

AD646282

REPORT NUMBER 147

MARCH 1964

MAIN LANDING GEAR DROP TEST REPORT

XV-5A

LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM

CONTRACT NUMBER DA44-177-TC-715

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REPORT NUMBER 147
MARCH, 1964

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OPERATION	
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MARKING	
INSTRUMENTS	
BY	
DISTRICT	
DATE	

MAIN LANDING GEAR
DROP TEST REPORT

XV-5A LIFT FAN
FLIGHT RESEARCH AIRCRAFT PROGRAM


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FEB 6 1967
B

ADVANCED ENGINE AND TECHNOLOGY DEPARTMENT
GENERAL ELECTRIC COMPANY
CINCINNATI, OHIO 45215

31 MAY 1968
MF

H. W. LOUD MACHINE WORKS, Inc
POMONA CALIFORNIA

REVISIONS

Date	Change Letter	Description	Approvals
11-6-63	A	<p>Page 2: Added Appendix "A" Drop Test Requirements Added Appendix "B" Basic Strut Air Pressure Curve</p> <p>Page 5: Corrected Mass Travel Values Added: Aircraft Configuration Aircraft Sign Convention Notes 167 Psig Drop Test Inflation Pressure. "See also Appendix "B"</p> <p>Page 9: Added: 167 Psig Inflation Pressure Page 10: Added: 167 Psig Inflation Pressure Page 11: Added: 167 Psig Inflation Pressure Page 12: Added: 167 Psig Inflation Pressure Pages 13, 14, 15, & 16: Added Calibration Values. 167 Psig Inflation Pressure</p>	

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1.0 GENERAL:

The shock absorber portion of the 1510L100 Main Landing Gear, but using a dummy cylinder was tested on 2 August 1963, in accordance with the H. W. Loud Test Procedure 1510LTP-4, Revision "A". This report presents the successful completion of the established test requirements.

The tests were witnessed by H. W. Loud Quality Control and Mr. Heinz J. Kowaczek of Federal Aviation Agency.

2.0 APPLICABLE DOCUMENTS:

2.1 1510LTP-4, Revision "A", H. W. Loud Drop Test Procedure.

2.2 SCDL0001, Ryan Main Gear Specification.

3.0 SUMMARY:

The results of the tests demonstrate satisfactory energy absorption characteristics of the shock absorber. (See Table I)

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4.0 DISCUSSION:

The shock absorber was mounted in the drop tower (See Figure I).

The ground reactions were measured with a reaction platform (See Figure II). The strut was serviced with hydraulic fluid and extended with 167 psig air pressure. The tire was inflated to 180 psig.

The tests were performed in accordance with the 1510LTP-4, Revision "A" Test Procedure. See Appendix "A" for a copy of the test requirements taken from the procedure.

Figure III shows the configuration of the metering pin and oriifice.

5.0 RESULTS:

The test results are given in Table I. The curves of vertical load vs stroke and vertical load vs mass travel after contact are given in Figures IV, V, VI, and VII. The actual test oscillograph traces are fold out pages.

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TABLE I

Drop Series Record No.	3 9770	1 9772	2 9785	4 9787
Aircraft Configuration	2 PT Level Gear Fwd. 12500 lb.	2 PT Level Gear Fwd. 9200 lb.	Tail Down Gear Fwd. 9200 lb.	2 PT VTOL Gear Aft 9200 lb.
Drop Height (Inches)	6.80	18.70	18.70	18.70
Actual Jig Wt. (lbs)	6238	4638	4638	4638
Energy Absorbed (Ft. lbs)	2983	5985	6210	6363
Wheel Speed (rpm)	2292	1971	1971	0
Sinking Velocity (Ft/sec)	6	10	10	10
Mass Travel (Inches)	6.89	8.61	8.37	9.35
Tire Deflection (Inches)	1.52	1.64	1.65	1.66
Oleo Stroke (Inches)	5.54	7.02	6.78	7.50
Platform Vert. Reaction (lbs)	7050	11370	12100	10840
Plat. Drag Fore Reaction (lbs)Aft	1450 3270	2820 4090	2000 4640	0
Strut Efficiency (%)	81.4	82.4	81.3	83.6

(a) 167 psig drop test inflation pressure

(b) See also Appendix "B"

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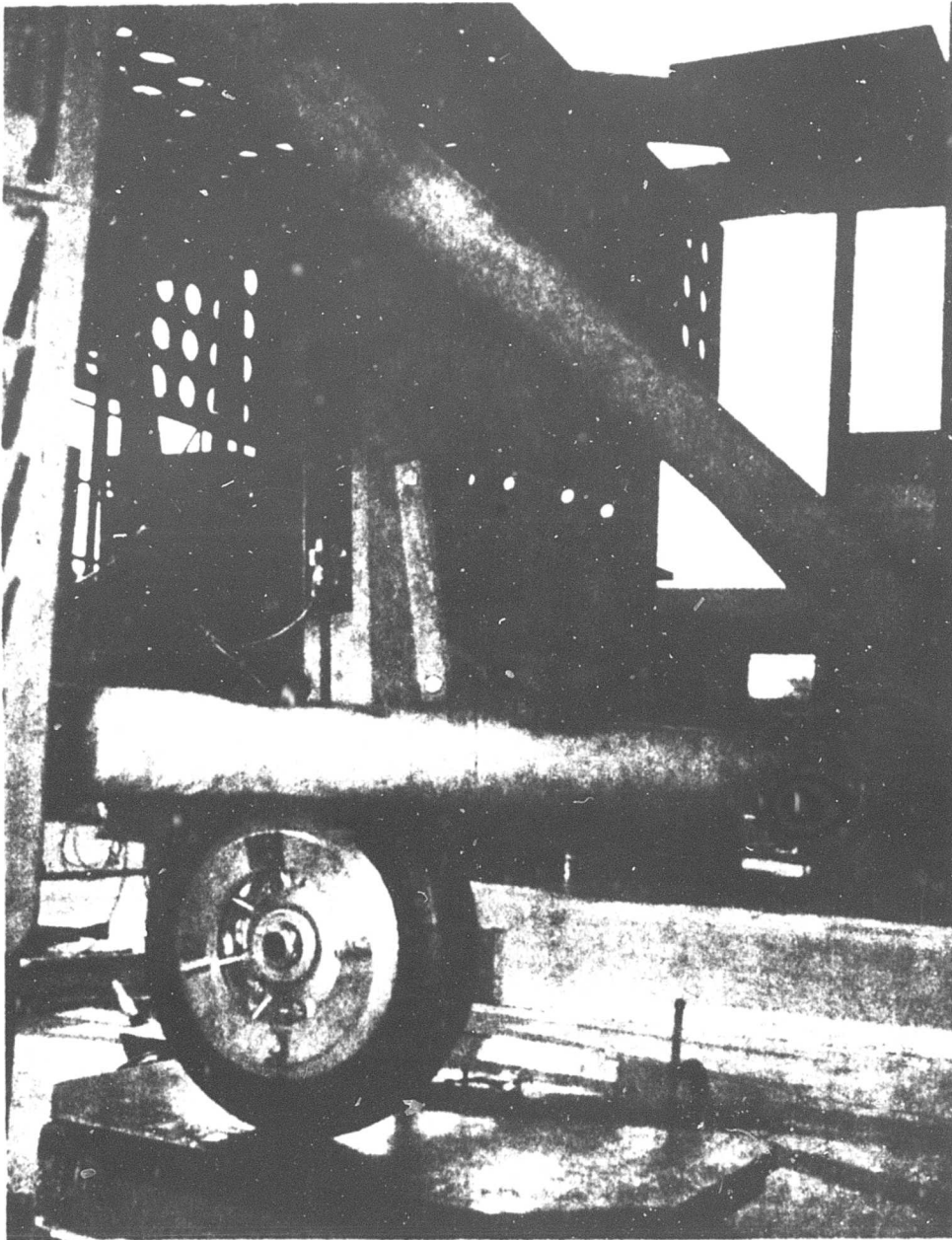


FIGURE I
DROP TEST TOWER
XV5A MAIN LANDING GEAR

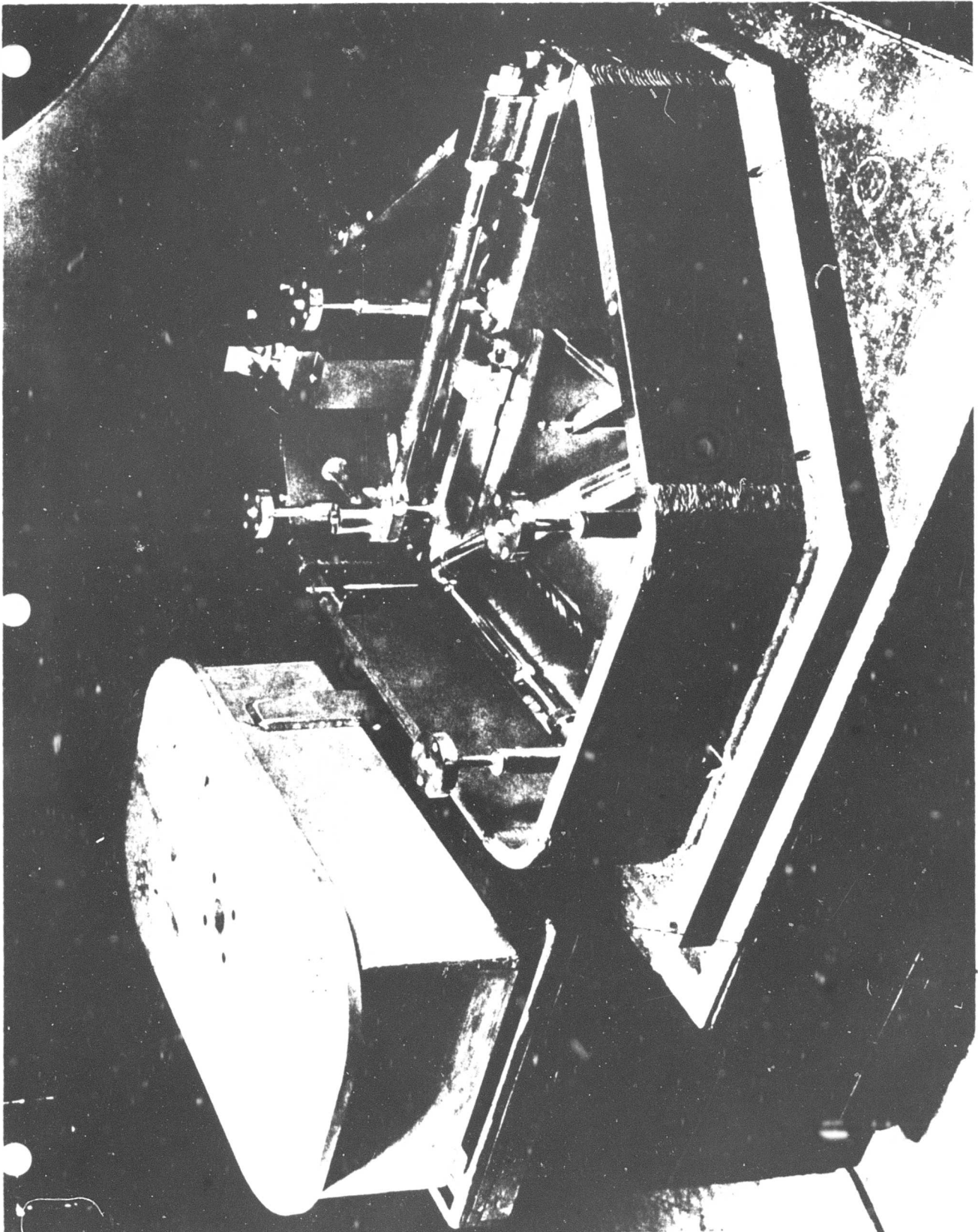
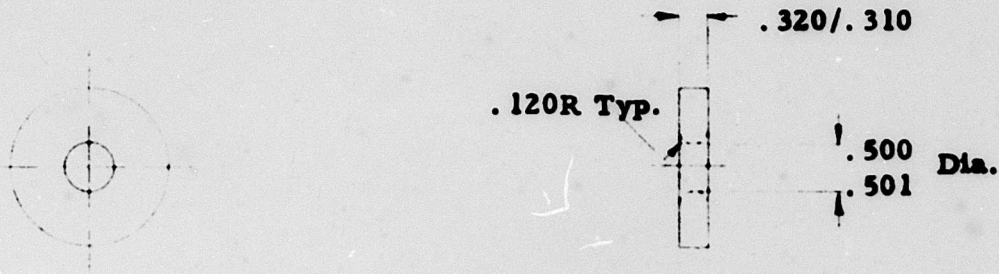


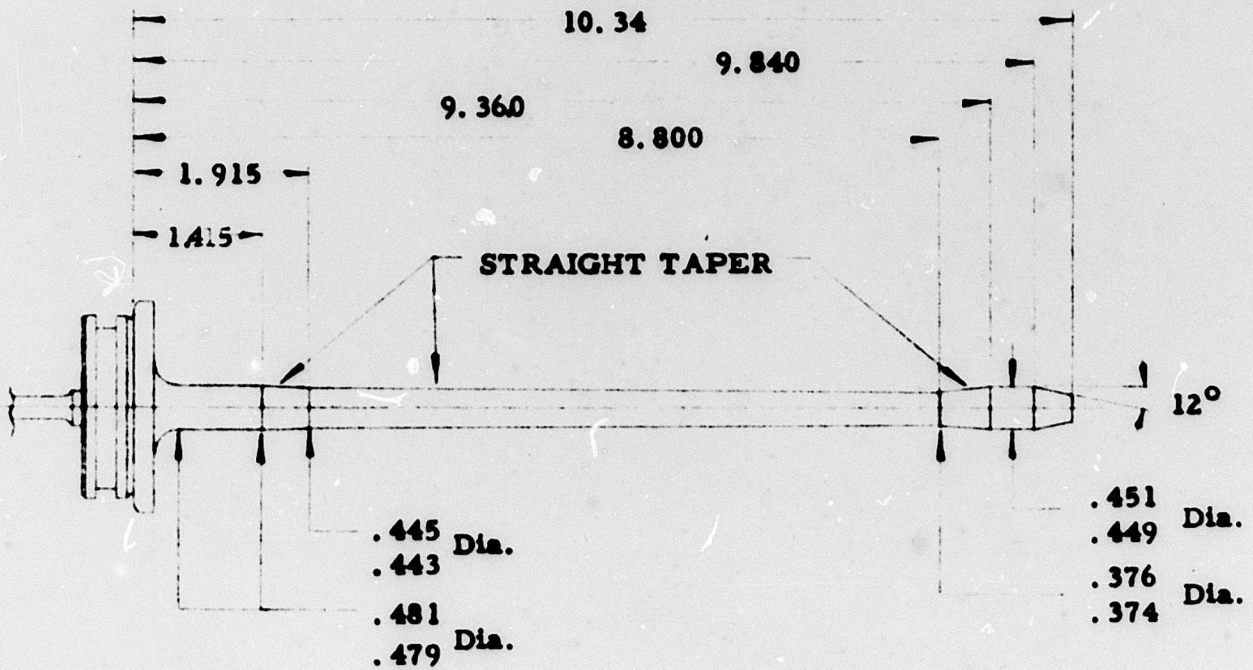
FIGURE II
REACTION PLATFORM

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FIGURE III



1510L115 ORIFICE CONFIGURATION (HALF SIZE)



1510L112 METERING PIN CONFIGURATION (HALF SIZE)

RECORD # 9770
h = 6.80 INS
Wj = 6238 *

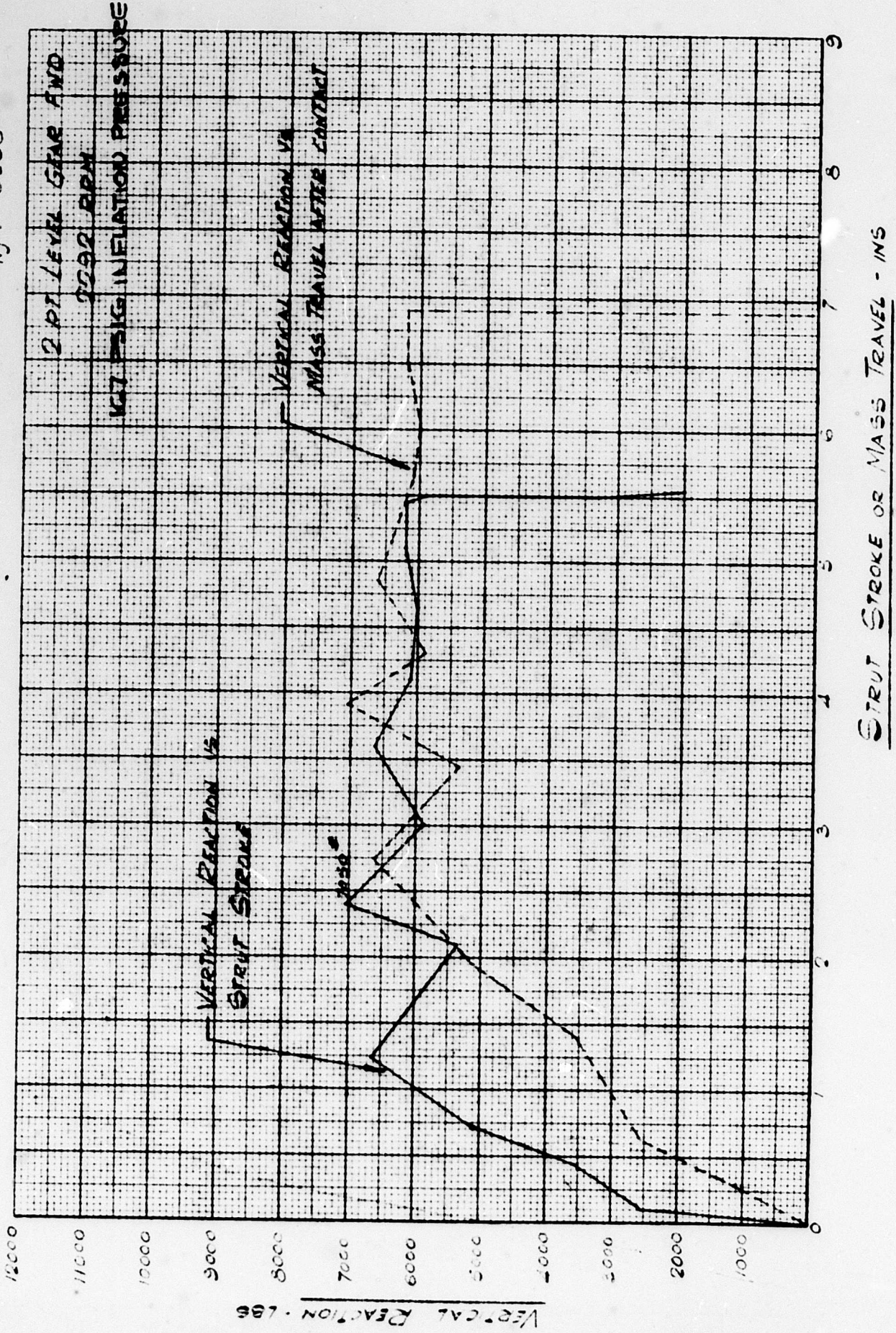
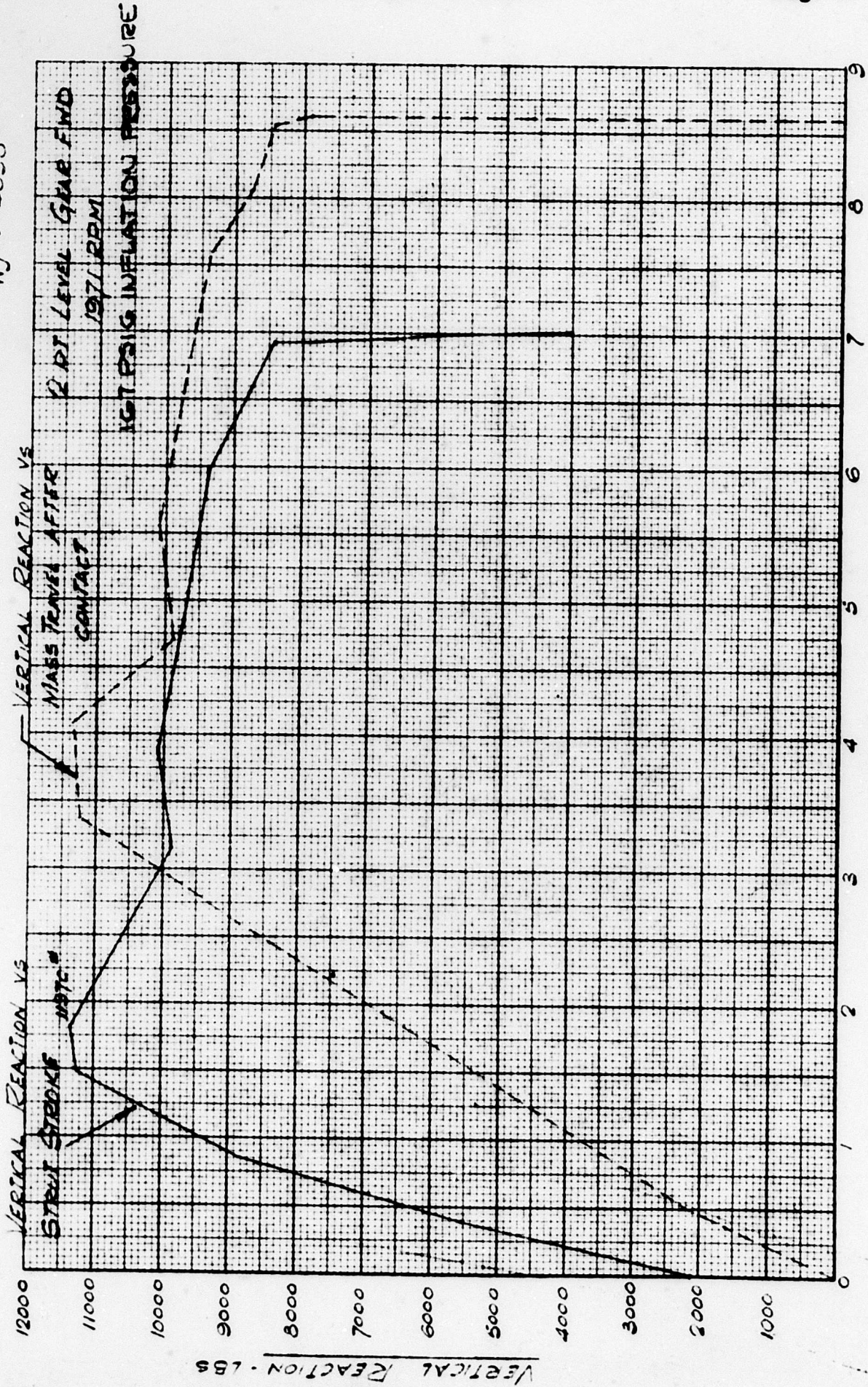


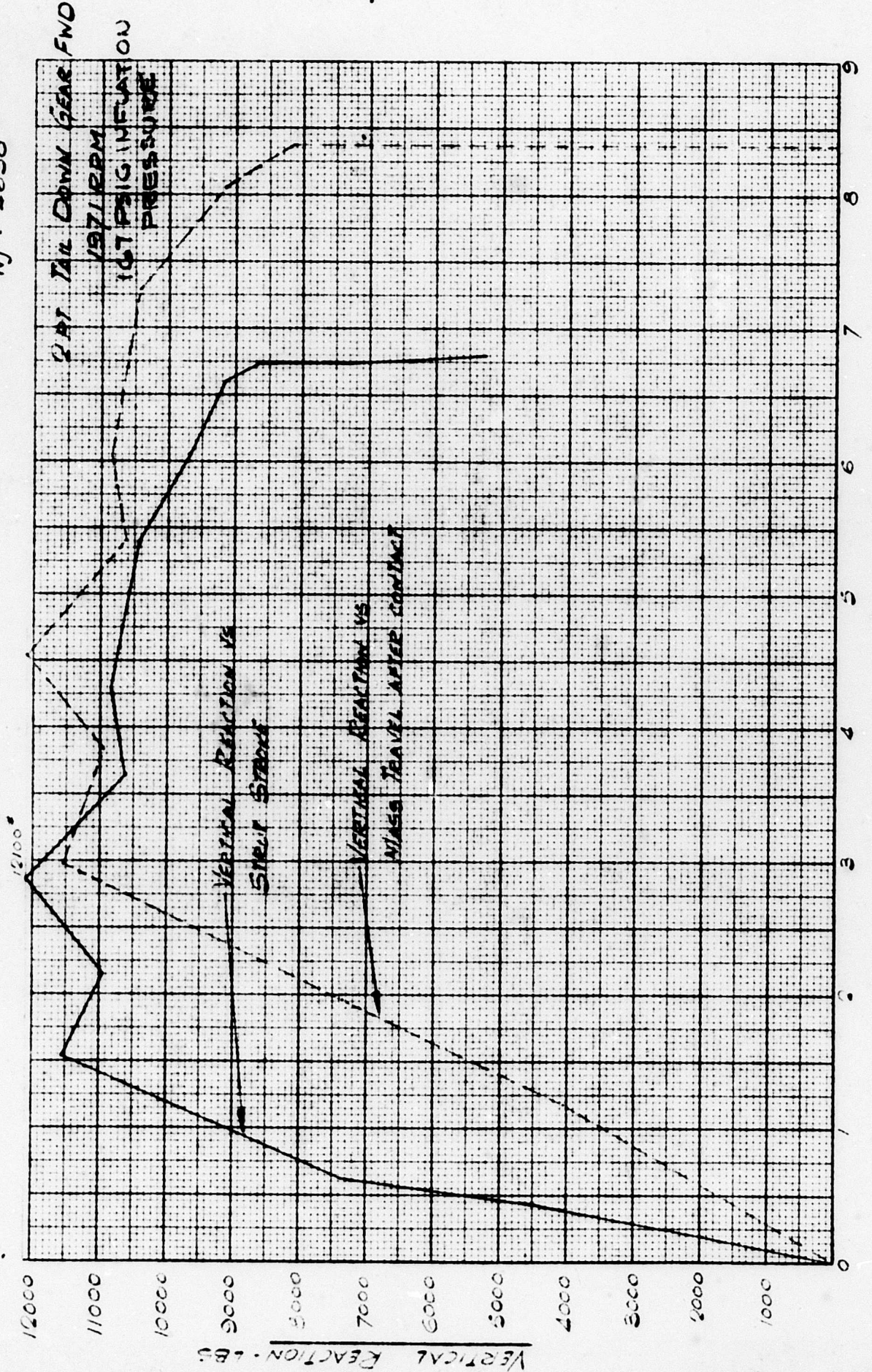
FIGURE IV

Record # 9772
h = 18.70 in
NJ = -633*



STRUT STROKE OR MASS TRAVEL - IN'S
FIGURE V

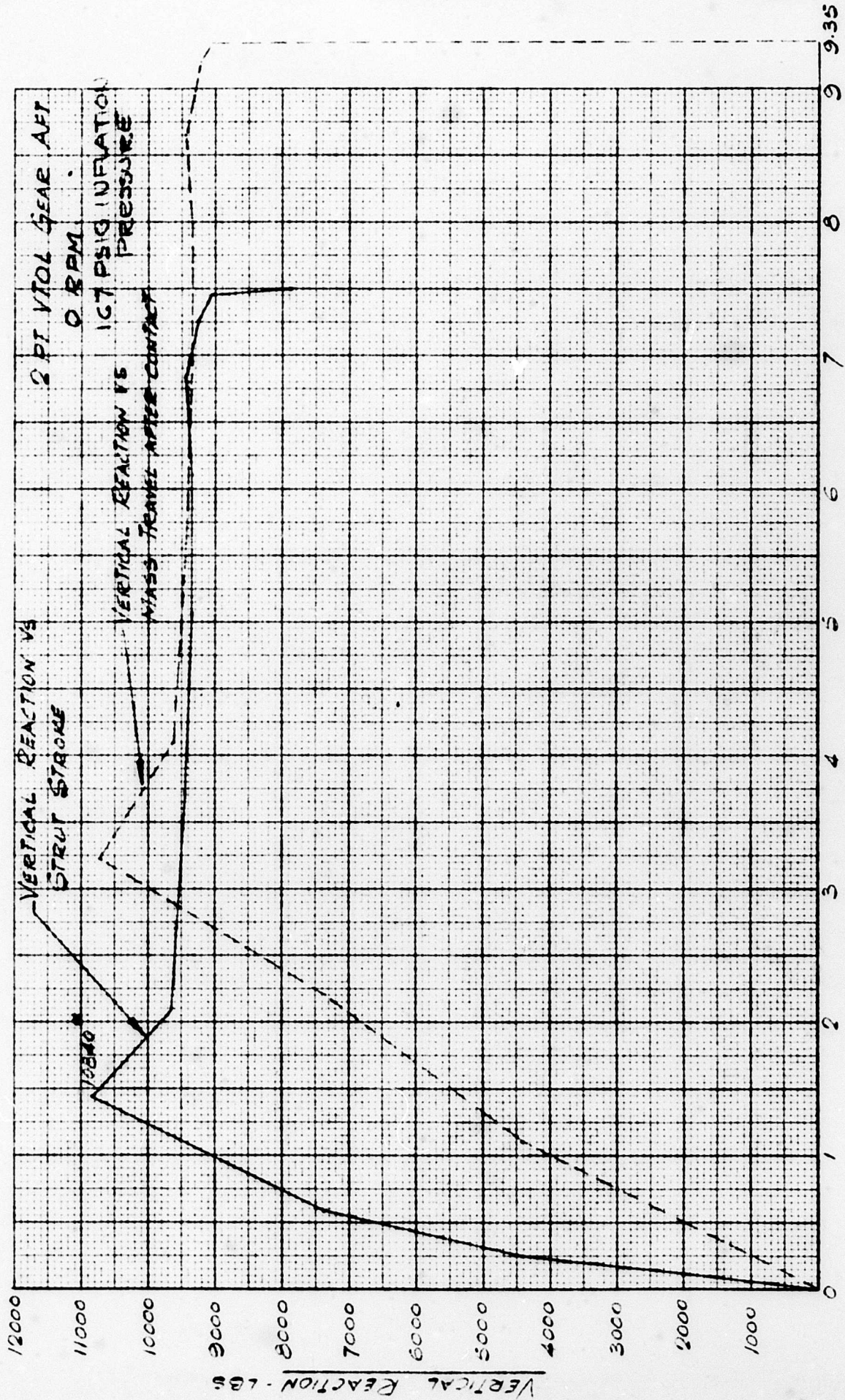
RECORD # 9785
D = 18.70 INS
WJ = 1638 #



STRUT STROKE OR MASS TRAVEL - IN

FIGURE VI

RECORD # 9787
t = 13.70 ms
W = 4638 *



2 PT VIOL GEAR AFT
0 RPM
107 PSIG INFLATION
PRESSURE

STRUT STROKE OR MASS TRAVEL - INS

FIGURE VI

Record 9710

167 PSIG UPLIFT/100 PS

1.85 SIN

42 = 43 IN

85 = 87 IN

13 = 134 IN

145 = 180 IN

145 = 10 FT/85

69 2.39 IN

1.99 = 0.82 IN

26 = 2.39 KIPS

54 = 4.95 KIPS

81 = 7.48 KIPS

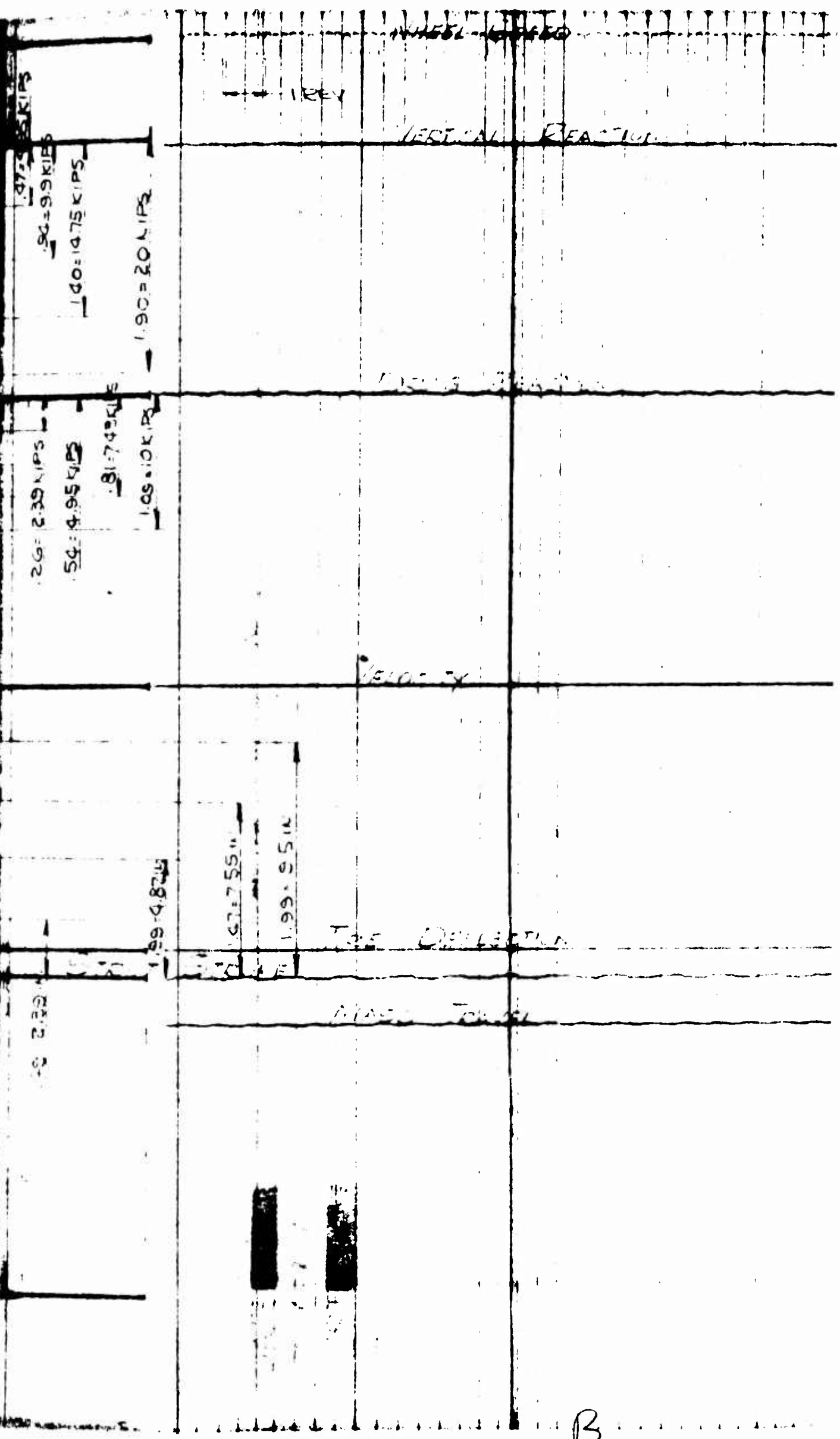
105 = 10 KIPS

147 = 9.95 KIPS

94 = 9.9 KIPS

140 = 14.75 KIPS

190 = 20 KIPS



1510-34

REV

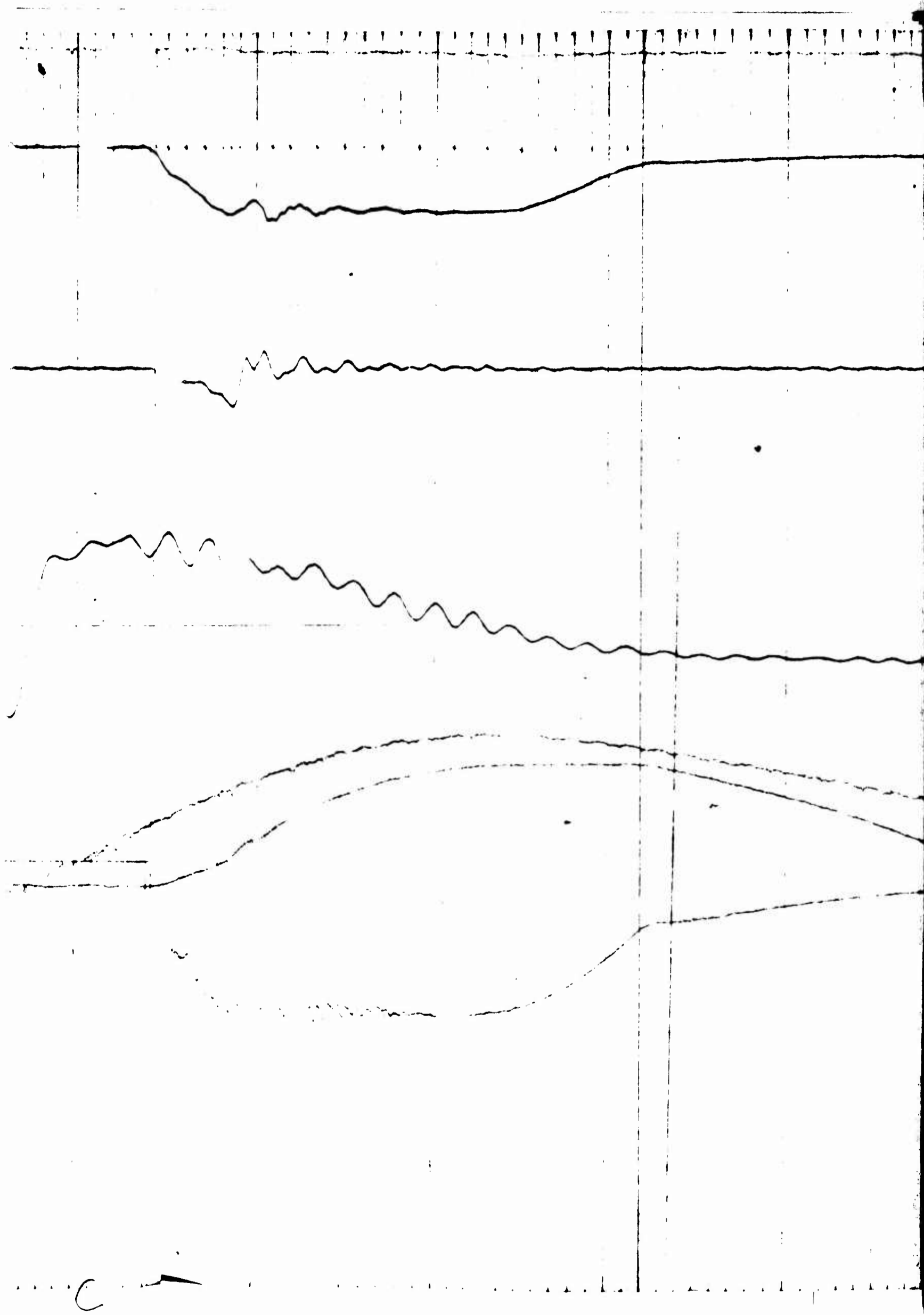
VERTICAL REACTION

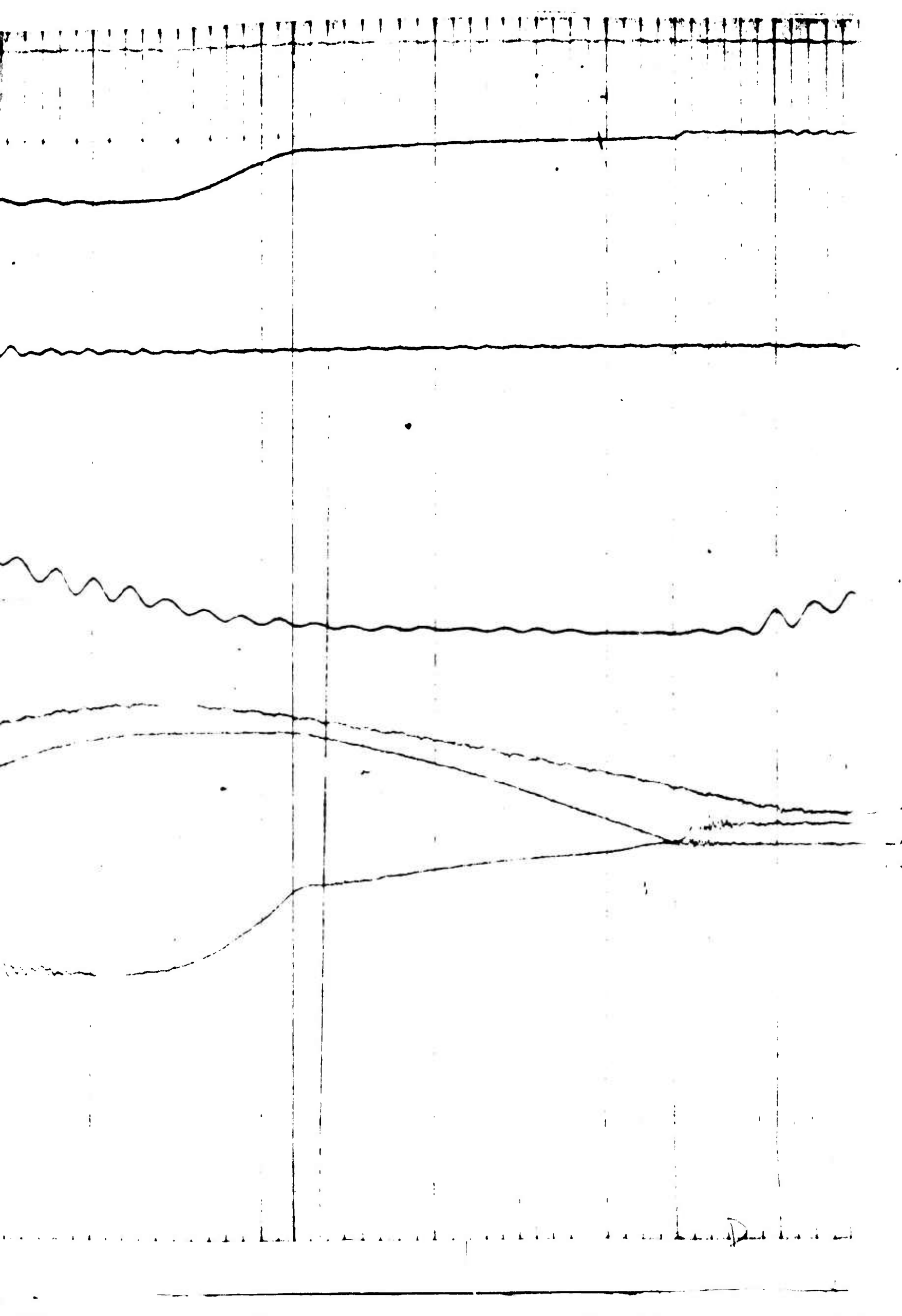
1510-34

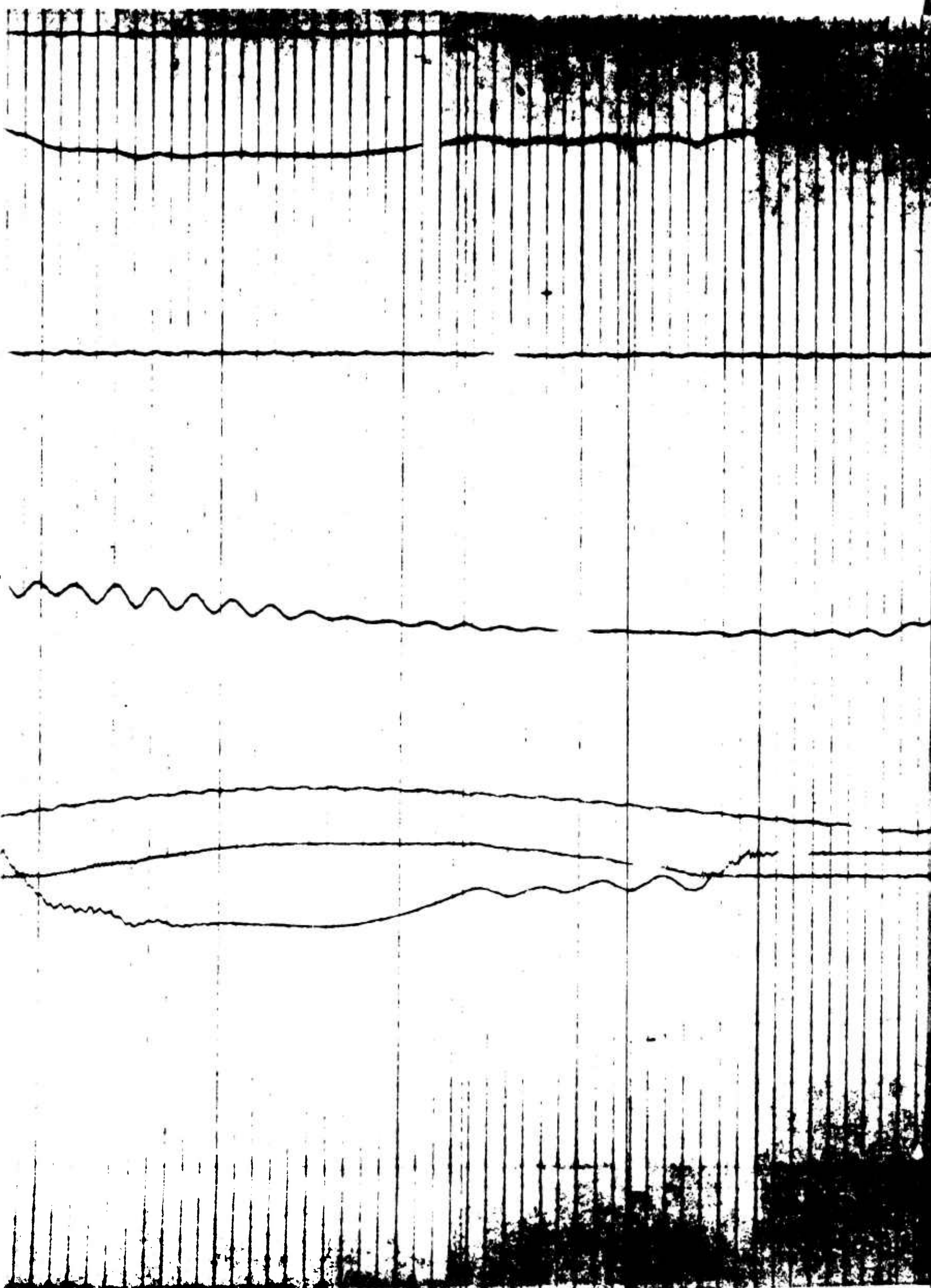
DEFLECTION

1.99

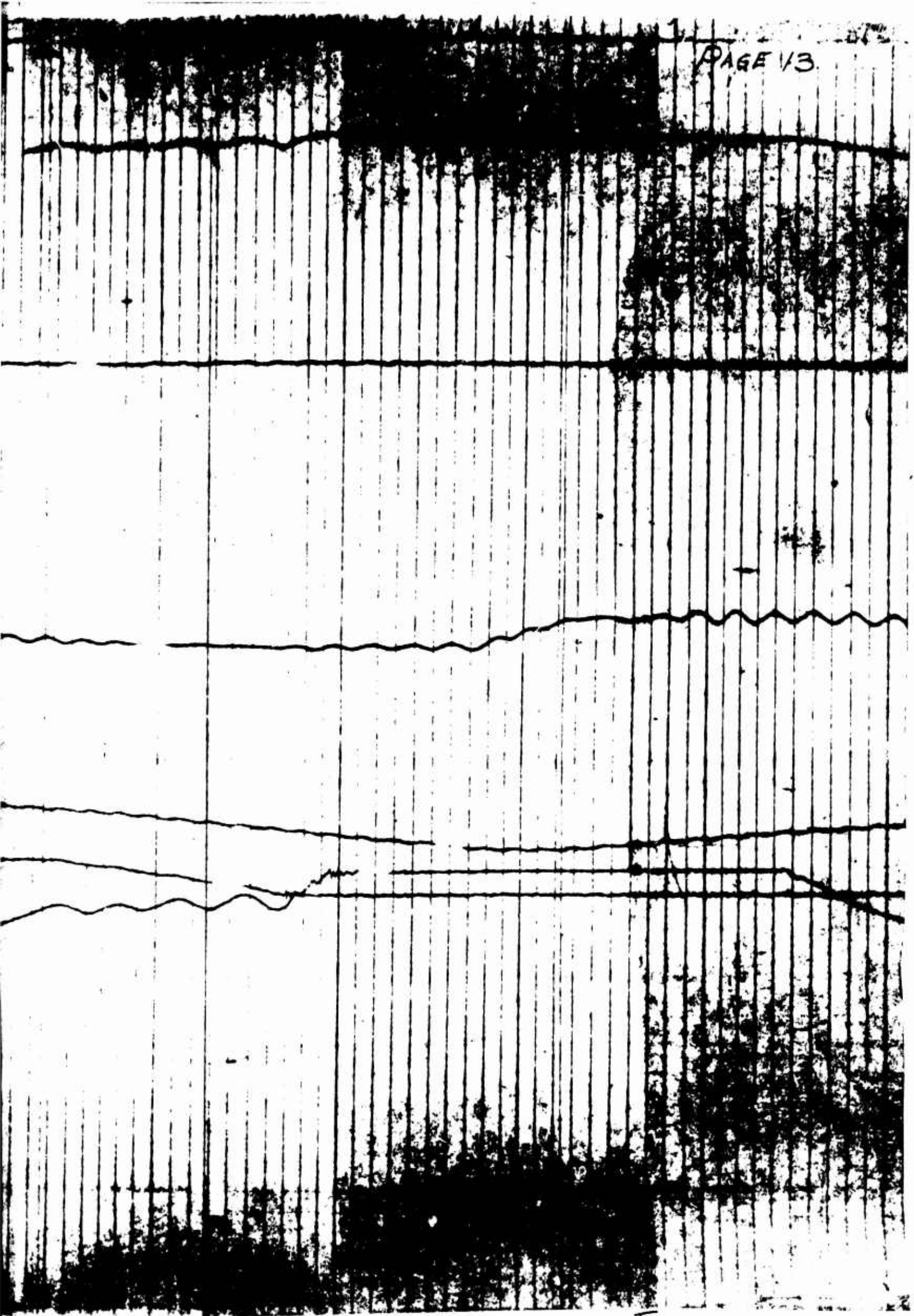
B







E



A

242 = 9.4

352 = 27.7 in

46 = 36 mm

85.0 mm

F 3 = 34.0

F 75 = 180.0

49 = 2.0

30.6 mm

Rec'd #9772

PSIG INFLATION PRESSURE

167

23.25

54 = 3.5

100

40 = 14.5

190 = 20.6



REV

30.53 kips

40.1475 kips

1.99 = 20 kips

1.99 = 20 kips

1.54 = 15.5 kips

1.99 = 20 kips

1.01 SECS

1.01

1.54

1.99 = 20 kips

1.54 = 15.5 kips

1.99 = 20 kips

TIME (SECS)

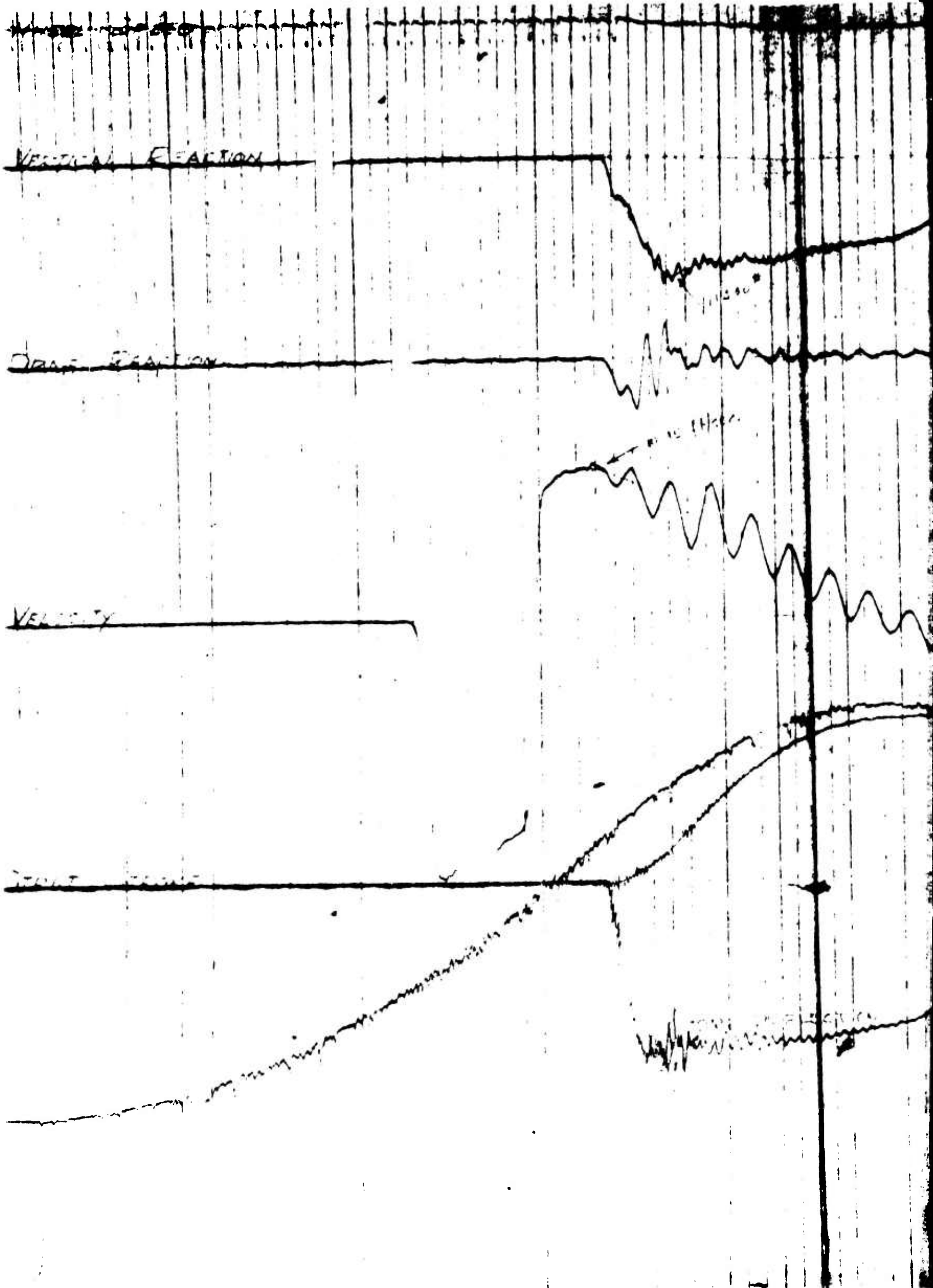
1.99

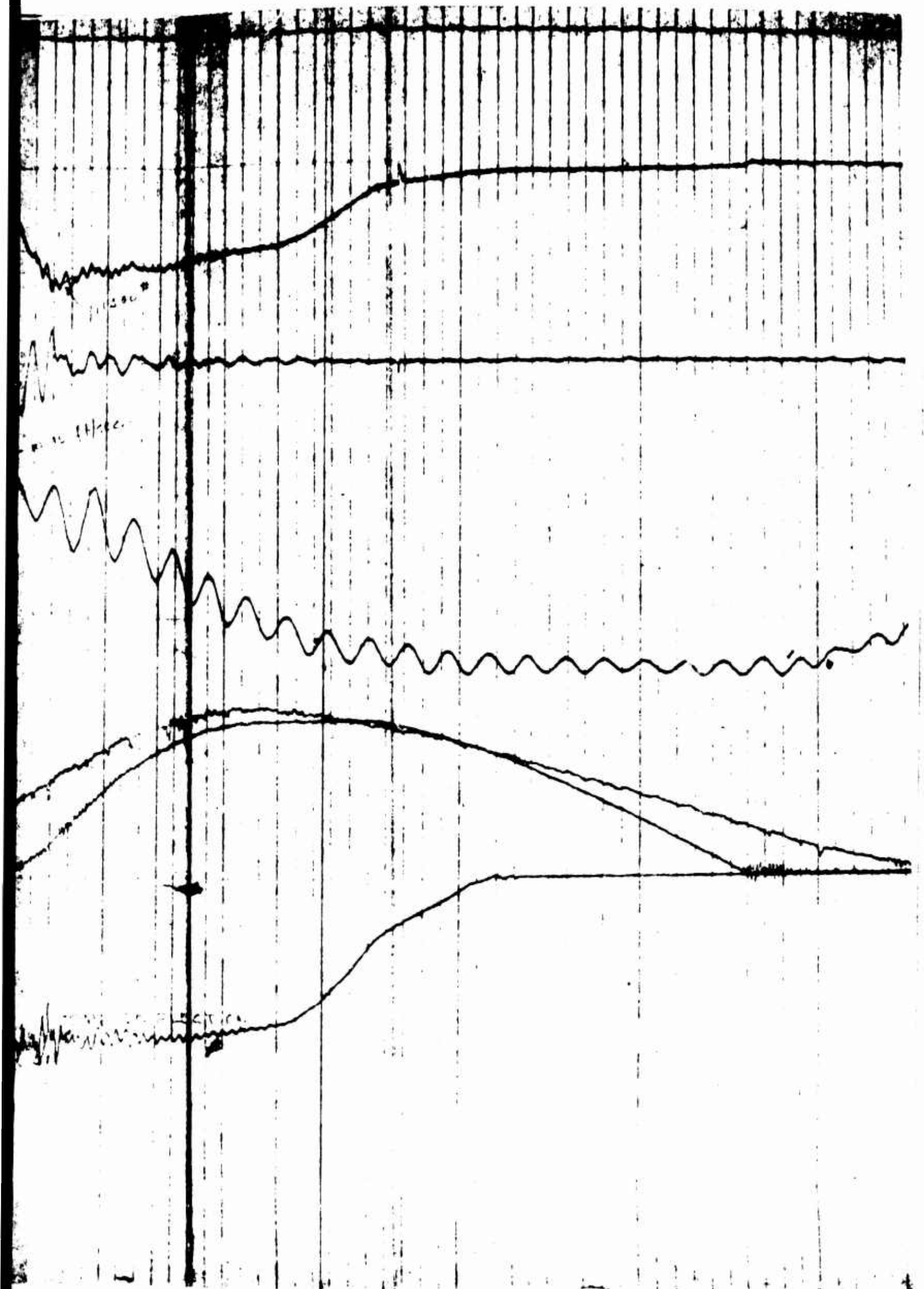
1.75 = 180 N

1.54 = 15.5 kips

1.54 = 15.5 kips

B





D



MAGNETIC

E.T. 1000

TIZ 1000

E

MASSACHUSETTS

STATE OF MASSACHUSETTS

TITLE DEFLECTION

124-978

T

4.6

65-67

37

78-80

197 PSIG INFLATION PRESSURE

35-10

HOOPER

67-755

DATE 2-10-60

0.75 sec

← .01 SECS

VELOCITY

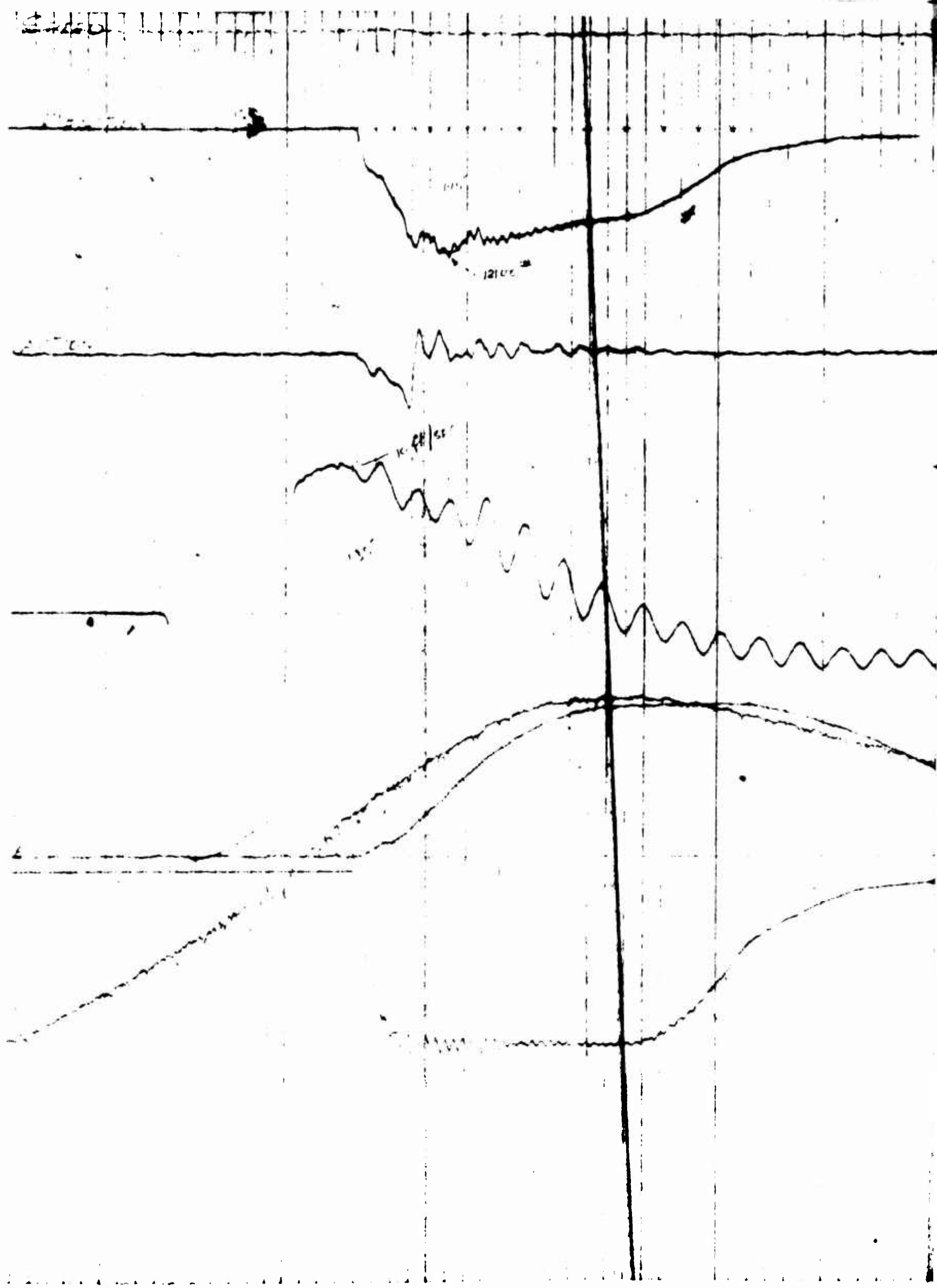
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0.56 sec

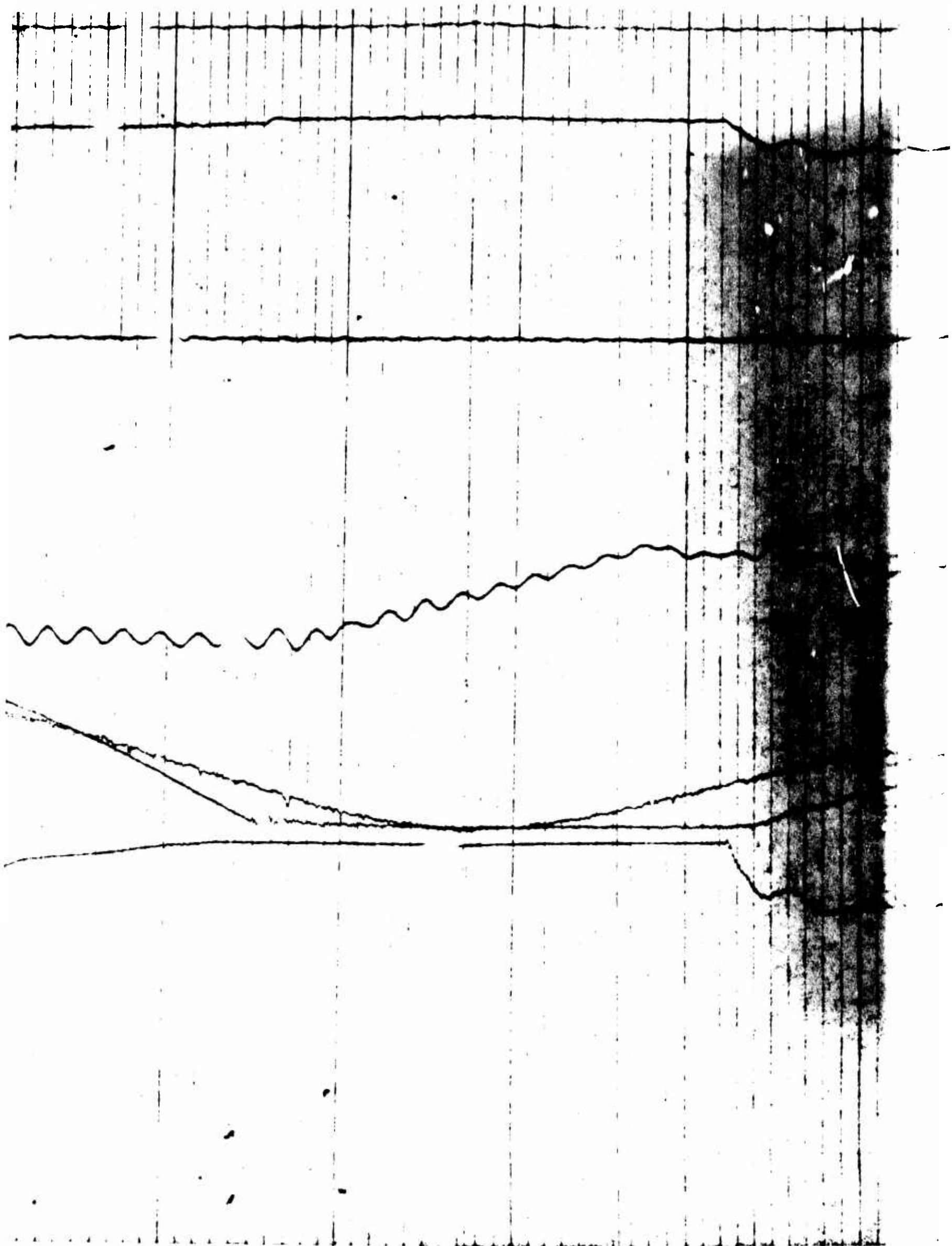
TIRE CRESTION

B

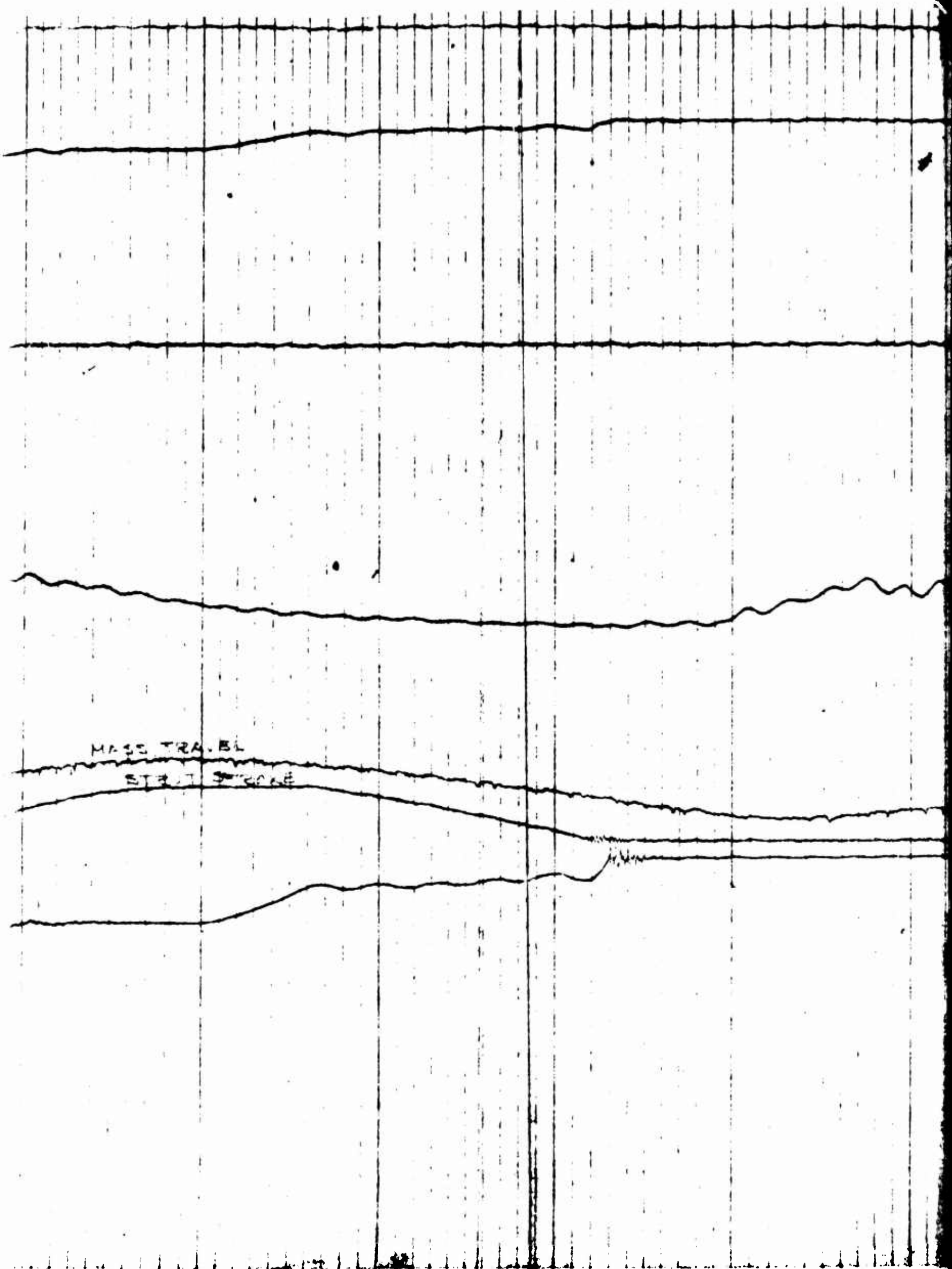
5450



C



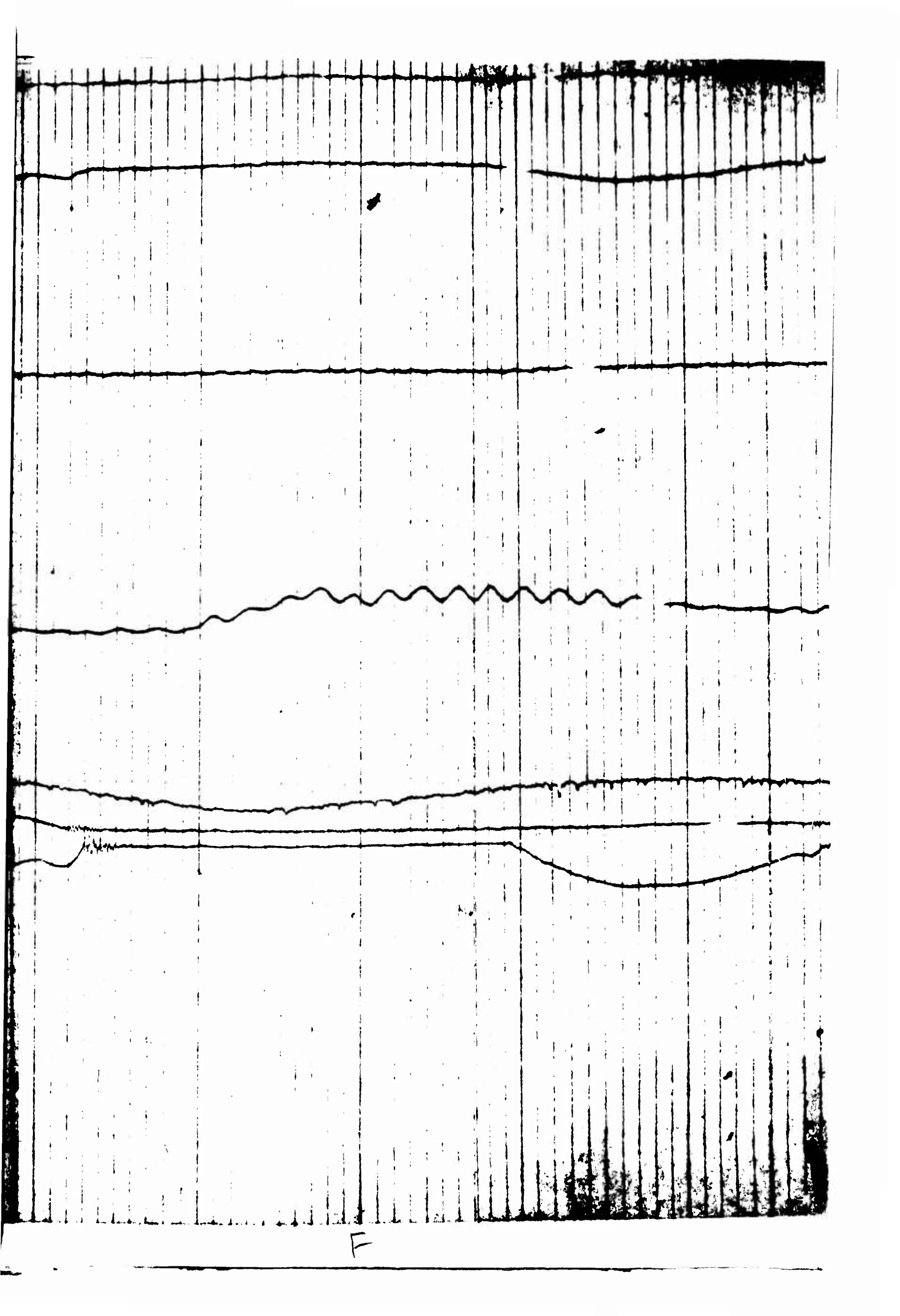
D



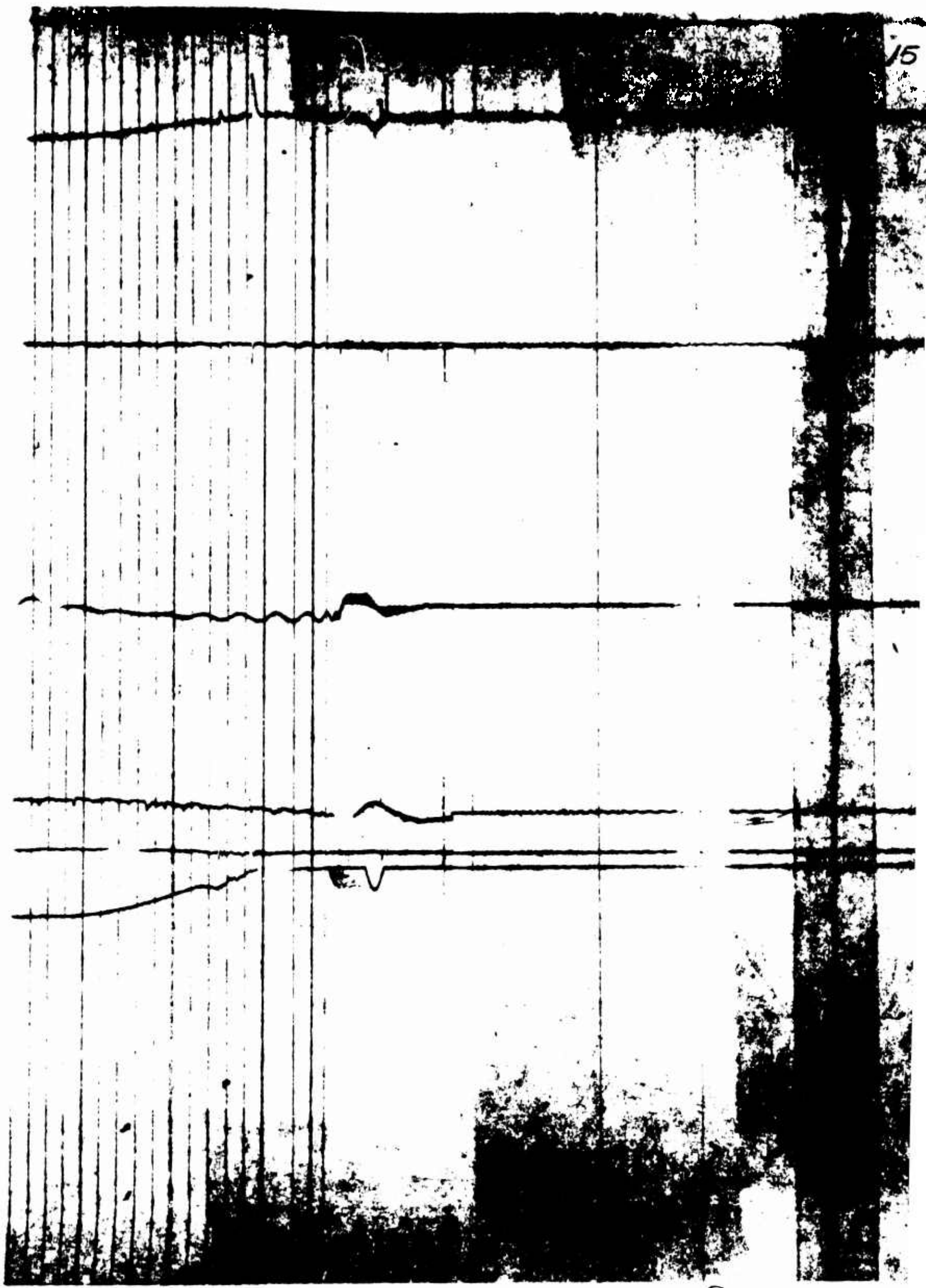
MASS TRAVEL

STREET SCENE

E



F



BLANK PAGE

RECORD #2757

167 PSIG INFLATION PRESSURE

F

357-2770

66-200

62-532

86-87

135-1051

99K185

ATION

VI
K
W

A

WHEEL SPEED

VERTICAL TEST

76-233KPS
54-485KPS

DRAG REACT

8-43KPS
109-10KPS

→ → .01 SEC

VELOCITY

1.47-7.55
1.99-9.510

TIRE DEFECTION

SIGMA STRESS

MASS TRAVEL

WHEEL SPEED

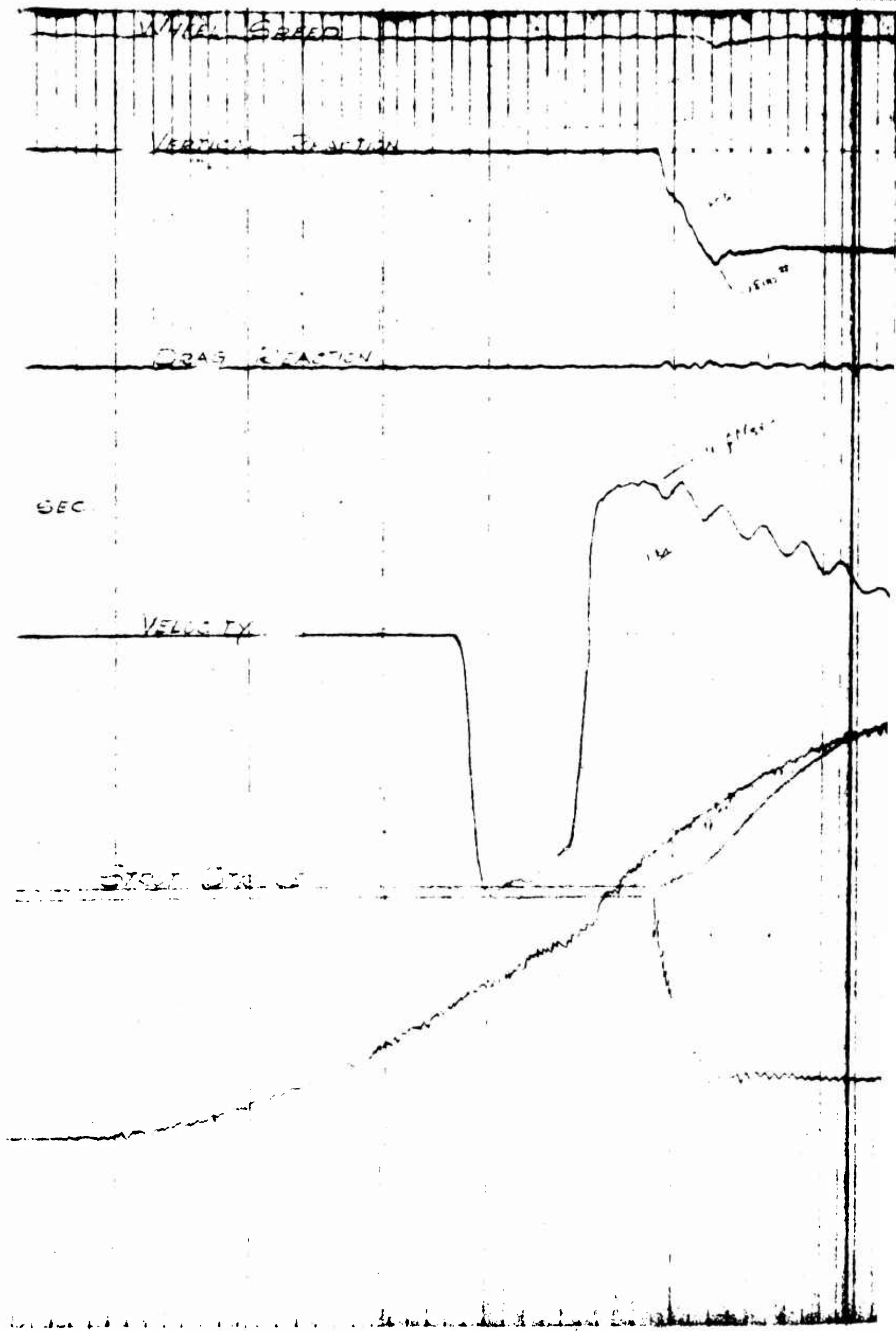
VERTICAL POSITION

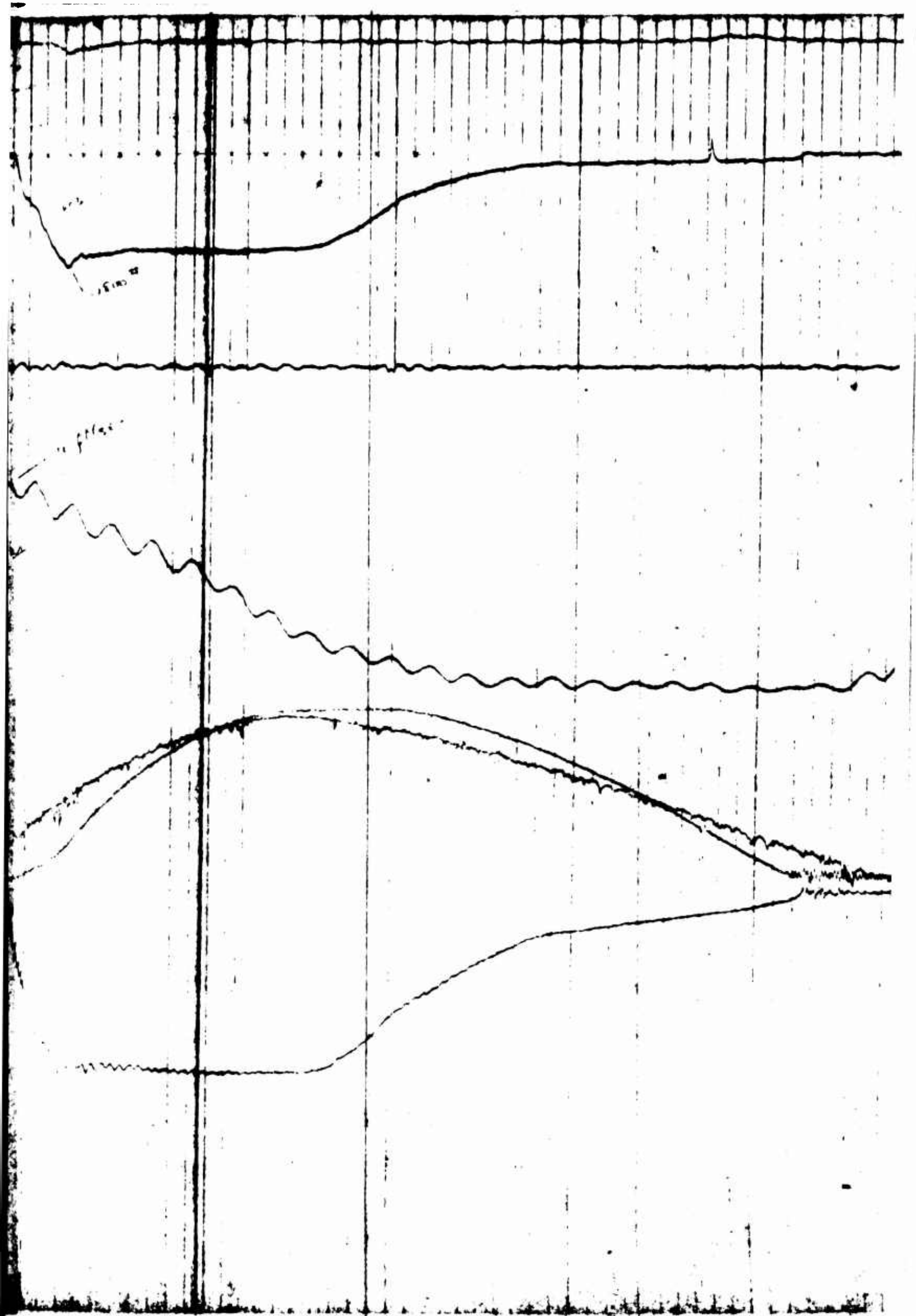
DRAW REACTION

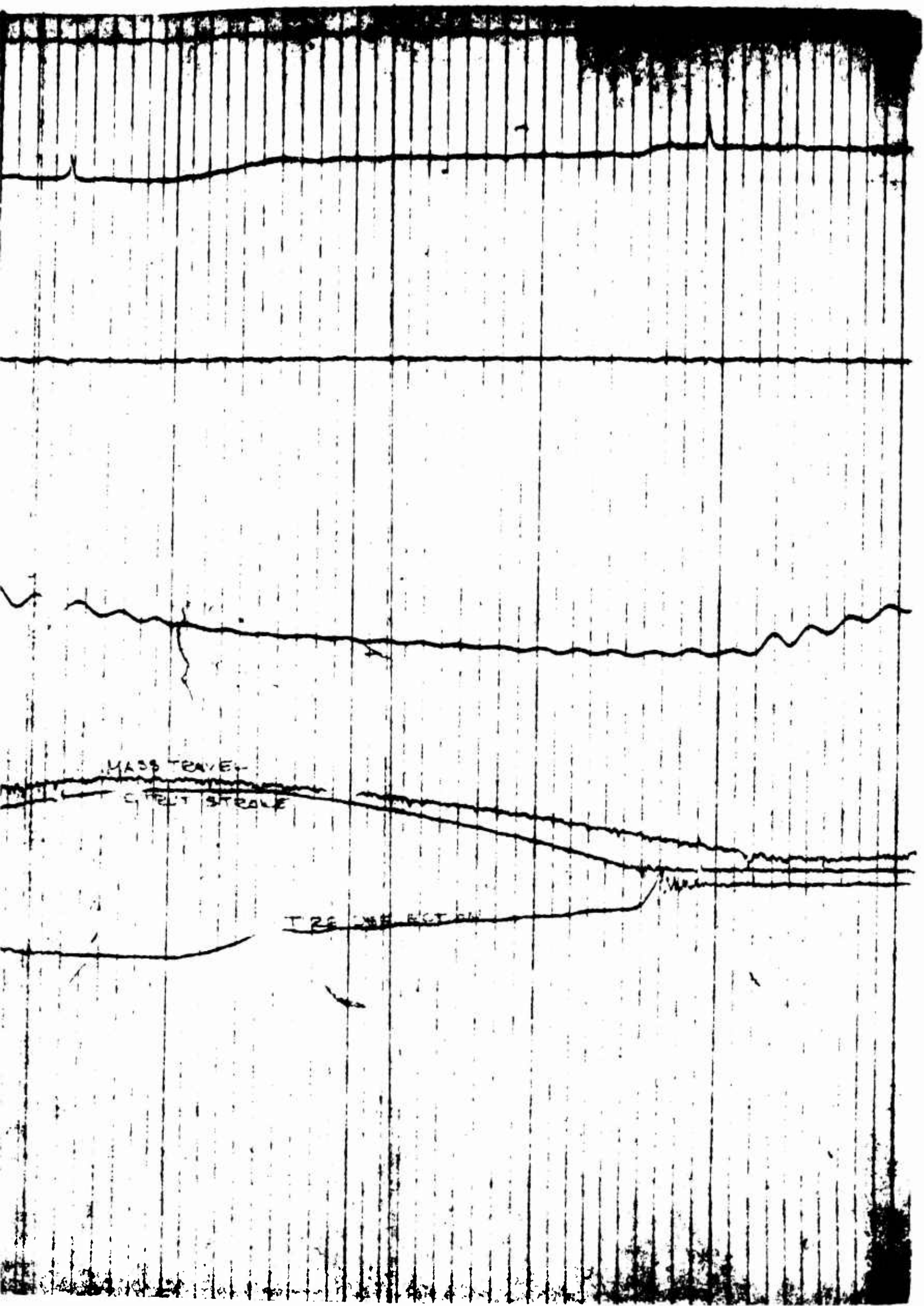
SEC

VELOCITY

DRAW CURVE



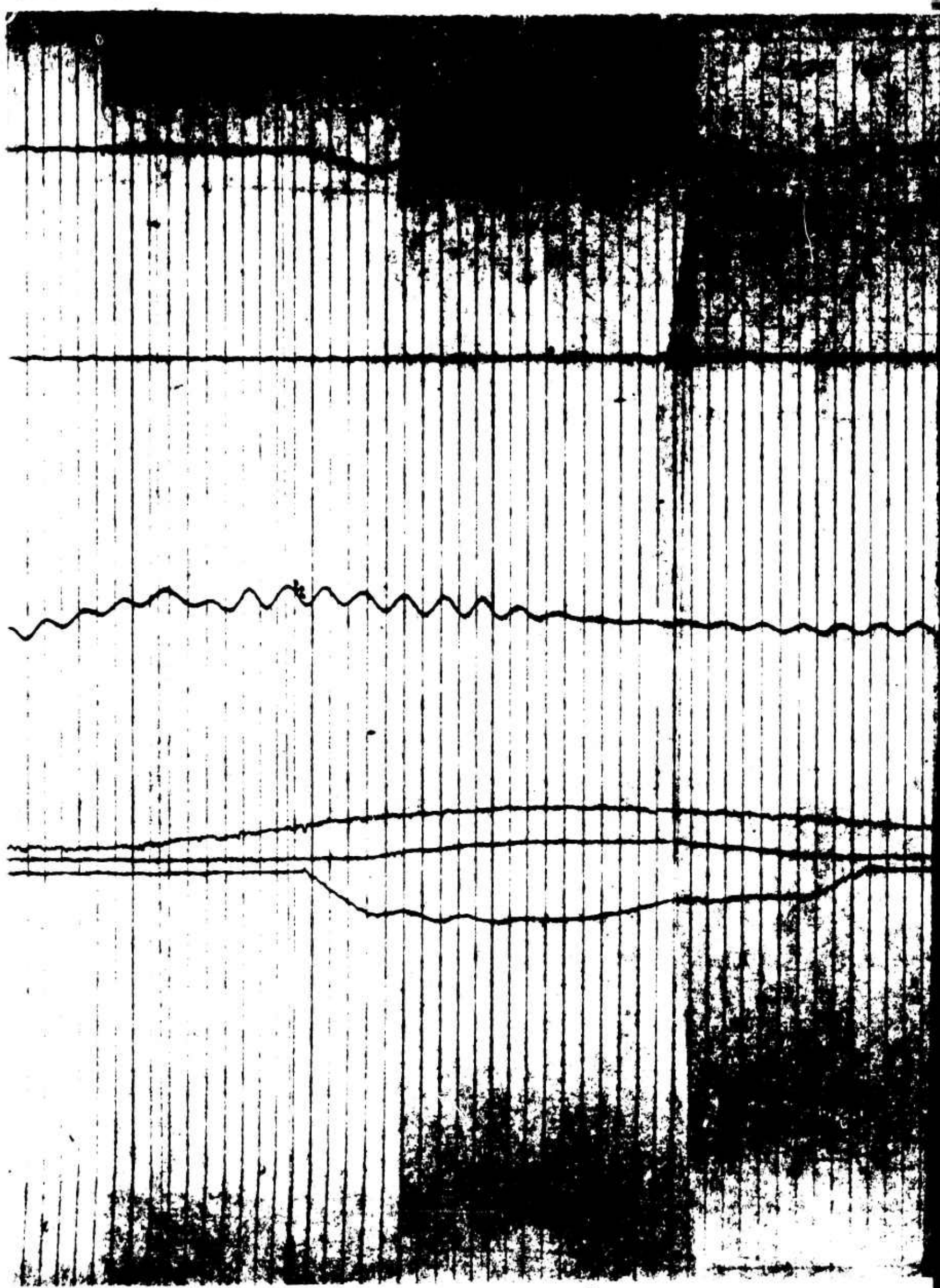




MASSIVE

SILTSTONE

TREE REFLECTION



1510LTR-1

DROP TEST REPORT

Appendix A

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APPENDIX A

DROP TEST REQUIREMENT

1510LTR-4

DROP TEST PROCEDURE

Page 18

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Rev. "A" 7-22-63

TABLE I

DROP TEST REQUIREMENTS

DROP SERIES	CONDITION	A/P WEIGHT (LBS)	EST. JIG WEIGHT (LBS)	CONTACT VELOCITY * (FT/SEC)	EST DROP HEIGHT (INS)	INPUT ENERGY * (FT LBS)	* WHEEL SPEED (R P M)	EIT STRUT INFLATION PRESS (PSI)	TIRE PRESSURE (PSI)	MAX VERTICAL GROUND REACTION (LBS)
1.	2 pt level Gear FWD	9200	4600	10	19.7	7143	1971	167	180	12144
2.	Tail Down Gear FWD	9200	4600	10	19.7	7143	1971	167	180	12144
3.	2 pt level Gear FWD	12500	6250	6	7.8	3494	2292	167	180	10200
4.	2 pt VTOL Gear AFT	9200	4600	10	19.7	7143	0	167	180	12144

* Based on 20 in. tire dia.

1510LTR-1

DROP TEST REPORT

Appendix B

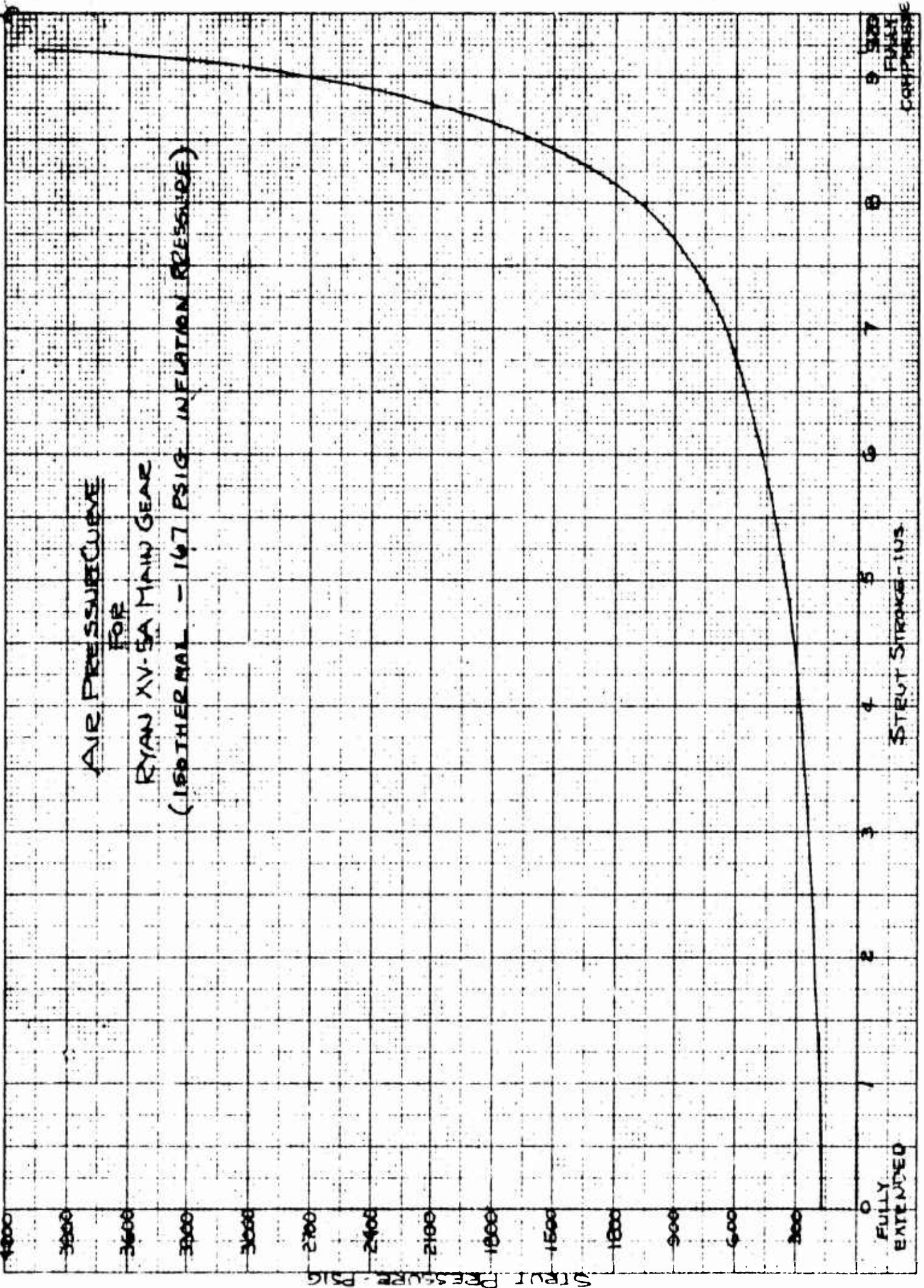
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Page 19

APPENDIX B

BASIC STRUT AIR PRESSURE CURVE

KOE
1/8" TO 1/4" INCH
359
MILITARY SPECIFICATION



STROKE - INCH

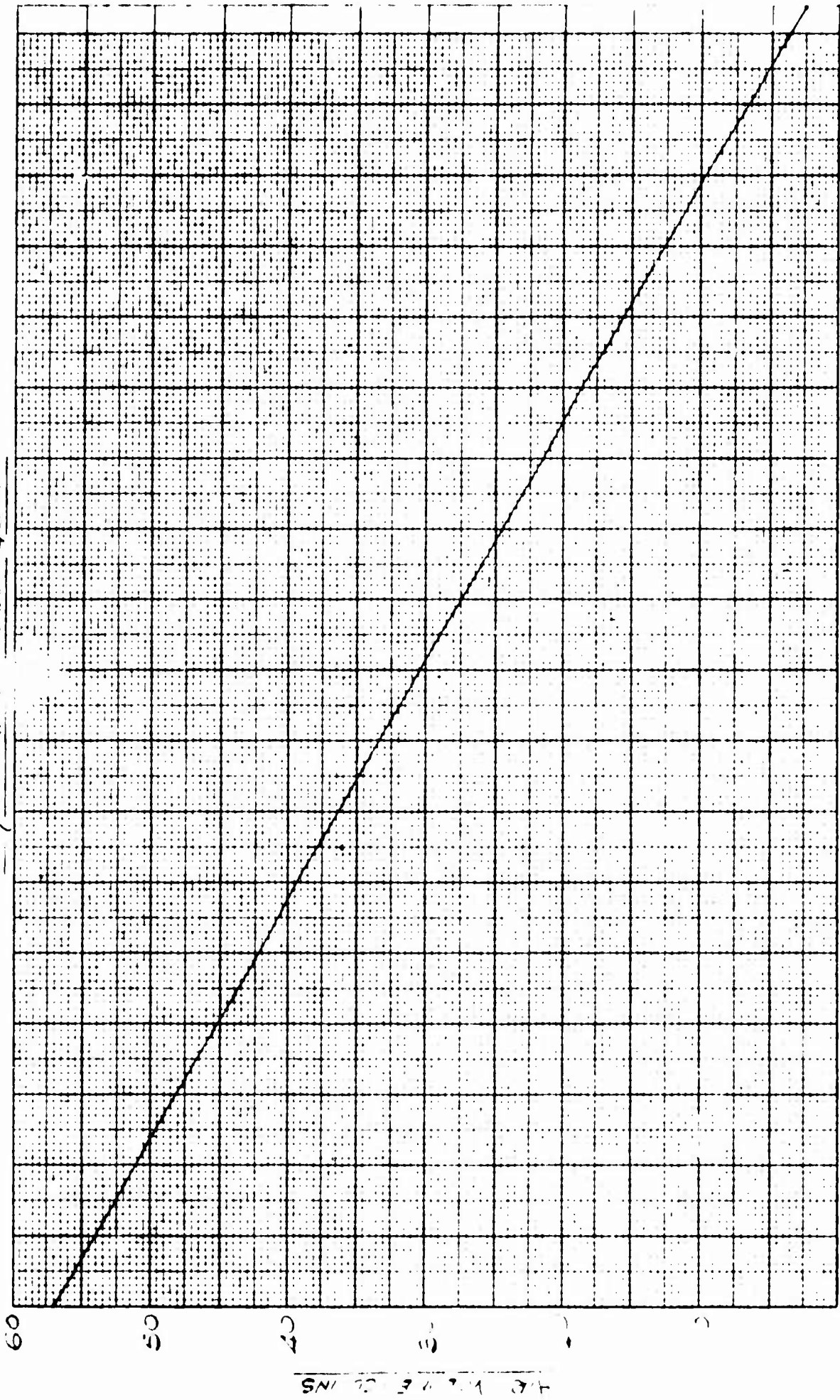
FULLY EXTENDED

FULLY COMPRESSED

STROKE PRESSURE - PSIG

AIR VOLUME VS STROKE CURVE

for
RYAN XV 1/2 IN. MAIN GEAR



STROKE - IN.

AIR VOLUME - CC IN.