

QC 40
Auro
C-105
P/AD/54

QC X
Auro
CF105
P-AD-54

20

FILE IN VAULT

C-105 P/Aero Data/54

~~UNCLASSIFIED~~
LATERAL STABILITY DERIVATIVES

IN 2 'G' FLIGHT ANALYZED

WING NOTCHED AND EXTENDED

Copy 6

April 1955 20



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TO

DATE

Report no.: QCX - AVRO - CF105 - P-AD-54

has been downgraded to: _____

de-classified

by (Name): Michel W. Drapeau

(Dept.): A/DND Coordinator, Access to Information

Date: Dec. 7, 1992

B. Auger
Signature



A. V. ROE CANADA LIMITED
MALTON - ONTARIO

UNCLASSIFIED

TECHNICAL DEPARTMENT (Aircraft)

AIRCRAFT:

REPORT NO. P/AERO DATA/54

FILE NO.

NO. OF SHEETS: _____

TITLE

ANALYZED

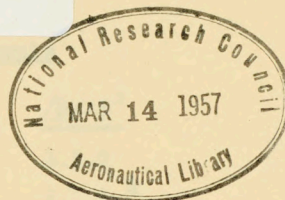
C-105

LATERAL STABILITY DERIVATIVES

IN 2 "G" FLIGHT

WING NOTCHED AND EXTENDED

confirmed as:
Classification ~~cancelled / changed to:~~ UNCLASSIFIED
By authority of: DRDA 7/DARFT 5-8/DAS ENR 6-4-5
Date: 5 Nov 1992
Signature: B. Aubrey
Unit / Rank / Appointment: DSFS 3, Secretary CRAD HQ DRP



PREPARED BY

DATE April 1955

CHECKED BY

DATE

SUPERVISED BY

DATE

APPROVED BY

DATE

45125

ISSUE NO	REVISION NO	REVISED BY	APPROVED BY	DATE	REMARKS

FORM 1316A

12422588



AIRCRAFT: _____

PREPARED BY _____

DATE _____

CHECKED BY _____

DATE _____

INDEX

C-105

**UNCLASSIFIED
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LATERAL STABILITY DERIVATIVES

IN 20' FLIGHT

	<u>Section</u>				
1. <u>Aileron Derivatives and Hinge Moments</u>					
$C_{l\delta a}$ *	1.1				
$C_{N\delta a}$	1.2				
* $C_{y\delta a}$	1.3				
C_{no} *	1.4				
C_{nd}	1.5				
$C_{n\delta}$	1.6				
2. <u>Rudder Derivatives and Hinge Moments</u>					
	<table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;"><u>$\beta < 3^\circ$</u></td> <td style="text-align: center;"><u>$\beta > 3^\circ$</u></td> <td></td> </tr> </table>		<u>$\beta < 3^\circ$</u>	<u>$\beta > 3^\circ$</u>	
	<u>$\beta < 3^\circ$</u>	<u>$\beta > 3^\circ$</u>			
$C_{N\delta_r}$ ($\delta_R < 10^\circ$)	2.1.1	2.1.2	2.1		
($\delta_R > 10^\circ$)	2.1.3	2.1.4 *			
$C_{l\delta_r}$ ($\delta_R < 10^\circ$)	2.2.1) 2.2.2	2.2		
($\delta_R > 10^\circ$)	2.2.3				
$C_{y\delta_r}$ ($\delta_R < 10^\circ$)	2.3.1	2.3.2	2.3		
($\delta_R > 10^\circ$)	2.3.3 *	2.3.4 *			
$C_{n\beta}$ *			2.4		
$C_{n\delta}$ *			2.5		

* Derivative independent of Angle of Attack.



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DATE

3. Sideslip Derivatives

	<u>$\beta < 3^\circ$</u>	<u>$\beta > 3^\circ$</u>	
$C_{N\beta}$	3.1.1	3.1.2	3.1
$C_{l\beta}$		3.2.1	3.2
$C_{y\beta}$	3.3.1	3.3.2 *	3.3

UNCLASSIFIED
NON CLASSIFIE4. Yawing Derivatives

	<u>$\beta < 3^\circ$</u>	<u>$\beta > 3^\circ$</u>	
C_{N_r}	4.1.1	4.1.2	4.1
C_{l_r}	4.2.1	4.2.2	4.2
C_{y_r}	4.3.1	4.3.2	4.3

5. Rolling Derivatives

	<u>$\beta < 3^\circ$</u>	<u>$\beta > 3^\circ$</u>	
C_{N_p}	5.1.1	5.1.1	5.1
C_{l_p} *		5.2.1 *	5.2
C_{y_p}	5.3.1	5.3.1	5.3

* Derivatives independent of Angle of Attack

P/AD154

1.2

P/Slab 75

GSH

6.1.2

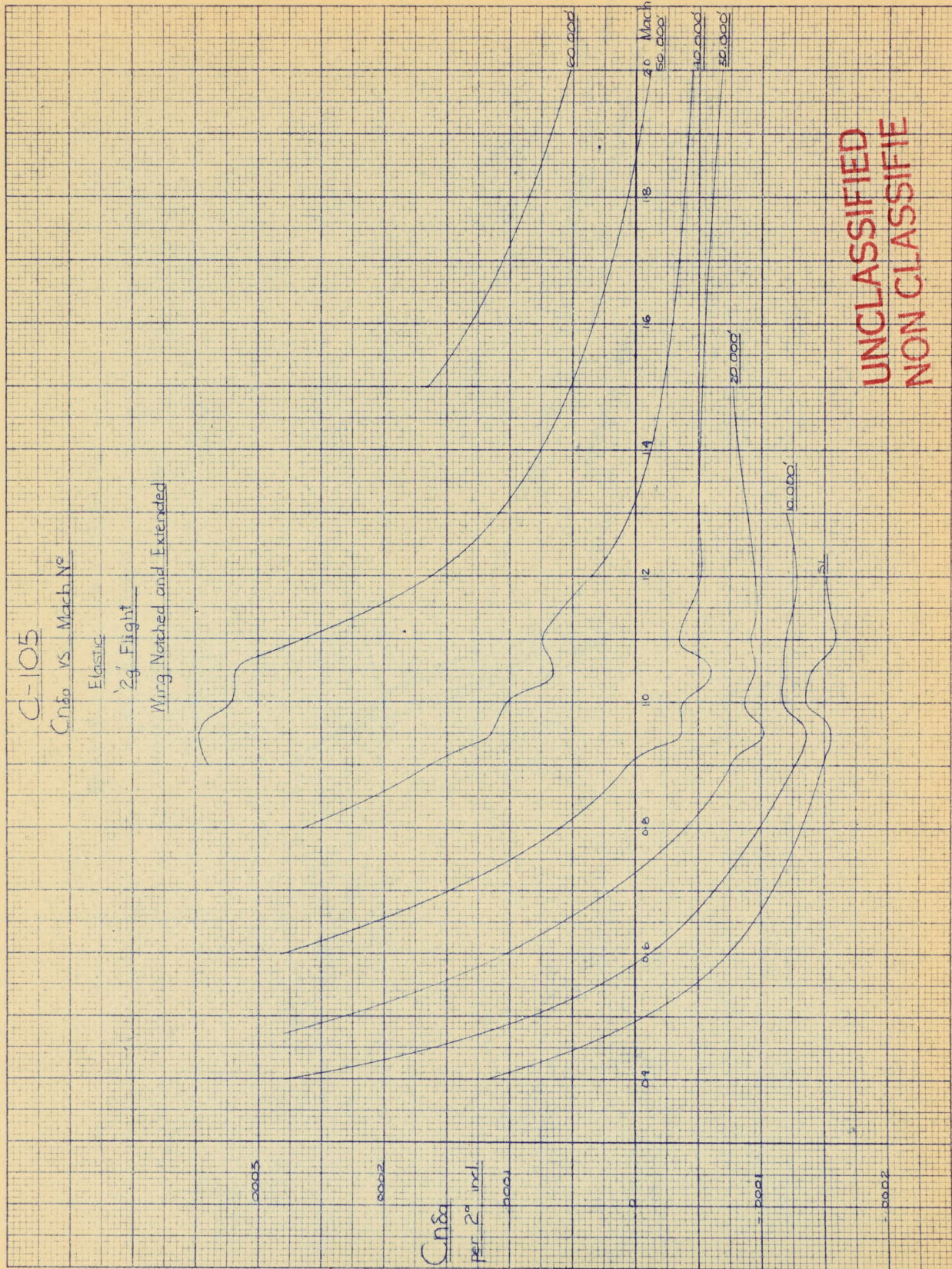
C-105

$C_{m\delta}$ vs Mach No

Elastic

2g Flight

Wing Notched and Extended



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P1A0154

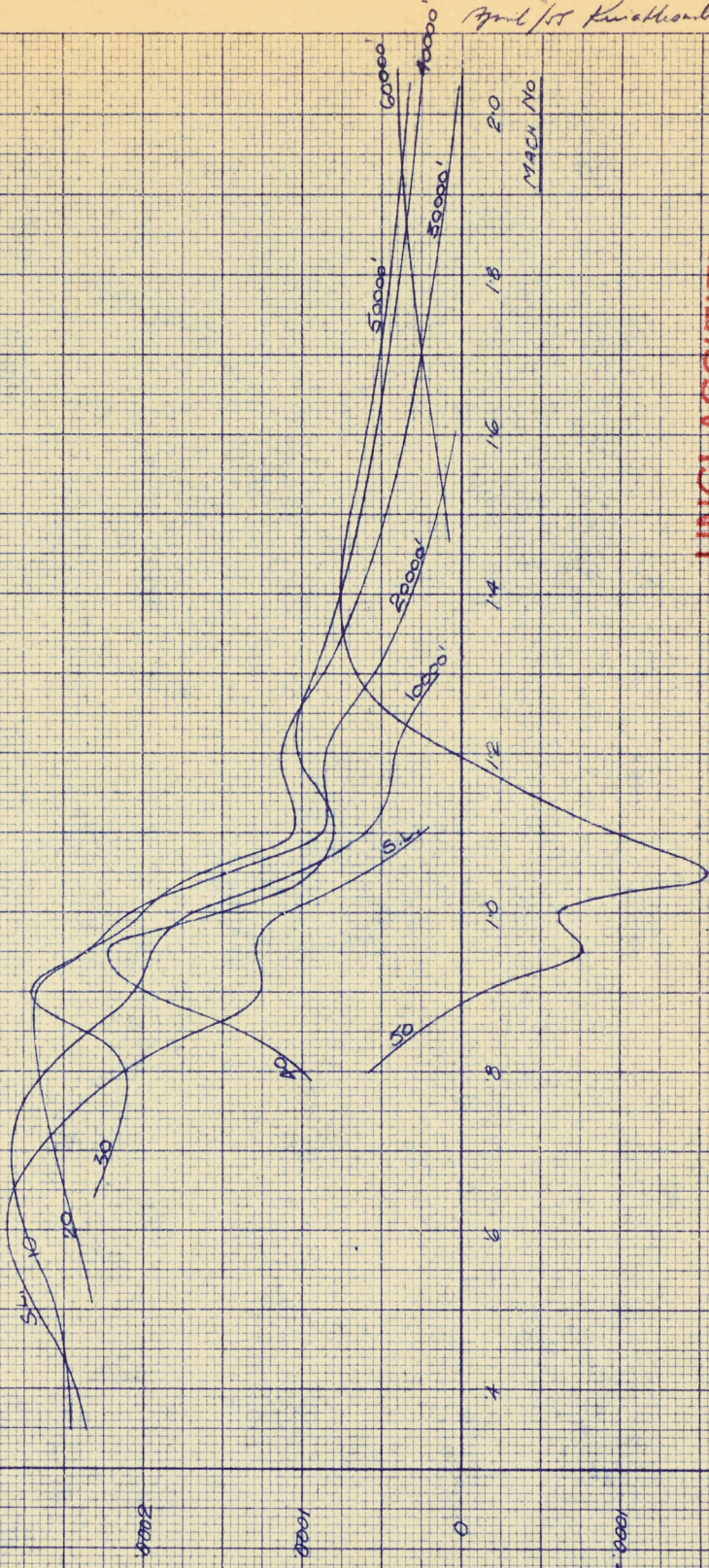
1.3

2/27/75

April 15 Kinetik 6-23

C105
ELASTIC C_{yg} VS. MACH No
IN EG' FLIGHT
KING NORMED & EXTENDED

C_{yg}
PER E°
INCLUDED
'0003



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P/AD/5A

2.1.1

P/Tab/75

GWSH

~~3.1.9~~

cg. 0.512
Wing notched and extended.

C-105
Cnδc vs MACH N°
Elastic
2g Flight
18° < α < 10°

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-0.0007

-0.0016

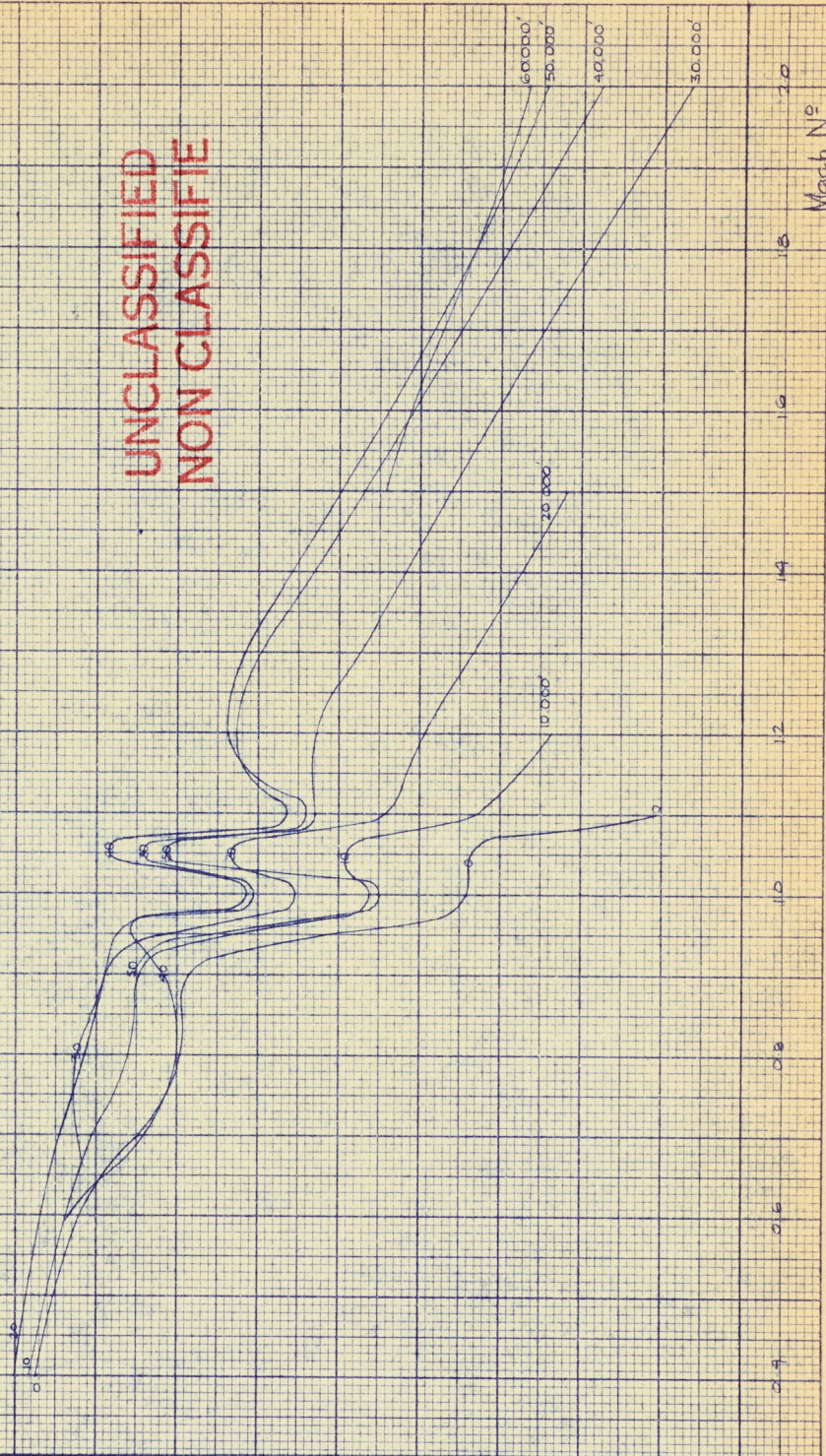
Cnδc
per degree

-0.0025

-0.0034

-0.0043

-0.0052



Mach N°

P/AD/54 2.1.2

P/Stub/75

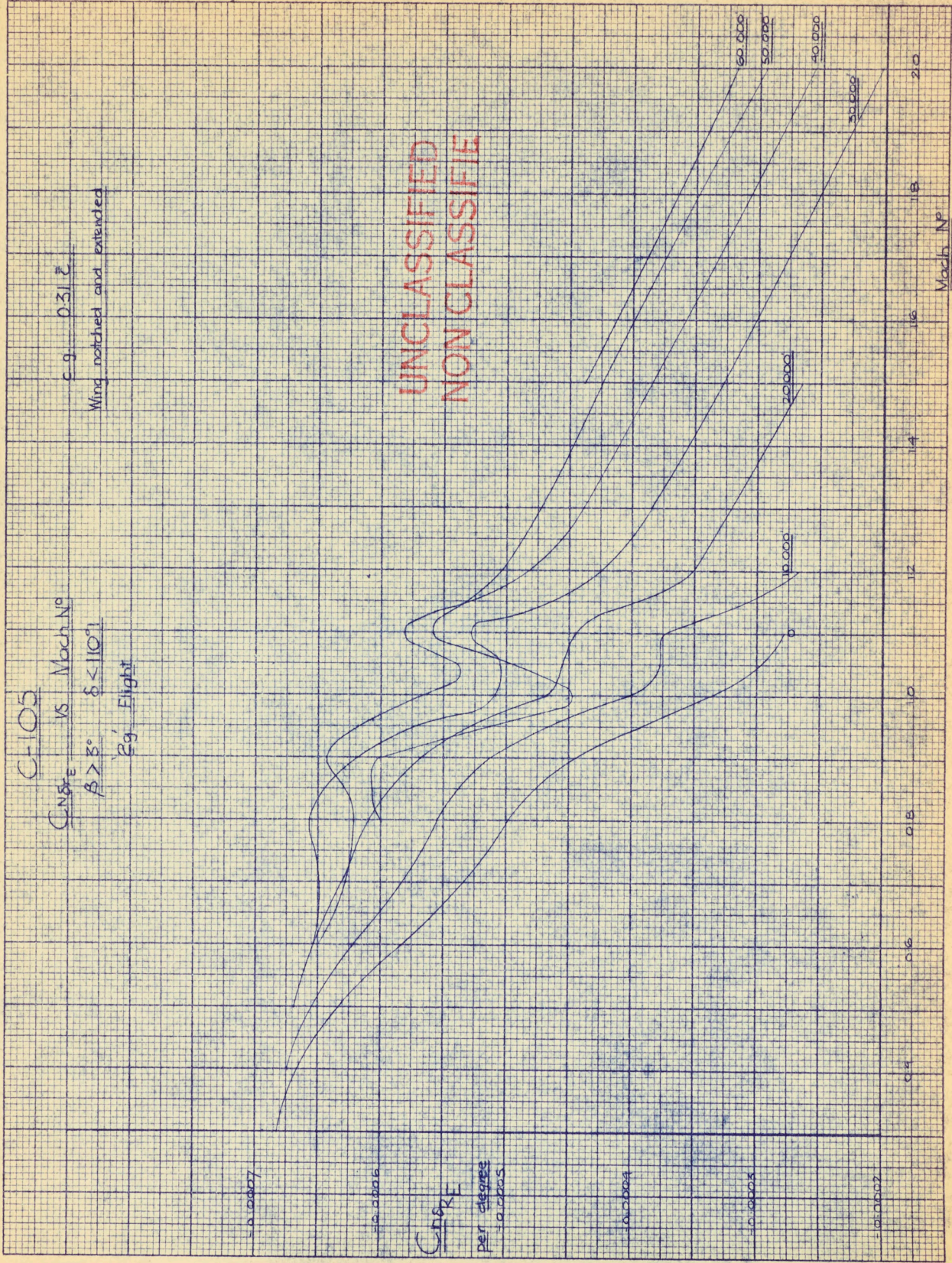
G.S.H.

3.2.6

c.g. 0.31 \bar{c}
Wing notched and extended

C-105
C.N.F. is Mach No
 $\beta > 3^\circ$ $\delta < 10^\circ$
Eg. Flight

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C.N.F.
per degree
0.0005

0.0004

0.0005

0.0007

P/AD/54

2.1.3

P/Stab/75

GUSH 3.52

C-105

$C_{n\delta}$ vs Mach No

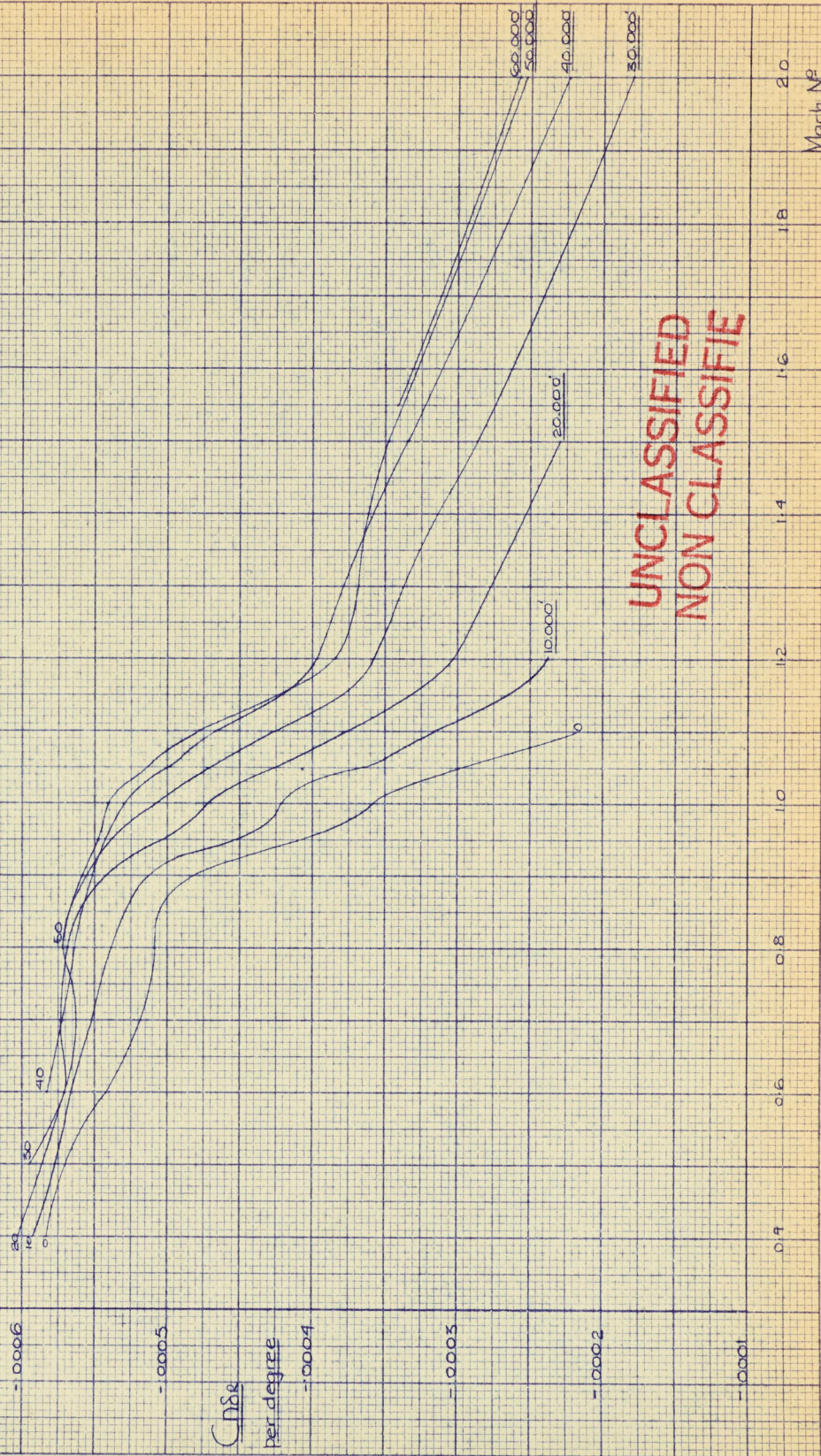
Elastic

2g Flight

c.g. 0.312

Wing Notched and Extended

$|\delta| < 3^\circ$ $|\delta R| > 10^\circ$



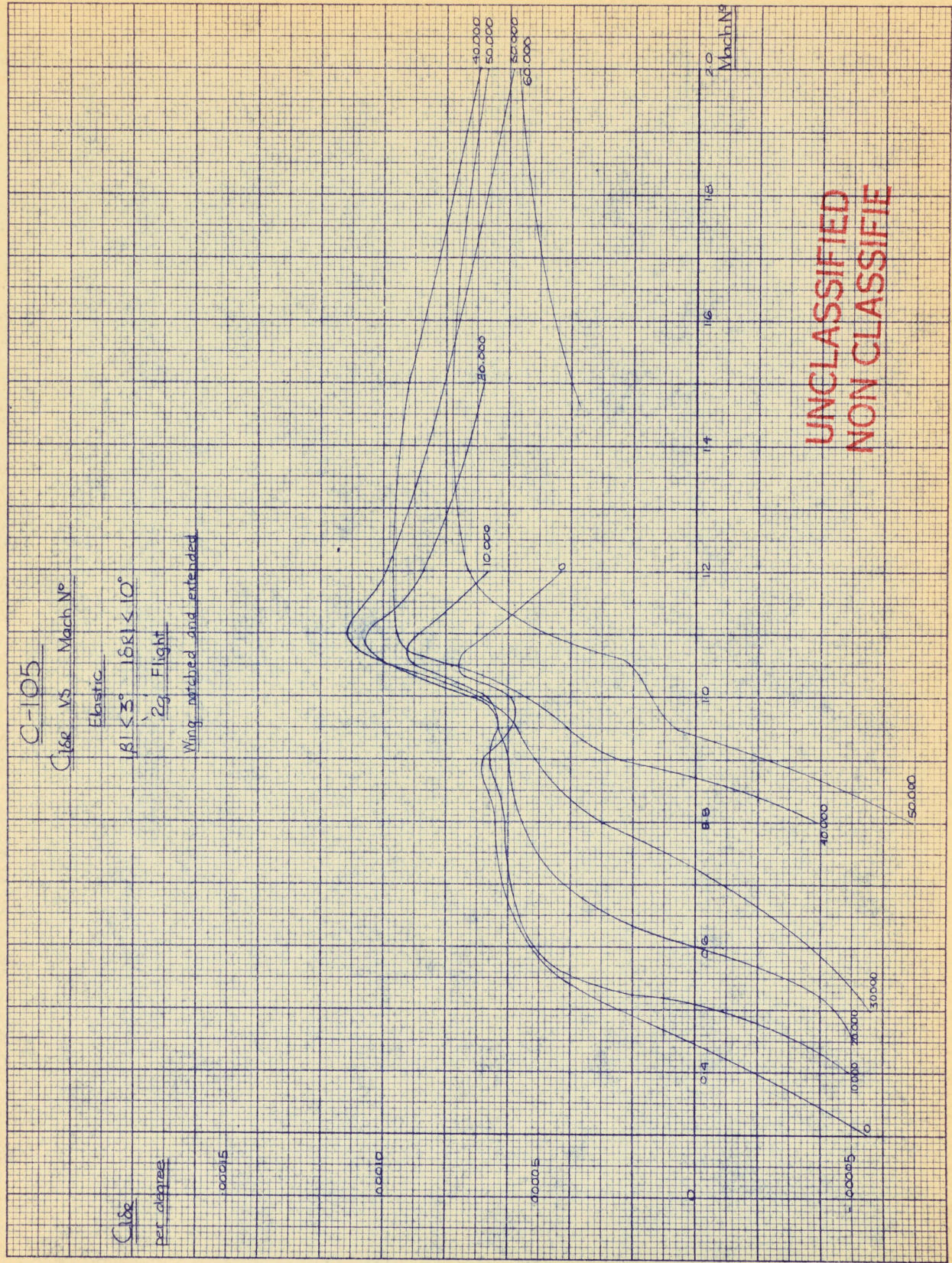
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P14D154 2.2.1

P/Stab/75
GWH. 47

C-105
C_l vs Mach No
Elastic
β < 3° 18 < 10°

2g Flight
Wing retracted and extended



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P/AD/54

2.2.2

SMT. 4.2 P/STAB/75
March 1955 J. Papis.

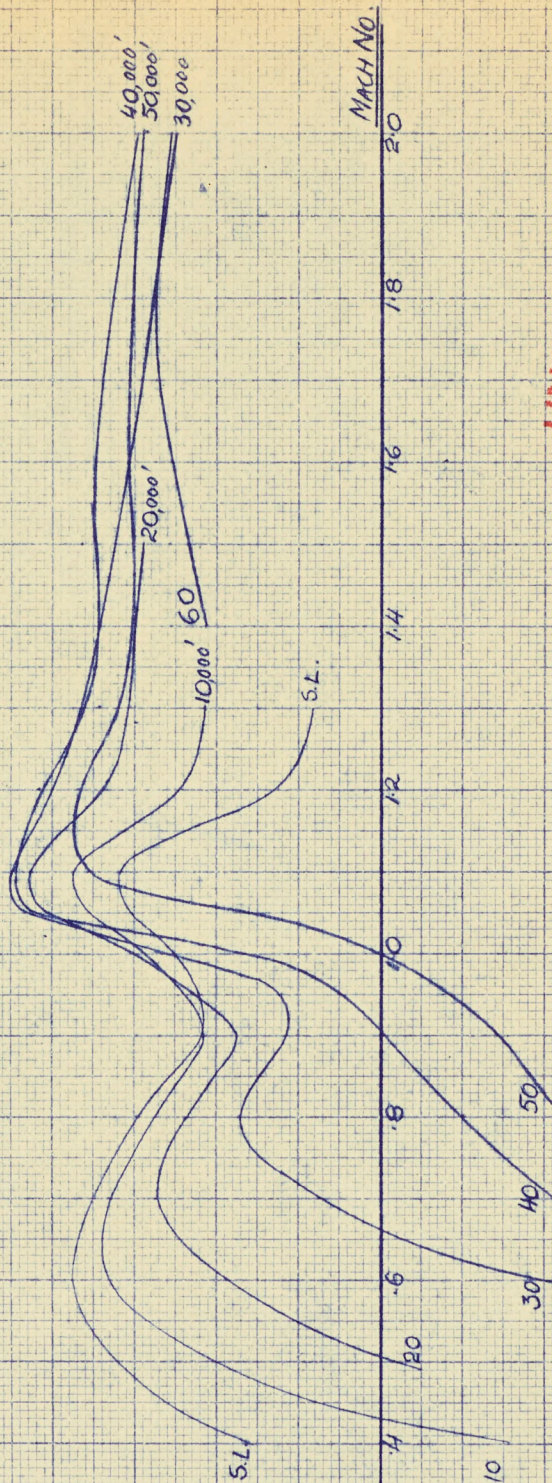
C 105

$B_2 C_3 W_3 \frac{1}{3} R_5$ - WING NOTCHED AND EXTENDED.

ELASTIC C_{Lcr} vs MACH No. - IN $2^{\circ}G$ FLIGHT

$18/23^{\circ}$ FULL δ RANGE.

C_{Lcr}
PER DEG
-00012
-00010
-00008
-00006
-00004
-00002
0
-00002
-00004
-00006



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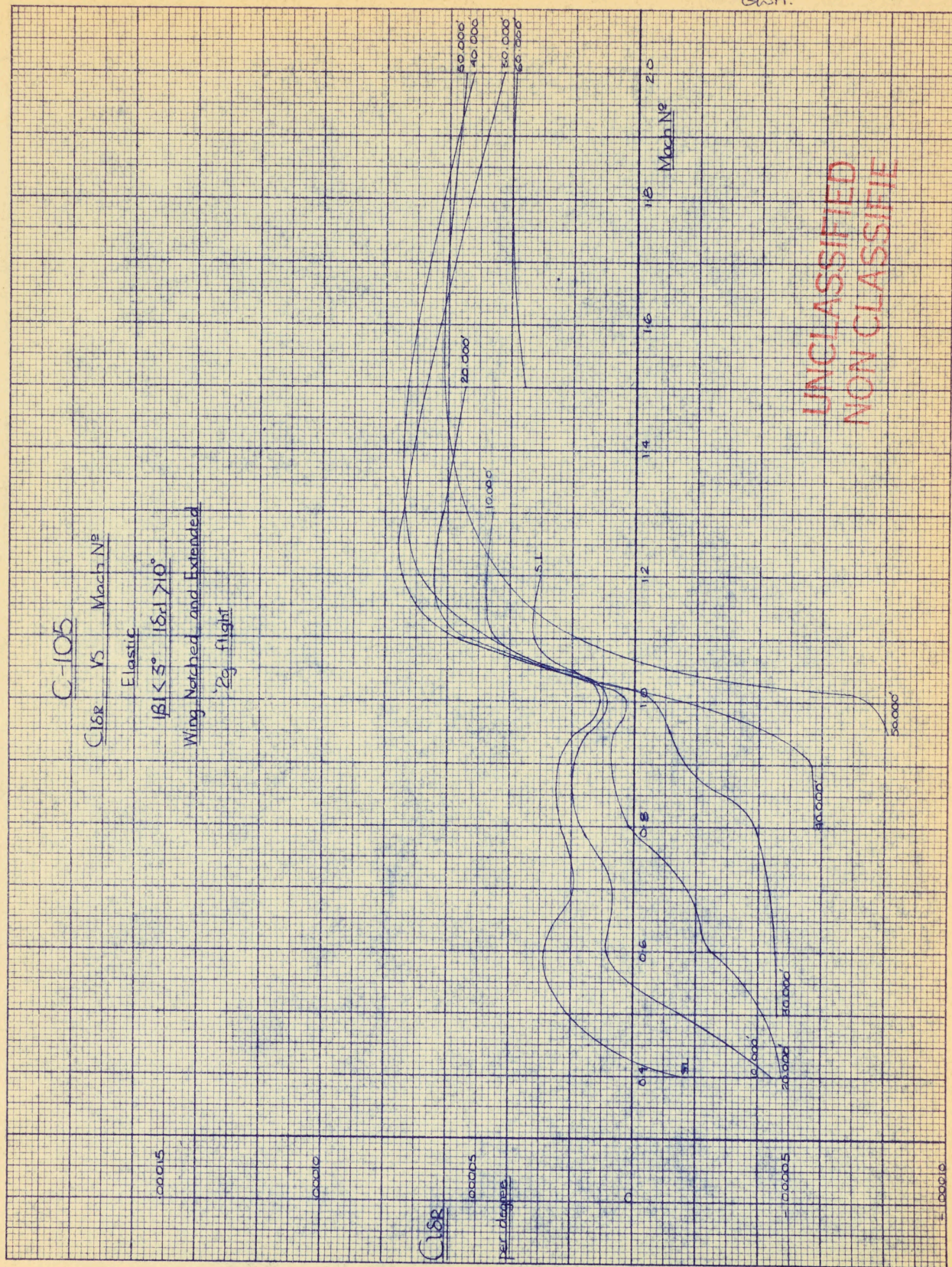
P/AD/54

2.2.3

P/Stab/75

GLSH.

2.11



C-105

CL vs Mach No

Elastic

$|\beta| < 3^\circ$ $|\delta_d| > 10^\circ$

Wing Notched and Extended

'2g flight

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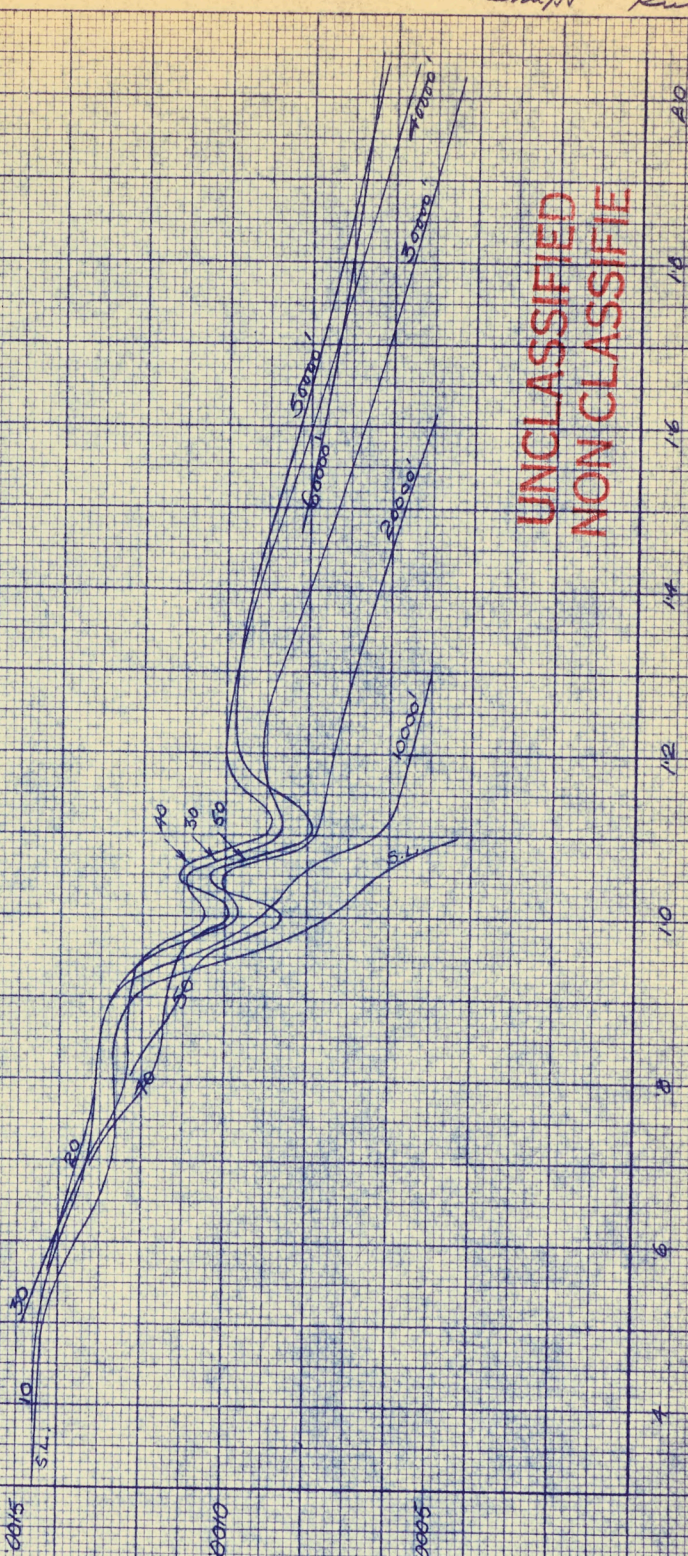
PIAD154

2.3.1

~~P/STAS/75~~ 1.15
Hand/PT Kwathh-w-h

C106
ELASTIC CYCLES MACH NO
IN 28' FLIGHT
WING NOTCHED AND EXTENDED
 $\beta/3 = 3^\circ$ C.G. = 31%
 $\beta/2 = 10^\circ$

Cycle
PER DEG.



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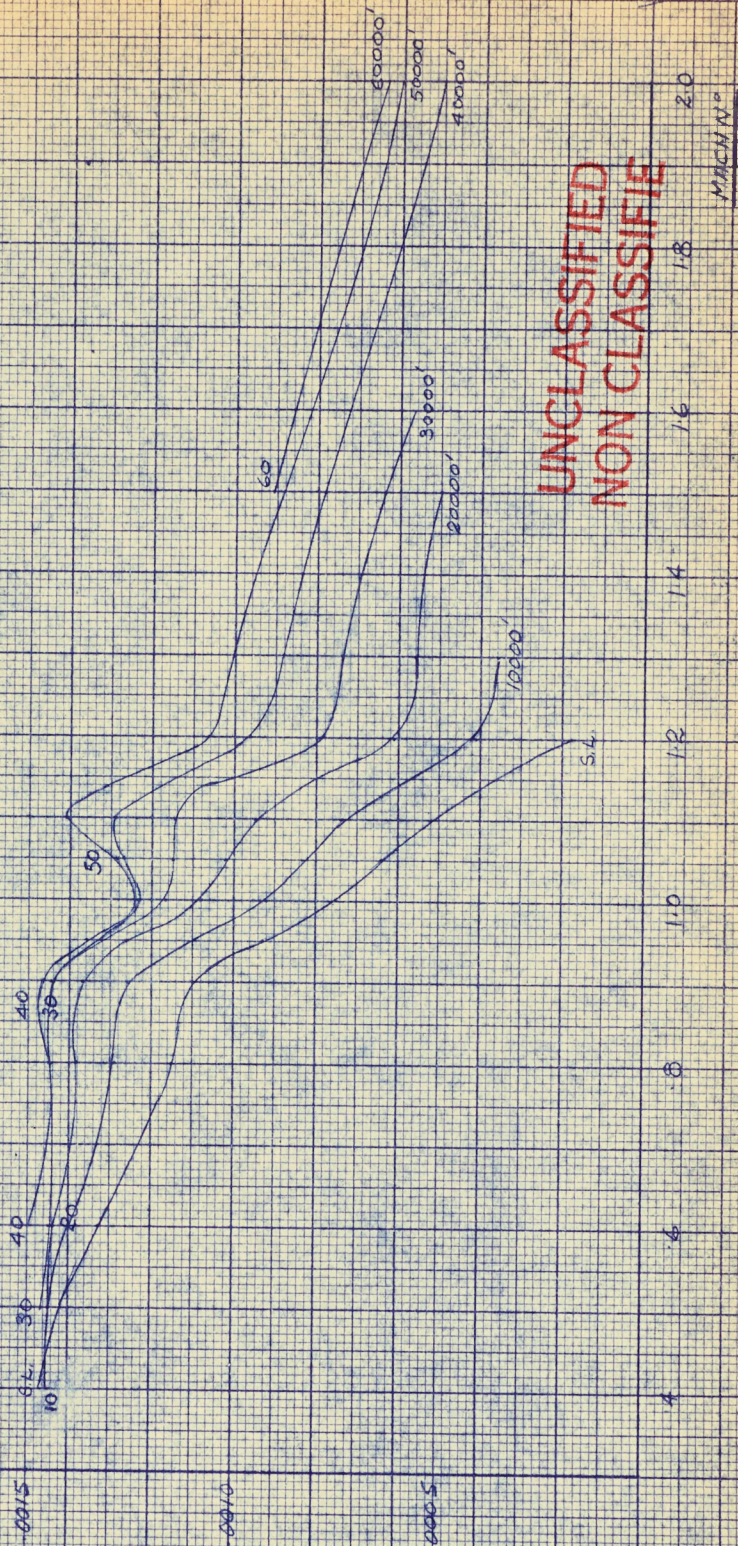
PBB

C-105

ELASTIC Q_Y vs MACH N°
IN 2 G FAULT

WING NOTCHED & EXTENDED
B > 3° ; ST < 10°

Q_Y (E)
PER DEGREE



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MACH N°

PIAD/54

3.1.1

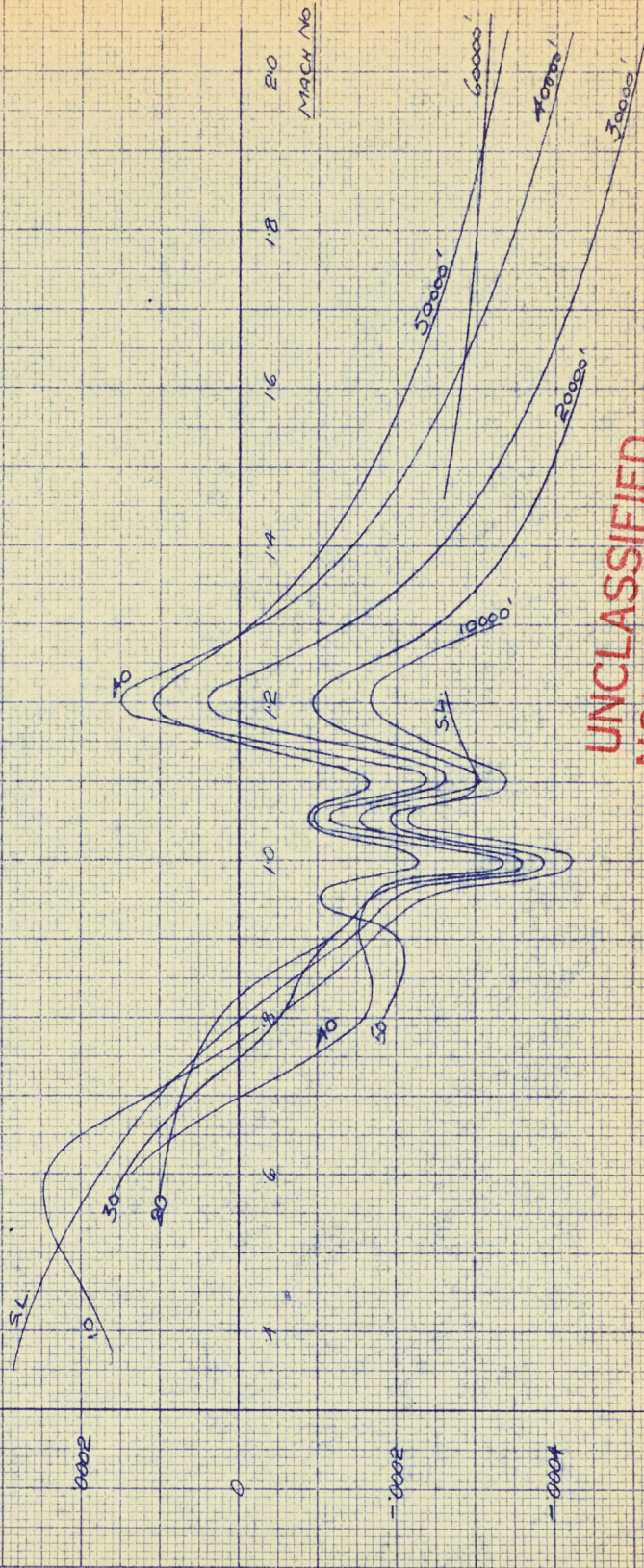
P/STAR/TS 2.12.
Hand/TS Kniatkovsk

C105
VS MACH No
IN RIG' FLIGHT

1/8/3°
CG = 31.5

WING NOTCHED & EXTENDED

C_{m3}
PER DEG

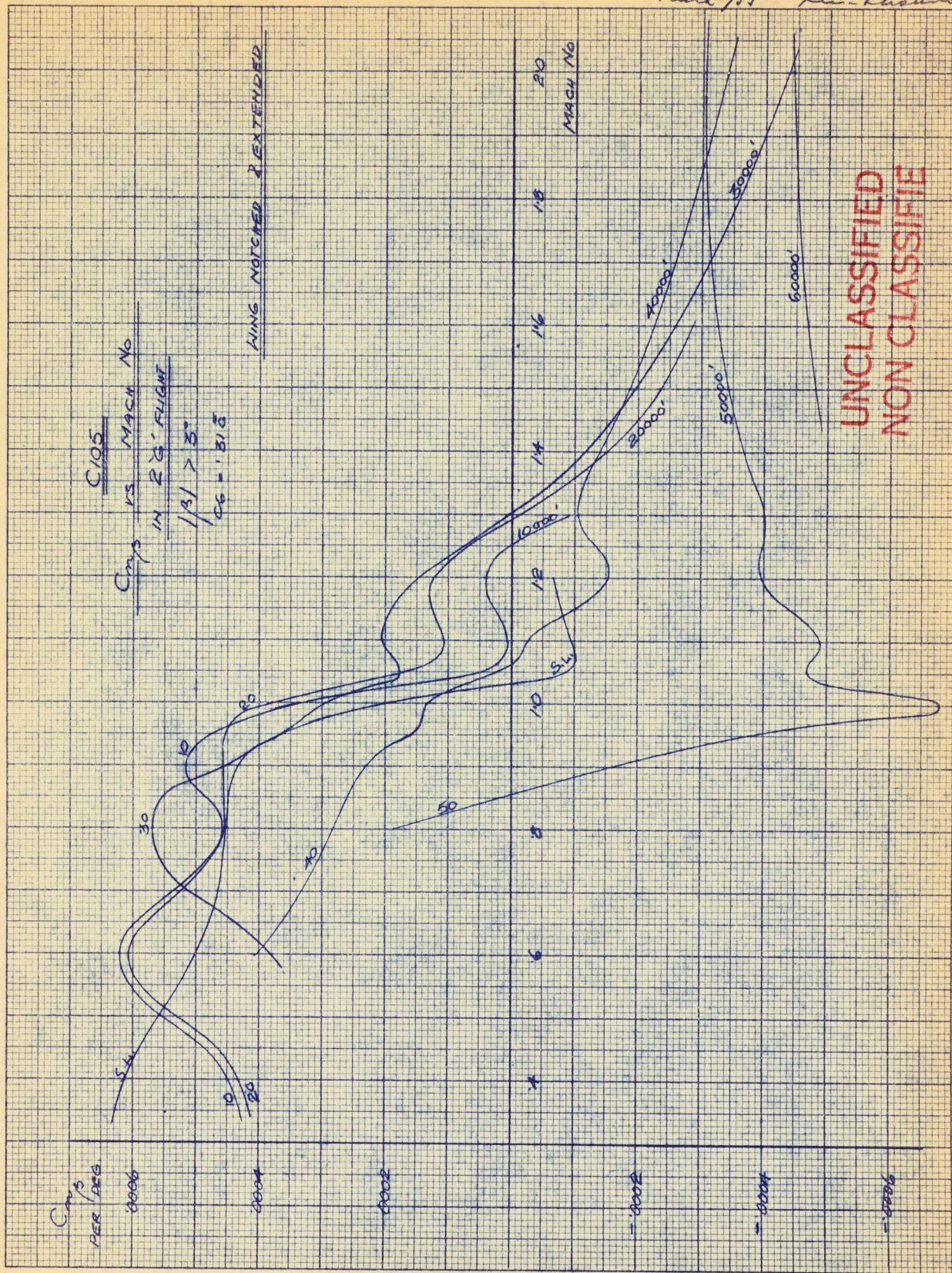


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P/AD/54

3.1.2

P/57973/75 2.20.
Hard / IT Kink / kinks



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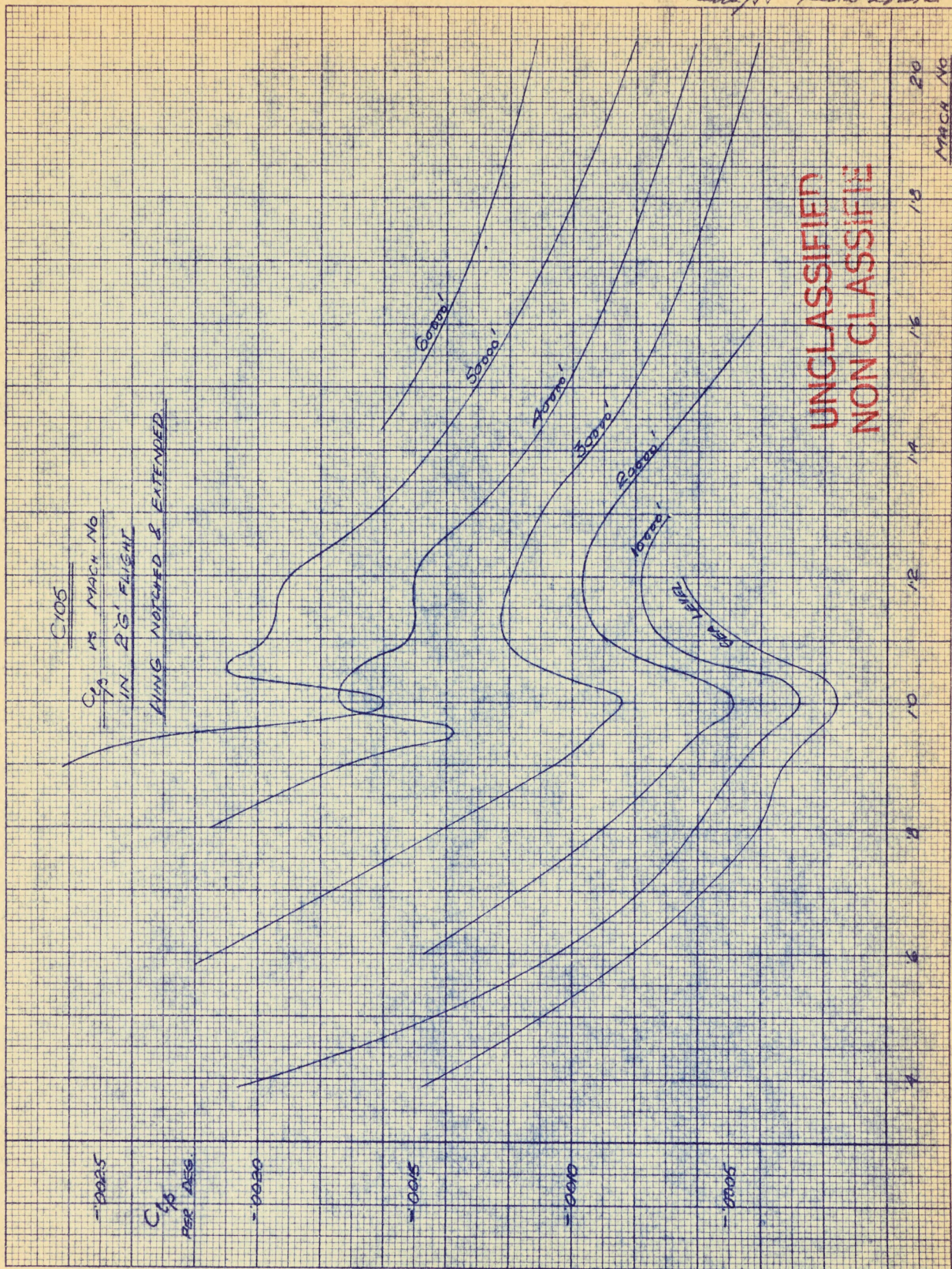
PIADISA

3.2.1

P/5793/75

5.4.

iland/55 Kuratkovski



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MACH NO

PIADISA

3.3.1

P/STAB/75

5.12.

Hand/IT Knaflovski

C108
C₁₀ 15 MACH No
IN R² FLIGHT
1/3/53

WING NOTCHED & EXTENDED
ELASTIC FIN.

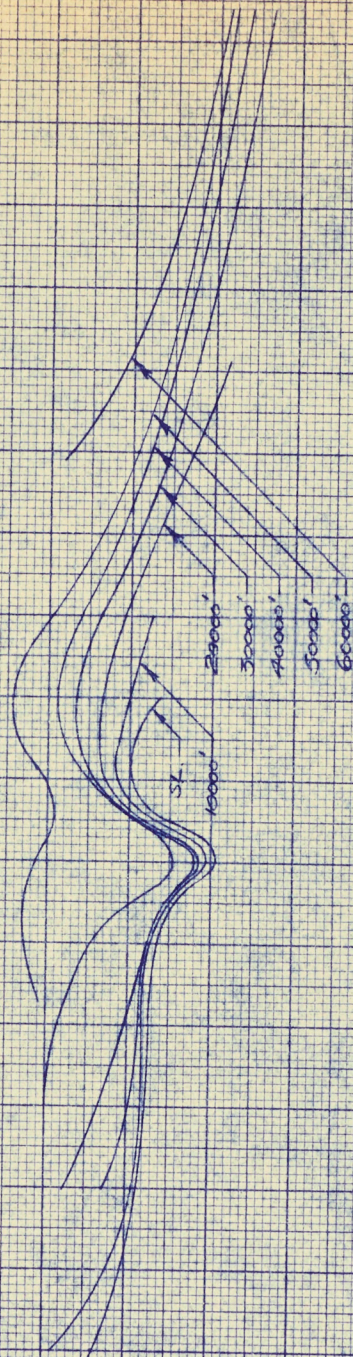
C₁₀
PER DEG

-003

-006

-009

-002



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20
MACH No

18

16

14

12

10

8

6

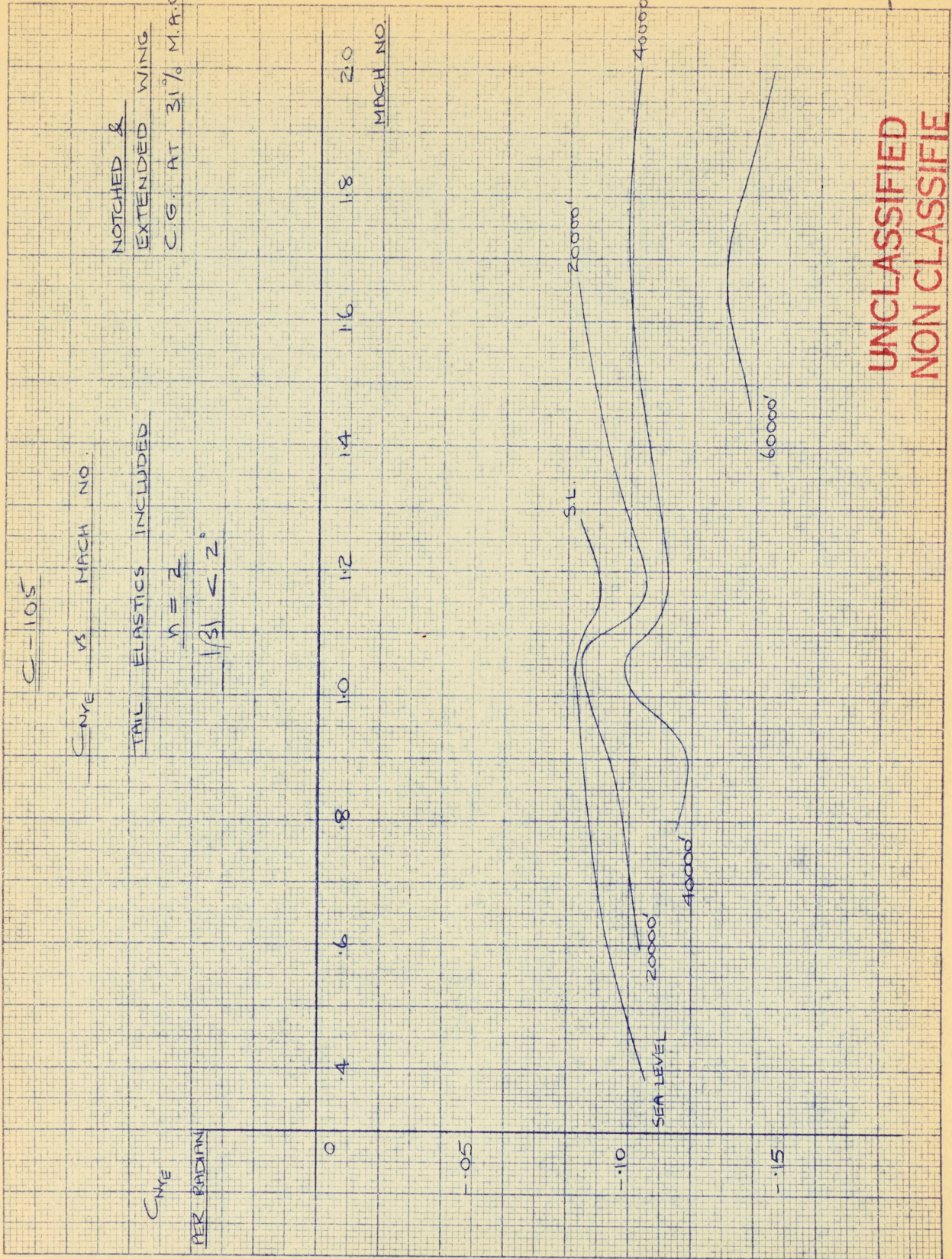
4

P/AD/54

4.1.1

P/Stab-170
LDB

87
Apr. '55



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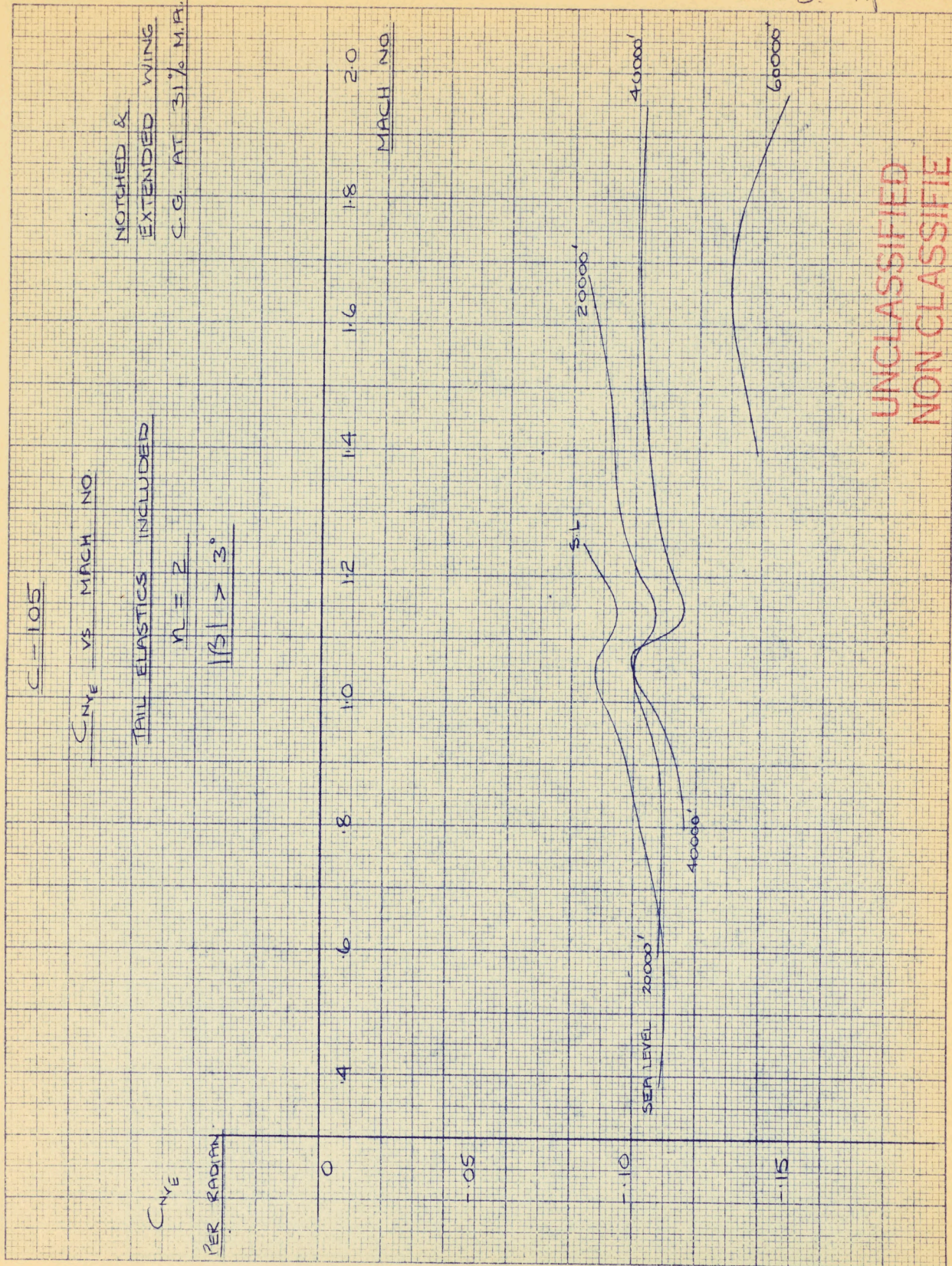
PIAD154

A.1.2

P/Sub-170

86

Apr. '55



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C-105

$C_{L'E}$ vs MACH. NO

TAIL ELASTICS INCLUDED

$n = 2$

$|\beta| \leq 2^\circ$

NOTCHED &

EXTENDED WING.

C.G. AT 31% M.A.C.

$C_{L'E}$
PER RADIAN.

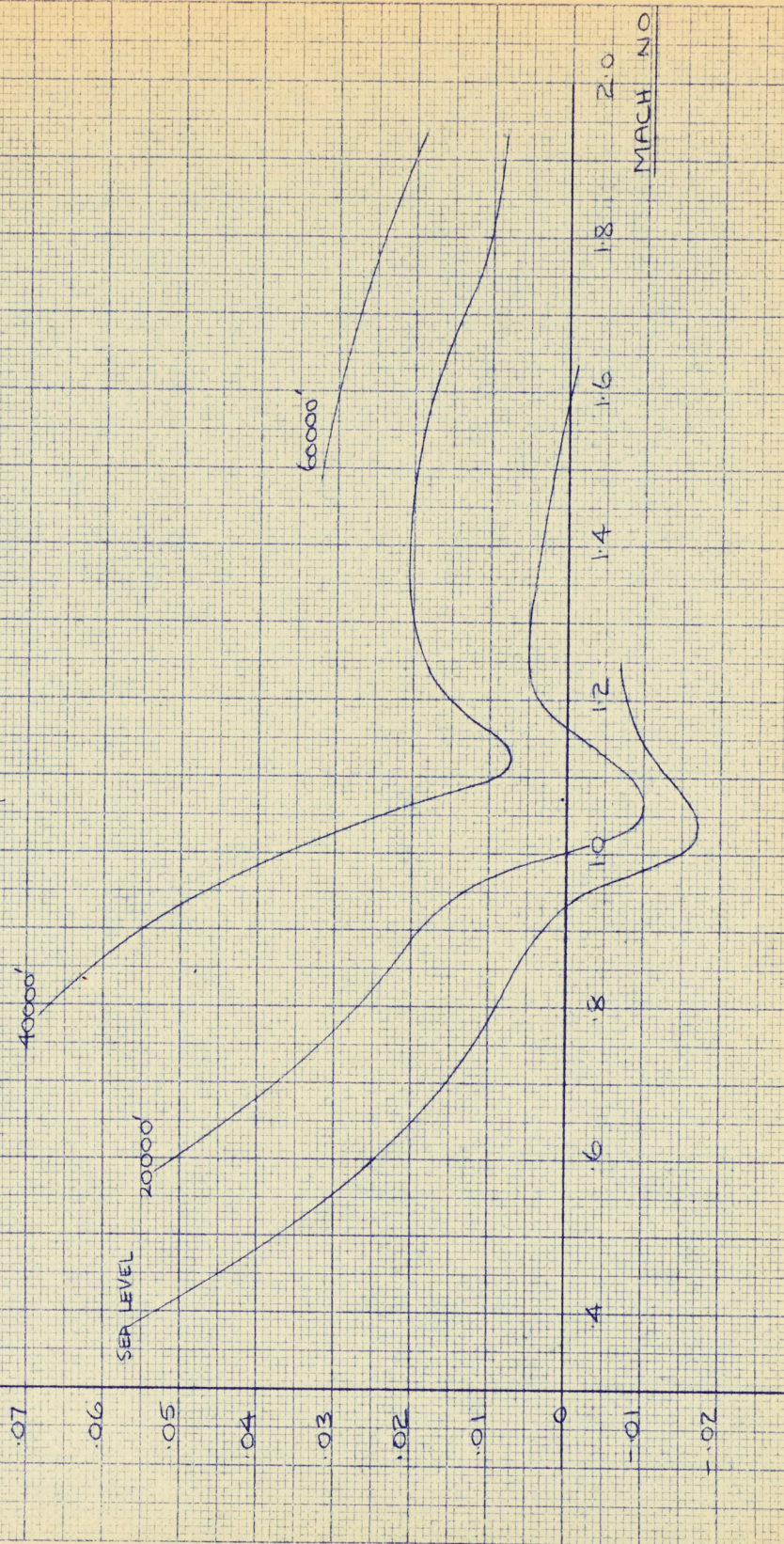
PIAD15A

4.2.1

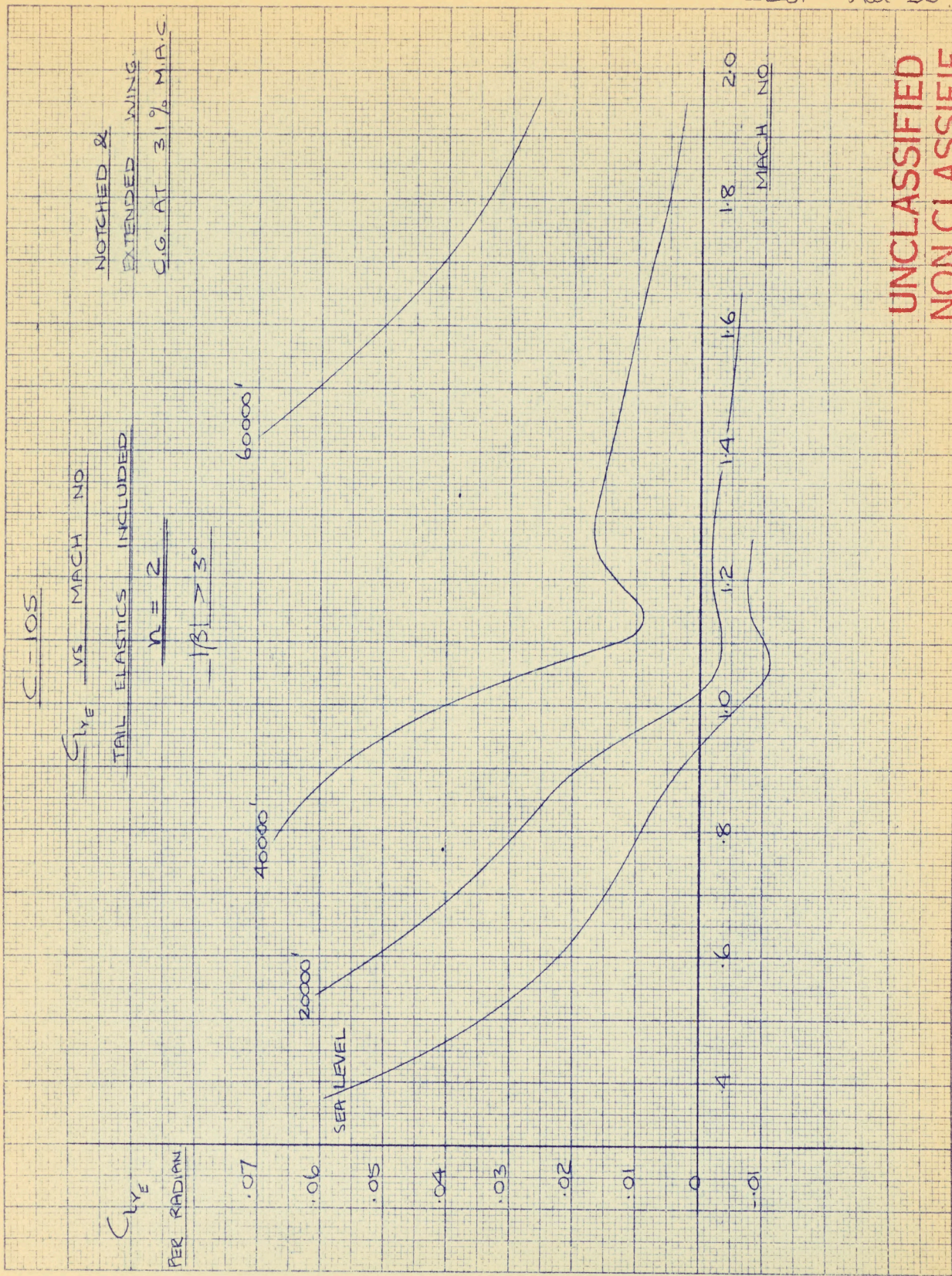
P/Stat/70

~~1180~~

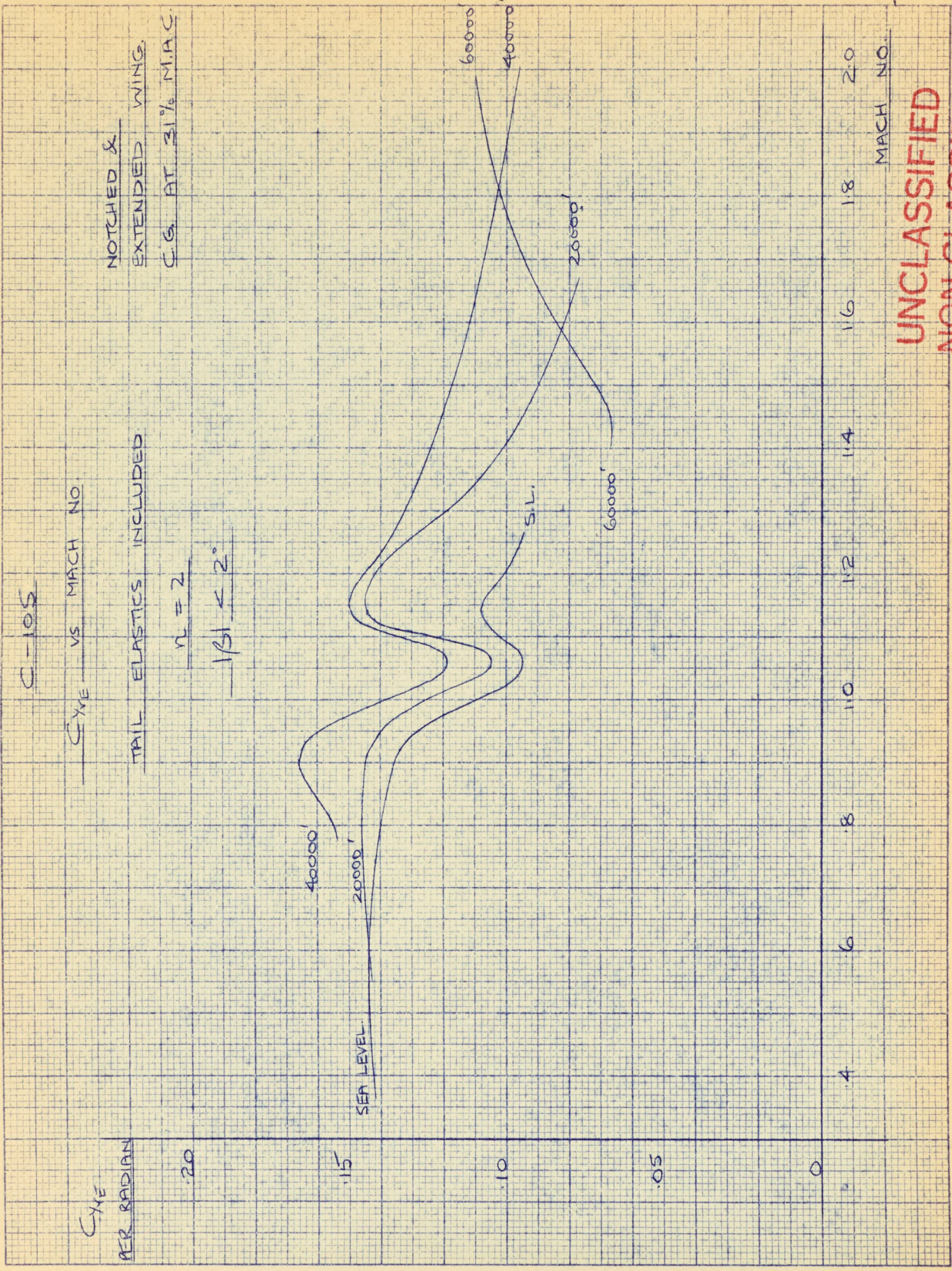
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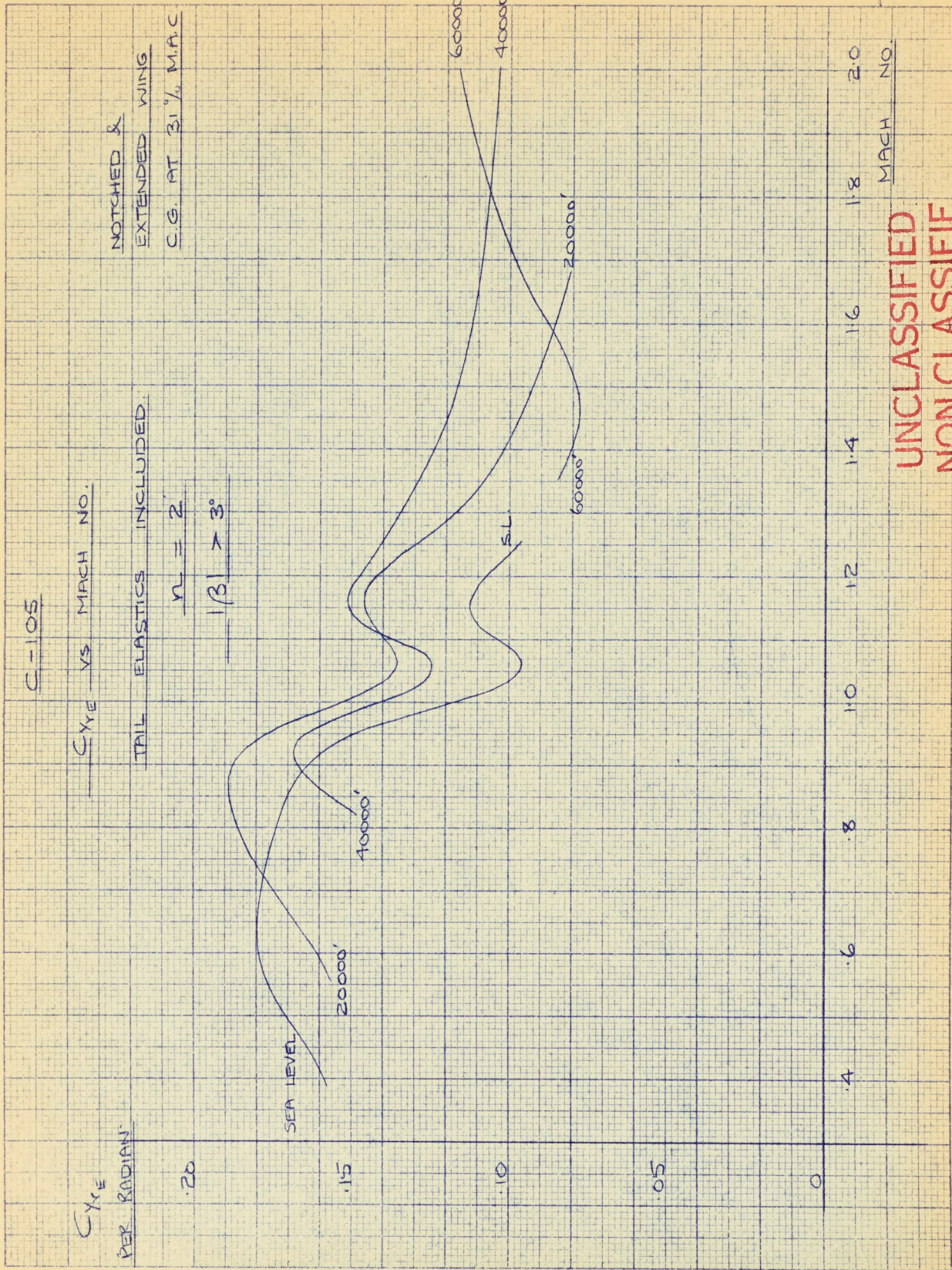
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P/ADISA

A. 3. 2

P/Stab/70

Apr. '55



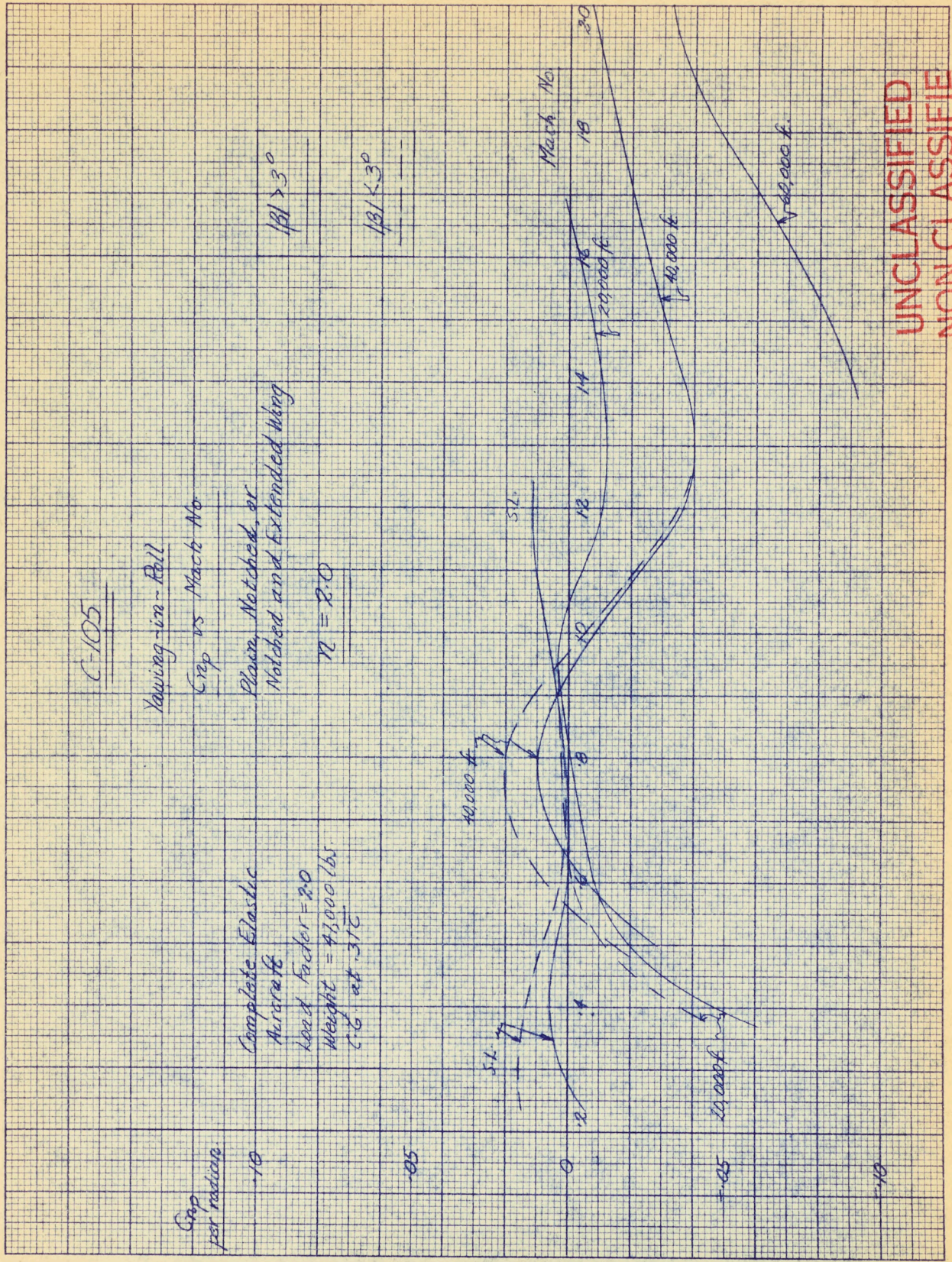
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P/AD/5A

5.1.1

May 1955
C.A Ford

P/5tab/76
2.17



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PIADISA

5, 3, 1

25/3/55

p/stab/76

C.A. Ford 3.15

C-105

Aeroelastic Sideforce in Roll

C_{yp} vs Mach No.

Plain, Notched, or Notched and Extended Wing

$\eta = 2$

$\beta > 3^\circ$

$\beta < 3^\circ$

Complete Aircraft

Load Factor = 2

Weight = 42,000 lbs.

C.G. at 31%

C_{yp}
per radian

30

20

10

0

Sea Level

20,000 ft

40,000 ft

60,000 ft

4

6

8

10

12

14

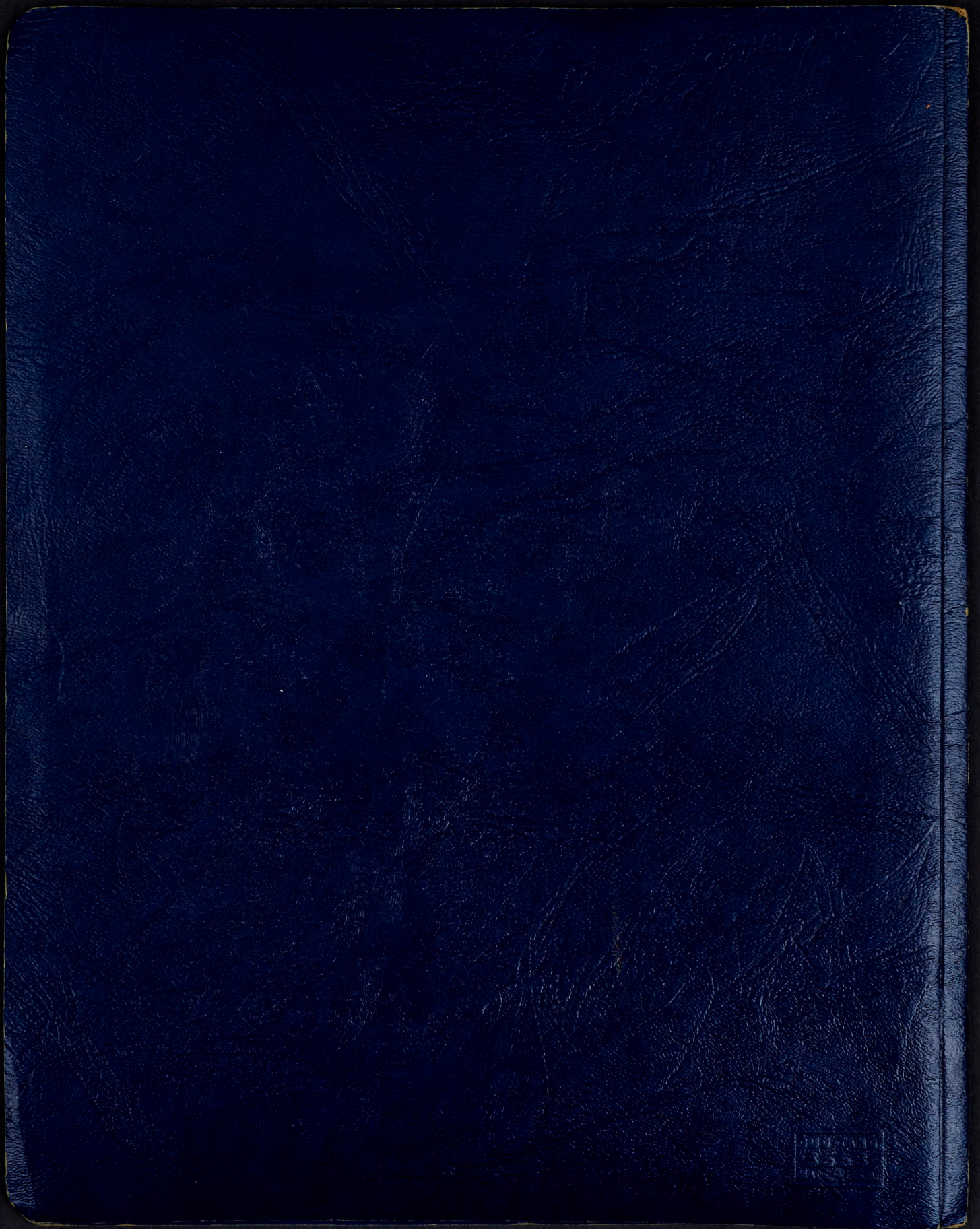
16

18

20

Mach No.

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