

JANUARY 1958

SECRET

UNCLASSIFIED

ARROW 2

PERIODIC PERFORMANCE REPORT

'NUMBER 13'

ANALYZED



AVRO AIRCRAFT LIMITED

X-13

JANUARY 1958

SECRET
UNCLASSIFIED

ANALYZED

ARROW 2

PERIODIC PERFORMANCE REPORT

NUMBER 13

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Issued toR.C.A.F.

Date of IssueFebruary 14, 1958.....

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PERFORMANCE

APPENDIX I

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APPENDIX I

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PERIODIC PERFORMANCE REPORT NO. 13

INTRODUCTION

There is no new input to the performance data of Periodic Performance Report No. 12, other than weight changes. Furthermore it is not anticipated that any changes of input data will be made until such time that Flight Test Data become available, either to confirm the present estimate or indicate what changes are necessary.

This report therefore departs from the form of previous reports. The primary purpose of this report being to show the effect of change in O.W.E. on the pertinent performance characteristics.

The O.W.E. is defined as the aircraft weight including armament less usable fuel, and the Combat Weight as the O.W.E. plus half fuel for the 200 N.M. high speed mission. The relevant mission profiles are given Periodic Performance Report No. 12.

4° up aileron was used above 45,000 ft. and the I.C.A.O. Standard Atmosphere was assumed.

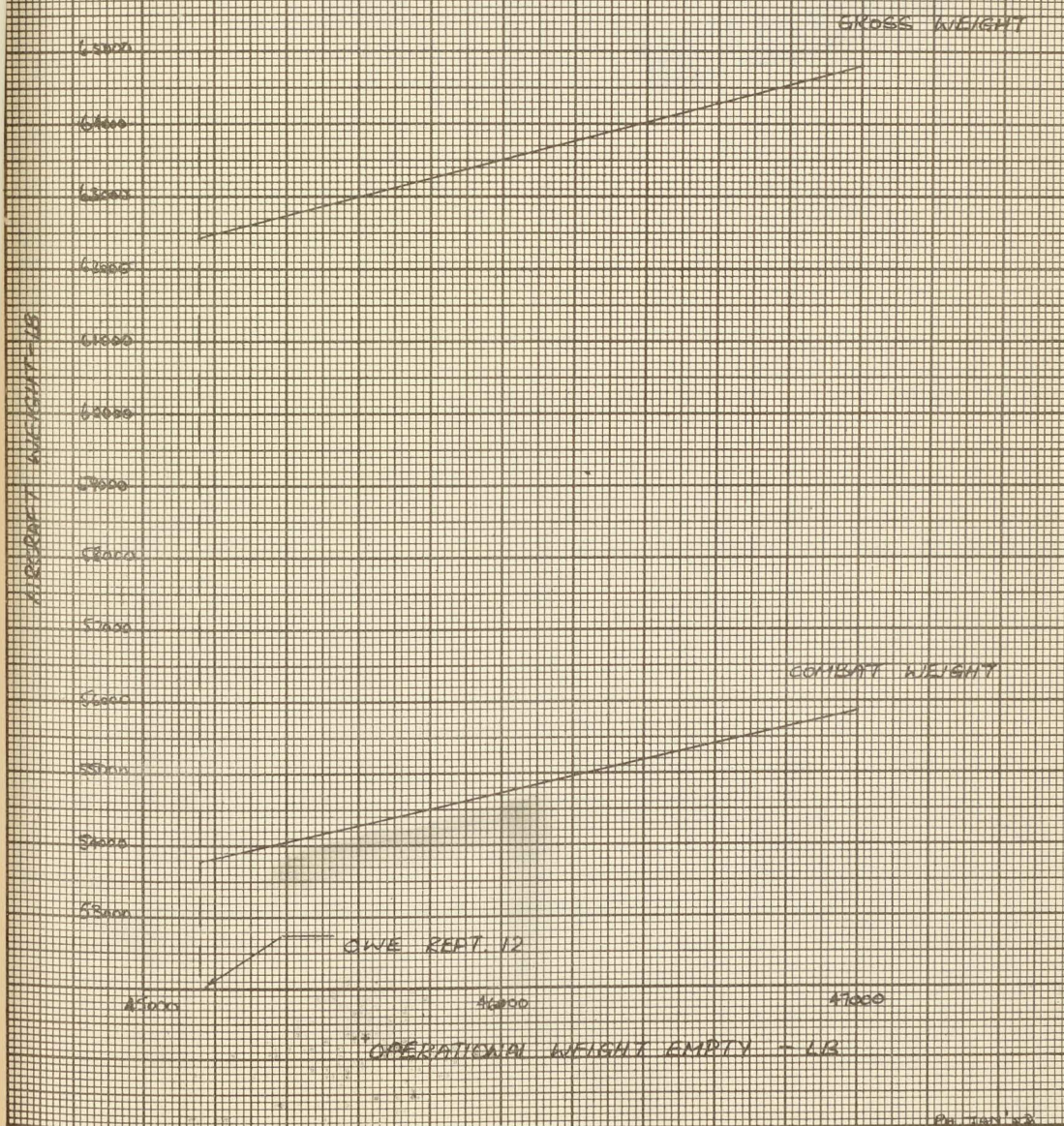
Due to an arithmetical error in the Overload Range Mission as given in Performance Report No. 12, a small discrepancy is present between this and the data given in this report, resulting in an increase in range of 26 N.M. at the O.W.E. of Report No. 12.

DRAWING 2

72 / PER / 8

VARIATION OF AIRCRAFT WEIGHT WITH OPERATIONAL
WEIGHT EMPTY FOR 200 NM HIGH SPEED MISSION

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FORM 1746

Fig. 1

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APPENDIX I

The following are working performance curves of the Arrow 2, given in as general a form as possible, to enable the user to calculate additional mission profiles.

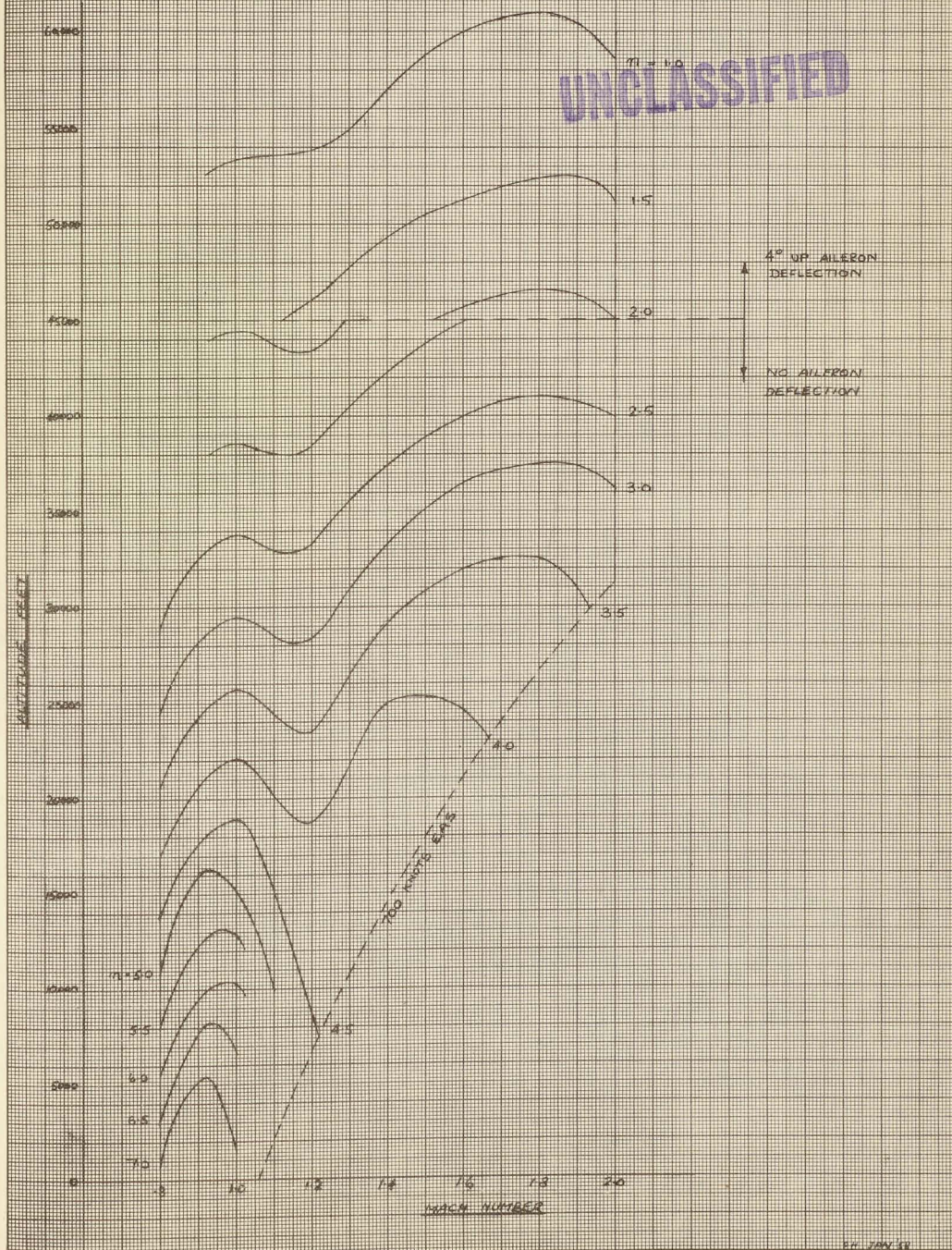
72/PERF/4

ARROW 2 MANOEUVRABILITY

AVAILABLE STEADY G'S AT COMBAT HEIGHT

MAX THRUST A/B LIT

COMBAT HEIGHT = 53796.16



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Fig. I-3

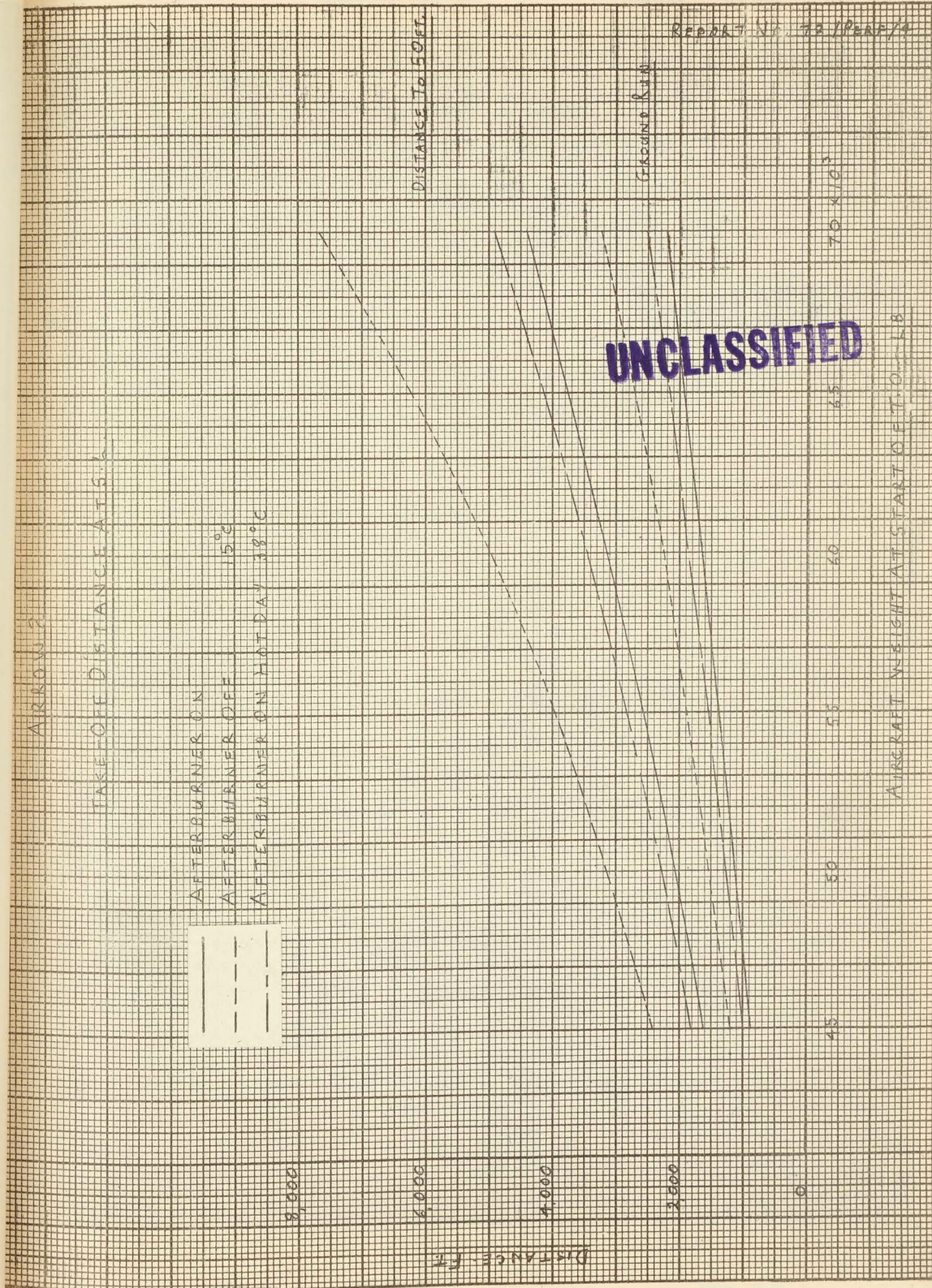


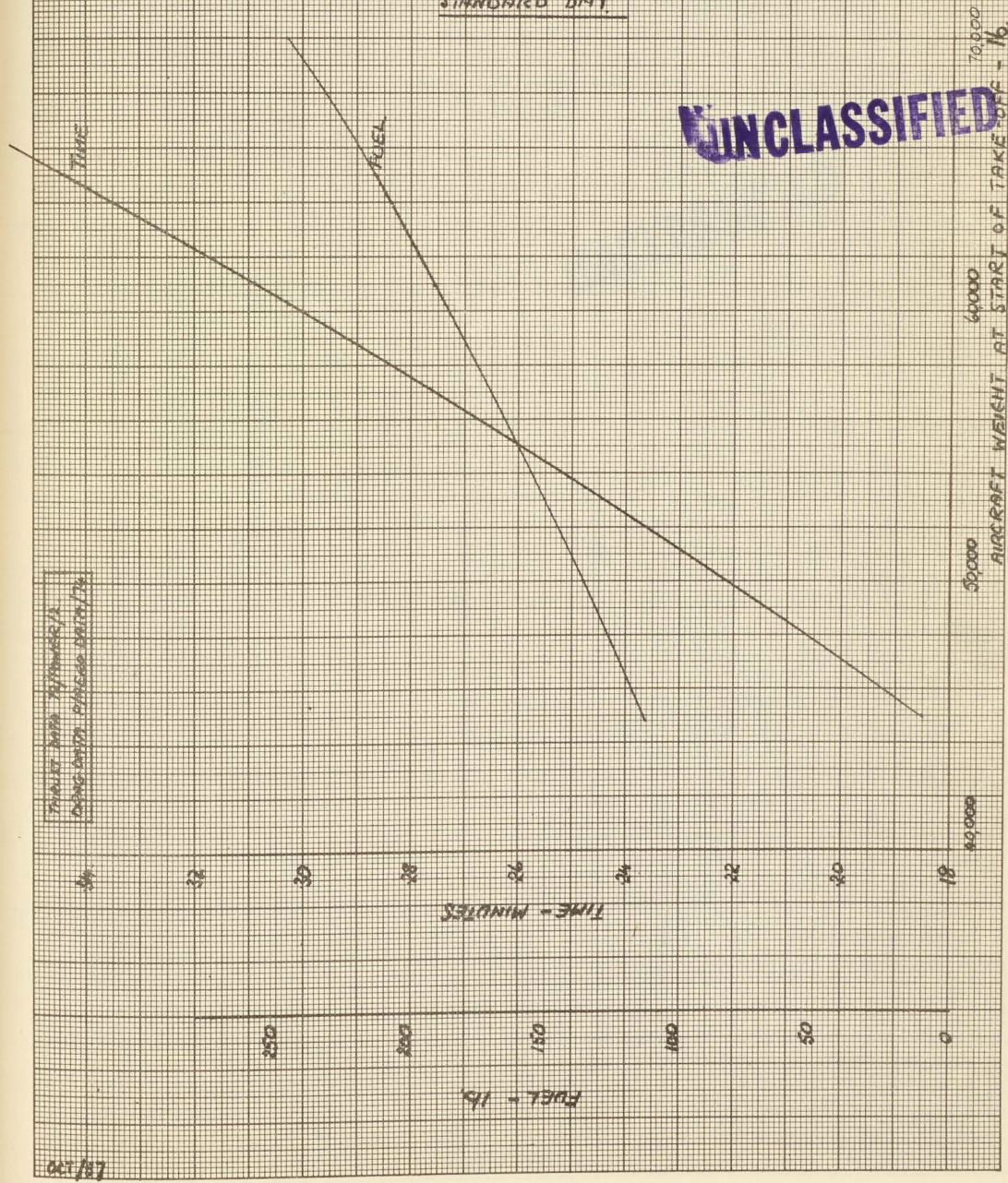
Fig. I-6

CF 106

TIME AND FUEL TO UNSTICK SPEED

PS 12 ENGINES AFTER BURNER UNLIT

STANDARD DAY



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Fig. I-7

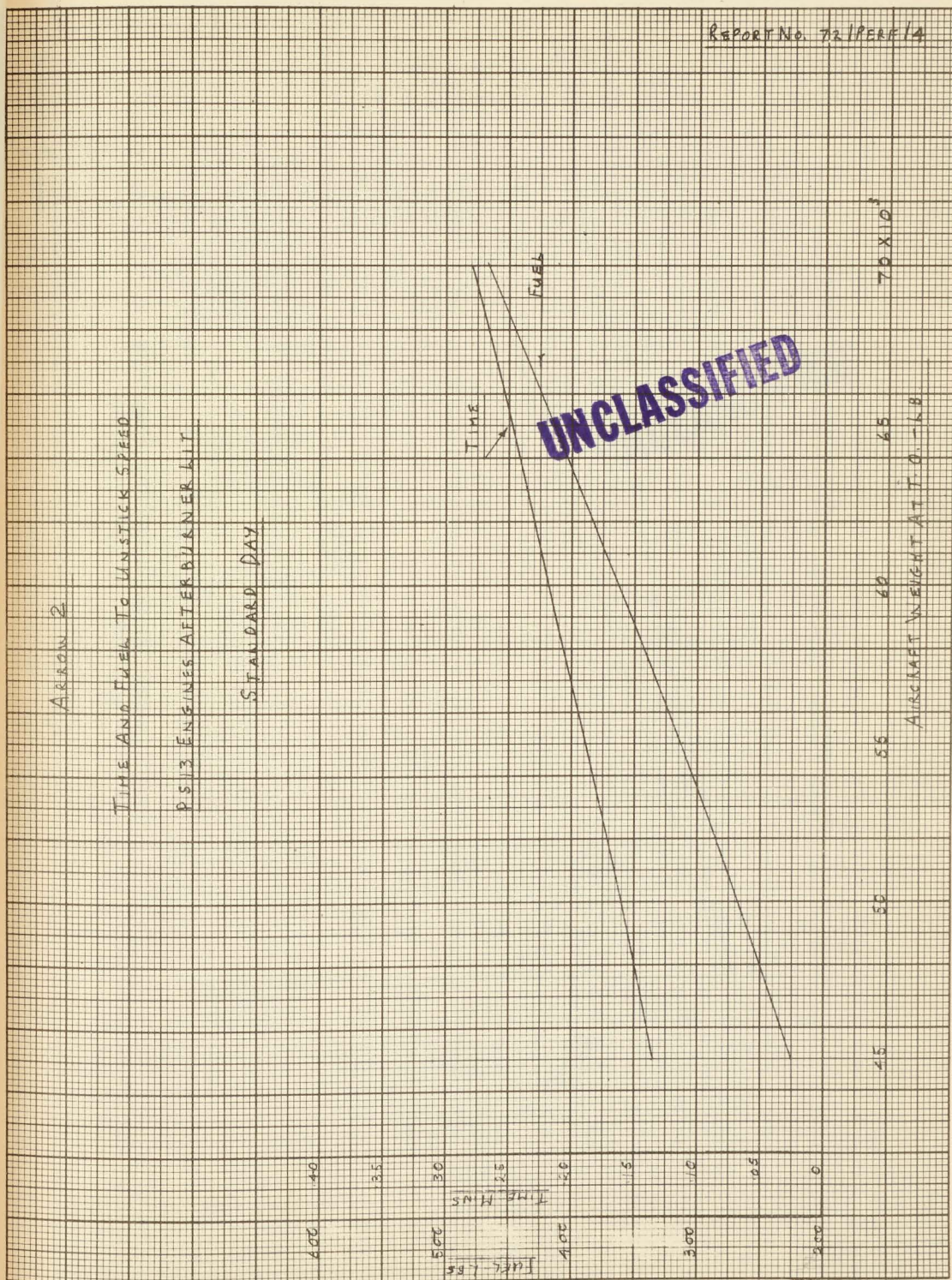


Fig. I-8

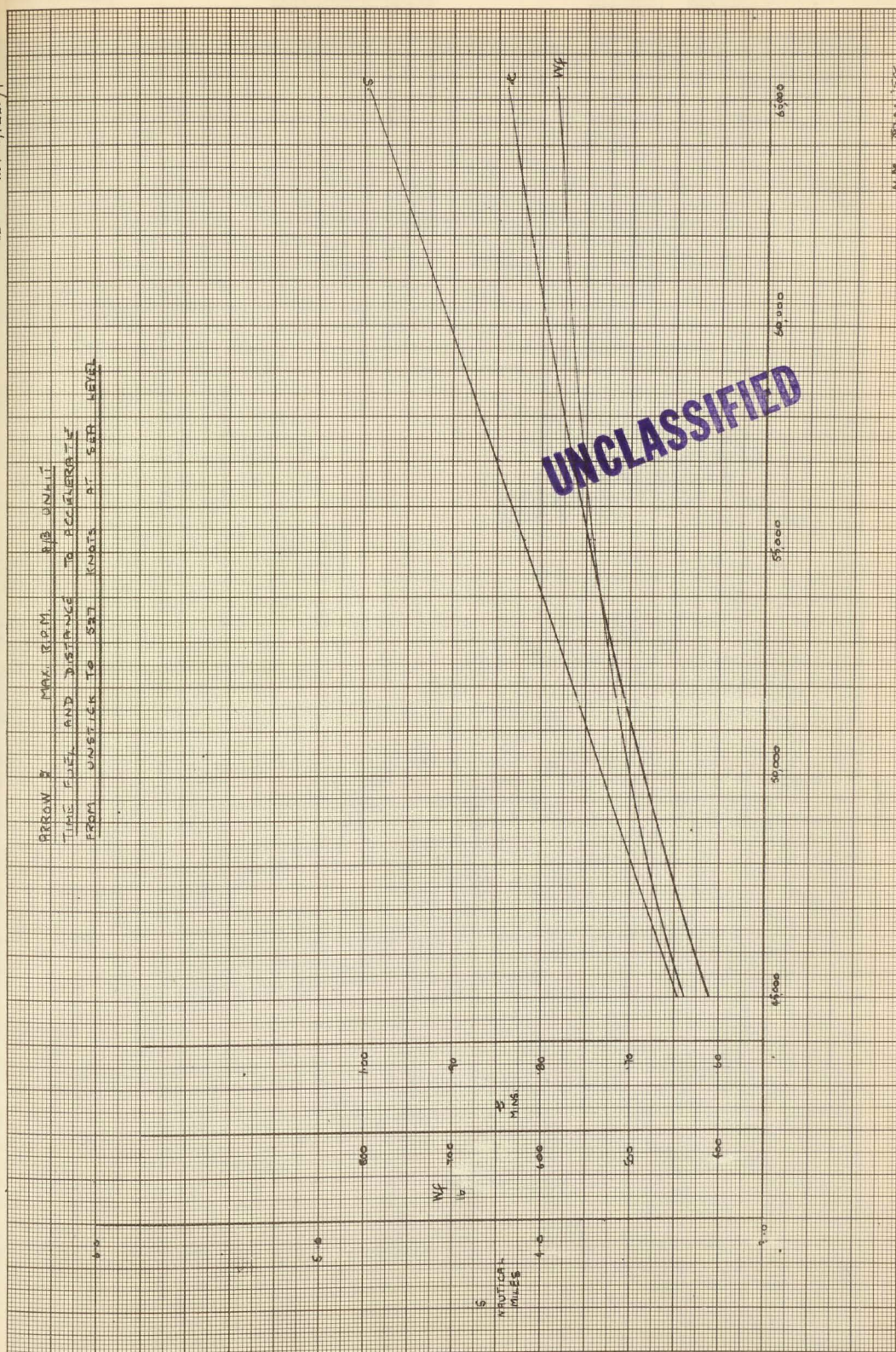


Fig. I-9

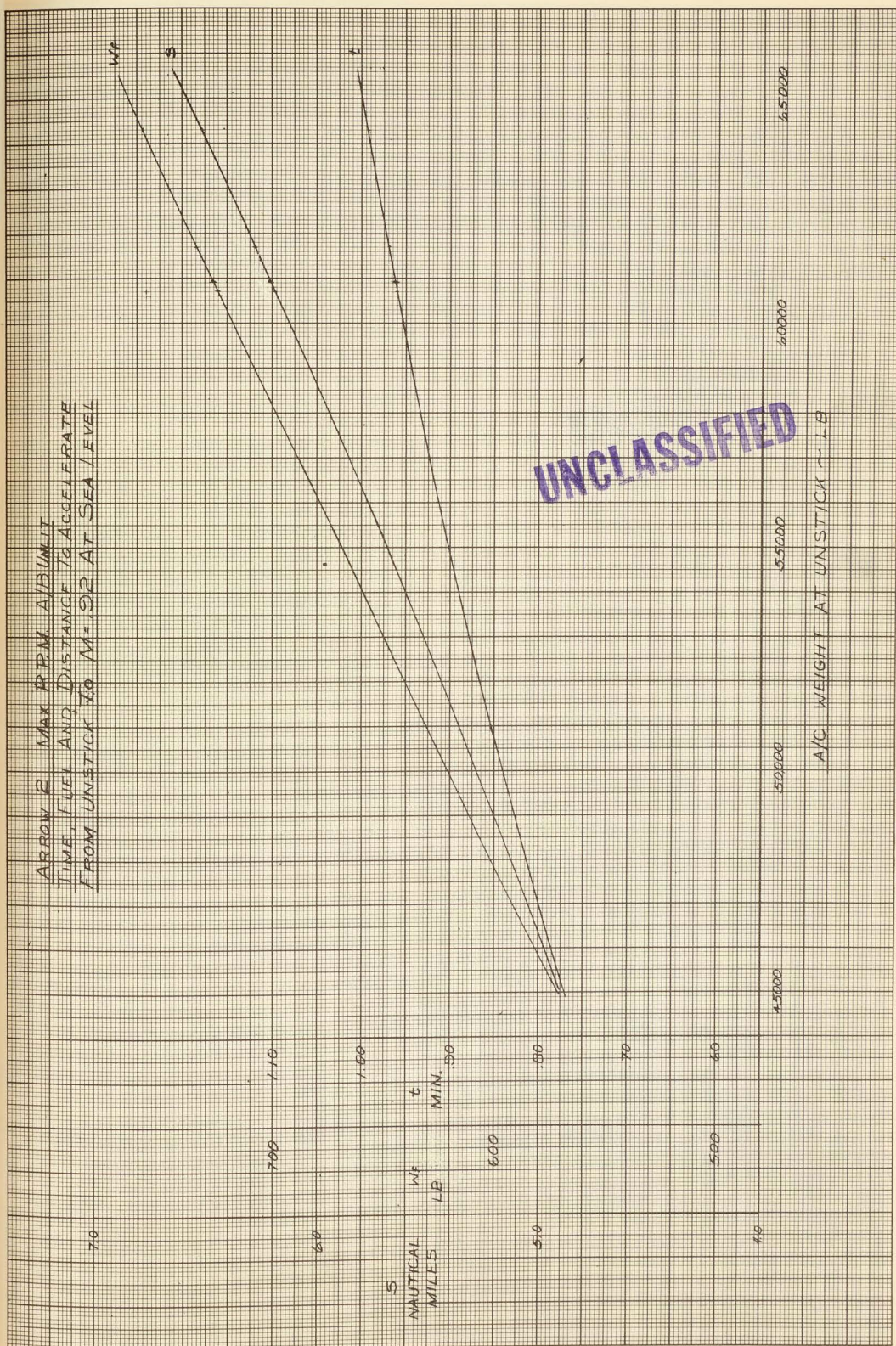
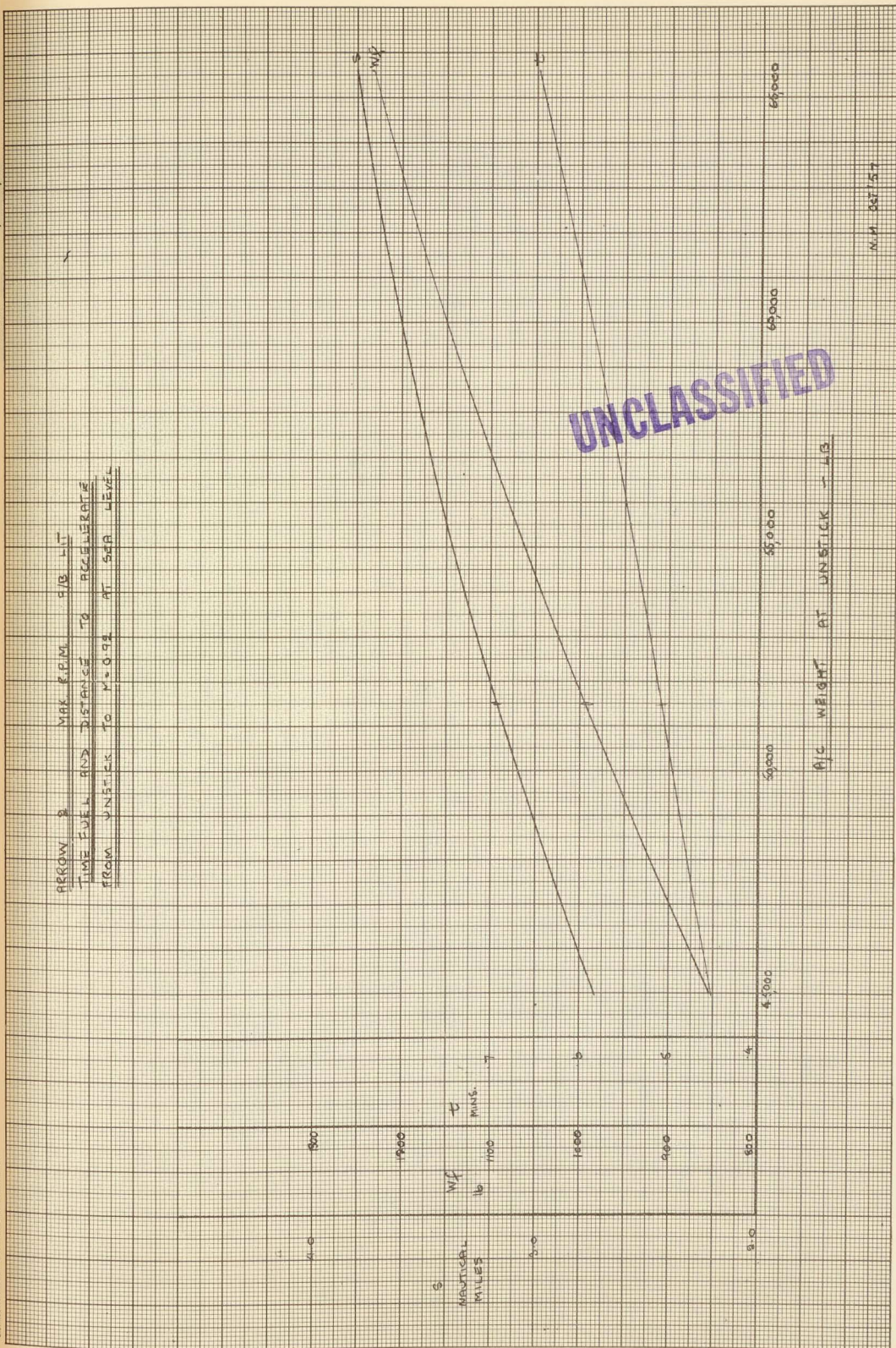


Fig. I-10

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Fig. I-11

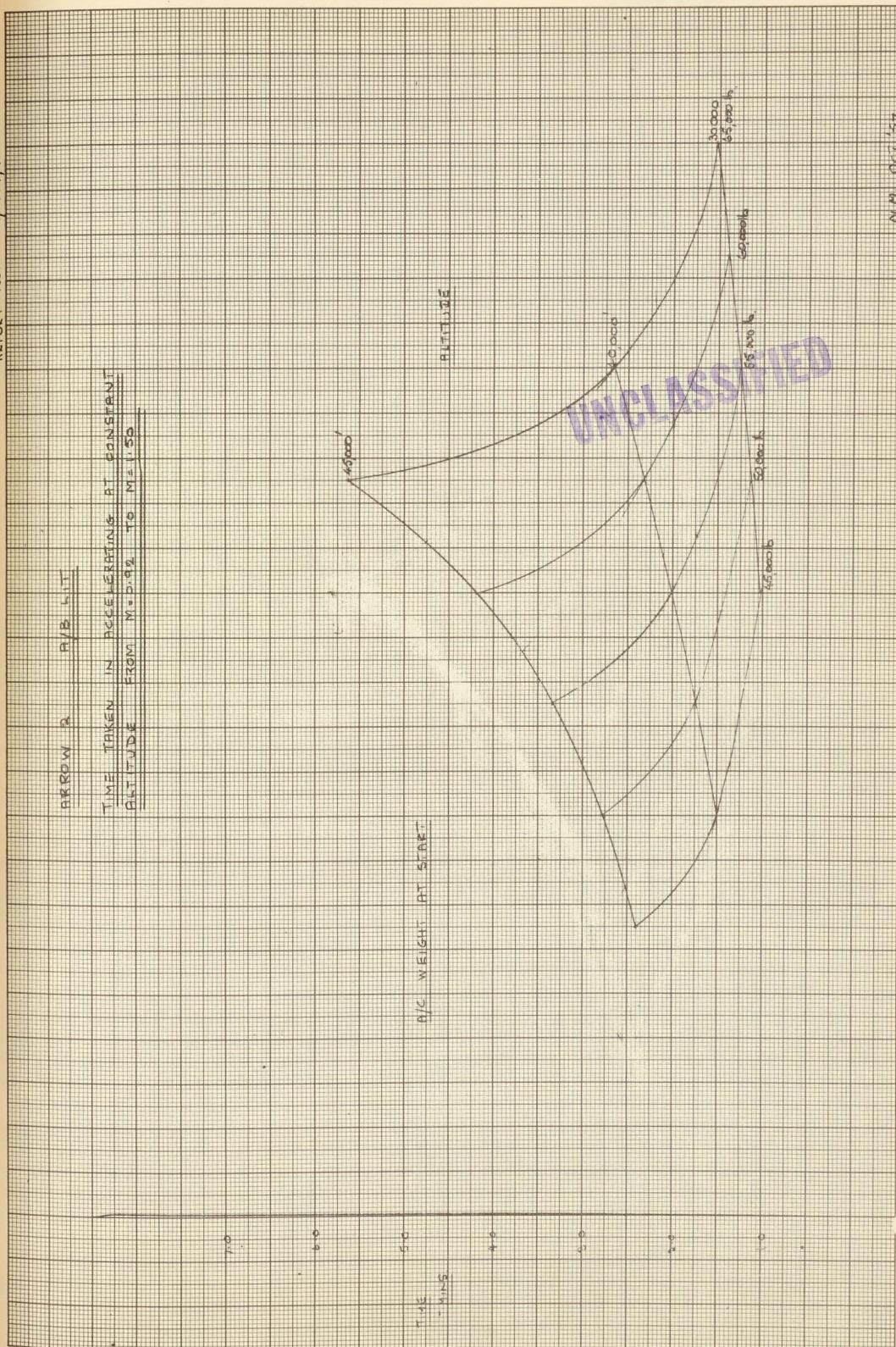
ARROW R. AIR LIT

TIME TAKEN IN ACCELERATING AT CONSTANT

ALTITUDE FROM $M=0.92$ TO $M=1.50$

A/C WEIGHT AT START

ALTITUDE



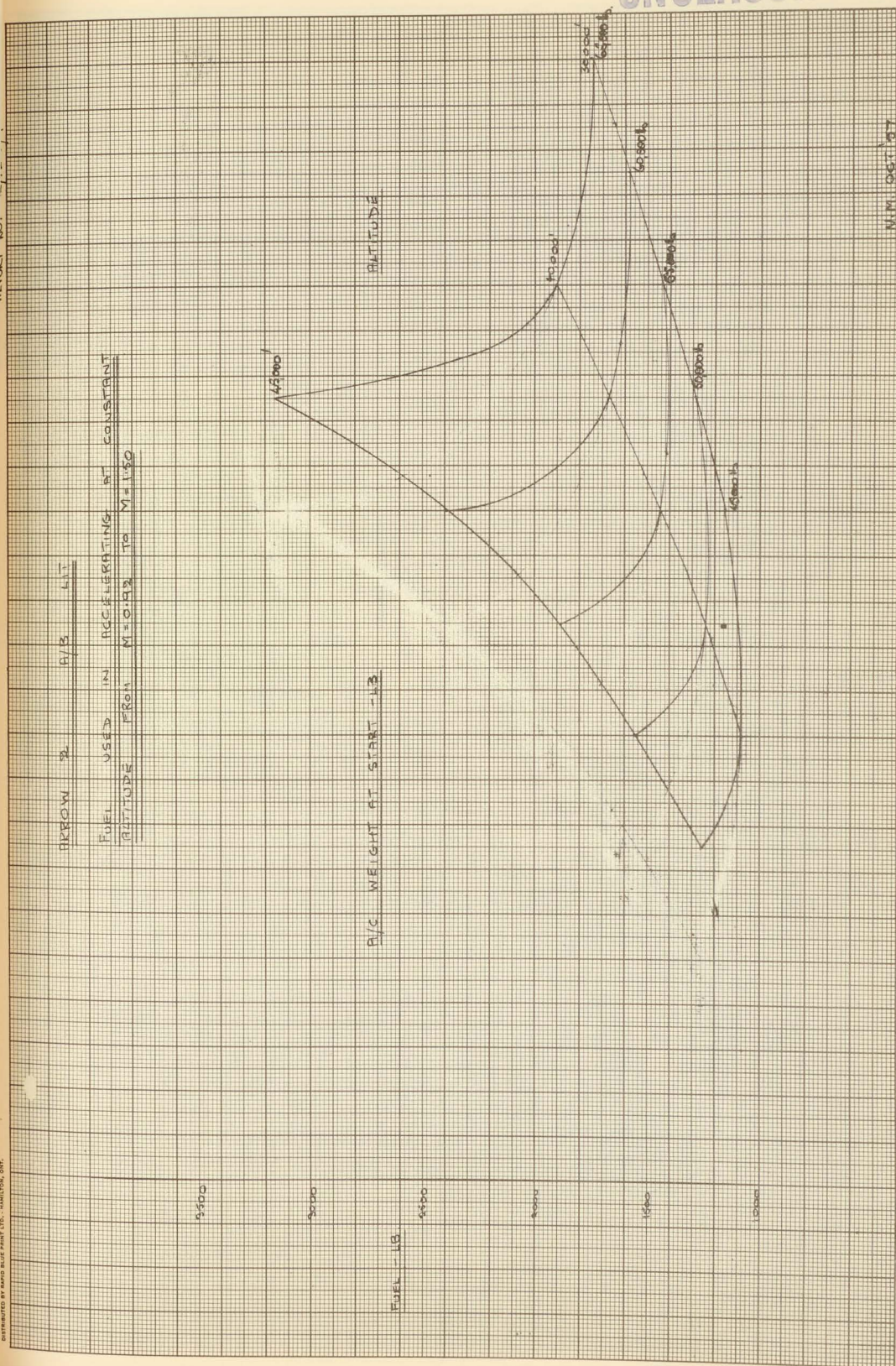
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Fig. I-12

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Fig. I-13

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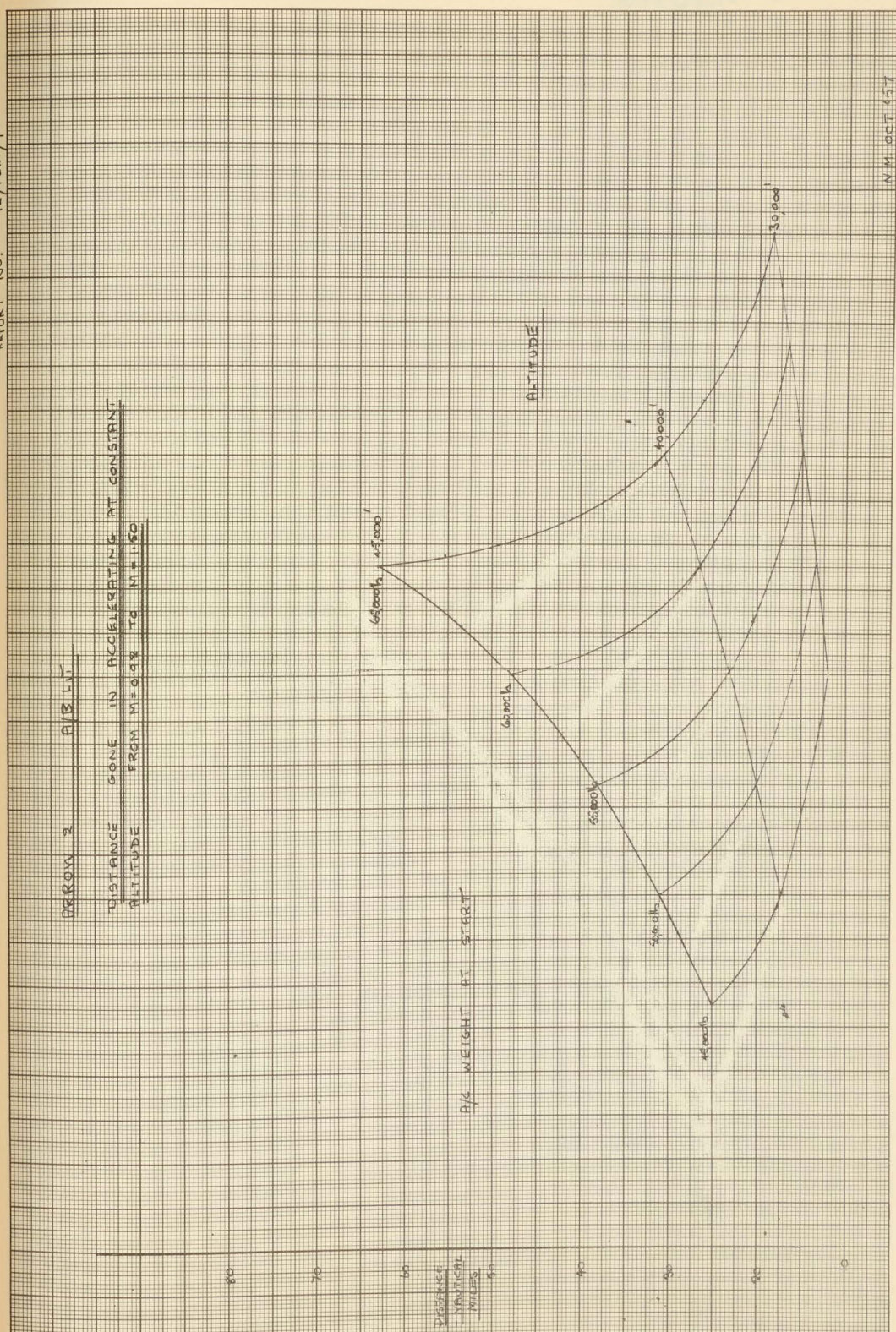
REPORT NO. 14/100-1

PROX 2 AIR IN

DISTANCE GONE IN ACCELERATING AT CONSTANT
ALTITUDE FROM M=0.8 TO M=1.50

1/4 WEIGHT AT START

ALTITUDE



NM OCT 157

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Fig. I-14

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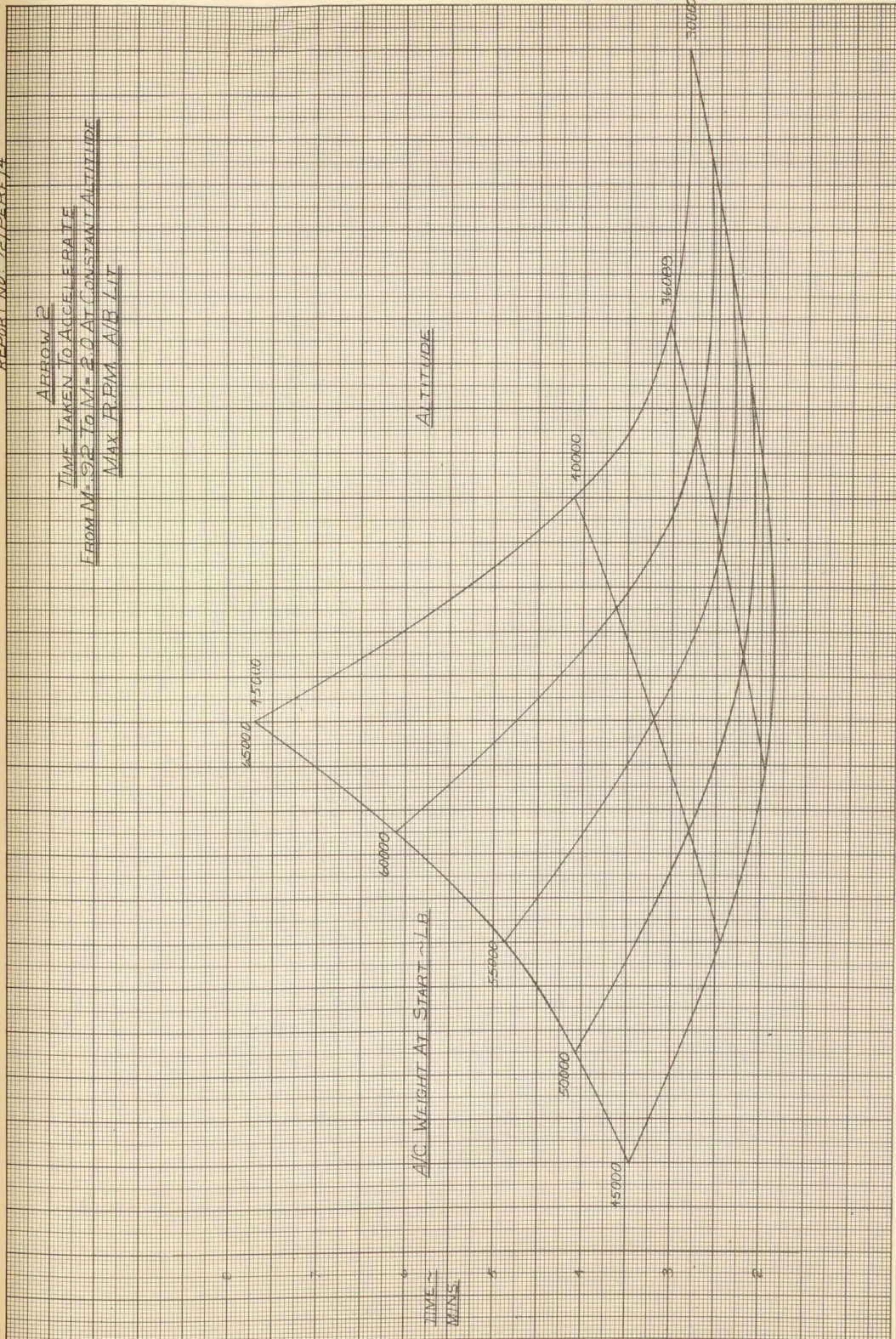
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ARROW 2

TIME TAKEN TO ACCELERATE

FROM M=50 TO M=8.0 AT CONSTANT ALTITUDE

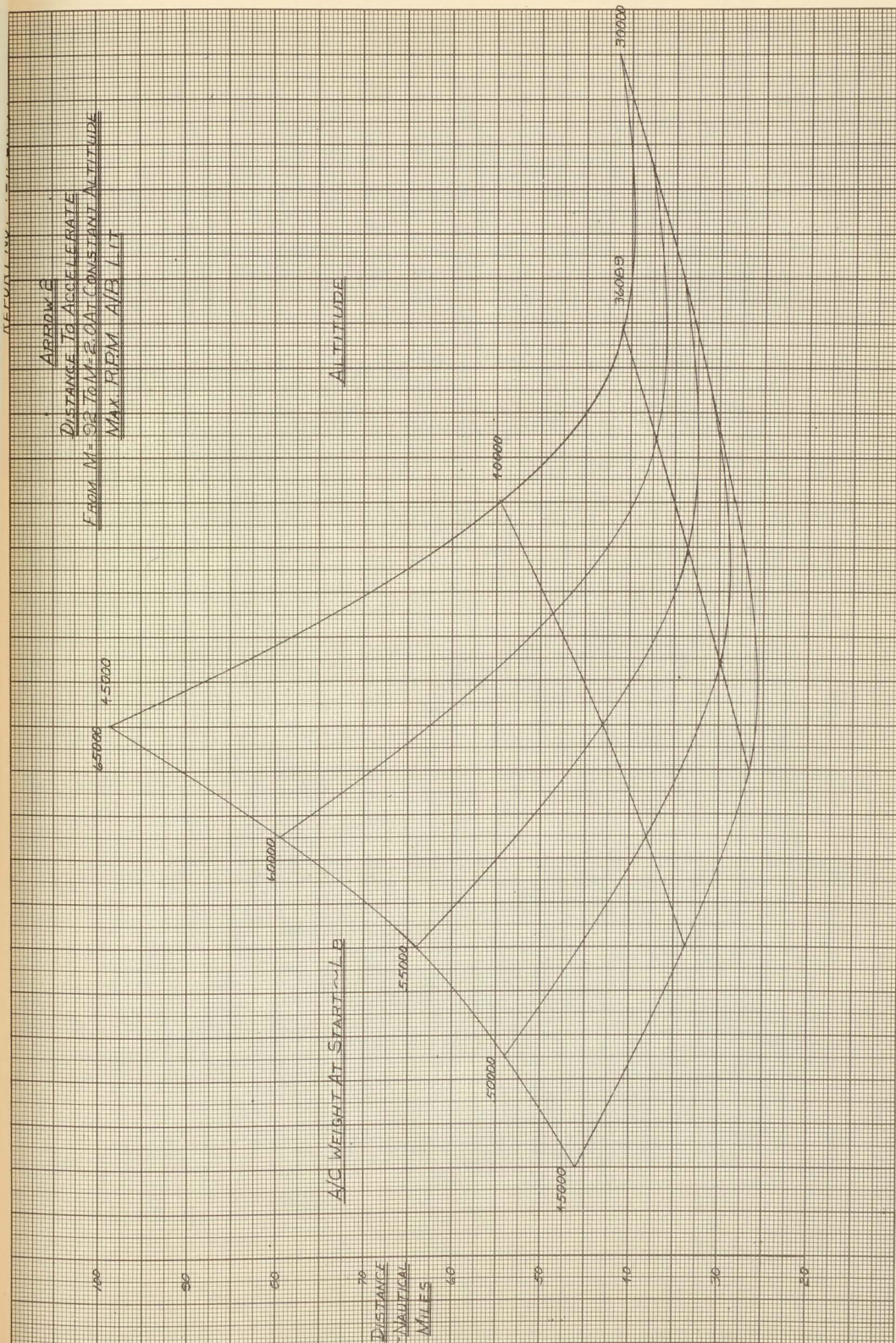
MAX RPM A/B 1/17



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Fig. I-15

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Fig. I-17

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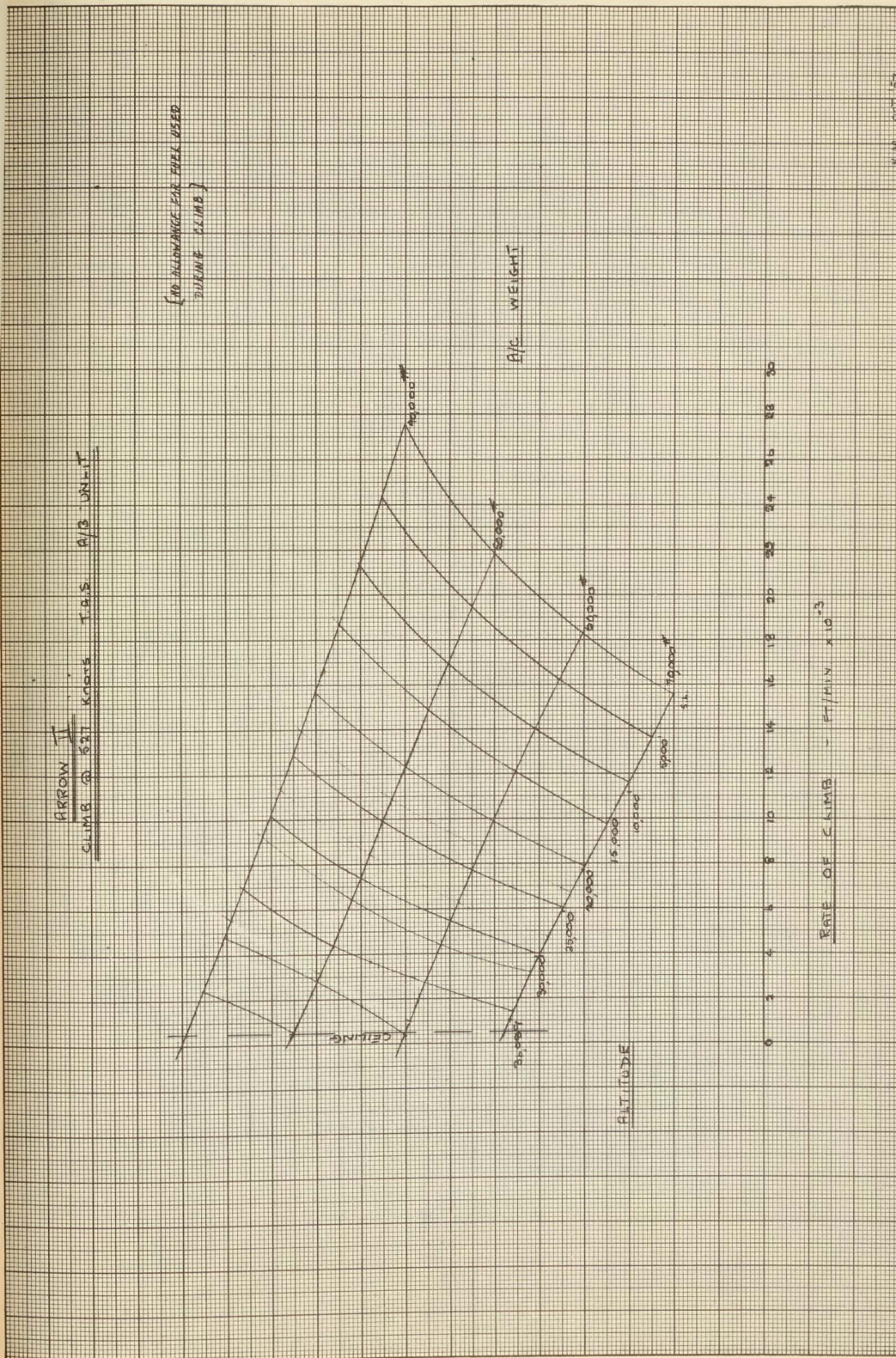


Fig. I-18

SECTION 2 CLIMB TO 50,000 FEET
STANDARD DAY

FUEL - WEIGHT WEIGHT

PIC WEIGHT
AT START
OF CLIMB

Altitude (ft)

Fuel - Pounds

10,000' 15,000' 20,000' 25,000' 30,000' 35,000' 40,000' 45,000' 50,000'

0 10,000 20,000 30,000 40,000 50,000

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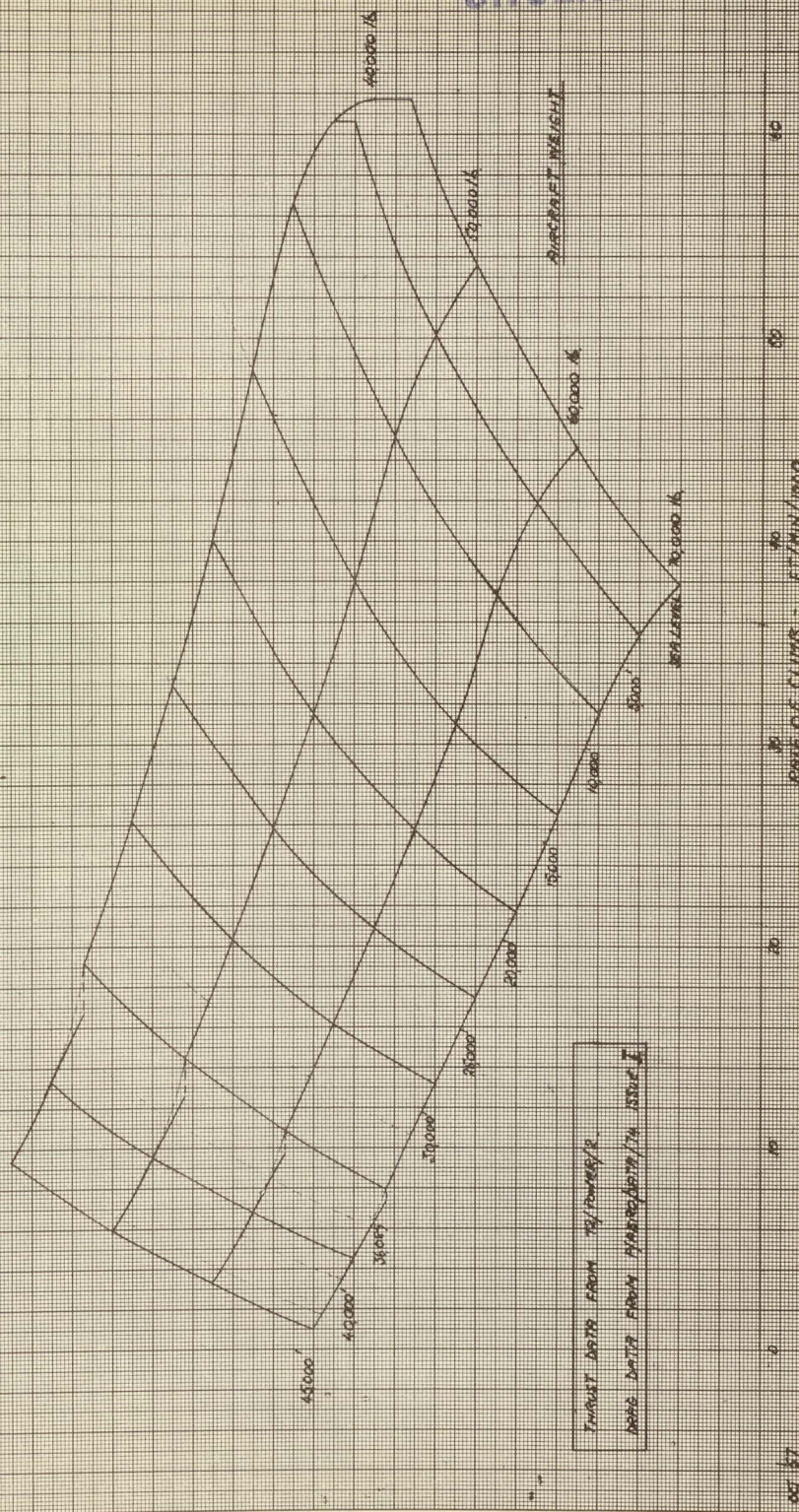
Fig. I-20

CA 106

RATE OF CLIMB AT CONSTANT MACH NUMBER OF 0.92

PS 13 ENGINES WITH MAXIMUM AFTERBURNER

(NO ALLOWANCE FOR FUEL USED DURING CLIMB)

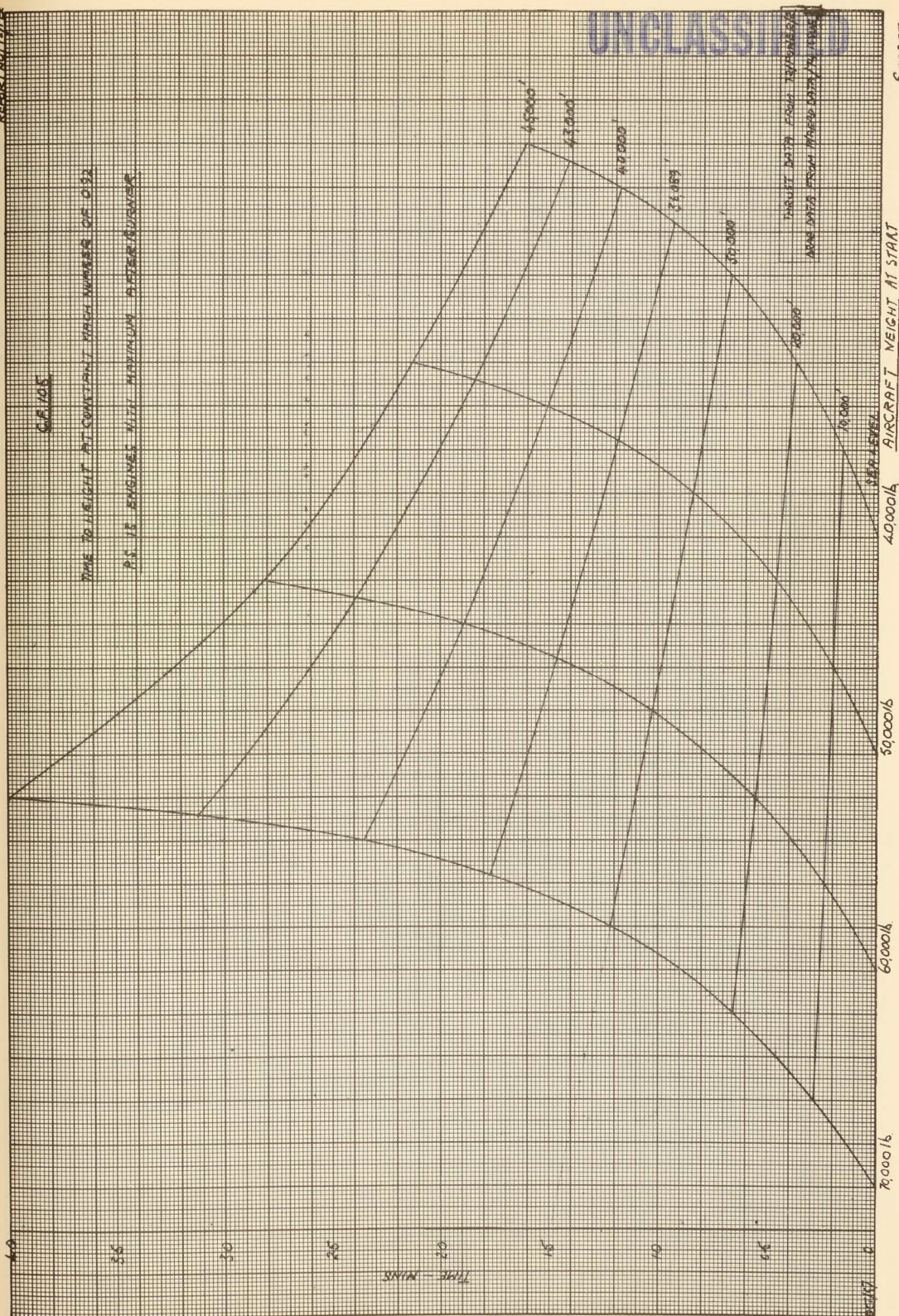


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Fig. I-22

REPORT NO. 70/18

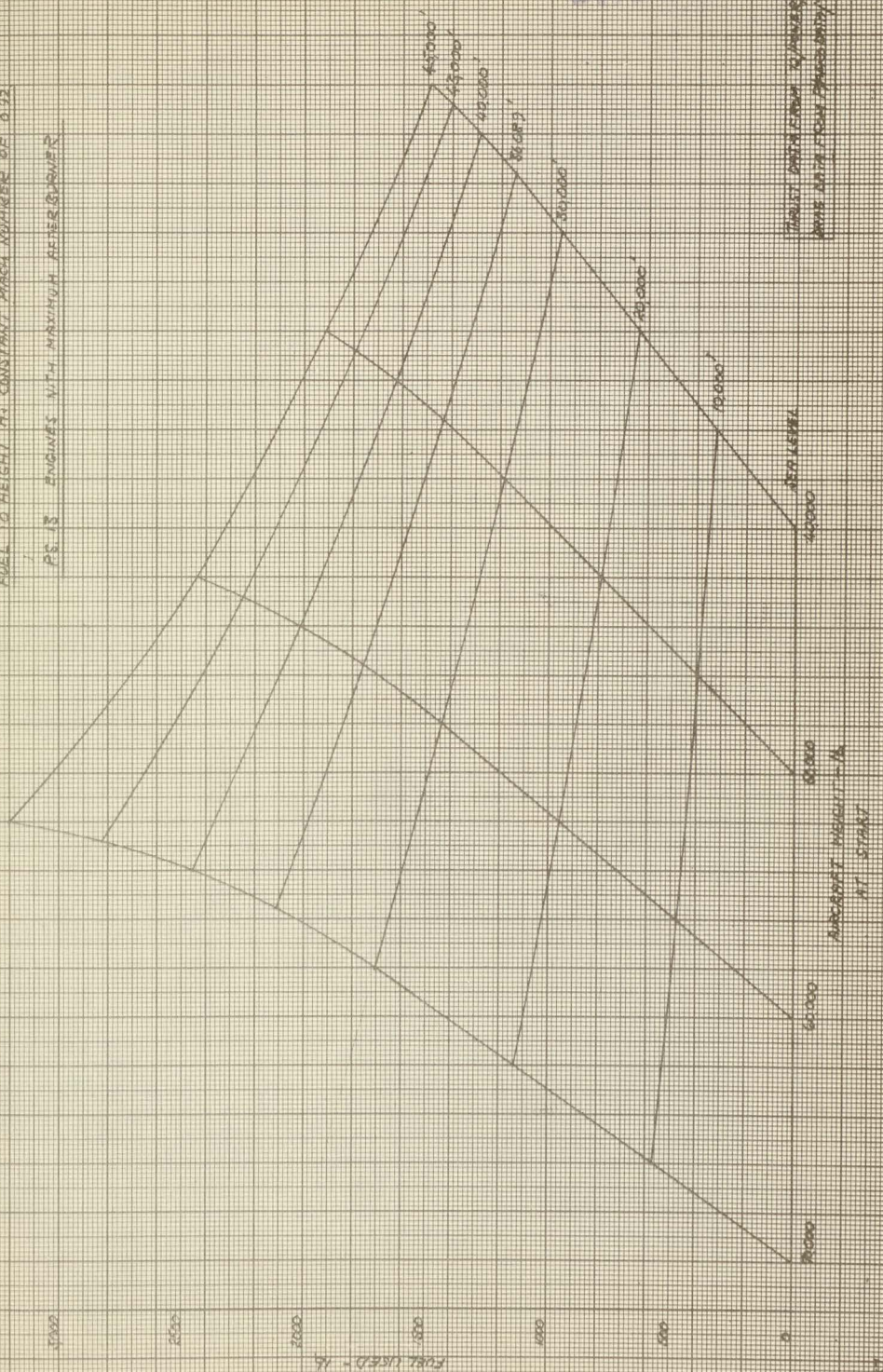


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Fig. I-23

FUEL TO HEIGHT AT CONSTANT MACH NUMBER OF 0.92

P8.13 ENGINES WITH MAXIMUM AFTERBURNING



1945-1946
1947-1948
1949-1950
1951-1952
1953-1954
1955-1956
1957-1958
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1961-1962
1963-1964
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2109-2110
2111-2112
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2197-2198
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2211-2212
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2239-2240
2241-2242
2243-2244
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2255-2256
2257-2258
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Abstract: Wadsworth, A.

47-57287

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Fig. I-24

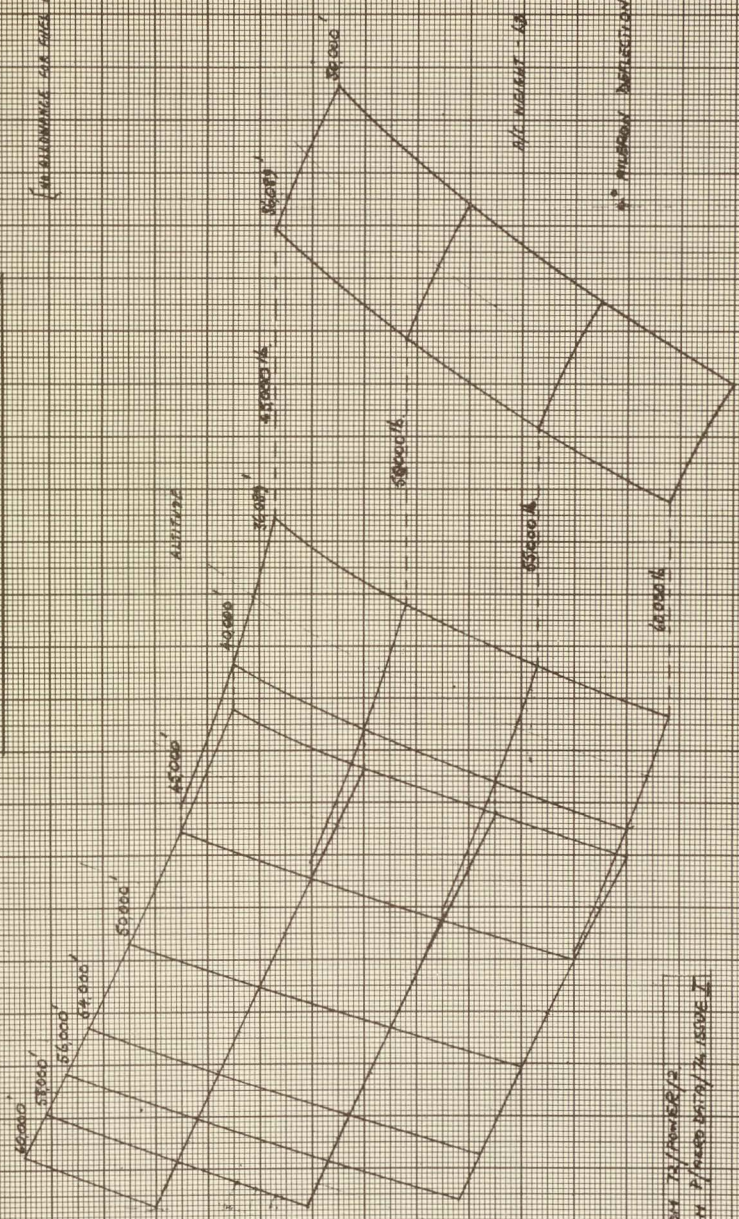
REPORT NO. 71-105

CA 105

DATE OF CLIMB AT CONSTANT MACH NUMBER OF 1.5

P-51 ENGINES WITH MAXIMUM AFTERBURNER

(UNUSABLE FOR FUEL USED DURING CLIMB)



THURST DATA FROM T-1 POWER/12
THURST DATA FROM P-51 DATA/12/10/14/16/18/20/22/24/26/28/30/32/34/36/38/40/42/44/46/48/50/52/54/56/58/60/62/64/66/68/70/72/74/76/78/80/82/84/86/88/90/92/94/96/98/100

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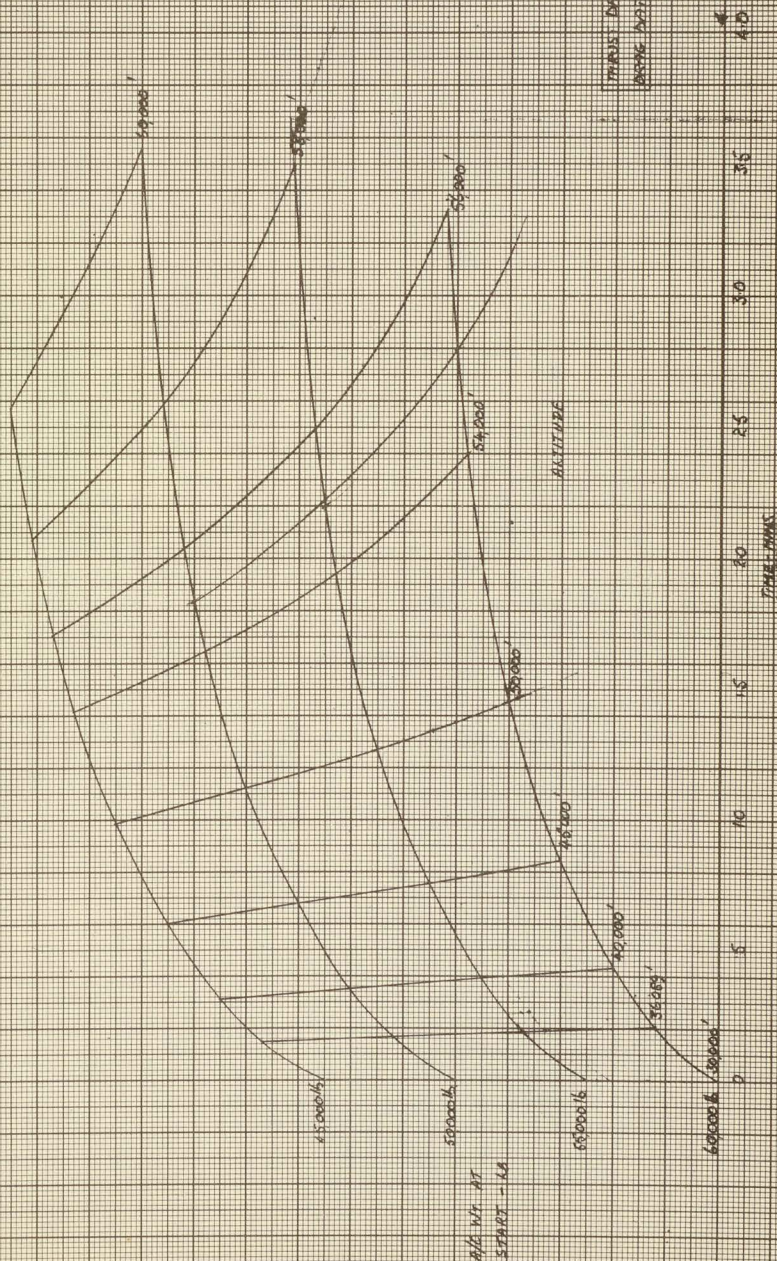
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Fig. I-26

C. A 106-

TIME TO HEIGHT AT CONSTANT MACH NUMBER OF 1.5

P.S. 13 ENGINES WITH MAXIMUM AFTERBURNER



THURS: DANCE FROM 12/20/2015-2/2

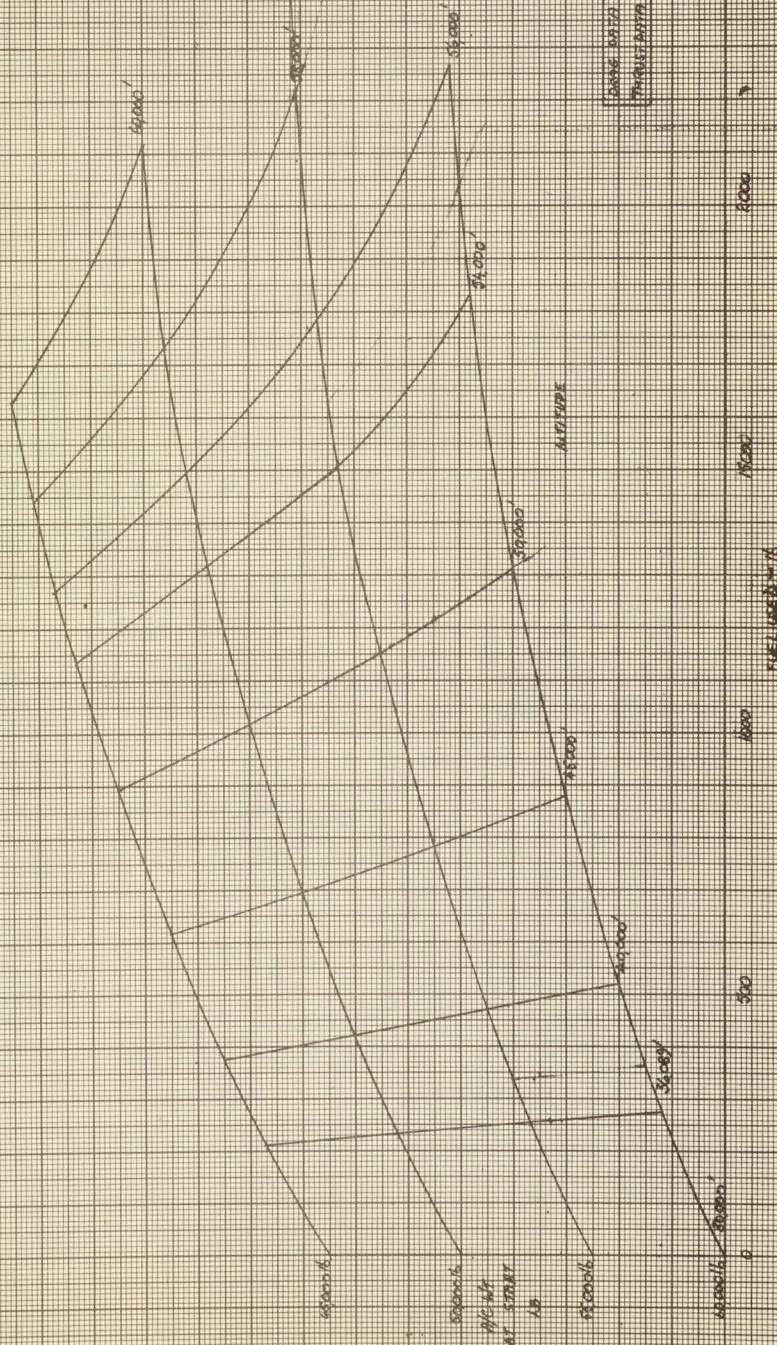
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Fig. I-27

CF 105

FUEL TO HEIGHT AT CONSTANT MACH NUMBER OF 15

OS 18 ENGINES WITH MAXIMUM AFTERBURNER



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DATE DATA FROM P/MECHANICAL UNIT
THURSDAY 5000 7/1/82

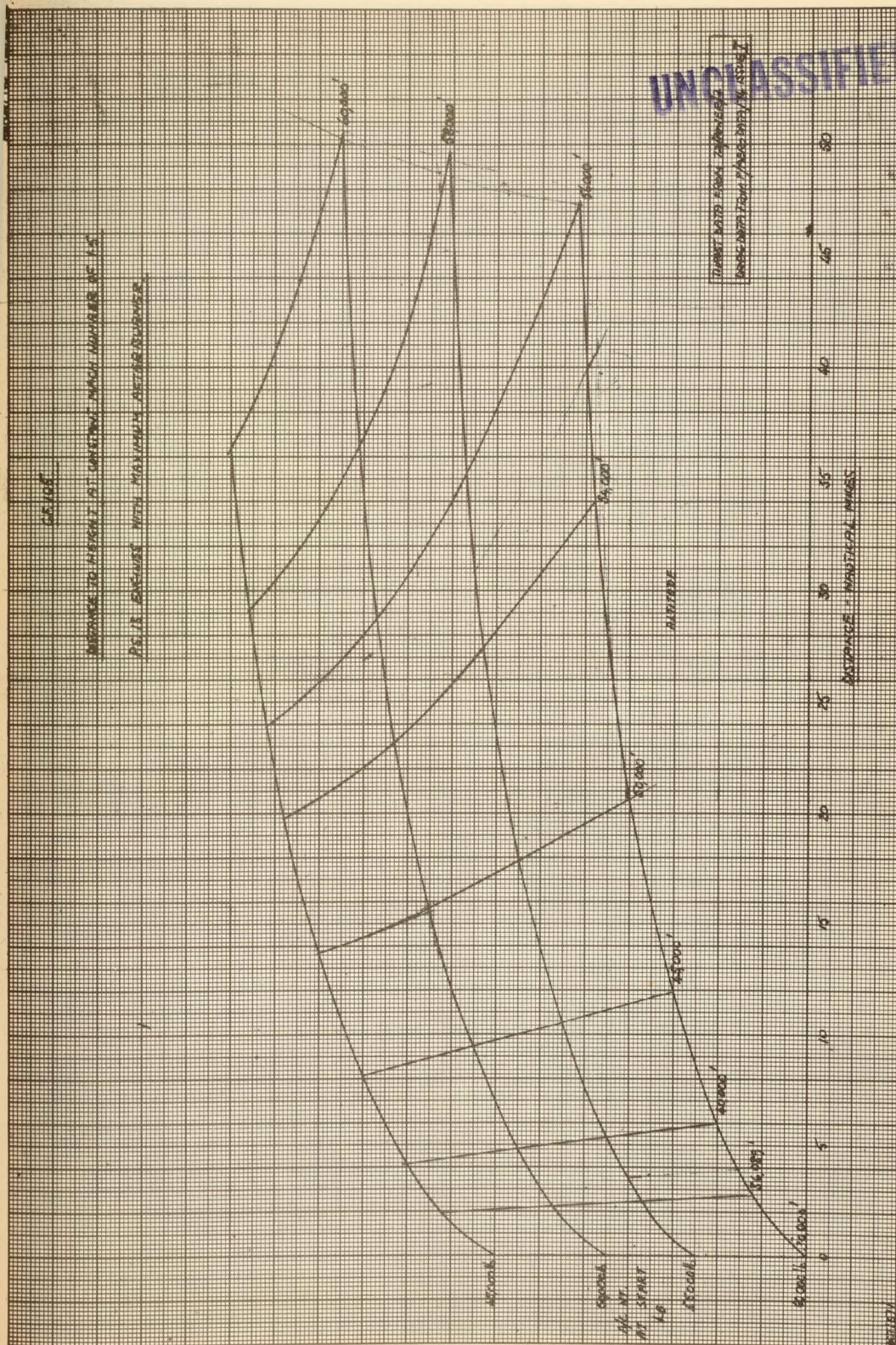
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Fig. I-28

Dec 18, 1962

DISTANCE TO HAVENOT AT CONSTANT WIND NUMBER OF 1.5

Dec 18, 1962



THURST WATER FROM TAPWATER
DOES NOT HAVE A HIGH CONTENT

75000 N. HALL RD. / D. WELLS DR. / DORR

ALFRED

SYSTEME - MECHANISME

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Fig. I-29

FIGURE 2

RATE OF CLIMB AT CONSTANT WING NO. OF 0.10

P.5.13 ENGINES WITH MAX AFTERBURNER

(NO ALLOWANCE FOR FUEL USED TURNING CLIMB)

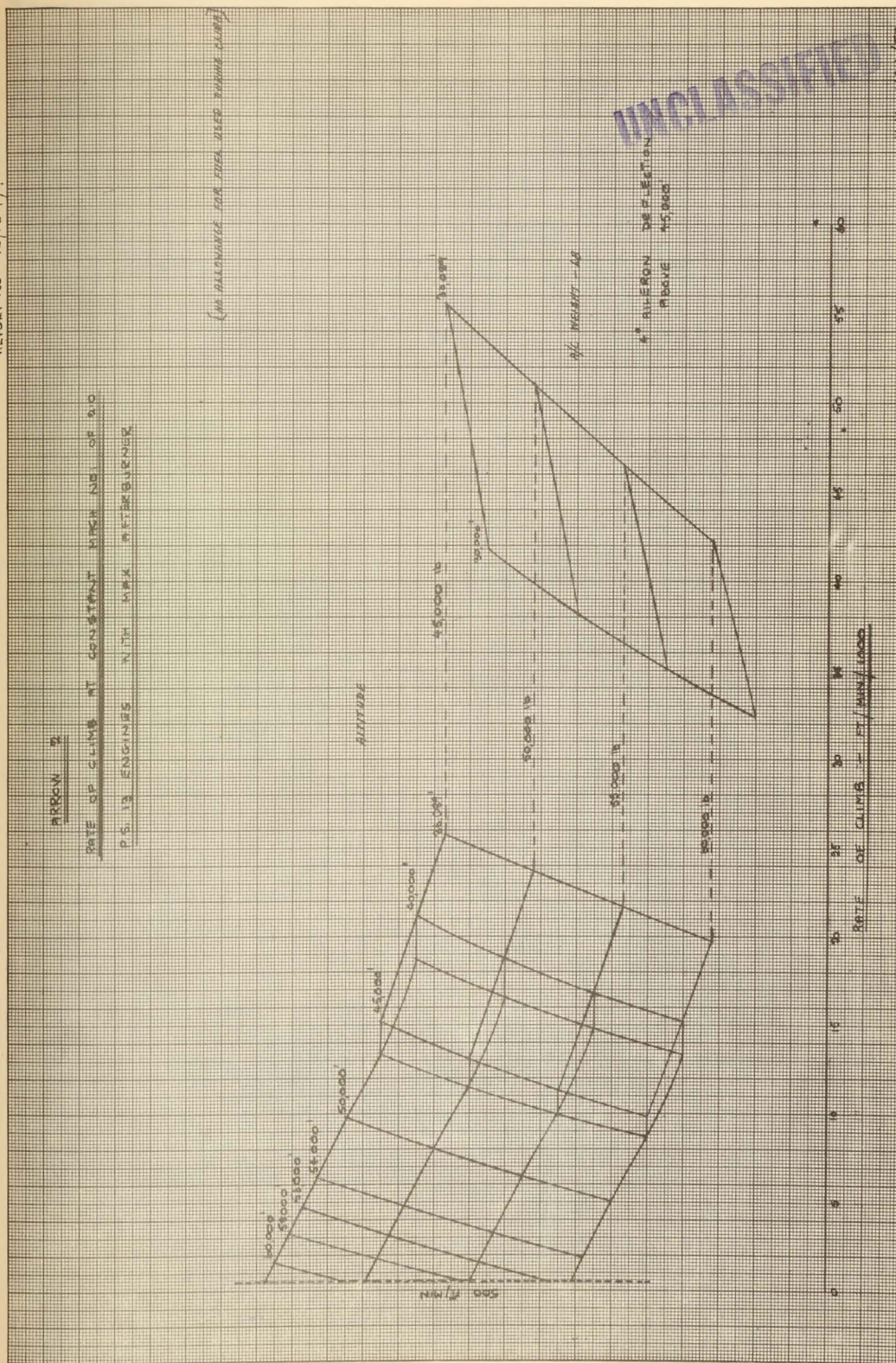
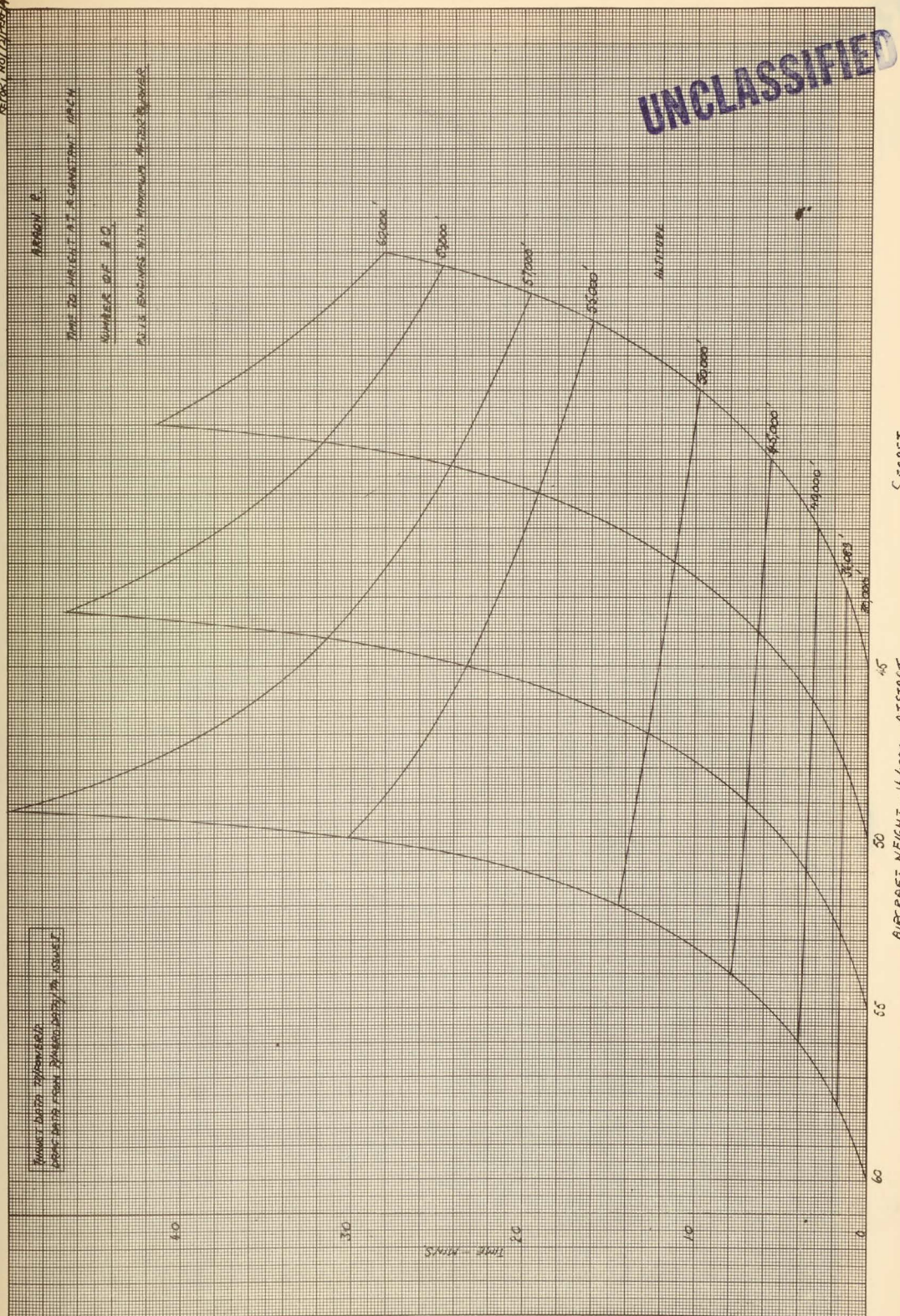


Fig. I-30

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Fig. I-31

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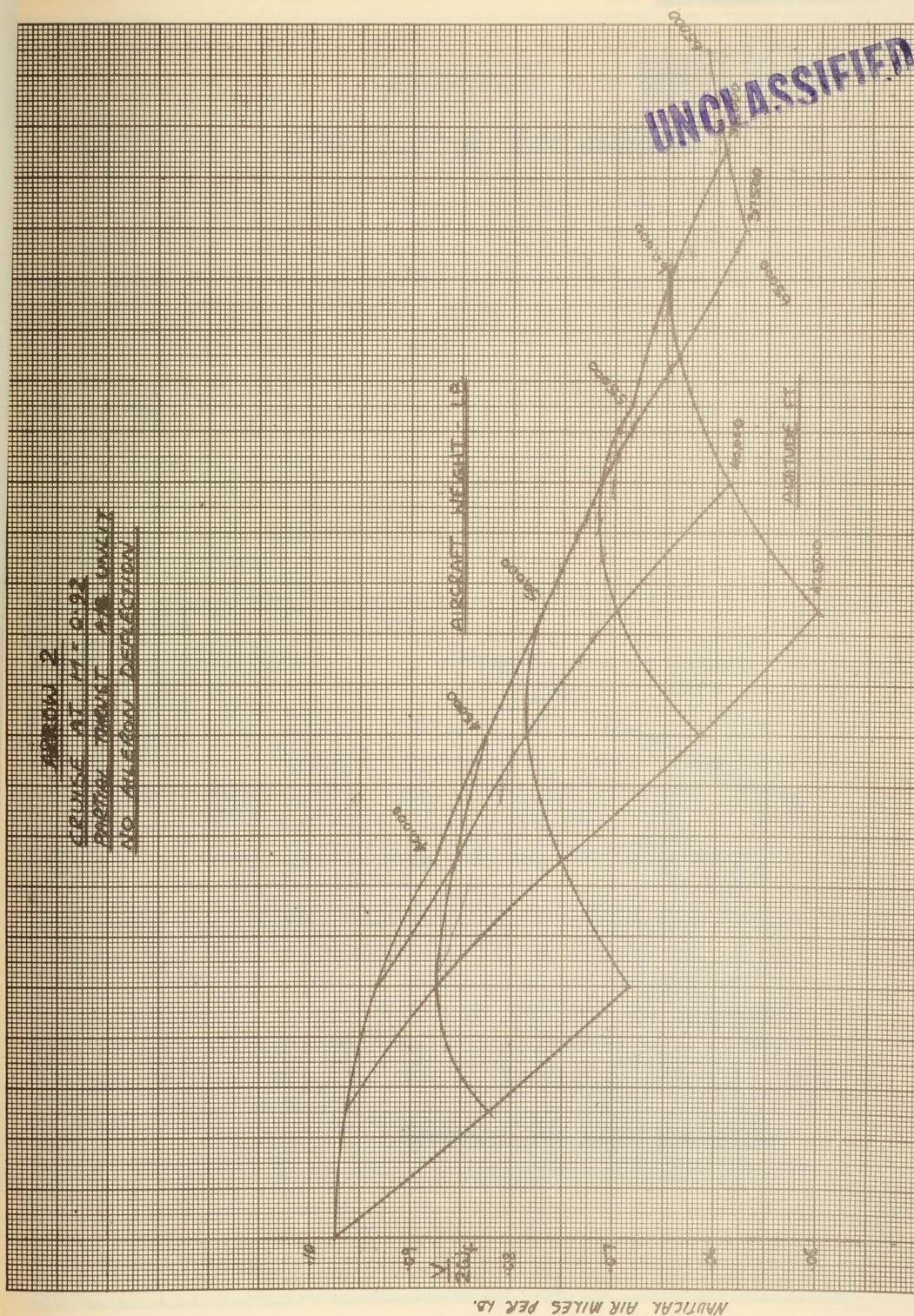


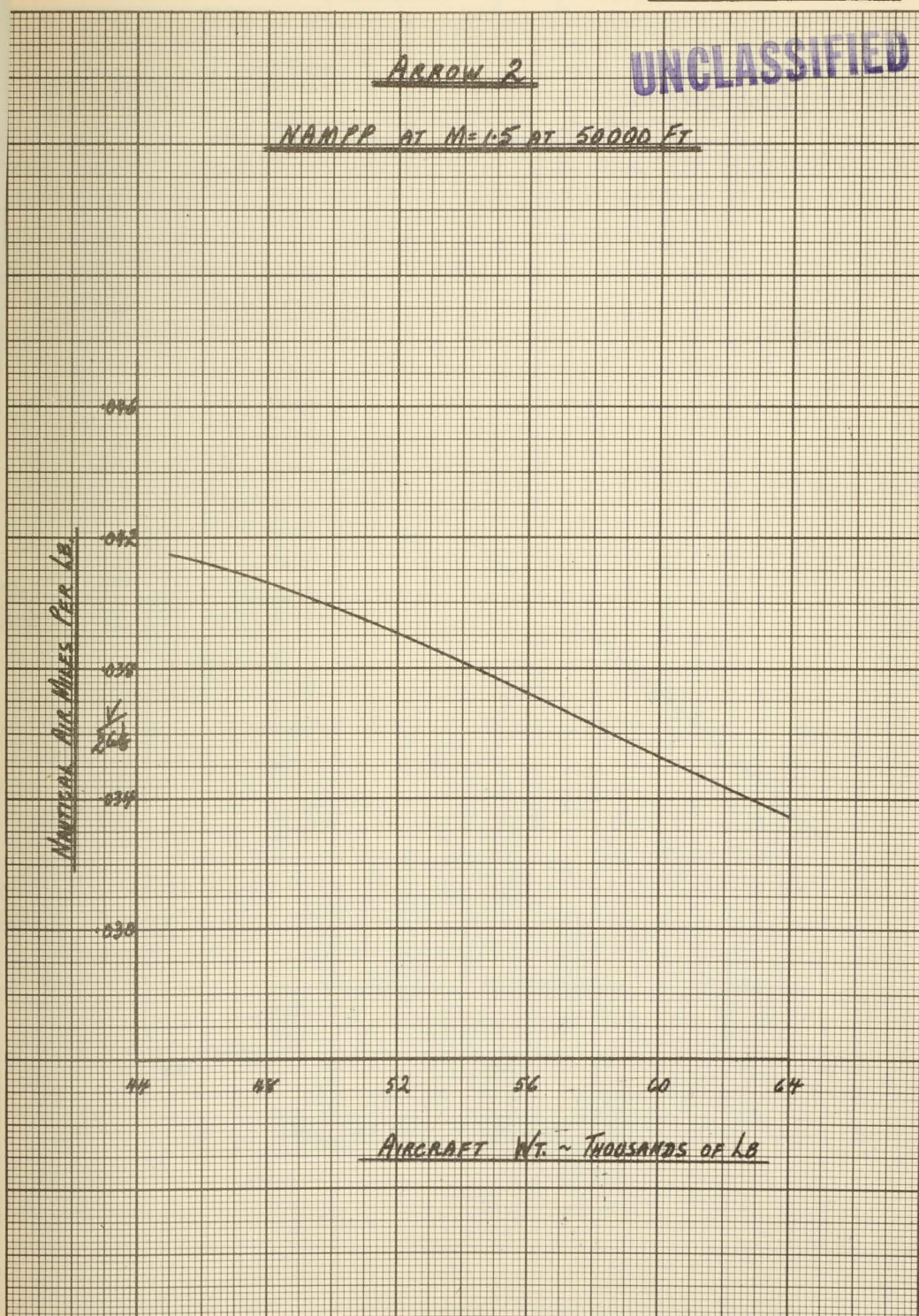
Fig. I-34

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ARROW 2

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NAMPP AT M=1.5 AT 50000 FT



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Fig. I-35

ARROW 2

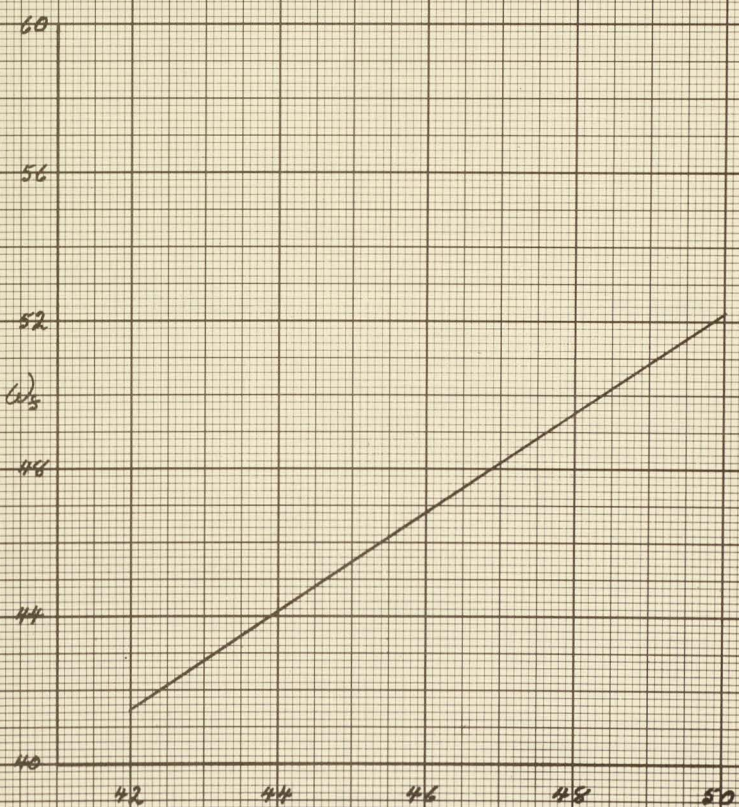
LOITER FUEL FLOW

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H_P = 42000 FT

[MAX ENDURANCE SPEED APPROX. CONST. $M = 0.88$]

FUEL FLOW PER ENGINE - LB/MIN



A/C Wt. - THOUSANDS OF LB.

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Fig. I-37

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ARROW 2

Loiter at Sea Level

Maximum endurance at sea level occurs at $M \approx 0.4$.

Fuel flow at maximum endurance = 70 lb./min./engine.

Taxi fuel consumption

Taxi should normally be done with idling r.p.m.

Idling low pressure rotor speed, $N_L = 2150$.

Idling fuel flow at sea level static conditions
from AVR-EMS-8, Issue 2 = 33.3 lb./min./engine.

