

QC
Avro
C-105
P/WT/52

QCX
Avro
CF105
P-WT-52

FILE IN VAULT

C-105 **ANALYZED** P/WIND TUNNEL/52

CONFIGURATION AND

REYNOLD'S NUMBER INVESTIGATIONS

UNCLASSIFIED

C.A.L. Wind Tunnel Tests - October 1954.



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TO
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DATE

Report no.: QCX-AVRO-CF105- P-WT-52

has been ☐ downgraded to: _____

☒ de-classified

by (Name): Michel W. Drapeau

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

Date: Dec. 7, 1992

R. Auger
Signature



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A. V. ROE CANADA LIMITED

MALTON - ONTARIO

TECHNICAL DEPARTMENT (Aircraft)

AIRCRAFT: C-105

REPORT NO. P/WIND TUNNEL/52

FILE NO.

NO. OF SHEETS:

TITLE:

ANALYZED

CONFIGURATION AND REYNOLD'S NUMBER INVESTIGATIONS

Classification ^{confirmed as:} ~~canceled~~ / changed to: UNCLASSIFIED
By authority of: DRDA 7/DARFT 5-8/DAS Eng 6-4-5
Date: 5 Nov 1992
Signature: B Aubrey
Unit / Rank / Appointment: DSIS 3, Secretary CRAD HQ DRP



PREPARED BY C.A. Ford

DATE Dec. 1954.

CHECKED BY

DATE

SUPERVISED BY

DATE

APPROVED BY

DATE

ISSUE NO	REVISION NO	REVISED BY	APPROVED BY	DATE	REMARKS

45120

12417661

TECHNICAL DEPARTMENT (Aircraft)

REPORT NO. P/WIND TUNNEL/52

SHEET NO. 1

AIRCRAFT:

C-105

PREPARED BY

DATE

C.A. Ford

Dec. 1954.

CHECKED BY

DATE

1.0 C_L vs q

1.1 Reynold's No. Effect

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2.0 C_M vs q , C_L

2.1 Reynold's No. Effect - See 1.1

2.2 Effect of Extensions

2.3 Effect of Notches

2.4 Optimum Cases

2.5 Comparisons

3.0 C_D vs C_L

3.1 Comparisons

4.0 C_y vs β

4.1 Effect of Notches

TECHNICAL DEPARTMENT (Aircraft)

REPORT NO. P/WIND TUNNEL/52

SHEET NO. 11

AIRCRAFT:

C-105

PREPARED BY

DATE

C.A. Ford

Dec. 1954.

CHECKED BY

DATE

5.0 C_N vs β

5.1 Effect of Reynolds' No.

5.2 Effect of Fuselage Modification

5.3 Effect of Wing Extensions

5.4 Effect of Notches

5.5 Effect of Canopy and Paired Intakes.

6.0 C_l vs β

6.1 Effect of Notches

7.0 C_{N_f} vs β

7.1 Effect of Reynold's No.

7.2 Effect of Wing Configuration.

7.3 Effect of Canopy and Paired Intakes.

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A. V. ROE CANADA LIMITED
MALTON - ONTARIO

TECHNICAL DEPARTMENT (Aircraft)

REPORT NO. P/WIND TUNNEL/52

SHEET NO. 11

AIRCRAFT:

C-105

PREPARED BY

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C.A. Ford

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5.0 C_N vs β

5.1 Effect of Reynolds' No.

5.2 Effect of Fuselage Modification

5.3 Effect of Wing Extensions

5.4 Effect of Notches

5.5 Effect of Canopy and Paired Intakes.

6.0 C_l vs β

6.1 Effect of Notches

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7.0 C_{N_f} vs β

7.1 Effect of Reynold's No.

7.2 Effect of Wing Configuration.

7.3 Effect of Canopy and Paired Intakes.

CM

8105
CH.1 WIND TUNNEL TESTS

OCTOBER 1954

CONV. 15 G.

EFFECT OF EXTENSIONS

NO NOISE $M=1.50$

$C_D = -10$

CONFID. BY G. K. B. & M. M. B.

(EXCEPT RUN 225 WHERE $ADU' = B_2$)

CONV. EXT. WING

○ 925 0 W_3

△ 1009 5% W_4

□ 1013 8% W_5

◇ 1017 10% W_5

◇ 1033 25 1035

◇ 1022

◇ 1032

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10 8 6 4 2 0 2 4 6 8 10 12

13

P/W7/52 221
NOV. 54. CLARK

C_M

C_{105}
C.O.K. WIND TUNNEL TESTS

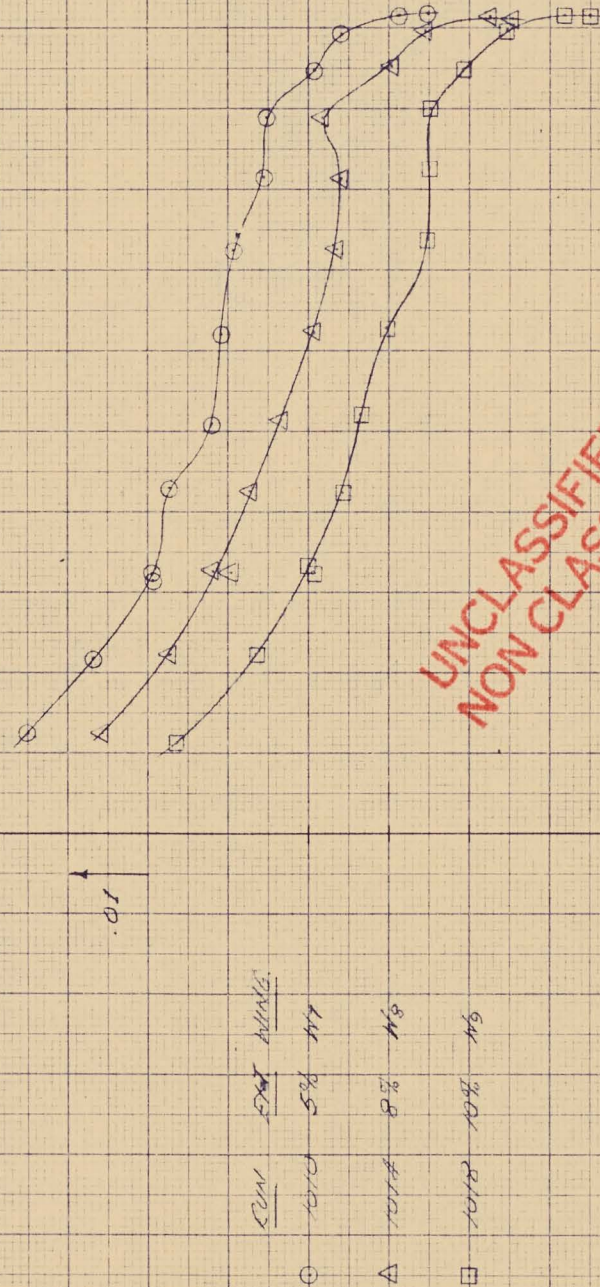
OCTOBER 1954

C_M VS C_F

EFFECT OF EXTENSIONS

5% NOTCH (NAT) $C_F = 10$ $M = 50$

CONTRIB. $24.5 \times 12.5 \times 1000$



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C_M VS C_F

10% 5% NAT

10% 8% NAT

10% 10% NAT

-4

-2

0

2

4

6

8

10

12

C_L

P/W/T/52 22.2
NOV. 54. CLARK

P/WT/52

223

Nov. 52.

CLARK

C-105
C.D. 1 NAD JUMPER TESTS (ACT 54)

CN 15 G

EFFECT OF EXTENSIONS

5% NOTCH $C_0 = 10$ $M = 50$

CONFIG. B4G1/2 K3 + N14G + N46.5

(EXCEPT RUN 926 W/RECE 802V-03)

CN

10
01

EXT. WING

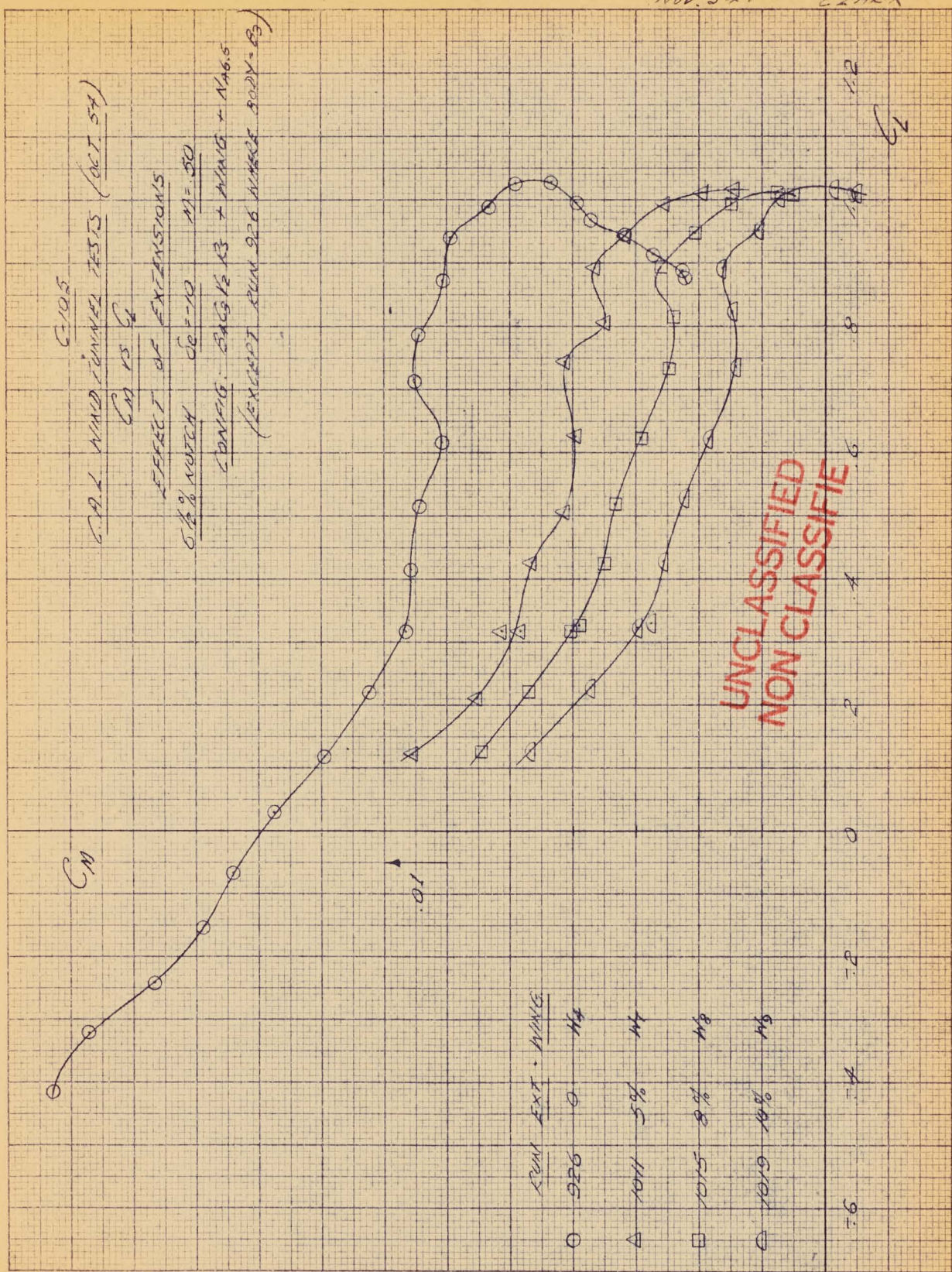
926 0 H4

1011 5% H4

1015 8% H4

1019 10% H4

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C₁₁

C₁₀₅

CAL WIND TUNNEL TESTS (OCT 54)

CAN 15.0"

EFFECT OF EXTENSIONS

8% NOTCH $\sigma_c = 10$ $M = .50$

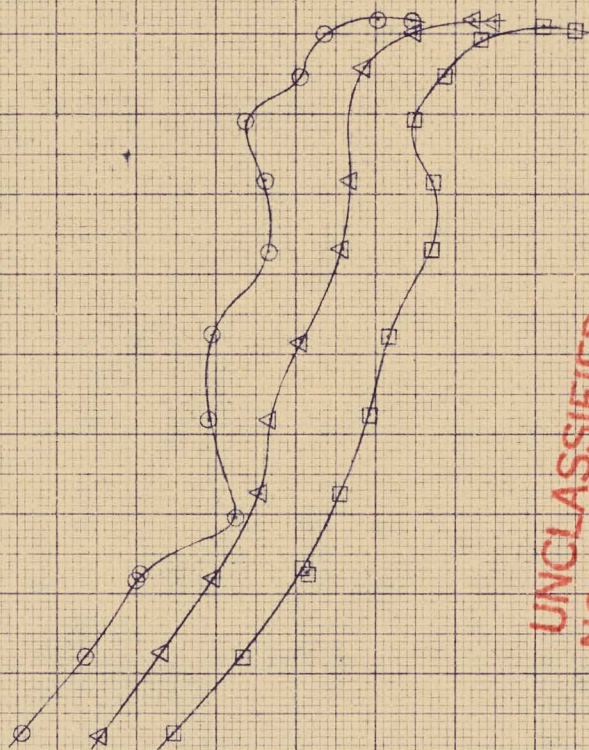
CONFIG. B & C 1/2 B N200 + WING

RUN EXT WING

1012 5% W1

1016 8% W2

1020 10% W3



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P/WT 152
NOV 54

22.4
CLARK

C_L

C-105
C.P.L. WIND TUNNEL TESTS
C.M. 156
EFFECT OF NOTCHES
ZERO EXTENSION NUMB.
N=50 $\Delta C = 10$

C.M.



RUN	ADJCT.	B ₂ G ₂ K ₂ L ₂ + WING				
		NONE	6.5A	20A	10.1A	7.5A
○	925					
△	926					
□	929					
◇	949					
▽	1007					

P/W/52

2.4

NOV 52

CLARK

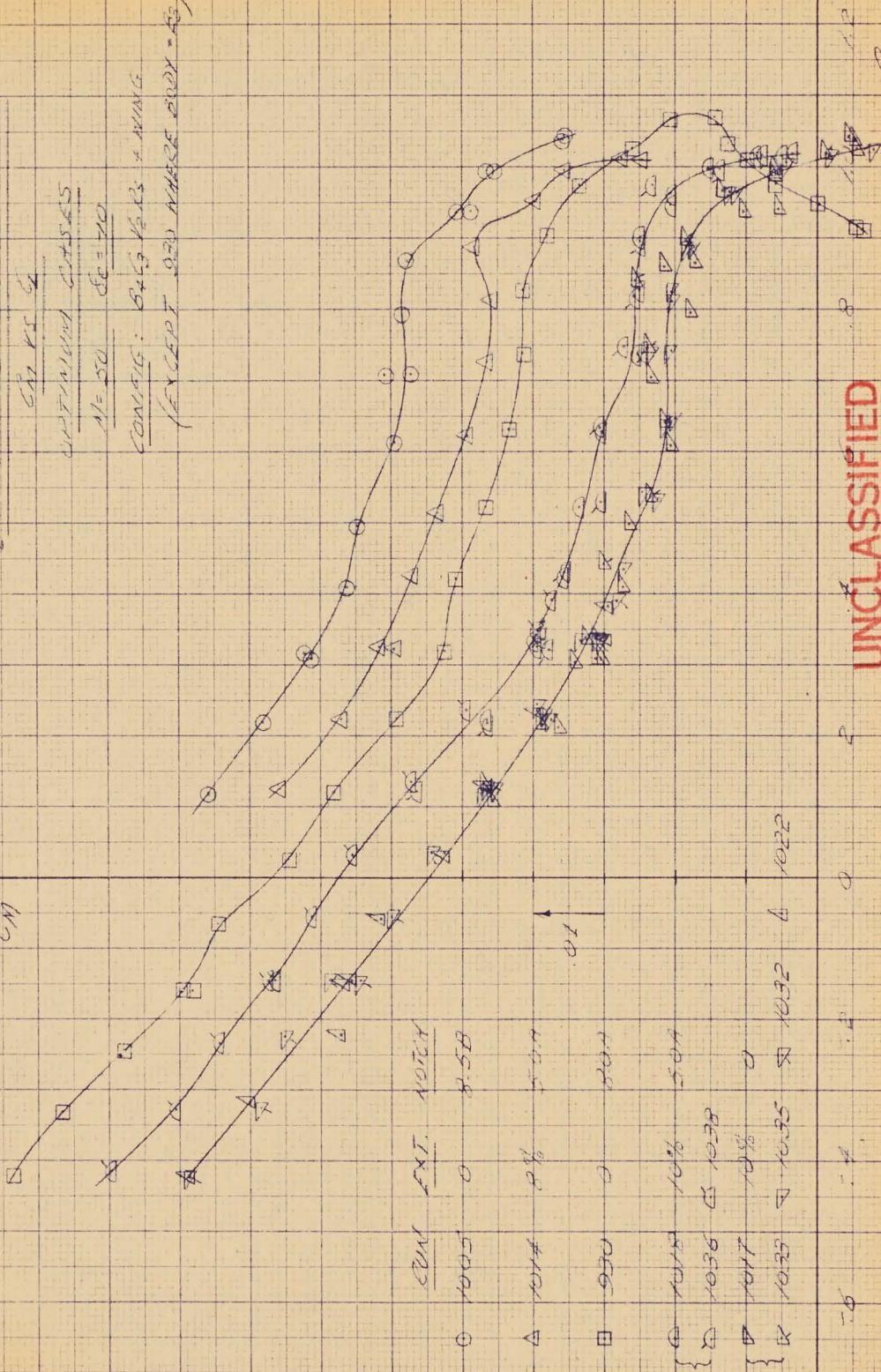
C-105
CALC. WIND TUNNEL TESTS

CHRS 4
WINDMILL CASES

N=50 SC=40

CONFIG: 8x3x3x3x3x3x3x3
(EXCEPT 8x3x3x3x3x3x3x3)

CM



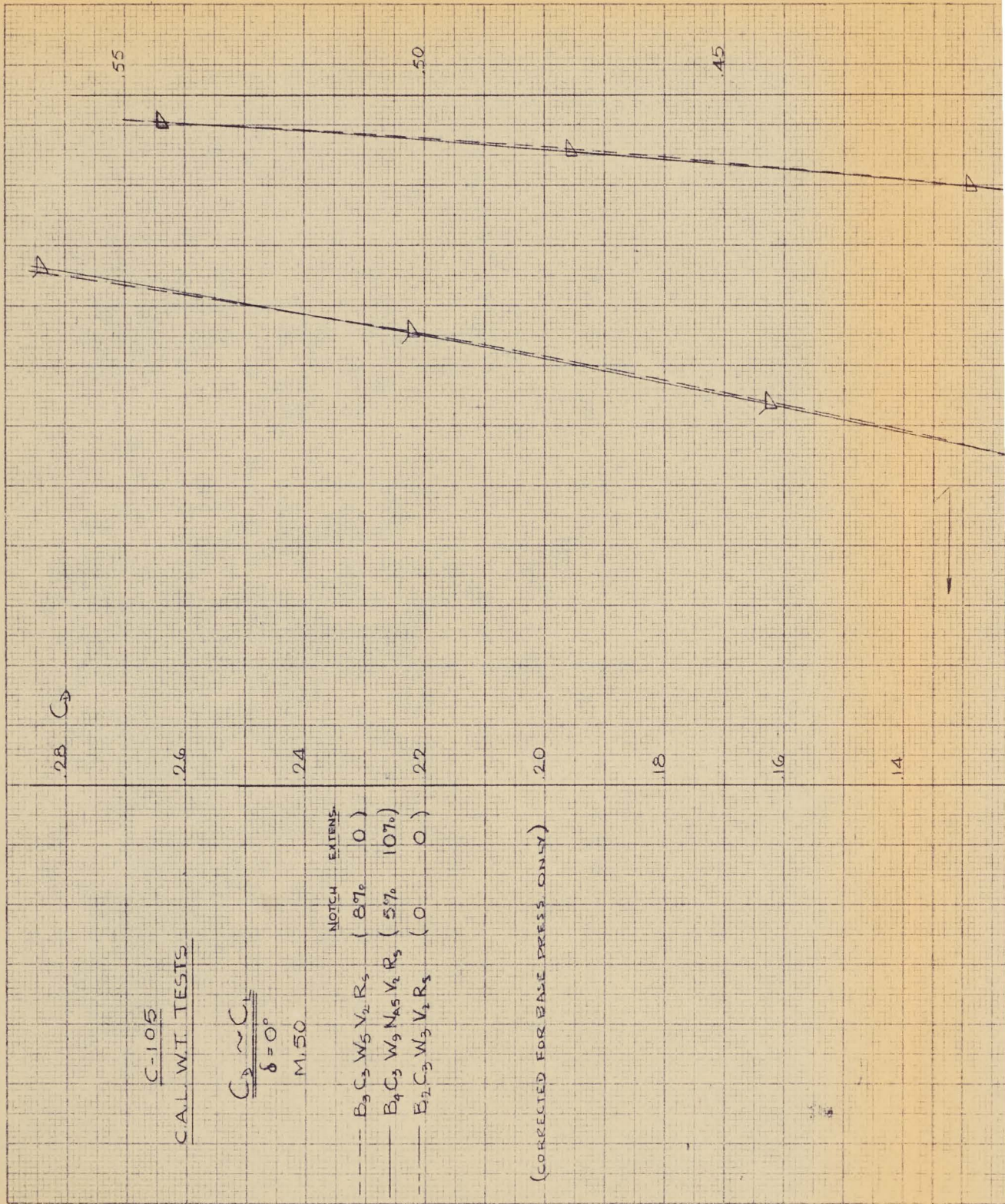
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C-105
CAL. WT. TESTS

$C_3 \sim C_4$
 $\delta = 0^\circ$
M. 50

	NOTCH	EXTENS.
--- $B_3 C_3 W_5 V_2 R_3$	(87%	0)
--- $B_4 C_3 W_5 N_4 S V_2 R_3$	(57%	107%
--- $B_2 C_3 W_3 V_2 R_3$	(0	0)

(CORRECTED FOR BASE PRESS ONLY)

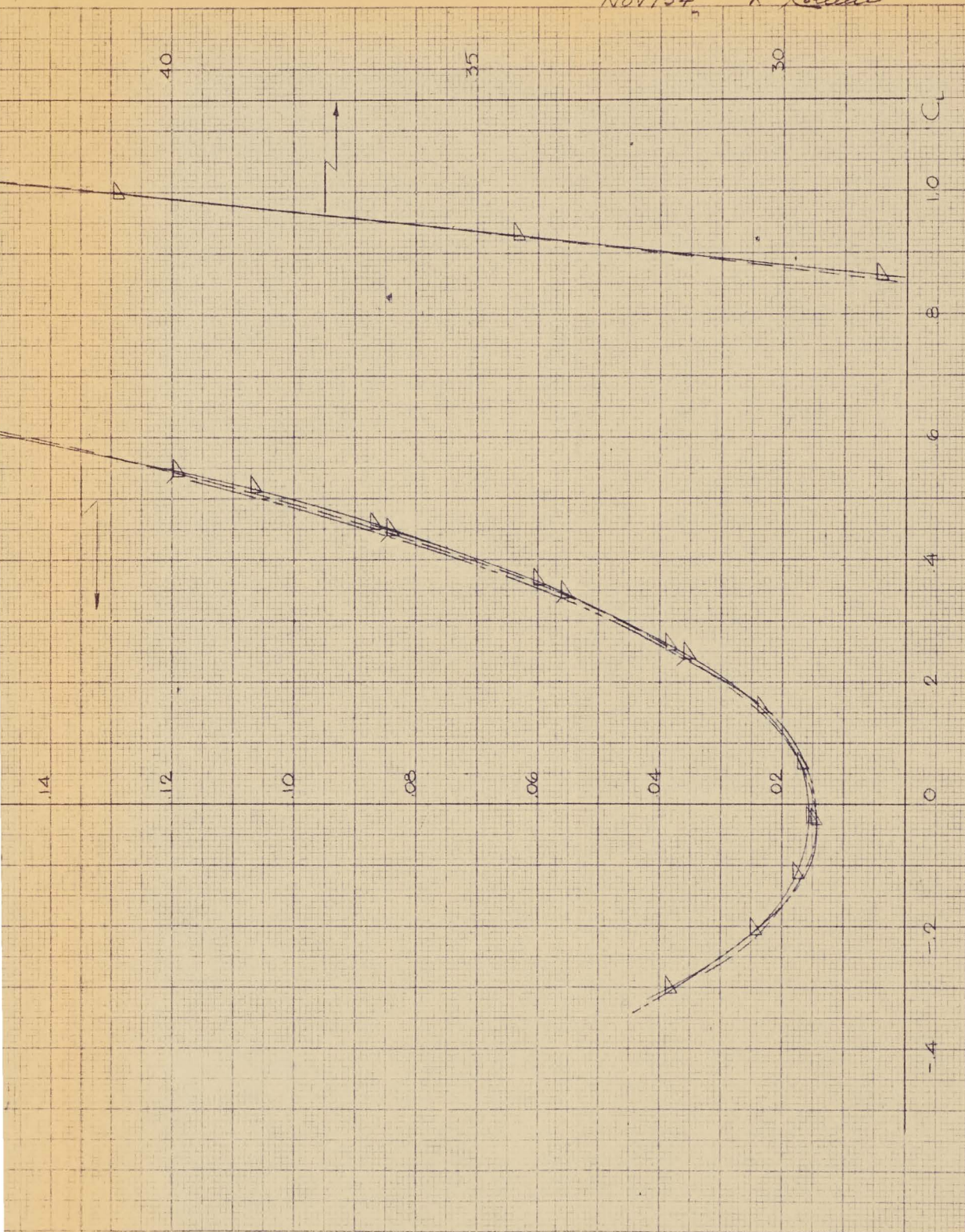


P/W/52

3.1

Nov/54

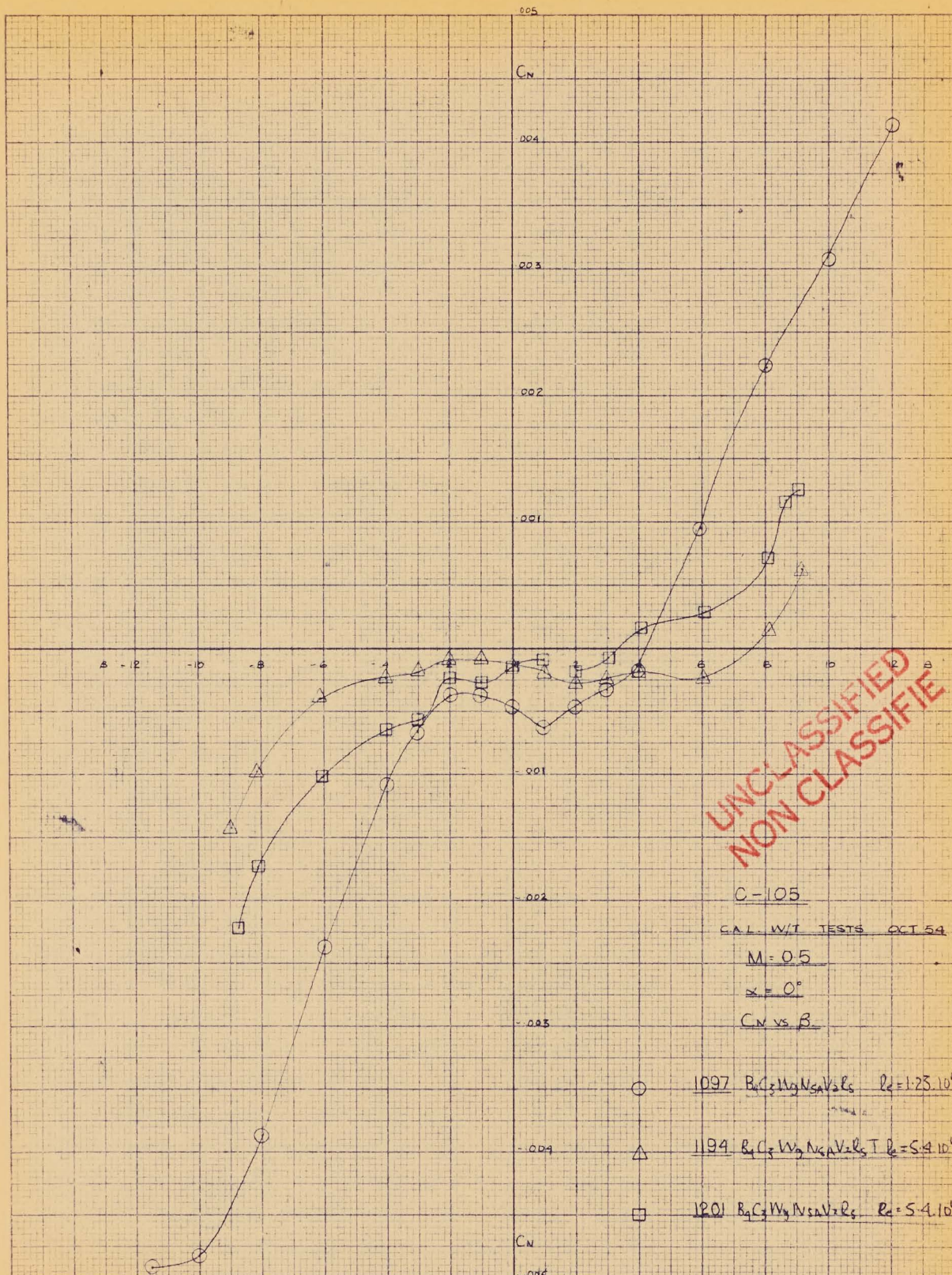
R. Collette



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P/WT/52

5.1.1



C-105

CAL. W/T TESTS OCT 54

$M = 0.5$

$\alpha = 0^\circ$

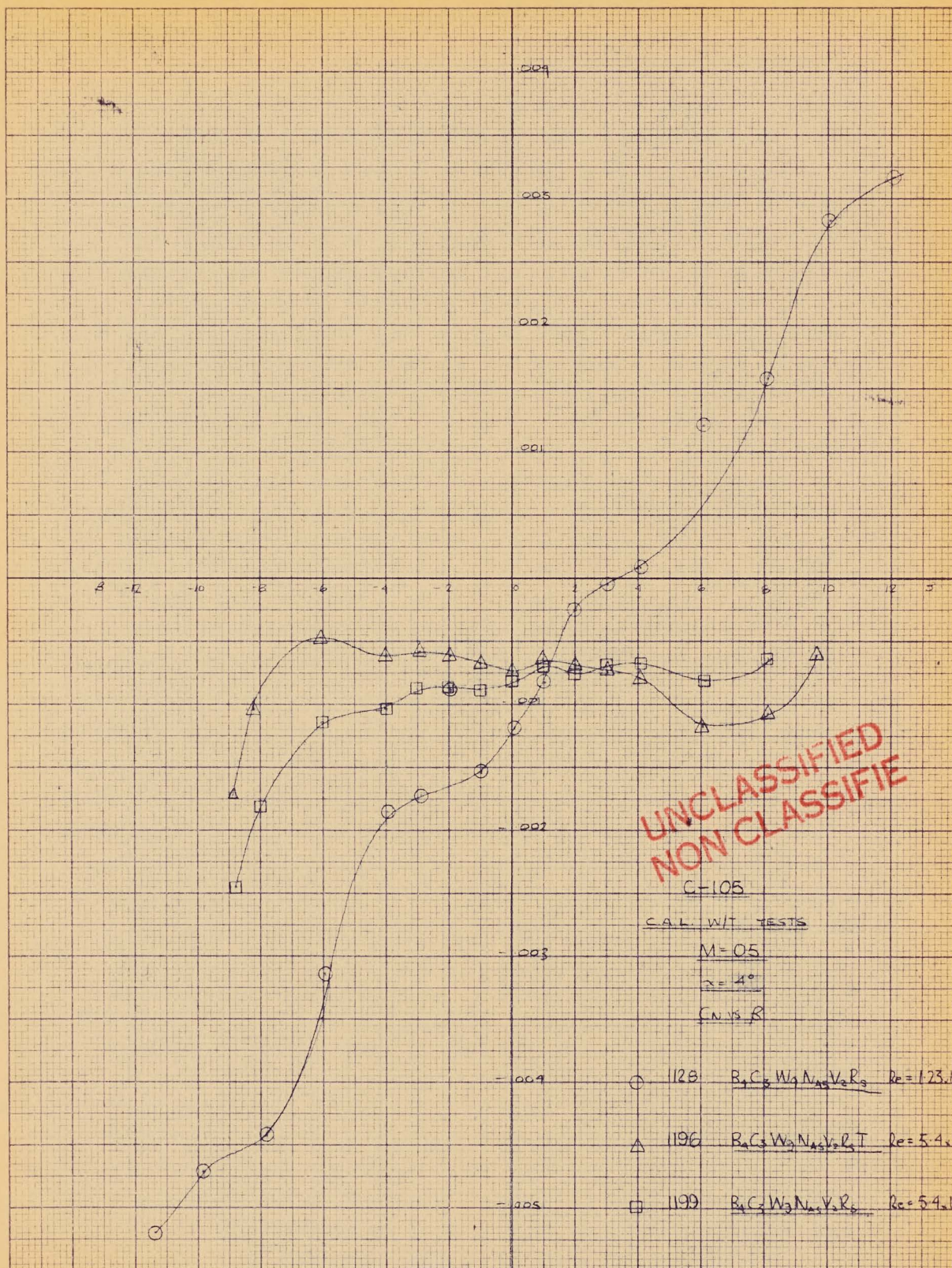
C_N vs β

- 1097 $B_1 C_2 W_3 N_4 V_5 R_6$ $R_6 = 1.25 \cdot 10^4$
- △ 1194 $B_1 C_2 W_3 N_4 V_5 T R_6$ $R_6 = 5.4 \cdot 10^4$
- 1201 $B_1 C_2 W_3 N_4 V_5 R_6$ $R_6 = 5.4 \cdot 10^4$

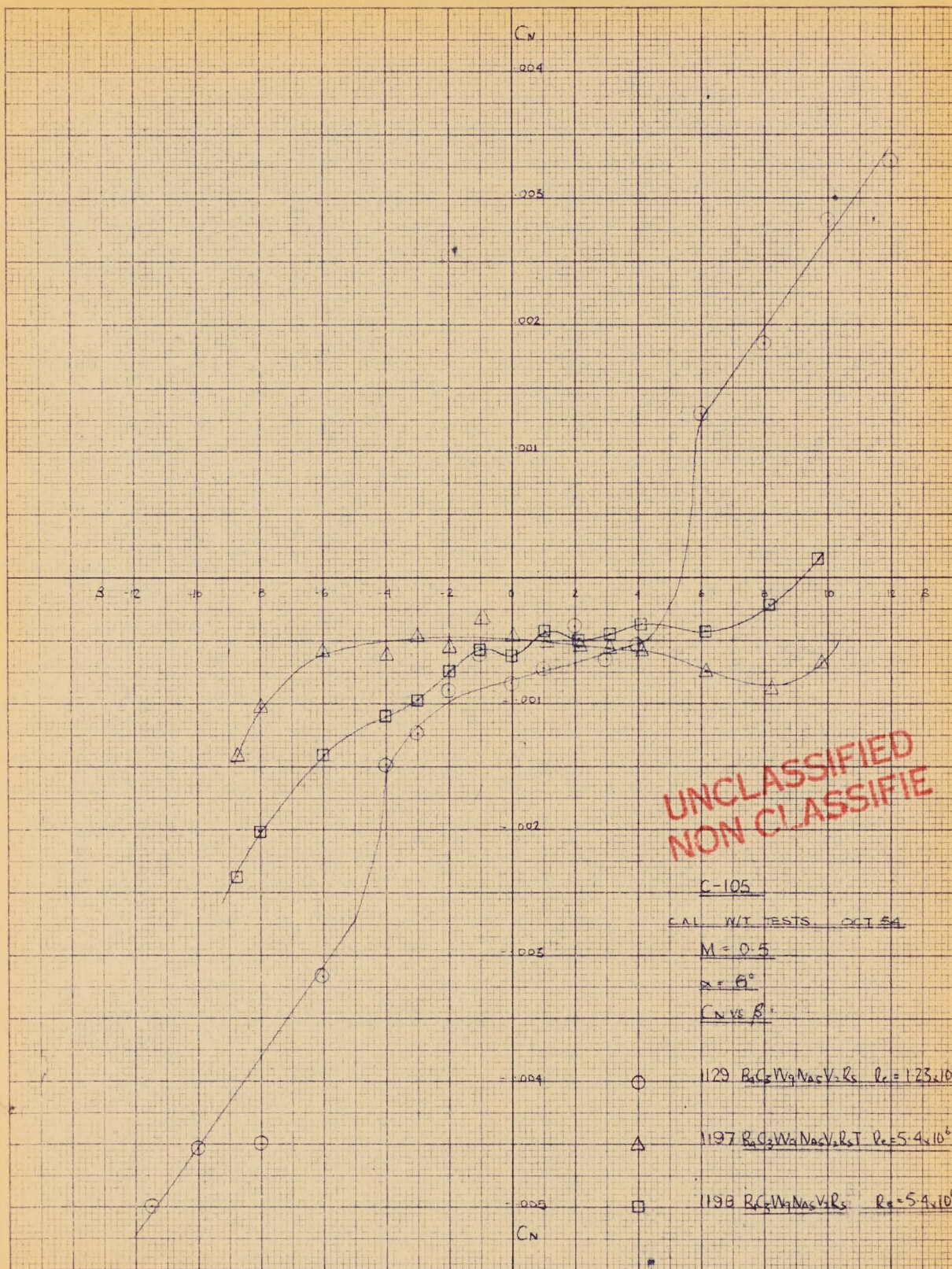
P/WIT/52

5.13

10 X 10 TO THE 1/2 INCH 359-12
KEUFFEL & ESSER CO. MADE IN U.S.A.



P/WT/52 5.1.4



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C-105

CAL W/T TESTS. OCT 54

$M = 0.5$

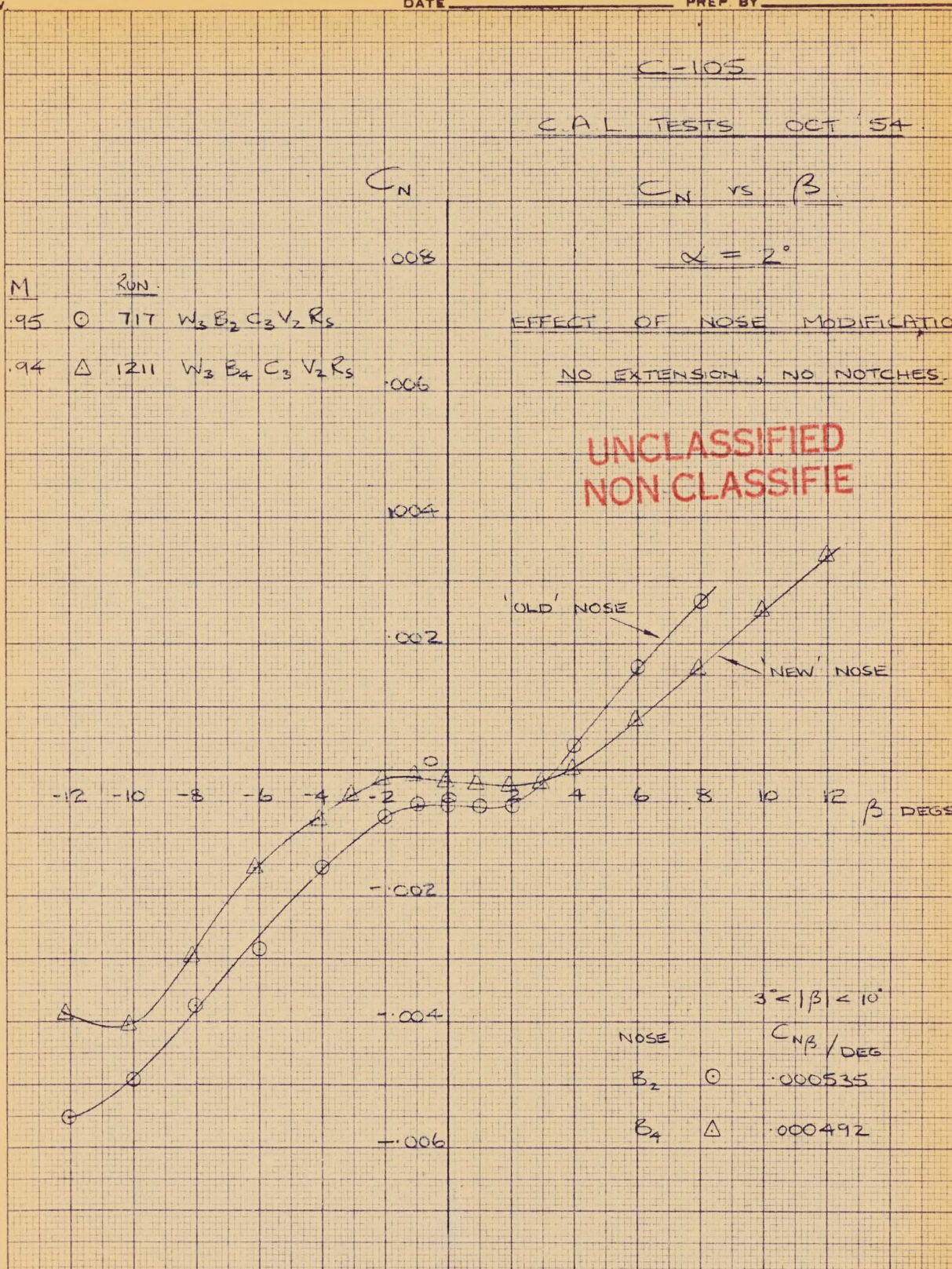
$\alpha = 6^\circ$

C_N vs β

1129 $RaCoWgNacVzRs$ $Re = 1.23 \times 10^6$

1197 $RaCoWgNacVzRs$ $Re = 5.4 \times 10^6$

1198 $RaCoWgNacVzRs$ $Re = 5.4 \times 10^6$



C-105

C.A.L. TESTS OCT. '54.

C_N

C_N vs β

$M = .95$

$\alpha = 2^\circ$

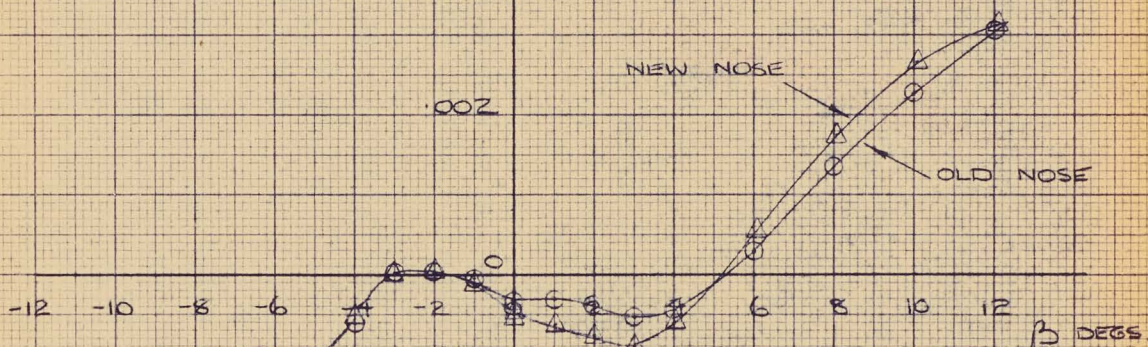
○ 1189 $B_2 W_9 N_{A5} C_3 V_2 R_s$

△ 1113 $B_4 W_9 N_{A5} C_3 V_2 R_s$

EFFECT OF NOSE MODIFICATION

10% EXTENSION, 5% NOTCH

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

NOSE

$C_N/\beta/\text{DEG}$

B_2 ○ .000515

B_4 △ .000515

C-105

C.A.I.L. TESTS OCT. '54

C_N

C_N vs β

.008

$M = .95$

$\alpha = 2^\circ$

○ 717 $W_3 B_2 C_2 V_2 R_5$

△ 1192 $W_9 B_2 C_3 V_2 R_5$

.006

EFFECT OF 10% EXTENSION

'OLD' NOSE.

.004

.002

NO EXTENSIONS

10% EXTENSIONS

-12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 β DEGS.

-.002

-.004

-.006

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AIRCRAFT
A. U. W.

COMPONENT

SHEET No. 532

REPORT No. P/WT/52

DATE

PREP. BY

C-105

C.A.L. TESTS OCT. '54

$C_N \sim \beta$

M RUN. C_N

$\alpha = 2^\circ$

.94 $\circ$ 1211 $B_4 W_3 C_3 V_2 R_5$

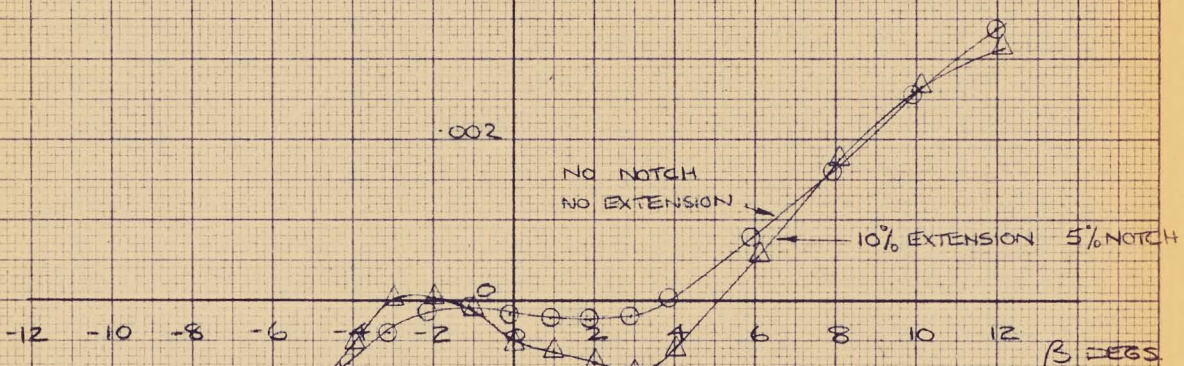
EFFECT OF 10% EXTENSION

.95 Δ 1113 $B_4 W_3 N_{A5} C_3 V_2 R_5$

WITH 5% NOTCH.

NEW NOSE

$M = .95$



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10 X 10 TO THE 1/2 INCH 359-12
K&S
KREUFFEL & ESSER CO. MADE IN U.S.A.

AIRCRAFT
A. U. W.

COMPONENT

SHEET No. 53-3

REPORT No. P/WT/52

DATE

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C-105

C.A.L. TESTS OCT '54

C_N vs β

$\alpha = 2^\circ$

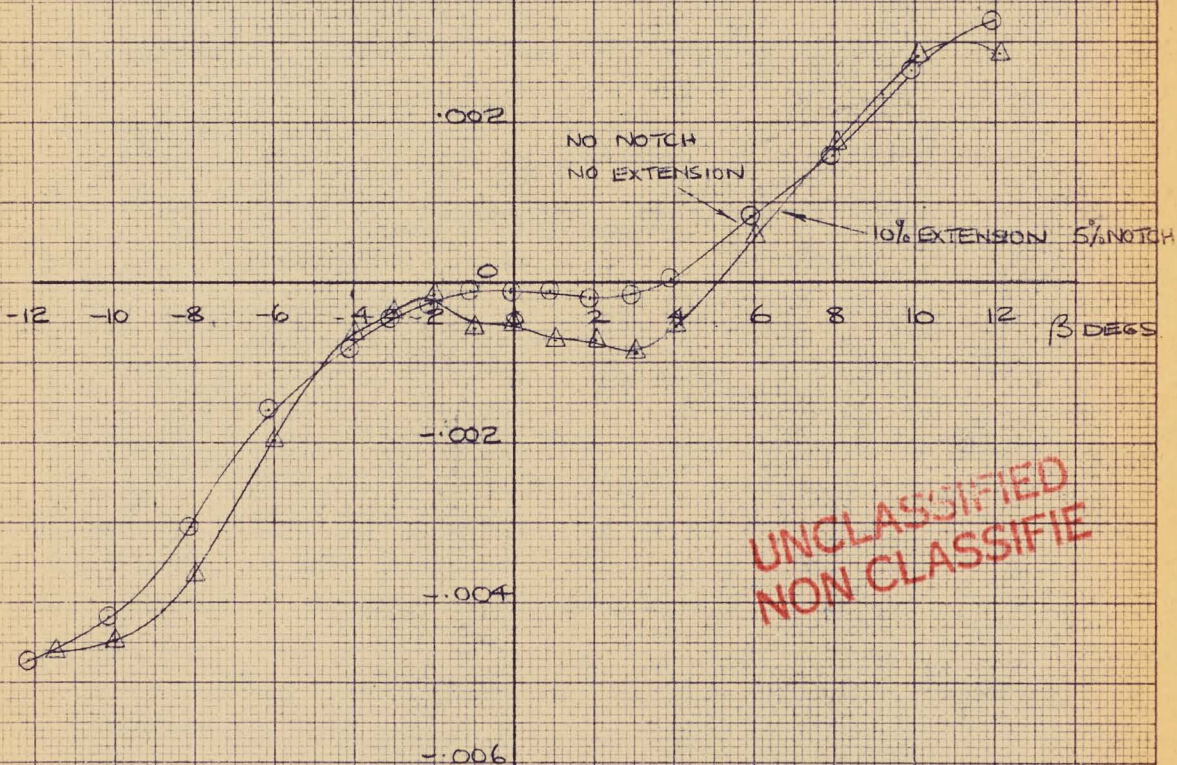
M	RUN	Configuration
90	1213	$B_4 W_3 C_3 V_2 R_5$
90	1114	$B_4 W_9 N_{A5} C_3 V_2 R_5$

EFFECT OF 10% EXTENSION

WITH 5% NOTCH.

NEW NOSE

$M = 90$



AIRCRAFT
A. U. W.

COMPONENT

SHEET NO. 5.41

REPORT NO. PLWT/52

DATE

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C.A.L. TESTS OCT. 54

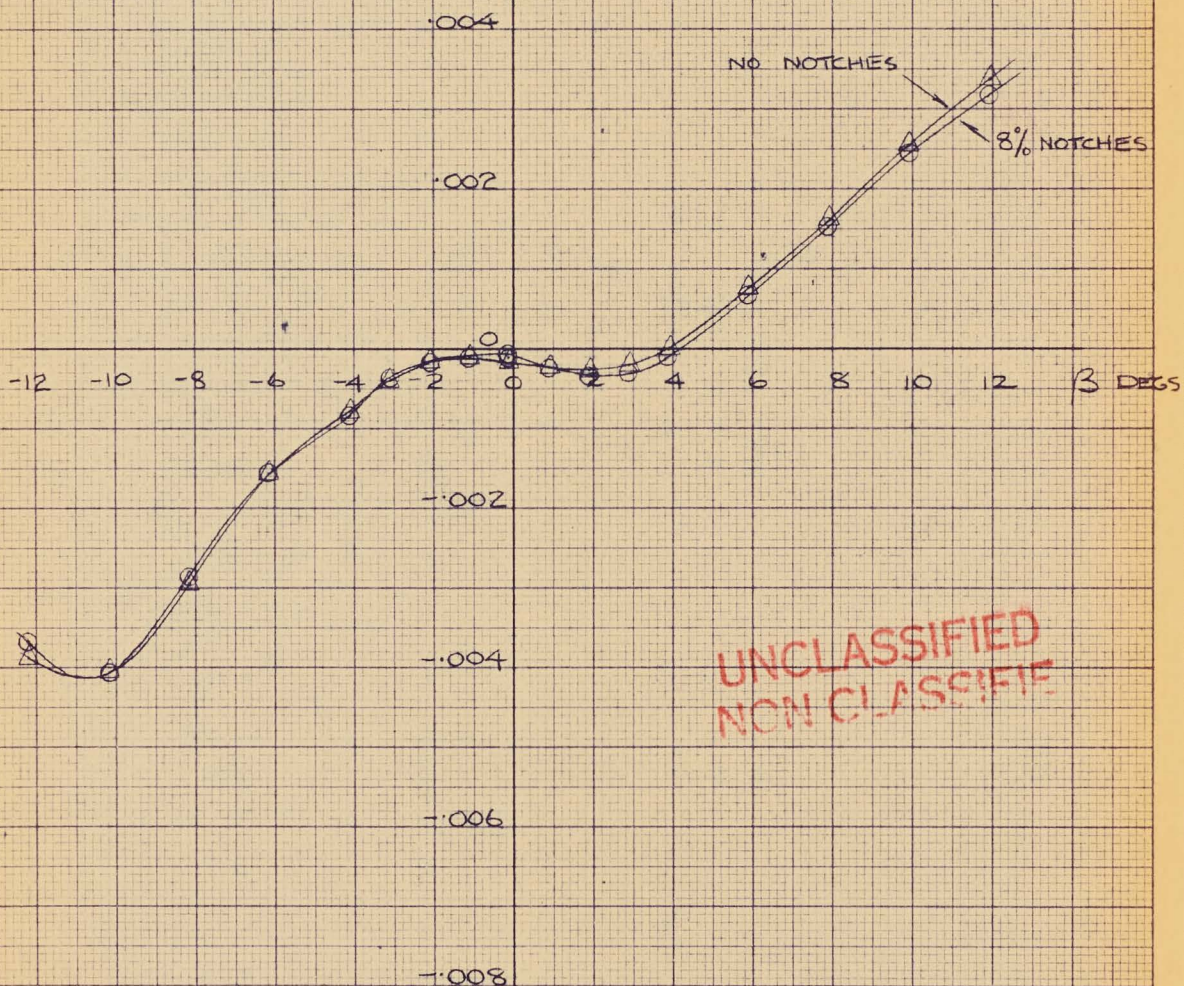
C_N vs β

$M = .94$

$\alpha = 2^\circ$

○ 1210 $W_3 B_4 N_{A_8} C_3 V_2 R_5$
△ 1211 $W_3 B_4 C_3 V_2 R_5$

EFFECT OF 8% NOTCHES
'NEW' NOSE



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542 P/WT/52

Oct/54. S. Kurath

C105

CAL WIND TUNNEL TESTS OCT 52

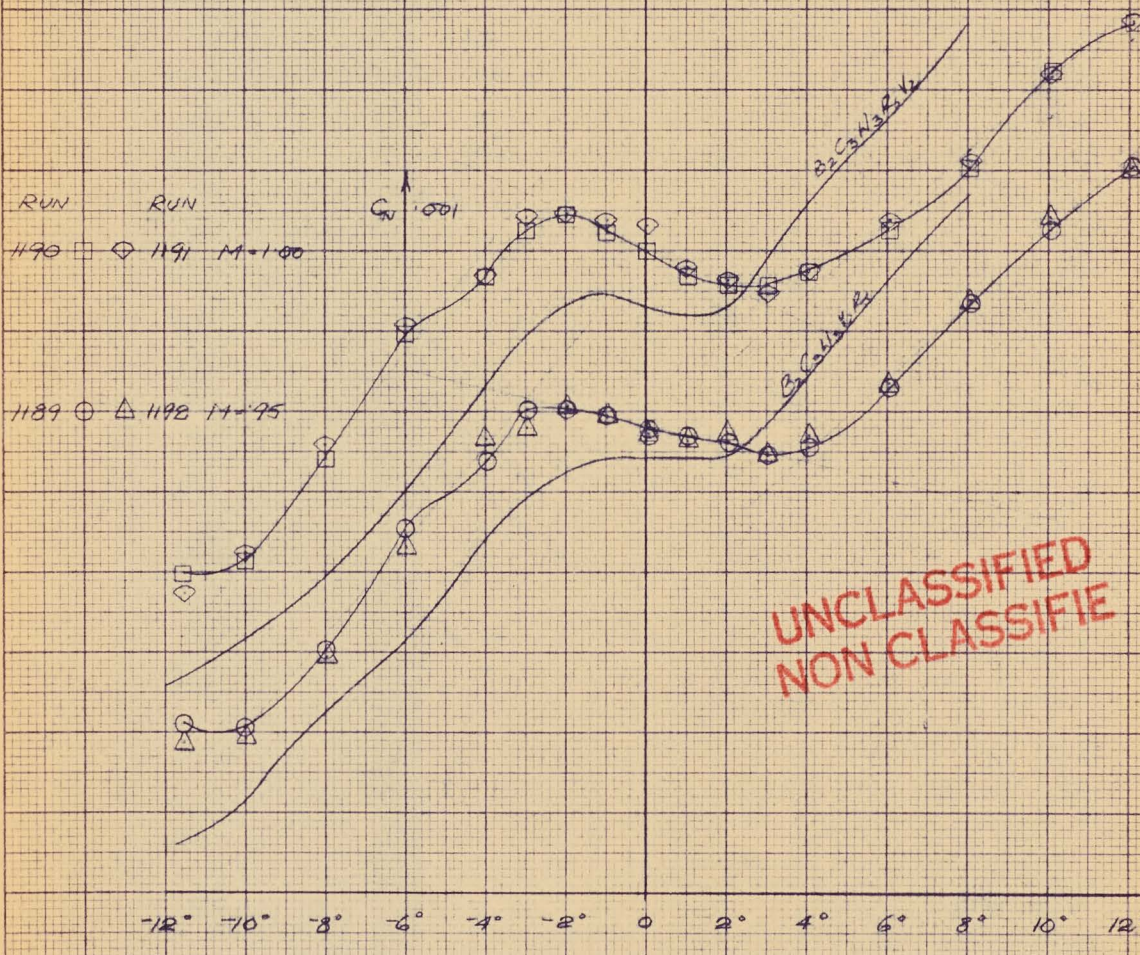
C_N vs β

EFFECT OF NOTCH

$\alpha = 2^\circ$

$\square$ $B_2 C_3 W_9 R_3 V_2 N_{45}$

$\triangle$ $B_2 C_3 W_9 R_3 K$



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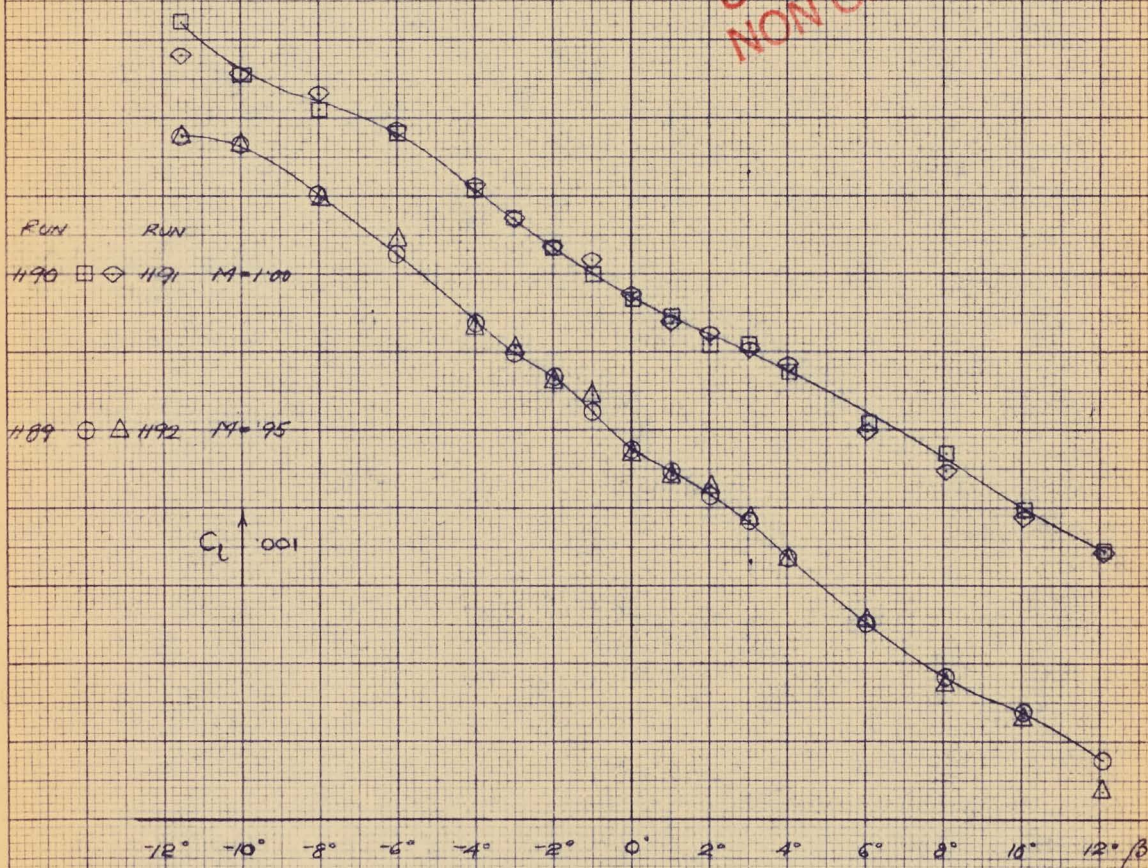
61 P/NT 152
Oct/54 J. Knapkowski

C105
C.A.L. WIND TUNNEL TESTS OCT. 57
 C_L vs β

EFFECT OF NOTCH
 $\alpha = 2^\circ$

○ □ $B_2 C_2 H_9 R_3 V_2 N_{95}$
△ ◇ $B_2 C_3 H_9 R_3 V_2$

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P/WT/52 7.1
C.A. Ford 4 Nov. 54

C-105

C.A.L. Wind Tunnel Tests
Oct. 1954

CNF

Reynolds Number Effect

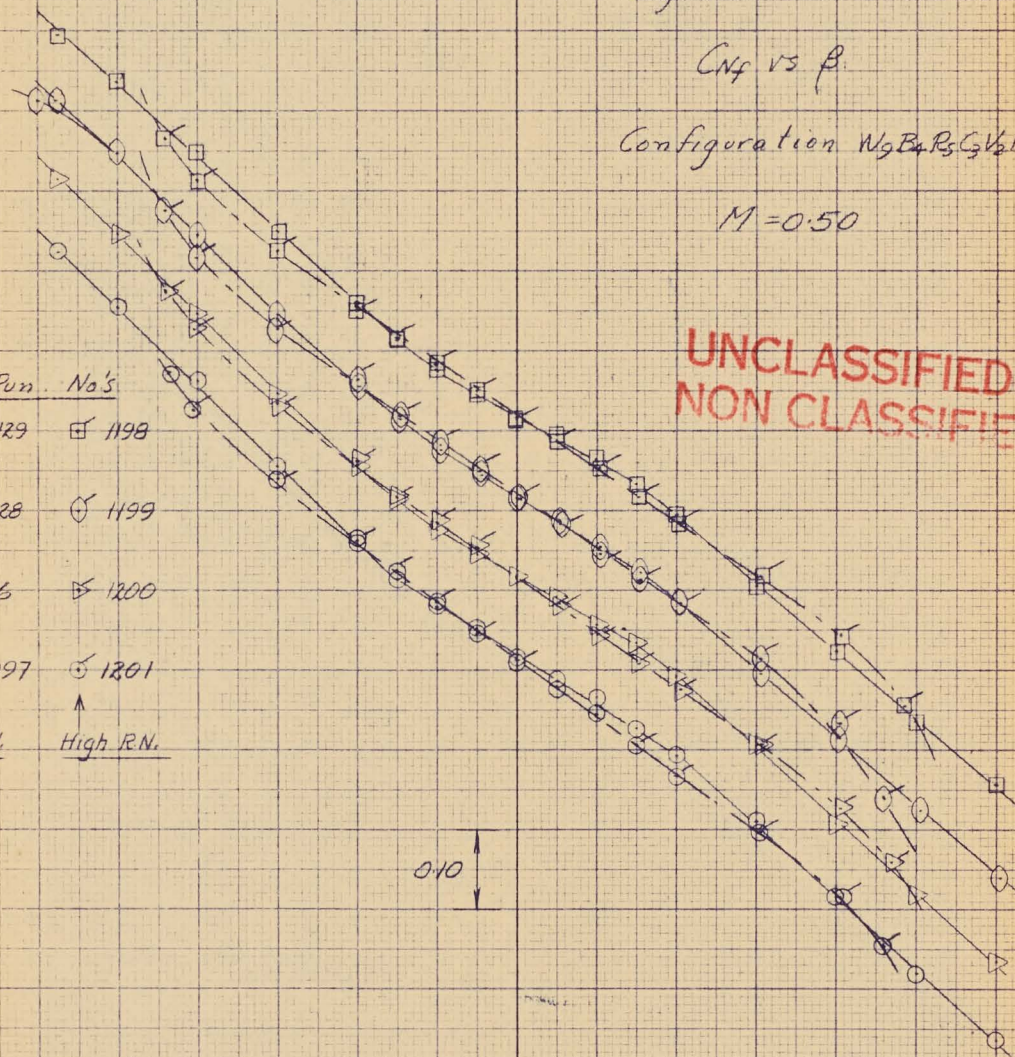
CNF vs β

Configuration $W_9 B_4 R_5 C_3 V_2 N_{45}$

$M=0.50$

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α	Run. No's	
66°	□ 1129	□ 1198
44°	○ 1128	○ 1199
22°	△ 1116	△ 1200
0°	○ 1097	○ 1201
	↑ Low RN.	↑ High RN.



0.10

-10 -5 0 5 10
 β - degrees

C-105C.A.L. Wind Tunnel TestsOct. 1954Effect of Wing Configuration
on C_{Nf} vs β C_{Nf} 