CF-105 ANALYZED P/WIND TUNNEL/108

N.A.E. LOW SPEED WIND TUNNEL TESTS

JANUARY 1956

LONGITUDINAL DERIVATIVES AND

COMPARISON WITH C.A.L.

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A V ROE CANADA LIMITED

MALTON ONTARIO

TECHNICAL DEPARTMENT (Aircraft)

AIRCRAFT CF-105 REPORT NO P/WIND TUNNEL/108

FILE NO NO OF SHEETS

TITLE

N.A.E. LOW SPEED WIND TUNNEL TESTS

JANUARY 1956

LONGITUDINAL DERIVATIVES AND COMPARISON WITH C.A.L.

PREPARED BY Stability and Control Group DATE April 1956

CHECKED BY J. Clark DATE April 1956

SUPERVISED BY DATE June 1956

APPROVED BY DATE June 1956

ISSUE NO	REVISION NO	REVISED	APPROVED BY	DATE	REMARKS

FORM 1316A

C-105

LIFT CURVE SLOPE vs ANGLE OF ATTACK

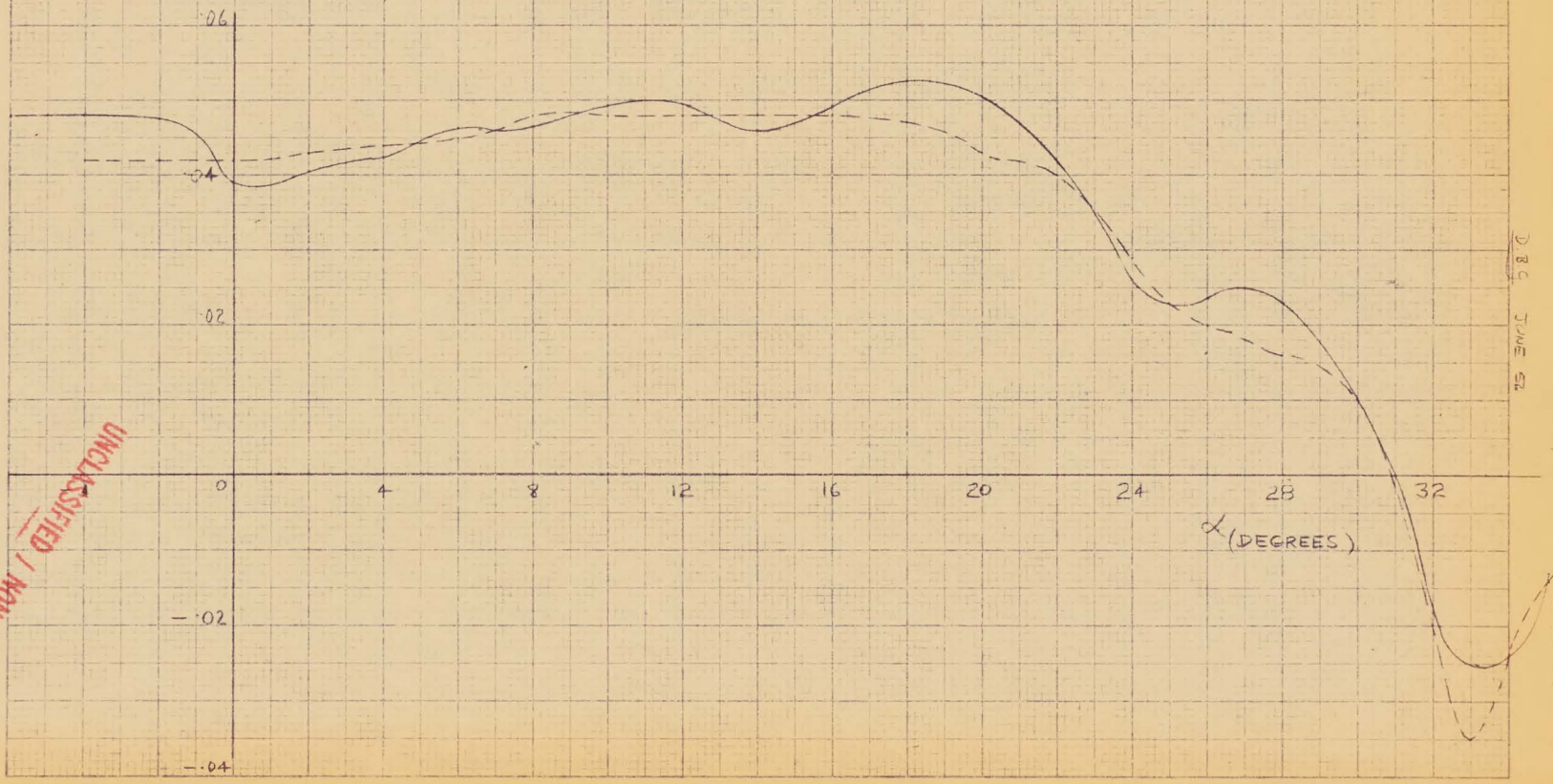
LOW MACH NUMBER

HIGH REYNOLDS NUMBER

NAE W/T TESTS ————

CAL W/T TESTS - - - - - -

$\delta_e = 0°$



D.B.C. JUNE 52

P/WT/108

SHT. 1.1

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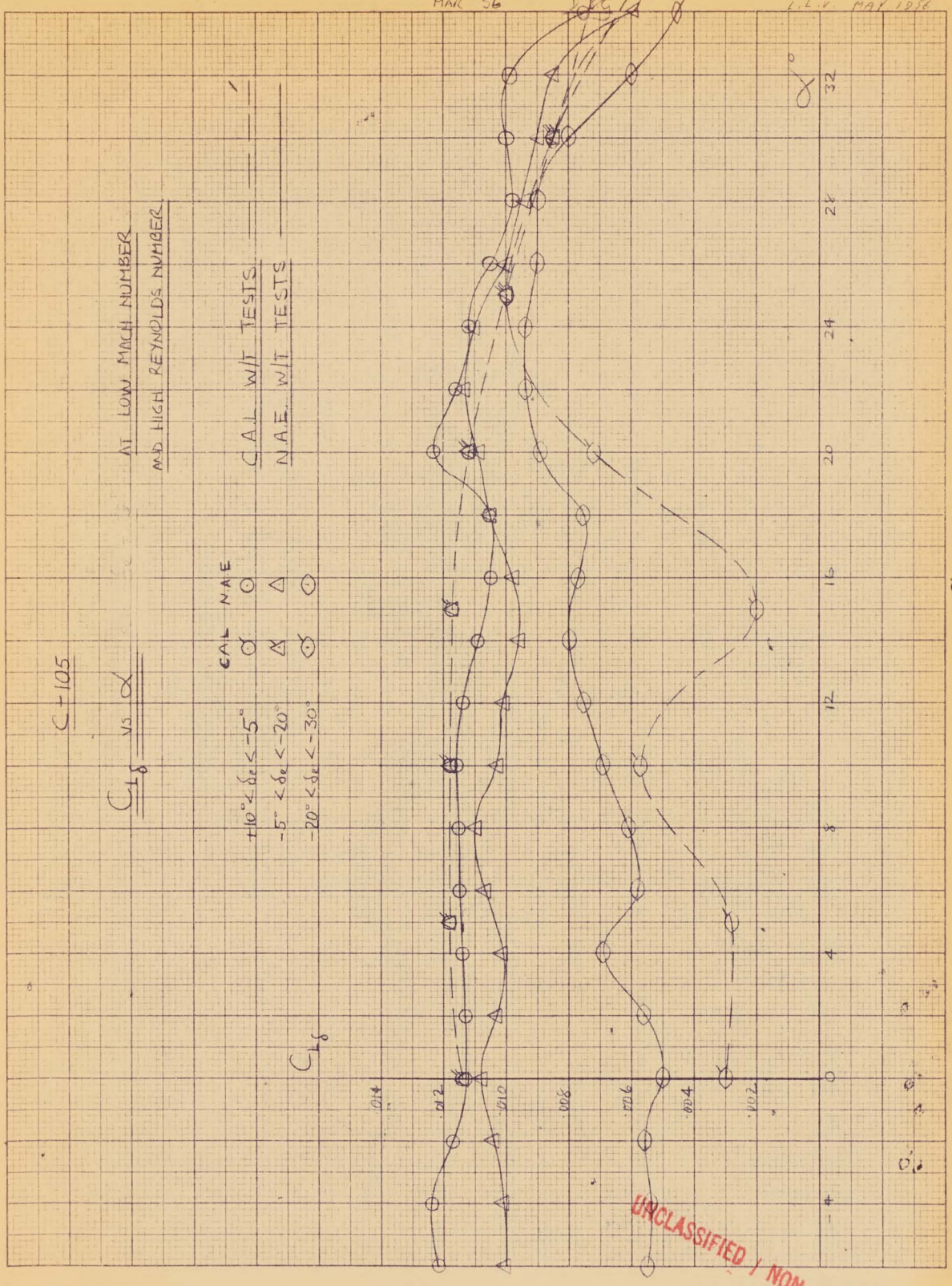
C_{L_δ} vs α

AT LOW MACH NUMBER
AND HIGH REYNOLDS NUMBER

	CAL	NAE
$+10° < \delta_e < -5°$	○	○
$-5° < \delta_e < -20°$	⊠	△
$-20° < \delta_e < -30°$	⊙	⊙

CAL W/T TESTS
N.A.E. W/T TESTS



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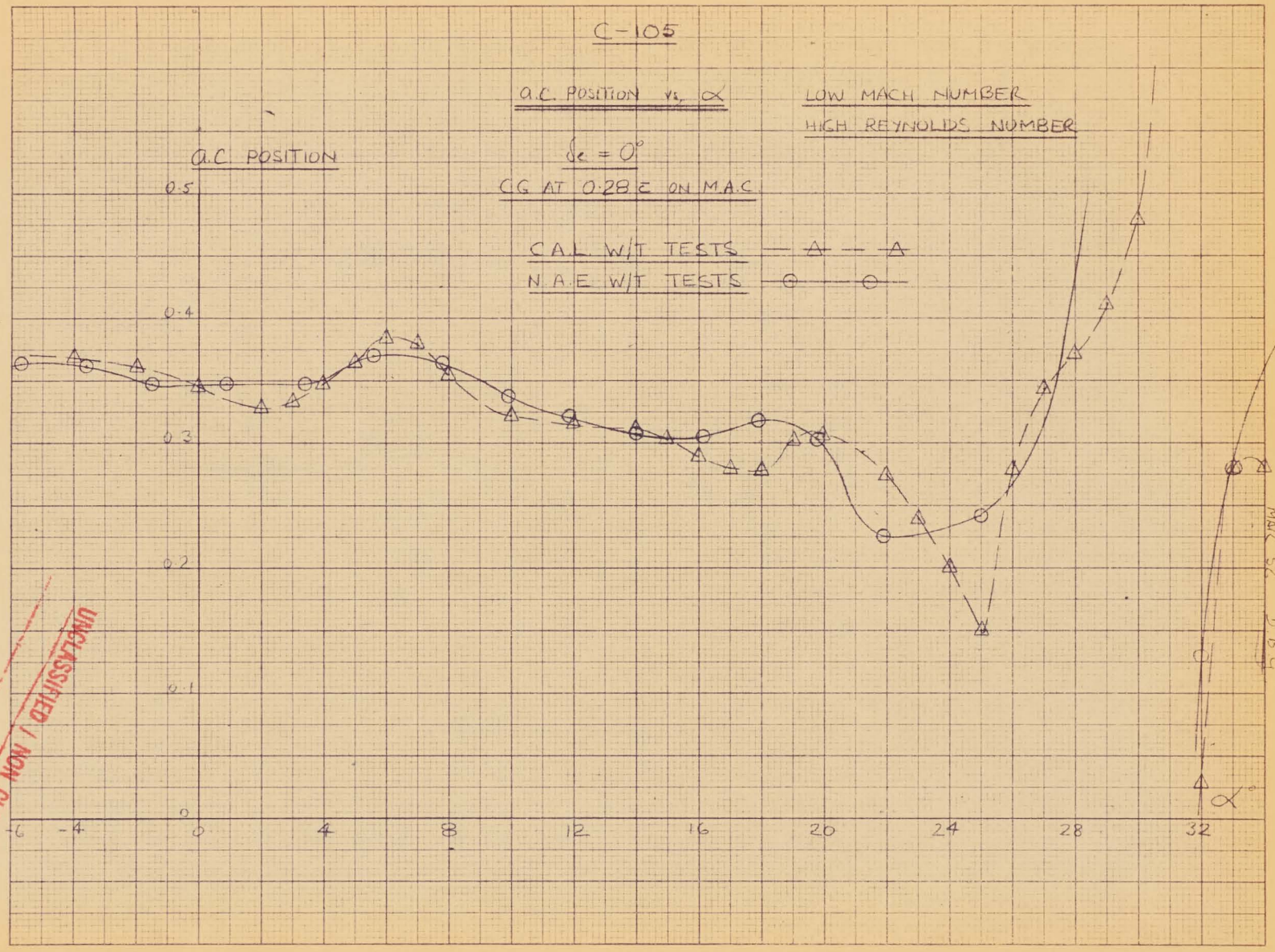

P/WT/108 2.1

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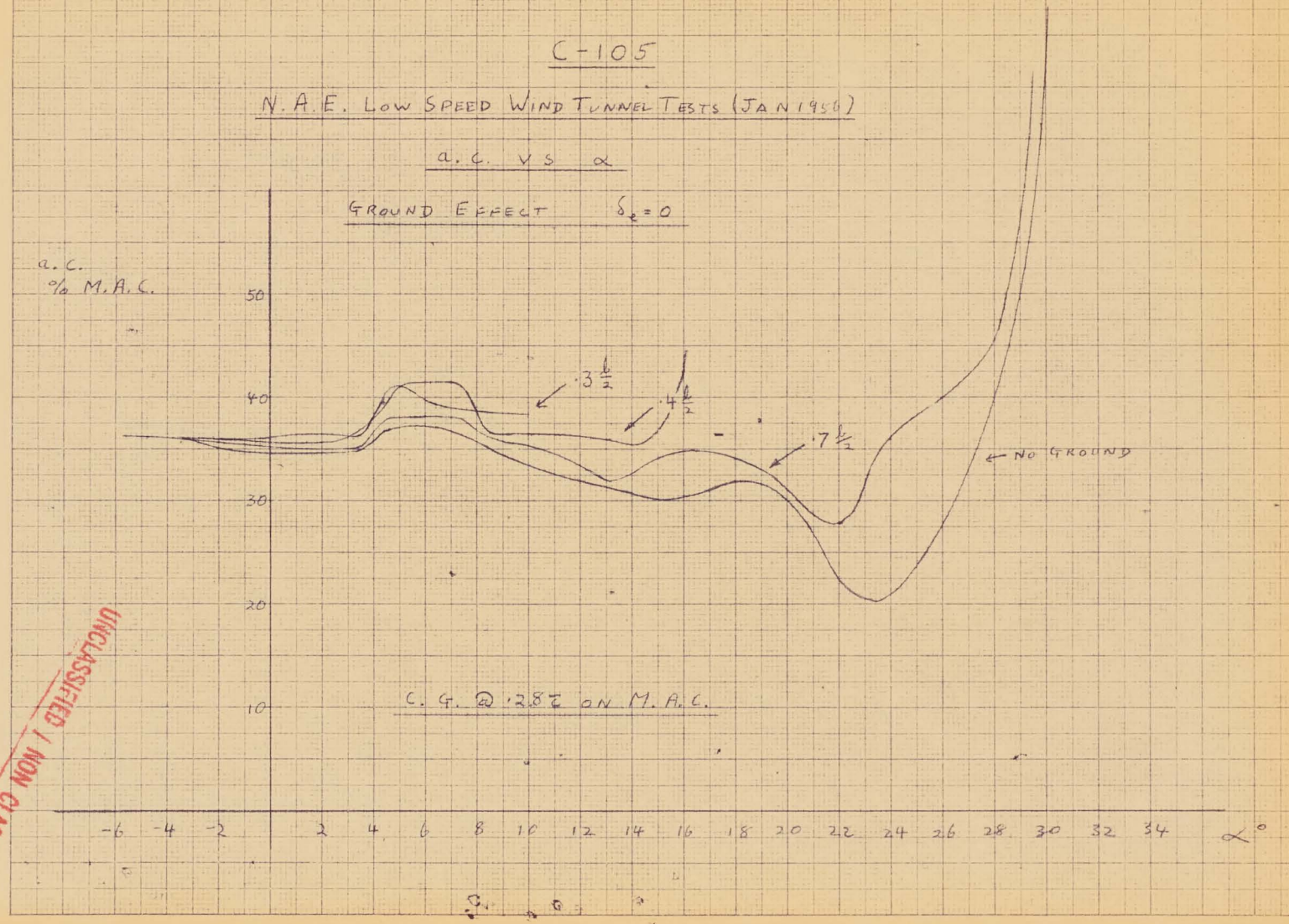
N.A.E. Low Speed Wind Tunnel Tests (Jan 1956)

a.c. vs α

Ground Effect $\delta_e = 0$



P/WT/108 2.1B

April 1956 E.R. Firth

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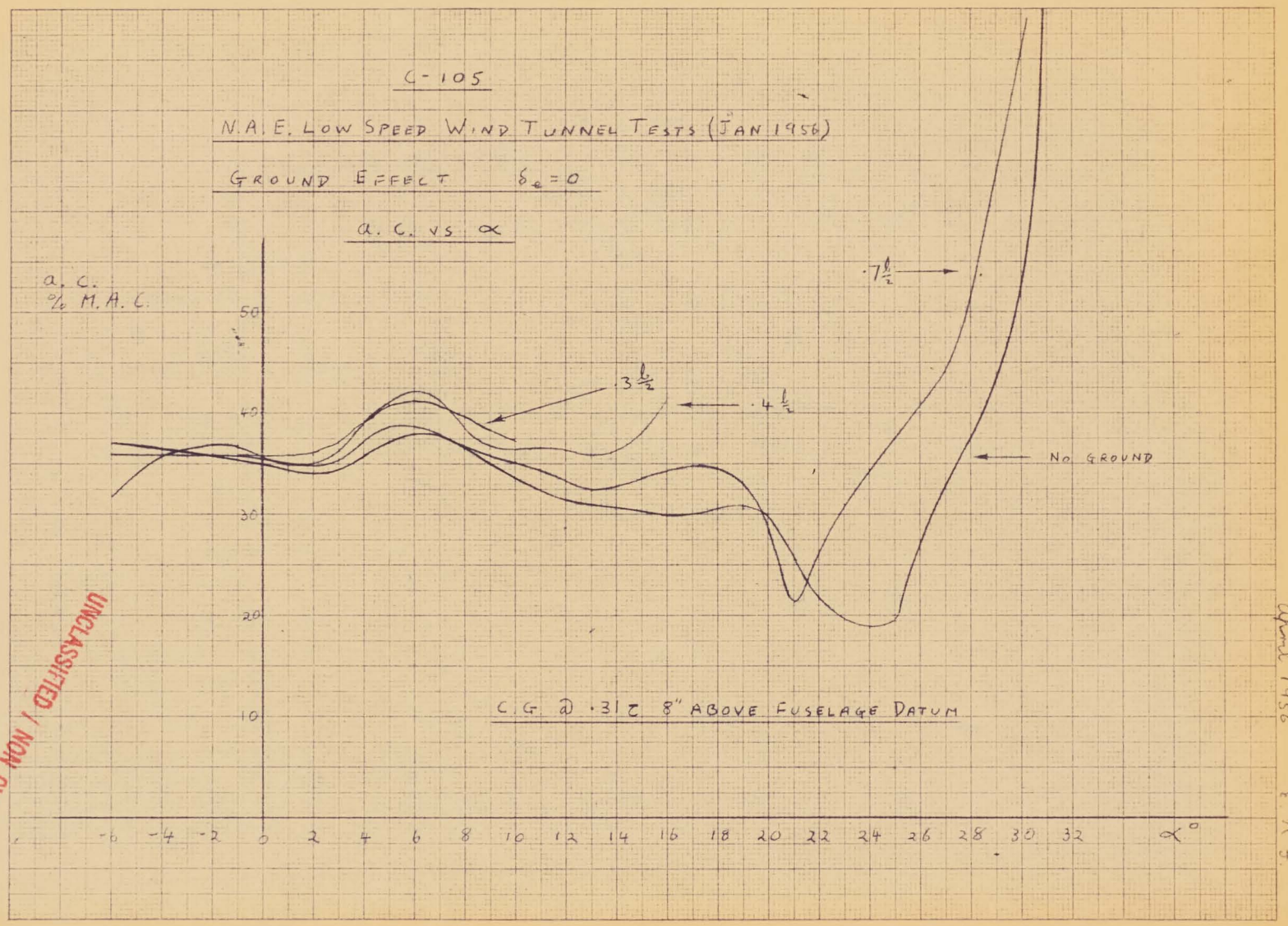
N.A.E. LOW SPEED WIND TUNNEL TESTS (JAN 1956)

GROUND EFFECT $\delta_e = 0$

a.c. vs α



C.G. @ .31 c 8" ABOVE FUSELAGE DATUM

C-105

$C_{M_{\delta_e}}$ vs α $(\delta_e = 0)$

C.G. @ .28 c̄ ON M.A.C.

C.A.L. (FROM P/WT/84) △
N.A.E. LOW SPEED ◯

C_{M_δ} AT CONST α

-.006
-.005
-.004
-.003
-.002
-.001

-5° 0° 5° 10° 15° 20° 25° 30° α

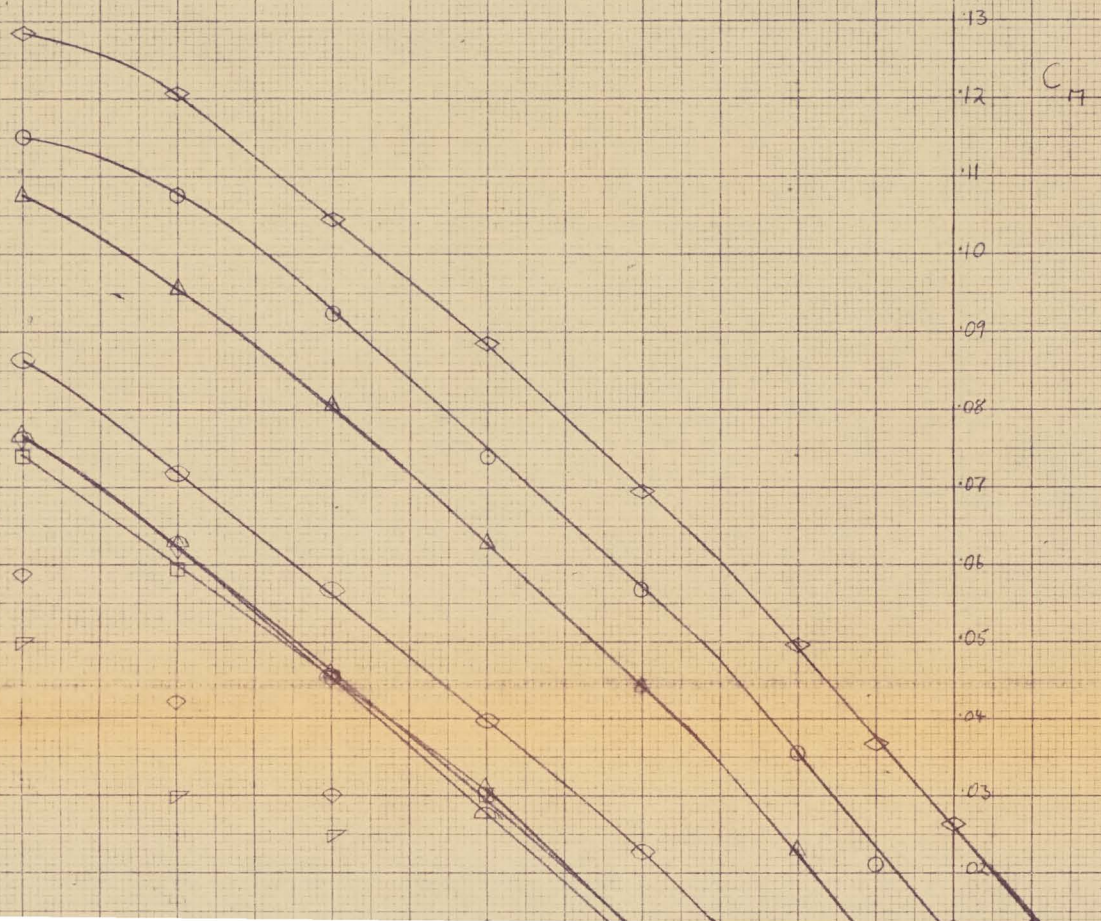
P/WT/108 2.2.
ER7 APRIL 1956

C-105

N.A.E. Low Speed Wind Tunnel Tests (Jan 1956)

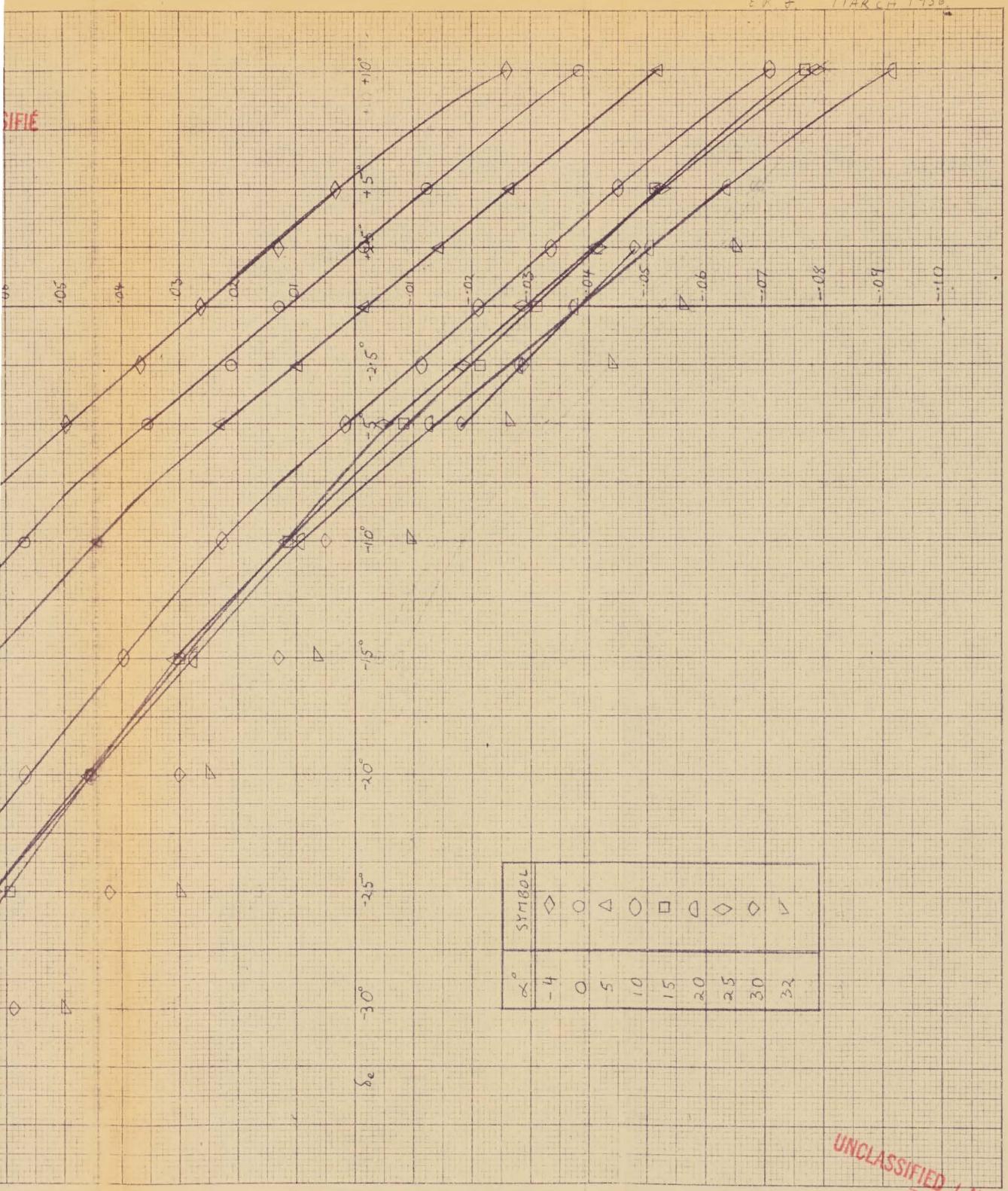
C_M vs δ_e (@ constant α)

C.G @ .28$\bar{c}$ on M.A.C.



P/WT/108 2·2·2

E.P.7 MARCH 1956



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C_{M_δ} AT CONSTANT C_L VS C_L

CG AT 0·28 $\bar{c}$ ON M.A.C.

LOW MACH NUMBER
HIGH REYNOLDS NUMBER

N.A.E W/T TESTS

	δ_e
○	0° i_t +10°
△	0° i_t −10°
○	0° i_t −20°
□	0° i_t −30°

C.A.L. W/T TESTS

○	−5° i_t +10°
△	0° i_t −10°
○	0° i_t −20°
□	0° i_t −30°

$C_{M_{\delta[C_L]}}$

−·006
−·004
−·002

−4 −2 0 2 4 6 8 10

C_L

C-105

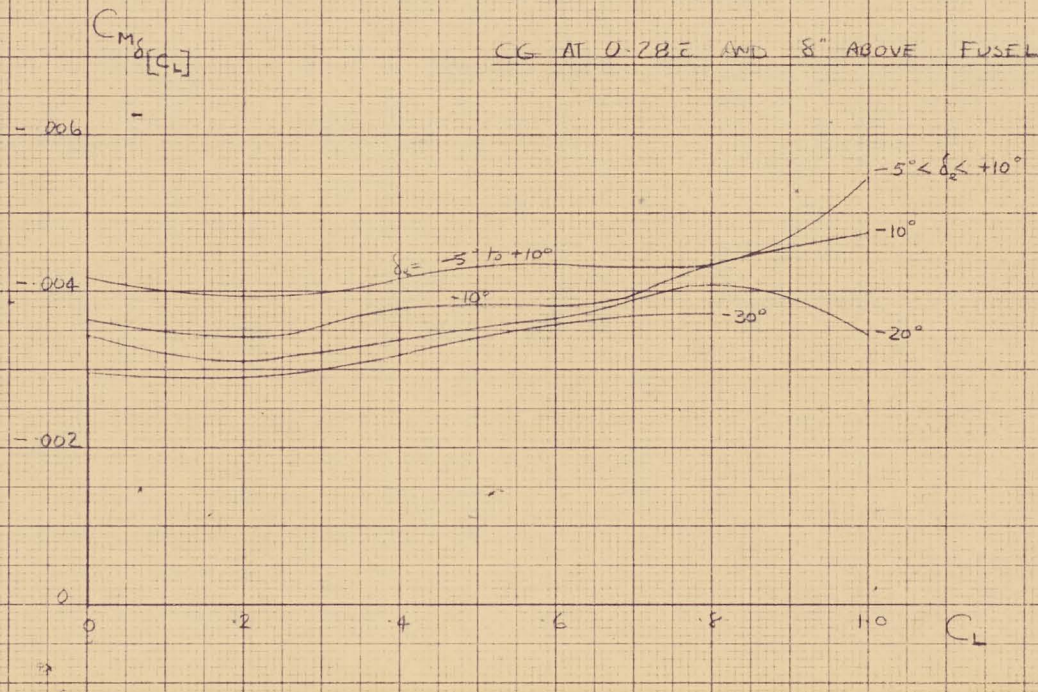
NAE LOW SPEED WIND TUNNEL TESTS

$C_{M_\delta (\text{const } C_L)}$ vs C_L AND δ_E

NO GROUND BOARD

(DERIVED FROM P/WT/98 5.3)
(SECANTS DRAWN FROM $\delta = 0°$)

CG AT 0.28 $\bar{c}$ AND 8" ABOVE FUSELAGE DATUM



MARCH 52 DRC

P/WT/108 2.3A

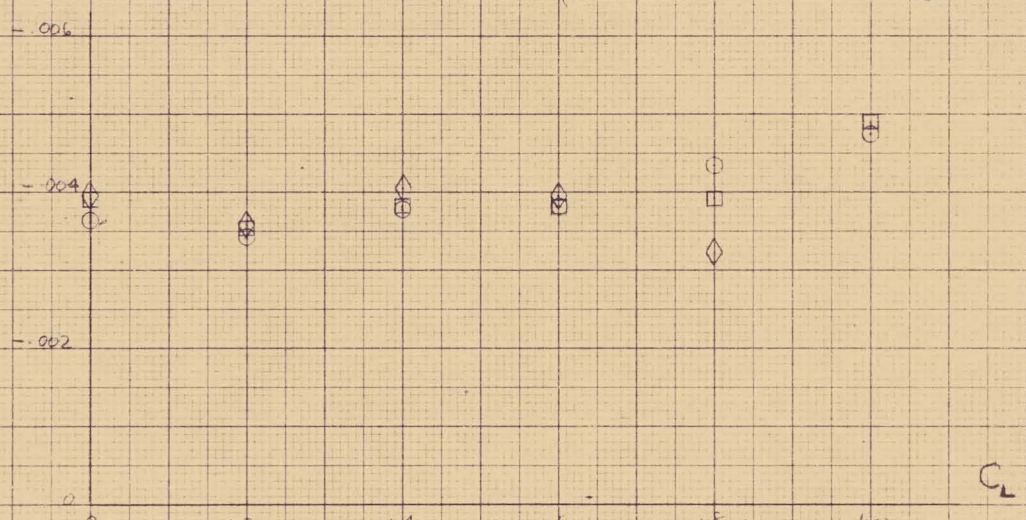
C-105

NAE LOW SPEED WIND TUNNEL TESTS (JAN 1956)

EFFECT OF GROUND ON $C_{M_\delta(C_L)}$ vs C_L WITH $\delta_e = -10°$

GROUND BOARD POSITION	0.4 b/2	0.7 b/2	∞
SYMBOL	◇	□	○

CG AT .28 c̄ AND 8" ABOVE FUSELAGE DATUM
(SECANTS DRAWN FROM $i_w = 0°$)



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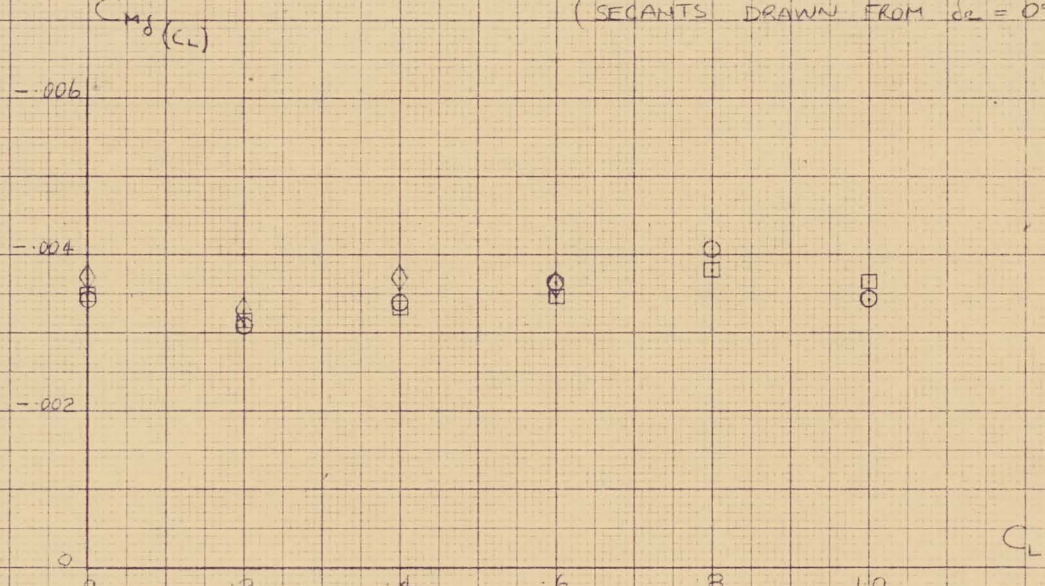
NAE LOW SPEED WIND TUNNEL TESTS (JAN 1956)

EFFECT OF GROUND ON $C_{M_{\delta_e}(C_L)}$ VS C_L WITH $\delta_e = -20°$

GROUND BOARD POSITION	0.4 b/2	0.7 b/2	∞
SYMBOL	◇	□	○

CG AT 0.28 c̄ AND 8" ABOVE FUSELAGE DATUM
(SECANTS DRAWN FROM $\delta_e = 0°$)



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NAE LOW SPEED WIND TUNNEL TESTS (JAN 1956)

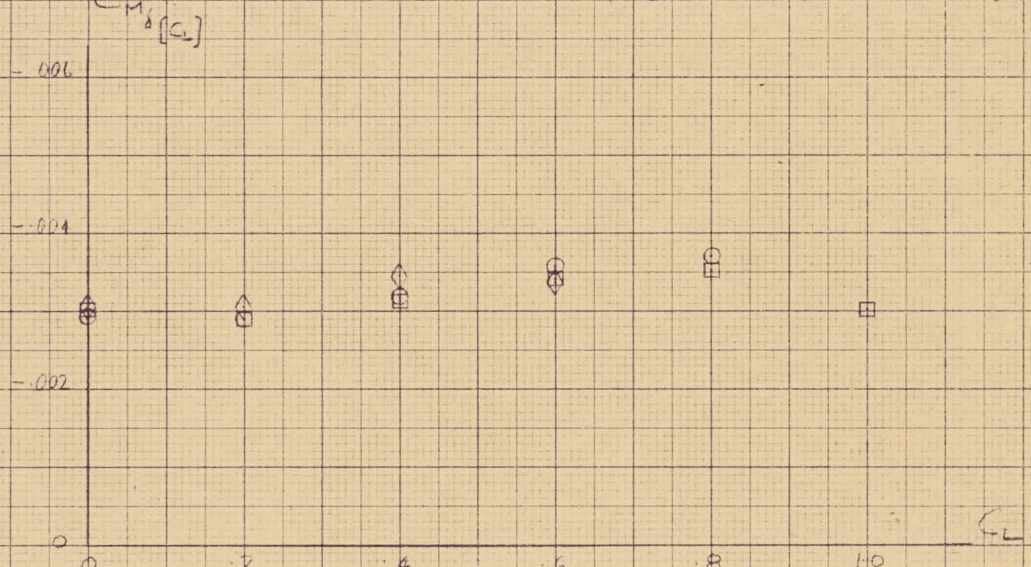
EFFECT OF GROUND ON $C_{M_\delta [C_L]}$ vs C_L WITH $\delta_e = -30°$

GROUND BOARD POSITION 0.4 b/2 0.7 b/2 ∞

SYMBOL ◇ ⊡ ⊙

CG AT 0.28 $\bar{c}$ AND 8" ABOVE FUSELAGE DATUM

(SECANTS DRAWN FROM $\delta_e = 0°$)



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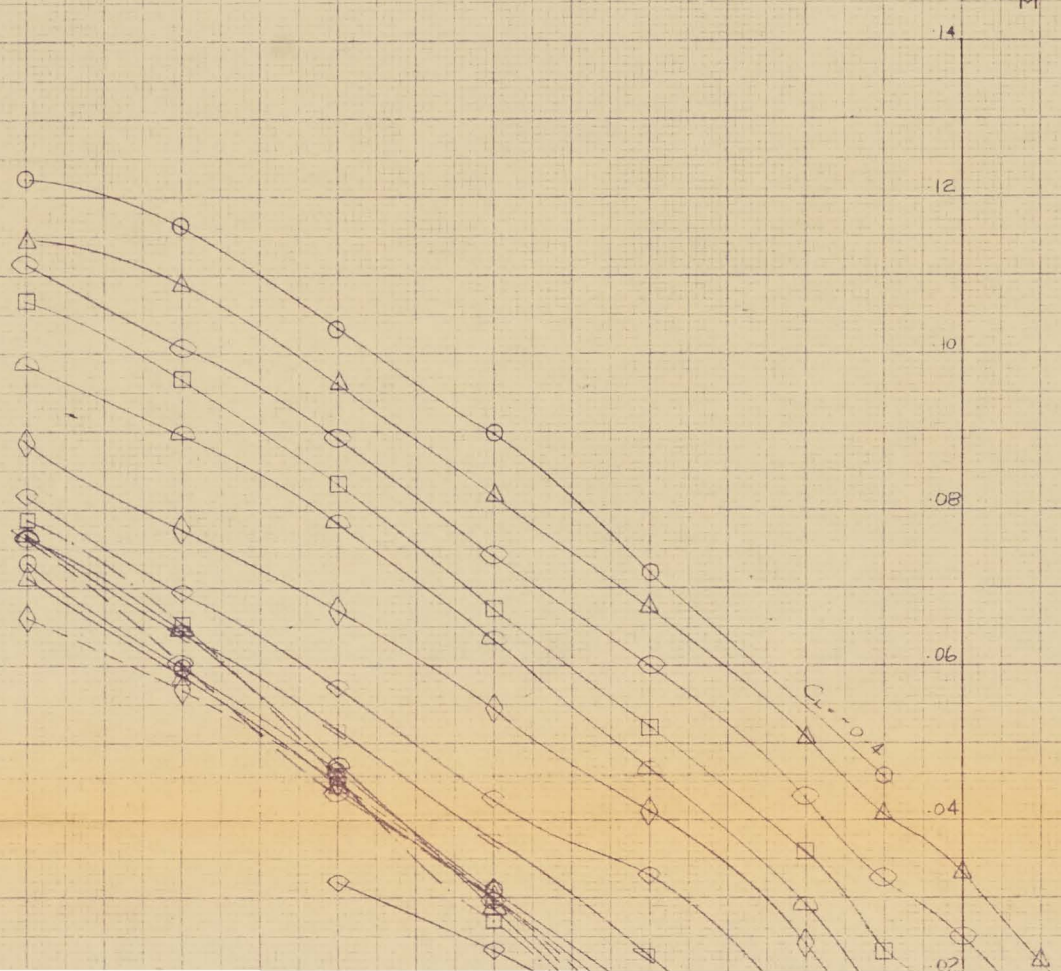
NAE. LOW SPEED WIND TUNNEL TESTS (JAN 1956)

C_M vs δ_R AT CONSTANT C_L

CG AT 0.28c ON MAC



MAR '56 DJC

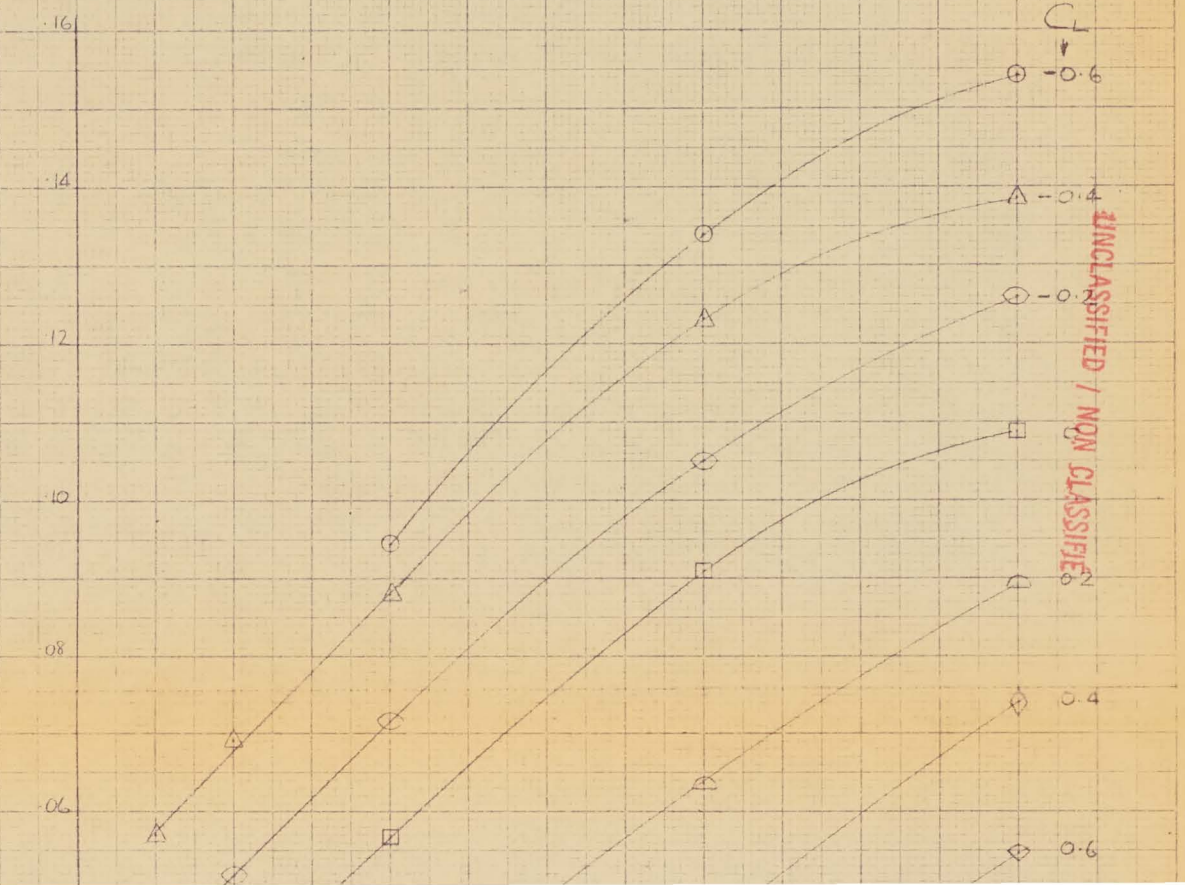
C-105

NAE LOW SPEED WIND TUNNEL TESTS (JAN 1956)

C_M vs δ_e (AT CONST C_L)

GROUND BOARD AT 0·4 $b/2$

CG AT 0·28$\bar{c}$ AND $\bar{8}$" ABOVE FUSELAGE DATUM



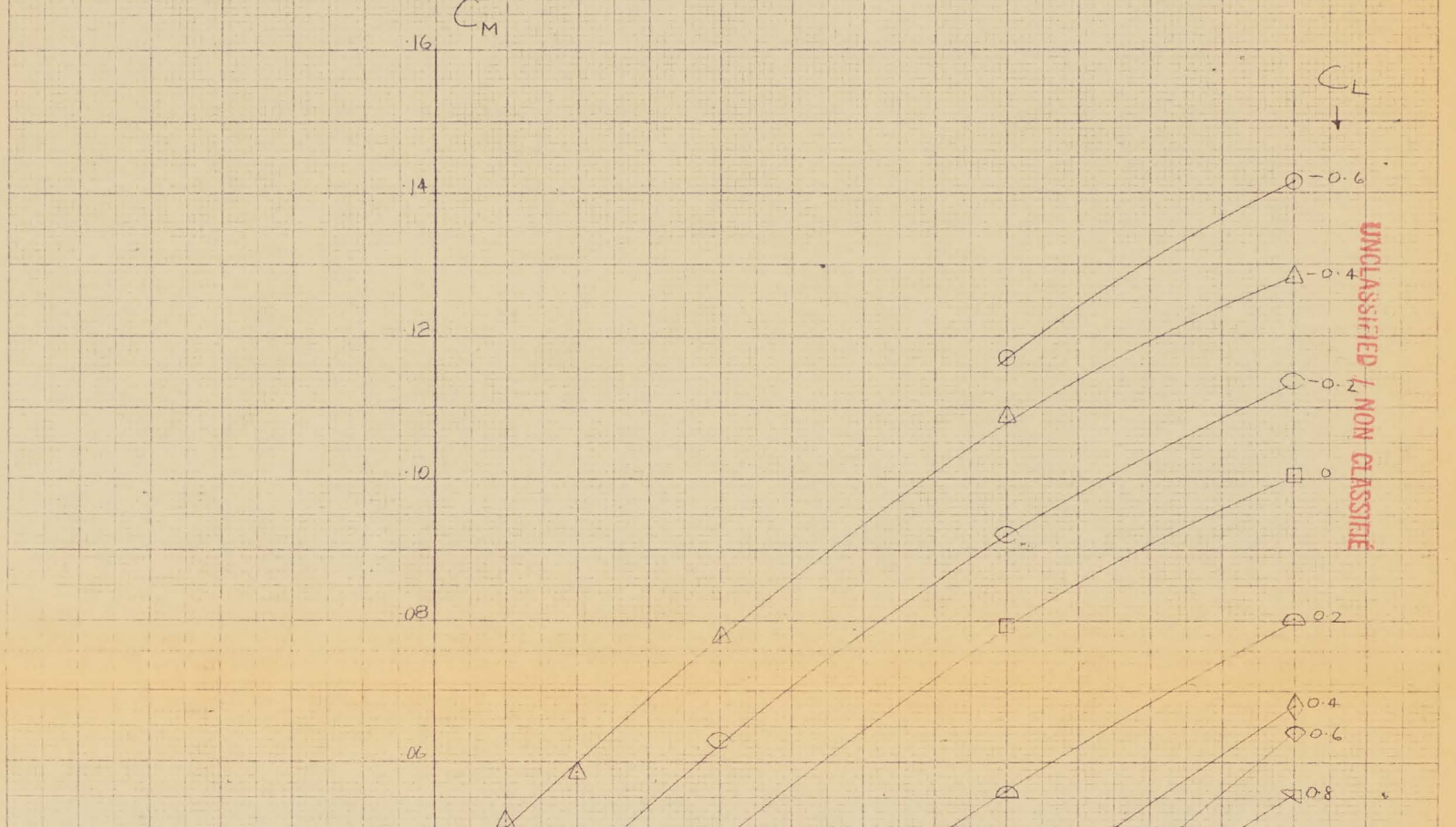
C-105

NAE WIND TUNNEL TESTS (LOW SPEED) (JAN 1952)

C_M vs δ_e (AT CONST C_L)

GROUND BOARD AT $0.7\frac{b}{2}$

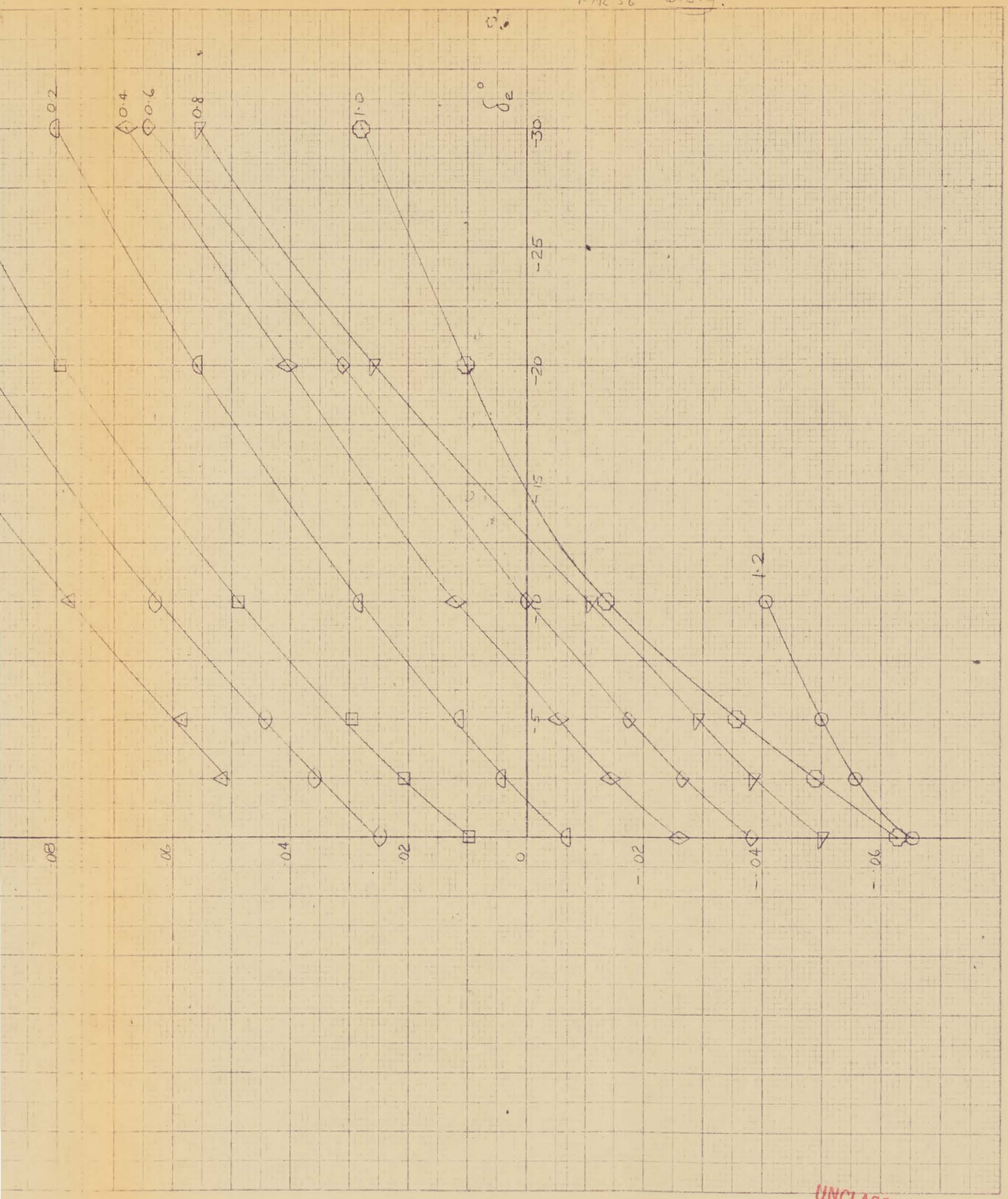
CG AT 0.28 $\bar{c}$ AND 8" ABOVE FUSELAGE DATUM



P/WT/108

2·3·5

MAR '56 D.B.G.



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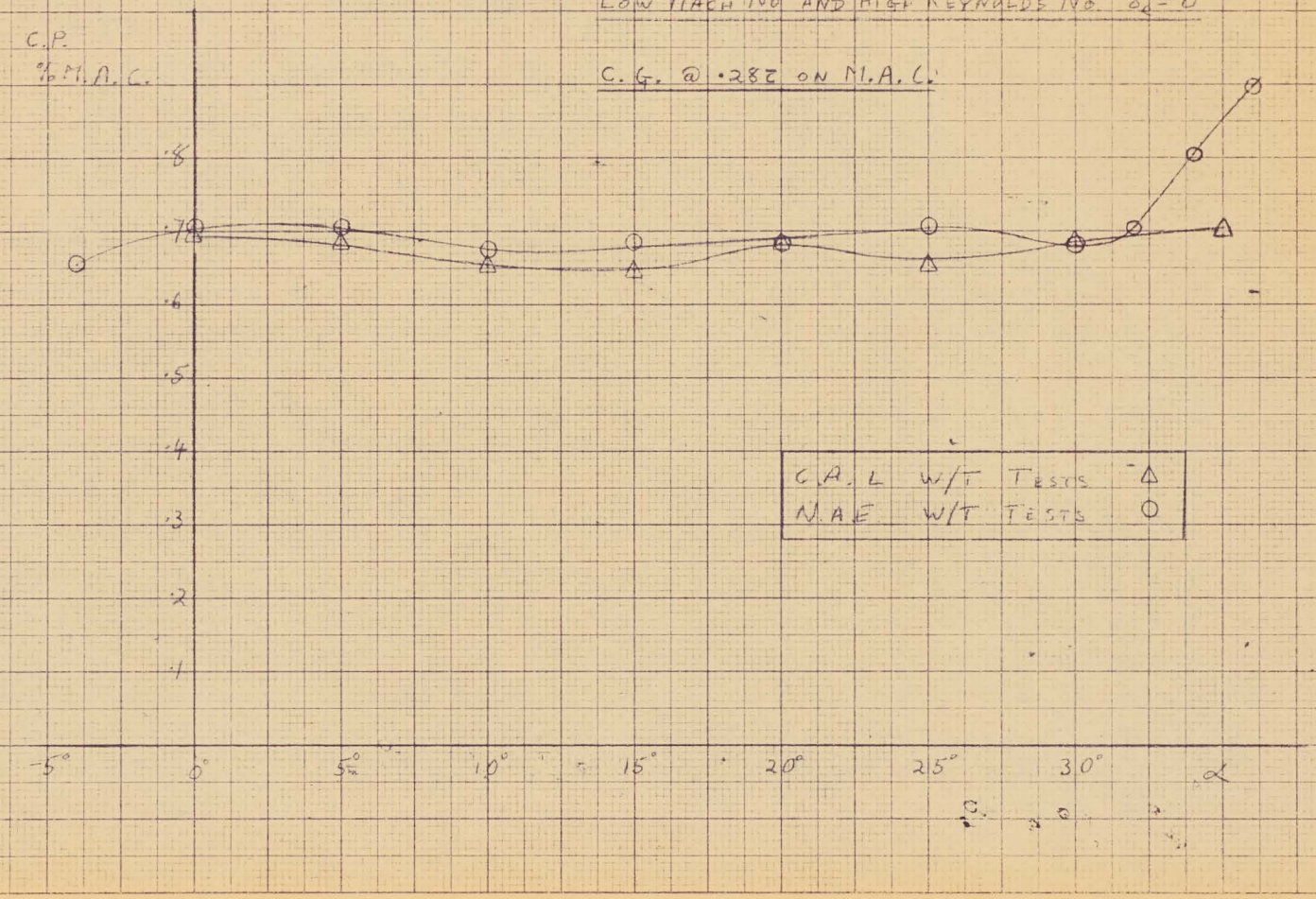
C.P. POSITION VS α

LOW MACH NO AND HIGH REYNOLDS NO. $\delta_e = 0$

C.G. @ .28 ON M.A.C.



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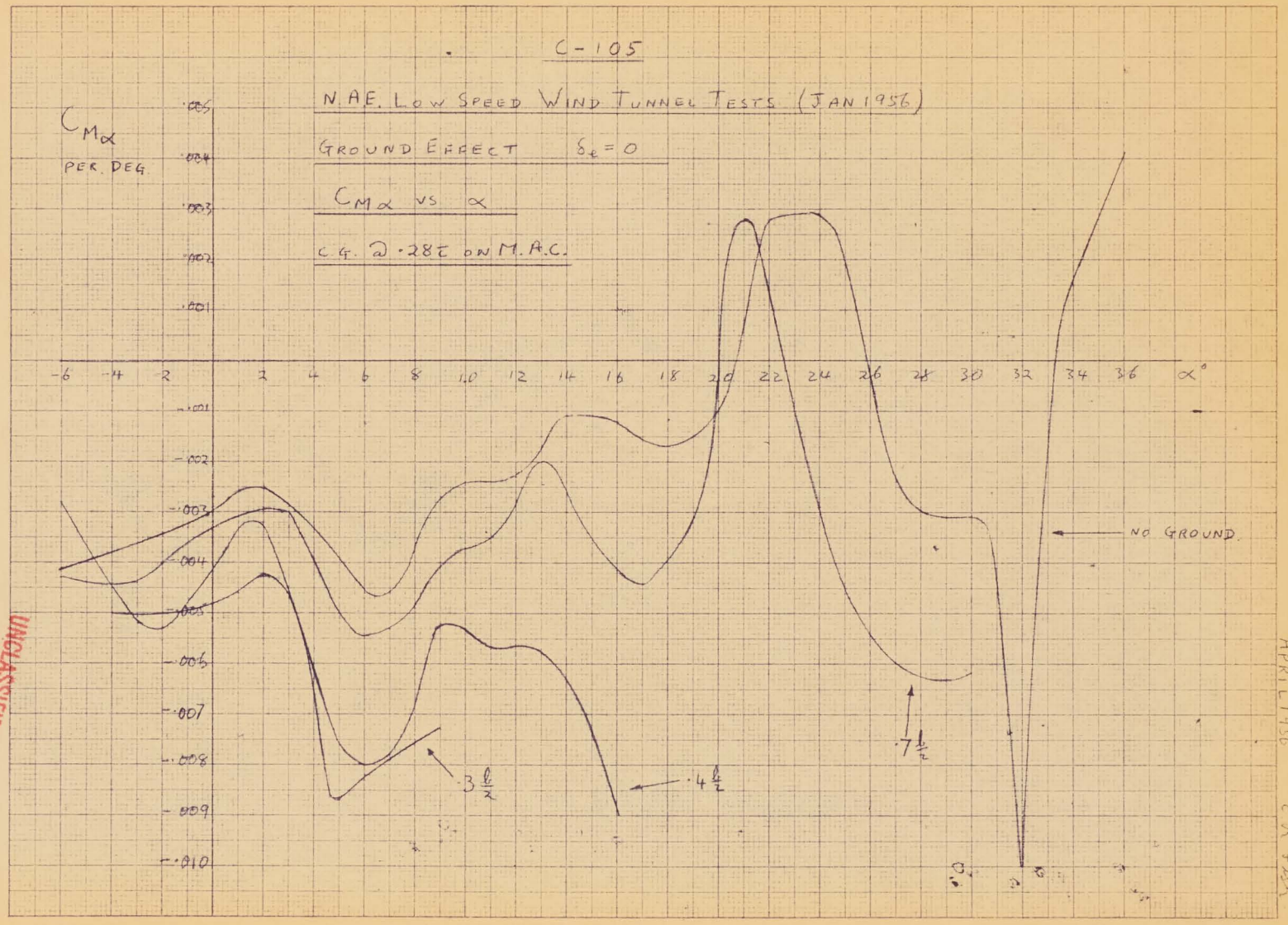
N.A.E. Low Speed Wind Tunnel Tests (Jan 1956)

Ground Effect $\delta_t = 0$

$C_{M\alpha}$ vs α

c.g. @ .28 $\bar{c}$ on M.A.C.



P/WT/108 2.5
APRIL 1956 E.R. 7461

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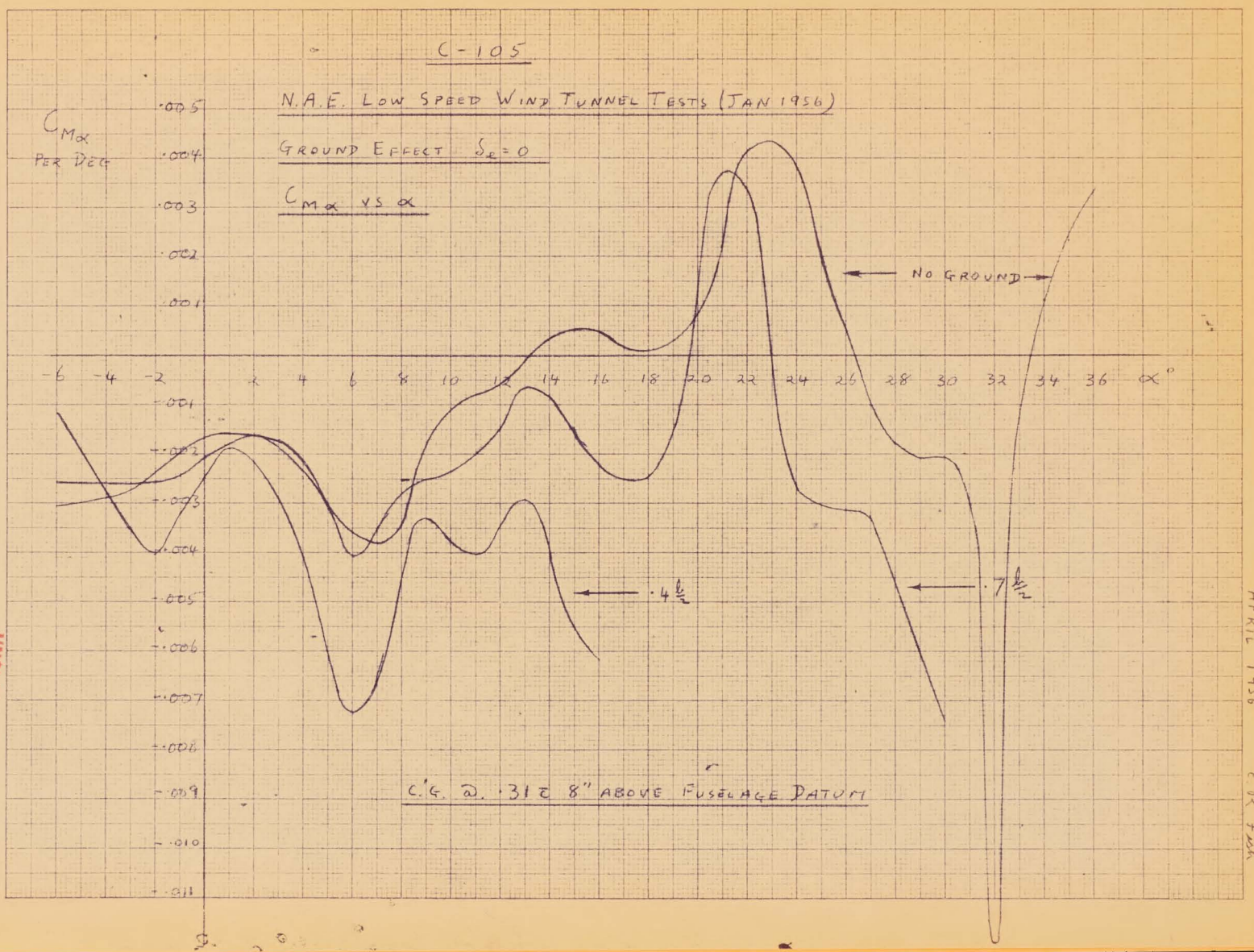
N.A.E. LOW SPEED WIND TUNNEL TESTS (JAN 1956)

GROUND EFFECT $\delta_e = 0$

$C_{M\alpha}$ VS α



C.G. @ ·31 c̄ 8" ABOVE FUSELAGE DATUM

P/WT/108 2.513
APRIL 1956 E R Tuck