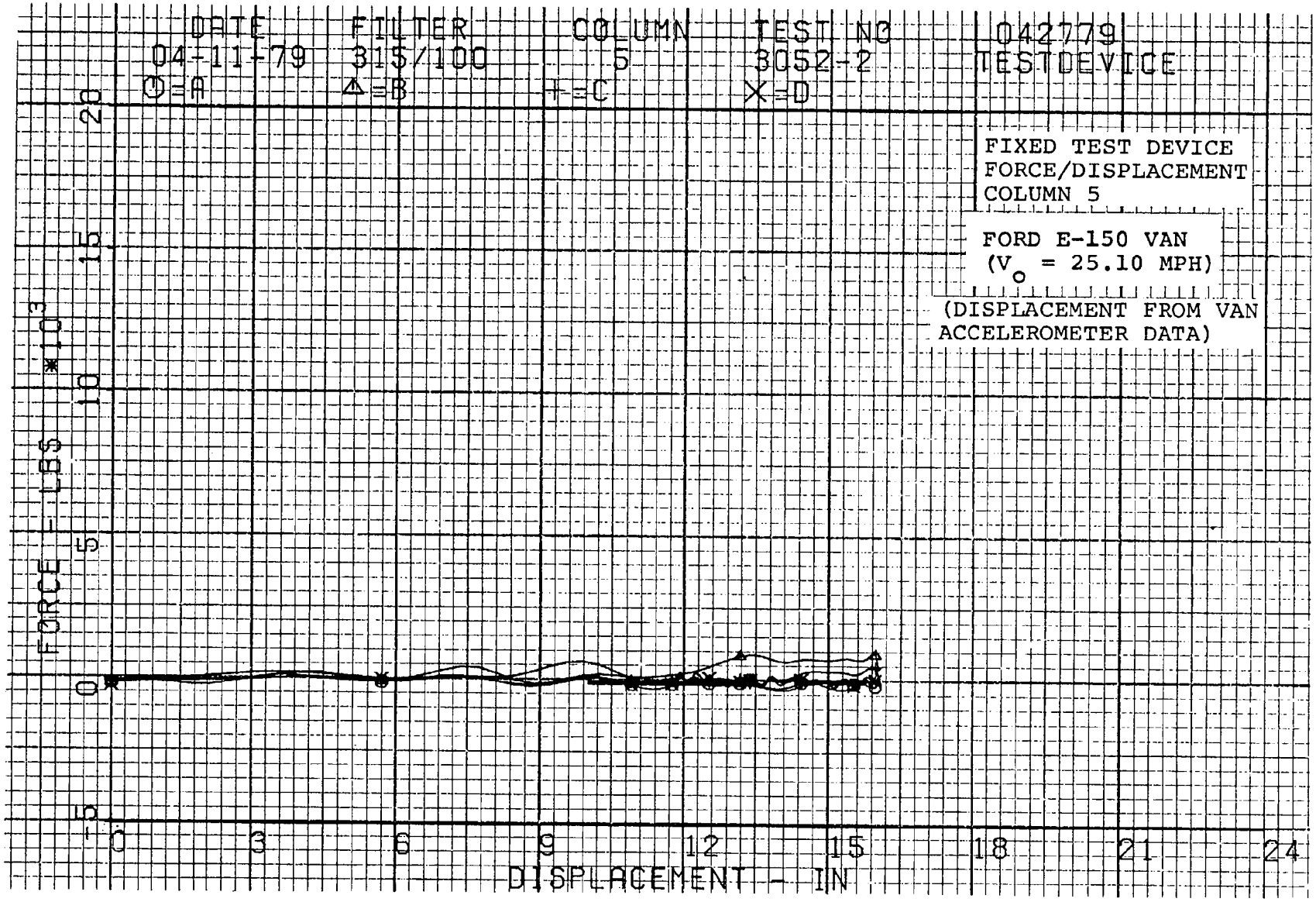

DATE
04-11-79
FILTER
315/100
COLUMN
3
TEST NO
3052-2
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 3
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

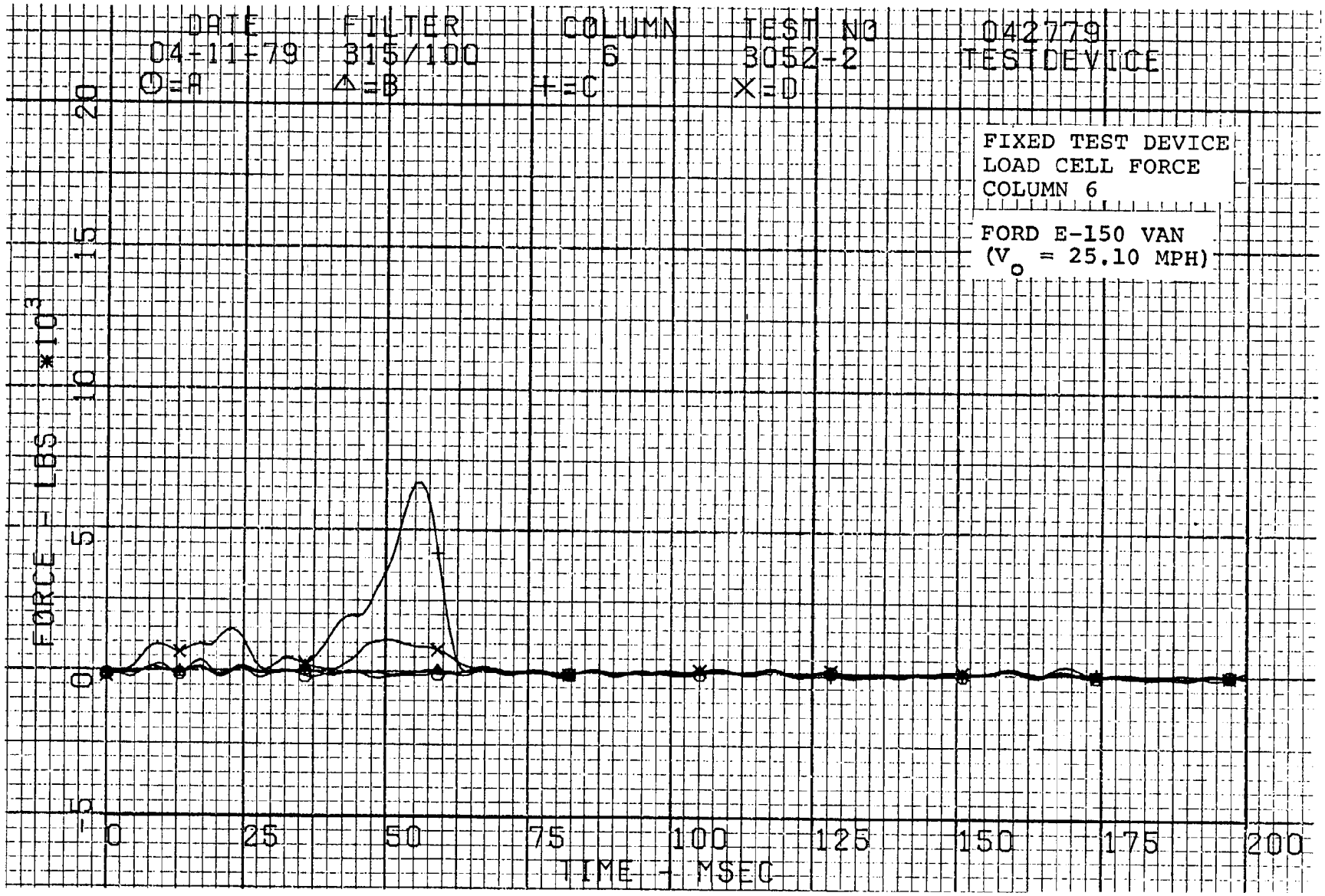

DATE
04-11-79
FILTER
315/100
COLUMN
3
TEST NO
3052-2
042779
TESTDEVICE
O=A
△=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 3
FORD E-150 VAN
(V_o = 25.10 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

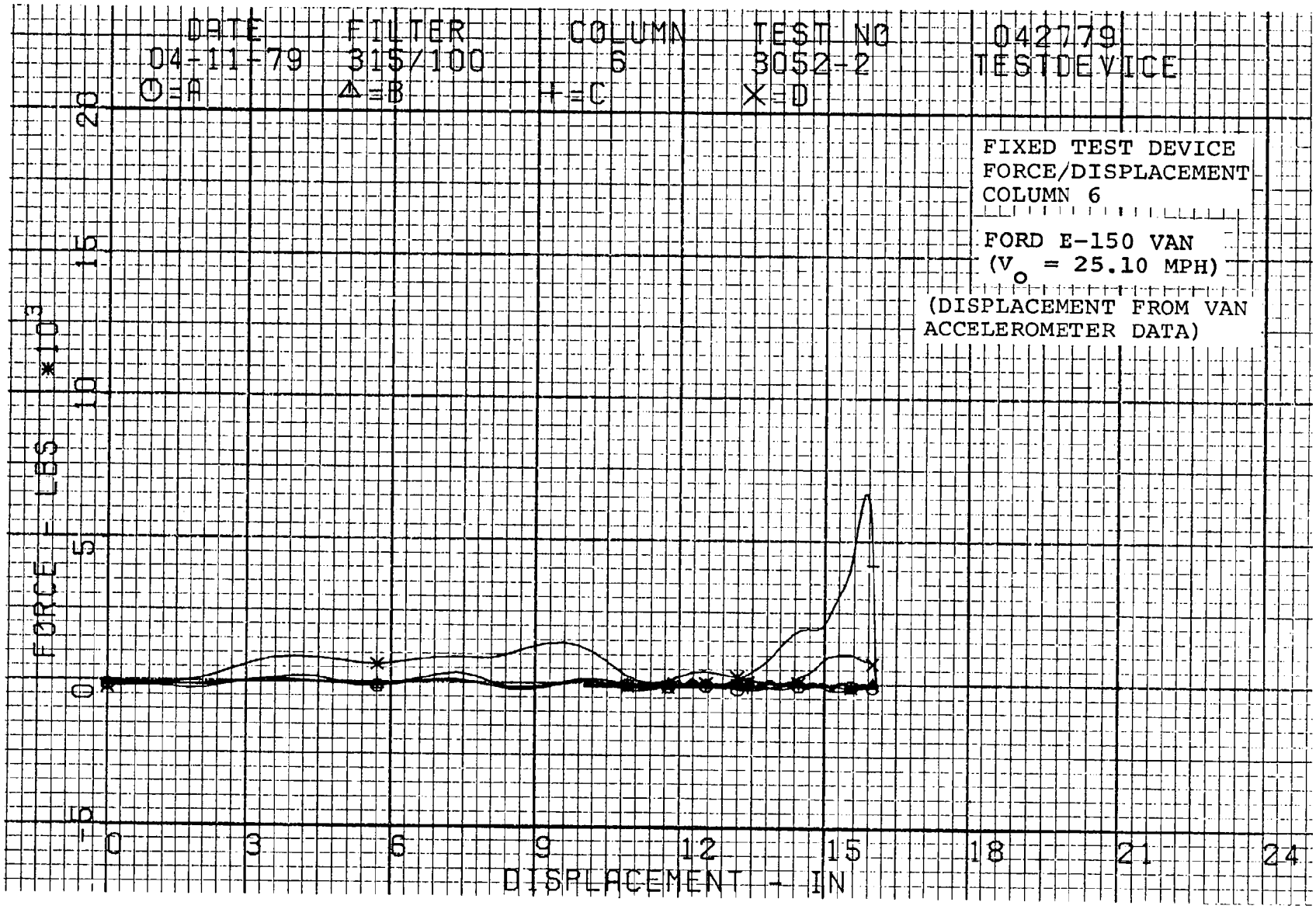

DATE
04-11-79
FILTER
315/100
COLUMN
4
TEST NO
3052-2
042779
TEST DEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 4
FORD E-150 VAN
(V_o = 25.10 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

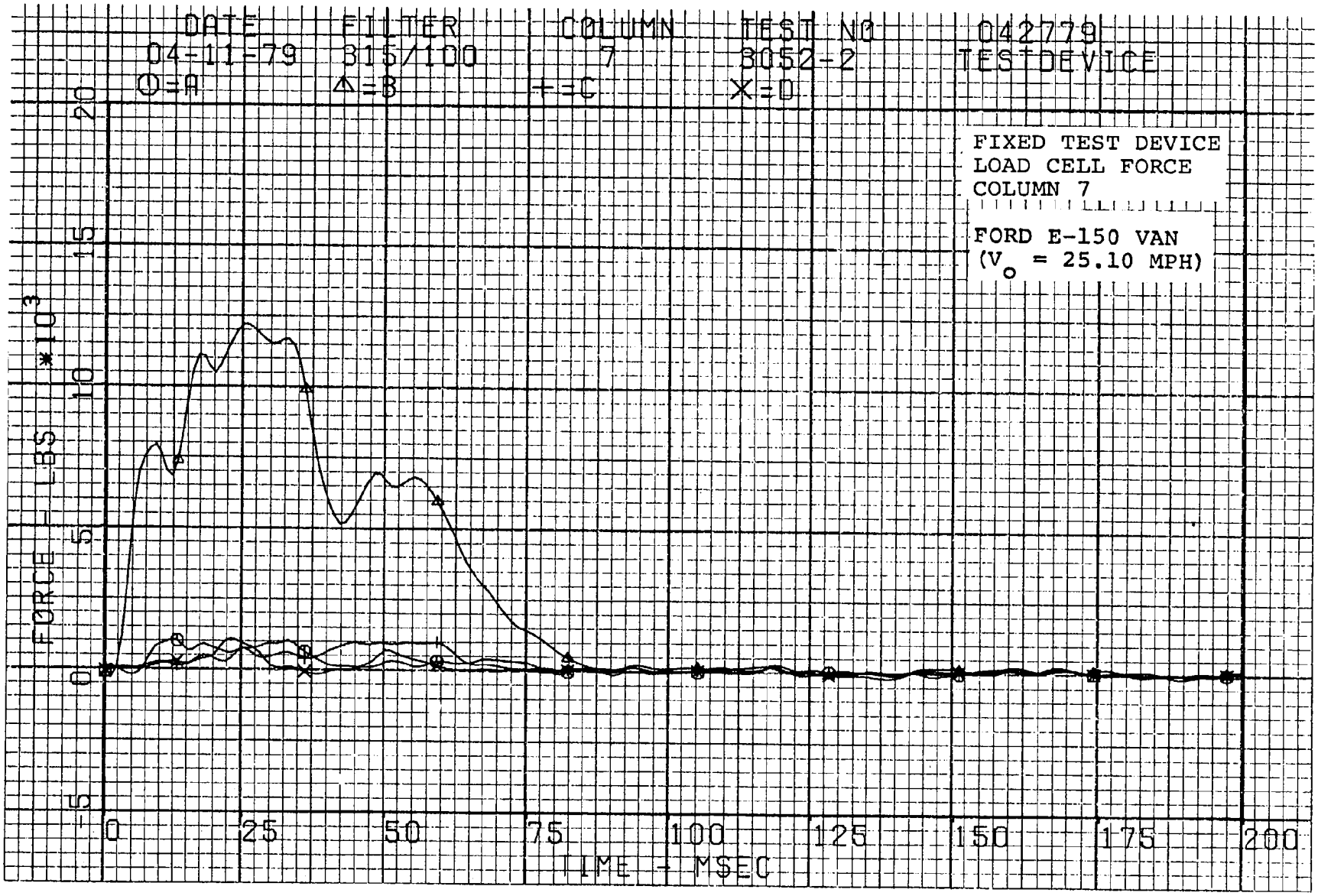

DATE
04-11-79
O=A
FILTER
315/100
Δ=B
COLUMN
4
+=C
TEST NO
3052-2
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 4
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

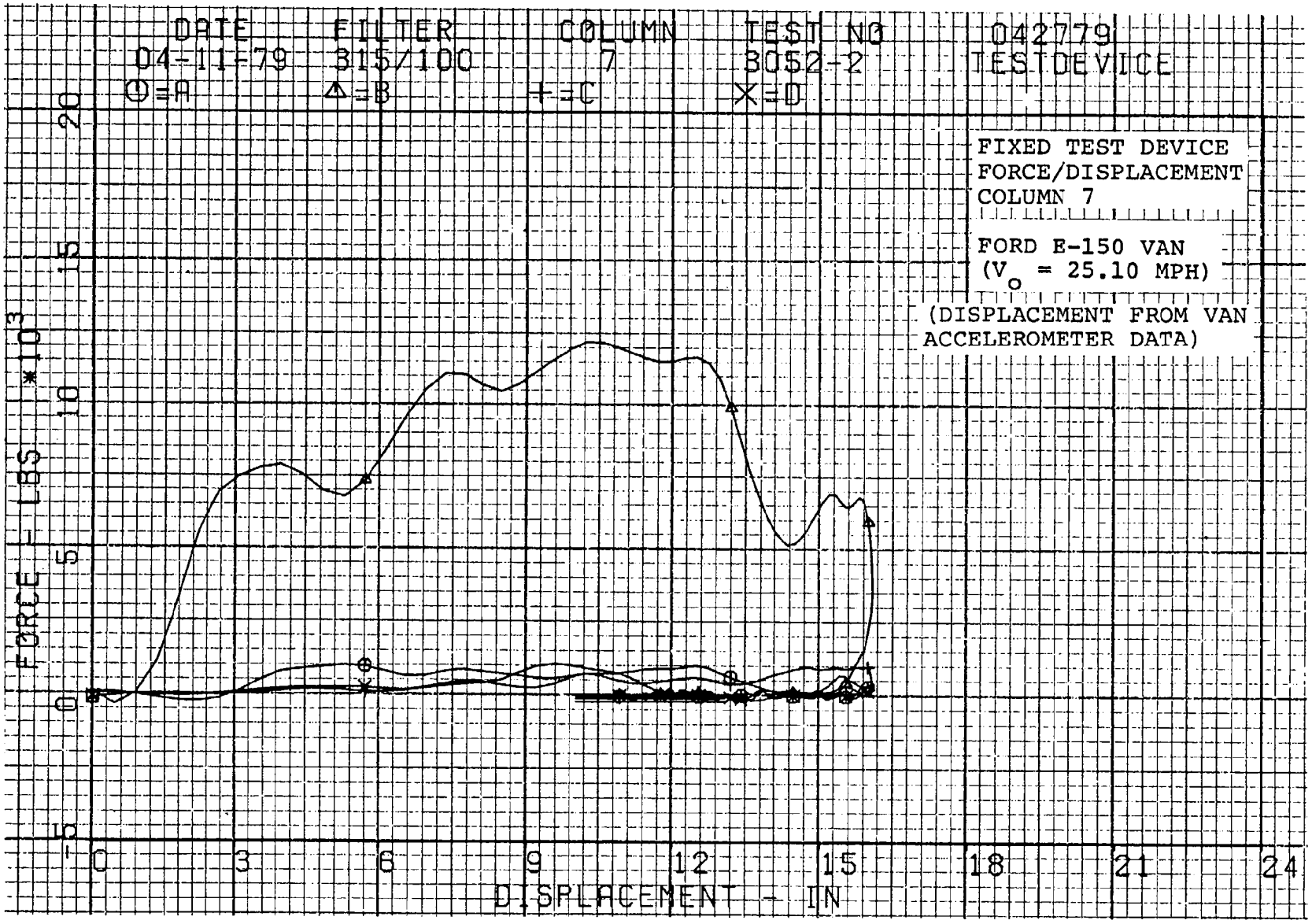

DATE
04-11-79
O=A
FILTER
315/100
△=B
COLUMN
5
+=C
TEST NO
3052-2
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 5
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

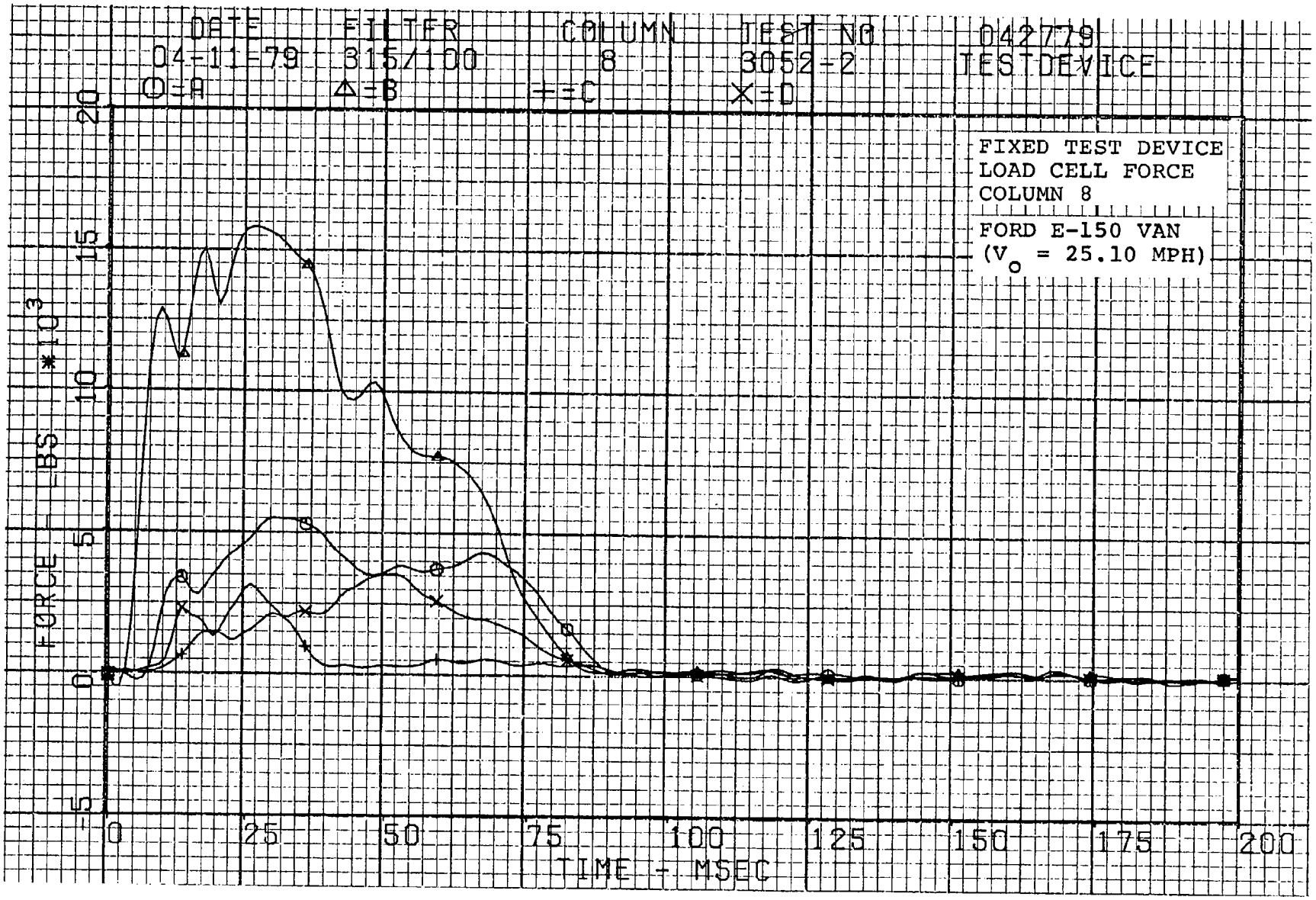

DATE
04-11-79
O=A
FILTER
315/100
△=B
COLUMN
5
+=C
TEST NO
3052-2
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 5
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

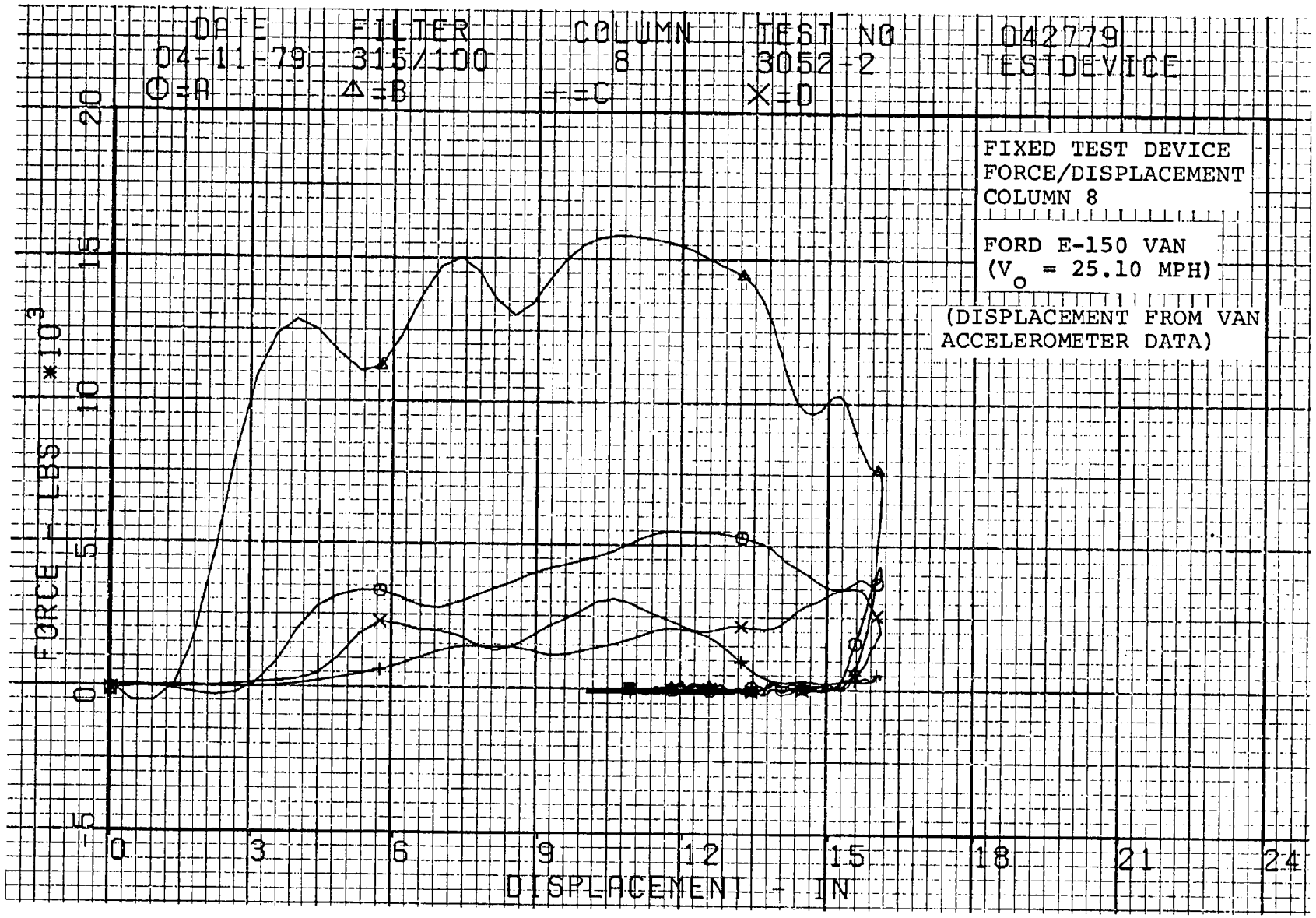

DATE
04-11-79
FILTER
315/100
COLUMN
6
TEST NO
3052-2
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 6
FORD E-150 VAN
(V_o = 25.10 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

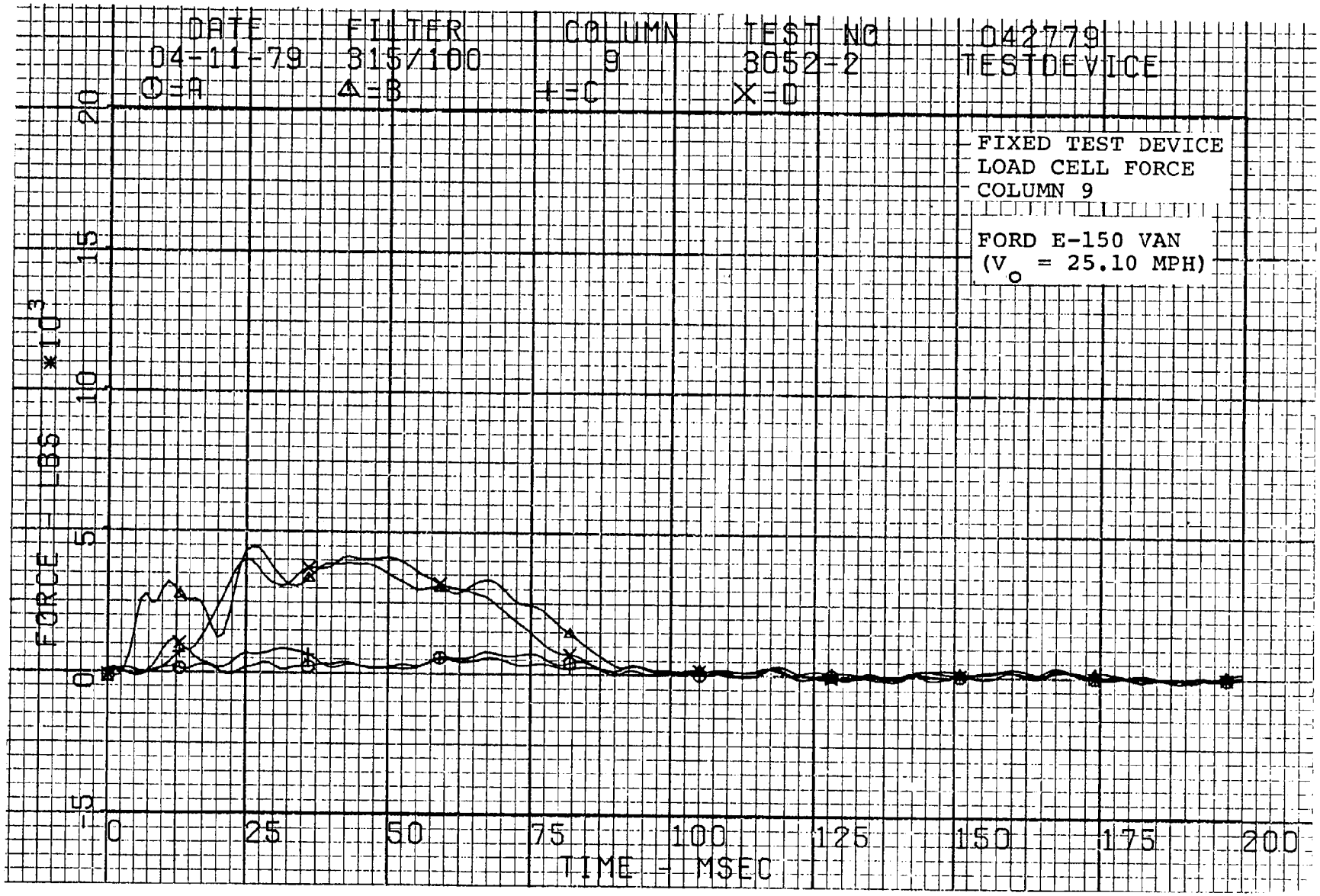

DATE
04-11-79
O=A
FILTER
315/100
Δ=B
COLUMN
6
+=C
TEST NO
3052-2
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 6
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

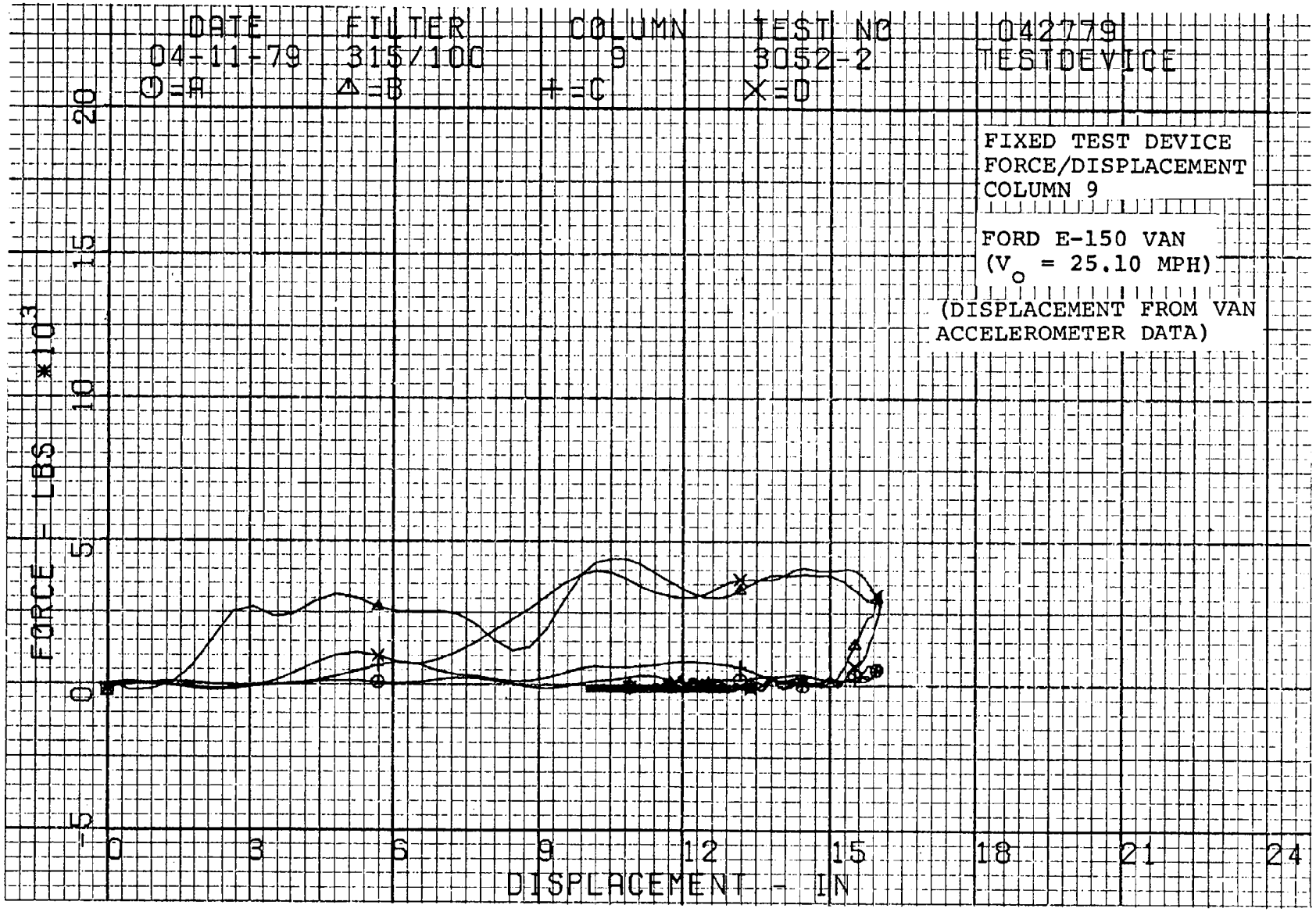

DATE
04-11-79
O=A
FILTER
315/100
Δ=B
COLUMN
7
+=C
TEST NO
3052-2
X=D
042779
TEST DEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 7
FORD E-150 VAN
(V_o = 25.10 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

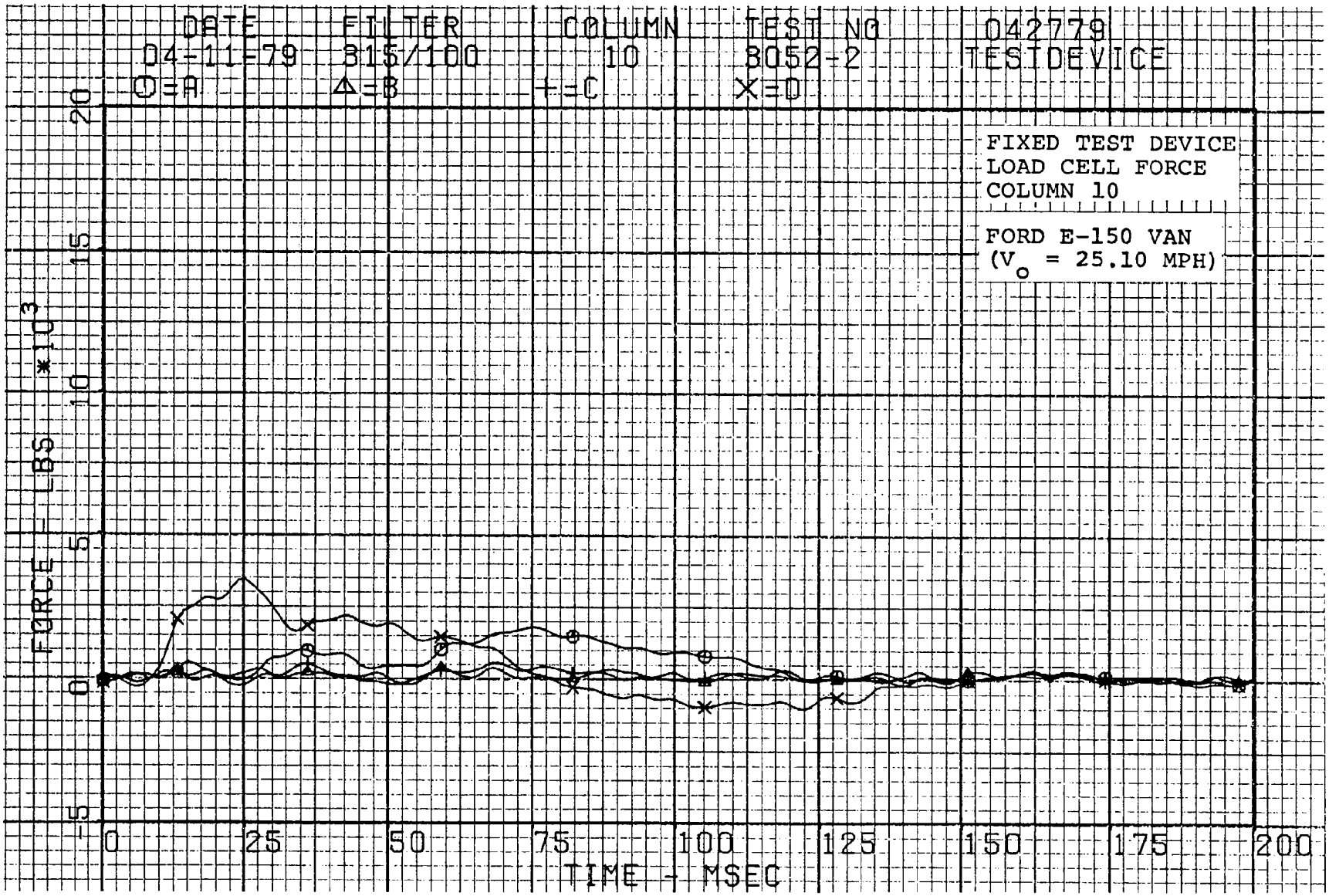

DATE
04-11-79
FILTER
315/100
COLUMN
7
TEST NO
3052-2
042779
TEST DEVICE
⊕=A
△=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 7
FORD E-150 VAN
(V_o = 25.10 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS * 10E3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

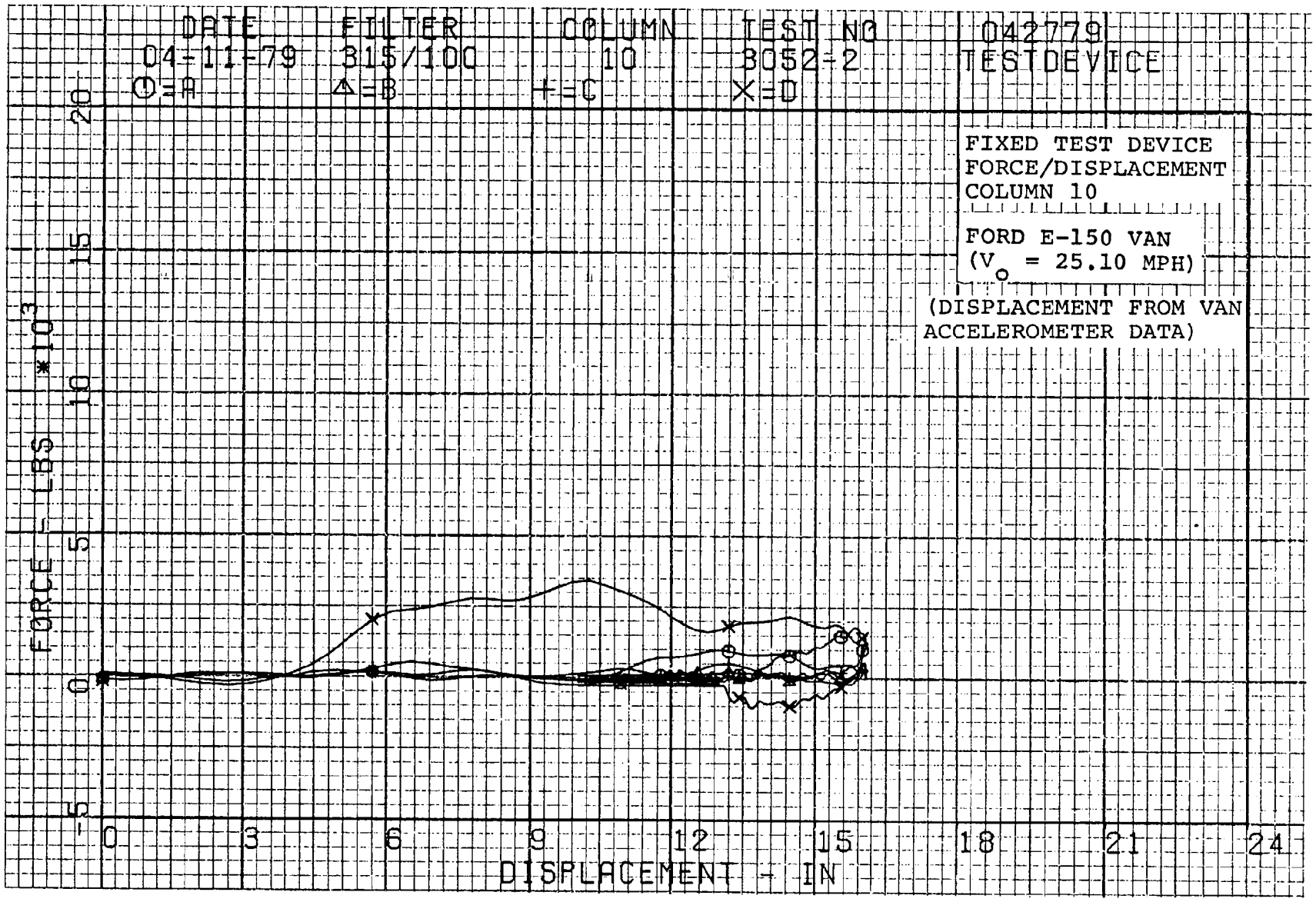

DATE
04-11-79
O=A
FILTER
315/100
△=B
COLUMN
8
+=C
TEST NO
3052-2
X=D
042779
TEST DEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 8
FORD E-150 VAN
(V_o = 25.10 MPH)
FORCE - LBS * 10 E 3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

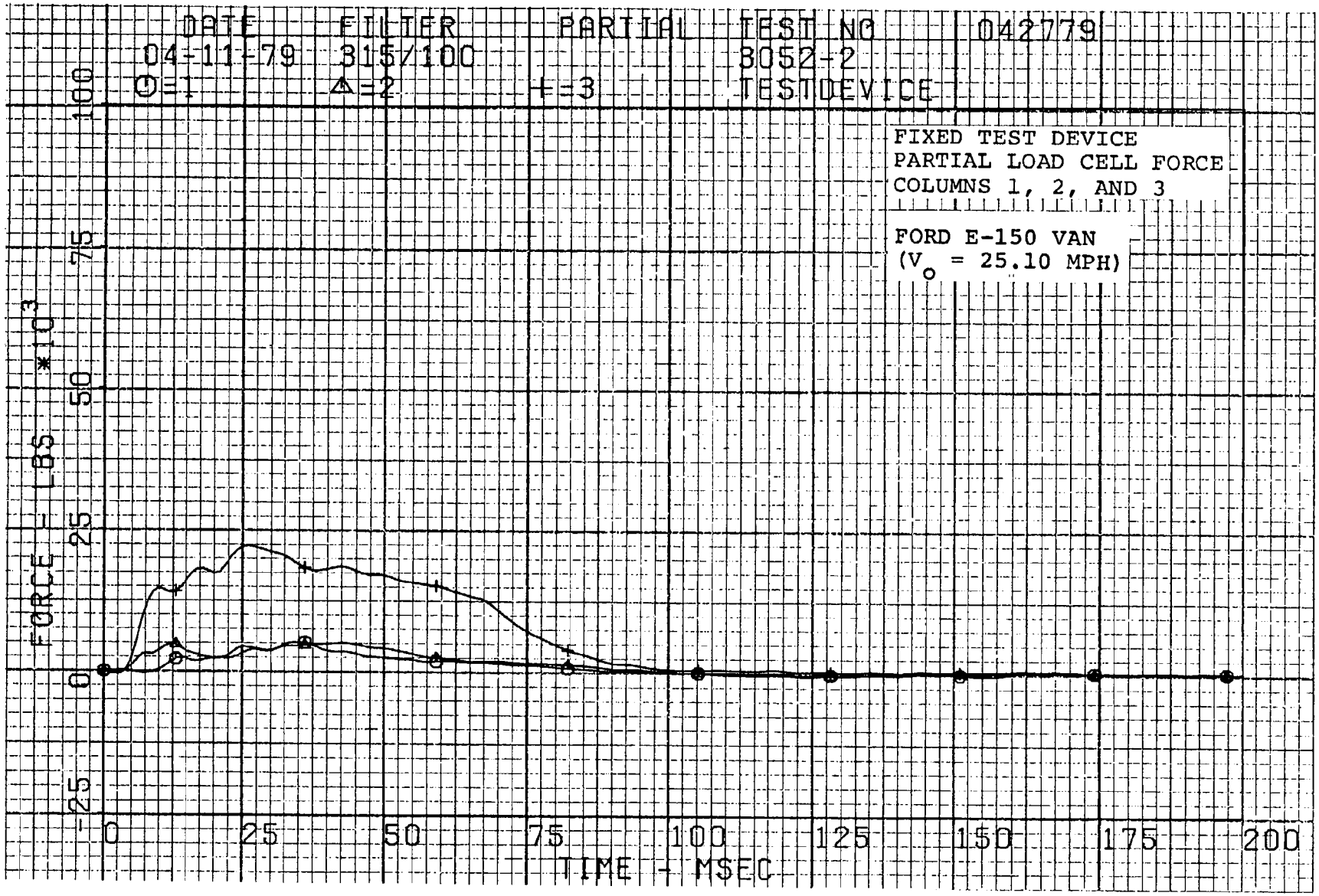

DATE
04-11-79
FILTER
315/100
COLUMN
8
TEST NO
3052-2
042779
TEST DEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 8
FORD E-150 VAN
(V_o = 25.10 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS * 10³
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

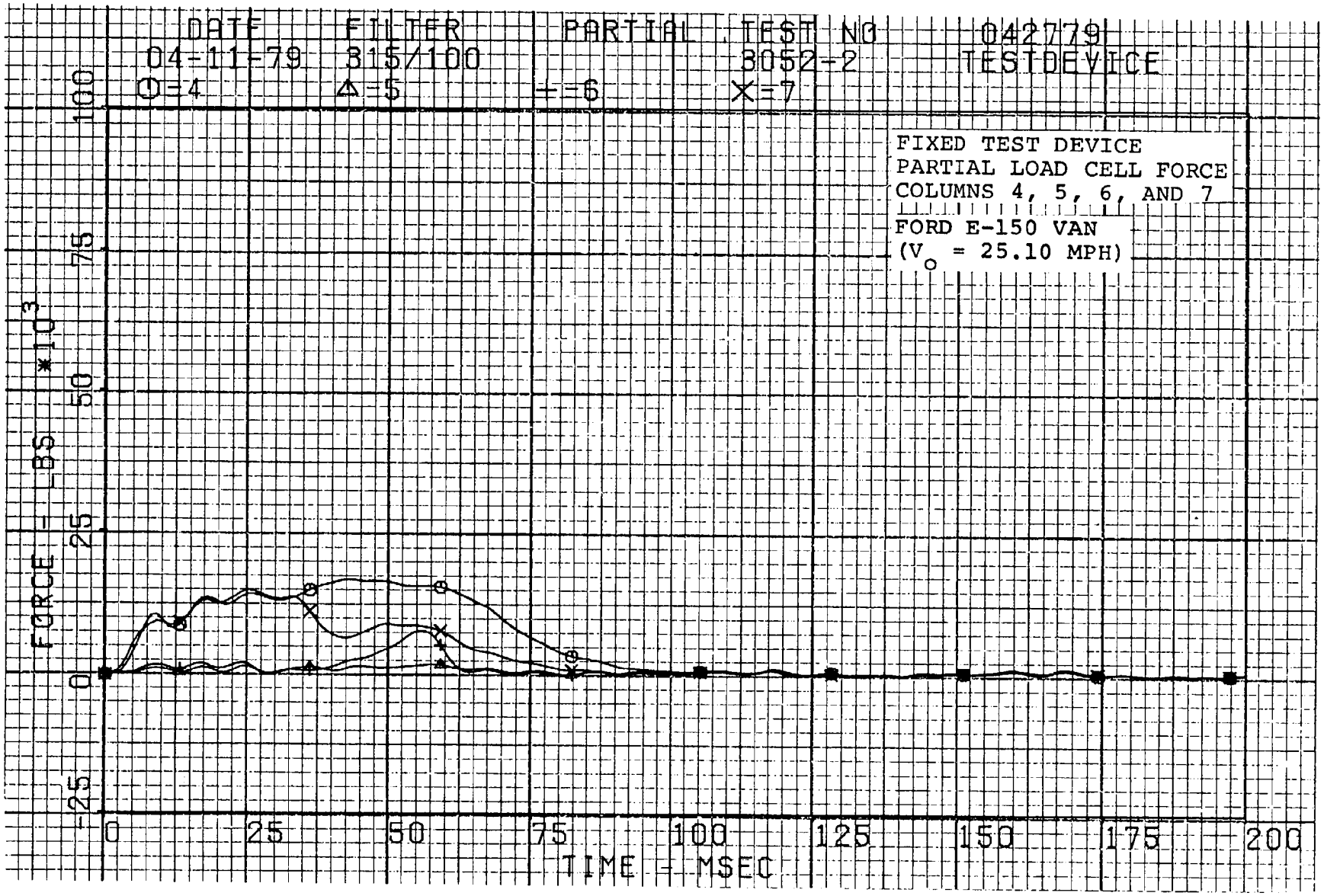

DATE
04-11-79
O=A
FILTER
315/100
△=B
COLUMN
9
+=C
TEST NO
3052-2
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 9
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

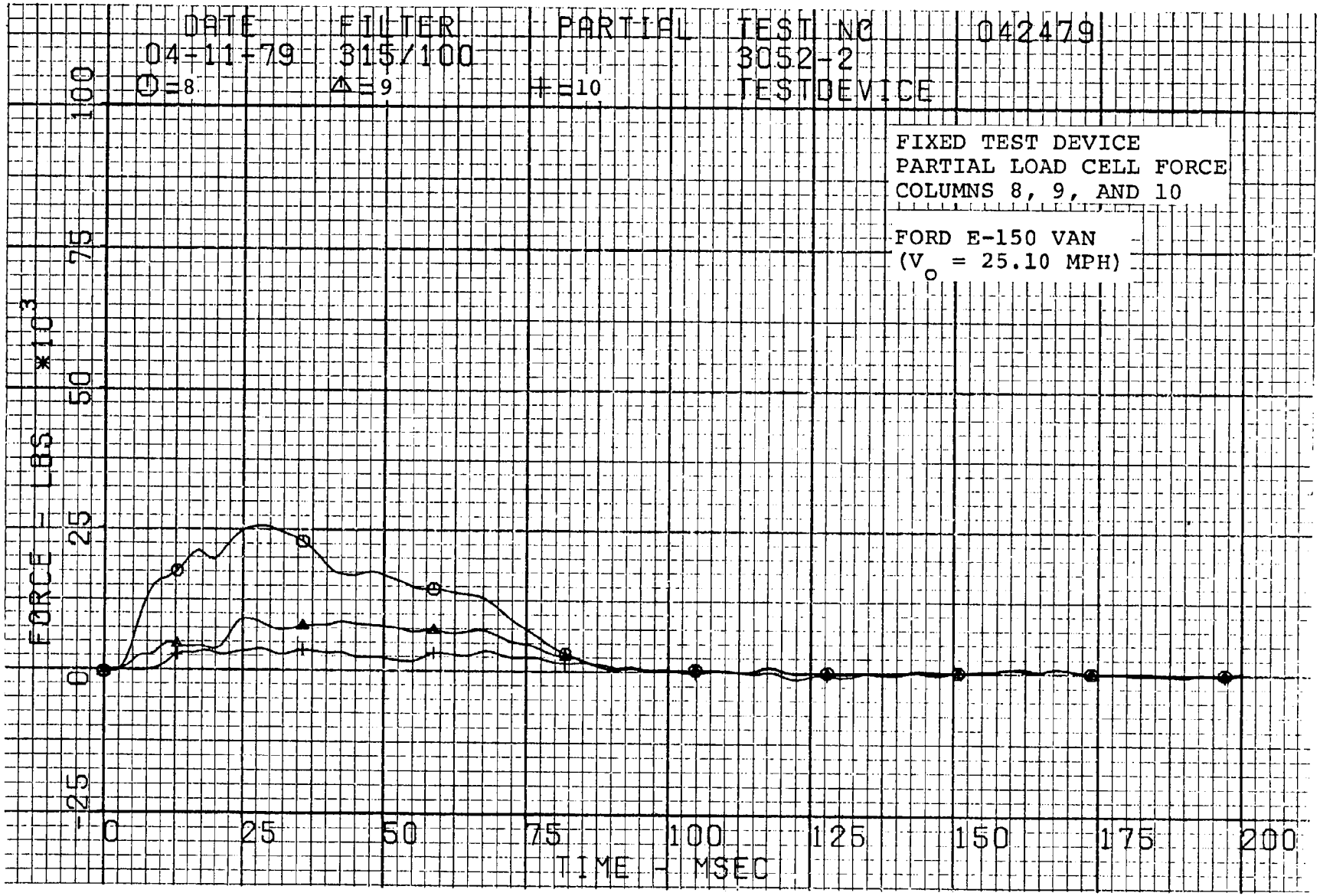

DATE
04-11-79
FILTER
315/100
COLUMN
9
TEST NO
3052-2
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 9
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

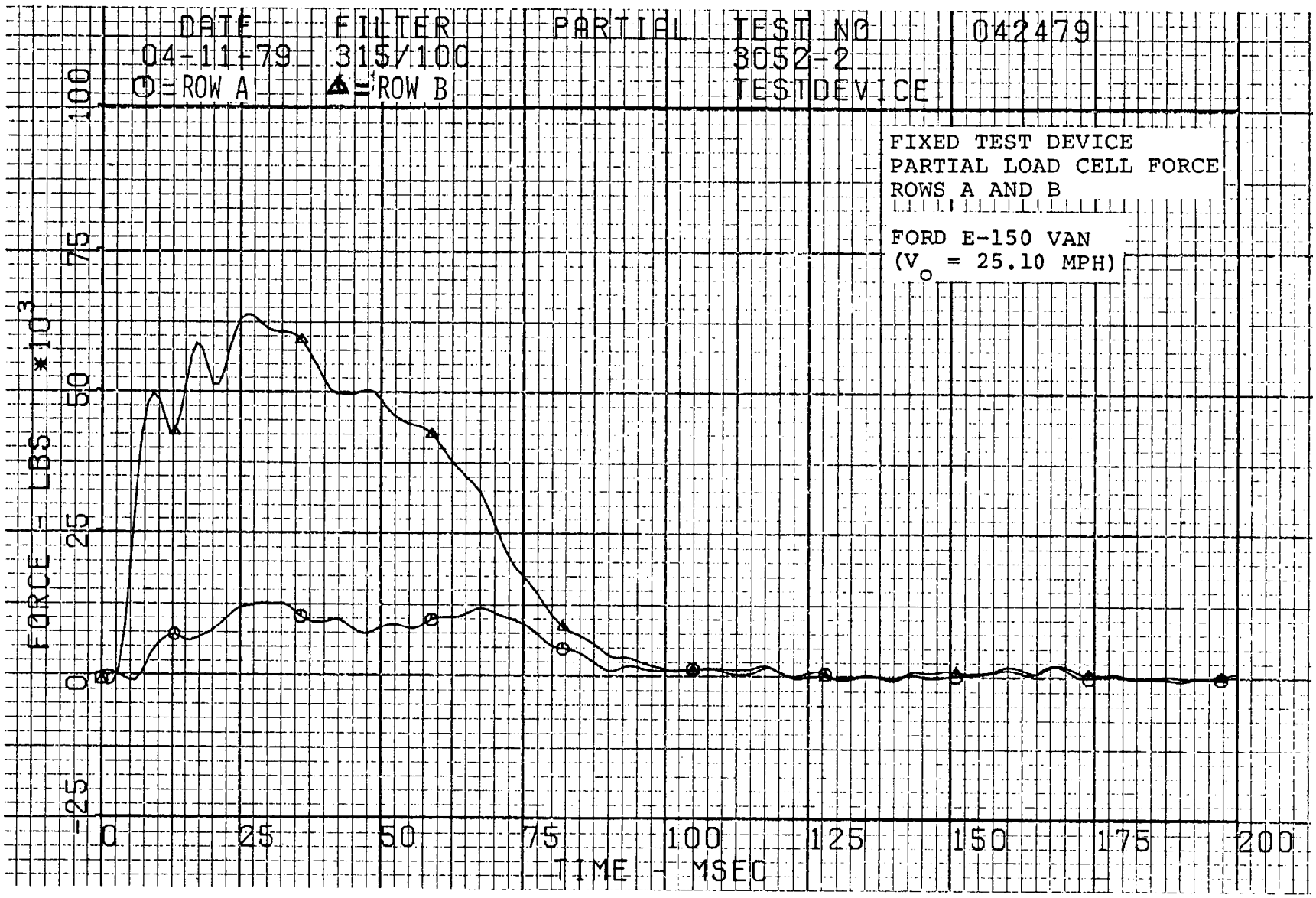

DATE
04-11-79
O=A
FILTER
315/100
Δ=B
COLUMN
10
+=C
TEST NO
8052-2
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 10
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

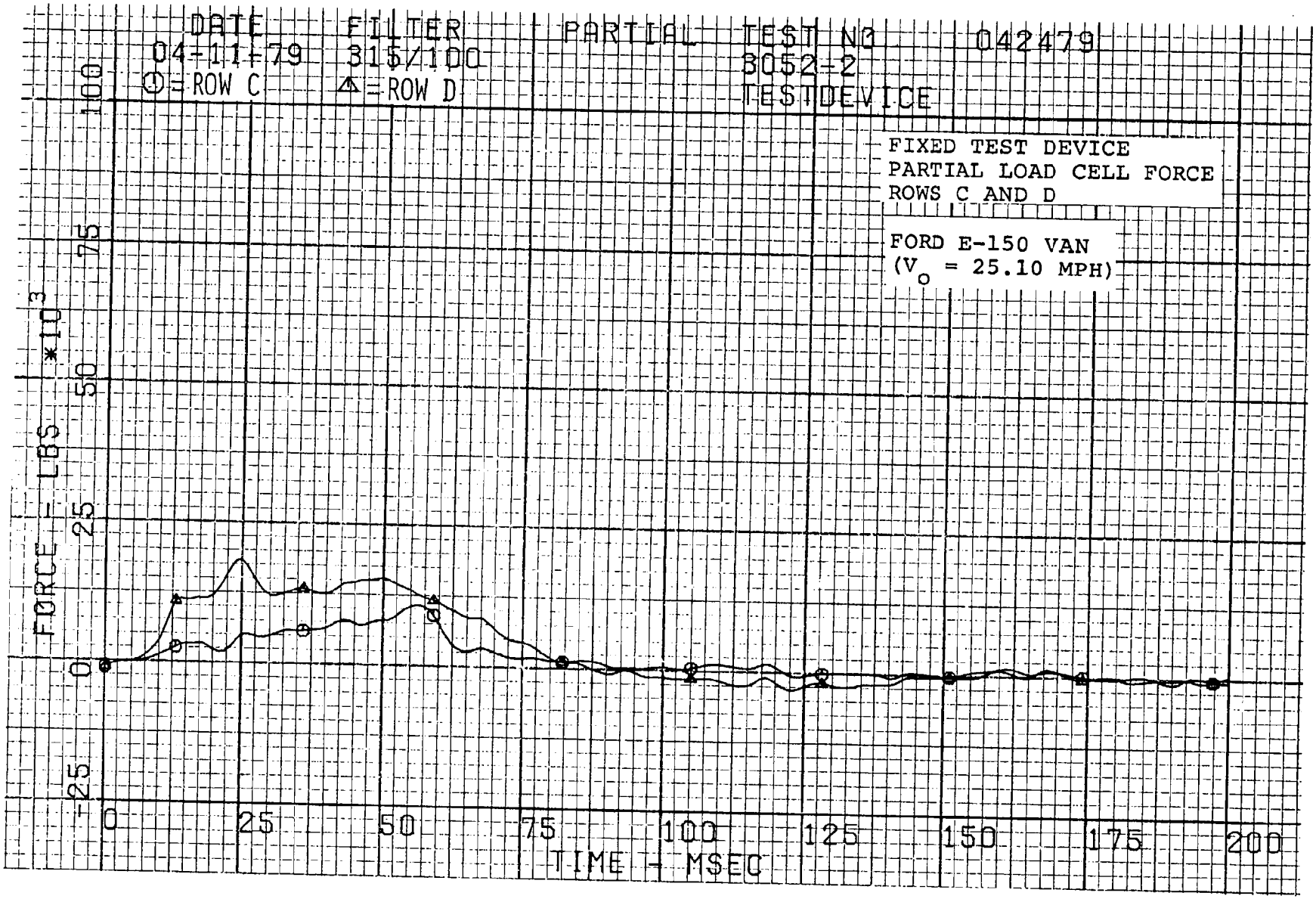

DATE
04-11-79
FILTER
315/100
COLUMN
10
TEST NO
3052-2
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 10
FORD E-150 VAN
(V o = 25.10 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS * 10 3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

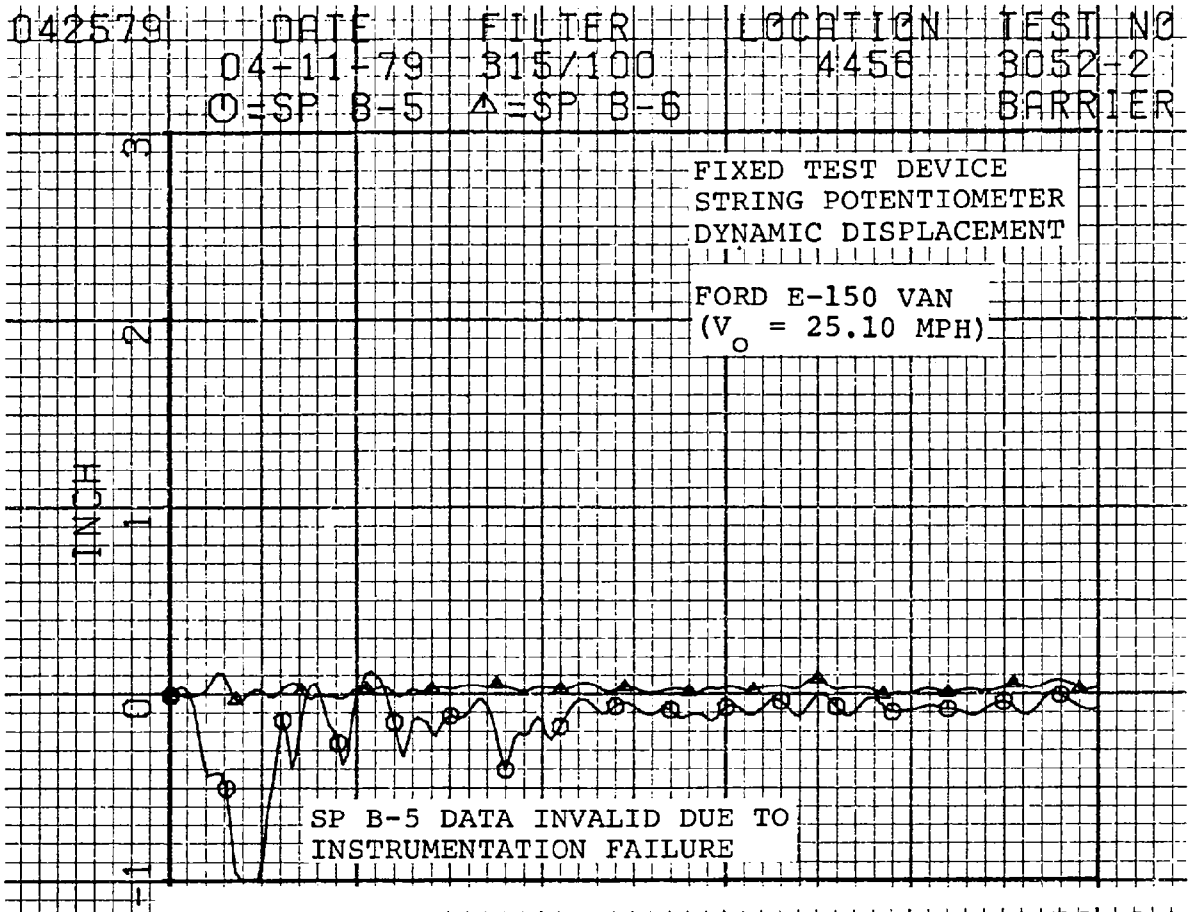

DATE
04-11-79
FILTER
315/100
PARTIAL
TEST NO
042779
3052-2
TESTDEVICE
O=1
Δ=2
+=3
FIXED TEST DEVICE
PARTIAL LOAD CELL FORCE
COLUMNS 1, 2, AND 3
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

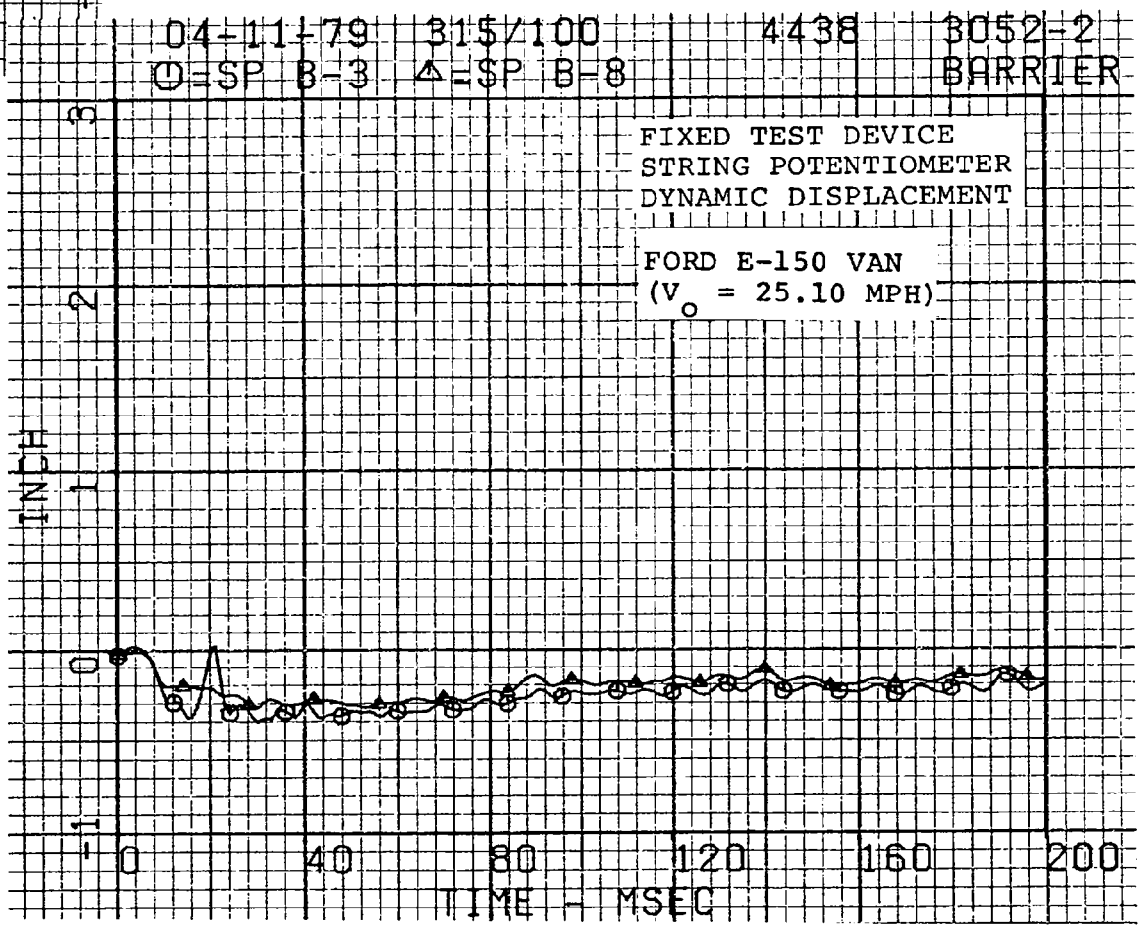

DATE
04-11-79
FILTER
315/100
PARTIAL
TEST NO
3052-2
042779
TESTDEVICE
⊙=4
Δ=5
+=6
X=7
FIXED TEST DEVICE
PARTIAL LOAD CELL FORCE
COLUMNS 4, 5, 6, AND 7
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

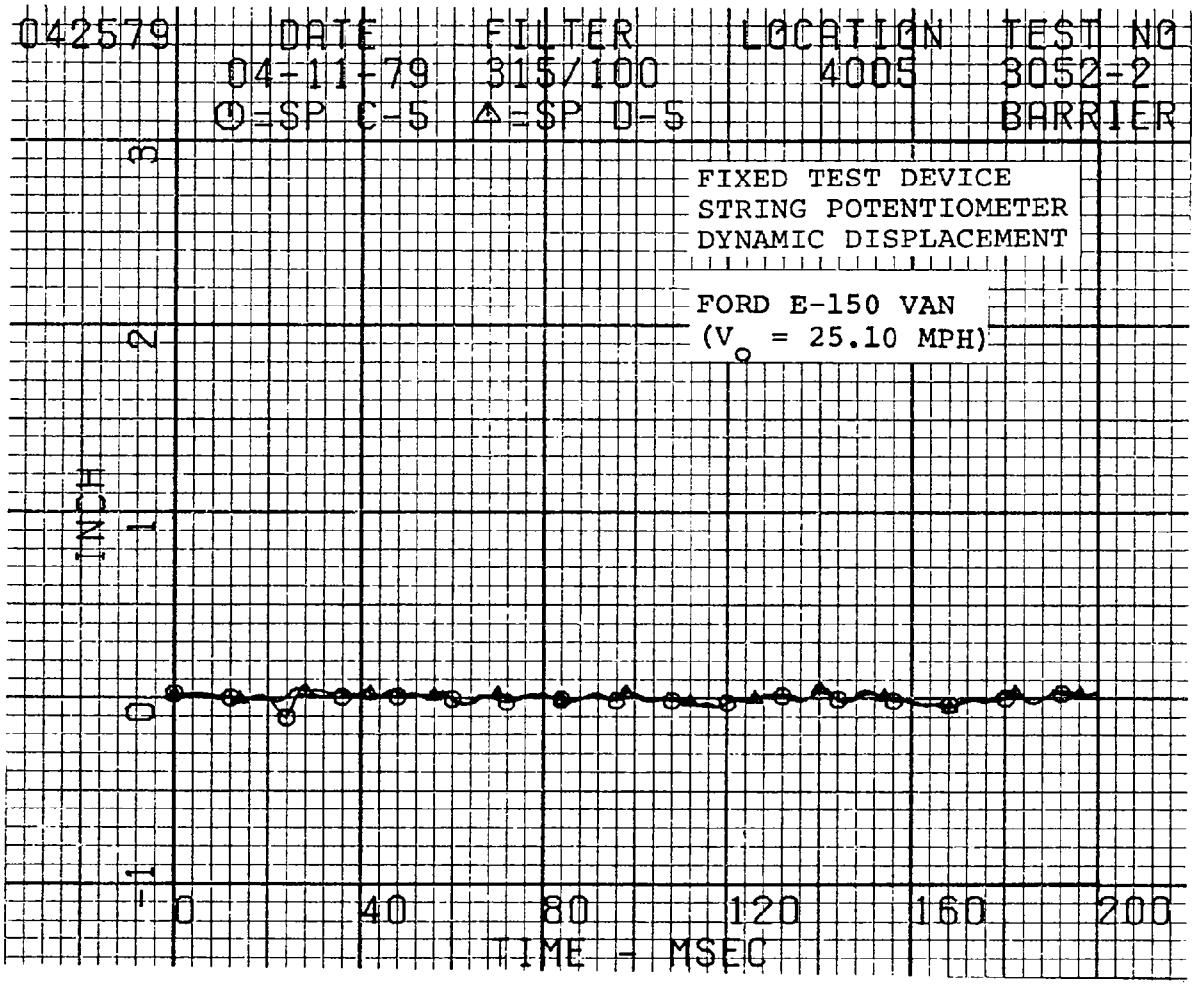

DATE
04-11-79
FILTER
315/100
PARTIAL
TEST NO
3052-2
TESTDEVICE
042479
O=8
Δ=9
+=10
FIXED TEST DEVICE
PARTIAL LOAD CELL FORCE
COLUMNS 8, 9, AND 10
FORD E-150 VAN
(V_o = 25.10 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-11-79
FILTER
315/100
PARTIAL
TEST NO
3052-2
TESTDEVICE
042479
O = ROW A
Δ = ROW B
FIXED TEST DEVICE
PARTIAL LOAD CELL FORCE
ROWS A AND B
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-11-79
FILTER
315/100
PARTIAL
TEST NO
3052-2
042479
TESTDEVICE
O = ROW C
Δ = ROW D
FIXED TEST DEVICE
PARTIAL LOAD CELL FORCE
ROWS C AND D
FORD E-150 VAN
(V_o = 25.10 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


042579
DATE
04-11-79
FILTER
315/100
LOCATION
4456
TEST NO
3052-2
BARRIER
O=SP B-5 △=SP B-6
FIXED TEST DEVICE
STRING POTENTIOMETER
DYNAMIC DISPLACEMENT
FORD E-150 VAN
(V_o = 25.10 MPH)
INCH
3
2
1
0
-1
SP B-5 DATA INVALID DUE TO
INSTRUMENTATION FAILURE


04-11-79
315/100
4438
3052-2
BARRIER
O=SP B-3 △=SP B-8
FIXED TEST DEVICE
STRING POTENTIOMETER
DYNAMIC DISPLACEMENT
FORD E-150 VAN
(V_o = 25.10 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC


042579
DATE
04-11-79
FILTER
315/100
LOCATION
4005
TEST NO
3052-2
BARRIER
⊙=SP C-5 △=SP D-5
FIXED TEST DEVICE
STRING POTENTIOMETER
DYNAMIC DISPLACEMENT
FORD E-150 VAN
(V$_o$ = 25.10 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC

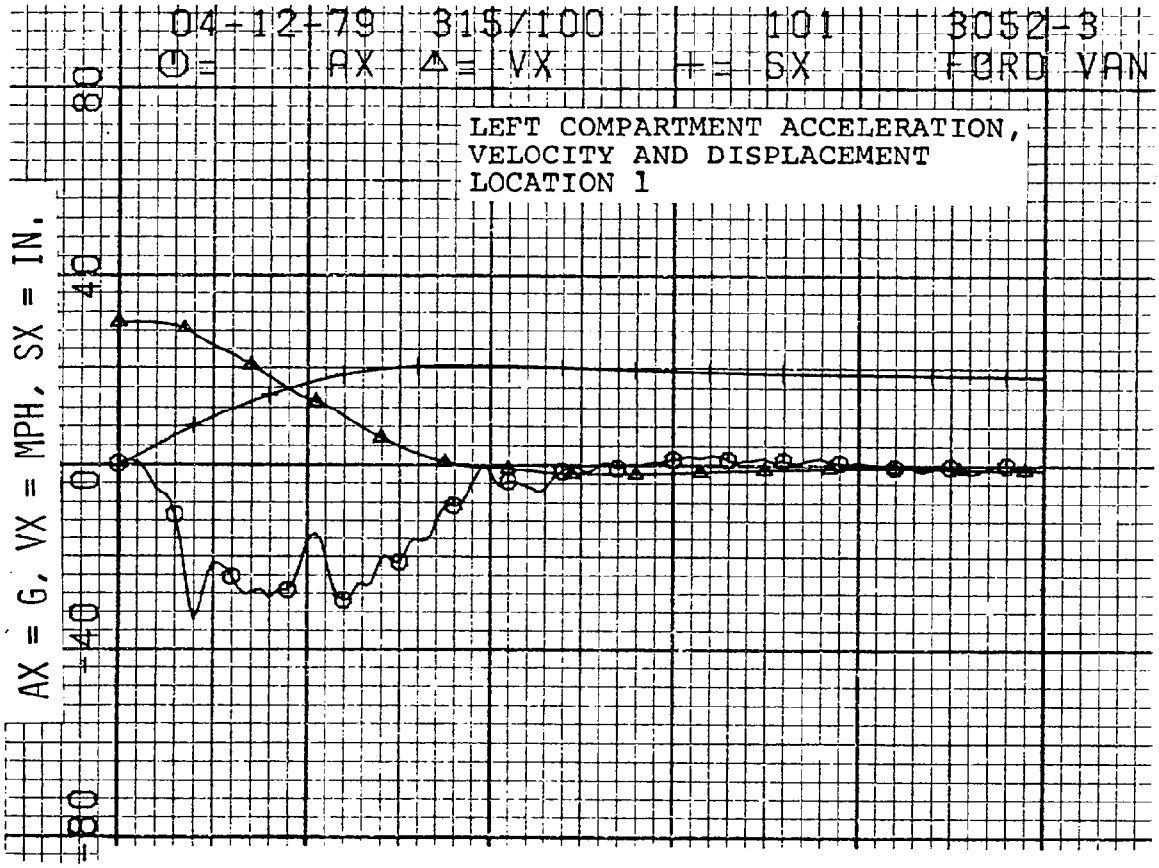
APPENDIX C

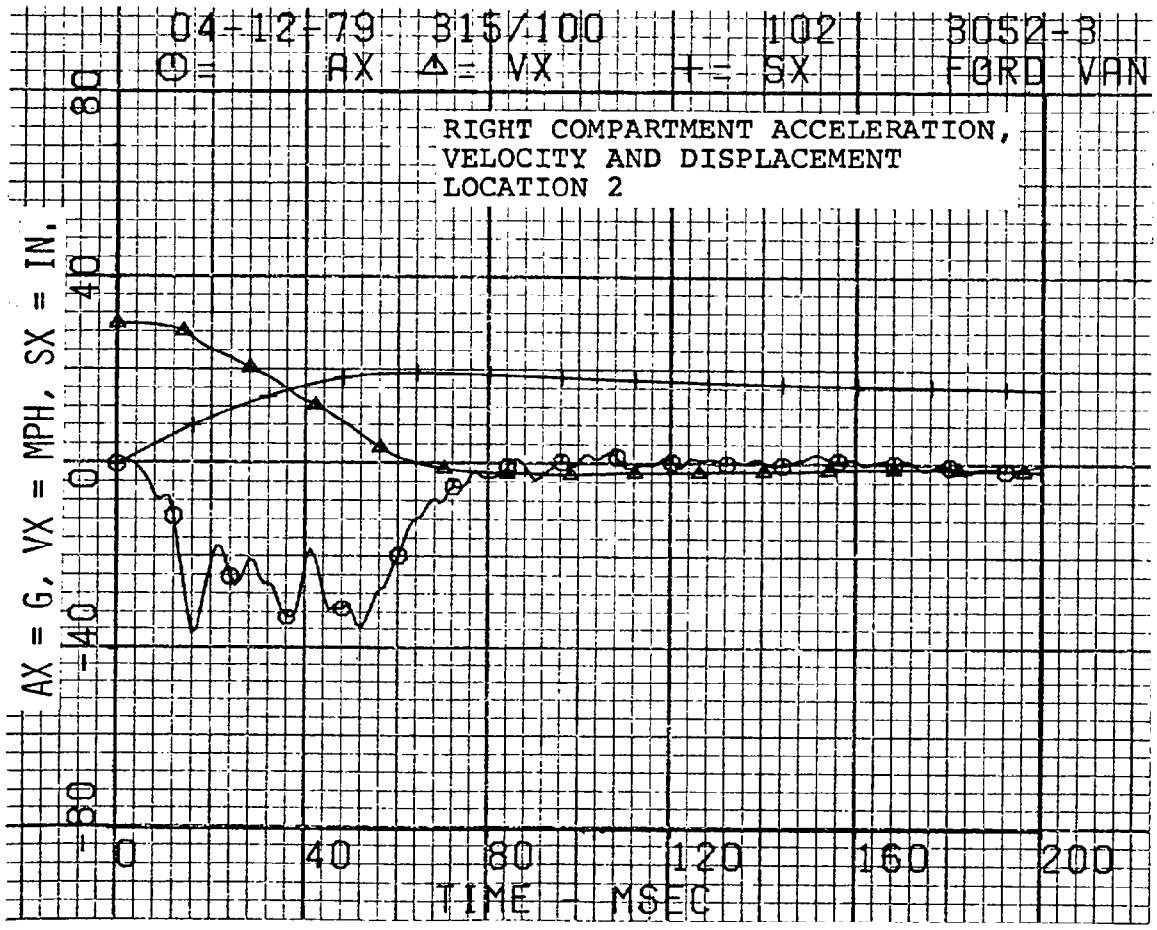
CALCOMP PLOTS FOR
TEST 3052-3

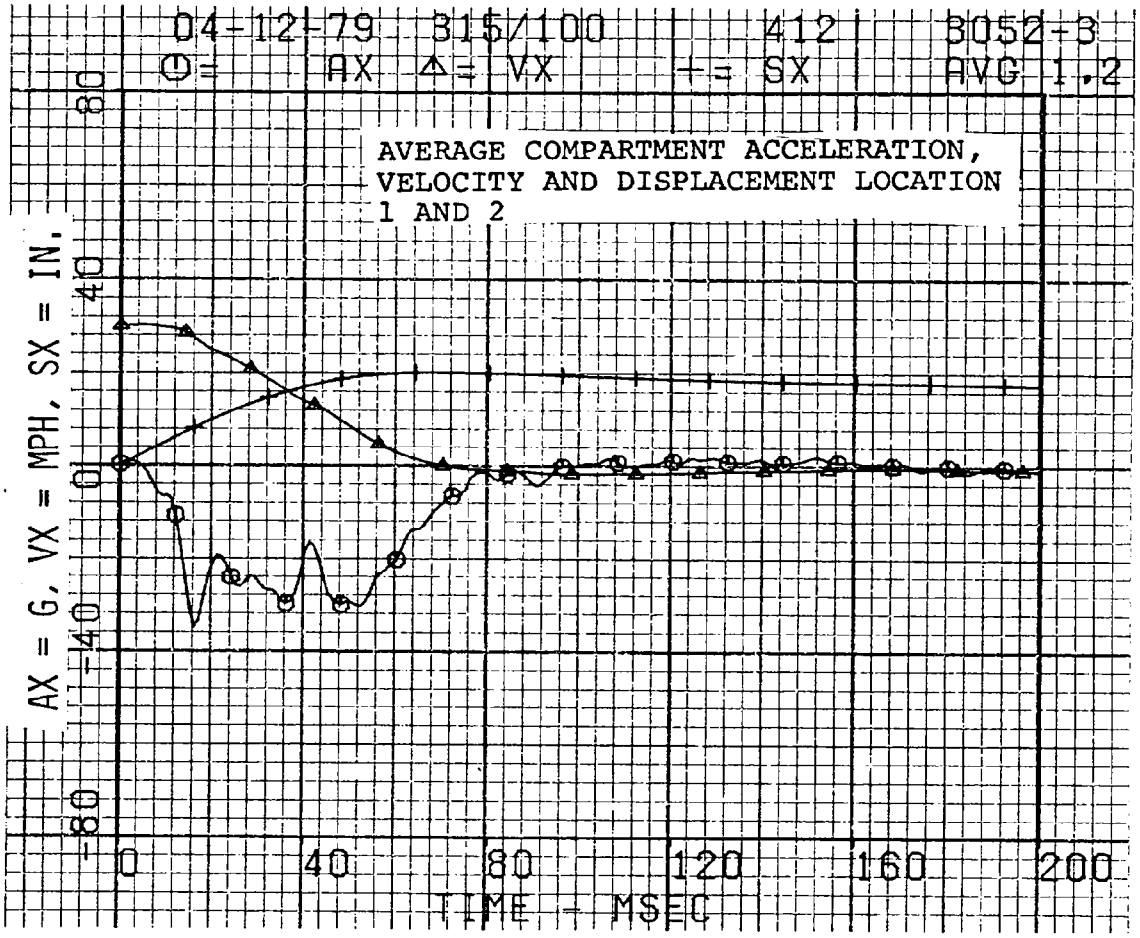
FORD E-150 ECONOLINE VAN-TO-NHTSA FIXED TEST DEVICE
SYMMETRIC HEAD-ON IMPACT

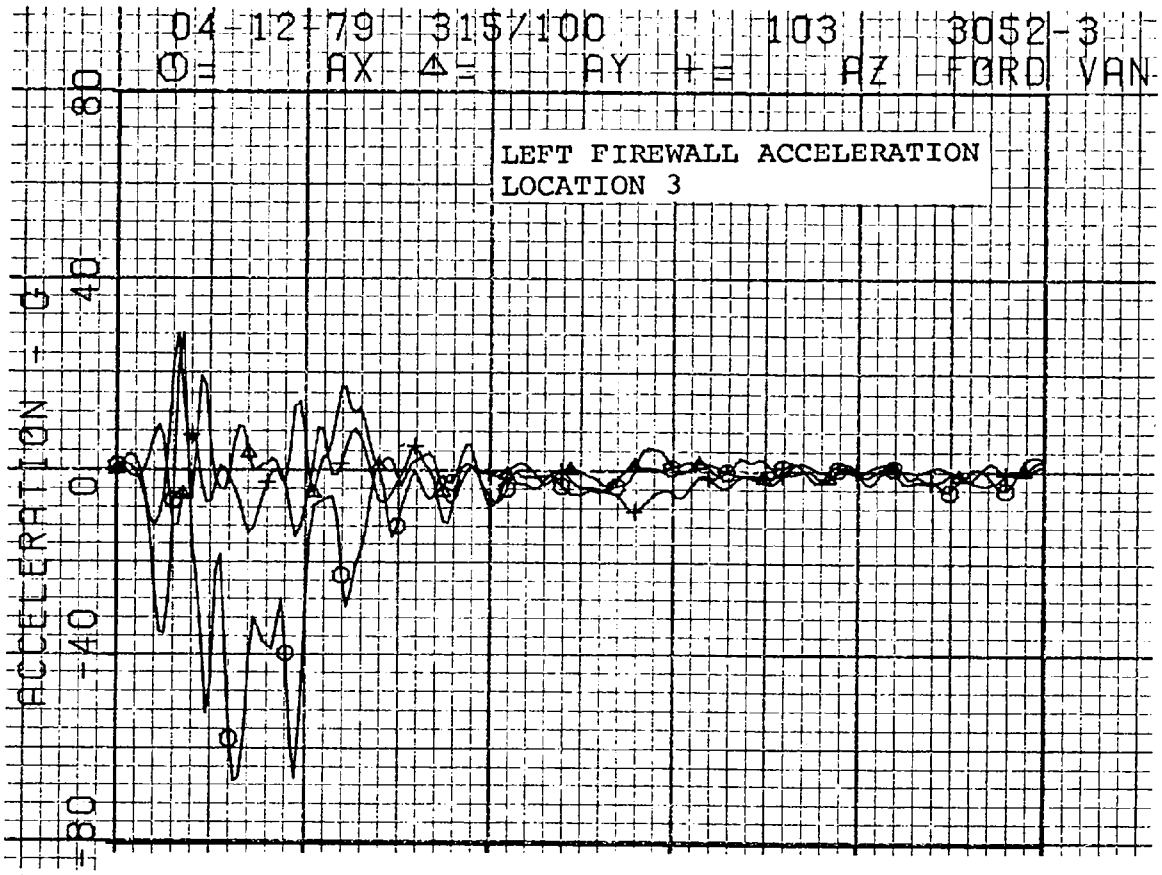
TEST SPEED: 30.02 MPH

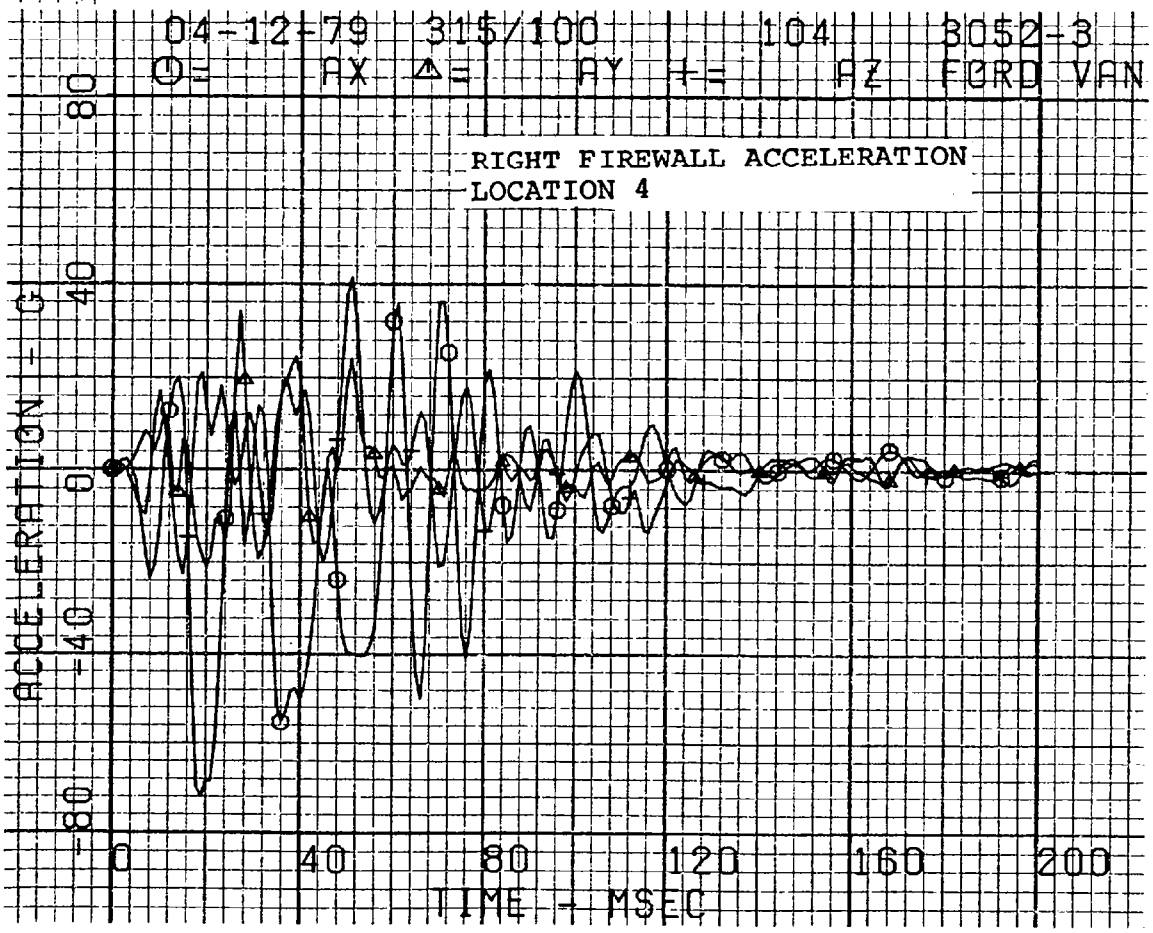
TEST DATE: APRIL 12, 1979

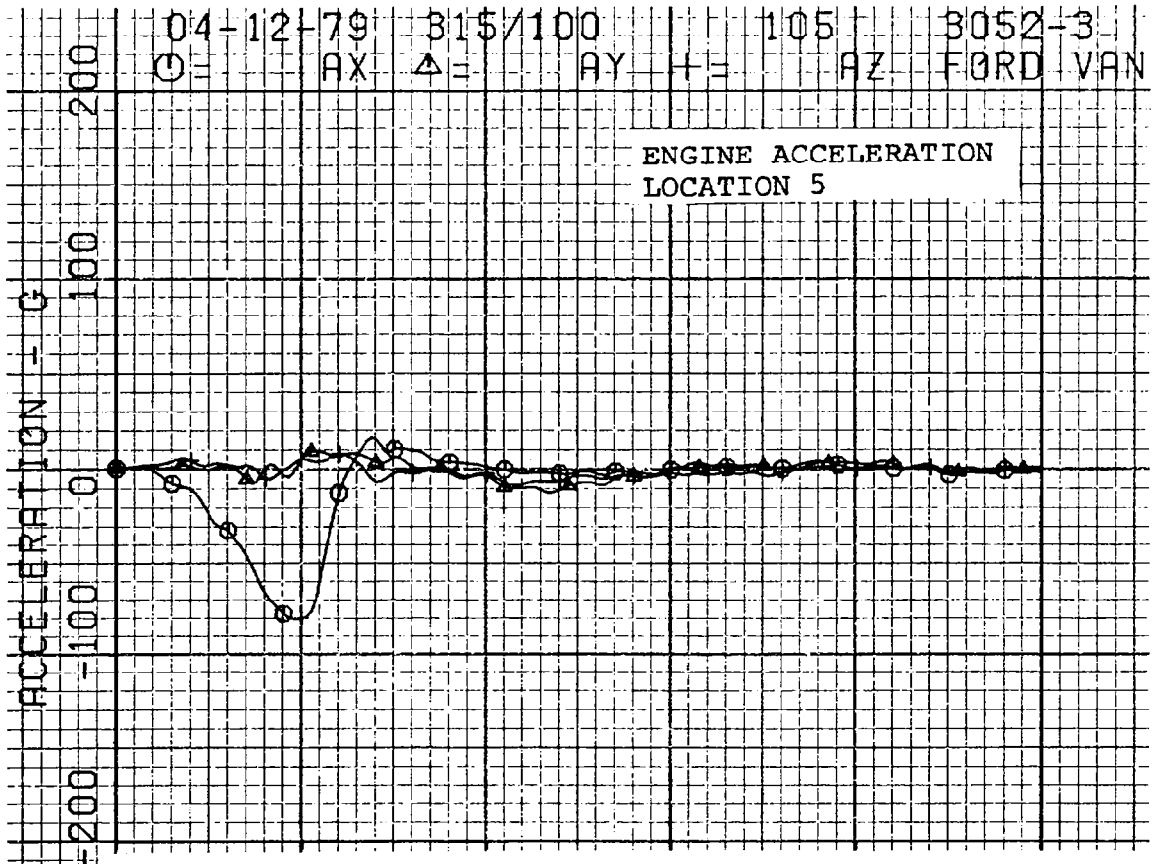

04-12-79 315/100 101 3052-3
O= AX △= VX += SX FORD VAN
LEFT COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT
LOCATION 1
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80

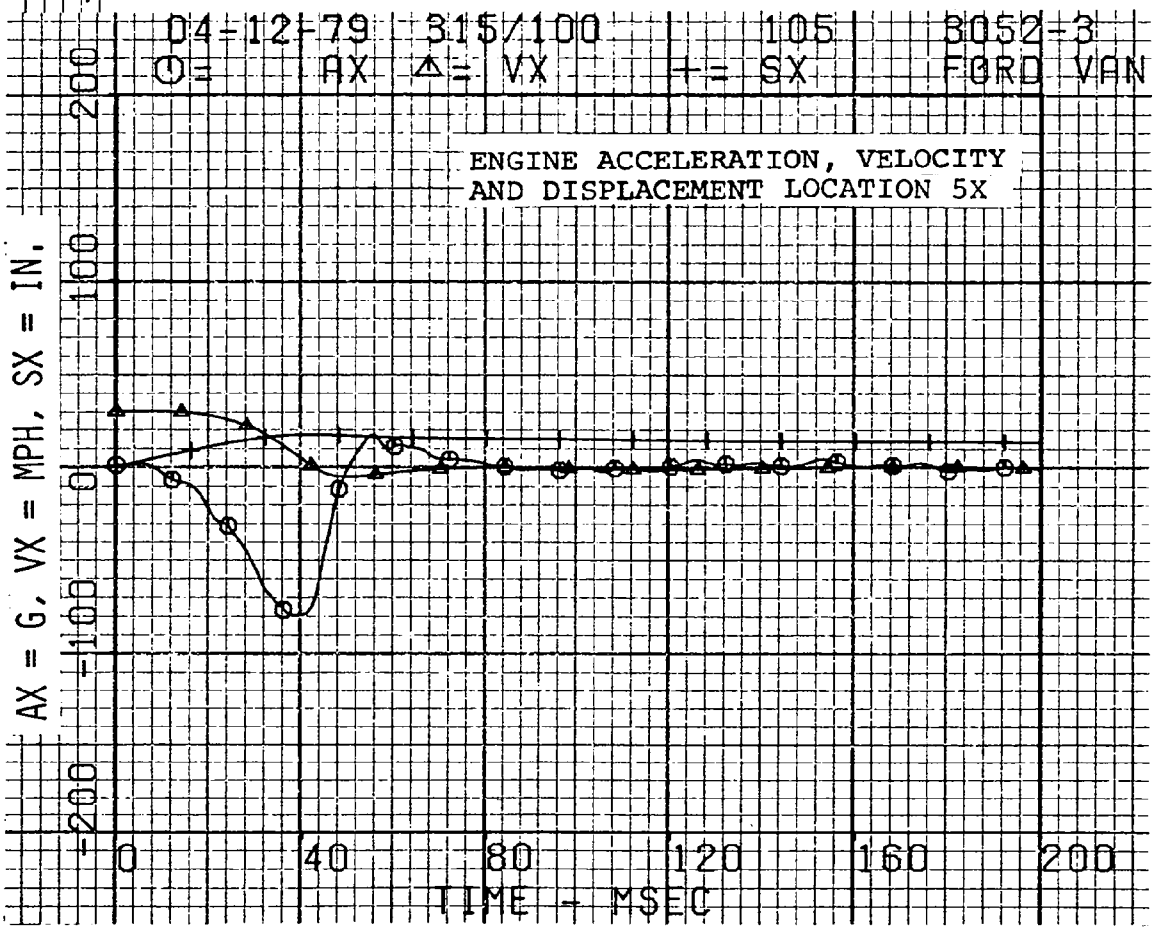

04-12-79 315/100 102 3052-3
O= AX △= VX += SX FORD VAN
RIGHT COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT
LOCATION 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

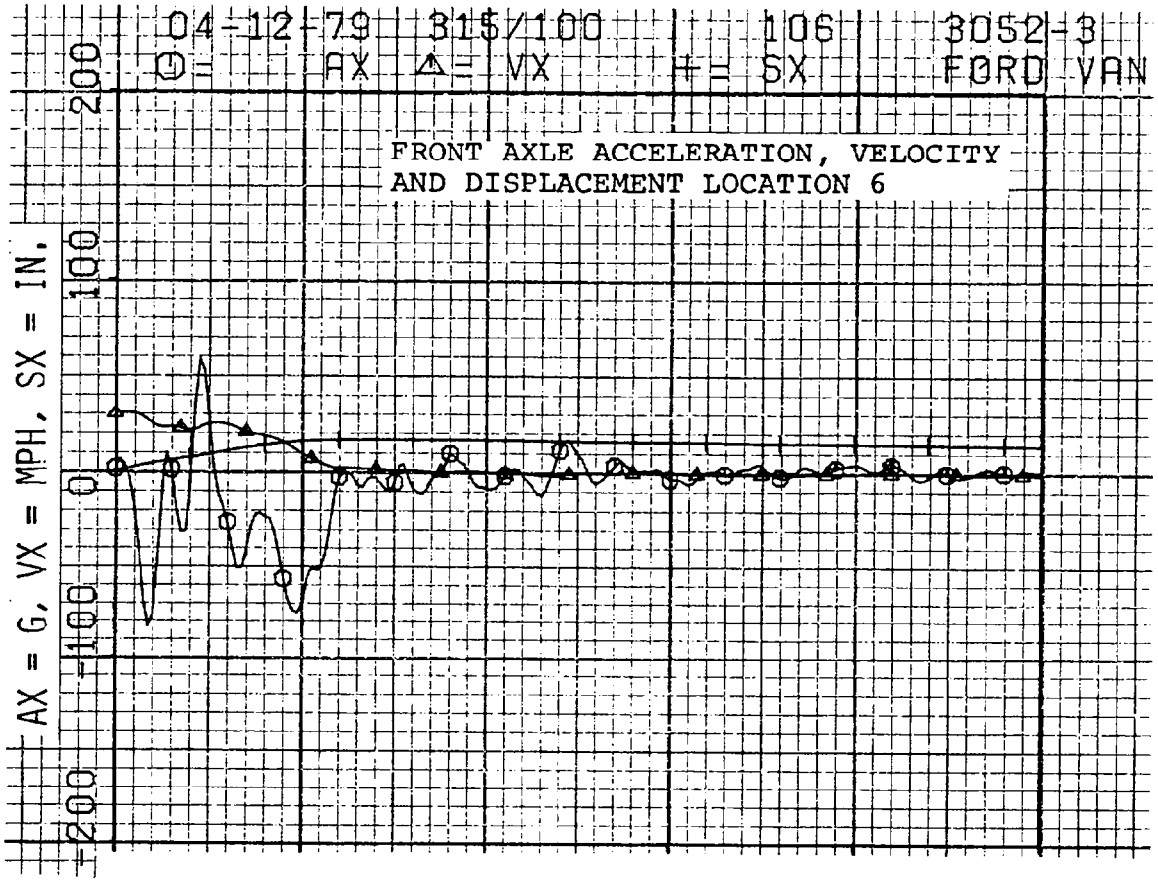

04-12-79 315/100 412 3052-3
⊖= AX △= VX += SX AVG 1,2
AVERAGE COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT LOCATION
1 AND 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

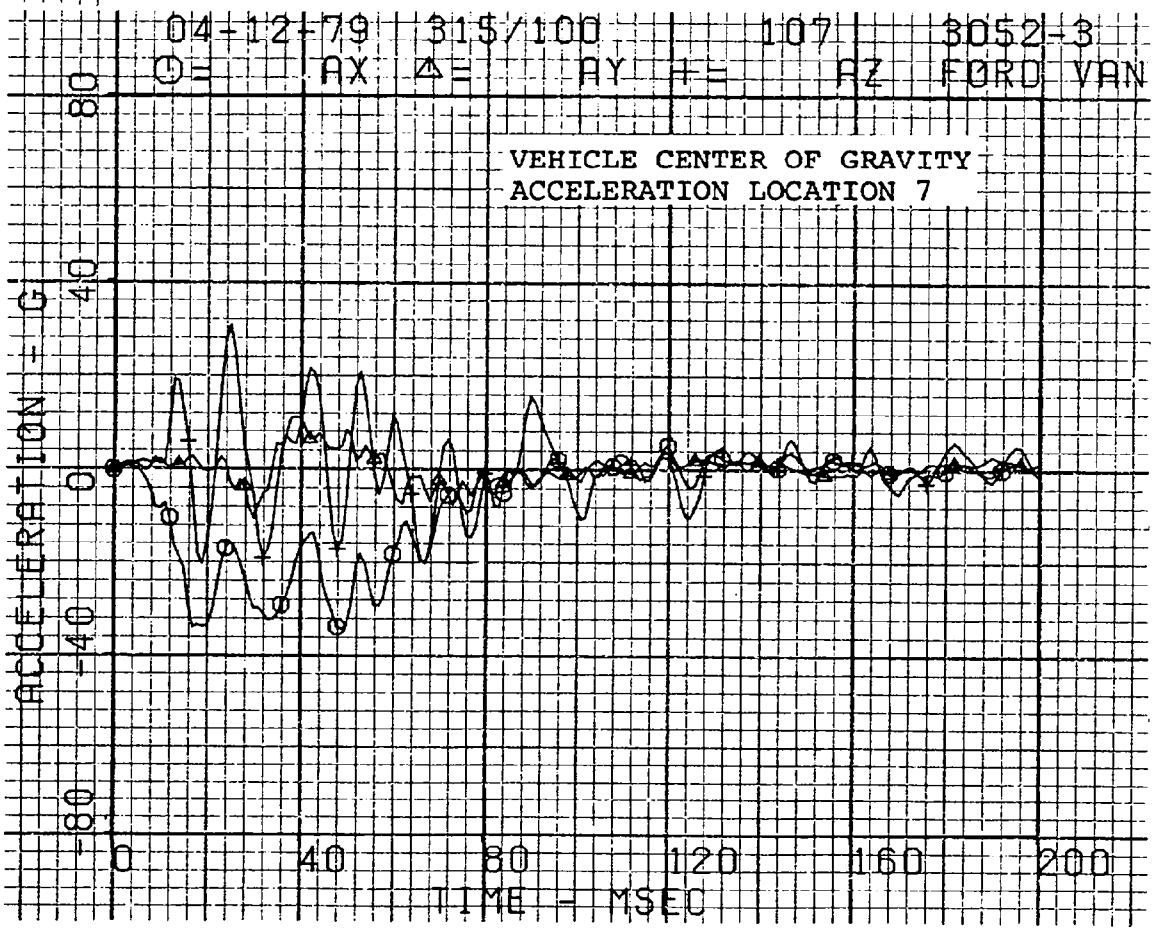

04-12-79 315/100 103 3052-3
O= AX Δ= AY += AZ FORD VAN
LEFT FIREWALL ACCELERATION
LOCATION 3
ACCELERATION - G
80
40
0
-40
-80

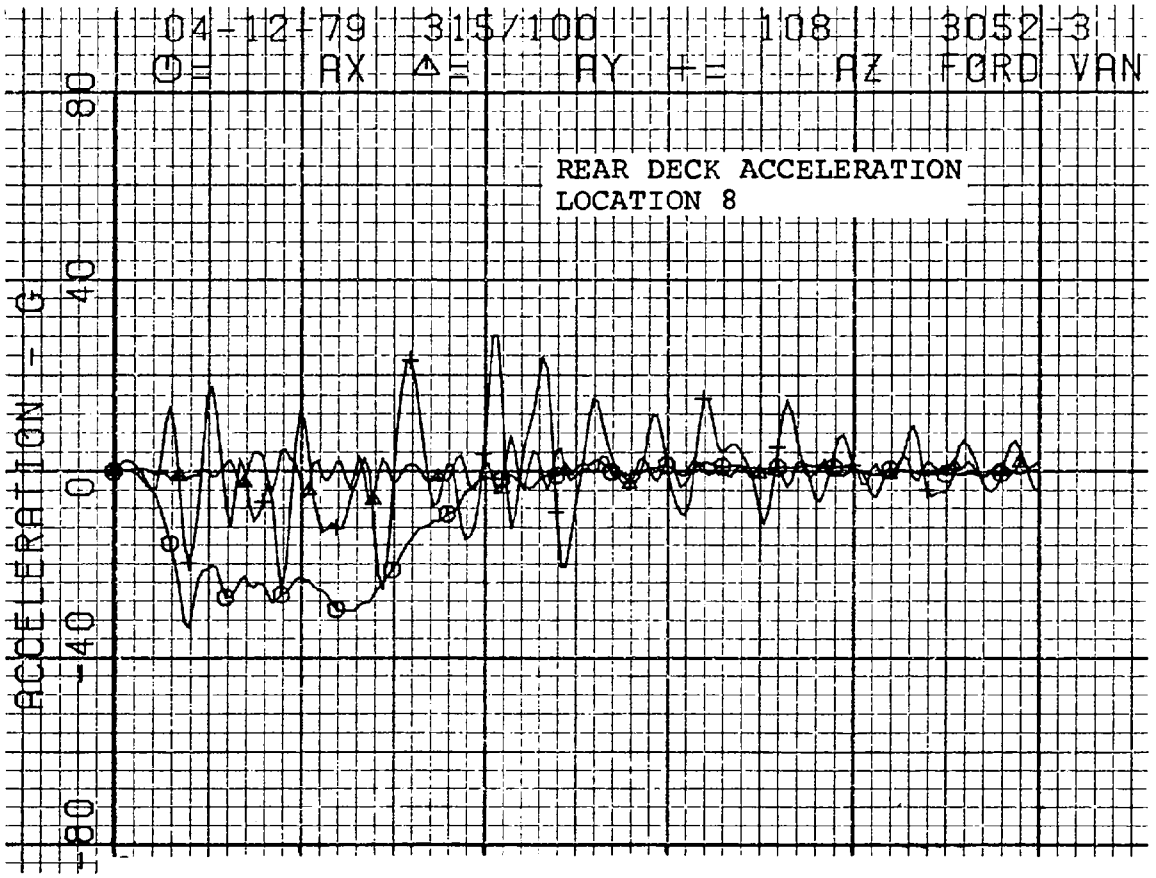

04-12-79 315/100 104 3052-3
O= AX Δ= AY += AZ FORD VAN
RIGHT FIREWALL ACCELERATION
LOCATION 4
ACCELERATION - G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

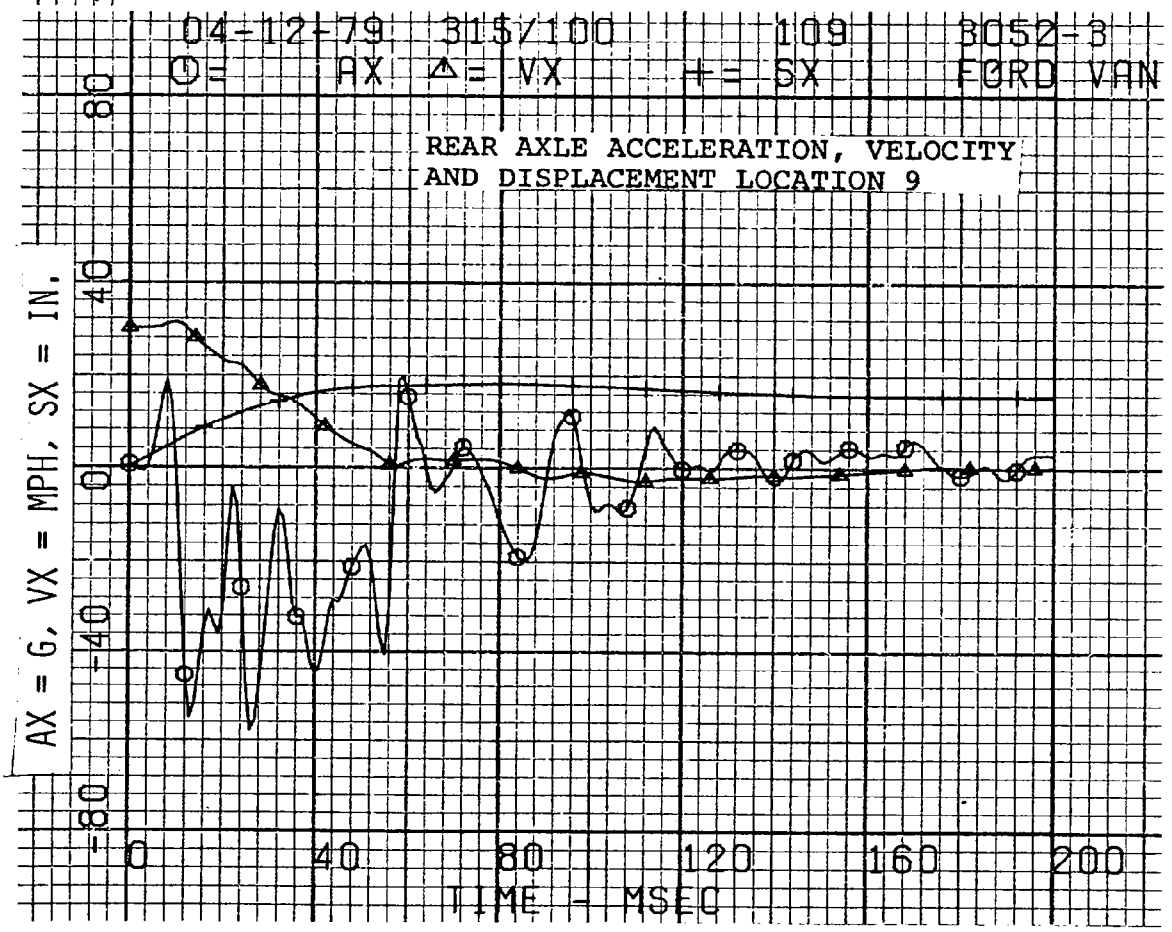

04-12-79 315/100 105 3052-3
⊙= AX △= AY += AZ FORD VAN
ENGINE ACCELERATION
LOCATION 5
ACCELERATION - G
200
100
0
-100
-200

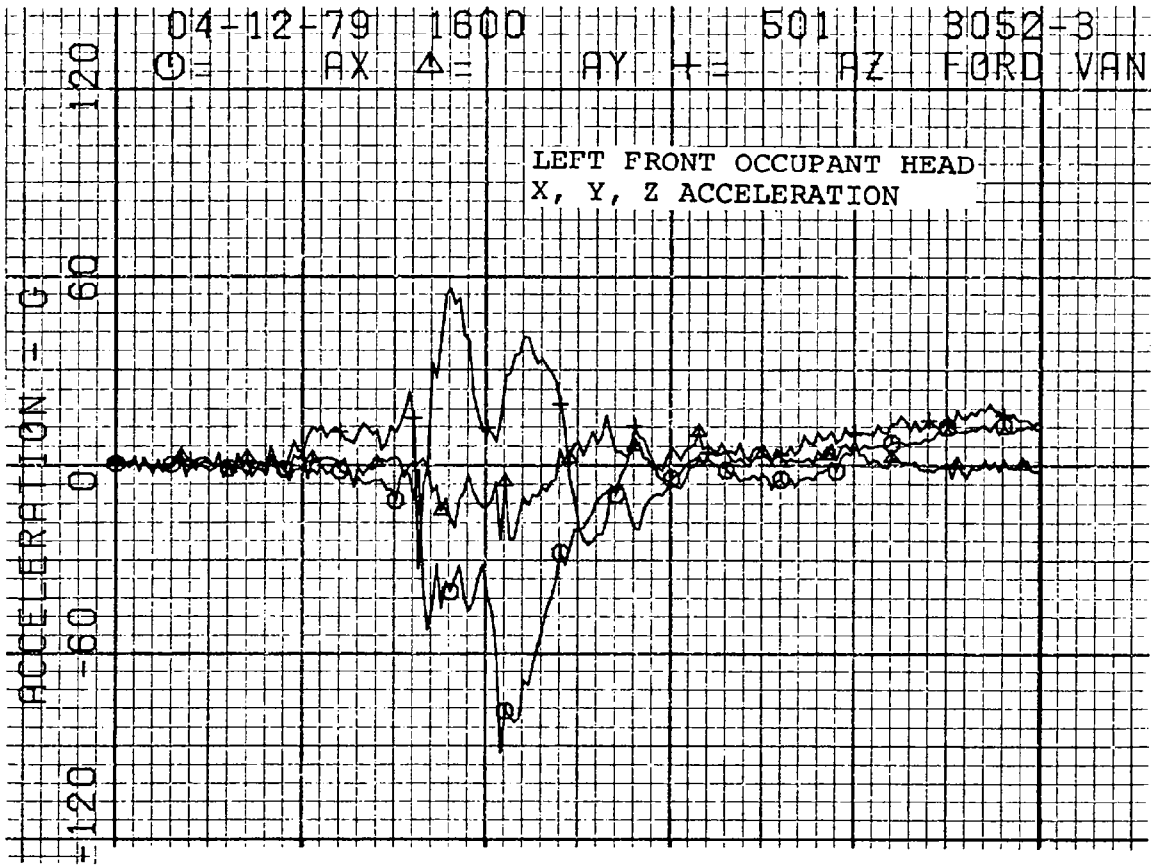

04-12-79 315/100 105 3052-3
⊙= AX △= VX += SX FORD VAN
ENGINE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 5X
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200
0
40
80
120
160
200
TIME - MSEC

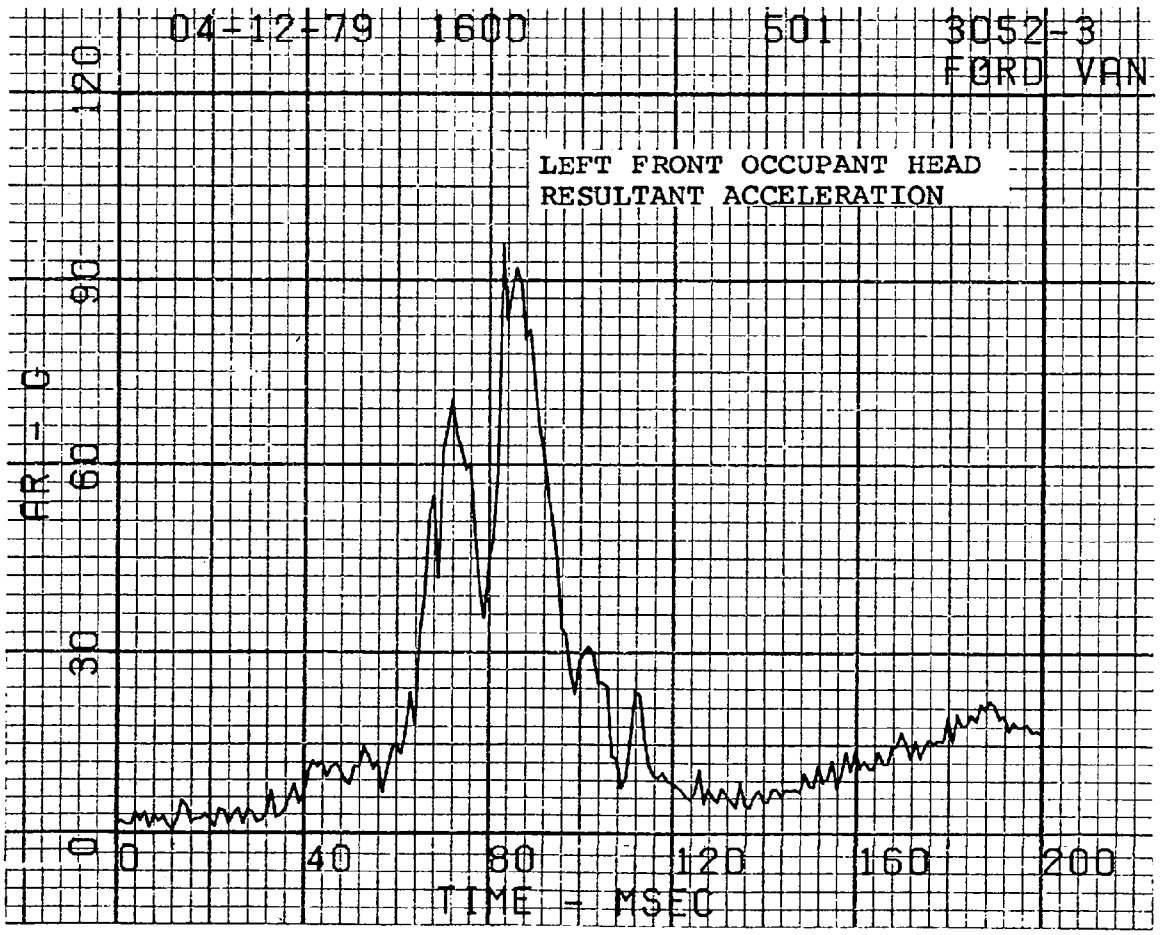

04-12-79 315/100 106 3052-3
O= AX △= VX += SX FORD VAN
FRONT AXLE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 6
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200

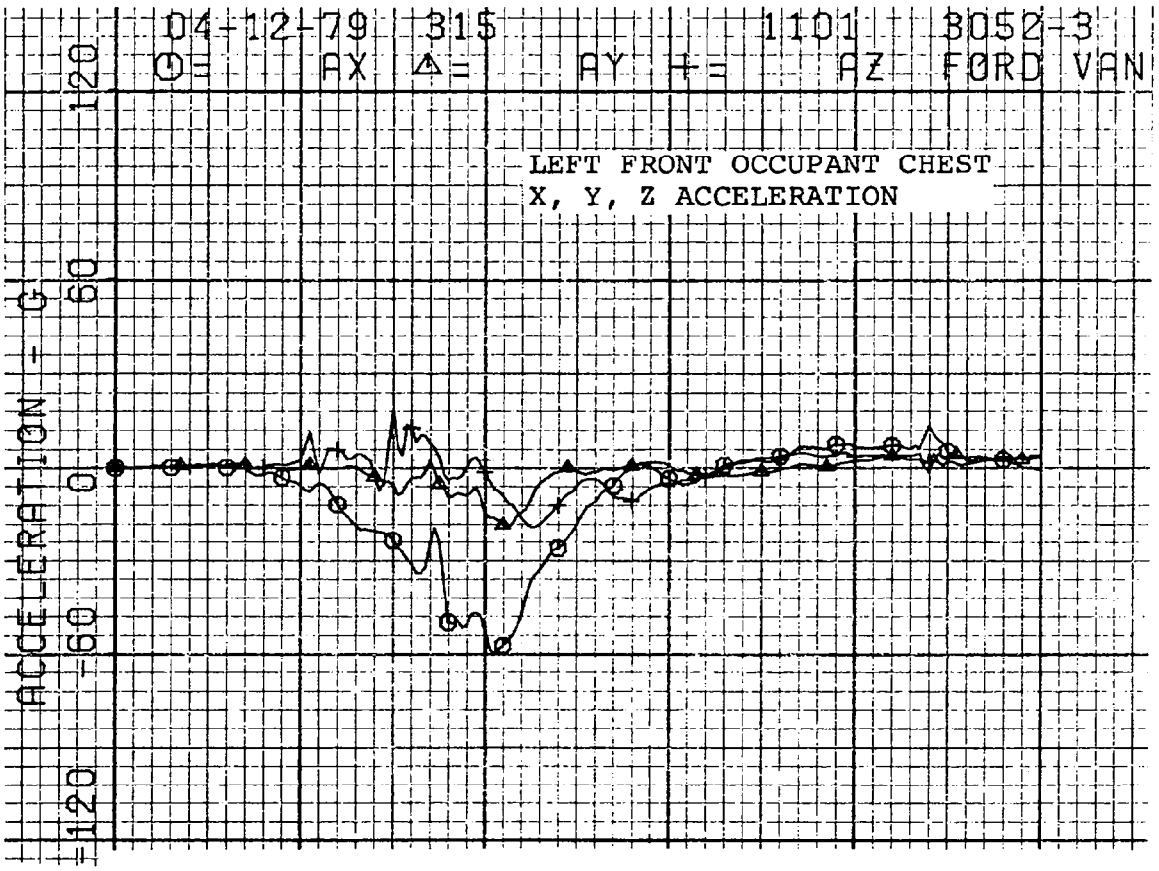

04-12-79 315/100 107 3052-3
O= AX △= AY += AZ FORD VAN
VEHICLE CENTER OF GRAVITY
ACCELERATION LOCATION 7
ACCELERATION = G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

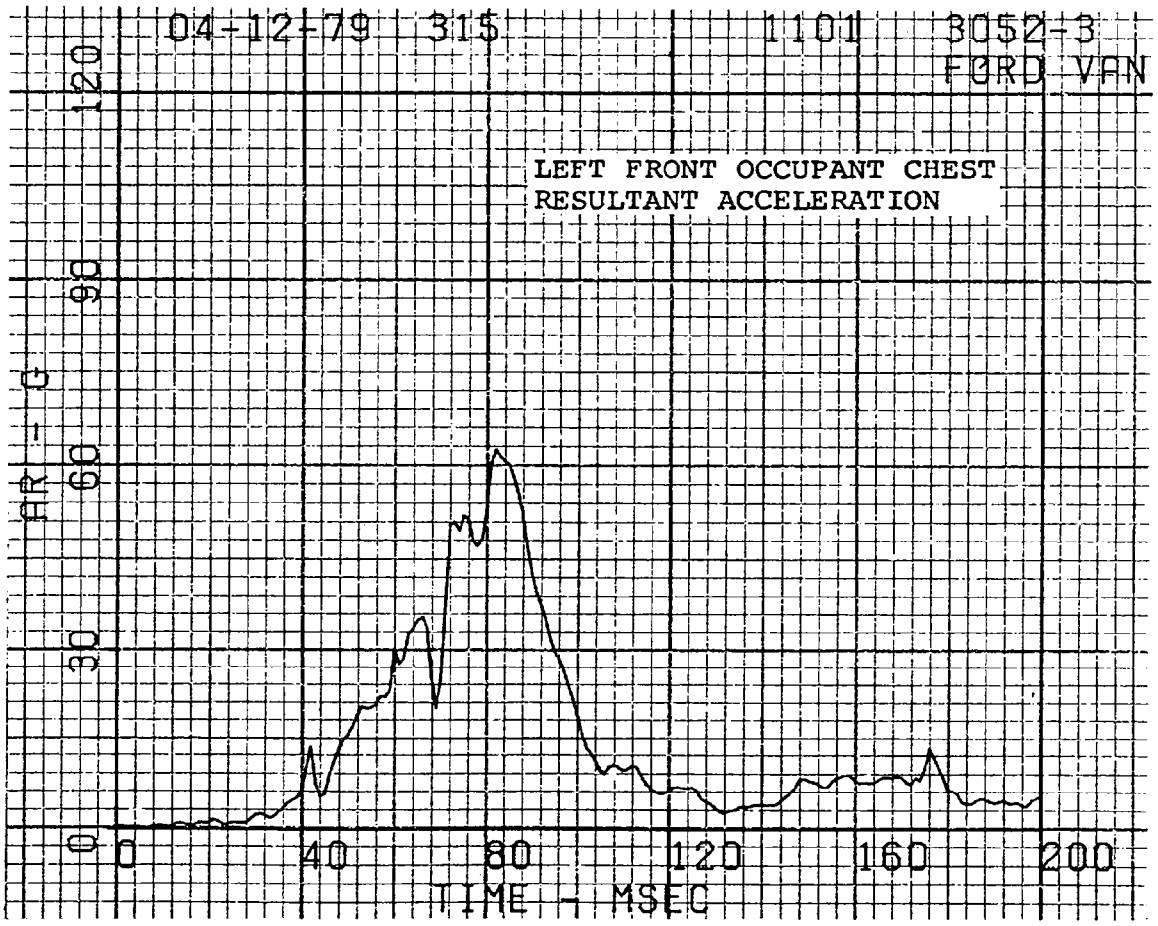

04-12-79 315/100 108 3052-3
O= AX △= AY += AZ FORD VAN
REAR DECK ACCELERATION
LOCATION 8
ACCELERATION - G
80
40
0
-40
-80

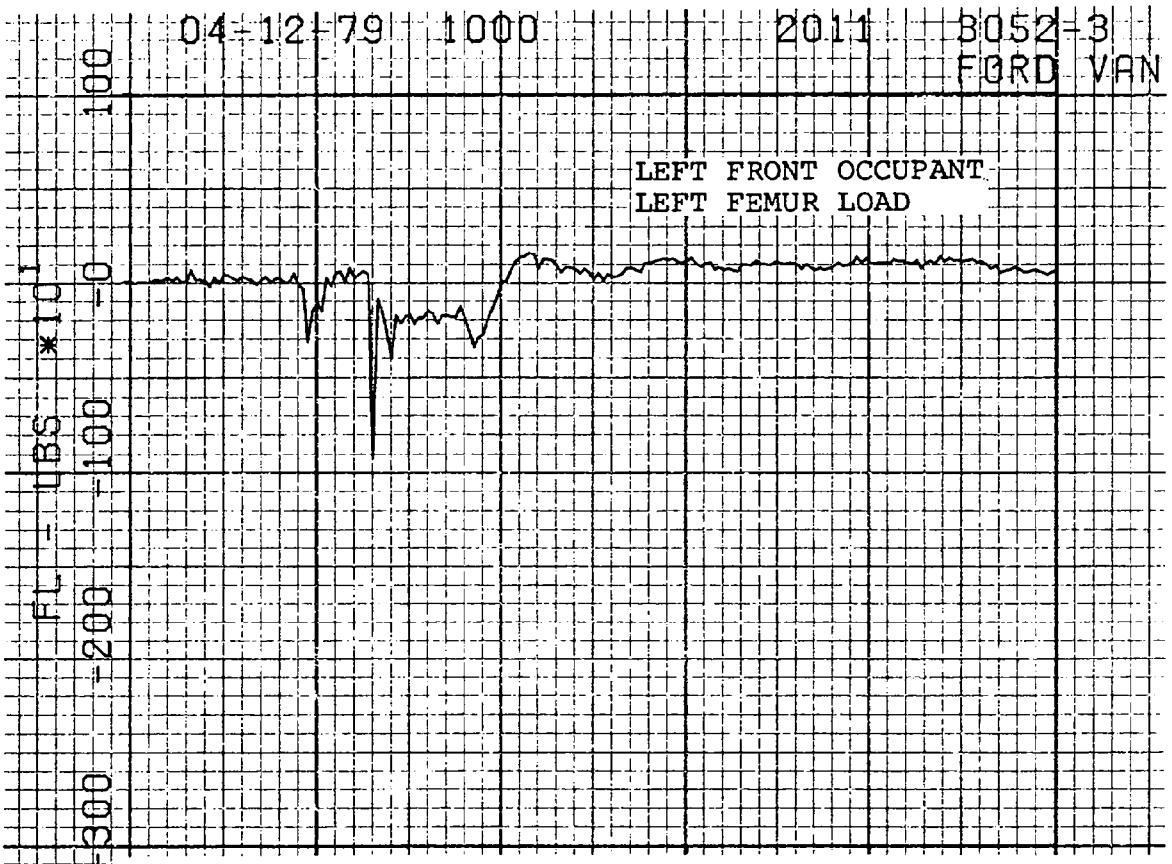

04-12-79 315/100 109 3052-3
O= AX △= VX += SX FORD VAN
REAR AXLE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 9
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

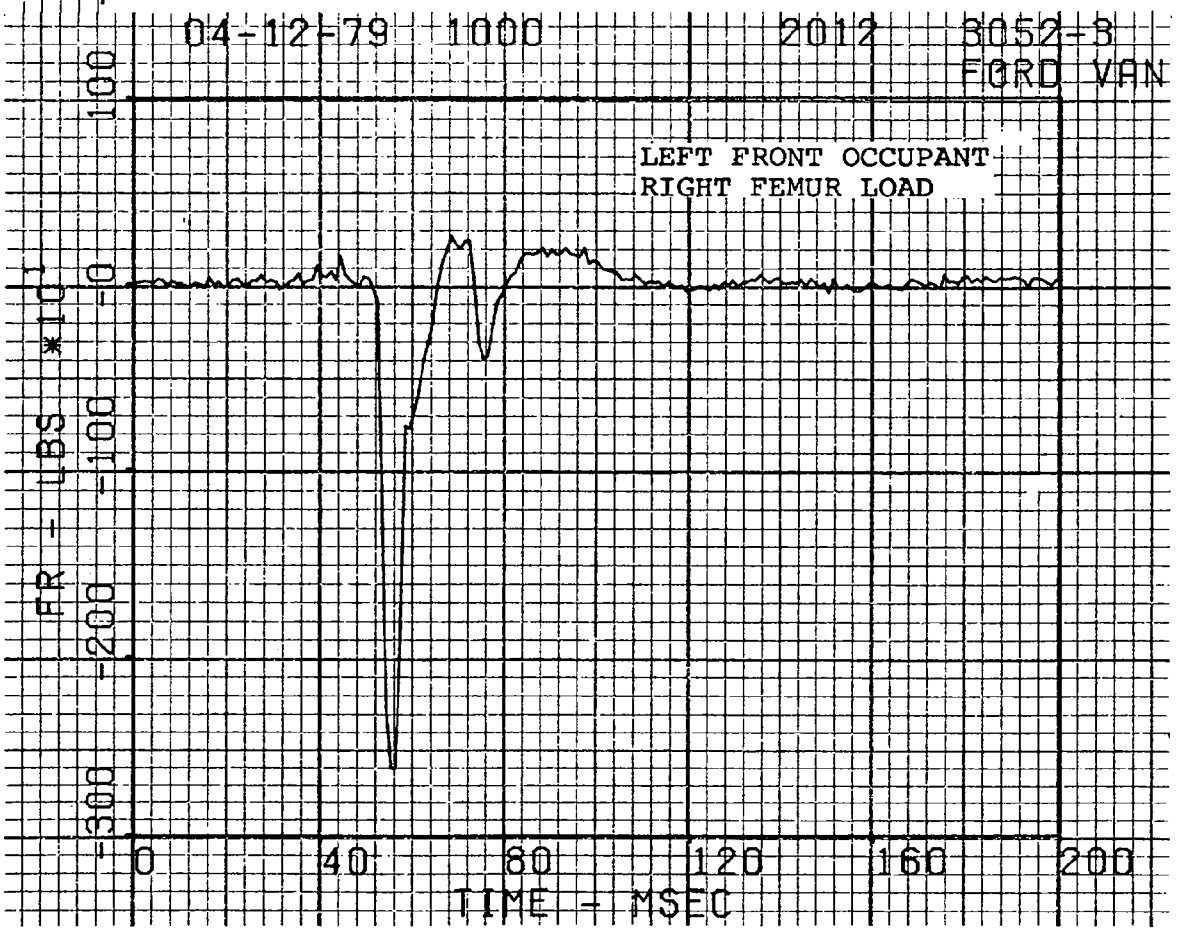

04-12-79 1600 501 3052-3
AX AY AZ FORD VAN
LEFT FRONT OCCUPANT HEAD
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

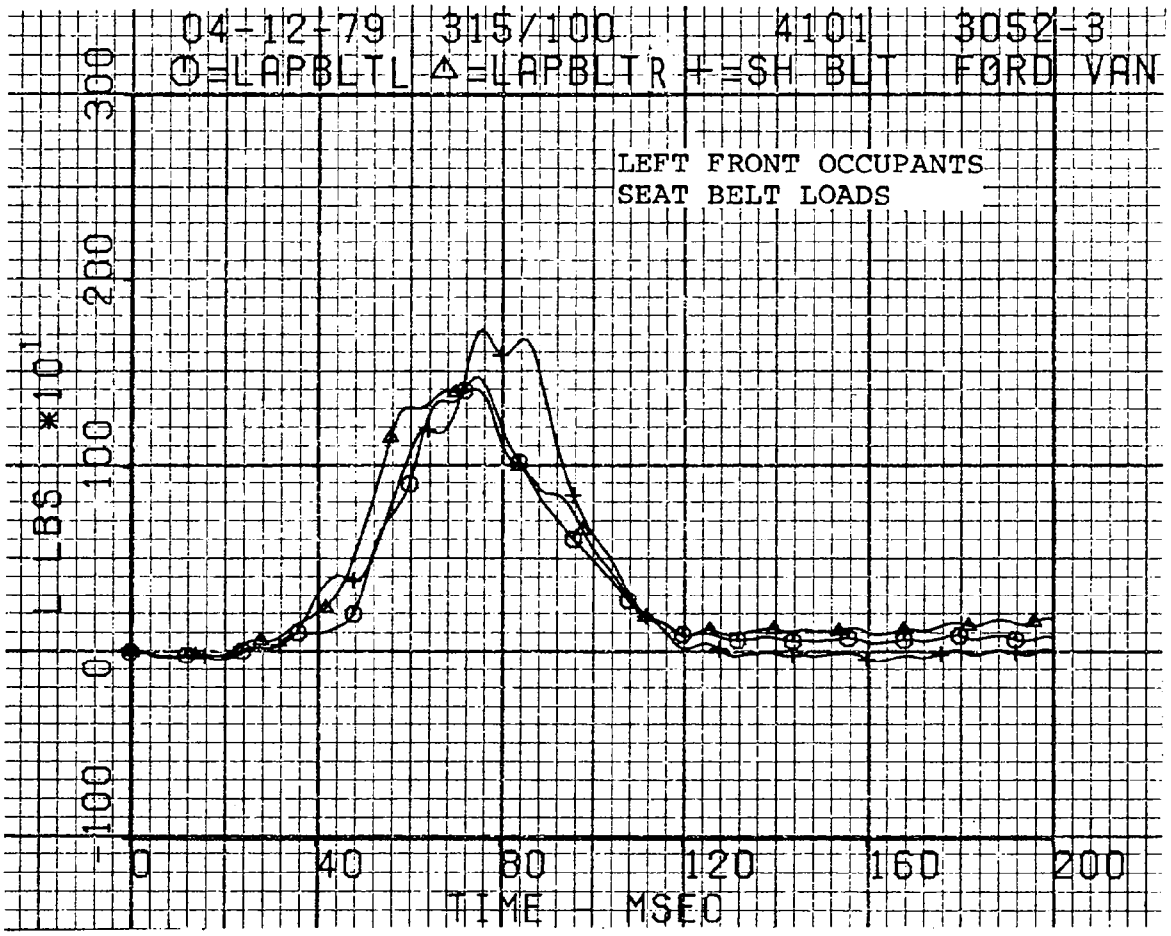

04-12-79 1600 501 3052-3
FORD VAN
LEFT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

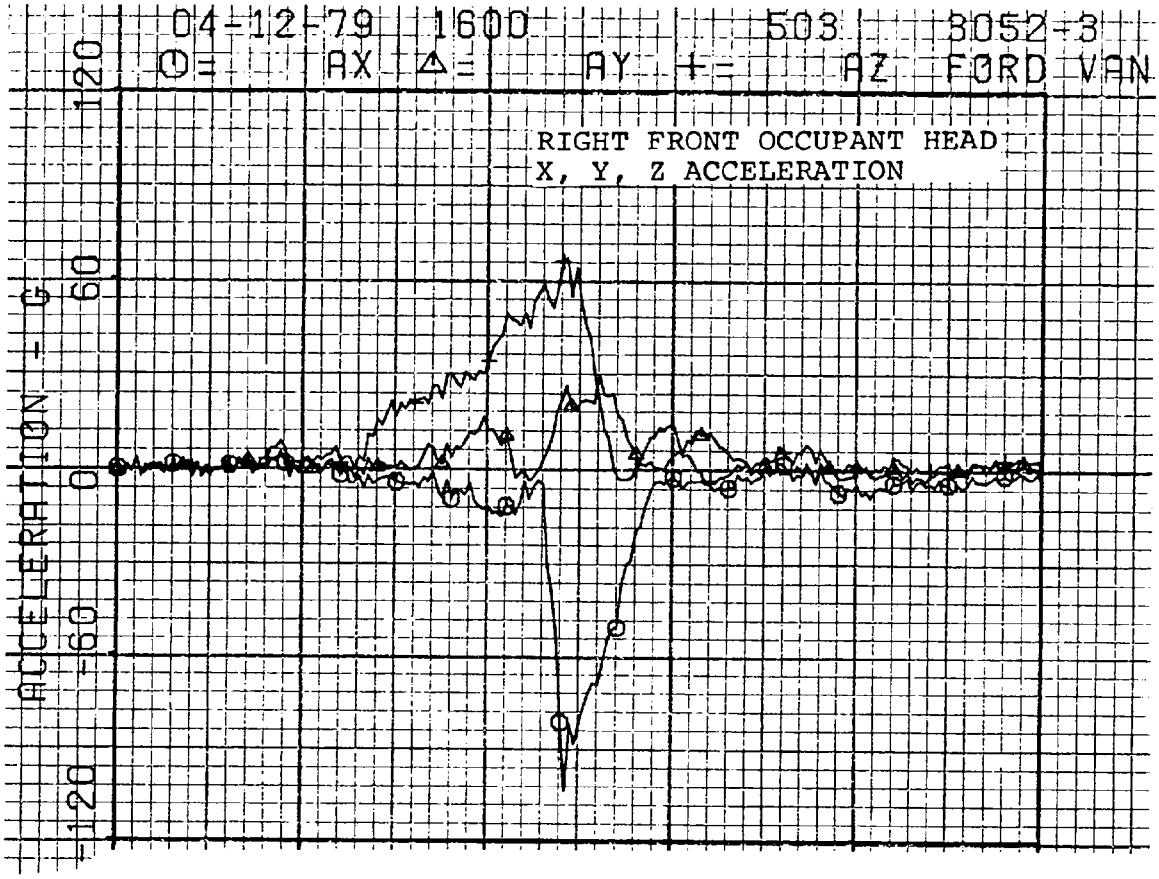

04-12-79 315 1101 3052-3
O= AX △= AY += AZ FORD VAN
LEFT FRONT OCCUPANT CHEST
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

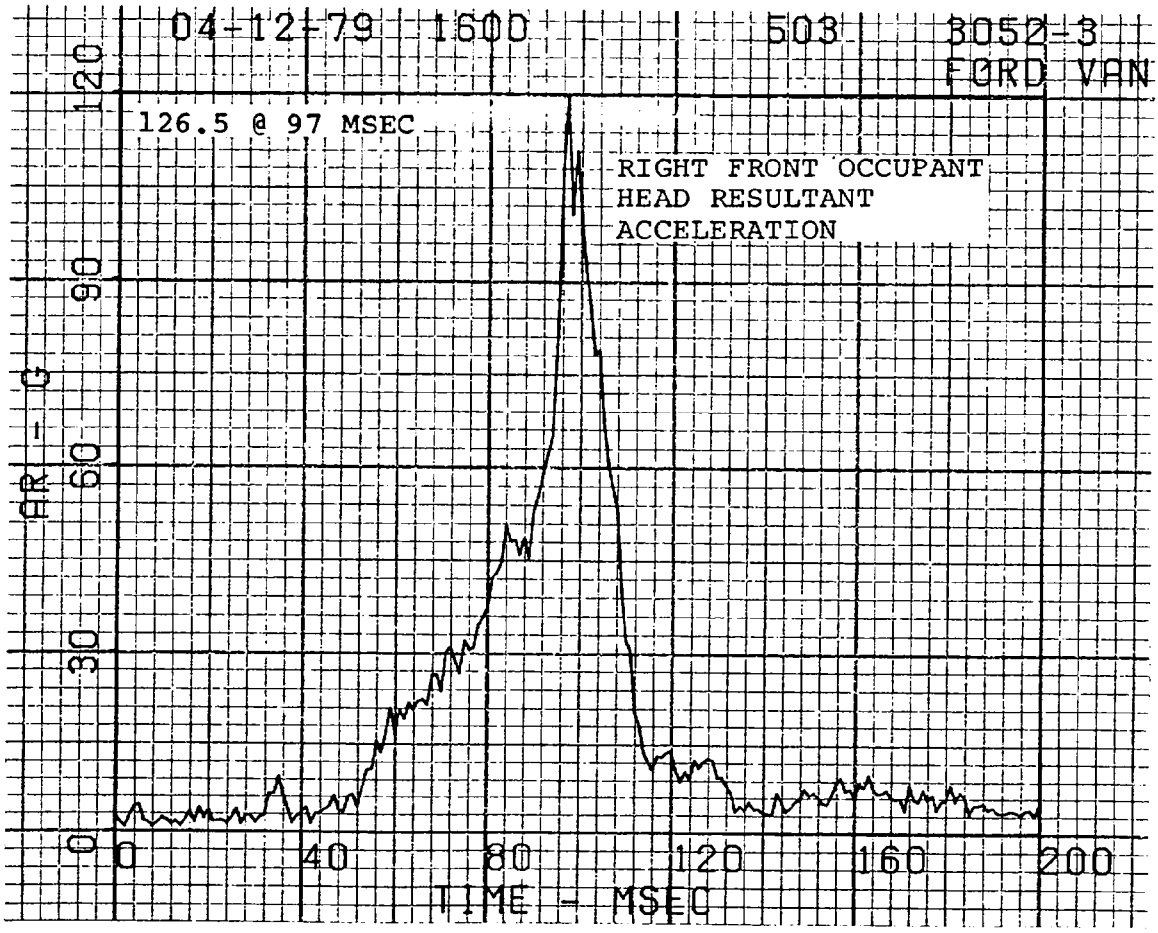

04-12-79 315 1101 3052-3
FORD VAN
LEFT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

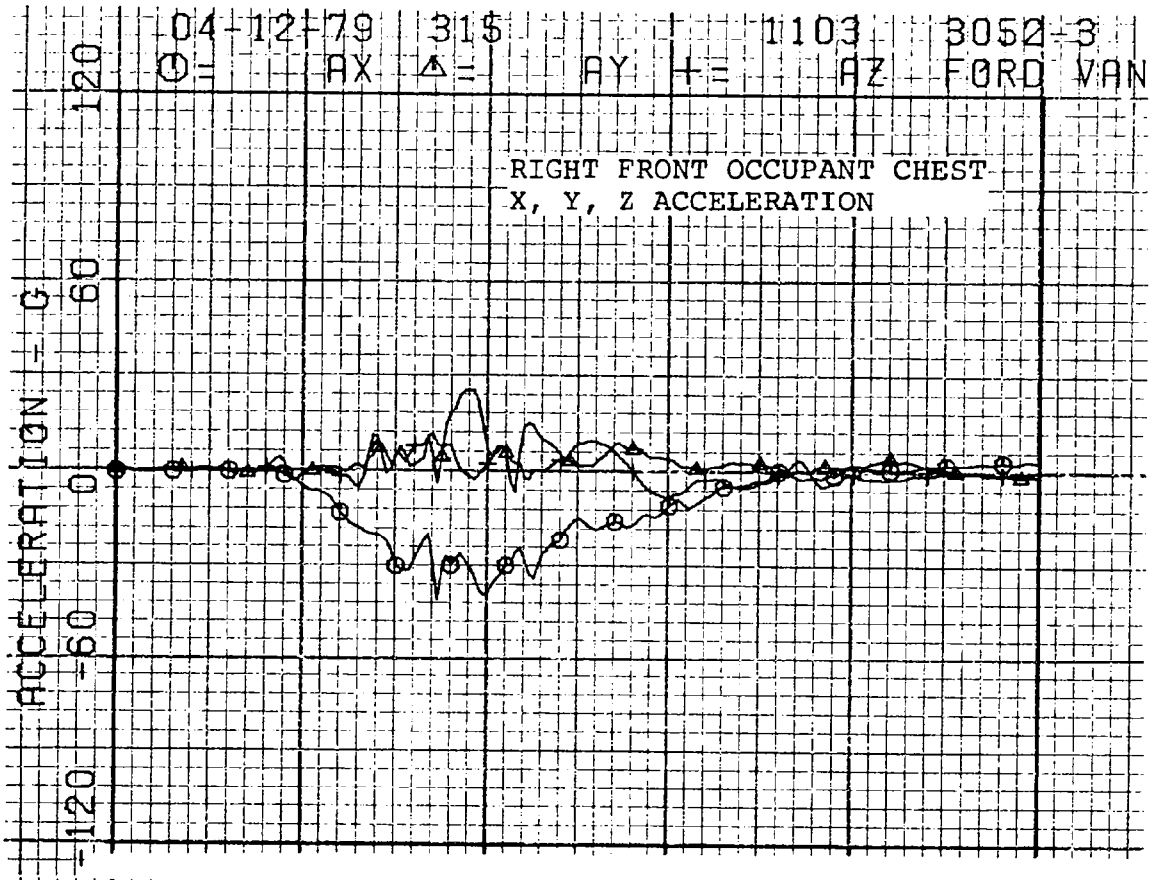

04-12-79 1000 2011 3052-3
FORD VAN
LEFT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
0
-100
-200
-300

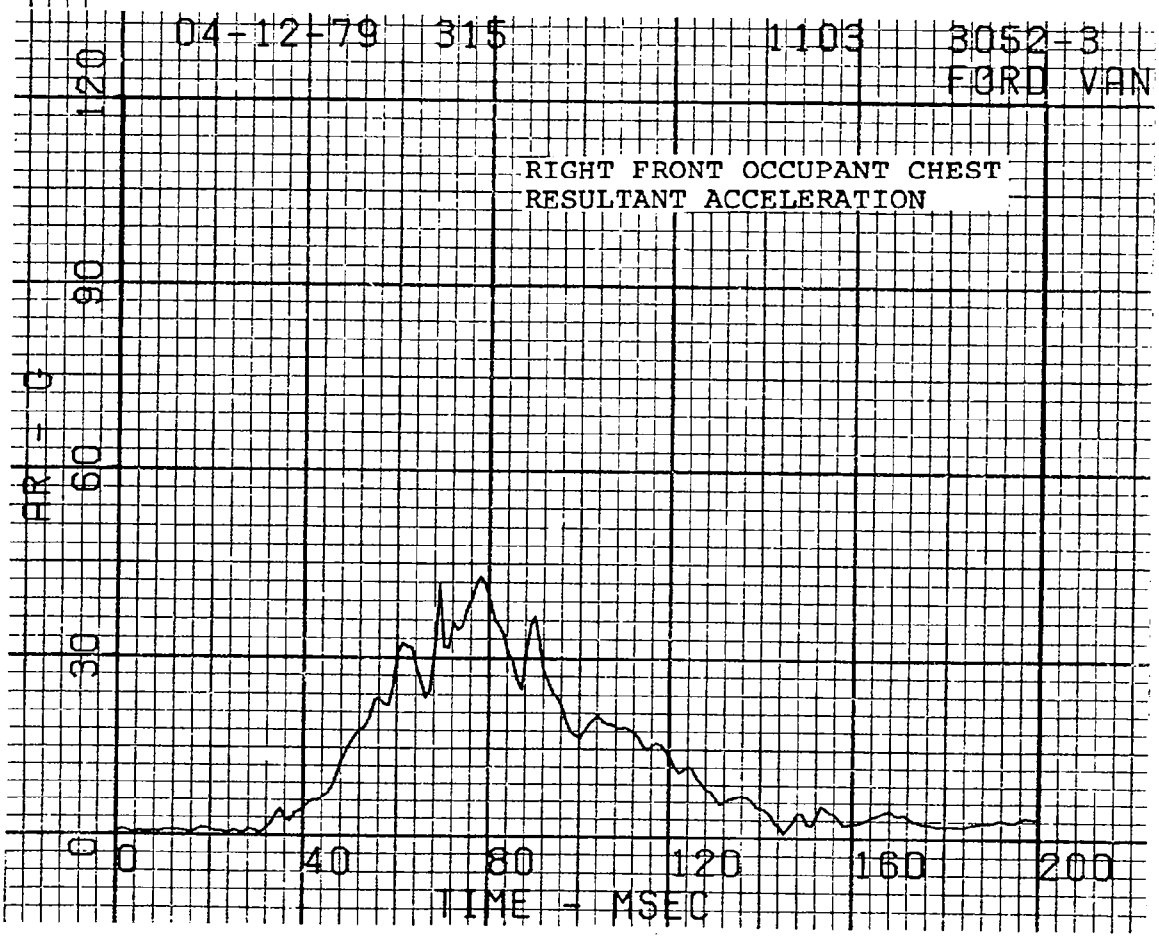

04-12-79 1000 2012 3052-3
FORD VAN
LEFT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

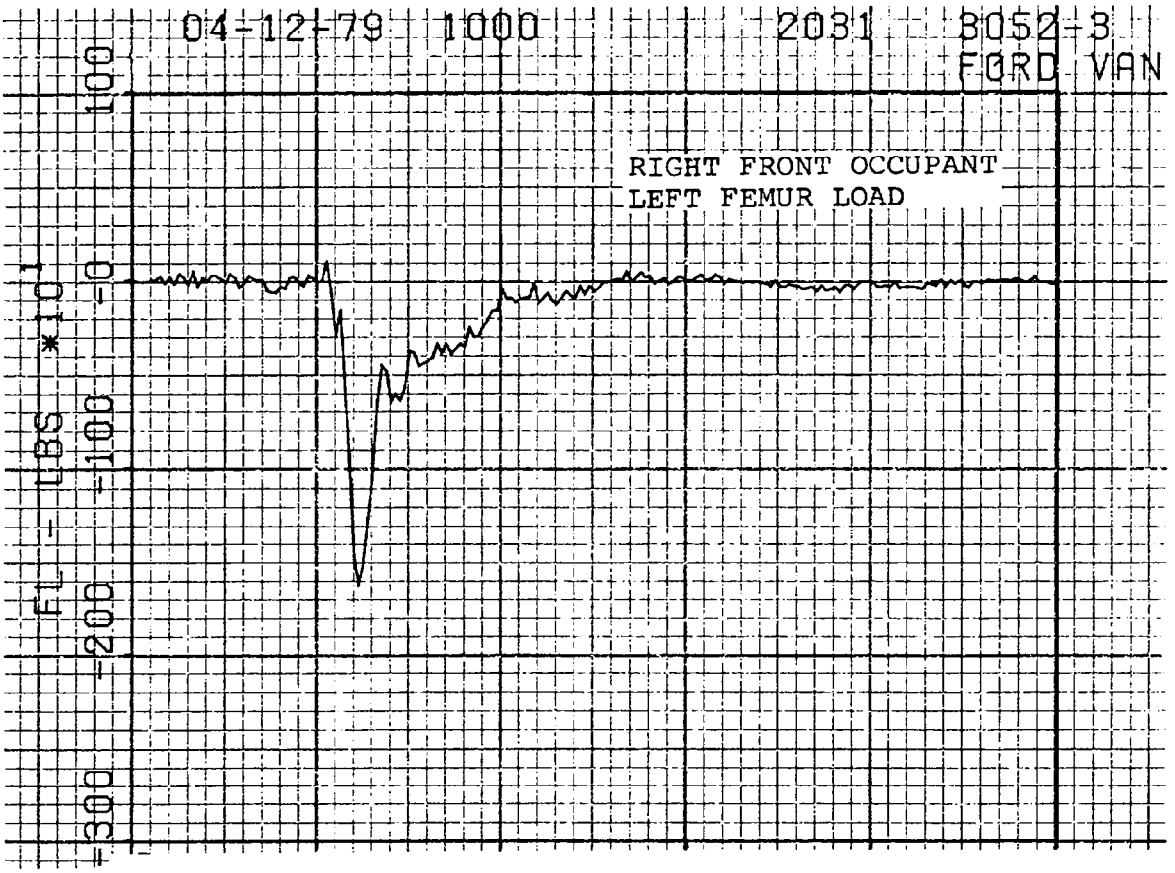

04-12-79 315/100 4101 3052-3
O=LAPBLTL △=LAPBLTR +=SH BLT FORD VAN
LEFT FRONT OCCUPANTS
SEAT BELT LOADS
L LBS *10
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC

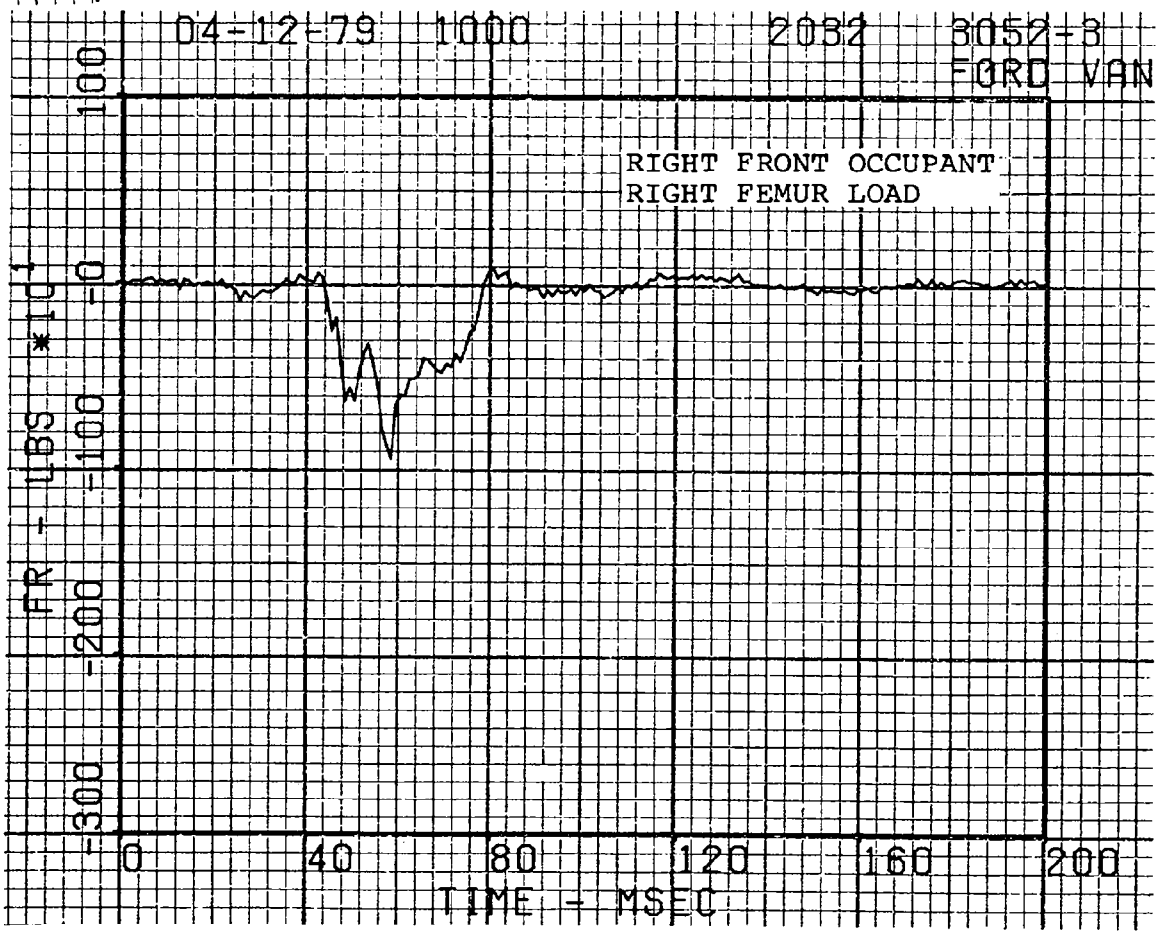

04-12-79 1600 503 3052-3
O= AX Δ= AY +- AZ FORD VAN
RIGHT FRONT OCCUPANT HEAD
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

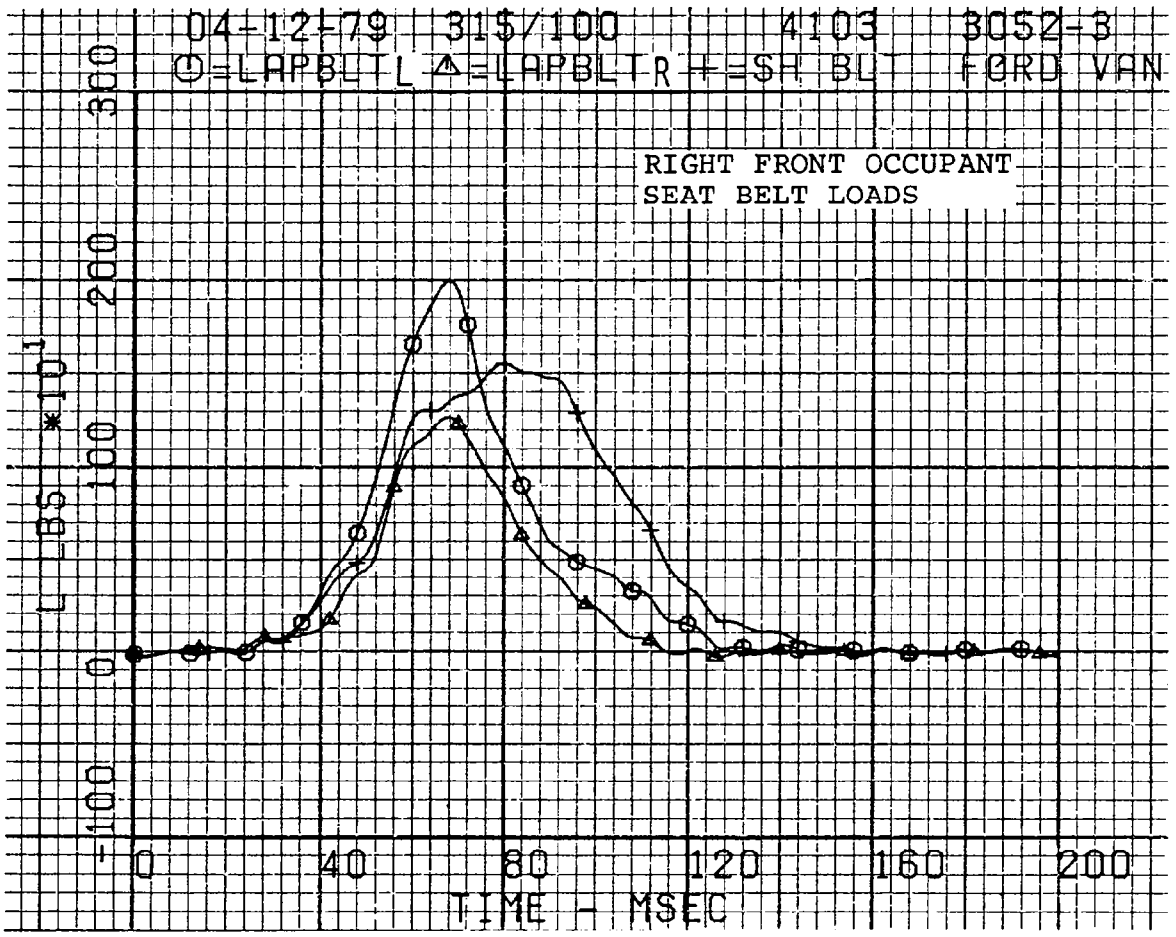

04-12-79 1600 503 3052-3
FORD VAN
126.5 @ 97 MSEC
RIGHT FRONT OCCUPANT
HEAD RESULTANT
ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

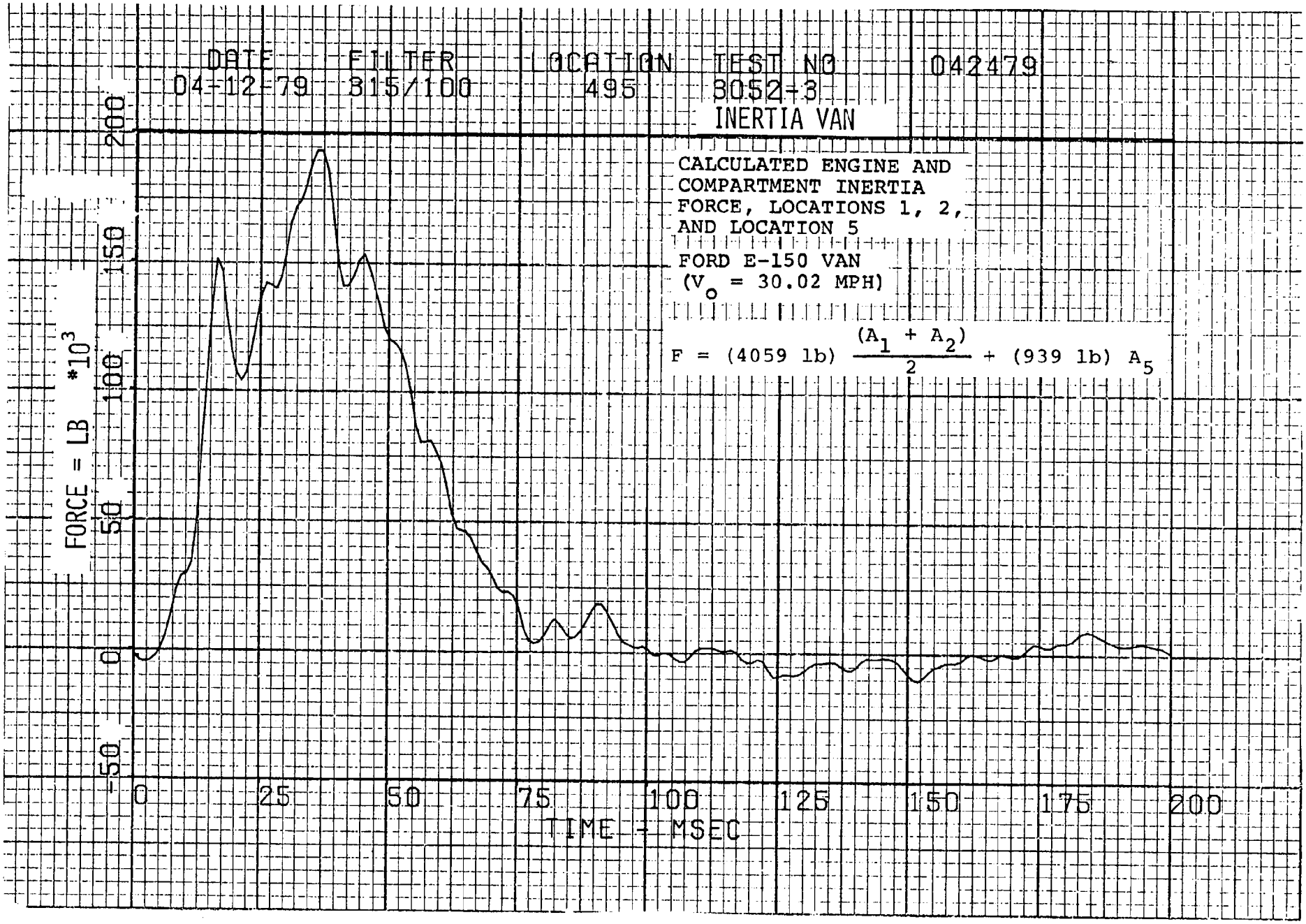

04-12-79 31$ 1103 3052-3
O= AX Δ= AY += AZ FORD VAN
RIGHT FRONT OCCUPANT CHEST
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

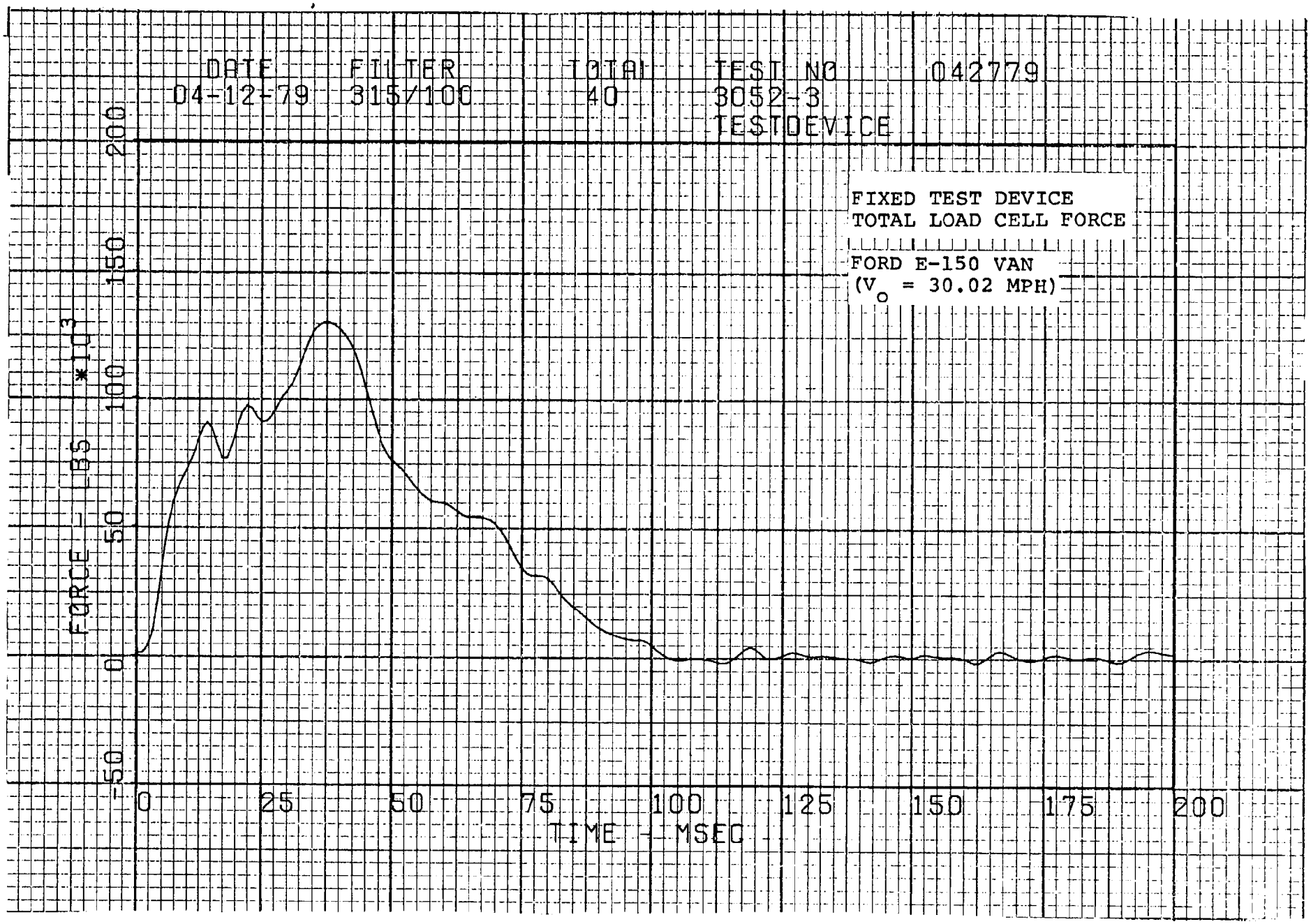

04-12-79 31$ 1103 3052-3
FORD VAN
RIGHT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

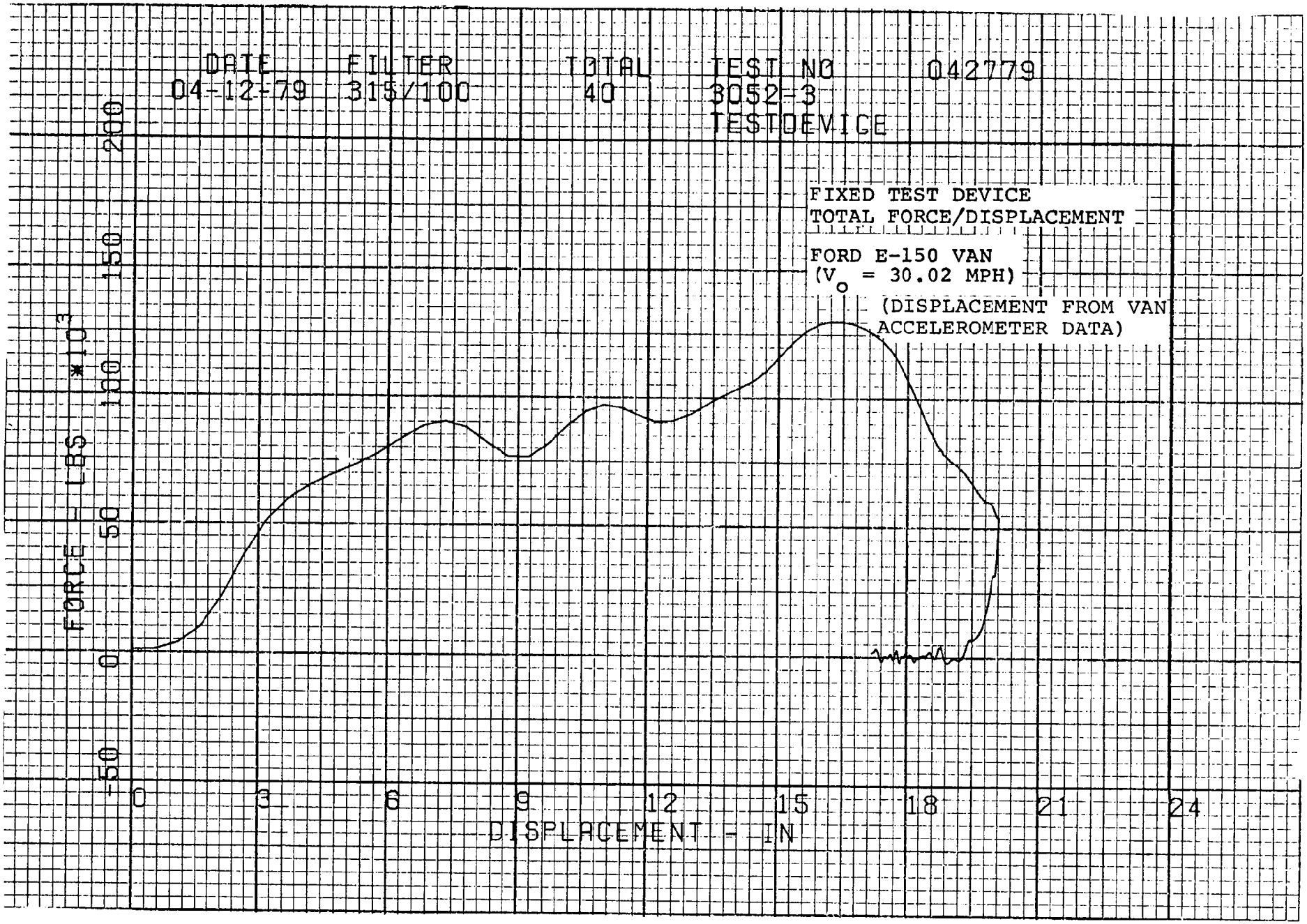

04-12-79 1000 2031 3052-3
FORD VAN
RIGHT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
-0
-100
-200
-300

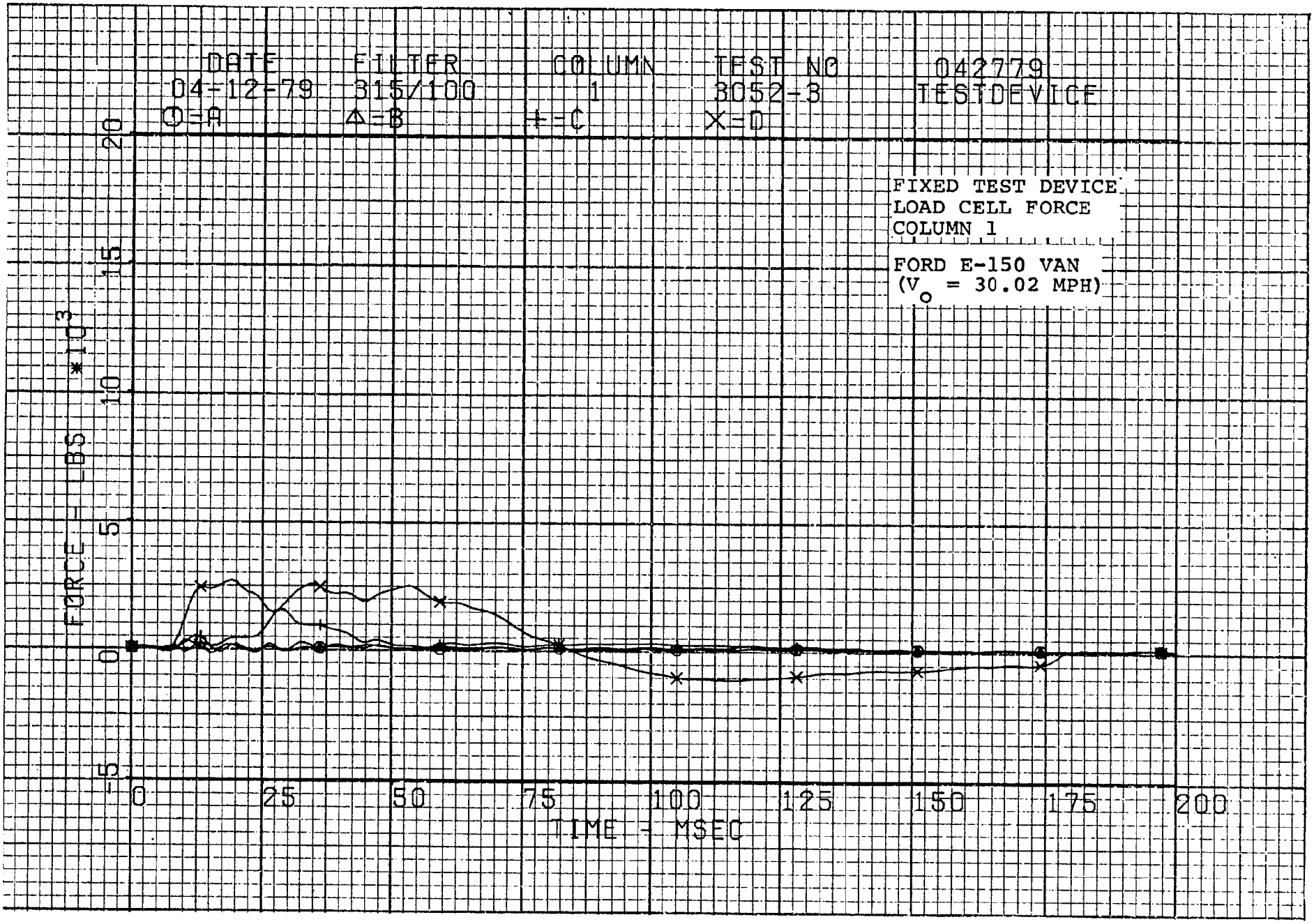

04-12-79 1000 2032 3052-3
FORD VAN
RIGHT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
-0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

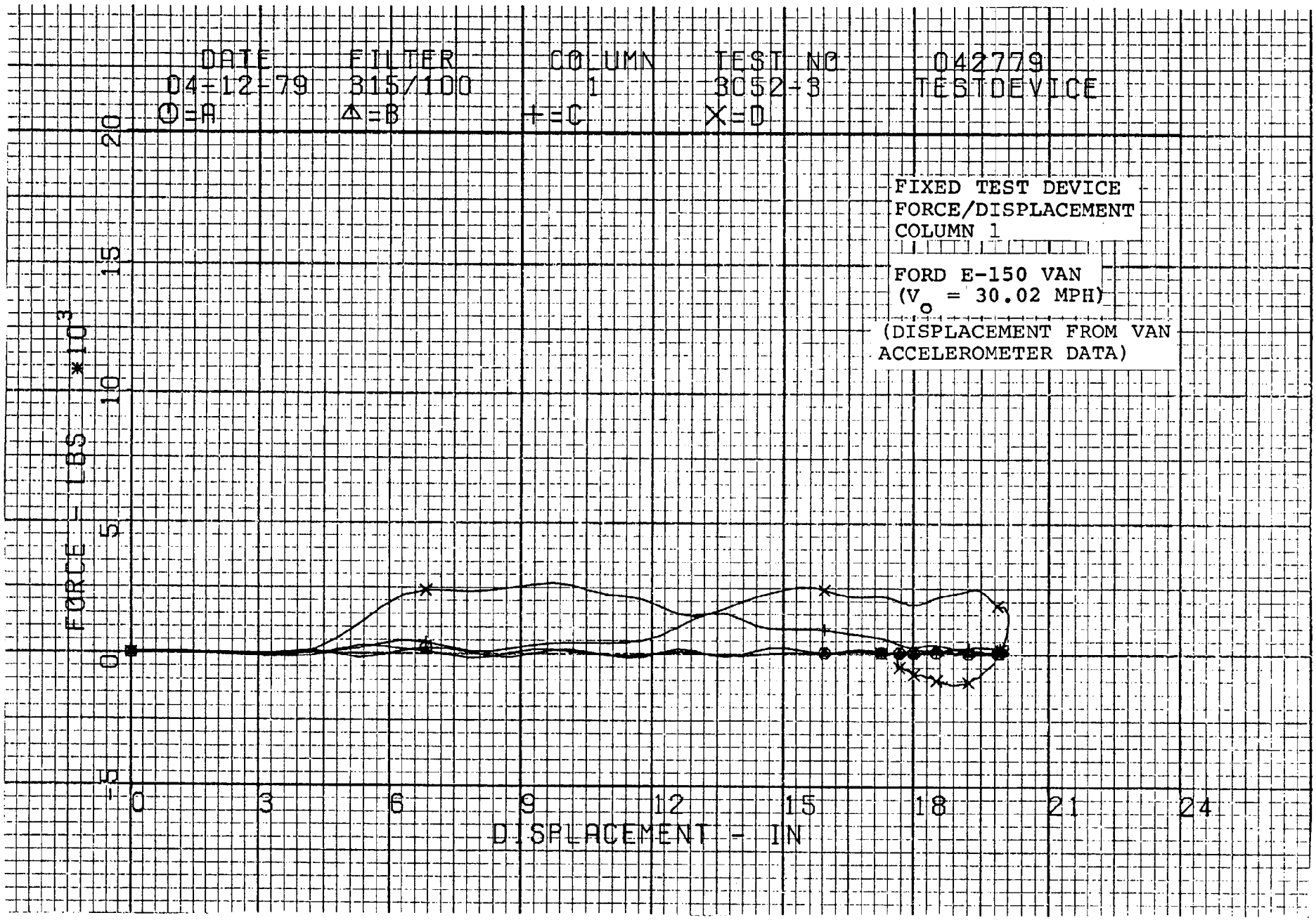

04-12-79 31$/100 4103 3052-3
O=LAPBLTL △=LAPBLTR +=SH BLT FORD VAN
RIGHT FRONT OCCUPANT
SEAT BELT LOADS
L-BS *10-1
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC

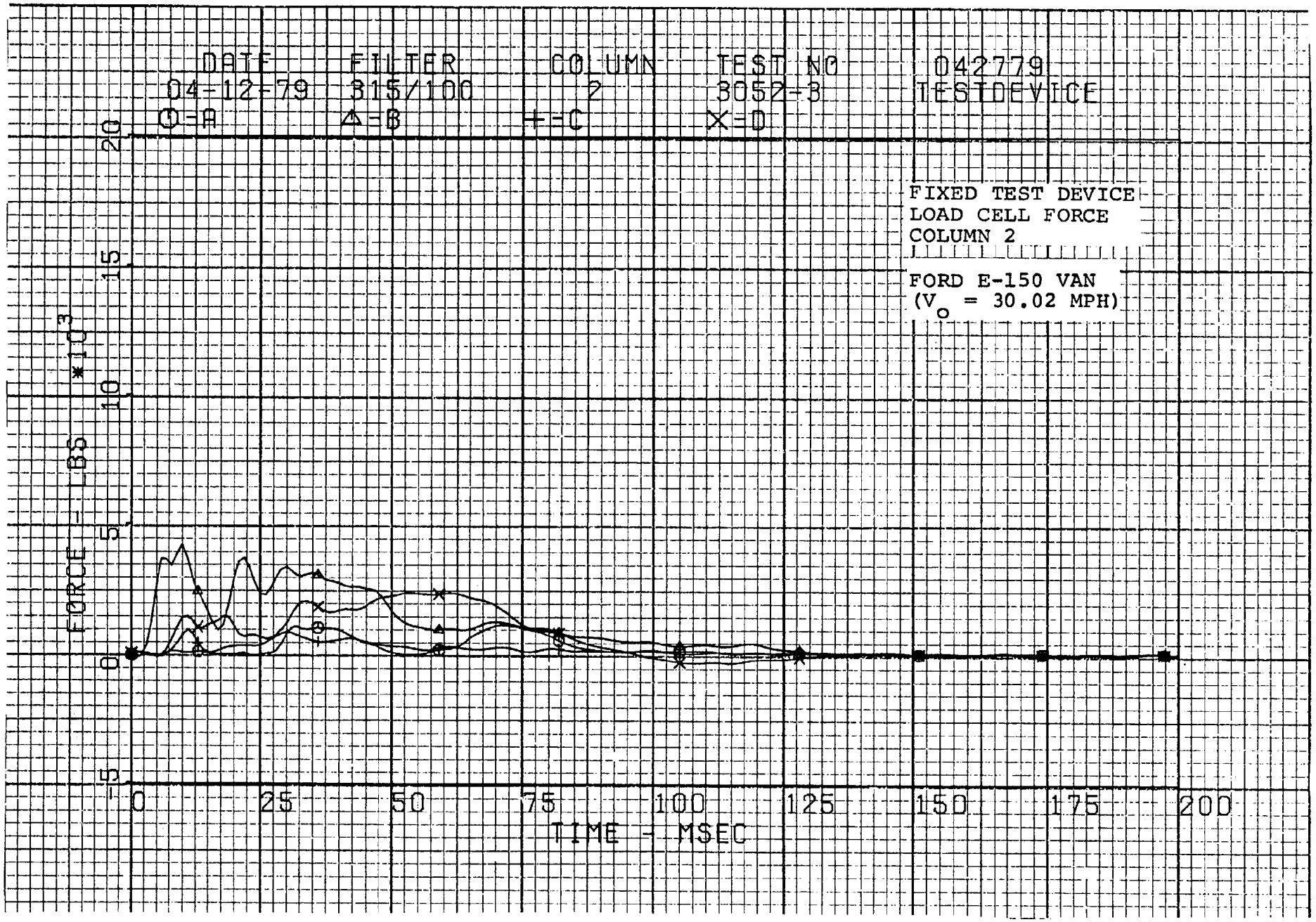

DATE
04-12-79
FILTER
315/100
LOCATION
495
TEST NO
3052-3
INERTIA VAN
042479
CALCULATED ENGINE AND
COMPARTMENT INERTIA
FORCE, LOCATIONS 1, 2,
AND LOCATION 5
FORD E-150 VAN
(V_o = 30.02 MPH)
$F = (4059\ lb)\ \frac{(A_1 + A_2)}{2} + (939\ lb)\ A_5$
FORCE = LB *10^3
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME - MSEC

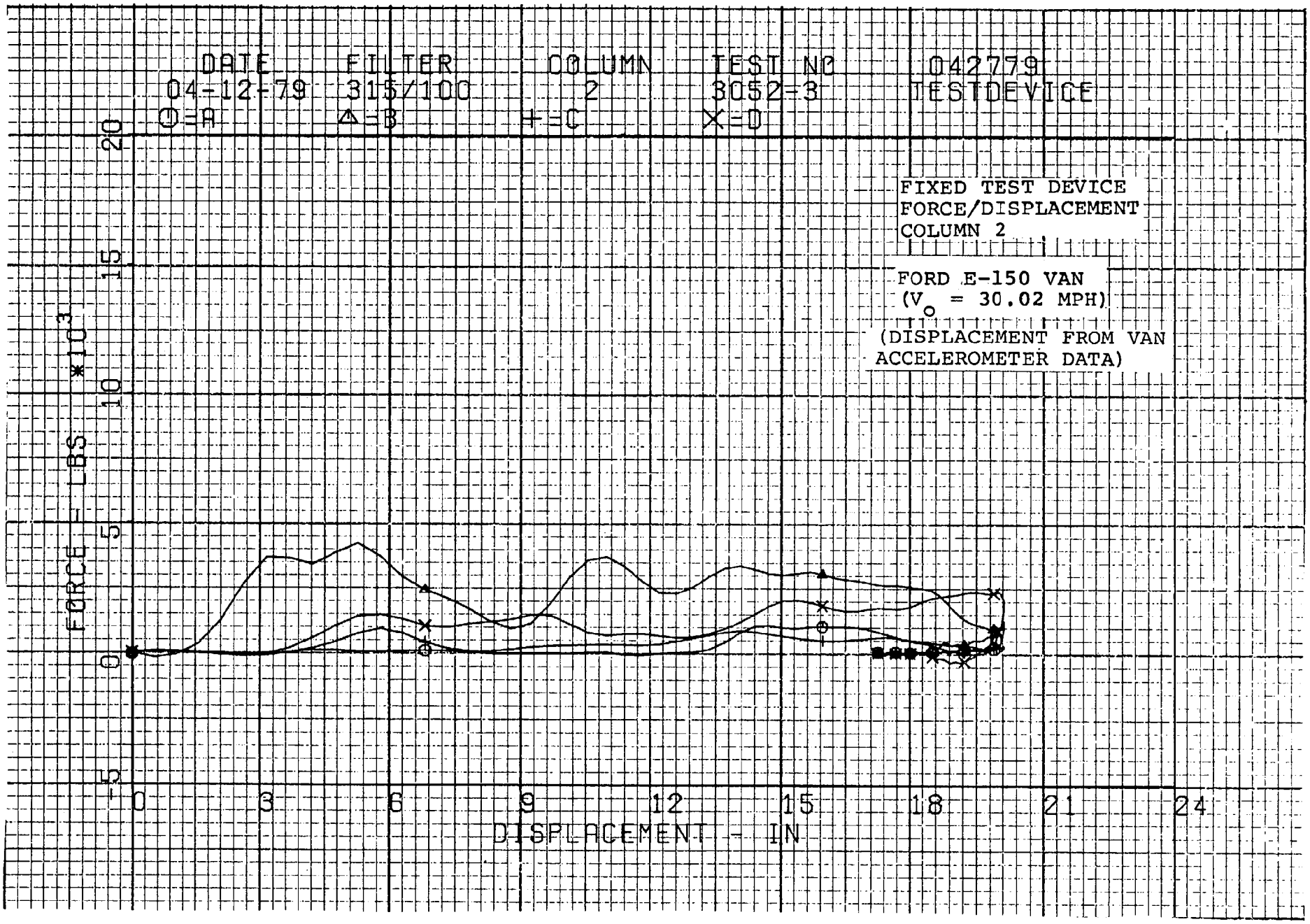

DATE
04-12-79
FILTER
315/100
TOTAL
40
TEST NO
3052-3
TESTDEVICE
042779
FIXED TEST DEVICE
TOTAL LOAD CELL FORCE
FORD E-150 VAN
(V$_o$ = 30.02 MPH)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME - MSEC

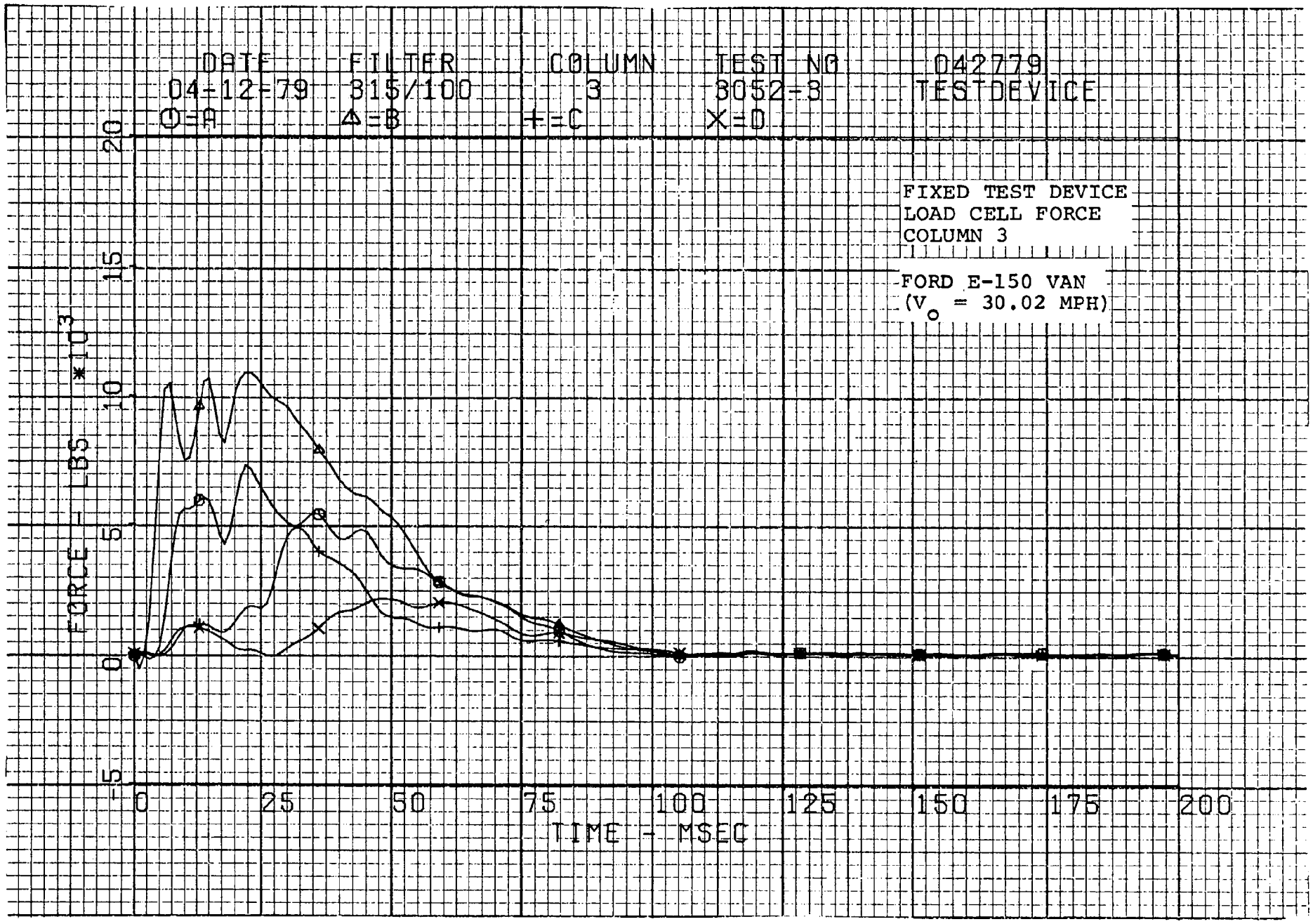

DATE
04-12-79
FILTER
315/100
TOTAL
40
TEST NO
3052-3
TESTDEVICE
042779
FIXED TEST DEVICE
TOTAL FORCE/DISPLACEMENT
FORD E-150 VAN
(V_o = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

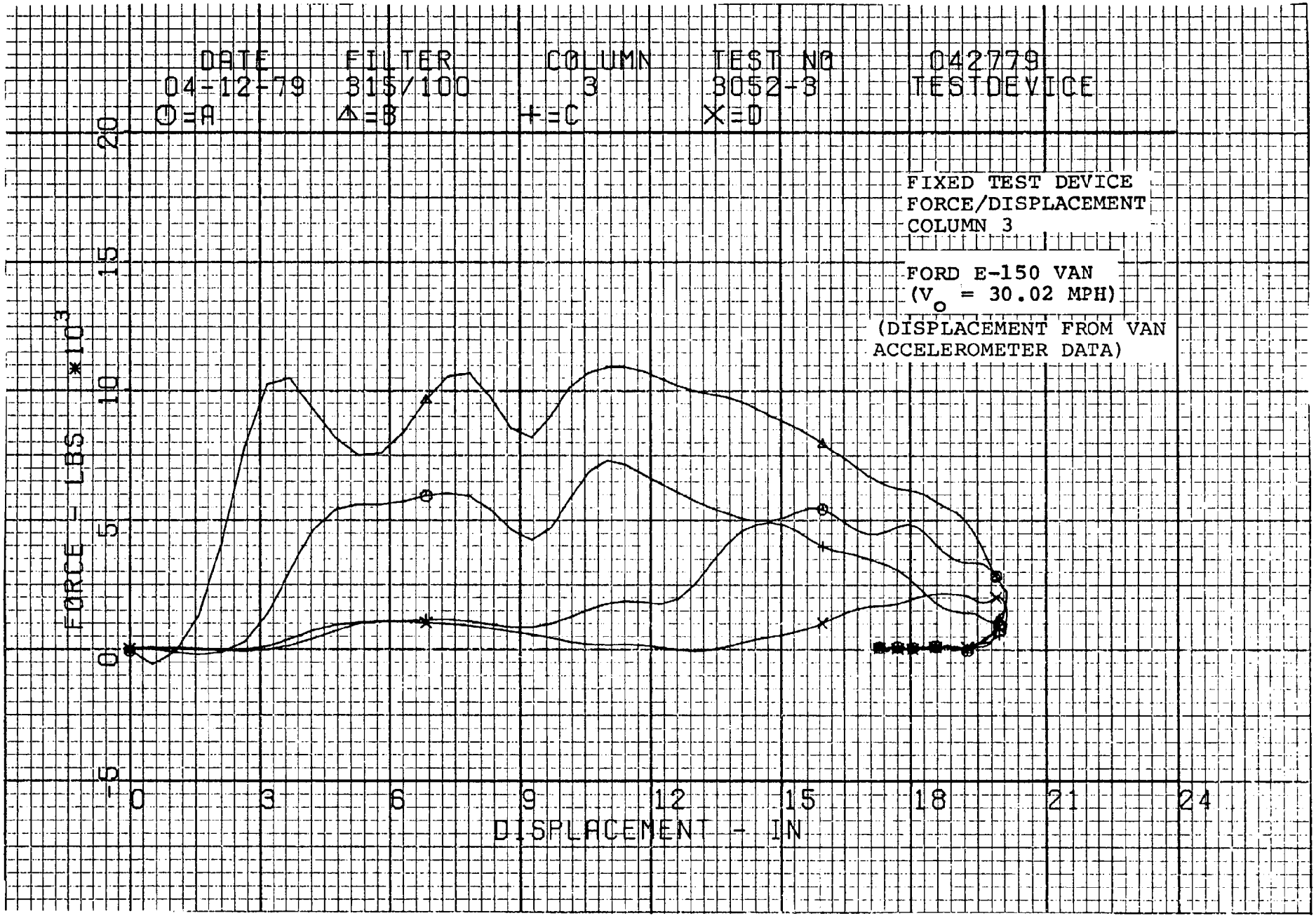

DATE
04-12-79
O=A
FILTER
315/100
Δ=B
COLUMN
1
+=C
TEST NO
3052-3
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 1
FORD E-150 VAN
(V o = 30.02 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

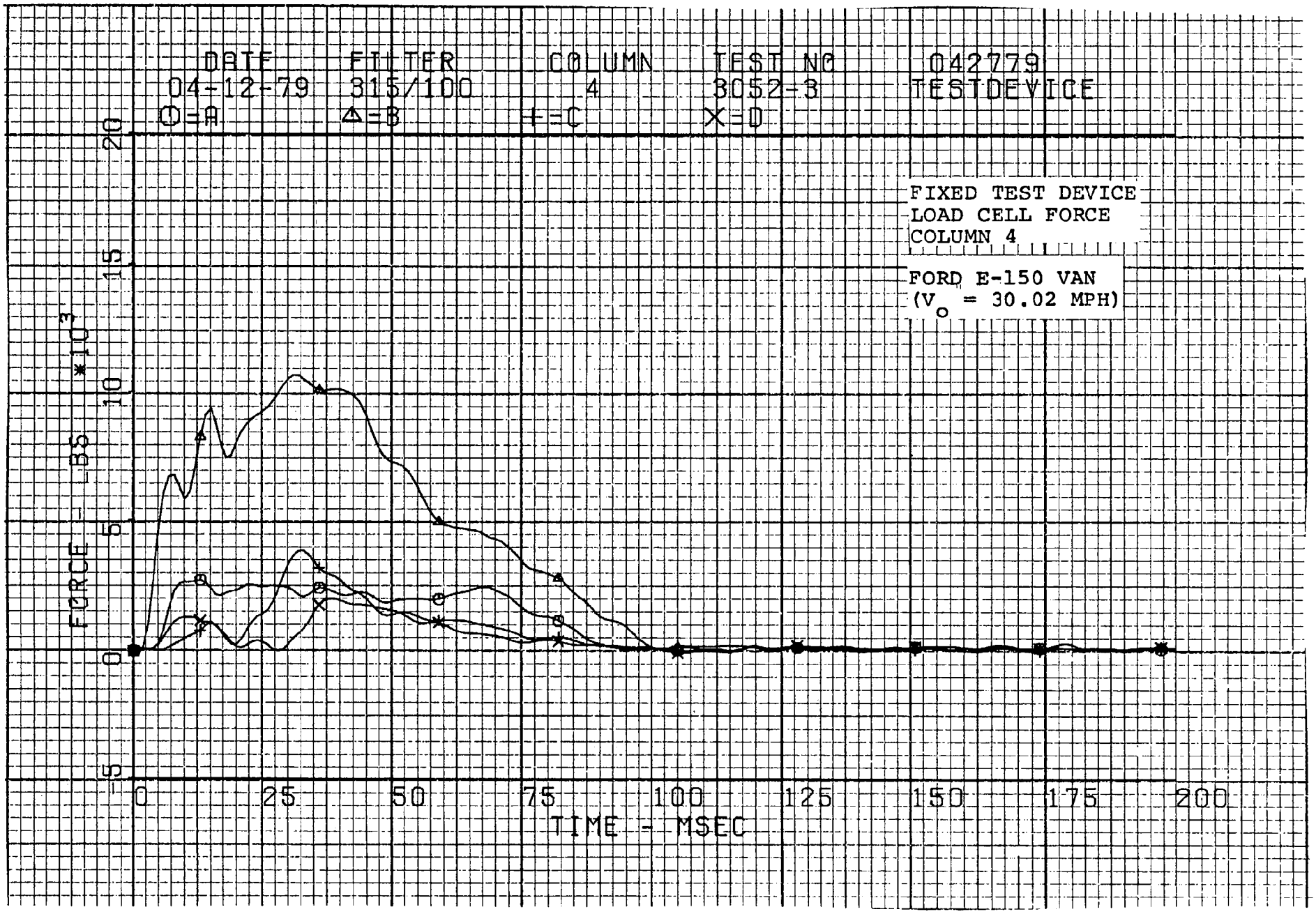

DATE
04-12-79
FILTER
315/100
COLUMN
1
TEST NO
3052-3
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 1
FORD E-150 VAN
(V_o = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

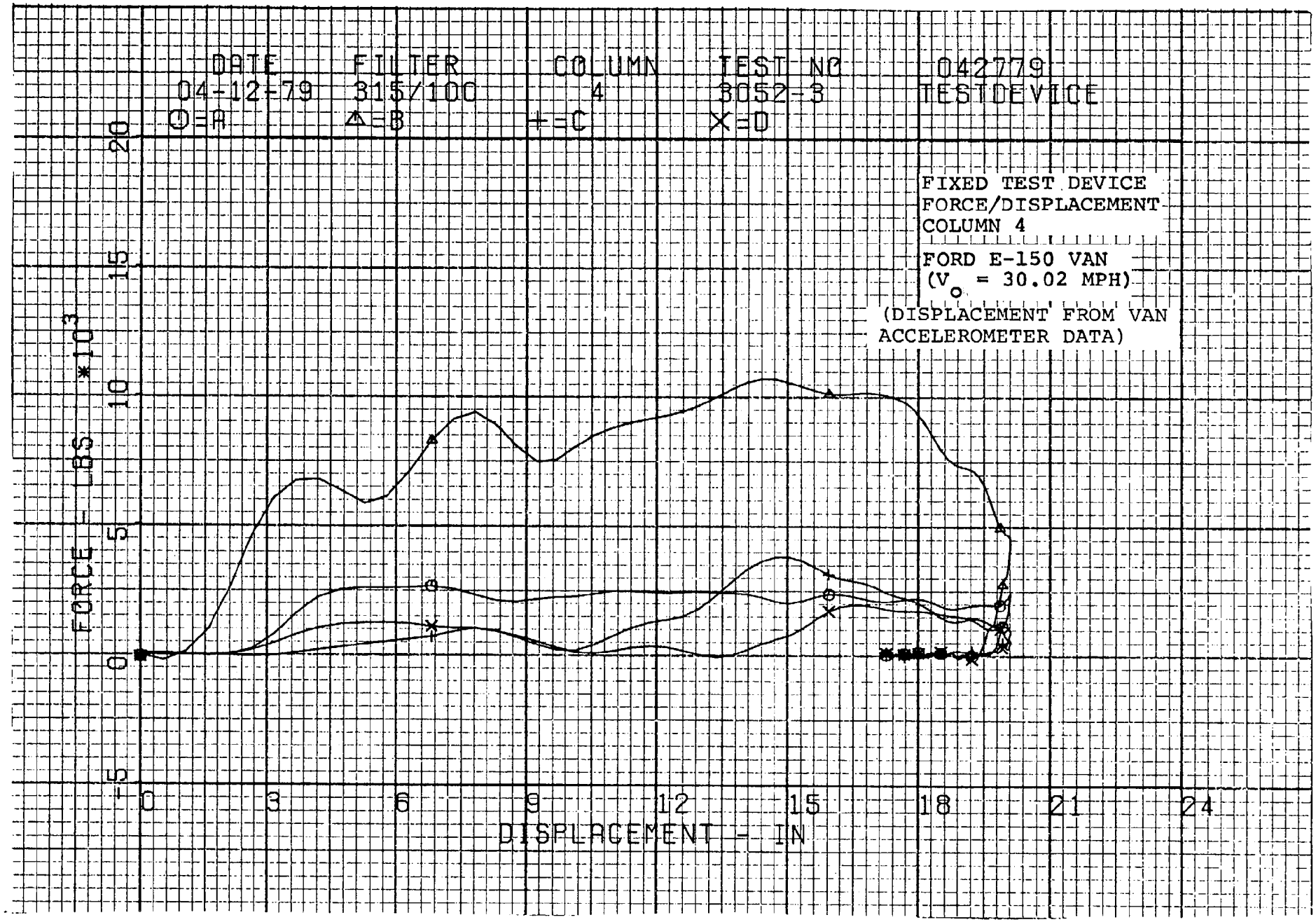

DATE
04-12-79
FILTER
315/100
COLUMN
2
TEST NO
3052-3
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 2
FORD E-150 VAN
(V_o = 30.02 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

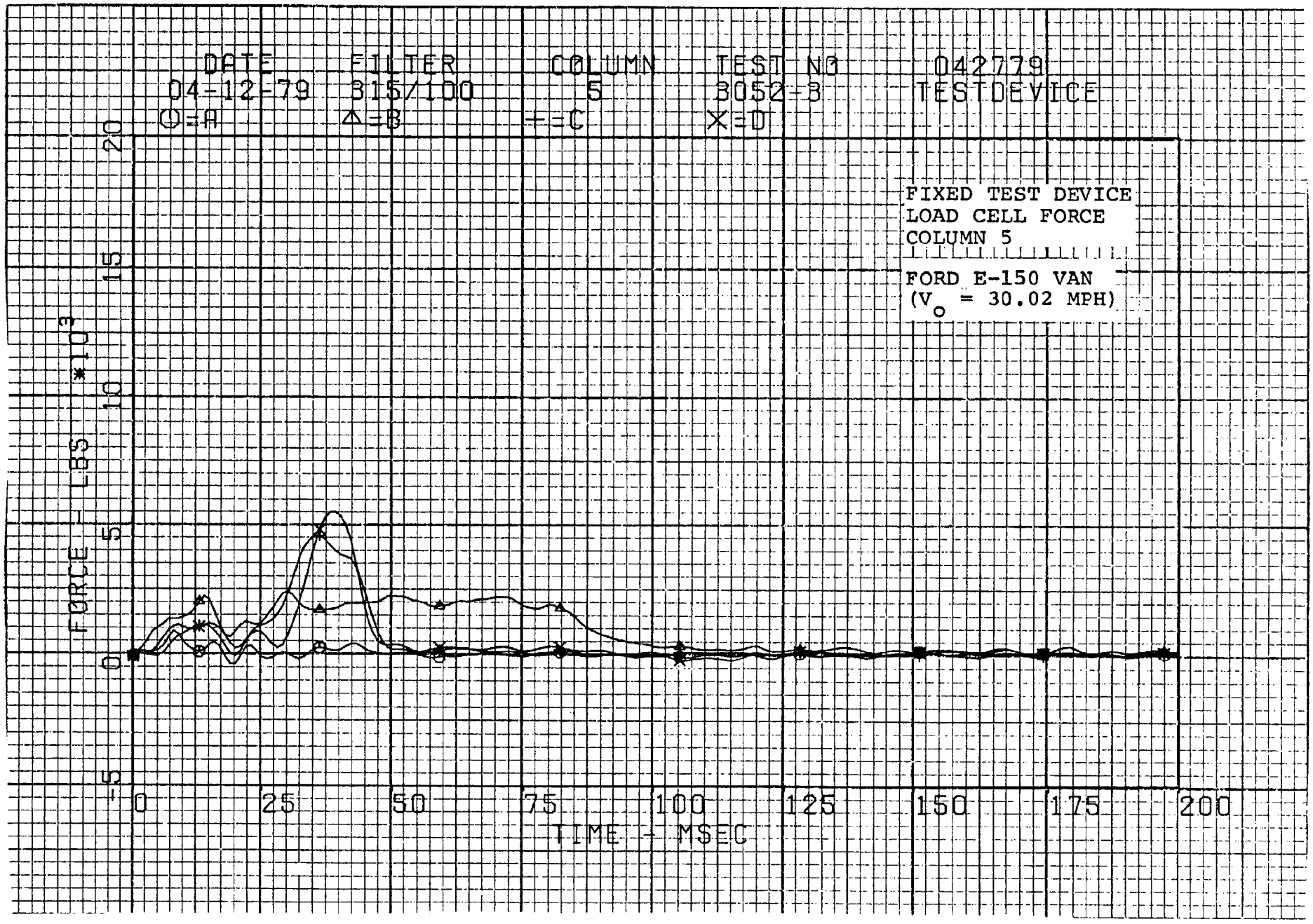

DATE
04-12-79
FILTER
315/100
COLUMN
2
TEST NO
3052-3
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 2
FORD E-150 VAN
(V$_o$ = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

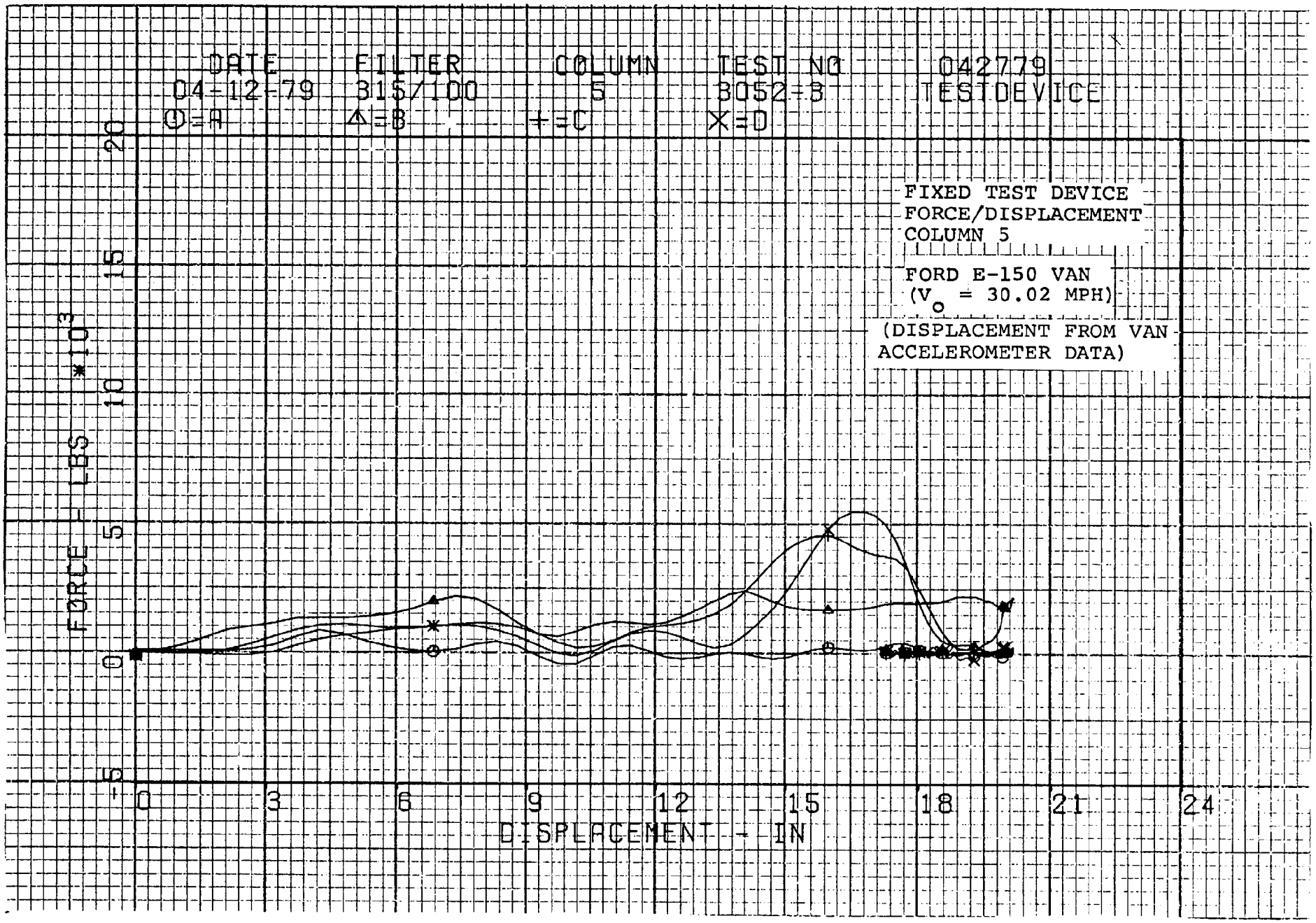

DATE
04-12-79
FILTER
315/100
COLUMN
3
TEST NO
3052-3
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 3
FORD E-150 VAN
(V o = 30.02 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

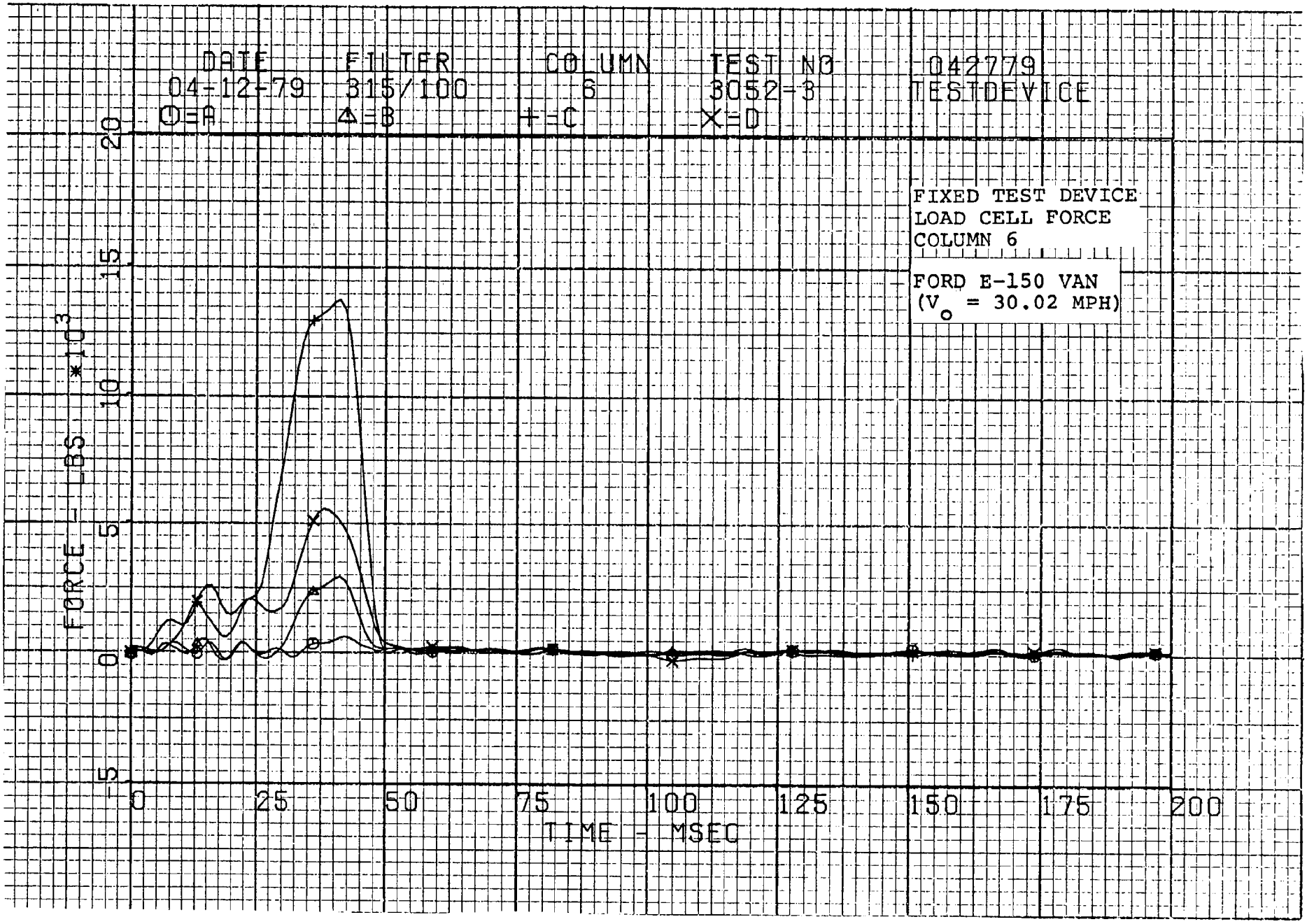

DATE
04-12-79
FILTER
315/100
COLUMN
3
TEST NO
3052-3
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 3
FORD E-150 VAN
(V_o = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

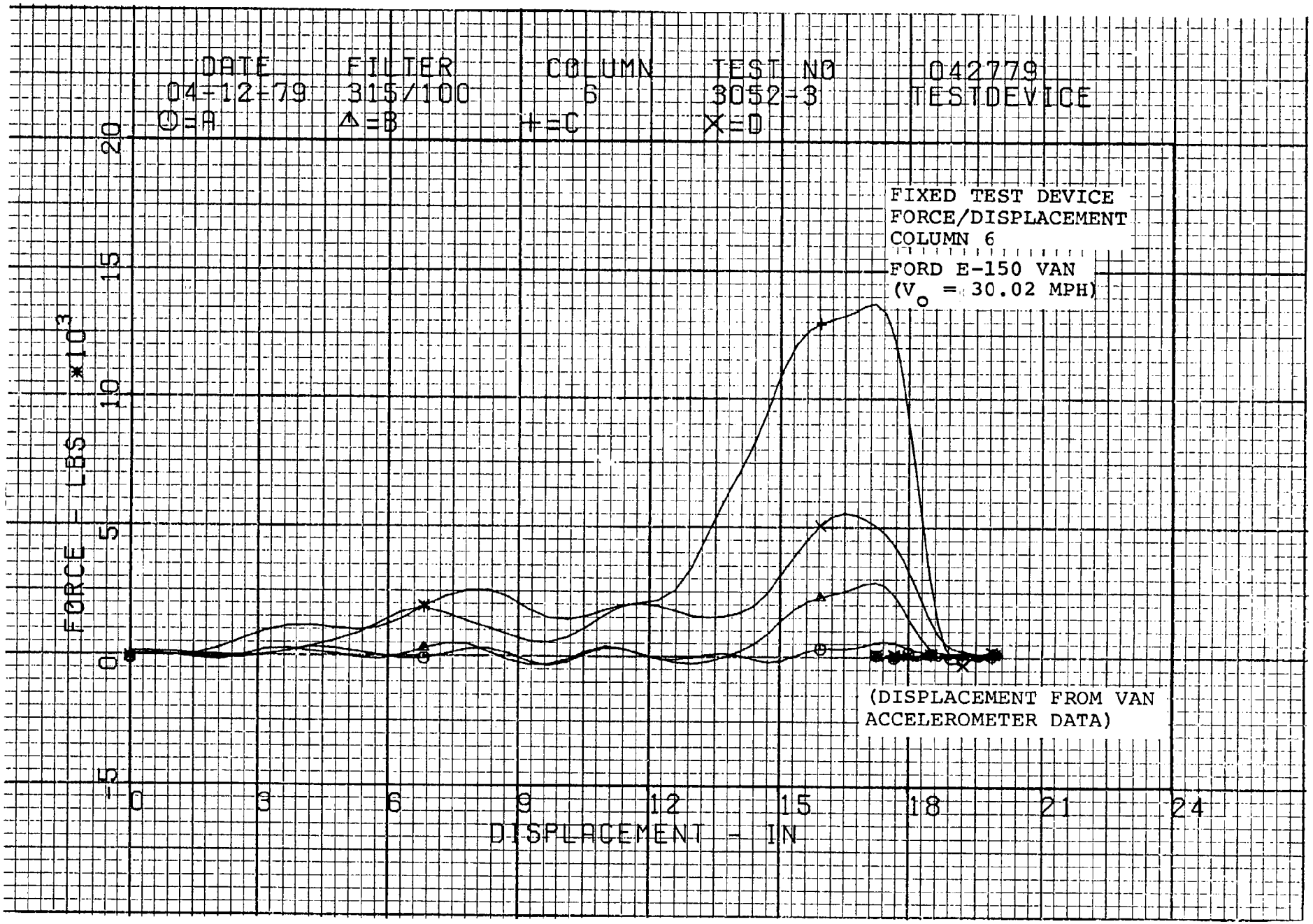

DATE
04-12-79
O=A
FILTER
315/100
Δ=B
COLUMN
4
+=C
TEST NO
3052-3
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 4
FORD E-150 VAN
(V$_o$ = 30.02 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

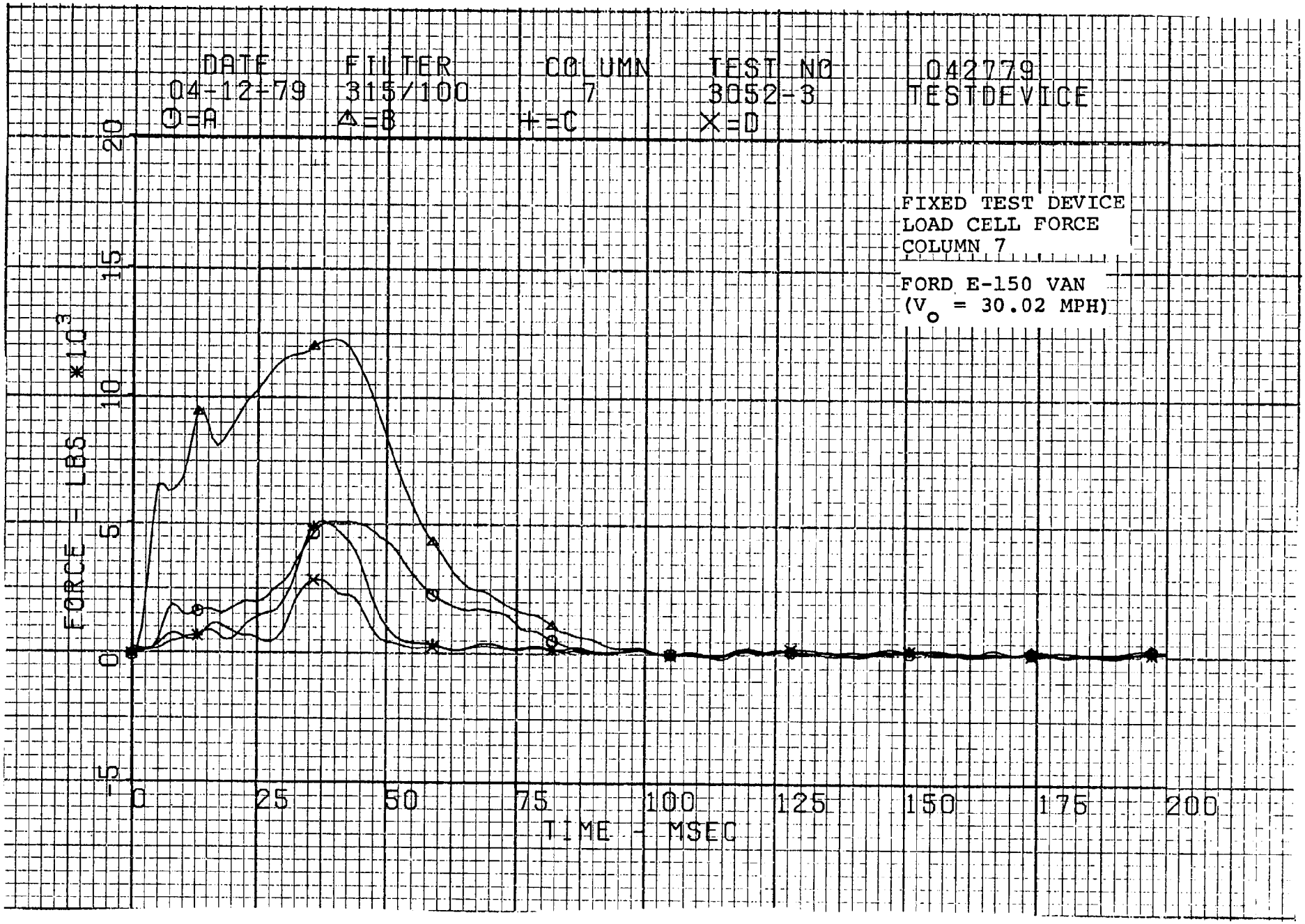

DATE
04-12-79
O=A
FILTER
315/100
Δ=B
COLUMN
4
+=C
TEST NO
3052-3
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 4
FORD E-150 VAN
(V o = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

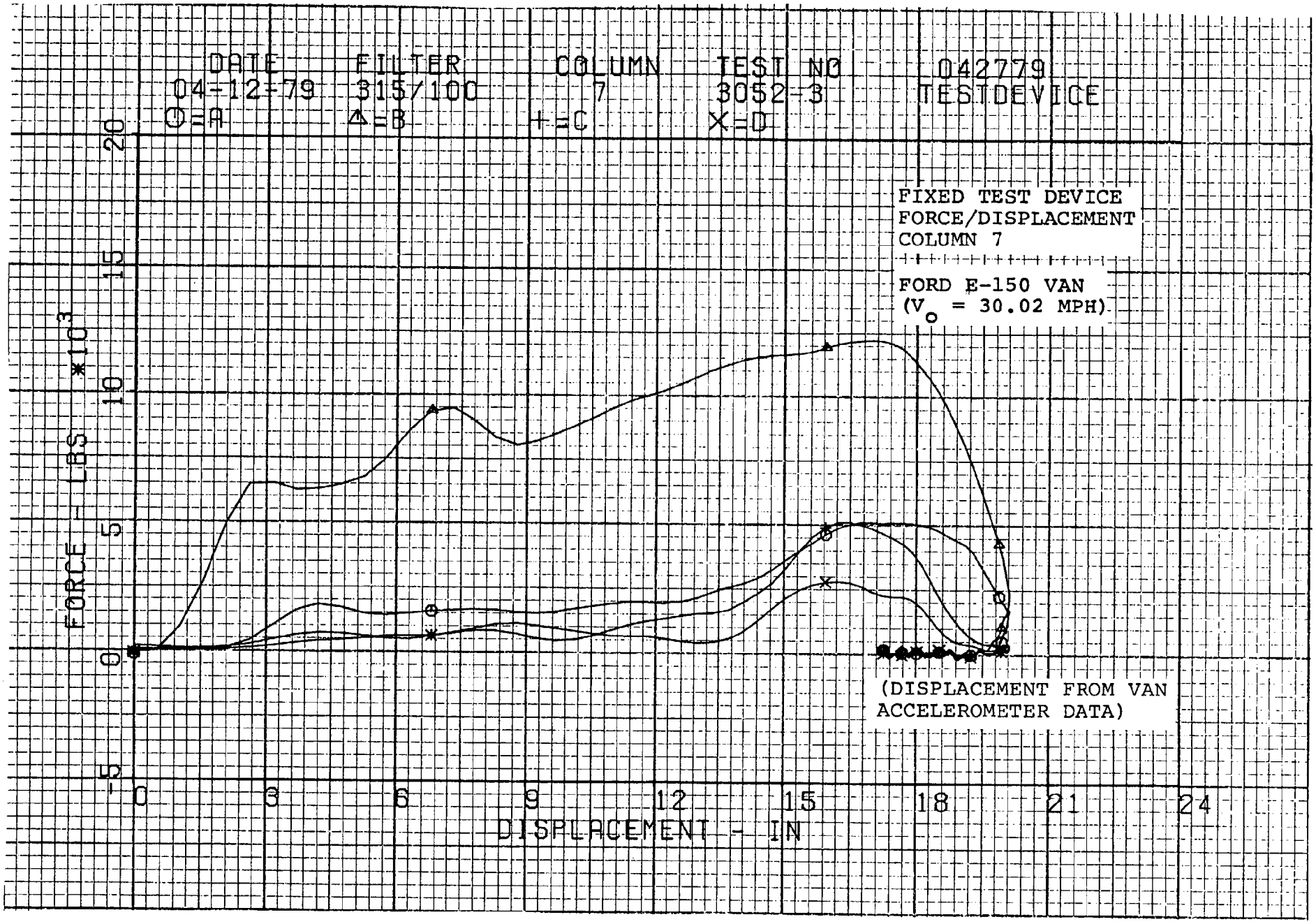

DATE
04-12-79
O=A
FILTER
315/100
Δ=B
COLUMN
5
+=C
TEST NO
3052-3
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 5
FORD E-150 VAN
(V o = 30.02 MPH)
FORCE - LBS *10 3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

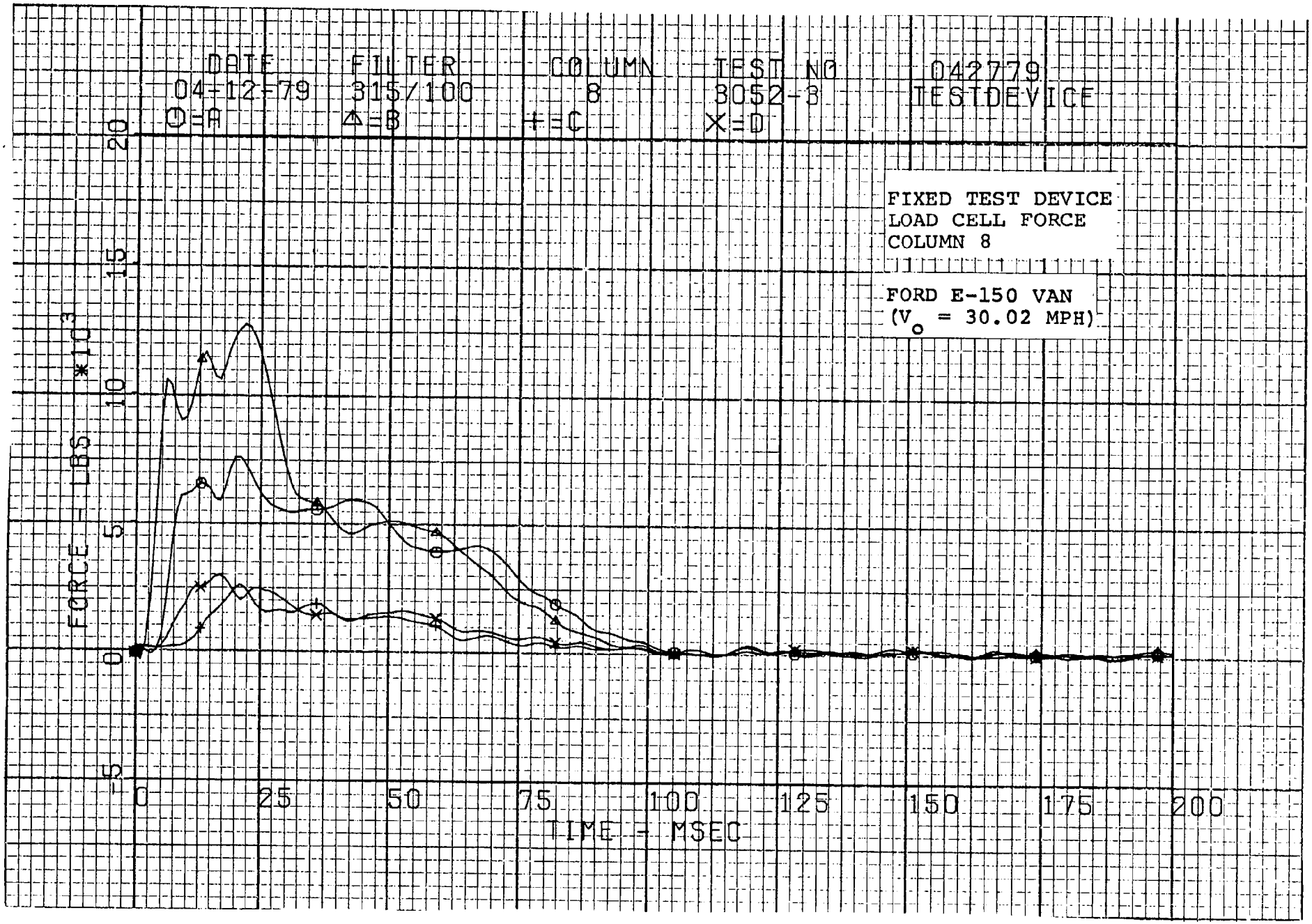

DATE
04-12-79
FILTER
315/100
COLUMN
5
TEST NO
3052-3
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 5
FORD E-150 VAN
(V_o = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

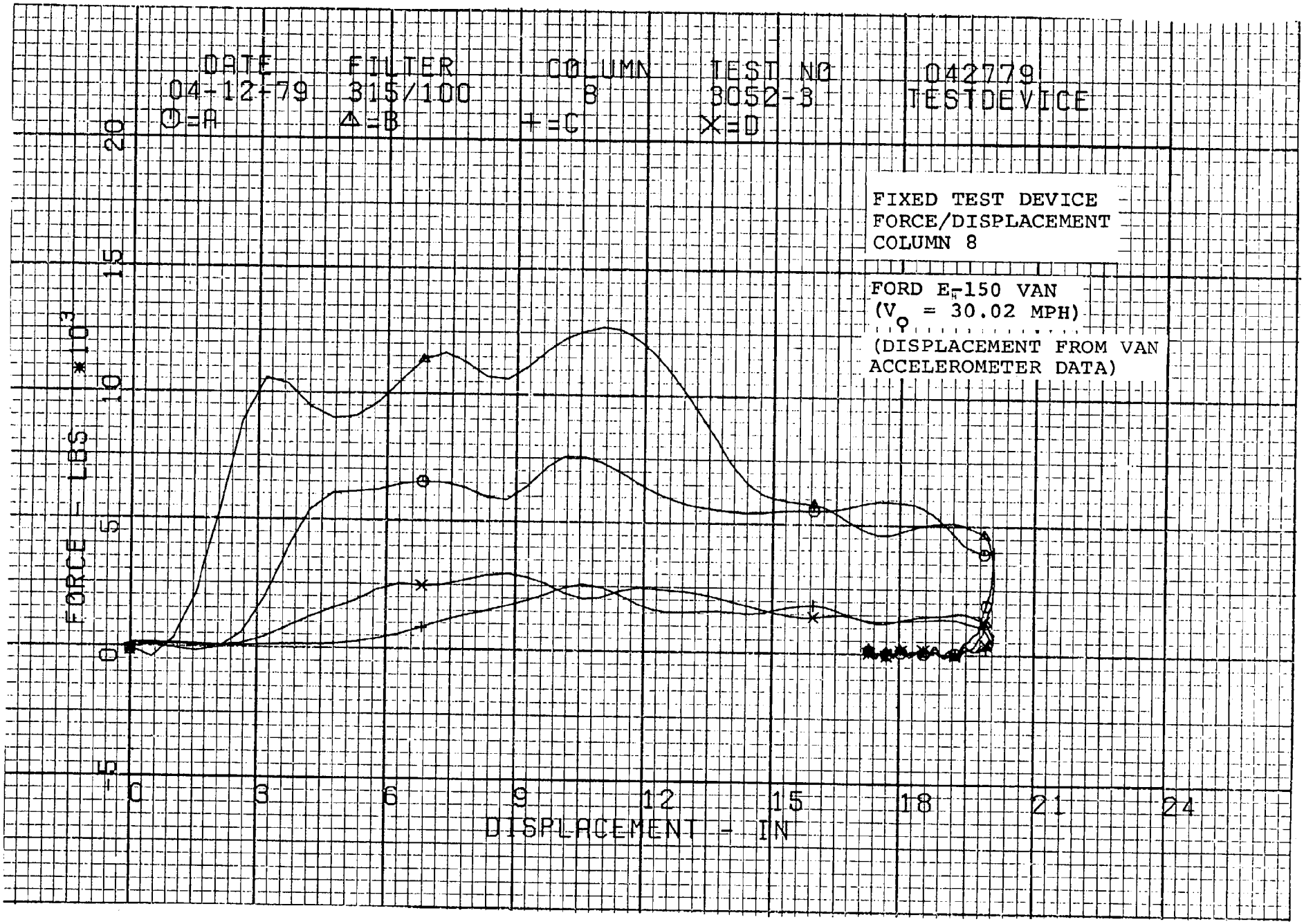

DATE
04-12-79
O=A
FILTER
315/100
Δ=B
COLUMN
6
+=C
TEST NO
3052-3
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 6
FORD E-150 VAN
(V o = 30.02 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

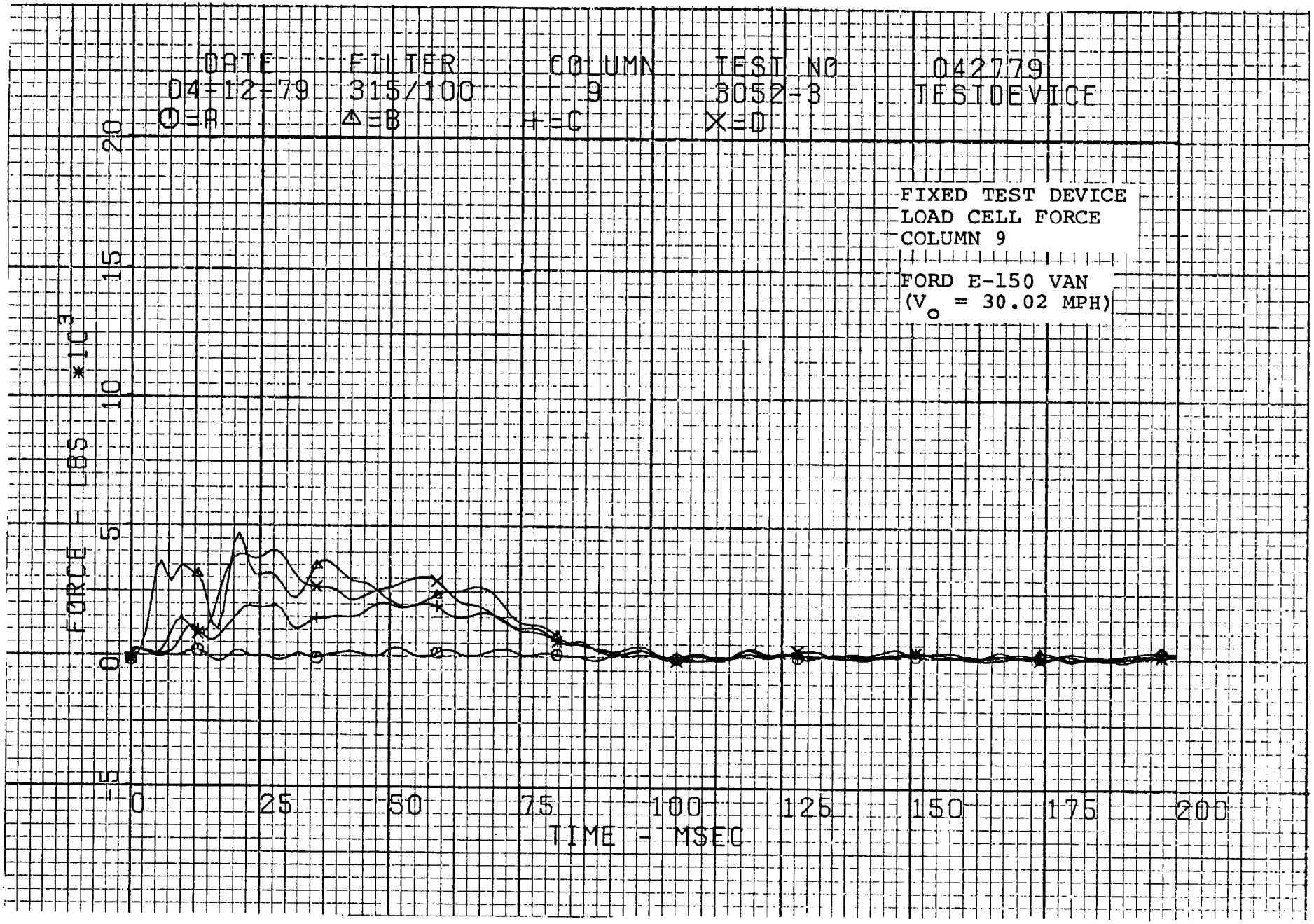

DATE
04-12-79
O=A
FILTER
315/100
△=B
COLUMN
6
+=C
TEST NO
3052-3
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 6
FORD E-150 VAN
(V_o = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

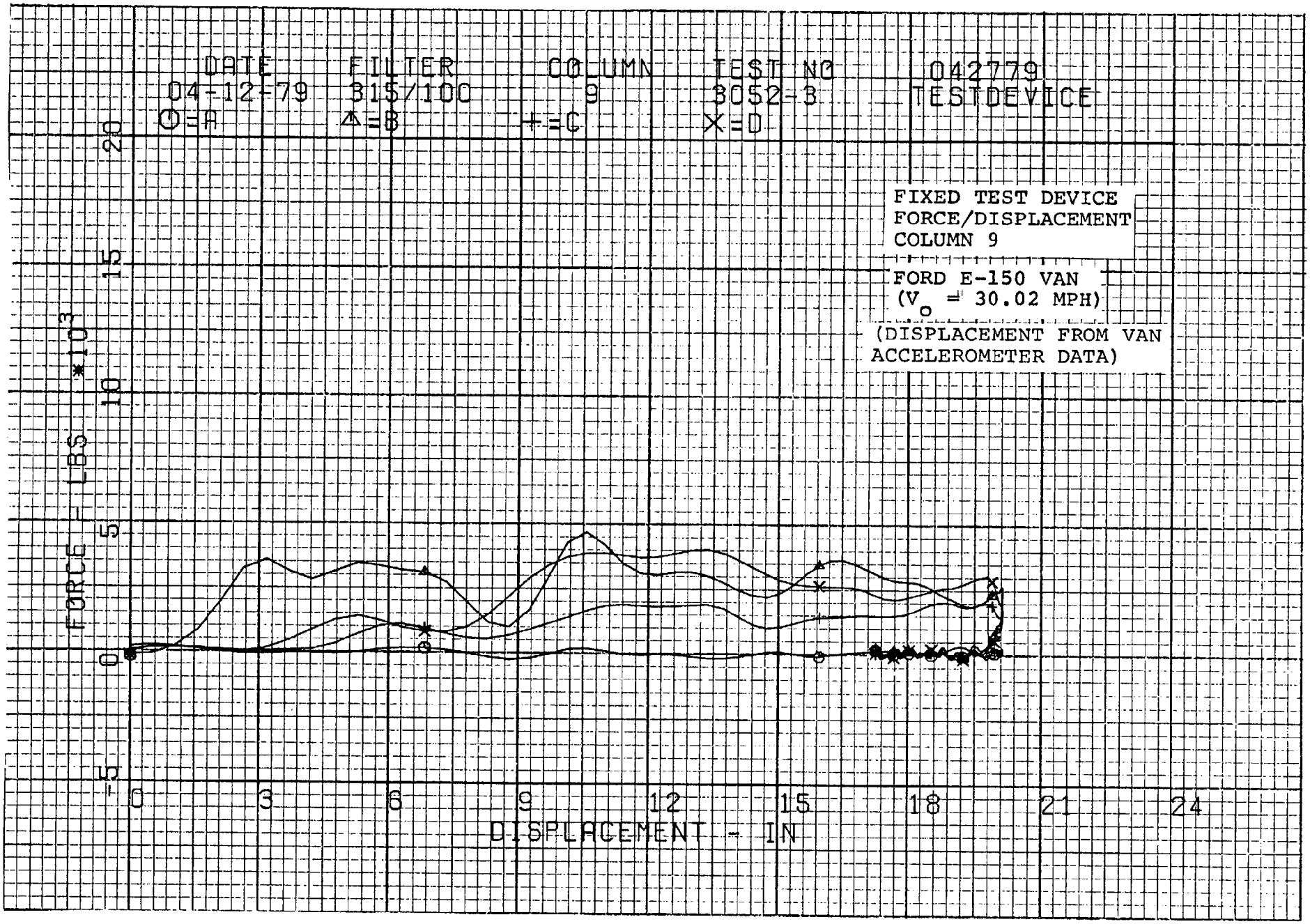

DATE
04-12-79
FILTER
315/100
COLUMN
7
TEST NO
3052-3
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 7
FORD E-150 VAN
(V o = 30.02 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

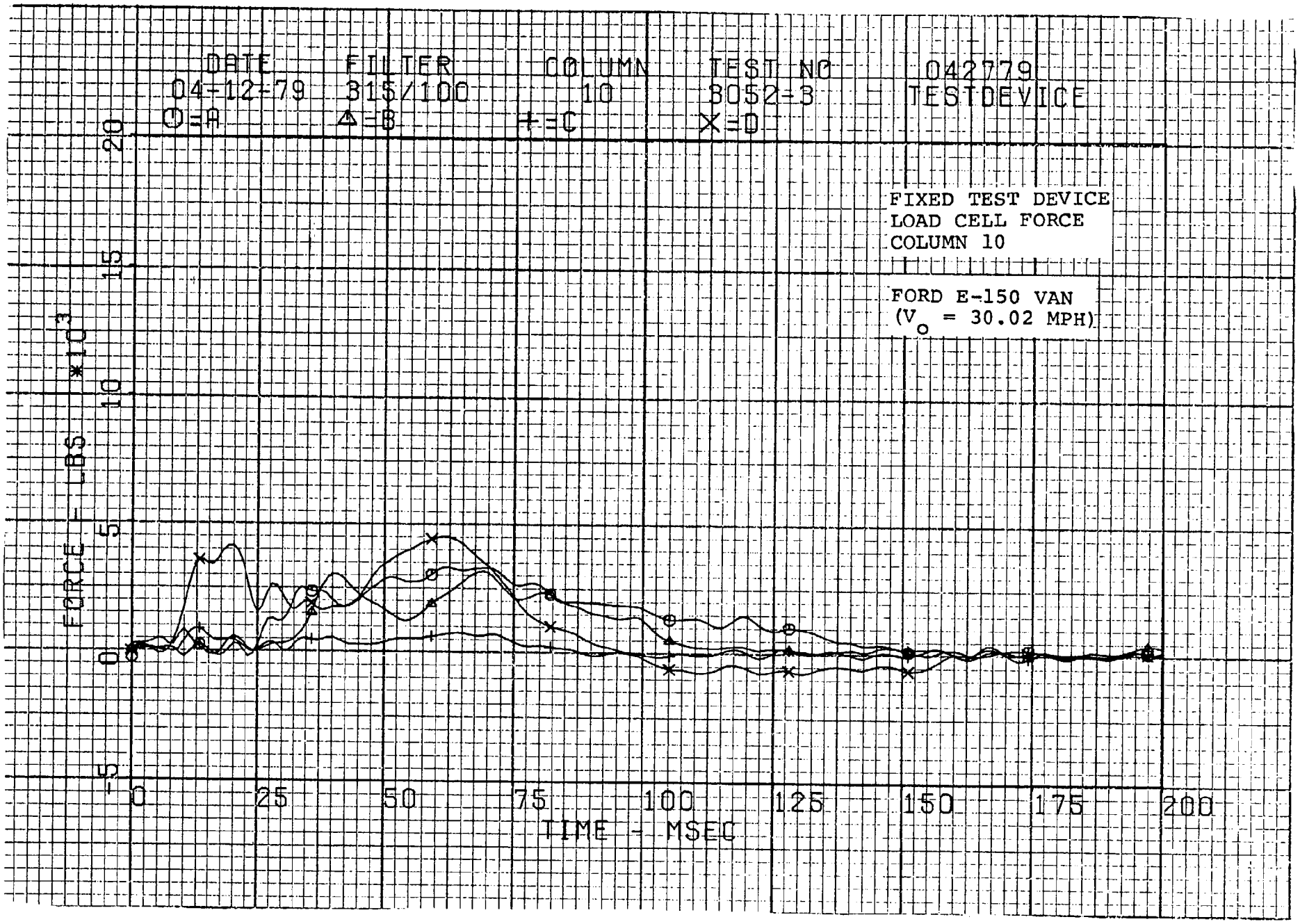

DATE
04-12-79
O=A
FILTER
315/100
△=B
COLUMN
7
+=C
TEST NO
3052-3
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 7
FORD E-150 VAN
(V_o = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

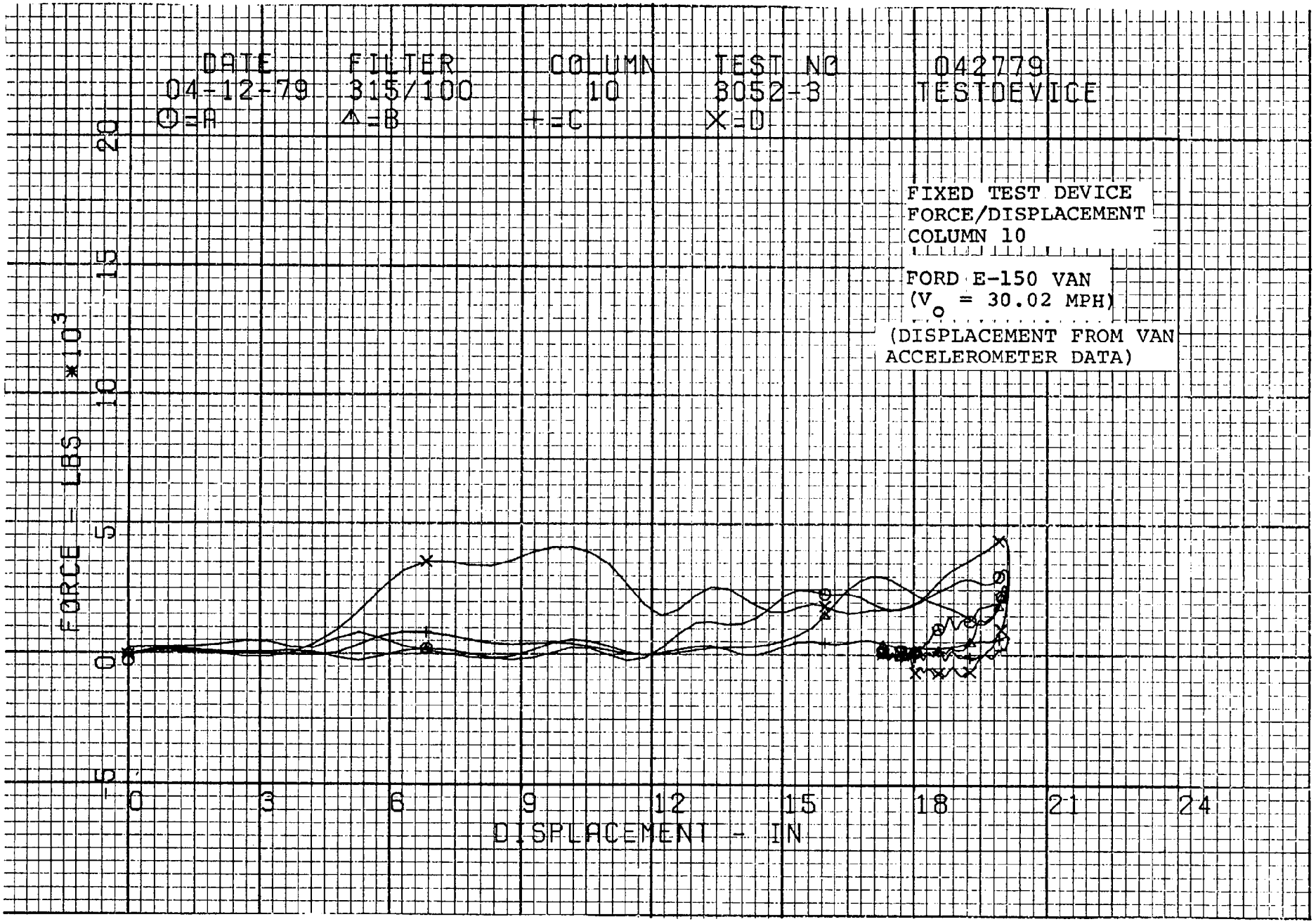

DATE
04-12-79
O=A
FILTER
315/100
△=B
COLUMN
8
+=C
TEST NO
3052-3
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 8
FORD E-150 VAN
(V_o = 30.02 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

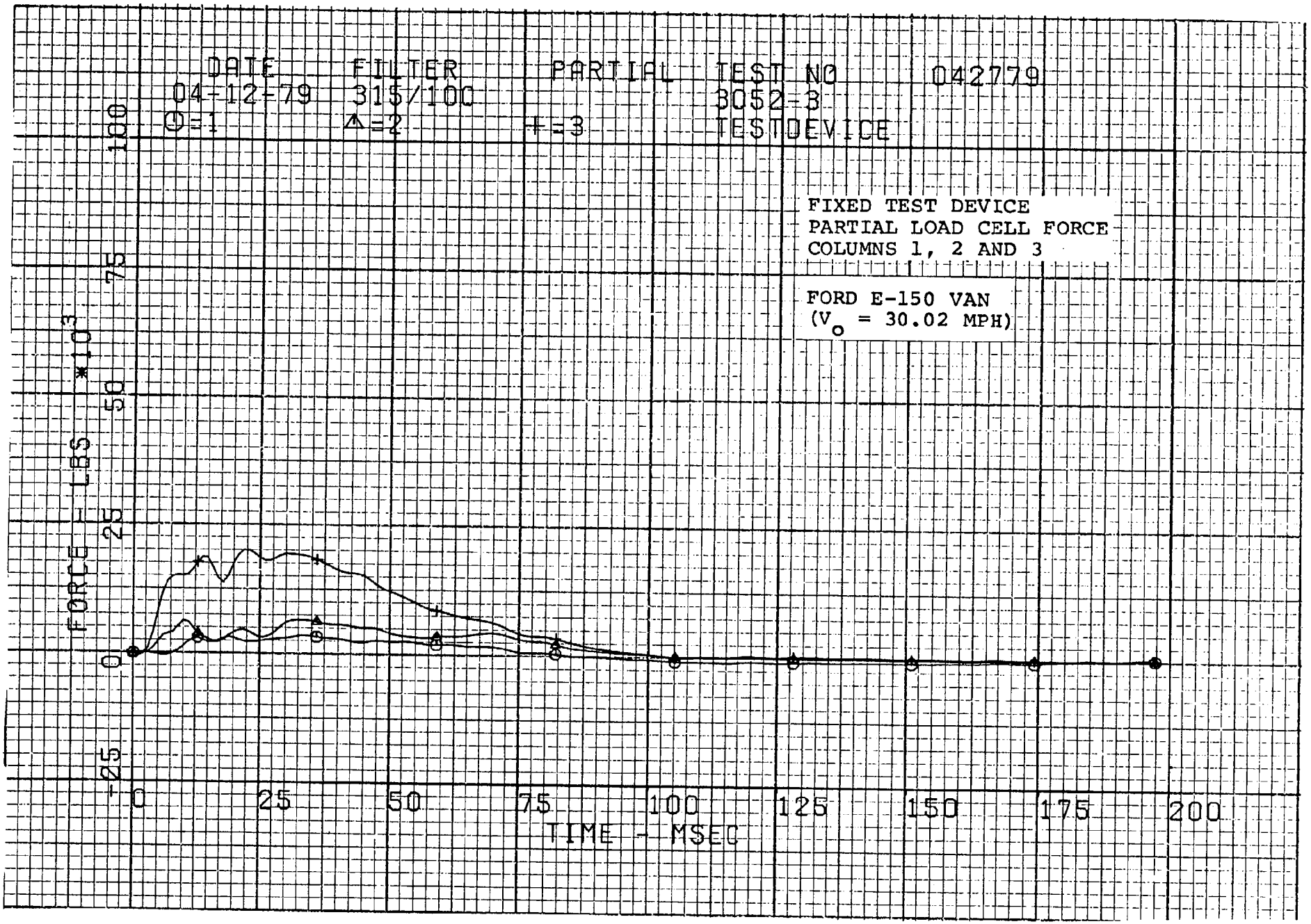

DATE
04-12-79
FILTER
315/100
COLUMN
8
TEST NO
3052-3
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 8
FORD E-150 VAN
(V = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

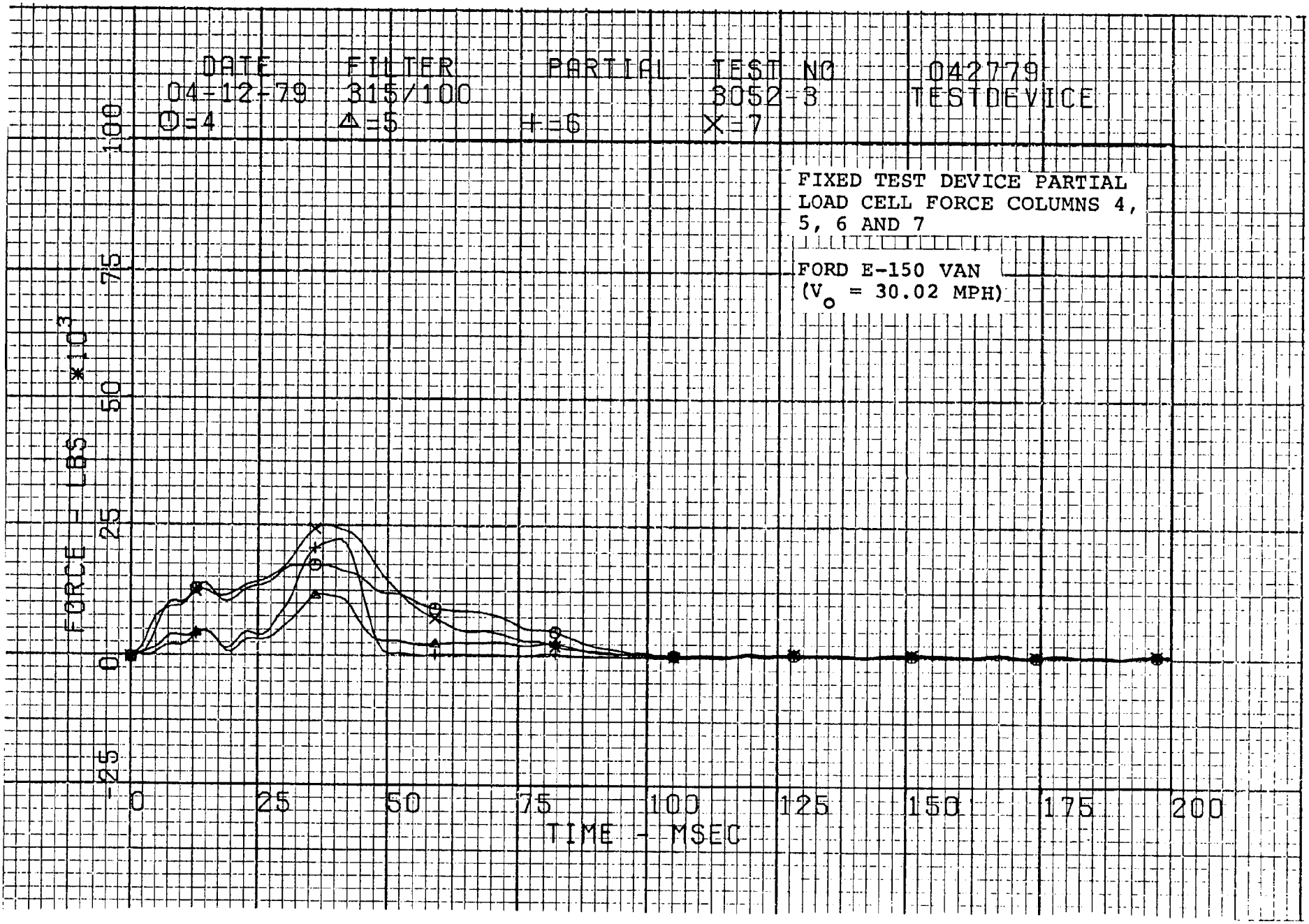

DATE
04-12-79
O=A
FILTER
315/100
Δ=B
COLUMN
9
+=C
TEST NO
3052-3
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 9
FORD E-150 VAN
(V$_o$ = 30.02 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

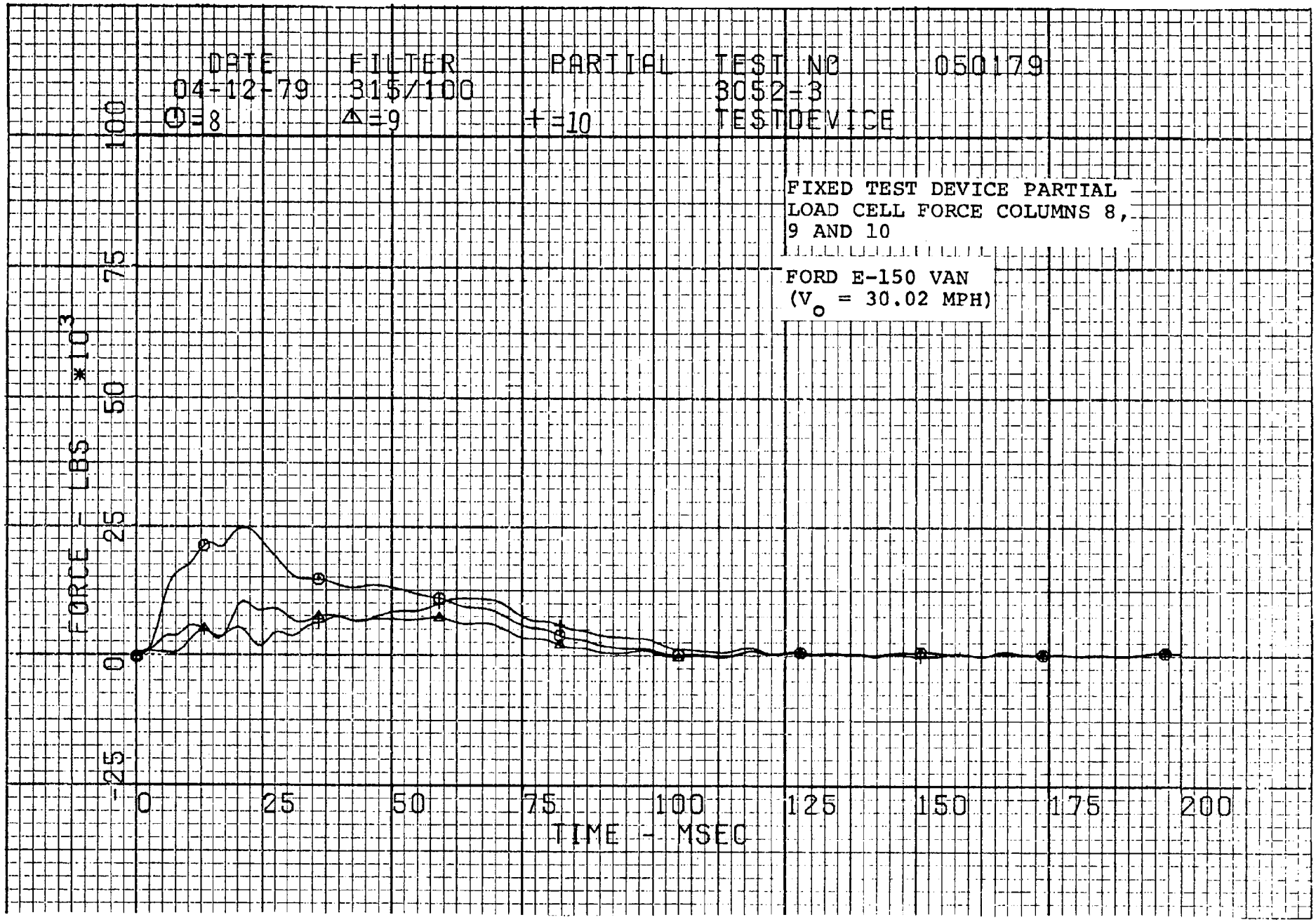

DATE
04-12-79
O=A
FILTER
315/100
△=B
COLUMN
9
+=C
TEST NO
3052-3
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 9
FORD E-150 VAN
(V_o = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE F LBS *10³
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

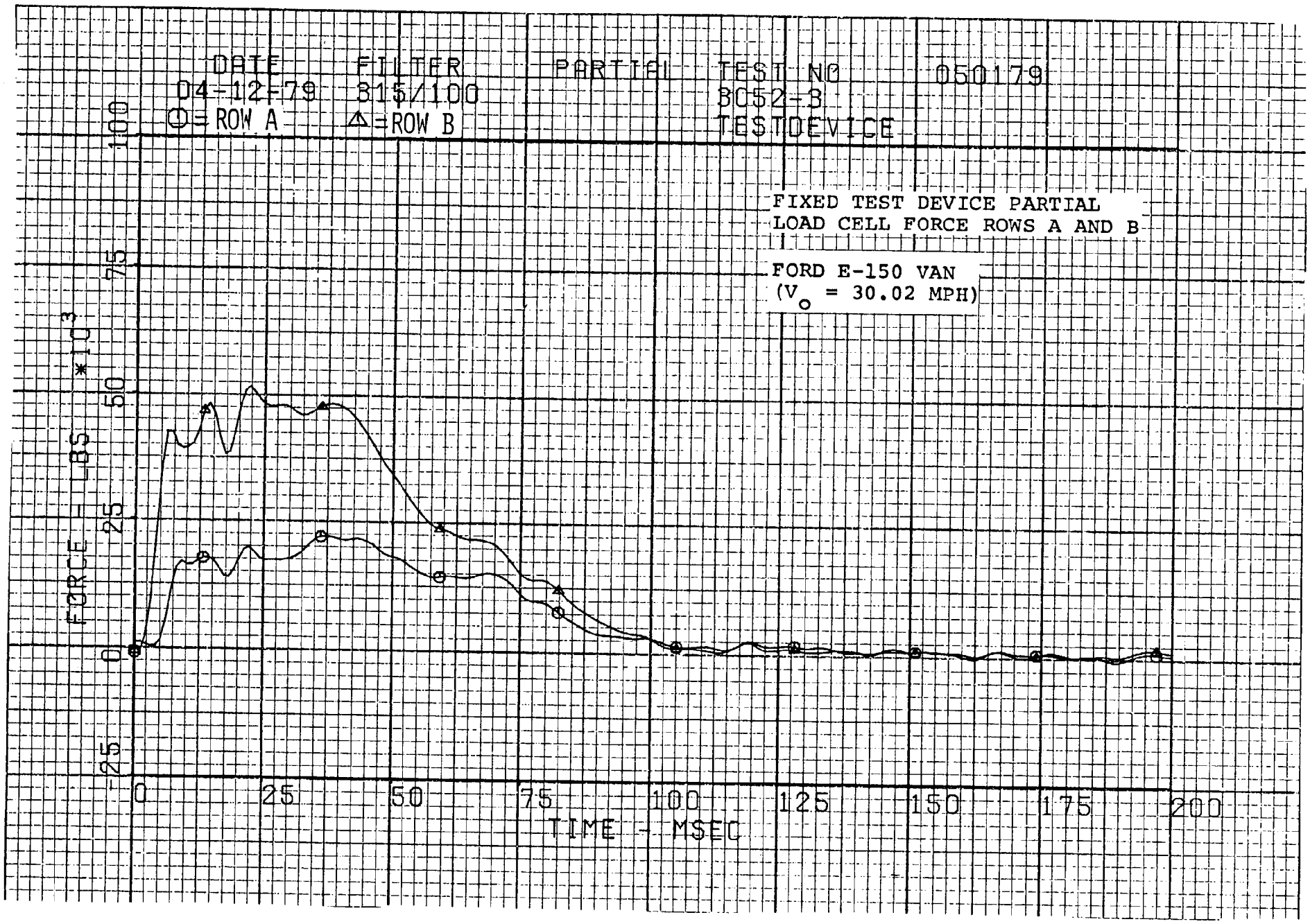

DATE
04-12-79
FILTER
315/100
COLUMN
10
TEST NO
3052-3
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 10
FORD E-150 VAN
(V$_o$ = 30.02 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

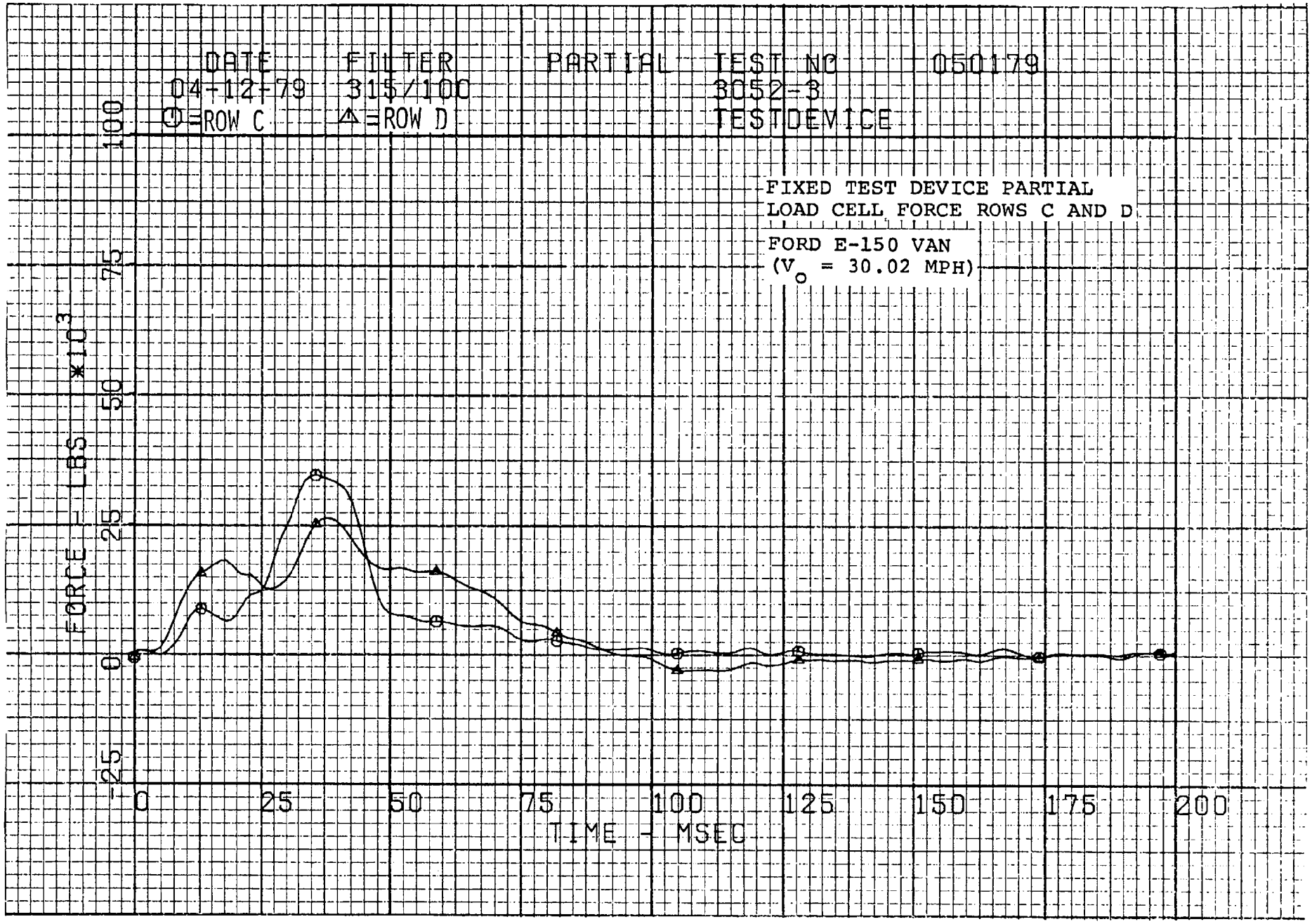

DATE
04-12-79
FILTER
315/100
COLUMN
10
TEST NO
3052-3
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 10
FORD E-150 VAN
(V₀ = 30.02 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

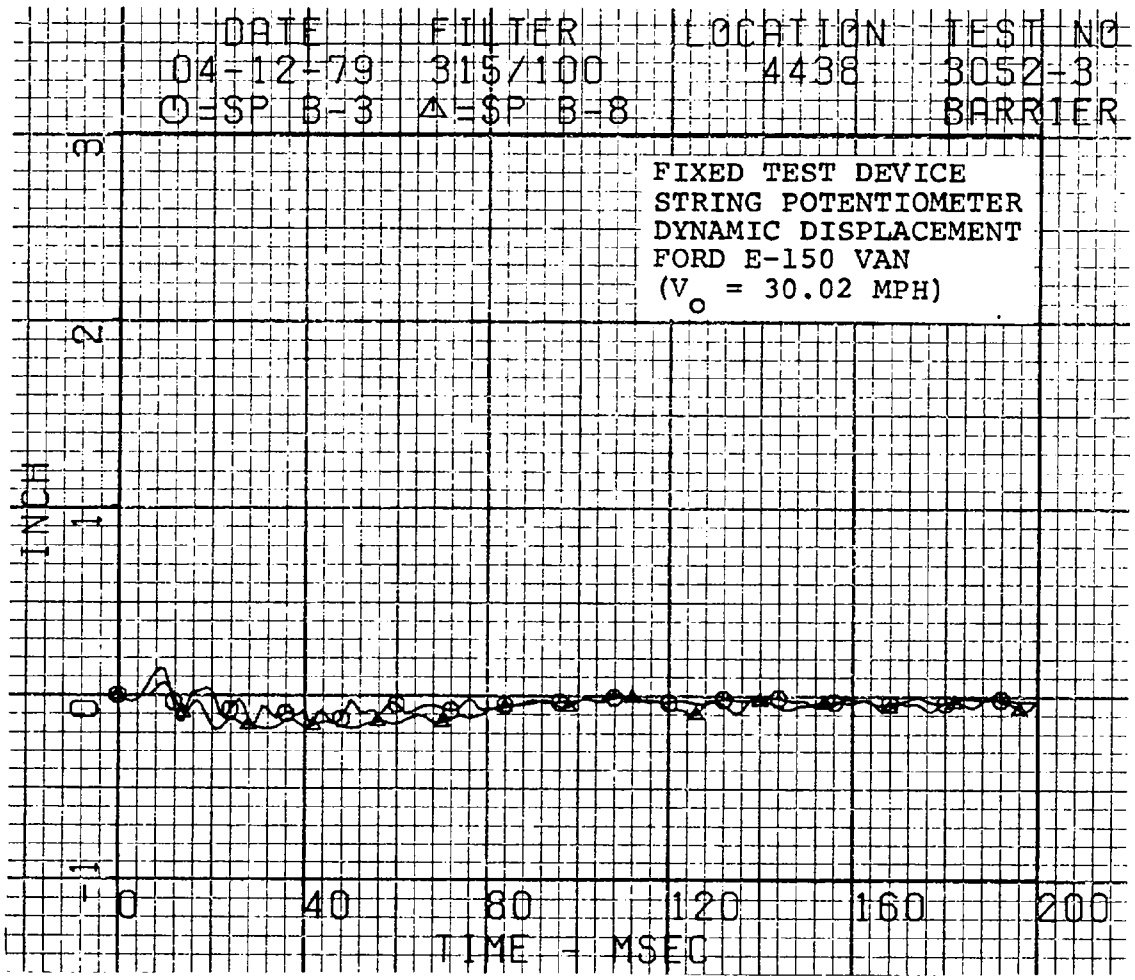

DATE
04-12-79
FILTER
315/100
PARTIAL
TEST NO
042779
3052-3
TESTDEVICE
⊙=1
△=2
+=3
FIXED TEST DEVICE
PARTIAL LOAD CELL FORCE
COLUMNS 1, 2 AND 3
FORD E-150 VAN
(V_o = 30.02 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

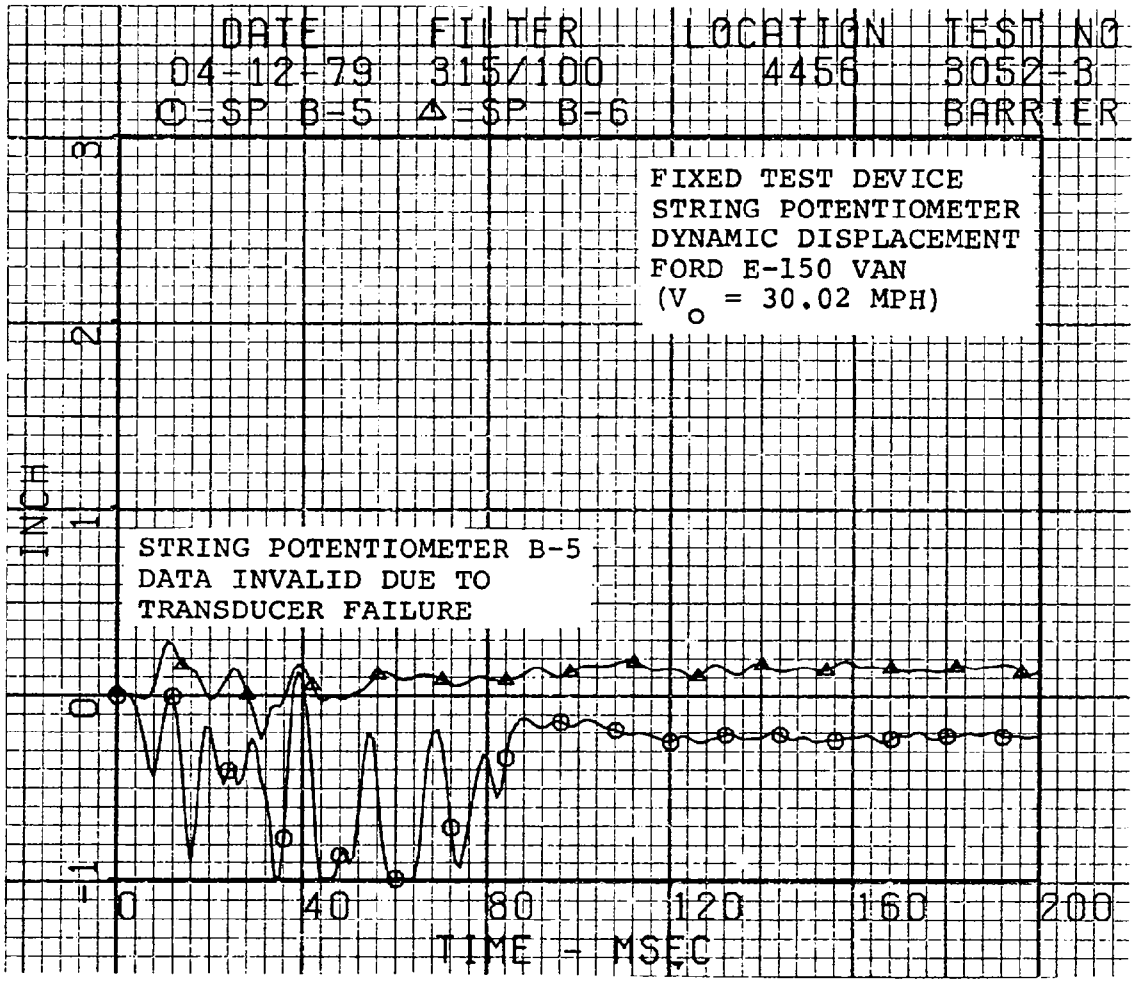

DATE
04-12-79
FILTER
315/100
PARTIAL
TEST NO
3052-3
042779
TESTDEVICE
O=4
Δ=5
+=6
X=7
FIXED TEST DEVICE PARTIAL LOAD CELL FORCE COLUMNS 4, 5, 6 AND 7
FORD E-150 VAN
(V_o = 30.02 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

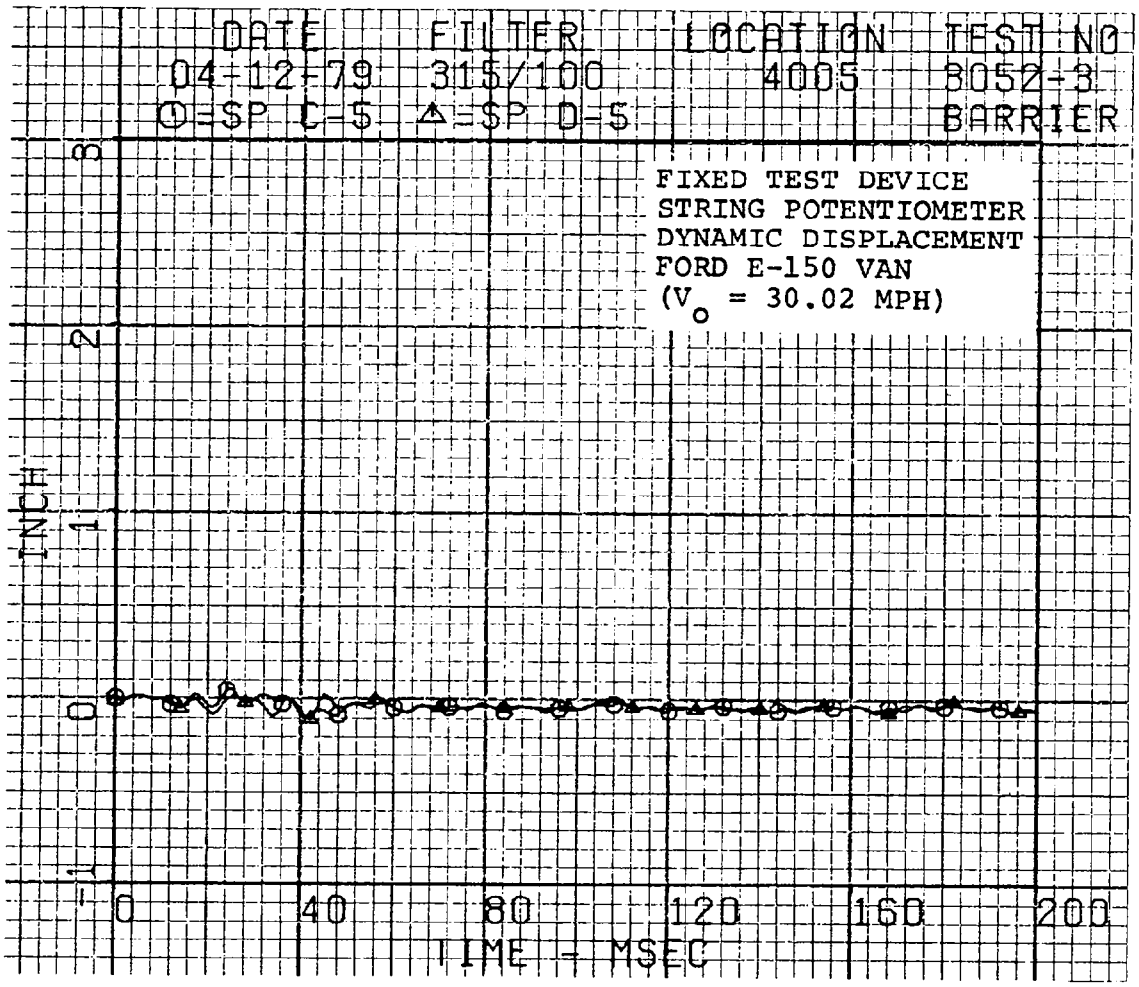

DATE
04-12-79
FILTER
315/100
PARTIAL
TEST NO
050179
3052-3
TESTDEVICE
O=8
Δ=9
+=10
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE COLUMNS 8,
9 AND 10
FORD E-150 VAN
(V_o = 30.02 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-12-79
FILTER
315/100
PARTIAL
TEST NO
050179
3C52-3
TESTDEVICE
O = ROW A
Δ = ROW B
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE ROWS A AND B
FORD E-150 VAN
(V_o = 30.02 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-12-79
FILTER
315/100
PARTIAL
TEST NO
050179
3052-3
TESTDEVICE
=ROW C
=ROW D
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE ROWS C AND D
FORD E-150 VAN
(V_o = 30.02 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-12-79
FILTER
315/100
LOCATION
4438
TEST NO
3052-3
O=SP B-3 Δ=SP B-8
BARRIER
FIXED TEST DEVICE
STRING POTENTIOMETER
DYNAMIC DISPLACEMENT
FORD E-150 VAN
(V o = 30.02 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC


DATE
04-12-79
FILTER
315/100
LOCATION
4456
TEST NO
3052-3
BARRIER
① = SP B-5
△ = SP B-6
FIXED TEST DEVICE
STRING POTENTIOMETER
DYNAMIC DISPLACEMENT
FORD E-150 VAN
(V_o = 30.02 MPH)
STRING POTENTIOMETER B-5
DATA INVALID DUE TO
TRANSDUCER FAILURE
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC


DATE
04-12-79
FILTER
315/100
LOCATION
4005
TEST NO
3052-3
BARRIER
O=SP C-5 △=SP D-5
FIXED TEST DEVICE
STRING POTENTIOMETER
DYNAMIC DISPLACEMENT
FORD E-150 VAN
(V o = 30.02 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC

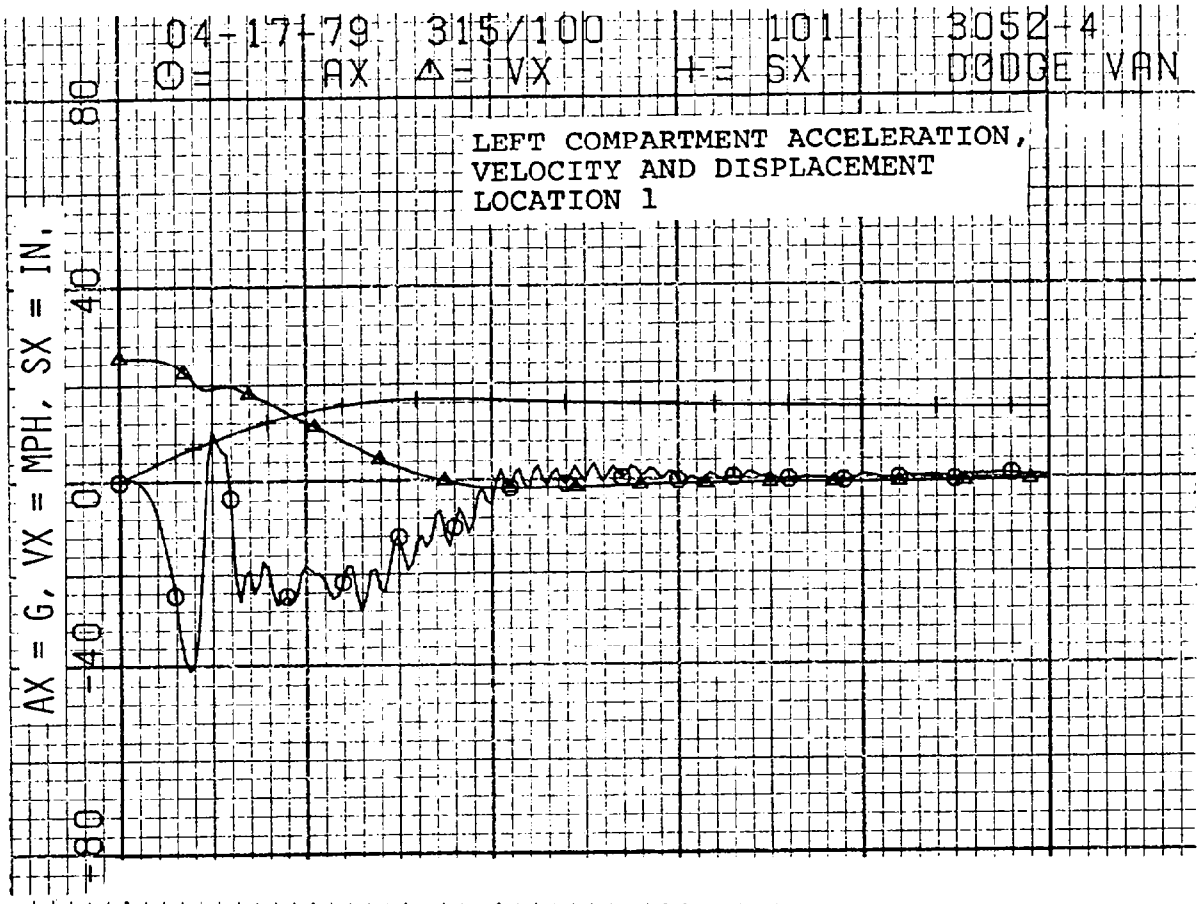
APPENDIX D

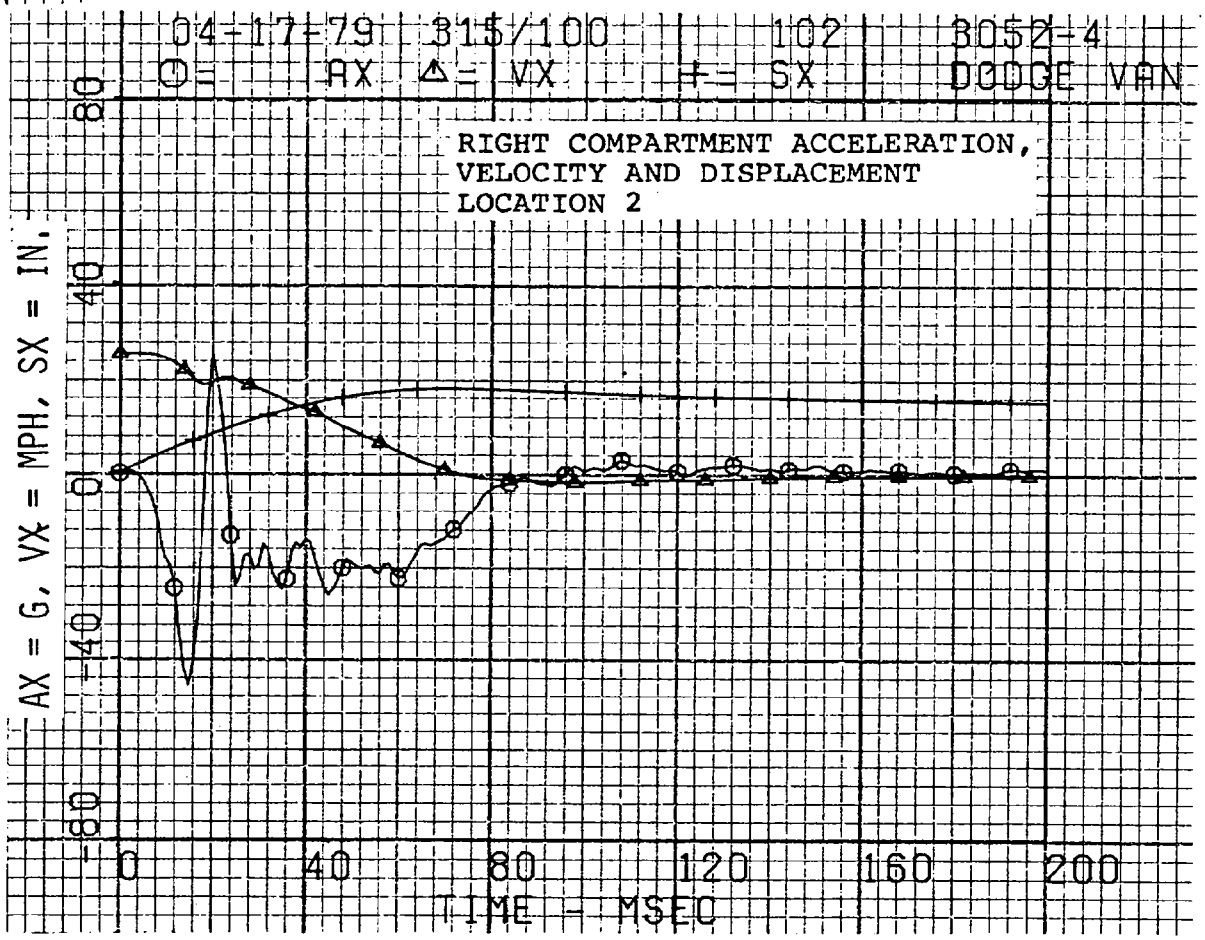
CALCOMP PLOTS FOR
TEST 3052-4

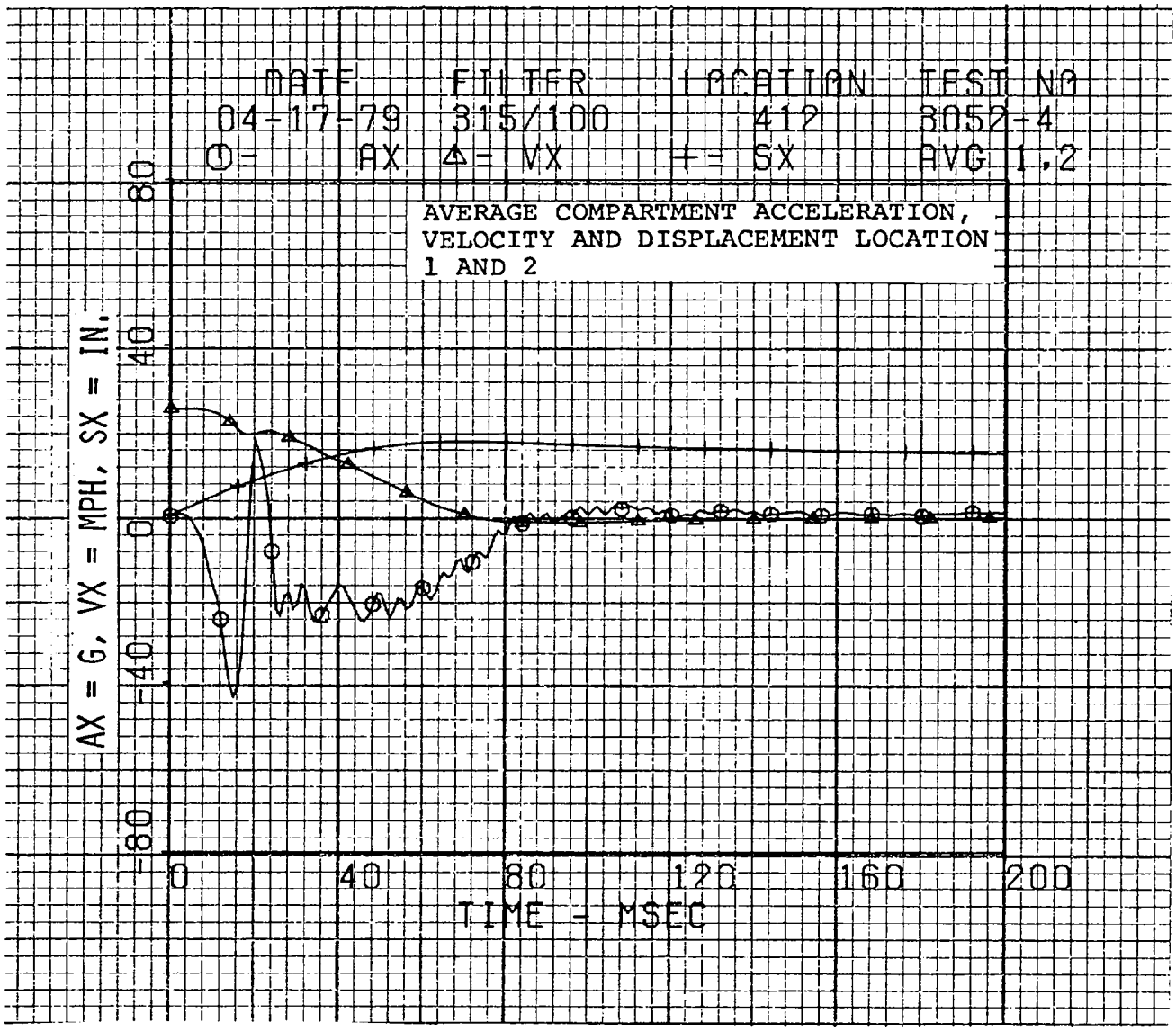
DODGE B-200 VAN-TO-NHTSA FIXED TEST DEVICE
SYMMETRIC HEAD-ON IMPACT

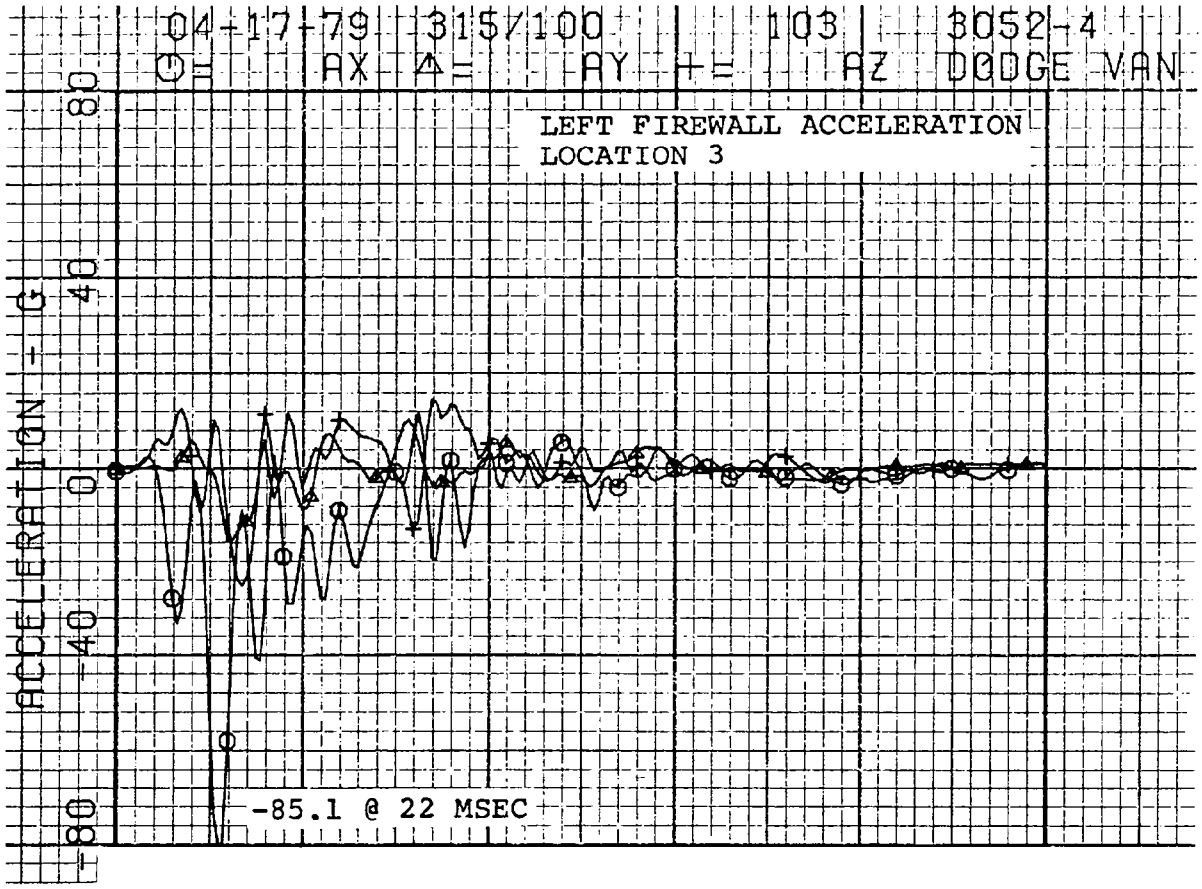
TEST SPEED: 25.17 MPH

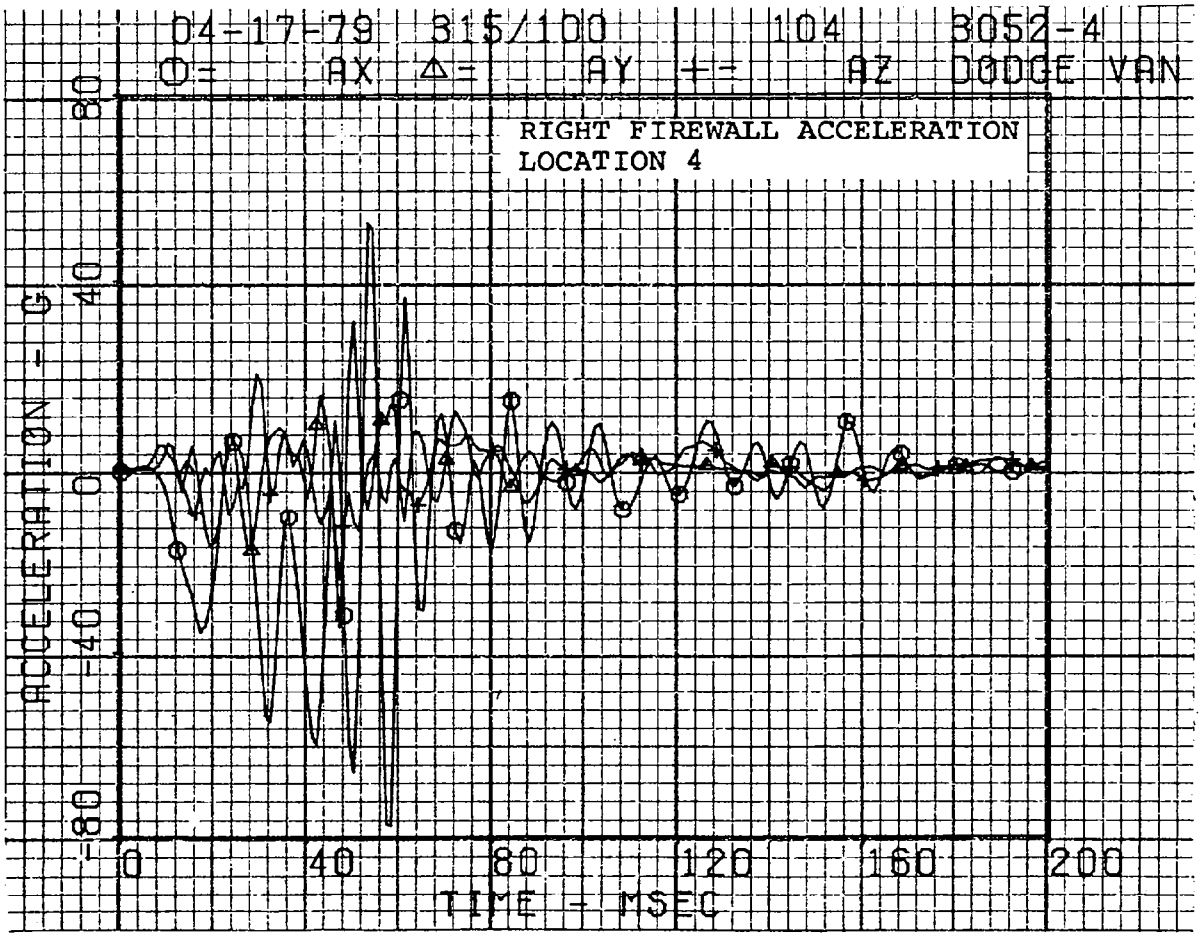
TEST DATE: APRIL 17, 1979

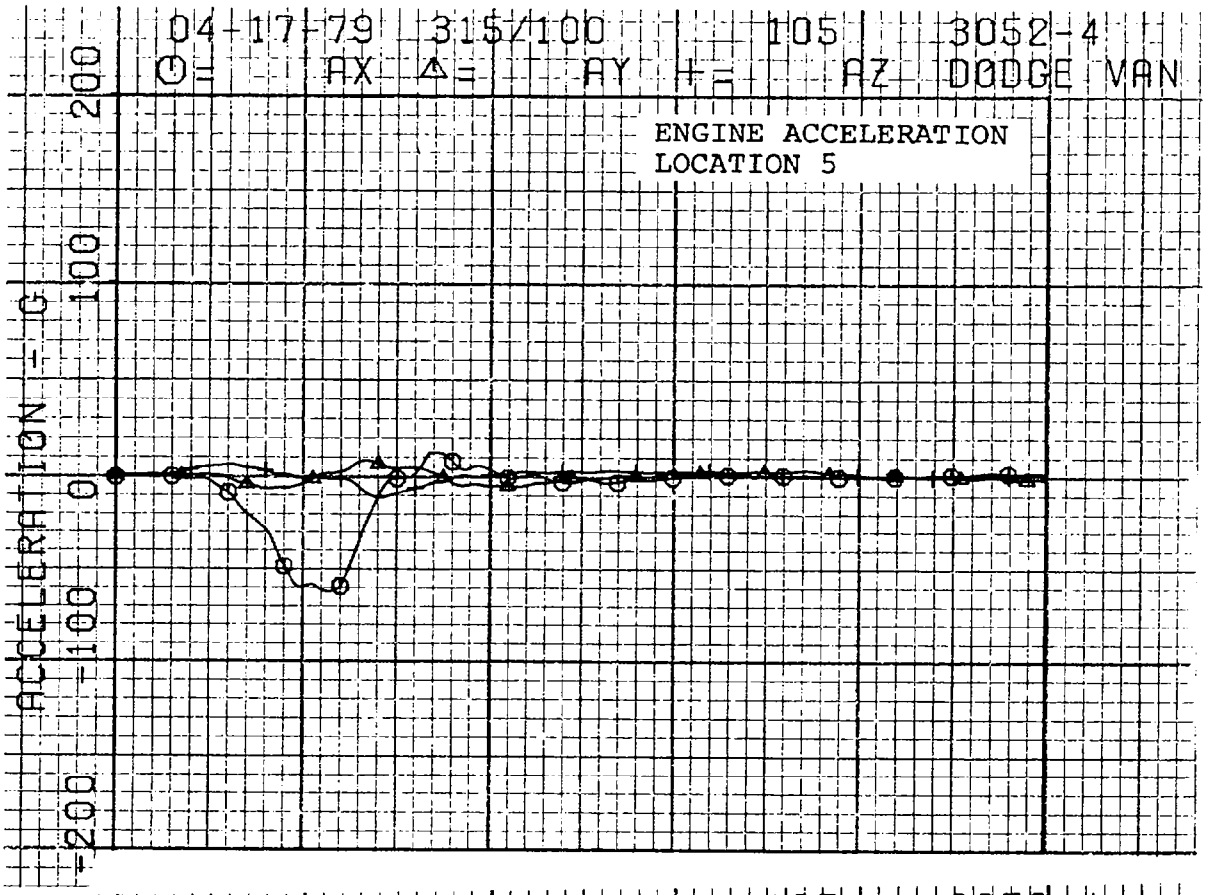

04-17-79 315/100 101 3052-4
O= AX Δ= VX += SX DODGE VAN
LEFT COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT
LOCATION 1
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80

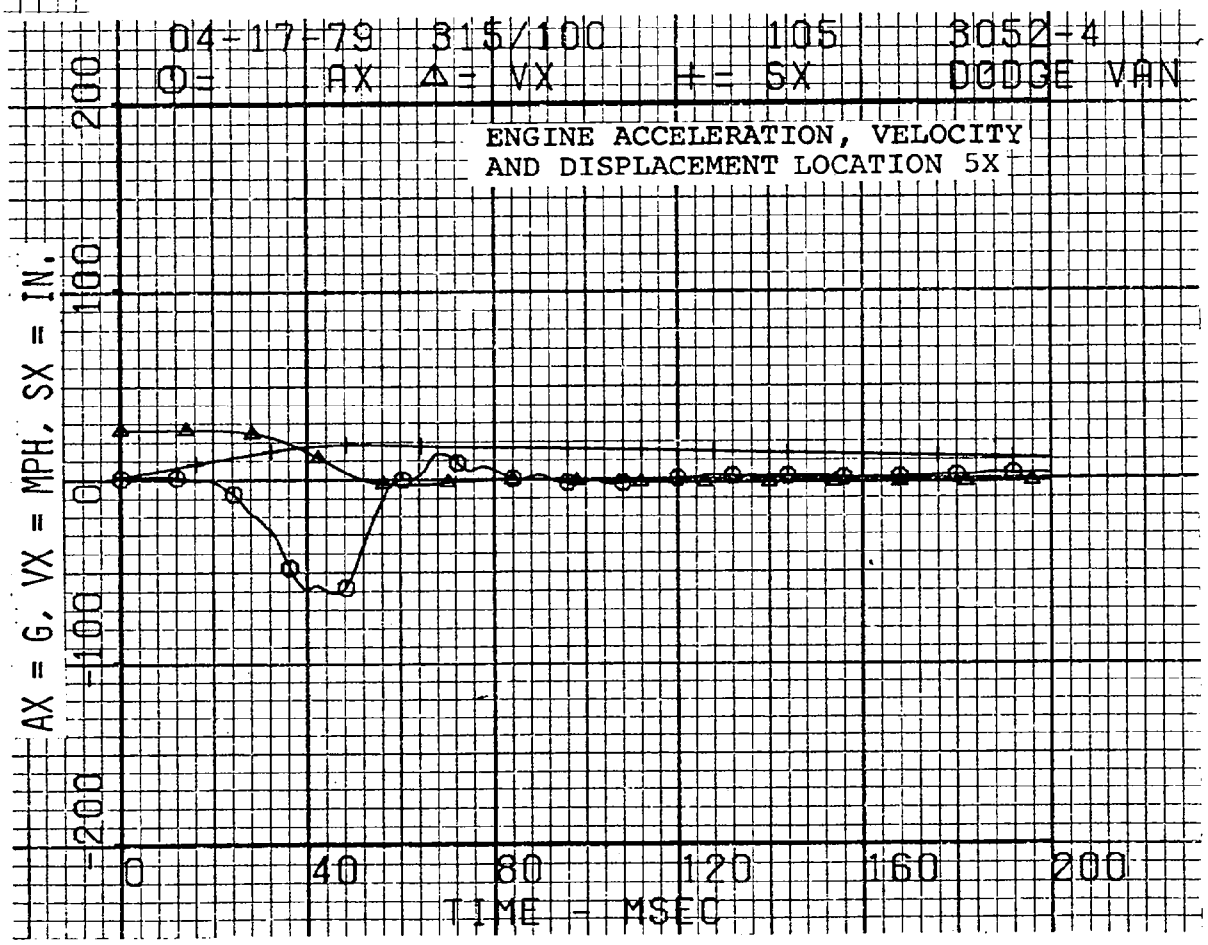

04-17-79 315/100 102 3052-4
O= AX Δ= VX += SX DODGE VAN
RIGHT COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT
LOCATION 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

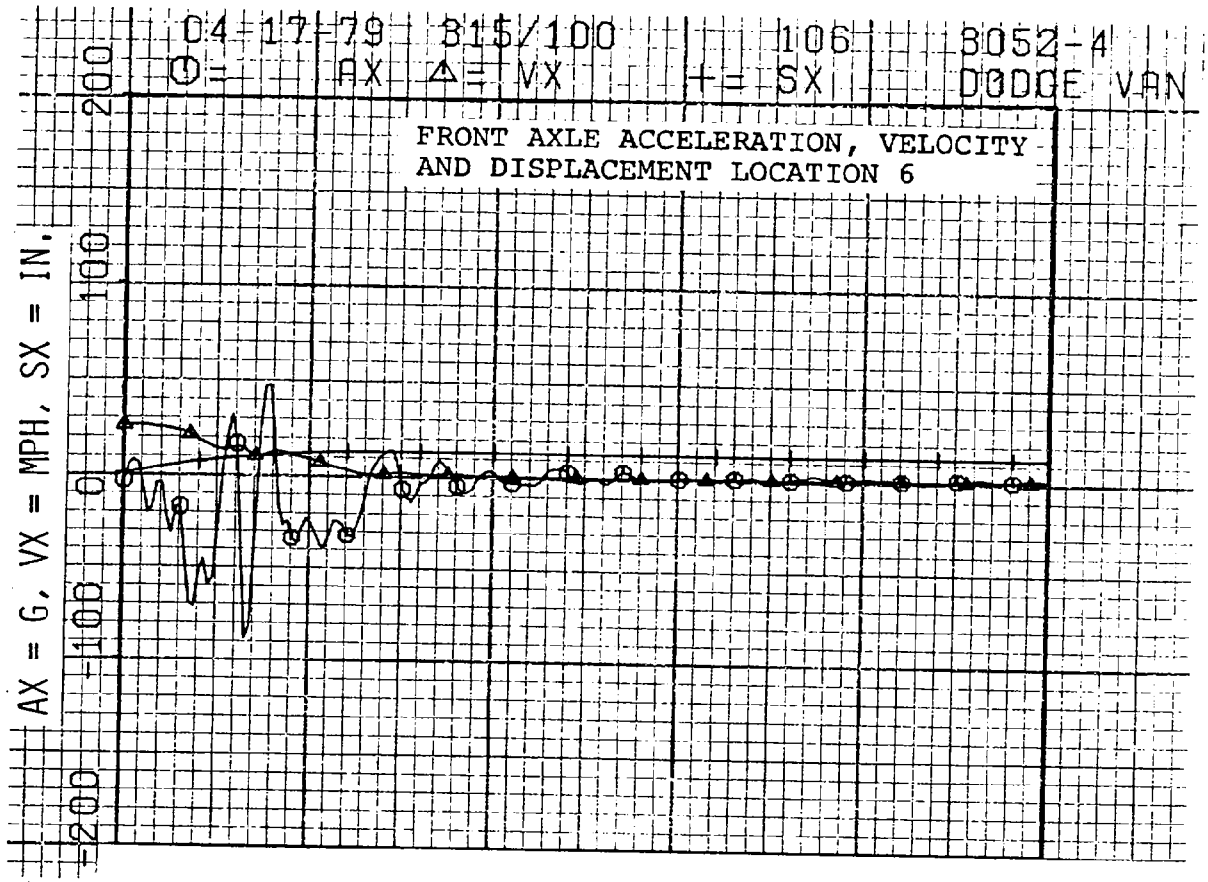

DATE
04-17-79
FILTER
315/100
LOCATION
412
TEST NO
3052-4
⊙= AX
Δ= VX
+= SX
AVG 1,2
AVERAGE COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT LOCATION
1 AND 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

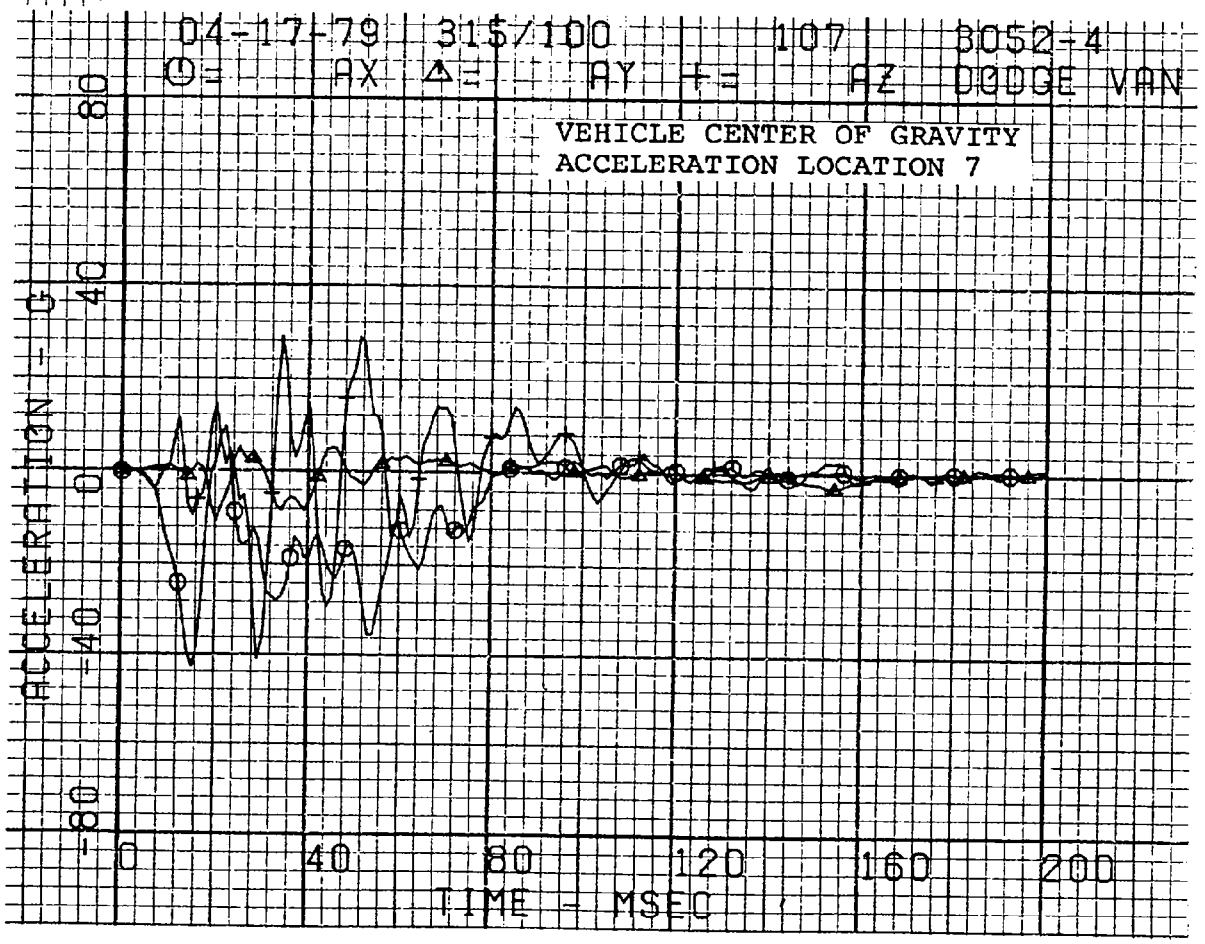

04-17-79 315/100 103 3052-4
O= AX Δ= AY += AZ DODGE VAN
LEFT FIREWALL ACCELERATION
LOCATION 3
-85.1 @ 22 MSEC
ACCELERATION - G
80
40
0
-40
-80

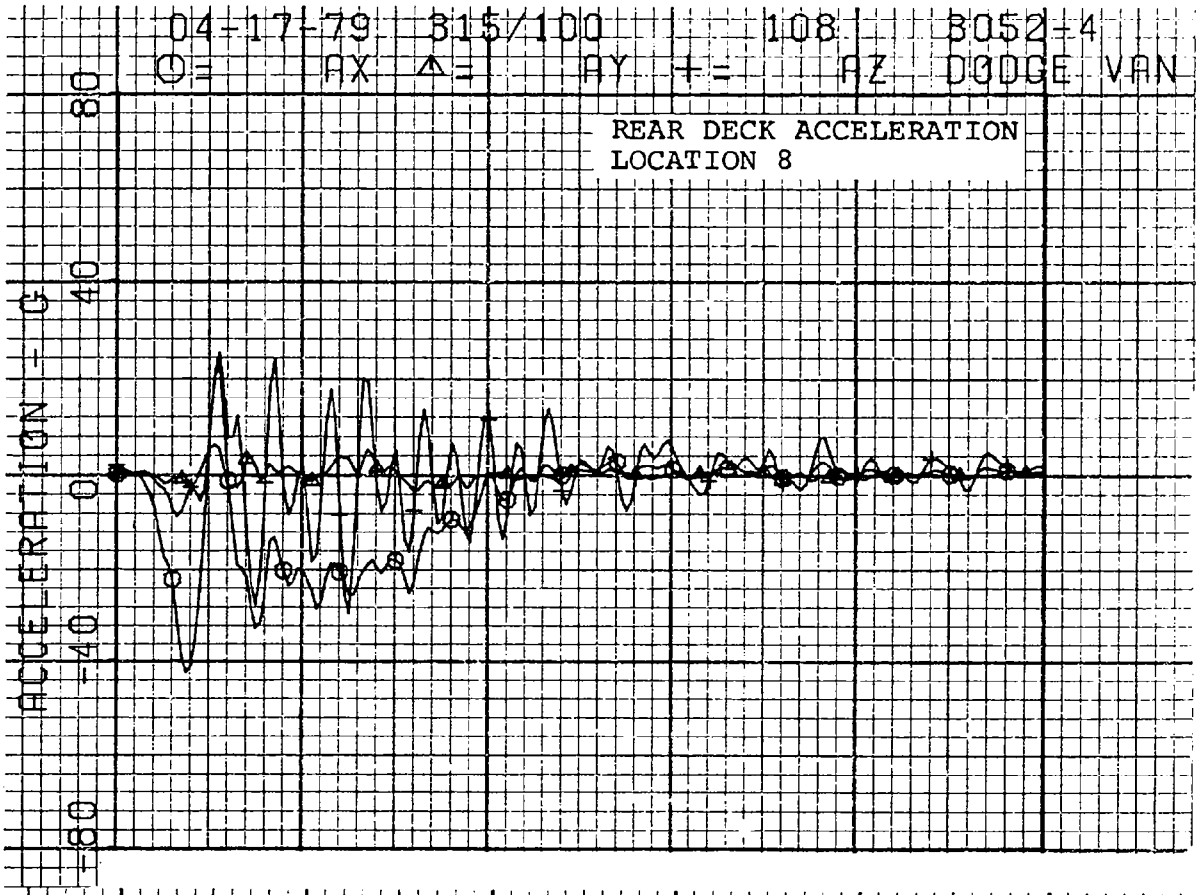

04-17-79 315/100 104 3052-4
O= AX Δ= AY += AZ DODGE VAN
RIGHT FIREWALL ACCELERATION
LOCATION 4
ACCELERATION - G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

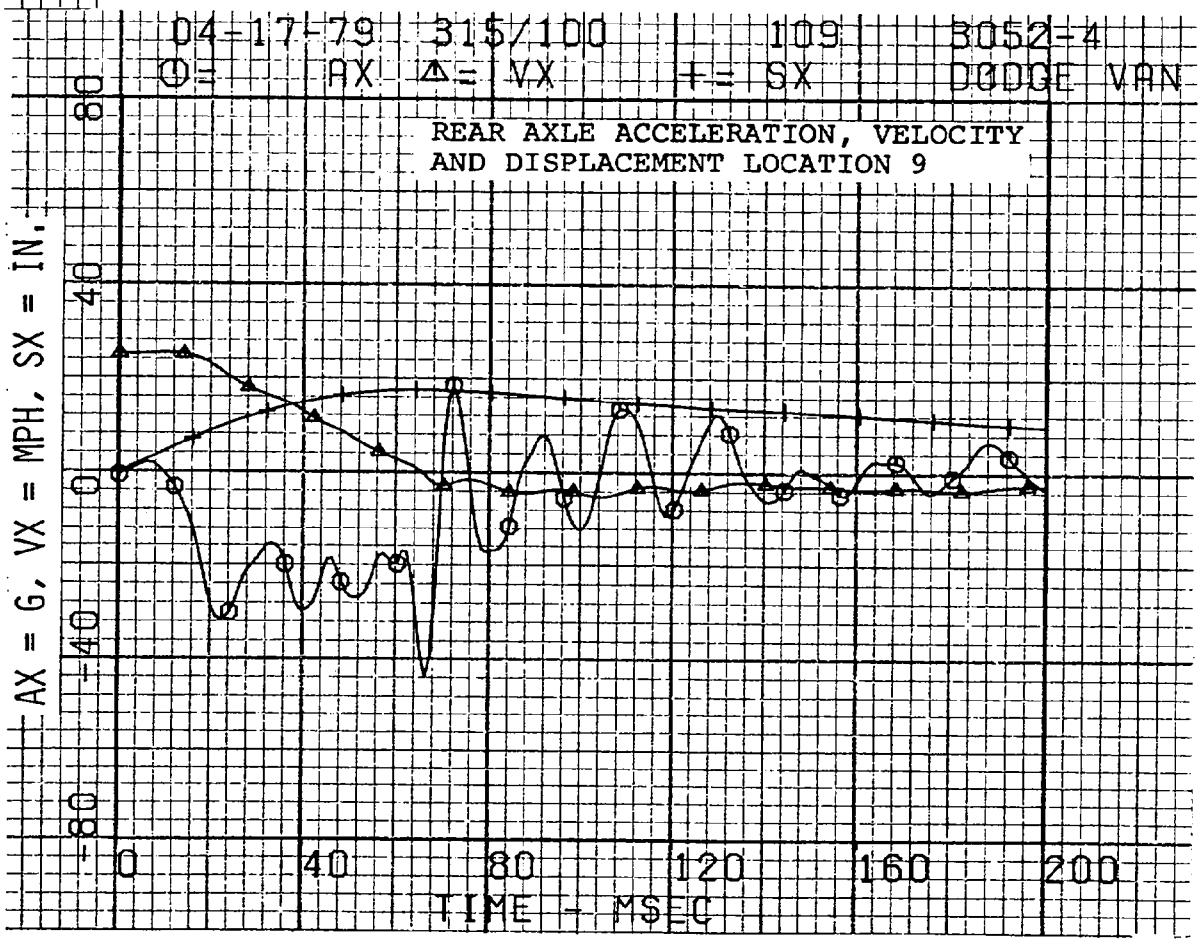

04-17-79 315/100 105 3052-4
O= AX Δ= AY += AZ DODGE VAN
ENGINE ACCELERATION
LOCATION 5
ACCELERATION - G
200
100
0
-100
-200

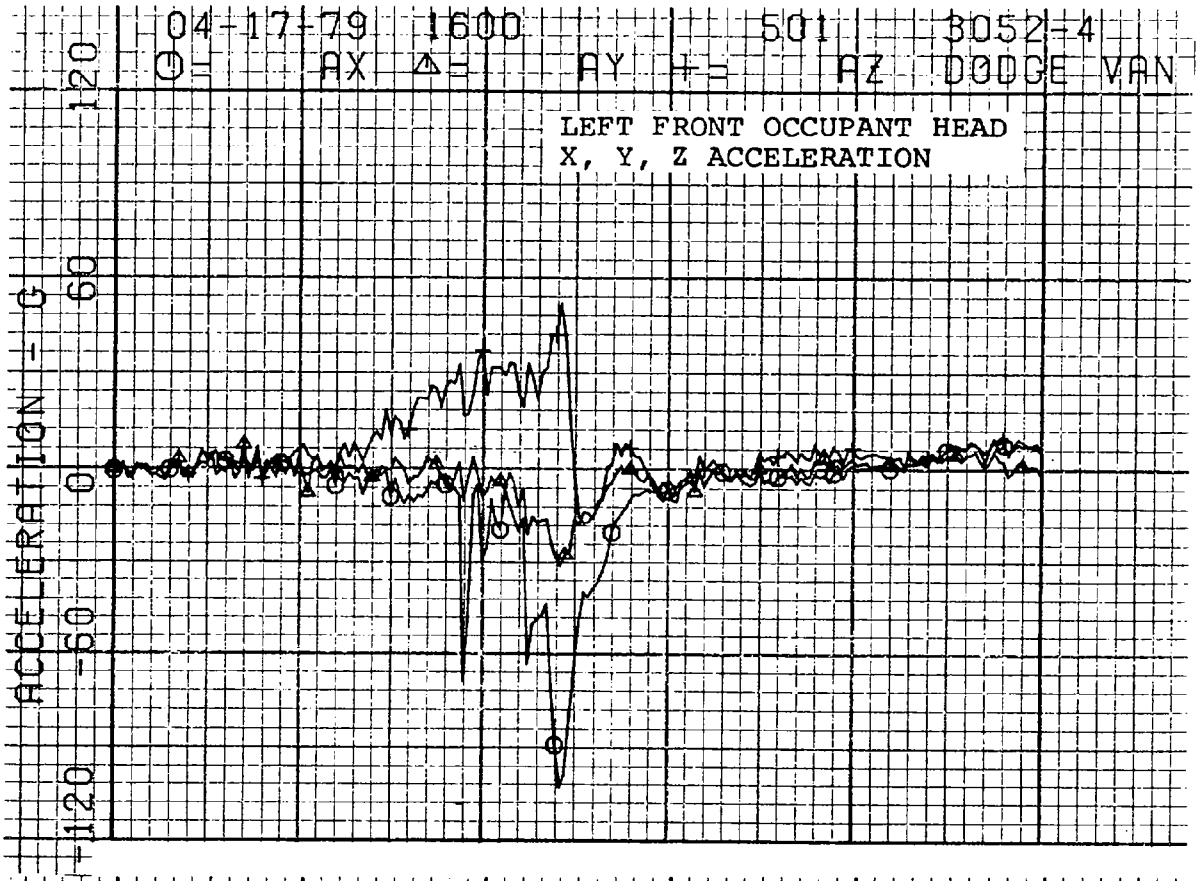

04-17-79 315/100 105 3052-4
O= AX Δ= VX += SX DODGE VAN
ENGINE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 5X
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200
0
40
80
120
160
200
TIME - MSEC

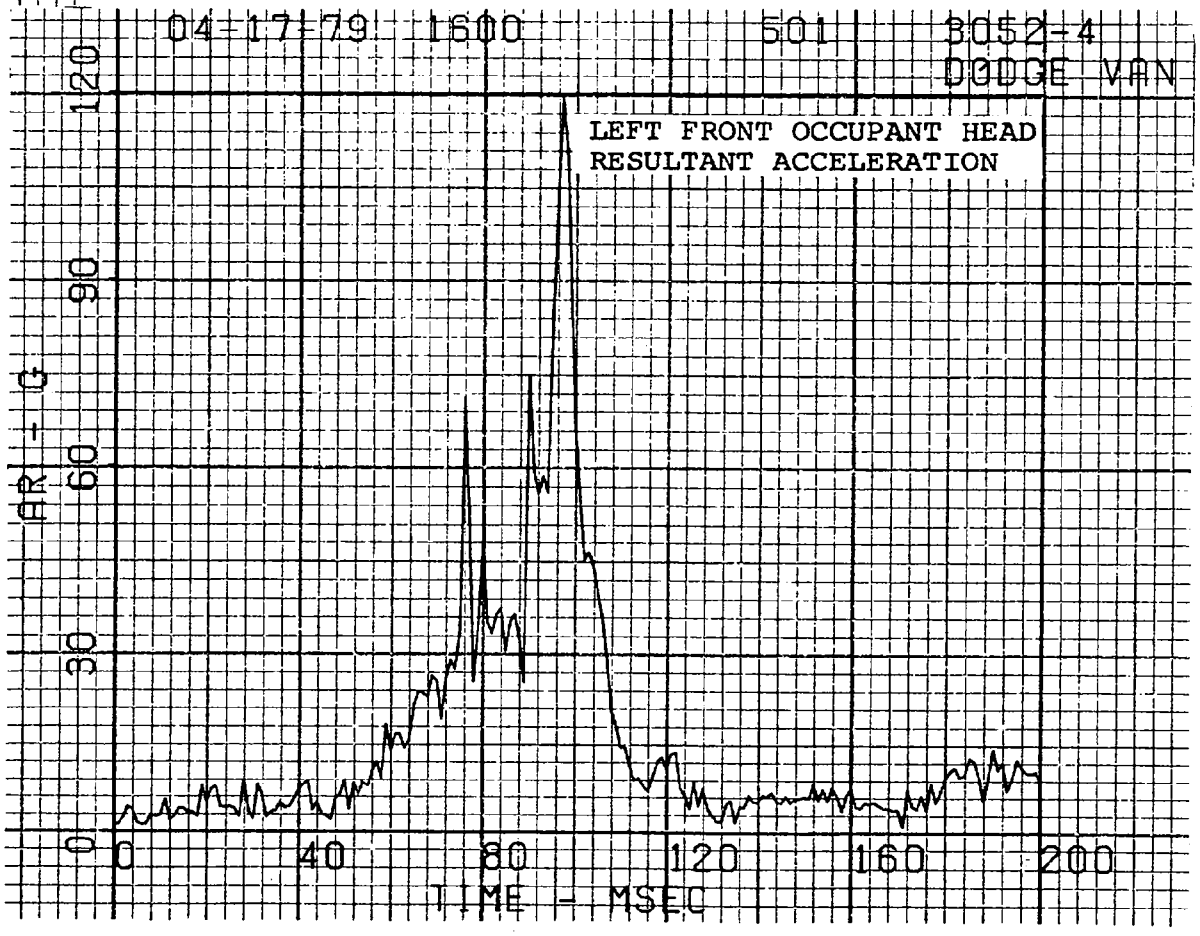

04-17-79 315/100 106 3052-4
O= AX △= VX += SX DODGE VAN
FRONT AXLE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 6
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200

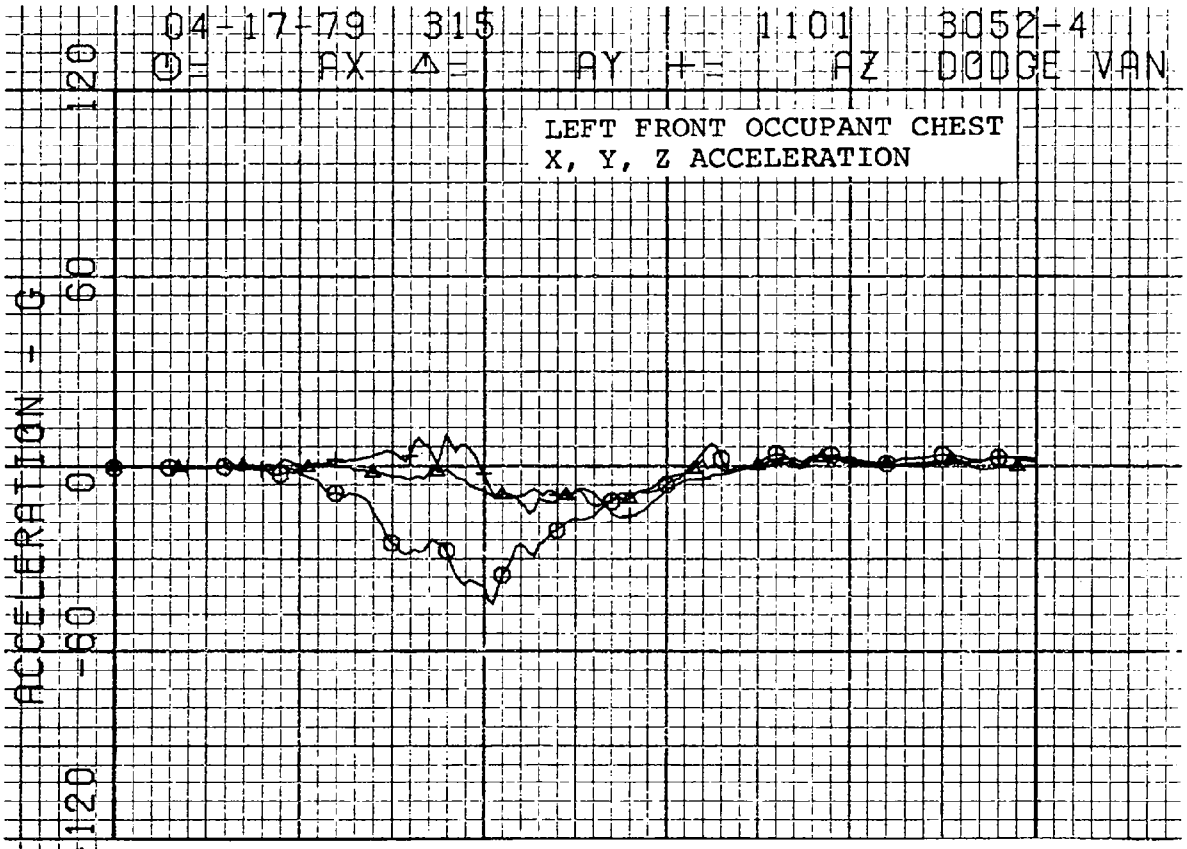

04-17-79 315/100 107 3052-4
O= AX △= AY += AZ DODGE VAN
VEHICLE CENTER OF GRAVITY
ACCELERATION LOCATION 7
ACCELERATION - G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

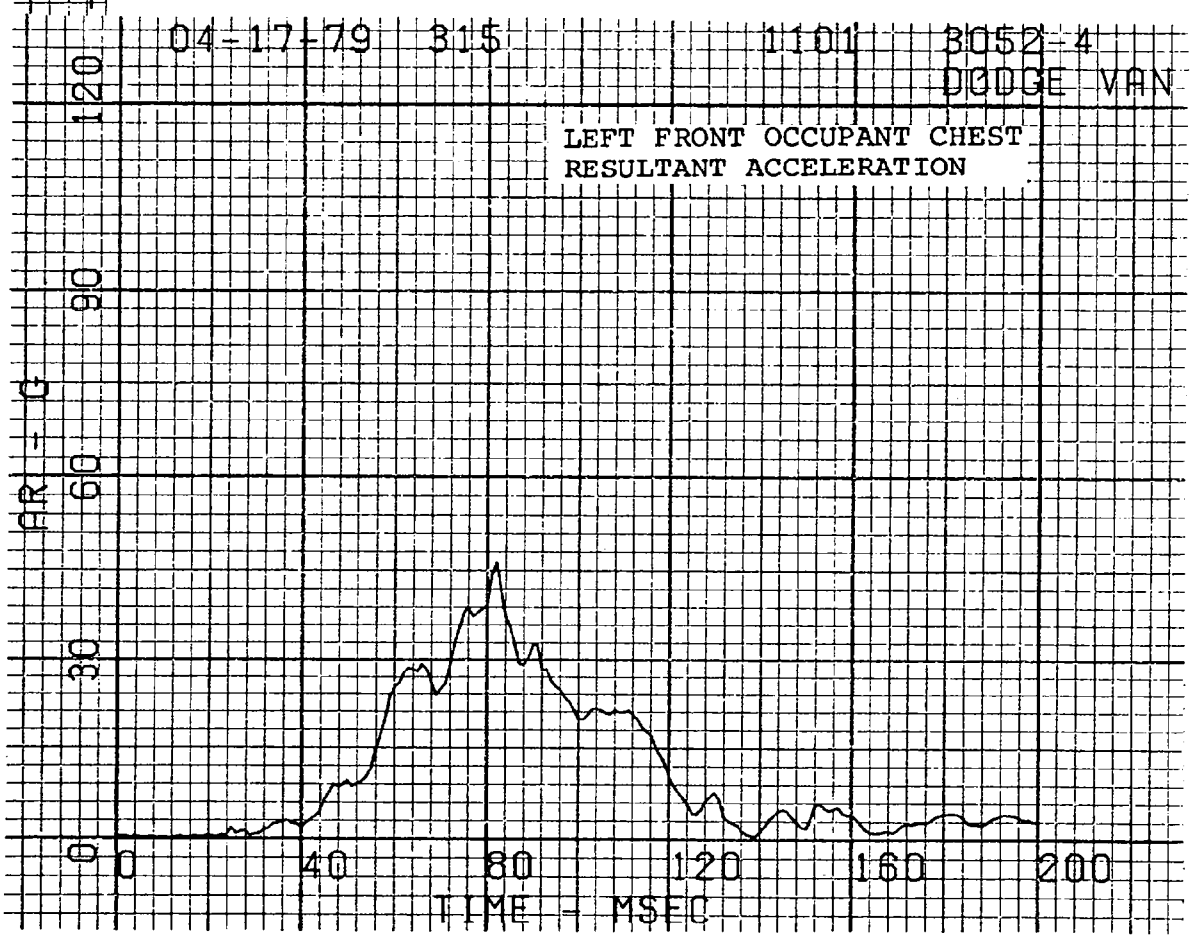

04-17-79 315/100 108 3052-4
O= AX Δ= AY += AZ DODGE VAN
REAR DECK ACCELERATION
LOCATION 8
ACCELERATION - G
80
40
0
-40
-80

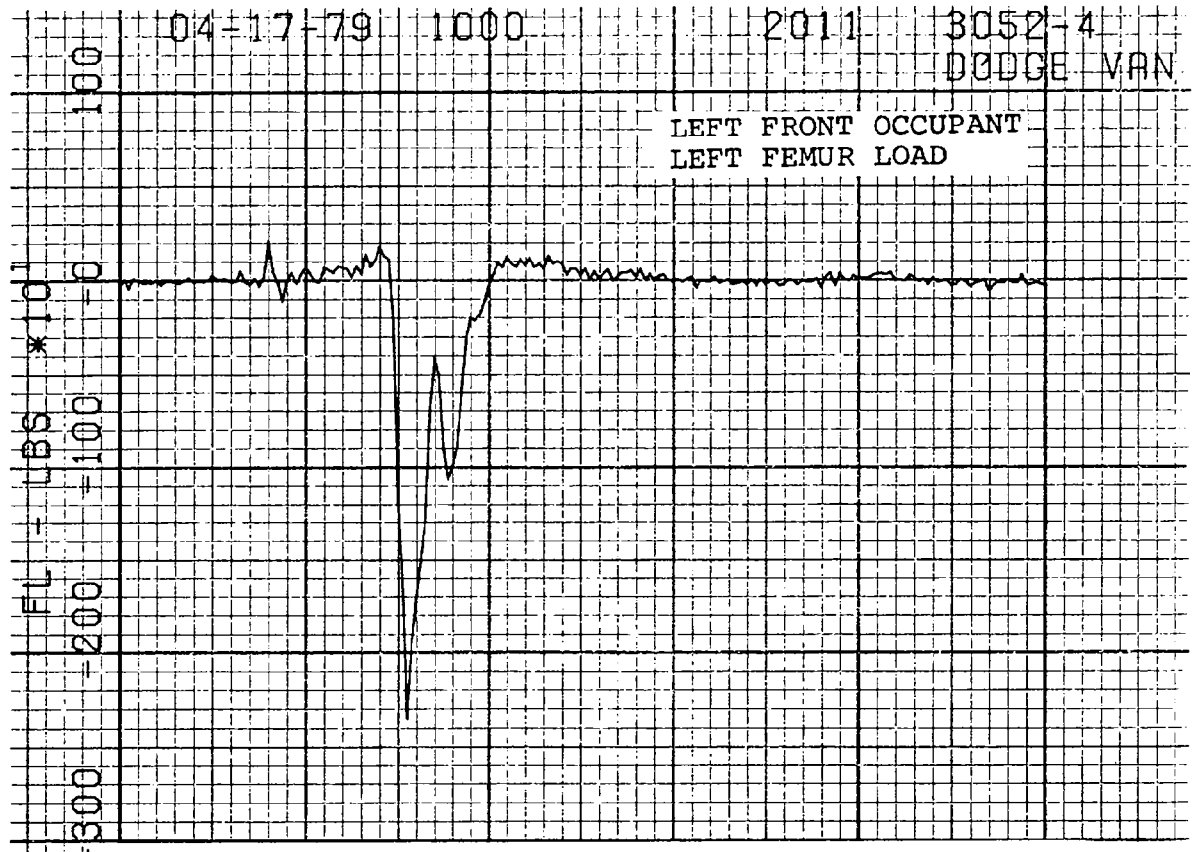

04-17-79 315/100 109 3052-4
O= AX Δ= VX += SX DODGE VAN
REAR AXLE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 9
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

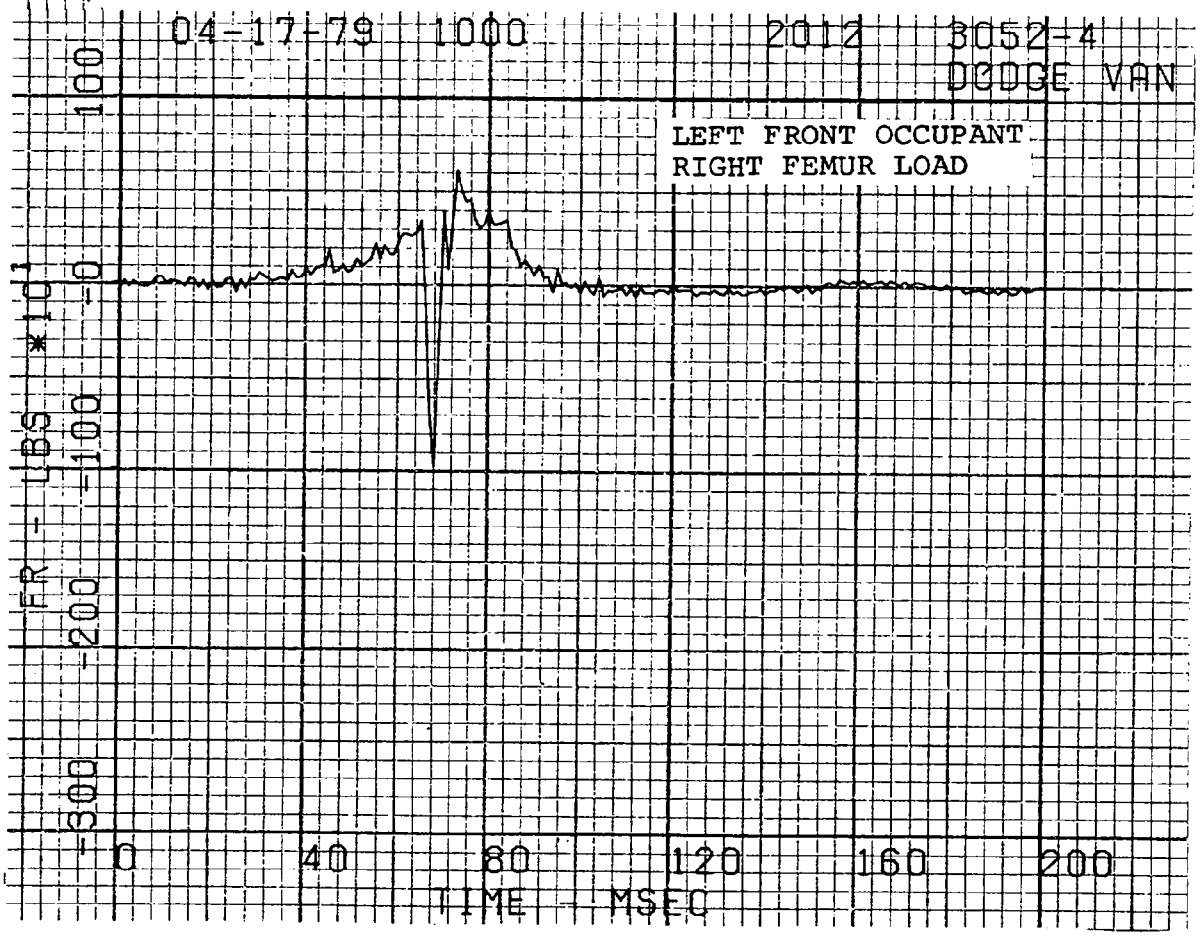

04-17-79 1600 501 3052-4
AX AY AZ DODGE VAN
LEFT FRONT OCCUPANT HEAD
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

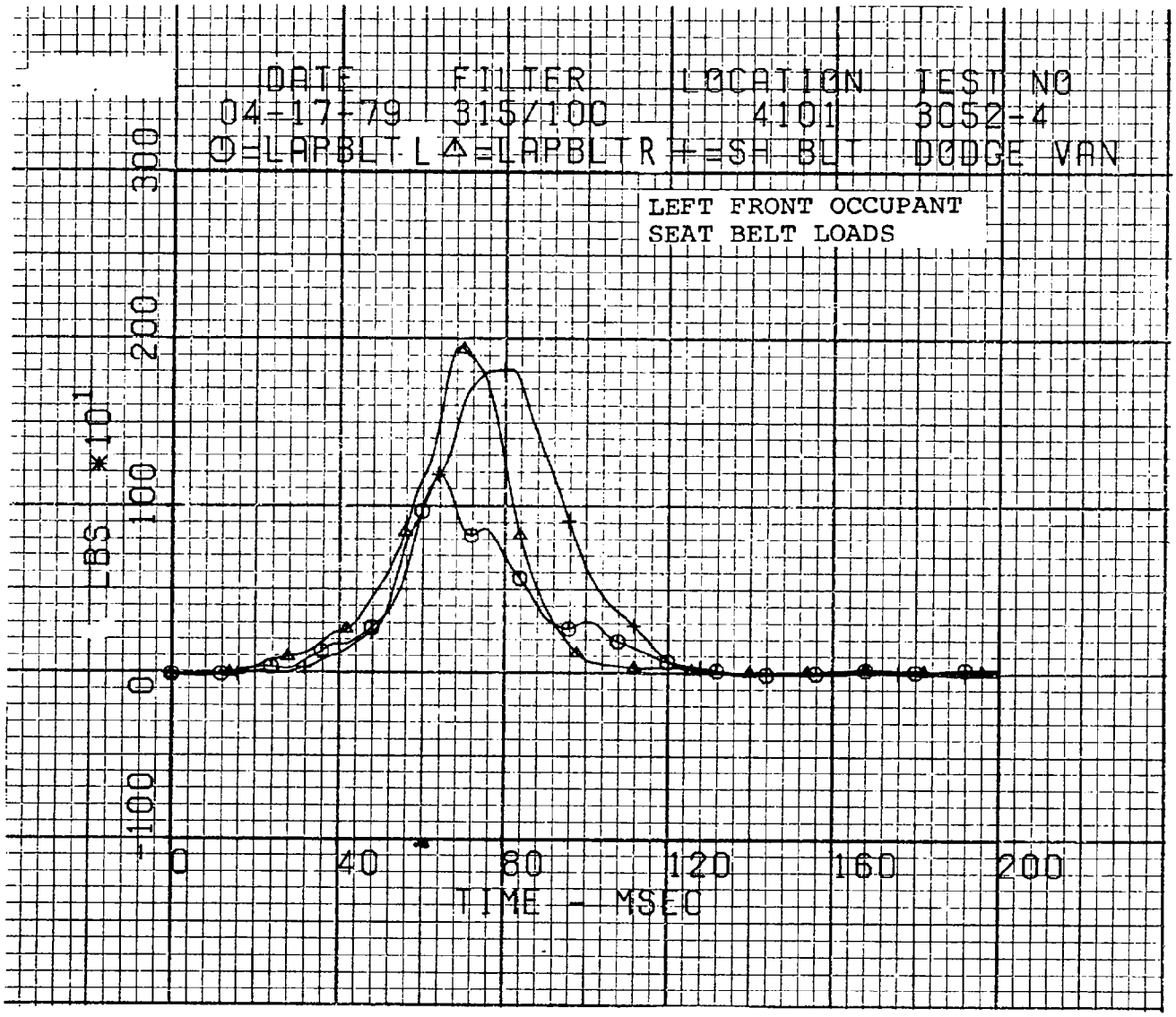

04-17-79 1600 501 3052-4
DODGE VAN
LEFT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

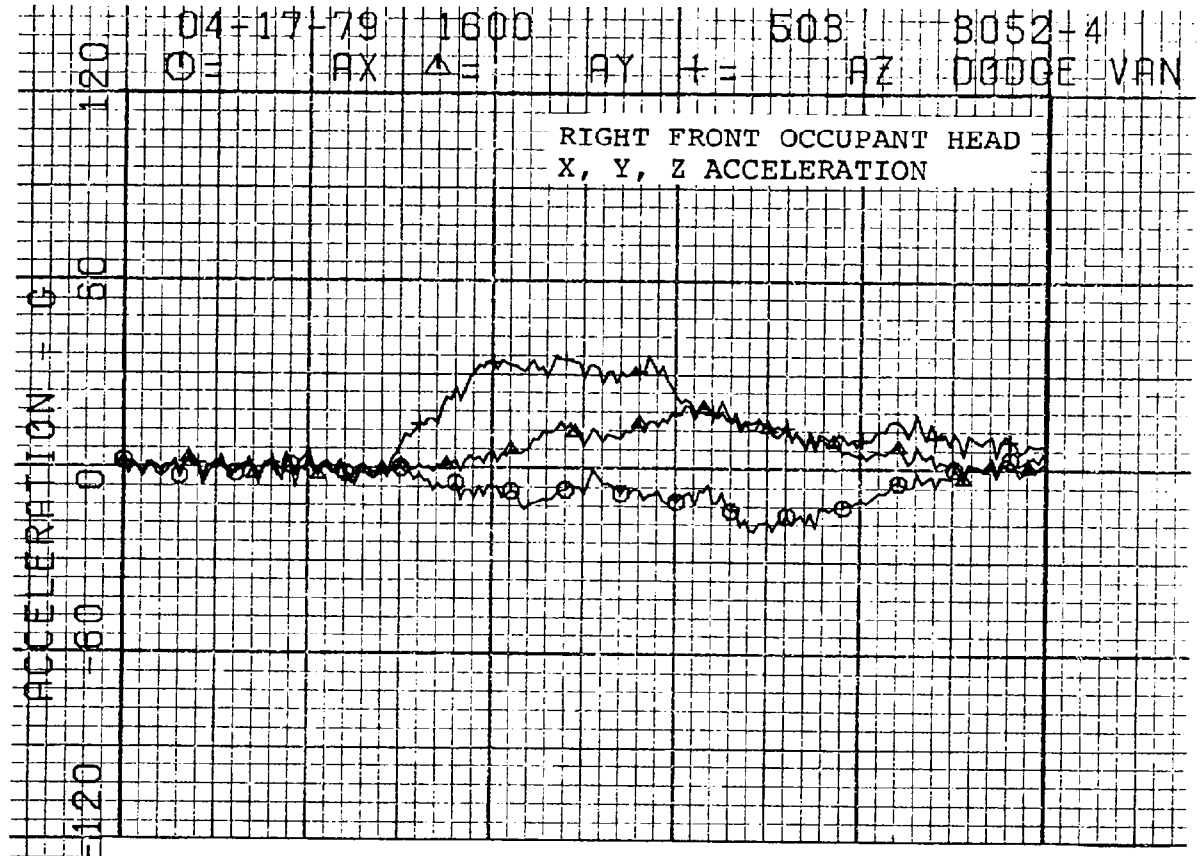

04-17-79 315 1101 3052-4
AX AY AZ DODGE VAN
LEFT FRONT OCCUPANT CHEST
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

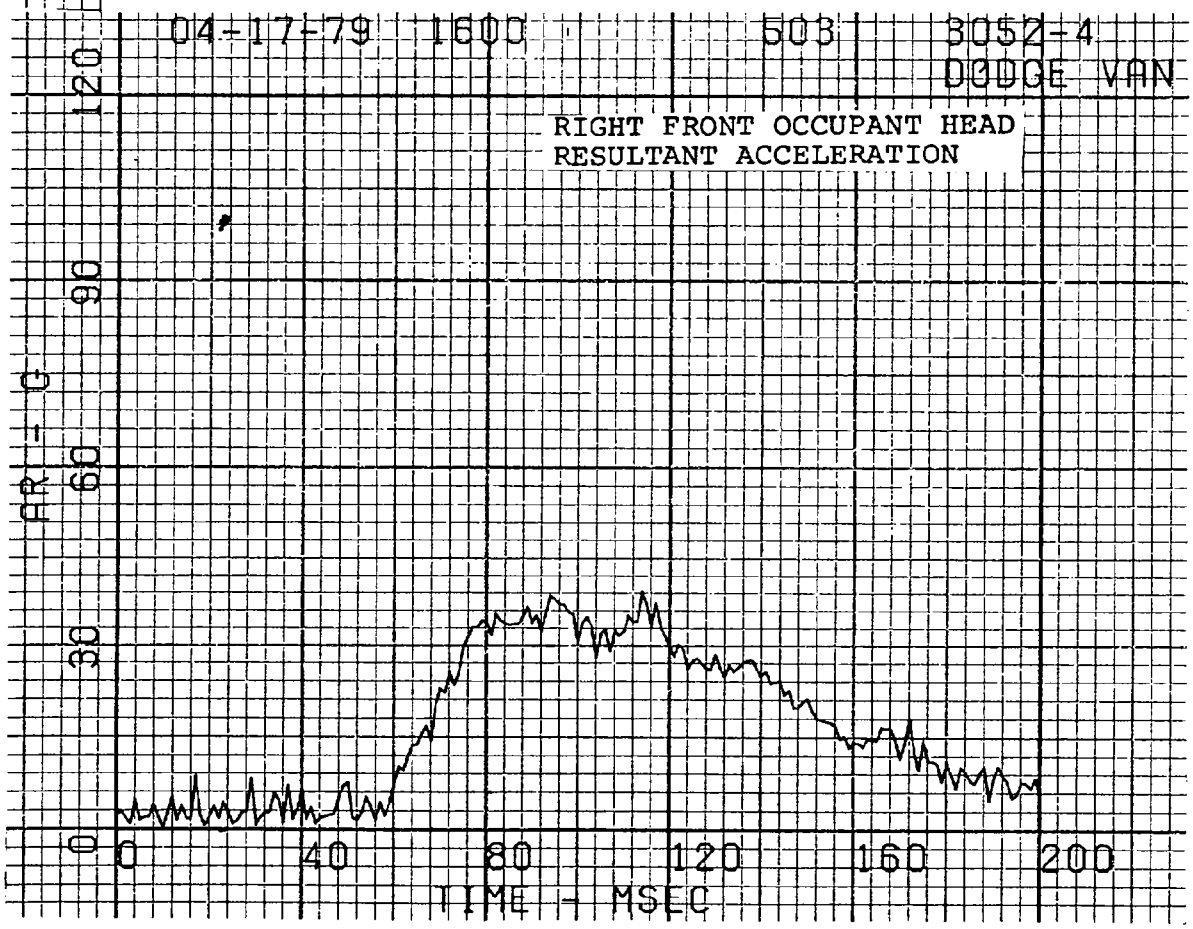

04-17-79 315 1101 3052-4
DODGE VAN
LEFT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

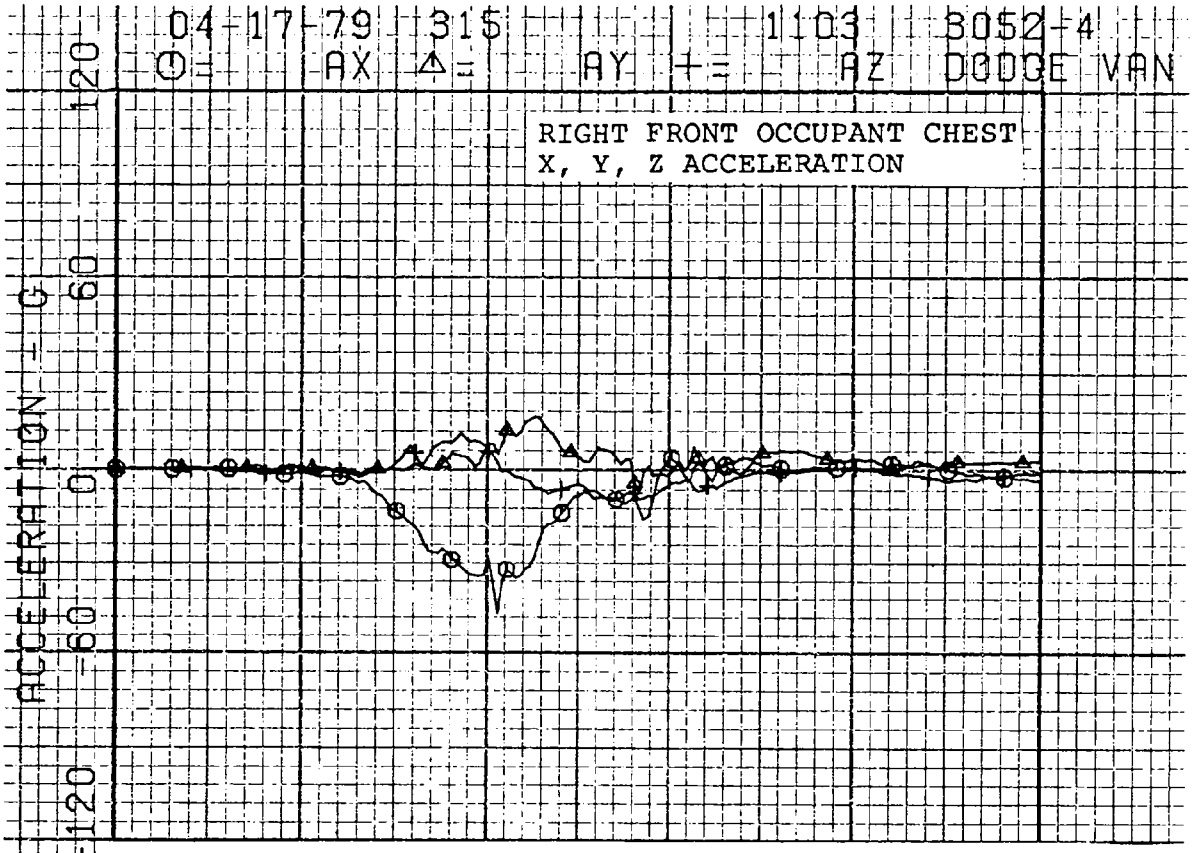

04-17-79 1000 2011 3052-4
DODGE VAN
LEFT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
-0
-100
-200
-300

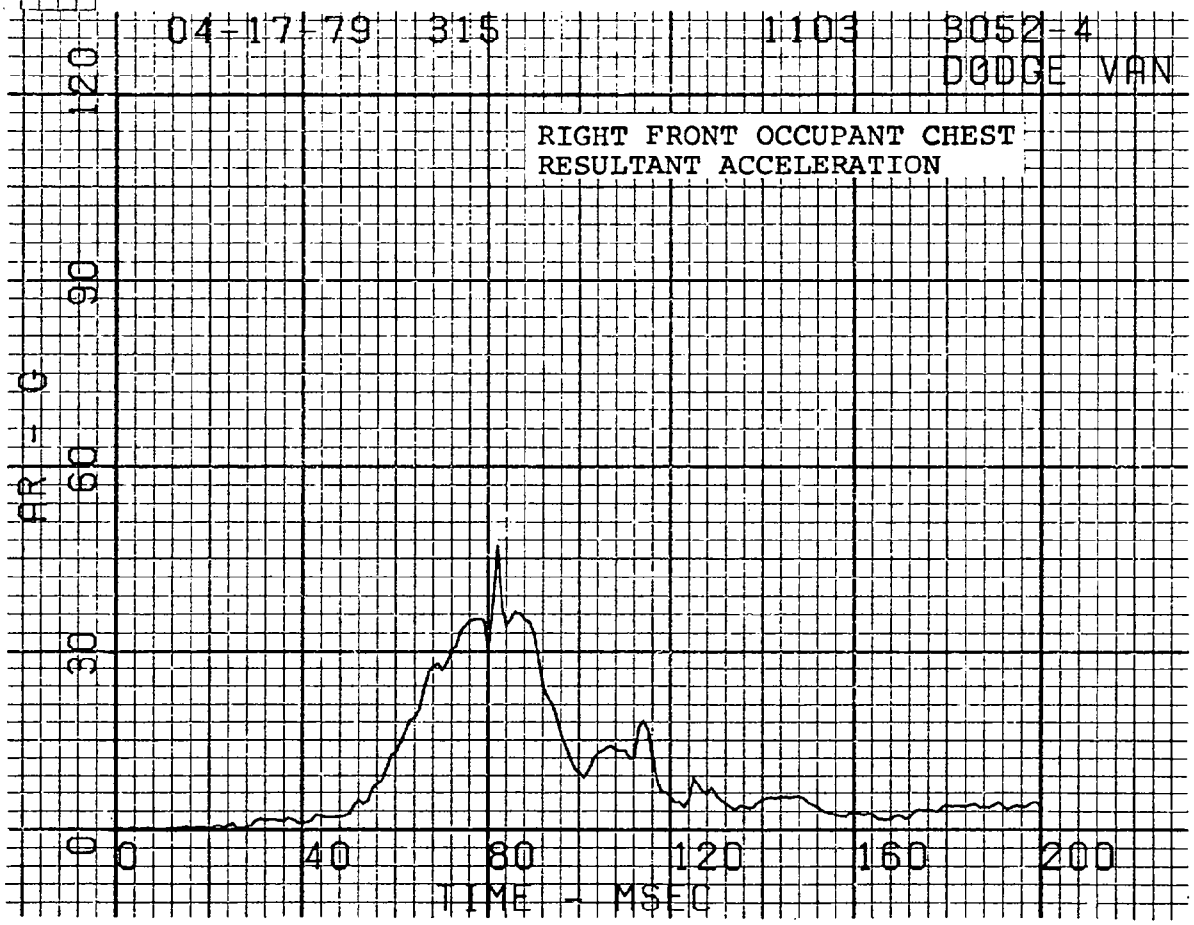

04-17-79 1000 2012 3052-4
DODGE VAN
LEFT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
-0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

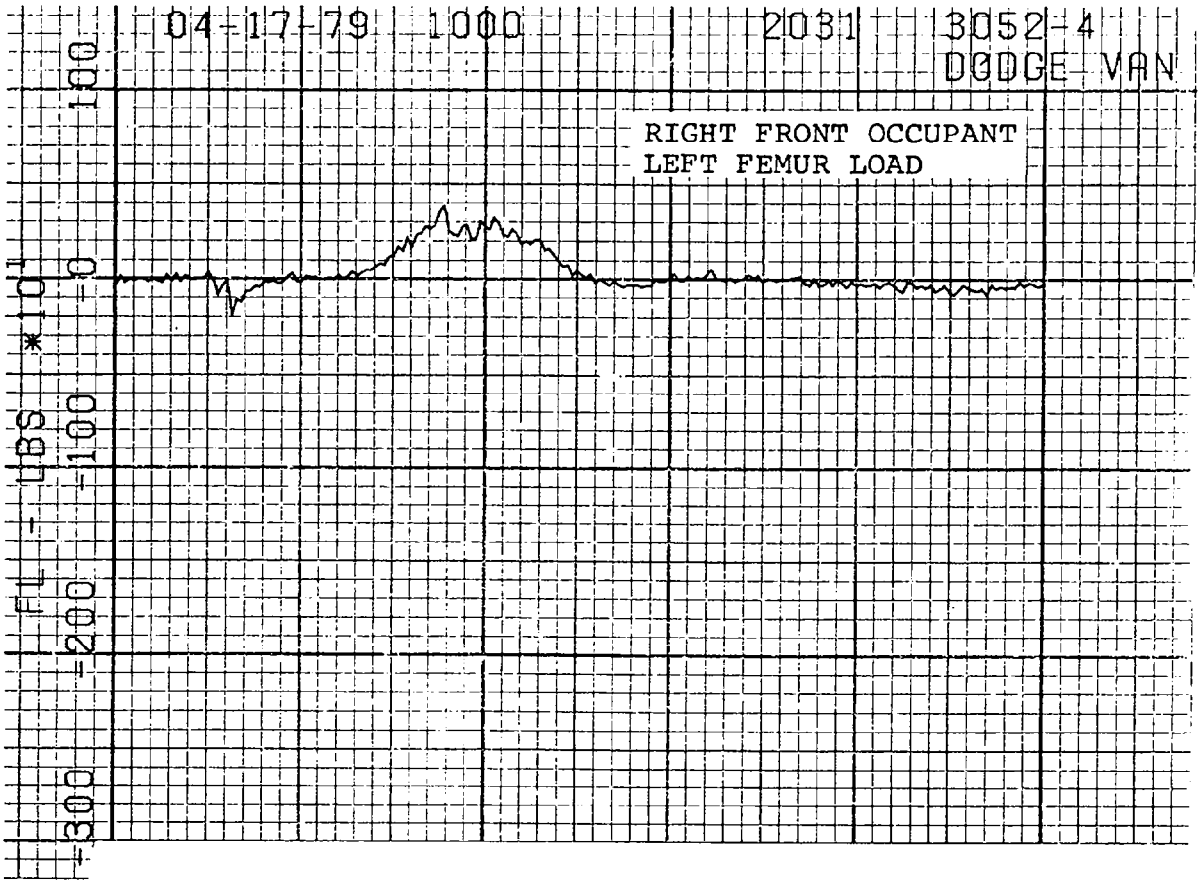

DATE FILTER LOCATION TEST NO
04-17-79 315/100 4101 3052-4
O=LAPBLT L △=LAPBLT R +=SH BLT DODGE VAN
LEFT FRONT OCCUPANT
SEAT BELT LOADS
LBS *10¹
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC

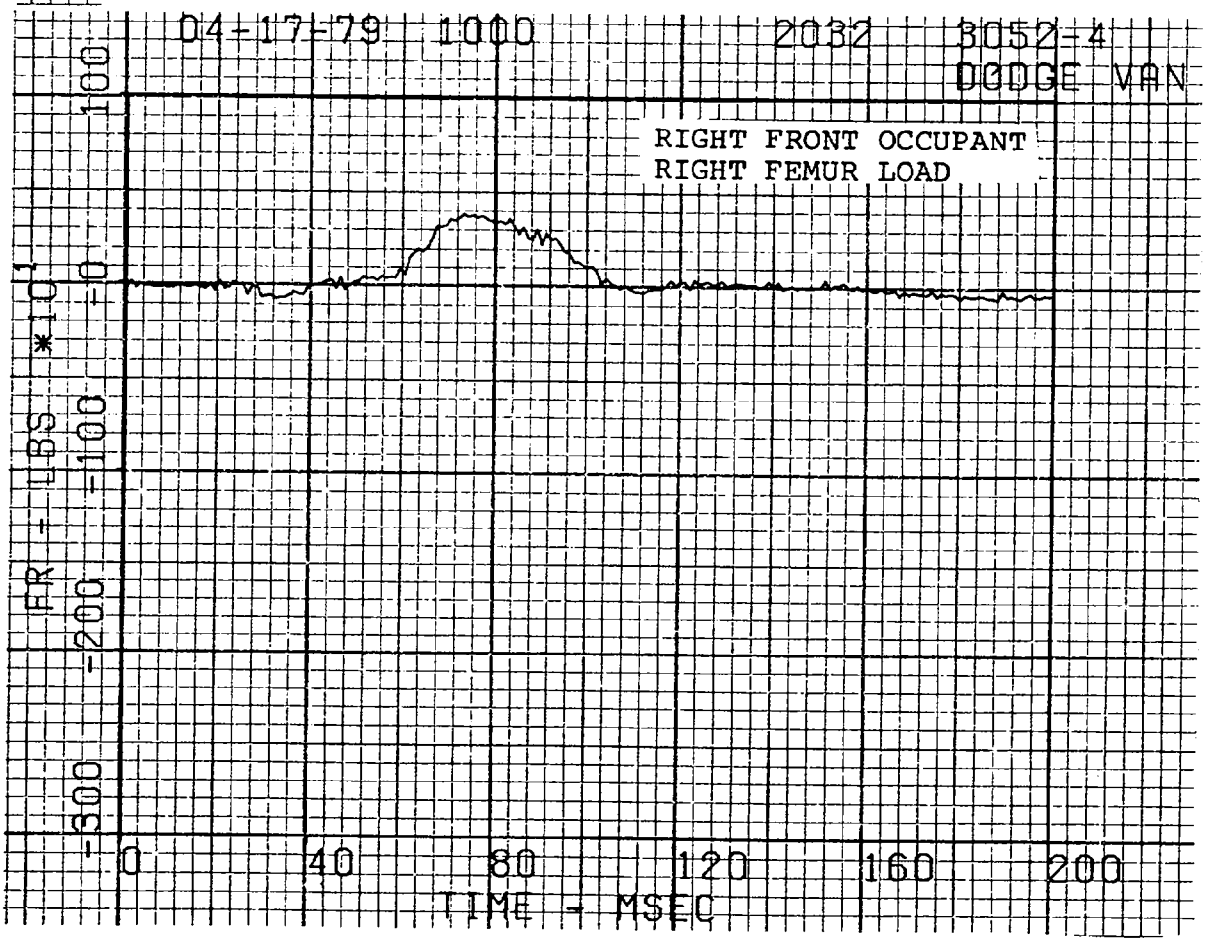

04-17-79 1600 503 3052-4
AX AY AZ DODGE VAN
RIGHT FRONT OCCUPANT HEAD
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

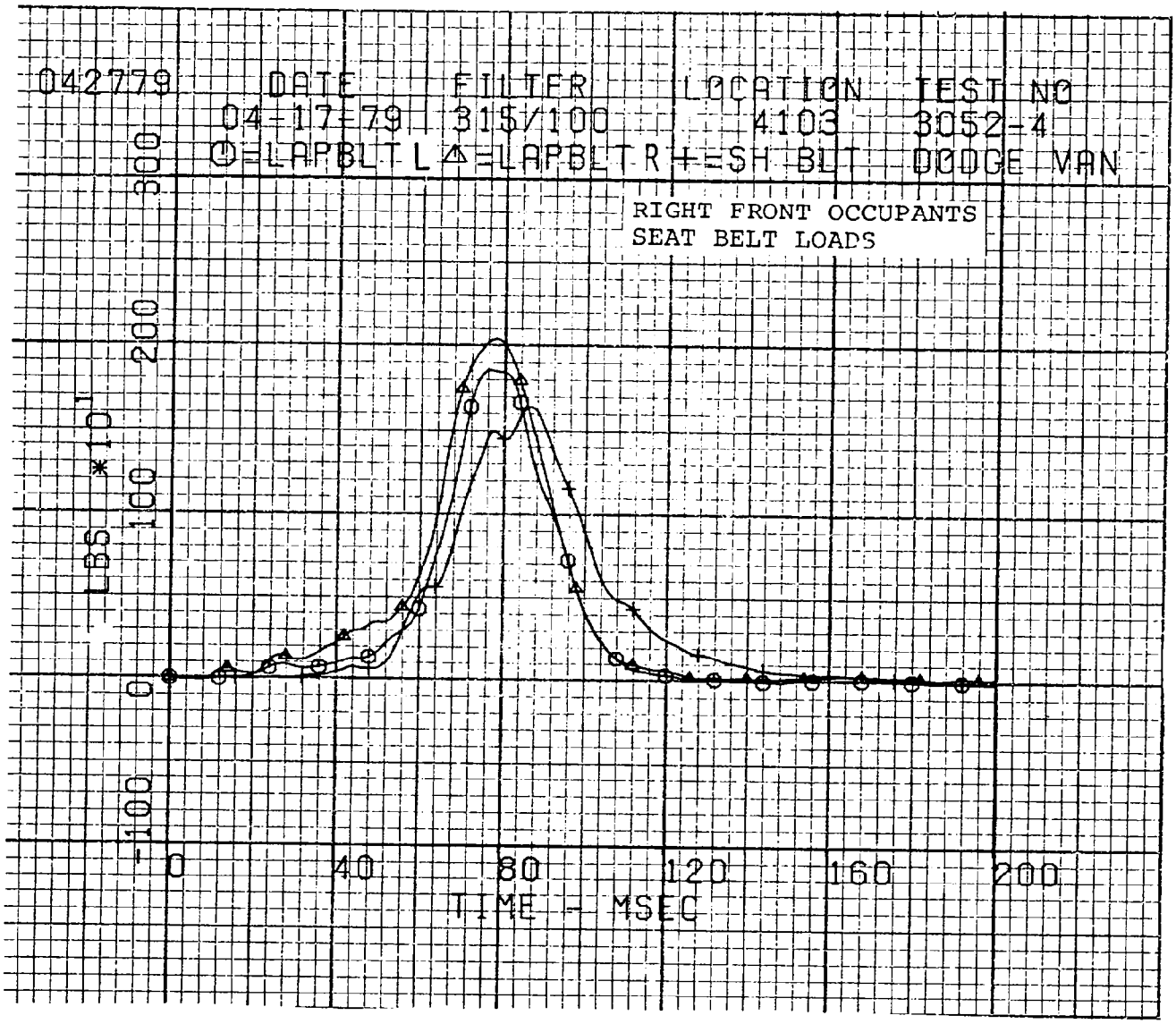

04-17-79 1600 503 3052-4
DODGE VAN
RIGHT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

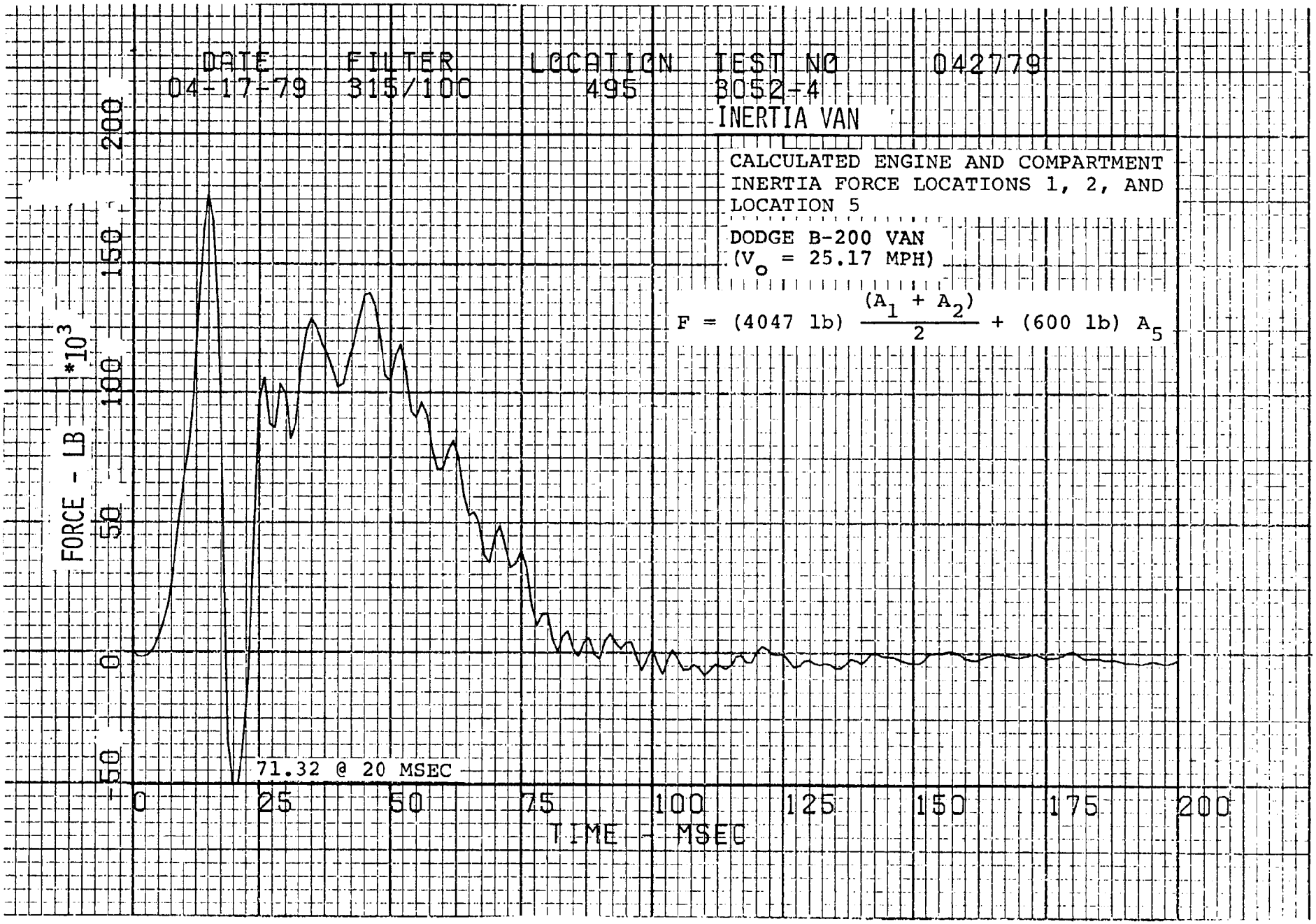

04-17-79 315 1103 3052-4
O= AX Δ= AY += AZ DODGE VAN
RIGHT FRONT OCCUPANT CHEST
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

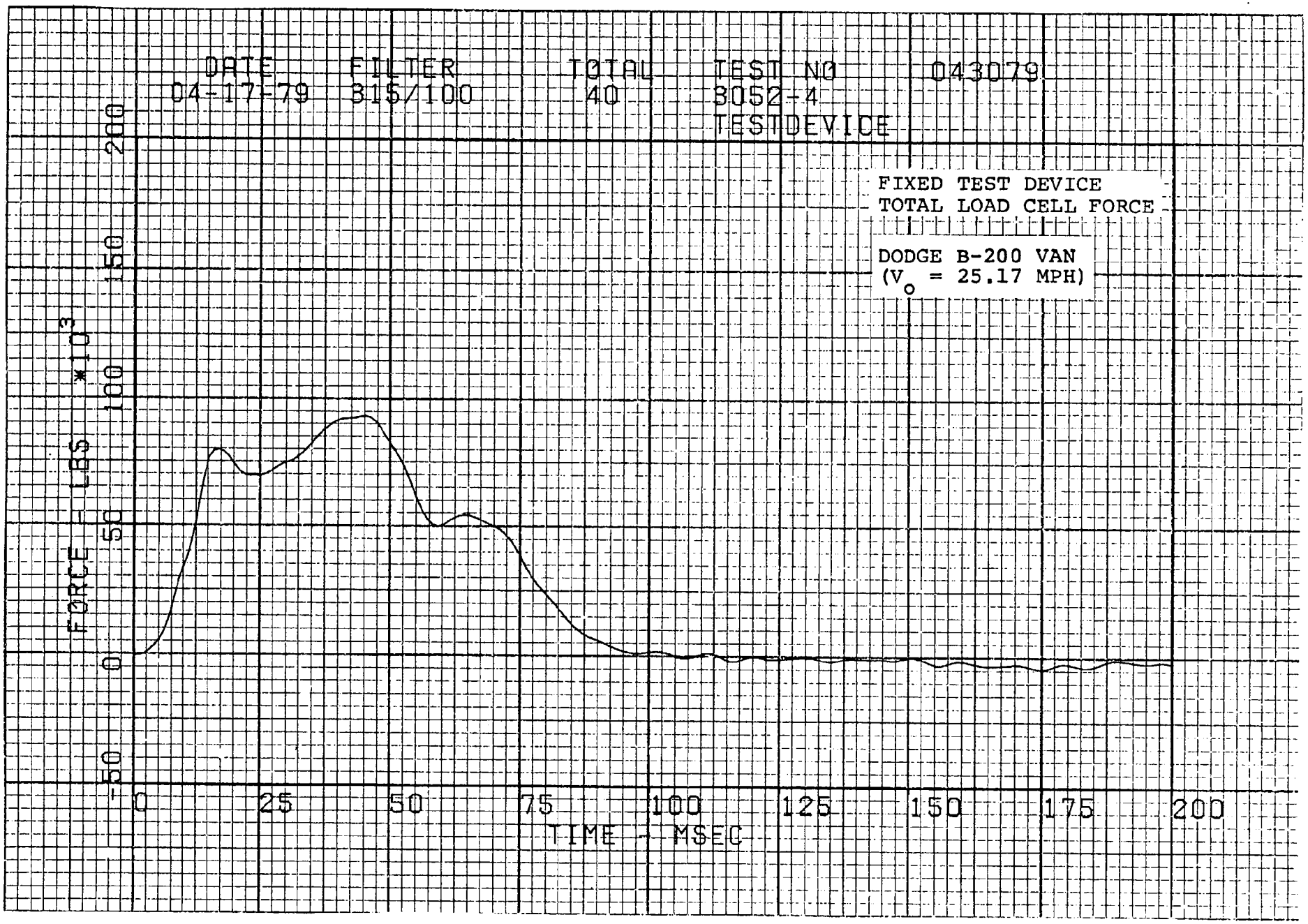

04-17-79 315 1103 3052-4
DODGE VAN
RIGHT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

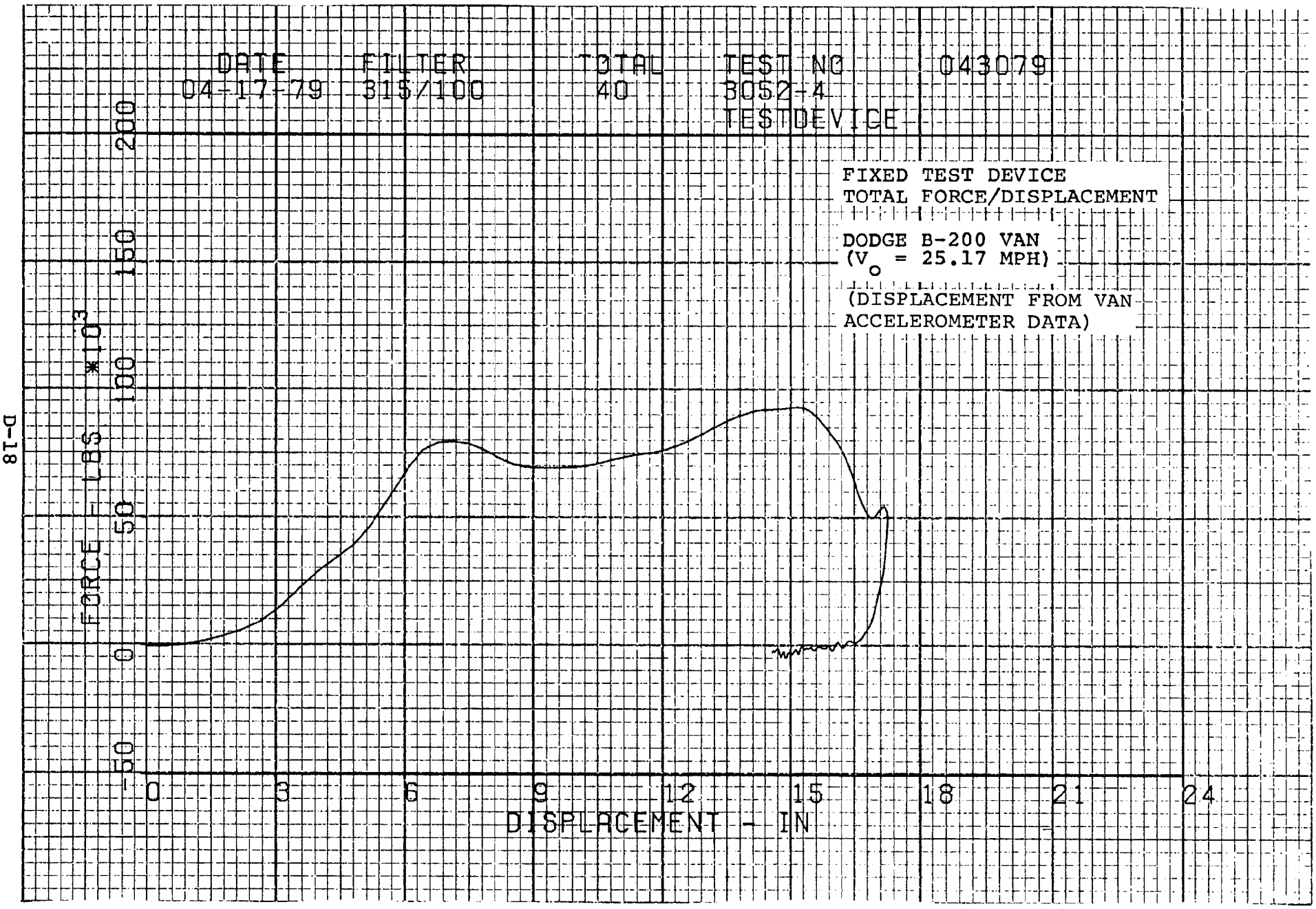

04-17-79 1000 2031 3052-4
DODGE VAN
RIGHT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
0
-100
-200
-300

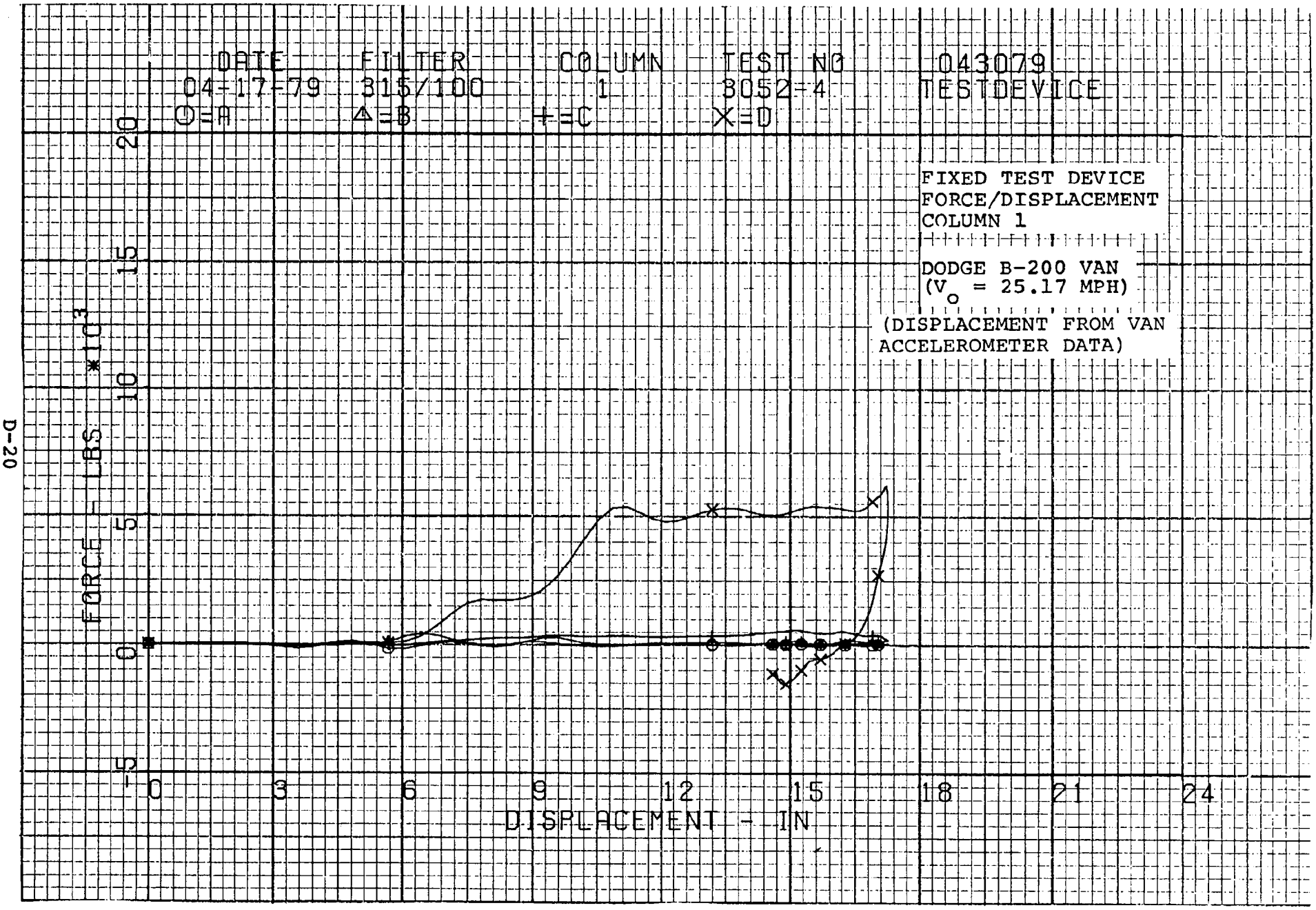

04-17-79 1000 2032 3052-4
DODGE VAN
RIGHT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

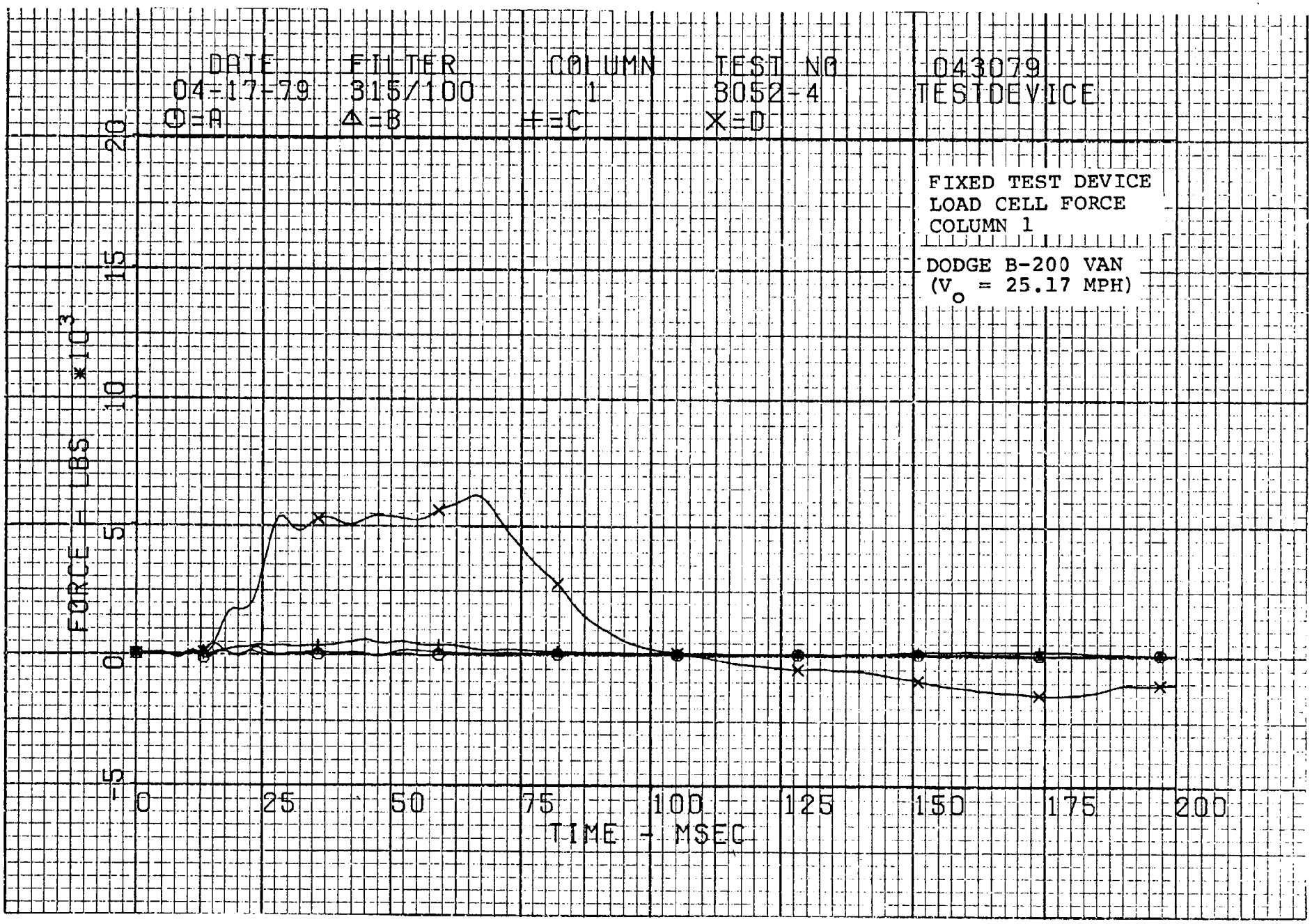

042779
DATE
FILTER
LOCATION
TEST NO
04-17-79
315/100
4103
3052-4
O=LAPBLT L △=LAPBLT R +=SH BLT
DODGE VAN
RIGHT FRONT OCCUPANTS
SEAT BELT LOADS
LBS * 10
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC

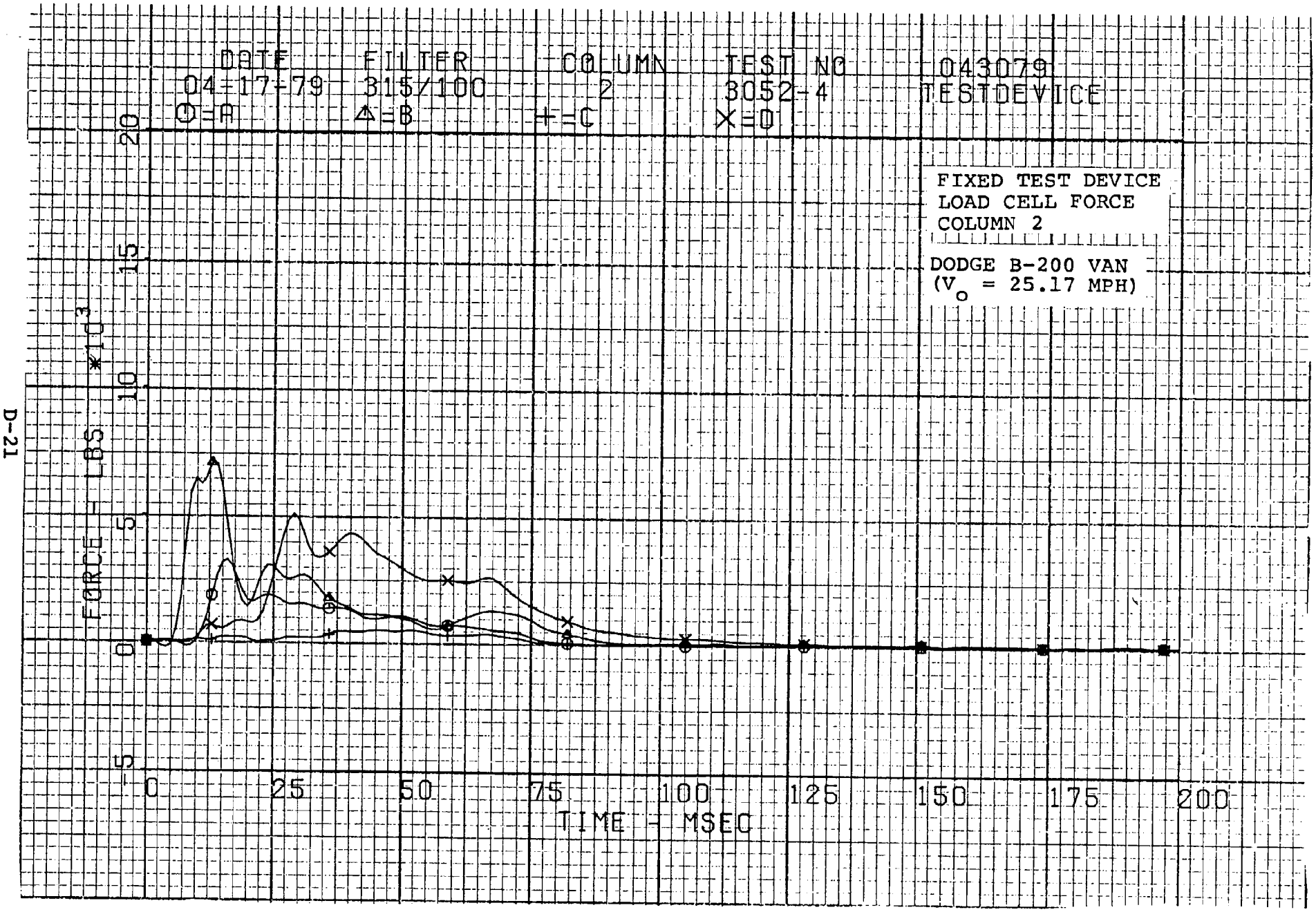

DATE
04-17-79
FILTER
315/100
LOCATION
495
TEST NO
042779
B052-4
INERTIA VAN
CALCULATED ENGINE AND COMPARTMENT INERTIA FORCE LOCATIONS 1, 2, AND LOCATION 5
DODGE B-200 VAN
(V_o = 25.17 MPH)
$F = (4047\ lb)\ \frac{(A_1 + A_2)}{2} + (600\ lb)\ A_5$
FORCE - LB *10^3
200
150
100
50
0
-50
71.32 @ 20 MSEC
0
25
50
75
100
125
150
175
200
TIME - MSEC

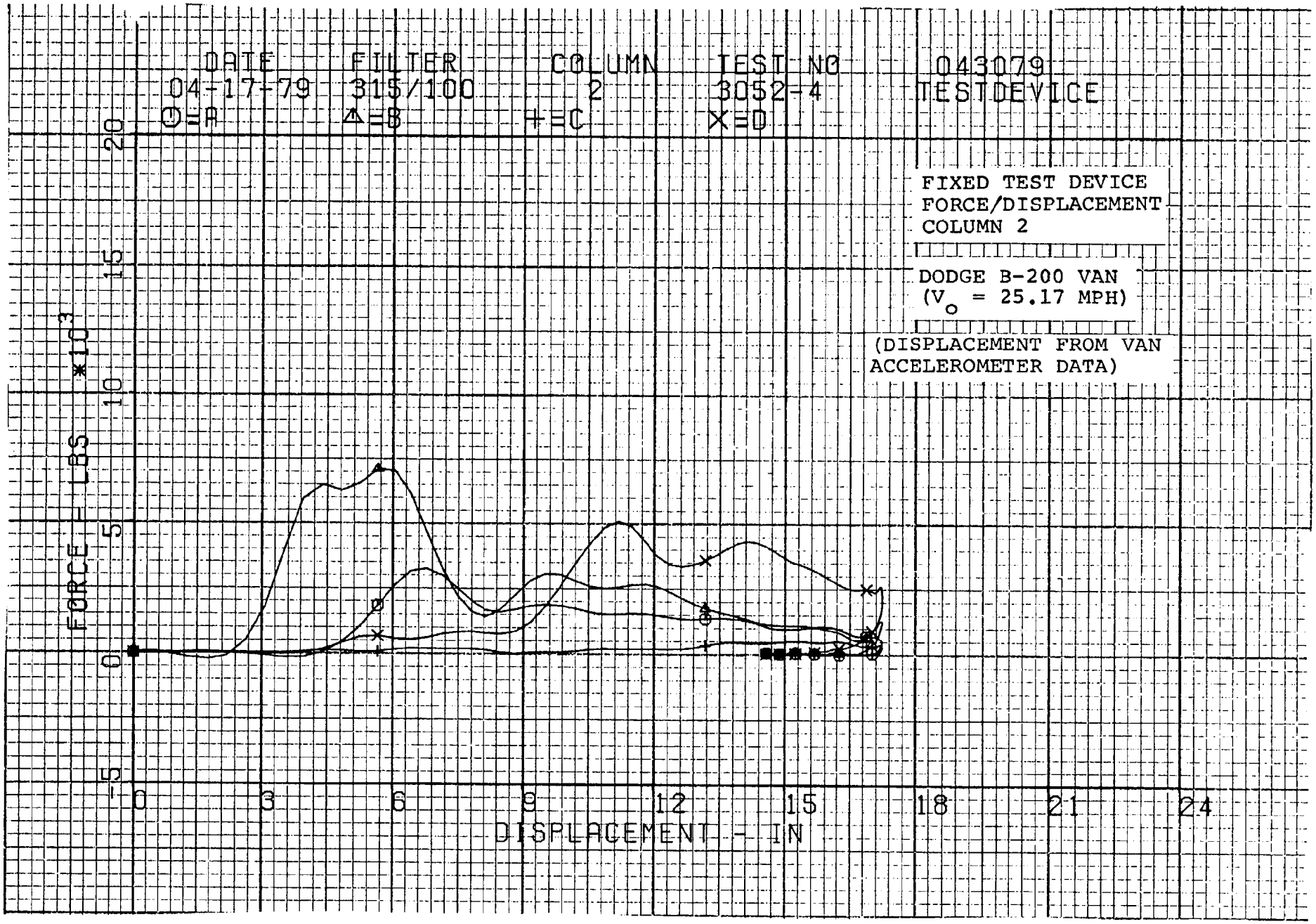

DATE
04-17-79
FILTER
315/100
TOTAL
40
TEST NO
3052-4
TESTDEVICE
043079
FIXED TEST DEVICE
TOTAL LOAD CELL FORCE
DODGE B-200 VAN
(V$_o$ = 25.17 MPH)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME - MSEC

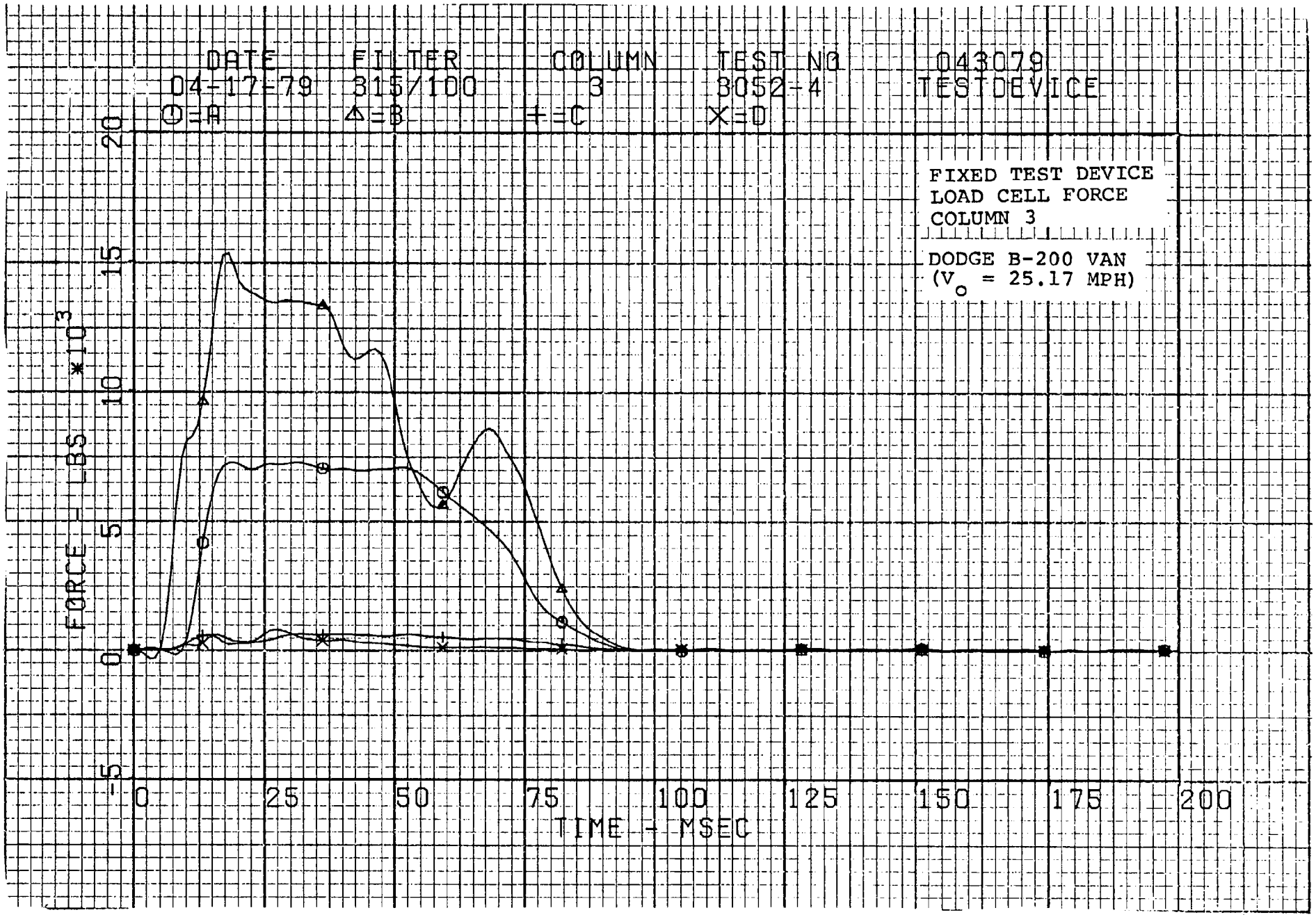

DATE
04-17-79
FILTER
315/100
TOTAL
40
TEST NO
3052-4
TESTDEVICE
043079
FIXED TEST DEVICE
TOTAL FORCE/DISPLACEMENT
DODGE B-200 VAN
(V o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

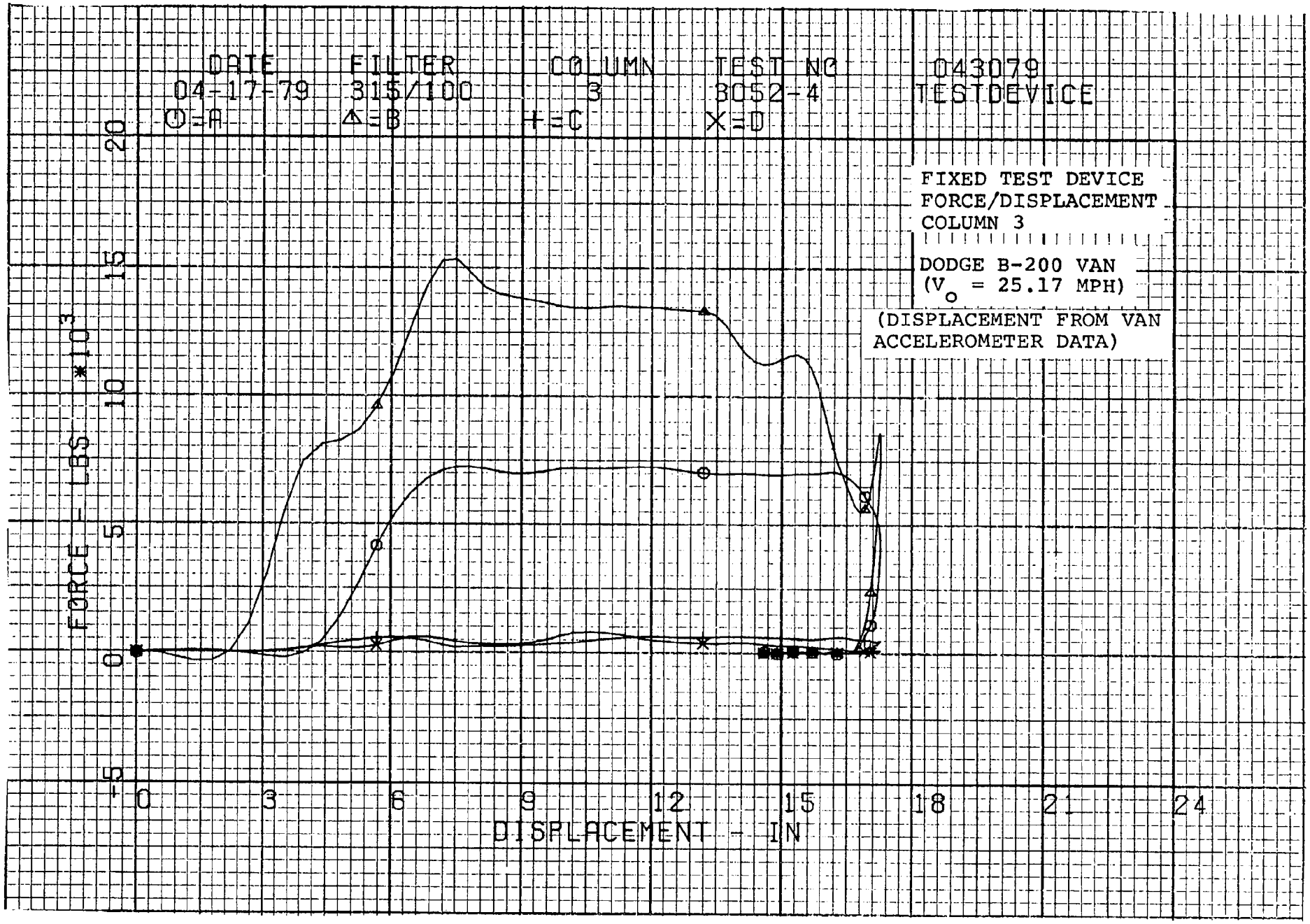

DATE
04-17-79
O=A
FILTER
315/100
Δ=B
COLUMN
1
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 1
DODGE B-200 VAN
(V o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

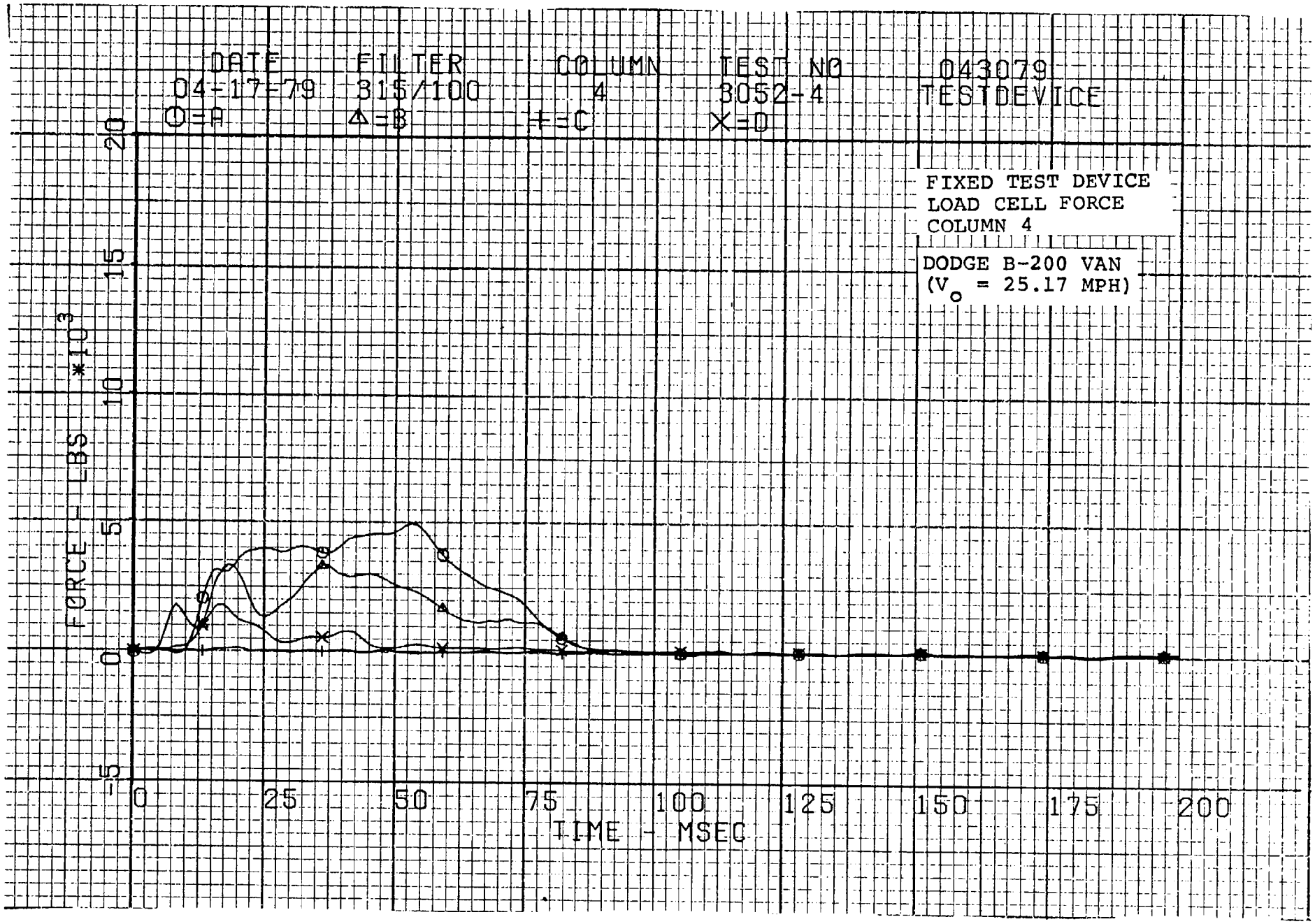

DATE
04-17-79
O=A
FILTER
315/100
Δ=B
COLUMN
1
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 1
DODGE B-200 VAN
(V$_o$ = 25.17 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

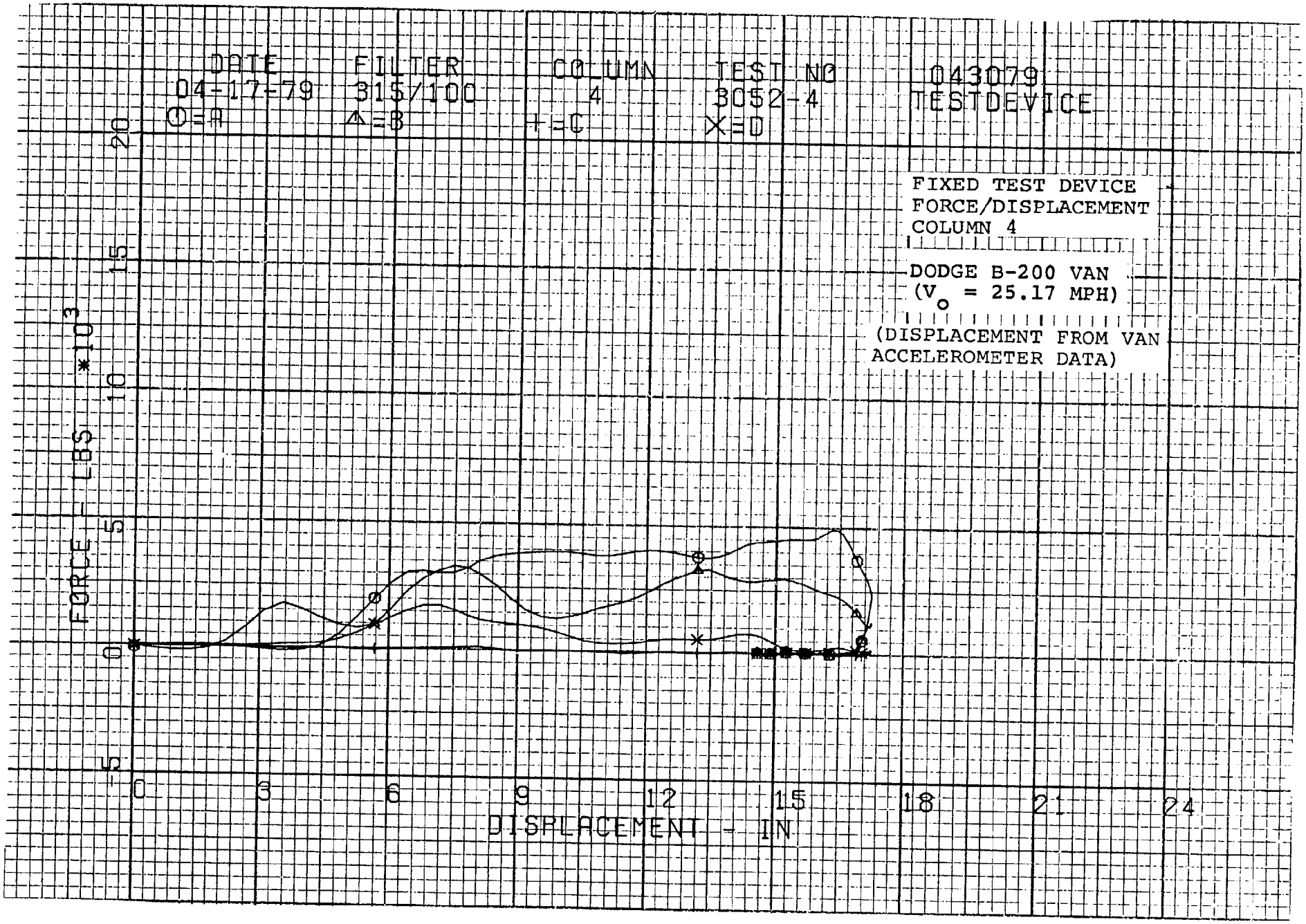

DATE
04-17-79
O=A
FILTER
315/100
Δ=B
COLUMN
2
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 2
DODGE B-200 VAN
(V_o = 25.17 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

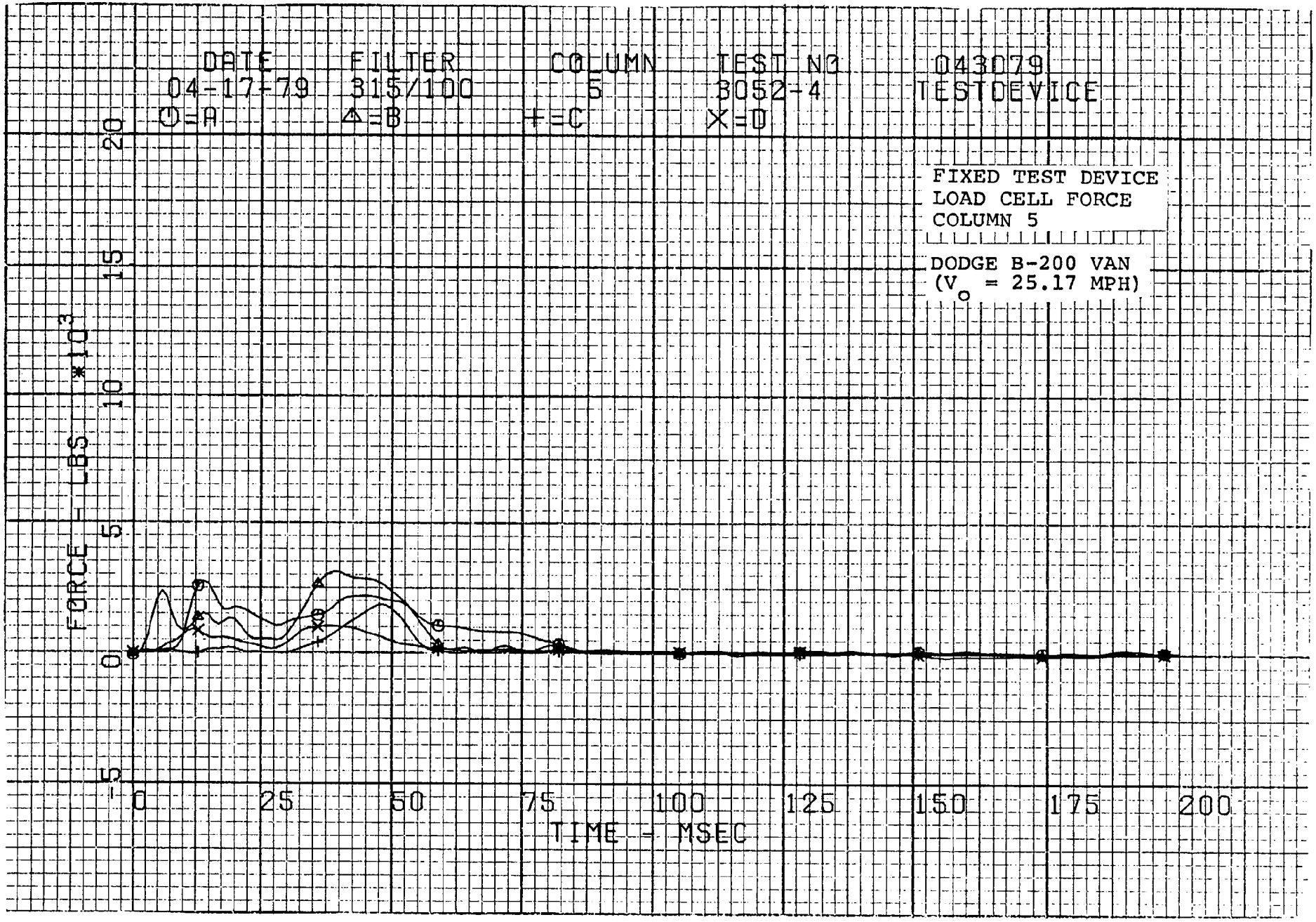

DATE
04-17-79
FILTER
315/100
COLUMN
2
TEST NO
3052-4
043079
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 2
DODGE B-200 VAN
(V_o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

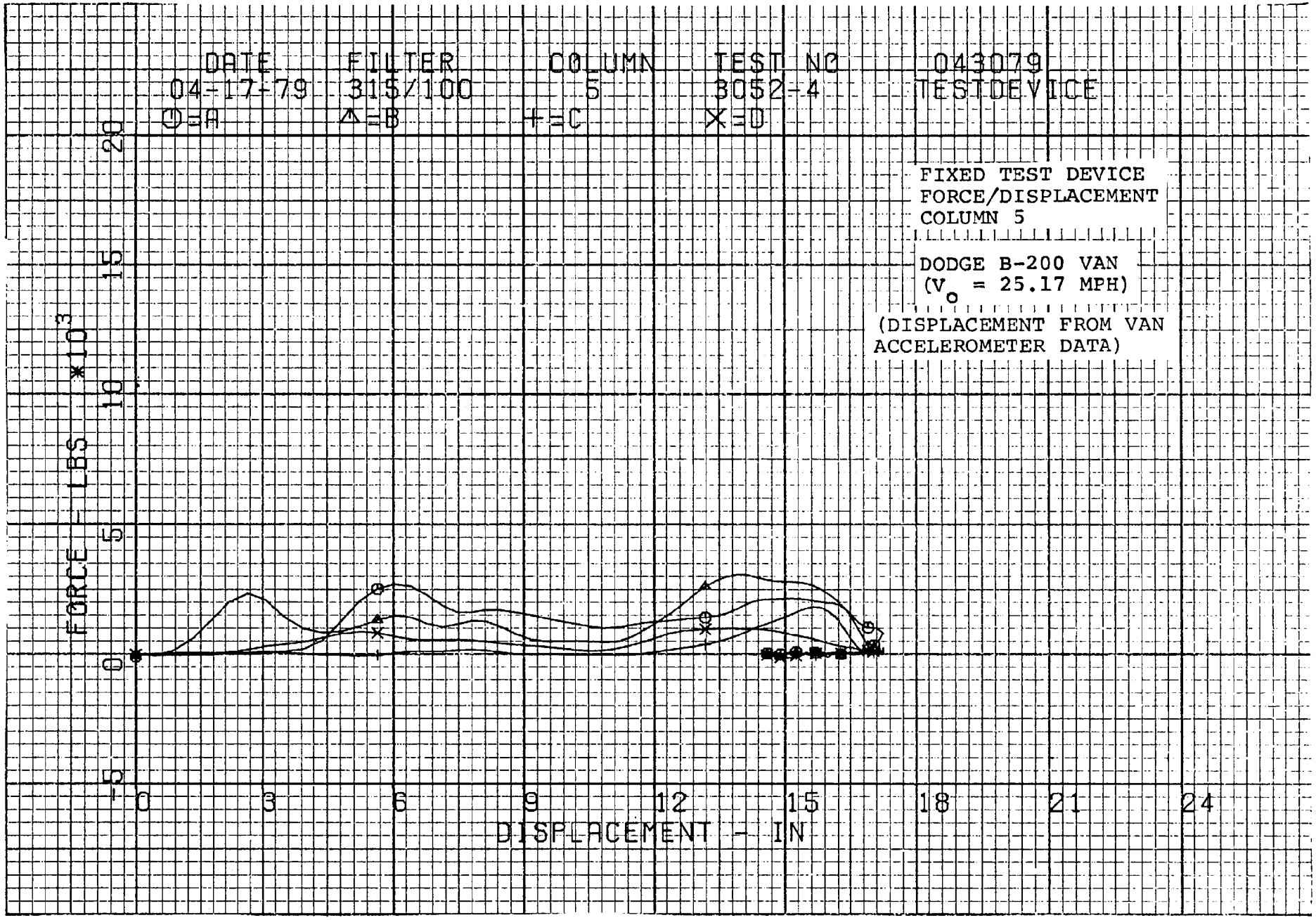

DATE
04-17-79
FILTER
315/100
COLUMN
3
TEST NO
3052-4
043079
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 3
DODGE B-200 VAN
(V$_o$ = 25.17 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

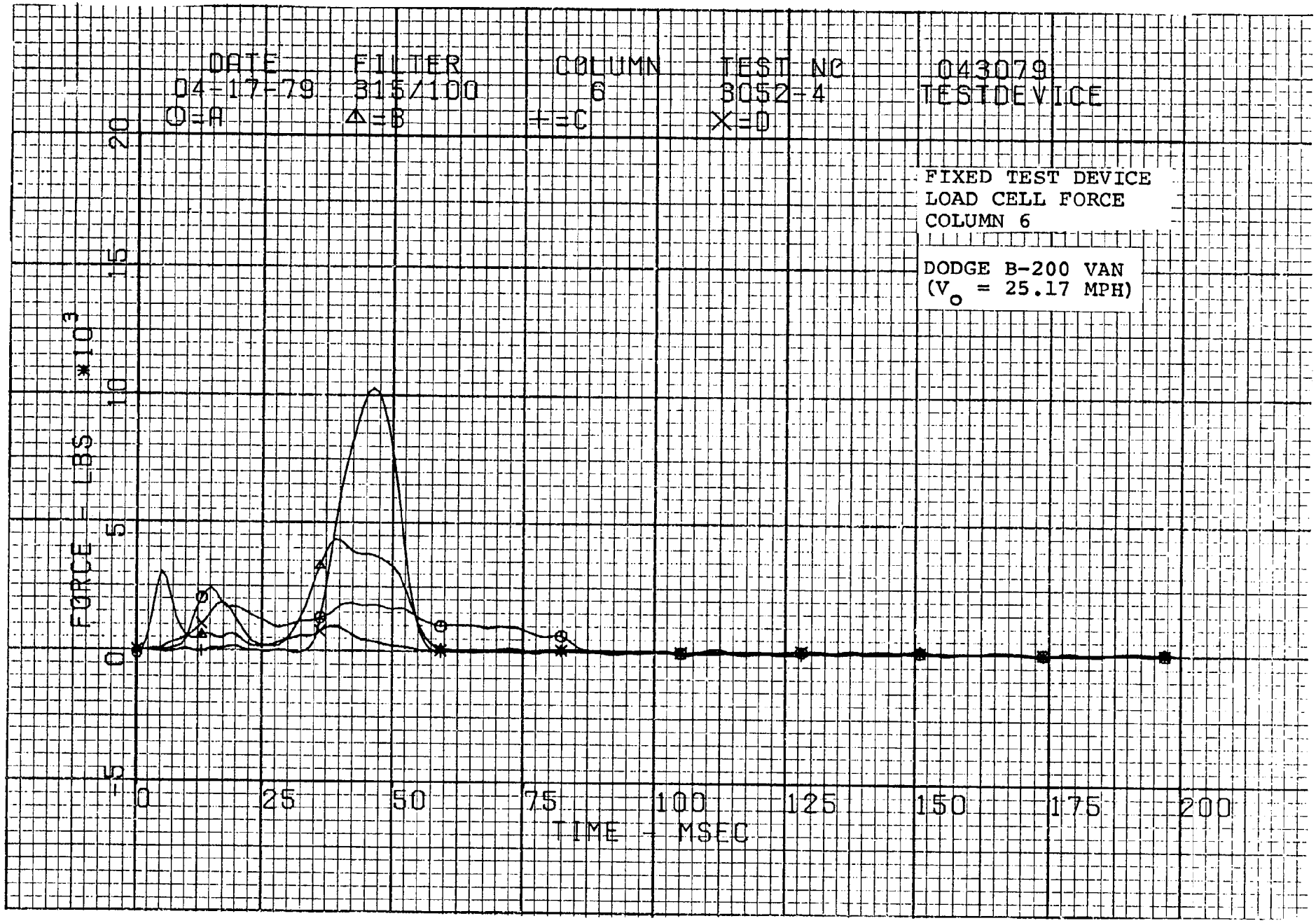

DATE
04-17-79
O=A
FILTER
315/100
△=B
COLUMN
3
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 3
DODGE B-200 VAN
(V_o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

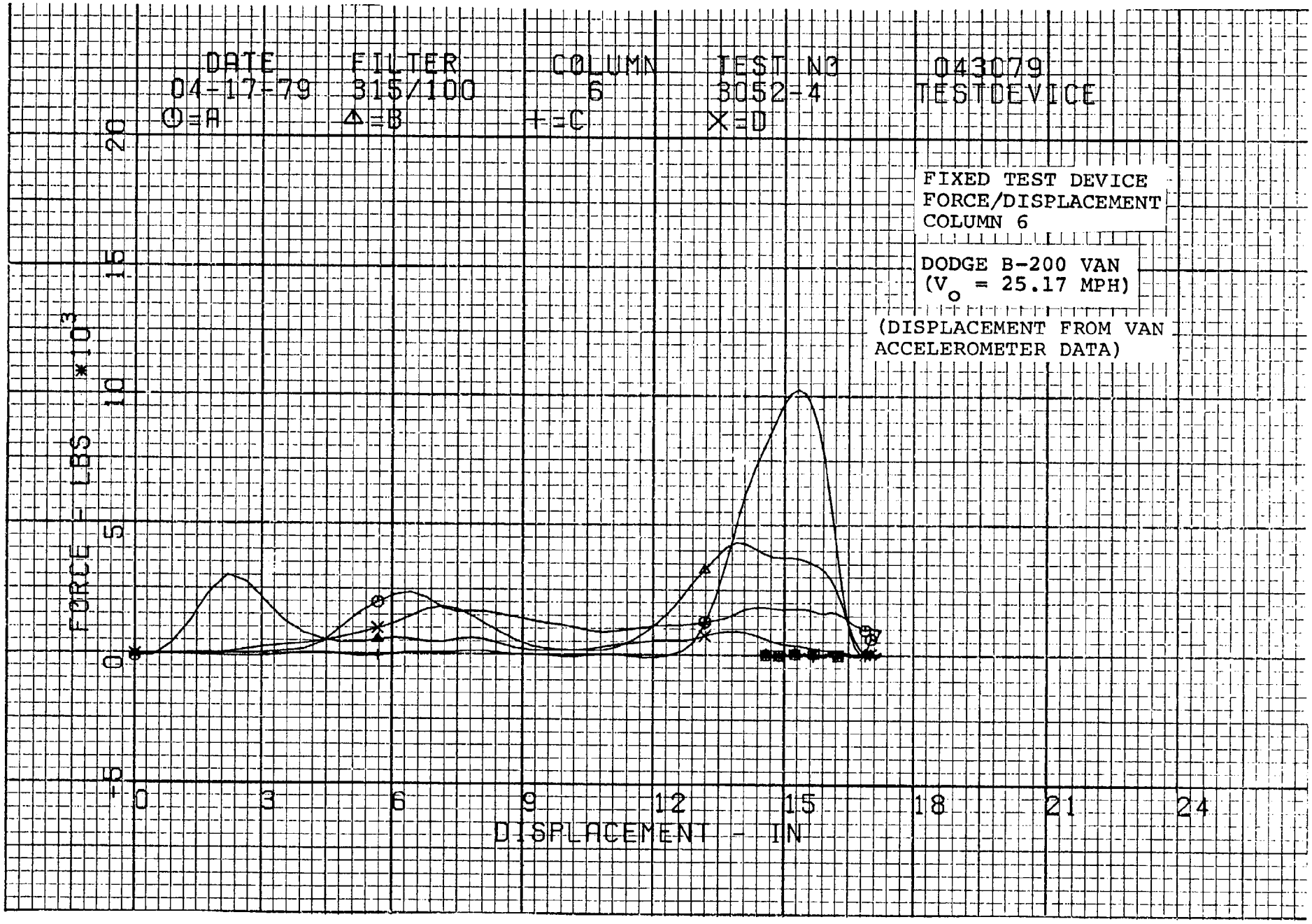

DATE
04-17-79
O=A
FILTER
315/100
Δ=B
COLUMN
4
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 4
DODGE B-200 VAN
(V o = 25.17 MPH)
FORCE - LBS *10 3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

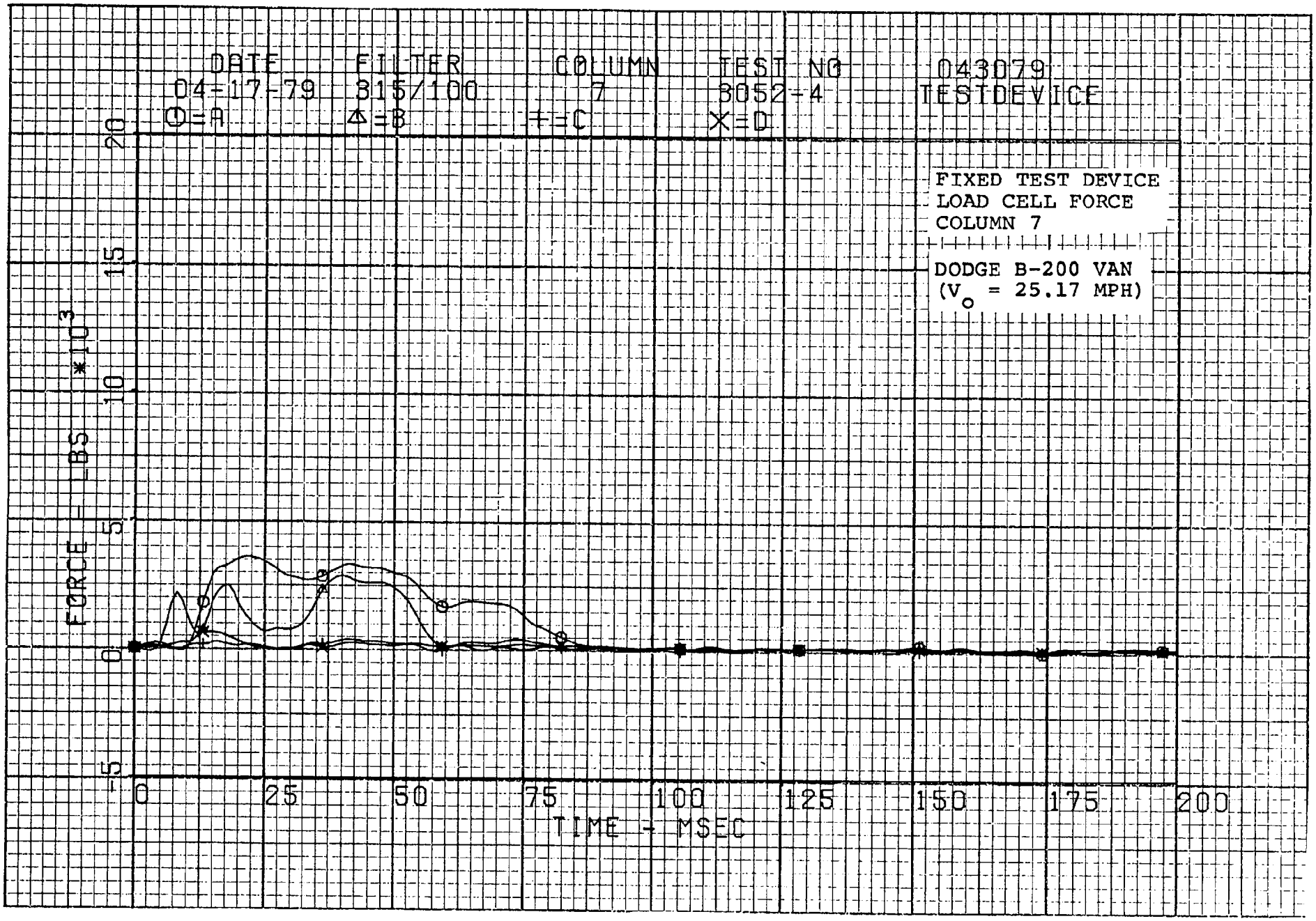

DATE
04-17-79
O=A
FILTER
315/100
△=B
COLUMN
4
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 4
DODGE B-200 VAN
(V_o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

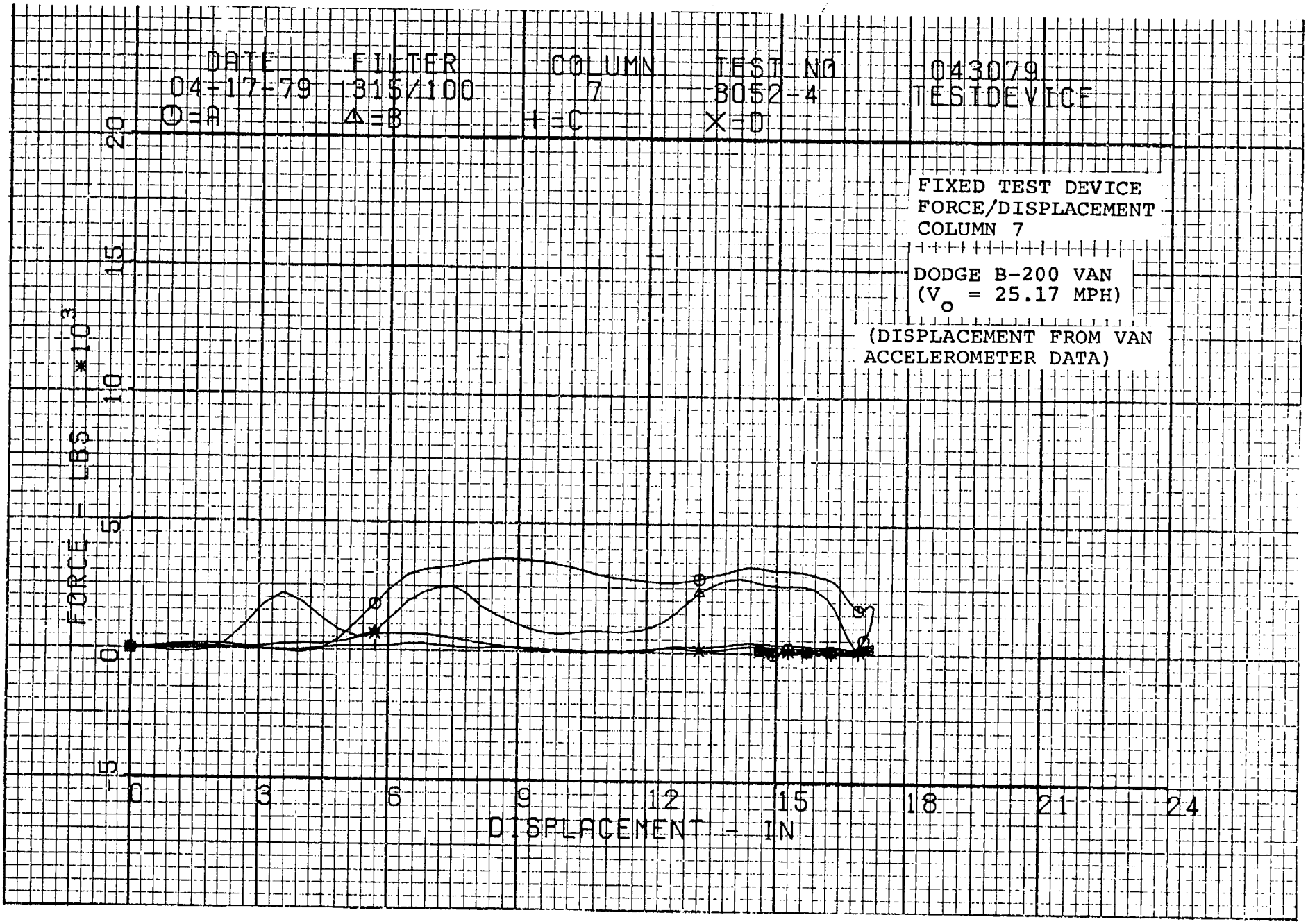

DATE
04-17-79
FILTER
315/100
COLUMN
5
TEST NO
3052-4
043079
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 5
DODGE B-200 VAN
(V$_o$ = 25.17 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

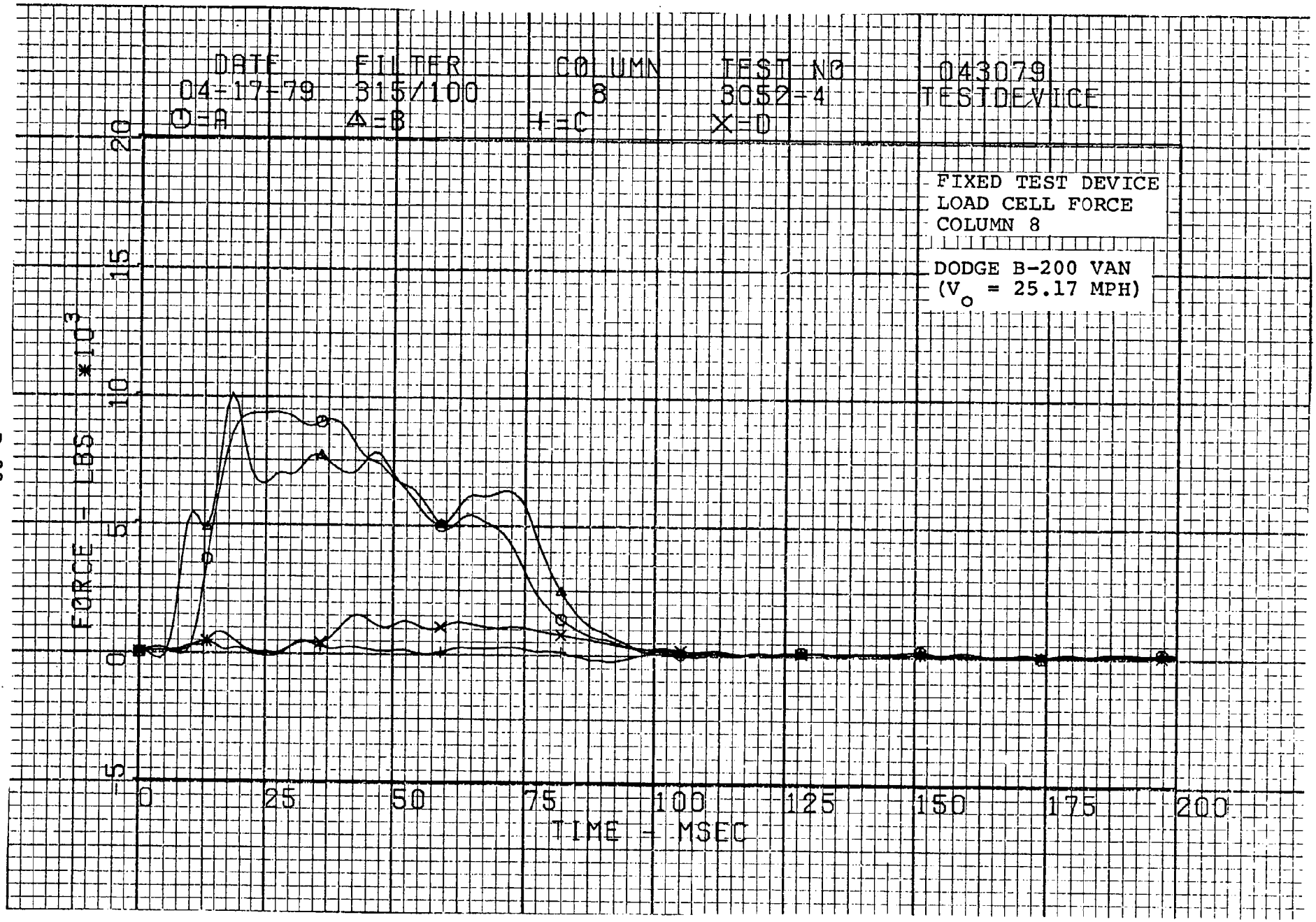

DATE
04-17-79
FILTER
315/100
COLUMN
5
TEST NO
3052-4
043079
TESTDEVICE
⊕=A
△=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 5
DODGE B-200 VAN
(V_o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

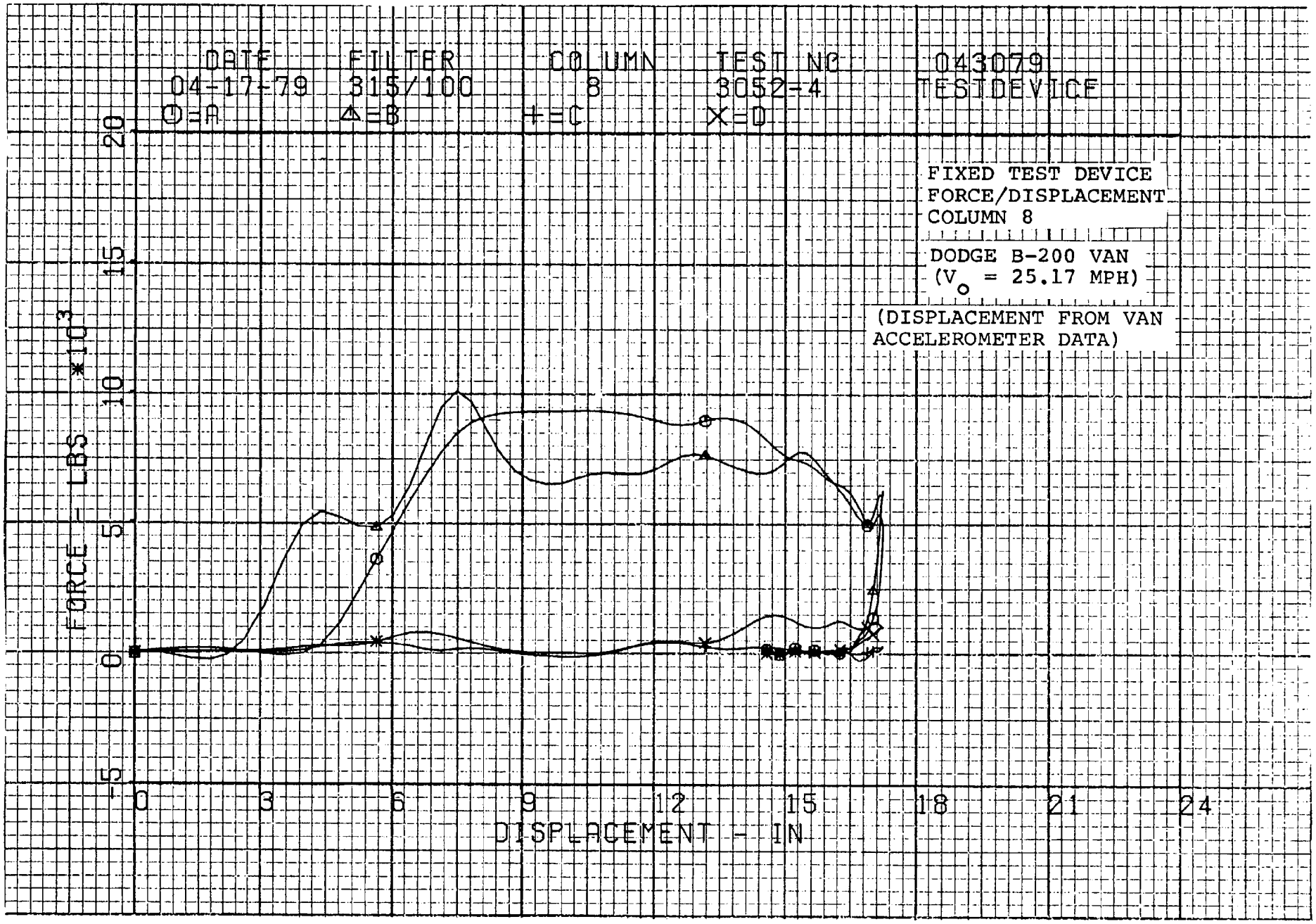

DATE
04-17-79
O=A
FILTER
315/100
△=B
COLUMN
6
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 6
DODGE B-200 VAN
(V_o = 25.17 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

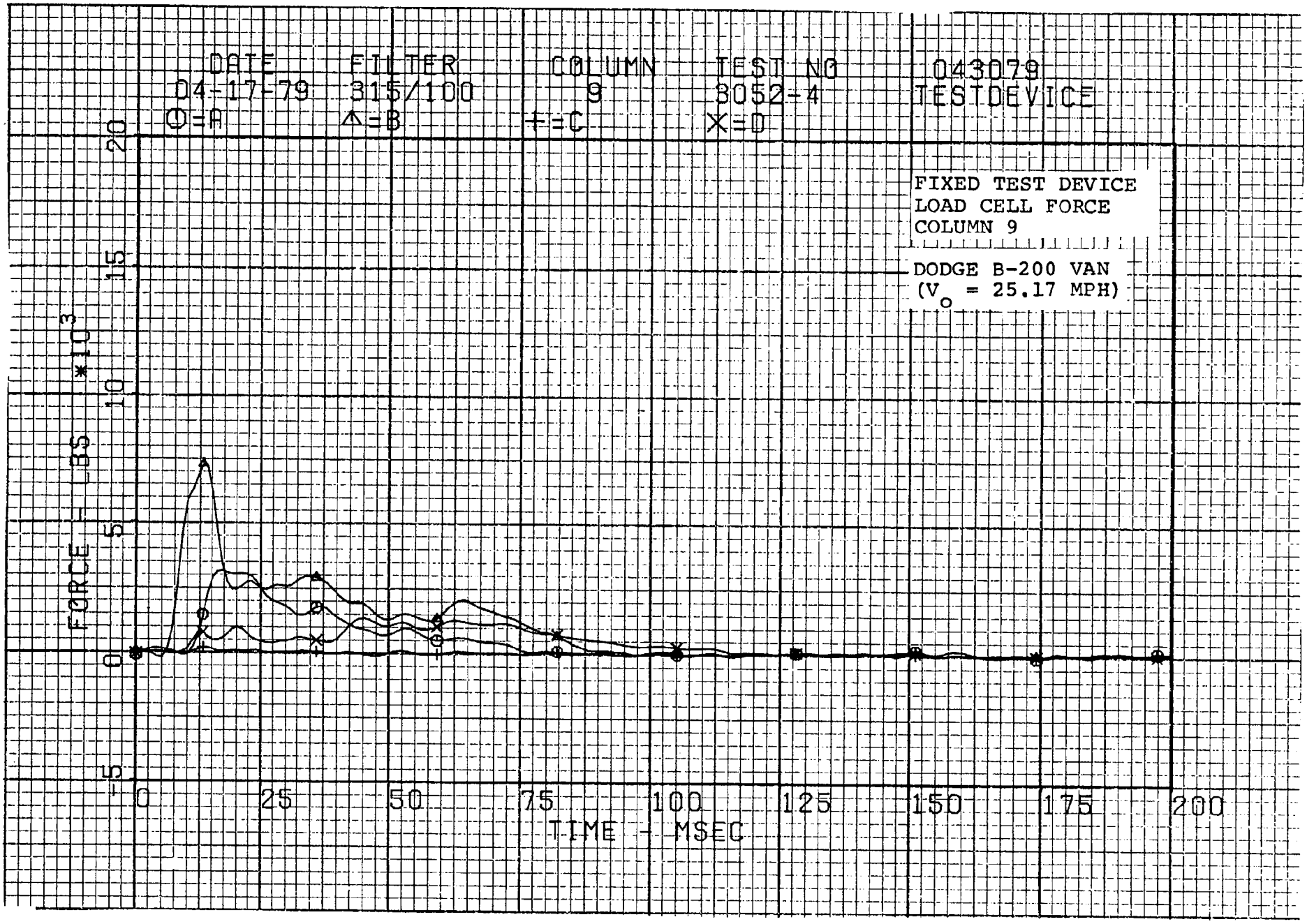

DATE
04-17-79
FILTER
315/100
COLUMN
6
TEST NO
3052-4
043079
TESTDEVICE
⊙=A
△=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 6
DODGE B-200 VAN
(V_o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

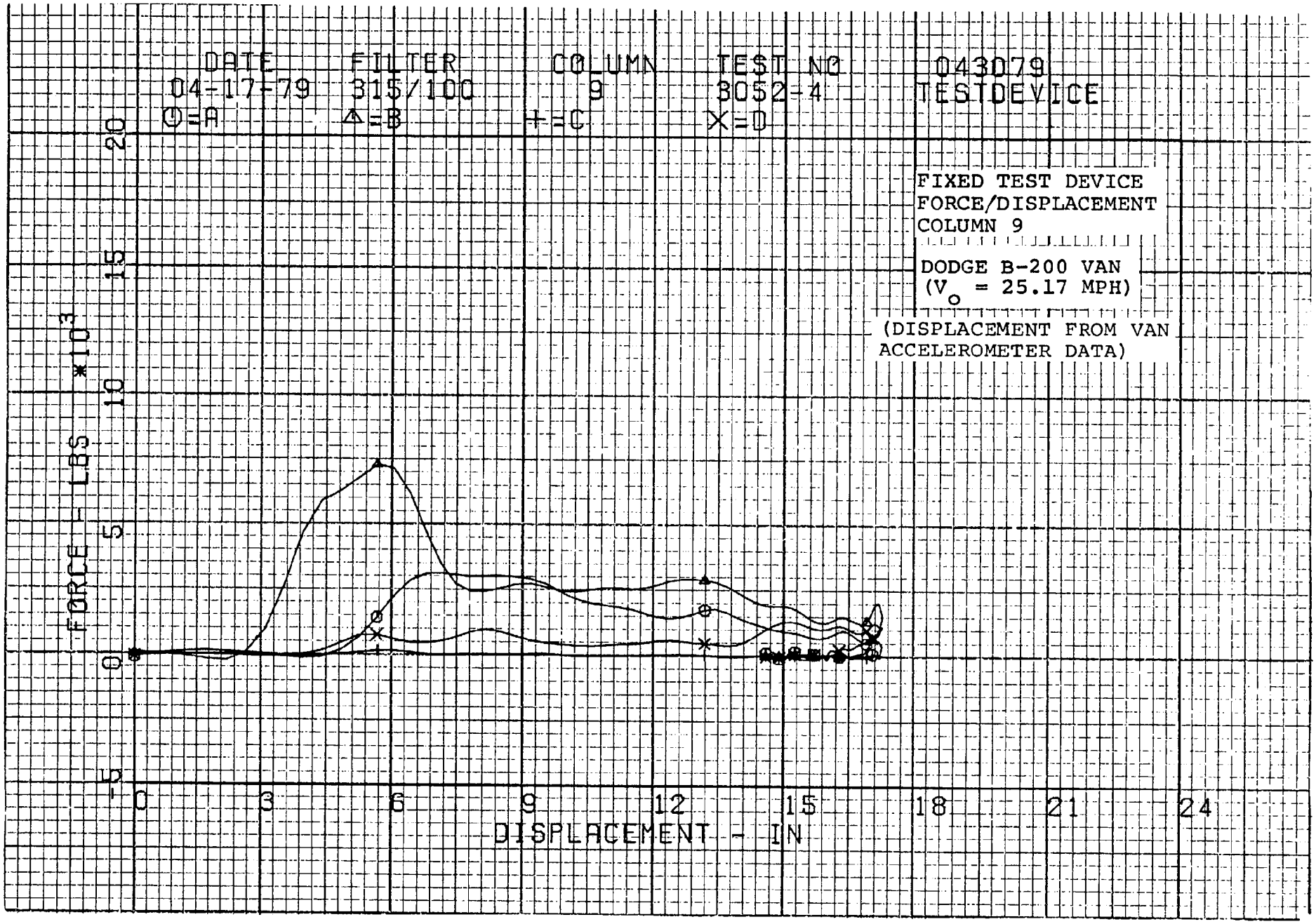

DATE
04-17-79
O=A
FILTER
315/100
Δ=B
COLUMN
7
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 7
DODGE B-200 VAN
(V o = 25.17 MPH)
FORCE - LBS *10 3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

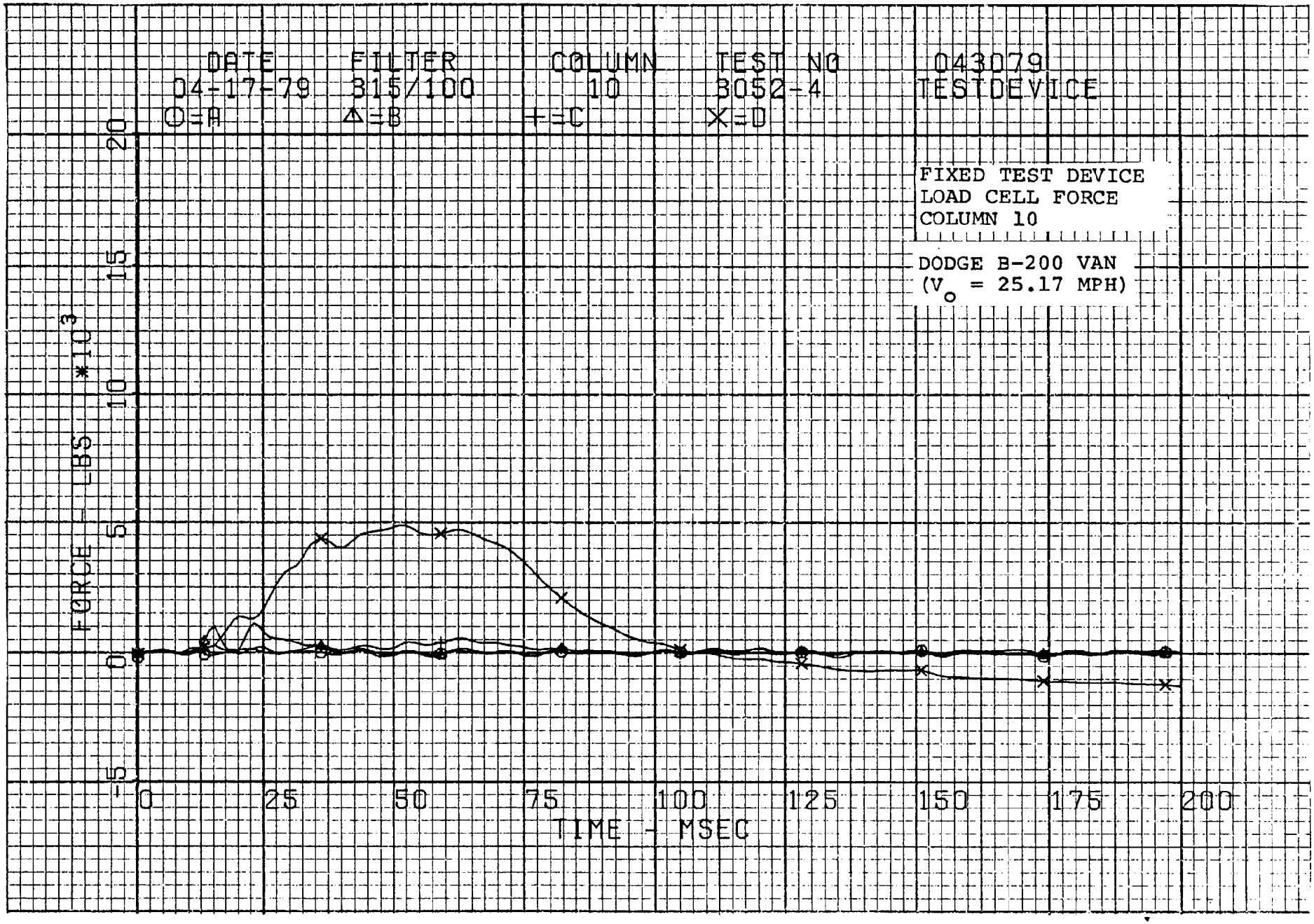

DATE
04-17-79
O=A
FILTER
315/100
△=B
COLUMN
7
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 7
DODGE B-200 VAN
(V_o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

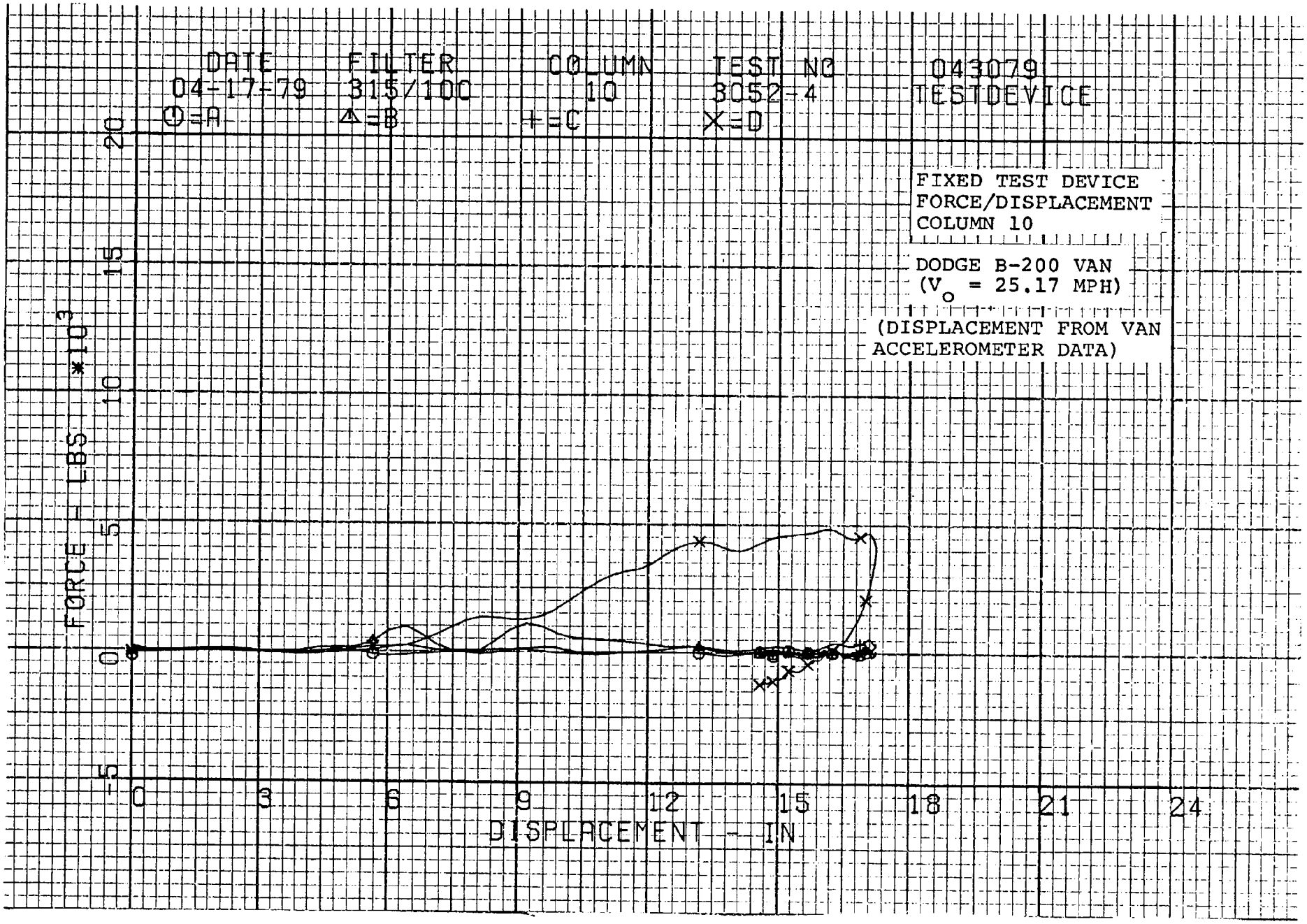

DATE
04-17-79
O=A
FILTER
315/100
Δ=B
COLUMN
8
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 8
DODGE B-200 VAN
(V$_o$ = 25.17 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

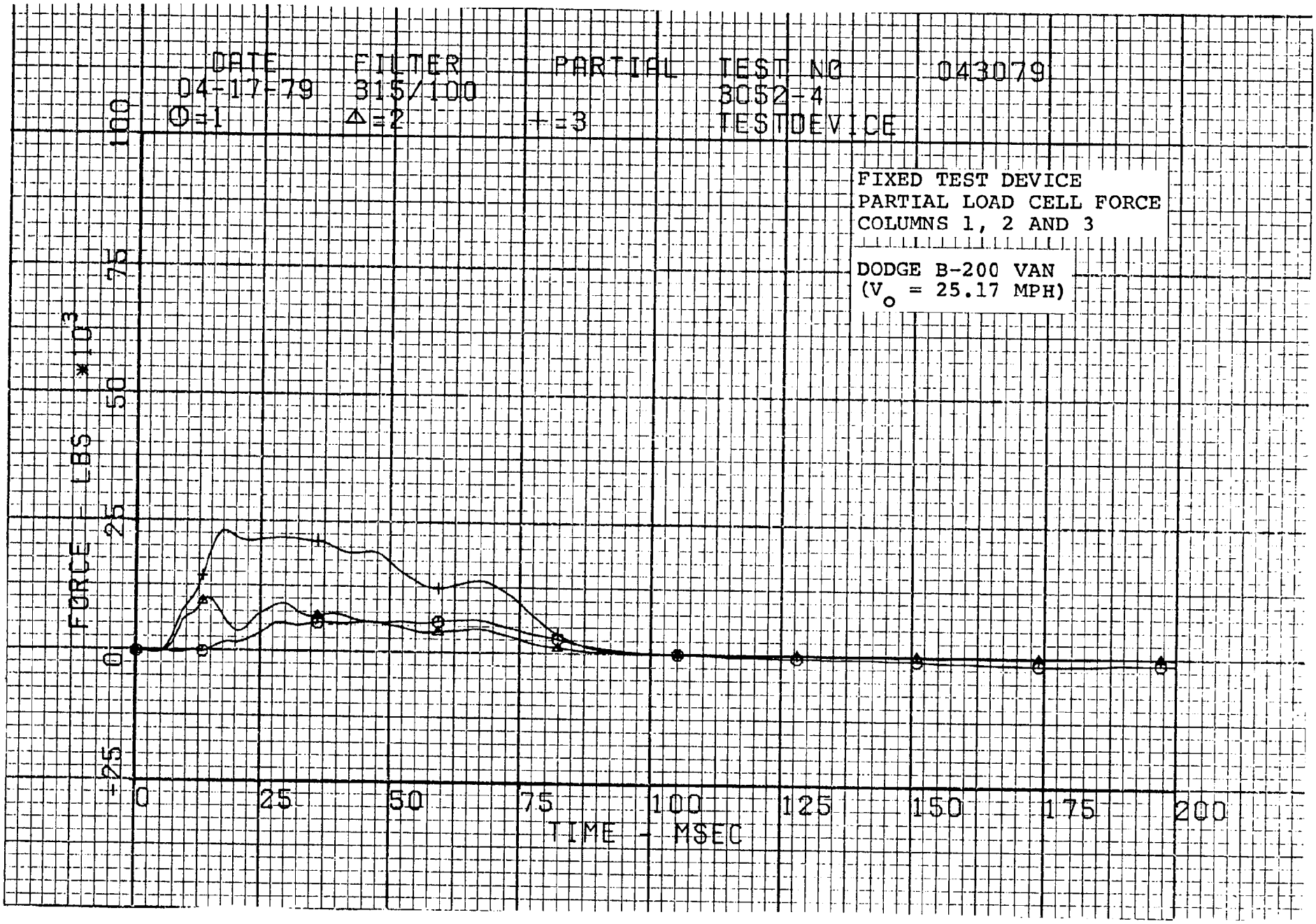

DATE
04-17-79
FILTER
315/100
COLUMN
8
TEST NO
3052-4
043079
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 8
DODGE B-200 VAN
(V_o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

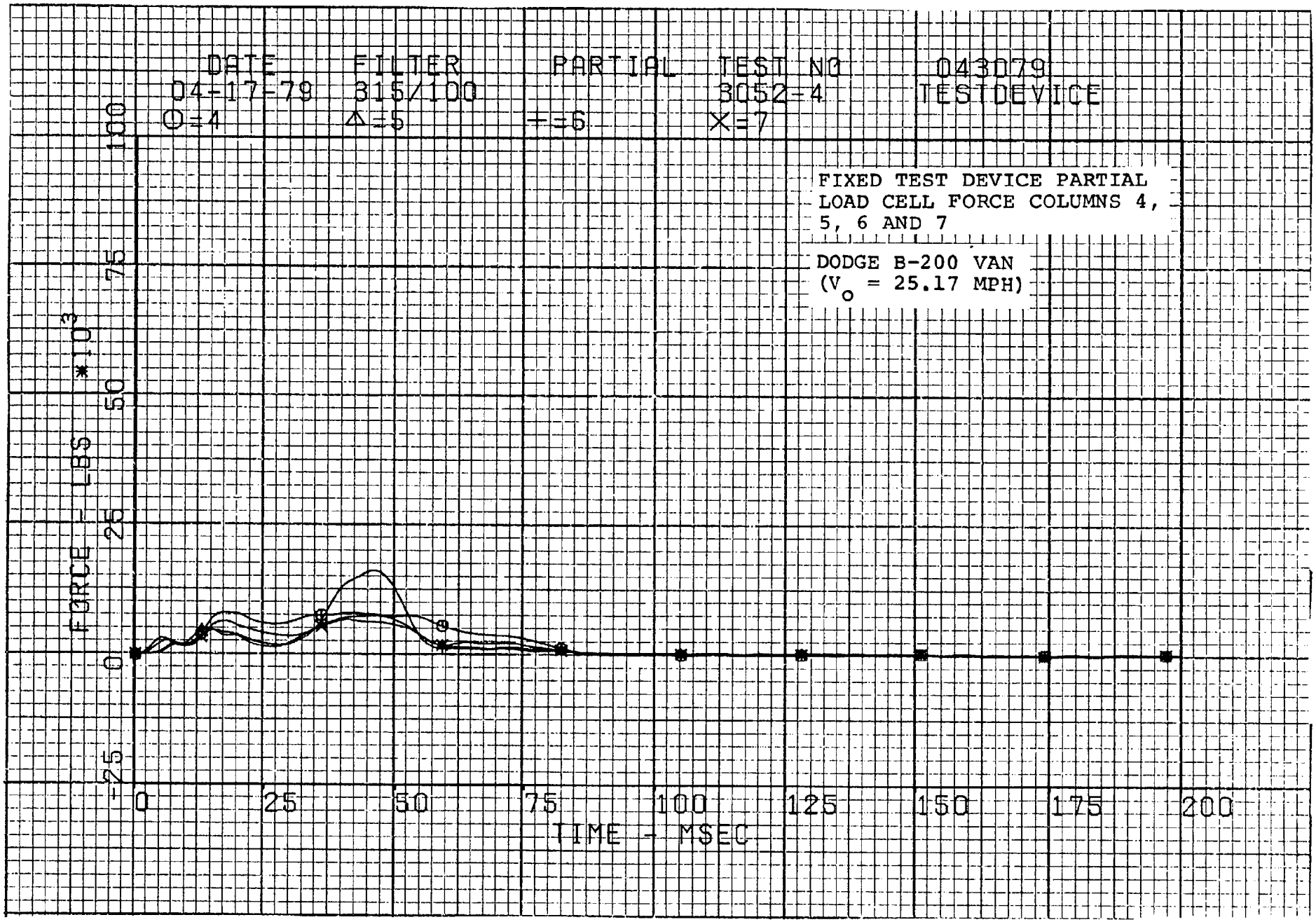

DATE
04-17-79
O=A
FILTER
315/100
△=B
COLUMN
9
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 9
DODGE B-200 VAN
(V$_o$ = 25.17 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

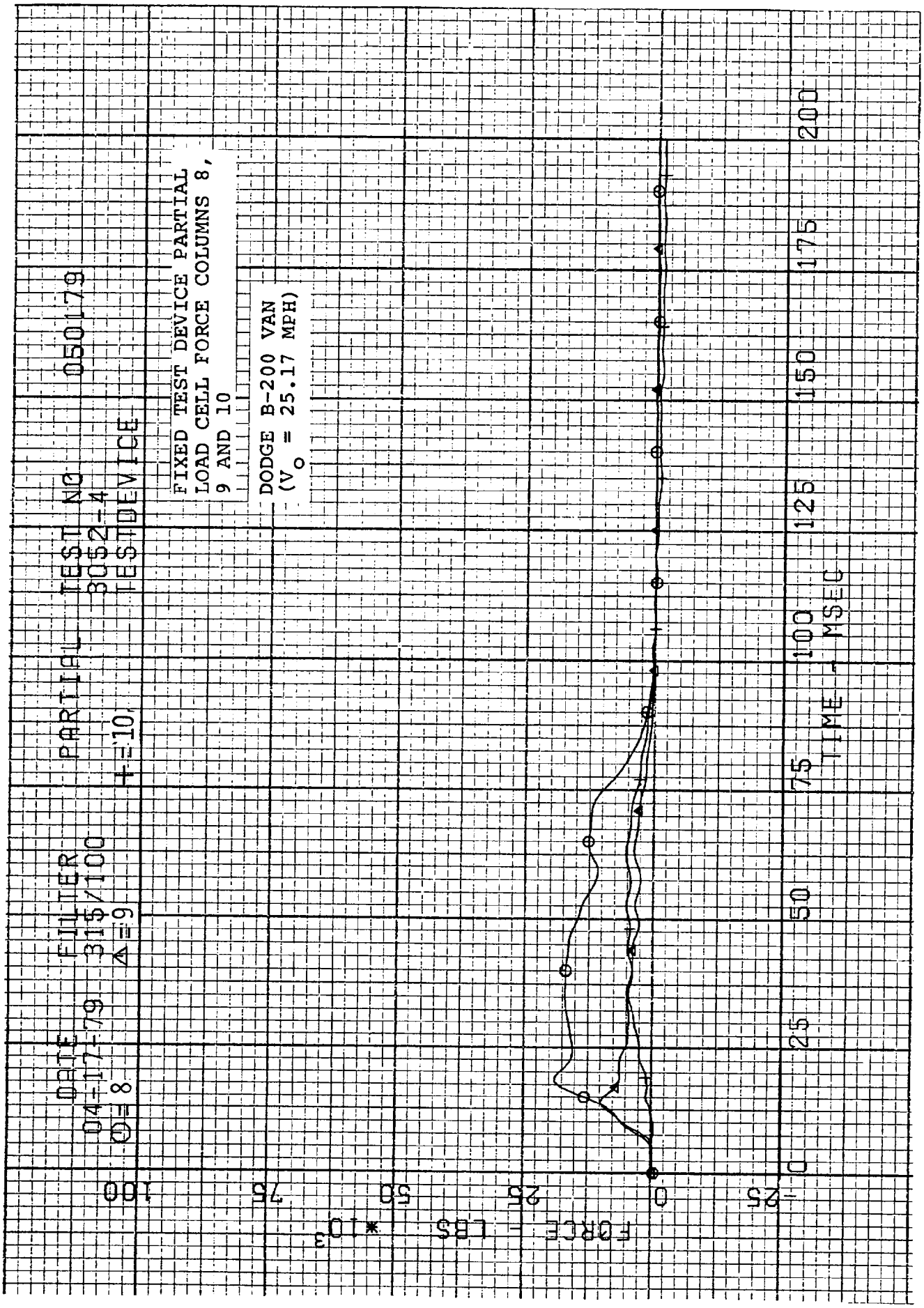

DATE
04-17-79
FILTER
315/100
COLUMN
9
TEST NO
3052-4
043079
TESTDEVICE
O=A
△=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 9
DODGE B-200 VAN
(V_o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

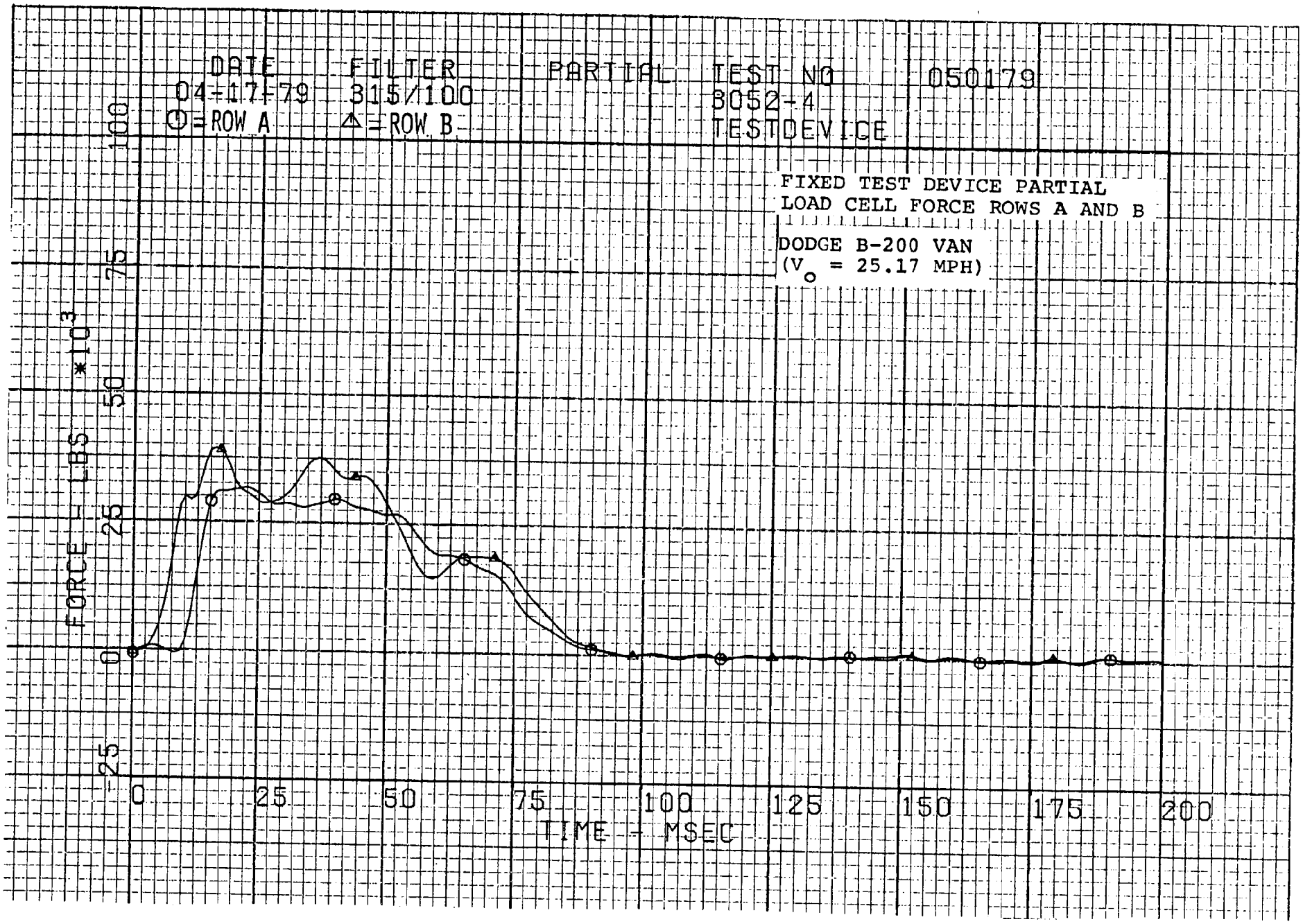

DATE
04-17-79
O=A
FILTER
315/100
Δ=B
COLUMN
10
+=C
TEST NO
3052-4
X=D
043079
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 10
DODGE B-200 VAN
(V o = 25.17 MPH)
FORCE - LBS *10 3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

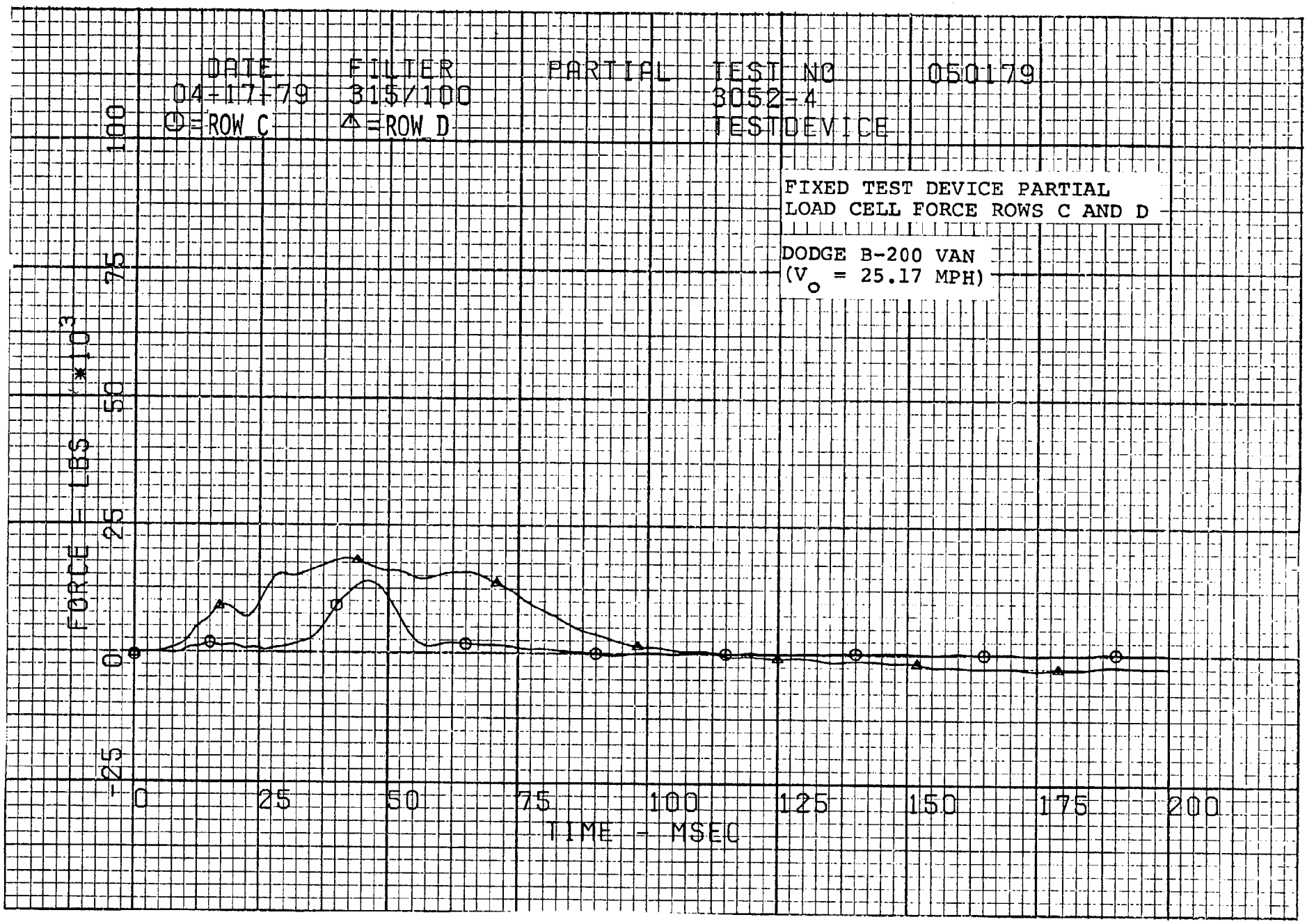

DATE
04-17-79
FILTER
315/100
COLUMN
10
TEST NO
3052-4
043079
TESTDEVICE
O=A
△=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 10
DODGE B-200 VAN
(V_o = 25.17 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

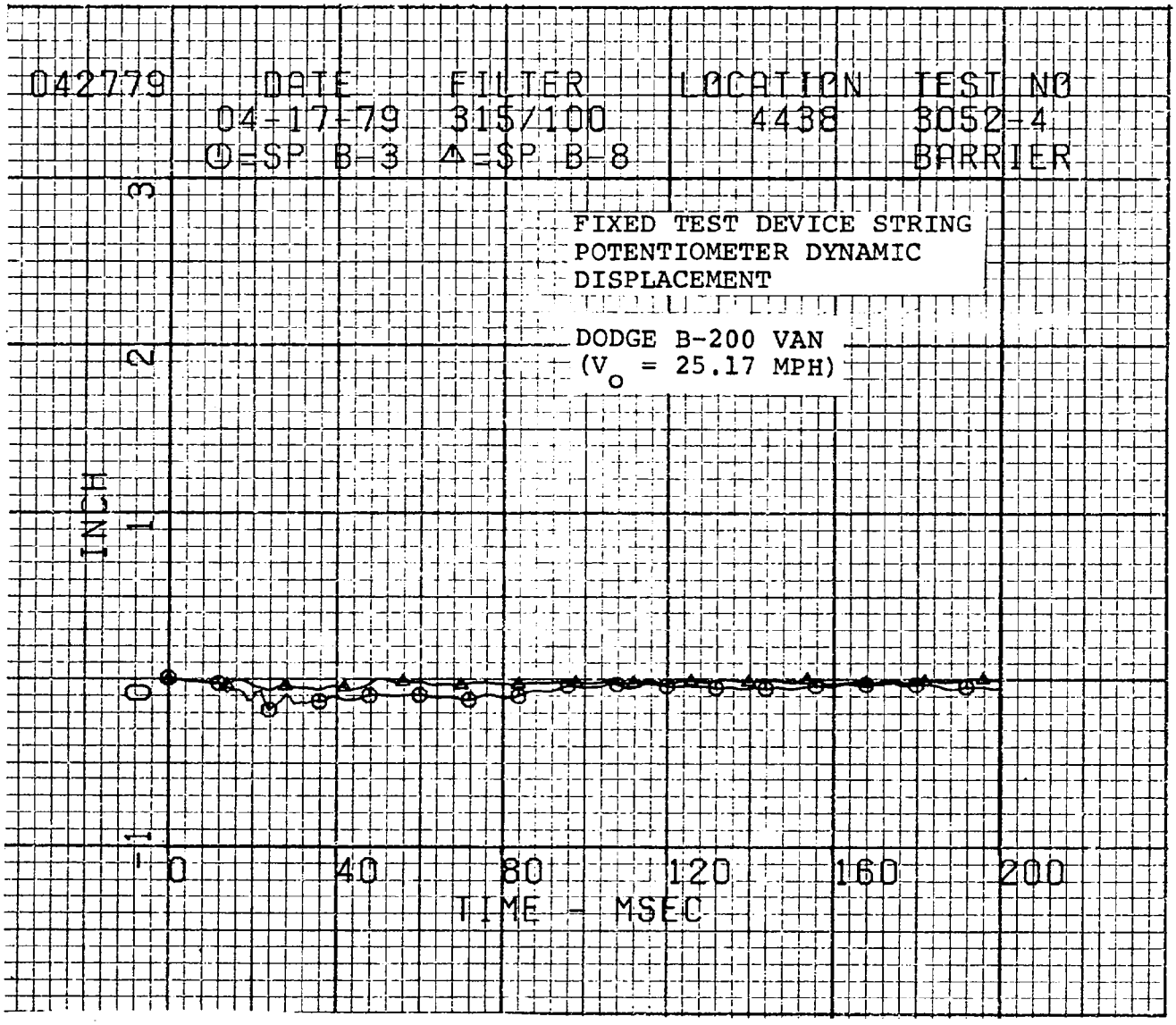

DATE
04-17-79
FILTER
315/100
PARTIAL
TEST NO
043079
3CS2-4
TESTDEVICE
O=1
Δ=2
+=3
FIXED TEST DEVICE
PARTIAL LOAD CELL FORCE
COLUMNS 1, 2 AND 3
DODGE B-200 VAN
(V_o = 25.17 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

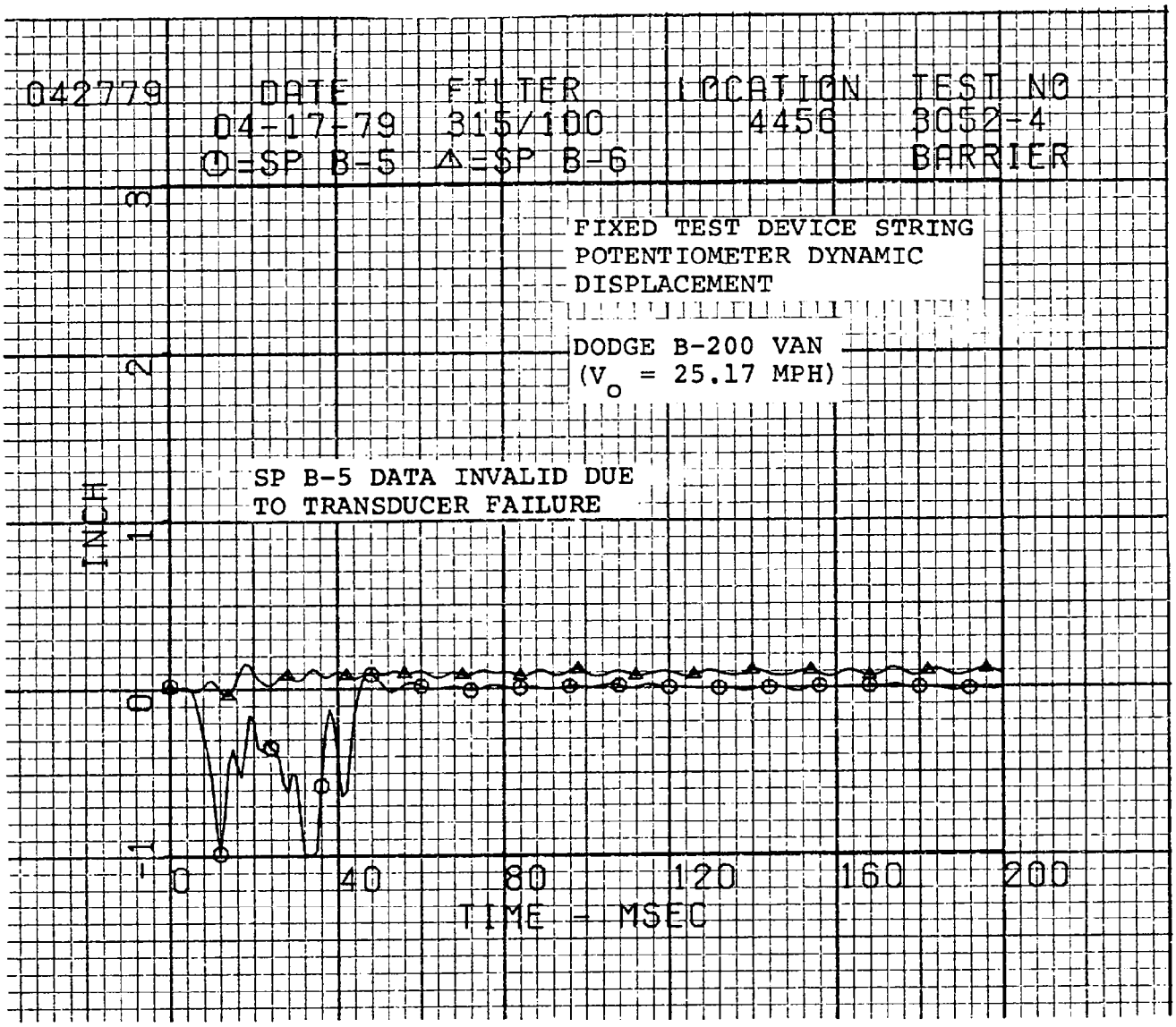

DATE
04-17-79
FILTER
315/100
PARTIAL
TEST NO
3052-4
043079
TESTDEVICE
O=4
Δ=5
+=6
X=7
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE COLUMNS 4,
5, 6 AND 7
DODGE B-200 VAN
(V$_o$ = 25.17 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

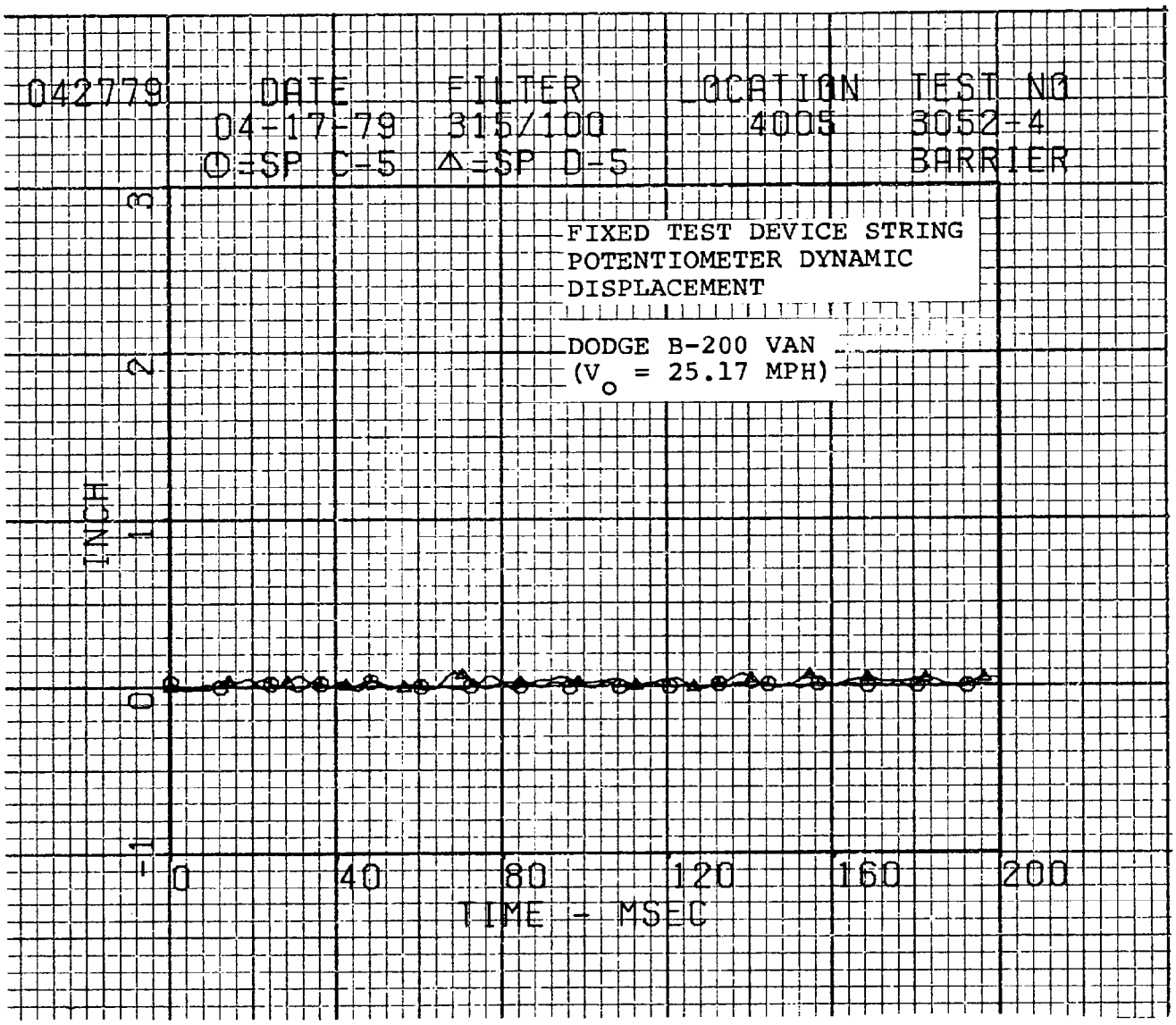

DATE 04-17-79
FILTER 315/100
PARTIAL TEST NO 3052-4
050179
TESTDEVICE
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE COLUMNS 8,
9 AND 10
DODGE B-200 VAN
(V o = 25.17 MPH)
FORCE - LBS *10³
TIME - MSEC
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200


DATE
04-17-79
FILTER
315/100
PARTIAL
TEST NO
050179
3052-4
TESTDEVICE
O = ROW A
Δ = ROW B
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE ROWS A AND B
DODGE B-200 VAN
(V_o = 25.17 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-17-79
FILTER
315/100
PARTIAL
TEST NO
3052-4
050179
TESTDEVICE
O=ROW C
△=ROW D
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE ROWS C AND D
DODGE B-200 VAN
(V o = 25.17 MPH)
FORCE - LBS (*10^3)
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


042779
DATE
04-17-79
FILTER
315/100
LOCATION
4438
TEST NO
3052-4
BARRIER
⊕=SP B-3 △=SP B-8
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
DODGE B-200 VAN
(V o = 25.17 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC


042779
DATE
04-17-79
FILTER
315/100
LOCATION
4456
TEST NO
3052-4
BARRIER
⊙=SP B-5
△=SP B-6
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
DODGE B-200 VAN
(V$_o$ = 25.17 MPH)
SP B-5 DATA INVALID DUE
TO TRANSDUCER FAILURE
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC


042779
DATE
04-17-79
FILTER
315/100
LOCATION
4005
TEST NO
3052-4
BARRIER
O=SP C-5 Δ=SP D-5
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
DODGE B-200 VAN
(V o = 25.17 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC

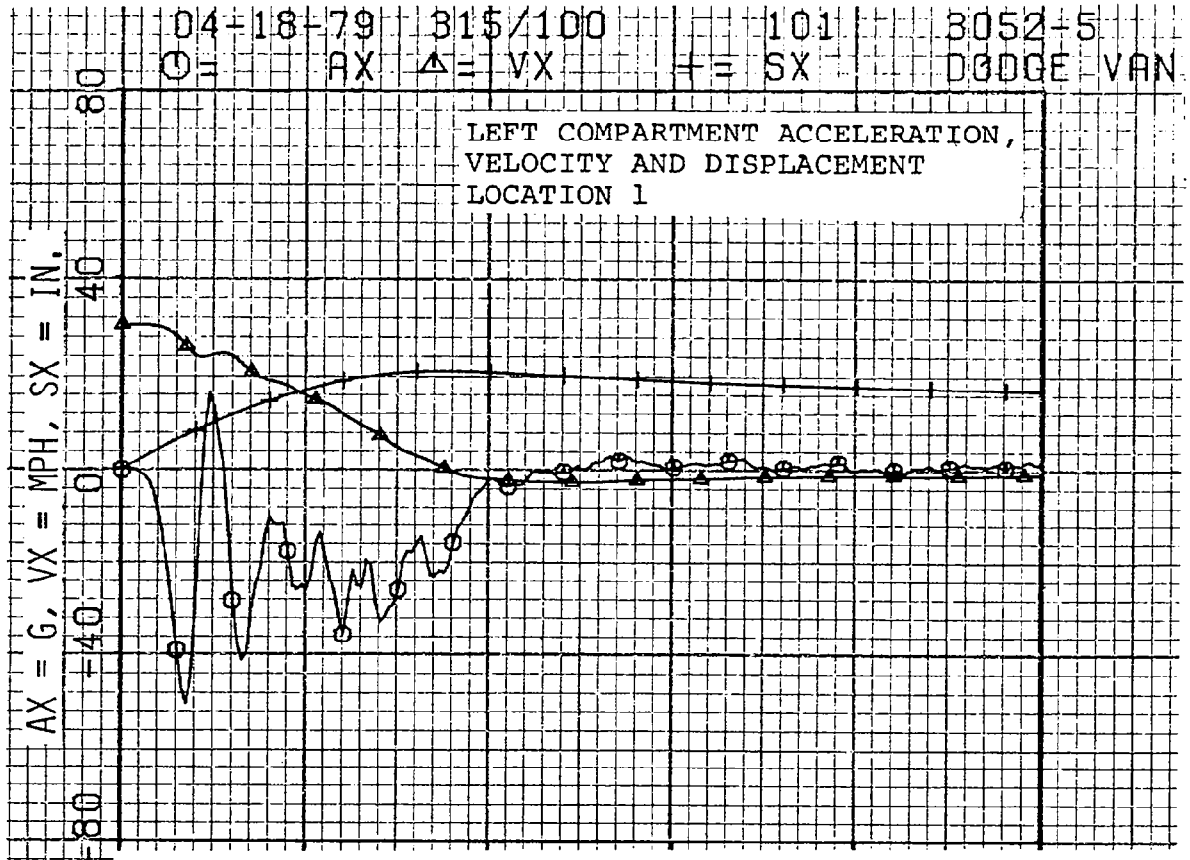
APPENDIX E

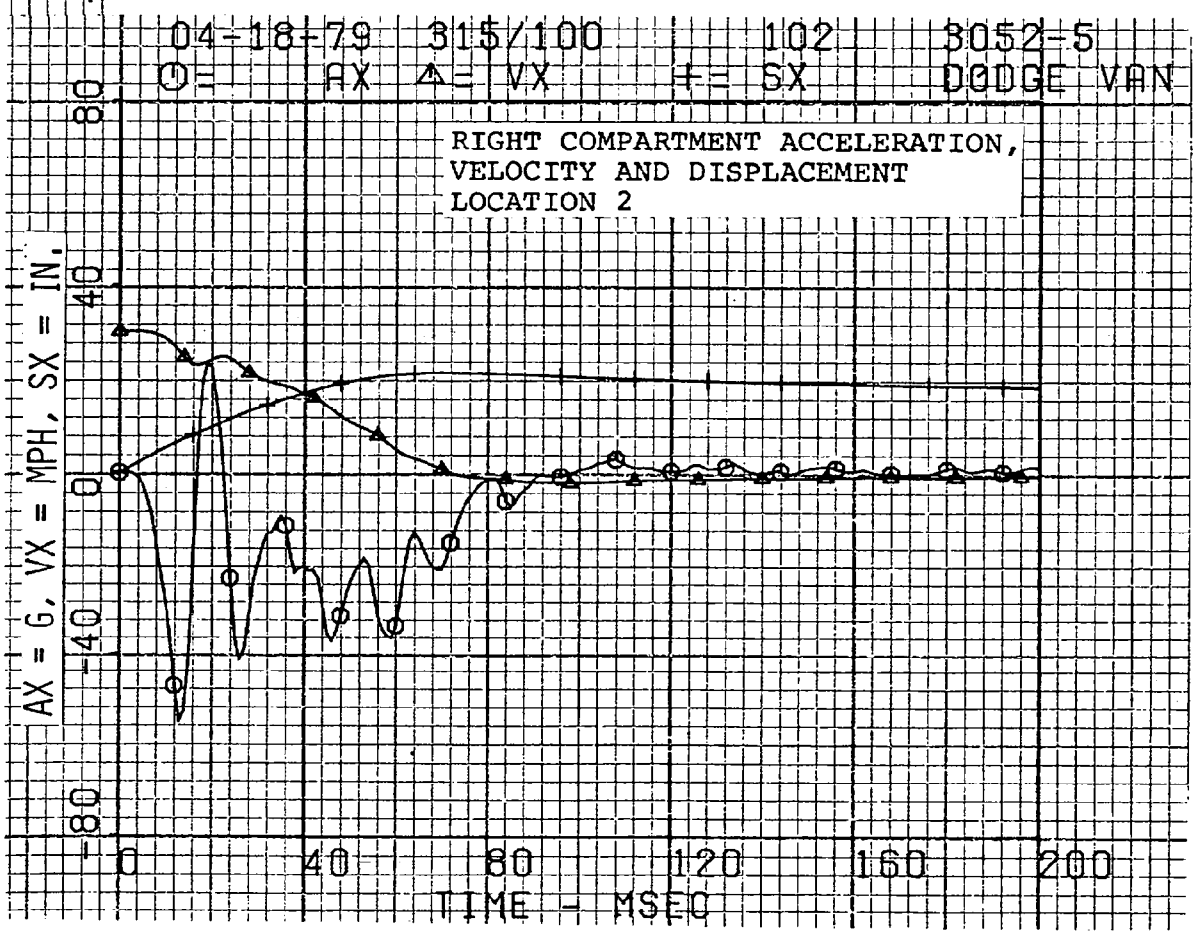
CALCOMP PLOTS FOR
TEST 3052-5

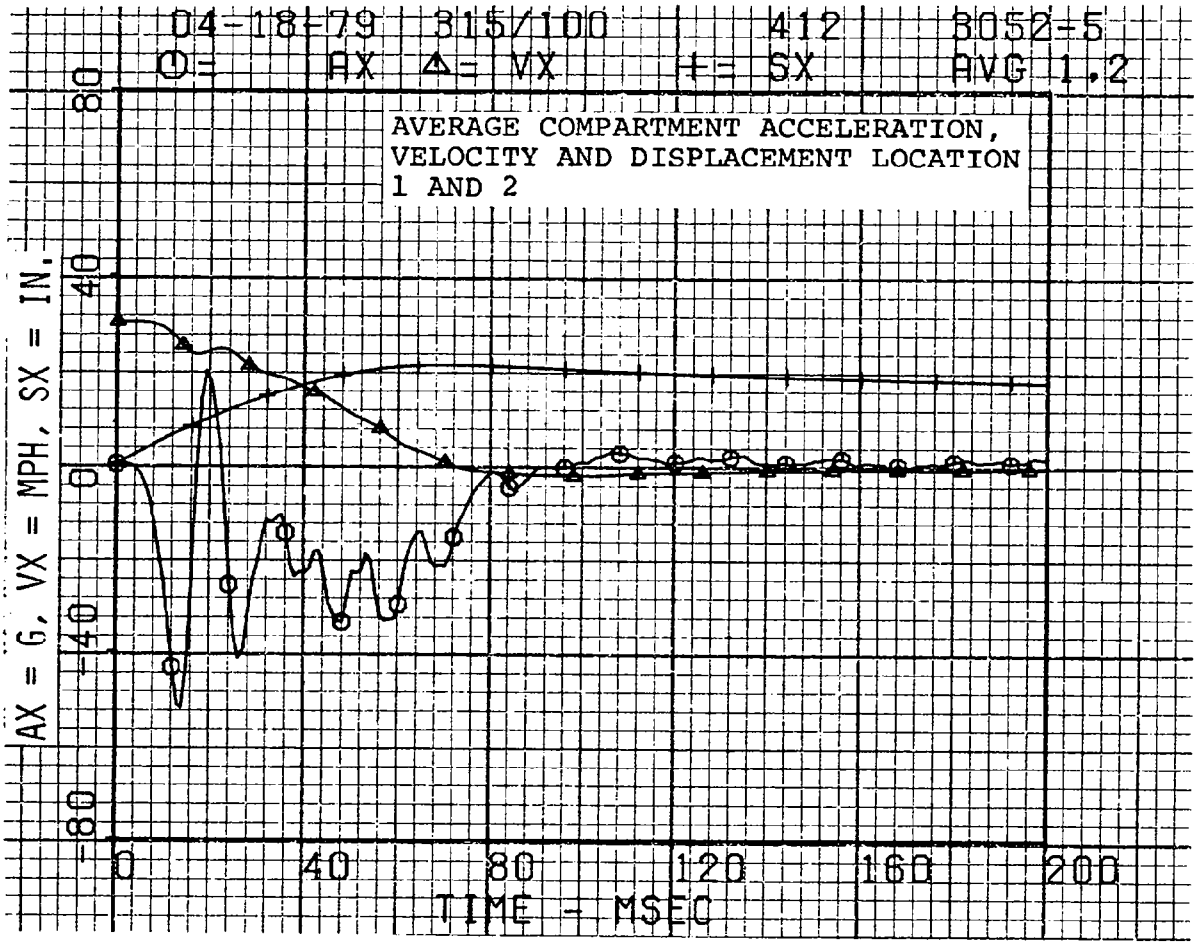
DODGE B-200 VAN-TO-NHTSA FIXED TEST DEVICE
SYMMETRIC HEAD-ON IMPACT

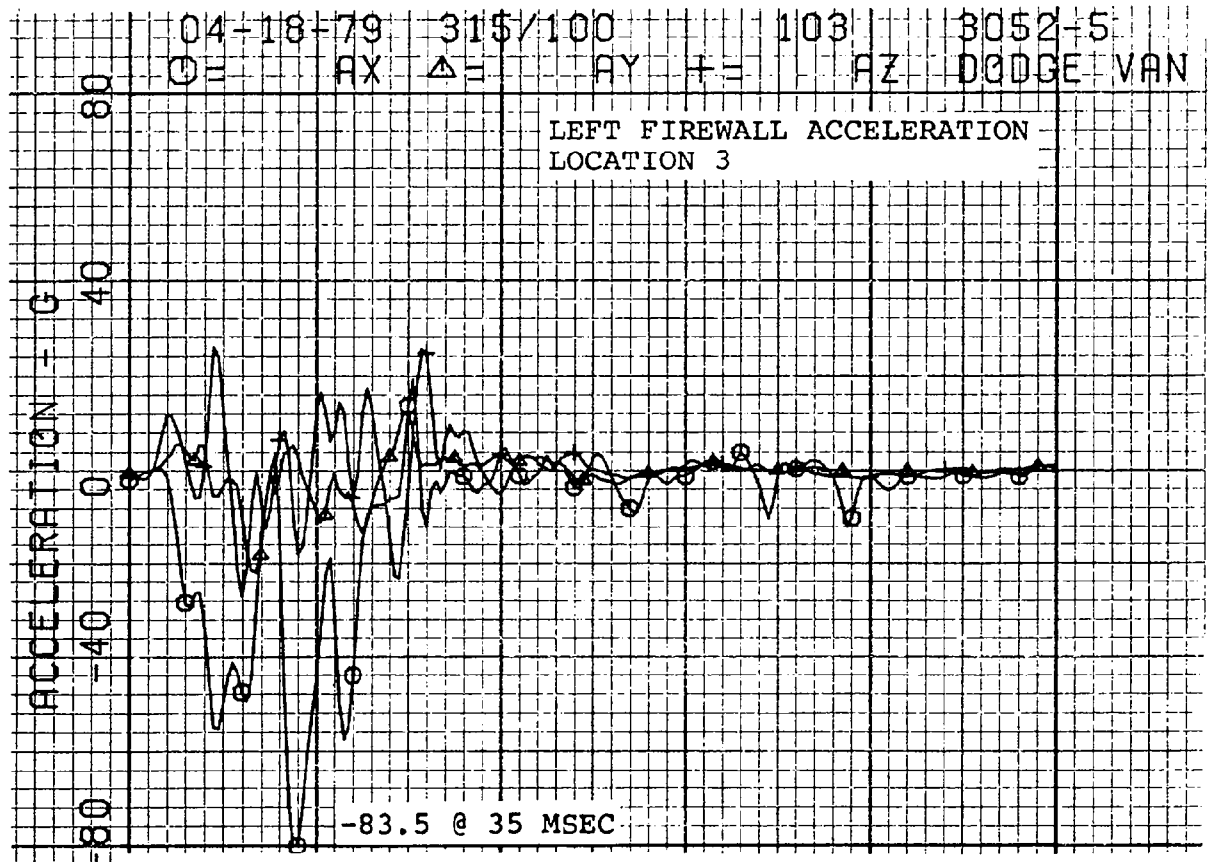
TEST SPEED: 30.22 MPH

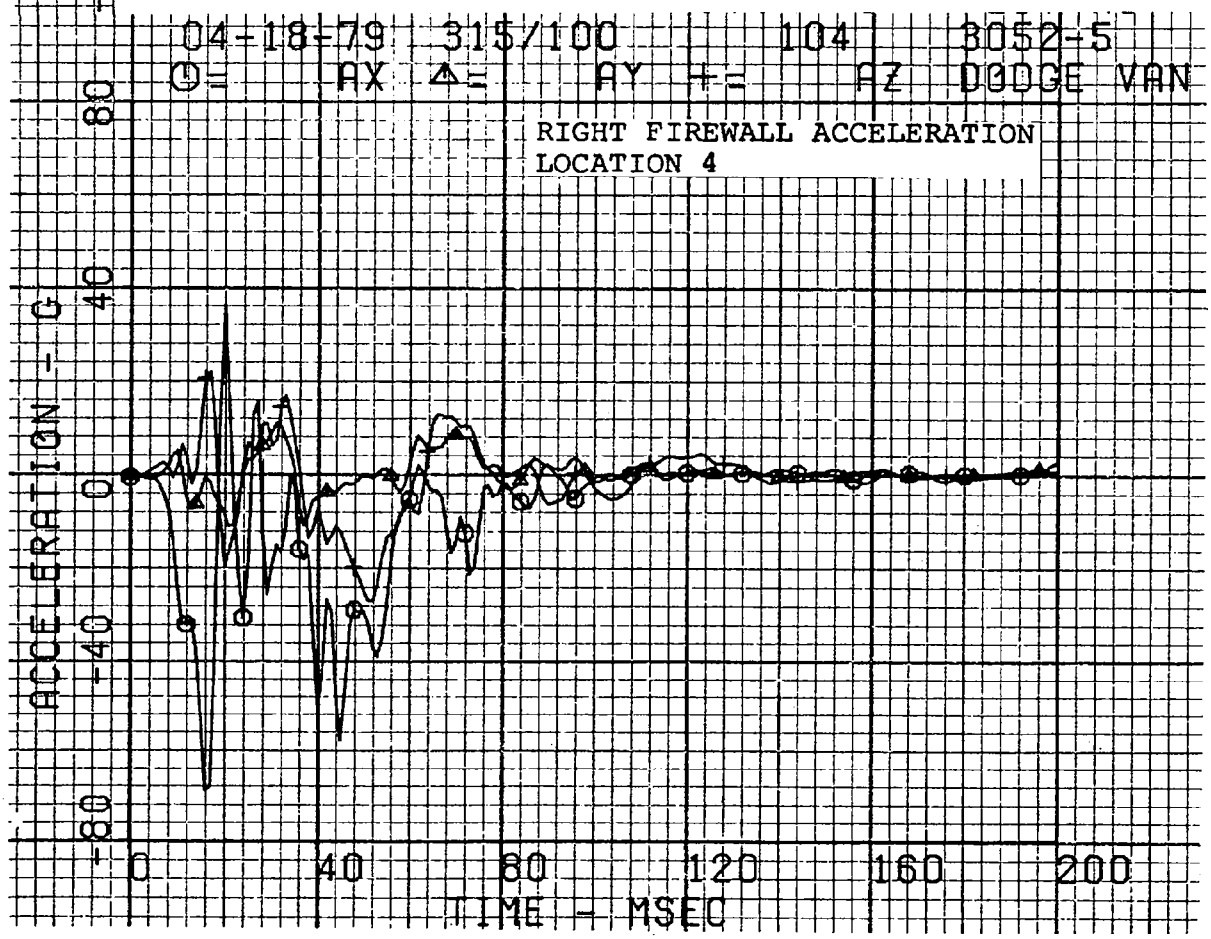
TEST DATE: APRIL 18, 1979

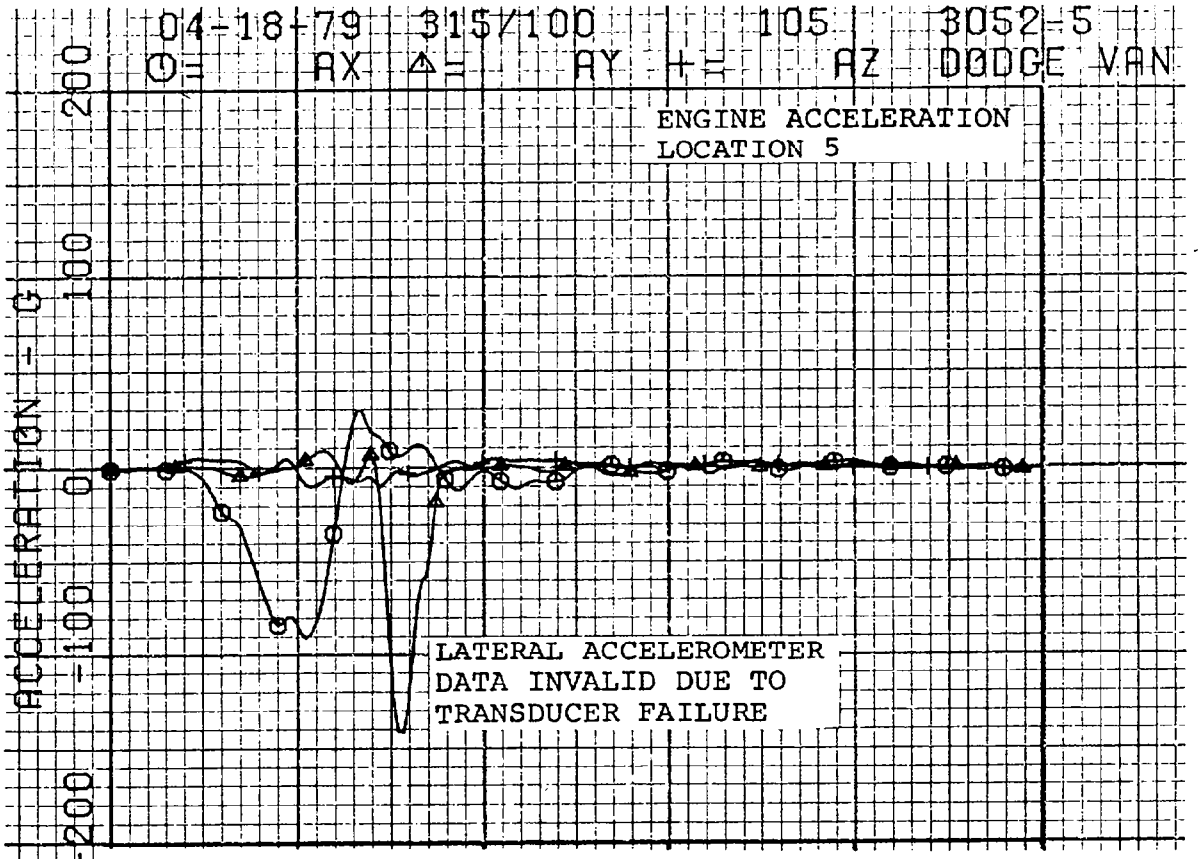

04-18-79 315/100 101 3052-5
O= AX △= VX += SX DODGE VAN
LEFT COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT
LOCATION 1
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80

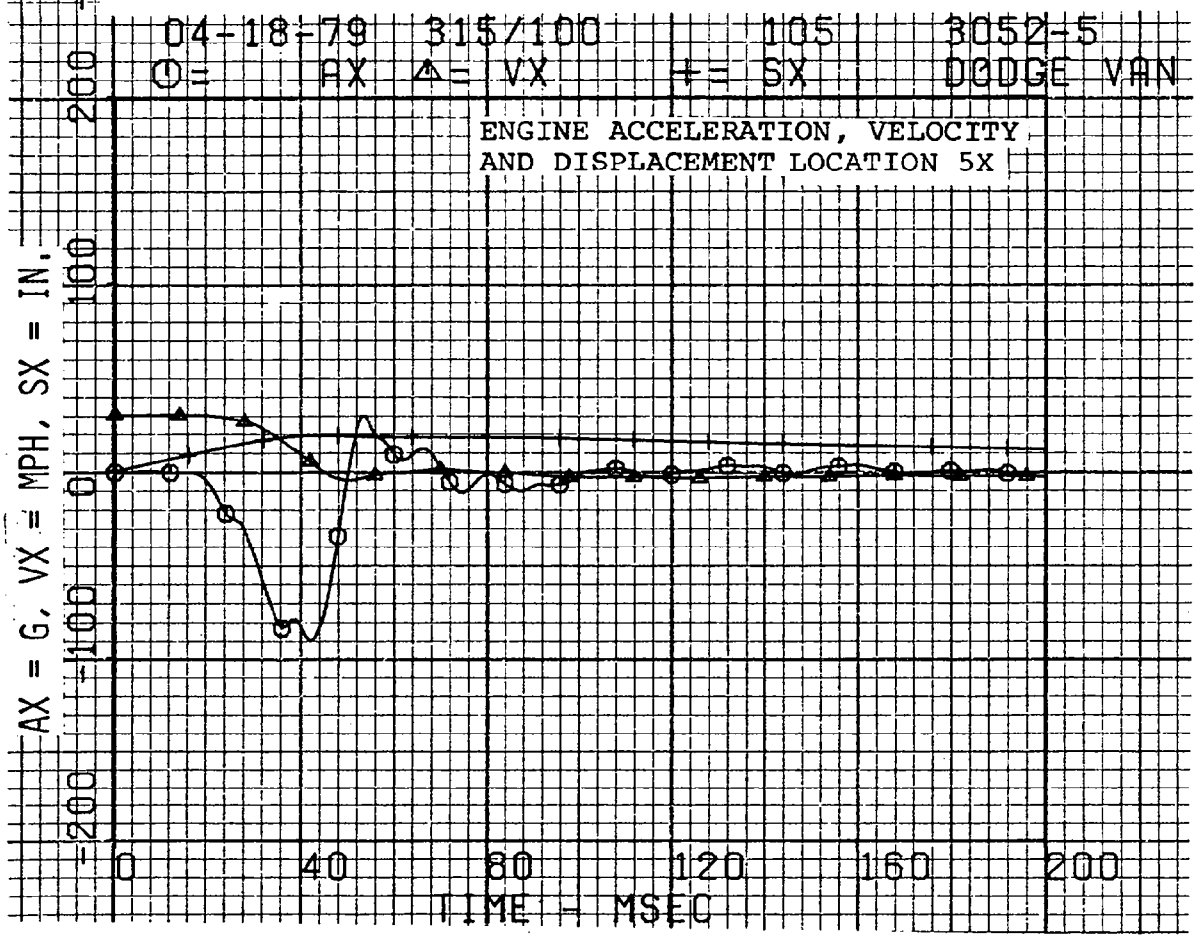

04-18-79 315/100 102 3052-5
O= AX △= VX += SX DODGE VAN
RIGHT COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT
LOCATION 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

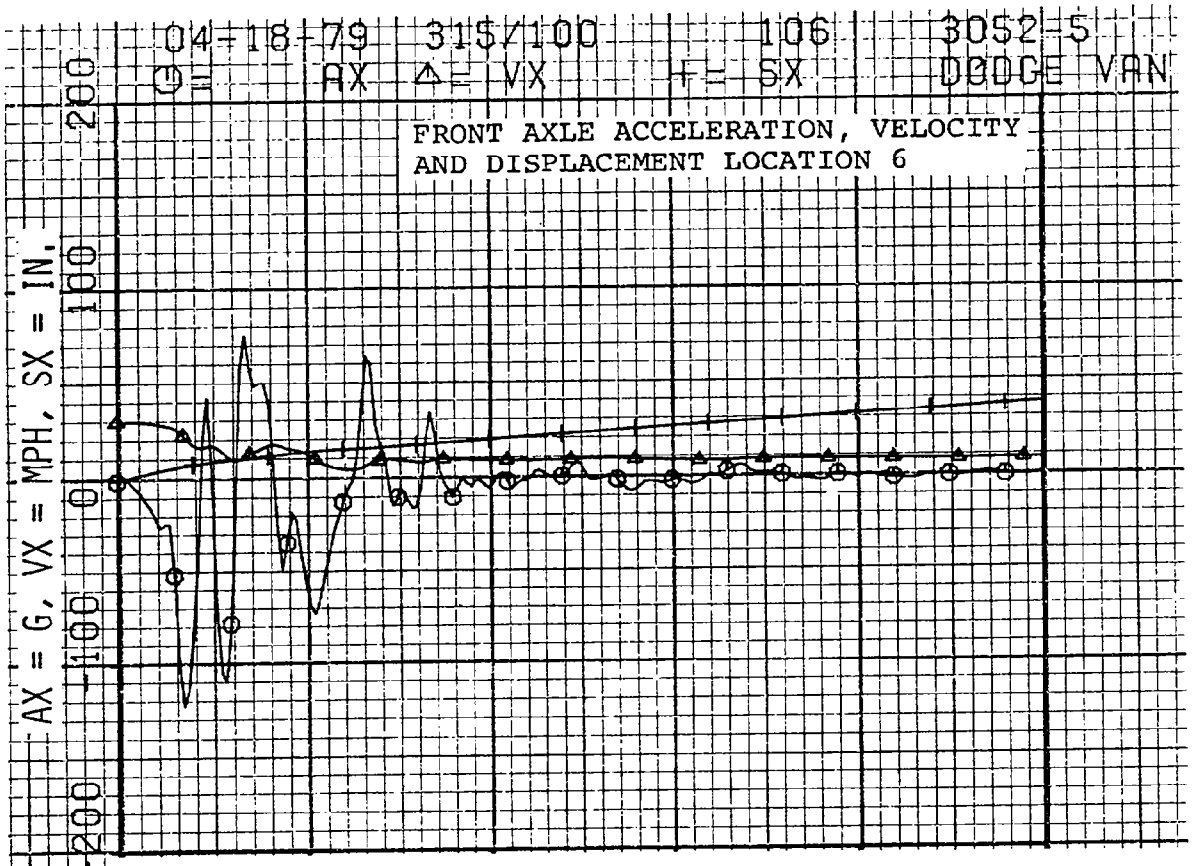

04-18-79 315/100 412 3052-5
O= AX △= VX += SX AVG 1,2
AVERAGE COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT LOCATION
1 AND 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

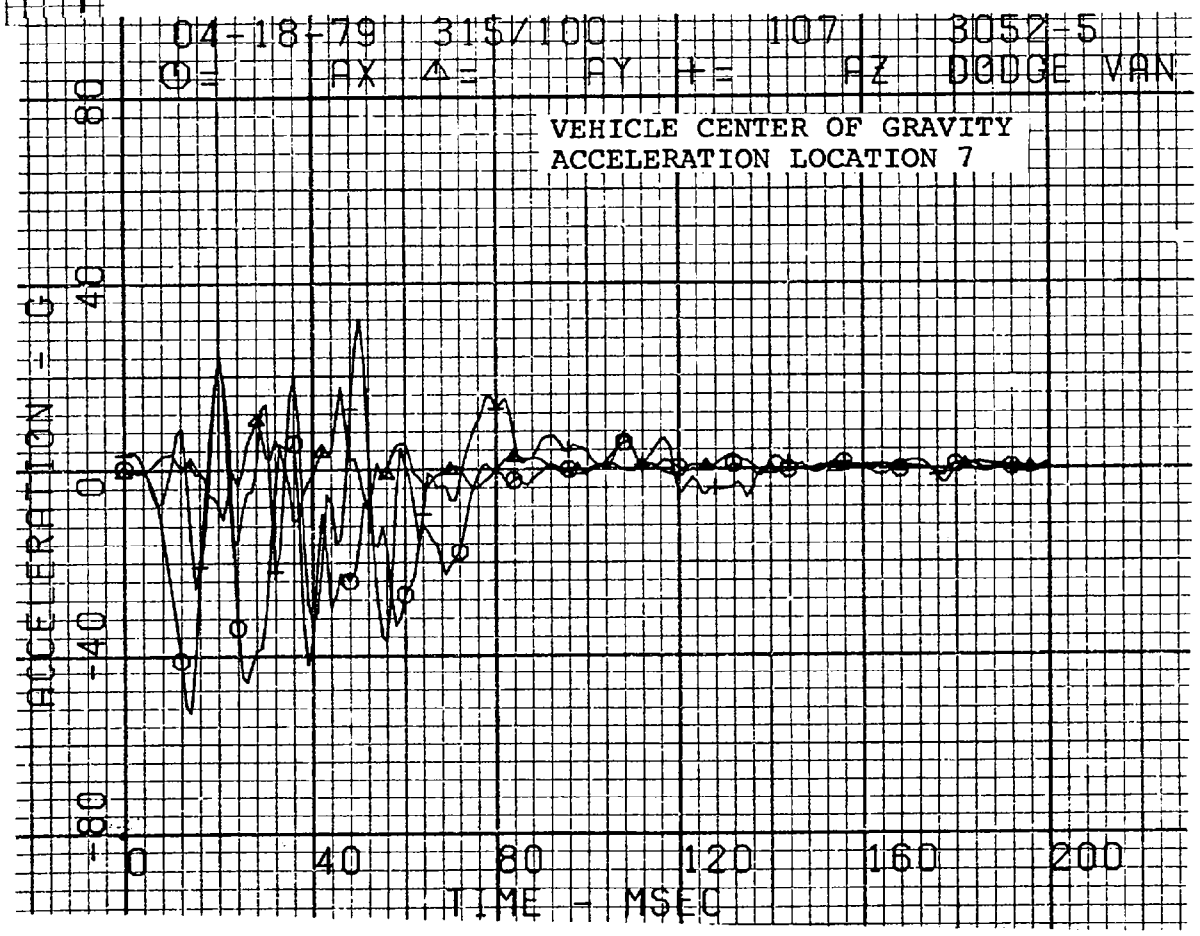

04-18-79 315/100 103 3052-5
⊙= AX △= AY += AZ DODGE VAN
LEFT FIREWALL ACCELERATION
LOCATION 3
-83.5 @ 35 MSEC
ACCELERATION - G
80
40
0
-40
-80

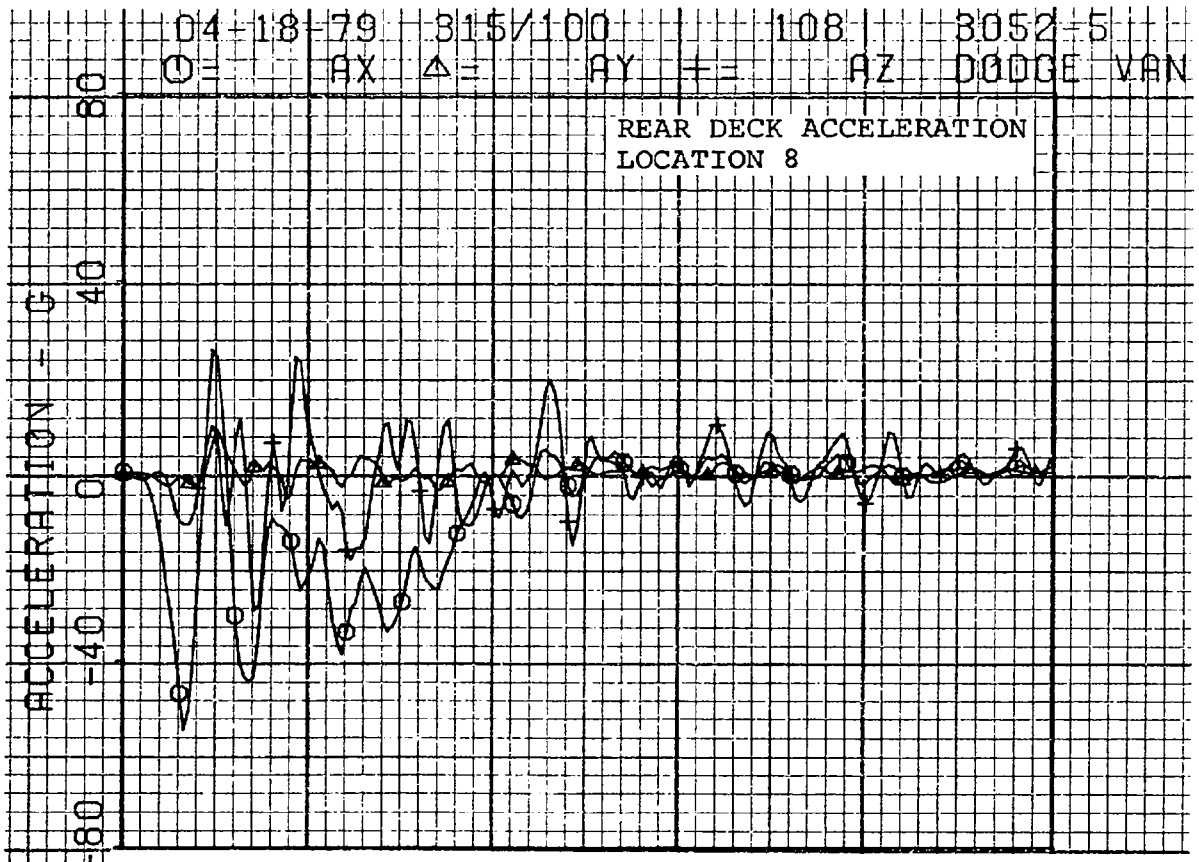

04-18-79 315/100 104 3052-5
⊙= AX △= AY += AZ DODGE VAN
RIGHT FIREWALL ACCELERATION
LOCATION 4
ACCELERATION - G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

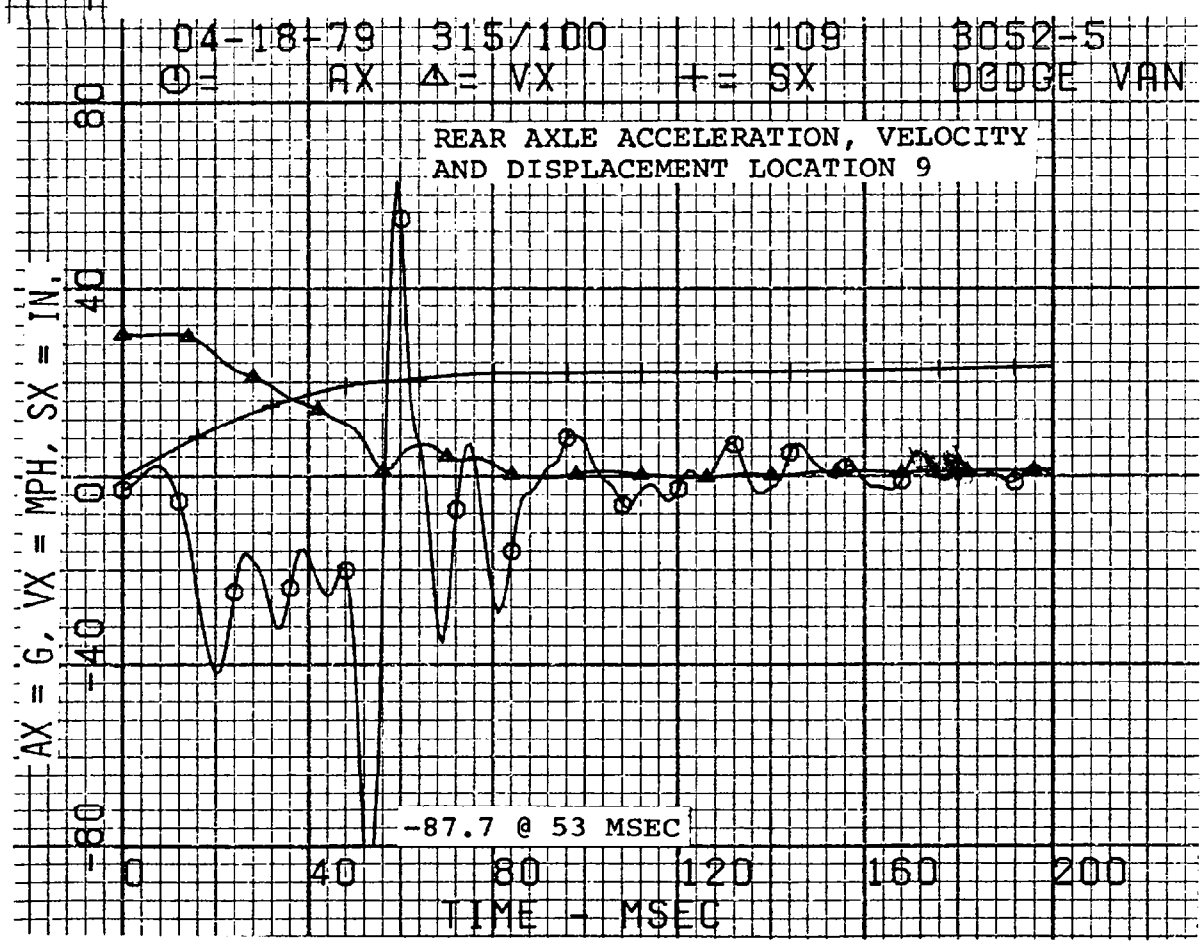

04-18-79 315/100 105 3052-5
⊙= AX △= AY += AZ DODGE VAN
ENGINE ACCELERATION
LOCATION 5
LATERAL ACCELEROMETER
DATA INVALID DUE TO
TRANSDUCER FAILURE
ACCELERATION = G
200
100
0
-100
-200

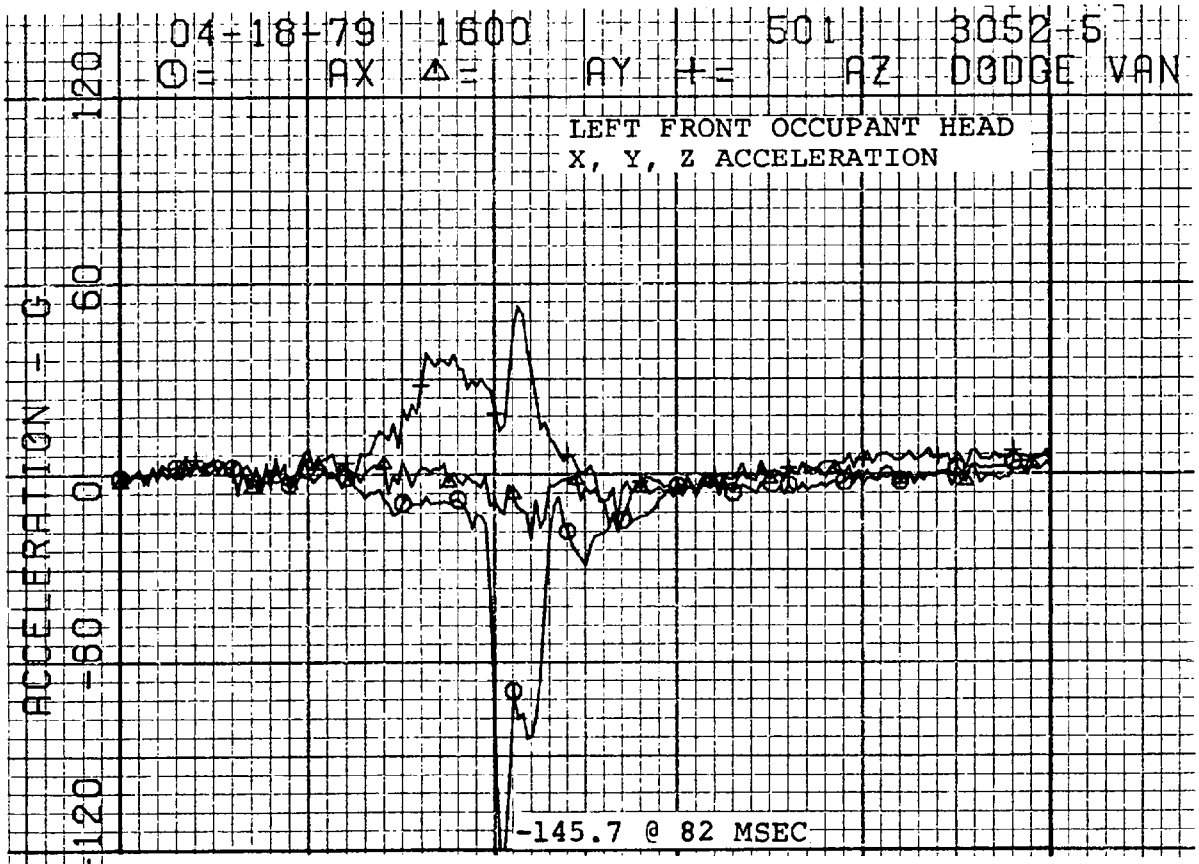

04-18-79 315/100 105 3052-5
⊙= AX △= VX += SX DODGE VAN
ENGINE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 5X
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200
0
40
80
120
160
200
TIME - MSEC

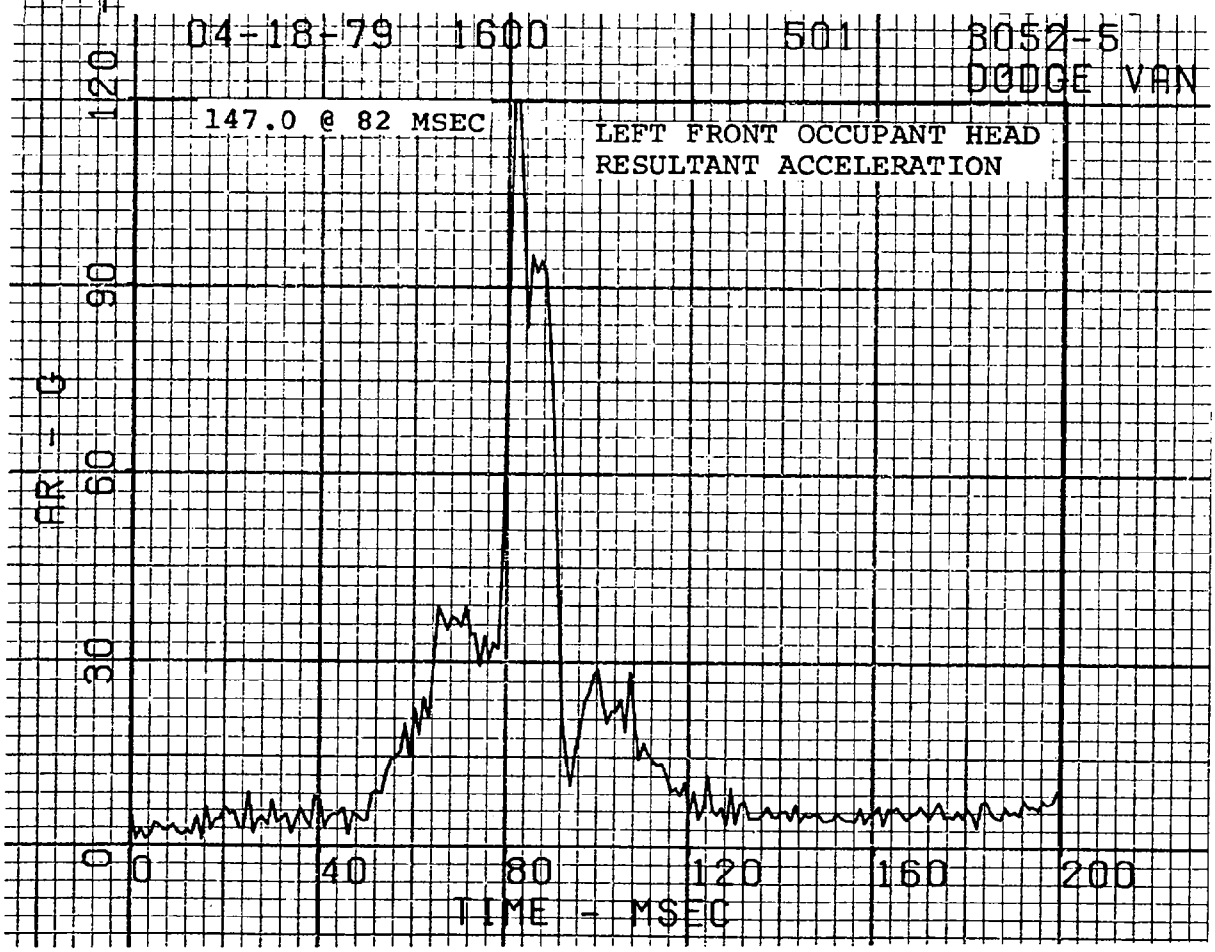

04-18-79 31$/100 106 3052-5
⊖= AX △= VX += SX DODGE VAN
FRONT AXLE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 6
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200

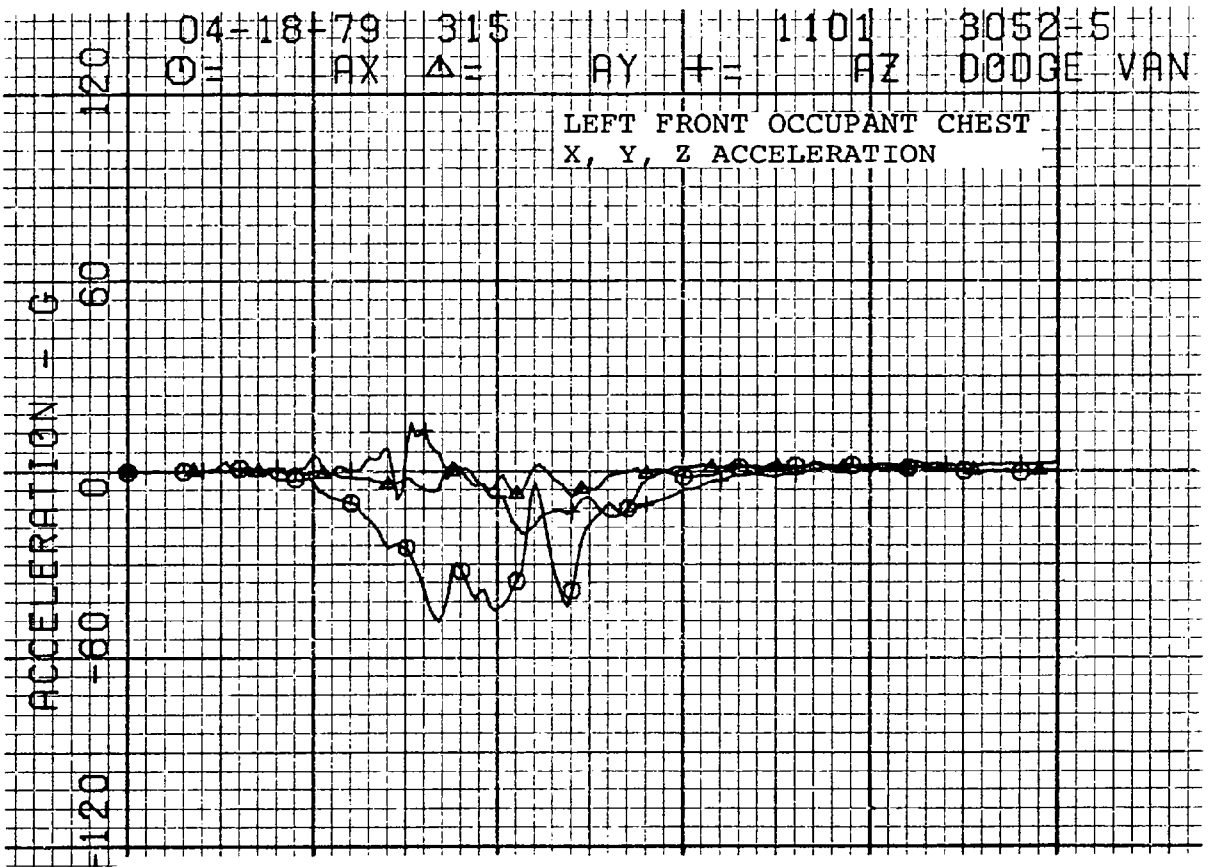

04-18-79 31$/100 107 3052-5
⊖= AX △= AY += AZ DODGE VAN
VEHICLE CENTER OF GRAVITY
ACCELERATION LOCATION 7
ACCELERATION - G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

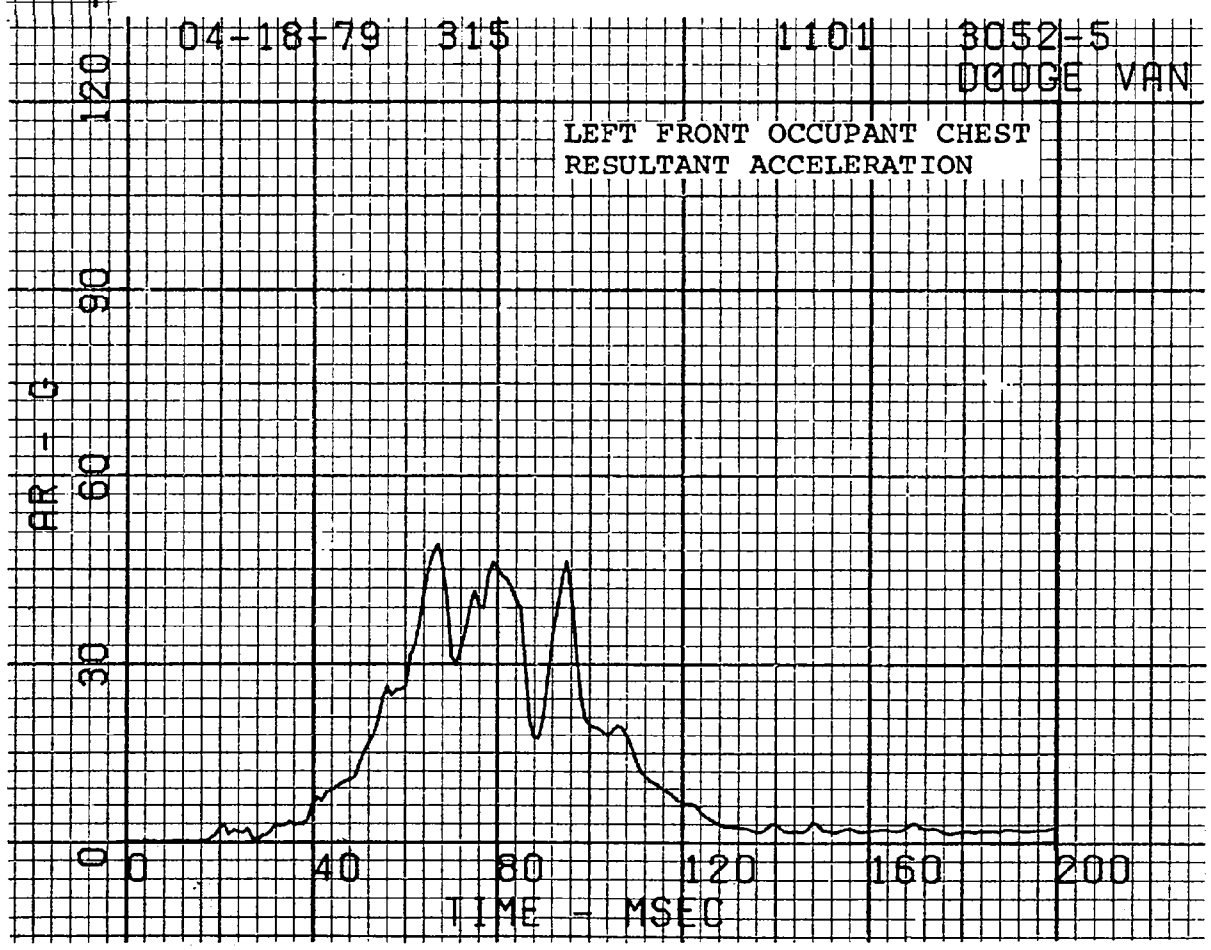

04-18-79 315/100 108 3052-5
O= AX △= AY += AZ DODGE VAN
REAR DECK ACCELERATION
LOCATION 8
ACCELERATION - G
80
40
0
-40
-80

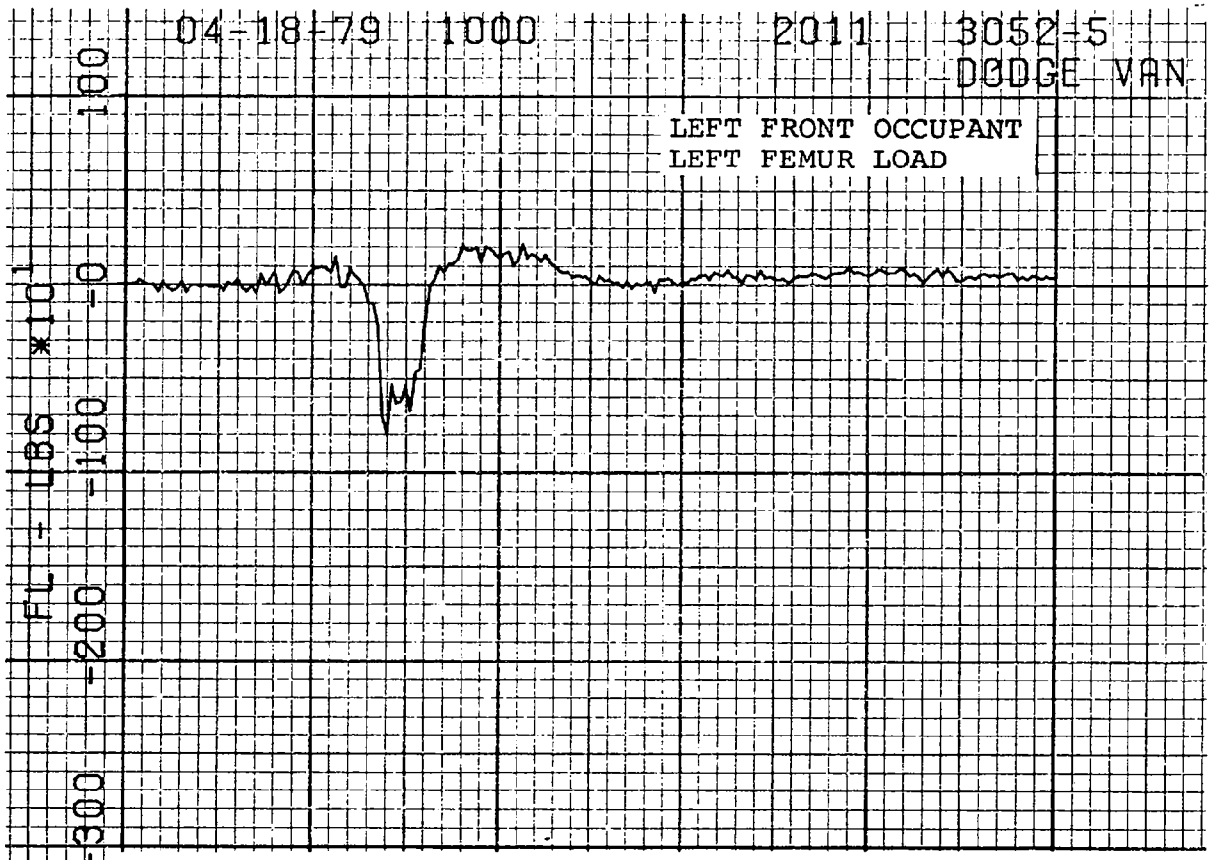

04-18-79 315/100 109 3052-5
O= AX △= VX += SX DODGE VAN
REAR AXLE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 9
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
-87.7 @ 53 MSEC
0
40
80
120
160
200
TIME - MSEC

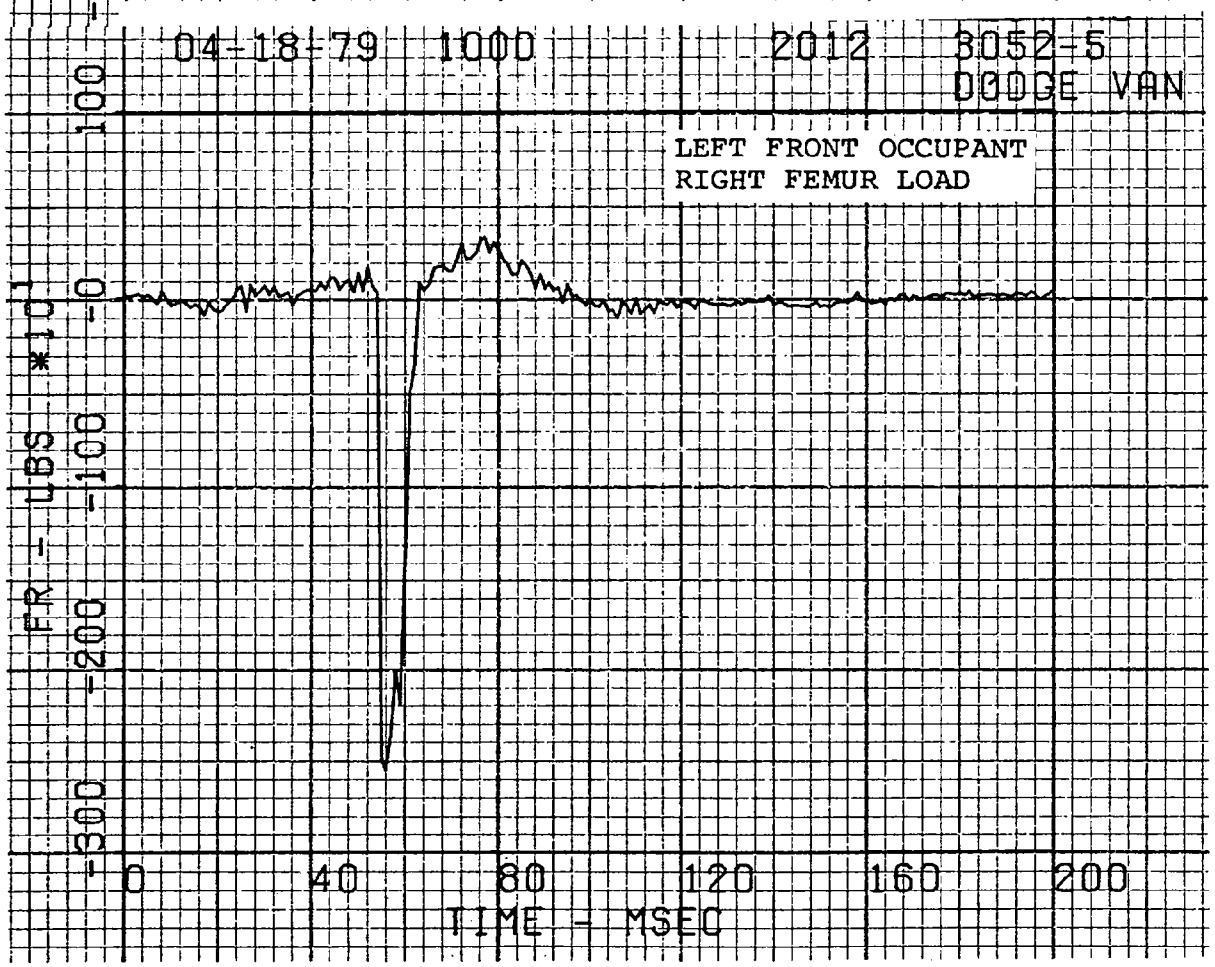

04-18-79 1600 501 3052-5
⊙= AX △= AY += AZ DODGE VAN
LEFT FRONT OCCUPANT HEAD
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120
-145.7 @ 82 MSEC

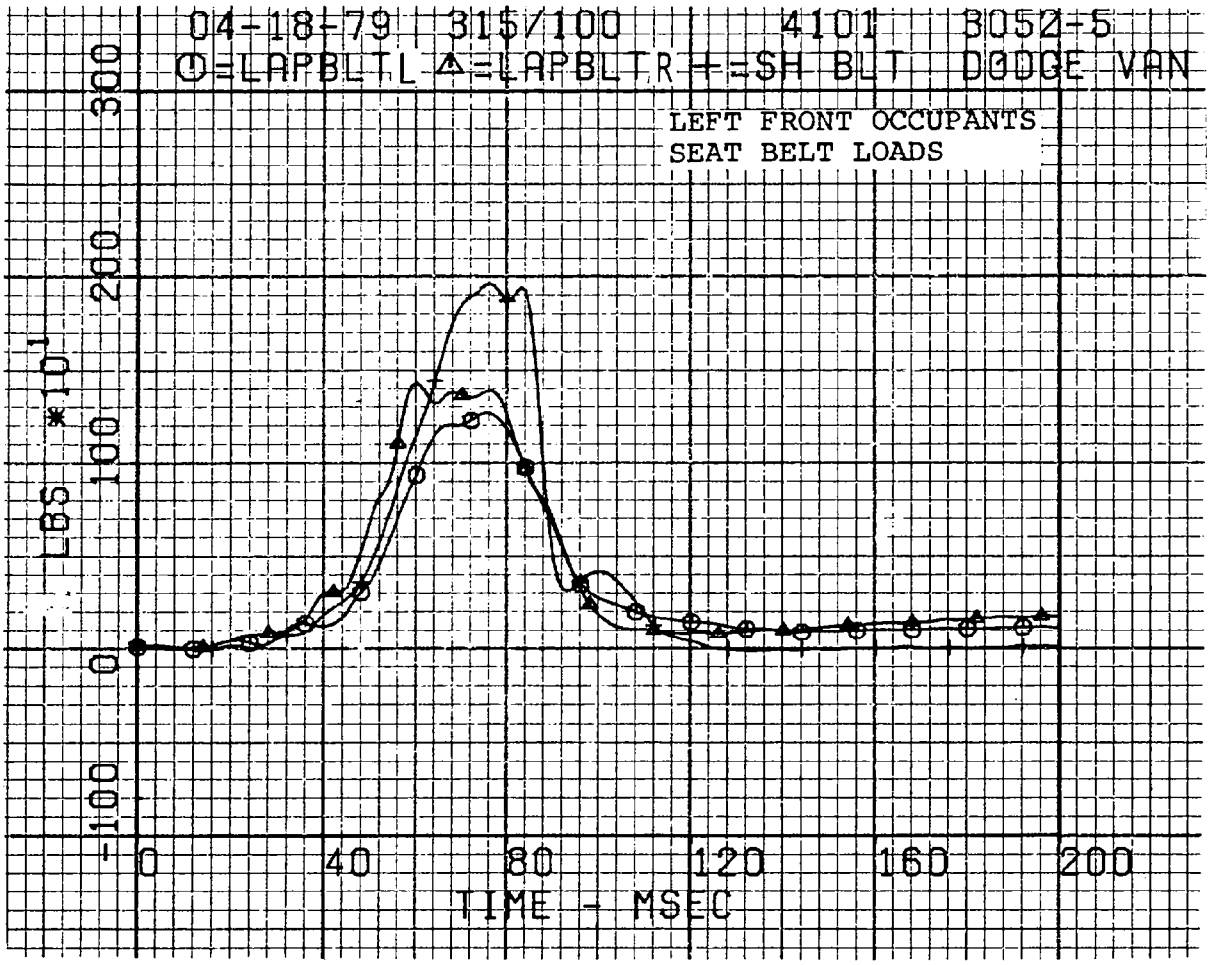

04-18-79 1600 501 3052-5
DODGE VAN
147.0 @ 82 MSEC
LEFT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

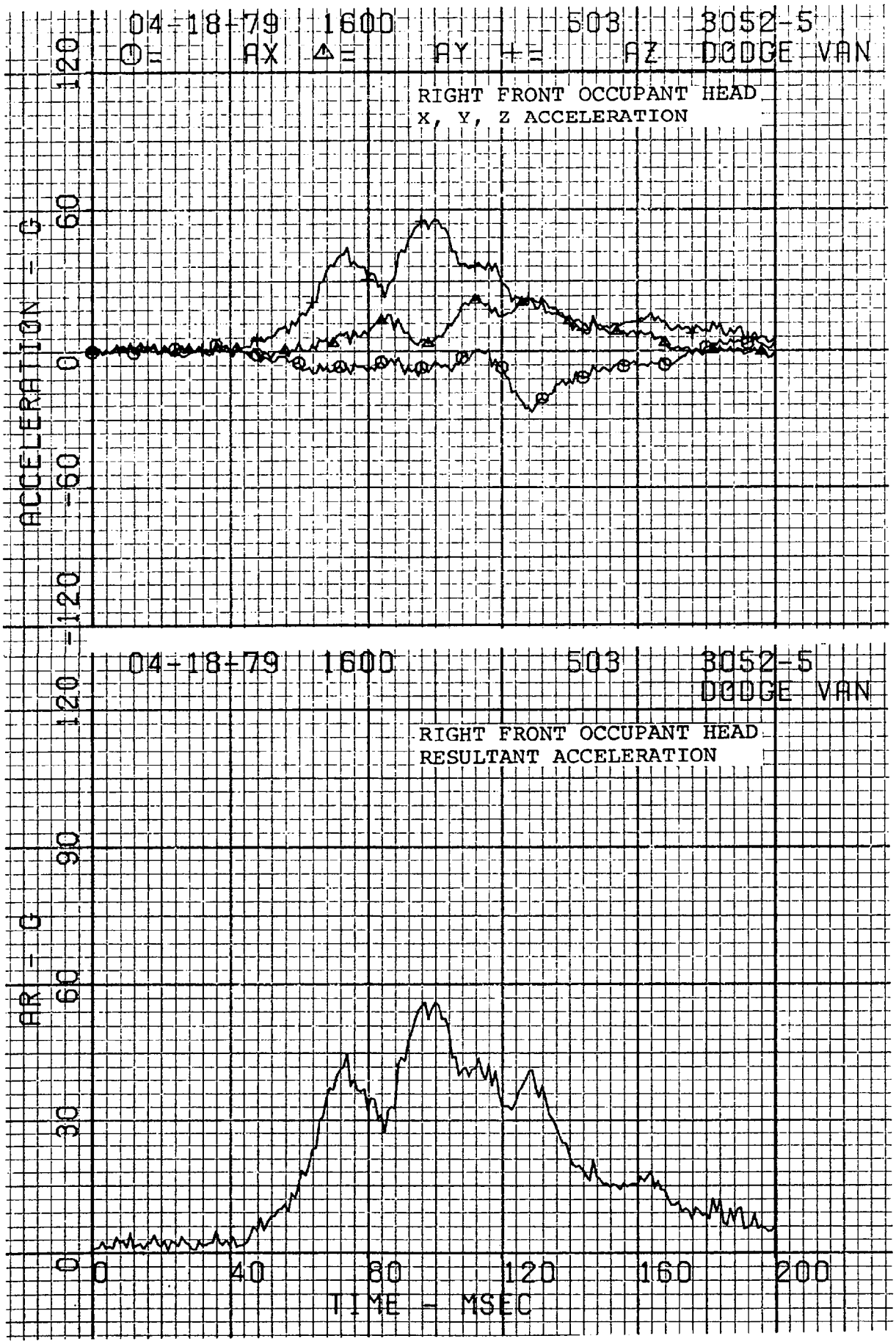

04-18-79 315 1101 3052-5
O= AX Δ= AY += AZ DODGE VAN
LEFT FRONT OCCUPANT CHEST
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

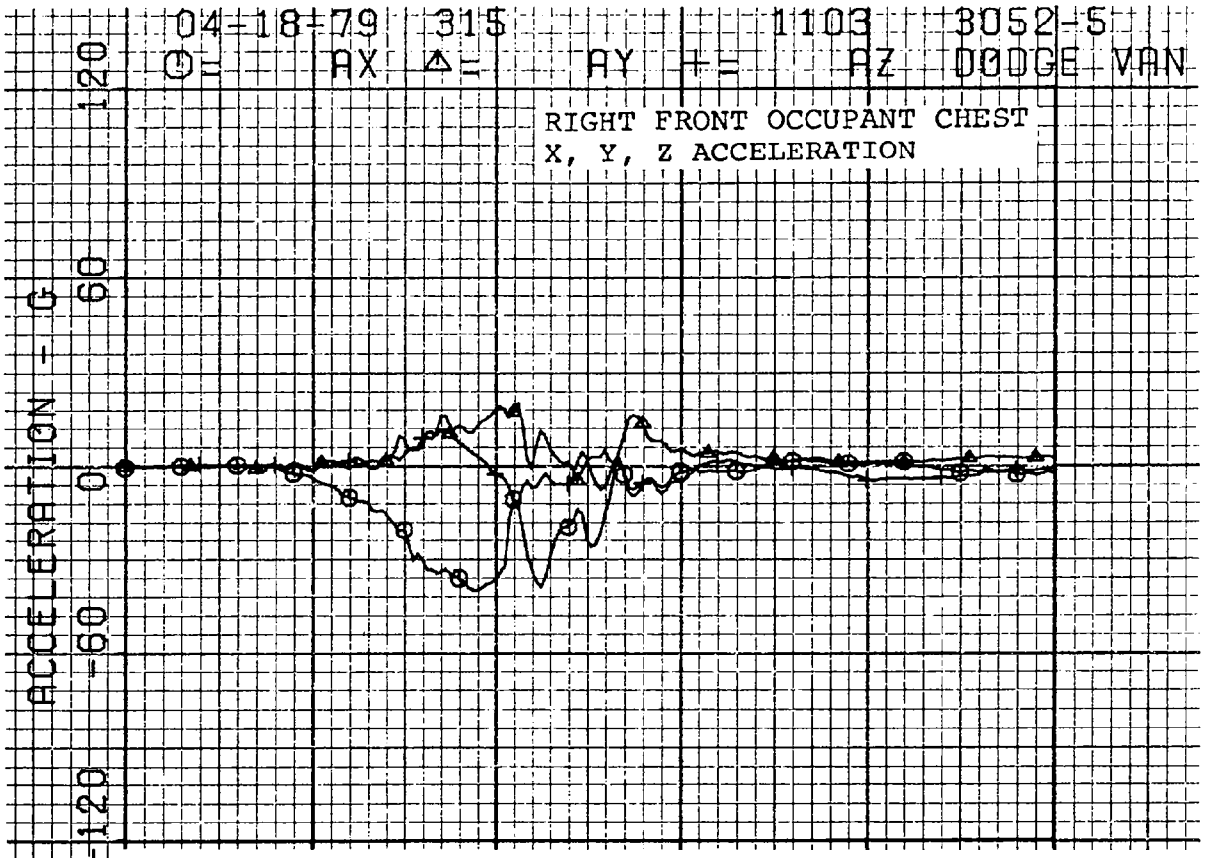

04-18-79 315 1101 3052-5
DODGE VAN
LEFT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

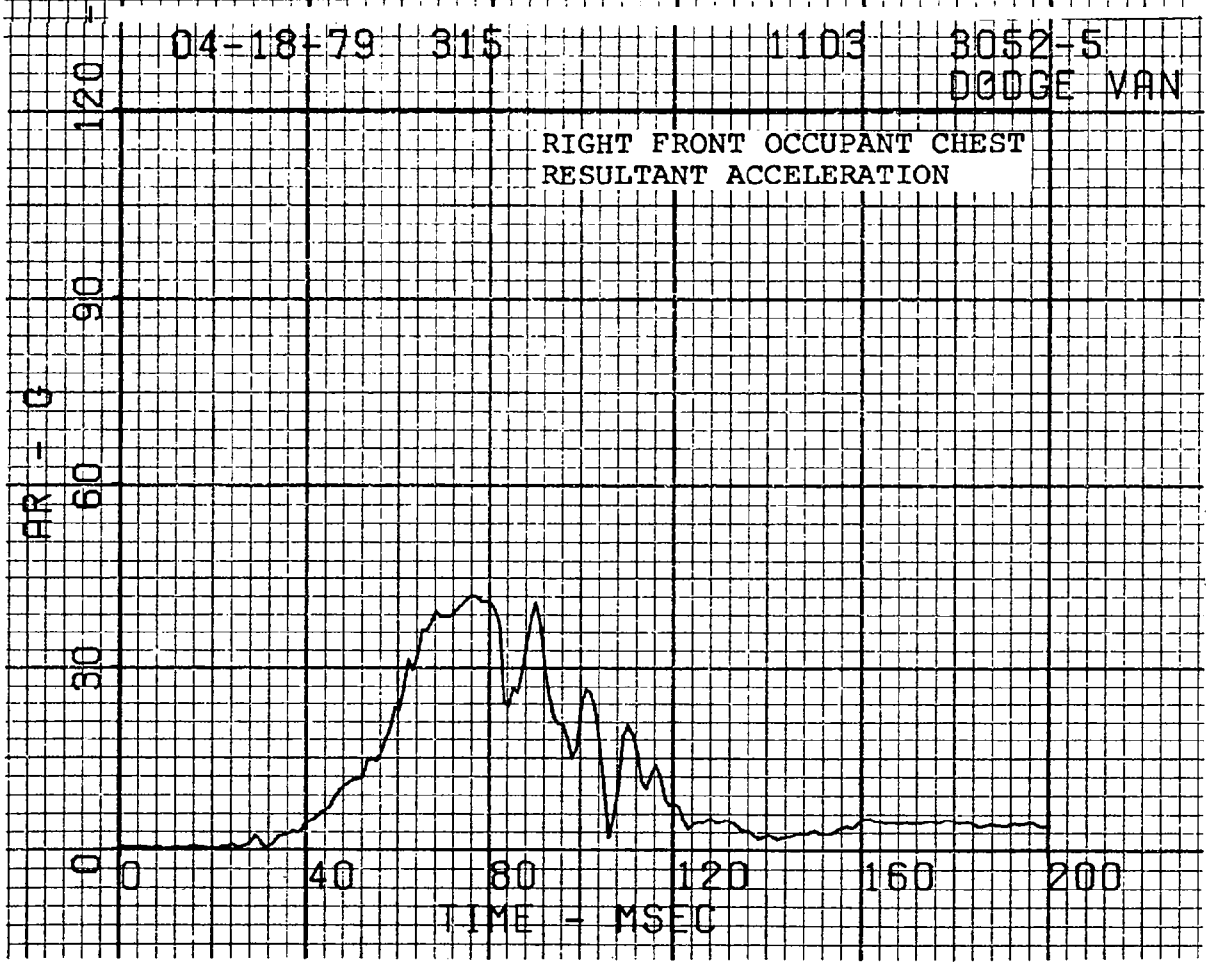

04-18-79 1000 2011 3052-5
DODGE VAN
LEFT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
0
-100
-200
-300

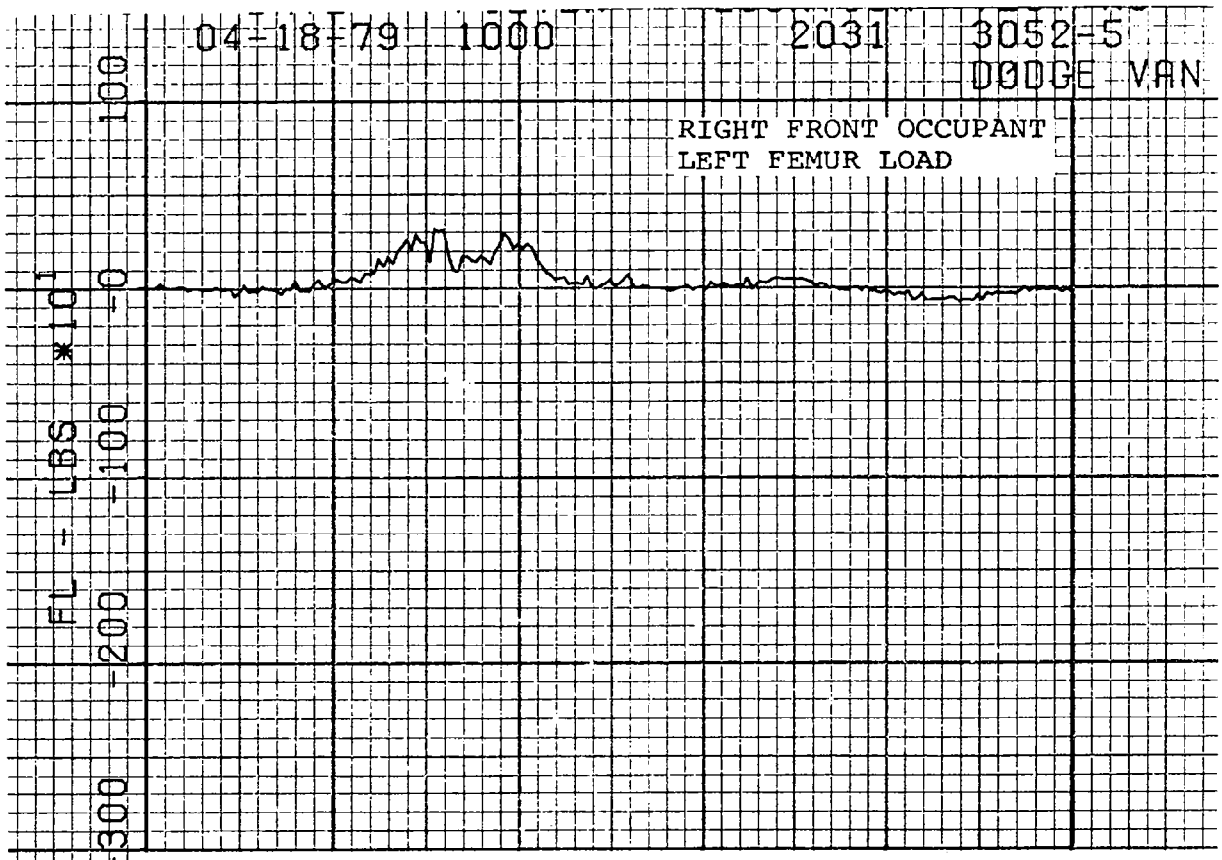

04-18-79 1000 2012 3052-5
DODGE VAN
LEFT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

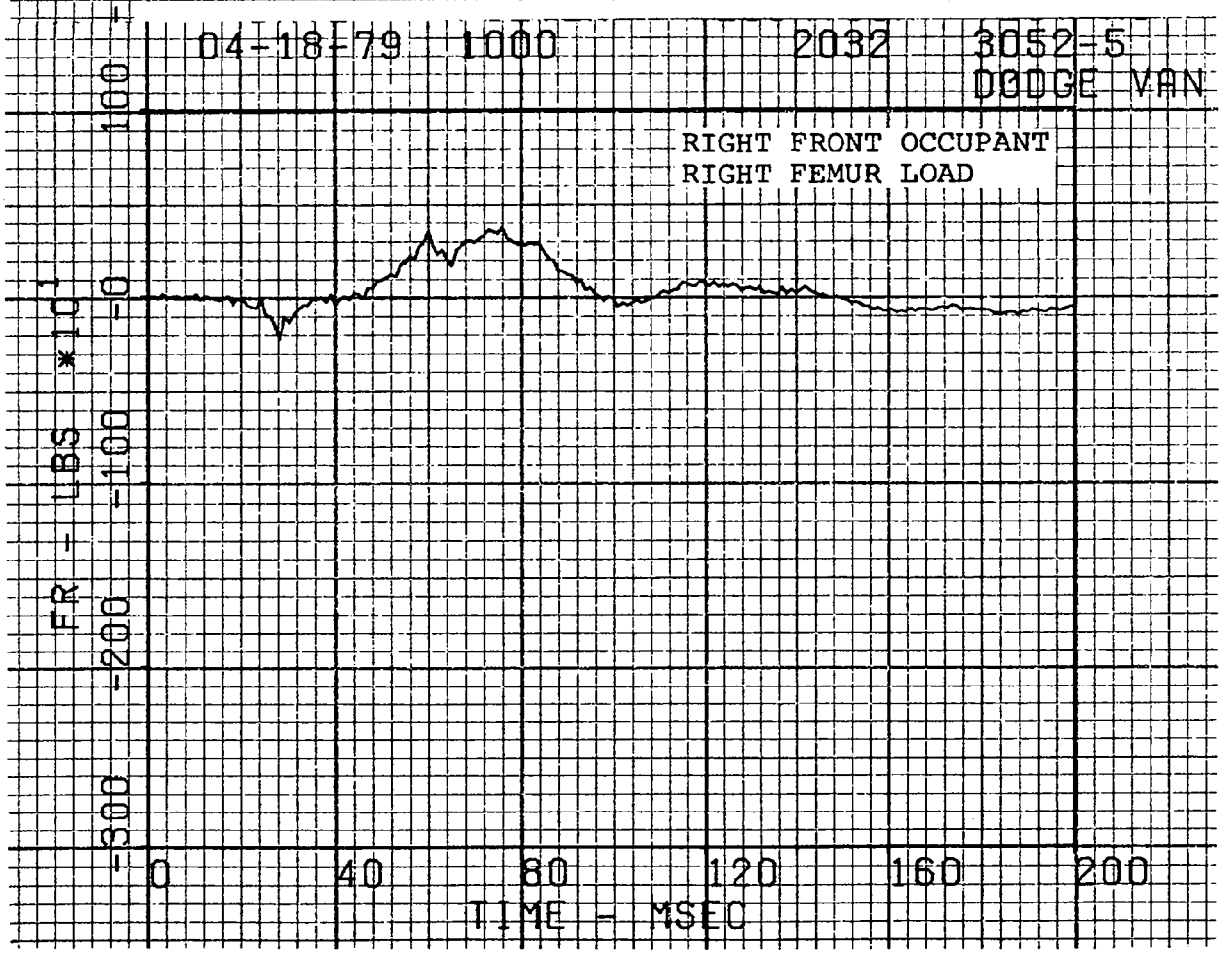

04-18-79 31$/100 4101 3052-5
O=LAPBLTL △=LAPBLTR +=SH BLT DODGE VAN
LEFT FRONT OCCUPANTS
SEAT BELT LOADS
LBS *10
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC

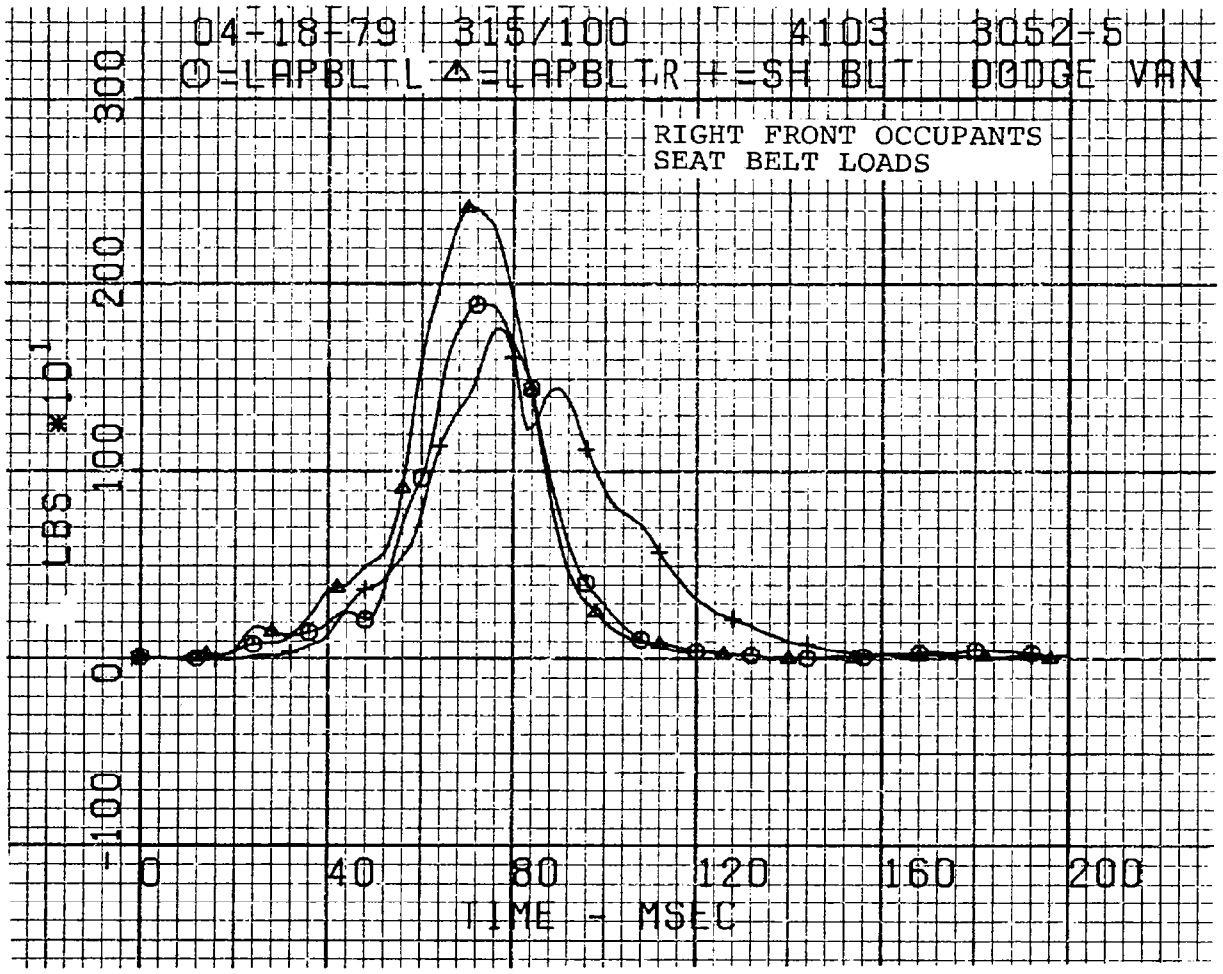

04-18-79 1600 503 3052-5
O= AX Δ= AY += AZ DODGE VAN
RIGHT FRONT OCCUPANT HEAD
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120
04-18-79 1600 503 3052-5
DODGE VAN
RIGHT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

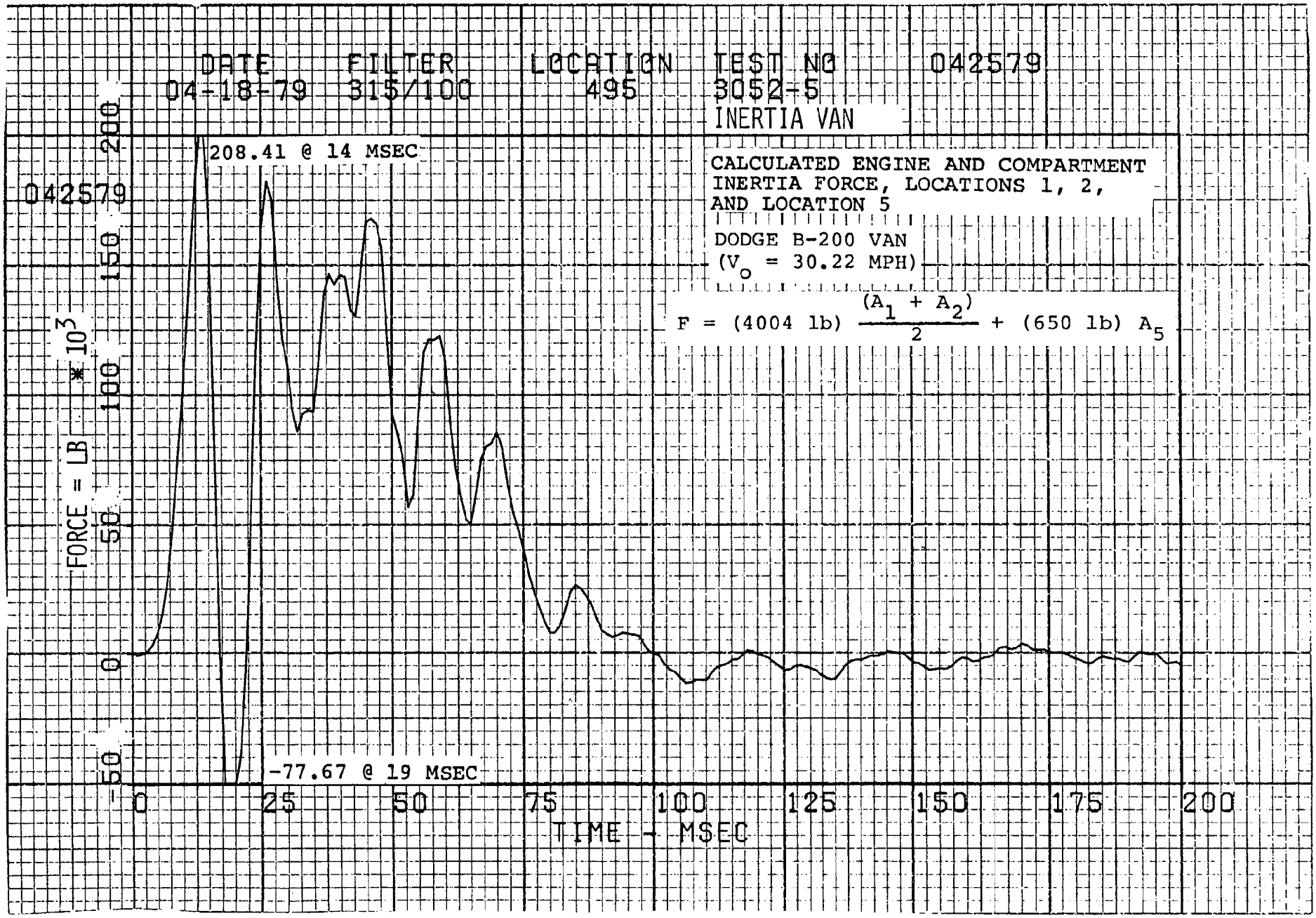

04-18-79 315 1103 3052-5
O= AX Δ= AY += AZ DODGE VAN
RIGHT FRONT OCCUPANT CHEST
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

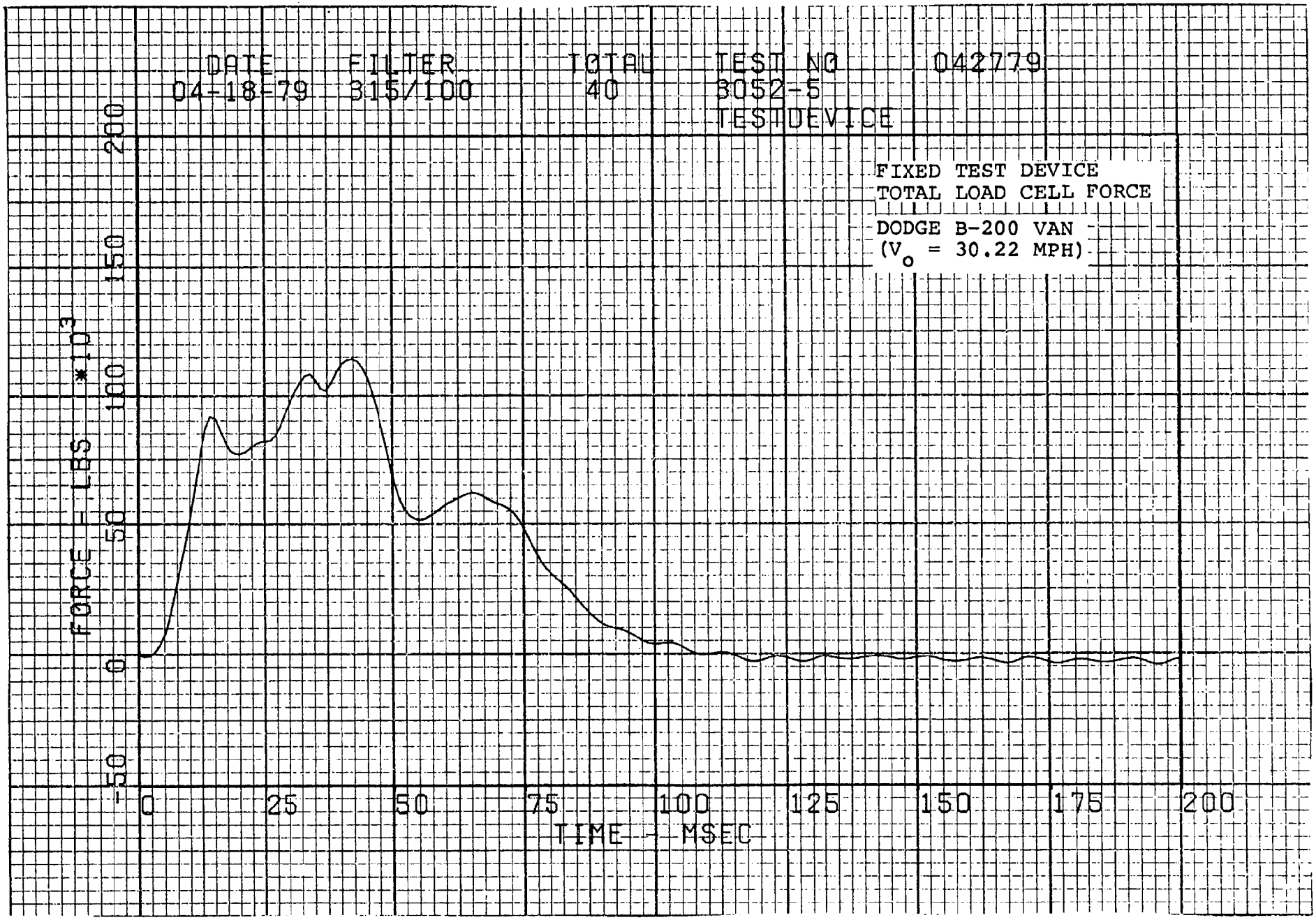

04-18-79 315 1103 3052-5
DODGE VAN
RIGHT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

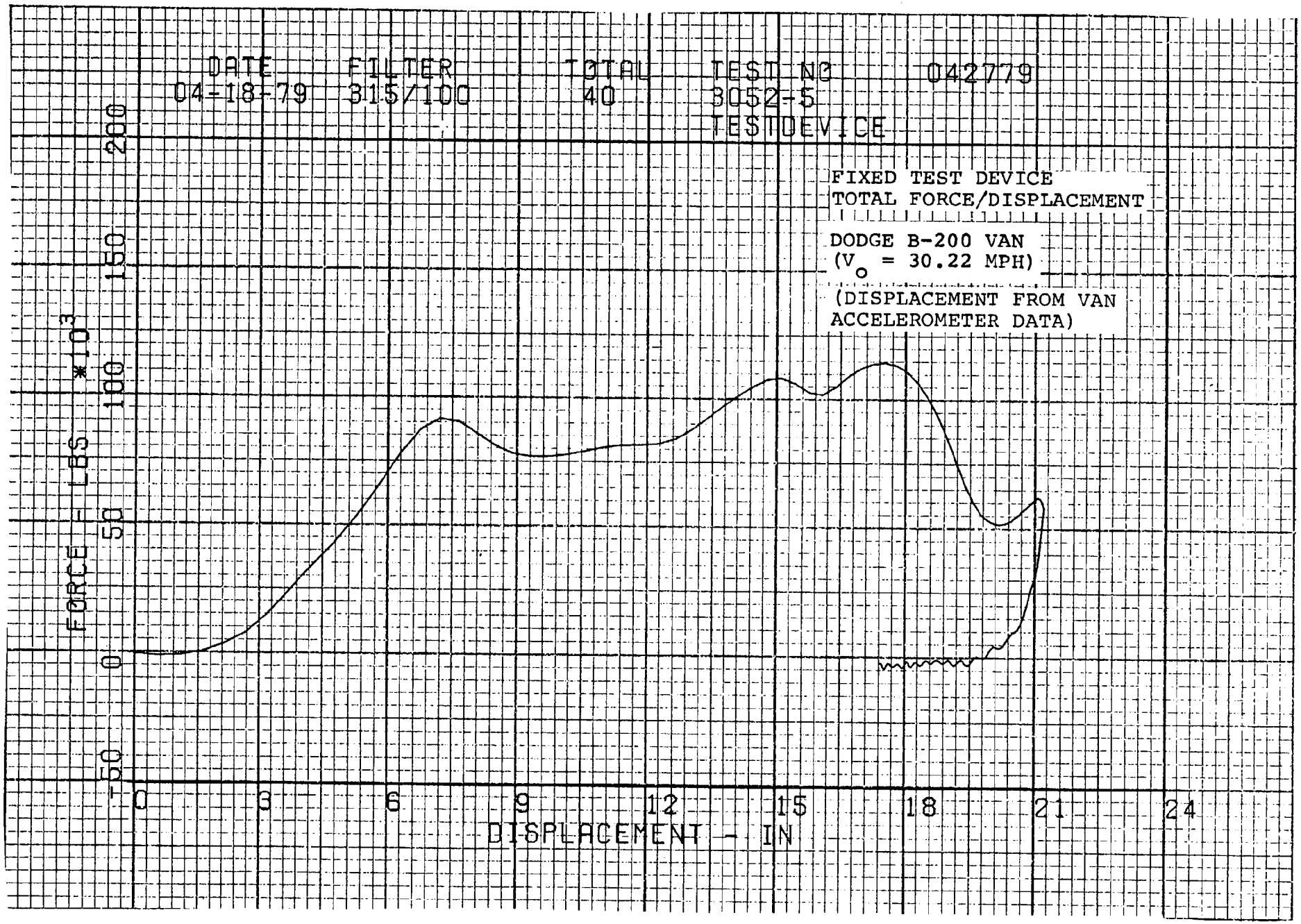

04-18-79 1000 2031 3052-5
DODGE VAN
RIGHT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
-0
-100
-200
-300

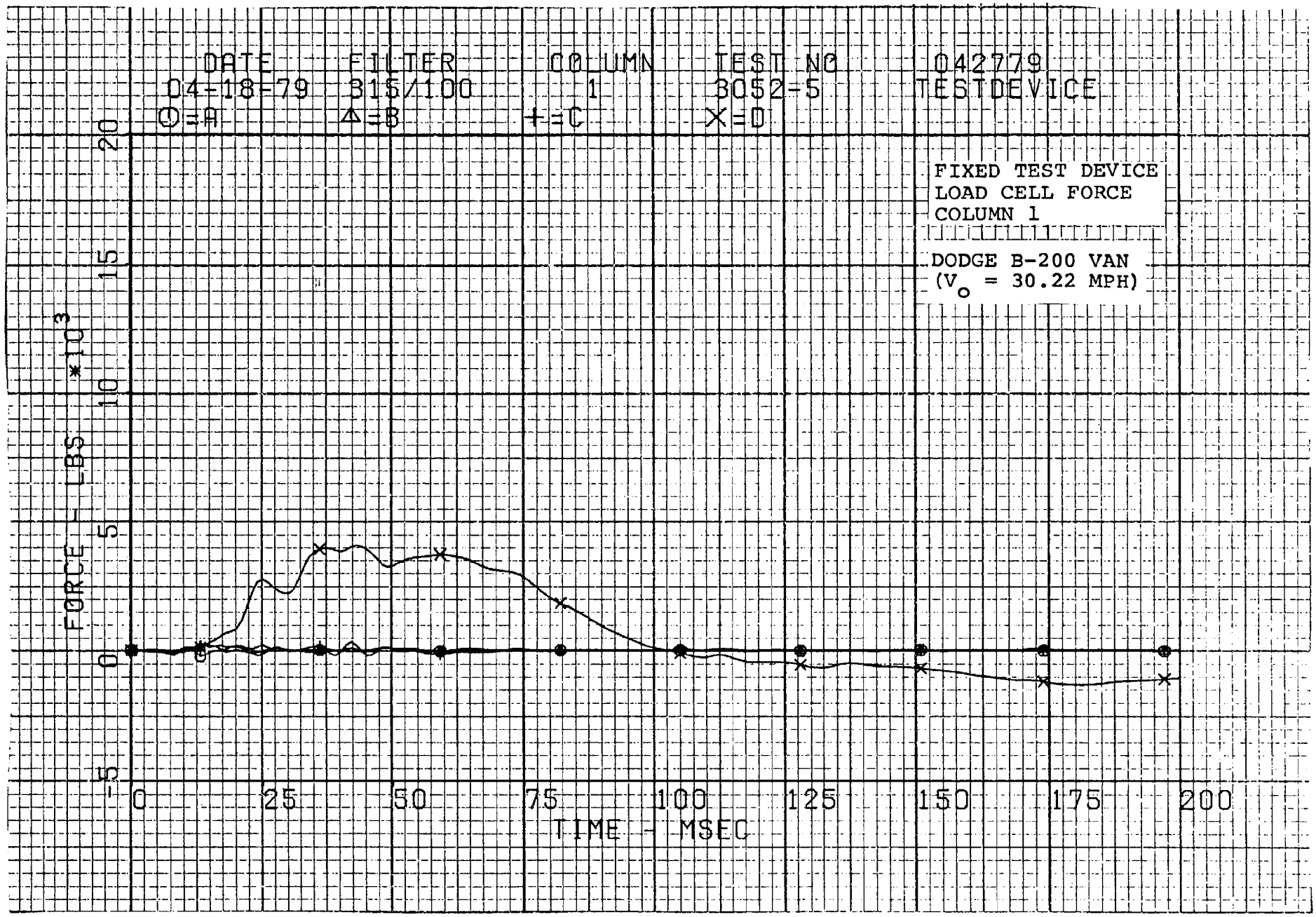

04-18-79 1000 2032 3052-5
DODGE VAN
RIGHT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
-0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

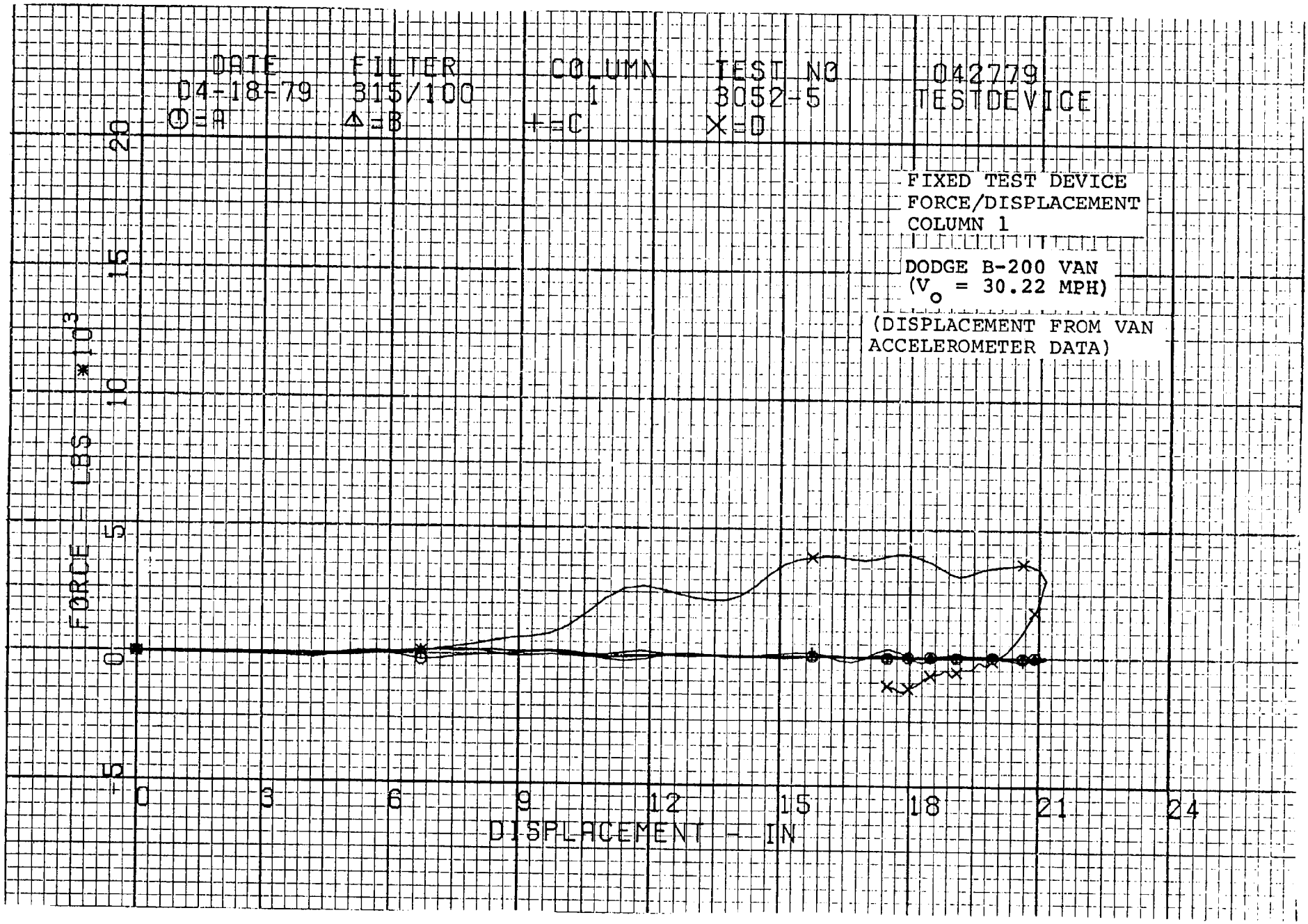

04-18-79 315/100 4103 3052-5
O=LAPBLTL △=LAPBLTR +=SH BLT DODGE VAN
RIGHT FRONT OCCUPANTS
SEAT BELT LOADS
LBS *10^1
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC

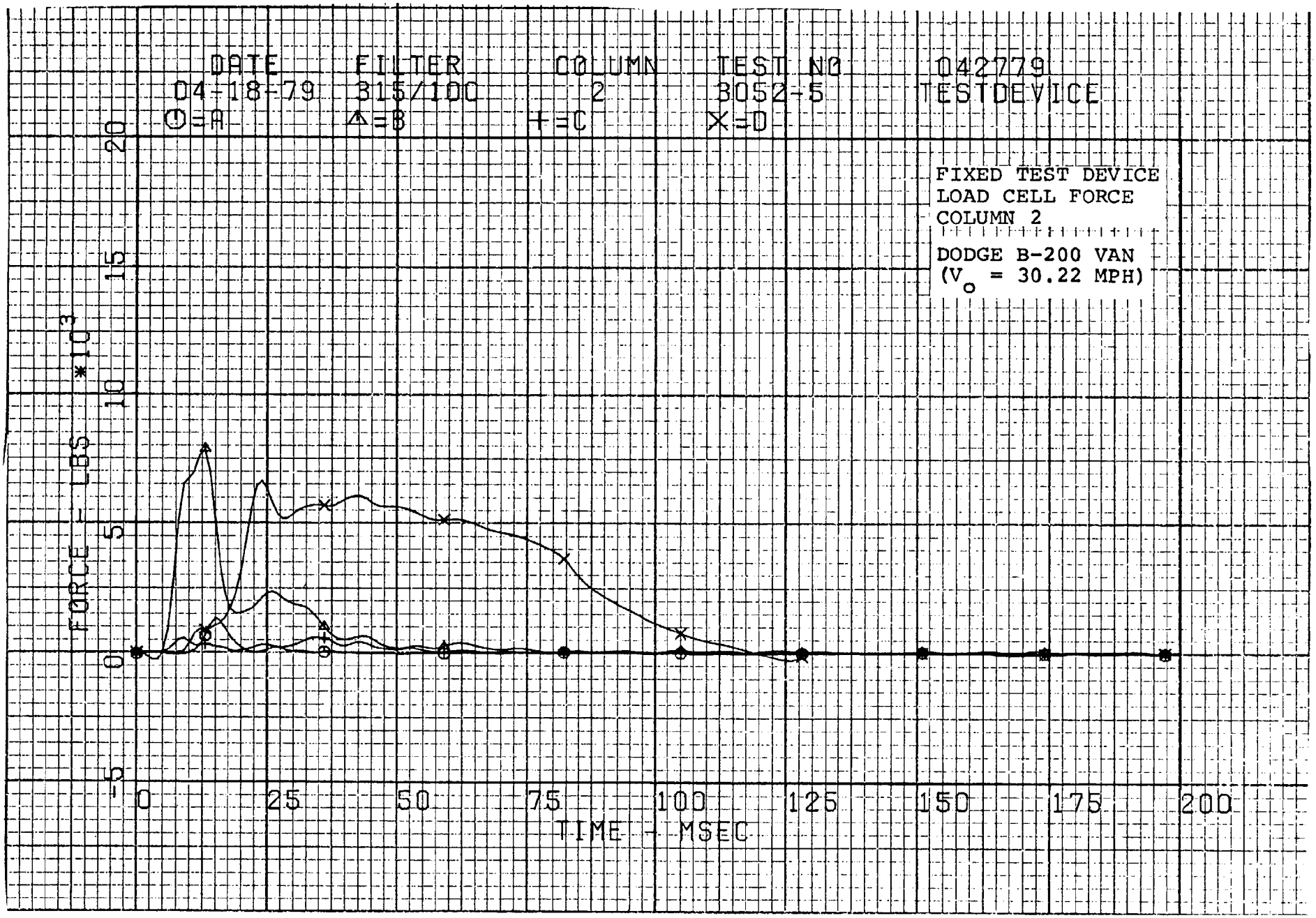

DATE
04-18-79
FILTER
315/100
LOCATION
495
TEST NO
3052-5
INERTIA VAN
042579
042579
208.41 @ 14 MSEC
-77.67 @ 19 MSEC
CALCULATED ENGINE AND COMPARTMENT INERTIA FORCE, LOCATIONS 1, 2, AND LOCATION 5
DODGE B-200 VAN
(V_o = 30.22 MPH)
$F = (4004\ lb)\ \frac{(A_1 + A_2)}{2} + (650\ lb)\ A_5$
FORCE = LB * 10^3
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME → MSEC

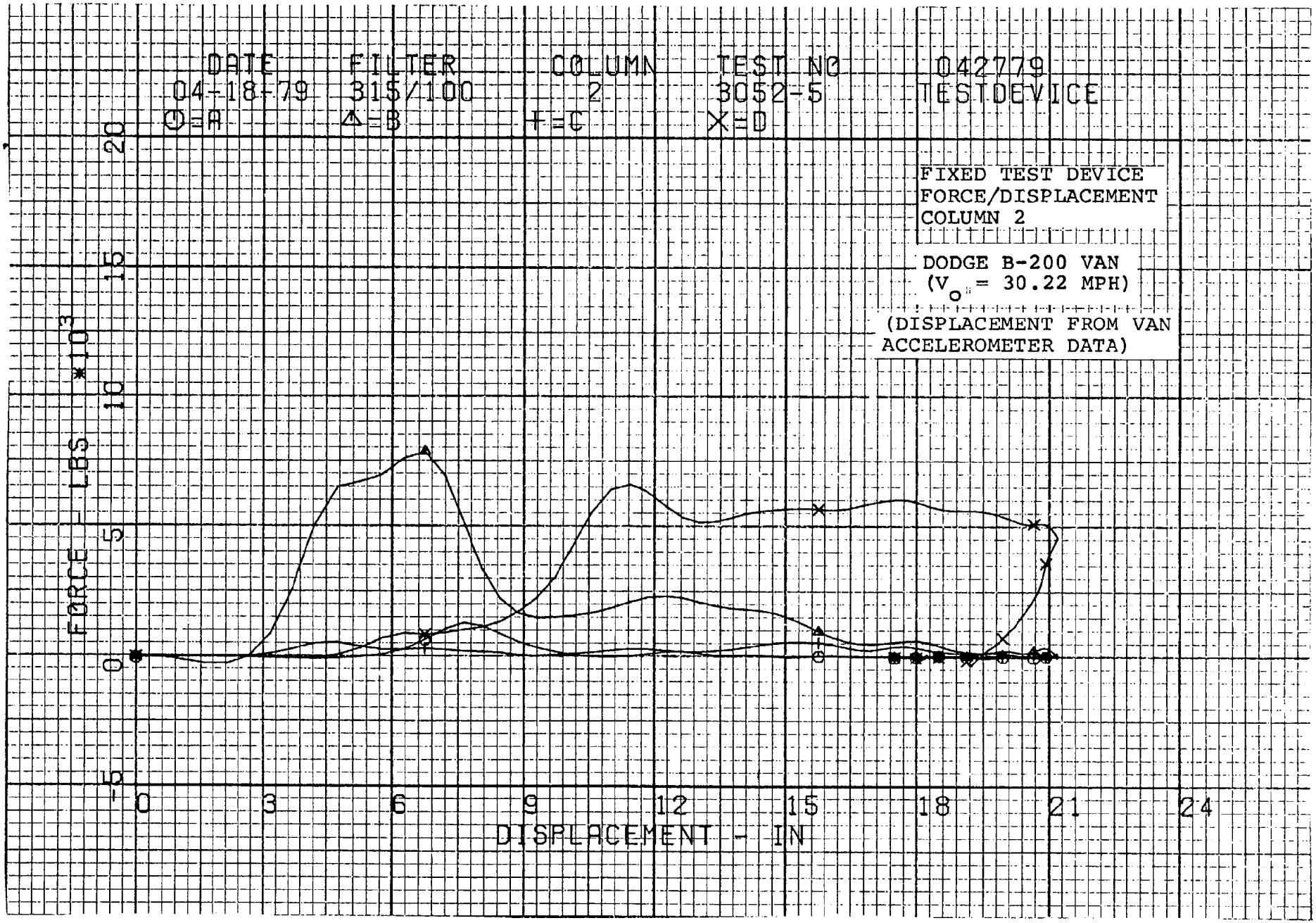

DATE
04-18-79
FILTER
315/100
TOTAU
40
TEST NO
042779
3052-5
TESTDEVICE
FIXED TEST DEVICE
TOTAL LOAD CELL FORCE
DODGE B-200 VAN
(V_o = 30.22 MPH)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME - MSEC

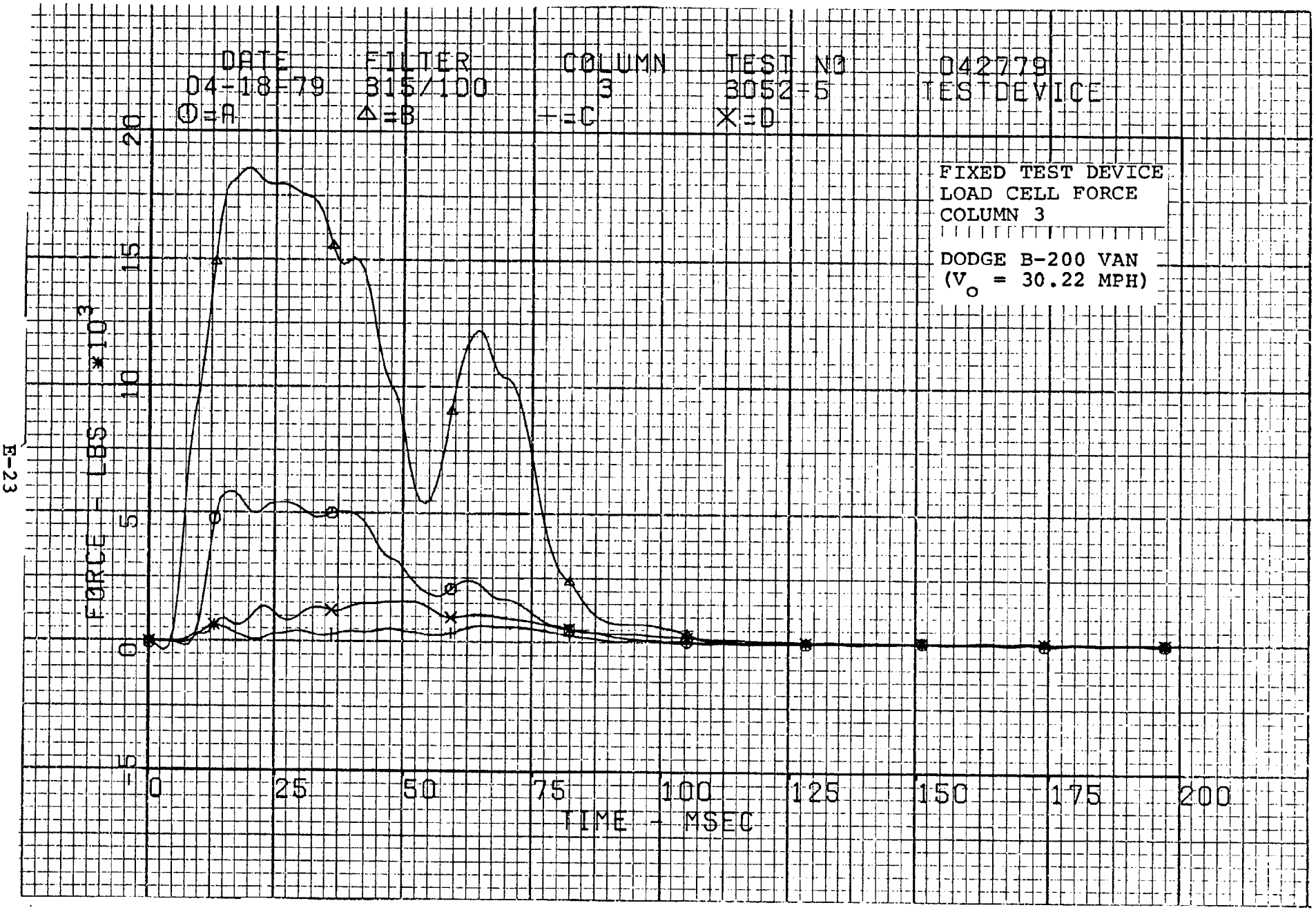

DATE
04-18-79
FILTER
315/100
TOTAL
40
TEST NO
3052-5
TESTDEVICE
042779
FIXED TEST DEVICE
TOTAL FORCE/DISPLACEMENT
DODGE B-200 VAN
(V o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

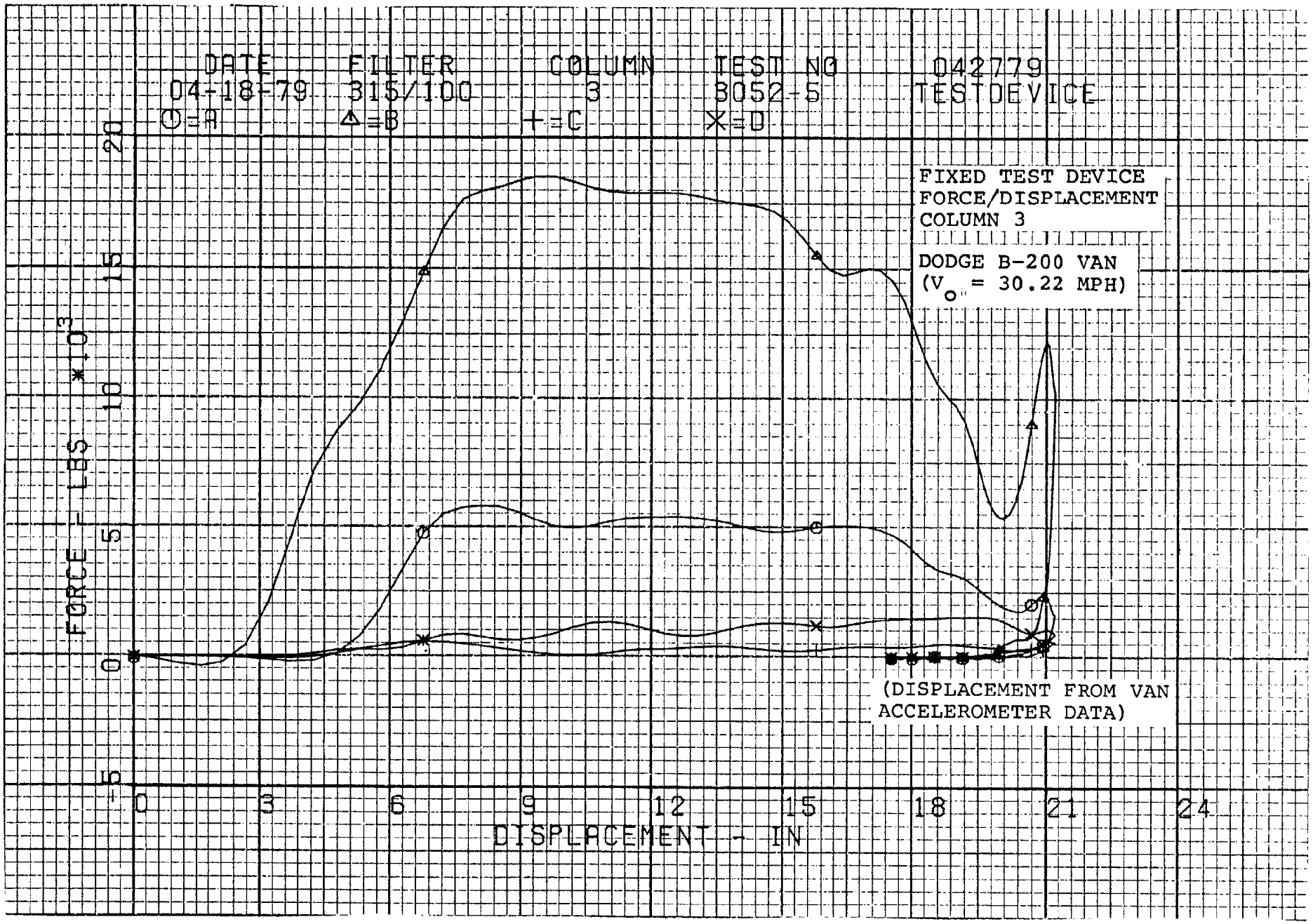

DATE
04-18-79
O=A
FILTER
315/100
Δ=B
COLUMN
1
+=C
TEST NO
3052-5
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 1
DODGE B-200 VAN
(V$_o$ = 30.22 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

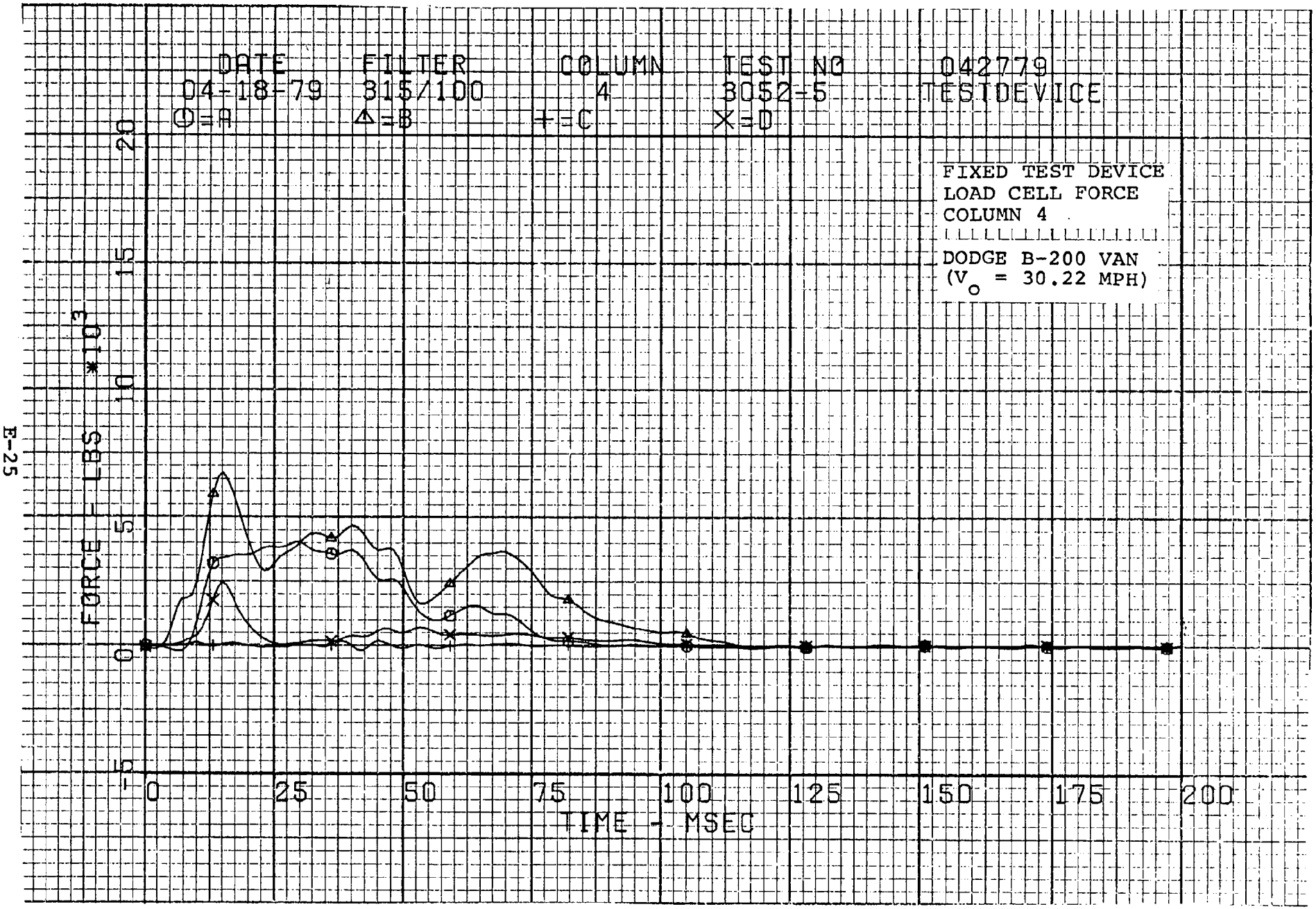

DATE
04-18-79
O=A
FILTER
315/100
Δ=B
COLUMN
1
+=C
TEST NO
3052-5
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 1
DODGE B-200 VAN
(V_o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

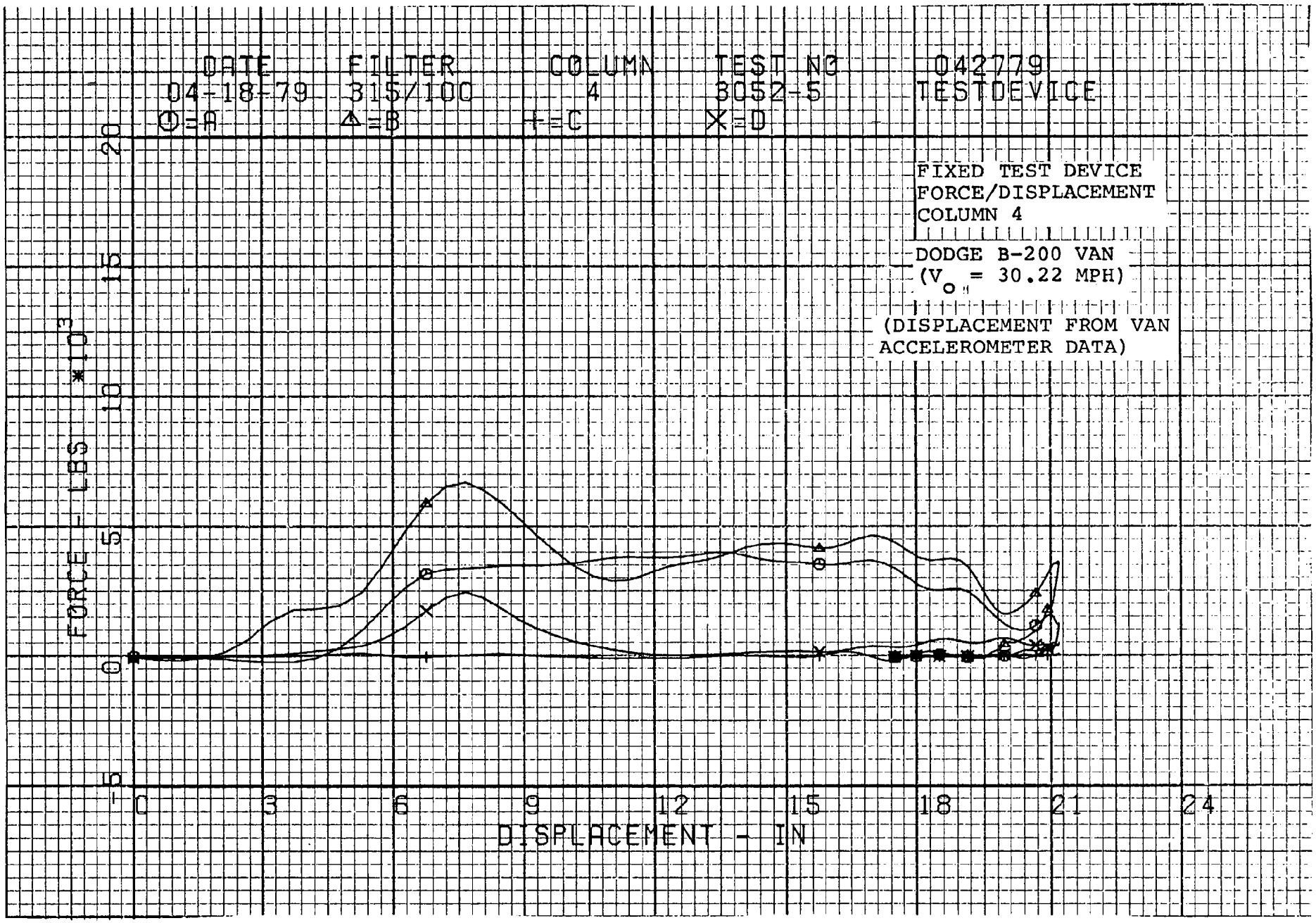

DATE
04-18-79
FILTER
315/100
COLUMN
2
TEST NO
3052-5
042779
TESTDEVICE
⊙=A
△=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 2
DODGE B-200 VAN
(V_o = 30.22 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

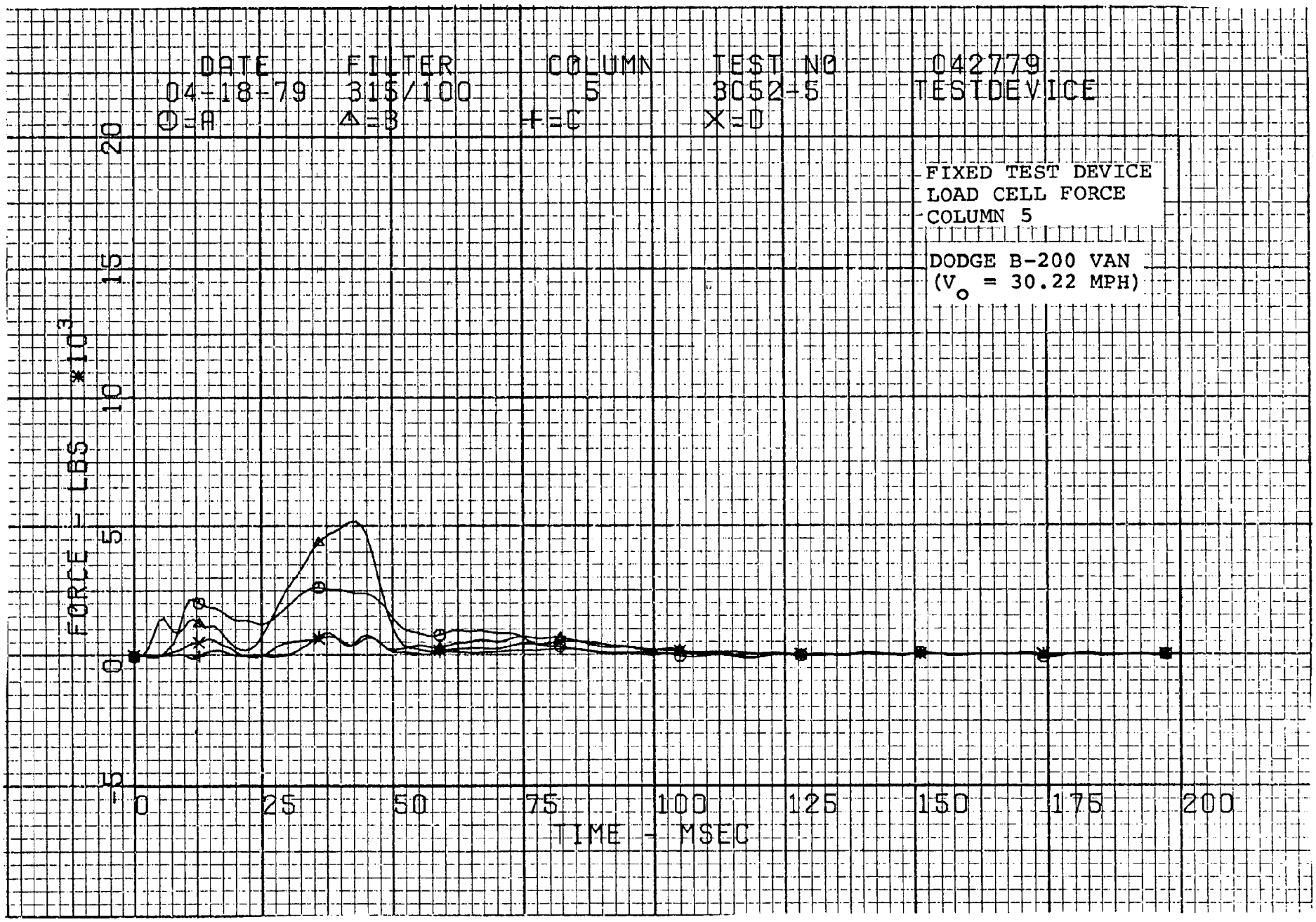

DATE
04-18-79
FILTER
315/100
COLUMN
2
TEST NO
3052-5
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 2
DODGE B-200 VAN
(V_o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

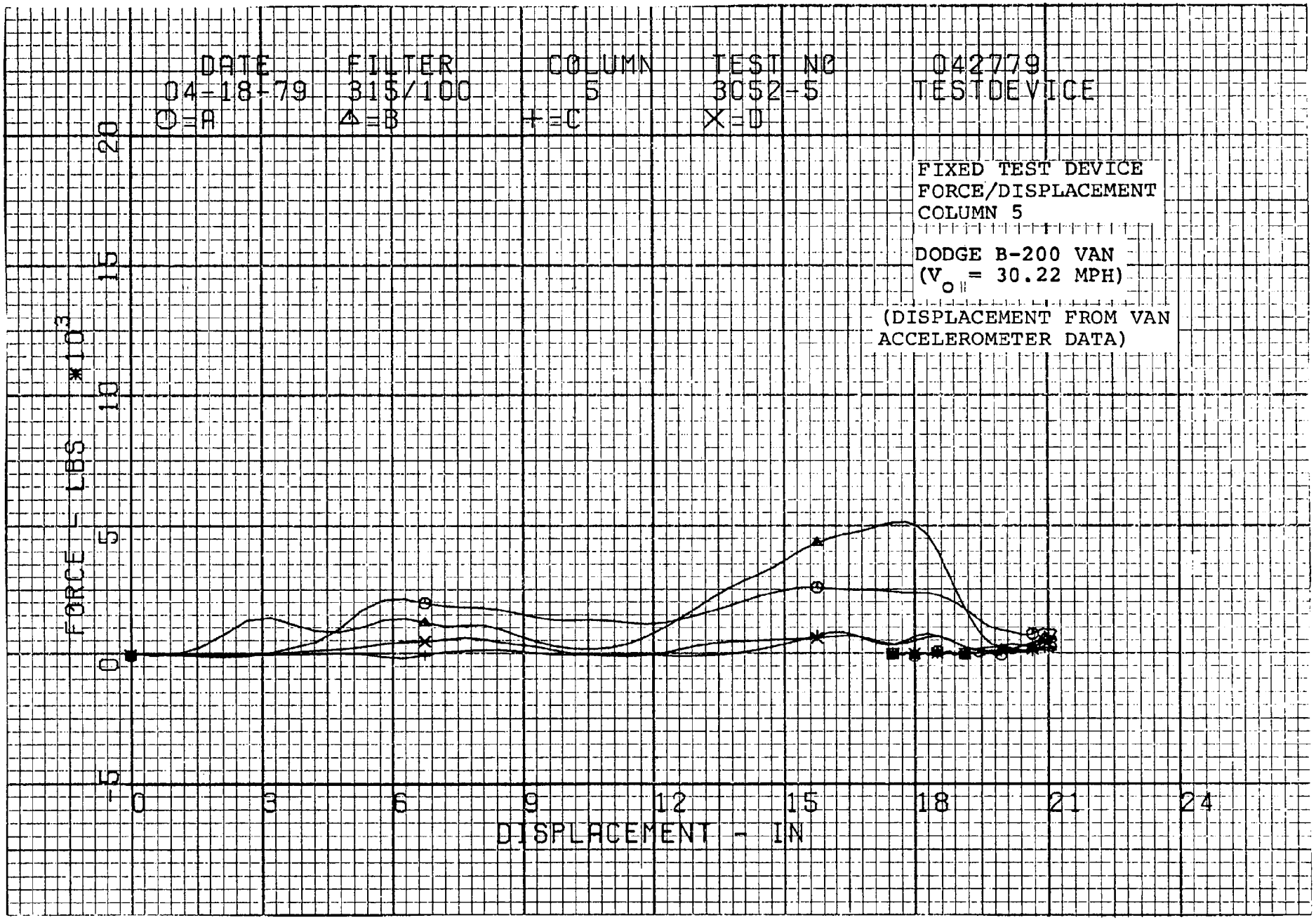

DATE
04-18-79
FILTER
315/100
COLUMN
3
TEST NO
3052-5
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 3
DODGE B-200 VAN
(V o = 30.22 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

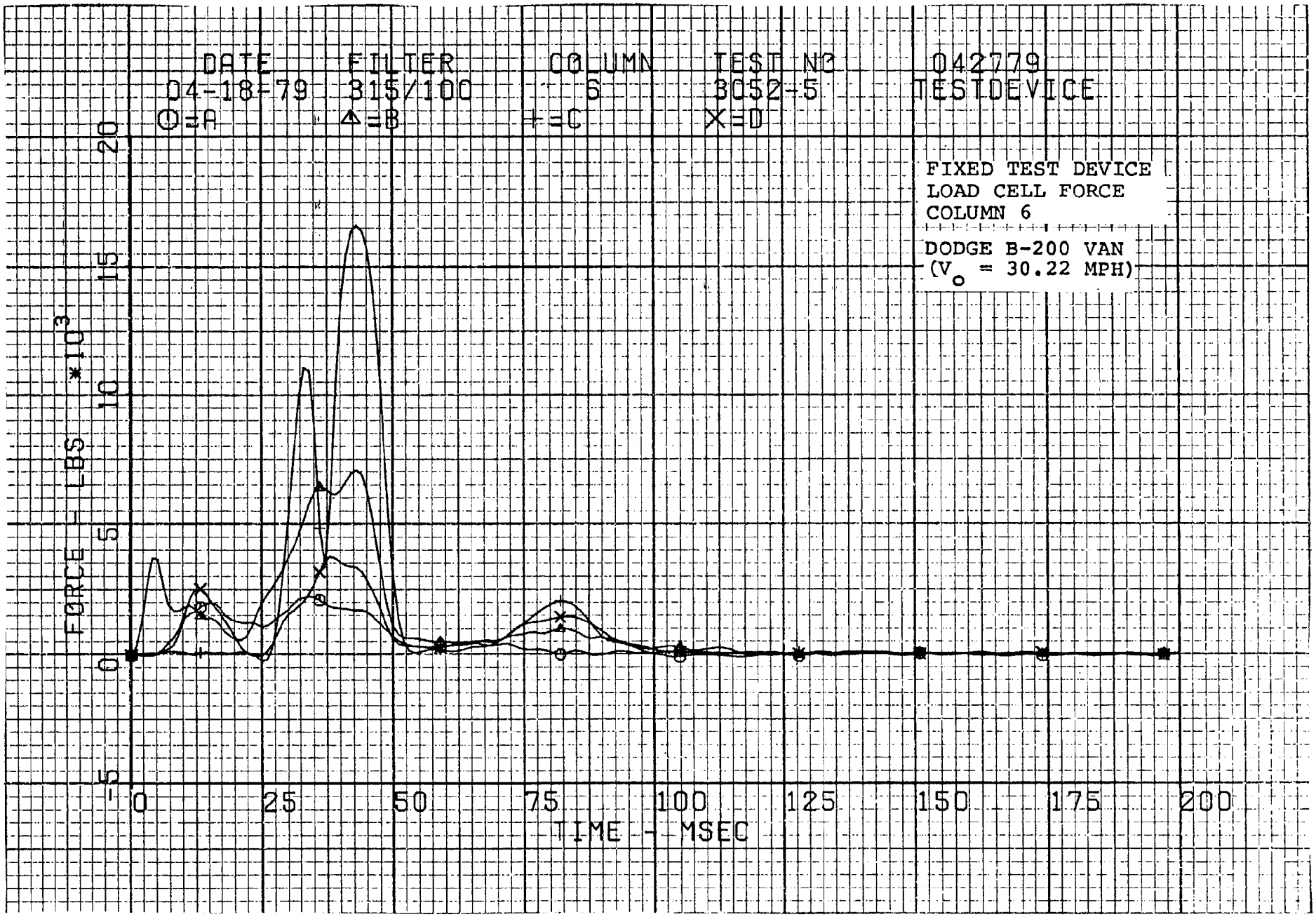

DATE
04-18-79
FILTER
315/100
COLUMN
3
TEST NO
8052-5
042779
TEST DEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 3
DODGE B-200 VAN
(V_o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

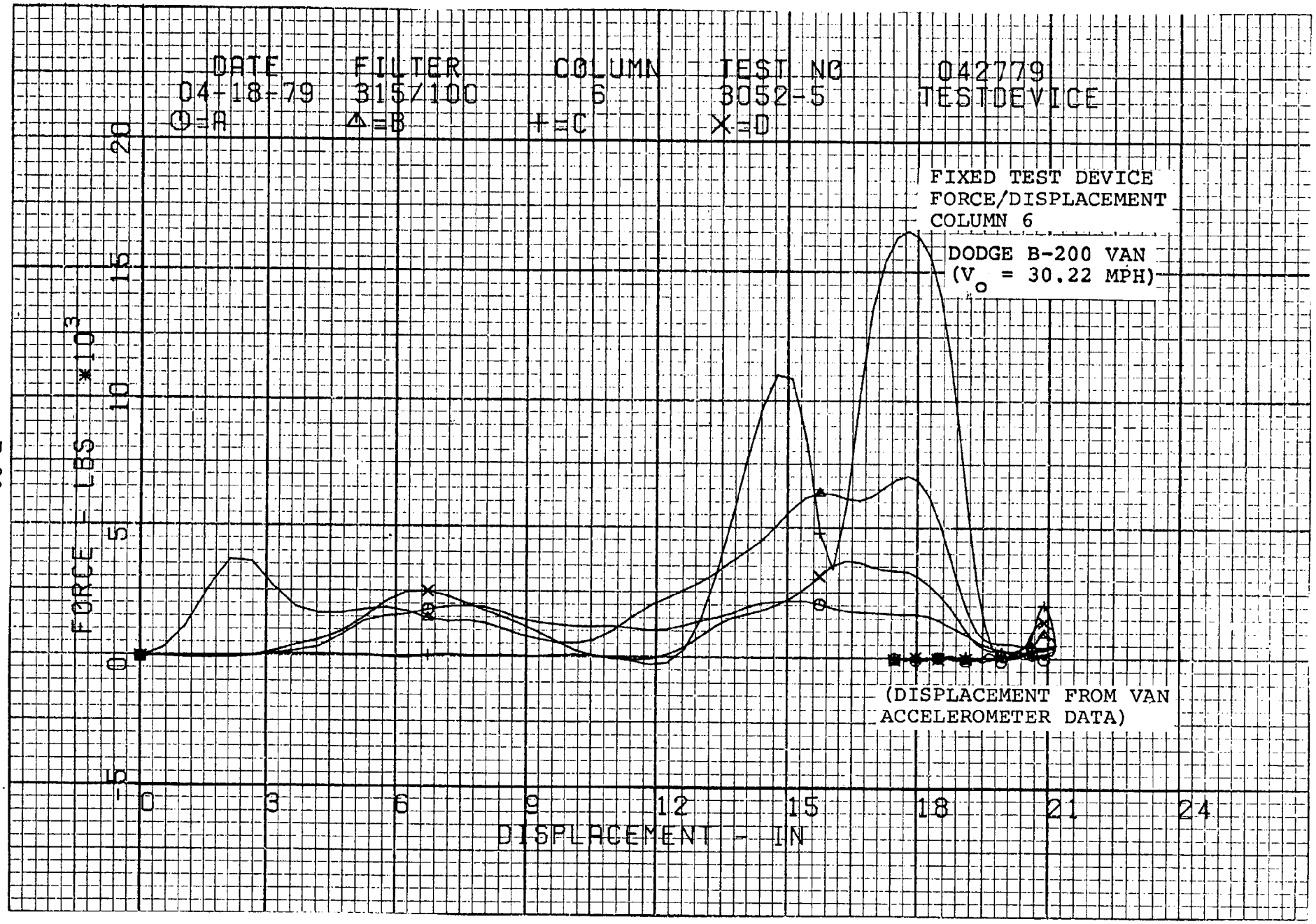

DATE
04-18-79
FILTER
315/100
COLUMN
4
TEST NO
3052-5
042779
TESTDEVICE
⊙=A
△=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 4
DODGE B-200 VAN
(V$_o$ = 30.22 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

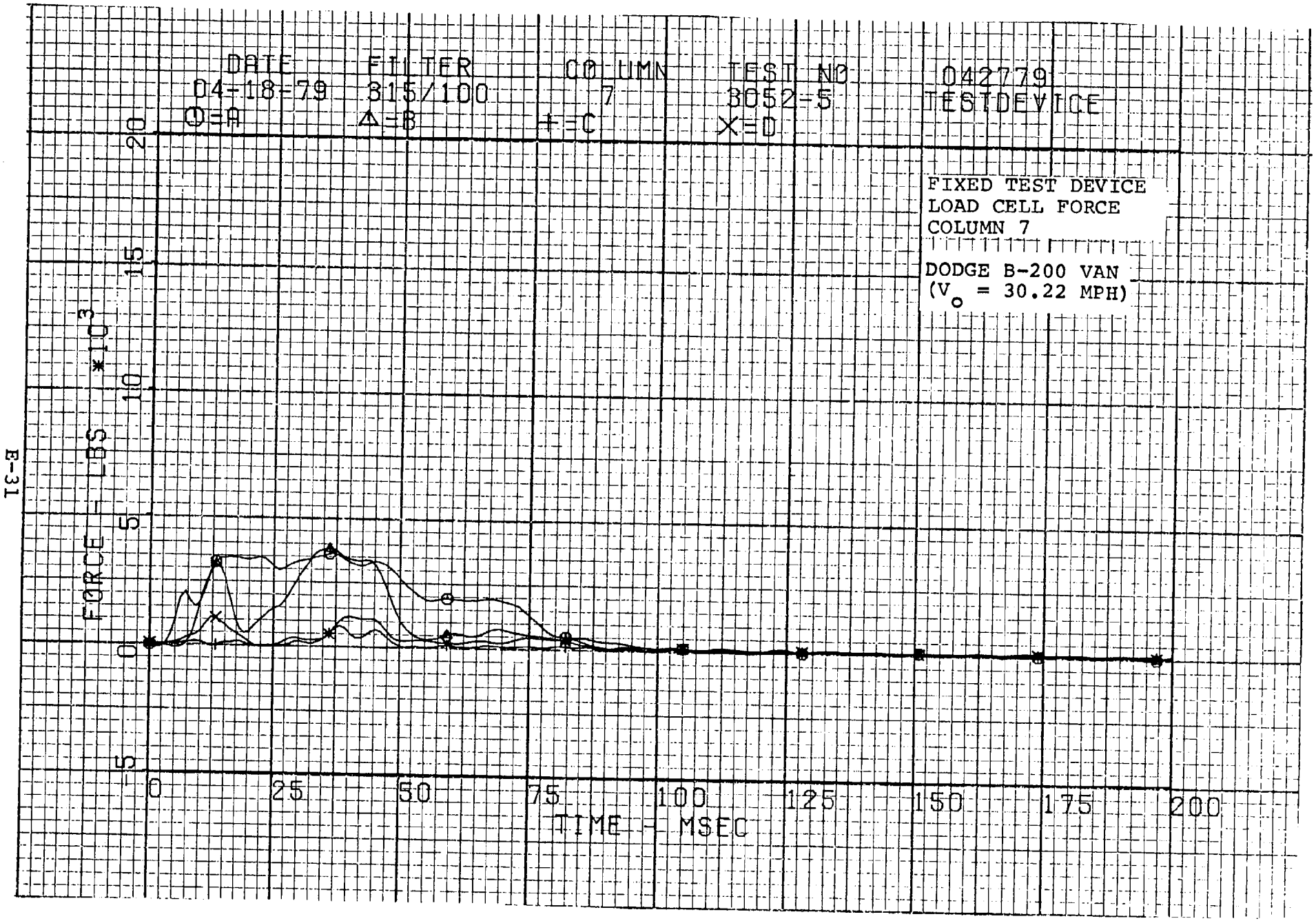

DATE
04-18-79
FILTER
315/100
COLUMN
4
TEST NO
8052-5
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 4
DODGE B-200 VAN
(V o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS * 10 3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

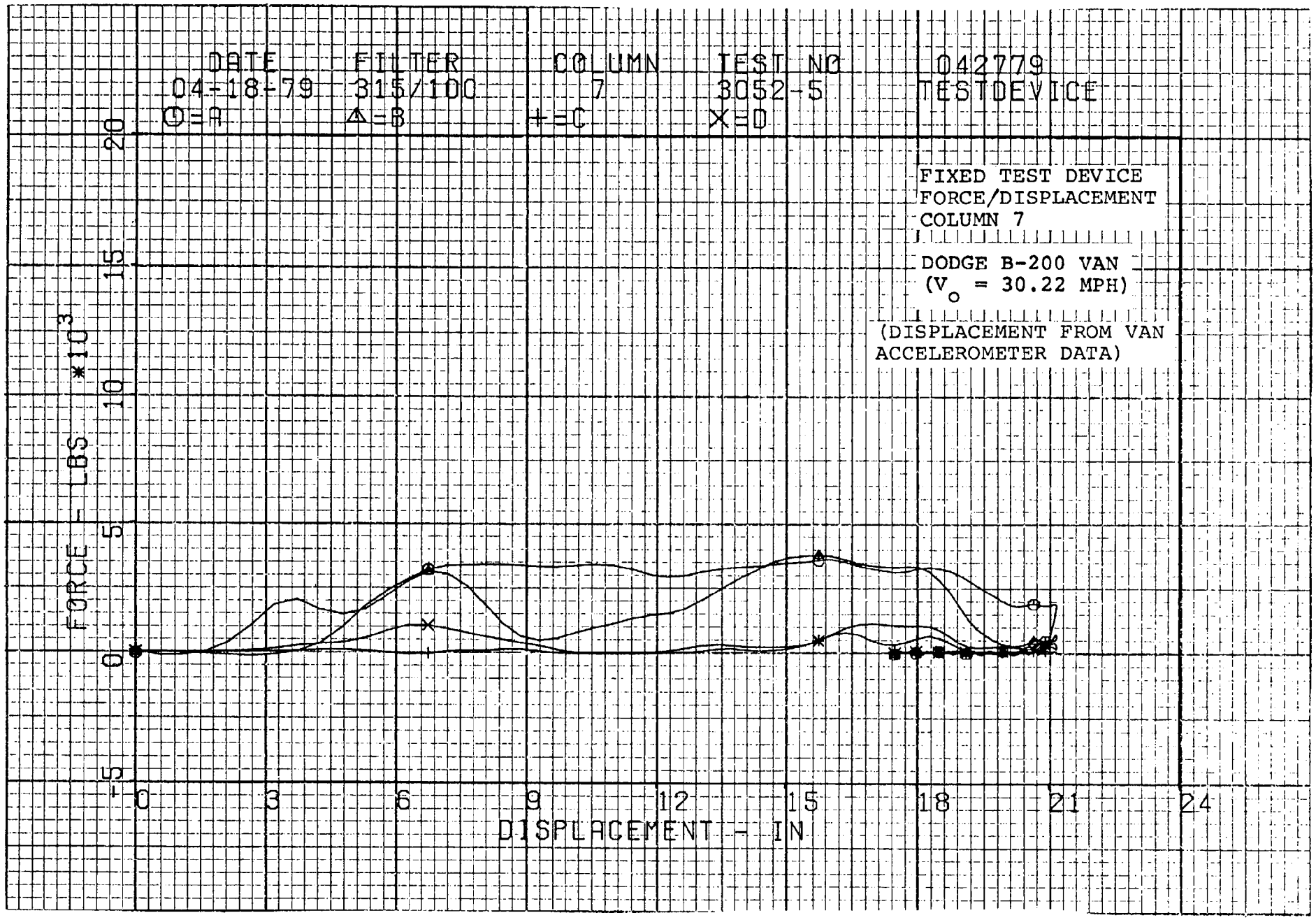

DATE
04-18-79
FILTER
315/100
COLUMN
5
TEST NO
3052-5
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 5
DODGE B-200 VAN
(V o = 30.22 MPH)
FORCE - LBS *10 3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

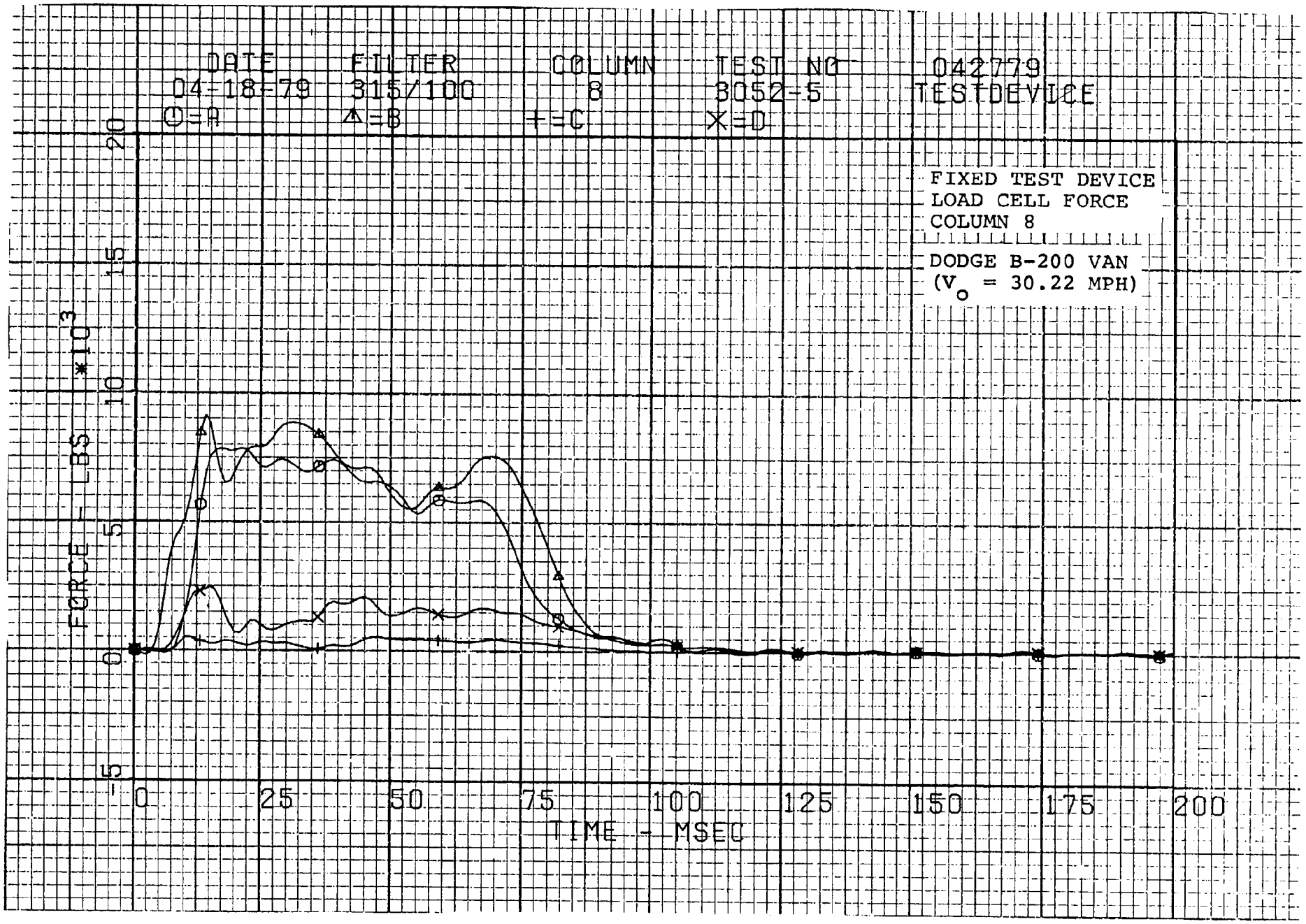

DATE
04-18-79
O=A
FILTER
315/100
Δ=B
COLUMN
5
+=C
TEST NO
3052-5
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 5
DODGE B-200 VAN
(V_o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

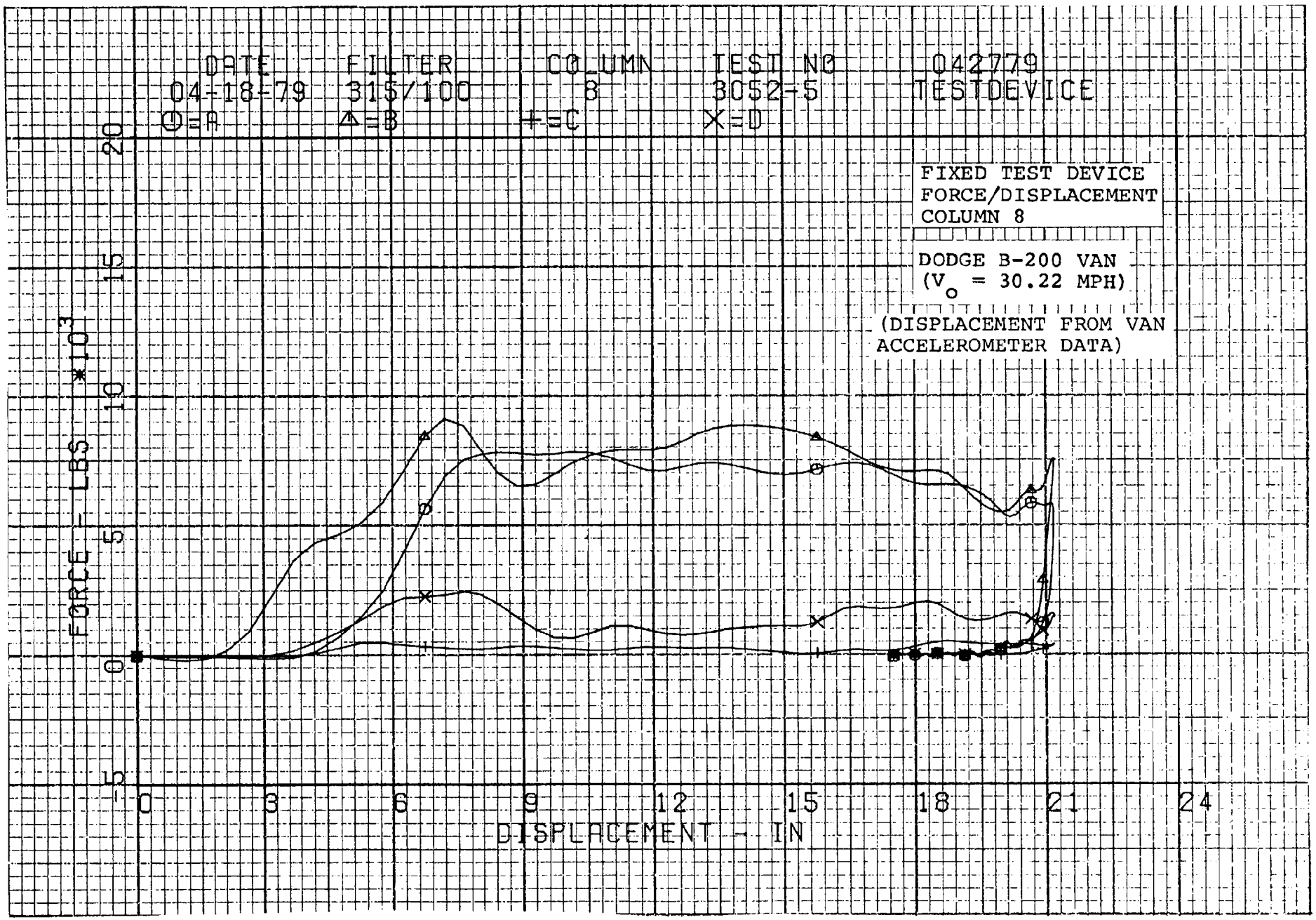

DATE
04-18-79
O=A
FILTER
315/100
▲=B
COLUMN
6
+=C
TEST NO
3052-5
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 6
DODGE B-200 VAN
(V_o = 30.22 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

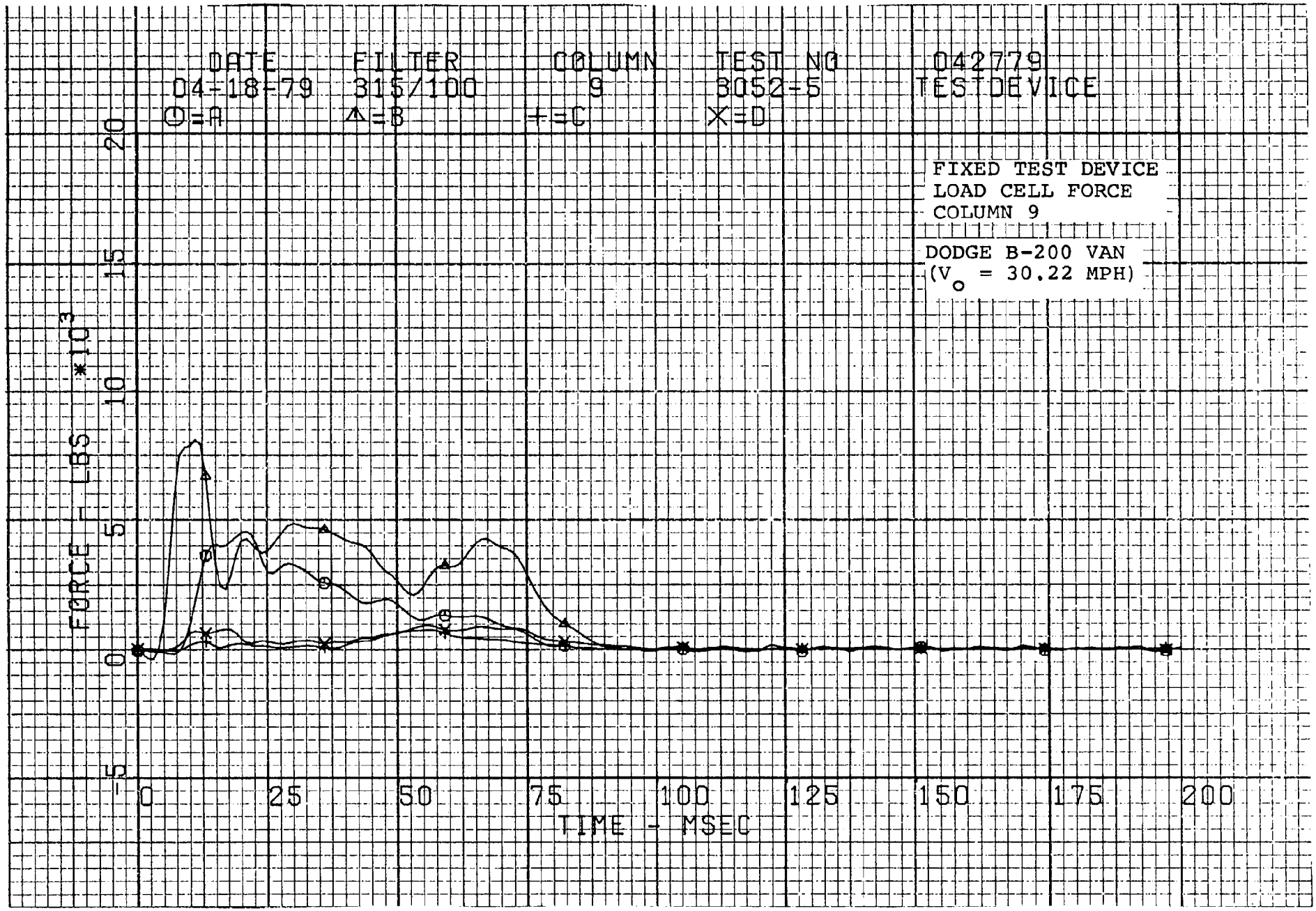

DATE
04-18-79
FILTER
315/100
COLUMN
6
TEST NO
3052-5
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 6
DODGE B-200 VAN
(V_o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
-5
0
5
10
15
20
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN


DATE
04-18-79
O=A
FILTER
315/100
Δ=B
COLUMN
7
+=C
TEST NO
3052-5
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 7
DODGE B-200 VAN
(V$_o$ = 30.22 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-18-79
FILTER
315/100
COLUMN
7
TEST NO
3052-5
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 7
DODGE B-200 VAN
(V_o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN


DATE
04-18-79
FILTER
315/100
COLUMN
8
TEST NO
3052-5
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 8
DODGE B-200 VAN
(V$_o$ = 30.22 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-18-79
FILTER
315/100
COLUMN
8
TEST NO
3052-5
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 8
DODGE B-200 VAN
(V_o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

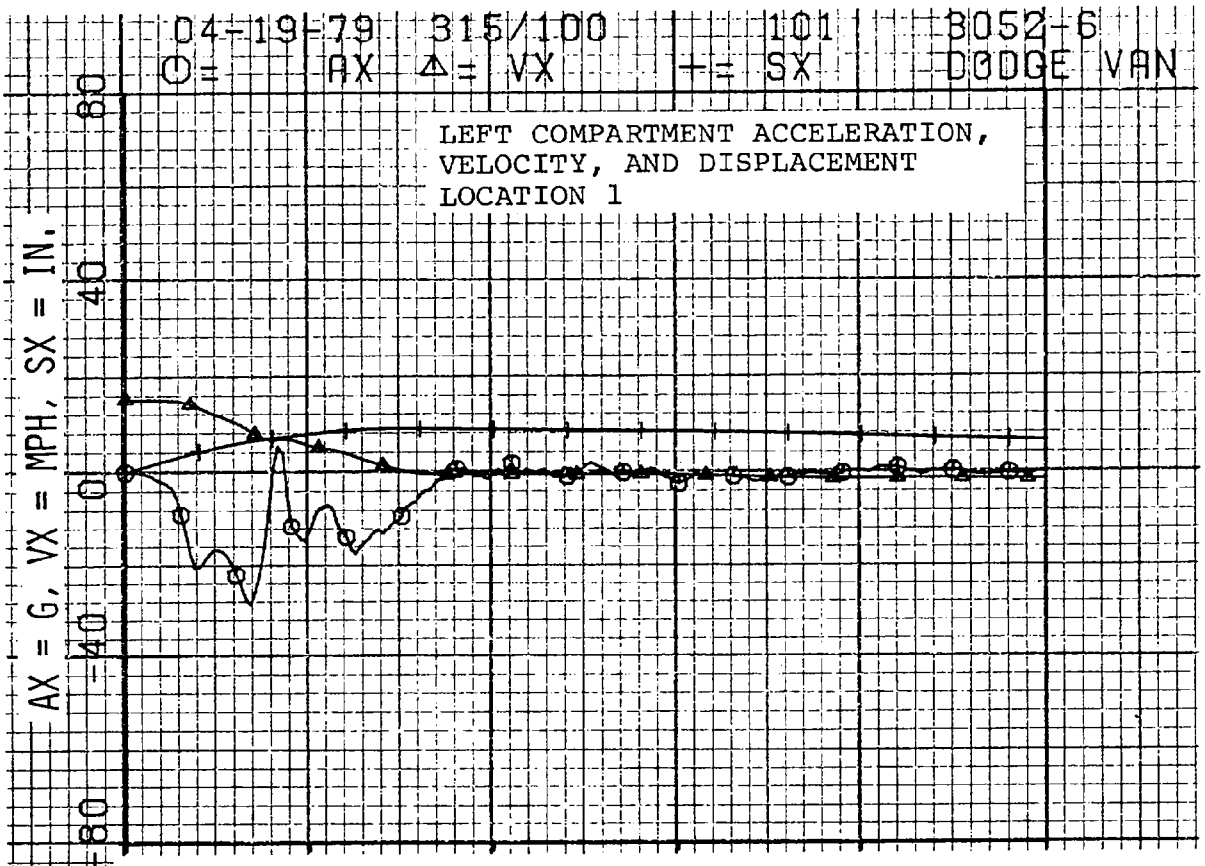

DATE
04-18-79
FILTER
315/100
COLUMN
9
TEST NO
3052-5
042779
TEST DEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 9
DODGE B-200 VAN
(V o = 30.22 MPH)
FORCE F LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

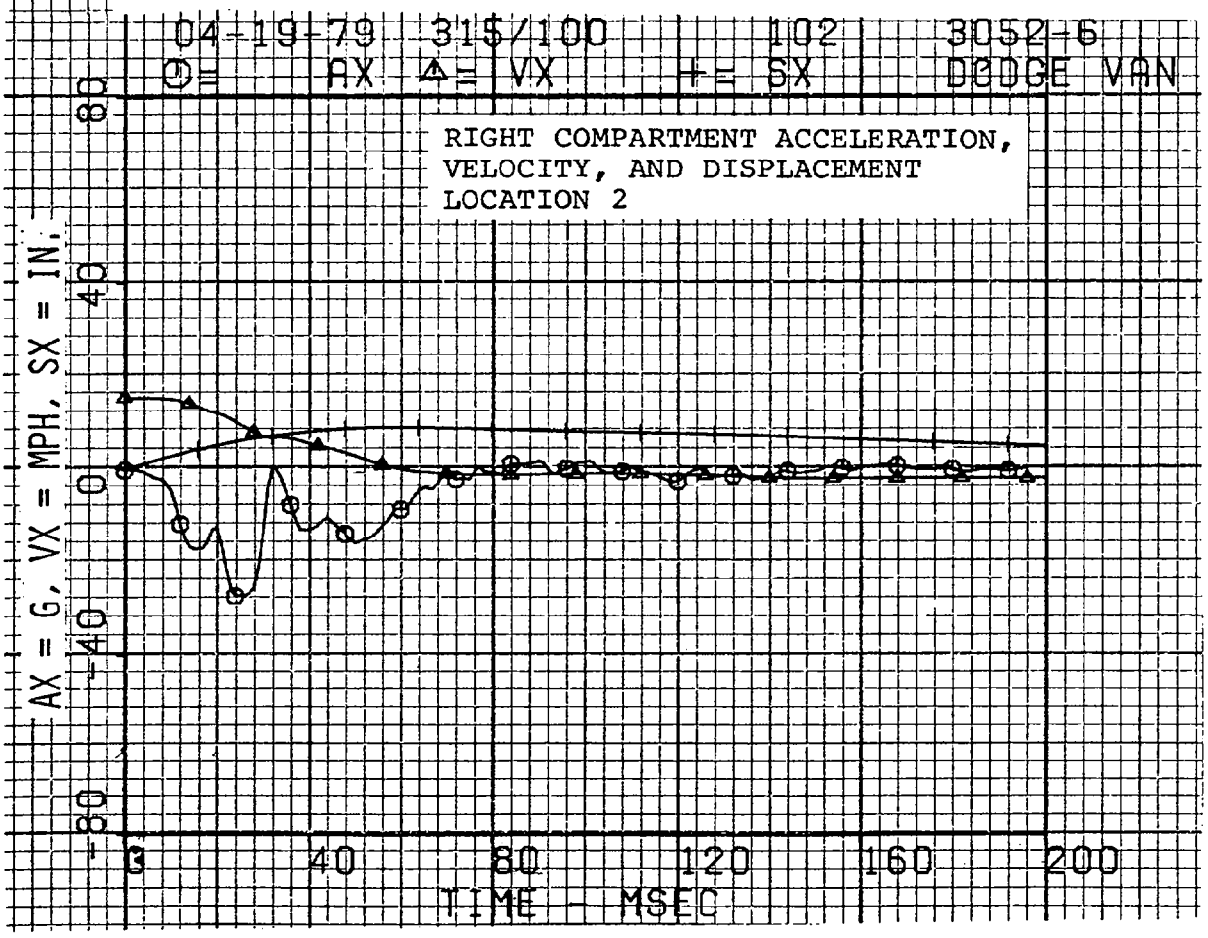
APPENDIX F

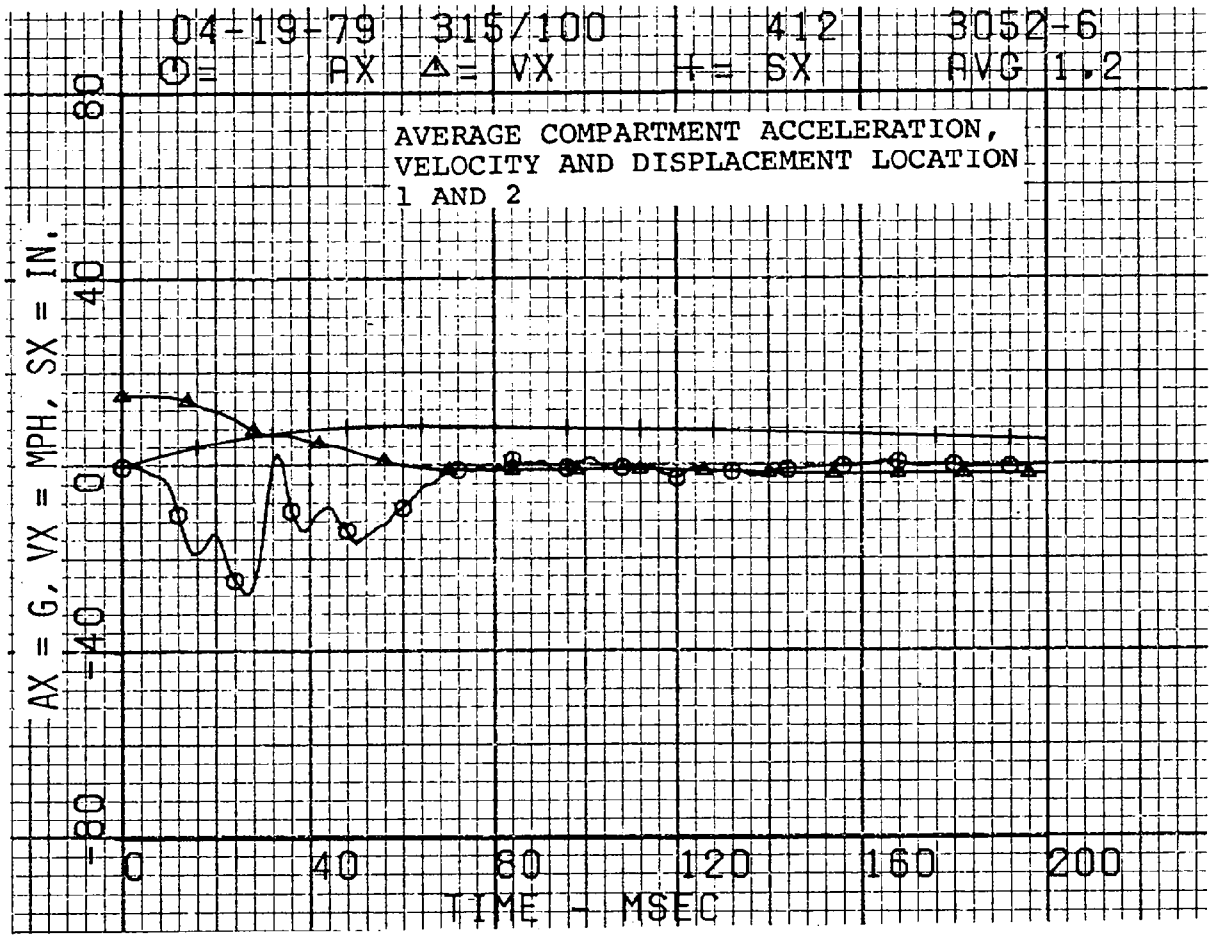
CALCOMP PLOTS FOR TEST 3052-6

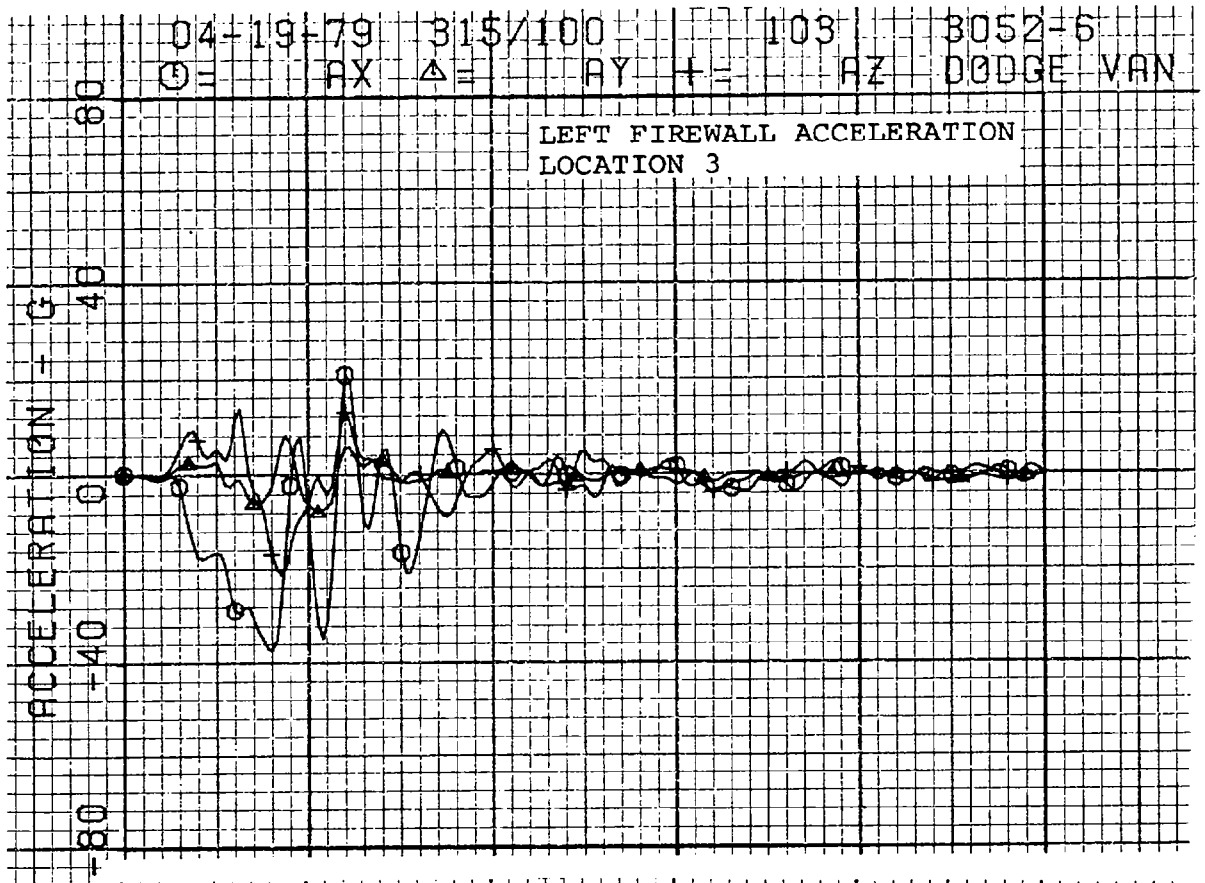
DODGE B-200 VAN-TO-NHTSA FIXED TEST DEVICE
SYMMETRIC HEAD-ON IMPACT

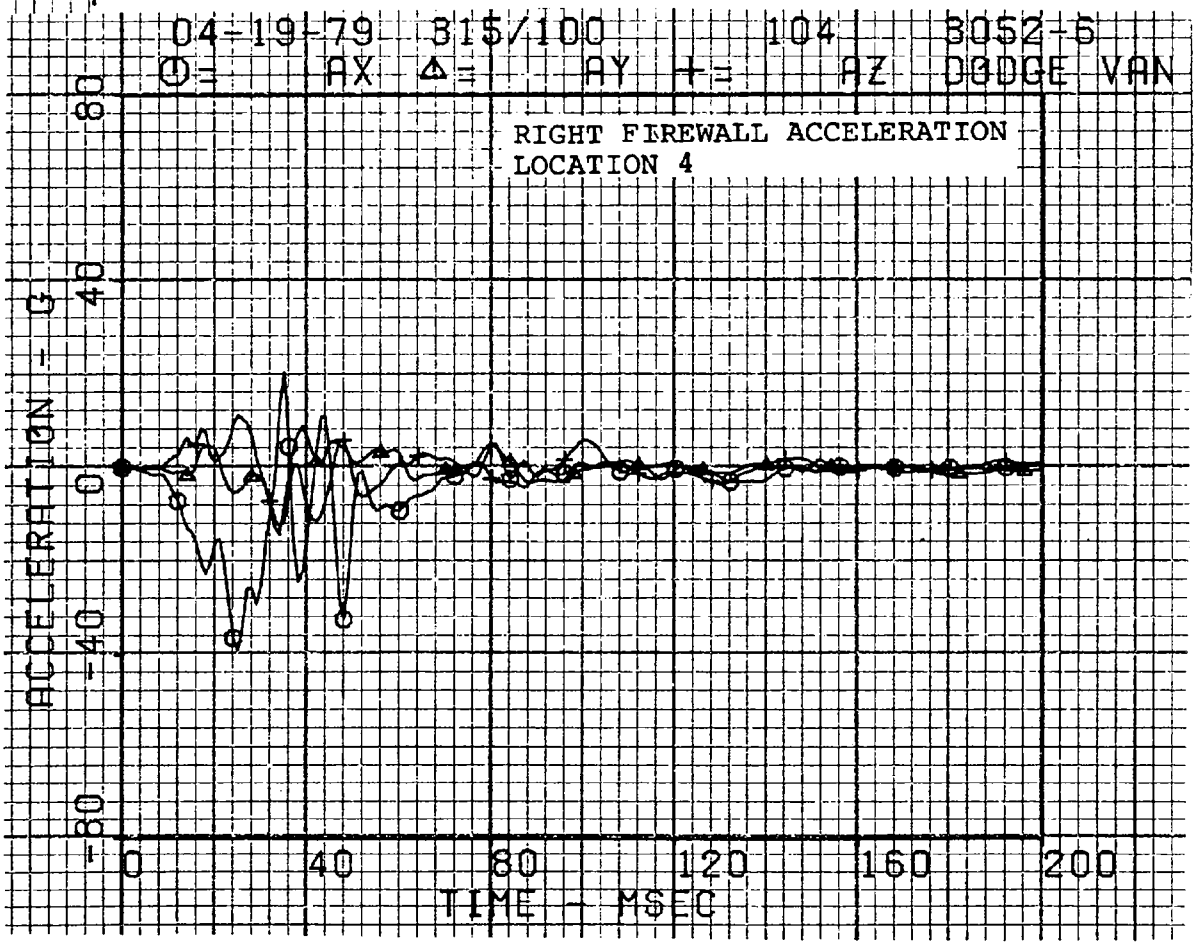
TEST SPEED: 15.28 MPH
TEST DATE: APRIL 19, 1979

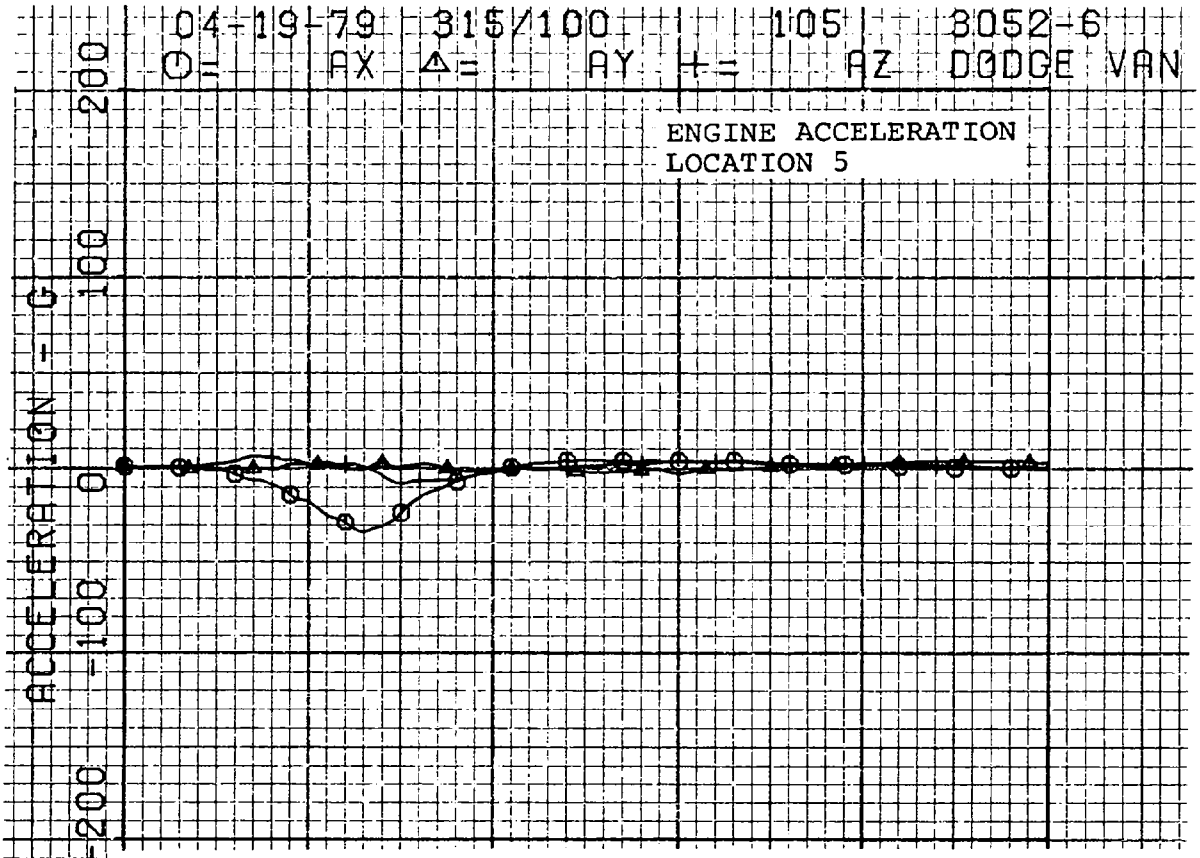

04-19-79 315/100 101 3052-6
O= AX △= VX += SX DODGE VAN
LEFT COMPARTMENT ACCELERATION,
VELOCITY, AND DISPLACEMENT
LOCATION 1
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80

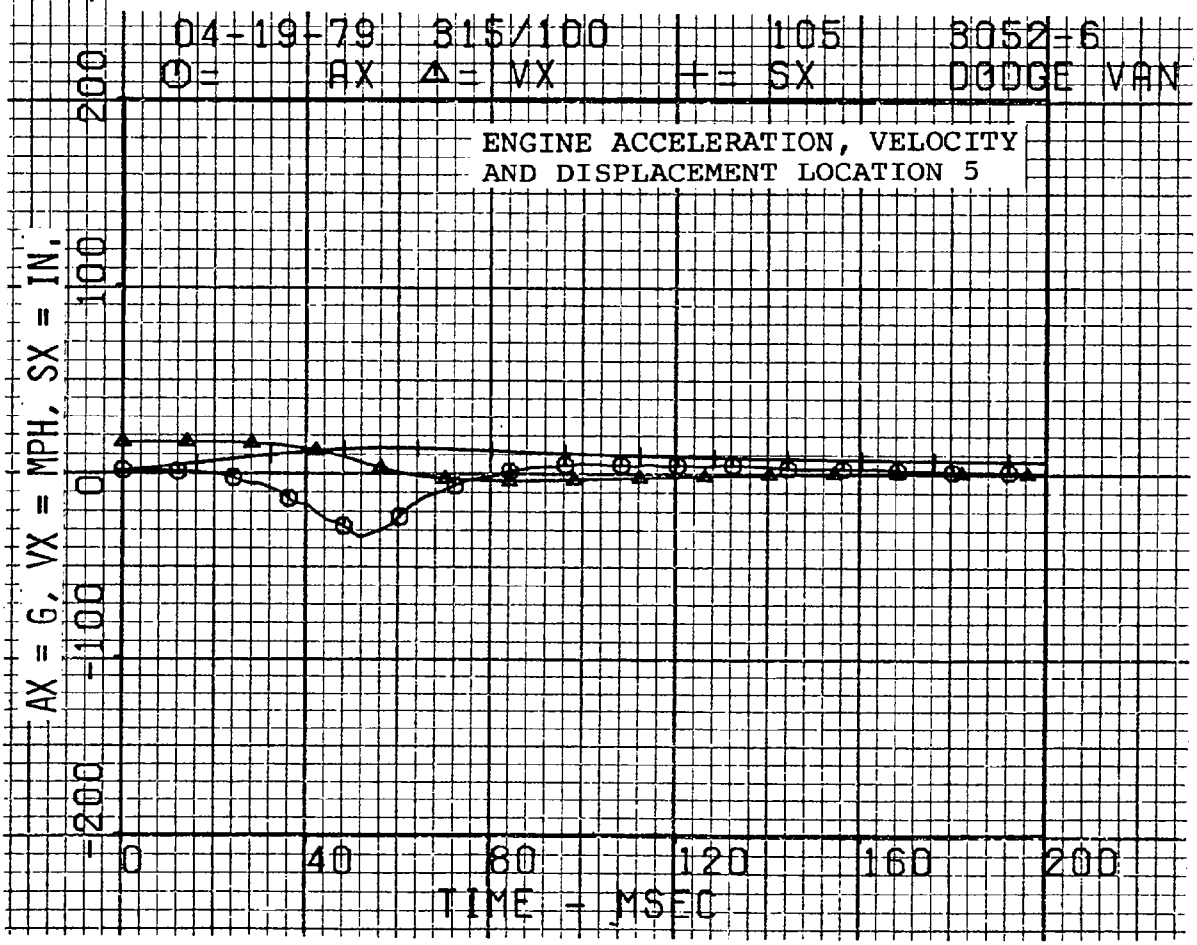

04-19-79 315/100 102 3052-6
O= AX △= VX += SX DODGE VAN
RIGHT COMPARTMENT ACCELERATION,
VELOCITY, AND DISPLACEMENT
LOCATION 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

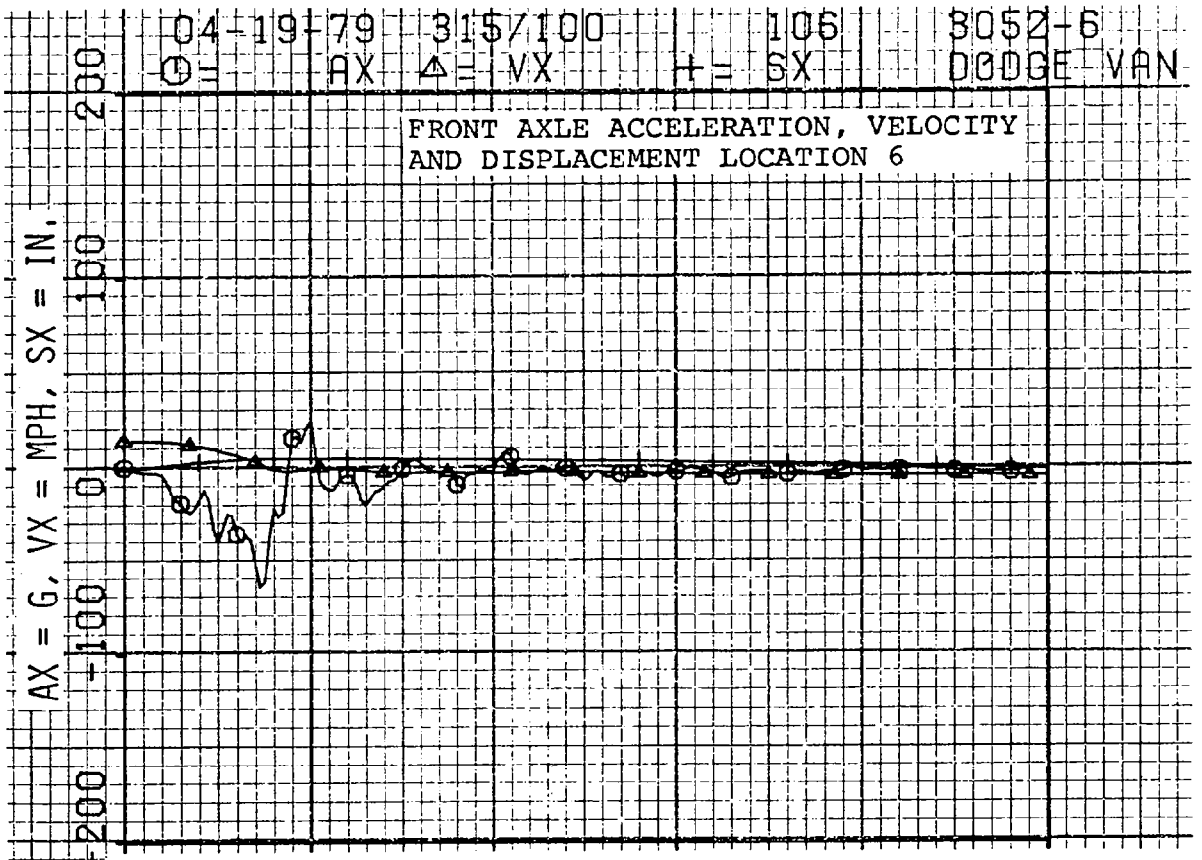

04-19-79 315/100 412 3052-6
O= AX △= VX += SX AVG 1,2
AVERAGE COMPARTMENT ACCELERATION,
VELOCITY AND DISPLACEMENT LOCATION
1 AND 2
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

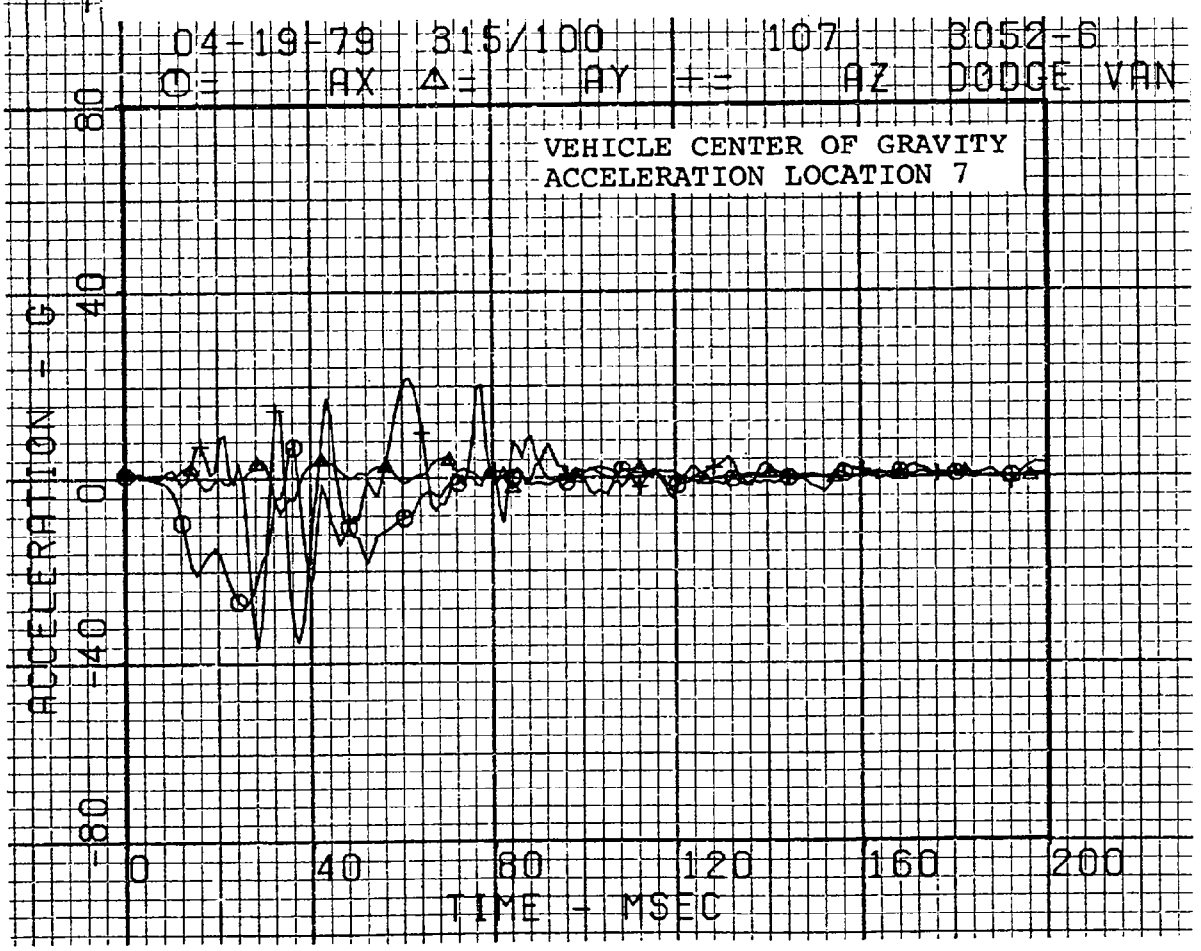

04-19-79 315/100 103 3052-6
AX AY AZ DODGE VAN
LEFT FIREWALL ACCELERATION
LOCATION 3
ACCELERATION - G
80
40
0
-40
-80

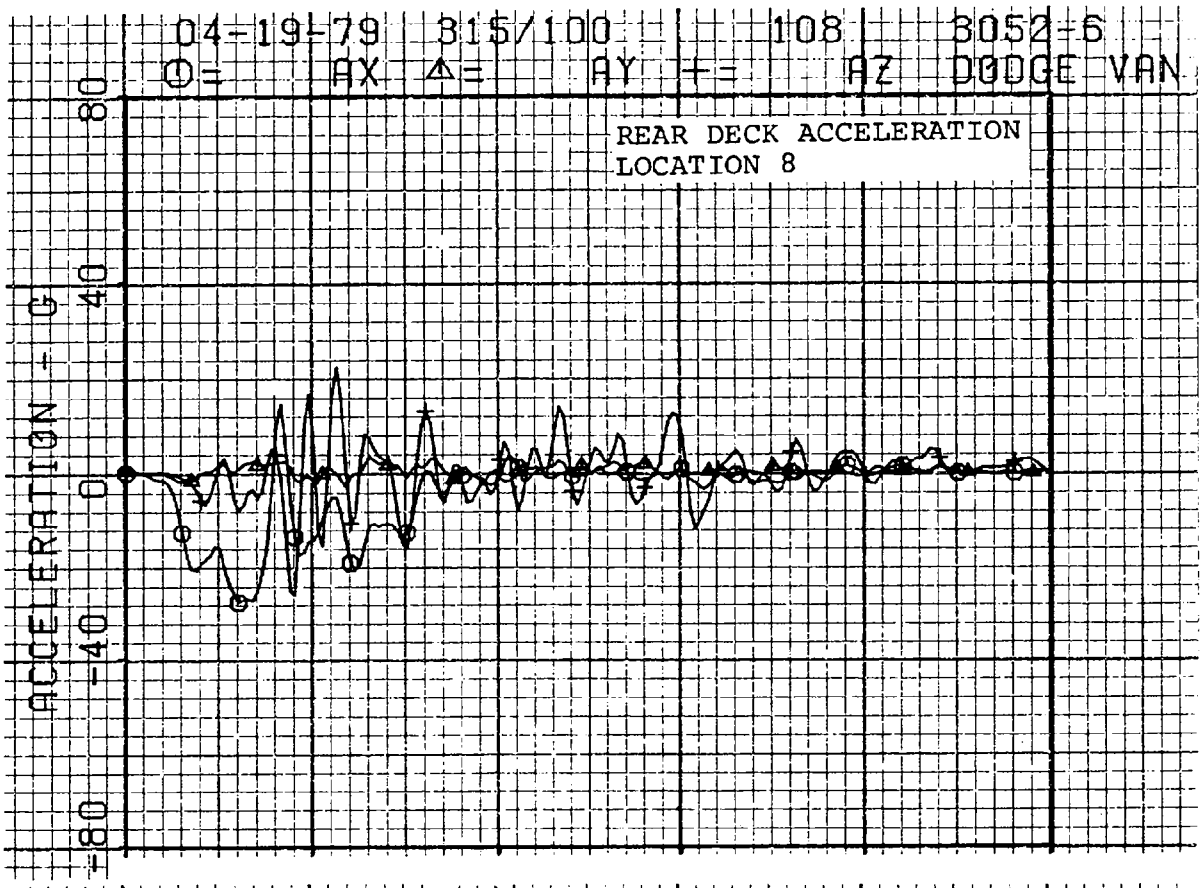

04-19-79 315/100 104 3052-6
AX AY AZ DODGE VAN
RIGHT FIREWALL ACCELERATION
LOCATION 4
ACCELERATION - G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

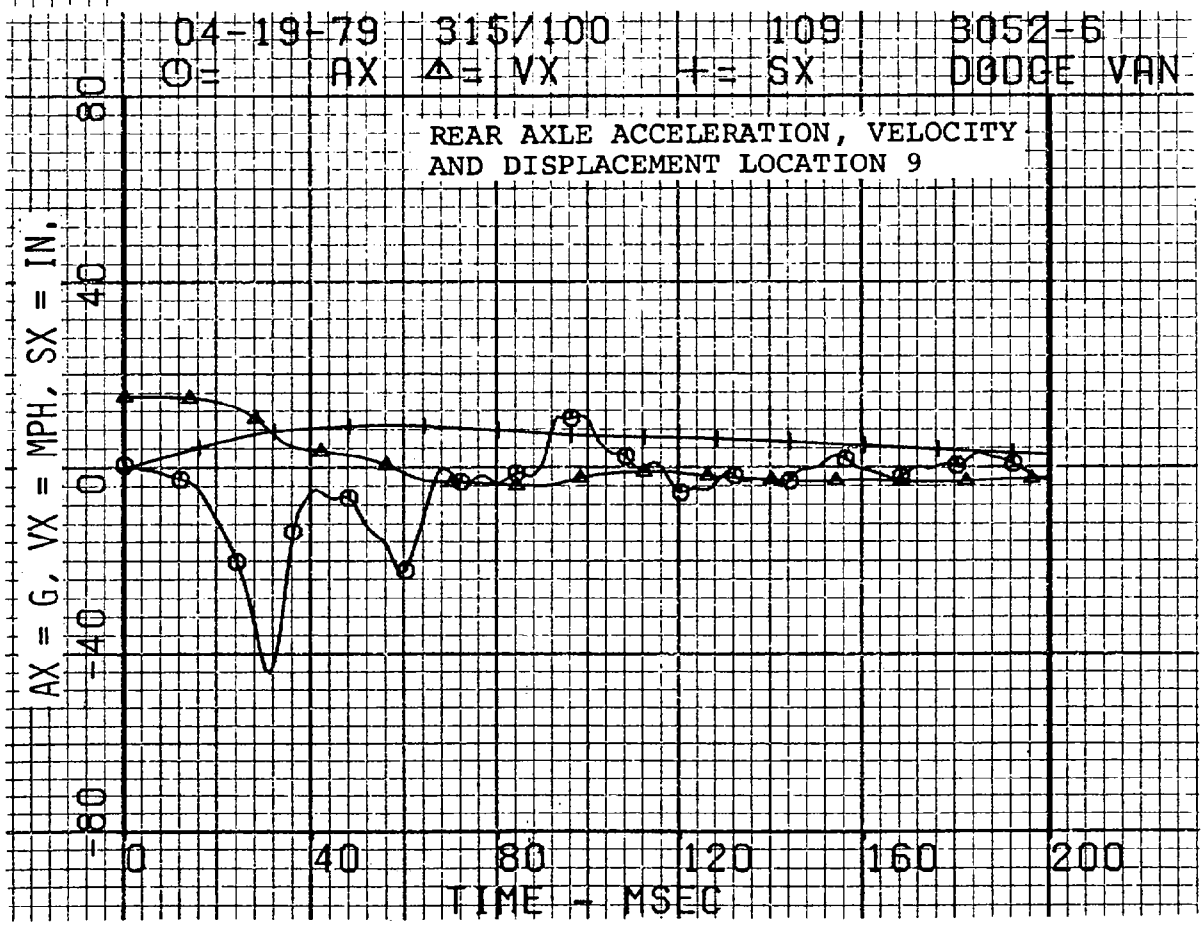

04-19-79 315/100 105 3052-6
O= AX △= AY += AZ DODGE VAN
ENGINE ACCELERATION
LOCATION 5
ACCELERATION - G
200
100
0
-100
-200

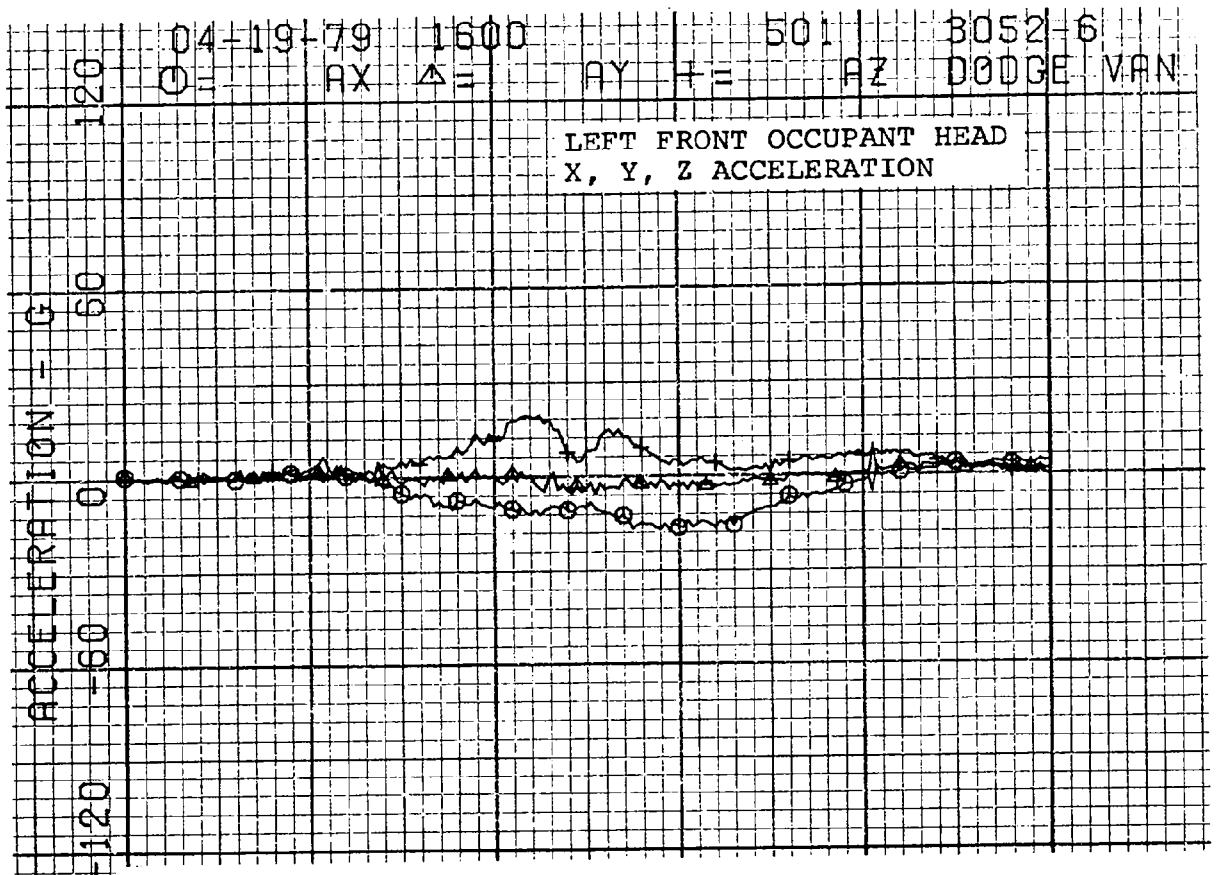

04-19-79 315/100 105 3052-6
O= AX △= VX += SX DODGE VAN
ENGINE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 5
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200
0
40
80
120
160
200
TIME - MSEC

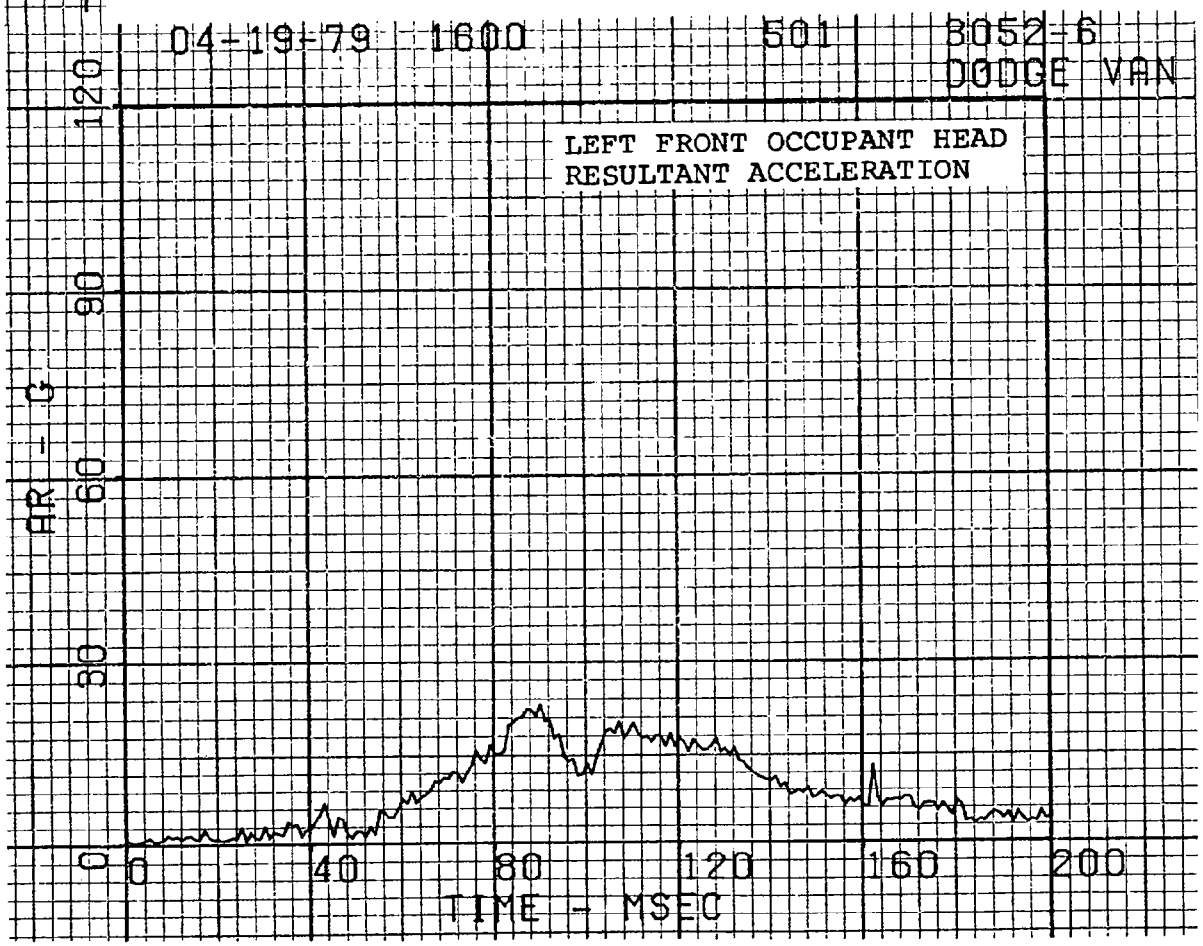

04-19-79 315/100 106 3052-6
O= AX △= VX += SX DODGE VAN
FRONT AXLE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 6
AX = G, VX = MPH, SX = IN.
200
100
0
-100
-200

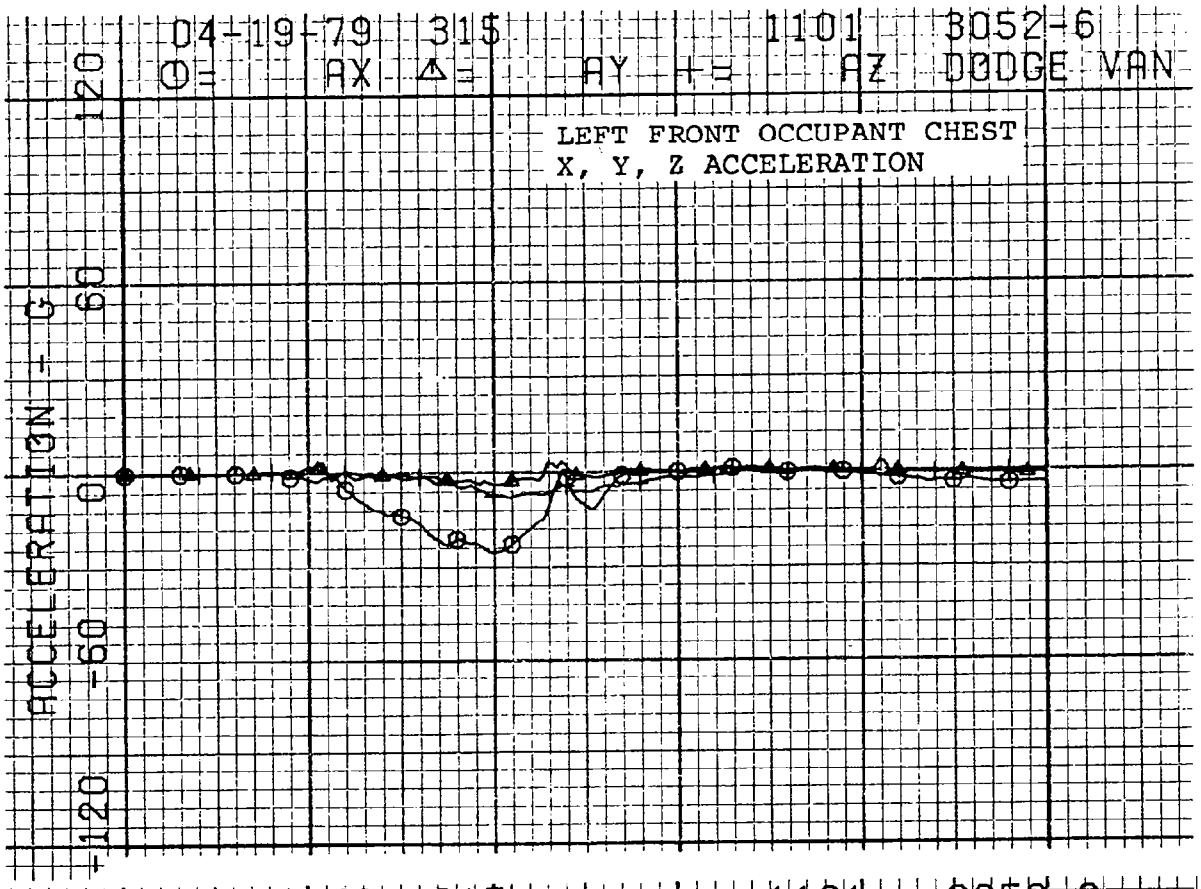

04-19-79 315/100 107 3052-6
O= AX △= AY += AZ DODGE VAN
VEHICLE CENTER OF GRAVITY
ACCELERATION LOCATION 7
ACCELERATION - G
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

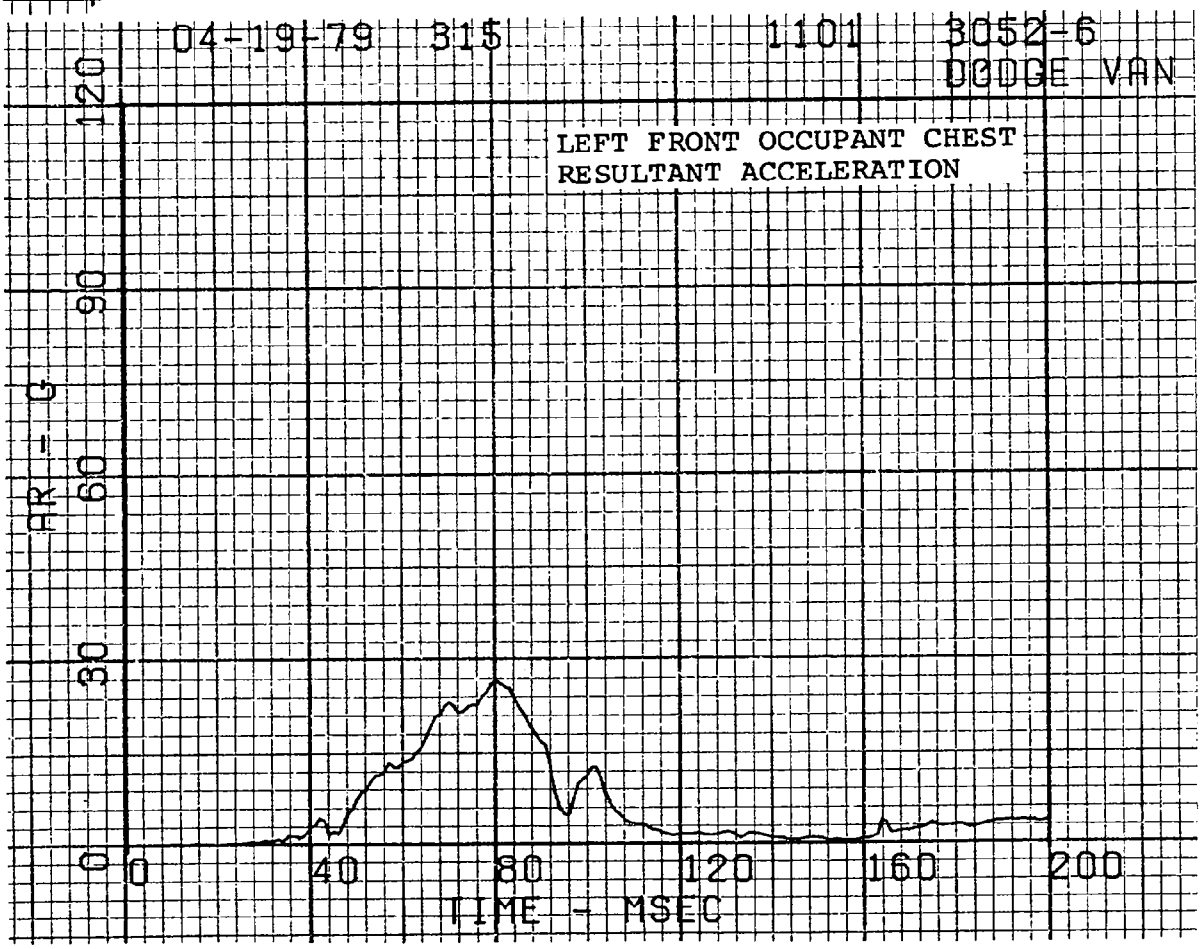

04-19-79 315/100 108 3052-6
O= AX △= AY += AZ DODGE VAN
REAR DECK ACCELERATION
LOCATION 8
ACCELERATION - G
80
40
0
-40
-80

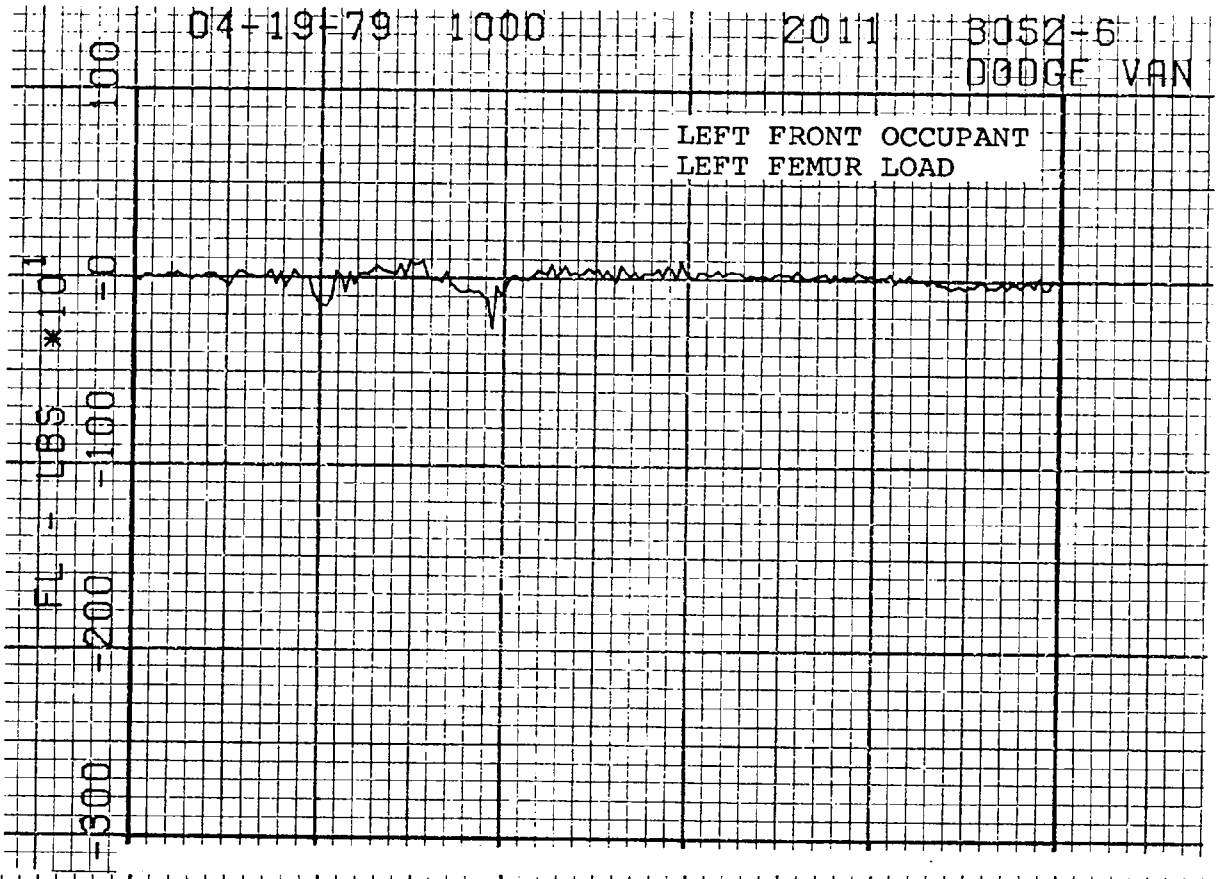

04-19-79 315/100 109 3052-6
O= AX △= VX += SX DODGE VAN
REAR AXLE ACCELERATION, VELOCITY
AND DISPLACEMENT LOCATION 9
AX = G, VX = MPH, SX = IN.
80
40
0
-40
-80
0
40
80
120
160
200
TIME - MSEC

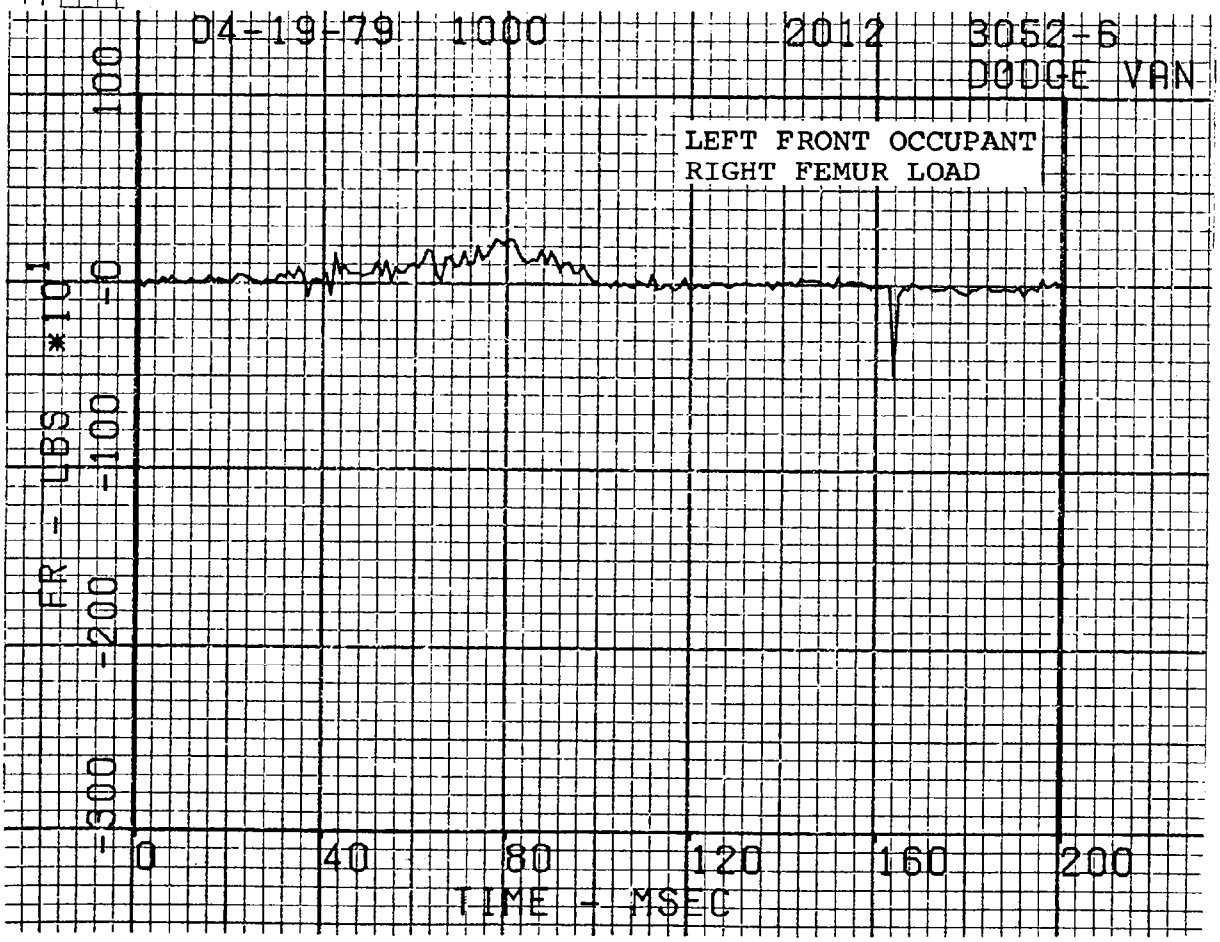

04-19-79 1600 501 3052-6
O= AX △= AY += AZ DODGE VAN
LEFT FRONT OCCUPANT HEAD
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

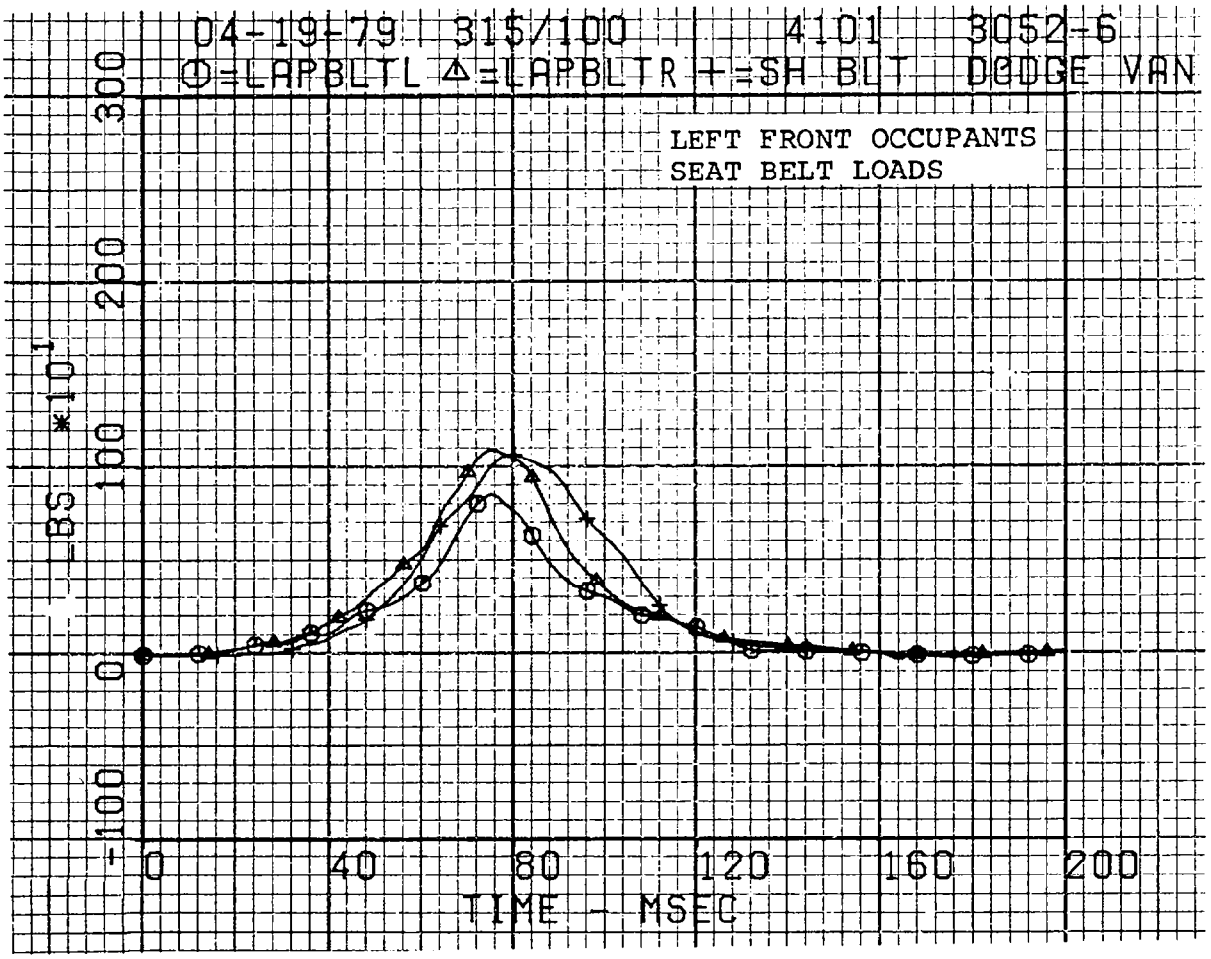

04-19-79 1600 501 3052-6
DODGE VAN
LEFT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

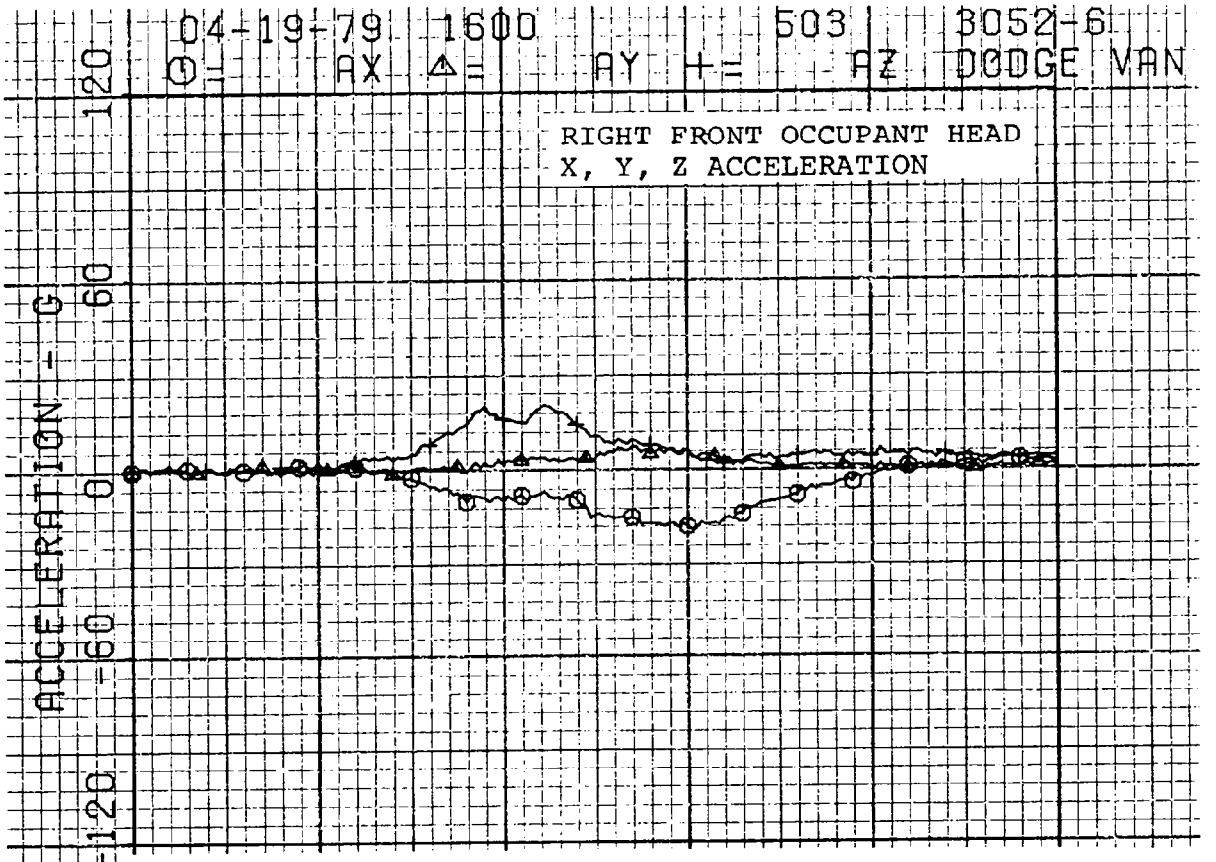

04-19-79 31$ 1101 3052-6
⊙= AX △= AY += AZ DODGE VAN
LEFT FRONT OCCUPANT CHEST
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

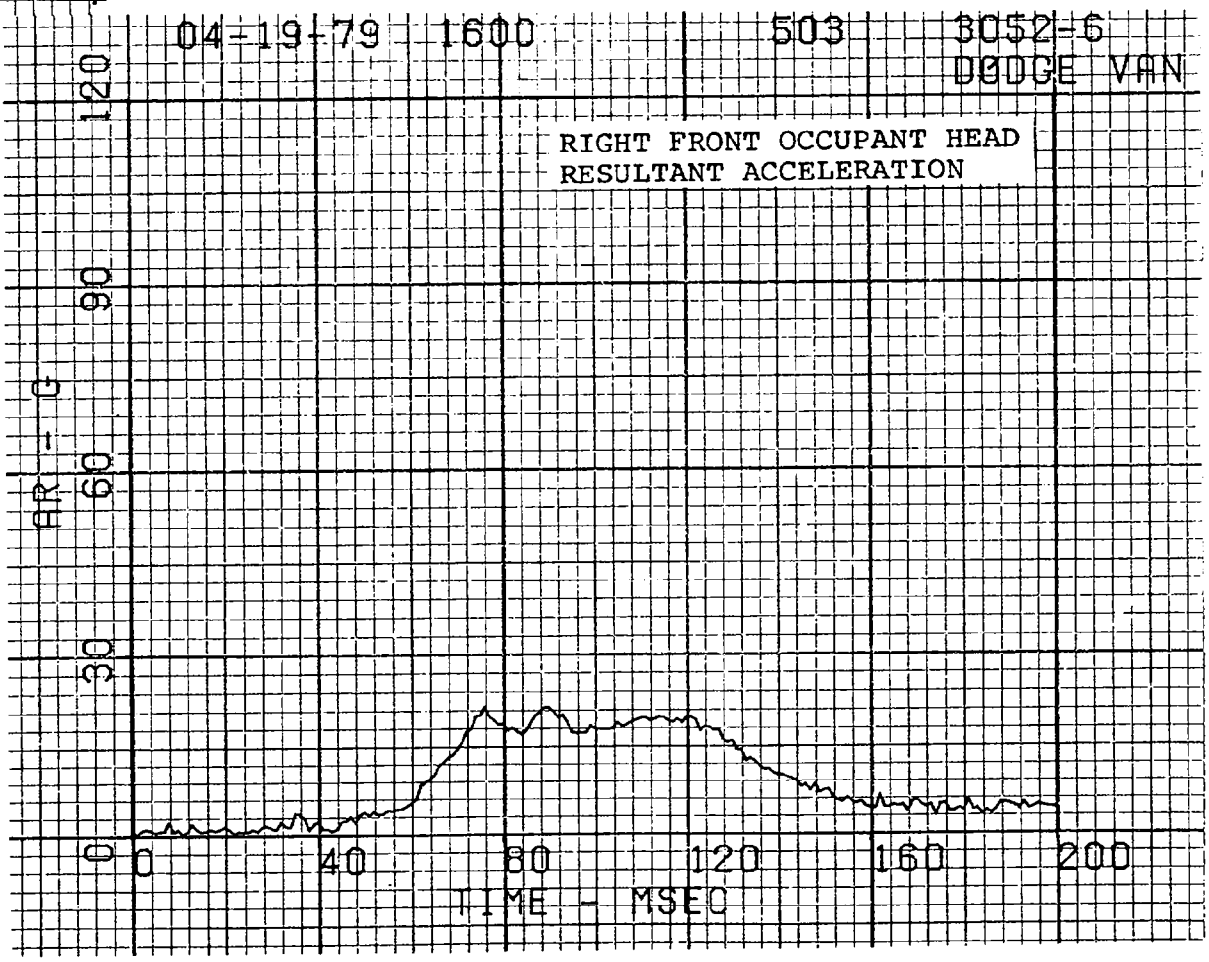

04-19-79 31$ 1101 3052-6
DODGE VAN
LEFT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

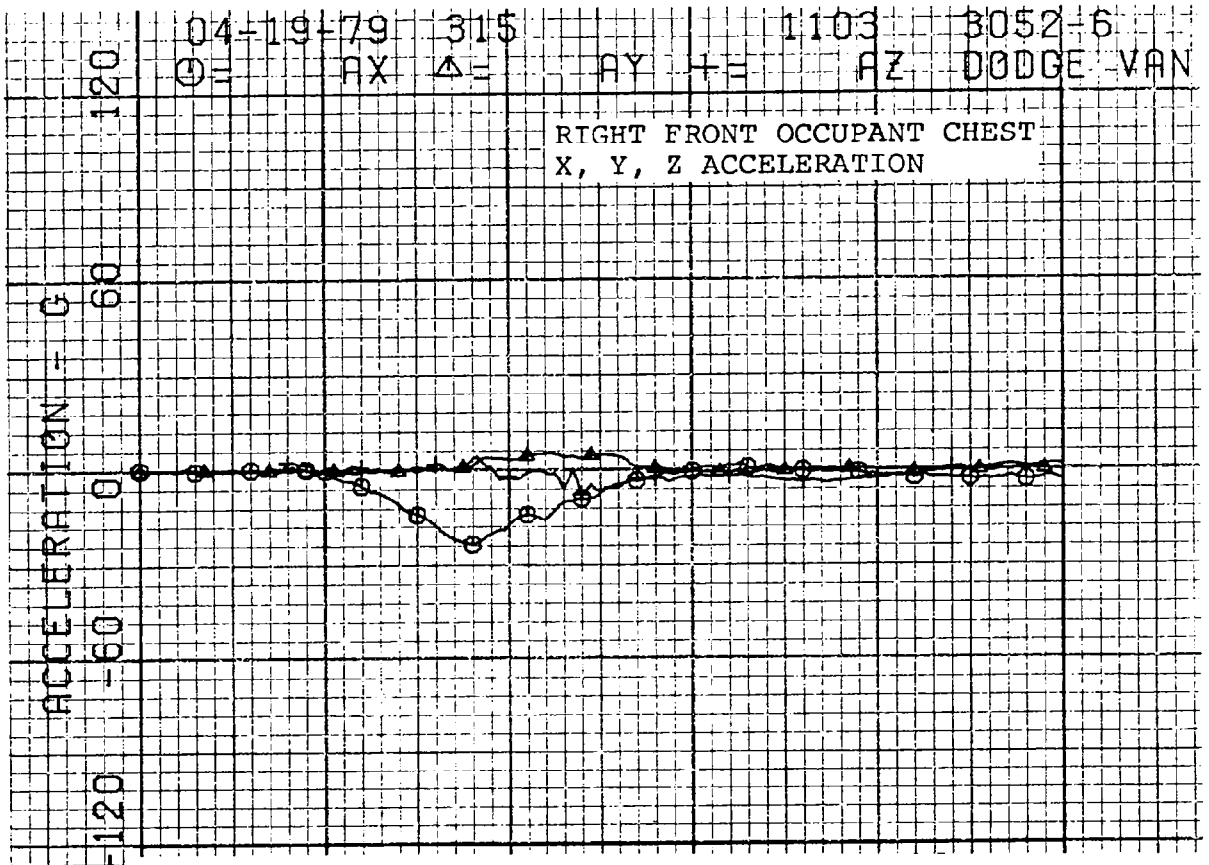

04-19-79 1000 2011 3052-6
DODGE VAN
LEFT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
0
-100
-200
-300

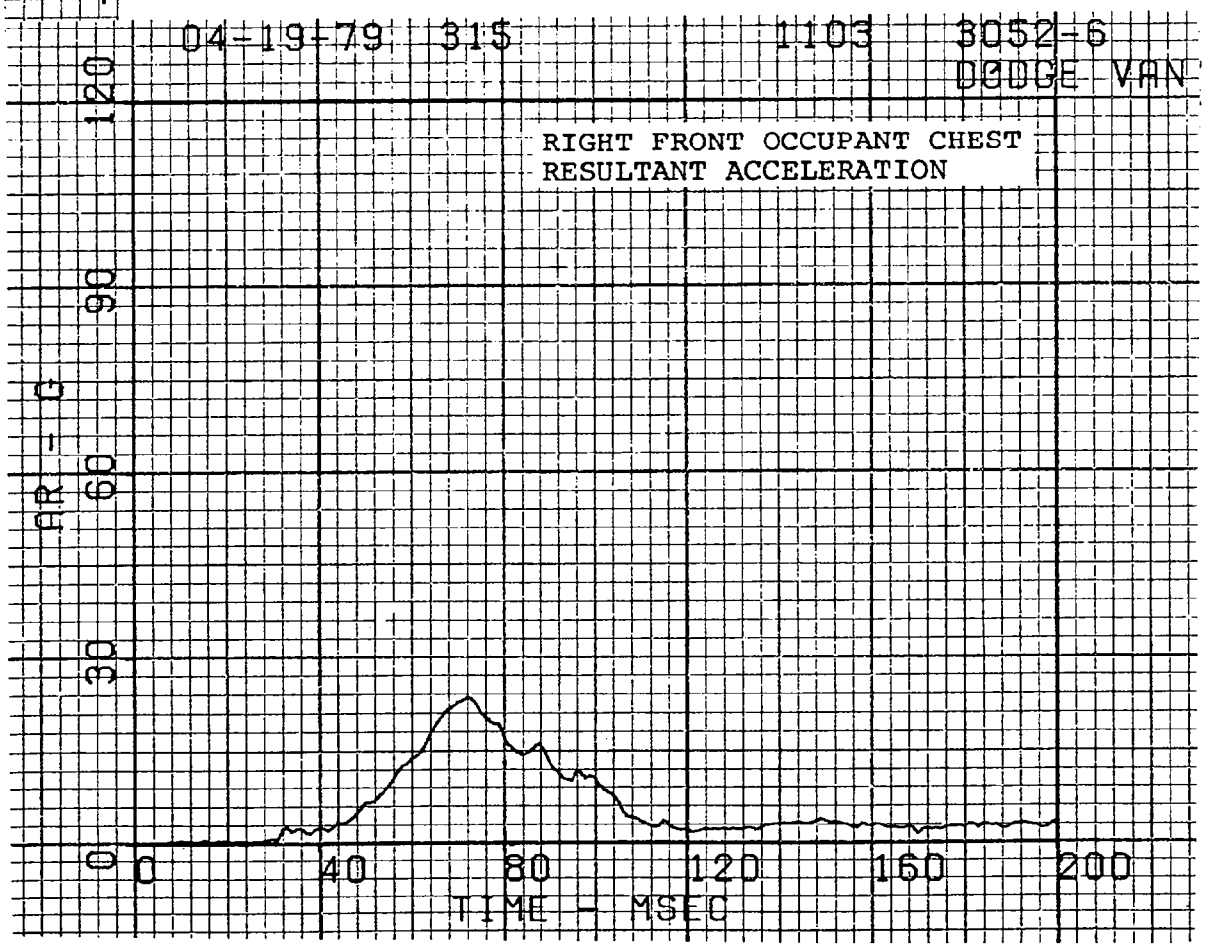

04-19-79 1000 2012 3052-6
DODGE VAN
LEFT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

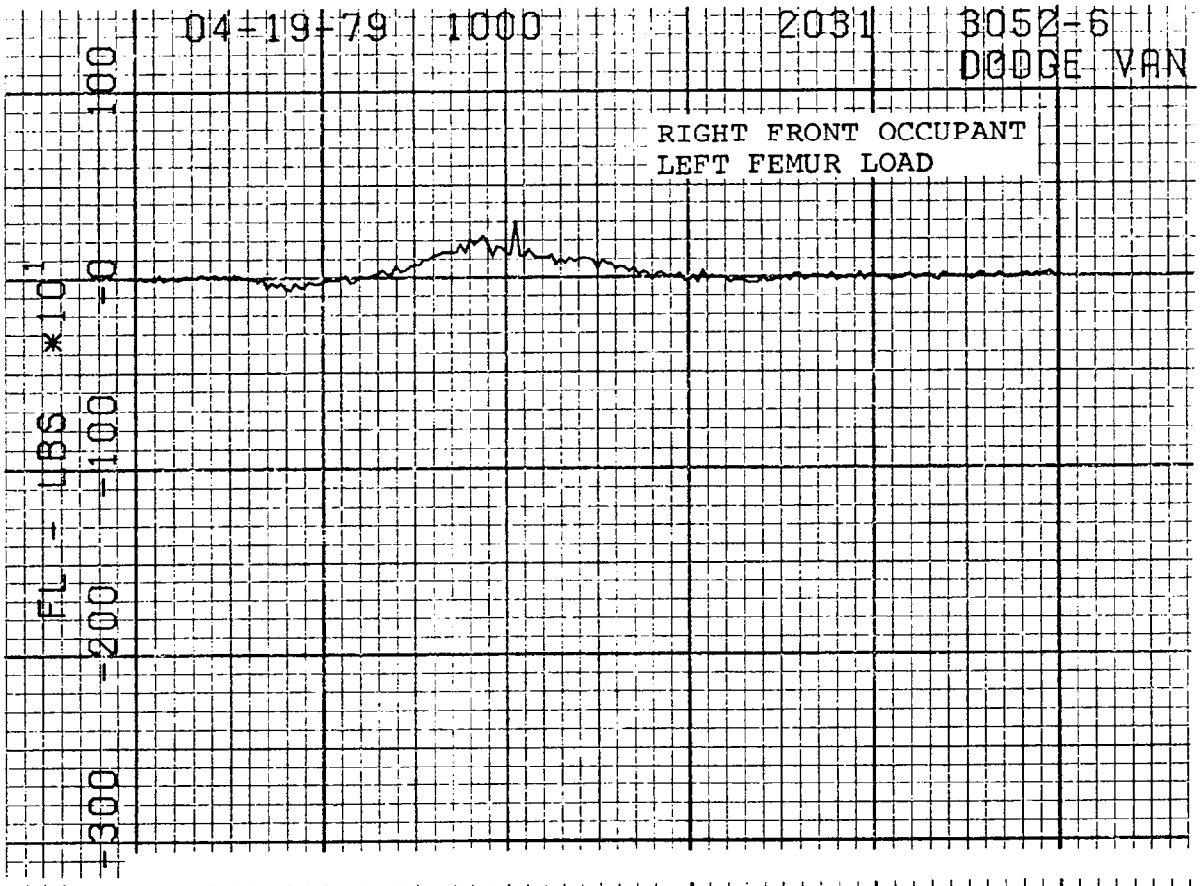

04-19-79 315/100 4101 3052-6
O=LAPBLTL Δ=LAPBLTR +=SH BLT DODGE VAN
LEFT FRONT OCCUPANTS
SEAT BELT LOADS
300
200
100
0
-100
LBS *10
0
40
80
120
160
200
TIME - MSEC

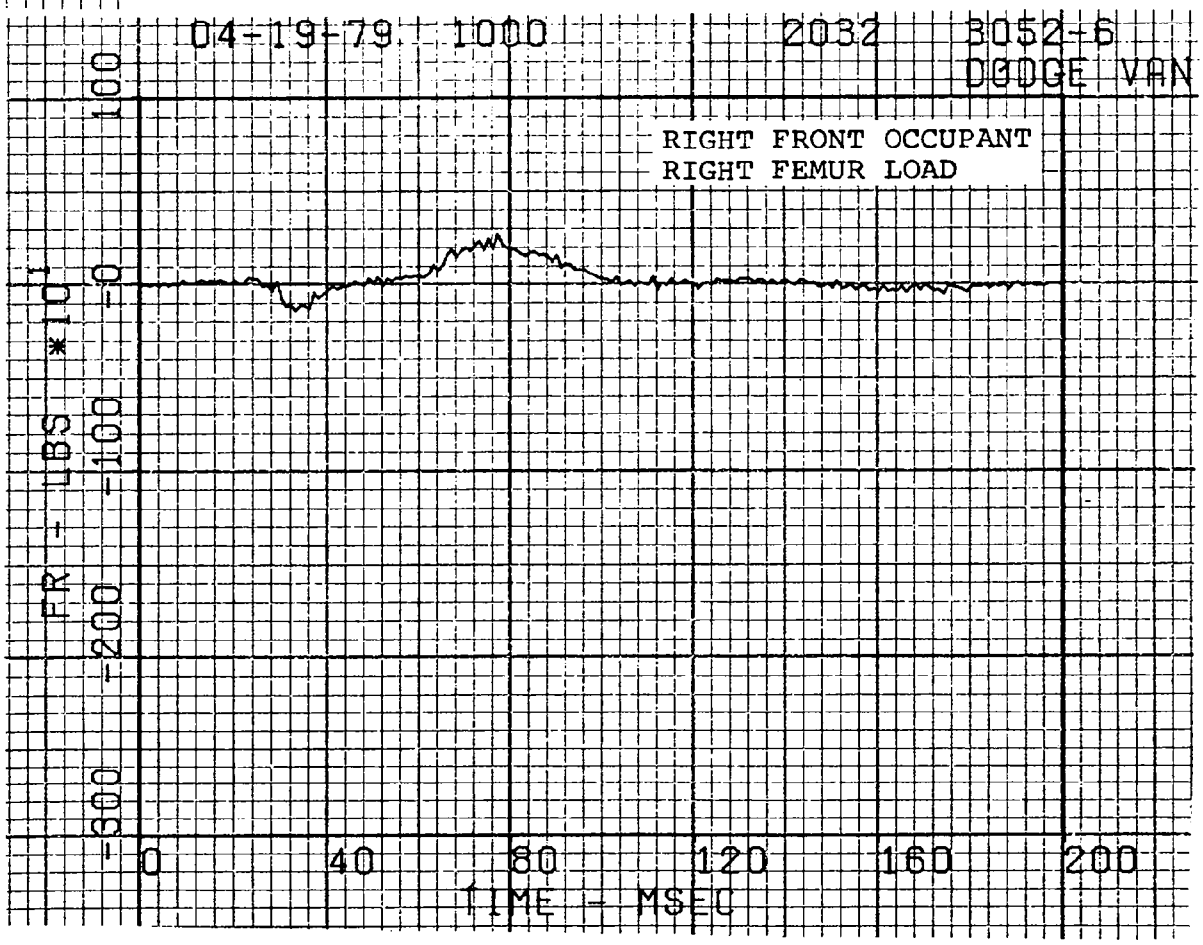

04-19-79 1600 503 3052-6
O= AX △= AY += AZ DODGE VAN
RIGHT FRONT OCCUPANT HEAD
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

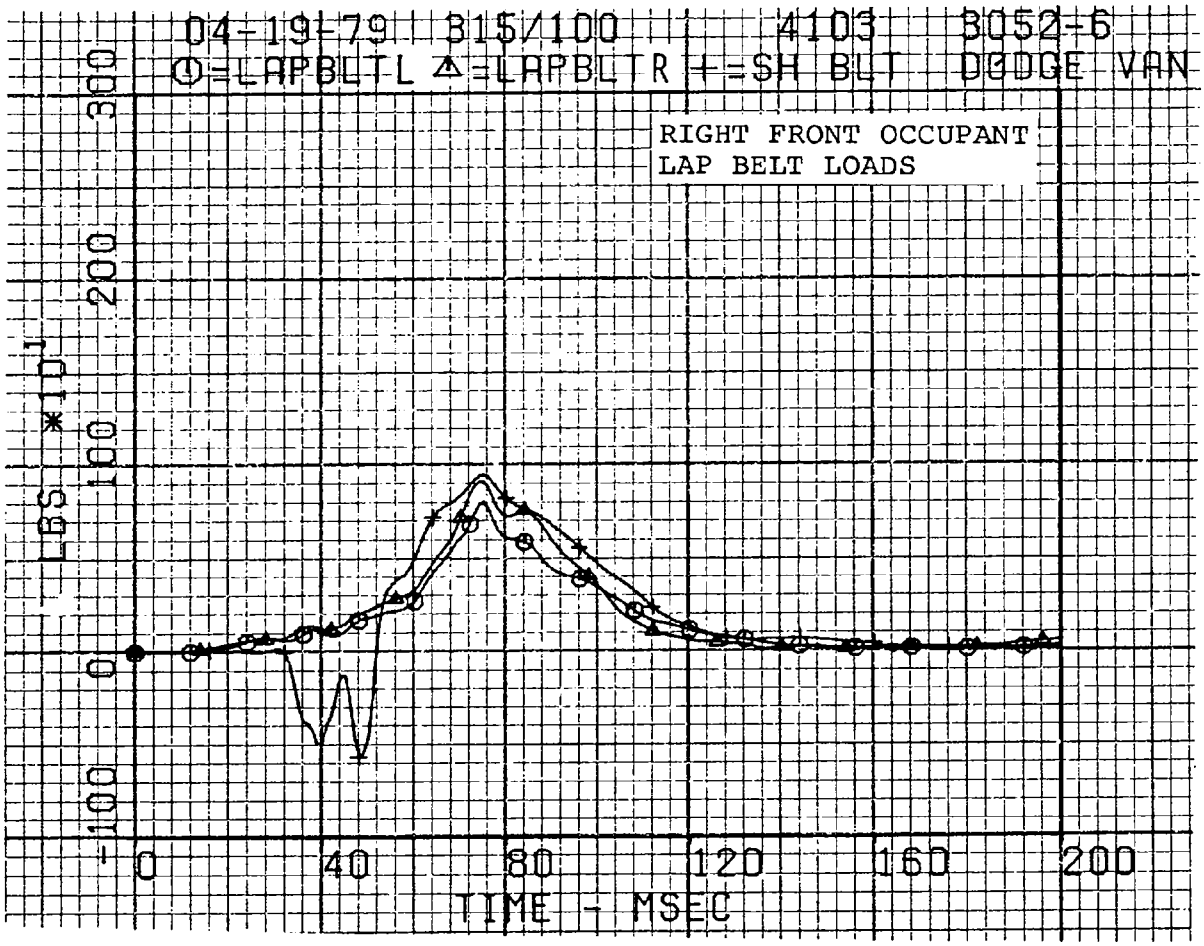

04-19-79 1600 503 3052-6
DODGE VAN
RIGHT FRONT OCCUPANT HEAD
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

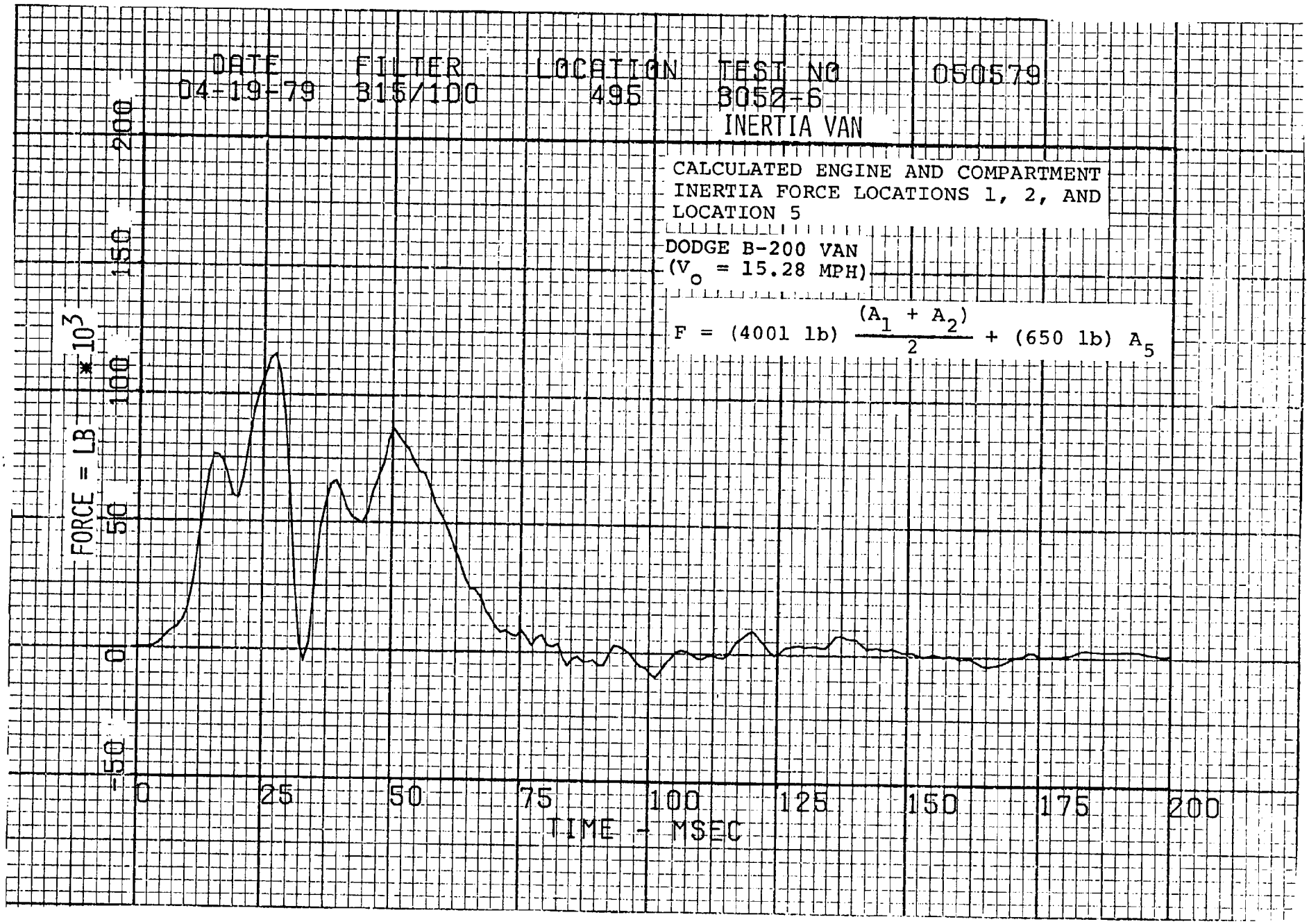

04-19-79 315 1103 3052-6
⊙= AX △= AY += AZ DODGE VAN
RIGHT FRONT OCCUPANT CHEST
X, Y, Z ACCELERATION
ACCELERATION - G
120
60
0
-60
-120

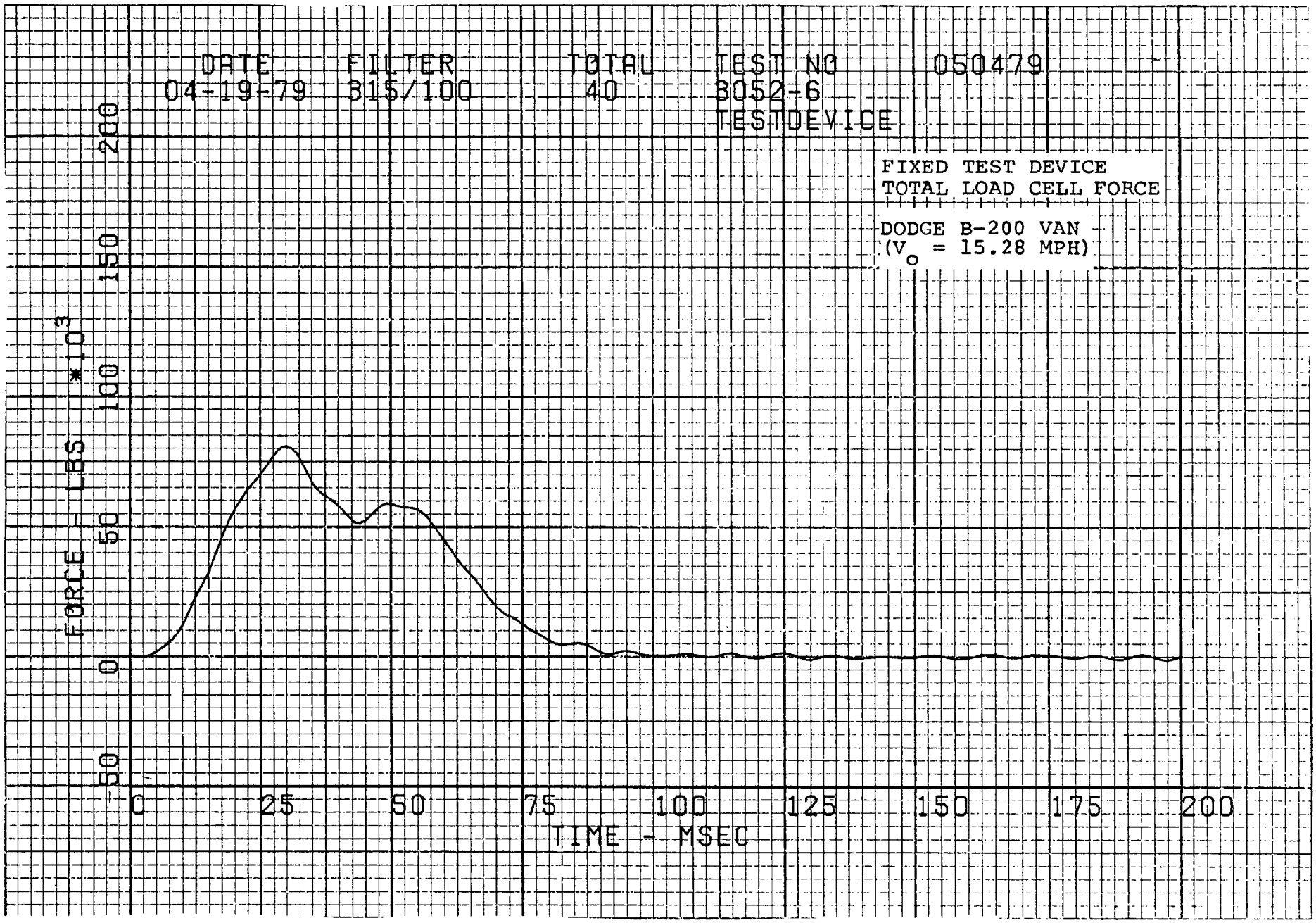

04-19-79 315 1103 3052-6
DODGE VAN
RIGHT FRONT OCCUPANT CHEST
RESULTANT ACCELERATION
AR - G
120
90
60
30
0
0
40
80
120
160
200
TIME - MSEC

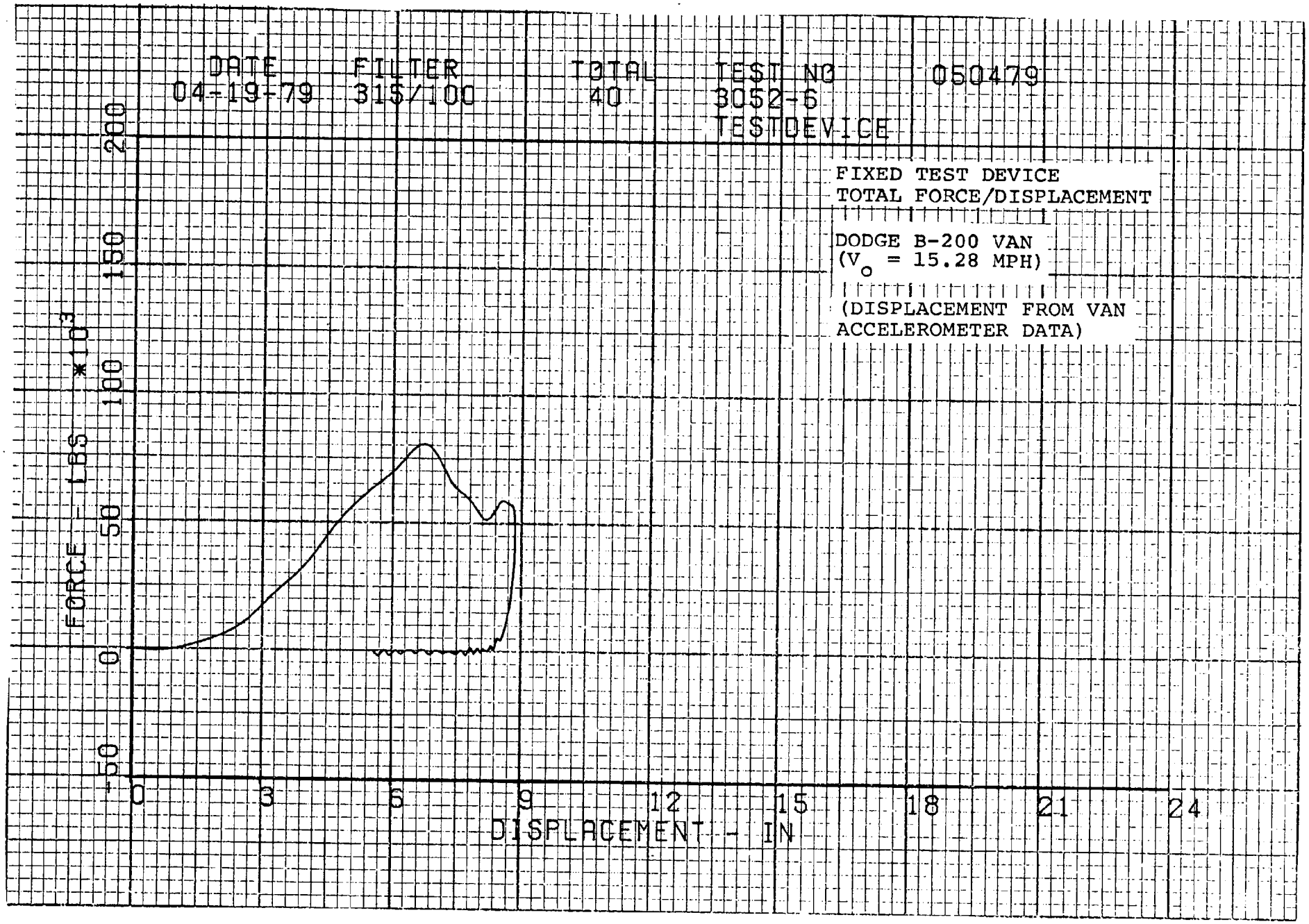

04-19-79 1000 2031 3052-6
DODGE VAN
RIGHT FRONT OCCUPANT
LEFT FEMUR LOAD
FL - LBS *10
100
-0
-100
-200
-300

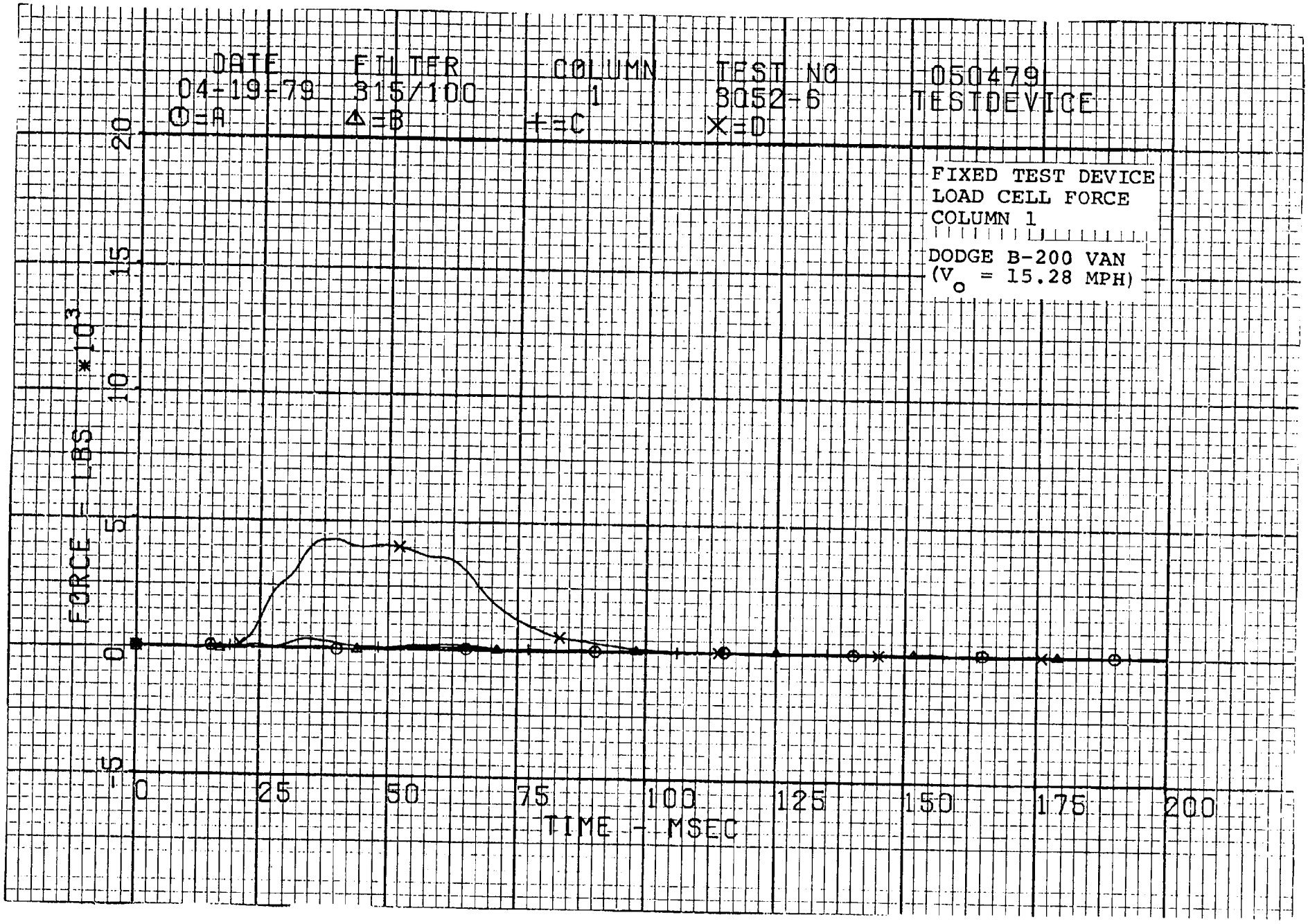

04-19-79 1000 2032 3052-6
DODGE VAN
RIGHT FRONT OCCUPANT
RIGHT FEMUR LOAD
FR - LBS *10
100
-0
-100
-200
-300
0
40
80
120
160
200
TIME - MSEC

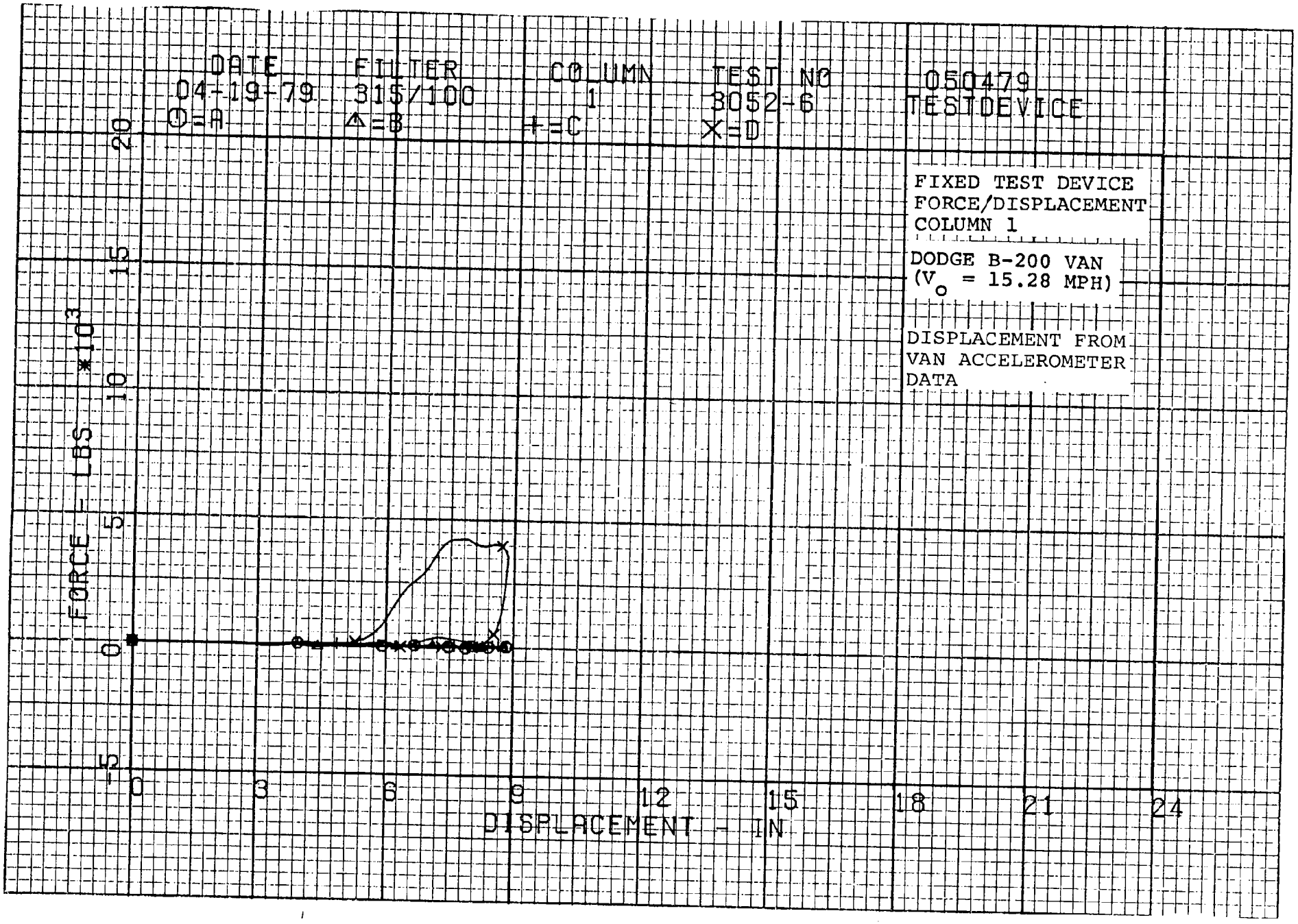

04-19-79 315/100 4103 3052-6
O=LAPBLTL △=LAPBLTR +=SH BLT DODGE VAN
RIGHT FRONT OCCUPANT
LAP BELT LOADS
LBS *10
300
200
100
0
-100
0
40
80
120
160
200
TIME - MSEC

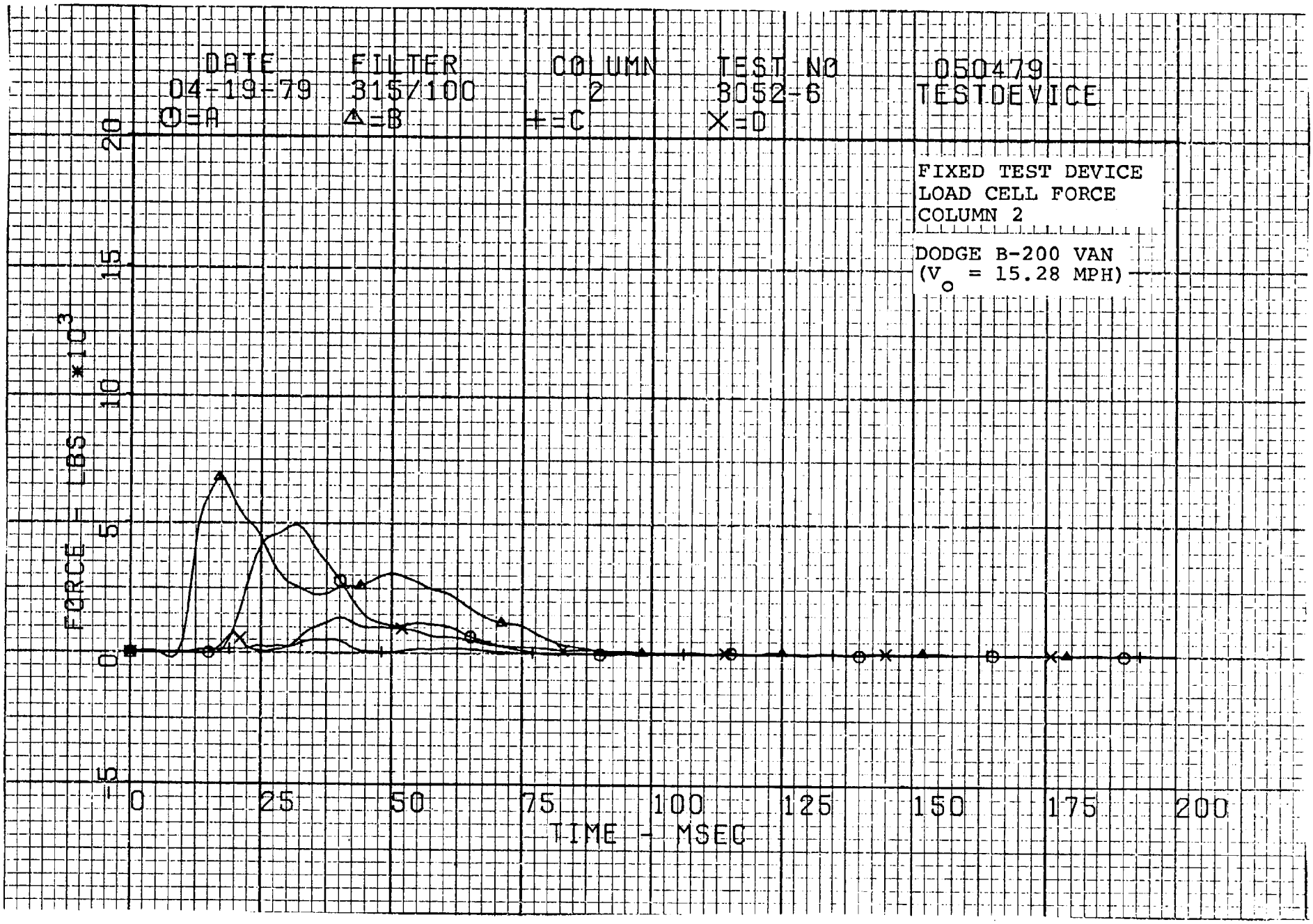

DATE
04-19-79
FILTER
315/100
LOCATION
495
TEST NO
3052-6
050579
INERTIA VAN
CALCULATED ENGINE AND COMPARTMENT INERTIA FORCE LOCATIONS 1, 2, AND LOCATION 5
DODGE B-200 VAN
(V_o = 15.28 MPH)
$F = (4001\ lb)\ \frac{(A_1 + A_2)}{2} + (650\ lb)\ A_5$
FORCE = LB * 10^3
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME - MSEC

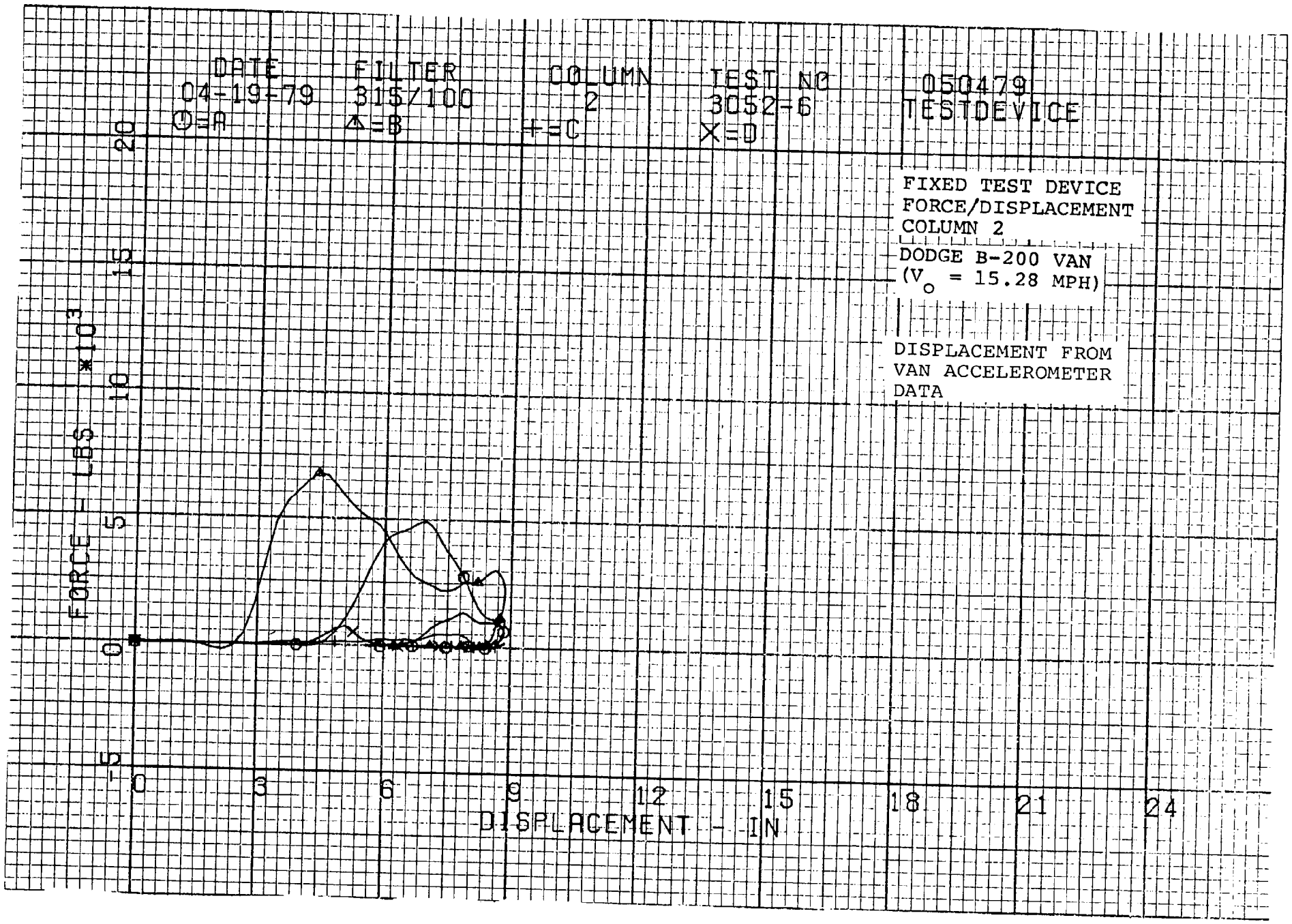

DATE
04-19-79
FILTER
315/100
TOTAL
40
TEST NO
3052-6
TESTDEVICE
050479
FIXED TEST DEVICE
TOTAL LOAD CELL FORCE
DODGE B-200 VAN
(V$_o$ = 15.28 MPH)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
25
50
75
100
125
150
175
200
TIME - MSEC

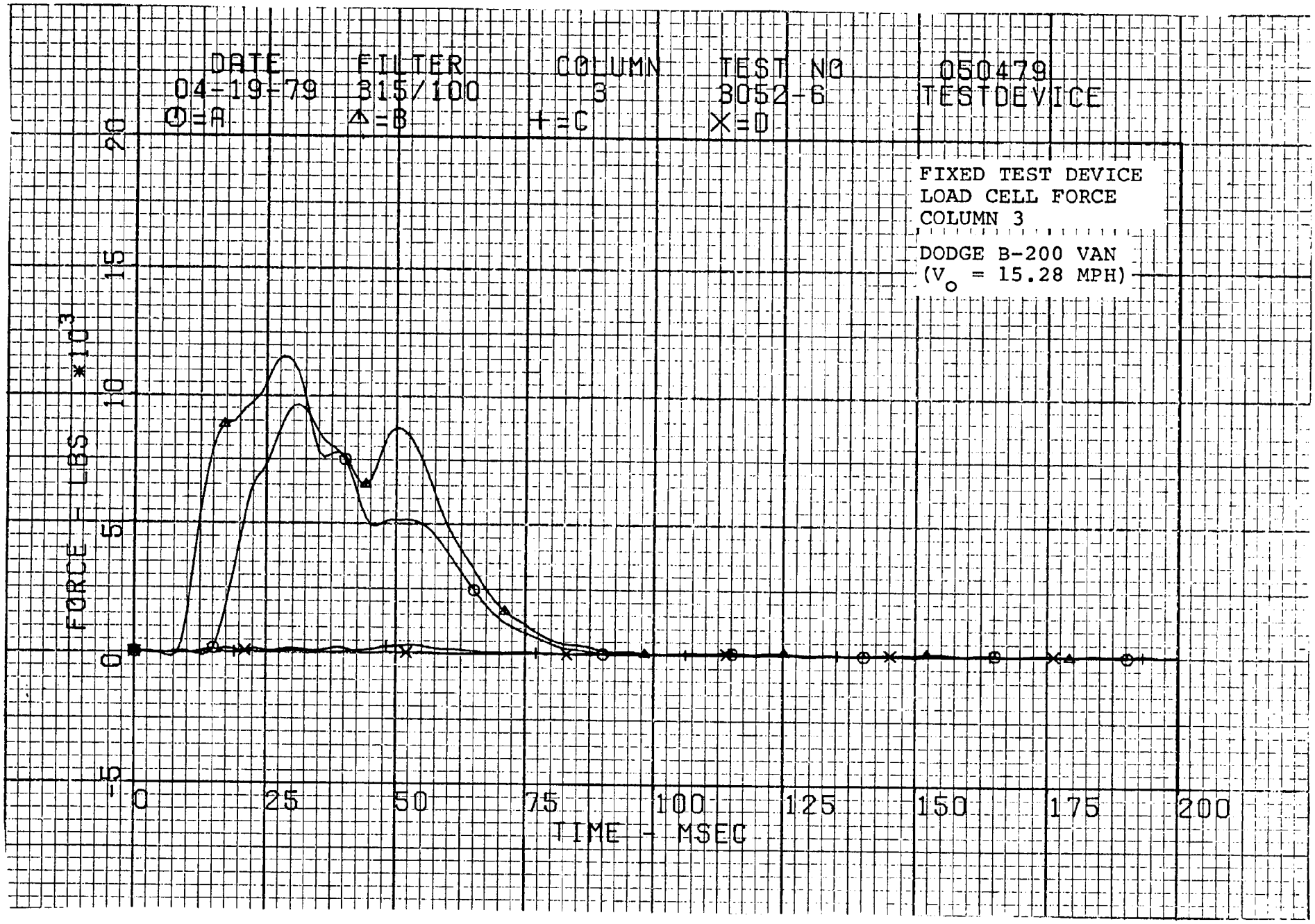

DATE
04-19-79
FILTER
315/100
TOTAL
40
TEST NO
3052-6
TESTDEVICE
050479
FIXED TEST DEVICE
TOTAL FORCE/DISPLACEMENT
DODGE B-200 VAN
(V_o = 15.28 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
200
150
100
50
0
-50
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

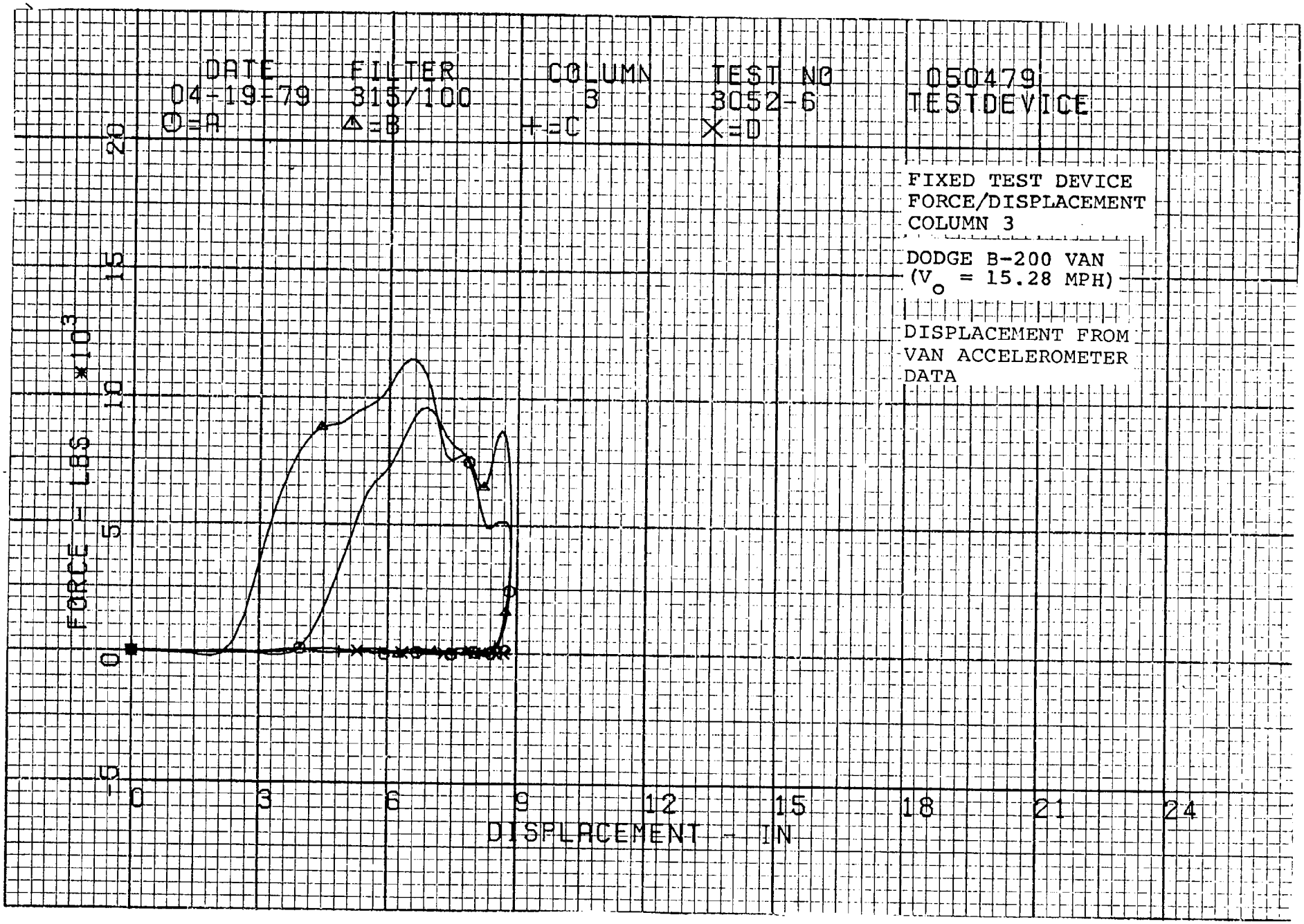

DATE
04-19-79
O=A
FILTER
315/100
Δ=B
COLUMN
1
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 1
DODGE B-200 VAN
(V_o = 15.28 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

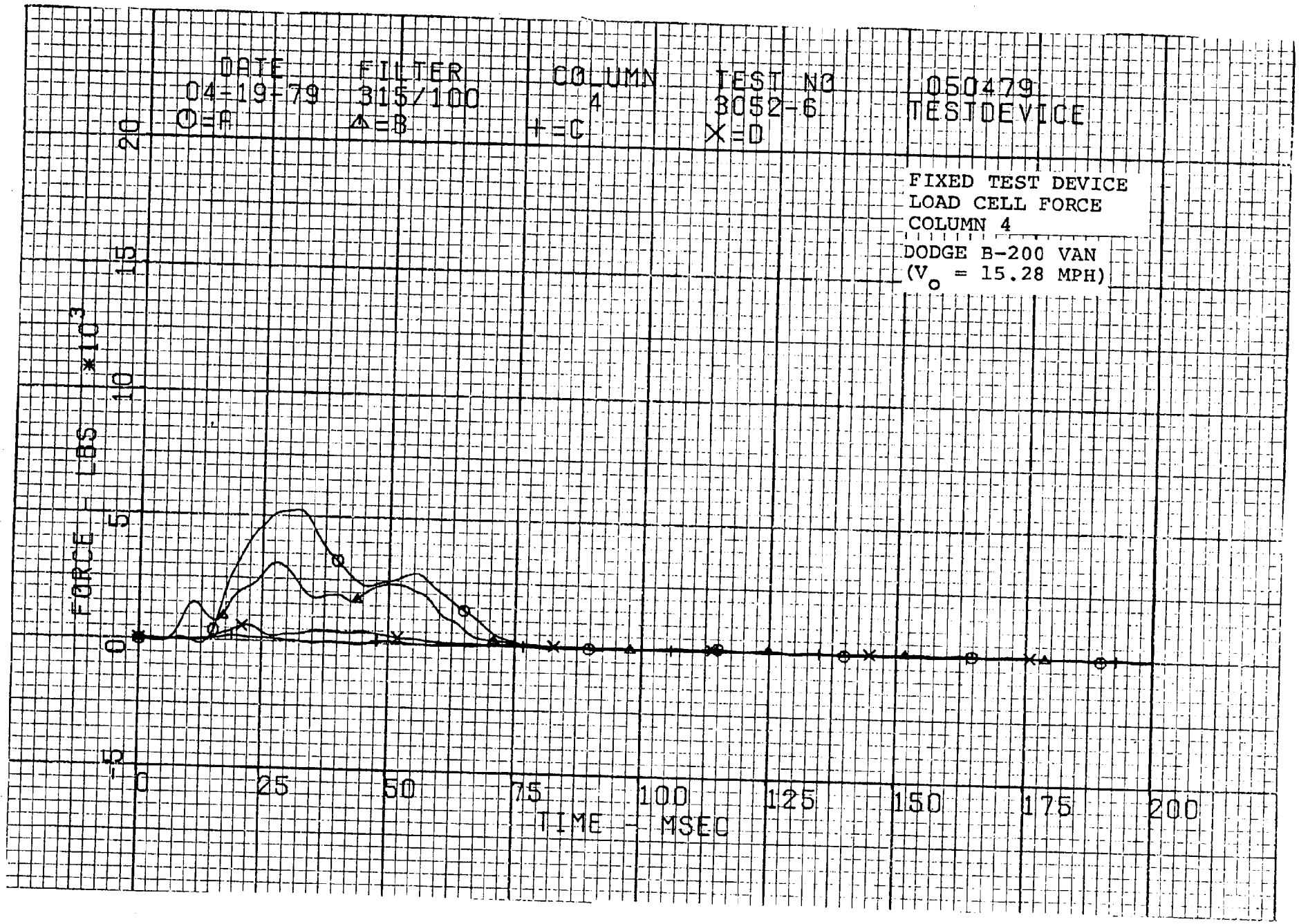

DATE
04-19-79
O=A
FILTER
315/100
Δ=B
COLUMN
1
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 1
DODGE B-200 VAN
(V_o = 15.28 MPH)
DISPLACEMENT FROM
VAN ACCELEROMETER
DATA
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

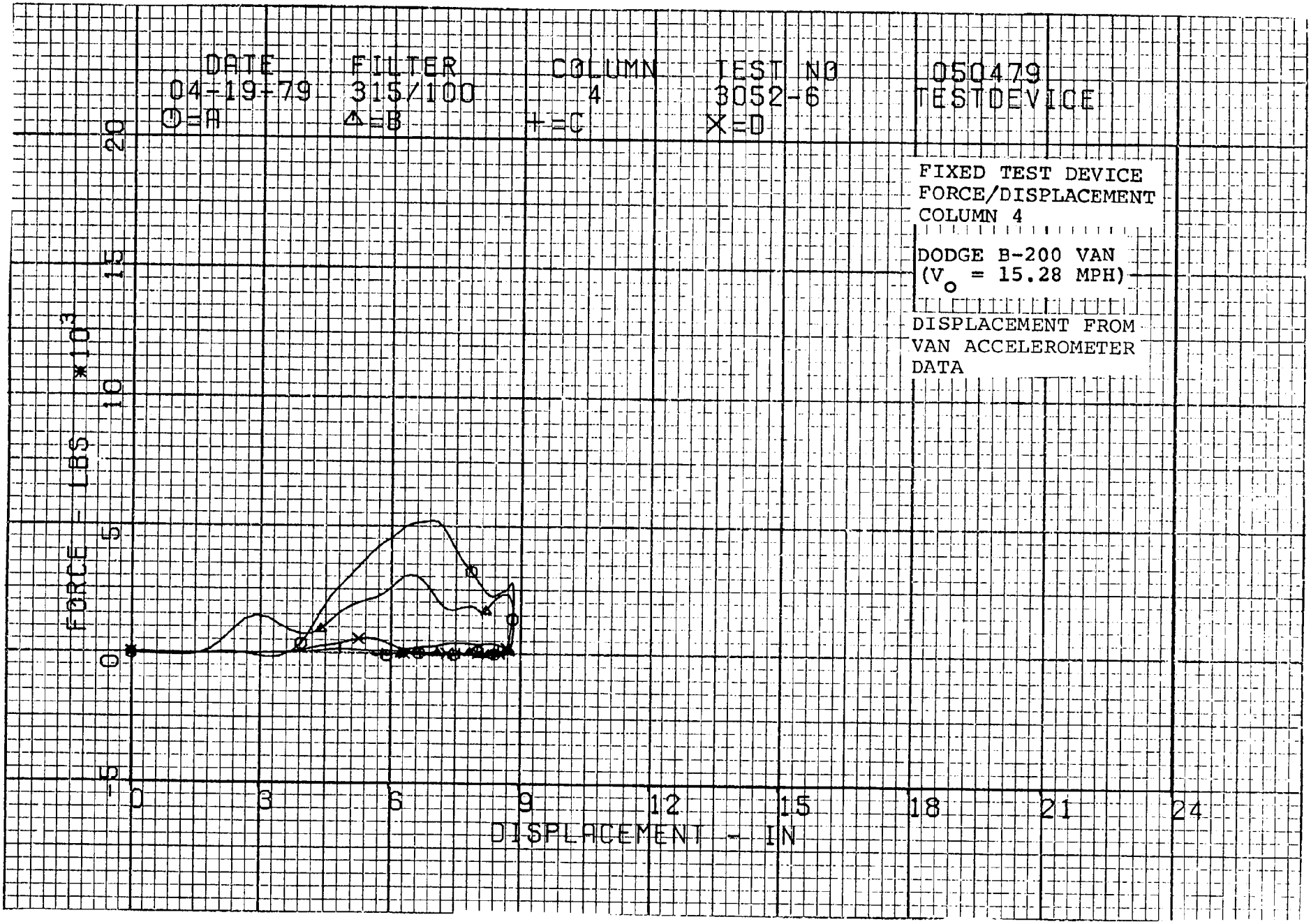

DATE
04-19-79
FILTER
315/100
COLUMN
2
TEST NO
3052-6
050479
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 2
DODGE B-200 VAN
(V o = 15.28 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

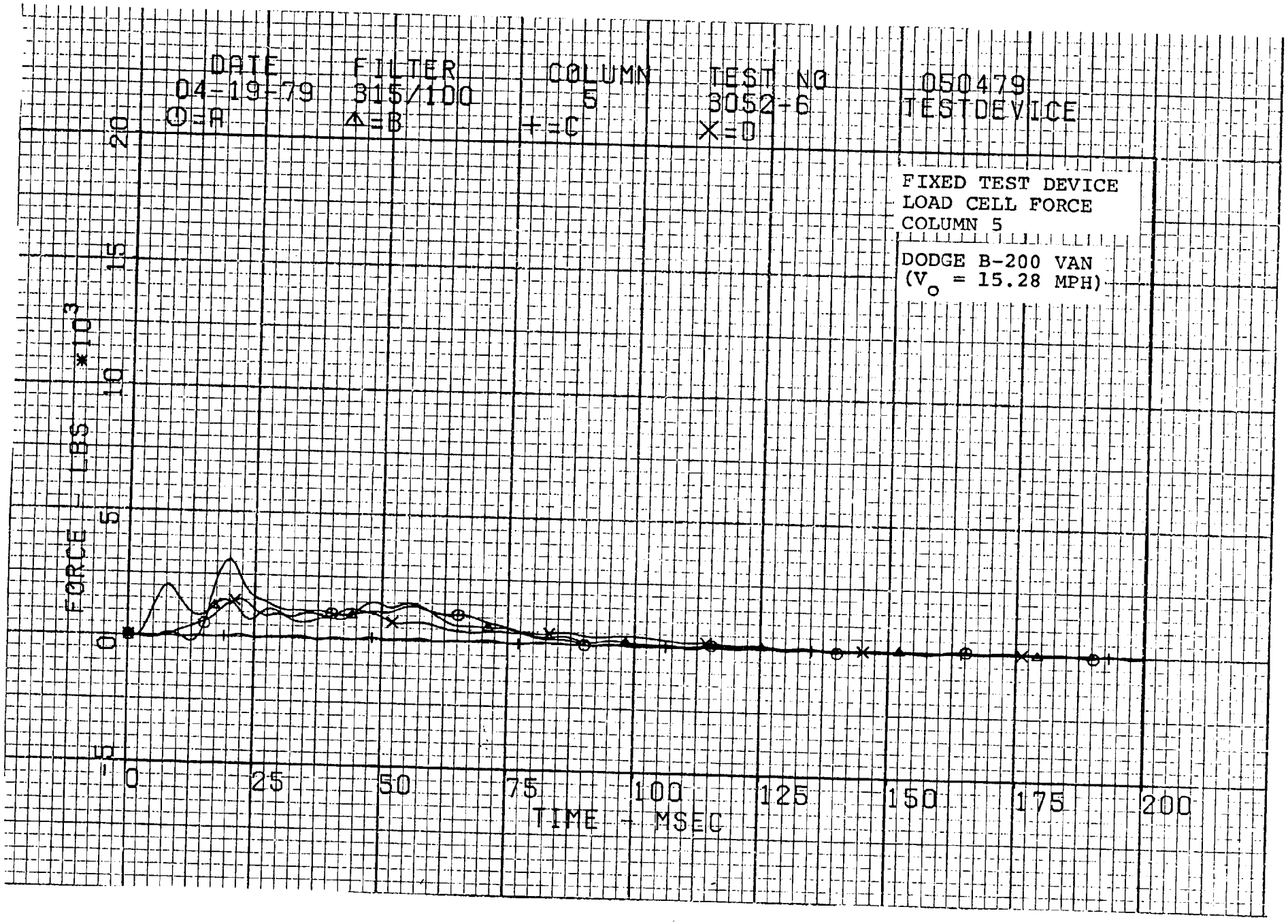

DATE
04-19-79
FILTER
315/100
COLUMN
2
TEST NO
3052-6
050479
TESTDEVICE
⊙=A
△=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 2
DODGE B-200 VAN
(V_o = 15.28 MPH)
DISPLACEMENT FROM
VAN ACCELEROMETER
DATA
FORCE - LBS *10³
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

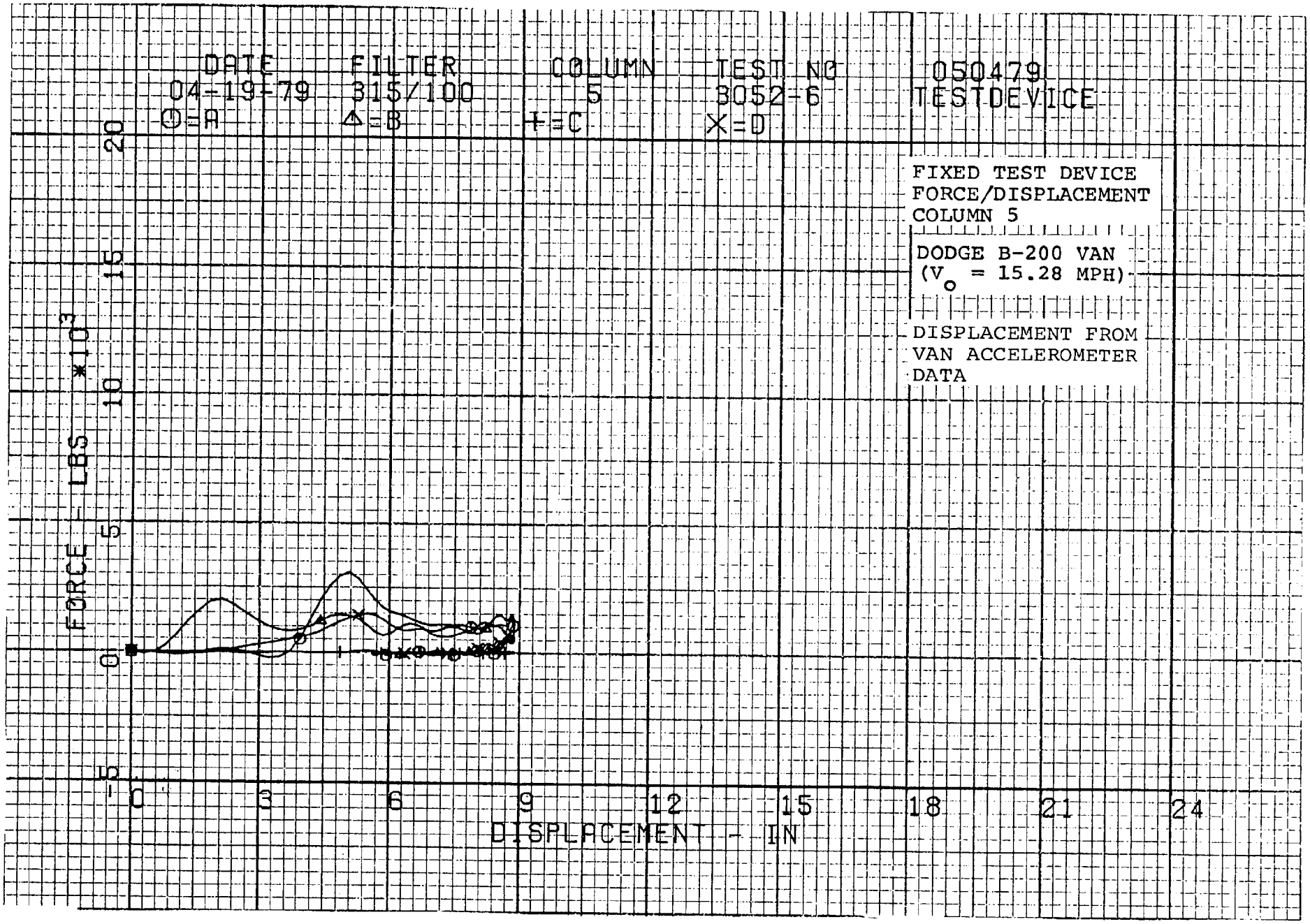

DATE
04-19-79
FILTER
315/100
COLUMN
3
TEST NO
3052-6
050479
TESTDEVICE
O=A
△=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 3
DODGE B-200 VAN
(V$_o$ = 15.28 MPH)
FORCE - LBS * 10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

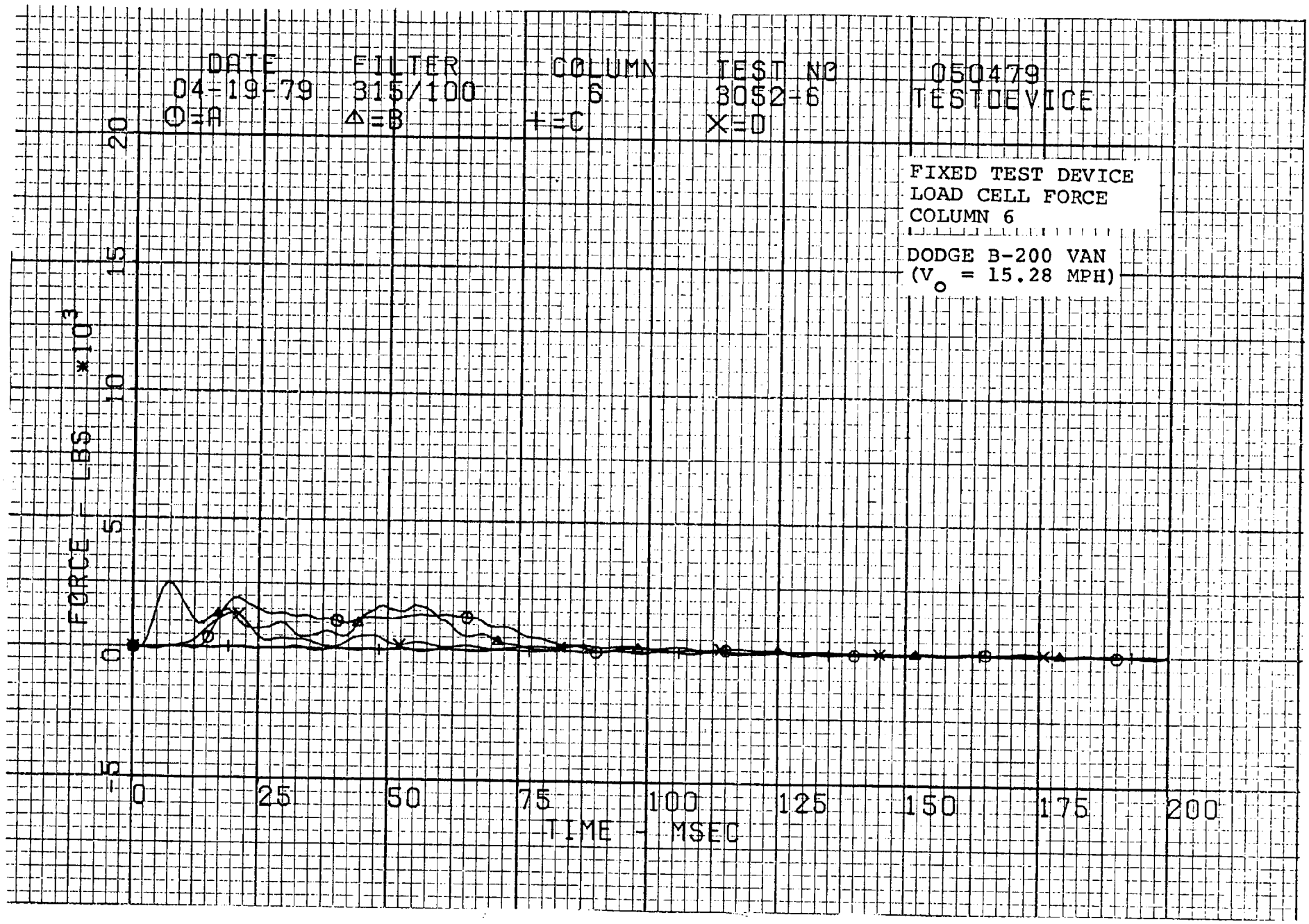

DATE
04-19-79
O=A
FILTER
315/100
△=B
COLUMN
3
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 3
DODGE B-200 VAN
(V_o = 15.28 MPH)
DISPLACEMENT FROM
VAN ACCELEROMETER
DATA
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

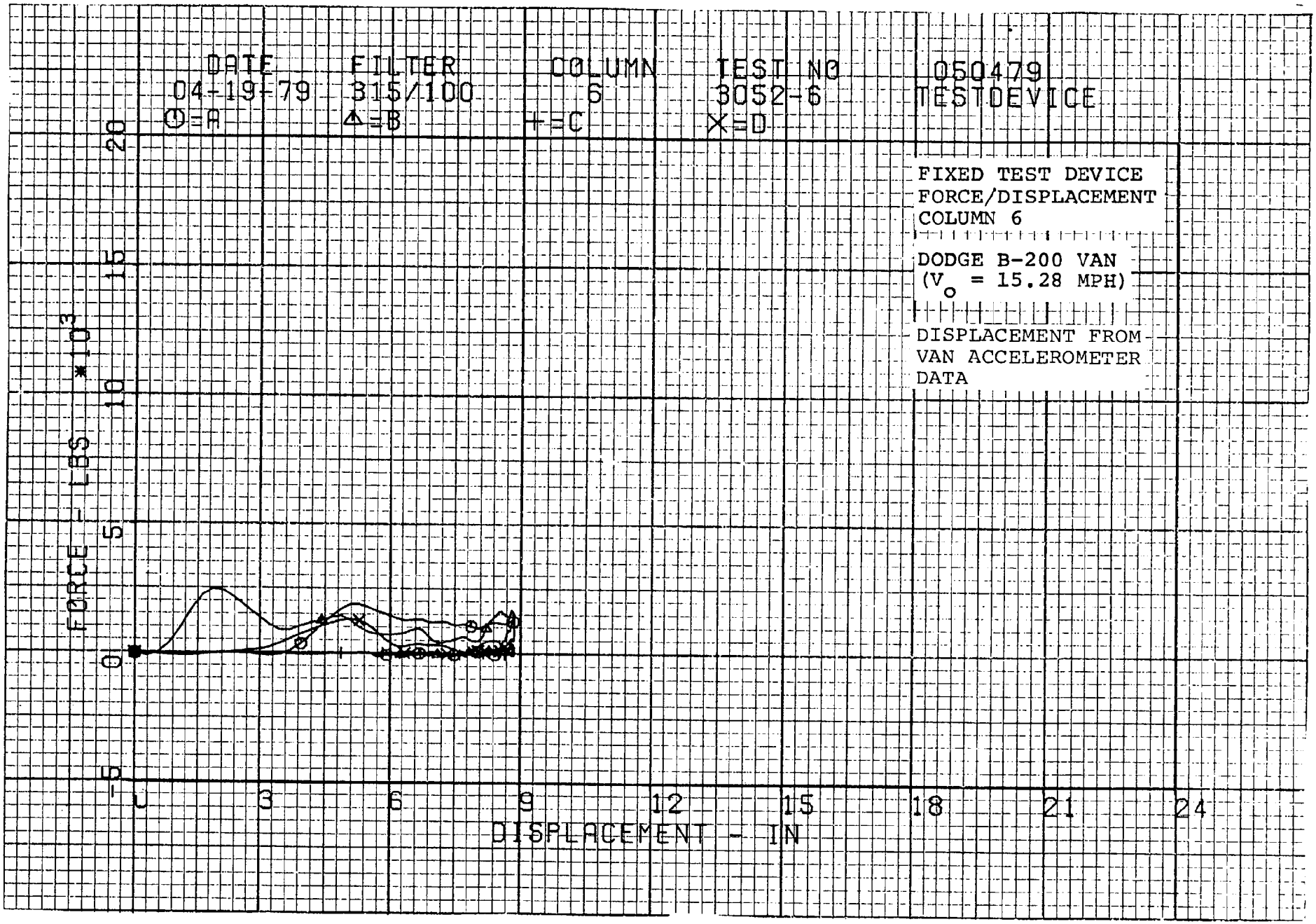

DATE
04-19-79
O=A
FILTER
315/100
Δ=B
COLUMN
4
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 4
DODGE B-200 VAN
(V$_o$ = 15.28 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

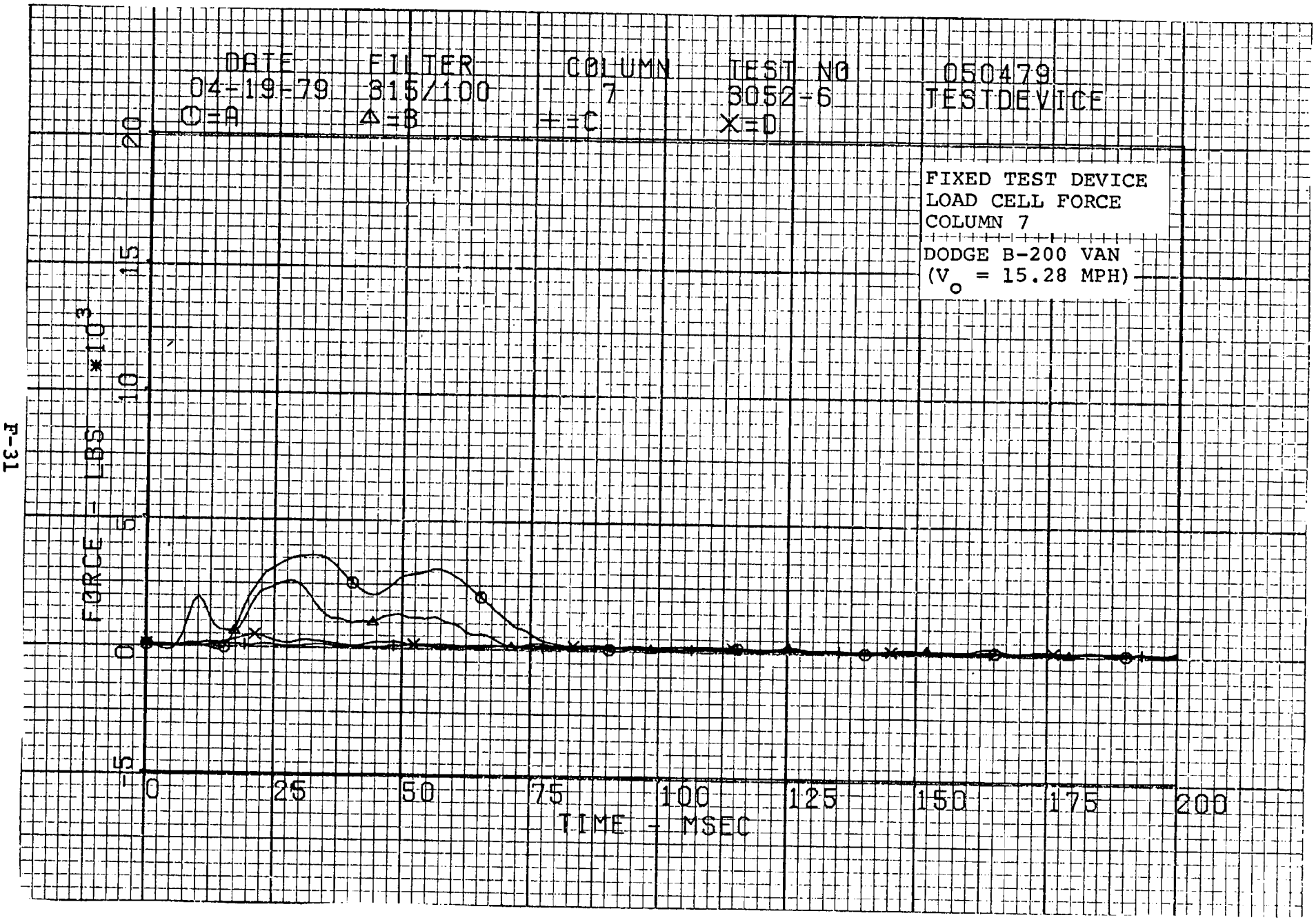

DATE
04-19-79
O=A
FILTER
315/100
△=B
COLUMN
4
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 4
DODGE B-200 VAN
(V_o = 15.28 MPH)
DISPLACEMENT FROM
VAN ACCELEROMETER
DATA
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

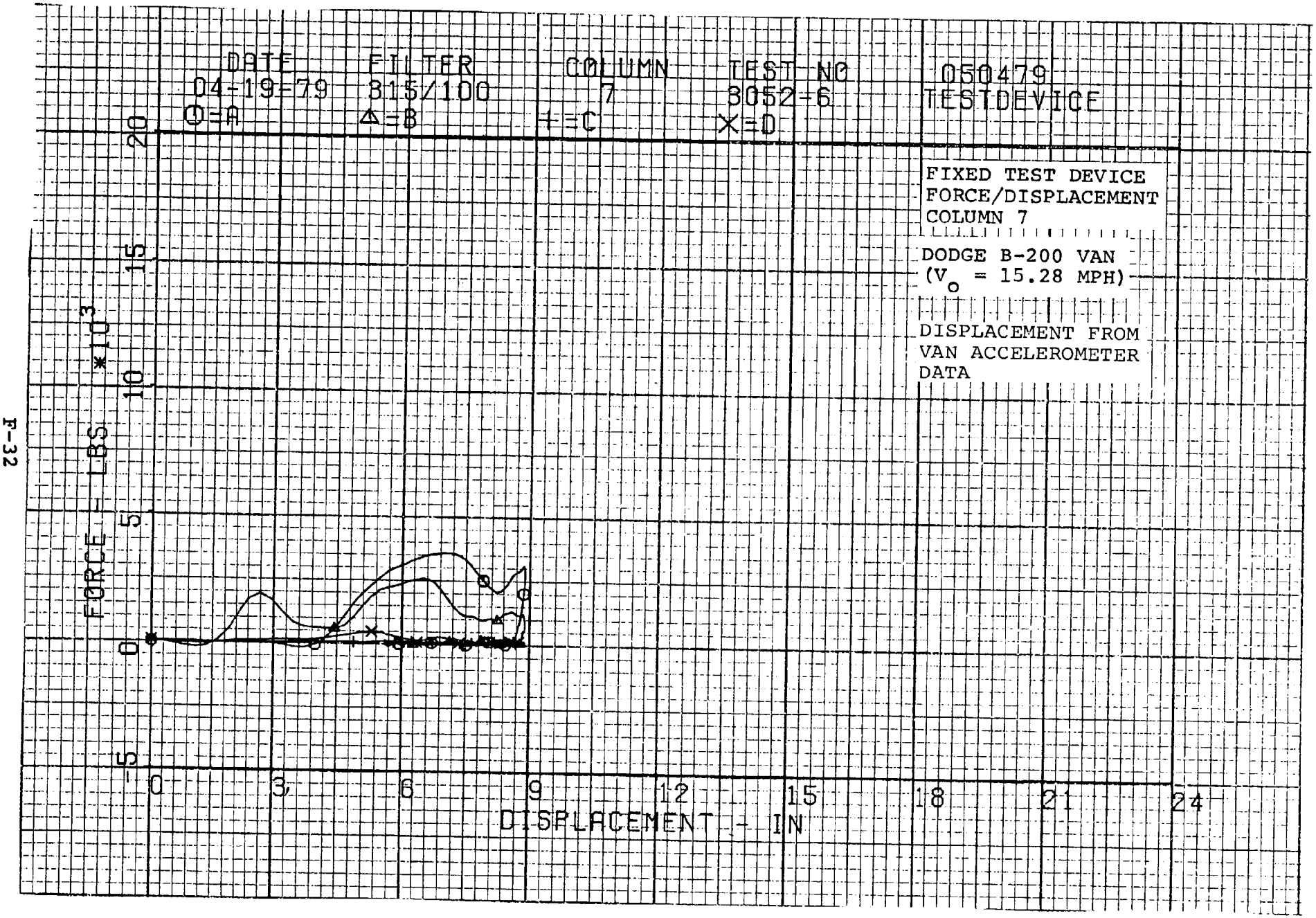

DATE
04-19-79
O=A
FILTER
315/100
△=B
COLUMN
5
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 5
DODGE B-200 VAN
(V_o = 15.28 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

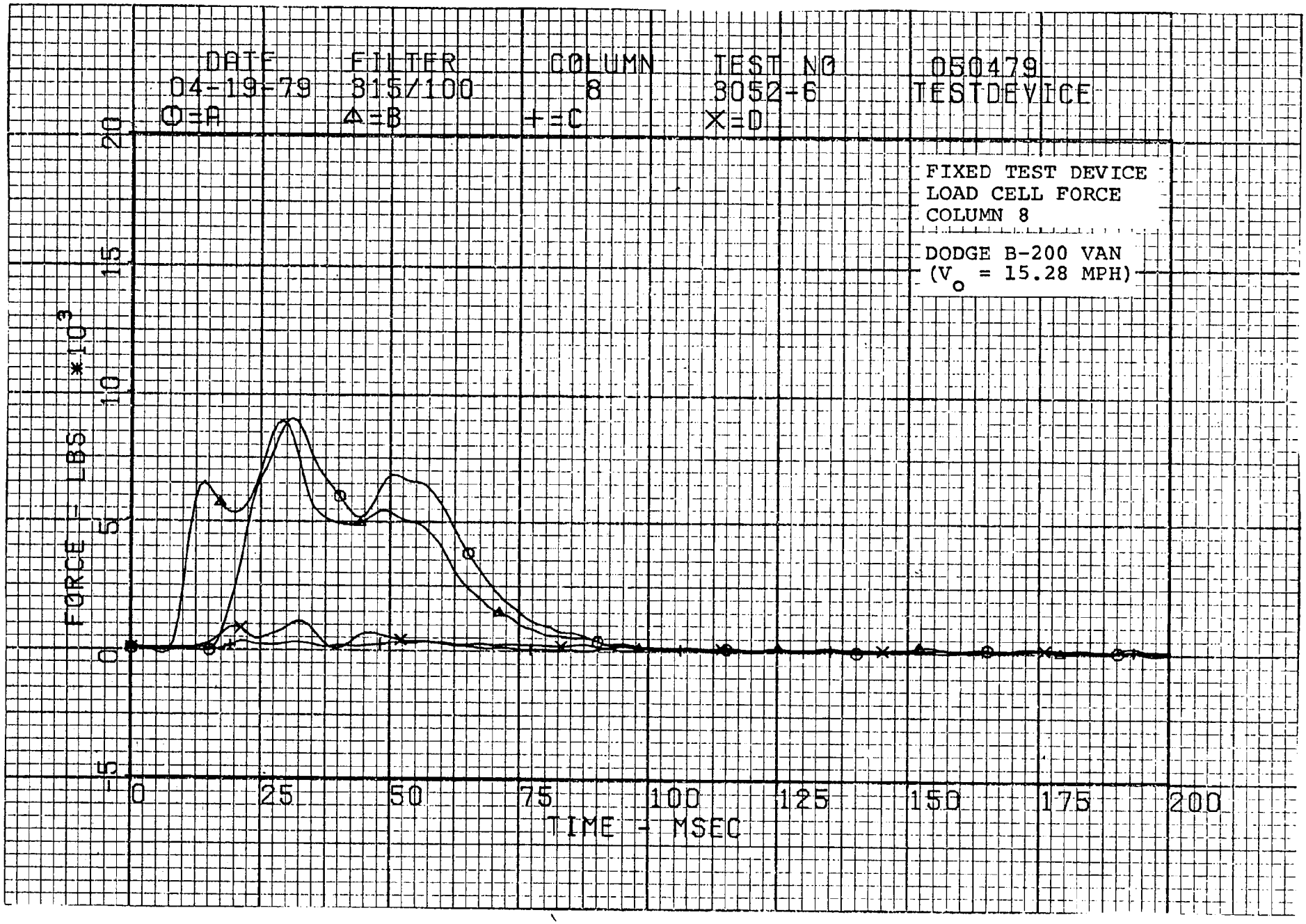

DATE
04-19-79
O=A
FILTER
315/100
Δ=B
COLUMN
5
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 5
DODGE B-200 VAN
(V o = 15.28 MPH)
DISPLACEMENT FROM
VAN ACCELEROMETER
DATA
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

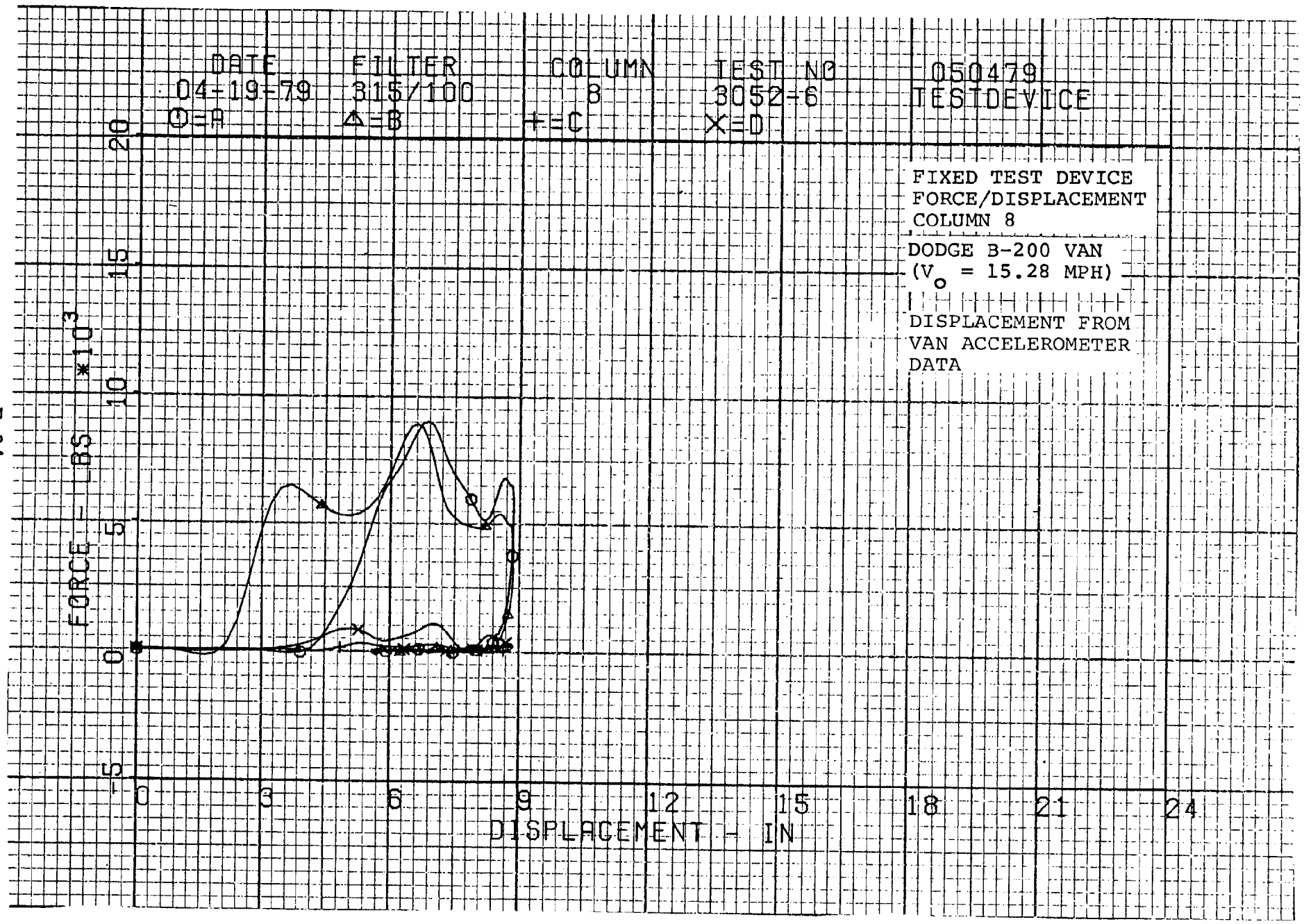

DATE
04-19-79
O=A
FILTER
315/100
Δ=B
COLUMN
6
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 6
DODGE B-200 VAN
(V o = 15.28 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

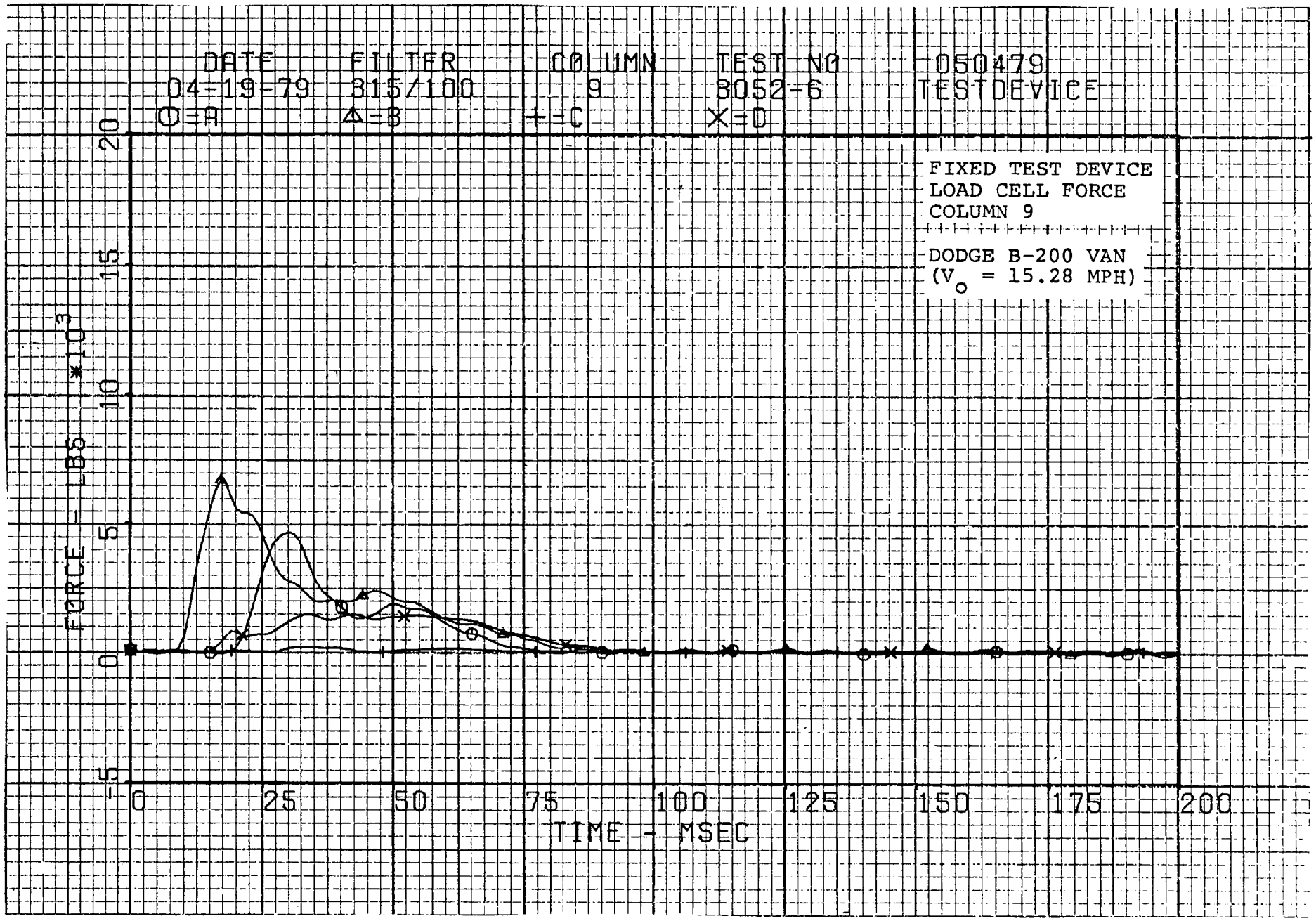

DATE
04-19-79
FILTER
315/100
COLUMN
6
TEST NO
3052-6
050479
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 6
DODGE B-200 VAN
(V_o = 15.28 MPH)
DISPLACEMENT FROM
VAN ACCELEROMETER
DATA
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

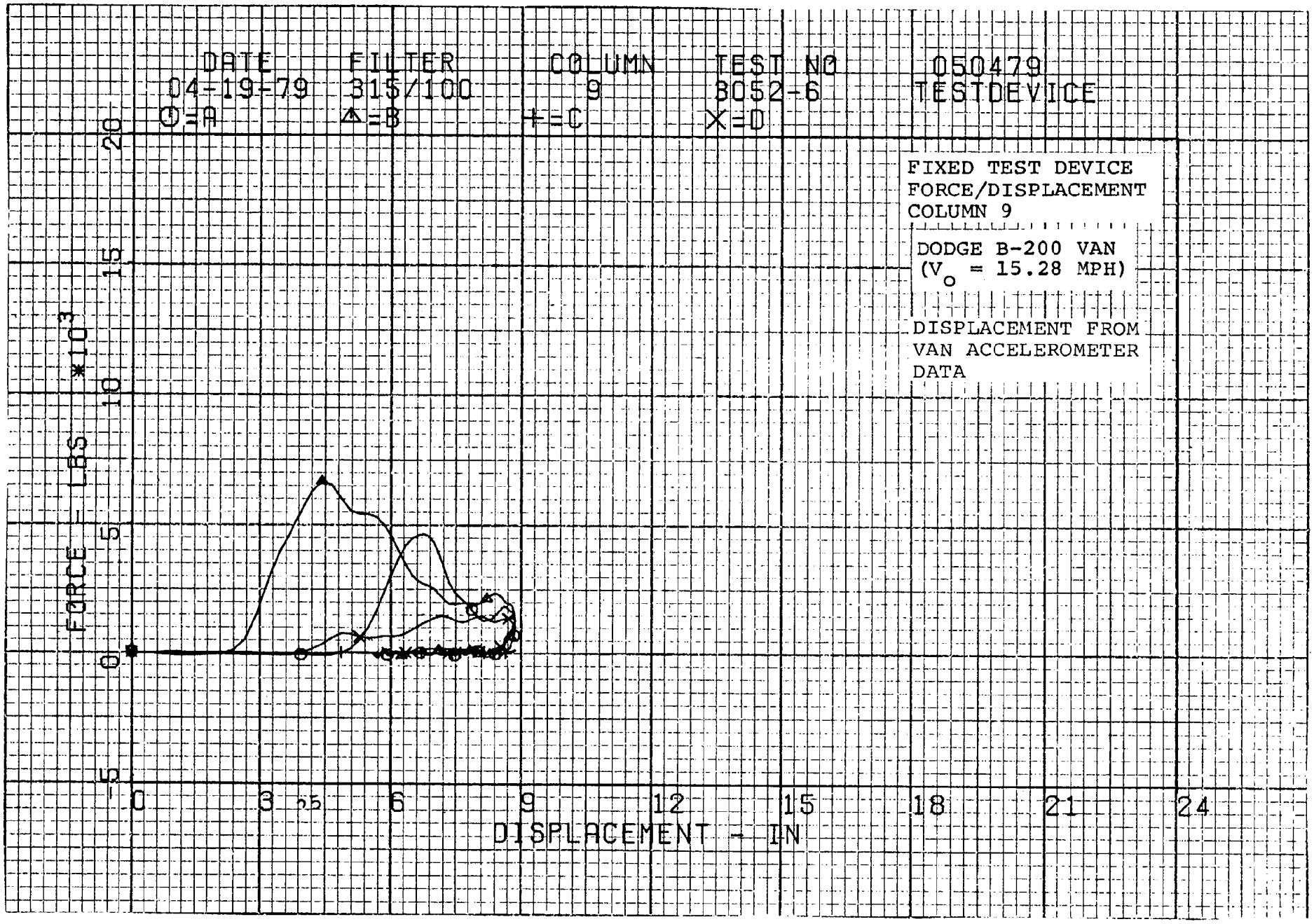

DATE
04-19-79
O=A
FILTER
315/100
Δ=B
COLUMN
7
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 7
DODGE B-200 VAN
(V$_o$ = 15.28 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

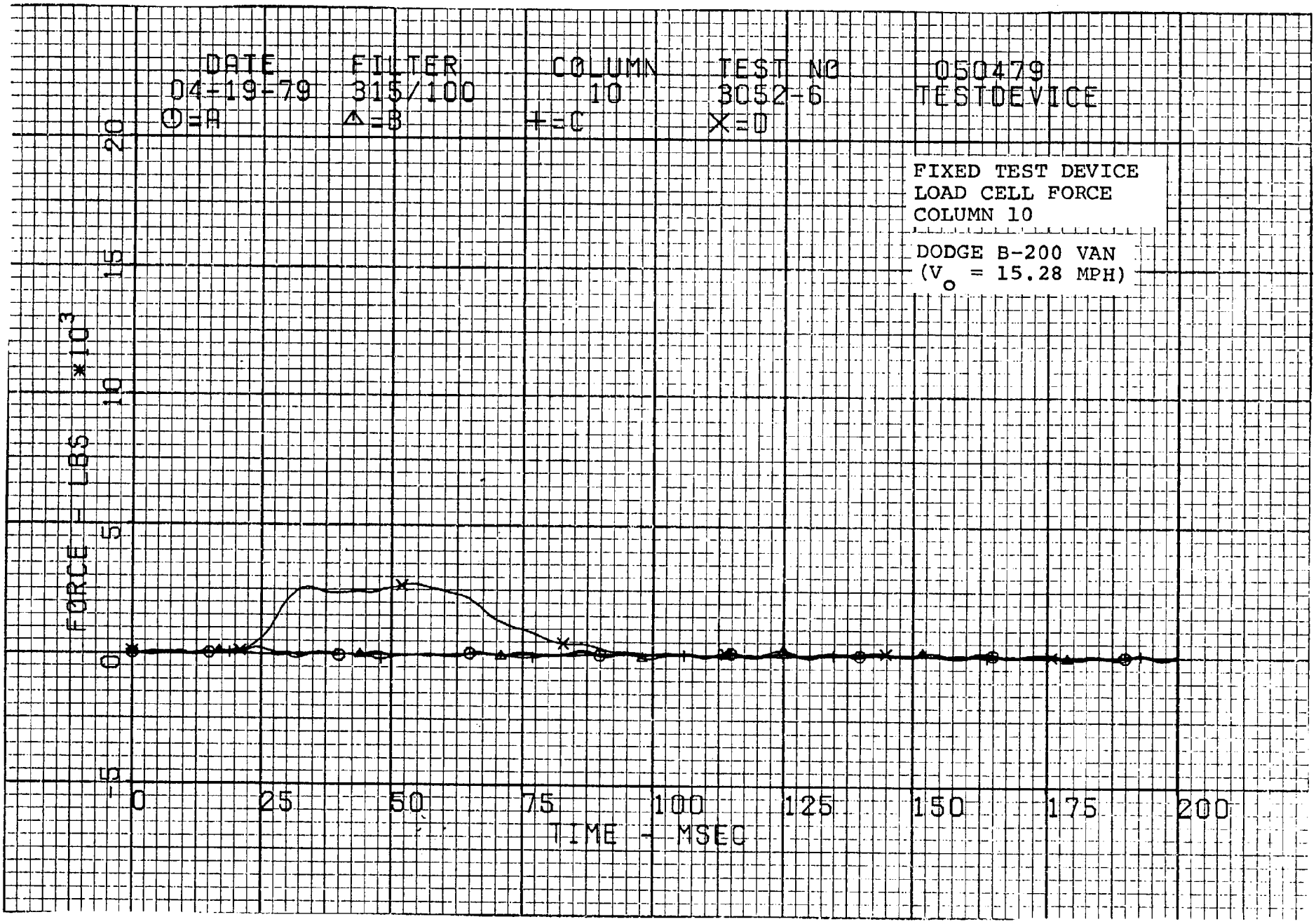

DATE
04-19-79
O=A
FILTER
315/100
△=B
COLUMN
7
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 7
DODGE B-200 VAN
(V_o = 15.28 MPH)
DISPLACEMENT FROM
VAN ACCELEROMETER
DATA
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

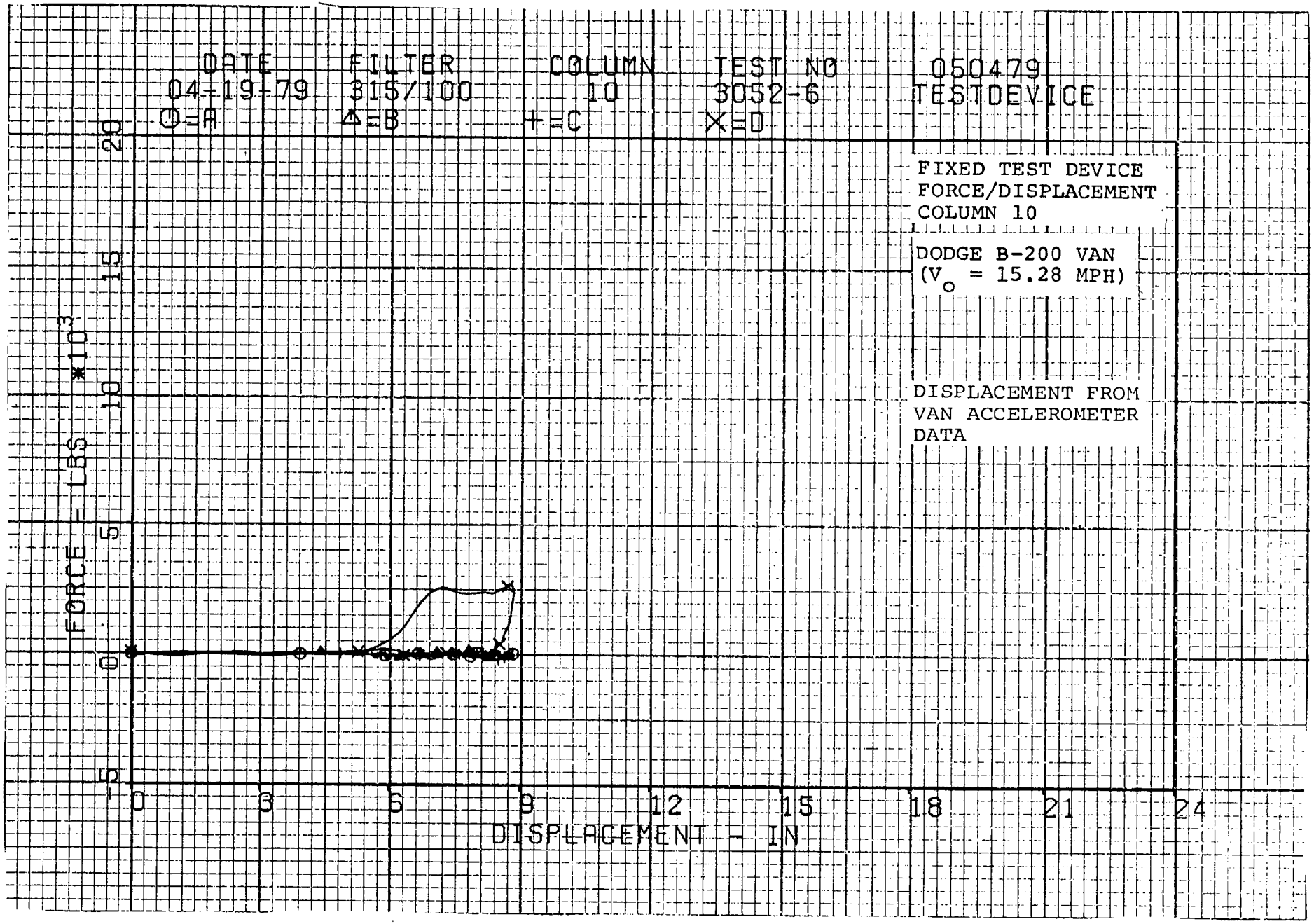

DATE
04-19-79
O=A
FILTER
315/100
Δ=B
COLUMN
8
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 8
DODGE B-200 VAN
(V_o = 15.28 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

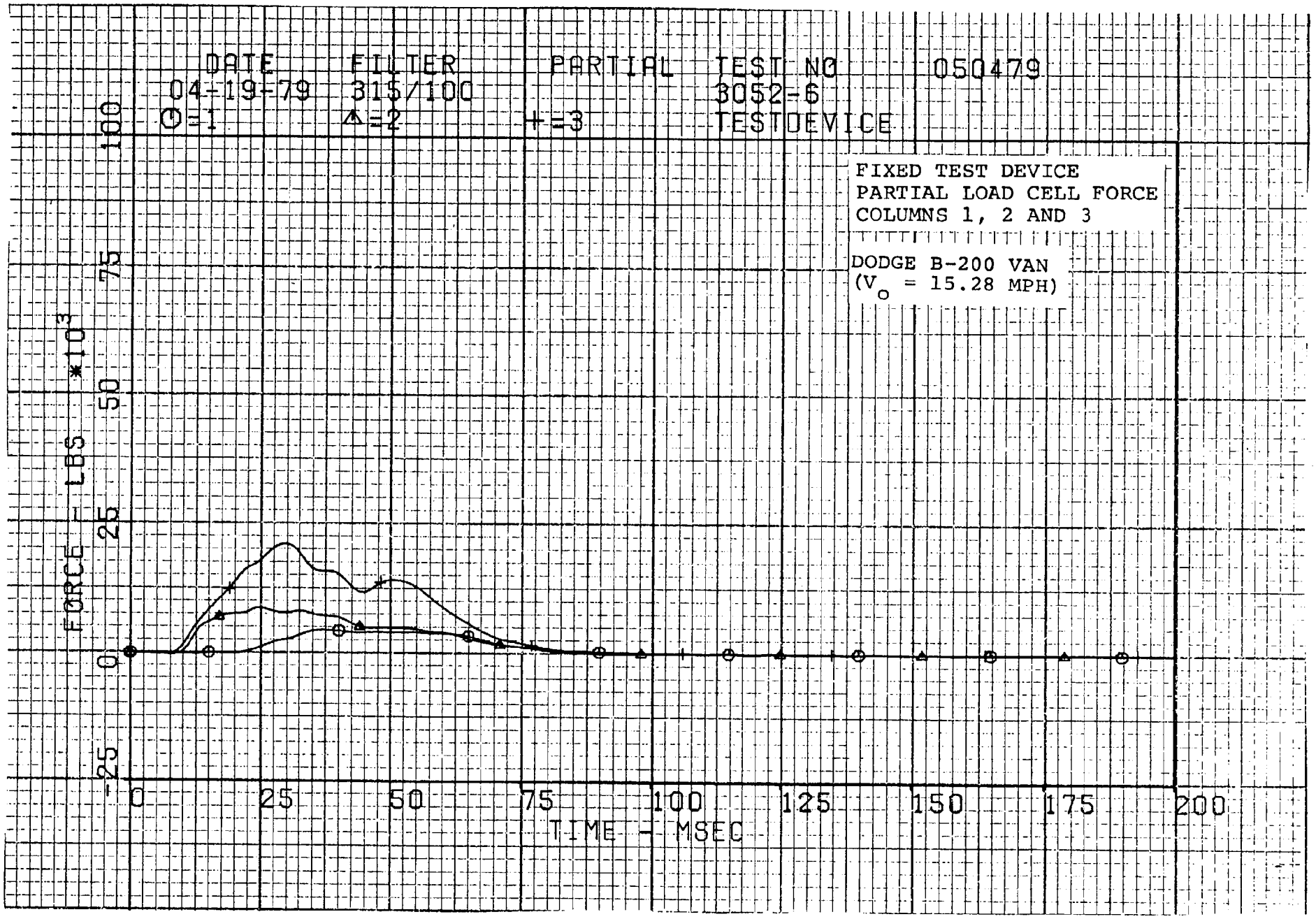

DATE
04-19-79
O=A
FILTER
315/100
△=B
COLUMN
8
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 8
DODGE B-200 VAN
(V_o = 15.28 MPH)
DISPLACEMENT FROM
VAN ACCELEROMETER
DATA
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

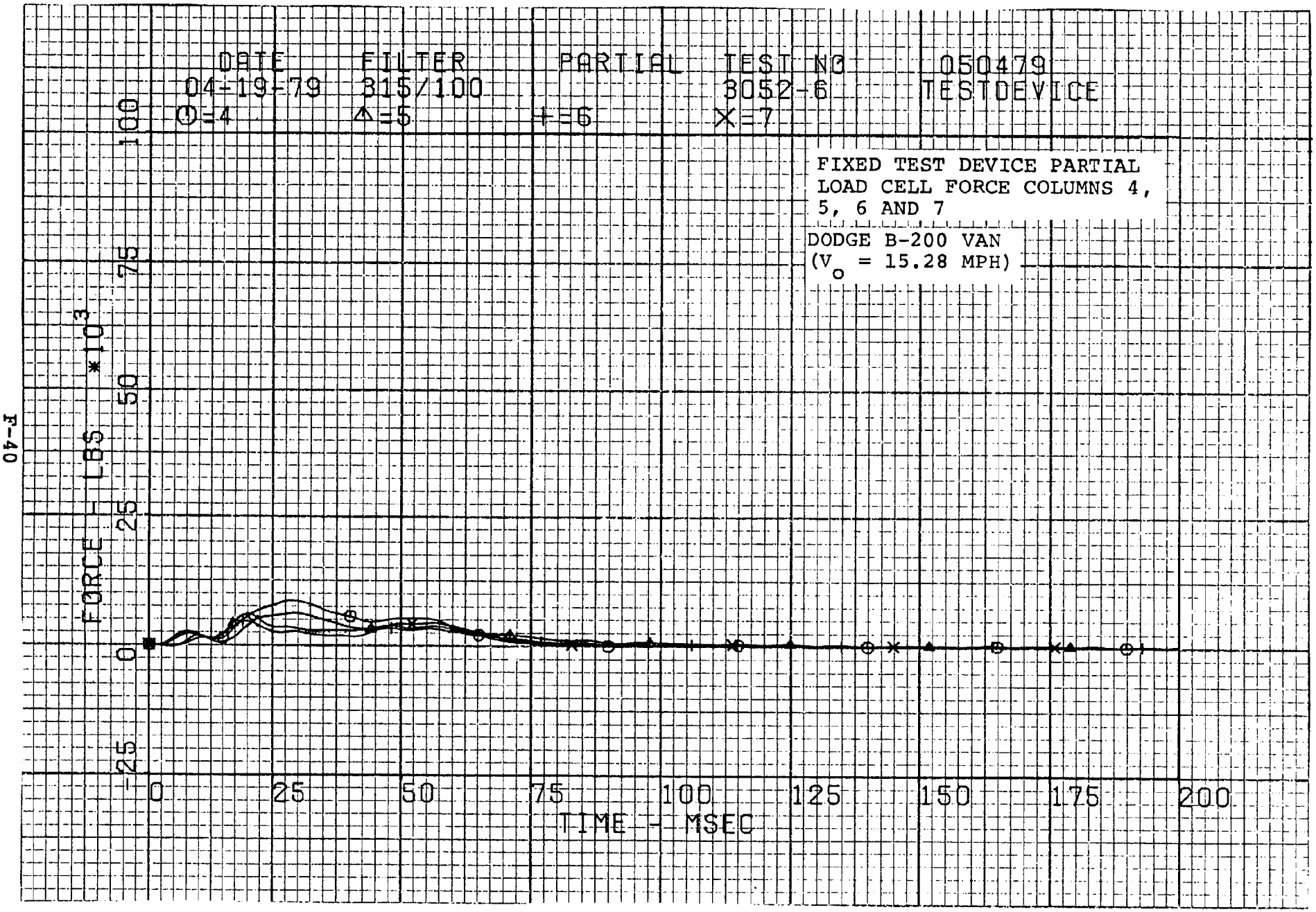

DATE
04-19-79
O=A
FILTER
315/100
Δ=B
COLUMN
9
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 9
DODGE B-200 VAN
(V$_o$ = 15.28 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

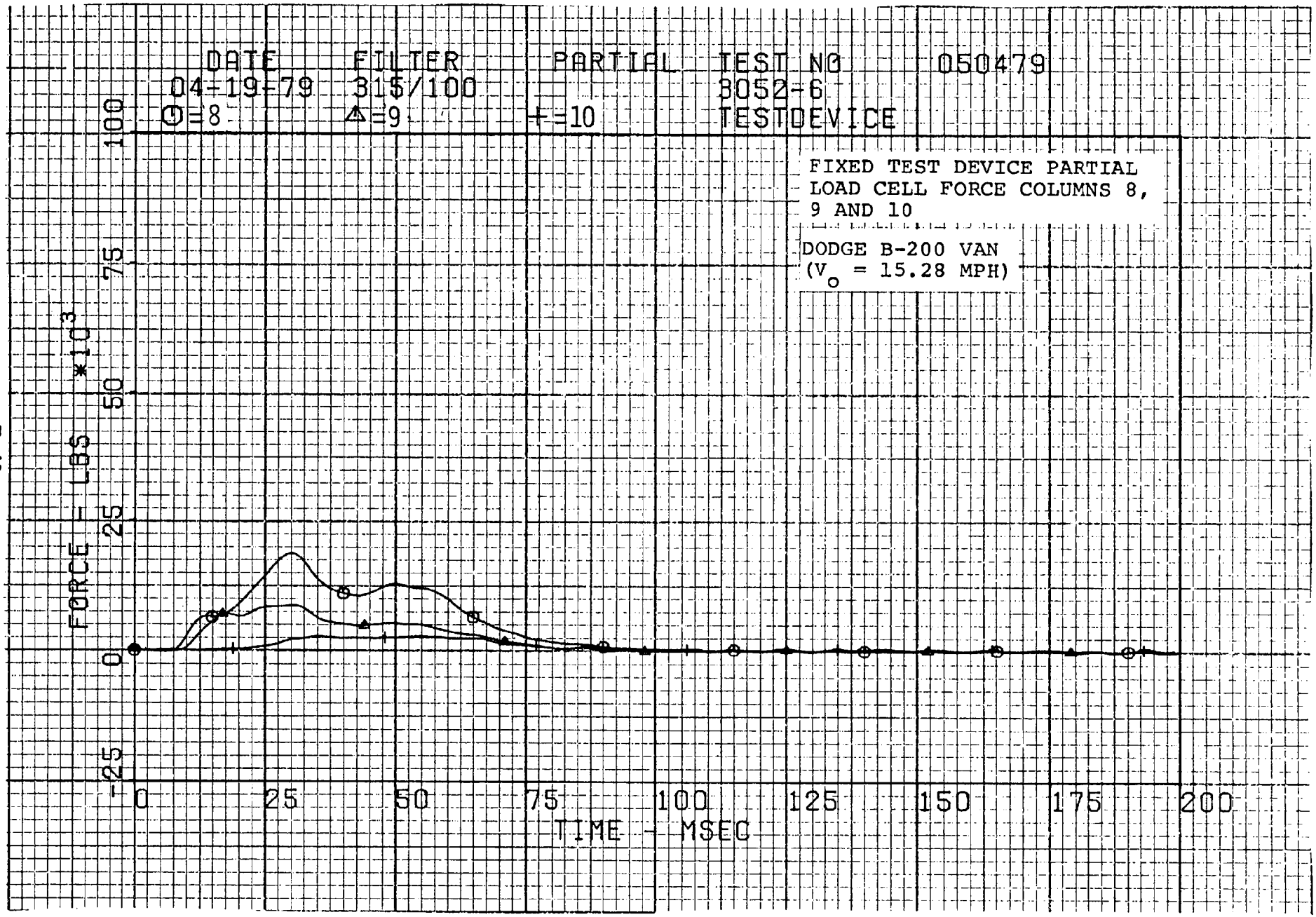

DATE
04-19-79
O=A
FILTER
315/100
△=B
COLUMN
9
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 9
DODGE B-200 VAN
(V_o = 15.28 MPH)
DISPLACEMENT FROM
VAN ACCELEROMETER
DATA
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

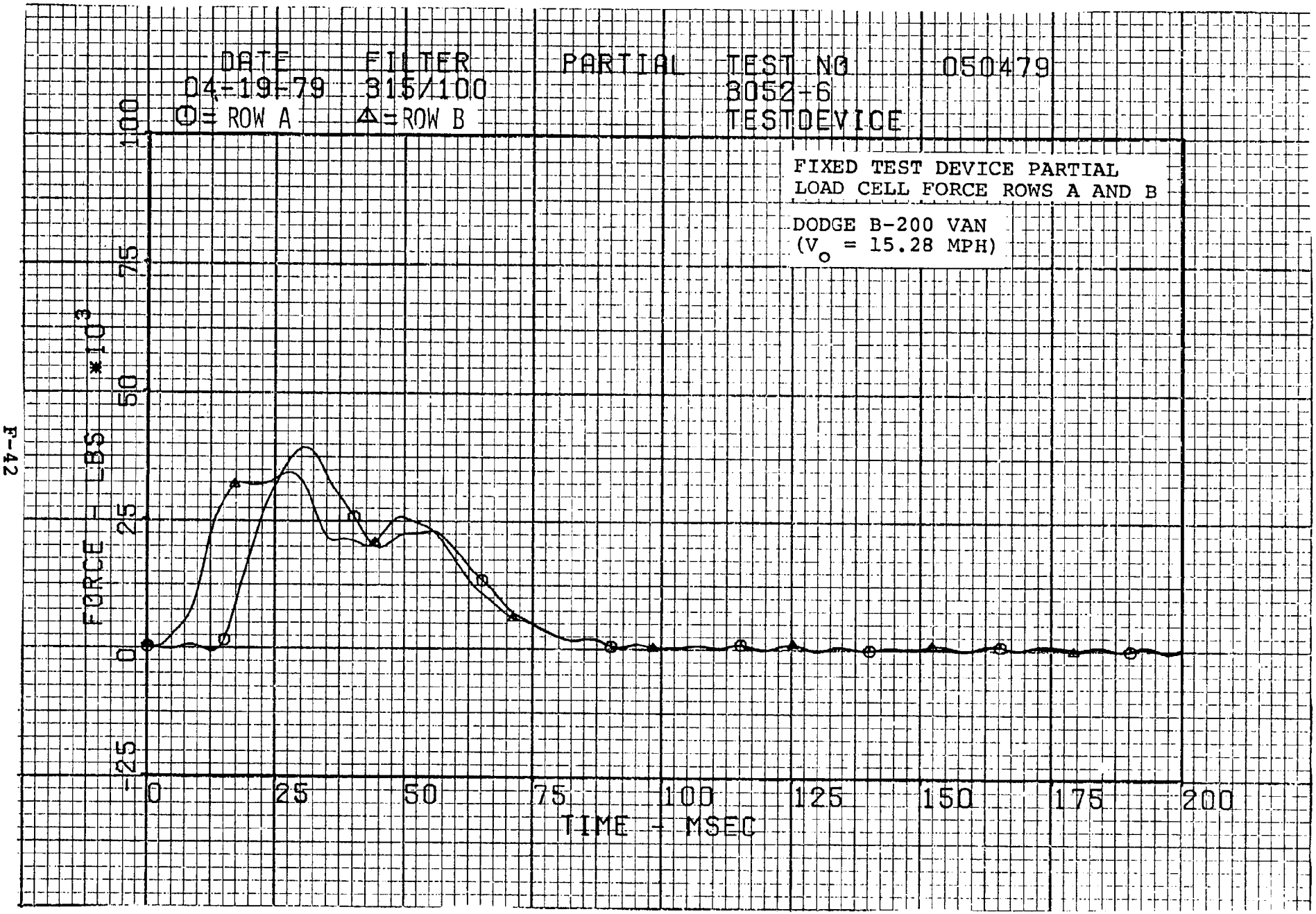

DATE
04-19-79
O=A
FILTER
315/100
△=B
COLUMN
10
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 10
DODGE B-200 VAN
(V_o = 15.28 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

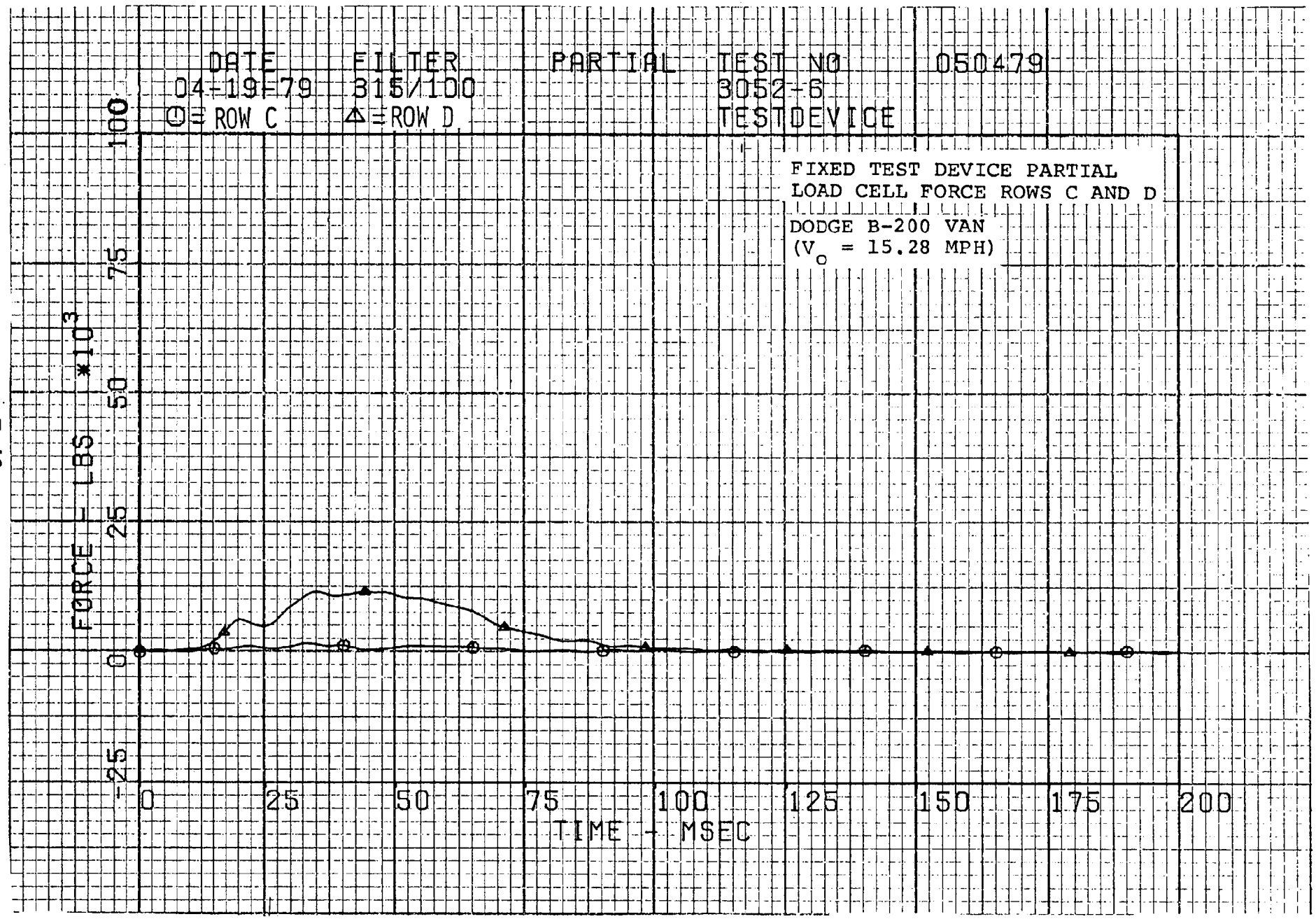

DATE
04-19-79
O=A
FILTER
315/100
Δ=B
COLUMN
10
+=C
TEST NO
3052-6
X=D
050479
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 10
DODGE B-200 VAN
(V_o = 15.28 MPH)
DISPLACEMENT FROM
VAN ACCELEROMETER
DATA
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

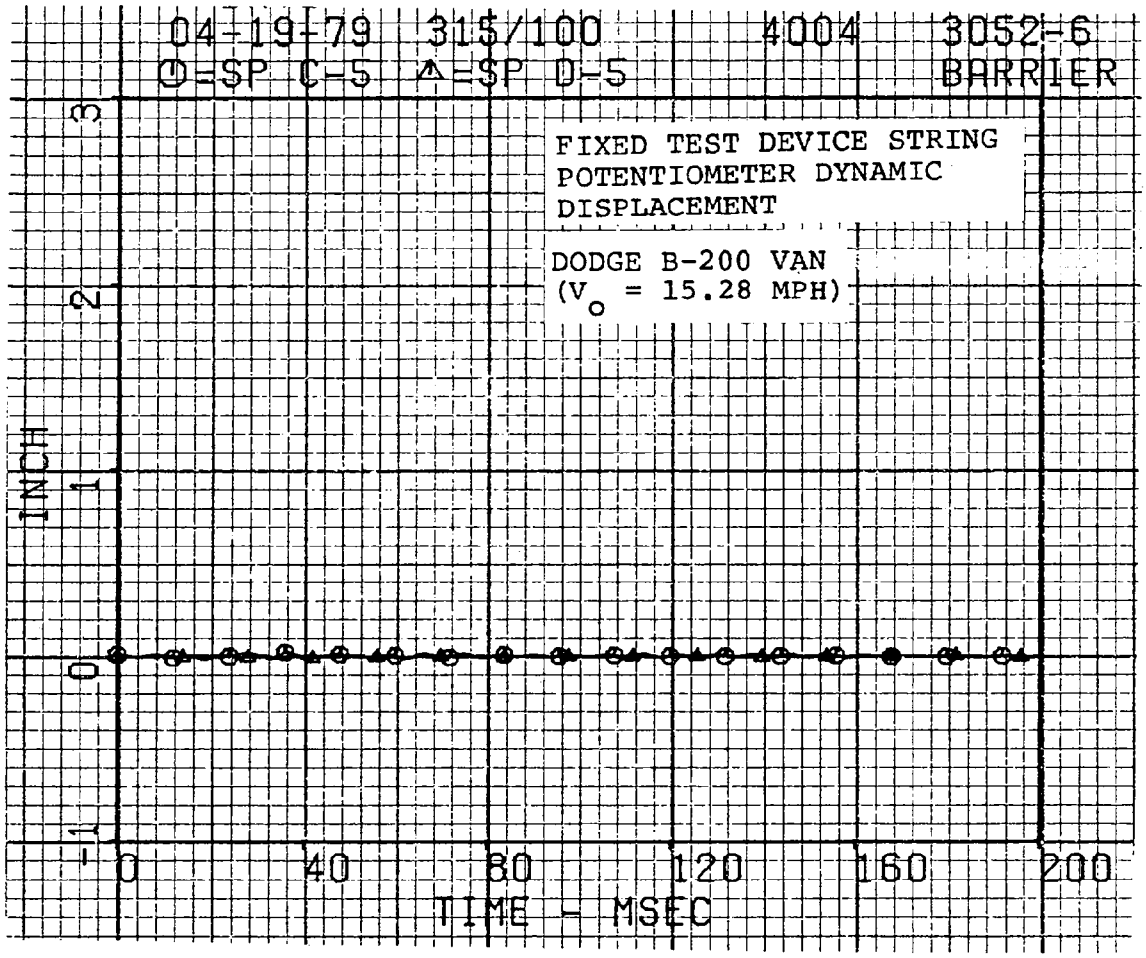

DATE
04-19-79
FILTER
315/100
PARTIAL
TEST NO
3052-6
050479
O=1
Δ=2
+=3
TESTDEVICE
FIXED TEST DEVICE
PARTIAL LOAD CELL FORCE
COLUMNS 1, 2 AND 3
DODGE B-200 VAN
(V_o = 15.28 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

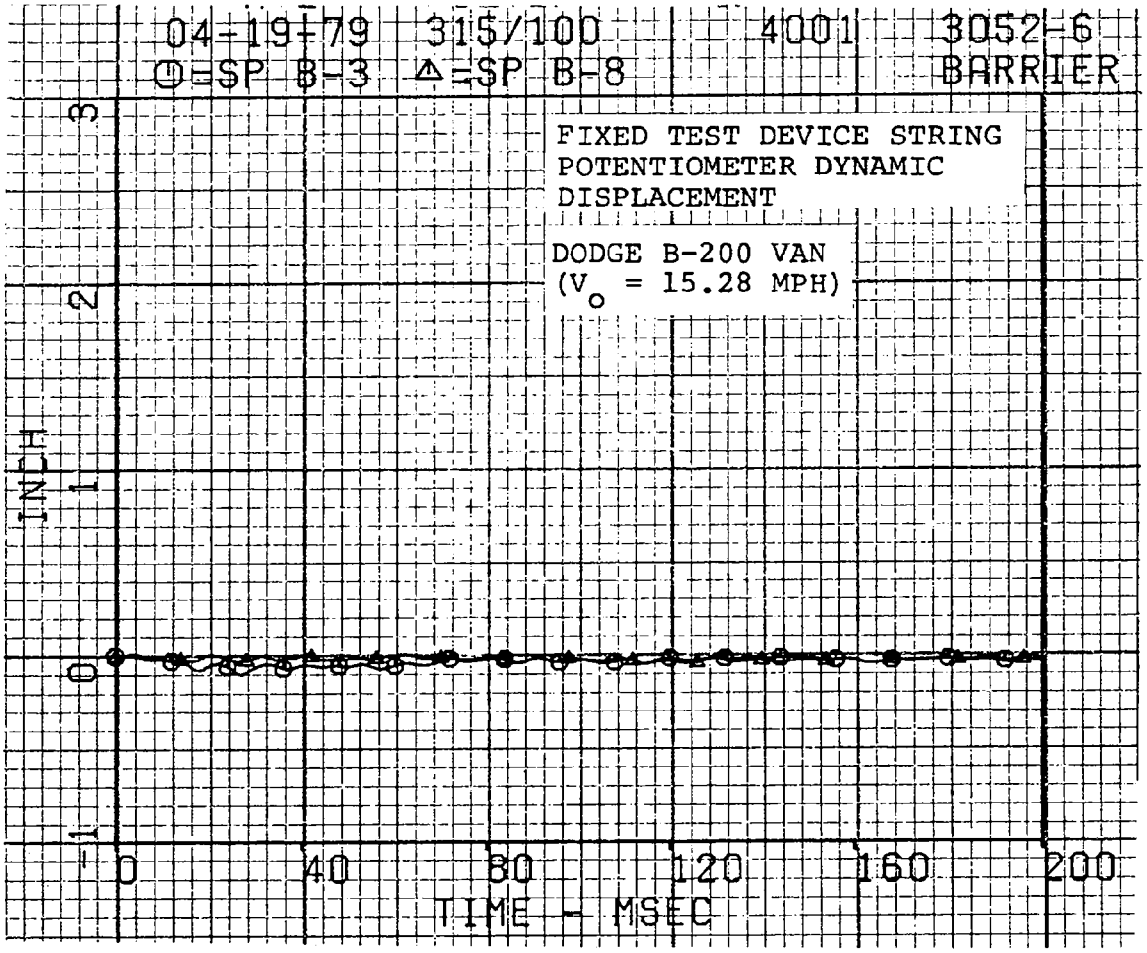

DATE
04-19-79
FILTER
315/100
PARTIAL
TEST NO
3052-6
050479
TESTDEVICE
⊙=4
△=5
+=6
X=7
FIXED TEST DEVICE PARTIAL LOAD CELL FORCE COLUMNS 4, 5, 6 AND 7
DODGE B-200 VAN
(V_o = 15.28 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

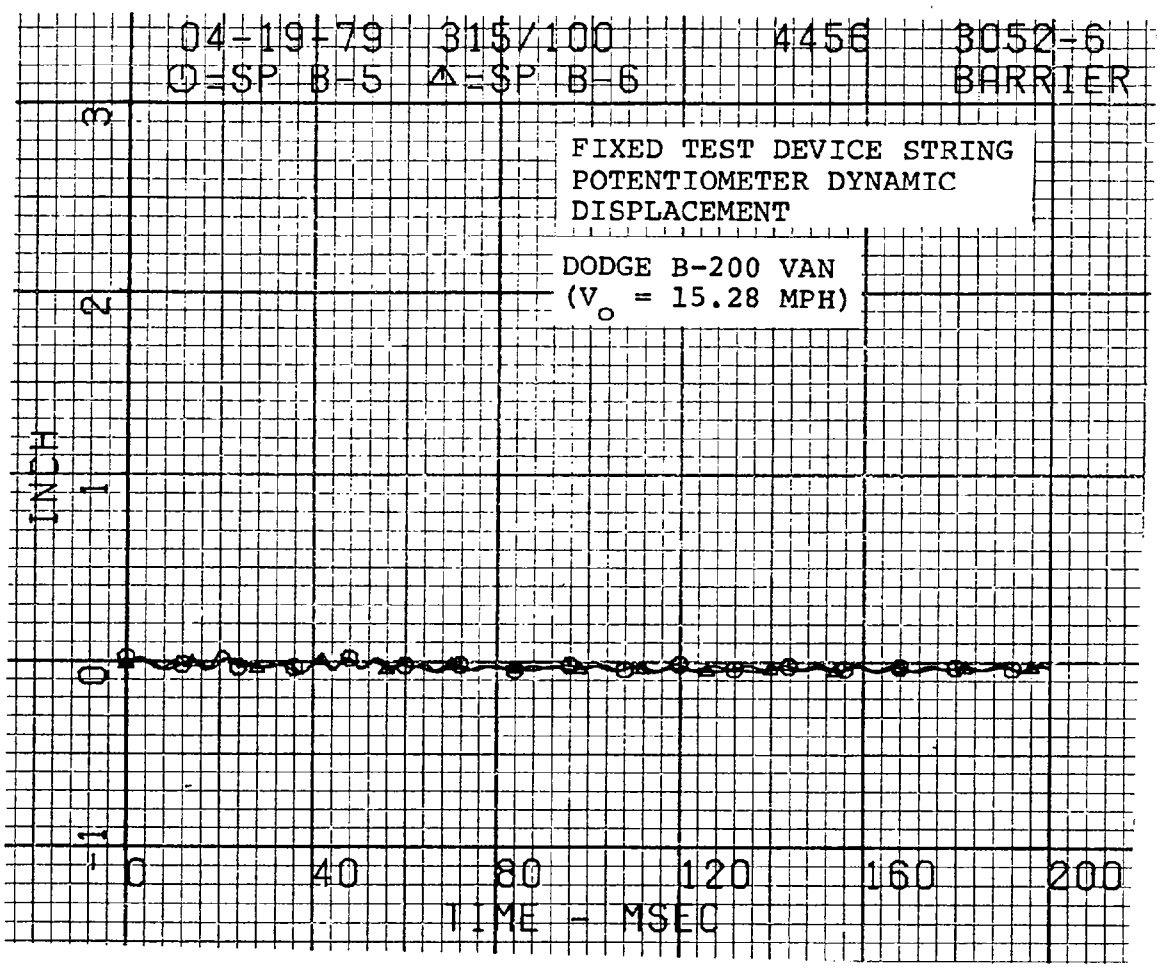

DATE
04-19-79
FILTER
315/100
PARTIAL
TEST NO
3052-6
TESTDEVICE
050479
⊙=8
△=9
+=10
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE COLUMNS 8,
9 AND 10
DODGE B-200 VAN
(V_o = 15.28 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

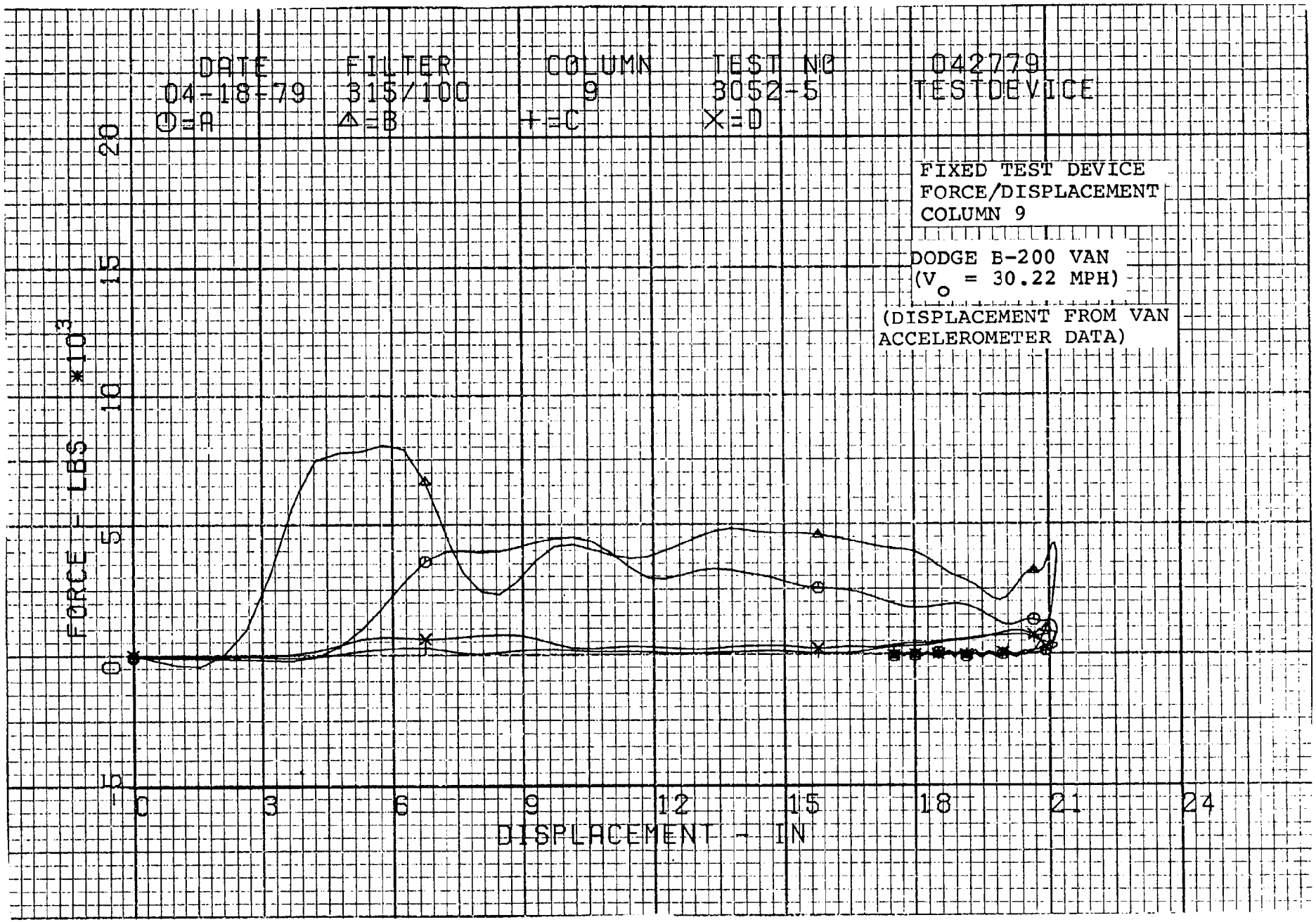

DATE
04-19-79
FILTER
315/100
PARTIAL
TEST NO
3052-6
TESTDEVICE
050479
O = ROW A
Δ = ROW B
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE ROWS A AND B
DODGE B-200 VAN
(V$_o$ = 15.28 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

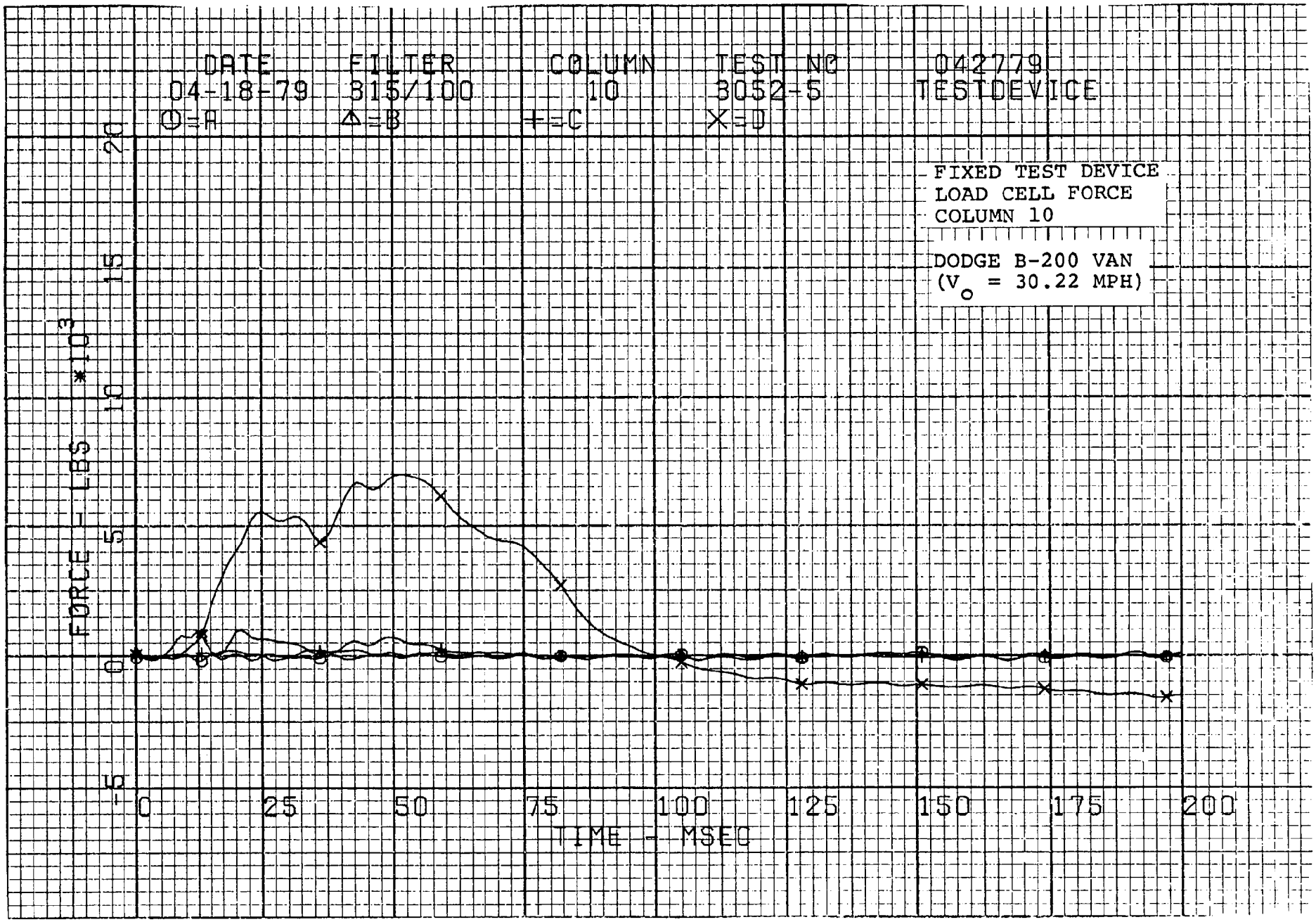

DATE
04-19-79
FILTER
315/100
PARTIAL
TEST NO
3052-6
050479
⊙ = ROW C
△ = ROW D
TESTDEVICE
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE ROWS C AND D
DODGE B-200 VAN
(V_o = 15.28 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

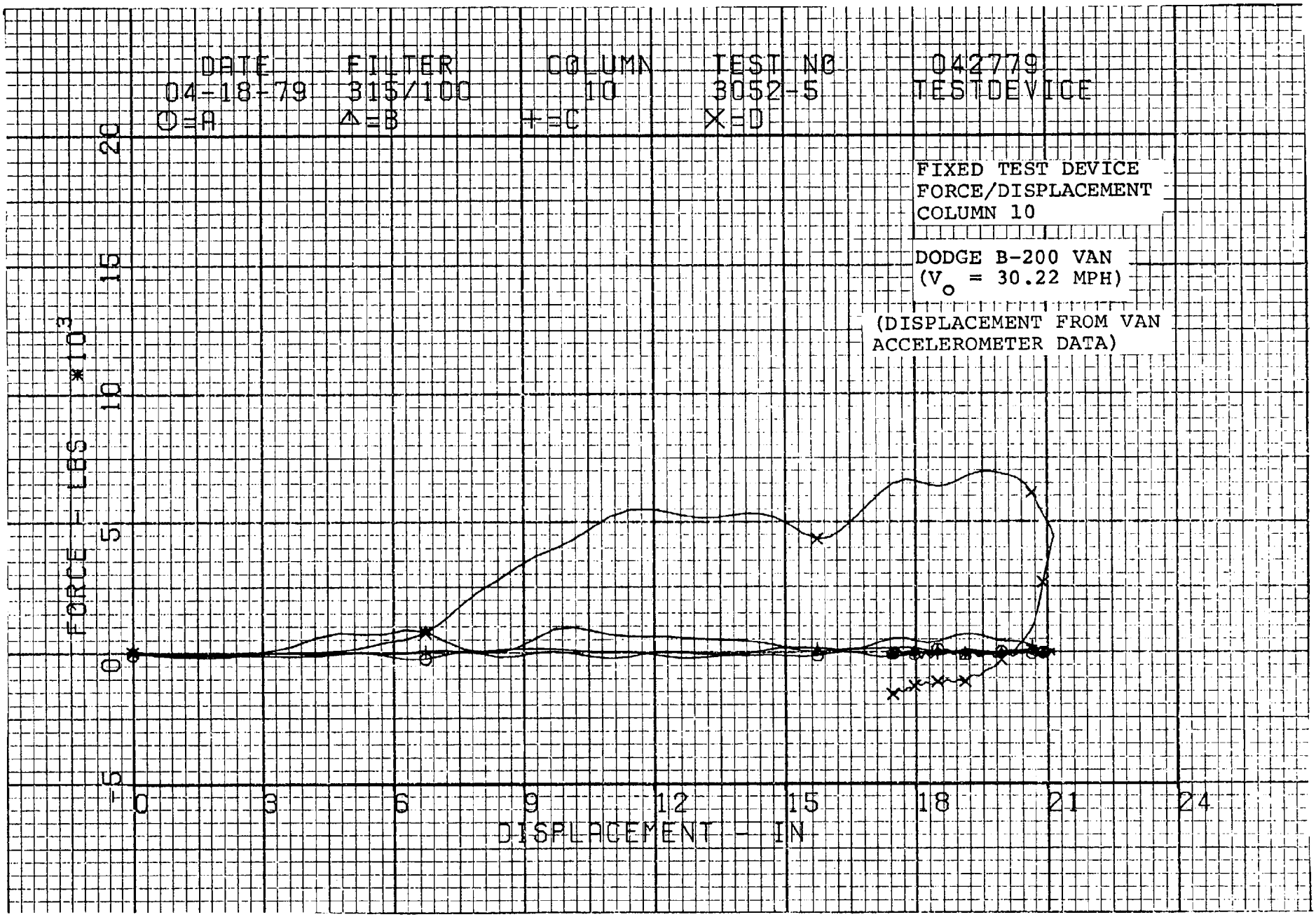

04-19-79 315/100 4004 3052-6
O=SP C-5 △=SP D-5 BARRIER
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
DODGE B-200 VAN
(V$_o$ = 15.28 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC

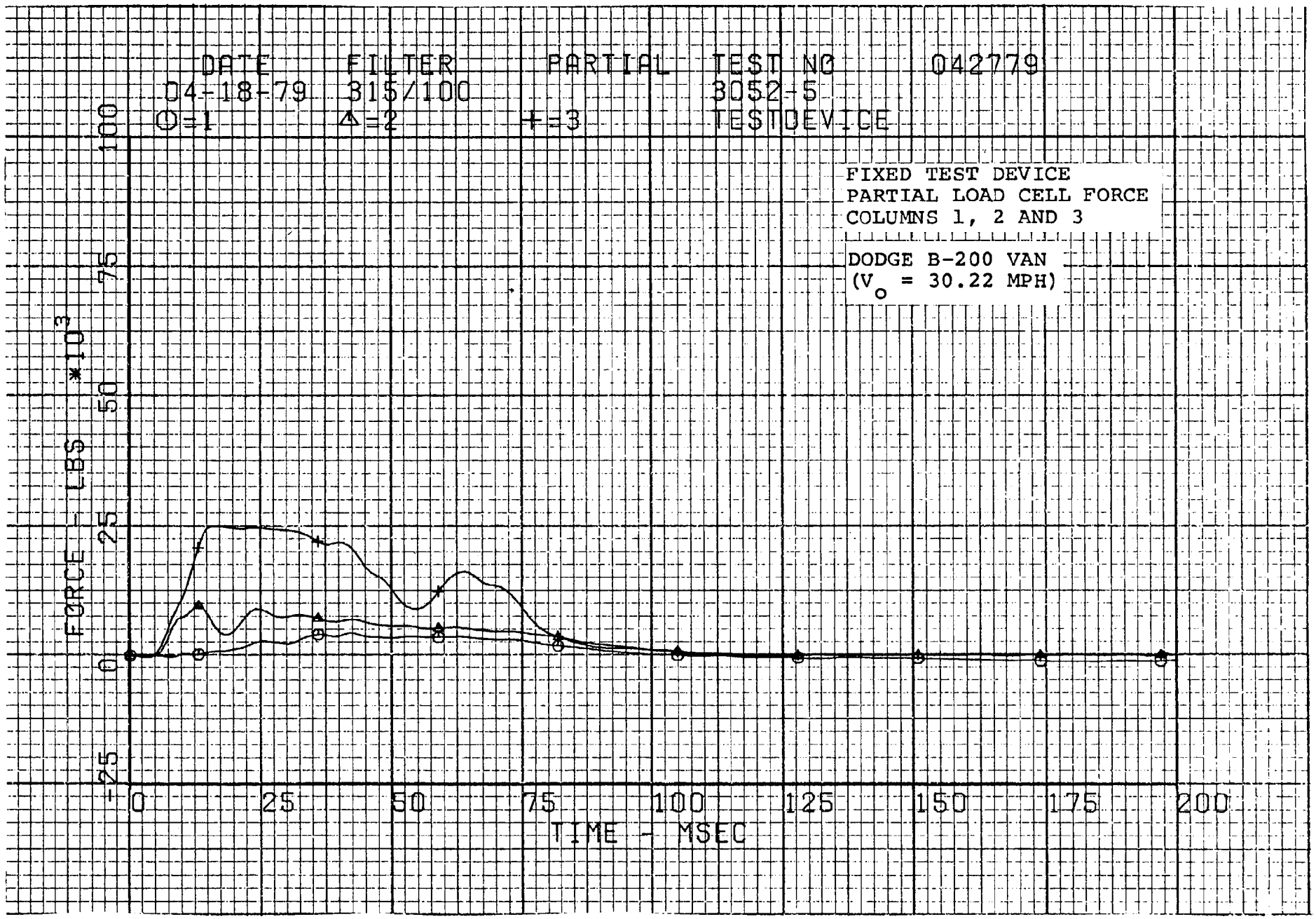

04-19-79 315/100 4001 3052-6
⊙=SP B-3 △=SP B-8 BARRIER
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
DODGE B-200 VAN
(V o = 15.28 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC

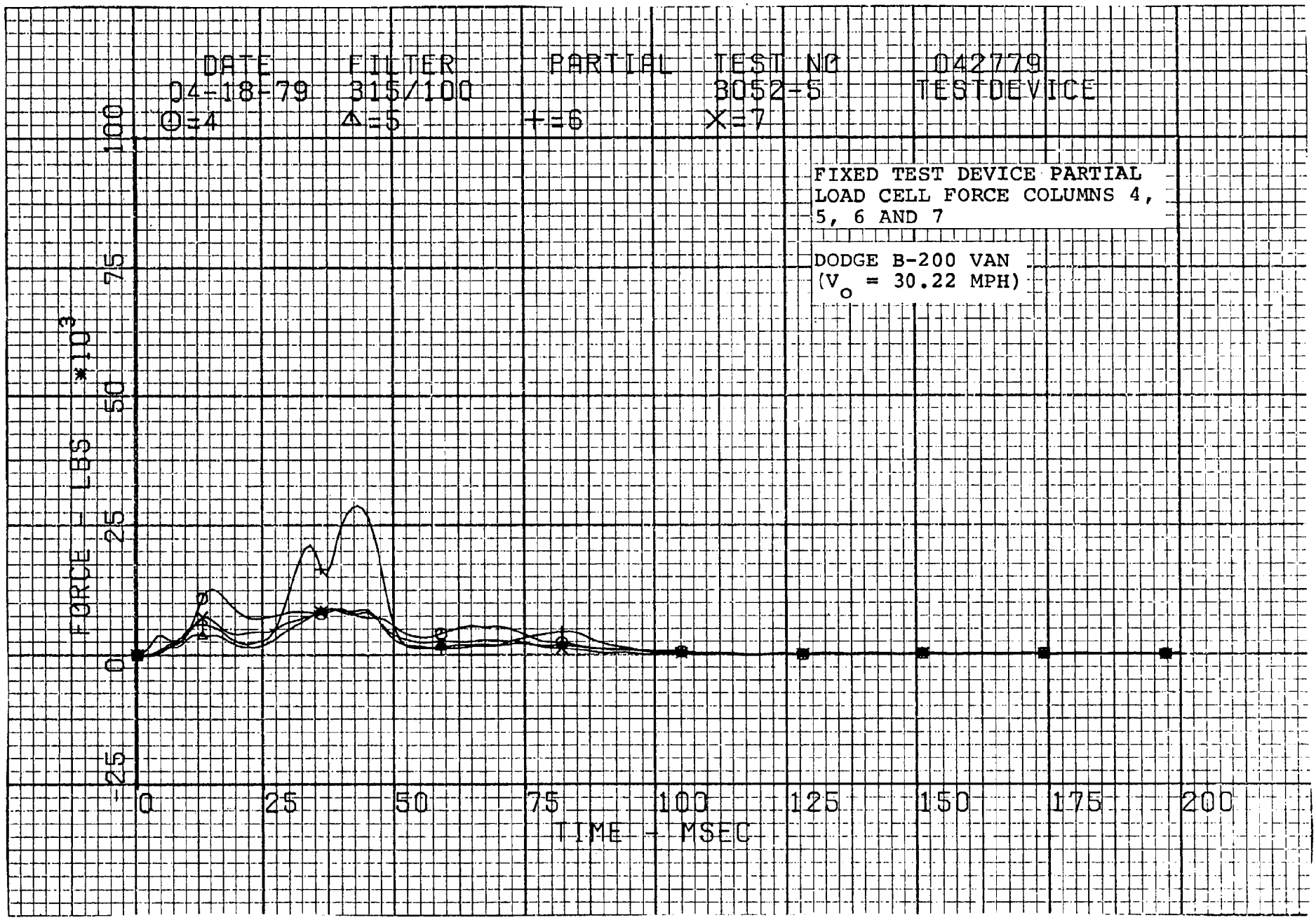

04-19-79 315/100 4456 3052-6
O=SP B-5 Δ=SP B-6 BARRIER
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
DODGE B-200 VAN
(V$_o$ = 15.28 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC

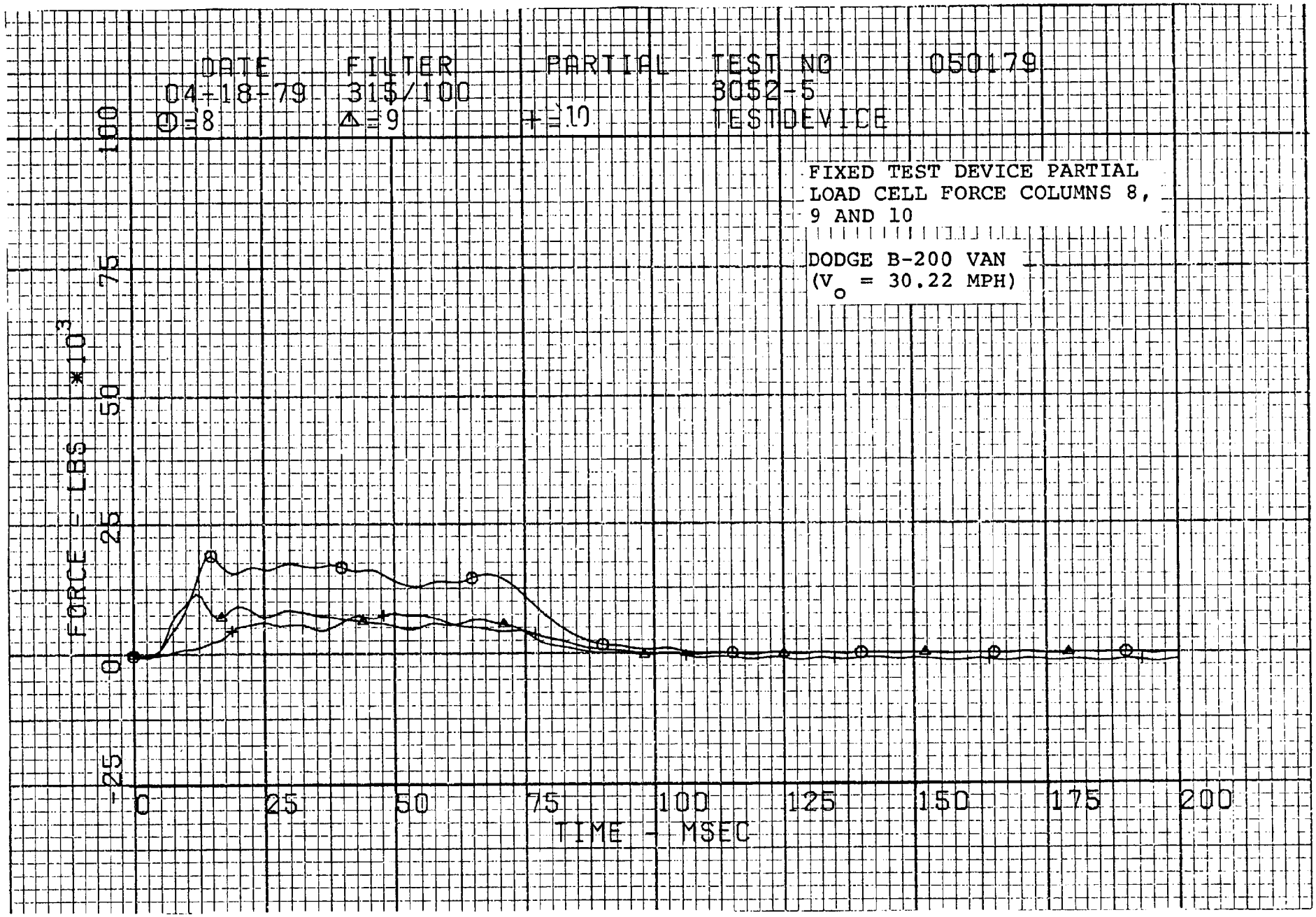

DATE
04-18-79
⊖=A
FILTER
315/100
△=B
COLUMN
9
+=C
TEST NO
3052-5
X=D
042779
TESTDEVICE
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 9
DODGE B-200 VAN
(V o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

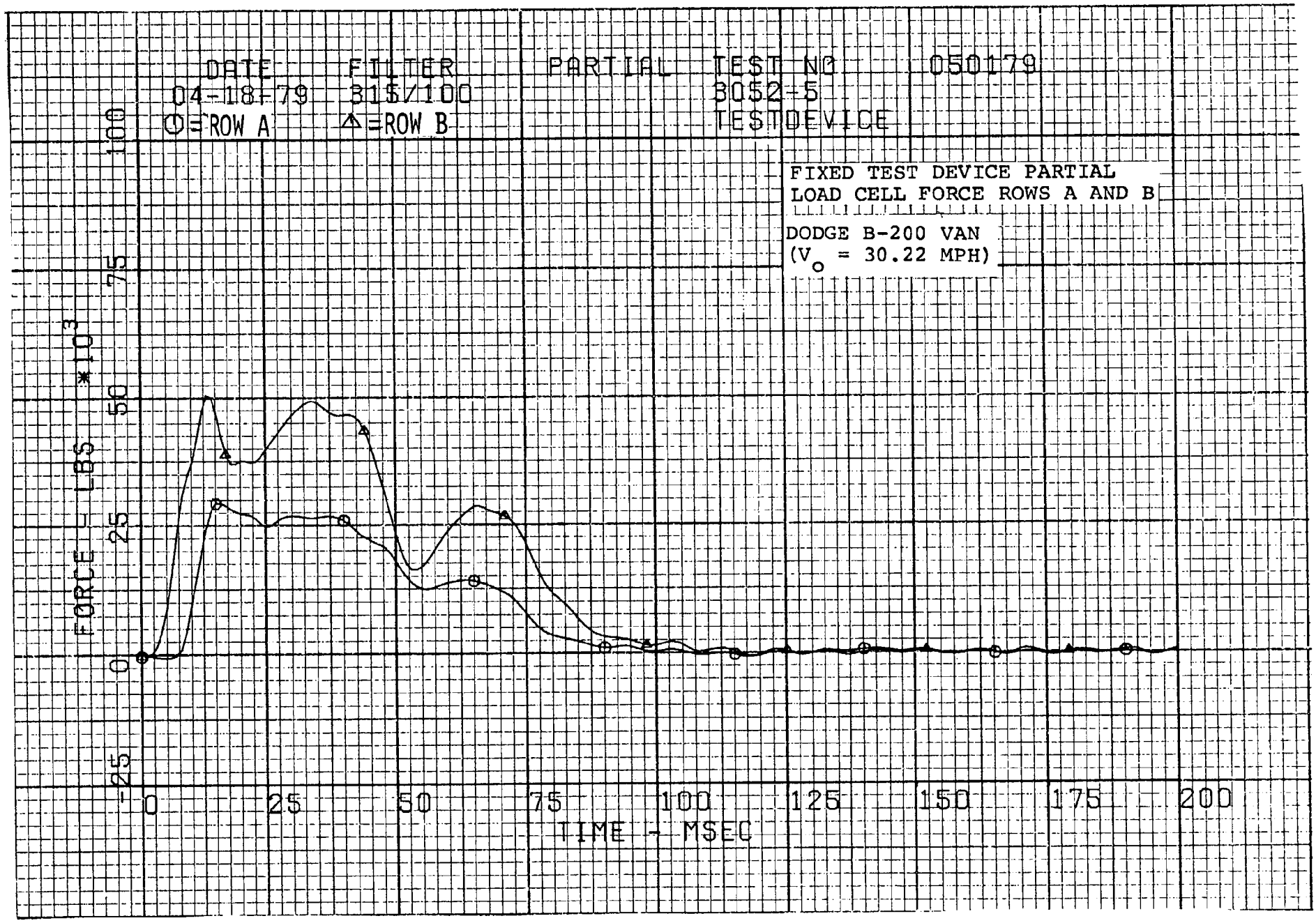

DATE
04-18-79
FILTER
315/100
COLUMN
10
TEST NO
3052-5
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
LOAD CELL FORCE
COLUMN 10
DODGE B-200 VAN
(V$_o$ = 30.22 MPH)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
25
50
75
100
125
150
175
200
TIME - MSEC

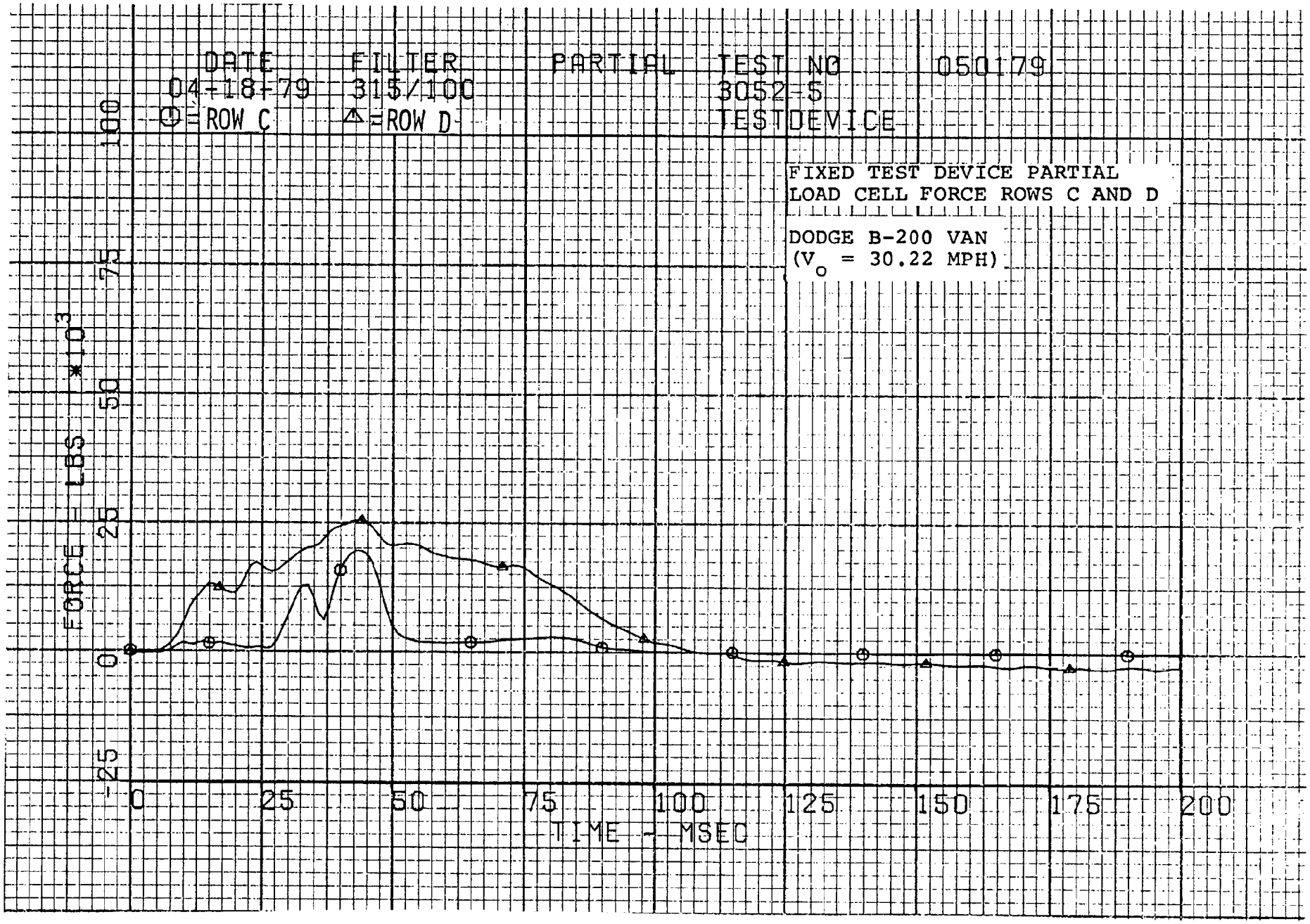

DATE
04-18-79
FILTER
315/100
COLUMN
10
TEST NO
3052-5
042779
TESTDEVICE
O=A
Δ=B
+=C
X=D
FIXED TEST DEVICE
FORCE/DISPLACEMENT
COLUMN 10
DODGE B-200 VAN
(V_o = 30.22 MPH)
(DISPLACEMENT FROM VAN
ACCELEROMETER DATA)
FORCE - LBS *10^3
20
15
10
5
0
-5
0
3
6
9
12
15
18
21
24
DISPLACEMENT - IN

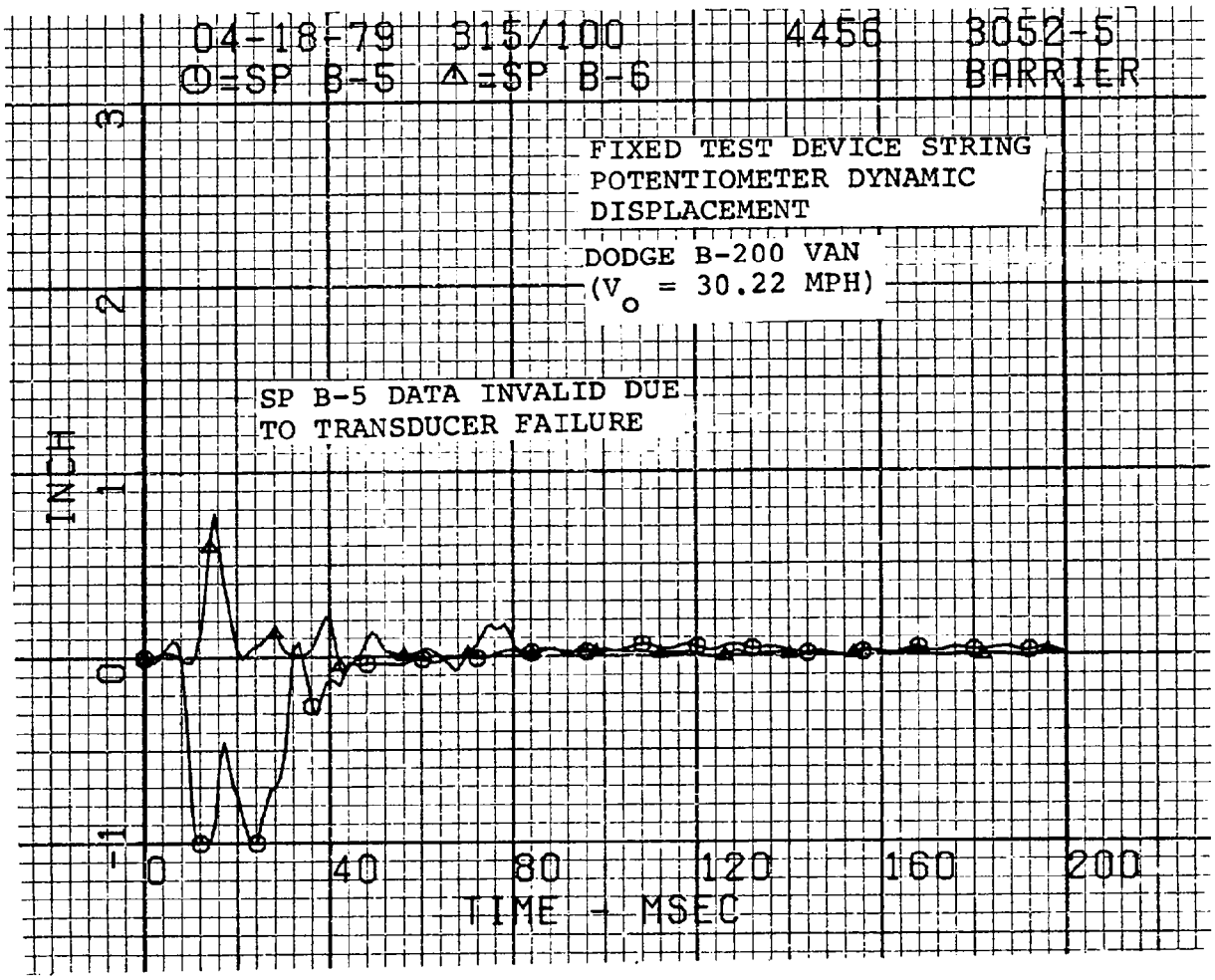

DATE
04-18-79
O=1
FILTER
315/100
△=2
PARTIAL
+=3
TEST NO
042779
3052-5
TESTDEVICE
FIXED TEST DEVICE
PARTIAL LOAD CELL FORCE
COLUMNS 1, 2 AND 3
DODGE B-200 VAN
(V_o = 30.22 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

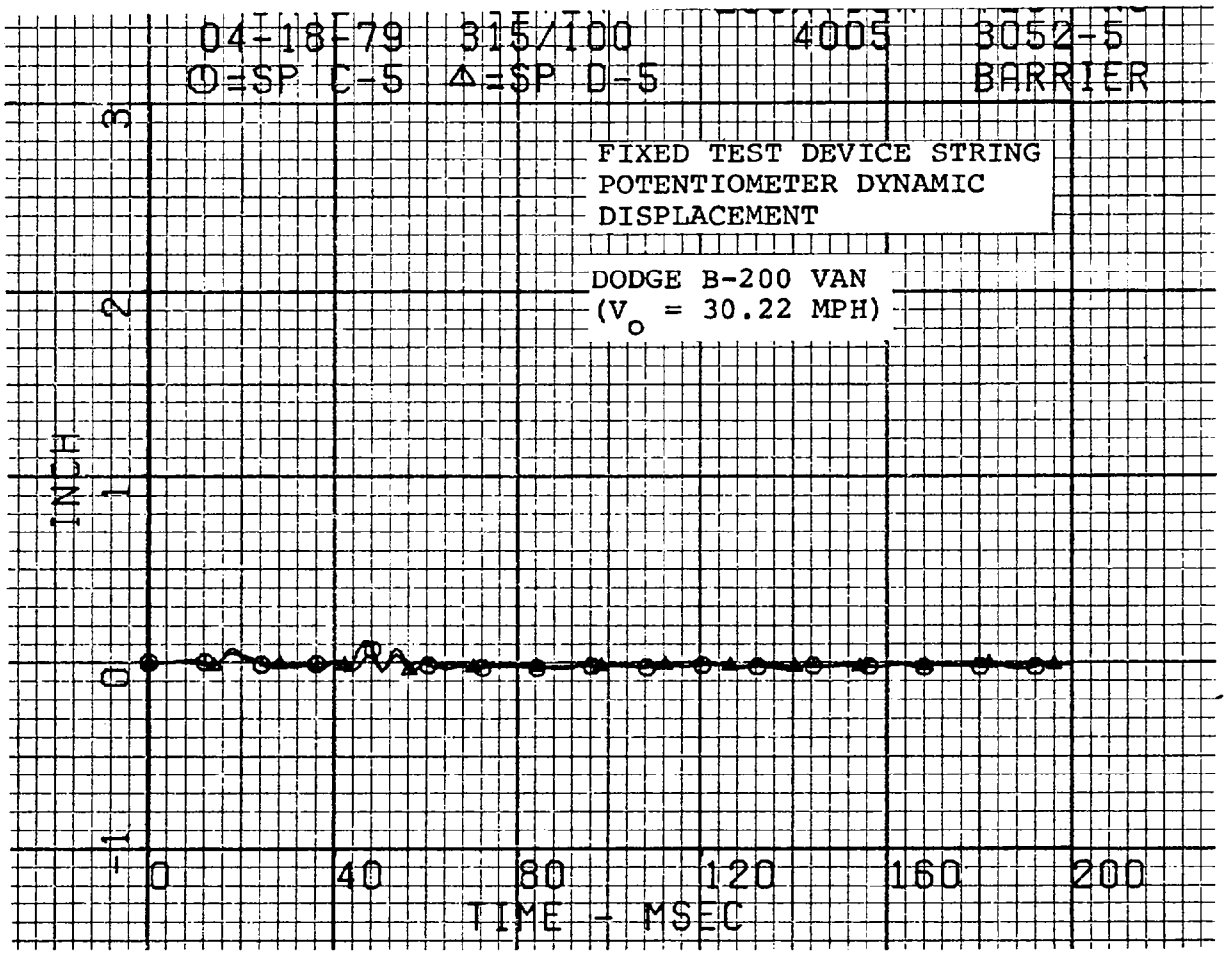

DATE
04-18-79
FILTER
315/100
PARTIAL
TEST NO
3052-5
042779
TESTDEVICE
O=4
Δ=5
+=6
X=7
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE COLUMNS 4,
5, 6 AND 7
DODGE B-200 VAN
(V o = 30.22 MPH)
FORCE - LBS *10 E
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC

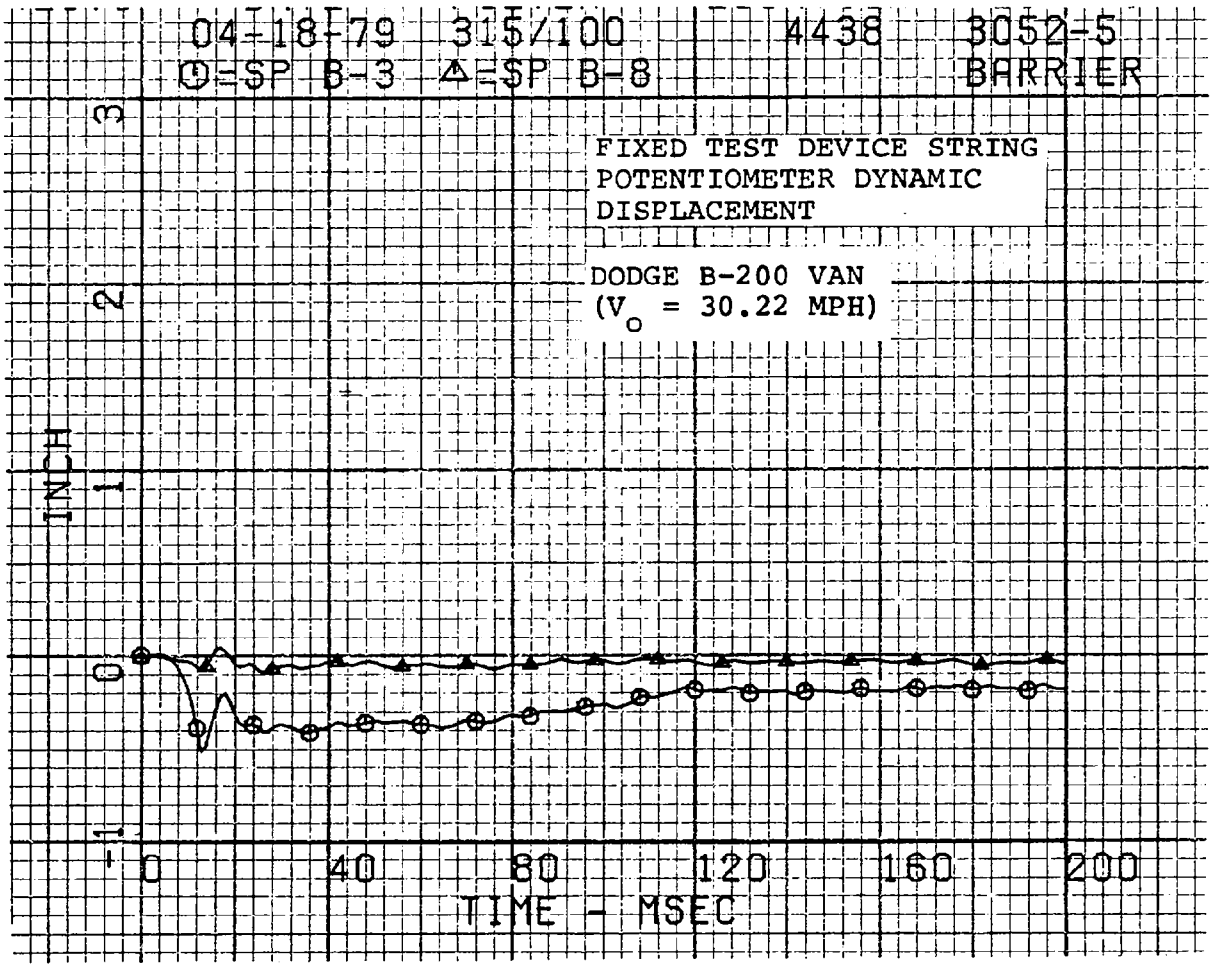

DATE
04-18-79
FILTER
315/100
PARTIAL
TEST NO
050179
3052-5
TESTDEVICE
⊕ = 8
△ = 9
+ = 10
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE COLUMNS 8,
9 AND 10
DODGE B-200 VAN
(V_o = 30.22 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-18-79
FILTER
315/100
PARTIAL
TEST NO
3052-5
TESTDEVICE
050179
O=ROW A
Δ=ROW B
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE ROWS A AND B
DODGE B-200 VAN
(V o = 30.22 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


DATE
04-18-79
FILTER
315/100
PARTIAL
TEST NO
3052-5
TESTDEVICE
050179
⊙=ROW C
△=ROW D
FIXED TEST DEVICE PARTIAL
LOAD CELL FORCE ROWS C AND D
DODGE B-200 VAN
(V_o = 30.22 MPH)
FORCE - LBS *10^3
100
75
50
25
0
-25
0
25
50
75
100
125
150
175
200
TIME - MSEC


04-18-79 315/100 4456 3052-5
⊙=SP B-5 △=SP B-6 BARRIER
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
DODGE B-200 VAN
(V o = 30.22 MPH)
SP B-5 DATA INVALID DUE
TO TRANSDUCER FAILURE
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC


04-18-79 315/100 4005 3052-5
Θ=SP C-5 Δ=SP D-5 BARRIER
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
DODGE B-200 VAN
(V_o = 30.22 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC


04-18-79 315/100 4438 3052-5
⊕=SP B-3 △=SP B-8 BARRIER
FIXED TEST DEVICE STRING
POTENTIOMETER DYNAMIC
DISPLACEMENT
DODGE B-200 VAN
(V_O = 30.22 MPH)
INCH
3
2
1
0
-1
0
40
80
120
160
200
TIME - MSEC

dsi Dynamic Science Inc.
a TALLEY INDUSTRIES Company

3052

June 15, 1979

Mr. Steve Peirce (NRD-12)
Contract Technical Manager
National Highway Traffic Safety
Administration
Trans Point Building
2100 Second Street, S.W.
Washington, D.C. 20590

Subject: Transmittal of Test Report 1, Volumes I and II

Reference: Contract DOT-HS-8-01942, "Van Crashworthiness and Aggressivity Study"

Dear Steve:

In accordance with the contractual requirements of the referenced program, we are forwarding the reproducible and eight (8) copies of Test Report 1, Volumes I and II. This report covers six Van-to-NHTSA Fixed Test Device tests conducted under Task 2 of the program.

Sincerely,

Sol D.

Sol Davis
Manager
Special Projects Department

SD:bmv

Enclosures

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Office of Contracts and Procurement
National Highway Traffic Safety
Administration
400 Seventh Street, S.W., Room 5301
Washington, D.C. 20590

Phoenix, Arizona 85027 • (602) 942-3300

LOAD CELL DATA

3052-1 = DOTØØ50
3052-2 = DOTØØ14
3052-3 = DOTØØ19
3052-4 = DOTØØ11
3052-5 = DOTØ191
3052-6 = DOTØ192

3052-7 = DOTØØ16
3052-8 = DOTØØØ9

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DOT 0009

Report No. (to be assigned by NHTSA)

VAN CRASHWORTHINESS AND AGGRESSIVITY STUDY

TEST REPORT 1

VAN-TO-NHTSA FIXED TEST DEVICE HEAD-ON IMPACT TESTS

VOLUME I

R. Yee
R. Cropper
S. Davis

Contract No. DOT-HS-8-01942
$111,121

June 1979

TEST REPORT

Document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
WASHINGTON, D.C. 20590

Prepared for the Department of Transportation, National Highway Traffic Safety Administration, under Contract No.: DOT-HS-8-01942. This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for the contents or use thereof.

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle VAN CRASHWORTHINESS AND AGGRESSIVITY STUDY, TEST REPORT I, VAN-TO-NHTSA FIXED TEST DEVICE HEAD-ON IMPACT TESTS, VOLUME I		5. Report Date June 1979
		6. Performing Orgn Code
7. Author(s) R. Yee, R. Cropper, S. Davis		8. Performing Orgn Rpt No. 3052-79-95B/1449
9. Performing Organization Name and Address Dynamic Science, Inc. A Talley Industries Company 1850 West Pinnacle Peak Road Phoenix, Arizona 85027		10. Work Unit No.
		11. Contract or Grant No. DOT-HS-8-01942, T.O. #4
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration 2100 Second Street, S.W. Washington, D.C. 20590		13. Type of Report and Period Covered TEST REPORT April - June 1979
		14. Sponsoring Agency Code

15. Supplementary Notes
Tests 1-6 of a series of 8 tests. Volume II contains Calcomp plots for the six tests.

16. Abstract

A series of eight full-scale van crash tests was conducted under Task 2 of Contract DOT-HS-8-01942, "Van Crashworthiness and Aggressivity Study." This report presents the results of six symmetric, head-on Van-to-NHTSA Fixed Test Device crash tests. Two different model vans were crashed at test speeds of 15, 25, and 30 mph. Tests 3052-1 through 3052-3 were conducted using 1979 Ford E-150 Econoline Vans, while Tests 3052-4 through 3052-6 were conducted using 1979 Dodge B-200 Vans.

The objective of these tests was to study the aggressivity of vans, to provide baseline test data to support extension of FMVSS 208 to vans, and to provide initial information for the future FMVSS 400 series standards upgrading.

This report contains all test results which include still photographs, dimensions, accelerometer location identification summaries of electronic data, and summaries of simulated occupant data. Volume II of this report contains all Calcomp plots of vehicle and NHTSA Test Device electronic data for each test.

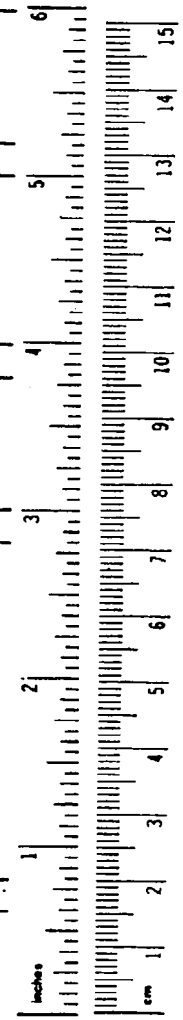
17. Key Words NHTSA Fixed Test Device, Ford E-150 Econoline Van, Dodge B-200 Van, Aggressivity, Crashworthiness		18. Distribution Statement Available through National Technical Information Service, Springfield, Virginia 22161	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. Pages 164	22. Price

Form DOT F 1700.7 (8-69)

METRIC CONVERSION FACTORS

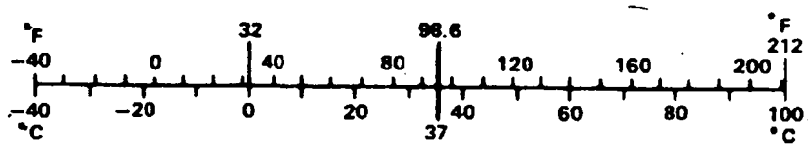
Approximate Conversions to Metric Measures

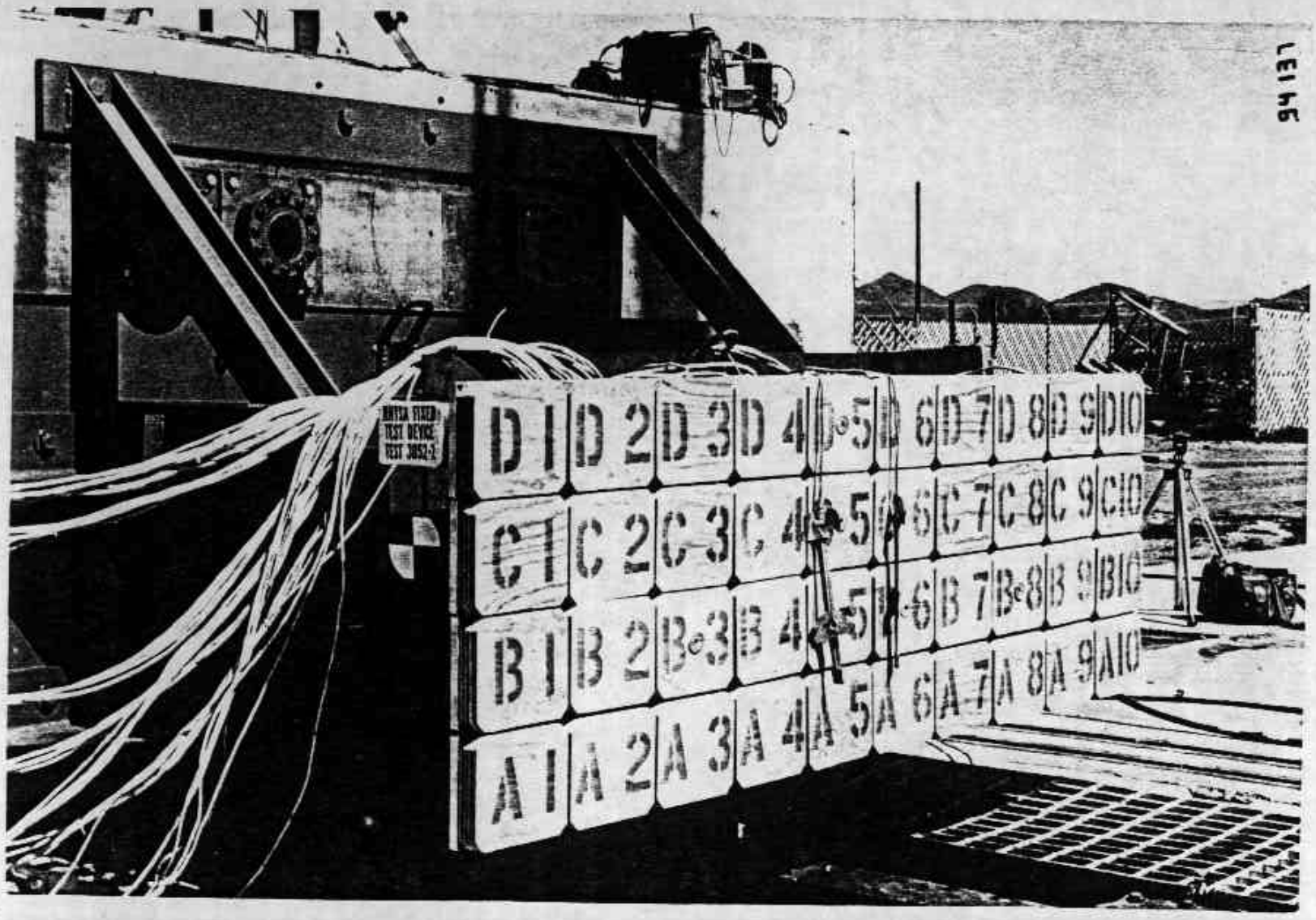
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	metric ton	t
		VOLUME		
tsp	teaspoons	5	milliliters	mL
Tbsp	tablespoons	15	milliliters	mL
in^3	cubic inches	16	milliliters	mL
fl oz	fluid ounces	30	milliliters	mL
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10 000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton (1000 kg)	1.1	short tons	
		VOLUME		
mL	milliliters	0.03	fluid ounces	fl oz
mL	milliliters	0.06	cubic inches	in^3
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F





NHTSA Fixed Test Device With Barrier Extention and Plywood Face.

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
1.1	TEST OBJECTIVE	1
1.2	TEST SCOPE	2
1.3	VEHICLE INSTRUMENTATION	5
1.3.1	Test Vehicle Instrumentation	5
1.3.2	NHTSA Fixed Test Device Instrumentation	8
1.4	PHOTOGRAPHIC INSTRUMENTATION	8
2.0	PRESENTATION OF RESULTS (TEST 3052-1) 50	14
3.0	PRESENTATION OF RESULTS (TEST 3052-2) 14	34
4.0	PRESENTATION OF RESULTS (TEST 3052-3) 19	54
5.0	PRESENTATION OF RESULTS (TEST 3052-4) 11	74
6.0	PRESENTATION OF RESULTS (TEST 3052-5) 191	94
7.0	PRESENTATION OF RESULTS (TEST 3052-6) 192	114
8.0	ANALYSIS OF VEHICLE IMPACT VELOCITY CHANGES	134

LIST OF ILLUSTRATIONS

Figure		Page
1-1	1979 Chevrolet Impala Interface With NHTSA Fixed Test Device	4
1-2	Test Vehicle Accelerometer Instrumentation - Ford E-150 Van (Tests 3052-1, 2, and 3)	6
1-3	Test Vehicle Accelerometer Instrumentation - Dodge B-200 Van (Tests 3052-4, 5, and 6)	7
1-4	1979 Ford Econoline 150 Van/NHTSA Fixed Test Device Interface	9
1-5	1979 Dodge B-200 Van/NHTSA Fixed Test Device Interface	10
1-6	Bumper/Test Device Interface - 1979 Ford E-150 Van	11

LIST OF ILLUSTRATIONS (CONTD)

Figure		Page
1-7	Bumper/Test Device Interface - 1979 Dodge B-200 Van.	12
2-1	Vehicle Configuration (Test 3052-1).	18
2-2	Post-test Vehicle Configuration (Test 3052-1). .	19
2-3	Vehicle Dummy Configuration (Test 3052-1). . . .	20
2-4	1979 Ford E-150 Van Exterior Static Crush (Test 3052-1).	25
2-5	1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-1)	27
3-1	Vehicle Configuration (Test 3052-2).	38
3-2	Post-test Vehicle Configuration (Test 3052-2). .	39
3-3	Vehicle Dummy Configuration (Test 3052-2). . . .	40
3-4	1979 Ford E-150 Van Exterior Static Crush (Test 3052-2).	45
3-5	1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-2)	47
4-1	Vehicle Configuration (Test 3052-3).	58
4-2	Post-test Vehicle Configuration (Test 3052-3). .	59
4-3	Vehicle Dummy Configuration (Test 3052-3). . . .	60
4-4	1979 Ford E-150 Van Exterior Static Crush (Test 3052-3).	65
4-5	1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-3)	67
5-1	Vehicle Configuration (Test 3052-4).	78
5-2	Post-test Vehicle Configuration (Test 3052-4). .	79
5-3	Vehicle Dummy Configuration (Test 3052-4). . . .	80
5-4	1979 Dodge B-200 Van Exterior Profile and Static Crush (Test 3052-4)	85

LIST OF ILLUSTRATIONS (CONTD)

Figure		Page
5-5	1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-4)	87
6-1	Vehicle Configuration (Test 3052-5)	98
6-2	Post-test Vehicle Configuration (Test 3052-5)	99
6-3	Vehicle Dummy Configuration (Test 3052-5)	100
6-4	1979 Dodge B-200 Van Exterior Profile and Static Crush (Test 3052-5)	105
6-5	1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-5)	107
7-1	Vehicle Configuration (Test 3052-6)	118
7-2	Post-test Vehicle Configuration (Test 3052-6)	119
7-3	Vehicle Dummy Configuration (Test 3052-6)	120
7-4	1979 Dodge B-200 Van Exterior Profile and Crush (Test 3052-6)	125
7-5	1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-6)	127
8-1	Driver Head Injury Criteria (HIC) Versus Impact Speed	137
8-2	RF Passenger Head Injury Criteria (HIC) Versus Impact Speed	137
8-3	Driver Chest Severity Index (SI) Versus Impact Speed	138
8-4	RF Passenger Chest Severity Index (SI) Versus Impact Speed	138
8-5	Driver Peak Chest Resultant Versus Impact Speed	139
8-6	RF Passenger Peak Chest Resultant Versus Impact Speed	139
8-7	Driver Left Femur Load Versus Impact Speed	140
8-8	Driver Right Femur Load Versus Impact Speed	140
8-9	RF Passenger Left Femur Load Versus Impact Speed	141

LIST OF ILLUSTRATIONS (CONTD)

Figure		Page
8-10	RF Passenger Right Femur Load Versus Impact Speed.	141
8-11	Dynamic Crush (Accelerometer Data) Versus Impact Speed.	143
8-12	Dynamic Crush (Film Data) Versus Impact Speed	143
8-13	Static Crush Versus Impact Speed.	144
8-14	Velocity Change (ΔV) Versus Impact Speed. . . .	144
8-15	Average Compartment Acceleration Versus Impact Speed.	145
8-16	Maximum Compartment Acceleration Versus Impact Speed.	145
8-17	Maximum Engine Acceleration Versus Speed. . . .	146
8-18	Maximum Vehicle Inertia Force Versus Impact Speed.	147
8-19	Total Measured Load Cell Force Versus Impact Speed.	147
8-20	Head and Chest Parameters Versus Vehicle Velocity Change (Van-to-Barrier Tests).	148
8-21	Head and Chest Parameter Versus Average Compartment Acceleration (Van-to-Barrier Tests).	149

LIST OF TABLES

Table		Page
1-1	TEST MATRIX - VAN CRASHWORTHINESS AND AGGRESSIVITY STUDY - 3052	3
1-2	VEHICLE AND FIXED TEST DEVICE INSTRUMENTATION SUMMARY.	5
1-3	CAMERA LOCATIONS FOR VAN-TO-NHTSA FIXED DEVICE IMPACT TESTS	13
2-1	CRASH TEST SUMMARY (TEST 3052-1).	15
2-2	VEHICLE INSPECTIONS SHEET (TEST 3052-1)	16

LIST OF TABLES (CONTD)

Table		Page
2-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-1)	17
2-4	PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-1)	17
2-5	CHRONOLOGY OF EVENTS (TEST 3052-1)	21
2-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-1)	22
2-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-1)	23
2-8	EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-1)	24
2-9	INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-1)	26
2-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-1)	28
2-11	SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-1)	29
2-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-1)	30
2-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-1)	31
2-14	SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-1)	32
2-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-1)	33
2-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-1)	33
3-1	CRASH TEST SUMMARY (TEST 3052-2)	35
3-2	VEHICLE INSPECTION SHEET (TEST 3052-2)	36
3-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-2)	37
3-4	PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-2)	37

LIST OF TABLES (CONTD)

Table		Page
3-5	CHRONOLOGY OF EVENTS (TEST 3052-2)	41
3-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-2)	42
3-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-2)	43
3-8	EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-2)	44
3-9	INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-2)	46
3-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-2)	48
3-11	SUMMARY OF VEHICLE ACCLEROMETER DATA (TEST 3052-2)	49
3-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-2)	50
3-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-2)	51
3-14	SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-2)	52
3-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-2)	53
3-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-2)	53
4-1	CRASH TEST SUMMARY (TEST 3052-3)	55
4-2	VEHICLE INSPECTION SHEET (TEST 3052-3)	56
4-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-3)	57
4-4	PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-3)	57
4-5	CHRONOLOGY OF EVENTS (TEST 3052-3)	61
4-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-3)	62

LIST OF TABLES (CONTD)

Table		Page
4-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-3)	63
4-8	EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-3)	64
4-9	INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-3)	66
4-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-3)	68
4-11	SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-3)	69
4-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-3)	70
4-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-3)	71
4-14	SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-3)	72
4-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-3)	73
4-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-3)	73
5-1	CRASH TEST SUMMARY (TEST 3052-4)	75
5-2	VEHICLE INSPECTION SHEET (TEST 3052-4)	76
5-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-4)	77
5-4	PRE-TEST DUMMY POSITIONS - DODGE B-200 VAN (TEST 3052-4)	77
5-5	CHRONOLOGY OF EVENTS (TEST 3052-4)	81
5-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-4)	82
5-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-4)	83
5-8	EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-4)	84

LIST OF TABLES (CONTD)

Table		Page
5-9	INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-4)	86
5-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-4)	88
5-11	SUMMARY OF VHEICLE ACCELEROMETER DATA (TEST 3052-4)	89
5-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-4)	90
5-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-4)	91
5-14	SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-4)	92
5-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-4)	93
5-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-4)	93
6-1	CRASH TEST SUMMARY (TEST 3052-5)	95
6-2	VEHICLE INSPECTION SHEET (TEST 3052-5)	96
6-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-5)	97
6-4	PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-5)	97
6-5	CHRONOLOGY OF EVENTS (TEST 3052-5)	101
6-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-5)	102
6-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-5)	103
6-8	EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-5)	104
6-9	INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-5)	106
6-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-5)	108

LIST OF TABLES (CONTD)

Table		Page
6-11	SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-5)	109
6-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-5)	110
6-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-5)	111
6-14	SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-5)	112
6-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-5)	113
6-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-5)	113
7-1	CRASH TEST SUMMARY (TEST 3052-6)	115
7-2	VEHICLE INSPECTION SHEET (TEST 3052-6)	116
7-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-6)	117
7-4	PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-6)	117
7-5	CHRONOLOGY OF EVENTS (TEST 3052-6)	121
7-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-6)	122
7-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-6)	123
7-8	EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-6)	124
7-9	INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-6)	126
7-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-6)	128
7-11	SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-6)	129
7-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-6)	130

LIST OF TABLES (CONTD)

Table		Page
7-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-6)	131
7-14	SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-6)	132
7-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-6)	133
7-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-6)	133
8-1	COMPARISON OF OCCUPANT RESPONSE DATA	136
8-2	COMPARISON OF VEHICLE RESPONSE DATA	142

1.0 INTRODUCTION

A series of eight full-scale van crash tests was conducted as required under Task 2 of Contract No. DOT-HS-8-01942 (Task Order #4), "Van Crashworthiness and Aggressivity Study," sponsored by the National Highway Traffic Safety Administration. This report presents the results of Tests 3052-1 through 3052-6, symmetric, head-on Van-to-NHTSA Fixed Test Device crash tests. This report is presented in two volumes. Volume I is the test report which contains summaries of all the test results. Volume II contains the Calcomp plots for all vehicle and NHTSA Test Device electronic data gathered during the conduct of these tests.

Test Report 2 presents the results of Tests 3052-7 and 3052-8 Van-to-car symmetric, head-on impact tests. Test Report 3 presents measurements gathered for accident investigation data relating to vehicle crash trajectory and residual crush. Also included in this report are moment of inertia measurements made on each make/model vehicle tested using the NHTSA Mobile Parametric Measuring Device.

1.1 TEST OBJECTIVE

The object of these tests was to:

- Study the crashworthiness and aggressivity of vans
- Provide baseline van collision data to support FMVSS 208, Occupant Crash Protection
- Support current vehicle standards and provide initial information for future FMVSS 400 series standards upgrading.

1.2 TEST SCOPE

The test matrix and summary of test conditions for conducting the van crash tests are shown in Table 1-1. Test speeds of 15, 25, and 30 mph were chosen as target speeds for two different models of vans which impacted the NHTSA Fixed Test Device. Tests 3052-1 through 3052-3 were conducted using 1979 Ford E-150 Econoline Vans, while Tests 3052-4 through 3052-6 were conducted using 1979 Dodge B-200 Vans. The NHTSA Fixed Test Device is a unique, segmented, load-measuring barrier which was supported by a 36-inch extension which attached to a rigid barrier. Its frontal height was set to simulate the front of a Chevrolet Impala (see Figure 1-1). The front face of each load-measuring module used a 7" x 8" x 1-1/2" plywood surface instead of the six-inch aluminum honeycomb block.

In each test, the van contained two instrumented Alderson Part 572, 50th percentile male anthropomorphic dummies (GFE) located in the two front outboard seating positions. Each occupant was restrained with the vehicle's production restraint system. (The Dodge Van's standard, two-point restraint system was replaced by the production, three-point restraint system.) The seat tracks were put at midposition, but not welded in place. Fuel was removed from the vans and replaced with water. Vehicles which contained tilt steering wheels were tested with the wheel placed in the lowermost driving position, per direction of the NHTSA Contract Technical Manager.

TABLE 1-1. TEST MATRIX - VAN CRASHWORTHINESS AND AGGRESSIVITY STUDY - 3052

	Test Number	Test Date (Tentative)	Test Configuration	Vehicle Model/ Dynamic Science No.	Vehicle Weight (±10 lb)	Closing Speed (mph)
50	●3052-1	4/10/79	Van-to-Load Cell Barrier Head-on	A - 1979 Ford Econoline 150 Van/#865	4,990	15.25
				B - NHTSA Fixed Test Device	>100,000	
14	●3052-2	4/11/79	Van-to-Load Cell Barrier Head-on	A - 1979 Ford Econoline 150 Van/#866	4,997	25.10
				B - NHTSA Fixed Test Device	>100,000	
19	●3052-3	4/12/79	Van-to-Load Cell Barrier Head-on	A - 1979 Ford Econoline 150 Van/#863*	4,998	30.02
				B - NHTSA Fixed Test Device	>100,000	
11	●3052-4	4/17/79	Van-to-Load Cell Barrier Head-on	A - 1979 Dodge B-200 Van/ #844	4,647	25.17
				B - NHTSA Fixed Test Device	>100,000	
191	●3052-5	4/18/79	Van-to-Load Cell Barrier Head-on	A - 1979 Dodge B-200 Van/ #845*	4,654	30.22
				B - NHTSA Fixed Test Device	>100,000	
192	●3052-6	4/19/79	Van-to-Load Cell Barrier Head-on	A - 1979 Dodge B-200 Van/ #846	4,651	15.28
				B - NHTSA Fixed Test Device	>100,000	
16	3052-7	5/09/79	Van-to-Car Symmetric Head-on	A - 1978 Ford Econoline 150 Van/#893	4,994	63.58
				B - 1979 Chevrolet Impala/ #837*	4,400	
09	3052-8	5/11/79	Van-to-Car Symmetric Head-on	A - 1979 Dodge B-200 Van/ #843	4,649	62.28
				B - 1979 Chevrolet Impala/ #838	4,403	

*Scheduled for Mobile Parametric Measuring Device Test. (5/21/79)
Note: Bullets indicate tests included in this report.

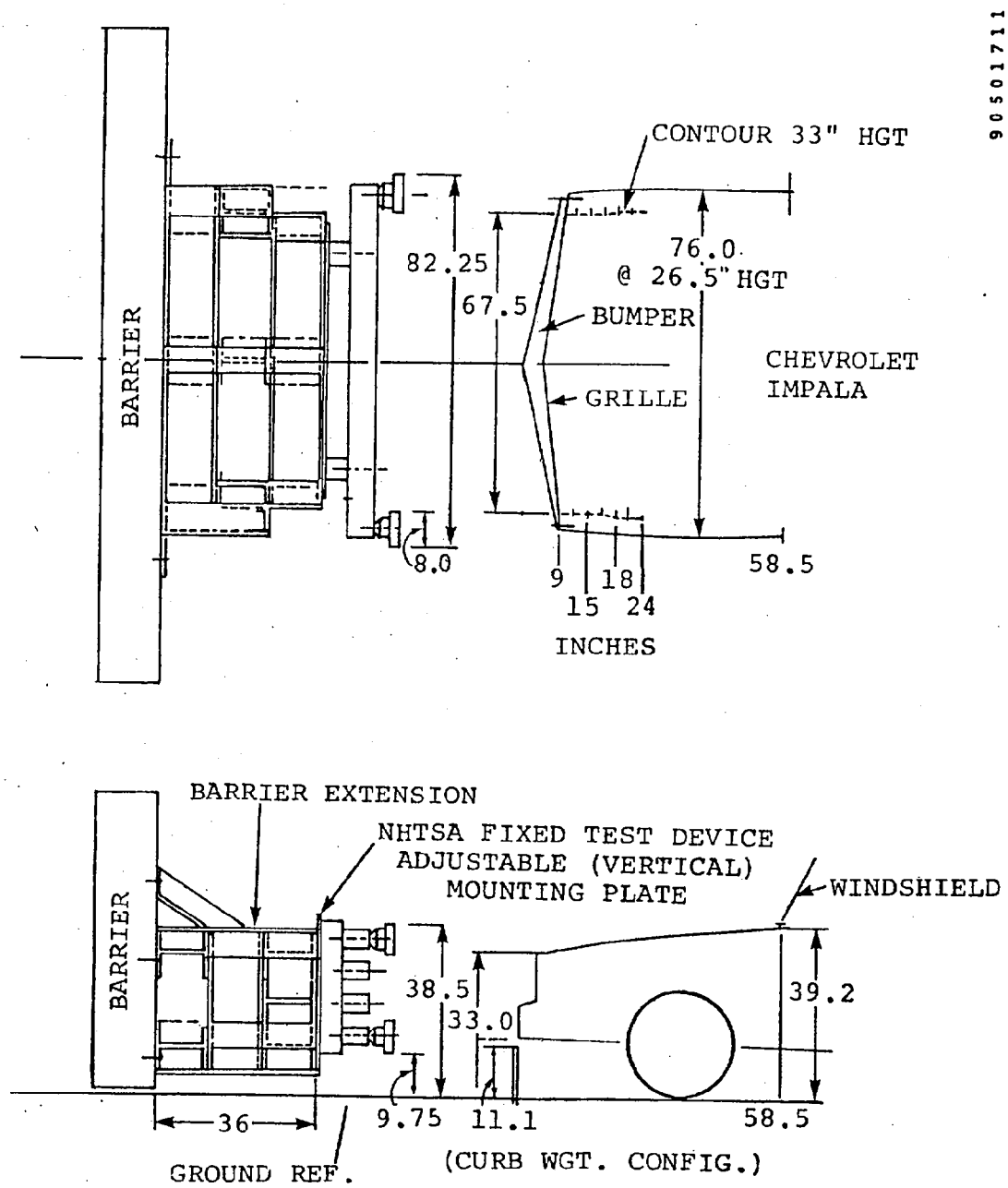


Figure 1-1. 1979 Chevrolet Impala Interface With NHTSA Fixed Test Device.

1.3 VEHICLE INSTRUMENTATION

See Table 1-2 for a summary of vehicle and Fixed Test Device instrumentation. A total of 87 data channels were used in conducting these tests. Van instrumentation consisted of 41 data channels requiring the use of three Remote Sensing Control Modules (RSCM's). The NHTSA Fixed Test Device contained a total of 46 data channels requiring the use of 4 RSCM's.

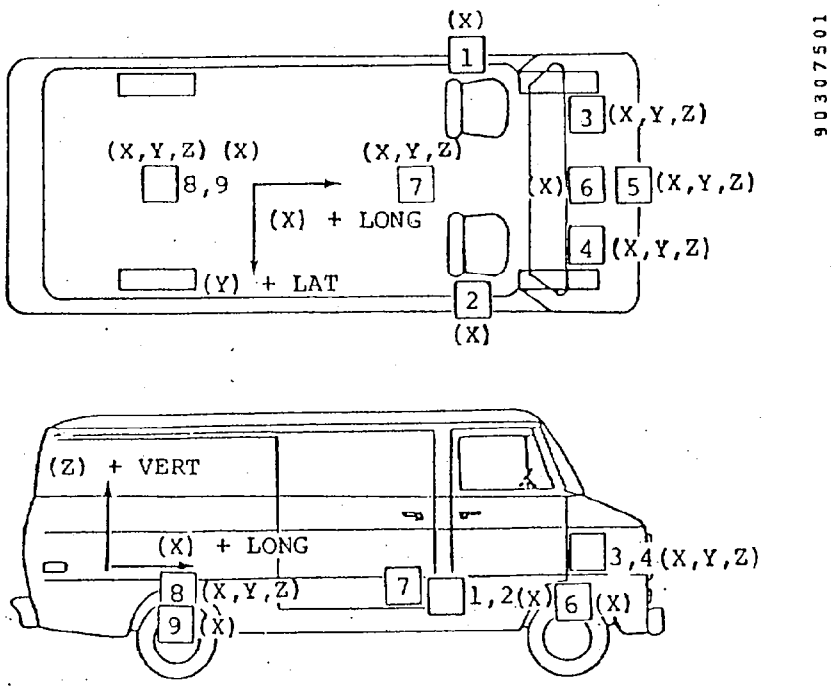
TABLE 1-2. VEHICLE AND FIXED TEST DEVICE INSTRUMENTATION SUMMARY

	Locations		Data Channels
Van Instrumentation			
Vehicle Accelerometers*	9		19
Dummy Instrumentation: Head (3), Chest (3), Femur (2)	2		16
Seat Belt Load Cells: Lap (2), Shoulder (1)	2		6
		Total	41 - 3 RSCM's
NHTSA Fixed Test Device Instrumentation			
Load Cells	40		40
String Potentiometers	6		6
		Total	46 - 4 RSCM's

*See Figures 1-2 and 1-3 for locations.

1.3.1 Test Vehicle Instrumentation

In addition to having two fully-instrumented anthropomorphic dummies, the test vehicle was instrumented with 19 accelerometers mounted in 9 locations. Figures 1-2 and 1-3 show the vehicle accelerometer locations for the Ford Van and Dodge Van, respectively.



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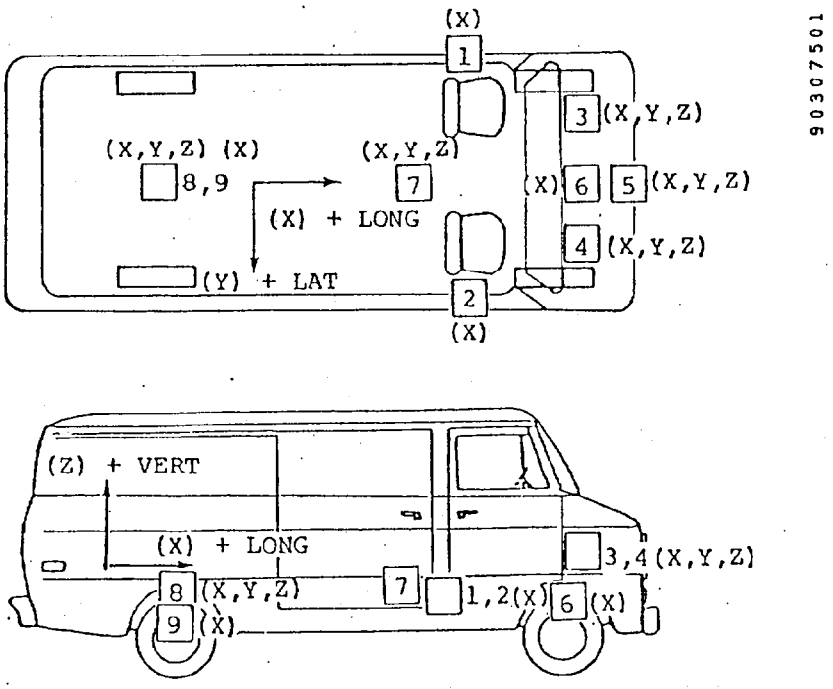
Ford E-150 Van Accelerometer Locations					Maximum* Expected Reading		
No.	Description of Location	X**	Y**	Z**	Long. (G)	Lat. (G)	Vert. (G)
1	Left B-pillar near floor	108	-29	26	50		
2	Right B-pillar near floor	108	29	26	50		
3	Left firewall inside compartment	156	-25	34	100	100	100
4	Right firewall inside compartment	156	16	36	100	100	100
5	Top engine block	151	3	35	200	200	200
6	Front axle	165	0	12	200		
7	Vehicle center of gravity	113	0	12	50	50	50
8	Cargo area over rear axle	38	-3	28	50	50	50
9	Rear axle	37	3	8	100		

*25- and 30-mph crashes only -- values reduced by 50% for 15-mph crashes.
**X coordinate - centerline of rear bumper; Y coordinate - vehicle centerline; Z coordinate - ground level.

Figure 1-2. Test Vehicle Accelerometer Instrumentation - Ford E-150 Van (Tests 3052-1, 2, and 3).



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Dodge B-200 Van Accelerometer Locations					Maximum* Expected Reading		
No.	Description of Location	X**	Y**	Z**	Long. (G)	Lat. (G)	Vert. (G)
1	Left B-pillar near floor	108	-32	26	50		
2	Right B-pillar near floor	108	32	26	50		
3	Left firewall inside compartment	157	-24	41	100	100	100
4	Right firewall inside compartment	152	23	38	100	100	100
5	Top engine block	142	3	34	200	200	200
6	Front axle	149	3	9	200		
7	Vehicle center of gravity	110	0	26	50	50	50
8	Cargo area over rear axle	38	0	28	50	50	50
9	Rear axle	48	0	15	100		

*25- and 30-mph crashes only -- values reduced by 50% for 15-mph crashes.
**X coordinate - centerline of rear bumper; Y coordinate - vehicle centerline; Z coordinate - ground level.

Figure 1-3. Test Vehicle Accelerometer Instrumentation - Dodge B-200 Van (Tests 3052-4, 5, and 6).

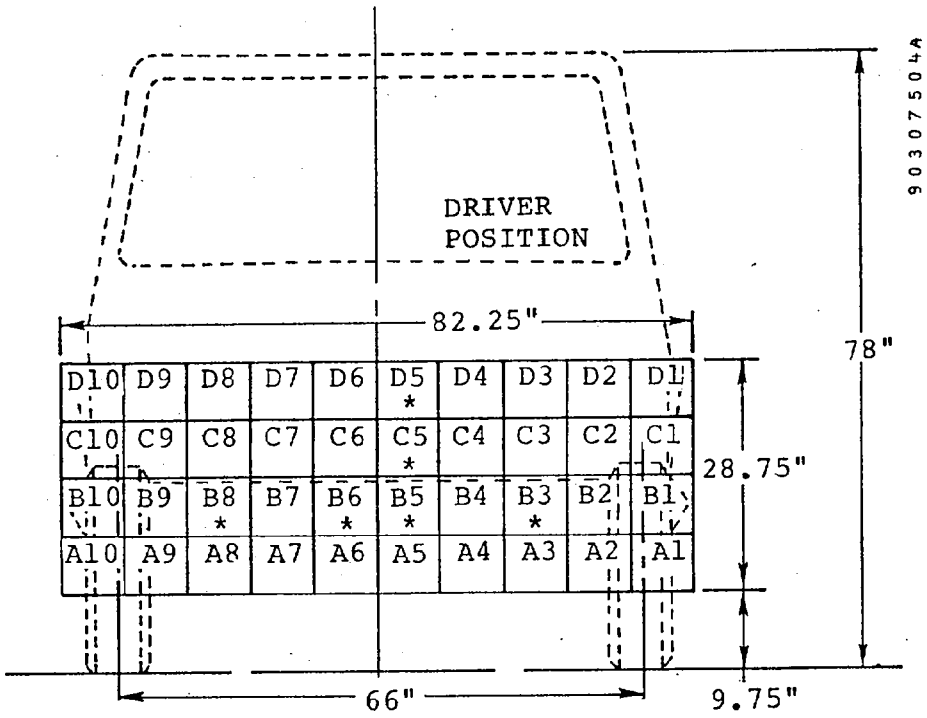
Dummy instrumentation and seat belt load cells required an additional 22 data channels, making a total of 41 data channels required for van instrumentation.

1.3.2 NHTSA Fixed Test Device Instrumentation

The Fixed Test Device was instrumented with forty 12.5 klb interface load cells and six Celesco dynamic string potentiometers. Figures 1-4 and 1-5 show the frontal interface areas for each model van. A side view of the van bumper/Test Device interface is shown in Figures 1-6 and 1-7 for each model van. The front face of the Fixed Test Device was modified to use 40 pieces of 1-1/2-inch thick, grade AB plywood rather than the standard 6-inch 50 psi aluminum honeycomb. In addition, the Test Device was attached to a 36-inch extension from the fixed barrier and set at a frontal height similar to the front of a Chevrolet Impala.

1.4 PHOTOGRAPHIC INSTRUMENTATION

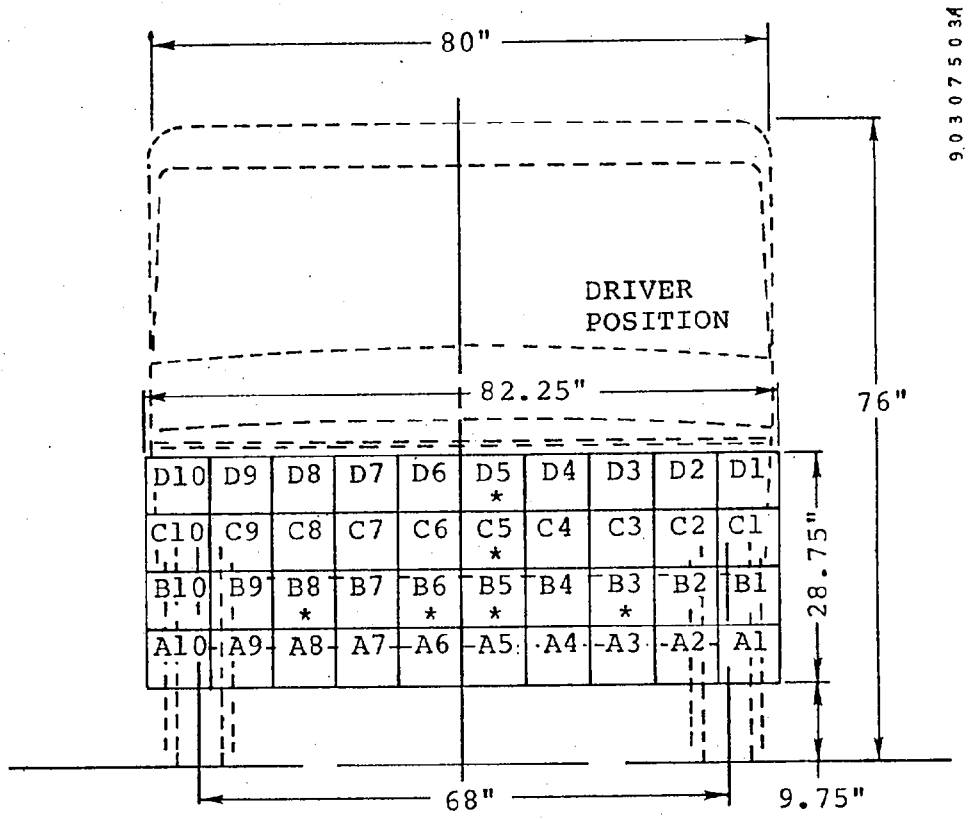
In all tests, seven high-speed cameras (five 1000 fps and two 500 fps) and one panning camera (24 fps) were used to cover the crash event (see Table 1-3). Two of the cameras used were mounted on board the vans to observe occupant kinematics. In addition to high-speed cameras, black-and-white and color slides were taken to record pre-test and post-test vehicle and dummy positions. These items have been submitted to NHTSA.



View from Rear of Test Device.

*Location of instrumentation modules that use 1210-LT-12.5K load cells which have holes for string potentiometer cables.

Figure 1-4. 1979 Ford Econoline 150 Van/NHTSA Fixed Test Device Interface.



View from Rear of Test Device.

*Location of instrumentation modules that use 1210-LT-12.5K load cells which have holes for string potentiometers.

Figure 1-5. 1979 Dodge B-200 Van/NHTSA Fixed Test Device Interface.

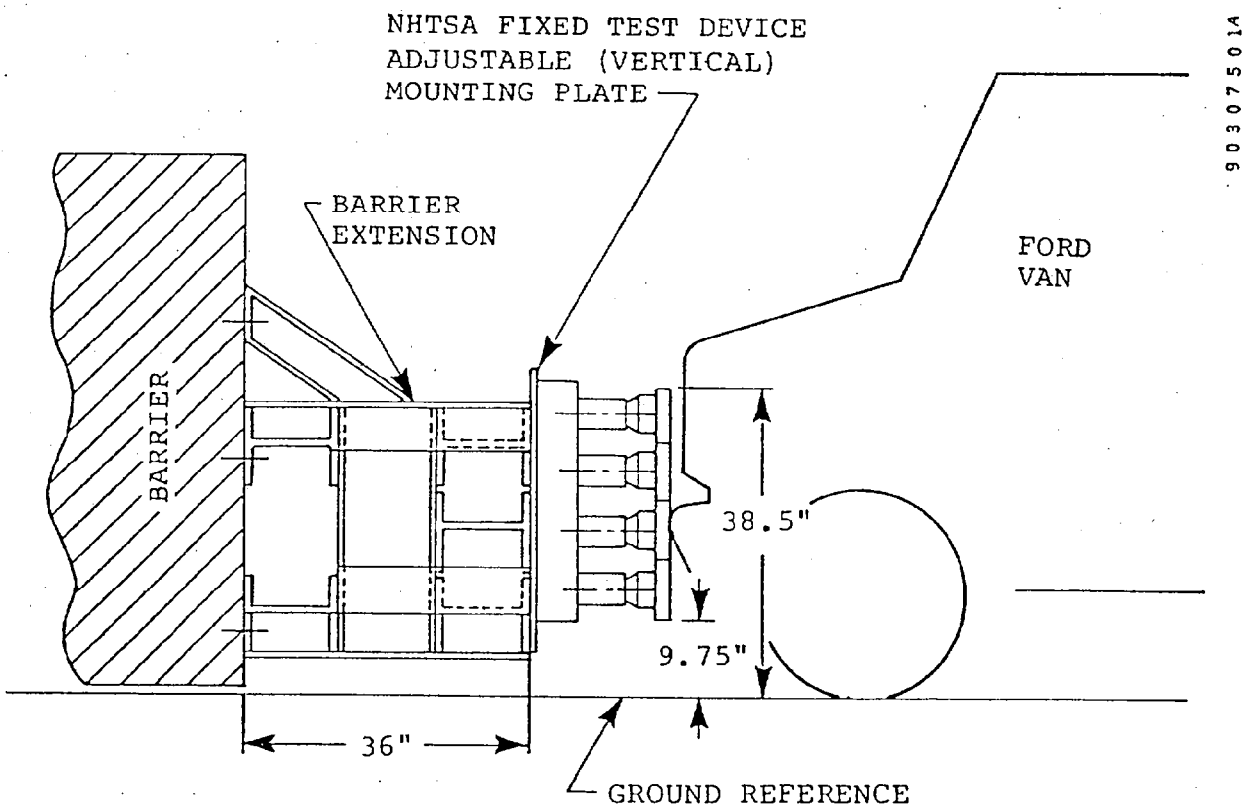


Figure 1-6. Bumper/Test Device Interface - 1979 Ford E-150 Van.

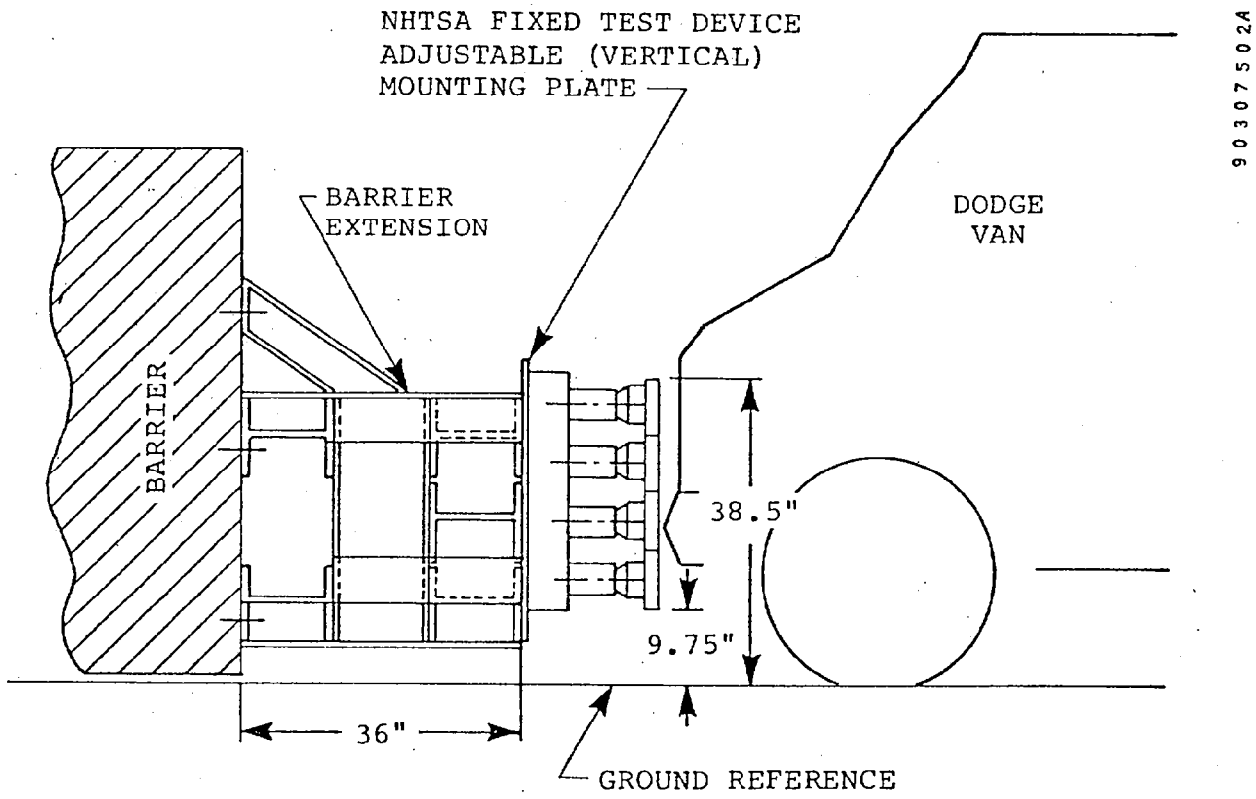


Figure 1-7. Bumper/Test Device Interface - 1979 Dodge B-200 Van.

TABLE 1-3. CAMERA LOCATIONS FOR VAN-TO-NHTSA FIXED TEST DEVICE IMPACT TESTS

Test No: 3052-1 through 6 Test Date: See Table 1-1

Test Type: Van-to-NHTSA Fixed Test Device

Vehicle A: 1979 Dodge B-200 Van (Tests 3052-1 to 3052-3)
1979 Ford E-150 Van (Tests 3052-4 to 3052-6)

Vehicle B: NHTSA Fixed Test Device

Comments: Cameras at locations 6 and 7 did not operate during Tests 3052-1 and 3052-2.

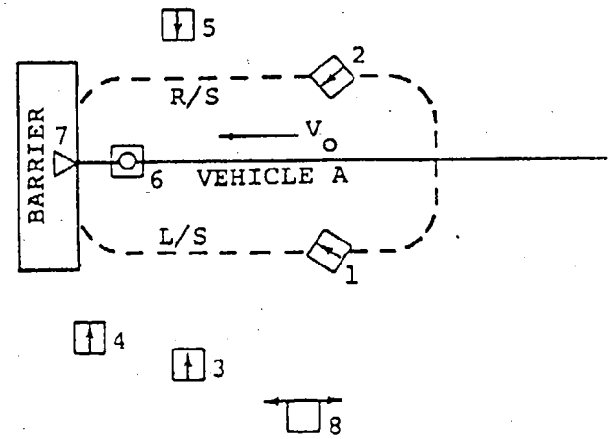
CAMERA	YES
STILLS	X
SLIDES	X
MOVIE	X
POLAROID	
VIDEO	

CAMERA SYMBOLS

- PIT
- GROUND
- BARRIER
- OVERHEAD
- ON-BOARD
- PANNING

FRAME RATE

1. 1000 fr/sec
2. 200 fr/sec
3. Other 24 fr/sec
4. 400 fr/sec
5. 500 fr/sec



Loc. No.	Location	Field of View	Lens Size	Frm Rate	Ser No	Impact Dist-X	C.L. Dist-Y	CAM Hght-Z
1	Onboard (R/S)	Right front seat and occupant	8mm	1				
2	Onboard (L/S)	Left front seat and occupant	8mm	1				
3	Left Side	Left side overall	13mm	1				
4	Left Side	Closeup of barrier and occupant compartment	25mm	1				
5	Right Side	Right side overall	13mm	1				
6	Pit	Under structure of vehicle including fuel tank	10mm	5				
7	Barrier	Occupants through front windshield	ZOOM	5				
8	Left Side	Panning test and overall results		3				

DSI FORM NO. TSO 125

2.0 PRESENTATION OF RESULTS (TEST 3052-1)

This section of the report presents the results of Test No. 3052-1, a head-on, symmetric crash test between a 1979 Ford E-150 Econoline Van and the NHTSA Fixed Test Device (V_o = 15.25 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix A (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 2-1. CRASH TEST SUMMARY (TEST 3052-1)

TEST NO. 3052-1 CONTRACT: DOT-HS-8-01942

TEST DATE: April 10, 1979 TIME: 1313 TEMPERATURE: 61 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Ford Econoline E-150 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	186.5/79.4	
Test Weight by Wheel (lb)	LF 1304 RF 1345 LR 1156 RR 1185	
Total Weight (lb)	4990	>100,000
Wheelbase (in.)	124.4	
Longitudinal C.G. (From Center of Front Axle) (in.)	58.4	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	15.25	0
Final Speed (mph @ msec)	-1.84 @ 68	
Velocity Change (mph)	17.09	
Maximum Averaged Compartment Acceleration (G @ msec)	-25.14 @ 16	
Maximum Engine Acceleration (G @ msec)	-28.50 @ 54	
Maximum Mutual Dynamic Crush (Film Data) (in.)	8.1	
Maximum Static Crush		
• Bottom of Windshield (in.)	0.0	
• Hood Level (in.)	1.8	
• Between Bumper/Hood (in.)	6.9	
• Bumper Level (in.)	5.8	
Maximum Post-test Intrusion (in.)	0.2	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #759	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 2-2. VEHICLE INSPECTION SHEET (TEST 3052-1)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: E14HHEF4397 Make: Ford

NHTSA No.: R&D

Year: 1979 Color: White Model: Econoline E-150 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont.: yes [ ] no [X] Bucket: X

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [ ] no [X] Split Back Bench: ____

Tinted Glass: yes [X] no [ ] Rear Window Def.: yes [ ] no [X]

Radio: yes [ ] no [X] Brakes: drum: R disc: F

Clock: yes [ ] no [X]

Tire Size: L78-15 Ply Rating: 4 Mfg. & Line: Goodyear

Bias Ply: ____ Belted: X Radial ____ /Eng.Type: V-8 Cylinders: 8 Total Displ: 351 CID

Trans. # Fwd. Speeds: 3 Shipping Weight: 4,094 lb Odometer: 388.5

Dealer (name, address, and phone number)

Remarks (list additional accessories not listed above)

Sliding side door

Date of Manufacture: 1-79 Dynamic Science No.: 865 Date Received: 3-12-79

Tilting Steering Wheel: yes [ ] no [X] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: ____ (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap and shoulder belts

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, wheel covers, and wipers removed. All fluids except for engine coolant removed. 100% water in fuel tank.

2. Does vehicle show evidence of prior accident history? Describe: No

3. Does vehicle show any significant corrosion? Describe: No

4. Check condition of the front bumper and frame: Satisfactory

TABLE 2-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-1)

Test No.	3052-1	Type	Van-to-NHTSA Fixed Test Device
Car Model	1979 Ford E-150 Van	Dynamic Science No.	865

Engine Size	351 CID
Engine Weight* (lb)	768
Engine Height/Width (in.)	33.7/19.2
Bumper to Engine Block (in.)	26.9
Engine Length (in.)	19.8
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	28.7
Bumper Height (in.) (Min./Max.)	17.0/23.9

*Includes engine and rigid attachments such as transmission and drive train.

TABLE 2-4. PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-1)

Distances (in.)	Driver	Passenger
Chest to Steering Wheel Hub (horizontal)	15.0	
Nose to Steering Wheel Upper Rim	18.7	
Nose to Windshield (horizontal)	27.2	24.2
Knee to Lower Panel (closest point)		
Left	8.5	7.3
Right	8.3	7.5
Chest to Dash (horizontal)	25.1	21.8
Forehead to Header	18.7	17.9

a) Pre-test

b) Post-test

Figure 2-1. Vehicle Configuration (Test 3052-1).

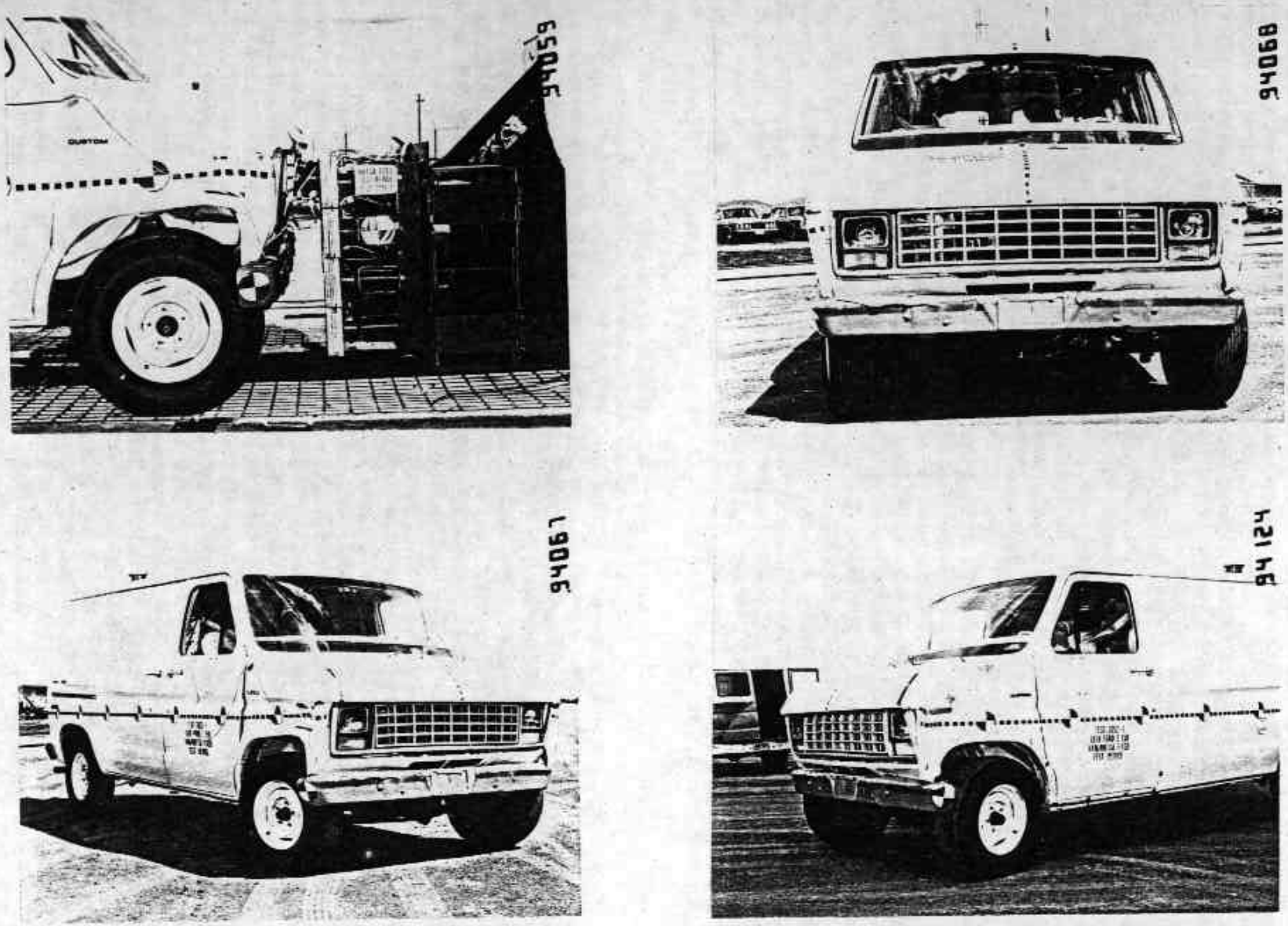
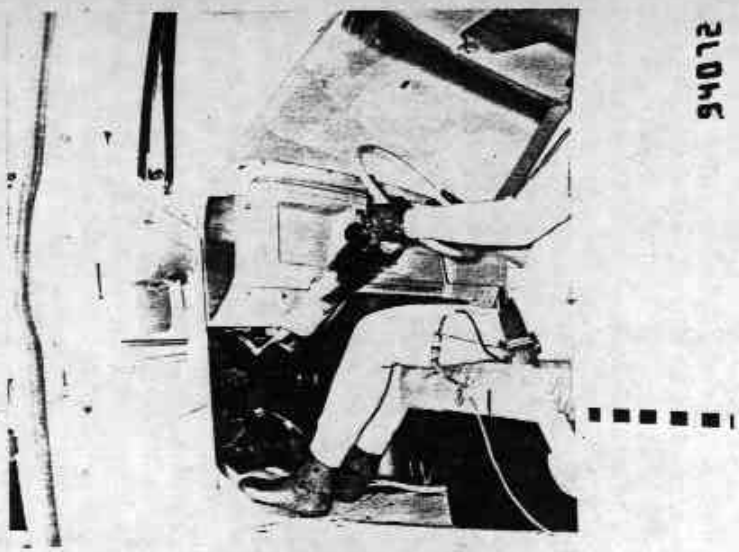
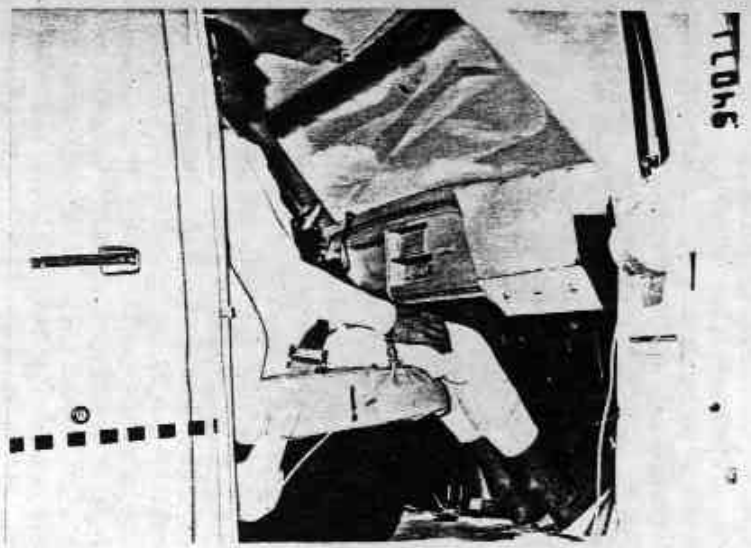


Figure 2-2. Post-test Vehicle Configuration (Test 3052-1).

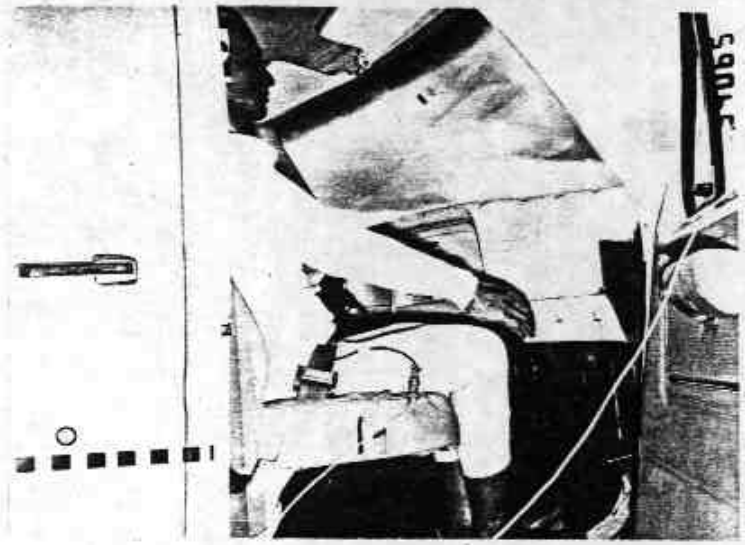


a) Pre-test Driver



c) Pre-test Passenger

b) Post-test Driver



d) Post-test Passenger

Figure 2-3. Vehicle Dummy Configuration (Test 3052-1).

TABLE 2-5. CHRONOLOGY OF EVENTS (TEST 3052-1)

VEHICLE: 1979 Ford Econoline E-150 Van

Time (msec)	Crash Event
0	Impact (visual)
6	Grille hits Test Device
14	Fenders hit Test Device
23	Bumper strikes front tires
24	Dummies start forward motion
50	Maximum vehicle dynamic crush (8.1 in.)
58	Minimum right side wheelbase (123.7 in.); Passenger dummy knees strike dash
60	Driver dummy hands strike dash
64	Minimum left side wheelbase (123.7 in.); Driver dummy knees strike dash
73	Passenger strikes engine cowling with left hand
80	Left rear tire leaves ground
85	Driver chest strikes steering wheel lower rim
112	Maximum vehicle declination (2.5°)
117	Driver head strikes steering wheel upper rim
122	Left rear tire recontacts ground
127	Maximum forward motion of both dummies
134	Vehicle separates from Test Device
252	Driver recontacts seat with upper back
262	Passenger recontacts seat with upper back
402	Maximum vehicle rebound inclination (1.75°)

TABLE 2-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-1)

VEHICLE: 1979 Ford Econoline E-150 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	Steering column	None
	upper rim	
Chest----------	Steering Wheel	None
	lower rim	
Knees----------	Lower dash panel	None

Glazing: Windshield 100% intact

Doors: All opened easily

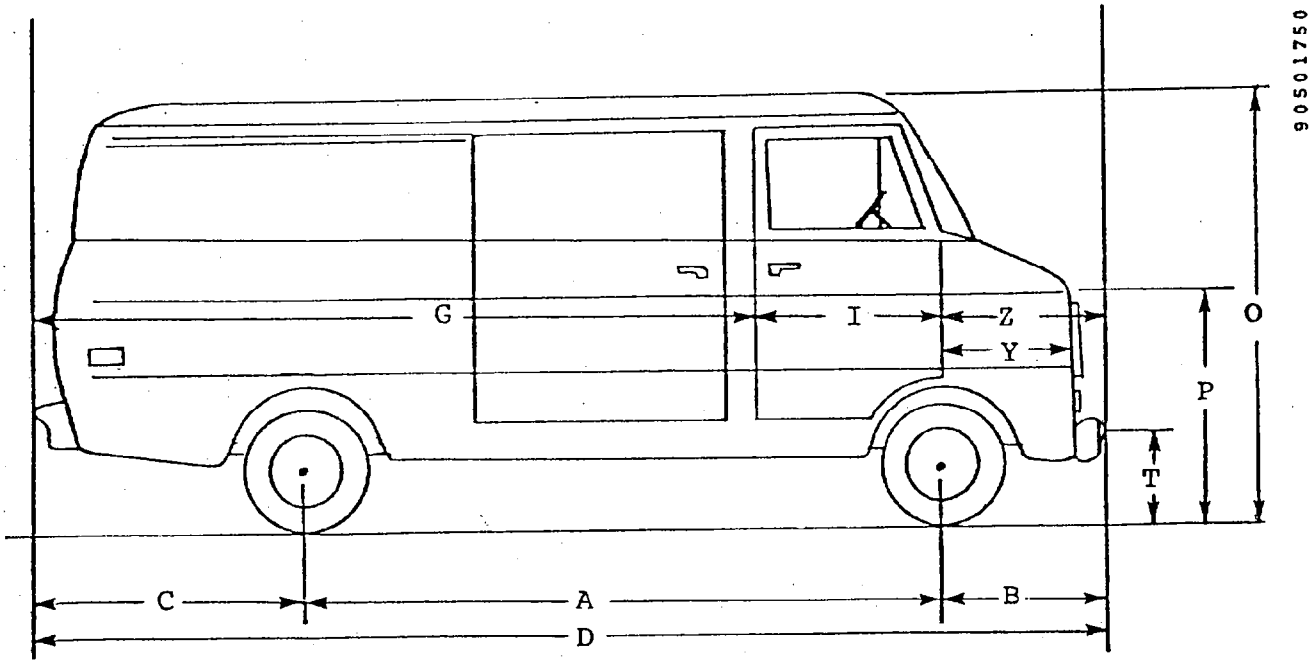
Seat Belt Anchorages and Restraints: Anchorages intact. No seat movement

Vehicle Centerline to Barrier Centerline: Front: 0 inch, Rear: 0 inch

Fuel Leakage: None

General Observations: Bumper struck both tires and locked up front wheels. Van rebounded 7 inches. Very little vehicle interior intrusion.

TABLE 2-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-1)



VEHICLE: 1979 FORD ECONOLINE E-150 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	124.2	124.5	124.3	124.7	-0.1	-0.2
B	24.8	25.0	19.2	19.3	5.6	5.7
C	37.3	37.1	37.3	37.1	0.0	0.0
D	186.3	186.6	180.8	181.1	5.5	5.5
G	109.5	109.3	109.6	109.5	-0.1	-0.2
I	37.4	37.4	37.3	37.4	0.1	0.0
O	78.6	78.3	78.9	78.6	0.3	0.3
P	42.3	42.2	42.7	41.9	0.4	-0.3
T	22.4	22.3	24.0	23.5	1.6	1.2
Y	37.8	37.5	32.8	32.7	5.0	4.8
Z	39.4	39.9	33.9	34.2	5.5	5.7

TABLE 2-8. EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-1)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	52.6	190	39.4	36.1	33.5	32.1	31.1	30.5	30.2	30.5	31.1	32.1	33.6	36.2	39.4
Hood Level	42.5	190	6.4	5.8	5.4	5.1	4.9	4.8	4.7	4.8	5.0	5.3	5.6	6.0	6.6
Between Bumper/Hood	34.5	190	7.0	6.6	5.7	5.3	5.0	4.8	4.7	4.8	4.9	5.1	5.5	6.6	7.2
Bumper Level	21.9	190	4.7	4.1	3.9	3.6	3.5	4.3	4.4	4.3	3.4	3.5	3.7	4.0	4.6
Post-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	53.4	190	39.4	35.9	33.4	31.9	30.9	30.3	30.1	30.4	31.0	32.0	33.6	36.1	39.3
Hood Level	42.4	190	8.2	6.5	6.2	5.9	5.7	5.5	5.5	5.5	5.6	5.9	6.1	6.5	8.4
Between Bumper/Hood	36.2	190	10.2	13.5	9.1	8.9	8.9	8.9	9.0	9.4	9.3	9.2	9.3	13.4	10.2
Bumper Level	23.6	190	10.2	9.6	9.4	9.2	9.1	10.1	10.1	10.0	9.1	9.2	9.4	9.5	10.0
Post-test Static Crush (in.)															
Bottom of Windshield	-0.8	0.0	0.0	-0.2	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.1
Hood Level	0.1	0.0	1.8	0.7	0.8	0.8	0.8	0.7	0.8	0.7	0.6	0.6	0.5	0.5	1.8
Between Bumper/Hood	-1.7	0.0	3.2	6.9	3.4	3.6	3.9	4.1	4.3	4.6	4.4	4.1	3.8	6.8	3.0
Bumper Level	-1.7	0.0	5.5	5.5	5.5	5.6	5.6	5.8	5.7	5.7	5.7	5.7	5.7	5.5	5.4

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

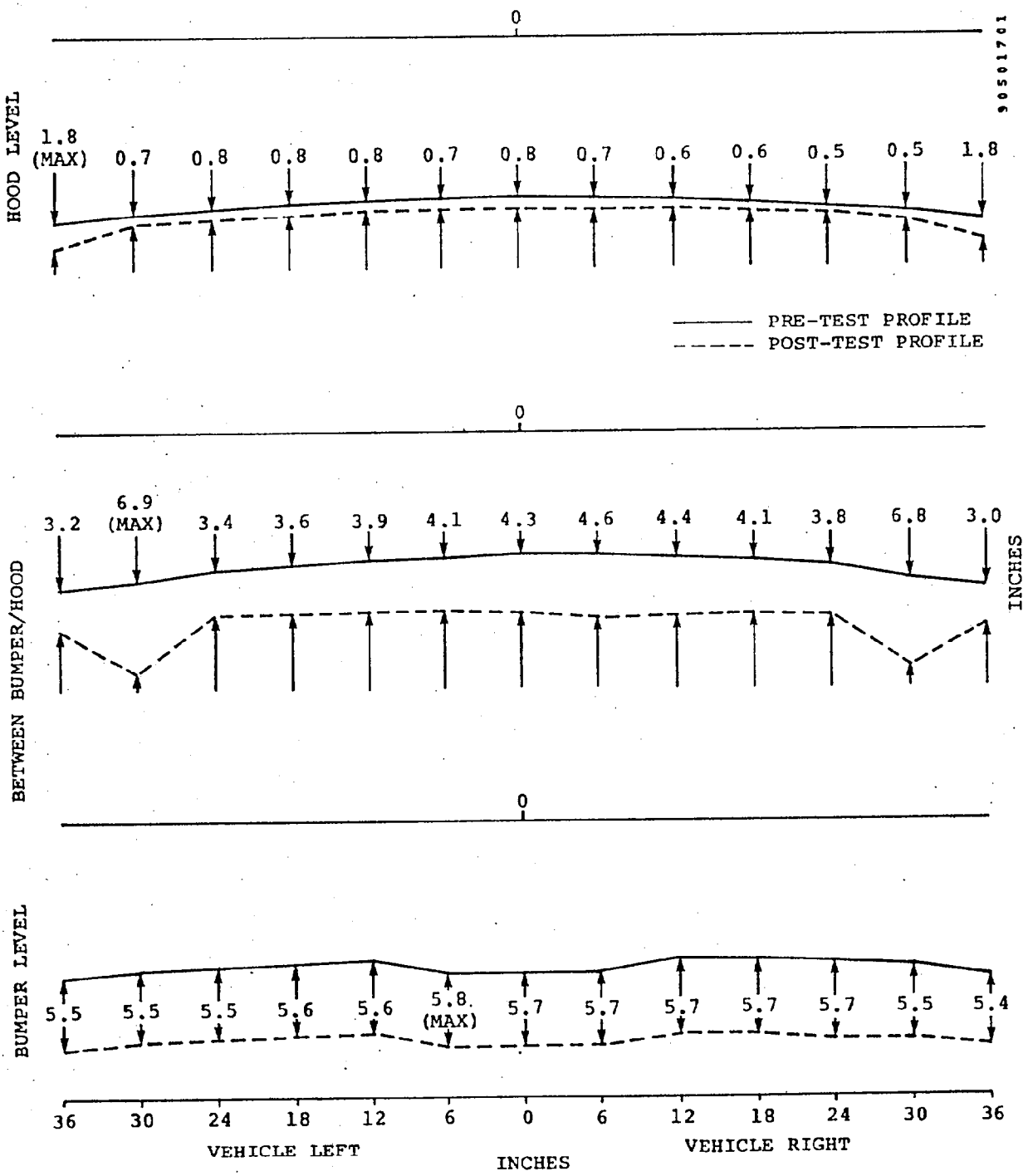


Figure 2-4. 1979 Ford E-150 Van Exterior Static Crush (Test 3052-1).

TABLE 2-9. INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-1)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)*							Distance Right of Center (in.)*					
			36	30	24	18	12	6	0	6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	58.2	125		16.1	16.2	16.3	16.3	16.4	16.4	16.5	17.4	18.3	18.4	18.4	
Knee Level	45.3	130		12.9	12.9	11.4	12.9	8.2	8.0	8.1	9.2	12.6	12.5	12.6	
Floor Level	30.6	130		19.6	25.0	25.0	27.5	5.5	3.9	3.8	5.9	22.0	22.4	18.0	
Post-test Profile - Distance from R.P. (in.)															
Dash Level	58.6	125		16.2	16.2	16.3	16.4	16.4	16.4	16.4	17.3	18.1	18.1	18.2	
Knee Level	45.9	130		12.9	13.0	11.5	12.8	8.1	7.9	8.0	9.0	13.1	13.0	13.0	
Floor Level	31.9	130		19.9	25.3	25.4	27.6	5.4	3.9	3.8	5.9	22.2	22.4	18.2	
Post-test Static Crush (in.)															
Dash Level	-0.4	0.0		-0.1	0.0	0.0	-0.1	0.0	0.0	0.1	0.1	0.2	0.3	0.2	
Knee Level	-0.6	0.0		0.0	-0.1	-0.1	0.1	0.1	0.1	0.1	0.2	-0.5	-0.5	-0.4	
Floor Level	-1.3	0.0		-0.3	-0.3	-0.4	-0.1	0.1	0.0	0.0	0.0	-0.2	0.0	-0.2	

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

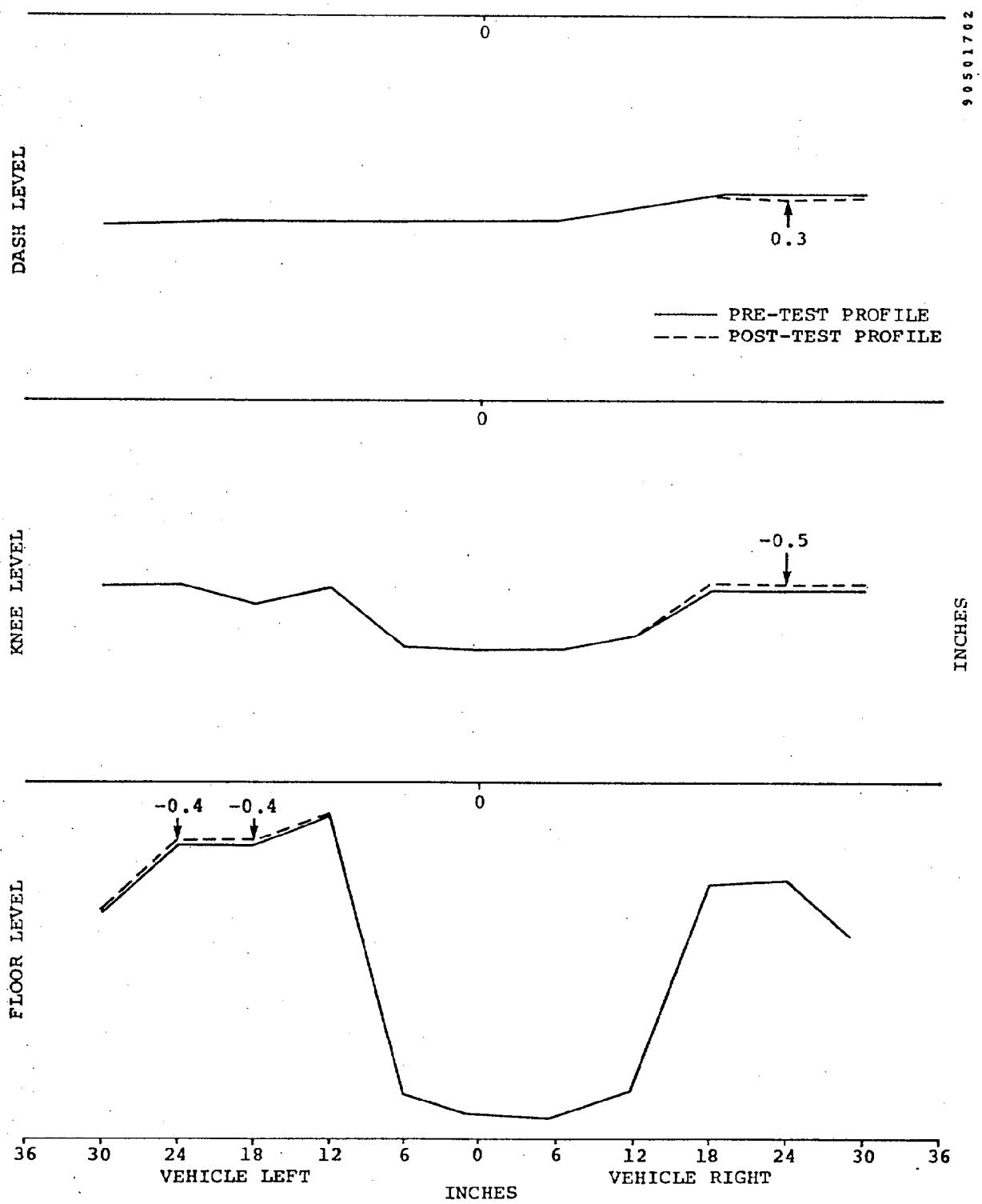


Figure 2-5. 1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-1).

TABLE 2-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-1)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	136.2	-18.1	60.3	136.0	-17.7	61.1	-0.2	0.4	0.8
Hub	132.7	-18.1	53.7	132.6	-17.7	54.5	-0.1	0.4	0.8
Bottom	126.5	-18.1	49.5	126.9	-17.7	50.0	0.4	0.4	0.5

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.

TABLE 2-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-1)

Vehicle: 1979 Ford Econoline E-150 Van

Accelerometer		Test 3052-1 (15.25 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-23.7	16	-1.9	70	+8.9	53
2X	Right Side B-pillar	-26.6	16	-1.8	66	+8.7	52
	Average 1X & 2X	-25.1	16	-1.8	68	+8.8	53
3X	Left Side Firewall	-45.5	26	-1.6	134	+8.5	54
3Y	Left Side Firewall	-7.2	19	+0.8	56	+1.6	200
3Z	Left Side Firewall	+12.9	17	-0.7	135	+1.9	116
4X	Right Side Firewall	-32.9	35	-1.6	139	+8.8	52
4Y	Right Side Firewall	-6.6	34	-0.6	78	-0.3	200
4Z	Right Side Firewall	-10.3	74	-1.1	168	+1.8	77
5X	Engine	-28.5	54	-5.5	72	+10.0	54
5Y	Engine	+4.4	50	-0.1	18	+1.8	200
5Z	Engine	-7.4	66	-0.6	110	+2.0	73
6X	Front Axle	-57.1	8	-1.5	69	+7.9	57
7X	Vehicle C.G.	-25.3	44	-2.2	67	+8.8	53
7Y	Vehicle C.G.	-3.6	21	-0.4	75	-0.1	100
7Z	Vehicle C.G.	+27.0	37	+1.1	95	+2.5	200
8X	Rear Compartment	-26.0	15	-2.3	68	+8.7	52
8Y	Rear Compartment	-6.8	15	-0.5	17	+1.0	200
8Z	Rear Compartment	-29.0	29	-3.3	56	-2.1	106
9X	Rear Axle	-44.1	15	-5.6	72	+8.0	54

TABLE 2-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-1)

Vehicle: 1979 Ford Econoline E-150 Van

		Test 3052-1 (15.25 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-16.2	125	-16.2	130
	Y	-8.2	129	+5.6	86
	Z	+19.5	94	+16.0	91
	R*	+22.0	98	+18.9	89
	HIC	78	74-142	70	60-152
CHEST					
	X	-29.3	78	-23.0	71
	Y	-5.4	95	+6.0	82
	Z	-6.6	95	-4.9	78
	R*	+26.2	80	+21.4	75
	SI	81	200	62	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-98	52	-64	46
	RT	-1030	68	-231	69

*3-msec clip.

TABLE 2-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-1)

Vehicle: 1979 Ford Econoline E-150 Van

	Test 3052-1 (15.25 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	787	80
Right Lap Belt	899	72
Shoulder Belt	1040	83
RIGHT FRONT OCCUPANT		
Left Lap Belt	1416	77
Right Lap Belt	868	76
Shoulder Belt	925	82

TABLE 2-14. SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-1)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	2.94	1.48	2.61	0.45	0.69	0.23	0.22	1.38	0.94	2.74
Time (msec)	50	44	38	11	11	11	12	30	31	30
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.30	0.40	0.44	0.23	0.25	0.18	0.23	0.22	0.13	0.82
Time (msec)	36	27	37	37	38	89	40	36	87	44
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	0.43	3.46	15.14	10.32	0.48	0.20	10.14	15.78*	3.06	0.28
Time (msec)	45	44	44	26	15	9	27	26	13	43
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	0.24	0.26	4.35	1.39	0.25	0.22	1.77	6.60	0.10	0.11
Time (msec)	193	135	53	53	15	17	37	40	27	27

*Maximum measured force.

TABLE 2-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-1)

Vehicle: 1979 Ford Econoline E-150 Van

Parameter	Test 3052-1 (15.25 mph) Peak Load (klb)	Time (msec)
Column 1	3.14	45
Column 2	3.44	26
Column 3	23.32	43
Column 4	11.78	49
Column 5	0.56	48
Column 6	1.28	15
Column 7	11.00	26
Column 8	21.56	44
Column 9	5.38	44
Column 10	3.34	45
Row A	13.90	37
Row B	56.68	45
Row C	2.74	37
Row D	11.35	29

TABLE 2-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-1)

Vehicle: 1979 Ford Econoline E-150 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	82.50	113.07
Time (msec)	44	16

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (4222 lb) plus engine acceleration times engine weight (768 lb).

3.0 PRESENTATION OF RESULTS (TEST 3052-2)

This section of the report presents the results of Test No. 3052-2, a head-on, symmetric crash test between a 1979 Ford E-150 Econoline Van and the NHTSA Fixed Test Device (V_O = 25.10 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix B (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 3-1. CRASH TEST SUMMARY (TEST 3052-2)

TEST NO. 3052-2 CONTRACT: DOT-HS-8-01942

TEST DATE: April 11, 1979 TIME: 1526 TEMPERATURE: 71 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Ford Econoline E-150 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	186.6/79.4	
Test Weight by Wheel (lb)	LF 1251 RF 1374 LR 1191 RR 1181	
Total Weight (lb)	4997	>100,000
Wheelbase (in.)	124.5	
Longitudinal C.G. (From Center of Front Axle) (in.)	59.1	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	25.10	0
Final Speed (mph @ msec)	-2.77 @ 105	
Velocity Change (mph)	27.87	
Maximum Averaged Compartment Acceleration (G @ msec)	-29.54 @ 26	
Maximum Engine Acceleration (G @ msec)	-40.00 @ 54	
Maximum Mutual Dynamic Crush (Film Data) (in.)	15.3	
Maximum Static Crush		
• Bottom of Windshield (in.)	-0.9	
• Hood Level (in.)	7.4	
• Between Bumper/Hood (in.)	13.1	
• Bumper Level (in.)	12.3	
Maximum Post-test Intrusion (in.)	1.7	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #759	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow truck centerline.

TABLE 3-2. VEHICLE INSPECTION SHEET (TEST 3052-2)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: E14HHEE2507 Make: Ford

NHTSA No.: R & D

Year: 1979 Color: Silver Model: Econoline E-150 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [ ] no [X] Bucket: X

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [ ] no [X]

Tinted Glass: yes [X] no [ ] Rear Window Def.: yes [ ] no [X] Split Back Bench: ____

Radio: yes [ ] no [X] Brakes: drum: R disc: F

Clock: yes [ ] no [X]

Tire Size: L78-15 Ply Rating: 4 Mfg. & Line: General

Bias Ply: ____ Belted: X Radial ____ /Eng.Type: V-8 Cylinders: 8 Total Displ: 351 cid

Trans. # Fwd. Speeds: 3 Shipping Weight: 4128 Odometer: 559.0

Dealer (name, address, and phone number)

Remarks (list additional accessories not listed above)

Sliding side door.

Date of Manufacture: 1-79 Dynamic Science No.: 866 Date Received: 3/12/79

Tilting Steering Wheel: yes [ ] no [X] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: ____ (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap and shoulder belt

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, spare tire, wheel covers, and wipers removed. All fluids except for engine coolant removed, 100% water in fuel tank.

2. Does vehicle show evidence of prior accident history? Describe: NO

3. Does vehicle show any significant corrosion? Describe: NO

4. Check condition of the front bumper and frame: Satisfactory

DS FORM 4200

TABLE 3-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-2)

Test No. 3052-2 Type Van-to-NHTSA Fixed Test Device

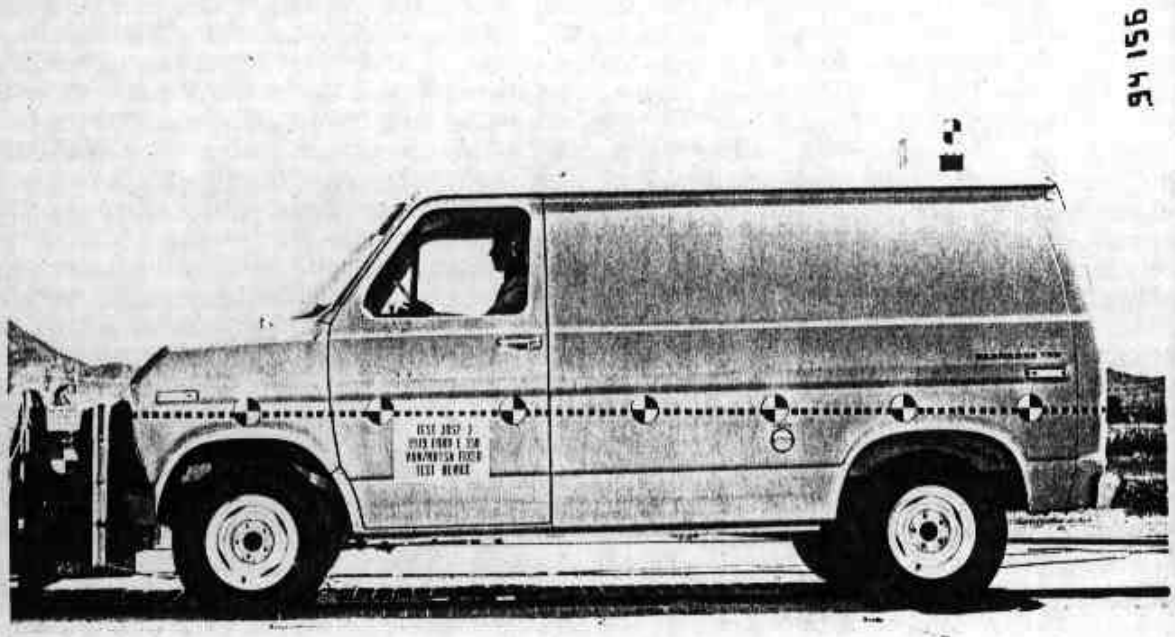
Car Model 1979 Ford E-150 Van Dynamic Science No. 866

Engine Size	351 CID
Engine Weight* (lb)	768
Engine Height/Width (in.)	33.4/19.2
Bumper to Engine Block (in.)	26.9
Engine Length (in.)	19.8
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	28.4
Bumper Height (in.) (Min./Max.)	16.9/24.0

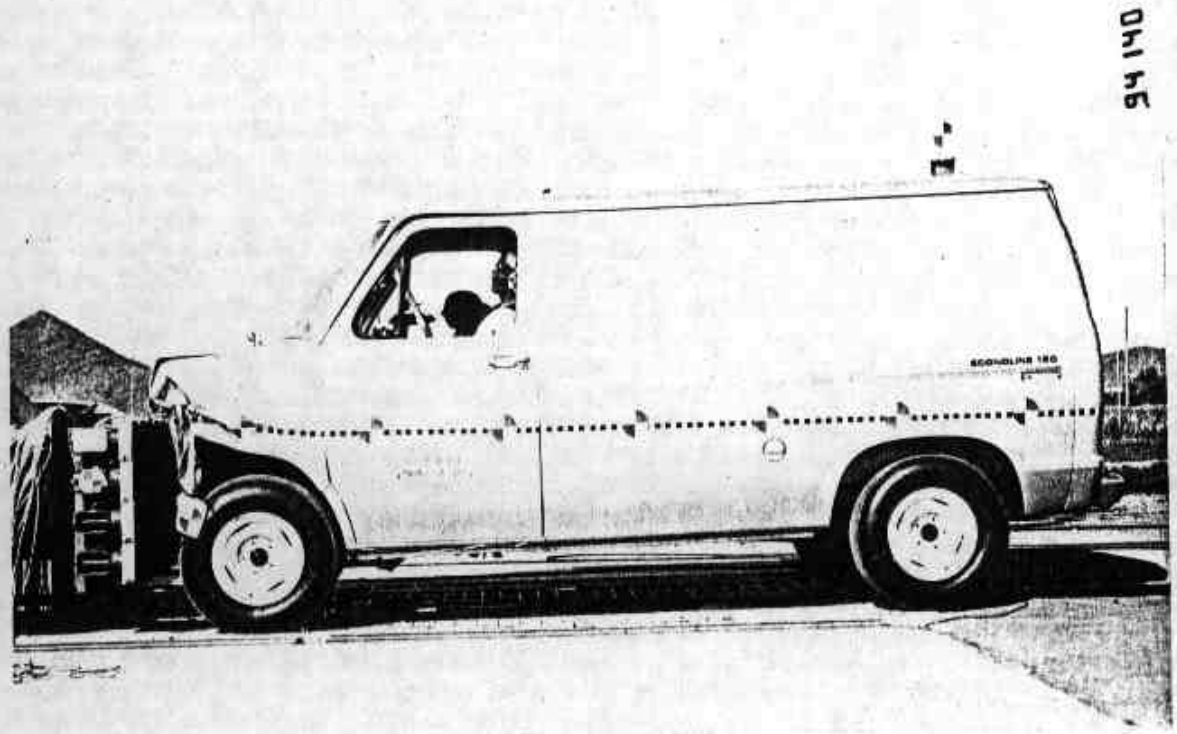
*Includes engine and rigid attachments such as transmission and drive train.

TABLE 3-4. PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-2)

Distances (in.)	Driver	Passenger
Chest to Steering Wheel Hub (horizontal)	14.8	
Nose to Steering Wheel Upper Rim	19.1	
Nose to Windshield (horizontal)	26.9	25.5
Knee to Lower Panel (closest point)		
Left	8.1	6.4
Right	7.9	6.8
Chest to Dash (horizontal)	25.1	21.5
Forehead to Header	18.4	18.2



a) Pre-test



b) Post-test

Figure 3-1. Vehicle Configuration (Test 3052-2).

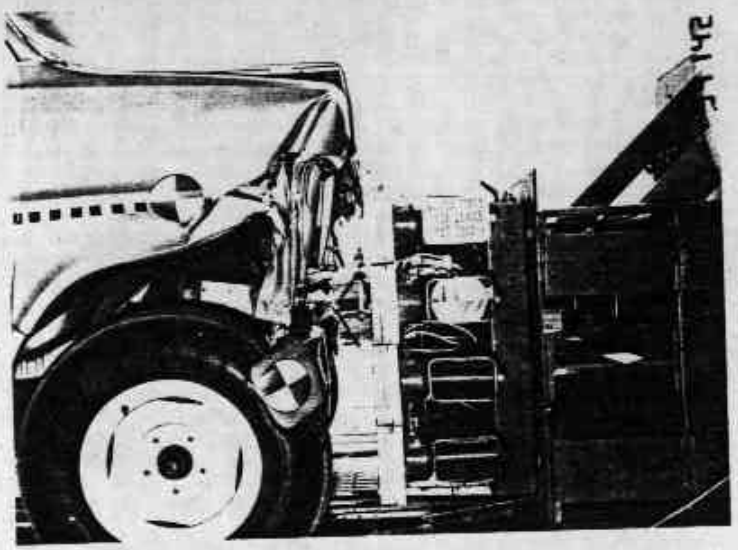
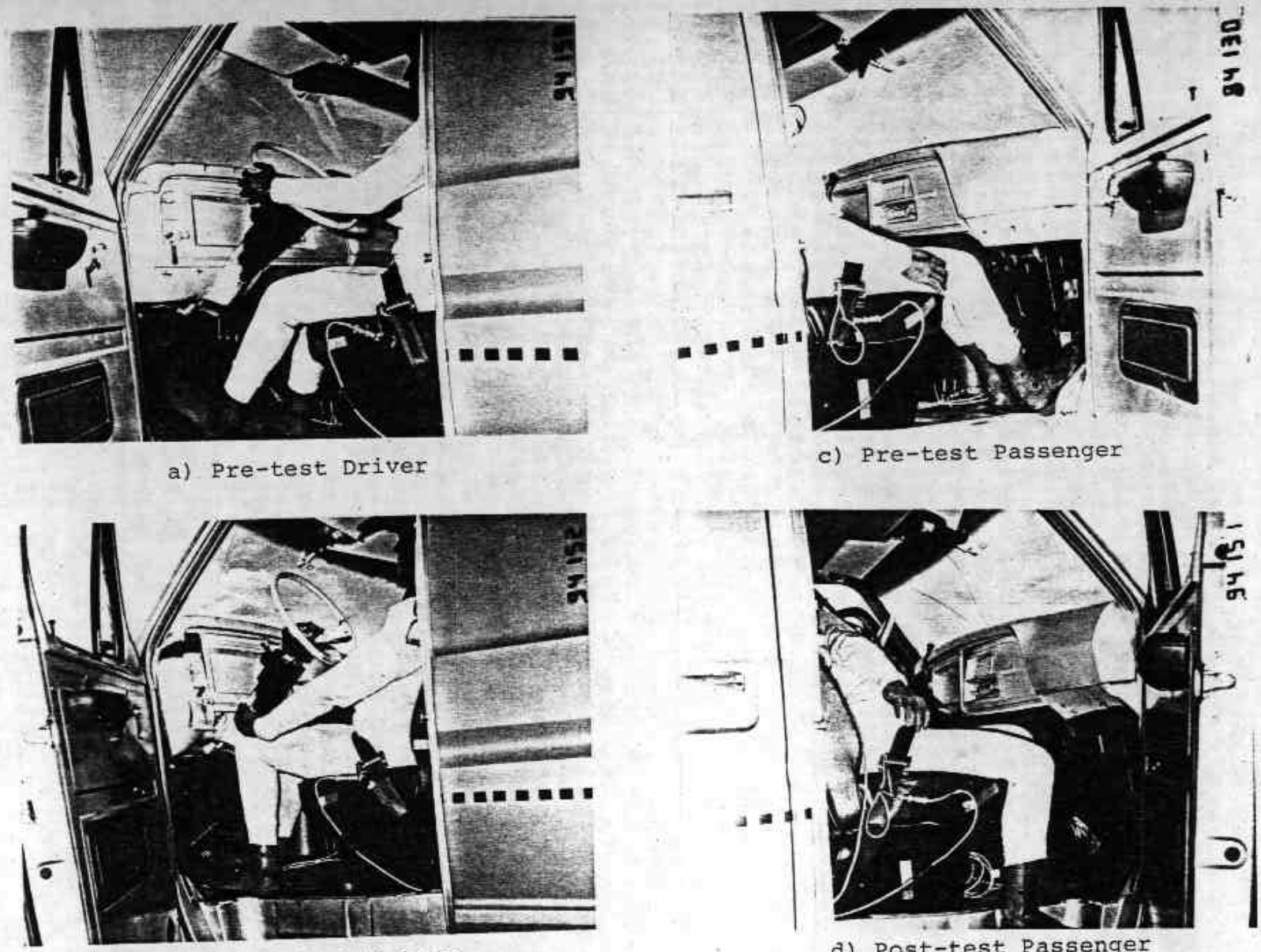


Figure 3-2. Post-test Vehicle Configuration (Test 3052-2).



a) Pre-test Driver

c) Pre-test Passenger

b) Post-test Driver

d) Post-test Passenger

Figure 3-3. Vehicle Dummy Configuration (Test 3052-2).

TABLE 3-5. CHRONOLOGY OF EVENTS (TEST 3052-2)

VEHICLE: 1979 Ford Econoline E-150 Van

Time (msec)	Crash Event
0	Impact (visual)
5	Grille hits Test Device
9	Fenders hit Test Device
23	Bumper strikes front tires; Dummies start forward motion
34	Front tires hit barrier
51	Hood curls over barrier and strikes load cells; Driver strikes steering wheel lower rim with chest
54	Driver hands strike dash; Passenger knees strike dash; Fender wells strike back of front tires
60	Minimum right side wheelbase (121.1 in.); Driver knees hit dash; Passenger strikes engine cowling with left hand
67	Maximum vehicle dynamic crush (15.3 in.)
68	Minimum left side wheelbase (122.0 in.)
78	Driver head strikes steering wheel hub
94	Maximum driver forward motion
98	Maximum vehicle declination (3.5°)
129	Maximum passenger forward motion
147	Right rear tire leaves ground
160	Vehicle separates from Test Device
165	Driver recontacts seat with upper back
249	Passenger recontacts seat with upper back
251	Right rear tire recontacts ground
377	Maximum vehicle rebound inclination (2.0°)

TABLE 3-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-2)

VEHICLE: 1979 Ford Econoline E-150 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	Steering wheel hub	None
Chest----------	Steering wheel lower rim	None
Knees----------	Lower dash	Lower dash

Glazing: Windshield 100% intact but window cracked slightly on driver side.

Doors: Difficult to open

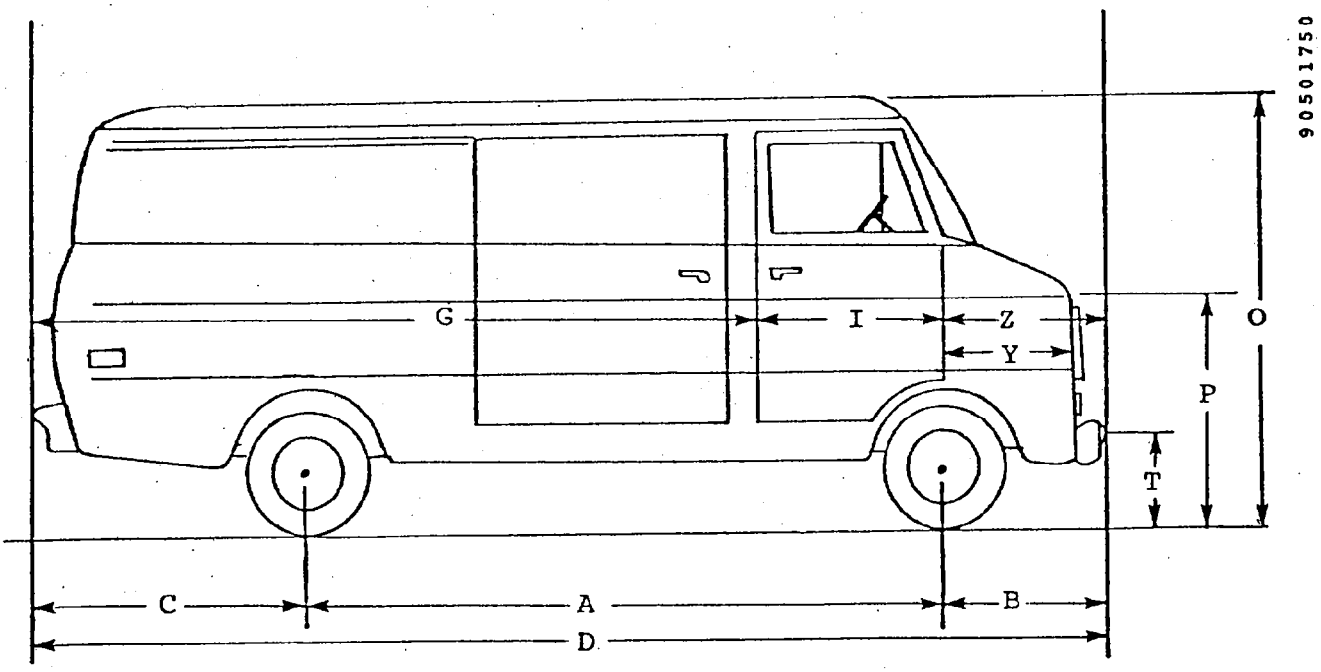
Seat Belt Anchorages and Restraints: Seat belts OK. Left seat moved 0.2 inch forward, right seat moved 0.4 inch forward

Vehicle Centerline to Barrier Centerline: Rear: 3 inches right, Front: 1 inch left

Fuel Leakage: None

General Observations: Radiator leaked. Bumper struck both front tires. Steering wheel rotated in and upward lifting up dash panel. Eight inches static rebound. Hood struck top row of load cells. Load cell C-6 struck by Master Cylinder of Brake Booster in van.

TABLE 3-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-2)



VEHICLE: 1979 FORD ECONOLINE E-150 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	124.8	125.2	123.5	123.5	1.3	1.7
B	24.7	24.3	15.8	13.6	8.9	10.7
C	37.0	37.2	37.2	37.1	-0.2	0.1
D	186.5	186.7	176.5	174.2	10.0	12.5
G	109.4	109.5	110.2	109.7	-0.8	-0.2
I	37.4	37.3	37.0	37.0	0.4	0.3
O	78.5	78.1	78.7	79.5	0.2	1.4
P	42.4	42.0	42.2	43.0	-0.2	1.0
T	22.4	22.0	25.4	25.0	3.0	3.0
Y	37.3	37.3	27.5	26.9	9.8	10.4
Z	39.7	39.9	29.3	27.5	10.4	12.4

TABLE 3-8. EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-2)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)*							Distance Right of Center (in.)*					
			36	30	24	18	12	6	0	6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	52.9	190	39.8	36.4	33.8	32.2	31.2	30.6	30.4	30.5	31.1	32.0	33.6	36.0	39.8
Hood Level	42.6	190	6.5	5.9	5.5	5.2	5.0	4.9	4.8	4.9	5.0	5.1	5.4	5.8	6.4
Between Bumper/Hood	34.6	190	6.8	6.6	5.7	5.3	5.0	4.9	4.7	4.7	4.8	5.0	5.4	6.4	6.7
Bumper Level	22.4	190	4.7	4.1	3.9	3.7	3.5	4.4	4.4	4.4	3.5	3.6	3.8	4.0	4.6
Post-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	53.2	190	39.1	35.5	32.9	31.4	30.5	30.0	30.0	30.1	30.7	31.7	33.4	35.7	39.6
Hood Level	41.9	190	12.3	9.2	9.1	9.0	9.0	9.0	9.1	9.2	9.3	9.5	9.7	10.0	13.8
Between Bumper/Hood	37.8	190	15.4	18.9	14.5	14.7	14.9	15.2	15.4	15.6	15.5	15.6	15.4	19.5	16.5
Bumper Level	29.2	190	14.9	14.5	14.6	14.4	14.9	15.9	16.5	16.2	15.4	15.3	15.4	15.5	15.8
Post-test Static Crush (in.)															
Bottom of Windshield	0.3	0.0	-0.7	-0.9	-0.9	-0.8	-0.7	-0.6	-0.4	-0.4	-0.4	-0.3	-0.2	-0.3	-0.2
Hood Level	-0.7	0.0	5.8	3.3	3.6	3.8	4.0	4.1	4.3	4.3	4.3	4.4	4.3	4.2	7.4
Between Bumper/Hood	3.2	0.0	8.6	12.3	8.8	9.4	9.9	10.3	10.7	10.9	10.7	10.6	10.0	13.1	9.8
Bumper Level	2.8	0.0	10.2	10.4	10.7	10.7	11.4	11.5	12.1	11.8	11.9	11.7	11.6	11.5	11.2

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

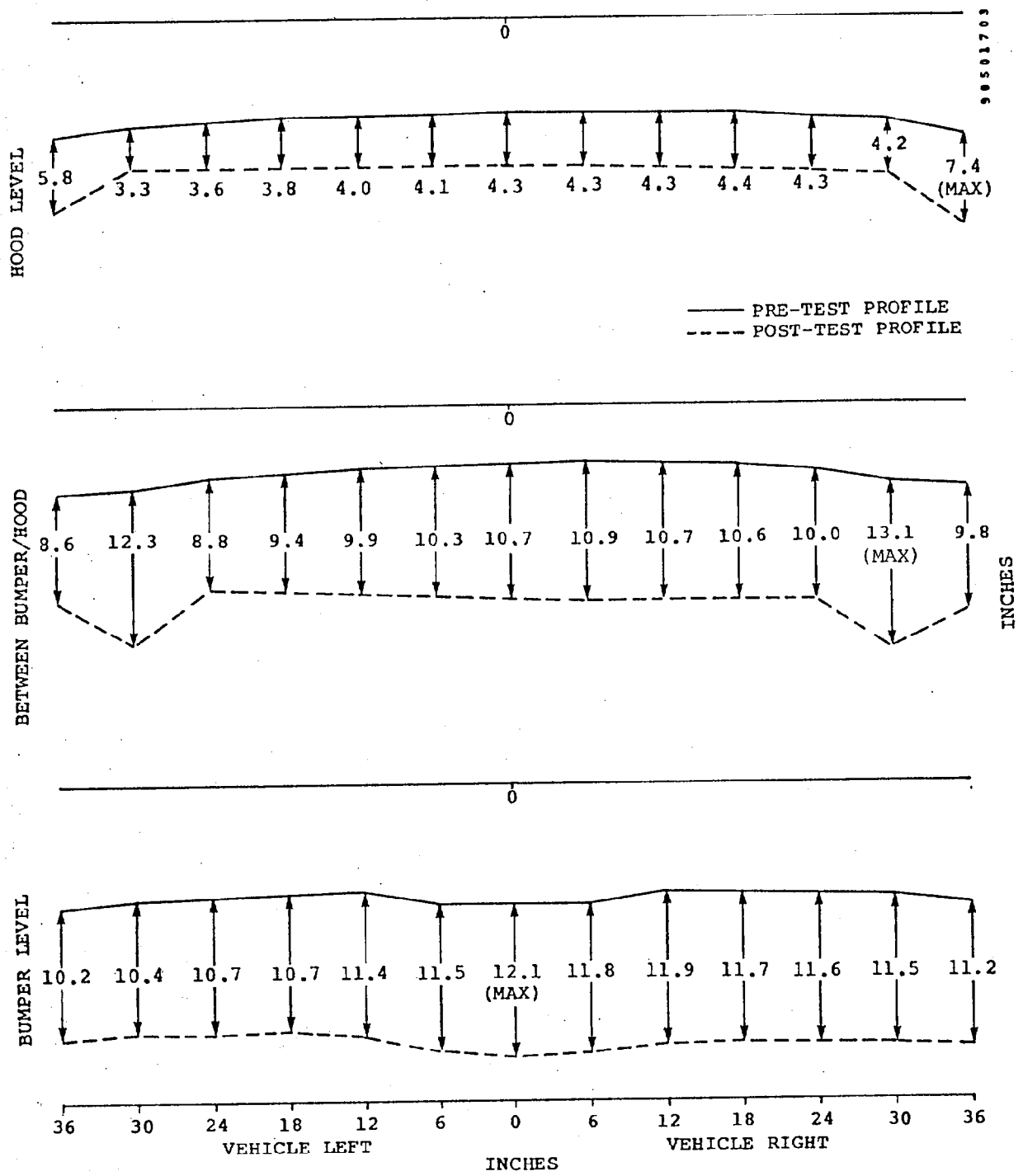


Figure 3-4. 1979 Ford E-150 Van Exterior Static Crush (Test 3052-2).

TABLE 3-9. INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-2)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)*							Distance Right of Center (in.)*					
			36	30	24	18	12	6	0	6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	58.6	125		16.0	16.0	16.0	16.0	16.1	16.2	16.2	16.8	18.2	18.1	18.0	
Knee Level	45.6	130		12.6	12.6	11.2	12.5	8.0	7.8	8.0	8.9	12.6	12.5	12.6	
Floor Level	29.5	130		20.5	25.6	27.1	27.4	5.4	3.8	3.9	5.6	26.8	26.8	23.6	
Post-test Profile - Distance from R.P. (in.)															
Dash Level	60.6	125		17.5	17.5	17.5	17.5	17.3	17.1	16.9	17.4	18.5	18.4	18.2	
Knee Level	47.0	130		12.9	13.6	12.5	11.4	7.9	7.8	7.8	8.8	14.5	14.5	14.5	
Floor Level	33.0	131		20.0	24.7	26.1	25.7	4.5	3.0	3.0	5.0	25.9	25.7	22.8	
Post-test Static Crush (in.)															
Dash Level	2.0	0.0		-1.5	-1.5	-1.5	-1.5	-1.2	-0.9	-0.7	-0.6	-0.3	-0.3	-0.2	
Knee Level	1.4	0.0		-0.3	-1.0	-1.3	1.1	0.1	0.0	0.2	0.1	-1.9	-2.0	-1.9	
Floor Level	3.5	1.0		-0.5	-0.1	0.0	0.7	-0.1	-0.2	-0.1	-0.4	-0.1	0.1	-0.2	

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

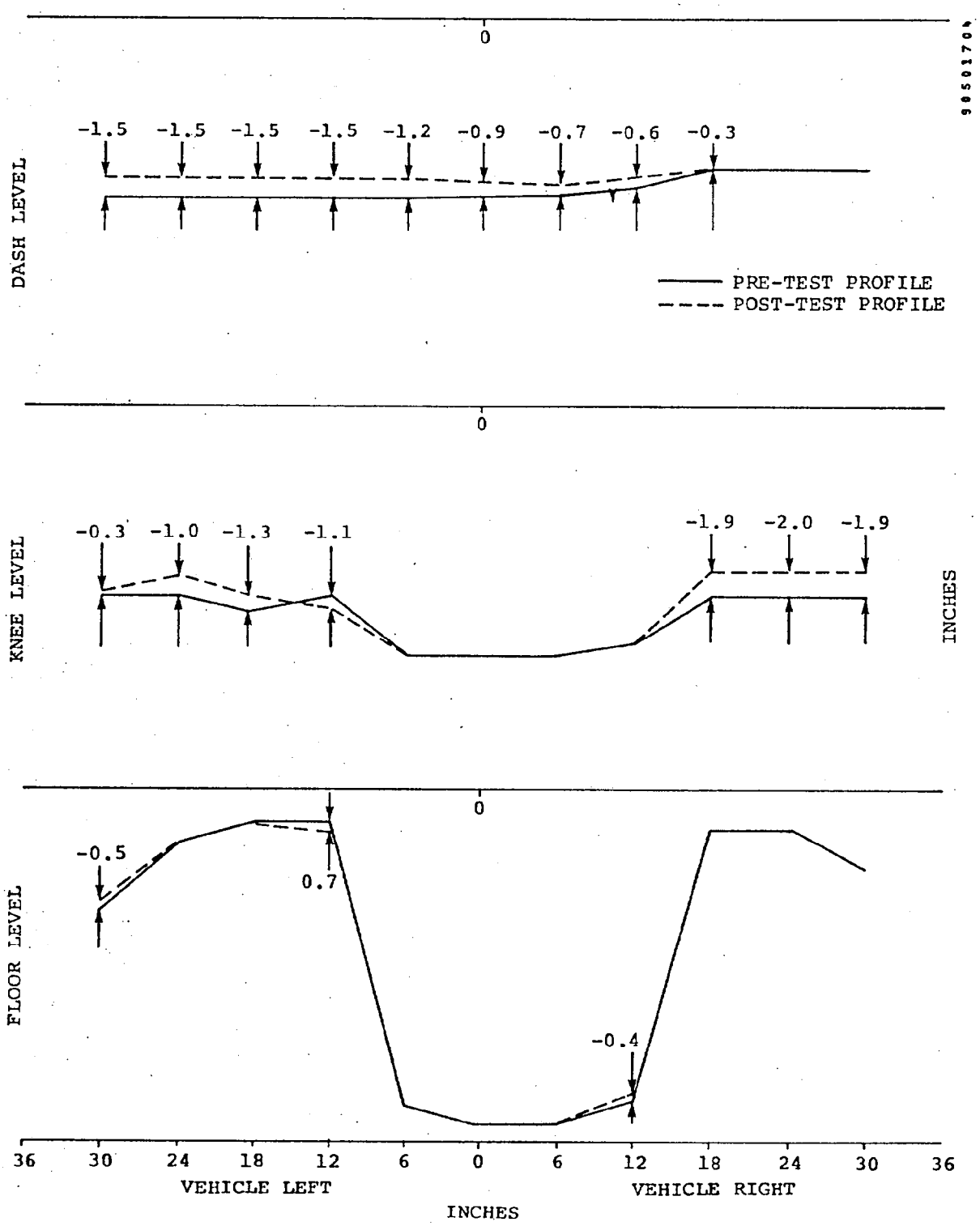


Figure 3-5. 1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-2).

TABLE 3-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-2)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	135.7	-18.1	60.6	133.9	-18.5	65.6	-1.8	-0.4	5.0
Hub	132.0	-18.1	53.9	131.8	-19.2	58.2	-0.2	-1.1	4.3
Bottom	126.3	-18.1	49.8	127.8	-19.5	53.1	1.5	-1.4	3.3

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.

TABLE 3-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-2)

Vehicle: 1979 Ford Econoline E-150 Van

Accelerometer		Test 3052-2 (25.10 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-28.2	28	-3.0	119	+15.9	63
2X	Right Side B-pillar	-31.9	25	-2.8	89	+16.2	66
	Average 1X & 2X	-29.5	26	-2.8	105	16.1	65
3X	Left Side Firewall	-59.0	27	-0.6	107	+14.9	70
3Y	Left Side Firewall	-15.1	17	-0.3	19	+10.2	200
3Z	Left Side Firewall	+28.1	14	-1.0	12	+4.1	129
4X	Right Side Firewall	-80.1	26	-1.8	103	+16.2	70
4Y	Right Side Firewall	-18.9	25	+1.3	28	+1.8	200
4Z	Right Side Firewall	-15.9	24	-2.7	142	-2.2	200
5X	Engine	-40.0	54	-5.1	73	+17.0	56
5Y	Engine	-9.1	81	-0.8	37	-0.5	200
5Z	Engine	-7.9	85	-4.5	169	-5.2	200
6X	Front Axle	-73.7	8	-2.8	101	+14.9	61
7X	Vehicle C.G.	-37.2	41	-3.5	108	+15.9	64
7Y	Vehicle C.G.	-12.9	37	-1.4	51	-0.4	71
7Z	Vehicle C.G.	+36.7	58	-2.4	137	-1.3	200
8X	Rear Compartment	-30.2	26	-3.4	95	+15.8	63
8Y	Rear Compartment	+4.8	42	-0.6	33	+1.0	200
8Z	Rear Compartment	-27.5	41	-4.7	59	-5.8	181
9X	Rear Axle	-53.5	14	-4.2	77	+13.9	63

TABLE 3-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-2)

Vehicle: 1979 Ford Econoline E-150 Van

		Test 3052-2 (25.10 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-61.3	98	-25.1	137
	Y	-12.5	101	+9.3	86
	Z	+46.9	83	+40.4	96
	R*	+64.6	96	+39.4	98
	HIC	557	70-112	393	71-150
CHEST					
	X	-45.8	74	-35.4	77
	Y	-6.3	80	+12.2	85
	Z	+15.6	60	+5.8	75
	R*	+41.4	72	+29.8	78
	SI	289	200	171	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-137	61	-141	50
	RT	-2851	55	-184	29

*3-msec clip.

TABLE 3-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-2)

Vehicle: 1979 Ford Econoline E-150 Van

	Test 3052-2 (25.10 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	1260	74
Right Lap Belt	1278	65
Shoulder Belt	1319	78
RIGHT FRONT OCCUPANT		
Left Lap Belt	1993	71
Right Lap Belt	1249	75
Shoulder Belt	1513	83

TABLE 3-14. SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-2)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	3.41	4.07	3.48	1.07	1.44	0.67	0.88	1.55	1.33	3.89
Time (msec)	25	43	51	23	23	24	25	24	13	36
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.54	0.81	2.09	0.96	6.69	0.54	1.78	2.02	0.36	0.68
Time (msec)	15	31	30	54	56	57	42	42	37	21
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	0.34	4.38	15.76*	12.18	0.38	1.00	13.27	15.73	3.58	0.45
Time (msec)	68	26	26	25	17	58	43	27	42	36
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	1.77	0.74	5.46	1.03	0.18	0.23	1.51	4.46	0.64	0.32
Time (msec)	75	67	30	12	118	168	60	28	26	33

*Maximum measured force.

TABLE 3-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-2)

Vehicle: 1979 Ford Econoline E-150 Van

Parameter	Test 3052-2 (25.10 mph) Peak Load (klb)	Time (msec)
Column 1	5.04	34
Column 2	4.96	43
Column 3	22.08	26
Column 4	16.50	43
Column 5	1.41	58
Column 6	7.45	56
Column 7	14.57	25
Column 8	25.52	29
Column 9	9.05	26
Column 10	3.63	28
Row A	12.26	29
Row B	63.40	27
Row C	10.66	56
Row D	18.37	25

TABLE 3-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-2)

Vehicle: 1979 Ford Econoline E-150 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	93.76	138.31
Time (msec)	25	28

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (4229 lb) plus engine acceleration times engine weight (768 lb).

4.0 PRESENTATION OF RESULTS (TEST 3052-3)

This section of the report presents the results of Test No. 3052-3, a head-on, symmetric crash test between a 1979 Ford E-150 Econoline Van and the NHTSA Fixed Test Device (V_o = 30.02 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix C (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 4-1. CRASH TEST SUMMARY (TEST 3052-3)

TEST NO. 3052-3 CONTRACT: DOT-HS-8-01942

TEST DATE: April 12, 1979 TIME: 1422 TEMPERATURE: 76 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Ford Econoline E-150 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	186.4/79.4	
Test Weight by Wheel (lb)	LF 1373 RF 1358 LR 1156 RR 1110	
Total Weight (lb)	4998	>100,000
Wheelbase (in.)	124.5	
Longitudinal C.G. (From Center of Front Axle) (in.)	56.4	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	30.02	0
Final Speed (mph @ msec)	-1.95 @ 97	
Velocity Change (mph)	31.97	
Maximum Averaged Compartment Acceleration (G @ msec)	-34.87 @ 16	
Maximum Engine Acceleration (G @ msec)	-79.89 @ 38	
Maximum Mutual Dynamic Crush (Film Data) (in.)	19.5	
Maximum Static Crush		
o Bottom of Windshield (in.)	0.7	
o Hood Level (in.)	11.3	
o Between Bumper/Hood (in.)	16.4	
o Bumper Level (in.)	14.9	
Maximum Post-test Intrusion (in.)	3.2	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #759	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 4-2. VEHICLE INSPECTION SHEET (TEST 3052-3)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: E14HHEC1109 Make: Ford

NHTSA No.: R & D

Year: 1979 Color: Silver Model: Econoline E-150 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [X] no [ ] Bucket: X (1)

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [X] no [ ]

Tinted Glass: yes [X] no [ ] Rear Window Def.: yes [ ] no [X] Split Back Bench: ____

Radio: yes [ ] no [X] Brakes: drum: R disc: F

Clock: yes [ ] no [X]

Tire Size: LR78-15 Ply Rating: 4 Mfg. & Line: General

Bias Ply: ____ Belted: ____ Radial X /Eng.Type: V-8 Cylinders: 8 Total Displ: 351 cid

Trans, # Fwd. Speeds: 3 Shipping Weight: 4129 Odometer: 475.6

Dealer (name, address, and phone number)

Remarks (list additional accessories not listed above)
Double fold out side doors
Transmission cooler
Inside hood latch

NOTE: RF seat removed from van used in Test 3052-1. Tilt steering wheel placed in lowermost position.

Date of Manufacture: 12/78 Dynamic Science No.: 863 Date Received: 3/12/79

Tilting Steering Wheel: yes [X] no [ ] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: ____ (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap and shoulder belts

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, wheel covers and wipers removed. Fluids except for engine coolant removed, 100% water in fuel tank. Passenger seat and belts used in Test 1.

2. Does vehicle show evidence of prior accident history? Describe: NO

3. Does vehicle show any significant corrosion? Describe: NO

4. Check condition of the front bumper and frame: Satisfactory

DS FORM 4200

TABLE 4-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-3)

Test No. 3052-3 Type Van-to-NHTSA Fixed Test Device

Car Model 1979 Ford E-150 Van Dynamic Science No. 863

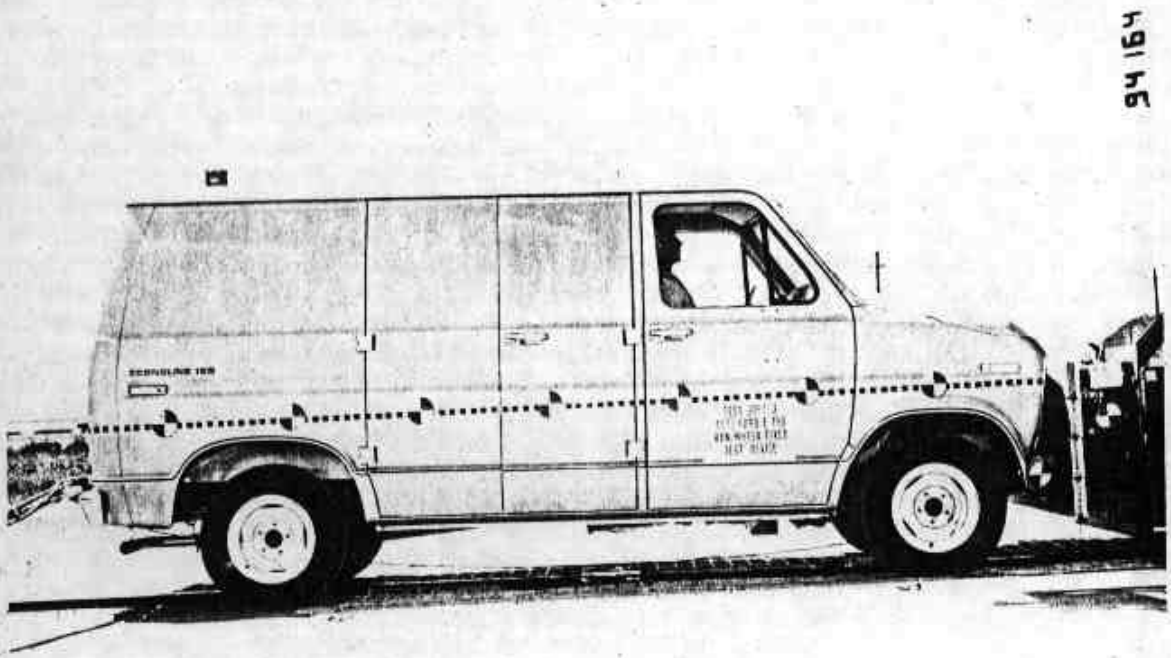
Engine Size	351 CID
Engine Weight* (lb)	768
Engine Height/Width (in.)	32.2/19.2
Bumper to Engine Block (in.)	26.7
Engine Length (in.)	19.8
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	28.3
Bumper Height (in.) (Min./Max.)	15.2/22.4

*Includes engine and rigid attachments such as transmission and drive train.

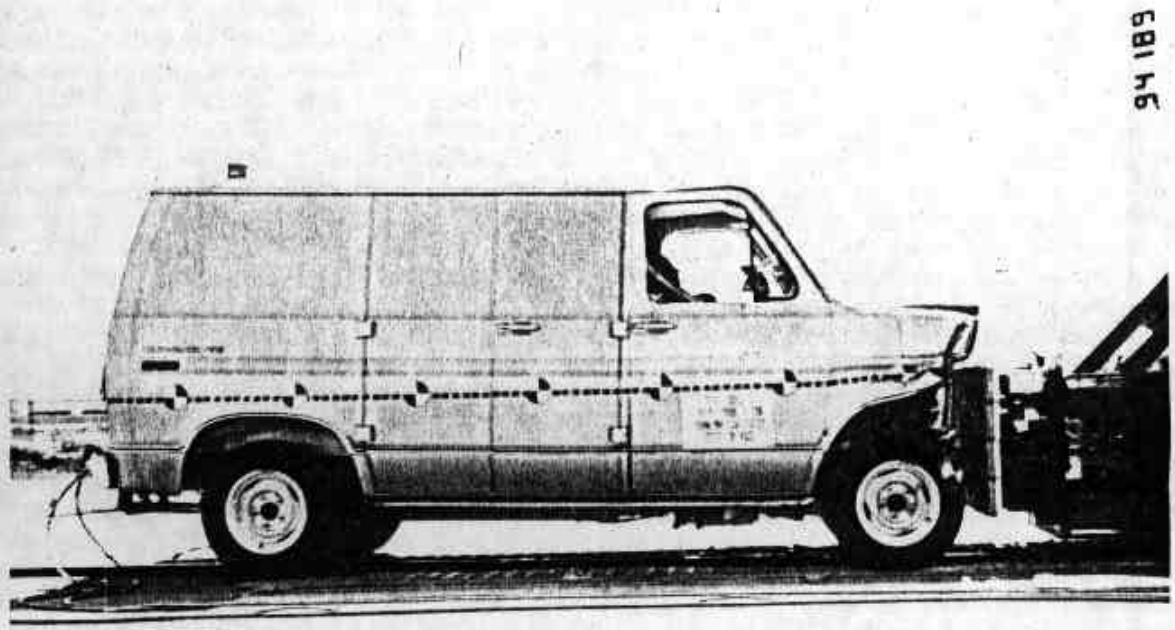
TABLE 4-4. PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-3)

Distances (in.)	Driver*	Passenger
Chest to Steering Wheel Hub (horizontal)	14.2	
Nose to Steering Wheel Upper Rim	18.5	
Nose to Windshield (horizontal)	28.0	25.9
Knee to Lower Panel (closest point)		
Left	8.3	6.9
Right	8.2	7.1
Chest to Dash (horizontal)	25.4	21.7
Forehead to Header	18.5	18.7

*Tilt steering wheel set at lowermost driving position.



a) Pre-test



b) Post-test

Figure 4-1. Vehicle Configuration (Test 3052-3).

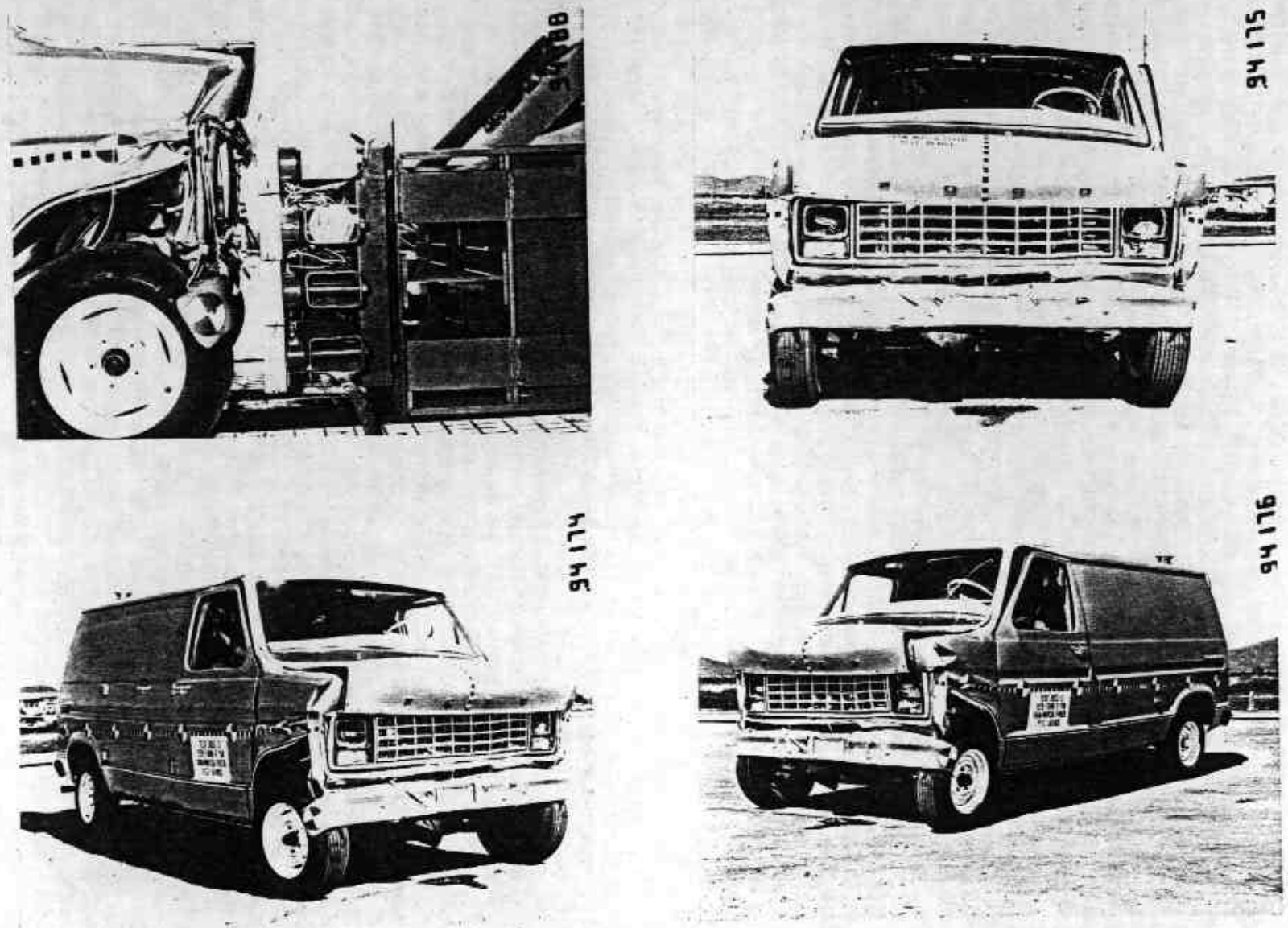
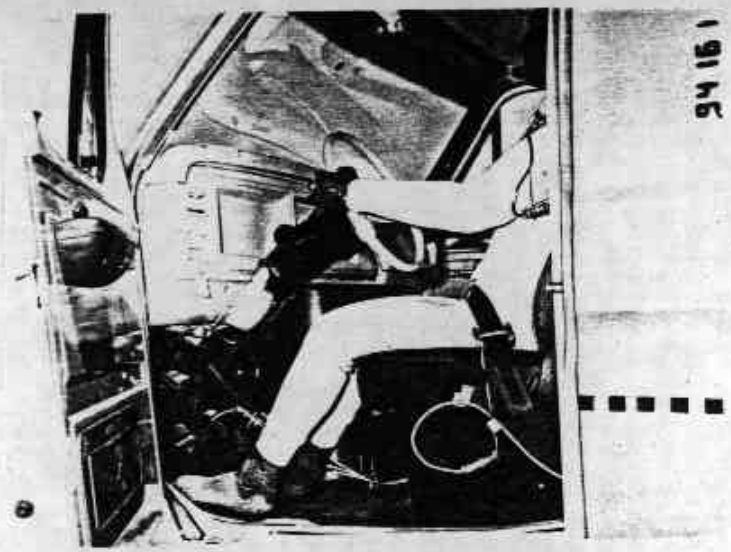


Figure 4-2. Post-test Vehicle Configuration (Test 3052-2).



a) Pre-test Driver

c) Pre-test Passenger

b) Post-test Driver

d) Post-test Passenger

Figure 4-3. Vehicle Dummy Configuration (Test 3052-3).

TABLE 4-5. CHRONOLOGY OF EVENTS (TEST 3052-3)

VEHICLE: 1979 Ford Econoline E-150 Van

Time (msec)	Crash Event
0	Impact (visual)
3	Grille hits Test Device
7	Fenders hit Test Device
23	Bumper hits front tires; Hood strikes top row of load cells
28	Driver starts forward motion
31	Tires strike Test Device
33	Passenger starts forward motion
46	Fender wells strike back of front tires; Passenger knees strike dash
54	Passenger left hand strikes engine cowling; Driver knees strike dash
59	Minimum wheelbase; Right side (120.8 in.); Left side (122.5 in.)
62	Steering wheel lower rim strikes driver in neck
68	Maximum vehicle dynamic crush (19.5 in.)
73	Driver hands and forearms strike dash
78	Driver head strikes steering wheel hub
88	Maximum driver forward motion
92	Maximum vehicle declination (4.0°); Right rear tire leaves ground
99	Passenger head hits dash
107	Maximum passenger forward motion
120	Left rear tire leaves ground
149	Driver recontacts seat with upper back
185	Vehicle separates from Test Device
195	Passenger recontacts seat with upper back
304	Right rear tire recontacts ground
336	Left rear tire recontacts ground
529	Maximum vehicle rebound inclination (3.25°)

TABLE 4-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-3)

VEHICLE: 1979 Ford Econoline E-150 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	Steering wheel hub and lower rim	Top of dash
Chest----------	None	None
Knees----------	Lower dash	Lower dash and air conditioner fan housing

Glazing: Cracked on driver's side of vehicle

Doors: Right passenger door difficult to open. Tools required to open left driver door

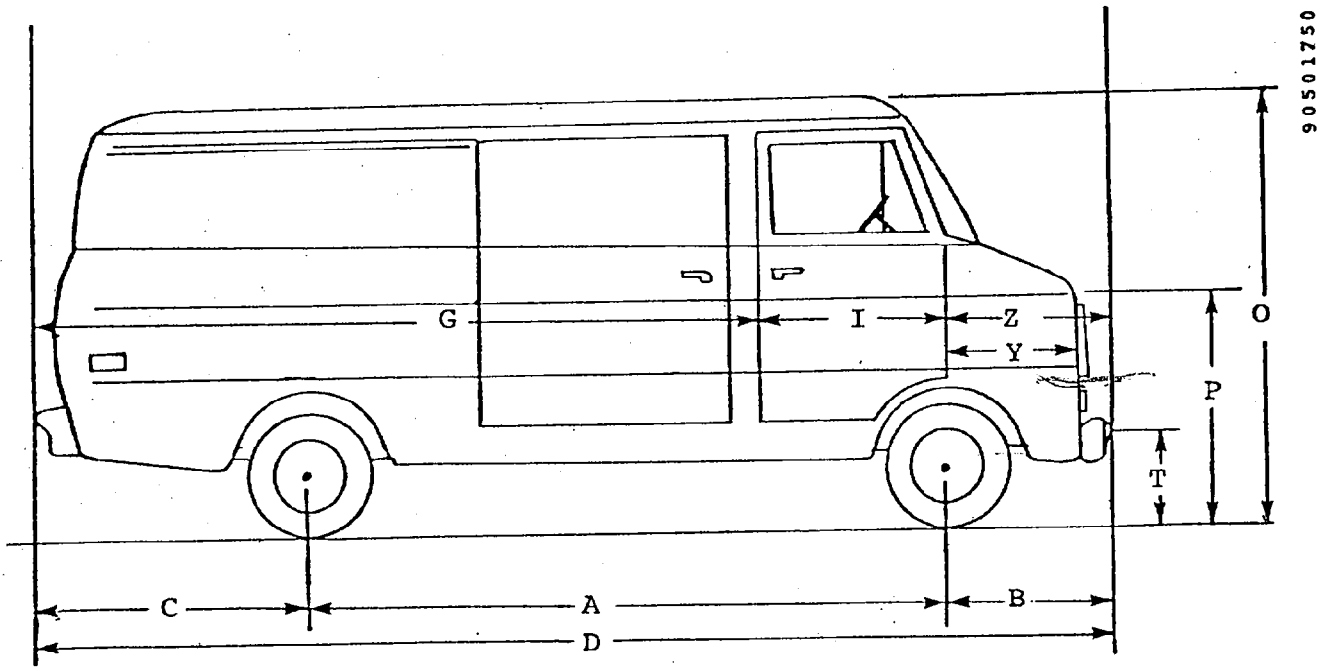
Seat Belt Anchorages and Restraints: Seat belts OK. Left seat moved 2.0 inches forward. Right seat moved 0.6 inch forward

Vehicle Centerline to Barrier Centerline: Rear: 3.4 inches left, Front: 2.3 inches left

Fuel Leakage: None

General Observations: Radiator leaked. Bumper struck both front tires. Steering column rotated upward. Seven inches static rebound. Load cell C-6 struck by master cylinder of brake booster of van.

TABLE 4-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-3)



VEHICLE: 1979 FORD ECONOLINE E-150 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	124.6	124.4	120.0	124.4	4.6	0.0
B	24.8	25.0	13.8	13.3	11.0	11.7
C	36.9	37.0	37.1	37.0	-0.2	0.0
D	186.3	186.4	170.9	174.7	15.4	11.7
G	109.3	109.1	109.3	110.9	0.0	-1.8
I	37.5	37.4	36.1	36.6	1.4	0.8
O	77.0	77.4	77.1	77.8	0.1	0.4
P	40.4	40.8	40.7	41.5	0.3	0.7
T	20.4	20.8	22.6	22.6	2.2	1.8
Y	37.3	37.3	25.0	24.7	12.3	12.6
Z	39.5	39.9	25.5	27.2	14.0	12.7

TABLE 4-8. EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-3)

Location	Height at	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	51.6	195	44.8	41.5	38.8	37.0	36.0	35.5	35.3	35.5	36.0	37.0	38.6	41.1	44.6
Hood Level	41.3	195	11.5	11.0	10.5	10.2	10.0	9.8	9.7	9.8	10.0	10.1	10.5	10.8	11.5
Between Bumper/Hood	39.1	195	11.7	11.7	10.7	10.4	10.1	10.0	9.9	10.0	10.1	10.4	10.7	11.8	11.9
Bumper Level	20.9	195	9.9	9.3	9.0	8.9	8.7	9.5	9.6	9.5	8.7	8.8	9.0	9.3	10.0
Post-test Profile - Distance to R.P. (in.)															
Bottom of Windshield	51.6	195	43.5	40.2	38.0	36.6	35.9	35.4	35.3	35.7	36.4	37.6	39.3	42.3	45.9
Hood Level	40.3	195	22.8	19.8	19.5	19.3	19.1	18.9	18.7	18.5	18.4	18.2	18.1	18.1	21.0
Between Bumper/Hood	35.1	195	24.9	28.1	23.0	23.1	23.4	23.7	23.6	23.4	22.8	22.1	21.4	25.8	23.0
Bumper Level	22.5	195	23.9	23.5	23.6	23.1	23.6	24.1	23.9	23.5	23.0	22.2	22.0	21.4	21.0
Post-test Static Crush (in.)															
Bottom of Windshield	0.0	0.0	-1.7	1.3	-0.8	-0.4	-0.1	-0.1	0.0	0.2	0.4	0.6	0.7	1.2	1.3
Hood Level	-1.0	0.0	11.3	8.8	9.0	9.1	9.1	9.1	9.0	8.7	8.4	8.1	7.6	7.3	9.5
Between Bumper/Hood	-4.0	0.0	13.2	16.4	12.3	12.7	13.3	13.7	13.7	13.4	12.7	11.7	10.7	14.0	11.1
Bumper Level	1.6	0.0	14.0	14.2	14.6	14.2	14.9	14.6	14.3	14.0	14.3	13.4	13.0	12.1	11.0

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

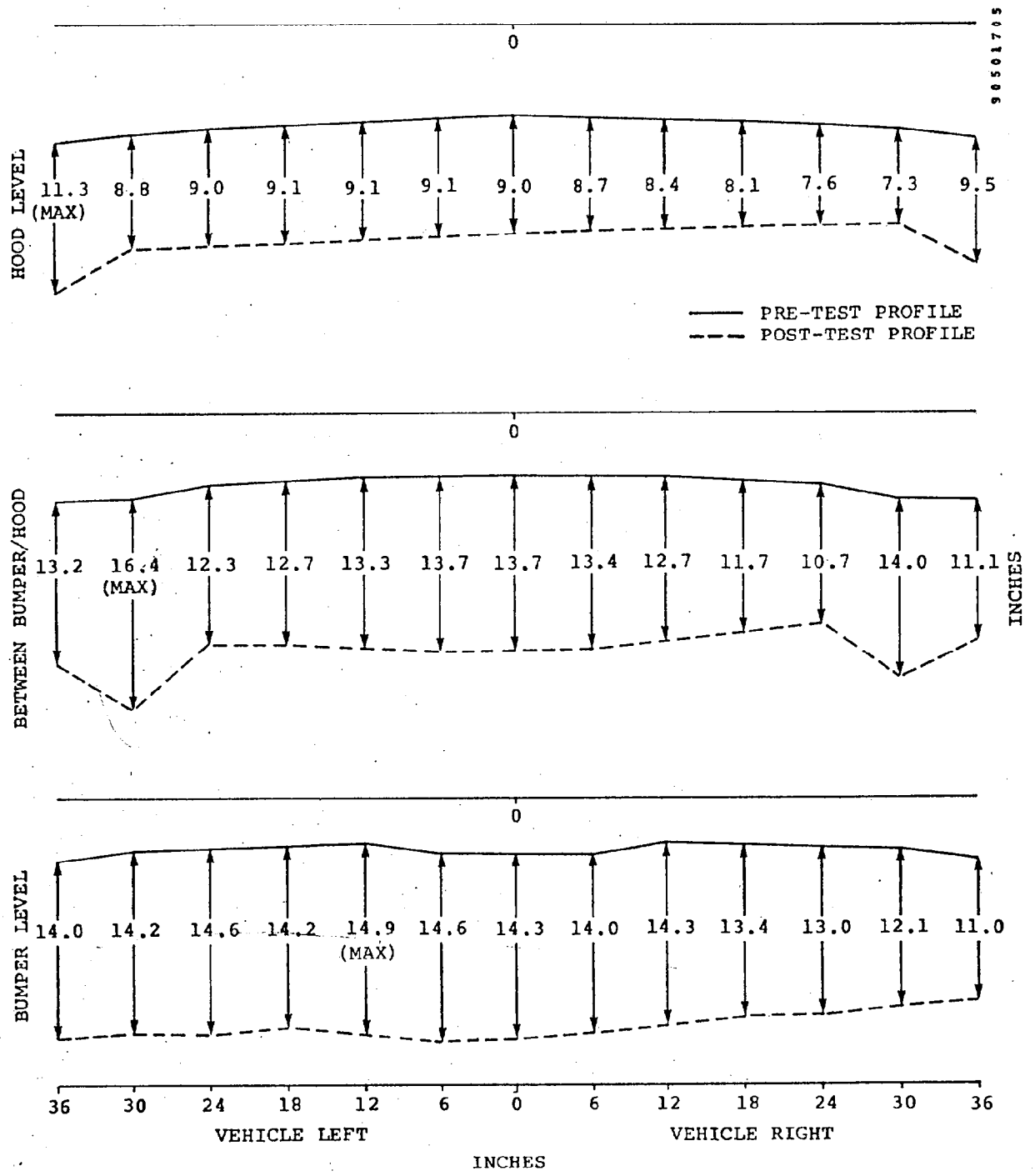


Figure 4-4. 1979 Ford E-150 Van Exterior Static Crush (Test 3052-3).

TABLE 4-9. INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-3)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	57.0	125		16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.9	18.2	18.4	18.5	
Knee Level	44.4	130		12.5	12.5	11.1	12.5	7.5	7.4	7.4	8.4	12.7	12.7	12.7	
Floor Level	31.4	130		21.1	25.7	27.2	27.3	5.0	4.4	4.4	5.4	26.5	26.5	22.9	
Post-test Profile - Distance from R.P. (in.)															
Dash Level	60.1	125		15.8	16.5	17.0	17.2	17.4	17.4	17.5	18.0	19.7	19.5	19.8	
Knee Level	44.3	130		11.2	9.6	8.7	11.0	6.5	6.5	6.8	8.1	12.5	12.5	12.2	
Floor Level	31.7	131.5		18.6	21.5	22.5	23.3	3.3	2.8	3.0	4.2	25.3	25.4	22.2	
Post-test Static Crush (in.)															
Dash Level	3.1	0.0		0.5	-0.2	-0.7	-0.9	-1.1	-1.1	-1.2	-1.1	-1.4	-1.1	-1.3	
Knee Level	-0.1	0.0		1.3	2.9	3.4	1.5	1.0	0.9	0.6	0.3	0.2	0.2	0.5	
Floor Level	-0.3	1.5		1.0	2.7	3.2	2.5	0.2	0.1	-0.1	-0.3	-0.3	-0.4	-0.8	

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

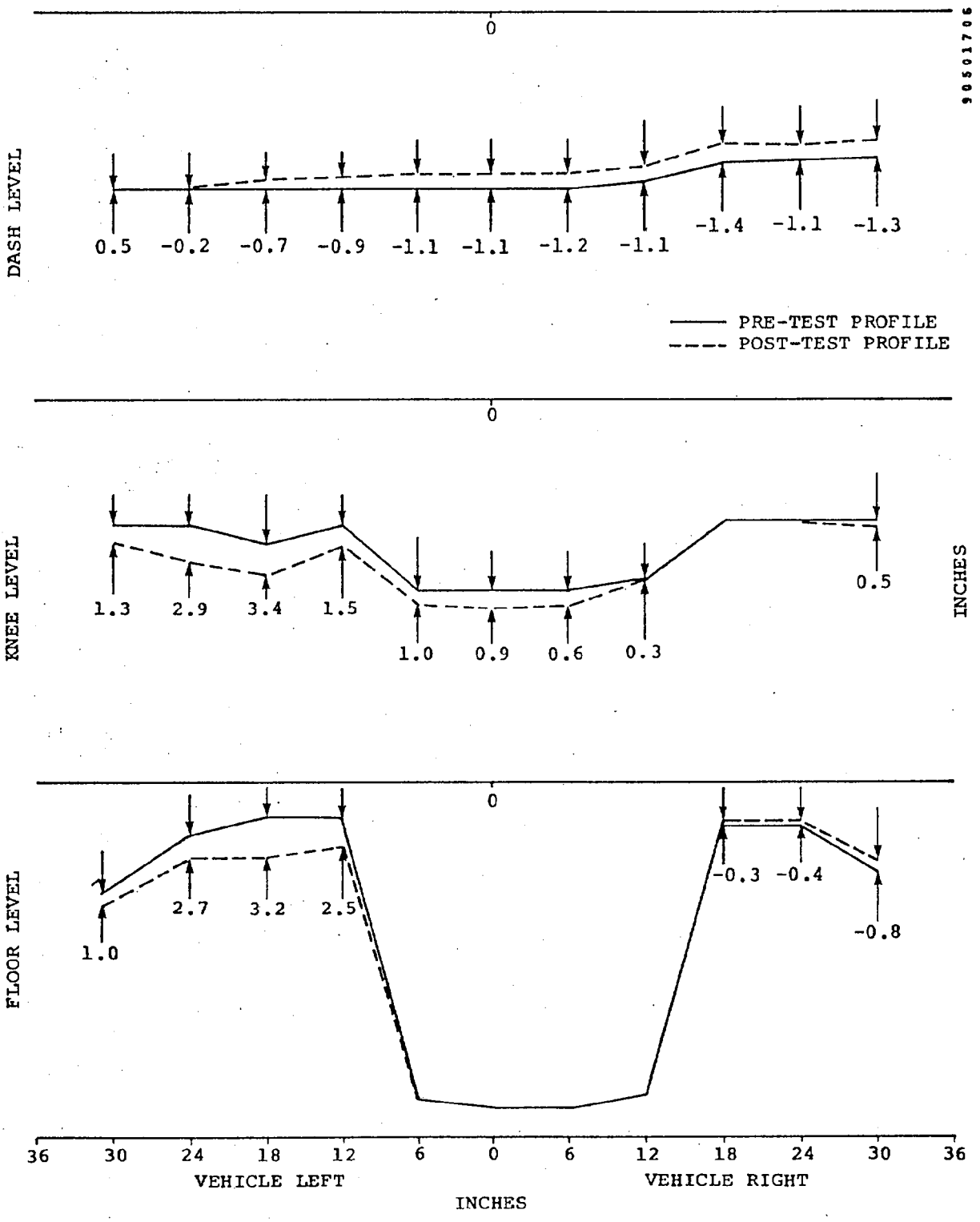


Figure 4-5. 1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-3).

TABLE 4-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-3)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	136.2	-18.1	60.3	136.0	-17.7	61.1	-0.2	0.4	0.8
Hub	132.7	-18.1	53.7	132.6	-17.7	54.5	-0.4	0.4	0.8
Bottom	126.5	-18.1	49.5	126.9	-17.7	50.0	0.4	0.4	0.5

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.
Note: Tilt steering wheel set at lowermost driving position.

TABLE 4-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-3)

Vehicle: 1979 Ford Econoline E-150 Van

Accelerometer		Test 3052-3 (30.02 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-33.3	16	-1.8	104	+20.7	74
2X	Right Side B-pillar	-36.4	16	-2.2	94	+19.7	65
	Average 1X & 2X	-34.9	16	-2.0	97	20.1	69
3X	Left Side Firewall	-66.5	25	-1.4	112	+17.2	86
3Y	Left Side Firewall	+19.8	18	-0.2	16	+12.6	200
3Z	Left Side Firewall	+28.6	13	-5.0	192	-8.0	200
4X	Right Side Firewall	-72.2	19	+0.2	97	+23.5	200
4Y	Right Side Firewall	-21.2	20	-1.3	25	+1.9	200
4Z	Right Side Firewall	-22.8	15	-1.1	17	+10.2	200
5X	Engine	-79.9	38	-5.8	50	+16.9	42
5Y	Engine	+12.3	94	+3.7	71	+2.7	95
5Z	Engine	+8.2	48	+3.4	53	+3.0	97
6X	Front Axle	-83.1	7	-2.4	94	+16.4	65
7X	Vehicle C.G.	-34.4	49	-3.0	103	+20.0	67
7Y	Vehicle C.G.	+10.9	39	-0.9	114	+1.0	85
7Z	Vehicle C.G.	+30.4	25	+4.2	63	+6.3	200
8X	Rear Compartment	-33.4	16	-2.7	99	+19.9	67
8Y	Rear Compartment	+7.4	86	-0.5	85	-0.4	185
8Z	Rear Compartment	+28.3	83	-5.4	60	-4.4	132
9X	Rear Axle	-57.8	26	-3.2	111	+18.2	83

TABLE 4-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-3)

Vehicle: 1979 Ford Econoline E-150 Van

		Test 3052-3 (30.02 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-91.9	83	-104.3	97
	Y	-23.7	85	+29.0	104
	Z	+56.2	72	+66.8	97
	R*	+88.4	85	+100.4	98
	HIC	929	66-96	1072	81-109
CHEST					
	X	-60.2	82	-40.8	69
	Y	-19.5	85	+25.4	76
	Z	-19.0	91	+11.7	68
	R*	+60.0	81	+39.3	76
	SI	561	200	290	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-927	52	-1632	49
	RT	-2617	56	-953	58

*3-msec clip.

TABLE 4-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-3)

Vehicle: 1979 Ford Econoline E-150 Van

	Test 3052-3 (30.02 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	1481	75
Right Lap Belt	1410	74
Shoulder Belt	1737	76
RIGHT FRONT OCCUPANT		
Left Lap Belt	2004	68
Right Lap Belt	1271	68
Shoulder Belt	1558	80

TABLE 4-14. SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-3)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	4.46	4.01	2.93	2.77	5.52	5.47	1.92	2.12	2.34	2.65
Time (msec)	61	28	17	37	38	39	38	48	53	19
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.85	2.02	2.57	5.08	13.69*	4.56	3.80	4.88	0.93	1.52
Time (msec)	12	49	21	38	41	36	33	32	11	28
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	3.12	4.66	12.70	12.19	2.84	2.41	10.67	10.89	4.22	0.29
Time (msec)	69	21	22	40	41	30	31	22	10	10
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	3.28	0.31	7.58	5.07	0.56	0.88	2.66	7.30	1.14	0.22
Time (msec)	62	51	21	40	42	8	13	22	71	33

*Maximum measured force.

TABLE 4-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-3)

Vehicle: 1979 Ford Econoline E-150 Van

Parameter	Test 3052-3 (30.02 mph) Peak Load (klb)	Time (msec)
Column 1	3.60	34
Column 2	6.64	32
Column 3	20.09	22
Column 4	17.23	36
Column 5	11.56	37
Column 6	22.09	41
Column 7	24.92	38
Column 8	24.68	21
Column 9	10.36	21
Column 10	10.76	65
Row A	21.73	37
Row B	51.44	22
Row C	34.44	36
Row D	26.36	38

TABLE 4-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-3)

Vehicle: 1979 Ford Econoline E-150 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	129.92	185.12
Time (msec)	38	36

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (4230 lb) plus engine acceleration times engine weight (768 lb).

5.0 PRESENTATION OF RESULTS (TEST 3052-4)

This section of the report presents the results of Test No. 3052-4, a head-on, symmetric crash test between a 1979 Dodge B-200 Van and the NHTSA Fixed Test Device (V_o = 25.17 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix D (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 5-1. CRASH TEST SUMMARY (TEST 3052-4)

TEST NO. 3052-4 CONTRACT: DOT-HS-8-01942

TEST DATE: April 17, 1979 TIME: 1138 TEMPERATURE: 82 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Dodge B-200 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	178.9/78.5	
Test Weight by Wheel (lb)	LF 1250 RF 1291 LR 1040 RR 1066	
Total Weight (lb)	4647	>100,000
Wheelbase (in.)	109.5	
Longitudinal C.G. (From Center of Front Axle) (in.)	49.6	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	25.17	0
Final Speed (mph @ msec)	-1.97 @ 96	
Velocity Change (mph)	27.14	
Maximum Averaged Compartment Acceleration (G @ msec)	-43.42 @ 15	
Maximum Engine Acceleration (G @ msec)	-62.11 @ 45	
Maximum Mutual Dynamic Crush (Film Data) (in.)	16.7	
Maximum Static Crush		
• Bottom of Windshield (in.)	0.8	
• Hood Level (in.)	8.6	
• Between Bumper/Hood (in.)	13.9	
• Bumper Level (in.)	14.5	
Maximum Post-test Intrusion (in.)	2.5	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #759	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 5-2. VEHICLE INSPECTION SHEET (TEST 3052-4)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: B21JF9X135433 Make: Dodge

NHTSA No.: R & D

Year: 1979 Color: Tan Model: B-200 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [ ] no [X] Bucket: X

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [ ] no [X]

Tinted Glass: yes [ ] no [X] Rear Window Def.: yes [ ] no [X] Split Back Bench: ____

Radio: yes [ ] no [X] Brakes: drum: ____ disc: ____

Clock: yes [ ] no [X]

Tire Size: J78-15 Ply Rating: 4 Mfg. & Line: Goodyear

Bias Ply: ____ Belted: X Radial ____ /Eng.Type: V-8 Cylinders: 8 Total Displ: 360 cid

Trans, # Fwd. Speeds: 3 Shipping Weight: 3855 Odometer: 53.9

Dealer (name, address, and phone number)

Holiday Oldsmobile Co.
3530 N. Scottsdale Rd.
Scottsdale, AZ 85251

Remarks (list additional accessories not listed above)

Fold-out Doors

Date of Manufacture: 11/78 Dynamic Science No.: 844 Date Received: 3/2/79

Tilting Steering Wheel: yes [ ] no [X] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: 22 gal (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap belts only.*

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, spare tire, wheel covers, and wipers removed. All fluids except for engine coolant removed, 100% water in fuel tank. *Chrysler Corp. lap and shoulder belt system installed.

2. Does vehicle show evidence of prior accident history? Describe: NO

3. Does vehicle show any significant corrosion? Describe: NO

4. Check condition of the front bumper and frame: Satisfactory

DS FORM 4200

TABLE 5-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-4)

Test No. 3052-4 Type Van-to-NHTSA Fixed Test Device

Car Model 1979 Dodge B-200 Van Dynamic Science No. 844

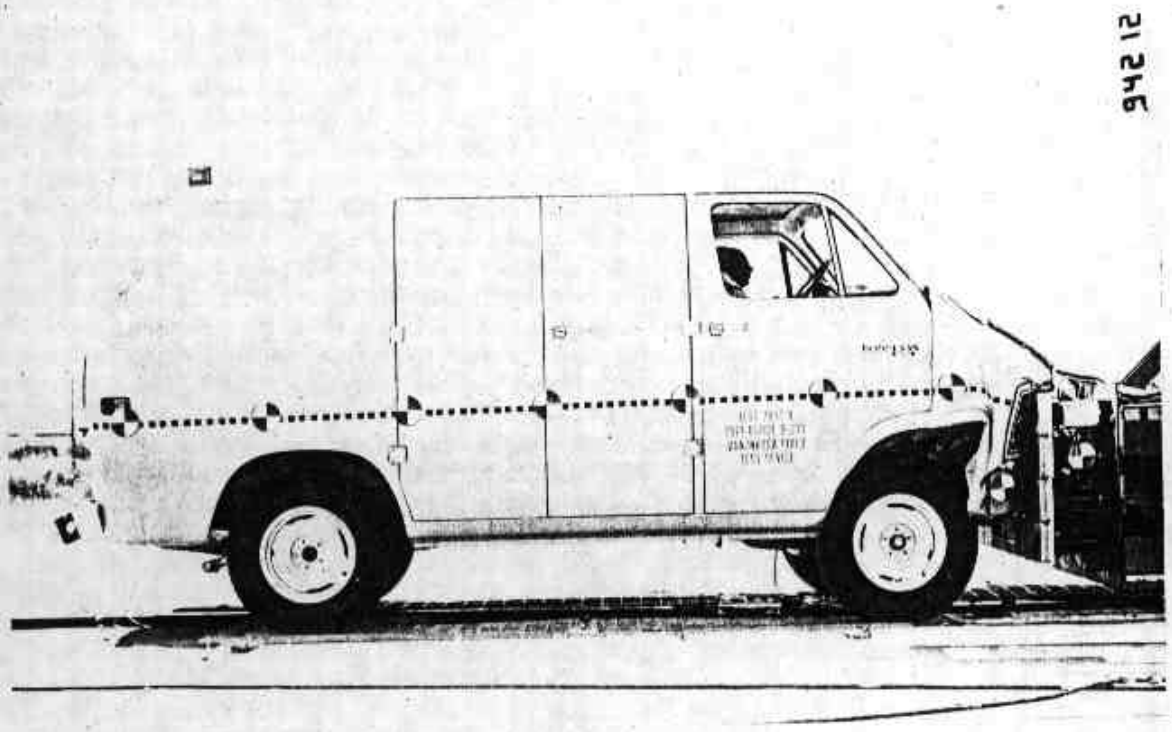
Engine Size	360 CID
Engine Weight* (lb)	722
Engine Height/Width (in.)	33.6/19.2
Bumper to Engine Block (in.)	25.6
Engine Length (in.)	20.2
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	22.2
Bumper Height (in.) (Min./Max.)	16.2/25.1

*Includes engine and rigid attachments such as transmission and drive train.

TABLE 5-4. PRE-TEST DUMMY POSITIONS - DODGE B-200 VAN (TEST 3052-4)

Distances (in.)	Driver	Passenger
Chest to Steering Wheel Hub (horizontal)	15.4	
Nose to Steering Wheel Upper Rim	21.8	
Nose to Windshield (horizontal)	30.1	31.5
Knee to Lower Panel (closest point)		
Left	7.1	10.2
Right	6.6	10.6
Chest to Dash (horizontal)	25.1	29.9
Forehead to Header	25.1	30.0

a) Pre-test



b) Post-test

Figure 5-1. Vehicle Configuration (Test 3052-4).

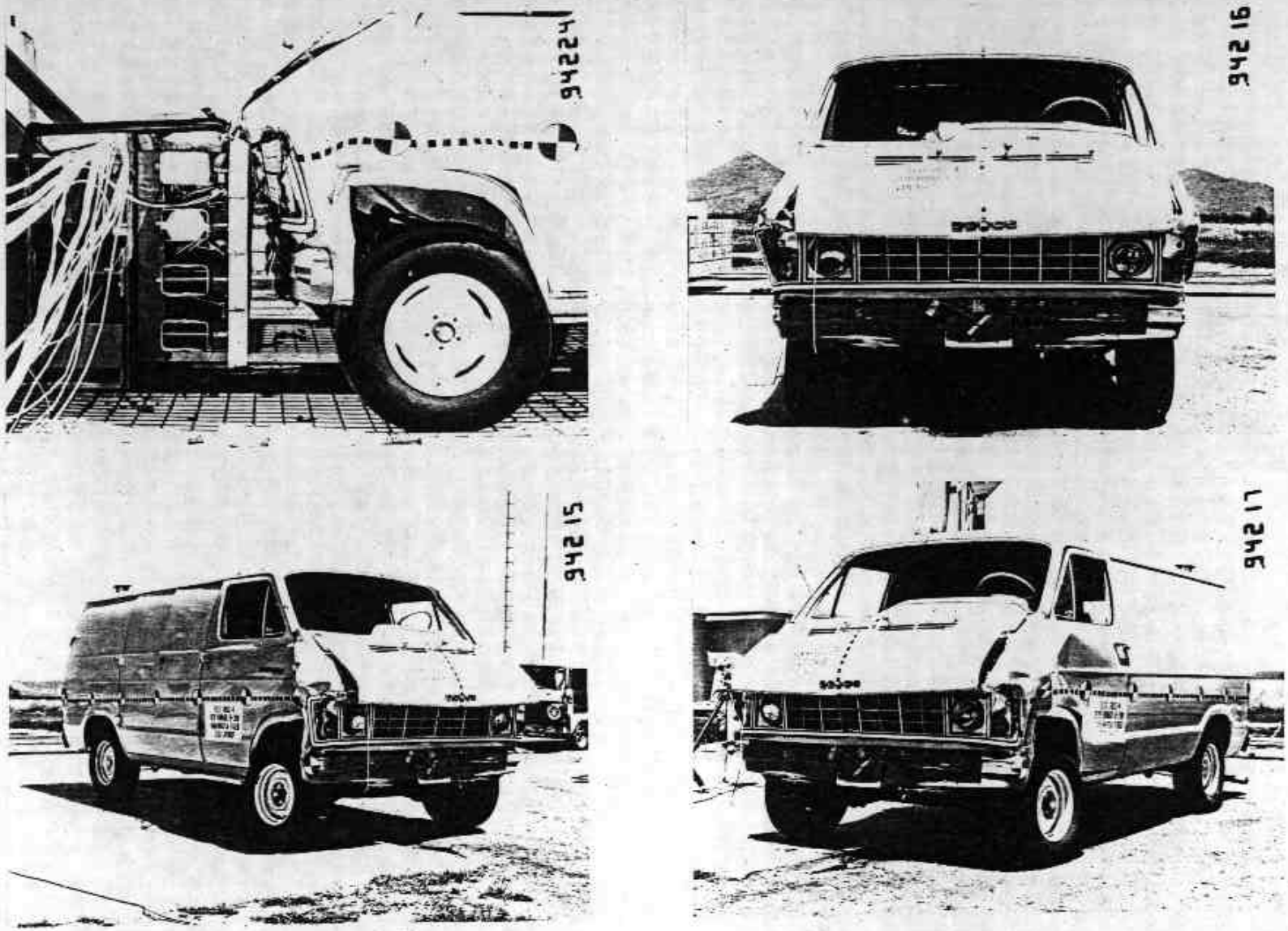
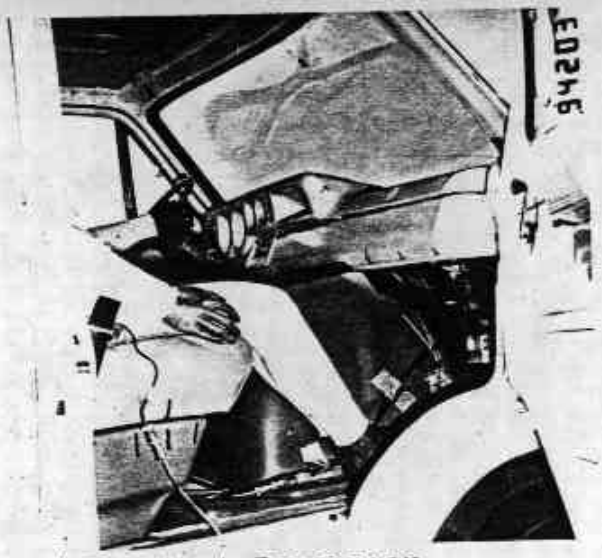


Figure 5-2. Post-test Vehicle Configuration (Test 3052-4).

a) Pre-test Driver



c) Pre-test Passenger

b) Post-test Driver

d) Post-test Passenger

Figure 5-3. Vehicle Dummy Configuration (Test 3052-4).

TABLE 5-5. CHRONOLOGY OF EVENTS (TEST 3052-4)

VEHICLE: 1979 Dodge B-200 Van

Time (msec)	Crash Event
0	Impact (visual)
4	Grille hits Test Device
22	Fenders strike tires
24	Dummies start forward motion
36	Fender wells strike back of front tires
50	Hood latch fails; Windshield pulls out of molding
54	Minimum wheelbase; Right side (99.5 in.); Left side (99.5 in.)
68	Maximum vehicle dynamic crush (16.7 in.)
77	Steering wheel lower rim strikes driver in neck; Passenger knees strike dash
86	Driver strikes steering column hub with head
92	Right rear tire leaves ground
98	Left rear tire leaves ground; Maximum driver forward motion
108	Passenger arms strike dash
136	Maximum passenger forward motion
150	Maximum vehicle declination (3.25°)
182	Driver recontacts seat with upper back
306	Passenger recontacts seat with upper back
355	Right rear tire recontacts ground
366	Left rear tire recontacts ground
460	Separation of vehicle and Test Device
637	Maximum vehicle rebound inclination (3.75°)

TABLE 5-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-4)

VEHICLE: 1979 Dodge B-200 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	Steering column, lower rim and hub	Possibly strikes right knee
Chest----------	None	None
Knees----------	Lower dash panel	Lower dash panel

Glazing: 100% pulled from molding

Doors: Both doors difficult to open

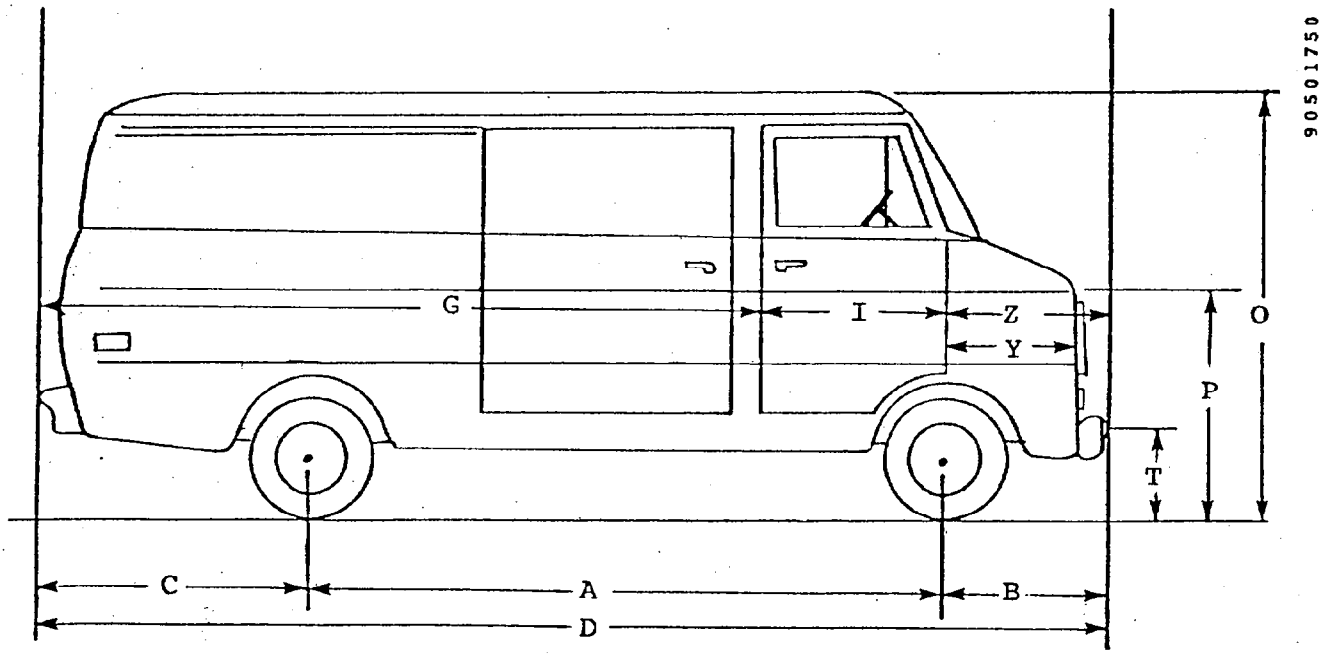
Seat Belt Anchorages and Restraints: Slight pulling of sheet metal around shoulder belt anchorages. Both seats moved forward 2.7 inches

Vehicle Centerline to Barrier Centerline: Rear: 5 inches right. Front: 1.5 inches left

Fuel Leakage: None

General Observations: Radiator leakage. Bumper struck both front tires and pushed them to the back of the fender wells. Hood latch failed. Steering wheel rotated upward. 5.5 inches static rebound.

TABLE 5-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-4)



VEHICLE: 1979 DODGE B-200 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	109.7	109.3	103.6	102.8	6.1	6.5
B	29.1	29.2	20.7	20.6	8.4	8.6
C	40.1	40.3	40.4	40.4	-0.3	-0.1
D	178.9	178.8	164.7	163.8	14.2	15.0
G	111.2	110.9	110.8	110.6	0.4	0.3
I	37.0	37.1	35.4	36.7	1.6	0.4
O	77.8	77.8	80.5	80.0	2.7	2.2
P	41.8	42.0	41.2	40.7	-0.6	-1.3
T	23.3	23.4	26.4	25.8	3.1	2.4
Y	27.1	27.2	20.6	16.3	6.5	10.9
Z	30.7	30.8	18.5	16.5	12.2	14.3

TABLE 5-8. EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-4)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)*							Distance Right of Center (in.)*					
			36	30	24	18	12	6	0	6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	55.2	185	33.2	29.7	27.9	26.7	25.9	25.3	25.0	25.3	25.9	26.8	28.0	29.8	33.2
Hood Level	41.3	185	10.1	9.4	8.8	8.3	7.9	7.5	7.3	7.5	7.9	8.3	8.6	9.2	9.9
Between Bumper/Hood	33.8	185	10.5	10.0	9.1	8.7	8.3	7.9	7.5	7.9	8.2	8.6	9.0	10.0	10.4
Bumper Level	22.4	185	8.9	8.1	7.7	7.2	6.8	6.3	6.3	6.4	6.7	7.2	7.8	8.3	9.1
Post-test Profile - Distance to R.P. (in.)															
Bottom of Windshield	56.5	185	34.0	29.7	27.6	26.5	25.6	25.1	24.8	25.1	25.7	26.6	27.8	29.5	32.8
Hood Level	39.2	185	16.0	12.4	12.1	12.0	12.0	11.9	11.7	12.2	12.6	12.9	13.3	13.7	18.5
Between Bumper/Hood	35.9	185	19.1	22.7	19.7	19.7	19.6	19.4	19.3	19.5	19.7	20.0	20.3	23.9	20.4
Bumper Level	25.4	185	20.5	20.5	20.0	20.4	20.4	20.5	20.7	20.9	20.7	20.7	20.6	21.1	21.4
Post-test Static Crush (in.)															
Bottom of Windshield	1.3	0.0	0.8	0.0	-0.3	-0.2	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.4
Hood Level	-2.1	0.0	5.9	3.0	3.3	3.7	4.1	4.4	4.4	4.7	4.7	4.6	4.3	4.5	8.6
Between Bumper/Hood	2.1	0.0	8.6	12.7	10.6	11.0	11.3	11.5	11.8	11.6	11.5	11.4	11.3	13.9	10.0
Bumper Level	3.0	0.0	11.6	12.4	12.3	13.2	13.6	14.2	14.4	14.5	14.0	13.5	12.8	12.8	12.3

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

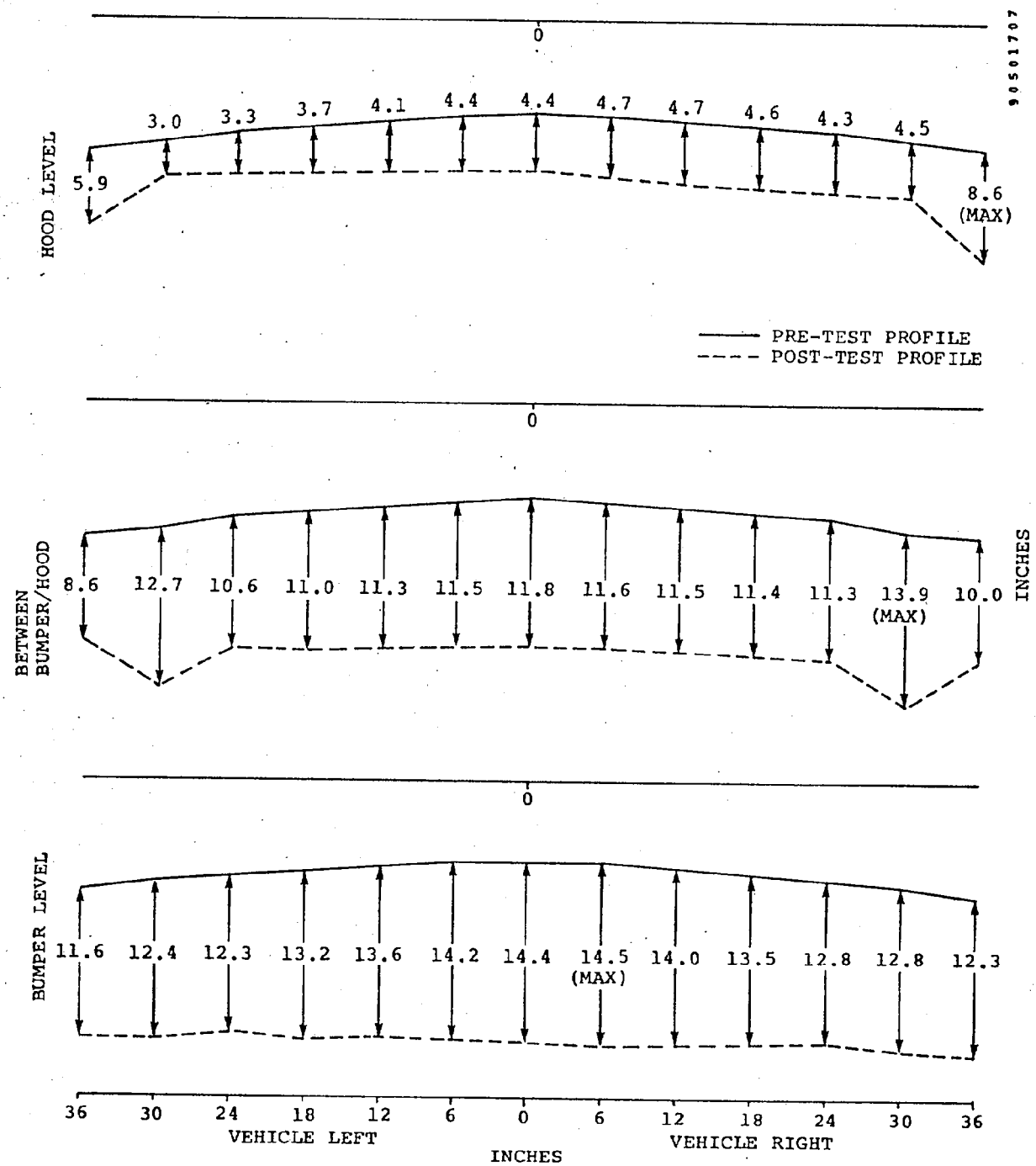


Figure 5-4. 1979 Dodge B-200 Van Exterior Profile and Static Crush (Test 3052-4).

TABLE 5-9. INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-4)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)*							Distance Right of Center (in.)*					
			36	30	24	18	12	6	0	6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	57.3	125		18.8	17.7	17.6	17.6	17.6	17.6	19.3	20.3	20.4	20.3	20.1	
Knee Level	45.0	125		18.3	18.1	17.9	17.7	17.6	9.3	9.5	14.4	17.7	18.1	18.2	
Floor Level	33.4	129		27.5	25.1	24.7	24.8	0.9	0.4	0.7	0.7	22.1	23.6	23.7	
Post-test Profile - Distance from R.P. (in.)															
Dash Level	62.1	125		19.0	17.9	17.9	17.9	18.0	18.0	19.3	20.2	20.1	20.0	19.6	
Knee Level	46.8	125		16.4	16.8	16.4	16.5	16.5	7.3	7.5	12.2	17.3	17.4	17.3	
Floor Level	35.1	125		29.0	27.3	27.5	27.5	3.1	2.9	3.0	3.5	26.1	27.2	26.8	
Post-test Static Crush (in.)															
Dash Level	4.8	0.0		-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	0.0	0.1	0.3	0.3	0.5	
Knee Level	1.8	0.0		1.9	1.3	1.5	1.2	1.1	2.0	2.0	2.2	0.4	0.7	0.9	
Floor Level	1.7	-4.0		2.5	1.8	1.2	1.3	1.8	1.5	1.7	1.2	0.0	0.4	0.9	

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

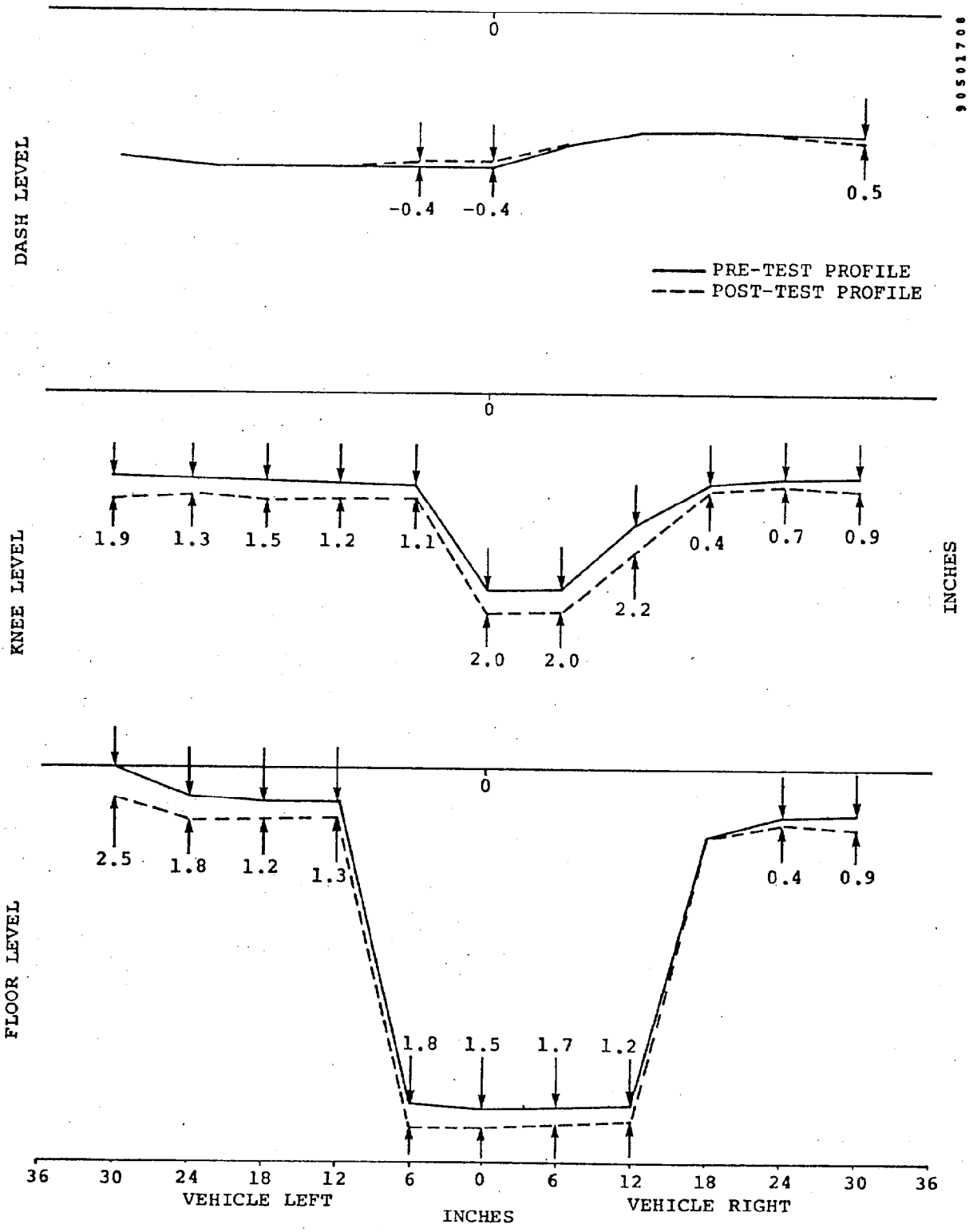


Figure 5-5. 1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-4).

TABLE 5-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-4)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	137.0	-19.2	60.9	139.1	-20.5	68.7	2.1	-1.3	7.8
Hub	133.4	-19.2	54.5	135.7	-19.4	62.4	2.3	-0.2	7.9
Bottom	128.0	-19.2	50.5	131.4	-18.9	57.9	3.4	0.3	7.4

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.

TABLE 5-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-4)

Vehicle: 1979 Dodge B-200 Van

Accelerometer		Test 3052-4 (25.17 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-40.9	15	-1.9	81	+16.8	69
2X	Right Side B-pillar	-45.9	15	-2.2	96	+17.7	72
	Average 1X & 2X	-43.4	15	-2.0	96	+17.3	71
3X	Left Side Firewall	-85.1	22	-1.3	193	+13.8	71
3Y	Left Side Firewall	-15.6	24	-2.4	43	-2.5	200
3Z	Left Side Firewall	-24.9	27	-1.1	31	+10.8	200
4X	Right Side Firewall	-77.8	58	-3.3	123	+15.9	64
4Y	Right Side Firewall	-34.2	47	-2.0	30	+2.3	200
4Z	Right Side Firewall	-23.5	47	-2.5	67	-1.9	200
5X	Engine	-62.1	45	-4.4	63	+17.4	50
5Y	Engine	+8.1	53	-2.5	116	-3.5	200
5Z	Engine	-11.4	57	-1.5	79	+1.5	200
6X	Front Axle	-88.9	26	-0.7	91	+12.7	75
7X	Vehicle C.G.	-42.8	15	-1.5	82	+1.7	72
7Y	Vehicle C.G.	-10.7	20	-1.8	42	-1.8	42
7Z	Vehicle C.G.	-40.8	29	-3.0	400	-3.0	47
8X	Rear Compartment	-42.5	15	-2.8	91	+17.1	68
8Y	Rear Compartment	+6.2	21	-0.3	18	+0.5	68
8Z	Rear Compartment	-29.5	50	-2.2	91	-2.0	152
9X	Rear Axle	-43.8	66	-5.2	104	+17.6	65

TABLE 5-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-4)

Vehicle: 1979 Dodge B-200 Van

		Test 3052-4 (25.17 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-102.8	97	-20.5	137
	Y	-31.3	97	+19.6	122
	Z	+52.0	97	+35.8	94
	R*	+85.5	99	+37.4	117
	HIC	660	75-106	409	69-153
CHEST					
	X	-44.4	82	-47.0	82
	Y	-14.8	90	+15.9	90
	Z	-16.2	110	+10.9	74
	R*	+39.1	80	+36.7	86
	SI	277	200	206	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-2346	62	-193	25
	RT	-980	68	-81	32

*3-msec clip.

TABLE 5-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-4)

Vehicle: 1979 Dodge B-200 Van

	Test 3052-4 (25.17 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	1185	65
Right Lap Belt	1953	69
Shoulder Belt	1825	81
RIGHT FRONT OCCUPANT		
Left Lap Belt	1852	77
Right Lap Belt	2033	78
Shoulder Belt	1637	87

TABLE 5-14. SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-4)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	4.84	1.31	1.43	0.60	1.84	1.00	1.74	0.78	5.07	6.15
Time (msec)	52	45	43	14	17	38	17	27	29	66
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.55	0.17	0.43	0.34	10.27	1.84	0.11	0.63	0.49	0.57
Time (msec)	63	14	32	41	46	48	20	32	46	45
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	1.09	7.27	10.04	2.81	4.33	3.08	3.29	15.32*	7.07	0.41
Time (msec)	23	13	18	40	39	39	18	18	13	15
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	0.12	3.14	9.32	3.56	2.40	2.72	4.91	7.25	3.24	0.14
Time (msec)	23	17	27	22	15	14	53	31	16	11

*Maximum measured force.

TABLE 5-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-4)

Vehicle: 1979 Dodge B-200 Van

Parameter	Test 3052-4 (25.17 mph) Peak Load (klb)	Time (msec)
Column 1	6.37	66
Column 2	10.30	14
Column 3	23.16	18
Column 4	7.96	18
Column 5	7.32	46
Column 6	16.11	46
Column 7	6.56	41
Column 8	19.08	18
Column 9	10.11	14
Column 10	5.38	63
Row A	31.57	22
Row B	39.22	16
Row C	13.97	46
Row D	18.51	42

TABLE 5-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-4)

Vehicle: 1979 Dodge B-200 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	93.40	171.21
Time (msec)	45	15

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (3925 lb) plus engine acceleration times engine weight (722 lb).

6.0 PRESENTATION OF RESULTS (TEST 3052-5)

This section of the report presents the results of Test No. 3052-5, a head-on, symmetric crash test between a 1979 Dodge B-200 Van and the NHTSA Fixed Test Device (V_o = 30.22 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix E (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 6-1. CRASH TEST SUMMARY (TEST 3052-5)

TEST NO. 3052-5 CONTRACT: DOT-HS-8-01942

TEST DATE: April 18, 1979 TIME: 1143 TEMPERATURE: 73 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Dodge B-200 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	178.8/78.5	
Test Weight by Wheel (lb)	LF 1301 RF 1305 LR 1029 RR 1019	
Total Weight (lb)	4654	>100,000
Wheelbase (in.)	109.5	
Longitudinal C.G. (From Center of Front Axle) (in.)	49.2	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	30.22	0
Final Speed (mph @ msec)	-2.57 @ 98	
Velocity Change (mph)	32.79	
Maximum Averaged Compartment Acceleration (G @ msec)	-51.92 @ 14	
Maximum Engine Acceleration (G @ msec)	-90.31 @ 42	
Maximum Mutual Dynamic Crush (Film Data) (in.)	19.1	
Maximum Static Crush		
• Bottom of Windshield (in.)	2.3	
• Hood Level (in.)	9.1	
• Between Bumper/Hood (in.)	15.7	
• Bumper Level (in.)	16.6	
Maximum Post-test Intrusion (in.)	5.1	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #759	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 6-2. VEHICLE INSPECTION SHEET (TEST 3052-5)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: B21JF9X151063 Make: Dodge

NHTSA No.: R & D

Year: 1979 Color: Gray Model: B-200 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [ ] no [X] Bucket: X (1)

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [X] no [ ]

Tinted Glass: yes [ ] no [X] Rear Window Def.: yes [ ] no [X] Split Back Bench: ____

Radio: yes [ ] no [X] Brakes: drum: R disc: F

Clock: yes [ ] no [X]

Tire Size: J78-15 Ply Rating: 4 Mfg. & Line: Goodyear

Bias Ply: ____ Belted: X Radial ____ /Eng.Type: V-8 Cylinders: 8 Total Displ: 360 cid

Trans. # Fwd. Speeds: 3 Shipping Weight: 4032 Odometer: 36.5

Dealer (name, address, and phone number)
Holiday Oldsmobile Co.
3530 N. Scottsdale Rd.
Scottsdale, AZ 85251

Remarks (list additional accessories not listed above)
Fold-out Doors
Tilt steering wheel set at lowermost driving position.

Date of Manufacture: 12/78 Dynamic Science No.: 845 Date Received: 3/2/79

Tilting Steering Wheel: yes [X] no [ ] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: 36 gal. (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap belt only*

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, spare tire, wheel covers, and wipers removed. All fluids except for engine coolant removed. 100% water in fuel tank. Passenger seat used in Test 3052-4. *Chrysler Corp. lap and shoulder belt system installed.
2. Does vehicle show evidence of prior accident history? Describe: NO
3. Does vehicle show any significant corrosion? Describe: NO
4. Check condition of the front bumper and frame: Satisfactory

DS FORM 4200

TABLE 6-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-5)

Test No. 3052-5 Type Van-to-NHTSA Fixed Test Device

Car Model 1979 Dodge B-200 Van Dynamic Science No. 845

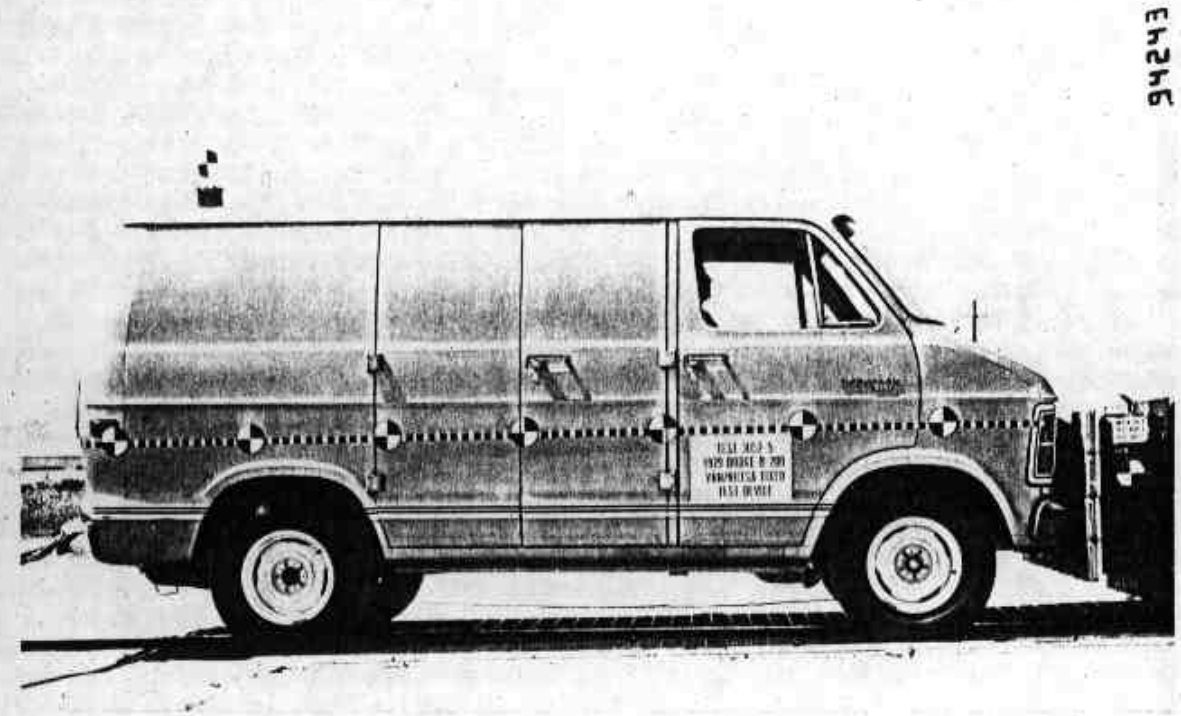
Engine Size	360 CID
Engine Weight* (lb)	796
Engine Height/Width (in.)	33.8/20.4
Bumper to Engine Block (in.)	25.9
Engine Length (in.)	19.6
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	22.3
Bumper Height (in.) (Min./Max.)	16.9/24.9

*Includes engine and rigid attachments such as transmission and drive train.

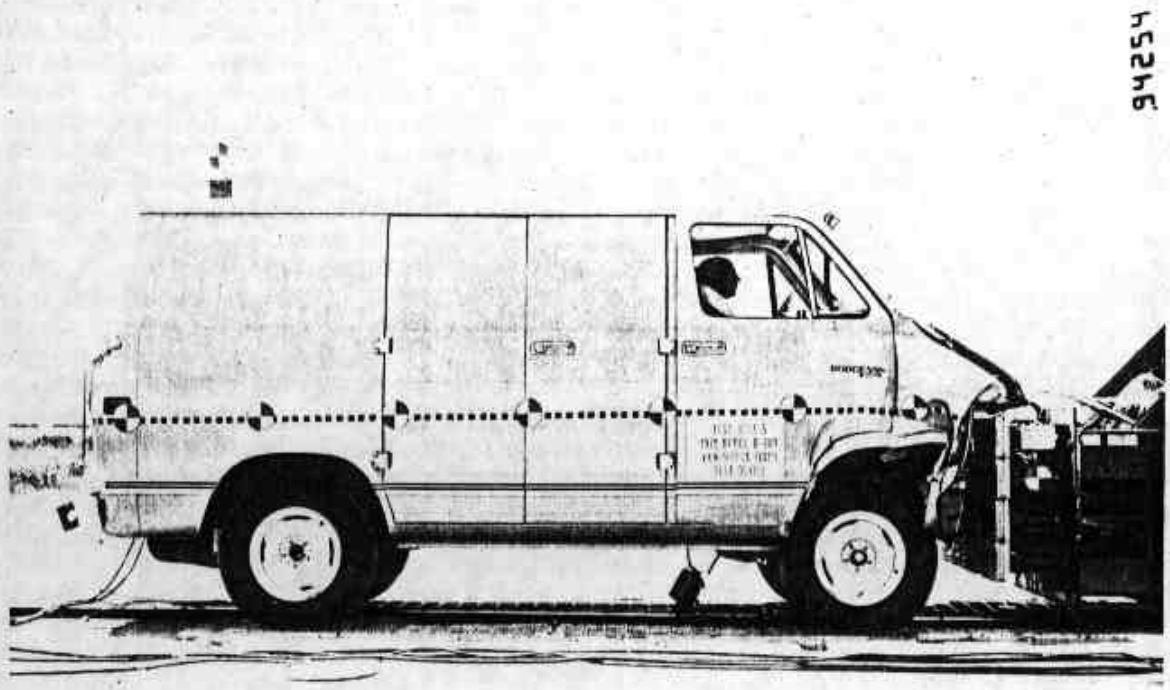
TABLE 6-4. PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-5)

Distances (in.)	Driver*	Passenger
Chest to Steering Wheel Hub (horizontal)	13.5	
Nose to Steering Wheel Upper Rim	19.3	
Nose to Windshield (horizontal)	30.1	32.6
Knee to Lower Panel (closest point)		
Left	6.9	10.0
Right	6.6	10.6
Chest to Dash (horizontal)	25.5	28.4
Forehead to Header	25.5	27.2

*Tilt Steering wheel in lowermost position.



a) Pre-test



b) Post-test

Figure 6-1. Vehicle Configuration (Test 3052-5).

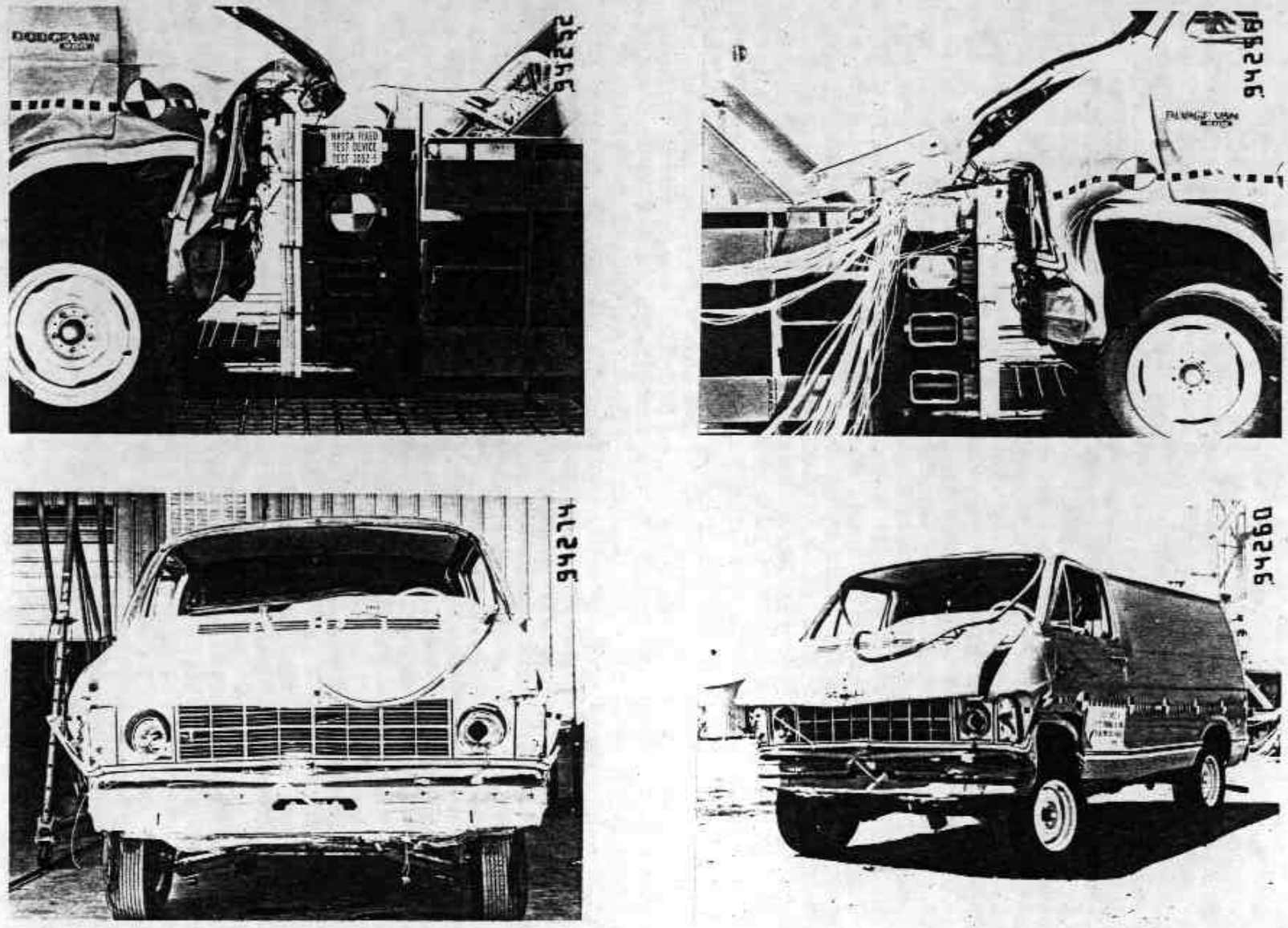
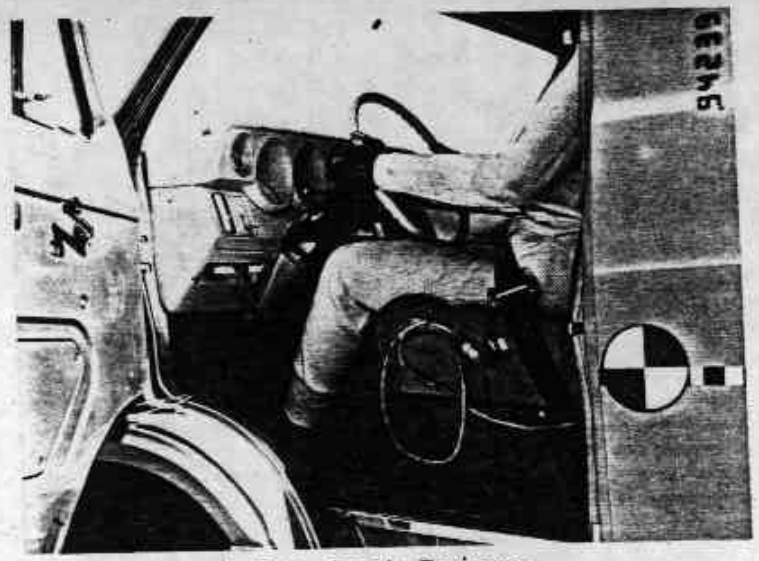
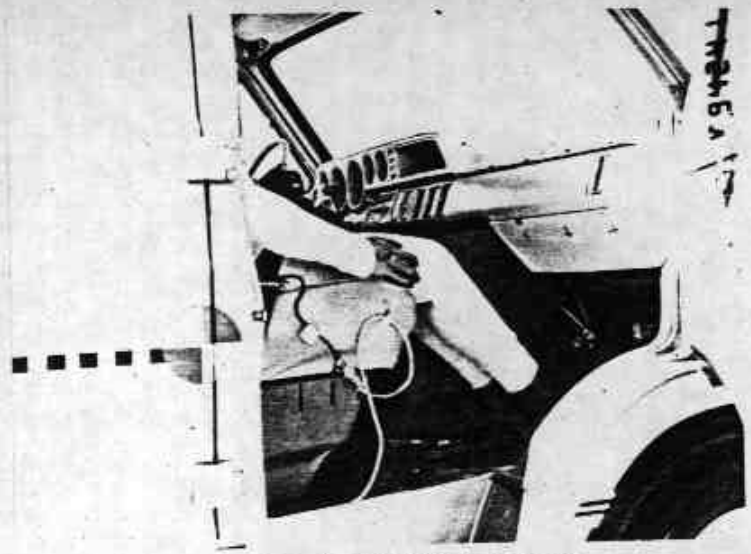


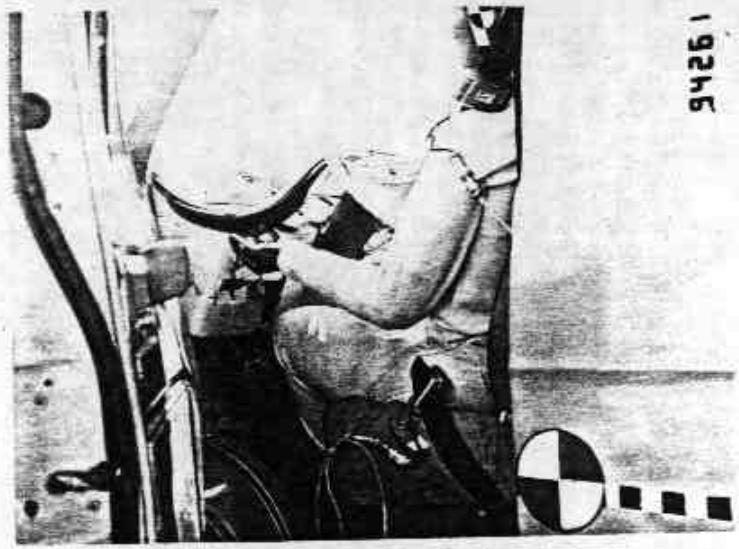
Figure 6-2. Post-test Vehicle Configuration (Test 3052-5).



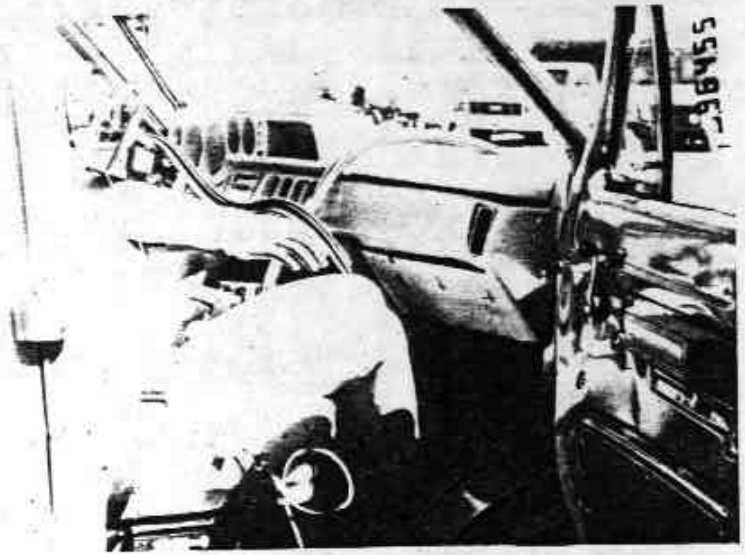
a) Pre-test Driver



c) Pre-test Passenger



b) Post-test Driver



d) Post-test Passenger

Figure 6-3. Vehicle Dummy Configuration (Test 3052-5).

TABLE 6-5. CHRONOLOGY OF EVENTS (TEST 3052-5)

VEHICLE: 1979 Dodge B-200 Van

Time (msec)	Crash Event
0	Impact (visual)
3	Grill strikes Test Device
18	Fenders strike front tires; Dummies start forward motion
27	Hood latch fails
33	Windshield pulls out of molding; Fender wells strike back of front tires
46	Driver knees strike dash
54	Hood strikes Test Device backing plate
57	Minimum right side wheelbase (96.9 in.); Passenger knees strike dash
59	Minimum left side wheelbase (97.6 in.)
62	Steering wheel lower rim strikes driver in chest; Passengerleft arm strikes engine cowling
66	Maximum vehicle dynamic crush (19.1 in.)
73	Driver arms strike dash
77	Driver strikes steering wheel hub with head
90	Driver maximum forward motion
97	Rear tires leave ground
131	Passenger maximum forward motion
167	Maximum vehicle declination (4.0°)
183	Driver recontacts seat with upper back
252	Passenger recontacts seat with upper back
403	Rear tires recontact ground
462	Vehicle separates from Test Device
583	Maximum vehicle rebound inclination (4.0°)

TABLE 6-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-5)

VEHICLE: 1979 Dodge B-200 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	Steering wheel hub	None
Chest----------	Steering wheel lower rim	None
Knees----------	Lower dash panel	Lower dash panel

Glazing: 100% pulled from molding

Doors: Both doors difficult to open

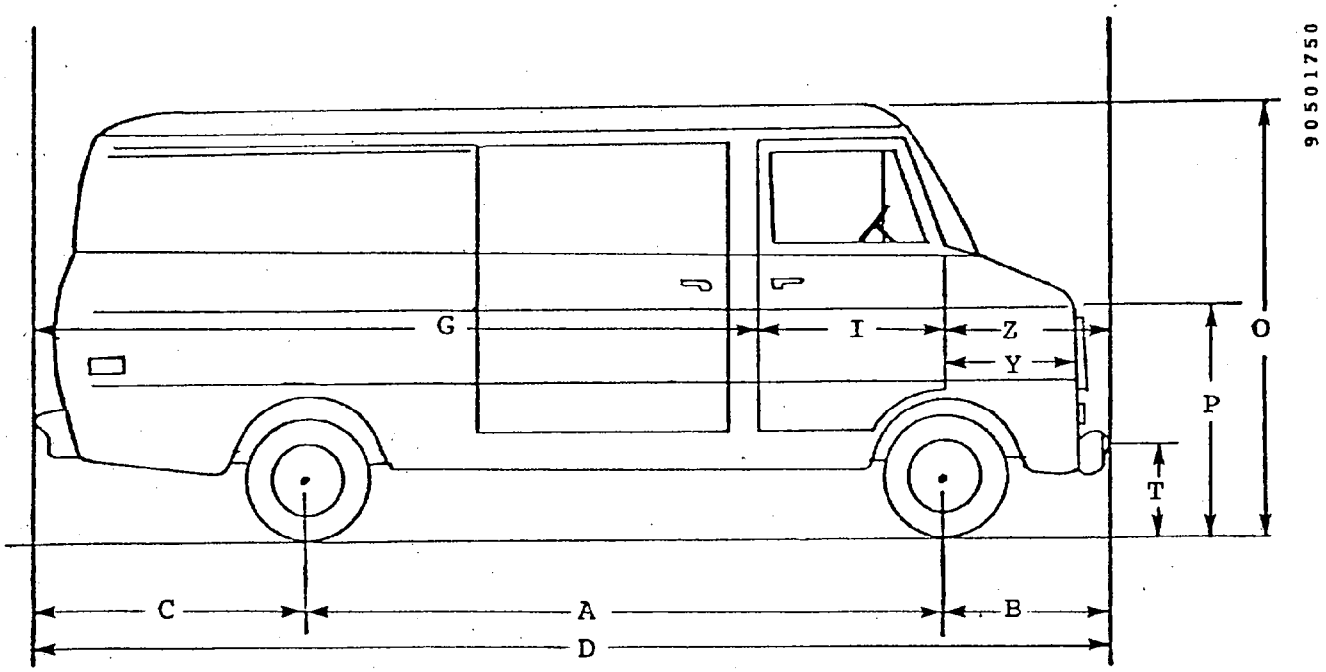
Seat Belt Anchorages and Restraints: Sheet metal around driver shoulder belt anchor torn from upper door sill. Deformation of sheet metal around passenger shoulder belt anchor. Left seat moved 0.3 inch forward, right seat moved 2.4 inches forward

Vehicle Centerline to Barrier Centerline: Rear: 2 inches right Front: 1 inch left

Fuel Leakage: None

General Observations: Radiator leakage. Bumper struck both front tires and pushed them to the back of the fender wells. Hood latch failed. Steering wheel rotated upward. 5.5 inches static rebound.

TABLE 6-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-5)



VEHICLE: 1979 DODGE B-200 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	109.6	109.3	101.8	101.5	7.8	7.8
B	29.0	29.1	19.3	19.1	9.7	10.0
C	40.2	40.3	40.5	40.6	-0.3	-0.3
D	178.9	178.7	161.6	161.2	17.3	17.5
G	111.0	110.8	110.1	110.2	0.9	0.6
I	36.9	37.1	34.1	35.7	2.8	2.4
O	78.0	77.5	80.6	79.5	2.6	2.0
P	42.2	41.8	40.1	42.5	-2.1	0.7
T	23.2	22.8	26.4	25.5	3.2	2.7
Y	27.0	26.9	17.1	15.2	9.9	11.7
Z	31.0	30.8	17.4	15.3	13.6	15.5

TABLE 6-8. EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-5)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	55.4	185	33.9	30.0	28.1	26.9	26.0	25.5	25.5	25.5	26.1	27.0	28.1	29.9	33.7
Hood Level	41.9	185	10.3	9.5	8.9	8.5	8.1	7.7	7.5	7.8	8.1	8.5	8.9	9.4	10.2
Between Bumper/Hood	34.1	185	10.7	10.3	9.4	9.0	8.5	8.1	7.9	8.1	8.5	8.9	9.3	10.3	10.7
Bumper Level	22.4	185	9.1	8.3	7.8	7.4	7.0	6.6	6.4	6.7	7.0	7.5	7.9	8.4	9.1
Post-test Profile - Distance to R.P. (in.)															
Bottom of Windshield	56.9	185	34.8	30.7	28.9	28.0	27.0	26.4	26.1	26.6	27.2	28.1	29.4	30.5	36.0
Hood Level	41.1	185	19.4	13.9	13.4	13.1	12.7	12.5	12.9	12.6	12.4	12.3	12.4	12.5	18.4
Between Bumper/Hood	37.1	185	23.7	26.0	22.9	22.9	22.8	22.8	22.7	22.7	22.8	22.8	22.9	25.9	23.8
Bumper Level	25.7	185	23.6	23.3	22.8	22.9	22.9	22.9	23.0	23.1	23.1	23.4	23.1	23.7	24.2
Post-test Static Crush (in.)															
Bottom of Windshield	1.5	0.0	0.9	0.7	0.8	1.1	1.0	0.9	0.6	1.1	1.1	1.1	1.3	0.6	2.3
Hood Level	-0.8	0.0	9.1	4.4	4.5	4.6	4.6	4.8	5.4	4.8	4.3	3.8	3.5	3.1	8.2
Between Bumper/Hood	3.0	0.0	13.0	15.7	13.5	13.9	14.3	14.7	14.8	14.6	14.3	13.9	13.6	15.6	13.1
Bumper Level	3.3	0.0	14.5	15.0	15.0	15.5	15.9	16.3	16.6	16.4	16.1	15.9	15.2	15.3	15.1

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

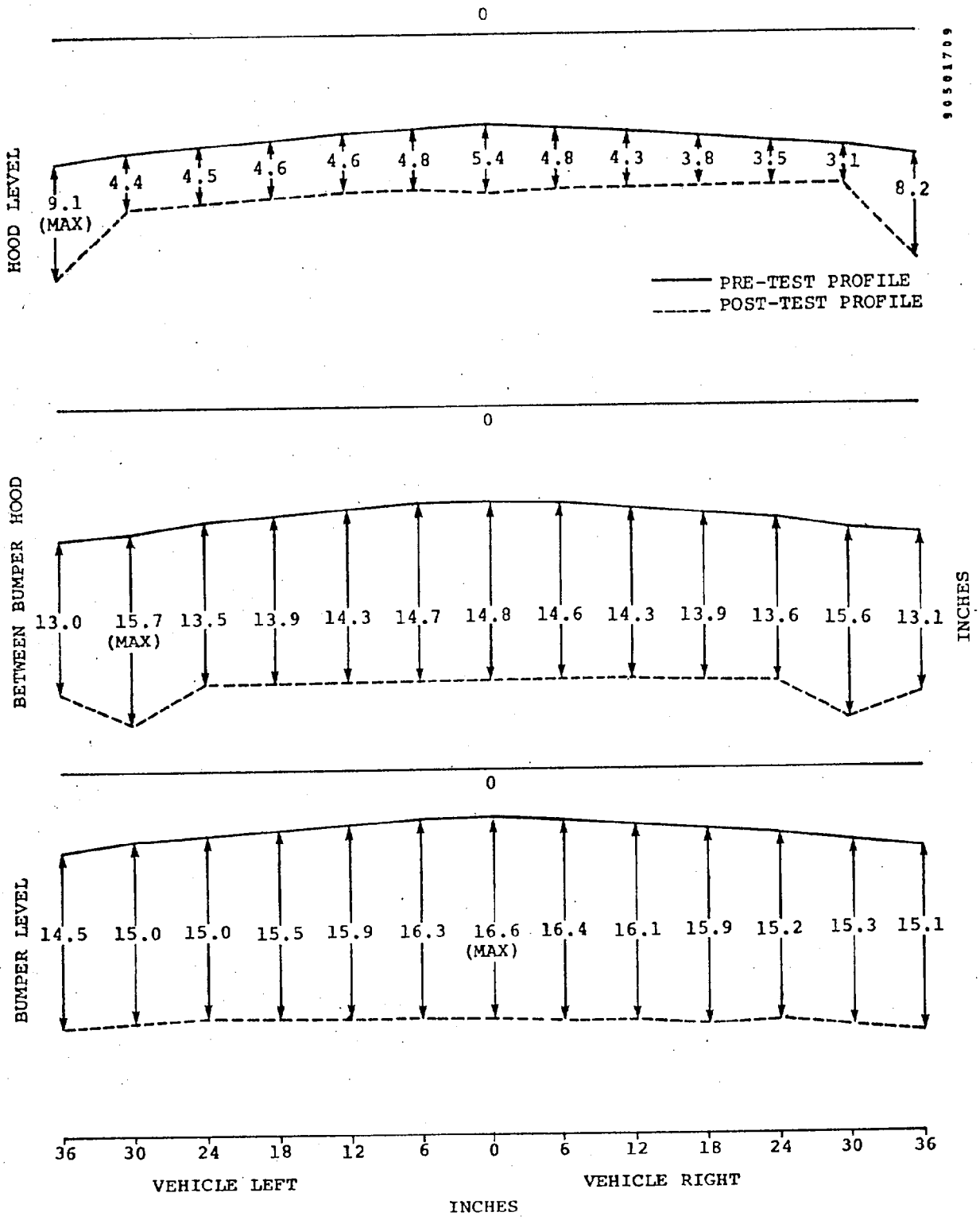


Figure 6-4. 1979 Dodge B-200 Van Exterior Profile and Static Crush (Test 3052-5).

TABLE 6-9. INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-5)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)*							Distance Right of Center (in.)*					
			36	30	24	18	12	6	0	6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	57.9	125		18.6	17.4	17.4	17.4	17.4	17.4	19.3	18.5	18.6	18.7	18.8	
Knee Level	45.3	125		19.4	19.8	16.6	18.5	18.5	9.3	9.3	13.5	18.4	18.5	18.7	
Floor Level	33.8	128		28.1	25.7	25.5	25.5	1.8	1.2	1.2	1.5	24.4	24.5	24.2	
Post-test Profile - Distance from R.P. (in.)															
Dash Level	62.1	125		17.4	16.4	16.4	16.5	16.6	16.8	18.5	17.1	17.2	17.3	17.4	
Knee Level	46.6	125		15.9	17.7	14.1	16.1	16.4	6.4	6.5	11.0	17.0	17.2	17.2	
Floor Level	34.8	125		26.0	25.1	24.8	26.2	2.4	2.1	2.4	3.0	26.4	26.3	25.7	
Post-test Static Crush (in.)															
Dash Level	4.2	0.0		1.2	1.0	1.0	0.9	0.8	0.8	0.8	1.4	1.4	1.4	1.4	
Knee Level	1.3	0.0		3.5	2.1	2.5	2.4	2.1	2.9	2.8	2.5	1.4	1.3	1.5	
Floor Level	1.0	-3.0		5.1	3.6	3.7	2.3	2.4	2.1	1.8	1.5	1.0	1.2	1.5	

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

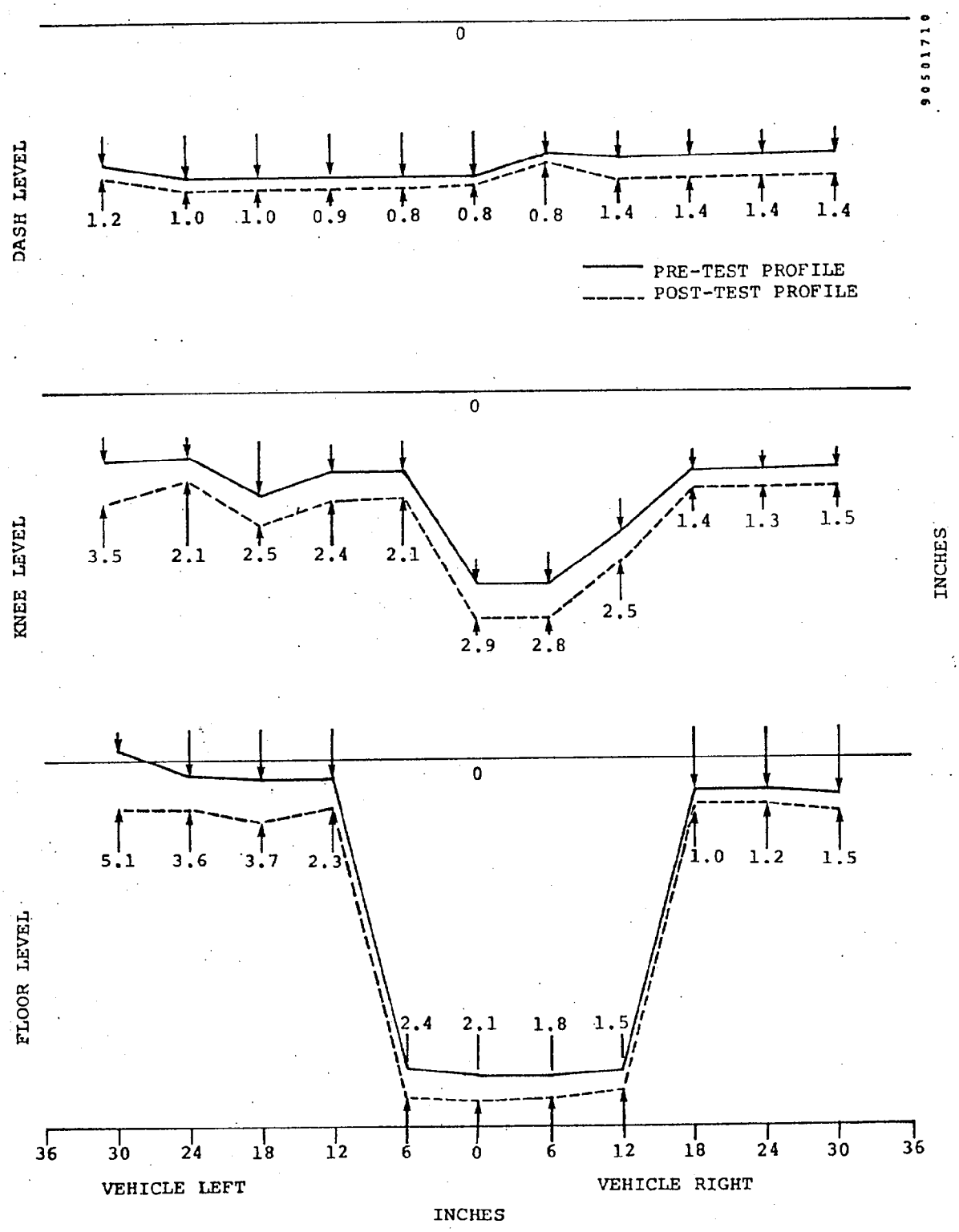


Figure 6-5. 1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-5).

TABLE 6-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-5)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	133.6	-19.8	59.6	134.2	-21.2	65.0	0.6	-1.4	5.1
Hub	131.9	-19.8	52.3	131.9	-19.5	58.0	0.0	0.3	5.7
Bottom	127.9	-19.8	46.6	127.5	-19.9	53.3	-0.4	-0.1	6.7

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.
Note: Tilt steering wheel set at lowermost driving position.

TABLE 6-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-5)

Vehicle: 1979 Dodge B-200 Van

Accelerometer		Test 3052-5 (30.22 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-50.6	14	-2.9	98	+21.0	70
2X	Right Side B-pillar	-55.4	13	-2.3	99	+21.4	71
	Average 1X & 2X	-51.9	14	-2.6	98	+21.2	71
3X	Left Side Firewall	-83.5	35	-9.4	195	+15.1	45
3Y	Left Side Firewall	-21.9	27	-3.9	54	-7.5	200
3Z	Left Side Firewall	-26.9	24	-0.7	39	+11.4	200
4X	Right Side Firewall	-68.7	16	-1.1	108	+20.8	84
4Y	Right Side Firewall	-11.1	21	-1.4	60	-0.7	70
4Z	Right Side Firewall	-26.8	52	-5.3	63	-6.2	200
5X	Engine	-90.3	42	-5.1	50	+18.9	45
5Y	Engine	-141.1*	63	-23.9	200	-56.5	200
5Z	Engine	-9.8	58	-1.8	70	+0.8	200
6X	Front Axle	-122.0	14	+4.6	50	+37.9	200
7X	Vehicle C.G.	-52.8	14	+0.8	91	+2.2	200
7Y	Vehicle C.G.	+17.7	46	-0.6	73	-8.2	200
7Z	Vehicle C.G.	-36.9	56	+2.0	119	-8.2	200
8X	Rear Compartment	-54.9	13	-3.9	89	+20.5	68
8Y	Rear Compartment	+9.0	20	-0.4	17	+0.4	174
8Z	Rear Compartment	-29.0	28	+2.4	200	-6.8	200
9X	Rear Axle	-87.7	53	-0.4	91	+23.2	200

*Data invalid due to transducer failure.

TABLE 6-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-5)

Vehicle: 1979 Dodge B-200 Van

		Test 3052-5 (30.22 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-145.7	82	-27.6	129
	Y	-20.5	88	+23.4	113
	Z	+52.6	85	+55.6	100
	R*	+94.9	85	+55.2	96
	HIC	1006	79-90	724	65-139
CHEST					
	X	-48.5	67	-40.0	75
	Y	-8.3	96	+20.1	85
	Z	-20.4	86	+16.0	69
	R*	+46.0	79	+41.0	79
	SI	391	200	305	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-789	56	-81	176
	RT	-2557	56	-232	28

*3-msec clip.

TABLE 6-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-5)

Vehicle: 1979 Dodge B-200 Van

	Test 3052-5 (30.22 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	1272	75
Right Lap Belt	1433	60
Shoulder Belt	1964	76
RIGHT FRONT OCCUPANT		
Left Lap Belt	1889	73
Right Lap Belt	2146	71
Shoulder Belt	1762	77

TABLE 6-14. SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-5)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	6.98	0.90	2.46	1.10	3.73	0.69	2.48	1.56	6.61	4.05
Time (msec)	51	56	15	40	38	38	15	51	24	43
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.73	0.76	0.53	0.76	1.66	0.84	0.21	0.63	0.58	0.34
Time (msec)	49	56	47	38	43	38	45	65	35	42
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	1.00	8.09	9.10	3.74	7.04	5.15	6.73	18.52*	7.84	0.19
Time (msec)	21	11	14	36	43	43	15	20	13	15
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	0.15	4.53	7.83	3.59	2.21	2.61	4.05	5.83	1.32	0.16
Time (msec)	150	21	21	37	34	36	29	16	15	20

*Maximum measured force.

TABLE 6-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-5)

Vehicle: 1979 Dodge B-200 Van

Parameter	Test 3052-5 (30.22 mph) Peak Load (klb)	Time (msec)
Column 1	4.37	42
Column 2	9.66	13
Column 3	25.02	16
Column 4	12.68	15
Column 5	8.74	38
Column 6	28.65	43
Column 7	8.73	38
Column 8	19.05	15
Column 9	11.69	12
Column 10	7.76	50
Row A	29.33	16
Row B	50.44	13
Row C	19.58	44
Row D	25.65	43

TABLE 6-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-5)

Vehicle: 1979 Dodge B-200 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	114.57	200.95
Time (msec)	42	14

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (3858 lb) plus engine acceleration times engine weight (796 lb).

7.0 PRESENTATION OF RESULTS (TEST 3052-6)

This section of the report presents the results of Test No. 3052-6, a head-on, symmetric crash test between a 1979 Dodge B-200 Van and the NHTSA Fixed Test Device (V_O = 15.28 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix F (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 7-1. CRASH TEST SUMMARY (TEST 3052-6)

TEST NO. 3052-6 CONTRACT: DOT-HS-8-01942

TEST DATE: April 19, 1979 TIME: 1451 TEMPERATURE: 77 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Dodge B-200 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	178.8/78.5	
Test Weight by Wheel (lb) LR 1015 RR 1015	LF 1300 RF 1321	
Total Weight (lb)	4651	>100,000
Wheelbase (in.)	109.3	
Longitudinal C.G. (From Center of Front Axle) (in.)	47.7	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	15.28	0
Final Speed (mph @ msec)	-1.84 @ 159	
Velocity Change (mph)	17.12	
Maximum Averaged Compartment Acceleration (G @ msec)	-27.63 @ 27	
Maximum Engine Acceleration (G @ msec)	-34.55 @ 52	
Maximum Mutual Dynamic Crush (Film Data) (in.)	7.5	
Maximum Static Crush		
• Bottom of Windshield (in.)	0.1	
• Hood Level (in.)	1.8	
• Between Bumper/Hood (in.)	4.6	
• Bumper Level (in.)	6.5	
Maximum Post-test Intrusion (in.)	1.3	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #760	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 7-2. VEHICLE INSPECTION SHEET (TEST 3052-6)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: B21JF9X151062 Make: Dodge

NHTSA No.: R & D

Year: 1979 Color: Gray Model: B-200 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [ ] no [X] Bucket: X (1)

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [X] no [ ]

Tinted Glass: yes [ ] no [X] Rear Window Def.: yes [ ] no [X] Split Back Bench: ____

Radio: yes [ ] no [X] Brakes: drum: R disc: F

Clock: yes [ ] no [X]

Tire Size: J78-15 Ply Rating: 4 Mfg. & Line: Goodyear

Bias Ply: ____ Belted: X Radial ____ /Eng.Type: V-8 Cylinders: 8 Total Displ: 360 cid

Trans, # Fwd. Speeds: 3 Shipping Weight: 4005 Odometer: 35.0

Dealer (name, address, and phone number)
Holiday Oldsmobile Co.
3530 N. Scottsdale Rd.
Scottsdale, AZ 85251

Remarks (list additional accessories not listed above)
Fold-out Doors
Tilt steering wheel set at lowermost driving position.

Date of Manufacture: 12/78 Dynamic Science No.: 846 Date Received: 3/2/79

Tilting Steering Wheel: yes [X] no [ ] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: 36 gal. (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap belt only*

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, spare tire, wheel covers, and wipers removed. All fluids except for engine coolant removed. 100% water in fuel tank. Passenger seat used in Test 3052-4 and -5. *Chrysler Corp. lap and shoulder belt system installed.
2. Does vehicle show evidence of prior accident history? Describe: NO
3. Does vehicle show any significant corrosion? Describe: NO
4. Check condition of the front bumper and frame: Satisfactory

DS FORM 4200

TABLE 7-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-6)

Test No. 3052-6 Type Van-to-NHTSA Fixed Test Device

Car Model 1979 Dodge B-200 Van Dynamic Science No. 846

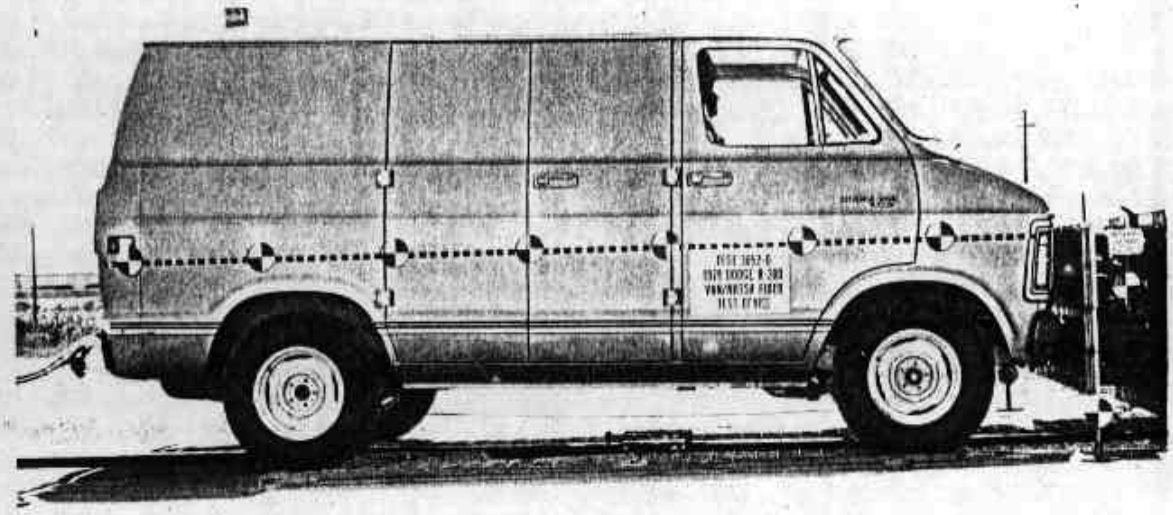
Engine Size	360 CID
Engine Weight* (lb)	796
Engine Height/Width (in.)	33.5/19.4
Bumper to Engine Block (in.)	25.7
Engine Length (in.)	19.8
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	22.0
Bumper Height (in.) (Min./Max.)	15.6/24.7

*Includes engine and rigid attachments such as transmission and drive train.

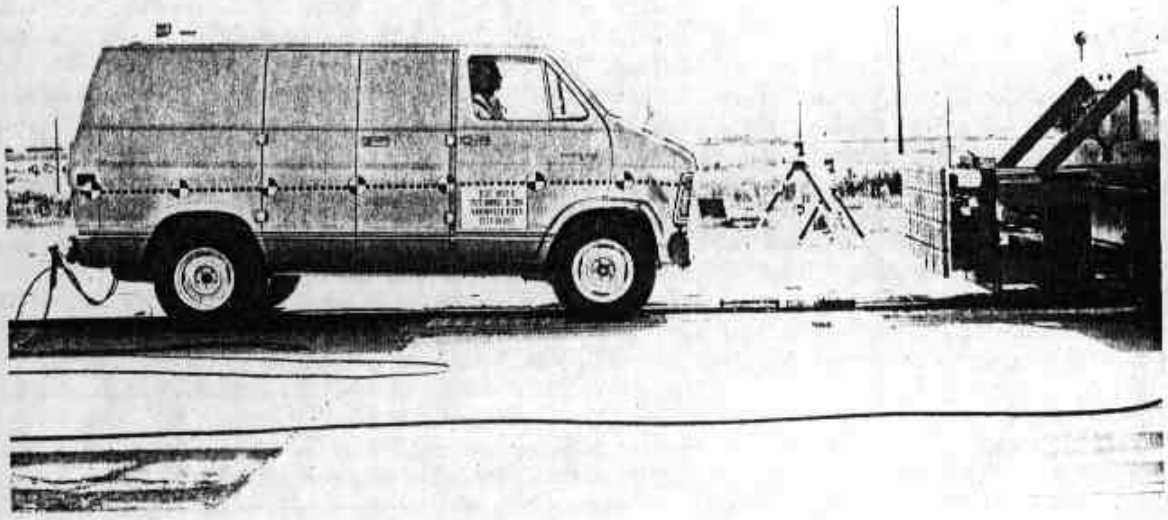
TABLE 7-4. PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-6)

Distances (in.)	Driver*	Passenger
Chest to Steering Wheel Hub (horizontal)	13.4	
Nose to Steering Wheel Upper Rim	19.6	
Nose to Windshield (horizontal)	30.0	31.1
Knee to Lower Panel (closest point)		
Left	6.9	10.1
Right	7.1	10.4
Chest to Dash (horizontal)	25.5	27.4
Forehead to Header	25.3	25.6

*Tilt steering wheel in lowermost position.



a) Pre-test



b) Post-test

Figure 7-1. Vehicle Configuration (Test 3052-6).

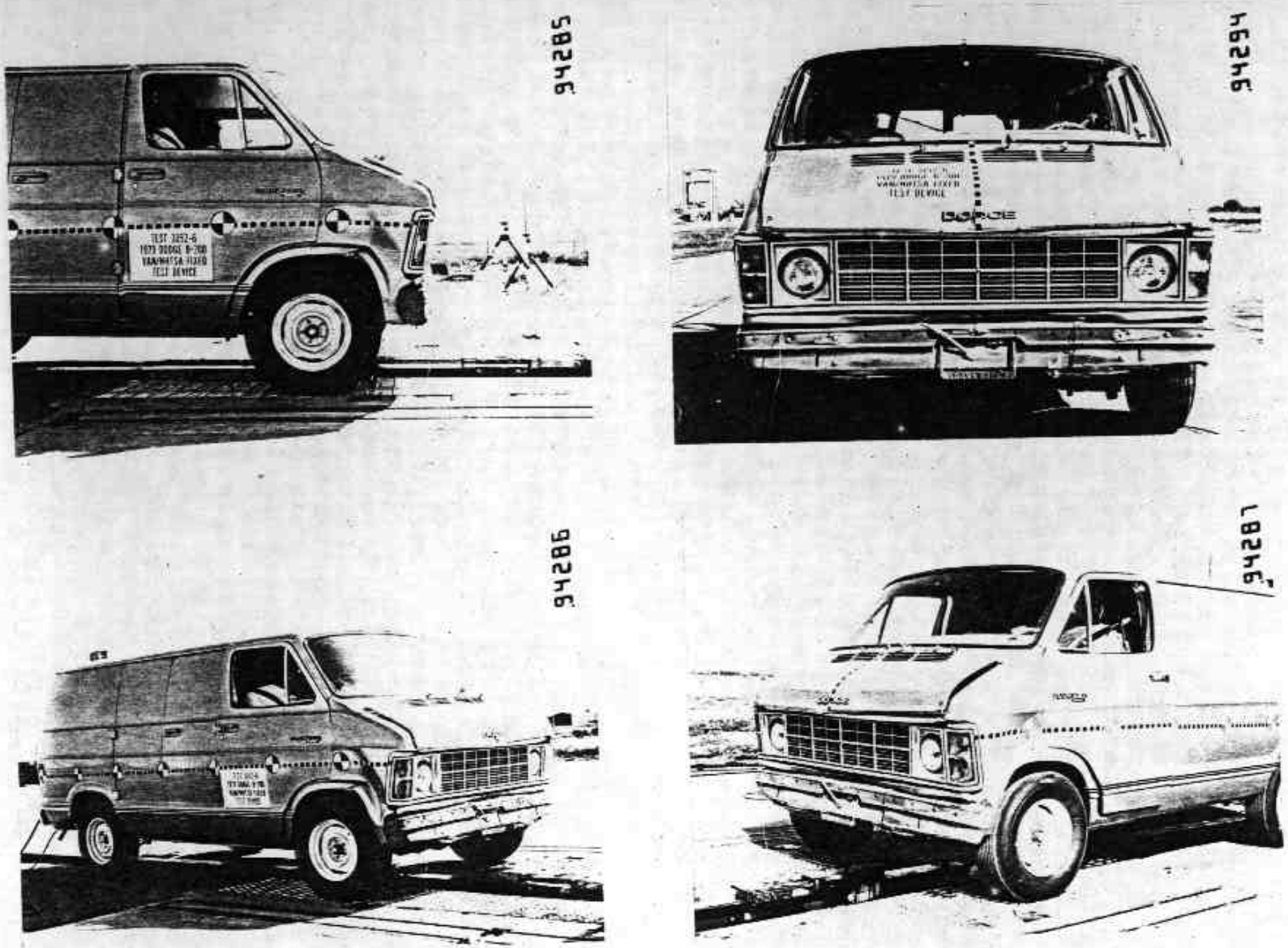
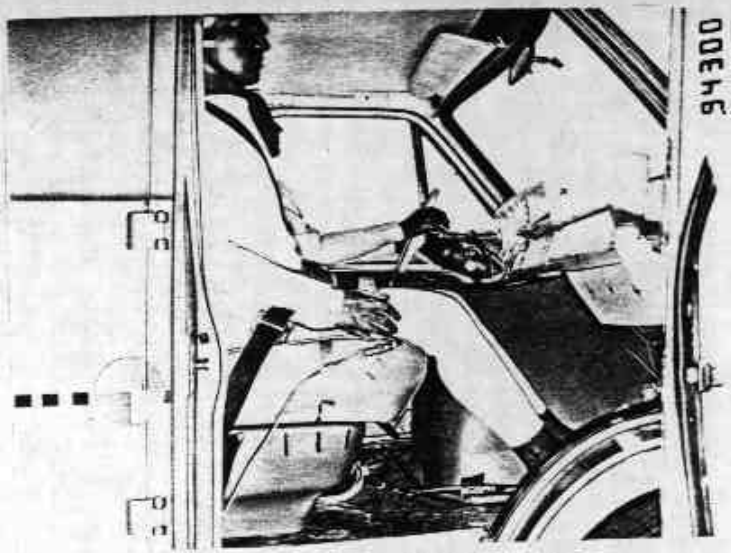
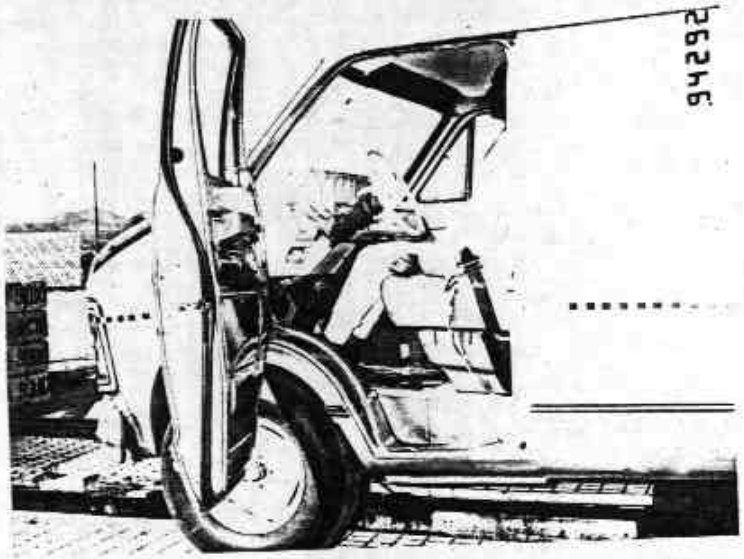


Figure 7-2. Post-test Vehicle Configuration (Test 3052-6).

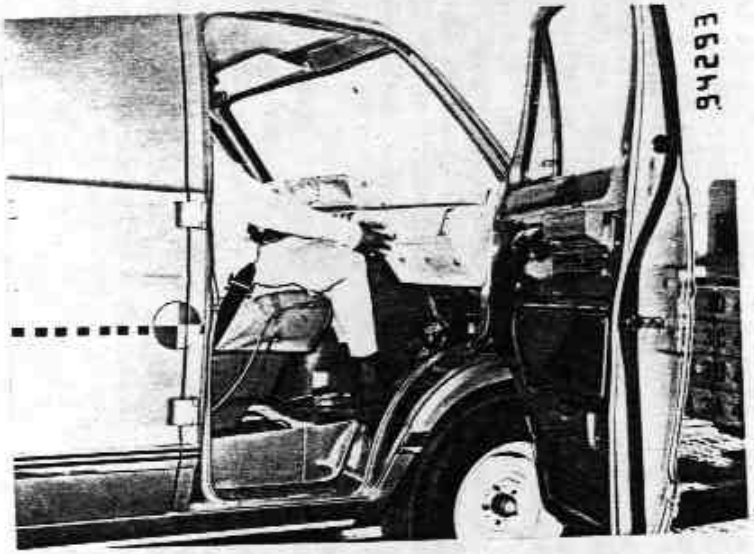
a) Pre-test Driver



c) Pre-test Passenger



b) Post-test Driver



d) Post-test Passenger

Figure 7-3. Vehicle Dummy Configuration (Test 3052-6).

TABLE 7-5. CHRONOLOGY OF EVENTS (TEST 3052-6)

VEHICLE: 1979 Dodge B-200 Van

Time (msec)	Crash Event
0	Impact (visual)
7	Grill strikes Test Device
22	Fenders strike front tires
24	Dummies start forward motion
54	Minimum wheelbase; Right side (104.3 in.); Left side (102.8 in.)
56	Maximum vehicle dynamic crush (7.5 in.)
58	Driver knees hit dash
73	Passenger left hand strikes engine cowling
83	Passenger knees hit dash
114	Maximum vehicle declination (2.0°); Driver maximum forward motion
119	Passenger maximum forward motion
190	Vehicle separates from Test Device
225	Passenger recontacts seat with upper back
312	Driver recontacts seat with upper back
406	Maximum vehicle rebound inclination (0.5°)

TABLE 7-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-6)

VEHICLE: 1979 Dodge B-200 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	None	None
Chest----------	None	None
Knees----------	Lower dash panel	Lower dash panel

Glazing: 100% intact

Doors: All opened easily

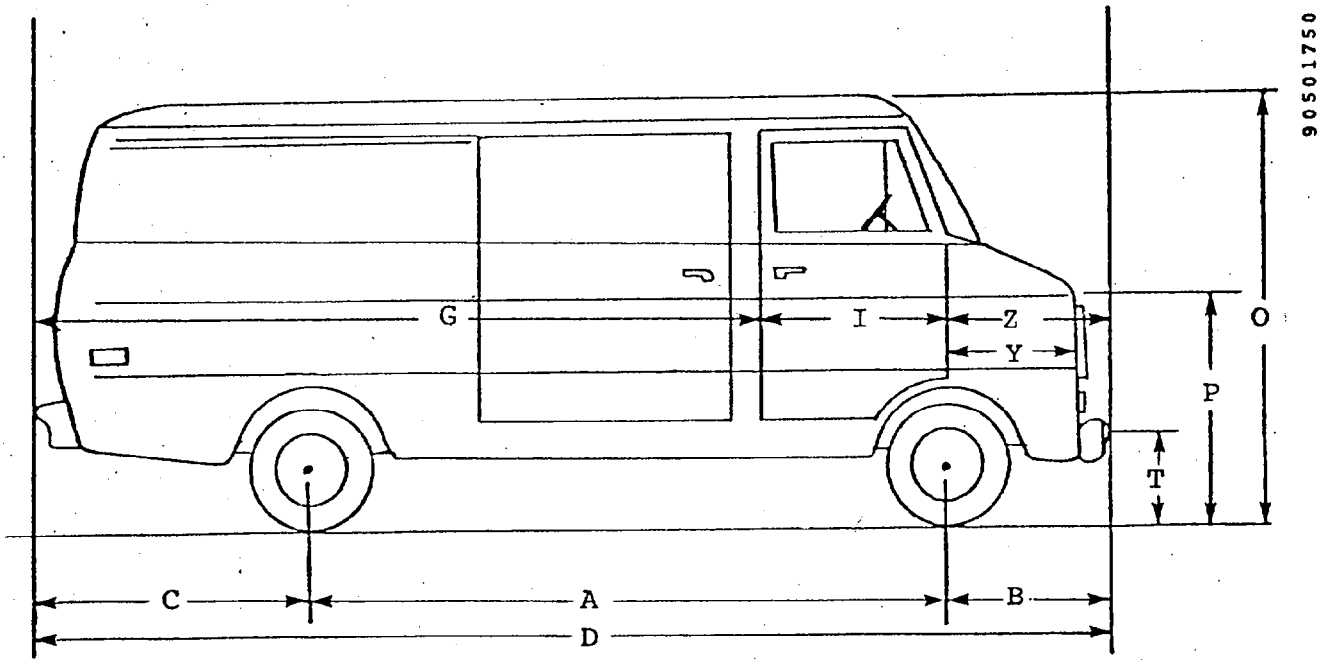
Seat Belt Anchorages and Restraints: Seat belts OK. No seat movement

Vehicle Centerline to Barrier Centerline: Rear: 0.5 inch right. Front: 1 inch right

Fuel Leakage: None

General Observations: Radiator leaked. Static rebound 67.6 inches

TABLE 7-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-6)



VEHICLE: 1979 DODGE B-200 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	109.2	109.3	107.6	107.6	1.6	1.7
B	29.1	29.1	24.1	23.6	5.0	5.5
C	40.3	40.5	40.3	40.4	0.0	0.1
D	178.6	178.9	172.0	171.6	6.6	7.3
G	110.6	111.0	110.8	111.0	-0.2	0.0
I	37.1	37.1	36.7	36.7	0.4	0.4
O	77.5	77.1	77.5	77.3	0.0	0.2
P	41.4	41.4	40.0	40.2	-1.4	-1.2
T	22.9	21.9	23.0	23.4	0.1	1.5
Y	28.2	28.0	25.2	25.1	3.0	2.9
Z	30.9	30.8	24.5	23.9	6.4	6.9

TABLE 7-8. EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-6)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	54.8	185	33.4	29.7	27.9	26.6	25.7	25.1	24.9	25.2	25.8	26.7	27.6	29.7	33.1
Hood Level	40.4	185	10.0	9.2	8.6	8.3	8.0	7.6	7.4	7.6	7.9	8.2	8.6	9.2	9.9
Between Bumper/Hood	33.3	185	10.5	10.1	9.2	8.8	8.4	8.0	7.5	7.8	8.1	8.5	8.9	9.7	10.2
Bumper Level	21.9	185	9.0	8.2	7.7	7.3	6.9	6.5	6.2	6.5	6.8	7.1	7.6	8.1	8.9
Post-test Profile - Distance to R.P. (in.)															
Bottom of Windshield	54.9	185	33.5	29.8	28.0	26.7	25.8	25.2	24.9	25.2	25.8	26.5	27.8	29.7	33.0
Hood Level	39.5	185	11.8	9.2	9.0	8.7	8.4	8.1	7.6	8.2	8.6	8.8	9.1	9.6	11.0
Between Bumper/Hood	32.9	185	12.7	13.2	12.9	12.7	12.6	12.4	12.1	12.2	12.4	12.4	12.4	13.0	12.4
Bumper Level	22.5	185	13.5	13.2	12.8	13.0	12.8	12.8	12.7	12.9	12.8	12.9	12.6	13.0	13.3
Post-test Static Crush (in.)															
Bottom of Windshield	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	-0.2	-0.2	0.0	-0.1
Hood Level	-0.9	0.0	1.8	0.0	0.4	0.4	0.4	0.5	0.2	0.6	0.7	0.6	0.5	0.4	1.1
Between Bumper/Hood	-0.4	0.0	2.2	3.1	3.7	3.9	4.2	4.4	4.6	4.4	4.3	3.9	3.5	3.3	2.2
Bumper Level	0.6	0.0	4.5	5.0	5.1	5.7	5.9	6.3	6.5	6.4	6.0	5.8	5.0	4.9	4.4

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

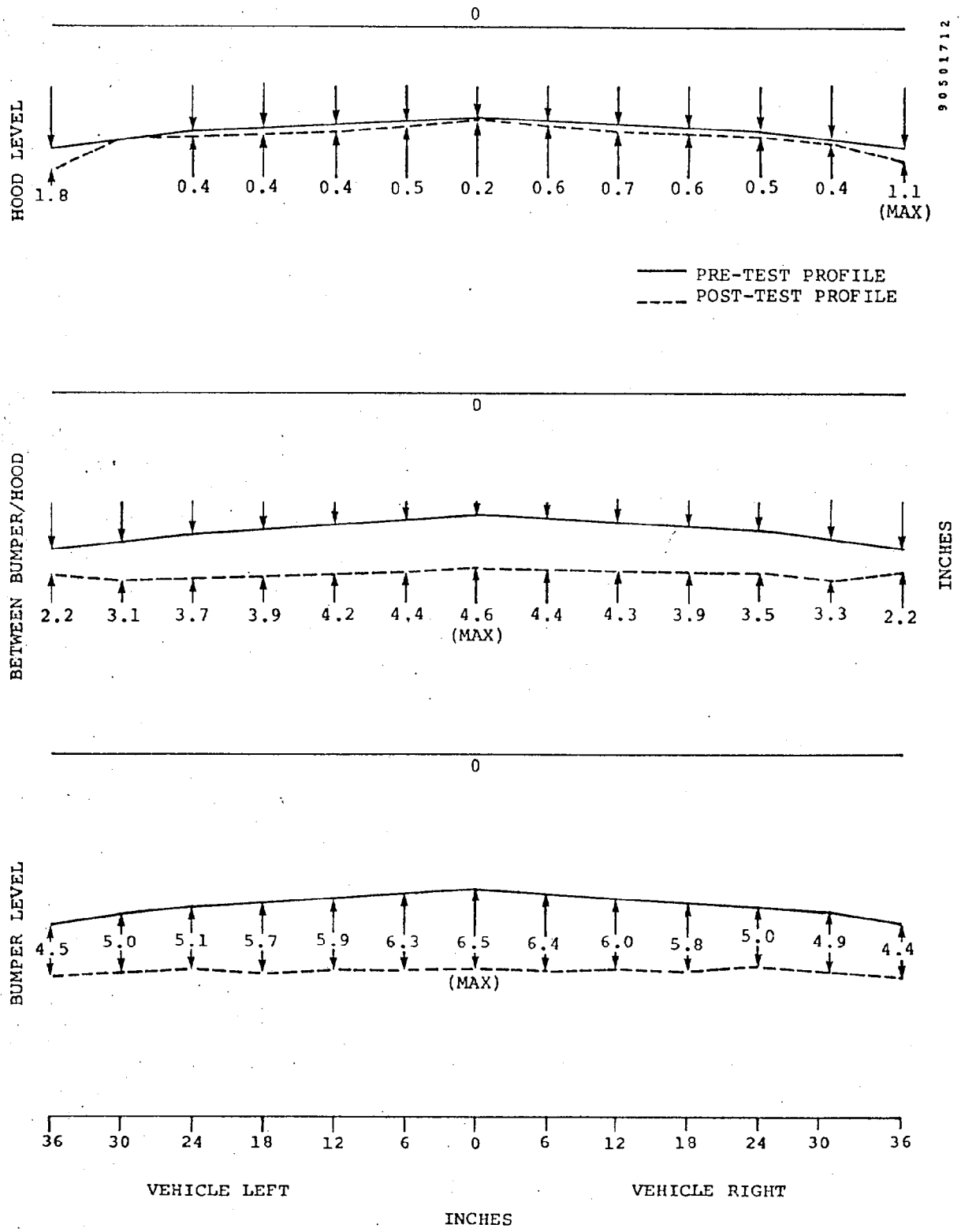


Figure 7-4. 1979 Dodge B-200 Van Exterior Profile and Static Crush (Test 3052-6).

TABLE 7-9. INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-6)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	56.8	125	18.9	18.0	18.0	18.0	18.0	18.1	19.7	20.5	20.5	20.4	20.2		
Knee Level	45.1	125	20.3	20.3	19.7	19.5	19.7	9.8	9.7	15.8	18.9	19.0	19.2		
Floor Level	32.4	129.5	27.1	24.6	24.5	24.4	0.5	0.1	0.1	0.4	23.1	23.2	23.0		
Post-test Profile - Distance from R.P. (in.)															
Dash Level	57.1	125	18.9	17.9	17.9	17.9	17.9	18.0	19.6	20.5	20.4	20.4	20.3		
Knee Level	44.3	125	19.6	19.9	19.6	19.5	19.5	8.5	8.8	15.1	18.8	19.0	19.3		
Floor Level	31.5	125	30.9	28.5	28.4	28.1	3.7	3.5	3.9	4.5	27.6	27.5	27.2		
Post-test Static Crush (in.)															
Dash Level	0.3	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	-0.1		
Knee Level	-0.8	0.0	0.7	0.4	0.1	0.0	0.2	1.3	0.9	0.7	0.1	0.0	-0.1		
Floor Level	-0.9	4.5	0.7	0.6	0.6	0.8	1.3	1.1	0.7	0.4	0.0	0.2	0.3		

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

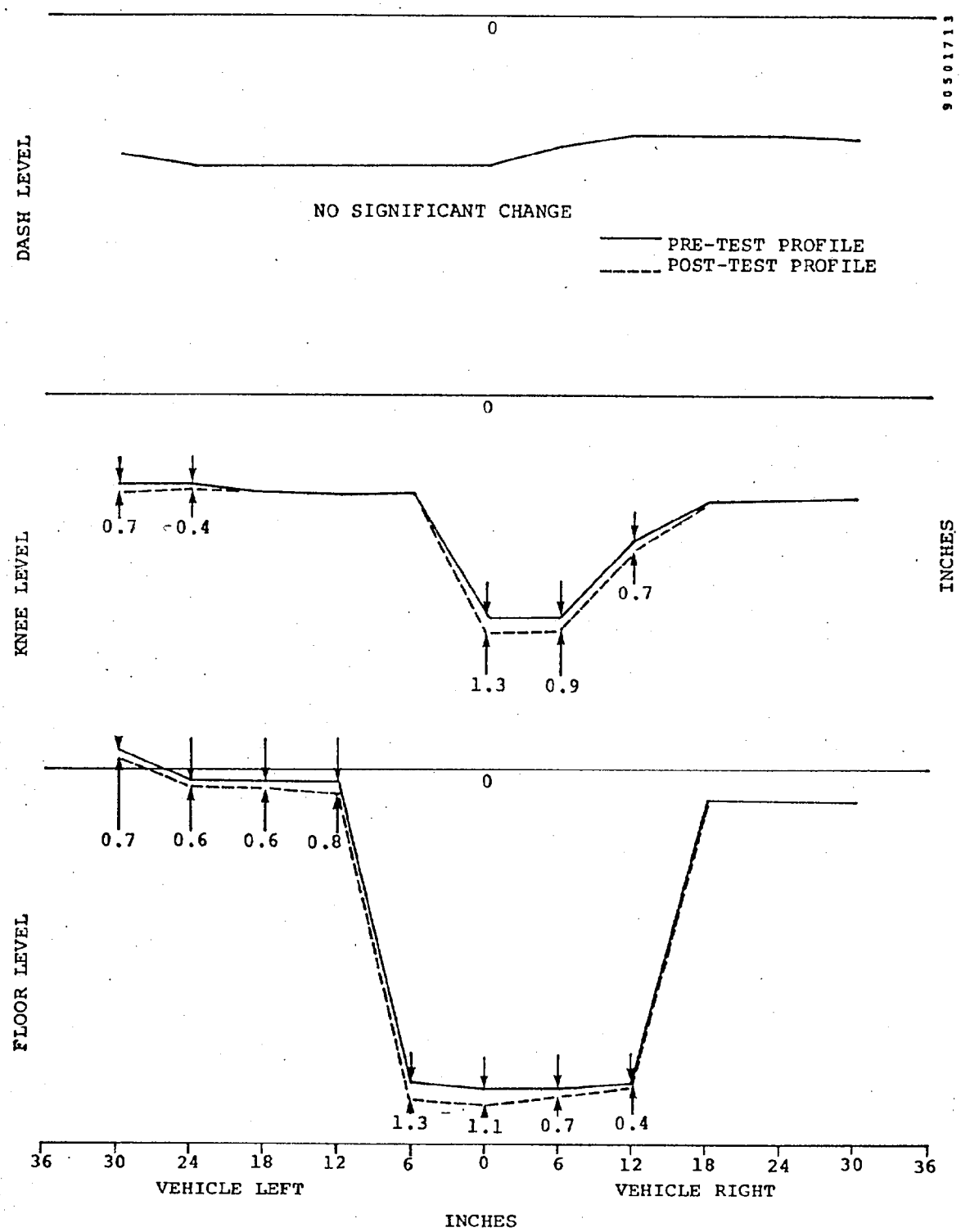


Figure 7-5. 1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-6).

TABLE 7-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-6)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	134.0	-19.8	59.0	134.8	-19.8	60.3	0.8	0.0	1.3
Hub	132.1	-19.8	52.0	132.4	-20.0	53.5	0.3	-0.2	1.5
Bottom	128.4	-19.8	46.1	128.3	-19.4	47.9	-0.1	0.4	1.8

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.
Note: Tilt steering wheel set at lowermost driving position.

TABLE 7-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-6)

Vehicle: 1979 Dodge B-200 Van

Accelerometer		Test 3052-6 (15.28 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-28.6	27	-1.7	200	+9.0	62
2X	Right Side B-pillar	-27.2	24	-2.1	151	+8.8	60
	Average 1X & 2X	-27.6	27	-1.8	159	+8.9	61
3X	Left Side Firewall	-37.1	32	-1.9	200	+8.4	63
3Y	Left Side Firewall	+8.4	35	-0.7	46	+0.1	41
3Z	Left Side Firewall	-20.8	34	-1.0	45	+0.6	36
4X	Right Side Firewall	-38.9	25	-0.7	149	+9.2	129
4Y	Right Side Firewall	-14.2	34	-1.3	36	+0.3	180
4Z	Right Side Firewall	-12.7	34	+0.2	99	+1.1	200
5X	Engine	-34.6	52	-5.6	84	+12.3	58
5Y	Engine	-3.6	120	-2.3	140	-2.4	194
5Z	Engine	-8.5	60	-1.3	95	+2.0	200
6X	Front Axle	-62.8	29	-3.2	195	+6.4	51
7X	Vehicle C.G.	-27.6	25	-2.1	153	+8.7	60
7Y	Vehicle C.G.	-8.0	33	-0.6	38	-0.1	66
7Z	Vehicle C.G.	-36.7	28	-5.2	55	-5.9	200
8X	Rear Compartment	-27.7	24	-2.2	154	+8.5	58
8Y	Rear Compartment	+3.3	52	-0.2	17	+1.0	200
8Z	Rear Compartment	-26.1	36	-2.9	43	-4.8	200
9X	Rear Axle	-44.1	31	-4.0	89	+9.0	57

TABLE 7-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-6)

Vehicle: 1979 Dodge B-200 Van

		Test 3052-6 (15.28 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-17.3	118	-19.2	121
	Y	-5.9	102	+6.9	109
	Z	+19.0	90	+20.1	89
	R*	+21.1	89	+21.0	91
	HIC	74	66-141	97	65-139
CHEST					
	X	-25.4	80	-23.5	72
	Y	-3.9	80	+5.2	89
	Z	-7.6	83	-7.6	96
	R*	+25.7	82	+22.9	70
	SI	77	200	58	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-261	77	-66	33
	RT	-486	163	-148	33

*3-msec clip.

TABLE 7-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-6)

Vehicle: 1979 Dodge B-200 Van

	Test 3052-6 (15.28 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	860	75
Right Lap Belt	1098	75
Shoulder Belt	1074	79
RIGHT FRONT OCCUPANT		
Left Lap Belt	804	75
Right Lap Belt	910	75
Shoulder Belt	950	75

TABLE 7-14. SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-6)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	2.70	1.44	1.03	0.42	1.33	1.50	0.60	0.20	1.33	4.22
Time (msec)	54	34	32	21	20	22	22	39	40	40
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.11	0.17	0.27	0.06	0.08	0.11	0.19	0.31	0.48	0.34
Time (msec)	140	34	21	23	32	22	19	53	38	34
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	0.24	6.66	8.86	2.51	2.49	2.05	3.09	11.53*	6.75	0.11
Time (msec)	24	17	29	28	7	8	28	28	17	24
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	0.18	4.65	8.97	3.53	1.91	3.12	5.24	9.63	4.90	0.06
Time (msec)	87	30	31	33	21	20	32	31	32	16

*Maximum measured force.

TABLE 7-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-6)

Vehicle: 1979 Dodge B-200 Van

Parameter	Test 3052-6 (15.28 mph) Peak Load (klb)	Time (msec)
Column 1	4.56	37
Column 2	8.81	25
Column 3	21.09	30
Column 4	8.52	29
Column 5	5.92	20
Column 6	4.56	20
Column 7	6.03	29
Column 8	18.65	30
Column 9	8.64	30
Column 10	2.64	55
Row A	39.00	30
Row B	34.20	28
Row C	1.46	33
Row D	11.42	35

TABLE 7-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-6)

Vehicle: 1979 Dodge B-200 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	81.12	111.43
Time (msec)	30	27

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (3855 lb) plus engine acceleration times engine weight (796 lb).

8.0 ANALYSIS OF VEHICLE IMPACT VELOCITY CHANGES

Since test speeds of 15, 25 and 30 mph were chosen as target speeds, a reasonably good data base for examining the effects of impact velocity for van-to-fixed barrier impact tests was established. The methodology used to study these effects was to plot various parameters against the actual test speeds conducted. Three types of response parameters were compared:

- Occupant Parameters versus Impact Velocity (see Table 8-1)
  - Head Injury Criteria (HIC) (Figures 8-1 and 8-2)
  - Chest Severity Index (SI) (Figures 8-3 and 8-4)
  - Peak Chest Acceleration (3 msec clip) (Figures 8-5 and 8-6)
  - Femur Load (right and left femurs) (Figures 8-7 to 8-10)
- Vehicle Parameters versus Impact Velocity (see Table 8-2)
  - Dynamic Crush (Film and Accelerometer Data) (Figures 8-11 and 8-12)
  - Static Crush (Figure 8-13)
  - Velocity Change (Figure 8-14)
  - Average Compartment Acceleration - calculated using time when compartment acceleration nears ±1 g (Figure 8-15)
  - Maximum Compartment Acceleration (Figure 8-16)
  - Maximum Engine Acceleration (Figure 8-17)
  - Vehicle Inertia Force calculated from (Figure 8-18):

$$F = (M \cdot a)_{VAN} + (M \cdot a)_{engine}$$

where M_{VAN} = Mass of Van less engine weight (lb)
a_{VAN} = Acceleration of Van Occupant Compartment (G)
M_{engine} = Mass of Van Engine and Transmission (lb)
a_{engine} = Acceleration of Van Engine (G)

- Load Cell Force - NHTSA Fixed Test Device, total 40 load cells (Figure 8-19)

- Occupant Parameters versus Vehicle Parameters (Figures 8-20 and 8-21)
  - Head Injury Criteria versus Vehicle Velocity Change
  - Chest Severity Index versus Vehicle Velocity Change
  - Peak Chest Acceleration versus Vehicle Velocity Change
  - Head Injury Criteria versus Average Compartment Acceleration
  - Chest Severity Index versus Average Compartment Acceleration
  - Peak Chest Acceleration versus Average Compartment Acceleration

TABLE 8-1. COMPARISON OF OCCUPANT RESPONSE DATA

	Test 3052-1 Ford		Test 3052-2 Ford		Test 3052-3 Ford		Test 3052-4 Dodge		Test 3052-5 Dodge		Test 3052-6 Dodge	
	LF	RF	LF	RF	LF	RF	LF	RF	LF	RF	LF	RF
Velocity - mph	15.25		25.10		30.02		25.17		30.22		15.28	
HIC	78	70	557	393	929	1072	660	409	1006	724	74	97
Chest SI	81	62	289	171	561	290	277	206	391	305	77	58
Peak Resultant Chest Acceleration (G)*	26.2	21.4	41.4	29.8	60.6	39.3	39.1	36.7	46.0	41.0	25.7	22.9
Left Femur Load (lb)	-98	-64	-137	-141	-927	-1632	-2346	-193	-789	-81	-261	-66
Right Femur Load (lb)	-1030	-231	-2851	-184	-2617	-953	-980	-81	-2557	-232	-486	-148

*3 msec clip

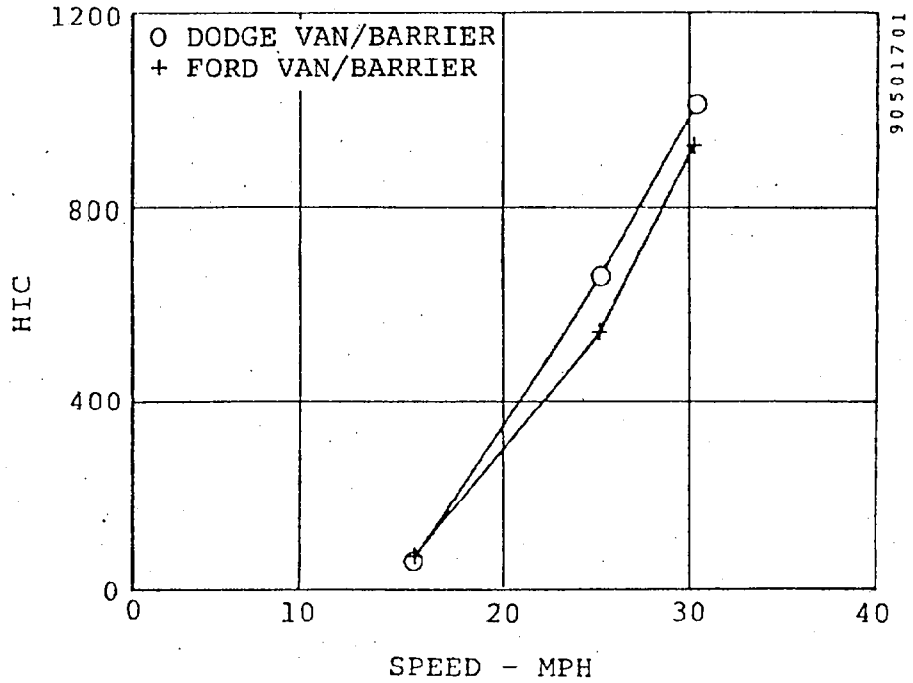


Figure 8-1. Driver Head Injury Criteria (HIC) Versus Impact Speed.

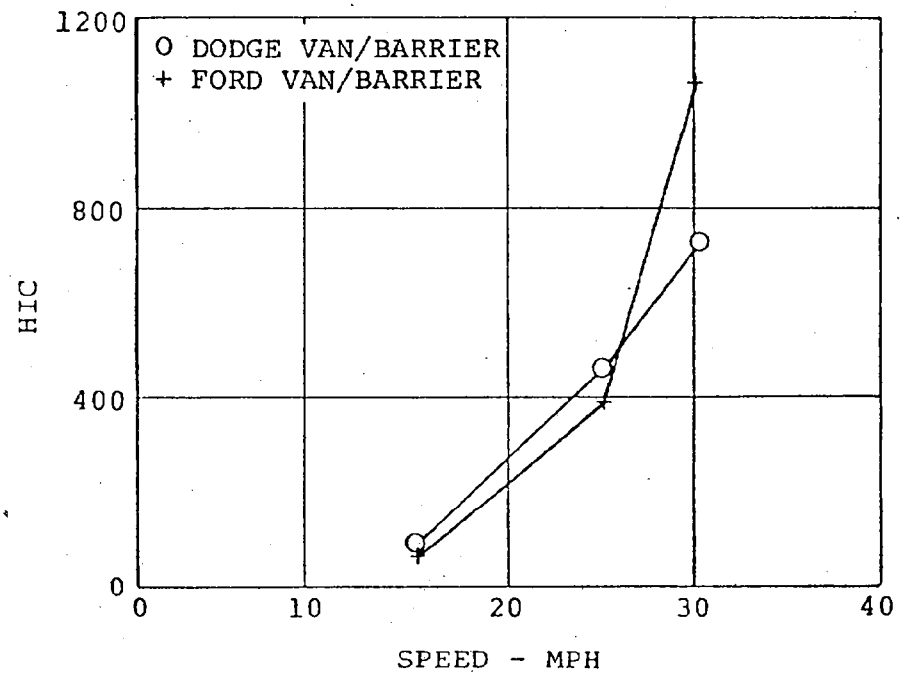


Figure 8-2. RF Passenger Head Injury Criteria (HIC) Versus Impact Speed.

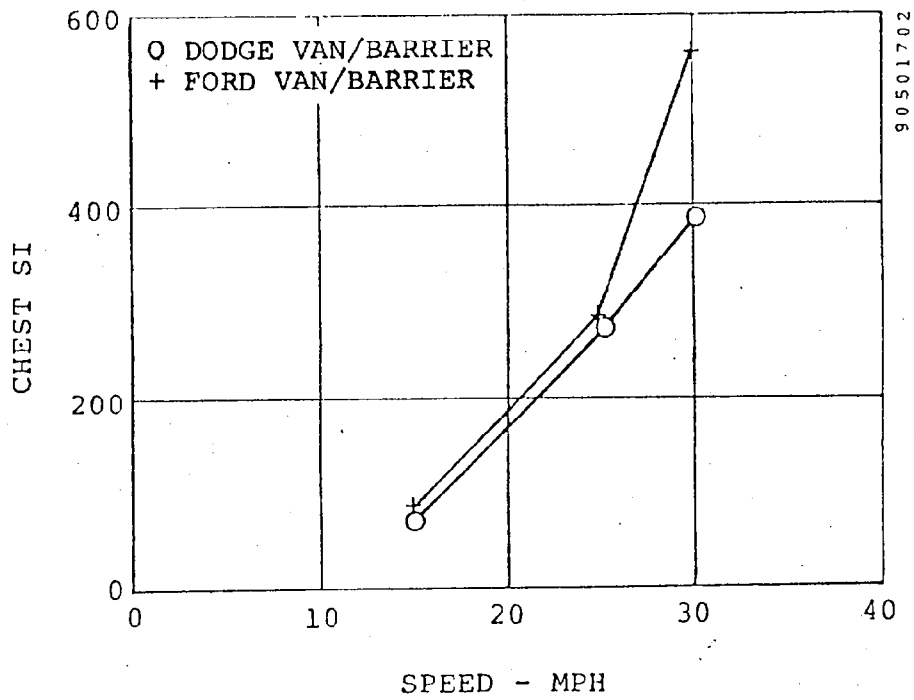


Figure 8-3. Driver Chest Severity Index (SI) Versus Impact Speed.

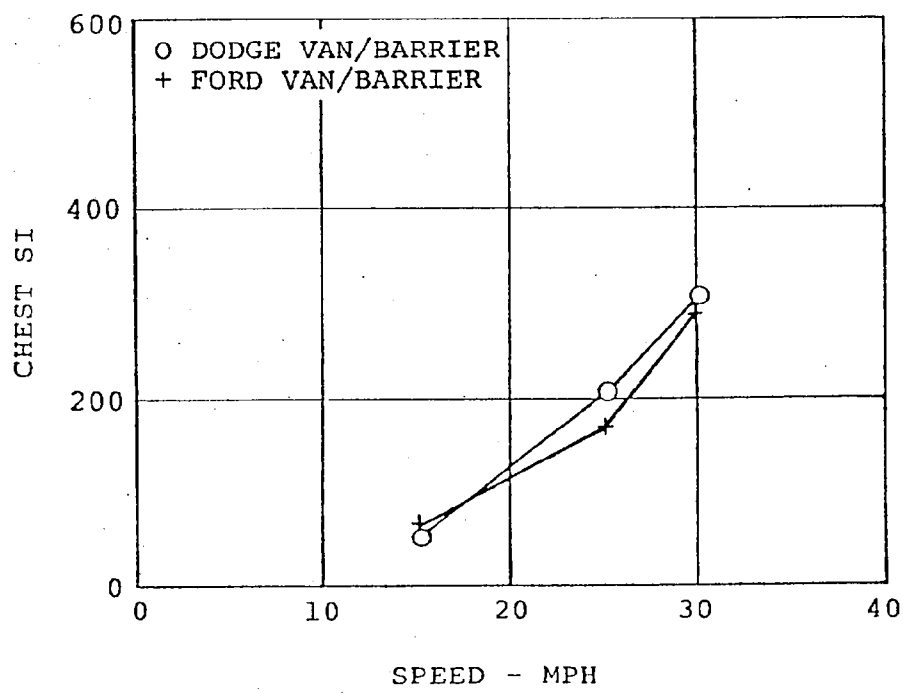


Figure 8-4. RF Passenger Chest Severity Index (SI) Versus Impact Speed.

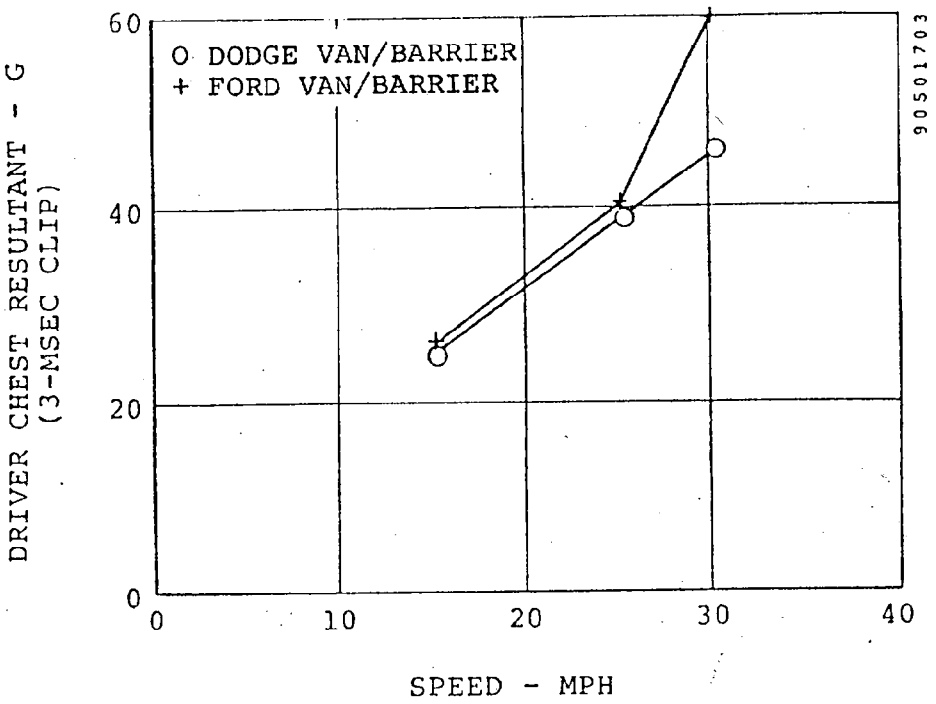


Figure 8-5. Driver Peak Chest Resultant Versus Impact Speed.

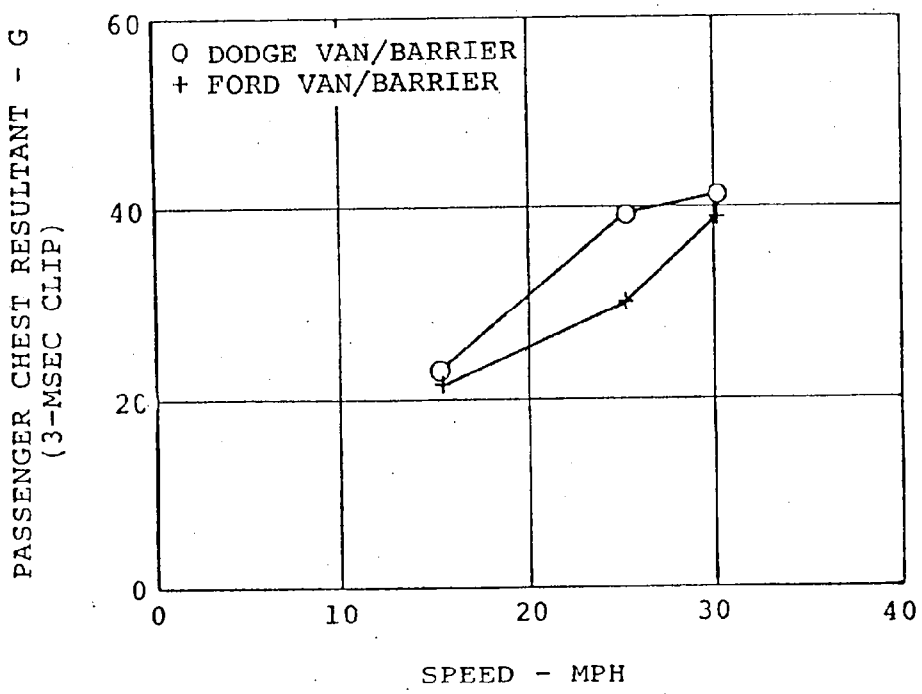


Figure 8-6. RF Passenger Peak Chest Resultant Versus Impact Speed.

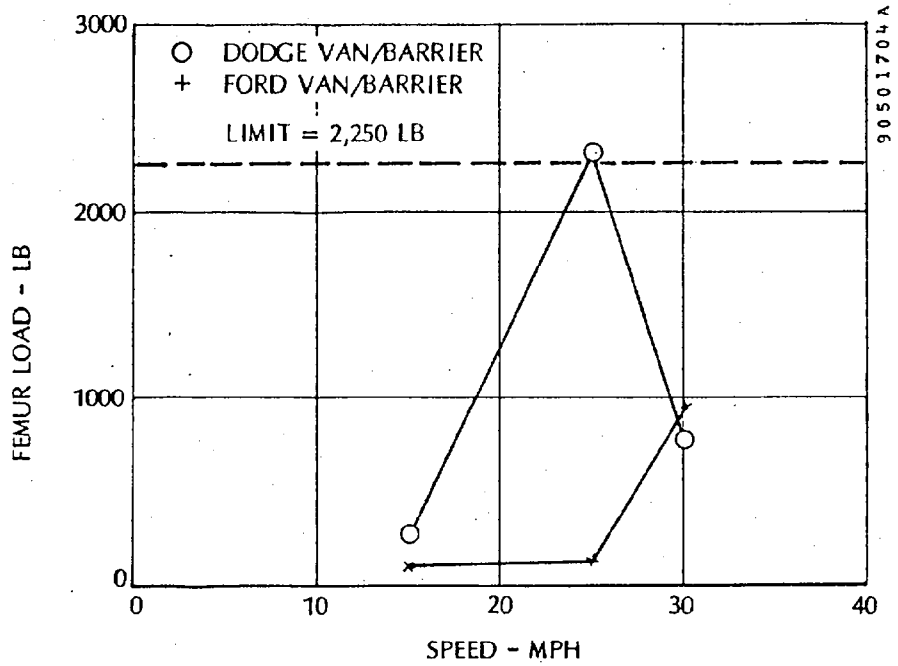


Figure 8-7. Driver Left Femur Load Versus Impact Speed.

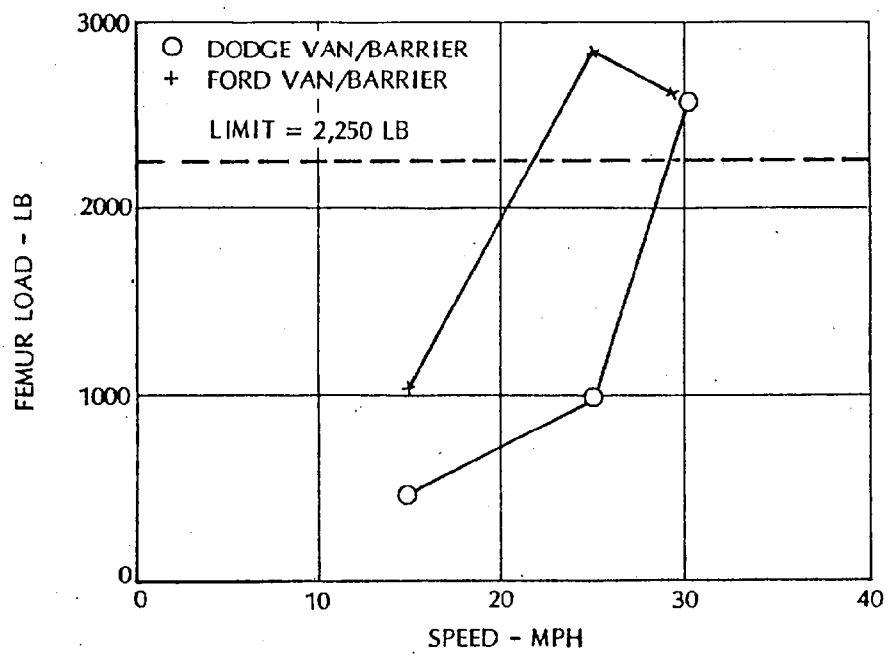


Figure 8-8. Driver Right Femur Load Versus Impact Speed.

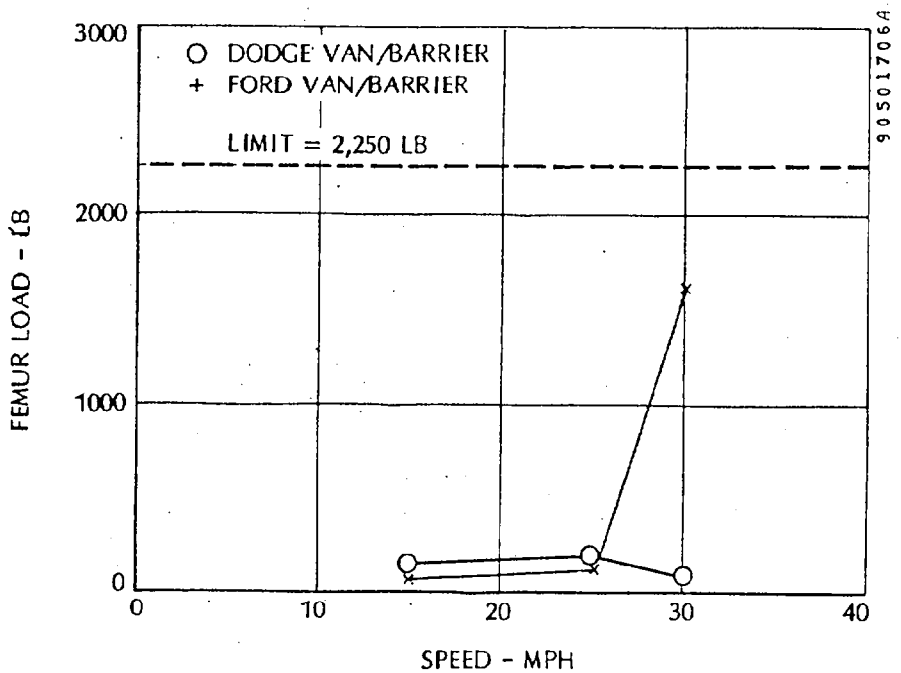


Figure 8-9. RF Passenger Left Femur Load Versus Impact Speed.

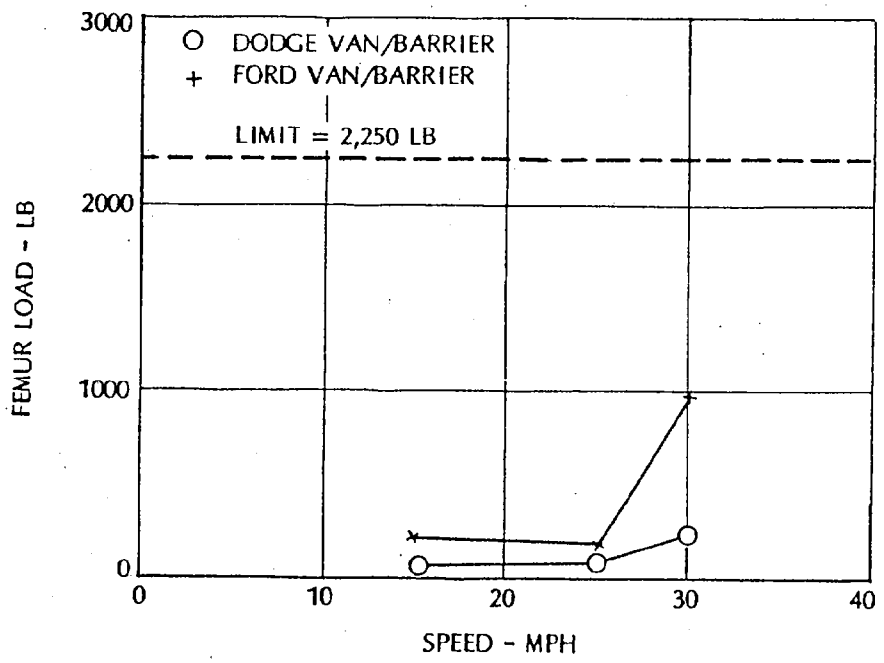


Figure 8-10. RF Passenger Right Femur Load Versus Impact Speed.

TABLE 8-2. COMPARISON OF VEHICLE RESPONSE DATA

	Test 3052-1	Test 3052-2	Test 3052-3	Test 3052-4	Test 3052-5	Test 3052-6
Velocity - mph	15.25	25.10	30.02	25.17	30.22	15.28
Delta Velocity - mph	17.09	27.87	31.97	27.14	32.79	17.12
Accelerometer Dynamic Crush - in.	8.8	16.1	20.1	17.3	21.2	8.9
@ msec	53	65	69	71	71	61
Film Dynamic Crush - in.	8.1	15.3	19.5	16.7	19.1	7.5
@ msec	50	67	68	68	66	56
Static Crush - in.	6.9	13.1	16.4	14.5	16.6	6.5
Peak Compartment Acceleration - G	-25.1	-29.5	-34.9	-43.4	-51.9	-27.6
@ msec	16	26	16	15	14	27
Average Acceleration - G	-11.8	-15.1	-18.0	-15.0	-16.6	-10.5
@ msec	66	81	78	81	90	70
Peak Engine Acceleration - G	-28.5	-40.0	-79.9	-62.1	-90.3	-34.6
@ msec	54	54	38	45	42	52
Fixed Test Device Force - klb	82.50	97.36	129.92	93.40	114.57	81.12
@ msec	44	25	38	45	42	30
Engine/Car Inertia Force - klb	113.07	138.31	185.12	171.21	200.95	111.43
@ msec	16	28	36	15	14	27

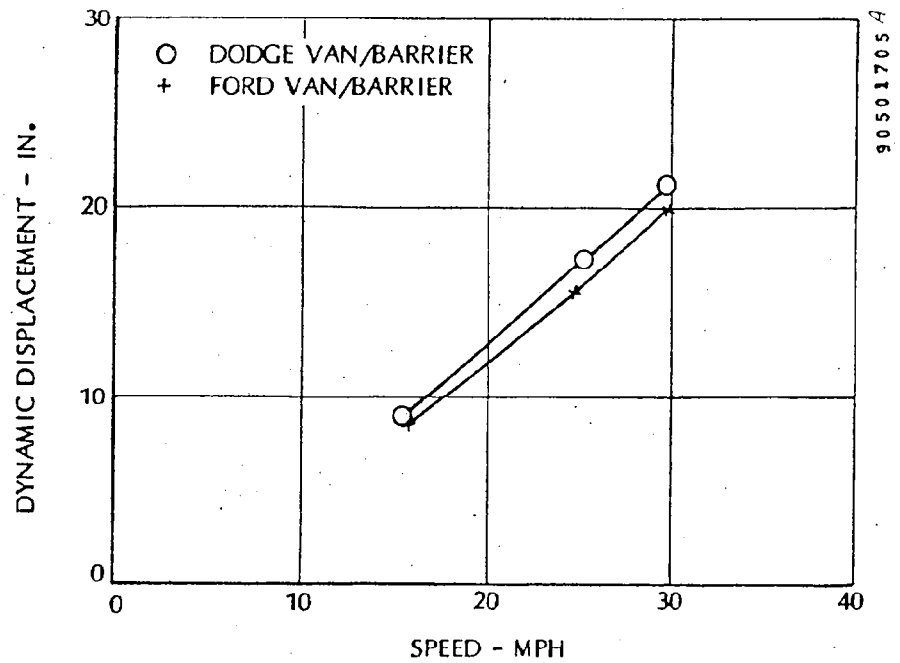


Figure 8-11. Dynamic Crush (Accelerometer Data) Versus Impact Speed.

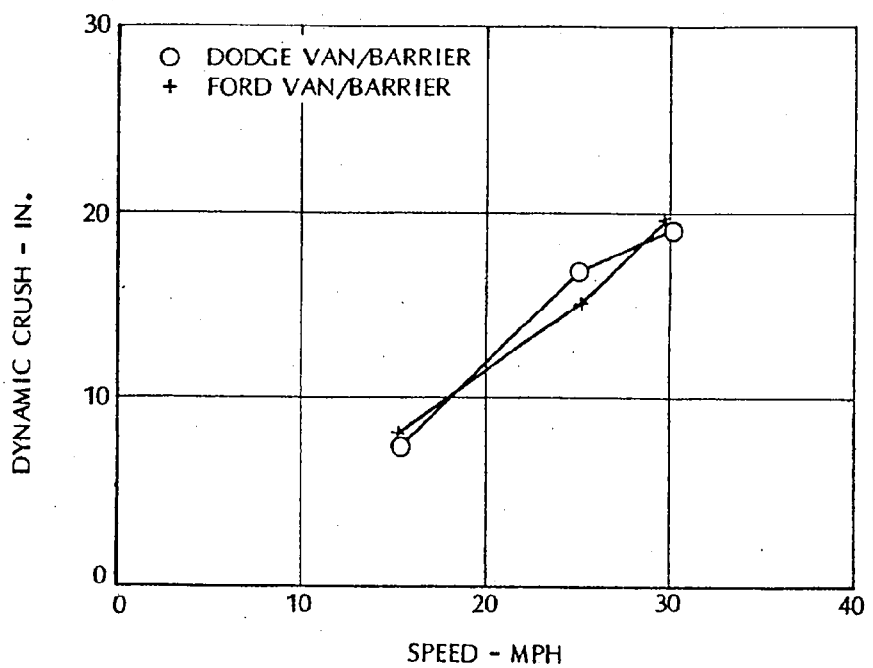


Figure 8-12. Dynamic Crush (Film Data) Versus Impact Speed.

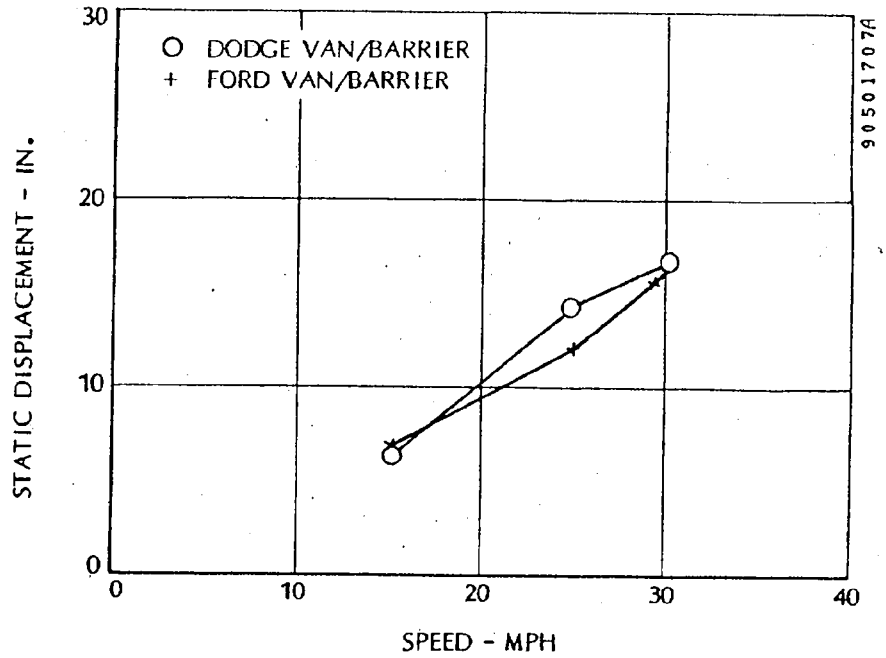


Figure 8-13. Static Crush Versus Impact Speed.

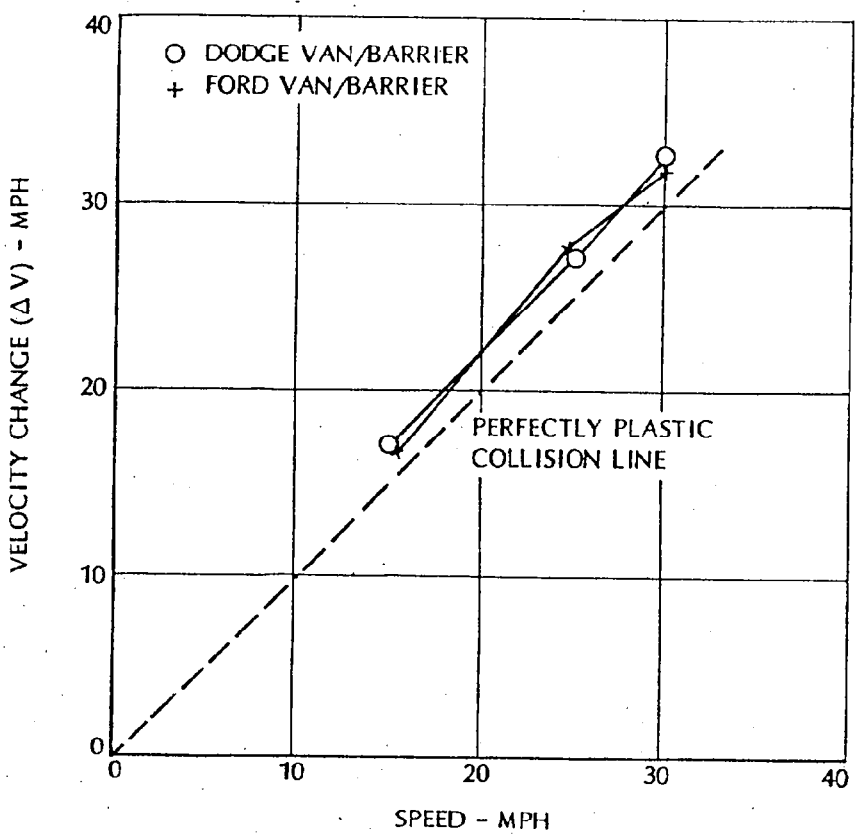


Figure 8-14. Velocity Change (ΔV) Versus Impact Speed.

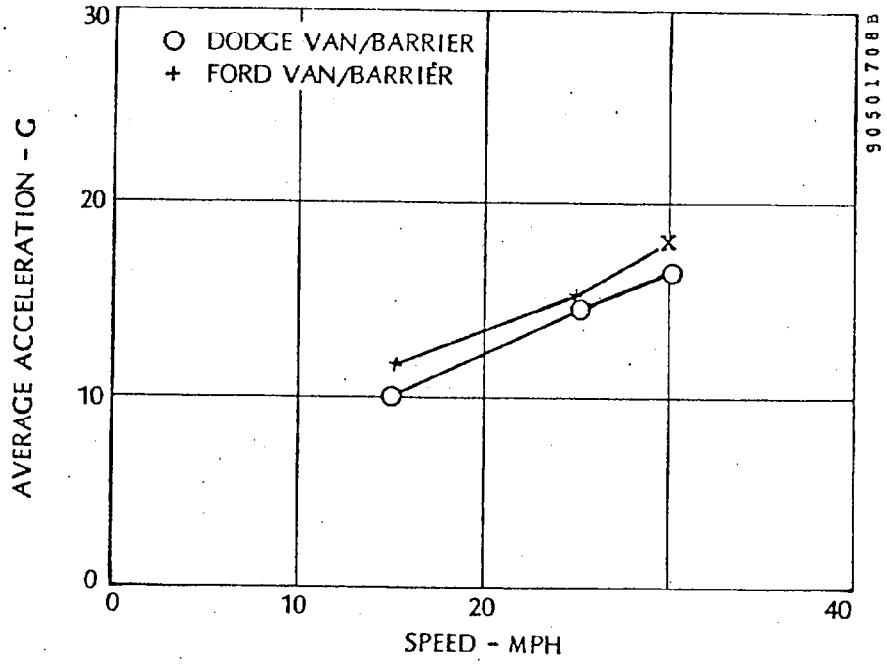


Figure 8-15. Average Compartment Acceleration Versus Speed.

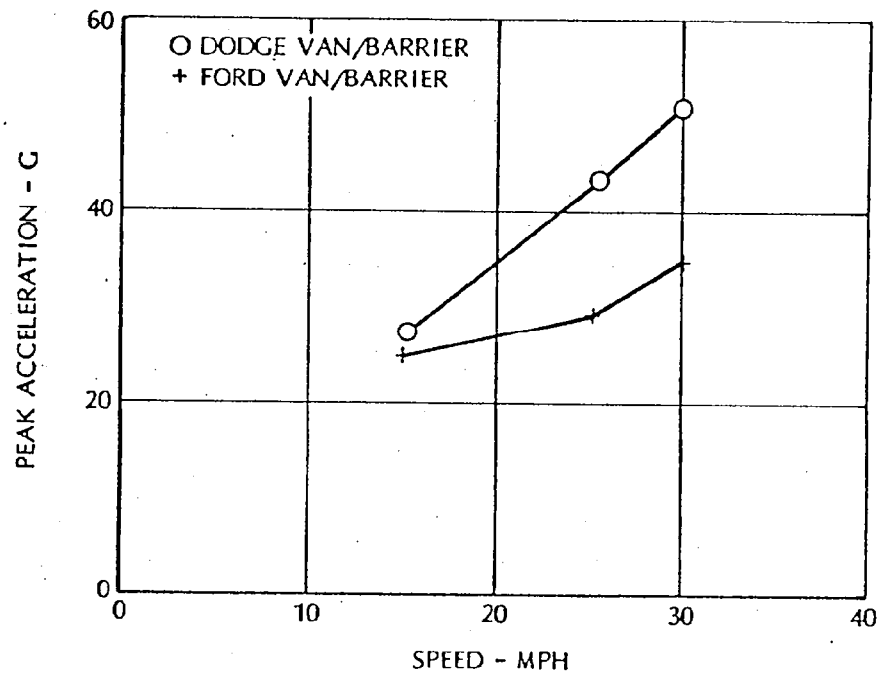


Figure 8-16. Maximum Compartment Acceleration Versus Speed.

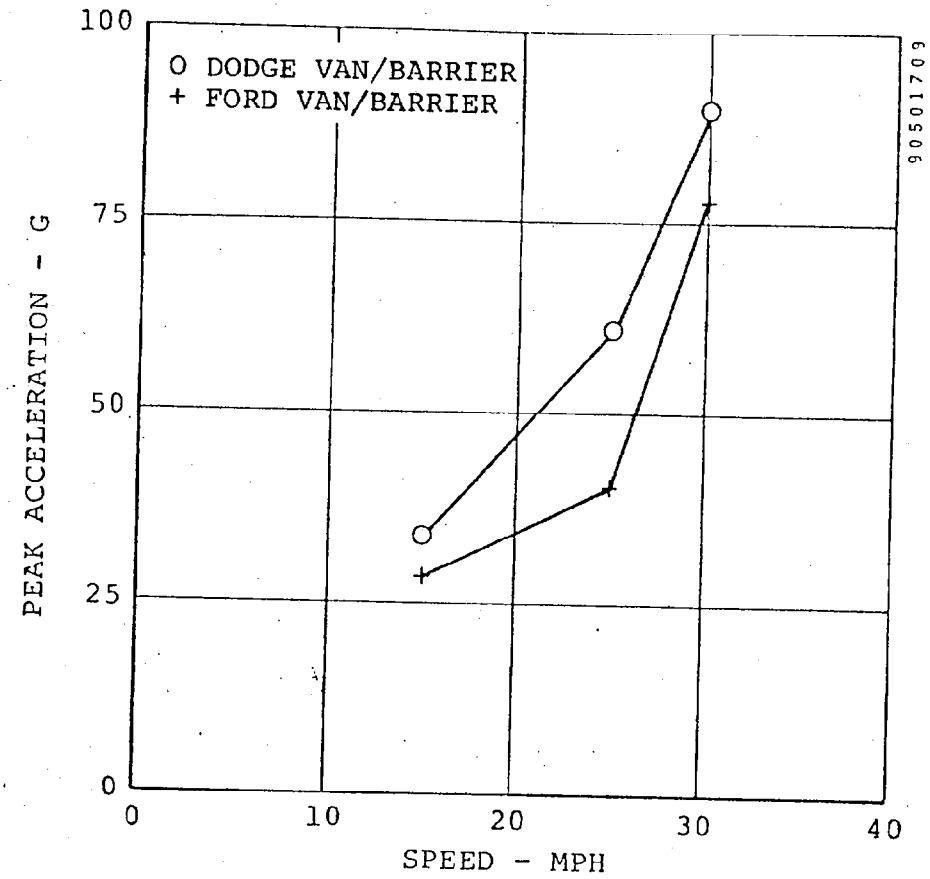


Figure 8-17. Maximum Engine Acceleration Versus Speed.

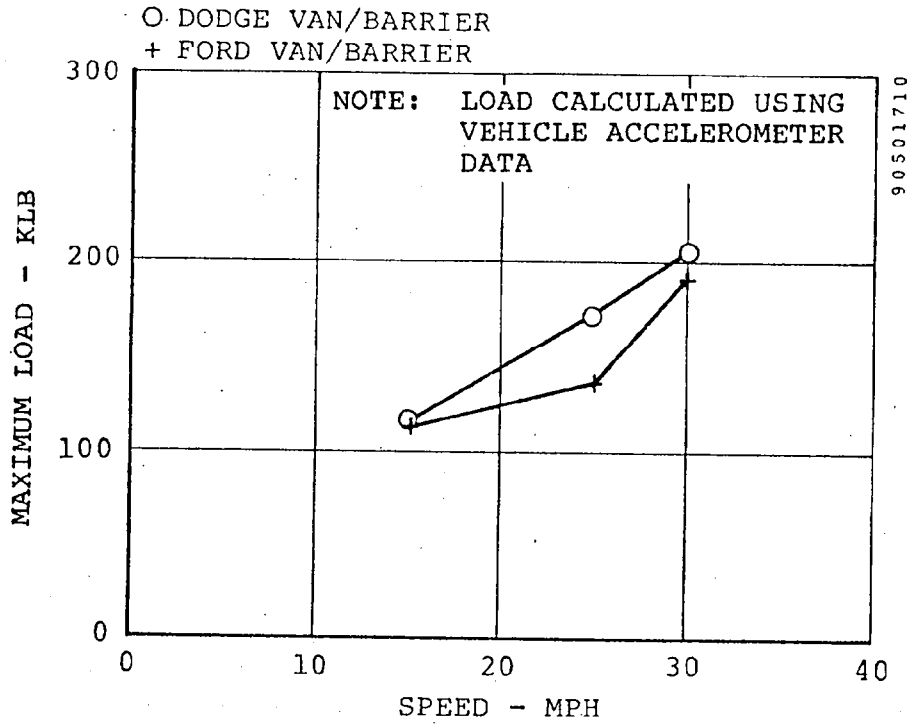


Figure 8-18. Maximum Vehicle Inertia Force Versus Impact Speed.

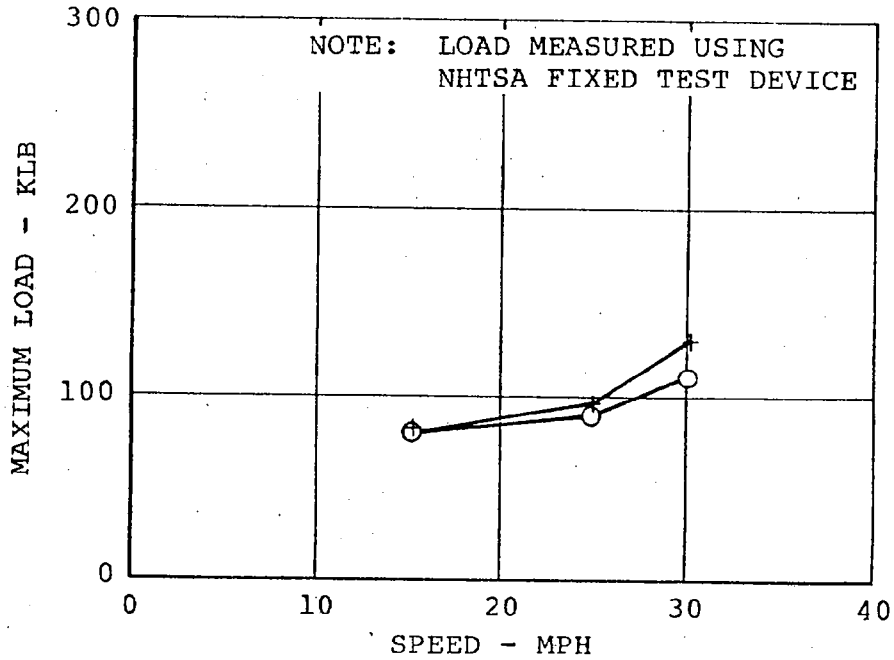


Figure 8-19. Total Measured Load Cell Force Versus Impact Speed.

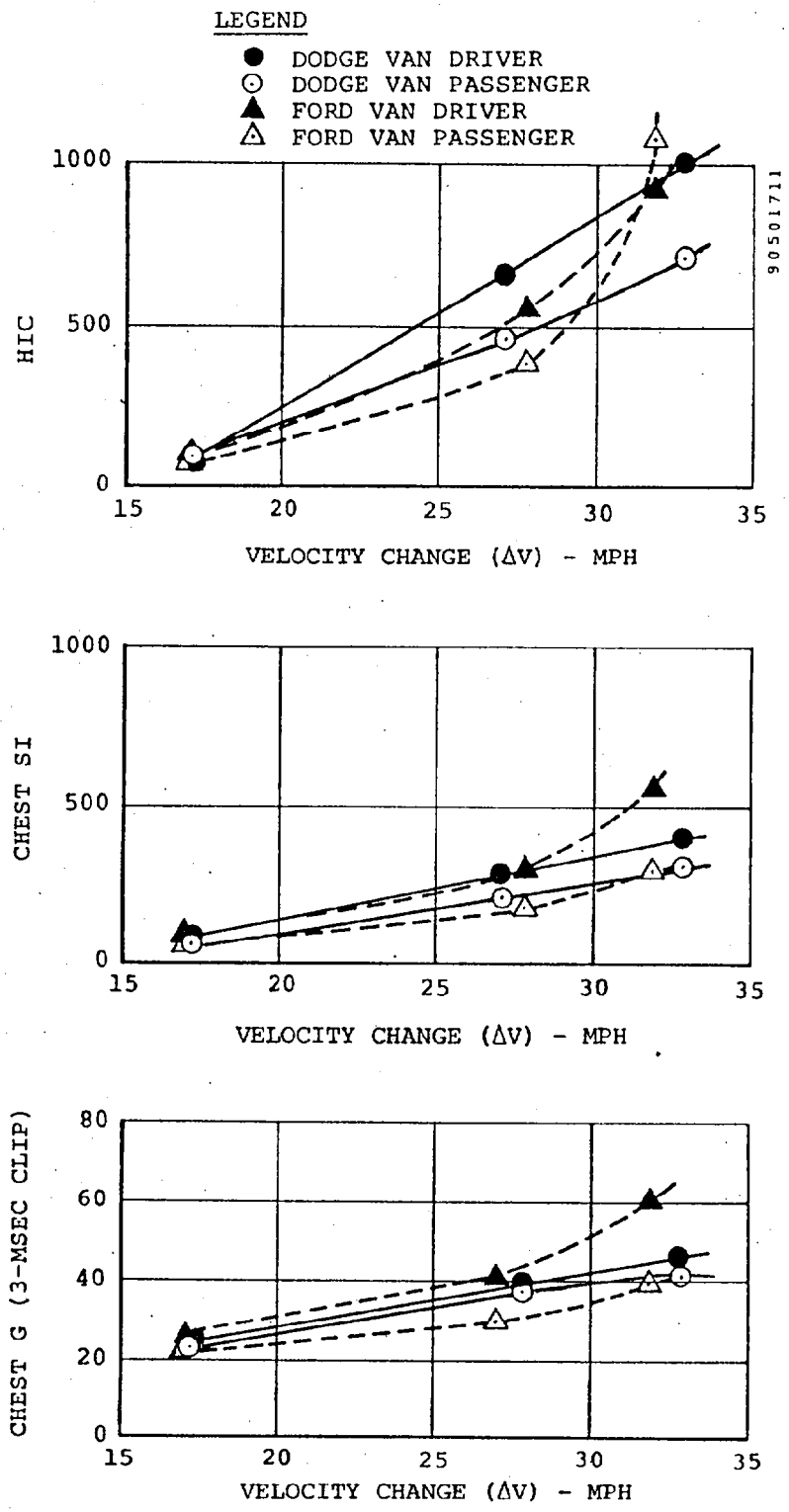


Figure 8-20. Head and Chest Parameters Versus Vehicle Velocity Change (Van-to-Barrier Tests).

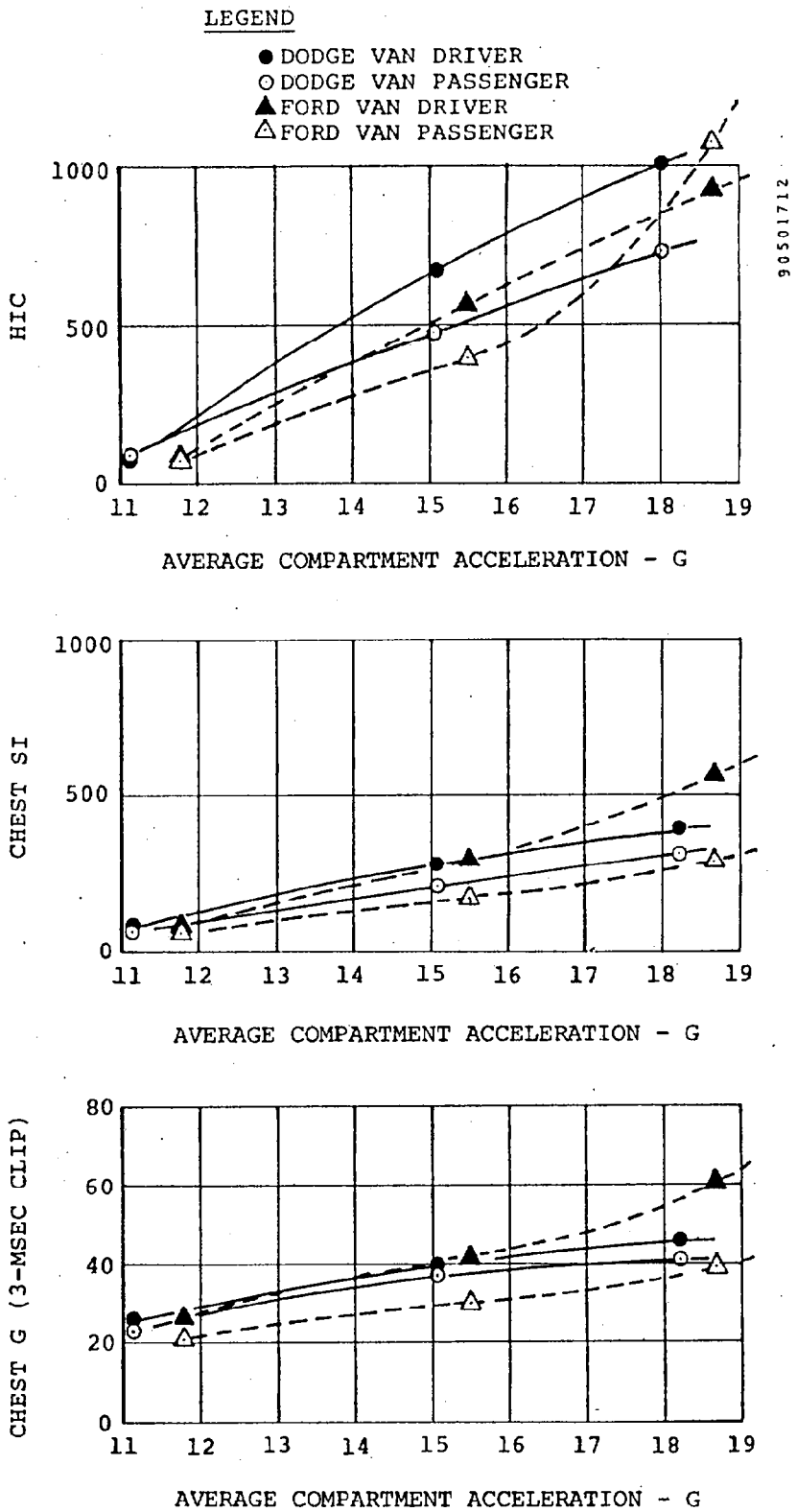


Figure 8-21. Head and Chest Parameters Versus Average Compartment Acceleration (Van-to-Barrier Tests).

3052-1 DOT ØØ5Ø - 3052-1
2 + DOT ØØ14 - 3052-2
3 DOT ØØ19 - 3052-3
4 DOT ØØ11 - 3052-4
5 + DOT Ø191 - 3052-5
6 DOT Ø192 - 3052-6
7 DOTØØ16 - 3052-7
8 DOTØØØ9

COPY

this test report covers tests #
11
50
14
19
191
192

This belongs in # 9, 191, Report

There is also a report in #14

The physical Report book is been microfiched for each test

Dynamic Science Inc.

A SUBSIDIARY OF TALLEY INDUSTRIES

1850 WEST PINNACLE PEAK ROAD · PHOENIX, ARIZONA 85027 · (602) 942-3300

Report No. (to be assigned by NHTSA)

-3052-8

VAN CRASHWORTHINESS AND AGGRESSIVITY STUDY

TEST REPORT 1

VAN-TO-NHTSA FIXED TEST DEVICE HEAD-ON IMPACT TESTS

VOLUME I

R. Yee
R. Cropper
S. Davis

Contract No. DOT-HS-8-01942
$111,121

June 1979

TEST REPORT

Document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161

Prepared for:

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
WASHINGTON, D.C. 20590

Prepared for the Department of Transportation, National Highway Traffic Safety Administration, under Contract No.: DOT-HS-8-01942.
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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle VAN CRASHWORTHINESS AND AGGRESSIVITY STUDY, TEST REPORT I, VAN-TO-NHTSA FIXED TEST DEVICE HEAD-ON IMPACT TESTS, VOLUME I		5. Report Date June 1979
		6. Performing Orgn Code
7. Author(s) R. Yee, R. Cropper, S. Davis		8. Performing Orgn Rpt No. 3052-79-95A
9. Performing Organization Name and Address Dynamic Science, Inc. A Talley Industries Company 1850 West Pinnacle Peak Road Phoenix, Arizona 85027		10. Work Unit No.
		11. Contract or Grant No. DOT-HS-8-01942, T.O. #4
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration 2100 Second Street, S.W. Washington, D.C. 20590		13. Type of Report and Period Covered TEST REPORT April - June 1979
		14. Sponsoring Agency Code

15. Supplementary Notes

Tests 1-6 of a series of 8 tests. Volume II contains Calcomp plots for the six tests.

16. Abstract

A series of eight full-scale van crash tests was conducted under Task 2 of Contract DOT-HS-8-01942, "Van Crashworthiness and Aggressivity Study." This report presents the results of six symmetric, head-on Van-to-NHTSA Fixed Test Device crash tests. Two different model vans were crashed at test speeds of 15, 25, and 30 mph. Tests 3052-1 through 3052-3 were conducted using 1979 Ford E-150 Econoline Vans, while Tests 3052-4 through 3052-6 were conducted using 1979 Dodge B-200 Vans.

The objective of these tests was to study the aggressivity of vans, to provide baseline test data to support extension of FMVSS 208 to vans, and to provide initial information for the future FMVSS 400 series standards upgrading.

This report contains all test results which include still photographs, dimensions, accelerometer location identification summaries of electronic data, and summaries of simulated occupant data. Volume II of this report contains all Calcomp plots of vehicle and NHTSA Test Device electronic data for each test.

17. Key Words	18. Distribution Statement
NHTSA Fixed Test Device, Ford E-150 Econoline Van, Dodge B-200 Van, Aggressivity, Crashworthiness	Available through National Technical Information Service, Springfield, Virginia 22161

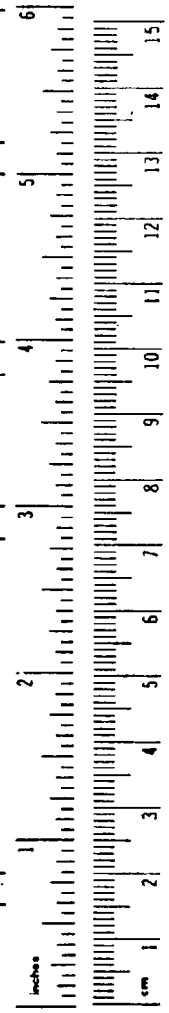
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. Pages	22. Price
Unclassified	Unclassified	164	

Form DOT F 1700.7 (8-69)

METRIC CONVERSION FACTORS

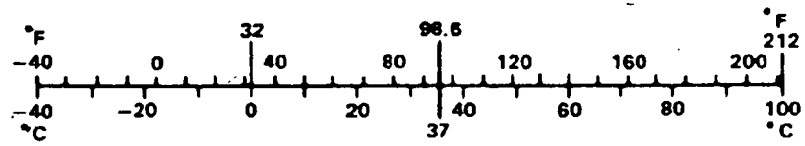
Approximate Conversions to Metric Measures

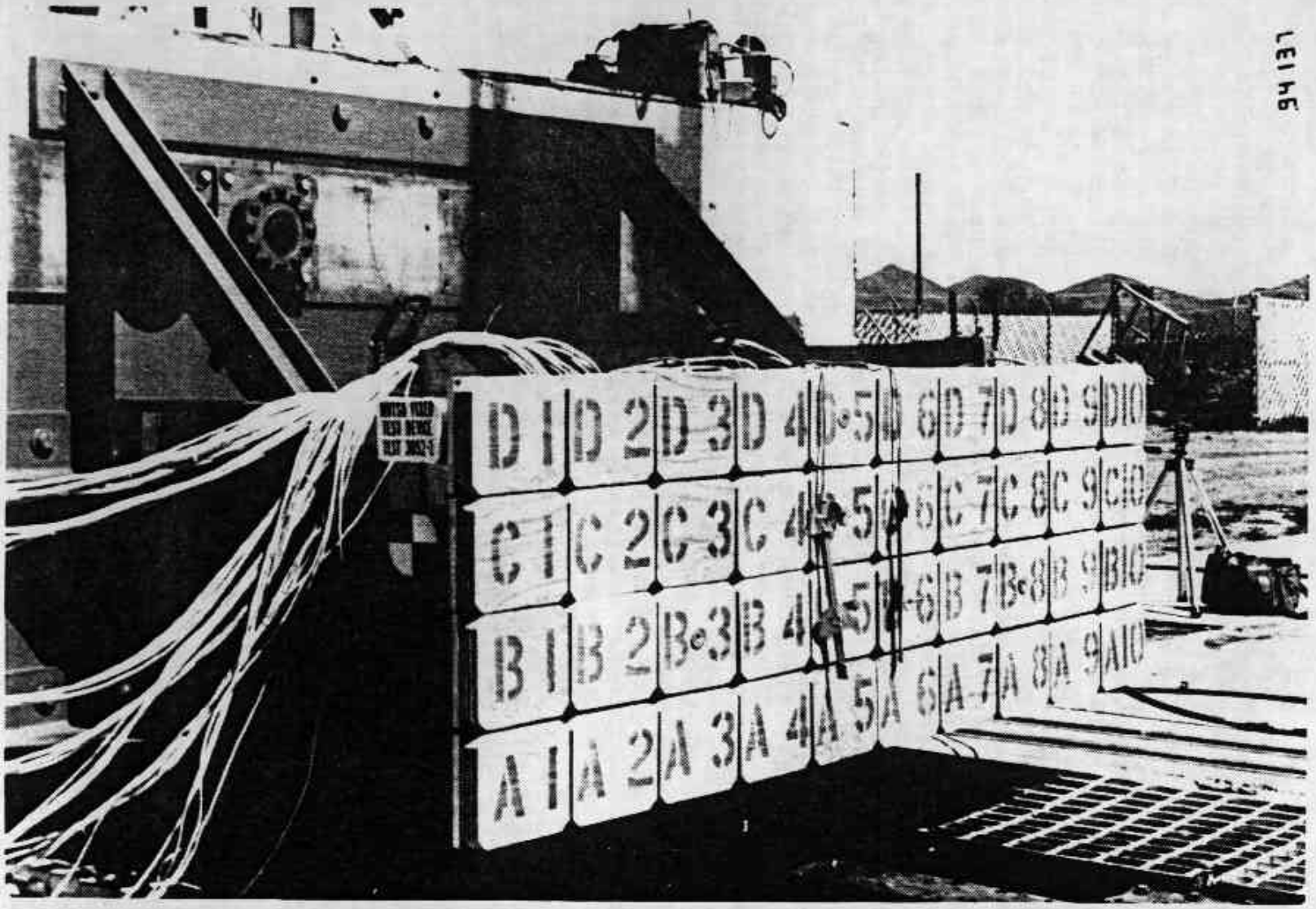
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	metric ton	t
		VOLUME		
tsp	teaspoons	5	milliliters	mL
Tbsp	tablespoons	15	milliliters	mL
in^3	cubic inches	16	milliliters	mL
fl oz	fluid ounces	30	milliliters	mL
c	cups	0.24	liters	L
pt	pints	0.47	liters	L
qt	quarts	0.95	liters	L
gal	gallons	3.8	liters	L
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	degrees Fahrenheit	5/9 (after subtracting 32)	degrees Celsius	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10 000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	metric ton (1000 kg)	1.1	short tons	
		VOLUME		
mL	milliliters	0.03	fluid ounces	fl oz
mL	milliliters	0.06	cubic inches	in^3
L	liters	2.1	pints	pt
L	liters	1.06	quarts	qt
L	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	degrees Celsius	9/5 (then add 32)	degrees Fahrenheit	°F





NHTSA Fixed Test Device With Barrier Extention and Plywood Face.

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
1.1	TEST OBJECTIVE	1
1.2	TEST SCOPE	2
1.3	VEHICLE INSTRUMENTATION	5
1.3.1	Test Vehicle Instrumentation	5
1.3.2	NHTSA Fixed Test Device Instrumentation	8
1.4	PHOTOGRAPHIC INSTRUMENTATION	8
2.0	PRESENTATION OF RESULTS (TEST 3052-1)	14
3.0	PRESENTATION OF RESULTS (TEST 3052-2)	34
4.0	PRESENTATION OF RESULTS (TEST 3052-3)	54
5.0	PRESENTATION OF RESULTS (TEST 3052-4)	74
6.0	PRESENTATION OF RESULTS (TEST 3052-5)	94
7.0	PRESENTATION OF RESULTS (TEST 3052-6)	114
8.0	ANALYSIS OF VEHICLE IMPACT VELOCITY CHANGES	134

LIST OF ILLUSTRATIONS

Figure		Page
1-1	1979 Chevrolet Impala Interface With NHTSA Fixed Test Device	4
1-2	Test Vehicle Accelerometer Instrumentation - Ford E-150 Van (Tests 3052-1, 2, and 3)	6
1-3	Test Vehicle Accelerometer Instrumentation - Dodge B-200 Van (Tests 3052-4, 5, and 6)	7
1-4	1979 Ford Econoline 150 Van/NHTSA Fixed Test Device Interface	9
1-5	1979 Dodge B-200 Van/NHTSA Fixed Test Device Interface	10
1-6	Bumper/Test Device Interface - 1979 Ford E-150 Van	11

LIST OF ILLUSTRATIONS (CONTD)

Figure		Page
1-7	Bumper/Test Device Interface - 1979 Dodge B-200 Van.	12
2-1	Vehicle Configuration (Test 3052-1).	18
2-2	Post-test Vehicle Configuration (Test 3052-1). .	19
2-3	Vehicle Dummy Configuration (Test 3052-1). . . .	20
2-4	1979 Ford E-150 Van Exterior Static Crush (Test 3052-1).	25
2-5	1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-1)	27
3-1	Vehicle Configuration (Test 3052-2).	38
3-2	Post-test Vehicle Configuration (Test 3052-2). .	39
3-3	Vehicle Dummy Configuration (Test 3052-2). . . .	40
3-4	1979 Ford E-150 Van Exterior Static Crush (Test 3052-2).	45
3-5	1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-2)	47
4-1	Vehicle Configuration (Test 3052-3).	58
4-2	Post-test Vehicle Configuration (Test 3052-3). .	59
4-3	Vehicle Dummy Configuration (Test 3052-3). . . .	60
4-4	1979 Ford E-150 Van Exterior Static Crush (Test 3052-3).	65
4-5	1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-3)	67
5-1	Vehicle Configuration (Test 3052-4).	78
5-2	Post-test Vehicle Configuration (Test 3052-4). .	79
5-3	Vehicle Dummy Configuration (Test 3052-4). . . .	80
5-4	1979 Dodge B-200 Van Exterior Profile and Static Crush (Test 3052-4)	85

LIST OF ILLUSTRATIONS (CONTD)

Figure		Page
5-5	1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-4)	87
6-1	Vehicle Configuration (Test 3052-5)	98
6-2	Post-test Vehicle Configuration (Test 3052-5)	99
6-3	Vehicle Dummy Configuration (Test 3052-5)	100
6-4	1979 Dodge B-200 Van Exterior Profile and Static Crush (Test 3052-5)	105
6-5	1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-5)	107
7-1	Vehicle Configuration (Test 3052-6)	118
7-2	Post-test Vehicle Configuration (Test 3052-6)	119
7-3	Vehicle Dummy Configuration (Test 3052-6)	120
7-4	1979 Dodge B-200 Van Exterior Profile and Crush (Test 3052-6)	125
7-5	1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-6)	127
8-1	Driver Head Injury Criteria (HIC) Versus Impact Speed	137
8-2	RF Passenger Head Injury Criteria (HIC) Versus Impact Speed	137
8-3	Driver Chest Severity Index (SI) Versus Impact Speed	138
8-4	RF Passenger Chest Severity Index (SI) Versus Impact Speed	138
8-5	Driver Peak Chest Resultant Versus Impact Speed	139
8-6	RF Passenger Peak Chest Resultant Versus Impact Speed	139
8-7	Driver Left Femur Load Versus Impact Speed	140
8-8	Driver Right Femur Load Versus Impact Speed	140
8-9	RF Passenger Left Femur Load Versus Impact Speed	141

LIST OF ILLUSTRATIONS (CONTD)

Figure		Page
8-10	RF Passenger Right Femur Load Versus Impact Speed.	141
8-11	Dynamic Crush (Accelerometer Data) Versus Impact Speed.	143
8-12	Dynamic Crush (Film Data) Versus Impact Speed	143
8-13	Static Crush Versus Impact Speed.	144
8-14	Velocity Change (ΔV) Versus Impact Speed. . . .	144
8-15	Average Compartment Acceleration Versus Impact Speed.	145
8-16	Maximum Compartment Acceleration Versus Impact Speed.	145
8-17	Maximum Engine Acceleration Versus Speed. . . .	146
8-18	Maximum Vehicle Inertia Force Versus Impact Speed.	147
8-19	Total Measured Load Cell Force Versus Impact Speed.	147
8-20	Head and Chest Parameters Versus Vehicle Velocity Change (Van-to-Barrier Tests).	148
8-21	Head and Chest Parameter Versus Average Compartment Acceleration (Van-to-Barrier Tests).	149

LIST OF TABLES

Table		Page
1-1	TEST MATRIX - VAN CRASHWORTHINESS AND AGGRESSIVITY STUDY - 3052	3
1-2	VEHICLE AND FIXED TEST DEVICE INSTRUMENTATION SUMMARY.	5
1-3	CAMERA LOCATIONS FOR VAN-TO-NHTSA FIXED DEVICE IMPACT TESTS	13
2-1	CRASH TEST SUMMARY (TEST 3052-1).	15
2-2	VEHICLE INSPECTIONS SHEET (TEST 3052-1)	16

LIST OF TABLES (CONTD)

Table		Page
2-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-1)	17
2-4	PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-1)	17
2-5	CHRONOLOGY OF EVENTS (TEST 3052-1)	21
2-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-1)	22
2-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-1)	23
2-8	EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-1)	24
2-9	INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-1)	26
2-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-1)	28
2-11	SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-1)	29
2-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-1)	30
2-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-1)	31
2-14	SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-1)	32
2-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-1)	33
2-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-1)	33
3-1	CRASH TEST SUMMARY (TEST 3052-2)	35
3-2	VEHICLE INSPECTION SHEET (TEST 3052-2)	36
3-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-2)	37
3-4	PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-2)	37

LIST OF TABLES (CONTD)

Table		Page
3-5	CHRONOLOGY OF EVENTS (TEST 3052-2)	41
3-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-2)	42
3-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-2)	43
3-8	EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-2)	44
3-9	INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-2)	46
3-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-2)	48
3-11	SUMMARY OF VEHICLE ACCLEROMETER DATA (TEST 3052-2)	49
3-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-2)	50
3-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-2)	51
3-14	SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-2)	52
3-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-2)	53
3-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-2)	53
4-1	CRASH TEST SUMMARY (TEST 3052-3)	55
4-2	VEHICLE INSPECTION SHEET (TEST 3052-3)	56
4-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-3)	57
4-4	PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-3)	57
4-5	CHRONOLOGY OF EVENTS (TEST 3052-3)	61
4-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-3)	62

LIST OF TABLES (CONTD)

Table		Page
4-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-3)	63
4-8	EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-3)	64
4-9	INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-3)	66
4-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-3)	68
4-11	SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-3)	69
4-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-3)	70
4-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-3)	71
4-14	SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-3)	72
4-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-3)	73
4-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-3)	73
5-1	CRASH TEST SUMMARY (TEST 3052-4)	75
5-2	VEHICLE INSPECTION SHEET (TEST 3052-4)	76
5-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-4)	77
5-4	PRE-TEST DUMMY POSITIONS - DODGE B-200 VAN (TEST 3052-4)	77
5-5	CHRONOLOGY OF EVENTS (TEST 3052-4)	81
5-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-4)	82
5-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-4)	83
5-8	EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-4)	84

LIST OF TABLES (CONTD)

Table		Page
5-9	INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN. (TEST 3052-4)	86
5-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-4)	88
5-11	SUMMARY OF VHEICLE ACCELEROMETER DATA (TEST 3052-4)	89
5-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-4)	90
5-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-4)	91
5-14	SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-4)	92
5-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-4)	93
5-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-4)	93
6-1	CRASH TEST SUMMARY (TEST 3052-5)	95
6-2	VEHICLE INSPECTION SHEET (TEST 3052-5)	96
6-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-5)	97
6-4	PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-5)	97
6-5	CHRONOLOGY OF EVENTS (TEST 3052-5)	101
6-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-5)	102
6-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-5)	103
6-8	EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-5)	104
6-9	INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-5)	106
6-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-5)	108

LIST OF TABLES (CONTD)

Table		Page
6-11	SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-5)	109
6-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-5)	110
6-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-5)	111
6-14	SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-5)	112
6-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-5)	113
6-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-5)	113
7-1	CRASH TEST SUMMARY (TEST 3052-6)	115
7-2	VEHICLE INSPECTION SHEET (TEST 3052-6)	116
7-3	SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-6)	117
7-4	PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-6)	117
7-5	CHRONOLOGY OF EVENTS (TEST 3052-6)	121
7-6	SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-6)	122
7-7	PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-6)	123
7-8	EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-6)	124
7-9	INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-6)	126
7-10	STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-6)	128
7-11	SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-6)	129
7-12	OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-6)	130

LIST OF TABLES (CONTD)

Table		Page
7-13	SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-6)	131
7-14	SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-6)	132
7-15	SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-6)	133
7-16	COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-6)	133
8-1	COMPARISON OF OCCUPANT RESPONSE DATA	136
8-2	COMPARISON OF VEHICLE RESPONSE DATA	142

1.0 INTRODUCTION

A series of eight full-scale van crash tests was conducted as required under Task 2 of Contract No. DOT-HS-8-01942 (Task Order #4), "Van Crashworthiness and Aggressivity Study," sponsored by the National Highway Traffic Safety Administration. This report presents the results of Tests 3052-1 through 3052-6, symmetric, head-on Van-to-NHTSA Fixed Test Device crash tests. This report is presented in two volumes. Volume I is the test report which contains summaries of all the test results. Volume II contains the Calcomp plots for all vehicle and NHTSA Test Device electronic data gathered during the conduct of these tests.

Test Report 2 presents the results of Tests 3052-7 and 3052-8 Van-to-car symmetric, head-on impact tests. Test Report 3 presents measurements gathered for accident investigation data relating to vehicle crash trajectory and residual crush. Also included in this report are moment of inertia measurements made on each make/model vehicle tested using the NHTSA Mobile Parametric Measuring Device.

1.1 TEST OBJECTIVE

The object of these tests was to:

- Study the crashworthiness and aggressivity of vans
- Provide baseline van collision data to support FMVSS 208, Occupant Crash Protection
- Support current vehicle standards and provide initial information for future FMVSS 400 series standards upgrading.

1.2 TEST SCOPE

The test matrix and summary of test conditions for conducting the van crash tests are shown in Table 1-1. Test speeds of 15, 25, and 30 mph were chosen as target speeds for two different models of vans which impacted the NHTSA Fixed Test Device. Tests 3052-1 through 3052-3 were conducted using 1979 Ford E-150 Econoline Vans, while Tests 3052-4 through 3052-6 were conducted using 1979 Dodge B-200 Vans. The NHTSA Fixed Test Device is a unique, segmented, load-measuring barrier which was supported by a 36-inch extension which attached to a rigid barrier. Its frontal height was set to simulate the front of a Chevrolet Impala (see Figure 1-1). The front face of each load-measuring module used a 7" x 8" x 1-1/2" plywood surface instead of the six-inch aluminum honeycomb block.

In each test, the van contained two instrumented Alderson Part 572, 50th percentile male anthropomorphic dummies (GFE) located in the two front outboard seating positions. Each occupant was restrained with the vehicle's production restraint system. (The Dodge Van's standard, two-point restraint system was replaced by the production, three-point restraint system.) The seat tracks were put at midposition, but not welded in place. Fuel was removed from the vans and replaced with water. Vehicles which contained tilt steering wheels were tested with the wheel placed in the lowermost driving position, per direction of the NHTSA Contract Technical Manager.

TABLE 1-1. TEST MATRIX - VAN CRASHWORTHINESS AND AGGRESSIVITY STUDY - 3052

Test Number	Test Date (Tentative)	Test Configuration	Vehicle Model/ Dynamic Science No.	Vehicle Weight (±10 lb)	Closing Speed (mph)
●3052-1	4/10/79	Van-to-Load Cell Barrier Head-on	A - 1979 Ford Econoline 150 Van/#865	4,990	15.25
			B - NHTSA Fixed Test Device	>100,000	
●3052-2	4/11/79	Van-to-Load Cell Barrier Head-on	A - 1979 Ford Econoline 150 Van/#866	4,997	25.10
			B - NHTSA Fixed Test Device	>100,000	
●3052-3	4/12/79	Van-to-Load Cell Barrier Head-on	A - 1979 Ford Econoline 150 Van/#863*	4,998	30.02
			B - NHTSA Fixed Test Device	>100,000	
●3052-4	4/17/79	Van-to-Load Cell Barrier Head-on	A - 1979 Dodge B-200 Van/ #844	4,647	25.17
			B - NHTSA Fixed Test Device	>100,000	
●3052-5	4/18/79	Van-to-Load Cell Barrier Head-on	A - 1979 Dodge B-200 Van/ #845*	4,654	30.22
			B - NHTSA Fixed Test Device	>100,000	
●3052-6	4/19/79	Van-to-Load Cell Barrier Head-on	A - 1979 Dodge B-200 Van/ #846	4,651	15.28
			B - NHTSA Fixed Test Device	>100,000	
3052-7	5/09/79	Van-to-Car Symmetric Head-on	A - 1978 Ford Econoline 150 Van/#893	4,994	63.58
			B - 1979 Chevrolet Impala/ #837*	4,400	
3052-8	5/11/79	Van-to-Car Symmetric Head-on	A - 1979 Dodge B-200 Van/ #843	4,649	62.28
			B - 1979 Chevrolet Impala/ #838	4,403	

*Scheduled for Mobile Parametric Measuring Device Test. (5/21/79)
Note: Bullets indicate tests included in this report.

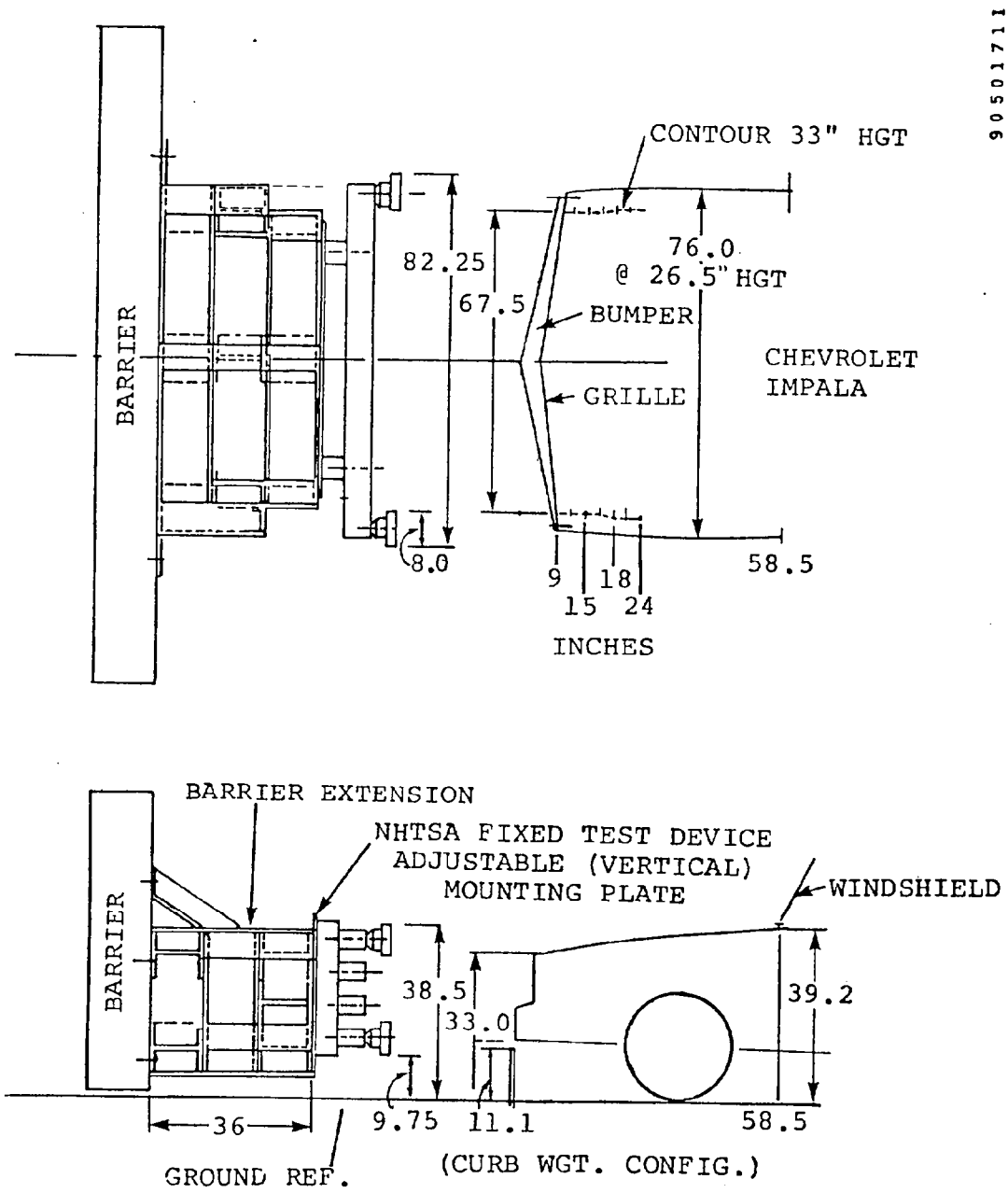


Figure 1-1. 1979 Chevrolet Impala Interface With NHTSA Fixed Test Device.

1.3 VEHICLE INSTRUMENTATION

See Table 1-2 for a summary of vehicle and Fixed Test Device instrumentation. A total of 87 data channels were used in conducting these tests. Van instrumentation consisted of 41 data channels requiring the use of three Remote Sensing Control Modules (RSCM's). The NHTSA Fixed Test Device contained a total of 46 data channels requiring the use of 4 RSCM's.

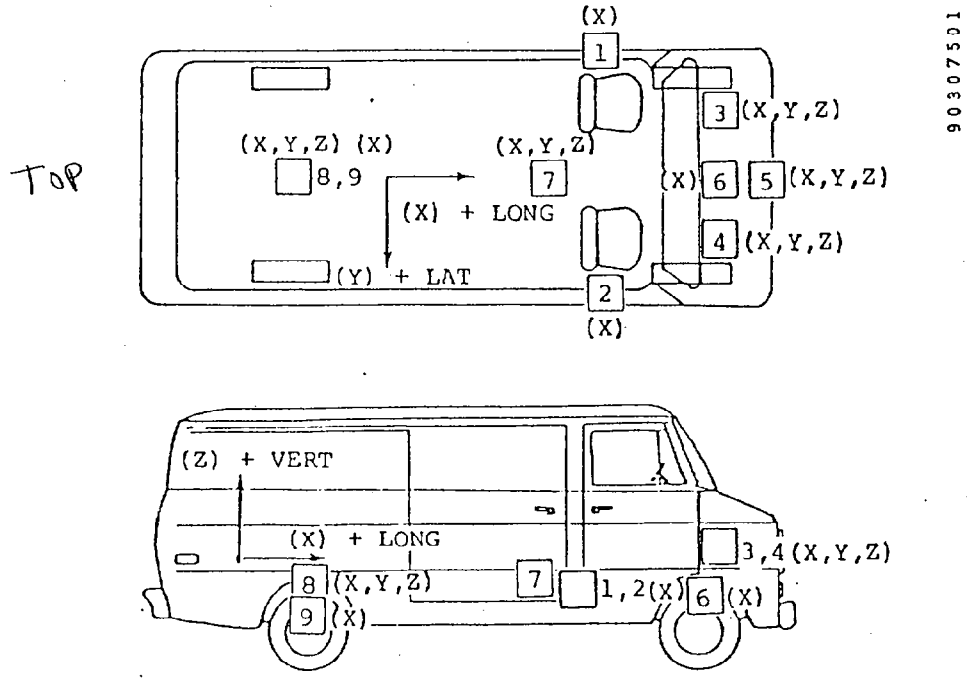
TABLE 1-2. VEHICLE AND FIXED TEST DEVICE INSTRUMENTATION SUMMARY

	Locations		Data Channels
Van Instrumentation			
Vehicle Accelerometers*	9		19
Dummy Instrumentation: Head (3), Chest (3), Femur (2)	2		16
Seat Belt Load Cells: Lap (2), Shoulder (1)	2		6
		Total	41 - 3 RSCM's
NHTSA Fixed Test Device Instrumentation			
Load Cells	40		40
String Potentiometers	6		6
		Total	46 - 4 RSCM's

*See Figures 1-2 and 1-3 for locations.

1.3.1 Test Vehicle Instrumentation

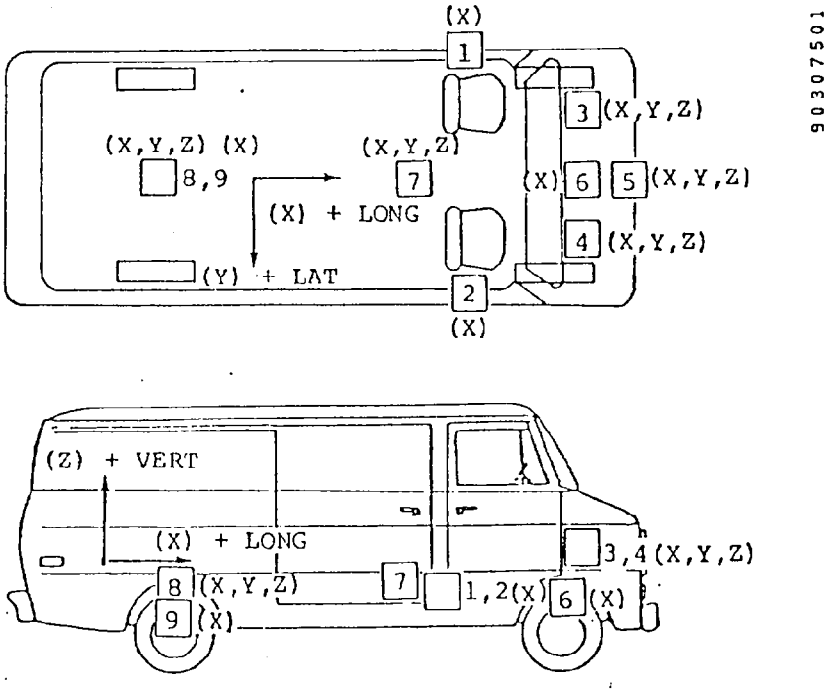
In addition to having two fully-instrumented anthropomorphic dummies, the test vehicle was instrumented with 19 accelerometers mounted in 9 locations. Figures 1-2 and 1-3 show the vehicle accelerometer locations for the Ford Van and Dodge Van, respectively.



Ford E-150 Van Accelerometer Locations					Maximum* Expected Reading		
No.	Description of Location	X**	Y**	Z**	Long. (G)	Lat. (G)	Vert. (G)
1	Left B-pillar near floor	108	-29	26	50		
2	Right B-pillar near floor	108	29	26	50		
3	Left firewall inside compartment	156	-25	34	100	100	100
4	Right firewall inside compartment	156	16	36	100	100	100
5	Top engine block	151	3	35	200	200	200
6	Front axle	165	0	12	200		
7	Vehicle center of gravity	113	0	12	50	50	50
8	Cargo area over rear axle	38	-3	28	50	50	50
9	Rear axle	37	3	8	100		

*25- and 30-mph crashes only -- values reduced by 50% for 15-mph crashes.
**X coordinate - centerline of rear bumper; Y coordinate - vehicle centerline; Z coordinate - ground level.

Figure 1-2. Test Vehicle Accelerometer Instrumentation - Ford E-150 Van (Tests 3052-1, 2, and 3).



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Dodge B-200 Van Accelerometer Locations					Maximum* Expected Reading		
No.	Description of Location	X**	Y**	Z**	Long. (G)	Lat. (G)	Vert. (G)
1	Left B-pillar near floor	108	-32	26	50		
2	Right B-pillar near floor	108	32	26	50		
3	Left firewall inside compartment	157	-24	41	100	100	100
4	Right firewall inside compartment	152	23	38	100	100	100
5	Top engine block	142	3	34	200	200	200
6	Front axle	149	3	9	200		
7	Vehicle center of gravity	110	0	26	50	50	50
8	Cargo area over rear axle	38	0	28	50	50	50
9	Rear axle	48	0	15	100		

*25- and 30-mph crashes only -- values reduced by 50% for 15-mph crashes.
**X coordinate - centerline of rear bumper; Y coordinate - vehicle centerline; Z coordinate - ground level.

Figure 1-3. Test Vehicle Accelerometer Instrumentation - Dodge B-200 Van (Tests 3052-4, 5, and 6).

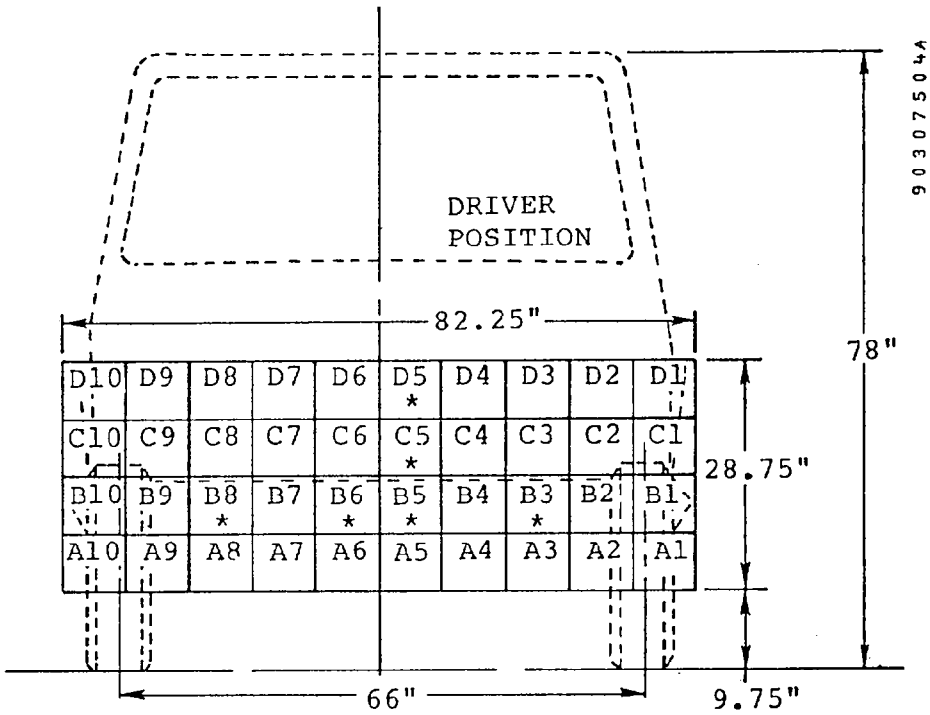
Dummy instrumentation and seat belt load cells required an additional 22 data channels, making a total of 41 data channels required for van instrumentation.

1.3.2 NHTSA Fixed Test Device Instrumentation

The Fixed Test Device was instrumented with forty 12.5 klb interface load cells and six Celesco dynamic string potentiometers. Figures 1-4 and 1-5 show the frontal interface areas for each model van. A side view of the van bumper/Test Device interface is shown in Figures 1-6 and 1-7 for each model van. The front face of the Fixed Test Device was modified to use 40 pieces of 1-1/2-inch thick, grade AB plywood rather than the standard 6-inch 50 psi aluminum honeycomb. In addition, the Test Device was attached to a 36-inch extension from the fixed barrier and set at a frontal height similar to the front of a Chevrolet Impala.

1.4 PHOTOGRAPHIC INSTRUMENTATION

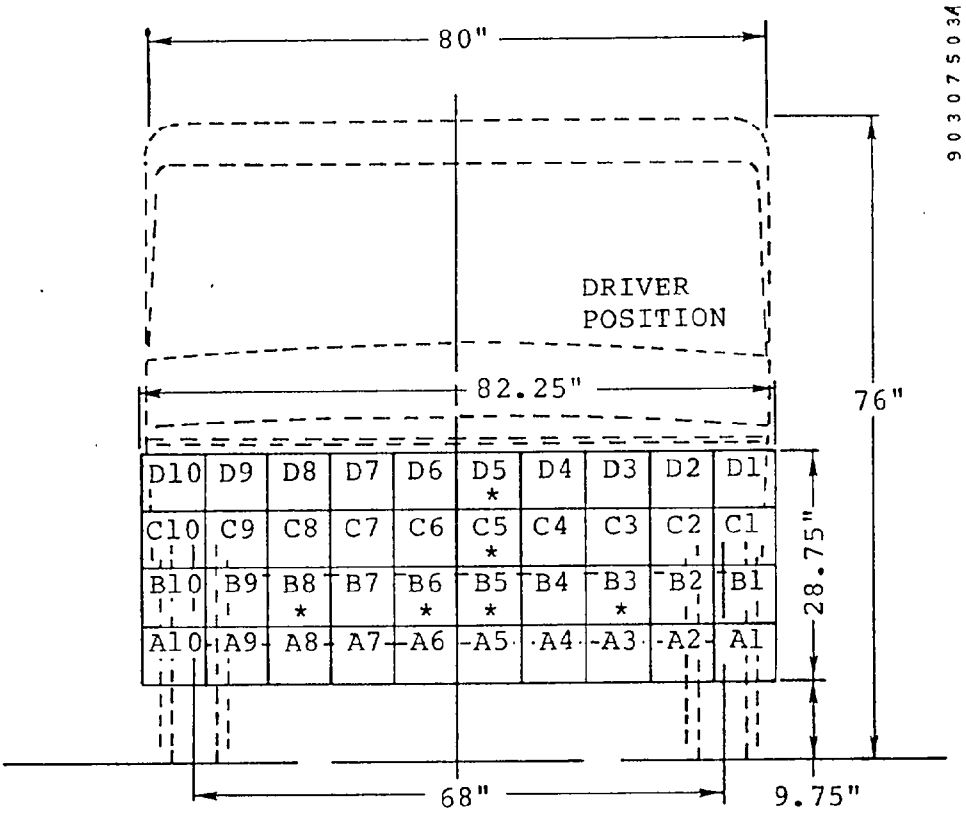
In all tests, seven high-speed cameras (five 1000 fps and two 500 fps) and one panning camera (24 fps) were used to cover the crash event (see Table 1-3). Two of the cameras used were mounted on board the vans to observe occupant kinematics. In addition to high-speed cameras, black-and-white and color slides were taken to record pre-test and post-test vehicle and dummy positions. These items have been submitted to NHTSA.



View from Rear of Test Device.

*Location of instrumentation modules that use 1210-LT-12.5K load cells which have holes for string potentiometer cables.

Figure 1-4. 1979 Ford Econoline 150 Van/NHTSA Fixed Test Device Interface.



View from Rear of Test Device.

*Location of instrumentation modules that use 1210-LT-12.5K load cells which have holes for string potentiometers.

Figure 1-5. 1979 Dodge B-200 Van/NHTSA Fixed Test Device Interface.

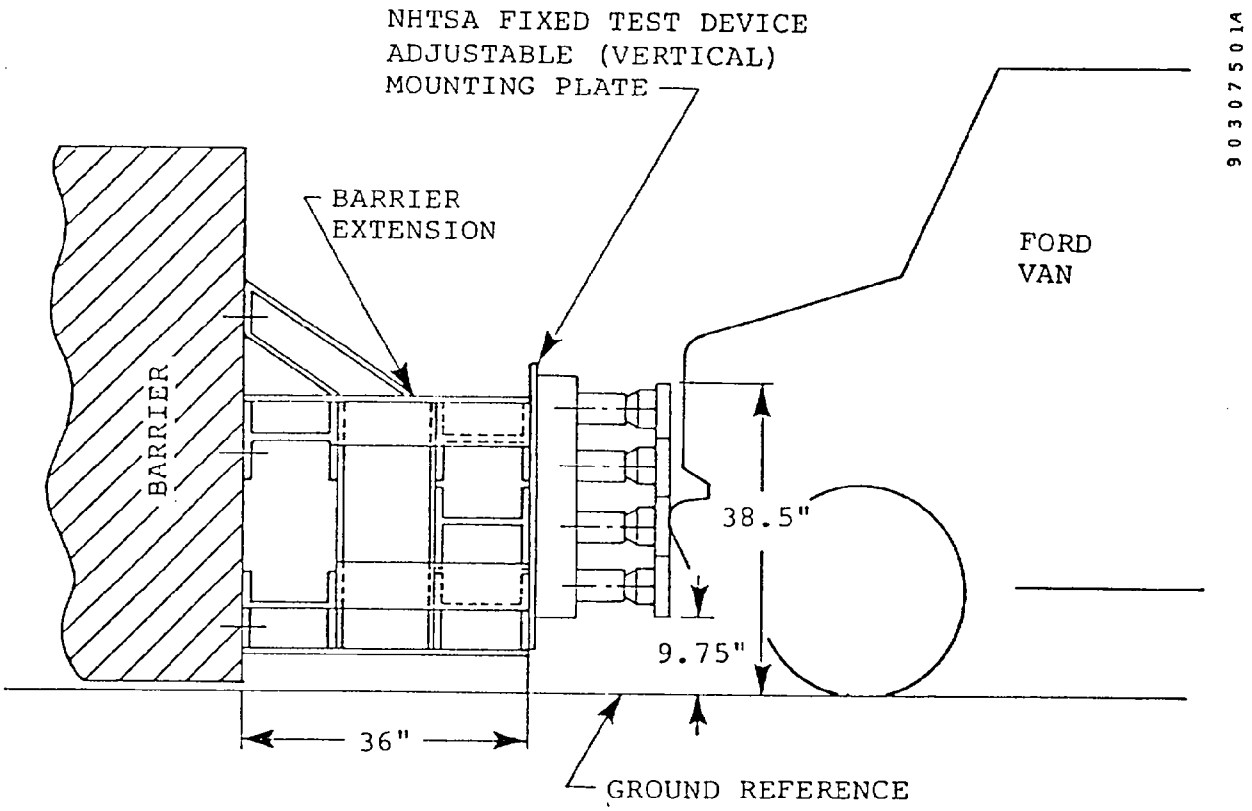


Figure 1-6. Bumper/Test Device Interface - 1979 Ford E-150 Van.

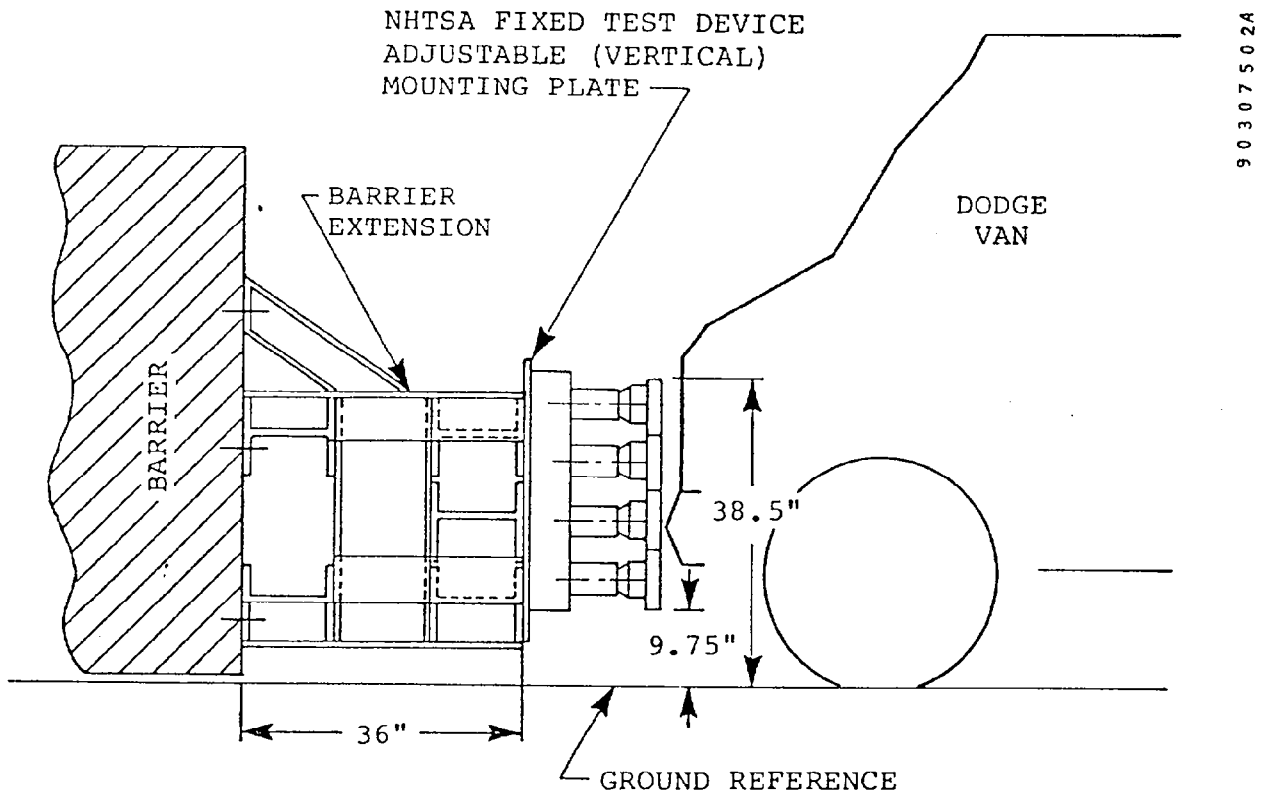


Figure 1-7. Bumper/Test Device Interface - 1979 Dodge B-200 Van.

TABLE 1-3. CAMERA LOCATIONS FOR VAN-TO-NHTSA FIXED TEST DEVICE IMPACT TESTS

Test No: 3052-1 through 6 Test Date: See Table 1-1

Test Type: Van-to-NHTSA Fixed Test Device

Vehicle A: 1979 Dodge B-200 Van (Tests 3052-1 to 3052-3)
1979 Ford E-150 Van (Tests 3052-4 to 3052-6)

Vehicle B: NHTSA Fixed Test Device

Comments: Cameras at locations 6 and 7 did not operate during Tests 3052-1 and 3052-2.

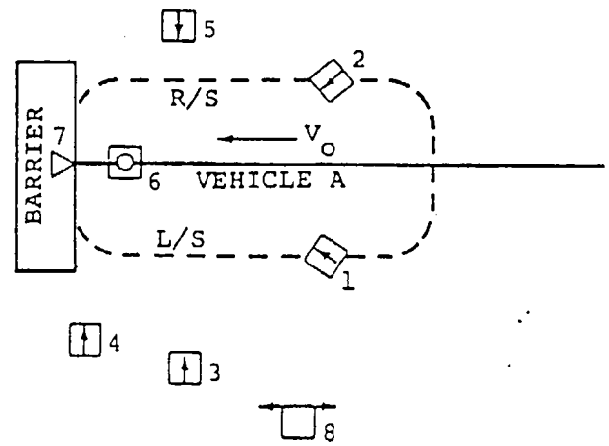
CAMERA	YES
STILLS	X
SLIDES	X
MOVIE	X
POLAROID	
VIDEO	

CAMERA SYMBOLS

- PIT
- GROUND
- BARRIER
- OVERHEAD
- ON-BOARD
- PANNING

FRAME RATE

1. 1000 fr/sec
2. 200 fr/sec
3. Other 24 fr/sec
4. 400 fr/sec
5. 500 fr/sec



Loc. No.	Location	Field of View	Lens Size	Frm Rate	Ser No	Impact Dist-X	C.L. Dist-Y	CAM Hght-Z
1	Onboard (R/S)	Right front seat and occupant	8mm	1				
2	Onboard (L/S)	Left front seat and occupant	8mm	1				
3	Left Side	Left side overall	13mm	1				
4	Left Side	Closeup of barrier and occupant compartment	25mm	1				
5	Right Side	Right side overall	13mm	1				
6	Pit	Under structure of vehicle including fuel tank	10mm	5				
7	Barrier	Occupants through front windshield	ZOOM	5				
8	Left Side	Panning test and overall results		3				

DSI FORM NO. TSO 125

2.0 PRESENTATION OF RESULTS (TEST 3052-1)

This section of the report presents the results of Test No. 3052-1, a head-on, symmetric crash test between a 1979 Ford E-150 Econoline Van and the NHTSA Fixed Test Device (V_O = 15.25 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix A (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 2-1. CRASH TEST SUMMARY (TEST 3052-1)

TEST NO. 3052-1 CONTRACT: DOT-HS-8-01942

TEST DATE: April 10, 1979 TIME: 1313 TEMPERATURE: 61 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Ford Econoline E-150 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	186.5/79.4	
Test Weight by Wheel (lb)	LF 1304 RF 1345 LR 1156 RR 1185	
Total Weight (lb)	4990	>100,000
Wheelbase (in.)	124.4	
Longitudinal C.G. (From Center of Front Axle) (in.)	58.4	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	15.25	0
Final Speed (mph @ msec)	-1.84 @ 68	
Velocity Change (mph)	17.09	
Maximum Averaged Compartment Acceleration (G @ msec)	-25.14 @ 16	
Maximum Engine Acceleration (G @ msec)	-28.50 @ 54	
Maximum Mutual Dynamic Crush (Film Data) (in.)	8.1	
Maximum Static Crush		
• Bottom of Windshield (in.)	0.0	
• Hood Level (in.)	1.8	
• Between Bumper/Hood (in.)	6.9	
• Bumper Level (in.)	5.8	
Maximum Post-test Intrusion (in.)	0.2	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #759	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 2-2. VEHICLE INSPECTION SHEET (TEST 3052-1)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: E14HHEF4397 Make: Ford

NHTSA No.: R&D

Year: 1979 Color: White Model: Econoline E-150 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [ ] no [X] Bucket: X

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [ ] no [X]

Tinted Glass: yes [X] no [ ] Rear Window Def.: yes [ ] no [X] Split Back Bench: ____

Radio: yes [ ] no [X] Brakes: drum: R disc: F

Clock: yes [ ] no [X]

Tire Size: L78-15 Ply Rating: 4 Mfg. & Line: Goodyear

Bias Ply: ____ Belted: X Radial ____ /Eng. Type: V-8 Cylinders: 8 Total Displ: 351 CID

Trans, # Fwd. Speeds: 3 Shipping Weight: 4,094 lb Odometer: 388.5

Dealer (name, address, and phone number)

Remarks (list additional accessories not listed above)

Sliding side door

Date of Manufacture: 1-79 Dynamic Science No.: 865 Date Received: 3-12-79

Tilting Steering Wheel: yes [ ] no [X] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: ____ (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap and shoulder belts

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, wheel covers, and wipers removed. All fluids except for engine coolant removed. 100% water in fuel tank.

2. Does vehicle show evidence of prior accident history? Describe: No

3. Does vehicle show any significant corrosion? Describe: No

4. Check condition of the front bumper and frame: Satisfactory

TABLE 2-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-1)

Test No. 3052-1 Type Van-to-NHTSA Fixed Test Device

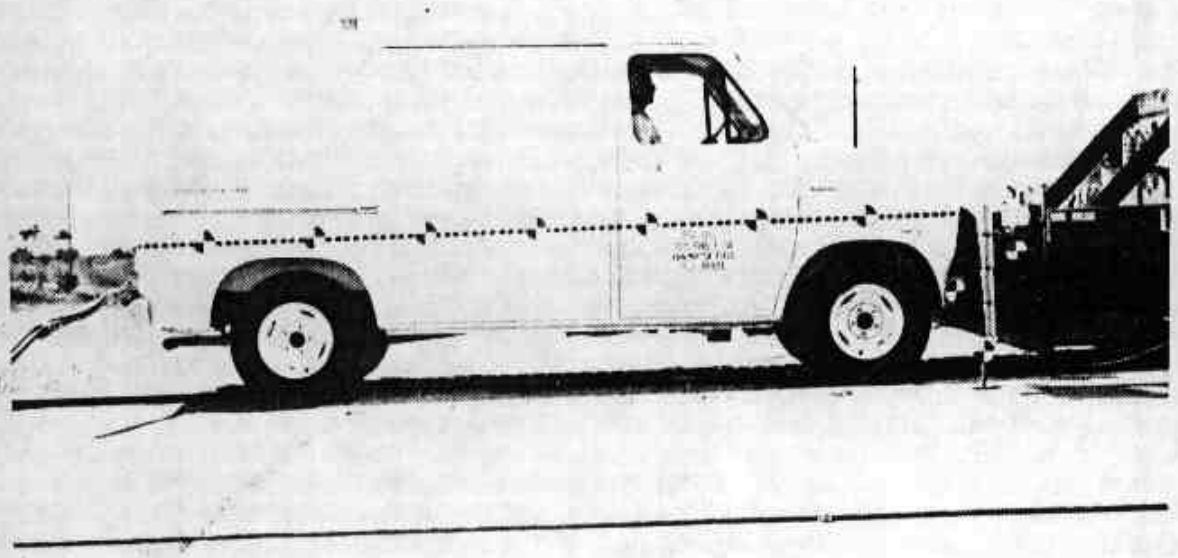
Car Model 1979 Ford E-150 Van Dynamic Science No. 865

Engine Size	351 CID
Engine Weight* (lb)	825
Engine Height/Width (in.)	33.7/19.2
Bumper to Engine Block (in.)	26.9
Engine Length (in.)	19.8
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	28.7
Bumper Height (in.) (Min./Max.)	17.0/23.9

*Includes engine and rigid attachments such as transmission and drive train.

TABLE 2-4. PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-1)

Distances (in.)	Driver	Passenger
Chest to Steering Wheel Hub (horizontal)	15.0	
Nose to Steering Wheel Upper Rim	18.7	
Nose to Windshield (horizontal)	27.2	24.2
Knee to Lower Panel (closest point)		
Left	8.5	7.3
Right	8.3	7.5
Chest to Dash (horizontal)	25.1	21.8
Forehead to Header	18.7	17.9



a) Pre-test

b) Post-test

Figure 2-1. Vehicle Configuration (Test 3052-1).

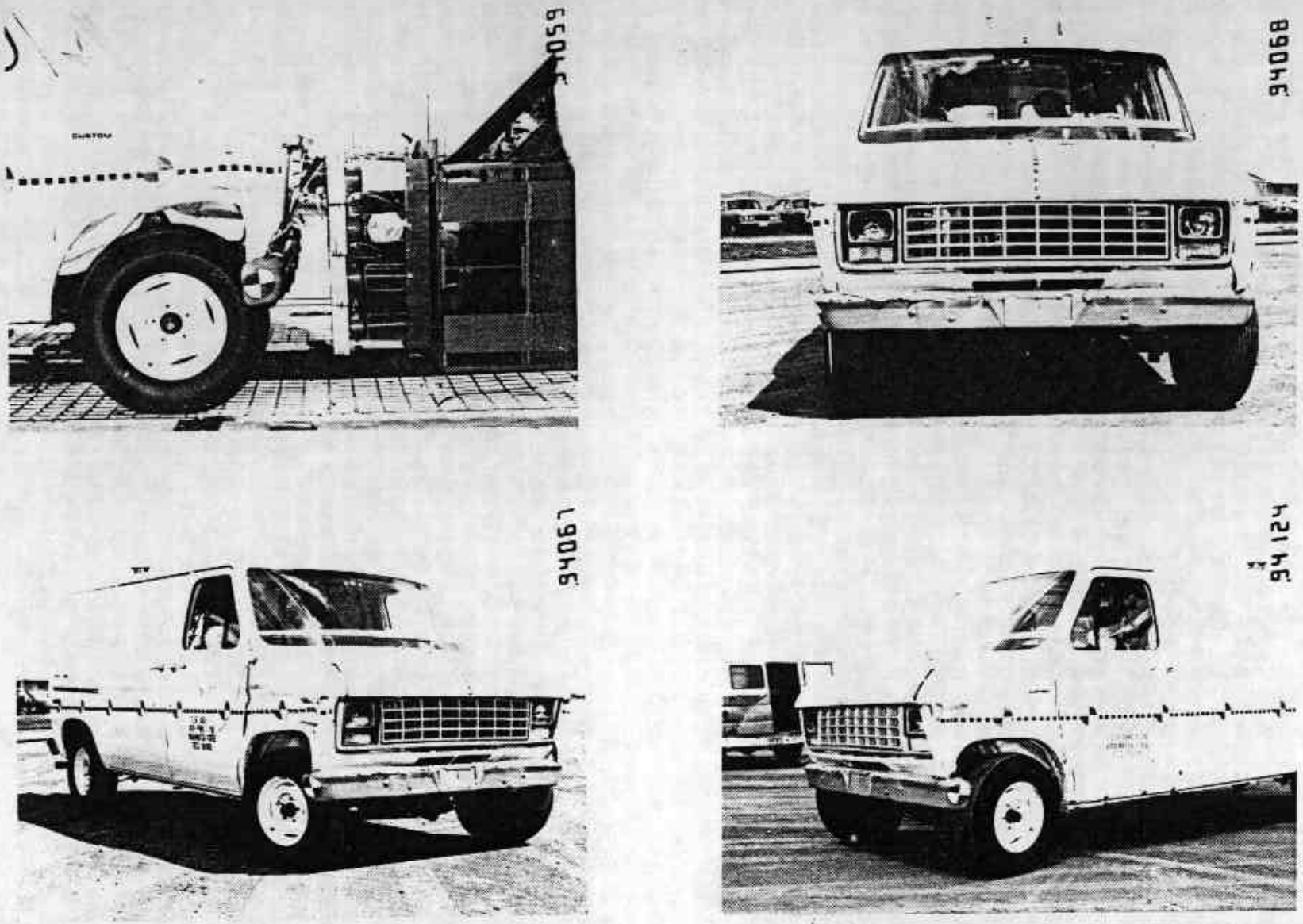
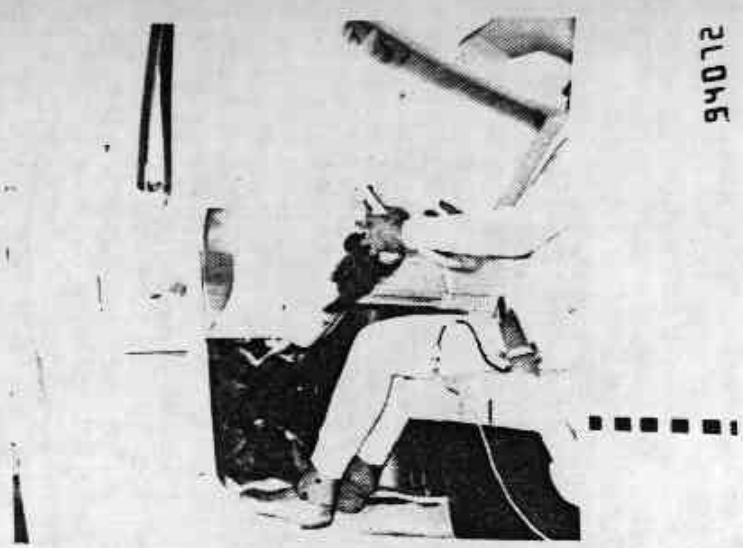
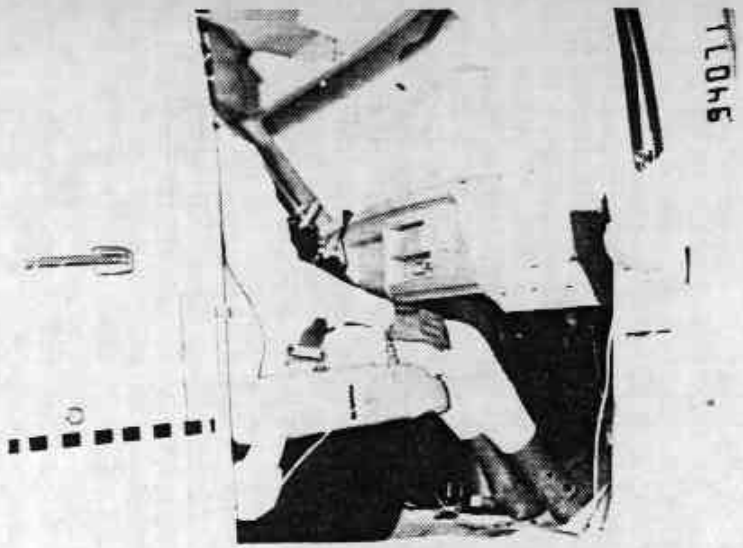


Figure 2-2. Post-test Vehicle Configuration (Test 3052-1).

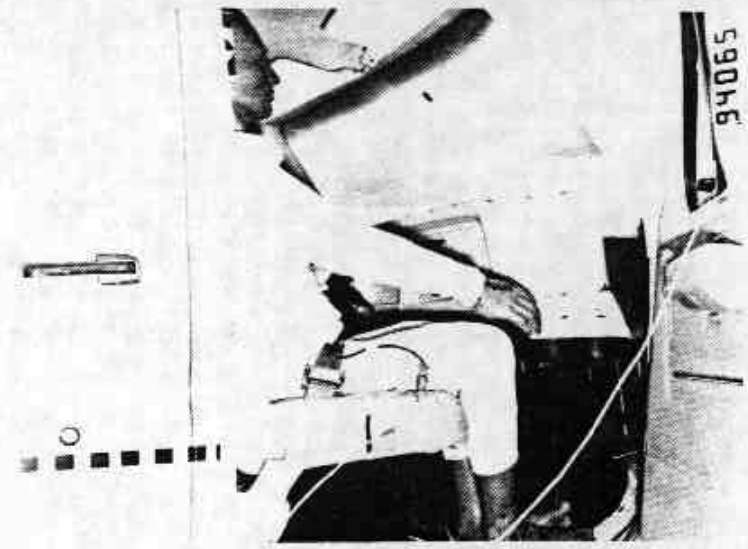


a) Pre-test Driver



c) Pre-test Passenger

b) Post-test Driver



d) Post-test Passenger

Figure 2-3. Vehicle Dummy Configuration (Test 3052-1).

TABLE 2-5. CHRONOLOGY OF EVENTS (TEST 3052-1)

VEHICLE: 1979 Ford Econoline E-150 Van

Time (msec)	Crash Event
0	Impact (visual)
6	Grille hits Test Device
14	Fenders hit Test Device
23	Bumper strikes front tires
24	Dummies start forward motion
50	Maximum vehicle dynamic crush (8.1 in.)
58	Minimum right side wheelbase (123.7 in.); Passenger dummy knees strike dash
60	Driver dummy hands strike dash
64	Minimum left side wheelbase (123.7 in.); Driver dummy knees strike dash
73	Passenger strikes engine cowling with left hand
80	Left rear tire leaves ground
85	Driver chest strikes steering wheel lower rim
112	Maximum vehicle declination (2.5°)
117	Driver head strikes steering wheel upper rim
122	Left rear tire recontacts ground
127	Maximum forward motion of both dummies
134	Vehicle separates from Test Device
252	Driver recontacts seat with upper back
262	Passenger recontacts seat with upper back
402	Maximum vehicle rebound inclination (1.75°)

TABLE 2-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-1)

VEHICLE: 1979 Ford Econoline E-150 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	Steering column upper rim	None
Chest----------	Steering Wheel lower rim	None
Knees----------	Lower dash panel	None

Glazing: Windshield 100% intact

Doors: All opened easily

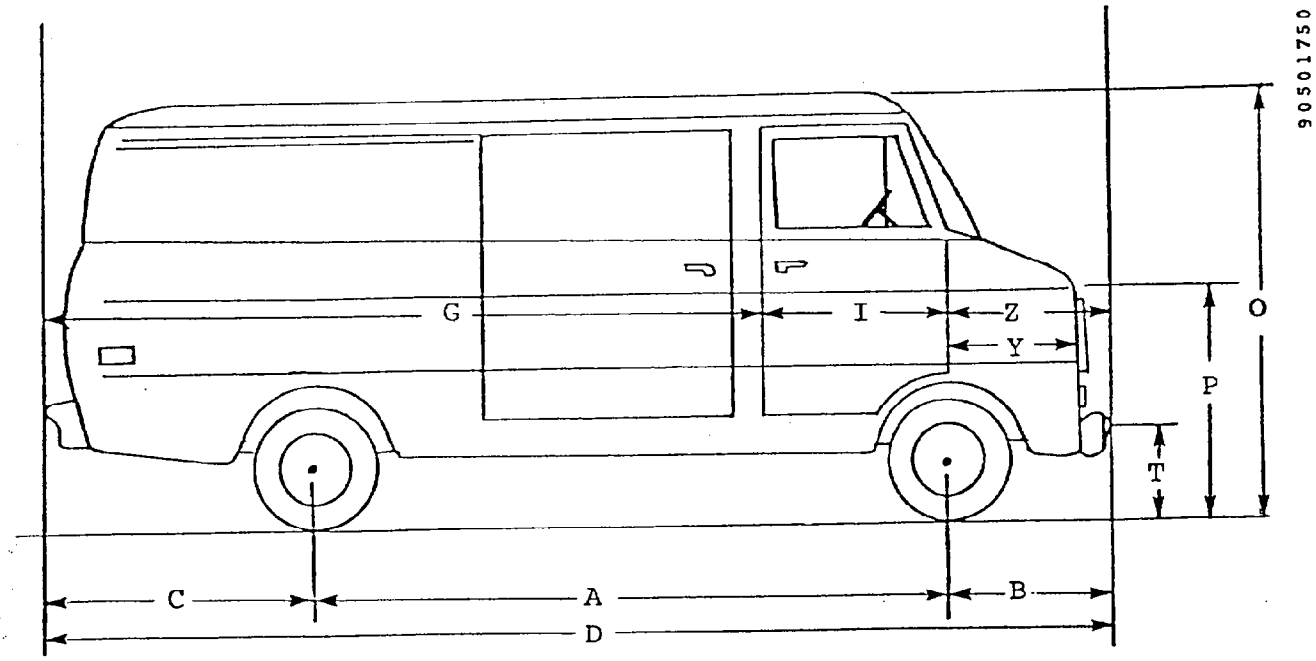
Seat Belt Anchorages and Restraints: Anchorages intact. No seat movement

Vehicle Centerline to Barrier Centerline: Front: 0 inch, Rear: 0 inch

Fuel Leakage: None

General Observations: Bumper struck both tires and locked up front wheels. Van rebounded 7 inches. Very little vehicle interior intrusion.

TABLE 2-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-1)



VEHICLE: 1979 FORD ECONOLINE E-150 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	124.2	124.5	124.3	124.7	-0.1	-0.2
B	24.8	25.0	19.2	19.3	5.6	5.7
C	37.3	37.1	37.3	37.1	0.0	0.0
D	186.3	186.6	180.8	181.1	5.5	5.5
G	109.5	109.3	109.6	109.5	-0.1	-0.2
I	37.4	37.4	37.3	37.4	0.1	0.0
O	78.6	78.3	78.9	78.6	0.3	0.3
P	42.3	42.2	42.7	41.9	0.4	-0.3
T	22.4	22.3	24.0	23.5	1.6	1.2
Y	37.8	37.5	32.8	32.7	5.0	4.8
Z	39.4	39.9	33.9	34.2	5.5	5.7

TABLE 2-8. EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-1)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)*							Distance Right of Center (in.)*					
			36	30	24	18	12	6	0	6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	52.6	190	39.4	36.1	33.5	32.1	31.1	30.5	30.2	30.5	31.1	32.1	33.6	36.2	39.4
Hood Level	42.5	190	6.4	5.8	5.4	5.1	4.9	4.8	4.7	4.8	5.0	5.3	5.6	6.0	6.6
Between Bumper/Hood	34.5	190	7.0	6.6	5.7	5.3	5.0	4.8	4.7	4.8	4.9	5.1	5.5	6.6	7.2
Bumper Level	21.9	190	4.7	4.1	3.9	3.6	3.5	4.3	4.4	4.3	3.4	3.5	3.7	4.0	4.6
Post-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	53.4	190	39.4	35.9	33.4	31.9	30.9	30.3	30.1	30.4	31.0	32.0	33.6	36.1	39.3
Hood Level	42.4	190	8.2	6.5	6.2	5.9	5.7	5.5	5.5	5.5	5.6	5.9	6.1	6.5	8.4
Between Bumper/Hood	36.2	190	10.2	13.5	9.1	8.9	8.9	8.9	9.0	9.4	9.3	9.2	9.3	13.4	10.2
Bumper Level	23.6	190	10.2	9.6	9.4	9.2	9.1	10.1	10.1	10.0	9.1	9.2	9.4	9.5	10.0
Post-test Static Crush (in.)															
Bottom of Windshield	-0.8	0.0	0.0	-0.2	-0.1	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.1
Hood Level	0.1	0.0	1.8	0.7	0.8	0.8	0.8	0.7	0.8	0.7	0.6	0.6	0.5	0.5	1.8
Between Bumper/Hood	-1.7	0.0	3.2	6.9	3.4	3.6	3.9	4.1	4.3	4.6	4.4	4.1	3.8	6.8	3.0
Bumper Level	-1.7	0.0	5.5	5.5	5.5	5.6	5.6	5.8	5.7	5.7	5.7	5.7	5.7	5.5	5.4

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

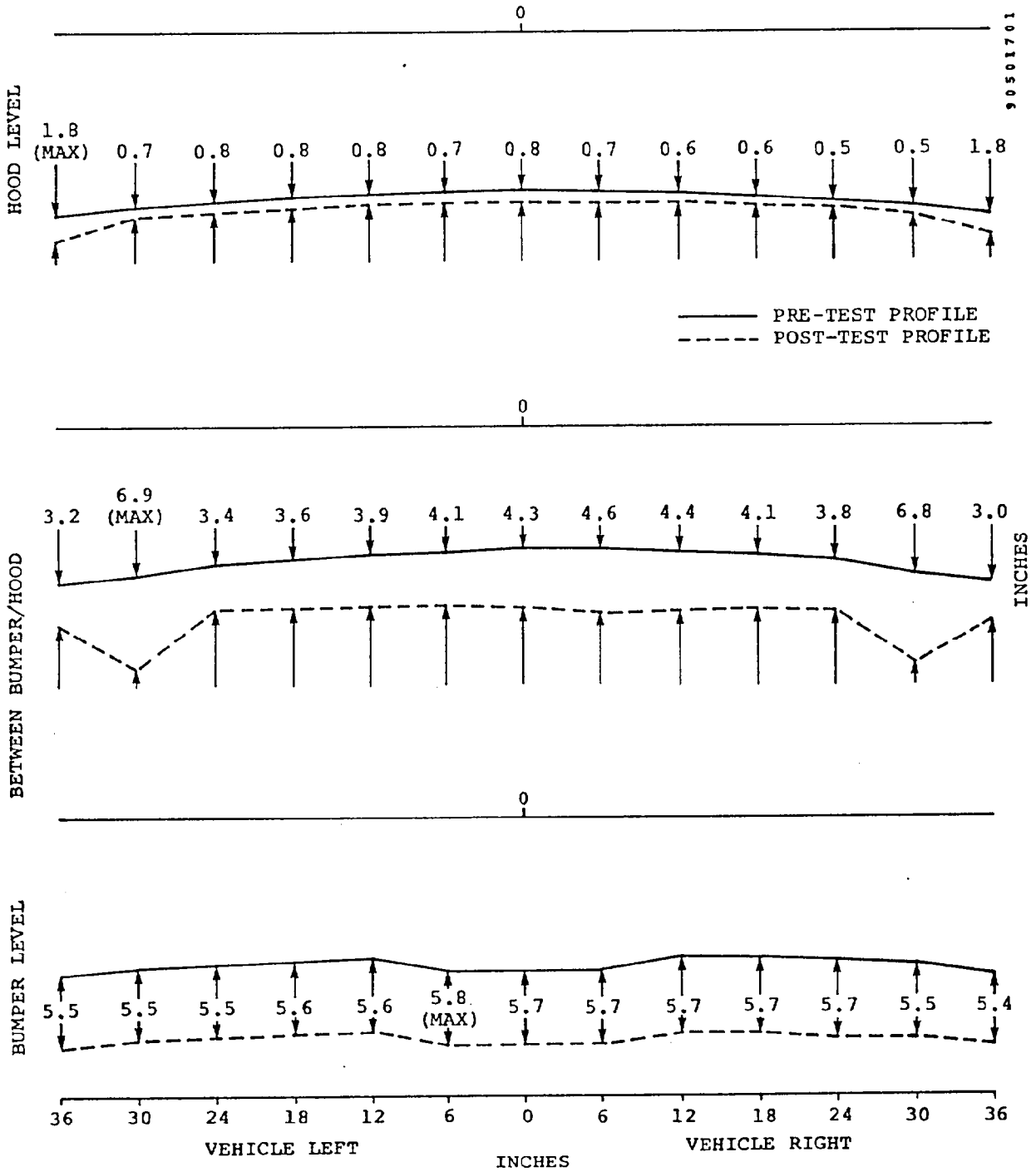


Figure 2-4. 1979 Ford E-150 Van Exterior Static Crush (Test 3052-1).

TABLE 2-9. INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-1)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	58.2	125		16.1	16.2	16.3	16.3	16.4	16.4	16.5	17.4	18.3	18.4	18.4	
Knee Level	45.3	130		12.9	12.9	11.4	12.9	8.2	8.0	8.1	9.2	12.6	12.5	12.6	
Floor Level	30.6	130		19.6	25.0	25.0	27.5	5.5	3.9	3.8	5.9	22.0	22.4	18.0	
Post-test Profile - Distance from R.P. (in.)															
Dash Level	58.6	125		16.2	16.2	16.3	16.4	16.4	16.4	16.4	17.3	18.1	18.1	18.2	
Knee Level	45.9	130		12.9	13.0	11.5	12.8	8.1	7.9	8.0	9.0	13.1	13.0	13.0	
Floor Level	31.9	130		19.9	25.3	25.4	27.6	5.4	3.9	3.8	5.9	22.2	22.4	18.2	
Post-test Static Crush (in.)															
Dash Level	-0.4	0.0		-0.1	0.0	0.0	-0.1	0.0	0.0	0.1	0.1	0.2	0.3	0.2	
Knee Level	-0.6	0.0		0.0	-0.1	-0.1	0.1	0.1	0.1	0.1	0.2	-0.5	-0.5	-0.4	
Floor Level	-1.3	0.0		-0.3	-0.3	-0.4	-0.1	0.1	0.0	0.0	0.0	-0.2	0.0	-0.2	

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

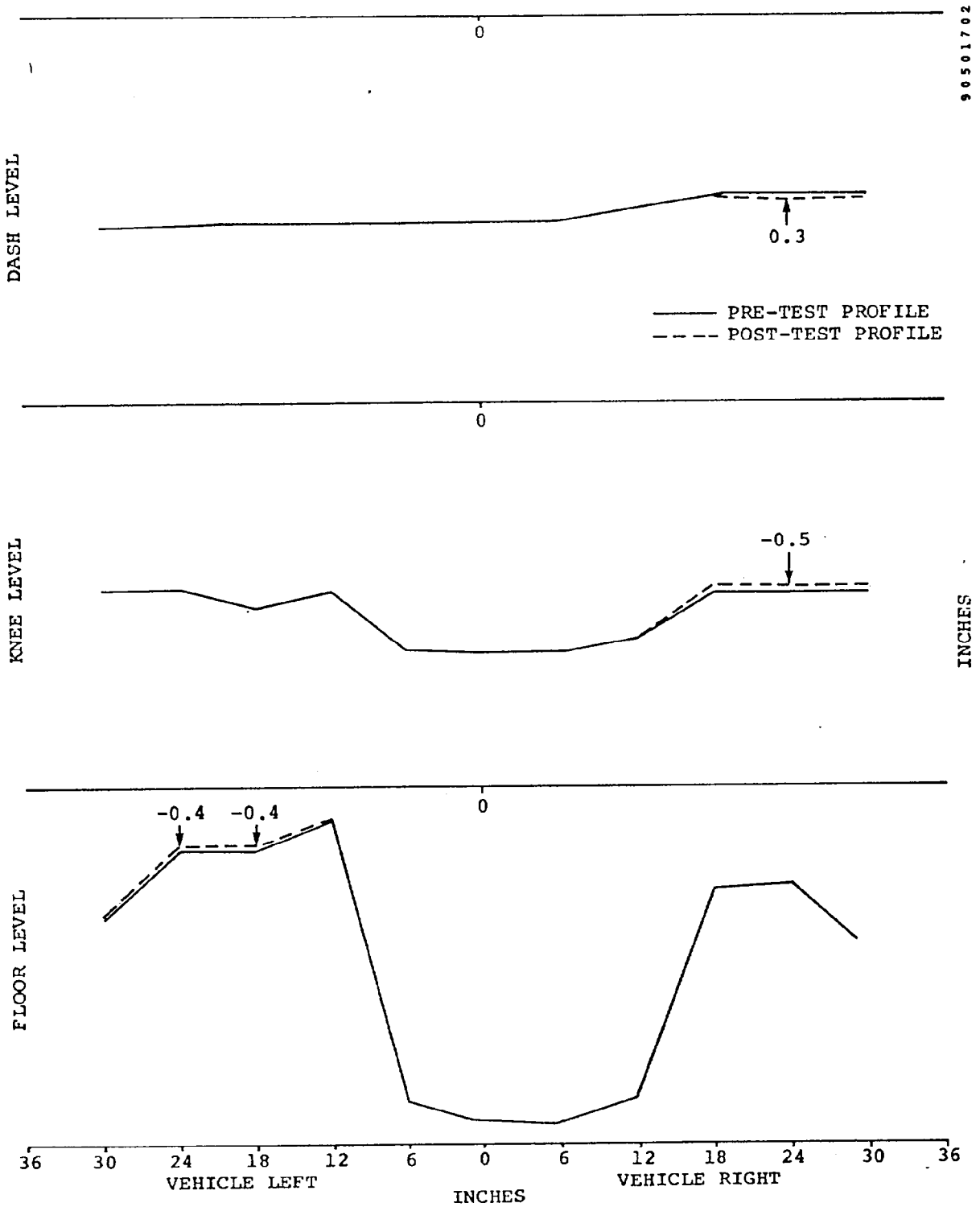


Figure 2-5. 1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-1).

TABLE 2-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-1)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	136.2	-18.1	60.3	136.0	-17.7	61.1	-0.2	0.4	0.8
Hub	132.7	-18.1	53.7	132.6	-17.7	54.5	-0.1	0.4	0.8
Bottom	126.5	-18.1	49.5	126.9	-17.7	50.0	0.4	0.4	0.5

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.

TABLE 2-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-1)

Vehicle: 1979 Ford Econoline E-150 Van

Accelerometer		Test 3052-1 (15.25 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-23.7	16	-1.9	70	+8.9	53
2X	Right Side B-pillar	-26.6	16	-1.8	66	+8.7	52
	Average 1X & 2X	-25.1	16	-1.8	68	+8.8	53
3X	Left Side Firewall	-45.5	26	-1.6	134	+8.5	54
3Y	Left Side Firewall	-7.2	19	+0.8	56	+1.6	200
3Z	Left Side Firewall	+12.9	17	-0.7	135	+1.9	116
4X	Right Side Firewall	-32.9	35	-1.6	139	+8.8	52
4Y	Right Side Firewall	-6.6	34	-0.6	78	-0.3	200
4Z	Right Side Firewall	-10.3	74	-1.1	168	+1.8	77
5X	Engine	-28.5	54	-5.5	72	+10.0	54
5Y	Engine	+4.4	50	-0.1	18	+1.8	200
5Z	Engine	-7.4	66	-0.6	110	+2.0	73
6X	Front Axle	-57.1	8	-1.5	69	+7.9	57
7X	Vehicle C.G.	-25.3	44	-2.2	67	+8.8	53
7Y	Vehicle C.G.	-3.6	21	-0.4	75	-0.1	100
7Z	Vehicle C.G.	+27.0	37	+1.1	95	+2.5	200
8X	Rear Compartment	-26.0	15	-2.3	68	+8.7	52
8Y	Rear Compartment	-6.8	15	-0.5	17	+1.0	200
8Z	Rear Compartment	-29.0	29	-3.3	56	-2.1	106
9X	Rear Axle	-44.1	15	-5.6	72	+8.0	54

TABLE 2-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-1)

Vehicle: 1979 Ford Econoline E-150 Van

		Test 3052-1 (15.25 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-16.2	125	-16.2	130
	Y	-8.2	129	+5.6	86
	Z	+19.5	94	+16.0	91
	R*	+22.0	98	+18.9	89
	HIC	78	74-142	70	60-152
CHEST					
	X	-29.3	78	-23.0	71
	Y	-5.4	95	+6.0	82
	Z	-6.6	95	-4.9	78
	R*	+26.2	80	+21.4	75
	SI	81	200	62	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-98	52	-64	46
	RT	-1030	68	-231	69

*3-msec clip.

TABLE 2-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-1)

Vehicle: 1979 Ford Econoline E-150 Van

	Test 3052-1 (15.25 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	787	80
Right Lap Belt	899	72
Shoulder Belt	1040	83
RIGHT FRONT OCCUPANT		
Left Lap Belt	1416	77
Right Lap Belt	868	76
Shoulder Belt	925	82

TABLE 2-14. SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-1)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	2.94	1.48	2.61	0.45	0.69	0.23	0.22	1.38	0.94	2.74
Time (msec)	50	44	38	11	11	11	12	30	31	30
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.30	0.40	0.44	0.23	0.25	0.18	0.23	0.22	0.13	0.82
Time (msec)	36	27	37	37	38	89	40	36	87	44
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	0.43	3.46	15.14	10.32	0.48	0.20	10.14	15.78*	3.06	0.28
Time (msec)	45	44	44	26	15	9	27	26	13	43
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	0.24	0.26	4.35	1.39	0.25	0.22	1.77	6.60	0.10	0.11
Time (msec)	193	135	53	53	15	17	37	40	27	27

*Maximum measured force.

TABLE 2-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-1)

Vehicle: 1979 Ford Econoline E-150 Van

Parameter	Test 3052-1 (15.25 mph) Peak Load (klb)	Time (msec)
Column 1	3.14	45
Column 2	3.44	26
Column 3	23.32	43
Column 4	11.78	49
Column 5	0.56	48
Column 6	1.28	15
Column 7	11.00	26
Column 8	21.56	44
Column 9	5.38	44
Column 10	3.34	45
Row A	13.90	37
Row B	56.68	45
Row C	2.74	37
Row D	11.35	29

TABLE 2-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-1)

Vehicle: 1979 Ford Econoline E-150 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	82.50	112.16
Time (msec)	44	16

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (4165 lb) plus engine acceleration times engine weight (825 lb).

3.0 PRESENTATION OF RESULTS (TEST 3052-2)

This section of the report presents the results of Test No. 3052-2, a head-on, symmetric crash test between a 1979 Ford E-150 Econoline Van and the NHTSA Fixed Test Device (V_o = 25.10 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix B (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 3-1. CRASH TEST SUMMARY (TEST 3052-2)

TEST NO. 3052-2 CONTRACT: DOT-HS-8-01942

TEST DATE: April 11, 1979 TIME: 1526 TEMPERATURE: 71 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Ford Econoline E-150 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	186.6/79.4	
Test Weight by Wheel (lb)	LF 1251 RF 1374 LR 1191 RR 1181	
Total Weight (lb)	4997	>100,000
Wheelbase (in.)	124.5	
Longitudinal C.G. (From Center of Front Axle) (in.)	59.1	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	25.10	0
Final Speed (mph @ msec)	-2.77 @ 105	
Velocity Change (mph)	27.87	
Maximum Averaged Compartment Acceleration (G @ msec)	-29.54 @ 26	
Maximum Engine Acceleration (G @ msec)	-40.00 @ 54	
Maximum Mutual Dynamic Crush (Film Data) (in.)	15.3	
Maximum Static Crush		
• Bottom of Windshield (in.)	-0.9	
• Hood Level (in.)	7.4	
• Between Bumper/Hood (in.)	13.1	
• Bumper Level (in.)	12.1	
Maximum Post-test Intrusion (in.)	0.7	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #759	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 3-2. VEHICLE INSPECTION SHEET (TEST 3052-2)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: E14HHEE2507 Make: Ford

NHTSA No.: R & D

Year: 1979 Color: Silver Model: Econoline E-150 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [ ] no [X] Bucket: X

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [ ] no [X] Split Back Bench: ____

Tinted Glass: yes [X] no [ ] Rear Window Def.: yes [ ] no [X]

Radio: yes [ ] no [X] Brakes: drum: R disc: F

Clock: yes [ ] no [X]

Tire Size: L78-15 Ply Rating: 4 Mfg. & Line: General

Bias Ply: ____ Belted: X Radial ____ /Eng.Type: V-8 Cylinders: 8 Total Displ: 351 cid

Trans, # Fwd. Speeds: 3 Shipping Weight: 4128 Odometer: 559.0

Dealer (name, address, and phone number)

Remarks (list additional accessories not listed above)

Sliding side door.

Date of Manufacture: 1-79 Dynamic Science No.: 866 Date Received: 3/12/79

Tilting Steering Wheel: yes [ ] no [X] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: ____ (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap and shoulder belt

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, spare tire, wheel covers, and wipers removed. All fluids except for engine coolant removed, 100% water in fuel tank.

2. Does vehicle show evidence of prior accident history? Describe: NO

3. Does vehicle show any significant corrosion? Describe: NO

4. Check condition of the front bumper and frame: Satisfactory

DS FORM 4200

TABLE 3-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-2)

Test No. 3052-2 Type Van-to-NHTSA Fixed Test Device

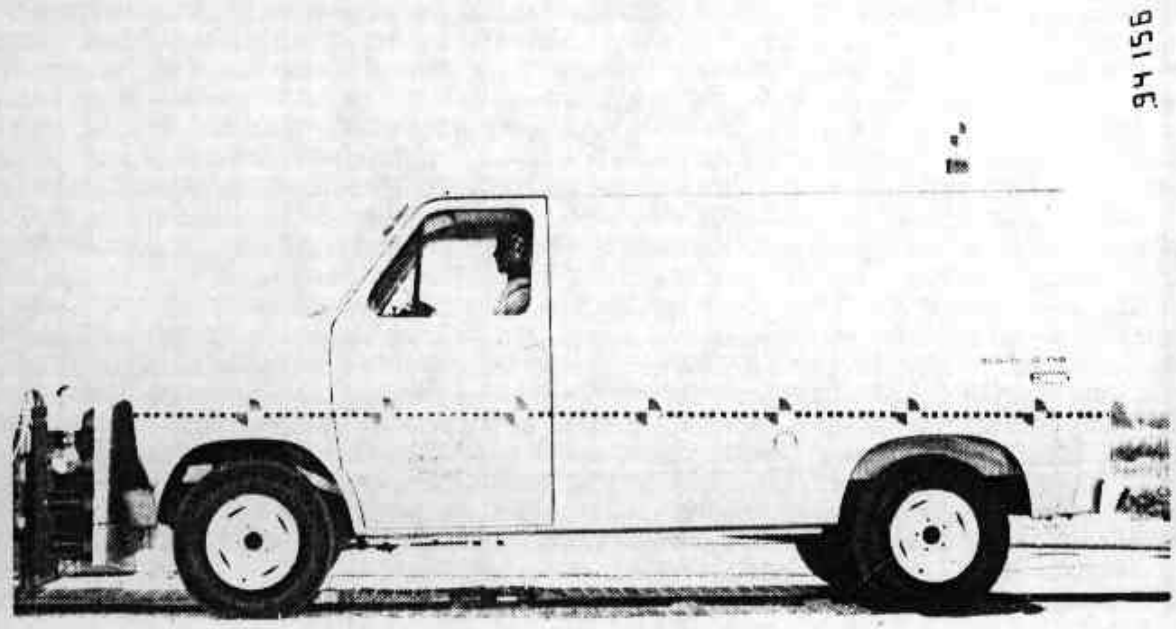
Car Model 1979 Ford E-150 Van Dynamic Science No. 866

Engine Size	351 CID
Engine Weight* (lb)	825
Engine Height/Width (in.)	33.4/19.2
Bumper to Engine Block (in.)	26.9
Engine Length (in.)	19.8
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	28.4
Bumper Height (in.) (Min./Max.)	16.9/24.0

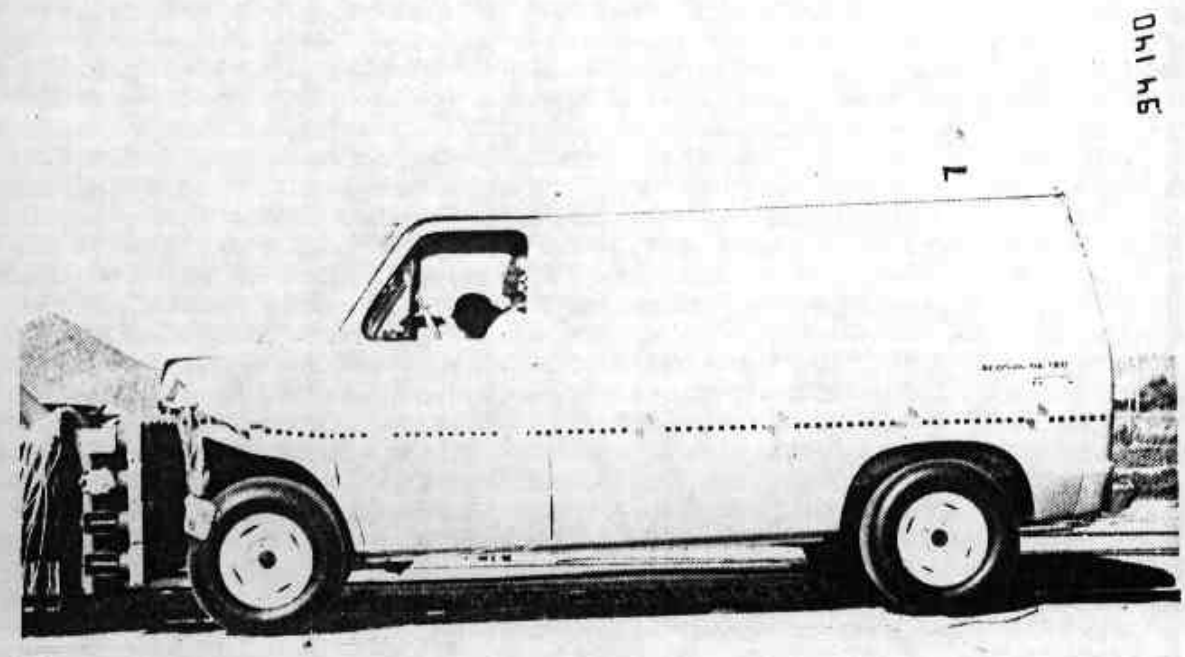
*Includes engine and rigid attachments such as transmission and drive train.

TABLE 3-4. PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-2)

Distances (in.)	Driver	Passenger
Chest to Steering Wheel Hub (horizontal)	14.8	
Nose to Steering Wheel Upper Rim	19.1	
Nose to Windshield (horizontal)	26.9	25.5
Knee to Lower Panel (closest point)		
Left	8.1	6.4
Right	7.9	6.8
Chest to Dash (horizontal)	25.1	21.5
Forehead to Header	18.4	18.2



a) Pre-test



b) Post-test

Figure 3-1. Vehicle Configuration (Test 3052-2).

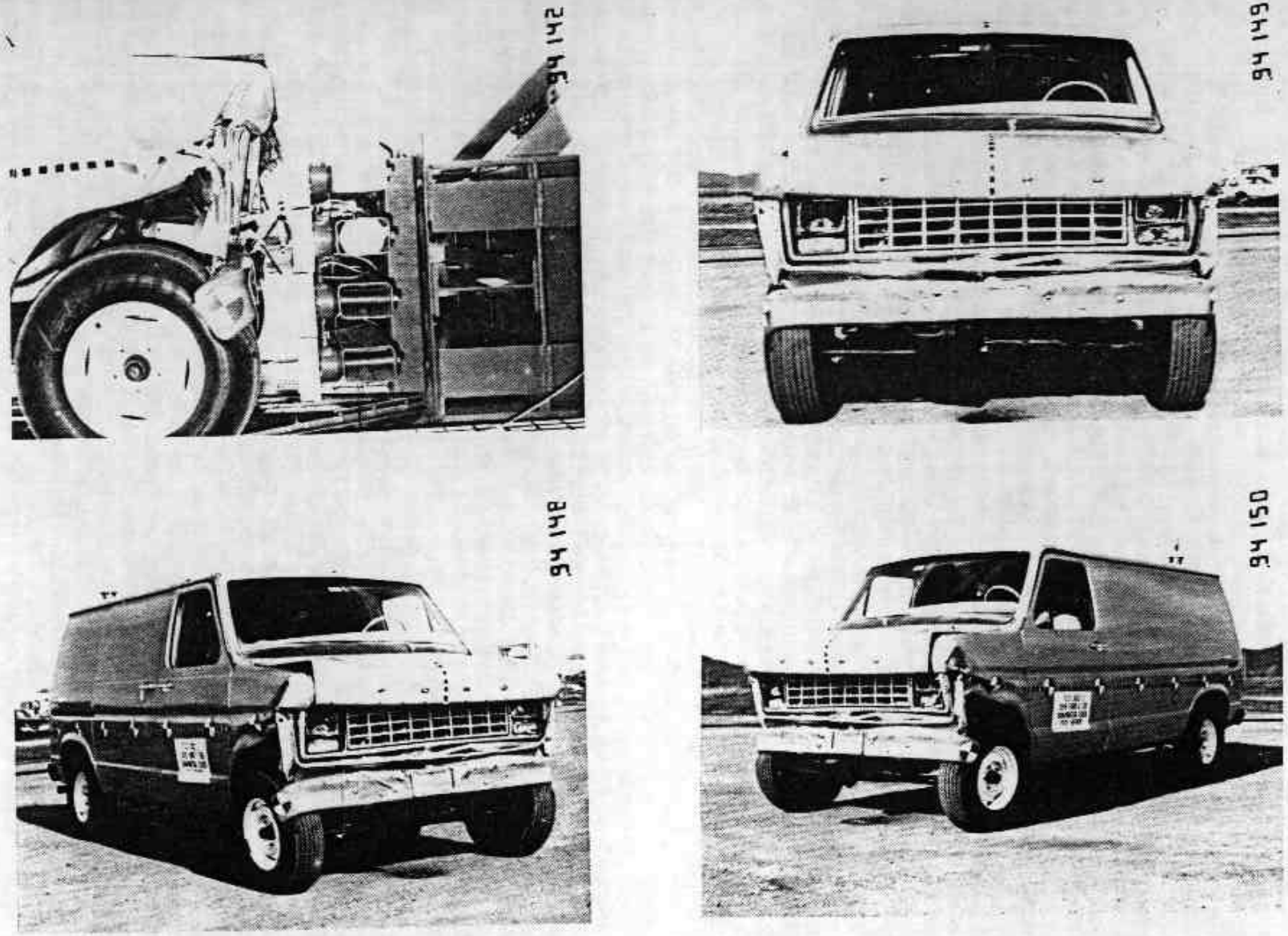
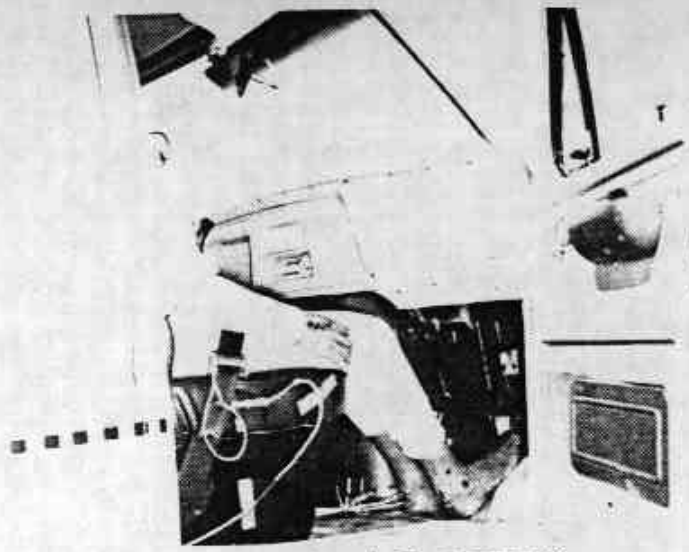
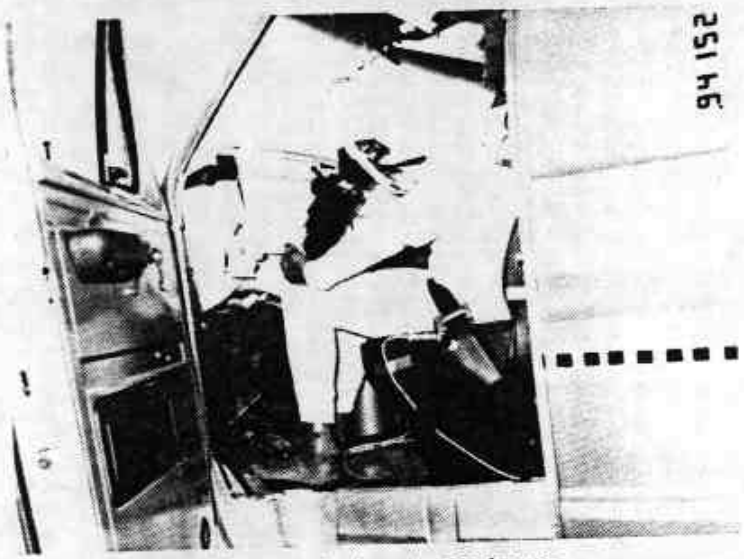


Figure 3-2. Post-test Vehicle Configuration (Test 3052-2).

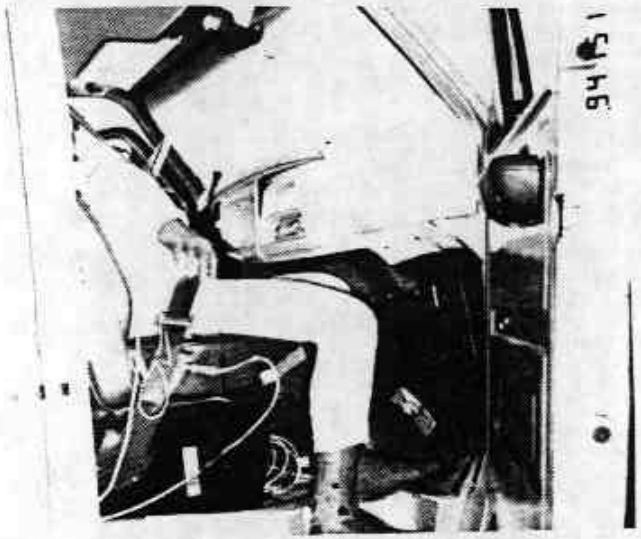
a) Pre-test Driver



c) Pre-test Passenger



b) Post-test Driver



d) Post-test Passenger

Figure 3-3. Vehicle Dummy Configuration (Test 3052-2).

TABLE 3-5. CHRONOLOGY OF EVENTS (TEST 3052-2)

VEHICLE: 1979 Ford Econoline E-150 Van

Time (msec)	Crash Event
0	Impact (visual)
5	Grille hits Test Device
9	Fenders hit Test Device
23	Bumper strikes front tires; Dummies start forward motion
34	Front tires hit barrier
51	Hood curls over barrier and strikes load cells; Driver strikes steering wheel lower rim with chest
54	Driver hands strike dash; Passenger knees strike dash; Fender wells strike back of front tires
60	Minimum right side wheelbase (121.1 in.); Driver knees hit dash; Passenger strikes engine cowling with left hand
67	Maximum vehicle dynamic crush (15.3 in.)
68	Minimum left side wheelbase (122.0 in.)
78	Driver head strikes steering wheel hub
94	Maximum driver forward motion
98	Maximum vehicle declination (3.5°)
129	Maximum passenger forward motion
147	Right rear tire leaves ground
160	Vehicle separates from Test Device
165	Driver recontacts seat with upper back
249	Passenger recontacts seat with upper back
251	Right rear tire recontacts ground
377	Maximum vehicle rebound inclination (2.0°)

TABLE 3-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-2)

VEHICLE: 1979 Ford Econoline E-150 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	Steering wheel hub	None
Chest----------	Steering wheel lower rim	None
Knees----------	Lower dash	Lower dash

Glazing: Windshield 100% intact but window cracked slightly on driver side.

Doors: Difficult to open

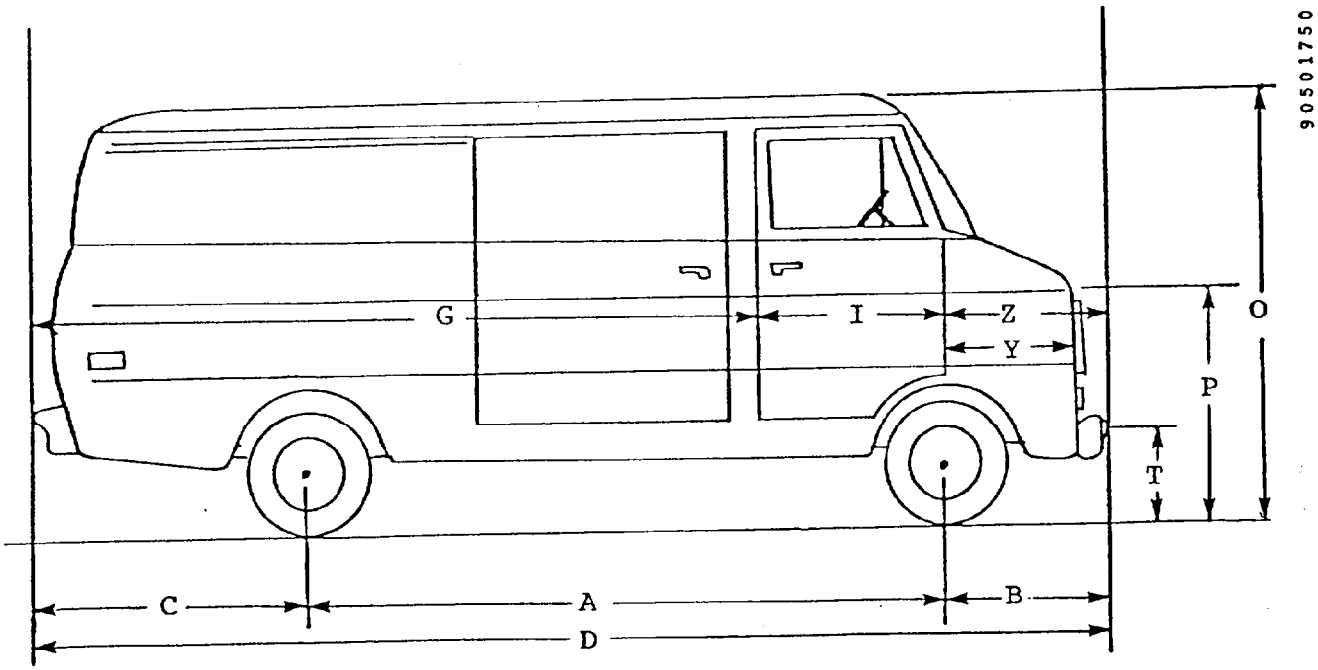
Seat Belt Anchorages and Restraints: Seat belts OK. Left seat moved 0.2 inch forward, right seat moved 0.4 inch forward

Vehicle Centerline to Barrier Centerline: Rear: 3 inches right, Front: 1 inch left

Fuel Leakage: None

General Observations: Radiator leaked. Bumper struck both front tires. Steering wheel rotated in and upward lifting up dash panel. Eight inches static rebound. Hood struck top row of load cells. Load cell C-6 struck by Master Cylinder of Brake Booster in van.

TABLE 3-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-2)



VEHICLE: 1979 FORD ECONOLINE E-150 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	124.8	125.2	123.5	123.5	1.3	1.7
B	24.7	24.3	15.8	13.6	8.9	10.7
C	37.0	37.2	37.2	37.1	-0.2	0.1
D	186.5	186.7	176.5	174.2	10.0	12.5
G	109.4	109.5	110.2	109.7	-0.8	-0.2
I	37.4	37.3	37.0	37.0	0.4	0.3
O	78.5	78.1	78.7	79.5	0.2	1.4
P	42.4	42.0	42.2	43.0	-0.2	1.0
T	22.4	22.0	25.4	25.0	3.0	3.0
Y	37.3	37.3	27.5	26.9	9.8	10.4
Z	39.7	39.9	29.3	27.5	10.4	12.4

TABLE 3-8. EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-2)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)*							Distance Right of Center (in.)*					
			36	30	24	18	12	6	0	6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	52.9	190	39.8	36.4	33.8	32.2	31.2	30.6	30.4	30.5	31.1	32.0	33.6	36.0	39.8
Hood Level	42.6	190	6.5	5.9	5.5	5.2	5.0	4.9	4.8	4.9	5.0	5.1	5.4	5.8	6.4
Between Bumper/Hood	34.6	190	6.8	6.6	5.7	5.3	5.0	4.9	4.7	4.7	4.8	5.0	5.4	6.4	6.7
Bumper Level	22.4	190	4.7	4.1	3.9	3.7	3.5	4.4	4.4	4.4	3.5	3.6	3.8	4.0	4.6
Post-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	53.2	190	39.1	35.5	32.9	31.4	30.5	30.0	30.0	30.1	30.7	31.7	33.4	35.7	39.6
Hood Level	41.9	190	12.3	9.2	9.1	9.0	9.0	9.0	9.1	9.2	9.3	9.5	9.7	10.0	13.8
Between Bumper/Hood	37.8	190	15.4	18.9	14.5	14.7	14.9	15.2	15.4	15.6	15.5	15.6	15.4	19.5	16.5
Bumper Level	29.2	190	14.9	14.5	14.6	14.4	14.9	15.9	16.5	16.2	15.4	15.3	15.4	15.5	15.8
Post-test Static Crush (in.)															
Bottom of Windshield	0.3	0.0	-0.7	-0.9	-0.9	-0.8	-0.7	-0.6	-0.4	-0.4	-0.4	-0.3	-0.2	-0.3	-0.2
Hood Level	-0.7	0.0	5.8	3.3	3.6	3.8	4.0	4.1	4.3	4.3	4.3	4.4	4.3	4.2	7.4
Between Bumper/Hood	3.2	0.0	8.6	12.3	8.8	9.4	9.9	10.3	10.7	10.9	10.7	10.6	10.0	13.1	9.8
Bumper Level	2.8	0.0	10.2	10.4	10.7	10.7	11.4	11.5	12.1	11.8	11.9	11.7	11.6	11.5	11.2

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

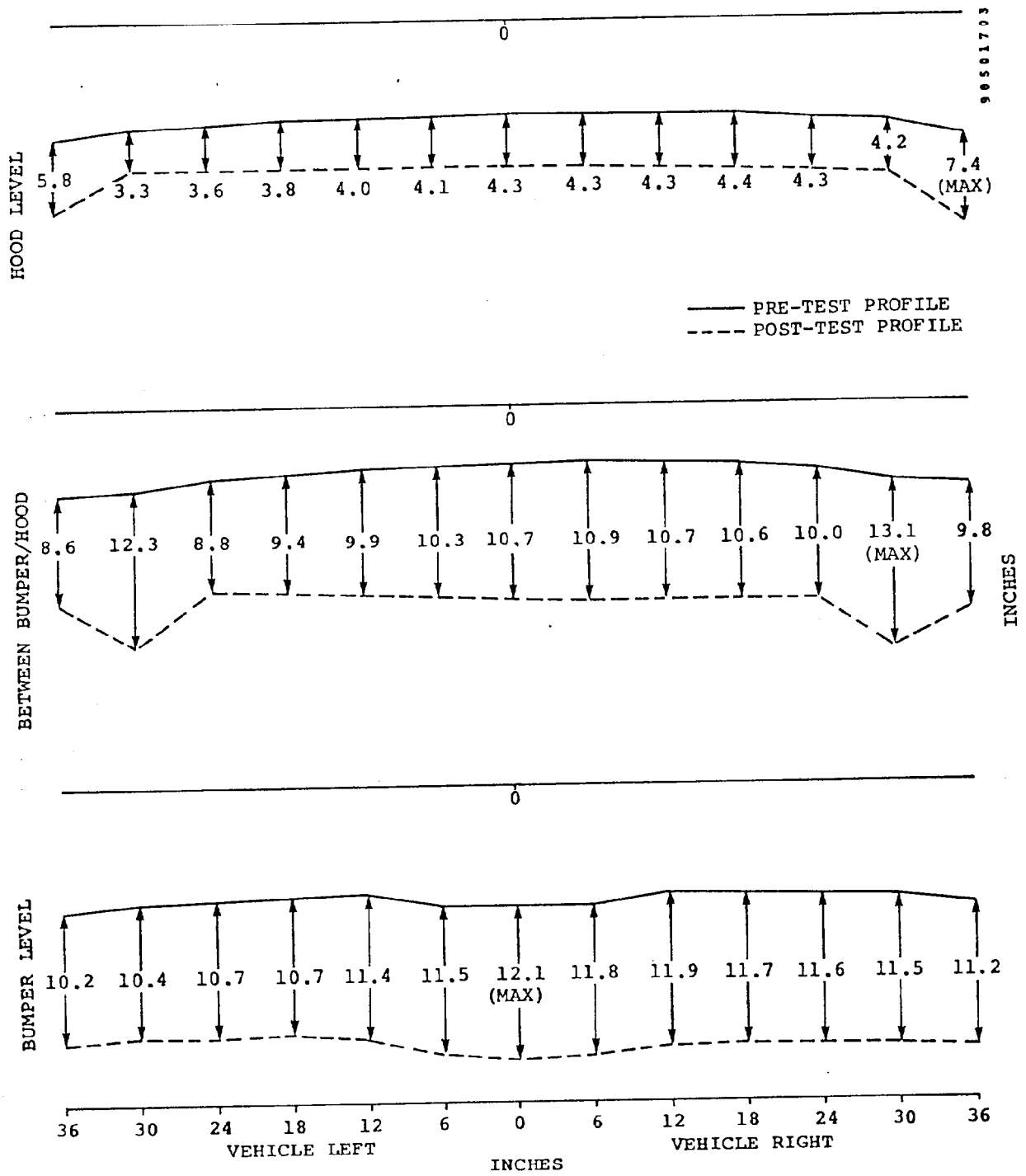


Figure 3-4. 1979 Ford E-150 Van Exterior Static Crush (Test 3052-2).

TABLE 3-9. INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-2)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)*							Distance Right of Center (in.)*					
			36	30	24	18	12	6	0	6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	58.6	125		16.0	16.0	16.0	16.0	16.1	16.2	16.2	16.8	18.2	18.1	18.0	
Knee Level	45.6	130		12.6	12.6	11.2	12.5	8.0	7.8	8.0	8.9	12.6	12.5	12.6	
Floor Level	29.5	130		20.5	25.6	27.1	27.4	5.4	3.8	3.9	5.6	26.8	26.8	23.6	
Post-test Profile - Distance from R.P. (in.)															
Dash Level	60.6	125		17.5	17.5	17.5	17.5	17.3	17.1	16.9	17.4	18.5	18.4	18.2	
Knee Level	47.0	130		12.9	13.6	12.5	11.4	7.9	7.8	7.8	8.8	14.5	14.5	14.5	
Floor Level	33.0	131		20.0	24.7	26.1	25.7	4.5	3.0	3.0	5.0	25.9	25.7	22.8	
Post-test Static Crush (in.)															
Dash Level	2.0	0.0		-1.5	-1.5	-1.5	-1.5	-1.2	-0.9	-0.7	-0.6	-0.3	-0.3	-0.2	
Knee Level	1.4	0.0		-0.3	-1.0	-1.3	1.1	0.1	0.0	0.2	0.1	-1.9	-2.0	-1.9	
Floor Level	3.5	1.0		-0.5	-0.1	0.0	0.7	-0.1	-0.2	-0.1	-0.4	-0.1	0.1	-0.2	

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

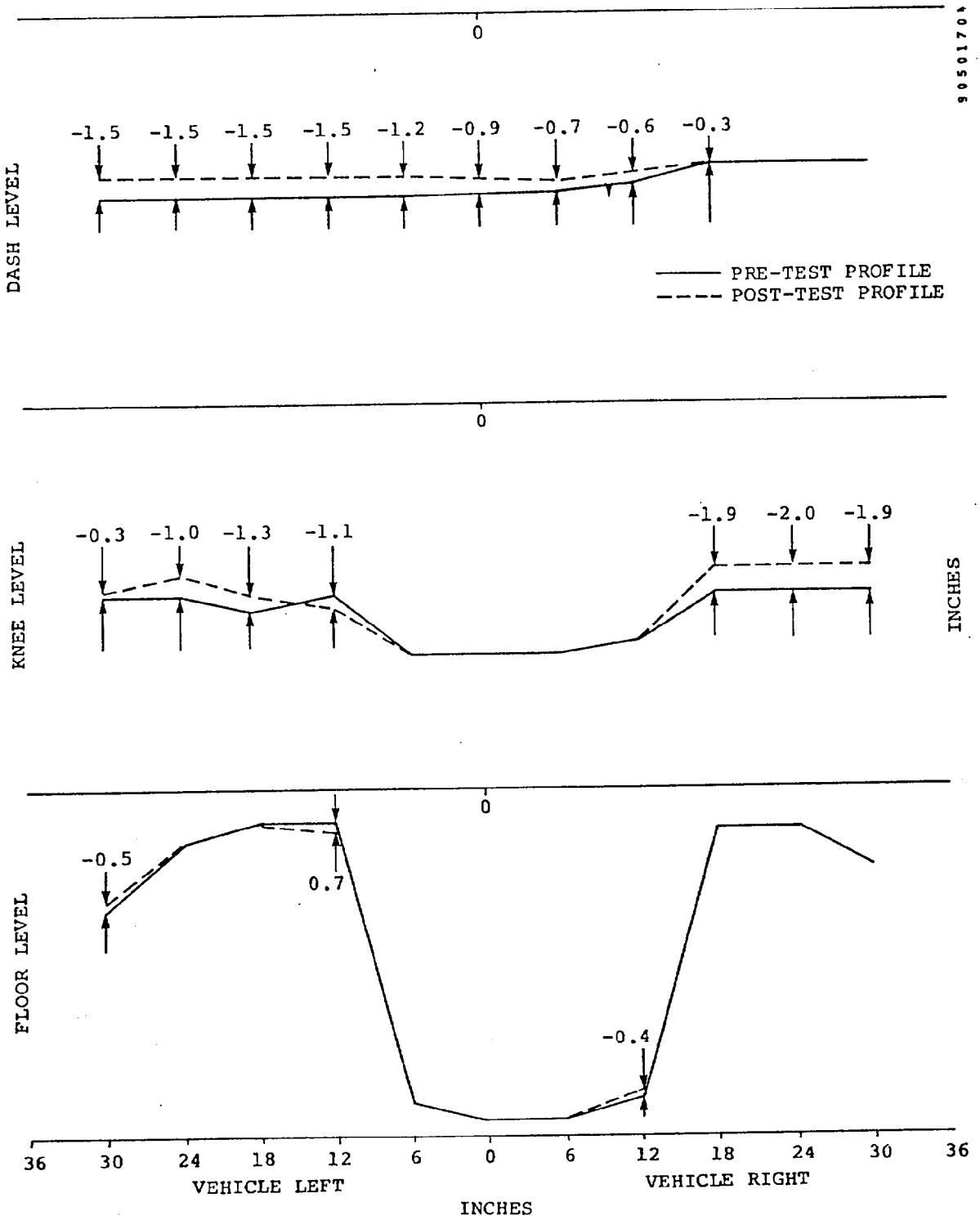


Figure 3-5. 1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-2).

TABLE 3-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLINE E-150 VAN (TEST 3052-2)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	135.7	-18.1	60.6	133.9	-18.5	65.6	-1.8	-0.4	5.0
Hub	132.0	-18.1	53.9	131.8	-19.2	58.2	-0.2	-1.1	4.3
Bottom	126.3	-18.1	49.8	127.8	-19.5	53.1	1.5	-1.4	3.3

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.

TABLE 3-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-2)

Vehicle: 1979 Ford Econoline E-150 Van

Accelerometer		Test 3052-2 (25.10 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-28.2	28	-3.0	119	+15.9	63
2X	Right Side B-pillar	-31.9	25	-2.8	89	+16.2	66
	Average 1X & 2X	-29.5	26	-2.8	105	16.1	65
3X	Left Side Firewall	-59.0	27	-0.6	107	+14.9	70
3Y	Left Side Firewall	-15.1	17	-0.3	19	+10.2	200
3Z	Left Side Firewall	+28.1	14	-1.0	12	+4.1	129
4X	Right Side Firewall	-80.1	26	-1.8	103	+16.2	70
4Y	Right Side Firewall	-18.9	25	+1.3	28	+1.8	200
4Z	Right Side Firewall	-15.9	24	-2.7	142	-2.2	200
5X	Engine	-40.0	54	-5.1	73	+17.0	56
5Y	Engine	-9.1	81	-0.8	37	-0.5	200
5Z	Engine	-7.9	85	-4.5	169	-5.2	200
6X	Front Axle	-73.7	8	-2.8	101	+14.9	61
7X	Vehicle C.G.	-37.2	41	-3.5	108	+15.9	64
7Y	Vehicle C.G.	-12.9	37	-1.4	51	-0.4	71
7Z	Vehicle C.G.	+36.7	58	-2.4	137	-1.3	200
8X	Rear Compartment	-30.2	26	-3.4	95	+15.8	63
8Y	Rear Compartment	+4.8	42	-0.6	33	+1.0	200
8Z	Rear Compartment	-27.5	41	-4.7	59	-5.8	181
9X	Rear Axle	-53.5	14	-4.2	77	+13.9	63

TABLE 3-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-2)

Vehicle: 1979 Ford Econoline E-150 Van

		Test 3052-2 (25.10 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-61.3	98	-25.1	137
	Y	-12.5	101	+9.3	86
	Z	+46.9	83	+40.4	96
	R*	+64.6	96	+39.4	98
	HIC	557	70-112	393	71-150
CHEST					
	X	-45.8	74	-35.4	77
	Y	-6.3	80	+12.2	85
	Z	+15.6	60	+5.8	75
	R*	+41.4	72	+29.8	78
	SI	289	200	171	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-137	61	-141	50
	RT	-2851	55	-184	29

*3-msec clip.

TABLE 3-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-2)

Vehicle: 1979 Ford Econoline E-150 Van

	Test 3052-2 (25.10 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	1260	74
Right Lap Belt	1278	65
Shoulder Belt	1319	78
RIGHT FRONT OCCUPANT		
Left Lap Belt	1993	71
Right Lap Belt	1249	75
Shoulder Belt	1513	83

TABLE 3-14. SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-2)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	3.41	4.07	3.48	1.07	1.44	0.67	0.88	1.55	1.33	3.89
Time (msec)	25	43	51	23	23	24	25	24	13	36
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.54	0.81	2.09	0.96	6.69	0.54	1.78	2.02	0.36	0.68
Time (msec)	15	31	30	54	56	57	42	42	37	21
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	0.34	4.38	15.76*	12.18	0.38	1.00	13.27	15.73	3.58	0.45
Time (msec)	68	26	26	25	17	58	43	27	42	36
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	1.77	0.74	5.46	1.03	0.18	0.23	1.51	4.46	0.64	0.32
Time (msec)	75	67	30	12	118	168	60	28	26	33

*Maximum measured force.

TABLE 3-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-2)

Vehicle: 1979 Ford Econoline E-150 Van

Parameter	Test 3052-2 (25.10 mph) Peak Load (klb)	Time (msec)
Column 1	5.04	34
Column 2	4.96	43
Column 3	22.08	26
Column 4	16.50	43
Column 5	1.41	58
Column 6	7.45	56
Column 7	14.57	25
Column 8	25.52	29
Column 9	9.05	26
Column 10	3.63	28
Row A	12.26	29
Row B	63.40	27
Row C	10.66	56
Row D	18.37	25

TABLE 3-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-2)

Vehicle: 1979 Ford Econoline E-150 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	93.76	138.01
Time (msec)	25	28

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (4172 lb) plus engine acceleration times engine weight (825 lb).

4.0 PRESENTATION OF RESULTS (TEST 3052-3)

This section of the report presents the results of Test No. 3052-3, a head-on, symmetric crash test between a 1979 Ford E-150 Econoline Van and the NHTSA Fixed Test Device (V_o = 30.02 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix C (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 4-1. CRASH TEST SUMMARY (TEST 3052-3)

TEST NO. 3052-3 CONTRACT: DOT-HS-8-01942

TEST DATE: April 12, 1979 TIME: 1422 TEMPERATURE: 76 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Ford Econoline E-150 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	186.4/79.4	
Test Weight by Wheel (lb)	LF 1373 RF 1358 LR 1156 RR 1110	
Total Weight (lb)	4998	>100,000
Wheelbase (in.)	124.5	
Longitudinal C.G. (From Center of Front Axle) (in.)	56.4	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	30.02	0
Final Speed (mph @ msec)	-1.95 @ 97	
Velocity Change (mph)	31.97	
Maximum Averaged Compartment Acceleration (G @ msec)	-34.87 @ 16	
Maximum Engine Acceleration (G @ msec)	-79.89 @ 38	
Maximum Mutual Dynamic Crush (Film Data) (in.)	19.5	
Maximum Static Crush		
o Bottom of Windshield (in.)	0.7	
o Hood Level (in.)	11.3	
o Between Bumper/Hood (in.)	16.4	
o Bumper Level (in.)	14.9	
Maximum Post-test Intrusion (in.)	3.2	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #759	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 4-2. VEHICLE INSPECTION SHEET (TEST 3052-3)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: E14HHEC1109 Make: Ford

NHTSA No.: R & D

Year: 1979 Color: Silver Model: Econoline E-150 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [X] no [ ] Bucket: X (1)

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [X] no [ ]

Tinted Glass: yes [X] no [ ] Rear Window Def.: yes [ ] no [X] Split Back Bench: ____

Radio: yes [ ] no [X] Brakes: drum: R disc: F

Clock: yes [ ] no [X]

Tire Size: LR78-15 Ply Rating: 4 Mfg. & Line: General

Bias Ply: ____ Belted: ____ Radial X /Eng.Type: V-8 Cylinders: 8 Total Displ: 351 cid

Trans, # Fwd. Speeds: 3 Shipping Weight: 4129 Odometer: 475.6

Dealer (name, address, and phone number)

Remarks (list additional accessories not listed above)
Double fold out side doors
Transmission cooler
Inside hood latch

NOTE: RF seat removed from van used in Test 3052-1. Tilt steering wheel placed in lowermost position.

Date of Manufacture: 12/78 Dynamic Science No.: 863 Date Received: 3/12/79

Tilting Steering Wheel: yes [X] no [ ] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: ____ (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap and shoulder belts

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, wheel covers and wipers removed. Fluids except for engine coolant removed, 100% water in fuel tank. Passenger seat and belts used in Test 1.

2. Does vehicle show evidence of prior accident history? Describe: NO

3. Does vehicle show any significant corrosion? Describe: NO

4. Check condition of the front bumper and frame: Satisfactory

DS FORM 4200

TABLE 4-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-3)

Test No. 3052-3 Type Van-to-NHTSA Fixed Test Device

Car Model 1979 Ford E-150 Van Dynamic Science No. 863

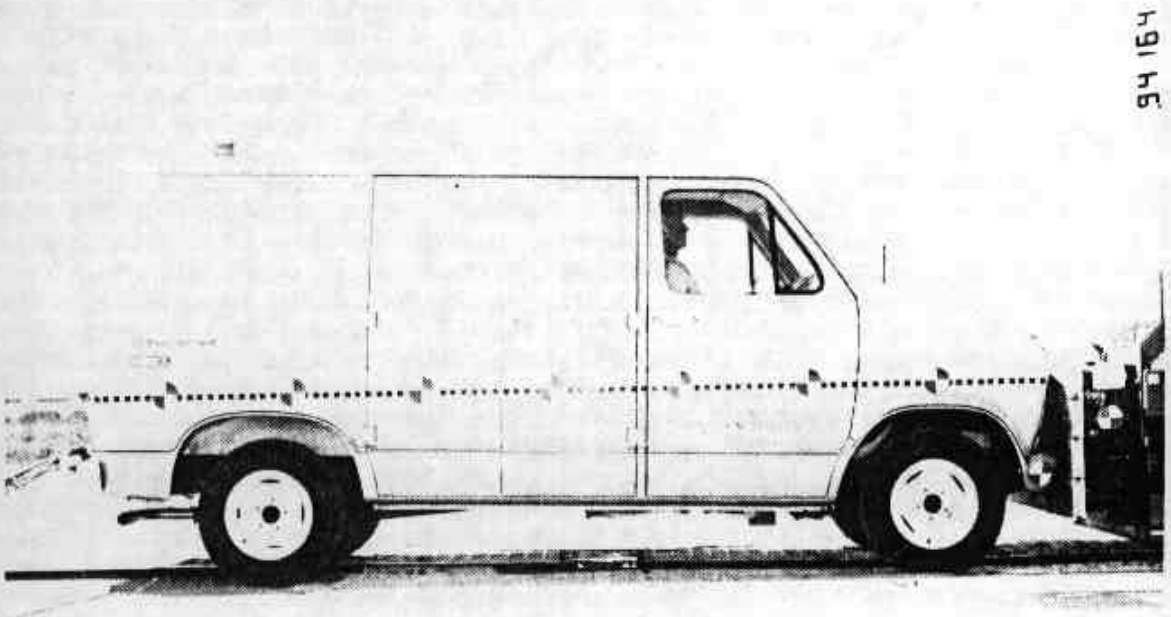
Engine Size	351 CID
Engine Weight* (lb)	939
Engine Height/Width (in.)	32.2/19.2
Bumper to Engine Block (in.)	26.7
Engine Length (in.)	19.8
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	28.3
Bumper Height (in.) (Min./Max.)	15.2/22.4

*Includes engine and rigid attachments such as transmission and drive train.

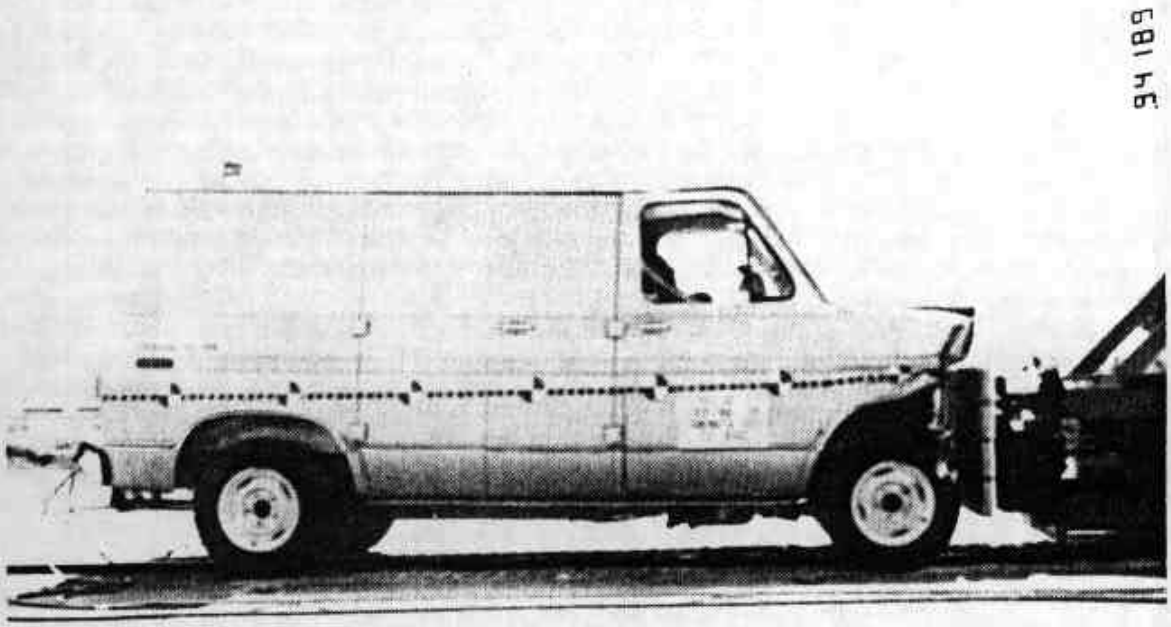
TABLE 4-4. PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-3)

Distances (in.)	Driver*	Passenger
Chest to Steering Wheel Hub (horizontal)	14.2	
Nose to Steering Wheel Upper Rim	18.5	
Nose to Windshield (horizontal)	28.0	25.9
Knee to Lower Panel (closest point)		
Left	8.3	6.9
Right	8.2	7.1
Chest to Dash (horizontal)	25.4	21.7
Forehead to Header	18.5	18.7

*Tilt steering wheel set at lowermost driving position.



a) Pre-test



b) Post-test

Figure 4-1. Vehicle Configuration (Test 3052-3).

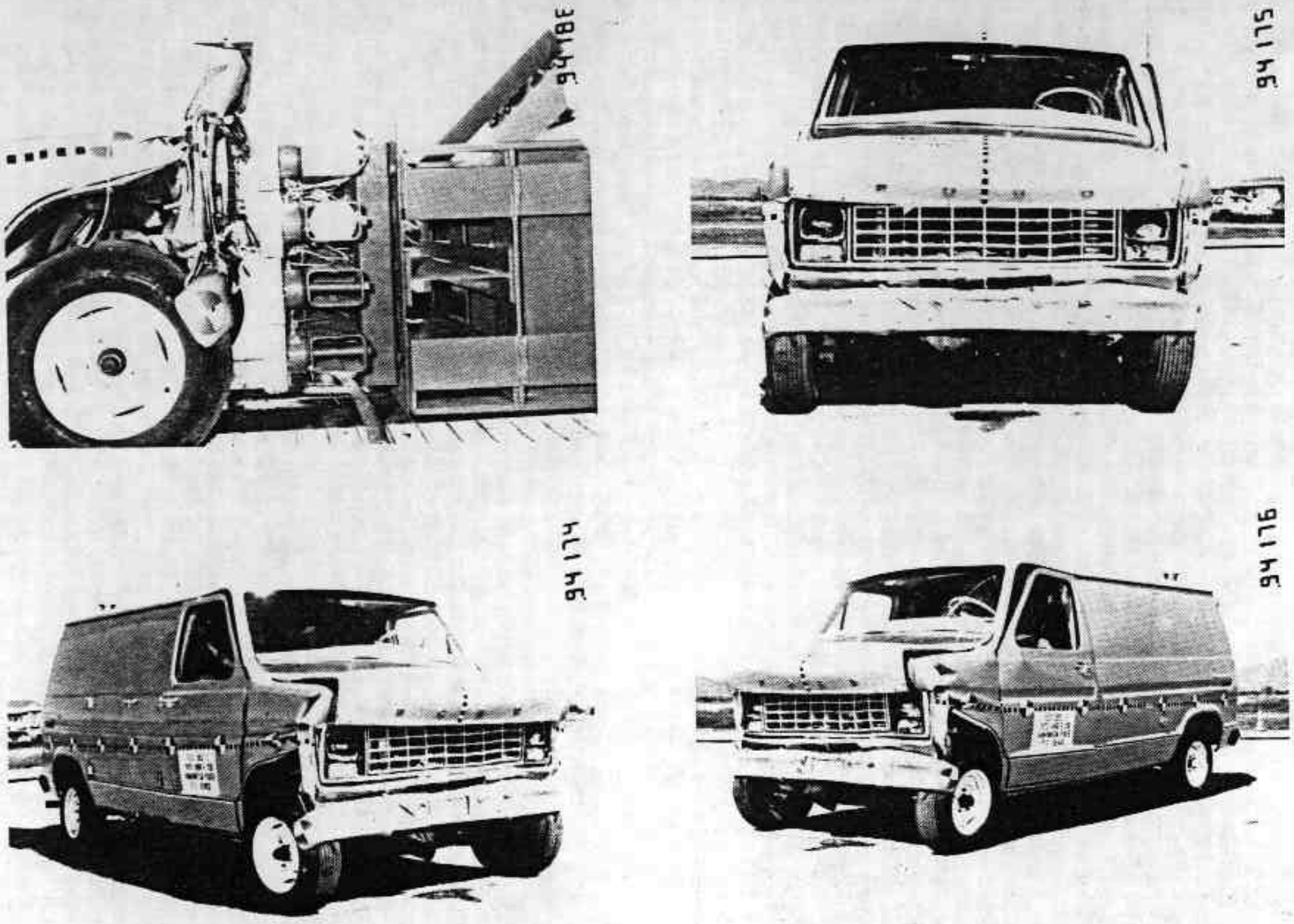
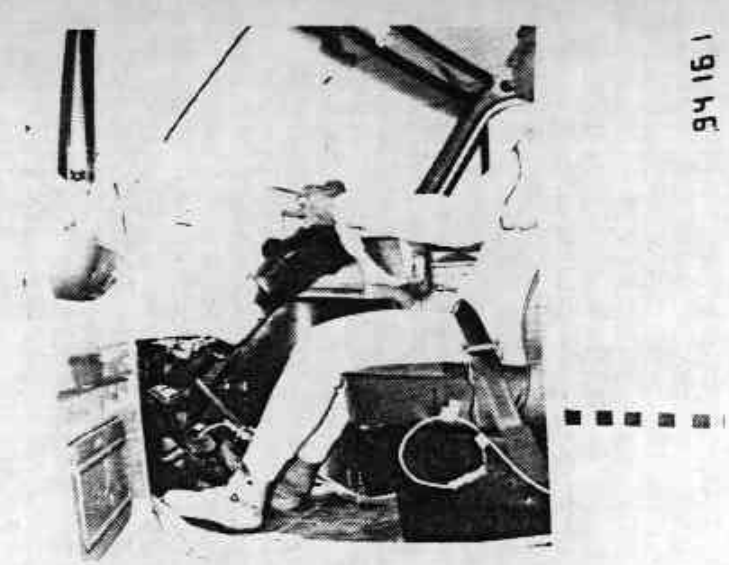
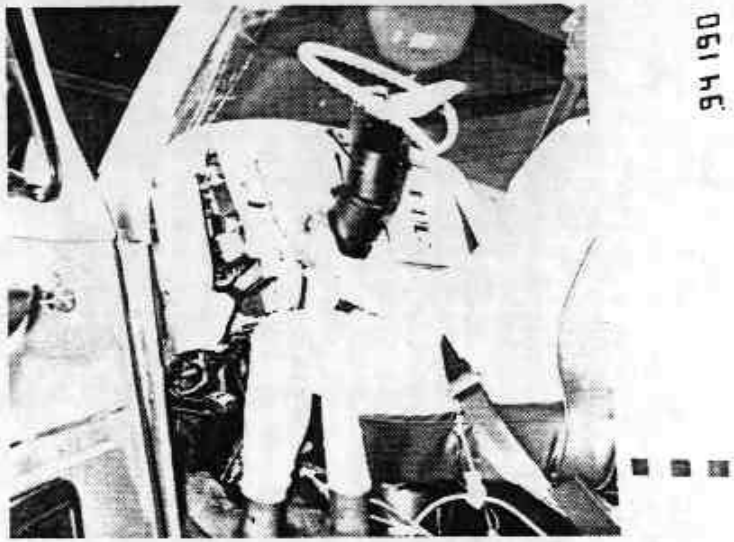


Figure 4-2. Post-test Vehicle Configuration (Test 3052-3).

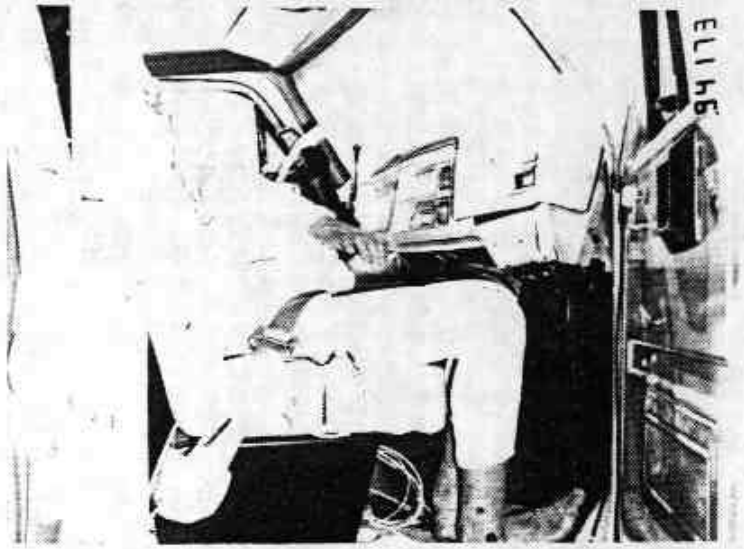


a) Pre-test Driver

c) Pre-test Passenger



b) Post-test Driver



d) Post-test Passenger

Figure 4-3. Vehicle Dummy Configuration (Test 3052-3).

TABLE 4-5. CHRONOLOGY OF EVENTS (TEST 3052-3)

VEHICLE: 1979 Ford Econoline E-150 Van

Time (msec)	Crash Event
0	Impact (visual)
3	Grille hits Test Device
7	Fenders hit Test Device
23	Bumper hits front tires; Hood strikes top row of load cells
28	Driver starts forward motion
31	Tires strike Test Device
33	Passenger starts forward motion
46	Fender wells strike back of front tires; Passenger knees strike dash
54	Passenger left hand strikes engine cowling; Driver knees strike dash
59	Minimum wheelbase; Right side (120.8 in.); Left side (122.5 in.)
62	Steering wheel lower rim strikes driver in neck
68	Maximum vehicle dynamic crush (19.5 in.)
73	Driver hands and forearms strike dash
78	Driver head strikes steering wheel hub
88	Maximum driver forward motion
92	Maximum vehicle declination (4.0°); Right rear tire leaves ground
99	Passenger head hits dash
107	Maximum passenger forward motion
120	Left rear tire leaves ground
149	Driver recontacts seat with upper back
185	Vehicle separates from Test Device
195	Passenger recontacts seat with upper back
304	Right rear tire recontacts ground
336	Left rear tire recontacts ground
529	Maximum vehicle rebound inclination (3.25°)

TABLE 4-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-3)

VEHICLE: 1979 Ford Econoline E-150 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	Steering wheel hub and lower rim	Top of dash
Chest----------	None	None
Knees----------	Lower dash	Lower dash and air conditioner fan housing

Glazing: Cracked on driver's side of vehicle

Doors: Right passenger door difficult to open. Tools required to open left driver door

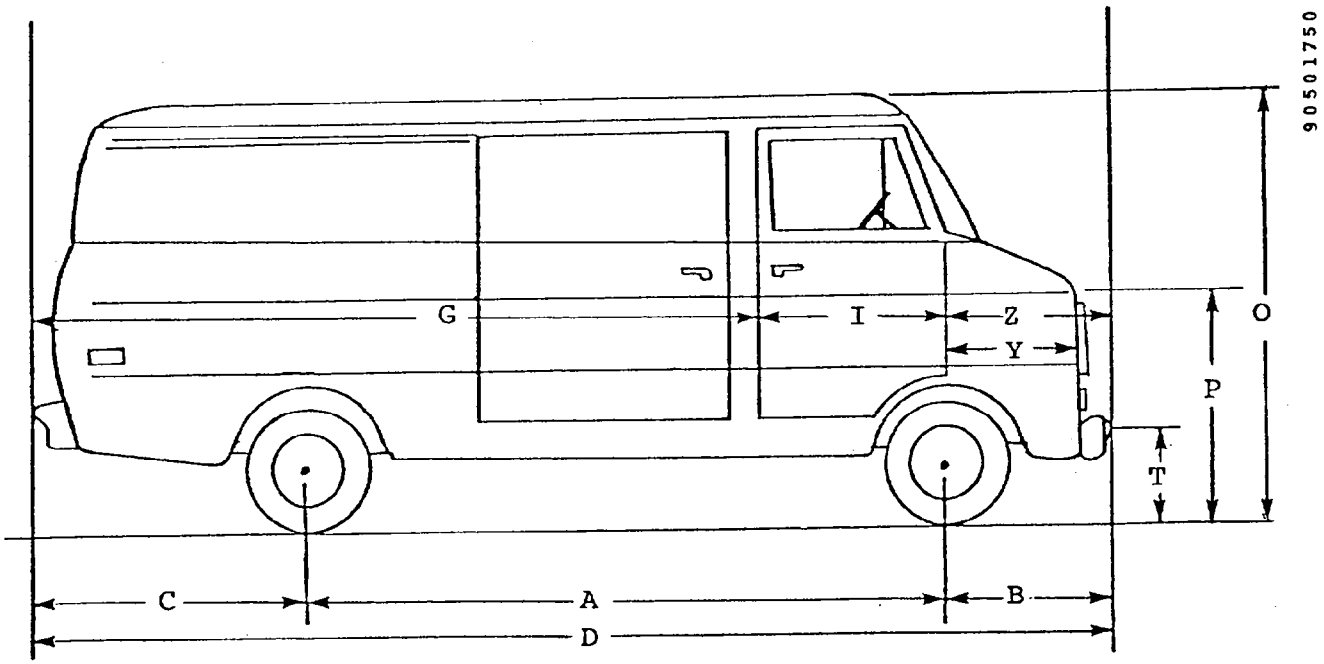
Seat Belt Anchorages and Restraints: Seat belts OK. Left seat moved 2.0 inches forward. Right seat moved 0.6 inch forward

Vehicle Centerline to Barrier Centerline: Rear: 3.4 inches left, Front: 2.3 inches left

Fuel Leakage: None

General Observations: Radiator leaked. Bumper struck both front tires. Steering column rotated upward. Seven inches static rebound. Load cell C-6 struck by master cylinder of brake booster of van.

TABLE 4-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-3)



VEHICLE: 1979 FORD ECONOLINE E-150 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	124.6	124.4	120.0	124.4	4.6	0.0
B	24.8	25.0	13.8	13.3	11.0	11.7
C	36.9	37.0	37.1	37.0	-0.2	0.0
D	186.3	186.4	170.9	174.7	15.4	11.7
G	109.3	109.1	109.3	110.9	0.0	-1.8
I	37.5	37.4	36.1	36.6	1.4	0.8
O	77.0	77.4	77.1	77.8	0.1	0.4
P	40.4	40.8	40.7	41.5	0.3	0.7
T	20.4	20.8	22.6	22.6	2.2	1.8
Y	37.3	37.3	25.0	24.7	12.3	12.6
Z	39.5	39.9	25.5	27.2	14.0	12.7

TABLE 4-8. EXTERIOR PROFILES AND STATIC CRUSH - FORD ECONOLINE E-150 VAN (TEST 3052-3)

Location	Height at	R.P.**	Distance Left of Center (in.)*							Distance Right of Center (in.)*					
			36	30	24	18	12	6	0	6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	51.6	195	44.8	41.5	38.8	37.0	36.0	35.5	35.3	35.5	36.0	37.0	38.6	41.1	44.6
Hood Level	41.3	195	11.5	11.0	10.5	10.2	10.0	9.8	9.7	9.8	10.0	10.1	10.5	10.8	11.5
Between Bumper/Hood	39.1	195	11.7	11.7	10.7	10.4	10.1	10.0	9.9	10.0	10.1	10.4	10.7	11.8	11.9
Bumper Level	20.9	195	9.9	9.3	9.0	8.9	8.7	9.5	9.6	9.5	8.7	8.8	9.0	9.3	10.0
Post-test Profile - Distance to R.P. (in.)															
Bottom of Windshield	51.6	195	43.5	40.2	38.0	36.6	35.9	35.4	35.3	35.7	36.4	37.6	39.3	42.3	45.9
Hood Level	40.3	195	22.8	19.8	19.5	19.3	19.1	18.9	18.7	18.5	18.4	18.2	18.1	18.1	21.0
Between Bumper/Hood	35.1	195	24.9	28.1	23.0	23.1	23.4	23.7	23.6	23.4	22.8	22.1	21.4	25.8	23.0
Bumper Level	22.5	195	23.9	23.5	23.6	23.1	23.6	24.1	23.9	23.5	23.0	22.2	22.0	21.4	21.0
Post-test Static Crush (in.)															
Bottom of Windshield	0.0	0.0	-1.7	1.3	-0.8	-0.4	-0.1	-0.1	0.0	0.2	0.4	0.6	0.7	1.2	1.3
Hood Level	-1.0	0.0	11.3	8.8	9.0	9.1	9.1	9.1	9.0	8.7	8.4	8.1	7.6	7.3	9.5
Between Bumper/Hood	-4.0	0.0	13.2	16.4	12.3	12.7	13.3	13.7	13.7	13.4	12.7	11.7	10.7	14.0	11.1
Bumper Level	1.6	0.0	14.0	14.2	14.6	14.2	14.9	14.6	14.3	14.0	14.3	13.4	13.0	12.1	11.0

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

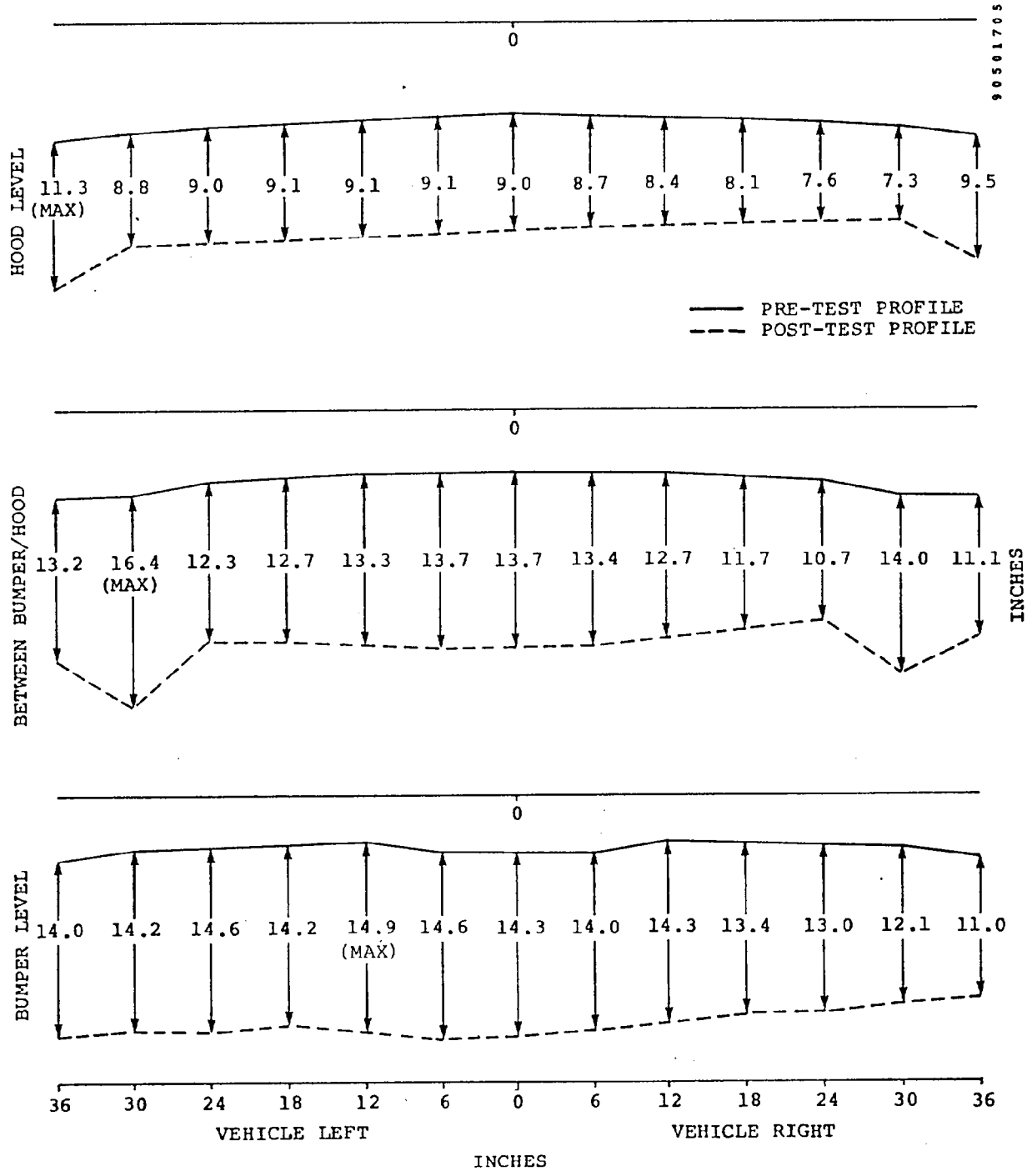


Figure 4-4. 1979 Ford E-150 Van Exterior Static Crush (Test 3052-3).

TABLE 4-9. INTERIOR PROFILE AND STATIC INTRUSION - FORD ECONOLINE E-150 VAN (TEST 3052-3)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	57.0	125	16.3	16.3	16.3	16.3	16.3	16.3	16.3	16.9	18.2	18.4	18.5		
Knee Level	44.4	130	12.5	12.5	11.1	12.5	7.5	7.4	7.4	8.4	12.7	12.7	12.7		
Floor Level	31.4	130	21.1	25.7	27.2	27.3	5.0	4.4	4.4	5.4	26.5	26.5	22.9		
Post-test Profile - Distance from R.P. (in.)															
Dash Level	60.1	125	15.8	16.5	17.0	17.2	17.4	17.4	17.5	18.0	19.7	19.5	19.8		
Knee Level	44.3	130	11.2	9.6	8.7	11.0	6.5	6.5	6.8	8.1	12.5	12.5	12.2		
Floor Level	31.7	131.5	18.6	21.5	22.5	23.3	3.3	2.8	3.0	4.2	25.3	25.4	22.2		
Post-test Static Crush (in.)															
Dash Level	3.1	0.0	0.5	-0.2	-0.7	-0.9	-1.1	-1.1	-1.2	-1.1	-1.4	-1.1	-1.3		
Knee Level	-0.1	0.0	1.3	2.9	3.4	1.5	1.0	0.9	0.6	0.3	0.2	0.2	0.5		
Floor Level	-0.3	1.5	1.0	2.7	3.2	2.5	0.2	0.1	-0.1	-0.3	-0.3	-0.4	-0.8		

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

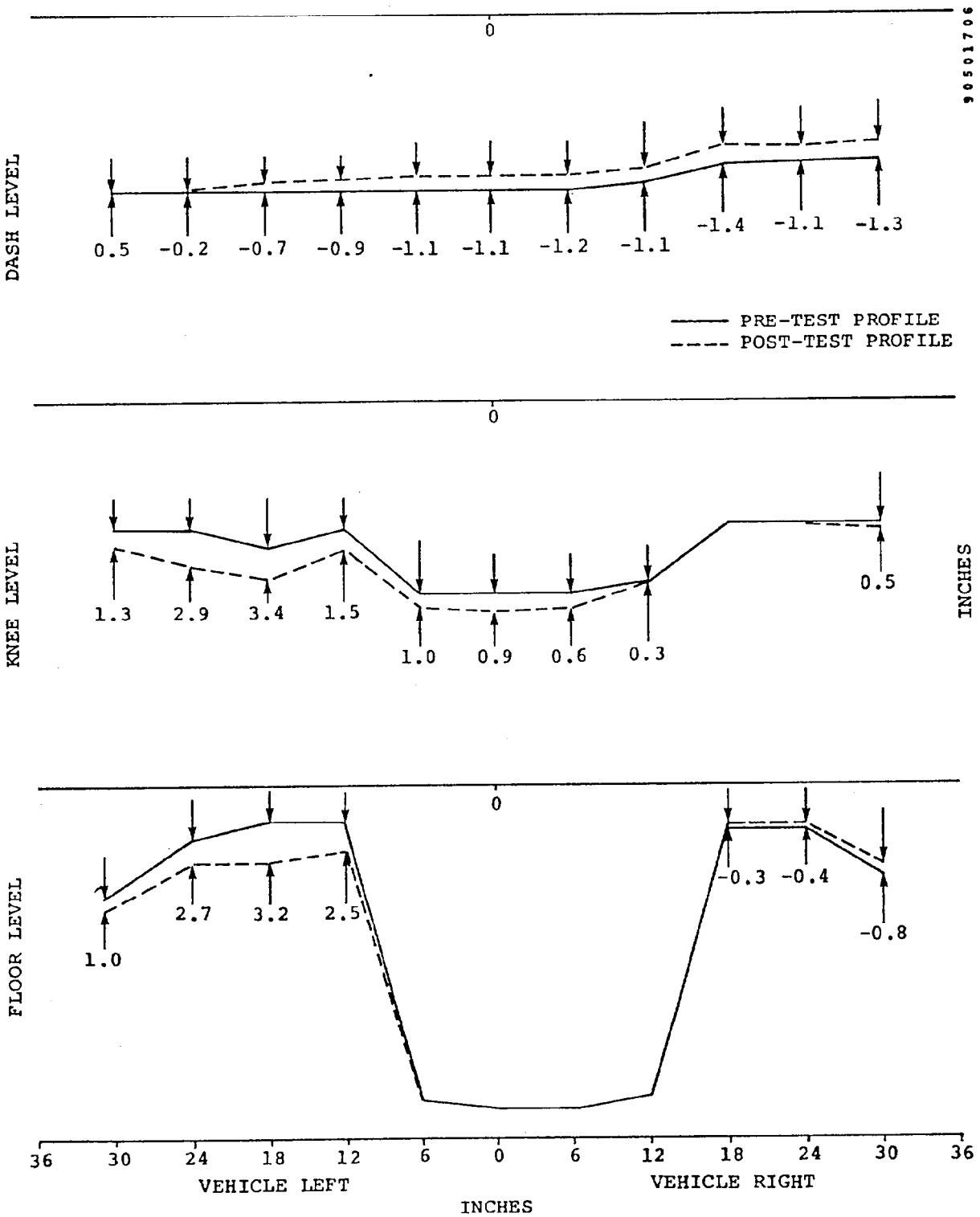


Figure 4-5. 1979 Ford E-150 Van Interior Profile and Static Intrusion (Test 3052-3).

TABLE 4-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - FORD ECONOLLNE E-150 VAN (TEST 3052-3)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	136.2	-18.1	60.3	136.0	-17.7	61.1	-0.2	0.4	0.8
Hub	132.7	-18.1	53.7	132.6	-17.7	54.5	-0.4	0.4	0.8
Bottom	126.5	-18.1	49.5	126.9	-17.7	50.0	0.4	0.4	0.5

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.
Note: Tilt steering wheel set at lowermost driving position.

TABLE 4-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-3)

Vehicle: 1979 Ford Econoline E-150 Van

Accelerometer		Test 3052-3 (30.02 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-33.3	16	-1.8	104	+20.7	74
2X	Right Side B-pillar	-36.4	16	-2.2	94	+19.7	65
	Average 1X & 2X	-34.9	16	-2.0	97	20.1	69
3X	Left Side Firewall	-66.5	25	-1.4	112	+17.2	86
3Y	Left Side Firewall	+19.8	18	-0.2	16	+12.6	200
3Z	Left Side Firewall	+28.6	13	-5.0	192	-8.0	200
4X	Right Side Firewall	-72.2	19	+0.2	97	+23.5	200
4Y	Right Side Firewall	-21.2	20	-1.3	25	+1.9	200
4Z	Right Side Firewall	-22.8	15	-1.1	17	+10.2	200
5X	Engine	-79.9	38	-5.8	50	+16.9	42
5Y	Engine	-12.3	94	+3.7	71	+2.7	95
5Z	Engine	+8.2	48	+3.4	53	+3.0	97
6X	Front Axle	-83.1	7	-2.4	94	+16.4	65
7X	Vehicle C.G.	-34.4	49	-3.0	103	+20.0	67
7Y	Vehicle C.G.	+10.9	39	-0.9	114	+1.0	85
7Z	Vehicle C.G.	+30.4	25	+4.2	63	+6.3	200
8X	Rear Compartment	-33.4	16	-2.7	99	+19.9	67
8Y	Rear Compartment	+7.4	86	-0.5	85	-0.4	185
8Z	Rear Compartment	+28.3	83	-5.4	60	-4.4	132
9X	Rear Axle	-57.8	26	-3.2	111	+18.2	83

TABLE 4-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-3)

Vehicle: 1979 Ford Econoline E-150 Van

		Test 3052-3 (30.02 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-91.9	83	-104.3	97
	Y	-23.7	85	+29.0	104
	Z	+56.2	72	+66.8	97
	R*	+88.4	85	+100.4	98
	HIC	929	66-96	1072	81-109
CHEST					
	X	-60.2	82	-40.8	69
	Y	-19.5	85	+25.4	76
	Z	-19.0	91	+11.7	68
	R*	+60.0	81	+39.3	76
	SI	561	200	290	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-927	52	-1632	49
	RT	-2617	56	-953	58

*3-msec clip.

TABLE 4-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-3)

Vehicle: 1979 Ford Econoline E-150 Van

	Test 3052-3 (30.02 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	1481	75
Right Lap Belt	1410	74
Shoulder Belt	1737	76
RIGHT FRONT OCCUPANT		
Left Lap Belt	2004	68
Right Lap Belt	1271	68
Shoulder Belt	1558	80

TABLE 4-14. SUMMARY OF MAXIMUM LOAD CELL DATA - FORD ECONOLINE E-150 VAN (TEST 3052-3)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	4.46	4.01	2.93	2.77	5.52	5.47	1.92	2.12	2.34	2.65
Time (msec)	61	28	17	37	38	39	38	48	53	19
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.85	2.02	2.57	5.08	13.69*	4.56	3.80	4.88	0.93	1.52
Time (msec)	12	49	21	38	41	36	33	32	11	28
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	3.12	4.66	12.70	12.19	2.84	2.41	10.67	10.89	4.22	0.29
Time (msec)	69	21	22	40	41	30	31	22	10	10
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	3.28	0.31	7.58	5.07	0.56	0.88	2.66	7.30	1.14	0.22
Time (msec)	62	51	21	40	42	8	13	22	71	33

*Maximum measured force.

TABLE 4-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-3)

Vehicle: 1979 Ford Econoline E-150 Van

Parameter	Test 3052-3 (30.02 mph) Peak Load (klb)	Time (msec)
Column 1	3.60	34
Column 2	6.64	32
Column 3	20.09	22
Column 4	17.23	36
Column 5	11.56	37
Column 6	22.09	41
Column 7	24.92	38
Column 8	24.68	21
Column 9	10.36	21
Column 10	10.76	65
Row A	21.73	37
Row B	51.44	22
Row C	34.44	36
Row D	26.36	38

TABLE 4-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-3)

Vehicle: 1979 Ford Econoline E-150 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	129.92	193.18
Time (msec)	38	36

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (4059 lb) plus engine acceleration times engine weight (939 lb).

5.0 PRESENTATION OF RESULTS (TEST 3052-4)

This section of the report presents the results of Test No. 3052-4, a head-on, symmetric crash test between a 1979 Dodge B-200 Van and the NHTSA Fixed Test Device (V_o = 25.17 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix D (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 5-1. CRASH TEST SUMMARY (TEST 3052-4)

TEST NO. 3052-4 CONTRACT: DOT-HS-8-01942

TEST DATE: April 17, 1979 TIME: 1138 TEMPERATURE: 82 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Dodge B-200 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	178.9/78.5	
Test Weight by Wheel (lb)	LF 1250 RF 1291 LR 1040 RR 1066	
Total Weight (lb)	4647	>100,000
Wheelbase (in.)	109.5	
Longitudinal C.G. (From Center of Front Axle) (in.)	49.6	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	25.17	0
Final Speed (mph @ msec)	-1.97 @ 96	
Velocity Change (mph)	27.14	
Maximum Averaged Compartment Acceleration (G @ msec)	-43.42 @ 15	
Maximum Engine Acceleration (G @ msec)	-62.11 @ 45	
Maximum Mutual Dynamic Crush (Film Data) (in.)	16.7	
Maximum Static Crush		
• Bottom of Windshield (in.)	0.8	
• Hood Level (in.)	8.6	
• Between Bumper/Hood (in.)	13.9	
• Bumper Level (in.)	14.5	
Maximum Post-test Intrusion (in.)	2.5	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #759	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 5-2. VEHICLE INSPECTION SHEET (TEST 3052-4)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: B21JF9X135433 Make: Dodge

NHTSA No.: R & D

Year: 1979 Color: Tan Model: B-200 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [ ] no [X] Bucket: X

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [ ] no [X] Split Back Bench: ____

Tinted Glass: yes [ ] no [X] Rear Window Def.: yes [ ] no [X]

Radio: yes [ ] no [X] Brakes: drum: ____ disc: ____

Clock: yes [ ] no [X]

Tire Size: J78-15 Ply Rating: 4 Mfg. & Line: Goodyear

Bias Ply: ____ Belted: X Radial ____ /Eng.Type: V-8 Cylinders: 8 Total Displ: 360 cid

Trans, # Fwd. Speeds: 3 Shipping Weight: 3855 Odometer: 53.9

Dealer (name, address, and phone number)

Holiday Oldsmobile Co.
3530 N. Scottsdale Rd.
Scottsdale, AZ 85251

Remarks (list additional accessories not listed above)

Fold-out Doors

Date of Manufacture: 11/78 Dynamic Science No.: 844 Date Received: 3/2/79

Tilting Steering Wheel: yes [ ] no [X] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: 22 gal (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap belts only.*

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, spare tire, wheel covers, and wipers removed. All fluids except for engine coolant removed, 100% water in fuel tank. *Chrysler Corp. lap and shoulder belt system installed.

2. Does vehicle show evidence of prior accident history? Describe: NO

3. Does vehicle show any significant corrosion? Describe: NO

4. Check condition of the front bumper and frame: Satisfactory

DS FORM 4200

TABLE 5-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-4)

Test No. 3052-4 Type Van-to-NHTSA Fixed Test Device

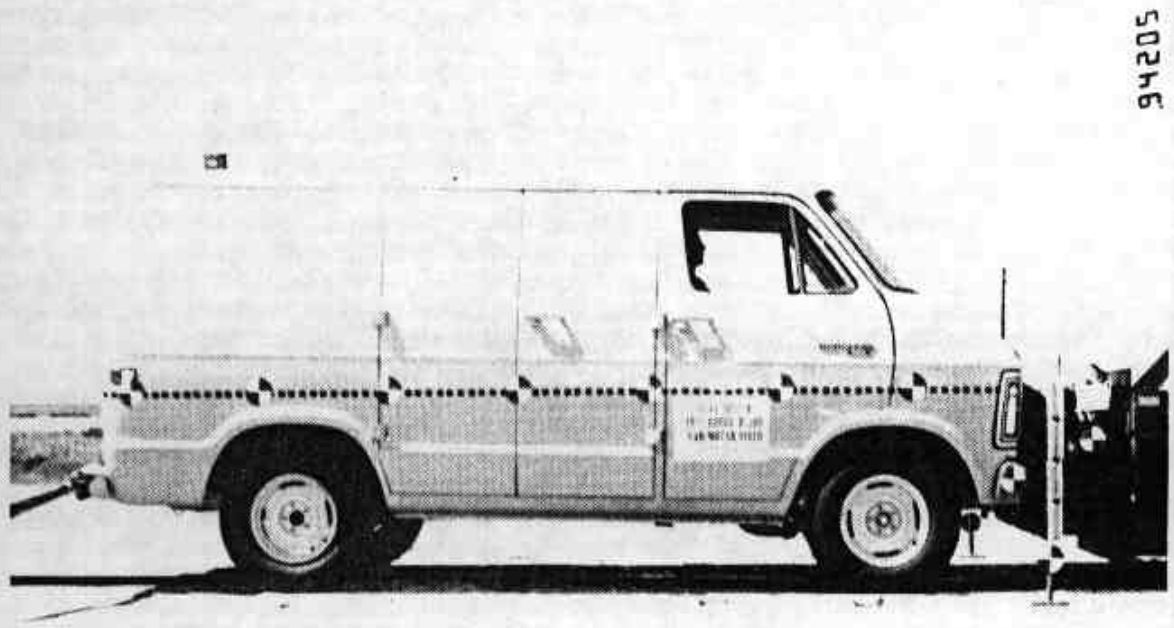
Car Model 1979 Dodge B-200 Van Dynamic Science No. 844

Engine Size	360 CID
Engine Weight* (lb)	650
Engine Height/Width (in.)	33.6/19.2
Bumper to Engine Block (in.)	25.6
Engine Length (in.)	20.2
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	22.2
Bumper Height (in.) (Min./Max.)	16.2/25.1

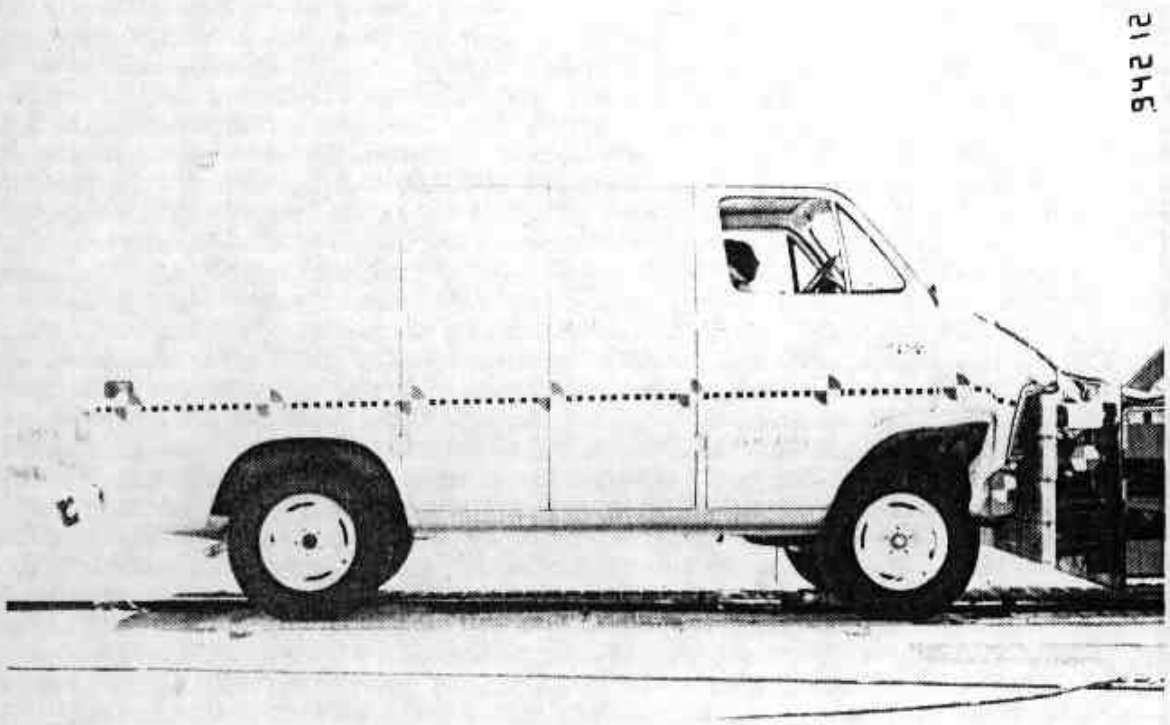
*Includes engine and rigid attachments such as transmission and drive train.

TABLE 5-4. PRE-TEST DUMMY POSITIONS - DODGE B-200 VAN (TEST 3052-4)

Distances (in.)	Driver	Passenger
Chest to Steering Wheel Hub (horizontal)	15.4	
Nose to Steering Wheel Upper Rim	21.8	
Nose to Windshield (horizontal)	30.1	31.5
Knee to Lower Panel (closest point)		
Left	7.1	10.2
Right	6.6	10.6
Chest to Dash (horizontal)	25.1	29.9
Forehead to Header	25.1	30.0



a) Pre-test



b) Post-test

Figure 5-1. Vehicle Configuration (Test 3052-4).

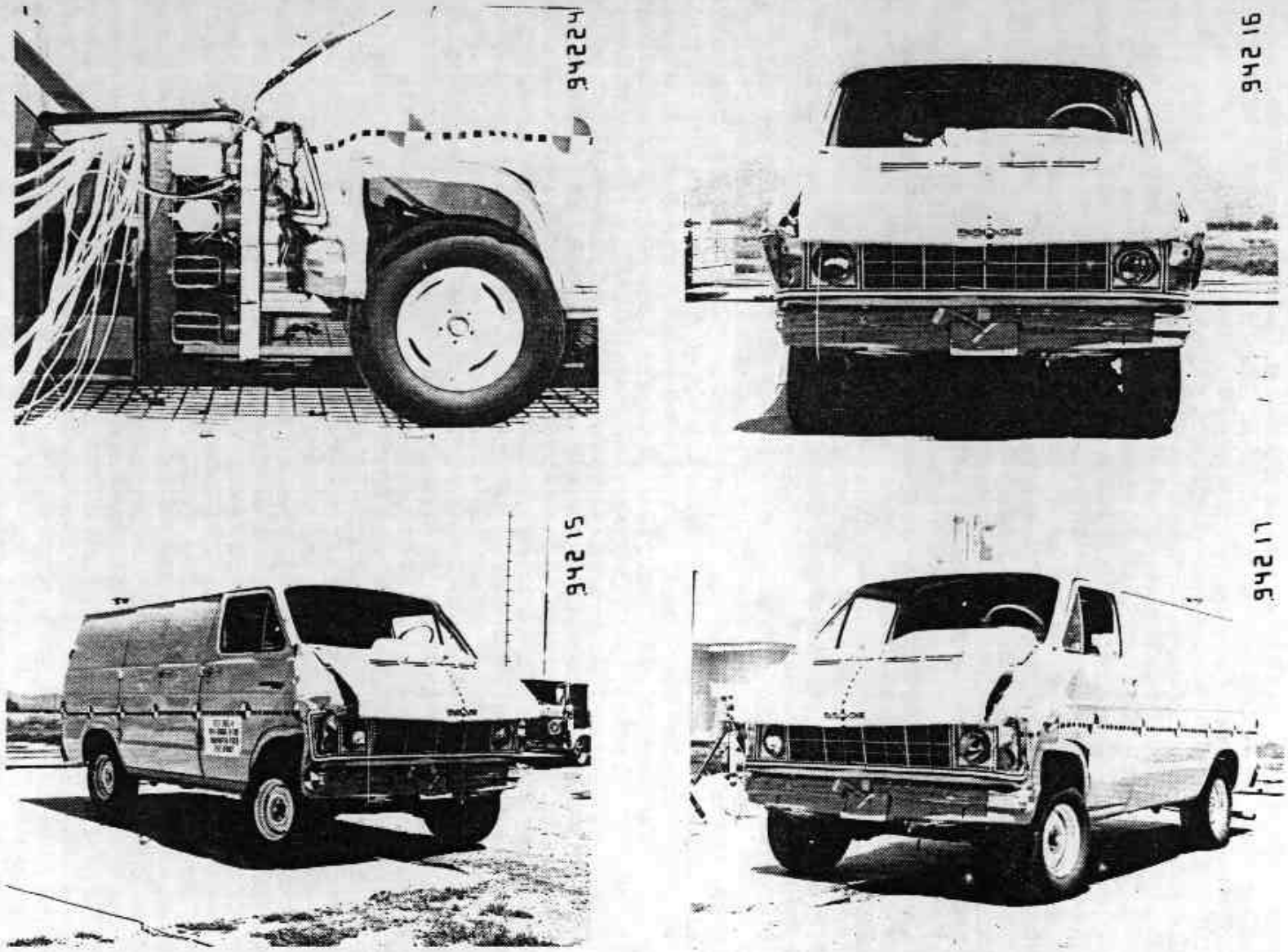
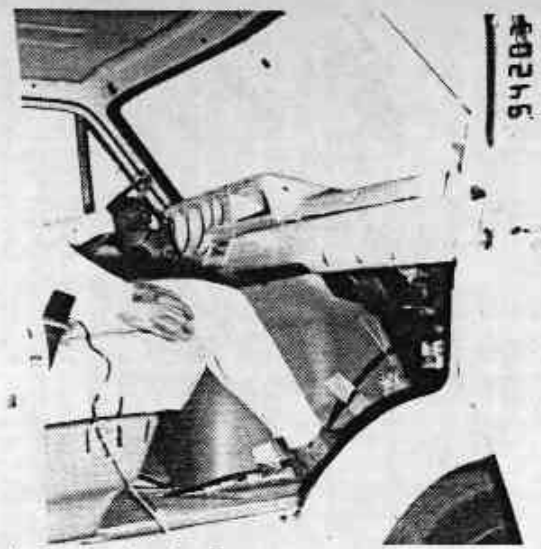


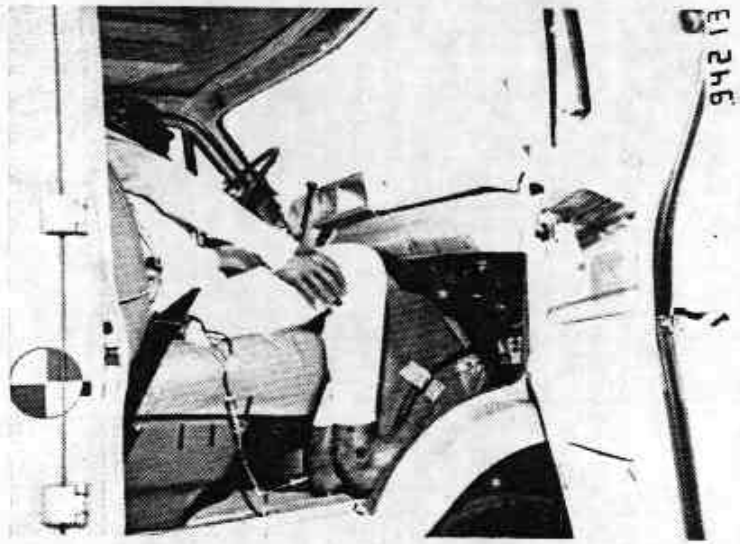
Figure 5-2. Post-test Vehicle Configuration (Test 3052-4).

a) Pre-test Driver



c) Pre-test Passenger

b) Post-test Driver



d) Post-test Passenger

Figure 5-3. Vehicle Dummy Configuration (Test 3052-4).

TABLE 5-5. CHRONOLOGY OF EVENTS (TEST 3052-4)

VEHICLE: 1979 Dodge B-200 Van

Time (msec)	Crash Event
0	Impact (visual)
4	Grille hits Test Device
22	Fenders strike tires
24	Dummies start forward motion
36	Fender wells strike back of front tires
50	Hood latch fails; Windshield pulls out of molding
54	Minimum wheelbase; Right side (99.5 in.); Left side (99.5 in.)
68	Maximum vehicle dynamic crush (16.7 in.)
77	Steering wheel lower rim strikes driver in neck; Passenger knees strike dash
86	Driver strikes steering column hub with head
92	Right rear tire leaves ground
98	Left rear tire leaves ground; Maximum driver forward motion
108	Passenger arms strike dash
136	Maximum passenger forward motion
150	Maximum vehicle declination (3.25°)
182	Driver recontacts seat with upper back
306	Passenger recontacts seat with upper back
355	Right rear tire recontacts ground
366	Left rear tire recontacts ground
460	Separation of vehicle and Test Device
637	Maximum vehicle rebound inclination (3.75°)

TABLE 5-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-4)

VEHICLE: 1979 Dodge B-200 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	Steering column, lower rim and hub	Possibly strikes right knee
Chest----------	None	None
Knees----------	Lower dash panel	Lower dash panel

Glazing: 100% pulled from molding

Doors: Both doors difficult to open

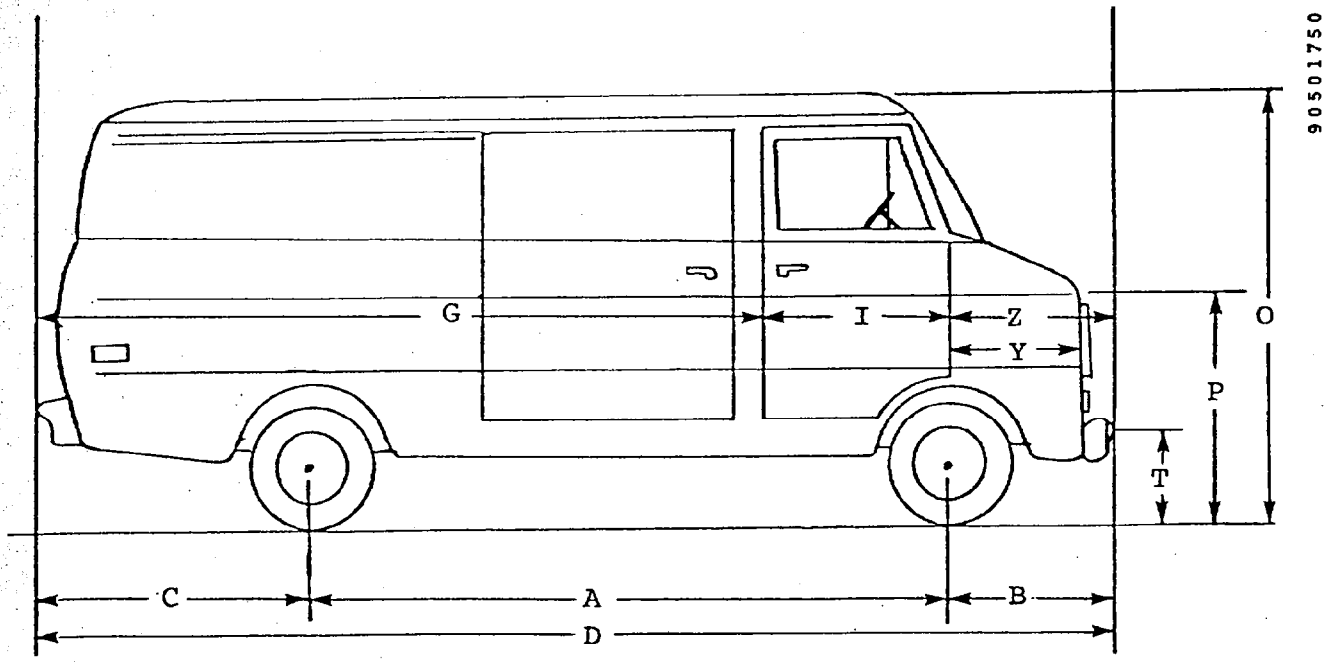
Seat Belt Anchorages and Restraints: Slight pulling of sheet metal around shoulder belt anchorages. Both seats moved forward 2.7 inches

Vehicle Centerline to Barrier Centerline: Rear: 5 inches right. Front: 1.5 inches left

Fuel Leakage: None

General Observations: Radiator leakage. Bumper struck both front tires and pushed them to the back of the fender wells. Hood latch failed. Steering wheel rotated upward. 5.5 inches static rebound.

TABLE 5-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-4)



VEHICLE: 1979 DODGE B-200 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	109.7	109.3	103.6	102.8	6.1	6.5
B	29.1	29.2	20.7	20.6	8.4	8.6
C	40.1	40.3	40.4	40.4	-0.3	-0.1
D	178.9	178.8	164.7	163.8	14.2	15.0
G	111.2	110.9	110.8	110.6	0.4	0.3
I	37.0	37.1	35.4	36.7	1.6	0.4
O	77.8	77.8	80.5	80.0	2.7	2.2
P	41.8	42.0	41.2	40.7	-0.6	-1.3
T	23.3	23.4	26.4	25.8	3.1	2.4
Y	27.1	27.2	20.6	16.3	6.5	10.9
Z	30.7	30.8	18.5	16.5	12.2	14.3

TABLE 5-8. EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-4)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	55.2	185	33.2	29.7	27.9	26.7	25.9	25.3	25.0	25.3	25.9	26.8	28.0	29.8	33.2
Hood Level	41.3	185	10.1	9.4	8.8	8.3	7.9	7.5	7.3	7.5	7.9	8.3	8.6	9.2	9.9
Between Bumper/Hood	33.8	185	10.5	10.0	9.1	8.7	8.3	7.9	7.5	7.9	8.2	8.6	9.0	10.0	10.4
Bumper Level	22.4	185	8.9	8.1	7.7	7.2	6.8	6.3	6.3	6.4	6.7	7.2	7.8	8.3	9.1
Post-test Profile - Distance to R.P. (in.)															
Bottom of Windshield	56.5	185	34.0	29.7	27.6	26.5	25.6	25.1	24.8	25.1	25.7	26.6	27.8	29.5	32.8
Hood Level	39.2	185	16.0	12.4	12.1	12.0	12.0	11.9	11.7	12.2	12.6	12.9	13.3	13.7	18.5
Between Bumper/Hood	35.9	185	19.1	22.7	19.7	19.7	19.6	19.4	19.3	19.5	19.7	20.0	20.3	23.9	20.4
Bumper Level	25.4	185	20.5	20.5	20.0	20.4	20.4	20.5	20.7	20.9	20.7	20.7	20.6	21.1	21.4
Post-test Static Crush (in.)															
Bottom of Windshield	1.3	0.0	0.8	0.0	-0.3	-0.2	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.4
Hood Level	-2.1	0.0	5.9	3.0	3.3	3.7	4.1	4.4	4.4	4.7	4.7	4.6	4.3	4.5	8.6
Between Bumper/Hood	2.1	0.0	8.6	12.7	10.6	11.0	11.3	11.5	11.8	11.6	11.5	11.4	11.3	13.9	10.0
Bumper Level	3.0	0.0	11.6	12.4	12.3	13.2	13.6	14.2	14.4	14.5	14.0	13.5	12.8	12.8	12.3

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

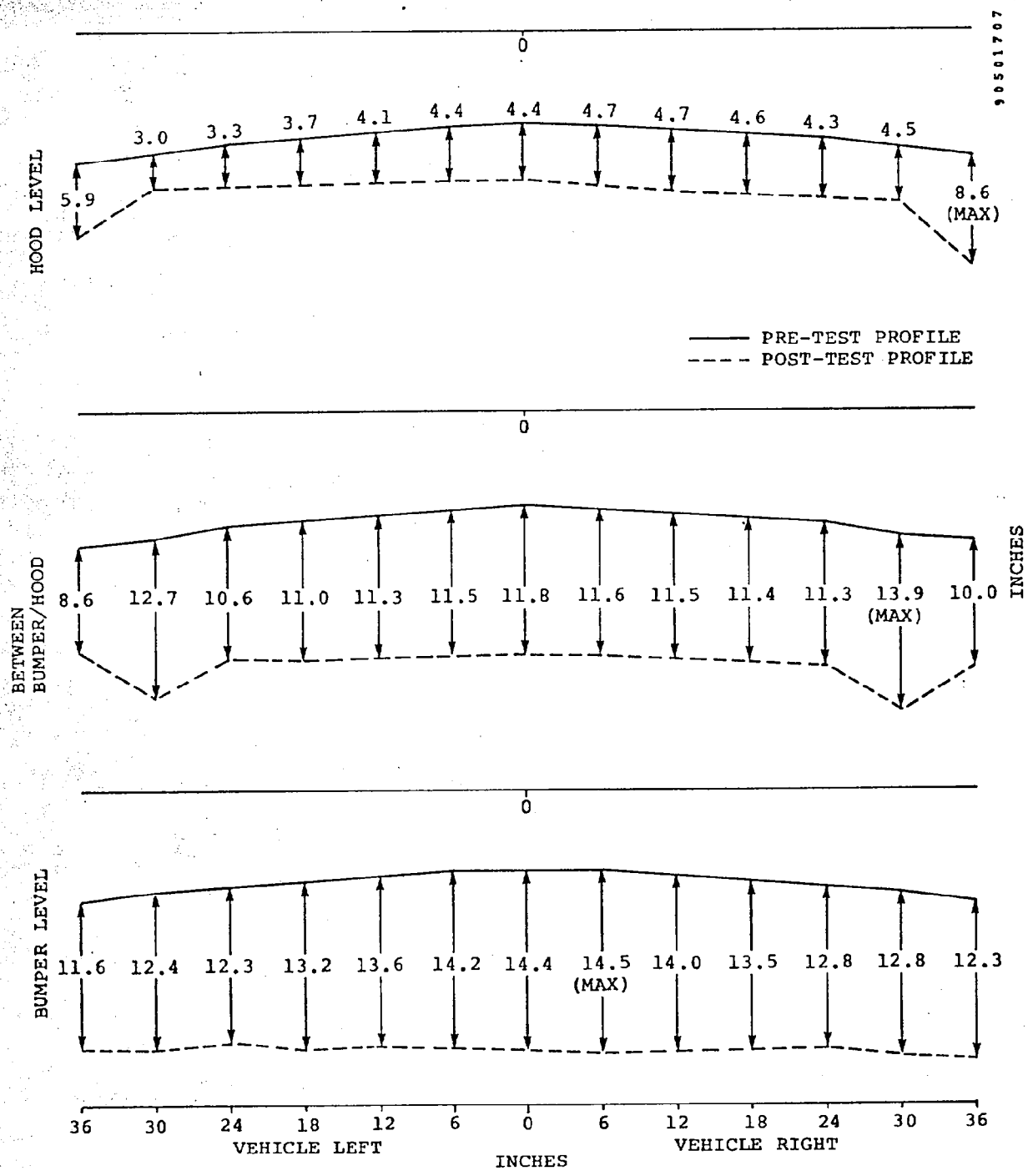


Figure 5-4. 1979 Dodge B-200 Van Exterior Profile and Static Crush (Test 3052-4).

TABLE 5-9. INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-4)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	57.3	125		18.8	17.7	17.6	17.6	17.6	17.6	19.3	20.3	20.4	20.3	20.1	
Knee Level	45.0	125		18.3	18.1	17.9	17.7	17.6	9.3	9.5	14.4	17.7	18.1	18.2	
Floor Level	33.4	129		27.5	25.1	24.7	24.8	0.9	0.4	0.7	0.7	22.1	23.6	23.7	
Post-test Profile - Distance from R.P. (in.)															
Dash Level	62.1	125		19.0	17.9	17.9	17.9	18.0	18.0	19.3	20.2	20.1	20.0	19.6	
Knee Level	46.8	125		16.4	16.8	16.4	16.5	16.5	7.3	7.5	12.2	17.3	17.4	17.3	
Floor Level	35.1	125		29.0	27.3	27.5	27.5	3.1	2.9	3.0	3.5	26.1	27.2	26.8	
Post-test Static Crush (in.)															
Dash Level	4.8	0.0		-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	0.0	0.1	0.3	0.3	0.5	
Knee Level	1.8	0.0		1.9	1.3	1.5	1.2	1.1	2.0	2.0	2.2	0.4	0.7	0.9	
Floor Level	1.7	-4.0		2.5	1.8	1.2	1.3	1.8	1.5	1.7	1.2	0.0	0.4	0.9	

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

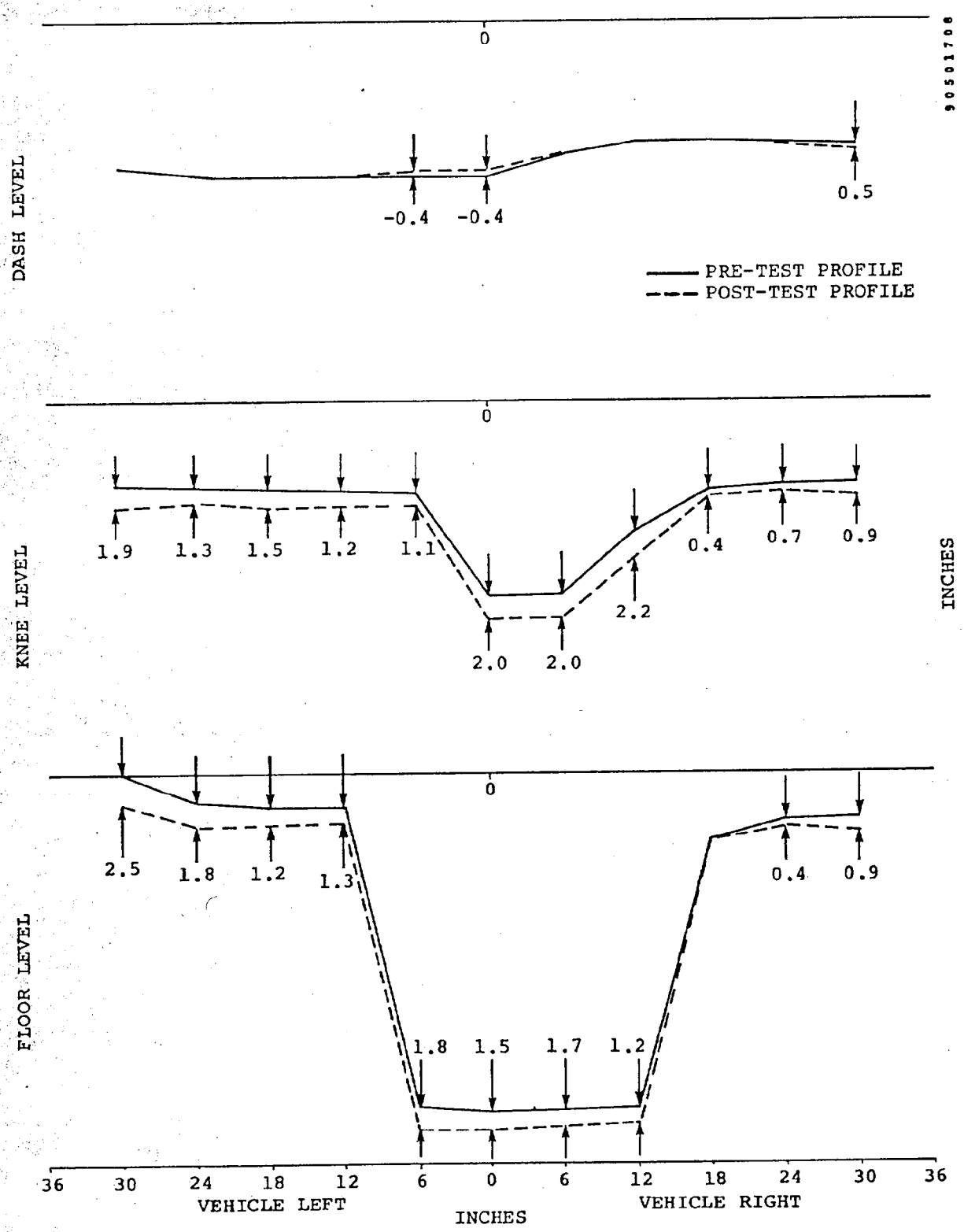


Figure 5-5. 1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-4).

TABLE 5-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-4)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	137.0	-19.2	60.9	139.1	-20.5	68.7	2.1	-1.3	7.8
Hub	133.4	-19.2	54.5	135.7	-19.4	62.4	2.3	-0.2	7.9
Bottom	128.0	-19.2	50.5	131.4	-18.9	57.9	3.4	0.3	7.4

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.

TABLE 5-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-4)

Vehicle: 1979 Dodge B-200 Van

Accelerometer		Test 3052-4 (25.17 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-40.9	15	-1.9	81	+16.8	69
2X	Right Side B-pillar	-45.9	15	-2.2	96	+17.7	72
	Average 1X & 2X	-43.4	15	-2.0	96	+17.3	71
3X	Left Side Firewall	-85.1	22	-1.3	193	+13.8	71
3Y	Left Side Firewall	-15.6	24	-2.4	43	-2.5	200
3Z	Left Side Firewall	-24.9	27	-1.1	31	+10.8	200
4X	Right Side Firewall	-77.8	58	-3.3	123	+15.9	64
4Y	Right Side Firewall	-34.2	47	-2.0	30	+2.3	200
4Z	Right Side Firewall	-23.5	47	-2.5	67	-1.9	200
5X	Engine	-62.1	45	-4.4	63	+17.4	50
5Y	Engine	+8.1	53	-2.5	116	-3.5	200
5Z	Engine	-11.4	57	-1.5	79	+1.5	200
6X	Front Axle	-88.9	26	-0.7	91	+12.7	75
7X	Vehicle C.G.	-42.8	15	-1.5	82	+1.7	72
7Y	Vehicle C.G.	-10.7	20	-1.8	42	-1.8	42
7Z	Vehicle C.G.	-40.8	29	-3.0	400	-3.0	47
8X	Rear Compartment	-42.5	15	-2.8	91	+17.1	68
8Y	Rear Compartment	+6.2	21	-0.3	18	+0.5	68
8Z	Rear Compartment	-29.5	50	-2.2	91	-2.0	152
9X	Rear Axle	-43.8	66	-5.2	104	+17.6	65

TABLE 5-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-4)

Vehicle: 1979 Dodge B-200 Van

		Test 3052-4 (25.17 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-102.8	97	-20.5	137
	Y	-31.3	97	+19.6	122
	Z	+52.0	97	+35.8	94
	R*	+85.5	99	+37.4	117
	HIC	660	75-106	409	69-153
CHEST					
	X	-44.4	82	-47.0	82
	Y	-14.8	90	+15.9	90
	Z	-16.2	110	+10.9	74
	R*	+39.1	80	+36.7	86
	SI	277	200	206	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-2346	62	-193	25
	RT	-980	68	-81	32

*3-msec clip.

TABLE 5-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-4)

Vehicle: 1979 Dodge B-200 Van

	Test 3052-4 (25.17 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	1185	65
Right Lap Belt	1953	69
Shoulder Belt	1825	81
RIGHT FRONT OCCUPANT		
Left Lap Belt	1852	77
Right Lap Belt	2033	78
Shoulder Belt	1637	87

TABLE 5-14. SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-4)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	4.84	1.31	1.43	0.60	1.84	1.00	1.74	0.78	5.07	6.15
Time (msec)	52	45	43	14	17	38	17	27	29	66
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.55	0.17	0.43	0.34	10.27	1.84	0.11	0.63	0.49	0.57
Time (msec)	63	14	32	41	46	48	20	32	46	45
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	1.09	7.27	10.04	2.81	4.33	3.08	3.29	15.32*	7.07	0.41
Time (msec)	23	13	18	40	39	39	18	18	13	15
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	0.12	3.14	9.32	3.56	2.40	2.72	4.91	7.25	3.24	0.14
Time (msec)	23	17	27	22	15	14	53	31	16	11

*Maximum measured force.

TABLE 5-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-4)

Vehicle: 1979 Dodge B-200 Van

Parameter	Test 3052-4 (25.17 mph) Peak Load (klb)	Time (msec)
Column 1	6.37	66
Column 2	10.30	14
Column 3	23.16	18
Column 4	7.96	18
Column 5	7.32	46
Column 6	16.11	46
Column 7	6.56	41
Column 8	19.08	18
Column 9	10.11	14
Column 10	5.38	63
Row A	31.57	22
Row B	39.22	16
Row C	13.97	46
Row D	18.51	42

TABLE 5-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-4)

Vehicle: 1979 Dodge B-200 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	93.40	176.38
Time (msec)	45	15

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (4047 lb) plus engine acceleration times engine weight (600 lb).

6.0 PRESENTATION OF RESULTS (TEST 3052-5)

This section of the report presents the results of Test No. 3052-5, a head-on, symmetric crash test between a 1979 Dodge B-200 Van and the NHTSA Fixed Test Device (V_o = 30.22 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix E (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 6-1. CRASH TEST SUMMARY (TEST 3052-5)

TEST NO. 3052-5 CONTRACT: DOT-HS-8-01942

TEST DATE: April 18, 1979 TIME: 1143 TEMPERATURE: 73 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Dodge B-200 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	178.8/78.5	
Test Weight by Wheel (lb)	LF 1301 RF 1305 LR 1029 RR 1019	
Total Weight (lb)	4654	>100,000
Wheelbase (in.)	109.5	
Longitudinal C.G. (From Center of Front Axle) (in.)	49.2	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	30.22	0
Final Speed (mph @ msec)	-2.57 @ 98	
Velocity Change (mph)	32.79	
Maximum Averaged Compartment Acceleration (G @ msec)	-51.92 @ 14	
Maximum Engine Acceleration (G @ msec)	-90.31 @ 42	
Maximum Mutual Dynamic Crush (Film Data) (in.)	19.1	
Maximum Static Crush		
• Bottom of Windshield (in.)	2.3	
• Hood Level (in.)	9.1	
• Between Bumper/Hood (in.)	15.7	
• Bumper Level (in.)	16.6	
Maximum Post-test Intrusion (in.)	5.1	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #759	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 6-2. VEHICLE INSPECTION SHEET (TEST 3052-5)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: B21JF9X151063 Make: Dodge

NHTSA No.: R & D

Year: 1979 Color: Gray Model: B-200 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [ ] no [X] Bucket: X (1)

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [X] no [ ]

Tinted Glass: yes [ ] no [X] Rear Window Def.: yes [ ] no [X] Split Back Bench: ____

Radio: yes [ ] no [X] Brakes: drum: R disc: F

Clock: yes [ ] no [X]

Tire Size: J78-15 Ply Rating: 4 Mfg. & Line: Goodyear

Bias Ply: ____ Belted: X Radial ____ /Eng.Type: V-8 Cylinders: 8 Total Displ: 360 cid

Trans, # Fwd. Speeds: 3 Shipping Weight: 4032 Odometer: 36.5

Dealer (name, address, and phone number)
Holiday Oldsmobile Co.
3530 N. Scottsdale Rd.
Scottsdale, AZ 85251

Remarks (list additional accessories not listed above)
Fold-out Doors
Tilt steering wheel set at lowermost driving position.

Date of Manufacture: 12/78 Dynamic Science No.: 845 Date Received: 3/2/79

Tilting Steering Wheel: yes [X] no [ ] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: 36 gal. (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap belt only*

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, spare tire, wheel covers, and wipers removed. All fluids except for engine coolant removed. 100% water in fuel tank. Passenger seat used in Test 3052-4. *Chrysler Corp. lap and shoulder belt system installed.
2. Does vehicle show evidence of prior accident history? Describe: NO
3. Does vehicle show any significant corrosion? Describe: NO
4. Check condition of the front bumper and frame: Satisfactory

DS FORM 4200

TABLE 6-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-5)

Test No. 3052-5 Type Van-to-NHTSA Fixed Test Device

Car Model 1979 Dodge B-200 Van Dynamic Science No. 845

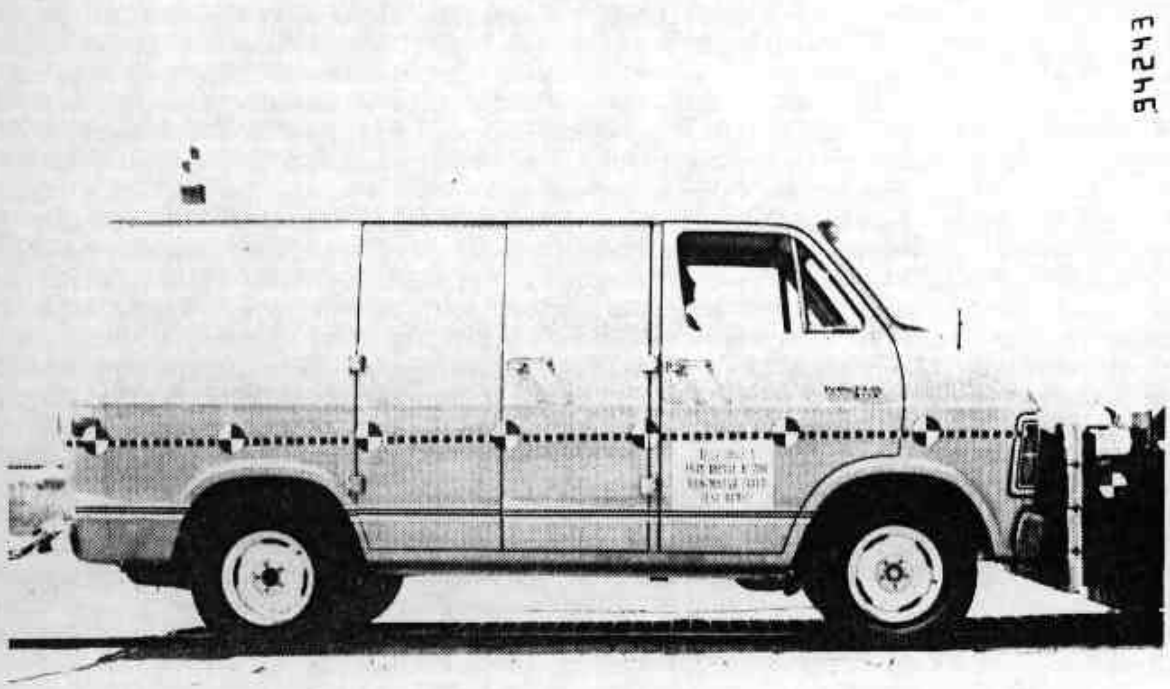
Engine Size	360 CID
Engine Weight* (lb)	650
Engine Height/Width (in.)	33.8/20.4
Bumper to Engine Block (in.)	25.9
Engine Length (in.)	19.6
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	22.3
Bumper Height (in.) (Min./Max.)	16.9/24.9

*Includes engine and rigid attachments such as transmission and drive train.

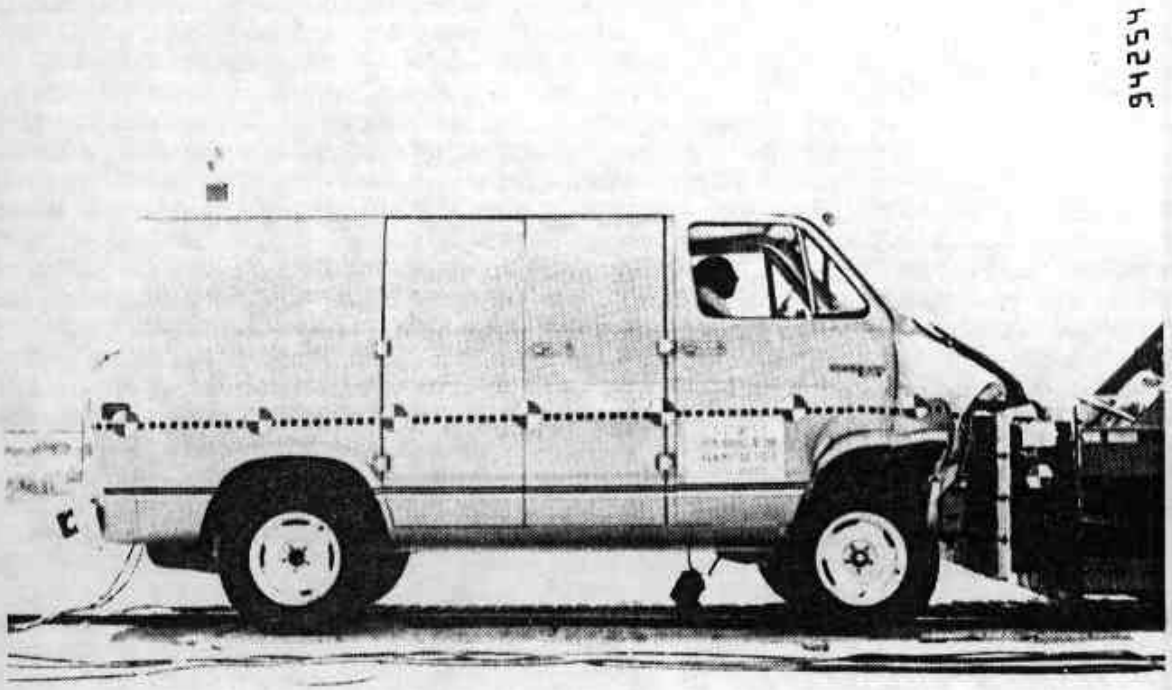
TABLE 6-4. PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-5)

Distances (in.)	Driver*	Passenger
Chest to Steering Wheel Hub (horizontal)	13.5	
Nose to Steering Wheel Upper Rim	19.3	
Nose to Windshield (horizontal)	30.1	32.6
Knee to Lower Panel (closest point)		
Left	6.9	10.0
Right	6.6	10.6
Chest to Dash (horizontal)	25.5	28.4
Forehead to Header	25.5	27.2

*Tilt steering wheel in lowermost position.



a) Pre-test



b) Post-test

Figure 6-1. Vehicle Configuration (Test 3052-5).

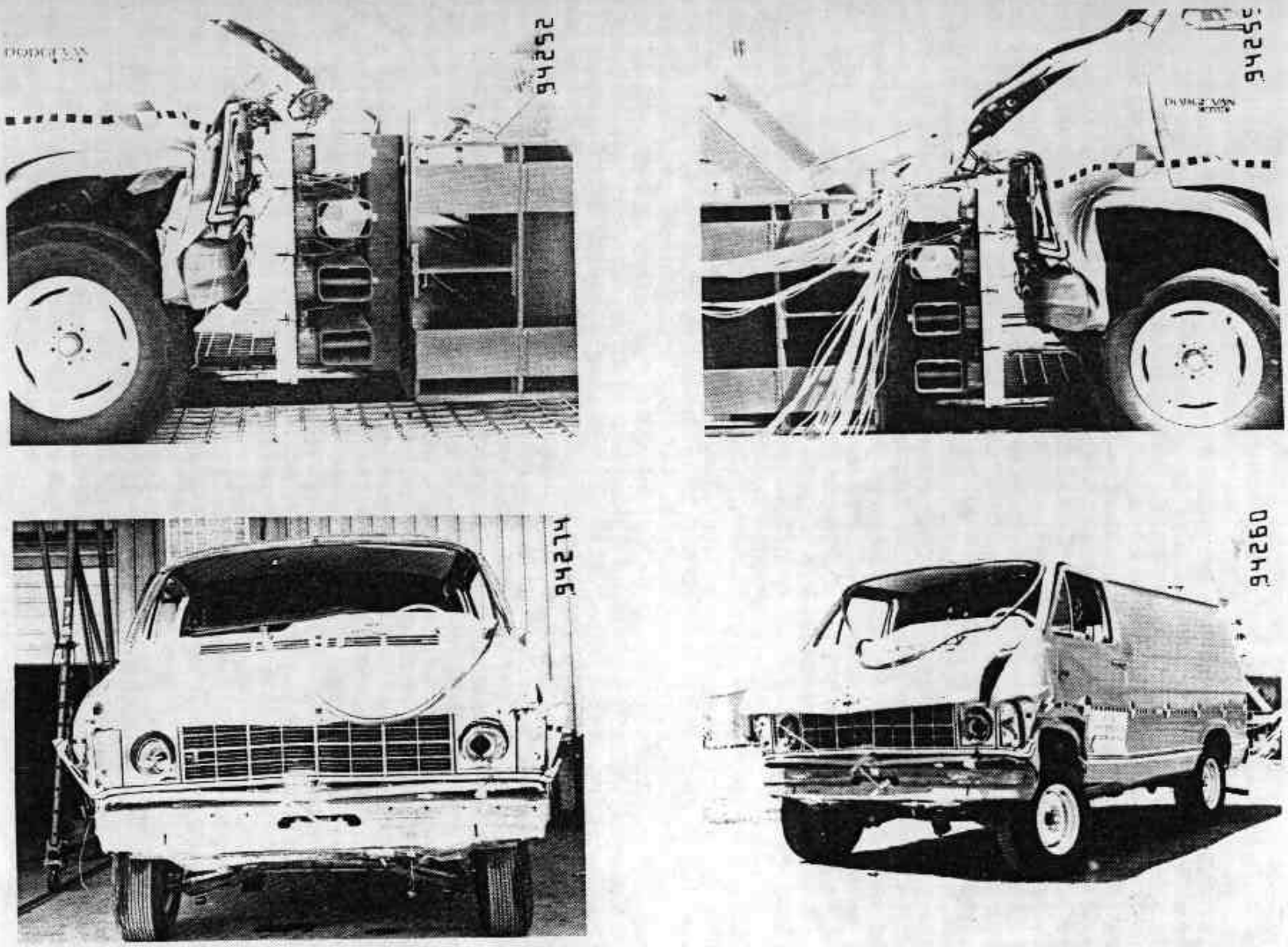
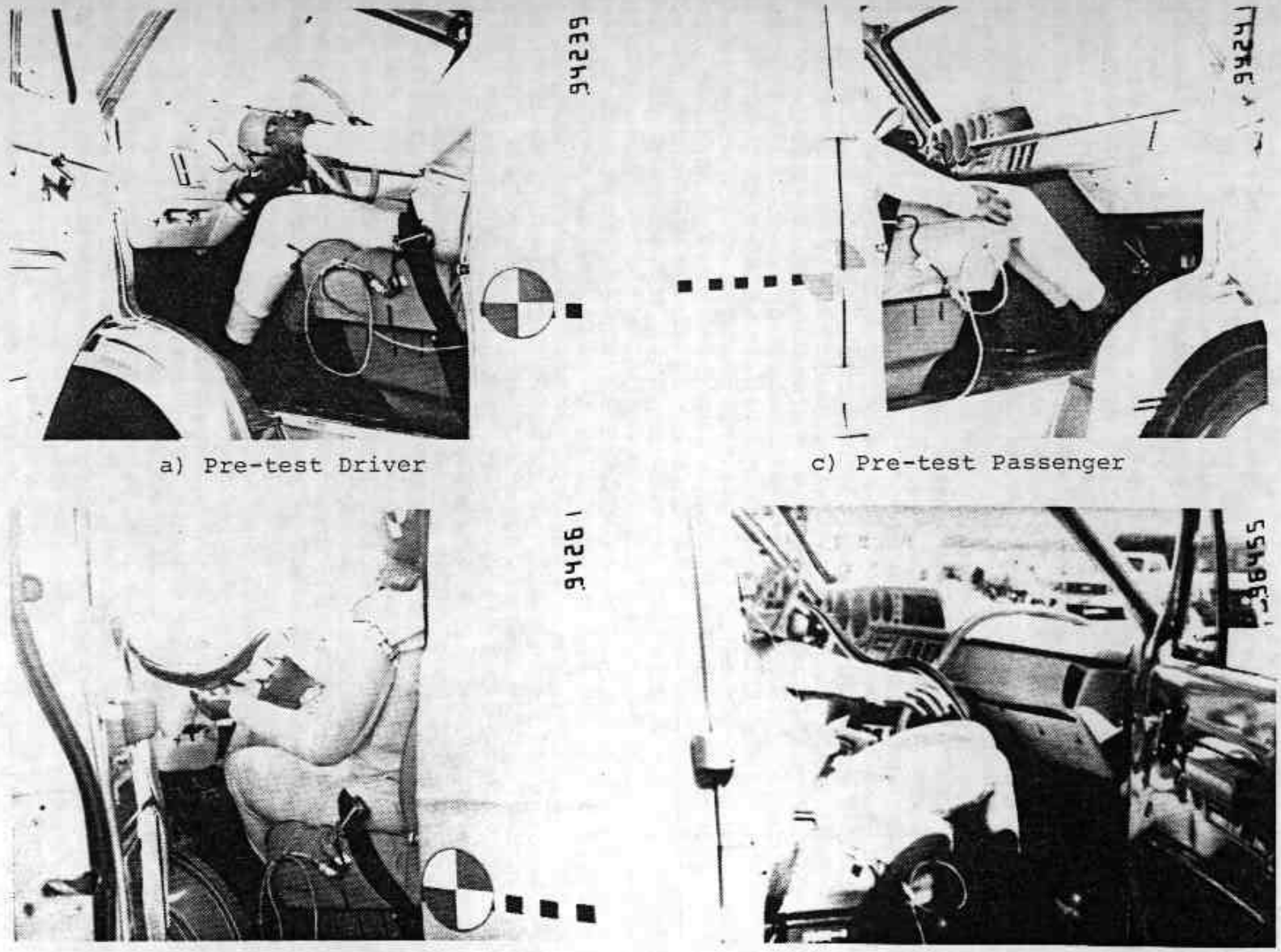


Figure 6-2. Post-test Vehicle Configuration (Test 3052-5).



a) Pre-test Driver

c) Pre-test Passenger

b) Post-test Driver

d) Post-test Passenger

Figure 6-3. Vehicle Dummy Configuration (Test 3052-5).

TABLE 6-5. CHRONOLOGY OF EVENTS (TEST 3052-5)

VEHICLE: 1979 Dodge B-200 Van

Time (msec)	Crash Event
0	Impact (visual)
3	Grill strikes Test Device
18	Fenders strike front tires; Dummies start forward motion
27	Hood latch fails
33	Windshield pulls out of molding; Fender wells strike back of front tires
46	Driver knees strike dash
54	Hood strikes Test Device backing plate
57	Minimum right side wheelbase (96.9 in.); Passenger knees strike dash
59	Minimum left side wheelbase (97.6 in.)
62	Steering wheel lower rim strikes driver in chest; Passengerleft arm strikes engine cowling
66	Maximum vehicle dynamic crush (19.1 in.)
73	Driver arms strike dash
77	Driver strikes steering wheel hub with head
90	Driver maximum forward motion
97	Rear tires leave ground
131	Passenger maximum forward motion
167	Maximum vehicle declination (4.0°)
183	Driver recontacts seat with upper back
252	Passenger recontacts seat with upper back
403	Rear tires recontact ground
462	Vehicle separates from Test Device
583	Maximum vehicle rebound inclination (4.0°)

TABLE 6-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-5)

VEHICLE: 1979 Dodge B-200 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	Steering wheel hub	None
Chest----------	Steering wheel lower rim	None
Knees----------	Lower dash panel	Lower dash panel

Glazing: 100% pulled from molding

Doors: Both doors difficult to open

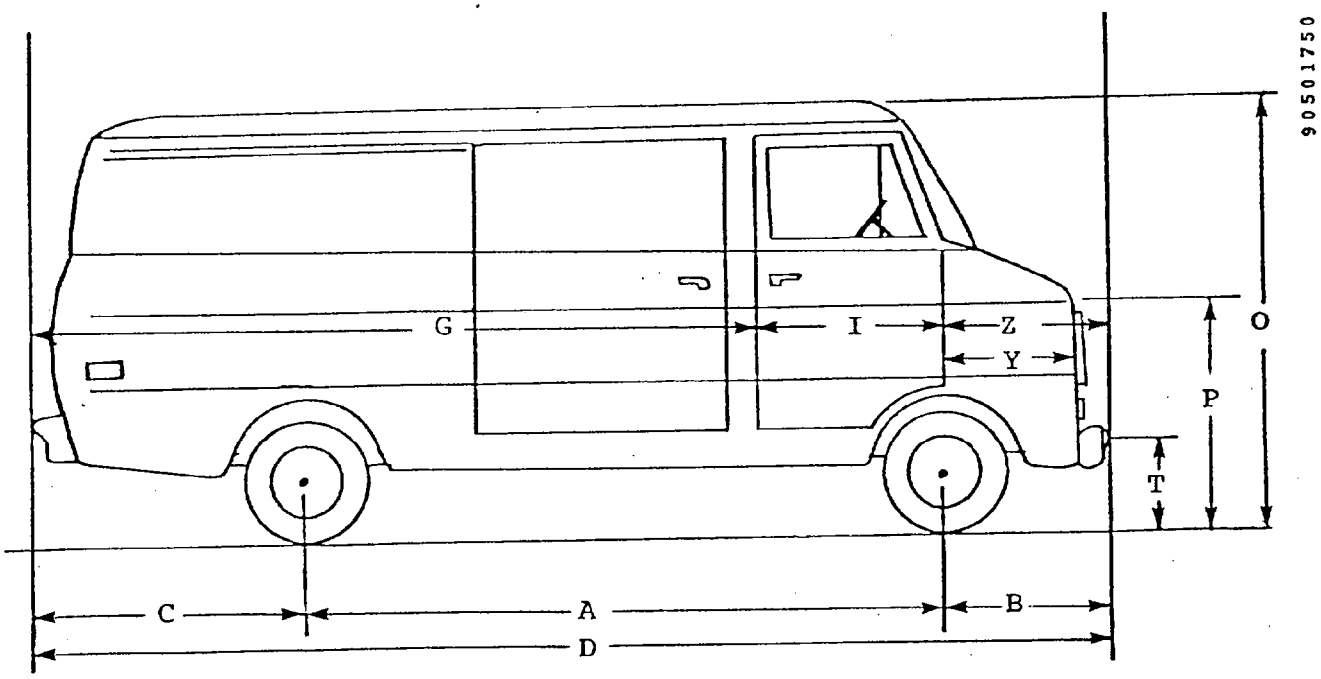
Seat Belt Anchorages and Restraints: Sheet metal around driver shoulder belt anchor torn from upper door sill. Deformation of sheet metal around passenger shoulder belt anchor. Left seat moved 0.3 inch forward, right seat moved 2.4 inches forward

Vehicle Centerline to Barrier Centerline: Rear: 2 inches right Front: 1 inch left

Fuel Leakage: None

General Observations: Radiator leakage. Bumper struck both front tires and pushed them to the back of the fender wells. Hood latch failed. Steering wheel rotated upward. 5.5 inches static rebound.

TABLE 6-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-5)



VEHICLE: 1979 DODGE B-200 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	109.6	109.3	101.8	101.5	7.8	7.8
B	29.0	29.1	19.3	19.1	9.7	10.0
C	40.2	40.3	40.5	40.6	-0.3	-0.3
D	178.9	178.7	161.6	161.2	17.3	17.5
G	111.0	110.8	110.1	110.2	0.9	0.6
I	36.9	37.1	34.1	35.7	2.8	2.4
O	78.0	77.5	80.6	79.5	2.6	2.0
P	42.2	41.8	40.1	42.5	-2.1	0.7
T	23.2	22.8	26.4	25.5	3.2	2.7
Y	27.0	26.9	17.1	15.2	9.9	11.7
Z	31.0	30.8	17.4	15.3	13.6	15.5

TABLE 6-8. EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-5)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	55.4	185	33.9	30.0	28.1	26.9	26.0	25.5	25.5	25.5	26.1	27.0	28.1	29.9	33.7
Hood Level	41.9	185	10.3	9.5	8.9	8.5	8.1	7.7	7.5	7.8	8.1	8.5	8.9	9.4	10.2
Between Bumper/Hood	34.1	185	10.7	10.3	9.4	9.0	8.5	8.1	7.9	8.1	8.5	8.9	9.3	10.3	10.7
Bumper Level	22.4	185	9.1	8.3	7.8	7.4	7.0	6.6	6.4	6.7	7.0	7.5	7.9	8.4	9.1
Post-test Profile - Distance to R.P. (in.)															
Bottom of Windshield	56.9	185	34.8	30.7	28.9	28.0	27.0	26.4	26.1	26.6	27.2	28.1	29.4	30.5	36.0
Hood Level	41.1	185	19.4	13.9	13.4	13.1	12.7	12.5	12.9	12.6	12.4	12.3	12.4	12.5	18.4
Between Bumper/Hood	37.1	185	23.7	26.0	22.9	22.9	22.8	22.8	22.7	22.7	22.8	22.8	22.9	25.9	23.8
Bumper Level	25.7	185	23.6	23.3	22.8	22.9	22.9	22.9	23.0	23.1	23.1	23.4	23.1	23.7	24.2
Post-test Static Crush (in.)															
Bottom of Windshield	1.5	0.0	0.9	0.7	0.8	1.1	1.0	0.9	0.6	1.1	1.1	1.1	1.3	0.6	2.3
Hood Level	-0.8	0.0	9.1	4.4	4.5	4.6	4.6	4.8	5.4	4.8	4.3	3.8	3.5	3.1	8.2
Between Bumper/Hood	3.0	0.0	13.0	15.7	13.5	13.9	14.3	14.7	14.8	14.6	14.3	13.9	13.6	15.6	13.1
Bumper Level	3.3	0.0	14.5	15.0	15.0	15.5	15.9	16.3	16.6	16.4	16.1	15.9	15.2	15.3	15.1

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

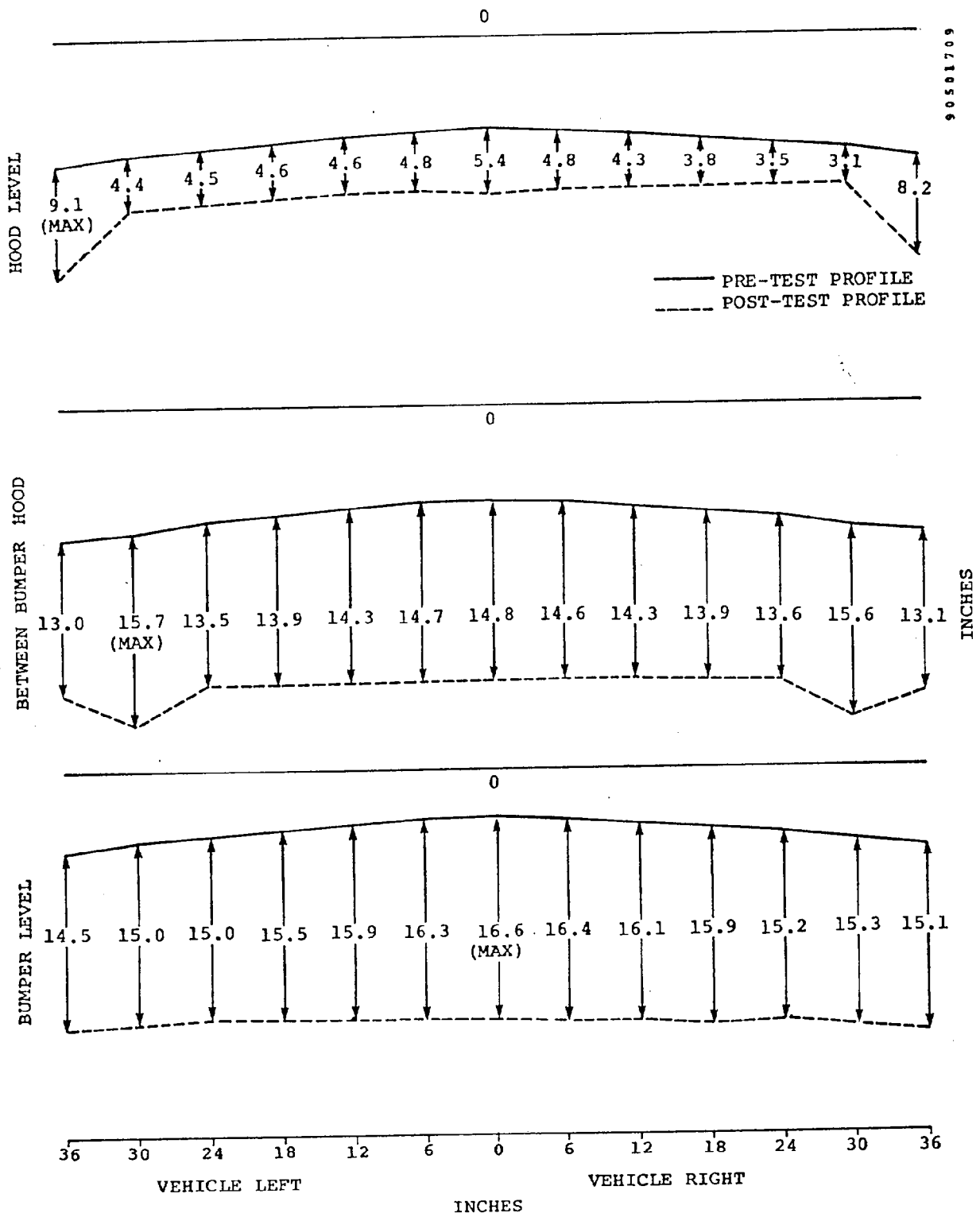


Figure 6-4. 1979 Dodge B-200 Van Exterior Profile and Static Crush (Test 3052-5).

TABLE 6-9. INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-5)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	57.9	125	18.6	17.4	17.4	17.4	17.4	17.4	19.3	18.5	18.6	18.7	18.8		
Knee Level	45.3	125	19.4	19.8	16.6	18.5	18.5	9.3	9.3	13.5	18.4	18.5	18.7		
Floor Level	33.8	128	28.1	25.7	25.5	25.5	1.8	1.2	1.2	1.5	24.4	24.5	24.2		
Post-test Profile - Distance from R.P. (in.)															
Dash Level	62.1	125	17.4	16.4	16.4	16.5	16.6	16.8	18.5	17.1	17.2	17.3	17.4		
Knee Level	46.6	125	15.9	17.7	14.1	16.1	16.4	6.4	6.5	11.0	17.0	17.2	17.2		
Floor Level	34.8	125	26.0	25.1	24.8	26.2	2.4	2.1	2.4	3.0	26.4	26.3	25.7		
Post-test Static Crush (in.)															
Dash Level	4.2	0.0	1.2	1.0	1.0	0.9	0.8	0.8	0.8	1.4	1.4	1.4	1.4		
Knee Level	1.3	0.0	3.5	2.1	2.5	2.4	2.1	2.9	2.8	2.5	1.4	1.3	1.5		
Floor Level	1.0	-3.0	5.1	3.6	3.7	2.3	2.4	2.1	1.8	1.5	1.0	1.2	1.5		

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

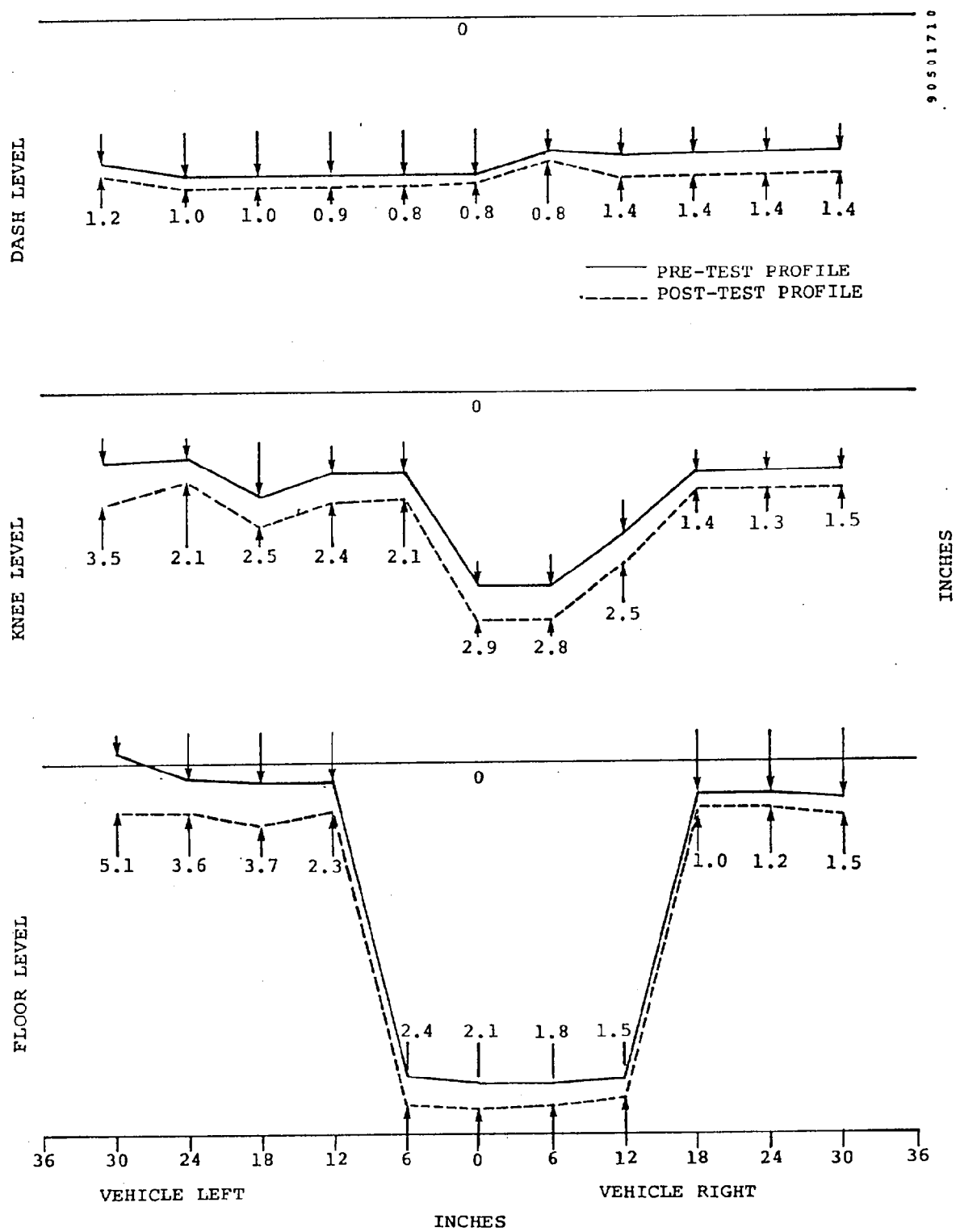


Figure 6-5. 1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-5).

TABLE 6-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-5)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	133.6	-19.8	59.6	134.2	-21.2	65.0	0.6	-1.4	5.1
Hub	131.9	-19.8	52.3	131.9	-19.5	58.0	0.0	0.3	5.7
Bottom	127.9	-19.8	46.6	127.5	-19.9	53.3	-0.4	-0.1	6.7

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.
Note: Tilt steering wheel set at lowermost driving position.

TABLE 6-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-5)

Vehicle: 1979 Dodge B-200 Van

Accelerometer		Test 3052-5 (30.22 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-50.6	14	-2.9	98	+21.0	70
2X	Right Side B-pillar	-55.4	13	-2.3	99	+21.4	71
	Average 1X & 2X	-51.9	14	-2.6	98	+21.2	71
3X	Left Side Firewall	-83.5	35	-9.4	195	+15.1	45
3Y	Left Side Firewall	-21.9	27	-3.9	54	-7.5	200
3Z	Left Side Firewall	-26.9	24	-0.7	39	+11.4	200
4X	Right Side Firewall	-68.7	16	-1.1	108	+20.8	84
4Y	Right Side Firewall	-11.1	21	-1.4	60	-0.7	70
4Z	Right Side Firewall	-26.8	52	-5.3	63	-6.2	200
5X	Engine	-90.3	42	-5.1	50	+18.9	45
5Y	Engine	-141.1*	63	-23.9	200	-56.5	200
5Z	Engine	-9.8	58	-1.8	70	+0.8	200
6X	Front Axle	-122.0	14	+4.6	50	+37.9	200
7X	Vehicle C.G.	-52.8	14	+0.8	91	+2.2	200
7Y	Vehicle C.G.	+17.7	46	-0.6	73	-8.2	200
7Z	Vehicle C.G.	-36.9	56	+2.0	119	-8.2	200
8X	Rear Compartment	-54.9	13	-3.9	89	+20.5	68
8Y	Rear Compartment	+9.0	20	-0.4	17	+0.4	174
8Z	Rear Compartment	-29.0	28	+2.4	200	-6.8	200
9X	Rear Axle	-87.7	53	-0.4	91	+23.2	200

*Data invalid due to transducer failure.

TABLE 6-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-5)

Vehicle: 1979 Dodge B-200 Van

		Test 3052-5 (30.22 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-145.7	82	-27.6	129
	Y	-20.5	88	+23.4	113
	Z	+52.6	85	+55.6	100
	R*	+94.9	85	+55.2	96
	HIC	1006	79-90	724	65-139
CHEST					
	X	-48.5	67	-40.0	75
	Y	-8.3	96	+20.1	85
	Z	-20.4	86	+16.0	69
	R*	+46.0	79	+41.0	79
	SI	391	200	305	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-789	56	-81	176
	RT	-2557	56	-232	28

*3-msec clip.

TABLE 6-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-5)

Vehicle: 1979 Dodge B-200 Van

	Test 3052-5 (30.22 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	1272	75
Right Lap Belt	1433	60
Shoulder Belt	1964	76
RIGHT FRONT OCCUPANT		
Left Lap Belt	1889	73
Right Lap Belt	2146	71
Shoulder Belt	1762	77

TABLE 6-14. SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-5)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	6.98	0.90	2.46	1.10	3.73	0.69	2.48	1.56	6.61	4.05
Time (msec)	51	56	15	40	38	38	15	51	24	43
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.73	0.76	0.53	0.76	1.66	0.84	0.21	0.63	0.58	0.34
Time (msec)	49	56	47	38	43	38	45	65	35	42
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	1.00	8.09	9.10	3.74	7.04	5.15	6.73	18.52*	7.84	0.19
Time (msec)	21	11	14	36	43	43	15	20	13	15
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	0.15	4.53	7.83	3.59	2.21	2.61	4.05	5.83	1.32	0.16
Time (msec)	150	21	21	37	34	36	29	16	15	20

*Maximum measured force.

TABLE 6-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-5)

Vehicle: 1979 Dodge B-200 Van

Parameter	Test 3052-5 (30.22 mph) Peak Load (klb)	Time (msec)
Column 1	4.37	42
Column 2	9.66	13
Column 3	25.02	16
Column 4	12.68	15
Column 5	8.74	38
Column 6	28.65	43
Column 7	8.73	38
Column 8	19.05	15
Column 9	11.69	12
Column 10	7.76	50
Row A	29.33	16
Row B	50.44	13
Row C	19.58	44
Row D	25.65	43

TABLE 6-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-5)

Vehicle: 1979 Dodge B-200 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	114.57	208.41
Time (msec)	42	14

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (4004 lb) plus engine acceleration times engine weight (650 lb).

7.0 PRESENTATION OF RESULTS (TEST 3052-6)

This section of the report presents the results of Test No. 3052-6, a head-on, symmetric crash test between a 1979 Dodge B-200 Van and the NHTSA Fixed Test Device (V_o = 15.28 mph).

This report presents all test results without analysis or discussion. Included in this document are: still photographs, film chronologies, vehicle damage sketches and tabulated pre- and post-test dimensions, accelerometer location identification, summaries of vehicle and NHTSA Test Device electronic data, and summaries of the simulated occupant data, including injury criteria values. High-speed motion pictures were also obtained for this test and have been submitted to NHTSA. Appendix F (Volume II) contains Calcomp plots for all electronic data for this test. This includes all vehicle accelerometer data, occupant response data, seat belt loads, NHTSA Test Device load cell data, force-deflection curves, and string potentiometer data. Refer to Section 8.0 for an analysis of the effect of impact velocity change on various vehicle and occupant response parameters.

TABLE 7-1. CRASH TEST SUMMARY (TEST 3052-6)

TEST NO. 3052-6 CONTRACT: DOT-HS-8-01942

TEST DATE: April 19, 1979 TIME: 1451 TEMPERATURE: 77 °F

TEST CONFIGURATION: Van-to-NHTSA Fixed Test Device Symmetric Head-on

VEHICLE NO. 1: 1979 Dodge B-200 Van

VEHICLE NO. 2: NHTSA Fixed Test Device

VEHICLE DATA	VEHICLE NO. 1	VEHICLE NO. 2
Overall Length/Width (in.)	178.8/78.5	
Test Weight by Wheel (lb) LR 1015 RR 1015	LF 1300 RF 1321	
Total Weight (lb)	4651	>100,000
Wheelbase (in.)	109.3	
Longitudinal C.G. (From Center of Front Axle) (in.)	47.7	
Impact Angle (deg)*	0	0
Offset Distance (in.)	0	0
Car Speed (mph)	15.28	0
Final Speed (mph @ msec)	-1.84 @ 159	
Velocity Change (mph)	17.12	
Maximum Averaged Compartment Acceleration (G @ msec)	-27.63 @ 27	
Maximum Engine Acceleration (G @ msec)	-34.55 @ 52	
Maximum Mutual Dynamic Crush (Film Data) (in.)	7.5	
Maximum Static Crush		
• Bottom of Windshield (in.)	0.1	
• Hood Level (in.)	1.8	
• Between Bumper/Hood (in.)	4.6	
• Bumper Level (in.)	6.5	
Maximum Post-test Intrusion (in.)	1.3	
OCCUPANTS		
Type	Alderson Part 572	
Location	LF - #A03 RF - #760	
Restraints	Standard Lap and Shoulder Belt	
INSTRUMENTATION		
Number of Data Channels	41	46
Number of Cameras	8	

*With respect to tow track centerline.

TABLE 7-2. VEHICLE INSPECTION SHEET (TEST 3052-6)

Contractor: Dynamic Science, Inc. Contract No.: DOT-HS-8-01942

VIN NO.: B21JF9X151062 Make: Dodge

NHTSA No.: R & D

Year: 1979 Color: Gray Model: B-200 Van

Auto Trans: yes [X] no [ ] Pwr Steering: yes [X] no [ ] Seats: (front) Bench: ____

Pwr Brakes: yes [X] no [ ] Auto Speed Cont: yes [ ] no [X] Bucket: X (1)

Pwr Seats: yes [ ] no [X] Anti Skid Brake: yes [ ] no [X] Split Bench: ____

Pwr Windows: yes [ ] no [X] Air Conditioning: yes [X] no [ ]

Tinted Glass: yes [ ] no [X] Rear Window Def.: yes [ ] no [X] Split Back Bench: ____

Radio: yes [ ] no [X] Brakes: drum: R disc: F

Clock: yes [ ] no [X]

Tire Size: J78-15 Ply Rating: 4 Mfg. & Line: Goodyear

Bias Ply: ____ Belted: X Radial ____ /Eng.Type: V-8 Cylinders: 8 Total Displ: 360 cid

Trans, # Fwd. Speeds: 3 Shipping Weight: 4005 Odometer: 35.0

Dealer (name, address, and phone number)
Holiday Oldsmobile Co.
3530 N. Scottsdale Rd.
Scottsdale, AZ 85251

Remarks (list additional accessories not listed above)
Fold-out Doors
Tilt steering wheel set at lowermost driving position.

Date of Manufacture: 12/78 Dynamic Science No.: 846 Date Received: 3/2/79

Tilting Steering Wheel: yes [X] no [ ] Telescoping Steering Wheel: yes [ ] no [X]

Fuel Capacity: 36 gal. (from owner's manual) "Space Saver" Spare Tire yes [ ] no [X]

Restraint System: Standard lap belt only*

1. Is the vehicle stock throughout? Describe: Mirrors, carpeting, jack, spare tire, wheel covers, and wipers removed. All fluids except for engine coolant removed. 100% water in fuel tank. Passenger seat used in Test 3052-4 and -5. *Chrysler Corp. lap and shoulder belt system installed.
2. Does vehicle show evidence of prior accident history? Describe: NO
3. Does vehicle show any significant corrosion? Describe: NO
4. Check condition of the front bumper and frame: Satisfactory

DS FORM 4200

TABLE 7-3. SUMMARY OF PRE-TEST ENGINE/BUMPER/FIREWALL CHARACTERISTICS (TEST 3052-6)

Test No. 3052-6 Type Van-to-NHTSA Fixed Test Device

Car Model 1979 Dodge B-200 Van Dynamic Science No. 846

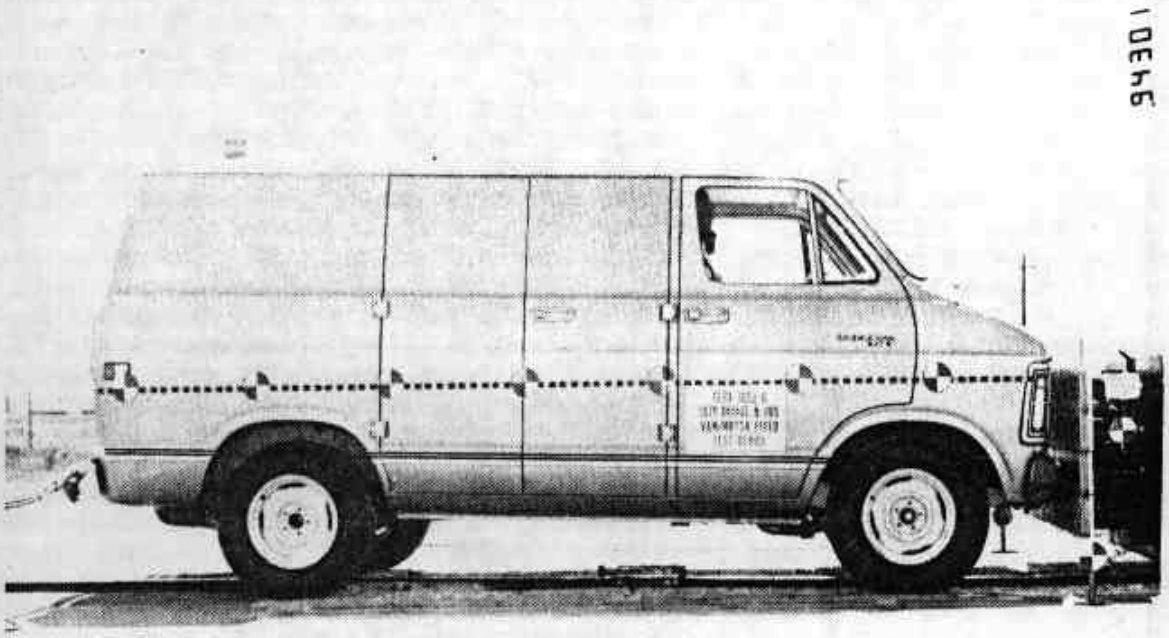
Engine Size	360 CID
Engine Weight* (lb)	650
Engine Height/Width (in.)	33.5/19.4
Bumper to Engine Block (in.)	25.7
Engine Length (in.)	19.8
Engine to Firewall (in.)	Not Applicable
Bumper to Firewall (in.)	22.0
Bumper Height (in.) (Min./Max.)	15.6/24.7

*Includes engine and rigid attachments such as transmission and drive train.

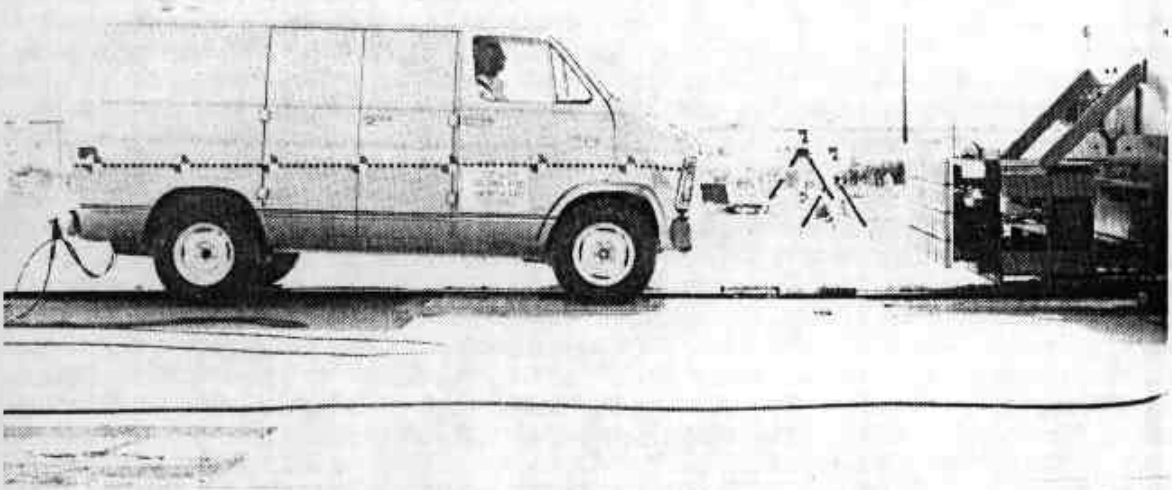
TABLE 7-4. PRE-TEST DUMMY POSITIONS - FORD E-150 VAN (TEST 3052-6)

Distances (in.)	Driver*	Passenger
Chest to Steering Wheel Hub (horizontal)	13.4	
Nose to Steering Wheel Upper Rim	19.6	
Nose to Windshield (horizontal)	30.0	31.1
Knee to Lower Panel (closest point)		
Left	6.9	10.1
Right	7.1	10.4
Chest to Dash (horizontal)	25.5	27.4
Forehead to Header	25.3	25.6

*Tilt steering wheel in lowermost position.



a) Pre-test



b) Post-test

Figure 7-1. Vehicle Configuration (Test 3052-6).

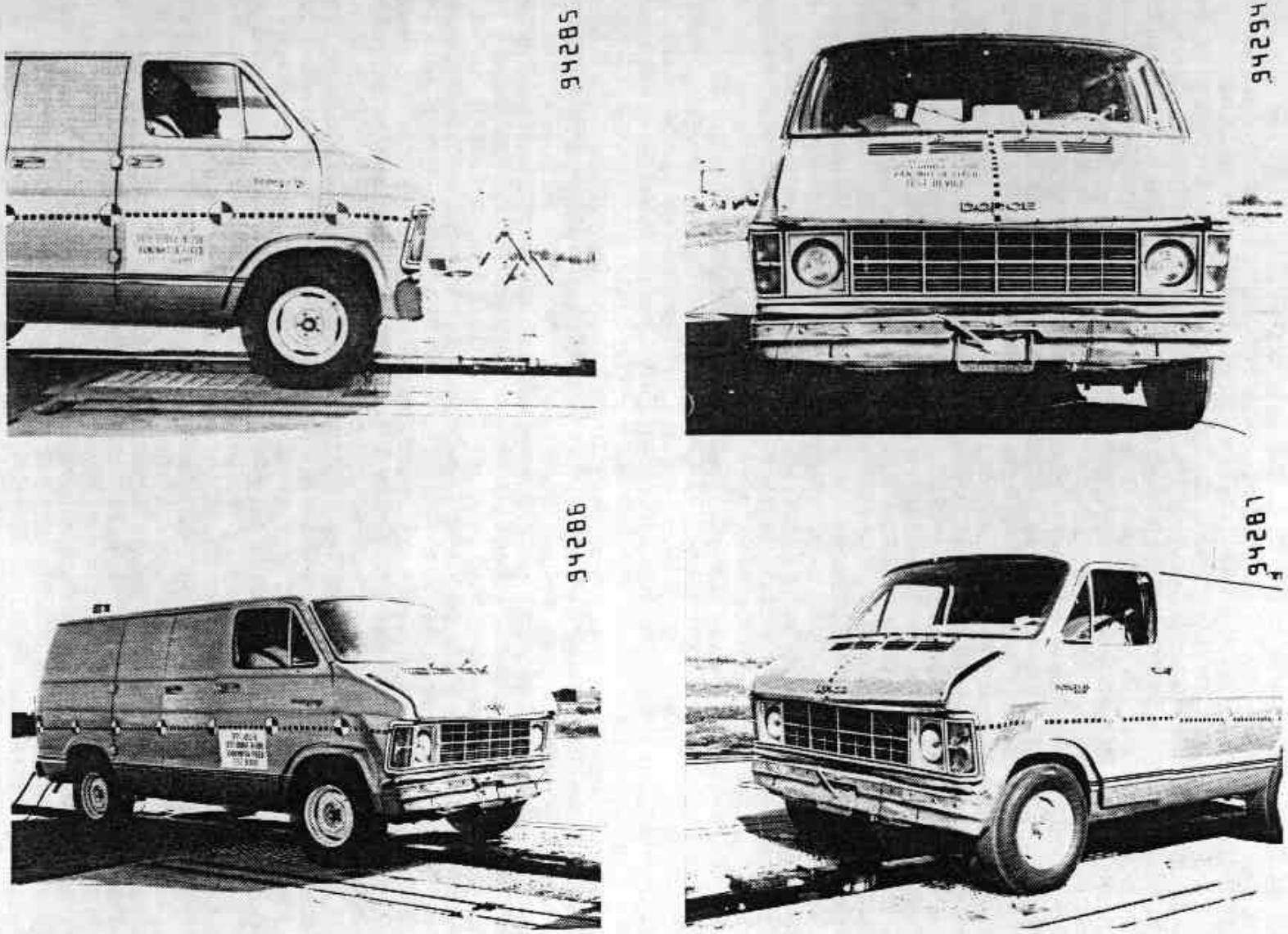
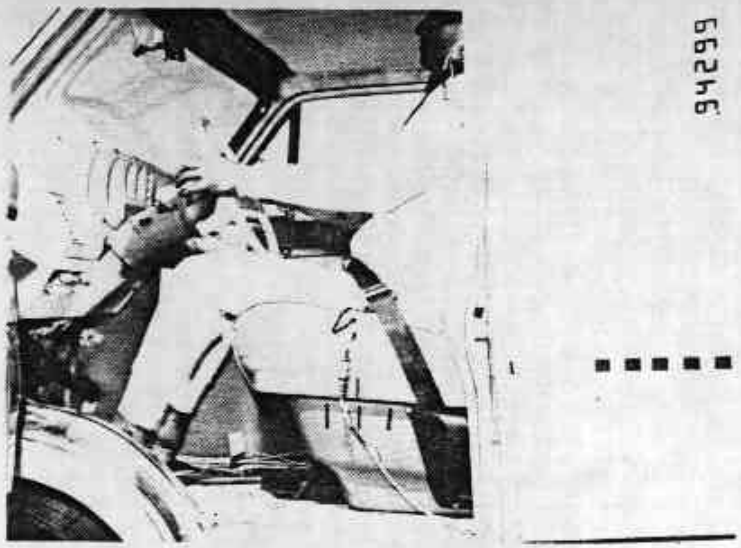
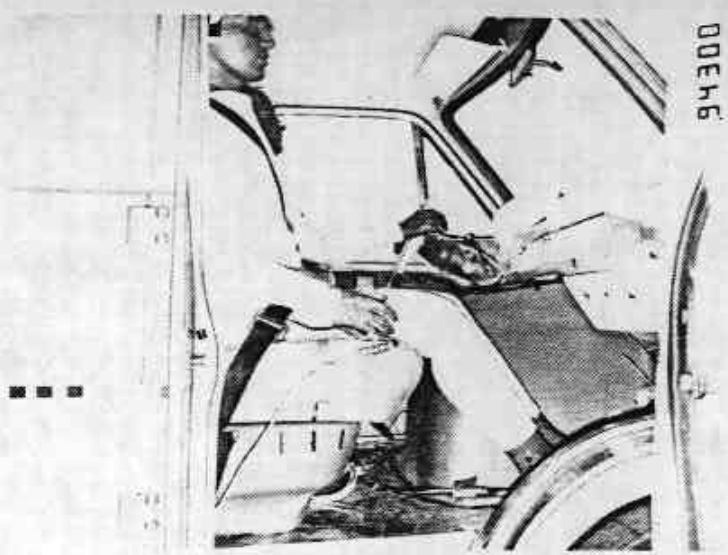


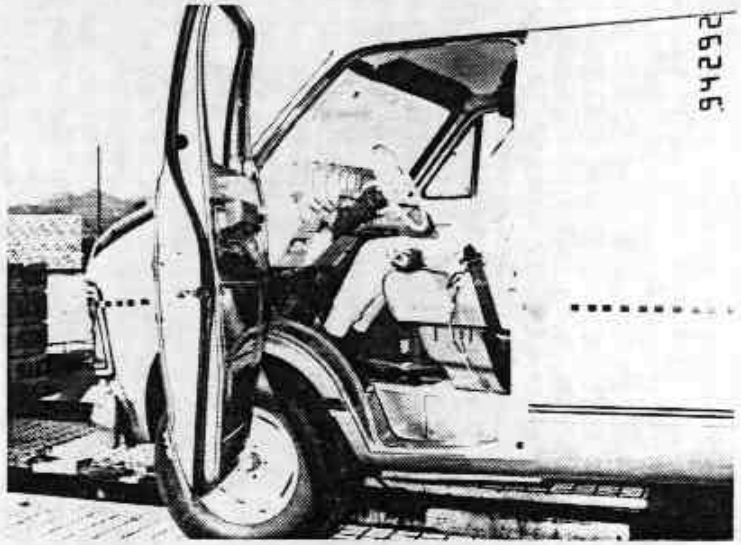
Figure 7-2. Post-test Vehicle Configuration (Test 3052-6).



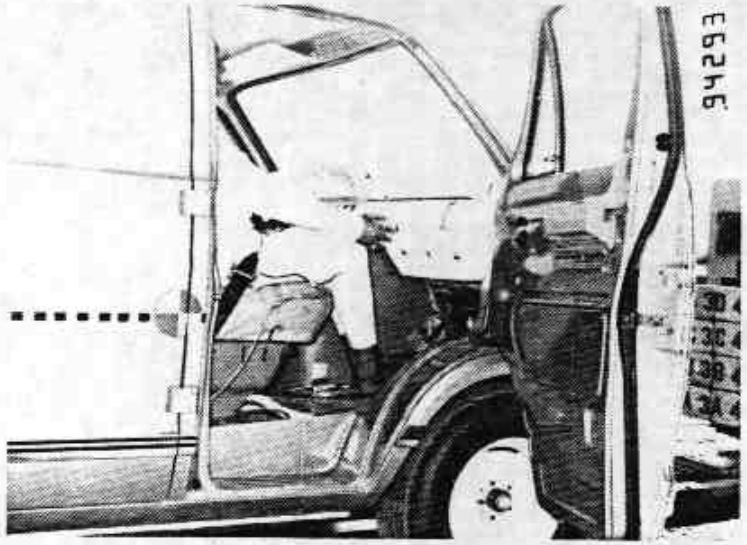
a) Pre-test Driver



c) Pre-test Passenger



b) Post-test Driver



d) Post-test Passenger

Figure 7-3. Vehicle Dummy Configuration (Test 3052-6).

TABLE 7-5. CHRONOLOGY OF EVENTS (TEST 3052-6)

VEHICLE: 1979 Dodge B-200 Van

Time (msec)	Crash Event
0	Impact (visual)
7	Grill strikes Test Device
22	Fenders strike front tires
24	Dummies start forward motion
54	Minimum wheelbase; Right side (104.3 in.); Left side (102.8 in.)
56	Maximum vehicle dynamic crush (7.5 in.)
58	Driver knees hit dash
73	Passenger left hand strikes engine cowling
83	Passenger knees hit dash
114	Maximum vehicle declination (2.0°); Driver maximum forward motion
119	Passenger maximum forward motion
190	Vehicle separates from Test Device
225	Passenger recontacts seat with upper back
312	Driver recontacts seat with upper back
406	Maximum vehicle rebound inclination (0.5°)

TABLE 7-6. SUMMARY OF POST-TEST OBSERVATIONS (TEST 3052-6)

VEHICLE: 1979 Dodge B-200 Van

Dummy Contact Points:	Left Front	Right Front
Head----------	None	None
Chest----------	None	None
Knees----------	Lower dash panel	Lower dash panel

Glazing: 100% intact

Doors: All opened easily

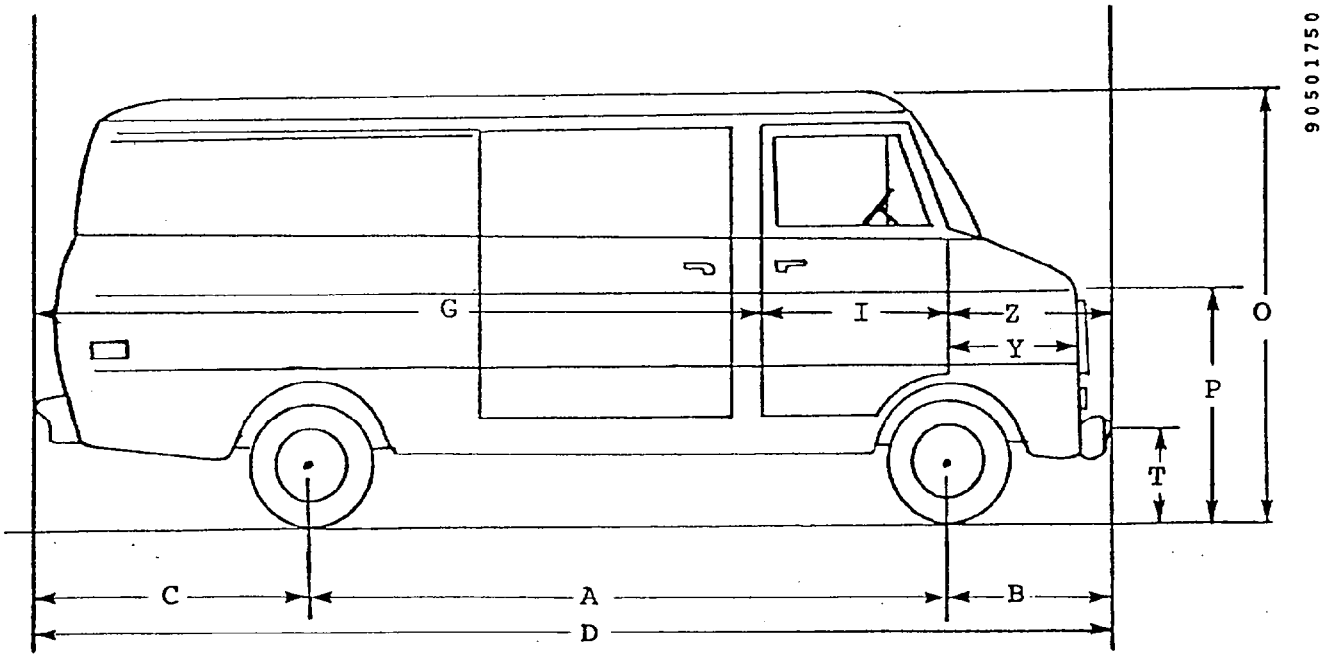
Seat Belt Anchorages and Restraints: Seat belts OK. No seat movement

Vehicle Centerline to Barrier Centerline: Rear: 0.5 inch right. Front: 1 inch right

Fuel Leakage: None

General Observations: Radiator leaked. Static rebound 67.6 inches

TABLE 7-7. PRE-TEST AND POST-TEST DIMENSION MEASUREMENTS (TEST 3052-6)



VEHICLE: 1979 DODGE B-200 VAN

	Pre-test (in.)		Post-test (in.)		Difference (in.)	
	LS	RS	LS	RS	LS	RS
A	109.2	109.3	107.6	107.6	1.6	1.7
B	29.1	29.1	24.1	23.6	5.0	5.5
C	40.3	40.5	40.3	40.4	0.0	0.1
D	178.6	178.9	172.0	171.6	6.6	7.3
G	110.6	111.0	110.8	111.0	-0.2	0.0
I	37.1	37.1	36.7	36.7	0.4	0.4
O	77.5	77.1	77.5	77.3	0.0	0.2
P	41.4	41.4	40.0	40.2	-1.4	-1.2
T	22.9	21.9	23.0	23.4	0.1	1.5
Y	28.2	28.0	25.2	25.1	3.0	2.9
Z	30.9	30.8	24.5	23.9	6.4	6.9

TABLE 7-8. EXTERIOR PROFILES AND STATIC CRUSH - DODGE B-200 VAN (TEST 3052-6)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Bottom of Windshield	54.8	185	33.4	29.7	27.9	26.6	25.7	25.1	24.9	25.2	25.8	26.7	27.6	29.7	33.1
Hood Level	40.4	185	10.0	9.2	8.6	8.3	8.0	7.6	7.4	7.6	7.9	8.2	8.6	9.2	9.9
Between Bumper/Hood	33.3	185	10.5	10.1	9.2	8.8	8.4	8.0	7.5	7.8	8.1	8.5	8.9	9.7	10.2
Bumper Level	21.9	185	9.0	8.2	7.7	7.3	6.9	6.5	6.2	6.5	6.8	7.1	7.6	8.1	8.9
Post-test Profile - Distance to R.P. (in.)															
Bottom of Windshield	54.9	185	33.5	29.8	28.0	26.7	25.8	25.2	24.9	25.2	25.8	26.5	27.8	29.7	33.0
Hood Level	39.5	185	11.8	9.2	9.0	8.7	8.4	8.1	7.6	8.2	8.6	8.8	9.1	9.6	11.0
Between Bumper/Hood	32.9	185	12.7	13.2	12.9	12.7	12.6	12.4	12.1	12.2	12.4	12.4	12.4	13.0	12.4
Bumper Level	22.5	185	13.5	13.2	12.8	13.0	12.8	12.8	12.7	12.9	12.8	12.9	12.6	13.0	13.3
Post-test Static Crush (in.)															
Bottom of Windshield	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	-0.2	-0.2	0.0	-0.1
Hood Level	-0.9	0.0	1.8	0.0	0.4	0.4	0.4	0.5	0.2	0.6	0.7	0.6	0.5	0.4	1.1
Between Bumper/Hood	-0.4	0.0	2.2	3.1	3.7	3.9	4.2	4.4	4.6	4.4	4.3	3.9	3.5	3.3	2.2
Bumper Level	0.6	0.0	4.5	5.0	5.1	5.7	5.9	6.3	6.5	6.4	6.0	5.8	5.0	4.9	4.4

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

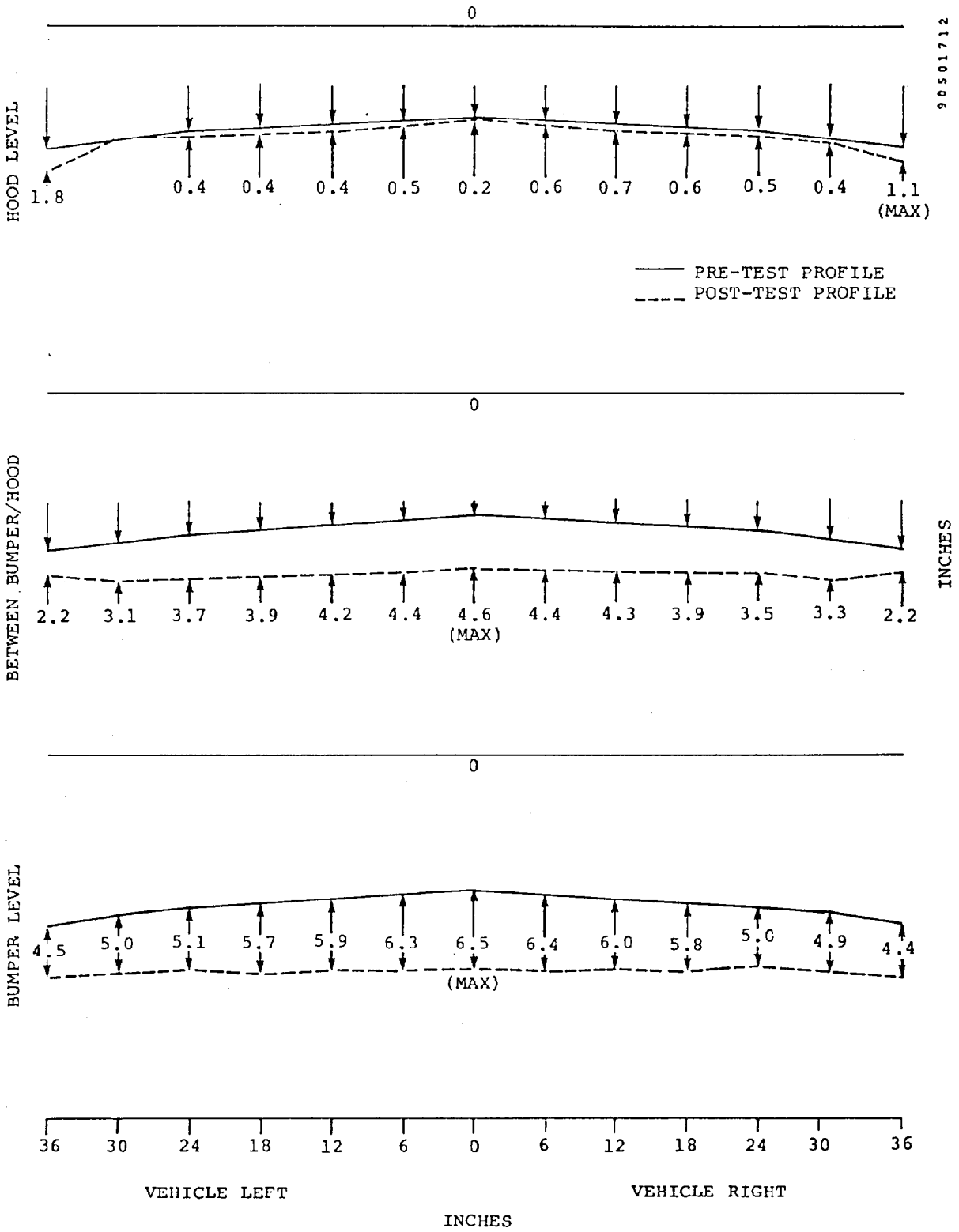


Figure 7-4. 1979 Dodge B-200 Van Exterior Profile and Static Crush (Test 3052-6).

TABLE 7-9. INTERIOR PROFILE AND STATIC INTRUSION - DODGE B-200 VAN (TEST 3052-6)

Location	Height at ℄	R.P.**	Distance Left of Center (in.)* 36	30	24	18	12	6	0	Distance Right of Center (in.)* 6	12	18	24	30	36
Pre-test Profile - Distance from R.P. (in.)															
Dash Level	56.8	125	18.9	18.0	18.0	18.0	18.0	18.1	19.7	20.5	20.5	20.4	20.2		
Knee Level	45.1	125	20.3	20.3	19.7	19.5	19.7	9.8	9.7	15.8	18.9	19.0	19.2		
Floor Level	32.4	129.5	27.1	24.6	24.5	24.4	0.5	0.1	0.1	0.4	23.1	23.2	23.0		
Post-test Profile - Distance from R.P. (in.)															
Dash Level	57.1	125	18.9	17.9	17.9	17.9	17.9	18.0	19.6	20.5	20.4	20.4	20.3		
Knee Level	44.3	125	19.6	19.9	19.6	19.5	19.5	8.5	8.8	15.1	18.8	19.0	19.3		
Floor Level	31.5	125	30.9	28.5	28.4	28.1	3.7	3.5	3.9	4.5	27.6	27.5	27.2		
Post-test Static Crush (in.)															
Dash Level	0.3	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	-0.1		
Knee Level	-0.8	0.0	0.7	0.4	0.1	0.0	0.2	1.3	0.9	0.7	0.1	0.0	-0.1		
Floor Level	-0.9	4.5	0.7	0.6	0.6	0.8	1.3	1.1	0.7	0.4	0.0	0.2	0.3		

*As viewed from driver position in van.
**Reference Plane from rear bumper of van.

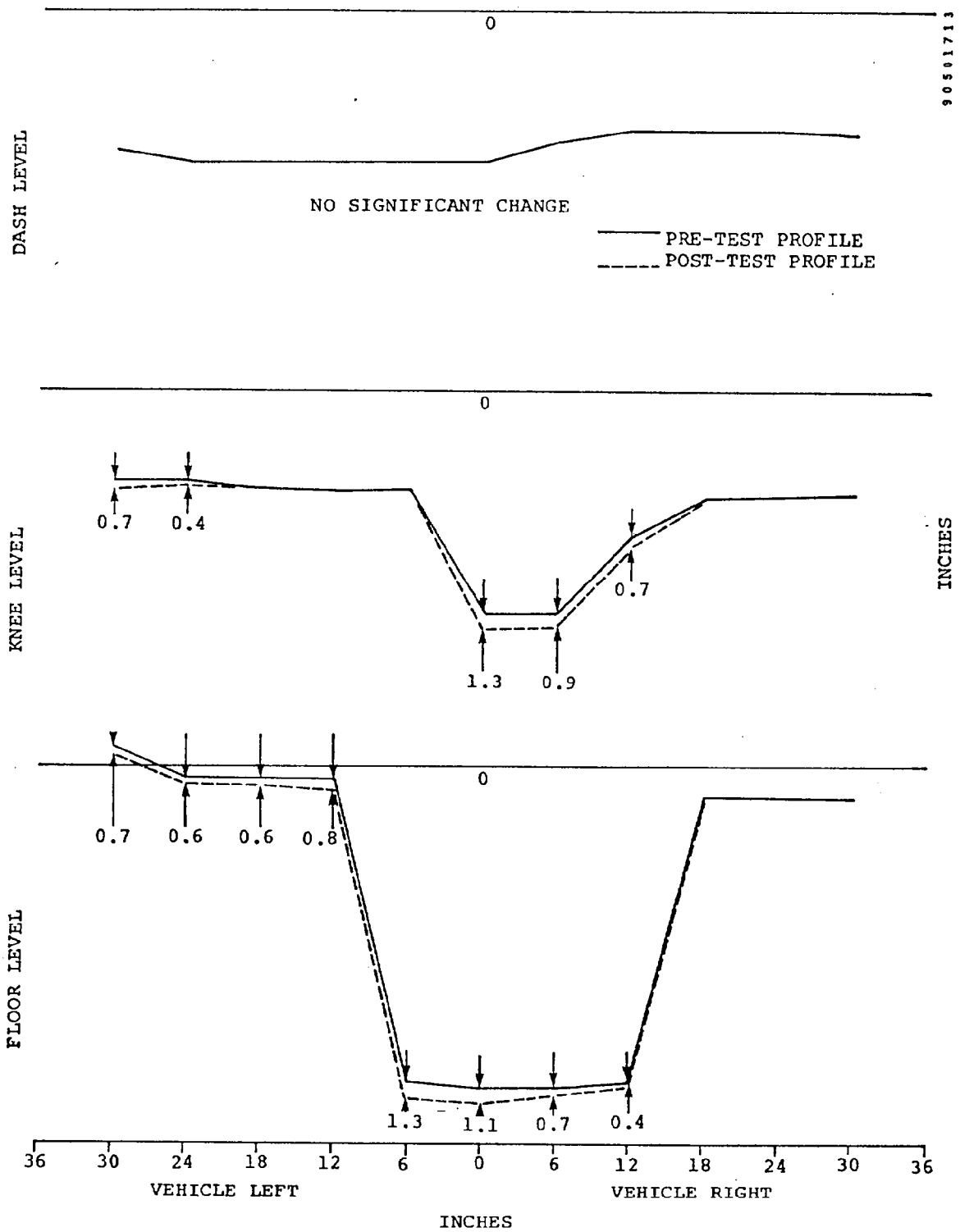


Figure 7-5. 1979 Dodge B-200 Van Interior Profile and Static Intrusion (Test 3052-6).

TABLE 7-10. STEERING WHEEL MEASUREMENTS AND DISPLACEMENT VALUES - DODGE B-200 VAN (TEST 3052-6)

Wheel Location	Pre-test (in.)			Post-test (in.)			Displacement (in.)		
	X*	Y*	Z*	X	Y	Z	X	Y	Z
Top	134.0	-19.8	59.0	134.8	-19.8	60.3	0.8	0.0	1.3
Hub	132.1	-19.8	52.0	132.4	-20.0	53.5	0.3	-0.2	1.5
Bottom	128.4	-19.8	46.1	128.3	-19.4	47.9	-0.1	0.4	1.8

*Reference for X, Y, and Z measurements are rear bumper, vehicle centerline and ground level, respectively.
Note: Tilt steering wheel set at lowermost driving position.

TABLE 7-11. SUMMARY OF VEHICLE ACCELEROMETER DATA (TEST 3052-6)

Vehicle: 1979 Dodge B-200 Van

Accelerometer		Test 3052-6 (15.28 mph)					
		Maximum Acceleration		Minimum Velocity		Maximum Displacement	
No.	Location	A (G)	T (msec)	V (mph)	T (msec)	S (in.)	T (msec)
1X	Left Side B-pillar	-28.6	27	-1.7	200	+9.0	62
2X	Right Side B-pillar	-27.2	24	-2.1	151	+8.8	60
	Average 1X & 2X	-27.6	27	-1.8	159	+8.9	61
3X	Left Side Firewall	-37.1	32	-1.9	200	+8.4	63
3Y	Left Side Firewall	+8.4	35	-0.7	46	+0.1	41
3Z	Left Side Firewall	-20.8	34	-1.0	45	+0.6	36
4X	Right Side Firewall	-38.9	25	-0.7	149	+9.2	129
4Y	Right Side Firewall	-14.2	34	-1.3	36	+0.3	180
4Z	Right Side Firewall	-12.7	34	+0.2	99	+1.1	200
5X	Engine	-34.6	52	-5.6	84	+12.3	58
5Y	Engine	-3.6	120	-2.3	140	-2.4	194
5Z	Engine	-8.5	60	-1.3	95	+2.0	200
6X	Front Axle	-62.8	29	-3.2	195	+6.4	51
7X	Vehicle C.G.	-27.6	25	-2.1	153	+8.7	60
7Y	Vehicle C.G.	-8.0	33	-0.6	38	-0.1	66
7Z	Vehicle C.G.	-36.7	28	-5.2	55	-5.9	200
8X	Rear Compartment	-27.7	24	-2.2	154	+8.5	58
8Y	Rear Compartment	+3.3	52	-0.2	17	+1.0	200
8Z	Rear Compartment	-26.1	36	-2.9	43	-4.8	200
9X	Rear Axle	-44.1	31	-4.0	89	+9.0	57

TABLE 7-12. OCCUPANT RESPONSE DATA SUMMARY (TEST 3052-6)

Vehicle: 1979 Dodge B-200 Van

		Test 3052-6 (15.28 mph)			
		Left Front Occupant		Right Front Occupant	
		Maximum Value (G)	T (msec)	Maximum Value (G)	T (msec)
HEAD					
	X	-17.3	118	-19.2	121
	Y	-5.9	102	+6.9	109
	Z	+19.0	90	+20.1	89
	R*	+21.1	89	+21.0	91
	HIC	74	66-141	97	65-139
CHEST					
	X	-25.4	80	-23.5	72
	Y	-3.9	80	+5.2	89
	Z	-7.6	83	-7.6	96
	R*	+25.7	82	+22.9	70
	SI	77	200	58	200
		Maximum Value (lb)	T (msec)	Maximum Value (lb)	T (msec)
FEMURS					
	LF	-261	77	-148	33
	RT	-469	163	-66	33

*3-msec clip.

TABLE 7-13. SUMMARY OF RESTRAINT SYSTEM DATA (TEST 3052-6)

Vehicle: 1979 Dodge B-200 Van

	Test 3052-6 (15.28 mph)	
	Peak Load (lb)	Time (msec)
LEFT FRONT OCCUPANT		
Left Lap Belt	860	75
Right Lap Belt	1098	75
Shoulder Belt	1074	79
RIGHT FRONT OCCUPANT		
Left Lap Belt	804	75
Right Lap Belt	910	75
Shoulder Belt	950	75

TABLE 7-14. SUMMARY OF MAXIMUM LOAD CELL DATA - DODGE B-200 VAN (TEST 3052-6)

Parameter	Right Half of Car					Left Half of Car				
Load Cell (No.)	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Force (klb)	2.70	1.44	1.03	0.42	1.33	1.50	0.60	0.20	1.33	4.22
Time (msec)	54	34	32	21	20	22	22	39	40	40
Load Cell (No.)	C10	C9	C8	C7	C6	C5	C4	C3	C2	C1
Force (klb)	0.11	0.17	0.27	0.06	0.08	0.11	0.19	0.31	0.48	0.34
Time (msec)	140	34	21	23	32	22	19	53	38	34
Load Cell (No.)	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1
Force (klb)	0.24	6.66	8.86	2.51	2.49	2.05	3.09	11.53*	6.75	0.11
Time (msec)	24	17	29	28	7	8	28	28	17	24
Load Cell (No.)	A10	B9	A8	A7	A6	A5	A4	A3	A2	A1
Force (klb)	0.18	4.65	8.97	3.53	1.91	3.12	5.24	9.63	4.90	0.06
Time (msec)	87	30	31	33	21	20	32	31	32	16

*Maximum measured force.

TABLE 7-15. SUMMARY OF GROUPED LOAD CELL DATA BY COLUMNS AND ROWS (TEST 3052-6)

Vehicle: 1979 Dodge B-200 Van

Parameter	Test 3052-6 (15.28 mph) Peak Load (klb)	Time (msec)
Column 1	4.56	37
Column 2	8.81	25
Column 3	21.09	30
Column 4	8.52	29
Column 5	5.92	20
Column 6	4.56	20
Column 7	6.03	29
Column 8	18.65	30
Column 9	8.64	30
Column 10	2.64	55
Row A	39.00	30
Row B	34.20	28
Row C	1.46	33
Row D	11.42	35

TABLE 7-16. COMPARISON OF TOTAL LOAD CELL FORCE AND INERTIA FORCE (TEST 3052-6)

Vehicle: 1979 Dodge B-200 Van

	Load Cell* Force	Engine/Car** Inertia Force
Force (klb)	81.12	115.52
Time (msec)	30	27

*Sum of 40 load cells.
**Average of van accelerometers 1 and 2 times van weight (4001 lb) plus engine acceleration times engine weight (650 lb).

8.0 ANALYSIS OF VEHICLE IMPACT VELOCITY CHANGES

Since test speeds of 15, 25 and 30 mph were chosen as target speeds, a reasonably good data base for examining the effects of impact velocity for van-to-fixed barrier impact tests was established. The methodology used to study these effects was to plot various parameters against the actual test speeds conducted. Three types of response parameters were compared:

- Occupant Parameters versus Impact Velocity (see Table 8-1)
  - Head Injury Criteria (HIC) (Figures 8-1 and 8-2)
  - Chest Severity Index (SI) (Figures 8-3 and 8-4)
  - Peak Chest Acceleration (3 msec clip) (Figures 8-5 and 8-6)
  - Femur Load (right and left femurs) (Figures 8-7 to 8-10)
- Vehicle Parameters versus Impact Velocity (see Table 8-2)
  - Dynamic Crush (Film and Accelerometer Data) (Figures 8-11 and 8-12)
  - Static Crush (Figure 8-13)
  - Velocity Change (Figure 8-14)
  - Average Compartment Acceleration - calculated using time when compartment acceleration nears ±1 g (Figure 8-15)
  - Maximum Compartment Acceleration (Figure 8-16)
  - Maximum Engine Acceleration (Figure 8-17)
  - Vehicle Inertia Force calculated from (Figure 8-18):

$$F = (M \cdot a)_{VAN} + (M \cdot a)_{engine}$$

where M_{VAN} = Mass of Van less engine weight (lb)
a_{VAN} = Acceleration of Van Occupant Compartment (G)
M_{engine} = Mass of Van Engine and Transmission (lb)
a_{engine} = Acceleration of Van Engine (G)

- Load Cell Force - NHTSA Fixed Test Device, total 40 load cells (Figure 8-19)

- Occupant Parameters versus Vehicle Parameters (Figures 8-20 and 8-21)

  - Head Injury Criteria versus Vehicle Velocity Change

  - Chest Severity Index versus Vehicle Velocity Change

  - Peak Chest Acceleration versus Vehicle Velocity Change

  - Head Injury Criteria versus Average Compartment Acceleration

  - Chest Severity Index versus Average Compartment Acceleration

  - Peak Chest Acceleration versus Average Compartment Acceleration

TABLE 8-1. COMPARISON OF OCCUPANT RESPONSE DATA

	Test 3052-1 Ford		Test 3052-2 Ford		Test 3052-3 Ford		Test 3052-4 Dodge		Test 3052-5 Dodge		Test 3052-6 Dodge	
	LF	RF	LF	RF	LF	RF	LF	RF	LF	RF	LF	RF
Velocity - mph	15.25		25.10		30.02		25.17		30.22		15.28	
HIC	78	70	557	393	929	1072	660	468	1006	724	74	97
Chest SI	81	62	289	171	561	290	277	206	391	305	77	58
Peak Resultant Chest Acceleration (G)*	26.2	21.4	41.4	29.8	60.6	39.3	39.1	36.7	46.0	41.0	25.7	22.9
Left Femur Load (lb)	-98	-64	-137	-141	-927	-1632	-2346	-193	-789	-81	-261	-148
Right Femur Load (lb)	-1030	-231	-2851	-184	-2617	-953	-980	-81	-2557	-232	-469	-66

*3 msec clip

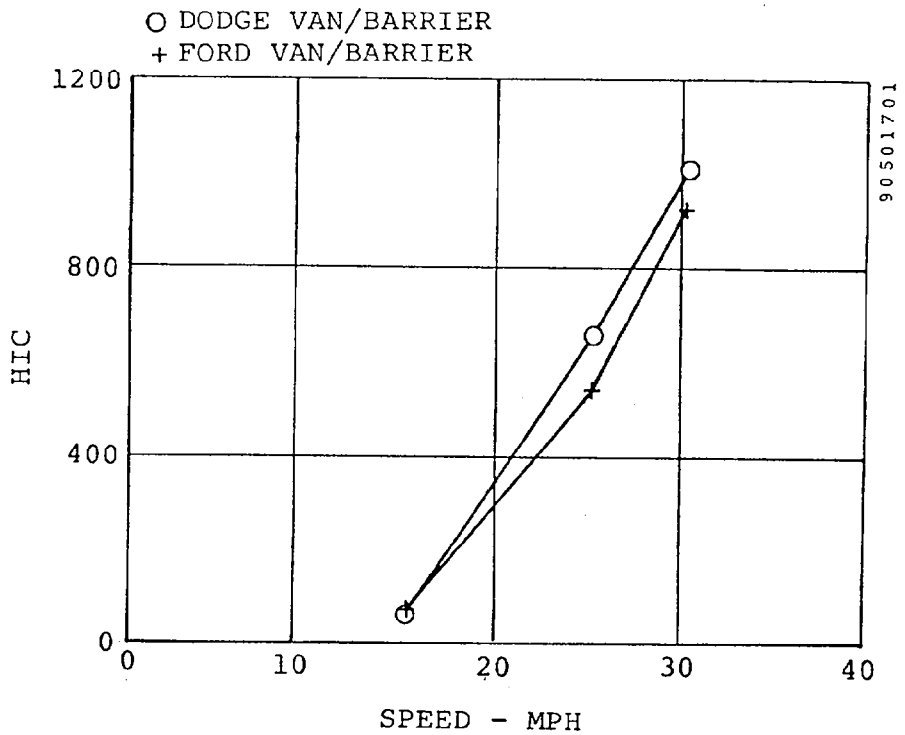


Figure 8-1. Driver Head Injury Criteria (HIC) Versus Impact Speed.

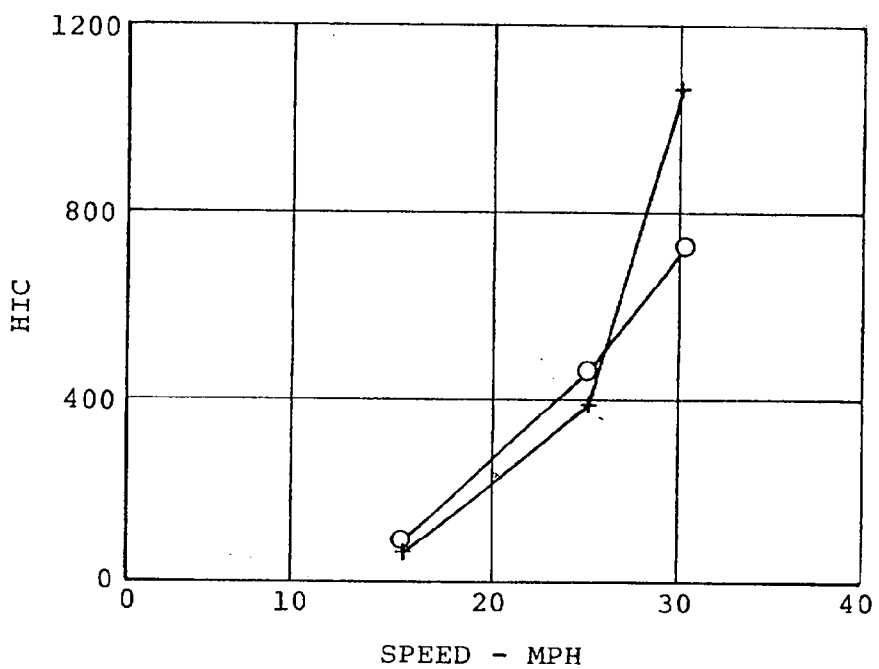


Figure 8-2. RF Passenger Head Injury Criteria (HIC) Versus Impact Speed.

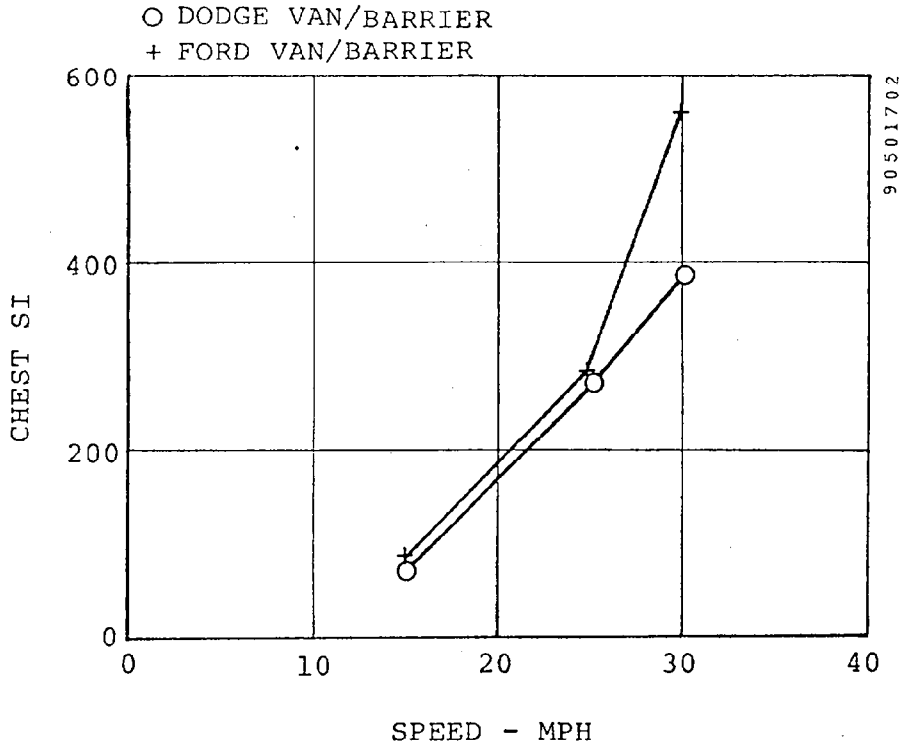


Figure 8-3. Driver Chest Severity Index (SI) Versus Impact Speed.

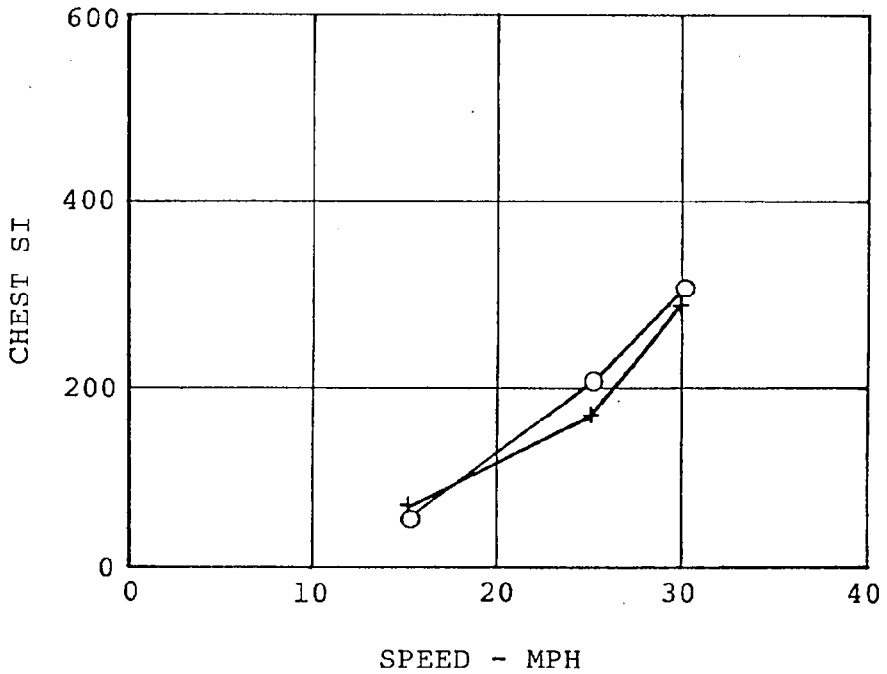


Figure 8-4. RF Passenger Chest Severity Index (SI) Versus Impact Speed.

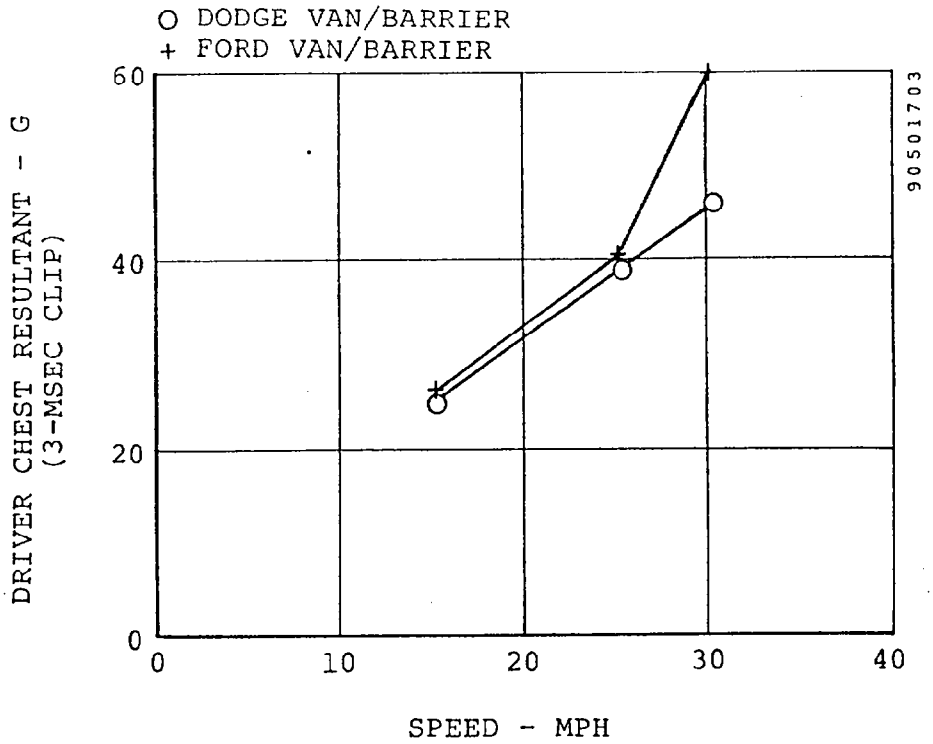


Figure 8-5. Driver Peak Chest Resultant Versus Impact Speed.

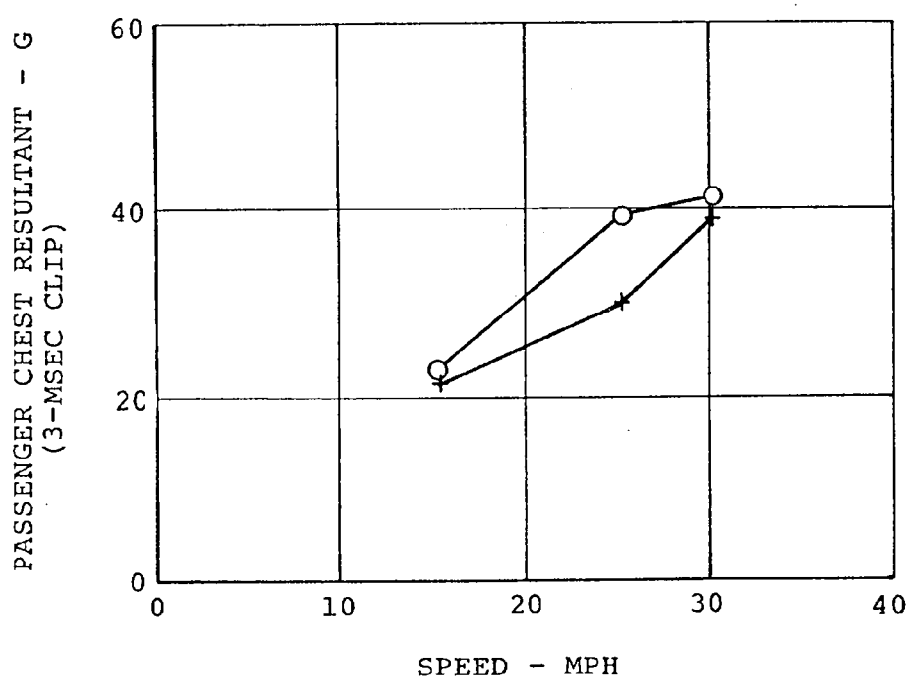


Figure 8-6. RF Passenger Peak Chest Resultant Versus Impact Speed.

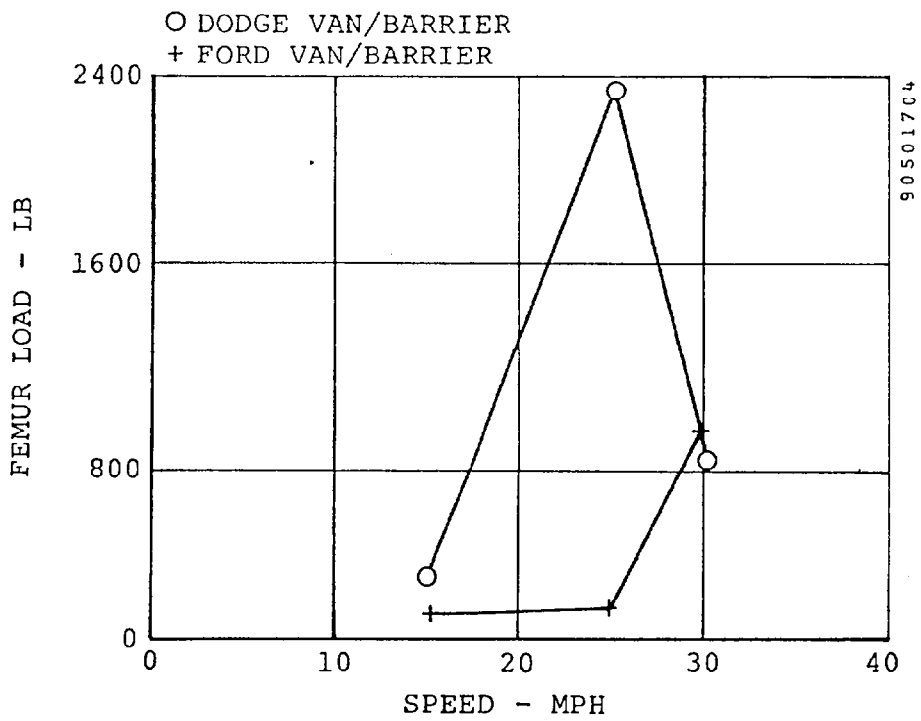


Figure 8-7. Driver Left Femur Load Versus Impact Speed.

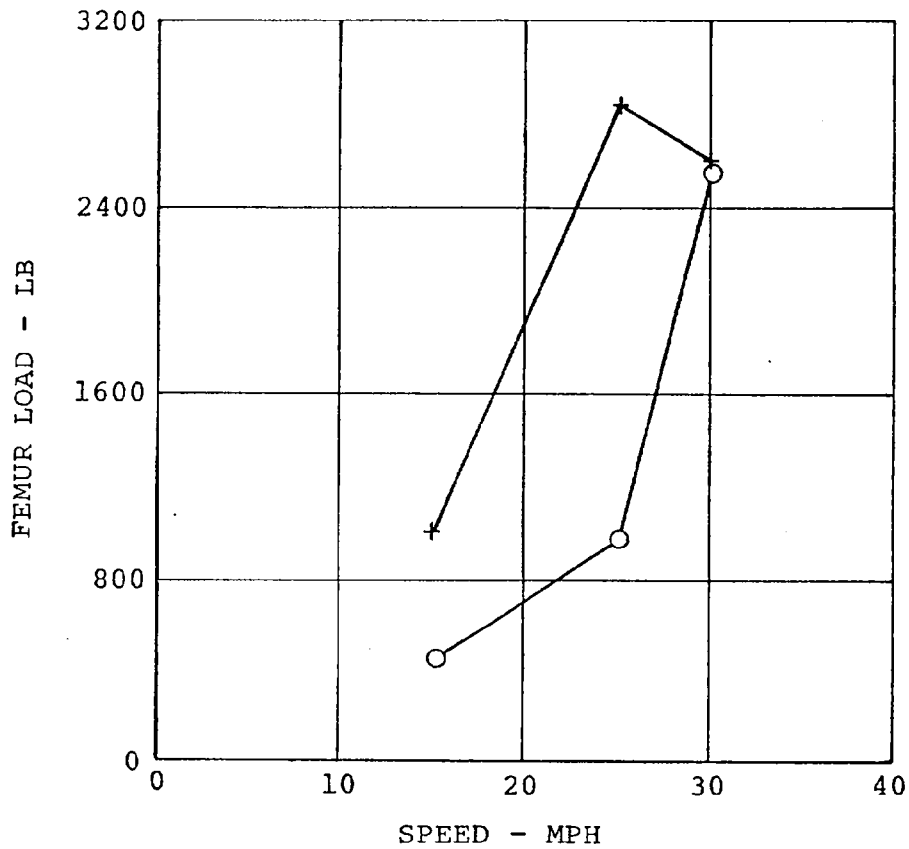


Figure 8-8. Driver Right Femur Load Versus Impact Speed.

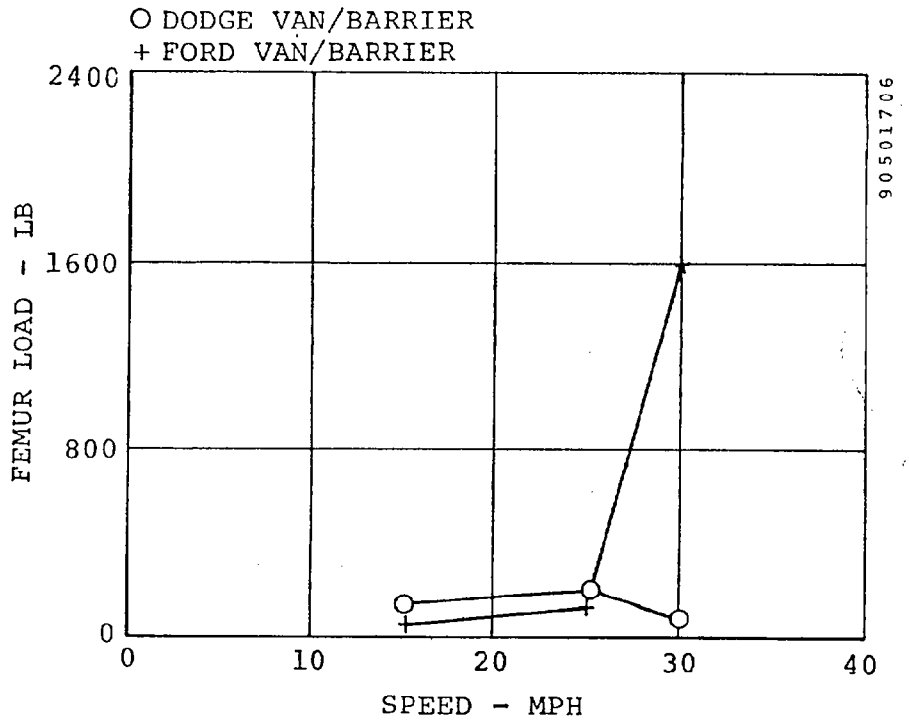


Figure 8-9. RF Passenger Left Femur Load Versus Impact Speed.

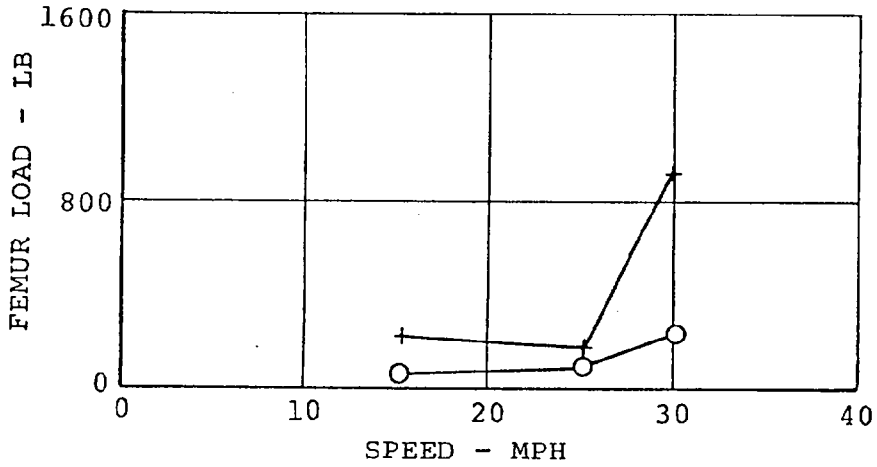


Figure 8-10. RF Passenger Right Femur Load Versus Impact Speed.

TABLE 8-2. COMPARISON OF VEHICLE RESPONSE DATA

	Test 3052-1	Test 3052-2	Test 3052-3	Test 3052-4	Test 3052-5	Test 3052-6
Velocity - mph	15.25	25.10	30.02	25.17	30.22	15.28
Delta Velocity - mph	17.09	27.87	31.97	27.14	32.79	17.12
Accelerometer Dynamic Crush - in.	8.8	16.1	20.1	17.3	21.2	8.9
@ msec	53	65	69	71	71	61
Film Dynamic Crush - in.	8.1	15.3	19.5	16.7	19.1	7.5
@ msec	50	67	68	68	66	56
Static Crush - in.	6.9	12.1	16.4	14.5	16.6	6.5
Peak Compartment Acceleration - G	-25.1	-29.5	-34.9	-43.4	-51.9	-27.6
@ msec	16	26	16	15	14	27
Average Acceleration - G	-11.61	-15.15	-18.0	-14.77	-17.6	-10.36
@ msec	66	82	78	82	82	70
Peak Engine Acceleration - G	-45.5	-59.0	-66.5	-85.1	-83.5	-37.1
@ msec	26	27	25	22	35	32
Fixed Test Device Force - klb	82.50	97.36	129.92	93.40	114.57	81.12
@ msec	44	25	38	45	42	30
Engine/Car Inertia Force - klb	112.16	138.01	193.18	176.38	208.41	115.52
@ msec	16	28	36	15	14	27

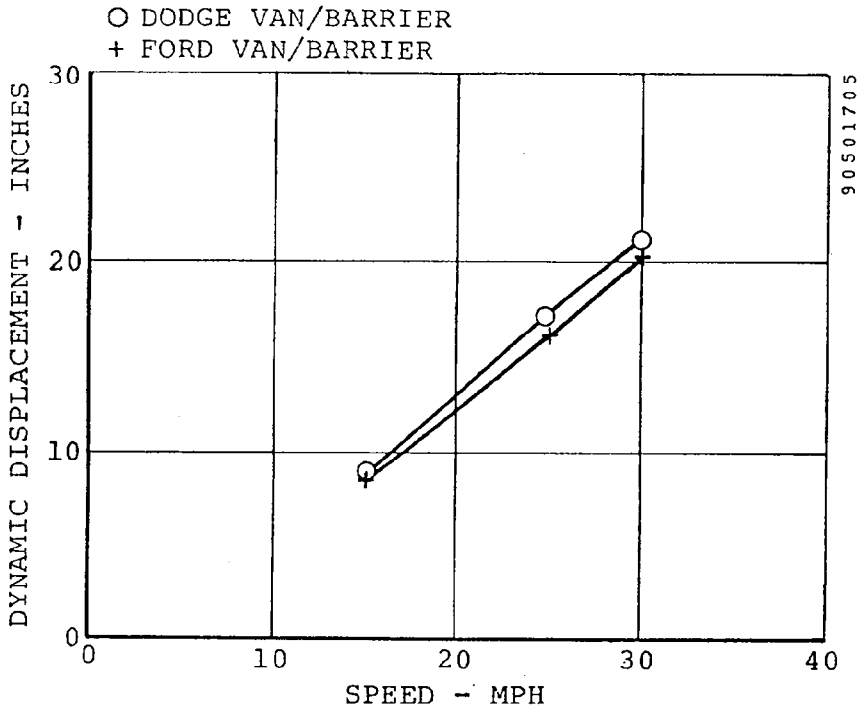


Figure 8-11. Dynamic Crush (Accelerometer Data) Versus Impact Speed.

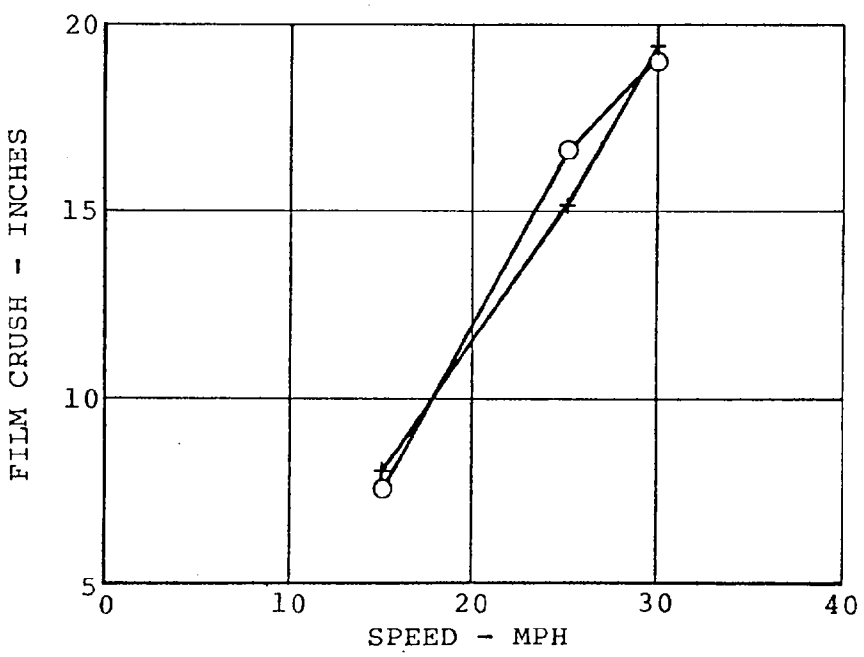


Figure 8-12. Dynamic Crush (Film Data) Versus Impact Speed.

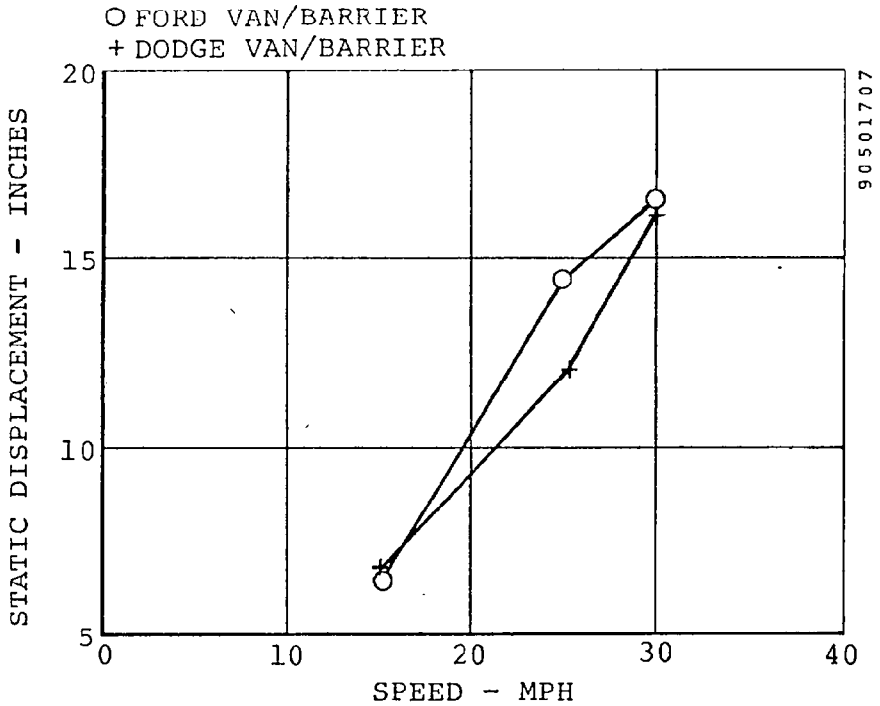


Figure 8-13. Static Crush Versus Impact Speed.

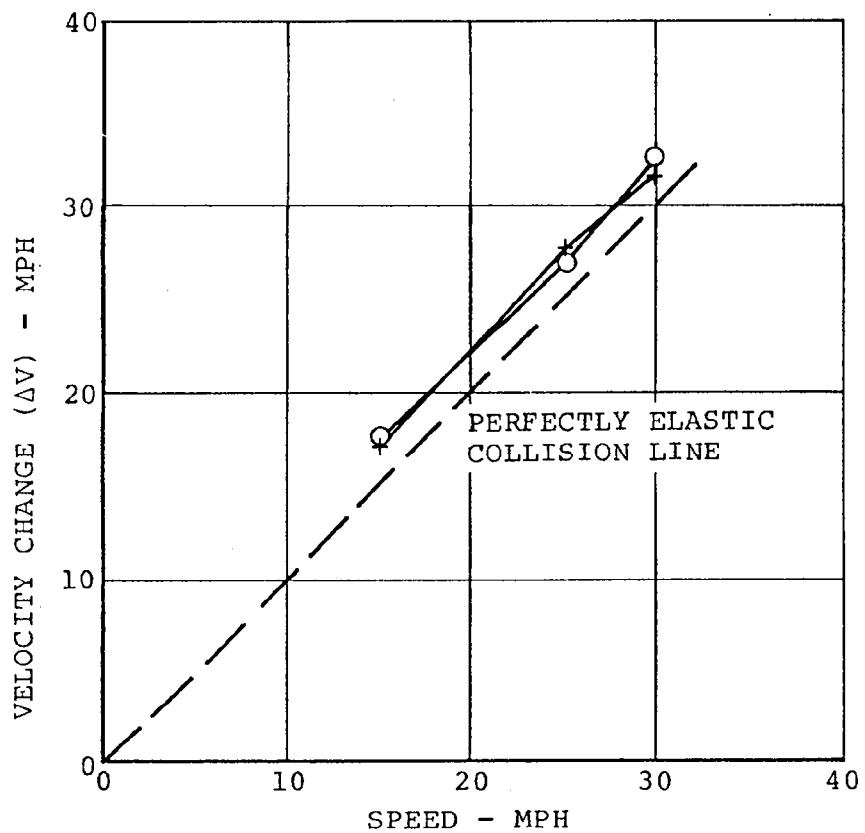


Figure 8-14. Velocity Change (ΔV) Versus Impact Speed.

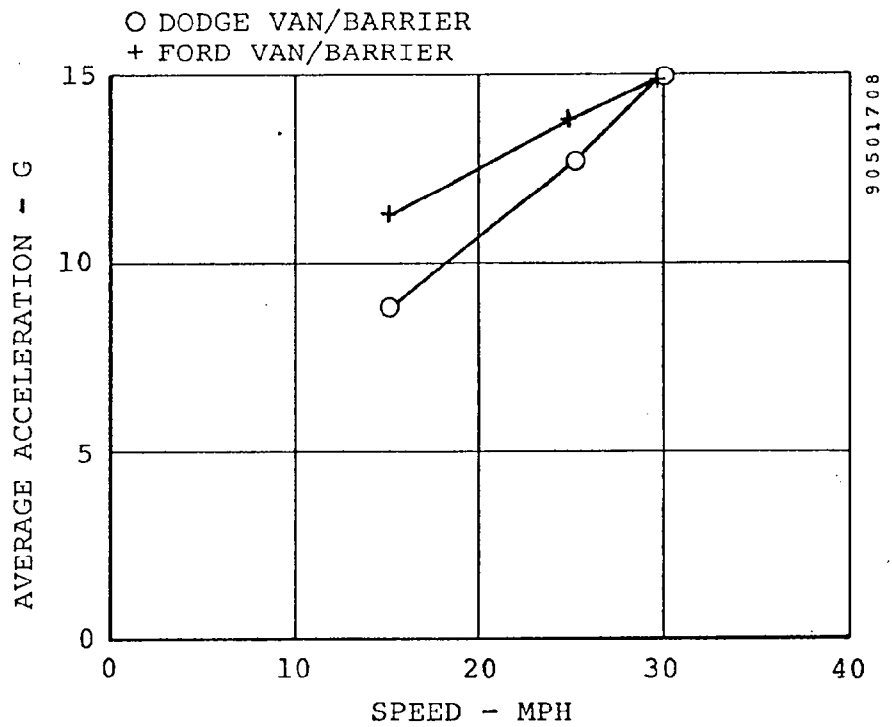


Figure 8-15. Average Compartment Acceleration Versus Impact Speed.

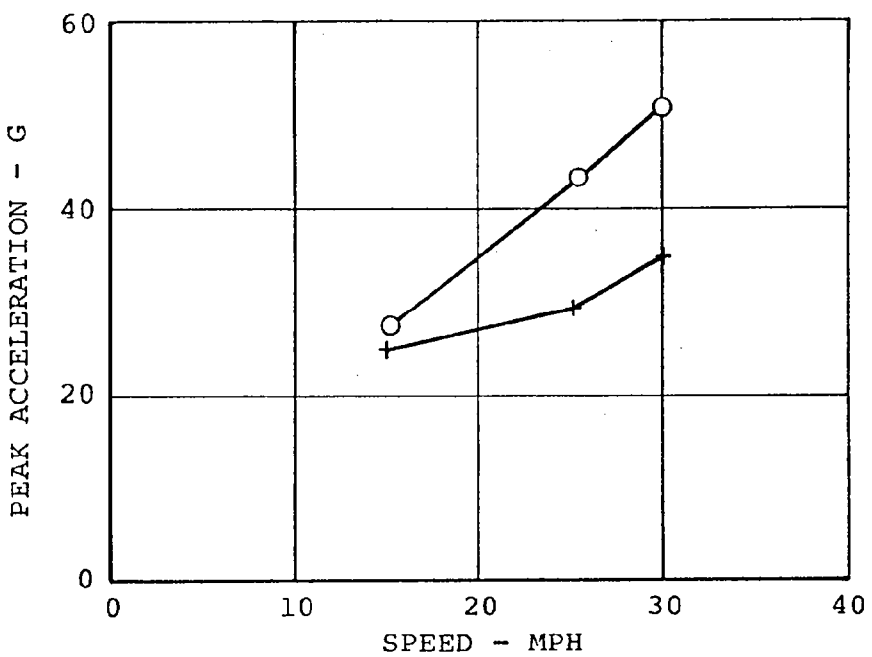


Figure 8-16. Maximum Compartment Acceleration Versus Impact Speed.

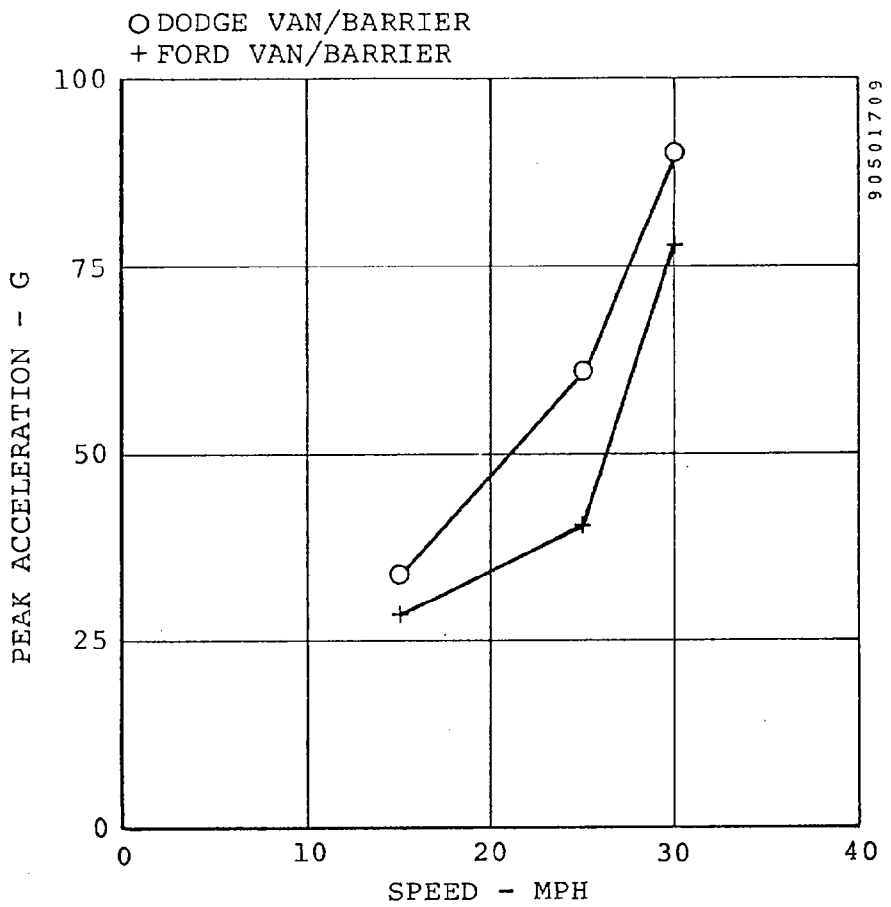


Figure 8-17. Maximum Engine Acceleration Versus Speed.

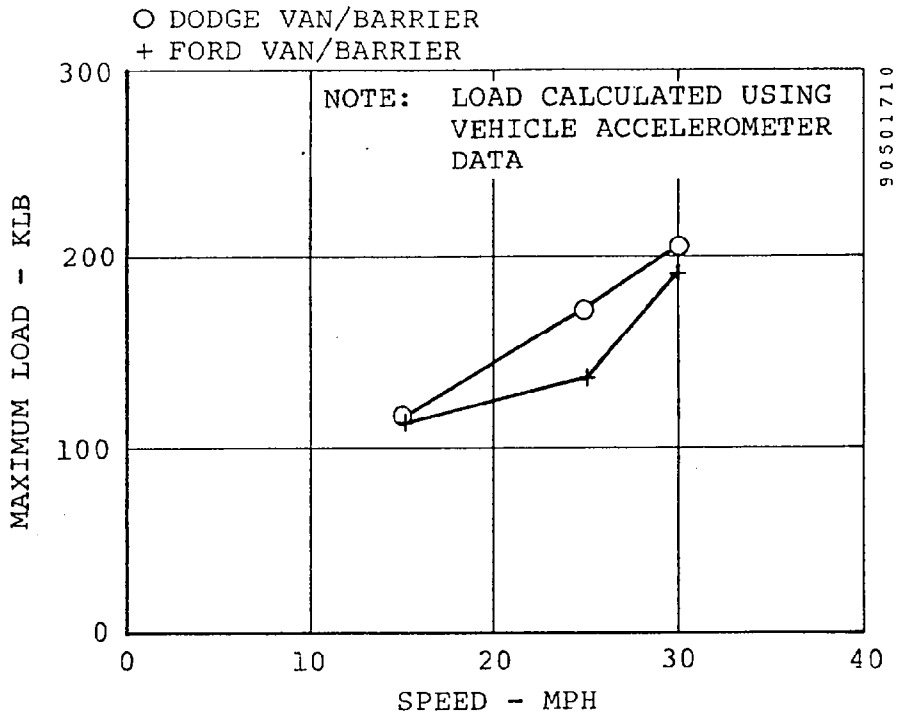


Figure 8-18. Maximum Vehicle Inertia Force Versus Impact Speed.

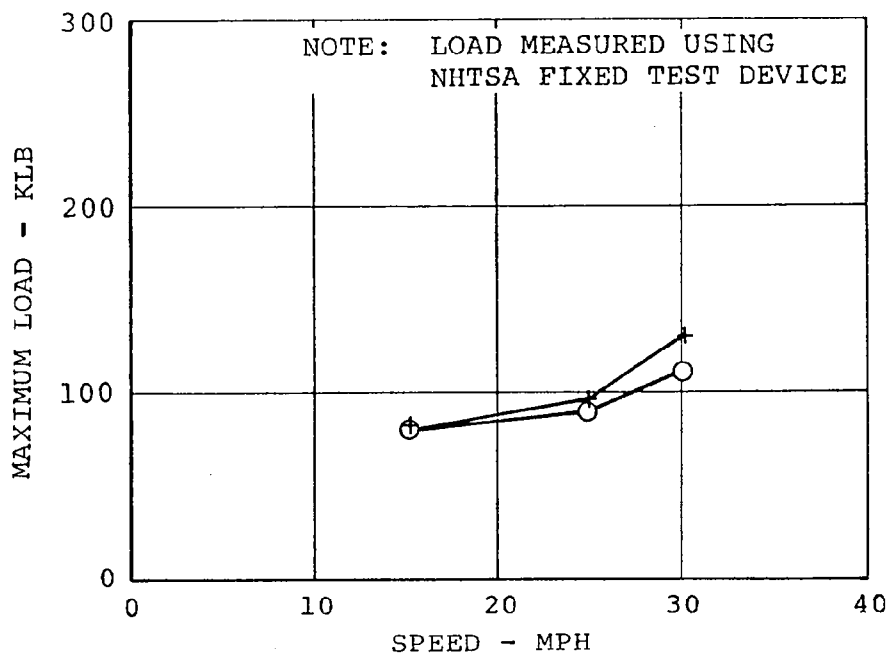


Figure 8-19. Total Measured Load Cell Force Versus Impact Speed.

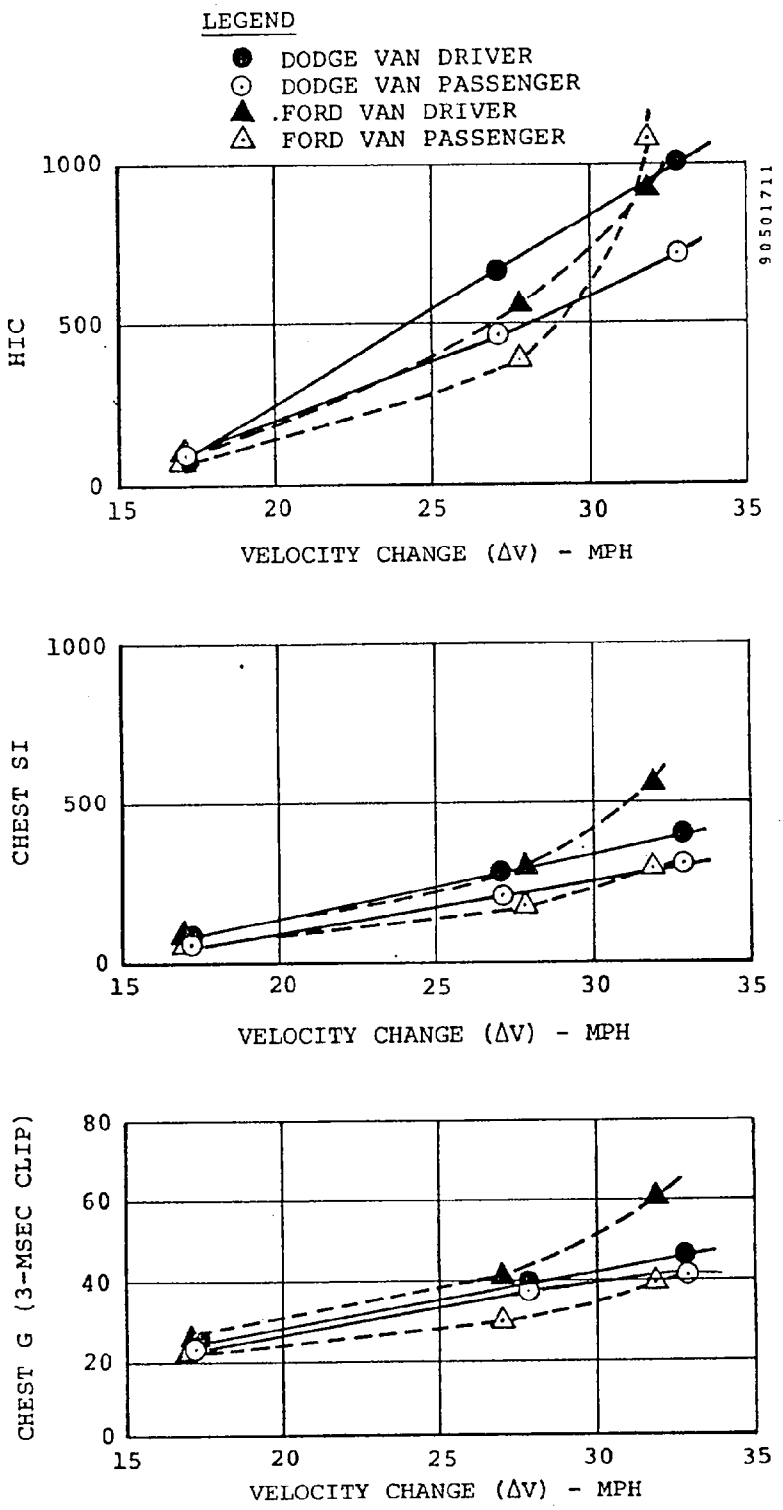


Figure 8-20. Head and Chest Parameters Versus Vehicle Velocity Change (Van-to-Barrier Tests).

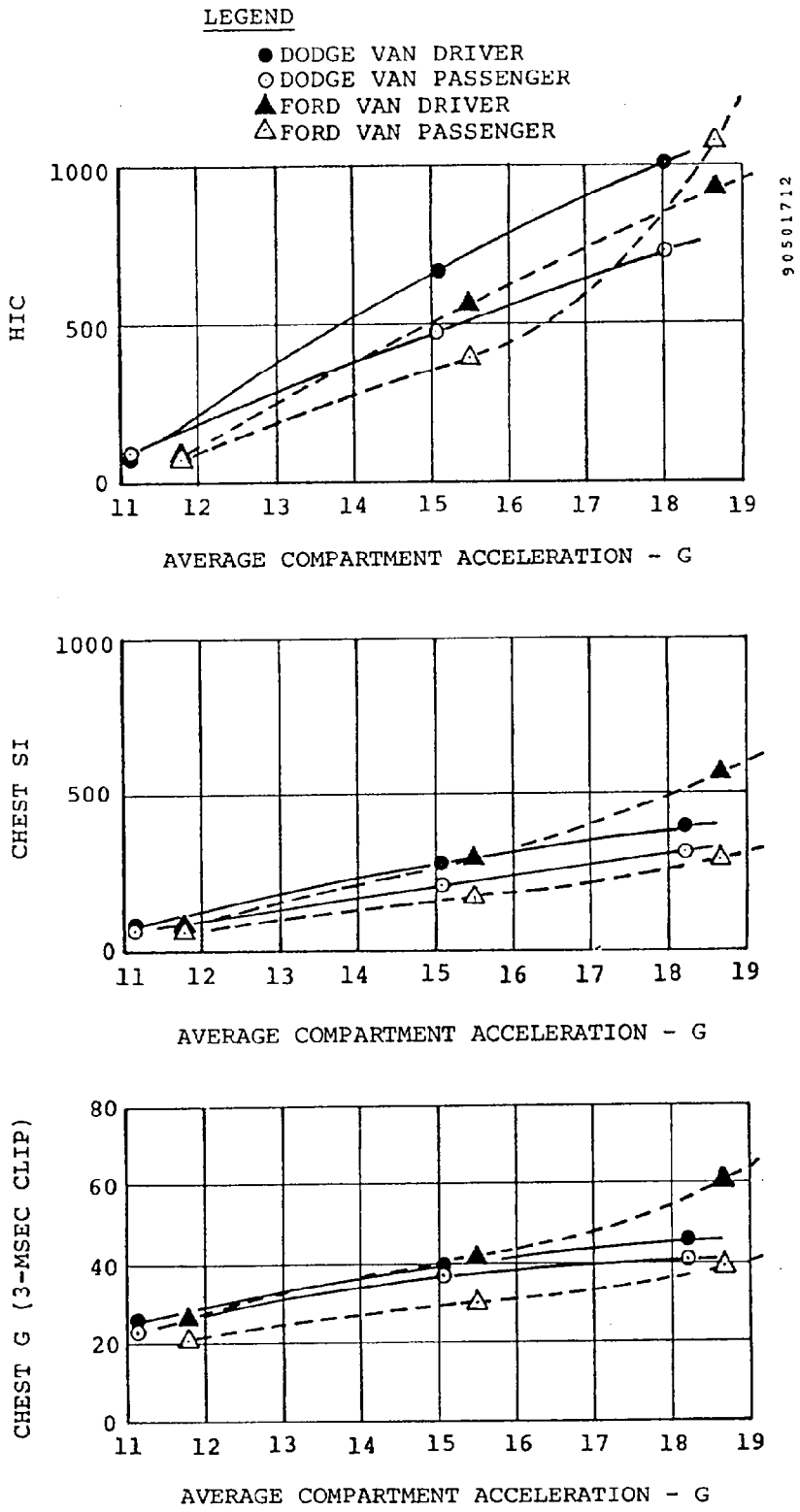


Figure 8-21. Head and Chest Parameters Versus Average Compartment Acceleration (Van-to-Barrier Tests).

dsi DynamicScience Inc.
a TALLEY INDUSTRIES Company

3052

June 15, 1979

Mr. Steve Peirce (NRD-12)
Contract Technical Manager
National Highway Traffic Safety
Administration
Trans Point Building
2100 Second Street, S.W.
Washington, D.C. 20590

Subject: Transmittal of Test Report 1, Volumes I and II

Reference: Contract DOT-HS-8-01942, "Van Crashworthiness and Aggressivity Study"

Dear Steve:

In accordance with the contractual requirements of the referenced program, we are forwarding the reproducible and eight (8) copies of Test Report 1, Volumes I and II. This report covers six Van-to-NHTSA Fixed Test Device tests conducted under Task 2 of the program.

Sincerely,

Sol D.

Sol Davis
Manager
Special Projects Department

SD:bmv

Enclosures

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