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Locally Linearized Longitudinal and Lateral-Directional Aerodynamic Stability and Control Derivatives for the X-29A Aircraft

Gerald D. Budd

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SUMMARY

The locally linearized longitudinal and lateral-directional aerodynamic stability and control derivatives for the X-29A aircraft were calculated for altitudes ranging from sea level to 50,000 ft, Mach numbers from 0.2 to 1.5, and angles of attack from -5° to 25°. Several other parameters were also calculated, including aerodynamic force and moment coefficients, control surface position, normal acceleration, static margin, and reference angle of attack.

INTRODUCTION

The unusual aerodynamic configuration and high degree of longitudinal instability of the X-29A aircraft make it desirable to have linear aerodynamic stability and control data for analysis purposes. Typically, aerodynamic simulation data packages are formatted with higher-order terms and nonlinear increment corrections.

A local, total-force-and-moment coefficient perturbation technique was used to linearize the aerodynamic stability and control derivatives. This technique was implemented on the batch simulation computer system at the NASA Dryden Flight Research Facility.

The nonlinear aerodynamic data were taken from reference 1 and subsequent updates. This data base has been active on Dryden's batch simulation since February 1983. Reference 1 was based on references 2 to 9. Reference 2 was the primary transonic wind tunnel data set. The wind tunnel tests are described in references 10 and 11.

This linearized plot package is interim because of anticipated revisions to the simulation data package.

NOMENCLATURE

a_n	normal acceleration, g
b	(wing) span, ft
$\bar{c}$	mean aerodynamic (geometric) chord, ft
C_A	axial force coefficient, deg^{-1}
$C_{A_q} = \frac{\partial C_A}{\partial \frac{q\bar{c}}{2U}}$	variation of axial force coefficient with pitch rate, rad^{-1}
$C_{A_\alpha} = \frac{\partial C_A}{\partial \alpha}$	variation of axial force coefficient with angle of attack, deg^{-1}

$C_{A_{\dot{\alpha}}} = \frac{\partial C_A}{\partial \frac{\dot{\alpha}\bar{c}}{2U}}$ variation of axial force coefficient with rate of change of angle of attack, rad^{-1}

$C_{A_{\delta_c}} = \frac{\partial C_A}{\partial \delta_c}$ variation of axial force coefficient with canard angle, deg^{-1}

$C_{A_{\delta_f}} = \frac{\partial C_A}{\partial \delta_f}$ variation of axial force coefficient with flap angle, deg^{-1}

$C_{A_{\delta_s}} = \frac{\partial C_A}{\partial \delta_s}$ variation of axial force coefficient with strake angle, deg^{-1}

$C_D = \frac{D}{\bar{q}S}$ drag coefficient (airplane)

$C_{D_q} = \frac{\partial C_D}{\partial \frac{q\bar{c}}{2U}}$ variation of drag coefficient with pitch rate, rad^{-1}

$C_{D_\alpha} = \frac{\partial C_D}{\partial \alpha}$ variation of drag coefficient with angle of attack, deg^{-1}

$C_{D_{\dot{\alpha}}} = \frac{\partial C_D}{\partial \frac{\dot{\alpha}\bar{c}}{2U}}$ variation of drag coefficient with rate of change of angle of attack, rad^{-1}

$C_{D_{\delta_c}} = \frac{\partial C_D}{\partial \delta_c}$ variation of drag coefficient with canard angle, deg^{-1}

$C_{D_{\delta_f}} = \frac{\partial C_D}{\partial \delta_f}$ variation of drag coefficient with flap angle, deg^{-1}

$C_{D_{\delta_s}} = \frac{\partial C_D}{\partial \delta_s}$ variation of drag coefficient with strake angle, deg^{-1}

$C_L = \frac{L}{\bar{q}S}$ lift coefficient (airplane)

$C_{L_q} = \frac{\partial C_L}{\partial \frac{q\bar{c}}{2U}}$ variation of lift coefficient with pitch rate, rad^{-1}

$C_{L_\alpha} = \frac{\partial C_L}{\partial \alpha}$ airplane lift curve slope, deg^{-1}

$C_{L_{\dot{\alpha}}} = \frac{\partial C_L}{\partial \frac{\dot{\alpha}\bar{c}}{2U}}$ variation of lift coefficient with rate of change of angle of attack, rad^{-1}

$C_{L_{\delta_c}} = \frac{\partial C_L}{\partial \delta_c}$ variation of lift coefficient with canard angle, deg^{-1}

$C_{L_{\delta_f}} = \frac{\partial C_L}{\partial \delta_f}$ variation of lift coefficient with flap angle, deg^{-1}

$C_{L_{\delta_s}} = \frac{\partial C_L}{\partial \delta_s}$ variation of lift coefficient with strake angle, deg^{-1}

$C_\ell = \frac{L}{\bar{q}Sb}$ rolling moment coefficient

$C_{\ell_p} = \frac{\partial C_\ell}{\partial \frac{pb}{2U_1}}$ variation of rolling moment coefficient with roll rate

$C_{\ell_r} = \frac{\partial C_\ell}{\partial \frac{rb}{2U_1}}$ variation of rolling moment coefficient with yaw rate

$C_{\ell_\beta} = \frac{\partial C_\ell}{\partial \beta}$ variation of rolling moment coefficient with sideslip angle (i.e., dihedral angle), deg^{-1}

$C_{\ell_{\delta_A}} = \frac{\partial C_\ell}{\partial \delta_A}$ variation of rolling moment coefficient with aileron angle (i.e., lateral control power), deg^{-1}

$C_{\ell_{\delta_r}} = \frac{\partial C_\ell}{\partial \delta_r}$ variation of rolling moment coefficient with rudder angle, deg^{-1}

$C_m = \frac{M}{\bar{q}S\bar{c}}$ pitching moment coefficient (airplane, planform)

$C_{m_q} = \frac{\partial C_m}{\partial \frac{q\bar{c}}{2U}}$ variation of pitching moment coefficient with pitch rate, rad^{-1}

$C_{m_\alpha} = \frac{\partial C_m}{\partial \alpha}$ variation of pitching moment coefficient with angle of attack (i.e., static longitudinal stability), deg^{-1}

$C_{m_{\dot{\alpha}}} = \frac{\partial C_m}{\partial \frac{\dot{\alpha}\bar{c}}{2U}}$ variation of pitching moment coefficient with rate of change of angle of attack, rad^{-1}

$C_{m_{\delta_c}} = \frac{\partial C_m}{\delta_c}$ variation of pitching moment coefficient with canard angle (i.e., longitudinal control power), deg^{-1}

$C_{m_{\delta_f}} = \frac{\partial C_m}{\partial \delta_f}$ variation of pitching moment coefficient with flap angle (i.e, longitudinal control power)

$C_{m_{\delta_s}} = \frac{\partial C_m}{\partial \delta_s}$ variation of pitching moment coefficient with strake angle (i.e., longitudinal control power), deg^{-1}

C_N normal force coefficient

$C_n = \frac{N}{\bar{q}Sb}$ yawing moment coefficient

$C_{N_q} = \frac{\partial C_N}{\partial \frac{q\bar{c}}{2U}}$ variation of normal force coefficient with pitch roll, rad^{-1}

$C_{n_p} = \frac{\partial C_n}{\partial \frac{pb}{2U_1}}$ variation of yawing moment coefficient with roll rate

$C_{n_r} = \frac{\partial C_n}{\partial \frac{rb}{2U_1}}$ variation of yawing moment coefficient with yaw rate

$C_{N_\alpha} = \frac{\partial C_N}{\partial \alpha}$ variation of normal force coefficient with angle of attack, deg^{-1}

$C_{N_{\dot{\alpha}}} = \frac{\partial C_N}{\partial \frac{\dot{\alpha}\bar{c}}{2U}}$ variation of normal force coefficient with rate of change of angle of attack, rad^{-1}

$C_{N_{\delta_c}} = \frac{\partial C_N}{\partial \delta_c}$ variation of normal force coefficient with canard angle, deg^{-1}

$C_{N\delta_f} = \frac{\partial C_N}{\partial \delta_f}$ variation of normal force coefficient with flap angle, deg^{-1}

$C_{N\delta_s} = \frac{\partial C_N}{\partial \delta_s}$ variation of normal force coefficient with strake angle, deg^{-1}

$C_{n_\beta} = \frac{\partial C_n}{\partial \beta}$ variation of yawing moment coefficient with sideslip angle, deg^{-1}

$C_{n_{\beta_{DYNAMIC}}} = C_{n_\beta} \cos \alpha - C_{\ell_\beta} \sin \alpha \frac{I_{zz}}{I_{xx}}$ (dutch roll stability parameter)

$C_{n_{\delta_a}} = \frac{\partial C_n}{\partial \delta_a}$ variation of yawing moment coefficient with aileron angle, deg^{-1}

$C_{n_{\delta_r}} = \frac{\partial C_n}{\partial \delta_r}$ variation of yawing moment coefficient with rudder angle, deg^{-1}

$C_y = \frac{F_y}{\bar{q}s}$ side force coefficient

$C_{y_p} = \frac{\partial C_y}{\partial \frac{pb}{2U}}$ variation of side force coefficient with roll rate

$C_{y_r} = \frac{\partial C_y}{\partial \frac{rb}{2U}}$ variation of side force coefficient with yaw rate

$C_{y_\beta} = \frac{\partial C_y}{\partial \beta}$ variation of side force coefficients with sideslip angle, deg^{-1}

$C_{y_{\delta_a}} = \frac{\partial C_y}{\partial \delta_a}$ variation of side force coefficient with aileron angle, deg^{-1}

$C_{y_{\delta_r}} = \frac{\partial C_y}{\partial \delta_r}$ variation of side force coefficient with rudder angle, deg^{-1}

D drag, lb

F_y side force along Y-axis, lb

g acceleration of gravity, ft/sec^2

I_{xx}, I_{yy}, I_{zz} moments of inertia about X, Y, Z axes, respectively, $slug\text{-}ft^2$

L	lift, lb
L	rolling moment, ft-lb
M	pitching moment, ft-lb
M#	Mach number
MAC	mean aerodynamic (geometric) chord, ft
N	normal force, lb
p	roll rate, rad/sec
q	pitch rate, rad/sec
$\bar{q}$	dynamic pressure, lb/ft^2
r	yaw rate, rad/sec
S	reference (wing) area, ft^2
U	forward velocity (along X-axis), ft/sec
WT	weight, lb
XCG	center of gravity location along X-axis, in
α	angle of attack, deg
β	sideslip angle, deg
δ_a	aileron deflection, deg
δ_c	canard deflection, deg
δ_f	flap deflection, deg
δ_r	rudder deflection, deg
δ_s	strake deflection, deg
ρ	air density, $slug/ft^3$

FIGURES

Figure	Description	Unit
1	C_L vs. C_D	
2	C_M vs. C_L	
3	A_n vs. Alpha	g
4	Alpha vs. Mach number	deg
5	Static margin vs. Mach number	percent MAC
6	Static margin vs. Alpha	percent MAC
7	Delta canard vs. Mach number	deg
8	Delta canard vs. Alpha	deg
9	Delta flap vs. Mach number	deg
10	Delta flap vs. Alpha	deg
11	Delta strake vs. Mach number	deg
12	Delta strake vs. Alpha	deg
13	C_L-lift vs. Mach number	---
14	C_L-lift vs. Alpha	---
15	C_D vs. Mach number	---
16	C_D vs. Alpha	---
17	C_M vs. Mach number	---
18	C_M vs. Alpha	---
19	C_A vs. Mach number	---
20	C_A vs. Alpha	---
21	C_N-normal vs. Mach number	---
22	C_N-normal vs. Alpha	---
23	C_L-canard vs. Mach number	per deg
24	C_L-canard vs. Alpha	per deg
25	C_D-canard vs. Mach number	per deg

Figure	Description	Unit
26	C_D-canard vs. Alpha	per deg
27	C_M-canard vs. Mach number	per deg
28	C_M-canard vs. Alpha	per deg
29	C_A-canard vs. Mach number	per deg
30	C_A-canard vs. Alpha	per deg
31	C_N-canard vs. Mach number	per deg
32	C_N-canard vs. Alpha	per deg
33	C_L-flap vs. Mach number	per deg
34	C_L-flap vs. Alpha	per deg
35	C_D-flap vs. Mach number	per deg
36	C_D-flap vs. Alpha	per deg
37	C_M-flap vs. Mach number	per deg
38	C_M-flap vs. Alpha	per deg
39	C_A-flap vs. Mach number	per deg
40	C_A-flap vs. Alpha	per deg
41	C_N-flap vs. Mach number	per deg
42	C_N-flap vs. Alpha	per deg
43	C_L-strake vs. Mach number	per deg
44	C_L-strake vs. Alpha	per deg
45	C_D-strake vs. Mach number	per deg
46	C_D-strake vs. Alpha	per deg
47	C_M-strake vs. Mach number	per deg
48	C_M-strake vs. Alpha	per deg
49	C_A-strake vs. Mach number	per deg
50	C_A-strake vs. Alpha	per deg
51	C_N-strake vs. Mach number	per deg
52	C_N-strake vs. Alpha	per deg

Figure	Description	Unit
53	C_y-aileron vs. Mach number	per deg
54	C_y-aileron vs. Alpha	per deg
55	C_l-aileron vs. Mach number	per deg
56	C_l-aileron vs. Alpha	per deg
57	C_n-aileron vs. Mach number	per deg
58	C_n-aileron vs. Alpha	per deg
59	C_y-rudder vs. Mach number	per deg
60	C_y-rudder vs. Alpha	per deg
61	C_l-rudder vs. Mach	per deg
62	C_l-rudder vs. Alpha	per deg
63	C_n-rudder vs. Mach number	per deg
64	C_n-rudder vs. Alpha	per deg
65	C_L-alpha vs. Mach number	per deg
66	C_L-alpha vs. Alpha	per deg
67	C_D-alpha vs. Mach number	per deg
68	C_D-alpha vs. Alpha	per deg
69	C_M-alpha vs. Mach number	per deg
70	C_M-alpha vs. Alpha	per deg
71	C_A-alpha vs. Mach number	per deg
72	C_A-alpha vs. Alpha	per deg
73	C_N-alpha vs. Mach number	per deg
74	C_N-alpha vs. Alpha	per deg
75	C_y-beta vs. Mach number	per deg
76	C_y-beta vs. Alpha	per deg
77	C_l-beta vs. Mach number	per deg
78	C_l-beta vs. Alpha	per deg
79	C_n-beta vs. Mach number	per deg

Figures	Description	Unit
80	C_n-beta vs. Alpha	per deg
81	C_n-beta dynamic vs. Mach number	per deg
82	C_n-beta dynamic vs. Alpha	per deg
83	C_L-alpha dot vs. Mach number	per deg
84	C_L-alpha dot vs. Alpha	per rad
85	C_D-alpha dot vs. Mach number	per rad
86	C_D-alpha dot vs. Alpha	per rad
87	C_M-alpha dot vs. Mach number	per rad
88	C_M-alpha dot vs. Alpha	per rad
89	C_A-alpha dot vs. Mach number	per rad
90	C_A-alpha dot vs. Alpha	per rad
91	C_N-alpha dot vs. Mach number	per rad
92	C_N-alpha dot vs. Alpha	per rad
93	C_L-q vs. Mach number	per rad
94	C_L-q vs. Alpha	per rad
95	C_D-q vs. Mach number	per rad
96	C_D-q vs. Alpha	per rad
97	C_M-q vs. Mach number	per rad
98	C_M-q vs. Alpha	per rad
99	C_A-q vs. Mach number	per rad
100	C_A-q vs. Alpha	per rad
101	C_N-q vs. Mach Number	per rad
102	C_N-q vs. Alpha	per rad
103	C_y-roll rate vs. Mach number	per rad
104	C_y-roll rate vs. Alpha	per rad
105	C_l-roll rate vs. Mach number	per rad
106	C_l-roll rate vs. Alpha	per rad

Figure	Description	Unit
107	C_n-roll rate vs. Mach number	per rad
108	C_n-roll rate vs. Alpha	per rad
109	C_y-yaw vs. Mach number	per rad
110	C_y-yaw vs. Alpha	per rad
111	C_l-yaw vs. Mach number	per rad
112	C_l-yaw vs. Alpha	per rad
113	C_n-yaw vs. Mach number	per rad
114	C_n-yaw vs. Alpha	per rad

DISCUSSION AND RESULTS

The X-29A longitudinal and lateral-directional aerodynamic stability and control derivatives presented may be used for linear analysis purposes. It must be emphasized that the derivatives have been locally linearized about the trim points. All the data points presented are at a trim condition.

Two types of trimming procedures were used in the calculation of these derivatives: (1) straight-and-level trim, which is steady-state 1g trim at a specified altitude and Mach number; and (2) alpha trim which is steady-state trim to a specified angle of attack at a given altitude and Mach number.

Care should be exercised when using this interim data set to avoid confusion. Occasionally a trim data point was perturbated about a breakpoint in the nonlinear simulation aerodynamic data base. An example of this is figure 48(b), Cm-delta strake as a function of alpha for Mach 0.6 and an altitude of 10,000 ft. The perturbation caused the 14° alpha trim point to be displaced downward an extreme amount.

In addition, the scaling of the dependent variables (Y-axis) was not always consistent because of the automatic scaling procedure used.

CONCLUDING REMARKS

Locally linearized longitudinal and lateral-directional aerodynamic stability and control derivatives were calculated for the X-29A aircraft, along with several other parameters. Data were obtained for altitudes of sea level to 50,000 ft, Mach numbers from 0.2 to 1.5, and angles of attack ranging from -5° to 25°.

The aerodynamic characteristics of the aircraft appear to be consistent and reasonable, indicating that the linearization technique used was acceptable.

National Aeronautics and Space Administration
Ames Research Center
Dryden Flight Research Facility
Edwards, Calif., August 24, 1983

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CL VS CD

7-14-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

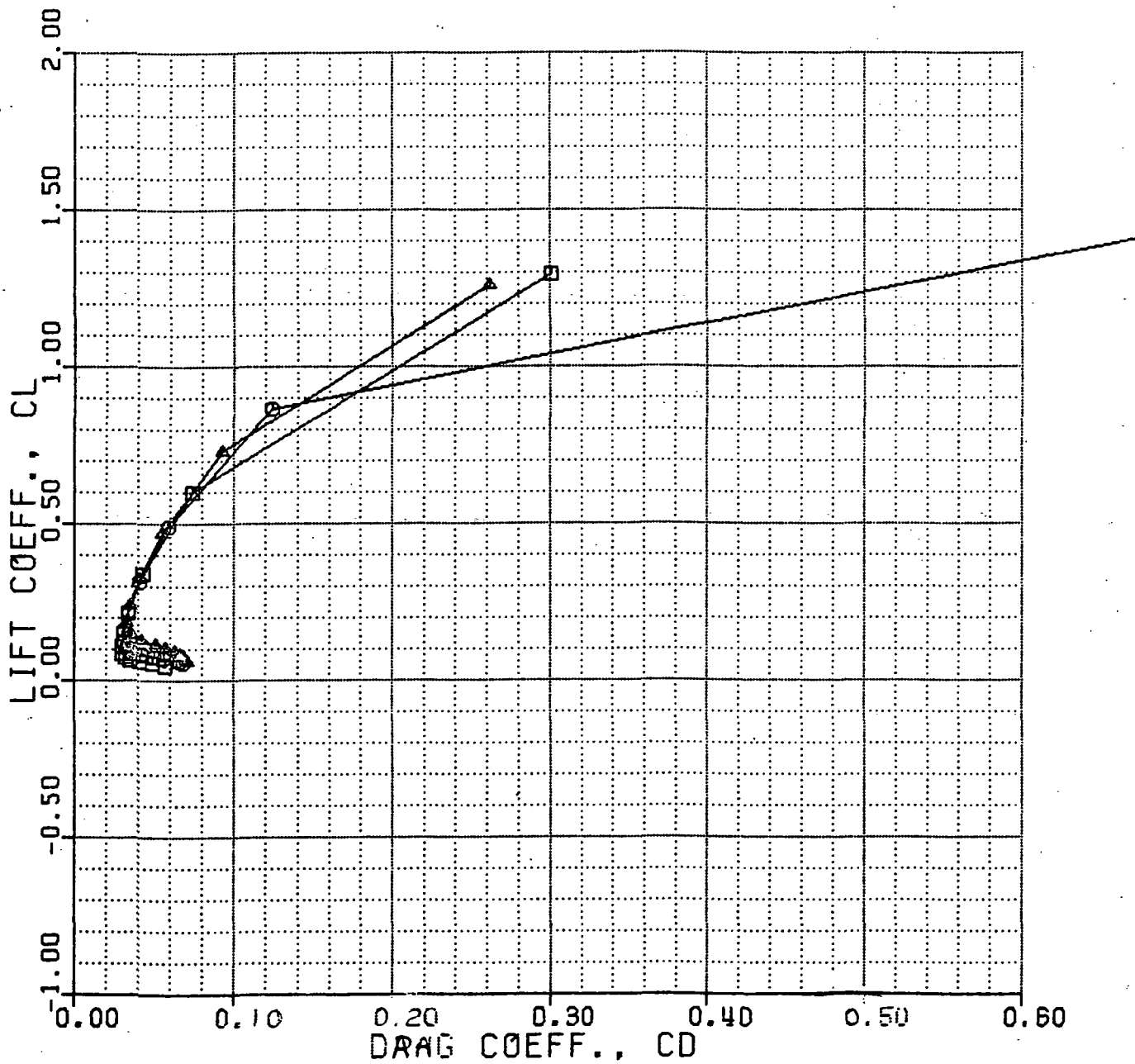

Figure 1(a)

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CL VS CD

7-14-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

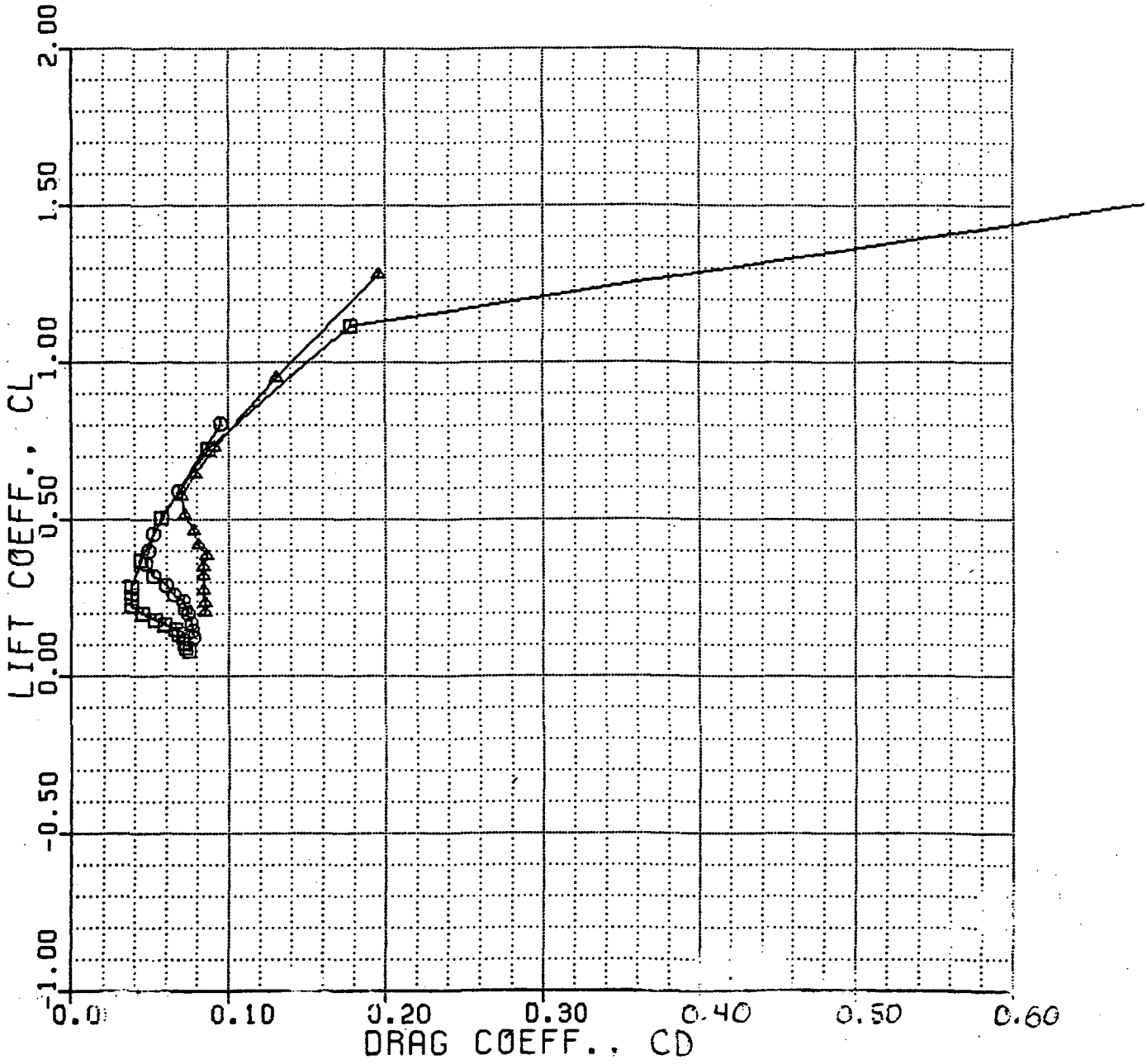

Figure 1(b)

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CL VS CD

7-12-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

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ALT = 10K ALP: -4 TO 22

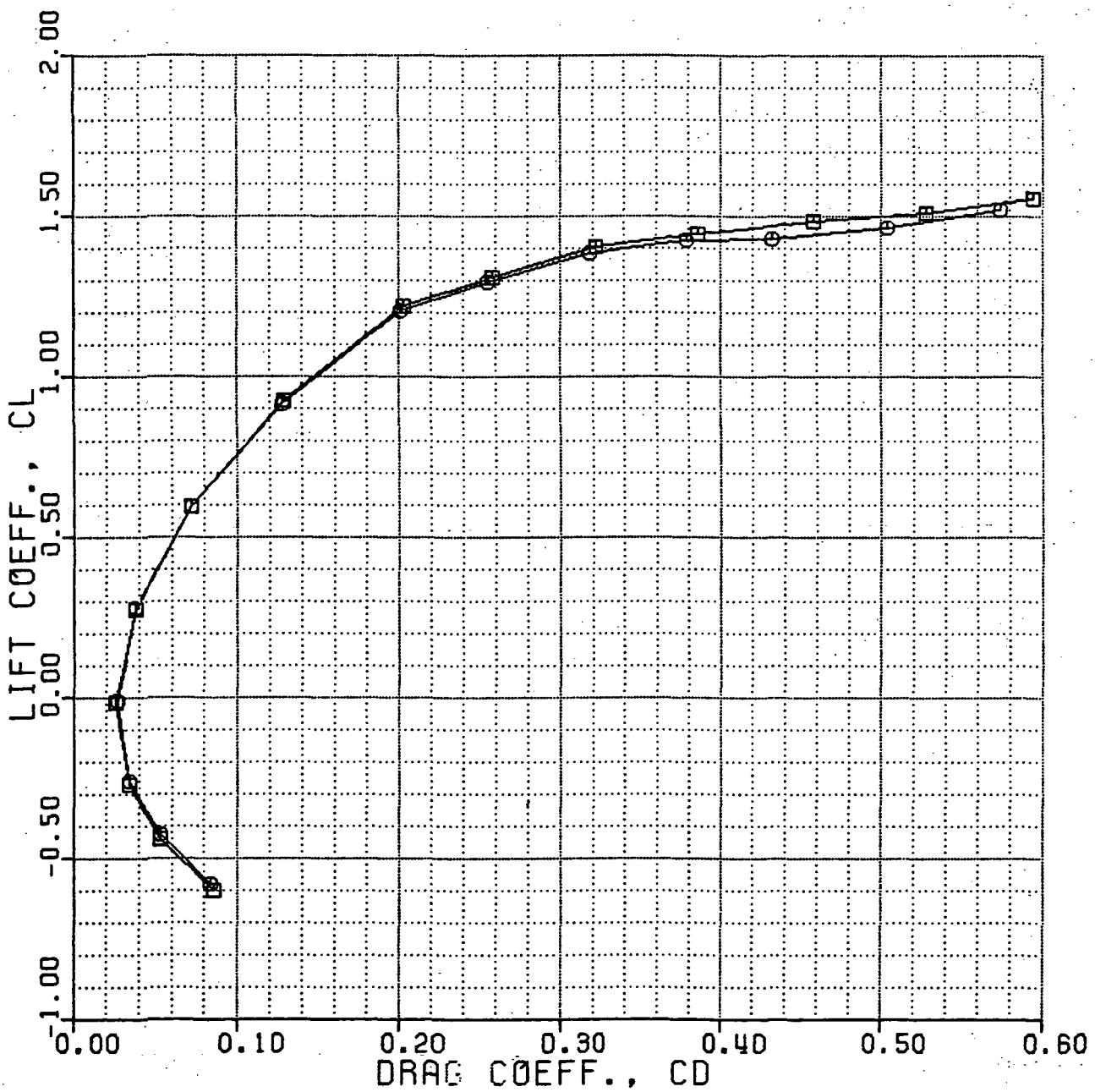

Figure 1(c)

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CL VS CD

7-12-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

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ALT = 20K ALP: -4 TO 20

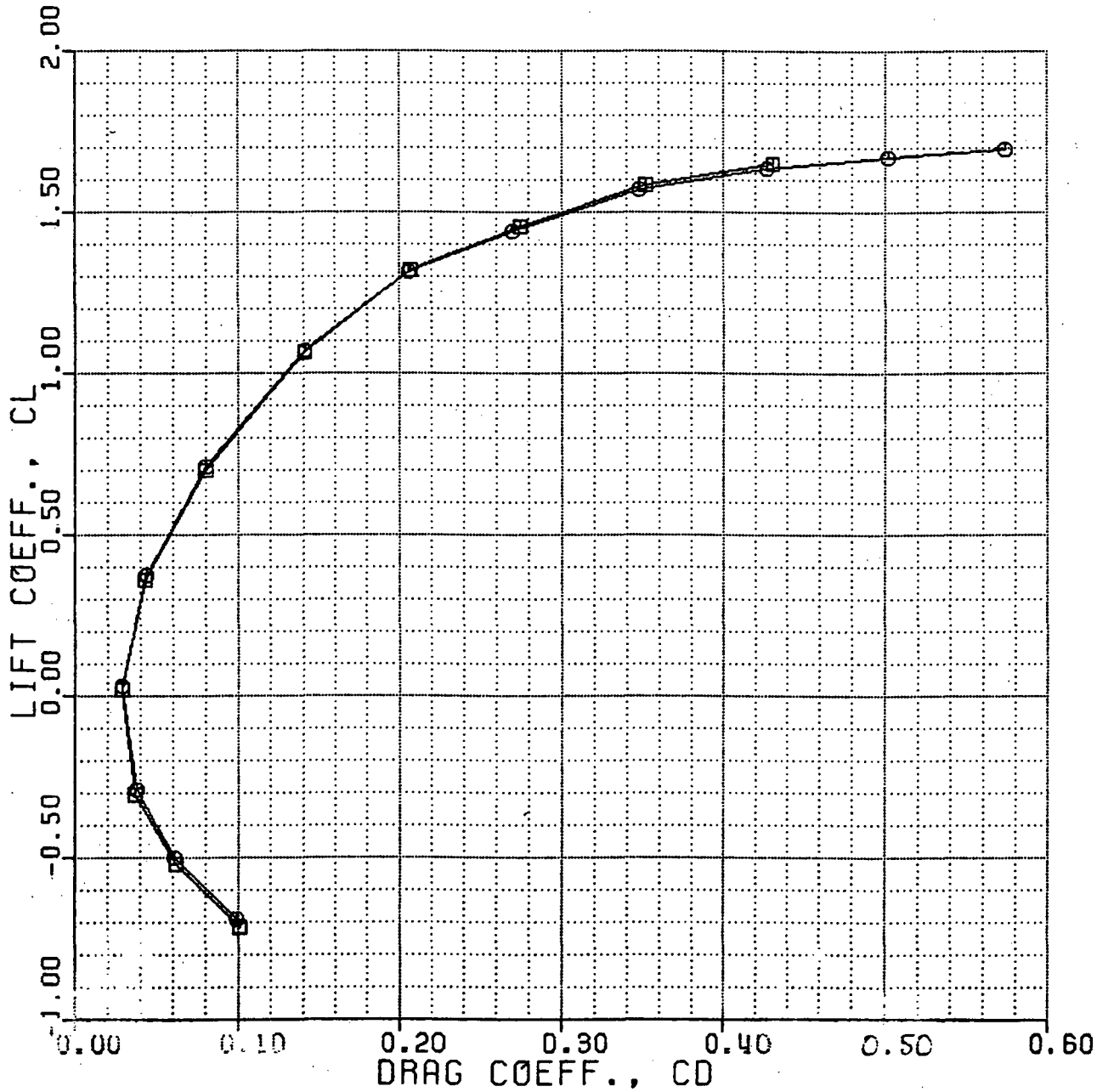

Figure 1(d)

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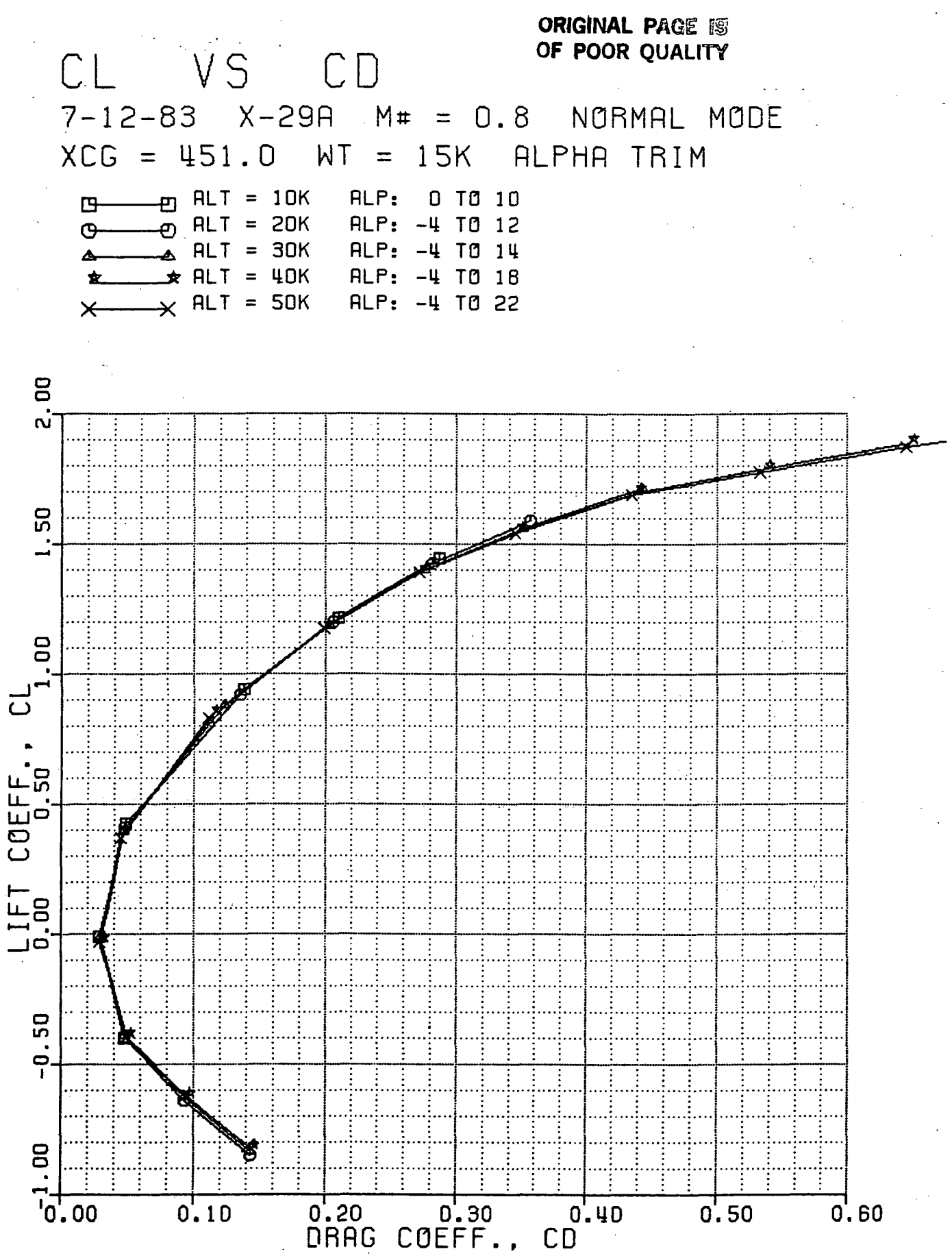

Figure 1(e)

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CL VS CD

7-14-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

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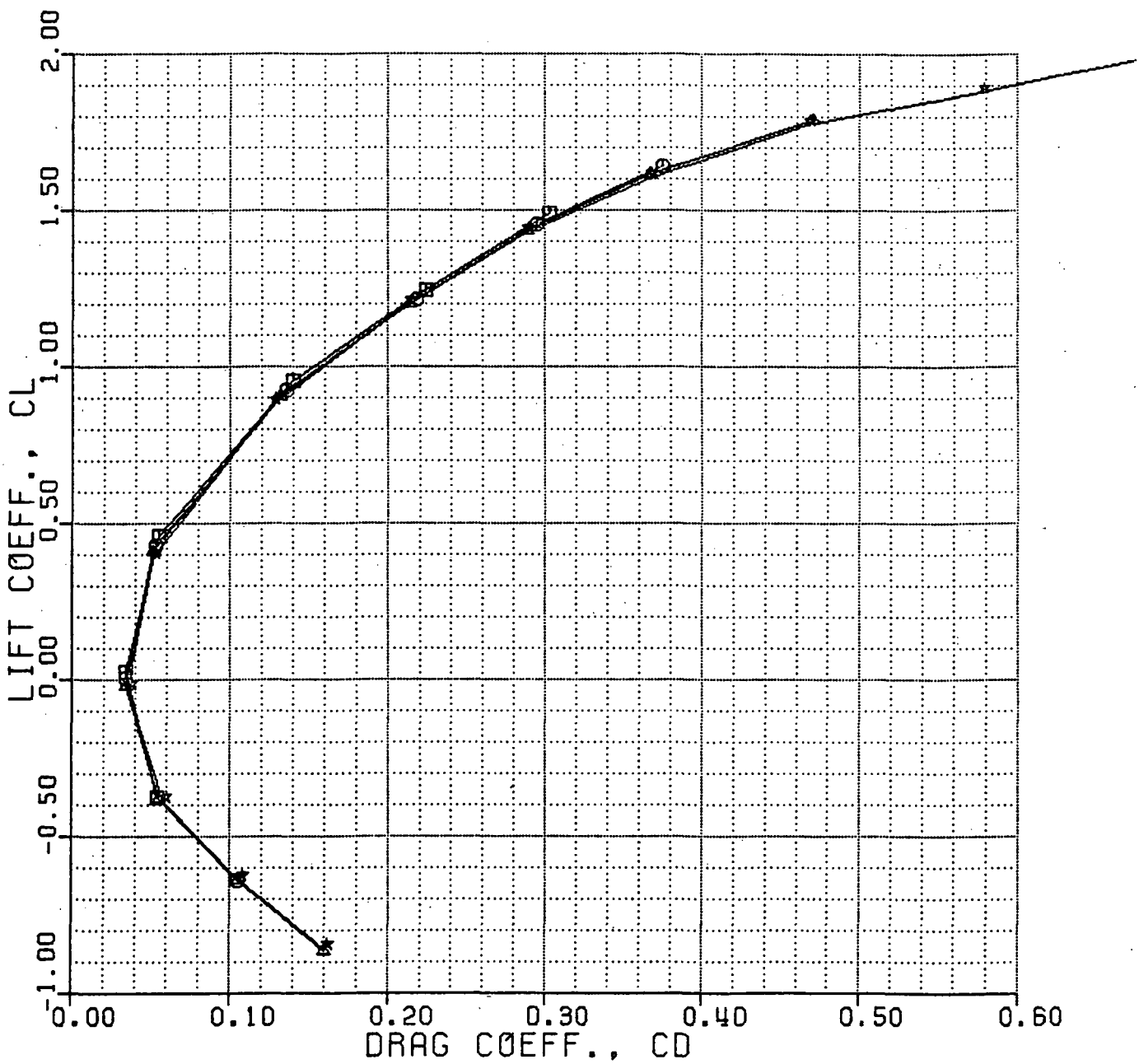
ALT = 50K ALP: -4 TO 18



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CL VS CD

7-14-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

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ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

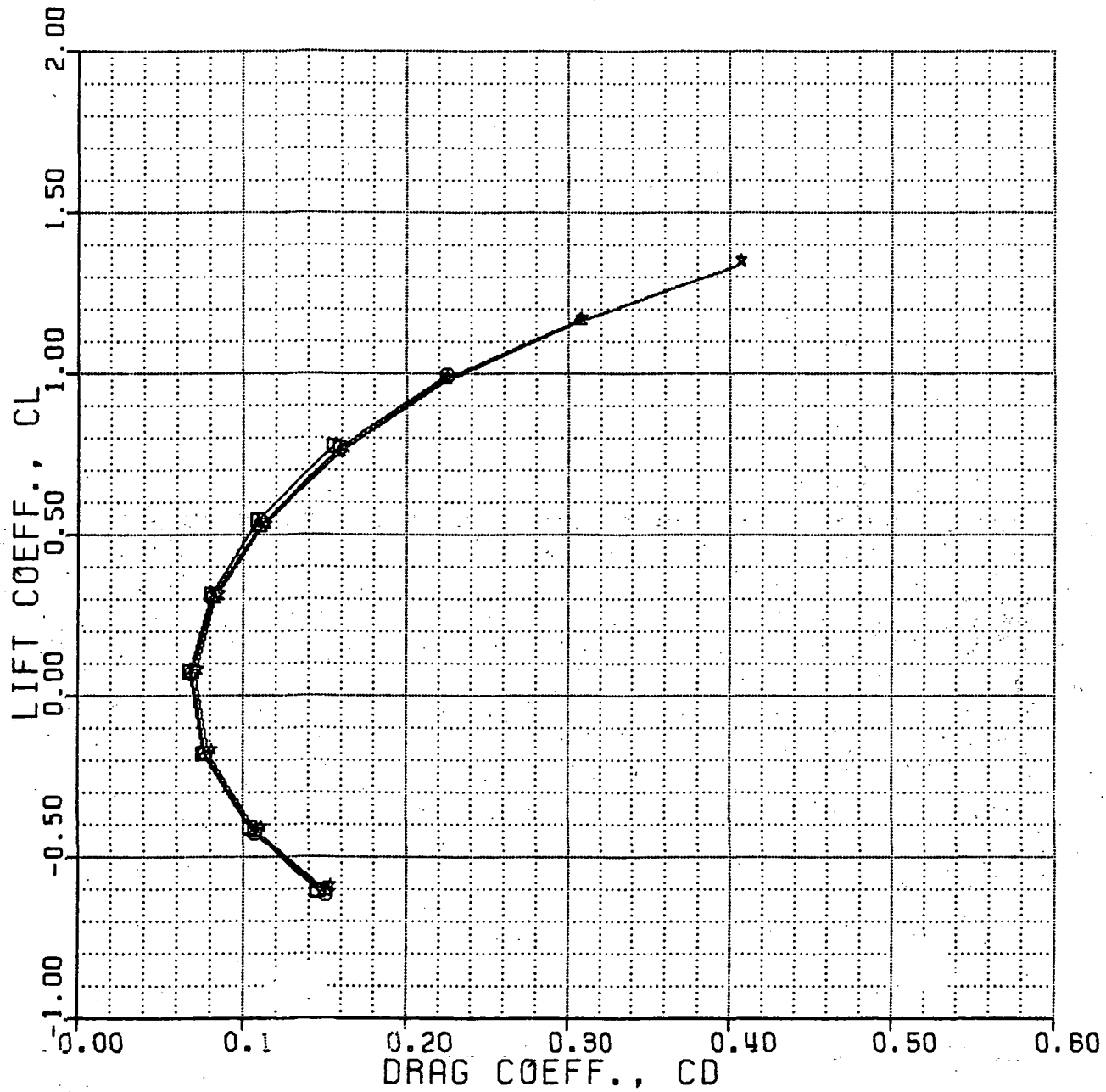

Figure 1(g)

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CL VS CD

7-14-83 X-29A M# = 1.5 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM

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ALT = 40K ALP: -4 TO 10
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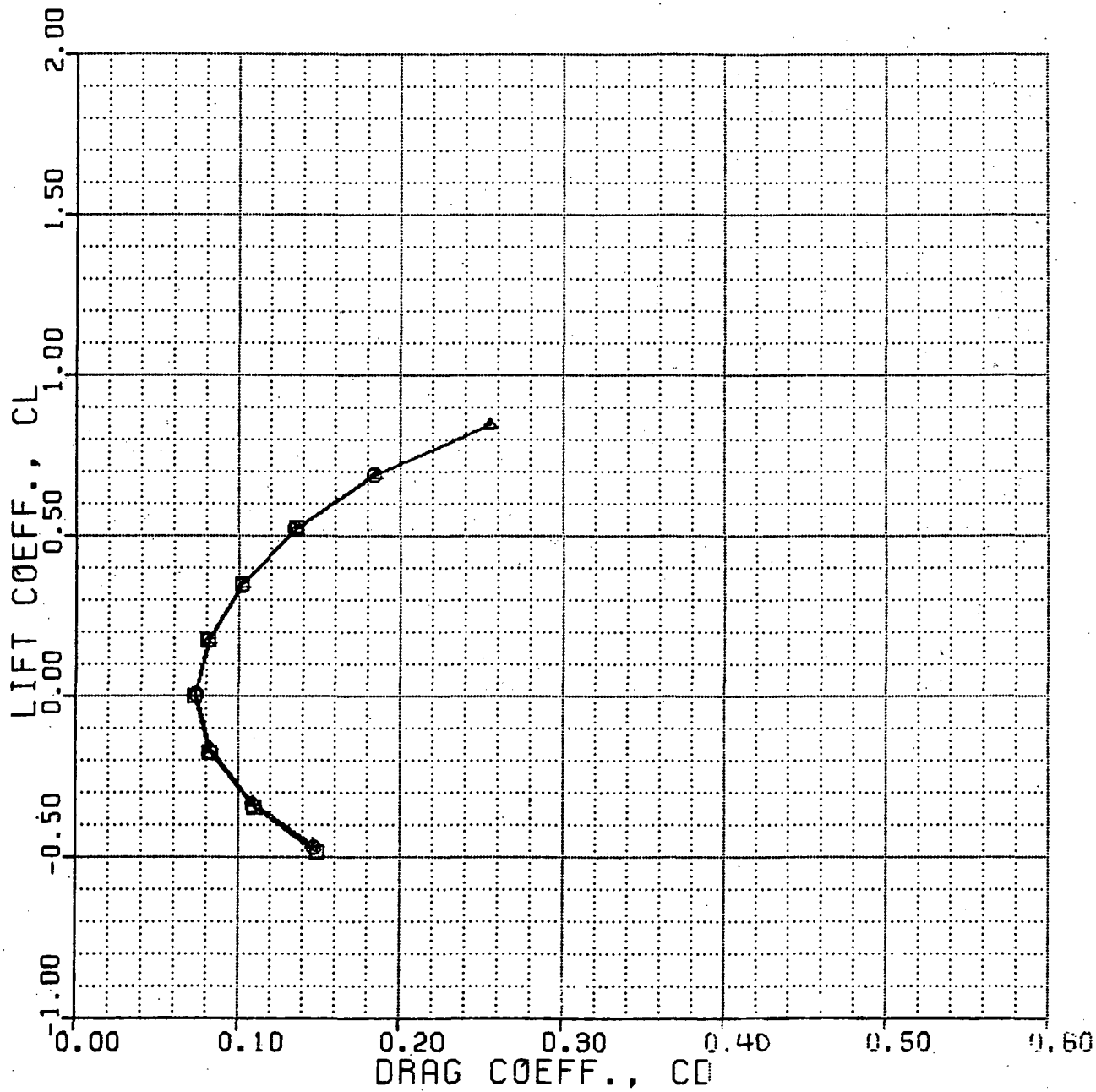

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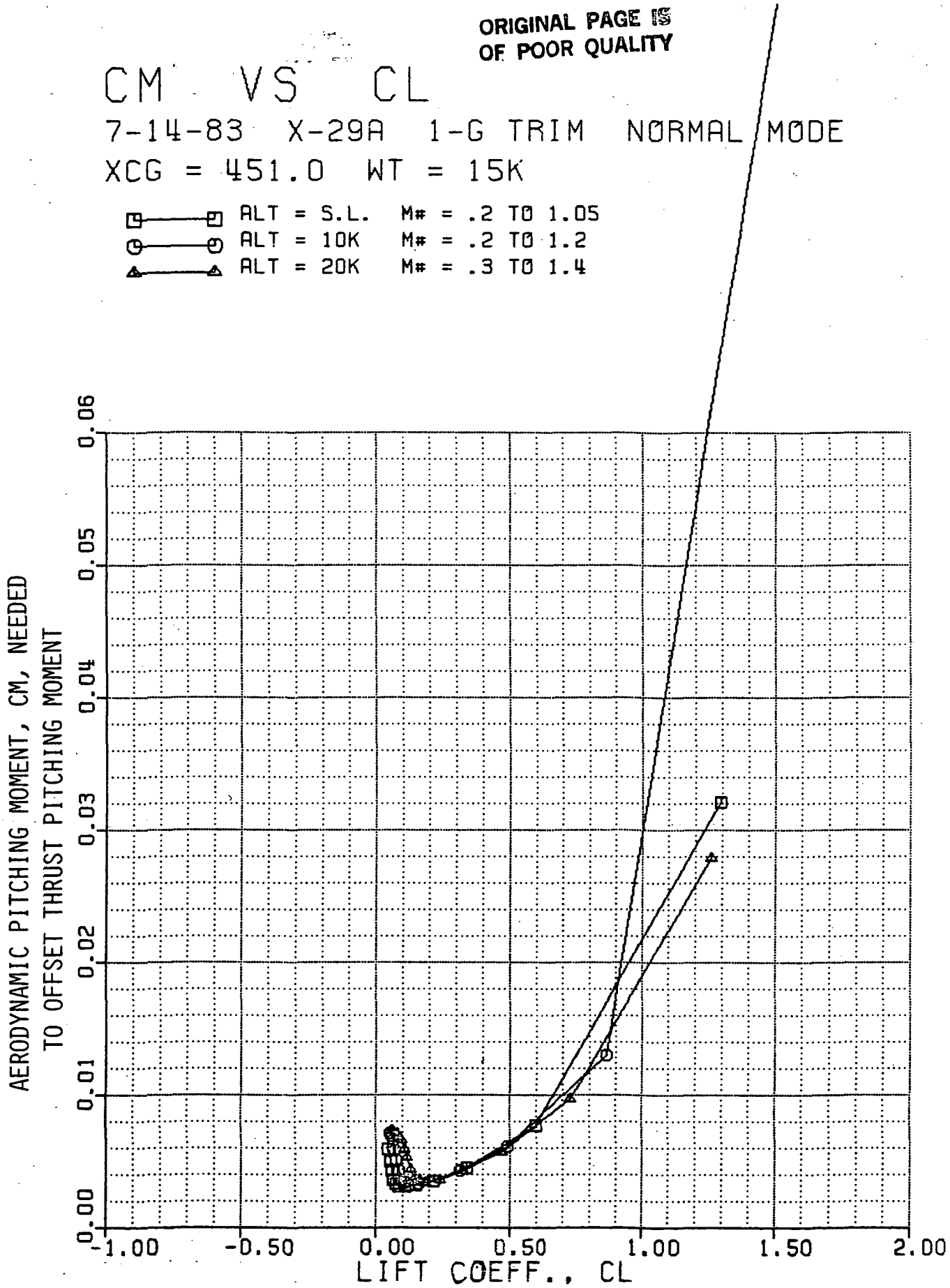

Figure 2(a)

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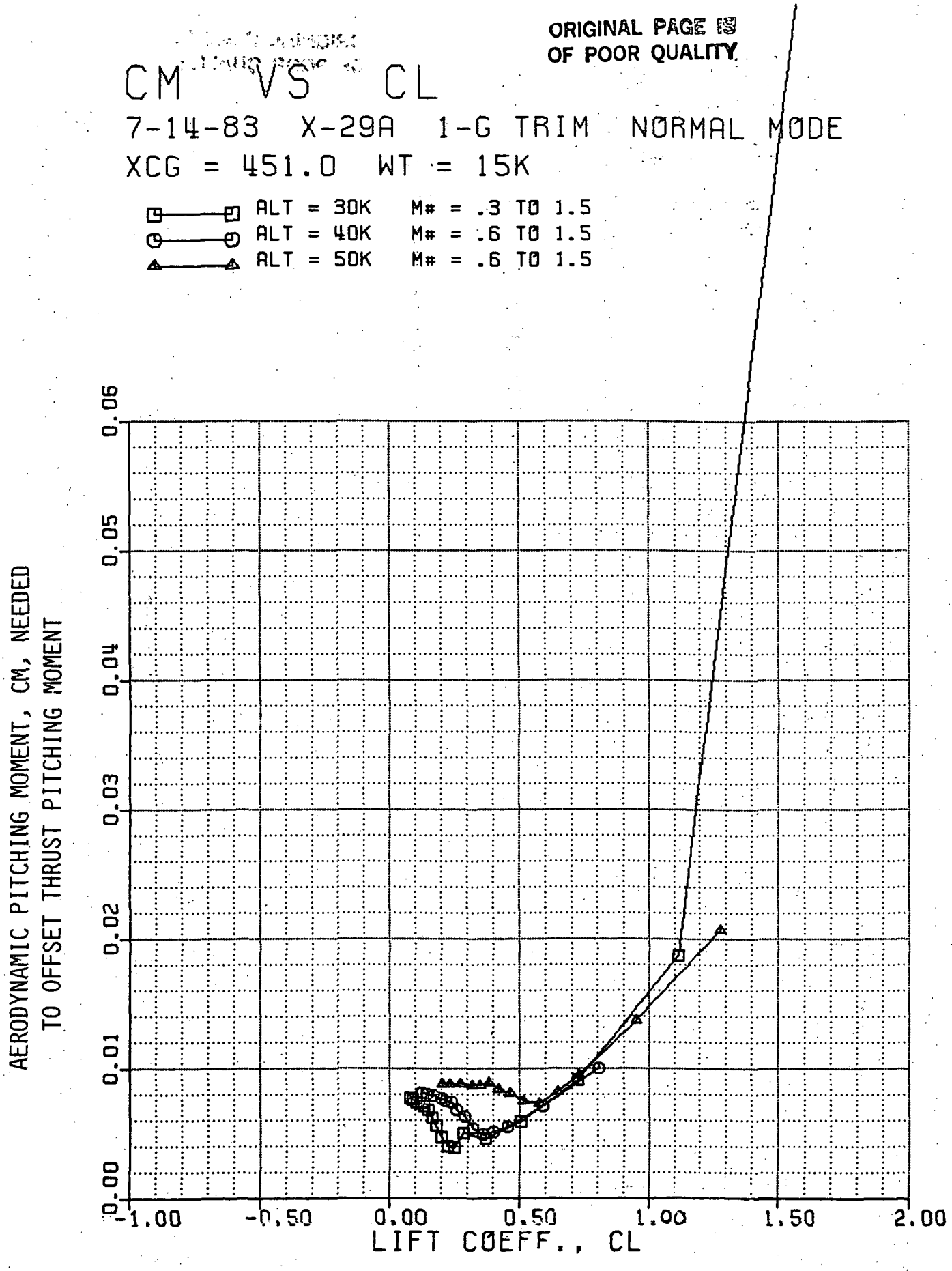

Figure 2(b)

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CM VS CL

7-12-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

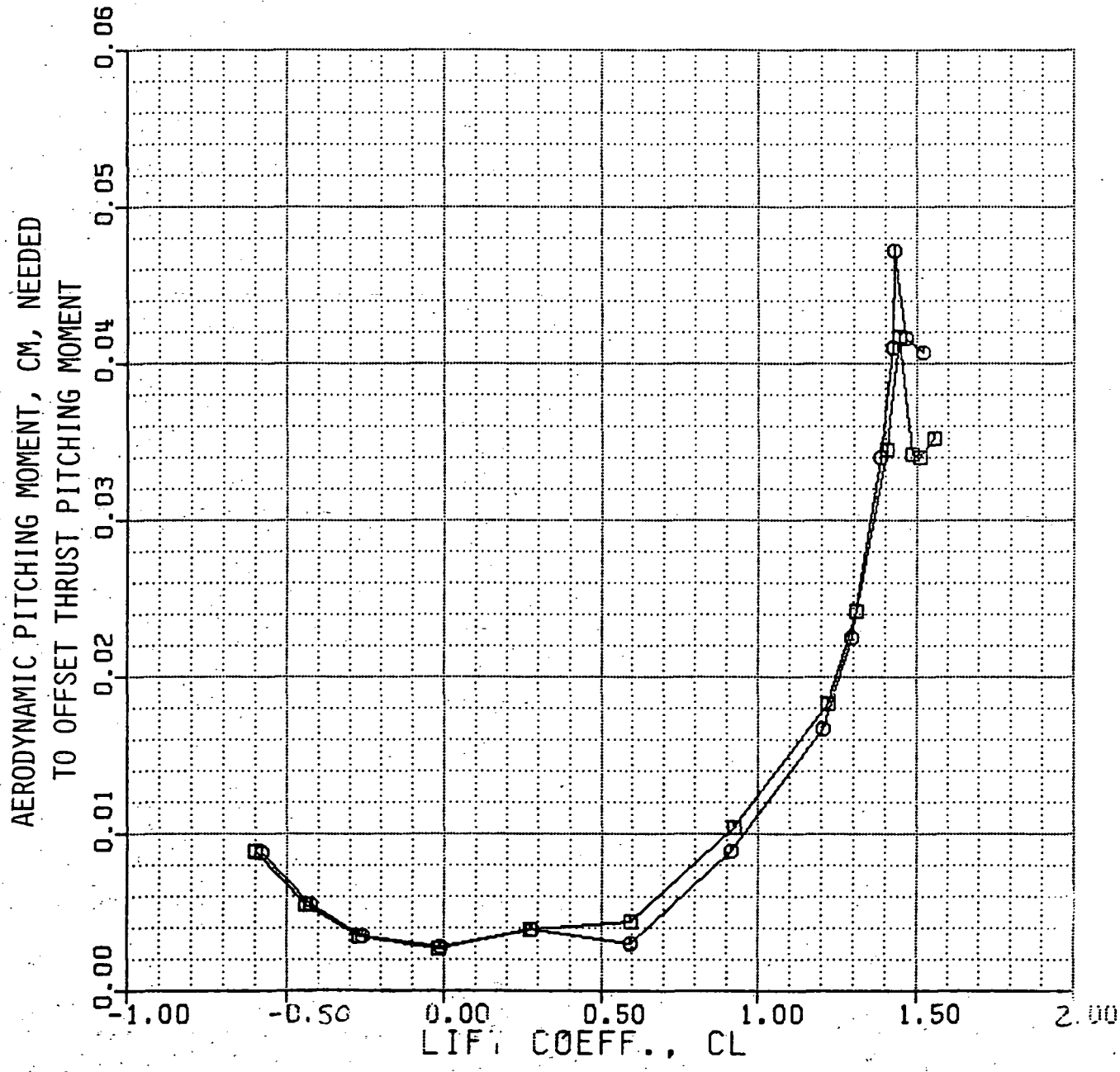

Figure 2(c)

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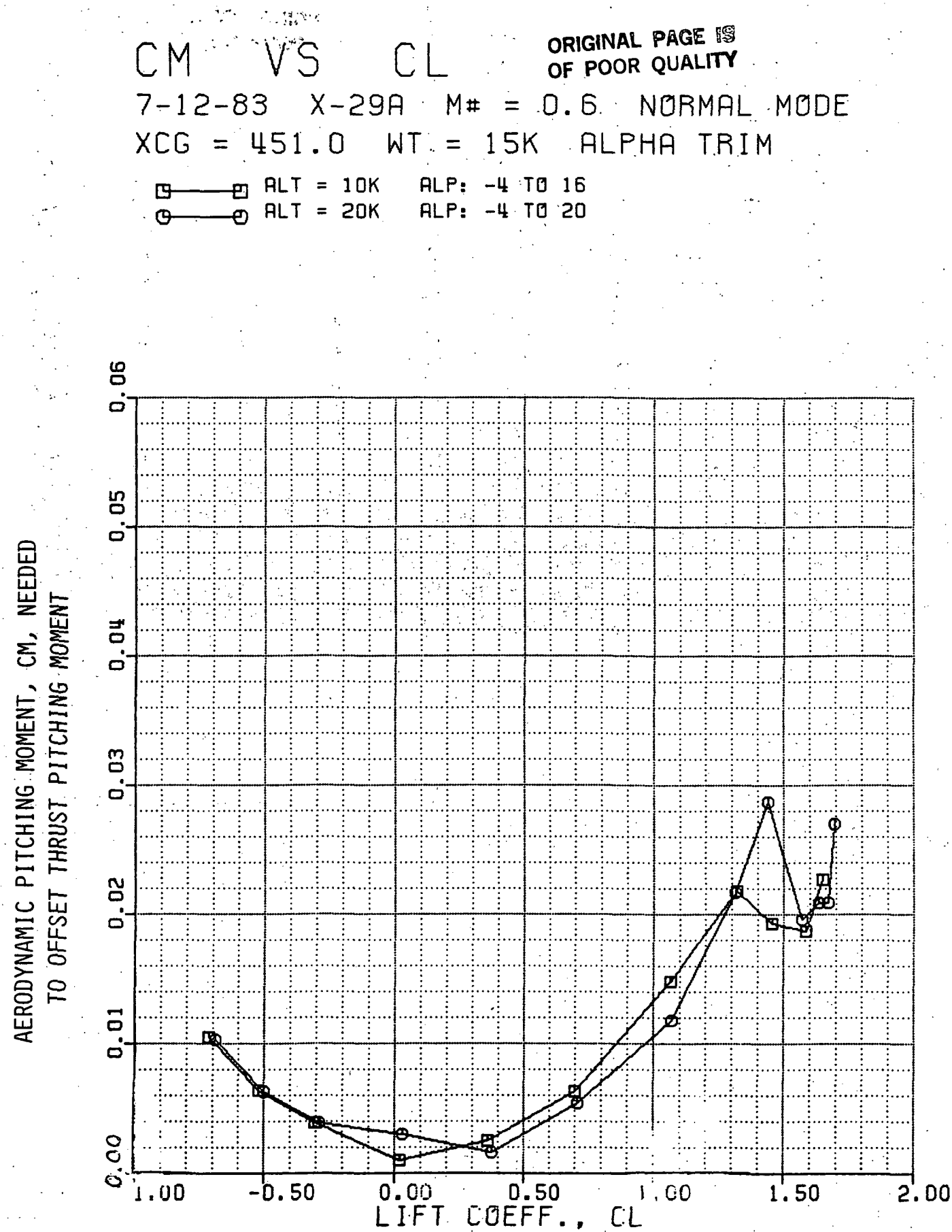

Figure 2(d)

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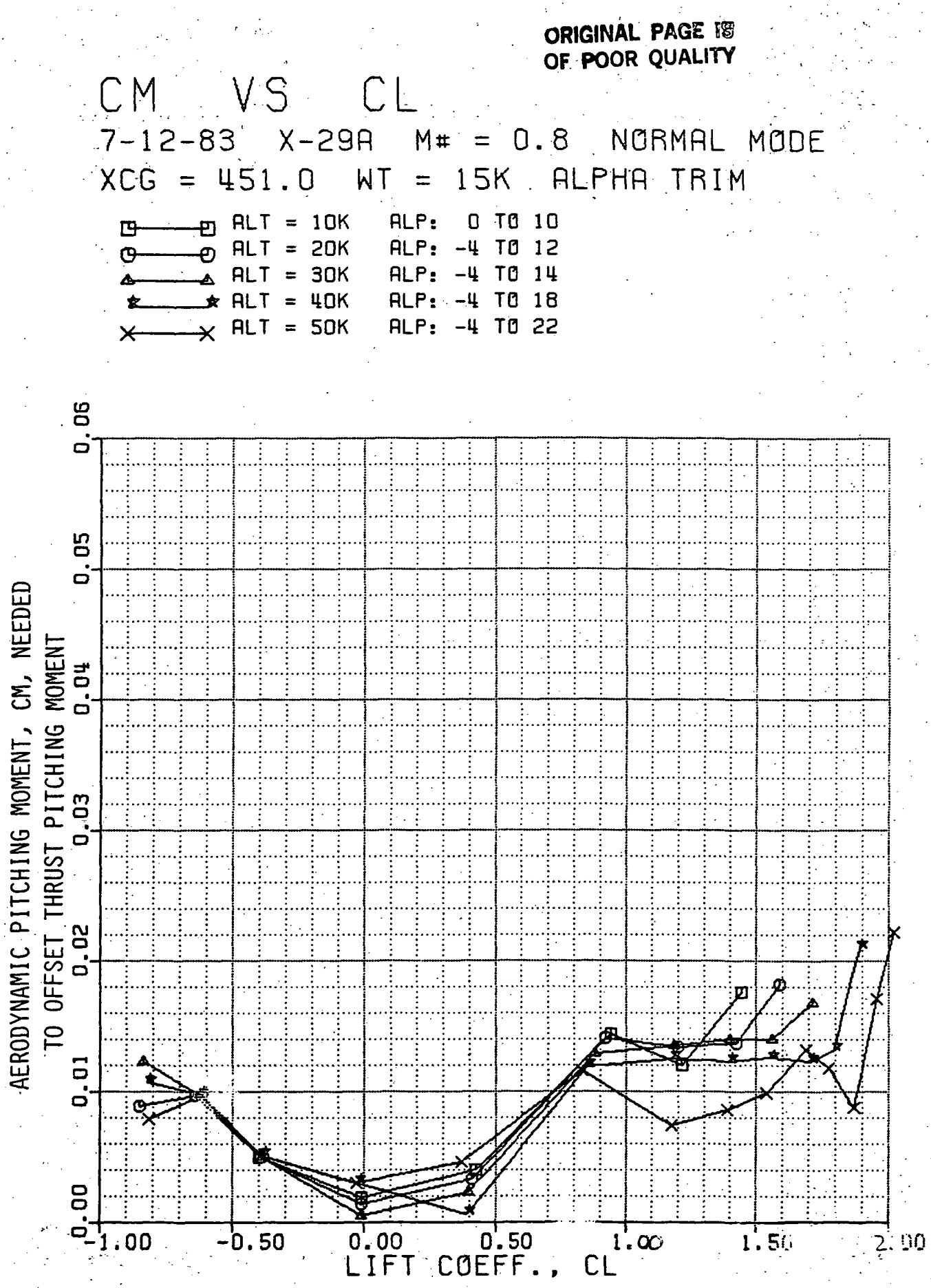

Figure 2(e)

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OF POOR QUALITY

CM VS CL

7-14-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 16

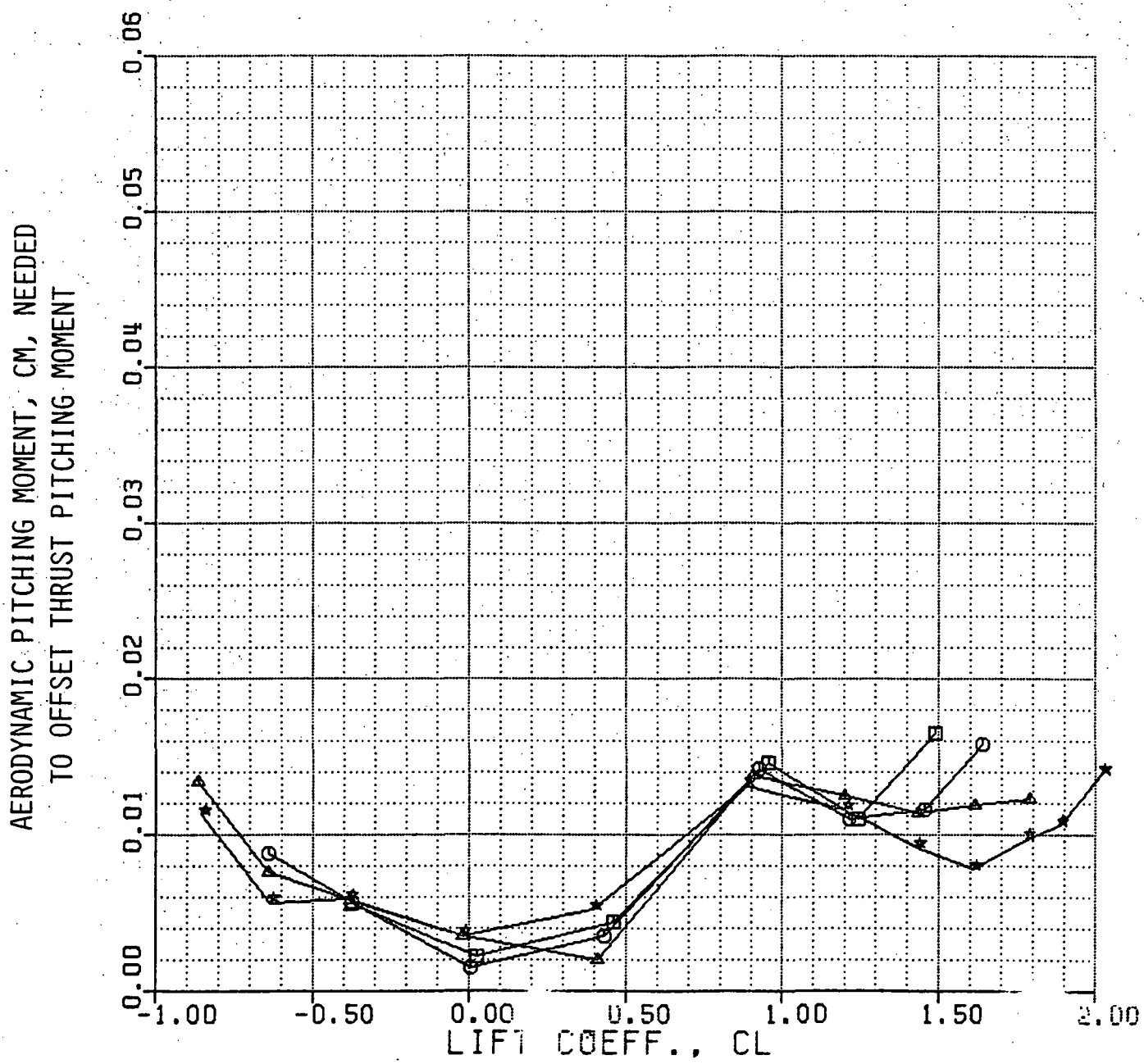

Figure 2(f)

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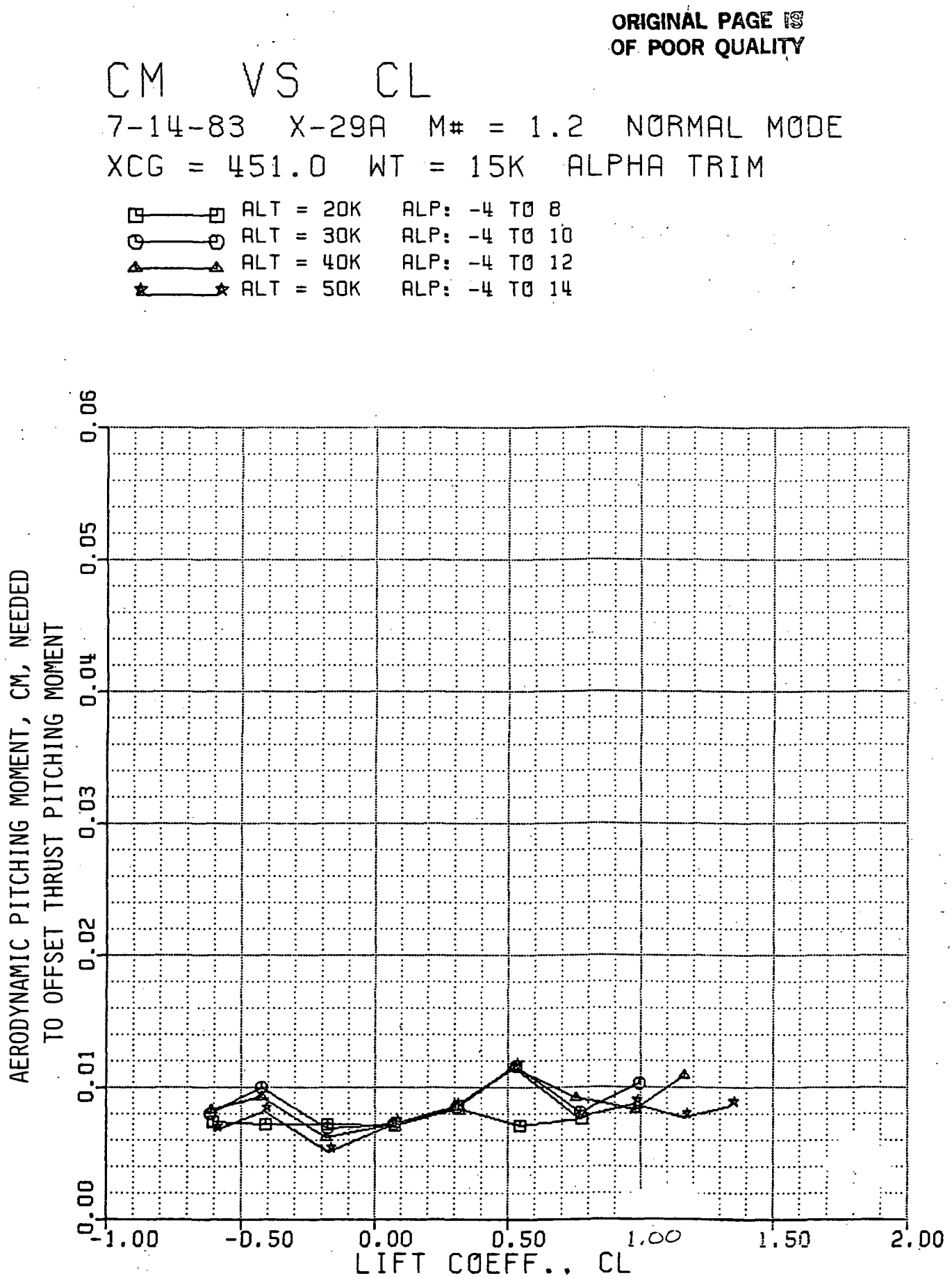

Figure 2(g)

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CM VS CL

7-14-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

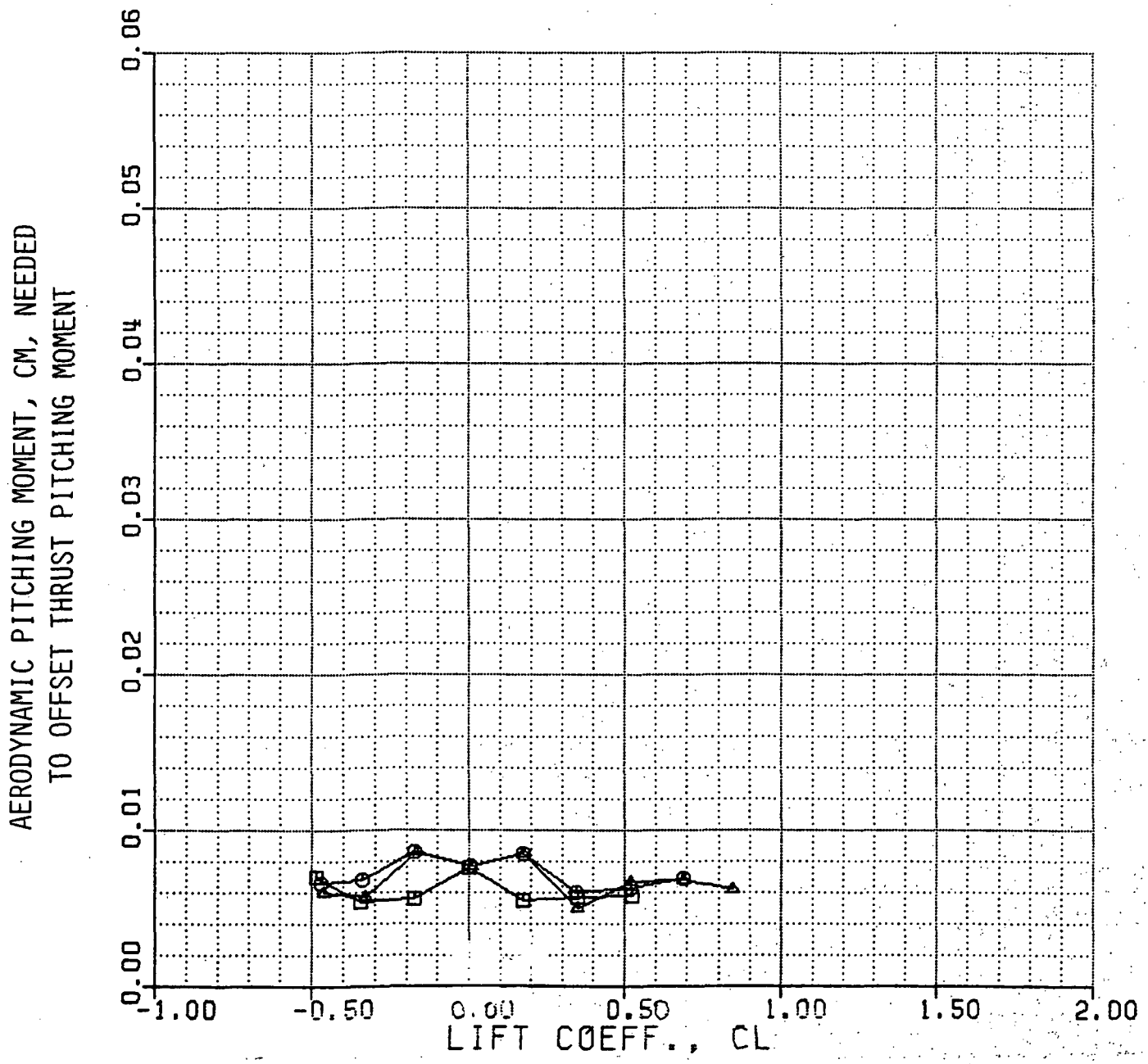

Figure 2(h)

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AN VS ALPHA

7-12-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

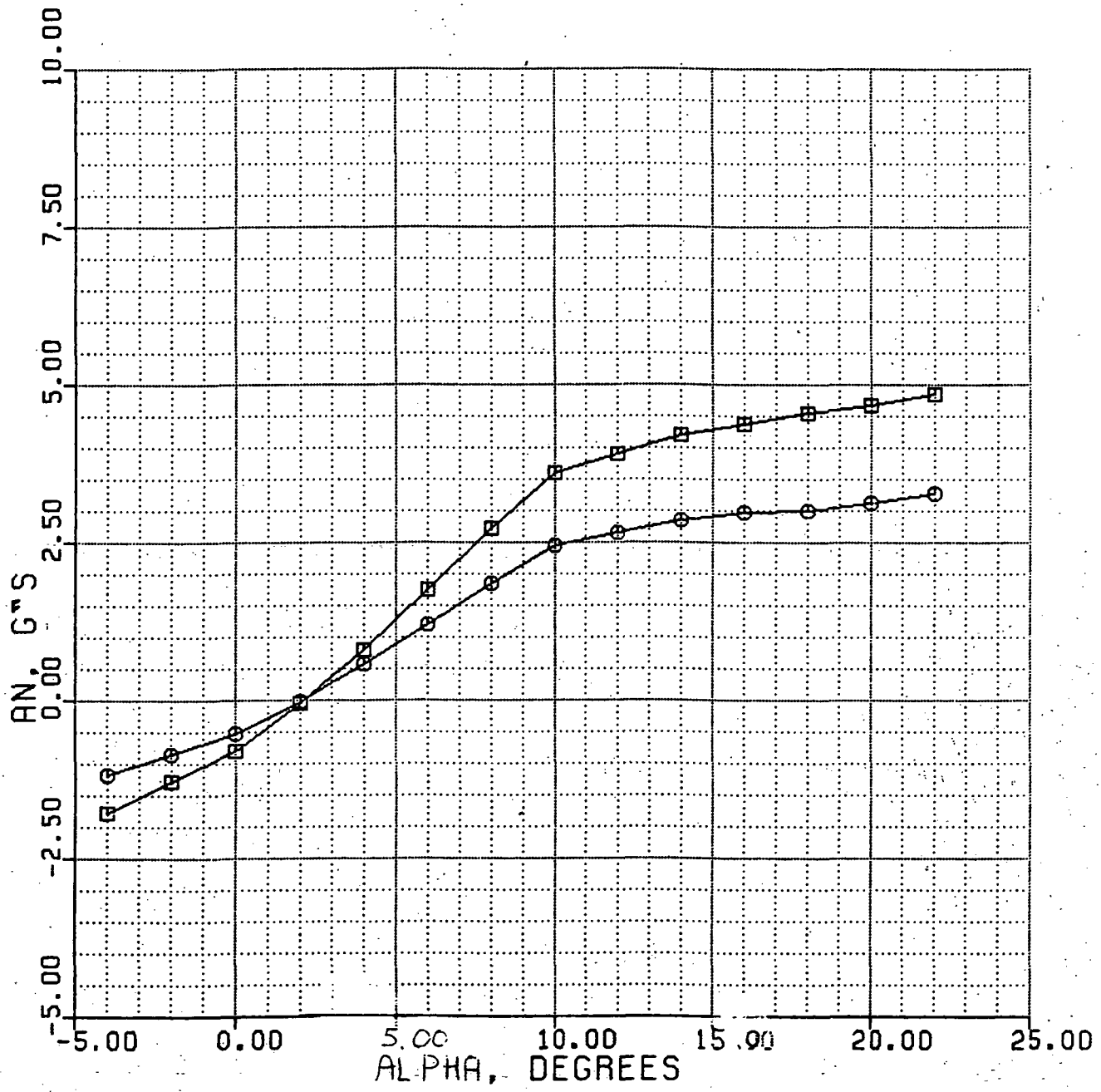

Figure 3(a)

ORIGINAL PAGE IS
OF POOR QUALITY

AN VS ALPHA

7-12-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

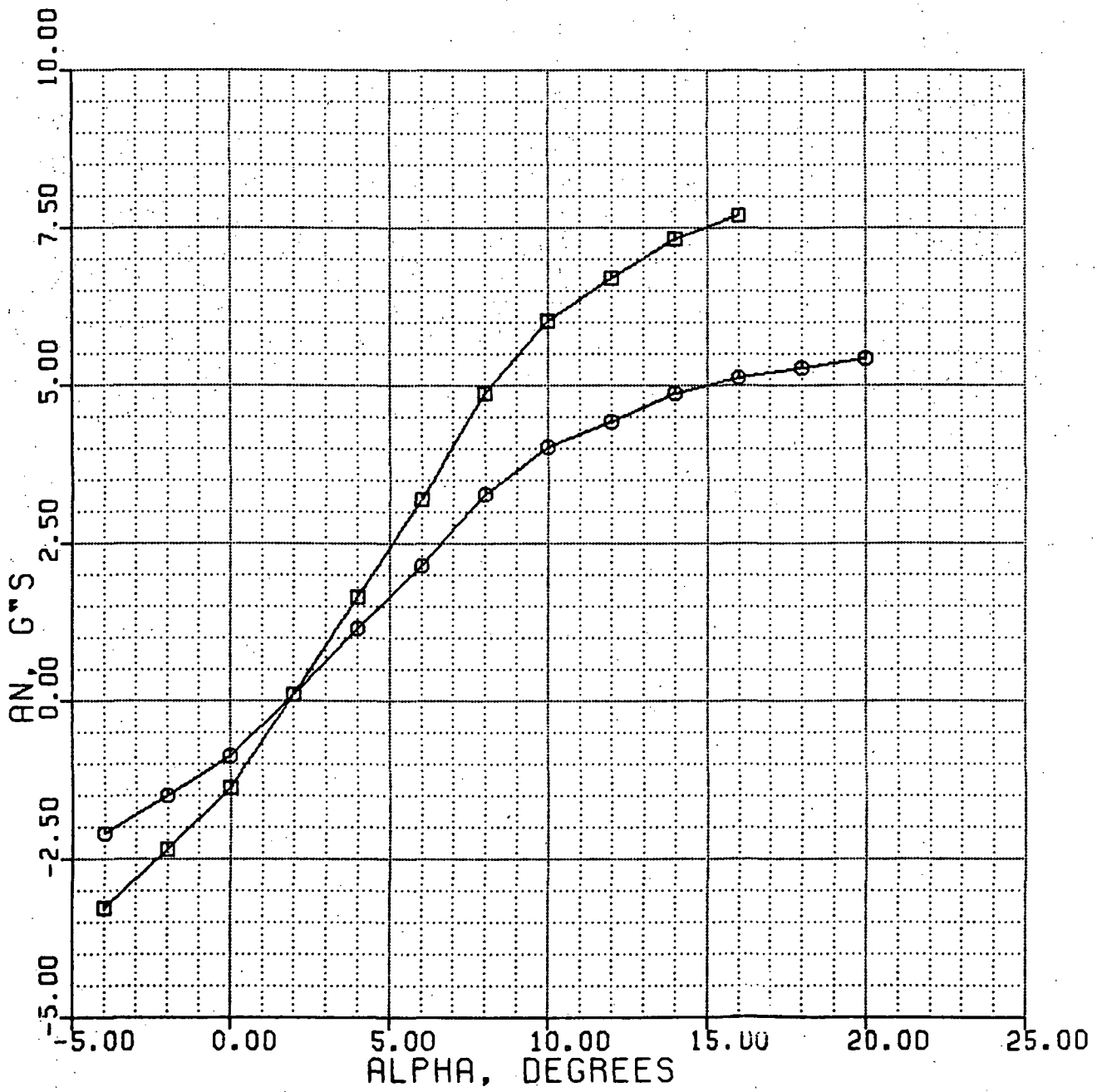

Figure 3(b)

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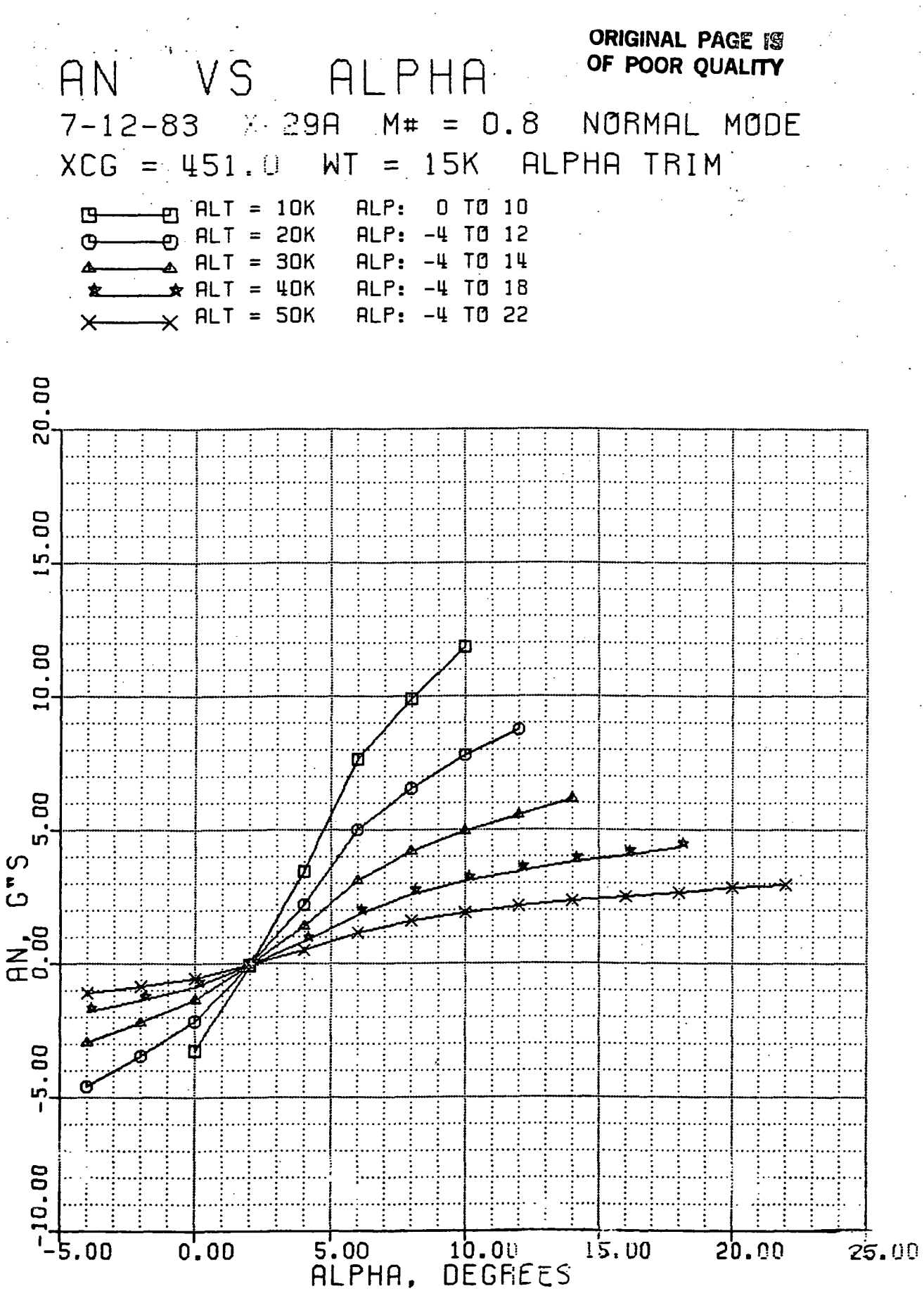

Figure 3(c)

ORIGINAL PAGE IS
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AN VS ALPHA

7-14-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

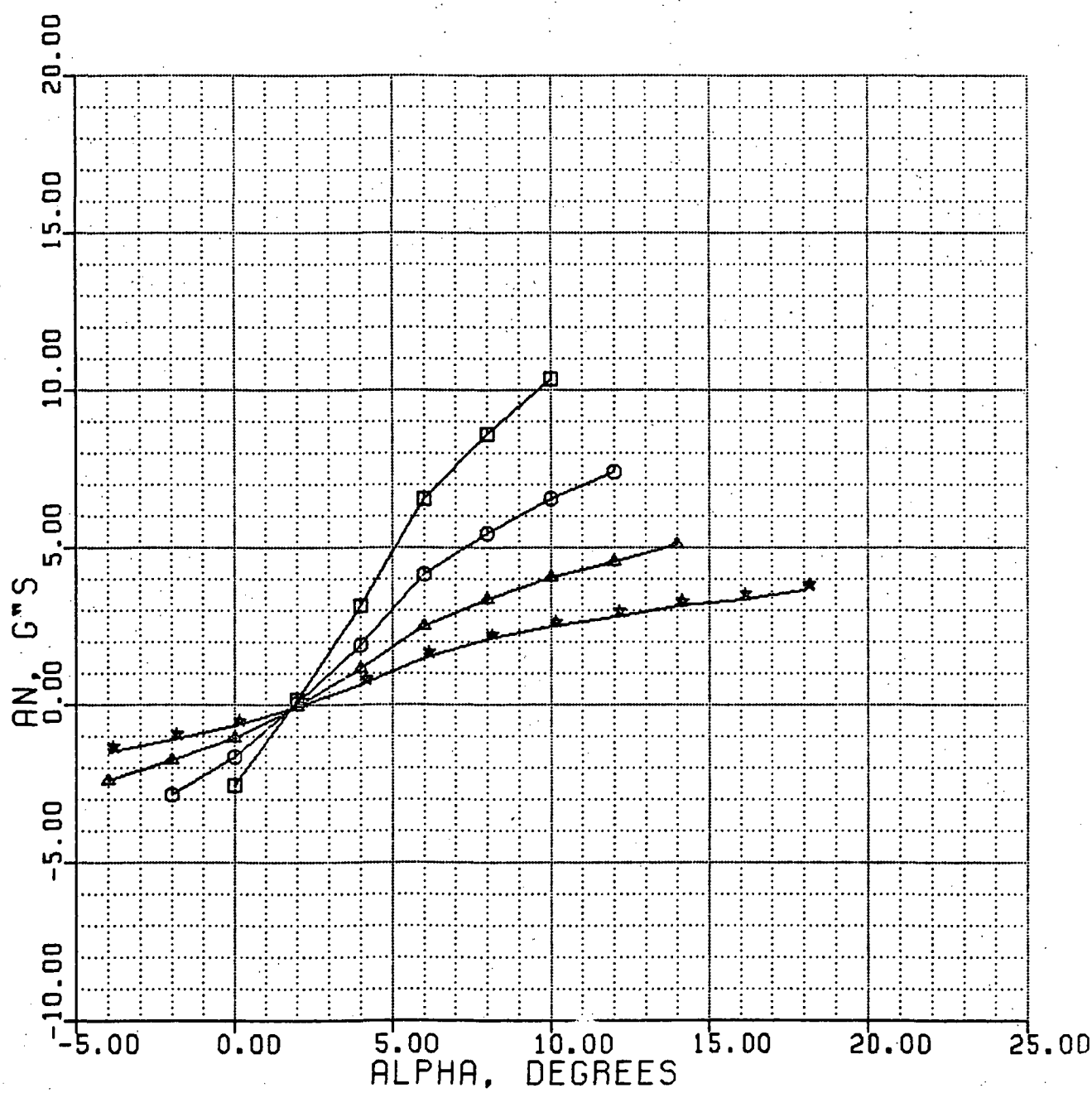

Figure 3(d)

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OF POOR QUALITY

AN VS ALPHA

7-14-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

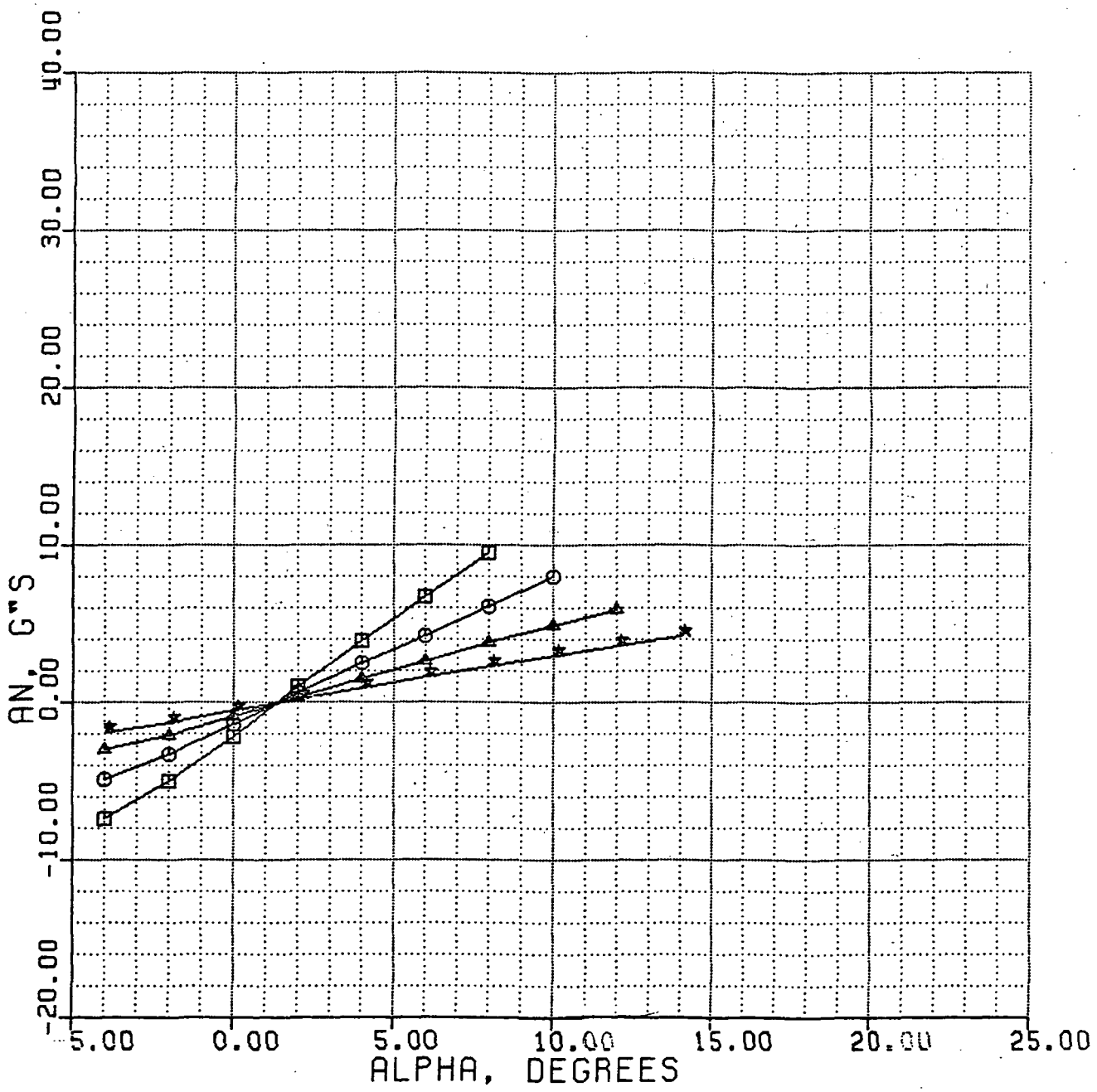

Figure 3(e)

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AN VS ALPHA

7-14-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

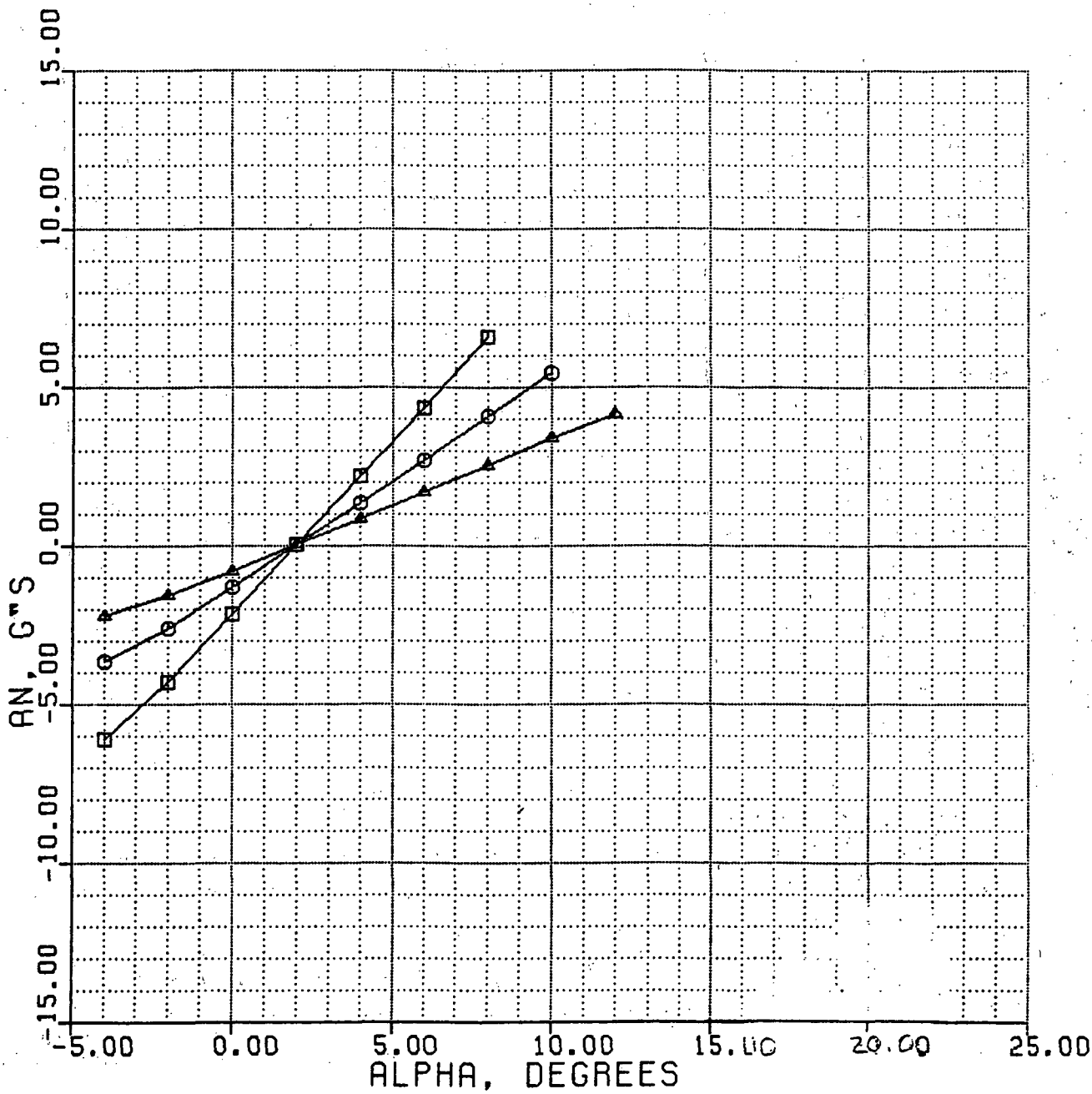

Figure 3(f)

ORIGINAL PAGE IS
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ALPHA VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

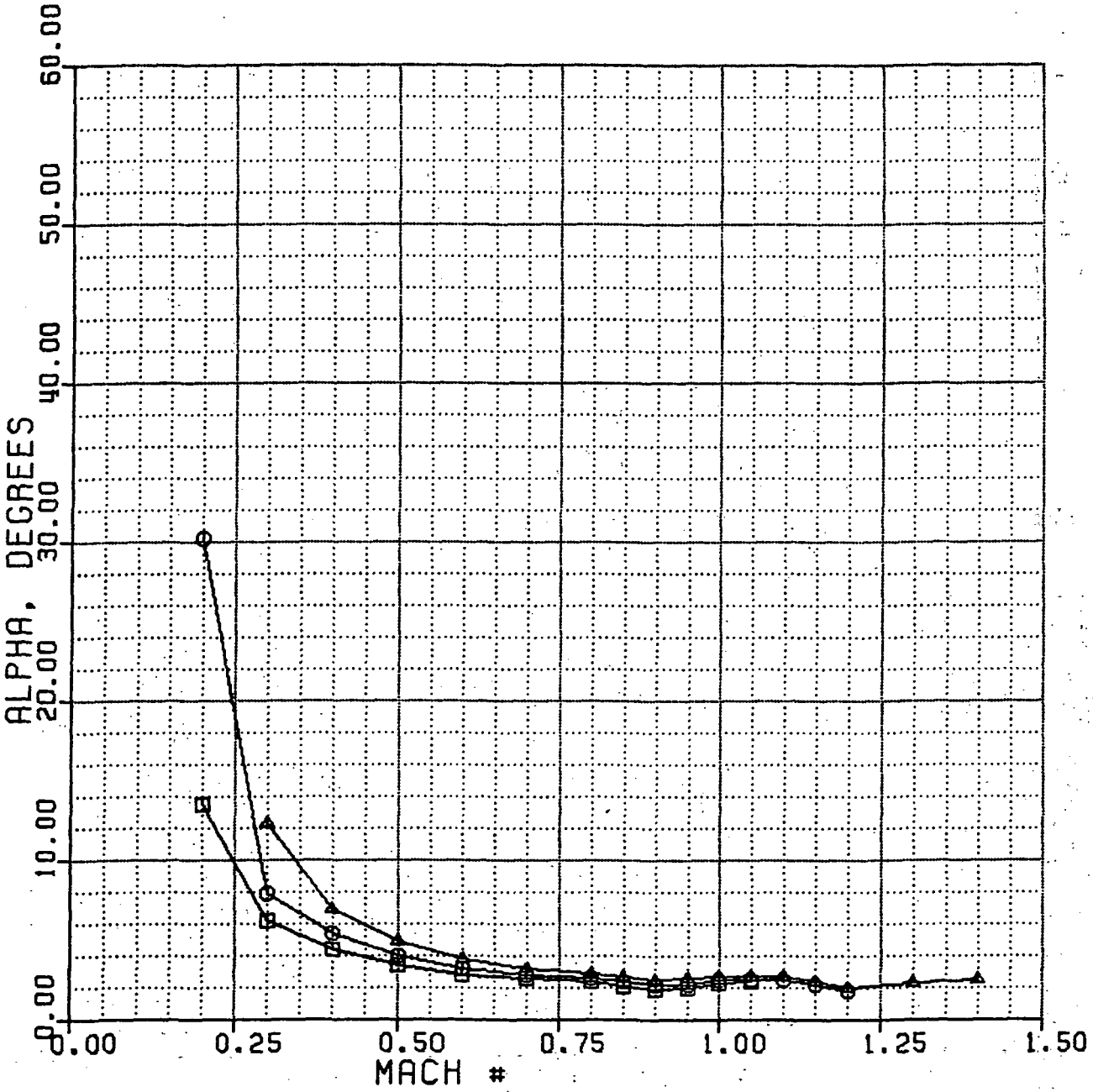

Figure 4(a)

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ALPHA VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

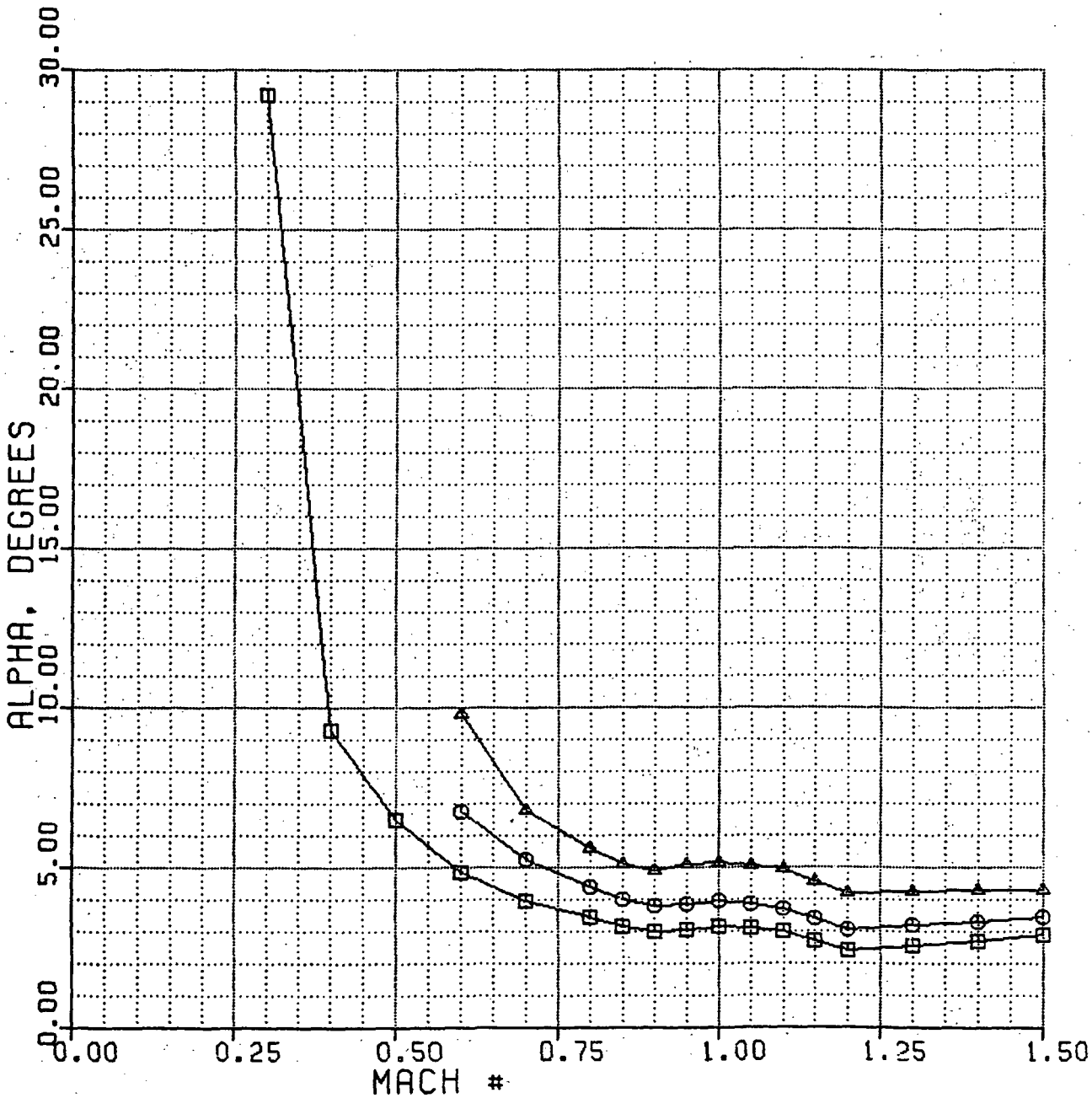

Figure 4(b)

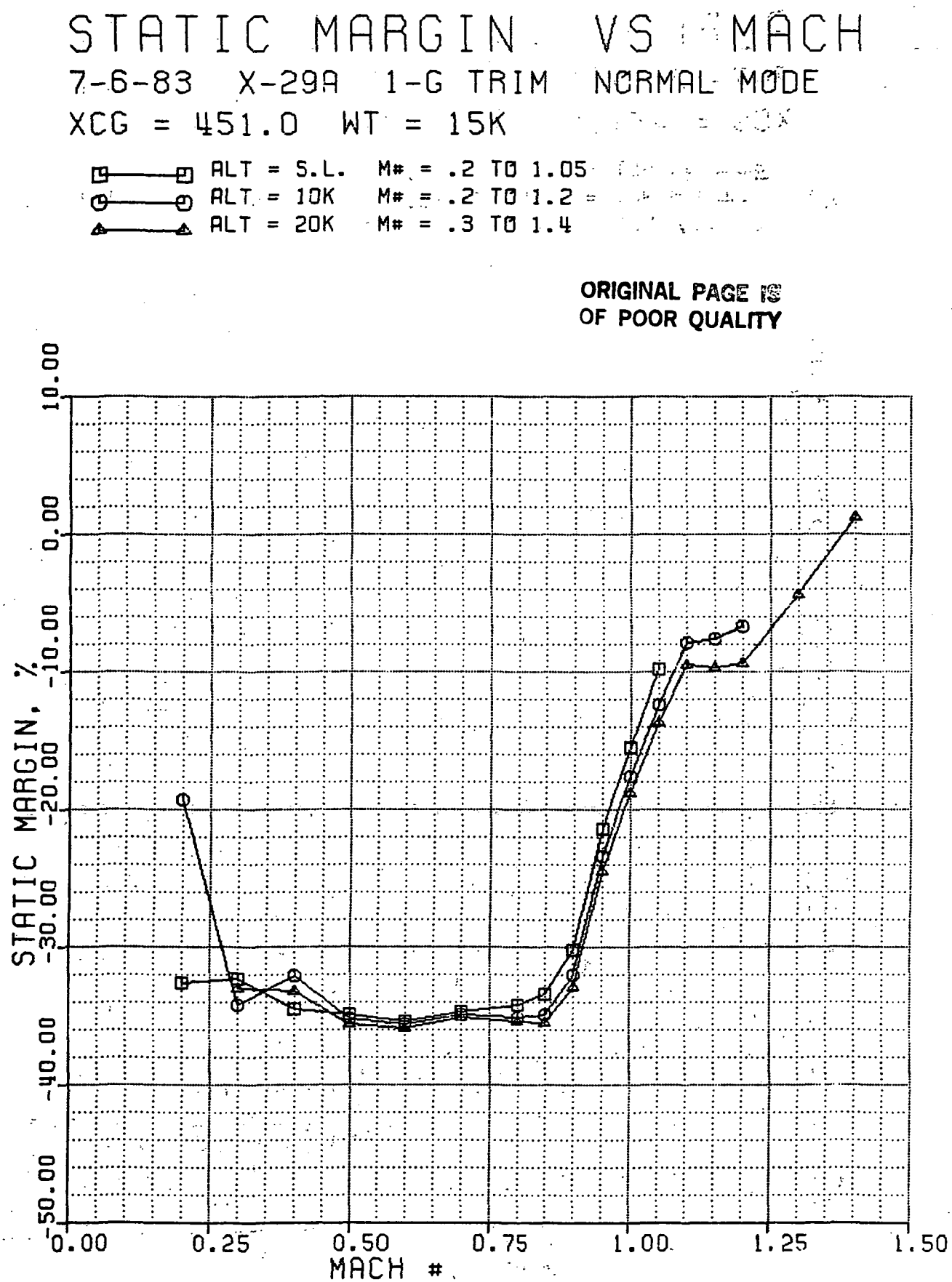
STATIC MARGIN VS MACH
7-6-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4
ORIGINAL PAGE IS
OF POOR QUALITY
STATIC MARGIN, %
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 5(a)

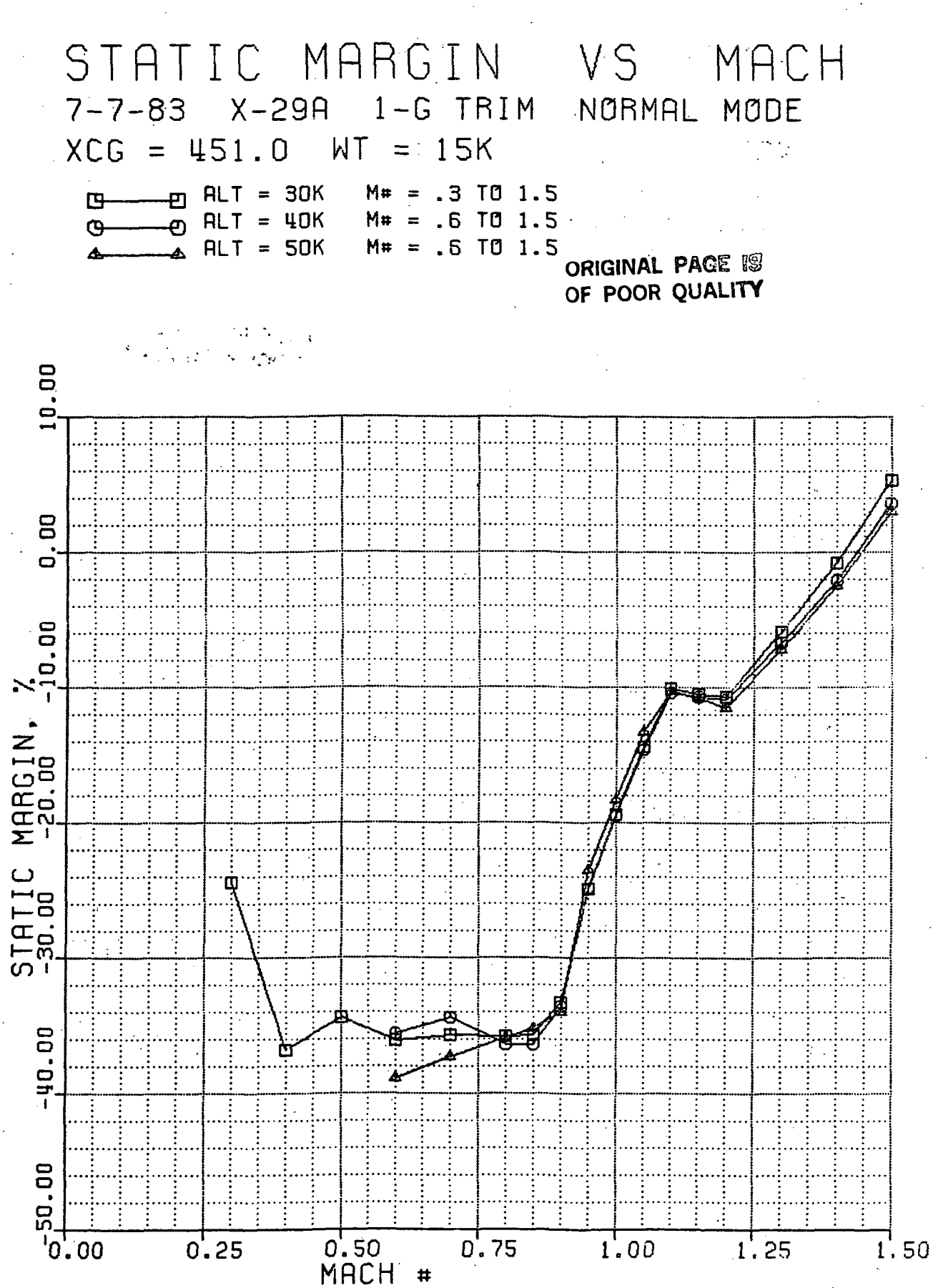
STATIC MARGIN VS MACH
7-7-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS
OF POOR QUALITY
STATIC MARGIN, %
10.00
0.00
-10.00
-20.00
-30.00
-40.00
-50.00
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 5(b)

STATIC MARGIN VS ALPHA

7-15-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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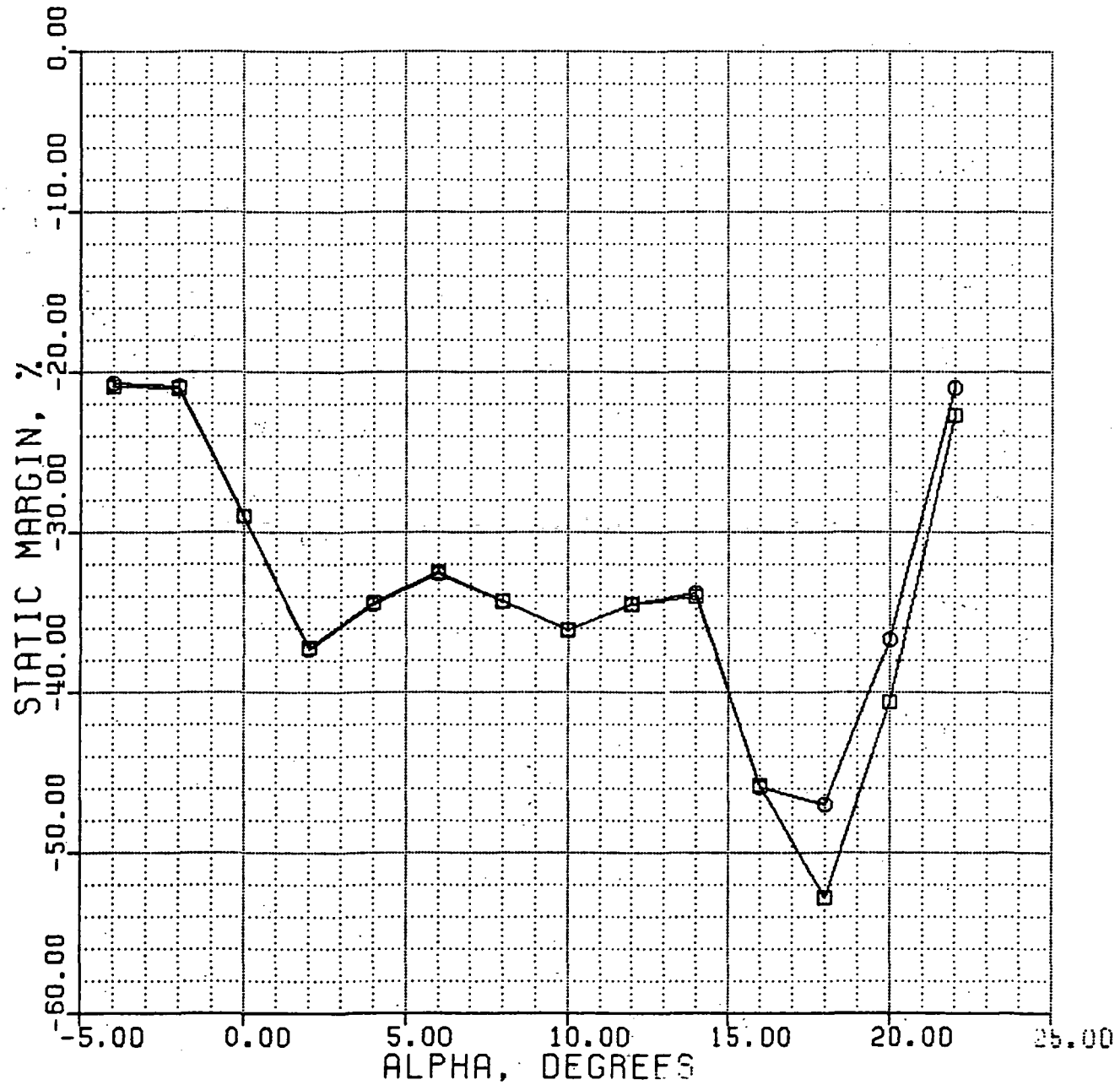
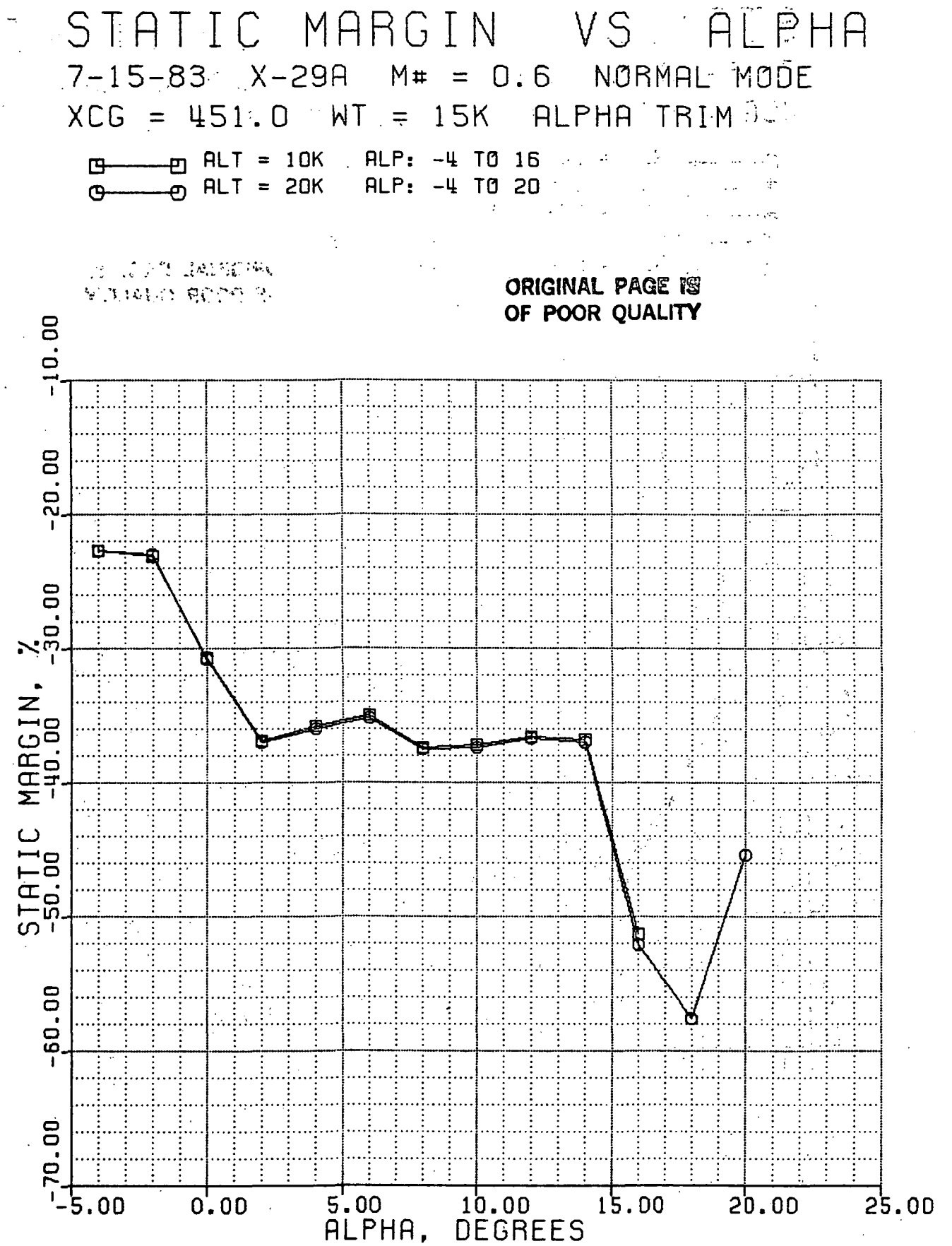


Figure 6(a)



ORIGINAL PAGE IS
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Figure 6(b)

STATIC MARGIN VS ALPHA

7-15-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22

ORIGINAL PAGE IS
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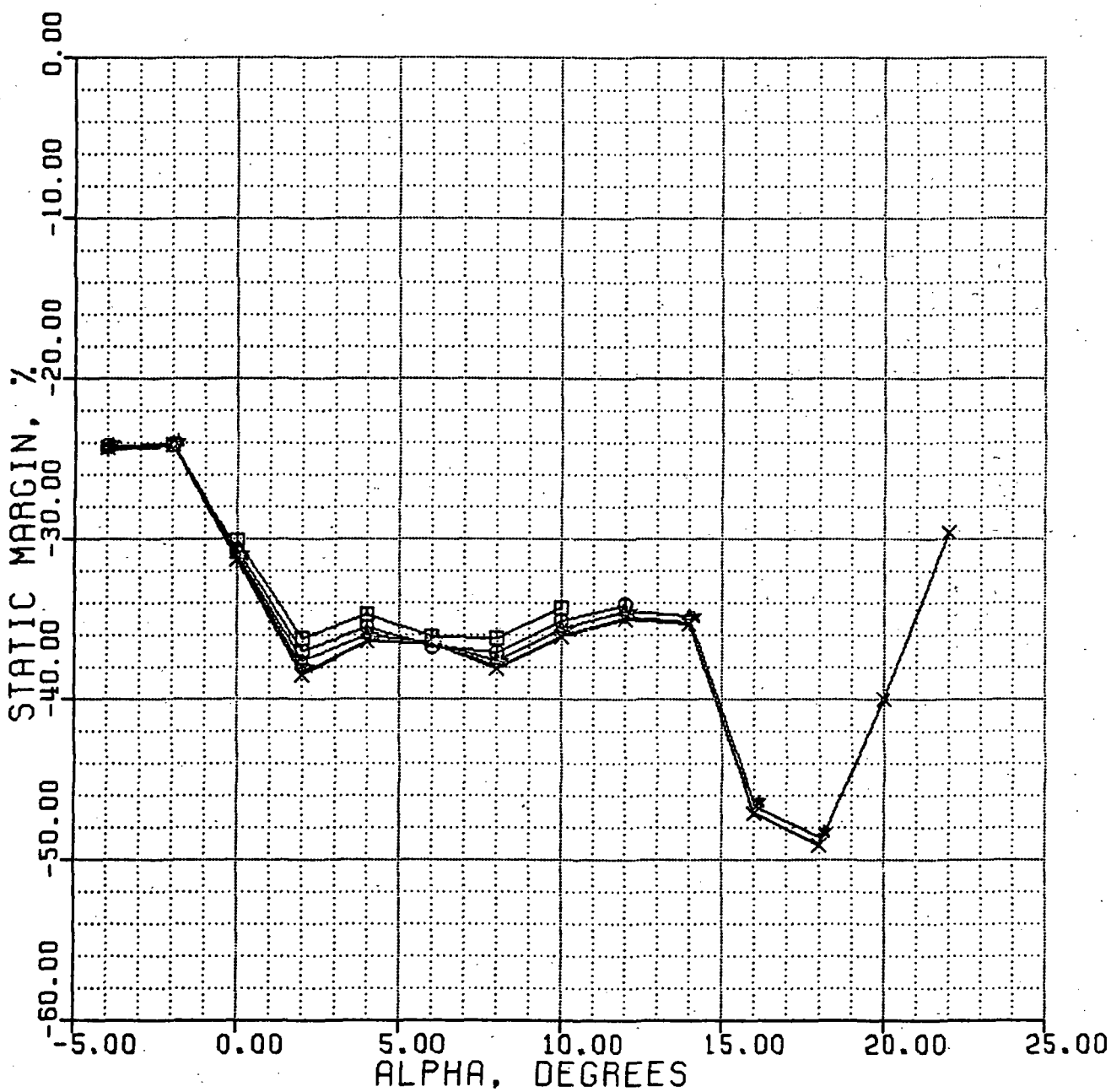

Figure 6(c)

STATIC MARGIN VS ALPHA

7-15-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
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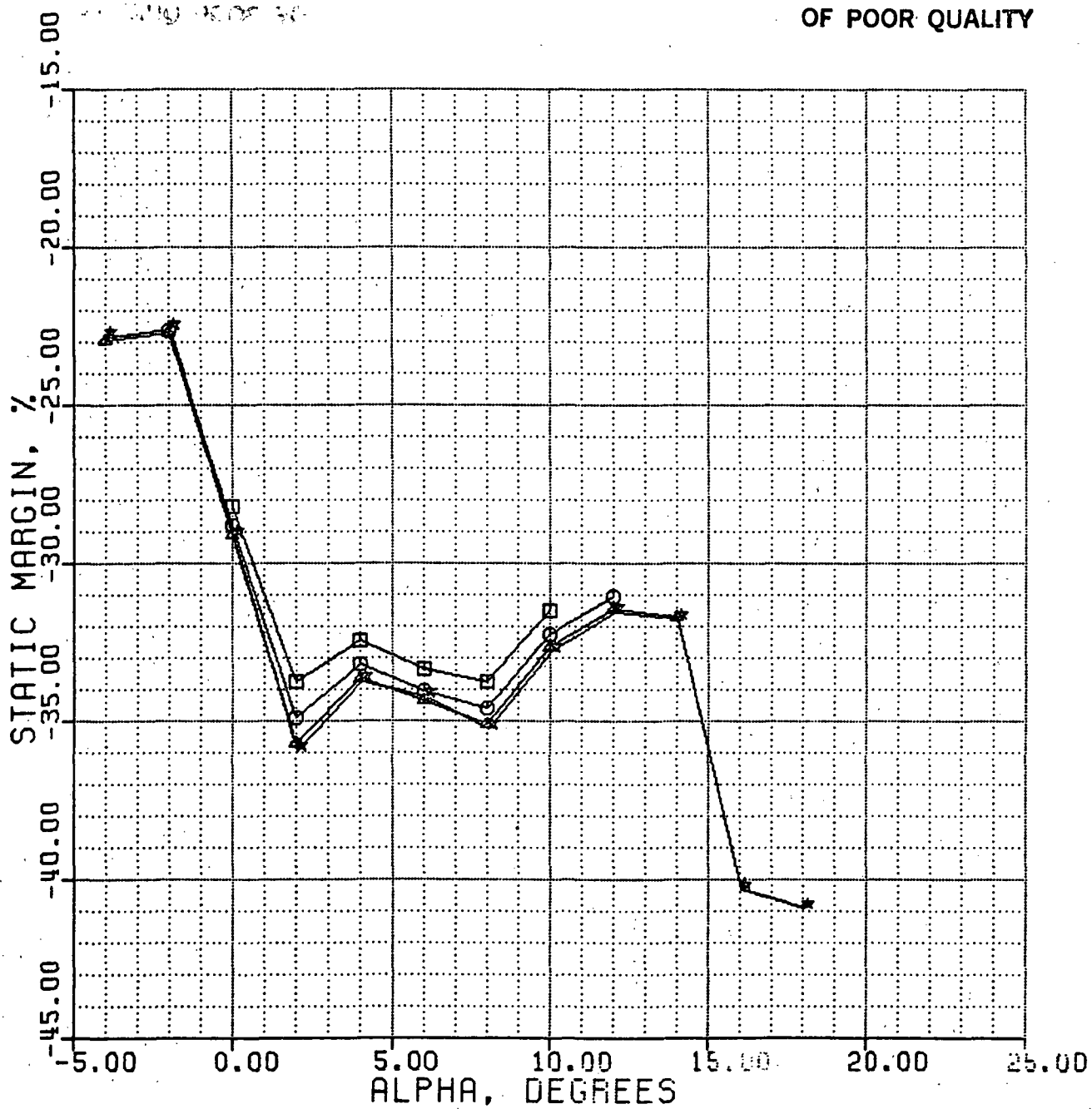

Figure 6(d)

STATIC MARGIN VS ALPHA

7-15-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
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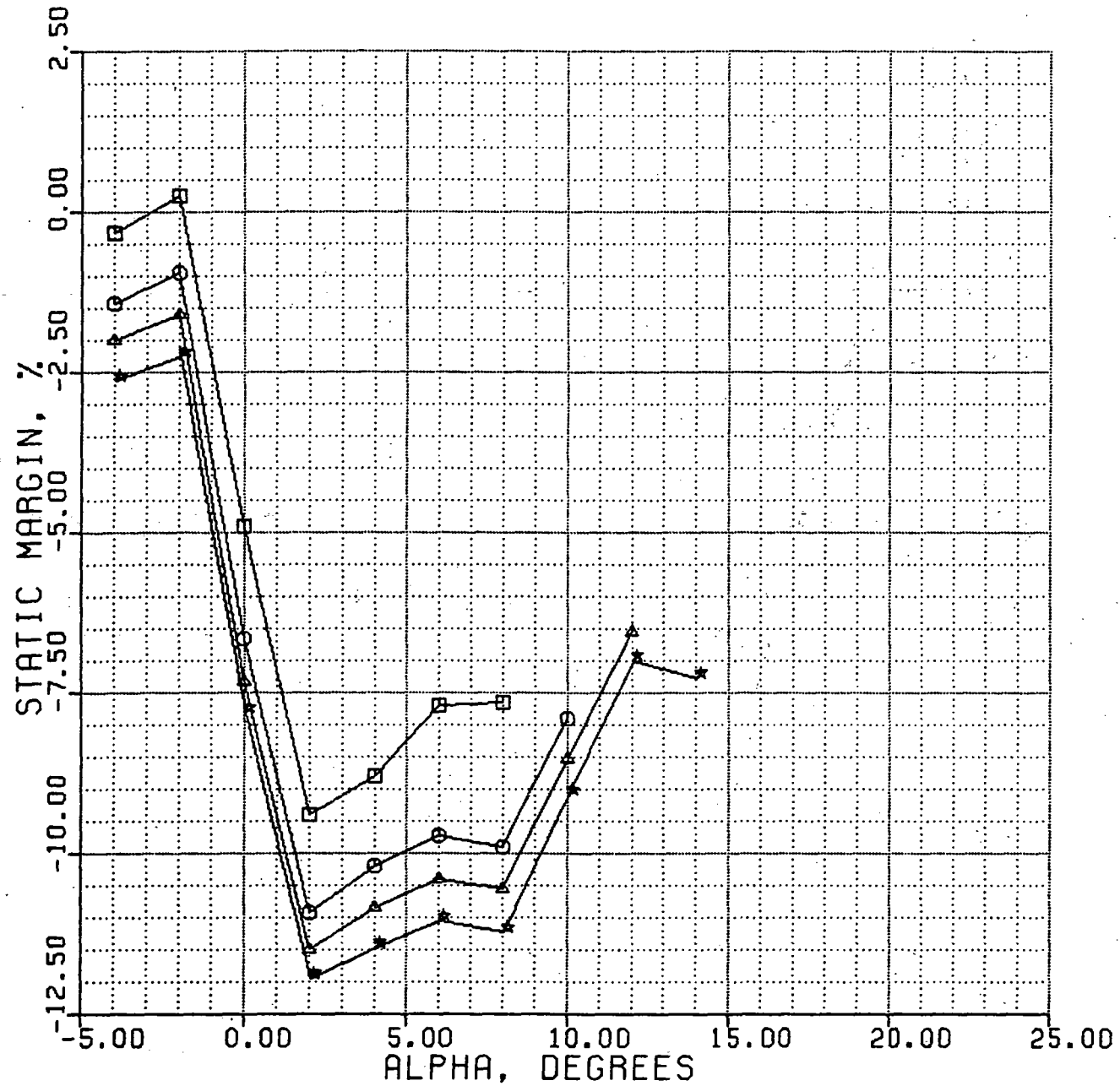

Figure 6(e)

STATIC MARGIN VS ALPHA

7-15-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
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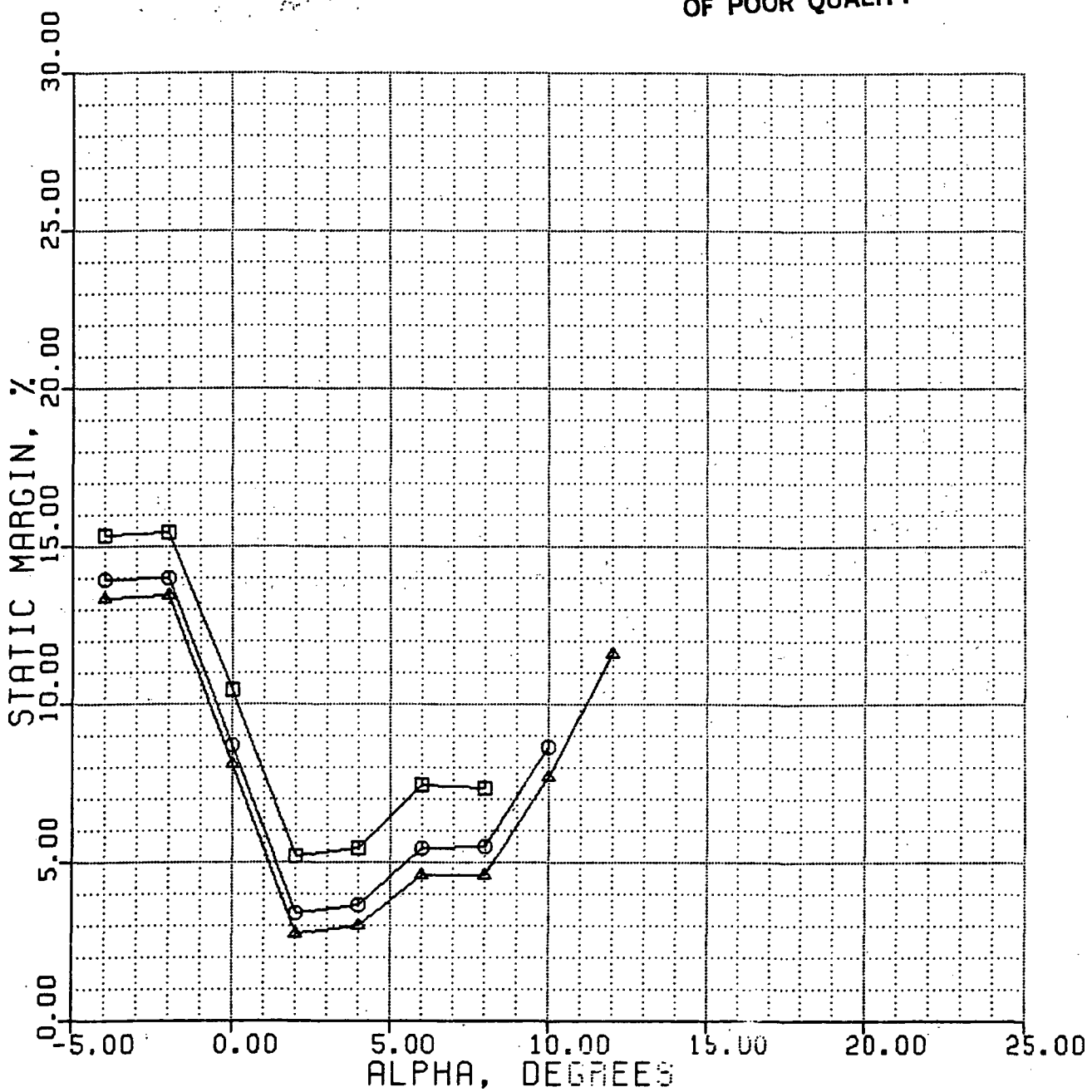

Figure 6(f)

DELTA CANARD VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
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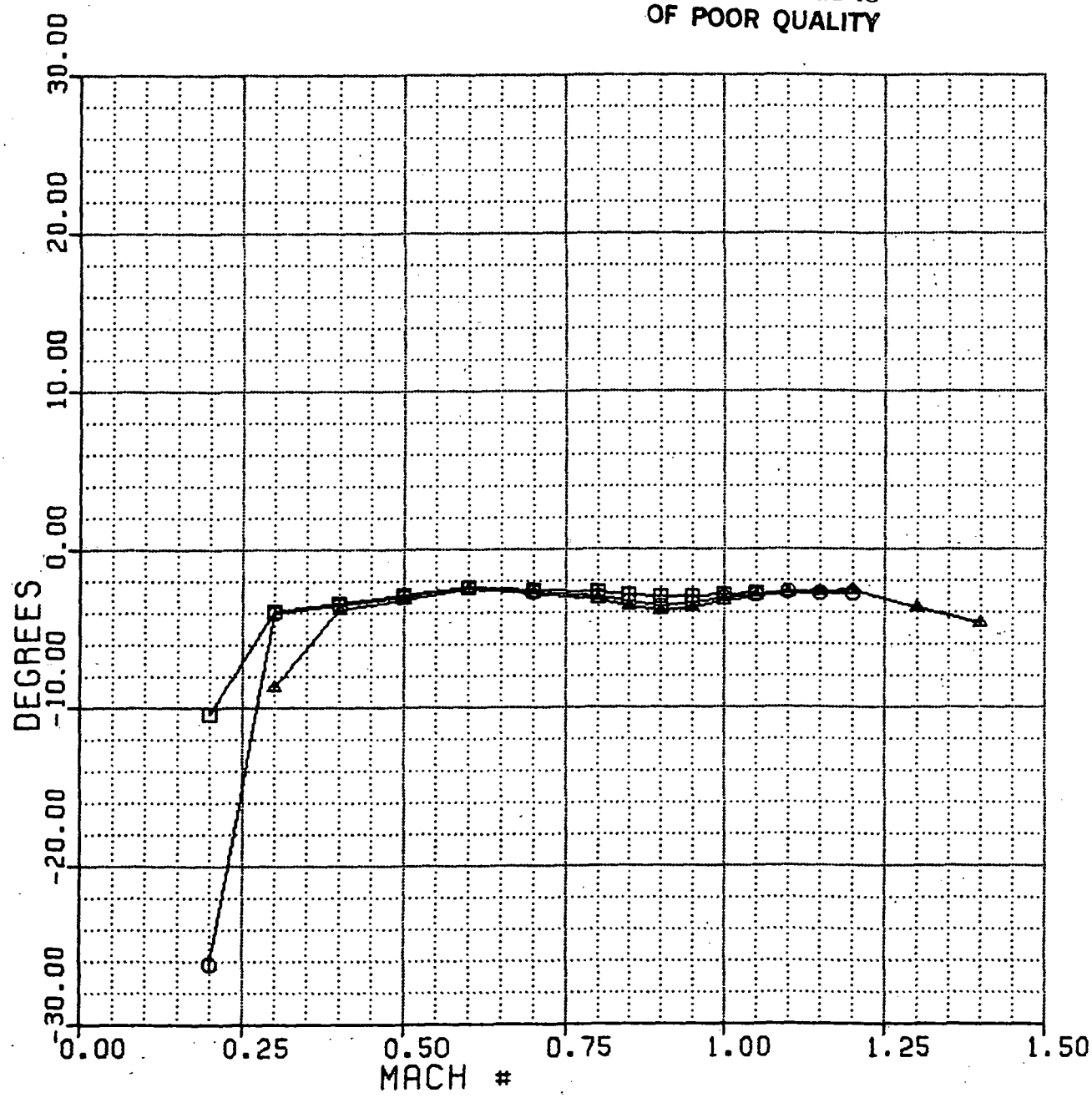

Figure 7(a)

DELTA CANARD VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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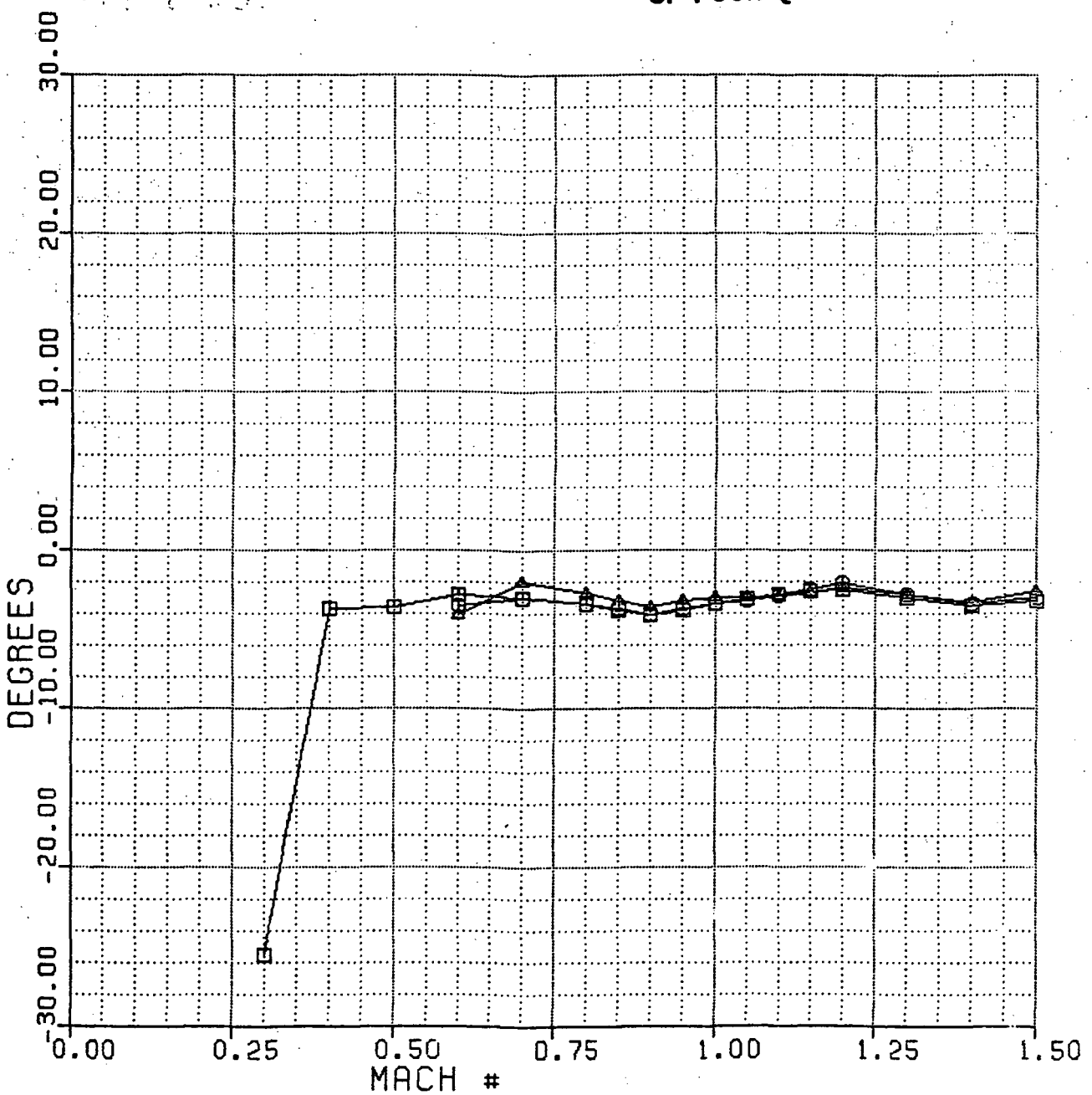

Figure 7(b)

DELTA CANARD VS ALPHA

6-15-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
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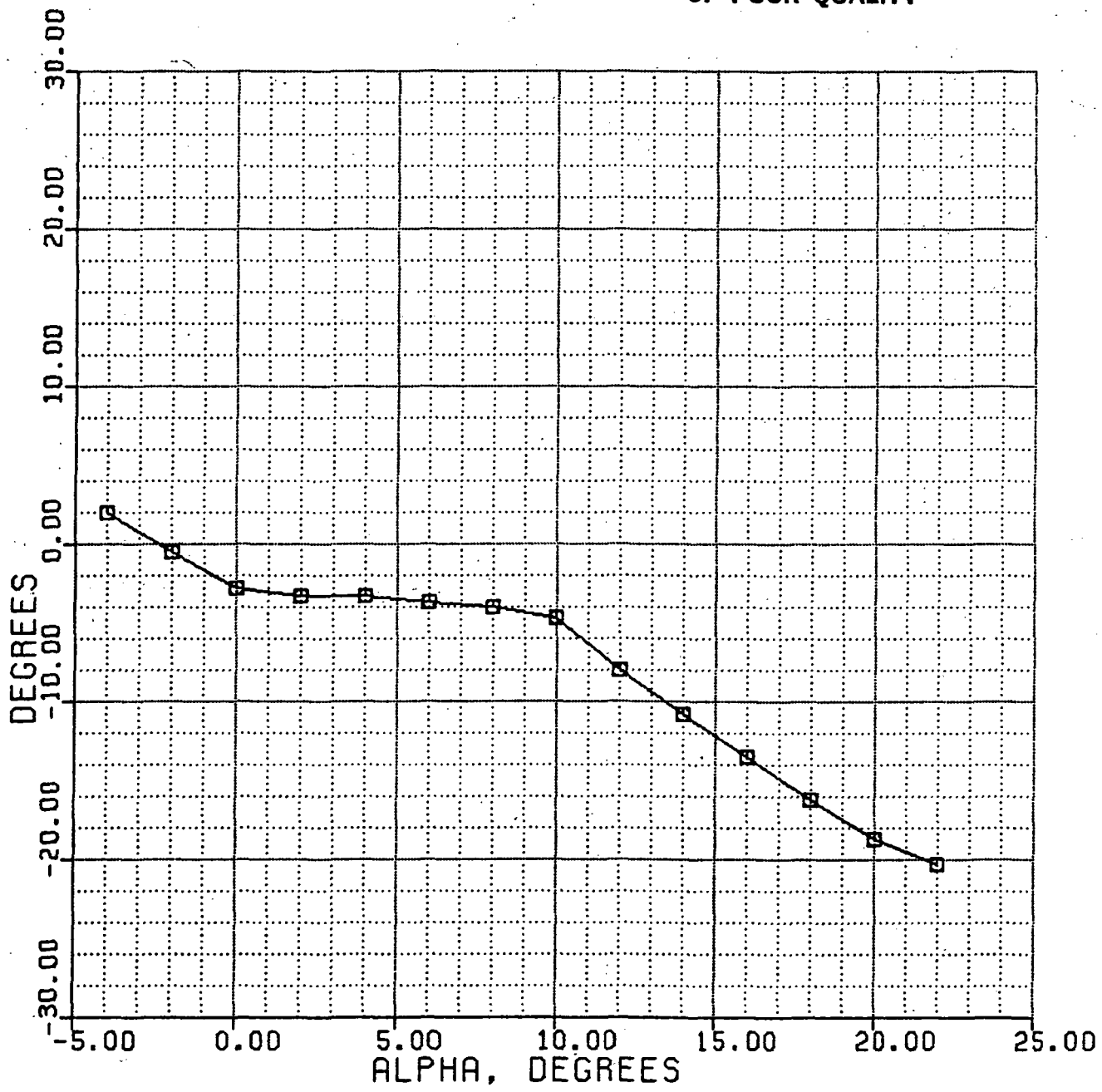

Figure 8(a)

DELTA CANARD VS ALPHA

6-16-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
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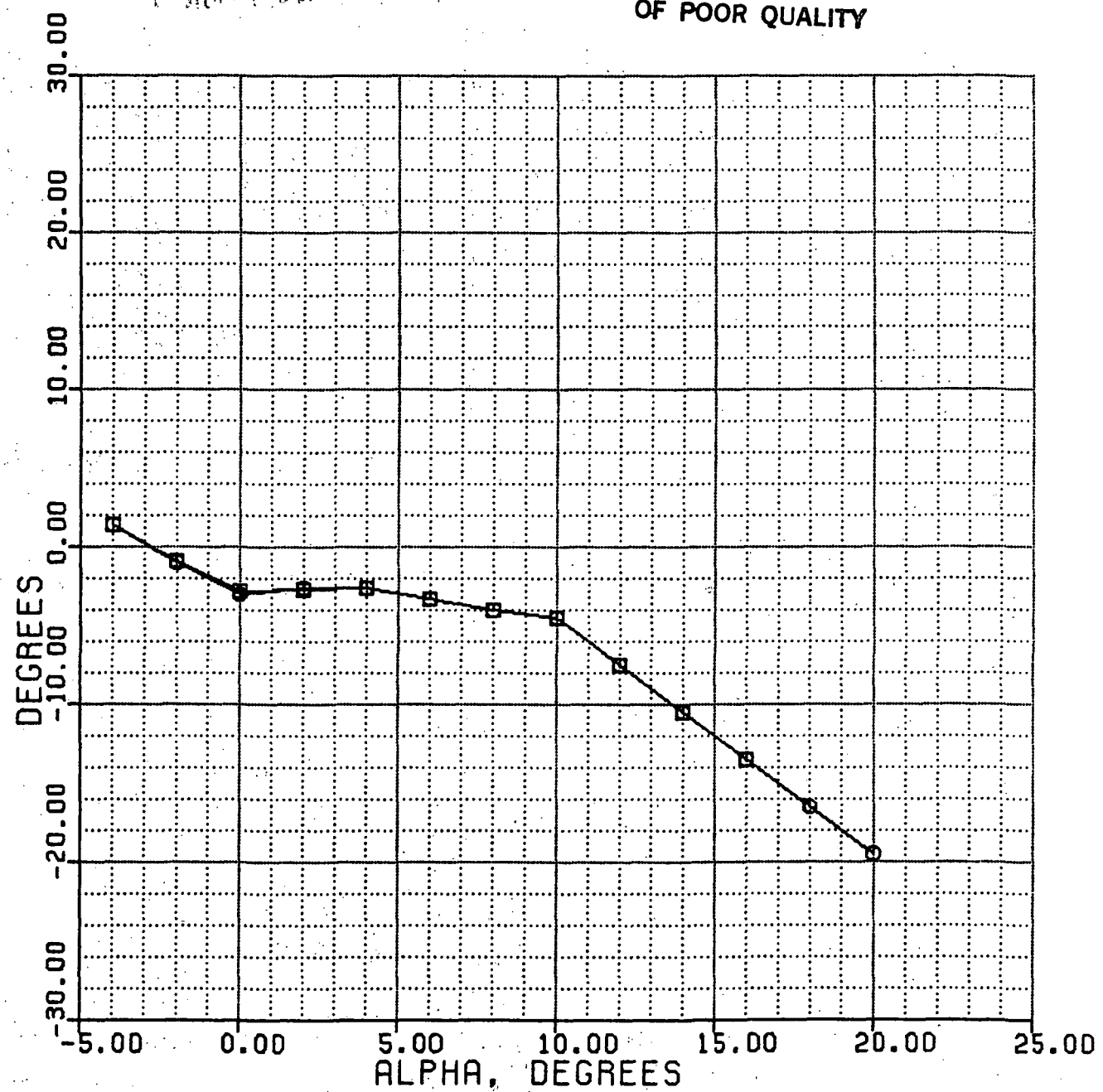
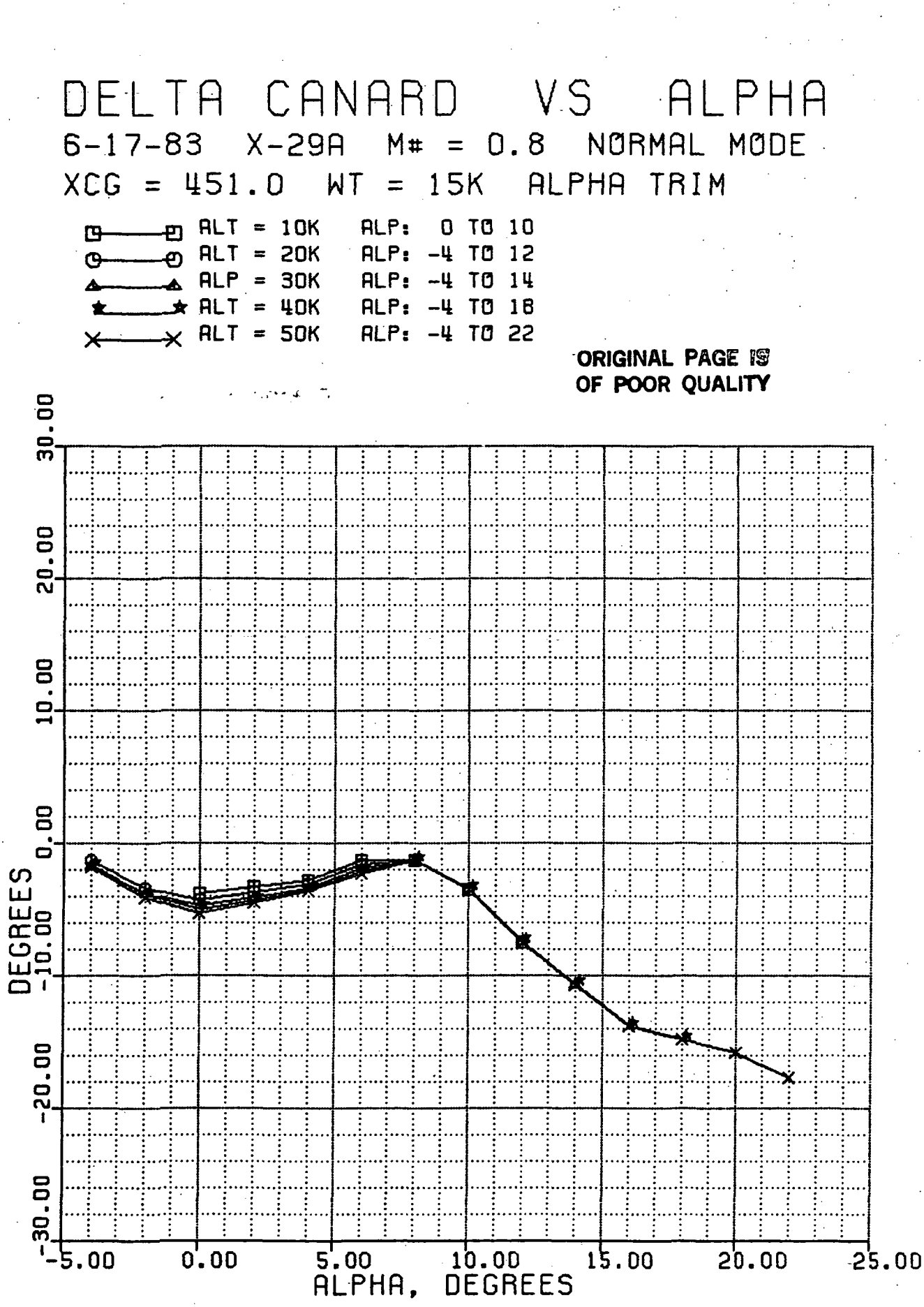


Figure 8(b)


DELTA CANARD VS ALPHA
6-17-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
30.00
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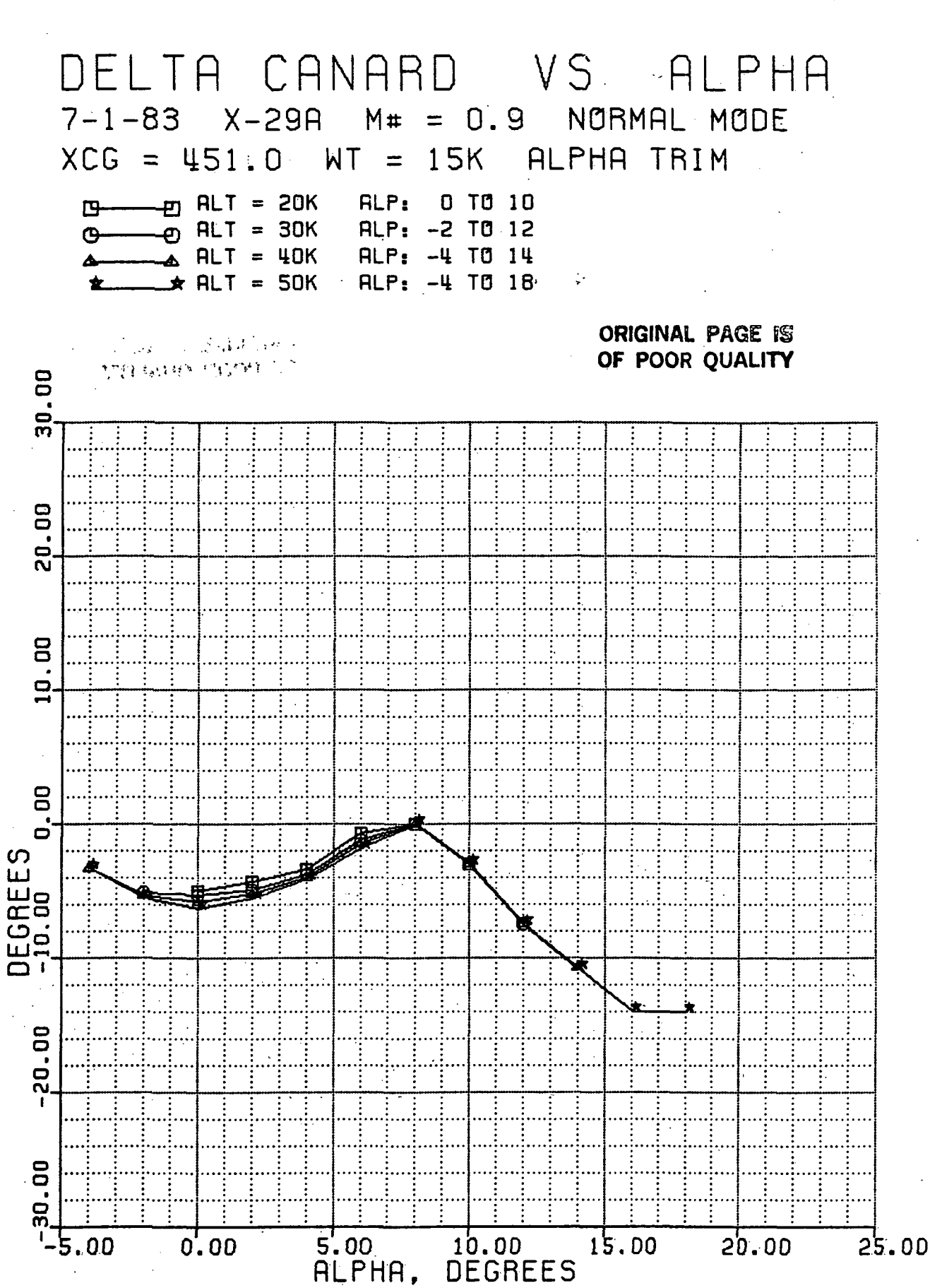
-10.00
-20.00
-30.00
DEGREES
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 8(c)


DELTA CANARD VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS
OF POOR QUALITY
DEGREES
30.00
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10.00
0.00
-10.00
-20.00
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0.00
5.00
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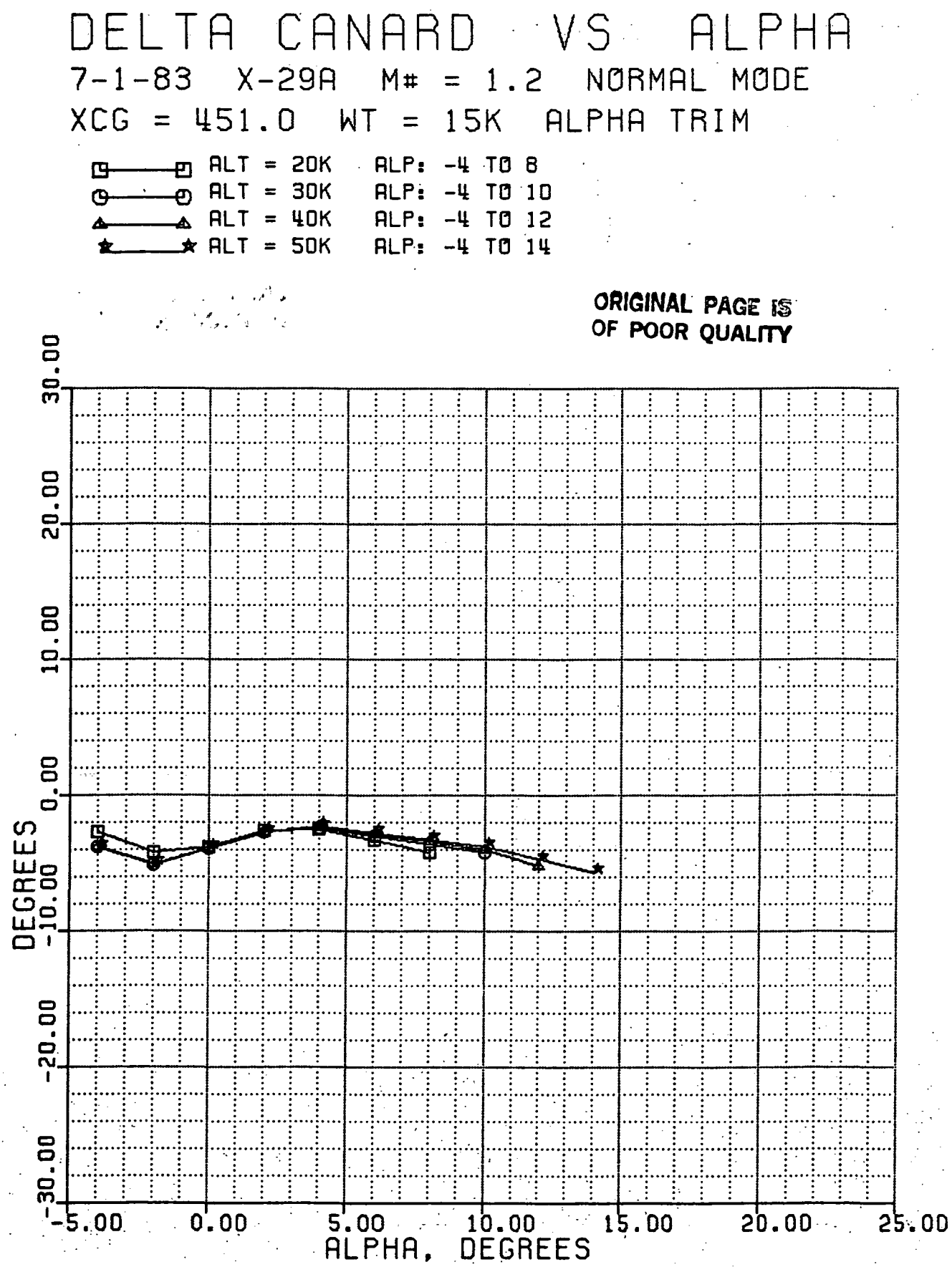
15.00
20.00
25.00
ALPHA, DEGREES

Figure 8(d)


DELTA CANARD VS ALPHA
7-1-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS
OF POOR QUALITY
30.00
20.00
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-10.00
-20.00
-30.00
DEGREES
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 8(e)

DELTA CANARD VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

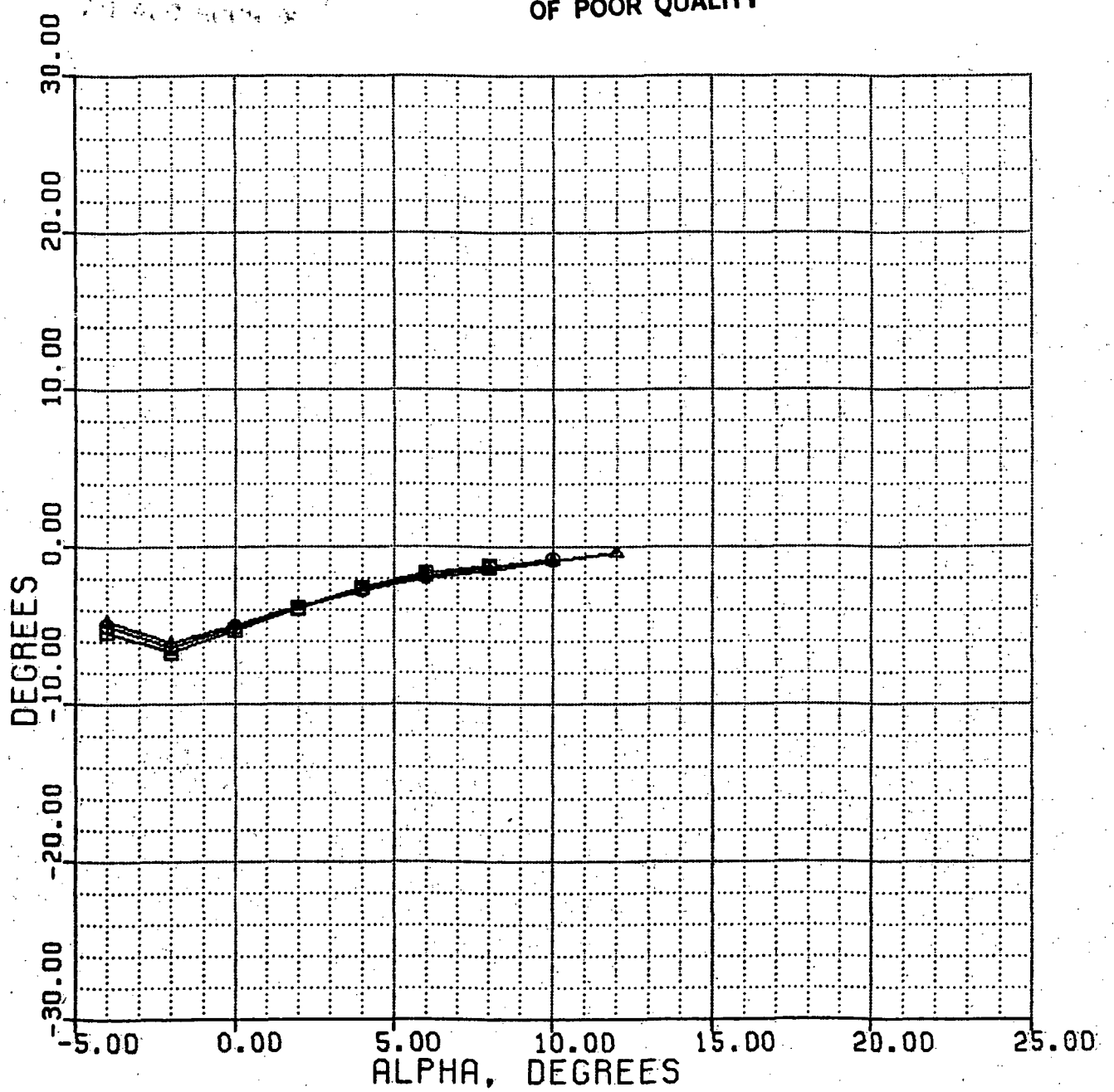


Figure 8(f)

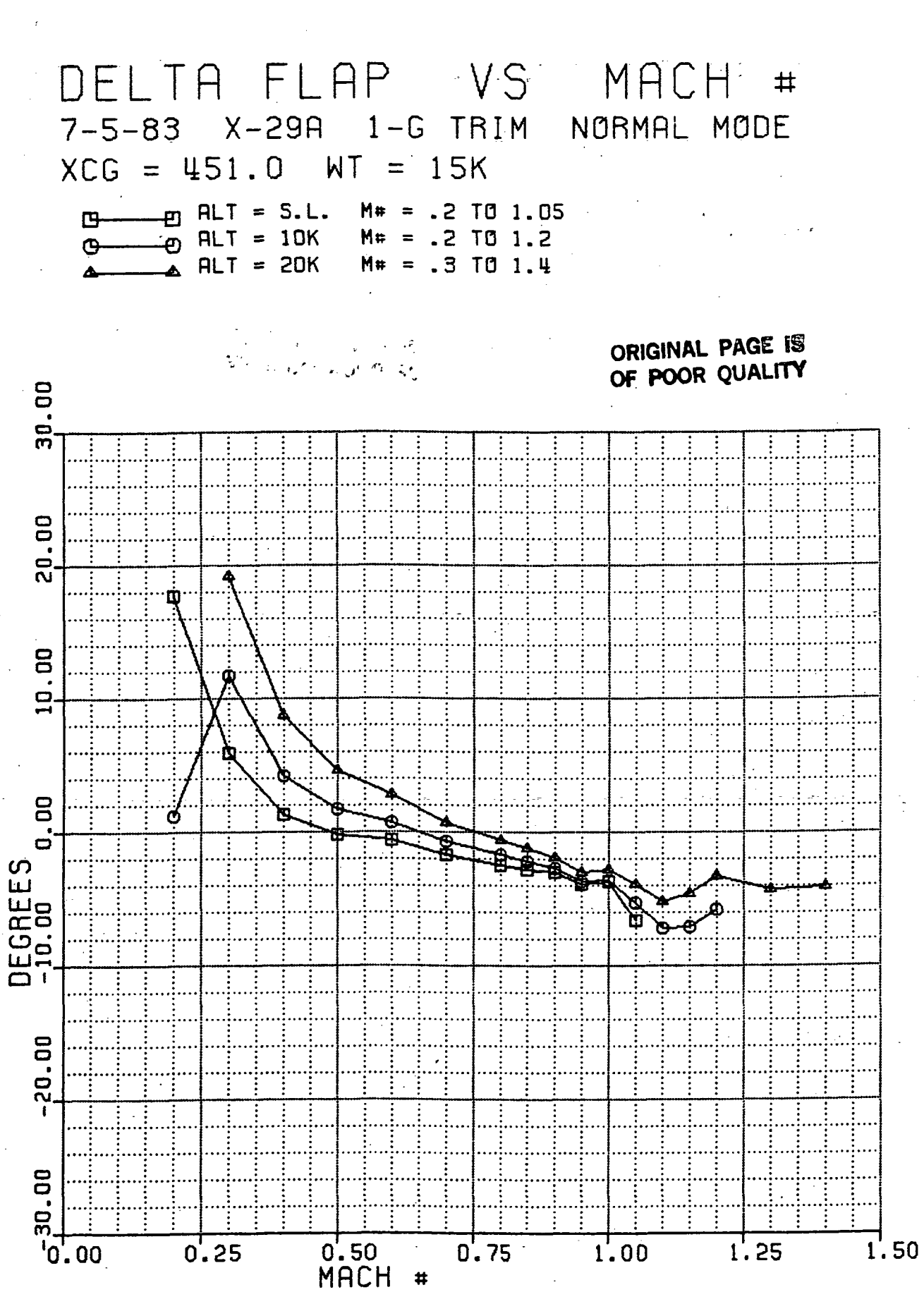

DELTA FLAP VS MACH #
7-5-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4
ORIGINAL PAGE IS
OF POOR QUALITY
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
DEGREES
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 9(a)

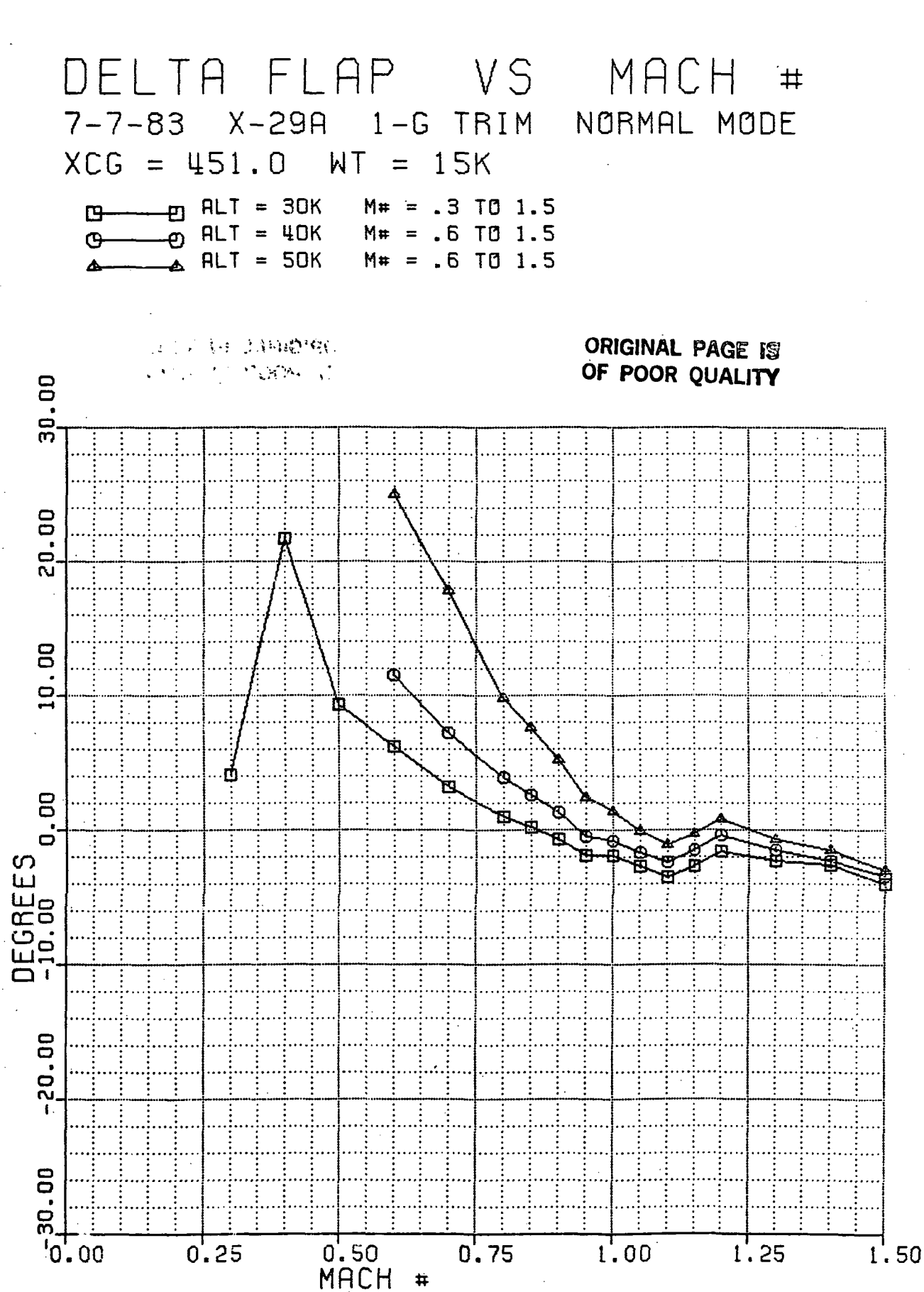
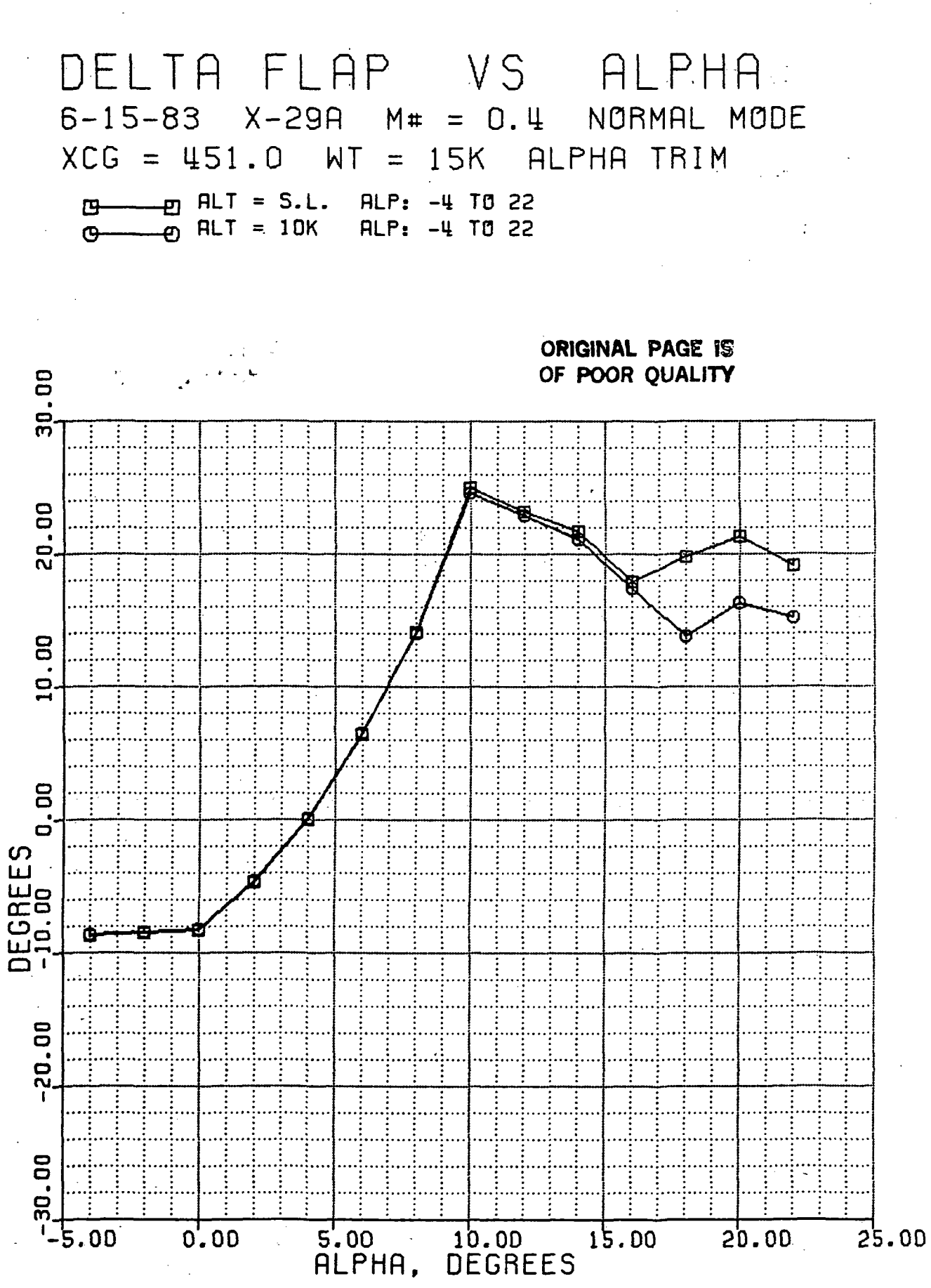

DELTA FLAP VS MACH #
7-7-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS
OF POOR QUALITY
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
DEGREES
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 9(b)


DELTA FLAP VS ALPHA
6-15-83 X-29A M# = 0.4 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TO 22
ALT = 10K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
30.00
20.00
10.00
0.00
-10.00
-20.00
-30.00
DEGREES
-5.00
0.00
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20.00
25.00
ALPHA, DEGREES

Figure 10(a)

DELTA FLAP VS ALPHA

6-16-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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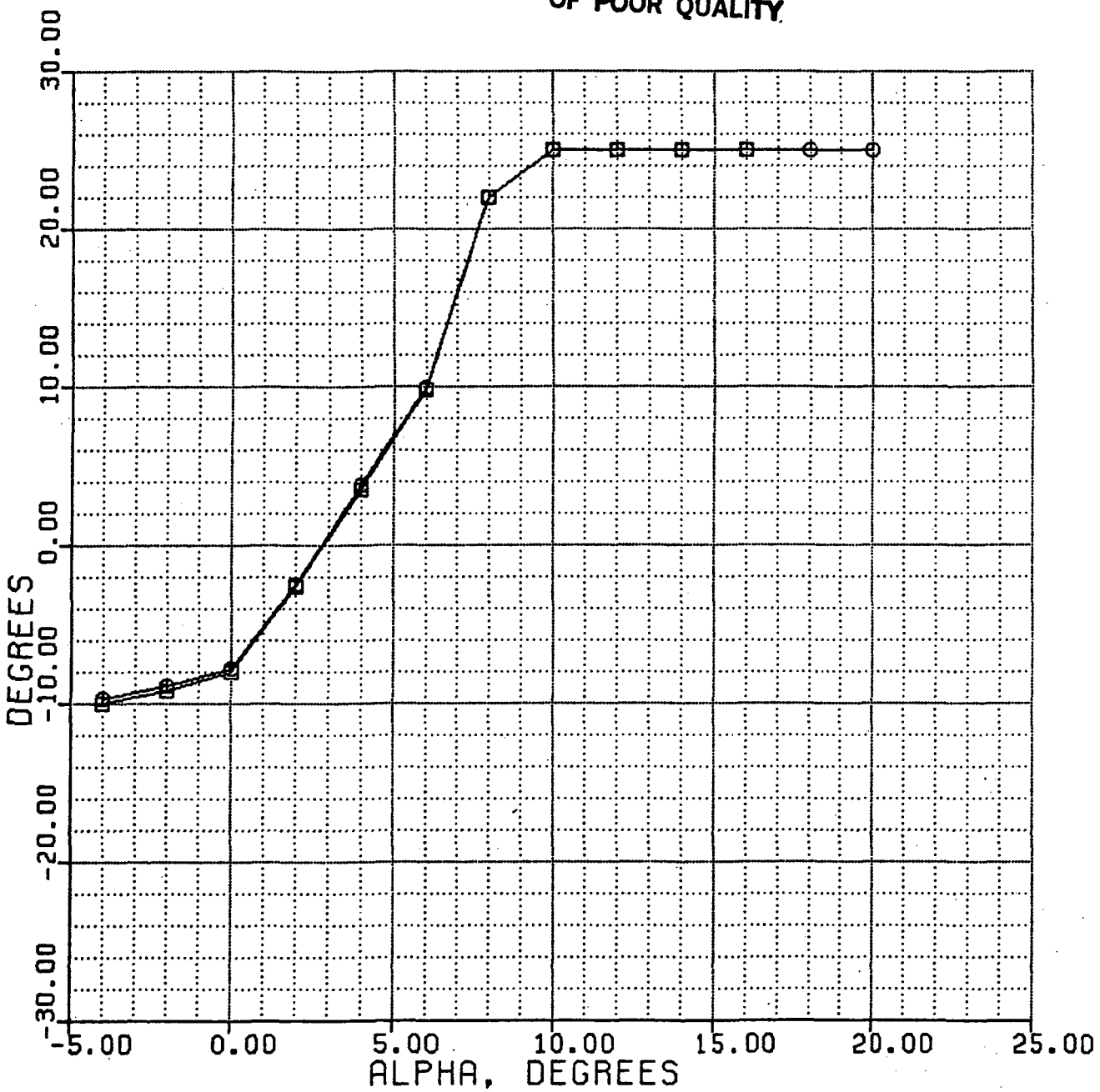
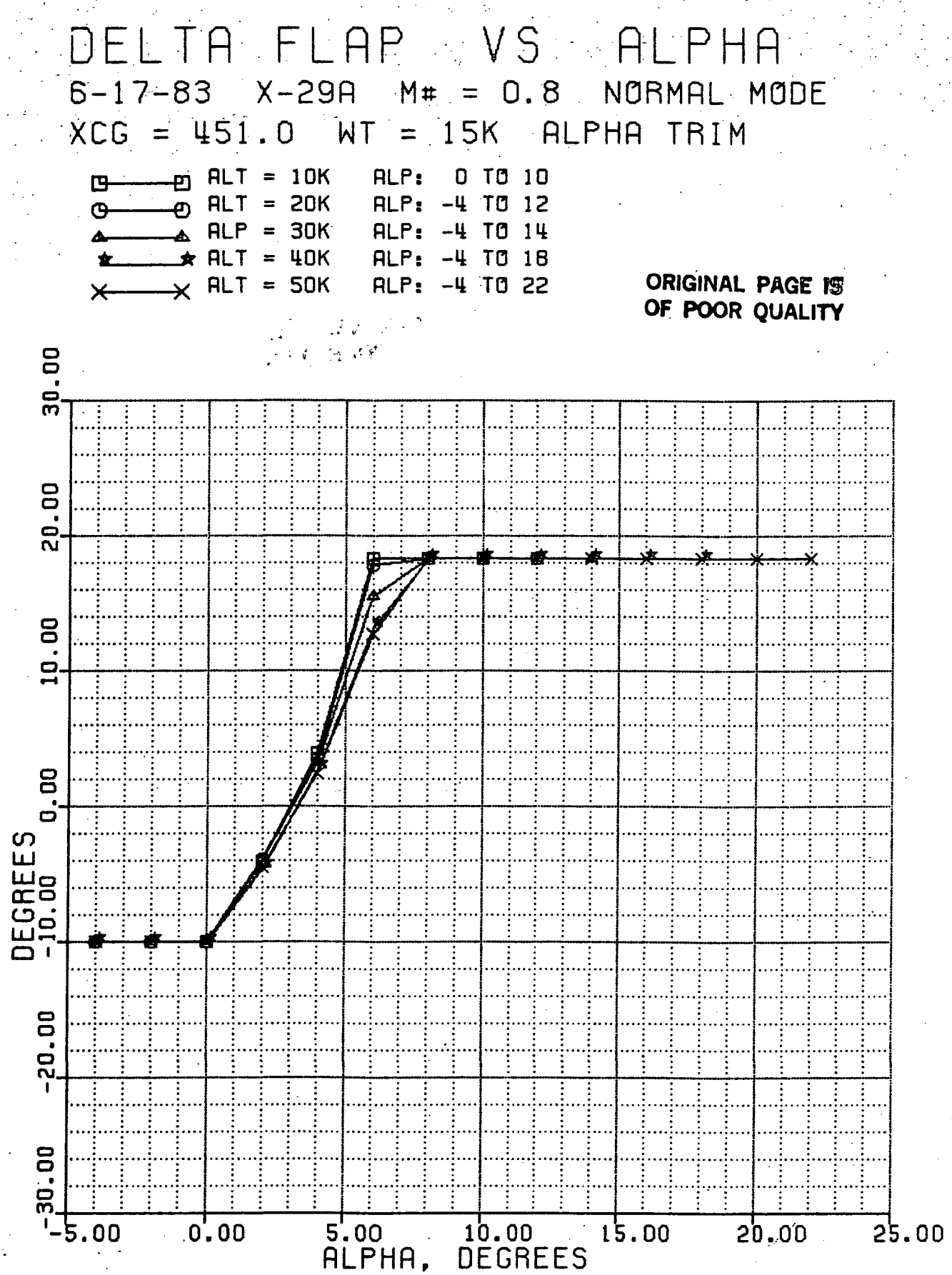


Figure 10(b)


DELTA FLAP VS ALPHA
6-17-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
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30.00
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-10.00
-20.00
-30.00
DEGREES
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 10(c)

DELTA FLAP VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
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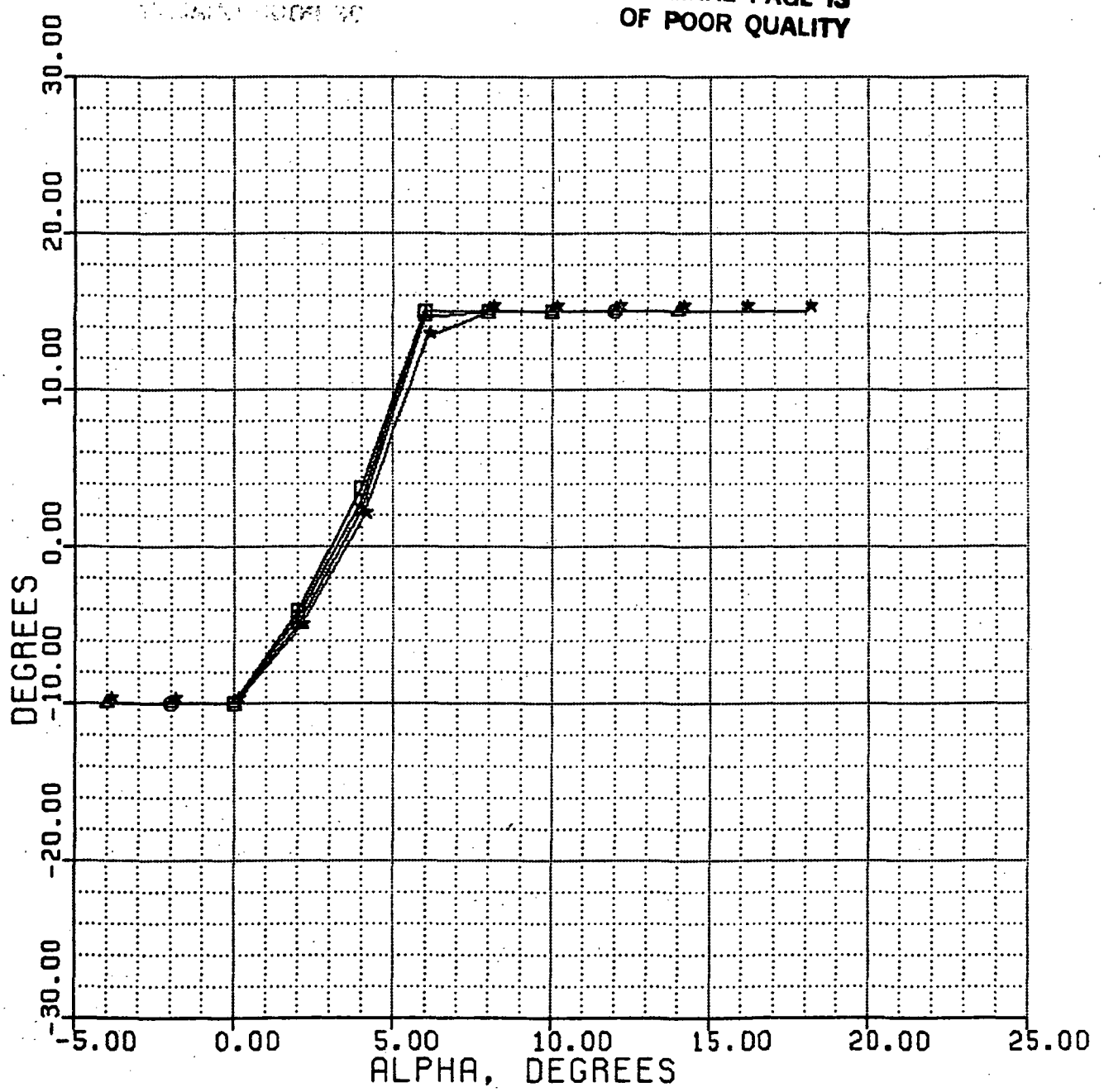

Figure 10(d)

DELTA FLAP VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
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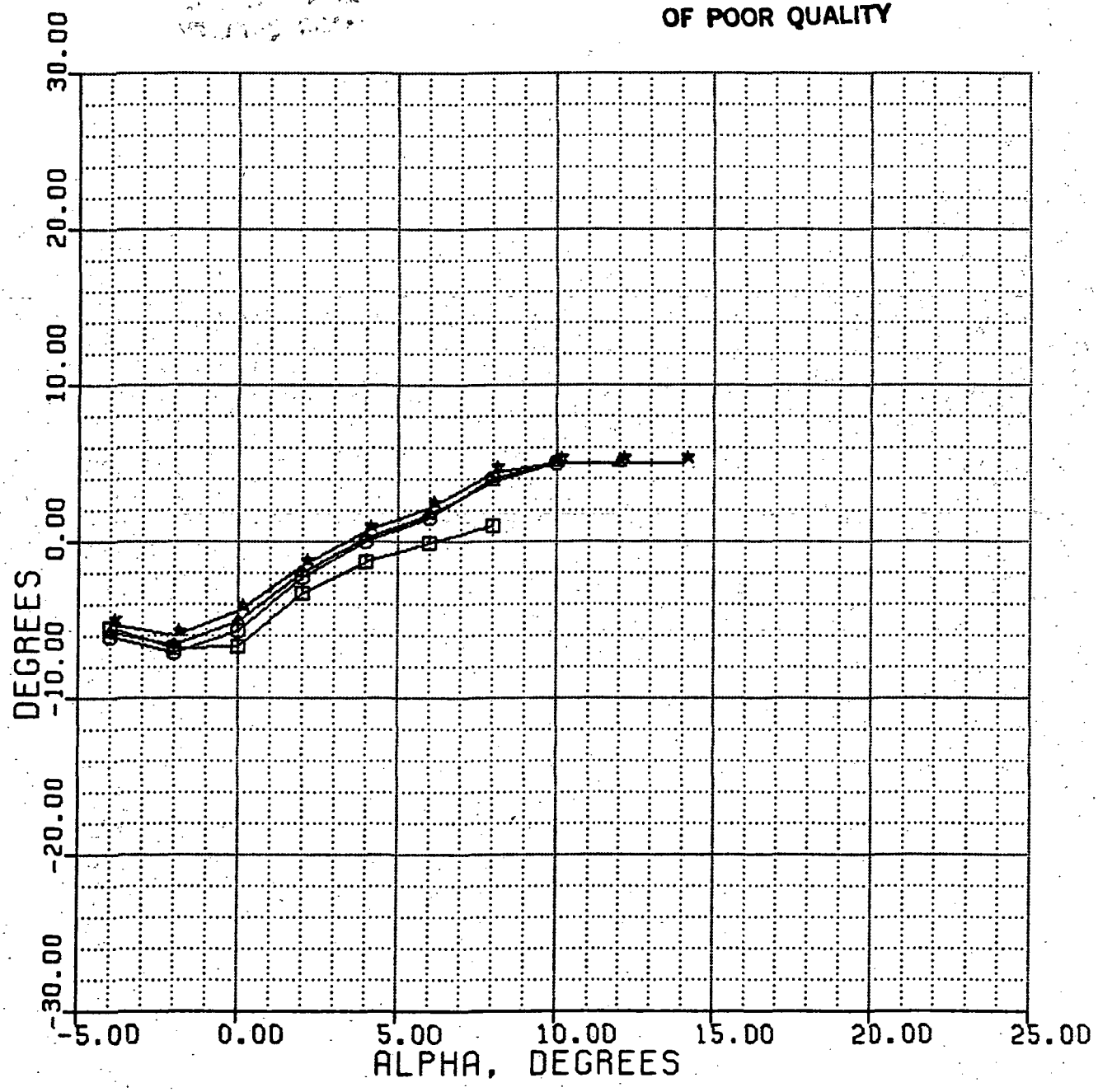

Figure 10(e)

DELTA FLAP VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

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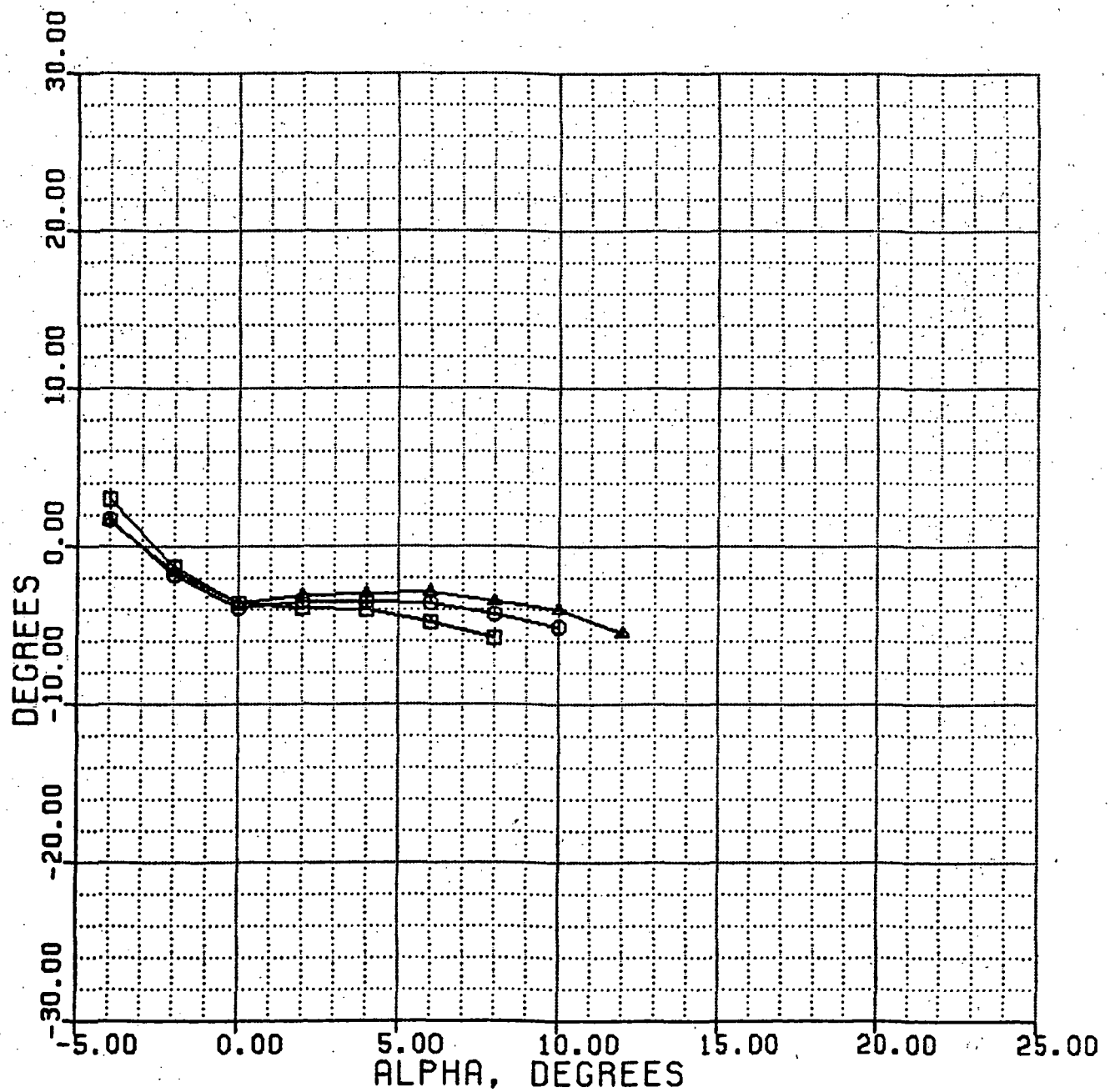

Figure 10(f)

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DELTA STRAKE VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

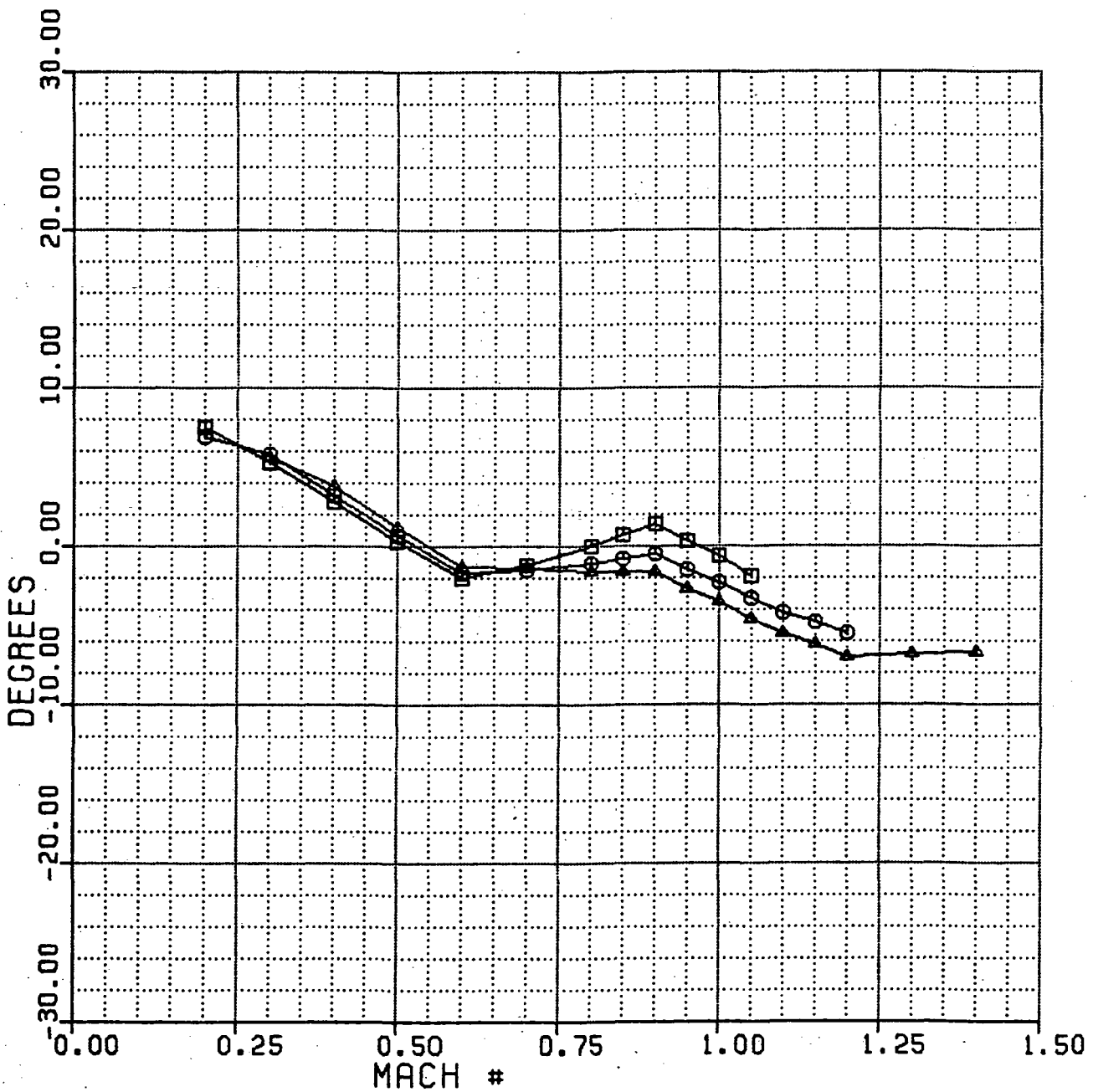

Figure 11(a)

DELTA STRAKE VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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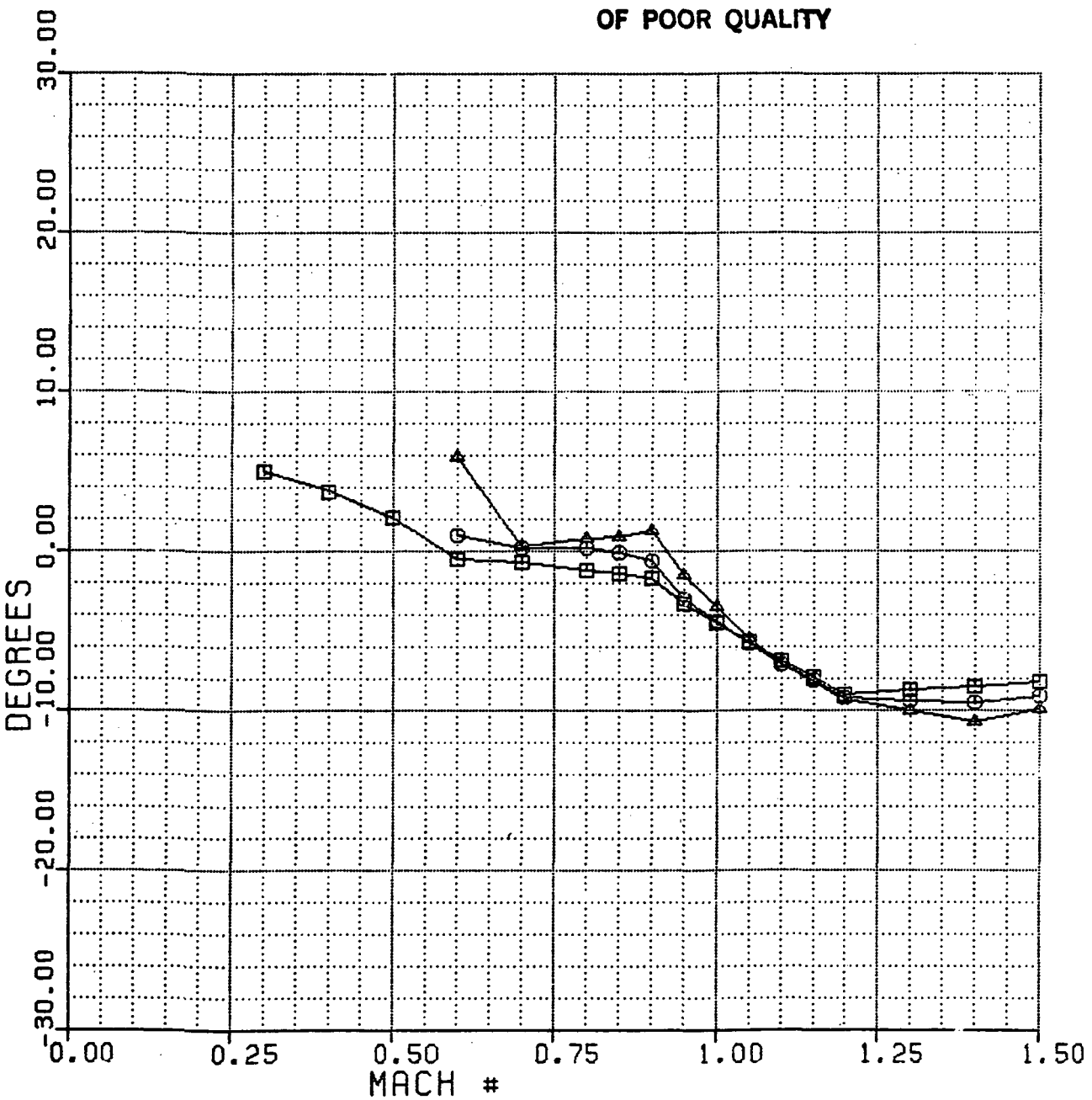

Figure 11(b)

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DELTA STRAKE VS ALPHA

6-15-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

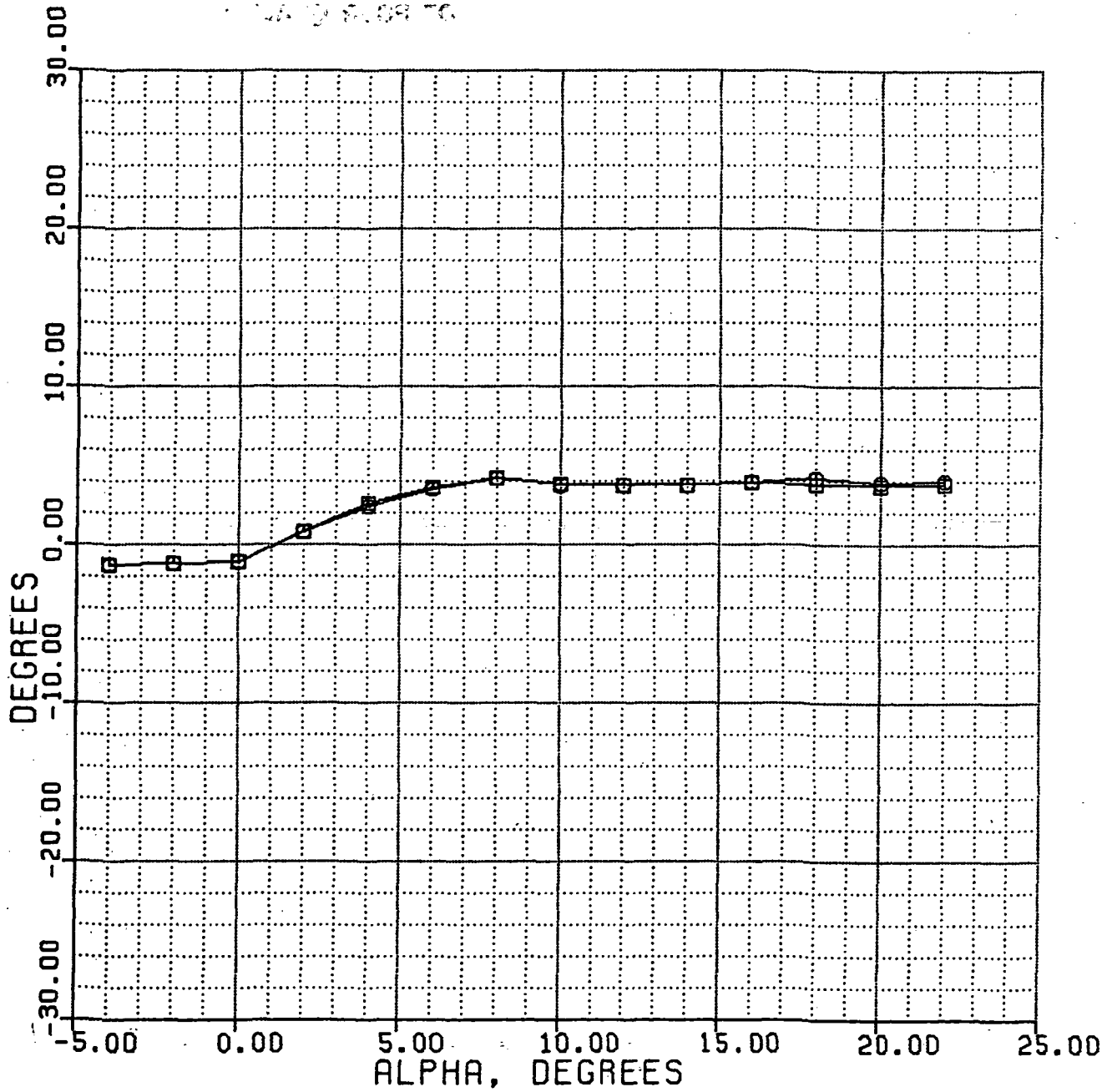

Figure 12(a)

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DELTA STRAKE VS ALPHA

6-16-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

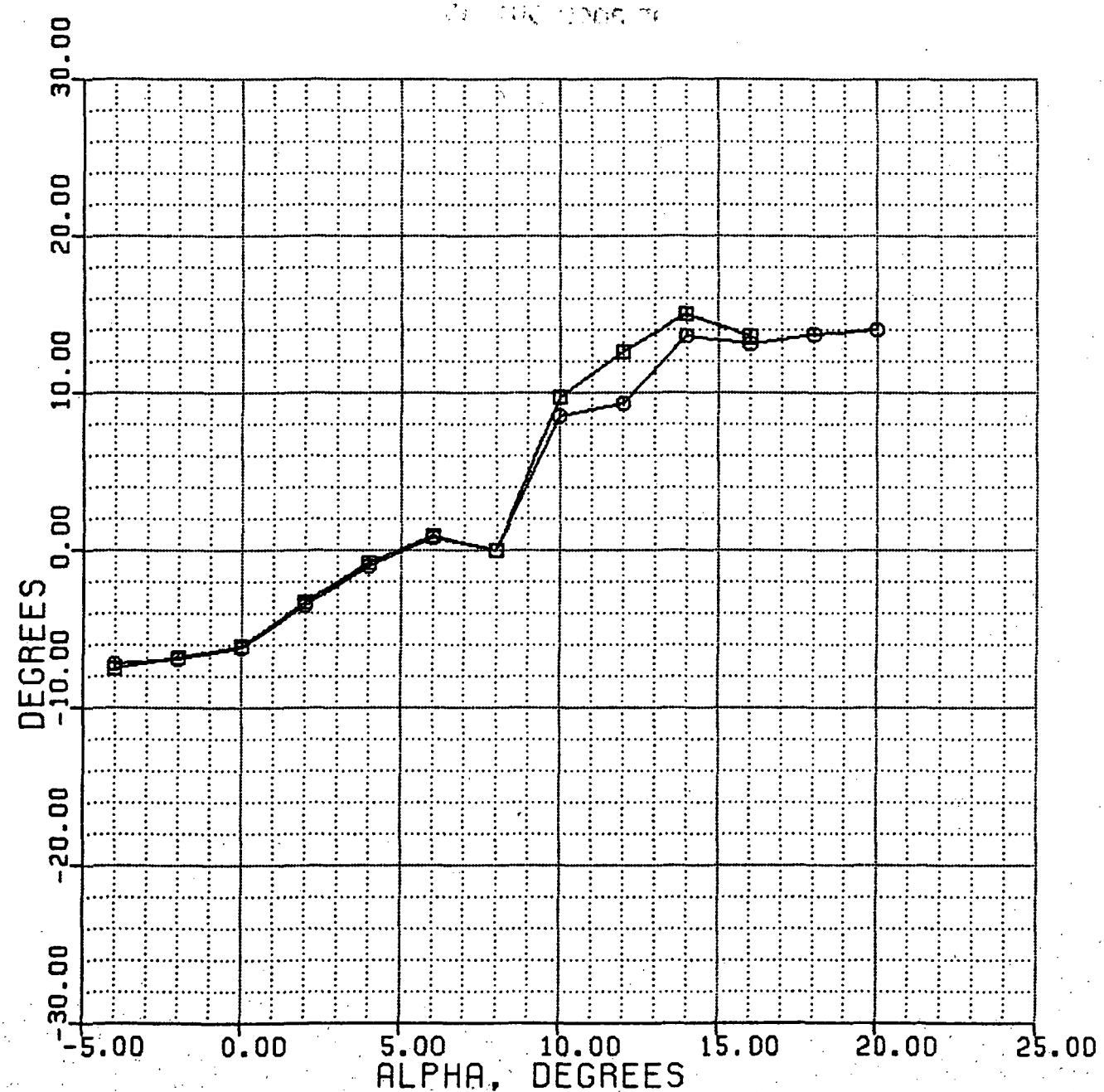

Figure 12(b)

DELTA STRAKE VS ALPHA

6-17-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22

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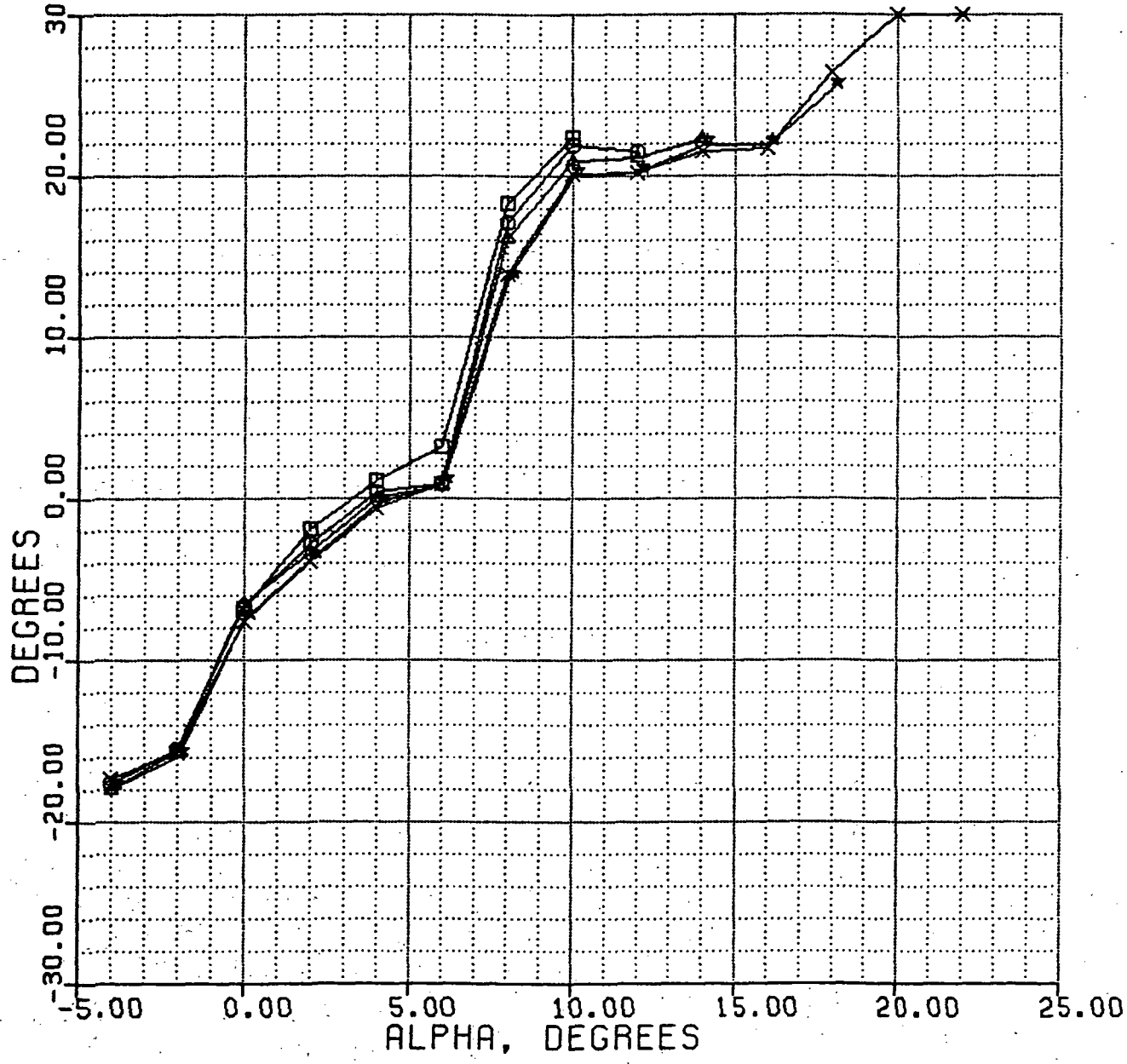

Figure 12(c)

DELTA STRAKE VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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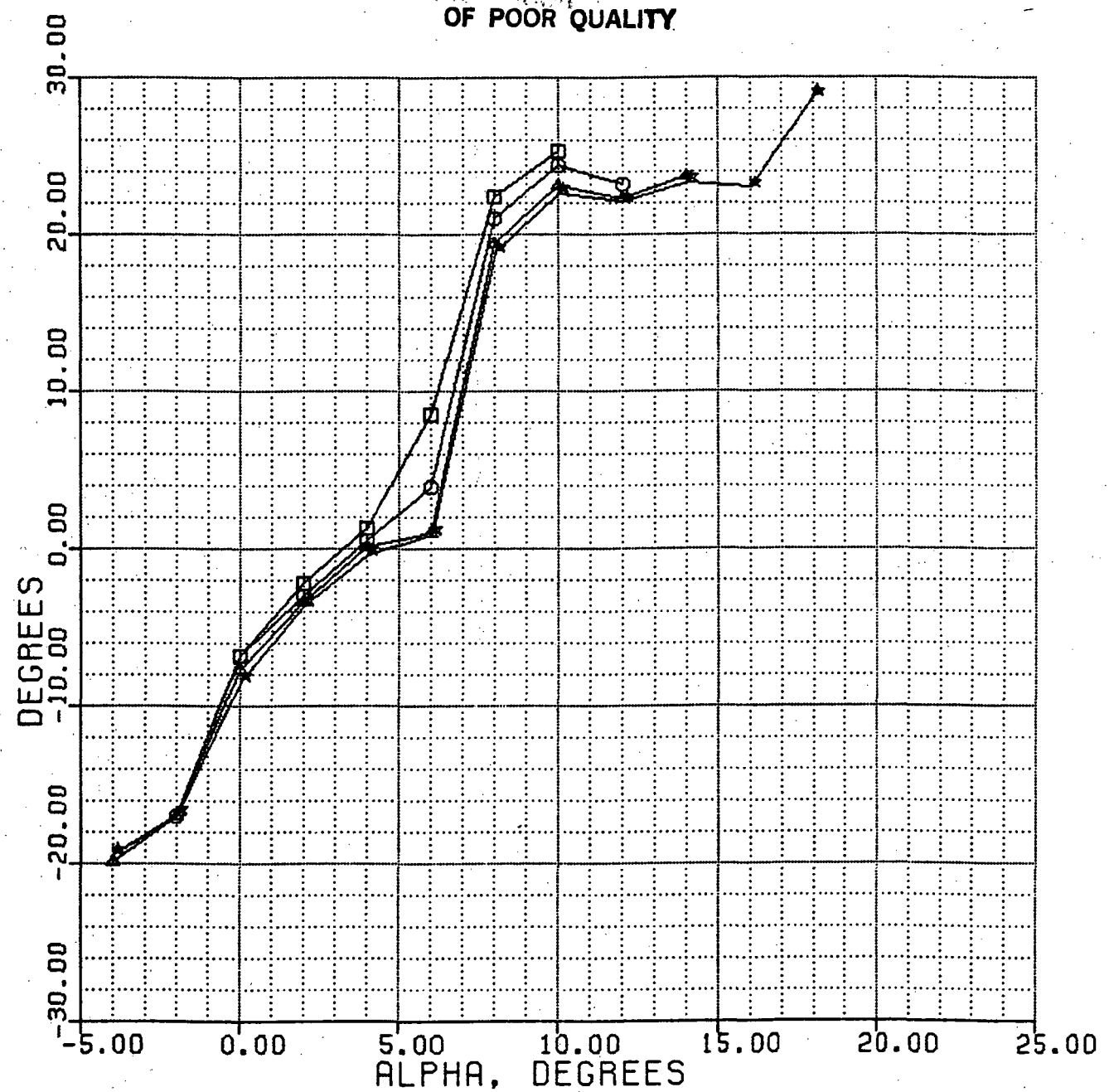

Figure 12(d)

DELTA STRAKE VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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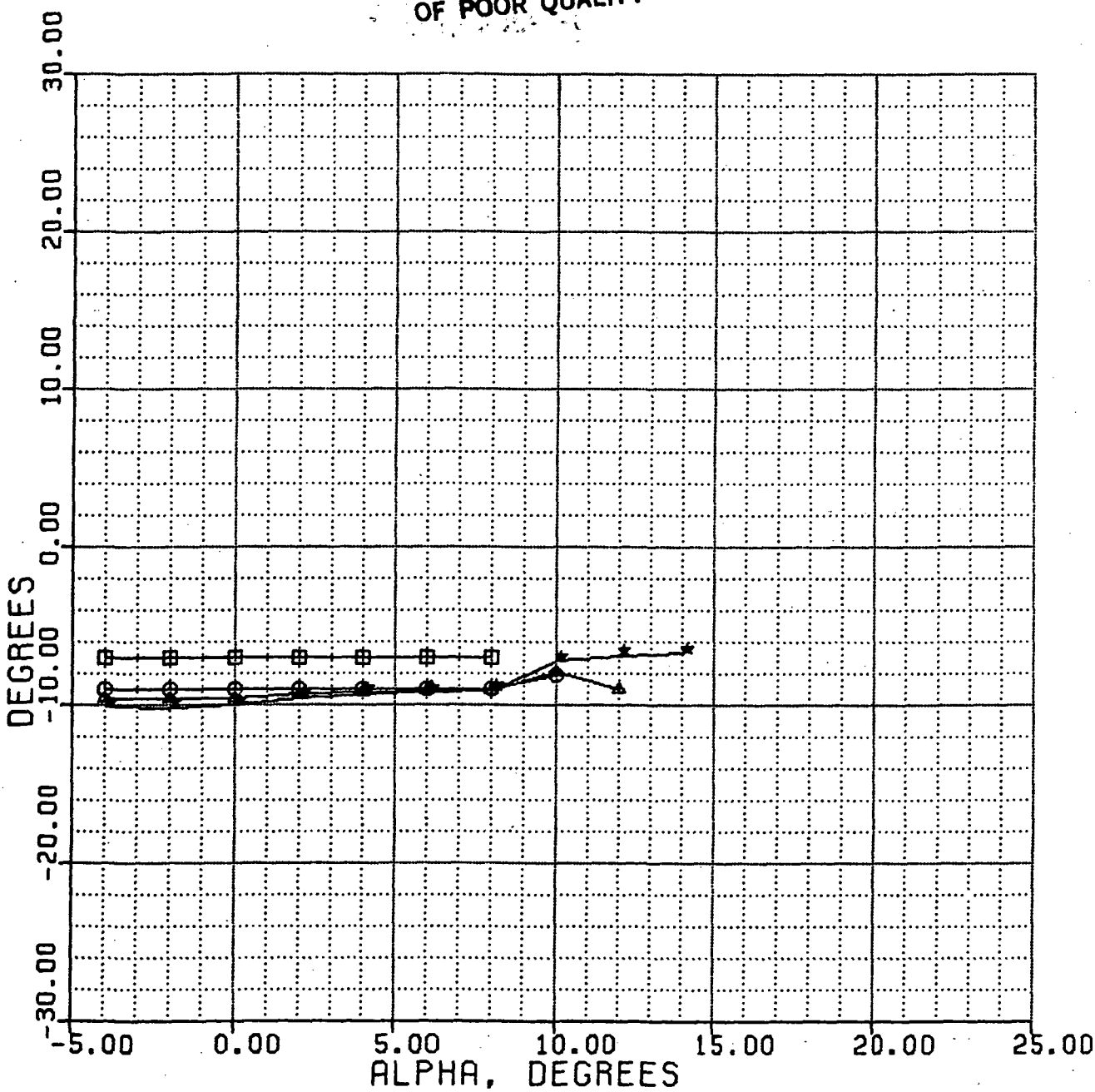

Figure 12(e)

DELTA STRAKE VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

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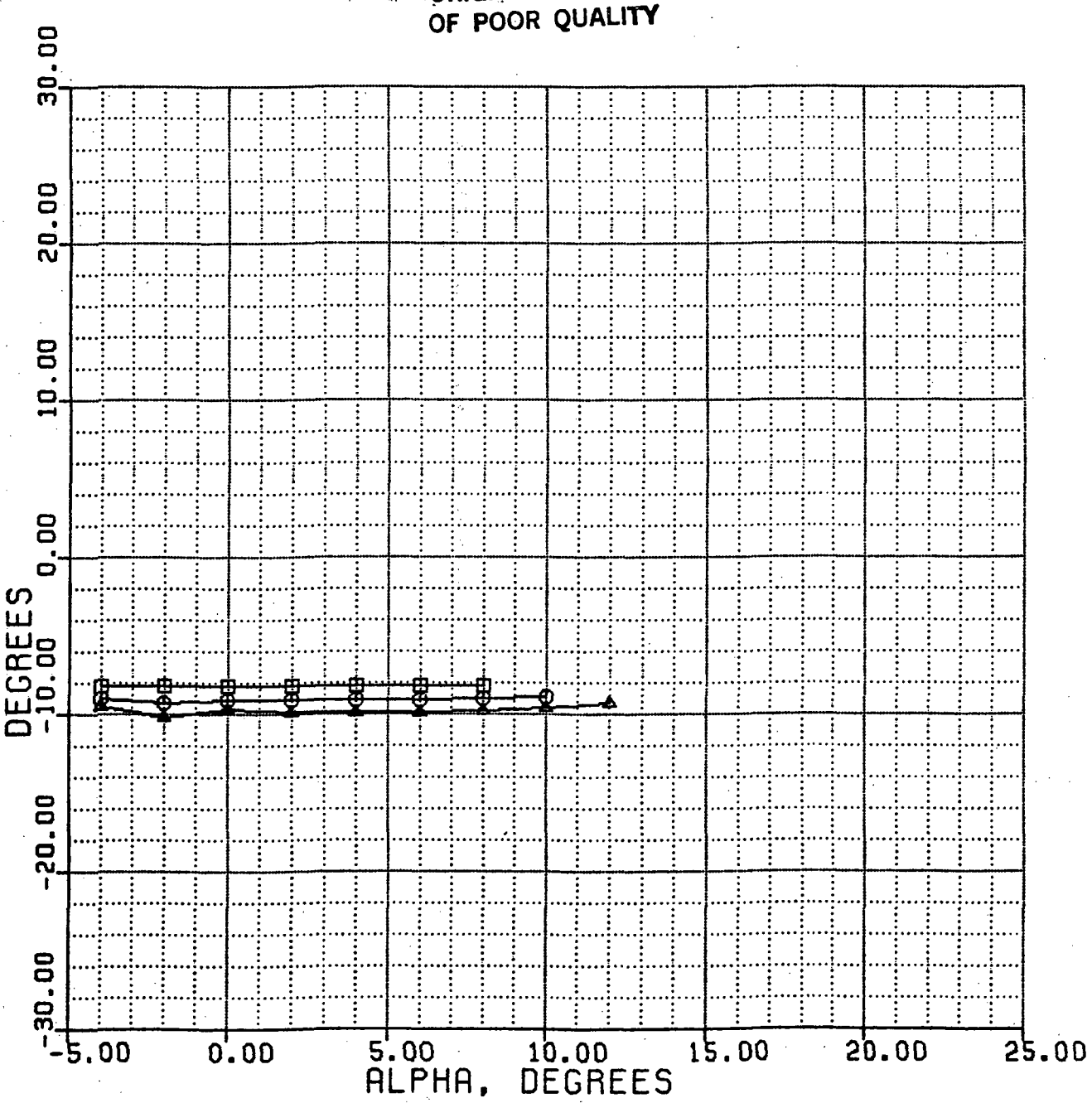

Figure 12(f)

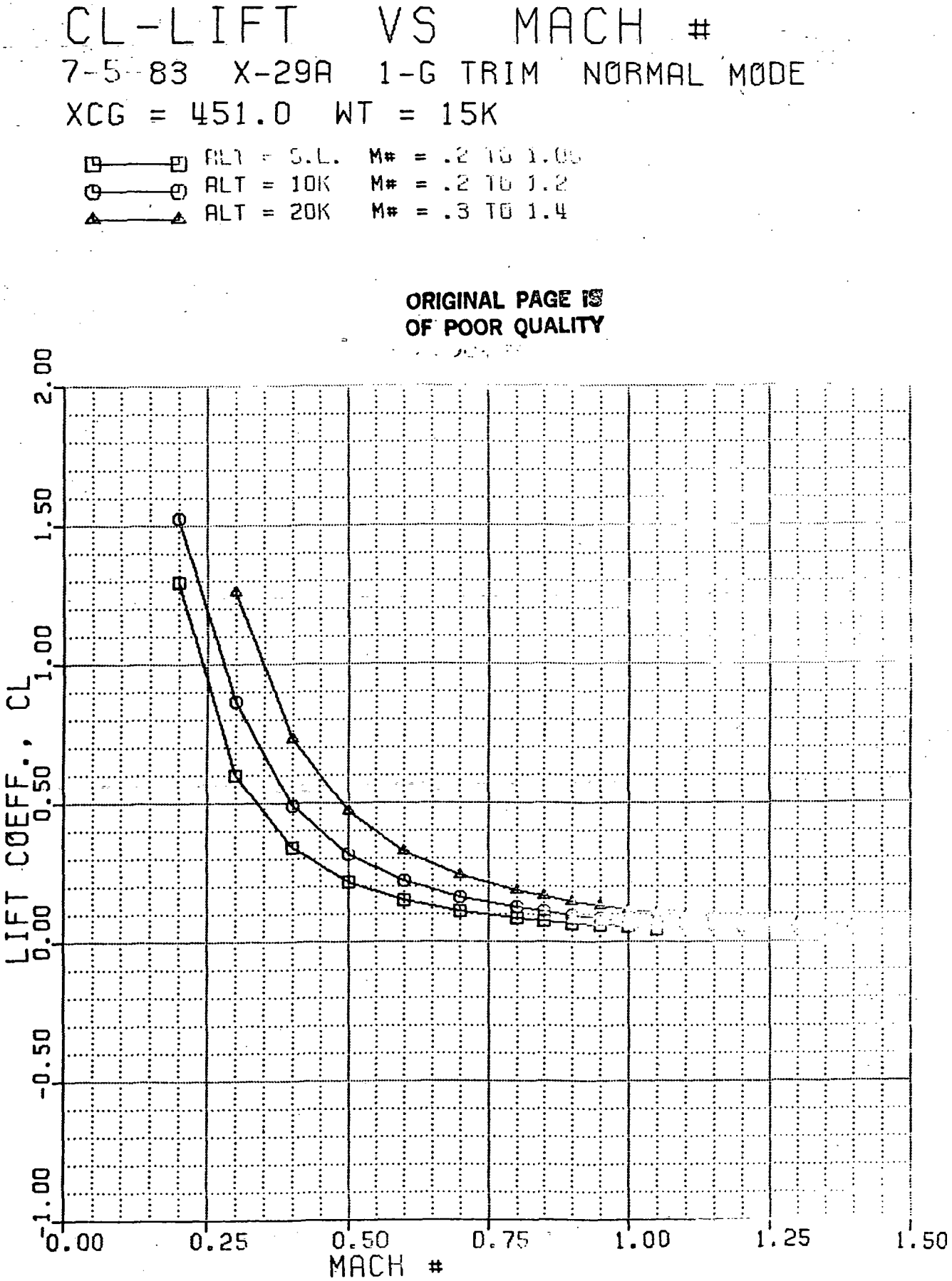

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Figure 13(a)

CL-LIFT VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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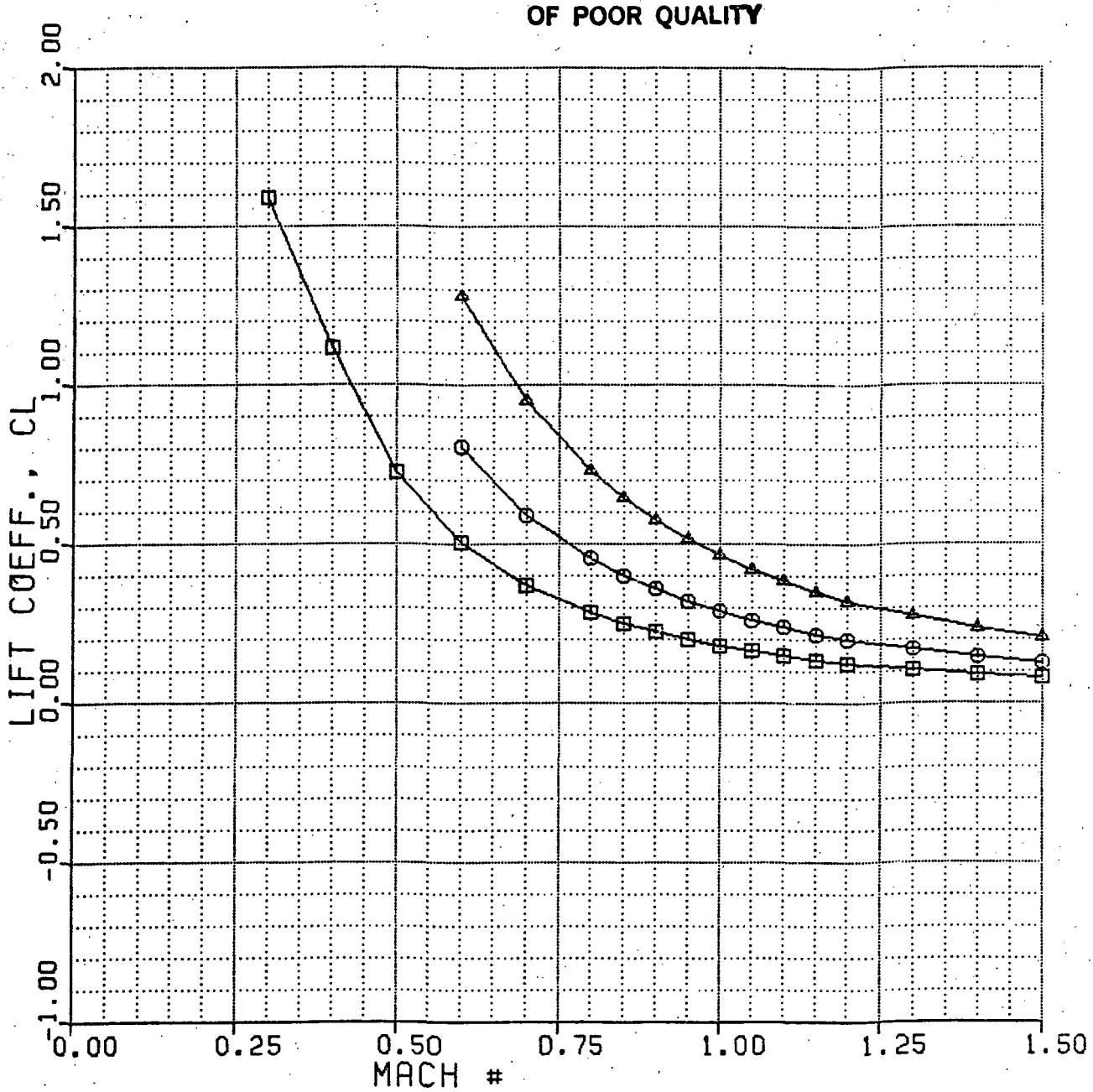

Figure 13(b)

CL-LIFT VS ALPHA

6-15-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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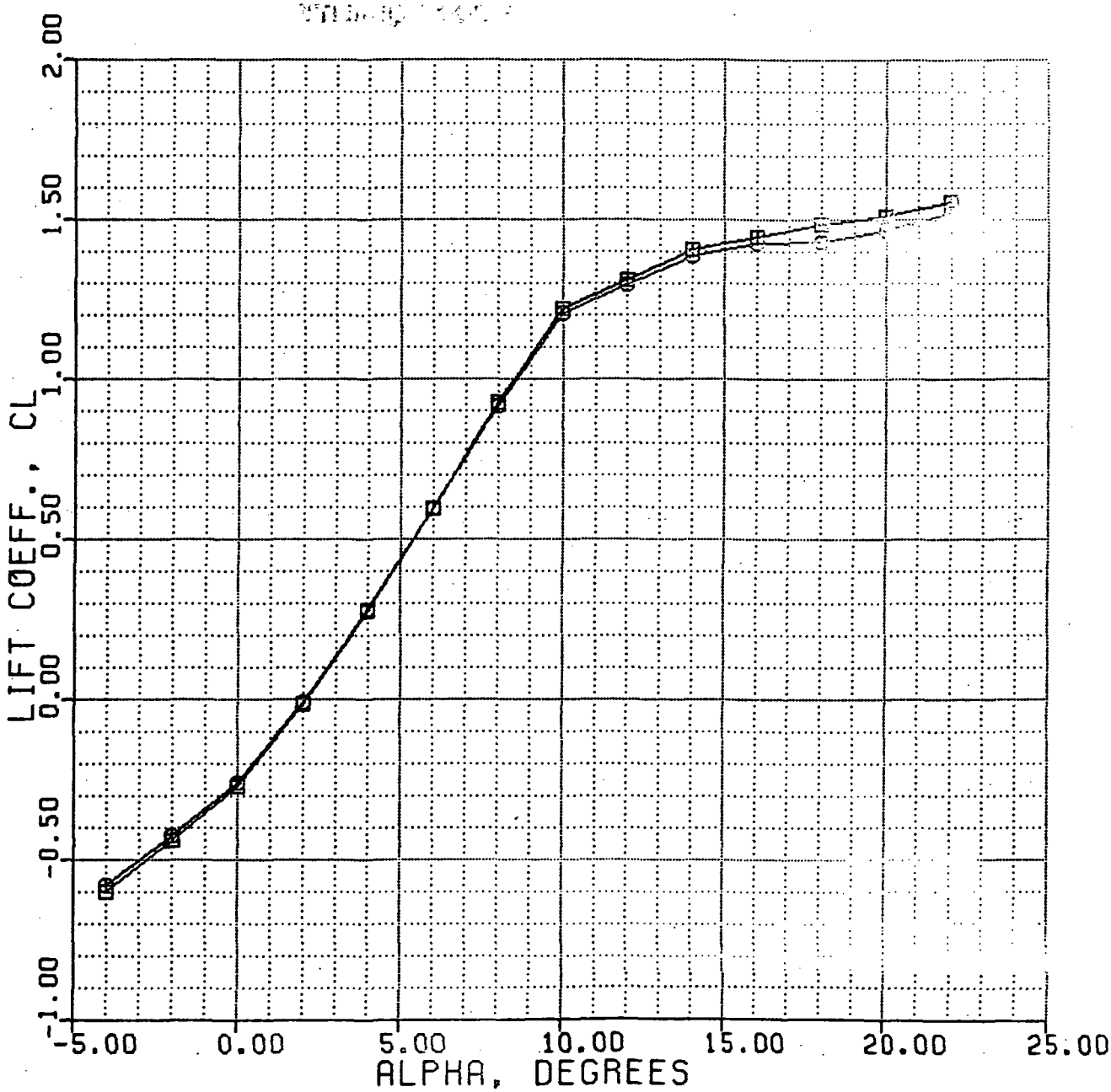

Figure 14(a)

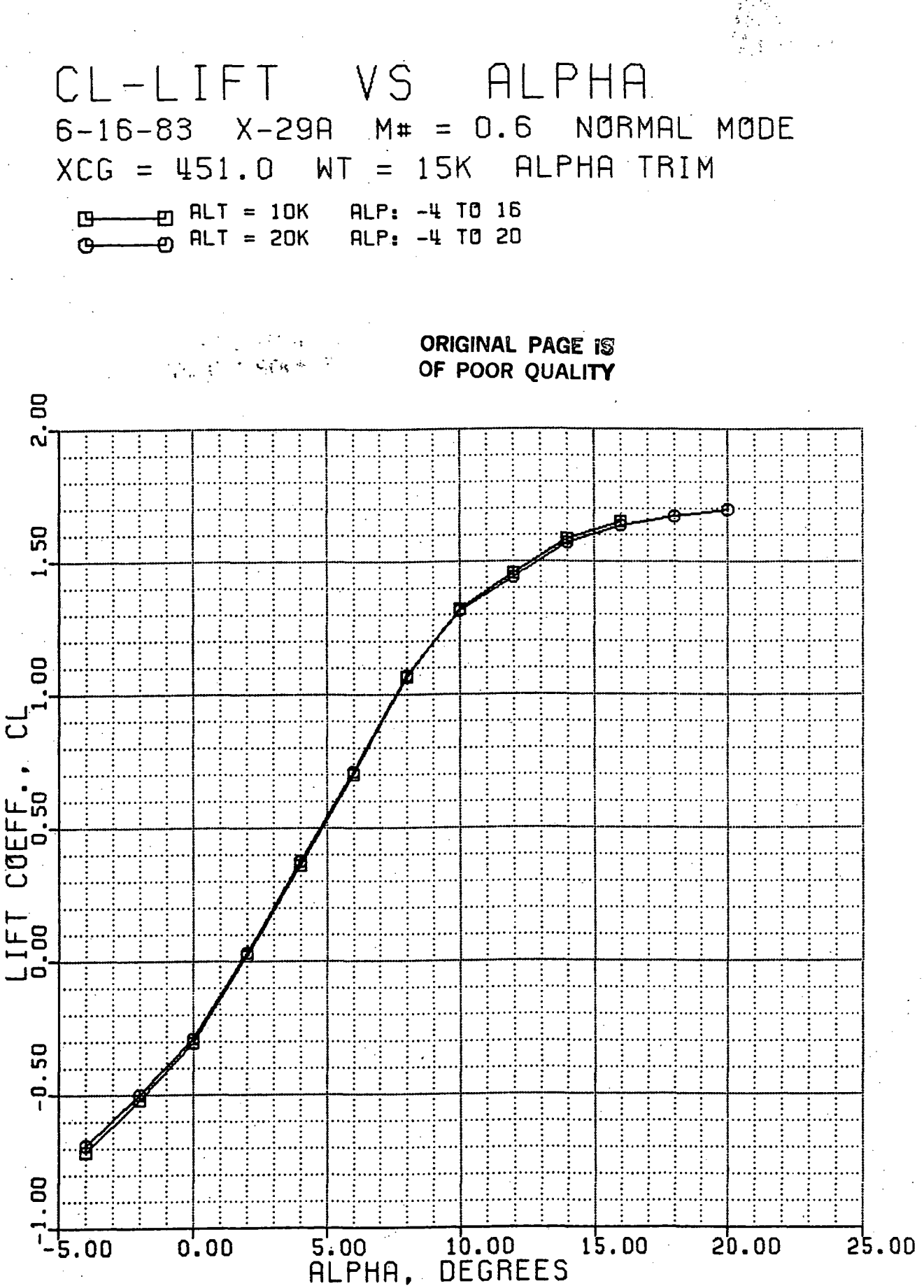

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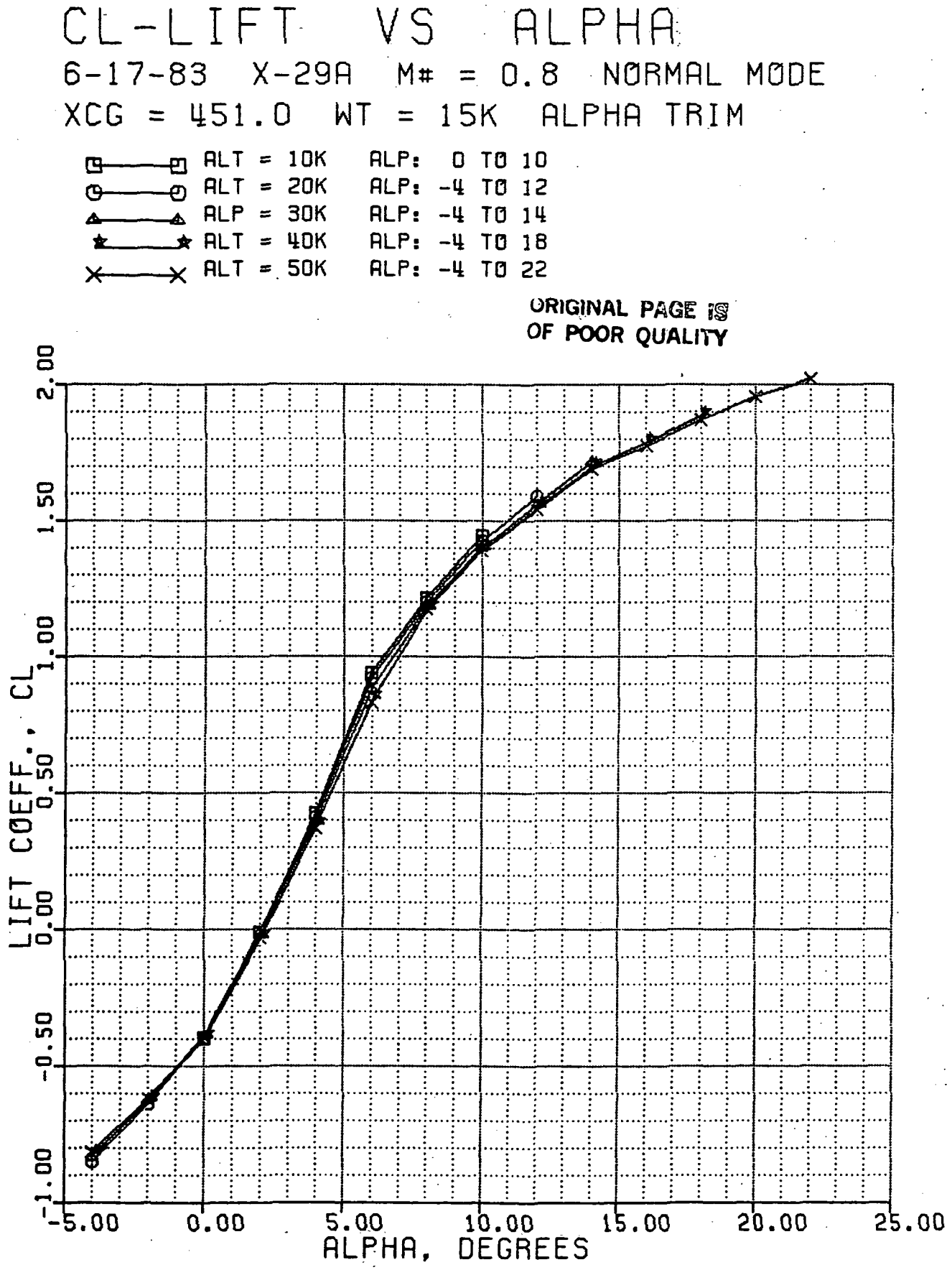
Figure 14(b)


CL-LIFT VS ALPHA
6-17-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
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LIFT COEFF., CL
2.00
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25.00
ALPHA, DEGREES

Figure 14(c)

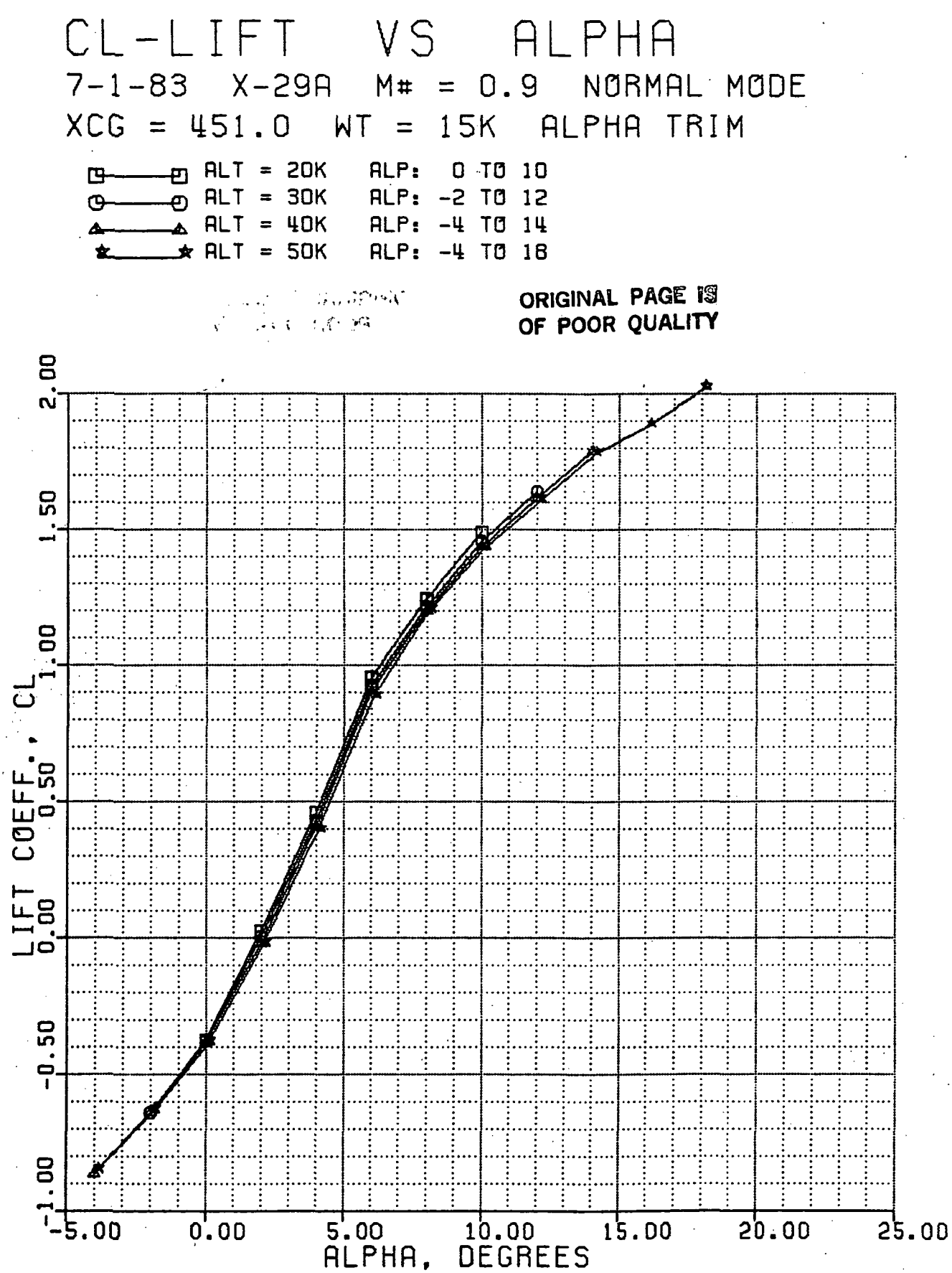

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Figure 14(d)

CL-LIFT VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
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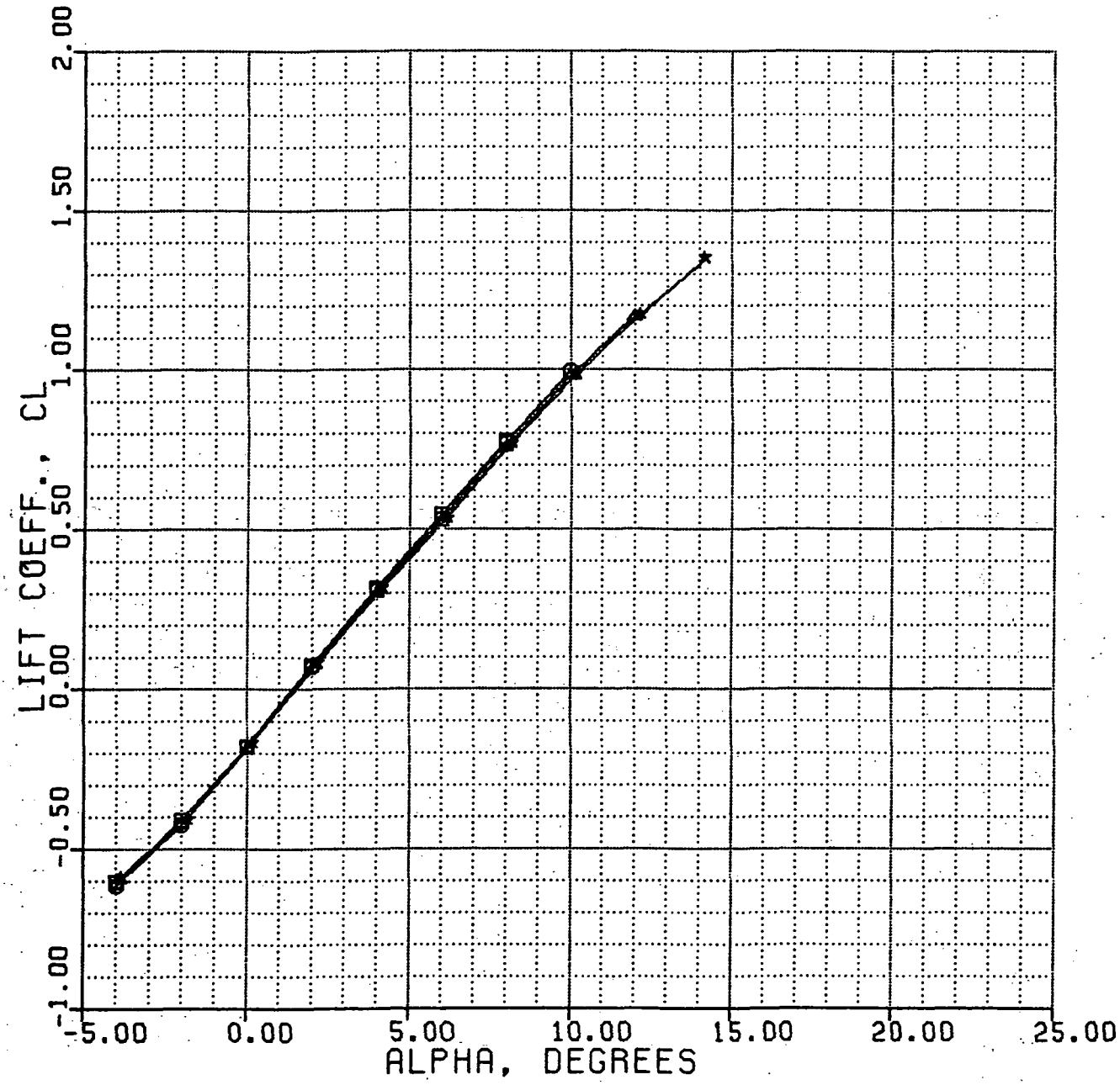
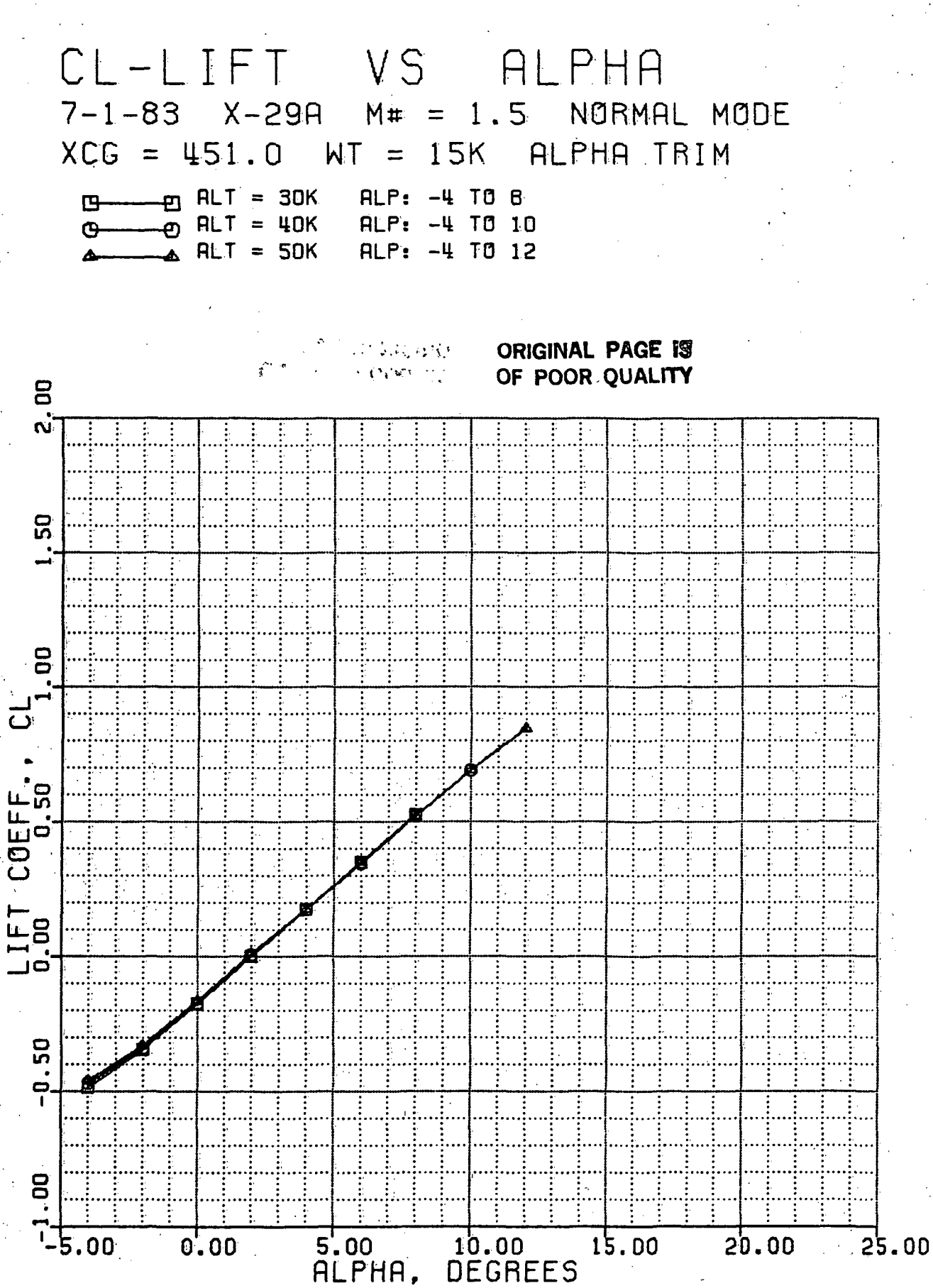


Figure 14(e)


CL-LIFT VS ALPHA
7-1-83 X-29A M# = 1.5 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12
ORIGINAL PAGE IS
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LIFT COEFF., CL
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20.00
25.00
ALPHA, DEGREES

Figure 14(f)

CD VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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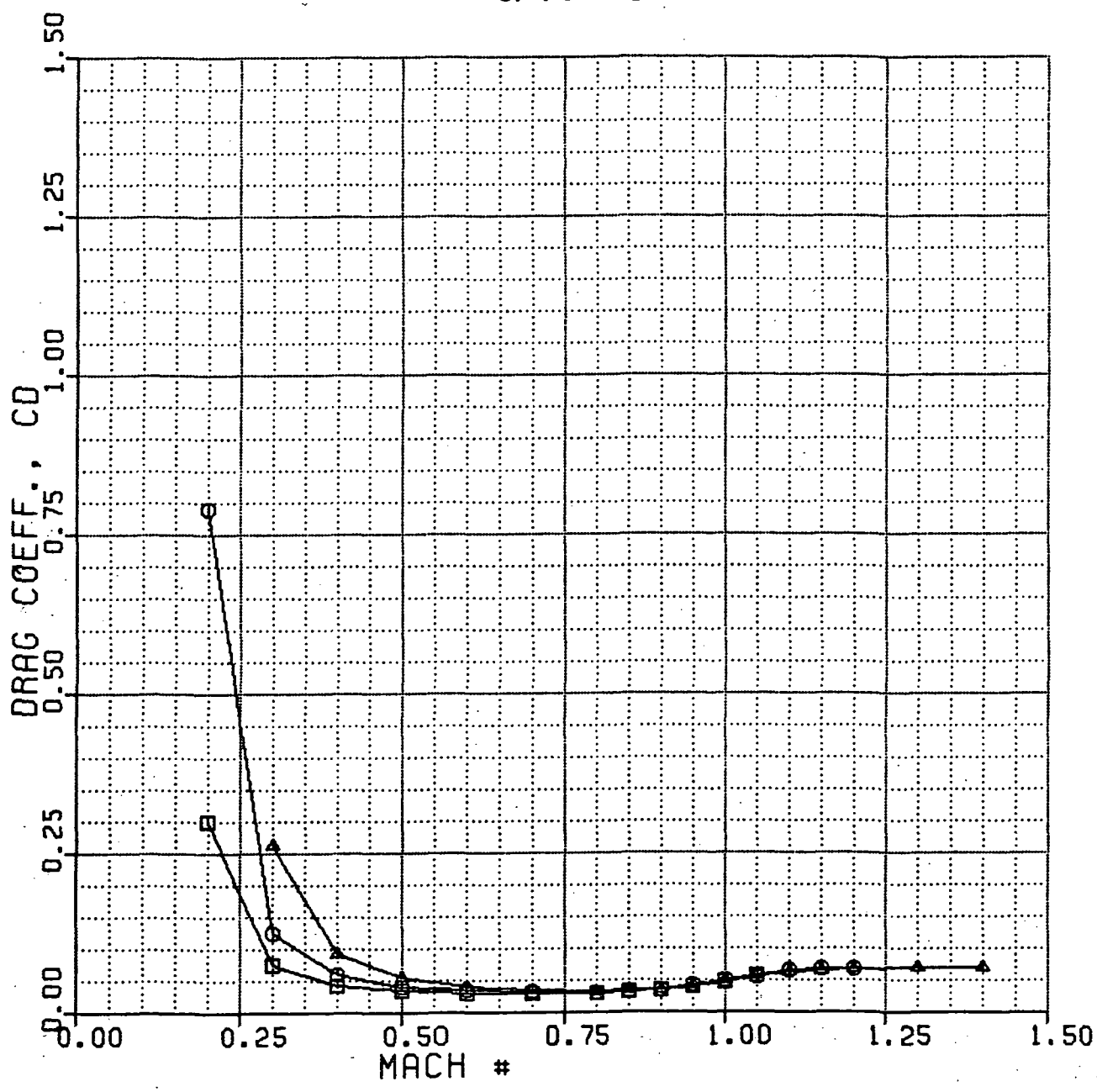
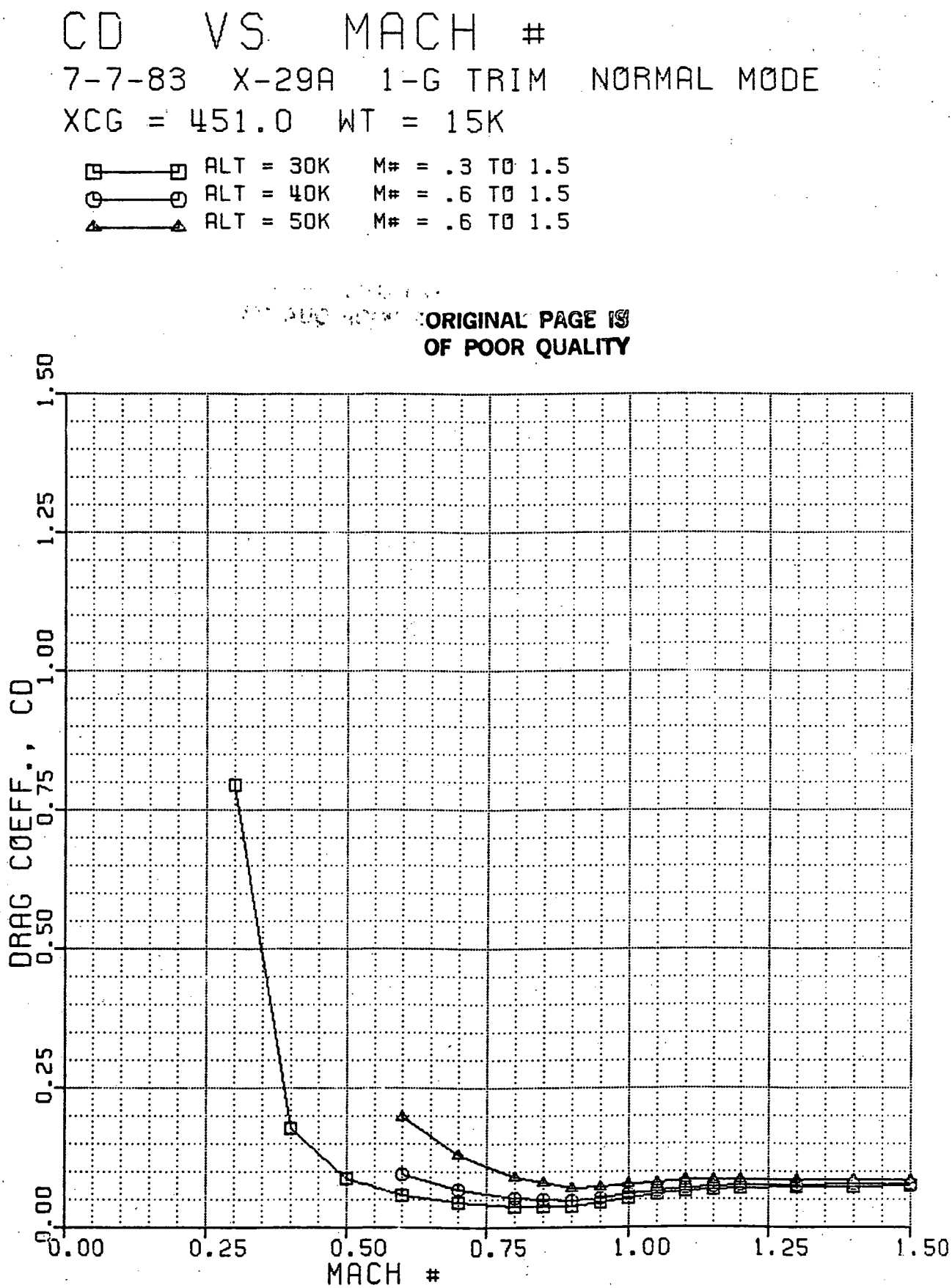


Figure 15(a)


CD VS MACH #
7-7-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS
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DRAG COEFF., CD
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 15(b)

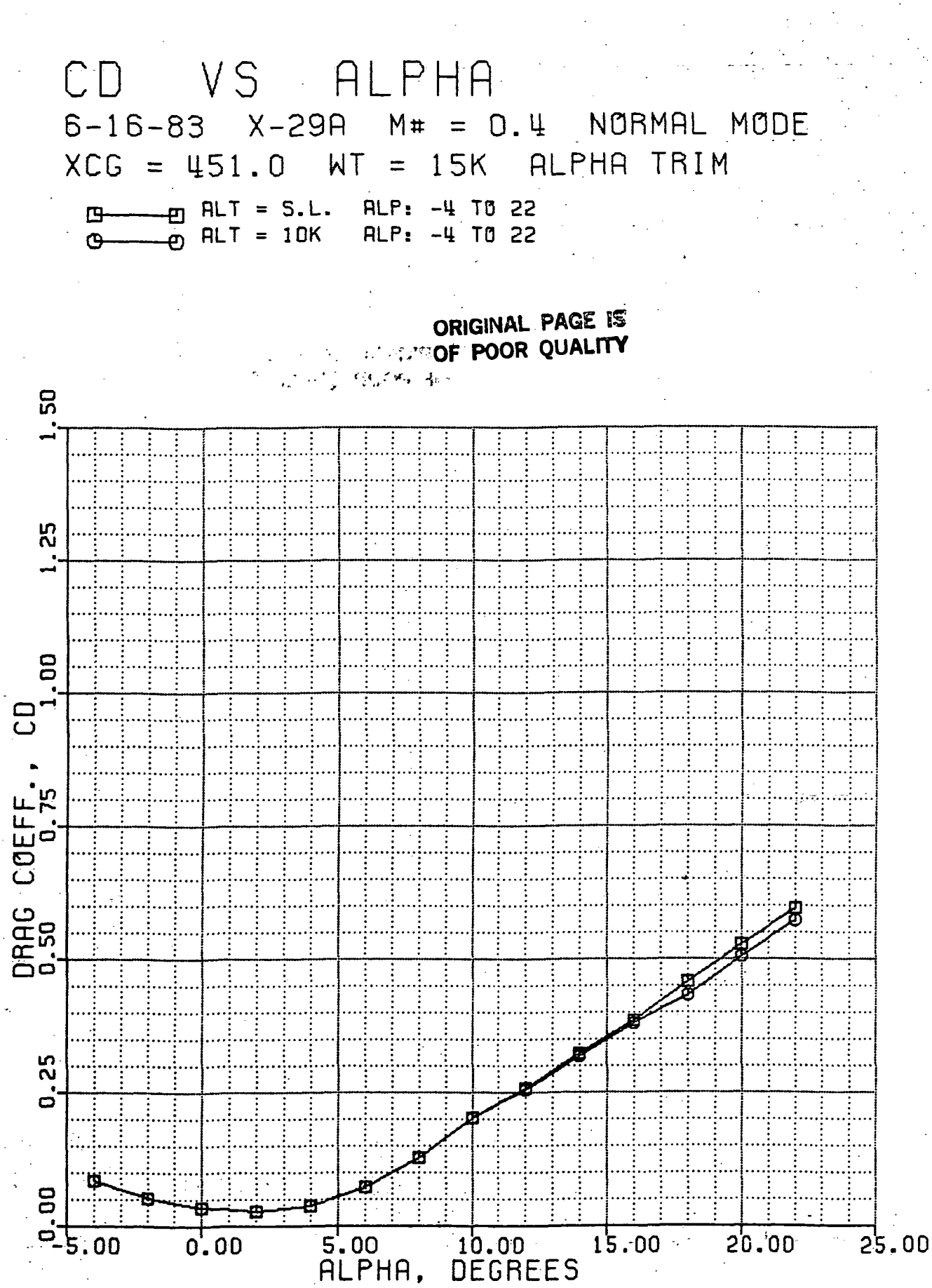

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Figure 16(a)

CD VS ALPHA

6-16-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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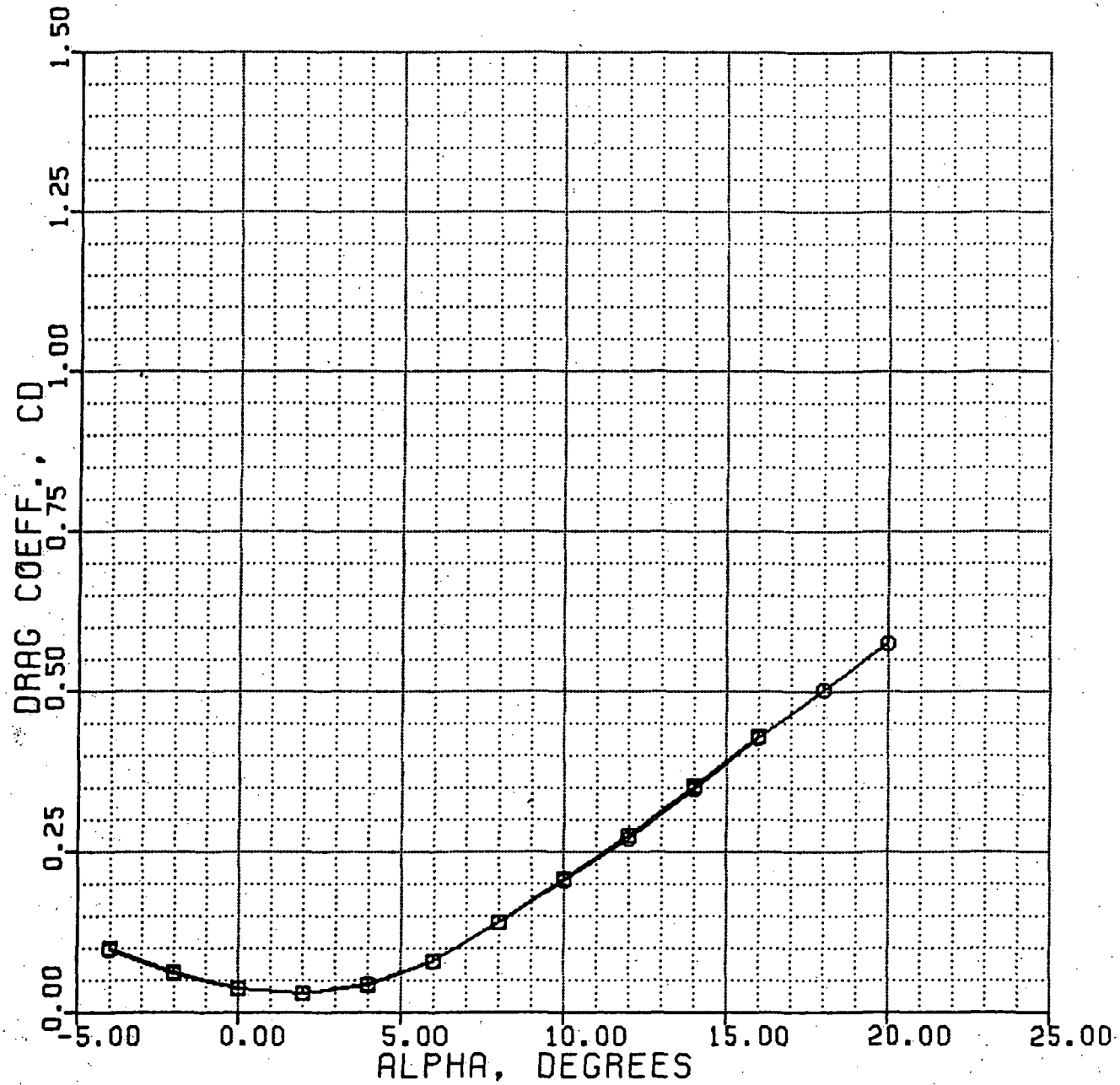
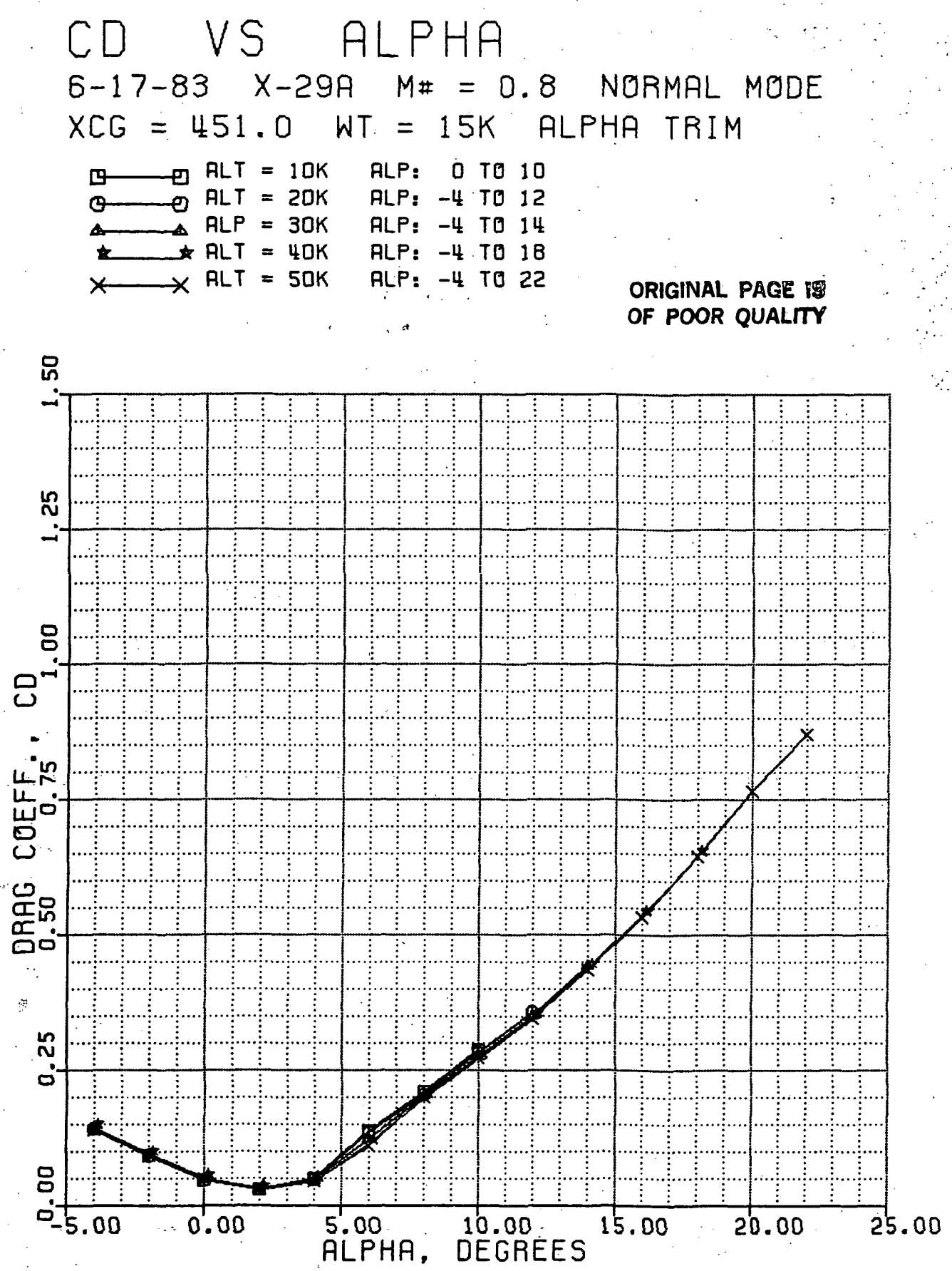


Figure 16(b)


CD VS ALPHA
6-17-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
DRAG COEFF., CD
0.00
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0.75
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-5.00
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15.00
20.00
25.00
ALPHA, DEGREES

Figure 16(c)

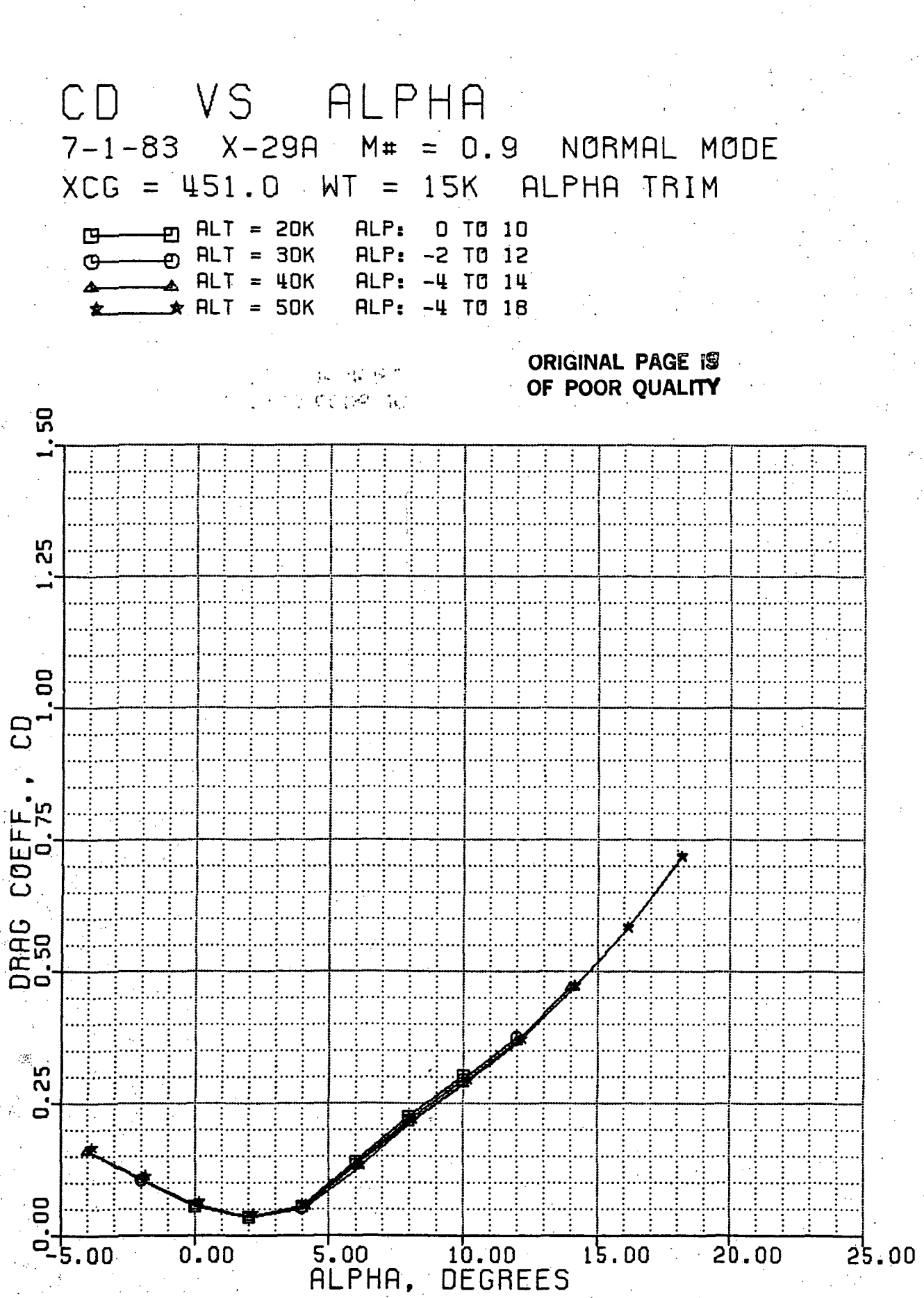
CD VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS
OF POOR QUALITY
DRAG COEFF., CD
0.00
0.25
0.50
0.75
1.00
1.25
1.50
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 16(d)

CD VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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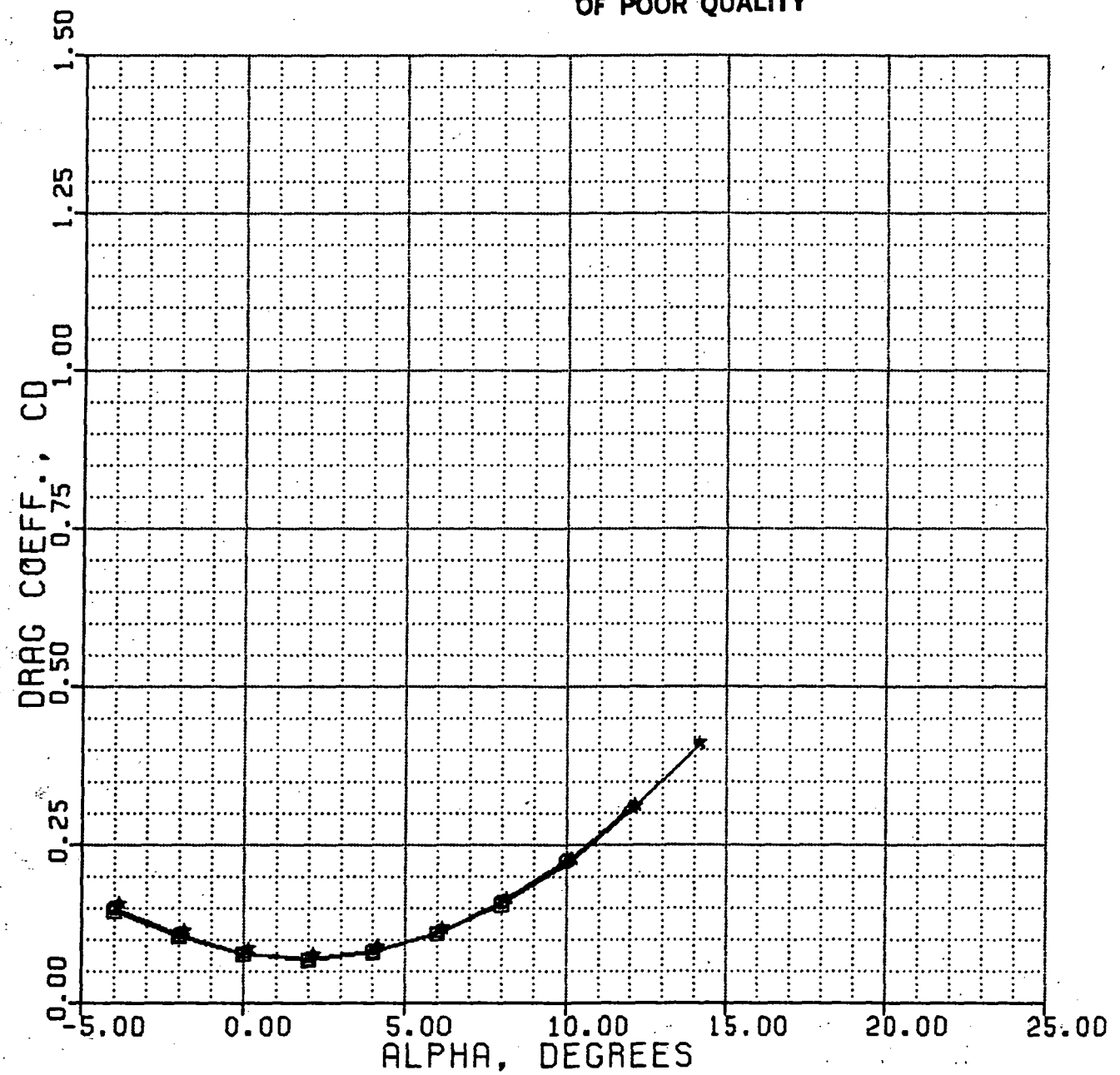

Figure 16(e)

CD VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
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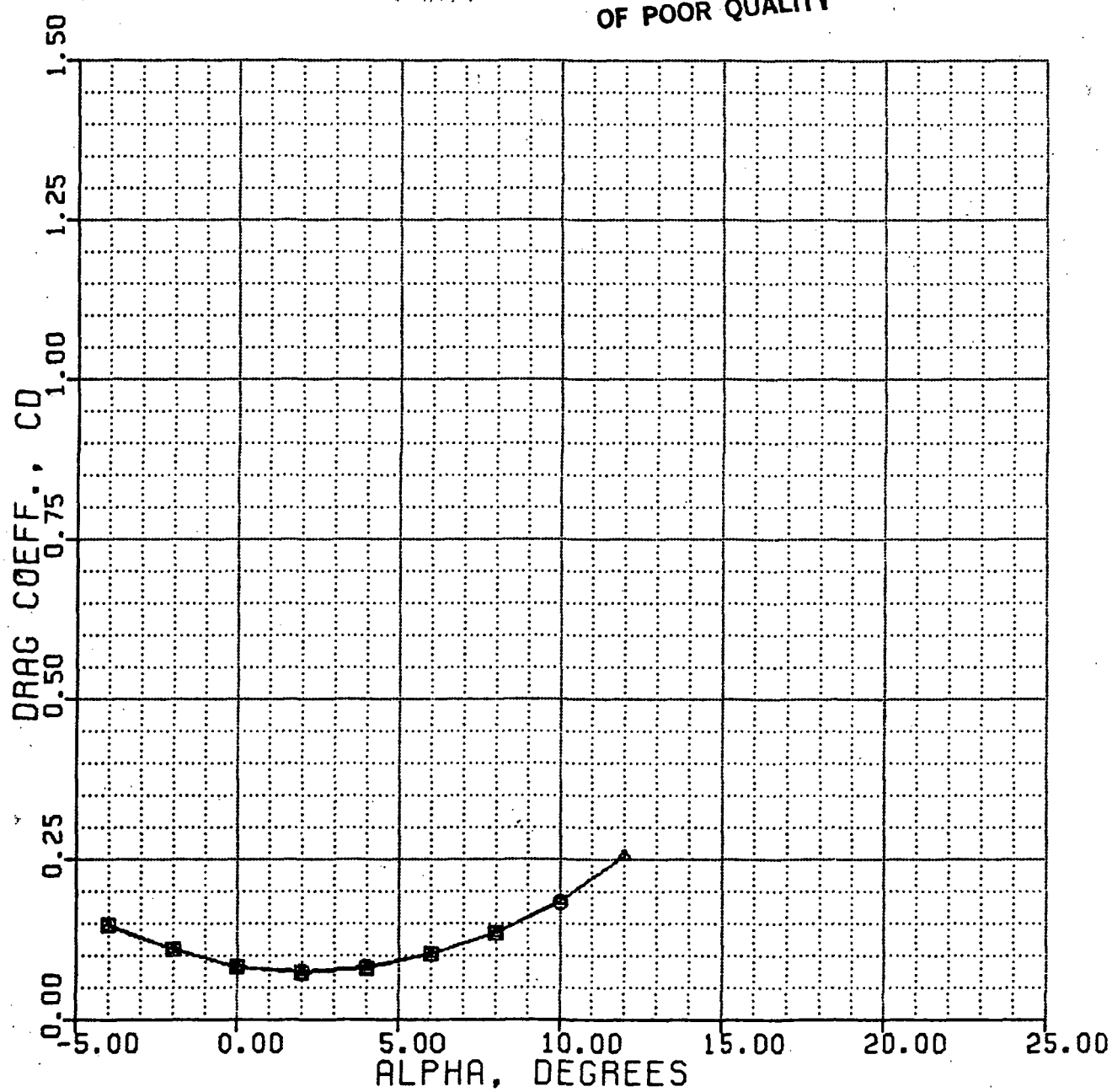


Figure 16(f)

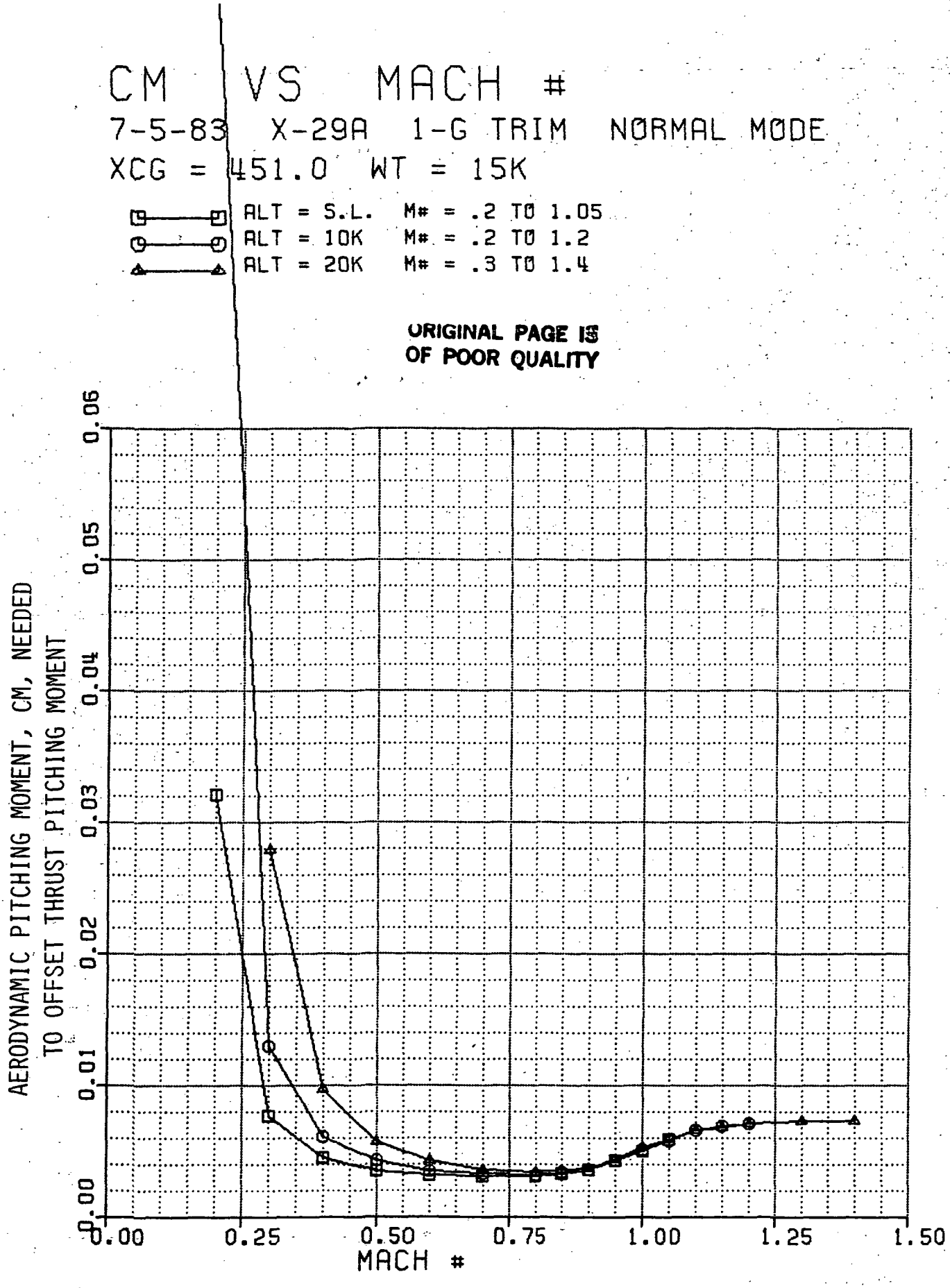

CM VS MACH #
7-5-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4
ORIGINAL PAGE IS
OF POOR QUALITY
AERODYNAMIC PITCHING MOMENT, CM, NEEDED
TO OFFSET THRUST PITCHING MOMENT
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 17(a)

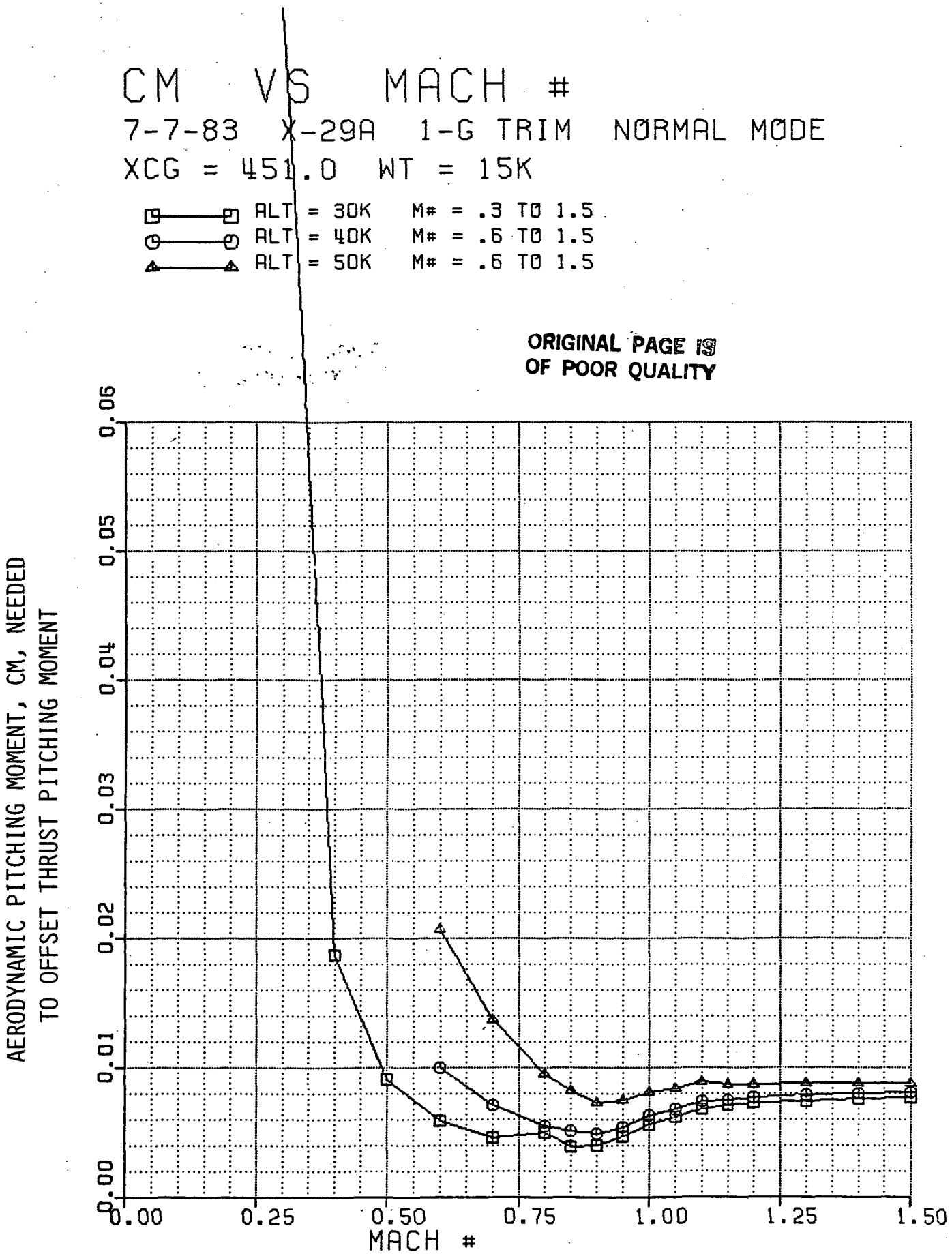
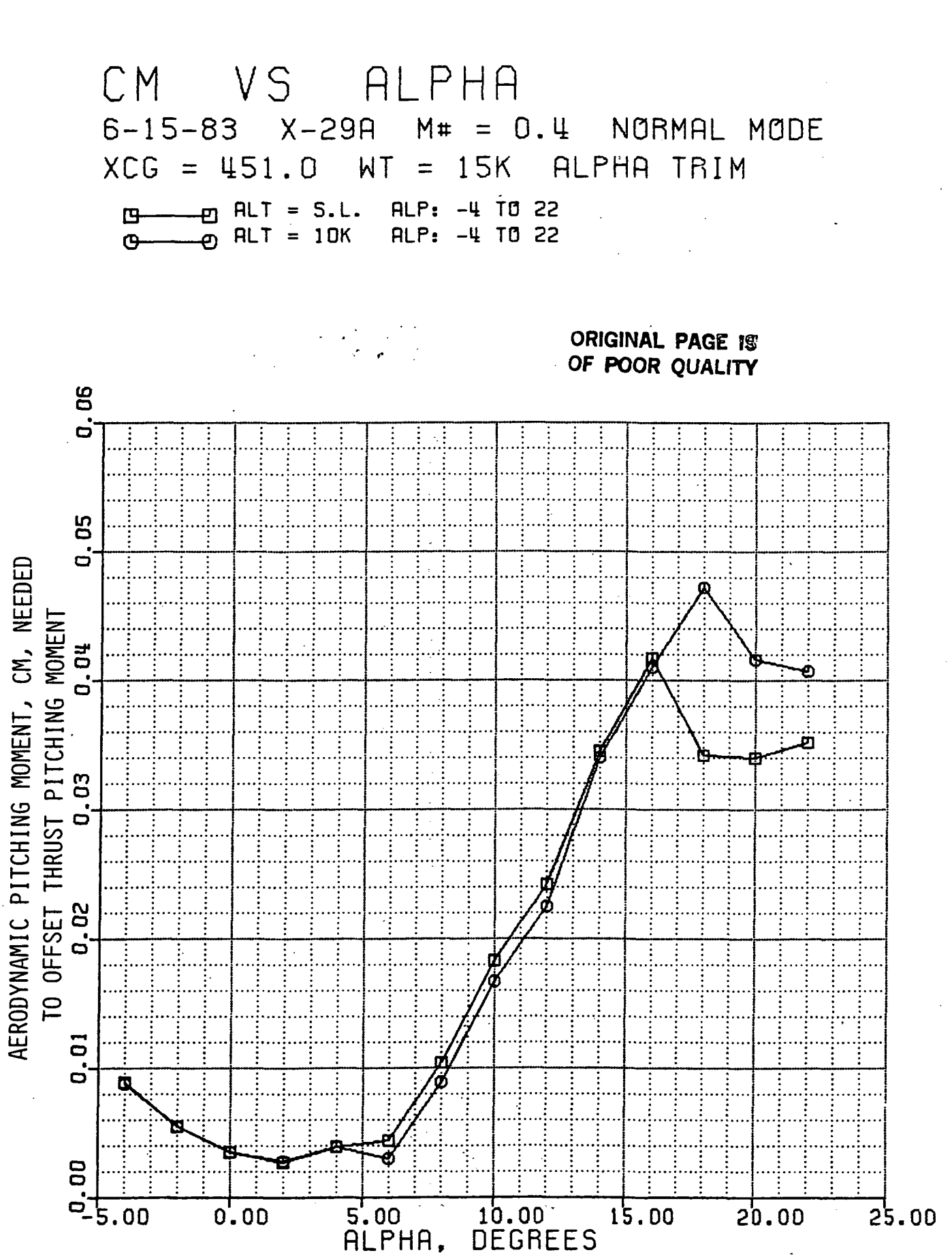

CM VS MACH #
7-7-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS
OF POOR QUALITY
AERODYNAMIC PITCHING MOMENT, CM, NEEDED
TO OFFSET THRUST PITCHING MOMENT
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 17(b)



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OF POOR QUALITY

Figure 18(a)

CM VS ALPHA

6-16-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
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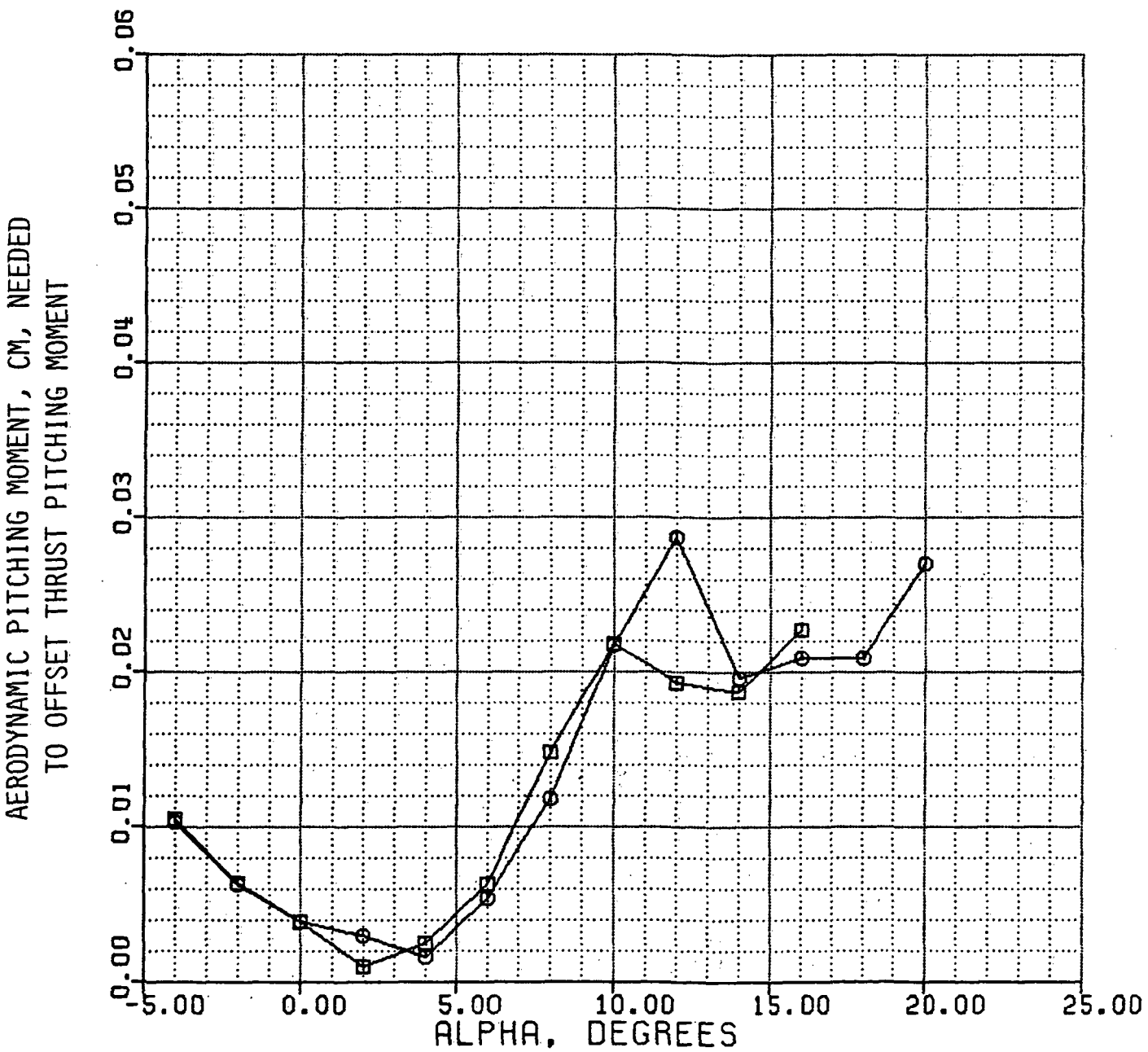

Figure 18(b)

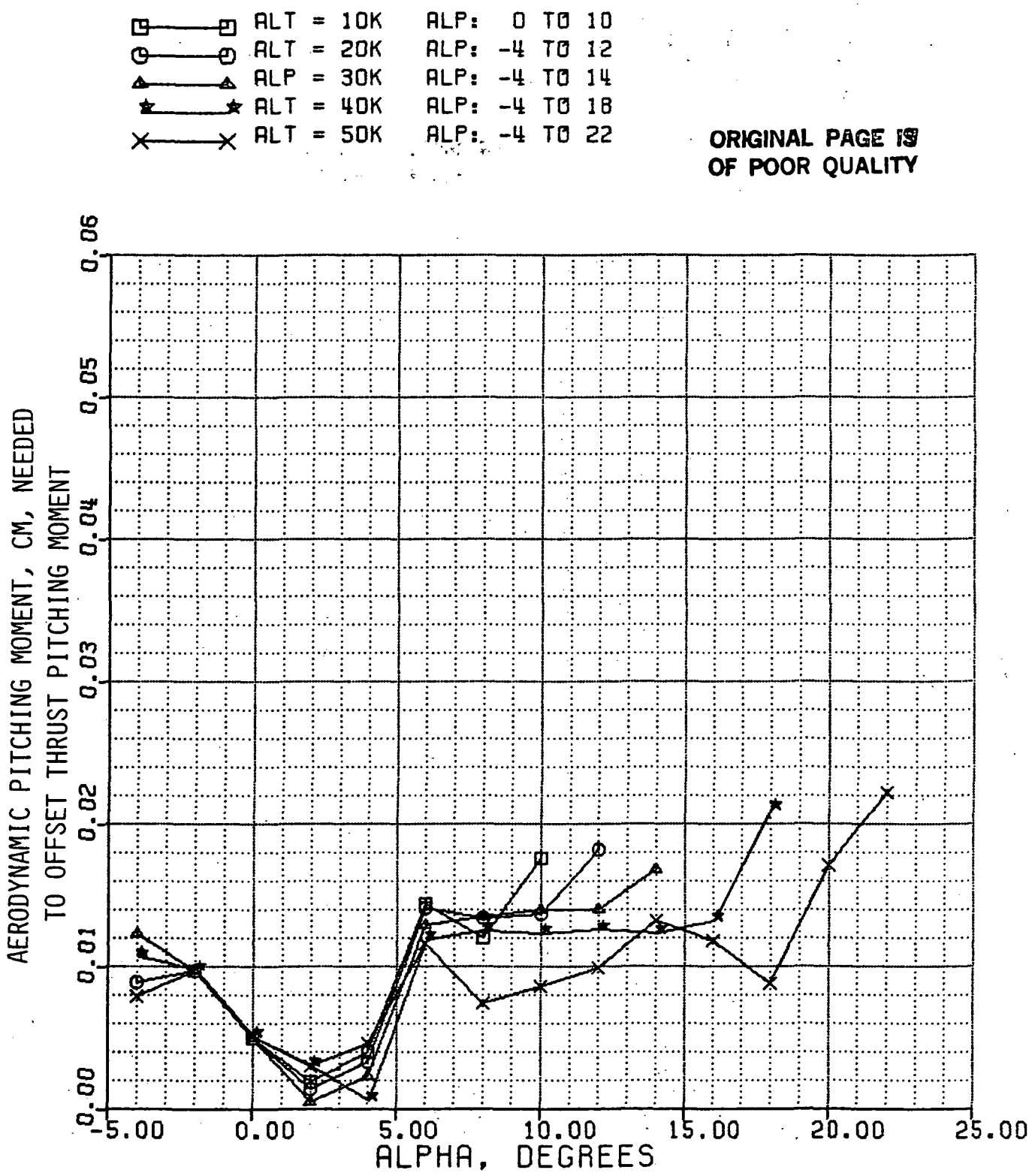
CM VS ALPHA
6-17-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
AERODYNAMIC PITCHING MOMENT, CM, NEEDED
TO OFFSET THRUST PITCHING MOMENT
0.06
0.05
0.04
0.03
0.02
0.01
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 18(c)

CM VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
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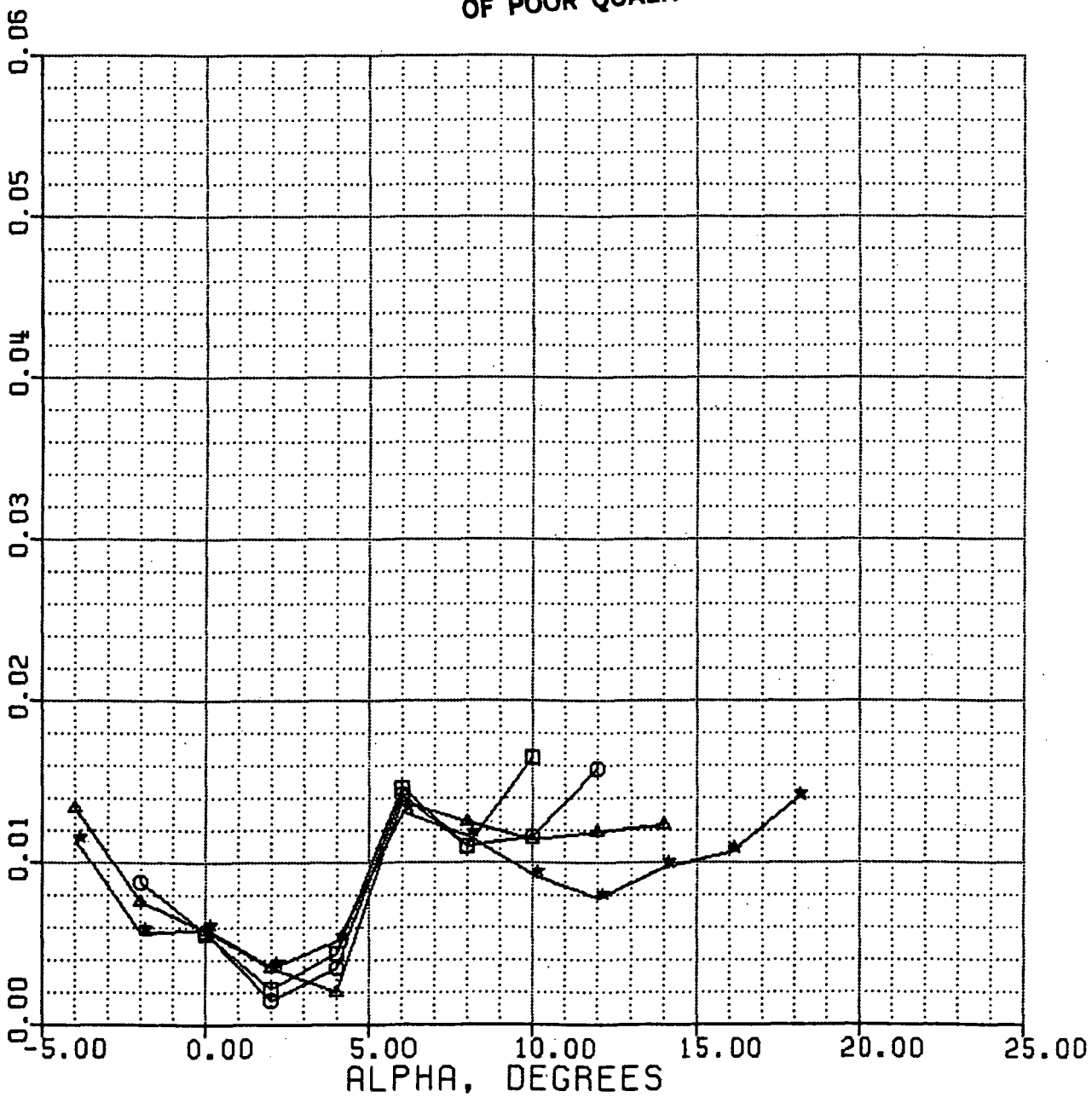
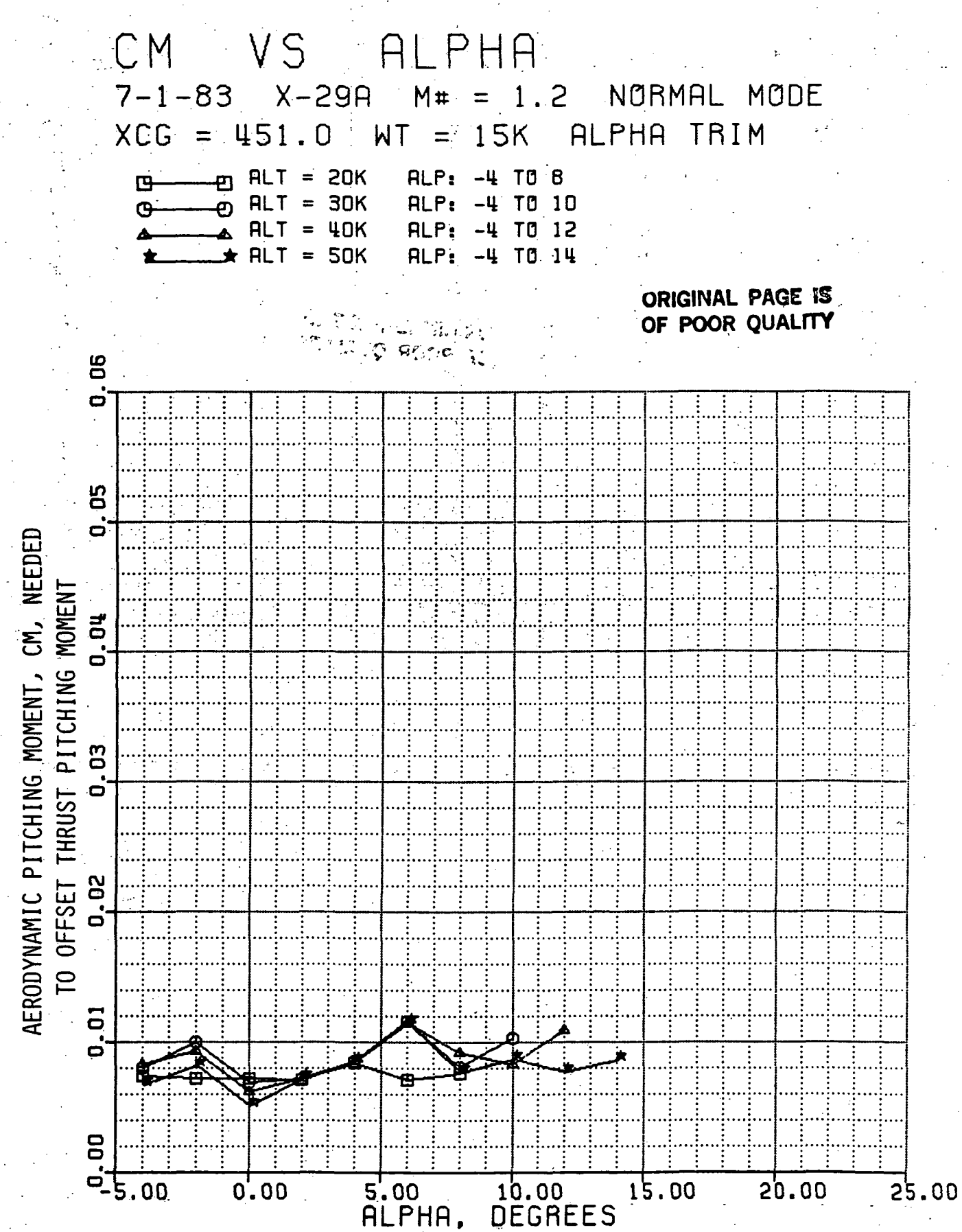


Figure 18(d)



ORIGINAL PAGE IS
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Figure 18(e)

CM VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

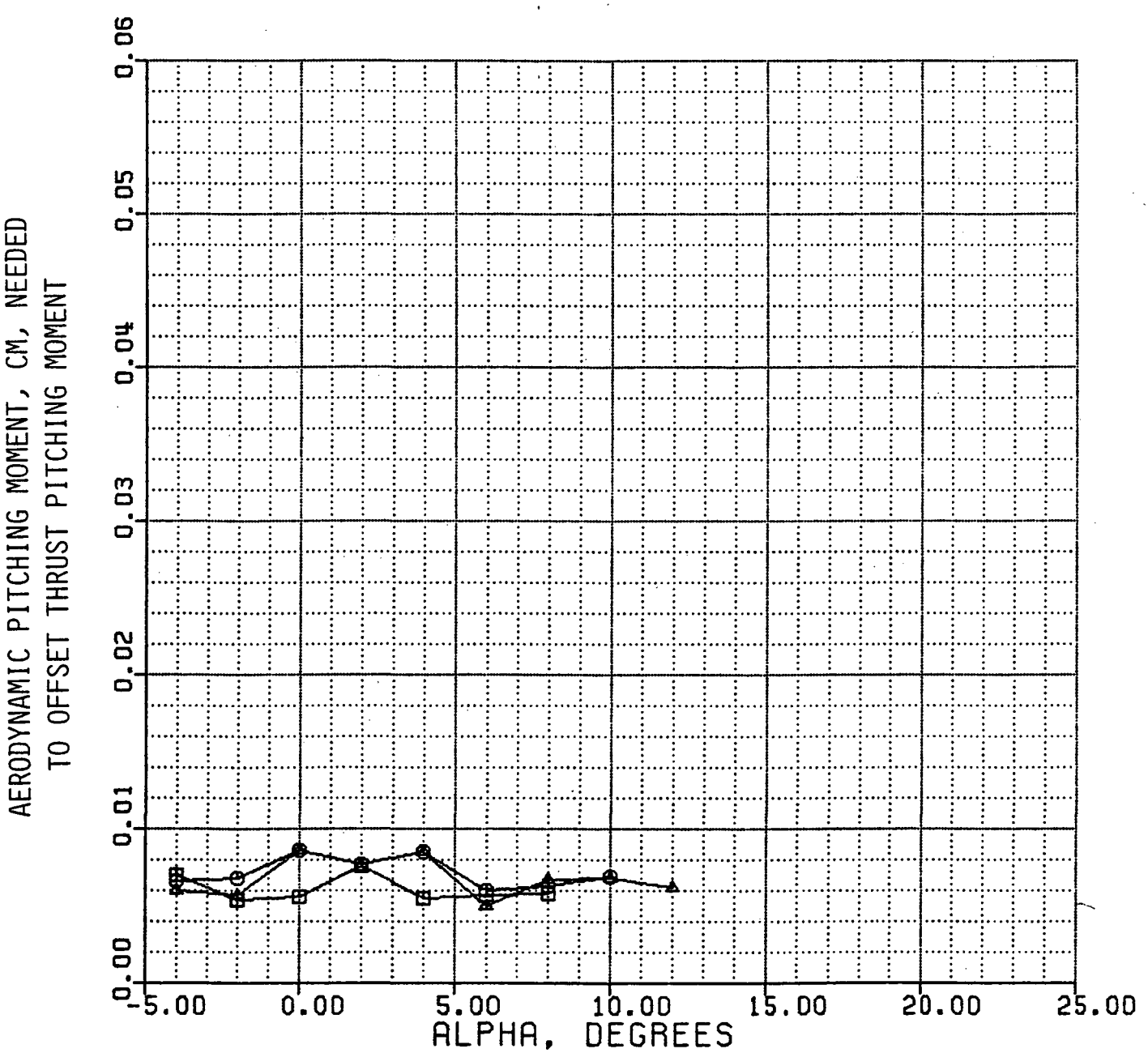

Figure 18(f)

CA VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

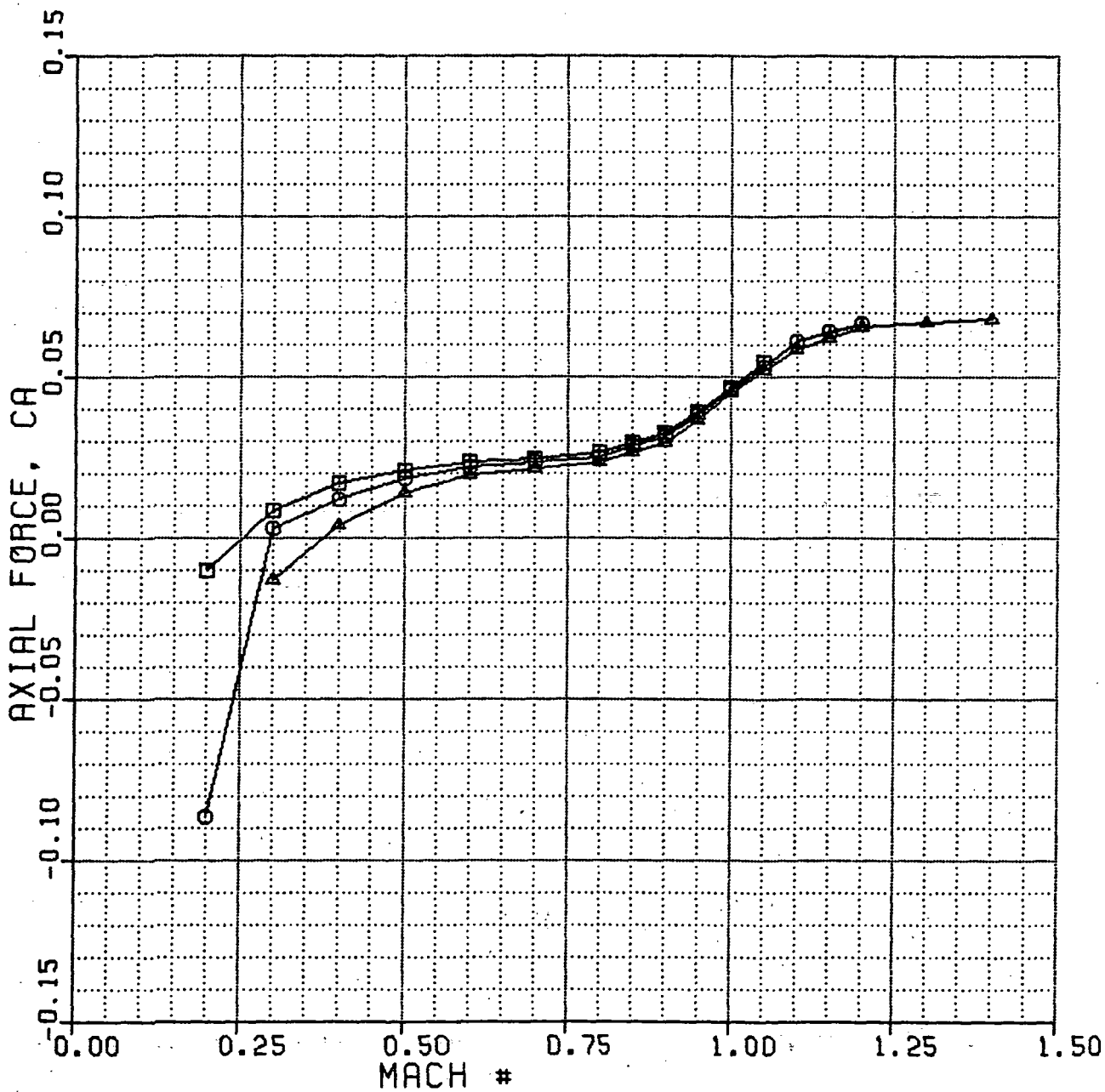

Figure 19(a)

ORIGINAL PAGE IS
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CA VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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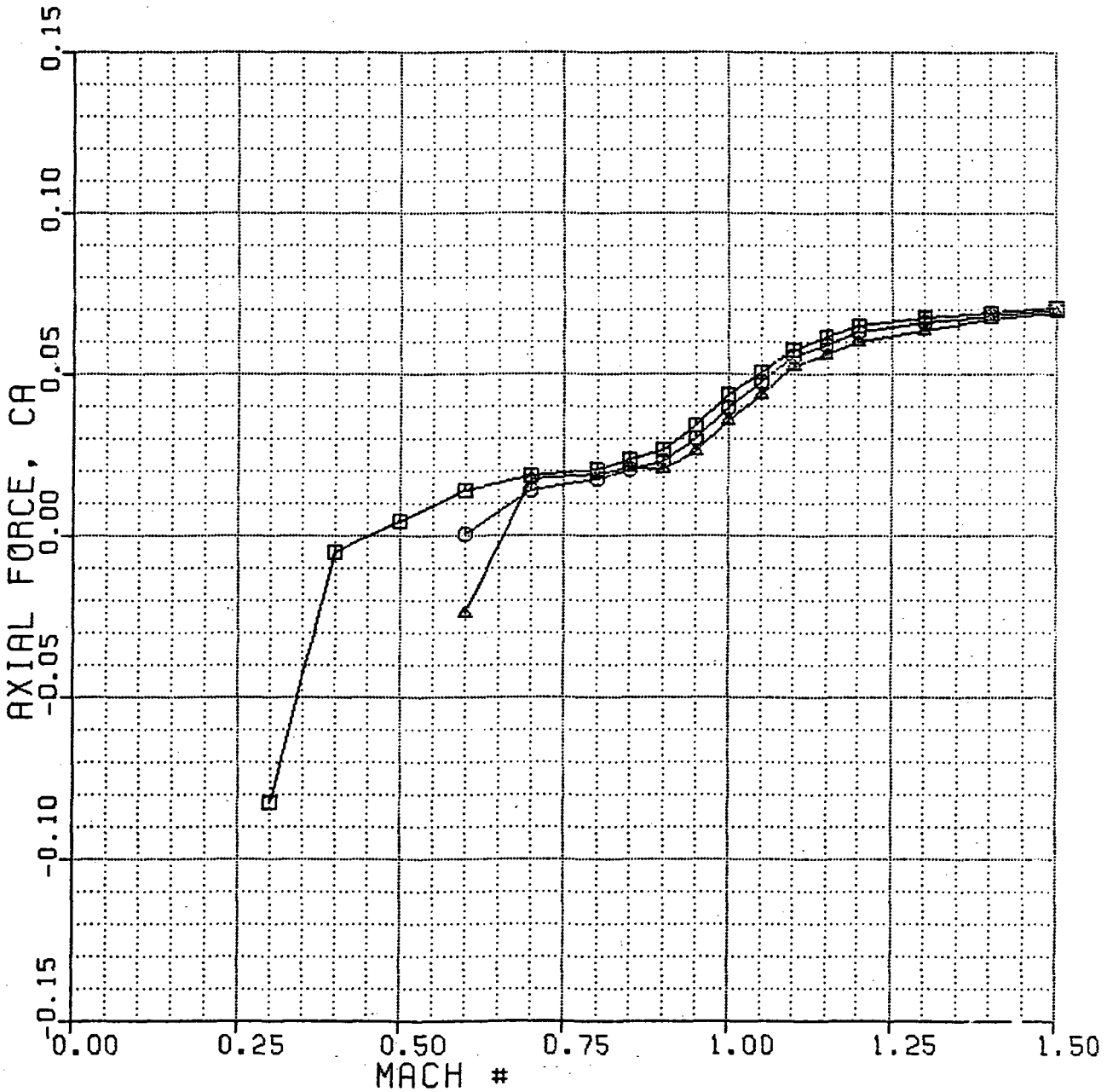

Figure 19(b)

ORIGINAL PAGE IS
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CA VS ALPHA

6-15-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

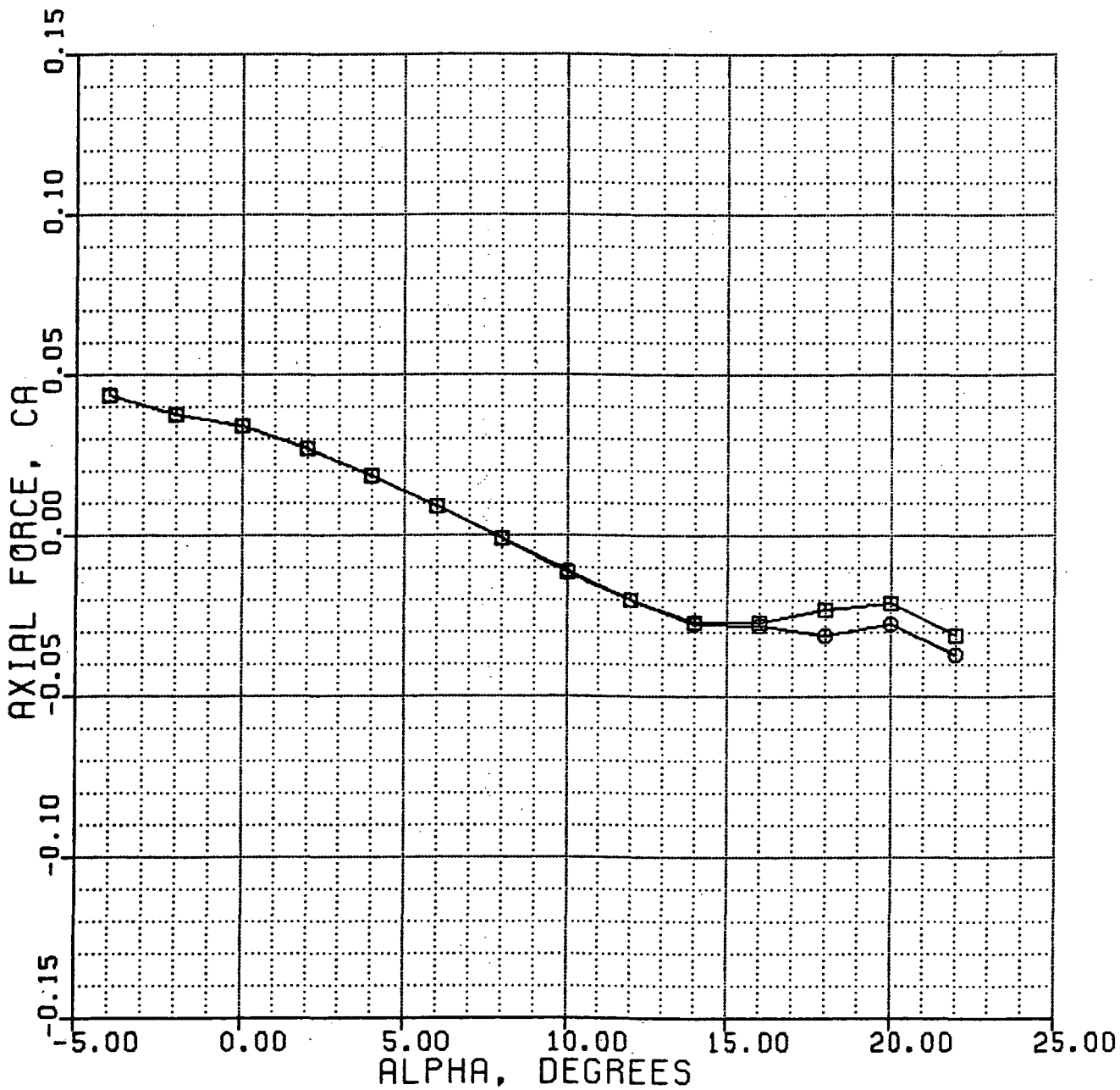

Figure 20(a)

C-2

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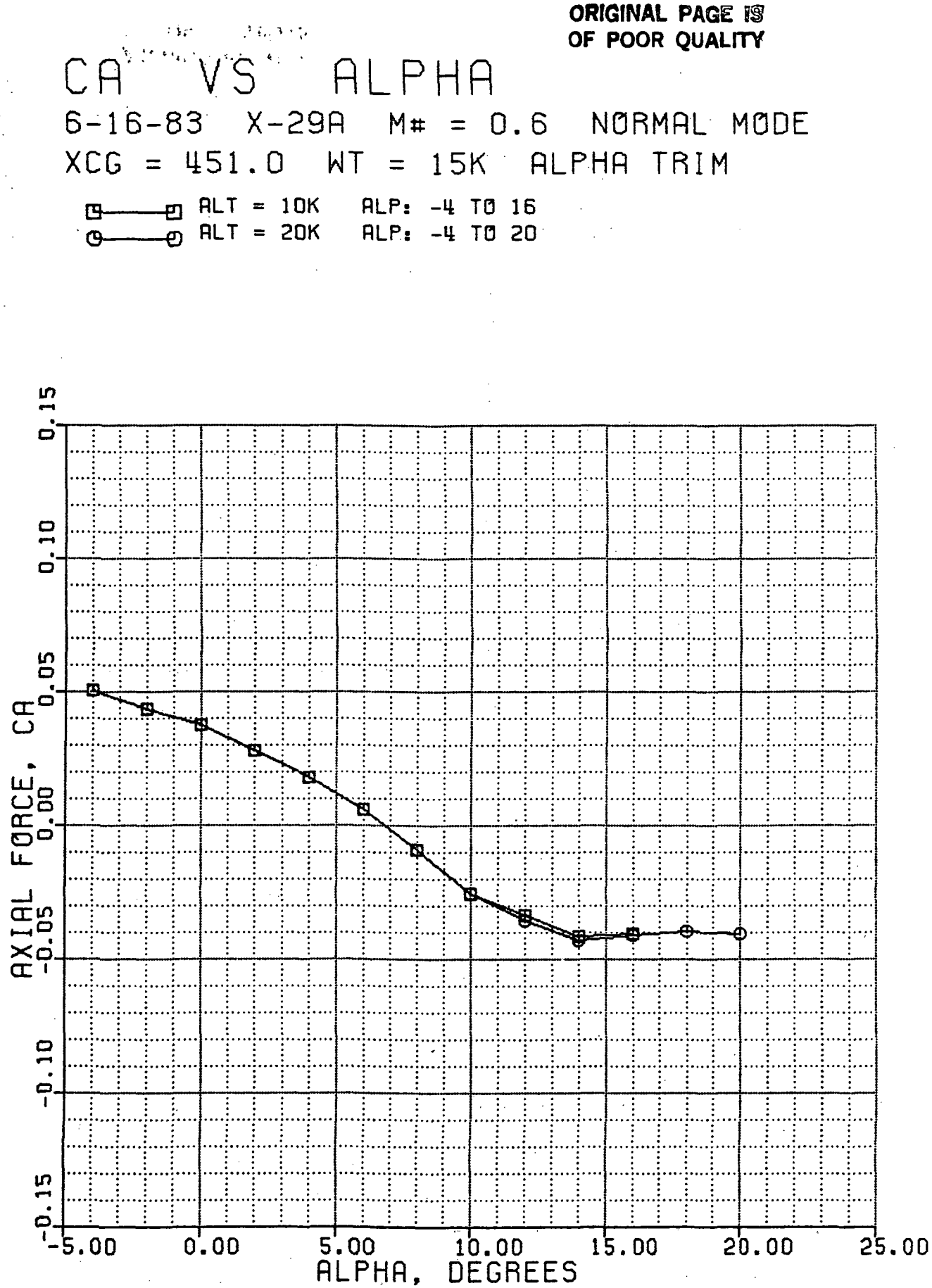

Figure 20(b)

ORIGINAL PAGE IS
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CA VS ALPHA

7-28-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 16
ALT = 50K ALP: -4 TO 22

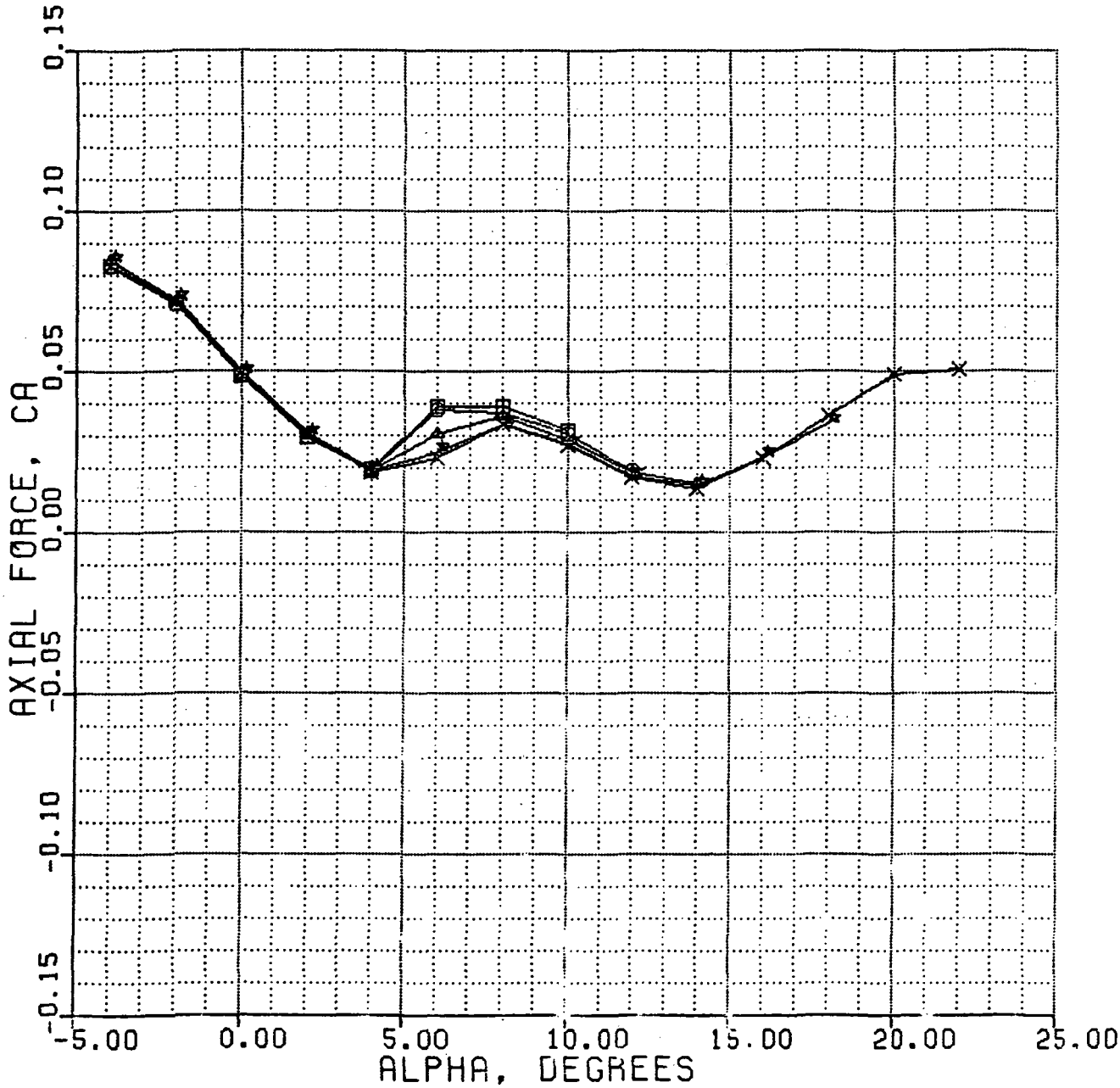

Figure 20(c)

ORIGINAL PAGE IS
OF POOR QUALITY

CA VS ALPHA

7-28-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

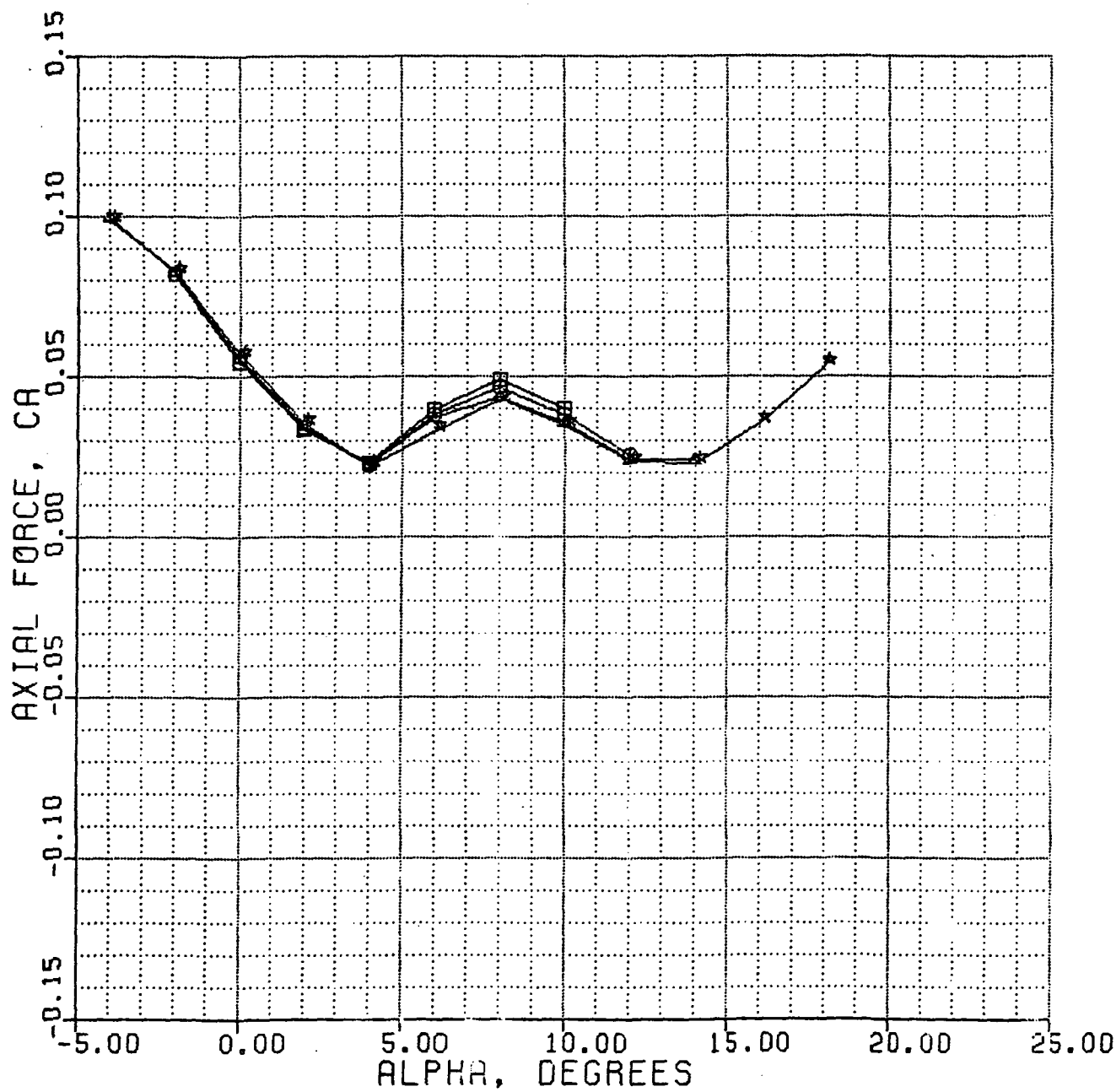

Figure 20(d)

ORIGINAL PAGE IS
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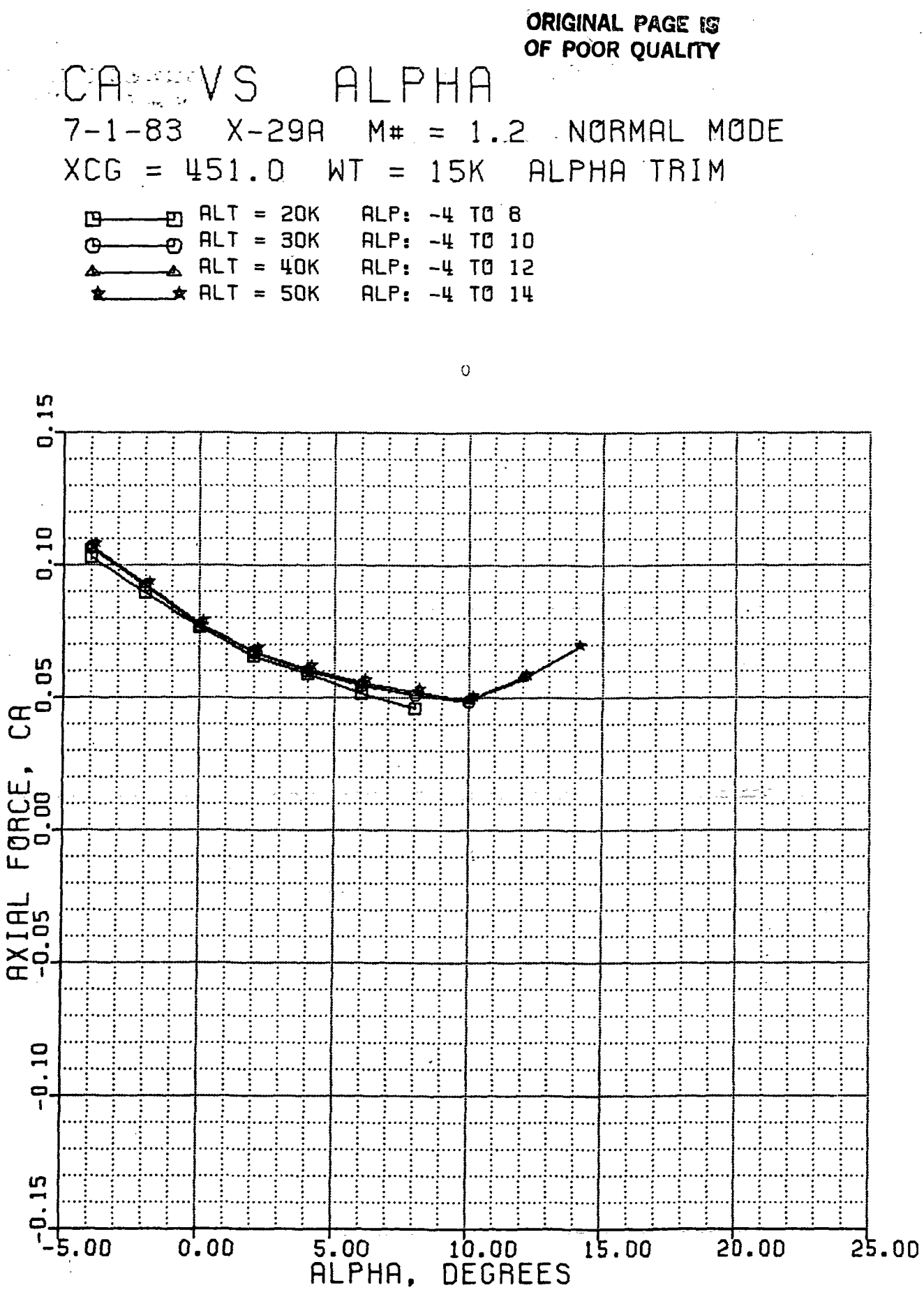

Figure 20(e)

ORIGINAL PAGE IS
OF POOR QUALITY

CA VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

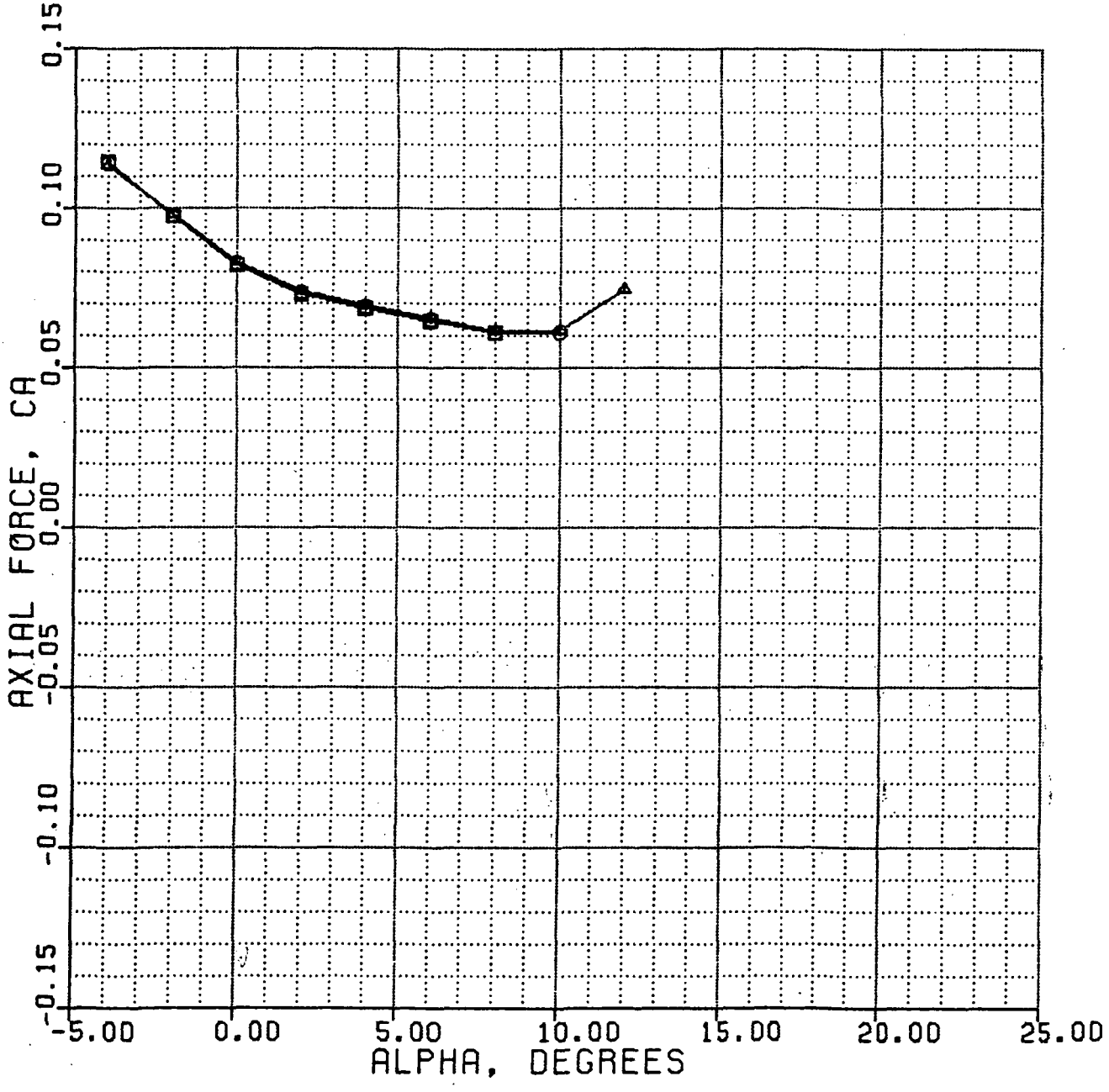

Figure 20(f)

ORIGINAL PAGE IS
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CN-NORMAL VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

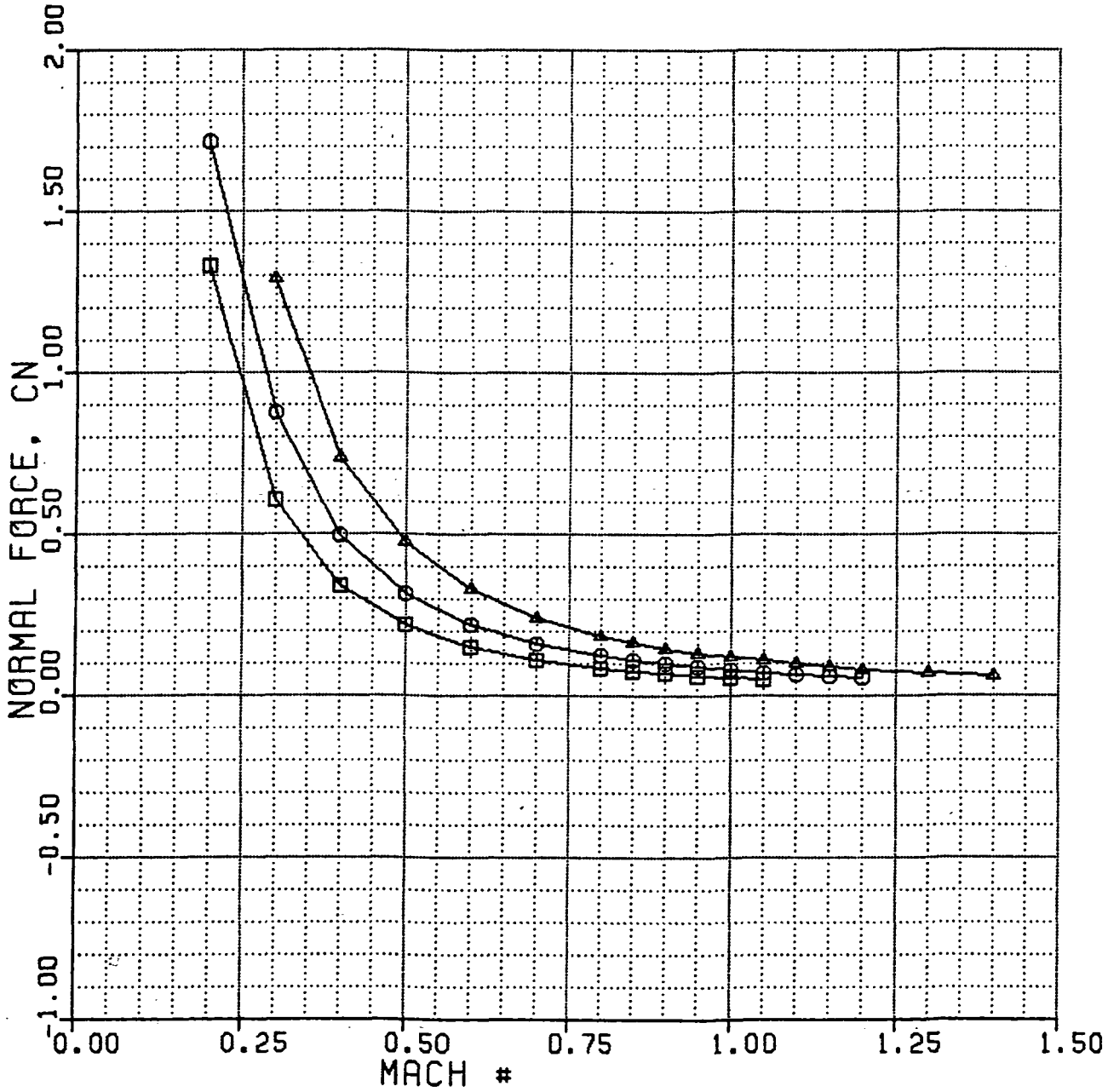

Figure 21(a)

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CN-NORMAL VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

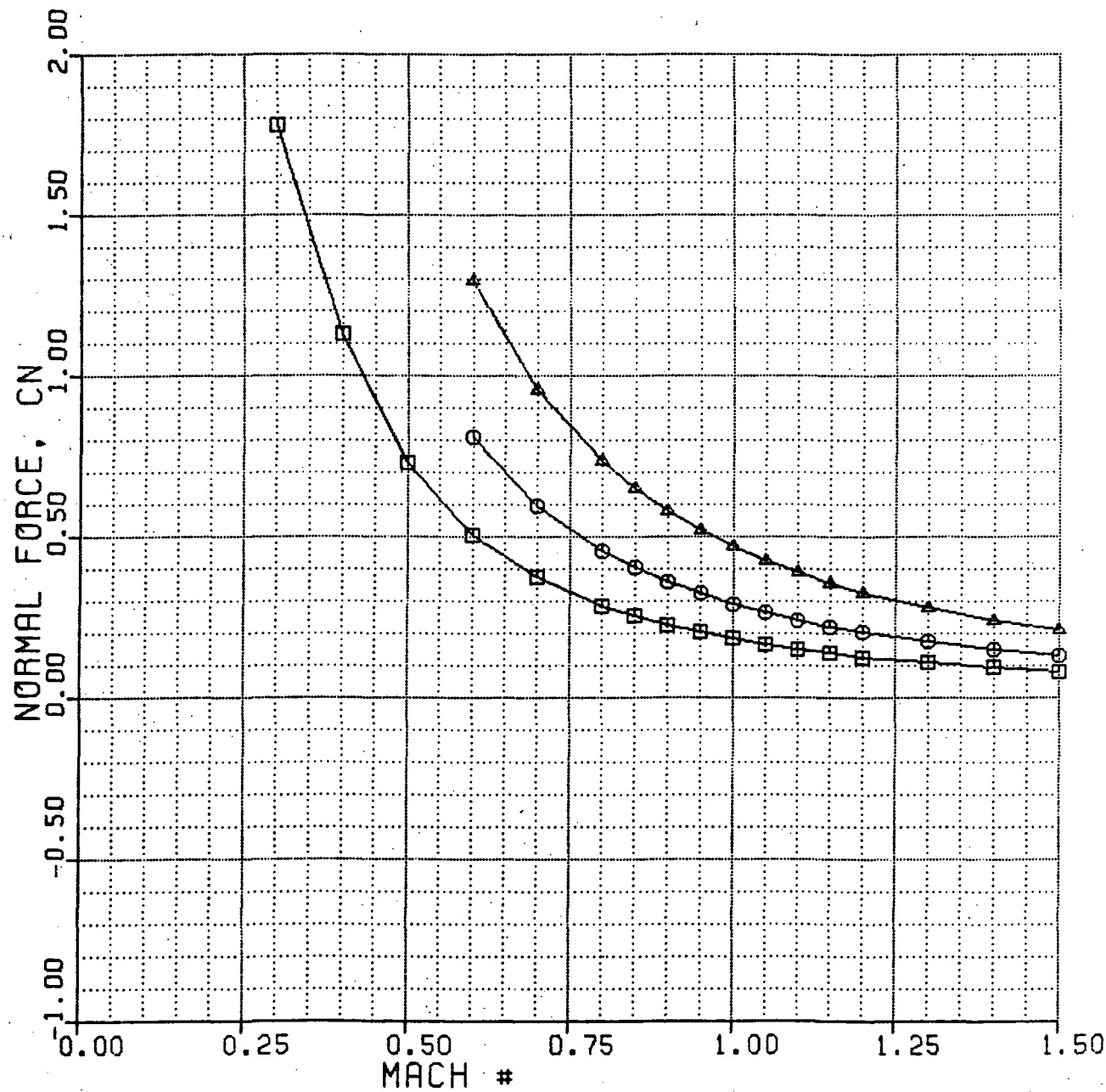

Figure 21(b)

CN-NORMAL VS ALPHA

6-15-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

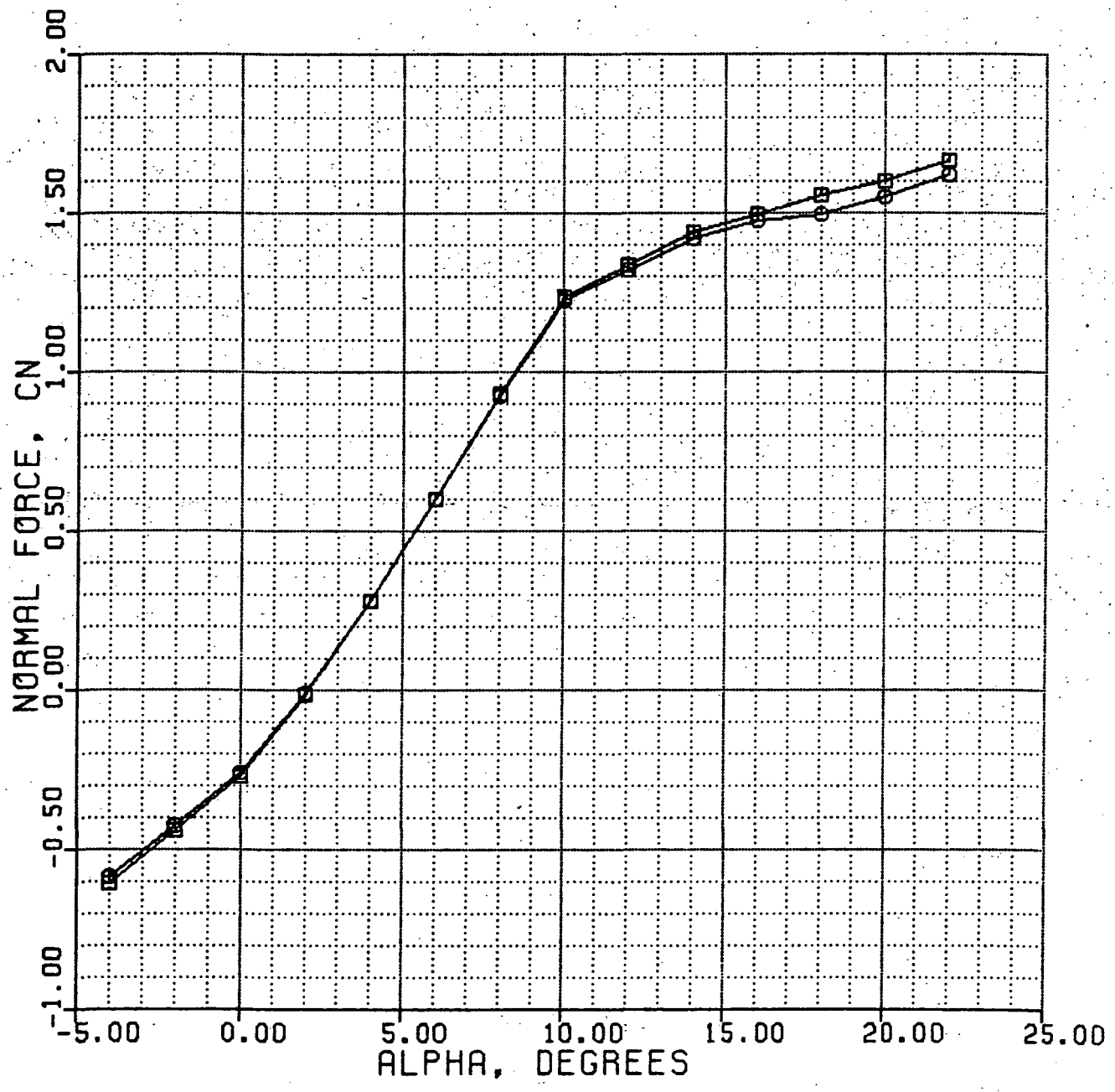

Figure 22(a)

CN-NORMAL VS ALPHA

6-16-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
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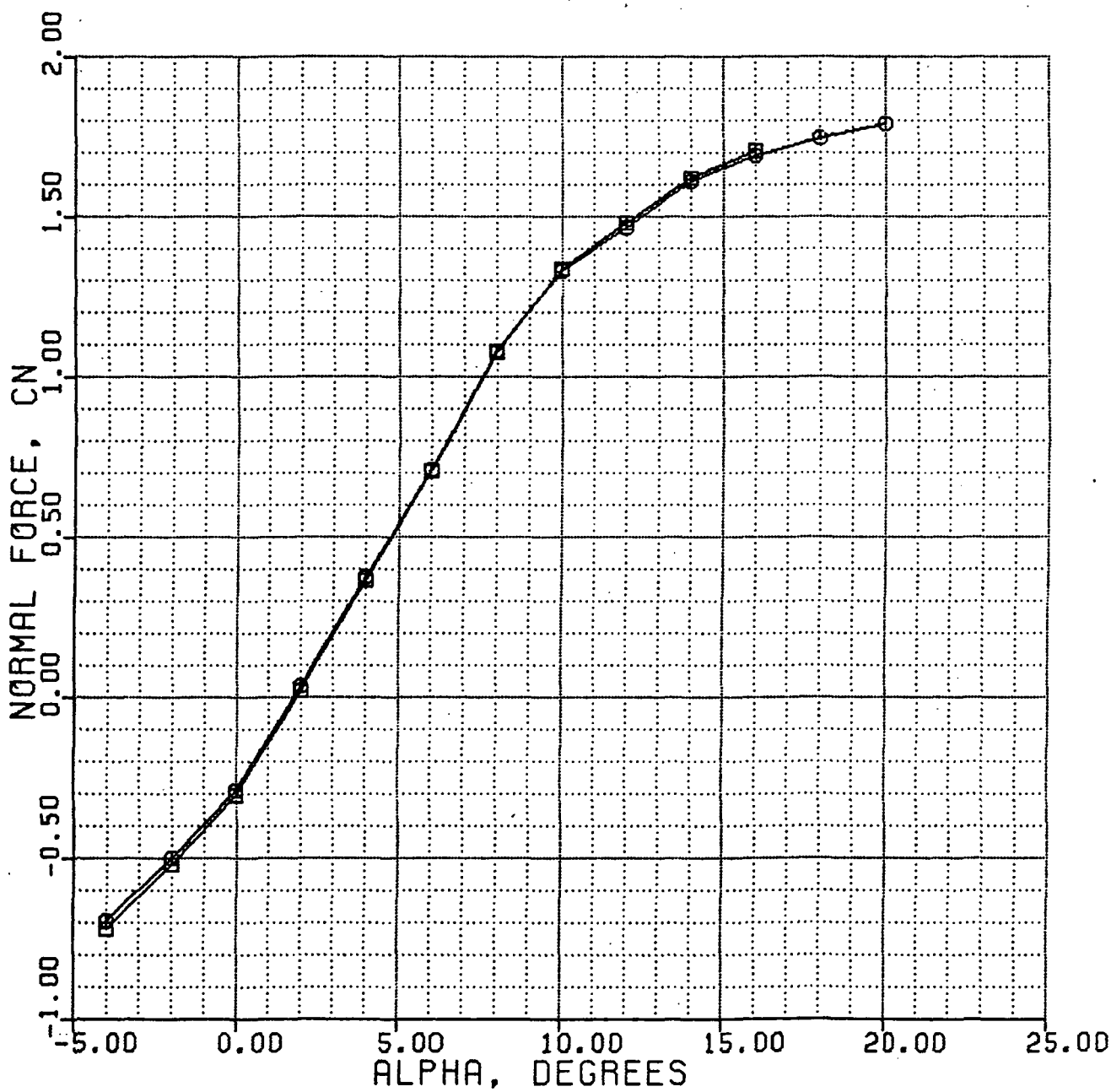

Figure 22(b)

ORIGINAL PAGE IS
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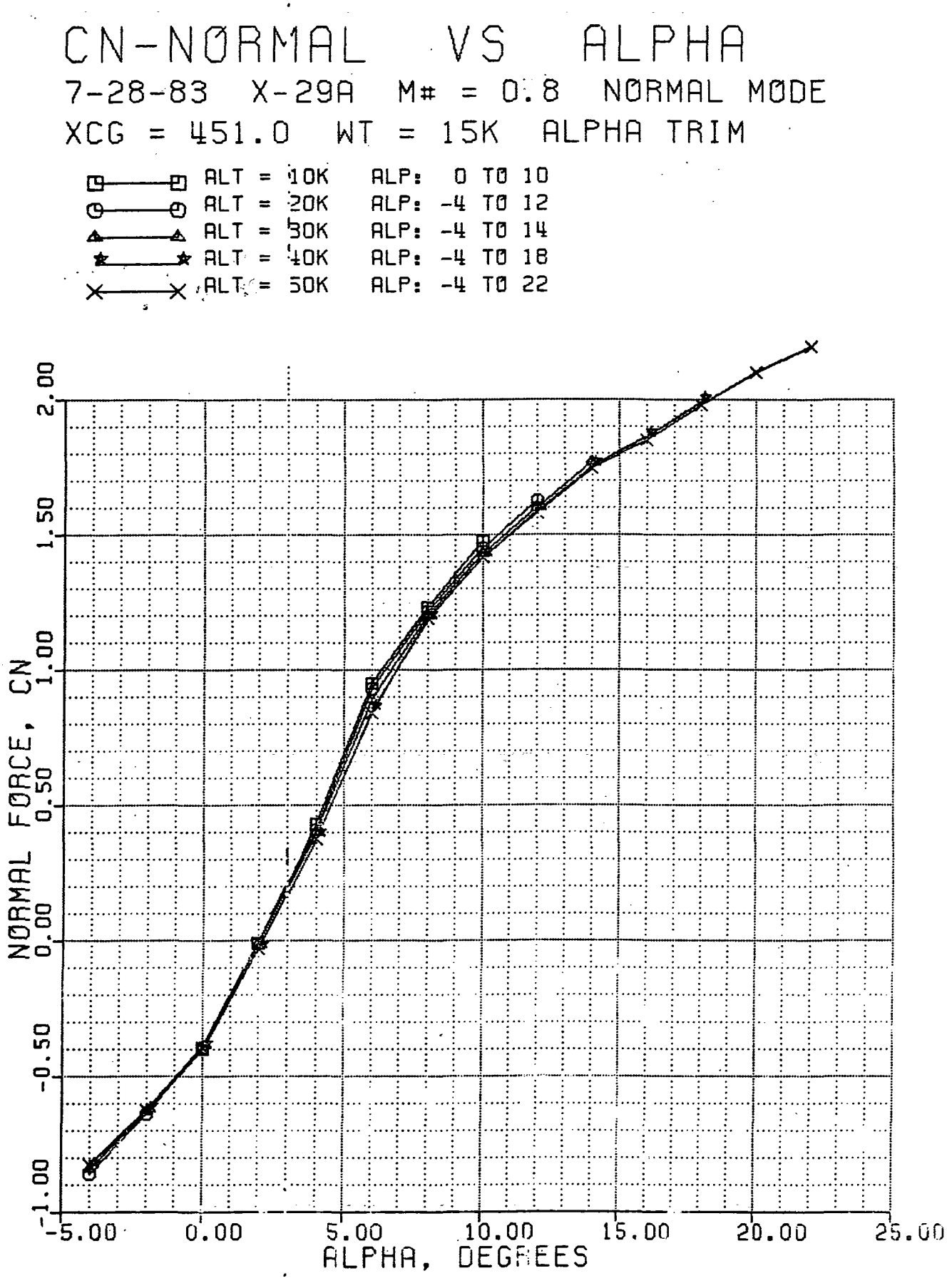

Figure 22(c)

ORIGINAL PAGE IS
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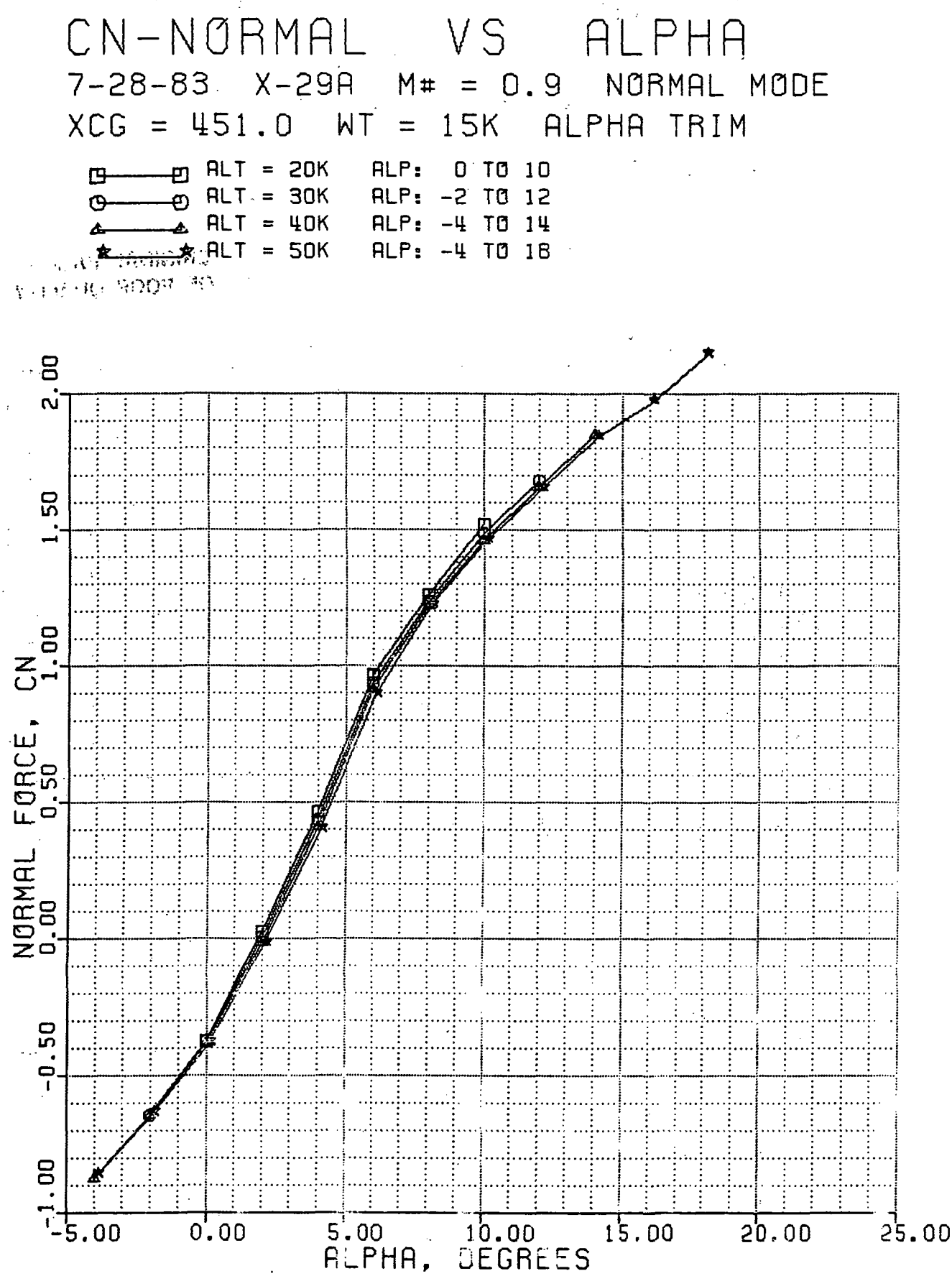

Figure 22(d)

CN-NORMAL VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

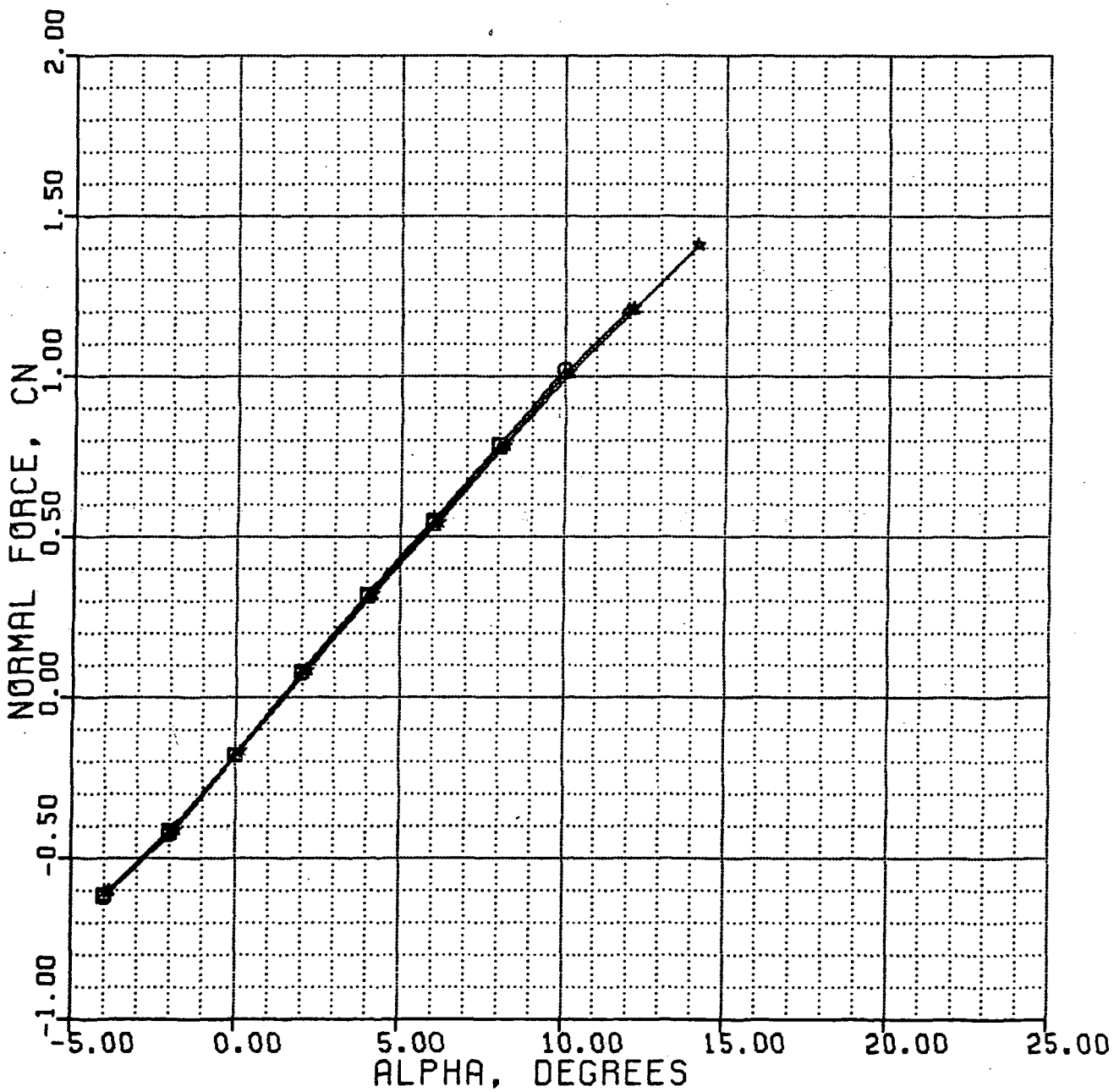

Figure 22(e)

ORIGINAL PAGE IS
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CN-NORMAL VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

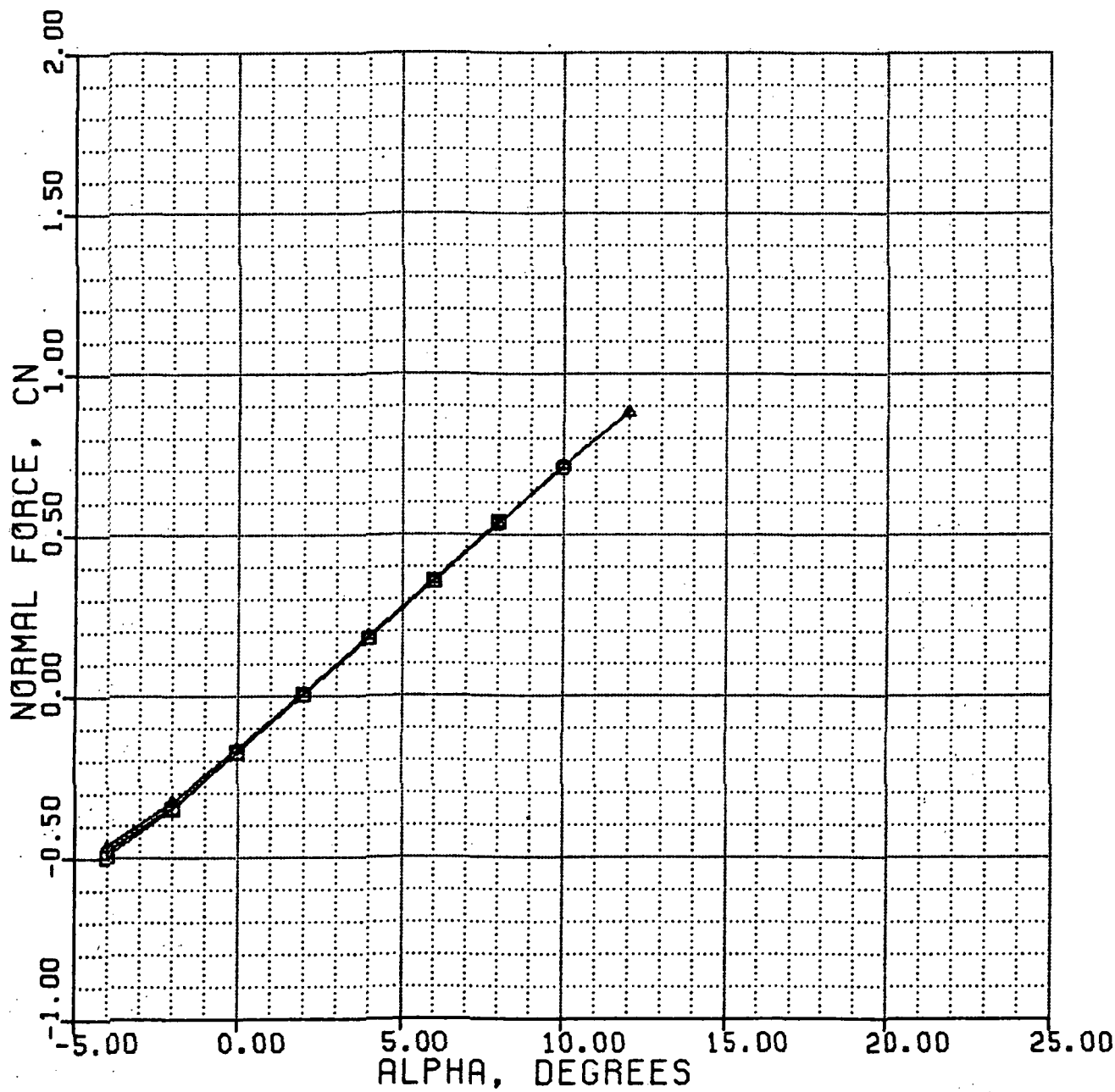
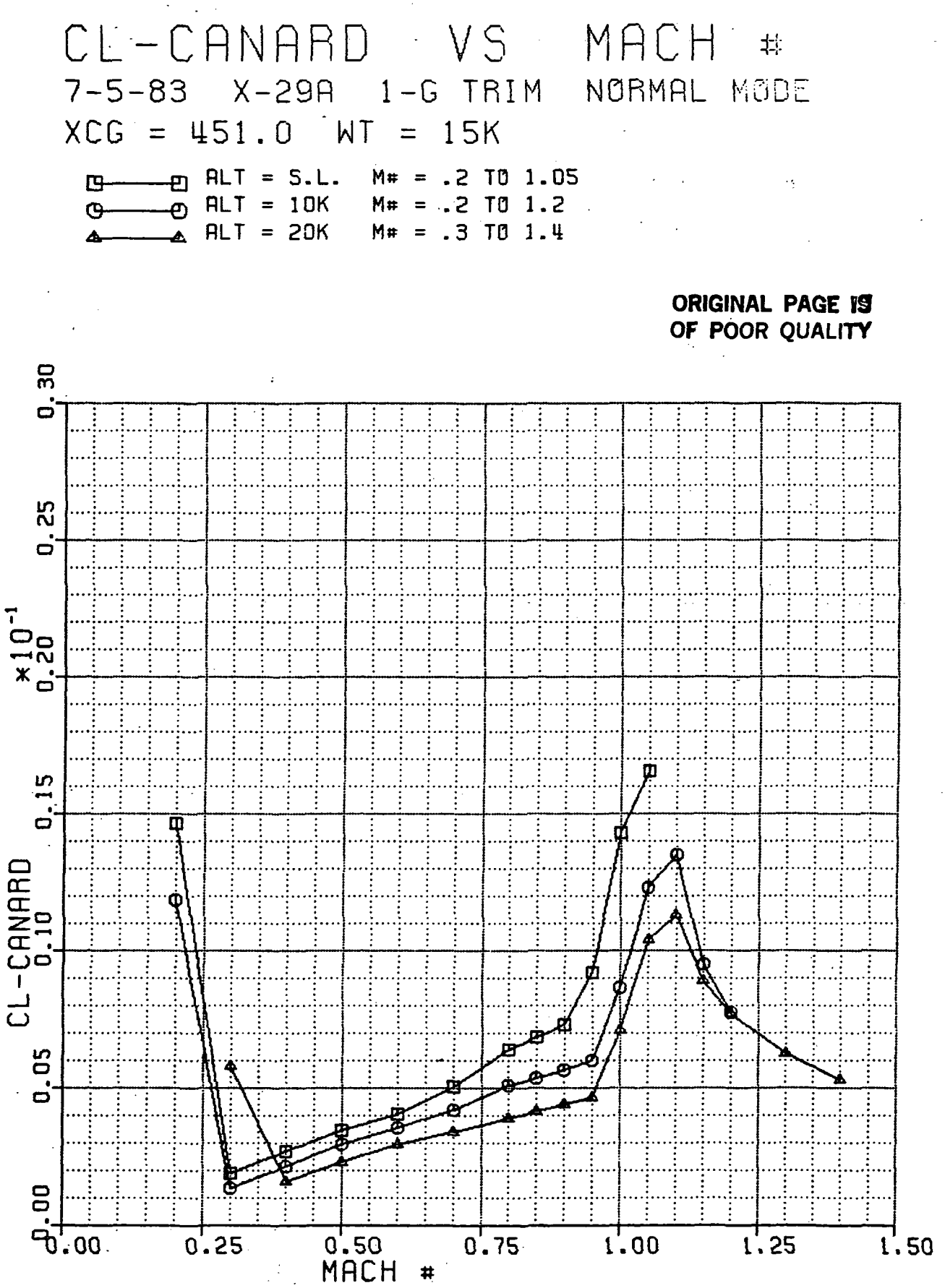


Figure 22(f)



ORIGINAL PAGE IS
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Figure 23(a)

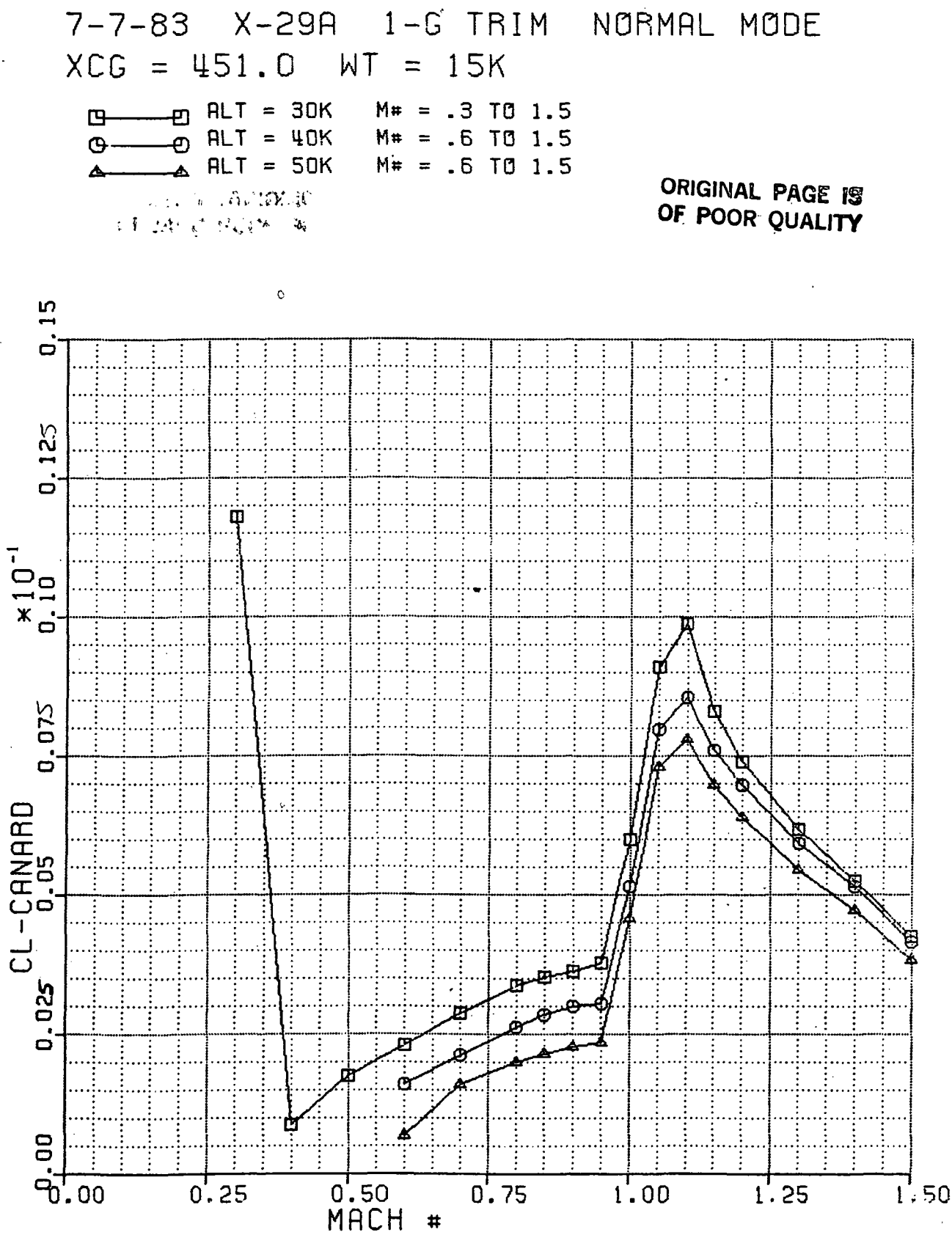
CL-CANARD VS MACH #
7-7-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS
OF POOR QUALITY
CL-CANARD
*10⁻¹
0.00
0.025
0.05
0.075
0.10
0.125
0.15
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 23(b)

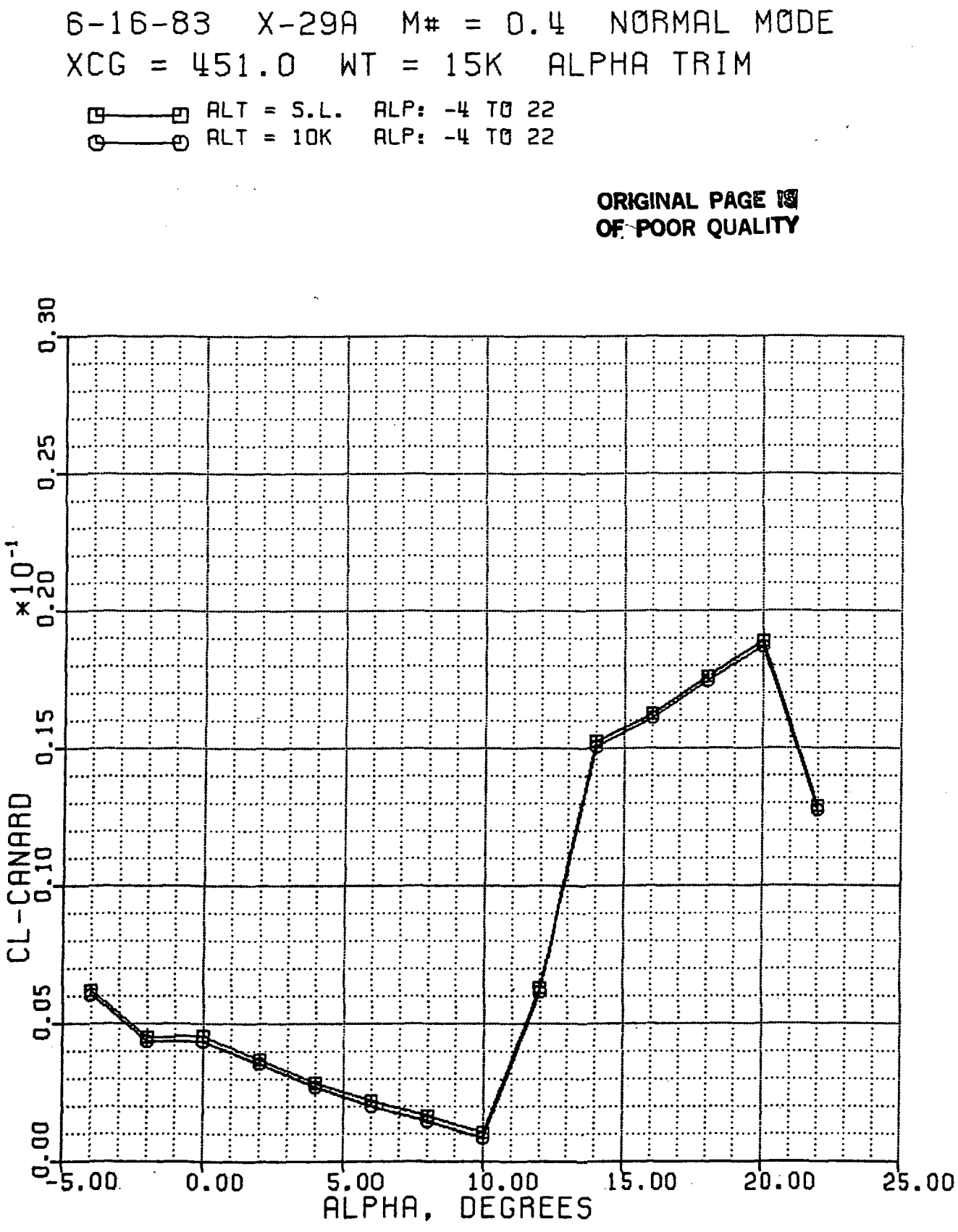
CL-CANARD VS ALPHA
6-16-83 X-29A M# = 0.4 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TO 22
ALT = 10K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CL-CANARD
*10^-1
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 24(a)

CL-CANARD VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
OF POOR QUALITY

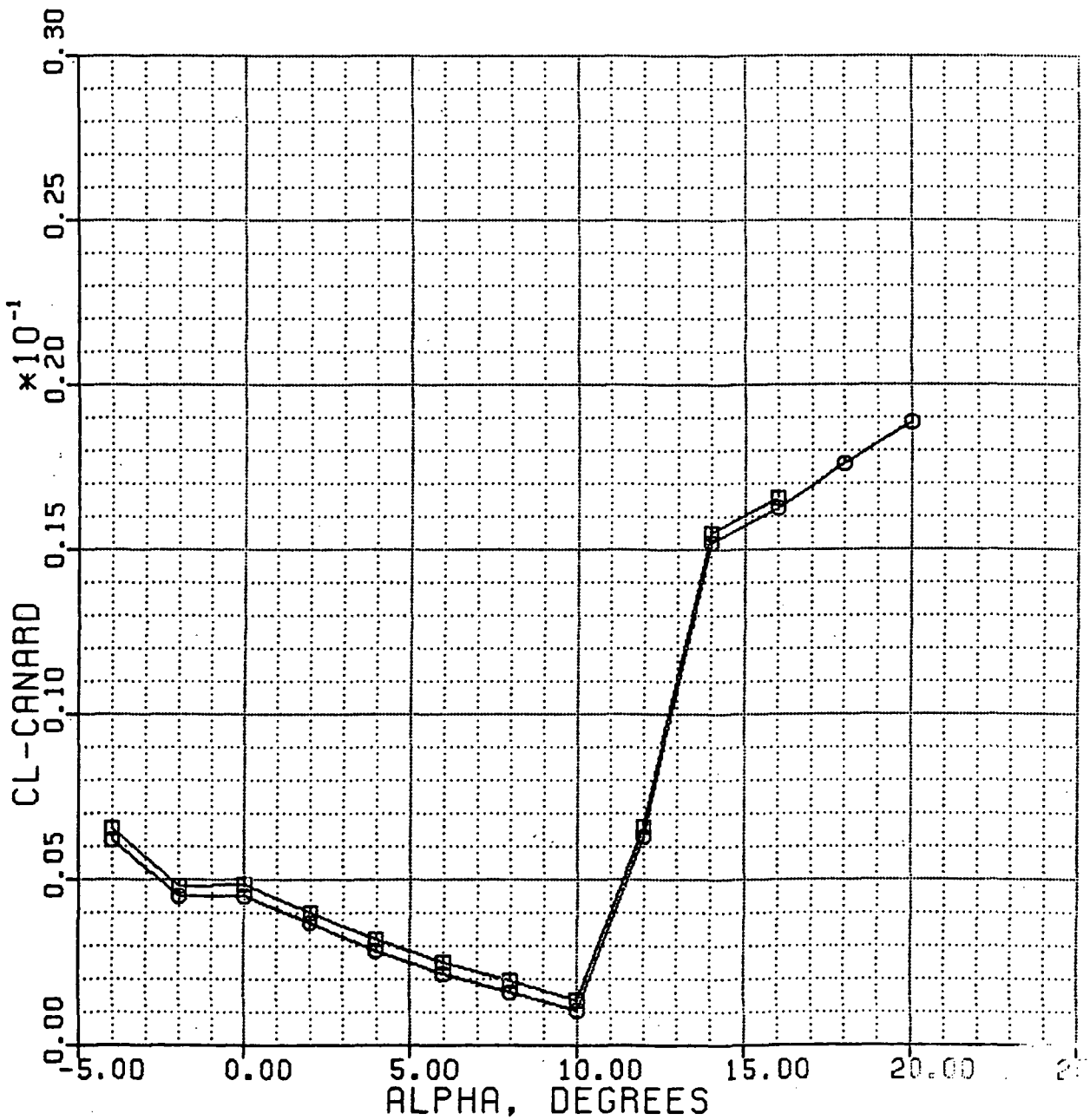

Figure 24(b)

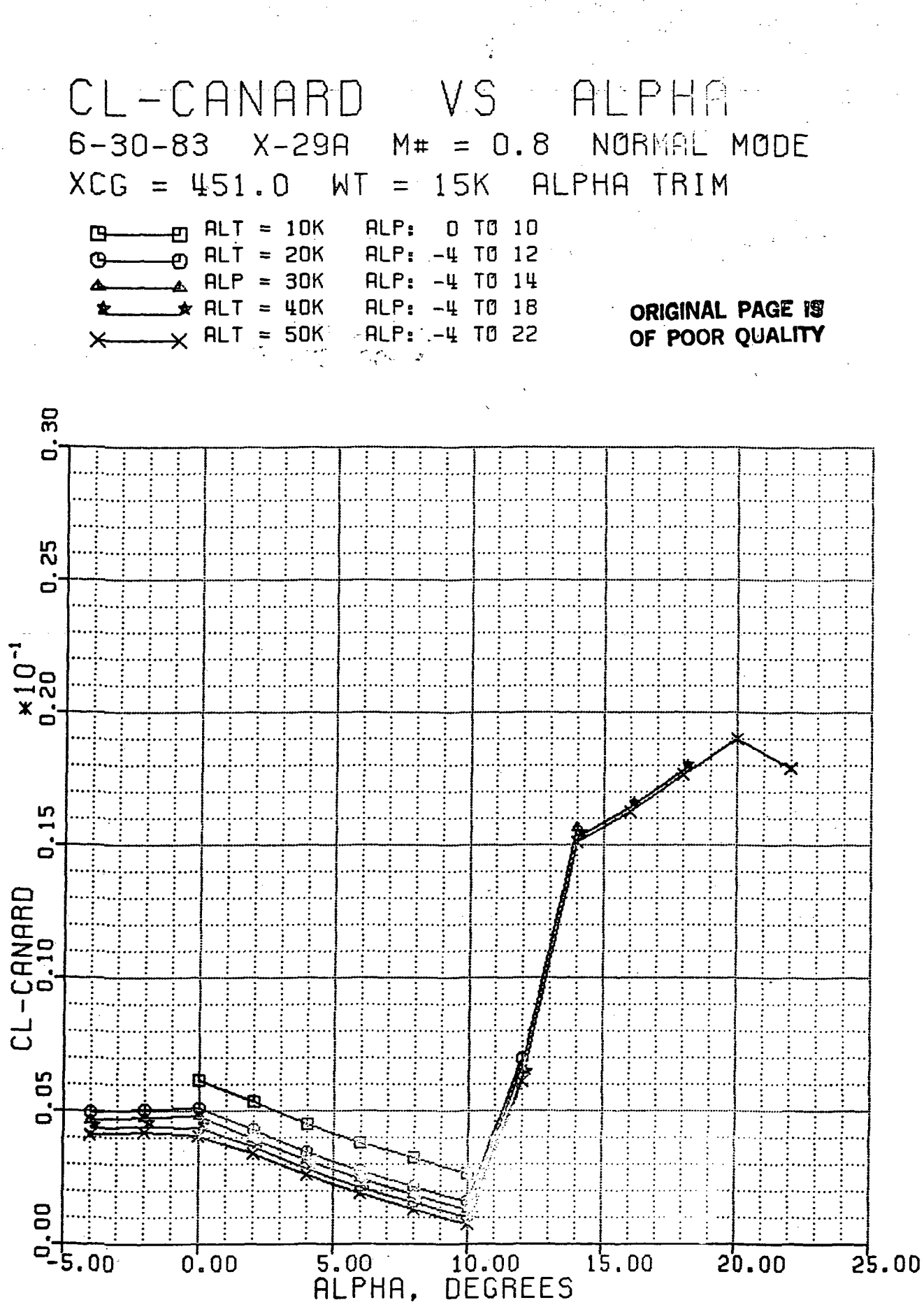
CL-CANARD VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
CL-CANARD
*10^-1
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 24(c)

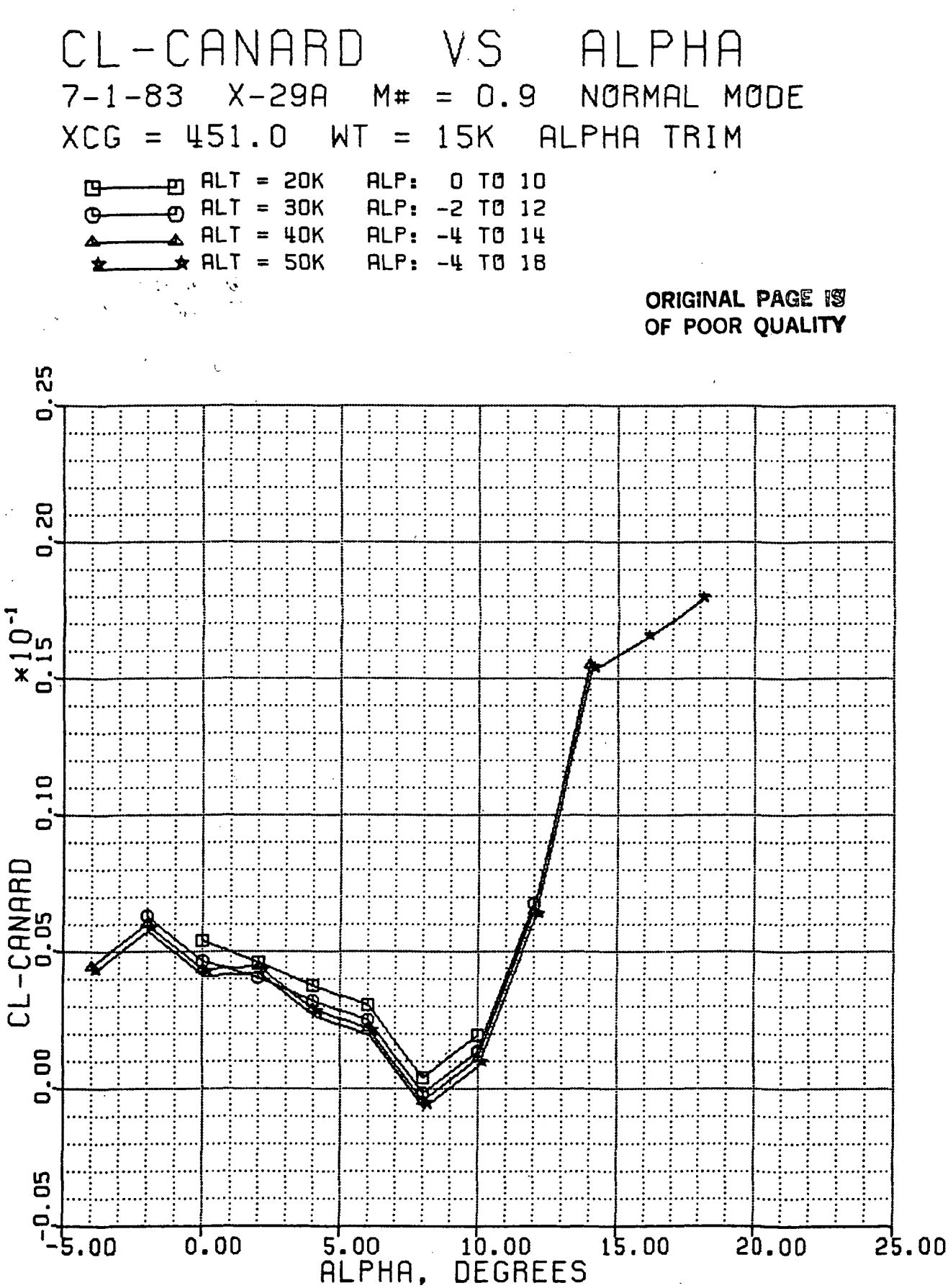
CL-CANARD VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS
OF POOR QUALITY
CL-CANARD
*10-1
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 24(d)

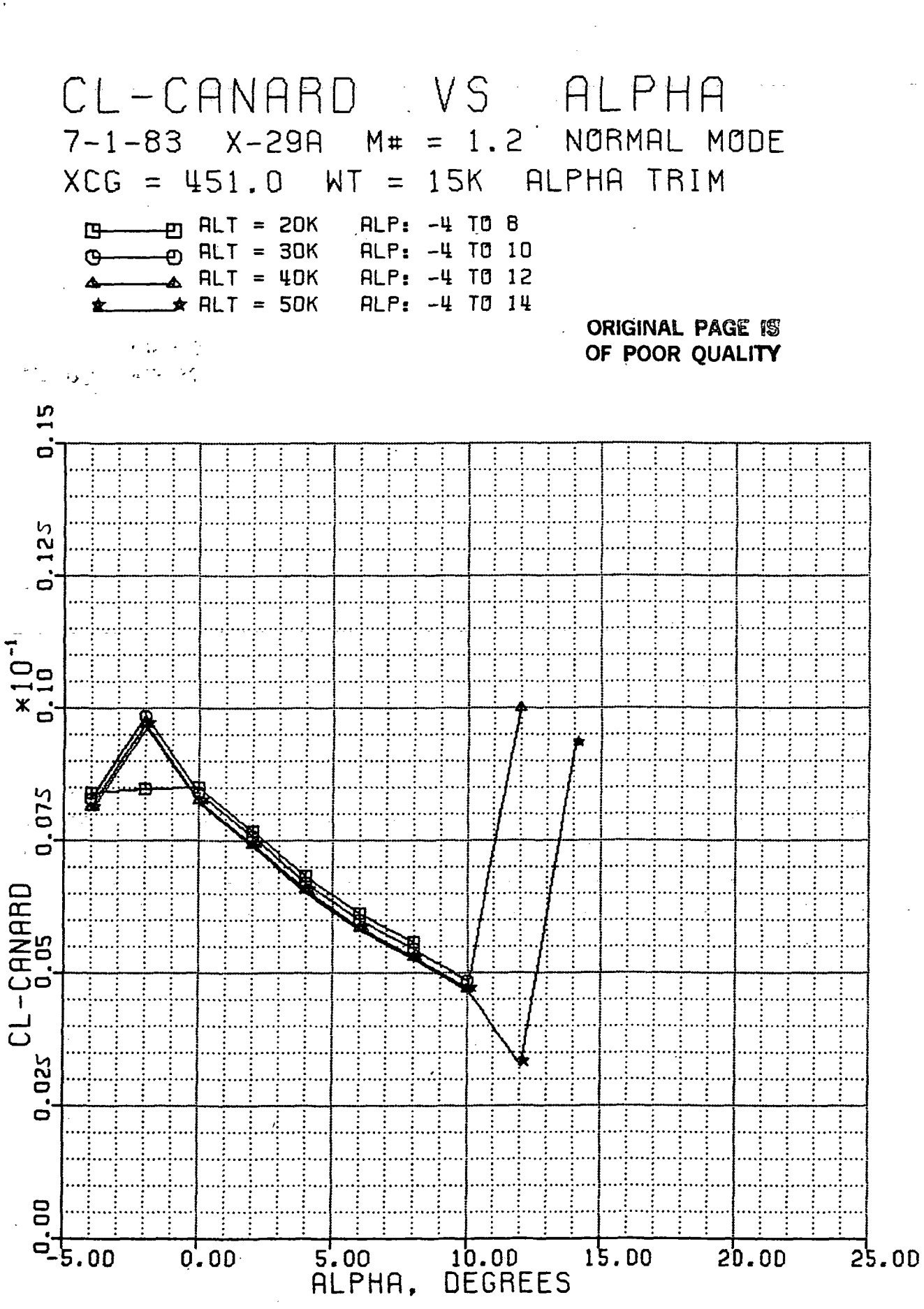
CL-CANARD VS ALPHA
7-1-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS
OF POOR QUALITY
CL-CANARD
*10⁻¹
0.15
0.125
0.10
0.075
0.05
0.025
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 24(e)

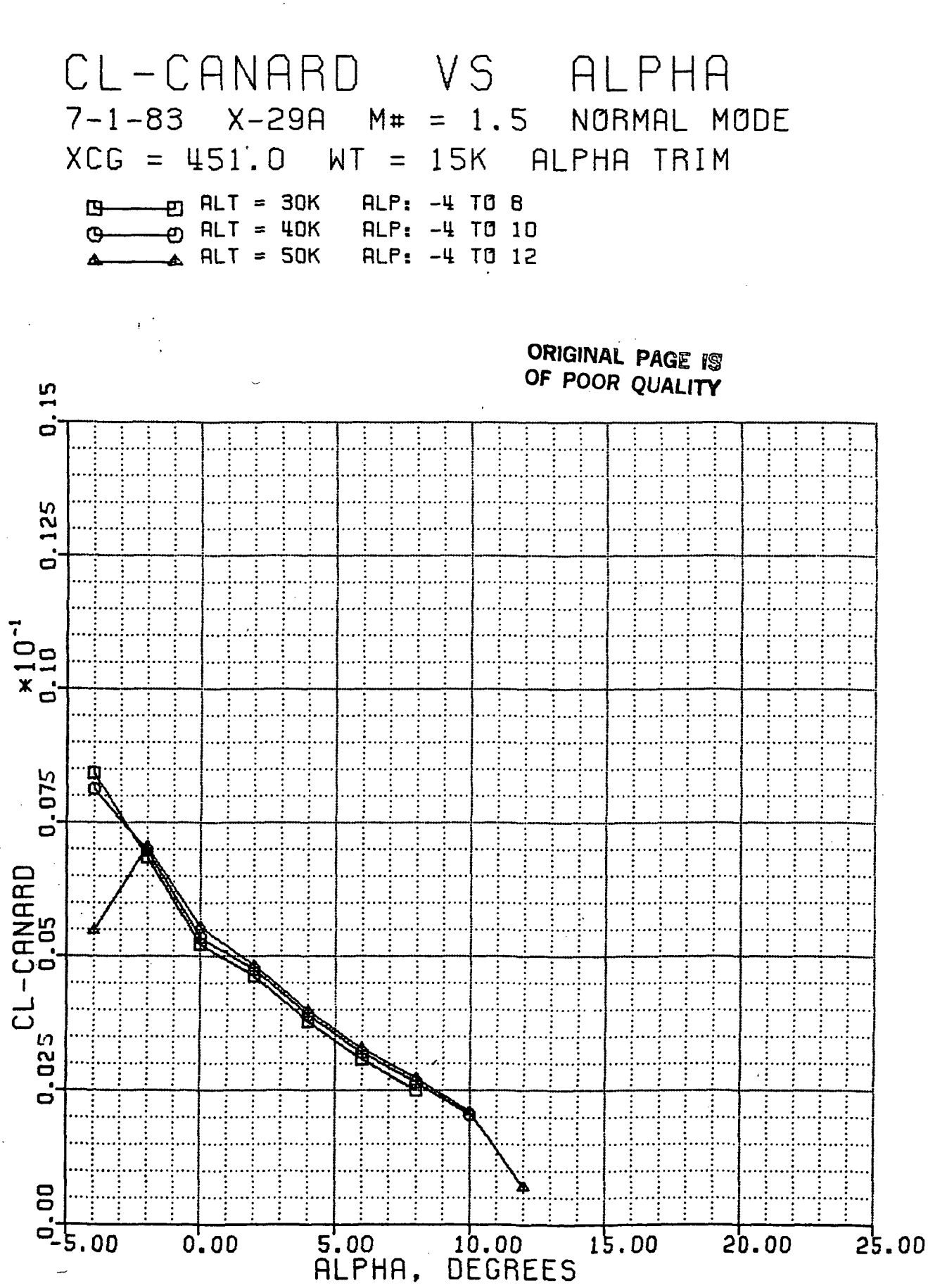
CL-CANARD VS ALPHA
7-1-83 X-29A M# = 1.5 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12
ORIGINAL PAGE IS
OF POOR QUALITY
CL-CANARD
*10-1
0.15
0.125
0.10
0.075
0.05
0.025
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 24(f)

CD-CANARD VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

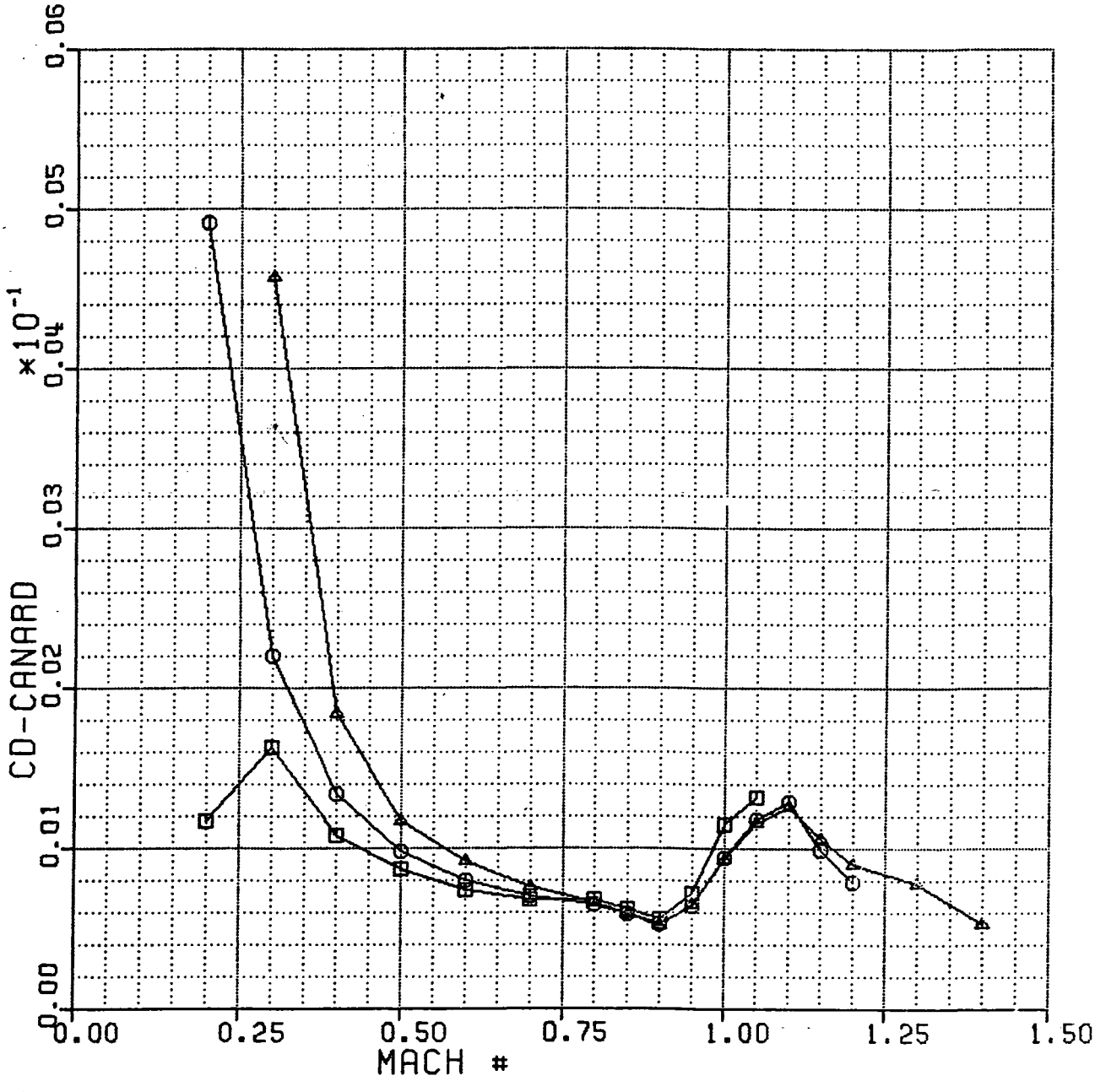

Figure 25(a)

CD-CANARD VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
OF POOR QUALITY

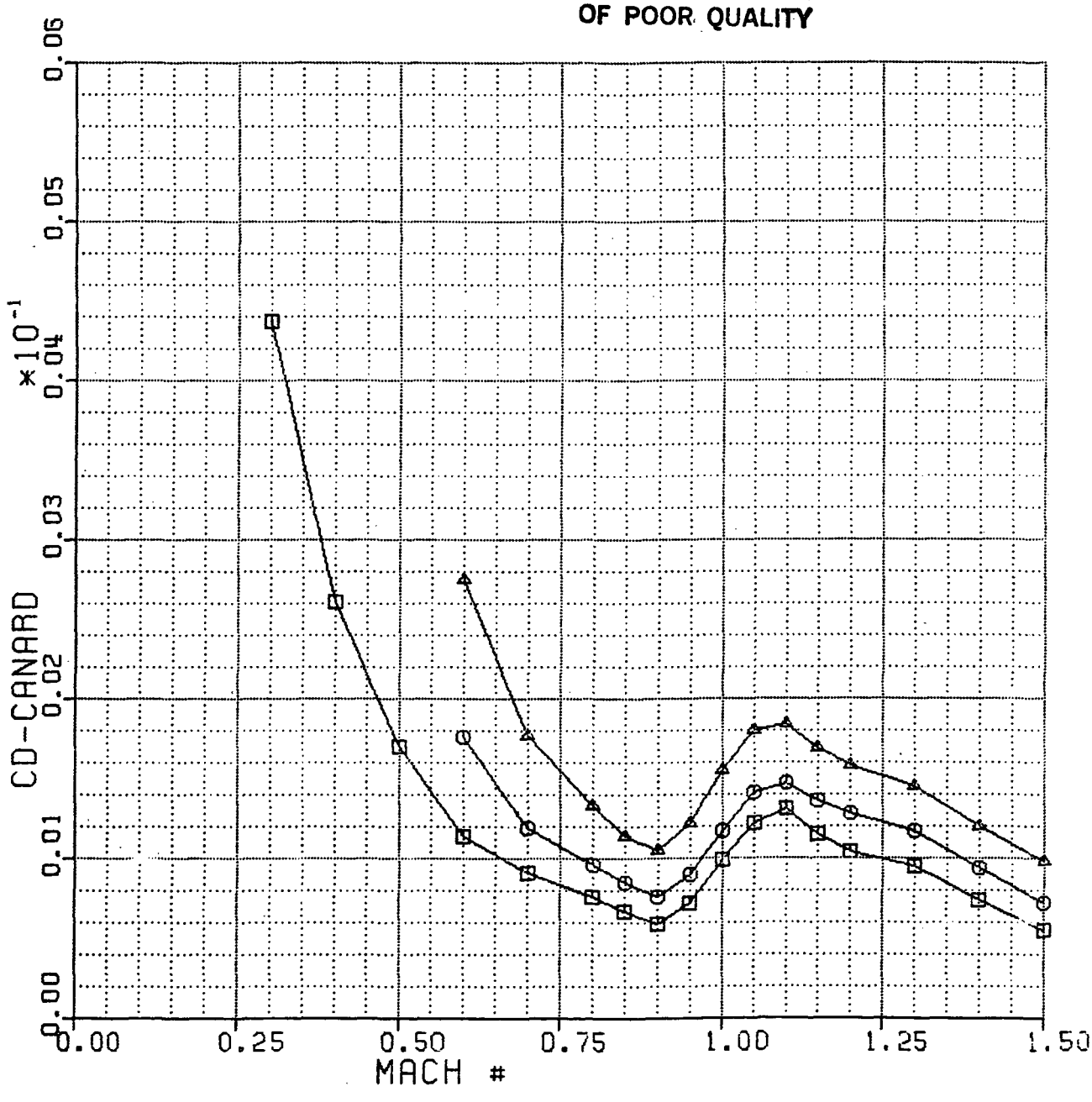

Figure 25(b)

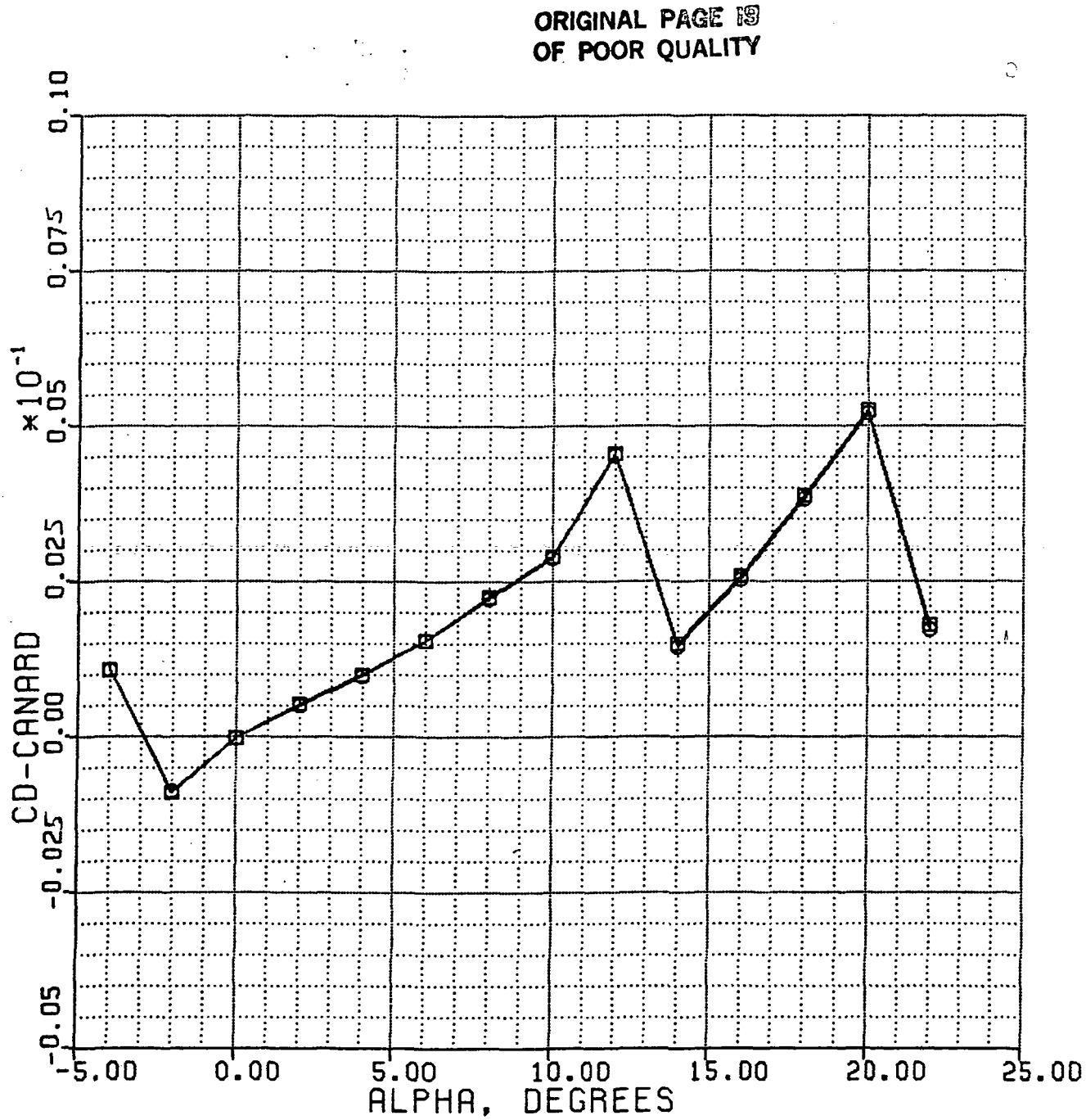
CD-CANARD VS ALPHA
6-16-83 X-29A M# = 0.4 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TO 22
ALT = 10K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CD-CANARD
*10^-1
0.10
0.075
0.05
0.025
0.00
-0.025
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 26(a)

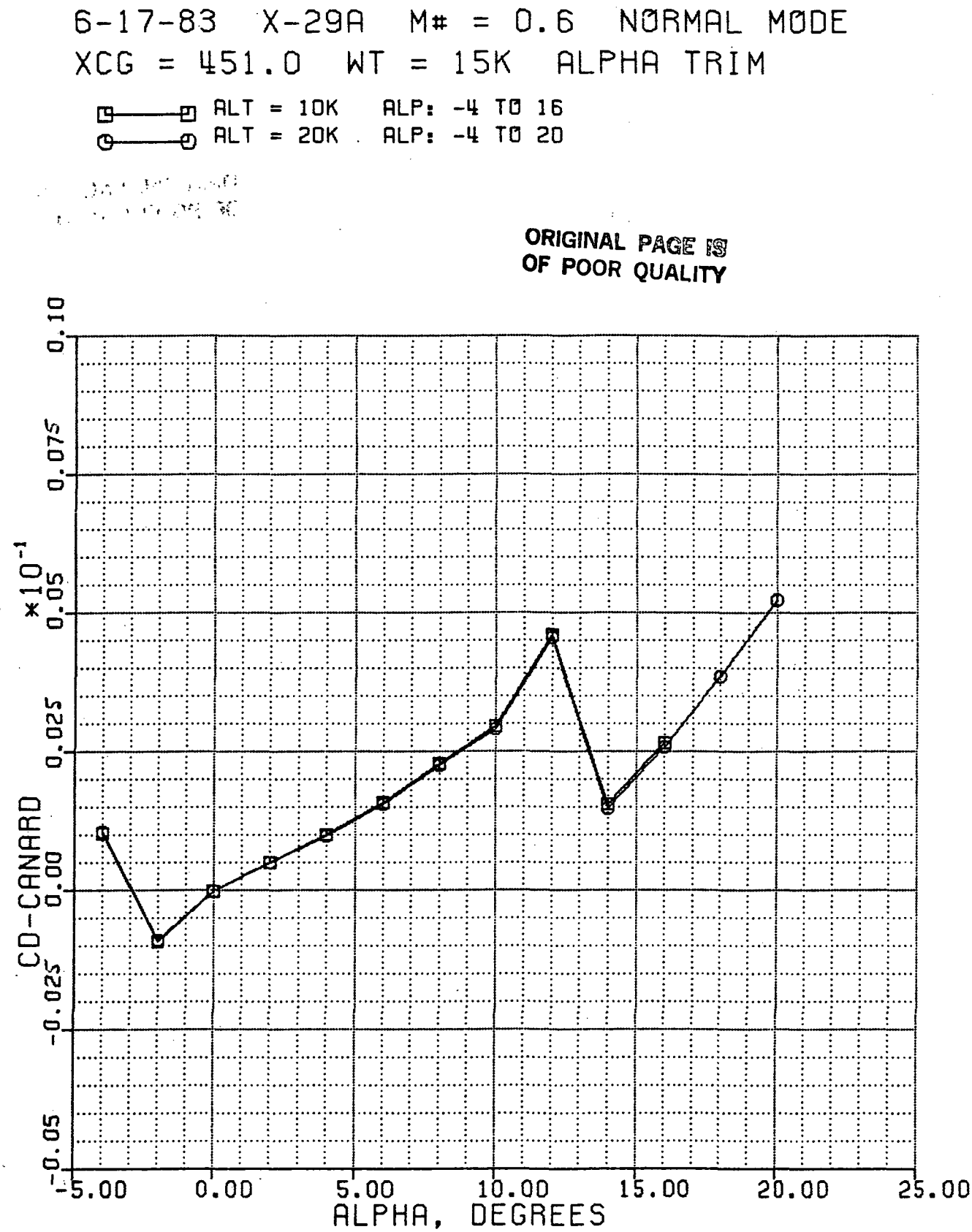
CD-CANARD VS ALPHA
6-17-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS
OF POOR QUALITY
CD-CANARD
*10^-1
0.10
0.075
0.05
0.025
0.00
-0.025
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 26(b)

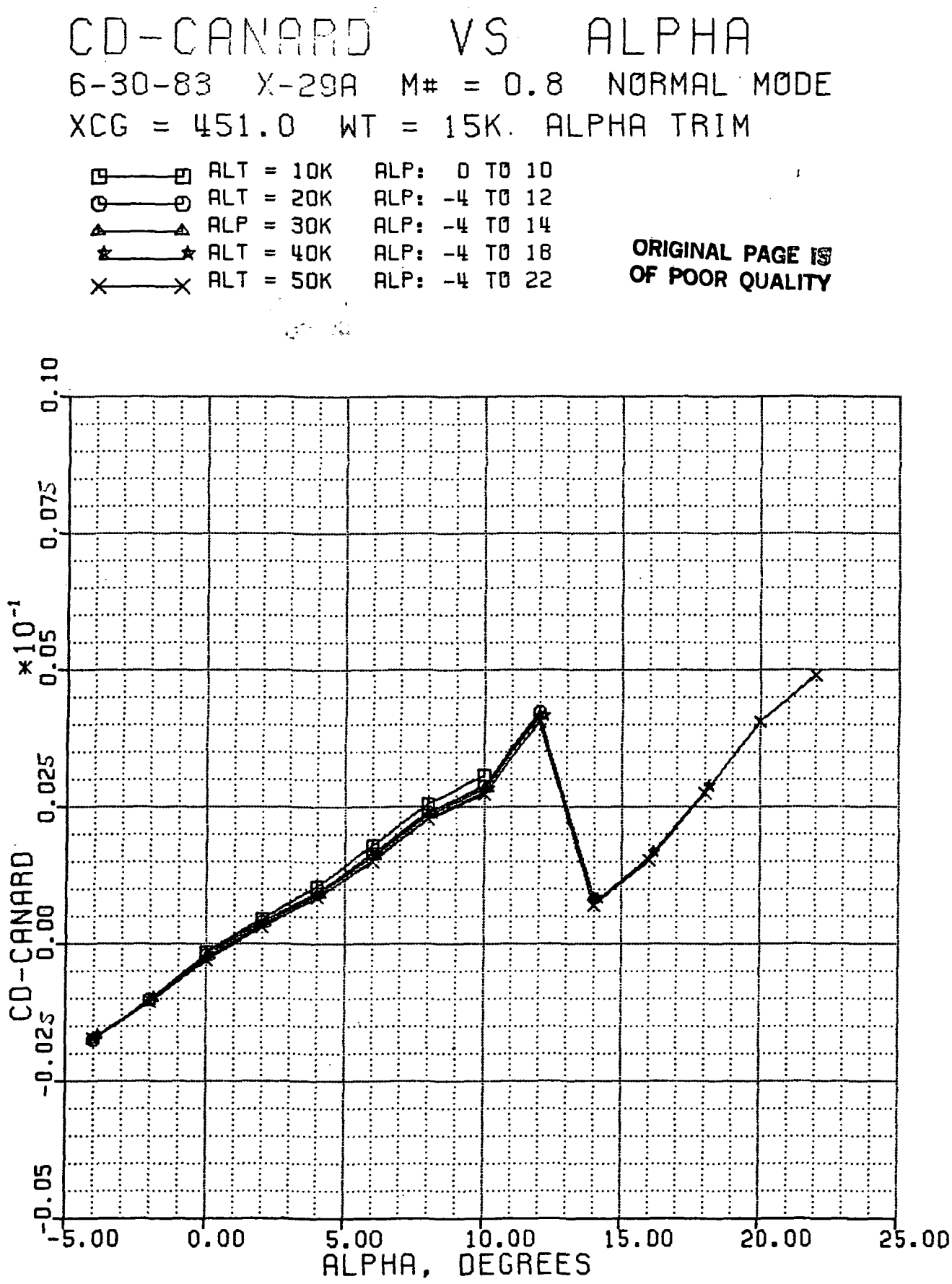
CD-CANARD VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K. ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
CD-CANARD *10^-1
0.10
0.075
0.05
0.025
0.00
-0.025
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 26(c)

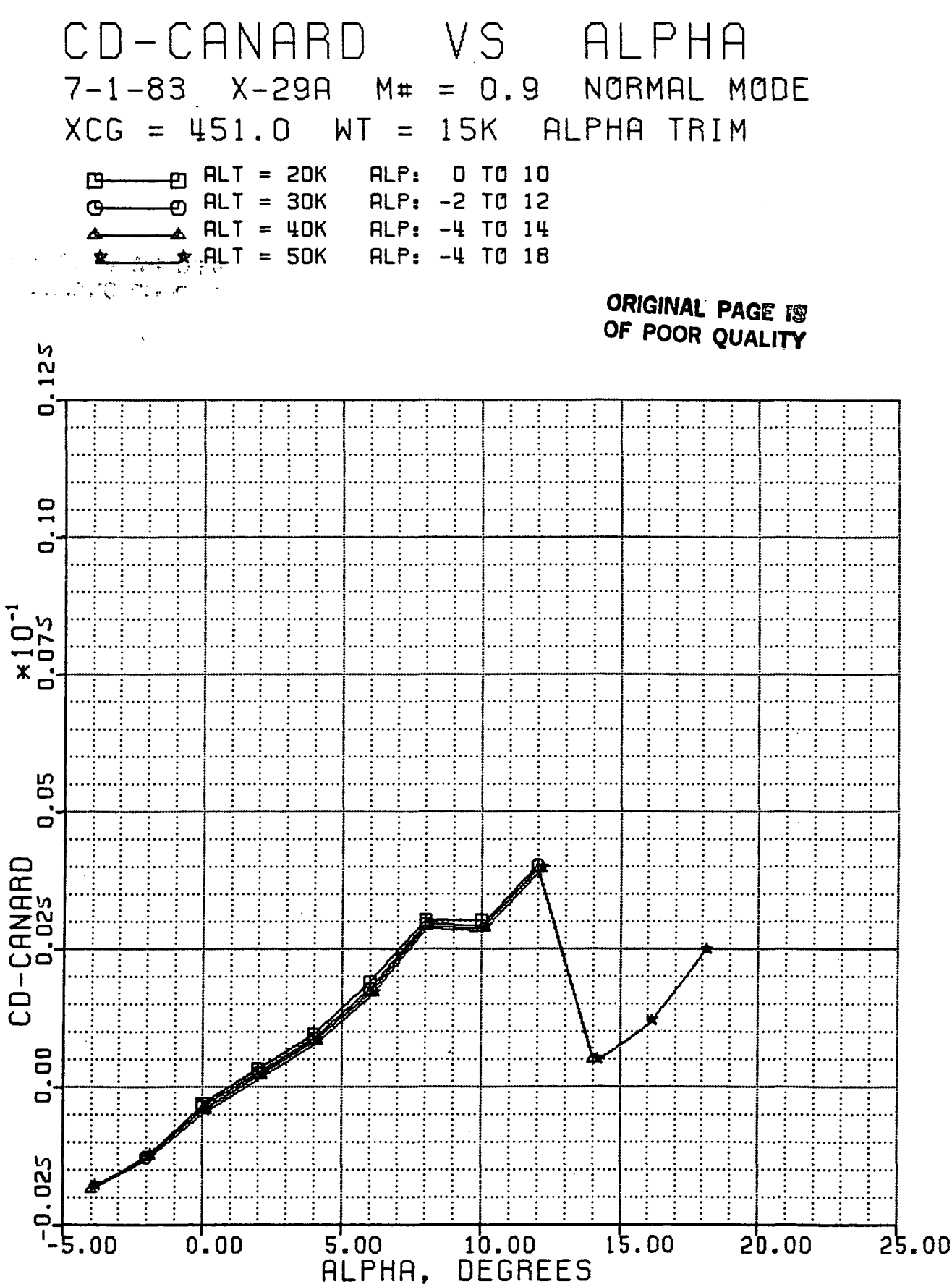
CD-CANARD VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS OF POOR QUALITY
CD-CANARD
*10^-1
0.125
0.10
0.075
0.05
0.025
0.00
-0.025
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 26(d)

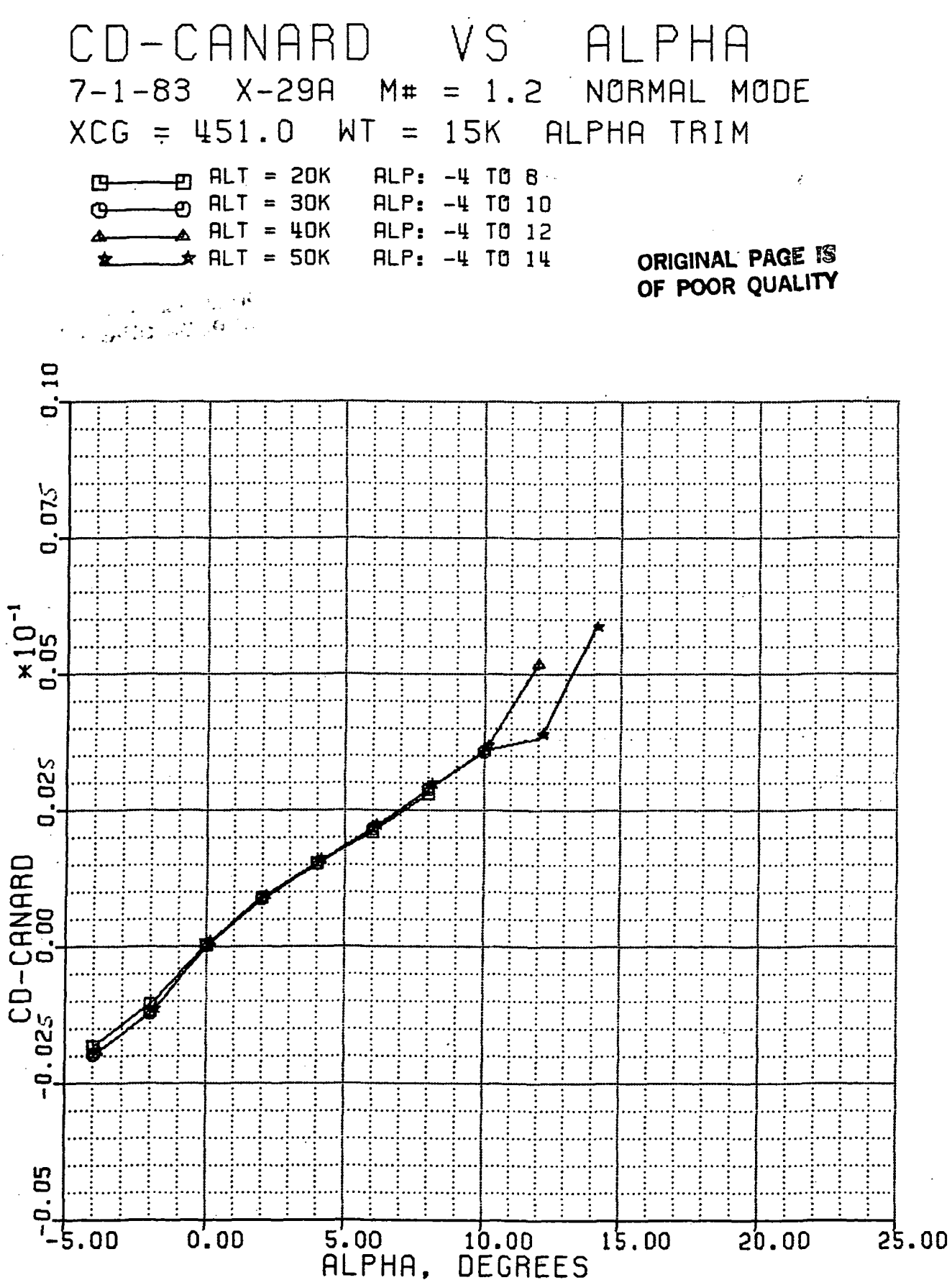
CD-CANARD VS ALPHA
7-1-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS OF POOR QUALITY
CD-CANARD
*10-1
0.10
0.075
0.05
0.025
0.00
-0.025
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 26(e)

CD-CANARD VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

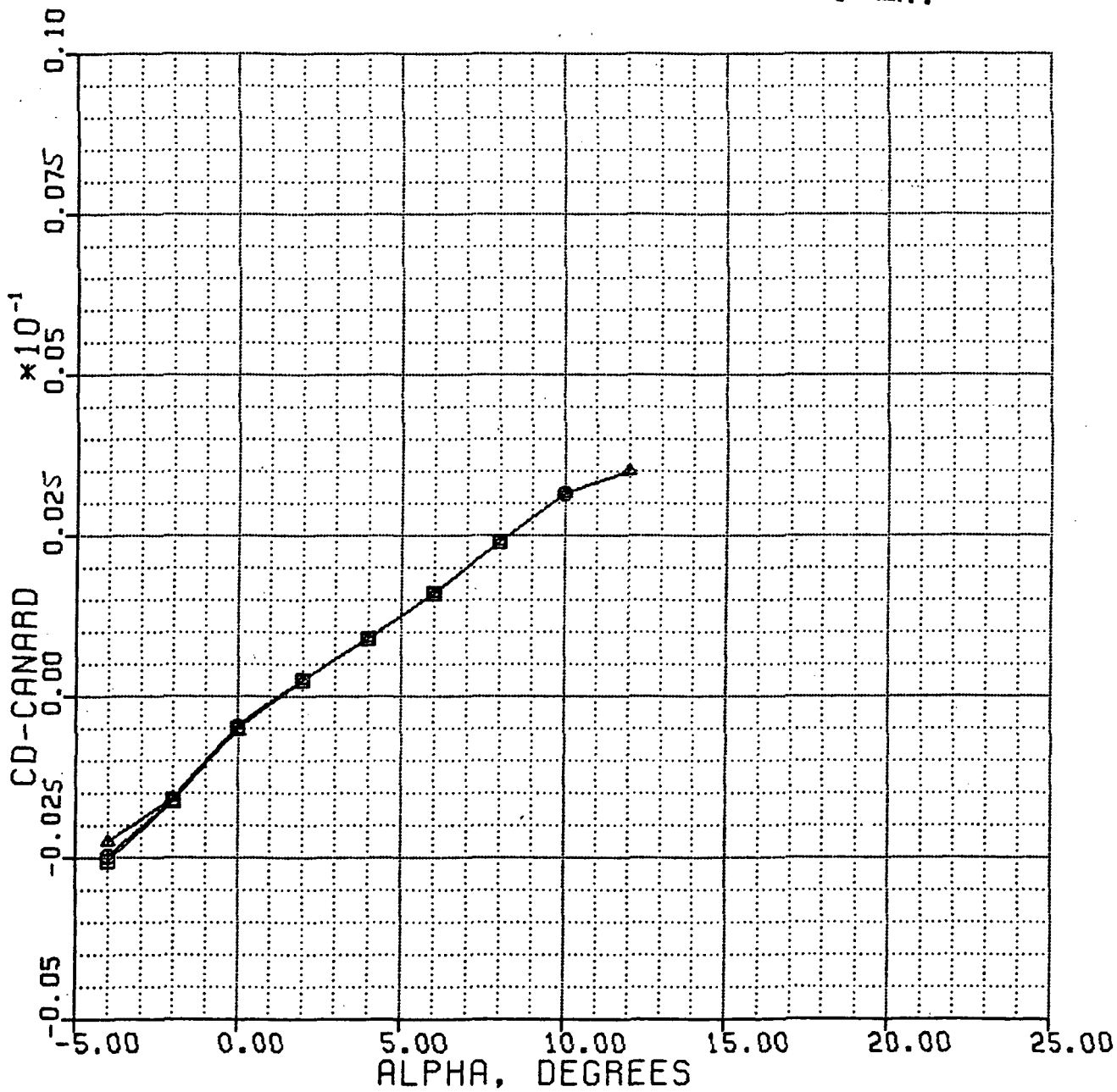

Figure 26(f)

ORIGINAL PAGE IS
OF POOR QUALITY

CM-CANARD VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

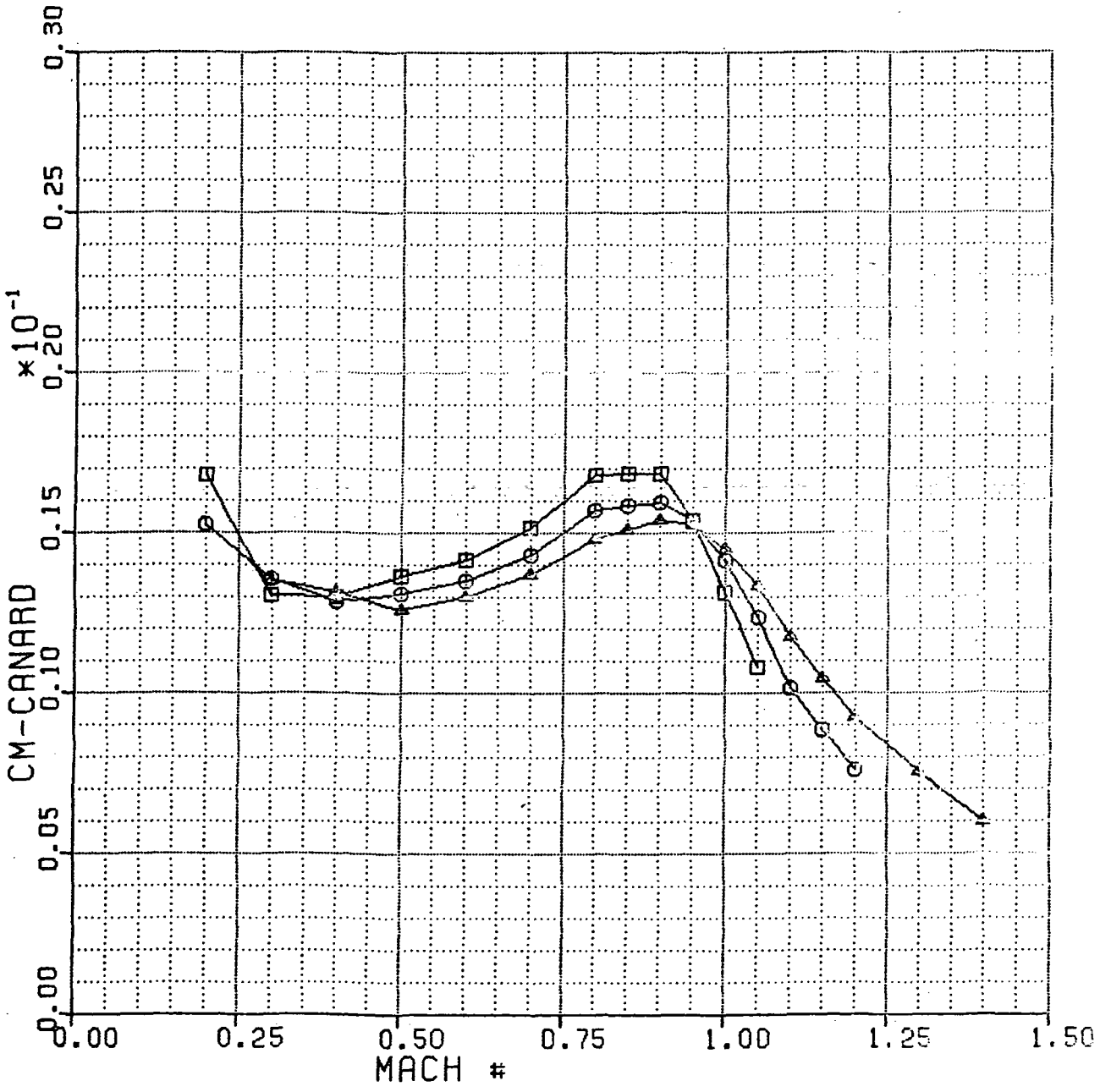

Figure 27(a)

CM-CANARD VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
OF POOR QUALITY

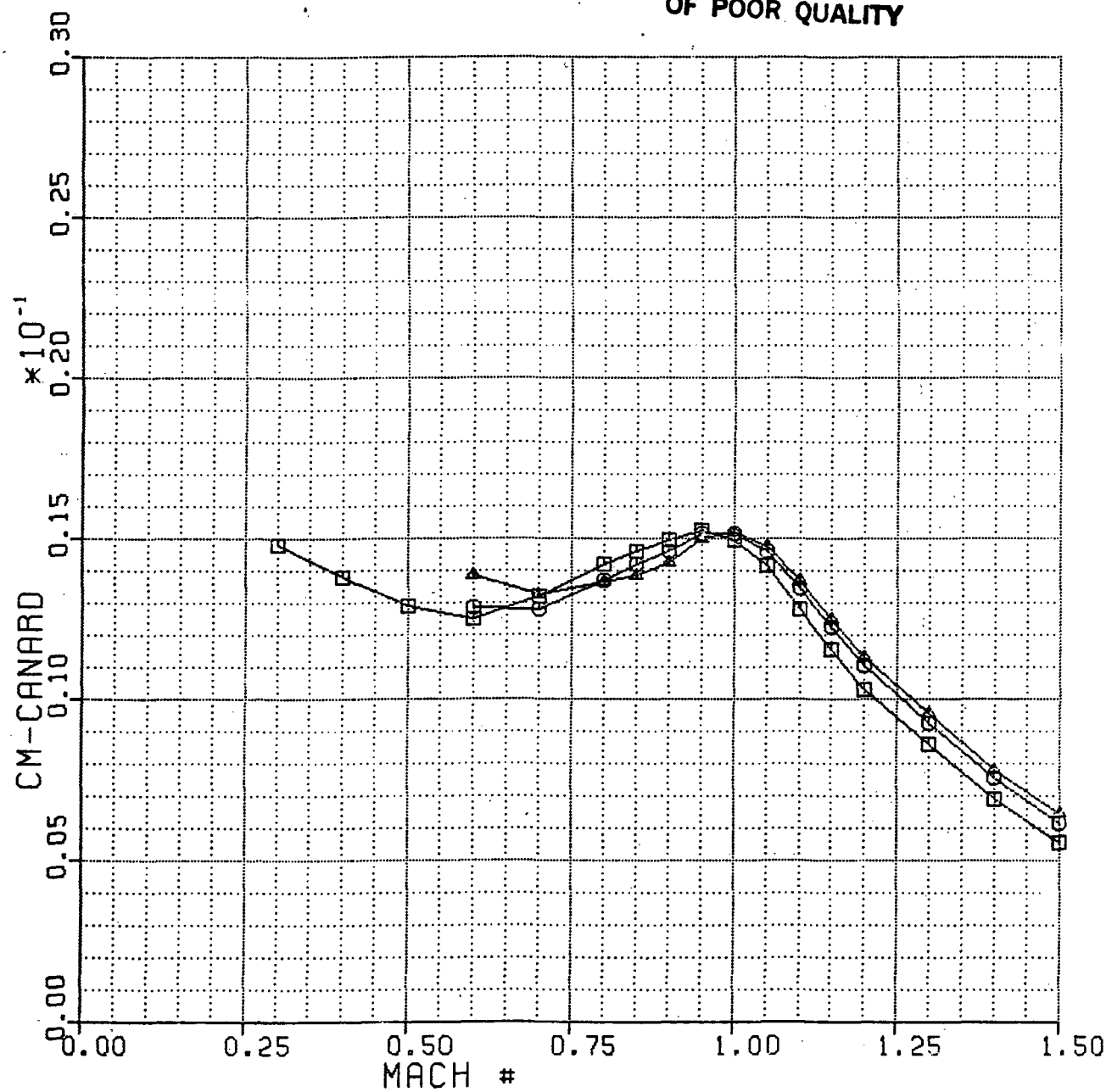

Figure 27(b)

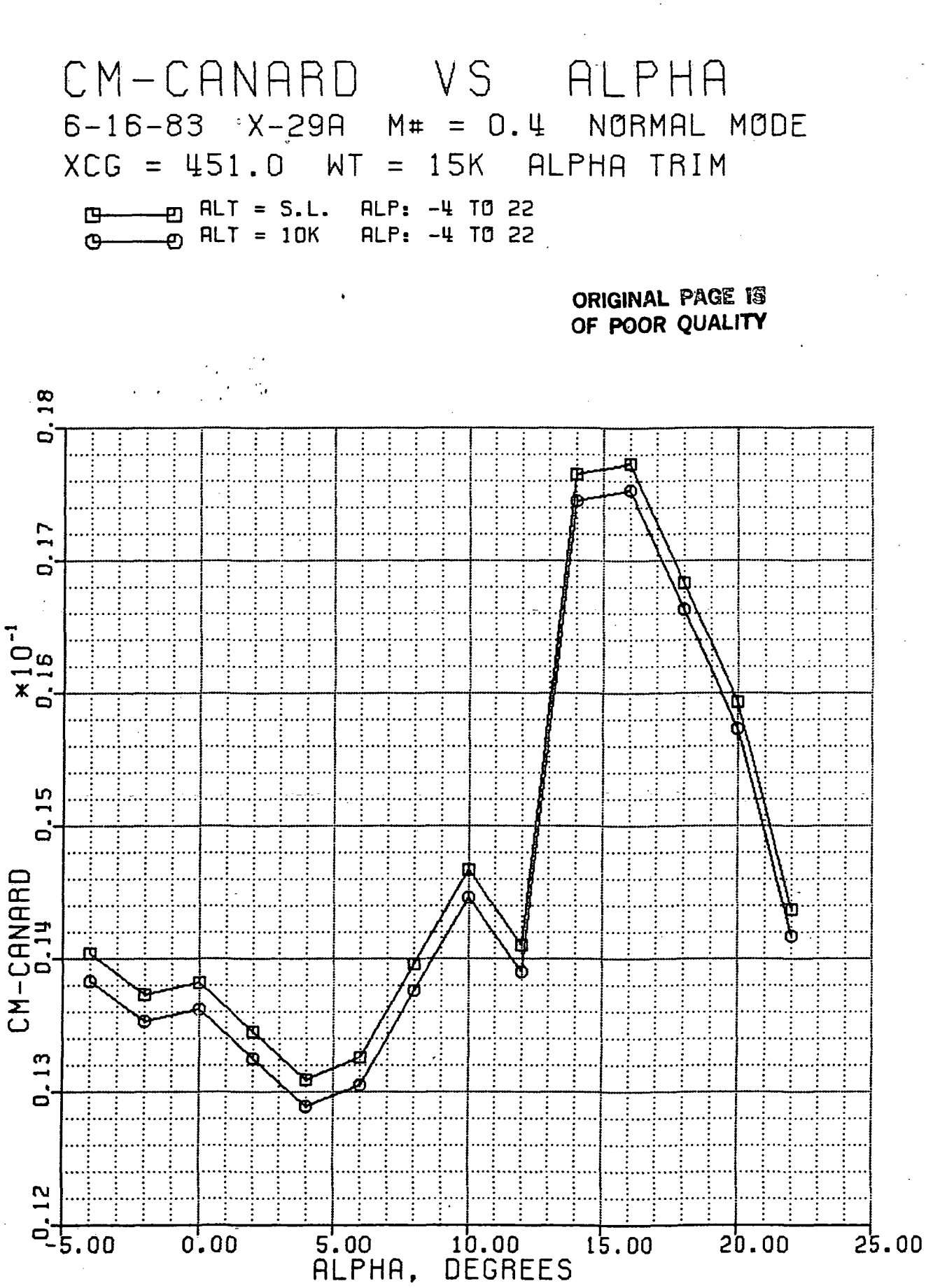
CM-CANARD VS ALPHA
6-16-83 X-29A M# = 0.4 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TO 22
ALT = 10K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CM-CANARD *10^-1
0.18
0.17
0.16
0.15
0.14
0.13
0.12
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 28(a)

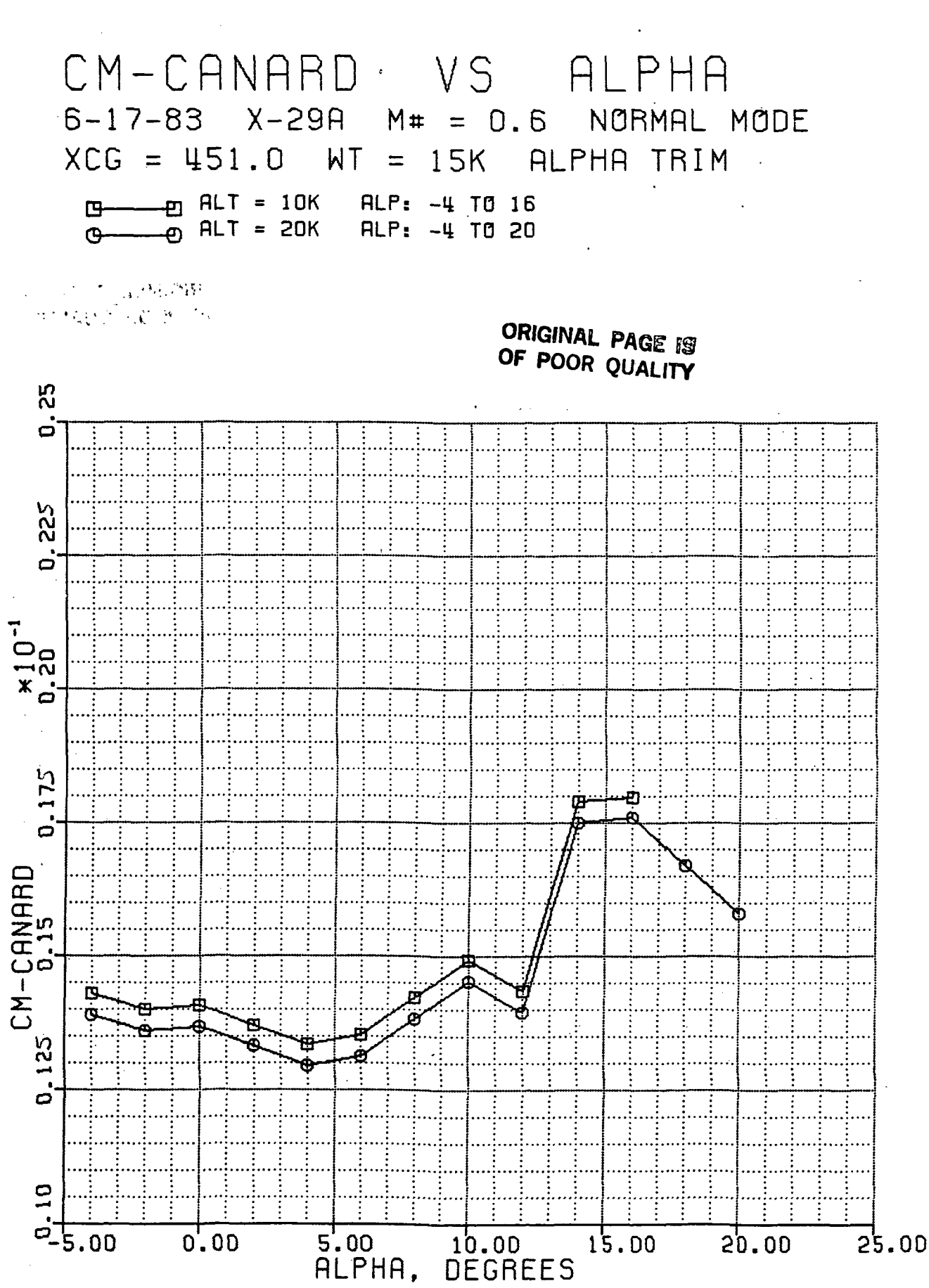
CM-CANARD VS ALPHA
6-17-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS
OF POOR QUALITY
CM-CANARD
*10^-1
0.25
0.225
0.20
0.175
0.15
0.125
0.10
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 28(b)

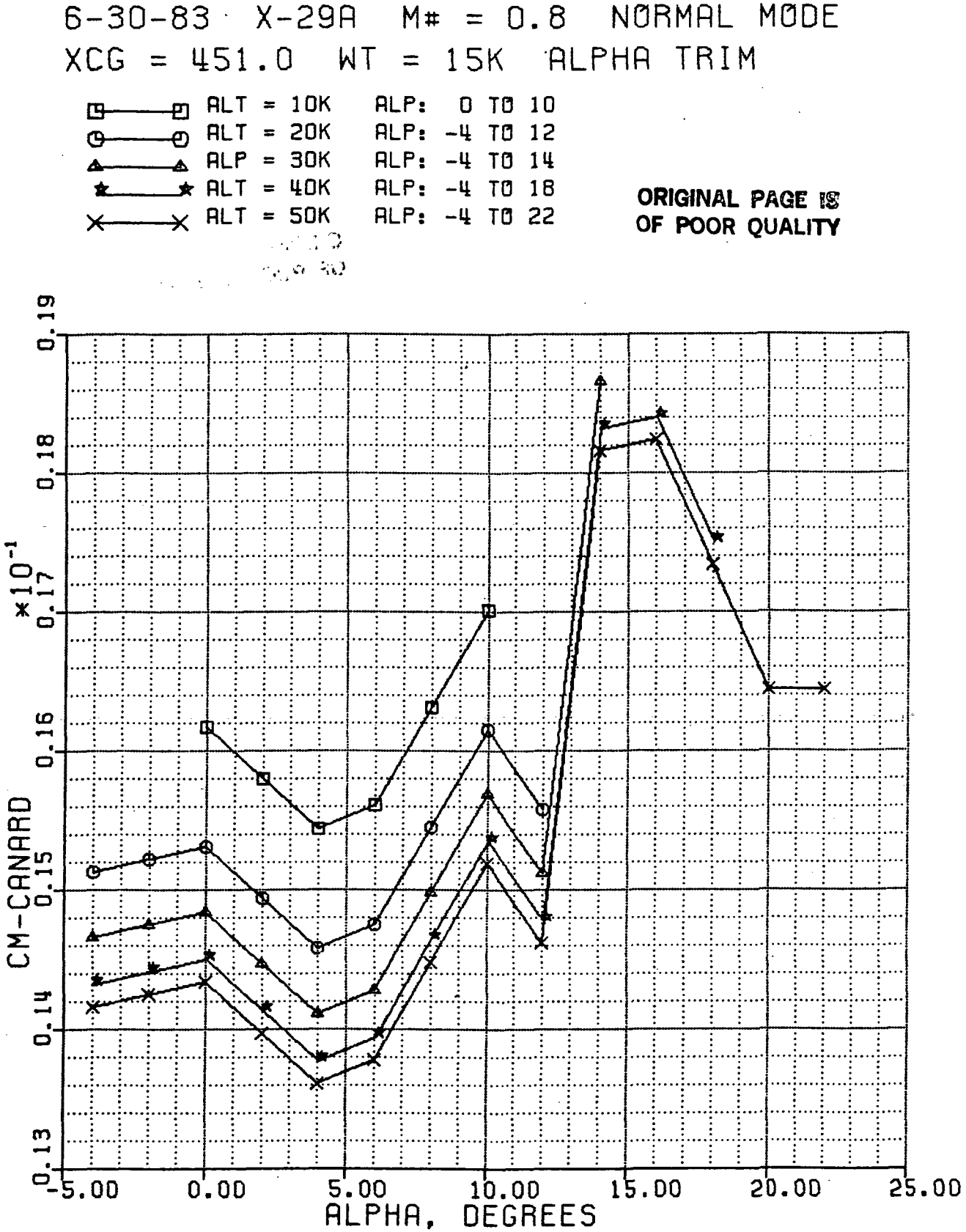
CM-CANARD VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
CM-CANARD *10-1
0.19
0.18
0.17
0.16
0.15
0.14
0.13
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 28(c)

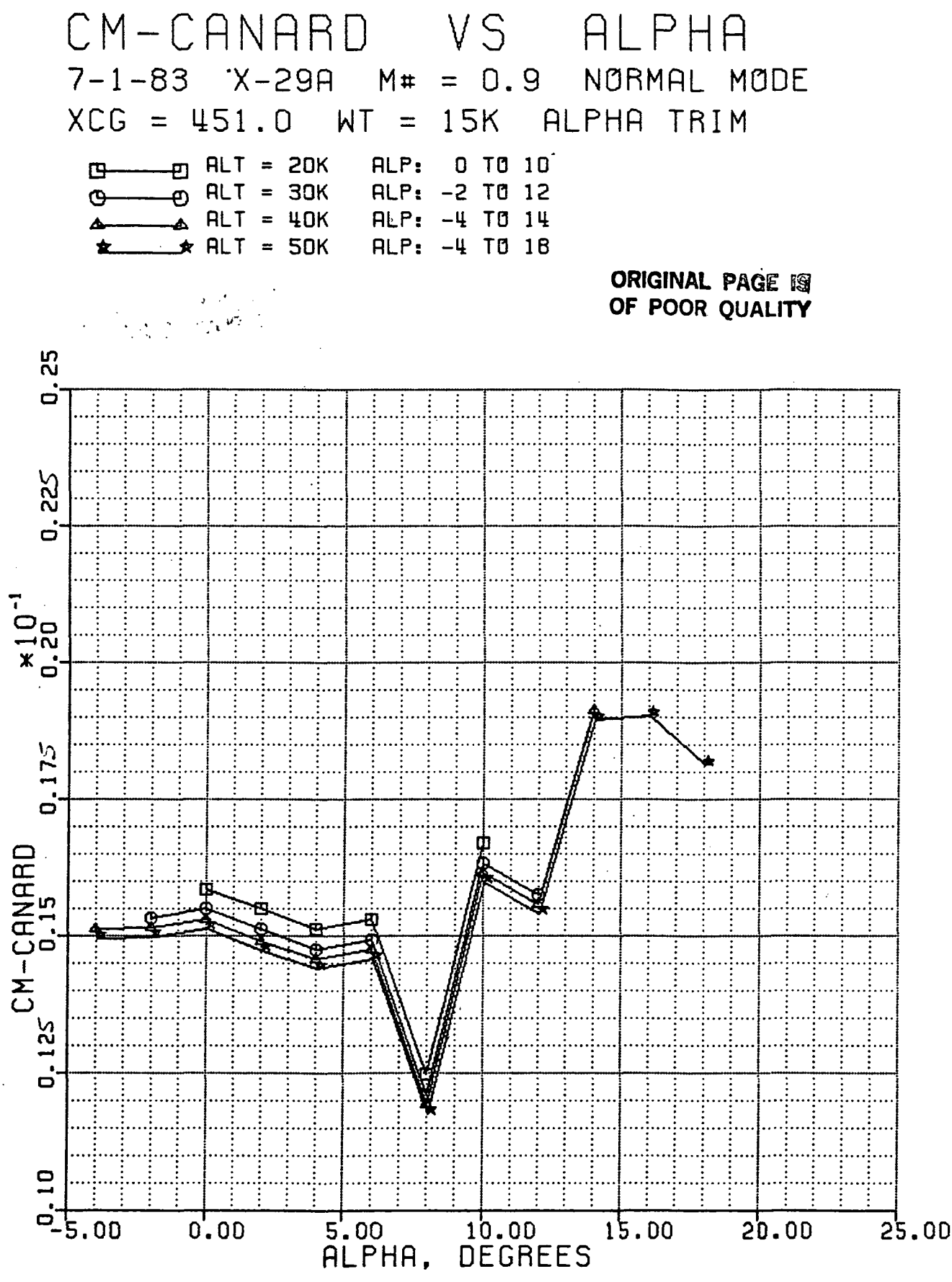
CM-CANARD VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS
OF POOR QUALITY
CM-CANARD *10-1
0.25
0.225
0.20
0.175
0.15
0.125
0.10
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 28(d)

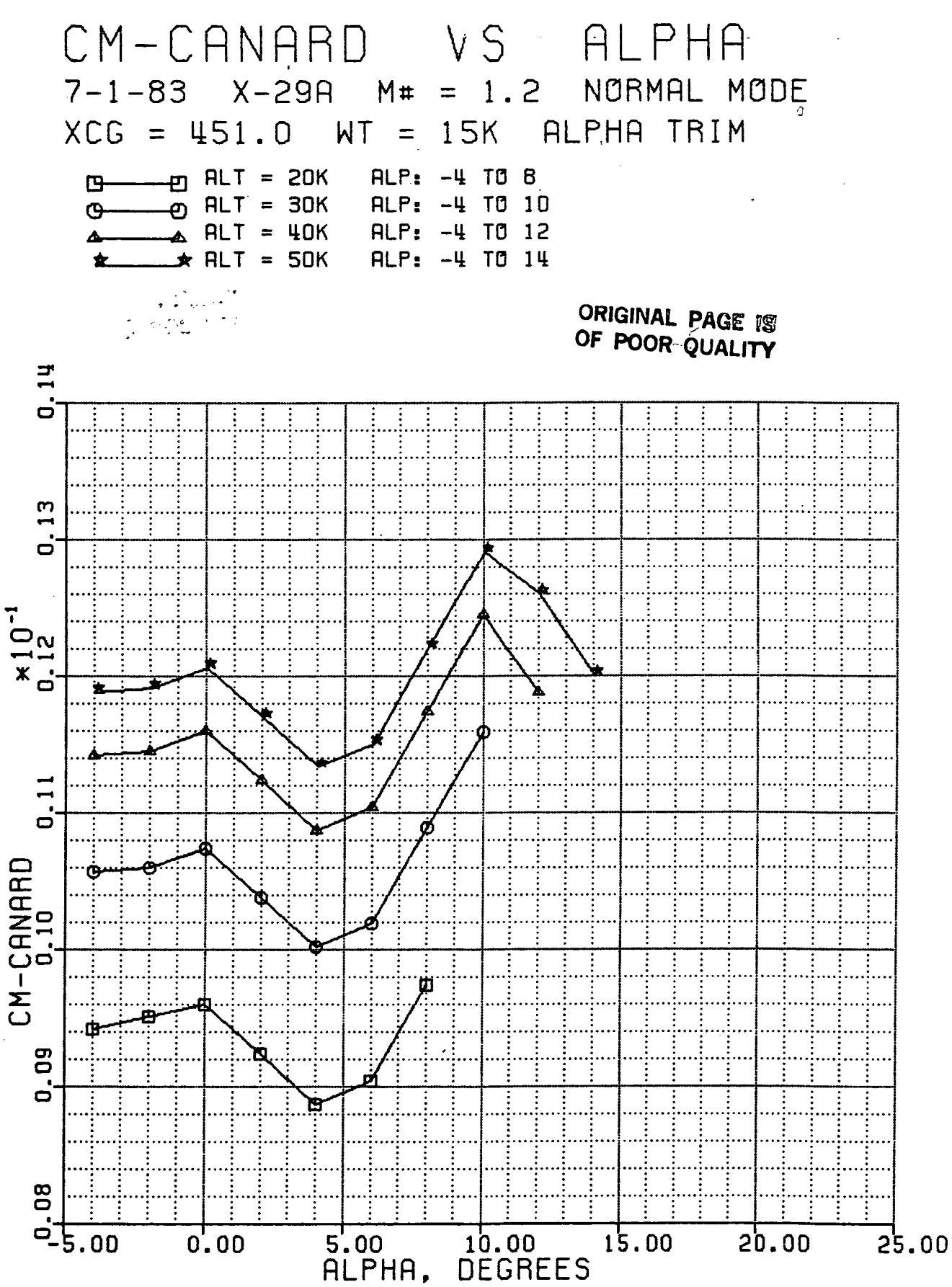
CM-CANARD VS ALPHA
7-1-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS
OF POOR QUALITY
CM-CANARD
*10-1
0.14
0.13
0.12
0.11
0.10
0.09
0.08
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 28(e)

CM-CANARD VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

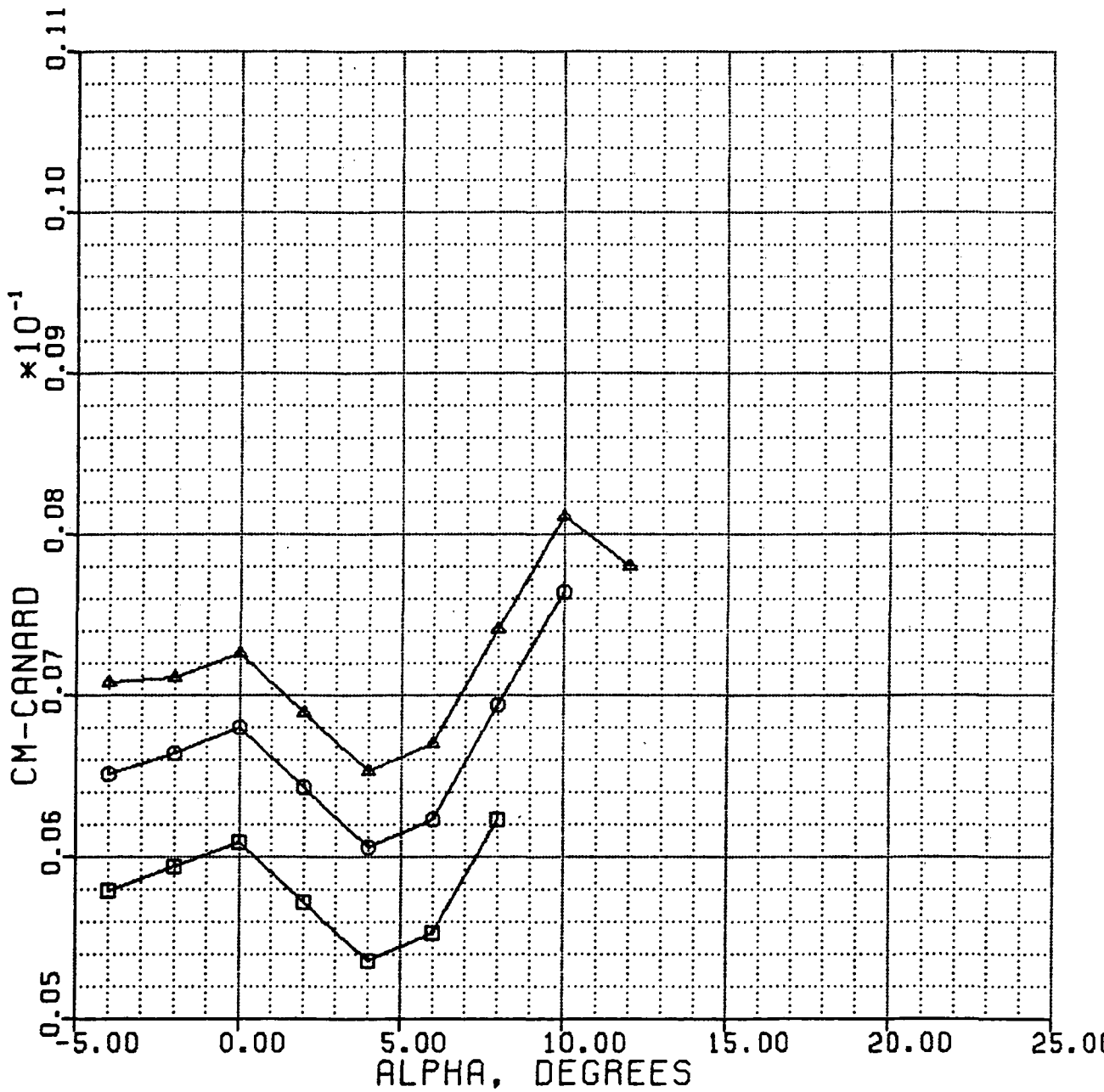

Figure 28(f)

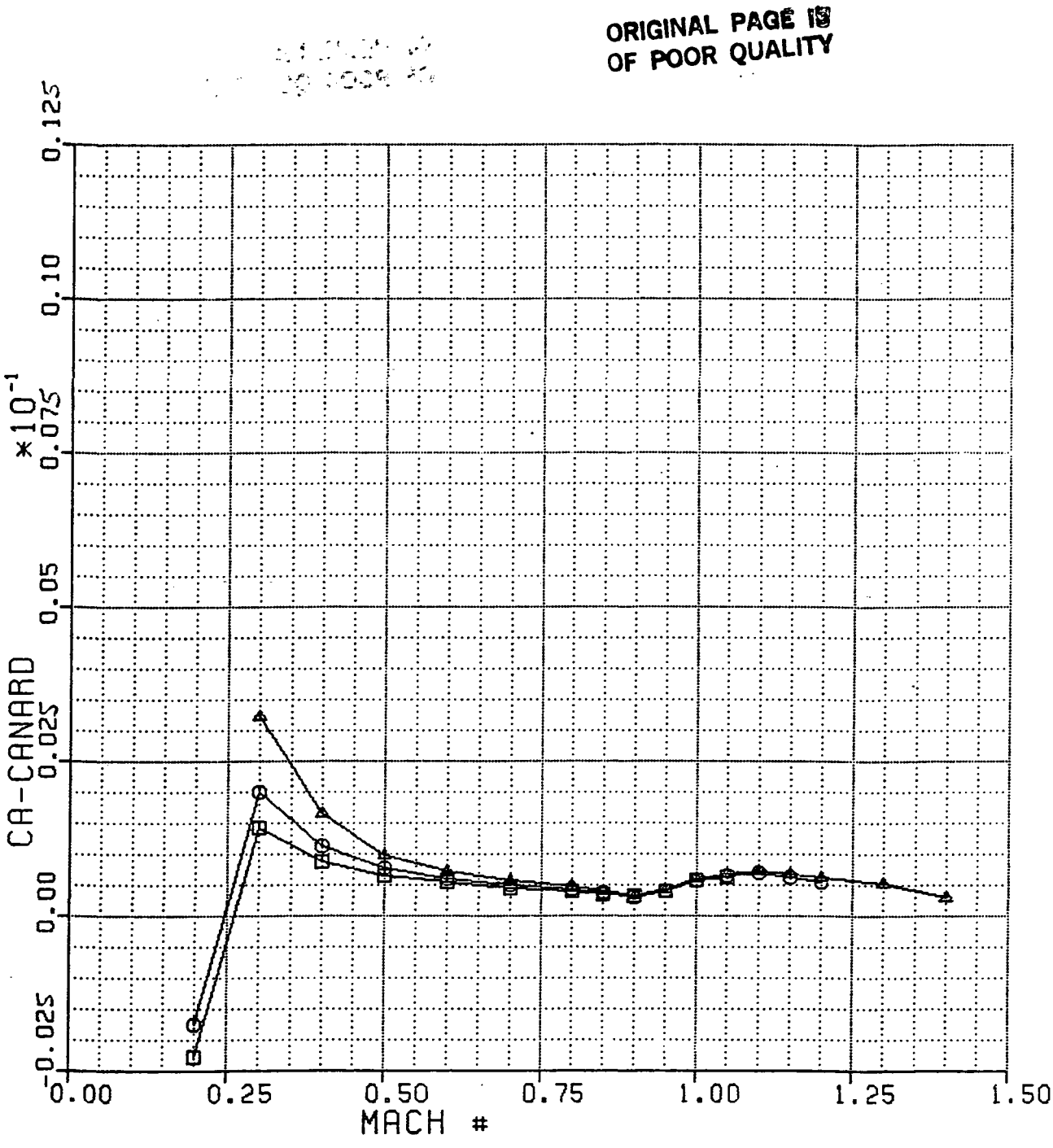
CA-CANARD VS MACH #
7-6-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4
ORIGINAL PAGE IS OF POOR QUALITY
CA-CANARD *10^-1
0.125
0.10
0.075
0.05
0.025
0.00
-0.025
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 29(a)

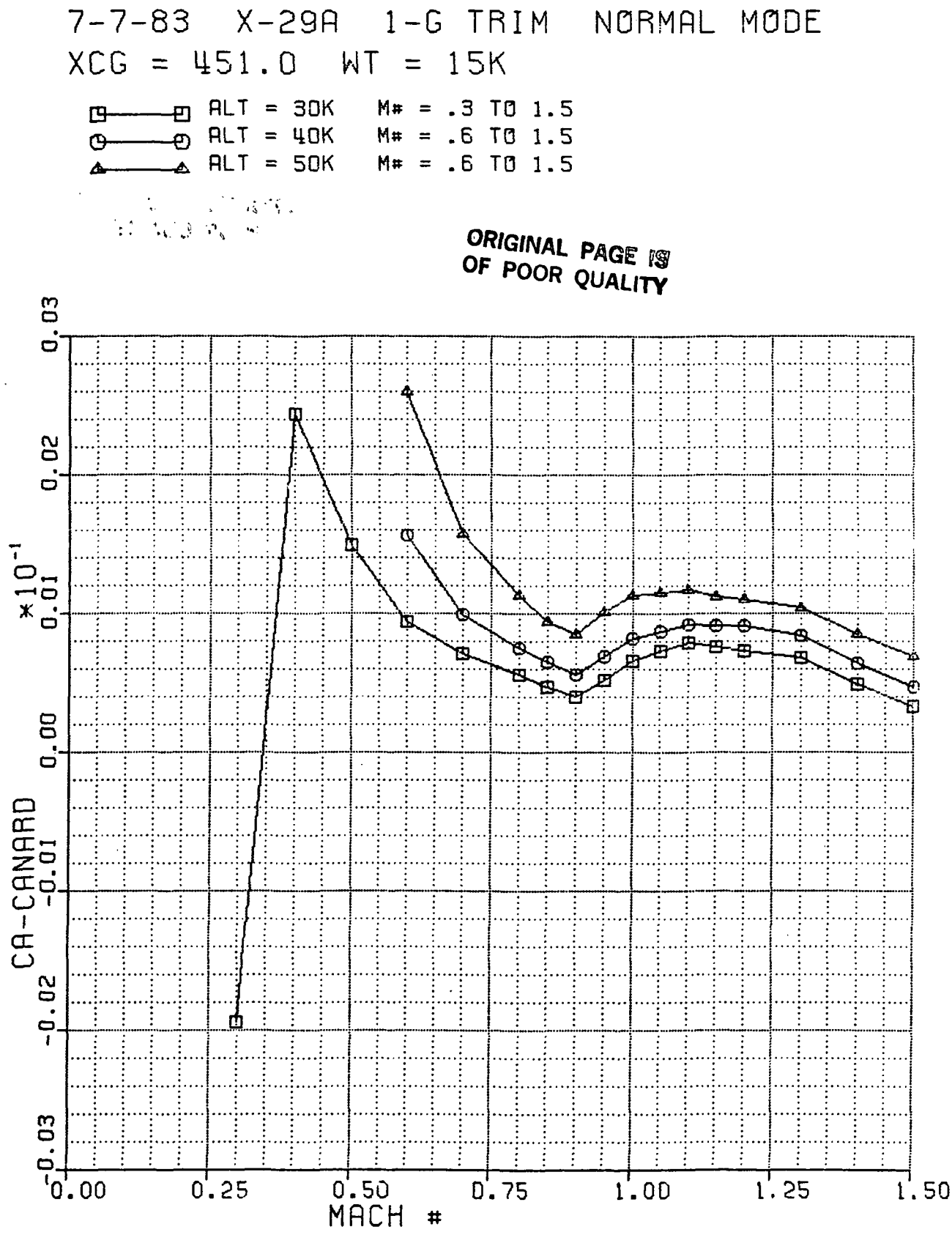
CA-CANARD VS MACH #
7-7-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS
OF POOR QUALITY
CA-CANARD
*10^-1
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 29(b)

CA-CANARD VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

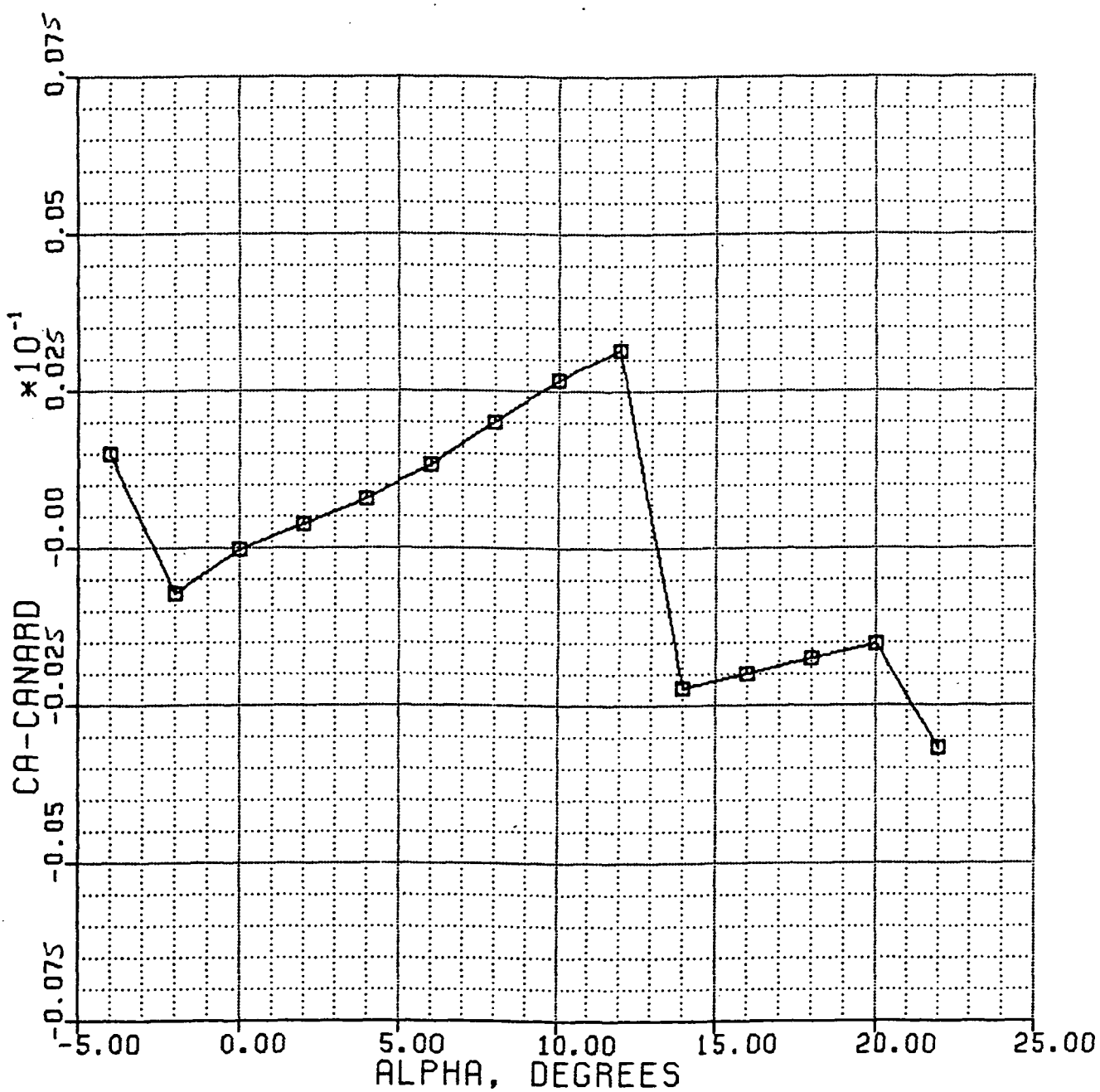

Figure 30(a)

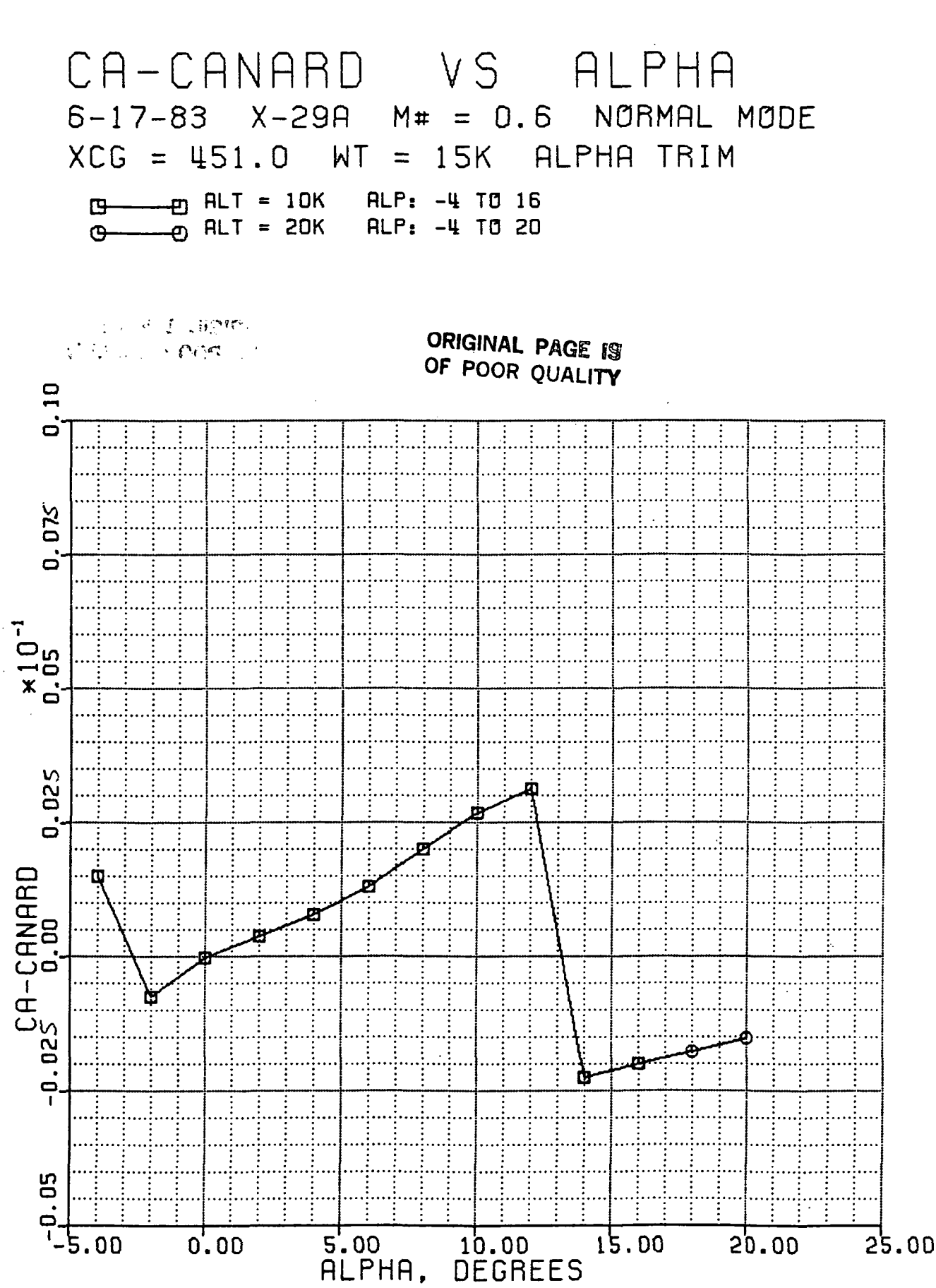
CA-CANARD VS ALPHA
6-17-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS
OF POOR QUALITY
0.10
0.075
0.05
0.025
0.00
-0.025
-0.05
*10^-1
CA-CANARD
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 30(b)

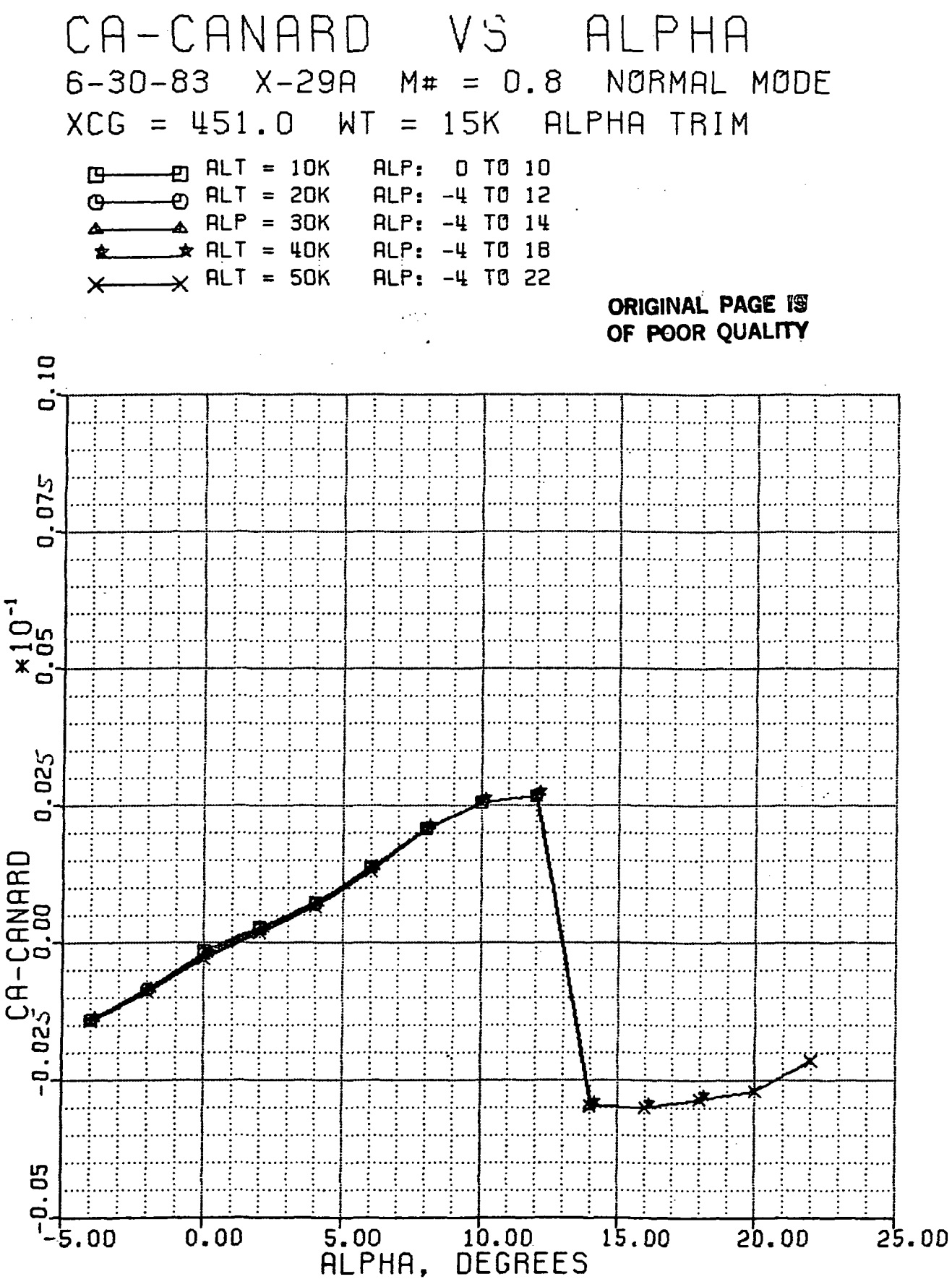
CA-CANARD VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CA-CANARD *10-1
0.10
0.075
0.05
0.025
0.00
-0.025
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 30(c)

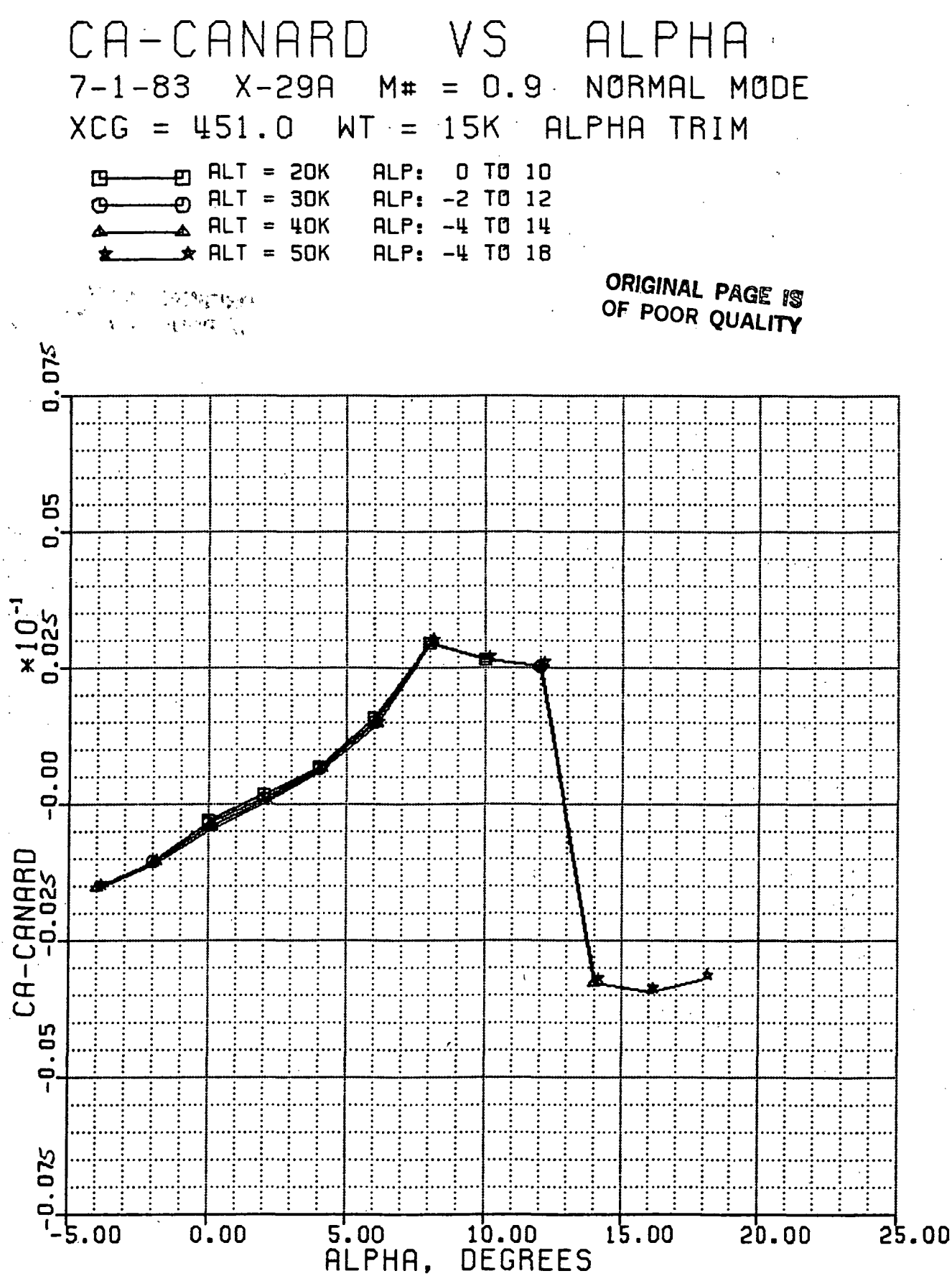
CA-CANARD VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS OF POOR QUALITY
CA-CANARD *10^-1
0.075
0.05
0.025
-0.00
-0.025
-0.05
-0.075
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 30(d)

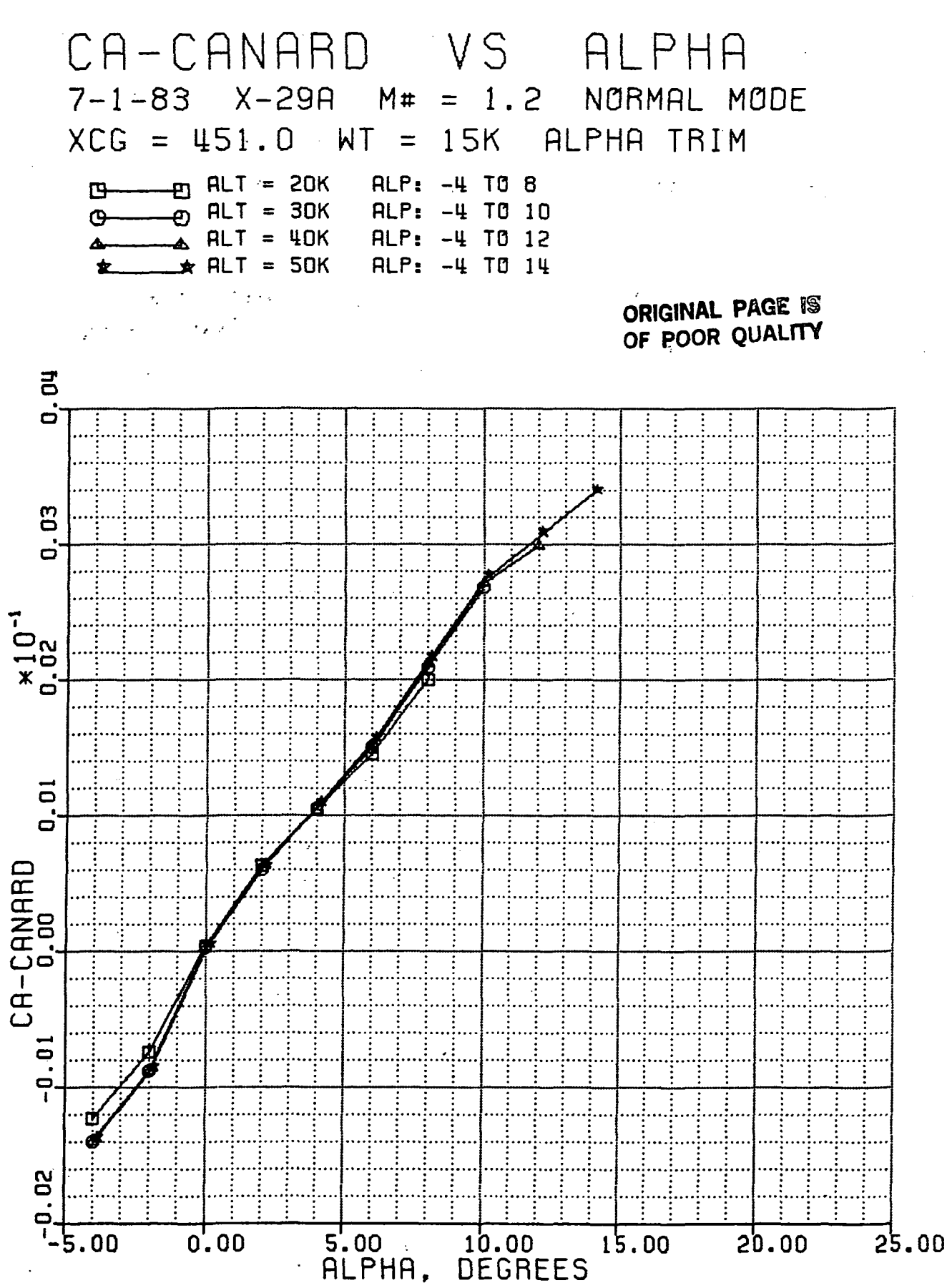
CA-CANARD VS ALPHA
7-1-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS
OF POOR QUALITY
CA-CANARD
*10-1
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 30(e)

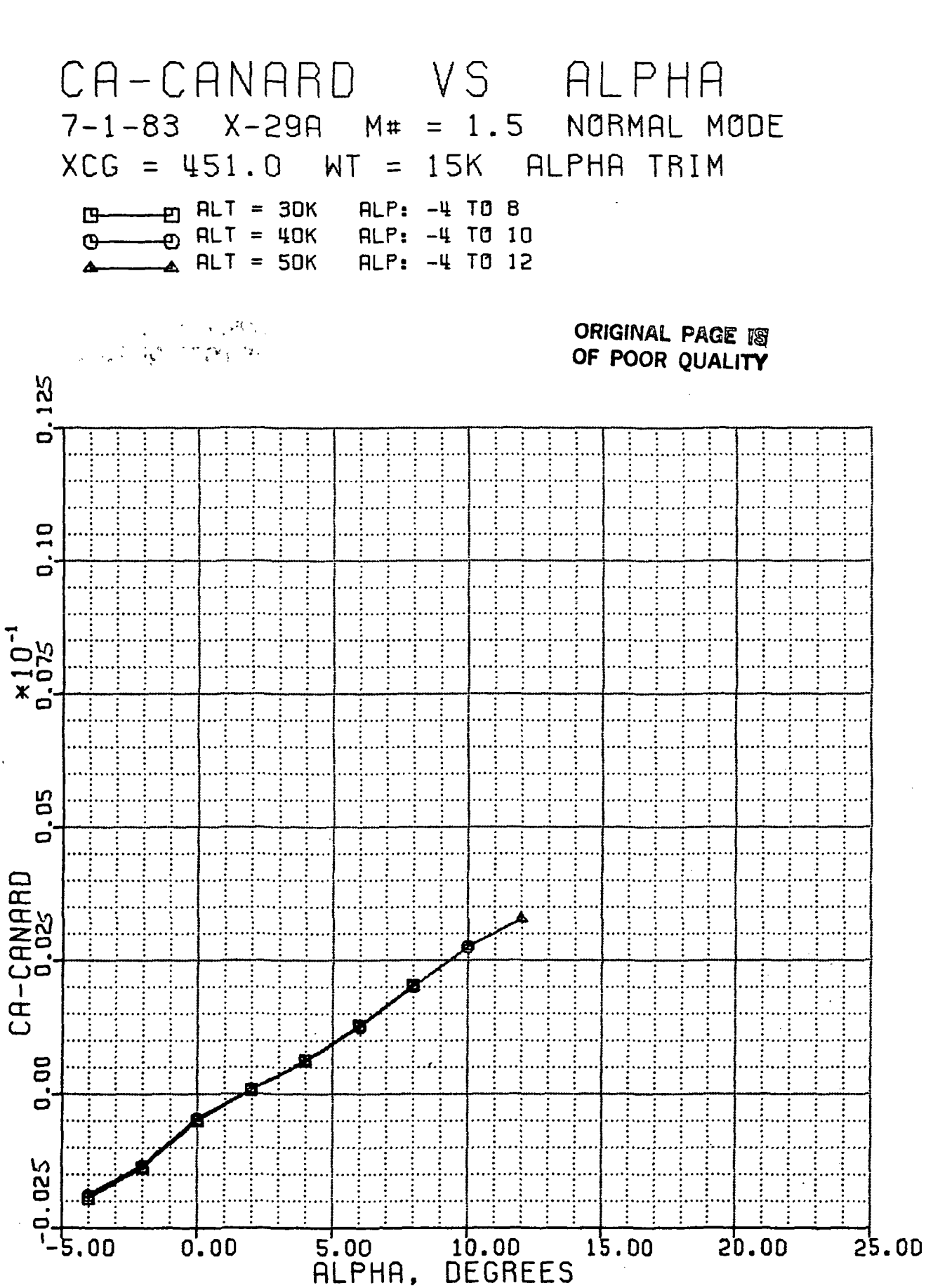
CA-CANARD VS ALPHA
7-1-83 X-29A M# = 1.5 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12
ORIGINAL PAGE IS
OF POOR QUALITY
CA-CANARD
*10-1
0.125
0.10
0.075
0.05
0.025
0.00
-0.025
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 30(f)

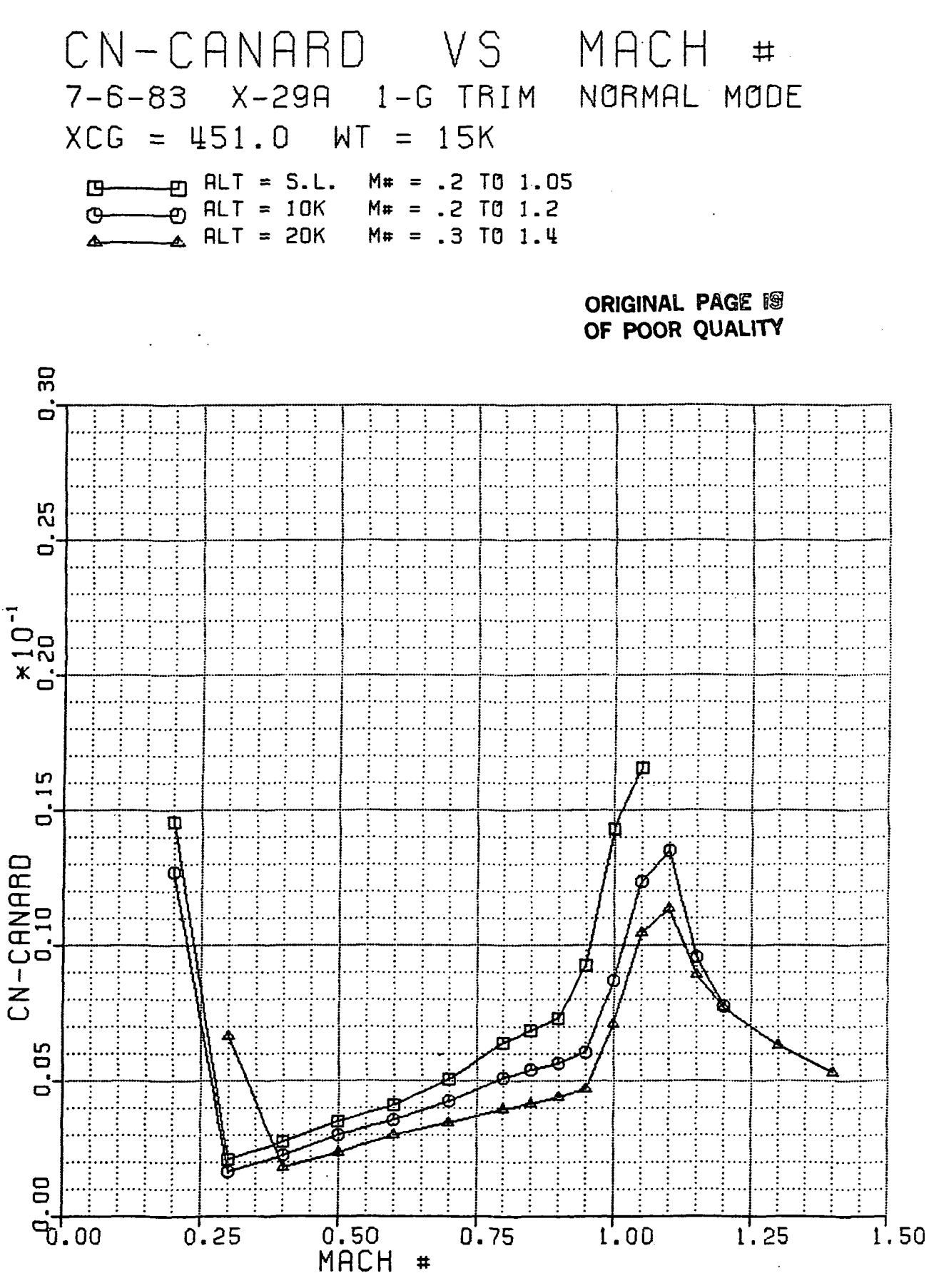
CN-CANARD VS MACH #
7-6-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4
ORIGINAL PAGE IS
OF POOR QUALITY
CN-CANARD
*10^-1
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 31(a)

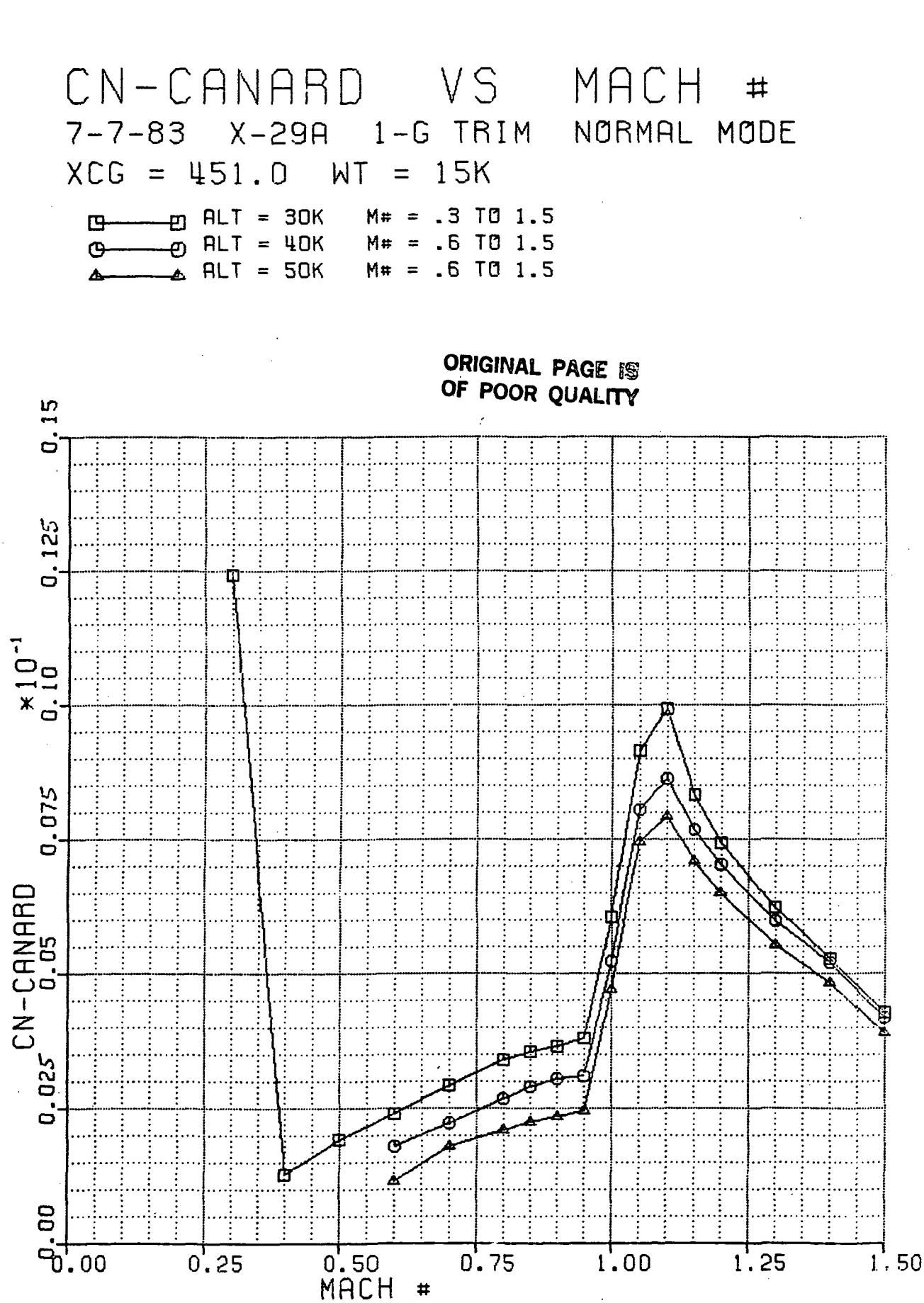
CN-CANARD VS MACH #
7-7-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS
OF POOR QUALITY
CN-CANARD
*10⁻¹
0.15
0.125
0.10
0.075
0.05
0.025
0.00
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 31(b)

CN-CANARD VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
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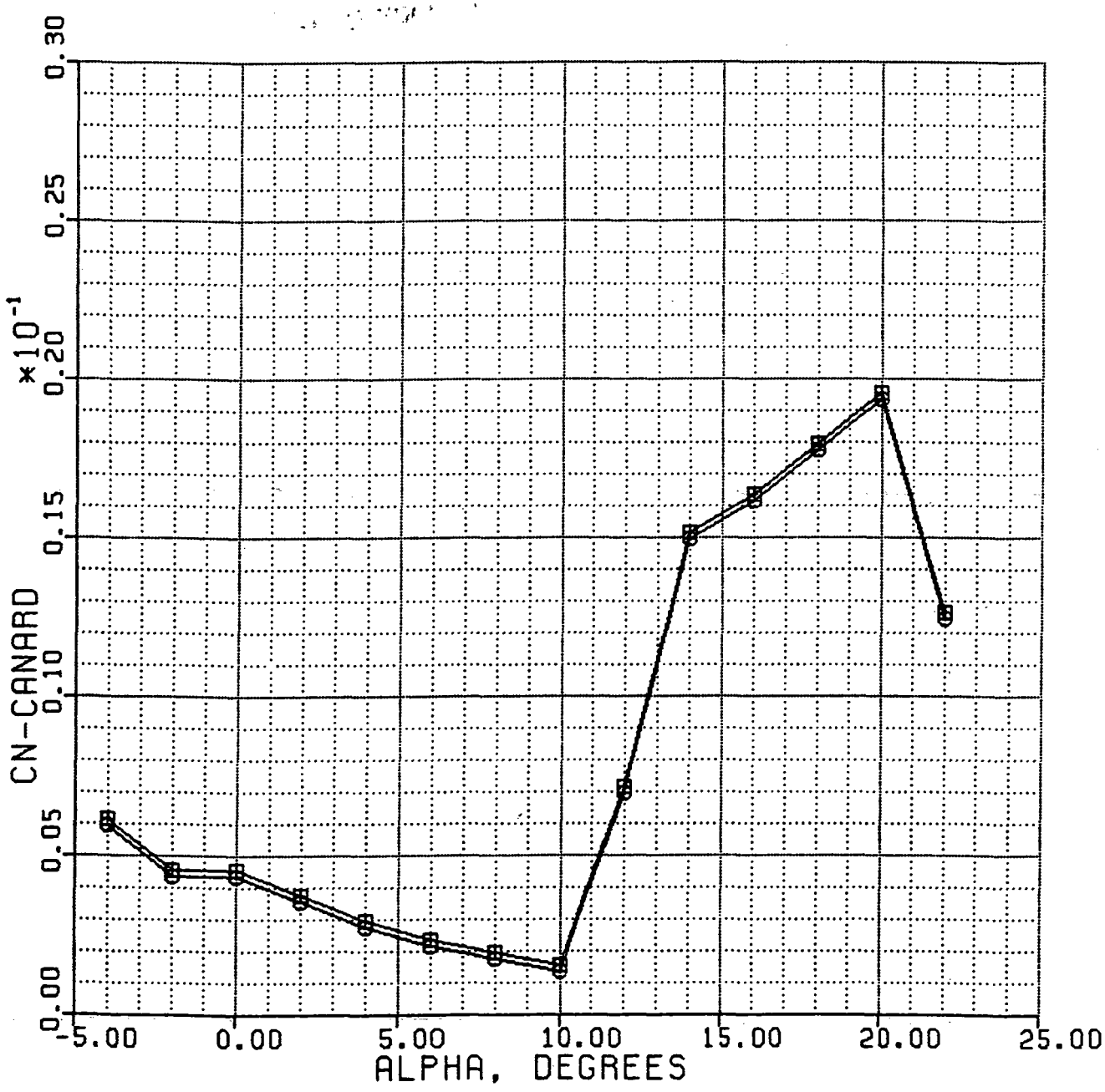

Figure 32(a)

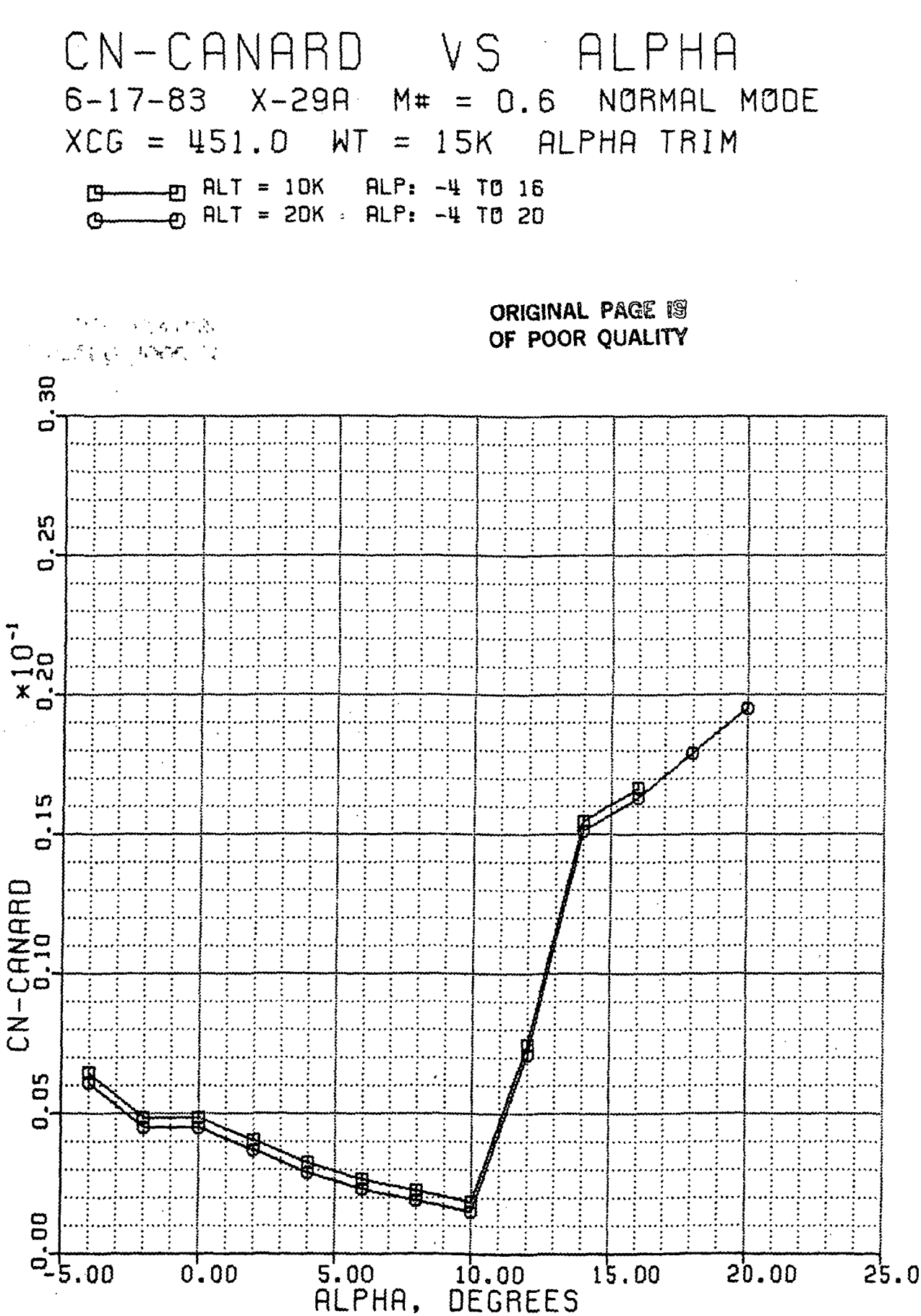

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Figure 32(b)

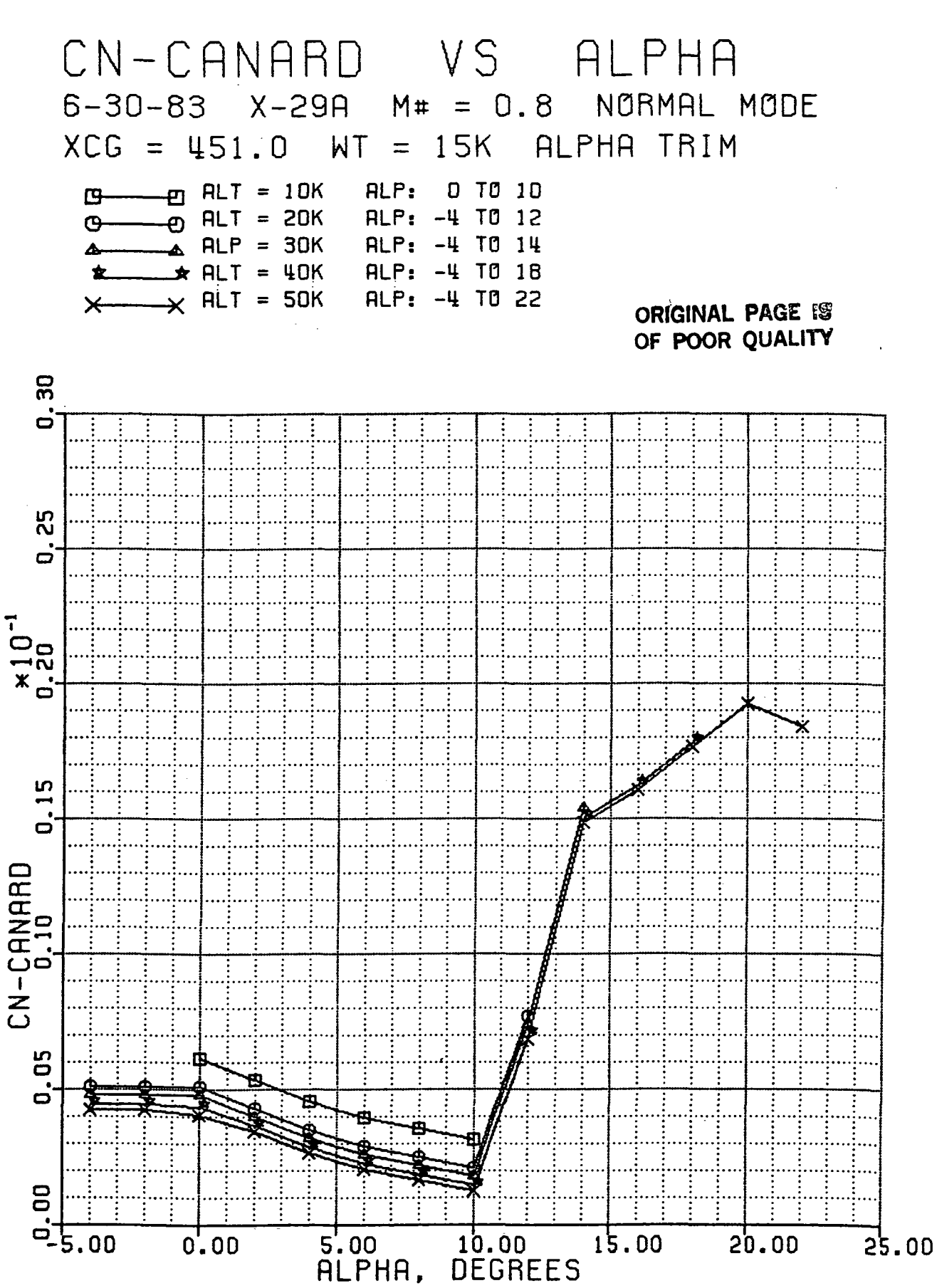
CN-CANARD VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CN-CANARD *10^-1
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 32(c)

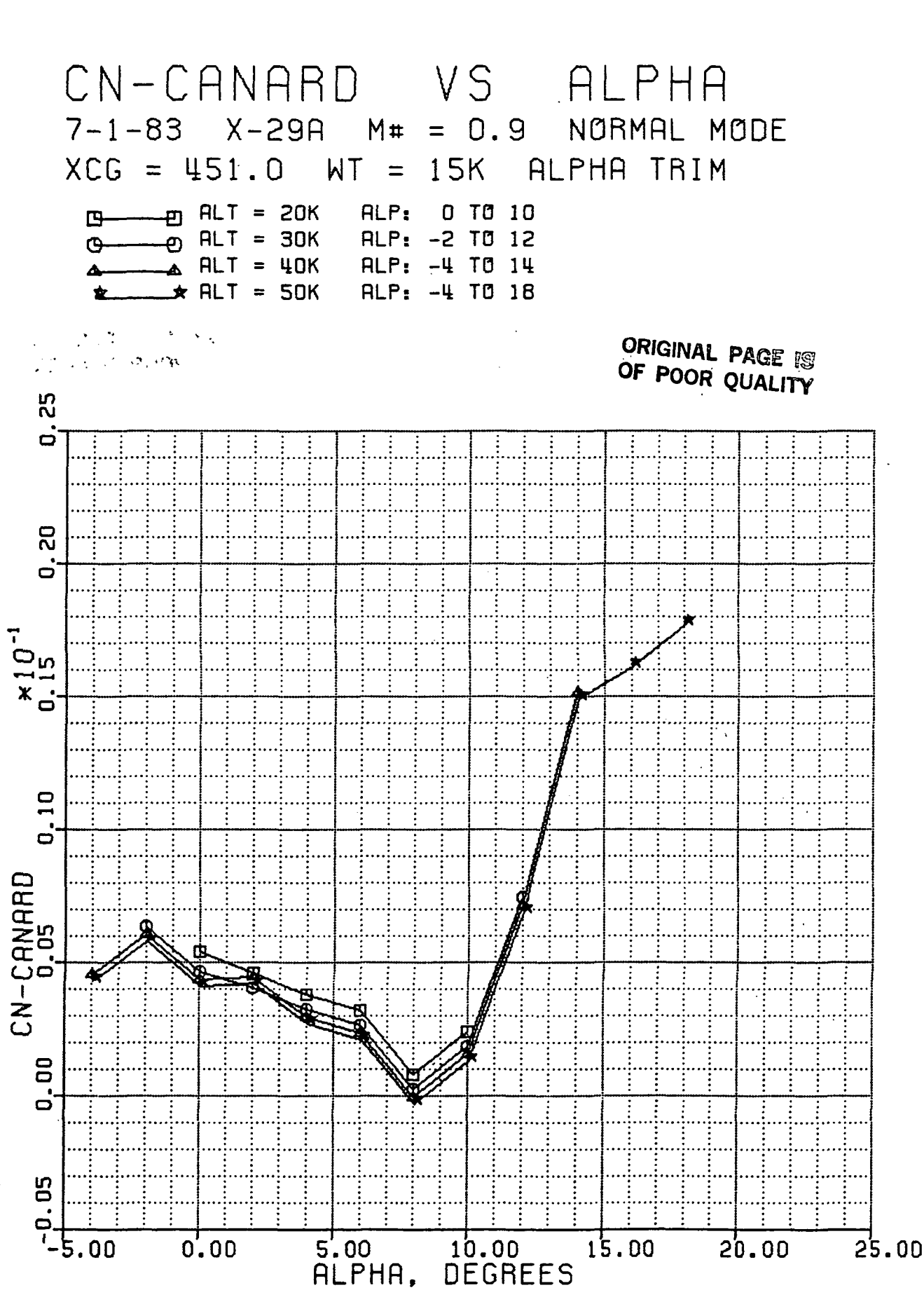
CN-CANARD VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS OF POOR QUALITY
CN-CANARD *10^-1
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 32(d)

CN-CANARD VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

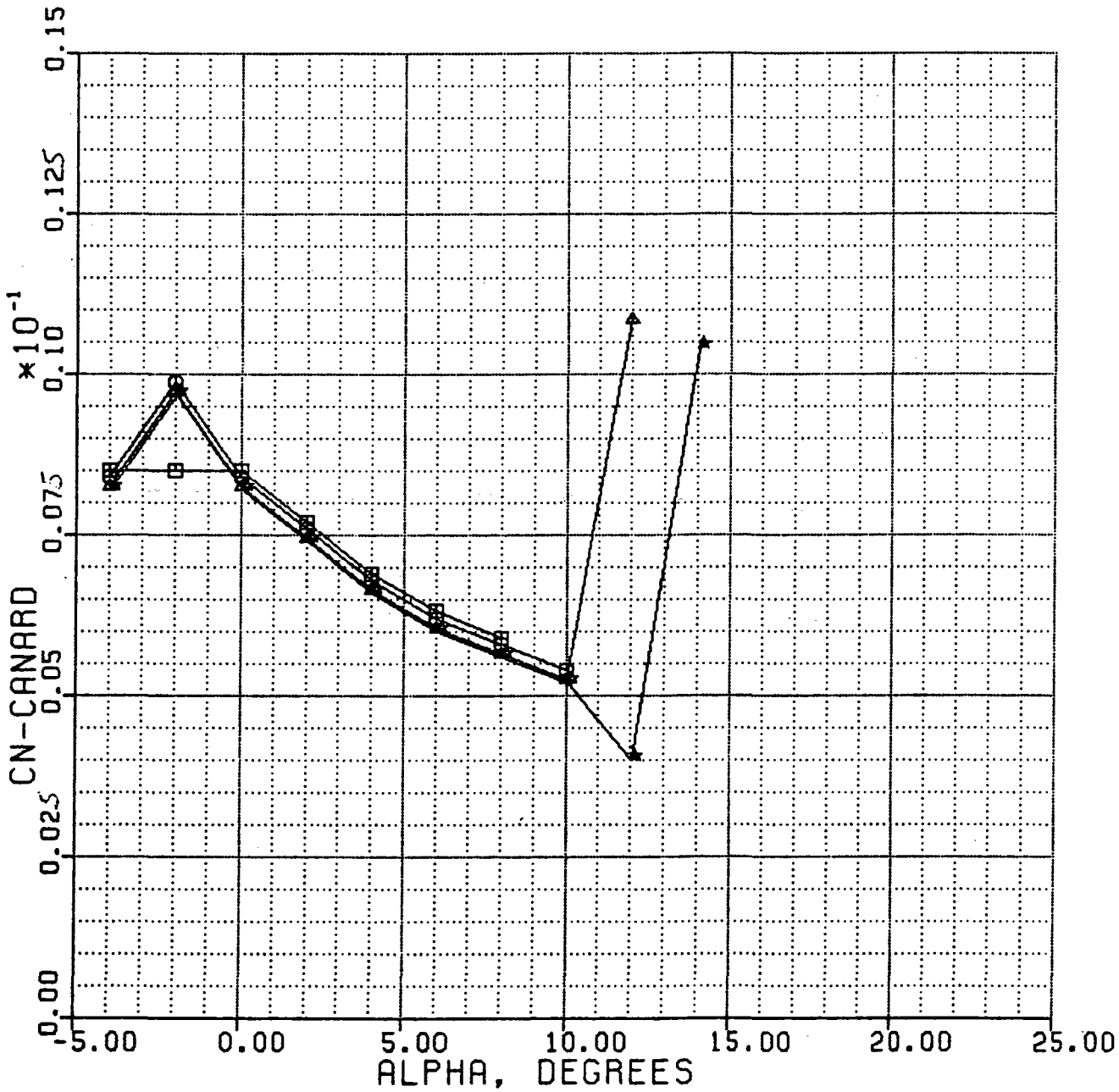

Figure 32(e)

CN-CANARD VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
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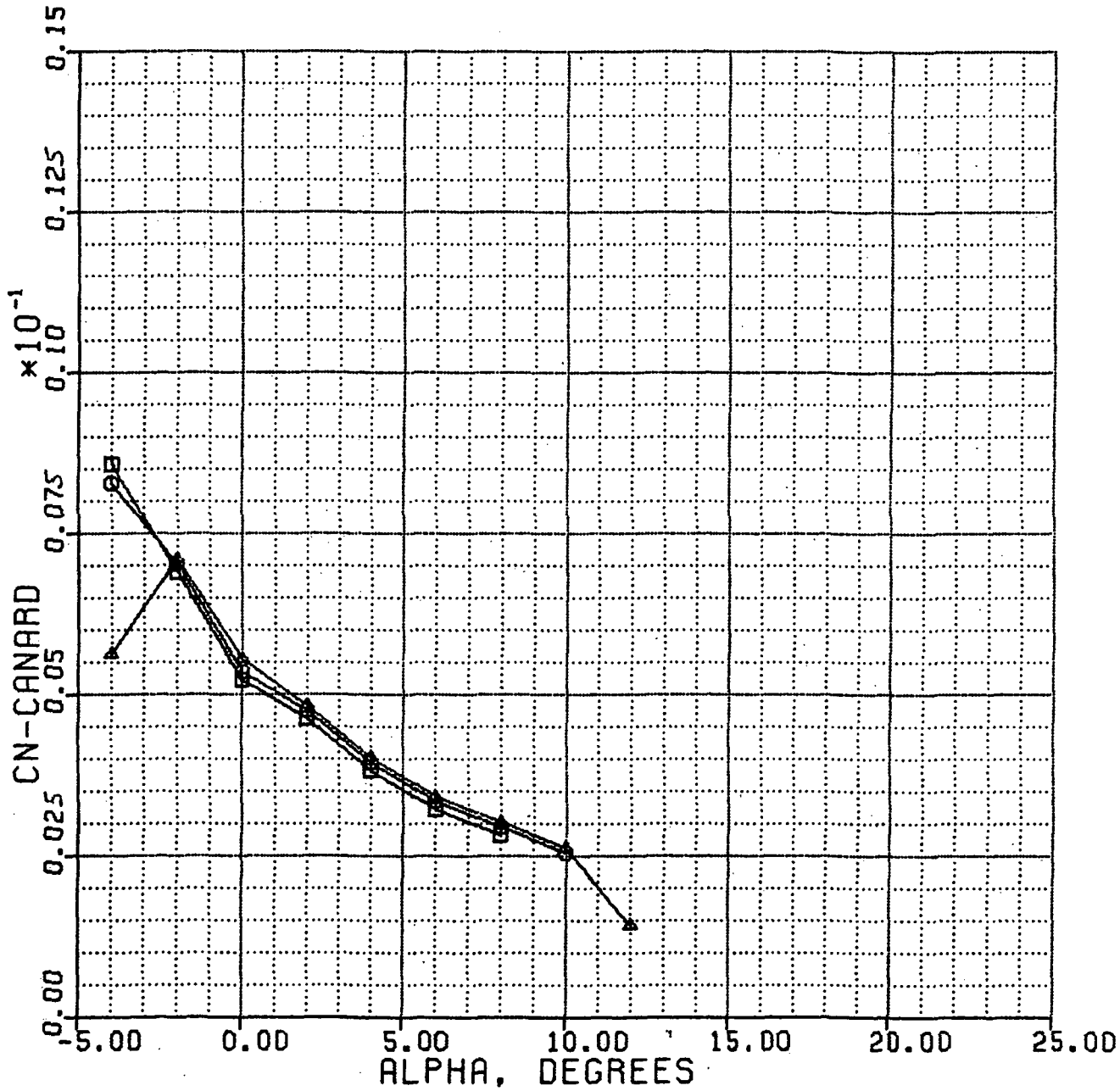

Figure 32(f)

CL-FLAP VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
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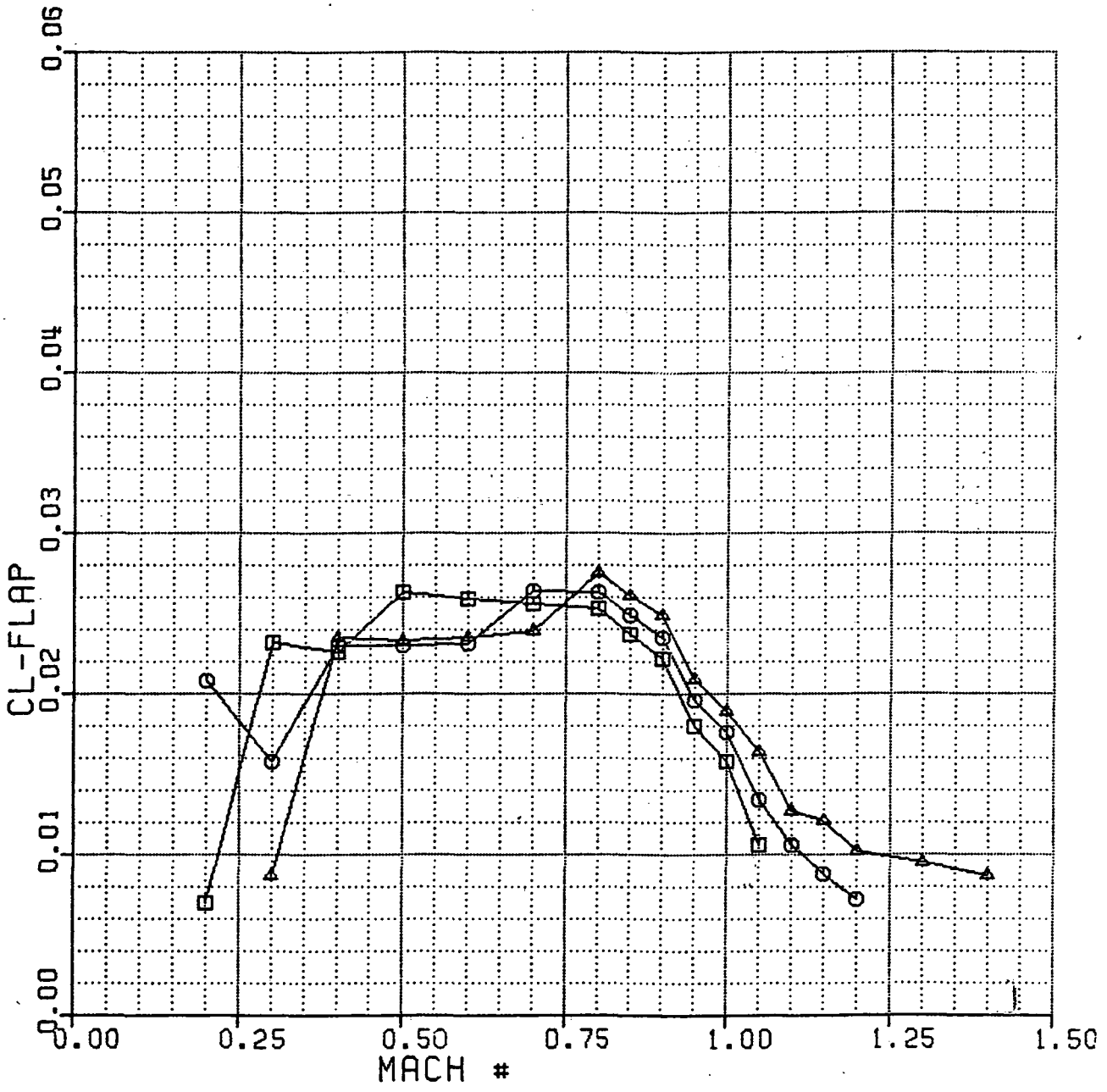

Figure 33(a)

CL-FLAP VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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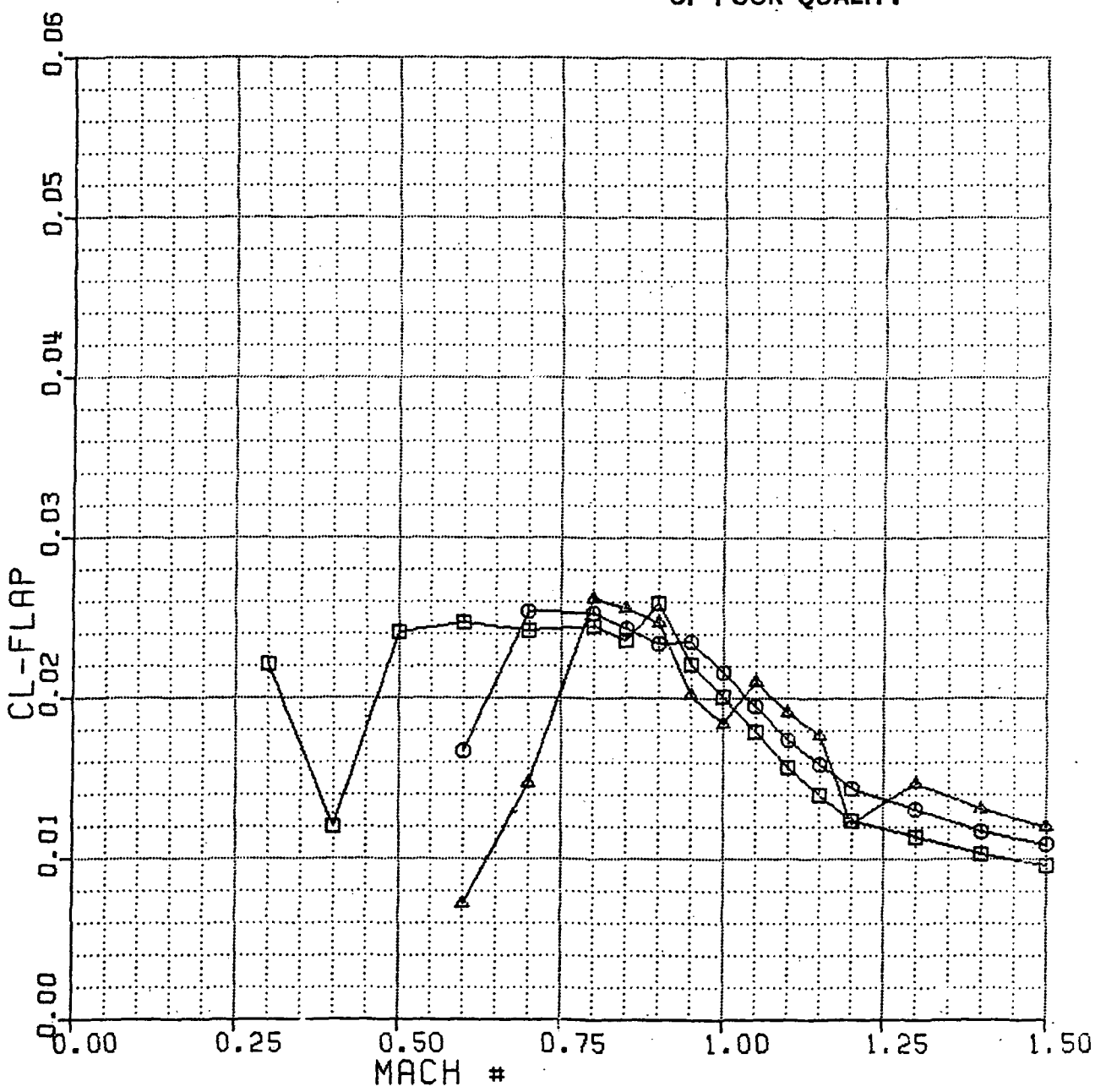

Figure 33(b)

CL-FLAP VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
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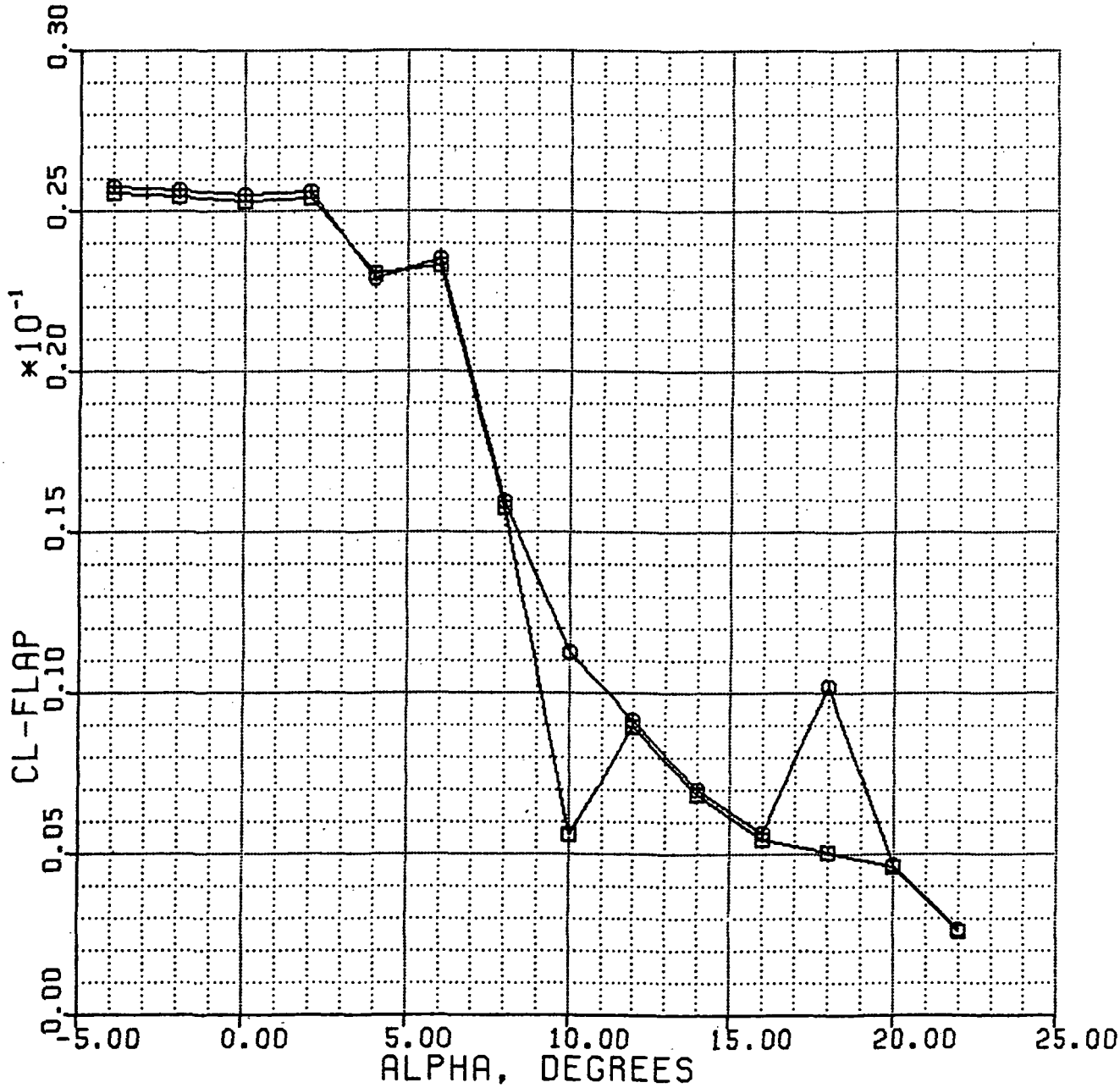

Figure 34(a)

CL-FLAP VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
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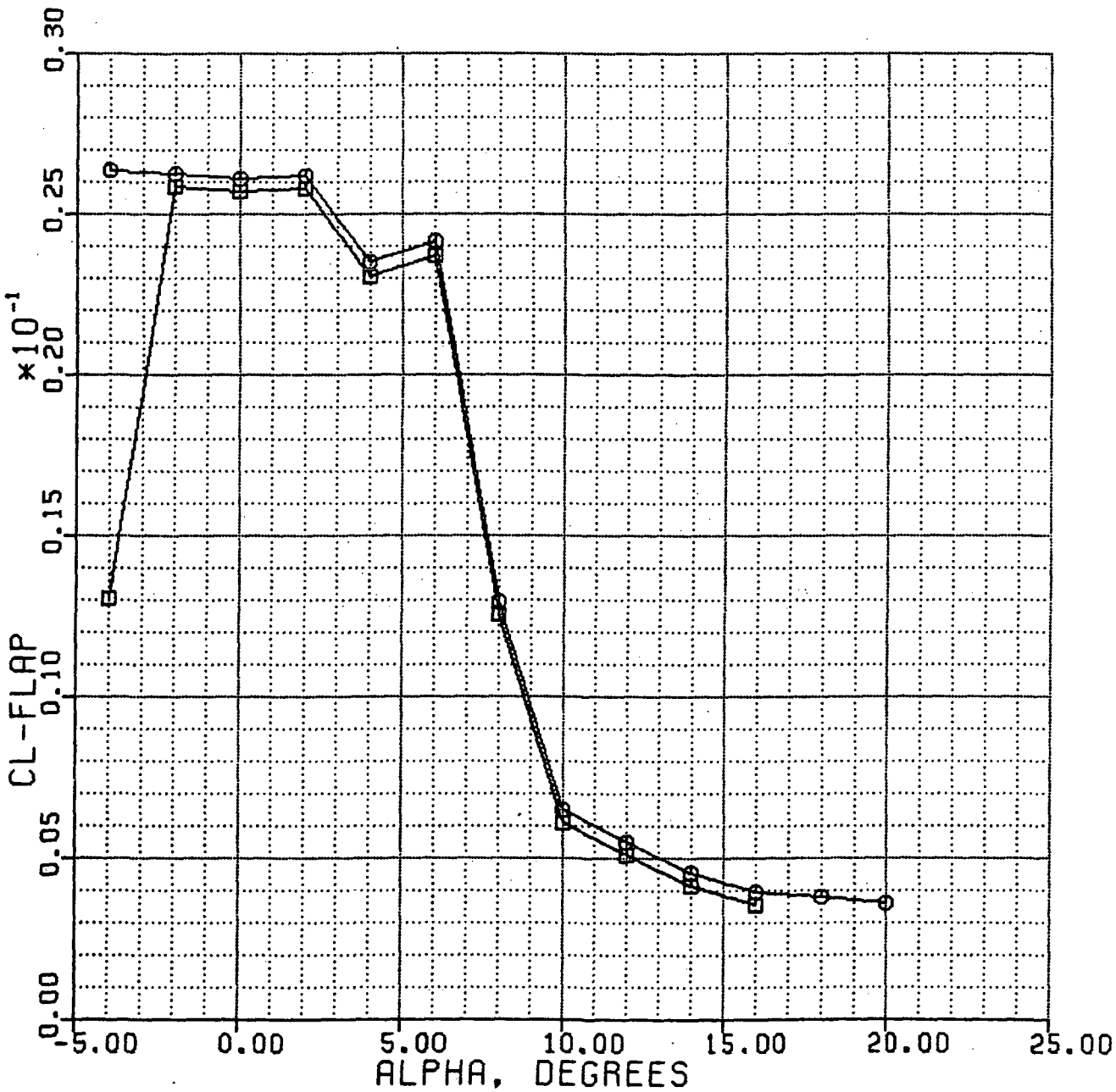

Figure 34(b)

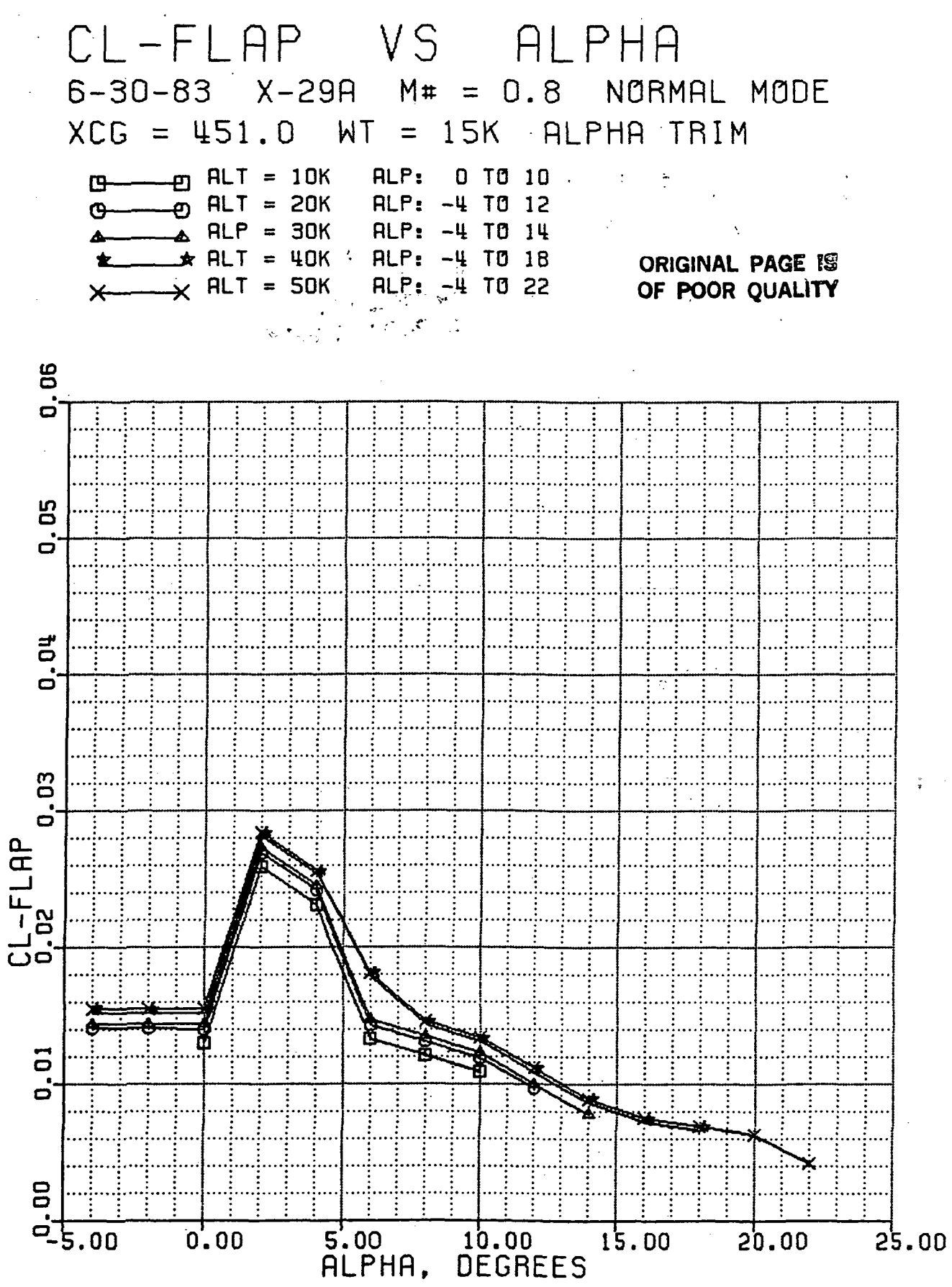
CL-FLAP VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CL-FLAP
0.00
0.01
0.02
0.03
0.04
0.05
0.06
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 34(c)

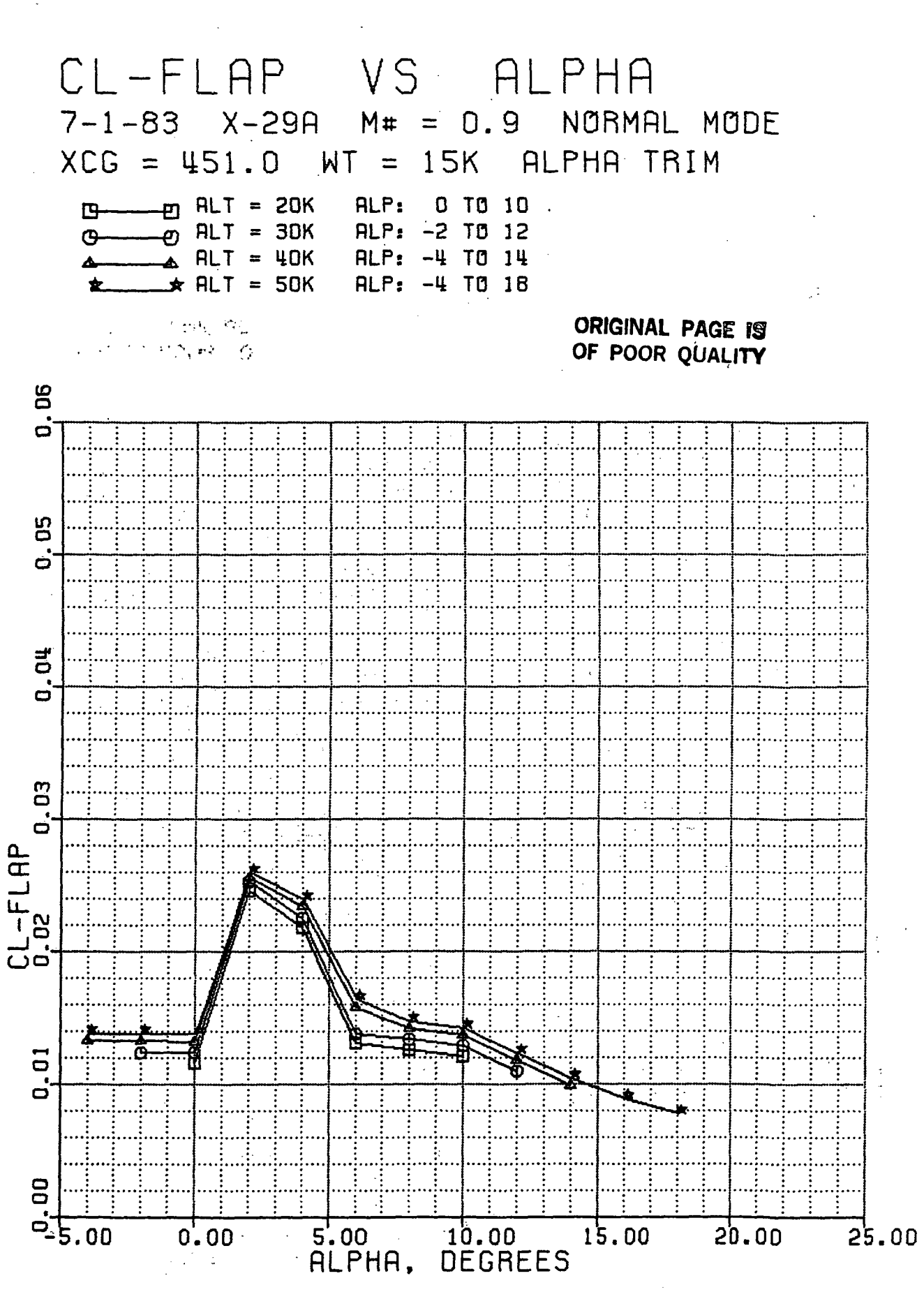
CL-FLAP VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS
OF POOR QUALITY
CL-FLAP
0.00
0.01
0.02
0.03
0.04
0.05
0.06
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 34(d)

CL-FLAP VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
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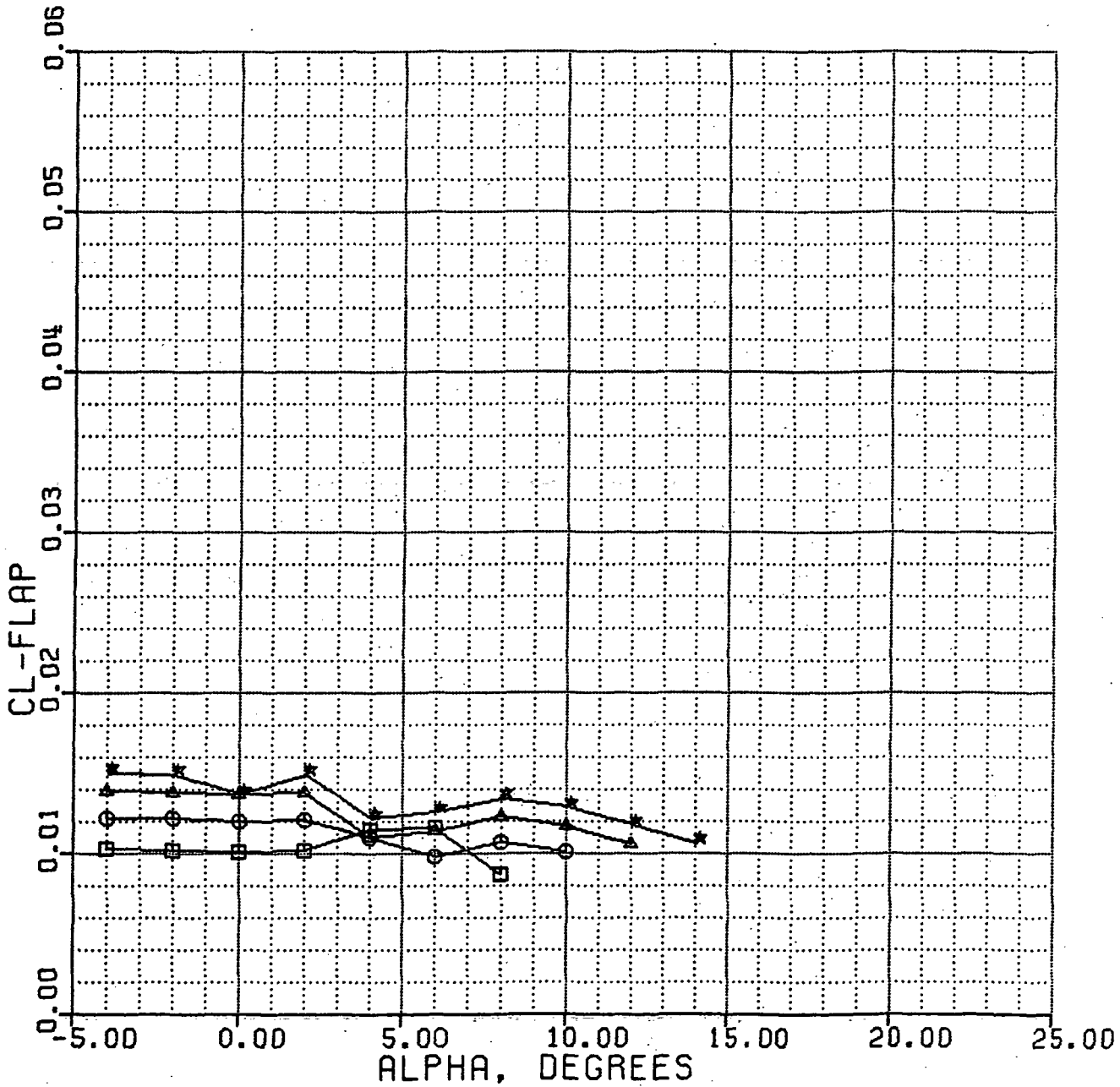

Figure 34(e)

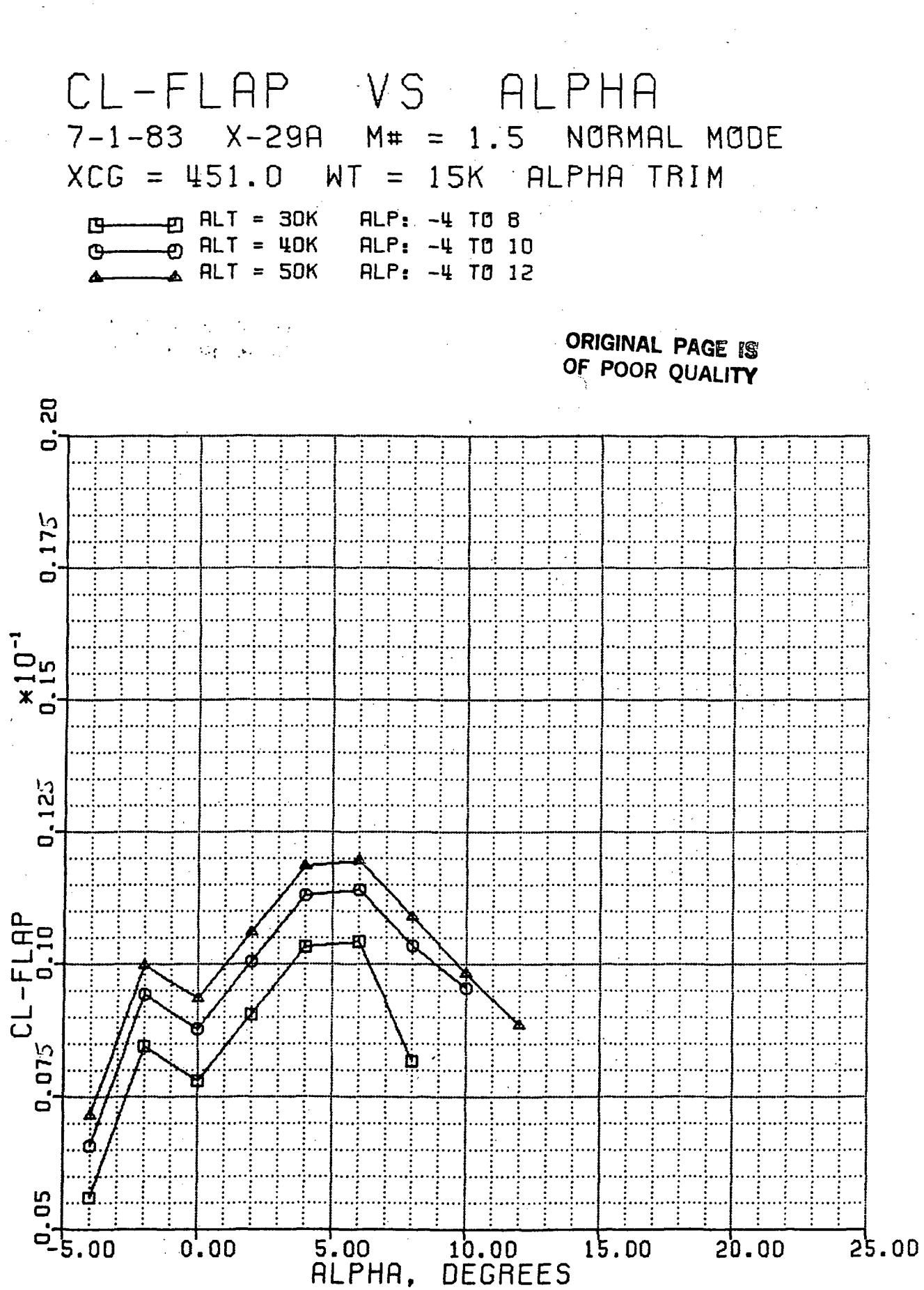
CL-FLAP VS ALPHA
7-1-83 X-29A M# = 1.5 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12
ORIGINAL PAGE IS
OF POOR QUALITY
CL-FLAP *10⁻¹
0.20
0.175
0.15
0.125
0.10
0.075
0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 34(f)

CD-FLAP VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
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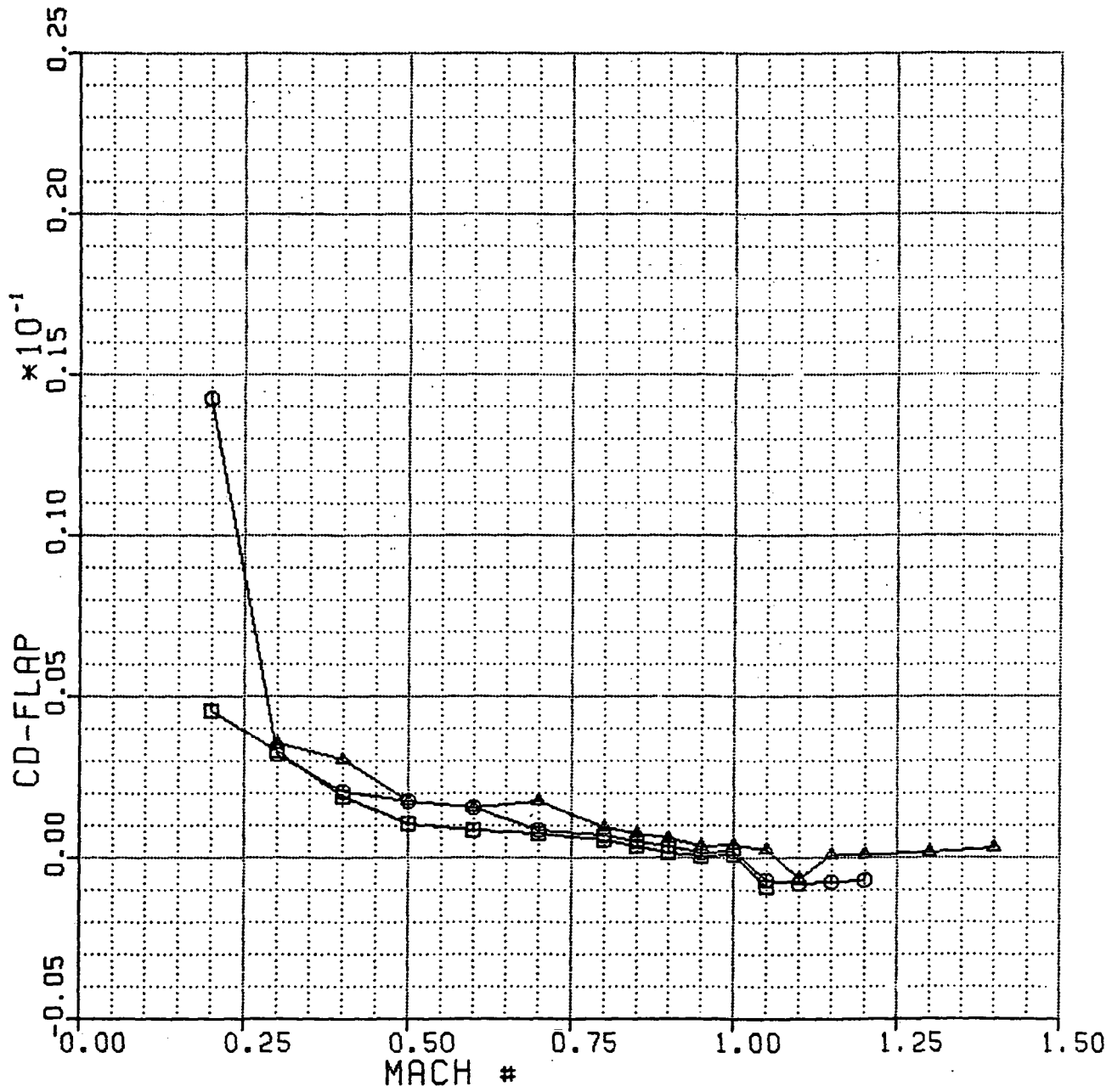

Figure 35(a)

CD-FLAP VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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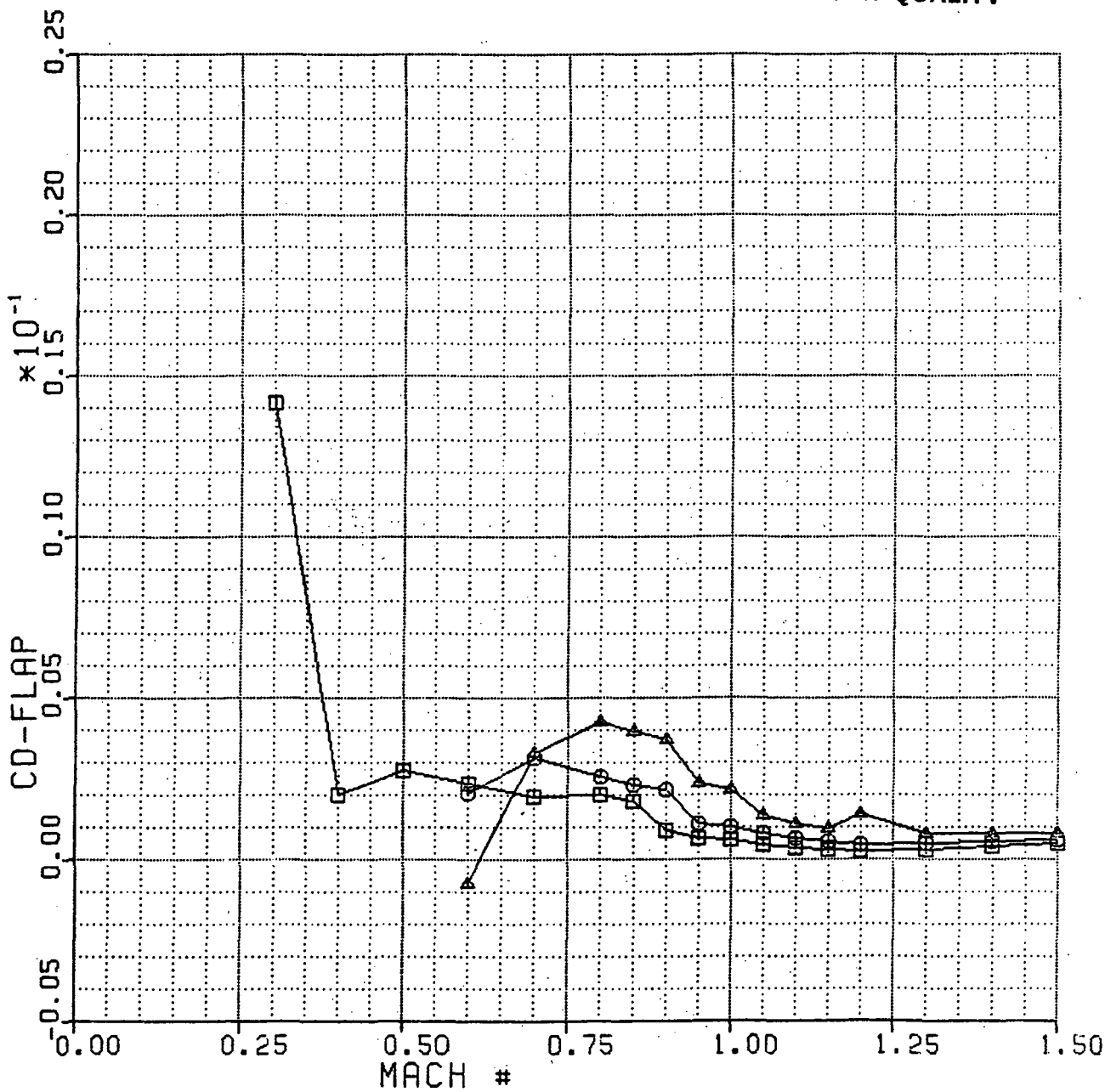

Figure 35(b)

CD-FLAP VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
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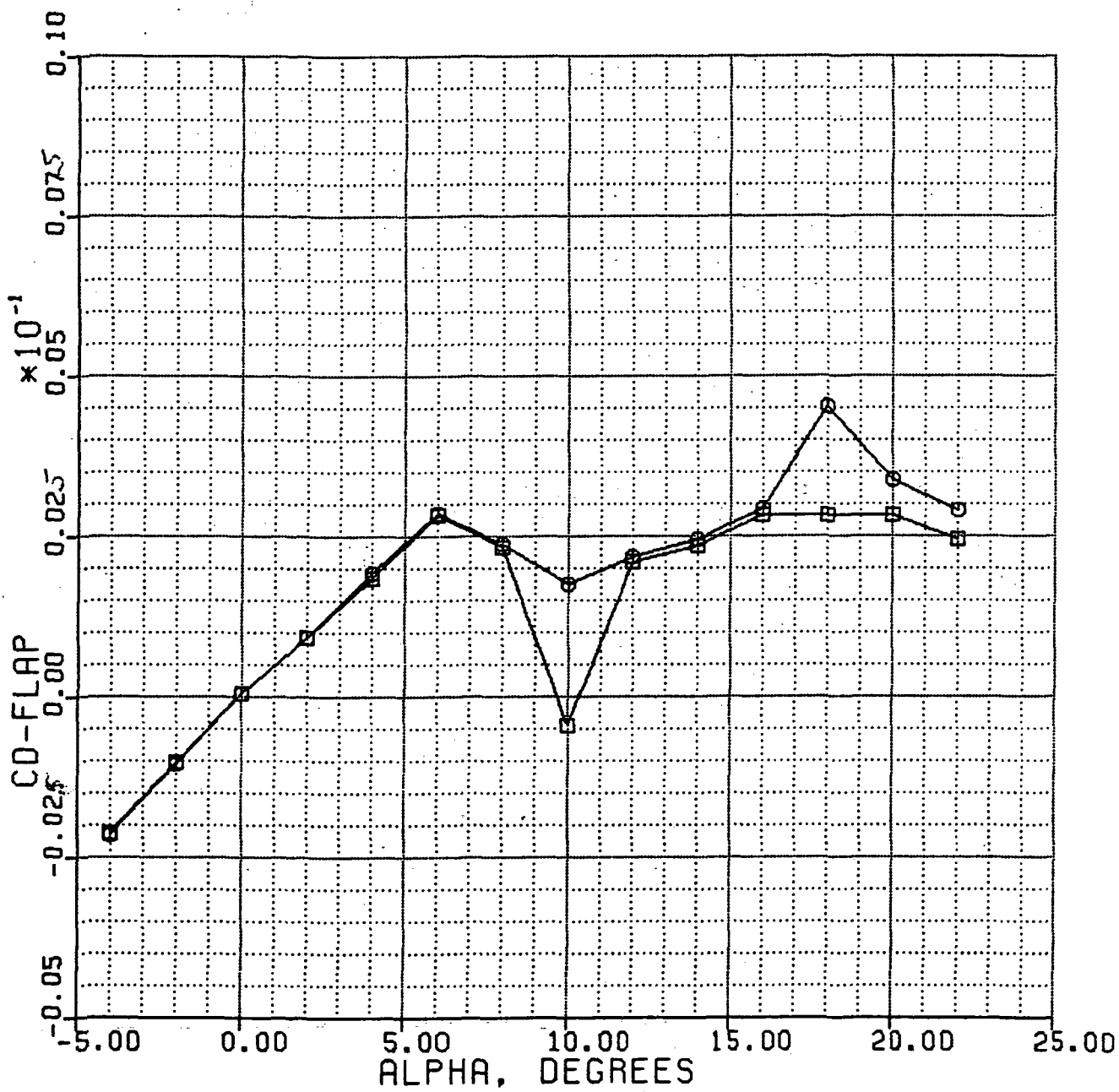

Figure 36(a)

CD-FLAP VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
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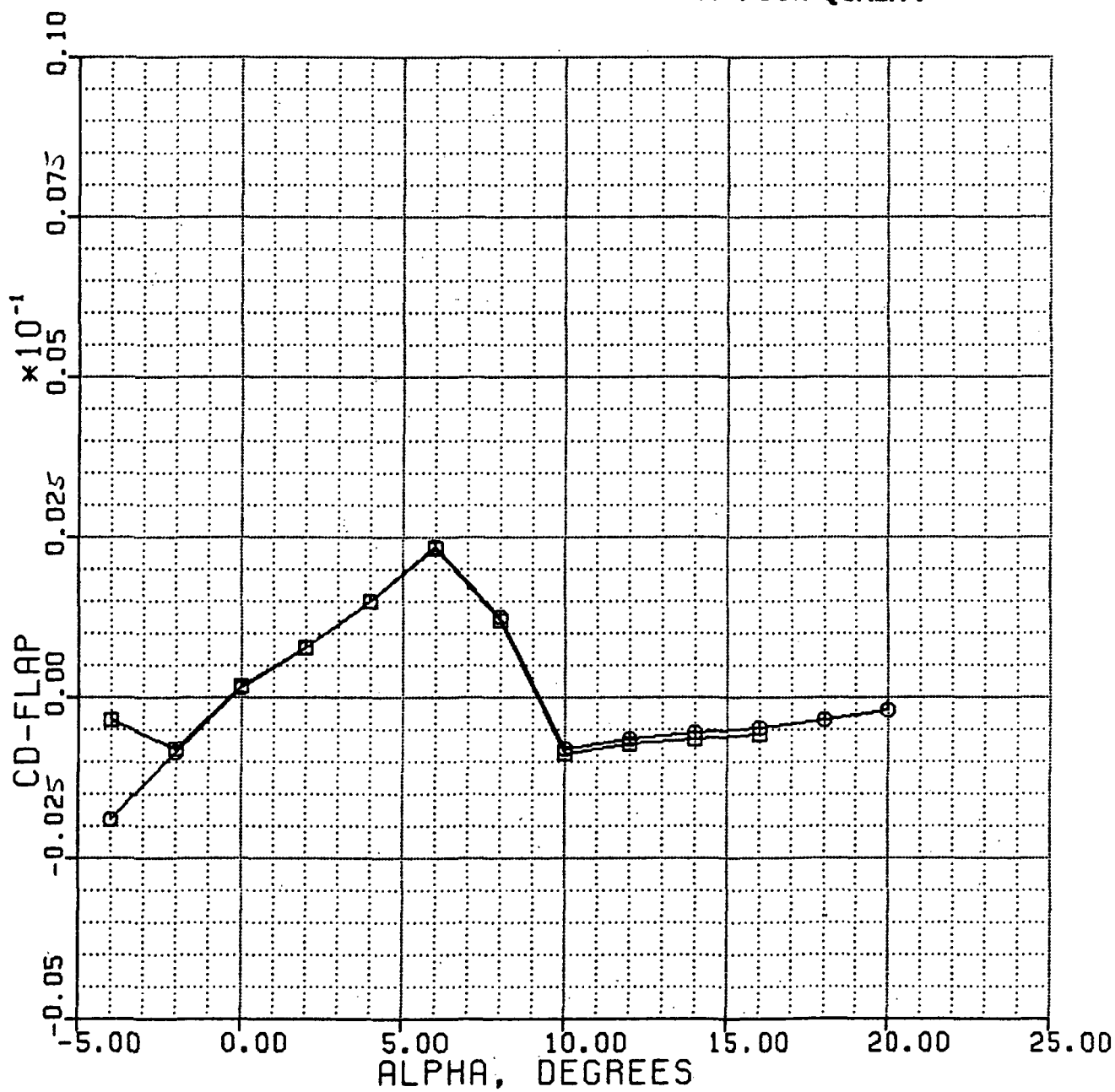

Figure 36(b)

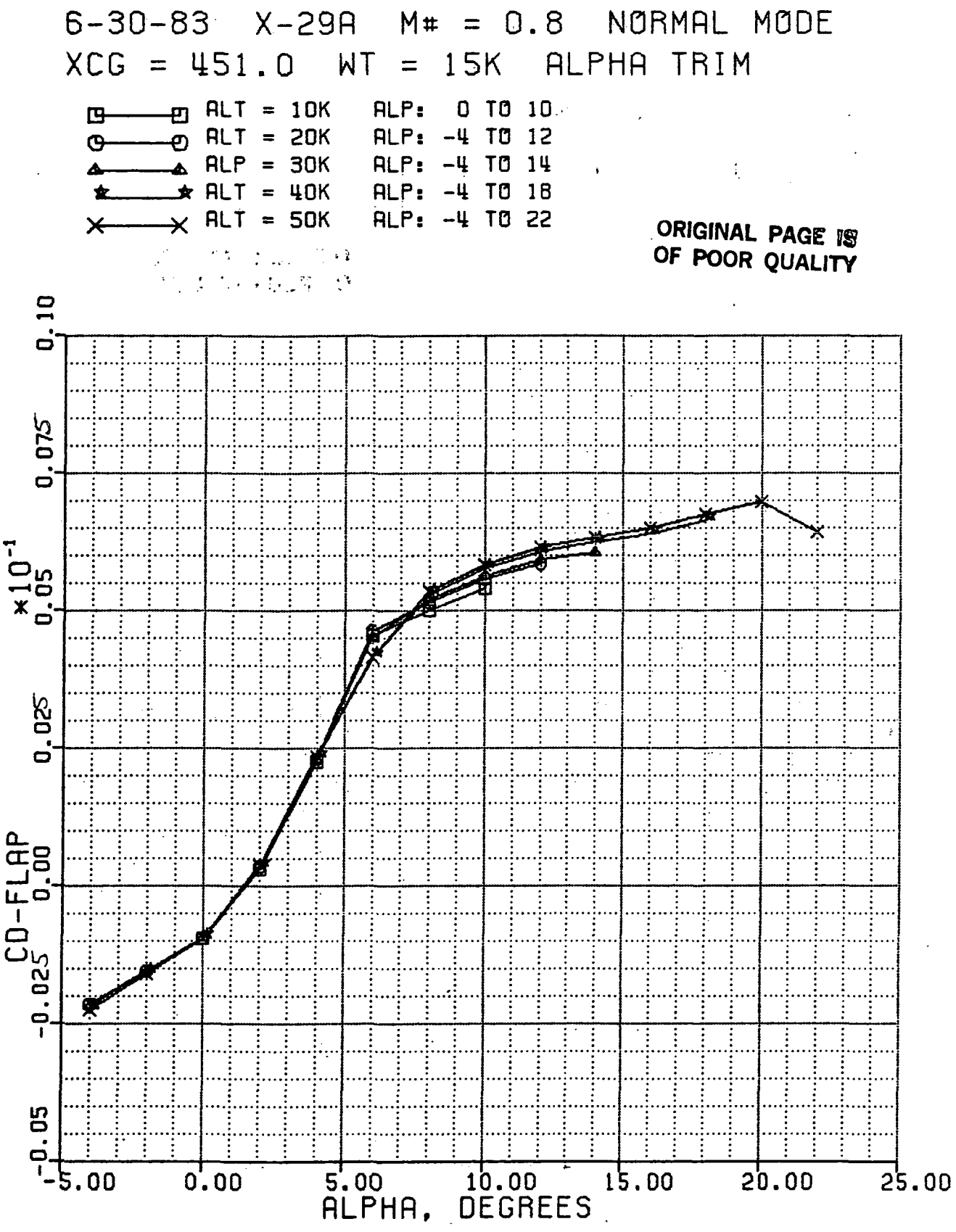
CD-FLAP VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
CD-FLAP
*10-1
0.10
0.075
0.05
0.025
0.00
-0.025
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 36(c)

CD-FLAP VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
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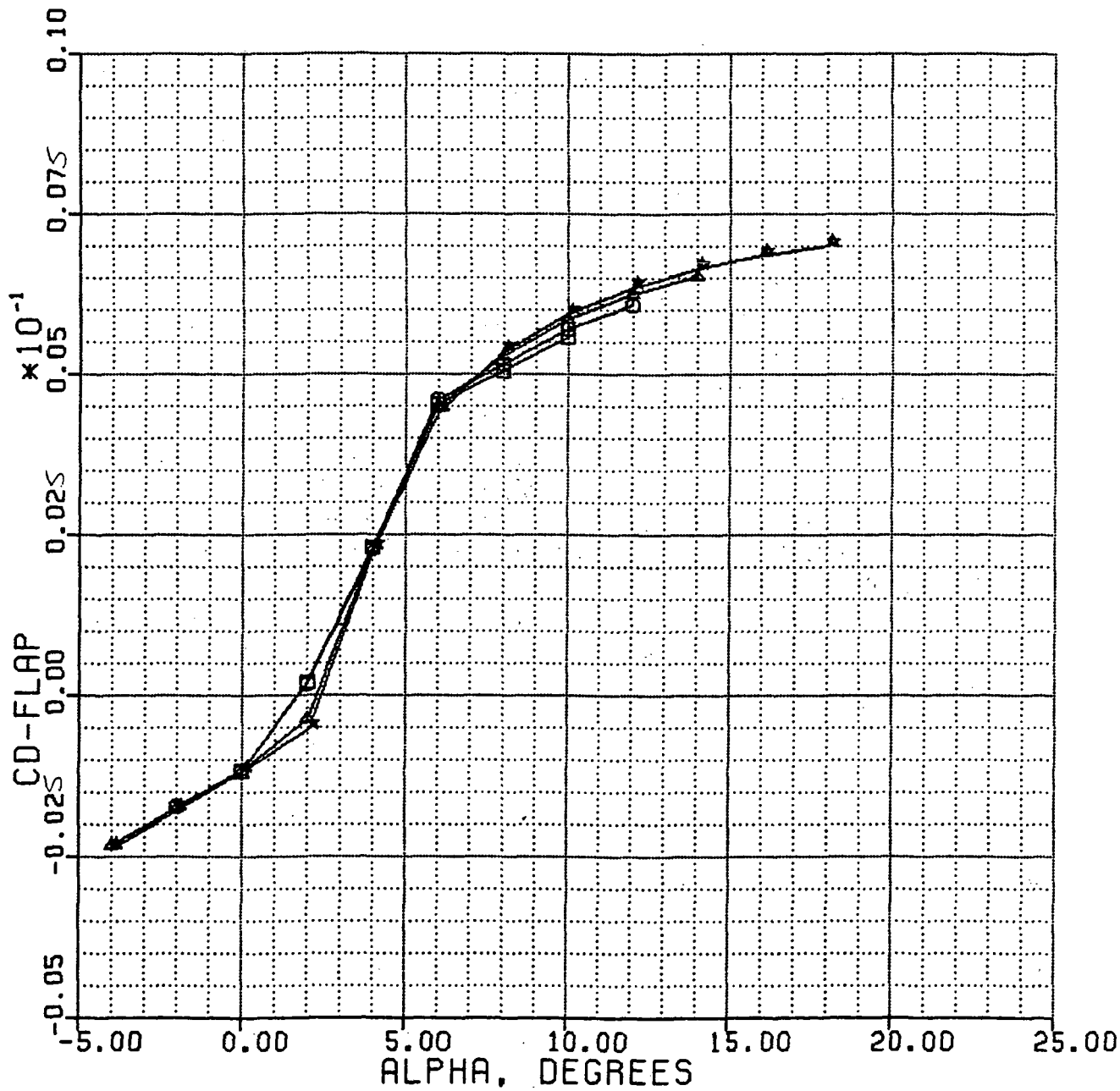

Figure 36(d)

CD-FLAP VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

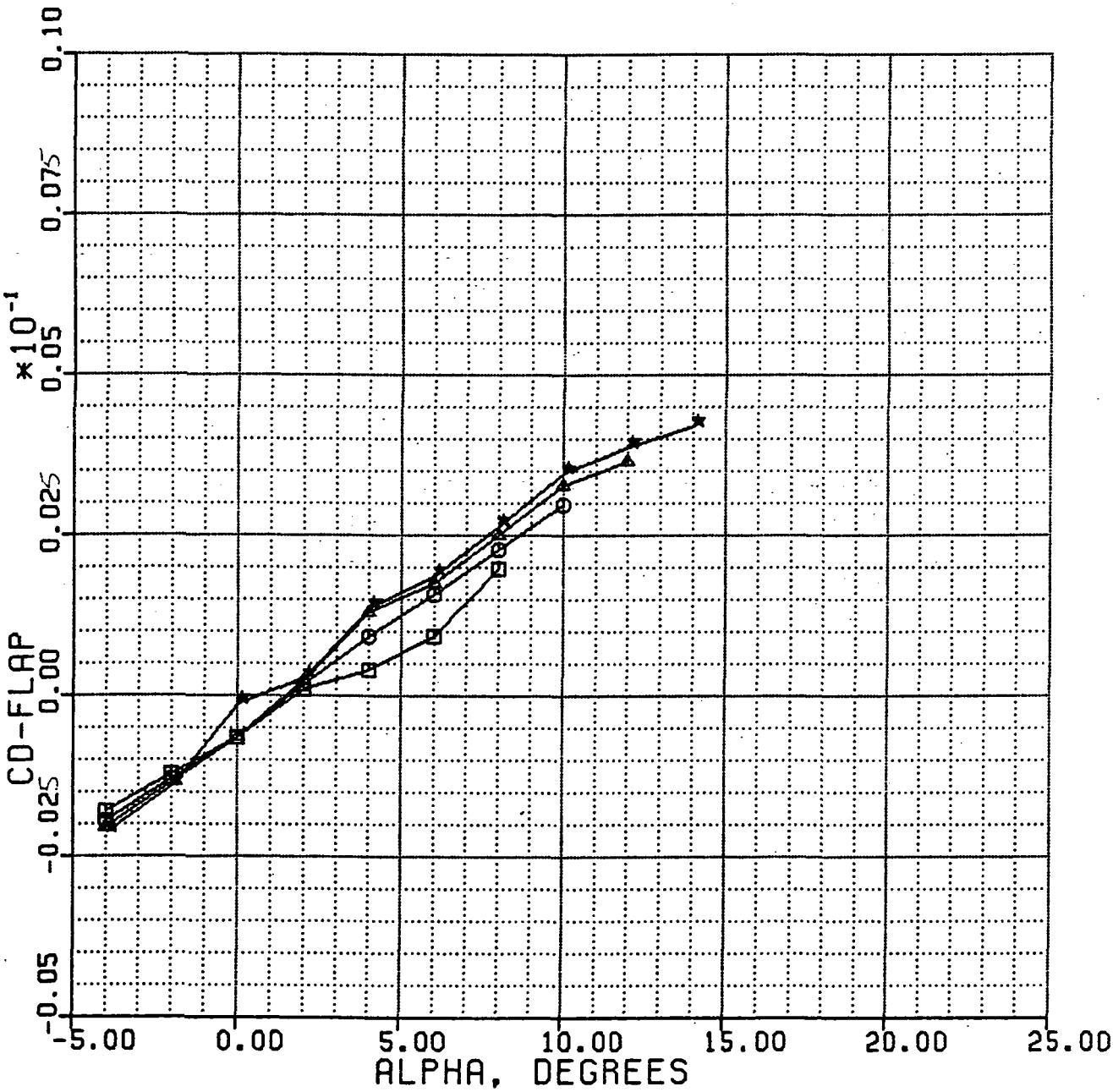

Figure 36(e)

CD-FLAP VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

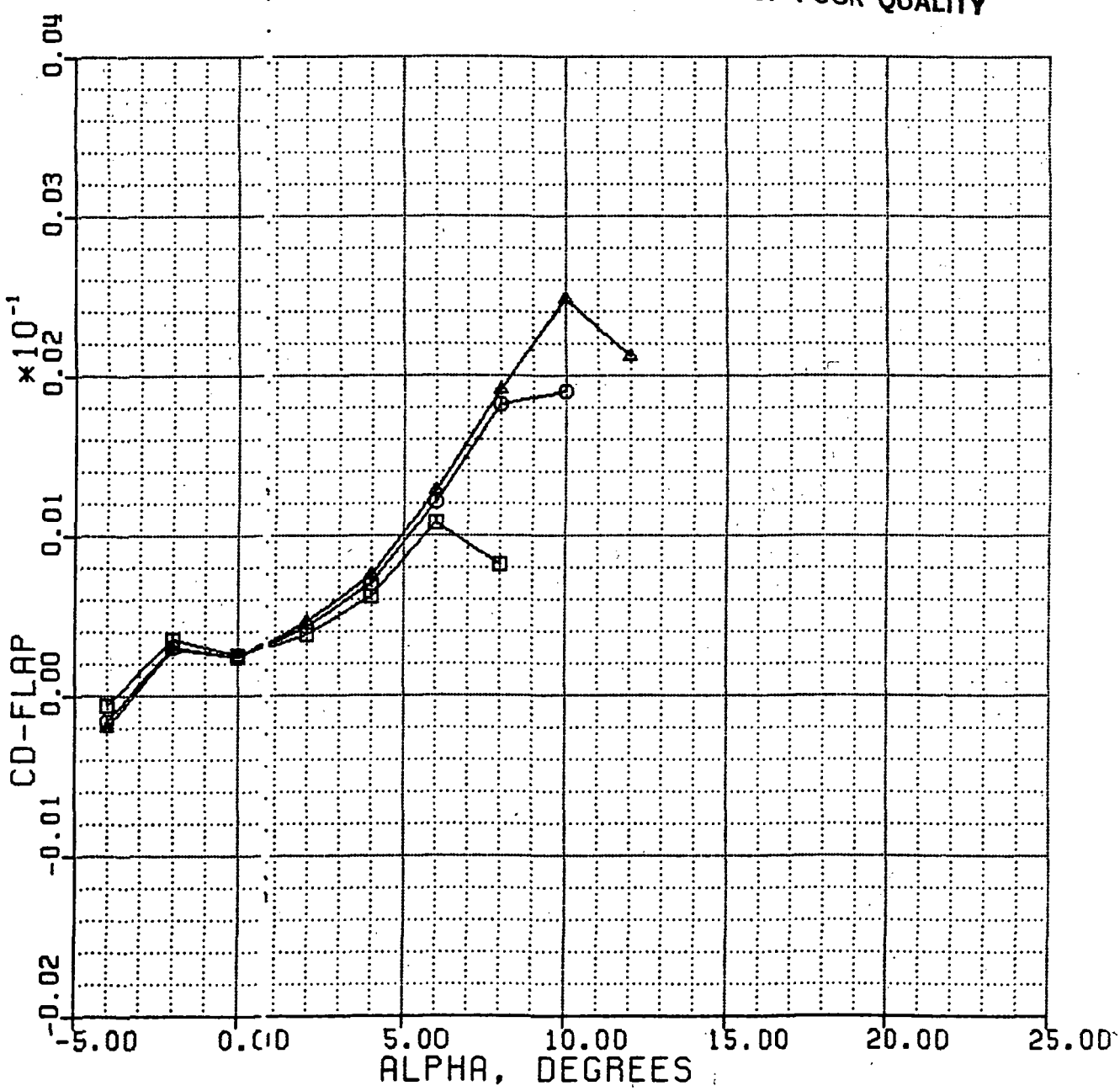

Figure 36(f)

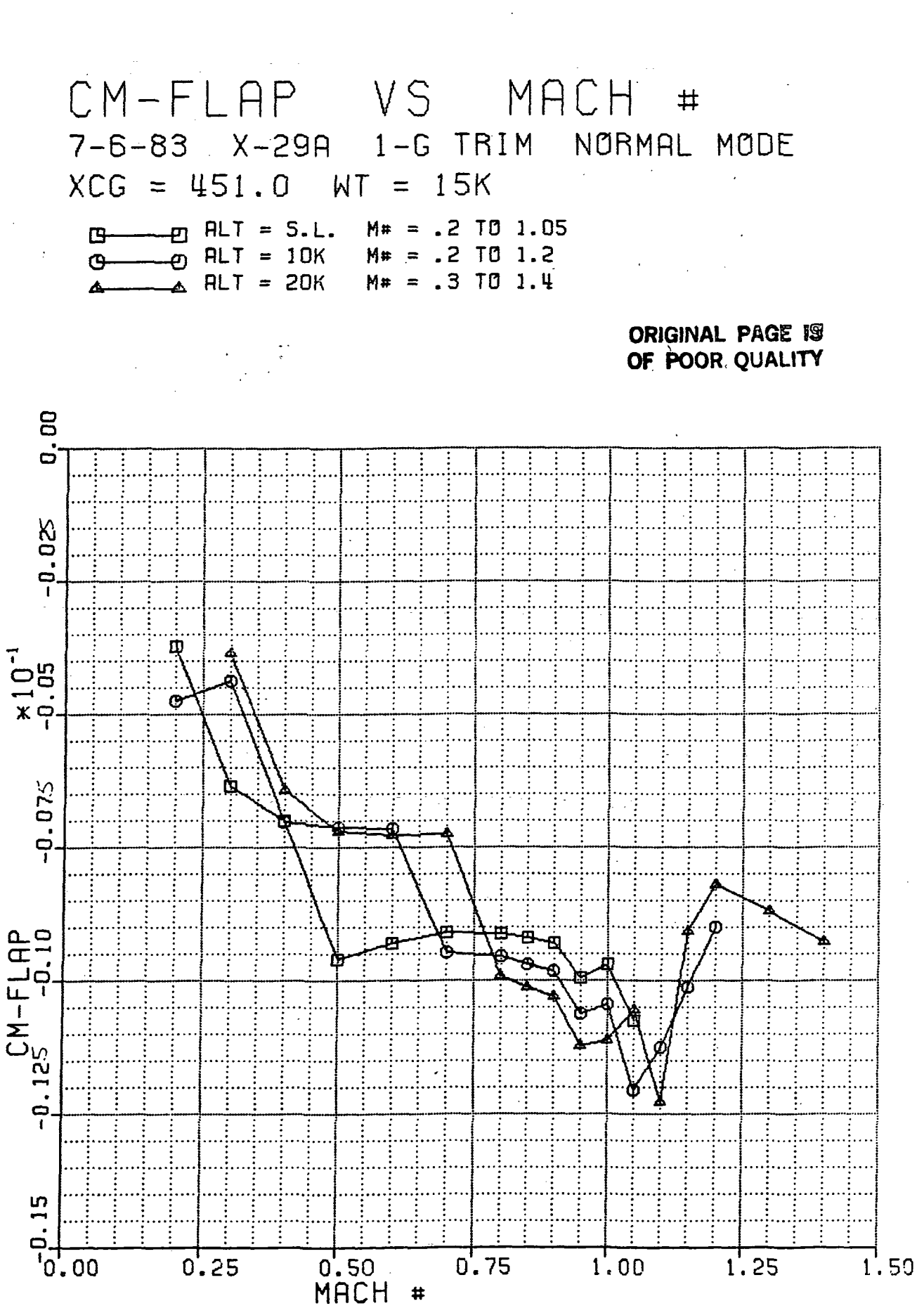
CM-FLAP VS MACH #
7-6-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4
ORIGINAL PAGE IS
OF POOR QUALITY
CM-FLAP
*10^-1
0.00
-0.025
-0.05
-0.075
-0.10
-0.125
-0.15
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 37(a)

CM-FLAP VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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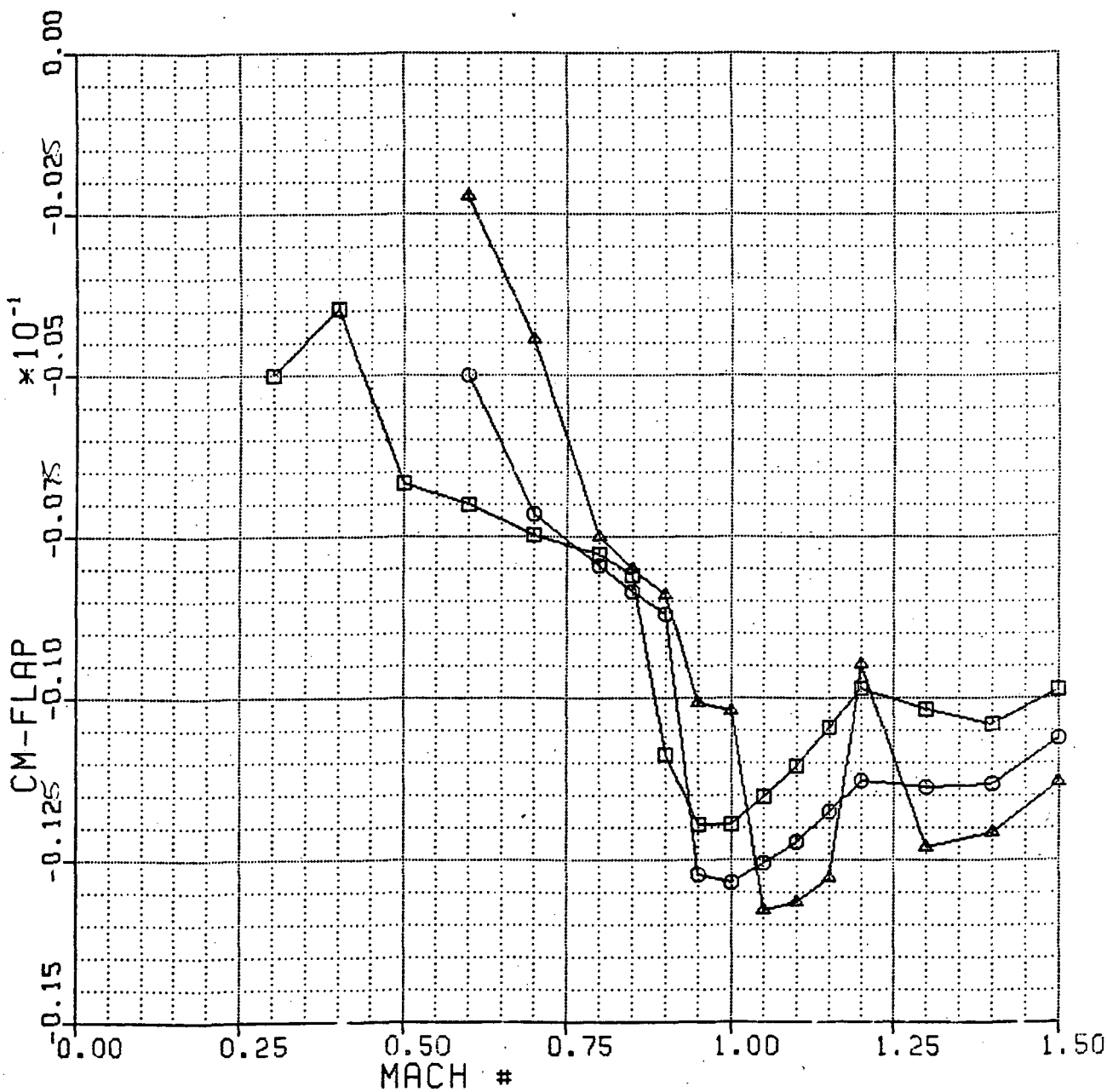

Figure 37(b)

CM-FLAP VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

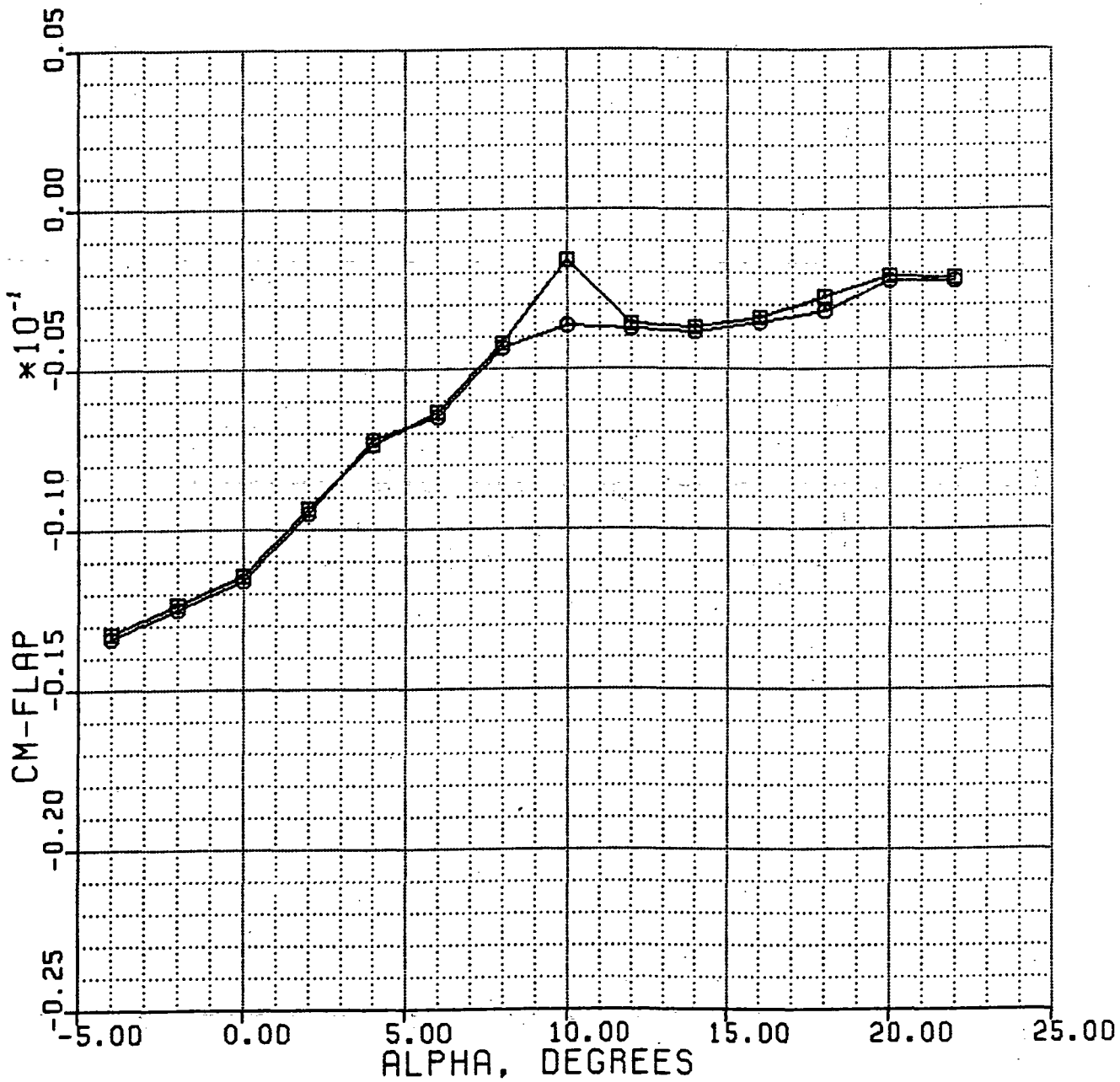

Figure 38(a)

CM-FLAP VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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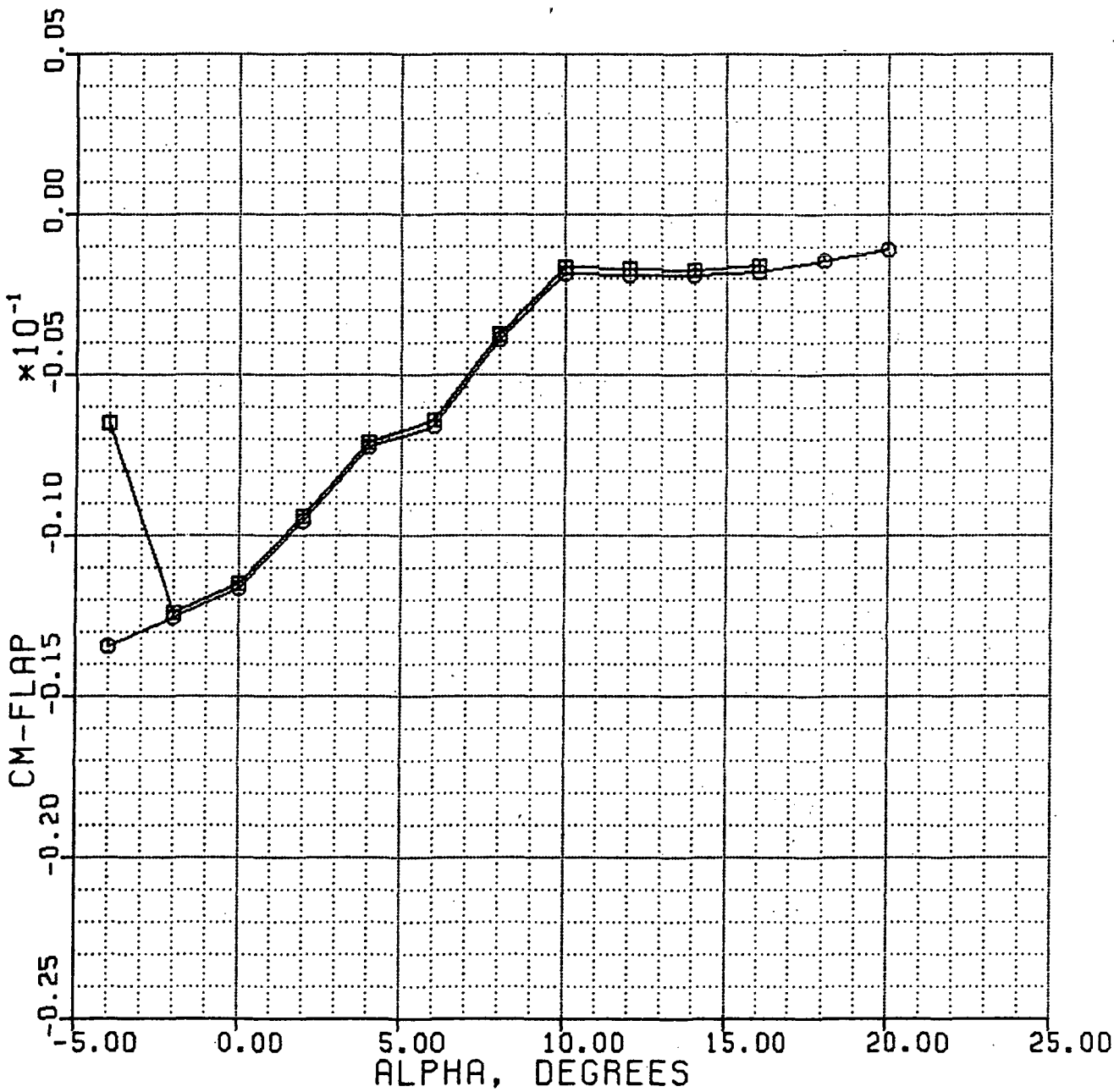

Figure 38(b)

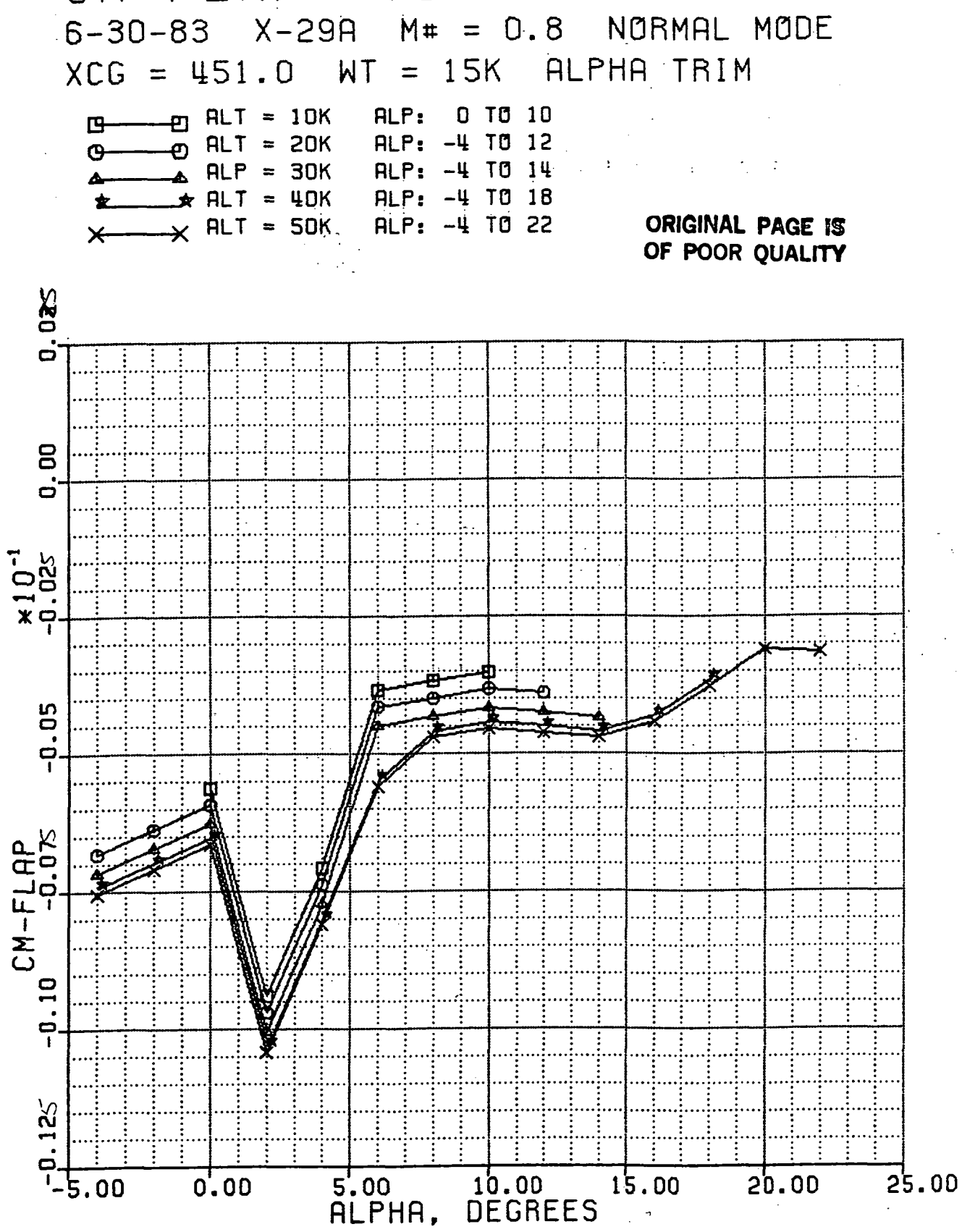
CM-FLAP VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CM-FLAP
*10-1
0.025
0.00
-0.025
-0.05
-0.075
-0.10
-0.125
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 38(c)

CM-FLAP VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
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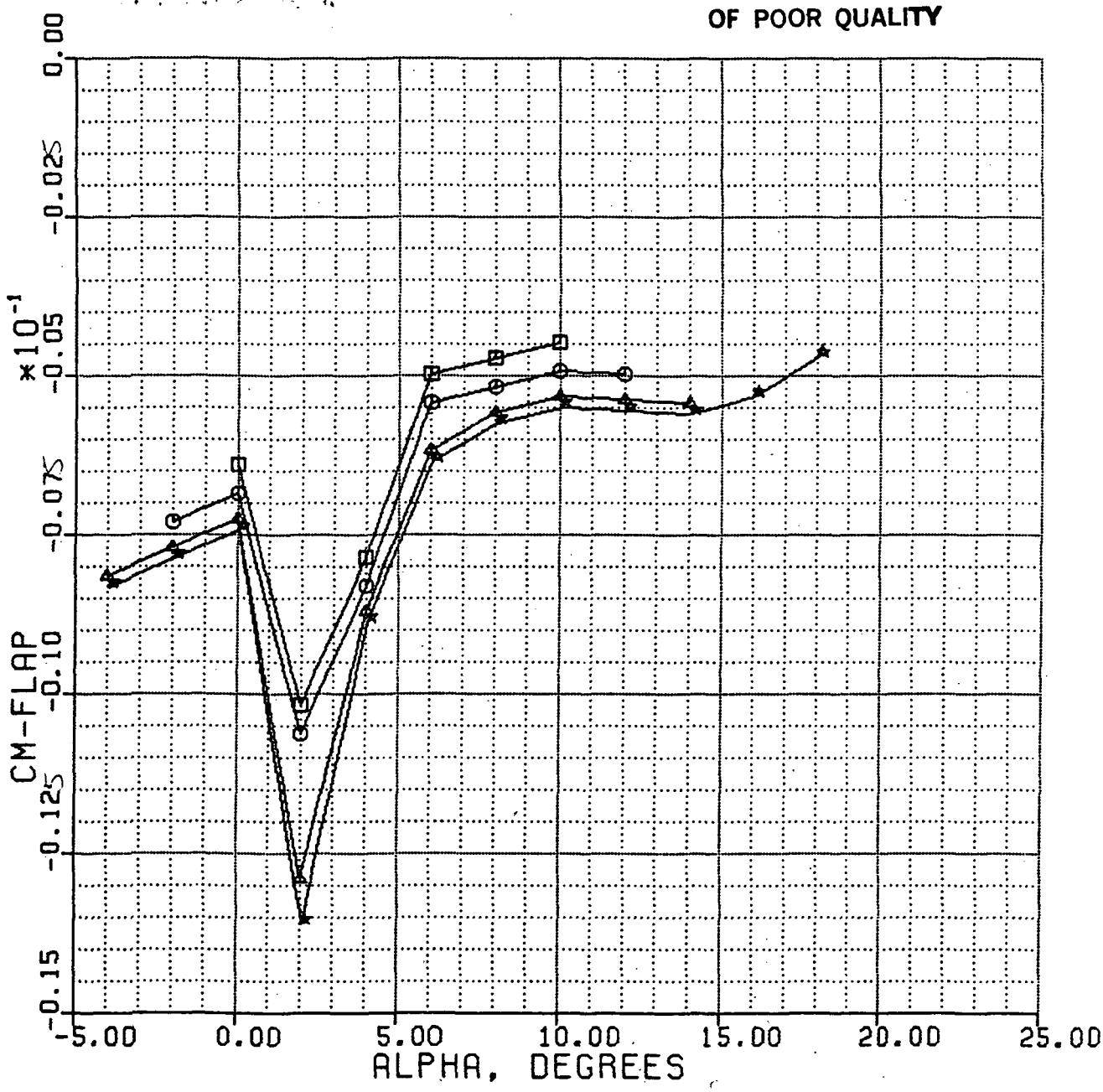

Figure 38(d)

CM-FLAP VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

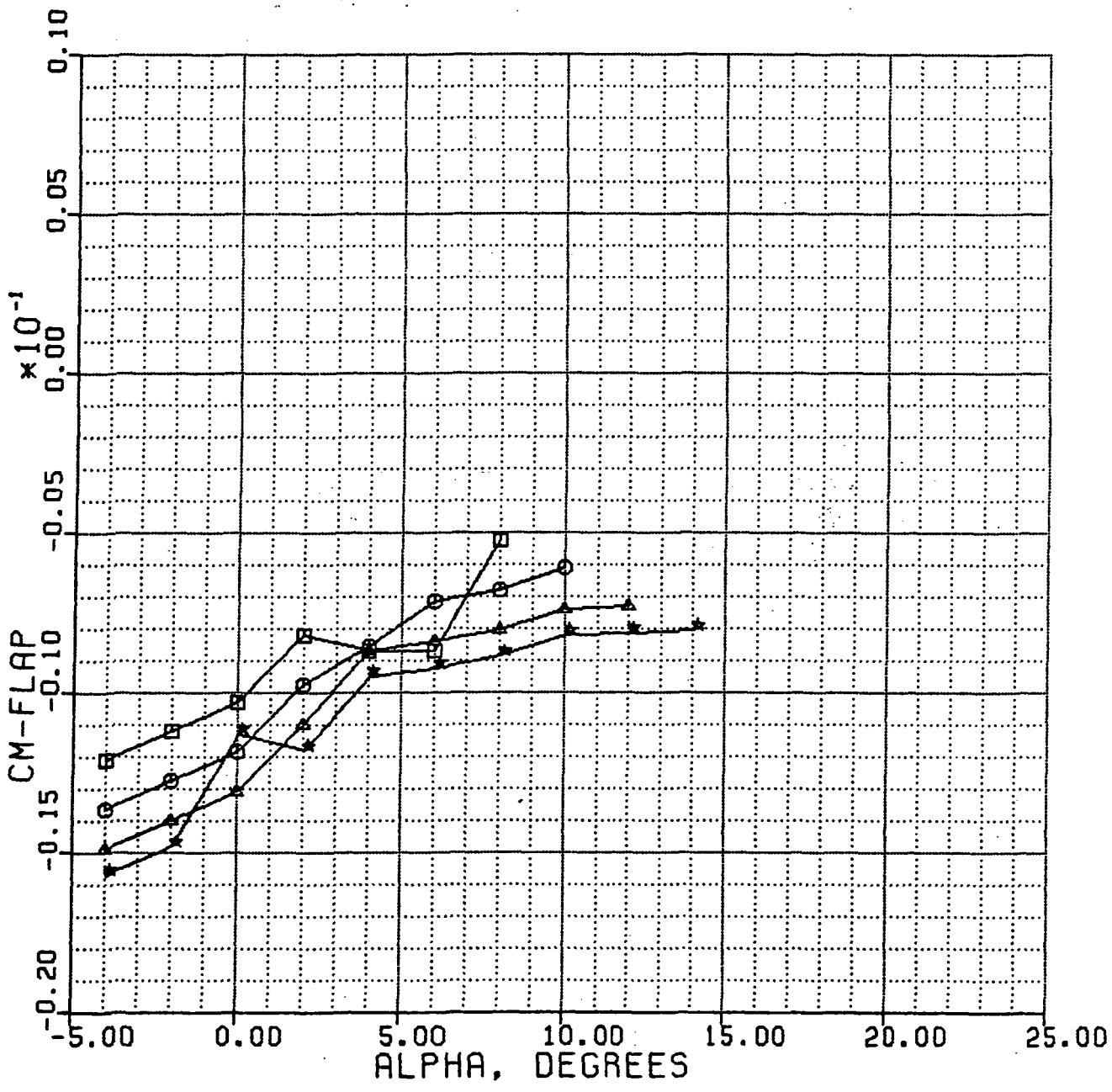

Figure 38(e)

CM-FLAP VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
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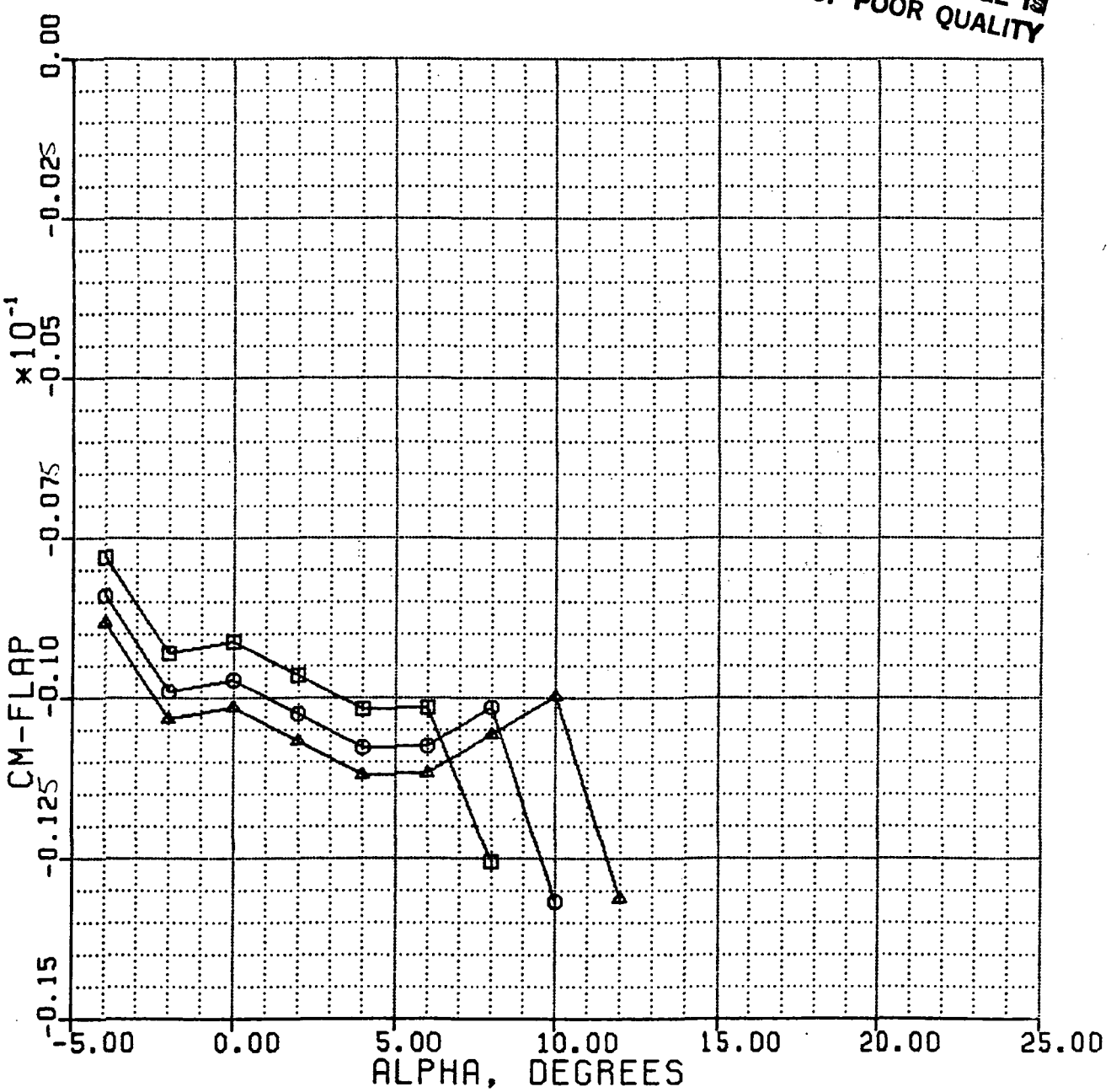

Figure 38(f)

CA-FLAP VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
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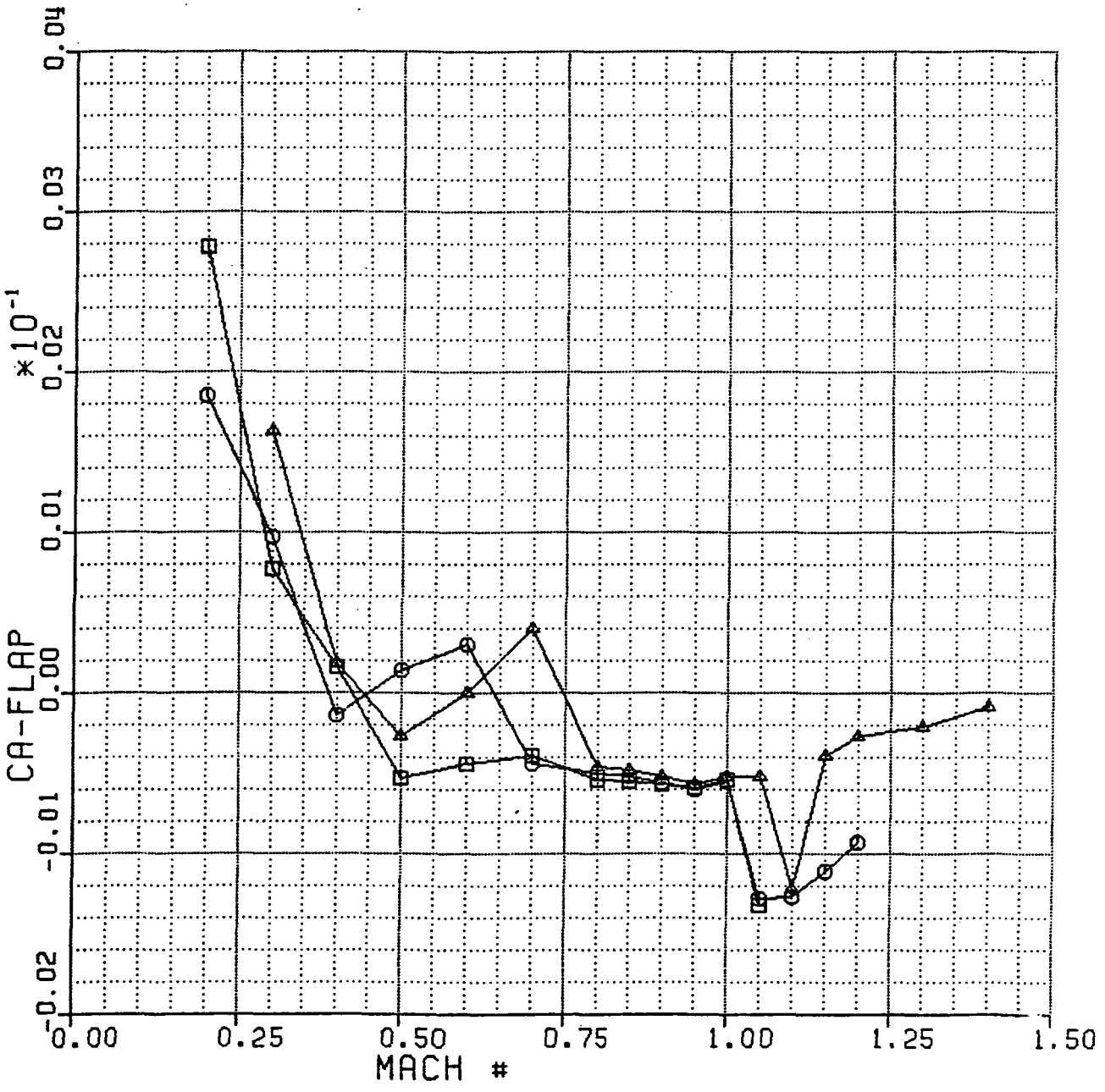

Figure 39(a)

CA-FLAP VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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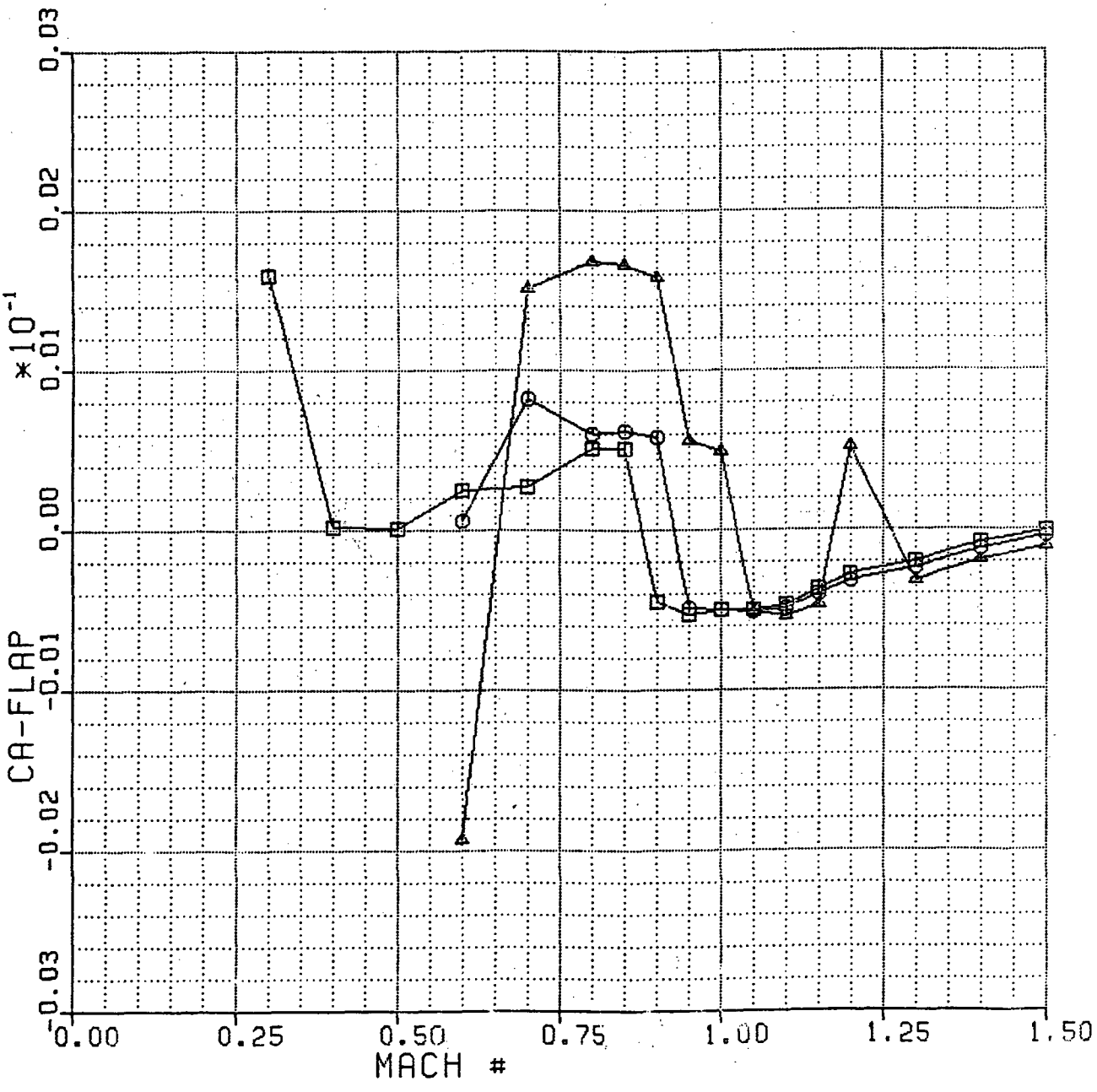

Figure 39(b)

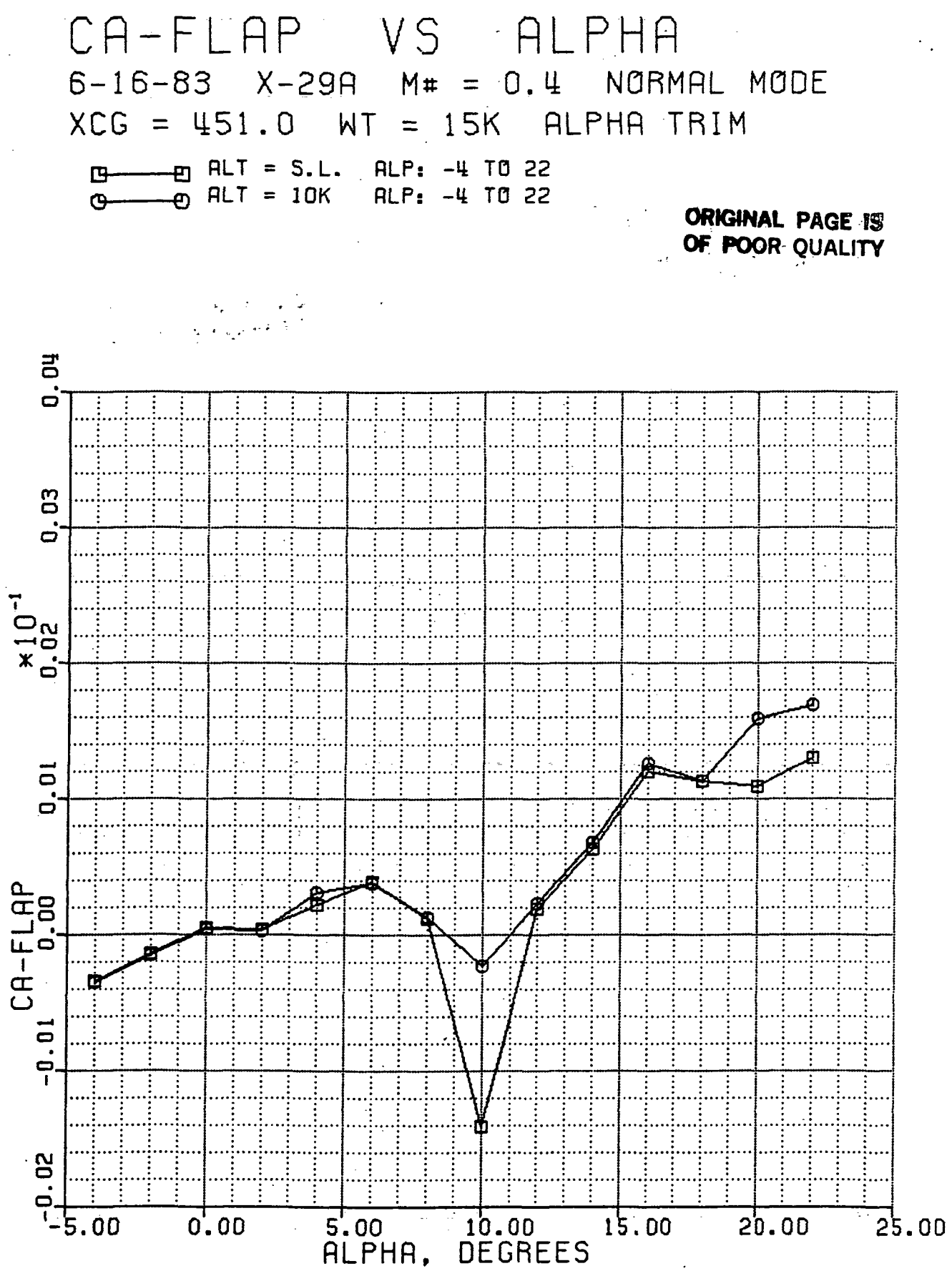
CA-FLAP VS ALPHA
6-16-83 X-29A M# = 0.4 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TO 22
ALT = 10K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CA-FLAP
*10^-1
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 40(a)

CA-FLAP VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
OF POOR QUALITY

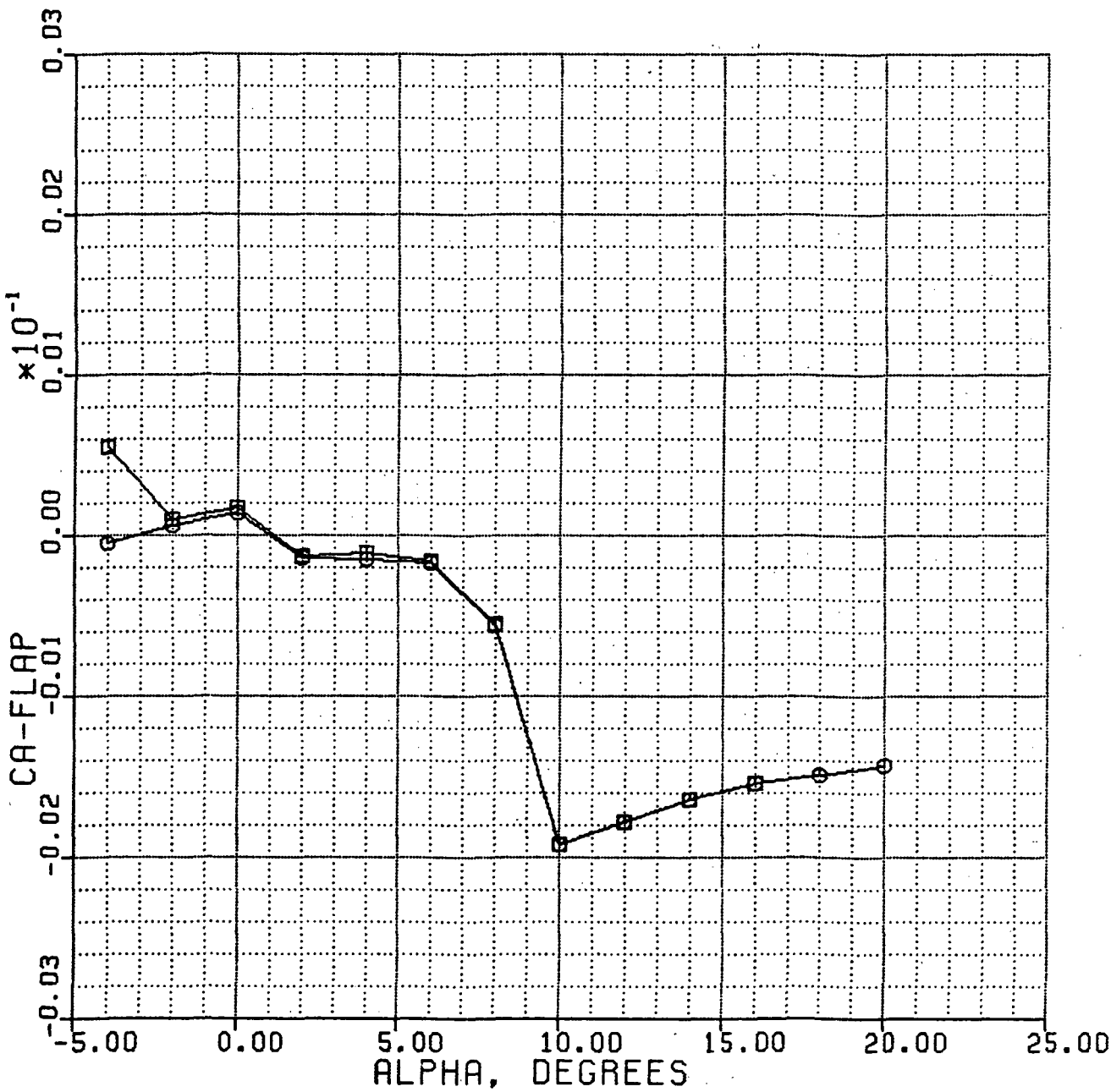

Figure 40(b)

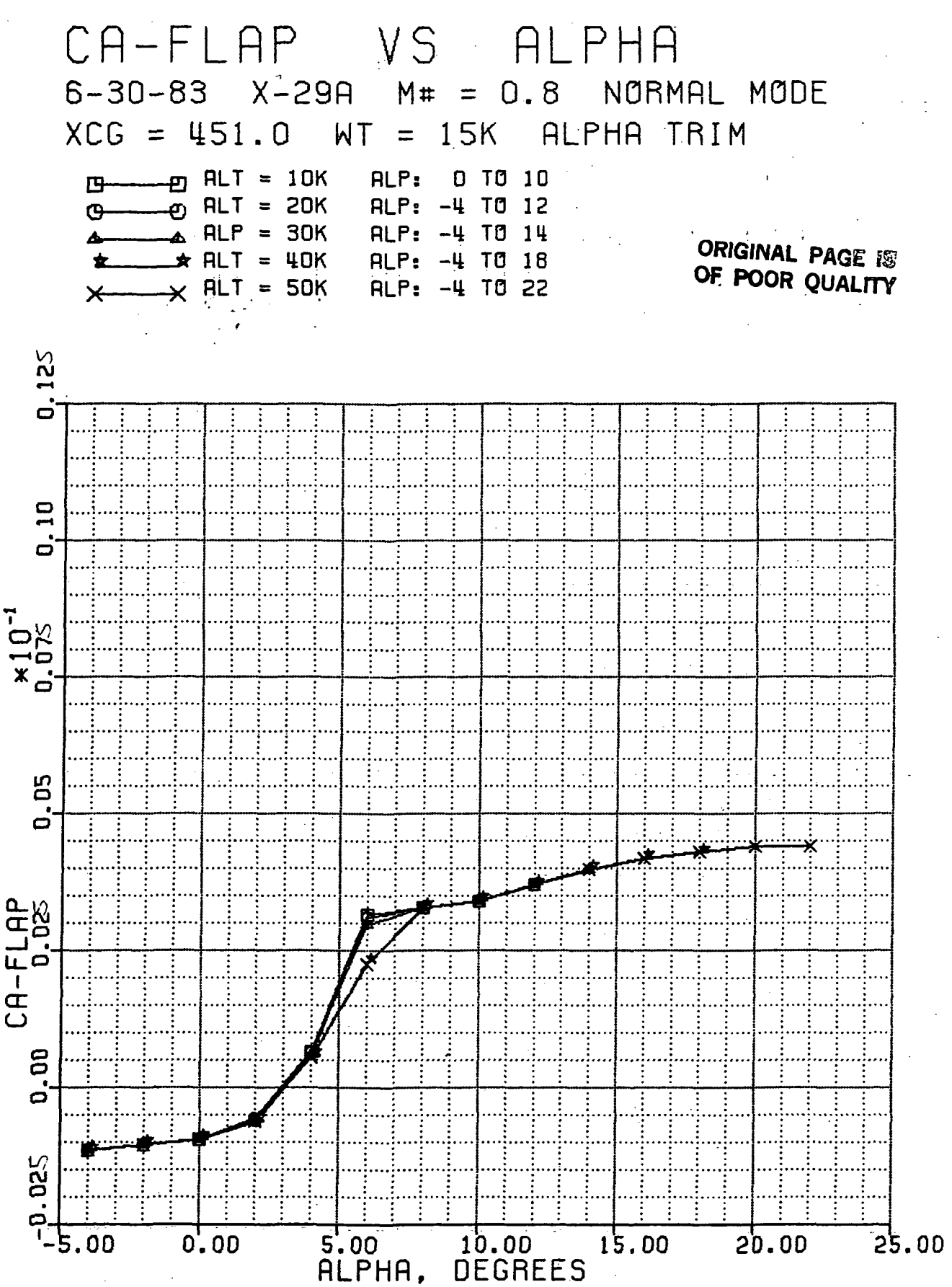
CA-FLAP VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
CA-FLAP *10⁻¹
0.125
0.10
0.075
0.05
0.025
0.00
-0.025
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 40(c)

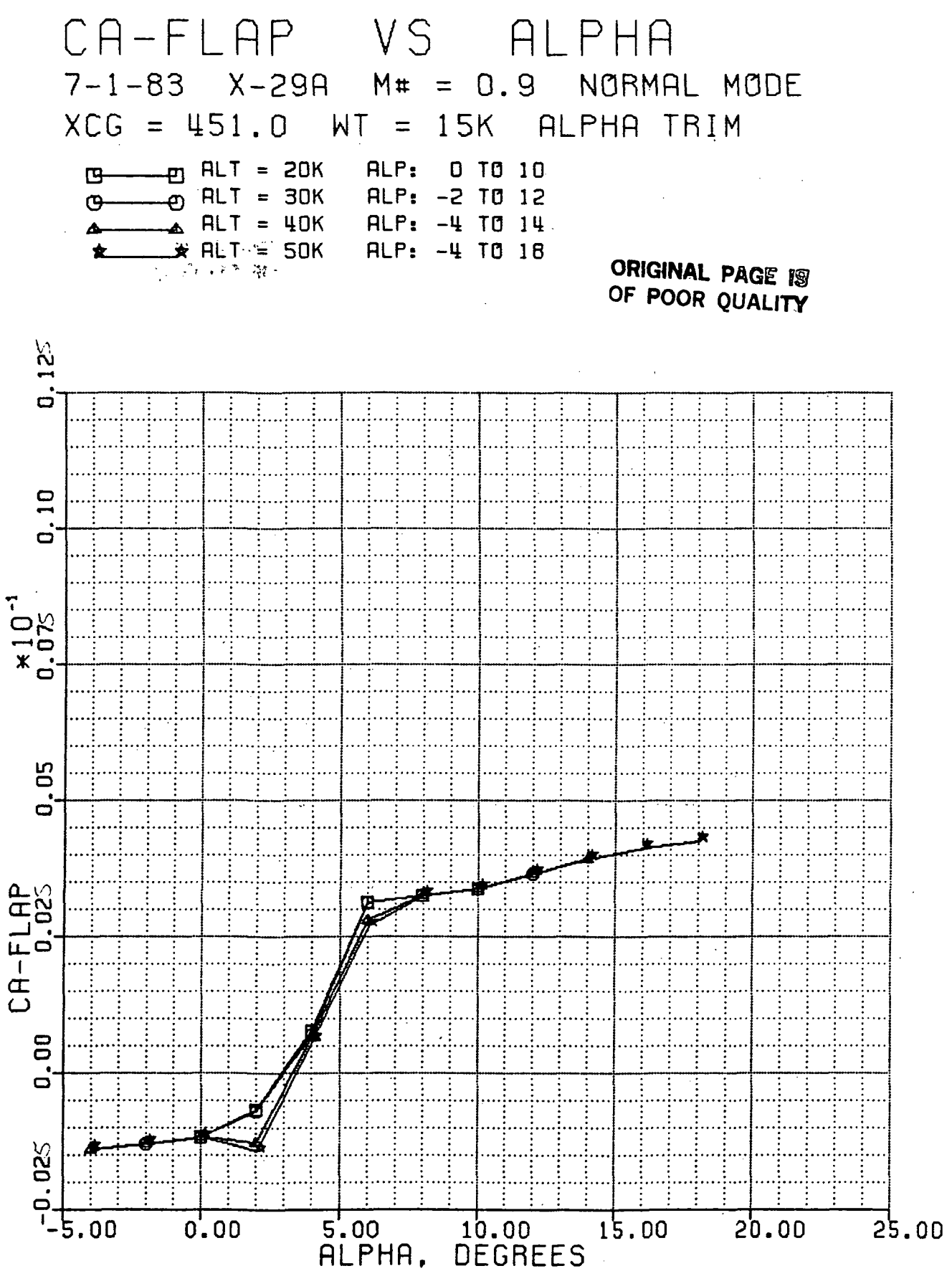
CA-FLAP VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS
OF POOR QUALITY
CA-FLAP *10^-1
0.125
0.10
0.075
0.05
0.025
0.00
-0.025
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 40(d)

CA-FLAP VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

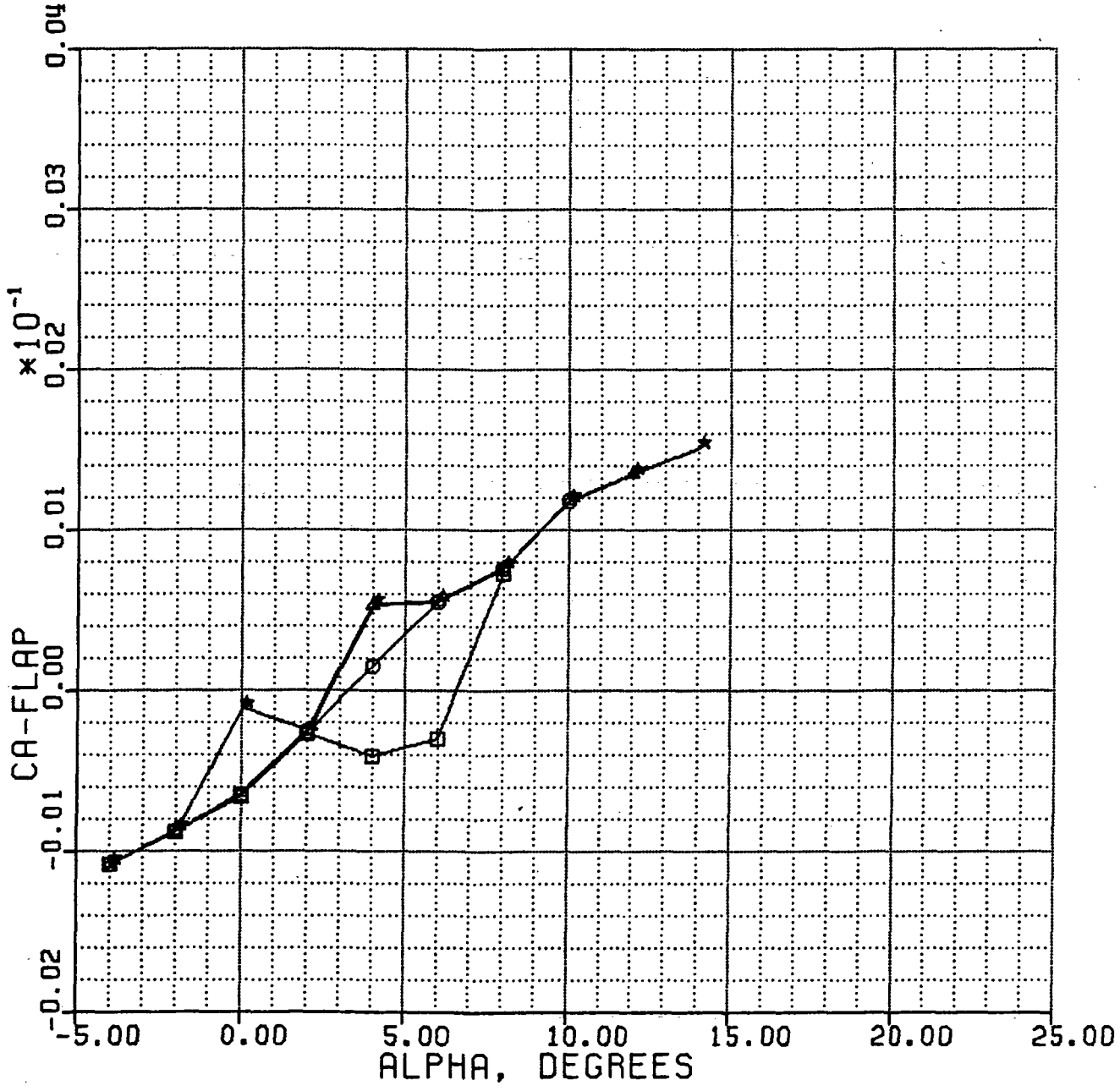

Figure 40(e)

CA-FLAP VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

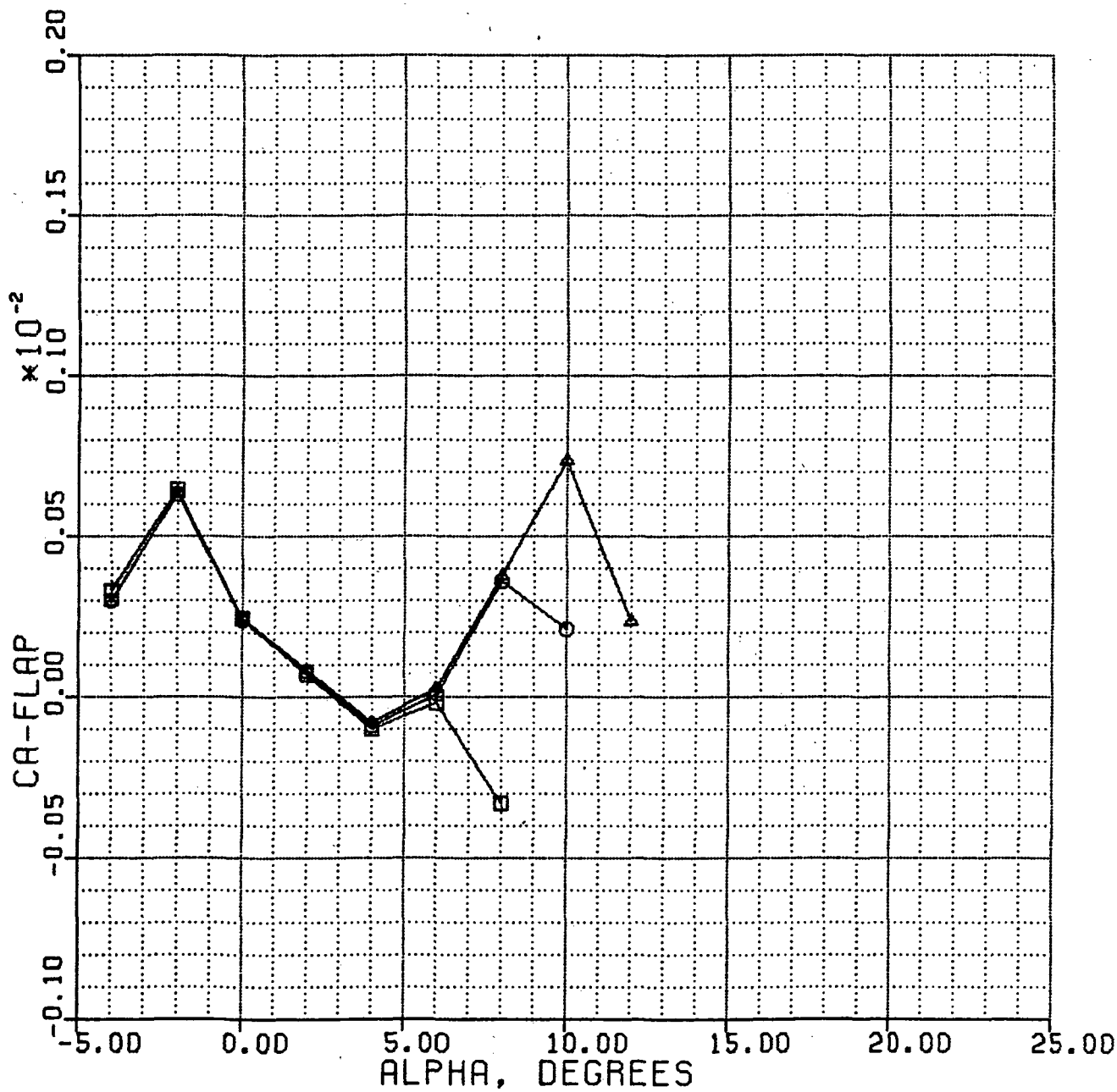

Figure 40(f)

CN-FLAP VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

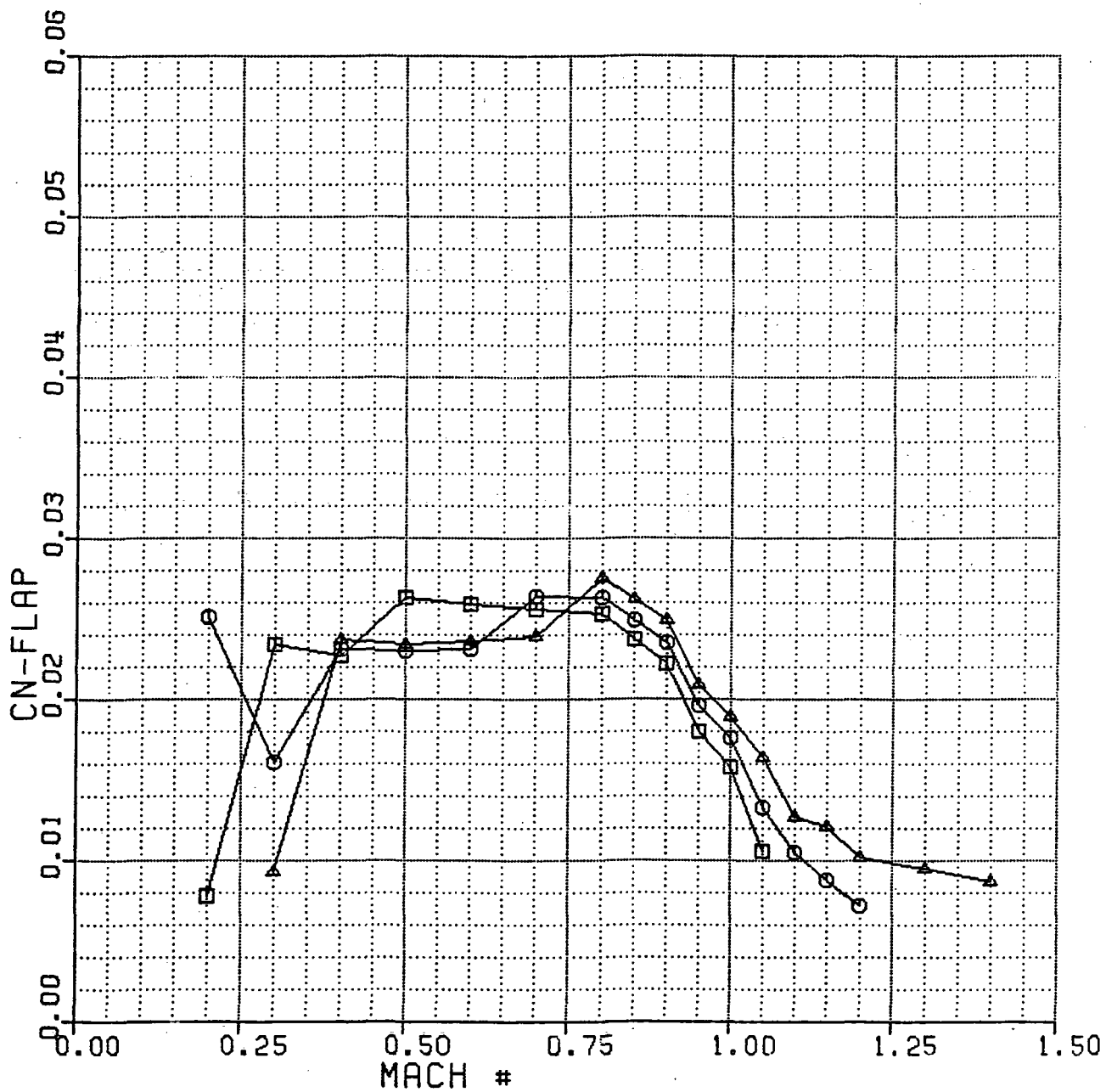

Figure 41(a)

CN-FLAP VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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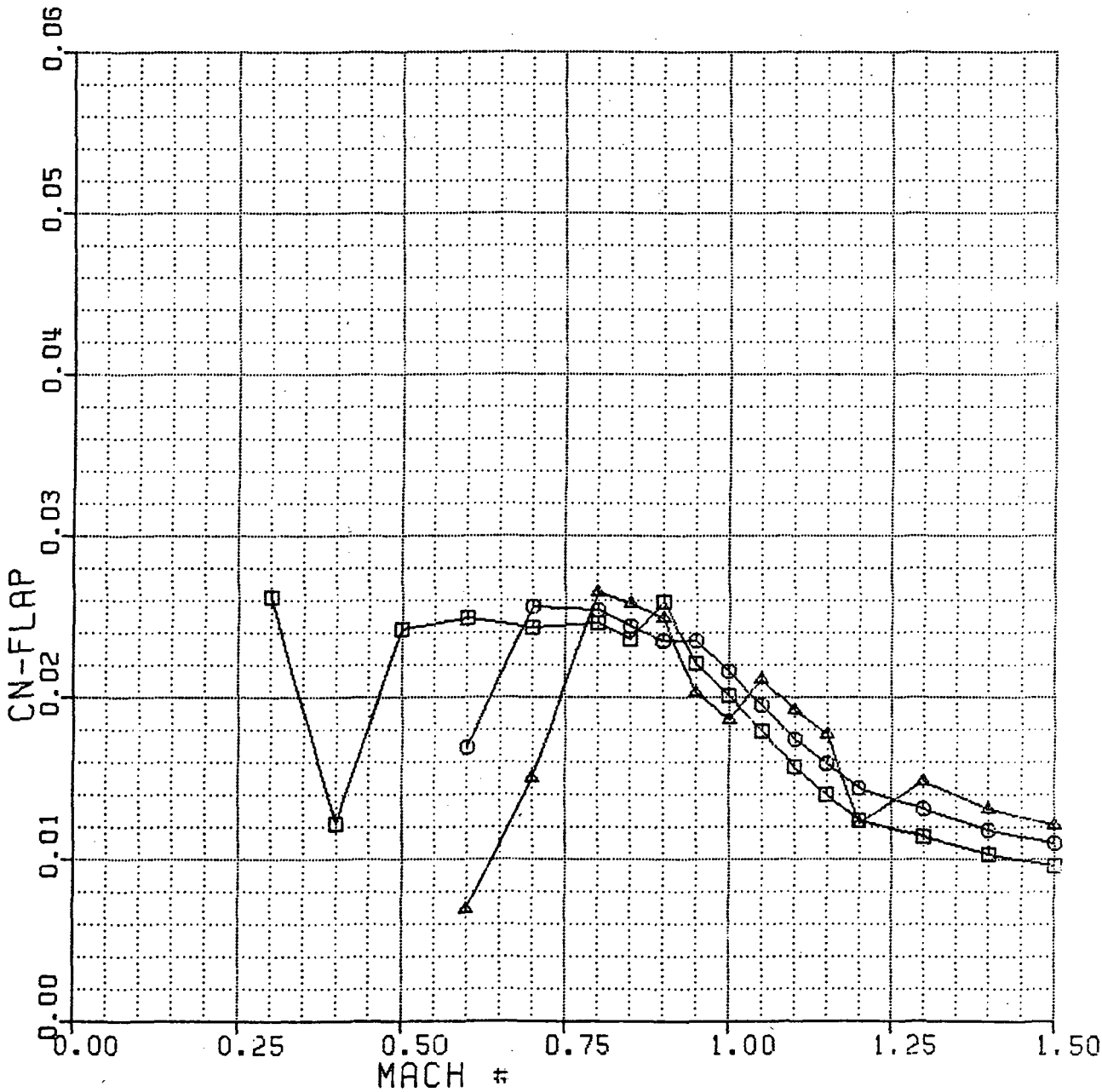

Figure 41(b)

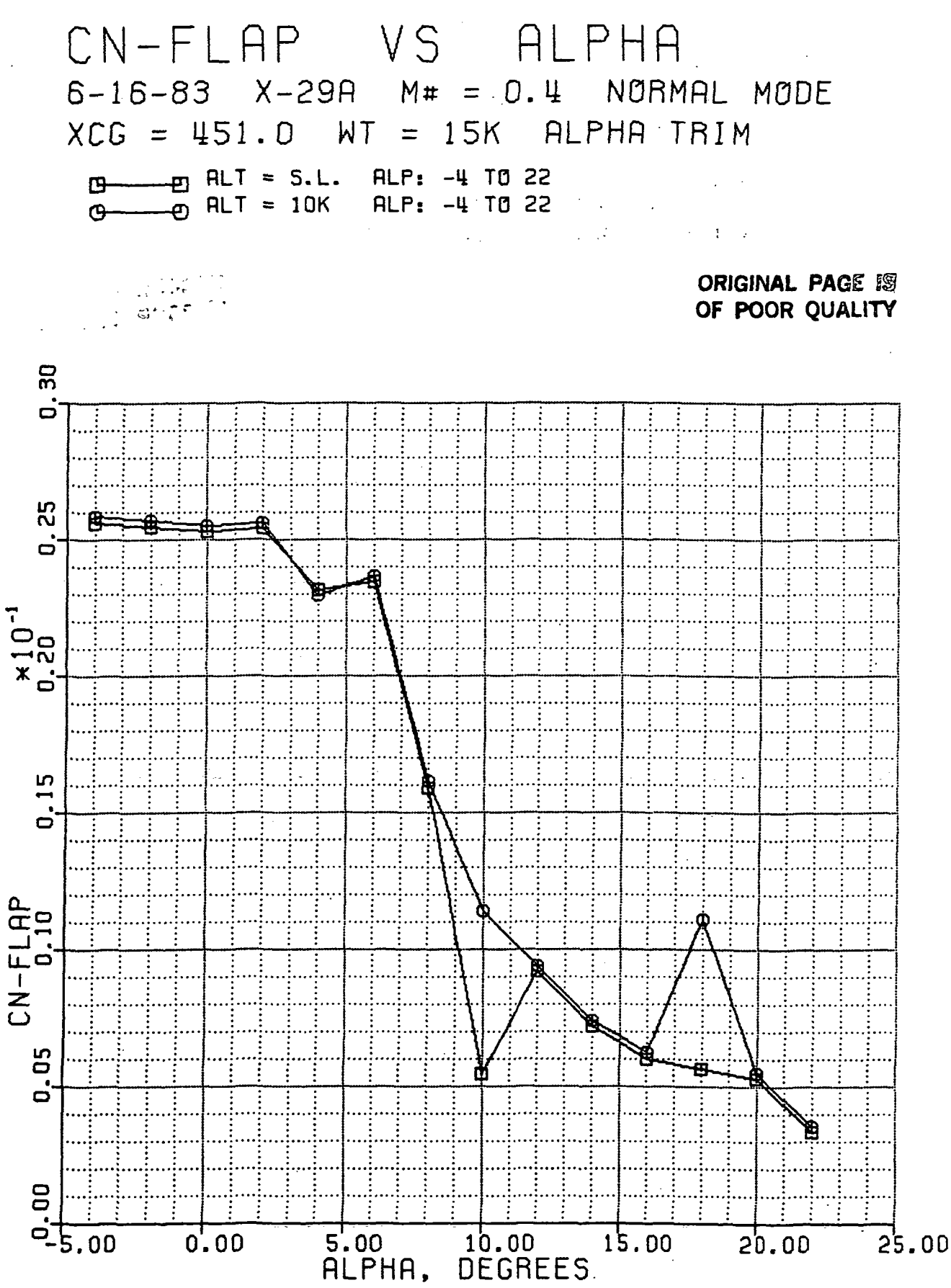
CN-FLAP VS ALPHA
6-16-83 X-29A M# = 0.4 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TO 22
ALT = 10K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CN-FLAP
*10⁻¹
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 42(a)

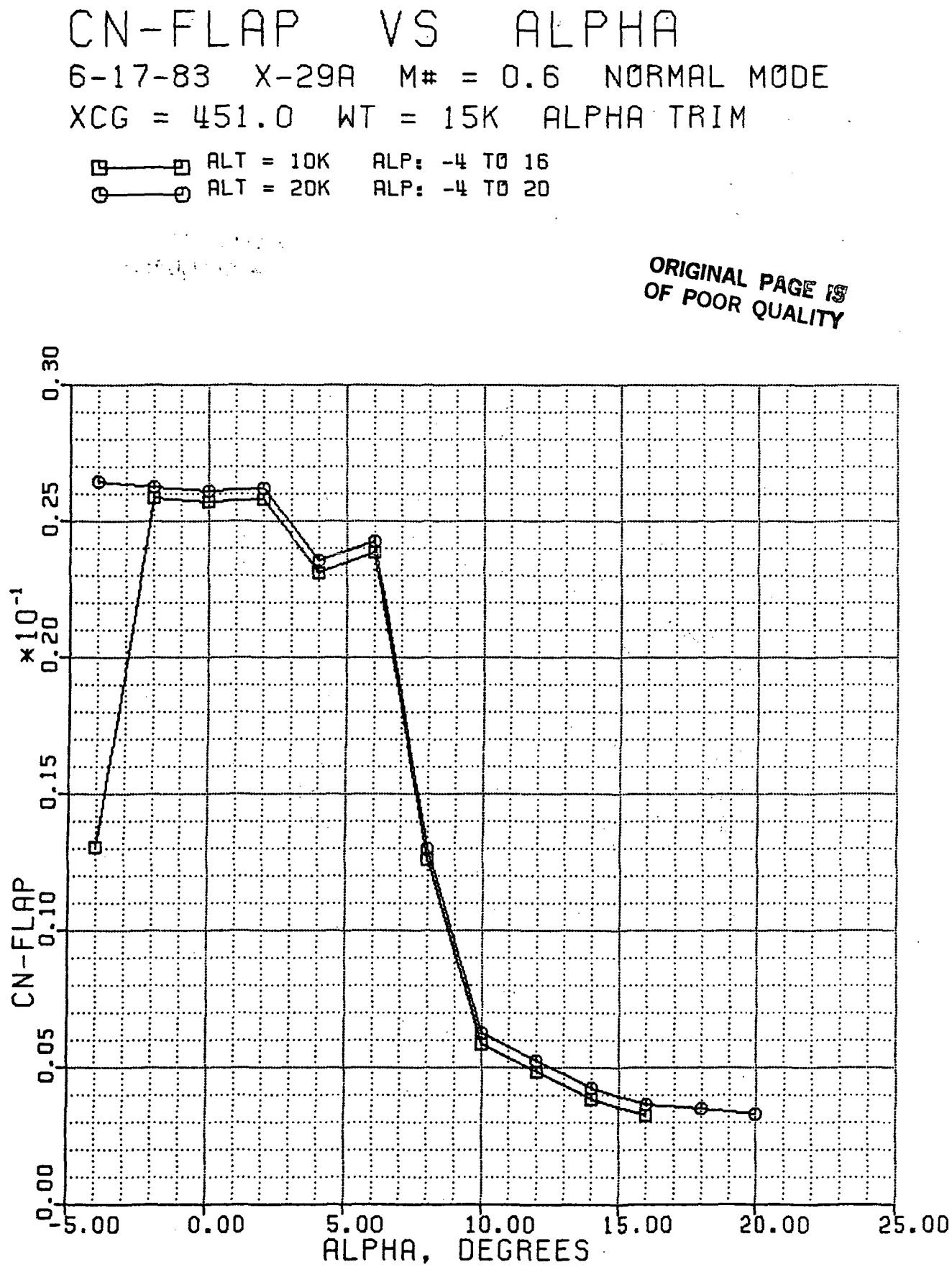
CN-FLAP VS ALPHA
6-17-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS OF POOR QUALITY
CN-FLAP
*10⁻¹
0.00
0.05
0.10
0.15
0.20
0.25
0.30
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 42(b)

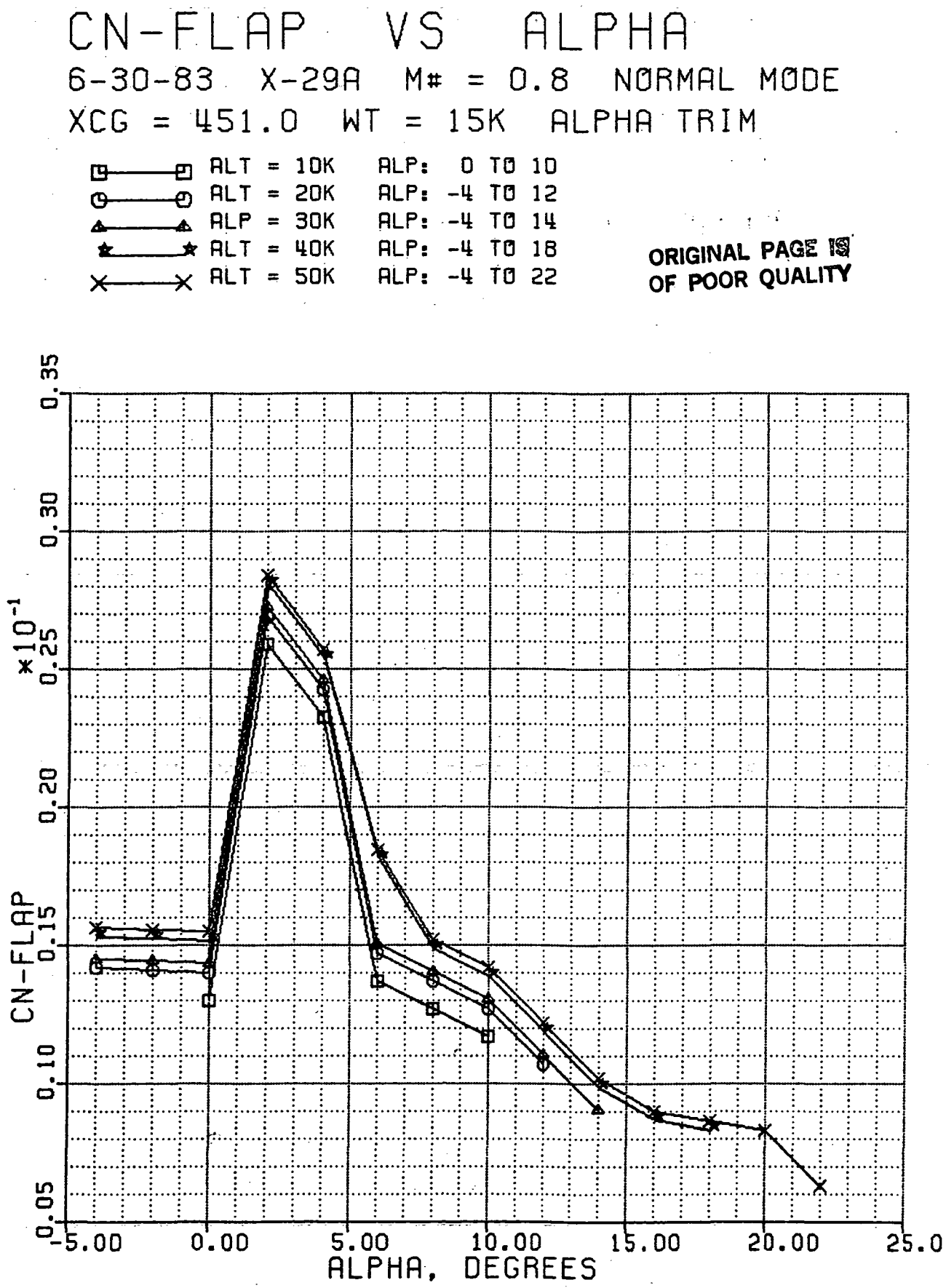
CN-FLAP VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
CN-FLAP
×10⁻¹
0.35
0.30
0.25
0.20
0.15
0.10
0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 42(c)

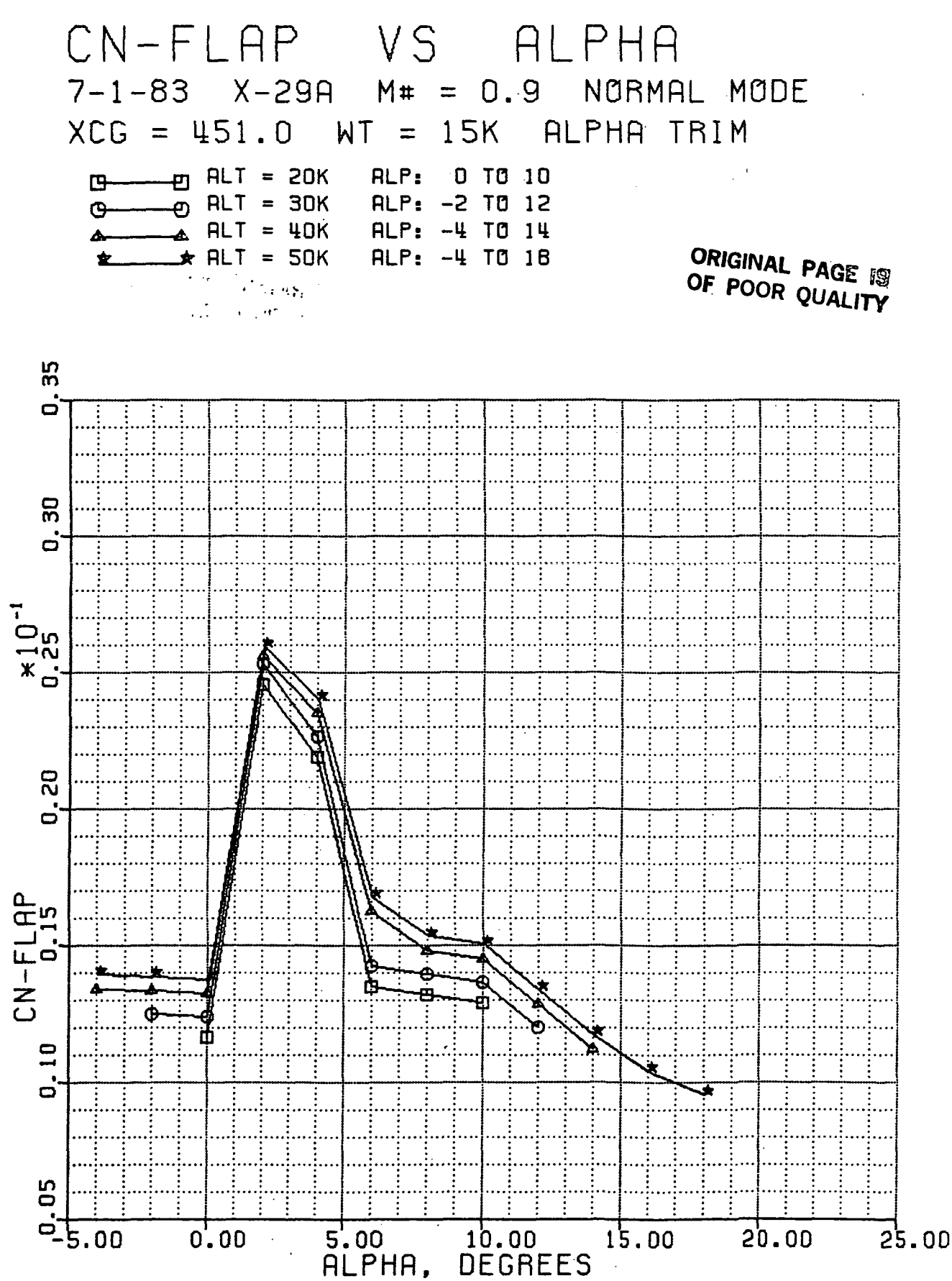
CN-FLAP VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS OF POOR QUALITY
CN-FLAP *10^-1
0.35
0.30
0.25
0.20
0.15
0.10
0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 42(d)

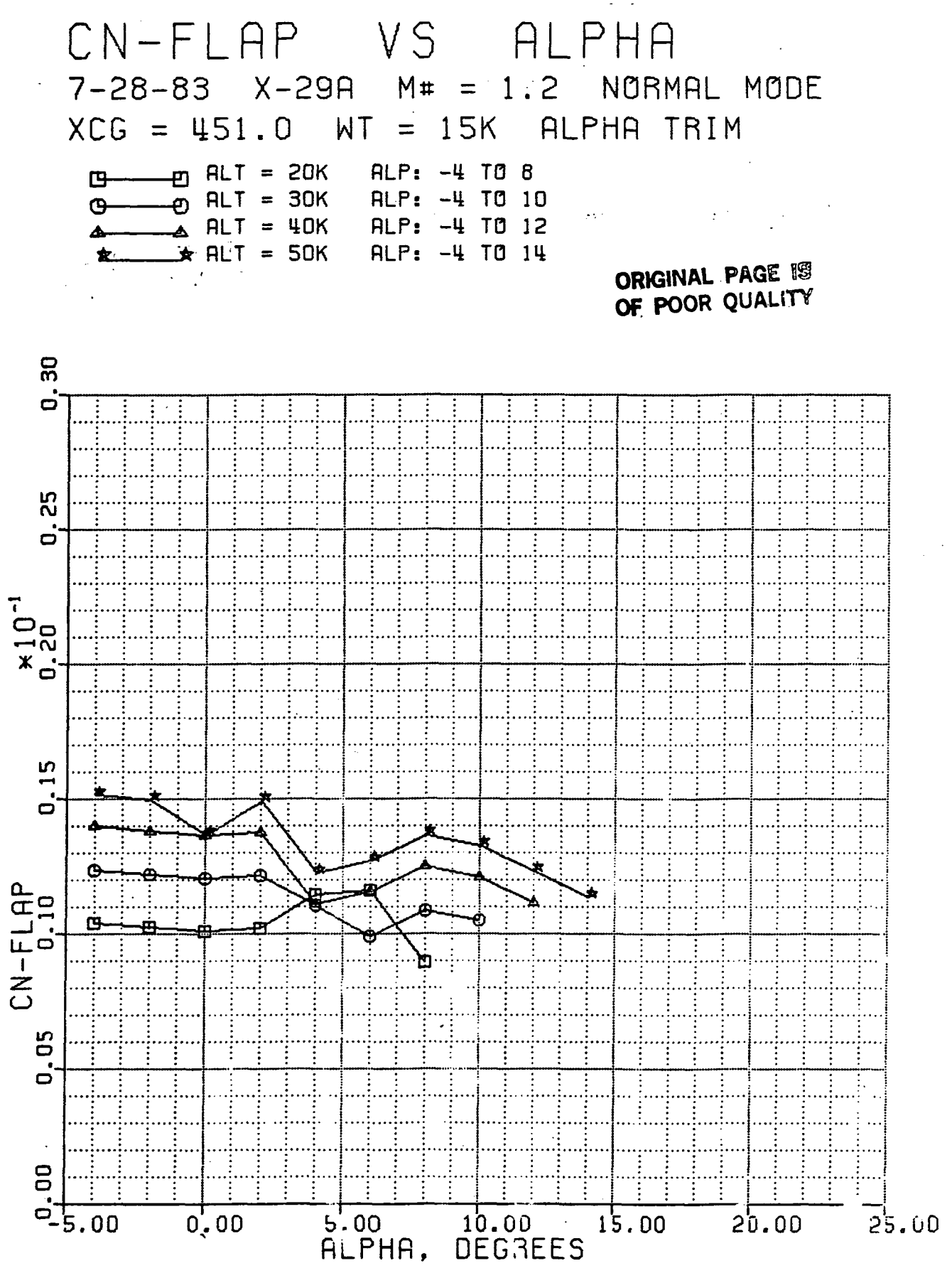
CN-FLAP VS ALPHA
7-28-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS
OF POOR QUALITY
CN-FLAP *10^-1
0.00
0.05
0.10
0.15
0.20
0.25
0.30
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 42(e)

CN-FLAP VS ALPHA

7-28-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

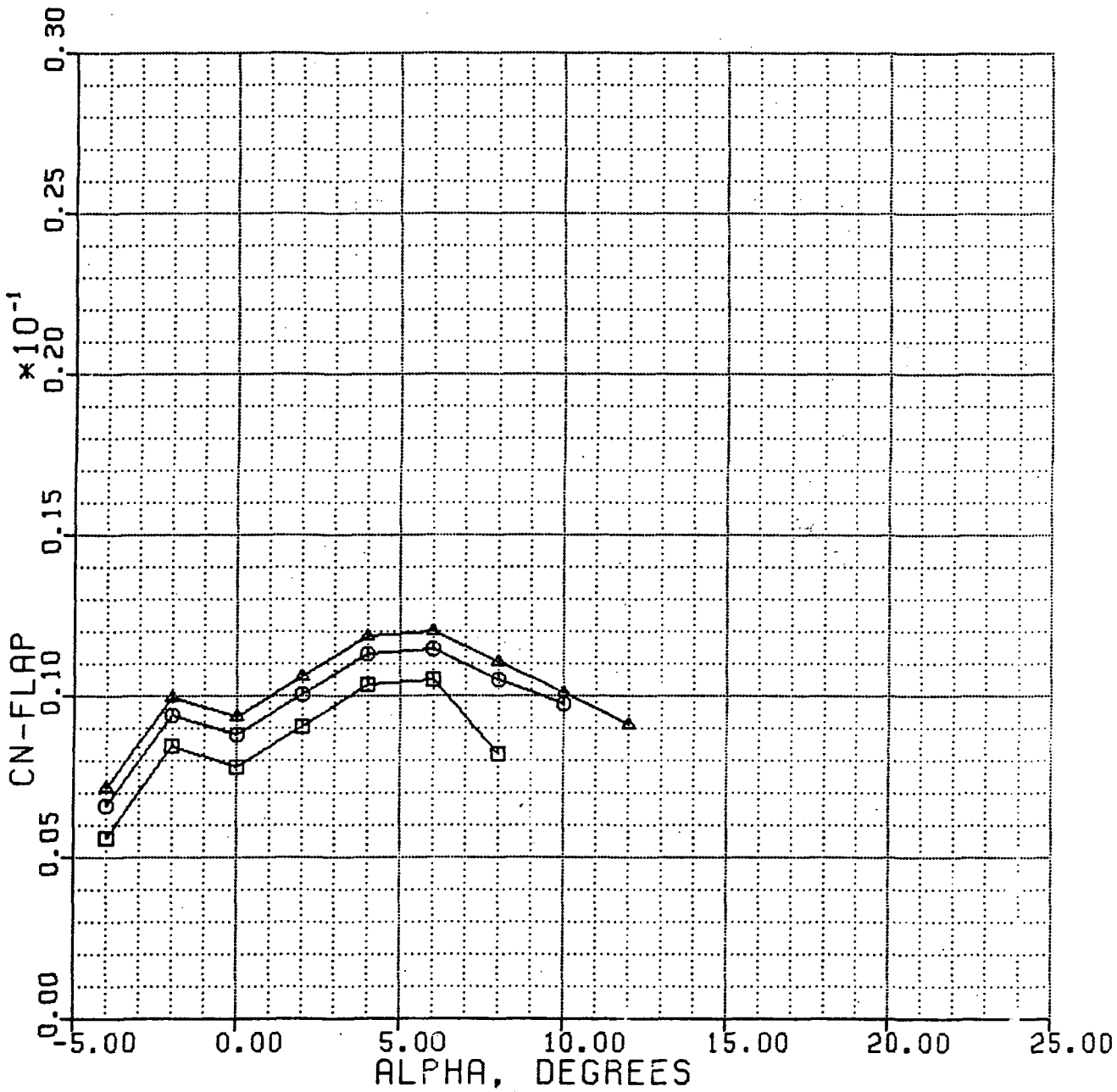

Figure 42(f)

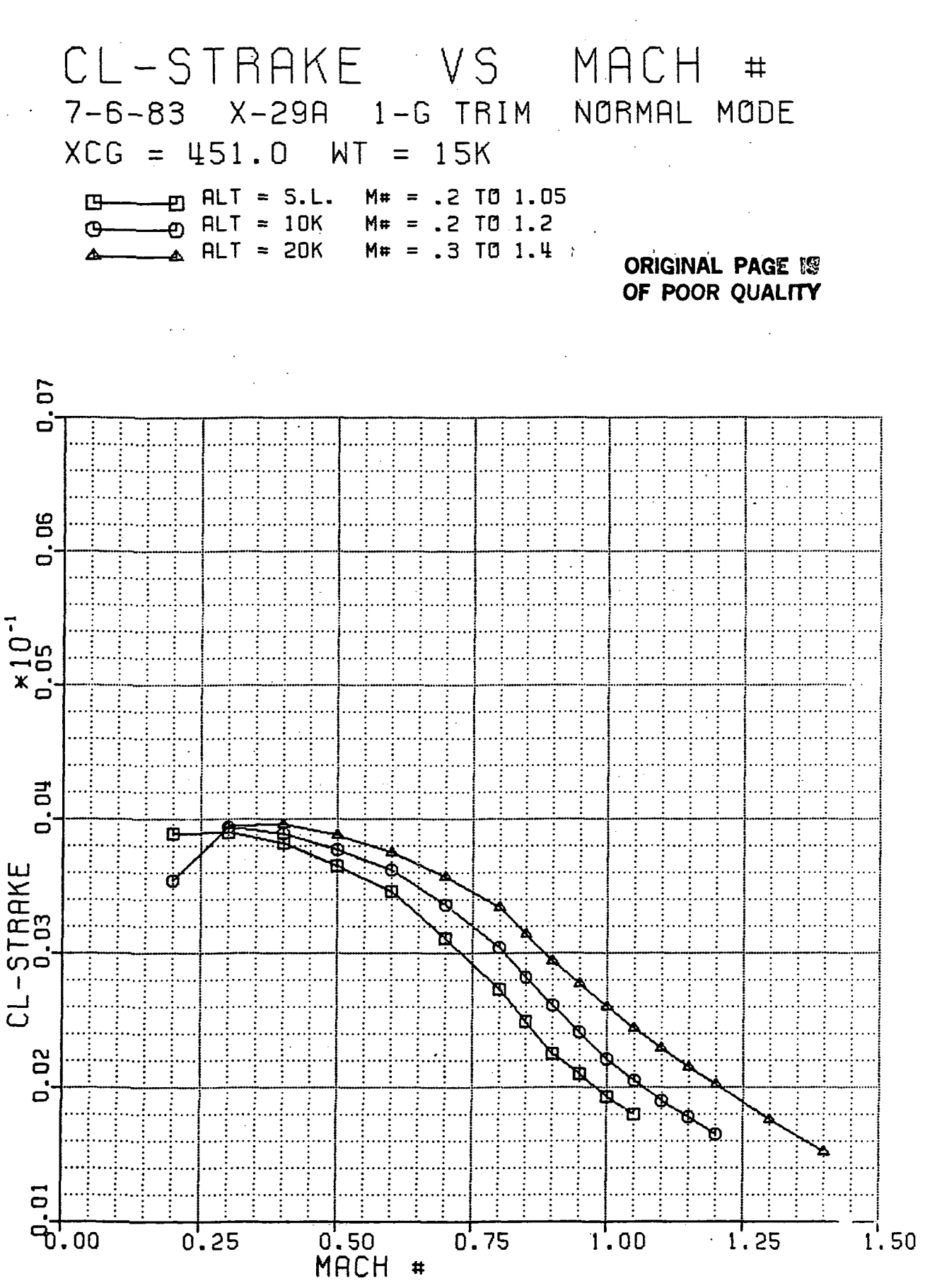
CL-STRAKE VS MACH #
7-6-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4
ORIGINAL PAGE IS
OF POOR QUALITY
CL-STRAKE
*10^-1
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 43(a)

CL-STRAKE VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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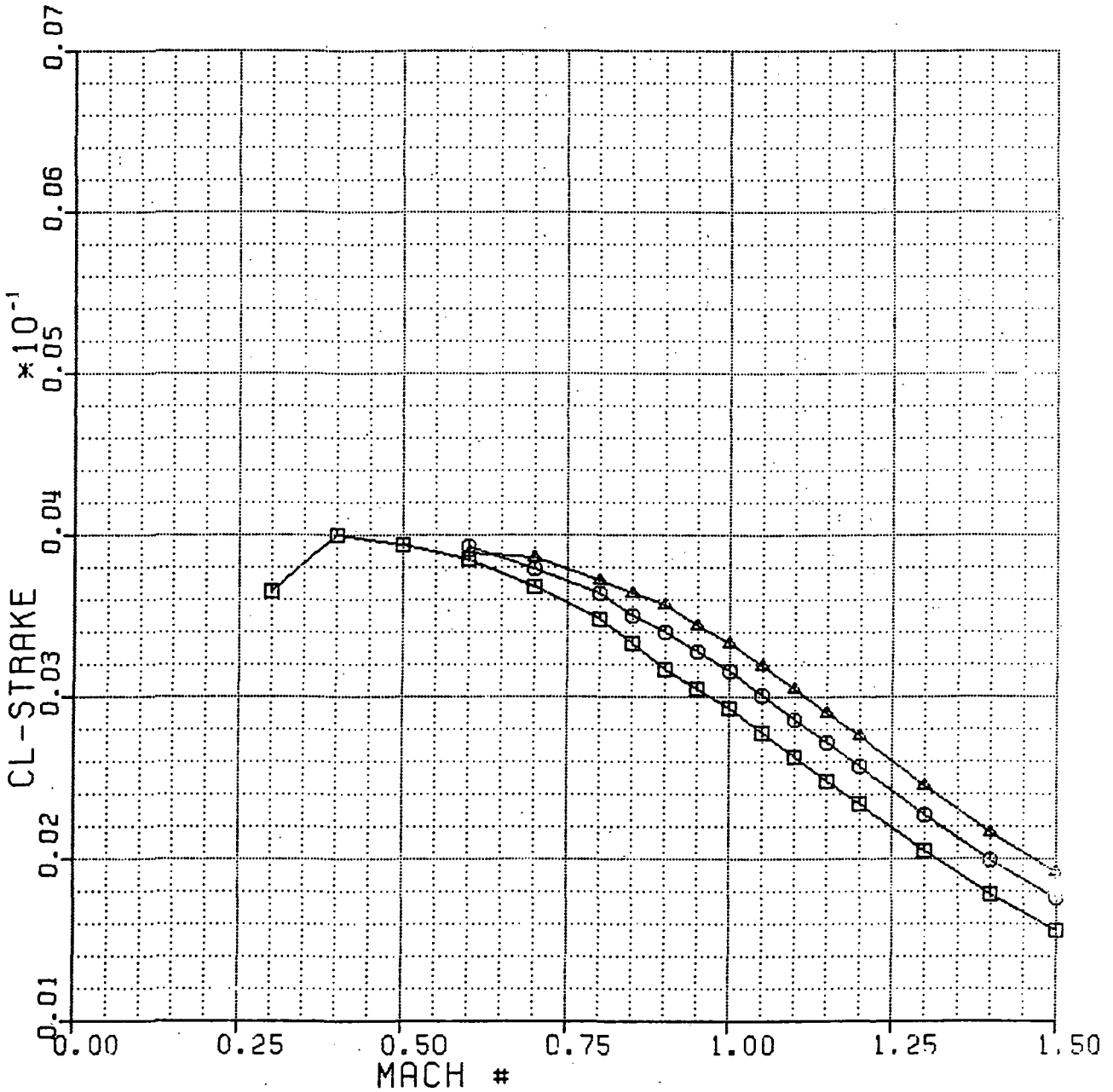

Figure 43(b)

CL-STRAKE VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

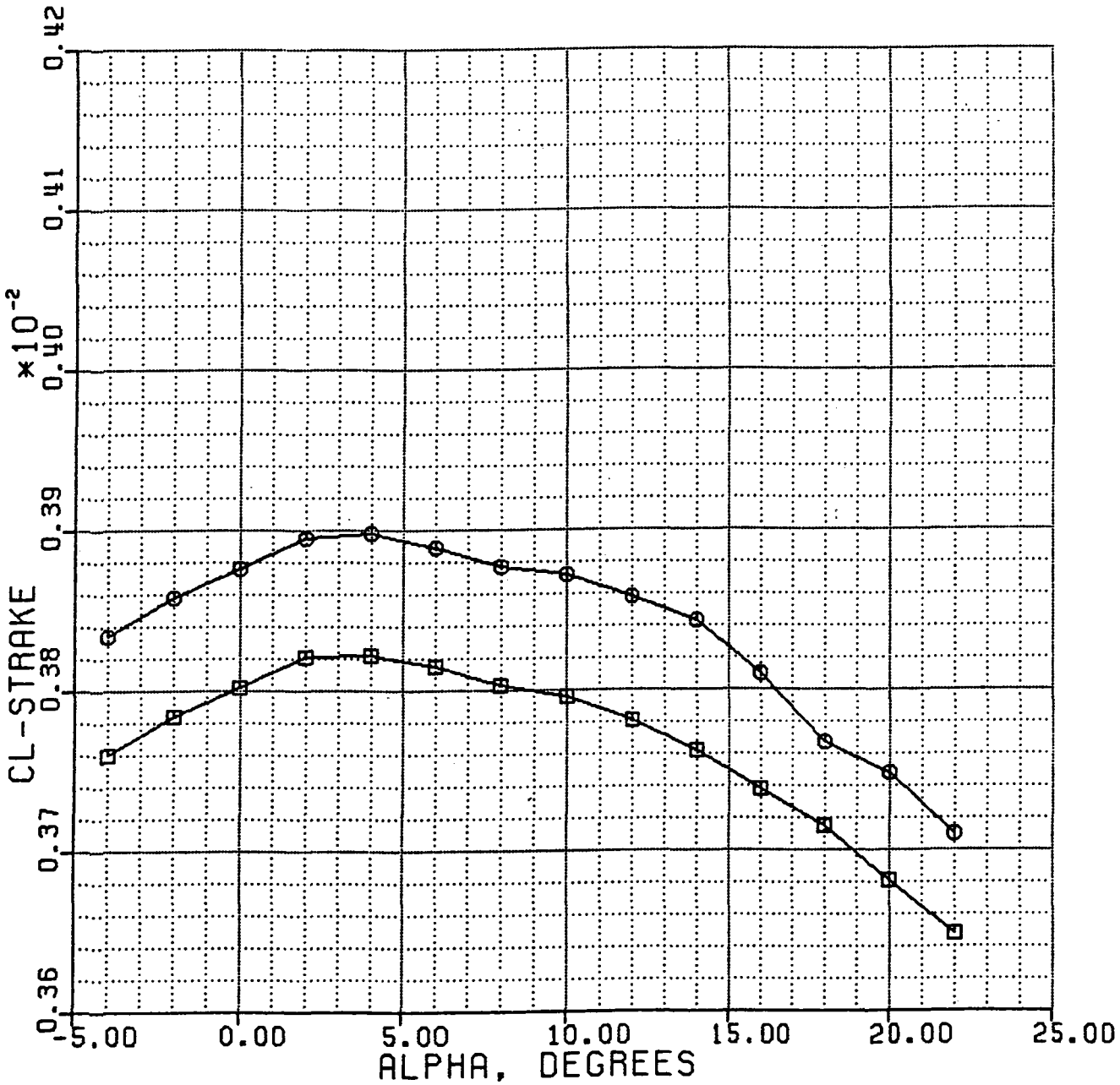

Figure 44(a)

CL-STRAKE VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
OF POOR QUALITY

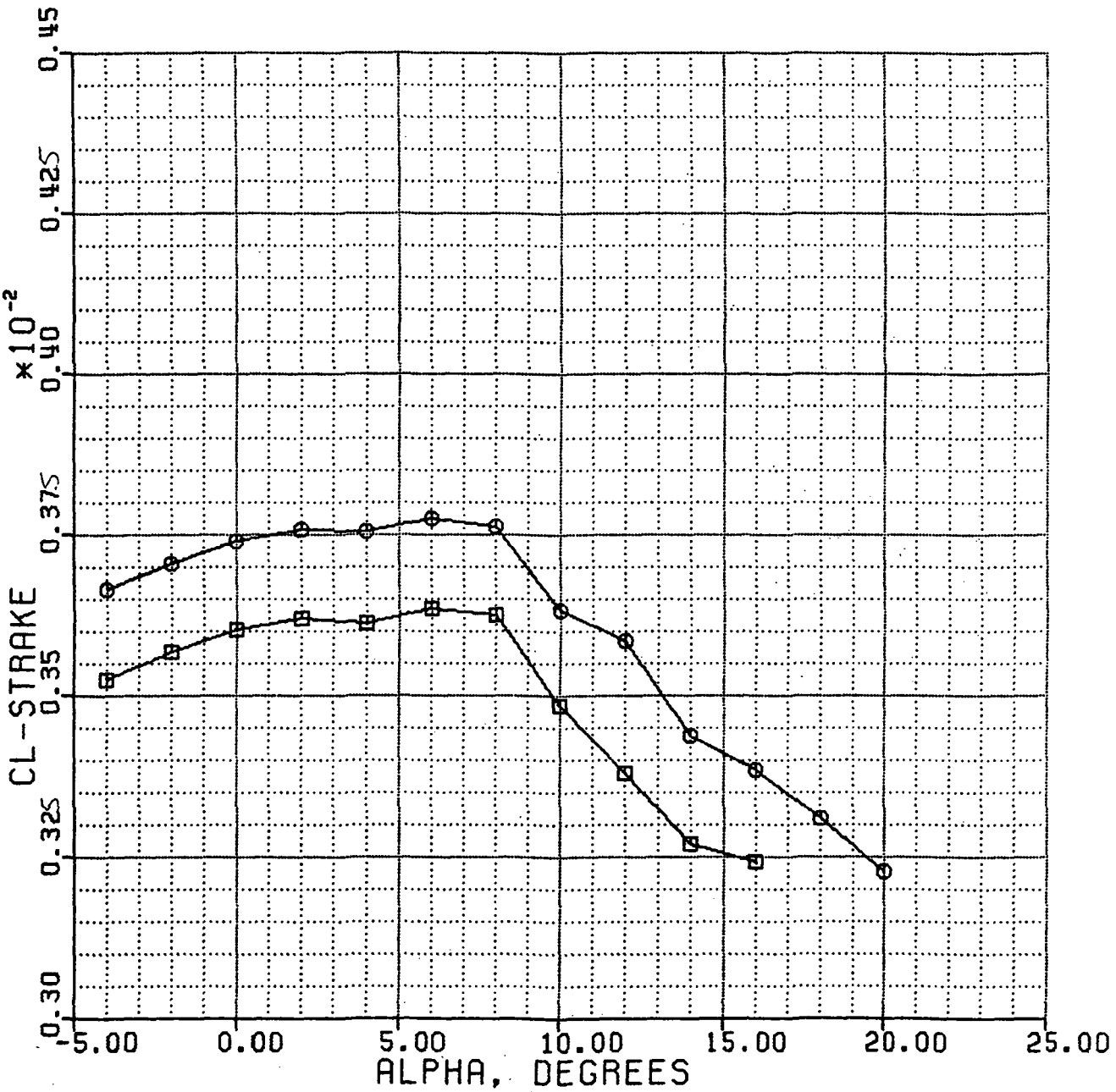

Figure 44(b)

C-3

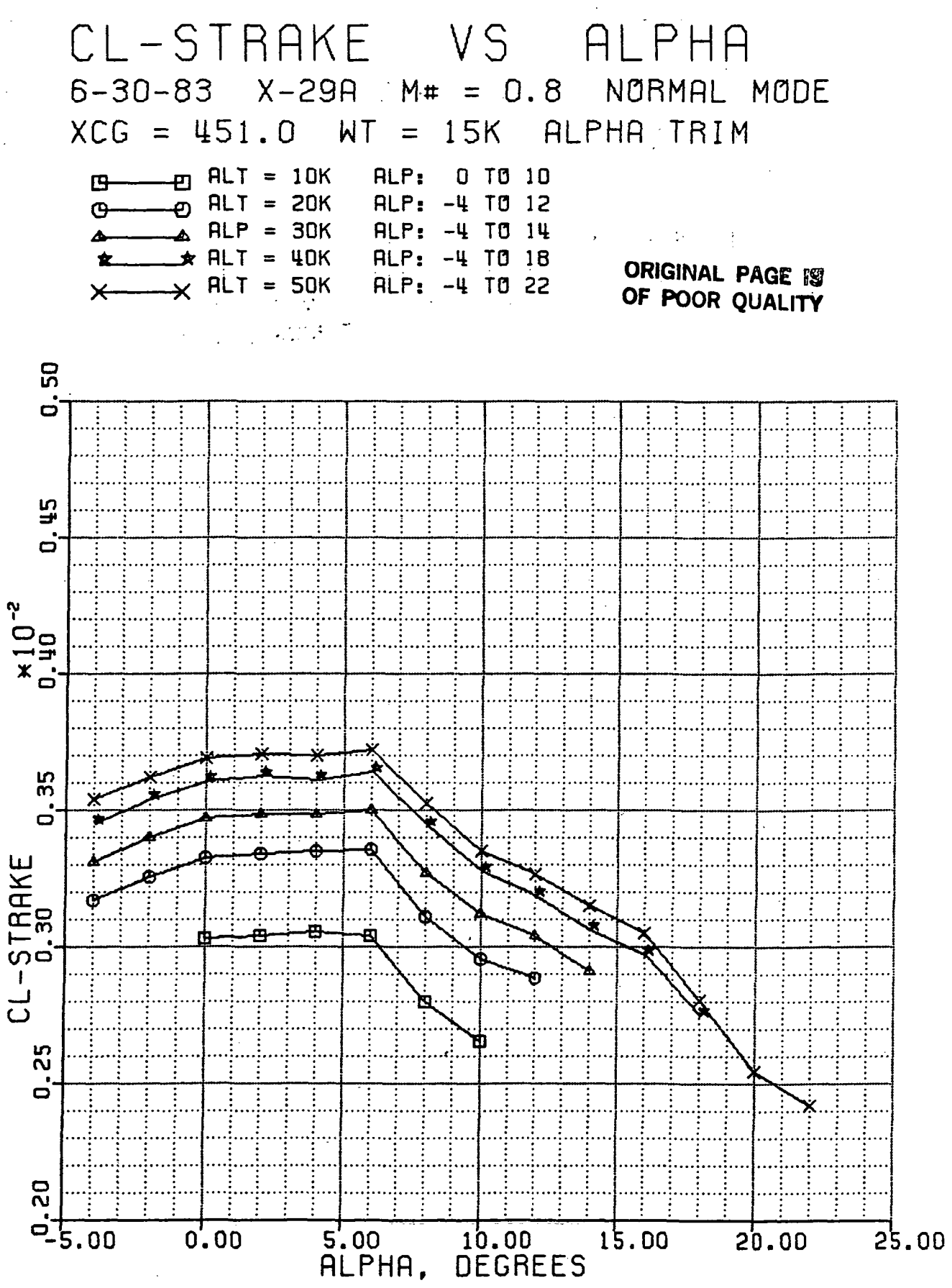
CL-STRAKE VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
CL-STRAKE
*10^-2
0.50
0.45
0.40
0.35
0.30
0.25
0.20
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 44(c)

CL-STRAKE VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
OF POOR QUALITY

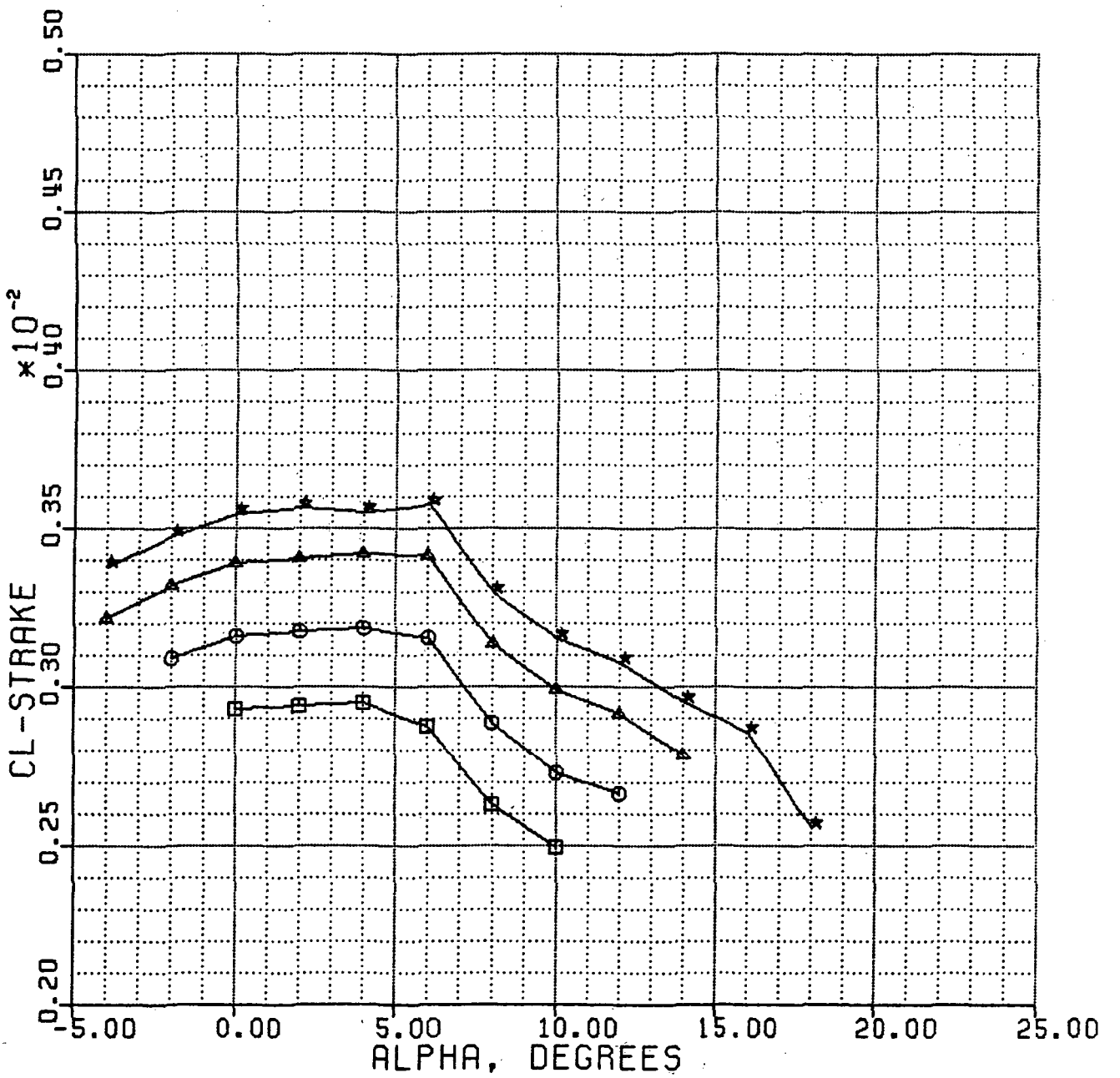

Figure 44(d)

CL-STRAKE VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

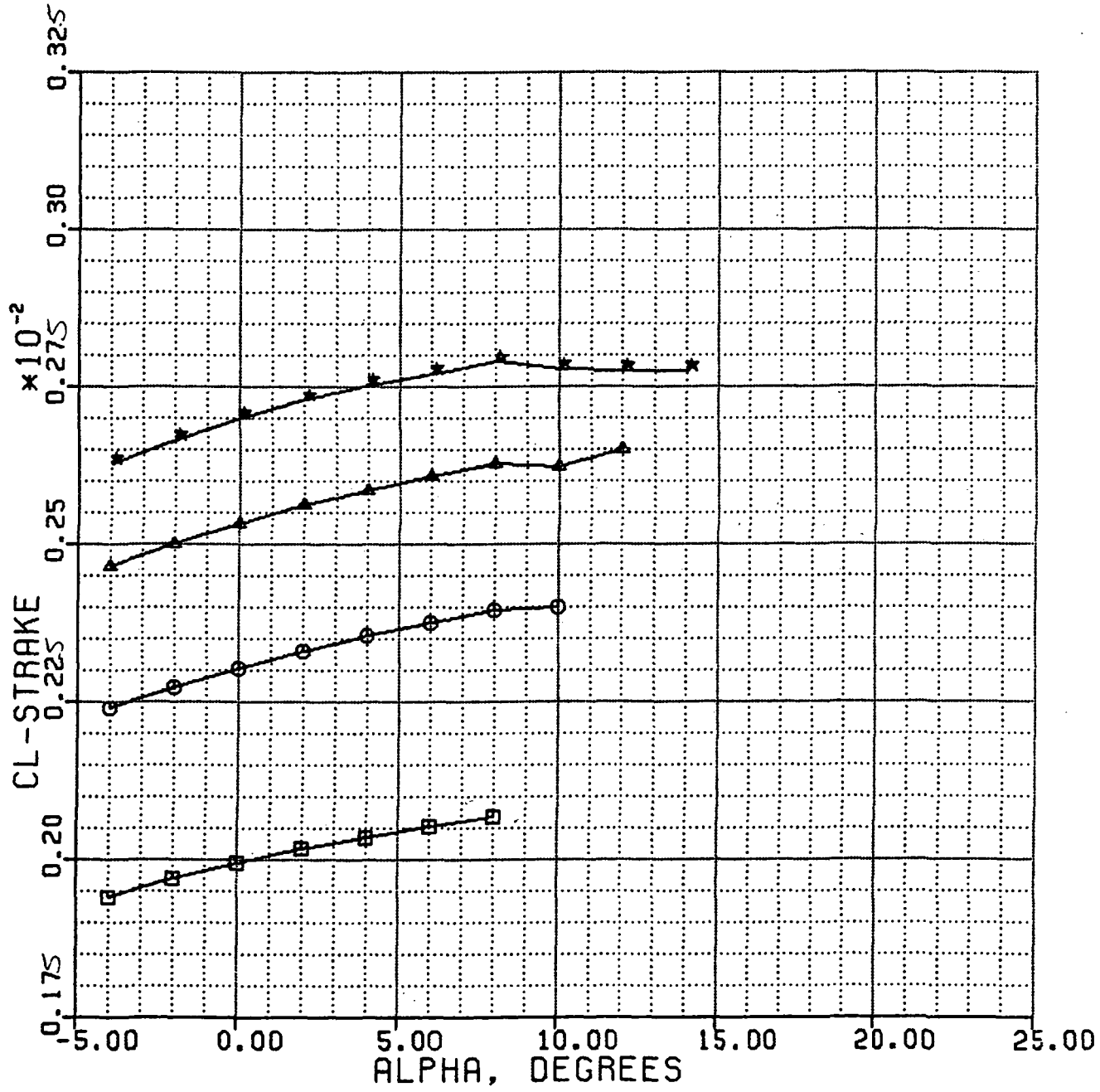

Figure 44(e)

CL-STRAKE VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

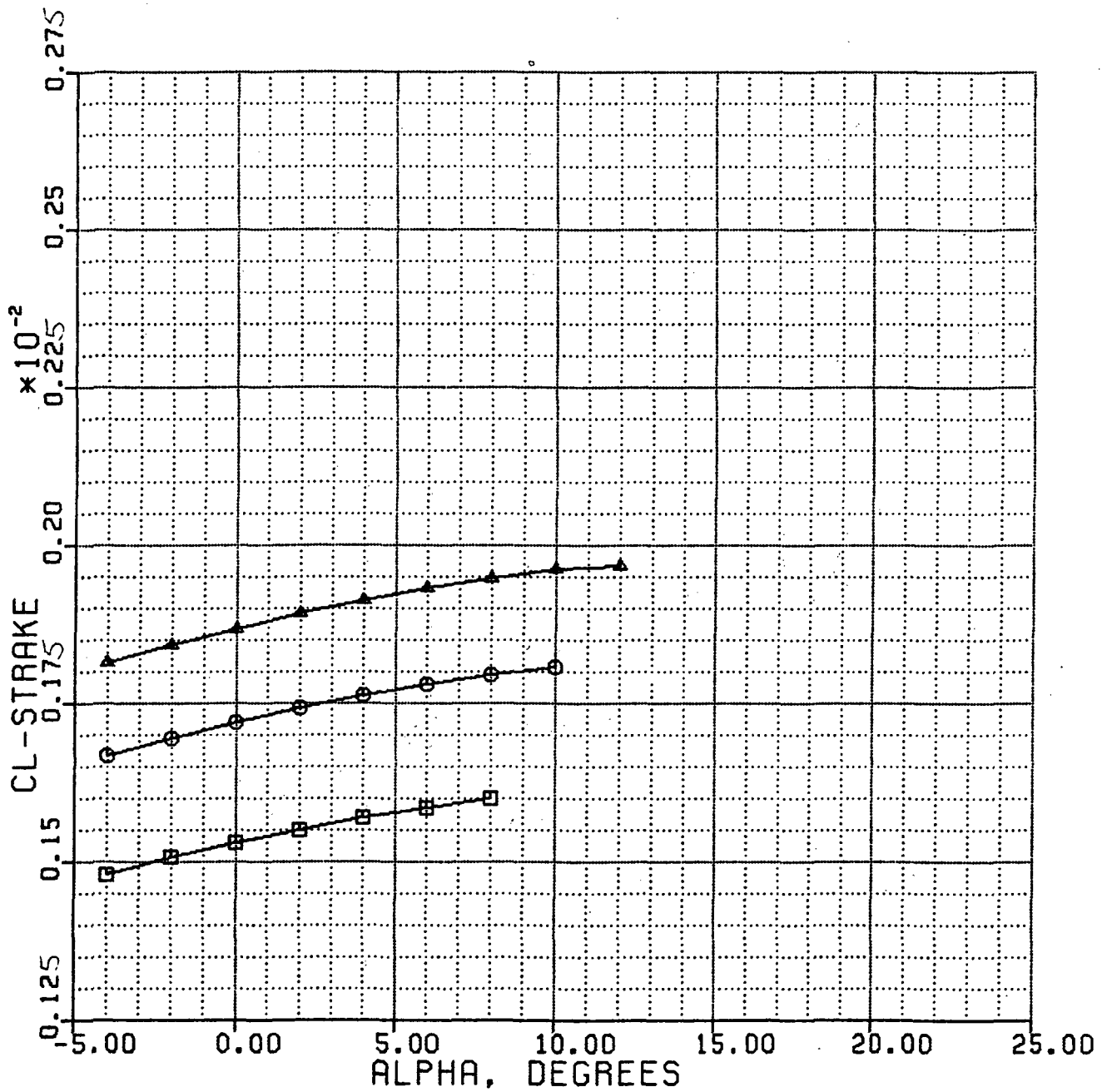

Figure 44(f)

CD-STRAKE VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

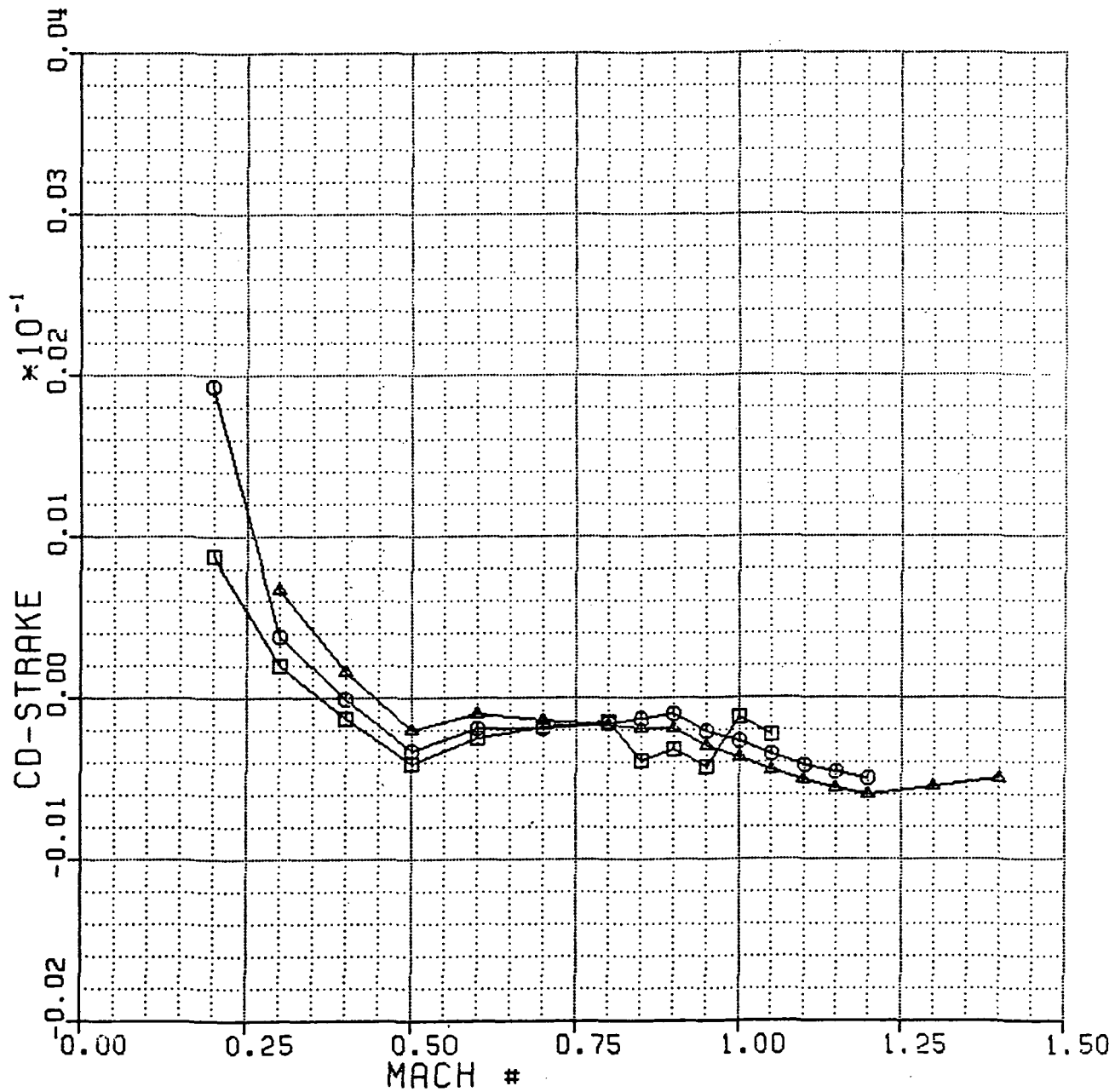

Figure 45(a)

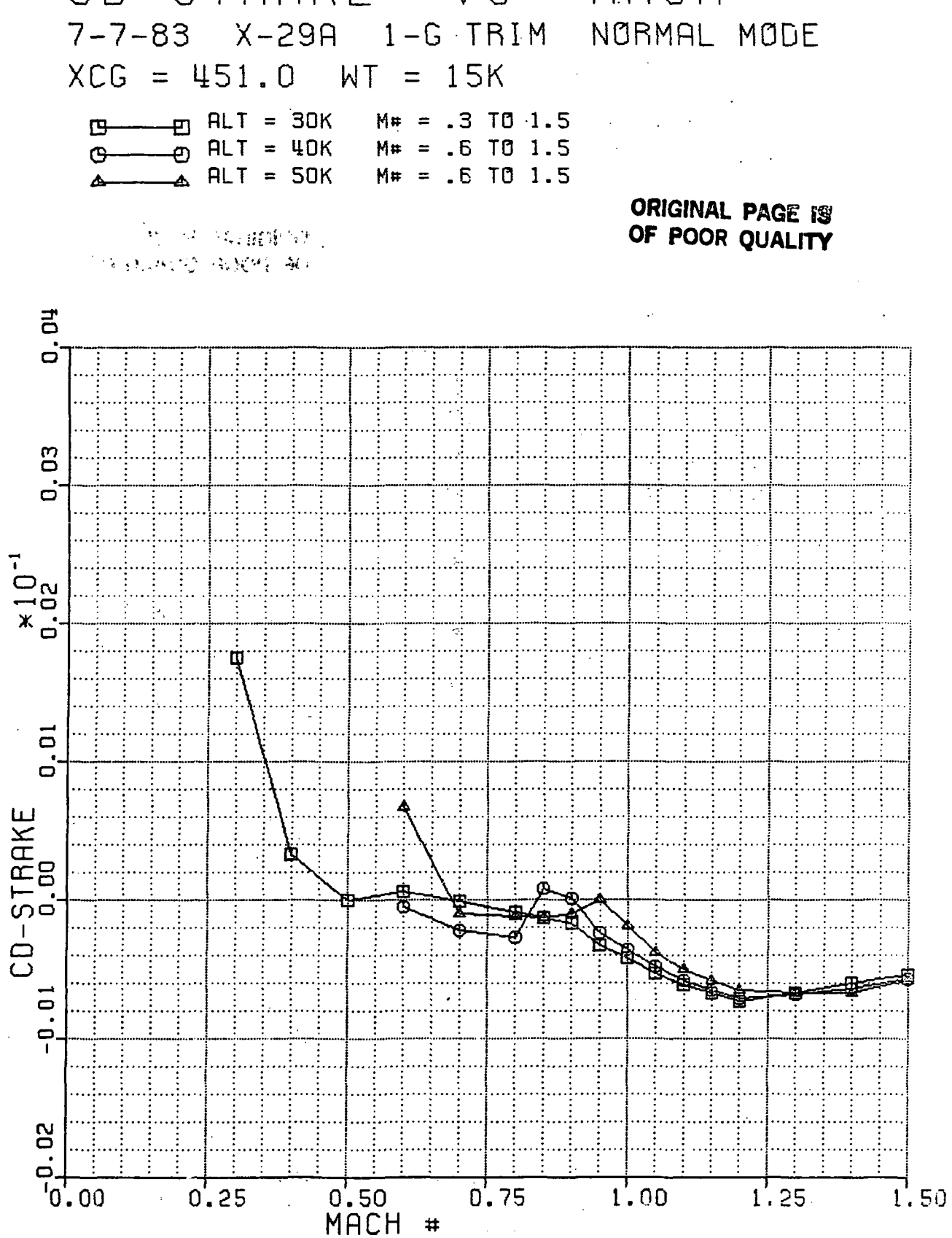
CD-STRAKE VS MACH #
7-7-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS
OF POOR QUALITY
CD-STRAKE *10^-1
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 45(b)

CD-STRAKE VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

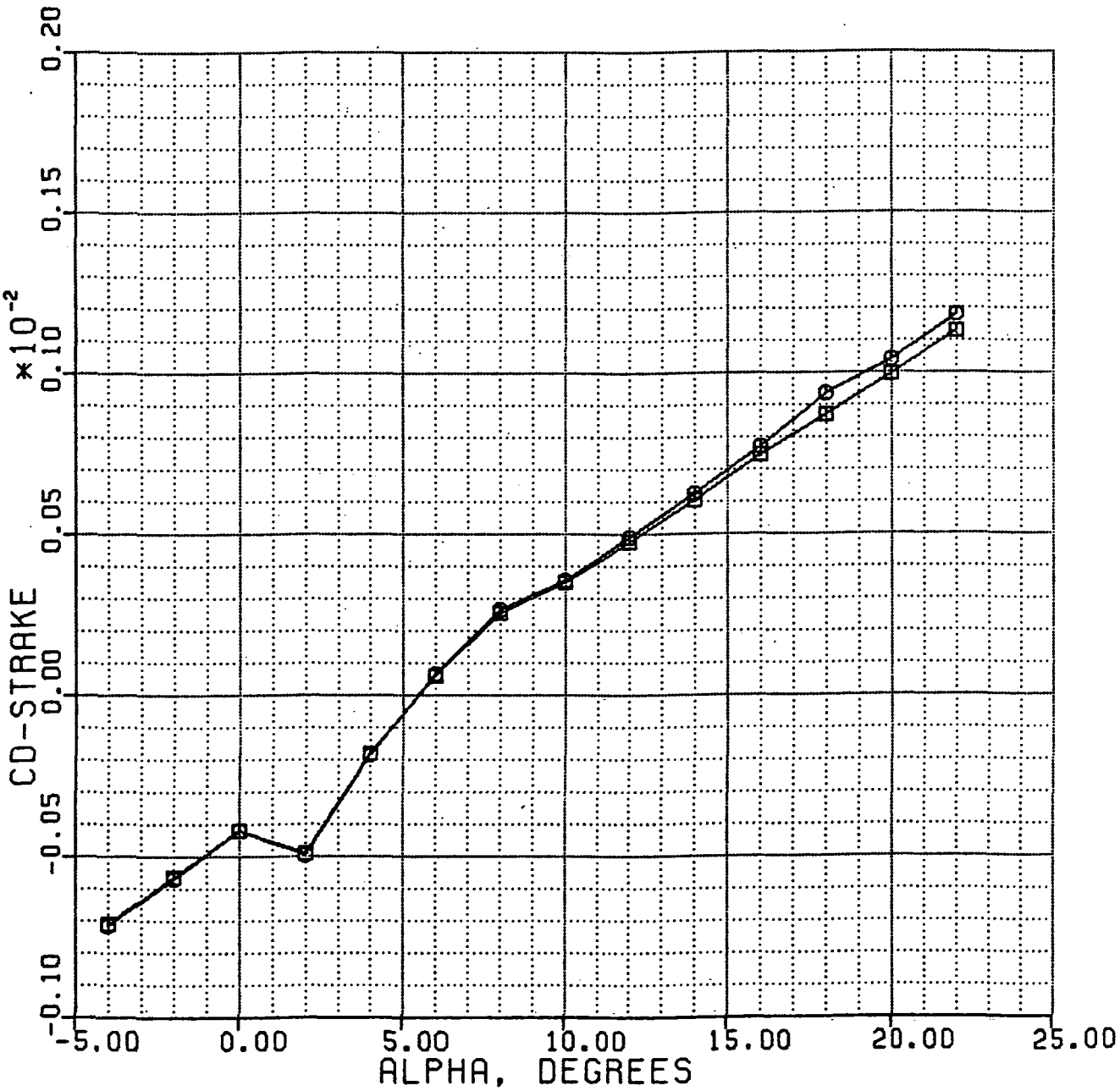

Figure 46(a)

CD-STRAKE VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
OF POOR QUALITY

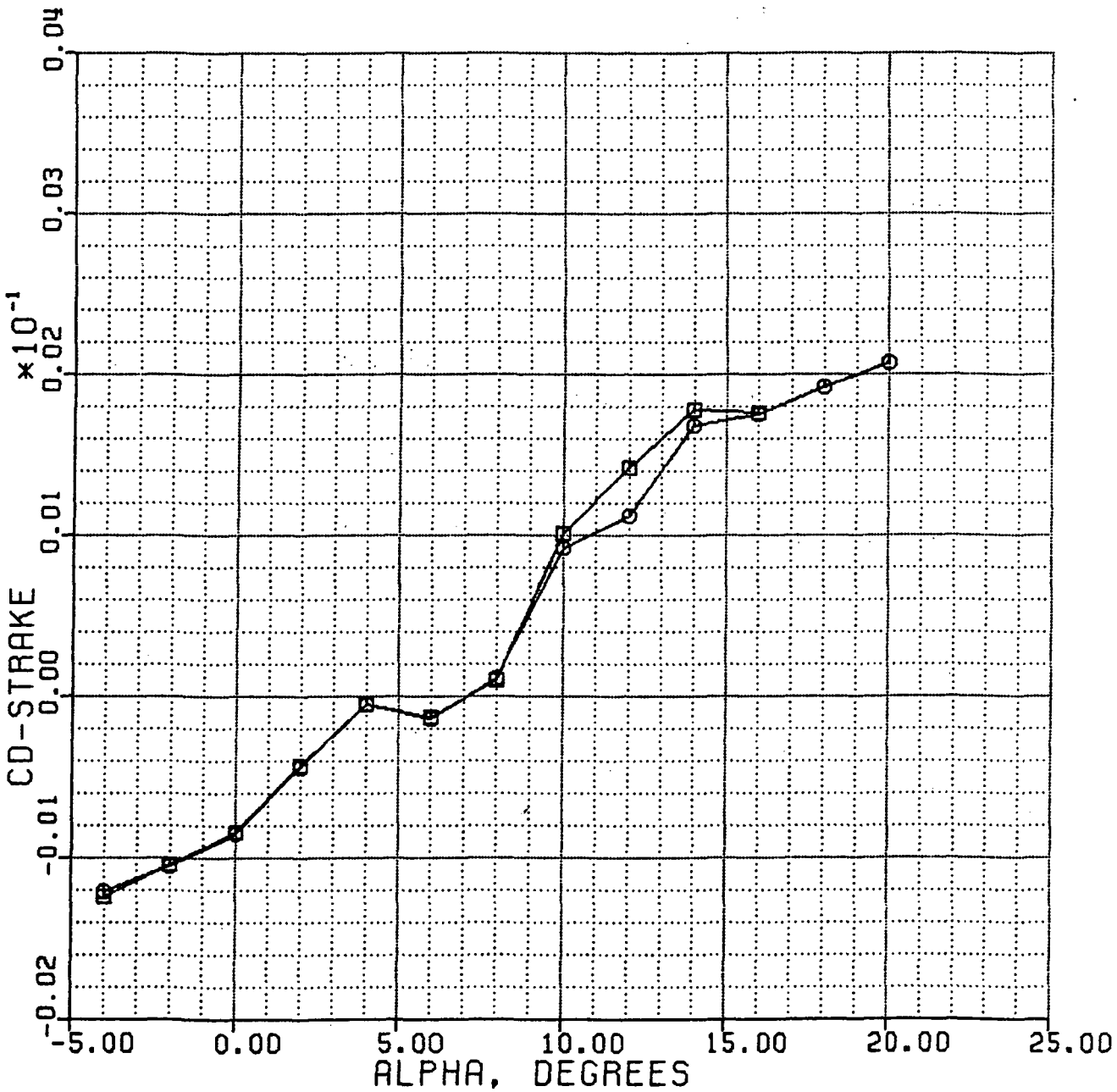

Figure 46(b)

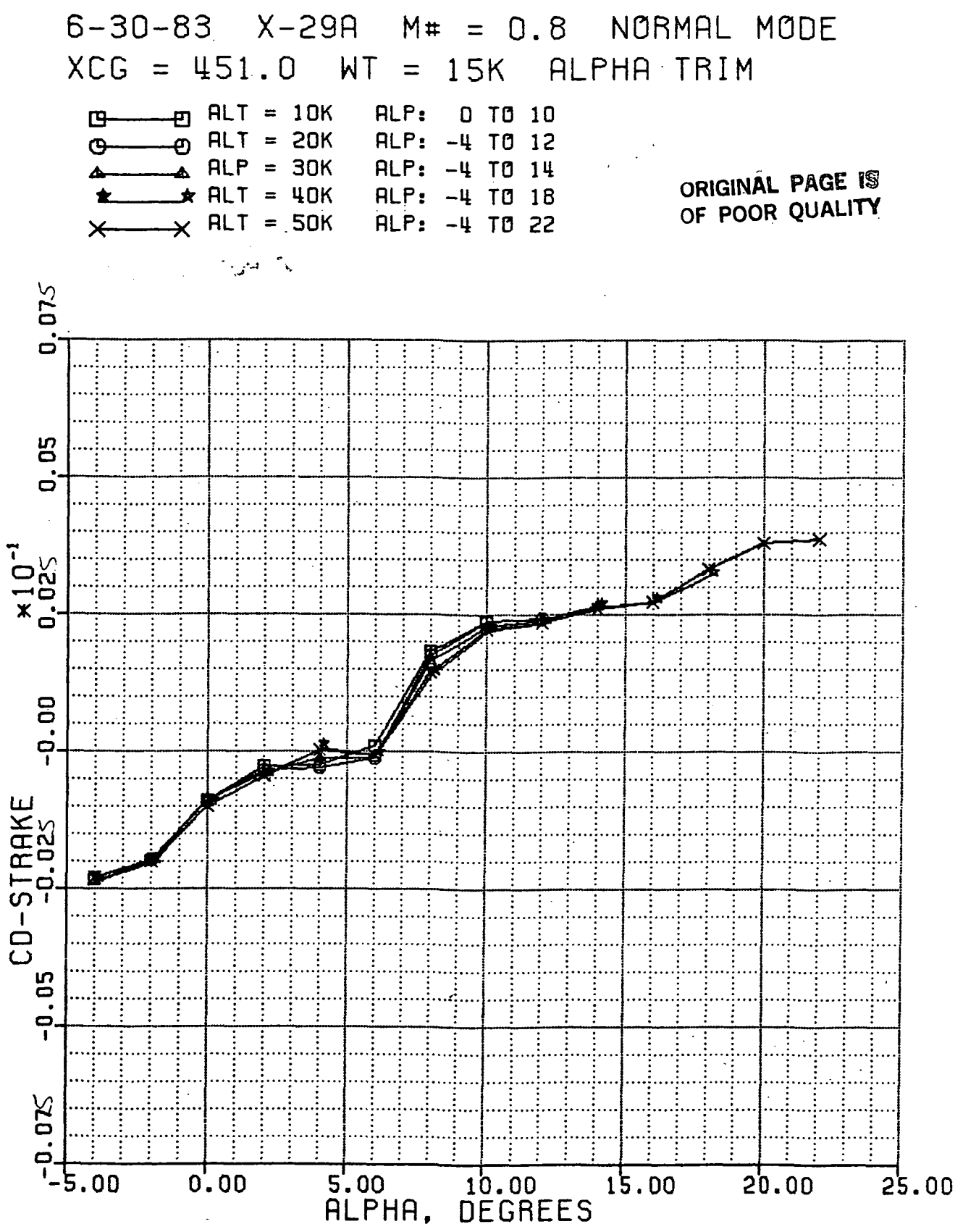
CD-STRAKE VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
CD-STRAKE *10⁻¹
0.075
0.05
0.025
-0.00
-0.025
-0.05
-0.075
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 46(c)

CD-STRAKE VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10

ALT = 30K ALP: -2 TO 12

ALT = 40K ALP: -4 TO 14

ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
OF POOR QUALITY

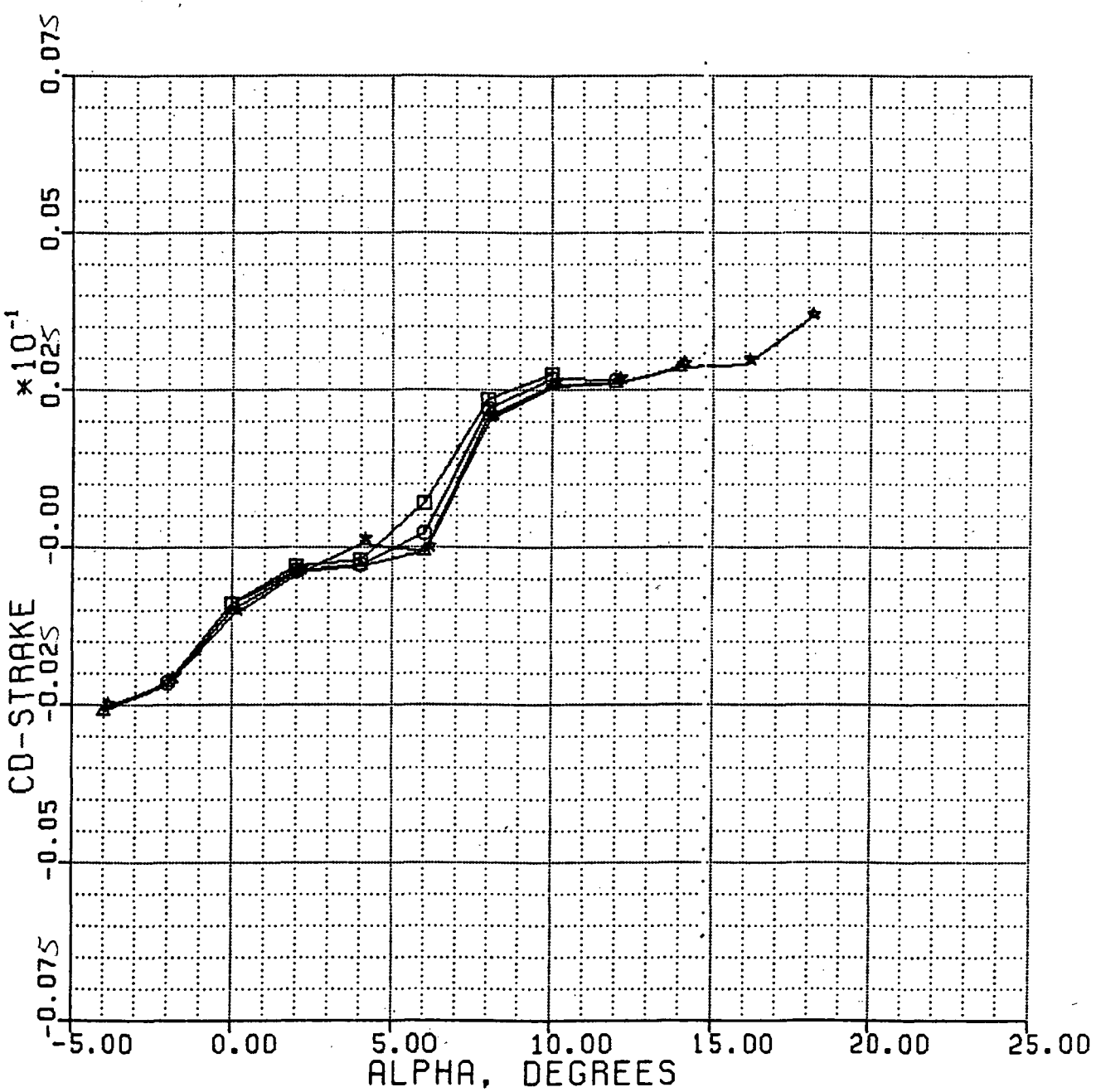

Figure 46(d)

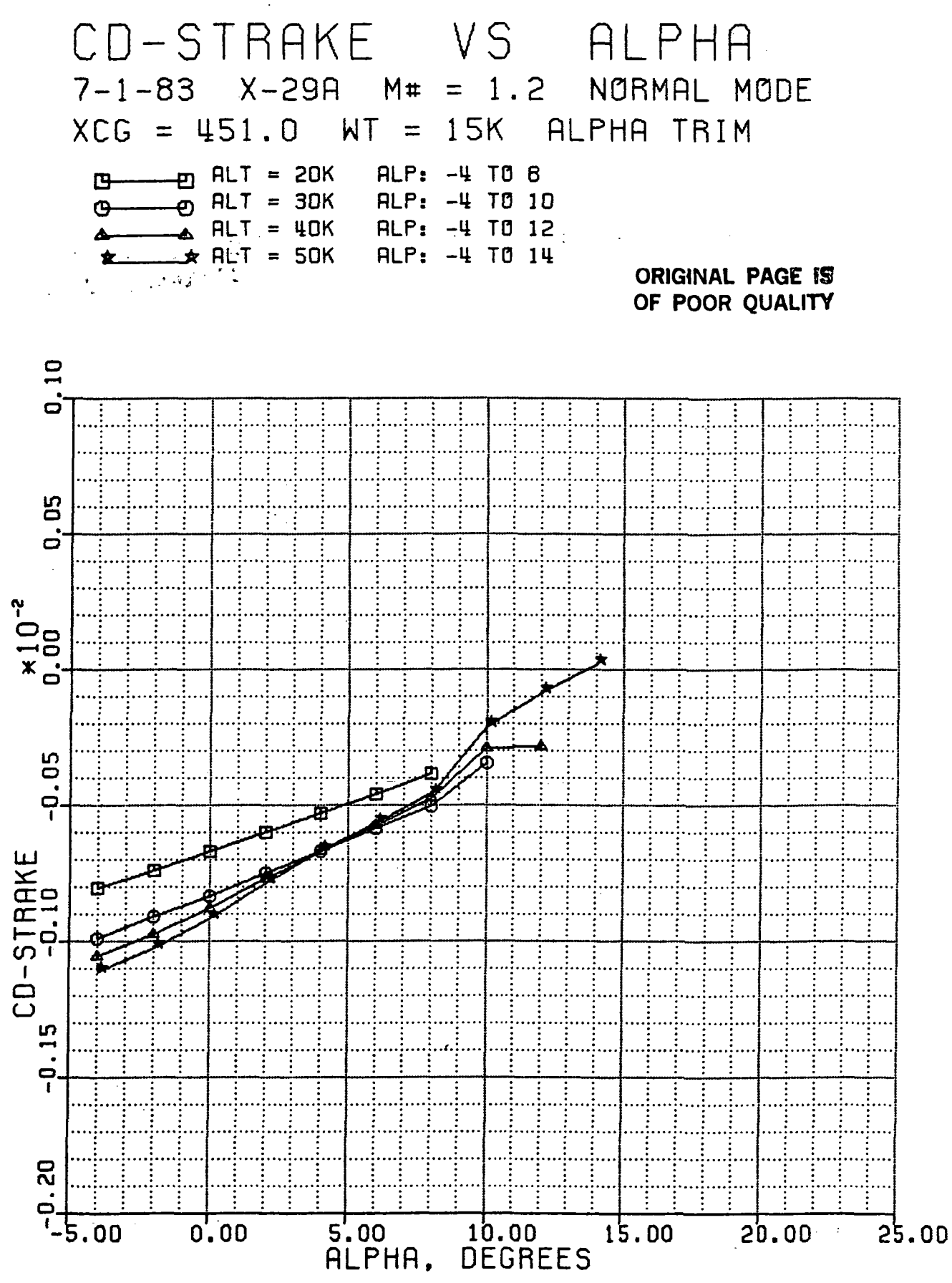
CD-STRAKE VS ALPHA
7-1-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 6
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS
OF POOR QUALITY
CD-STRAKE
*10-2
0.10
0.05
0.00
-0.05
-0.10
-0.15
-0.20
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 46(e)

CD-STRAKE VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

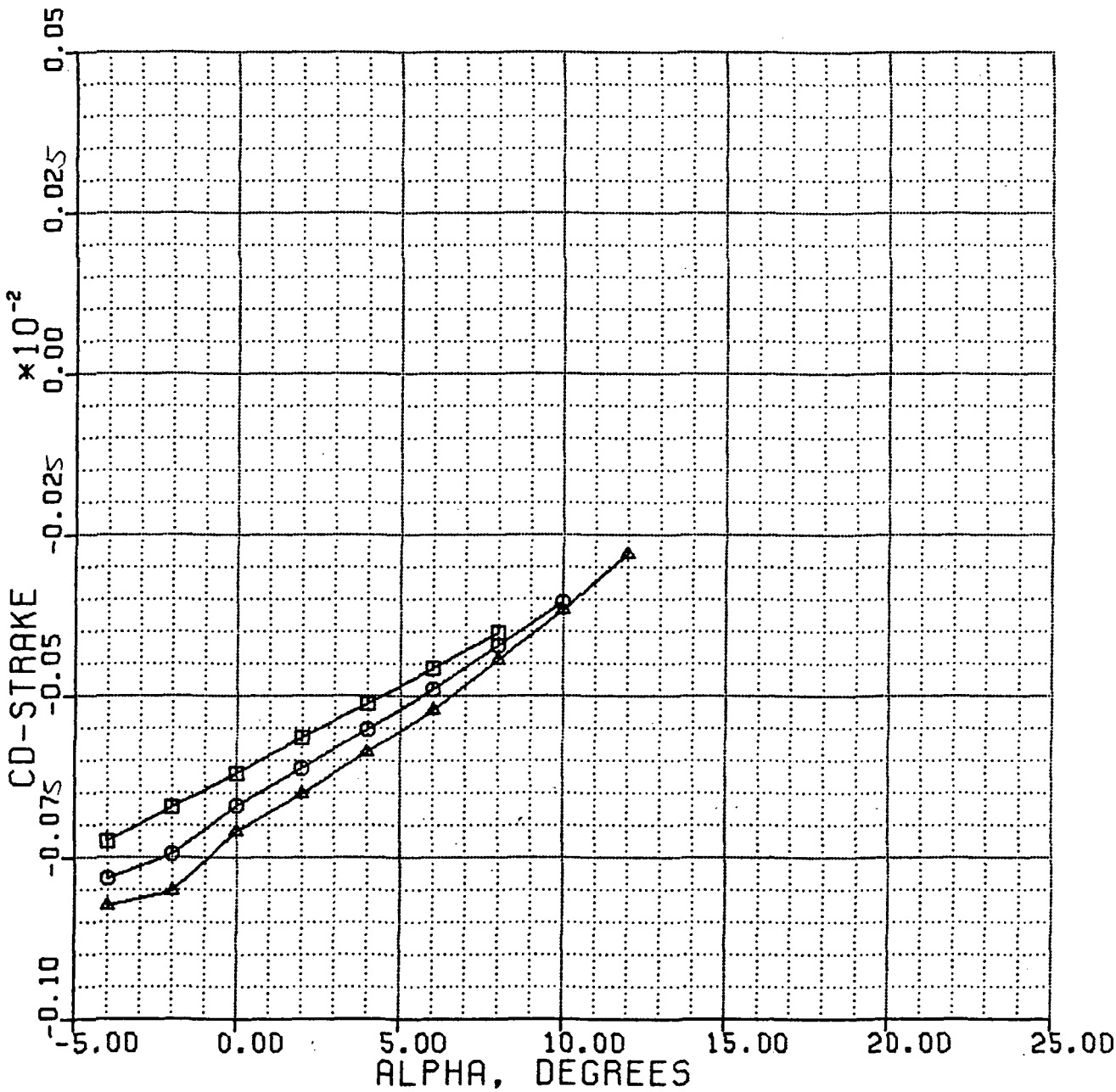

Figure 46(f)

CM-STRAKE VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
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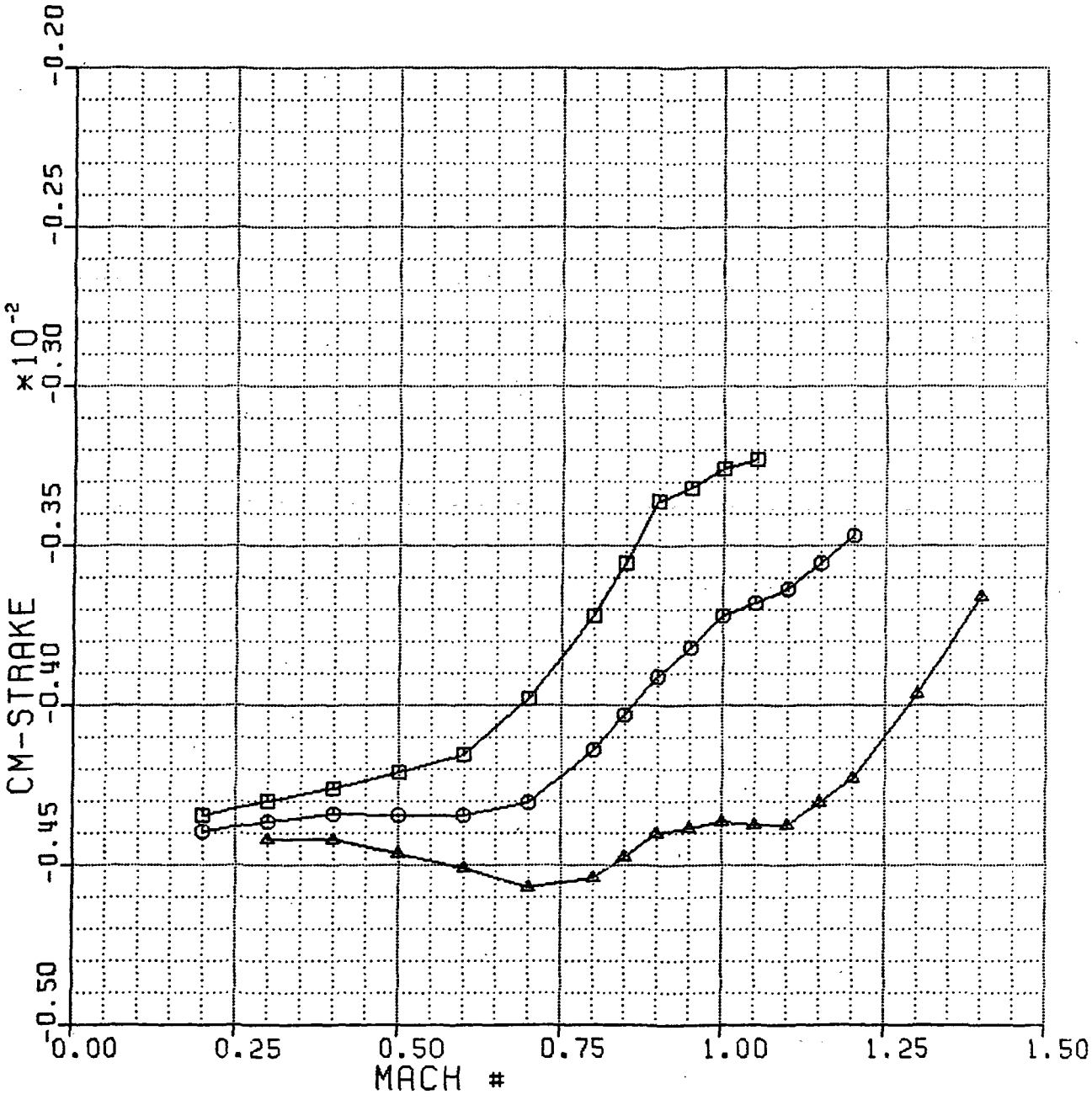

Figure 47(a)

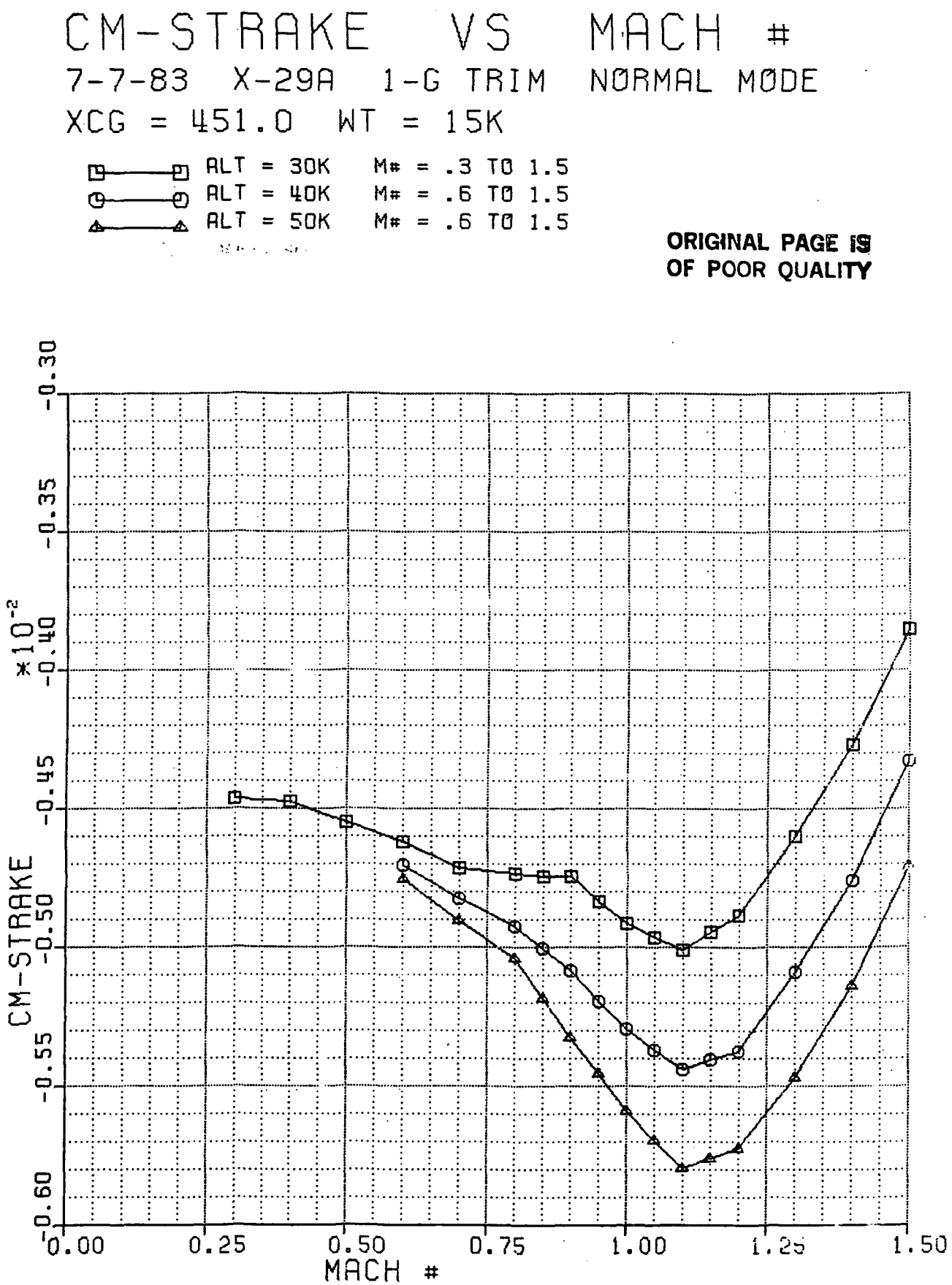
CM-STRAKE VS MACH #
7-7-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS
OF POOR QUALITY
CM-STRAKE *10-2
-0.30
-0.35
-0.40
-0.45
-0.50
-0.55
-0.60
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 47(b)

CM-STRAKE VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

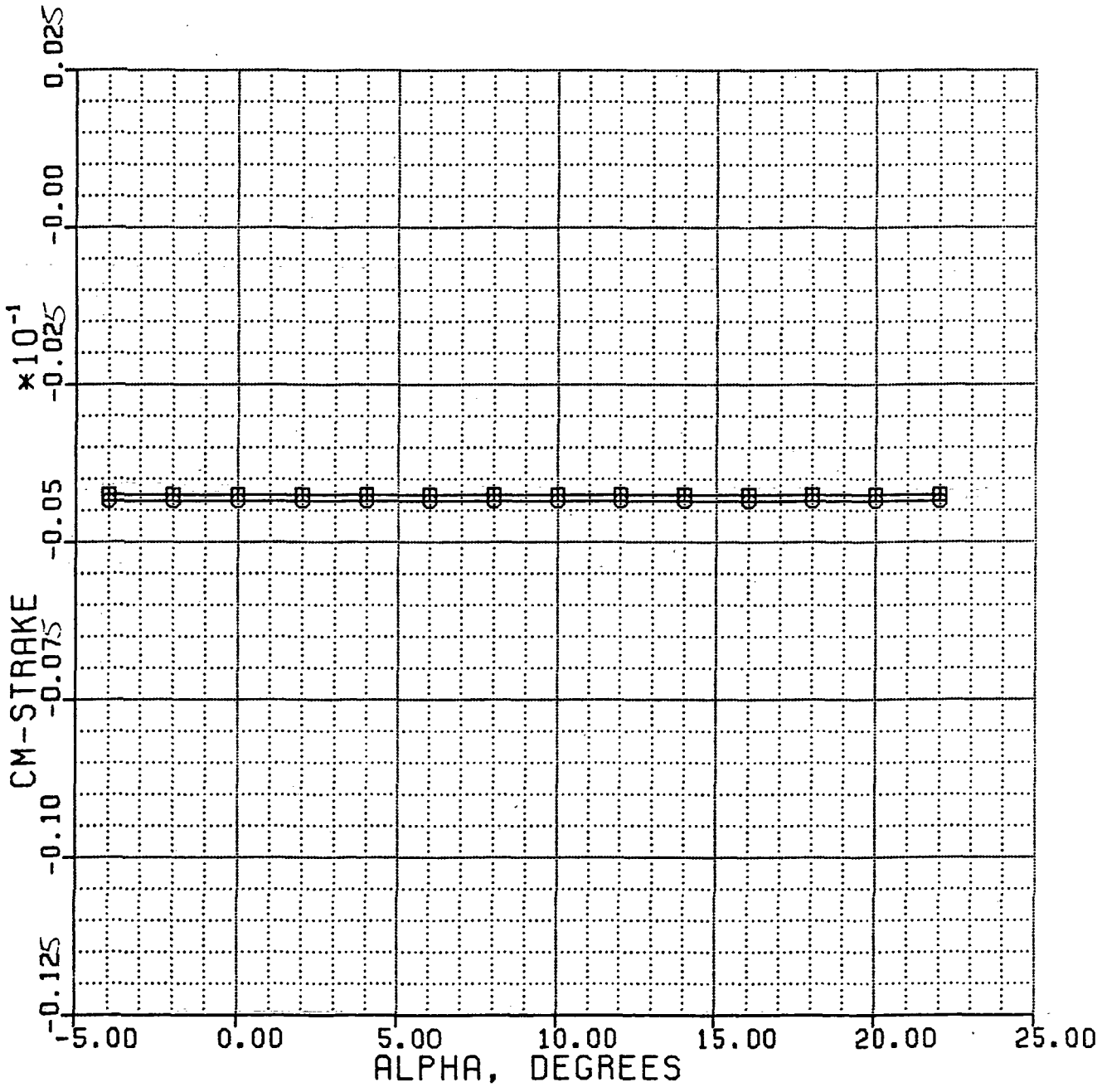

Figure 48(a)

CM-STRAKE VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
OF POOR QUALITY

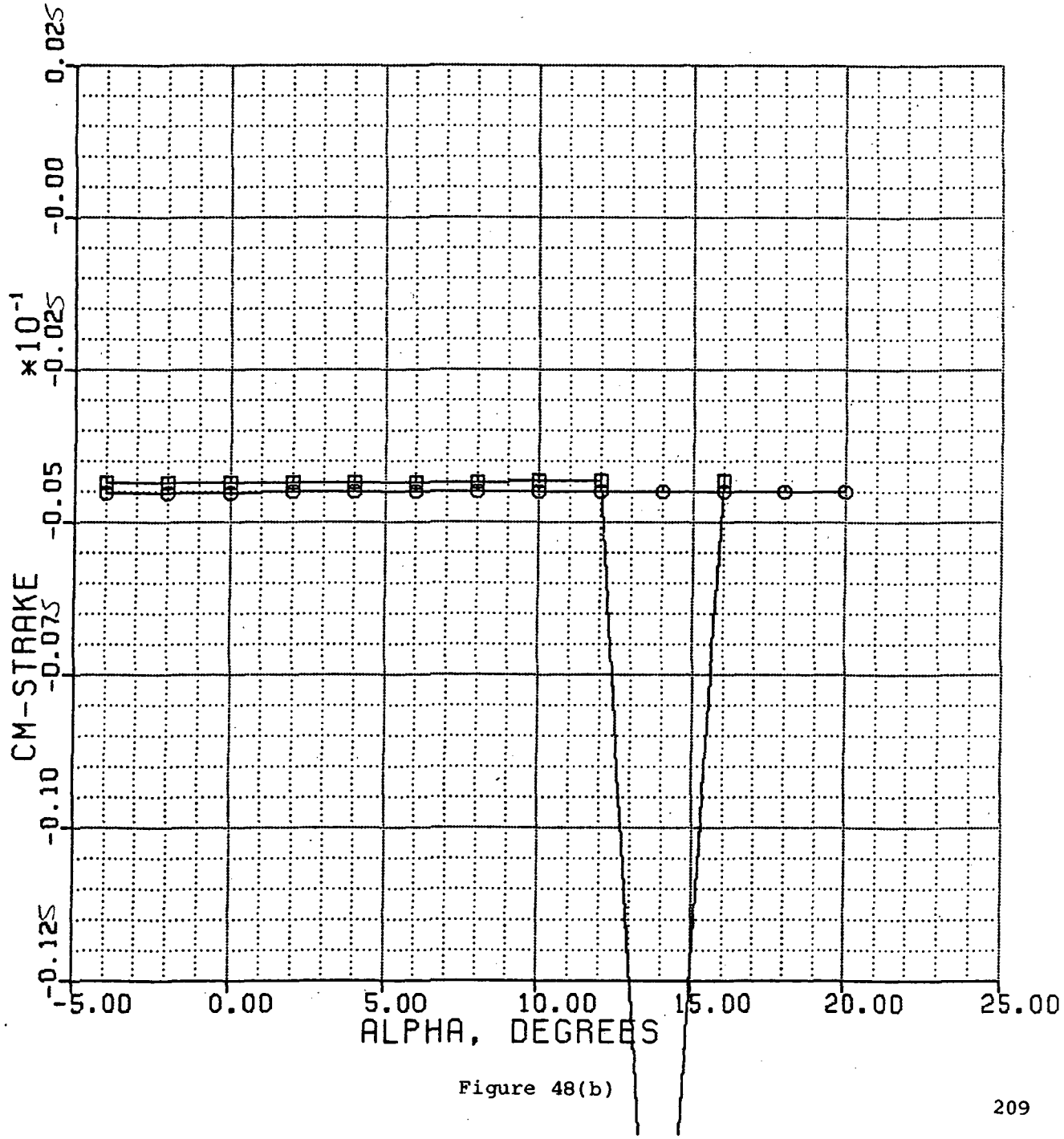

Figure 48(b)

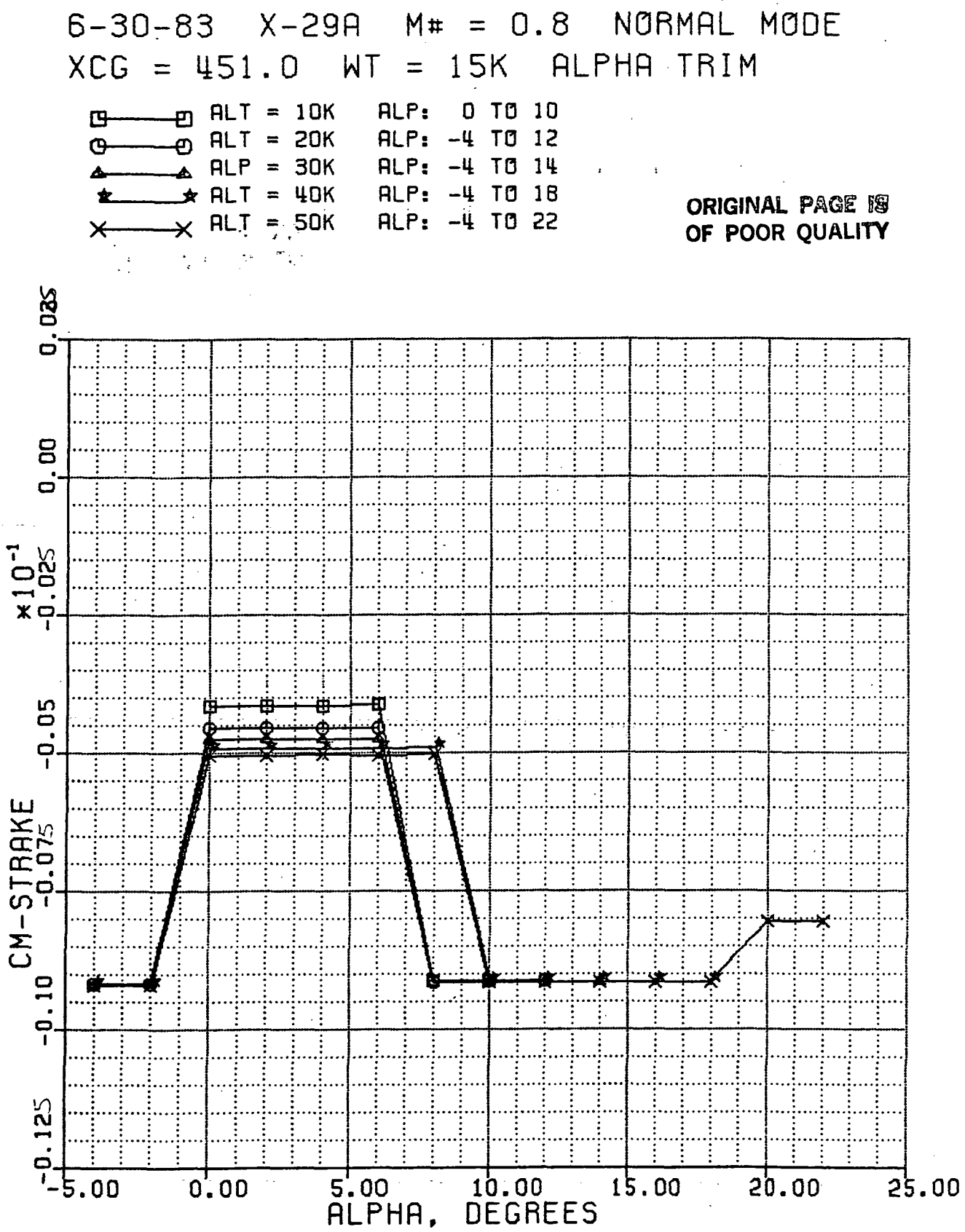
CM-STRAKE VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CM-STRAKE
*10-1
0.025
0.00
-0.025
-0.05
-0.075
-0.10
-0.125
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 48(c)

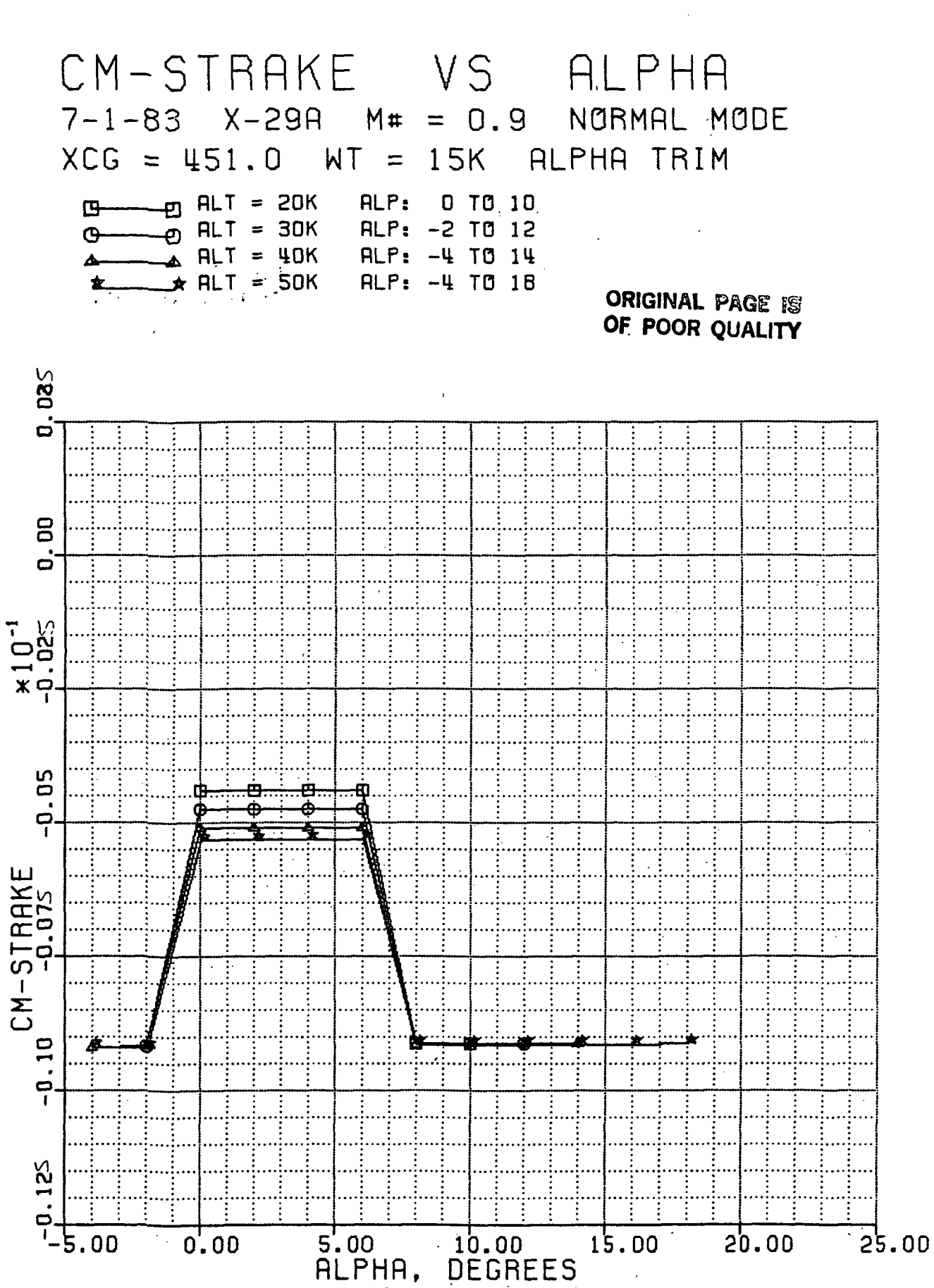
CM-STRAKE VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS
OF POOR QUALITY
CM-STRAKE
*10^-1
0.025
0.00
-0.025
-0.05
-0.075
-0.10
-0.125
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 48(d)

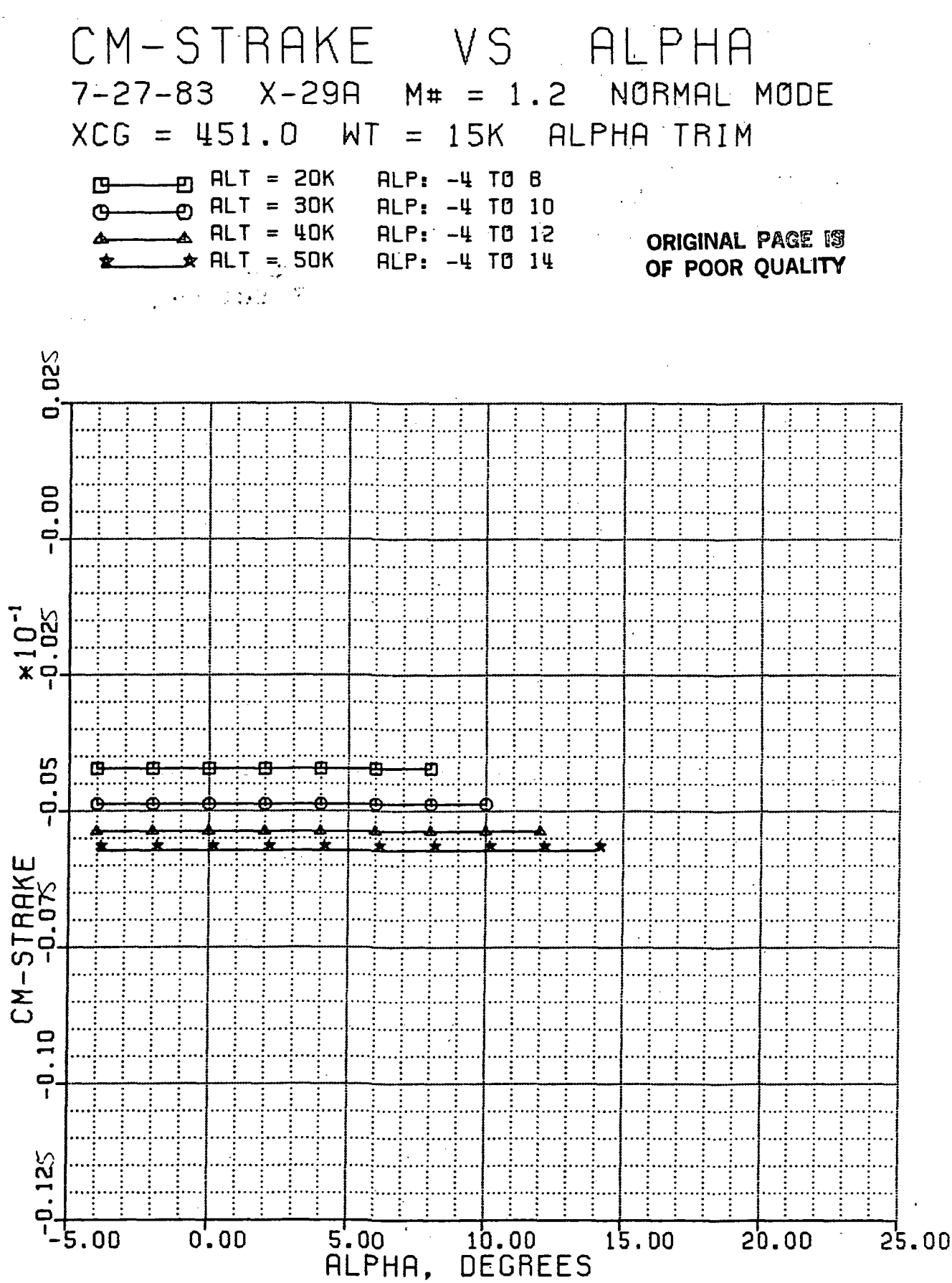
CM-STRAKE VS ALPHA
7-27-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS OF POOR QUALITY
0.025
-0.00
-0.025
-0.05
-0.075
-0.10
-0.125
*10-1
CM-STRAKE
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 48(e)

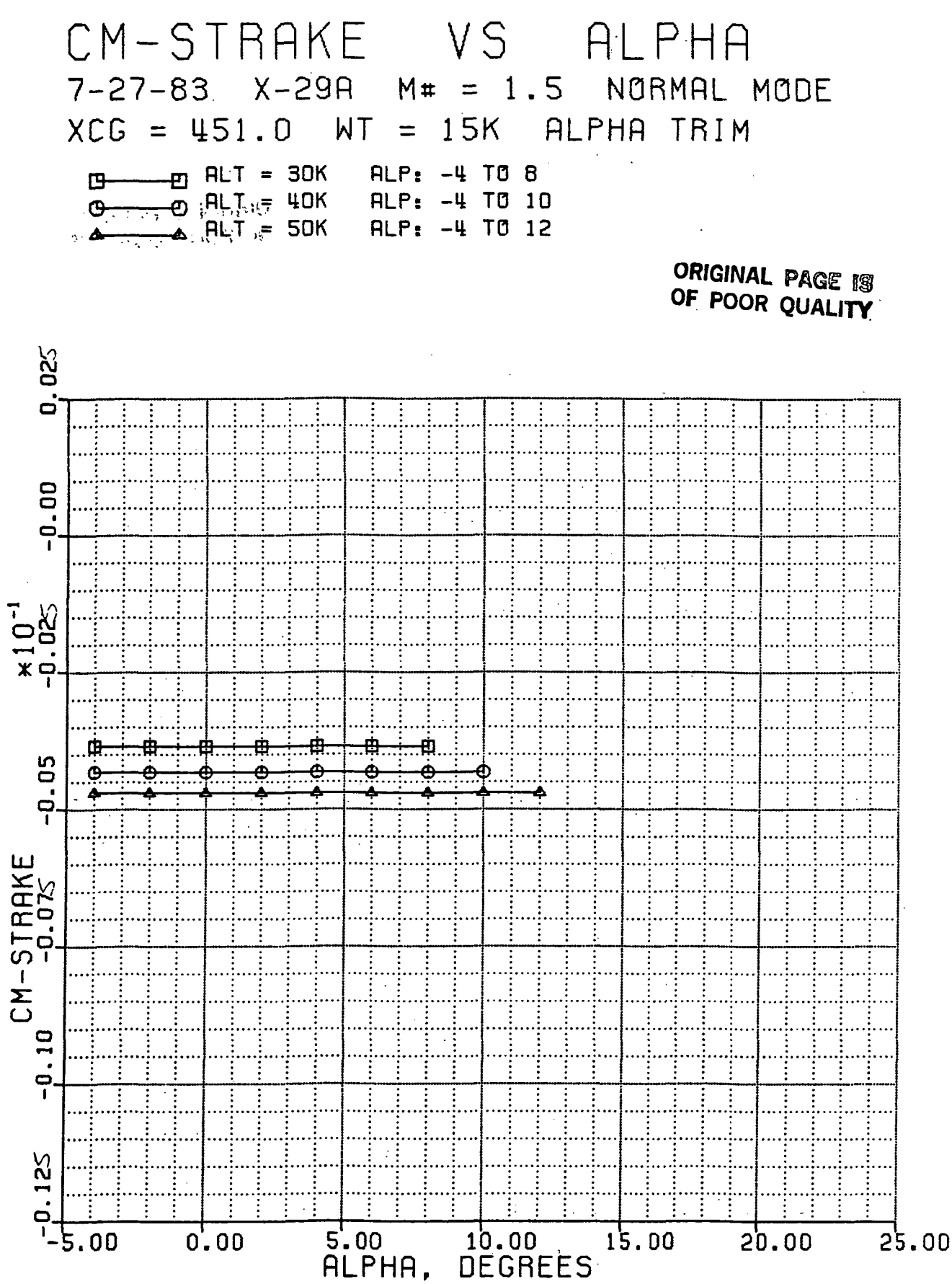
CM-STRAKE VS ALPHA
7-27-83 X-29A M# = 1.5 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12
ORIGINAL PAGE IS OF POOR QUALITY
CM-STRAKE
*10^-1
0.025
-0.00
-0.025
-0.05
-0.075
-0.10
-0.125
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 48(f)

CA-STRAKE VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

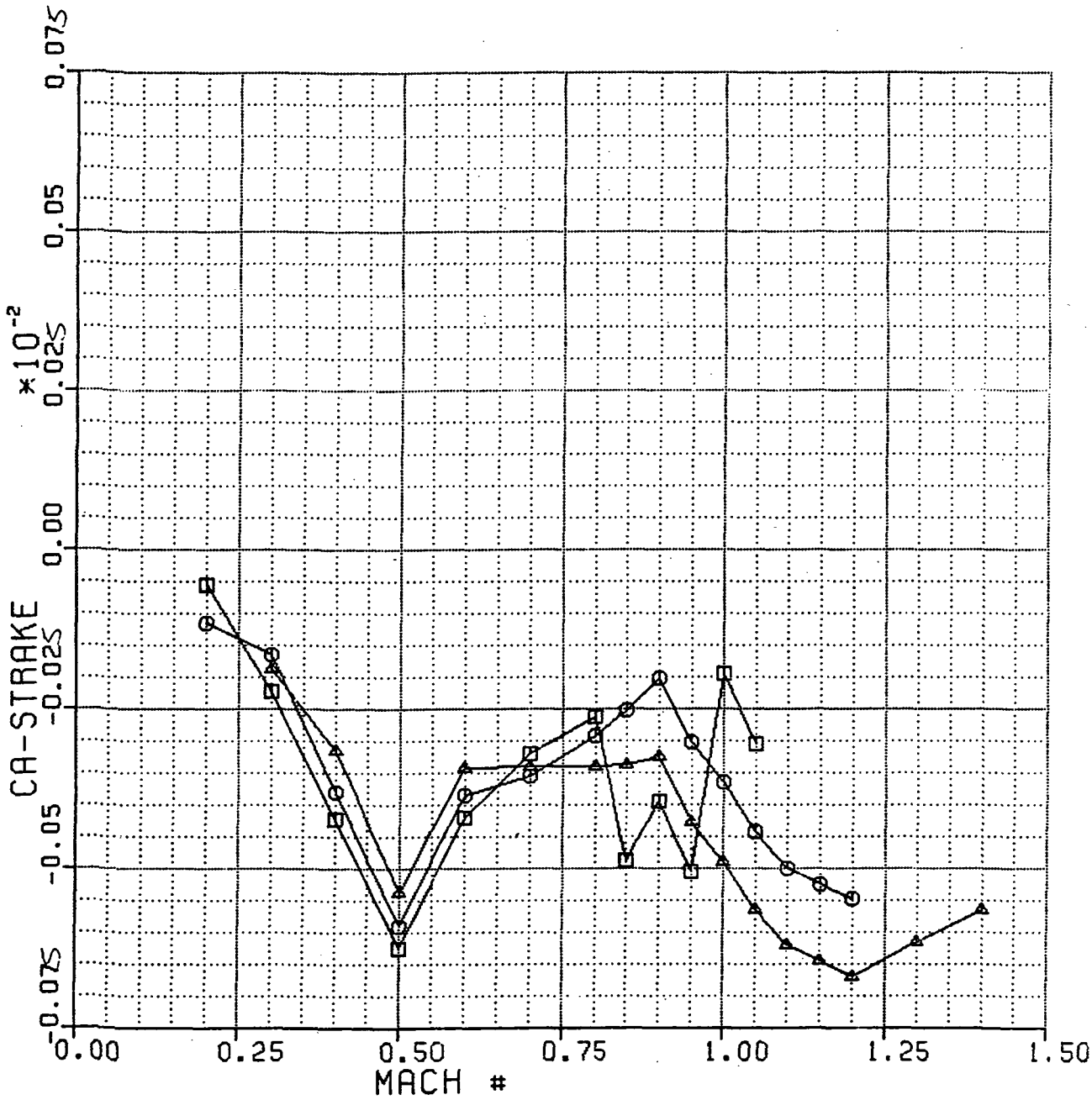

Figure 49(a)

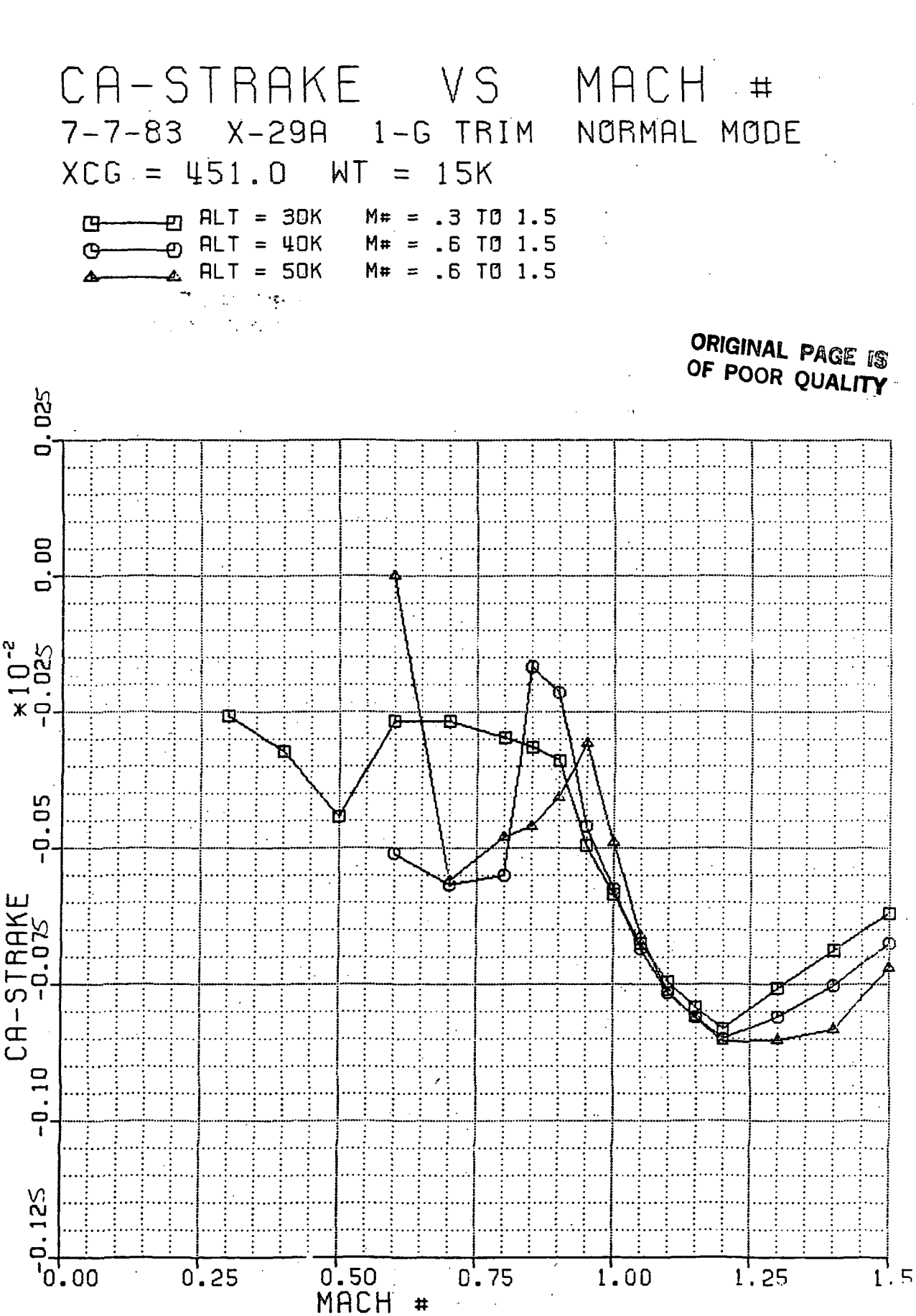
CA-STRAKE VS MACH #
7-7-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS OF POOR QUALITY
CA-STRAKE
*10^-2
0.025
0.00
-0.025
-0.05
-0.075
-0.10
-0.125
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 49(b)

CA-STRAKE VS ALPHA

6-16-83 X-29A M# = 0.4 ALPHA TRIM

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

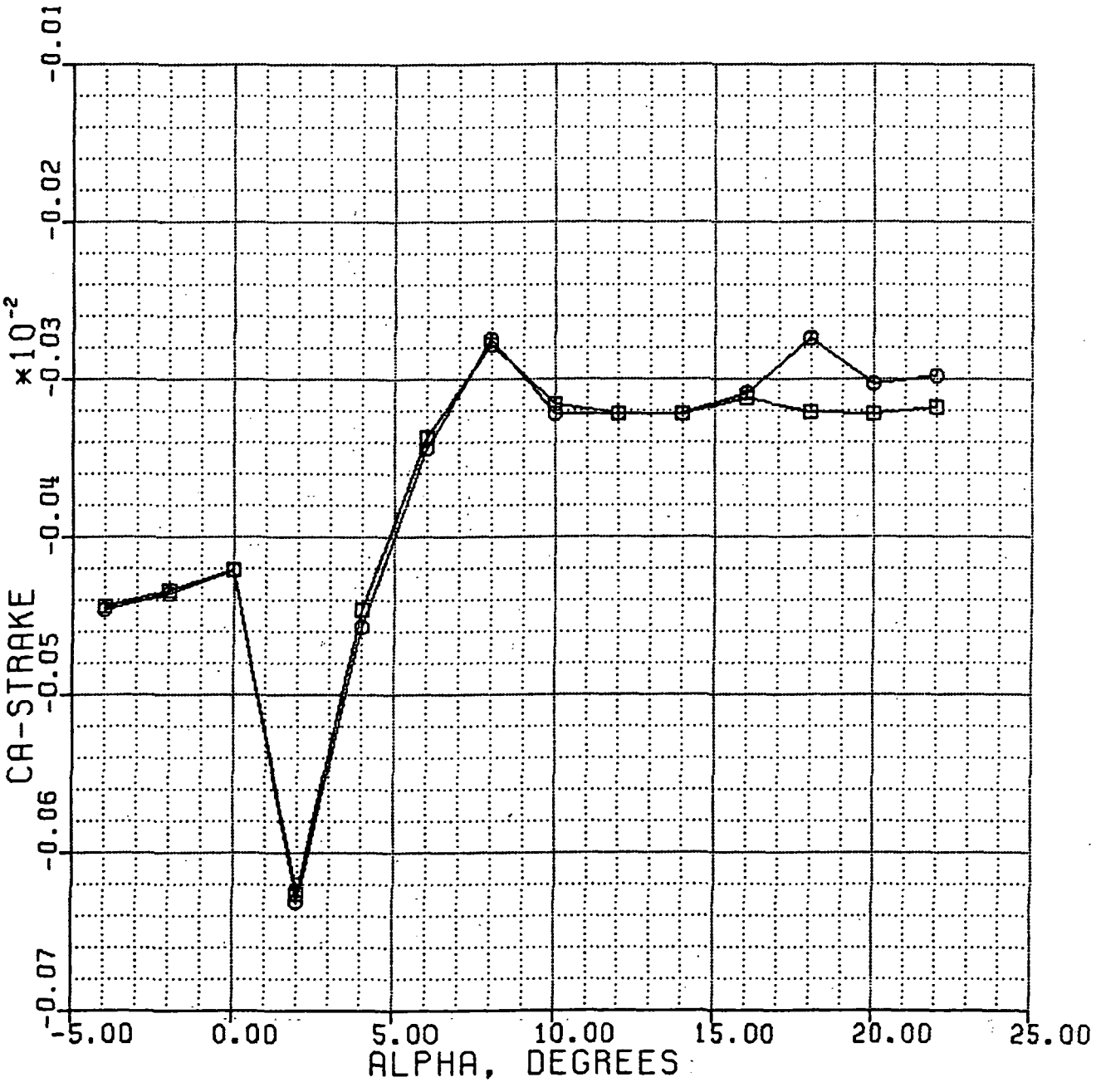

Figure 50(a)

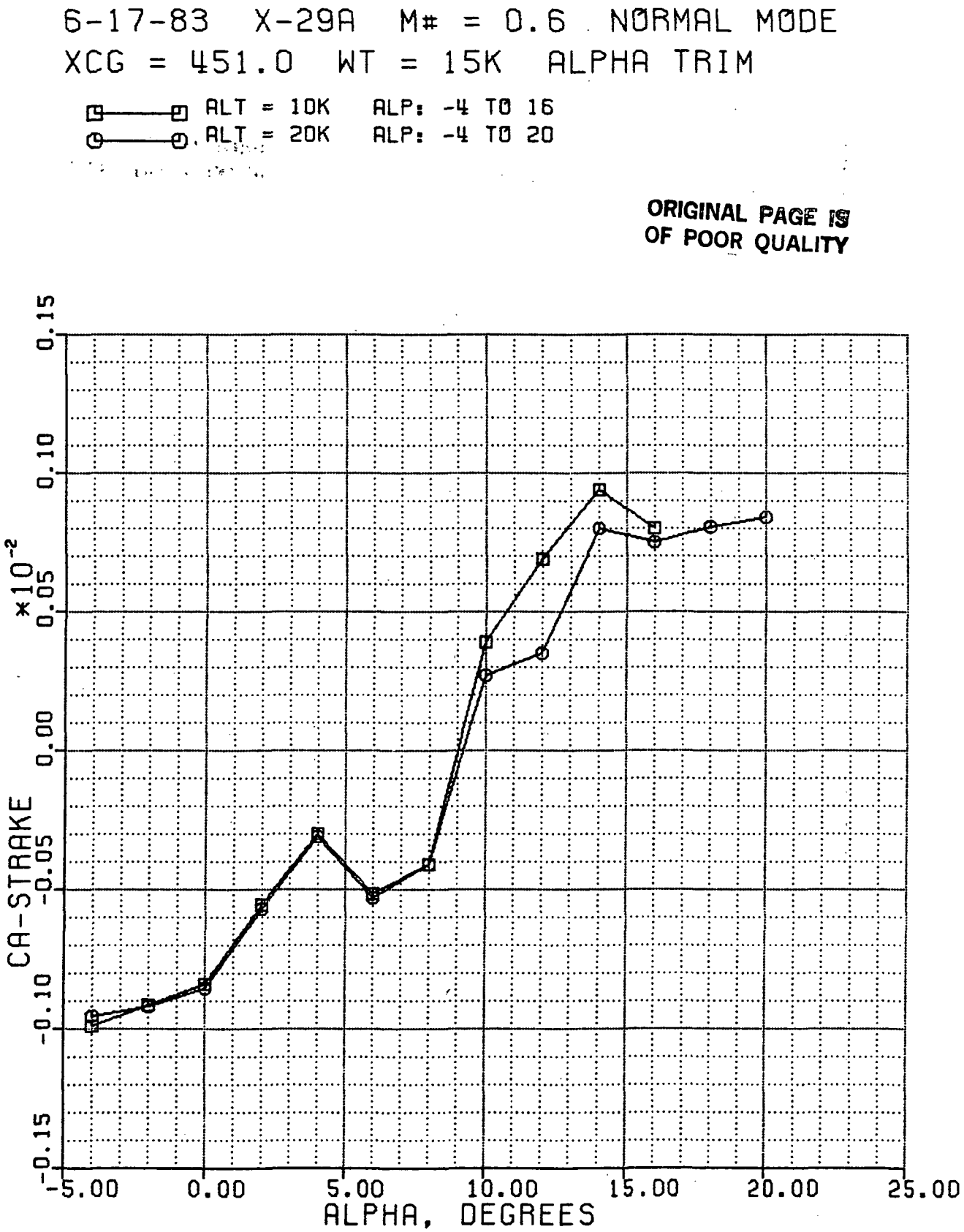
CA-STRAKE VS ALPHA
6-17-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS
OF POOR QUALITY
CA-STRAKE *10^-2
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 50(b)

CA-STRAKE VS ALPHA

6-30-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10
ALT = 20K	ALP: -4 TO 12
ALP = 30K	ALP: -4 TO 14
ALT = 40K	ALP: -4 TO 18
ALT = 50K	ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

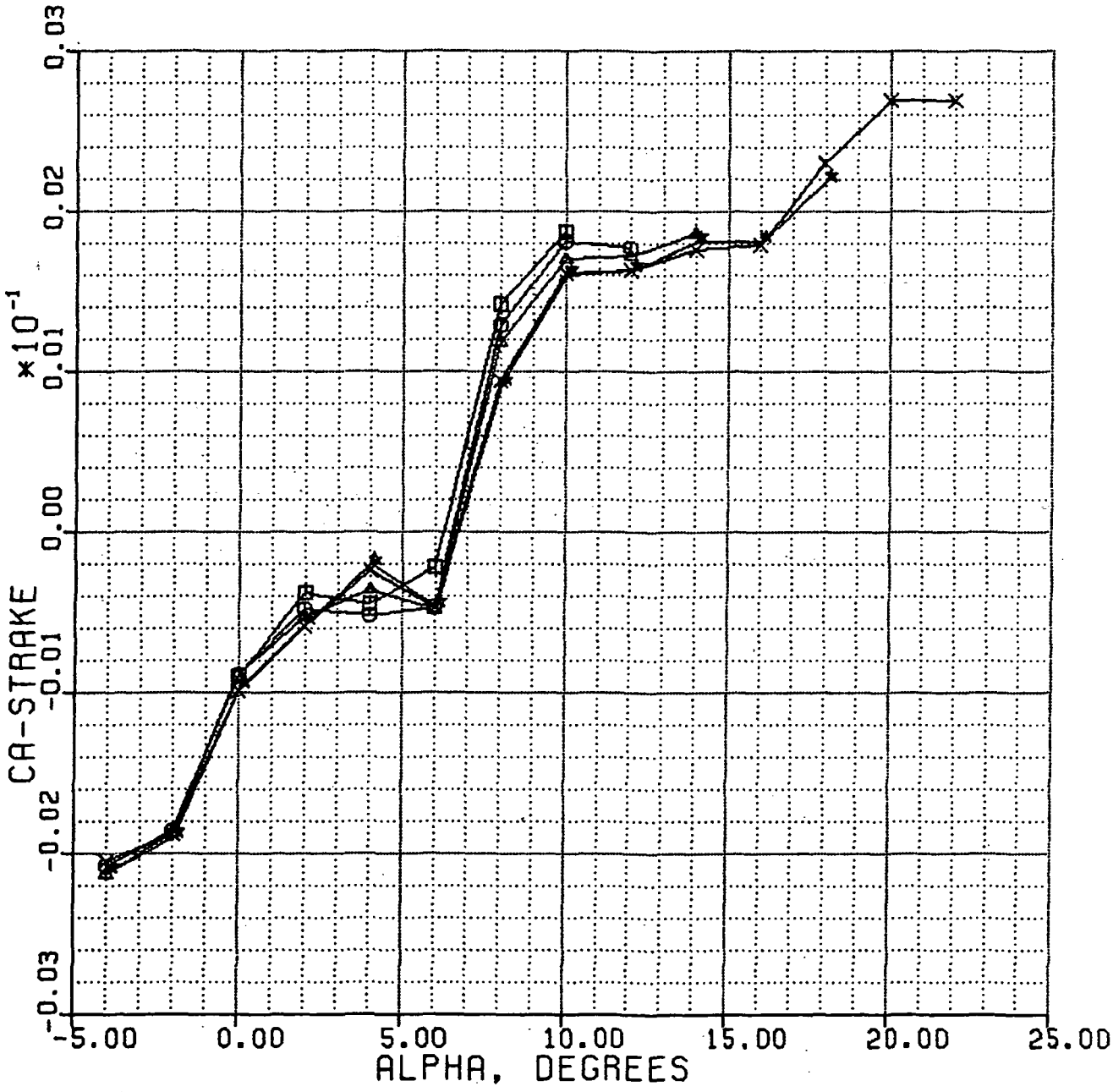

Figure 50(c)

CA-STRAKE VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
OF POOR QUALITY

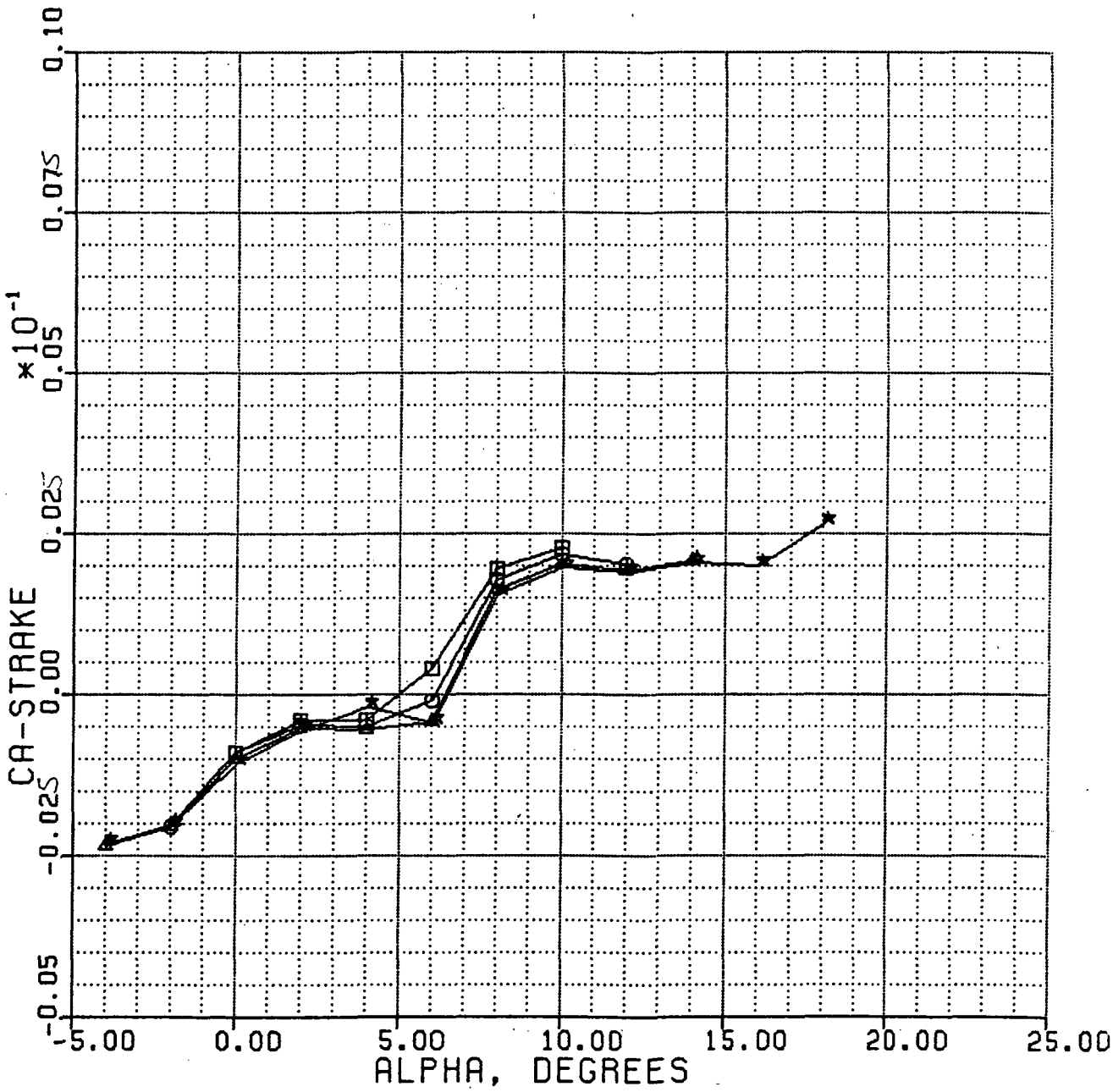

Figure 50(d)

CA-STRAKE VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

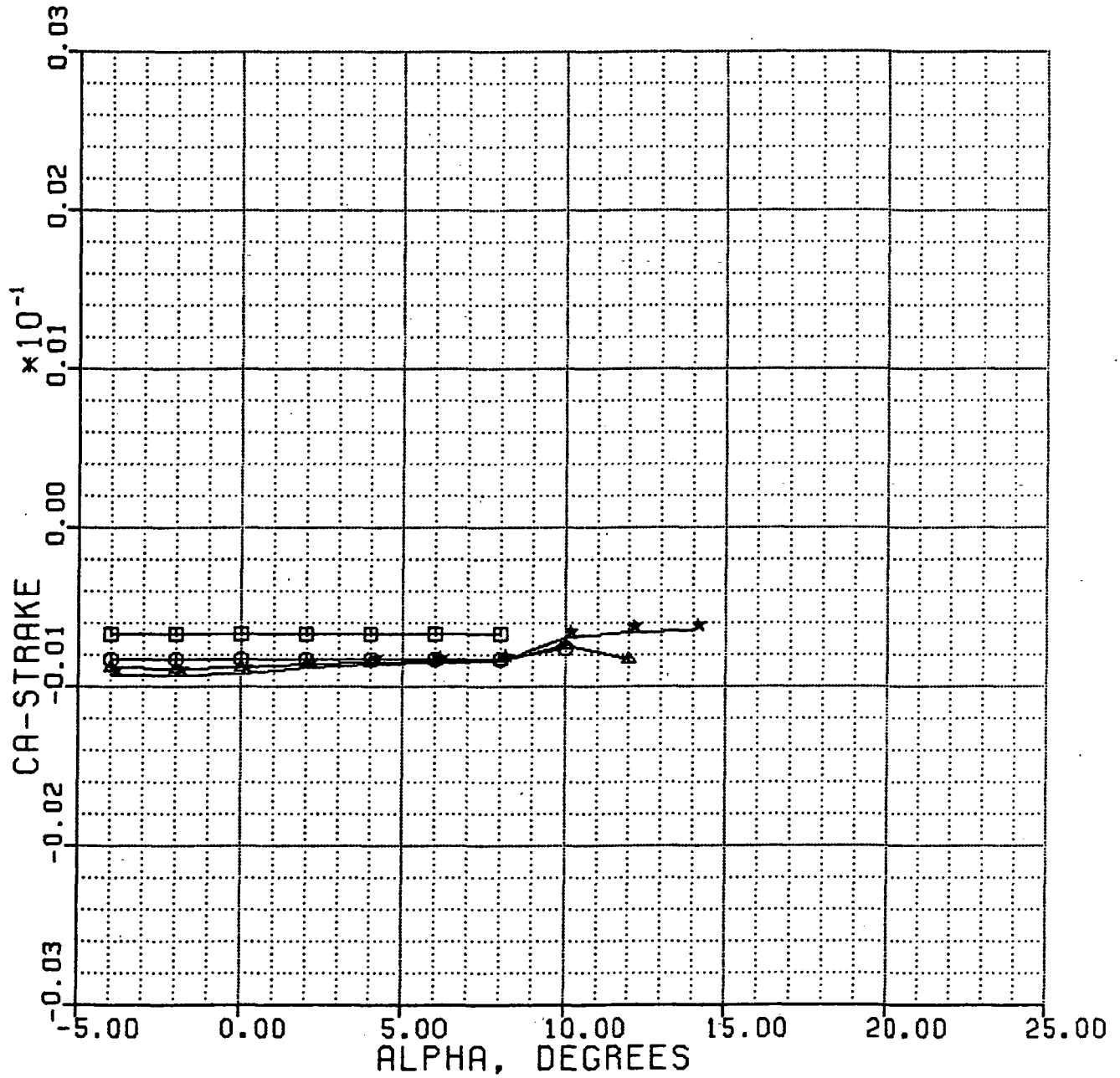

Figure 50(e)

CA-STRAKE VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

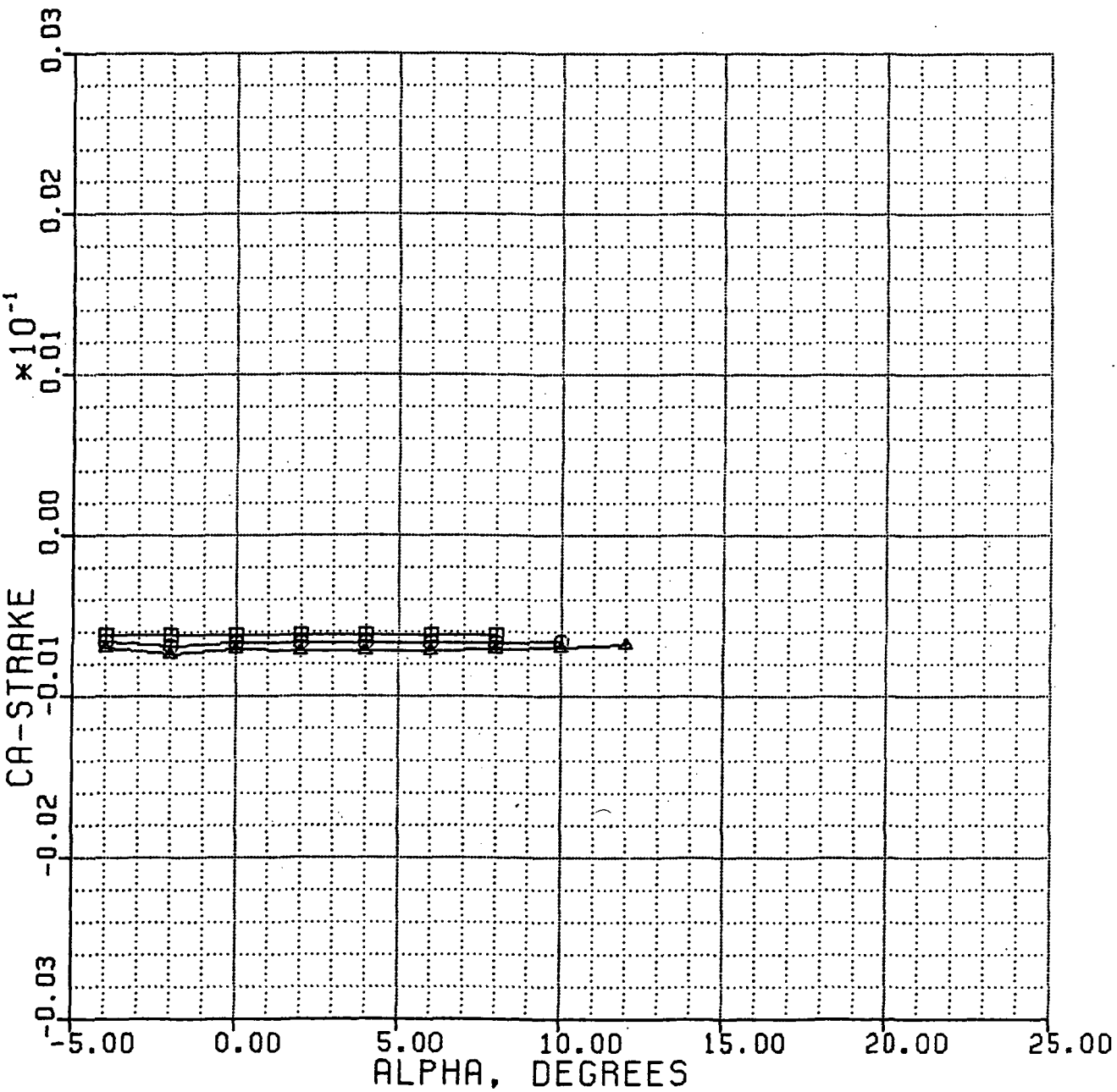

Figure 50(f)

CN-STRAKE VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

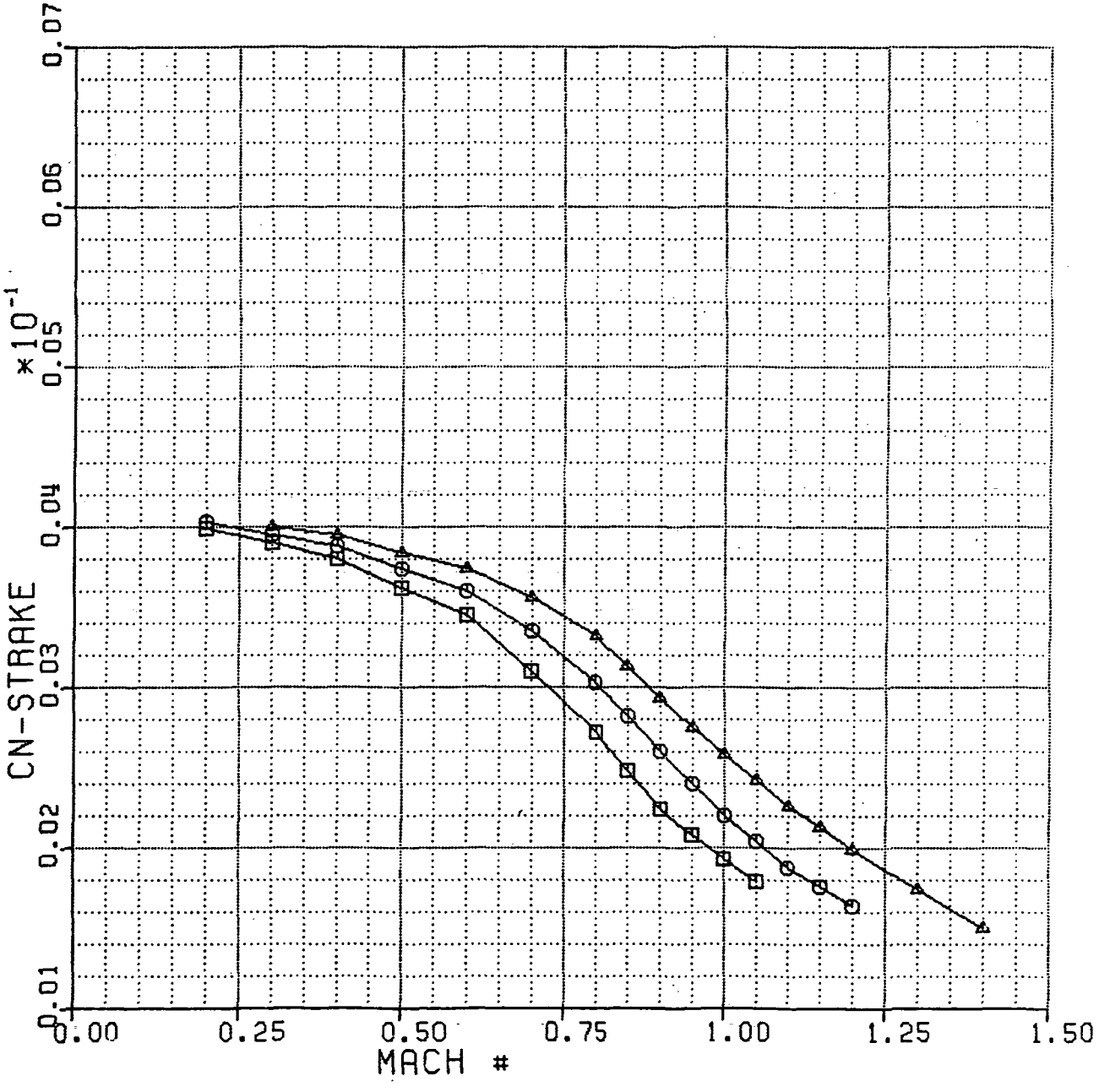

Figure 51(a)

CN-STRAKE VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
OF POOR QUALITY

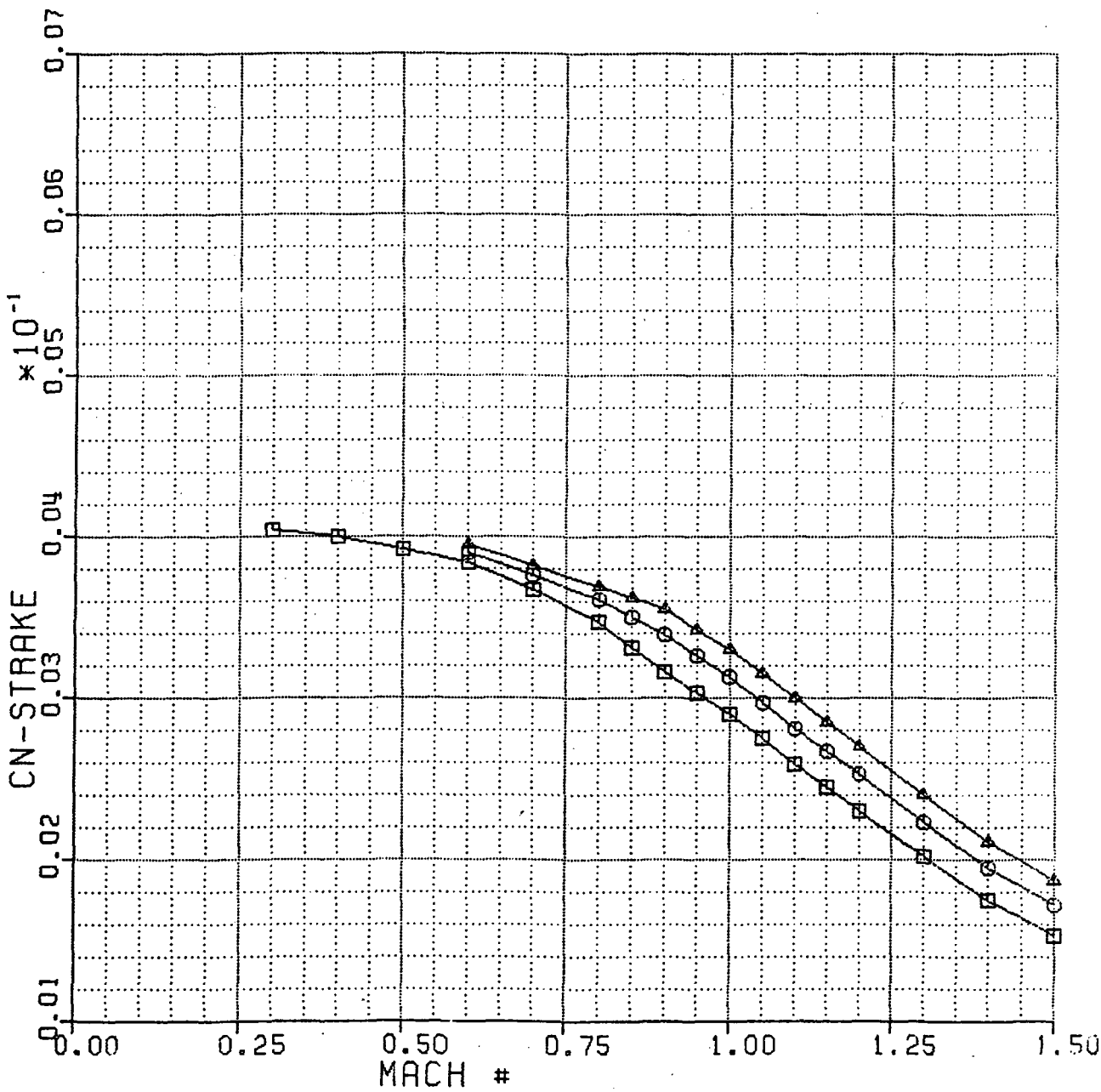

Figure 51(b)

CN-STRAKE VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

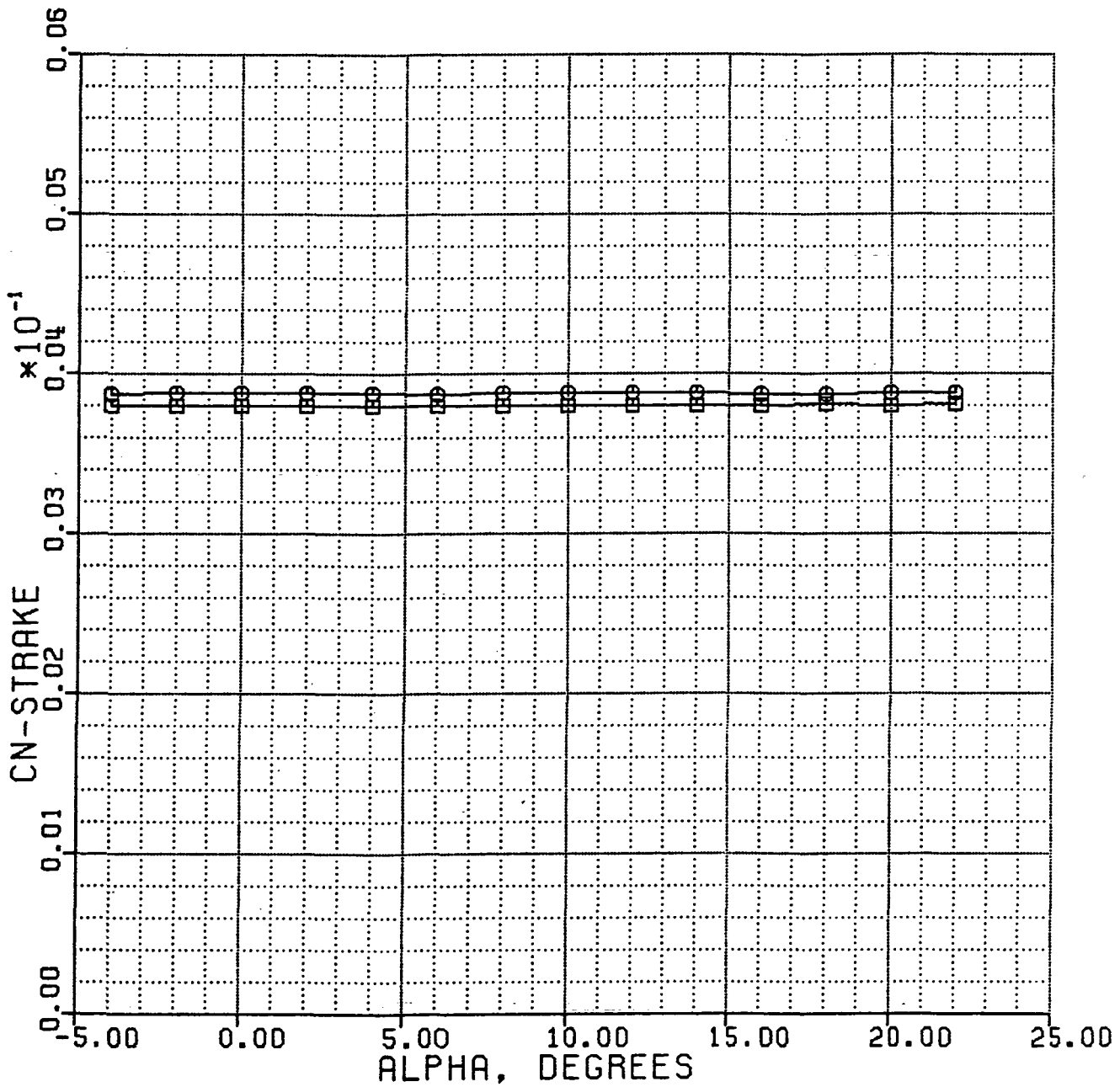

Figure 52(a)

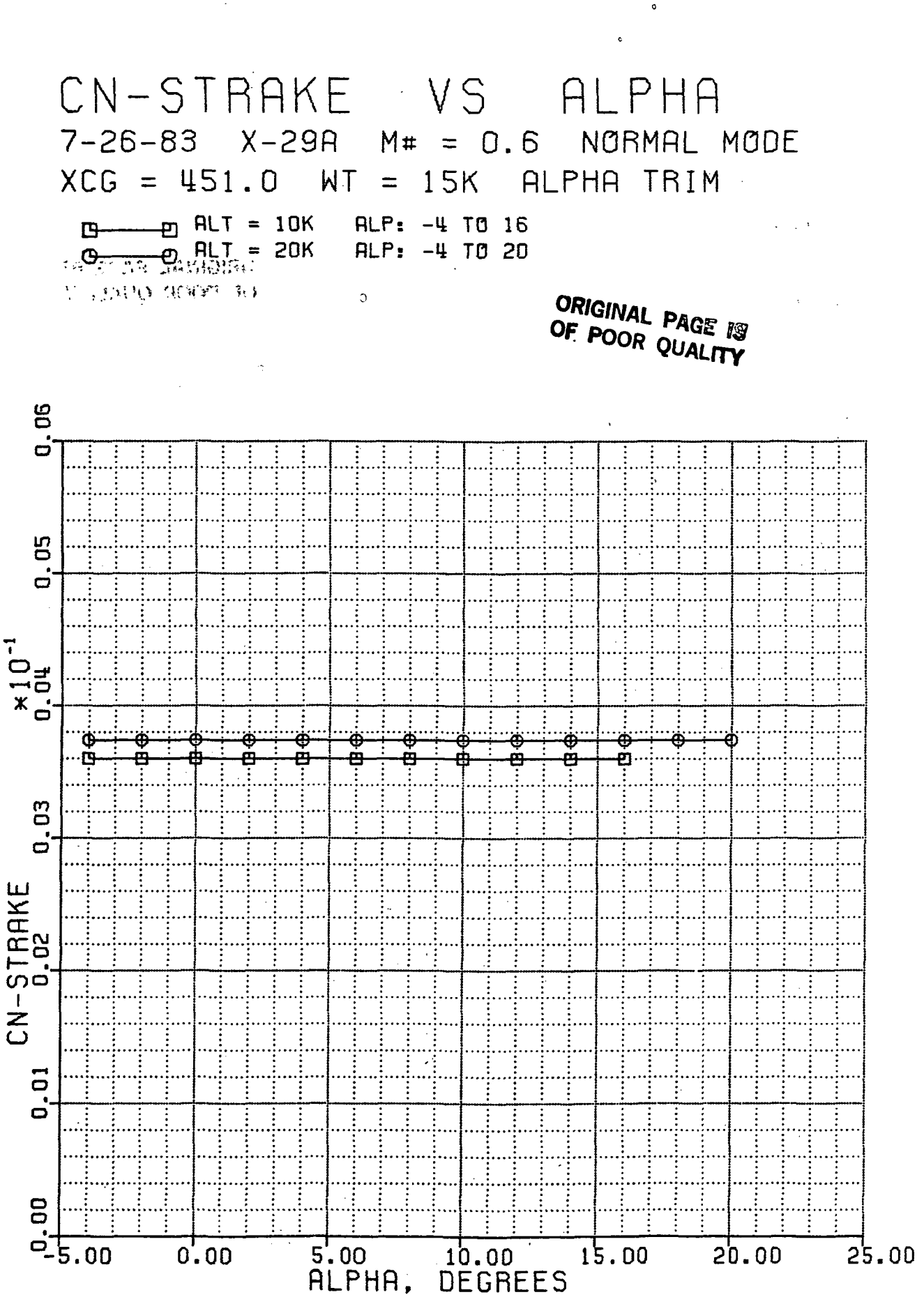
CN-STRAKE VS ALPHA
7-26-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS
OF POOR QUALITY
CN-STRAKE
*10^-1
0.00
0.01
0.02
0.03
0.04
0.05
0.06
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 52(b)

CN-STRAKE VS ALPHA

6-30-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

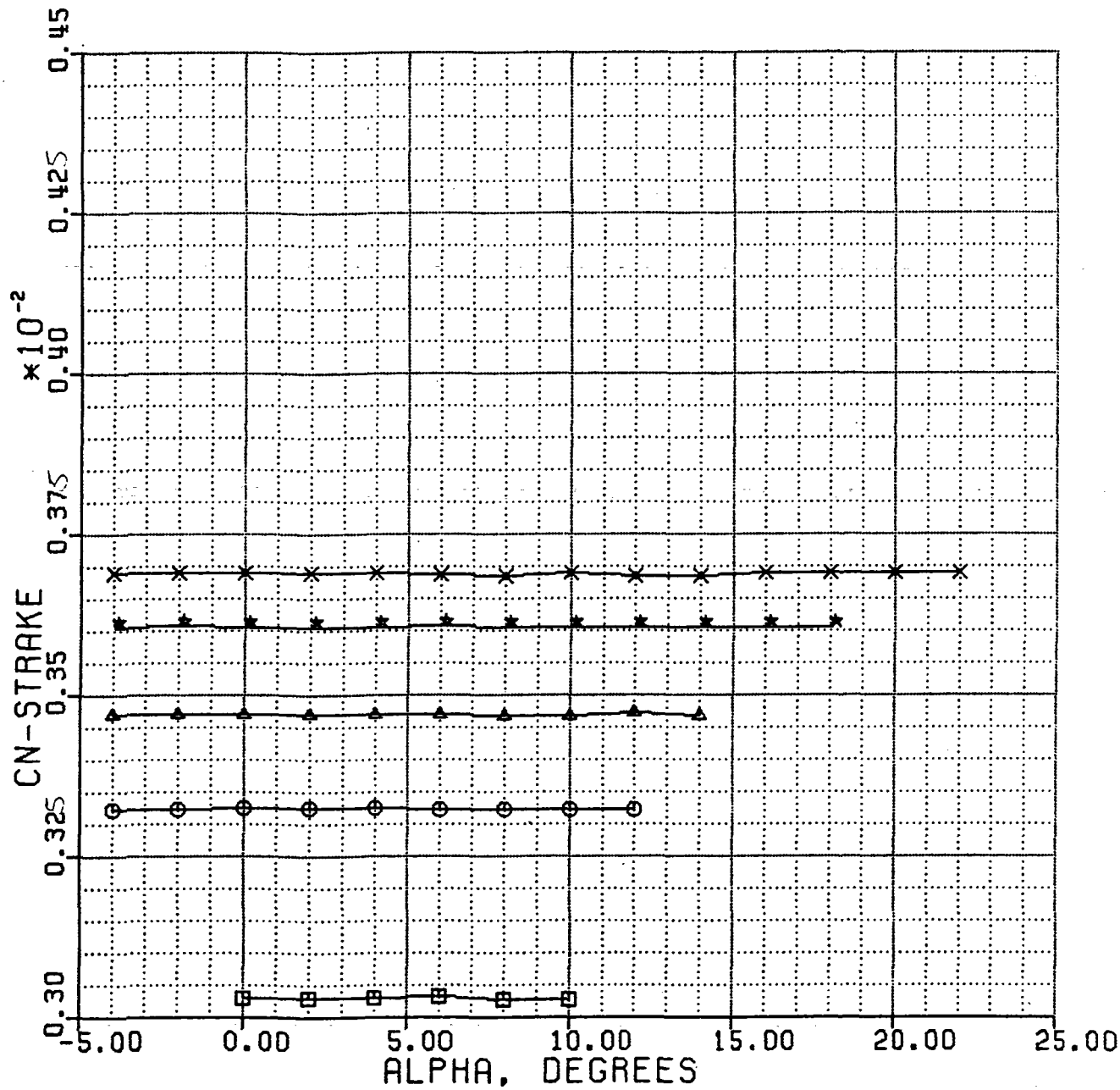

Figure 52(c)

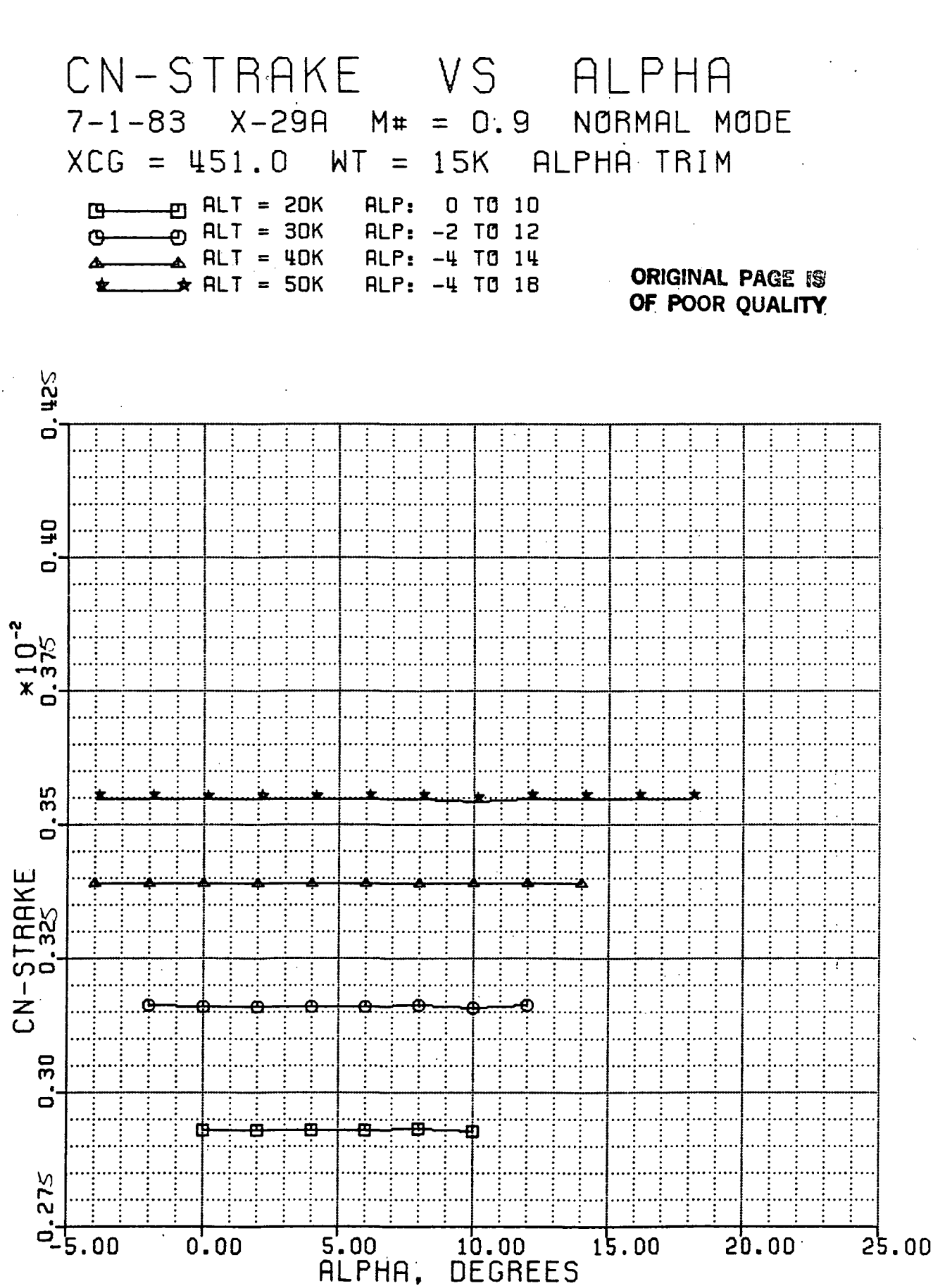
CN-STRAKE VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS
OF POOR QUALITY
CN-STRAKE
*10^-2
0.425
0.40
0.375
0.35
0.325
0.30
0.275
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 52(d)

CN-STRAKE VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

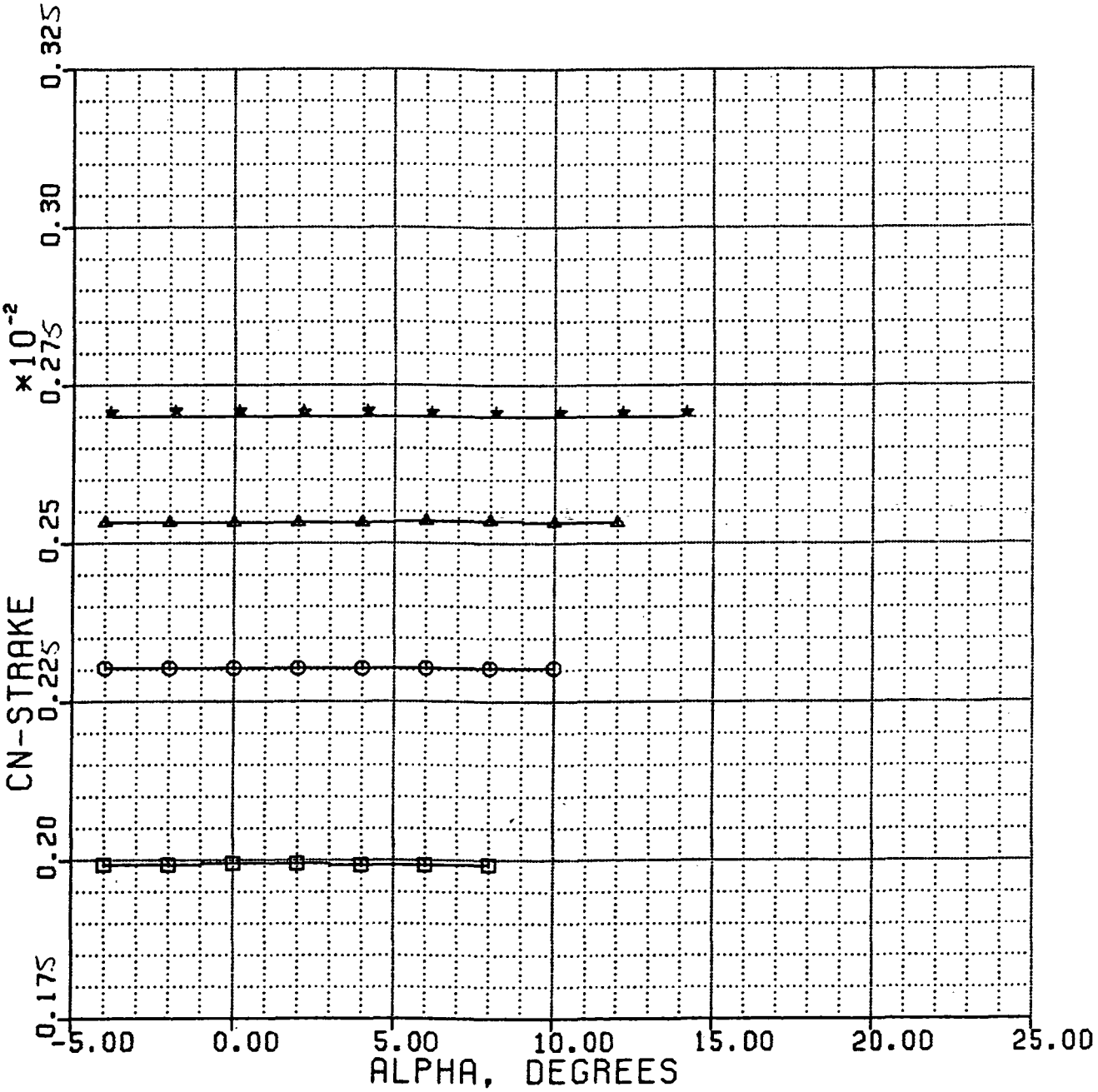

Figure 52(e)

CN-STRAKE VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

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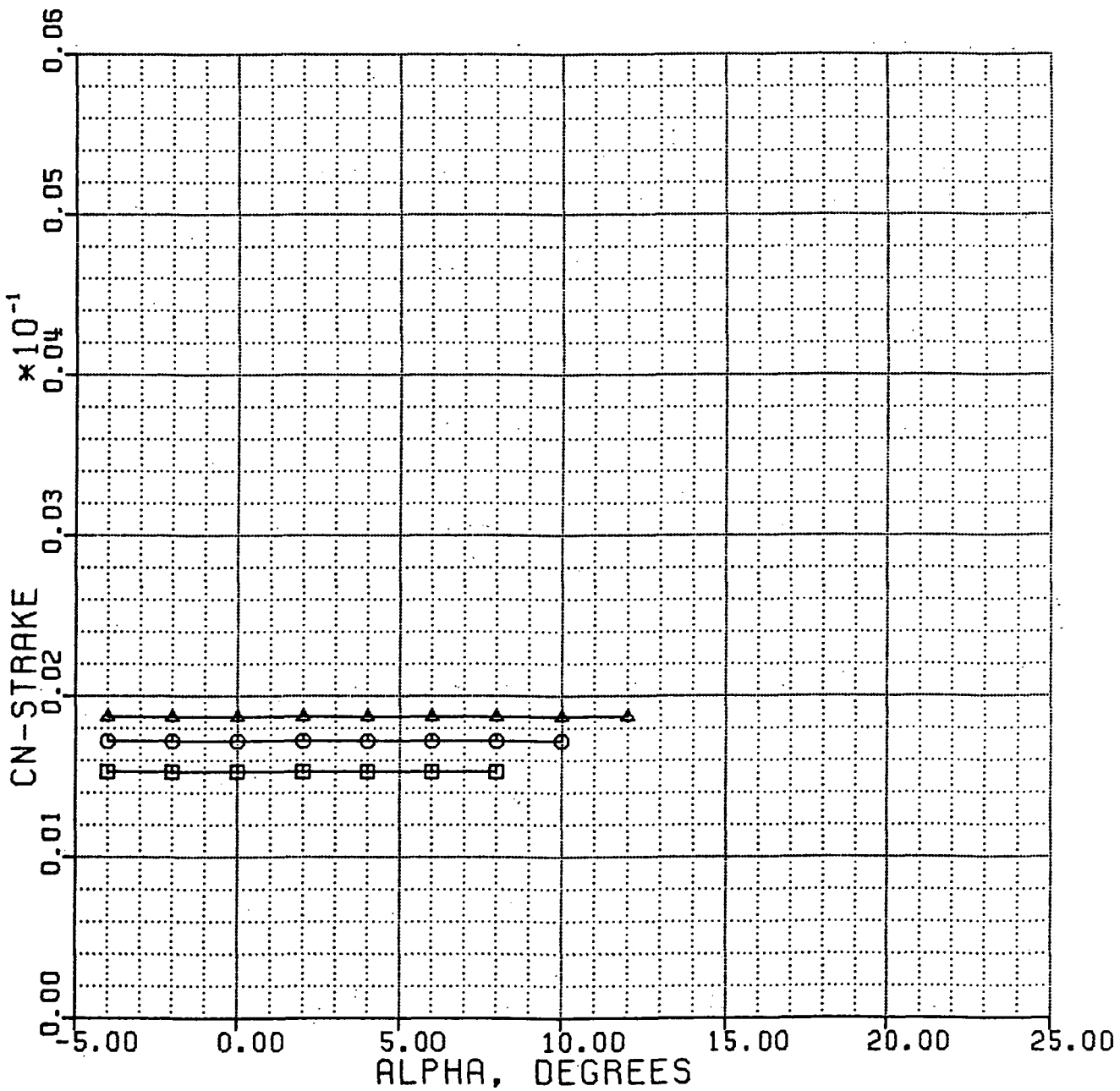

Figure 52(f)

Cy – AILERON VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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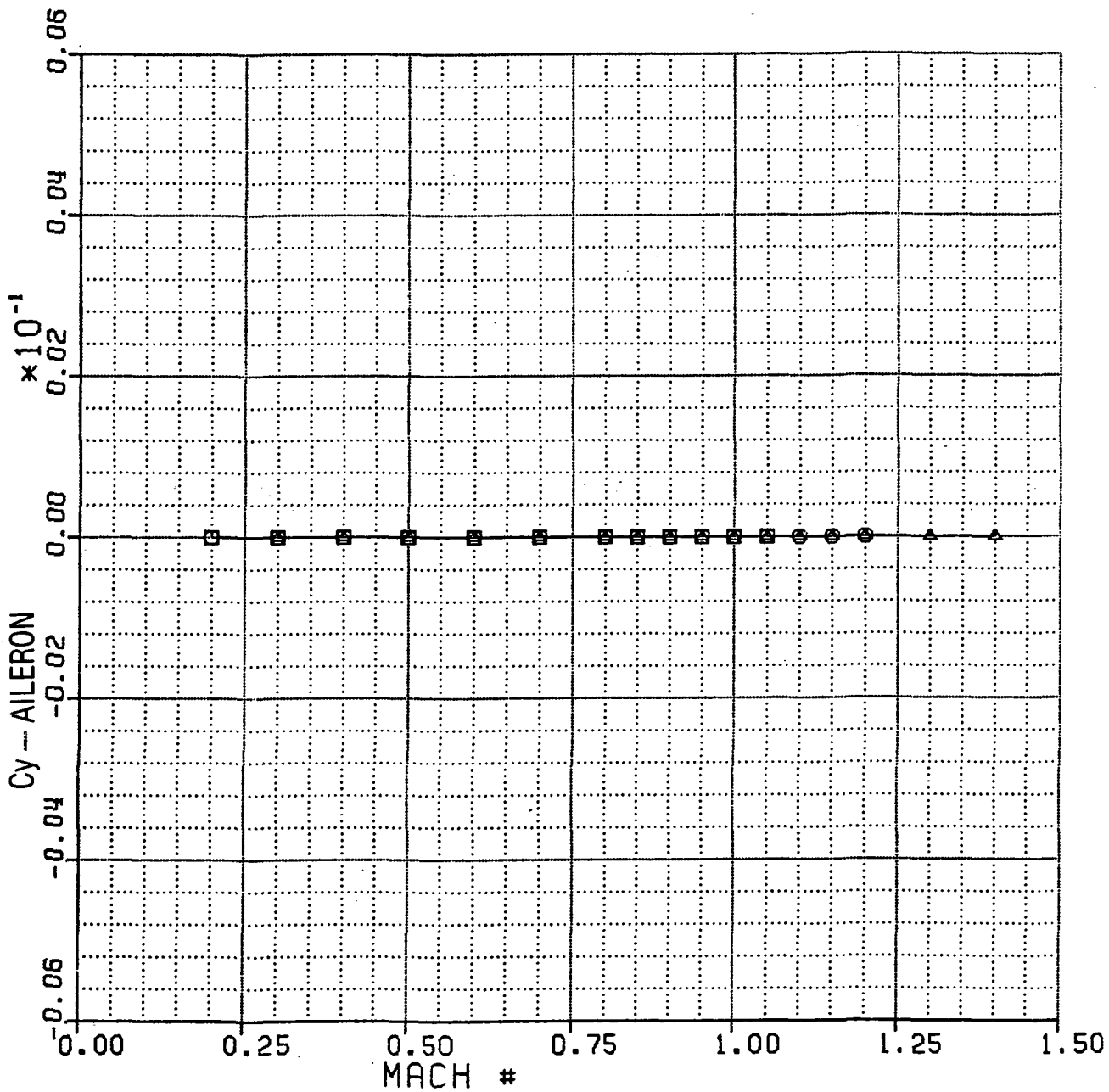

Figure 53(a)

Cy – AILERON VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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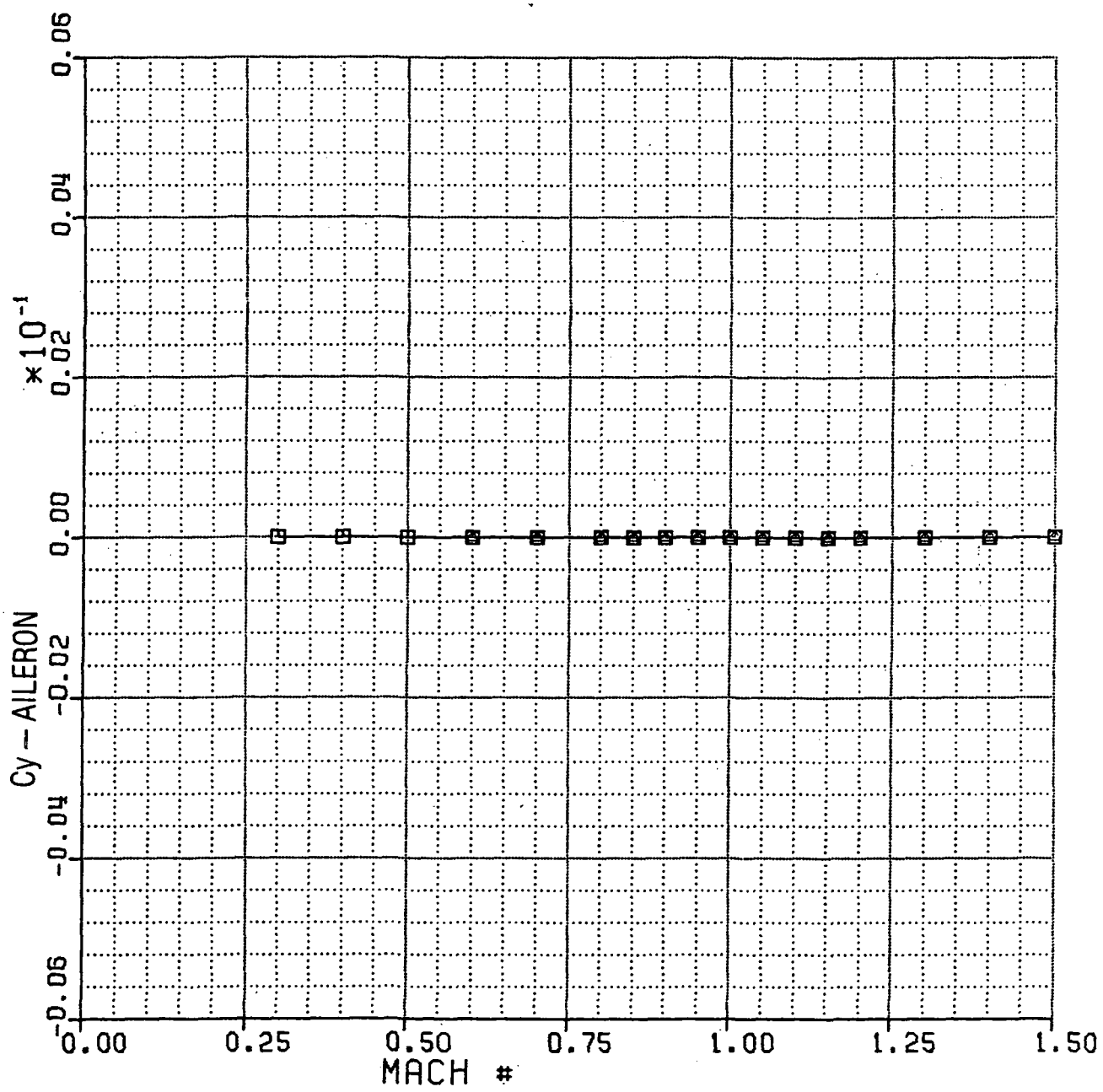

Figure 53(b)

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Cy – AILERON VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

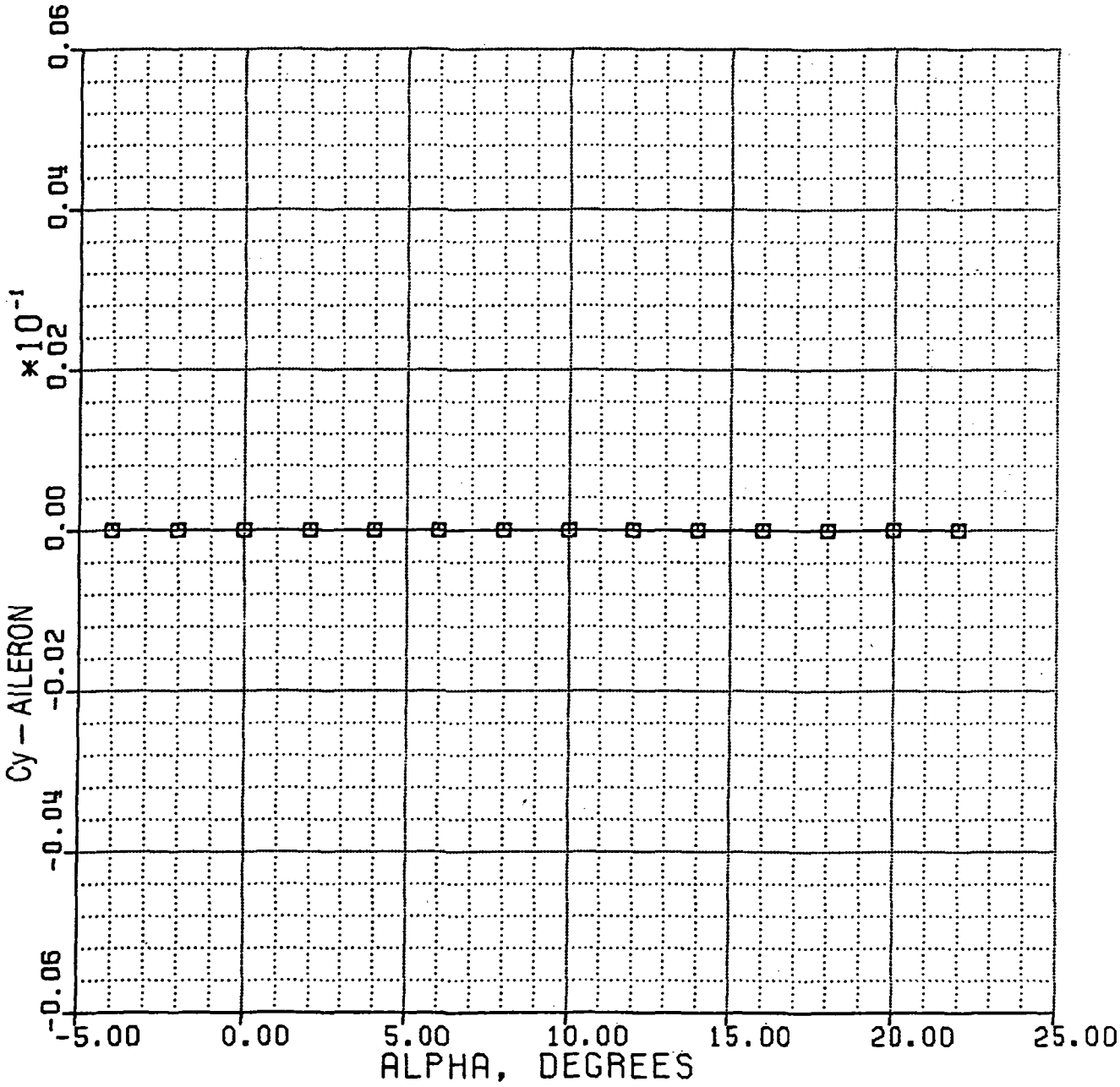

Figure 54(a)

Cy – AILERON VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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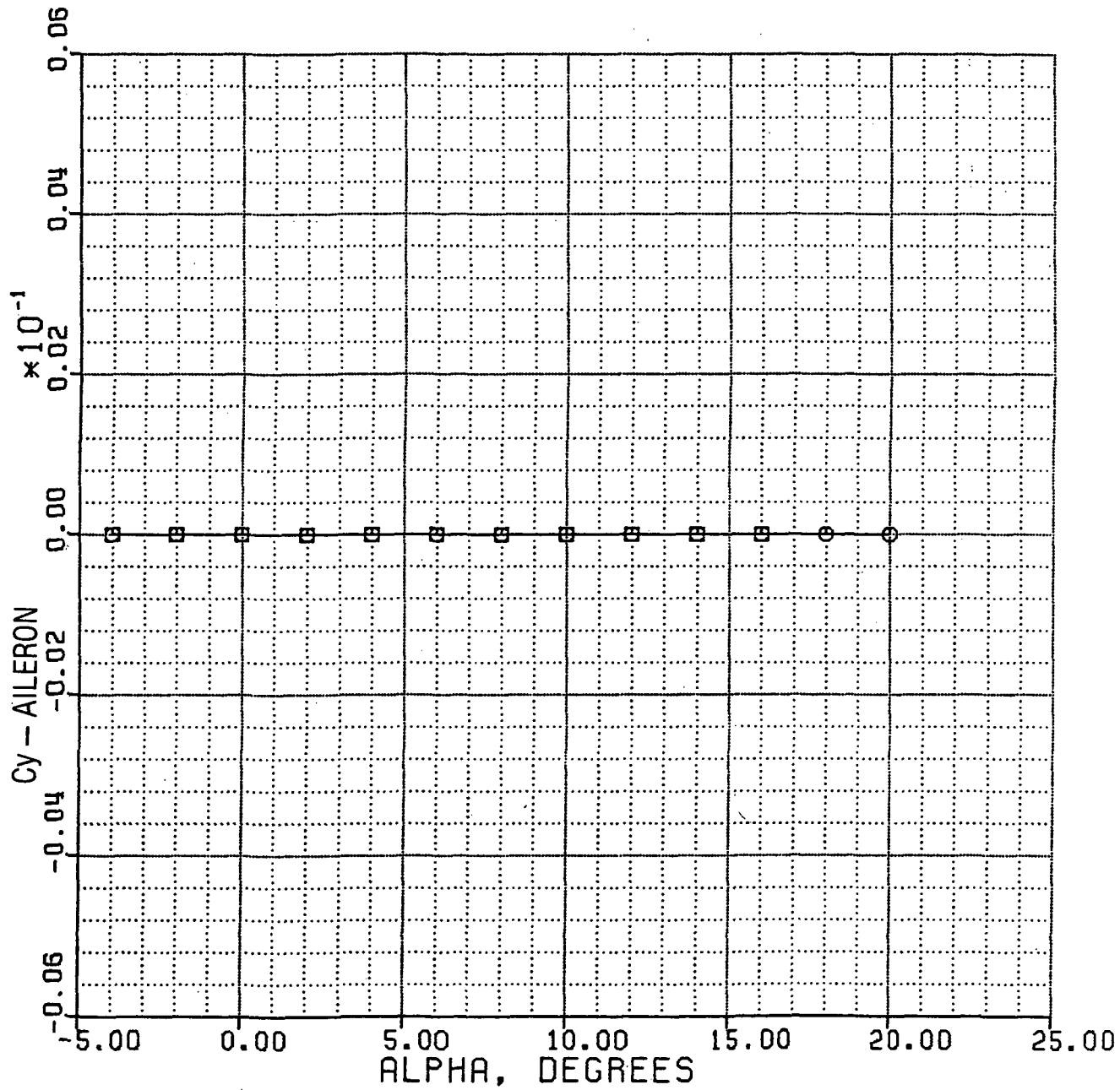

Figure 54(b)

Cy – AILERON VS ALPHA

7-26-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10	
ALT = 20K	ALP: -4 TO 12	
ALT = 30K	ALP: -4 TO 14	
ALT = 40K	ALP: -4 TO 18	
ALT = 50K	ALP: -4 TO 22	

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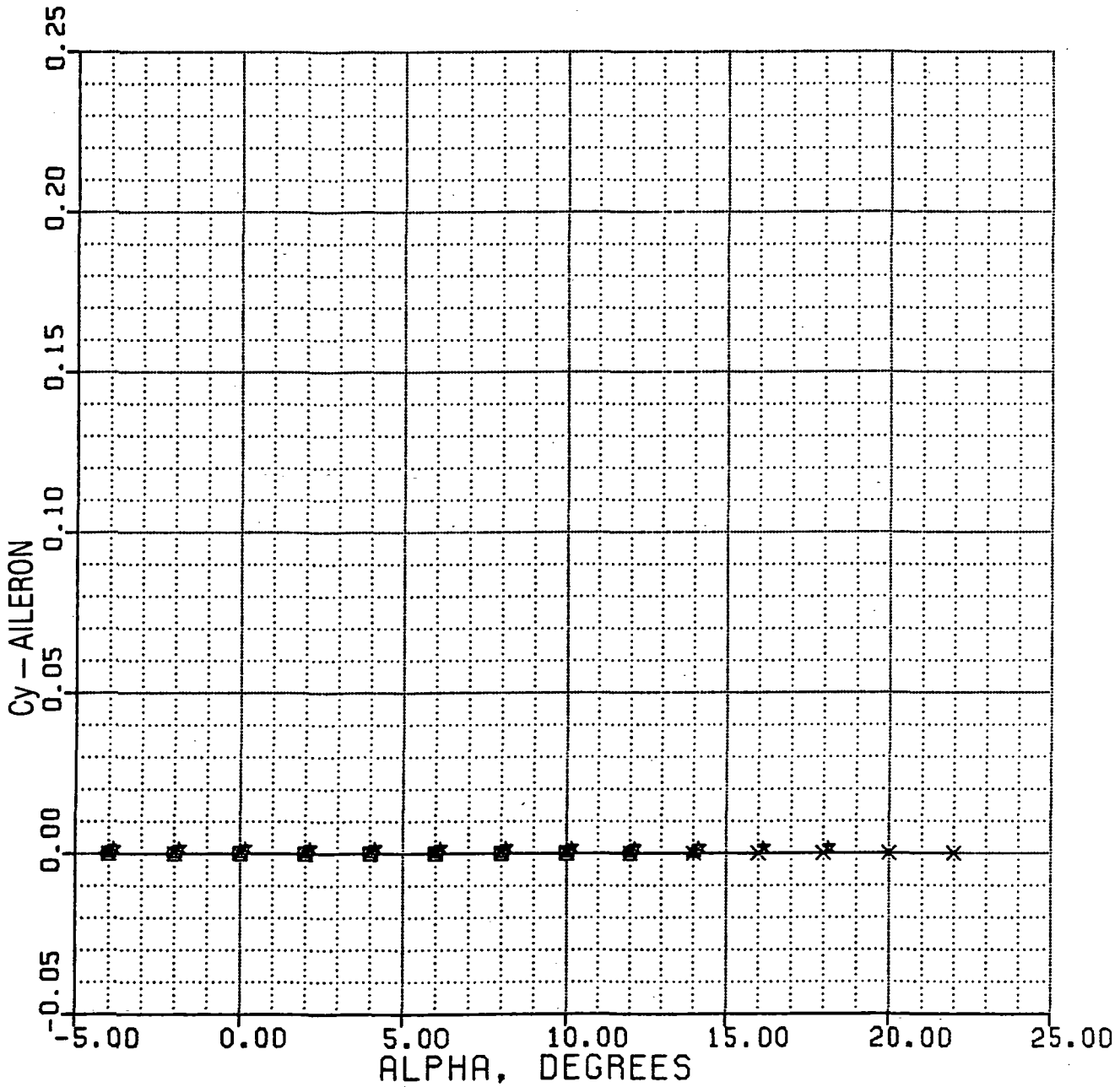

Figure 54(c)

Cy – AILERON VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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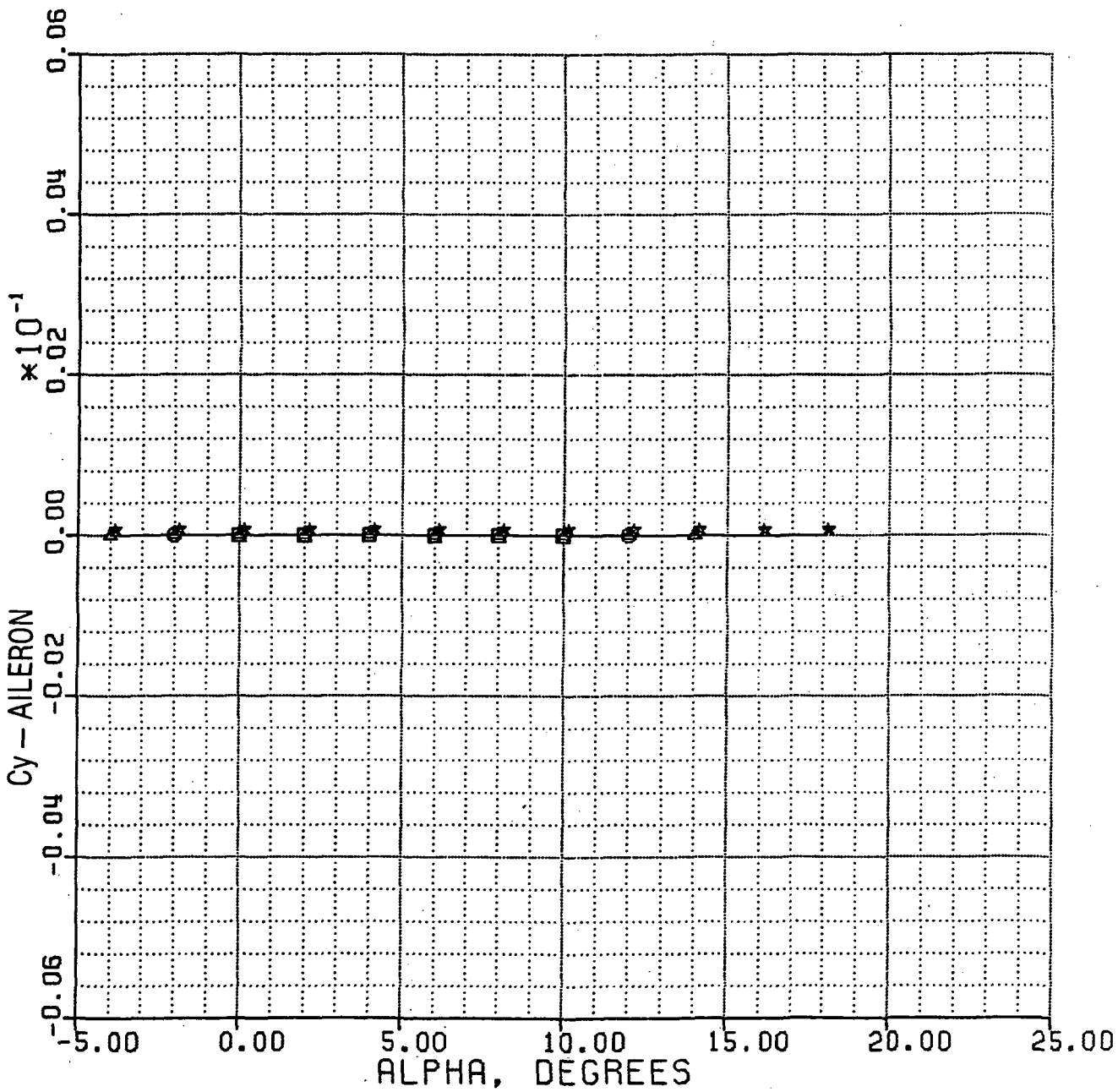

Figure 54(d)

Cy – AILERON VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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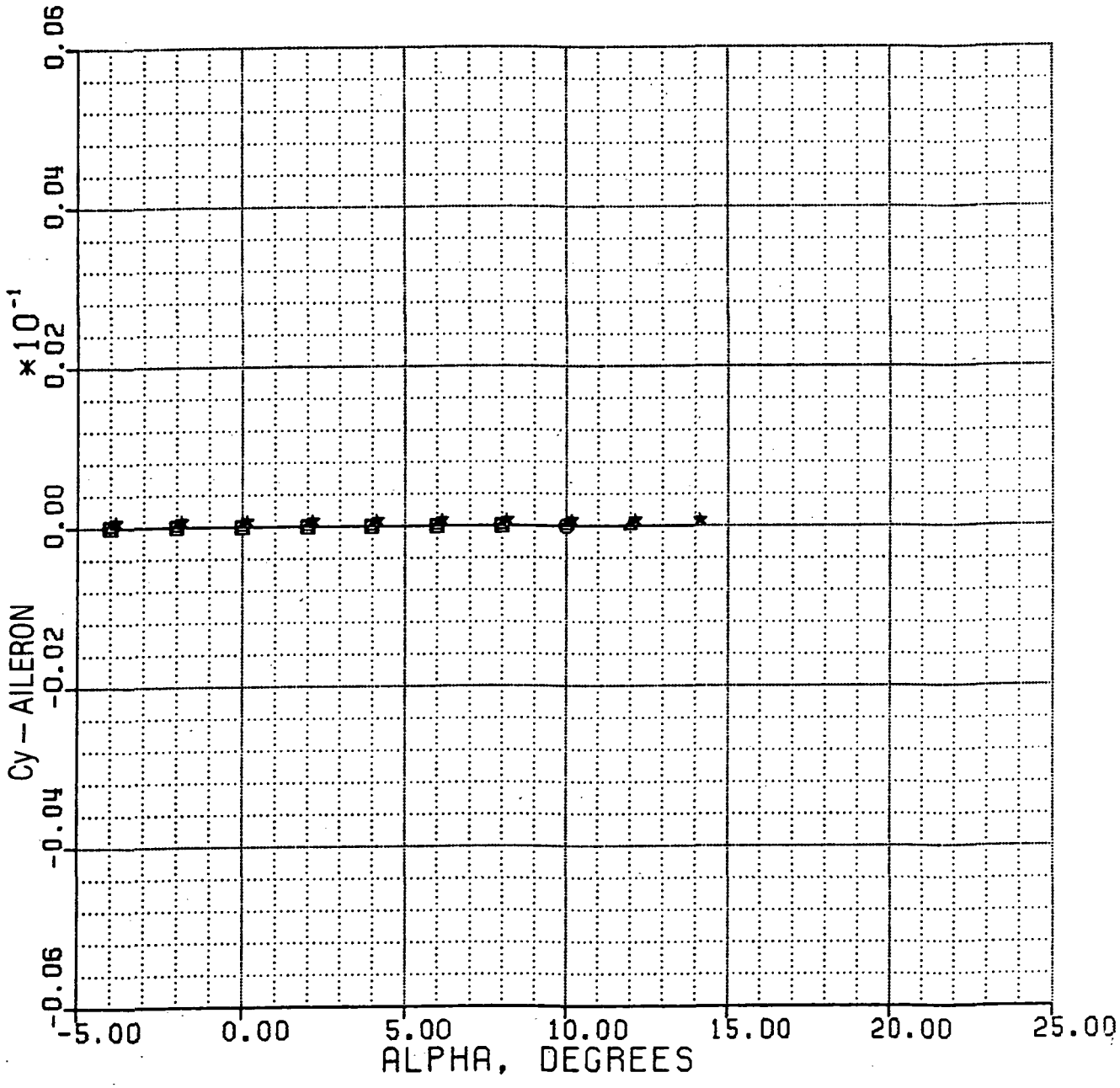

Figure 54(e)

Cy – AILERON VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

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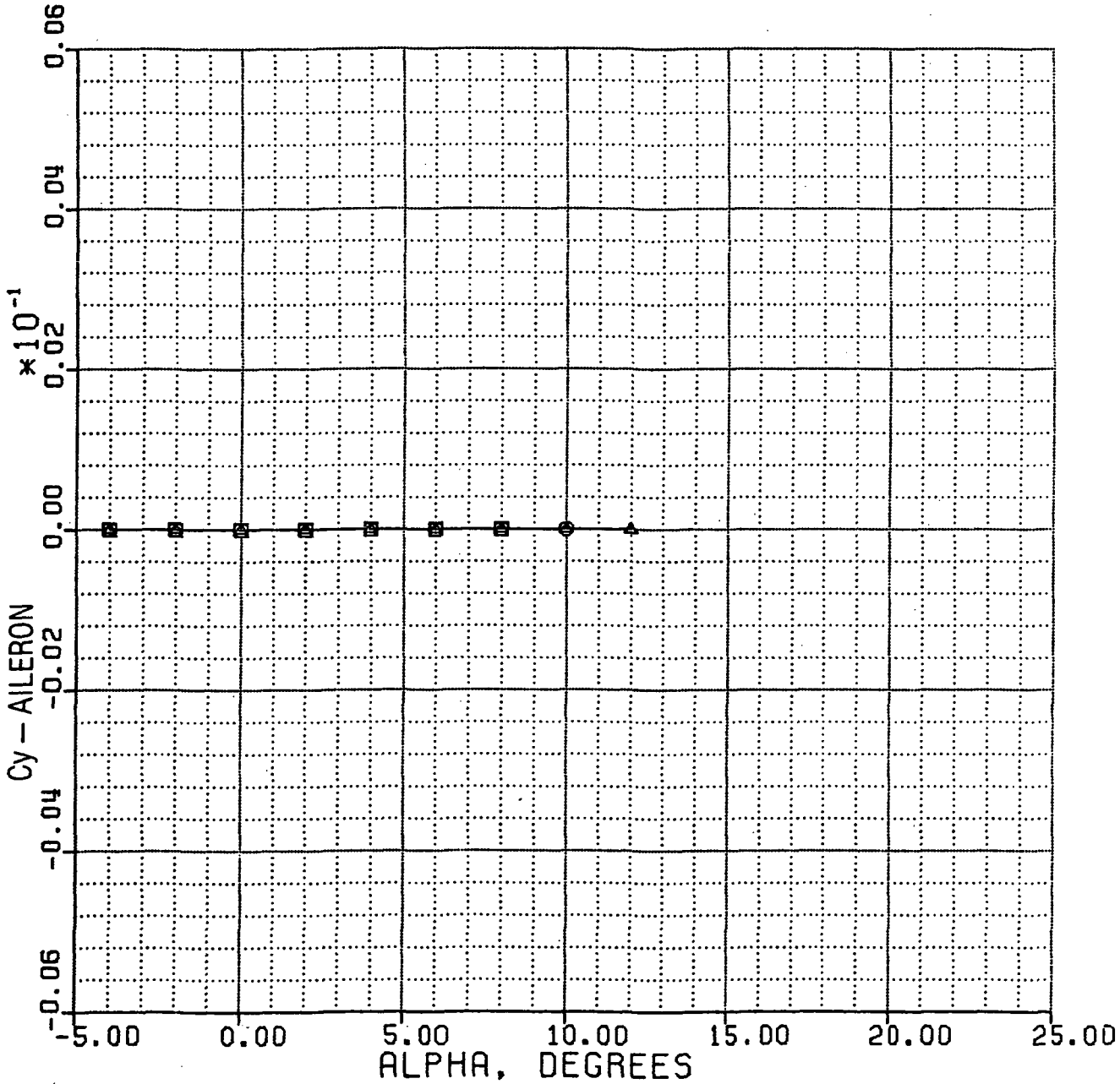

Figure 54(f)

Cl – AILERON VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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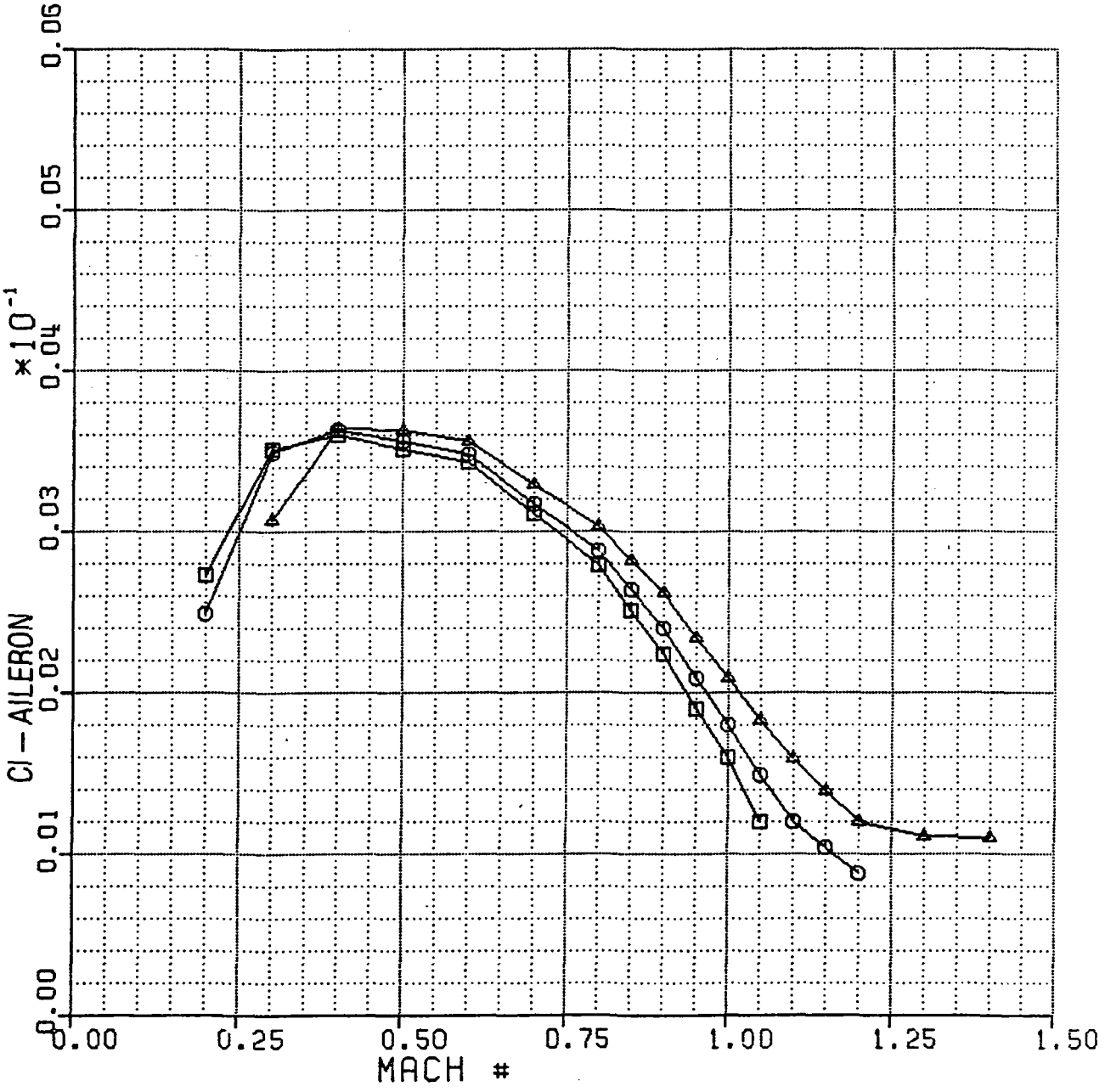

Figure 55(a)

Cl – AILERON VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TØ 1.5

ALT = 40K M# = .6 TØ 1.5

ALT = 50K M# = .6 TØ 1.5

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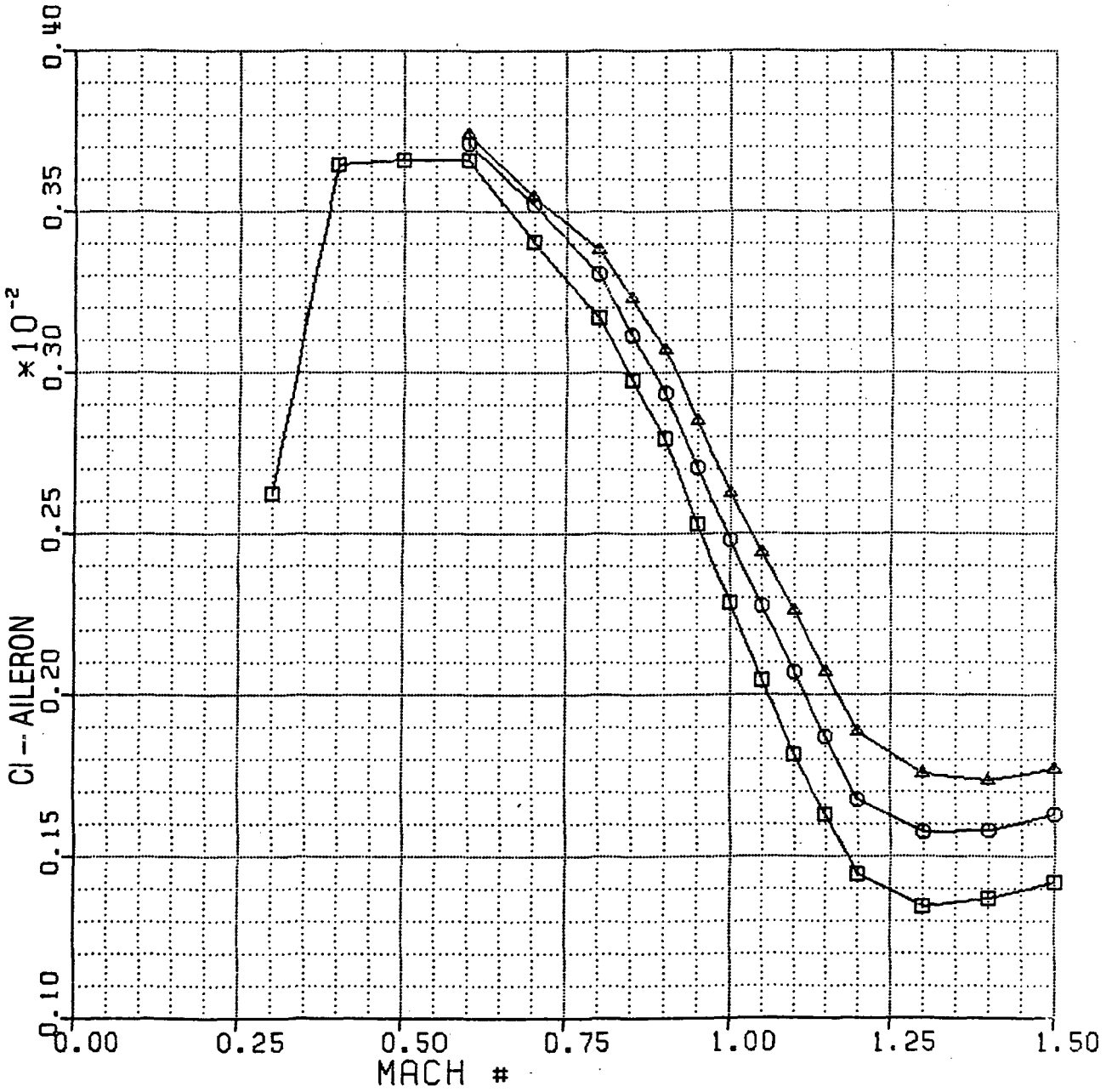

Figure 55(b)

Cl – AILERON VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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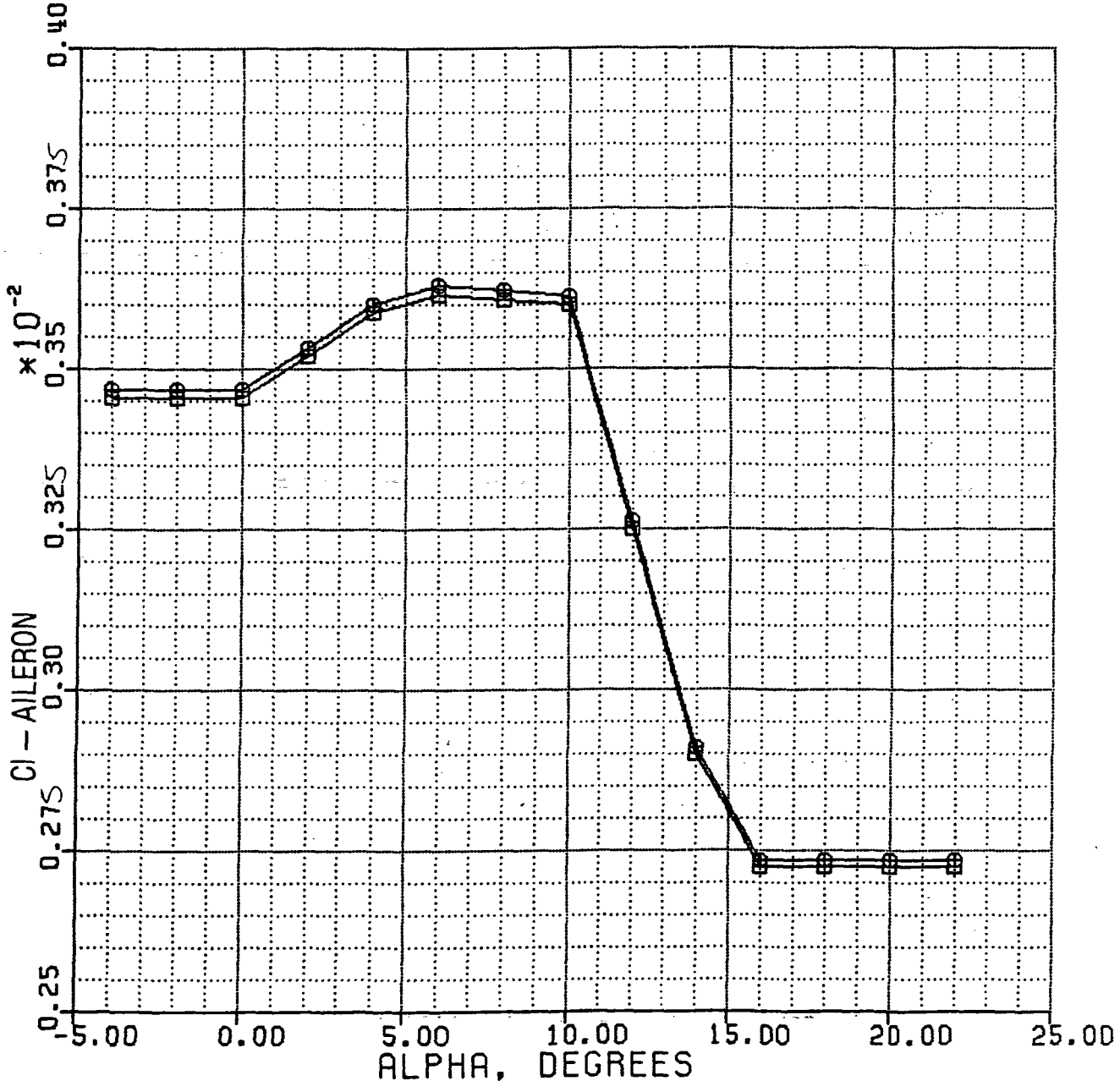

Figure 56(a)

CI – AILERON VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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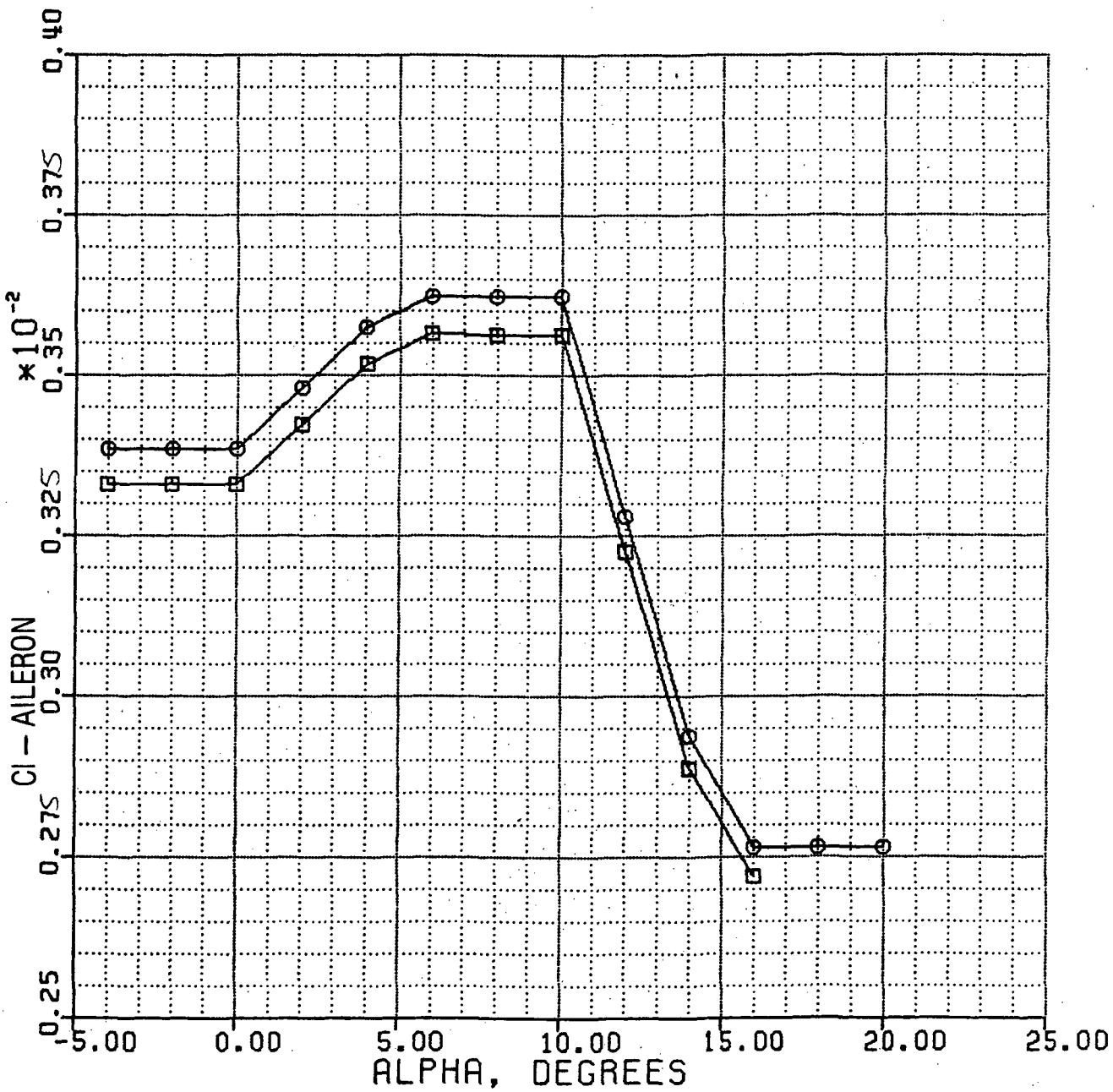

Figure 56(b)

CI — AILERON VS ALPHA

6-30-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10
ALT = 20K	ALP: -4 TO 12
ALP = 30K	ALP: -4 TO 14
ALT = 40K	ALP: -4 TO 18
ALT = 50K	ALP: -4 TO 22

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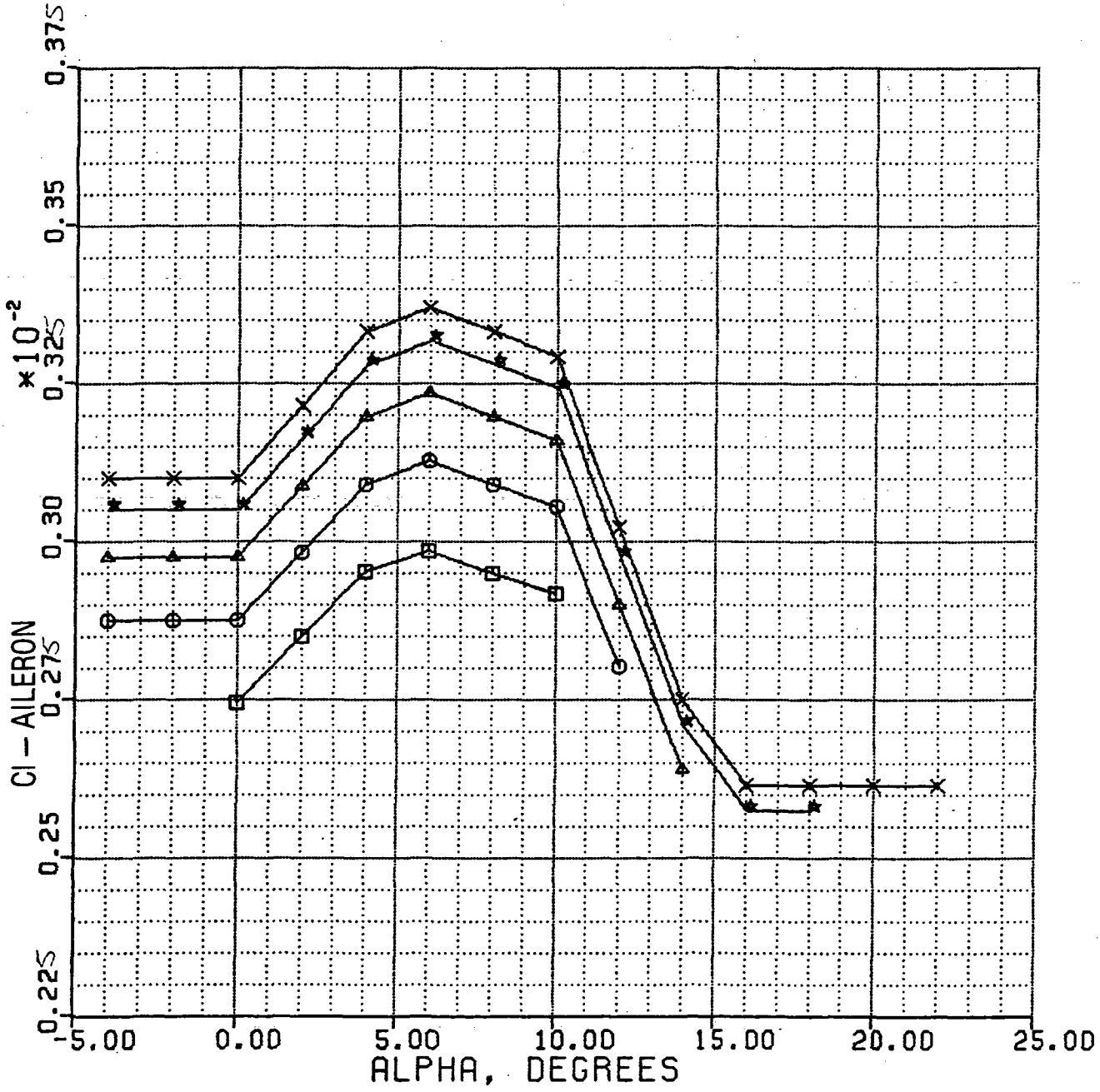

Figure 56(c)

CI – AILERON VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K	ALP:	0 TO 10
ALT = 30K	ALP:	-2 TO 12
ALT = 40K	ALP:	-4 TO 14
ALT = 50K	ALP:	-4 TO 18

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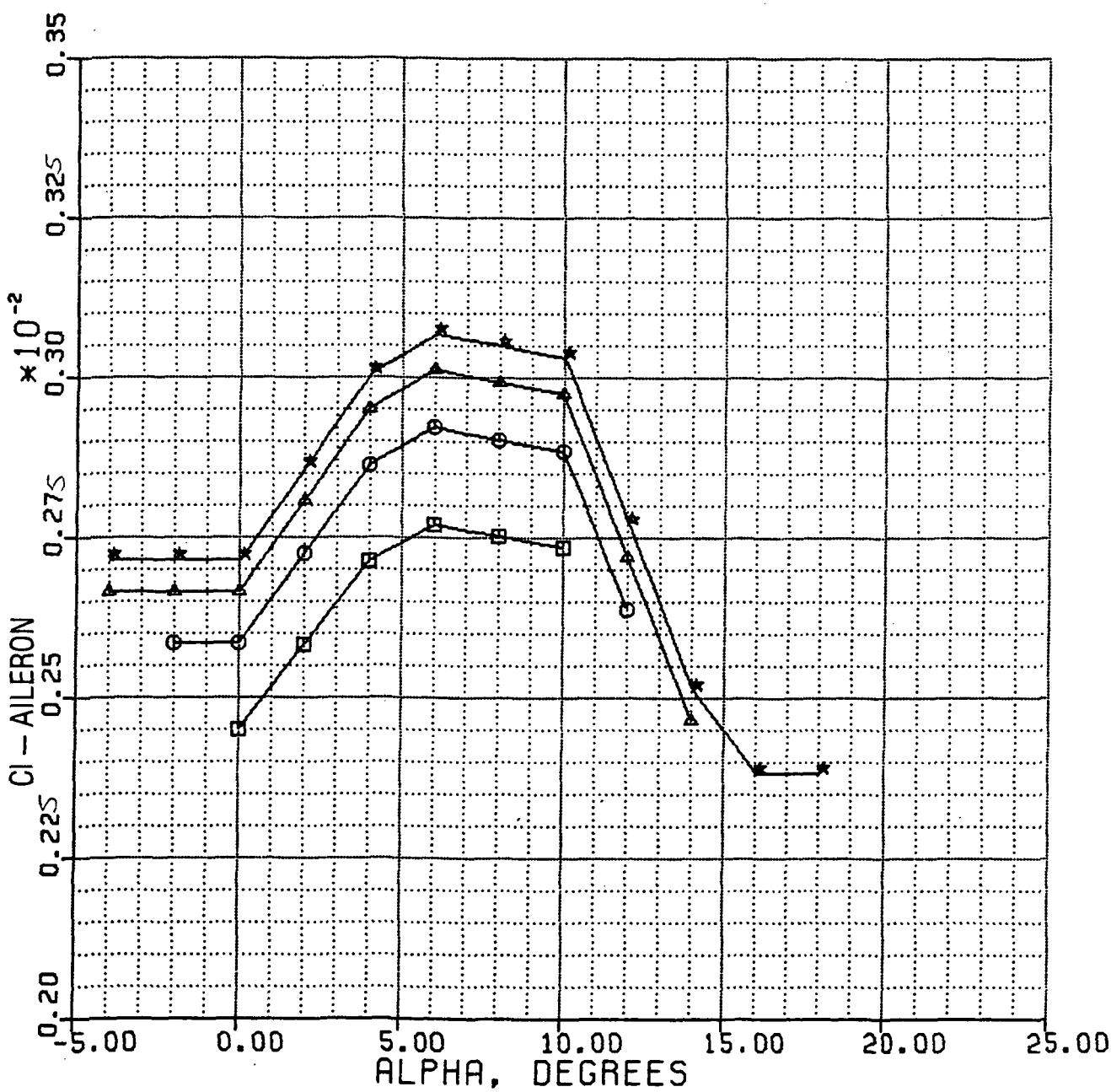

Figure 56(d)

CI – AILERON VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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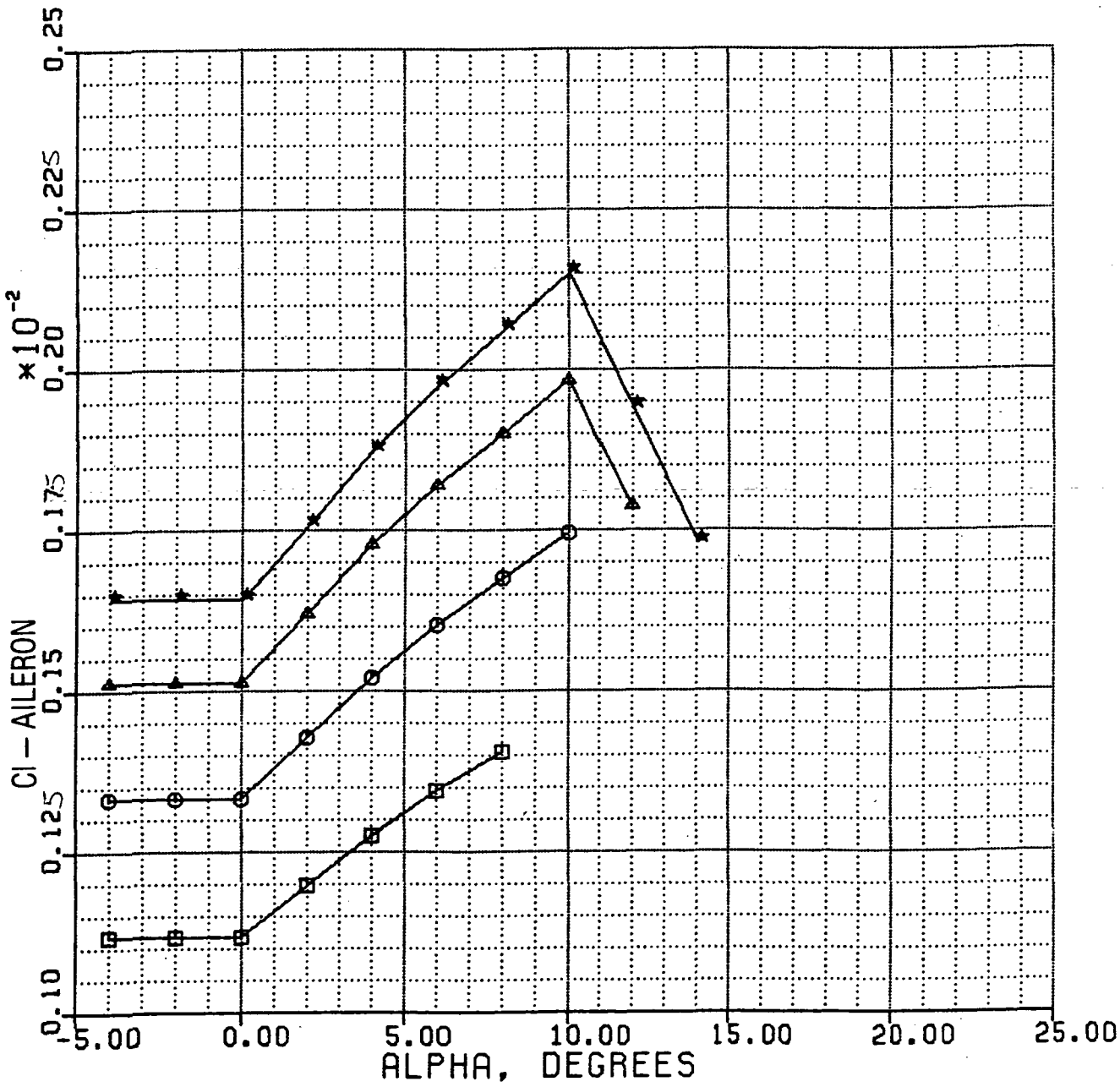

Figure 56(e)

CI – AILERON VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

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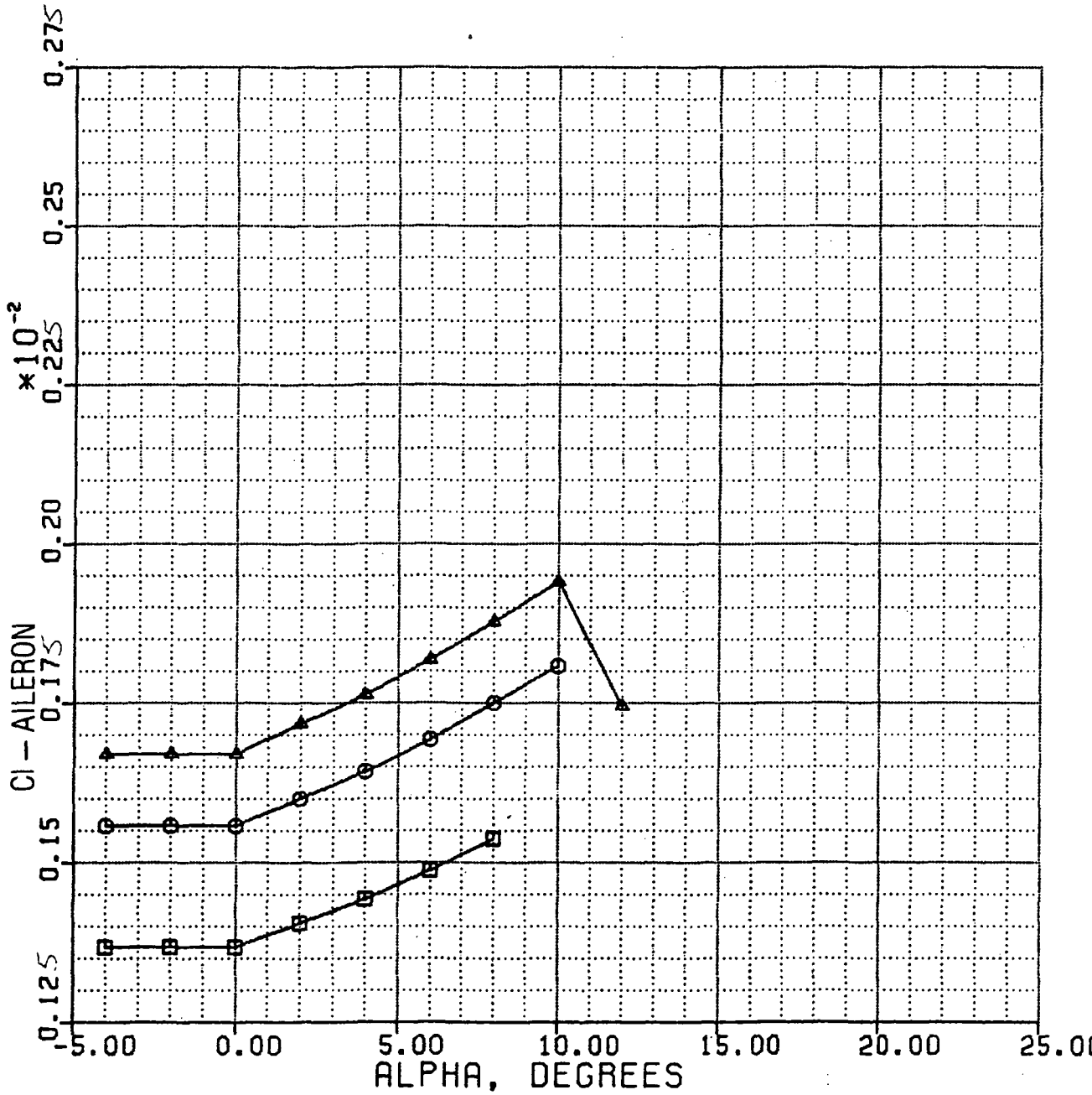

Figure 56(f)

Cn – AILERON VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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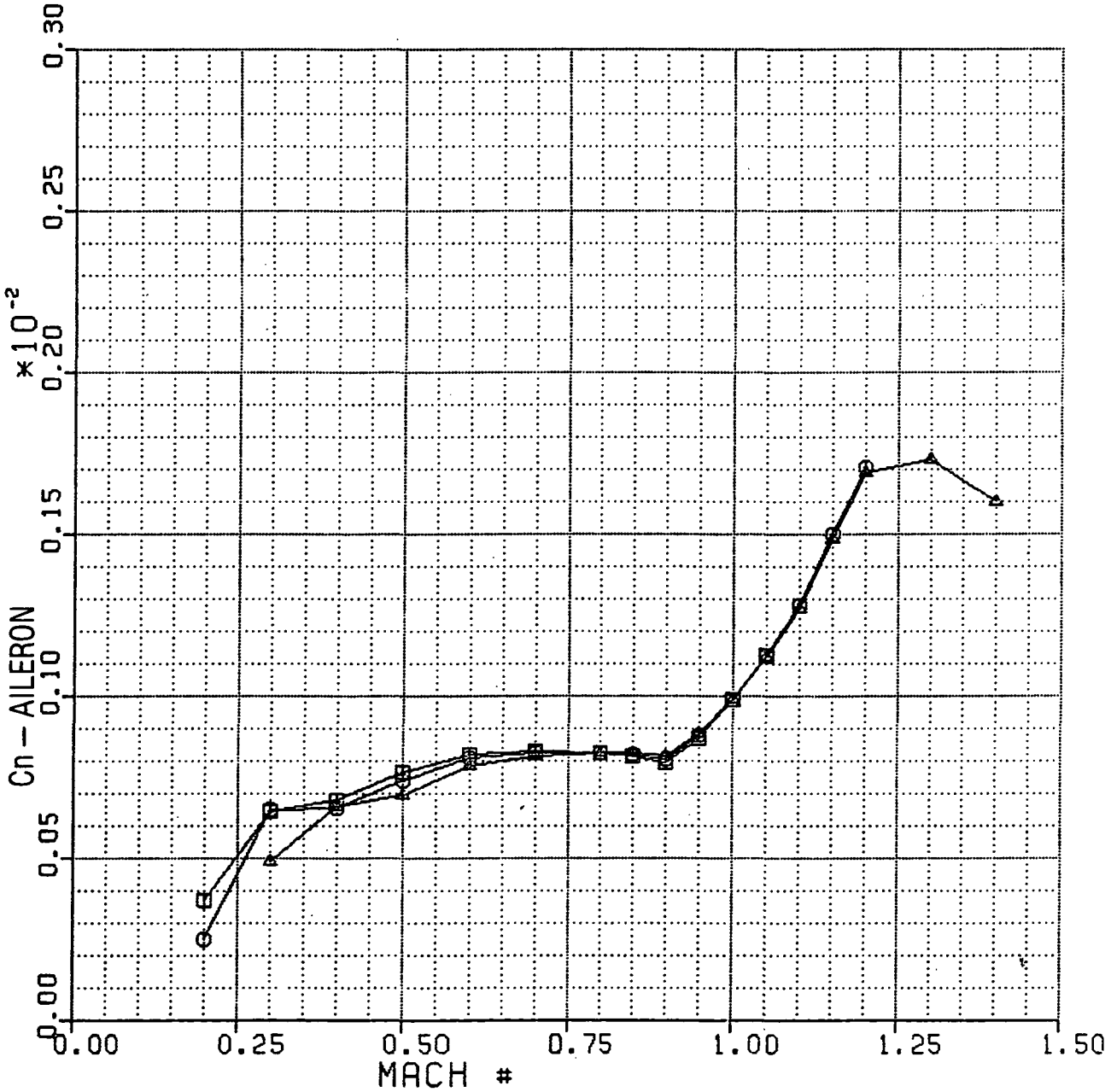

Figure 57(a)

Cn – AILERON VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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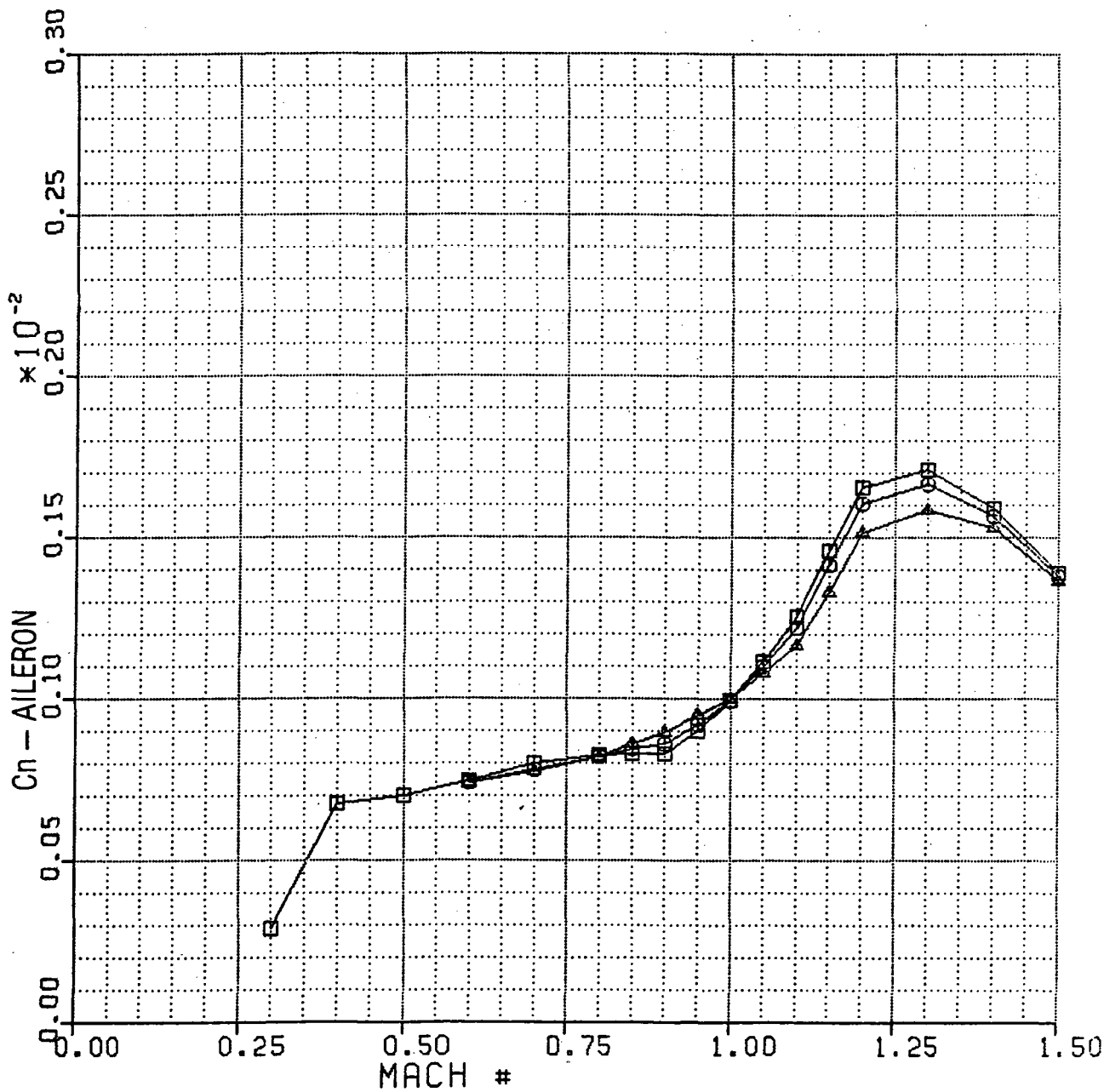

Figure 57(b)

Cn – AILERON VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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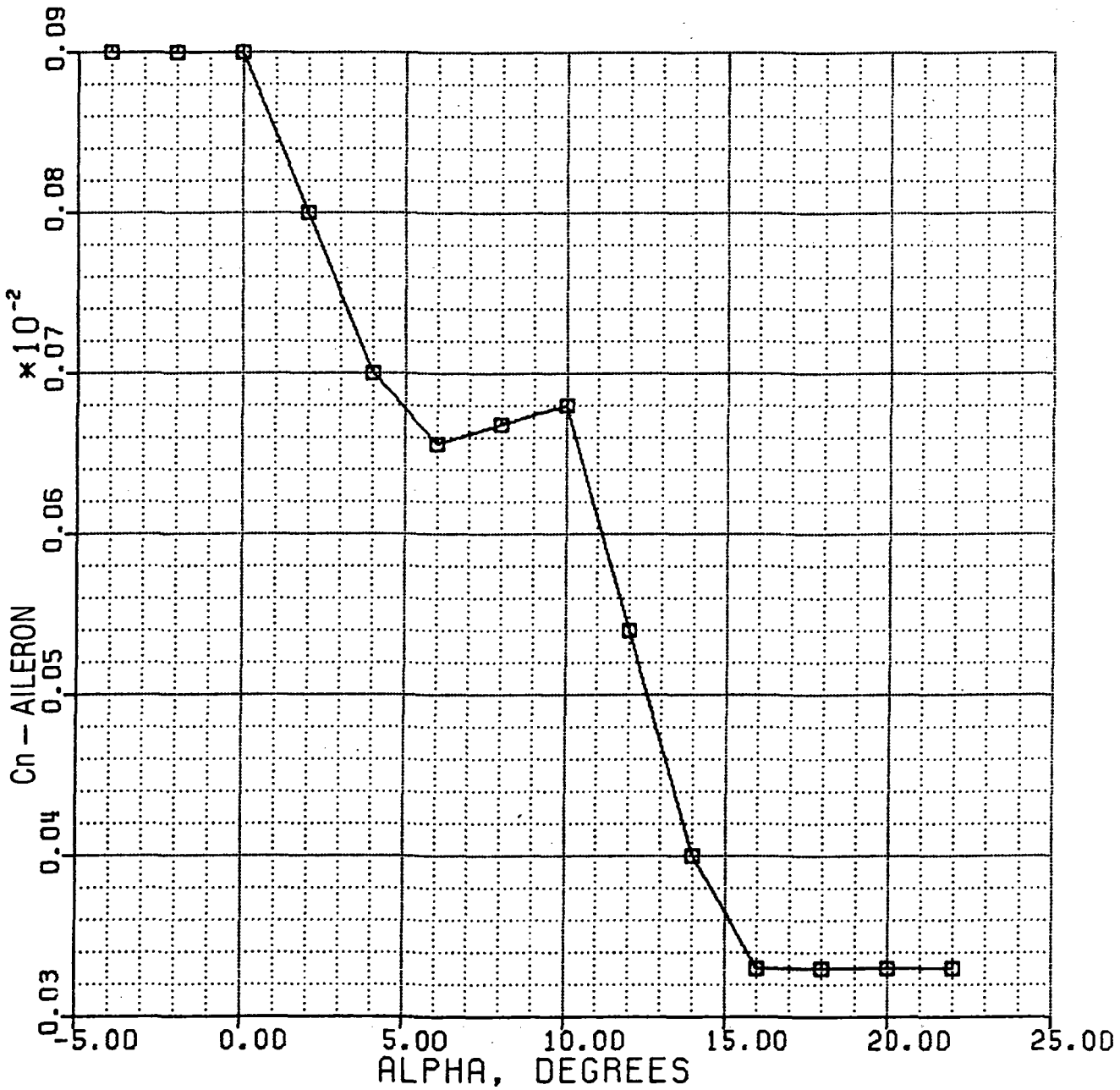

Figure 58(a)

Cn – AILERON VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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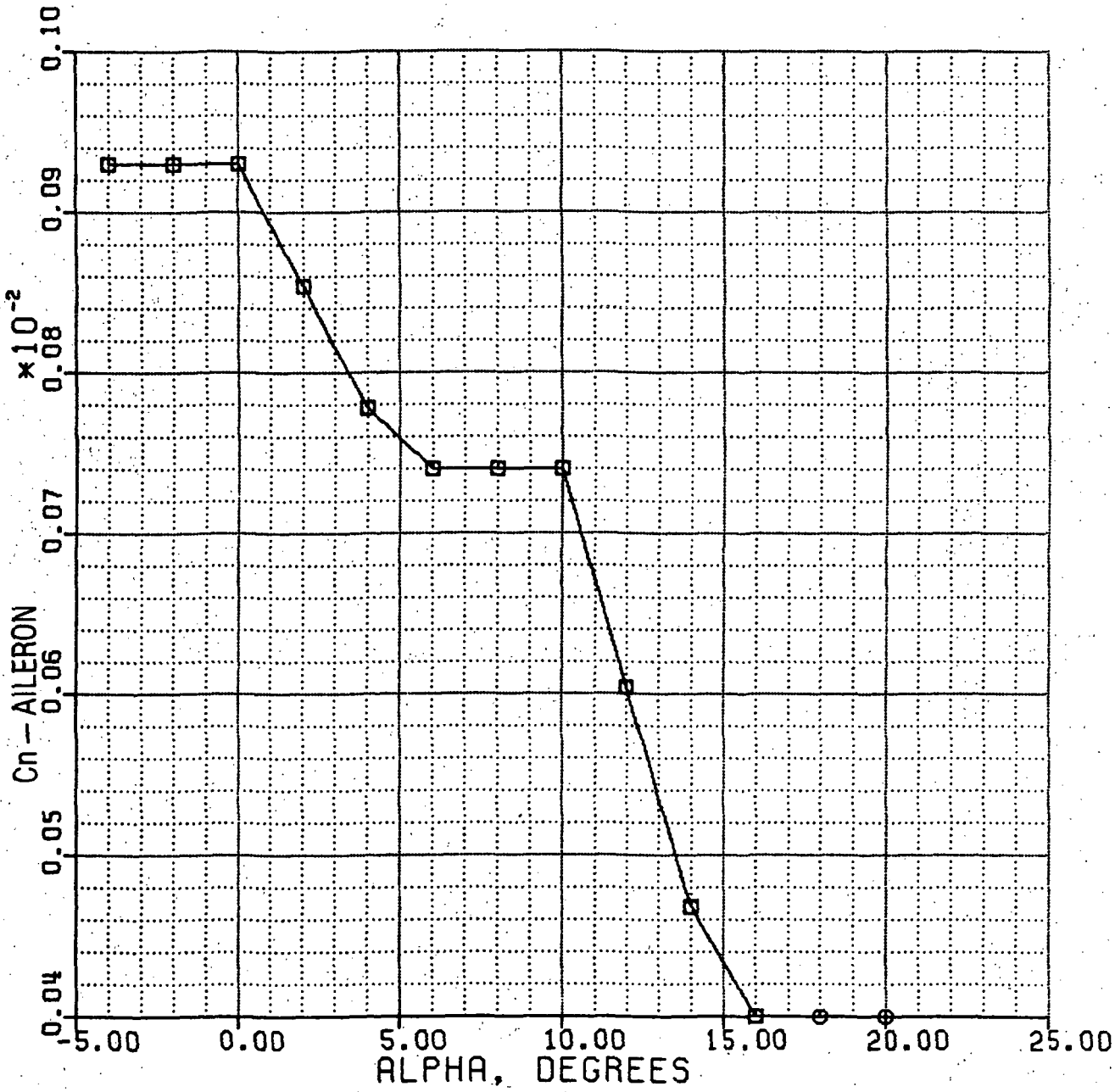

Figure 58(b)

Cn – AILERON VS ALPHA

6-30-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10
ALT = 20K	ALP: -4 TO 12
ALP = 30K	ALP: -4 TO 14
ALT = 40K	ALP: -4 TO 18
ALT = 50K	ALP: -4 TO 22

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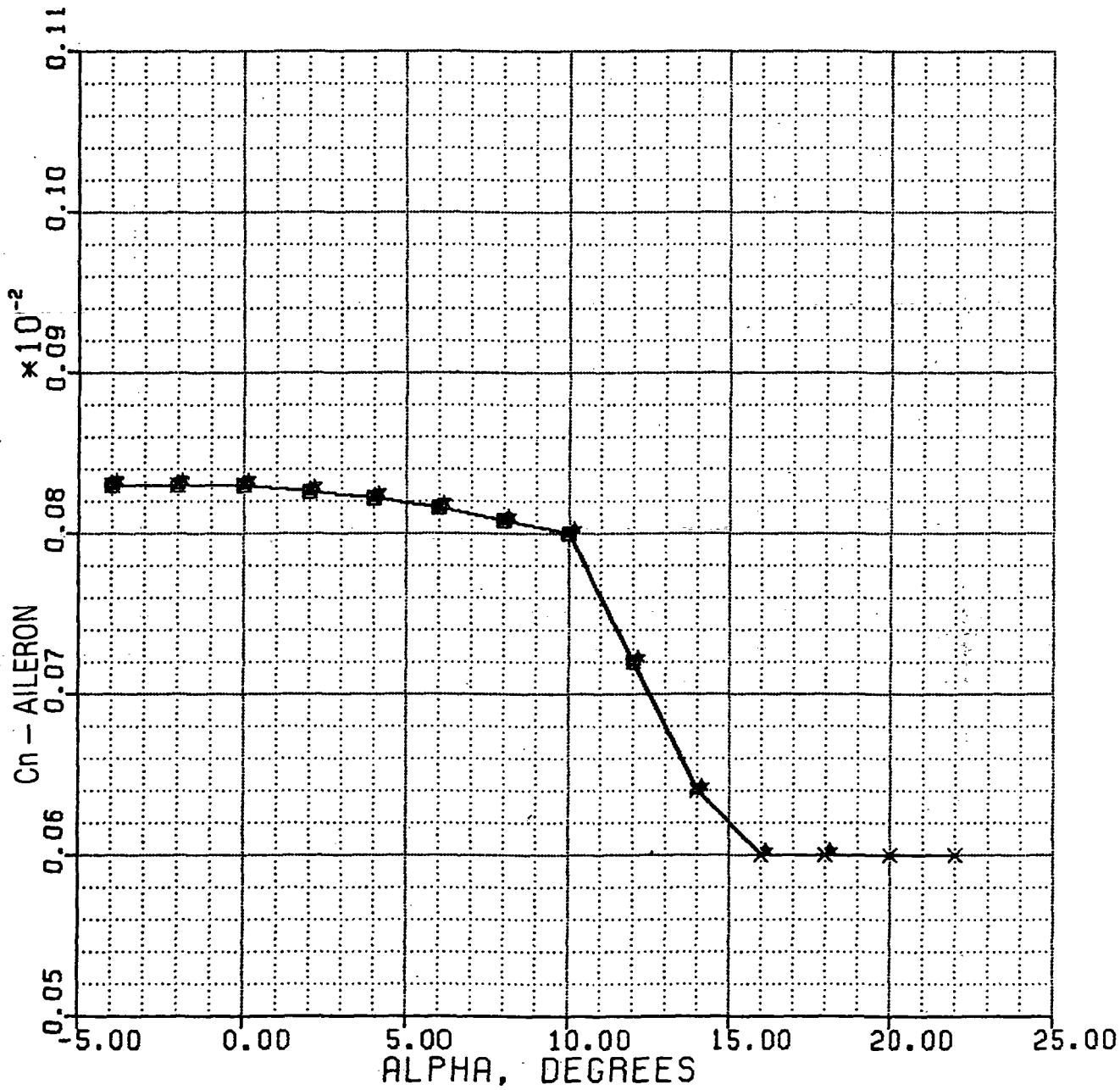

Figure 58(c)

Cn – AILERON VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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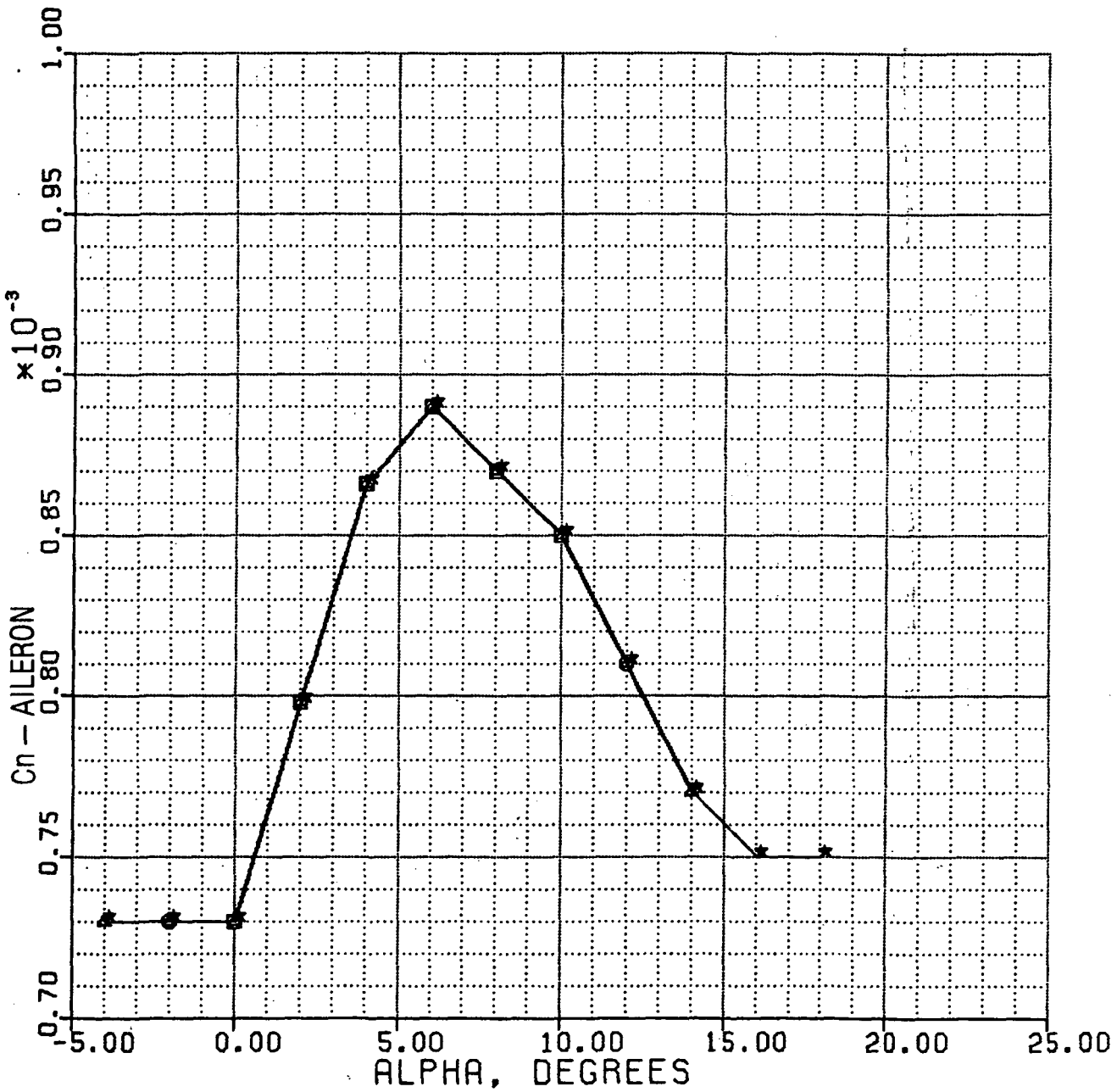

Figure 58(d)

Cn – AILERON VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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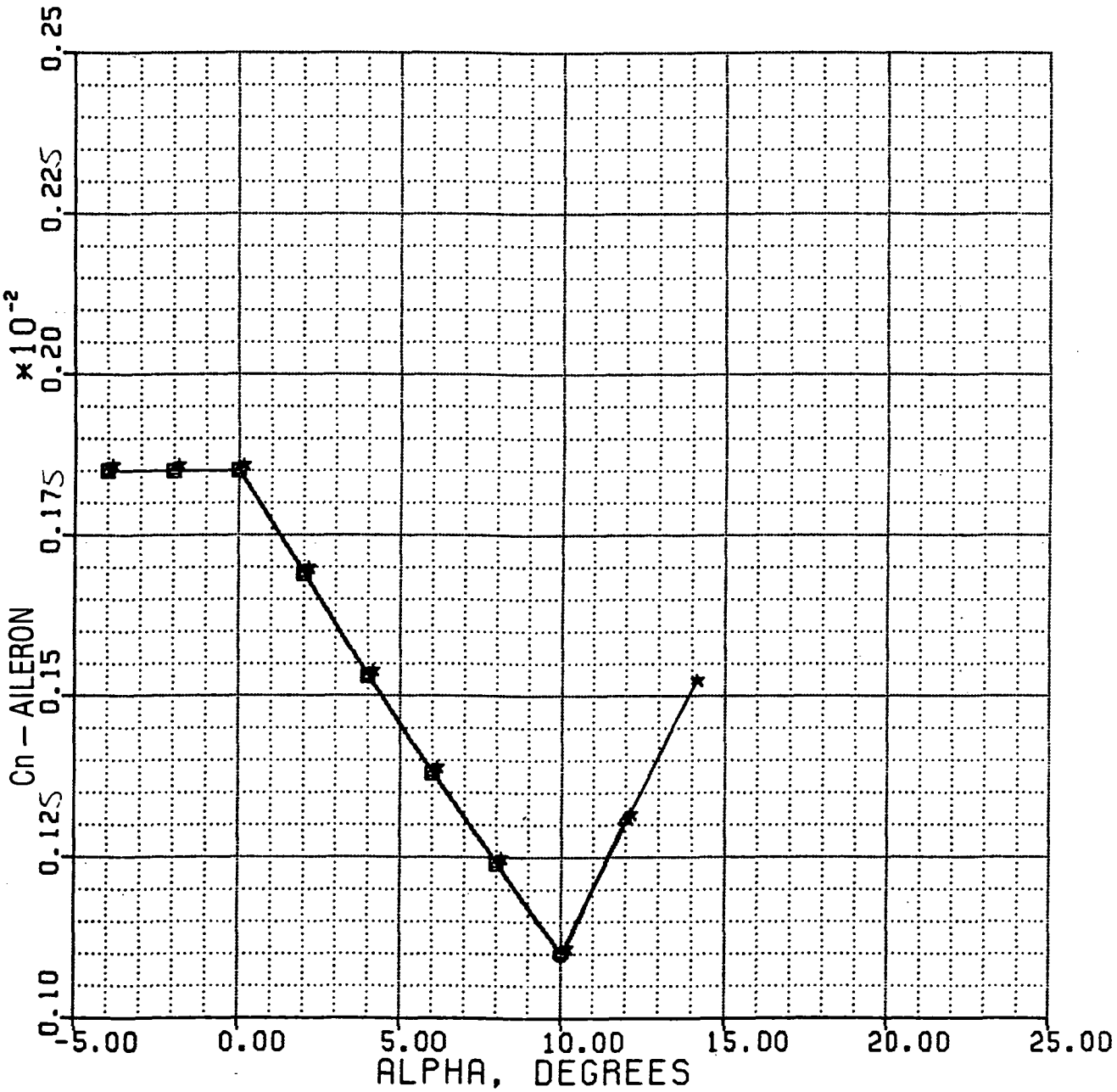

Figure 58(e)

Cn – AILERON VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

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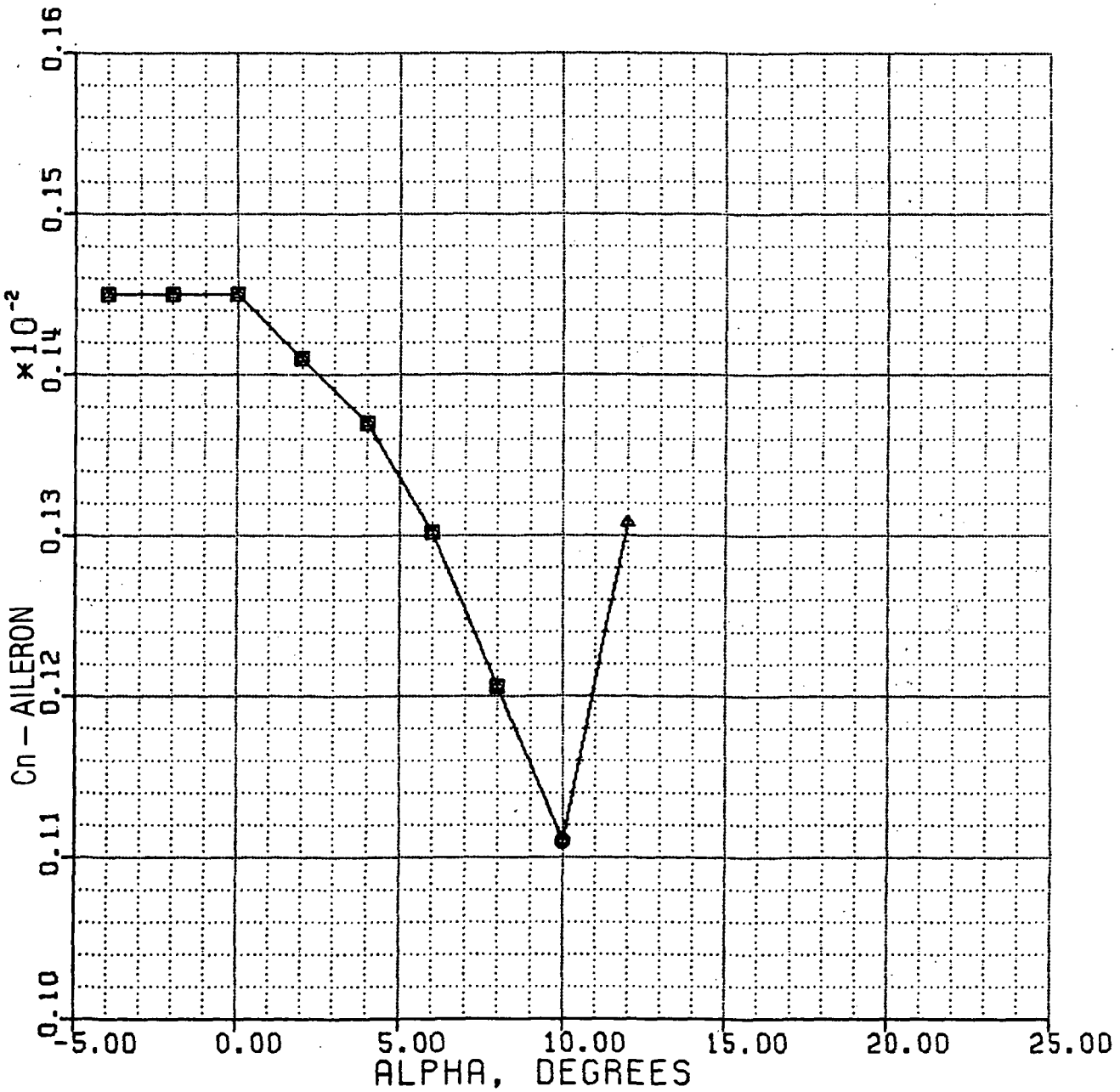

Figure 58(f)

Cy – RUDDER VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05

ALT = 10K M# = .2 TO 1.2

ALT = 20K M# = .3 TO 1.4

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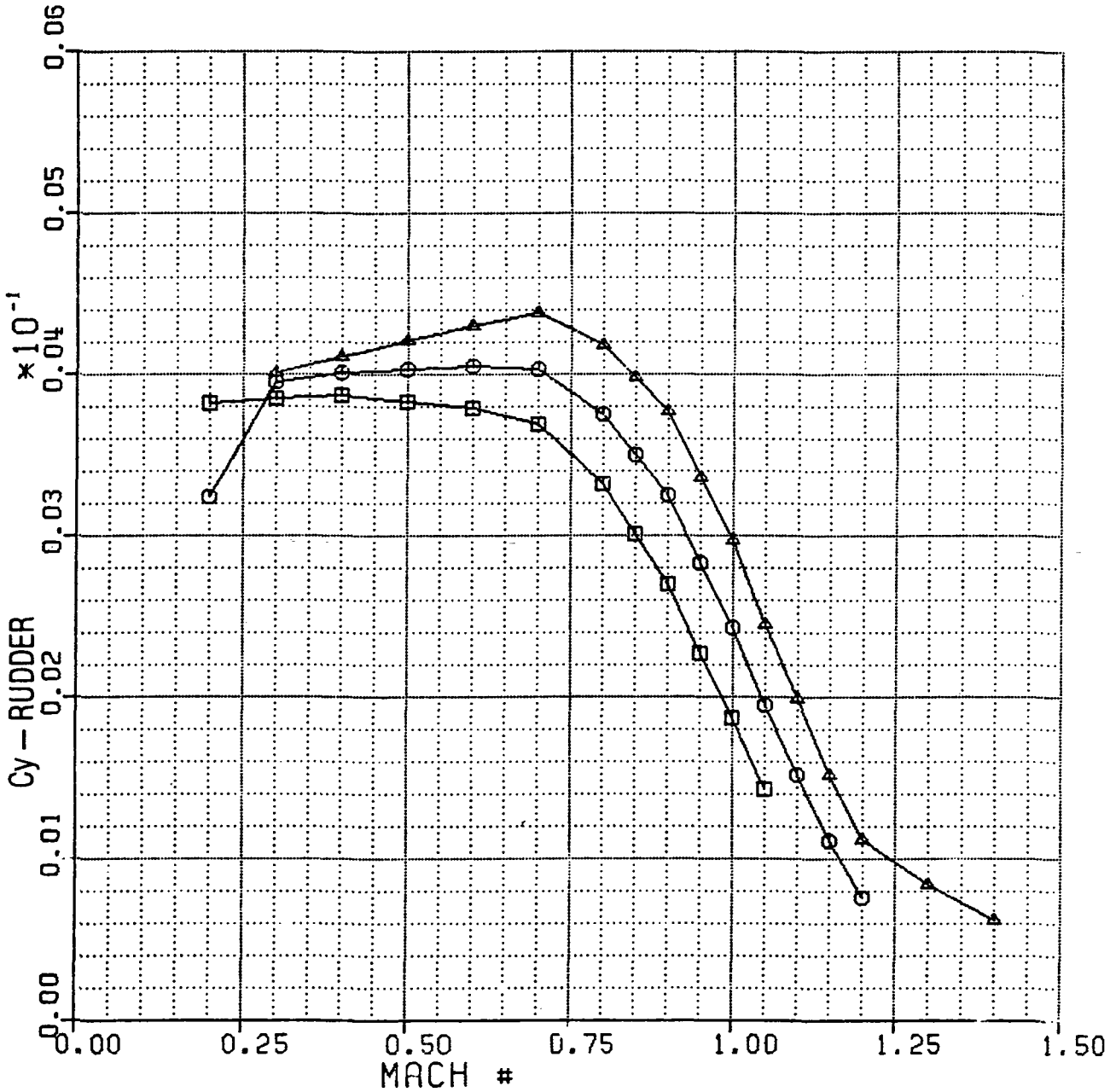

Figure 59(a)

Cy – RUDDER VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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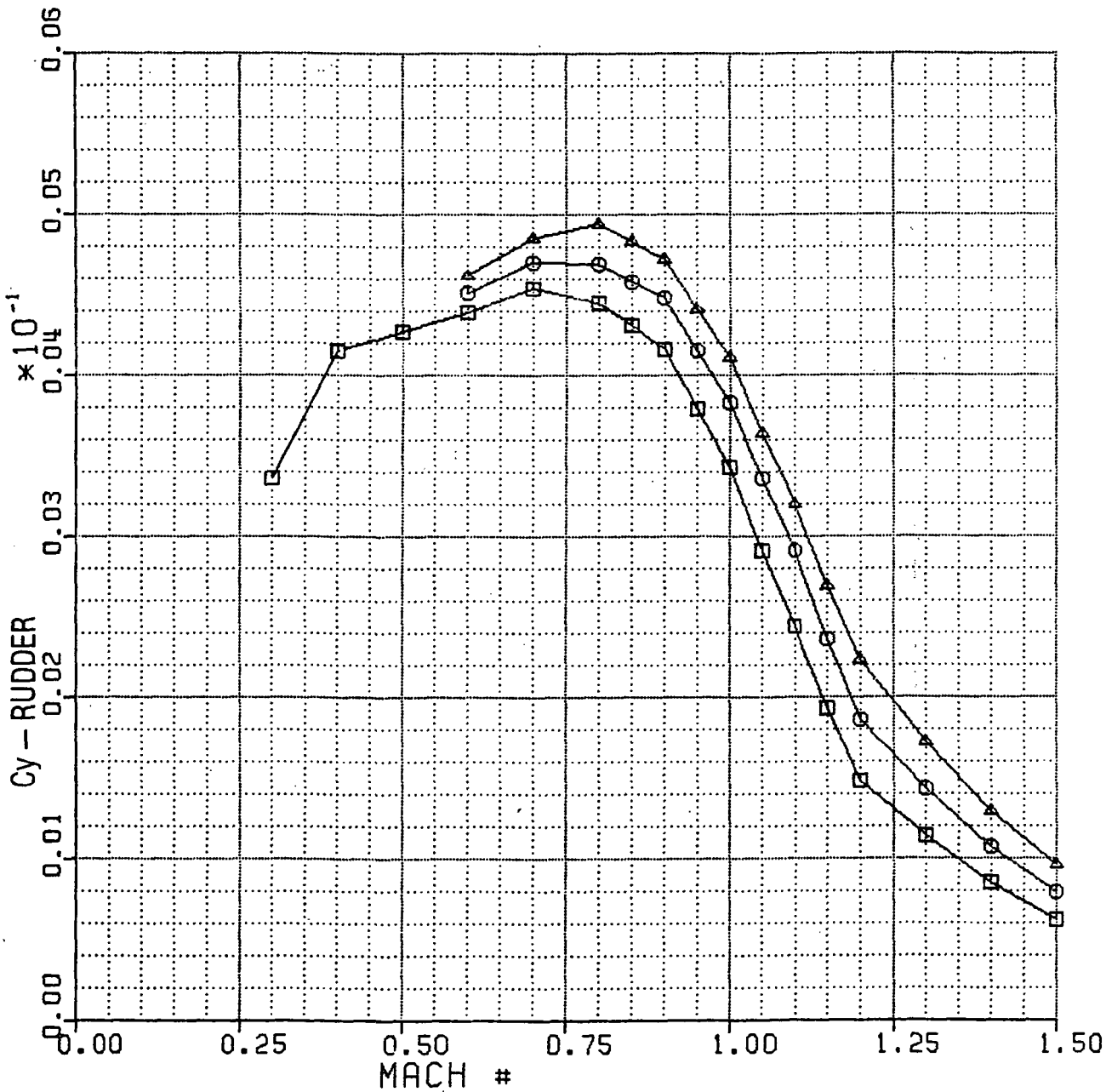

Figure 59(b)

Cy – RUDDER VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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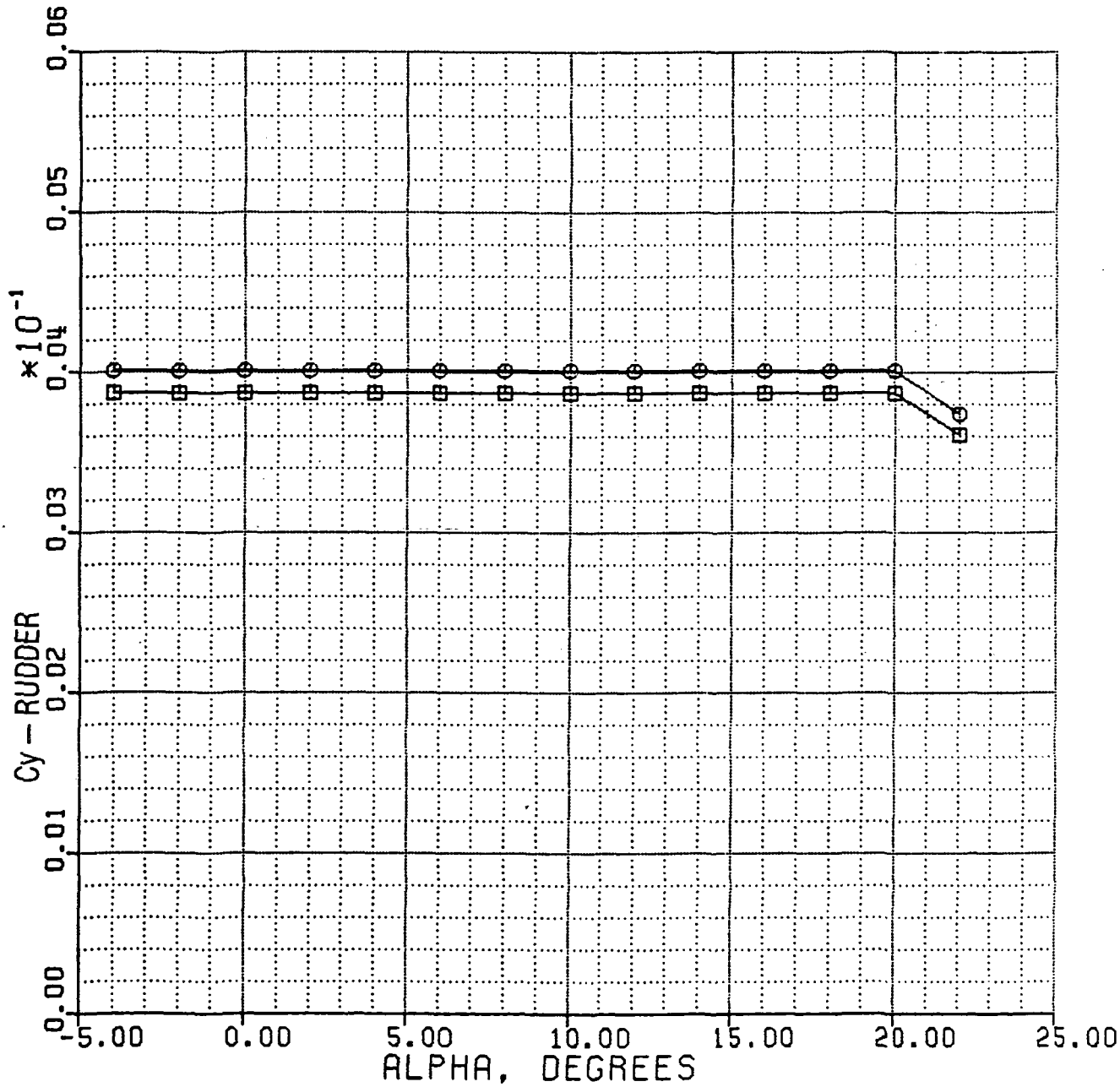

Figure 60(a)

Cy – RUDDER VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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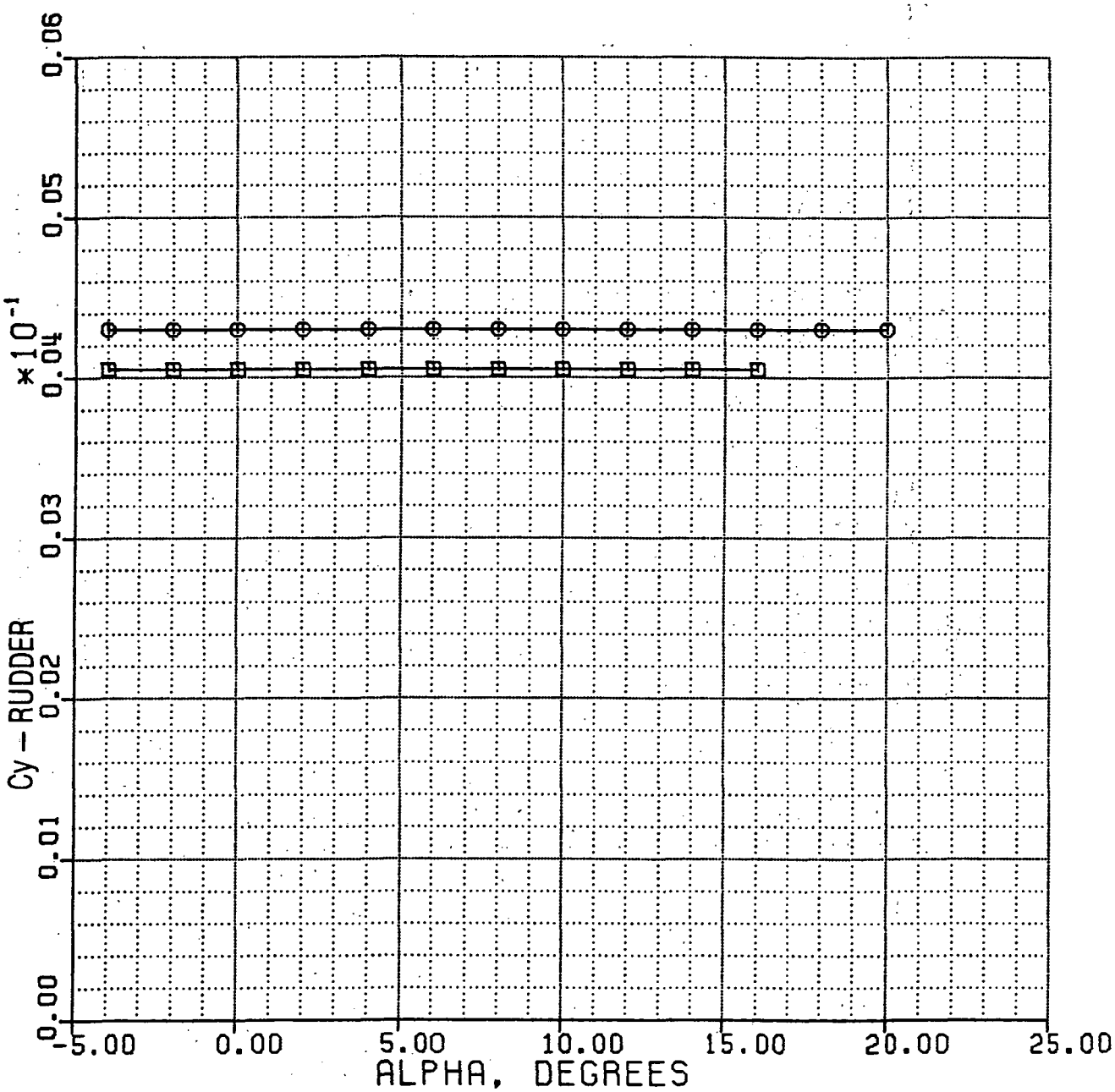

Figure 60(b)

Cy — RUDDER VS ALPHA

7-26-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22

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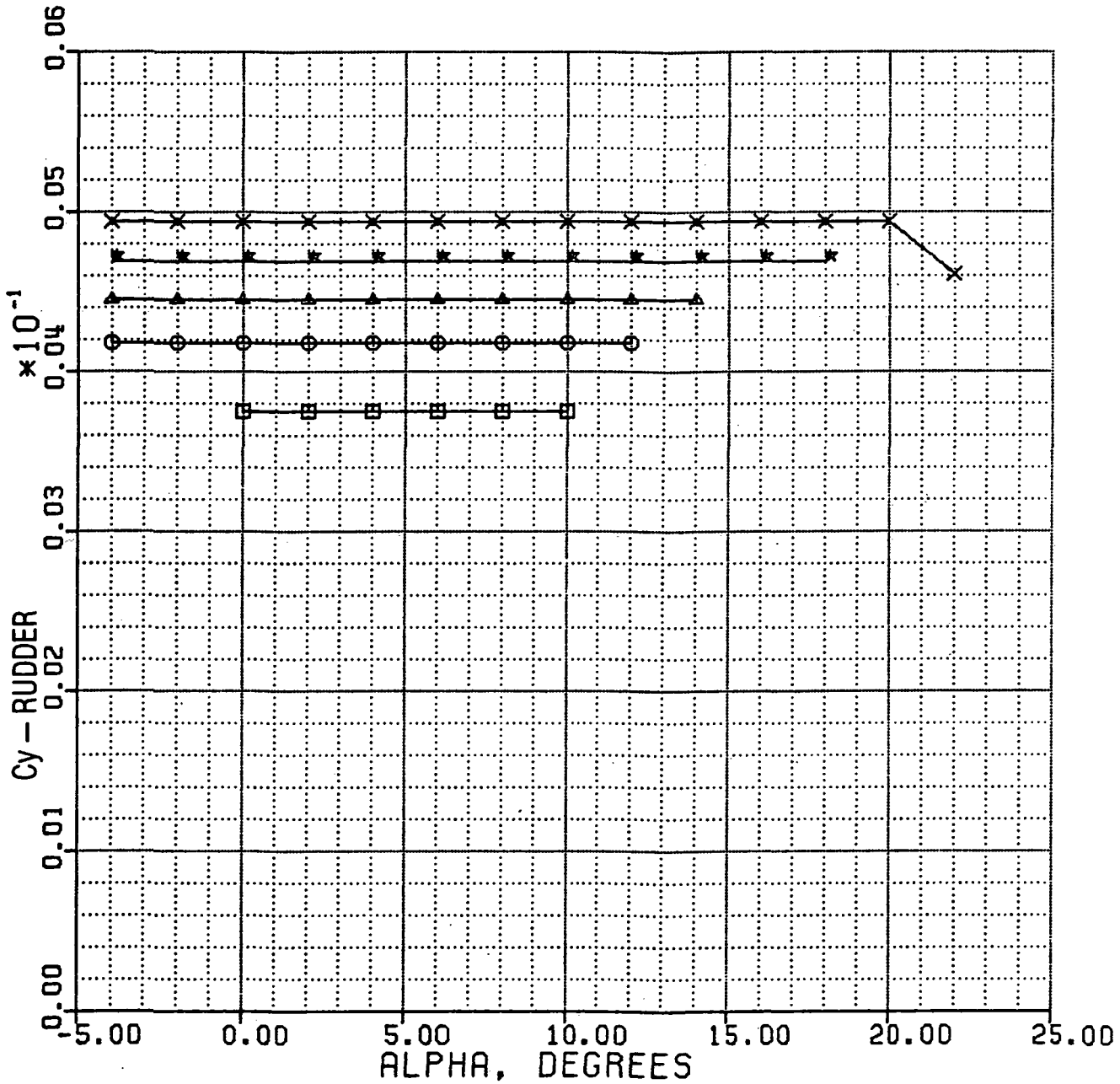

Figure 60(c)

Cy – RUDDER VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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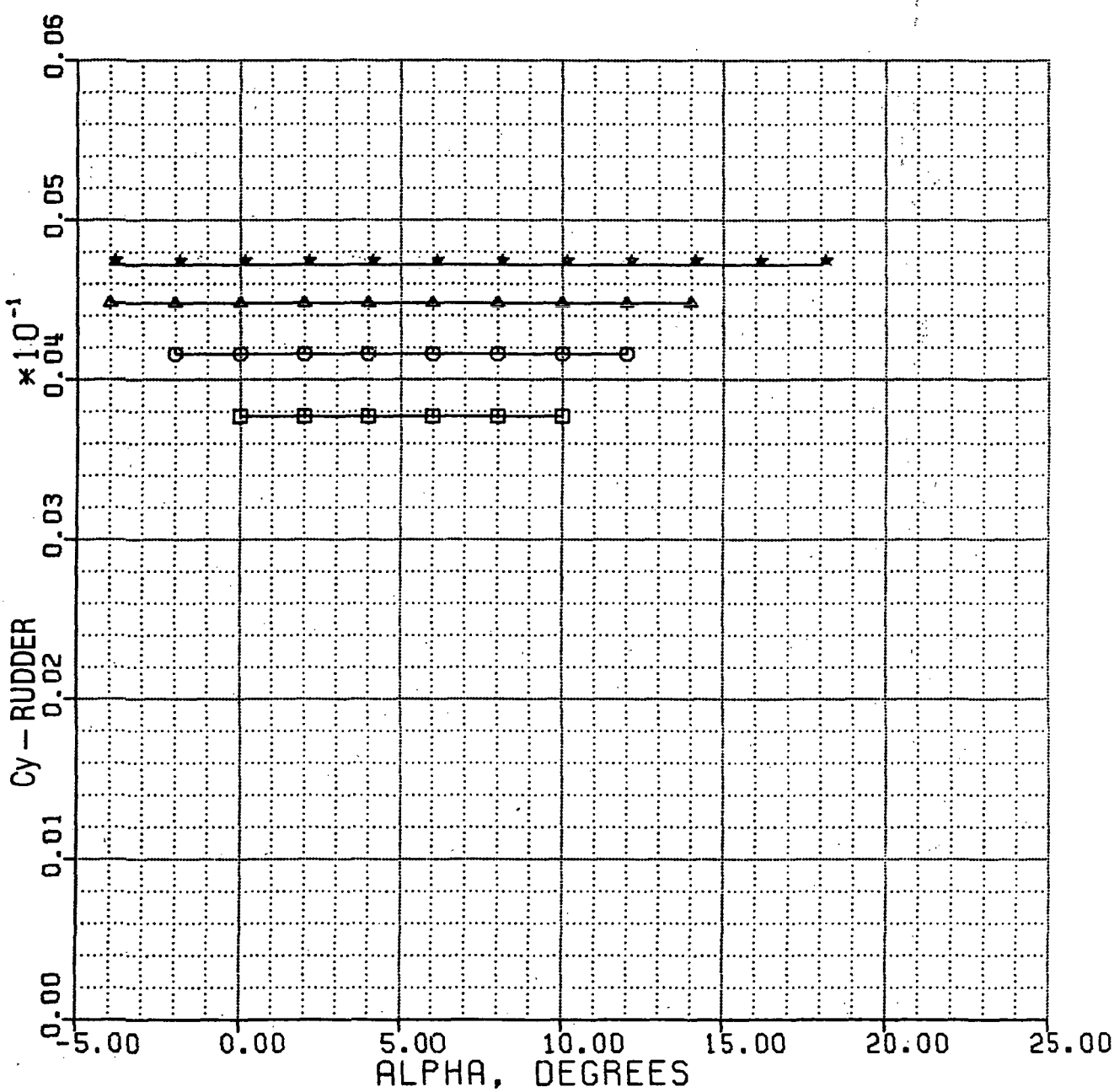

Figure 60(d)

Cy – RUDDER VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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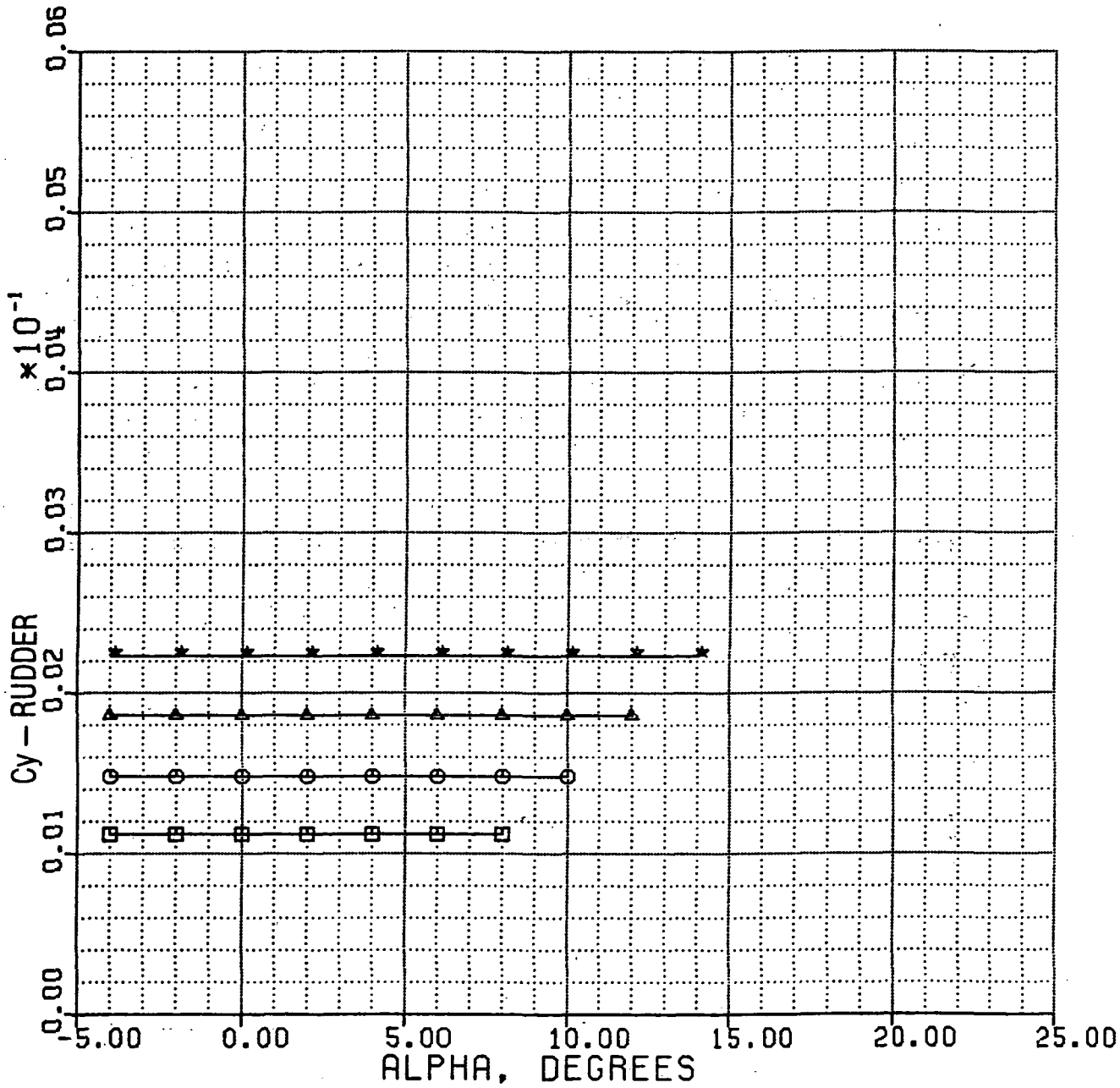

Figure 60(e)

Cy – RUDDER VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

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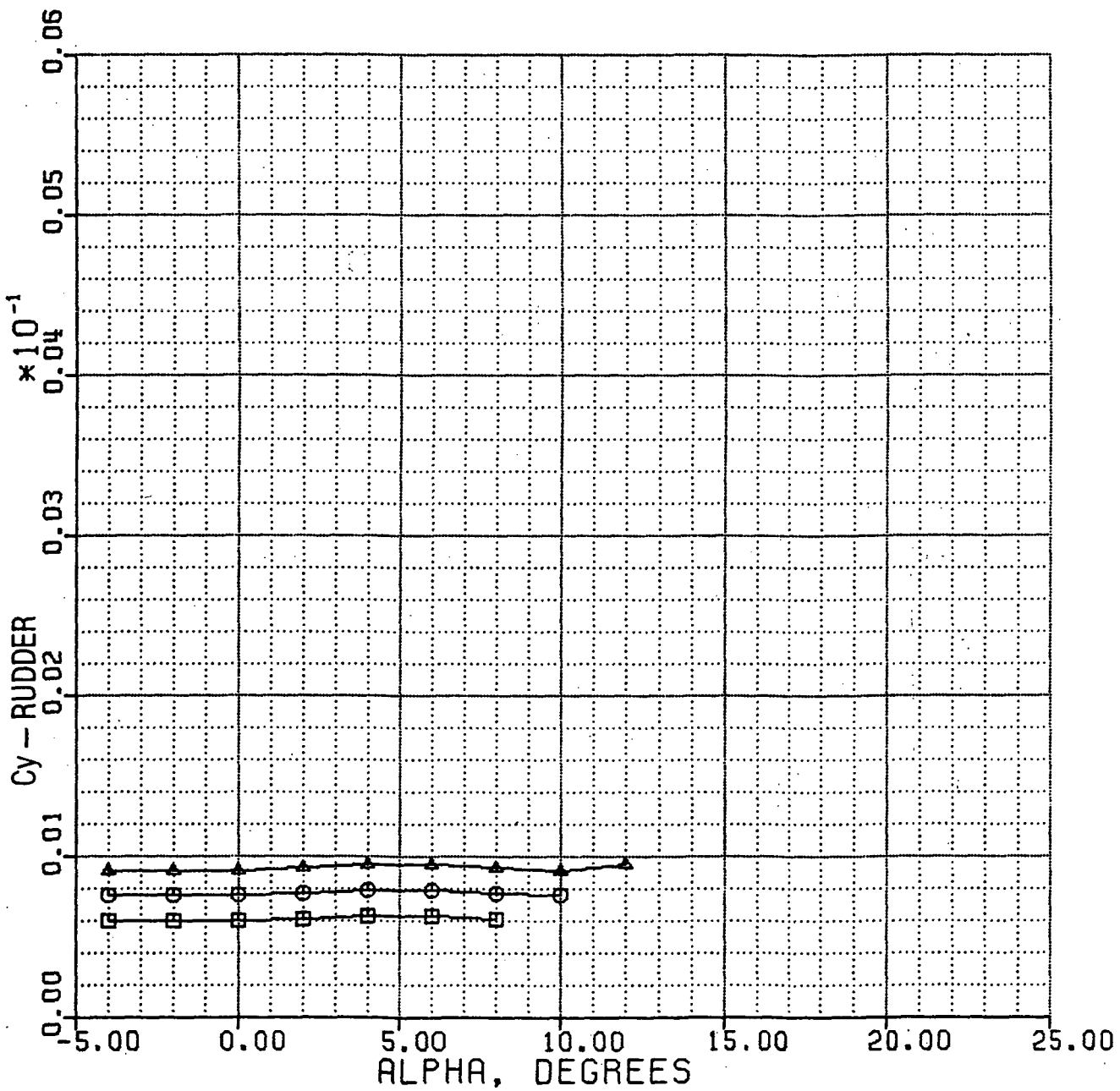

Figure 60(f)

Cl – RUDDER VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05

ALT = 10K M# = .2 TO 1.2

ALT = 20K M# = .3 TO 1.4

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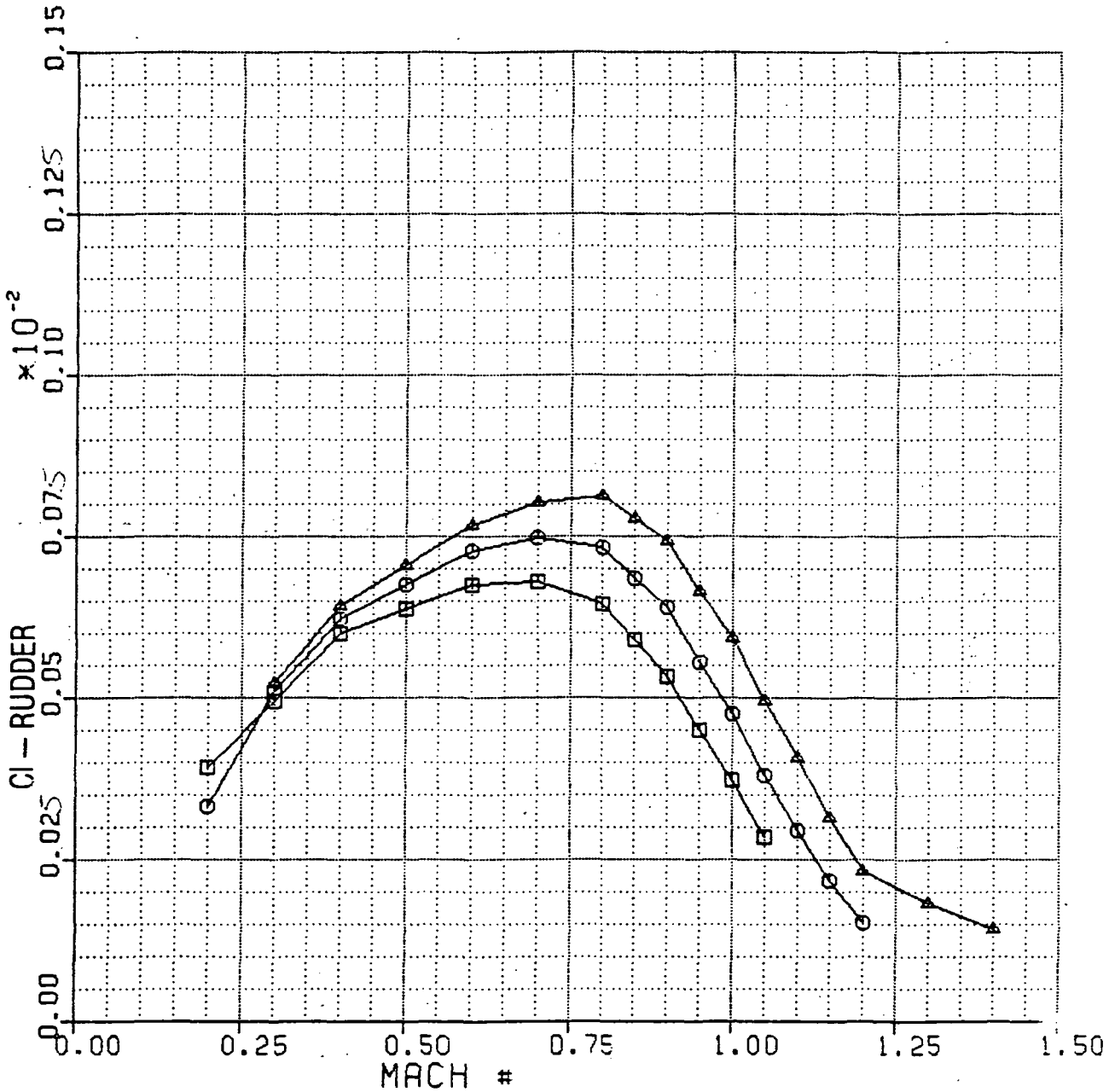

Figure 61(a)

Cl – RUDDER VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5

ALT = 40K M# = .6 TO 1.5

ALT = 50K M# = .6 TO 1.5

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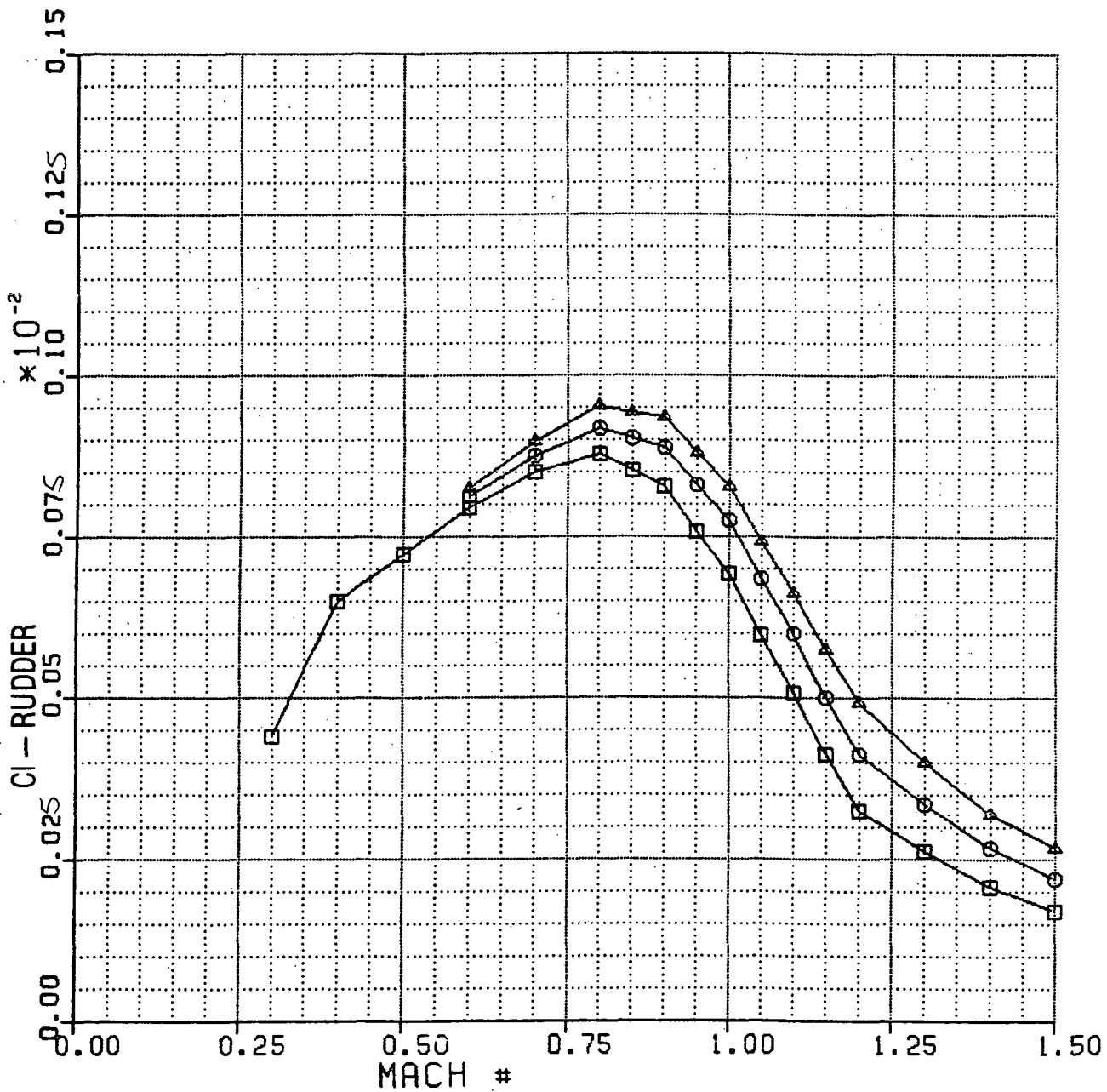

Figure 61(b)

Cl – RUDDER VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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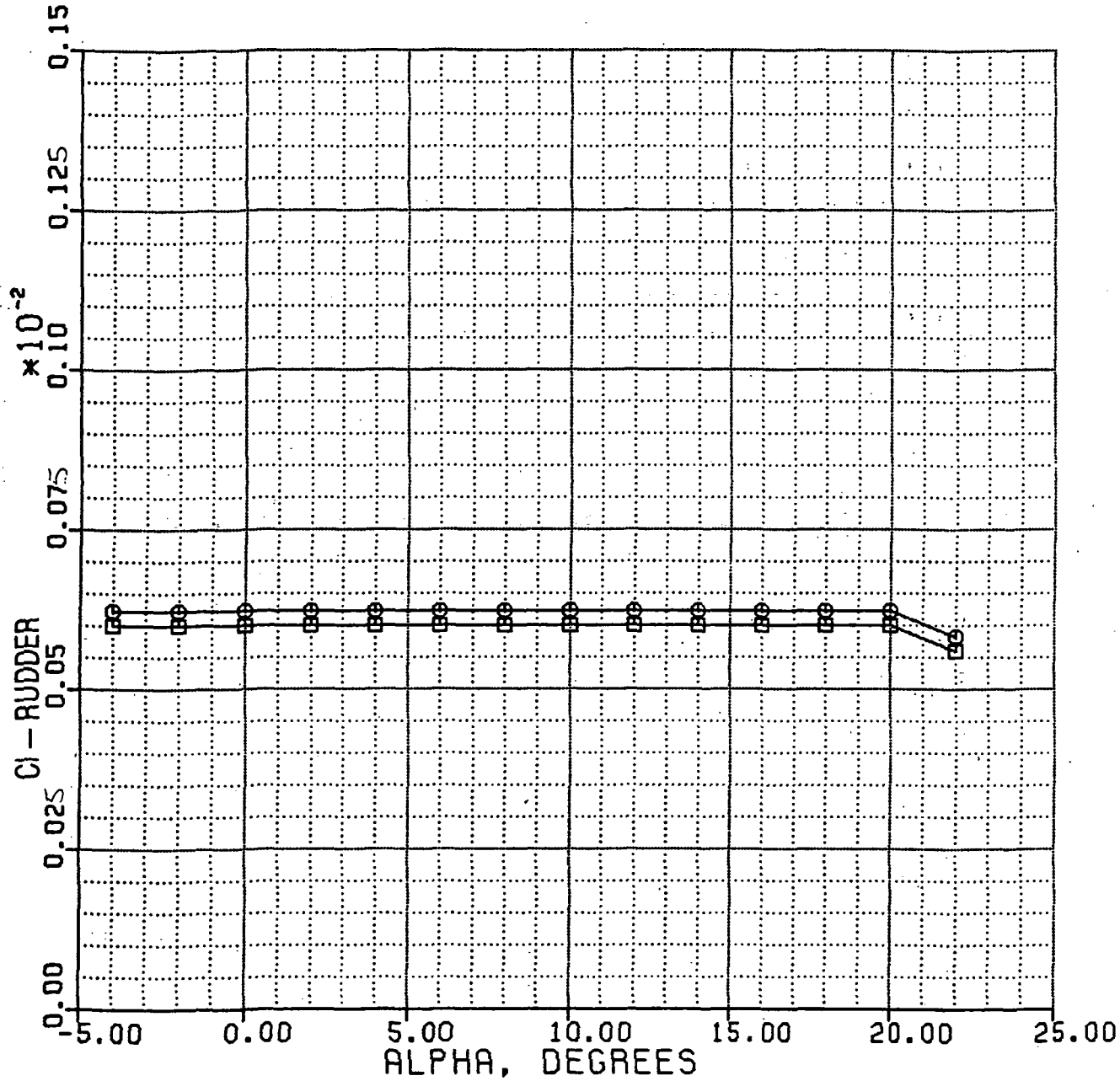

Figure 62(a)

Cl – RUDDER VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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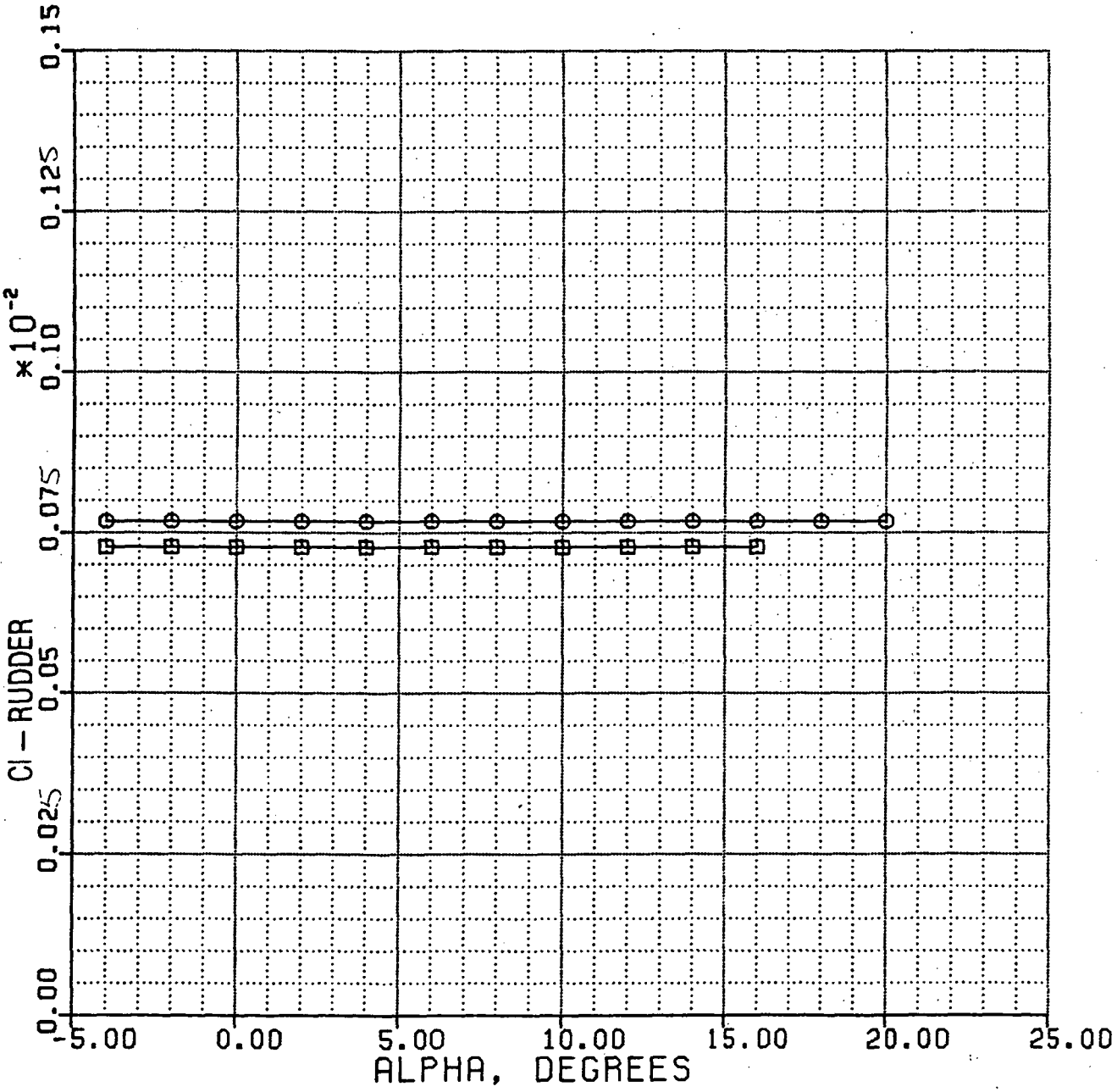

Figure 62(b)

CI – RUDDER VS ALPHA

7-26-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22

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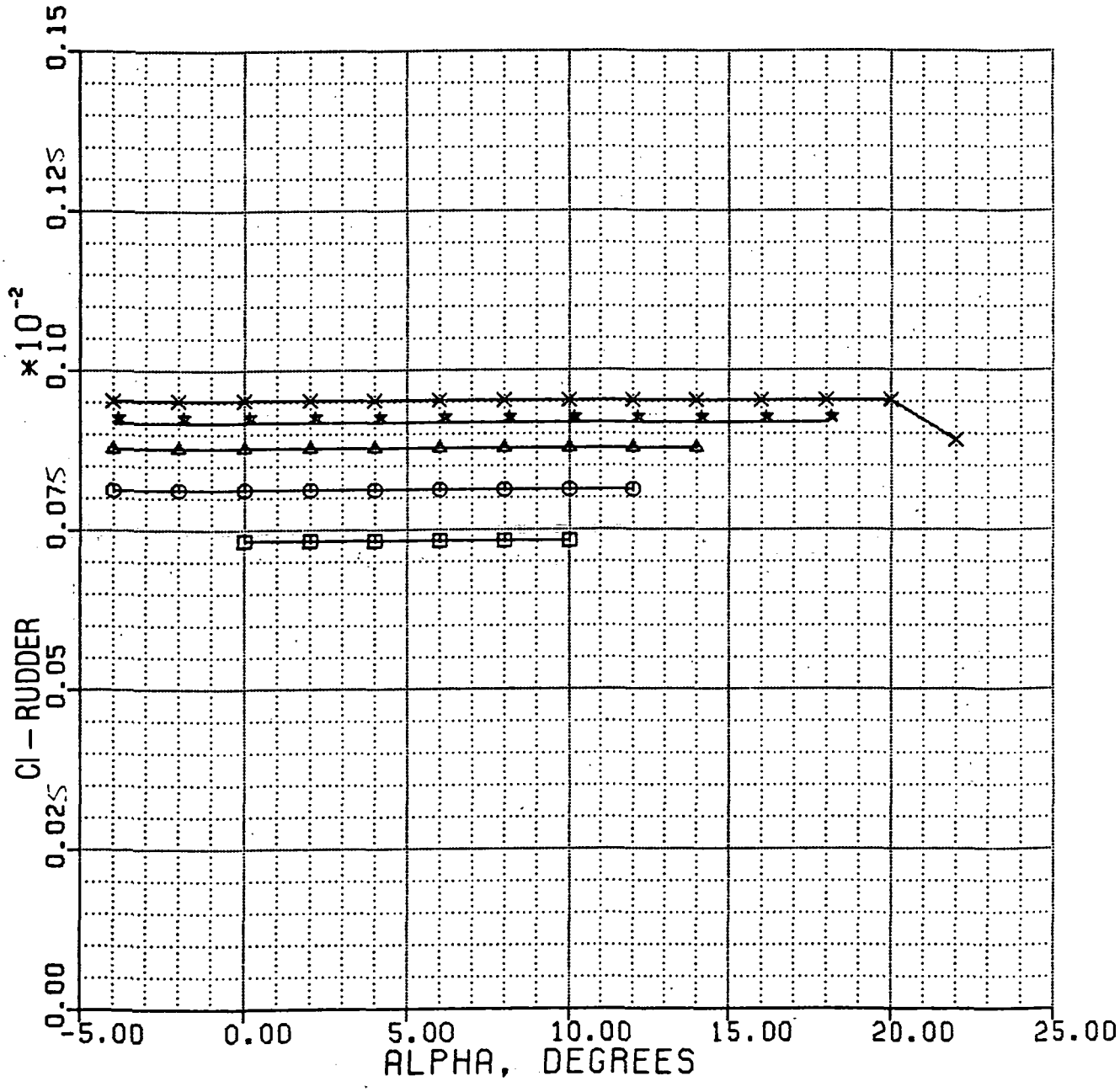

Figure 62(c)

CI – RUDDER VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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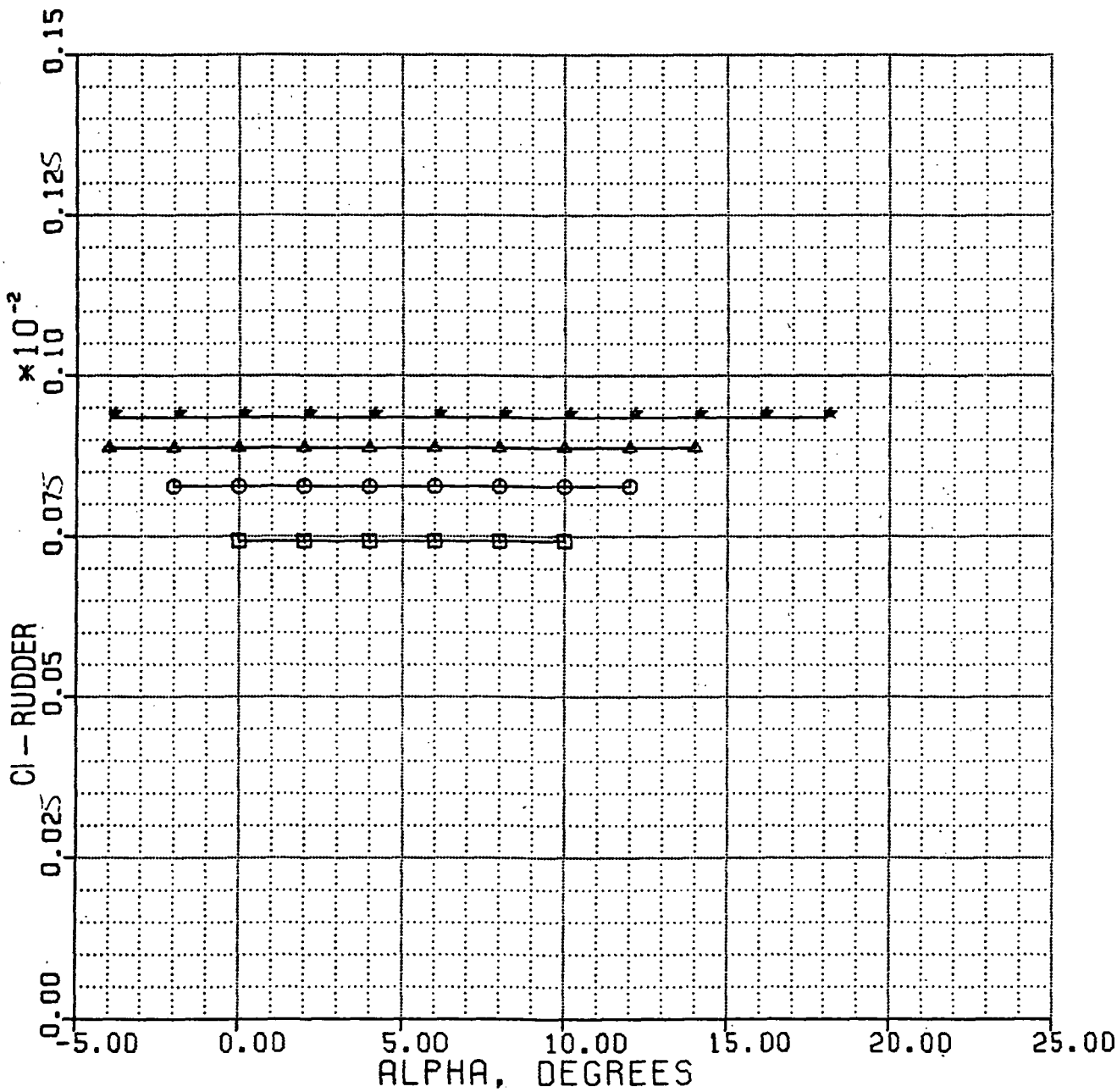

Figure 62(d)

Cl – RUDDER VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K	ALP: -4 TO 8
ALT = 30K	ALP: -4 TO 10
ALT = 40K	ALP: -4 TO 12
ALT = 50K	ALP: -4 TO 14

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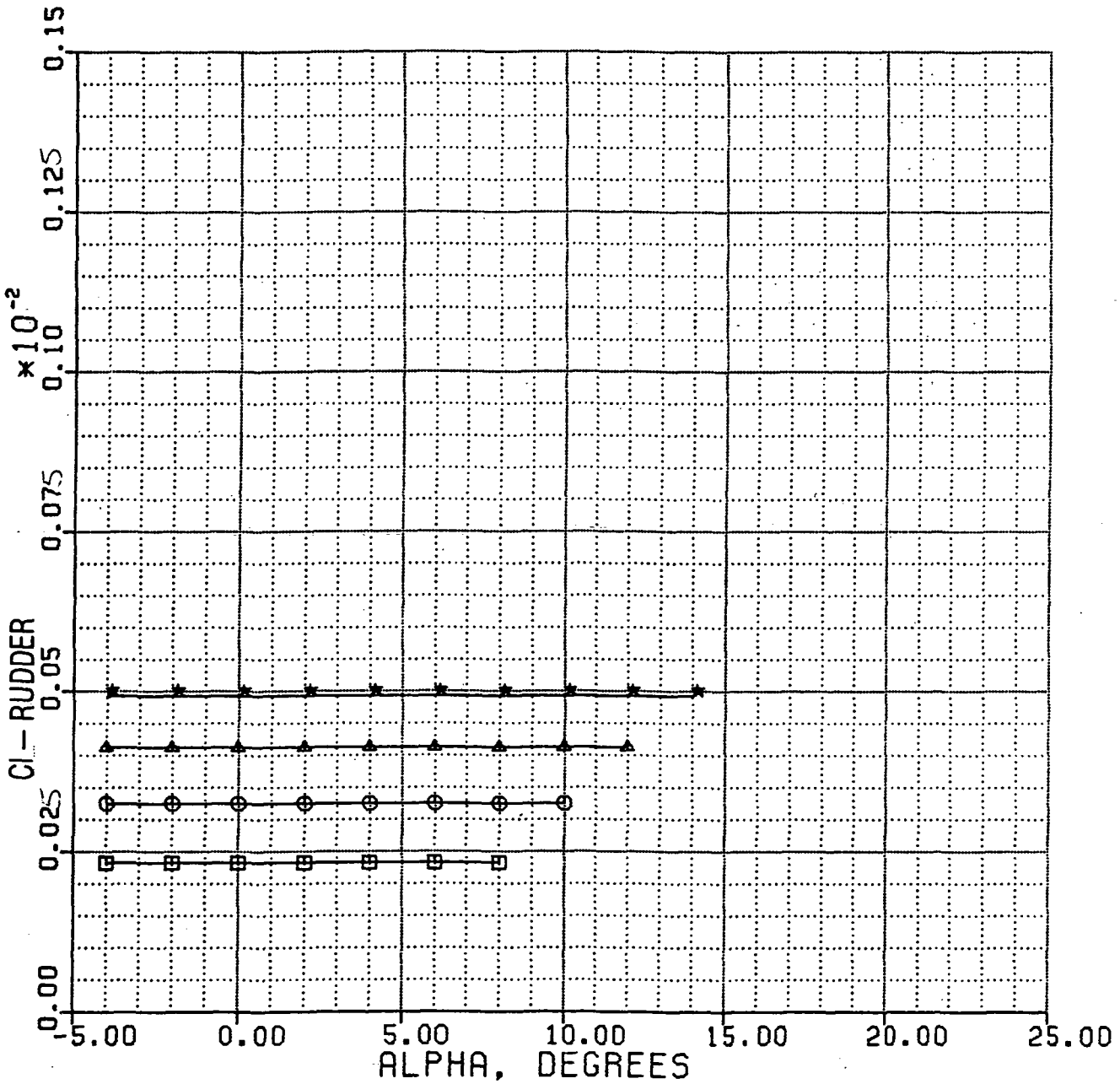

Figure 62(e)

CI – RUDDER VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

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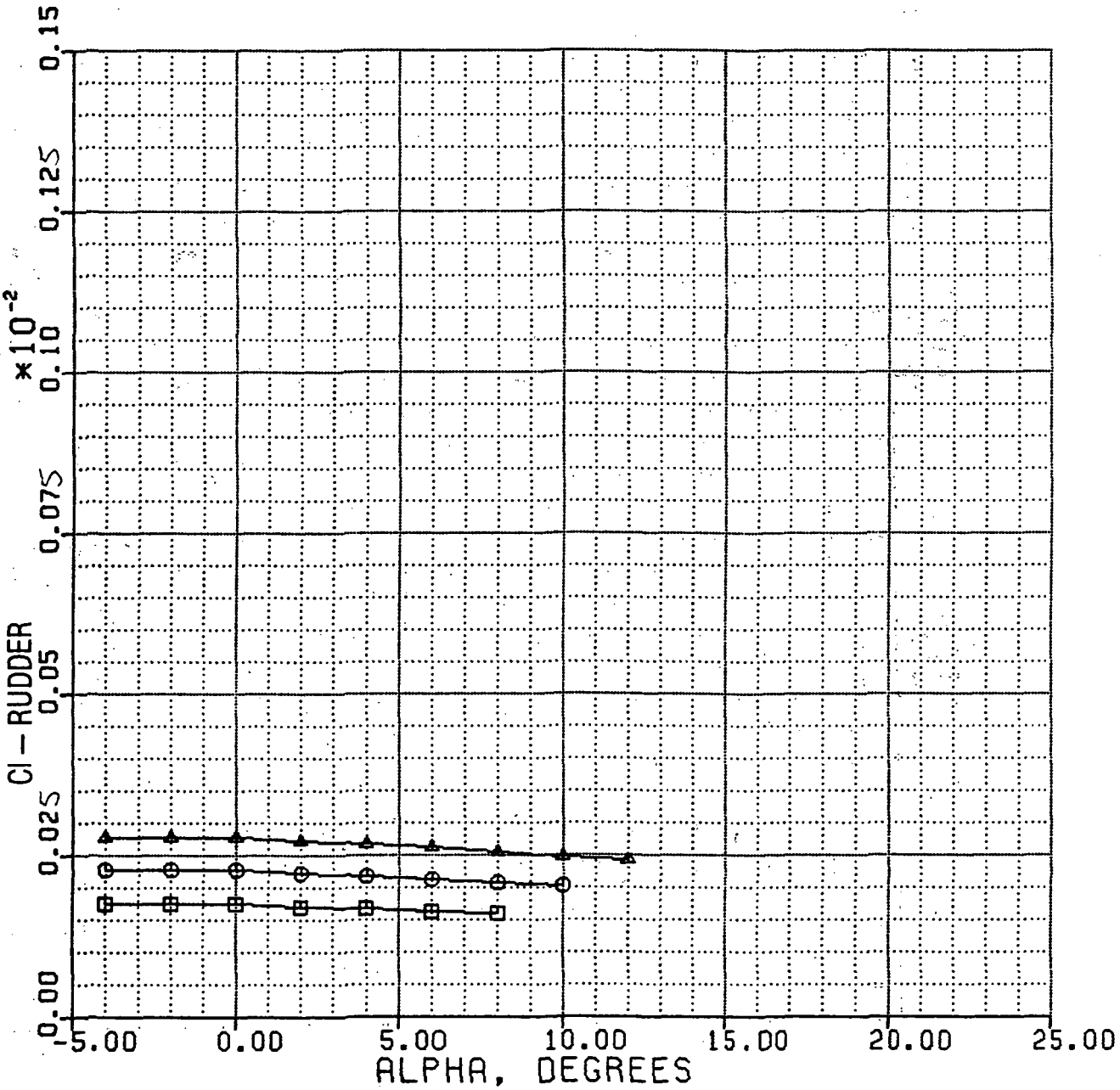

Figure 62(f)

Cn – RUDDER VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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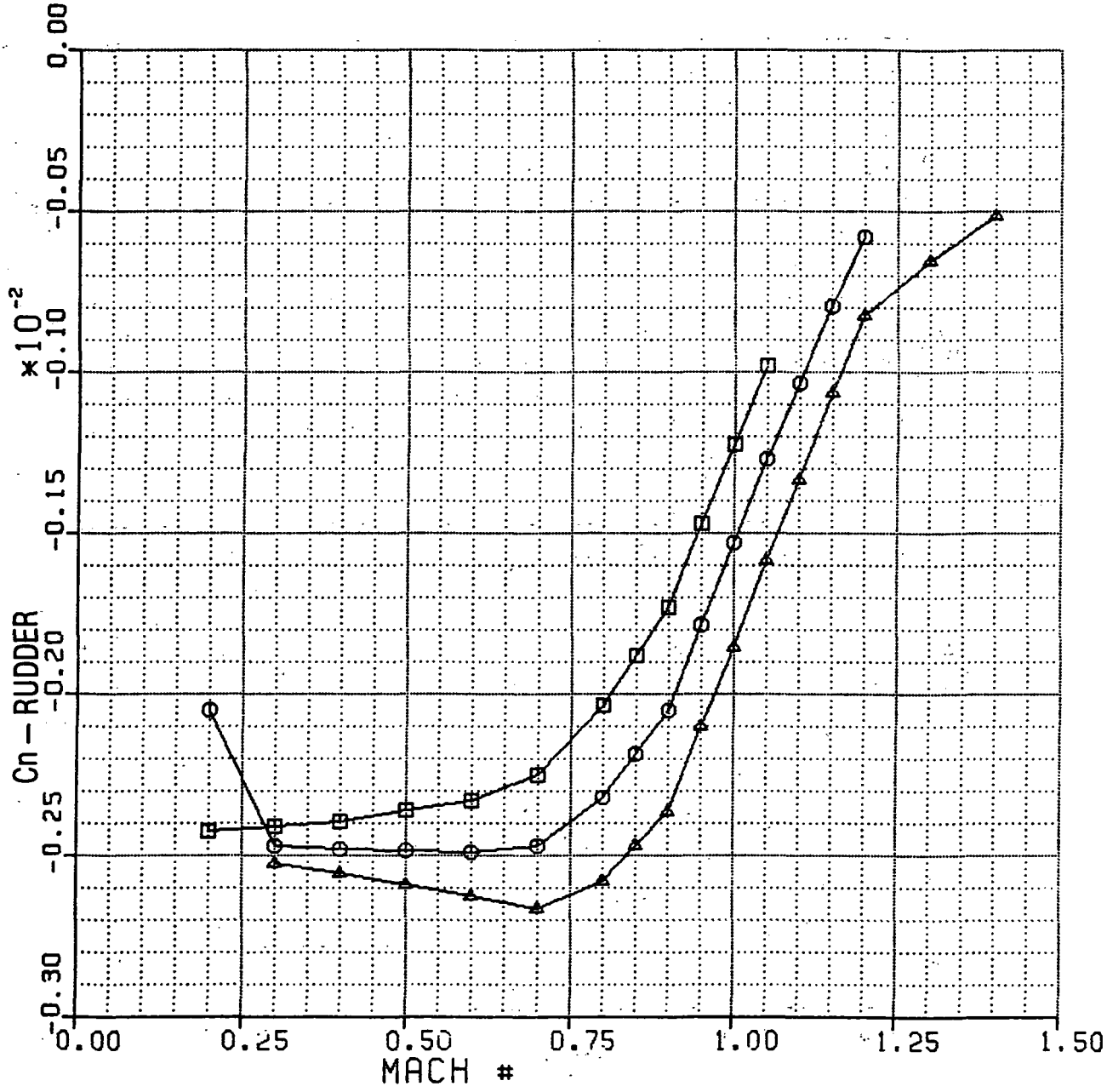

Figure 63(a)

Cn – RUDDER VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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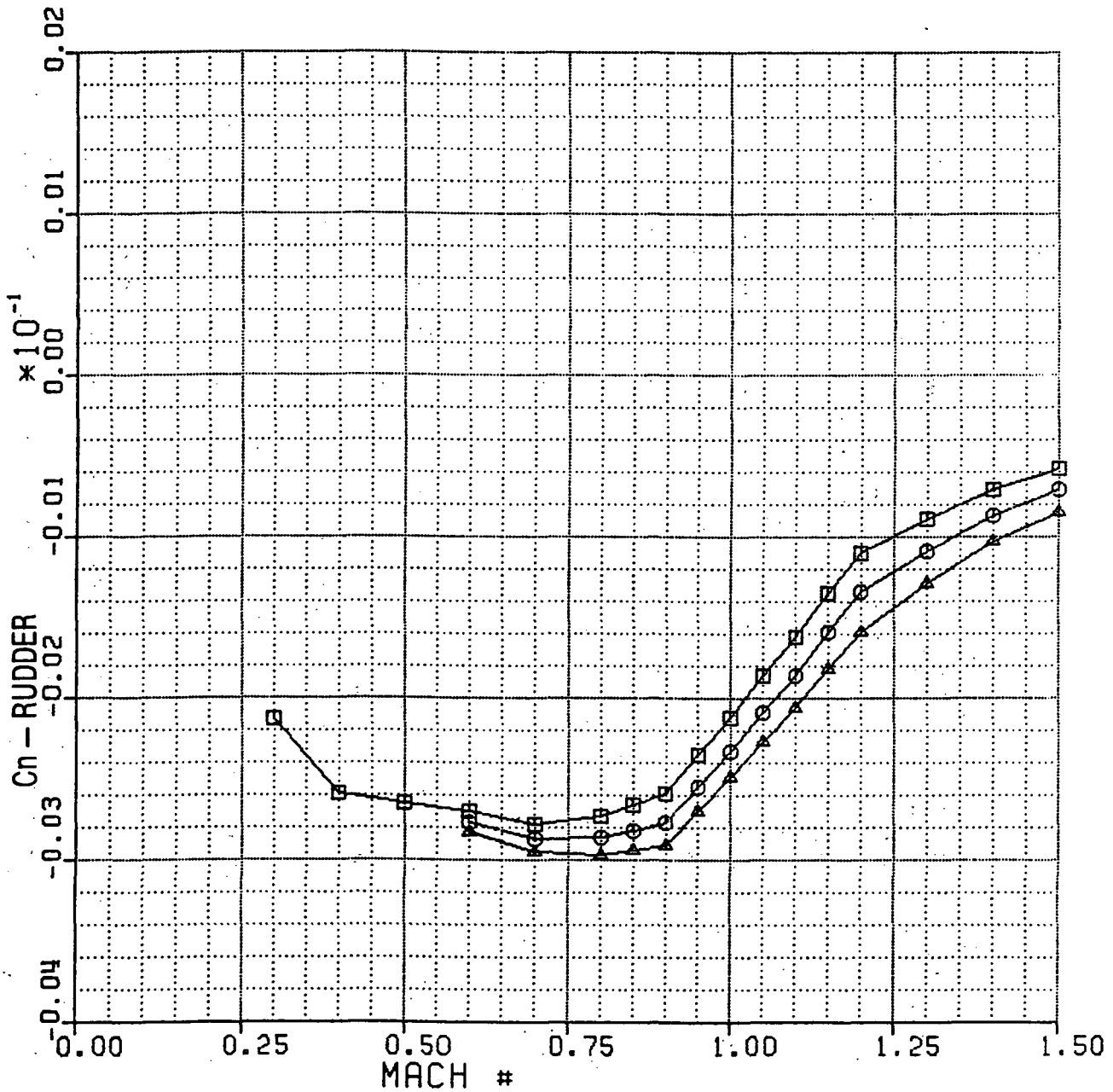

Figure 63(b)

Cn – RUDDER VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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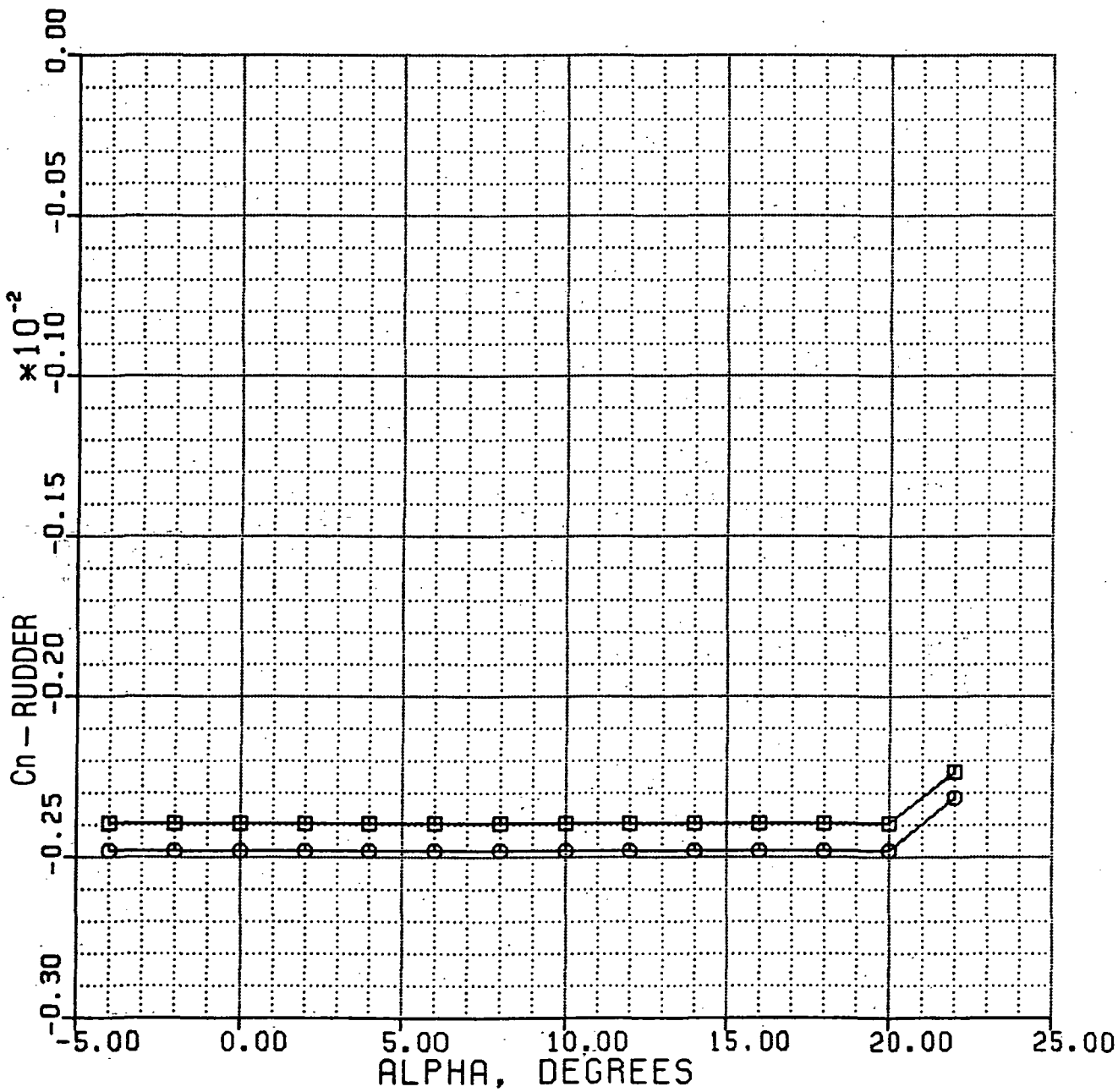

Figure 64(a)

Cn – RUDDER VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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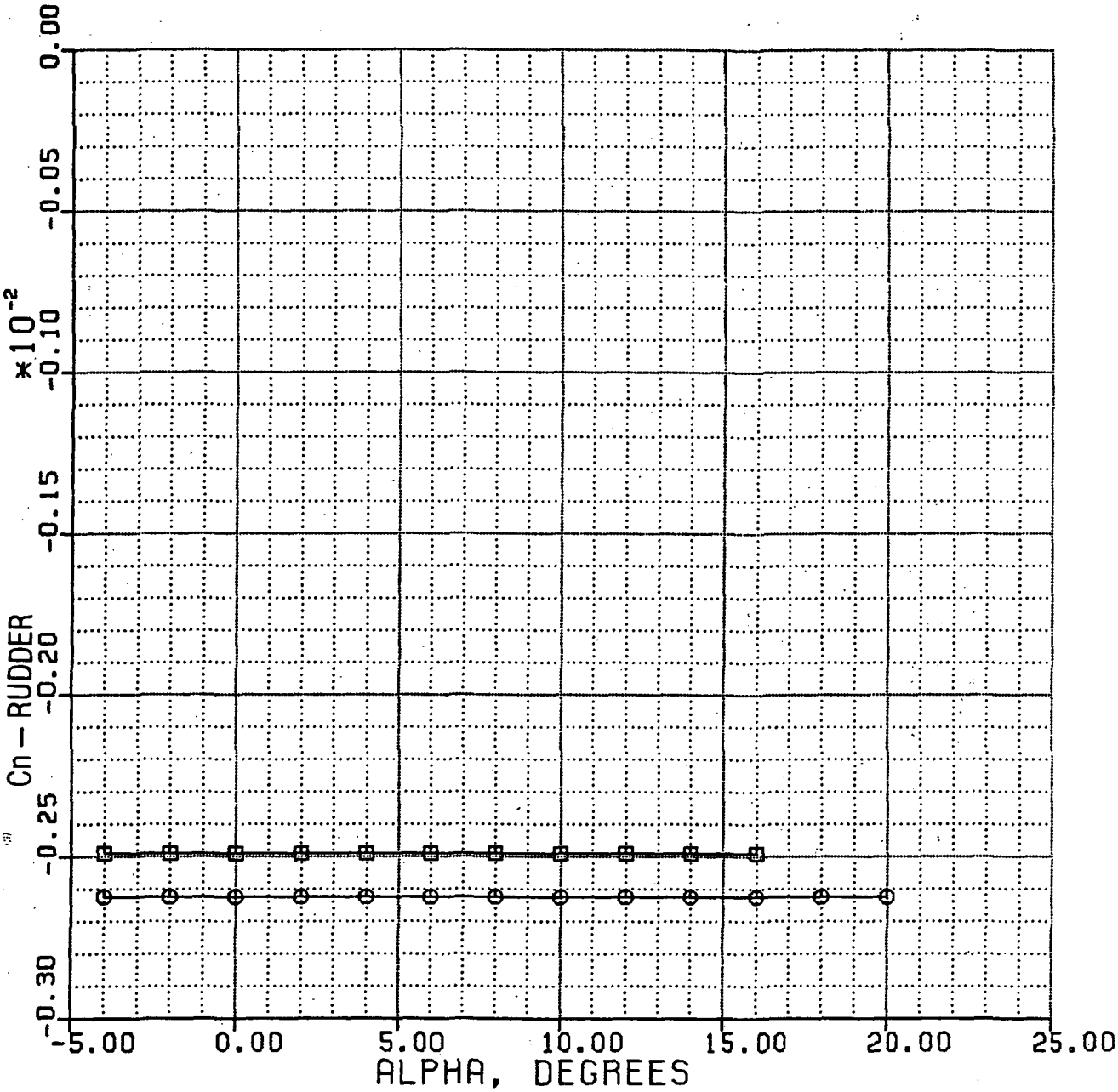

Figure 64(b)

Cn – RUDDER VS ALPHA

7-26-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 16
ALT = 50K ALP: -4 TO 22

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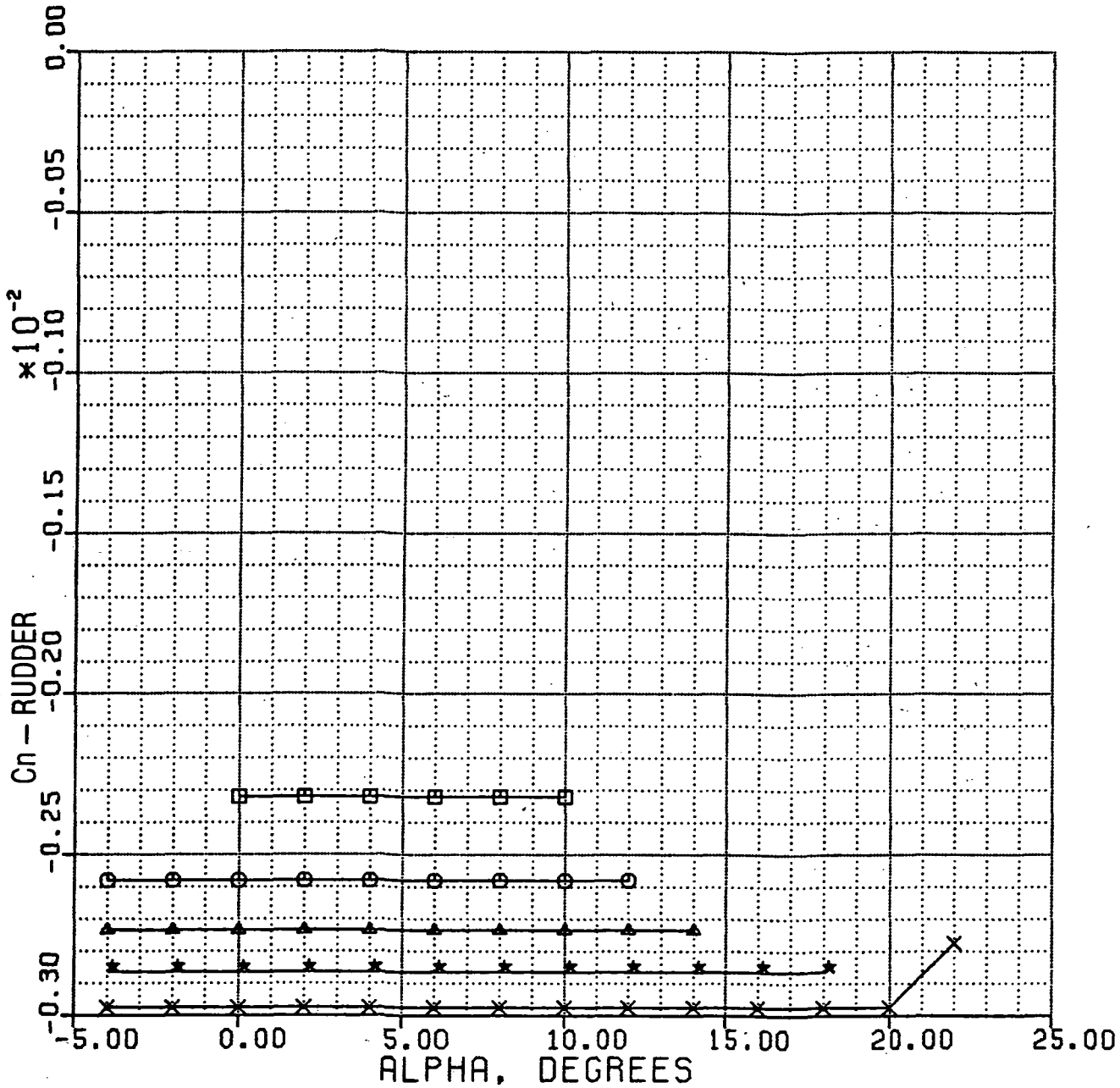

Figure 64(c)

Cn – RUDDER VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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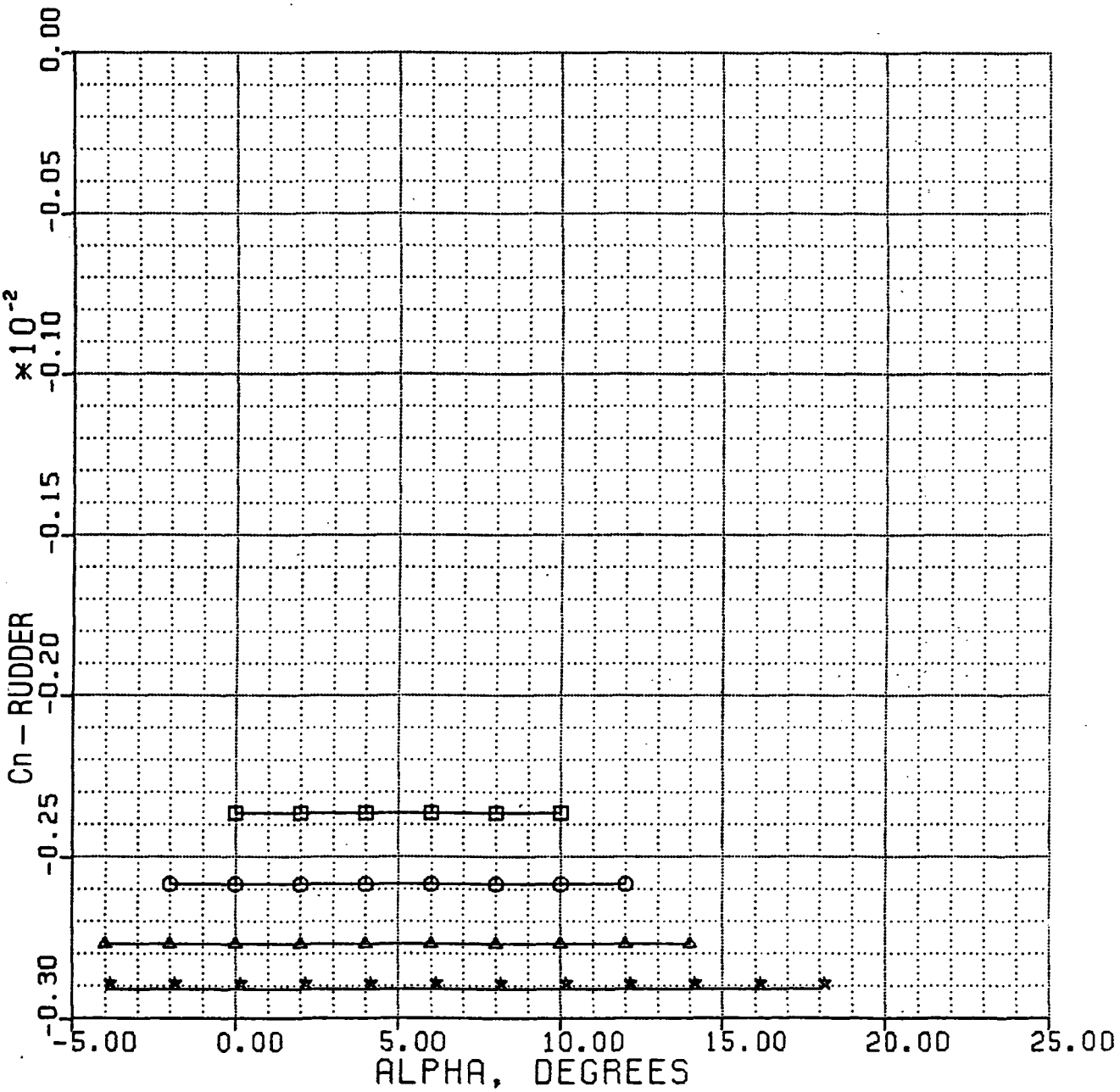

Figure 64(d)

Cn – RUDDER VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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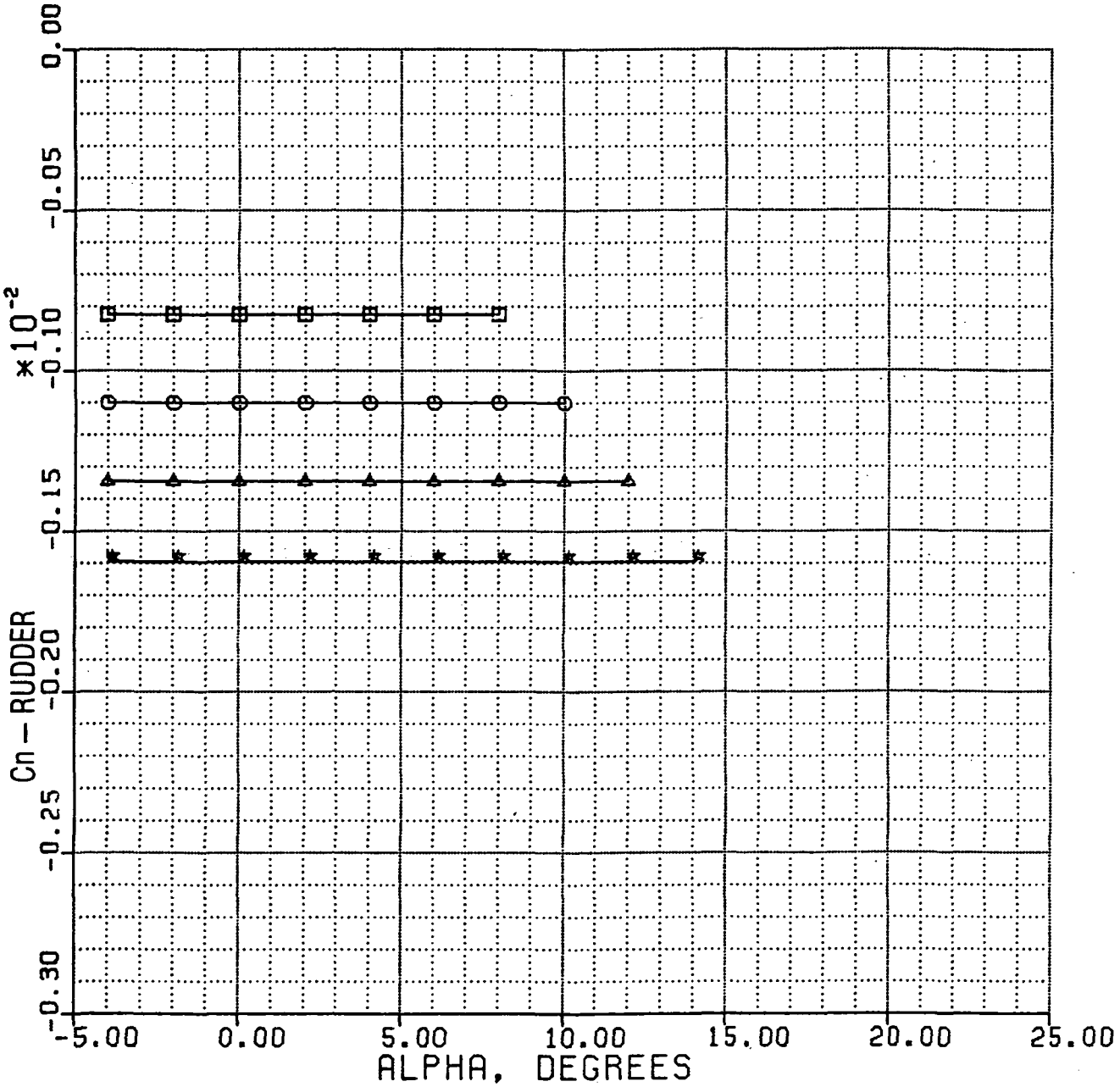

Figure 64(e)

Cn – RUDDER VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

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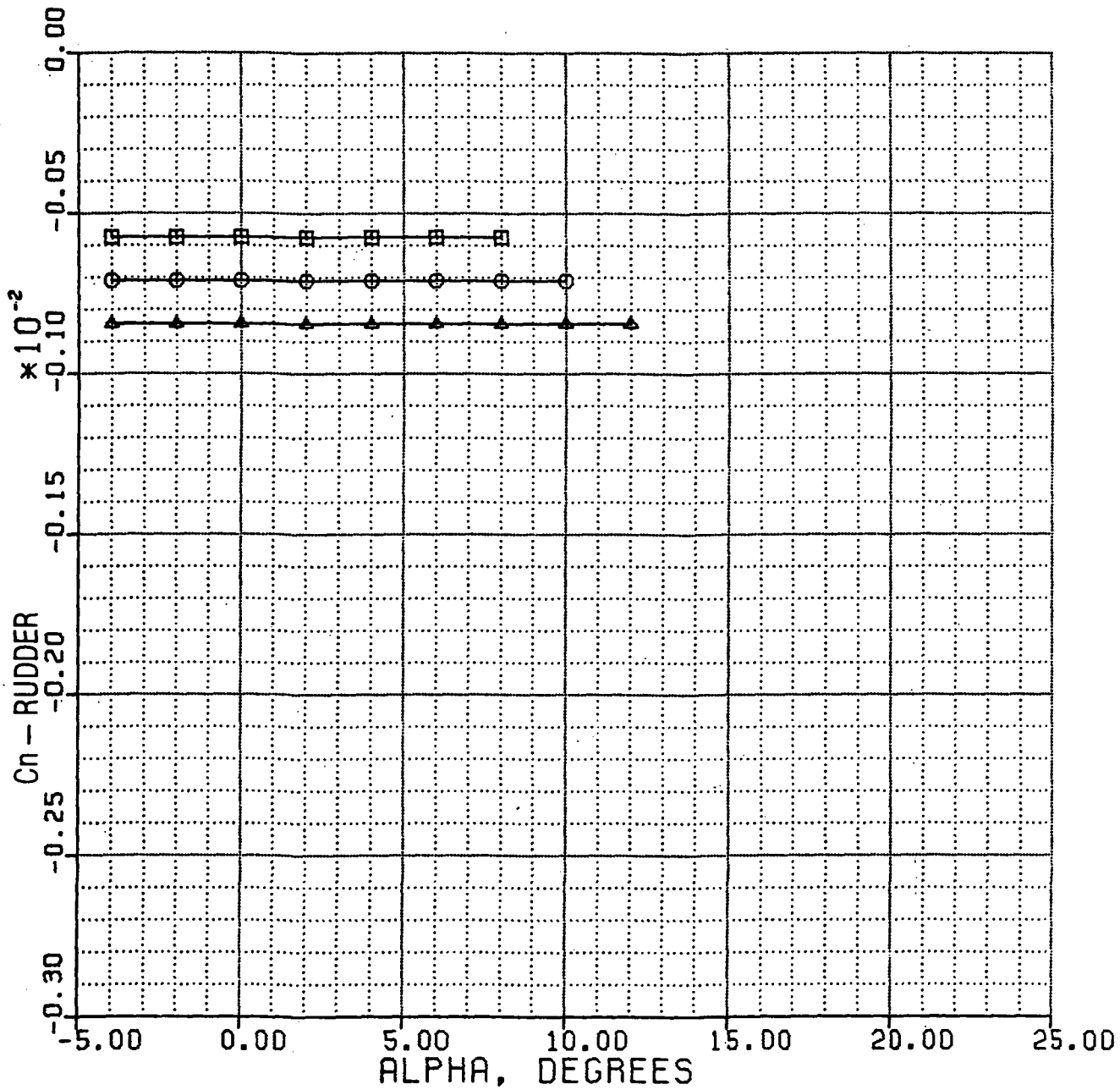

Figure 64(f)

CL-ALPHA VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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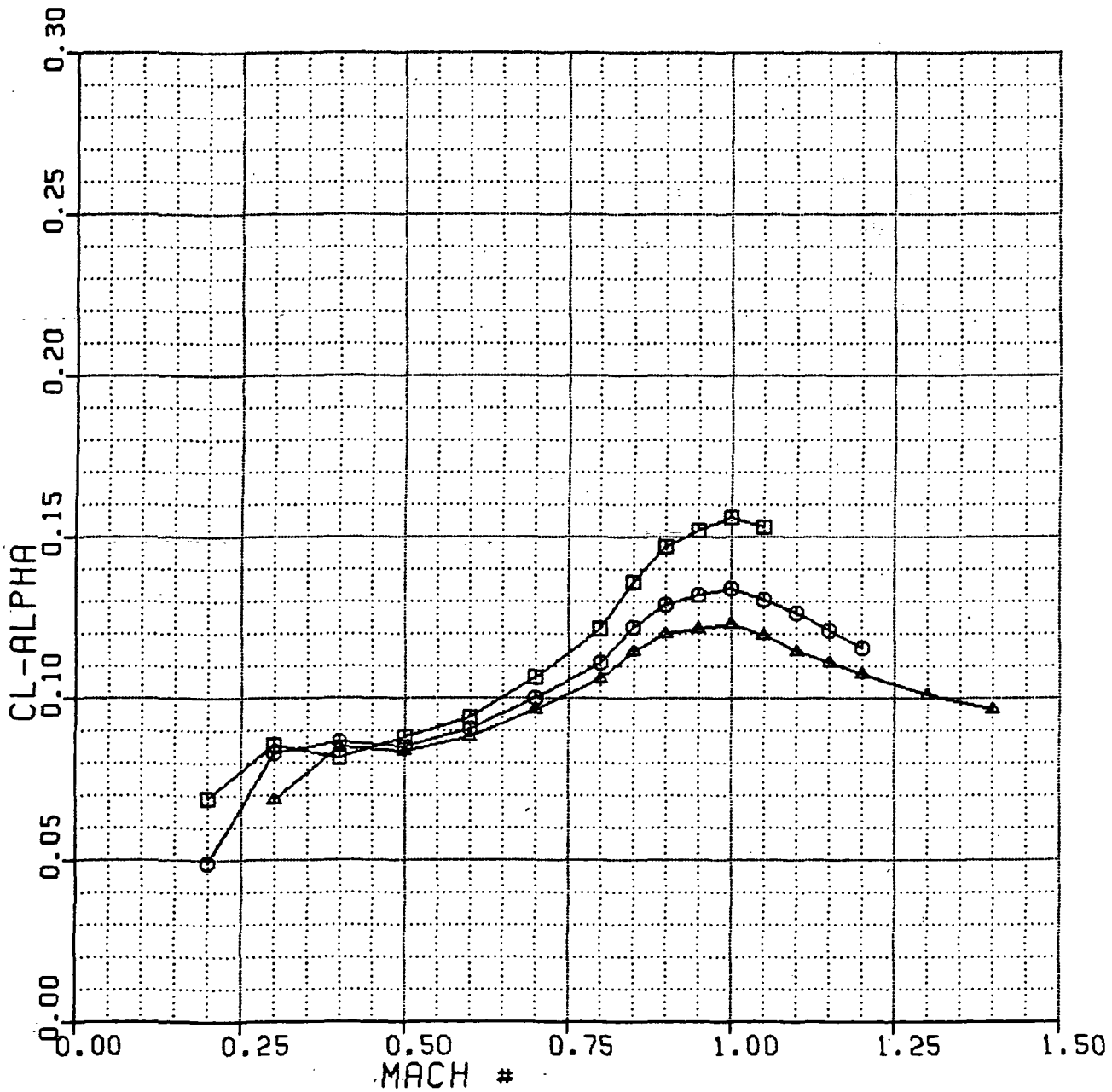

Figure 65(a)

CL-ALPHA VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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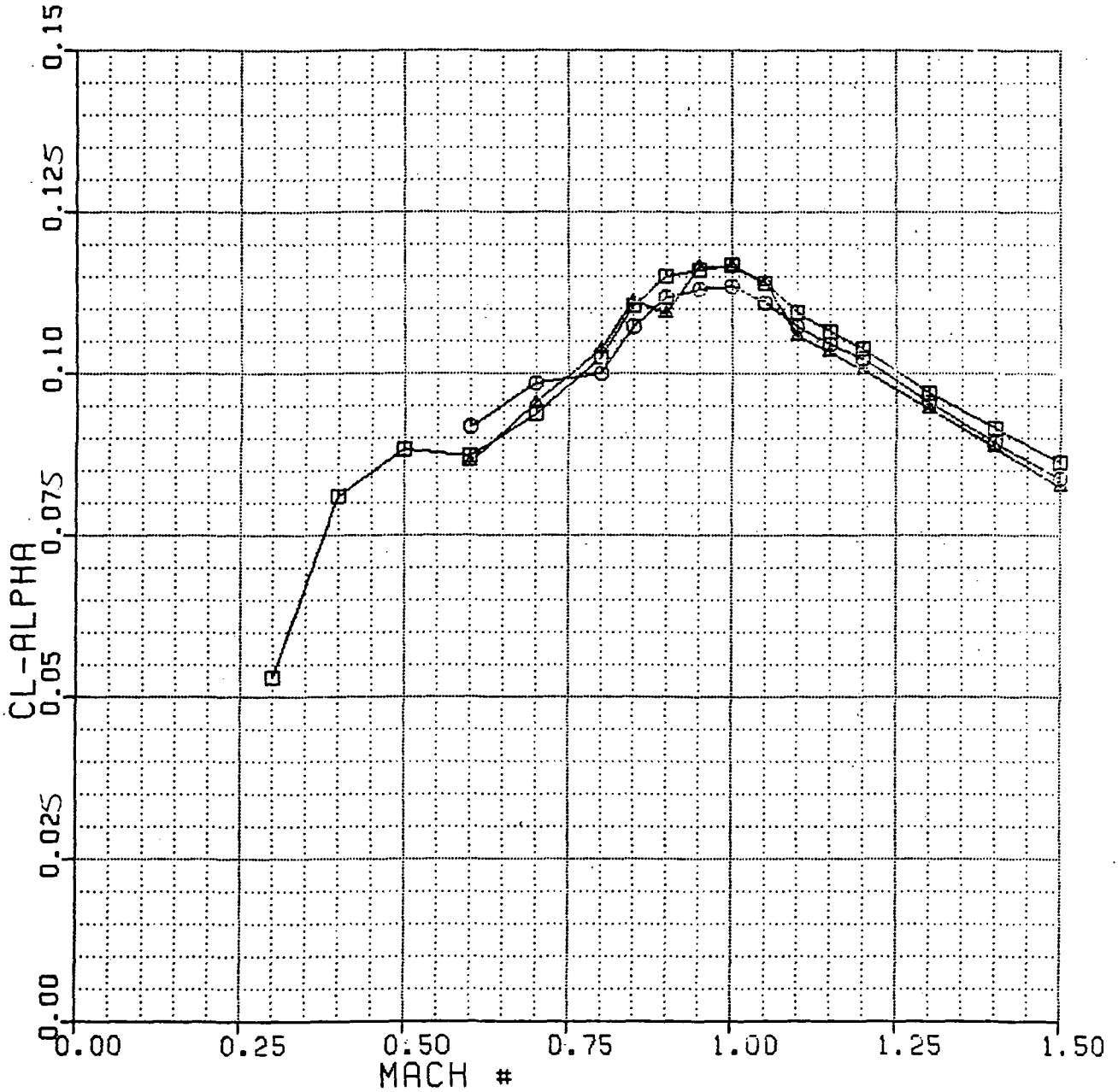

Figure 65(b)

CL-ALPHA VS ALPHA

6-15-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
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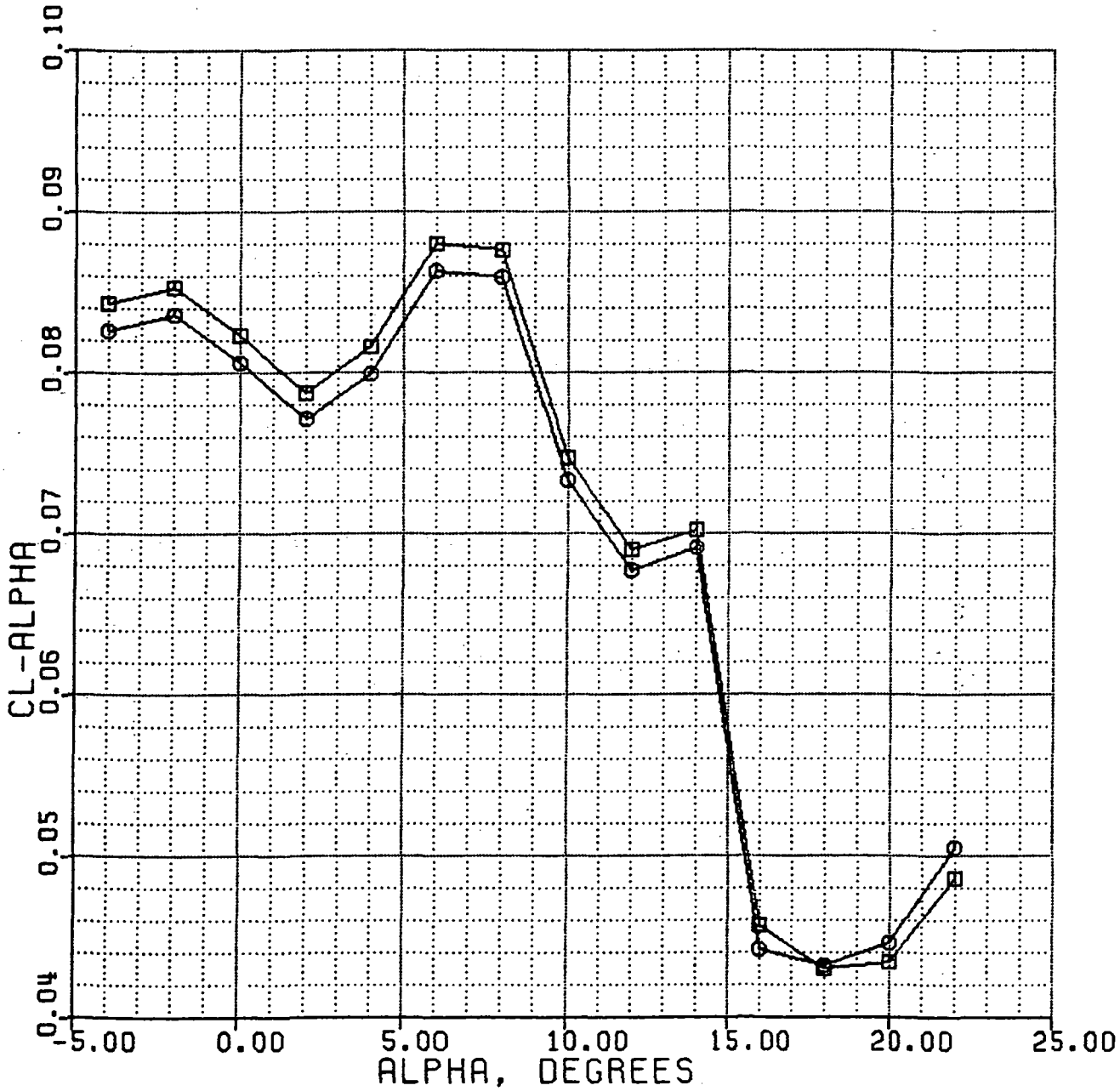

Figure 66(a)

CL-ALPHA VS ALPHA

6-16-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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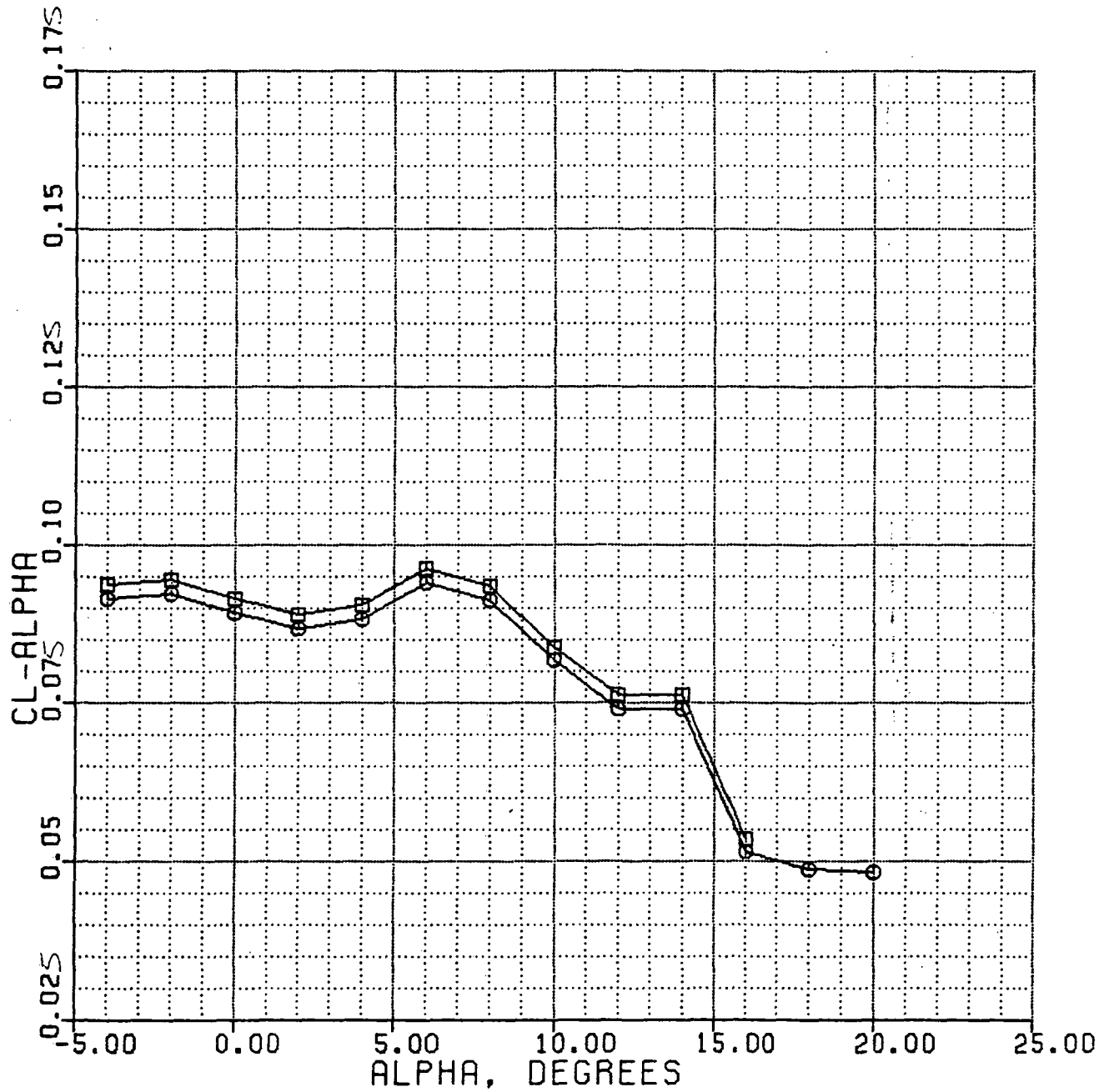
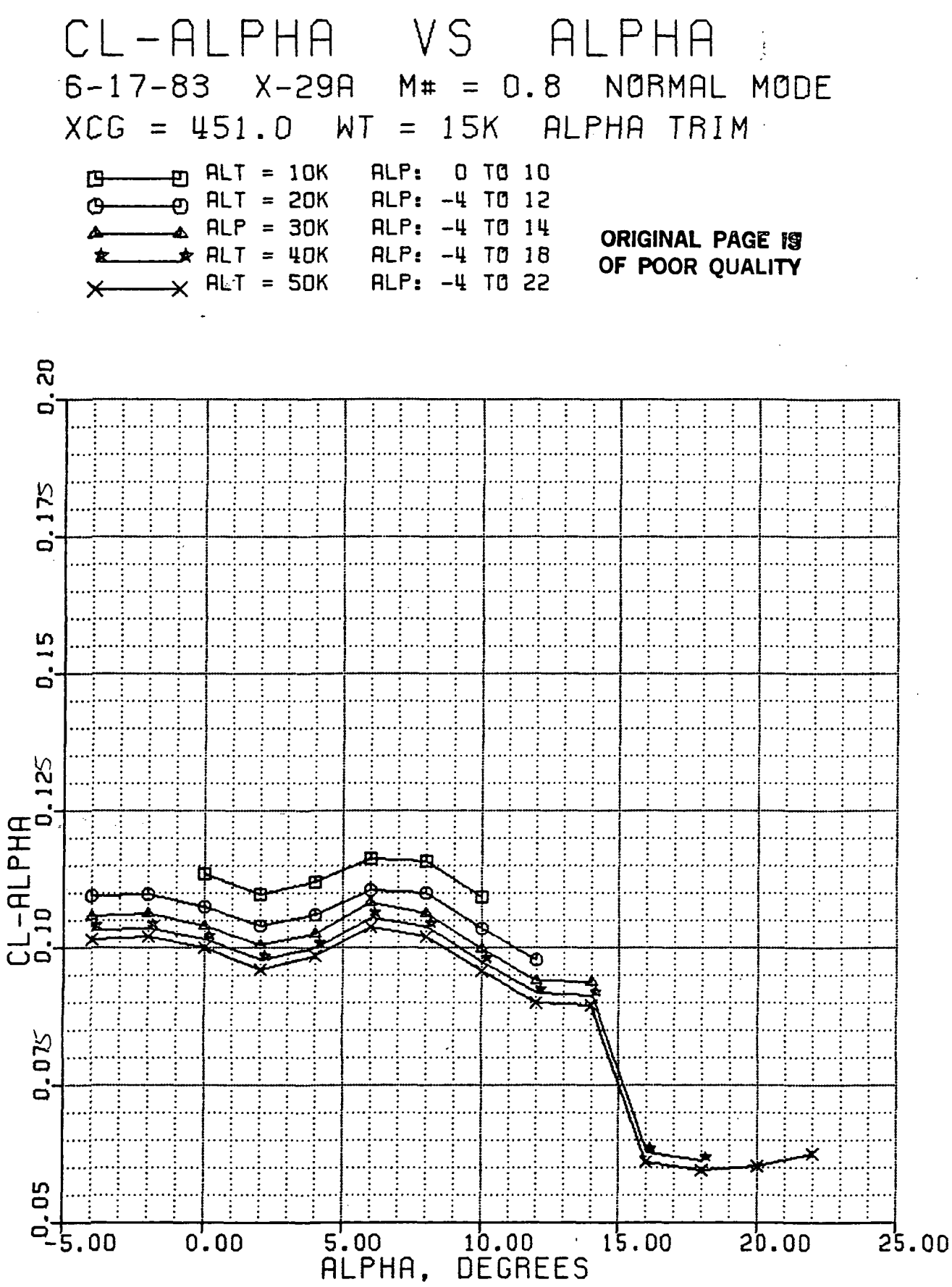


Figure 66(b)


CL-ALPHA VS ALPHA
6-17-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
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CL-ALPHA
0.20
0.175
0.15
0.125
0.10
0.075
0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 66(c)

CL-ALPHA VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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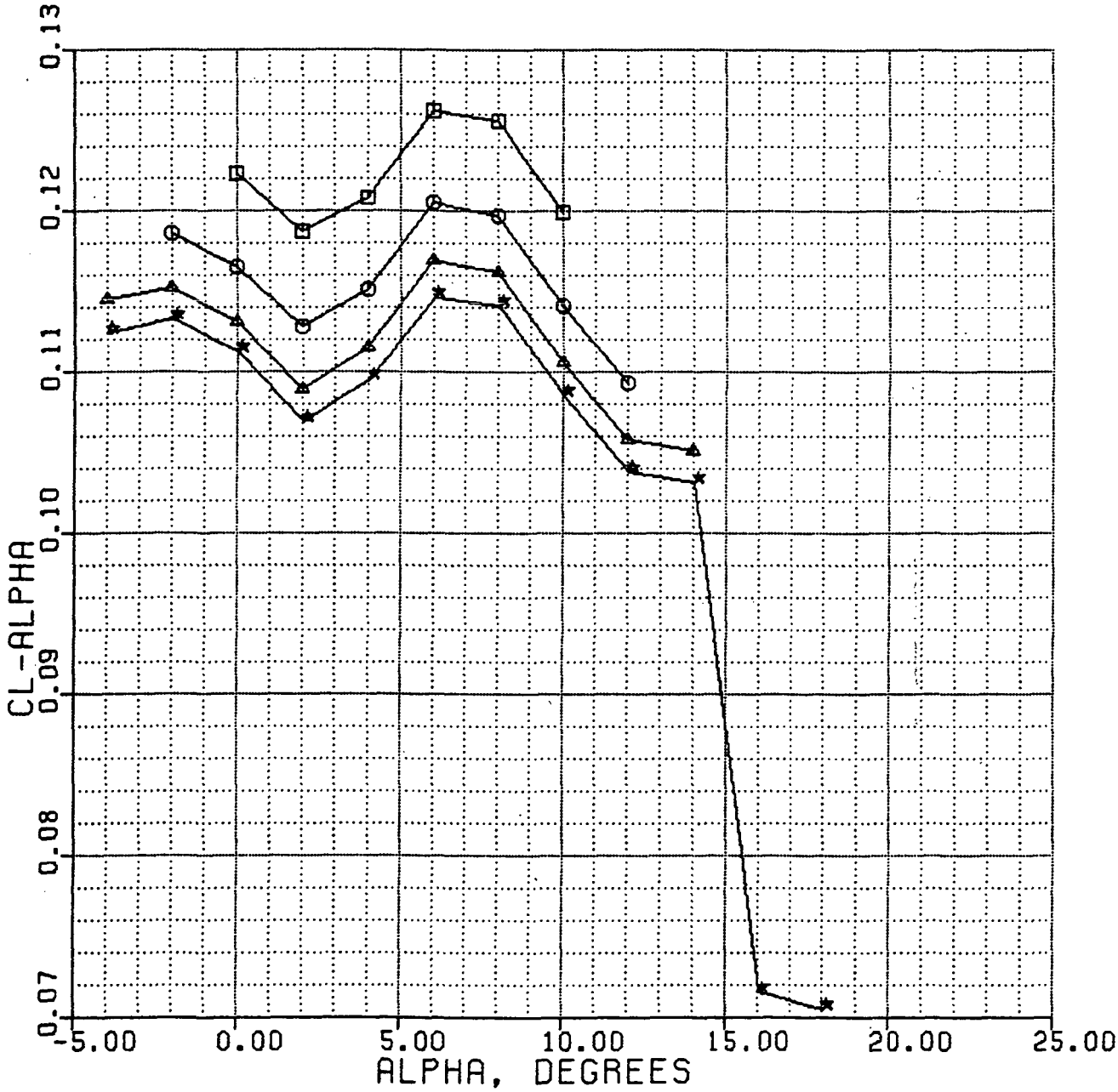

Figure 66(d)

CL-ALPHA VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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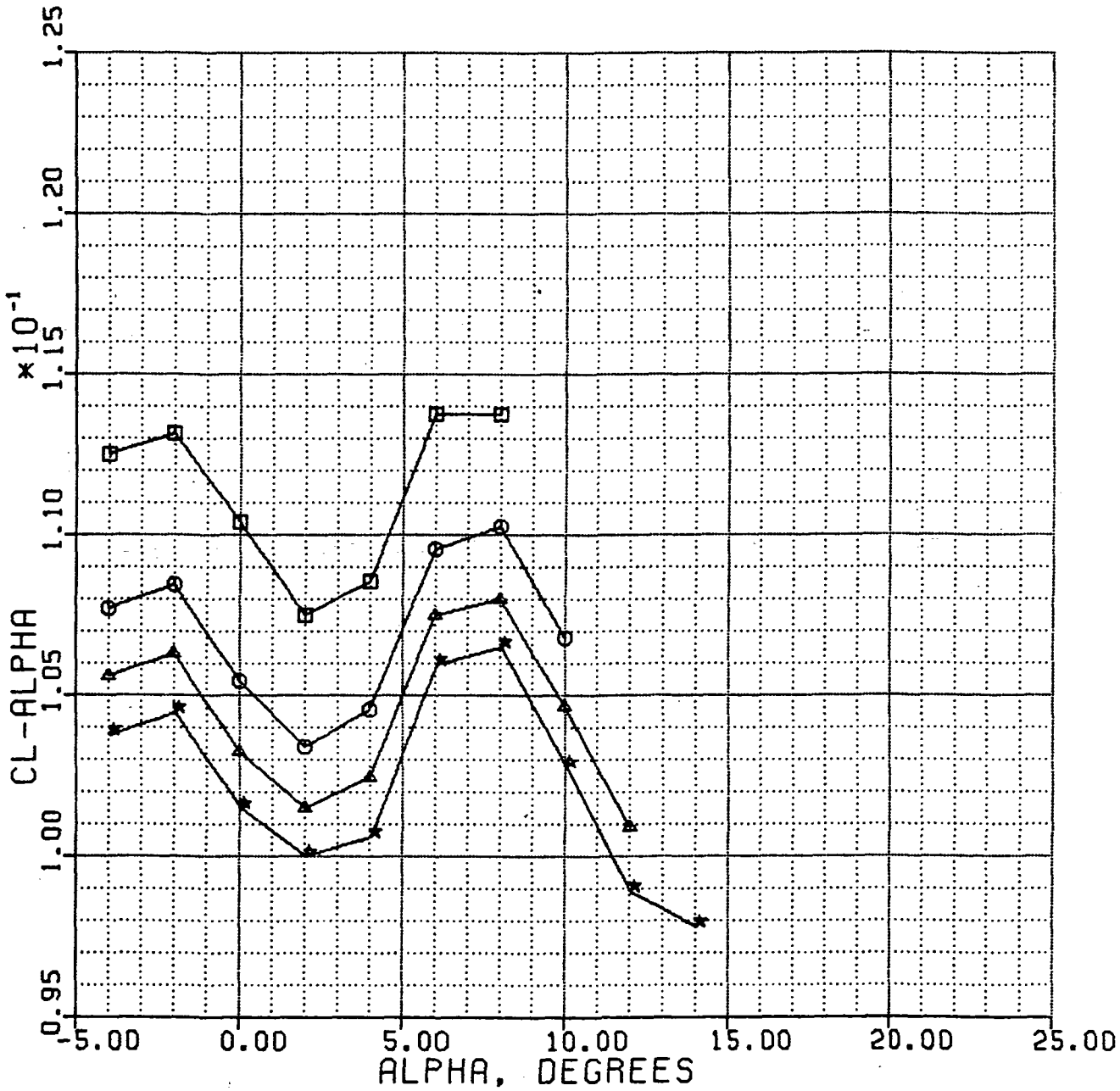
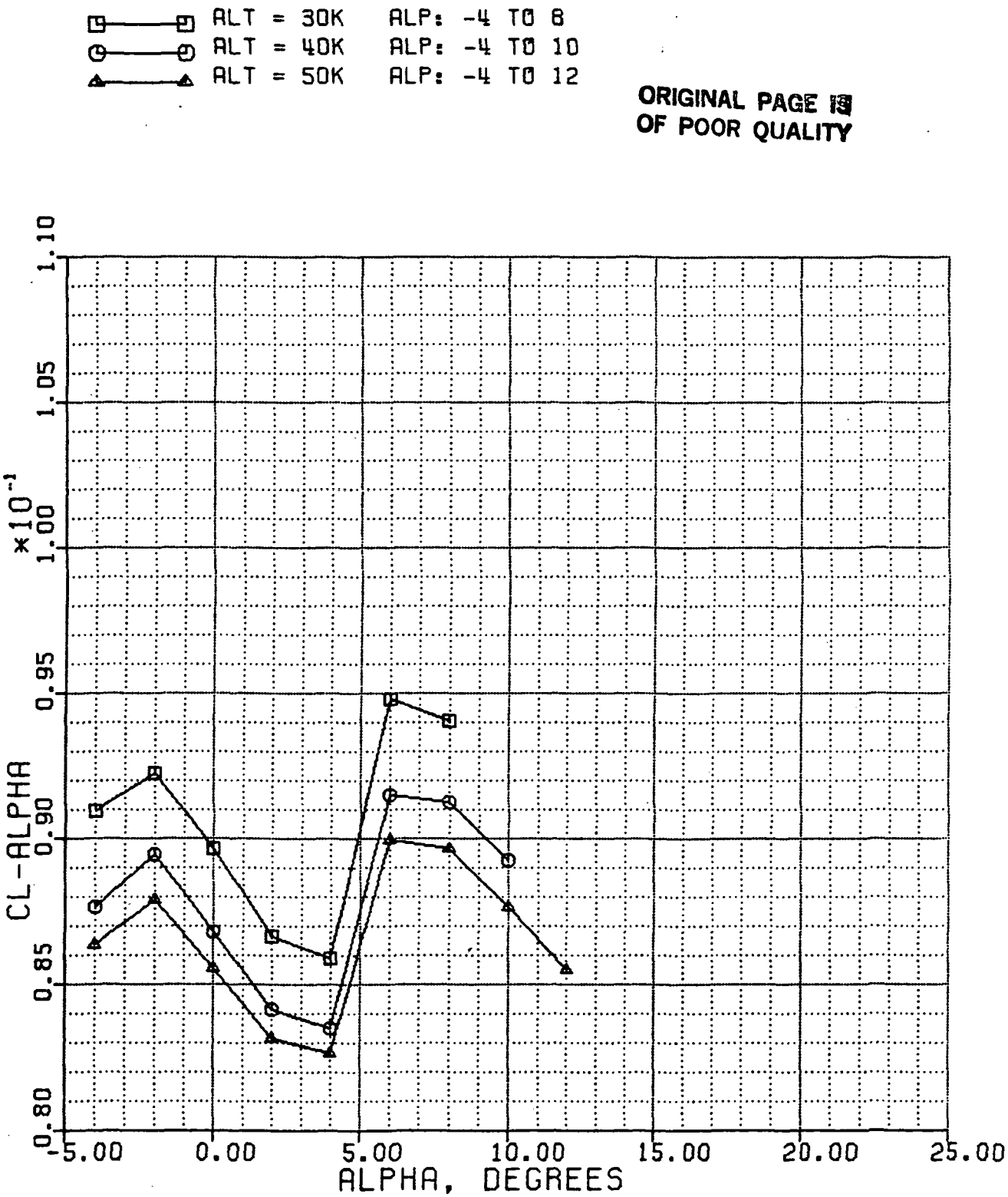


Figure 66(e)


CL-ALPHA VS ALPHA
7-1-83 X-29A M# = 1.5 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12
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CL-ALPHA
*10^-1
1.10
1.05
1.00
0.95
0.90
0.85
0.80
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 66(f)

CD-ALPHA VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05.
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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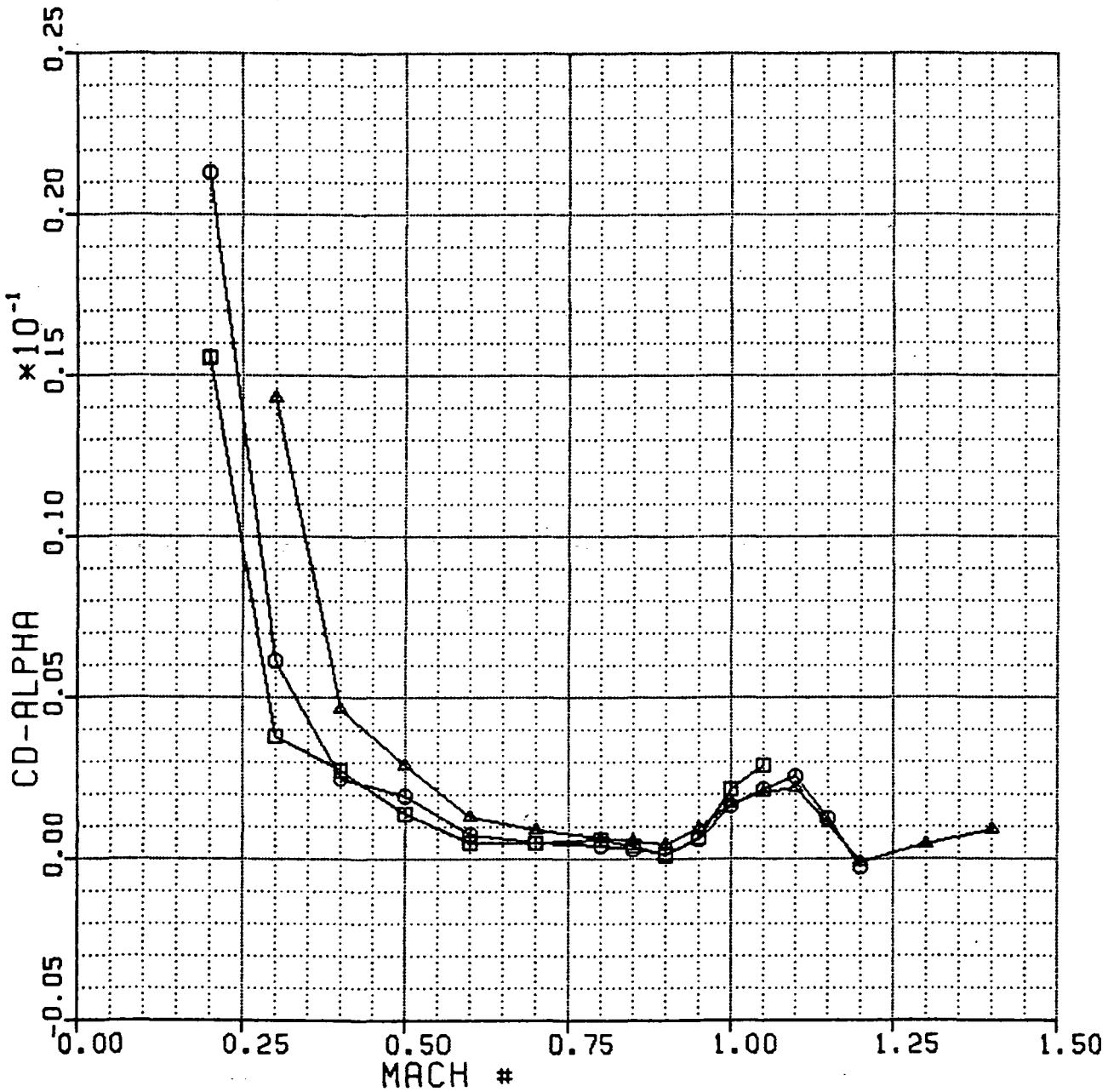

Figure 67(a)

CD-ALPHA VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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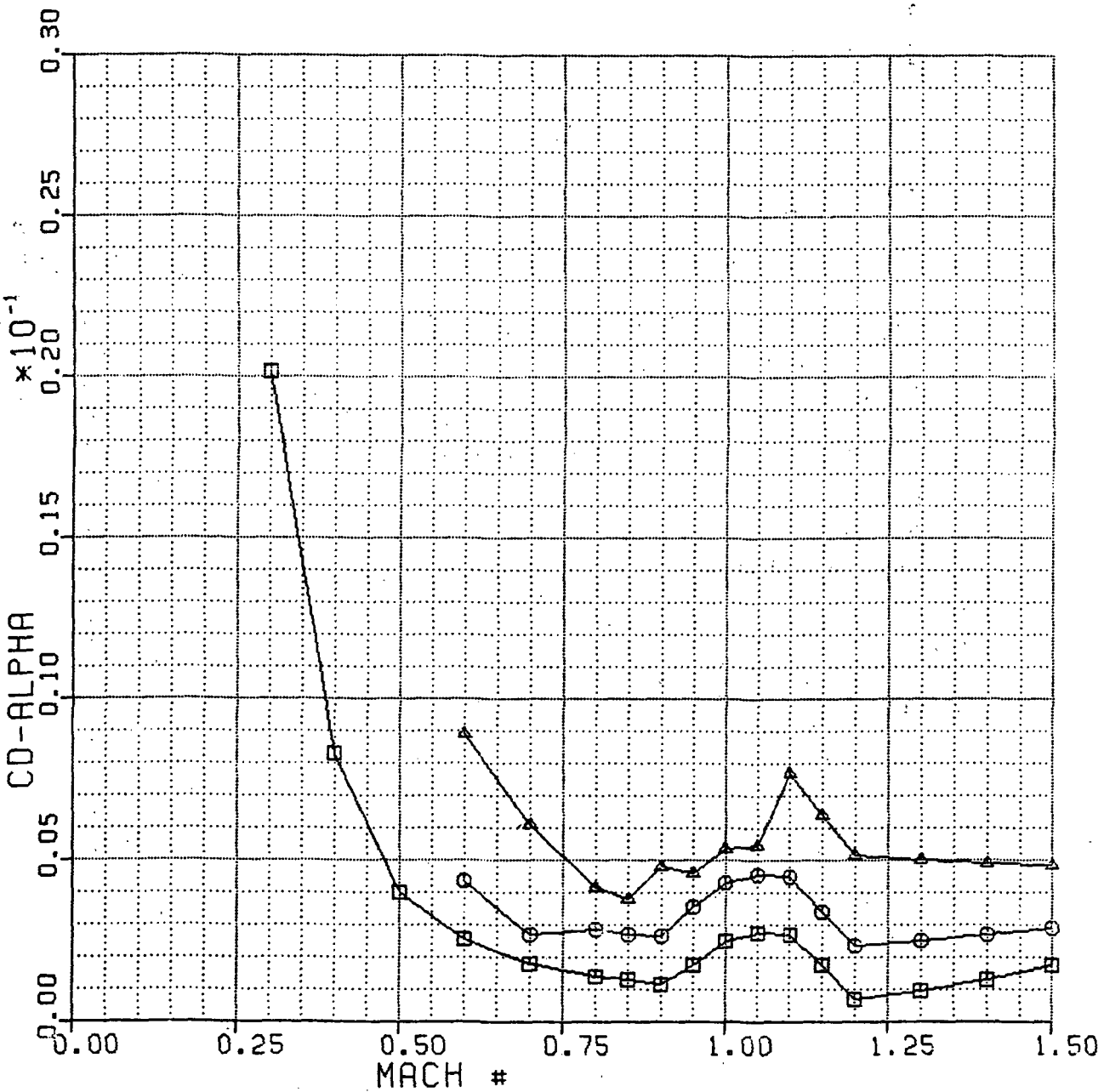

Figure 67(b)

CD-ALPHA VS ALPHA

6-15-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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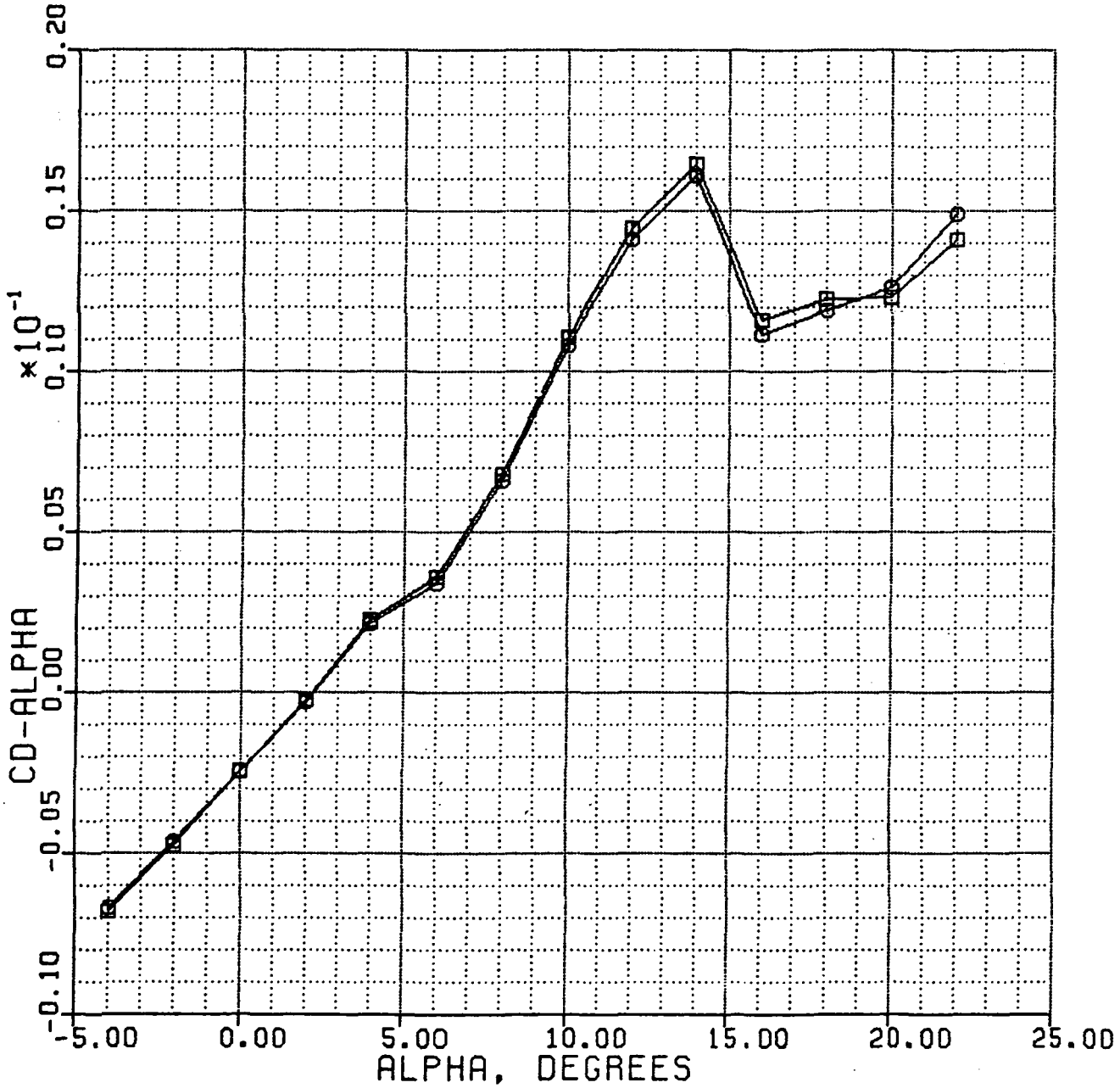

Figure 68(a)

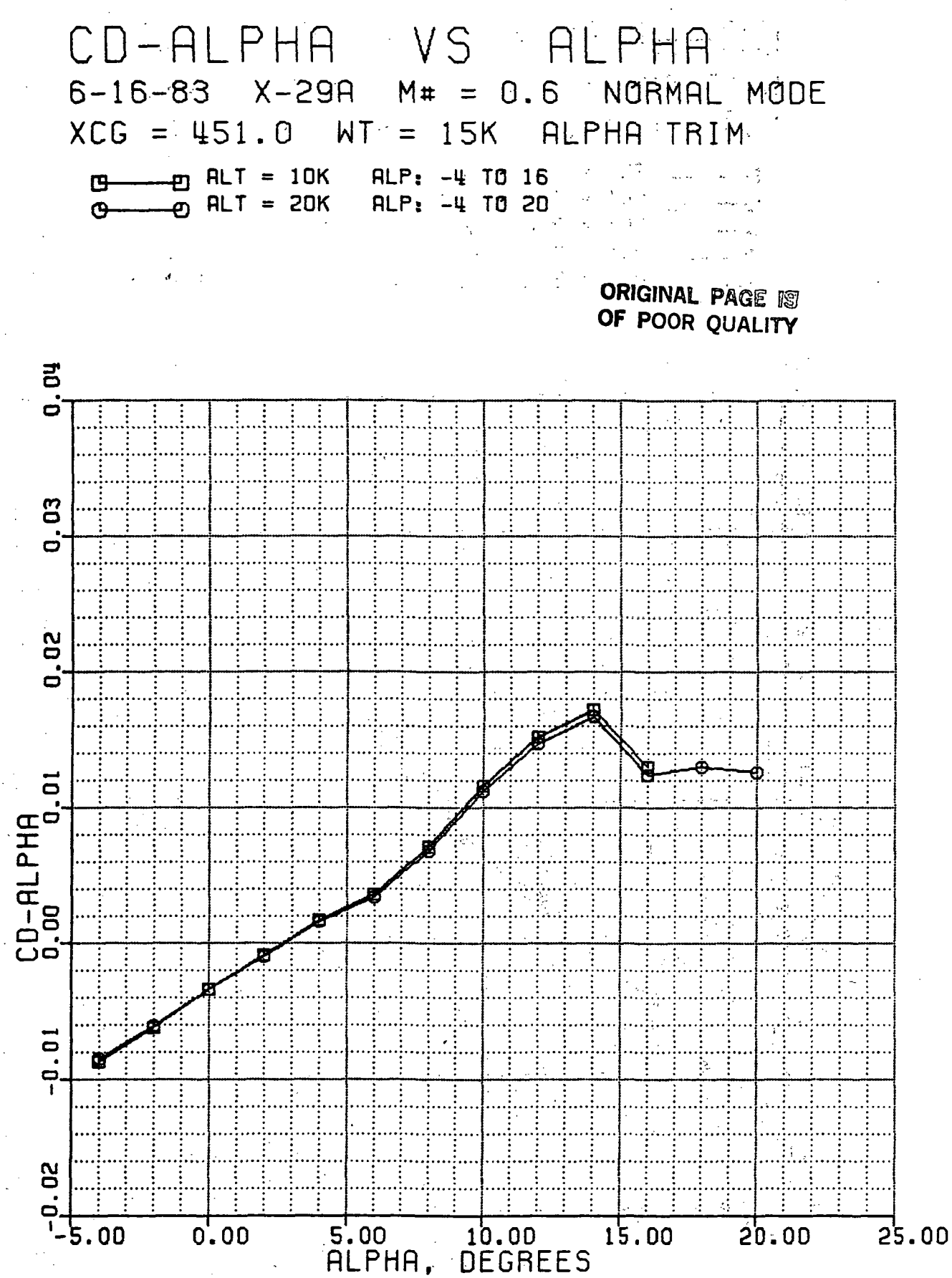

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Figure 68(b)

CD-ALPHA VS ALPHA

6-17-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10	
ALT = 20K	ALP: -4 TO 12	
ALP = 30K	ALP: -4 TO 14	
ALT = 40K	ALP: -4 TO 18	
ALT = 50K	ALP: -4 TO 22	

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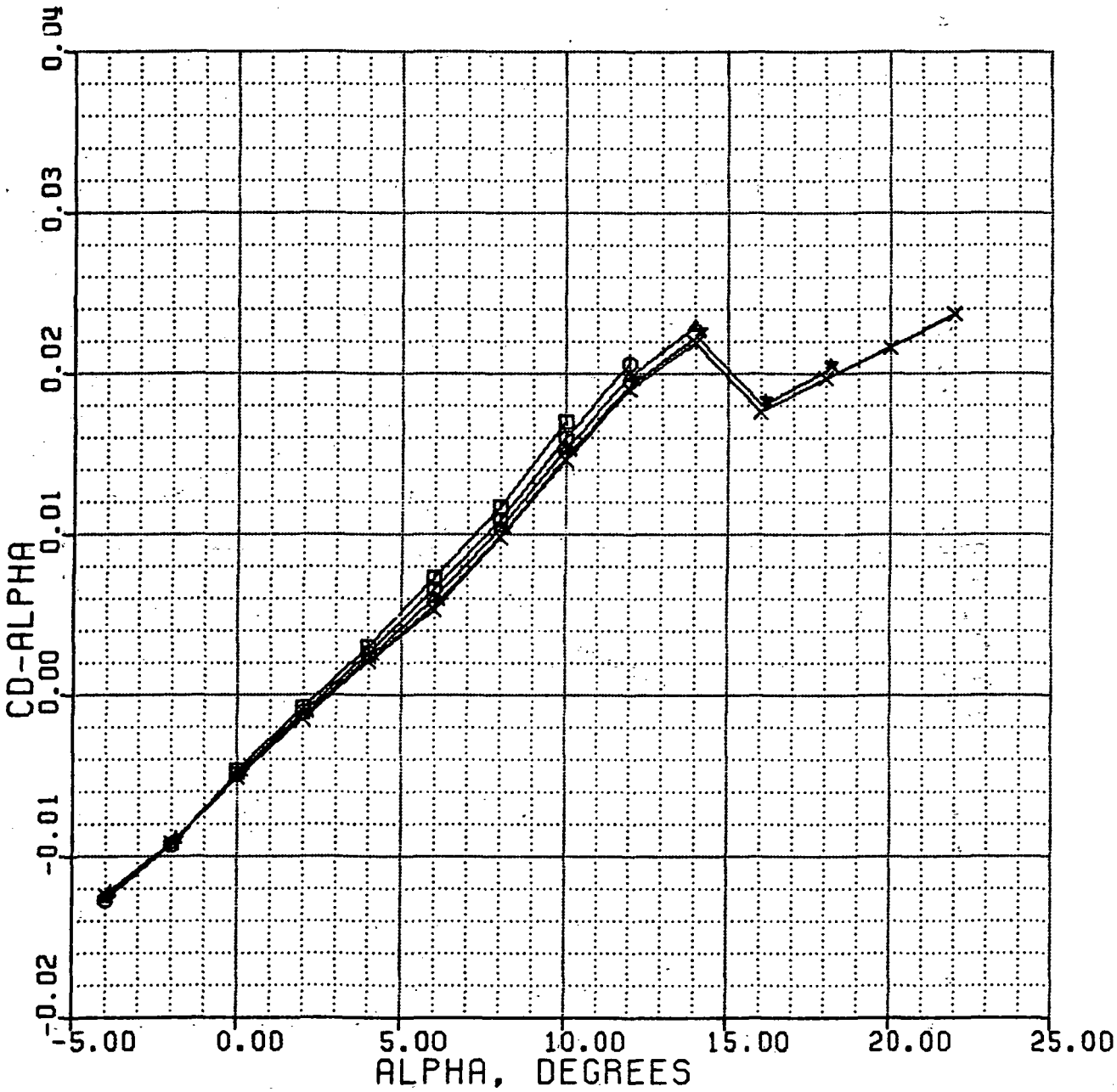

Figure 68(c)

C-4

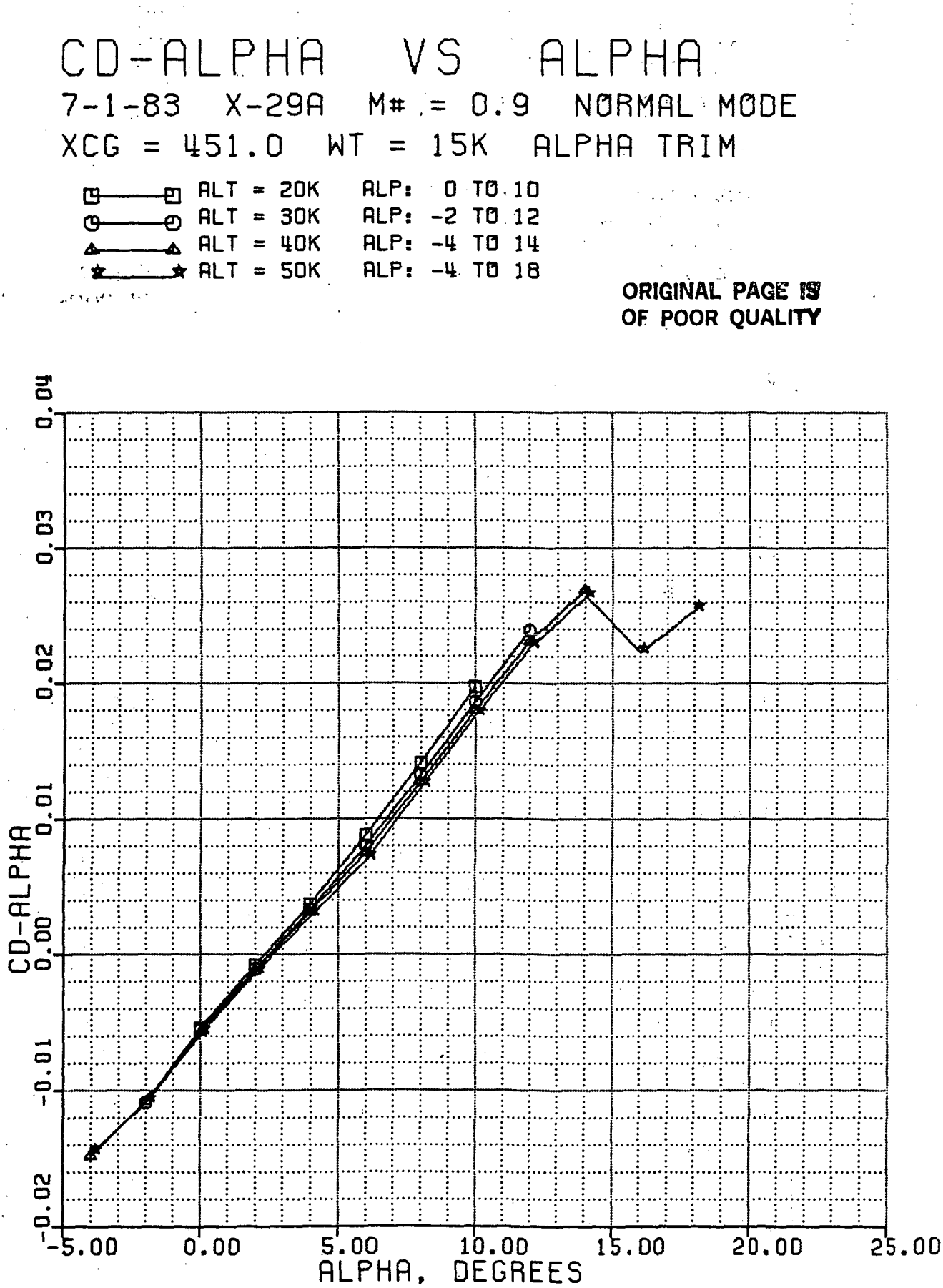
CD-ALPHA VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS
OF POOR QUALITY
CD-ALPHA
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 68(d)

CD-ALPHA VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

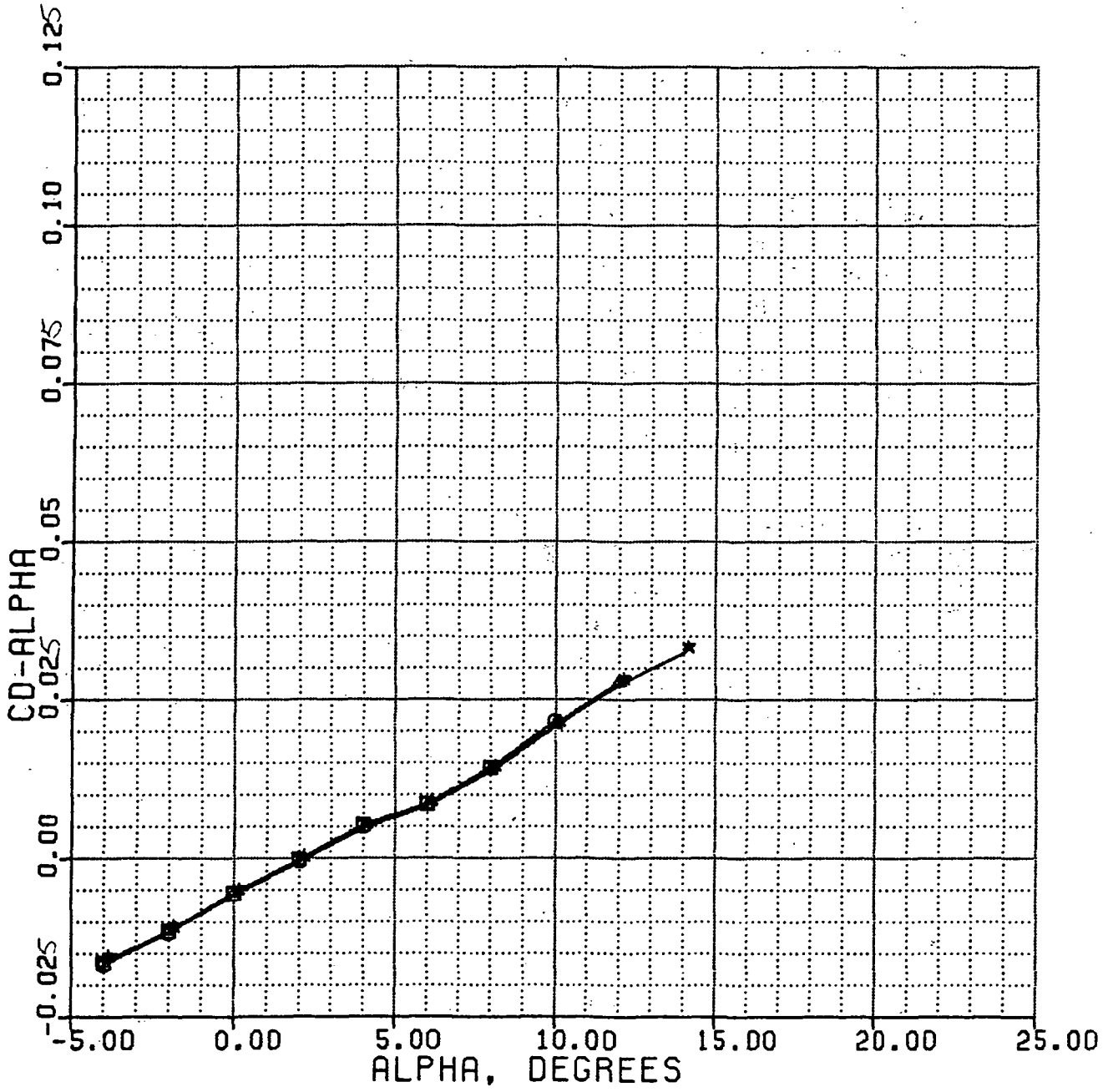

Figure 68(e)

CD-ALPHA VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

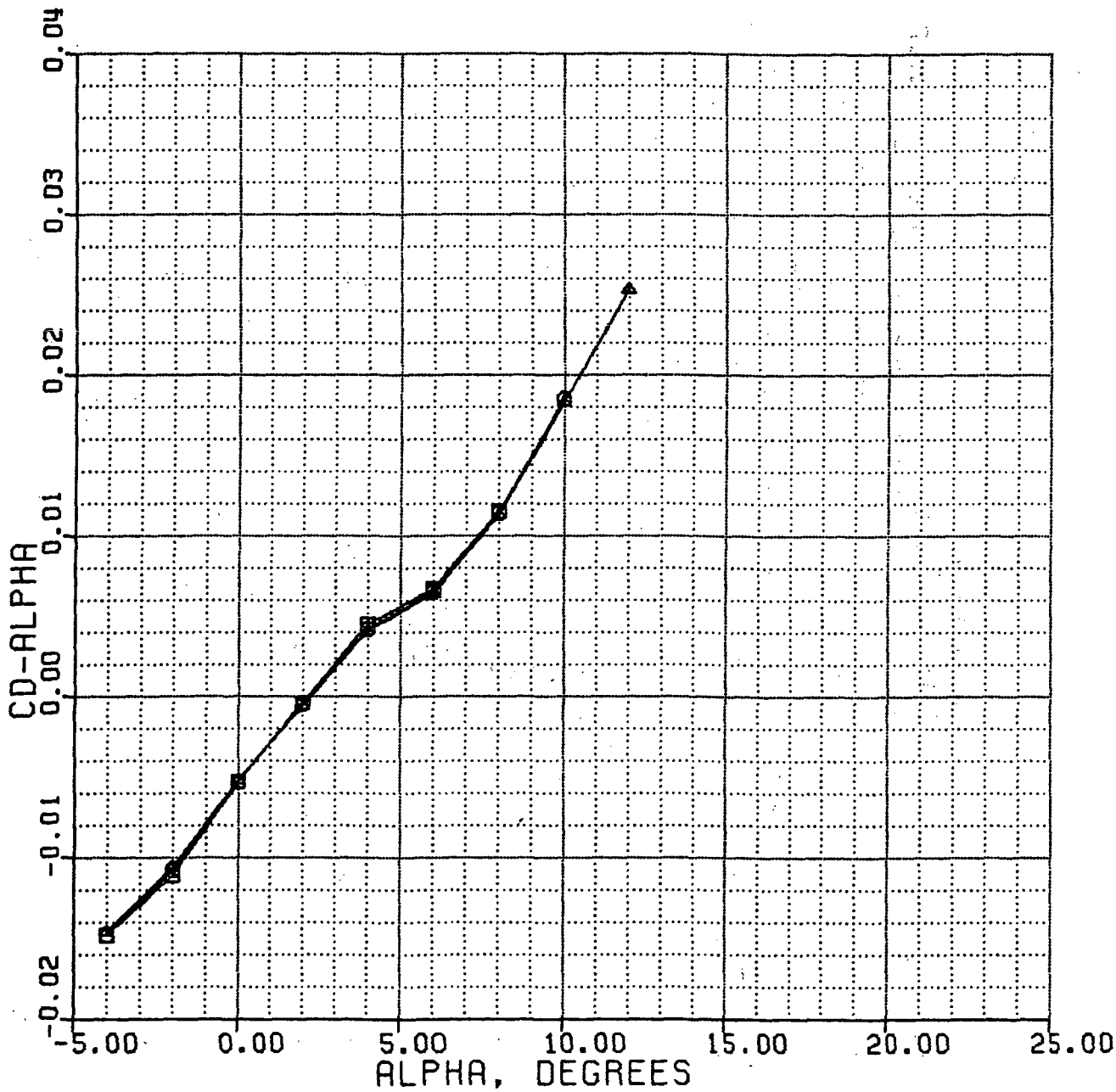

Figure 68(f)

CM-ALPHA VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

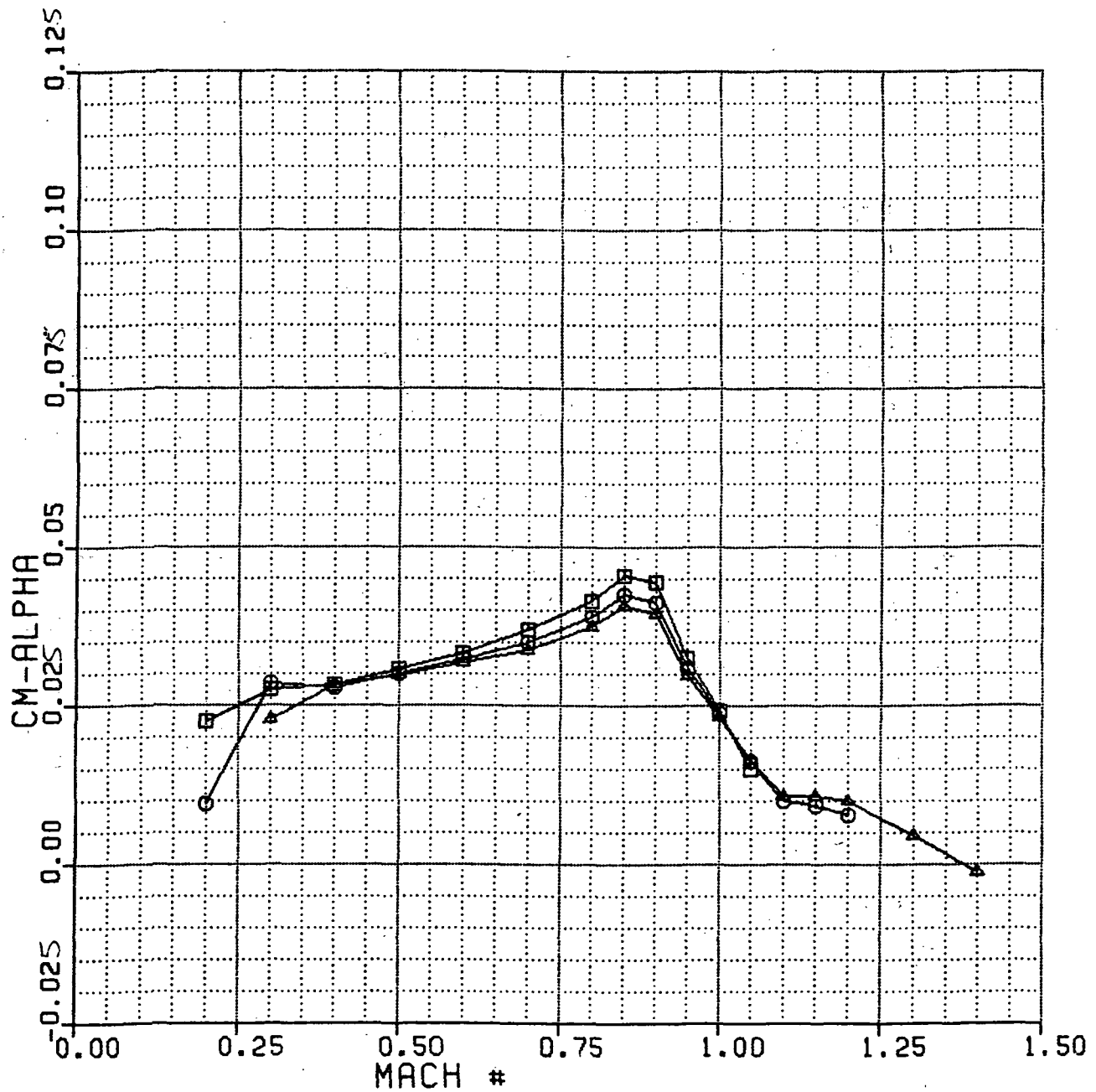

Figure 69(a)

CM-ALPHA VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
OF POOR QUALITY

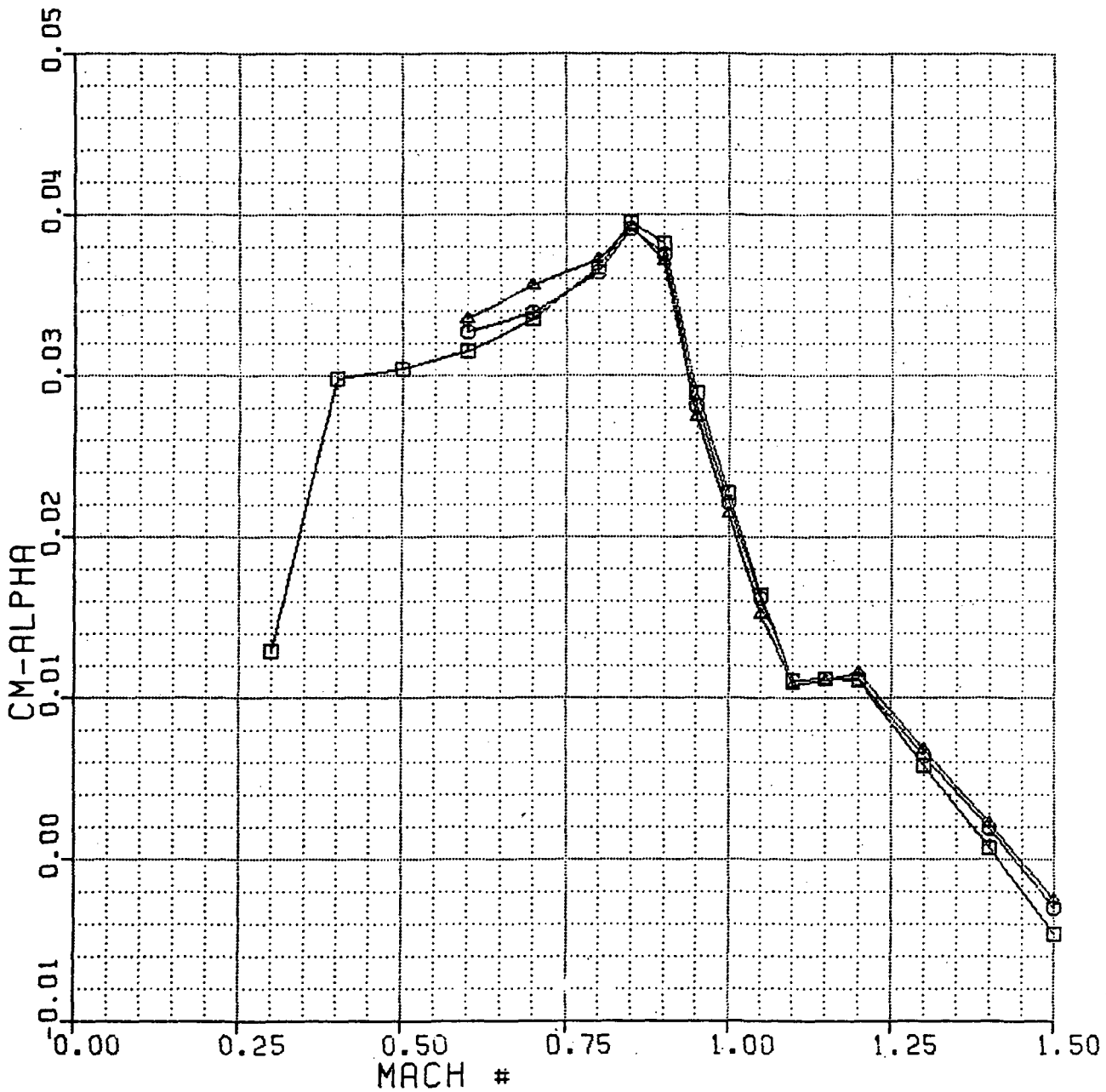

Figure 69(b)

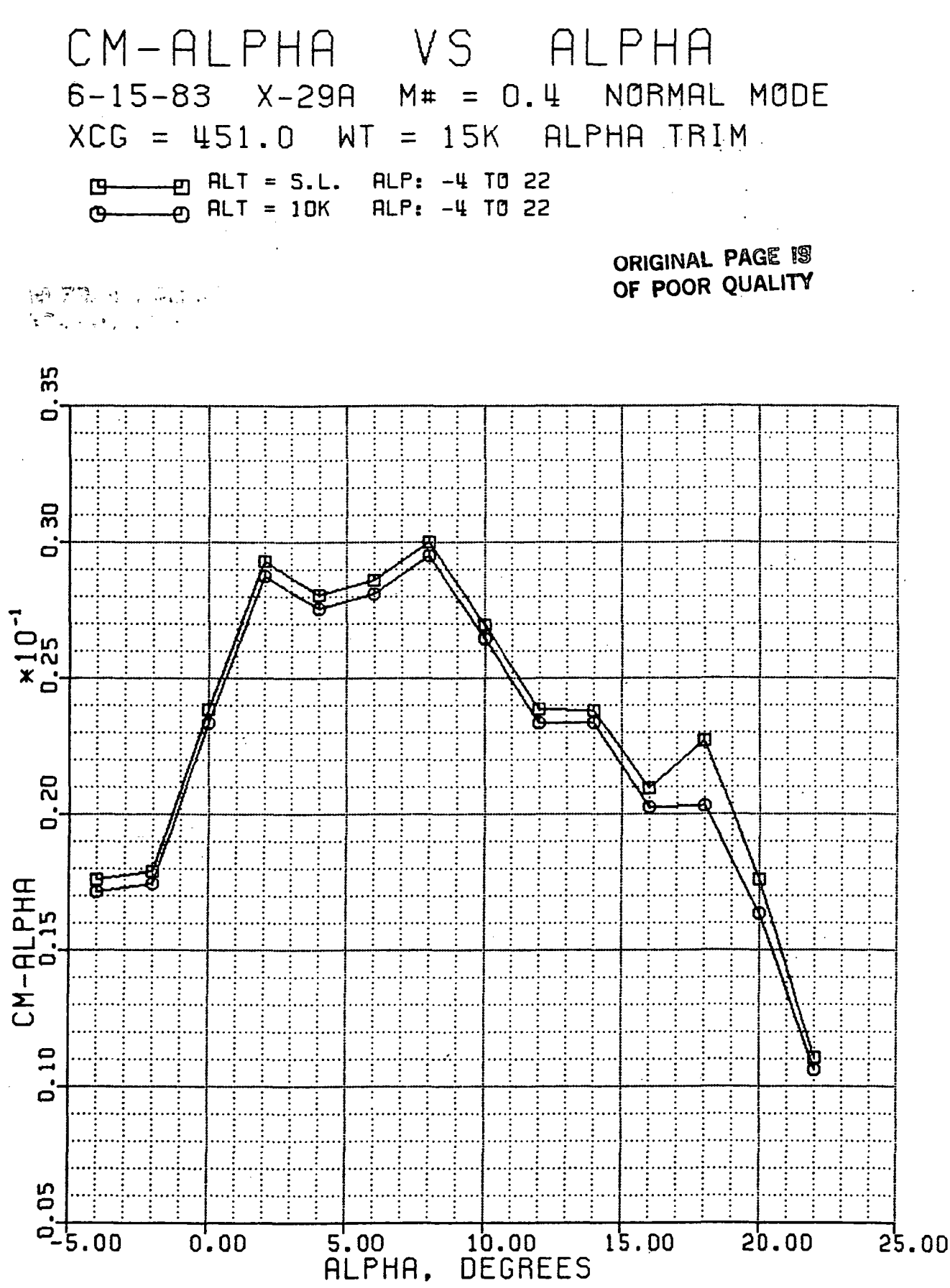
CM-ALPHA VS ALPHA
6-15-83 X-29A M# = 0.4 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TO 22
ALT = 10K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CM-ALPHA
×10⁻¹
0.35
0.30
0.25
0.20
0.15
0.10
0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 70(a)

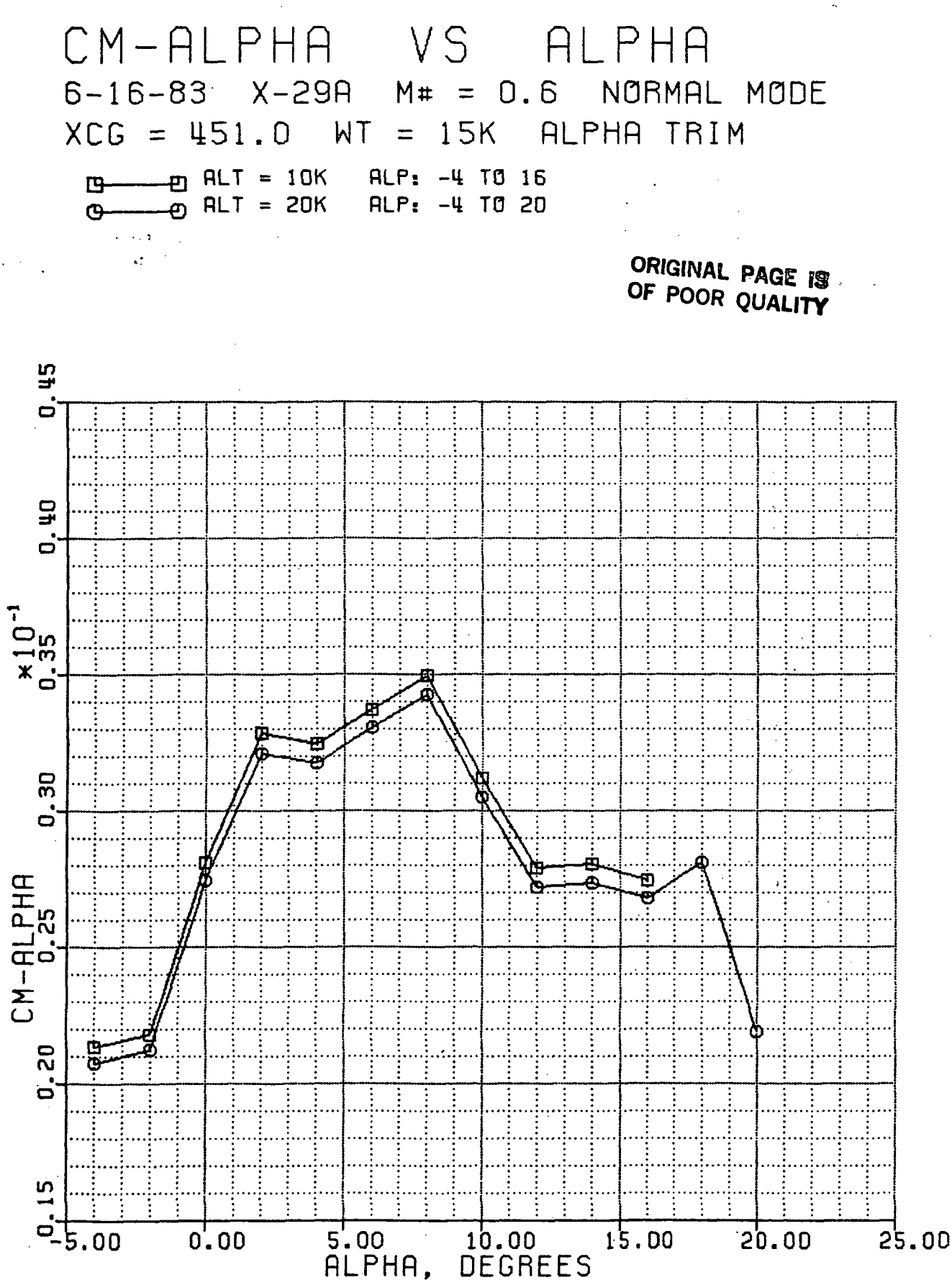
CM-ALPHA VS ALPHA
6-16-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS
OF POOR QUALITY
CM-ALPHA
*10⁻¹
0.45
0.40
0.35
0.30
0.25
0.20
0.15
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 70(b)

CM-ALPHA VS ALPHA

6-17-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10
ALT = 20K	ALP: -4 TO 12
ALP = 30K	ALP: -4 TO 14
ALT = 40K	ALP: -4 TO 18
ALT = 50K	ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

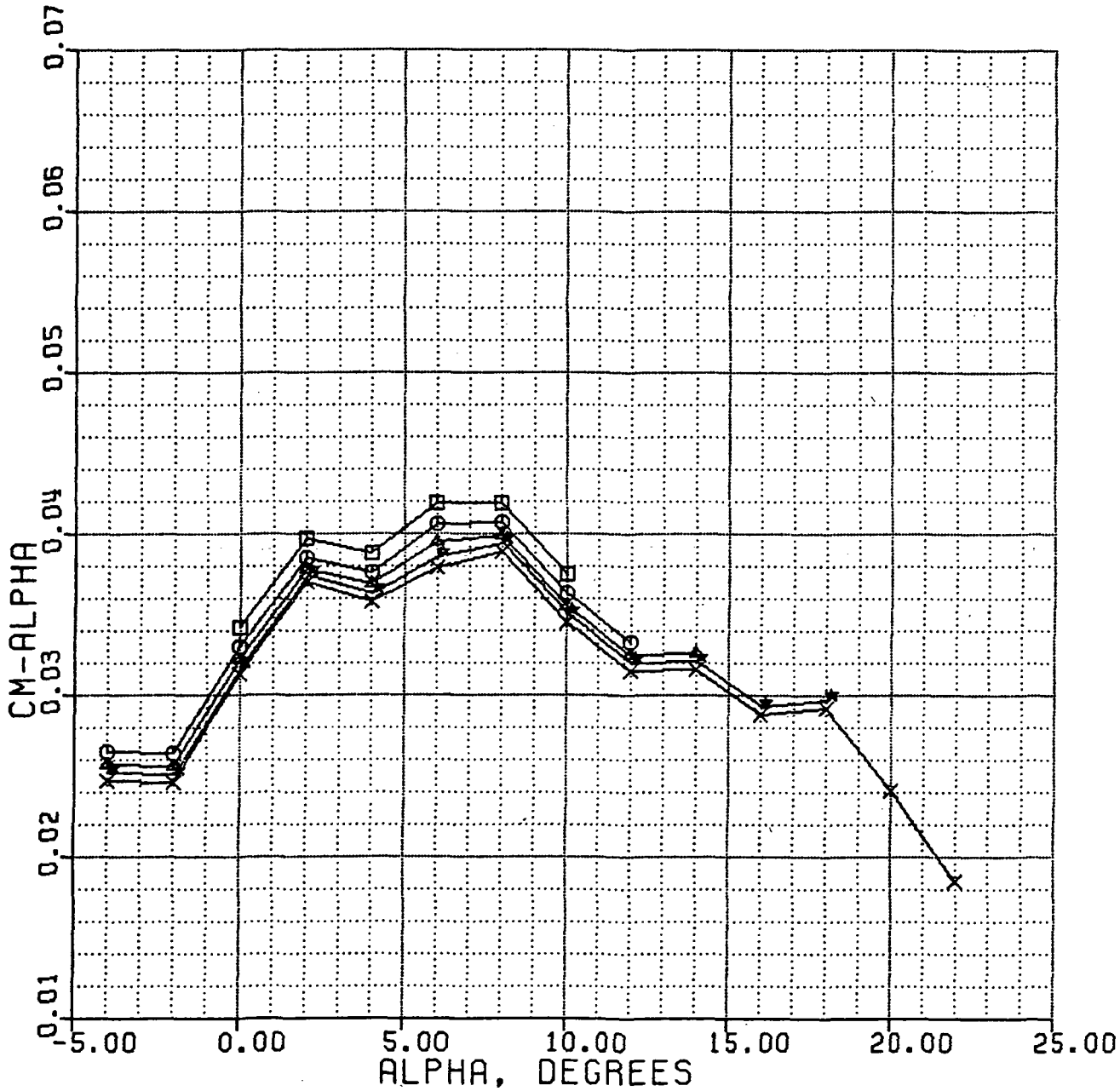

Figure 70(c)

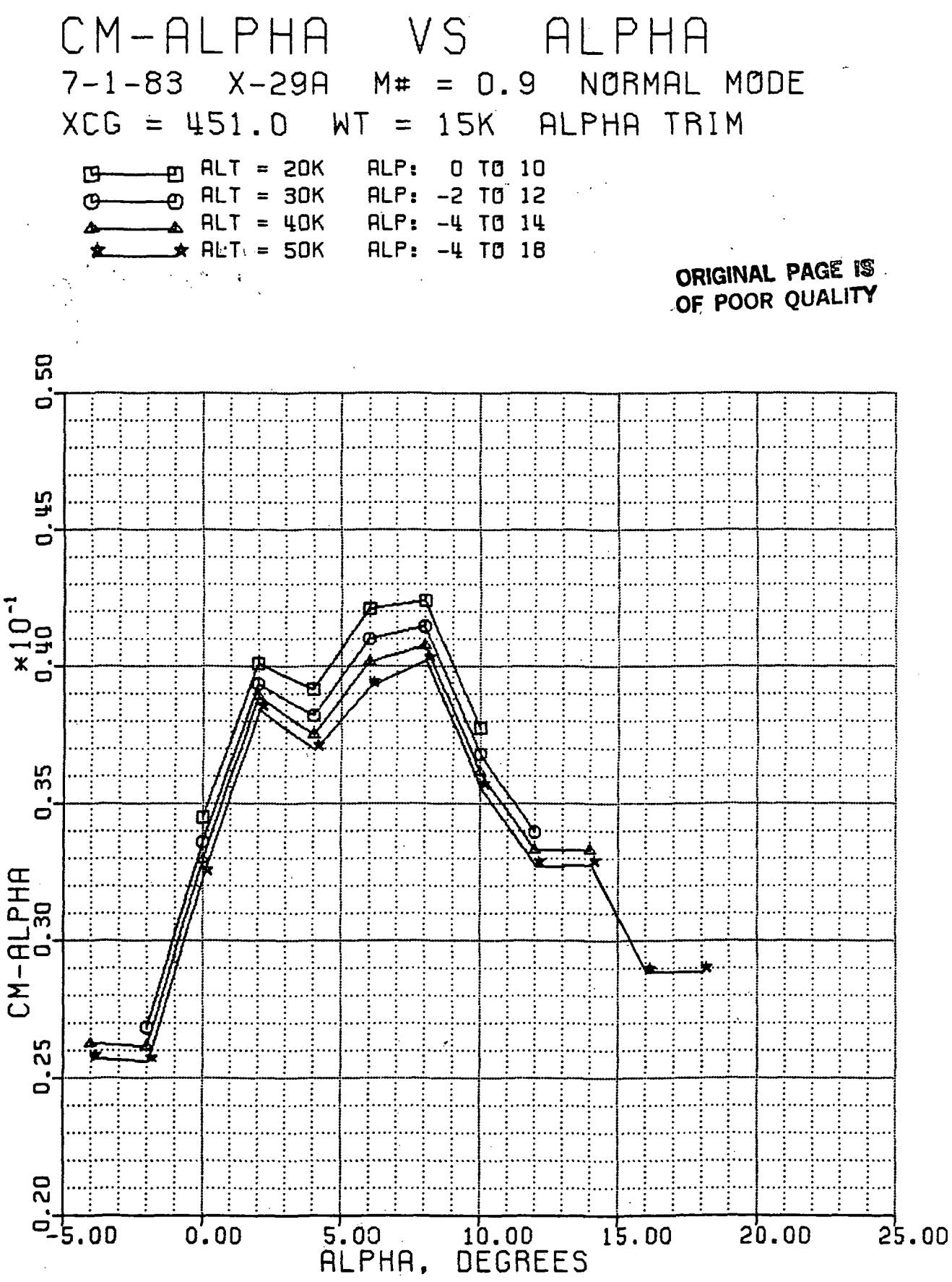
CM-ALPHA VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS OF POOR QUALITY
CM-ALPHA *10-1
0.50
0.45
0.40
0.35
0.30
0.25
0.20
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 70(d)

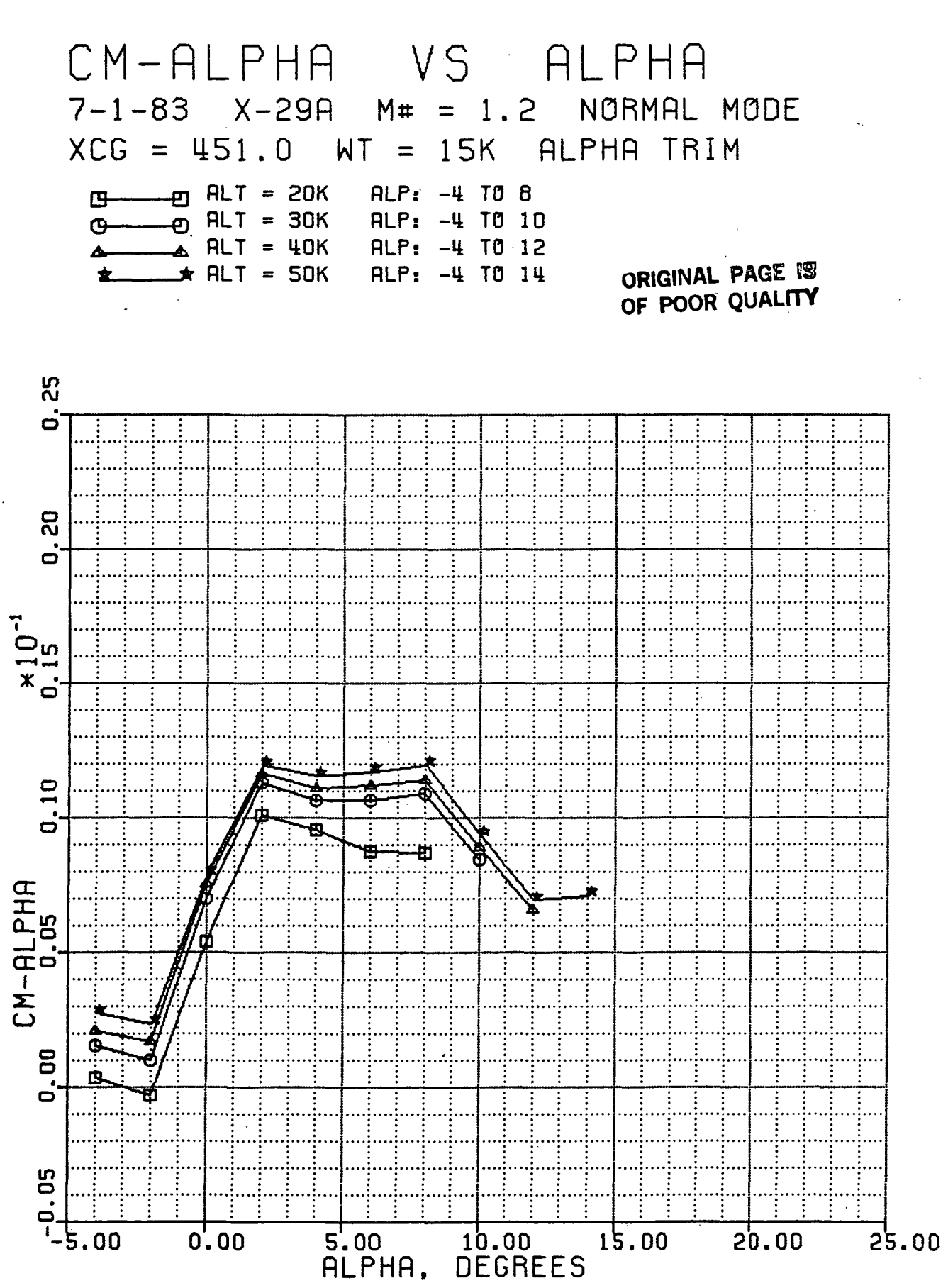
CM-ALPHA VS ALPHA
7-1-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS
OF POOR QUALITY
CM-ALPHA *10-1
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 70(e)

CM-ALPHA VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

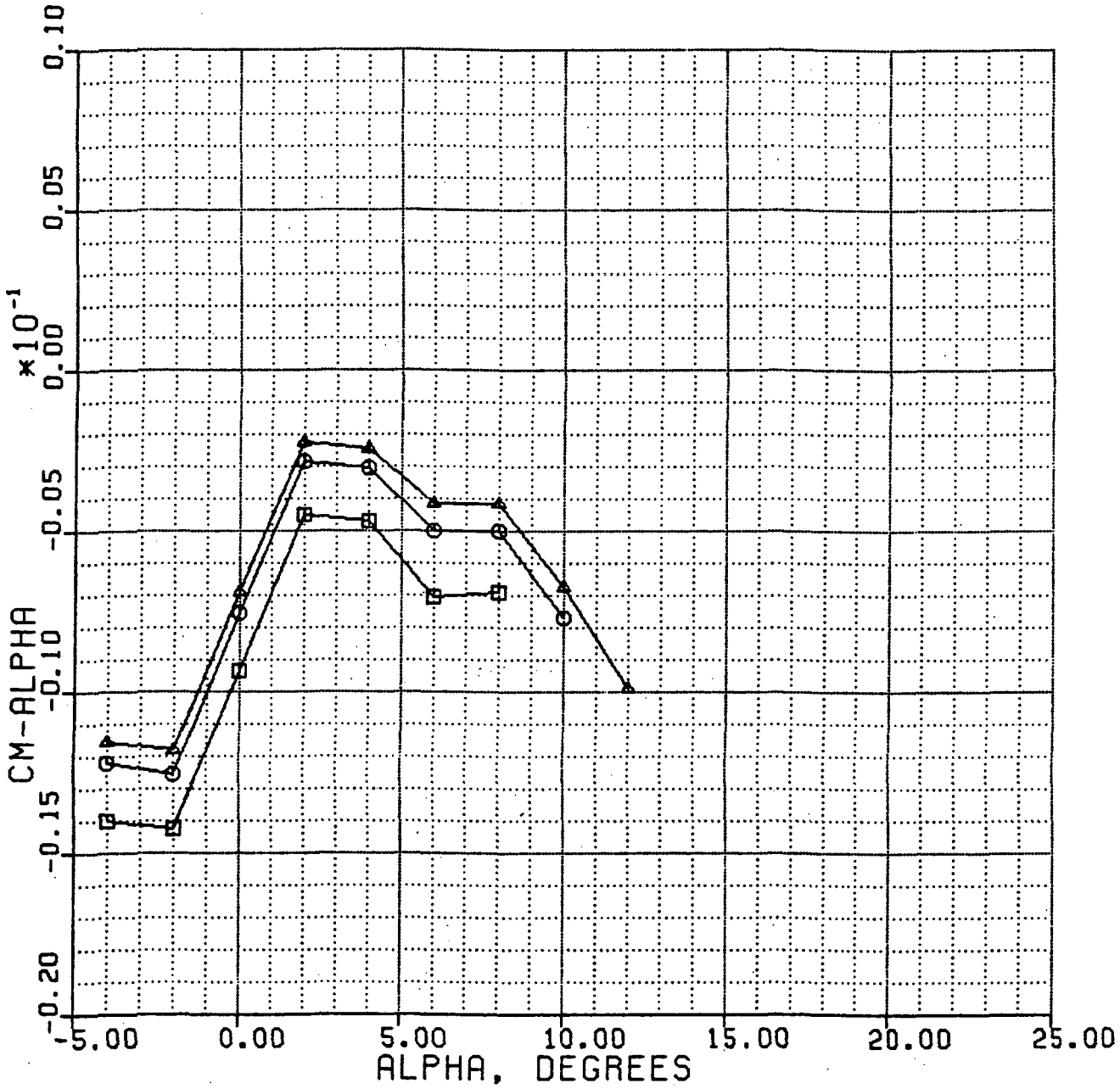

Figure 70(f)

CA-ALPHA VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

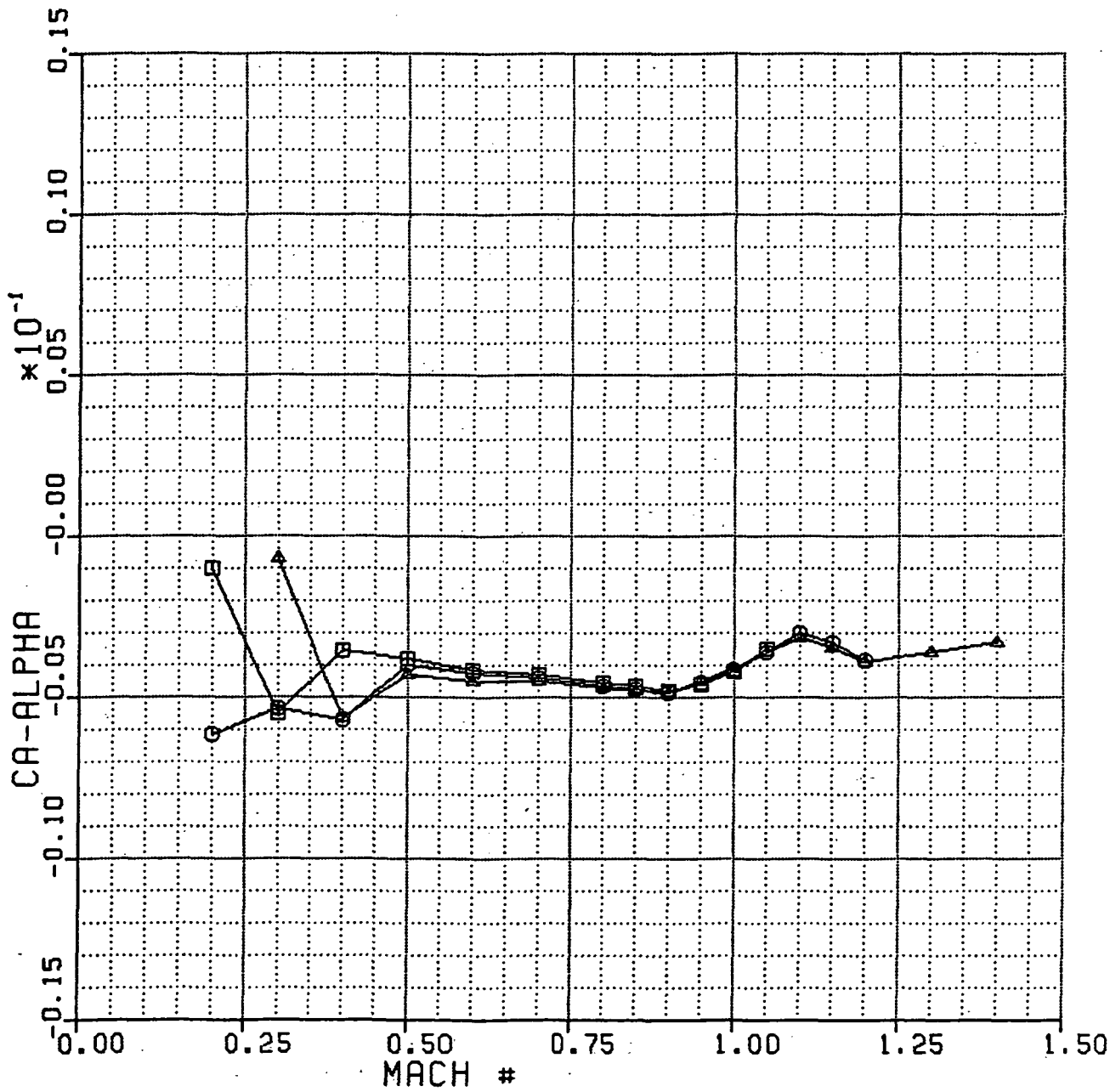

Figure 71(a)

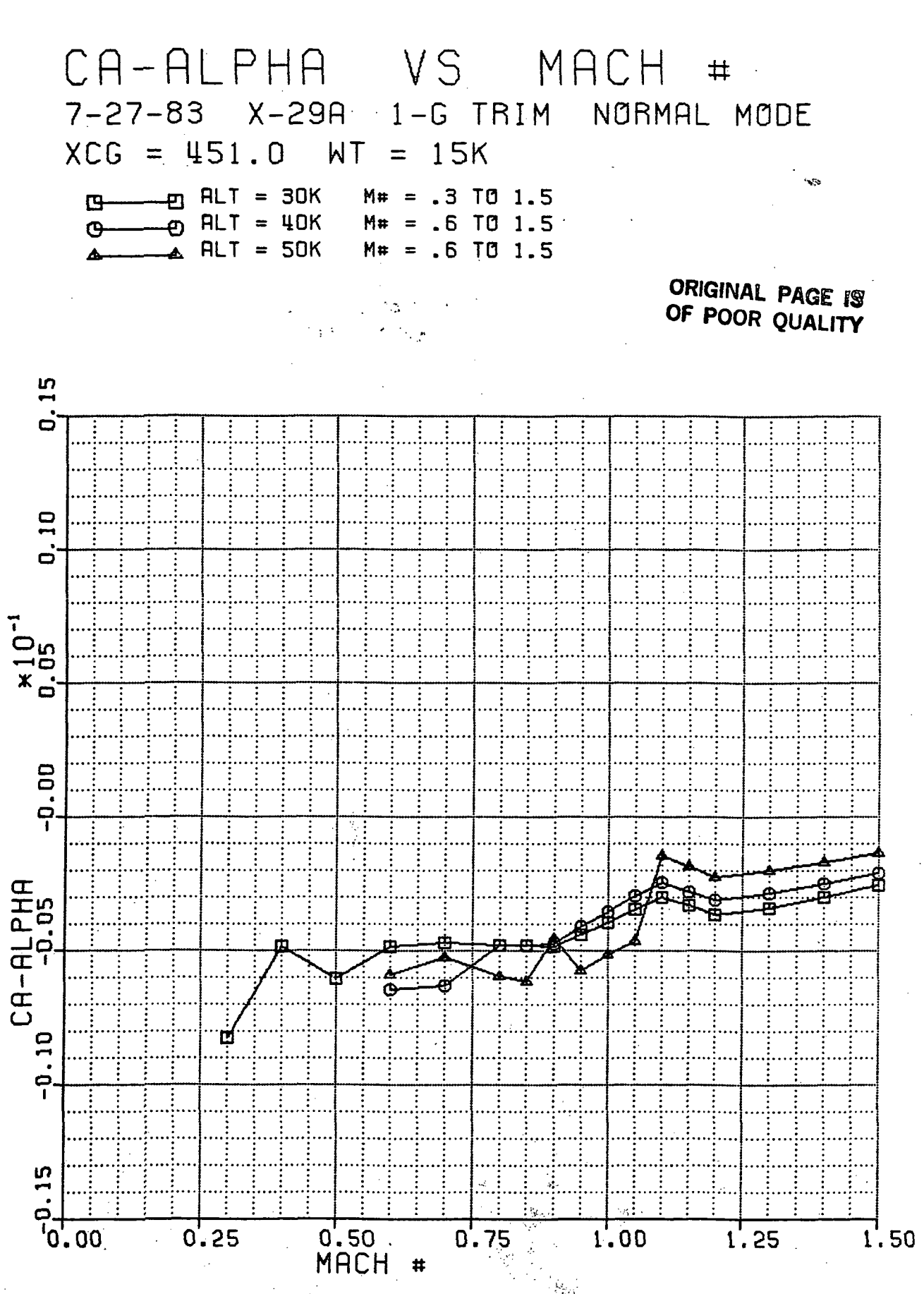
CA-ALPHA VS MACH #
7-27-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5
ORIGINAL PAGE IS OF POOR QUALITY
CA-ALPHA *10⁻¹
0.15
0.10
0.05
-0.00
-0.05
-0.10
-0.15
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 71(b)

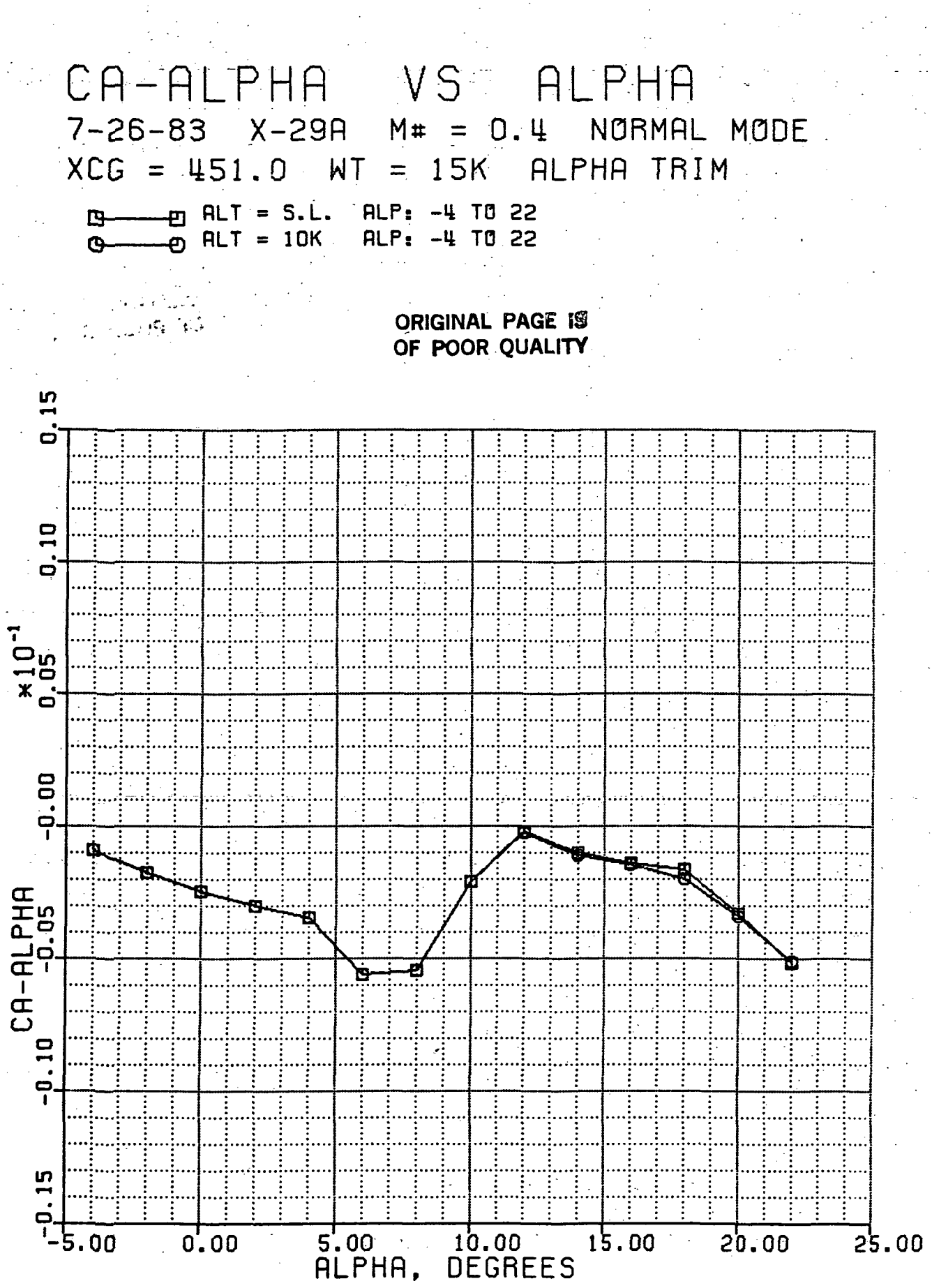
CA-ALPHA VS ALPHA
7-26-83 X-29A M# = 0.4 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TO 22
ALT = 10K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
0.15
0.10
0.05
-0.00
-0.05
-0.10
-0.15
*10-1
CA-ALPHA
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 72(a)

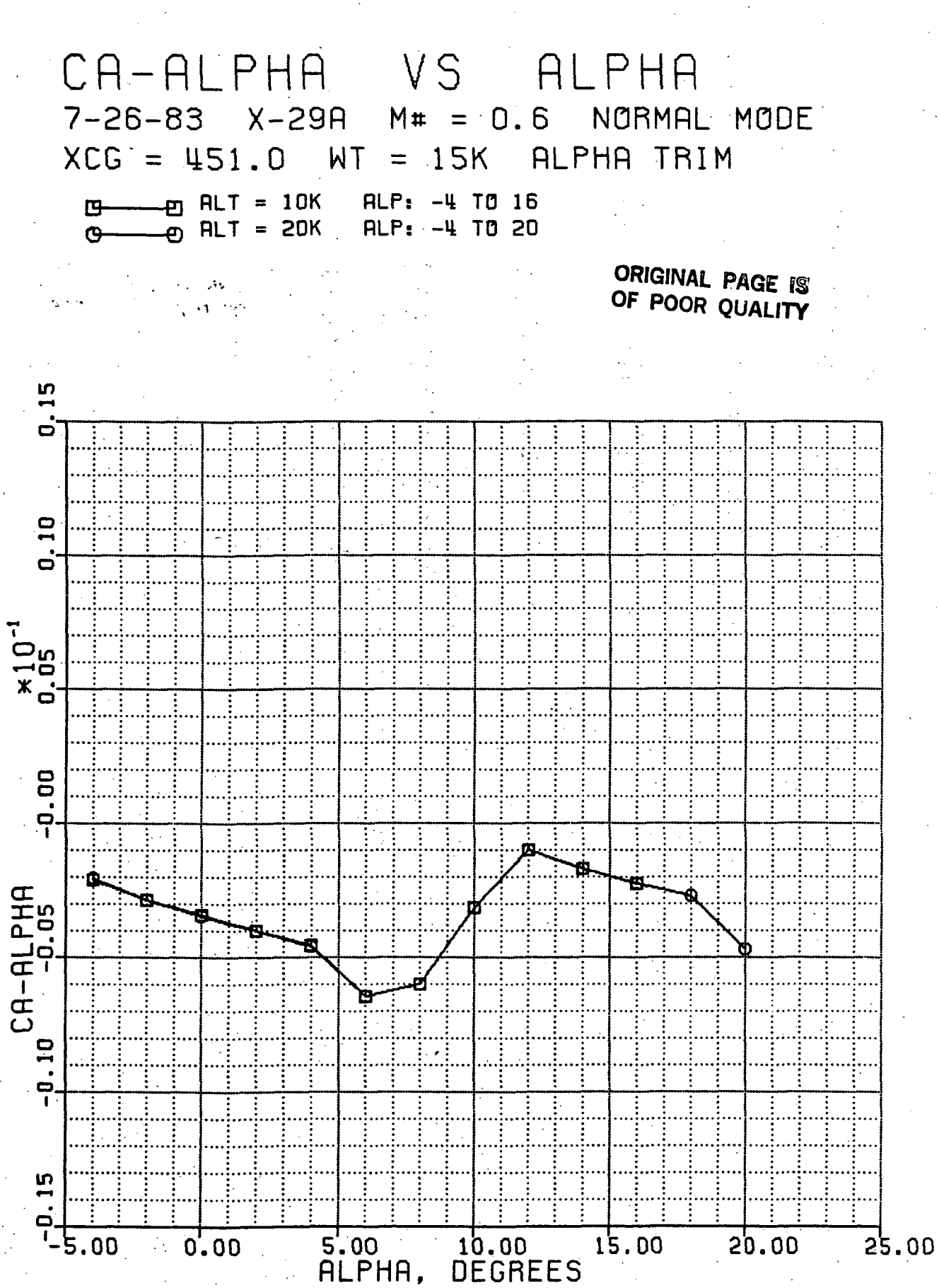
CA-ALPHA VS ALPHA
7-26-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS
OF POOR QUALITY
*10⁻¹
0.15
0.10
0.05
-0.00
-0.05
-0.10
-0.15
CA-ALPHA
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 72(b)

CA-ALPHA VS ALPHA

6-17-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10
ALT = 20K	ALP: -4 TO 12
ALP = 30K	ALP: -4 TO 14
ALT = 40K	ALP: -4 TO 18
ALT = 50K	ALP: -4 TO 22

ORIGINAL PAGE IS
OF POOR QUALITY

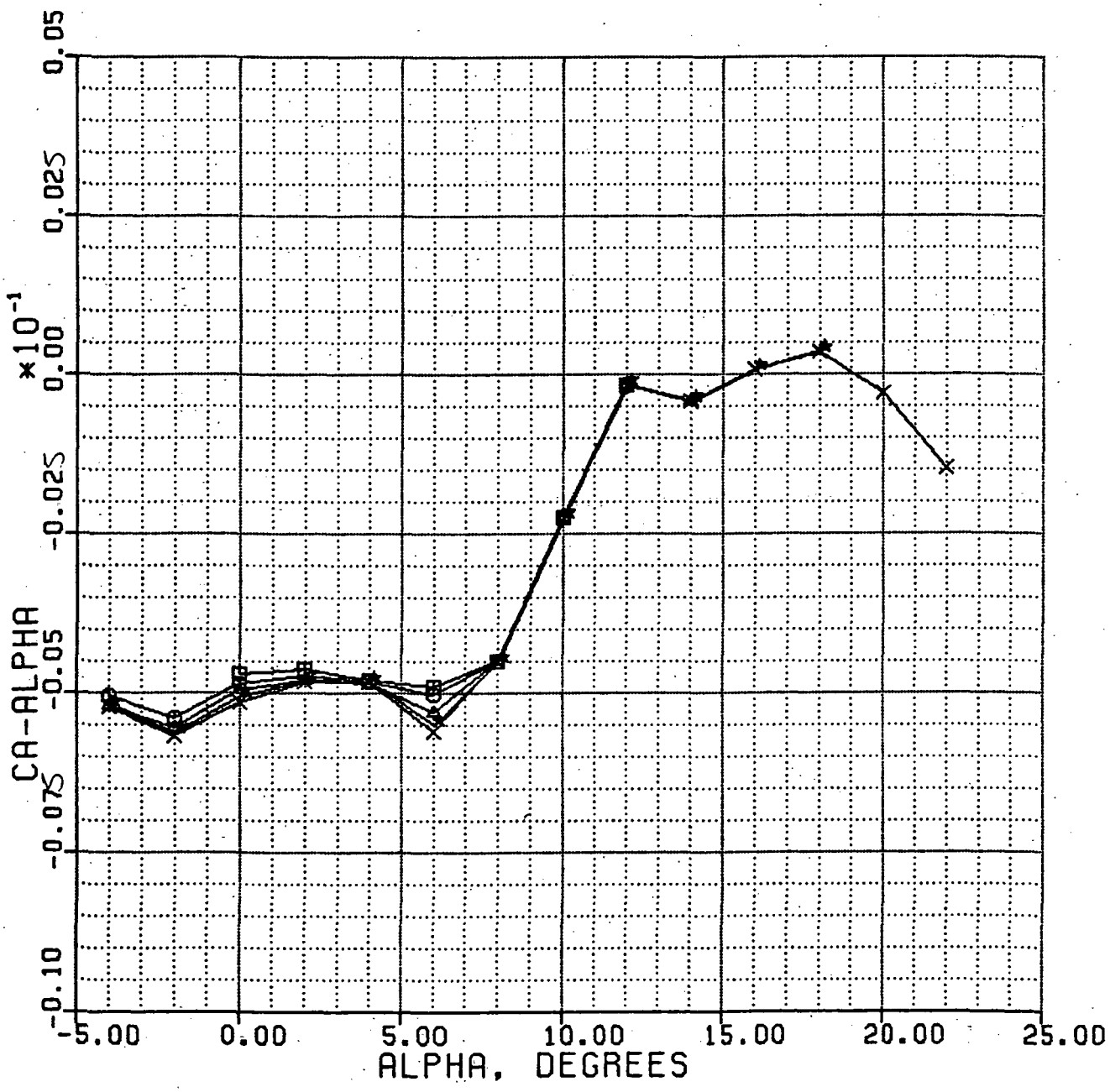

Figure 72(c)

CA-ALPHA VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
OF POOR QUALITY

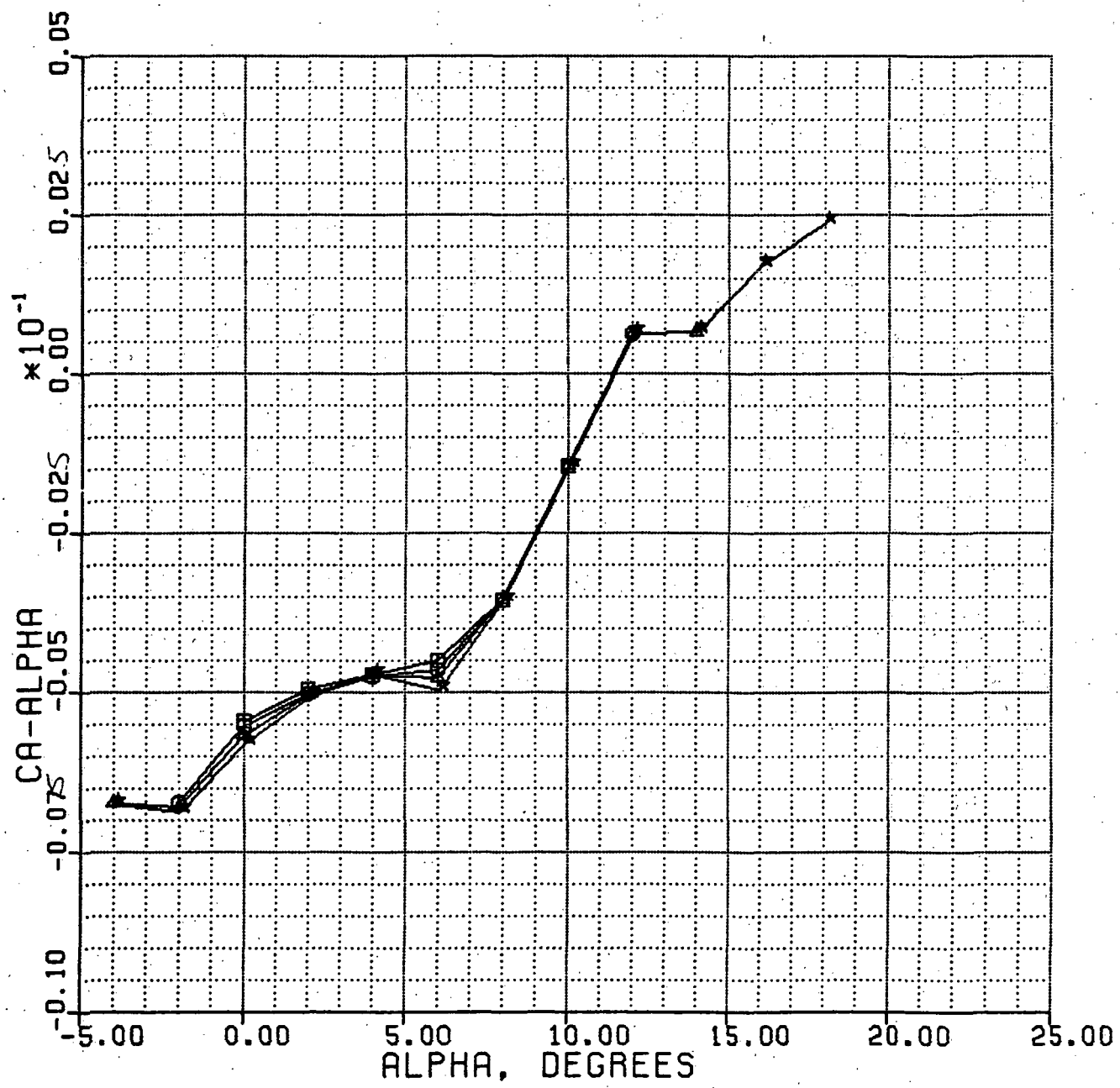

Figure 72(d)

CA-ALPHA VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

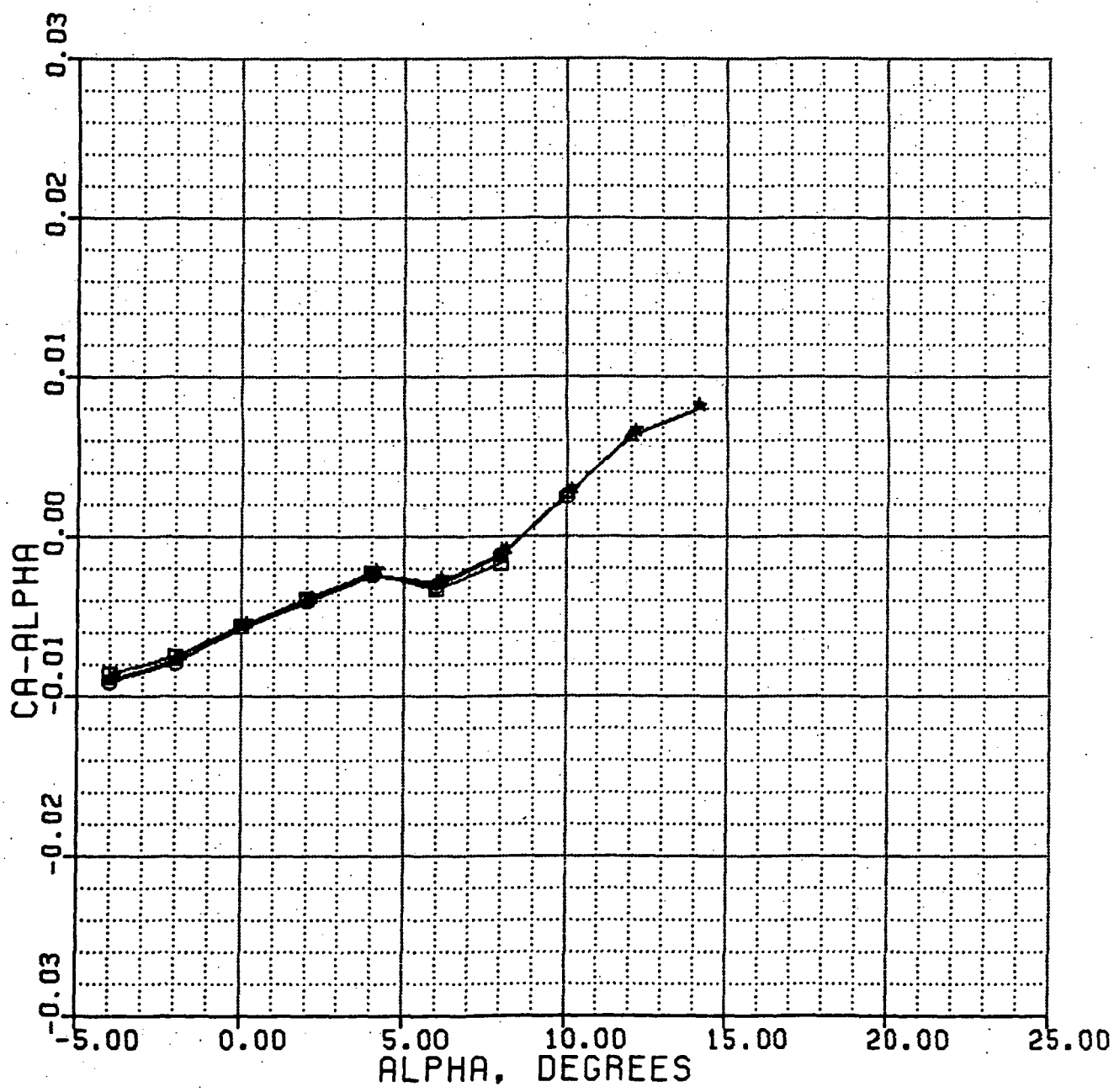

Figure 72(e)

CA-ALPHA VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

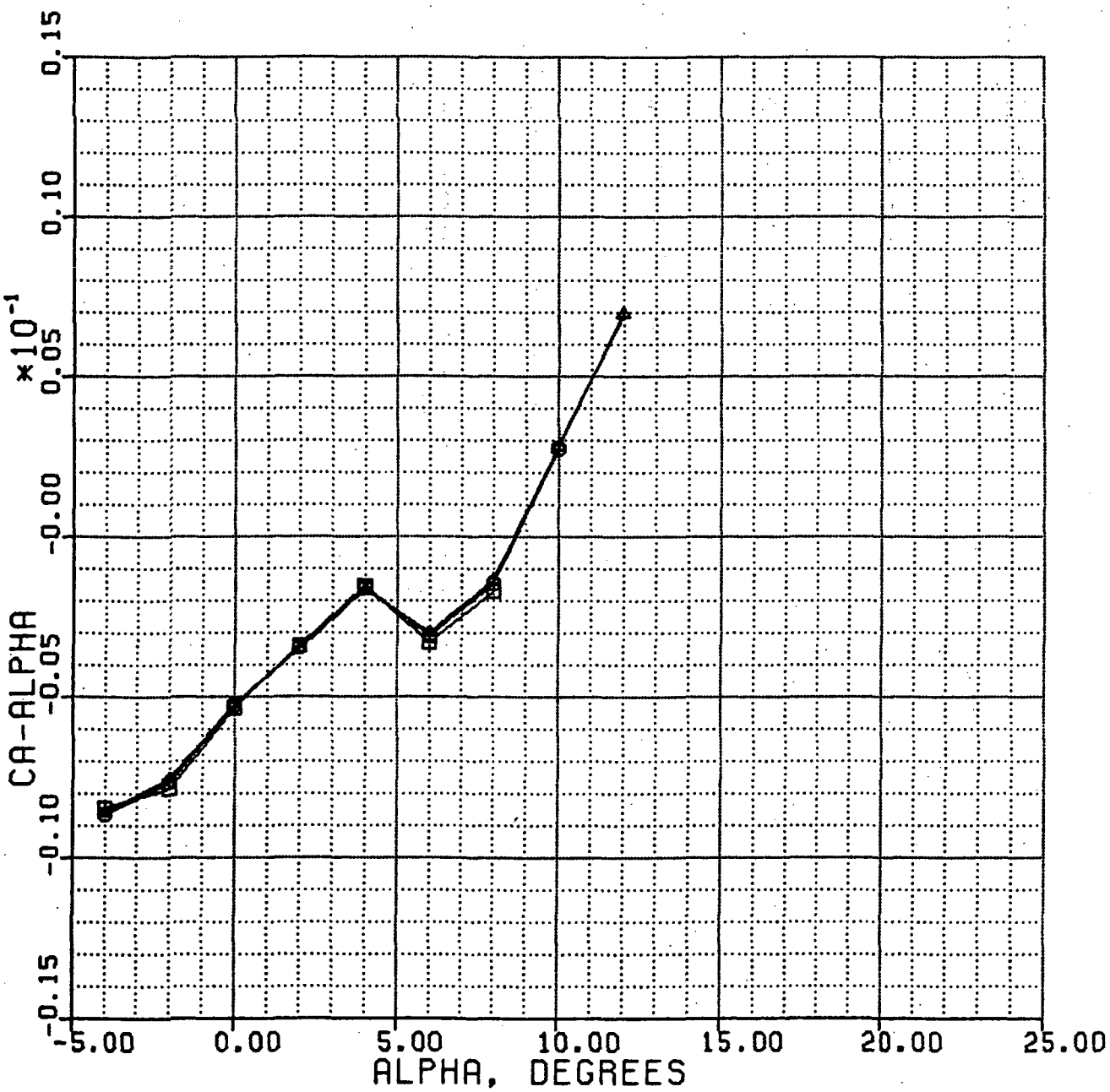

Figure 72(f)

CN-ALPHA VS MACH

7-5-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

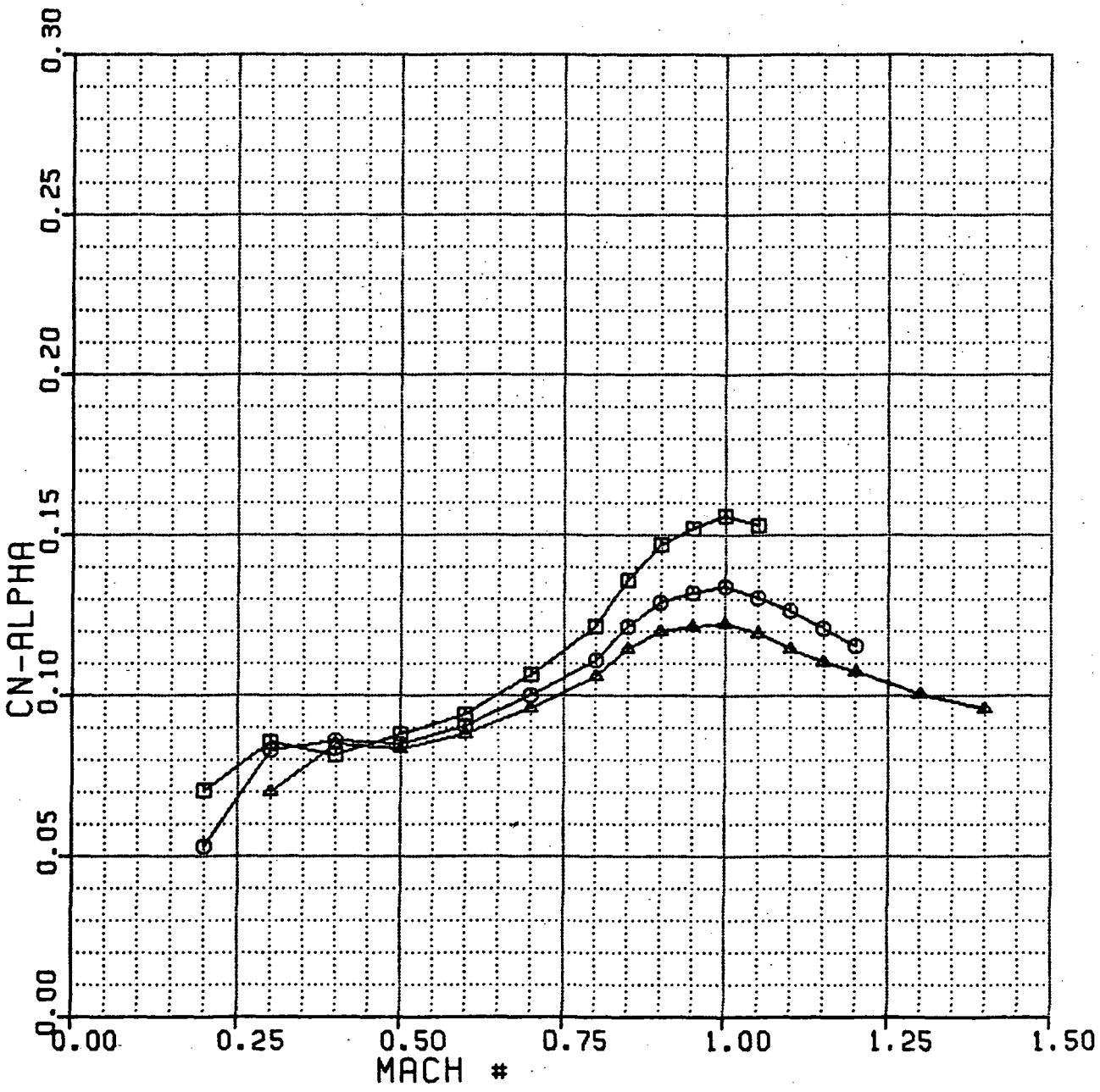

Figure 73(a)

CN-ALPHA VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
OF POOR QUALITY

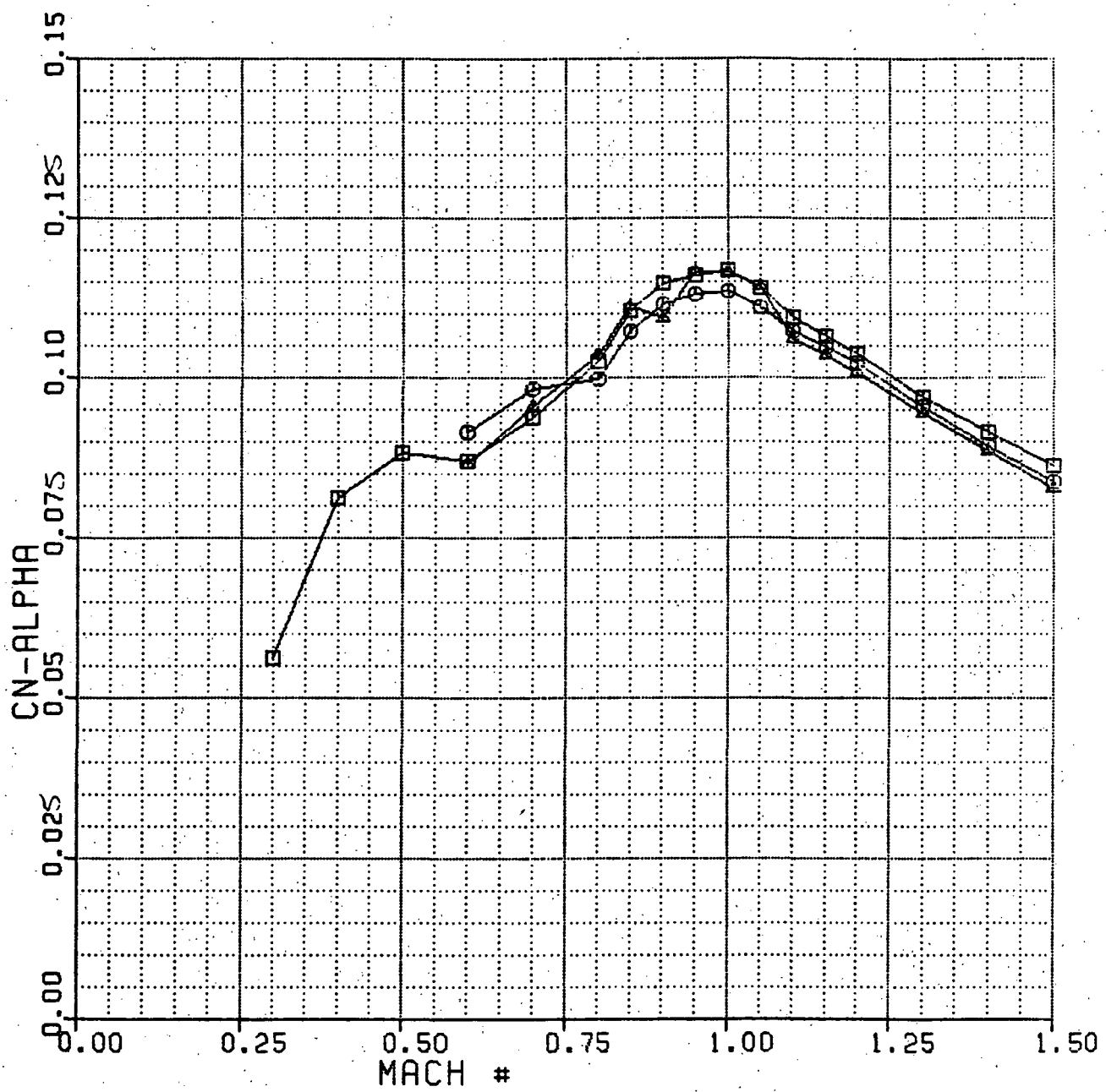

Figure 73(b)

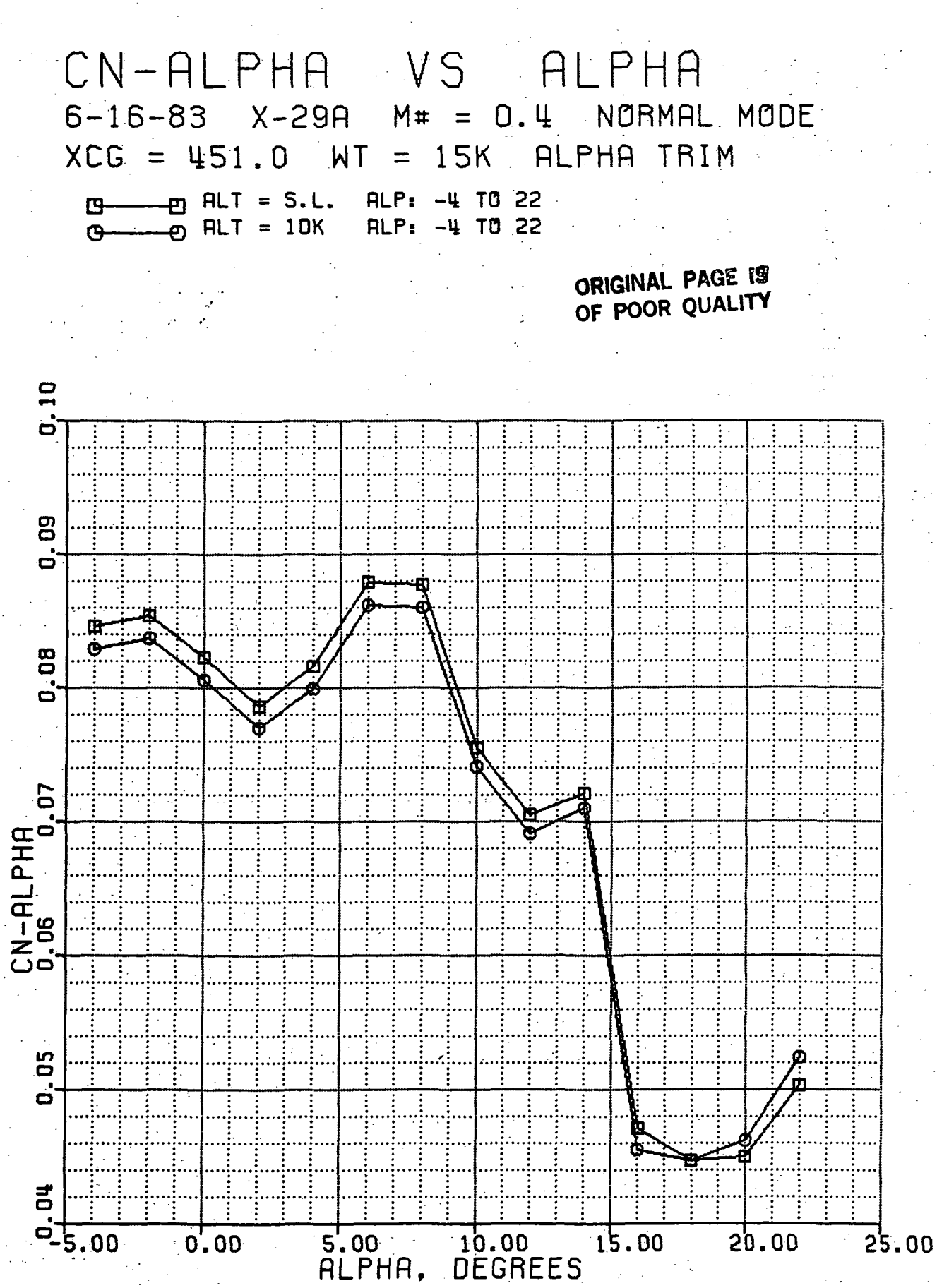
CN-ALPHA VS ALPHA
6-16-83 X-29A M# = 0.4 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TO 22
ALT = 10K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
CN-ALPHA
0.10
0.09
0.08
0.07
0.06
0.05
0.04
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 74(a)

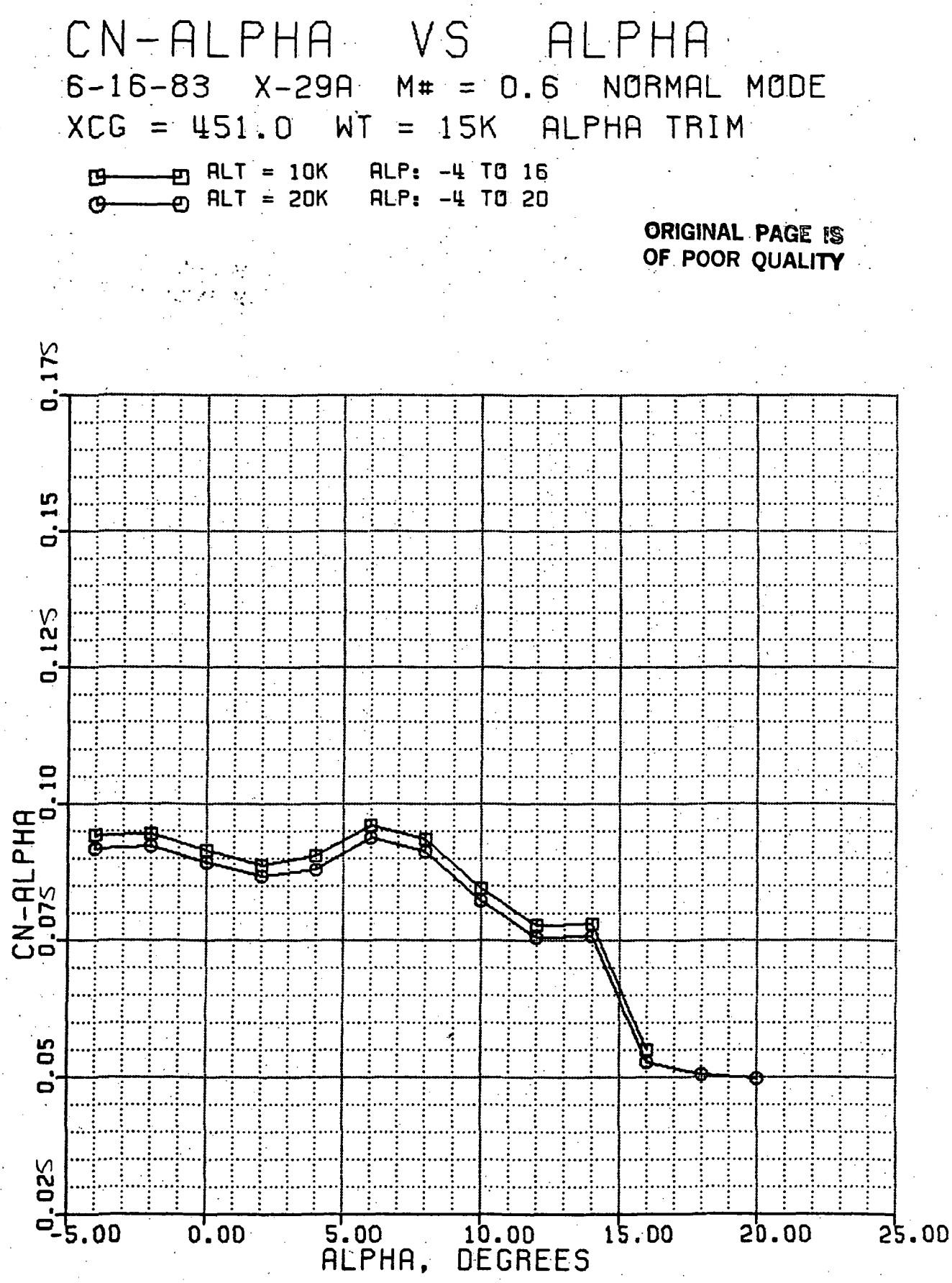
CN-ALPHA VS ALPHA
6-16-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS
OF POOR QUALITY
CN-ALPHA
0.17S
0.15
0.12S
0.10
0.07S
0.05
0.02S
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 74(b)

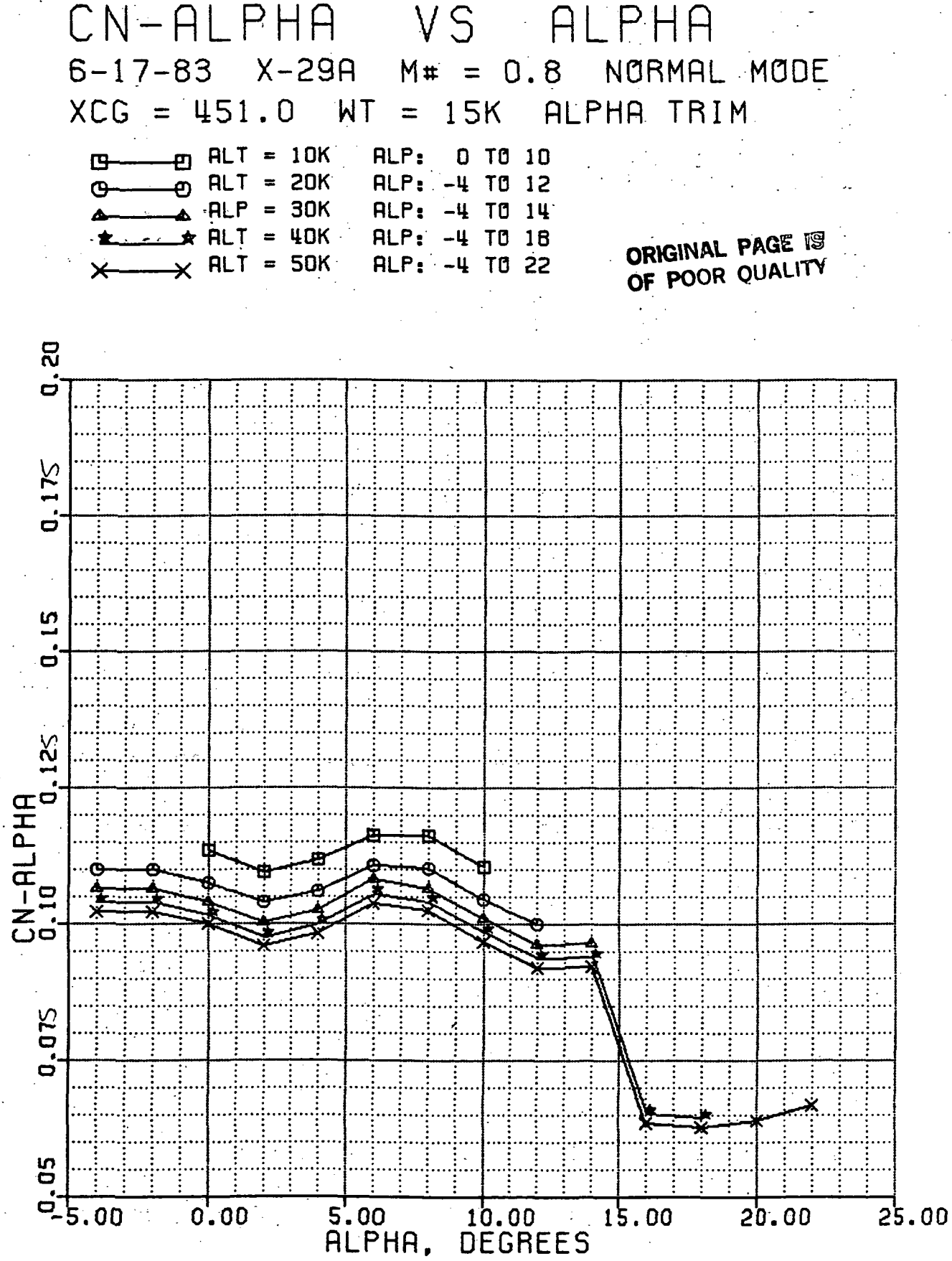
CN-ALPHA VS ALPHA
6-17-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
CN-ALPHA
0.20
0.175
0.15
0.125
0.10
0.075
0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 74(c)

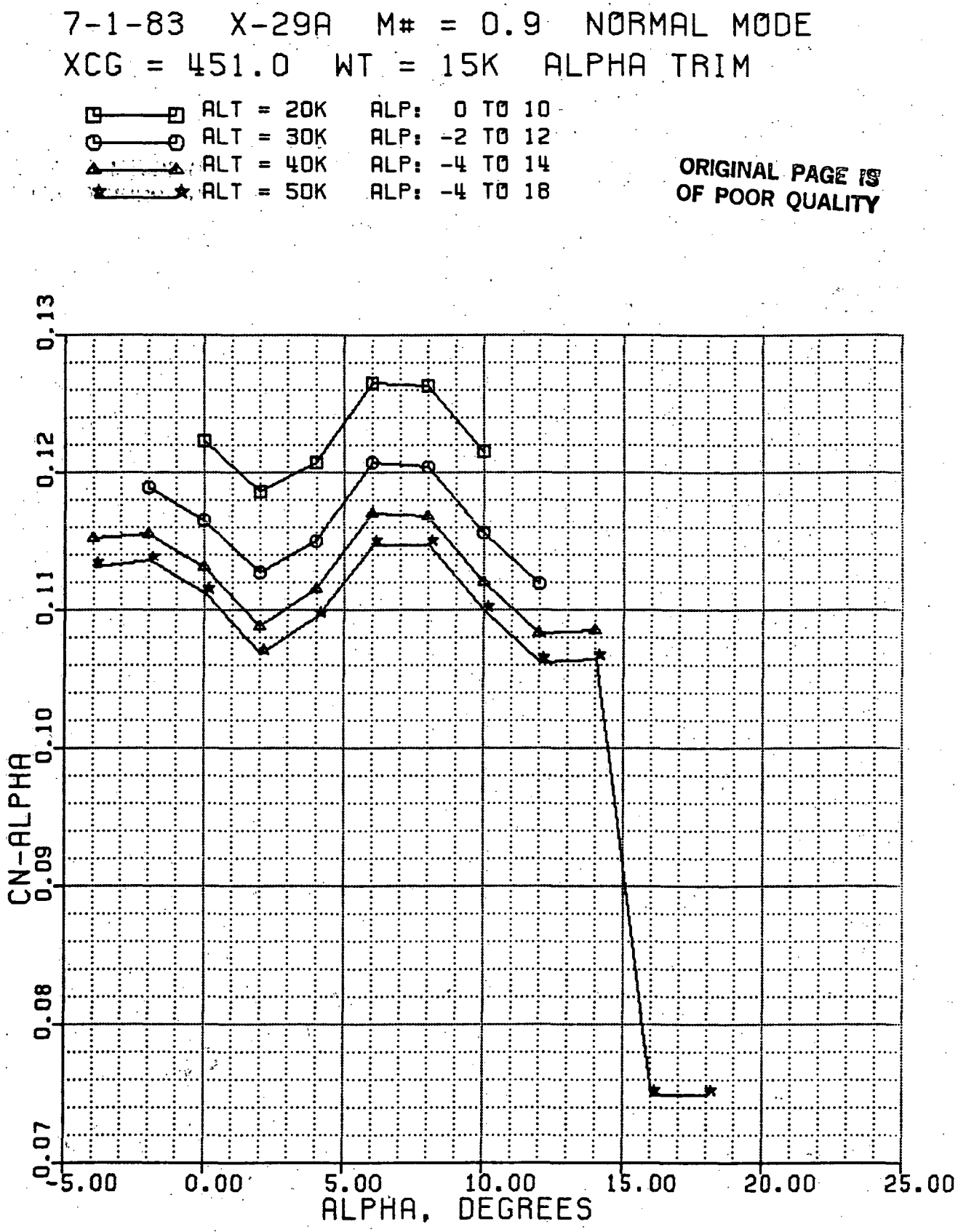
CN-ALPHA VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS OF POOR QUALITY
CN-ALPHA
0.13
0.12
0.11
0.10
0.09
0.08
0.07
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 74(d)

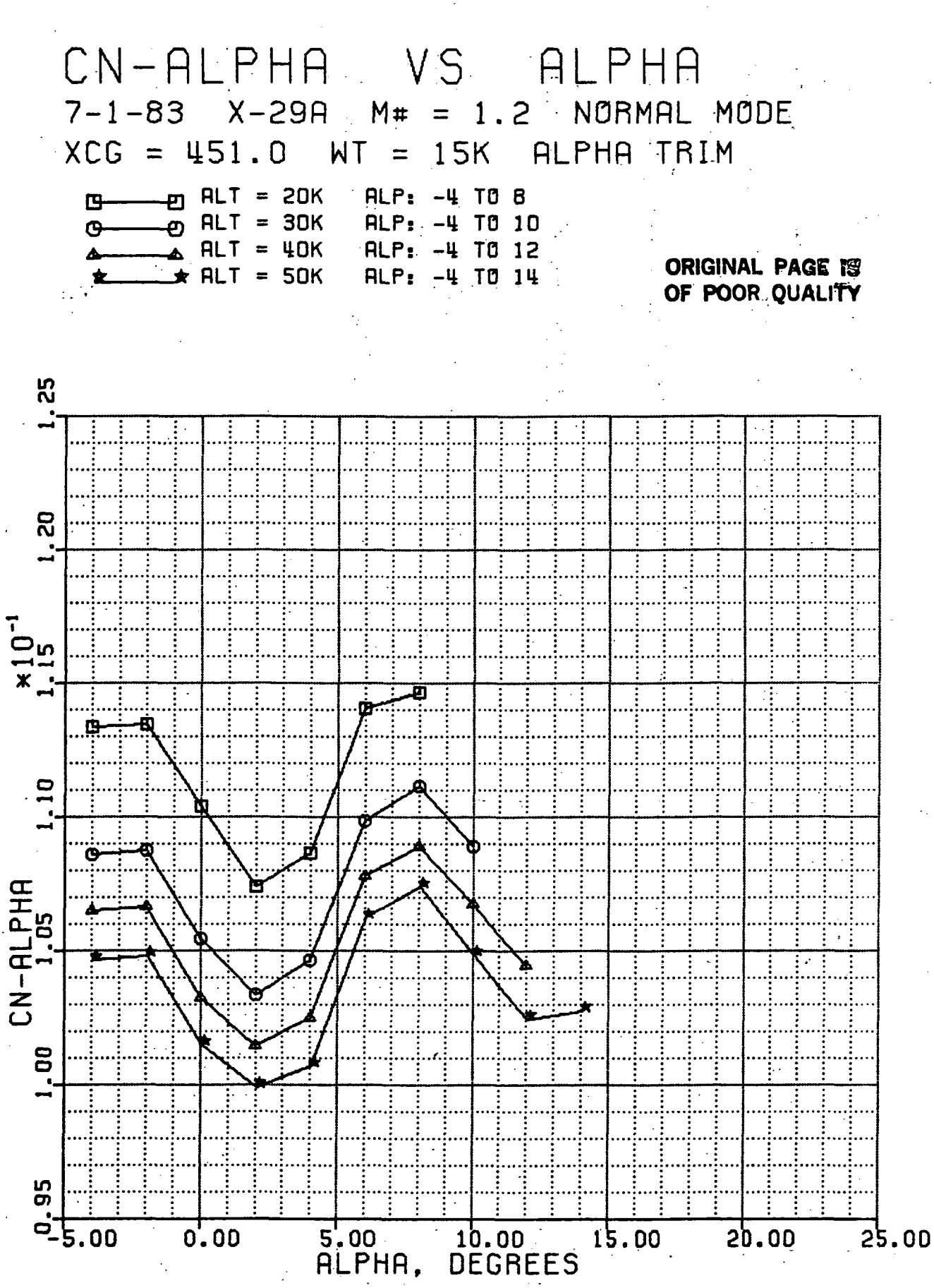
CN-ALPHA VS ALPHA
7-1-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS
OF POOR QUALITY
CN-ALPHA
*10^-1
1.25
1.20
1.15
1.10
1.05
1.00
0.95
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 74(e)

CN-ALPHA VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

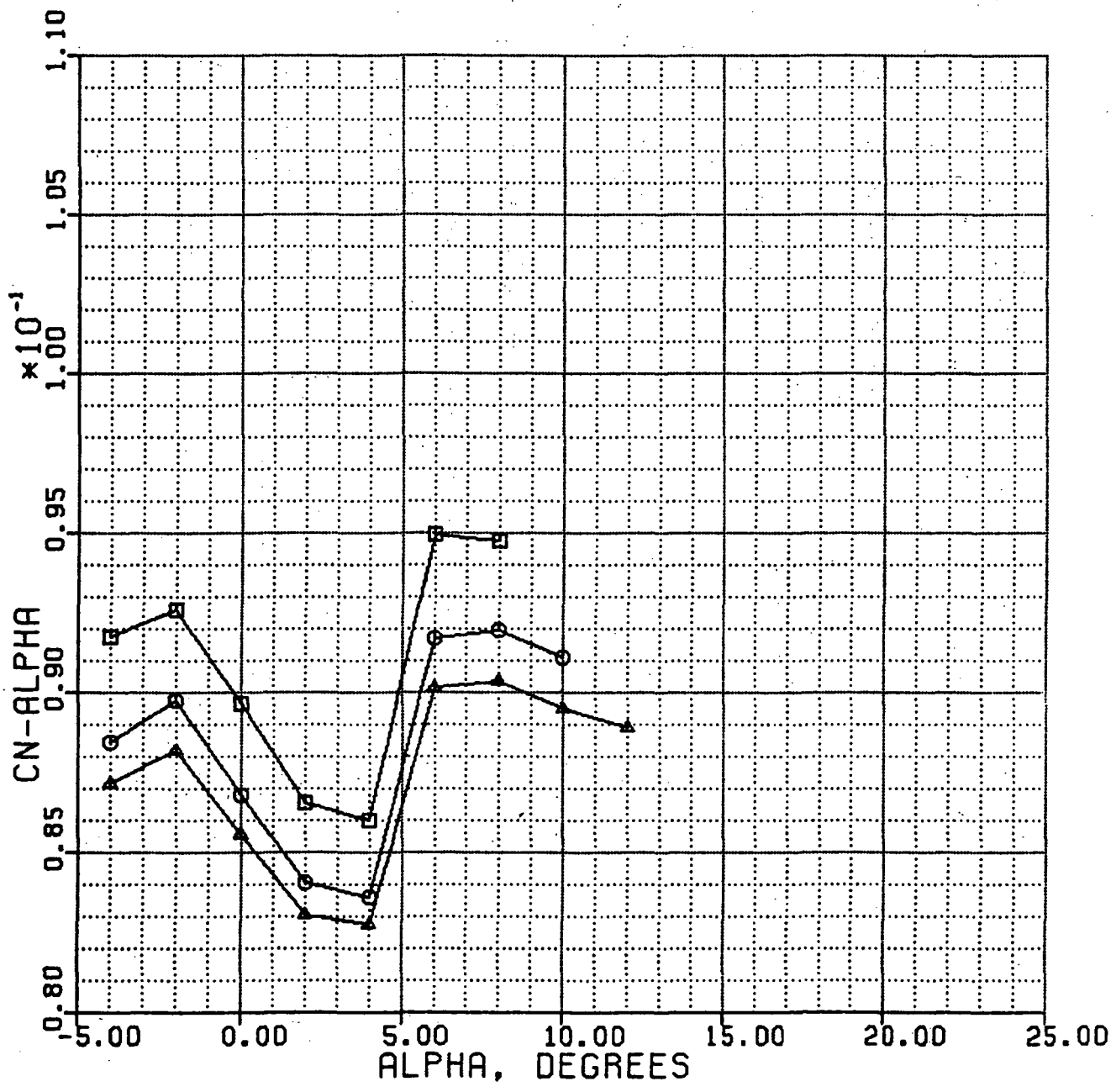

Figure 74(f)

Cy – BETA VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

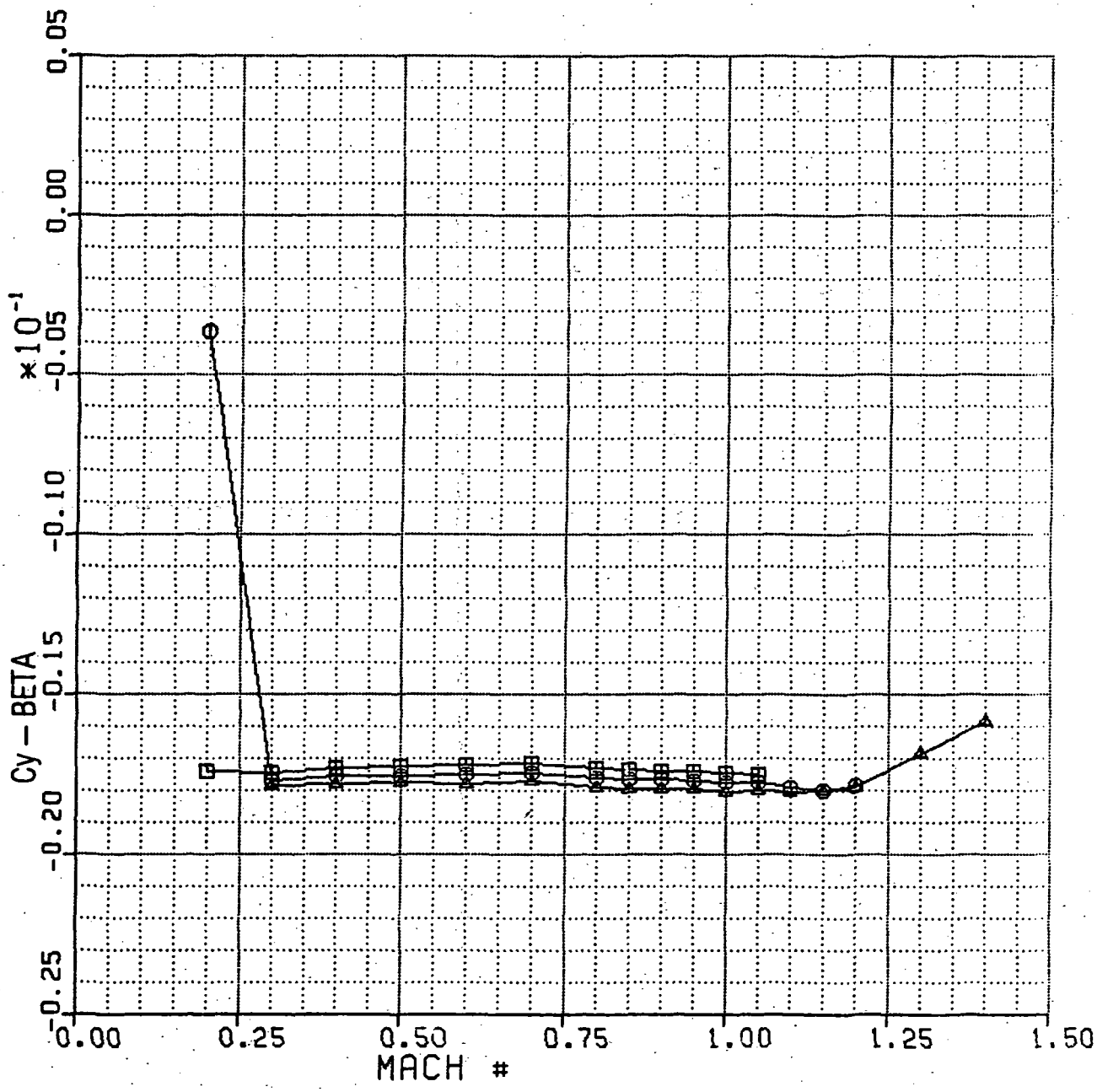

Figure 75(a)

Cy – BETA VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5

ALT = 40K M# = .6 TO 1.5

ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
OF POOR QUALITY

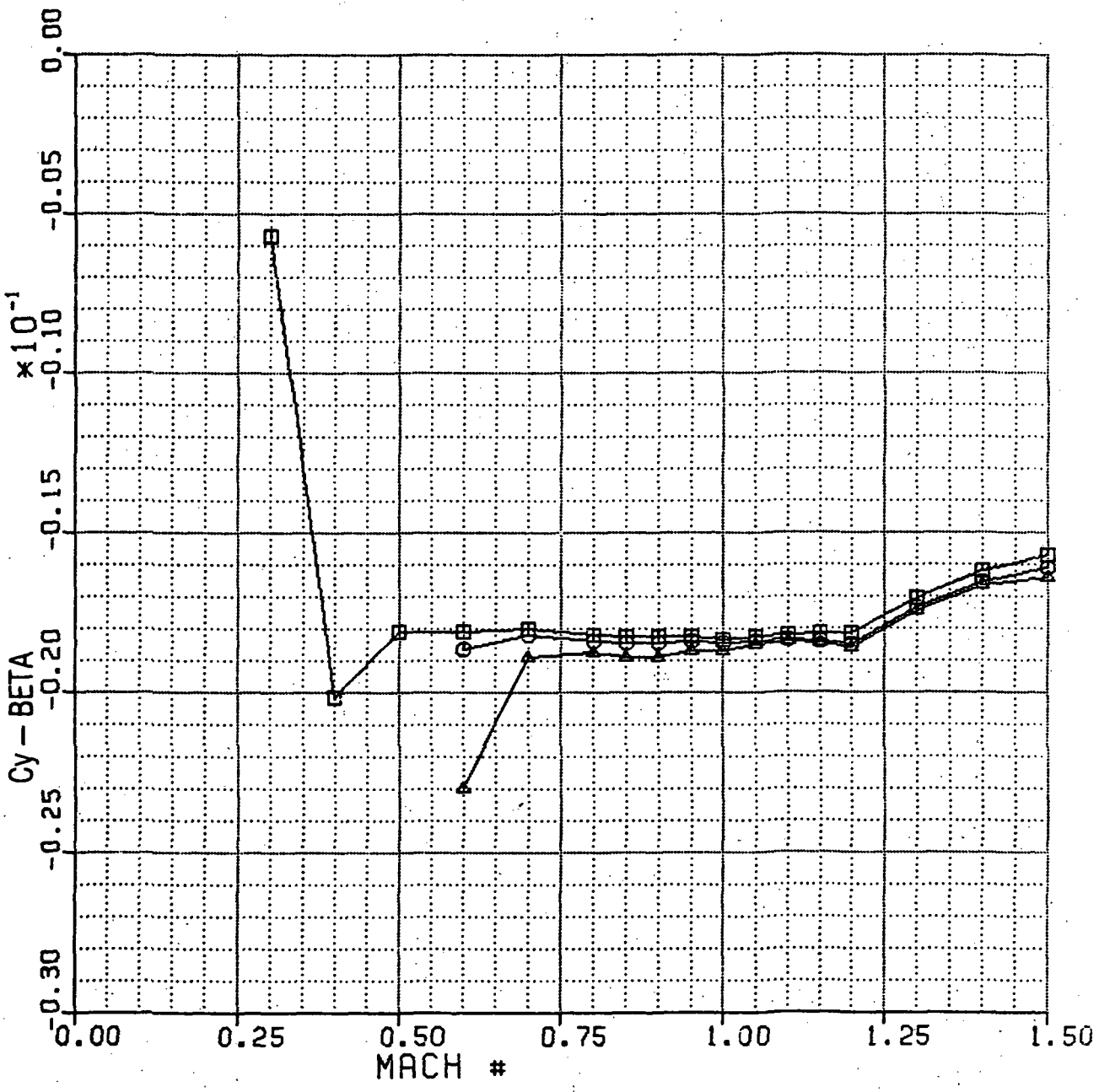

Figure 75(b)

Cy – BETA VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
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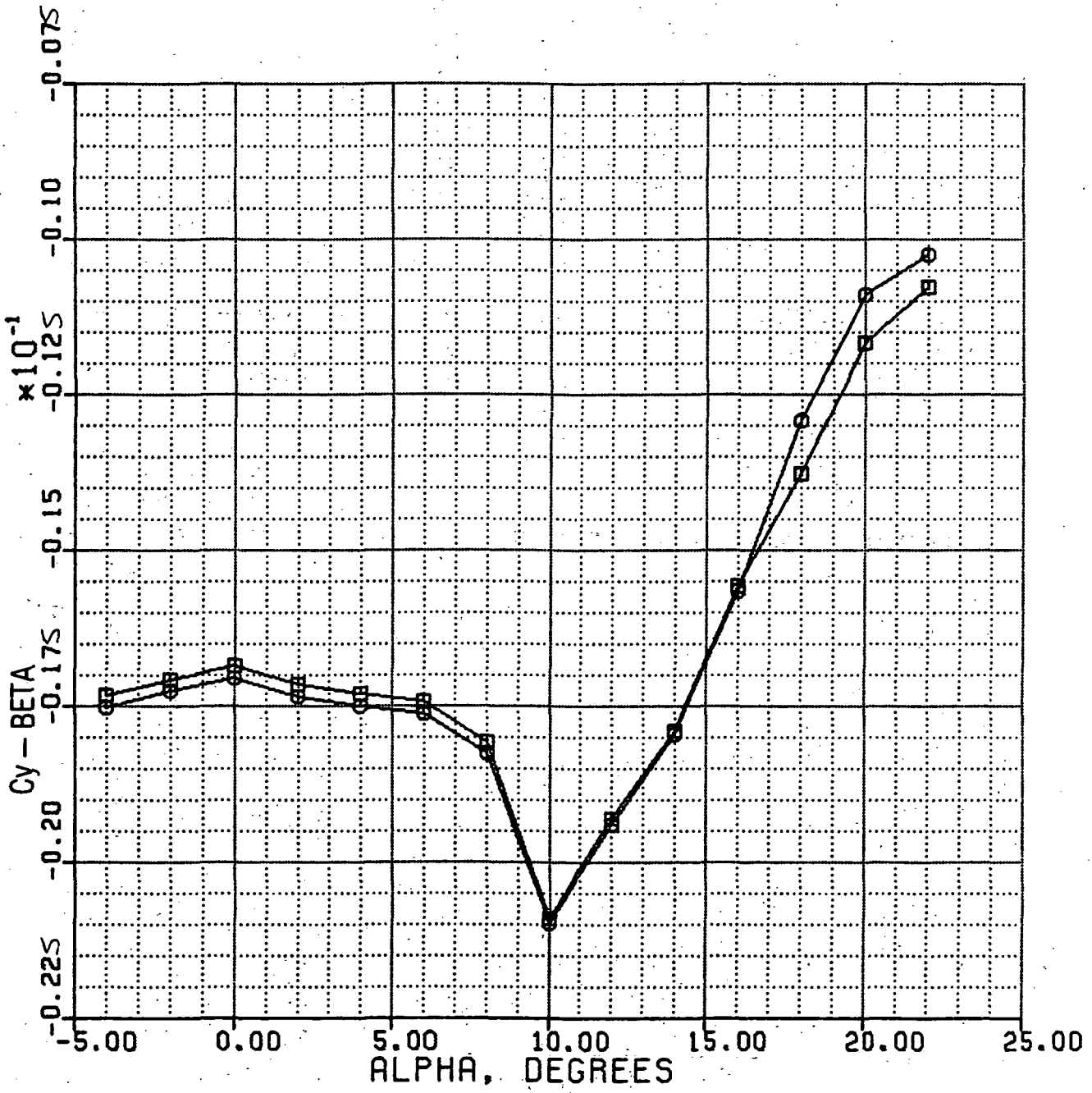

Figure 76(a)

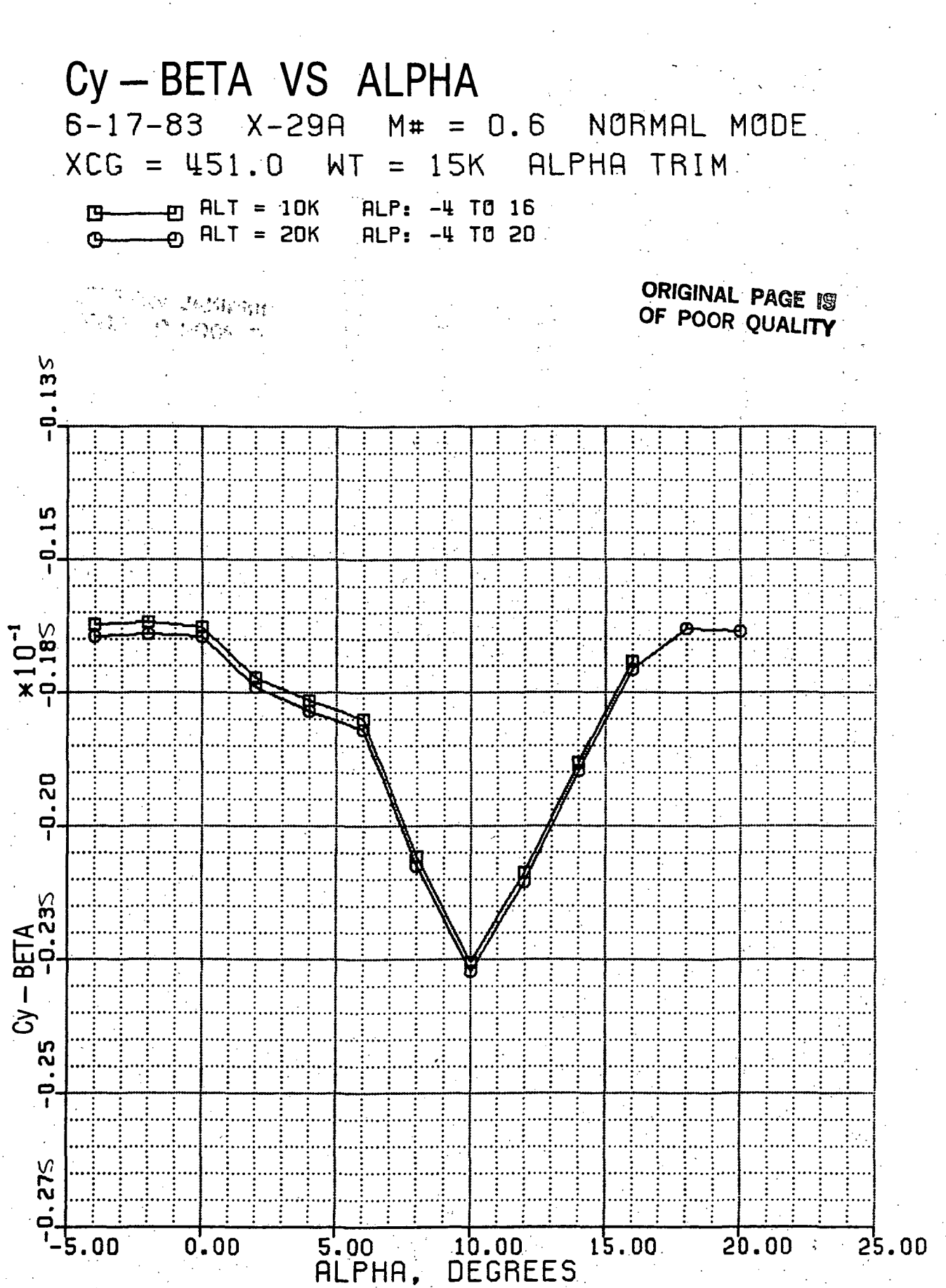
Cy – BETA VS ALPHA
6-17-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS
OF POOR QUALITY
-0.13
-0.15
-0.18
-0.20
-0.23
-0.25
-0.27
*10-1
Cy – BETA
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 76(b)

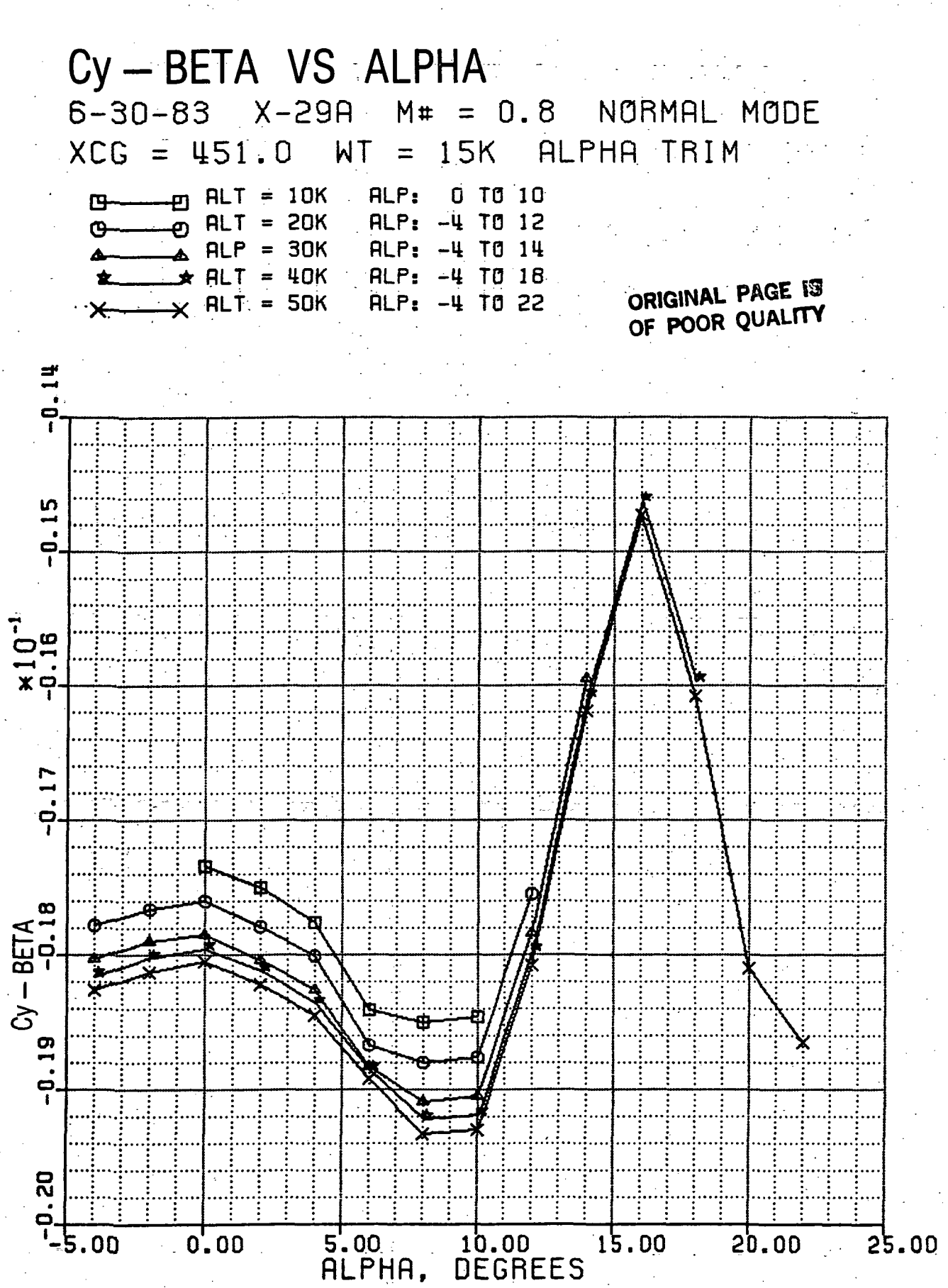
Cy – BETA VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
-0.14
-0.15
-0.16
-0.17
-0.18
-0.19
-0.20
×10⁻¹
Cy – BETA
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 76(c)

Cy – BETA VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
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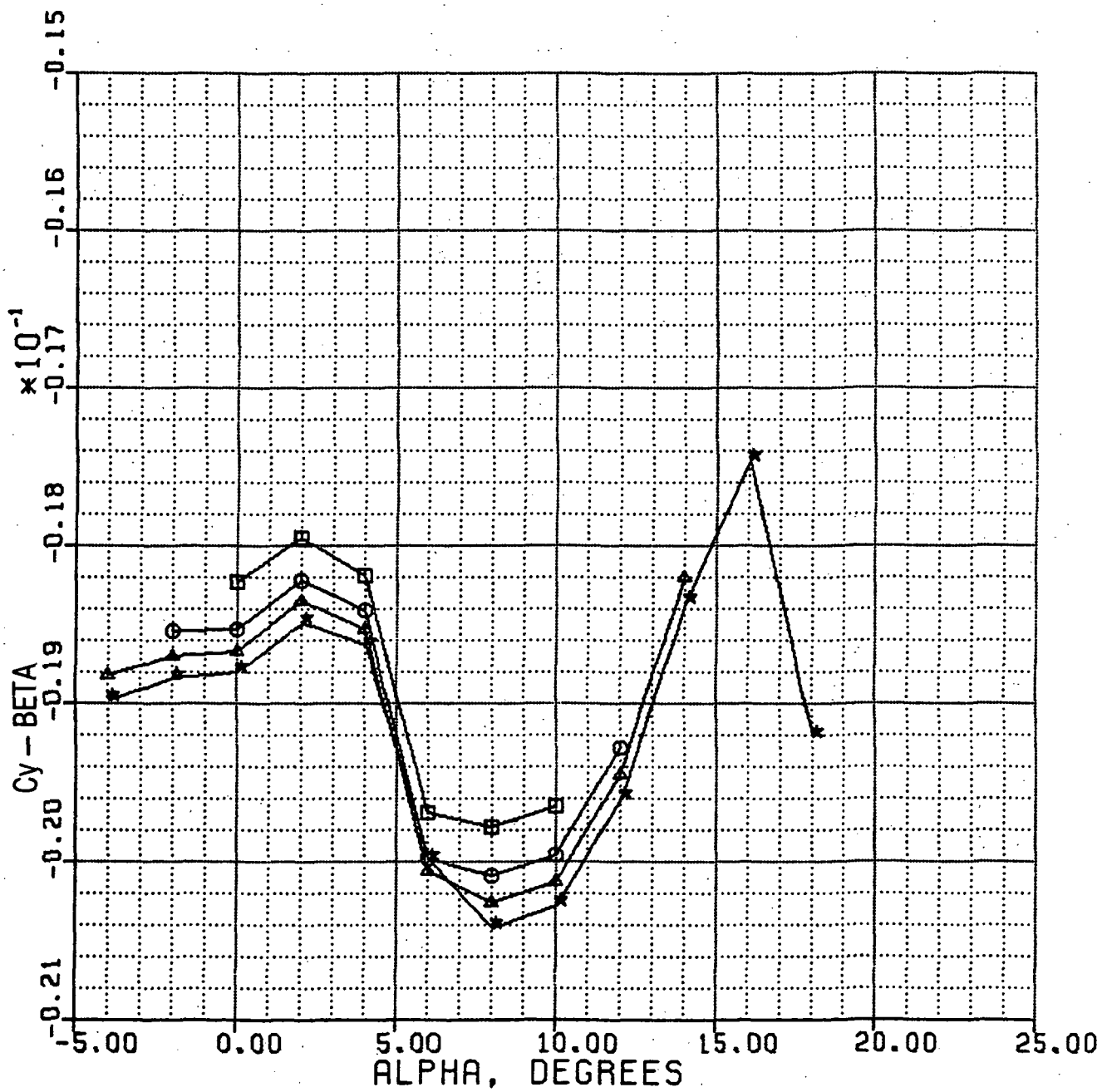

Figure 76(d)

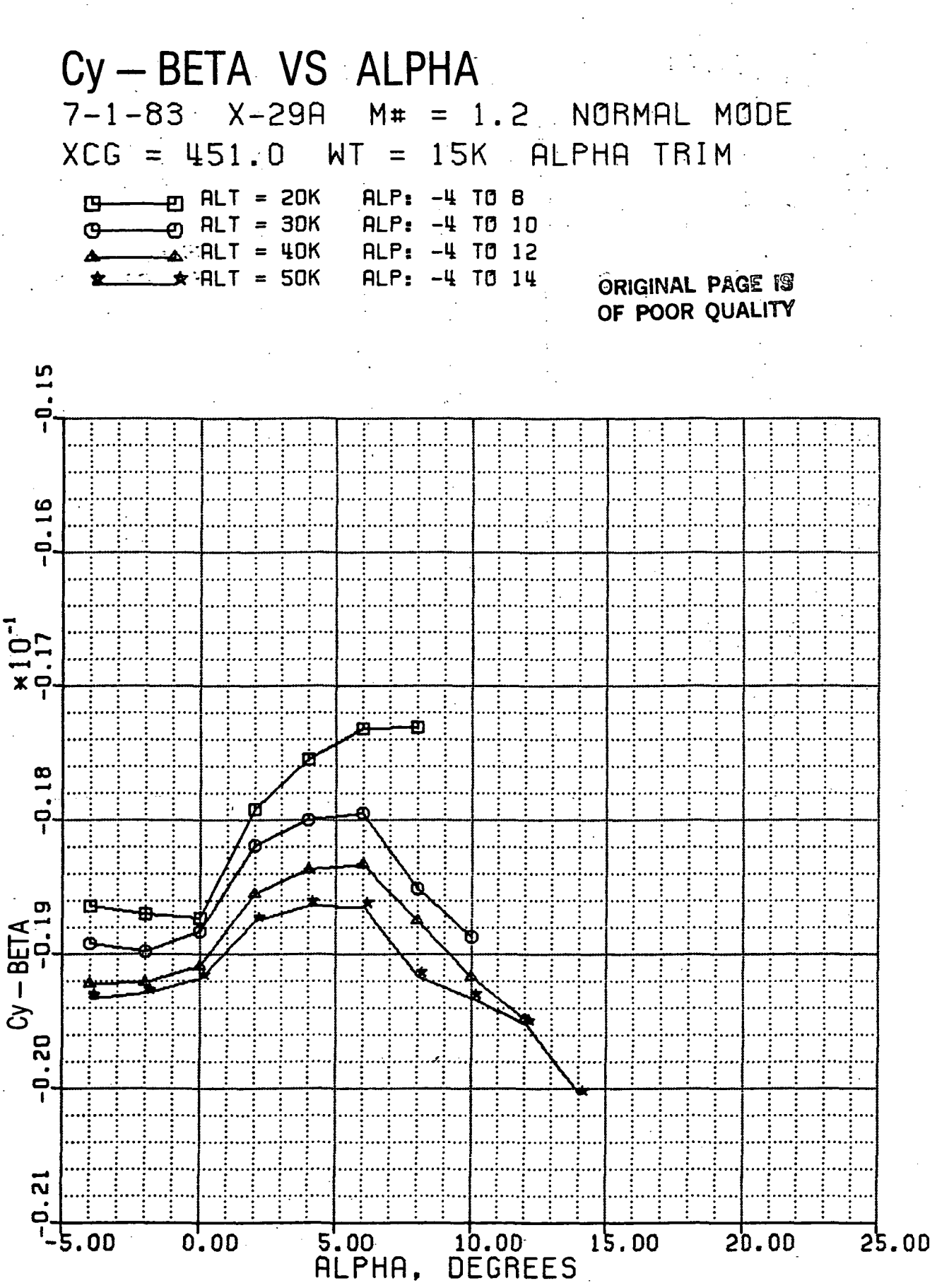
Cy – BETA VS ALPHA
7-1-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS
OF POOR QUALITY
Cy – BETA
*10-1
-0.15
-0.16
-0.17
-0.18
-0.19
-0.20
-0.21
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 76(e)

Cy – BETA VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
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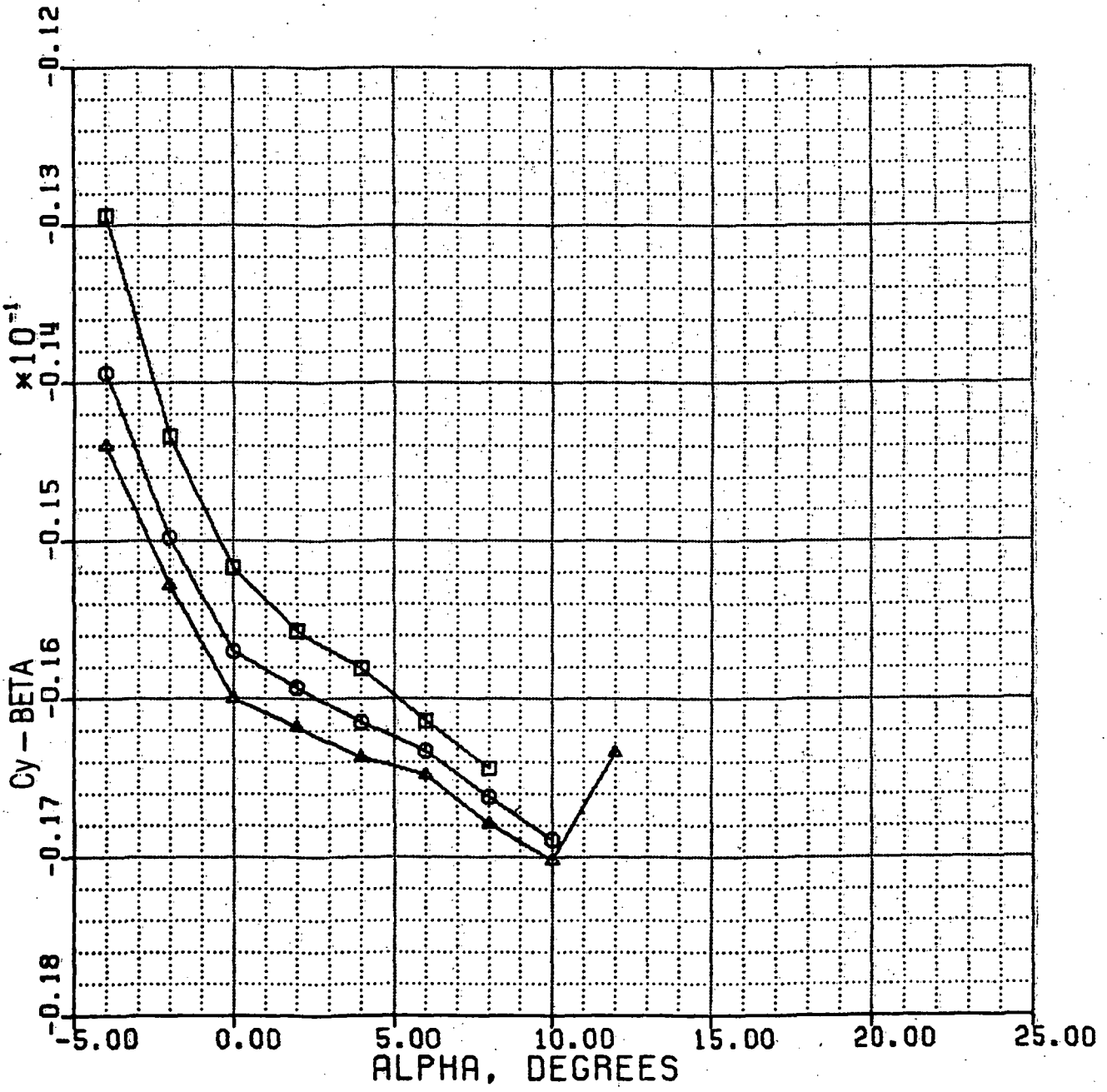

Figure 76(f)

Cl – BETA VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05

ALT = 10K M# = .2 TO 1.2

ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
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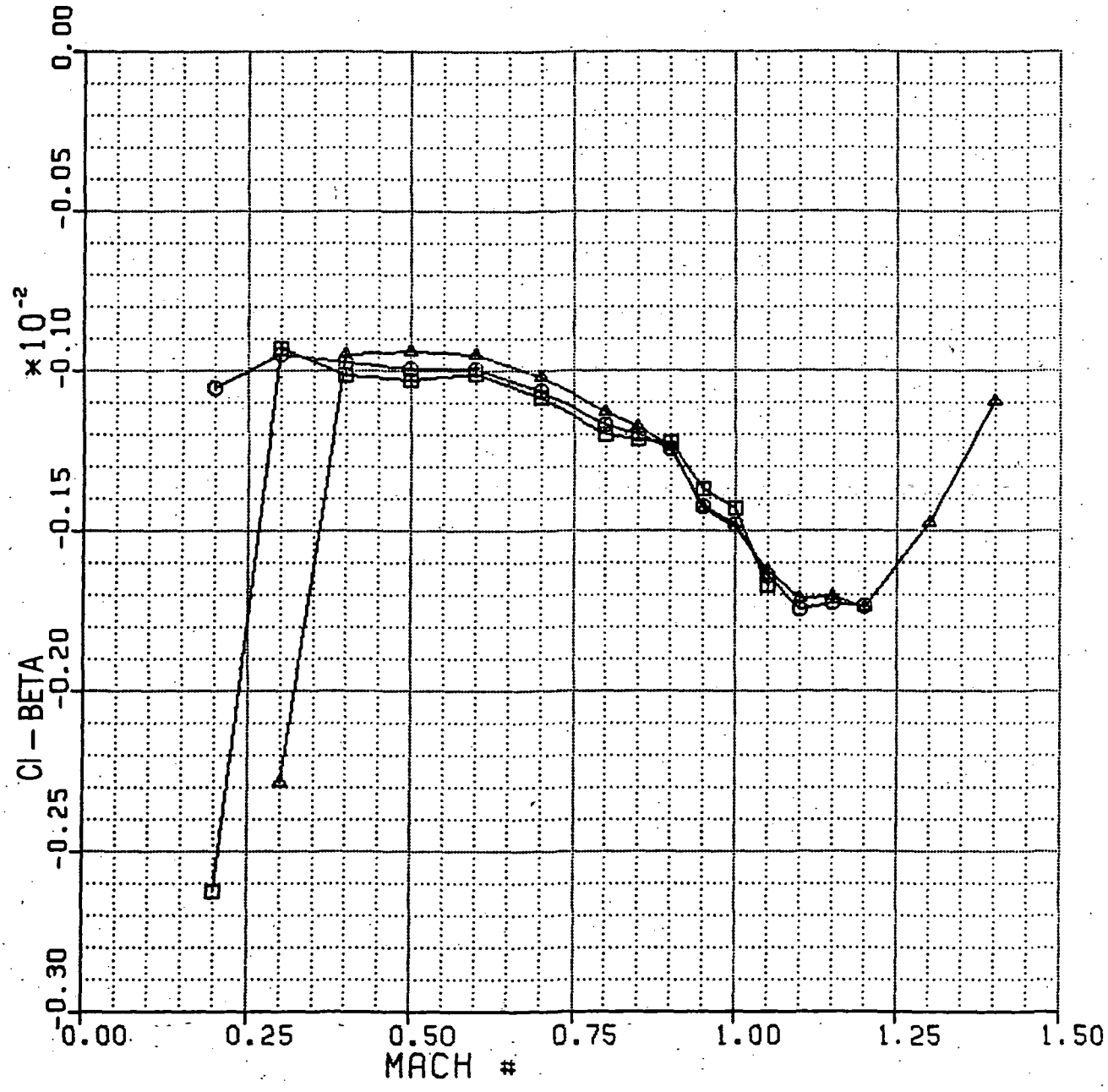

Figure 77(a)

Cl – BETA VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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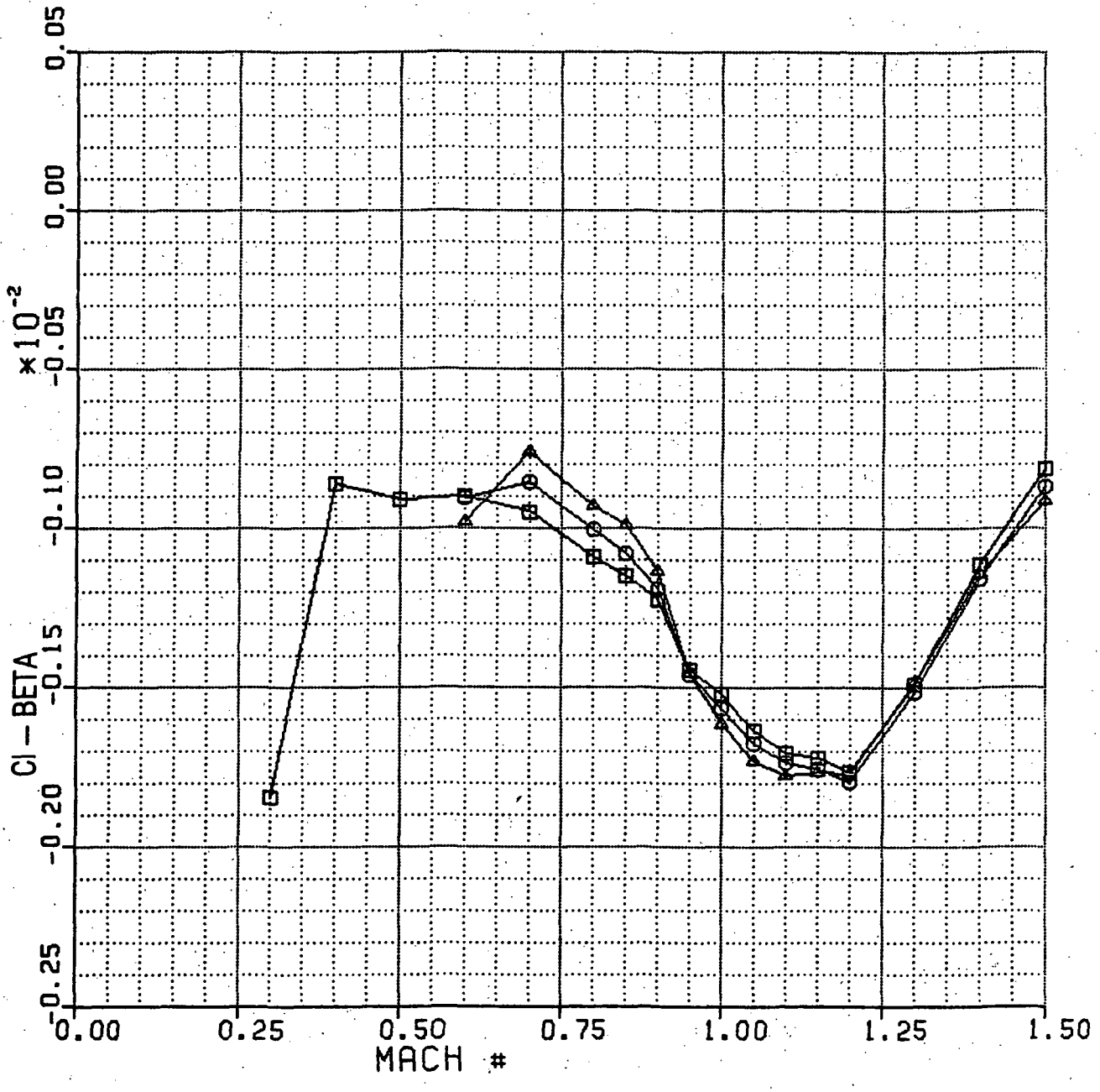

Figure 77(b)

CI – BETA VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
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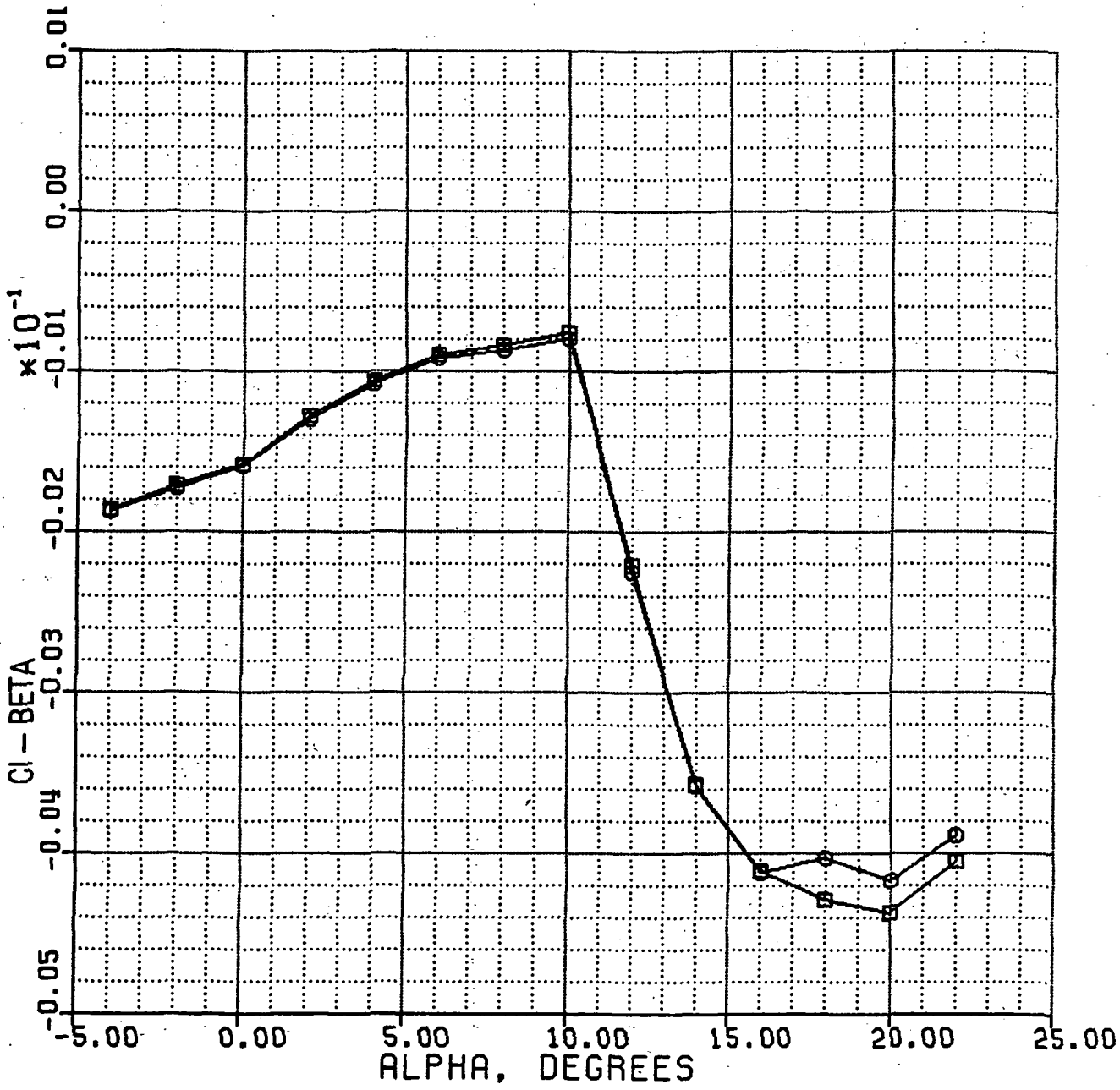

Figure 78(a)

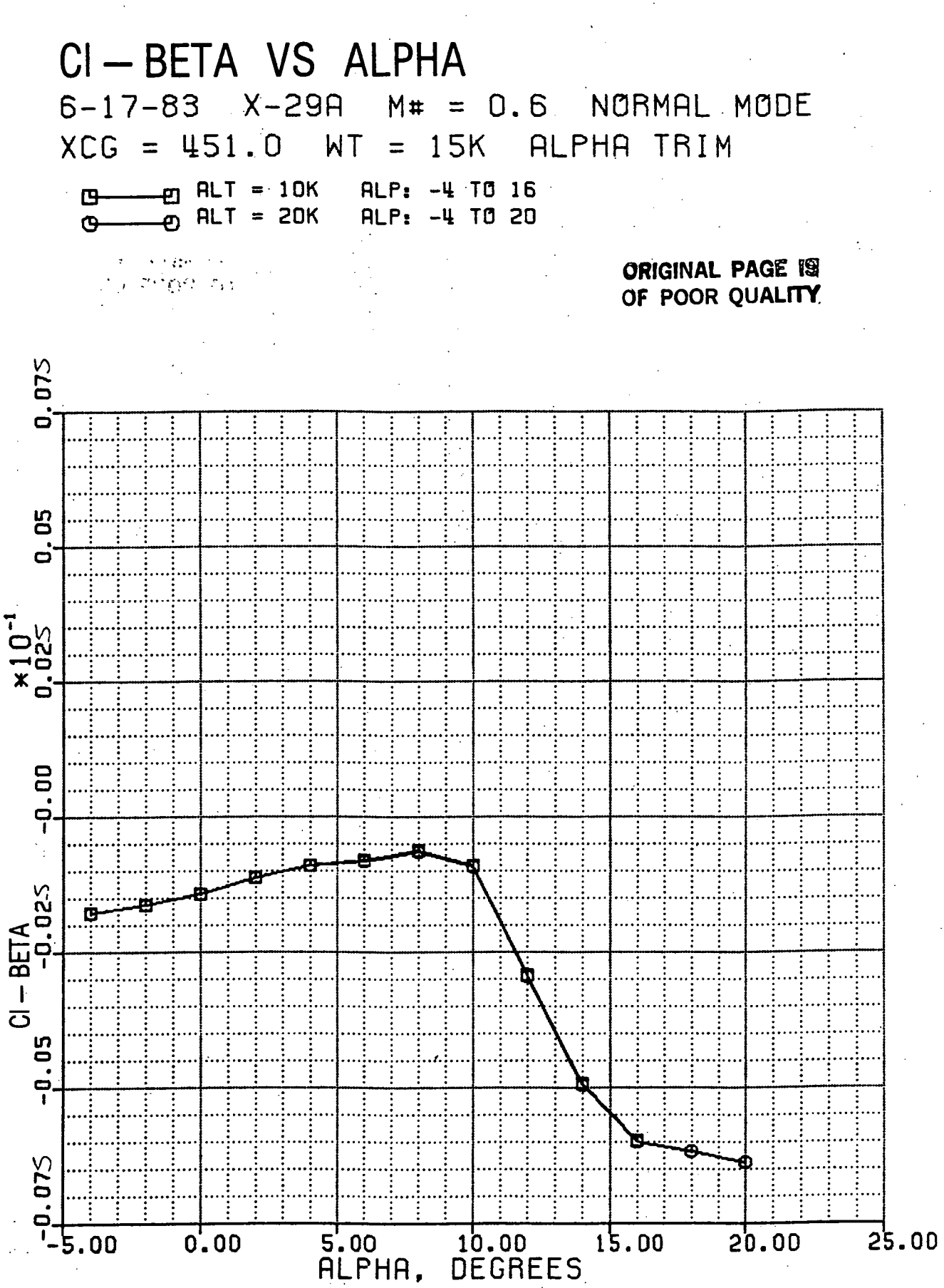
Cl – BETA VS ALPHA
6-17-83 X-29A M# = 0.6 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TO 16
ALT = 20K ALP: -4 TO 20
ORIGINAL PAGE IS
OF POOR QUALITY
Cl – BETA
×10⁻¹
0.075
0.05
0.025
-0.00
-0.025
-0.05
-0.075
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 78(b)

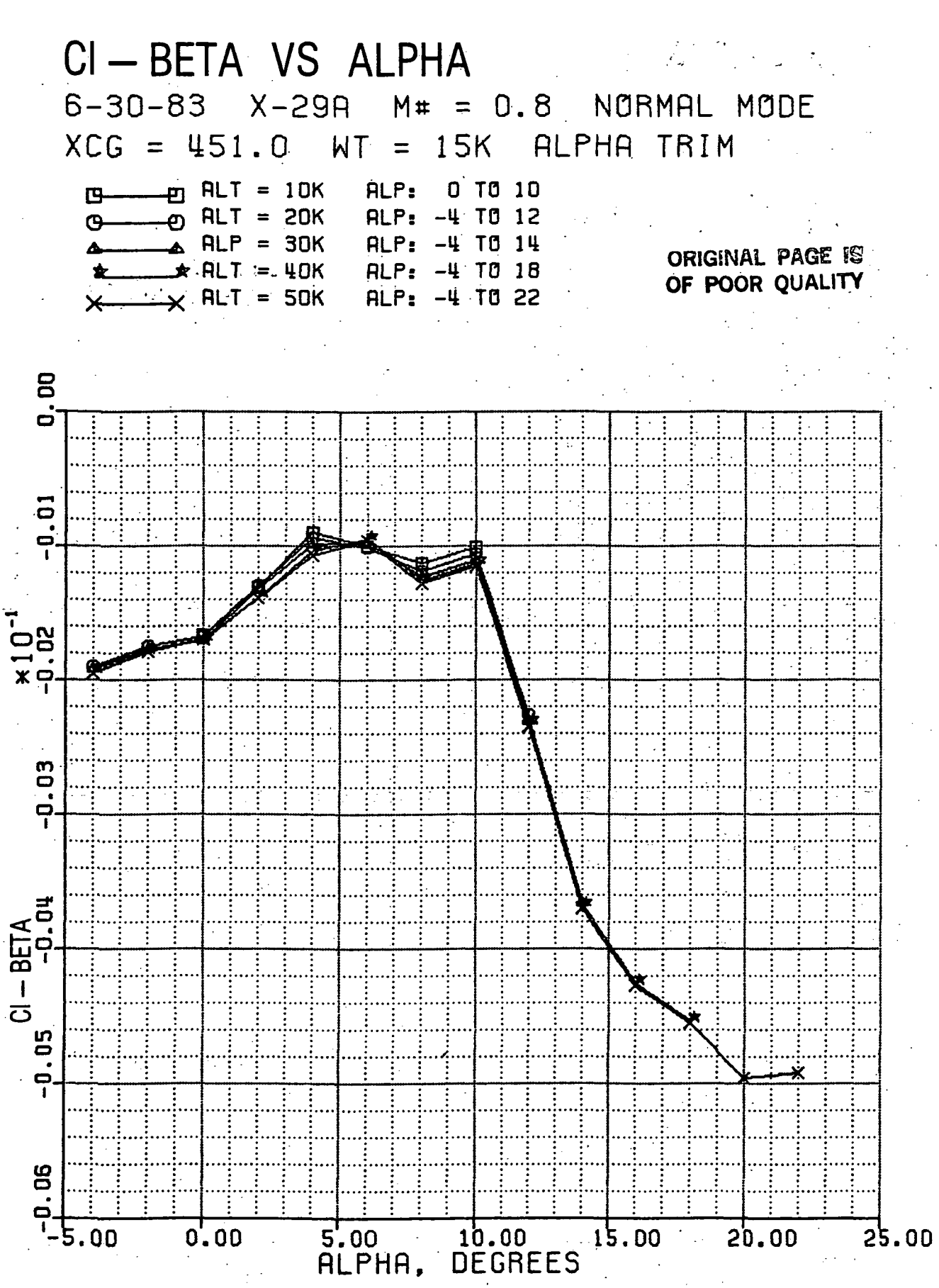
Cl – BETA VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
-0.06
*10-1
Cl – BETA
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 78(c)

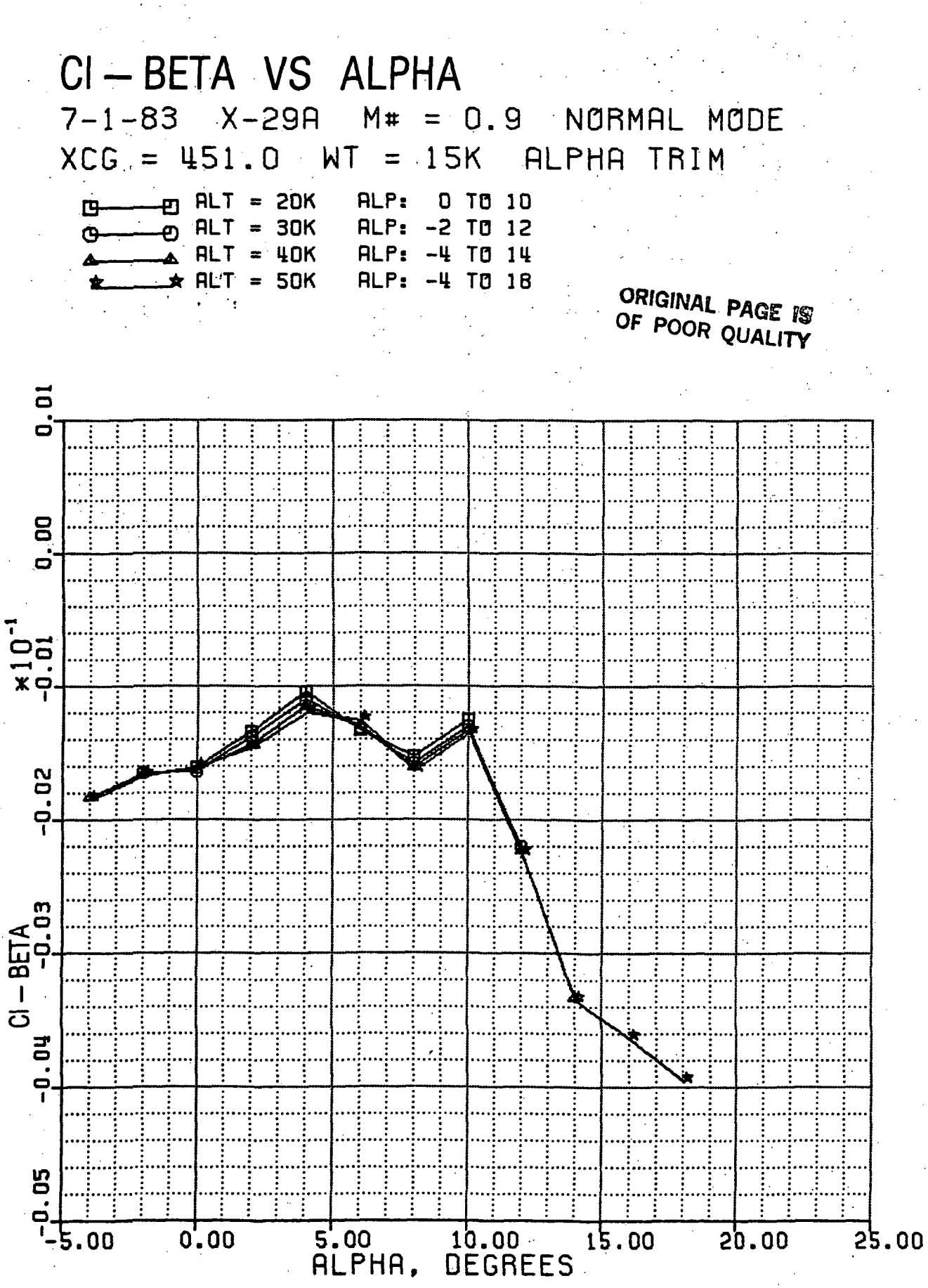
CI – BETA VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18
ORIGINAL PAGE IS OF POOR QUALITY
0.01
0.00
-0.01
-0.02
-0.03
-0.04
-0.05
*10-1
CI – BETA
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 78(d)

Cl – BETA VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
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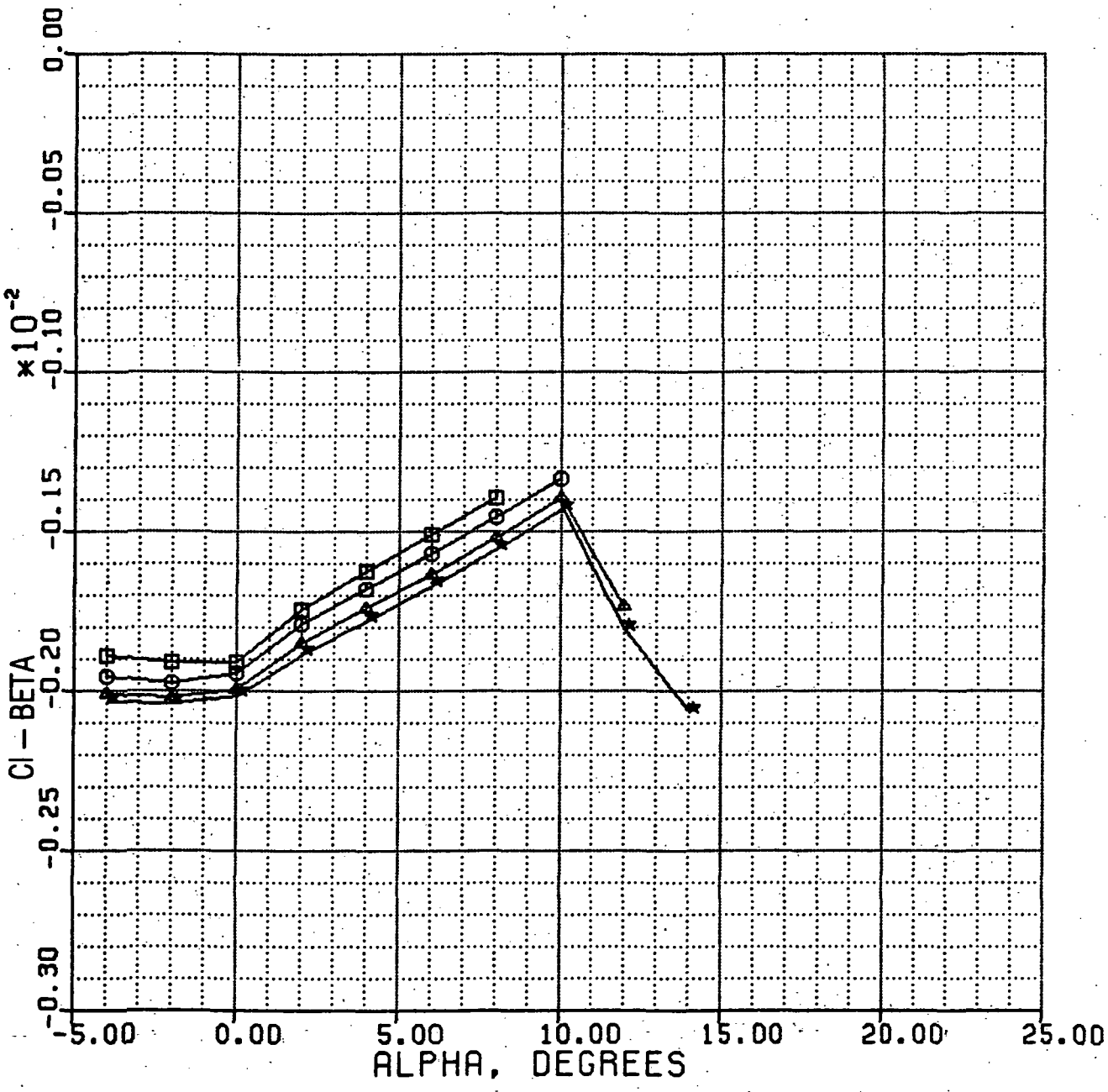

Figure 78(e)

Cl – BETA VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
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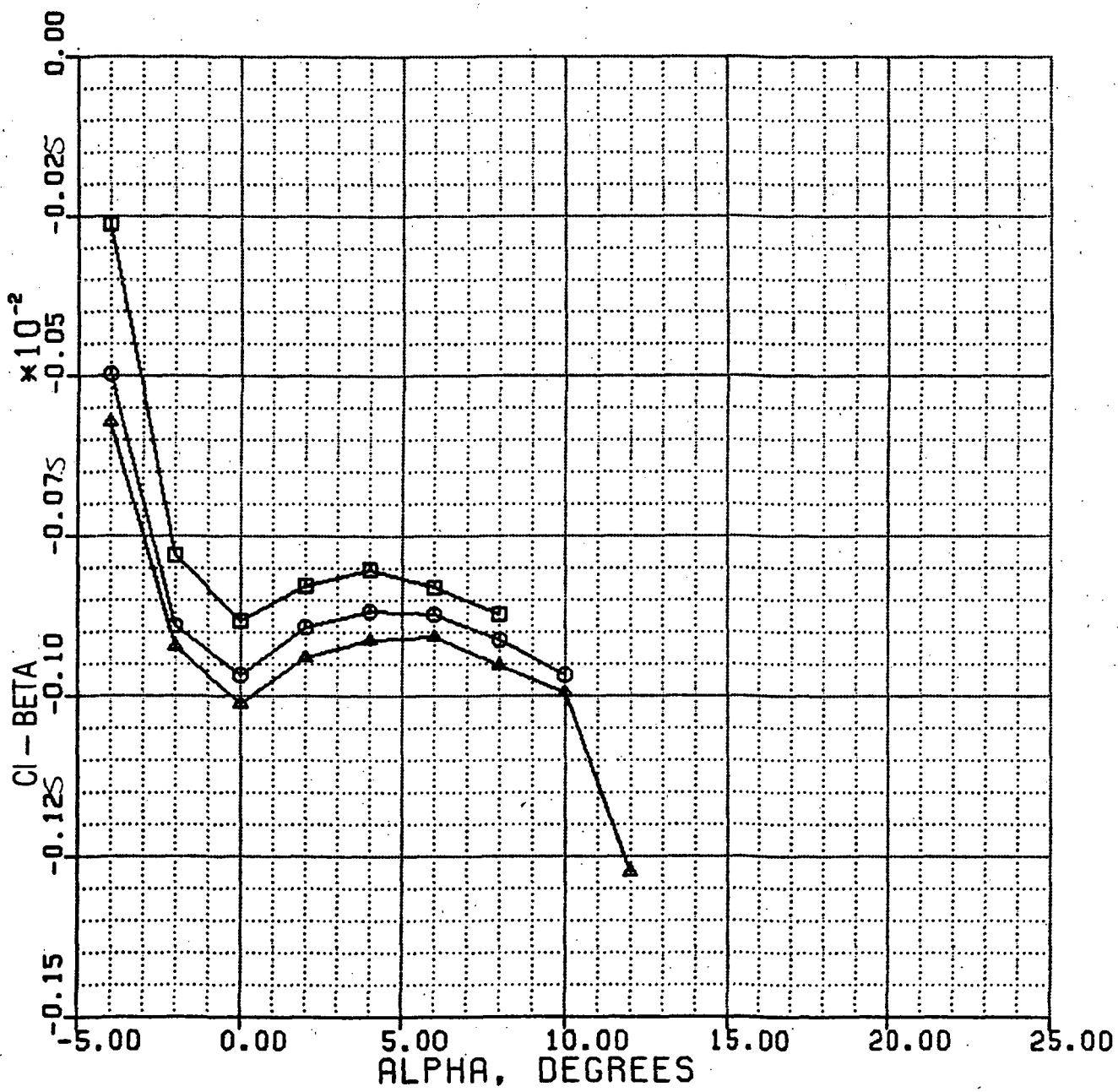

Figure 78(f)

Cn – BETA VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05

ALT = 10K M# = .2 TO 1.2

ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
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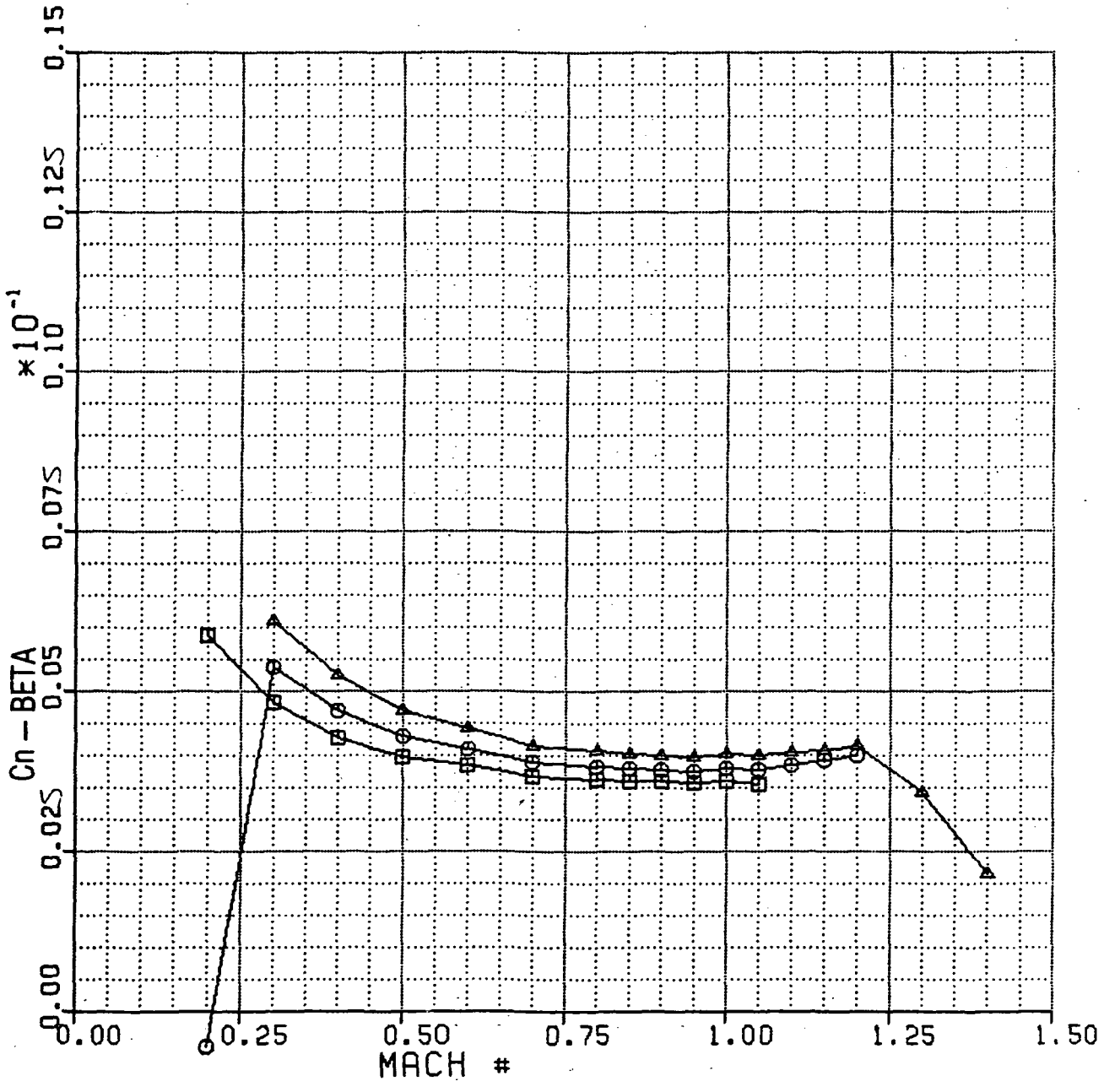

Figure 79(a)

Cn – BETA VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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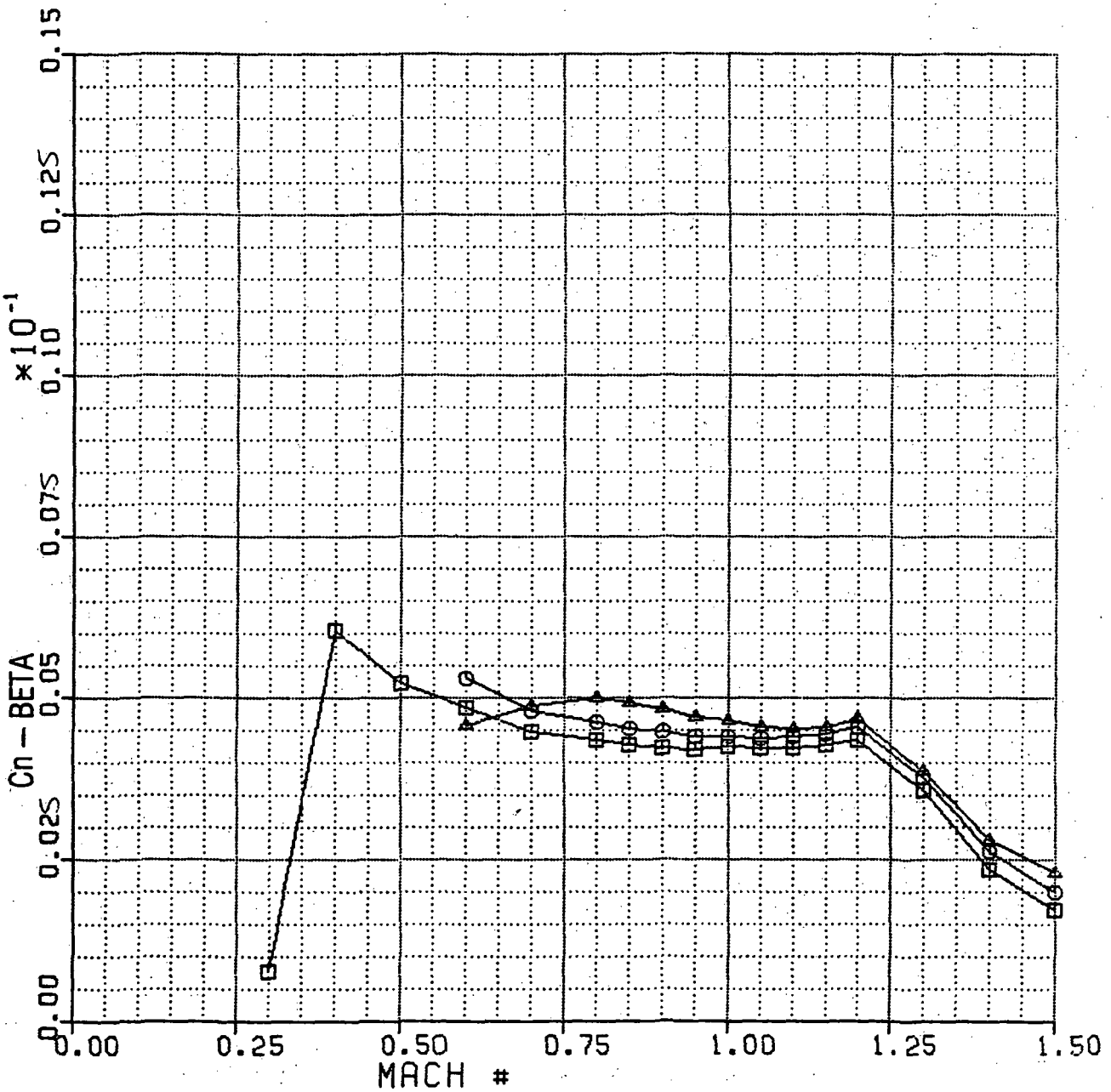

Figure 79(b)

Cn – BETA VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
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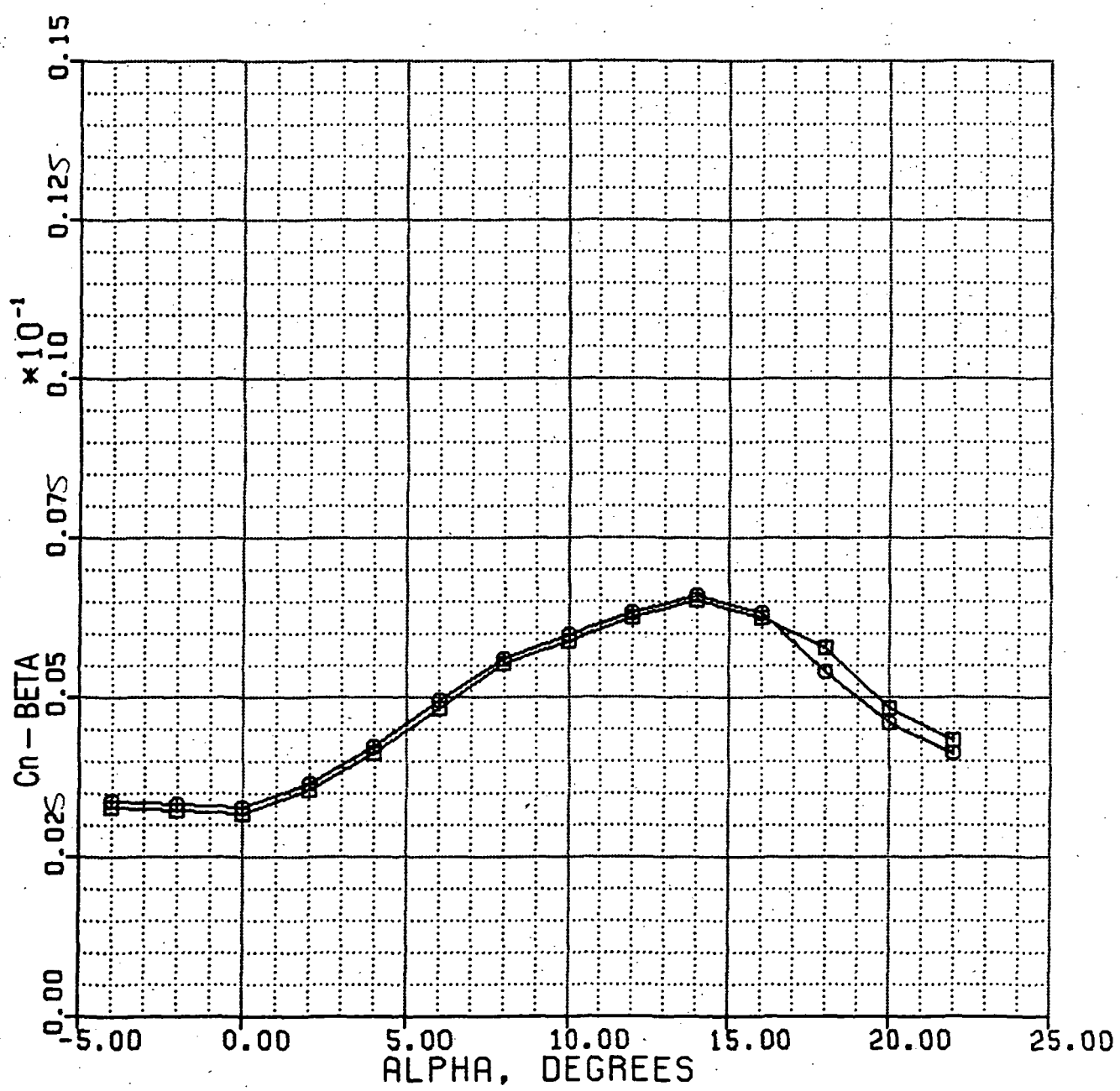

Figure 80(a)

Cn – BETA VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
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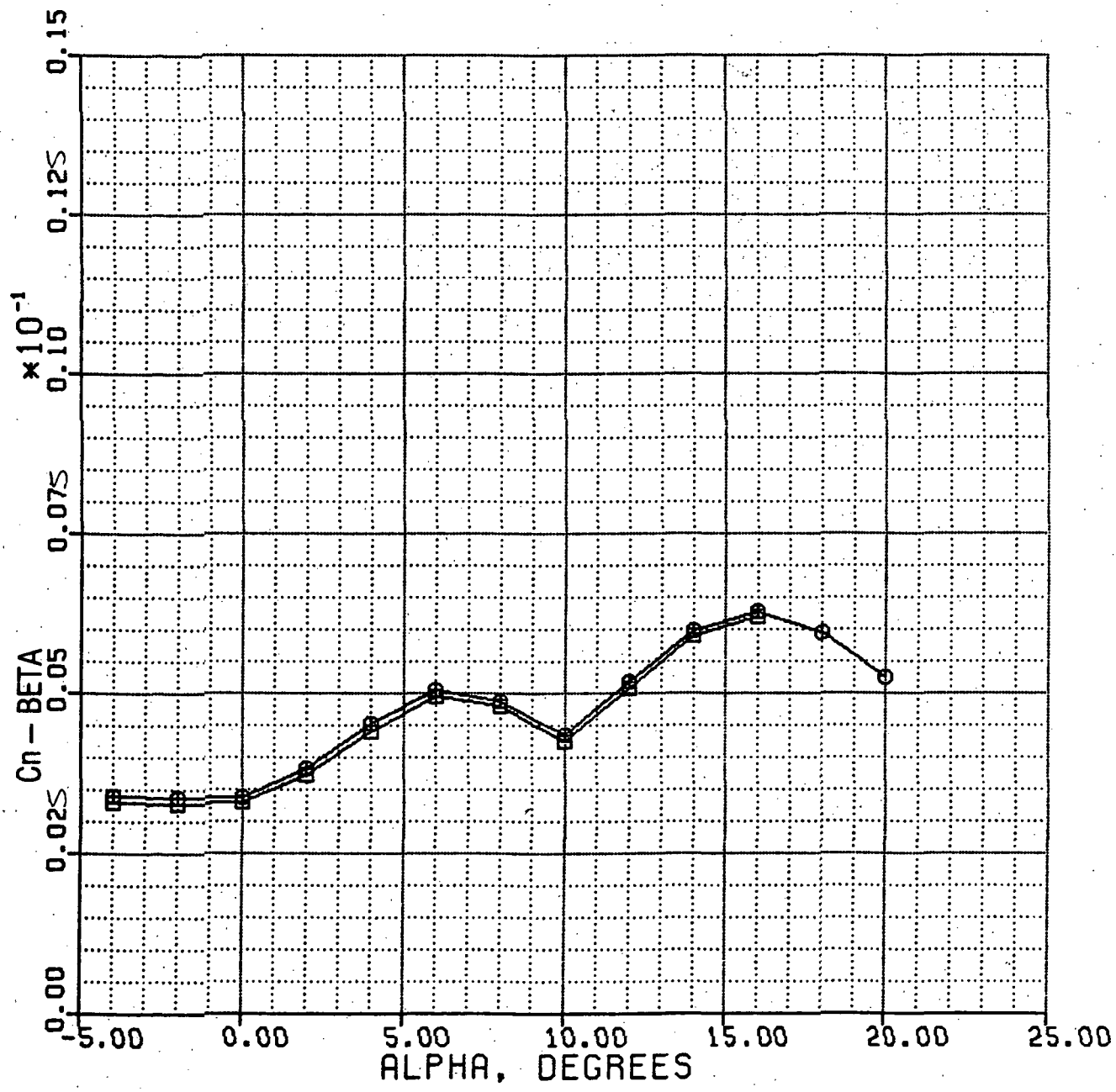

Figure 80(b)

Cn – BETA VS ALPHA

6-30-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10
ALT = 20K	ALP: -4 TO 12
ALP = 30K	ALP: -4 TO 14
ALT = 40K	ALP: -4 TO 18
ALT = 50K	ALP: -4 TO 22

ORIGINAL PAGE IS
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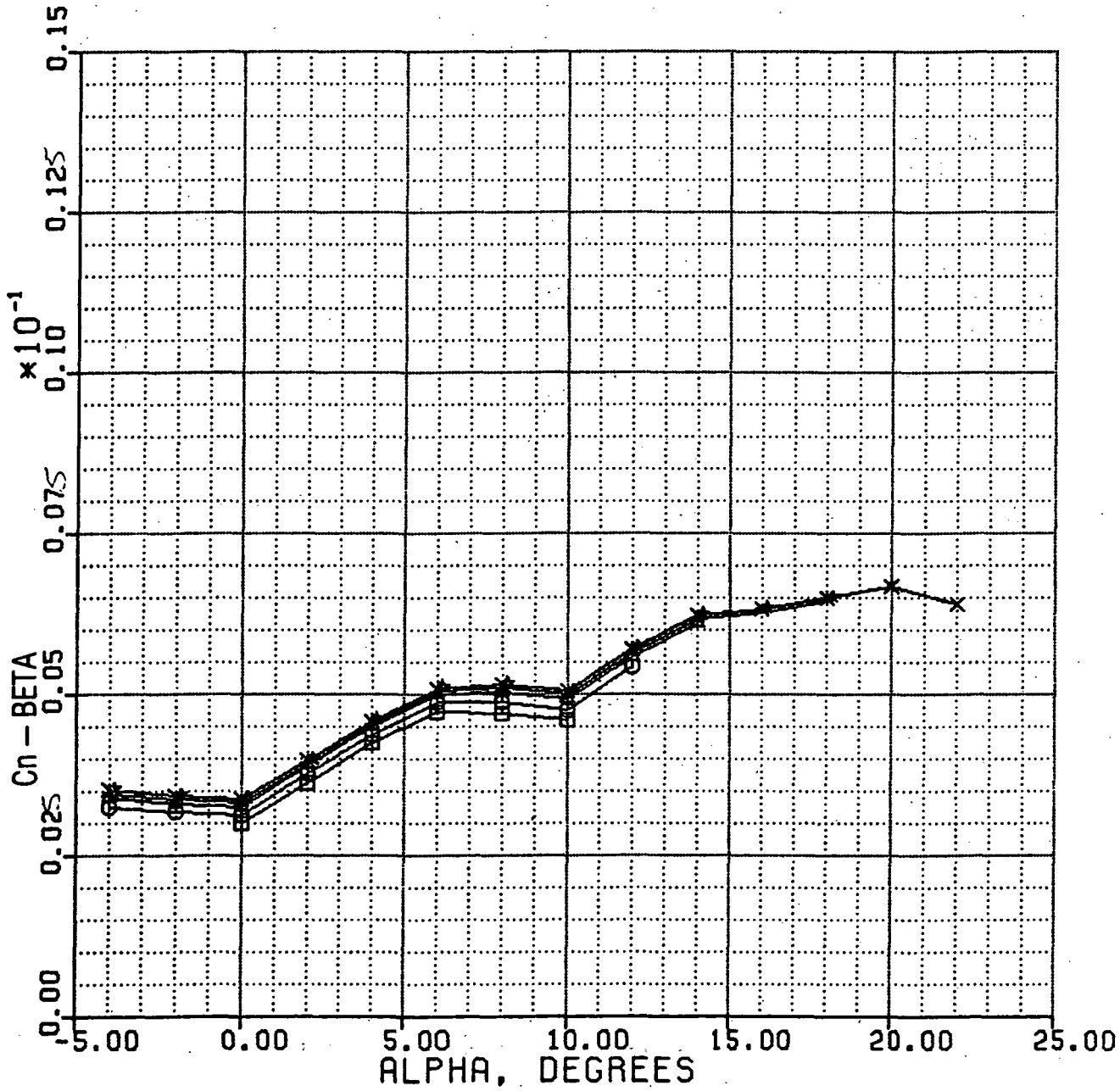

Figure 80(c)

Cn – BETA VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
OF POOR QUALITY

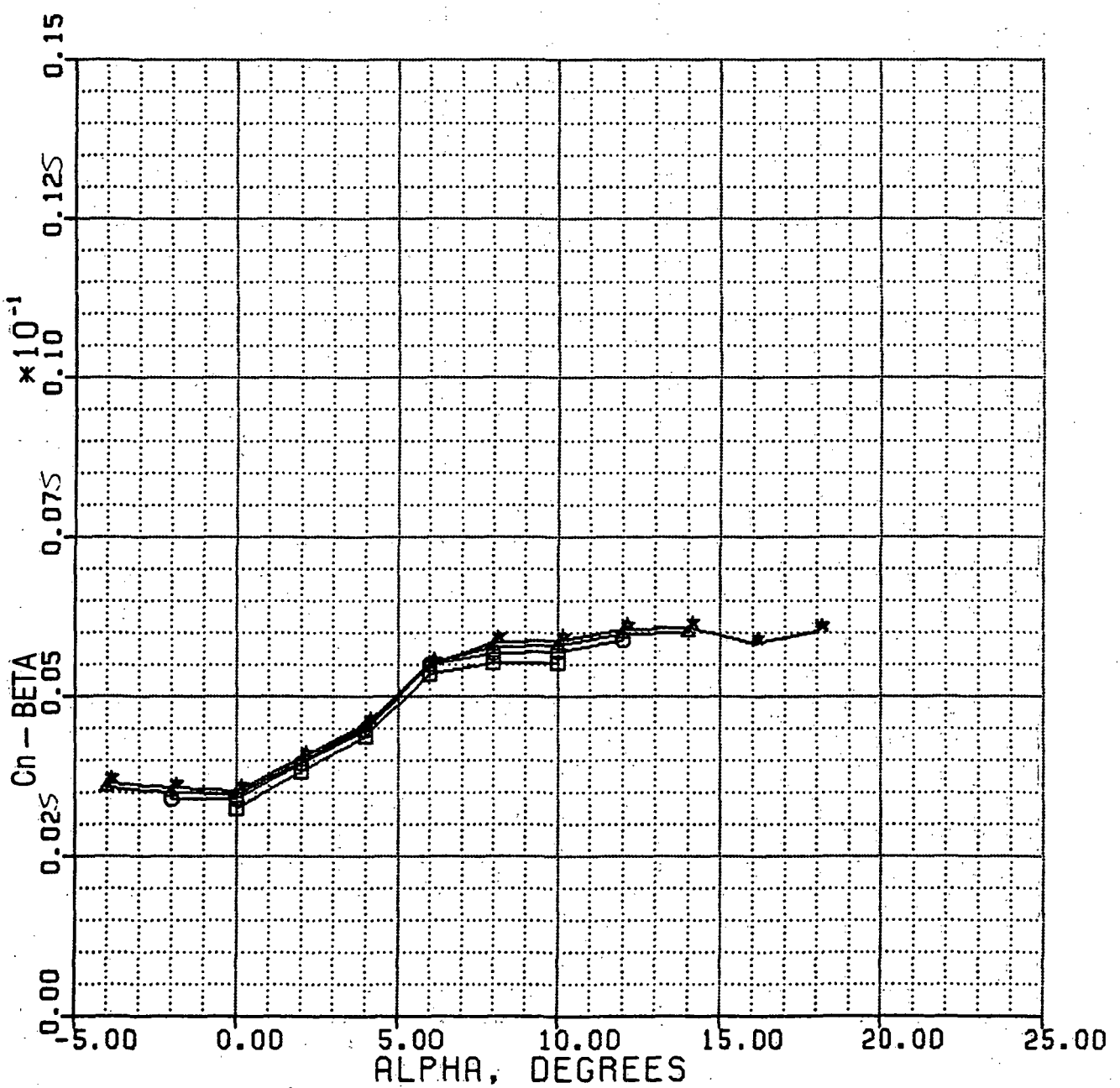

Figure 80(d)

Cn – BETA VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
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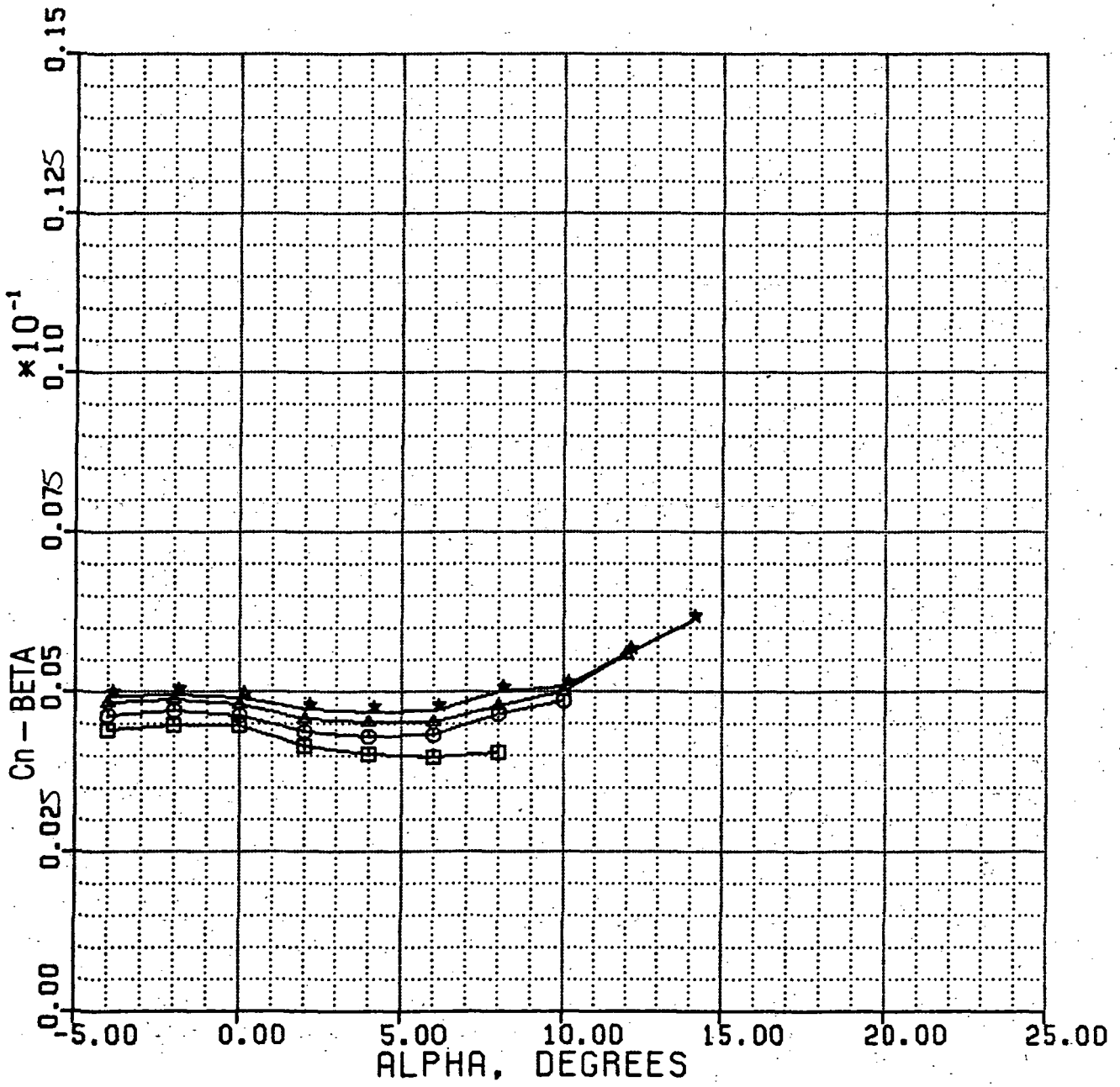

Figure 80(e)

Cn – BETA VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
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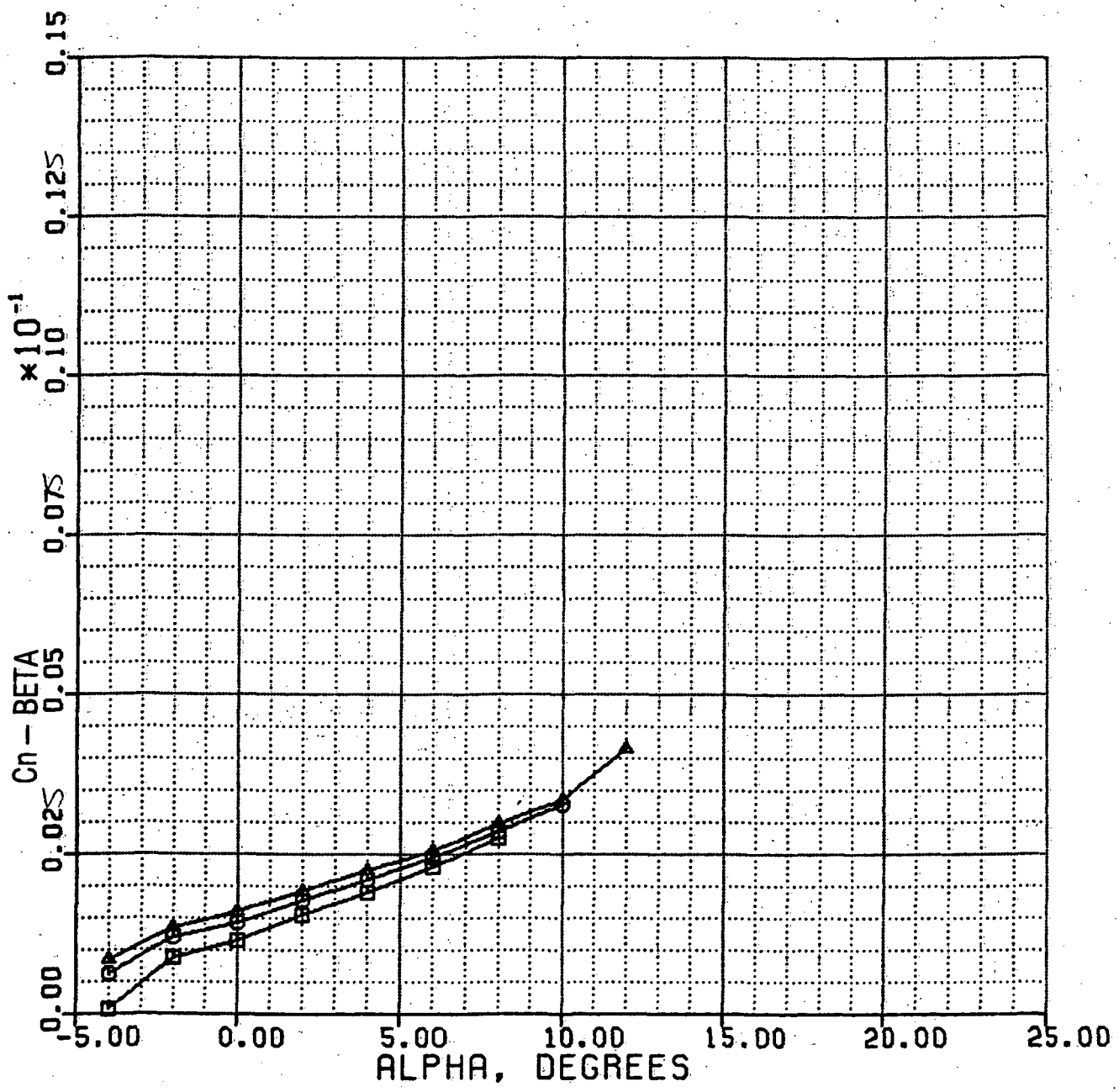

Figure 80(f)

Cn – BETA DYNAMIC VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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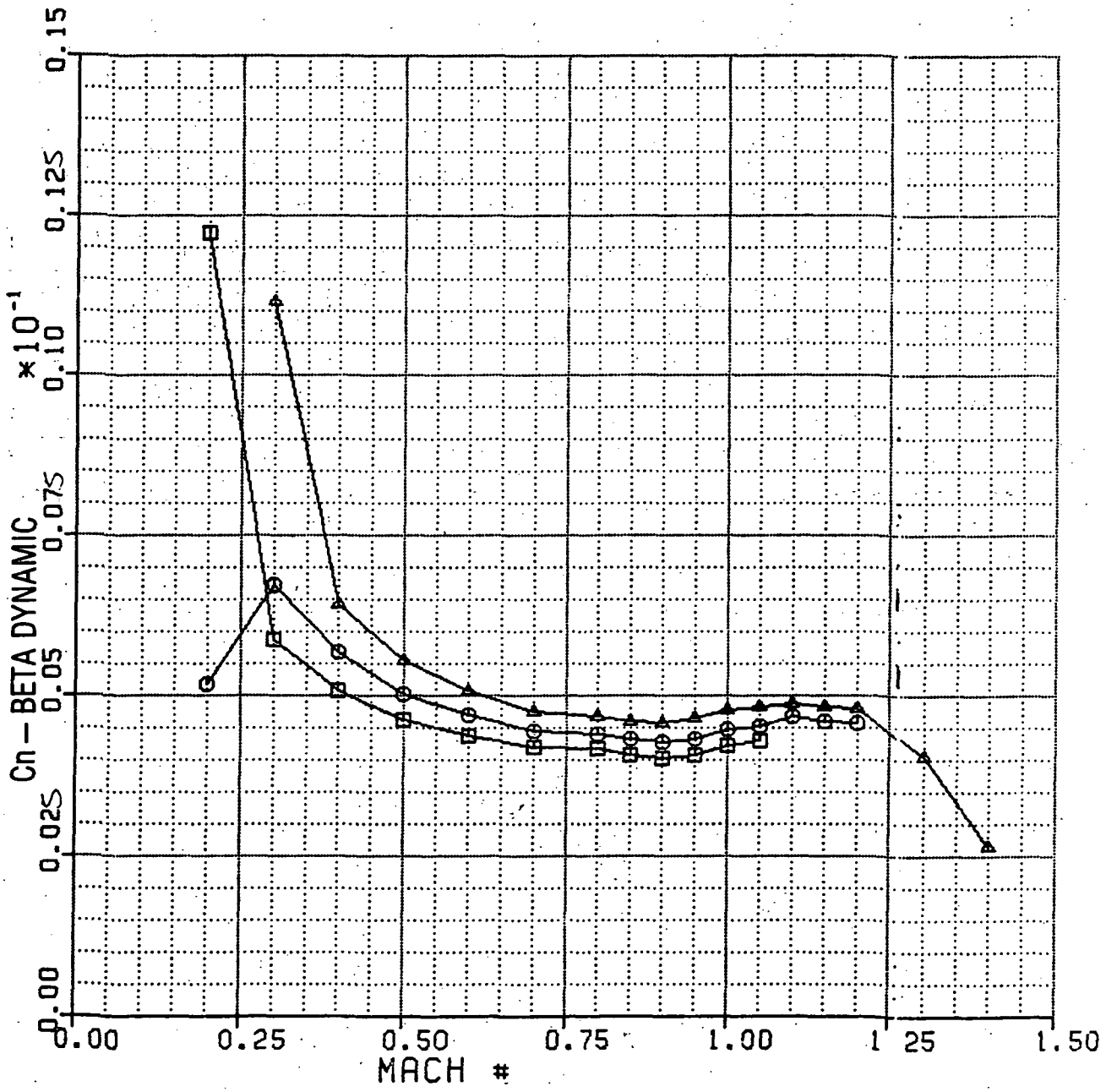

Figure 81(a)

Cn – BETA DYNAMIC VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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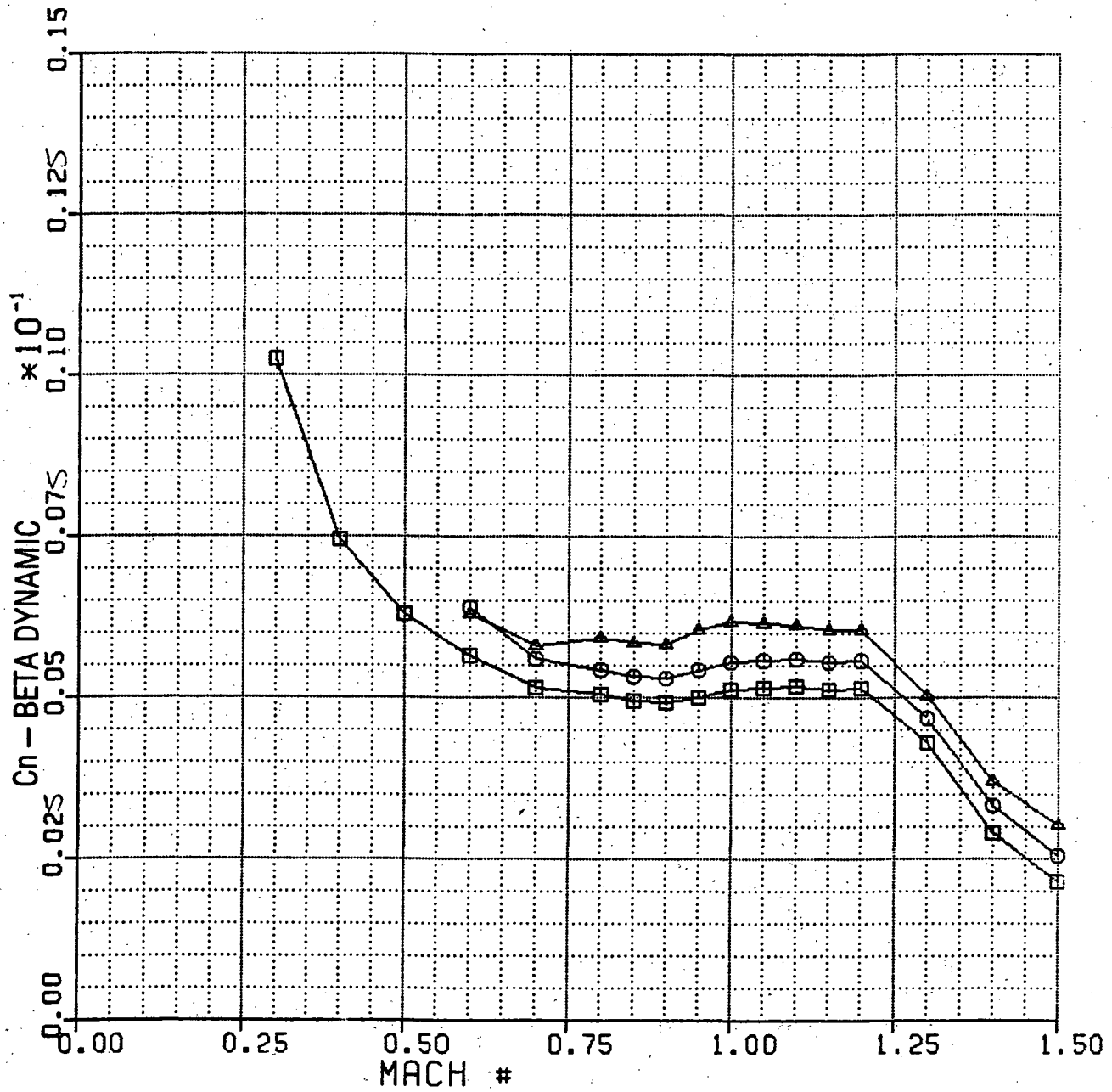

Figure 81(b)

Cn – BETA DYNAMIC VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
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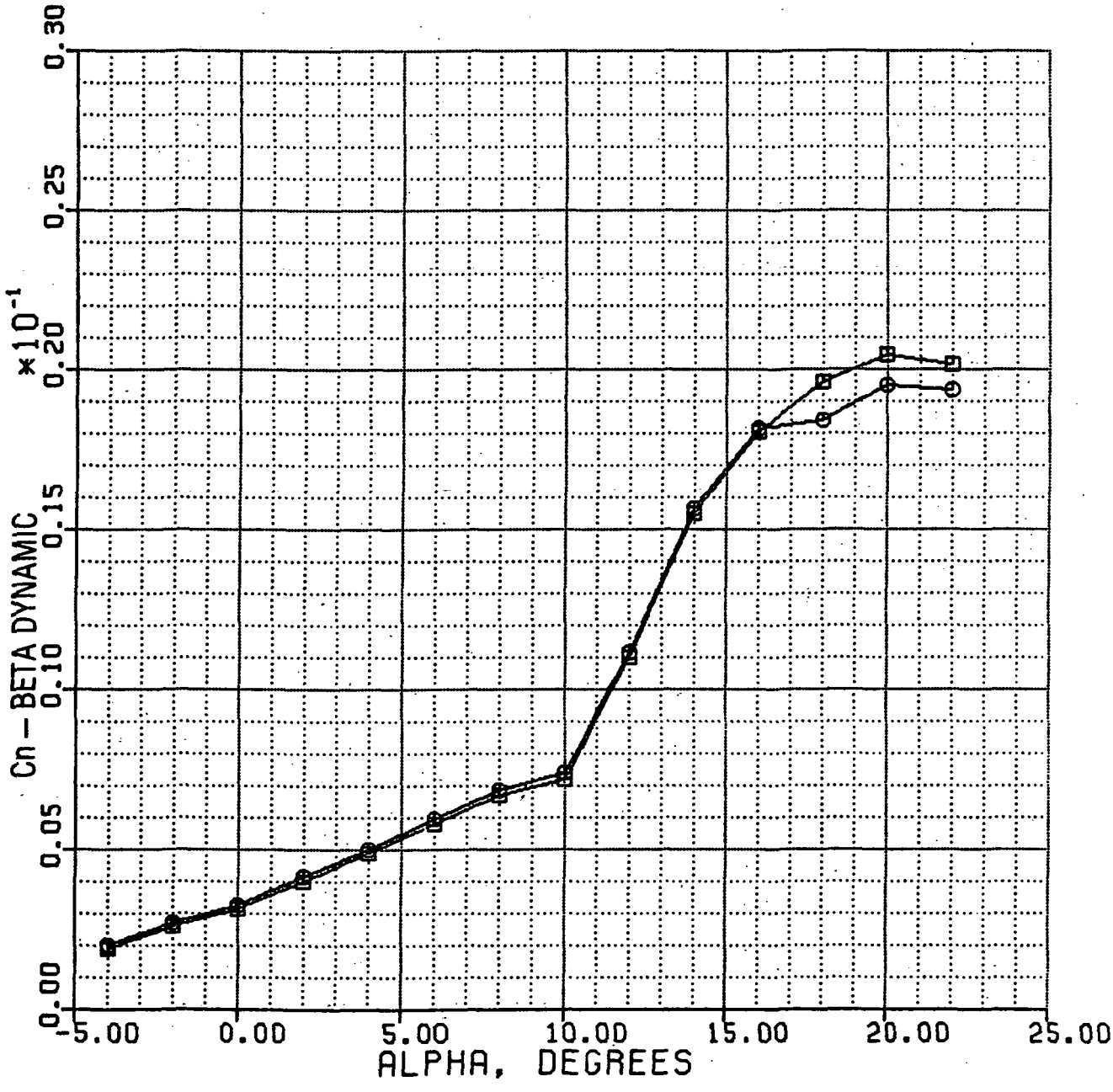

Figure 82(a)

Cn – BETA DYNAMIC VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
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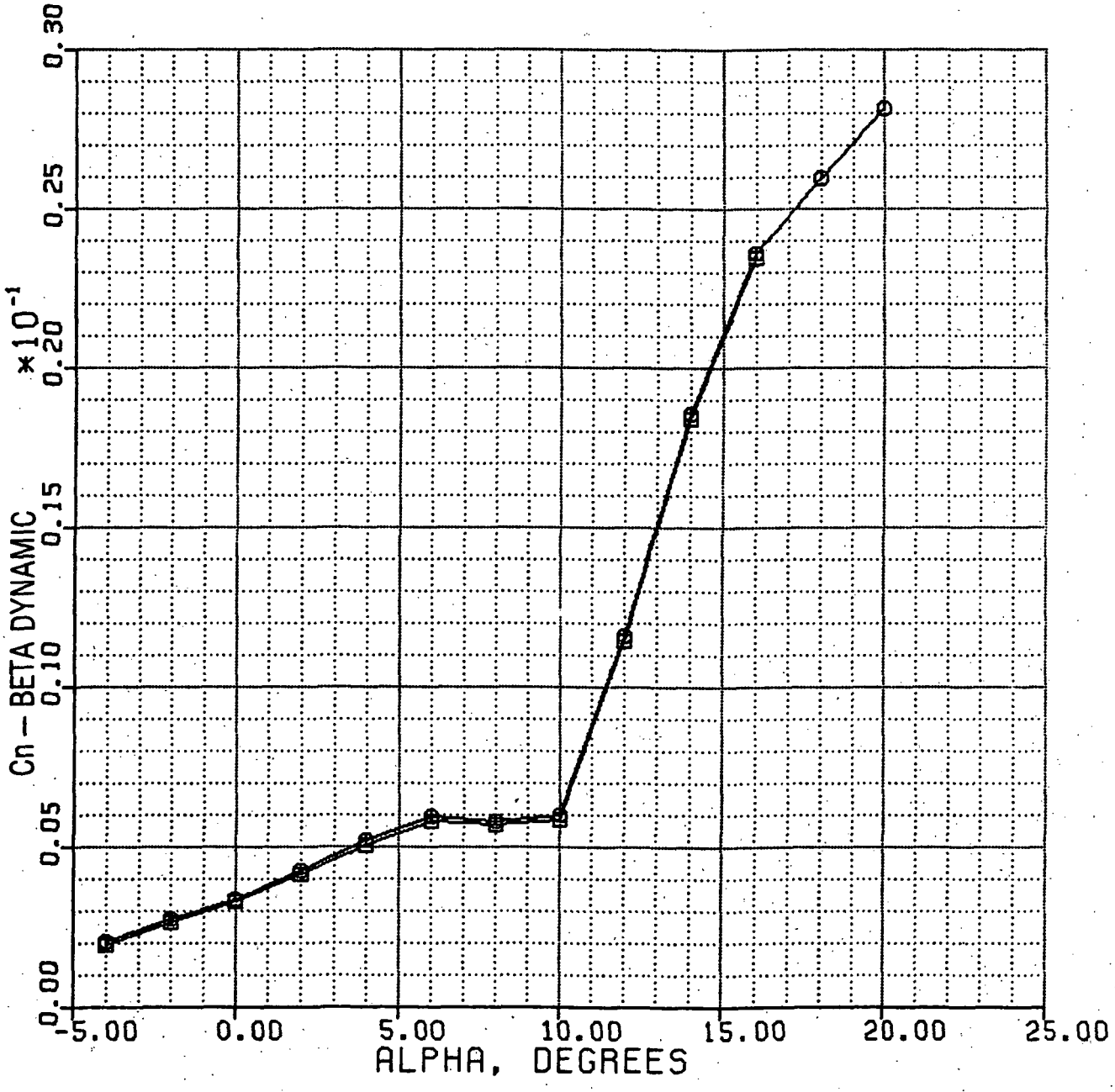

Figure 82(b)

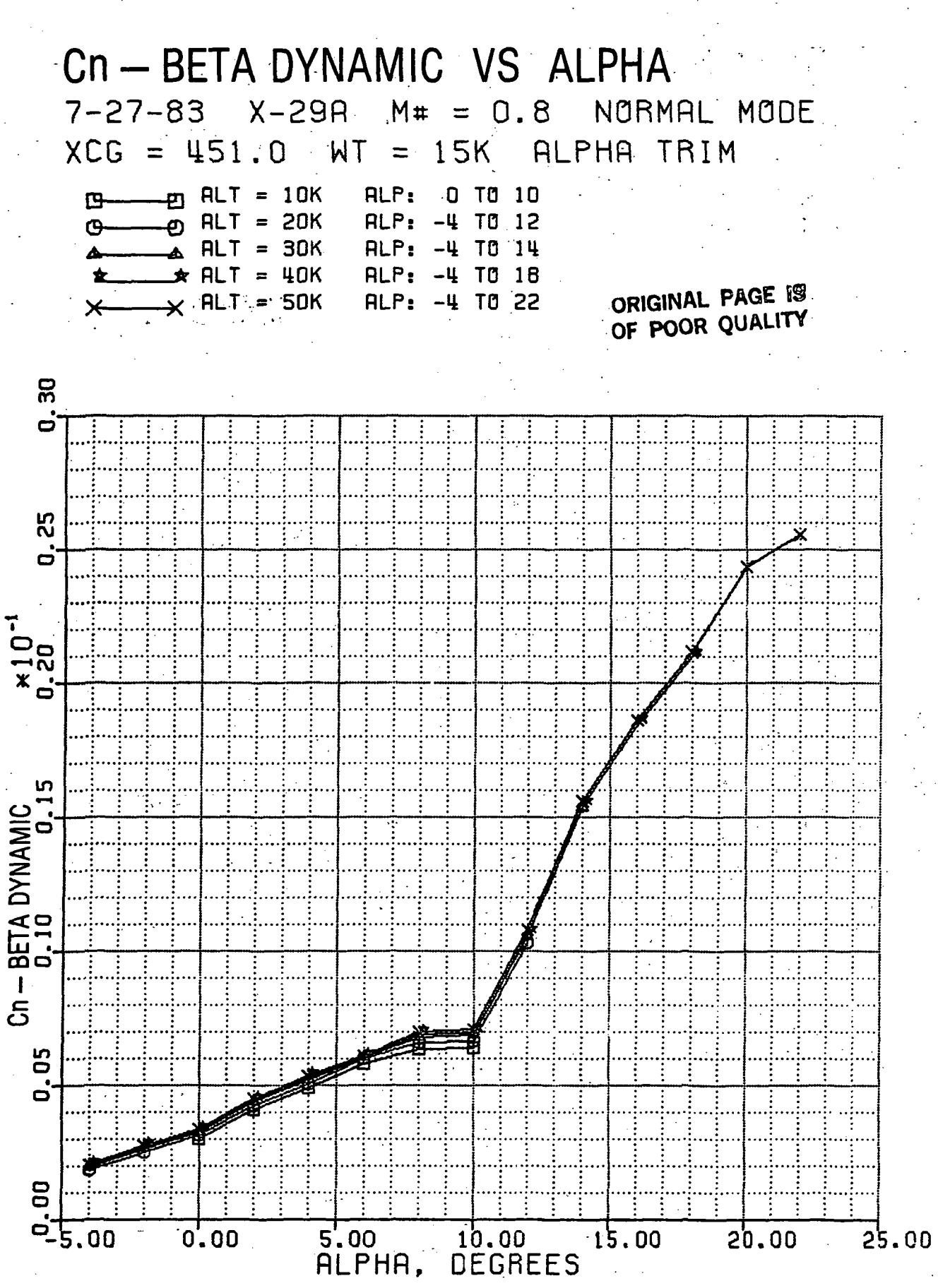
Cn – BETA DYNAMIC VS ALPHA
7-27-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS OF POOR QUALITY
Cn – BETA DYNAMIC ×10⁻¹
0.30
0.25
0.20
0.15
0.10
0.05
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 82(c)

Cn – BETA DYNAMIC VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
OF POOR QUALITY

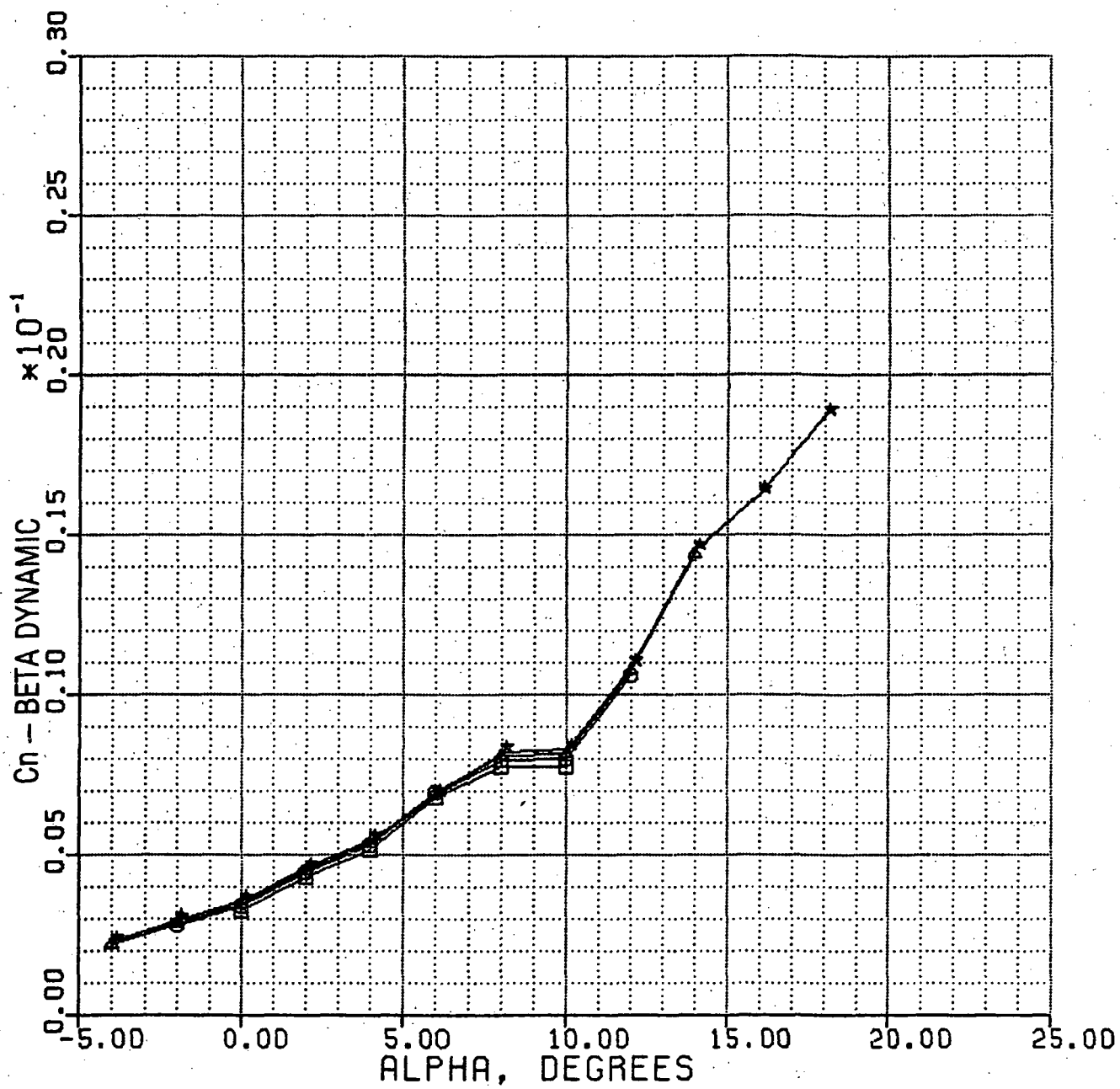

Figure 82(d)

Cn — BETA DYNAMIC VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

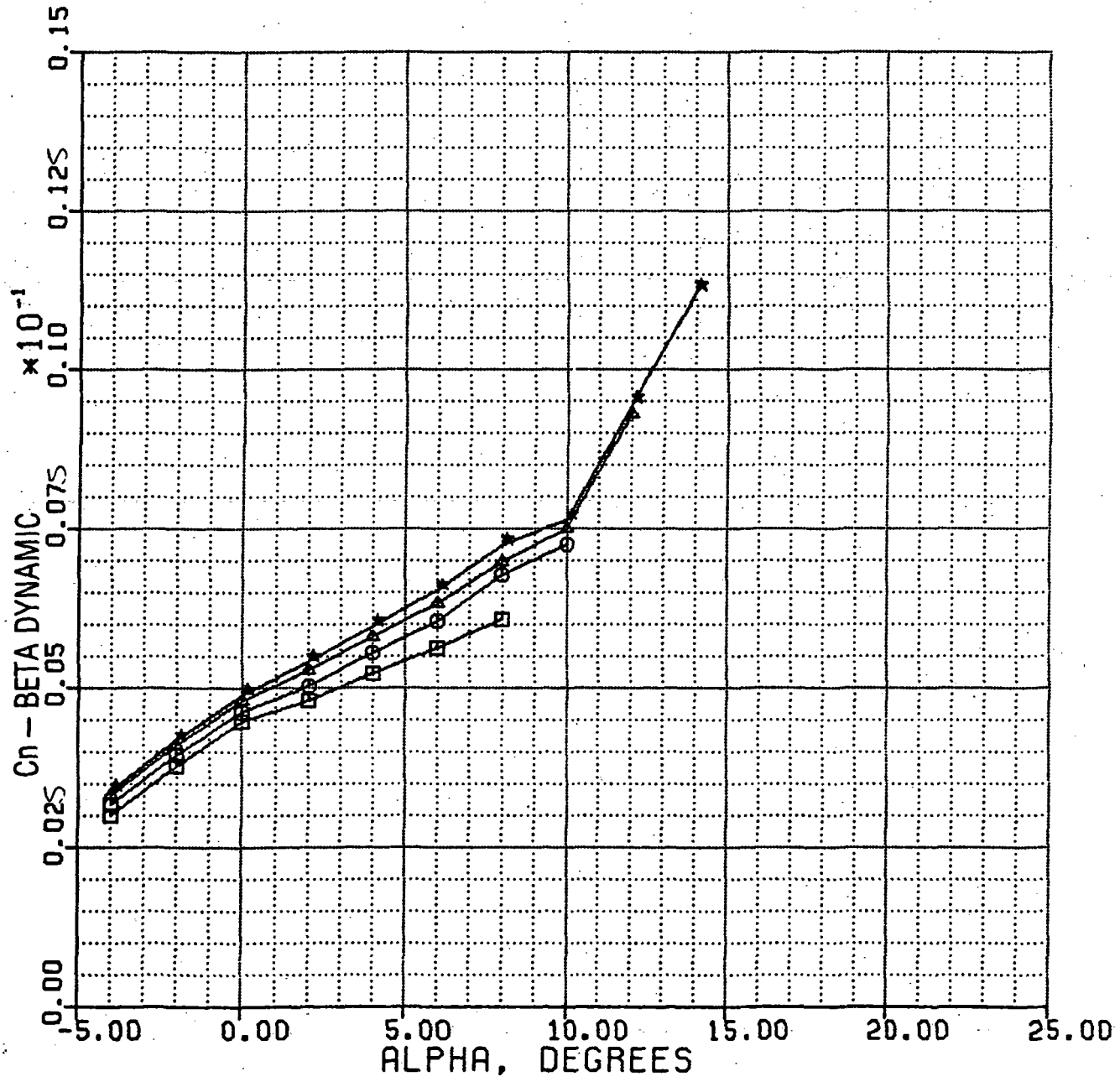

Figure 82(e)

Cn – BETA DYNAMIC VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

ORIGINAL PAGE IS
OF POOR QUALITY

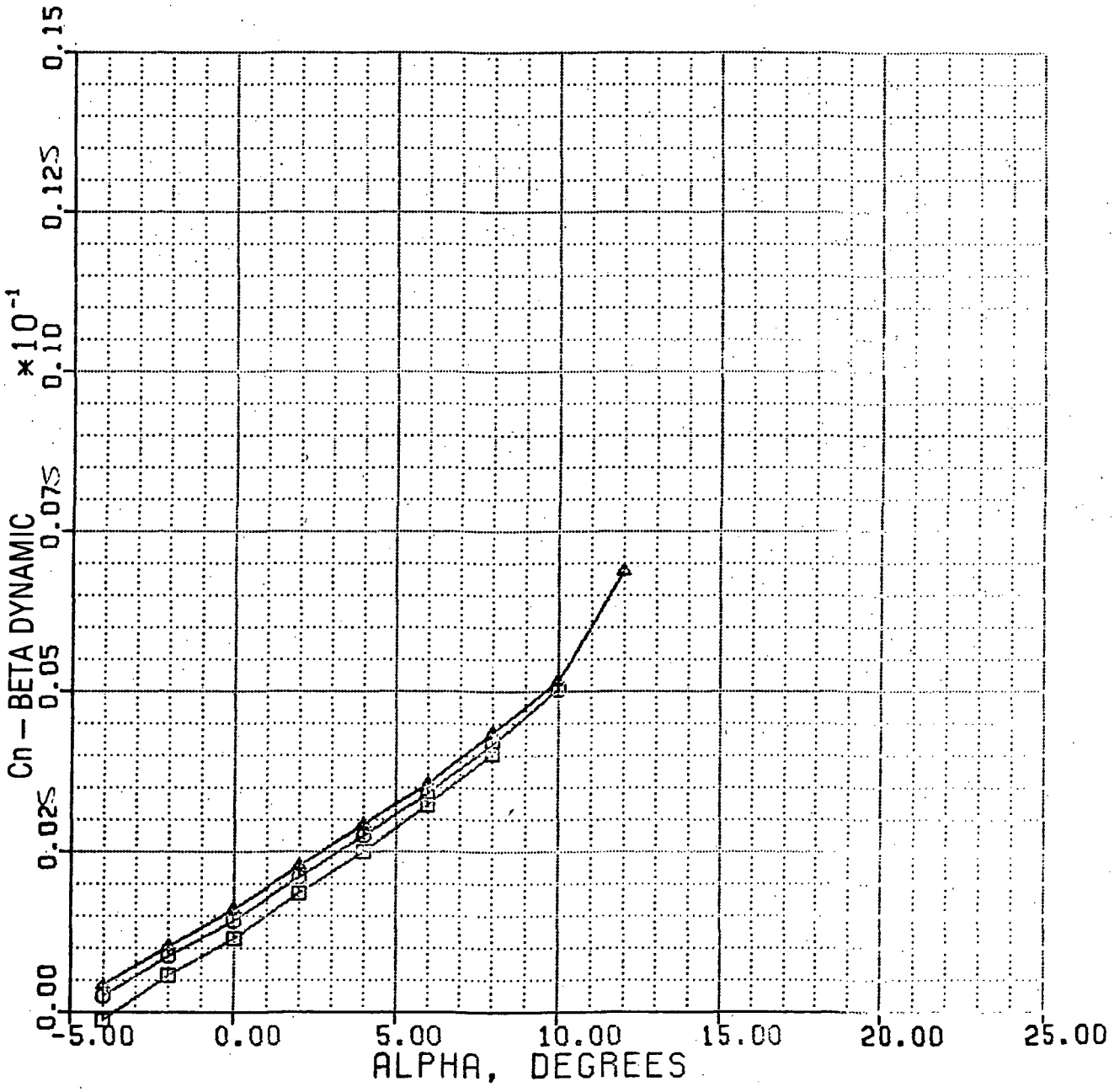

Figure 82(f)

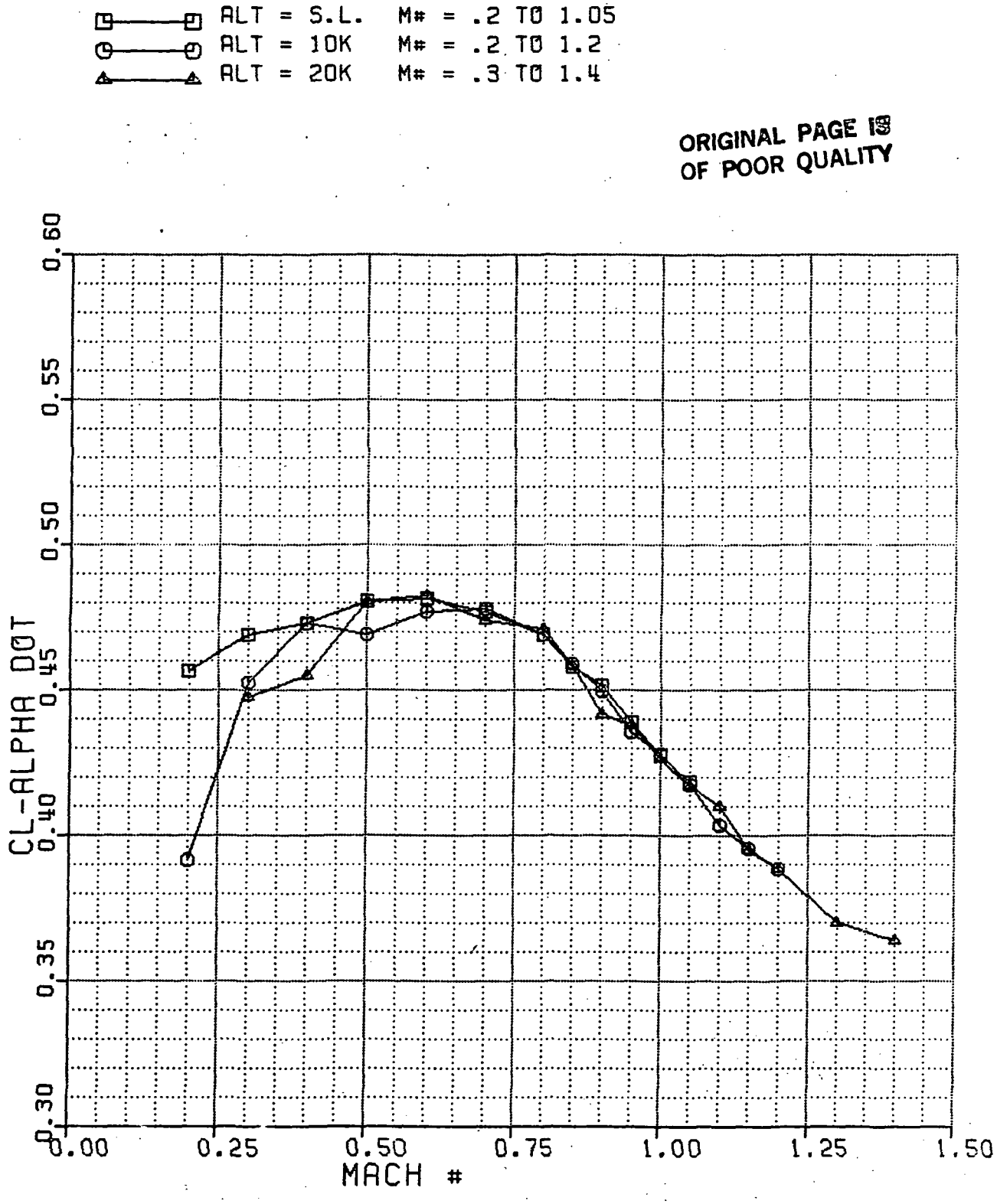
CL-ALPHA DØT VS MACH #
7-6-83 X-29A 1-G TRIM NORMAL MODE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TØ 1.05
ALT = 10K M# = .2 TØ 1.2
ALT = 20K M# = .3 TØ 1.4
ORIGINAL PAGE IS OF POOR QUALITY
CL-ALPHA DØT
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 83(a)

CL-ALPHA DØT VS MACH

7-7-83 X-29A 1-G TRIM NØRMAL MØDE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TØ 1.5
ALT = 40K M# = .6 TØ 1.5
ALT = 50K M# = .6 TØ 1.5

ORIGINAL PAGE IS
OF POOR QUALITY

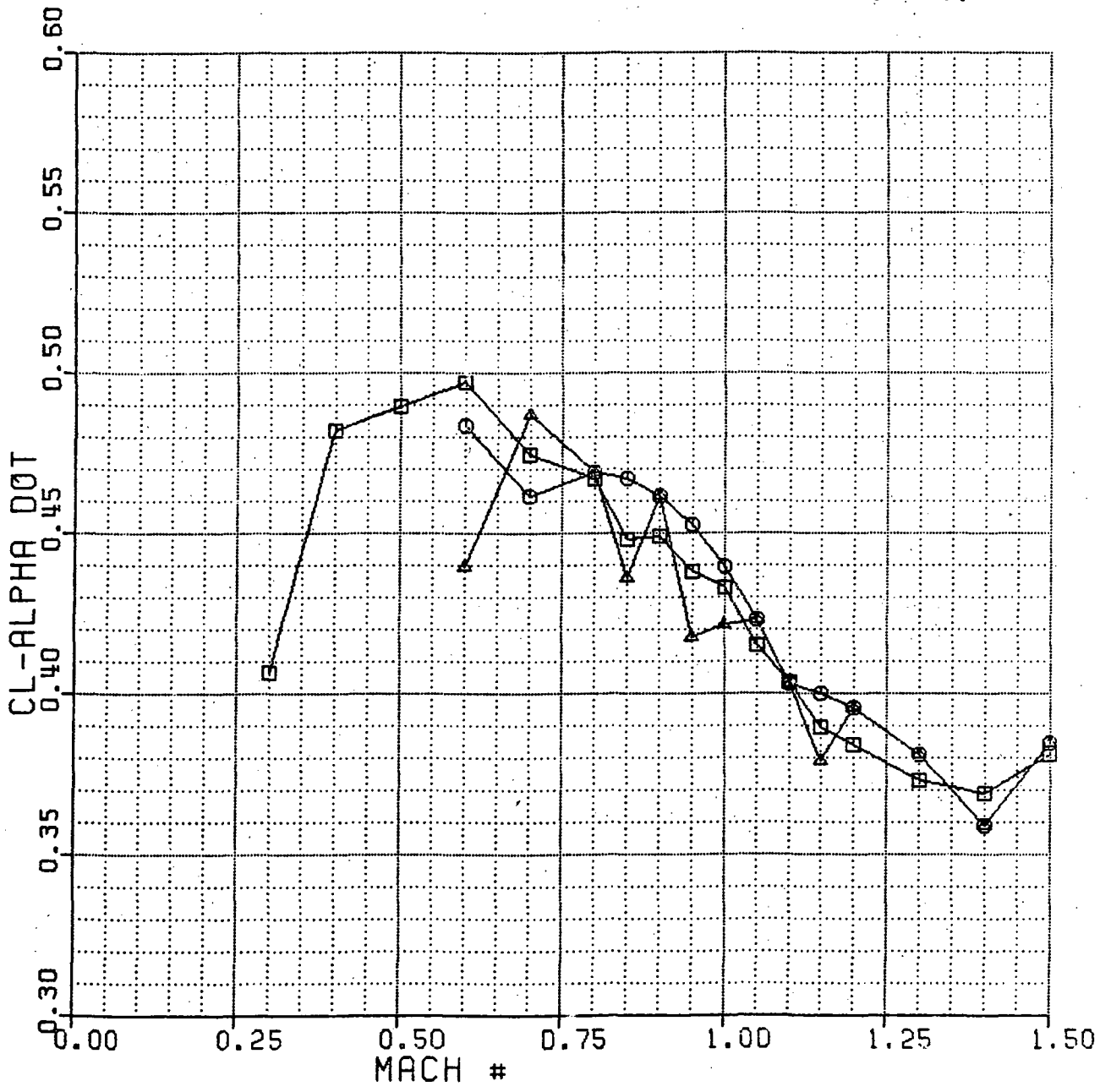

Figure 83(b)

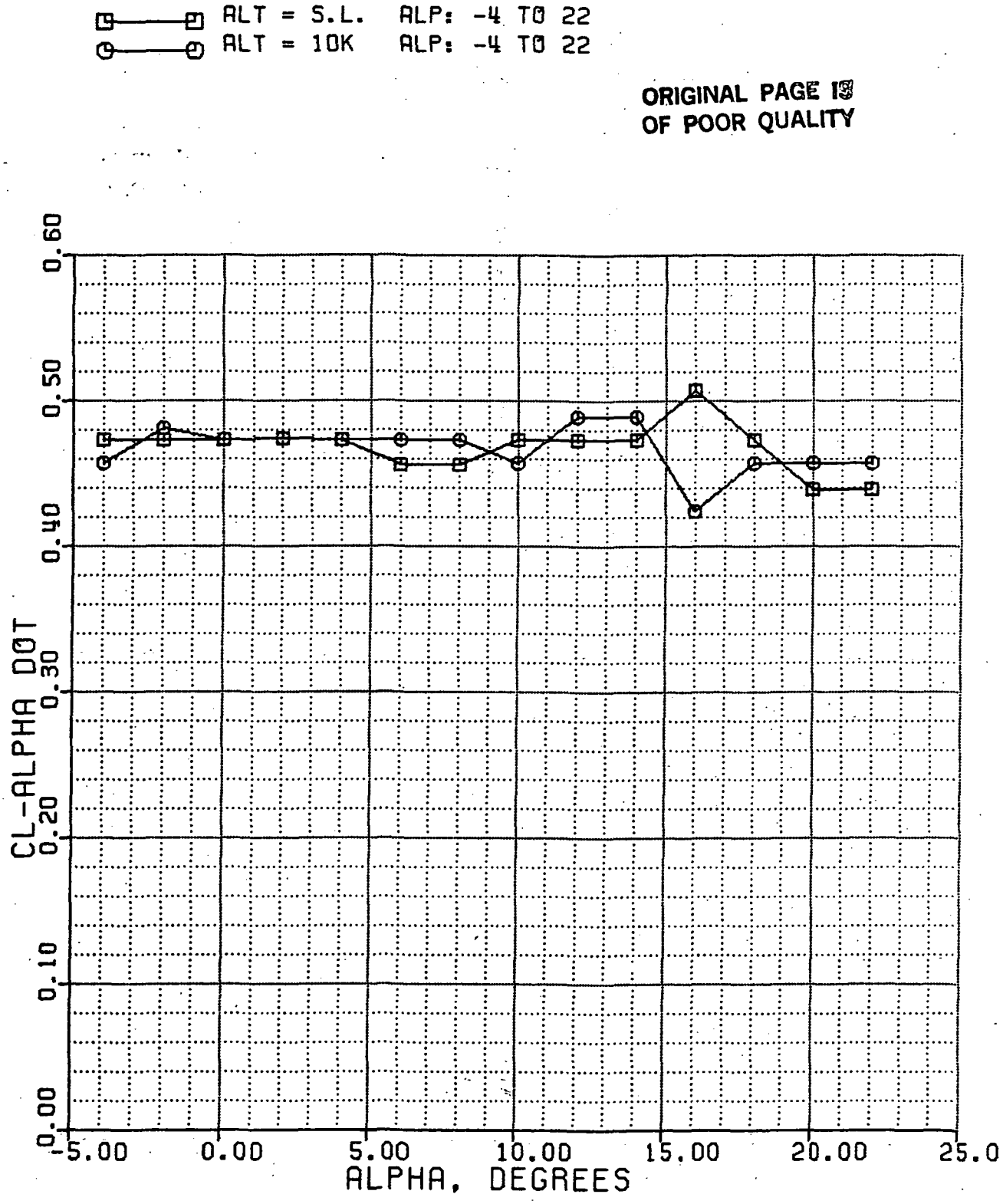
CL-ALPHA DØT VS ALPHA
7-26-83 X-29A M# = 0.4 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TØ 22
ALT = 10K ALP: -4 TØ 22
ORIGINAL PAGE IS
OF POOR QUALITY
CL-ALPHA DØT
0.00
0.10
0.20
0.30
0.40
0.50
0.60
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 84(a)

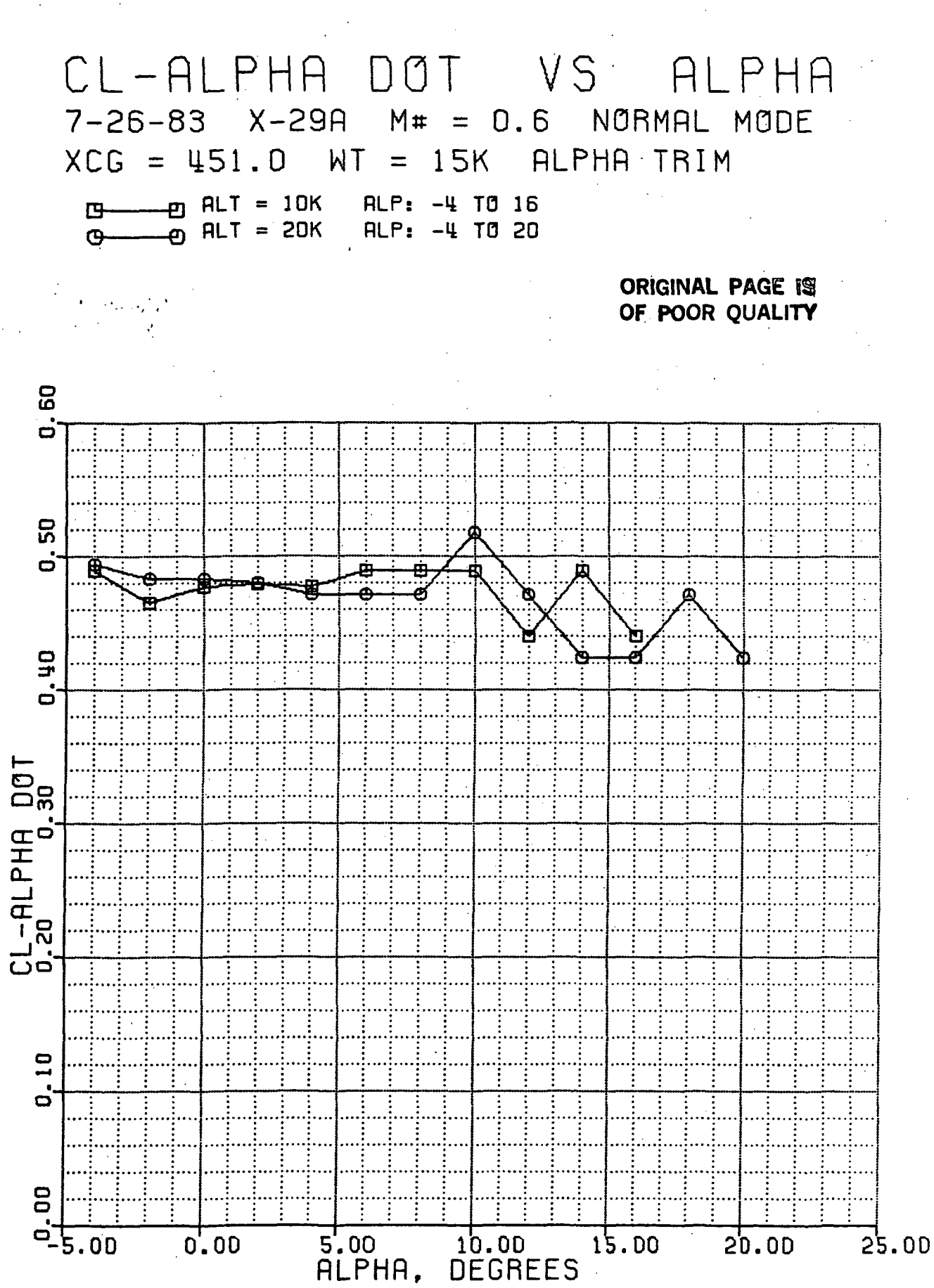
CL-ALPHA DØT VS ALPHA
7-26-83 X-29A M# = 0.6 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TØ 16
ALT = 20K ALP: -4 TØ 20
ORIGINAL PAGE IS
OF POOR QUALITY
CL-ALPHA DØT
0.00
0.10
0.20
0.30
0.40
0.50
0.60
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 84(b)

CL-ALPHA DØT VS ALPHA

7-26-83 X-29A M# = 0.8 NØRMAL MØDE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TØ 10
ALT = 20K	ALP: -4 TØ 12
ALT = 30K	ALP: -4 TØ 14
ALT = 40K	ALP: -4 TØ 18
ALT = 50K	ALP: -4 TØ 22

ORIGINAL PAGE IS
OF POOR QUALITY

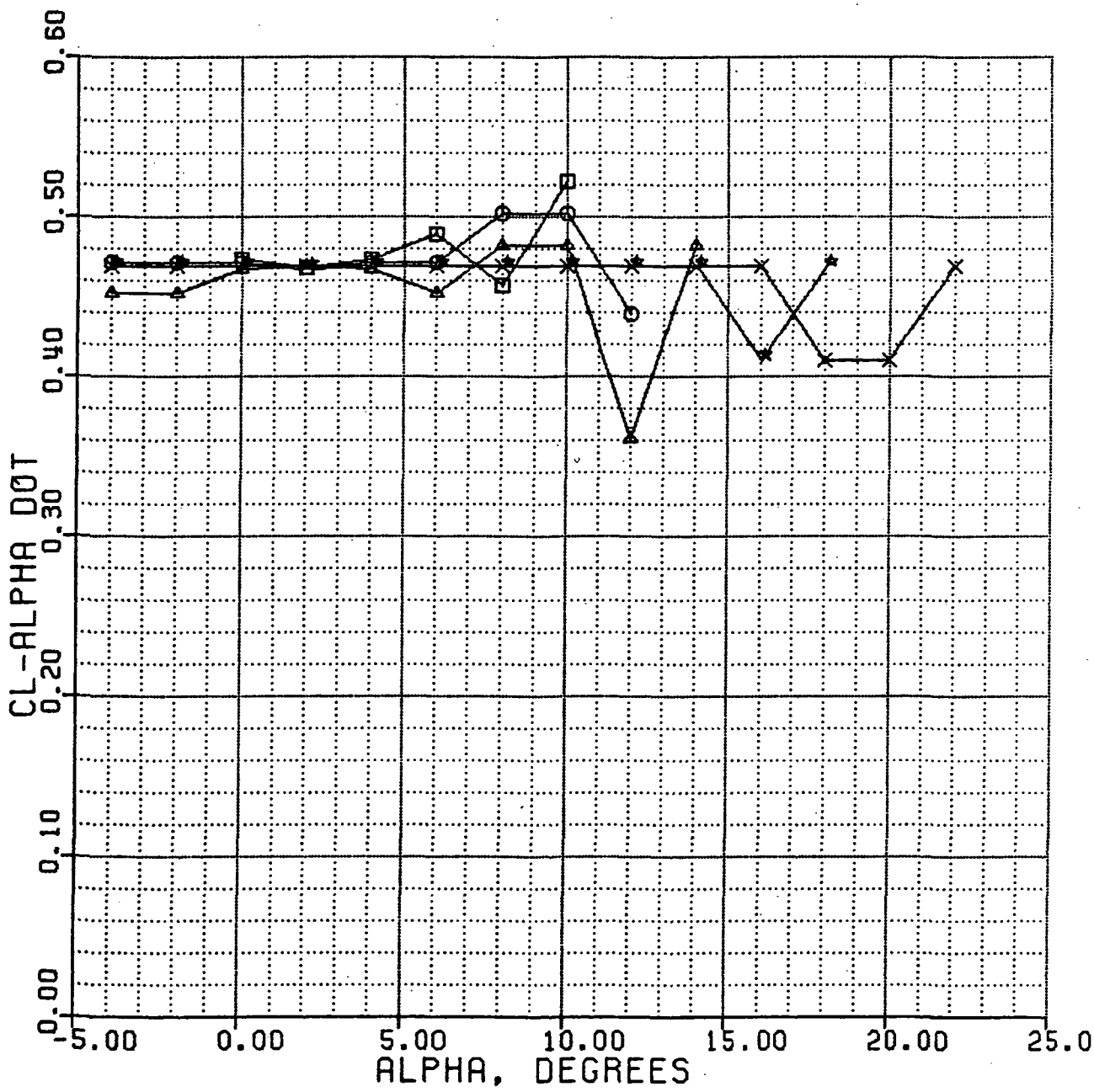

Figure 84(c)

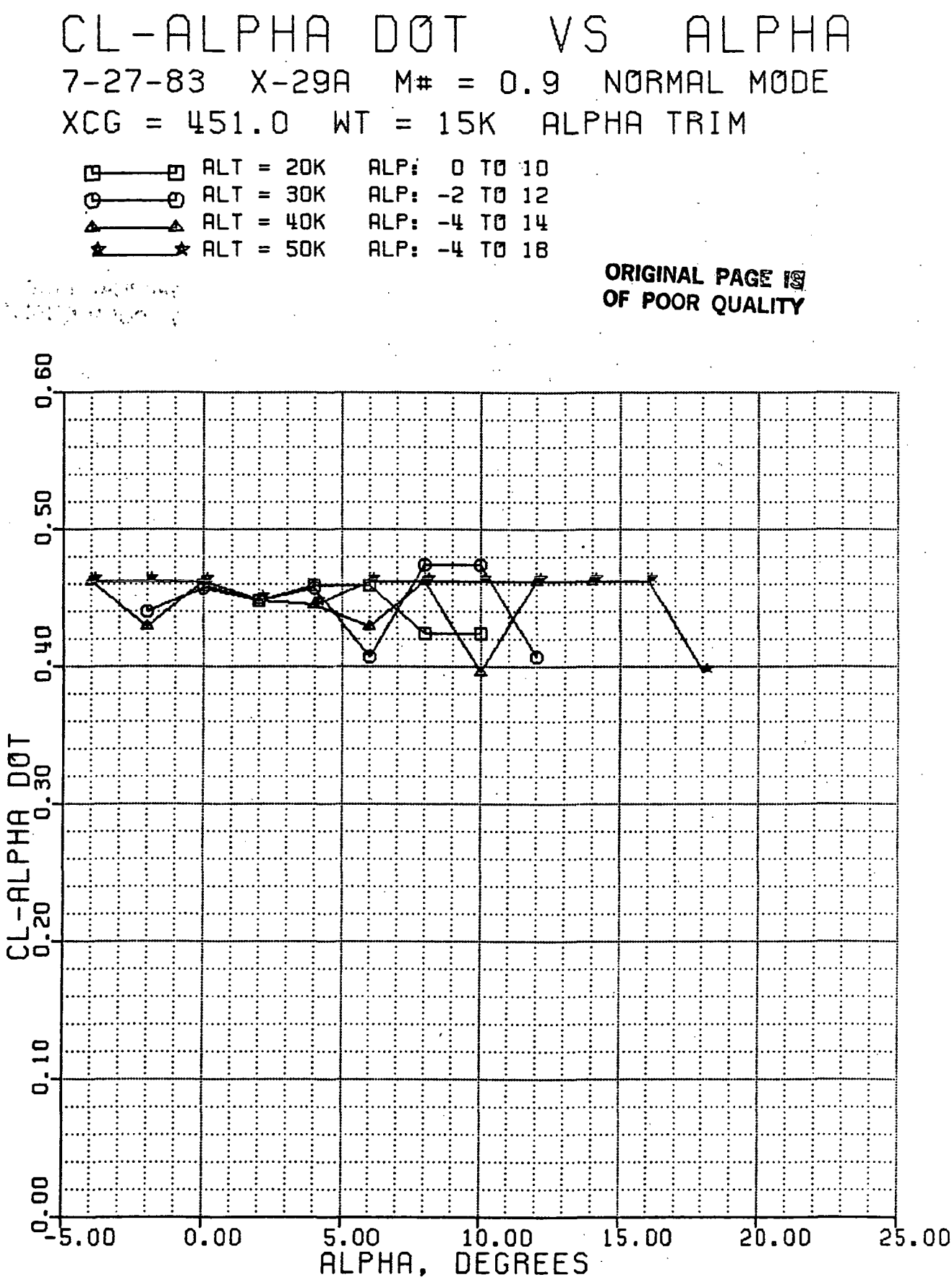
CL-ALPHA DØT VS ALPHA
7-27-83 X-29A M# = 0.9 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TØ 10
ALT = 30K ALP: -2 TØ 12
ALT = 40K ALP: -4 TØ 14
ALT = 50K ALP: -4 TØ 18
ORIGINAL PAGE IS
OF POOR QUALITY
CL-ALPHA DØT
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 84(d)

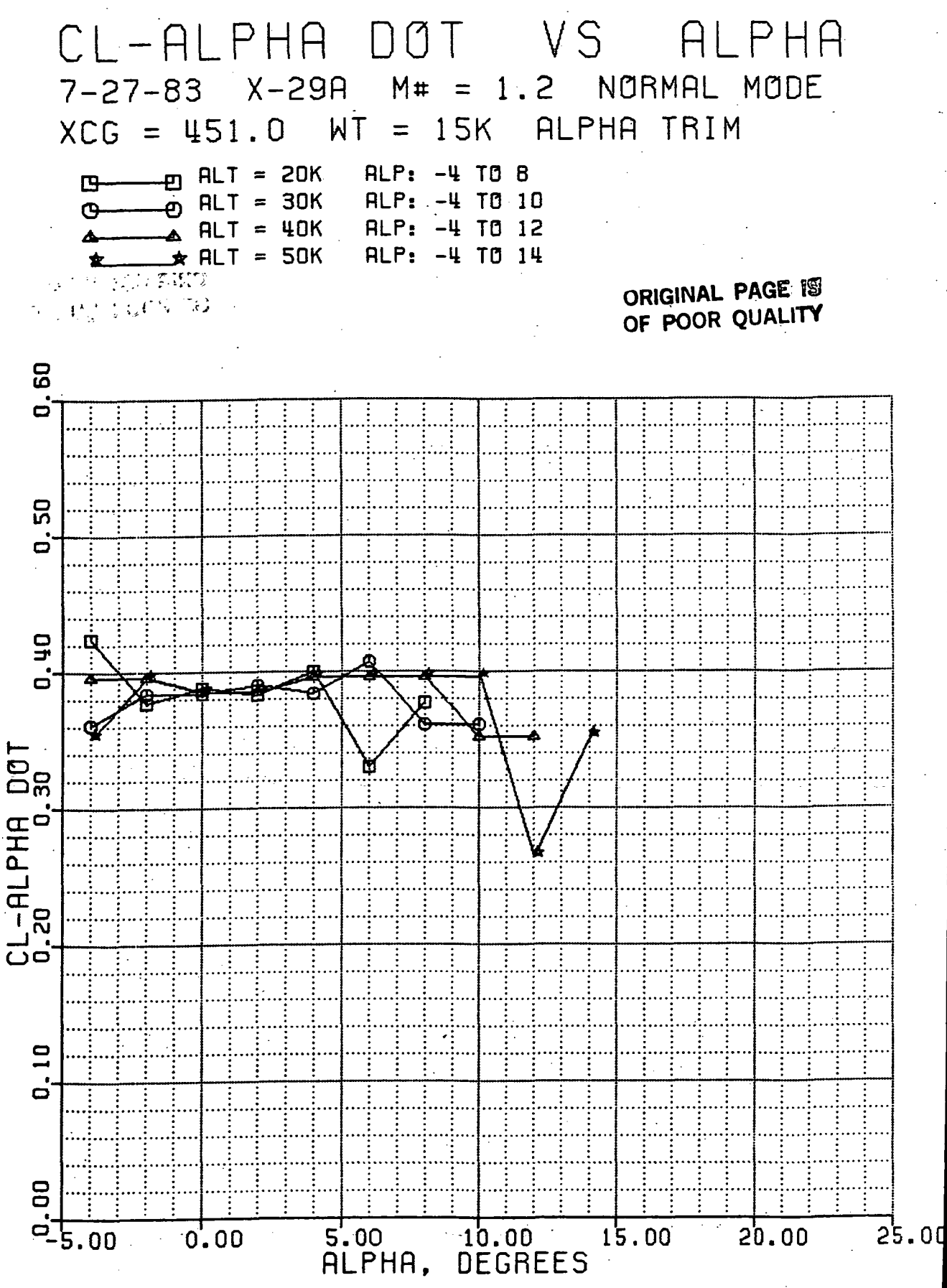
CL-ALPHA DØT VS ALPHA
7-27-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
ORIGINAL PAGE IS
OF POOR QUALITY
CL-ALPHA DØT
0.00
0.10
0.20
0.30
0.40
0.50
0.60
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 84(e)

CL-ALPHA DØT VS ALPHA

7-27-83 X-29A M# = 1.5 NØRMAL MØDE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TØ 8
ALT = 40K ALP: -4 TØ 10
ALT = 50K ALP: -4 TØ 12

ORIGINAL PAGE IS
OF POOR QUALITY

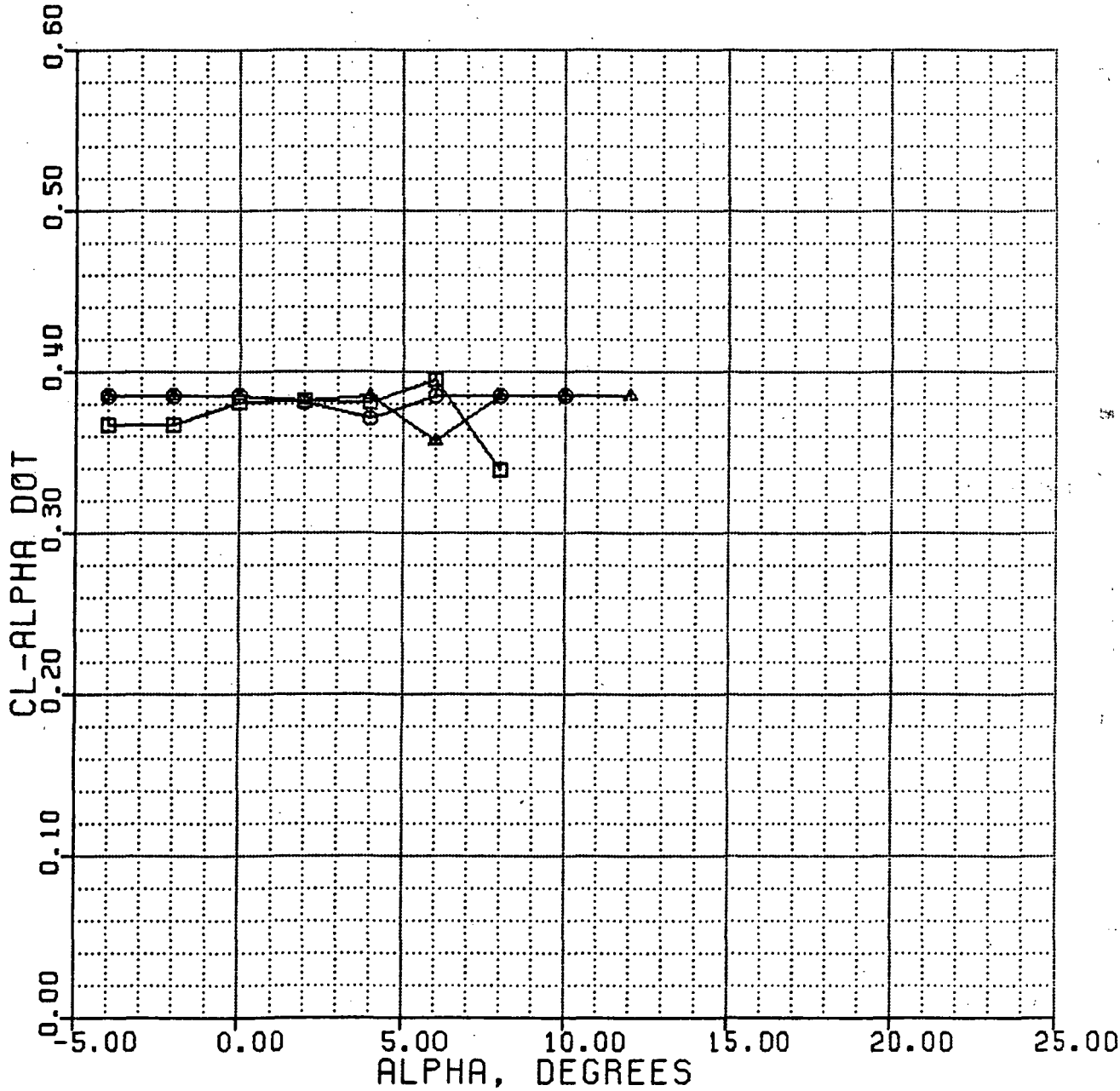

Figure 84(f)

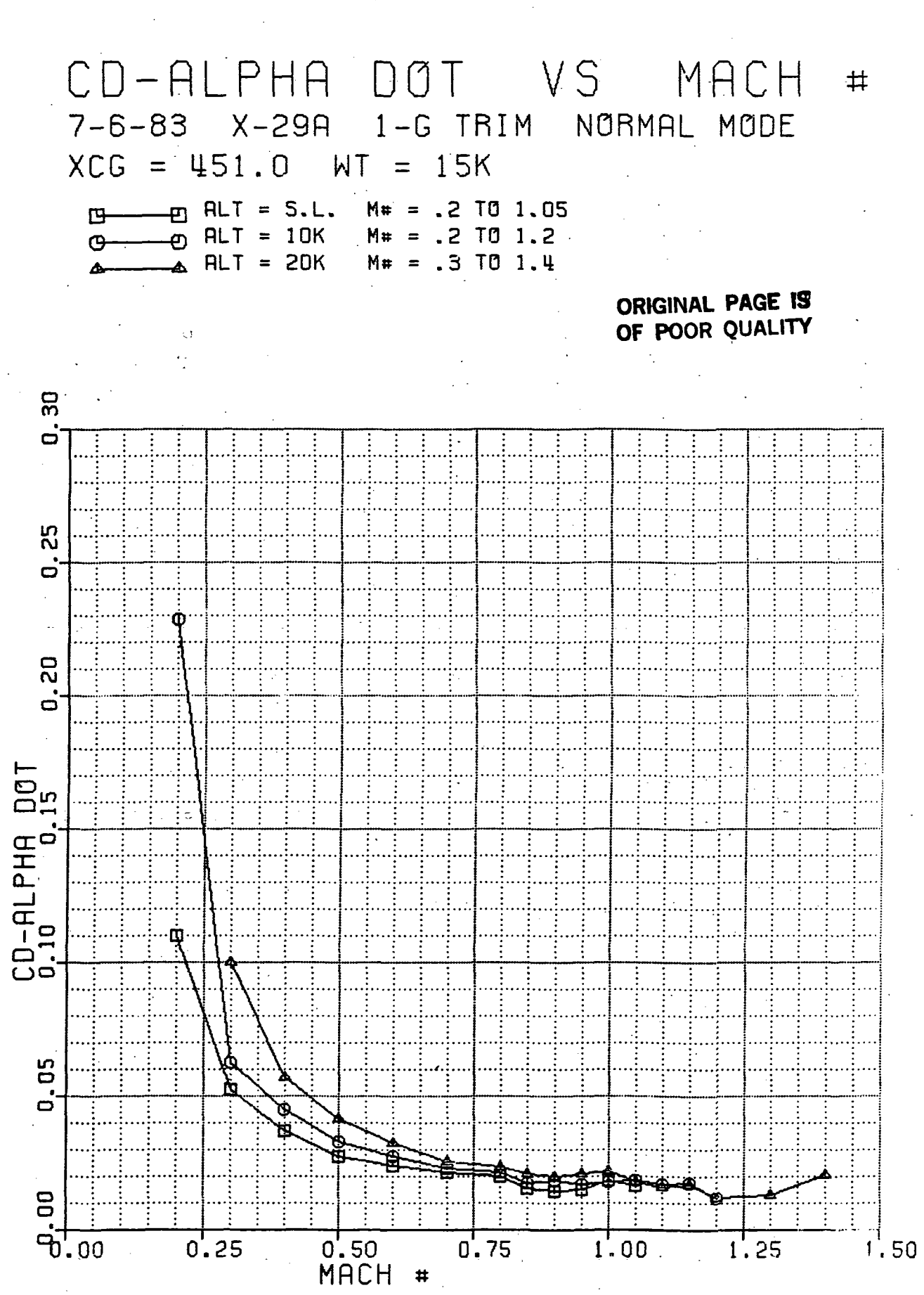
CD-ALPHA DØT VS MACH #
7-6-83 X-29A 1-G TRIM NØRMAL MØDE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TØ 1.05
ALT = 10K M# = .2 TØ 1.2
ALT = 20K M# = .3 TØ 1.4
ORIGINAL PAGE IS
OF POOR QUALITY
CD-ALPHA DØT
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 85(a)

CD-ALPHA DØT VS MACH

7-7-83 X-29A 1-G TRIM NØRMAL MØDE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TØ 1.5
ALT = 40K M# = .6 TØ 1.5
ALT = 50K M# = .6 TØ 1.5

ORIGINAL PAGE IS
OF POOR QUALITY

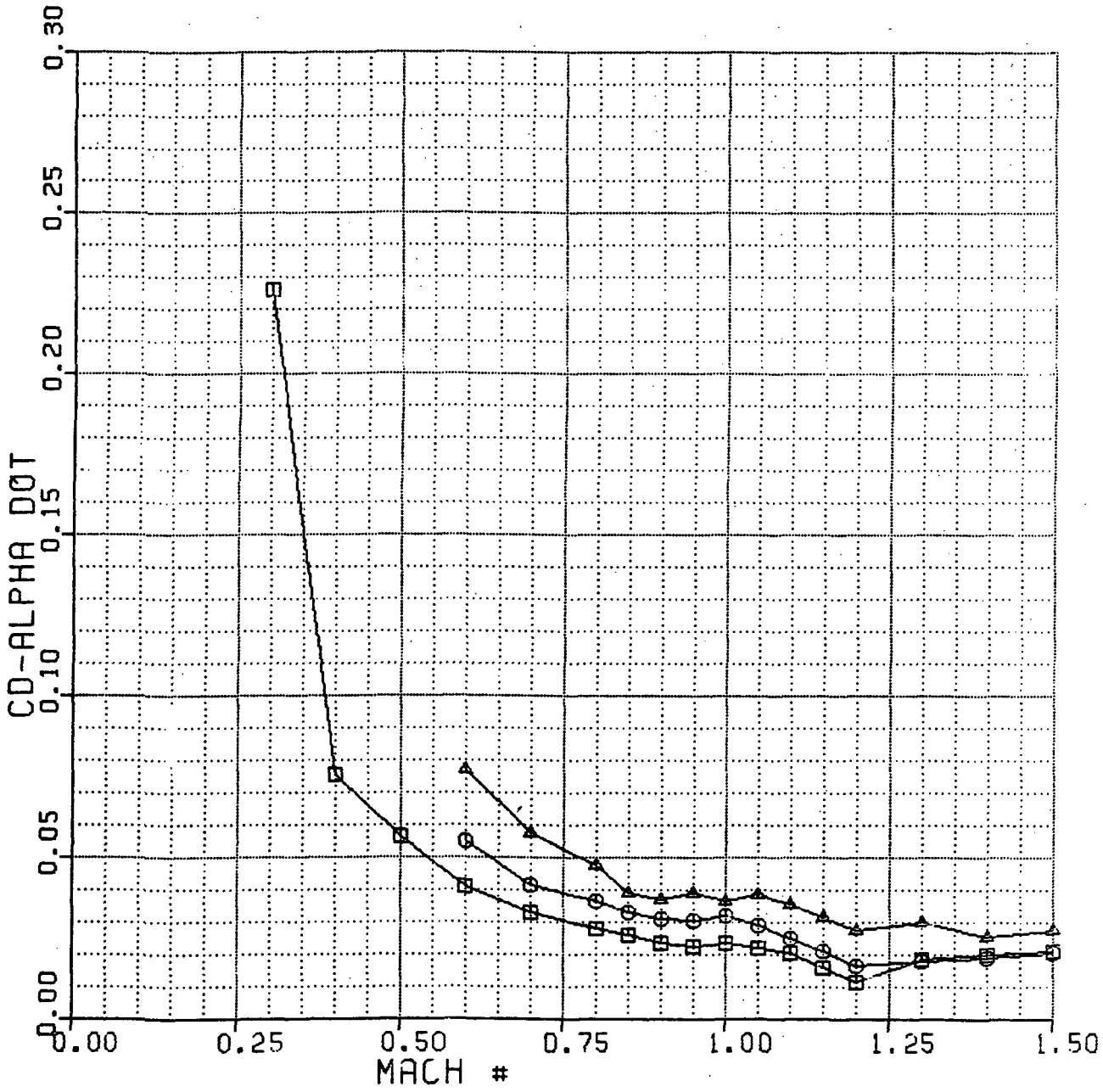

Figure 85(b)

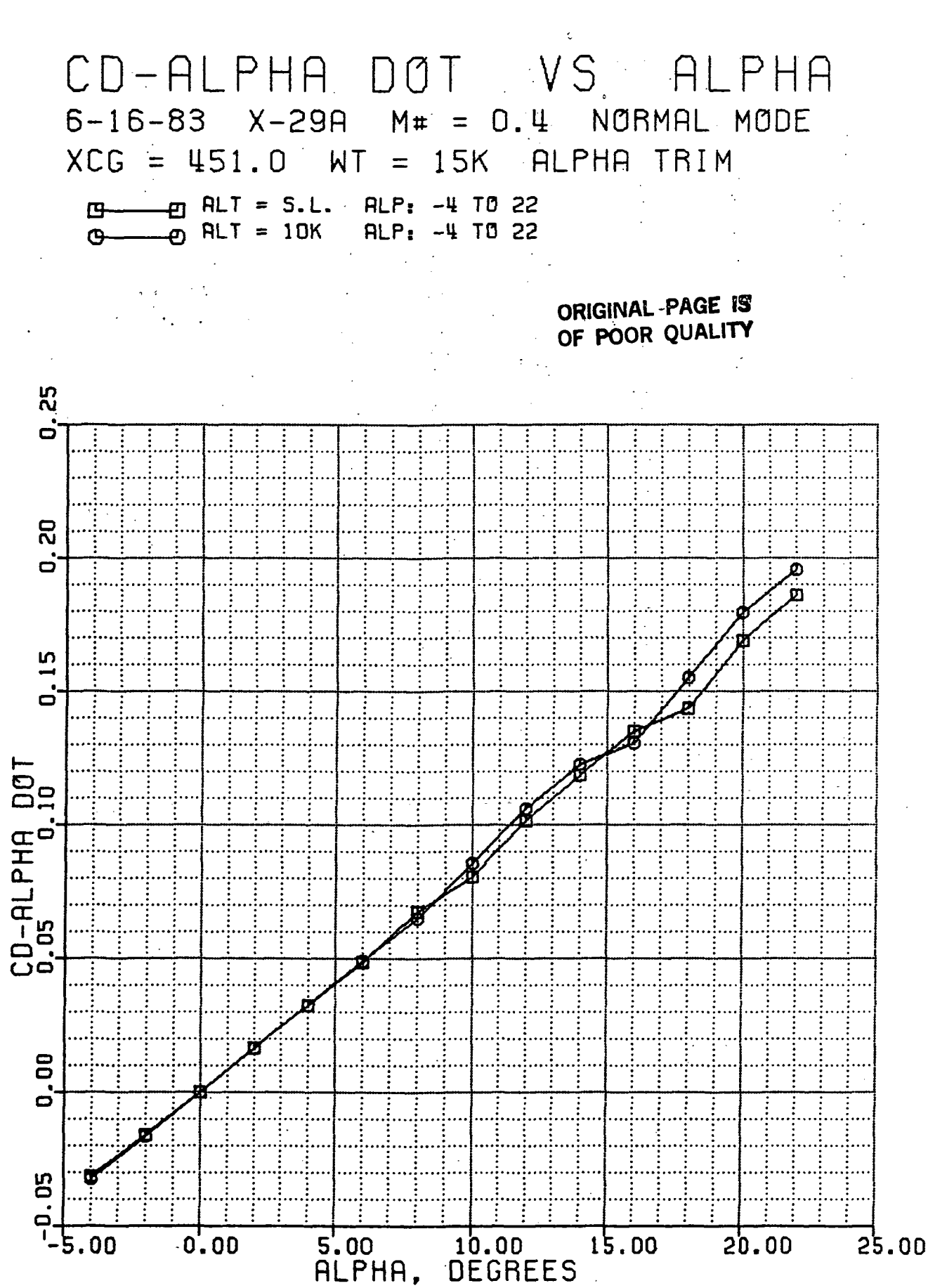
CD-ALPHA DØT VS ALPHA
6-16-83 X-29A M# = 0.4 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TØ 22
ALT = 10K ALP: -4 TØ 22
ORIGINAL PAGE IS
OF POOR QUALITY
CD-ALPHA DØT
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 86(a)

CD-ALPHA DOT VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
OF POOR QUALITY

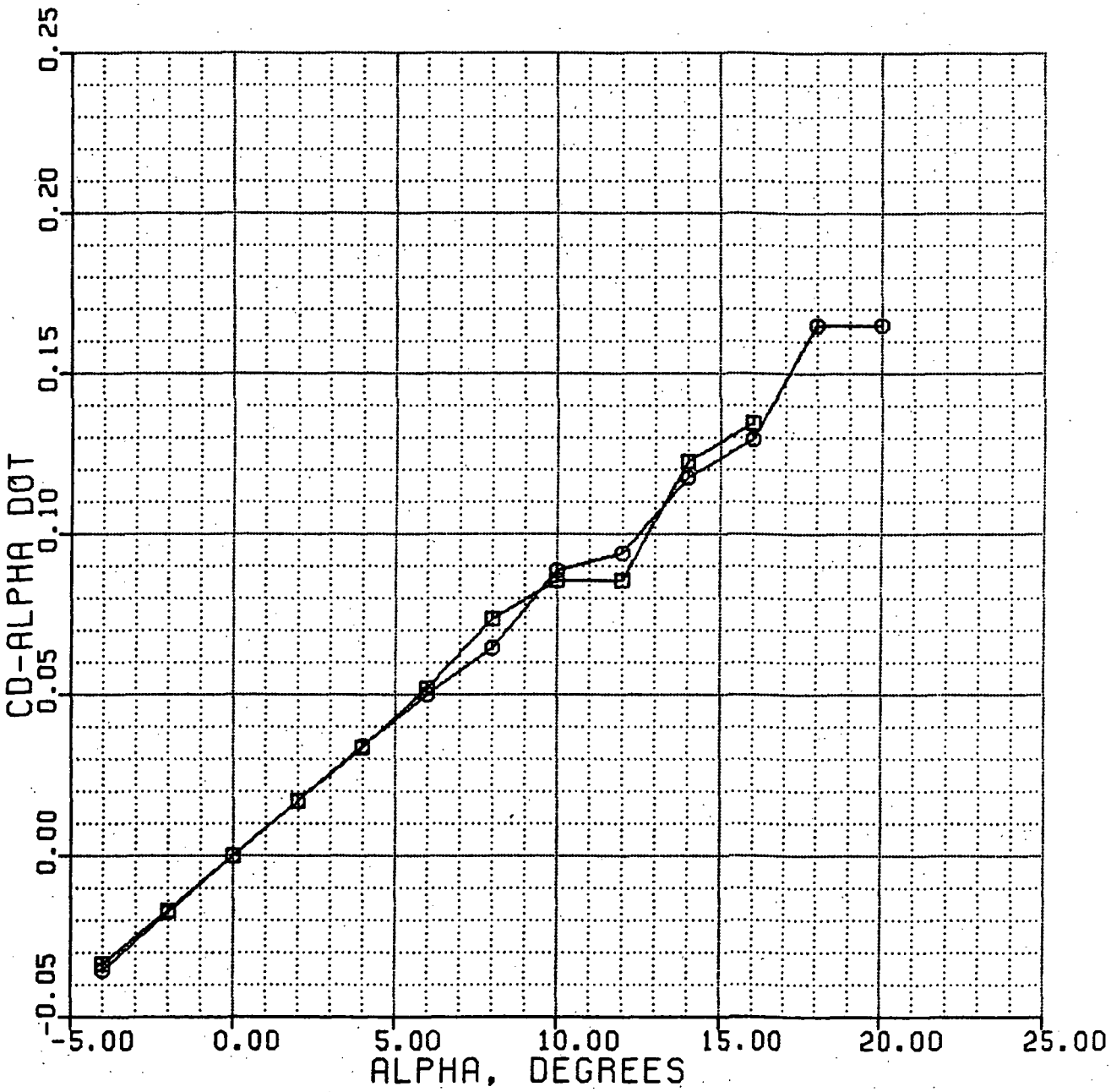

Figure 86(b)

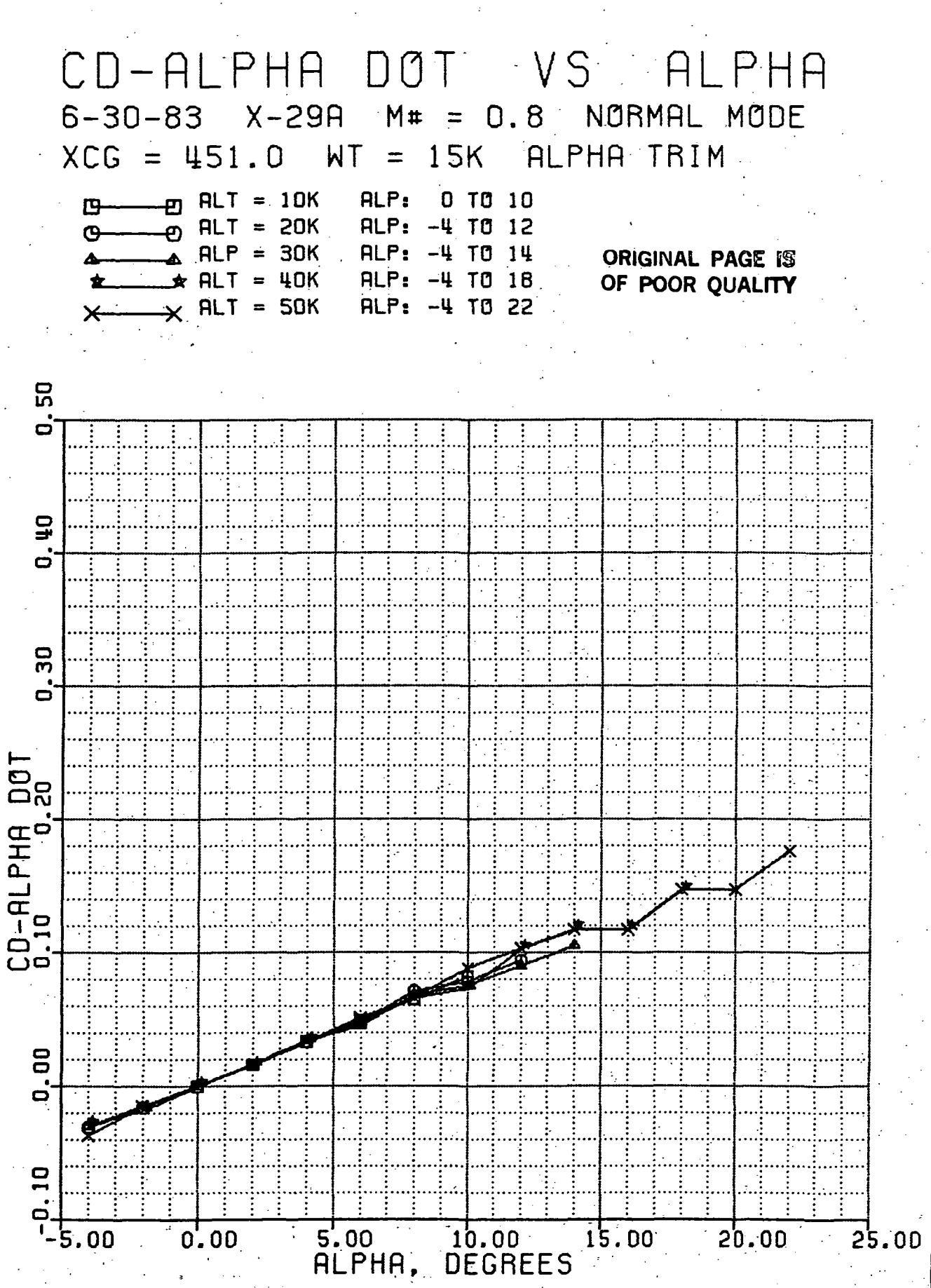
CD-ALPHA DØT VS ALPHA
6-30-83 X-29A M# = 0.8 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TØ 10
ALT = 20K ALP: -4 TØ 12
ALP = 30K ALP: -4 TØ 14
ALT = 40K ALP: -4 TØ 18
ALT = 50K ALP: -4 TØ 22
ORIGINAL PAGE IS OF POOR QUALITY
CD-ALPHA DØT
0.50
0.40
0.30
0.20
0.10
0.00
-0.10
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 86(c)

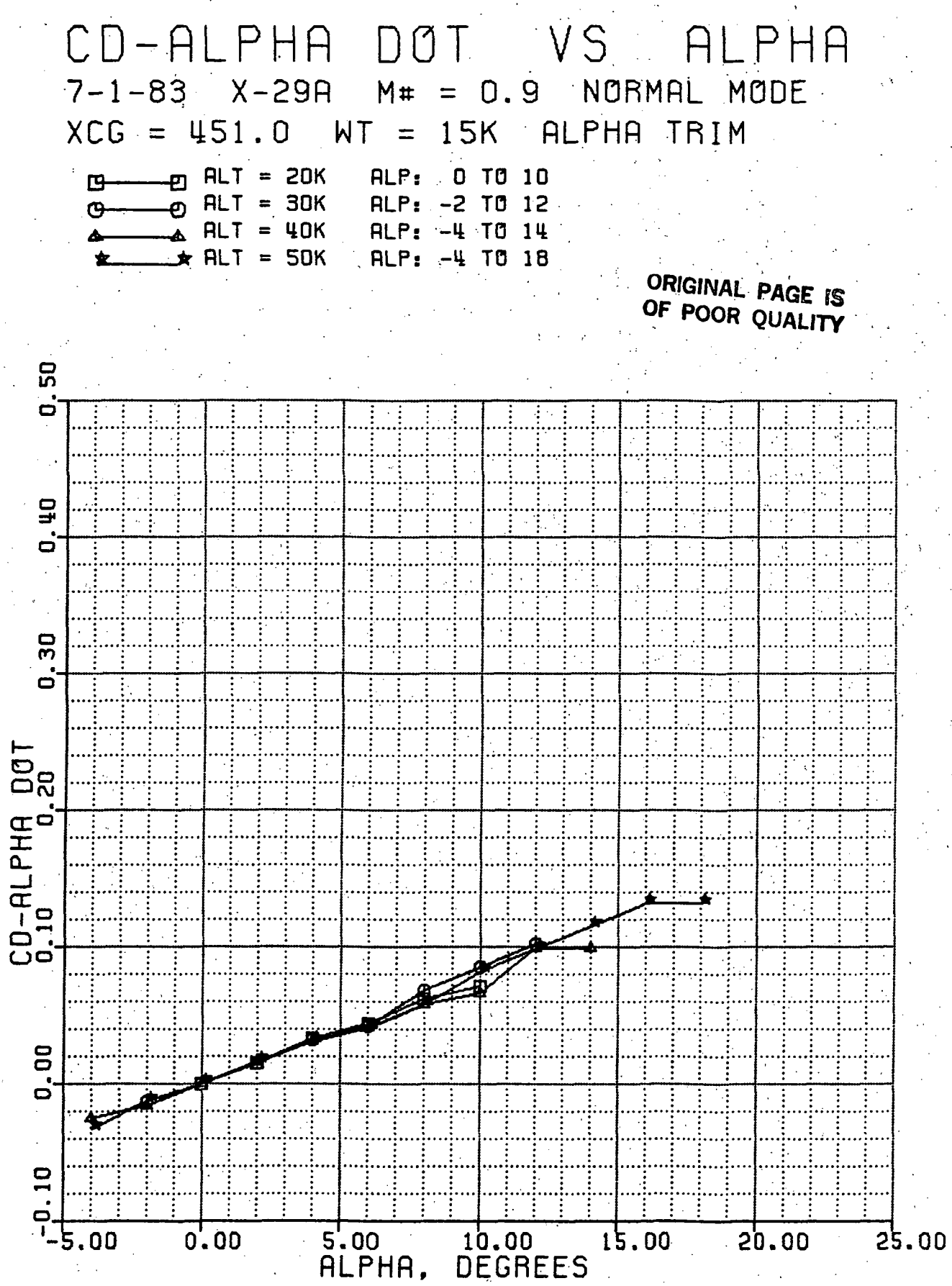
CD-ALPHA DØT VS ALPHA
7-1-83 X-29A M# = 0.9 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: 0 TØ 10
ALT = 30K ALP: -2 TØ 12
ALT = 40K ALP: -4 TØ 14
ALT = 50K ALP: -4 TØ 18
ORIGINAL PAGE IS
OF POOR QUALITY
CD-ALPHA DØT
0.50
0.40
0.30
0.20
0.10
0.00
-0.10
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 86(d)

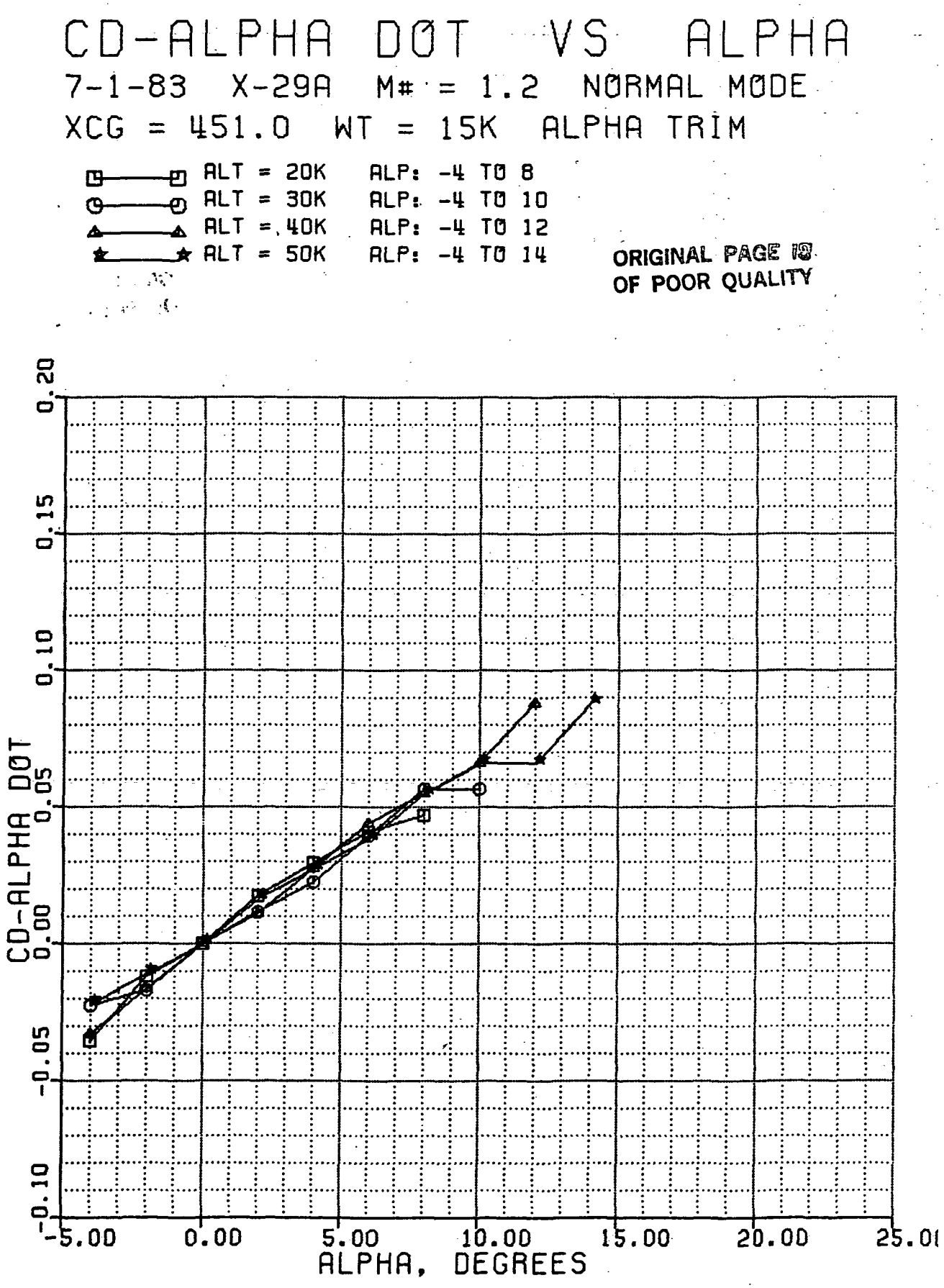
CD-ALPHA DØT VS ALPHA
7-1-83 X-29A M# = 1.2 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TØ 8
ALT = 30K ALP: -4 TØ 10
ALT = 40K ALP: -4 TØ 12
ALT = 50K ALP: -4 TØ 14
ORIGINAL PAGE IS
OF POOR QUALITY
CD-ALPHA DØT
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 86(e)

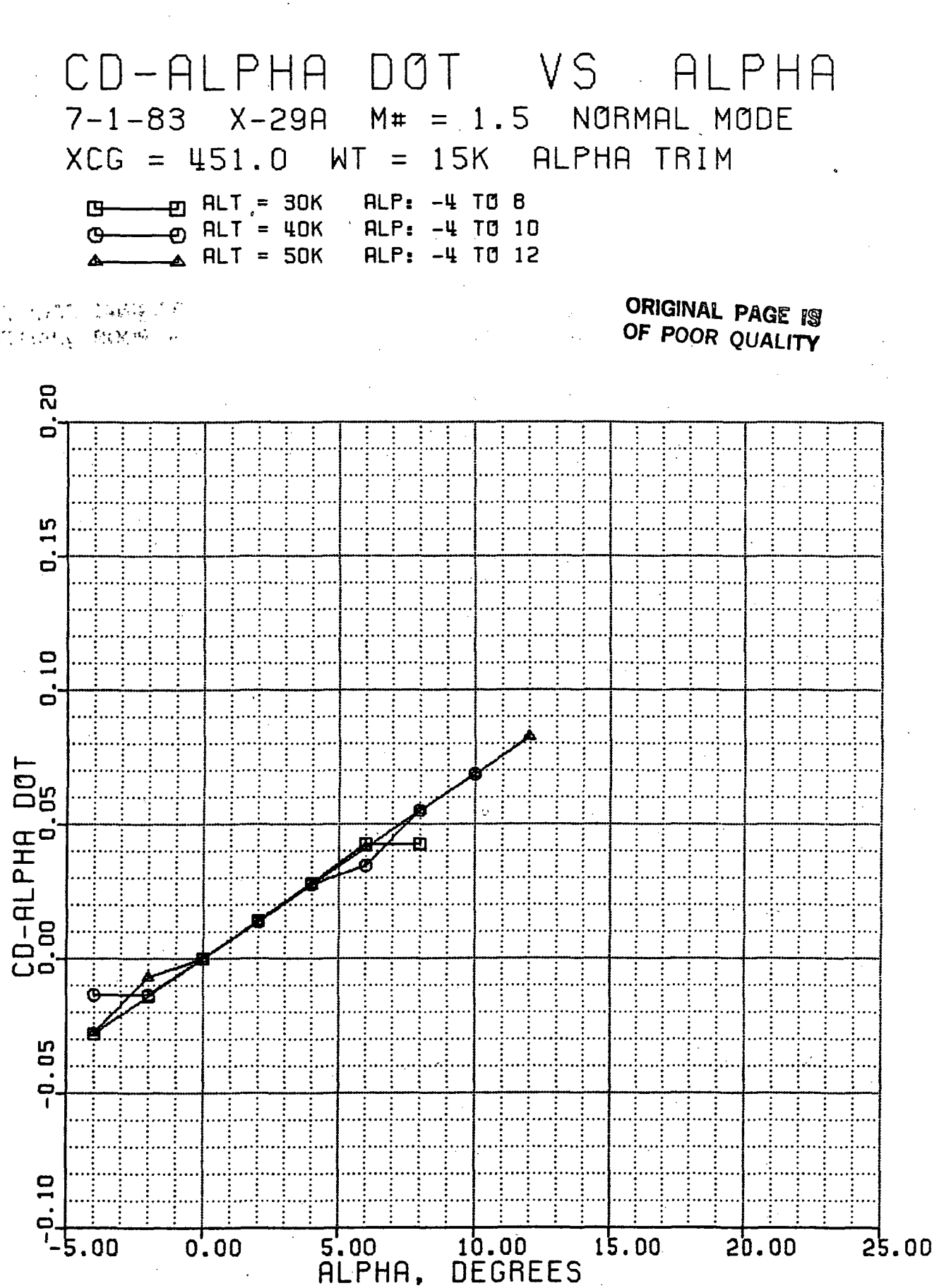
CD-ALPHA DØT VS ALPHA
7-1-83 X-29A M# = 1.5 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 30K ALP: -4 TØ 8
ALT = 40K ALP: -4 TØ 10
ALT = 50K ALP: -4 TØ 12
ORIGINAL PAGE IS
OF POOR QUALITY
CD-ALPHA DØT
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 86(f)

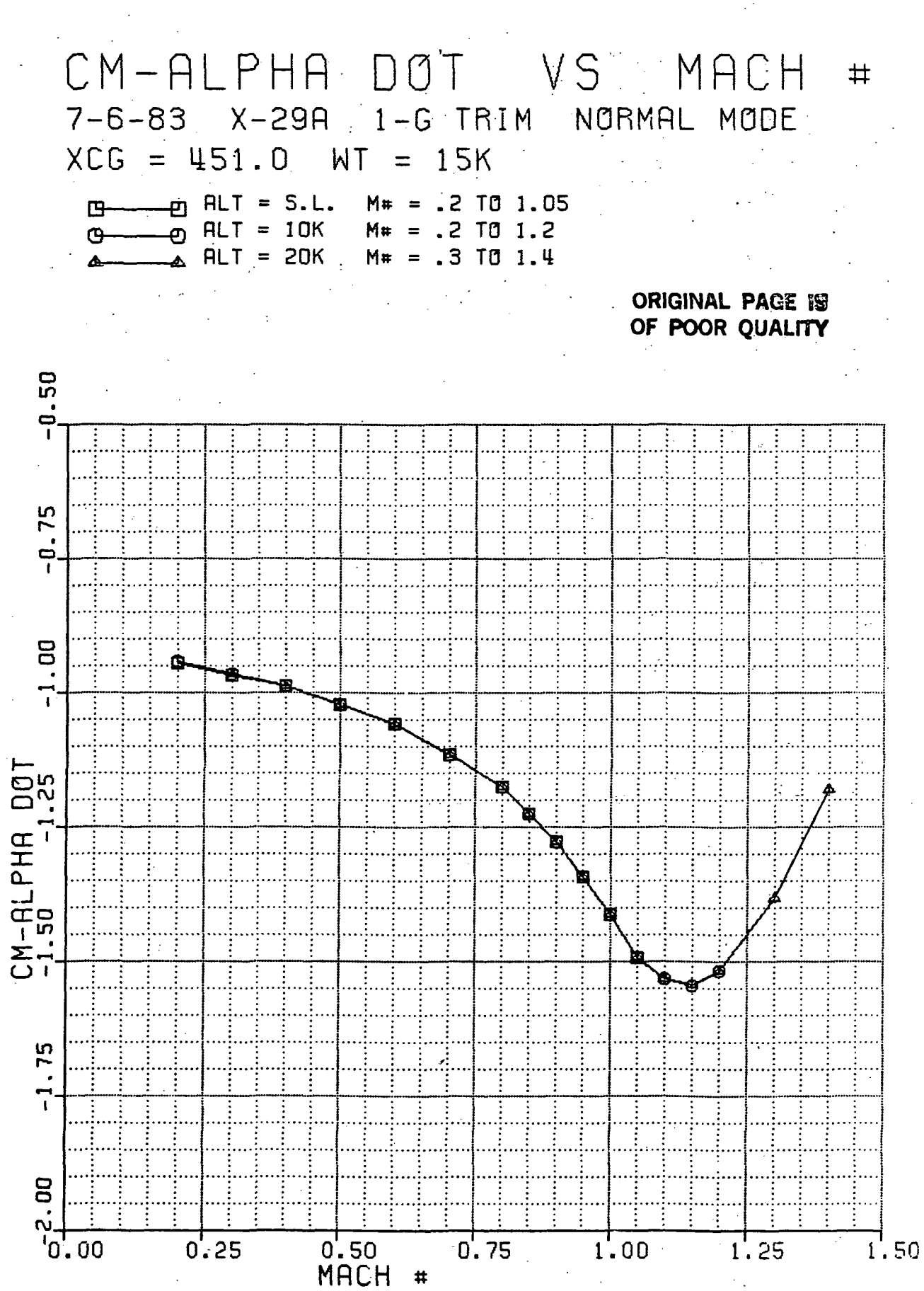
CM-ALPHA DØT VS MACH #
7-6-83 X-29A 1-G TRIM NØRMAL MØDE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TØ 1.05
ALT = 10K M# = .2 TØ 1.2
ALT = 20K M# = .3 TØ 1.4
ORIGINAL PAGE IS
OF POOR QUALITY
CM-ALPHA DØT
-0.50
-0.75
-1.00
-1.25
-1.50
-1.75
-2.00
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 87(a)

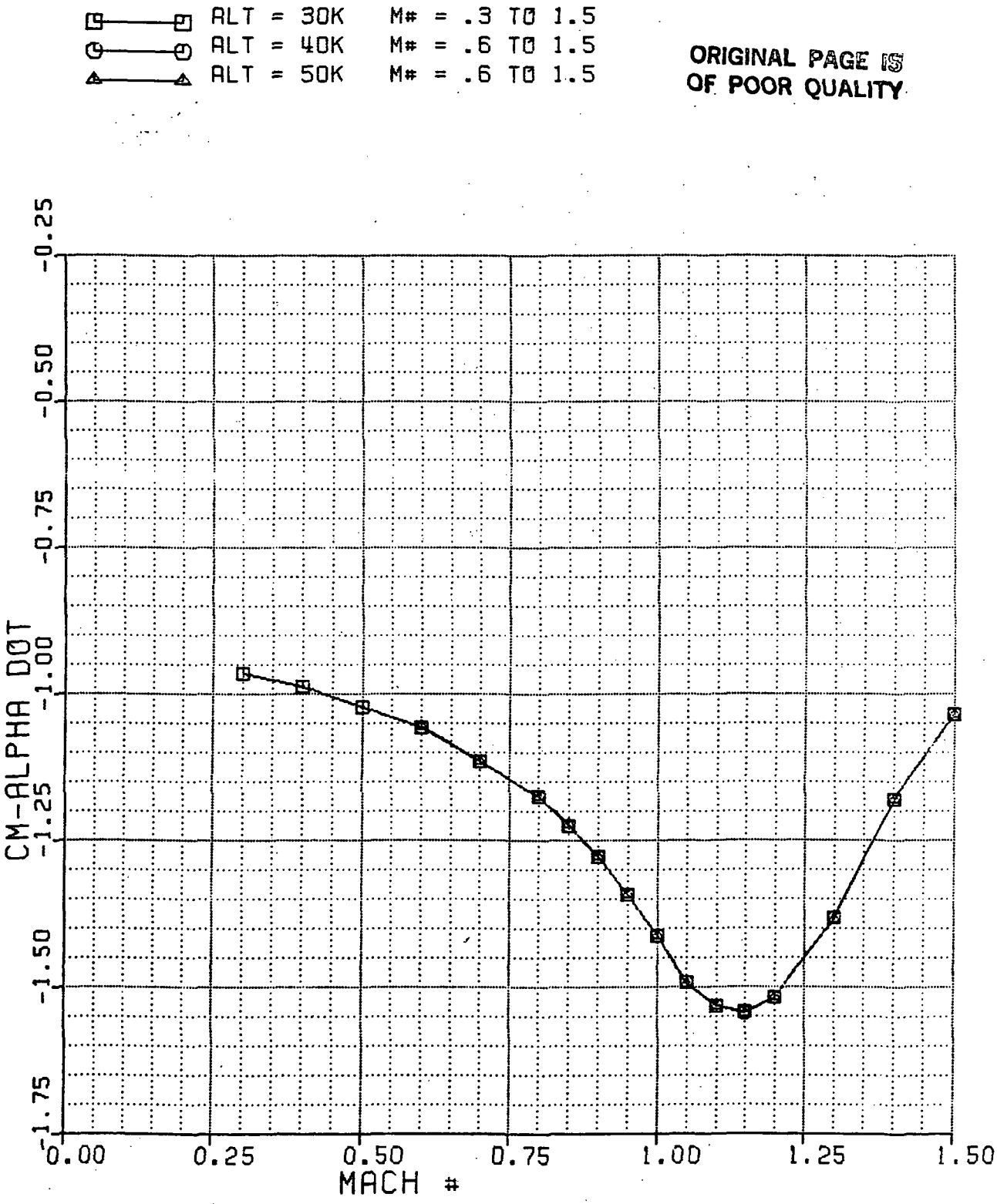
CM-ALPHA DØT VS MACH #
7-7-83 X-29A 1-G TRIM NØRMAL MØDE
XCG = 451.0 WT = 15K
ALT = 30K M# = .3 TØ 1.5
ALT = 40K M# = .6 TØ 1.5
ALT = 50K M# = .6 TØ 1.5
ORIGINAL PAGE IS
OF POOR QUALITY
CM-ALPHA DØT
-0.25
-0.50
-0.75
-1.00
-1.25
-1.50
-1.75
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 87(b)

CM-ALPHA DØT VS ALPHA

7-26-83 X-29A M# = 0.4 NØRMAL MØDE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TØ 22

ALT = 10K ALP: -4 TØ 22

ORIGINAL PAGE IS
OF POOR QUALITY

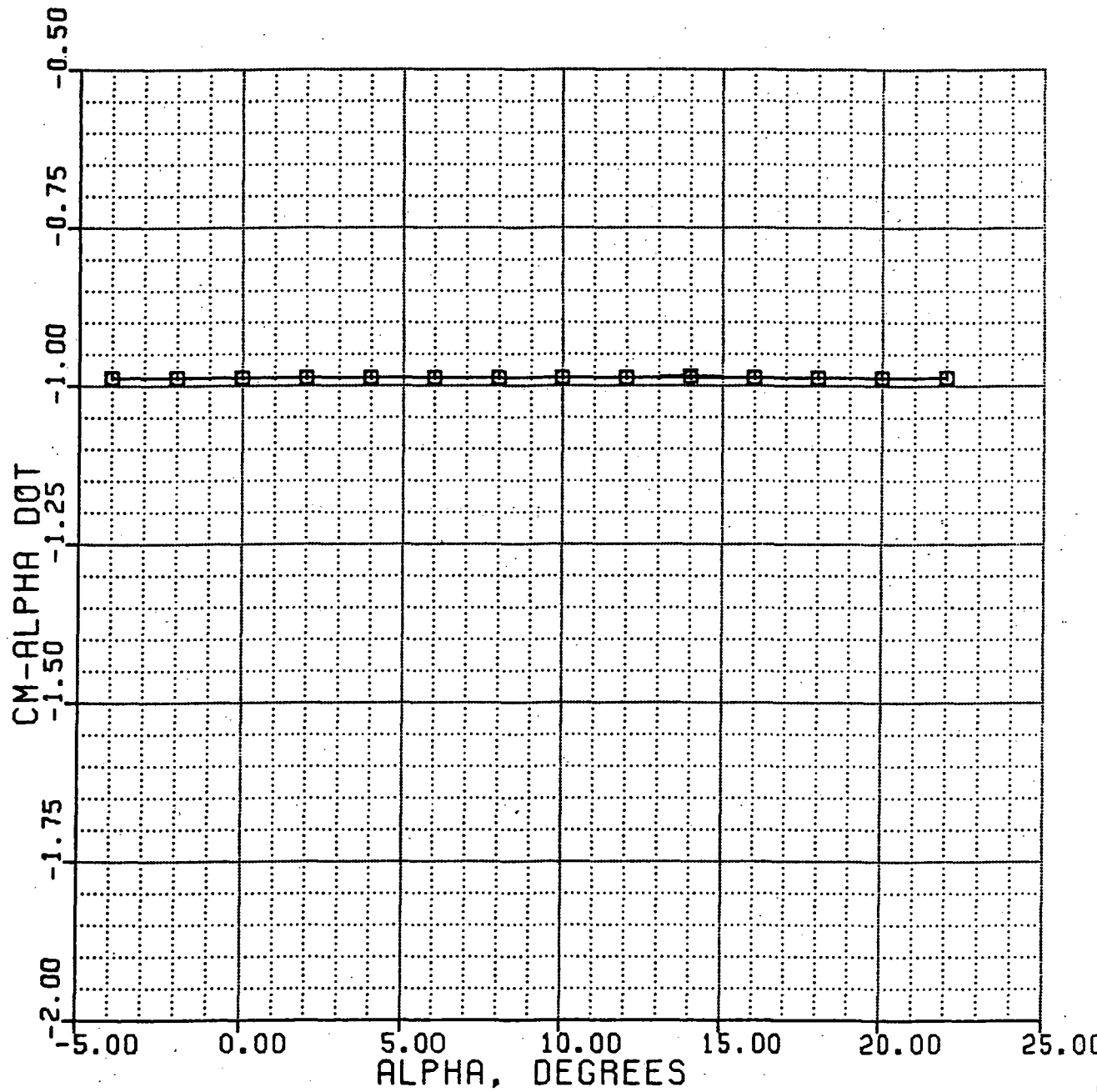

Figure 88(a)

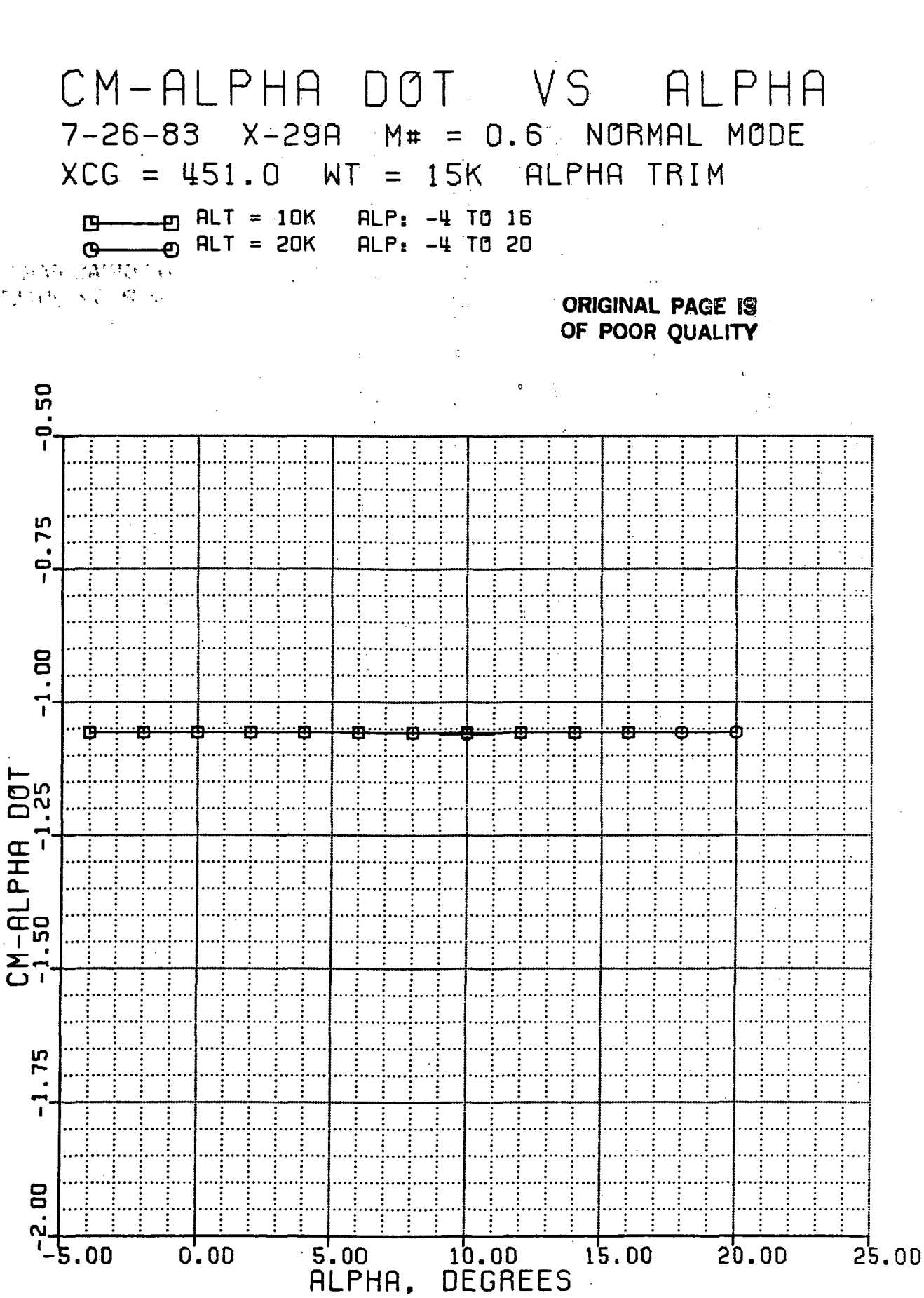
CM-ALPHA DØT VS ALPHA
7-26-83 X-29A M# = 0.6 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: -4 TØ 16
ALT = 20K ALP: -4 TØ 20
ORIGINAL PAGE IS
OF POOR QUALITY
-0.50
-0.75
-1.00
-1.25
-1.50
-1.75
-2.00
CM-ALPHA DØT
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 88(b)

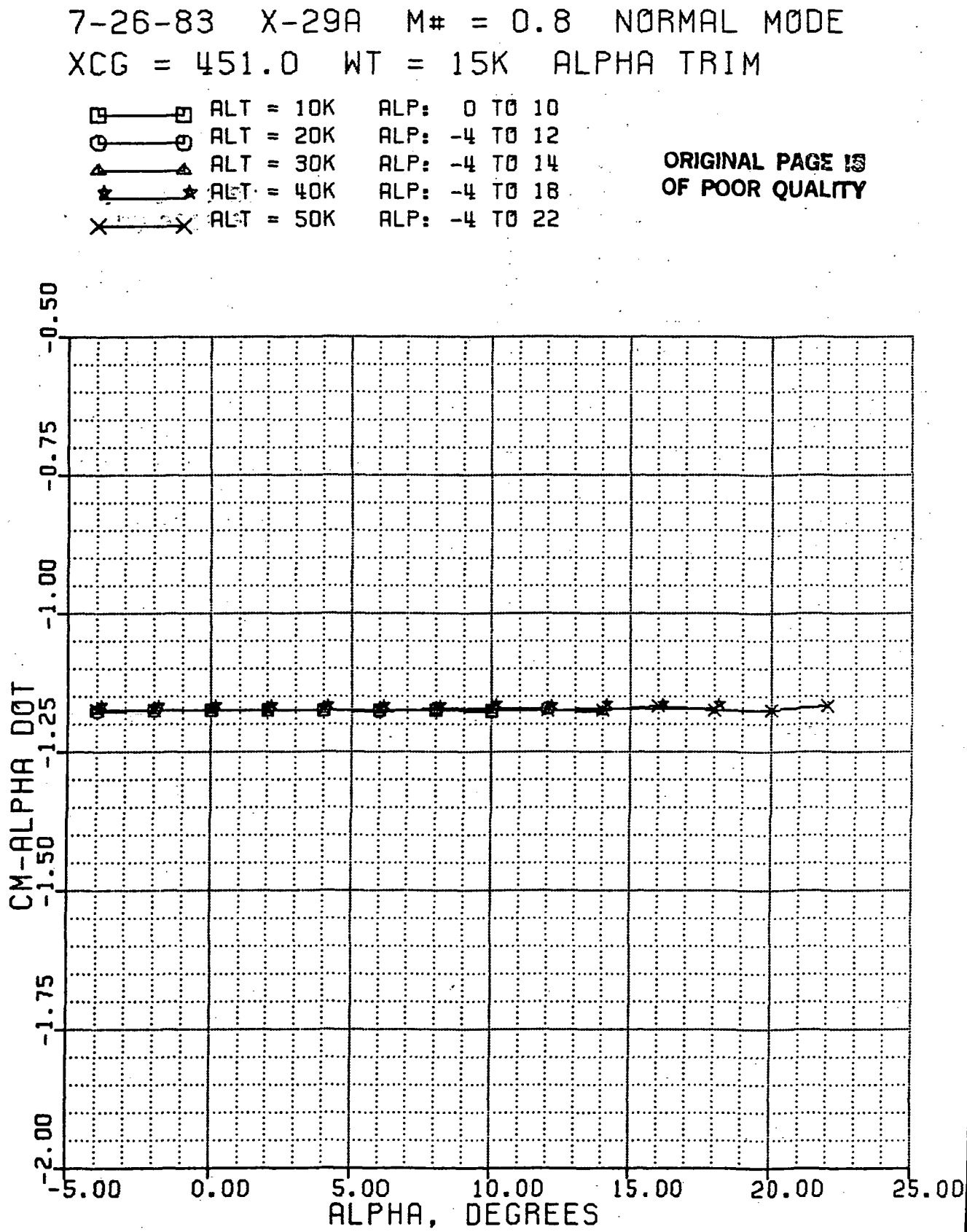
CM-ALPHA DØT VS ALPHA
7-26-83 X-29A M# = 0.8 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TØ 10
ALT = 20K ALP: -4 TØ 12
ALT = 30K ALP: -4 TØ 14
ALT = 40K ALP: -4 TØ 18
ALT = 50K ALP: -4 TØ 22
ORIGINAL PAGE IS
OF POOR QUALITY
CM-ALPHA DØT
-0.50
-0.75
-1.00
-1.25
-1.50
-1.75
-2.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 88(c)

CM-ALPHA DØT VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TØ 10
ALT = 30K ALP: -2 TØ 12
ALT = 40K ALP: -4 TØ 14
ALT = 50K ALP: -4 TØ 18

ORIGINAL PAGE IS
OF POOR QUALITY

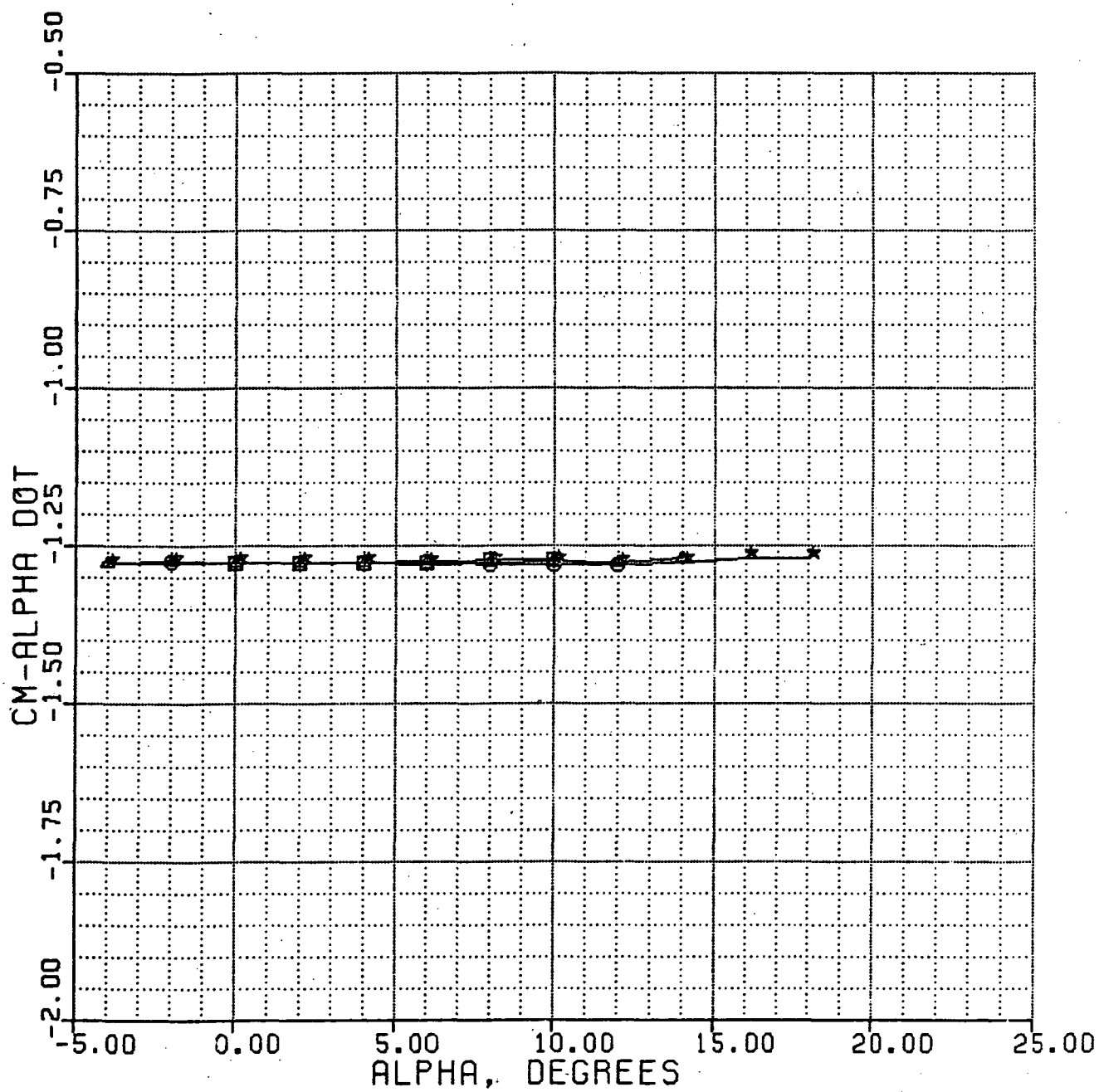

Figure 88(d)

CM-ALPHA DØT VS ALPHA

7-27-83 X-29A M# = 1.2 NØRMAL MØDE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TØ 8
ALT = 30K ALP: -4 TØ 10
ALT = 40K ALP: -4 TØ 12
ALT = 50K ALP: -4 TØ 14

ORIGINAL PAGE IS
OF POOR QUALITY

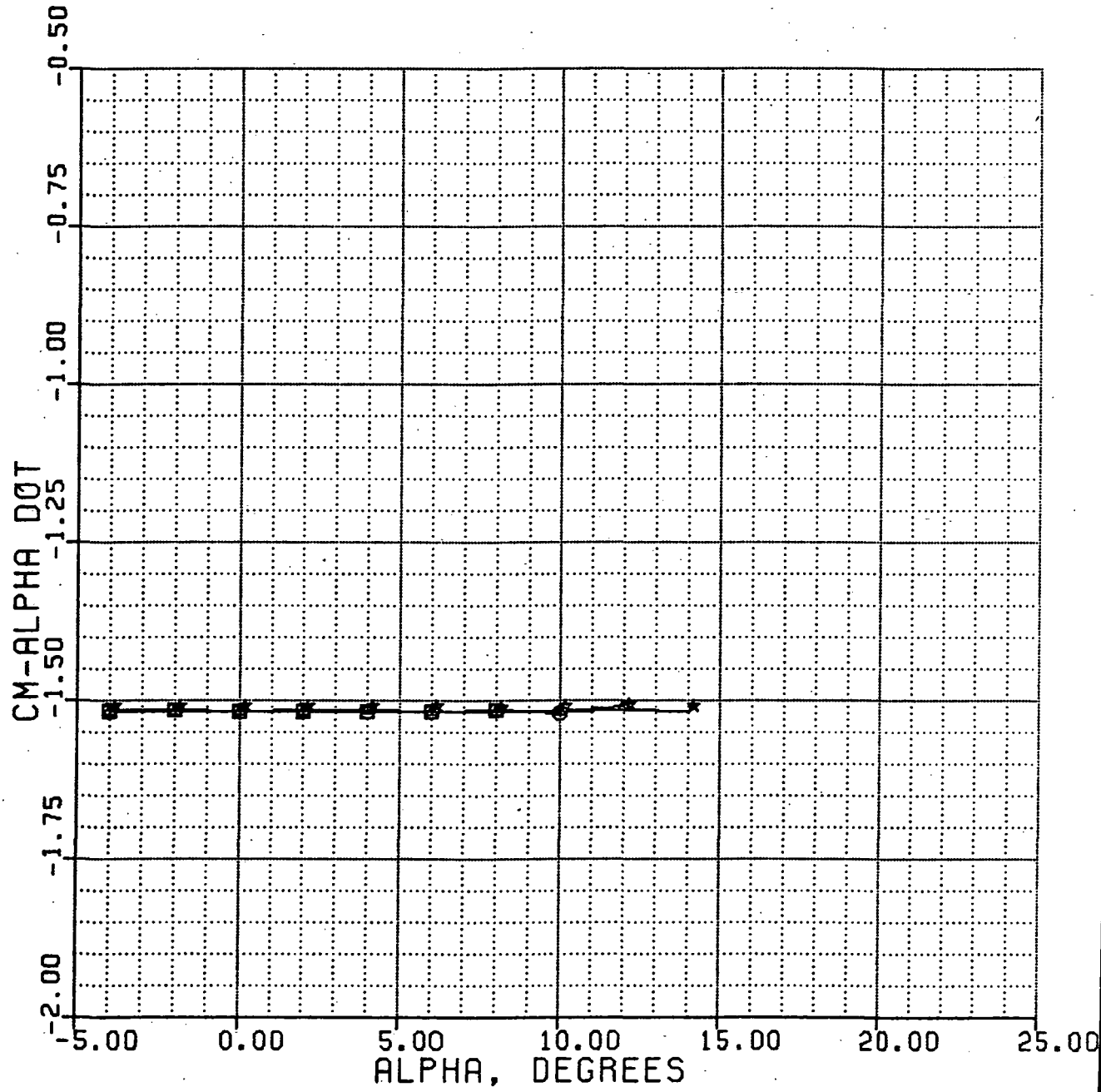

Figure 88(e)

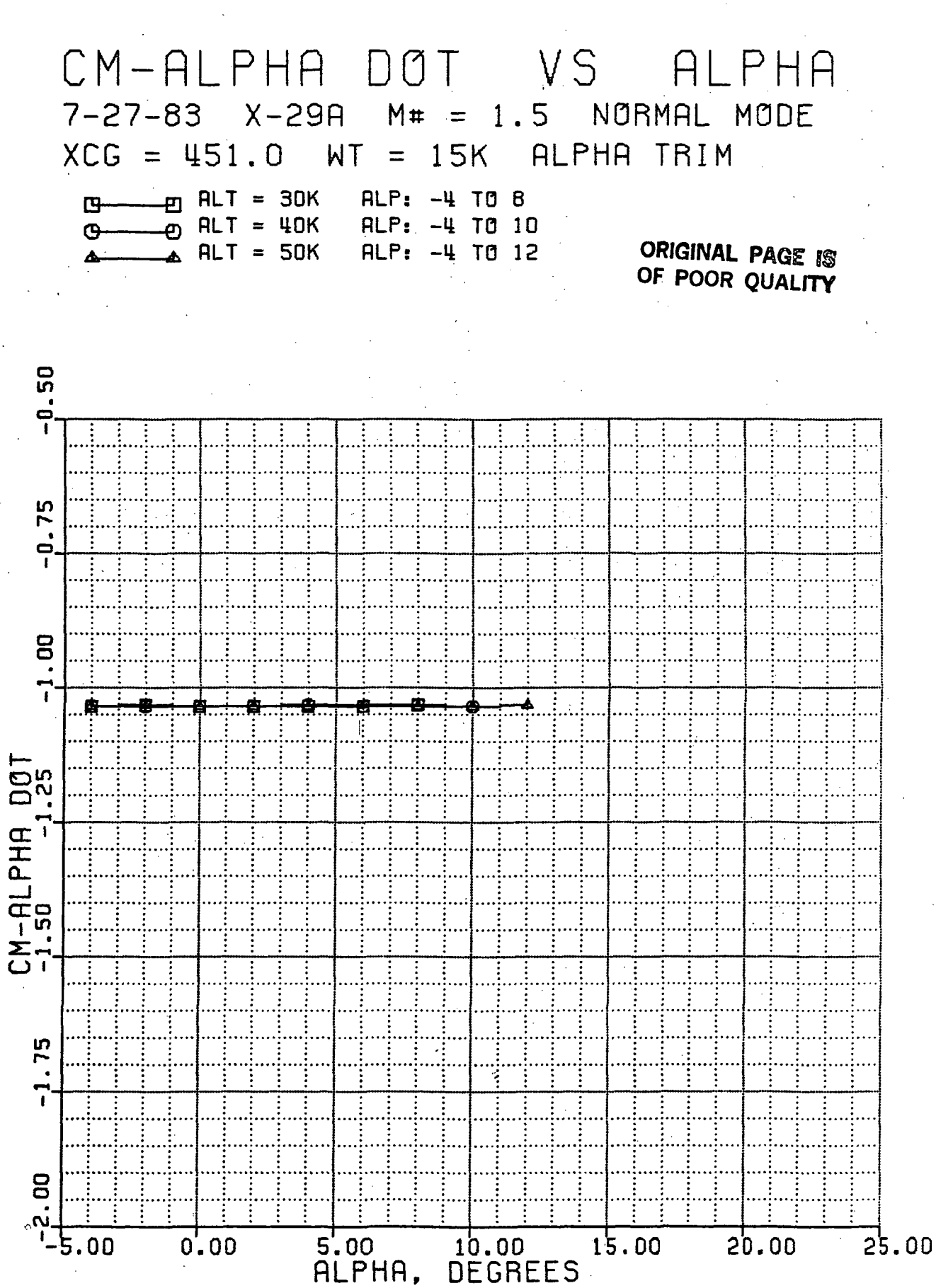
CM-ALPHA DØT VS ALPHA
7-27-83 X-29A M# = 1.5 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 30K ALP: -4 TØ 8
ALT = 40K ALP: -4 TØ 10
ALT = 50K ALP: -4 TØ 12
ORIGINAL PAGE IS
OF POOR QUALITY
CM-ALPHA DØT
-0.50
-0.75
-1.00
-1.25
-1.50
-1.75
-2.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 88(f)

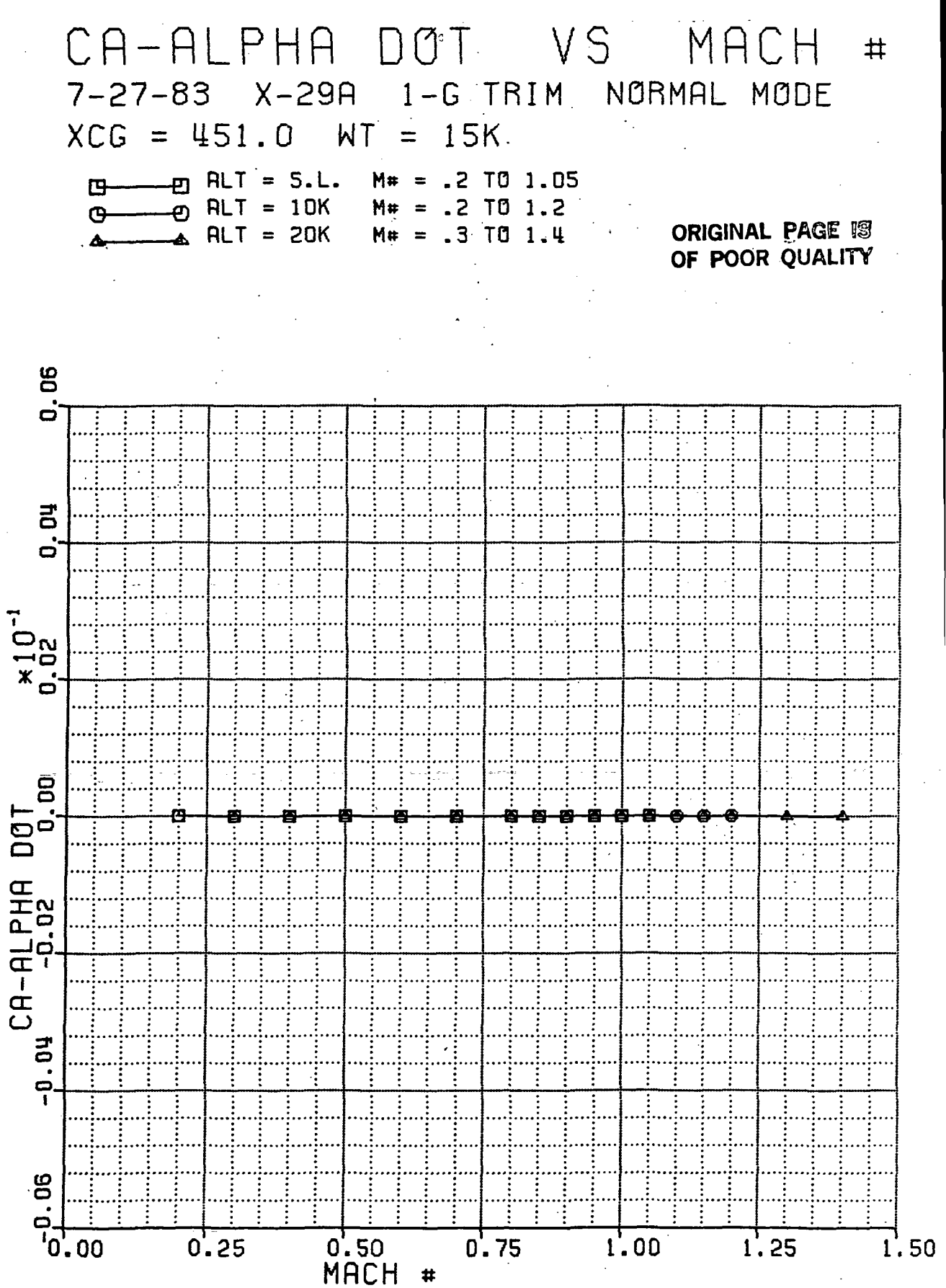
CA-ALPHA DØT VS MACH #
7-27-83 X-29A 1-G TRIM NØRMAL MØDE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TØ 1.05
ALT = 10K M# = .2 TØ 1.2
ALT = 20K M# = .3 TØ 1.4
ORIGINAL PAGE IS
OF POOR QUALITY
CA-ALPHA DØT *10⁻¹
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 89(a)

CA-ALPHA DØT VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TØ 1.5
ALT = 40K M# = .6 TØ 1.5
ALT = 50K M# = .6 TØ 1.5

ORIGINAL PAGE IS
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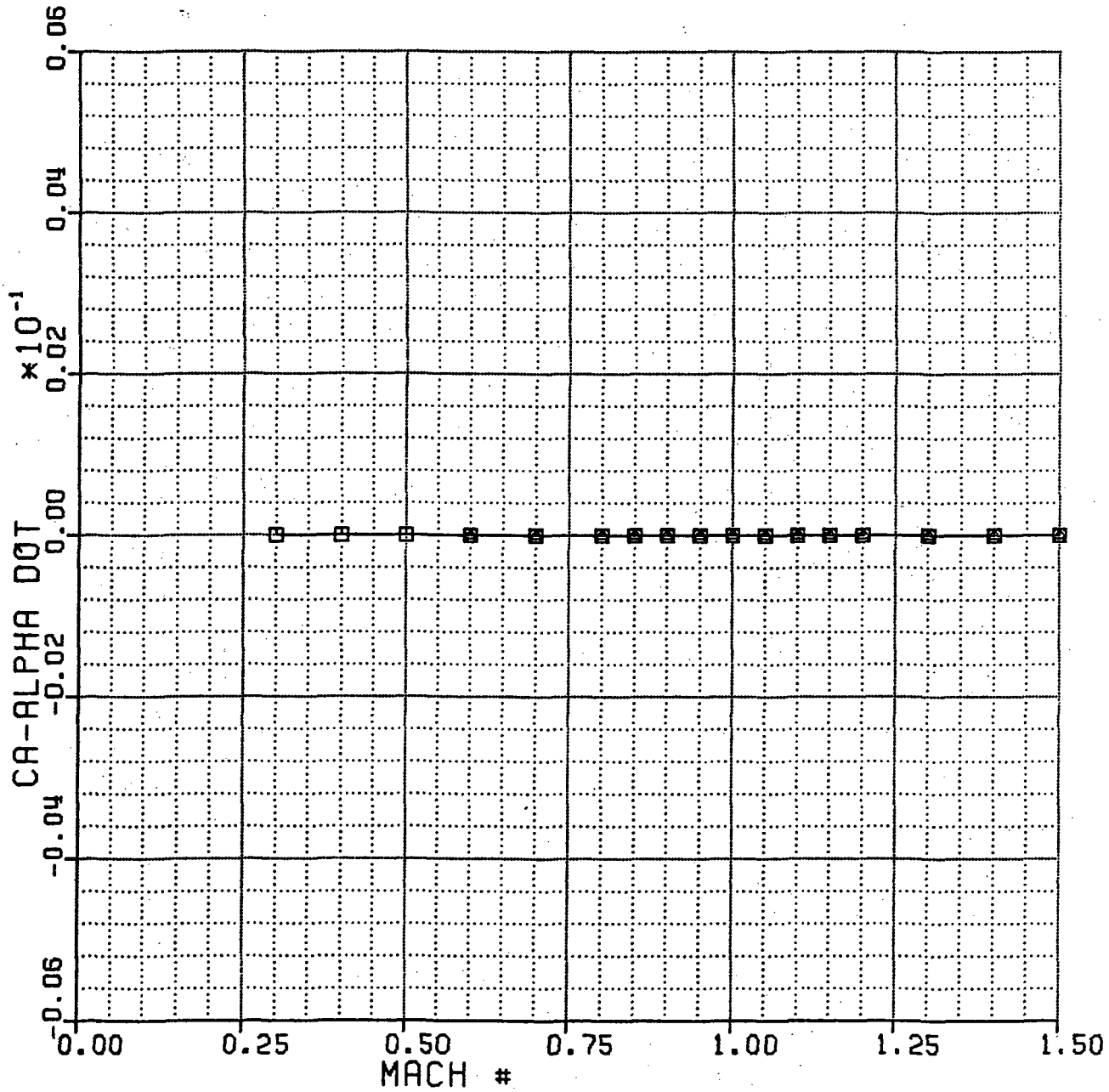

Figure 89(b)

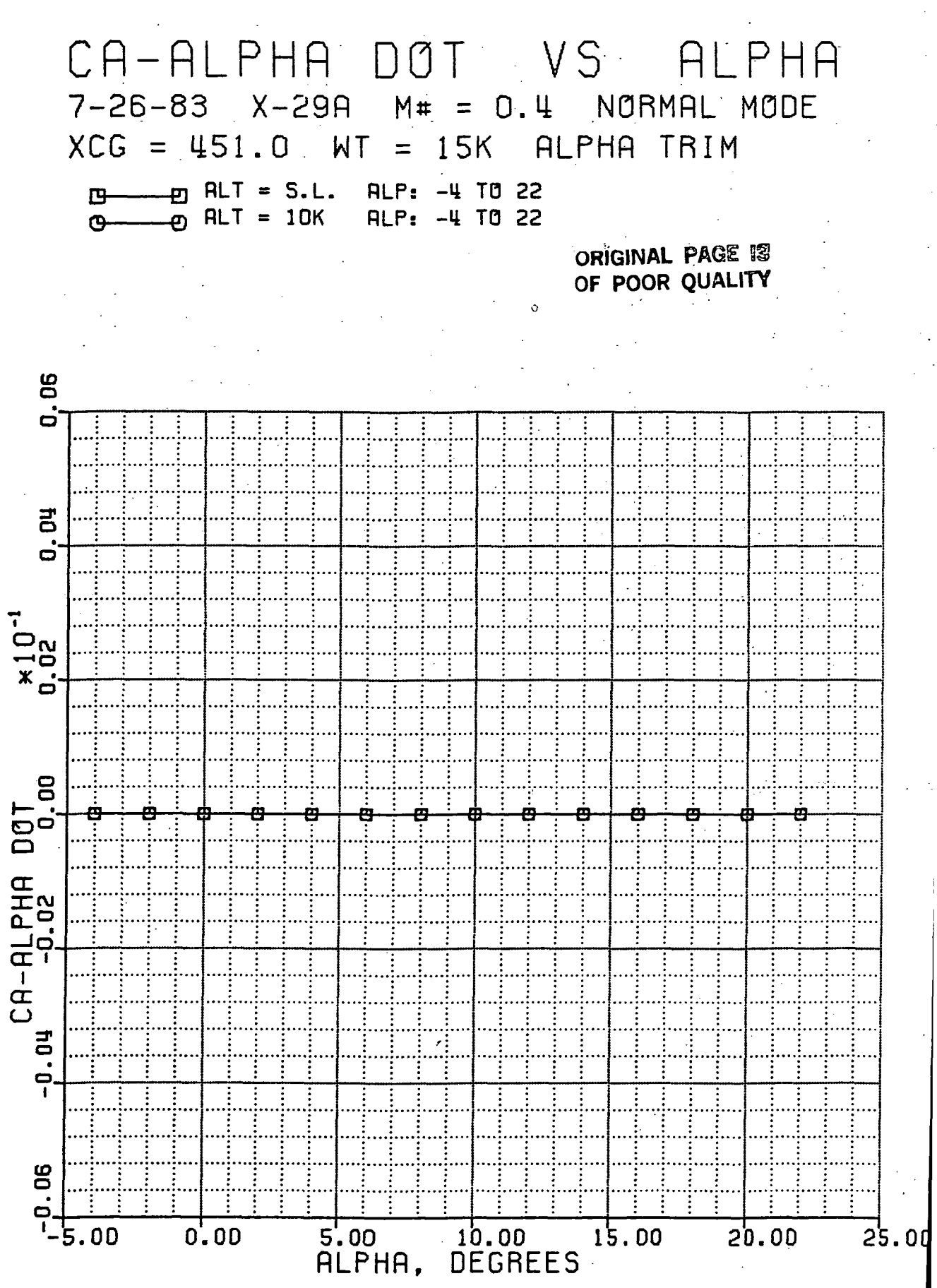
CA-ALPHA DØT VS ALPHA
7-26-83 X-29A M# = 0.4 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = S.L. ALP: -4 TØ 22
ALT = 10K ALP: -4 TØ 22
ORIGINAL PAGE IS
OF POOR QUALITY
CA-ALPHA DØT
*10-1
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 90(a)

CA-ALPHA DØT VS ALPHA

7-26-83 X-29A M# = 0.6 NØRMAL MØDE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TØ 16

ALT = 20K ALP: -4 TØ 20

ORIGINAL PAGE IS
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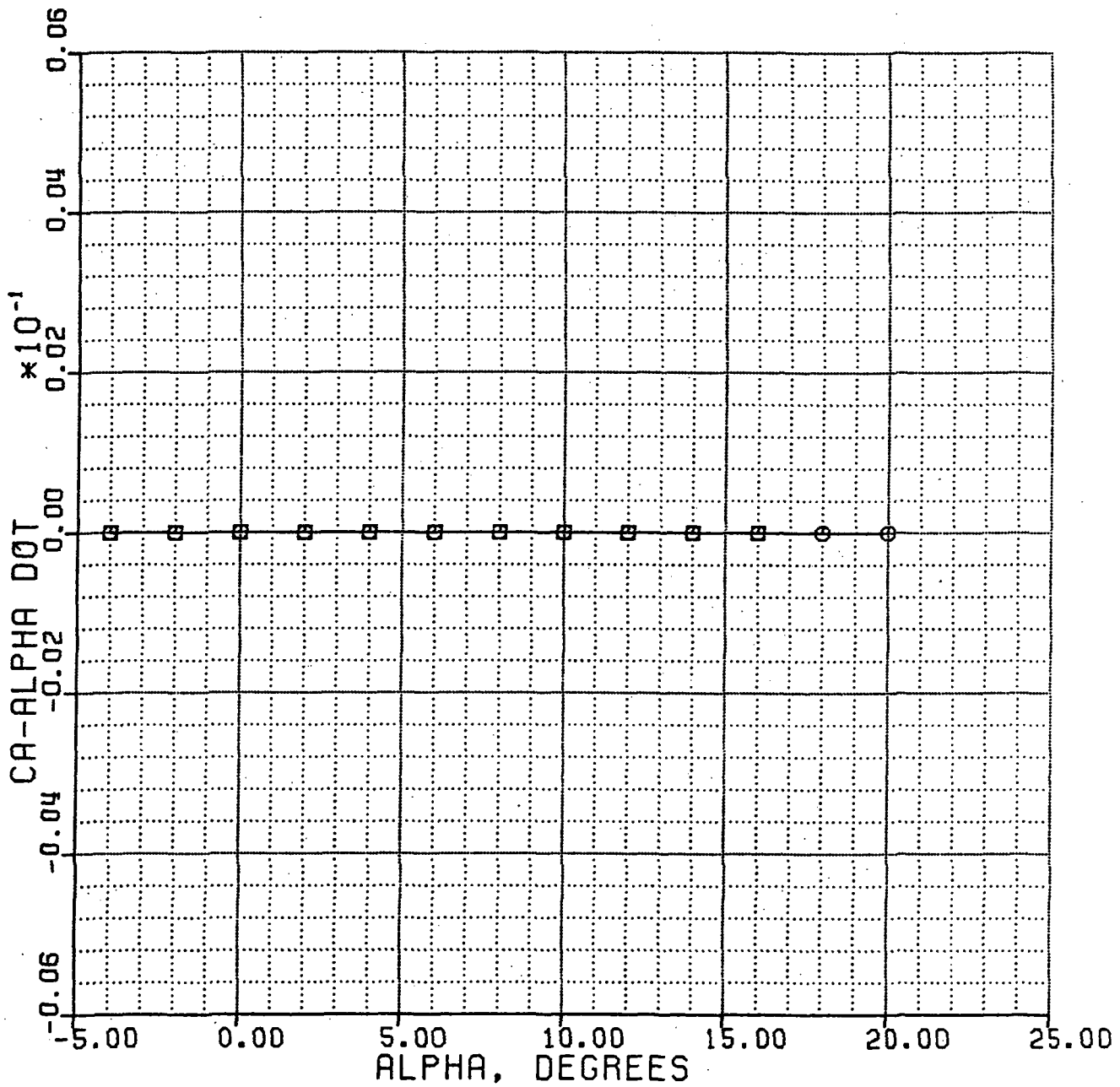

Figure 90(b)

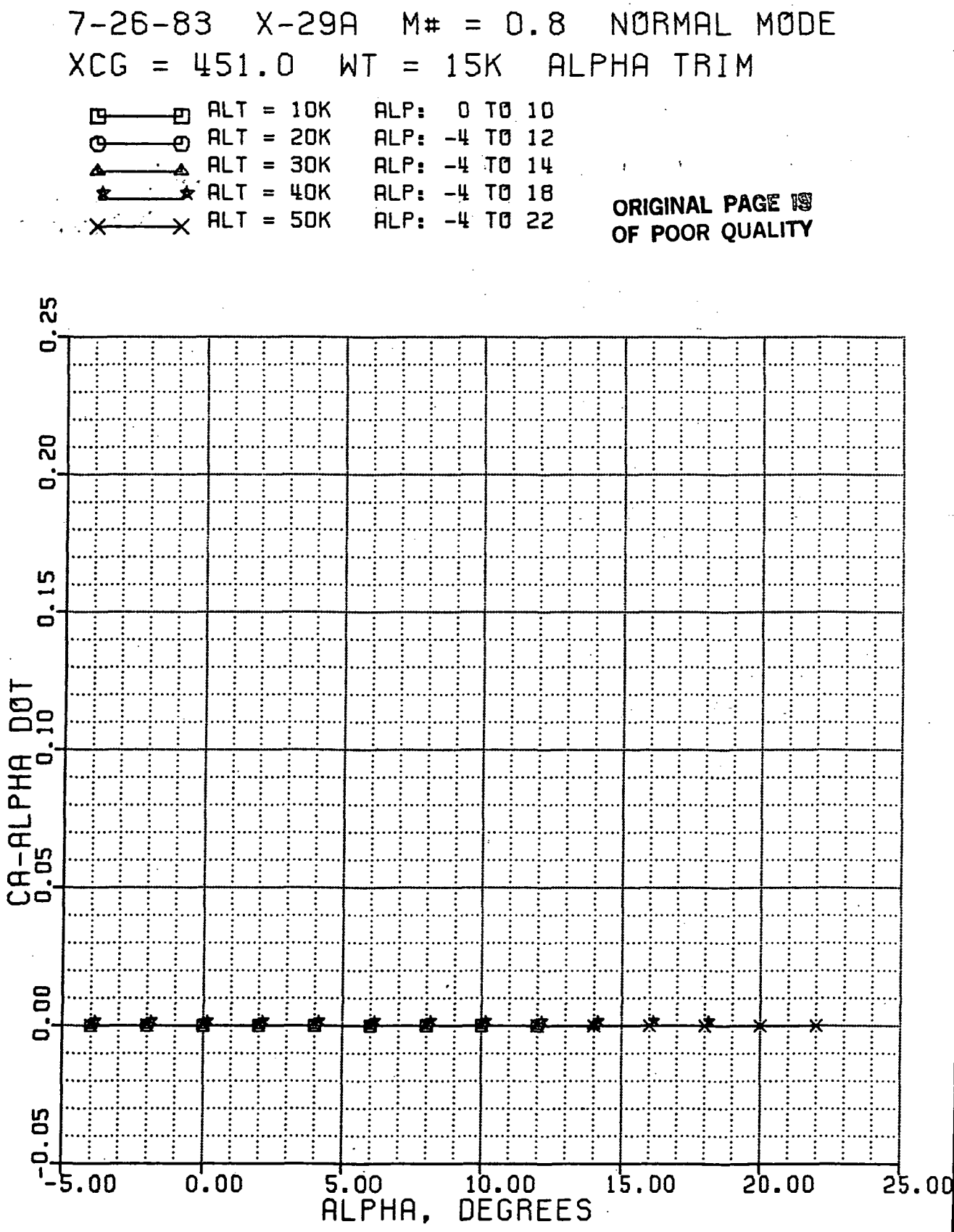
CA-ALPHA DØT VS ALPHA
7-26-83 X-29A M# = 0.8 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TØ 10
ALT = 20K ALP: -4 TØ 12
ALT = 30K ALP: -4 TØ 14
ALT = 40K ALP: -4 TØ 18
ALT = 50K ALP: -4 TØ 22
ORIGINAL PAGE IS
OF POOR QUALITY
CA-ALPHA DØT
0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 90(c)

CA-ALPHA DØT VS ALPHA

7-27-83 X-29A M# = 0.9 NØRMAL MØDE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K	ALP:	0 TØ 10
ALT = 30K	ALP:	-2 TØ 12
ALT = 40K	ALP:	-4 TØ 14
ALT = 50K	ALP:	-4 TØ 18

ORIGINAL PAGE IS
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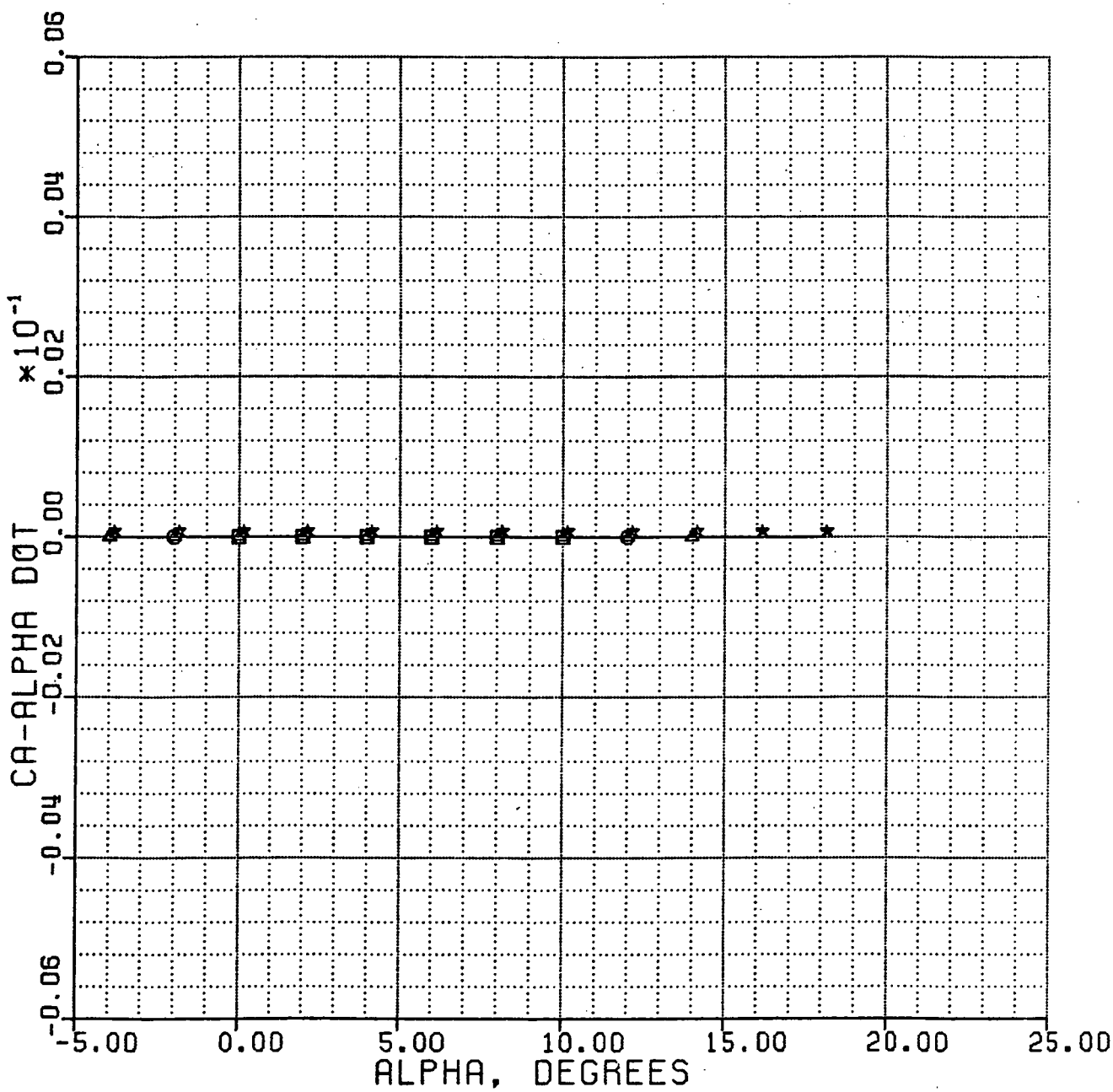

Figure 90(d)

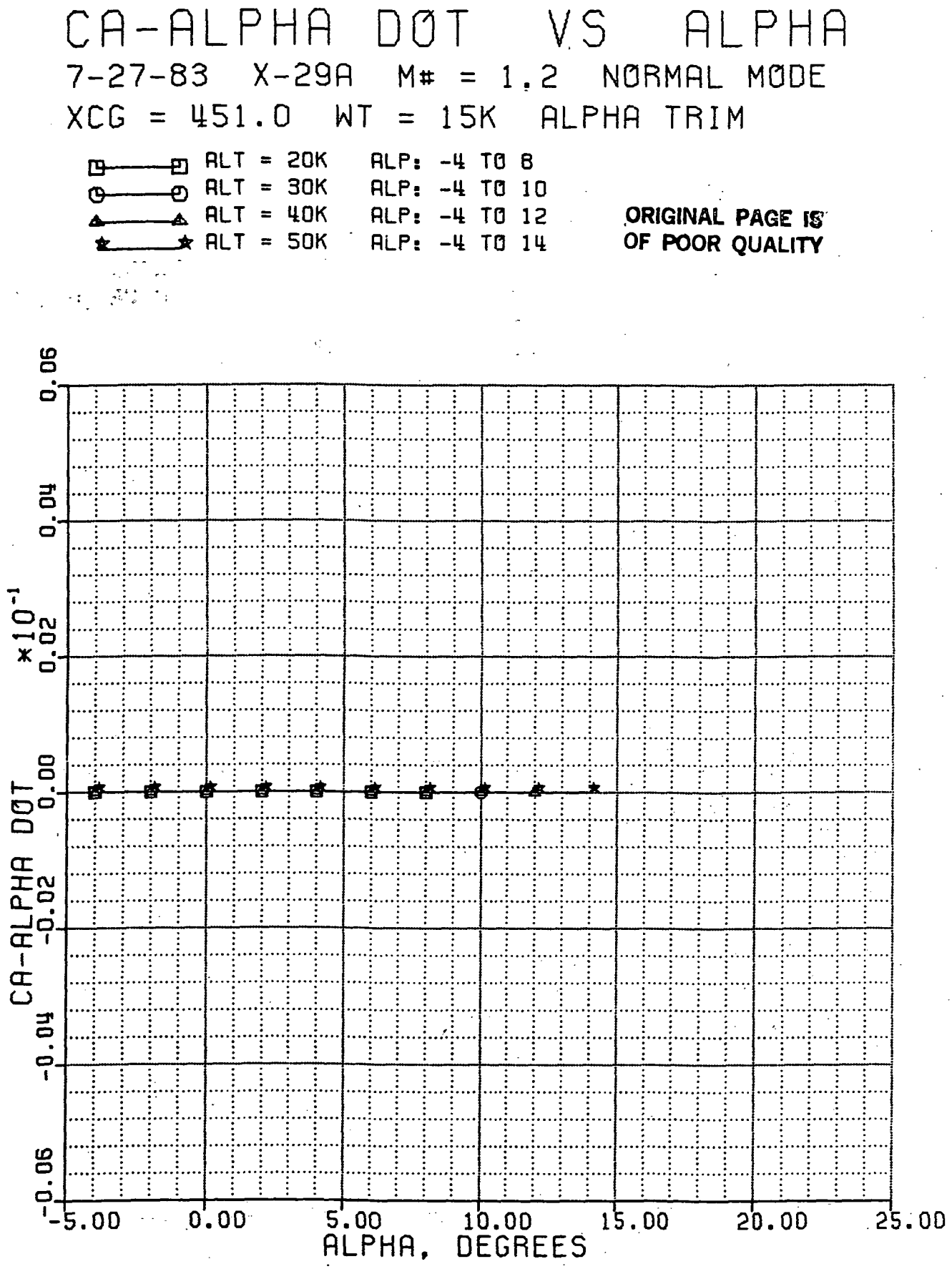
CA-ALPHA DØT VS ALPHA
7-27-83 X-29A M# = 1.2 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TØ 8
ALT = 30K ALP: -4 TØ 10
ALT = 40K ALP: -4 TØ 12
ALT = 50K ALP: -4 TØ 14
ORIGINAL PAGE IS OF POOR QUALITY
CA-ALPHA DØT
*10^-1
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 90(e)

CA-ALPHA DØT VS ALPHA

7-27-83 X-29A M# = 1.5 NØRMAL MØDE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TØ 8

ALT = 40K ALP: -4 TØ 10

ALT = 50K ALP: -4 TØ 12

ORIGINAL PAGE IS
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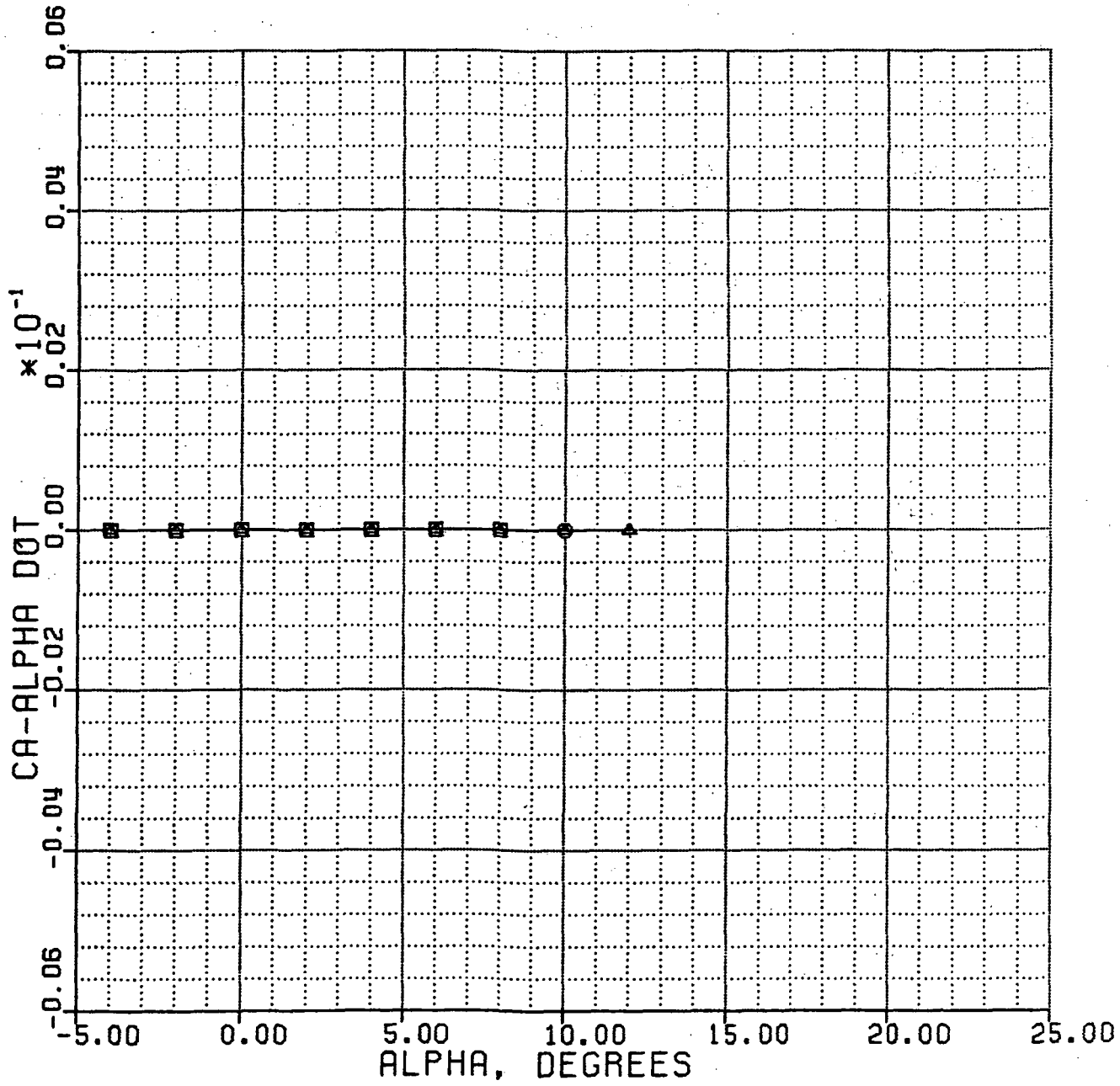

Figure 90(f)

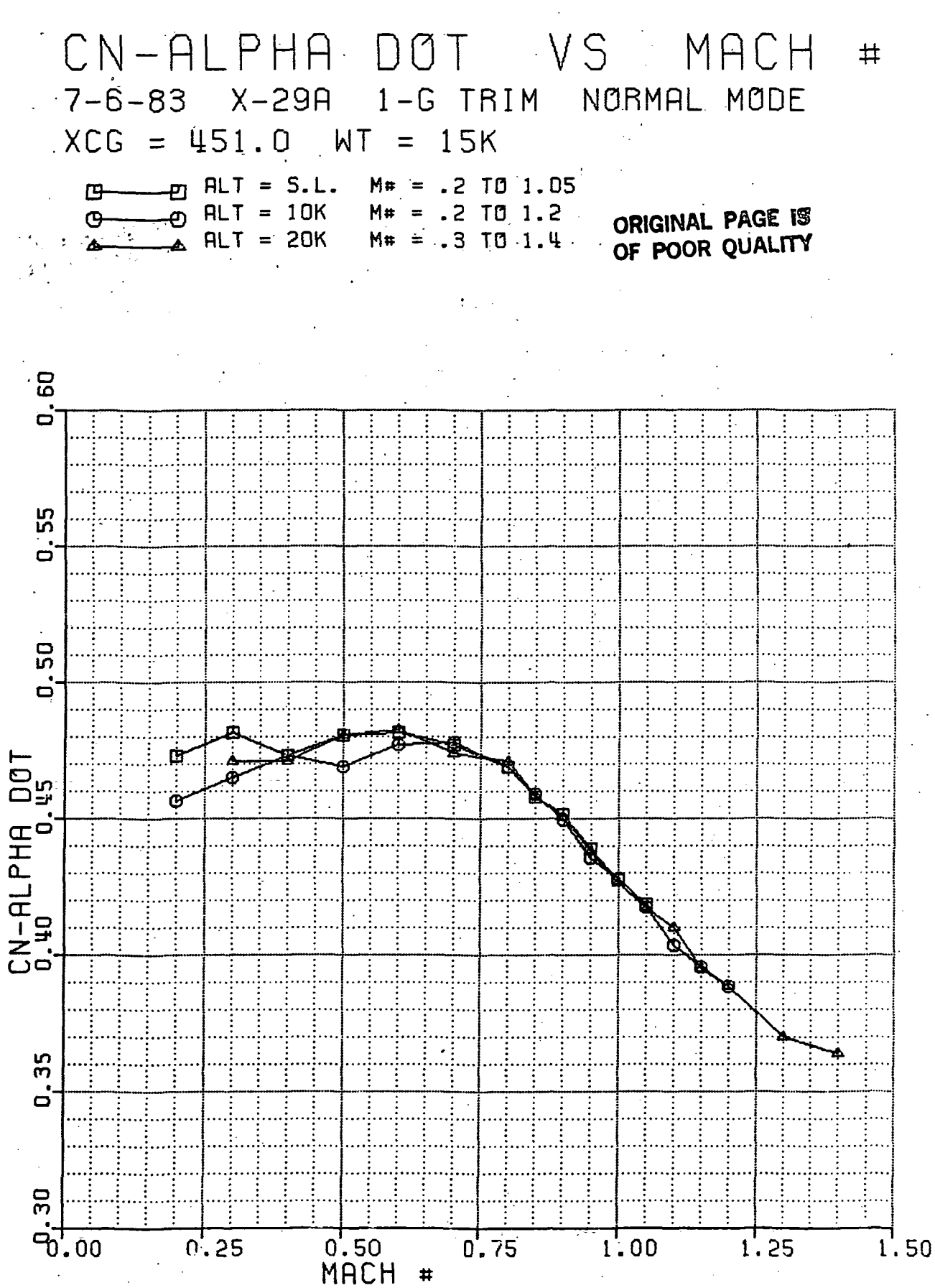
CN-ALPHA DØT VS MACH #
7-6-83 X-29A 1-G TRIM NØRMAL MØDE
XCG = 451.0 WT = 15K
ALT = S.L. M# = .2 TØ 1.05
ALT = 10K M# = .2 TØ 1.2
ALT = 20K M# = .3 TØ 1.4
ORIGINAL PAGE IS OF POOR QUALITY
CN-ALPHA DØT
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.00
0.25
0.50
0.75
1.00
1.25
1.50
MACH #

Figure 91(a)

CN-ALPHA DØT VS MACH

7-7-83 X-29A 1-G TRIM NØRMAL MØDE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TØ 1.5
ALT = 40K M# = .6 TØ 1.5
ALT = 50K M# = .6 TØ 1.5

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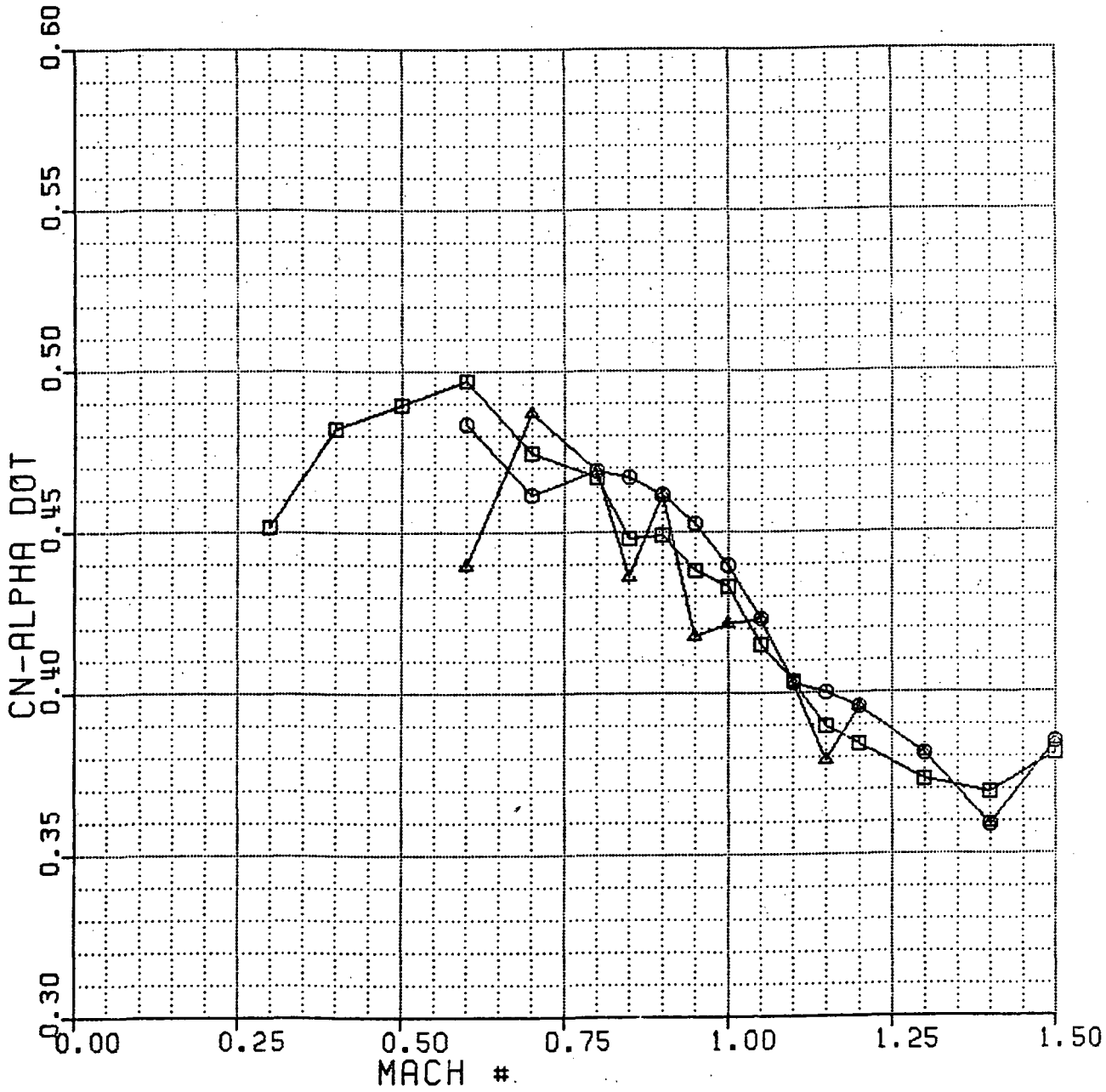

Figure 91(b)

CN-ALPHA DØT VS ALPHA

7-26-83 X-29A M# = 0.4 NØRMAL MØDE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TØ 22

ALT = 10K ALP: -4 TØ 22

ORIGINAL PAGE IS
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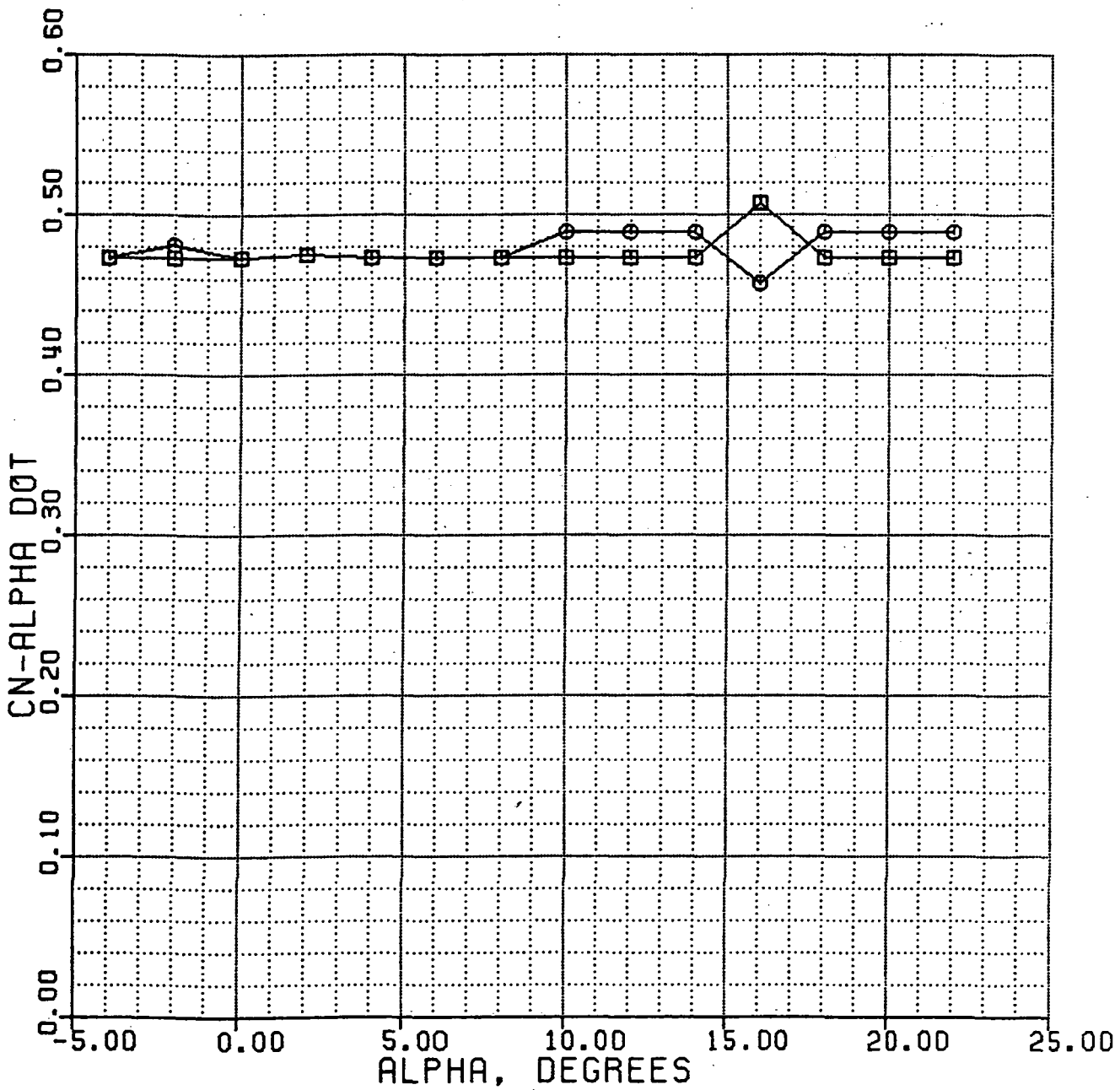

Figure 92(a)

CN-ALPHA DØT VS ALPHA

7-26-83 X-29A M# = 0.6 NØRMAL MØDE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TØ 16

ALT = 20K ALP: -4 TØ 20

ORIGINAL PAGE IS
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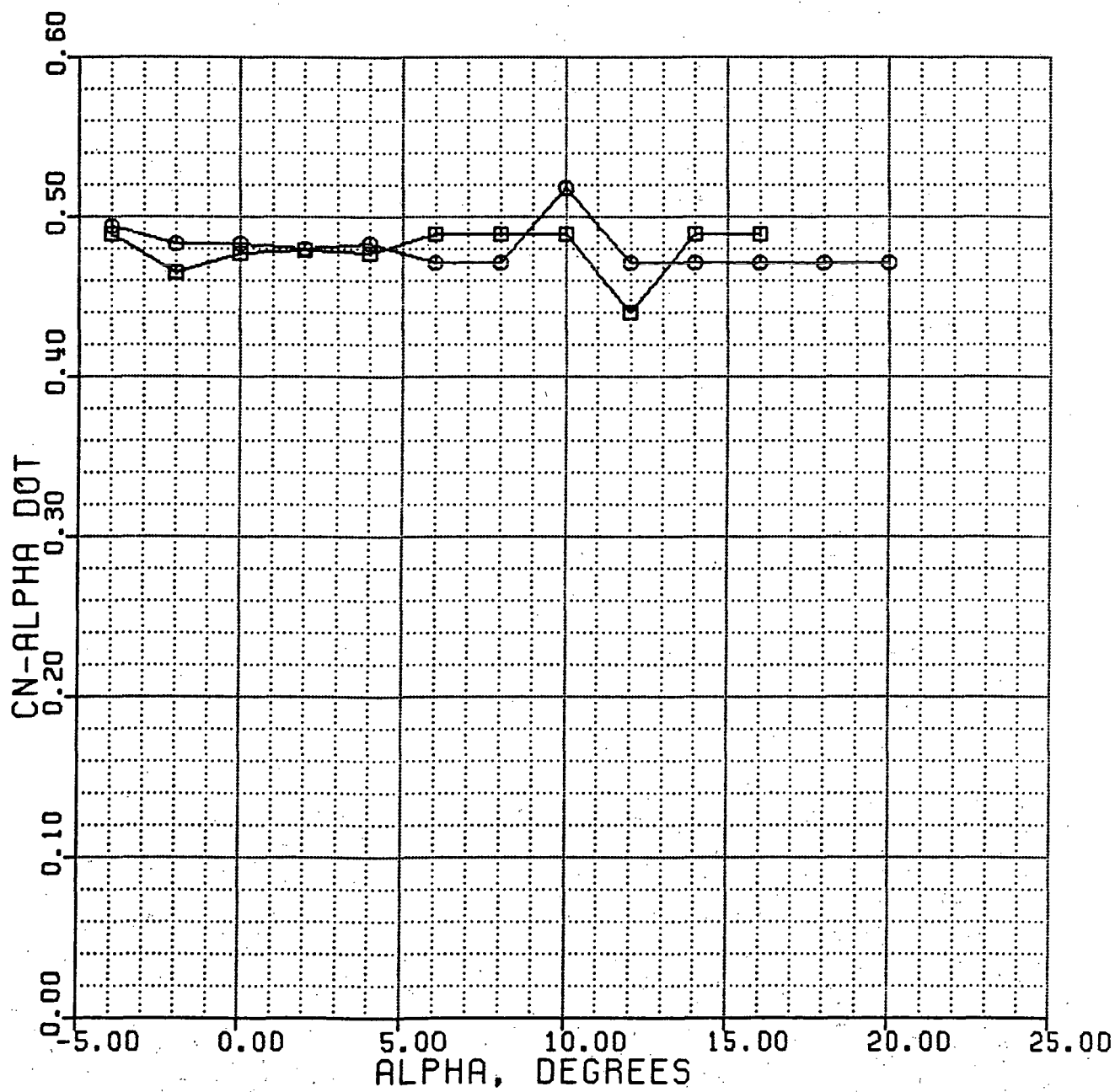

Figure 92(b)

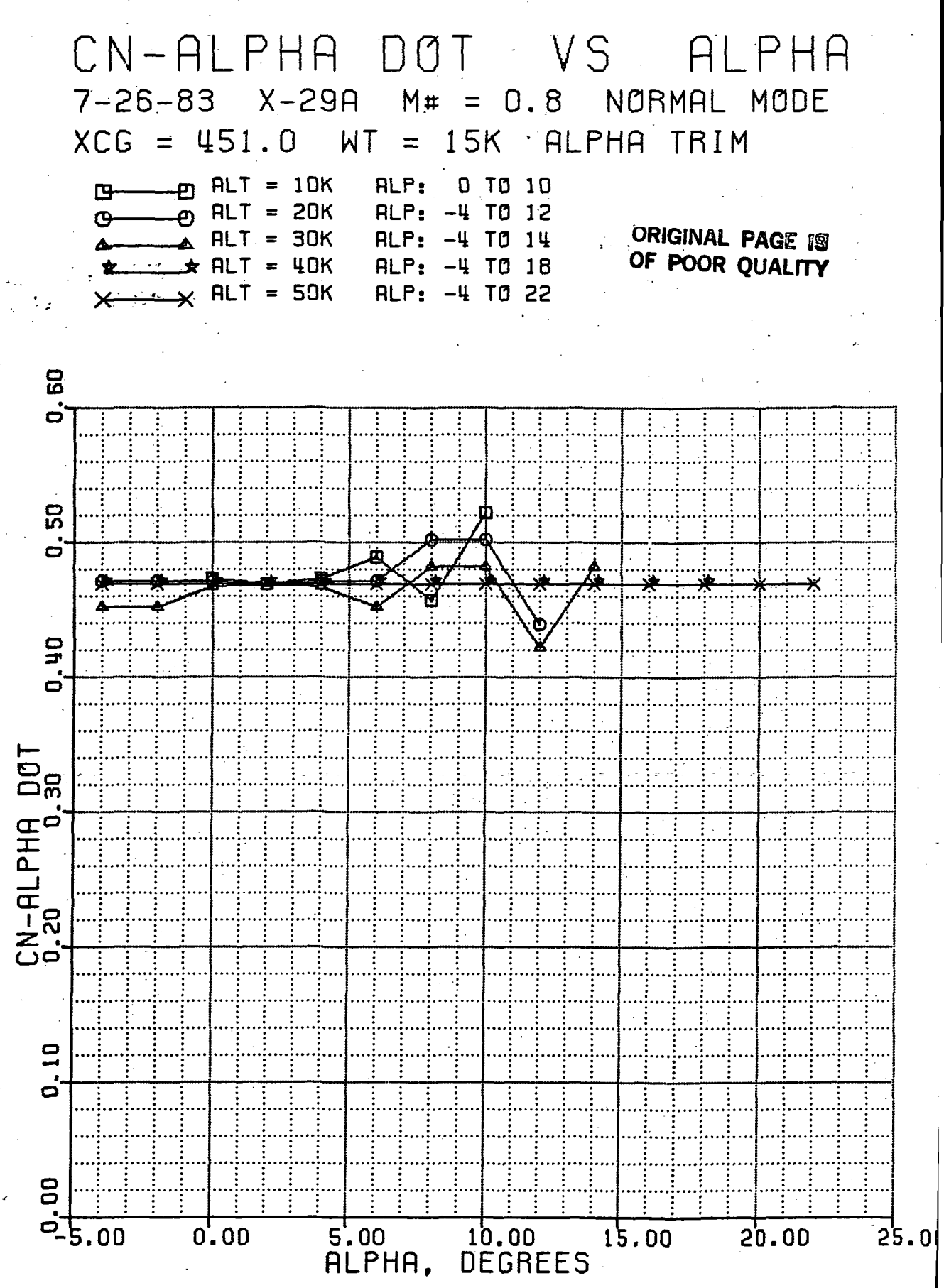
CN-ALPHA DØT VS ALPHA
7-26-83 X-29A M# = 0.8 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TØ 10
ALT = 20K ALP: -4 TØ 12
ALT = 30K ALP: -4 TØ 14
ALT = 40K ALP: -4 TØ 18
ALT = 50K ALP: -4 TØ 22
ORIGINAL PAGE IS OF POOR QUALITY
CN-ALPHA DØT
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.0
ALPHA, DEGREES

Figure 92(c)

CN-ALPHA DØT VS ALPHA

7-27-83 X-29A M# = 0.9 NØRMAL MØDE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TØ 10
ALT = 30K ALP: -2 TØ 12
ALT = 40K ALP: -4 TØ 14
ALT = 50K ALP: -4 TØ 18

ORIGINAL PAGE IS
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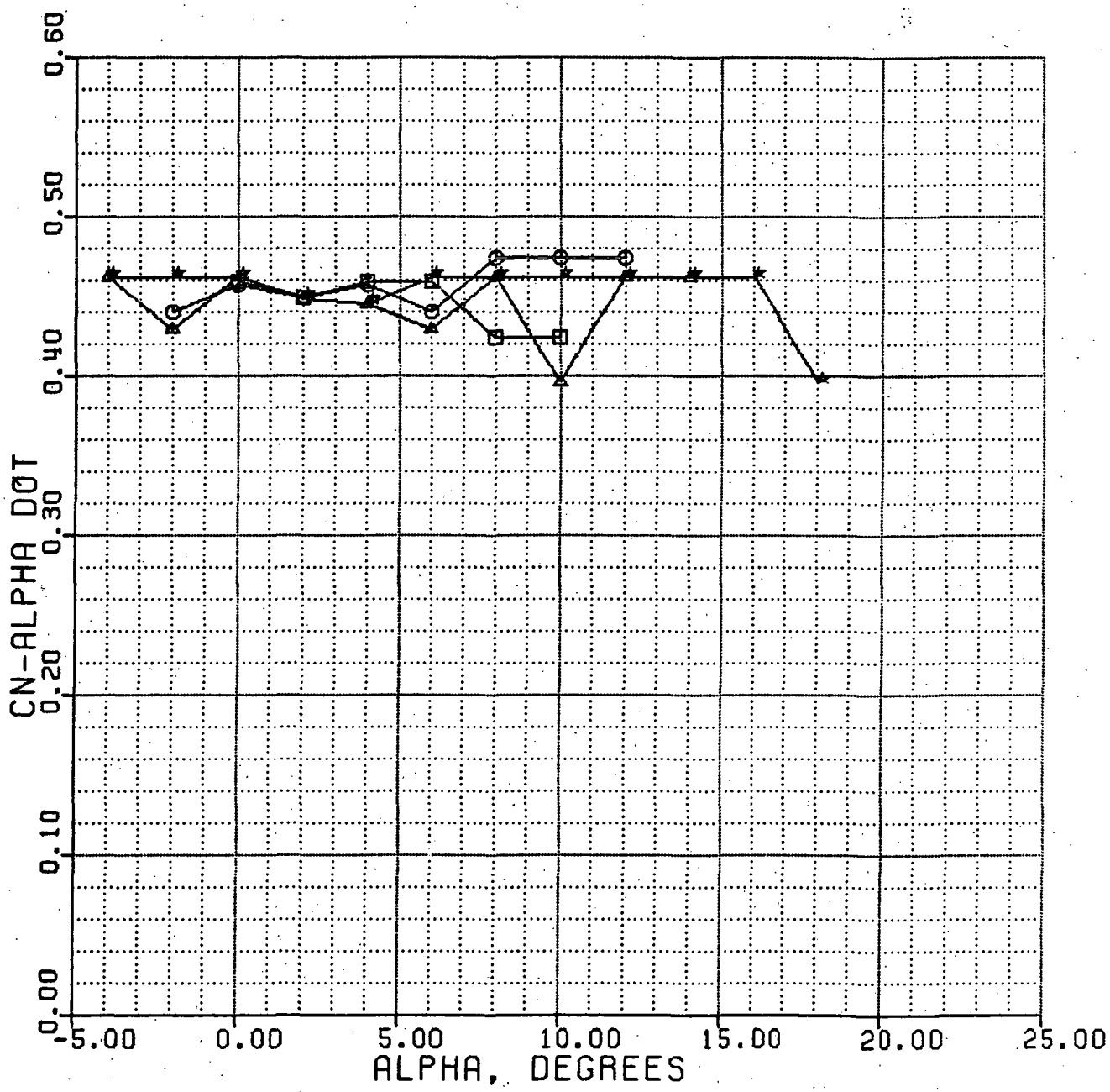

C-5

Figure 92(d)

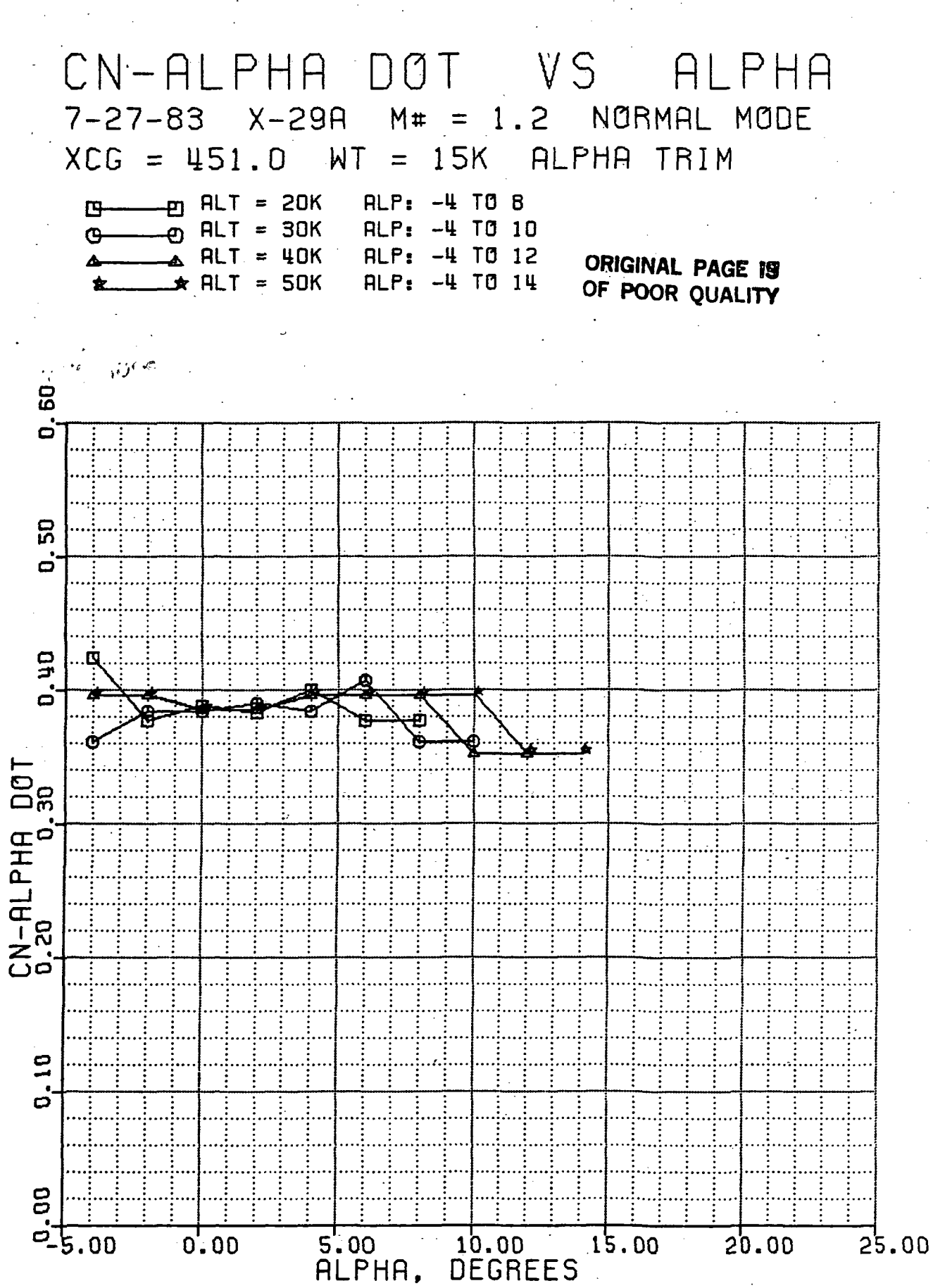
CN-ALPHA DØT VS ALPHA
7-27-83 X-29A M# = 1.2 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TØ 8
ALT = 30K ALP: -4 TØ 10
ALT = 40K ALP: -4 TØ 12
ALT = 50K ALP: -4 TØ 14
ORIGINAL PAGE IS OF POOR QUALITY
CN-ALPHA DØT
0.00
0.10
0.20
0.30
0.40
0.50
0.60
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 92(e)

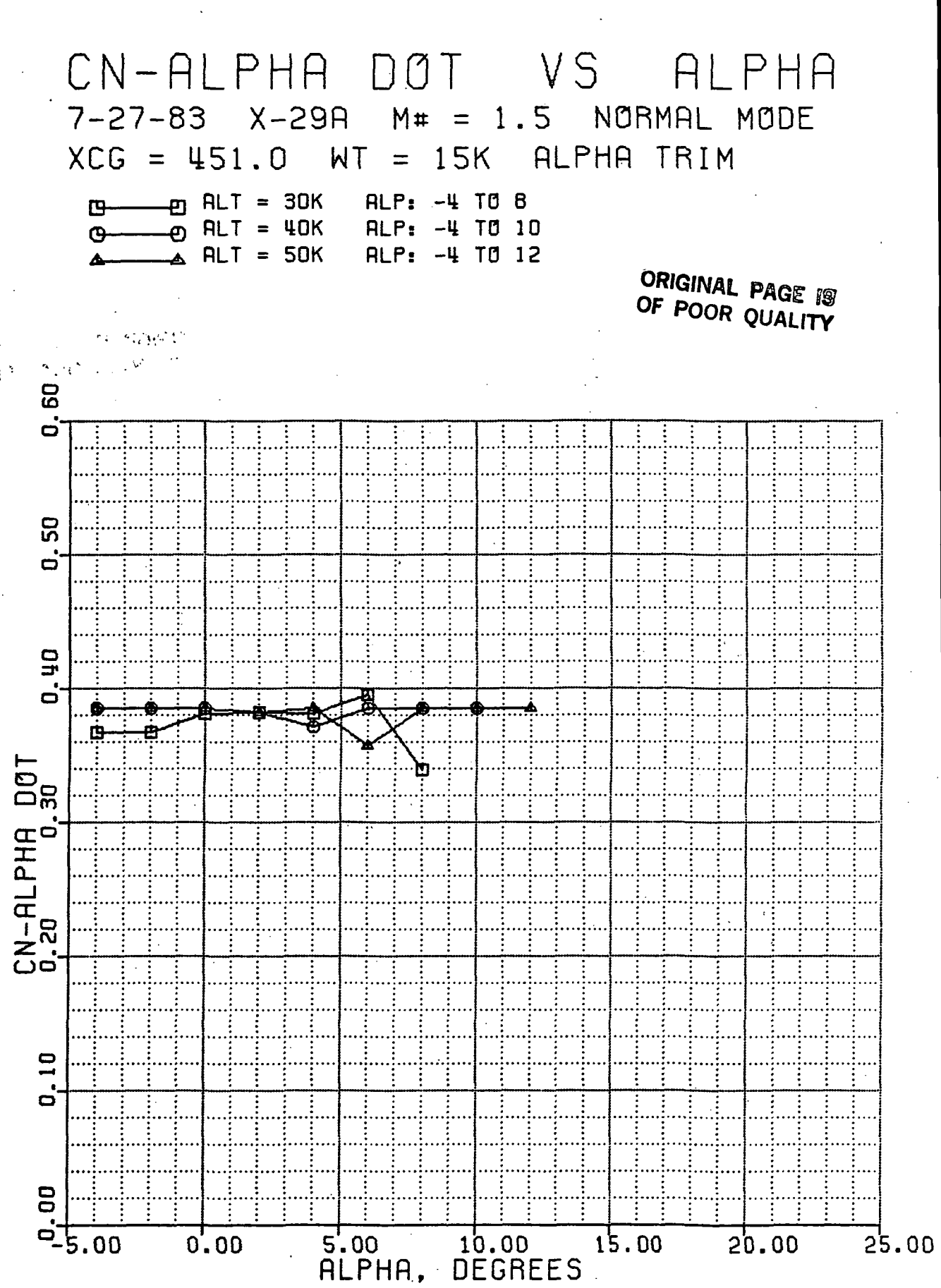
CN-ALPHA DØT VS ALPHA
7-27-83 X-29A M# = 1.5 NØRMAL MØDE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 30K ALP: -4 TØ 8
ALT = 40K ALP: -4 TØ 10
ALT = 50K ALP: -4 TØ 12
ORIGINAL PAGE IS OF POOR QUALITY
CN-ALPHA DØT
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 92(f)

CL − q VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

ORIGINAL PAGE IS
OF POOR QUALITY

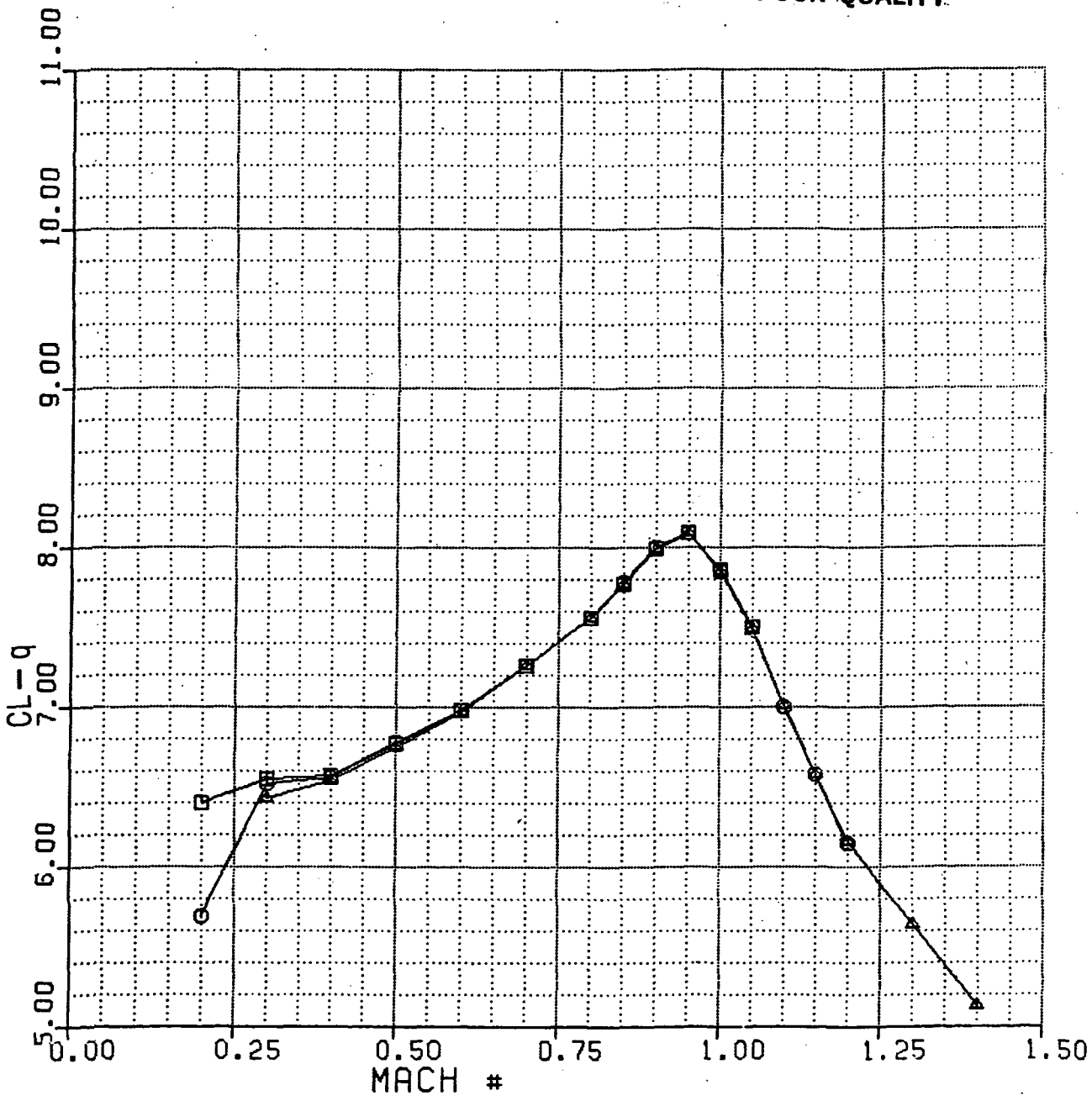

Figure 93(a)

CL − q VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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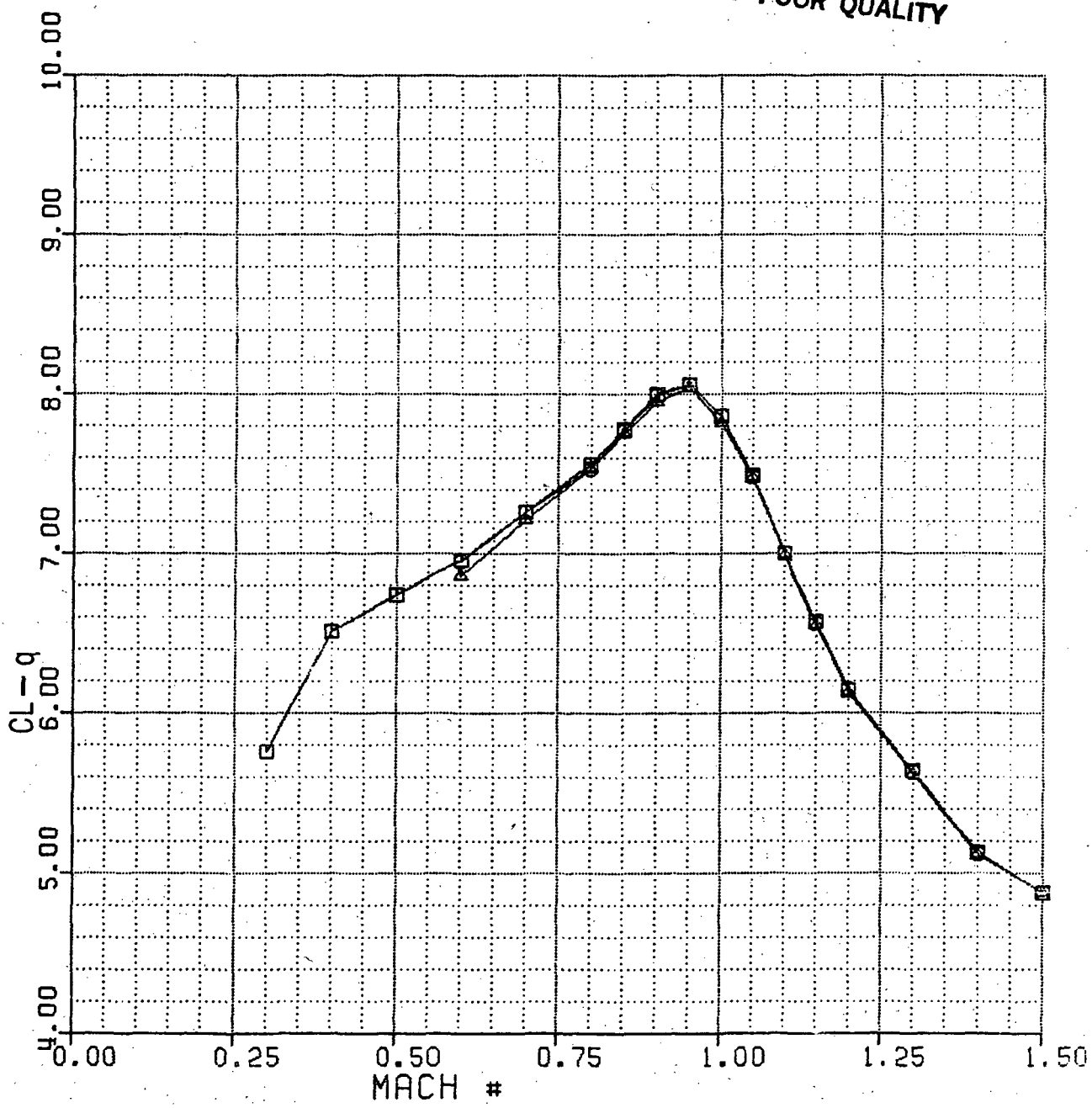

Figure 93(b)

CL – q VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

ORIGINAL PAGE IS
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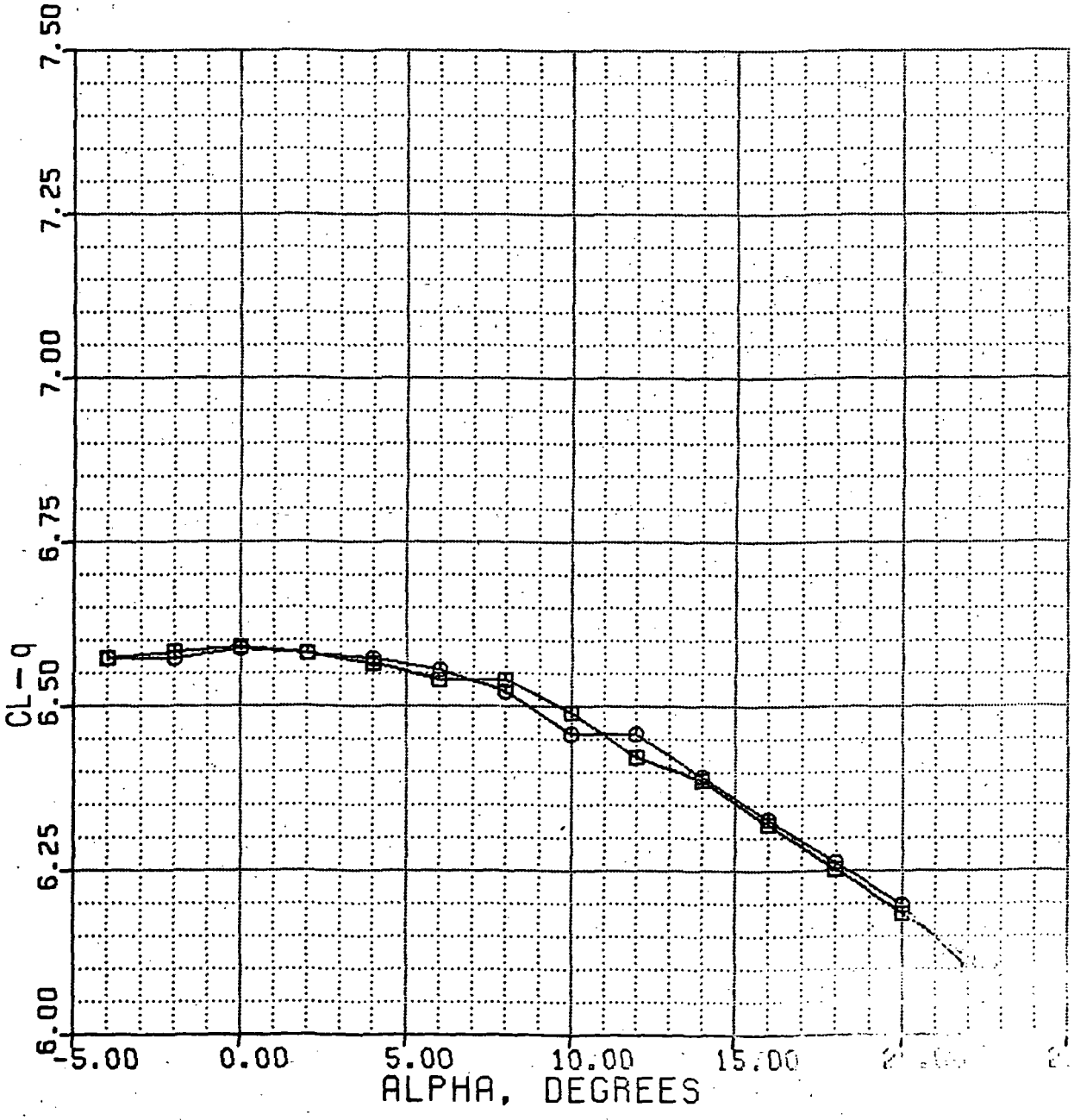

Figure 94(a)

CL – q VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
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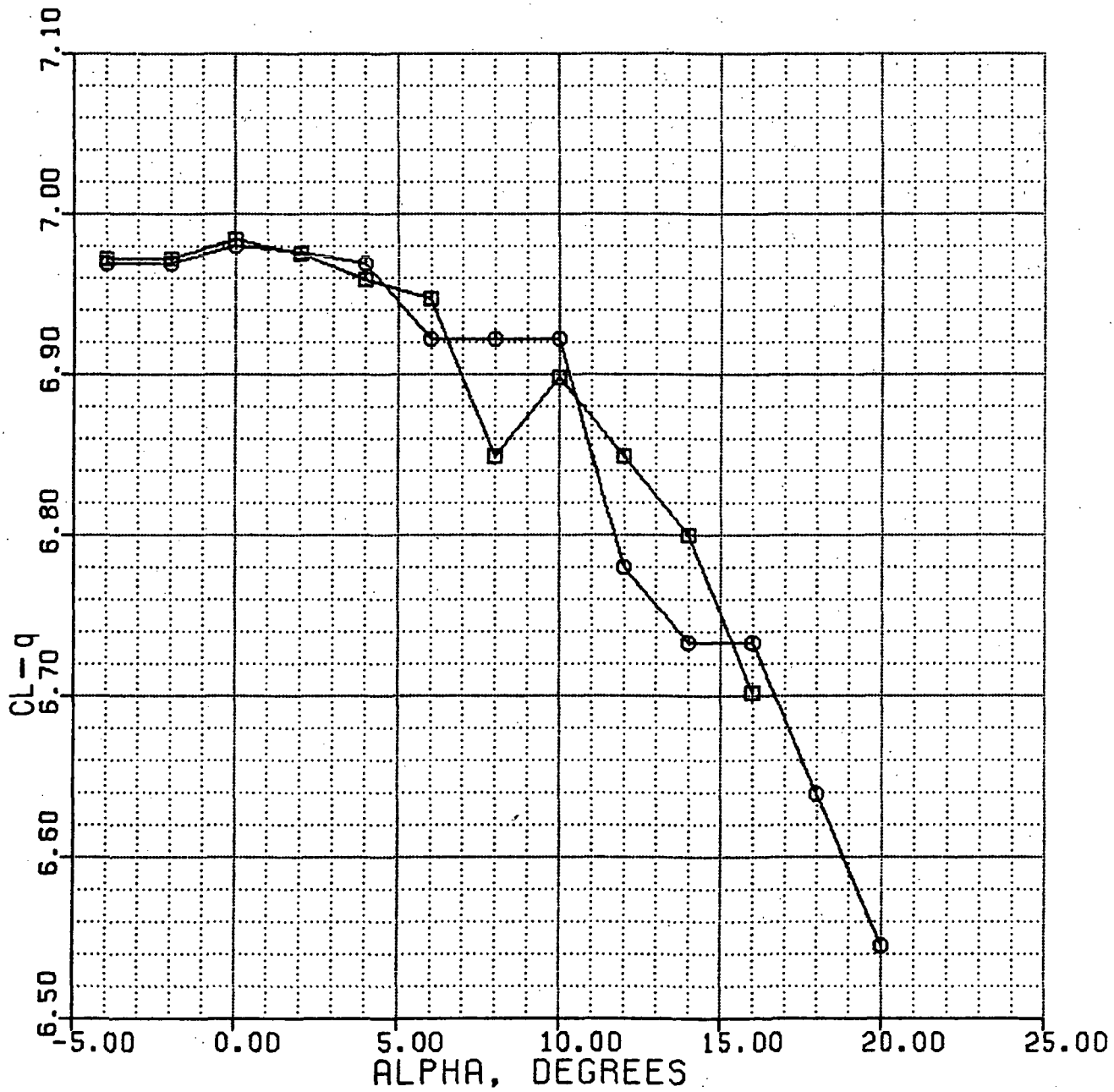

Figure 94(b)

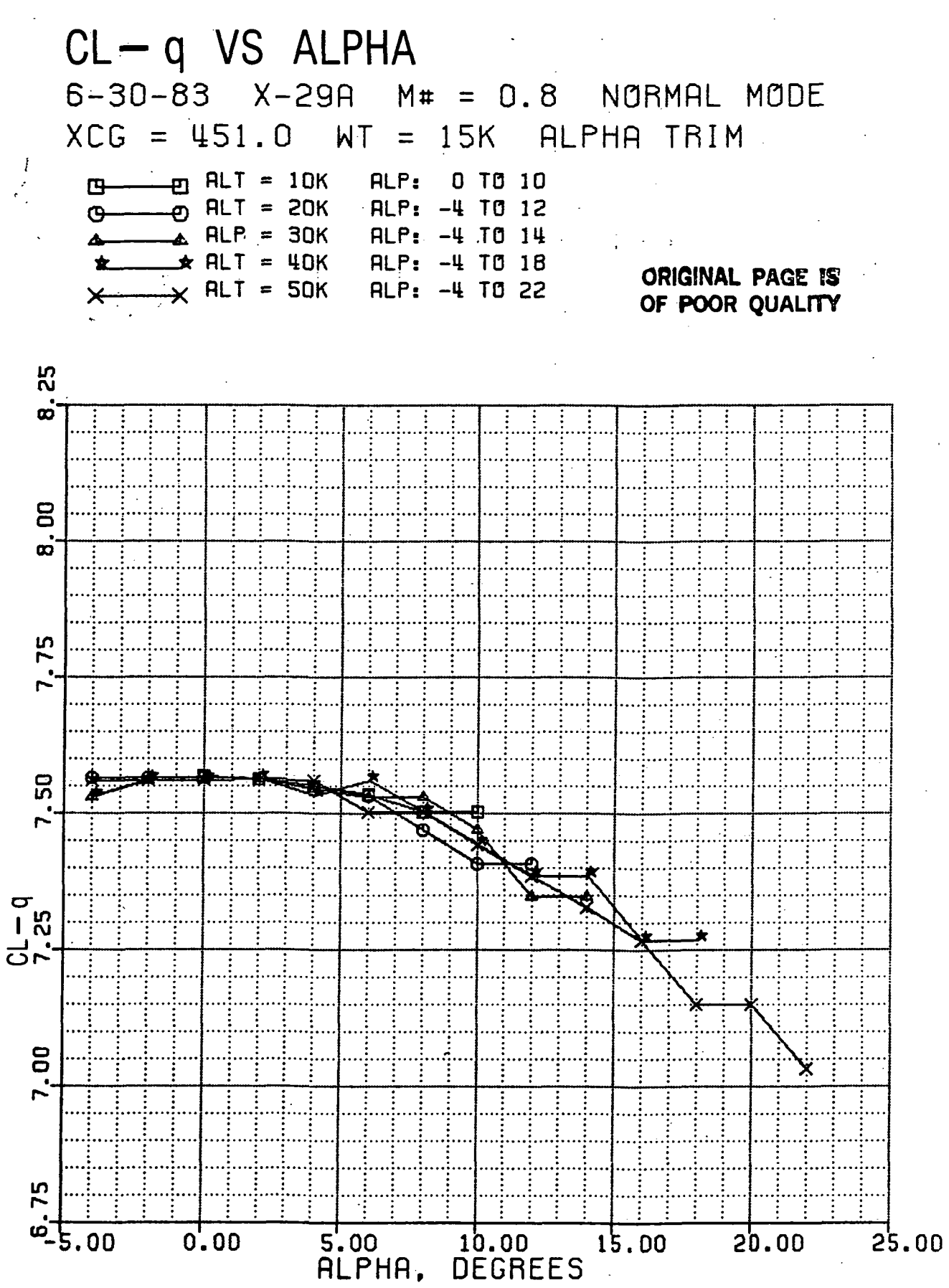
CL − q VS ALPHA
6-30-83 X-29A M# = 0.8 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22
ORIGINAL PAGE IS
OF POOR QUALITY
8.25
8.00
7.75
7.50
7.25
7.00
6.75
CL − q
-5.00
0.00
5.00
10.00
15.00
20.00
25.00
ALPHA, DEGREES

Figure 94(c)

CL − q VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

ORIGINAL PAGE IS
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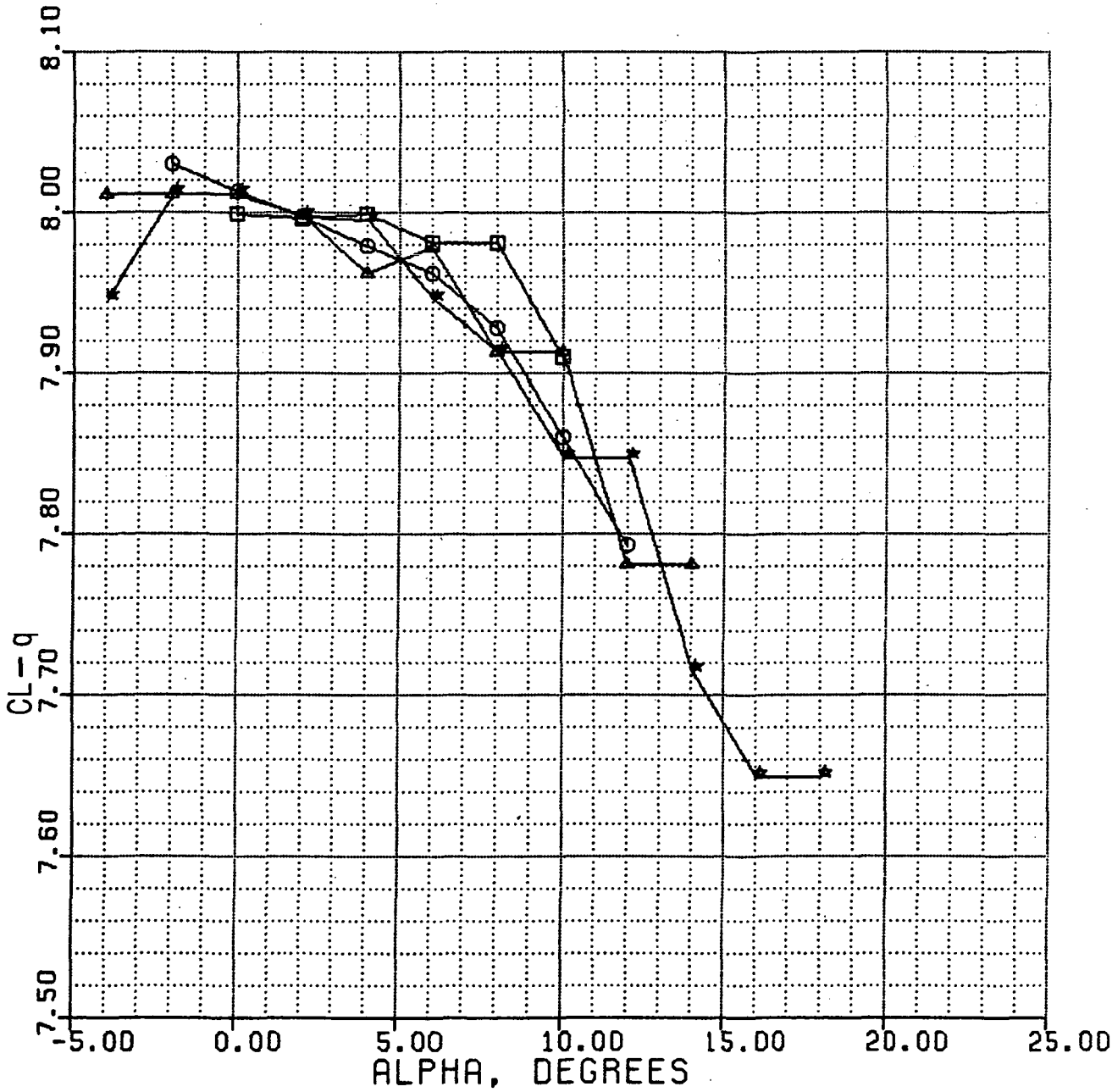

Figure 94(d)

CL – q VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

ORIGINAL PAGE IS
OF POOR QUALITY

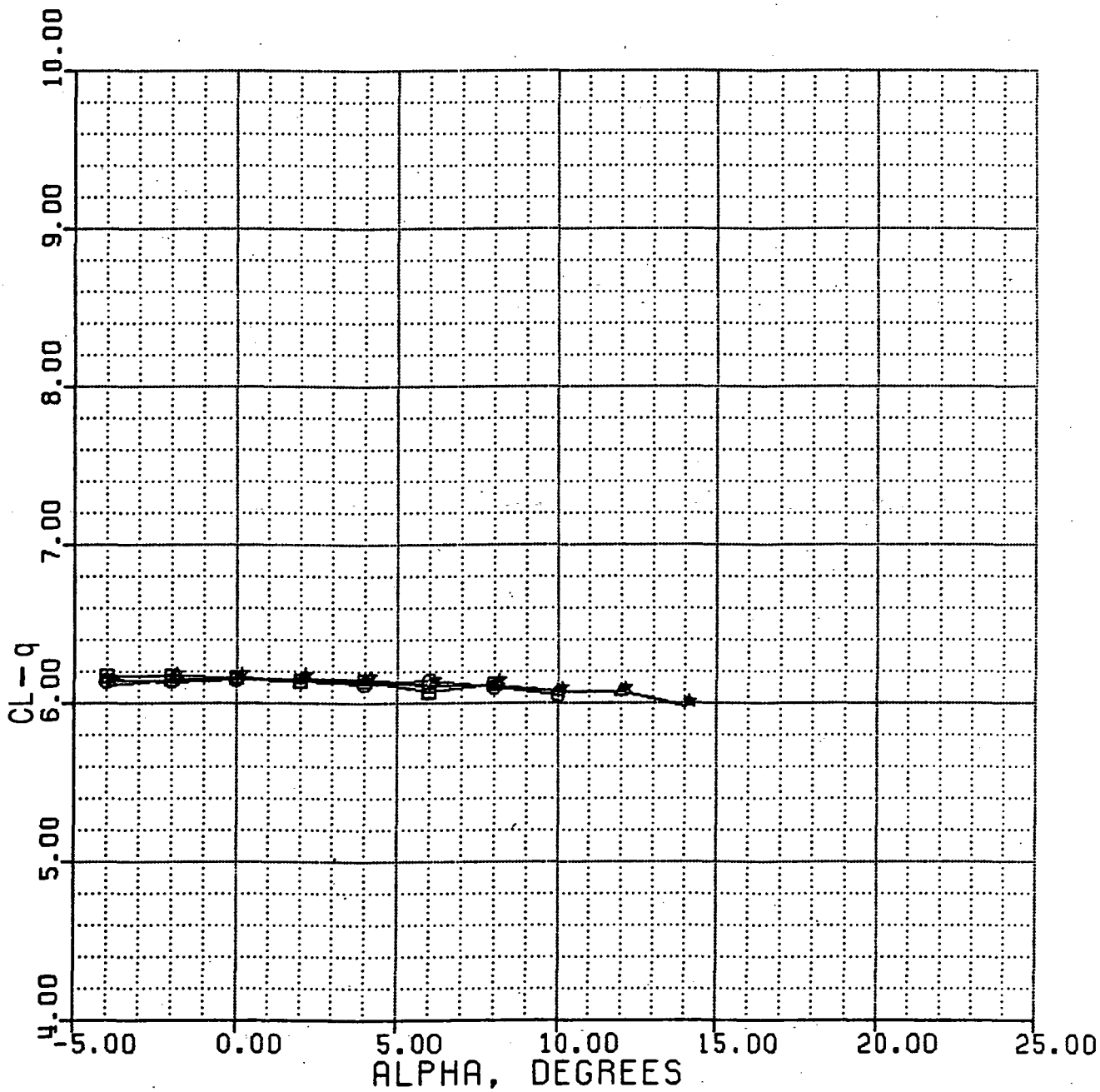

Figure 94(e)

CL – q VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

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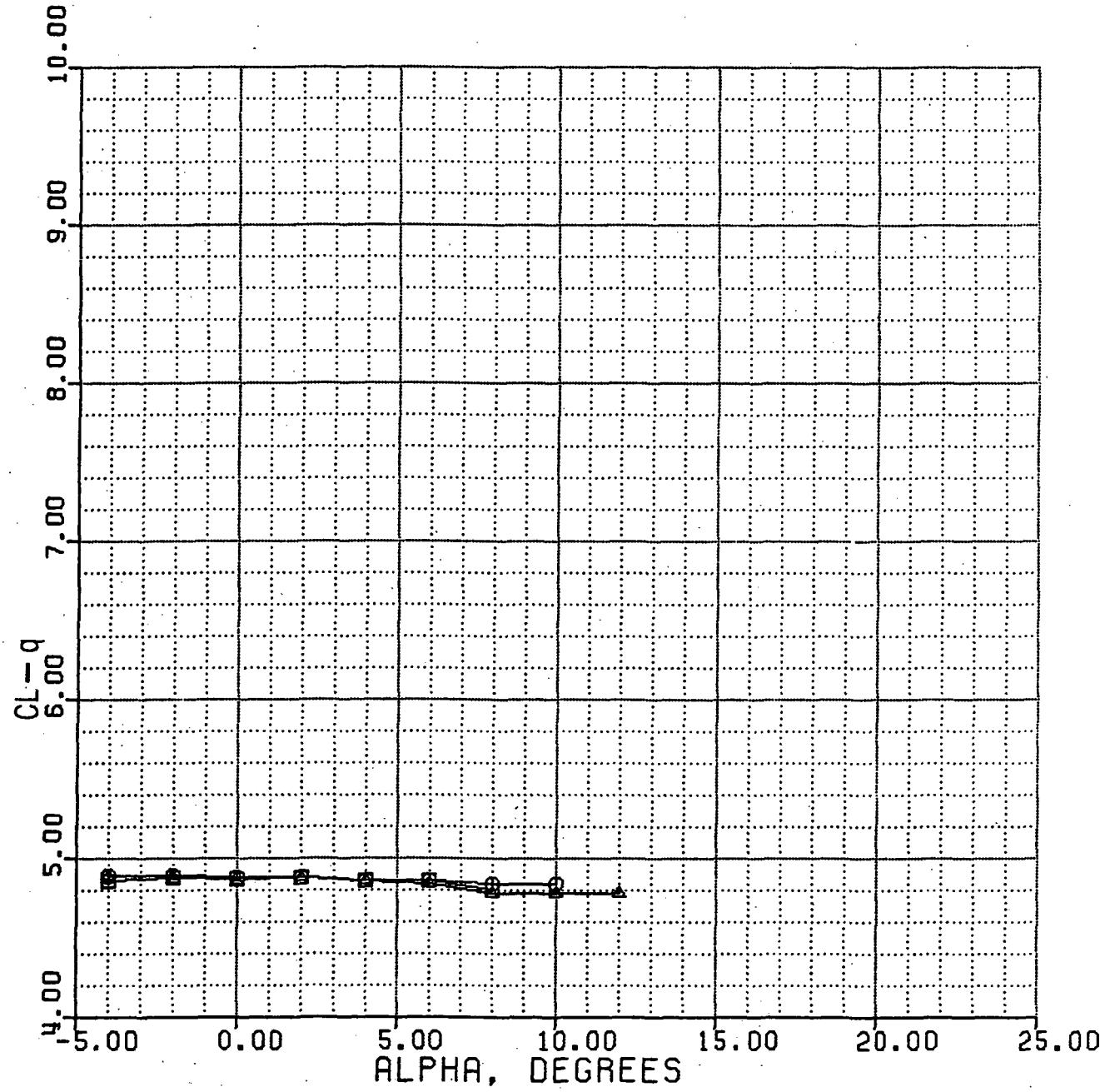

Figure 94(f)

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CD − q VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

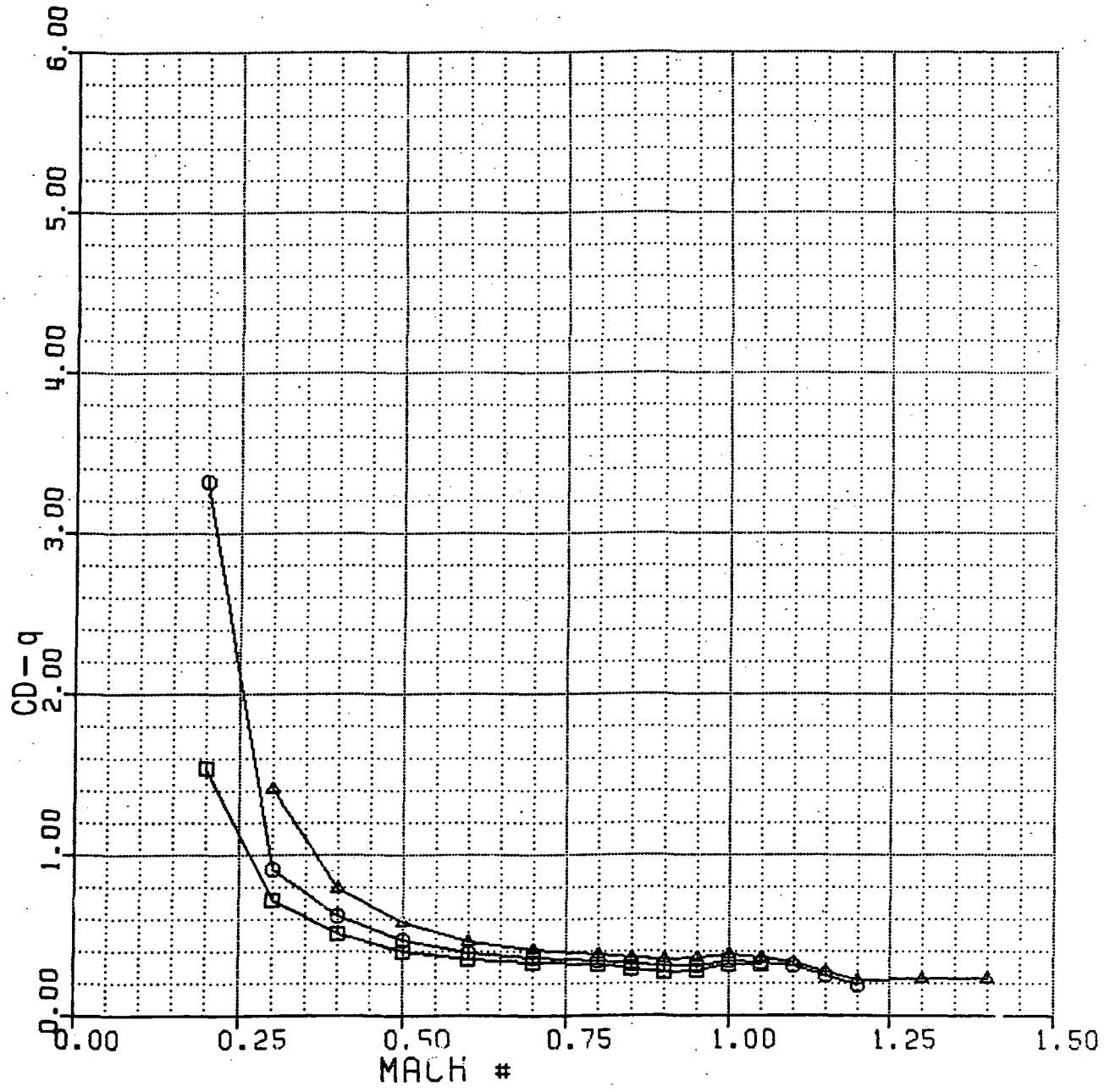

Figure 95(a)

CD − q VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5

ALT = 40K M# = .6 TO 1.5

ALT = 50K M# = .6 TO 1.5

ORIGINAL PAGE IS
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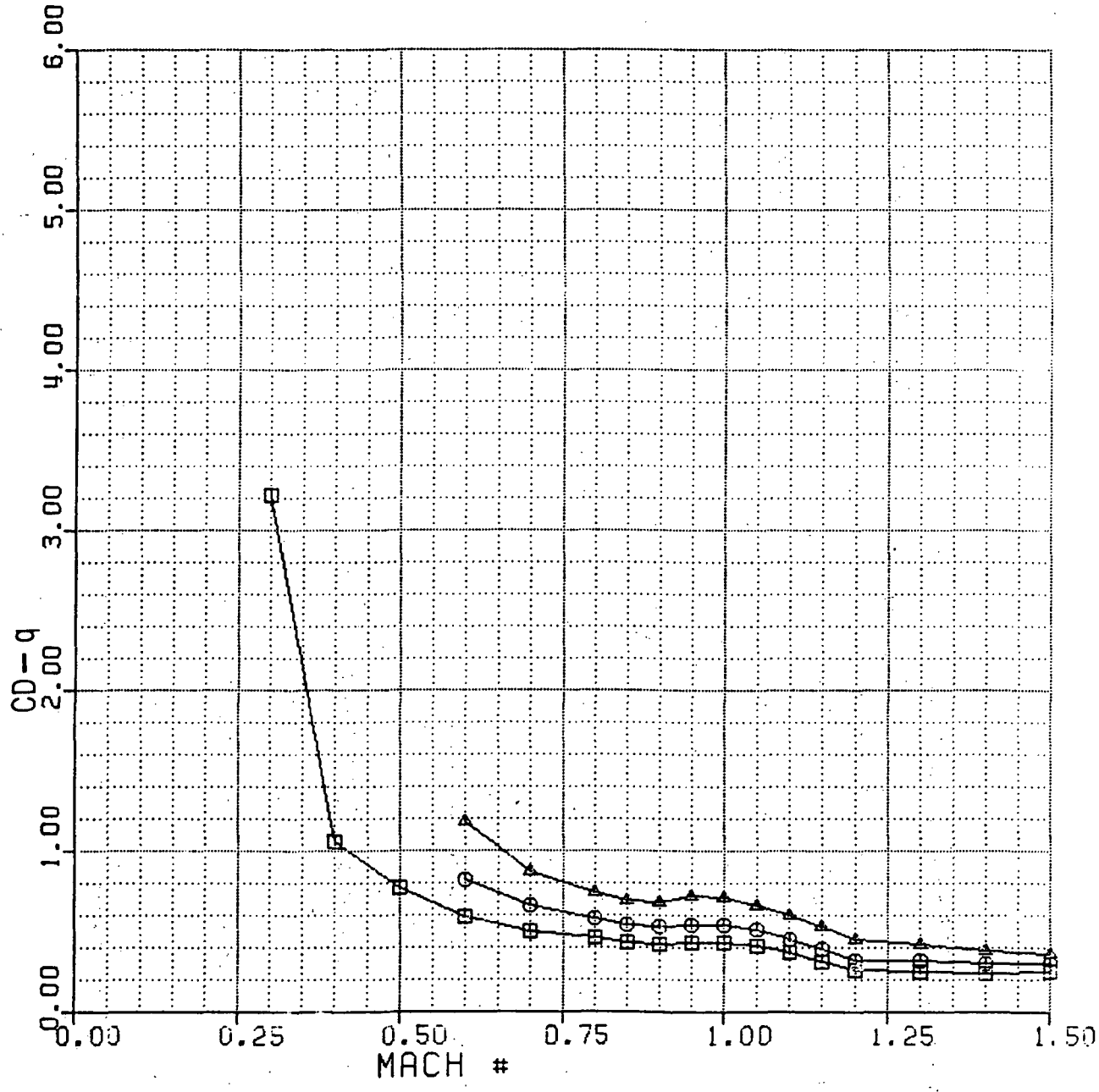

Figure 95(b)

CD−q VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 22

ALT = 20K ALP: -4 TO 22

ORIGINAL PAGE IS
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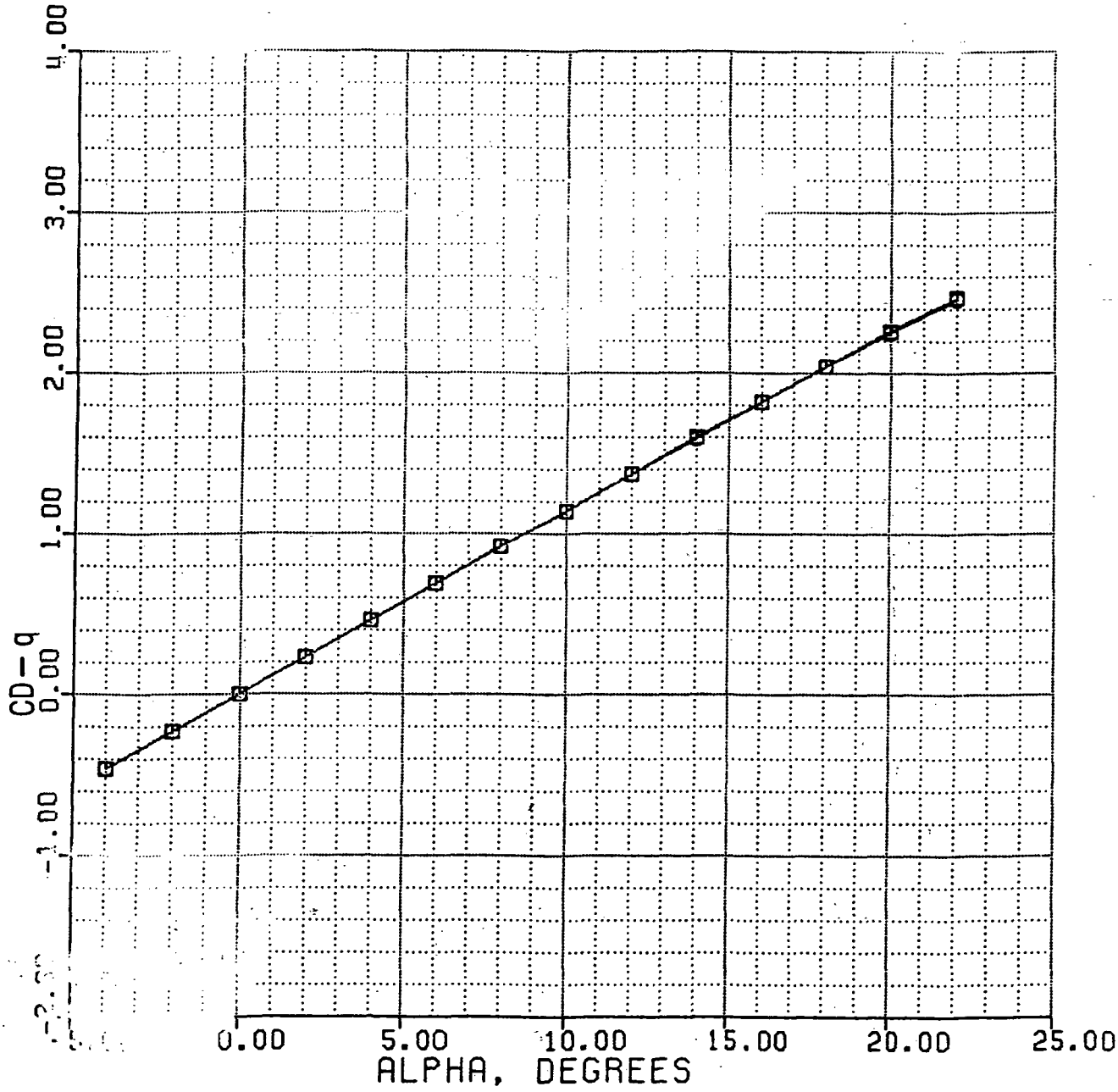

Figure 96(a)

CD− q VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

ORIGINAL PAGE IS
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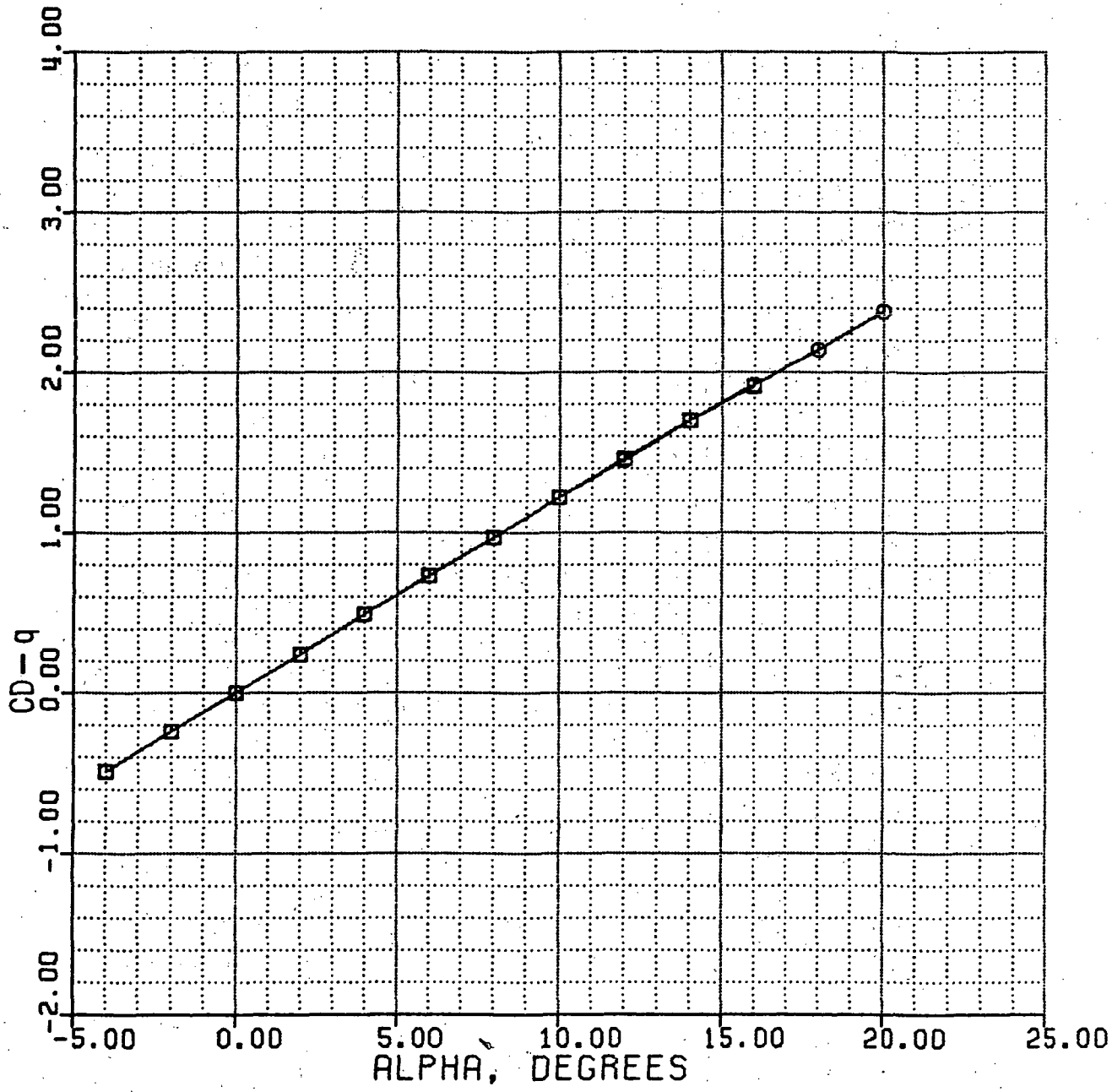

Figure 96(b)

CD — q VS ALPHA

6-30-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10	
ALT = 20K	ALP: -4 TO 12	
ALP = 30K	ALP: -4 TO 14	
ALT = 40K	ALP: -4 TO 18	
ALT = 50K	ALP: -4 TO 22	

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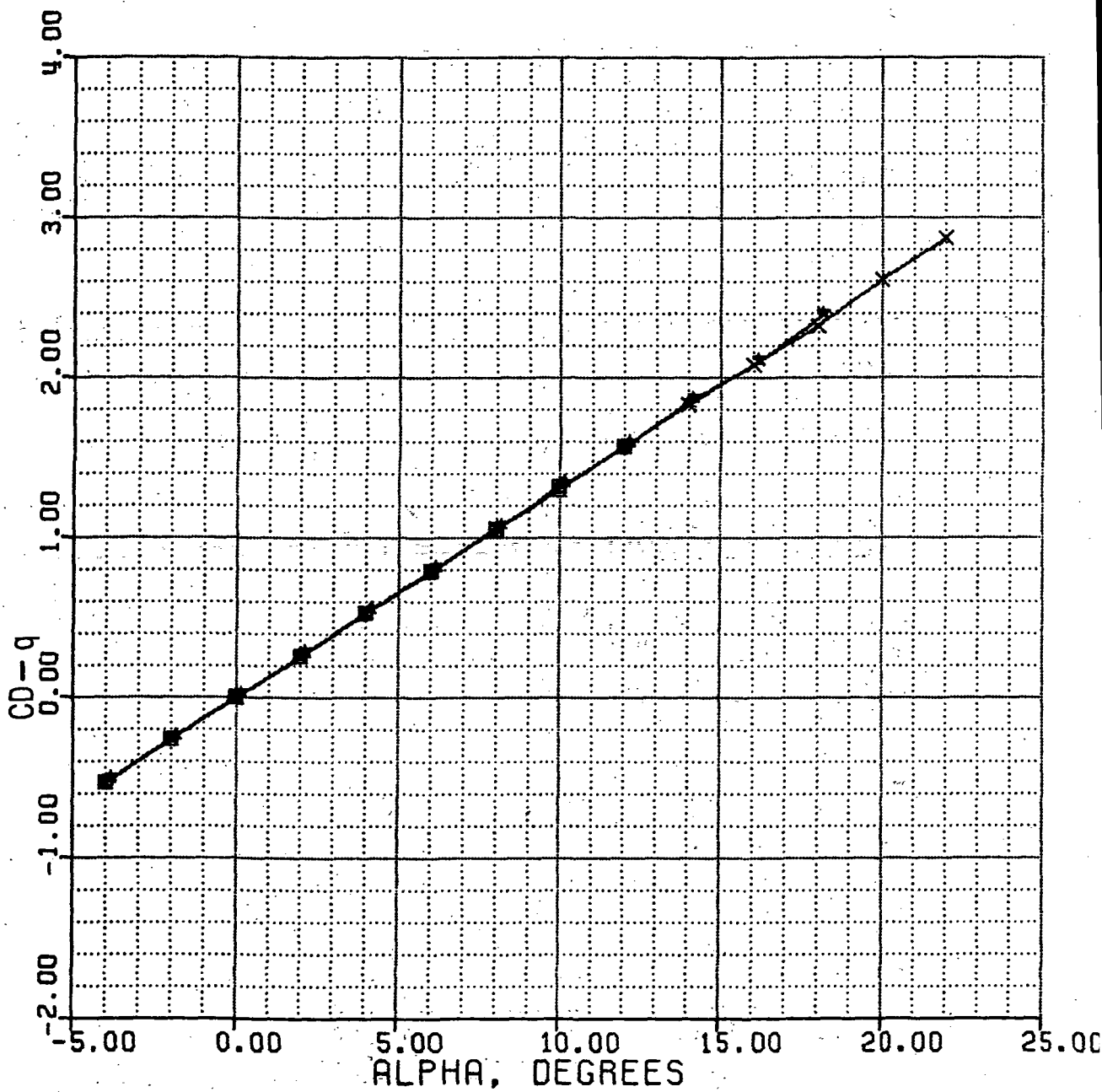

Figure 96(c)

CD−q VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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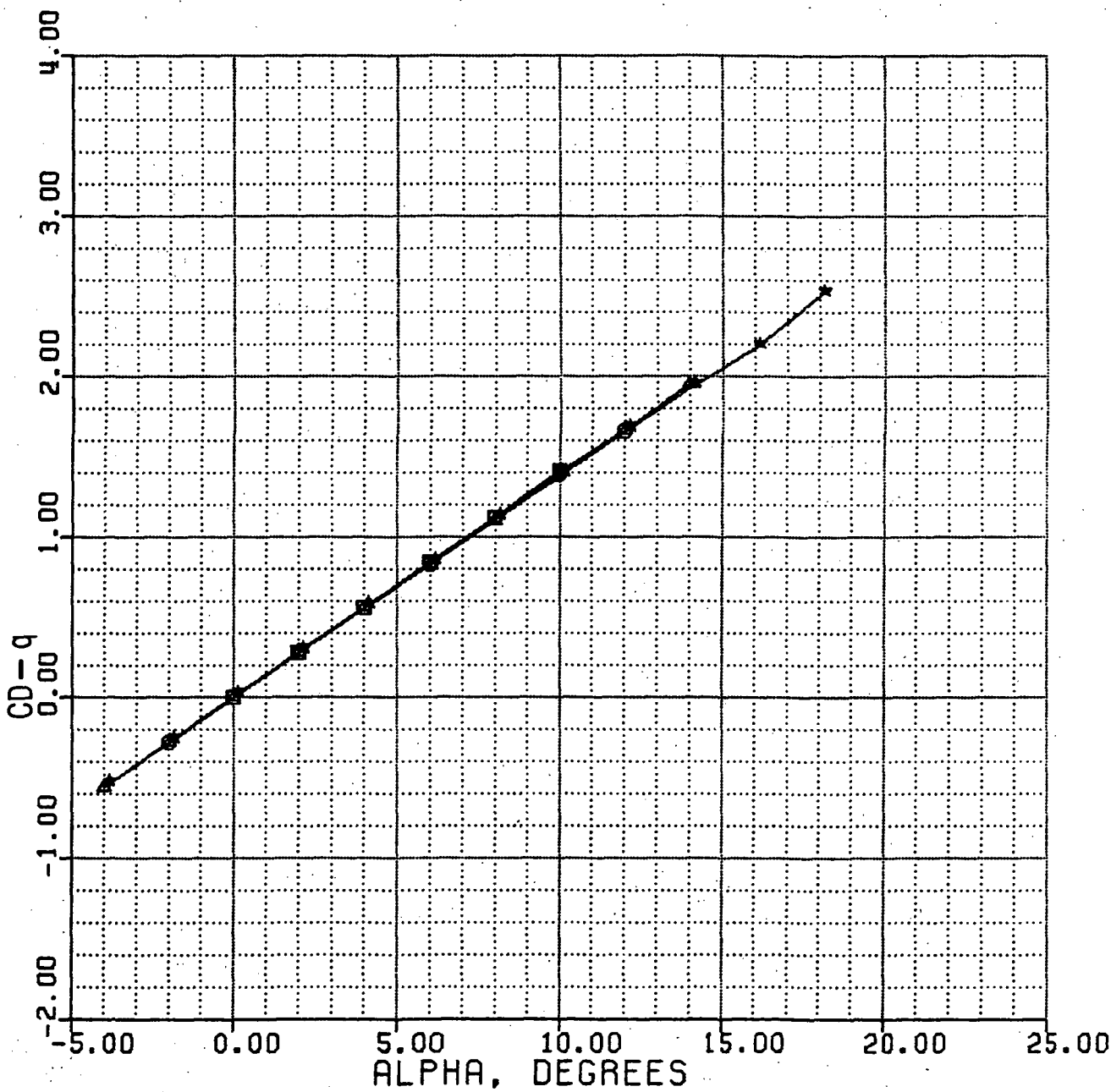

Figure 96(d)

CD−q VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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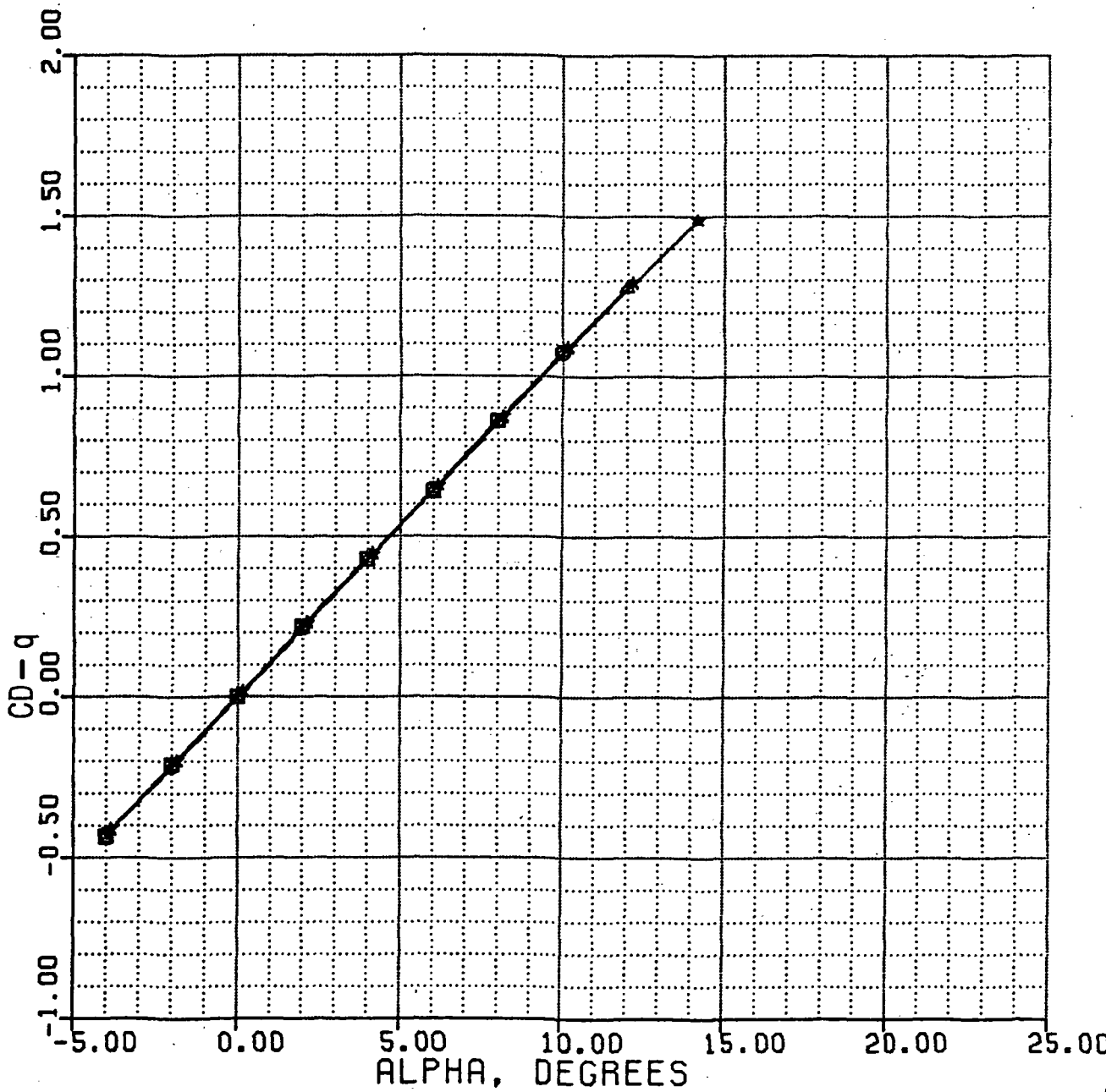

Figure 96(e)

CD−q VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

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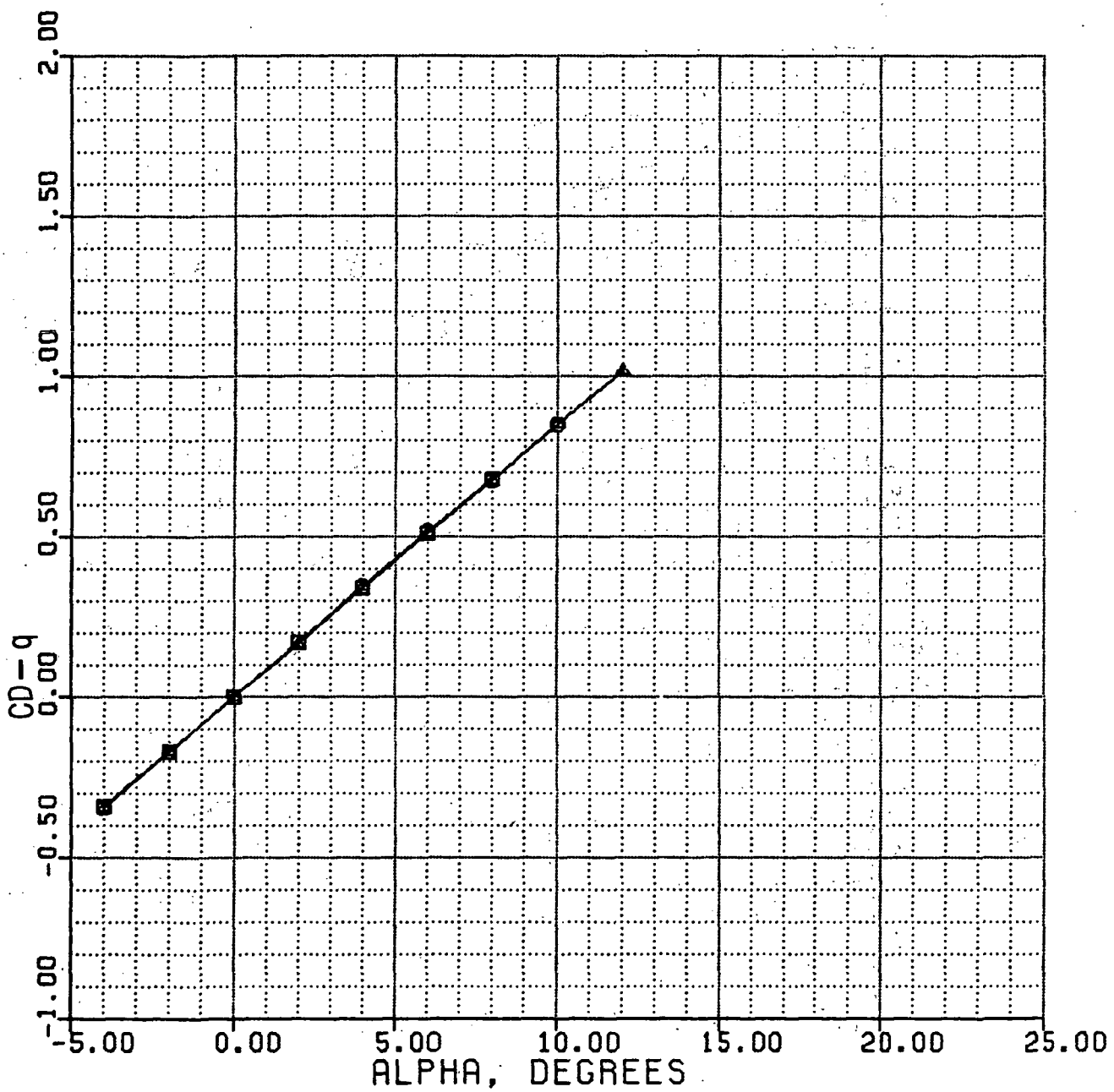

Figure 96(f)

CM − q VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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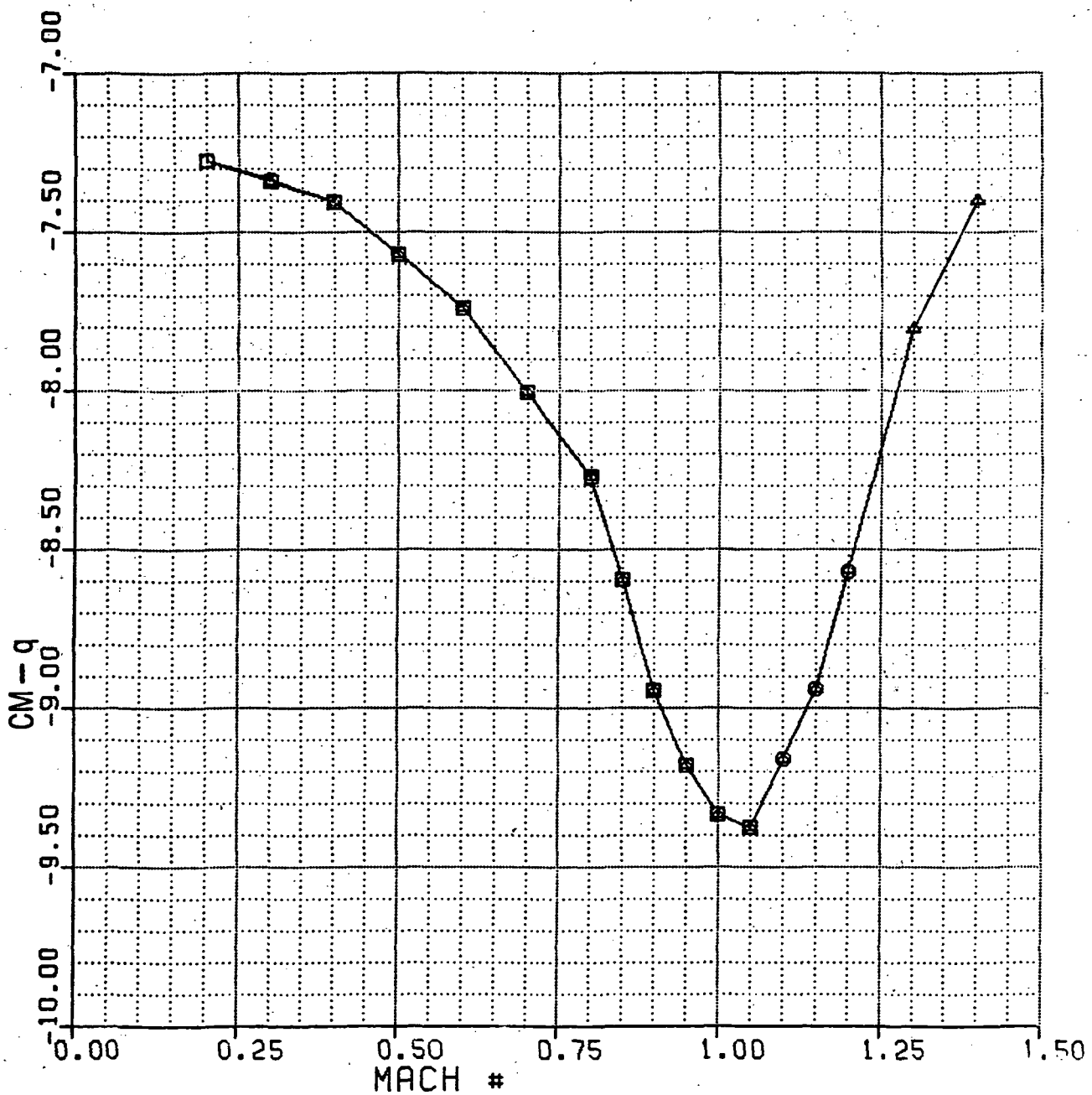

Figure 97(a)

CM − q VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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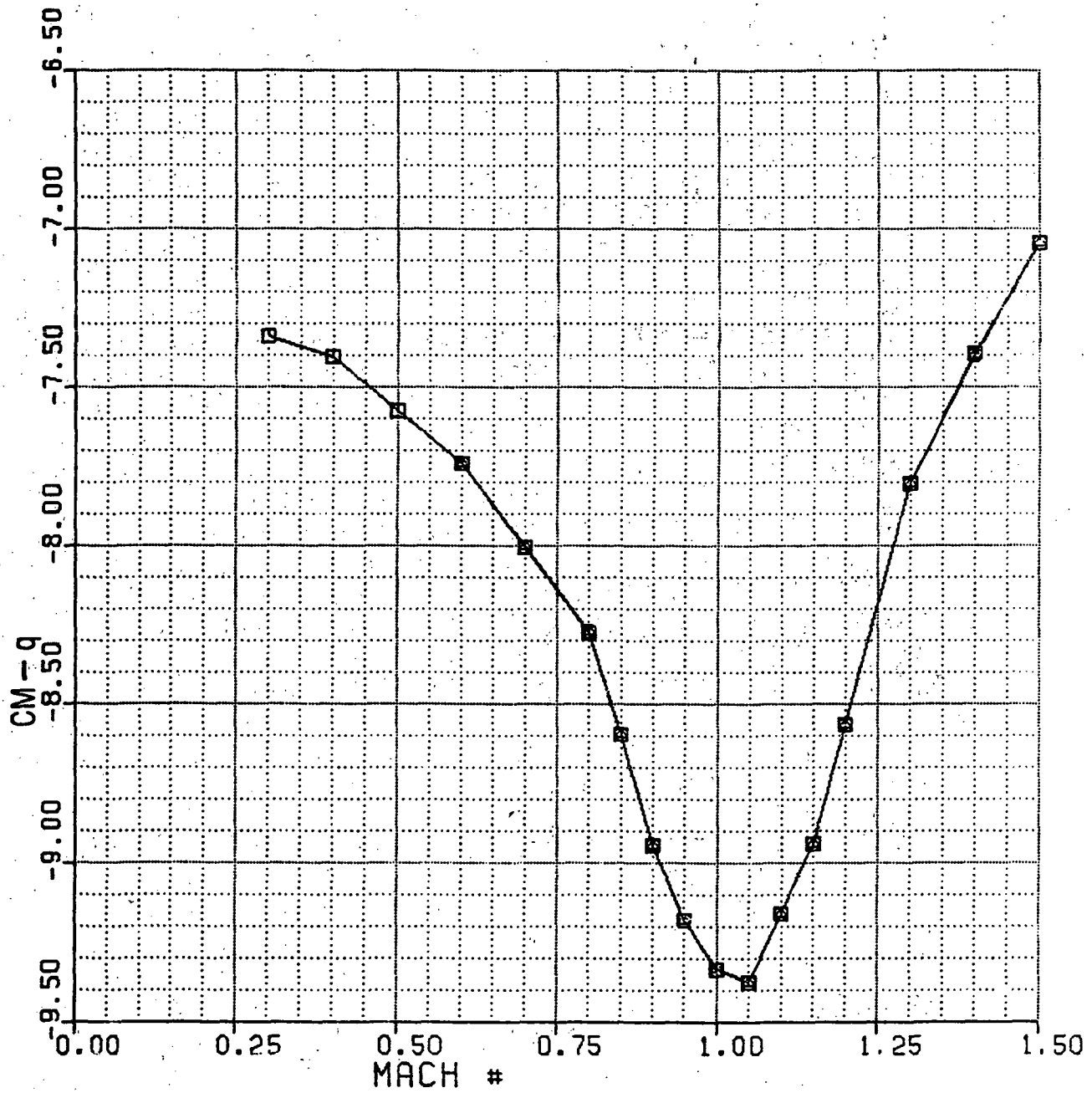

Figure 97(b)

CM − q VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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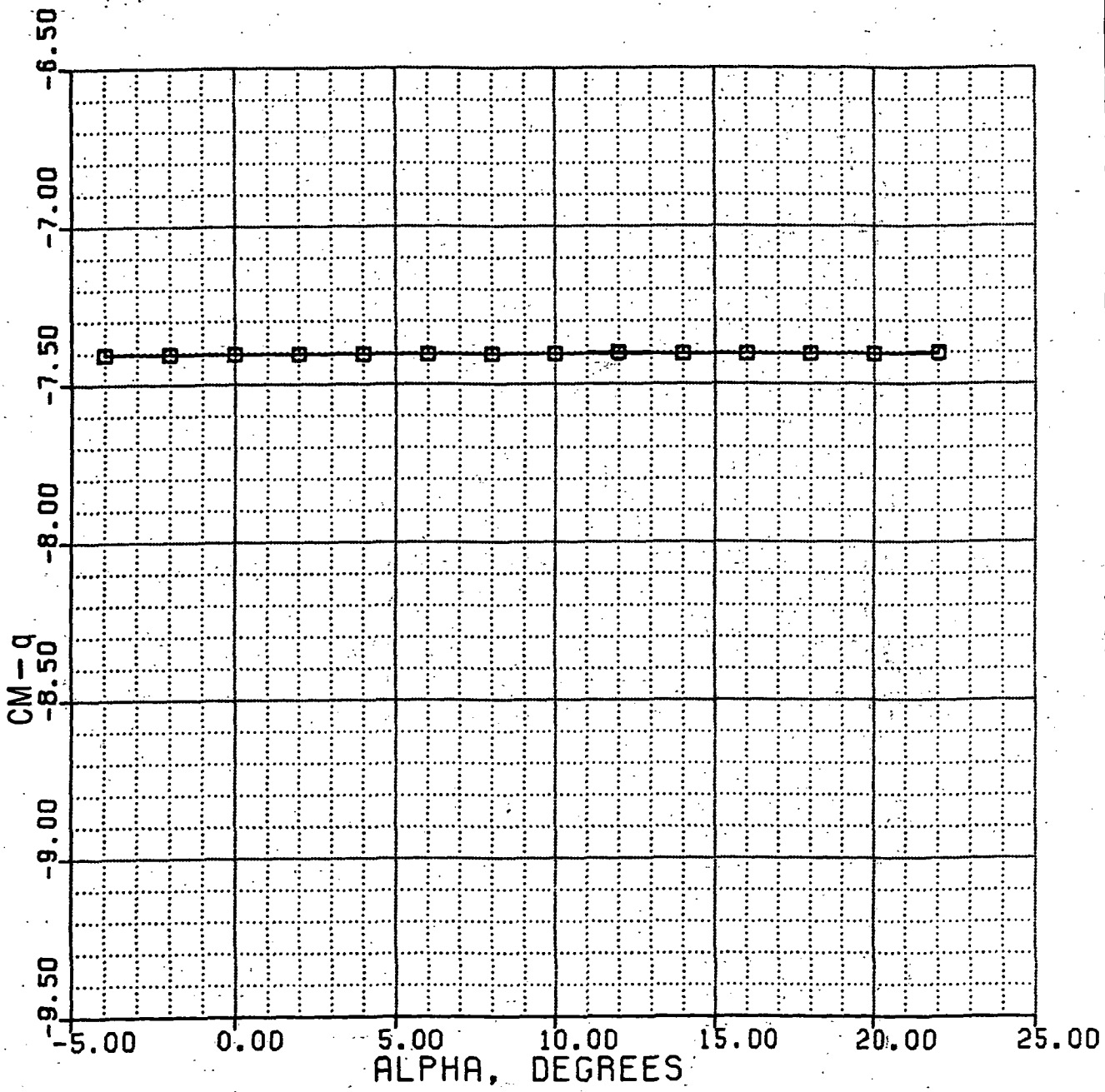

Figure 98(a)

CM − q VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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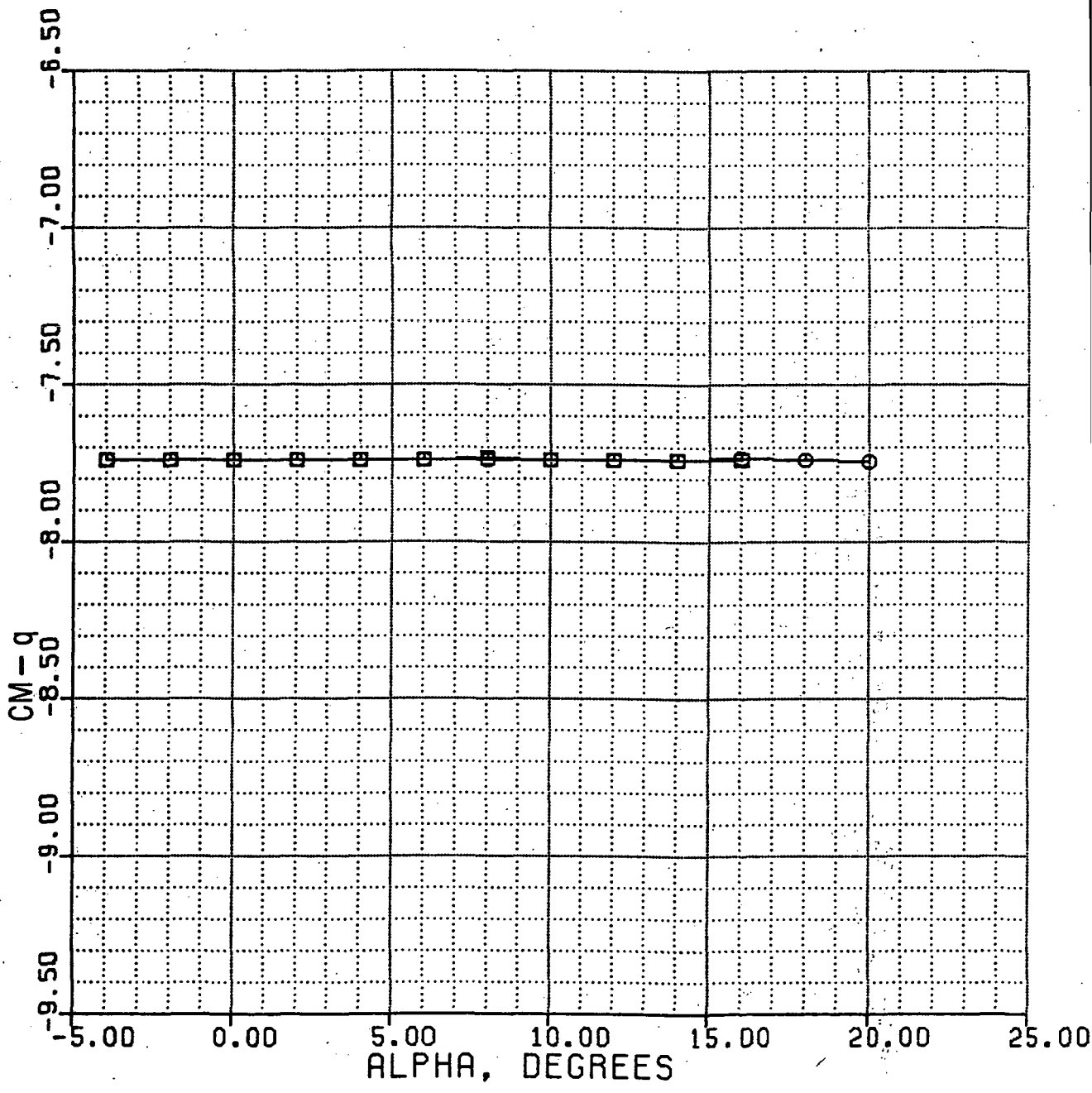

Figure 98(b)

CM − q VS ALPHA

7-26-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10
ALT = 20K	ALP: -4 TO 12
ALT = 30K	ALP: -4 TO 14
ALT = 40K	ALP: -4 TO 18
ALT = 50K	ALP: -4 TO 22

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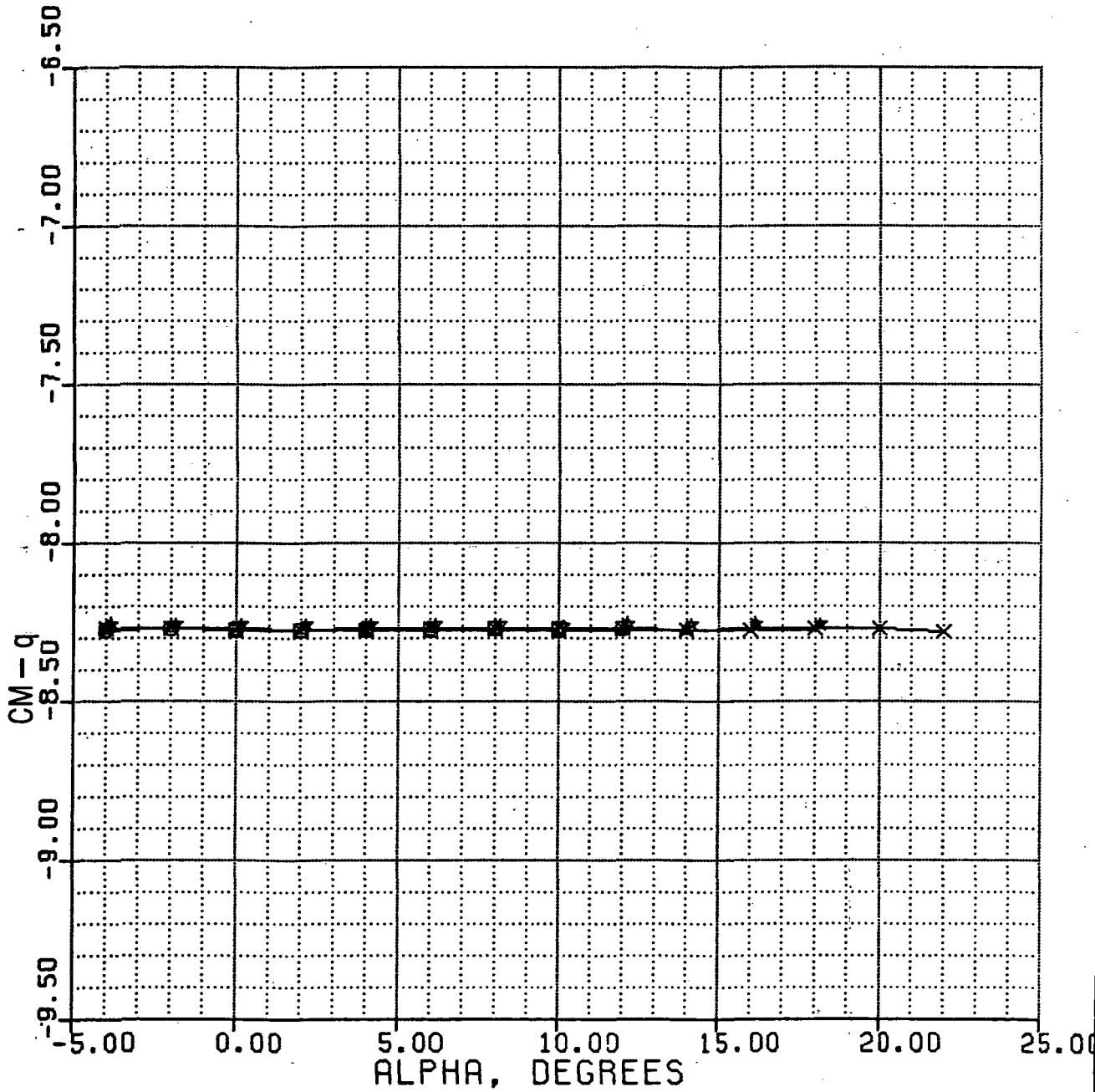

Figure 98(c)

CM − q VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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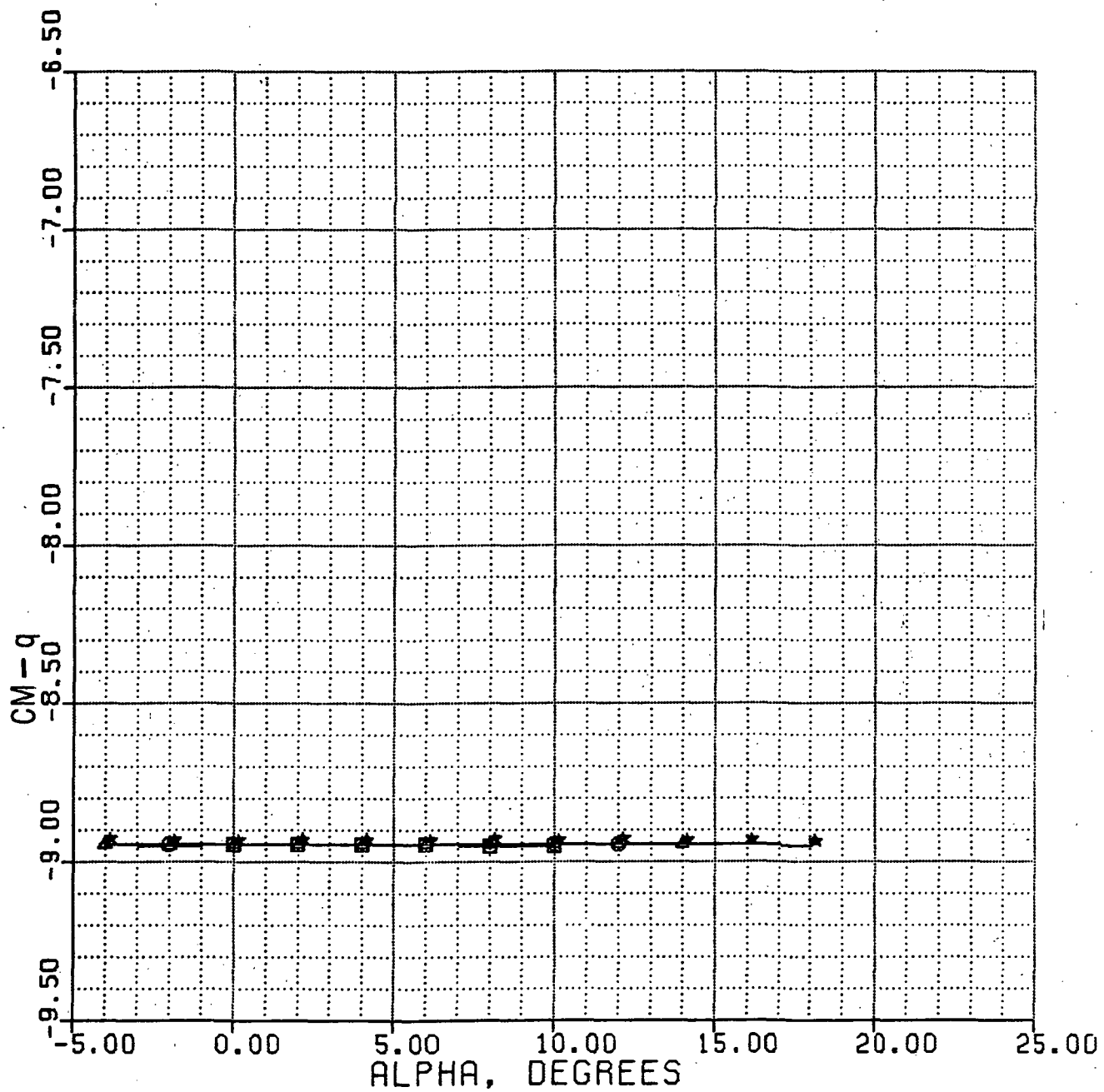
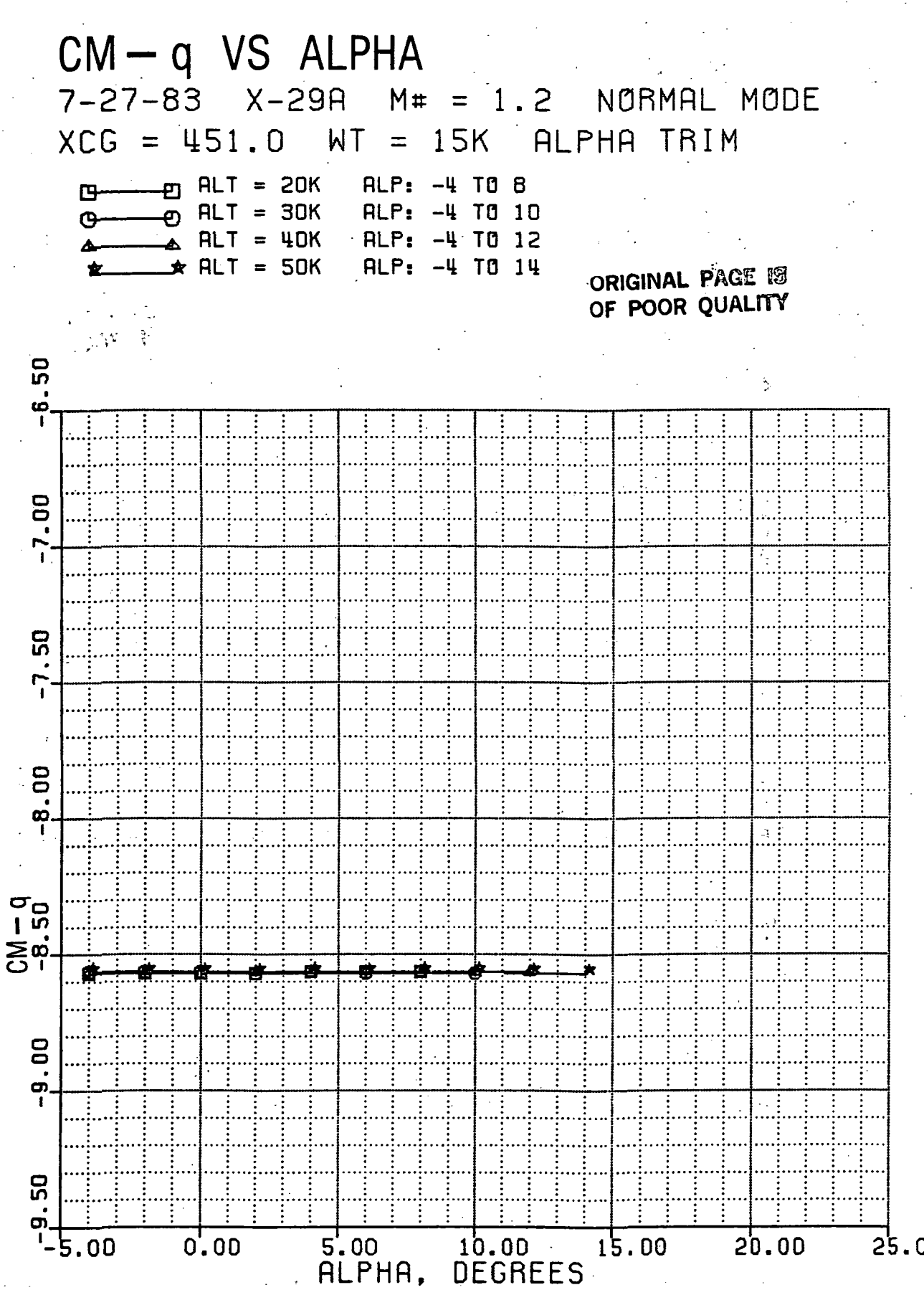


Figure 98(d)


CM − q VS ALPHA
7-27-83 X-29A M# = 1.2 NORMAL MODE
XCG = 451.0 WT = 15K ALPHA TRIM
ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14
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-6.50
-7.00
-7.50
-8.00
-8.50
-9.00
-9.50
CM − q
-5.00
0.00
5.00
10.00
15.00
20.00
25.0
ALPHA, DEGREES

Figure 98(e)

CM − q VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

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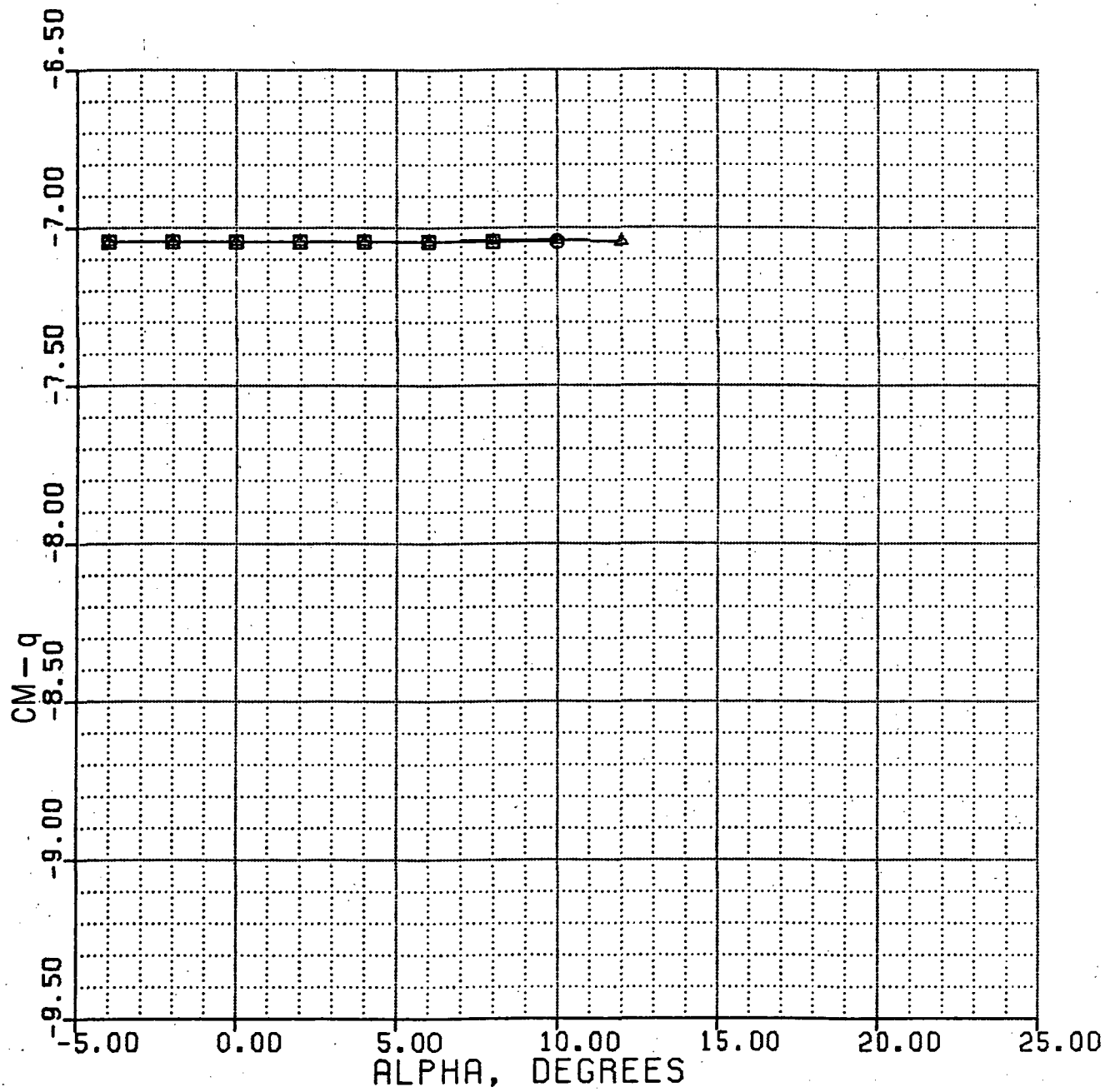

Figure 98(f)

CA − q VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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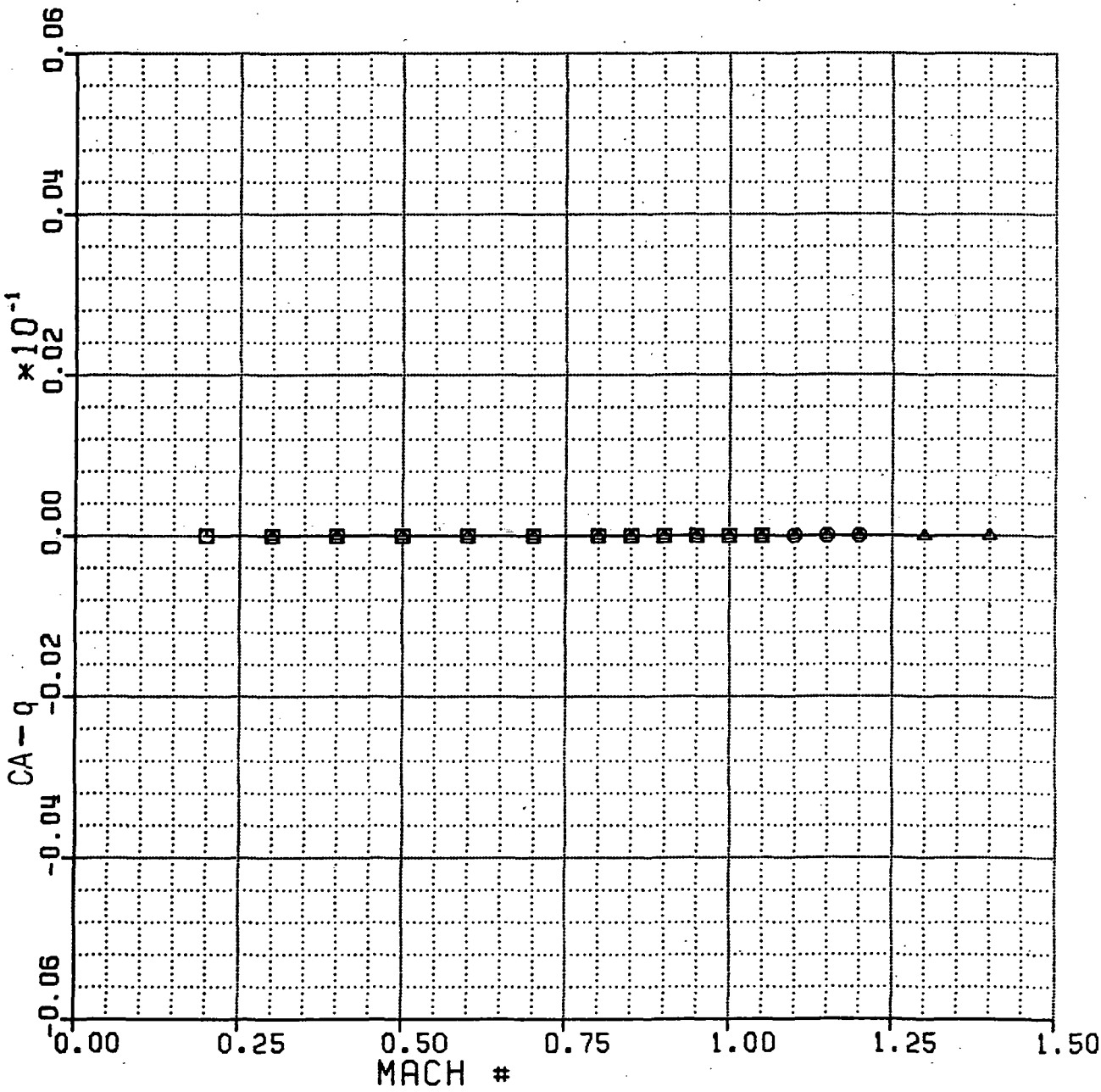

Figure 99(a)

CA − q VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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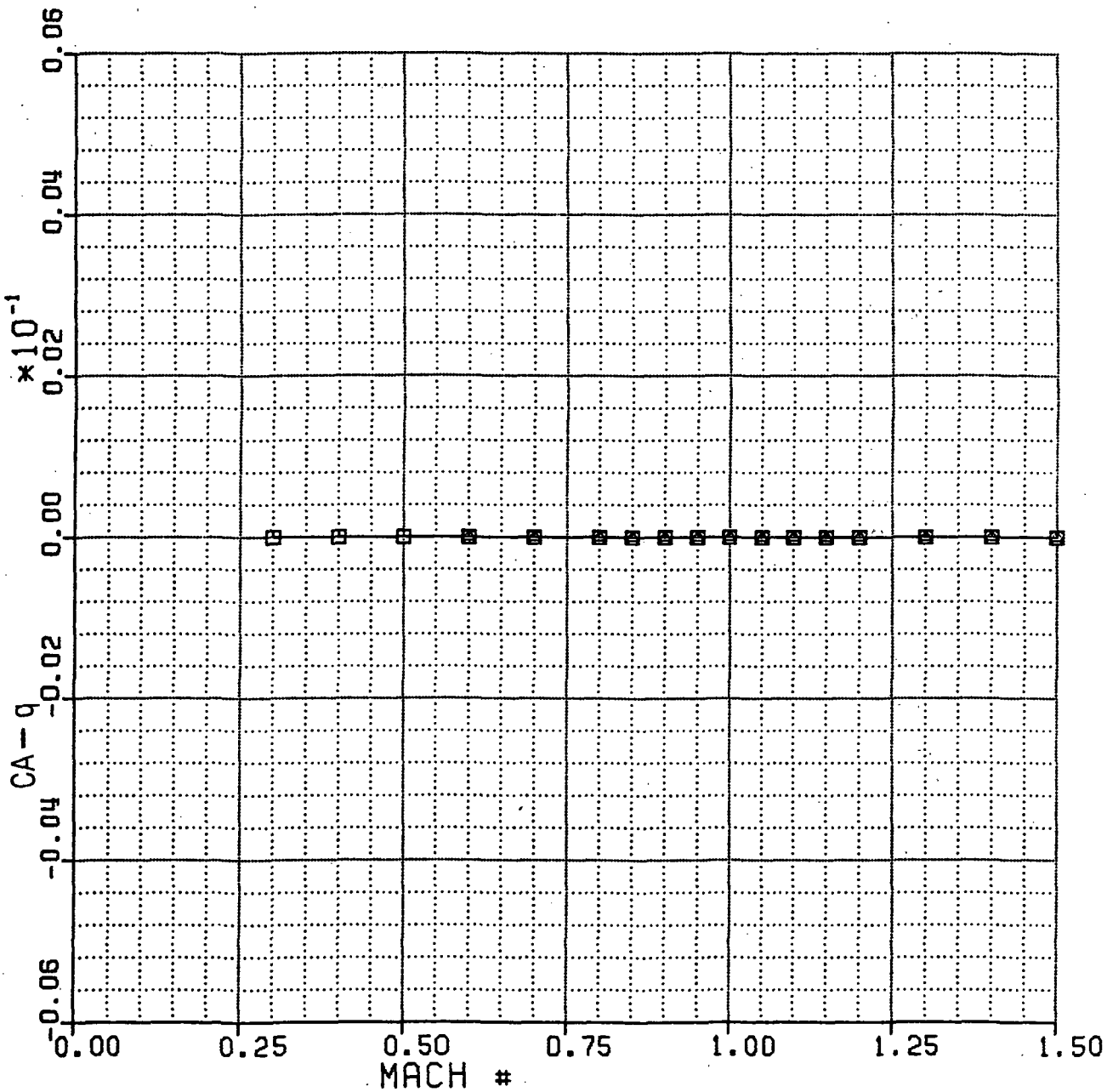

Figure 99(b)

CA – q VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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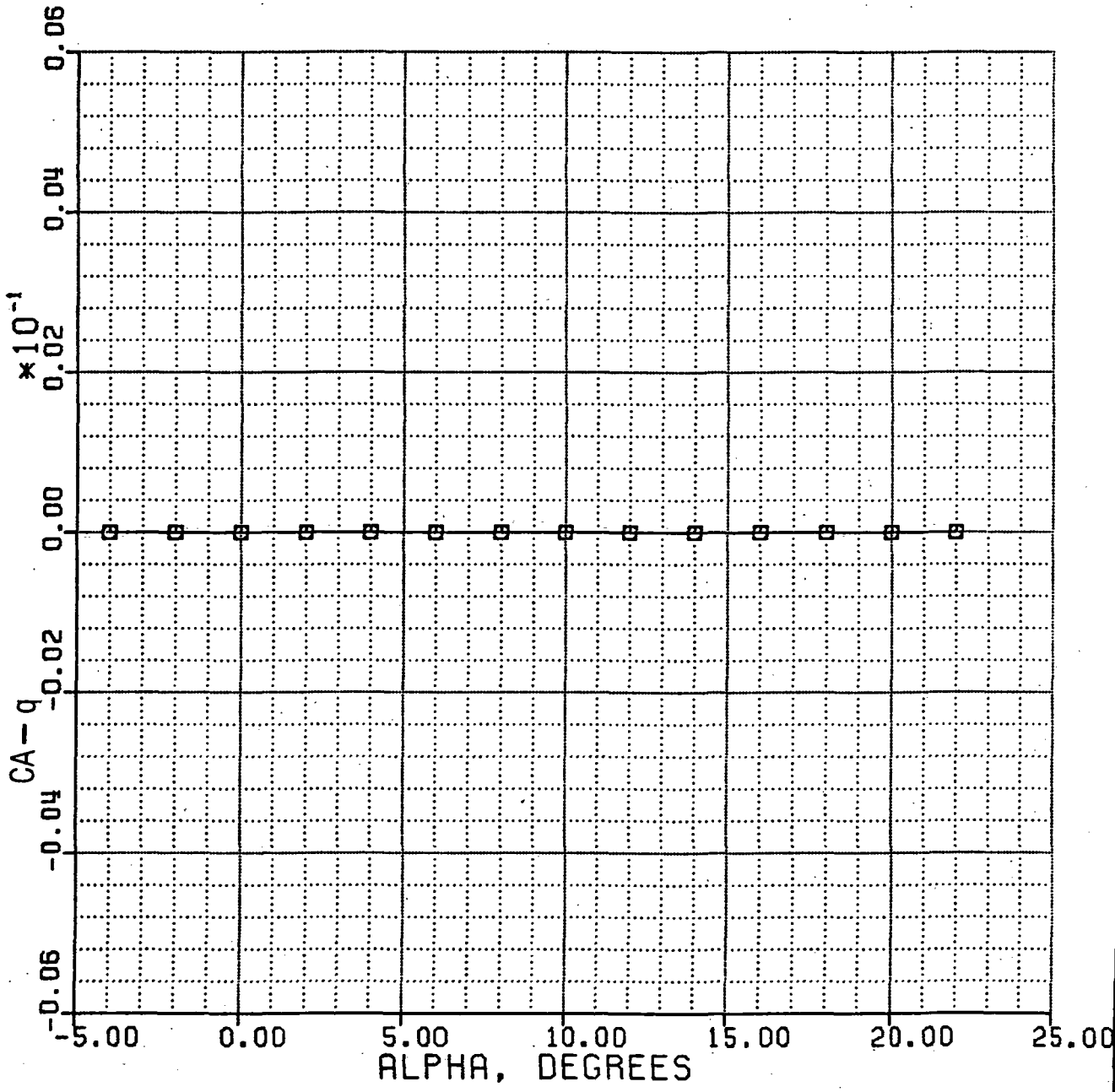

Figure 100(a)

CA− q VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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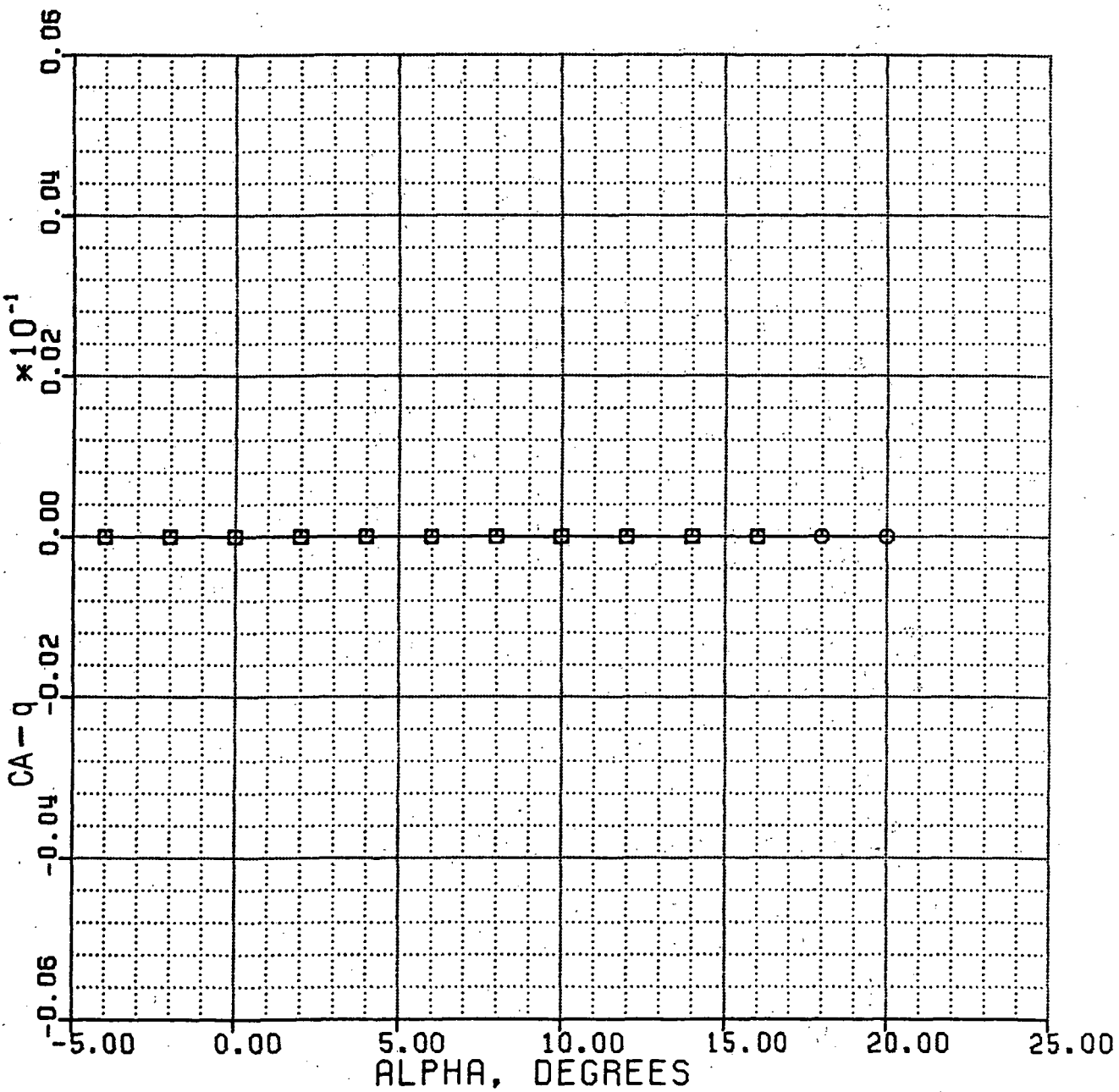

Figure 100(b)

CA – q VS ALPHA

7-26-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22

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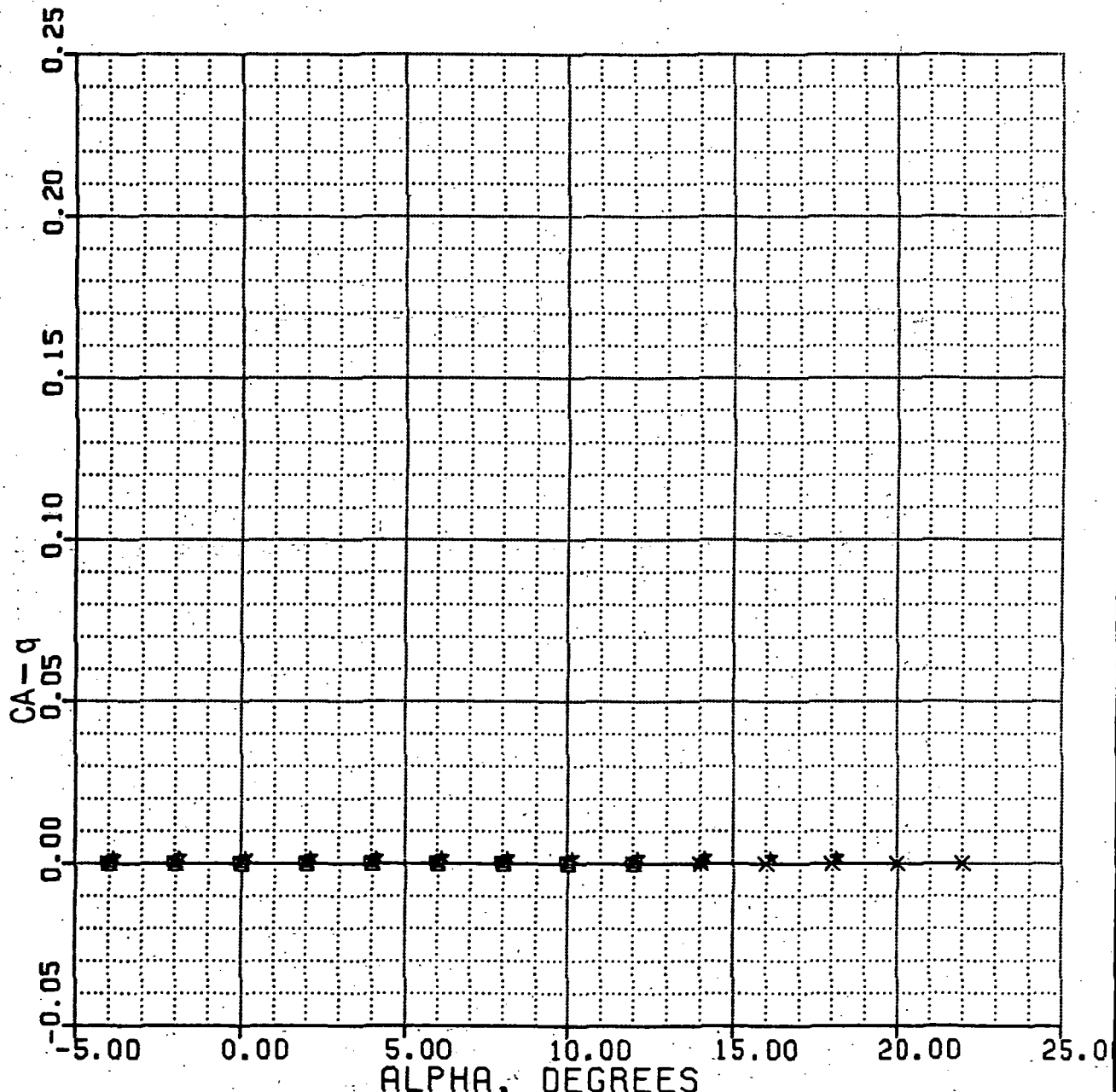

Figure 100(c)

CA − q VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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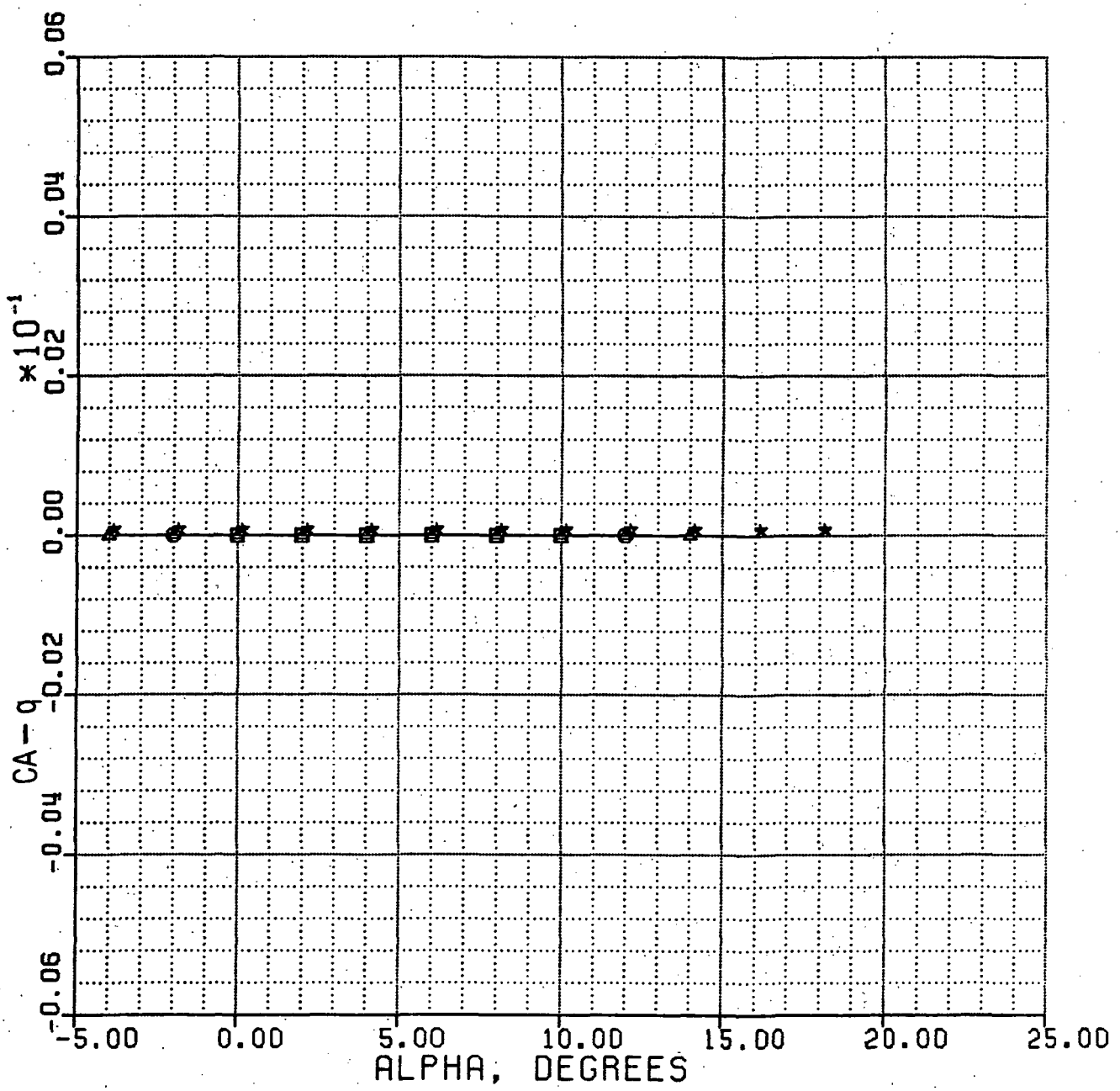

Figure 100(d)

CA – q VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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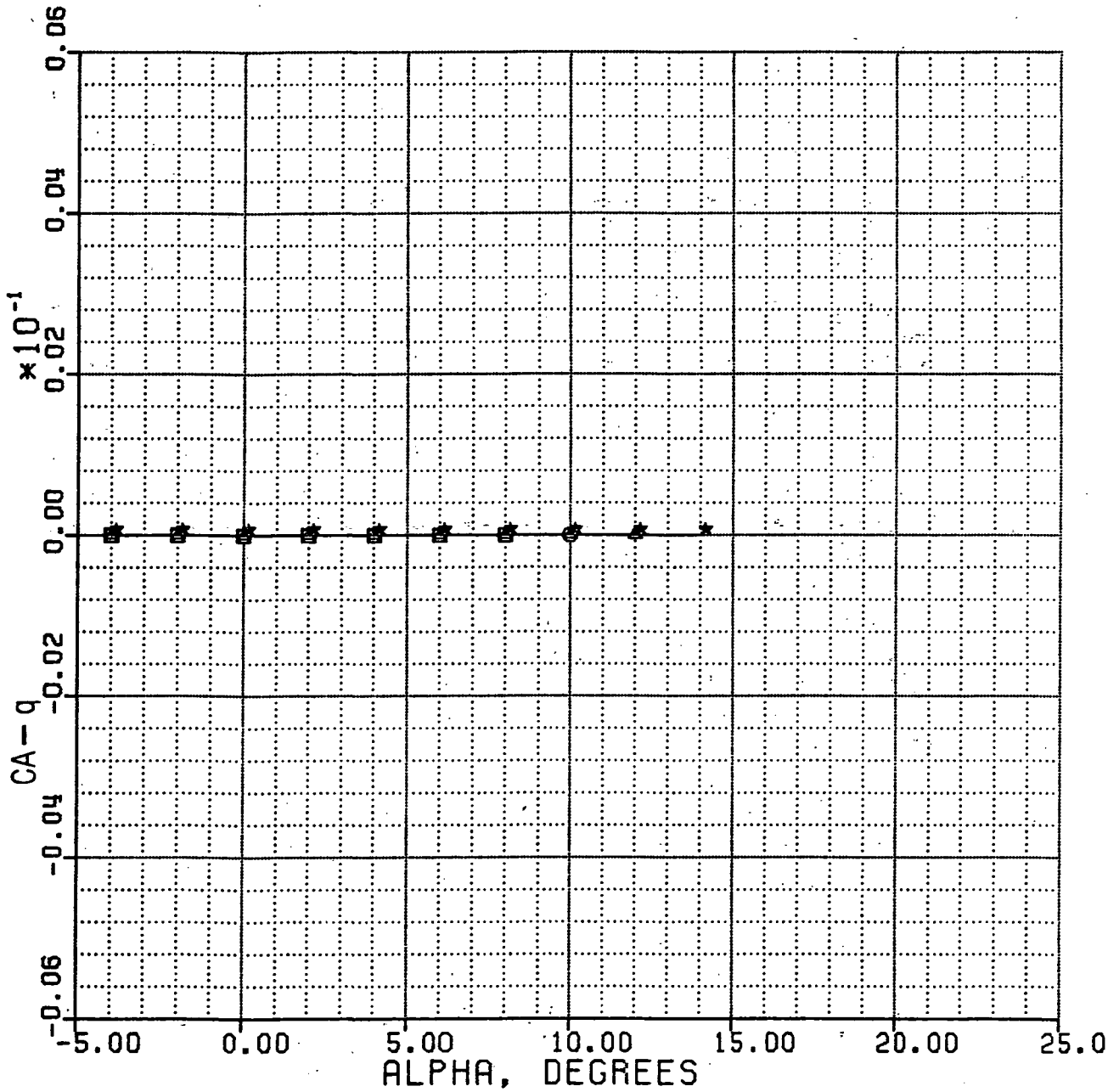

Figure 100(e)

CA – q VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

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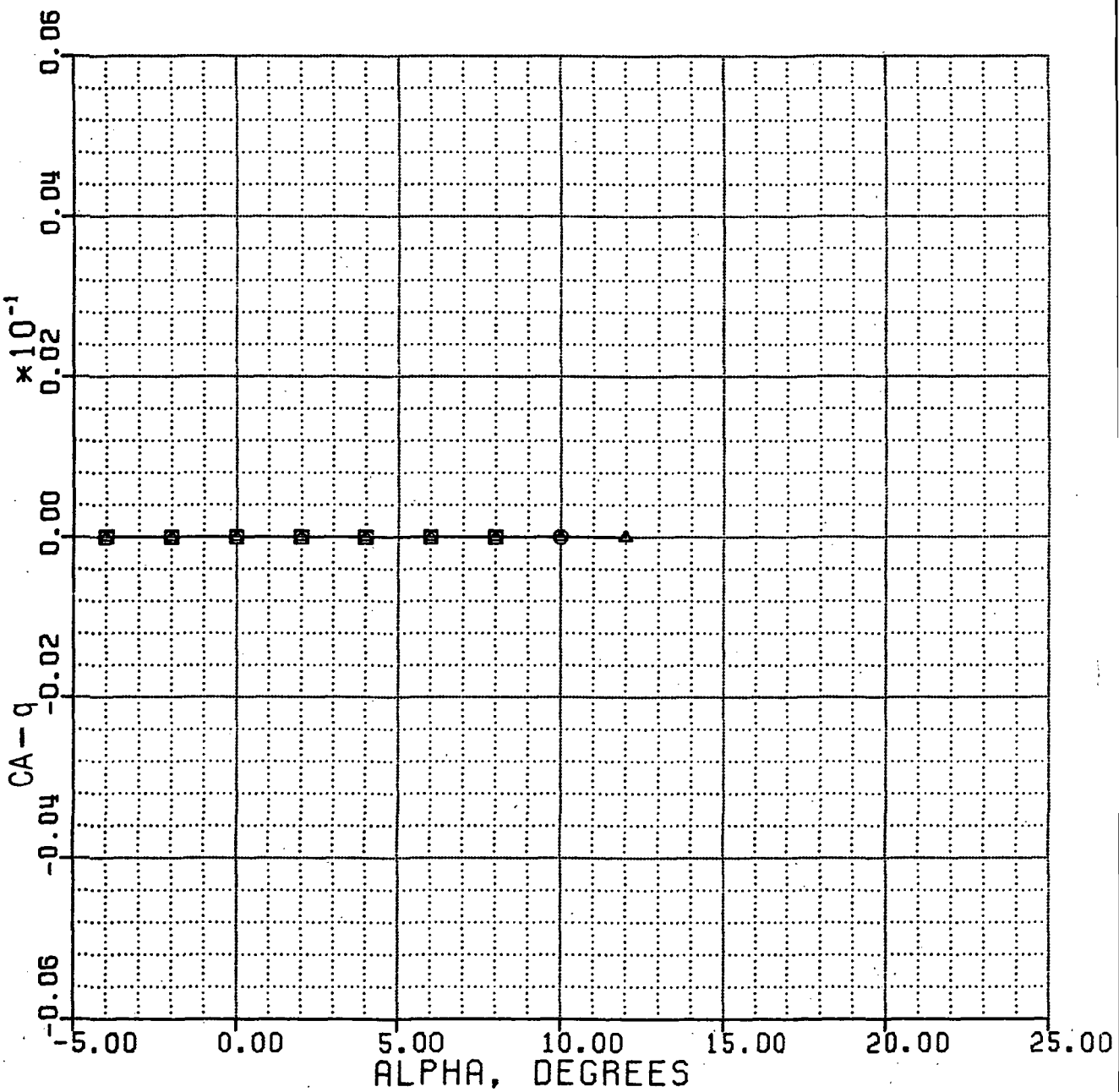

Figure 100(f)

CN – q VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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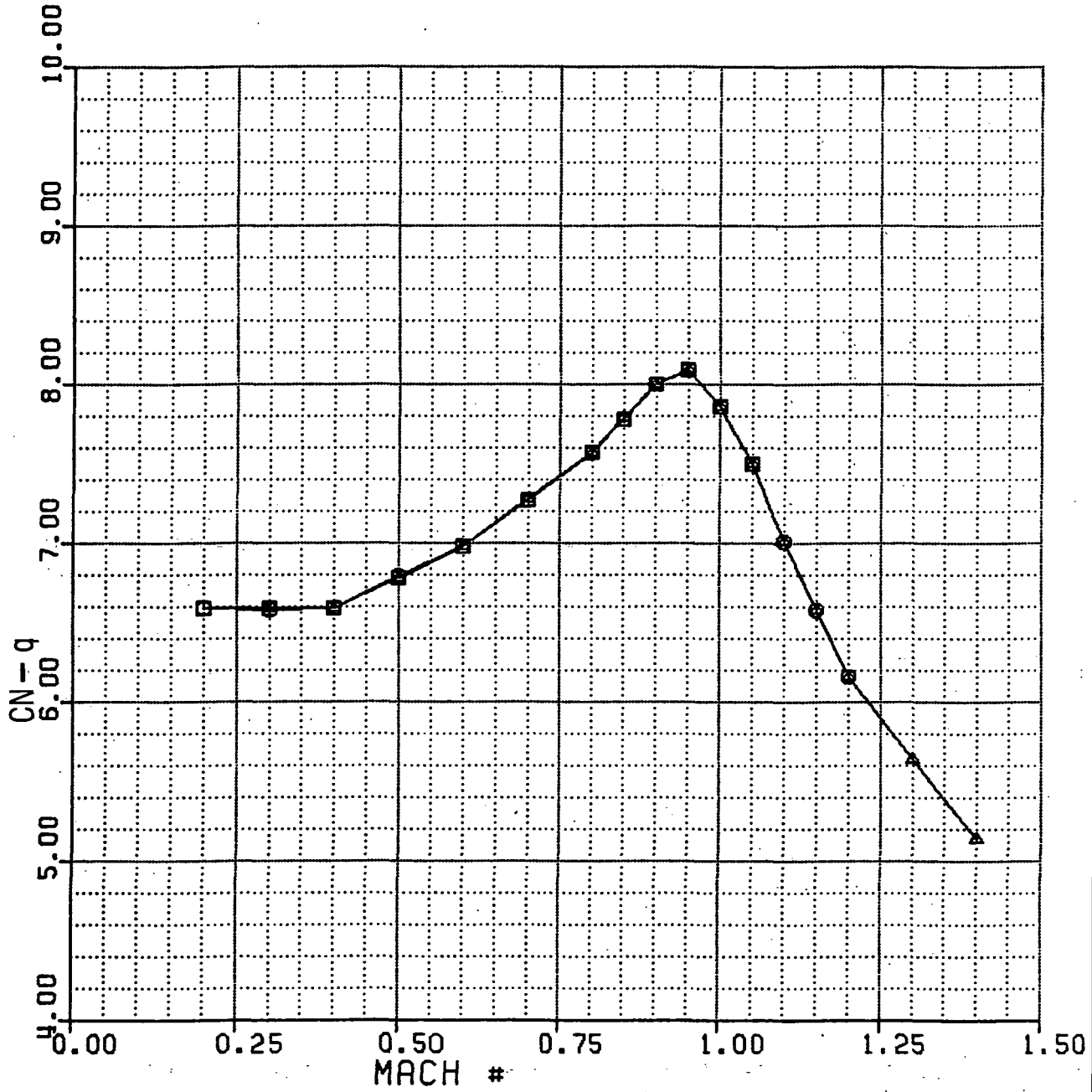

Figure 101(a)

CN – q VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5

ALT = 40K M# = .6 TO 1.5

ALT = 50K M# = .6 TO 1.5

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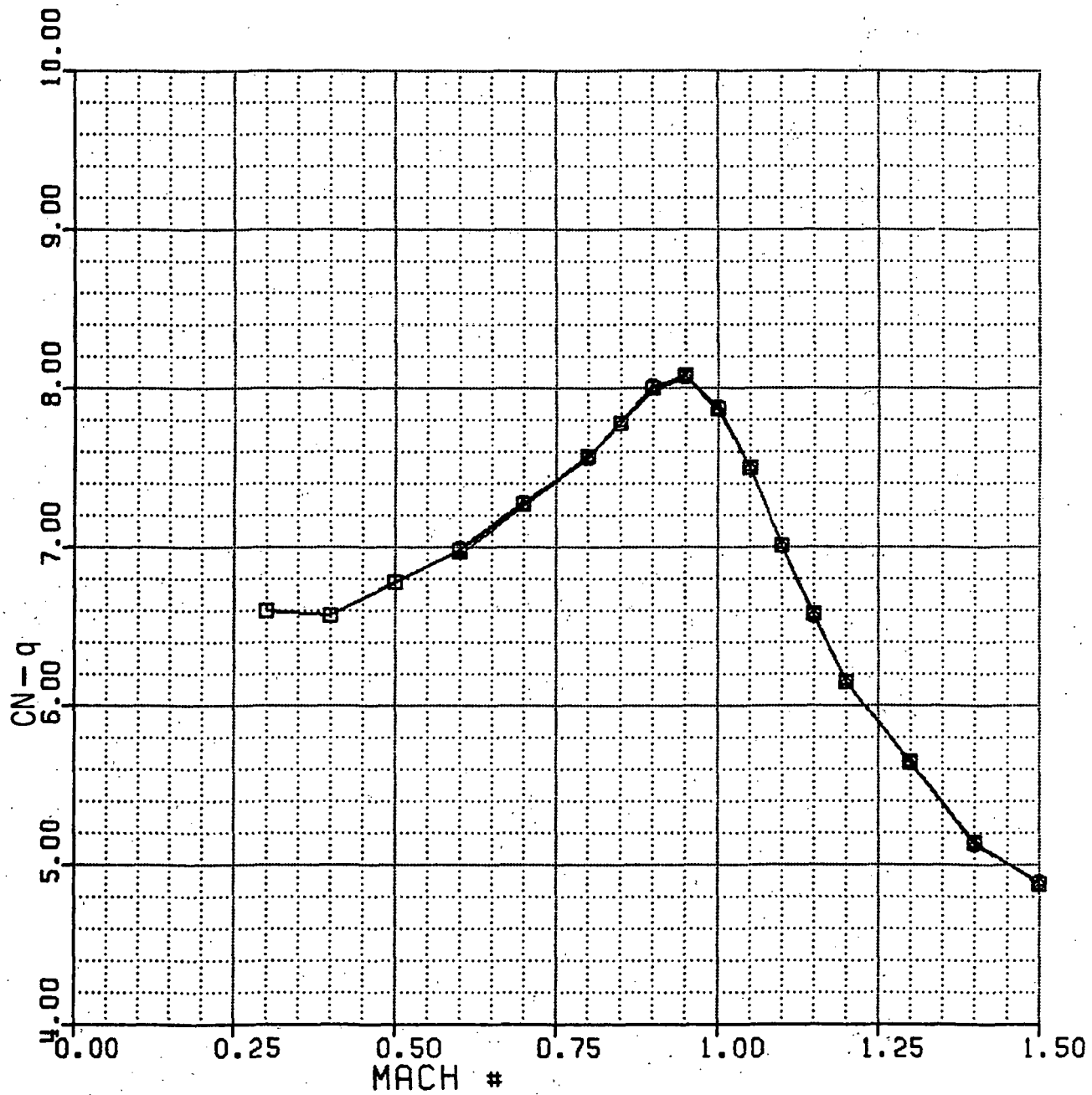

Figure 101(b)

CN – q VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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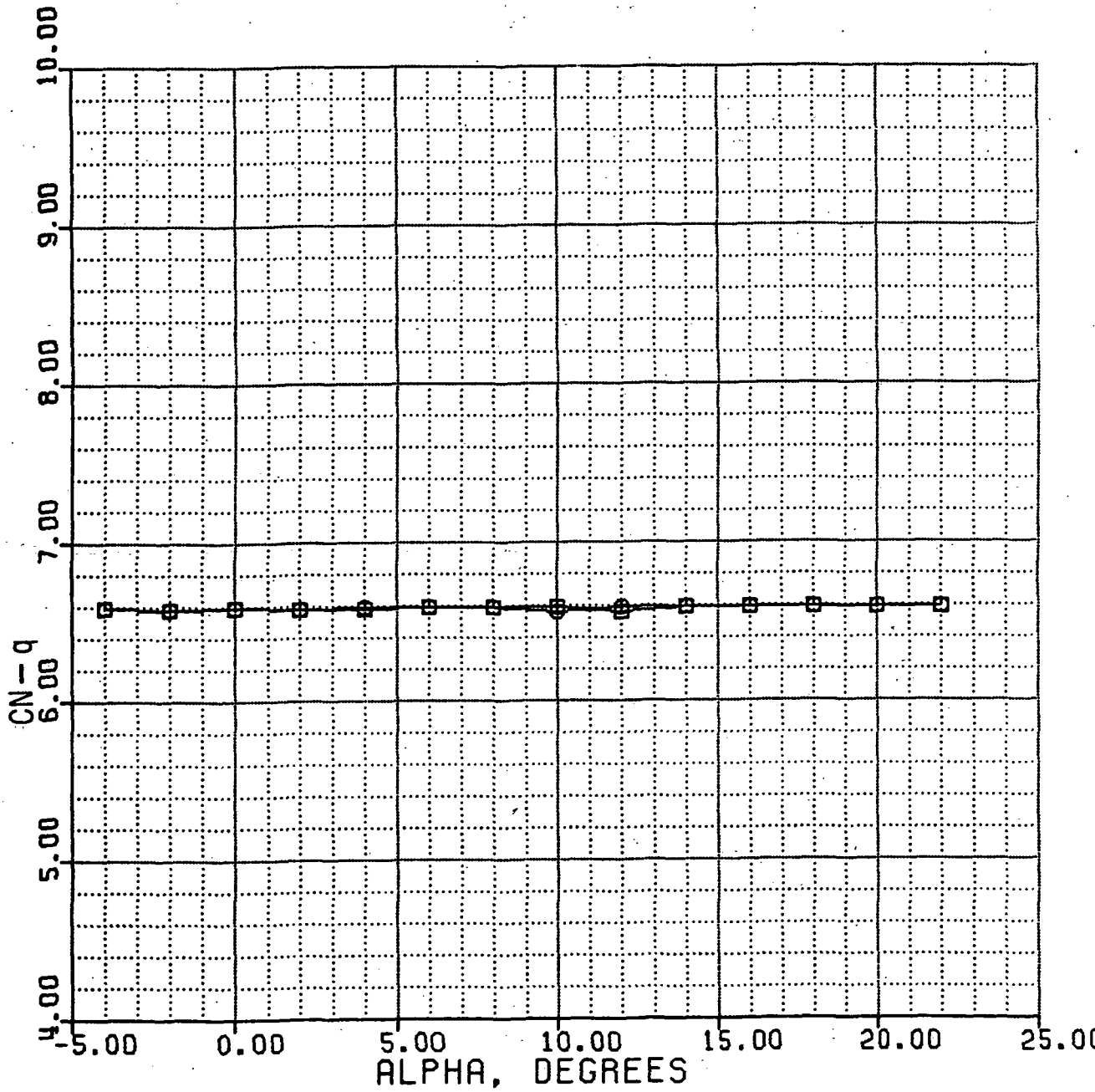

Figure 102(a)

CN – q VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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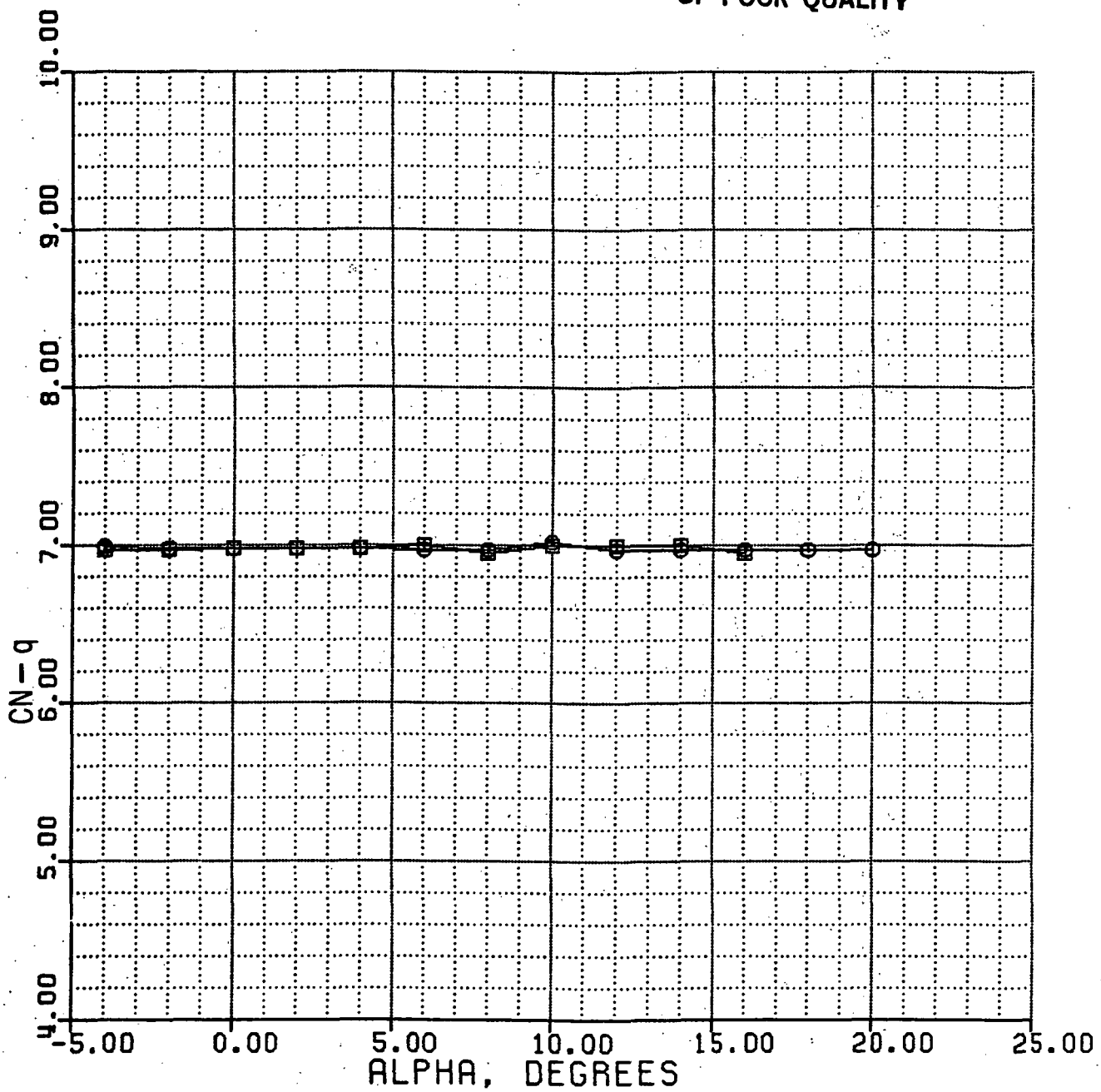

Figure 102(b)

CN – q VS ALPHA

7-26-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22

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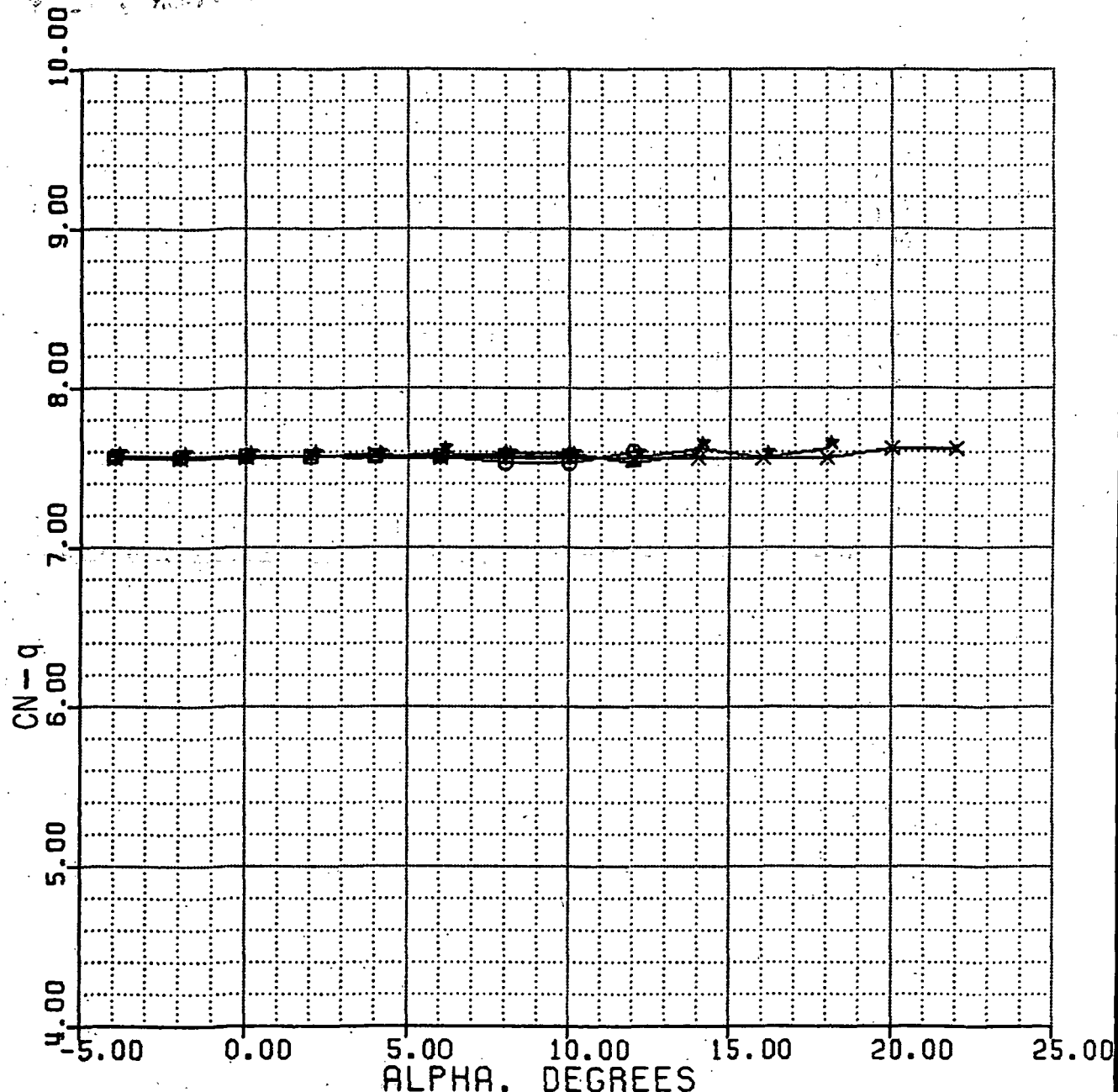

Figure 102(c)

CN – q VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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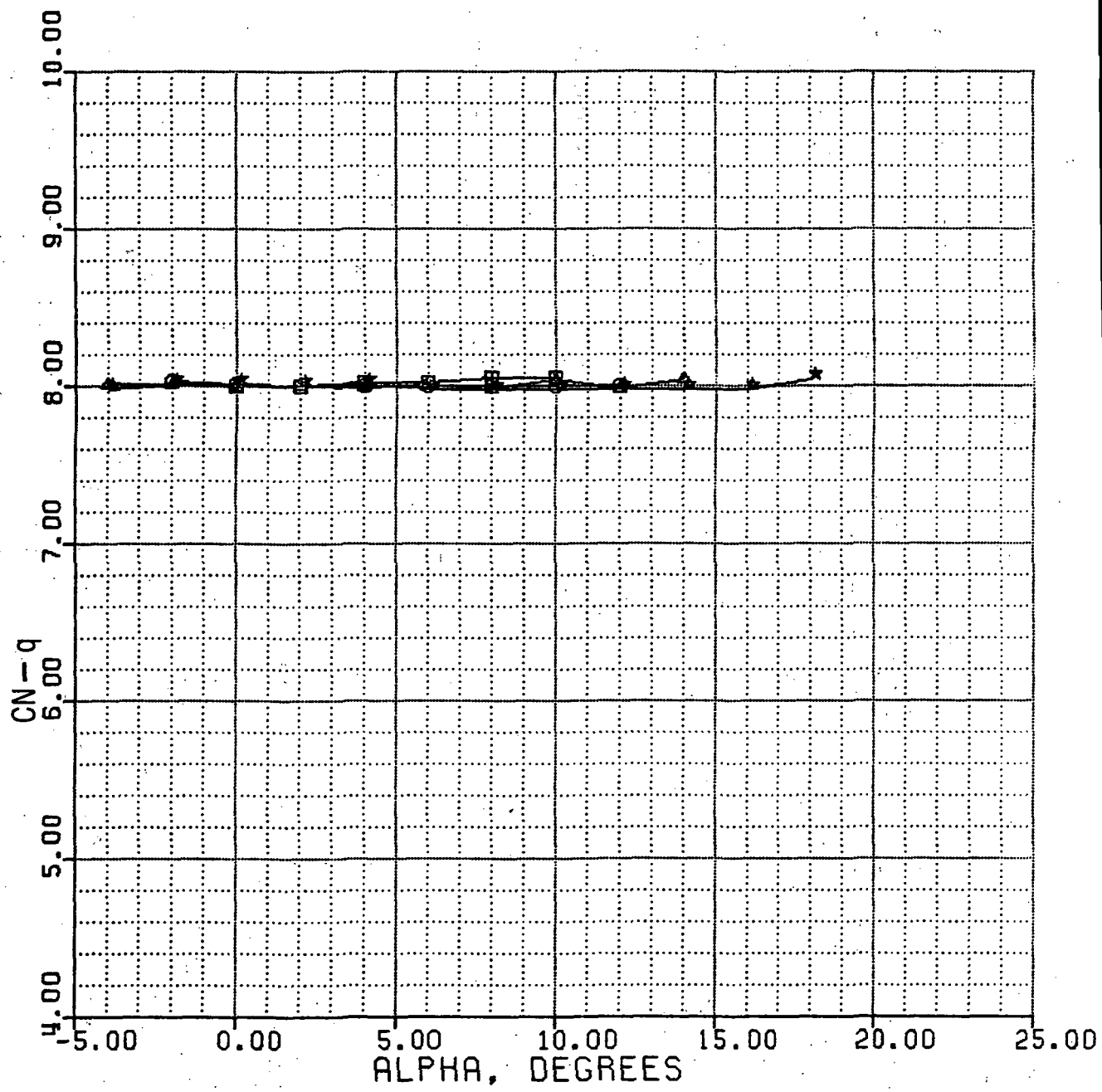

Figure 102(d)

CN – q VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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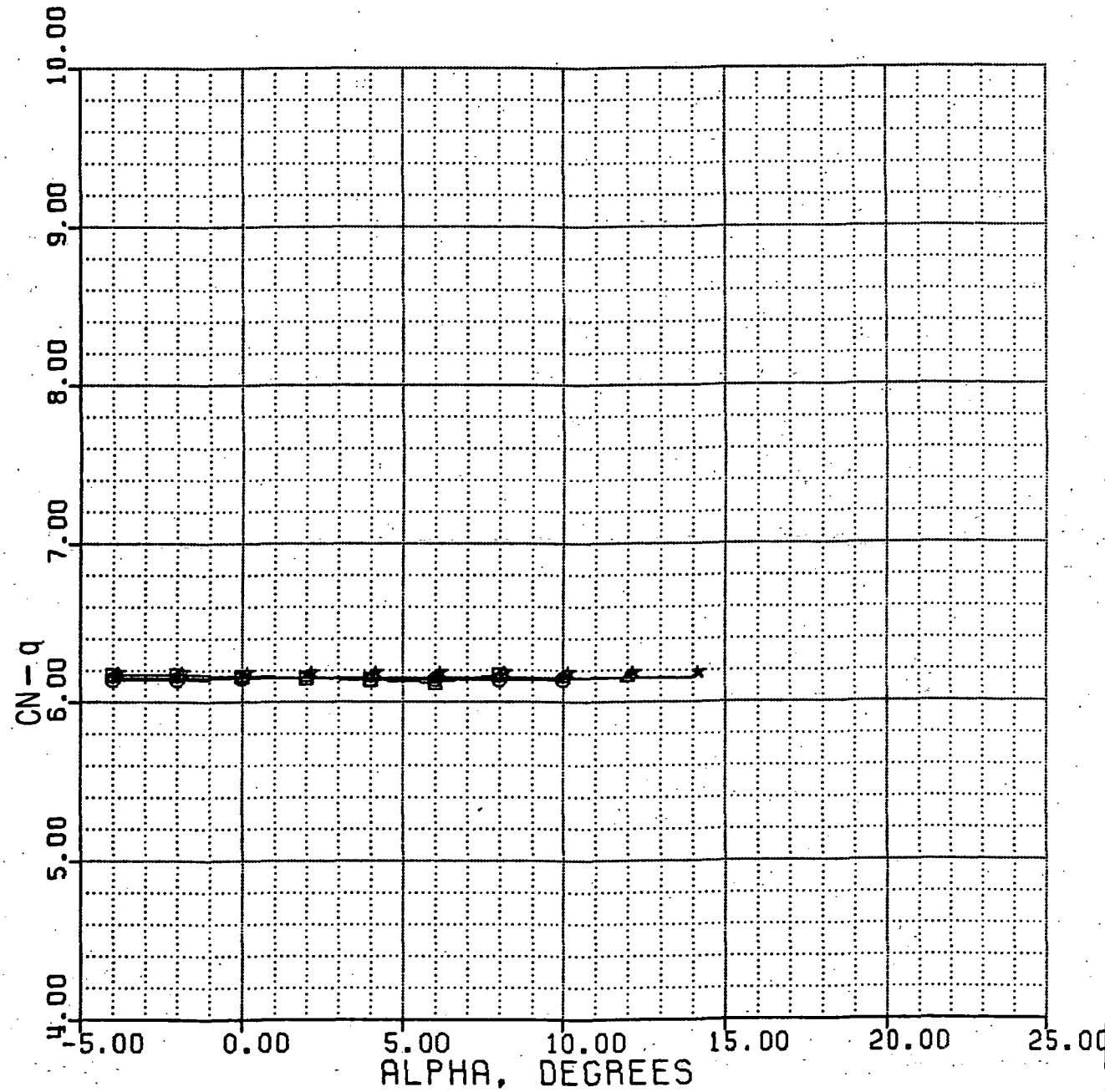

Figure 102(e)

CN – q VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

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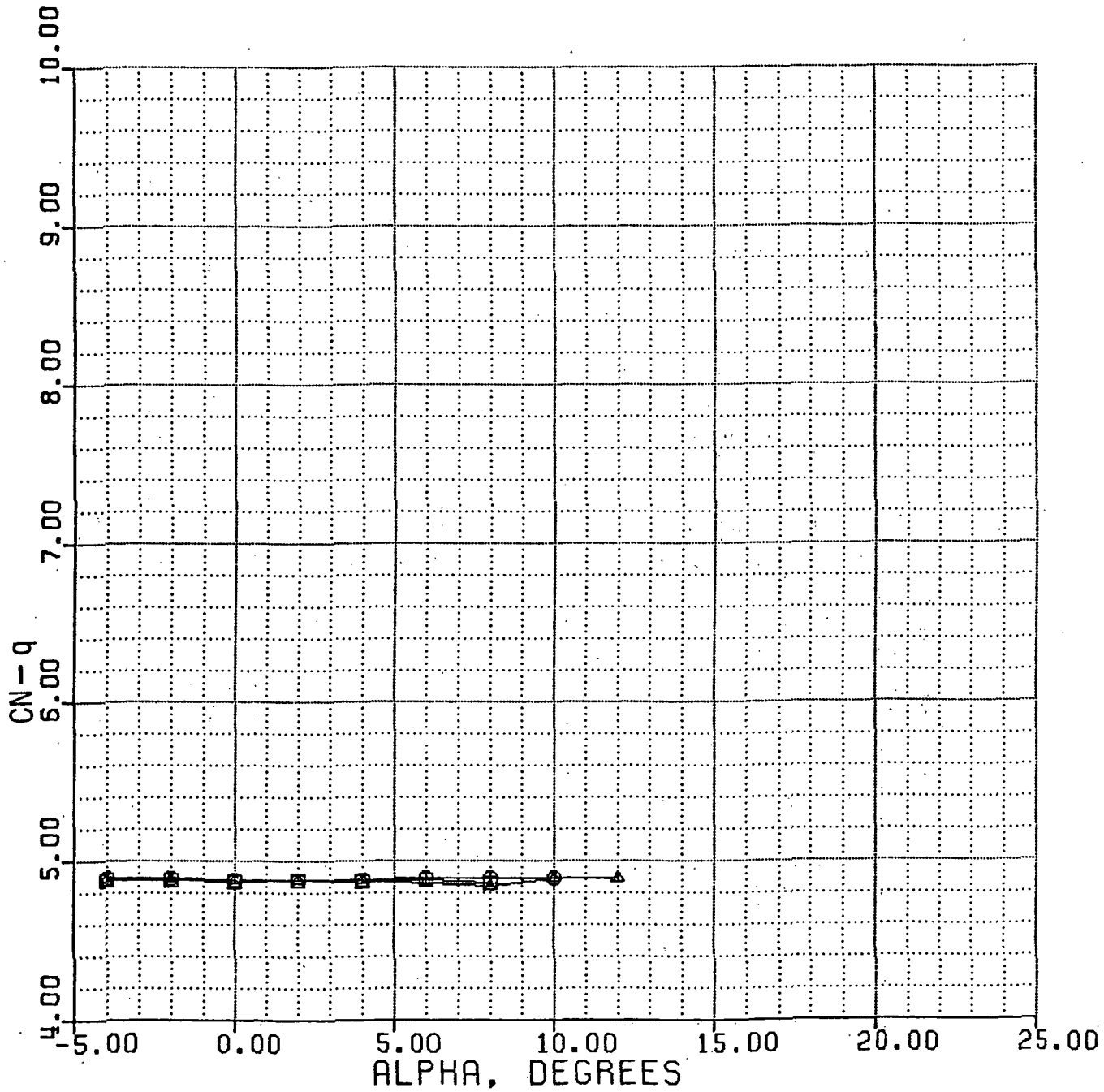

Figure 102(f)

Cy — ROLL RATE VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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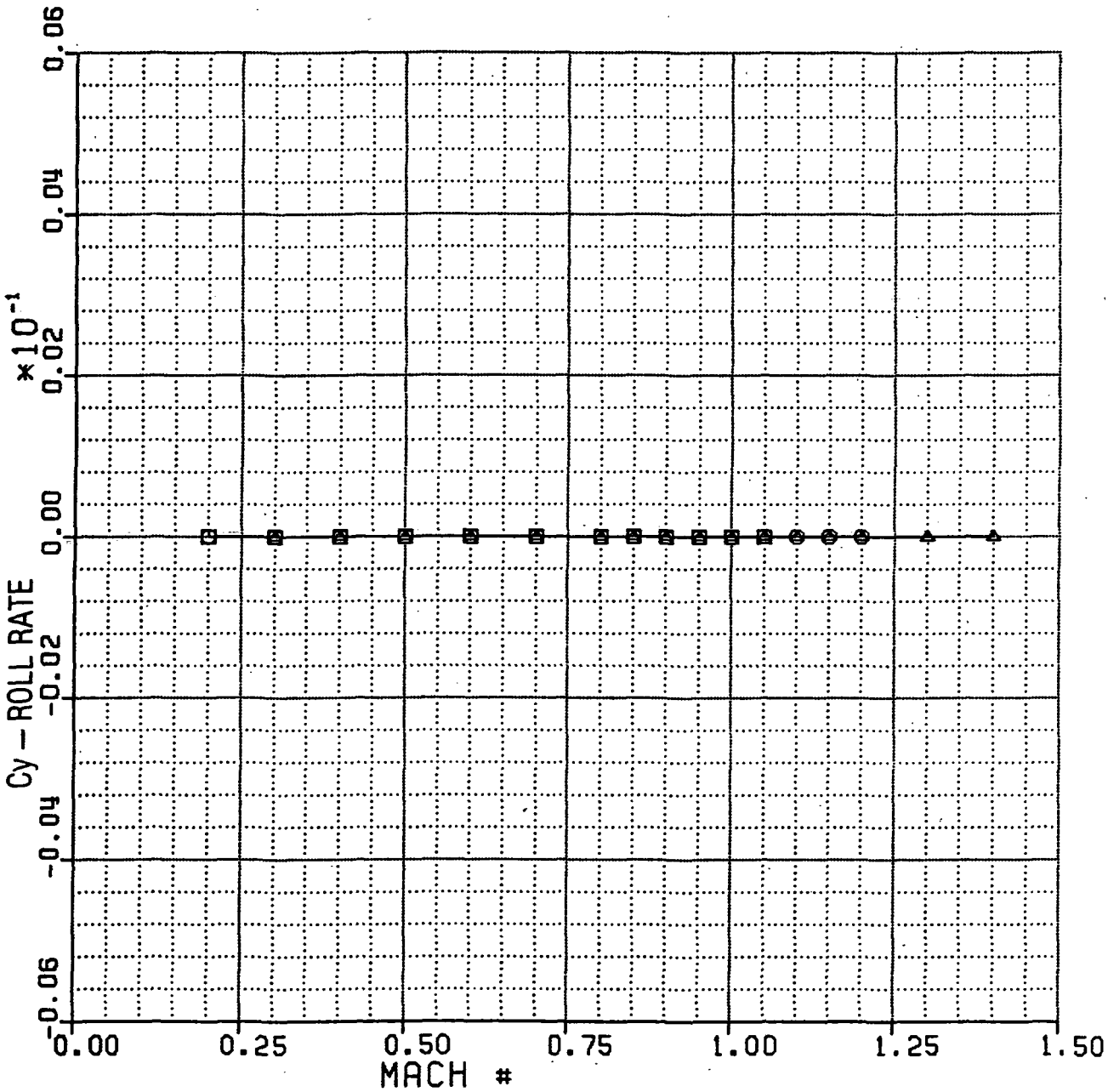

Figure 103(a)

Cy – ROLL RATE VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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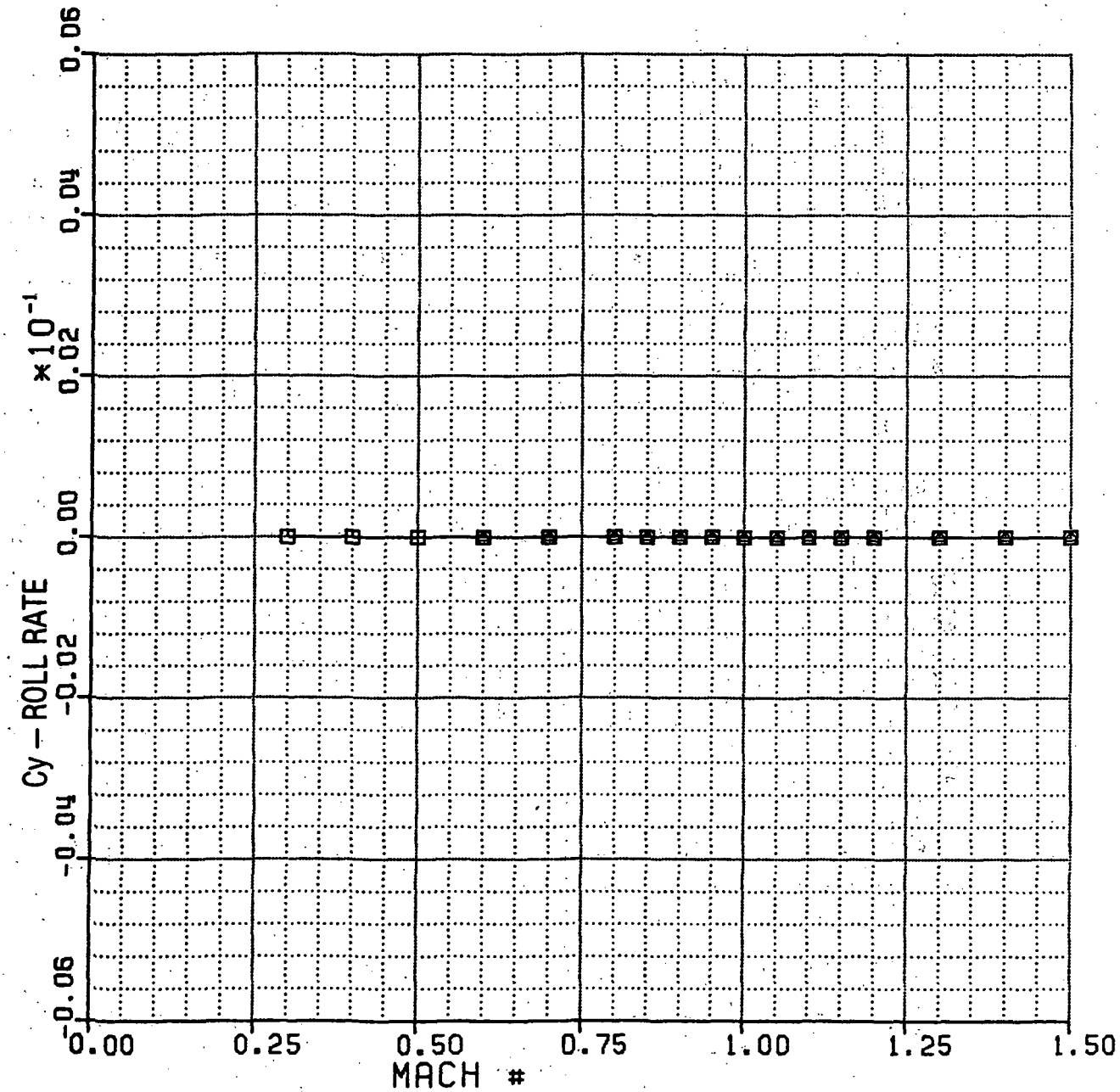

Figure 103(b)

Cy – ROLL RATE VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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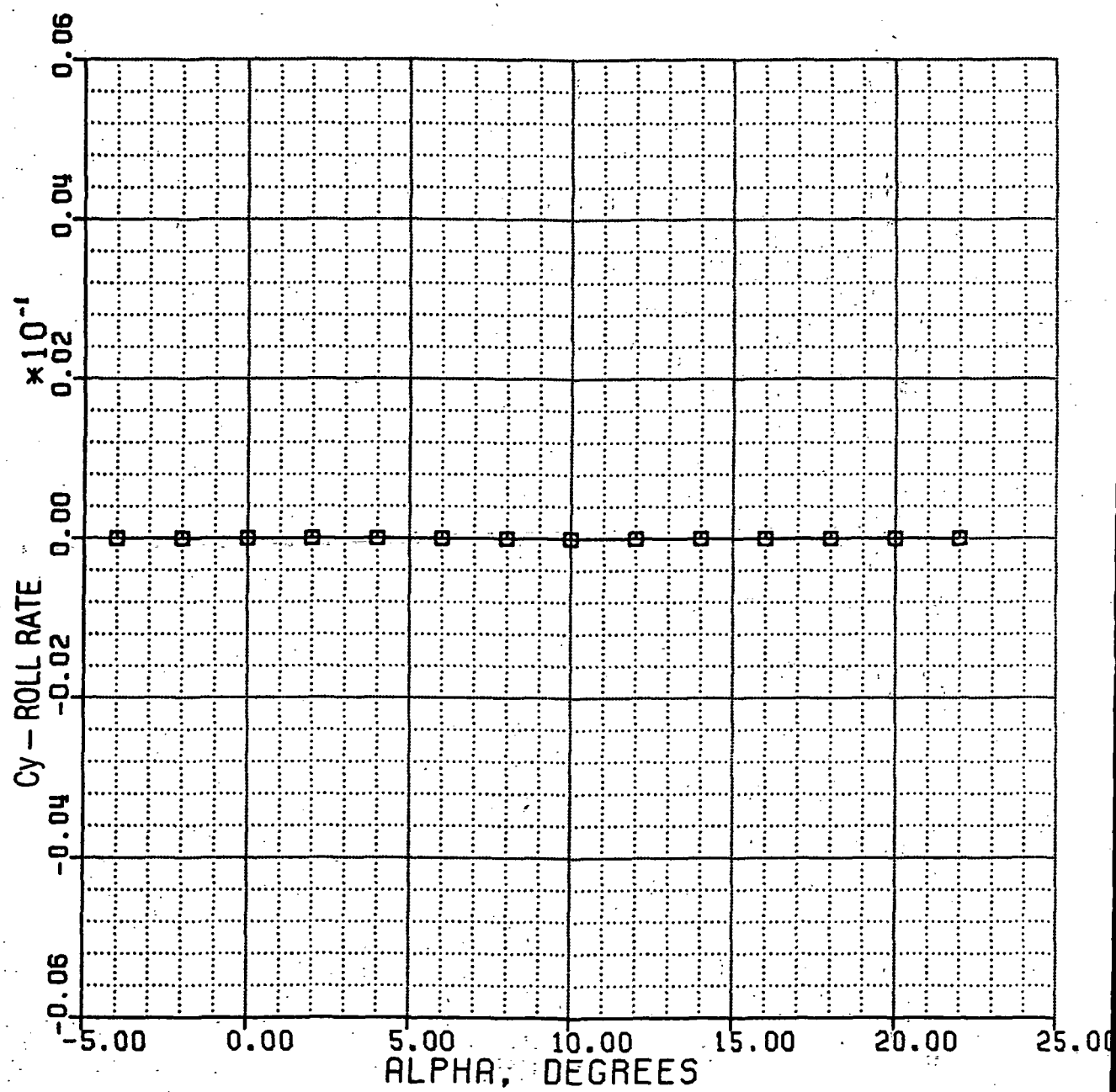

Figure 104(a)

Cy – ROLL RATE VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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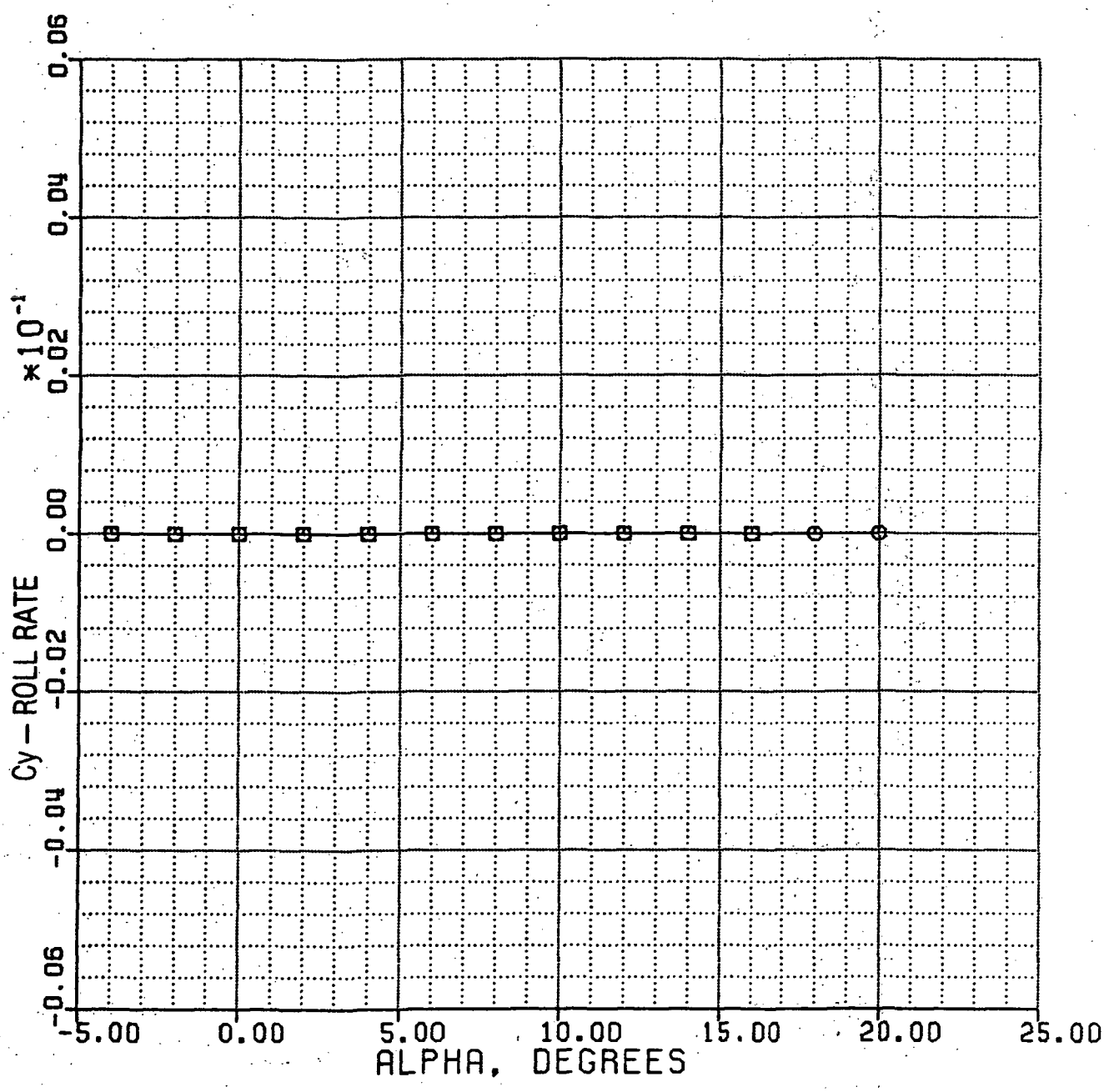

Figure 104(b)

Cy – ROLL RATE VS ALPHA

7-26-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10	
ALT = 20K	ALP: -4 TO 12	
ALT = 30K	ALP: -4 TO 14	
ALT = 40K	ALP: -4 TO 18	
ALT = 50K	ALP: -4 TO 22	

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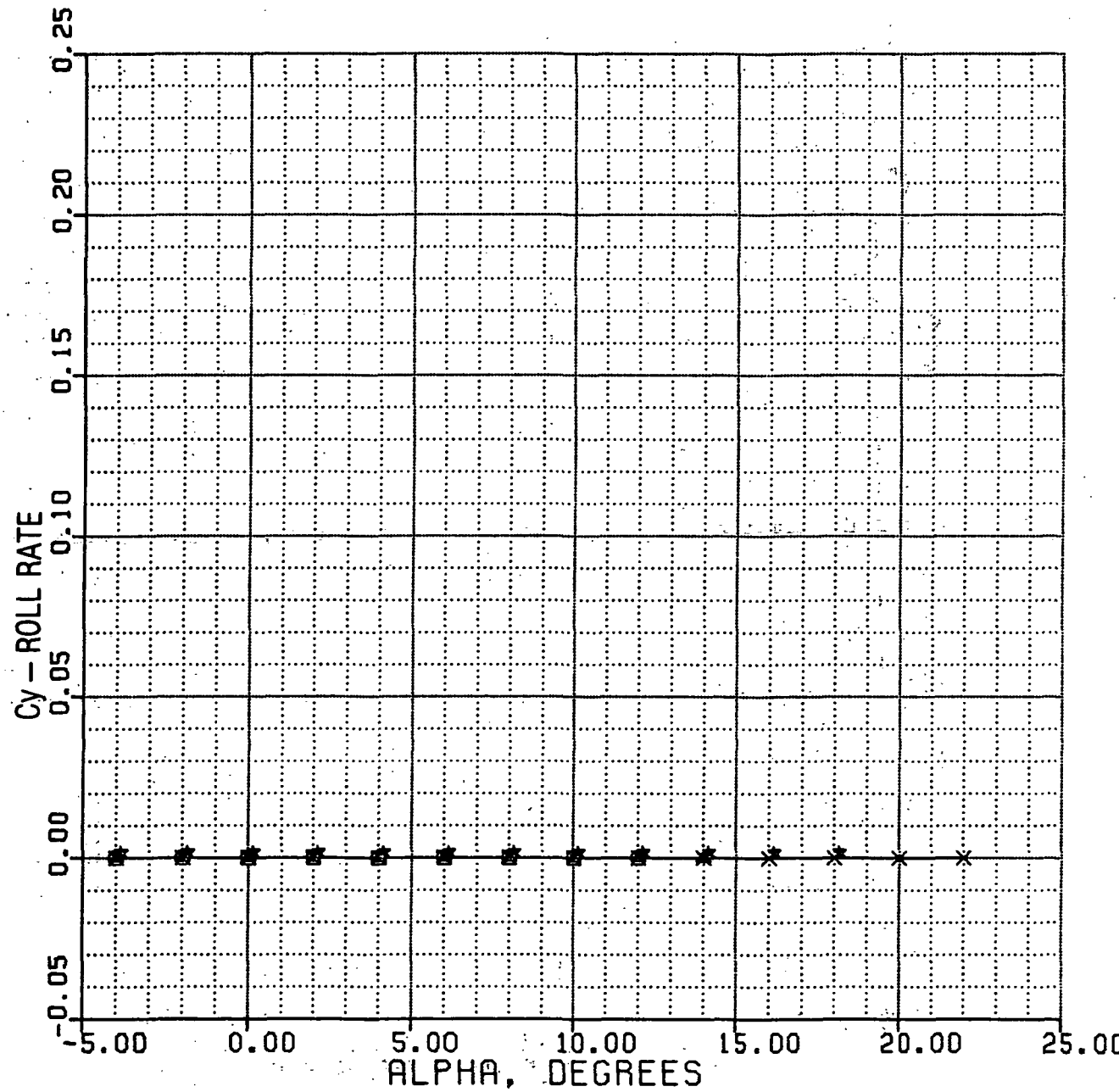

Figure 104(c)

Cy — ROLL RATE VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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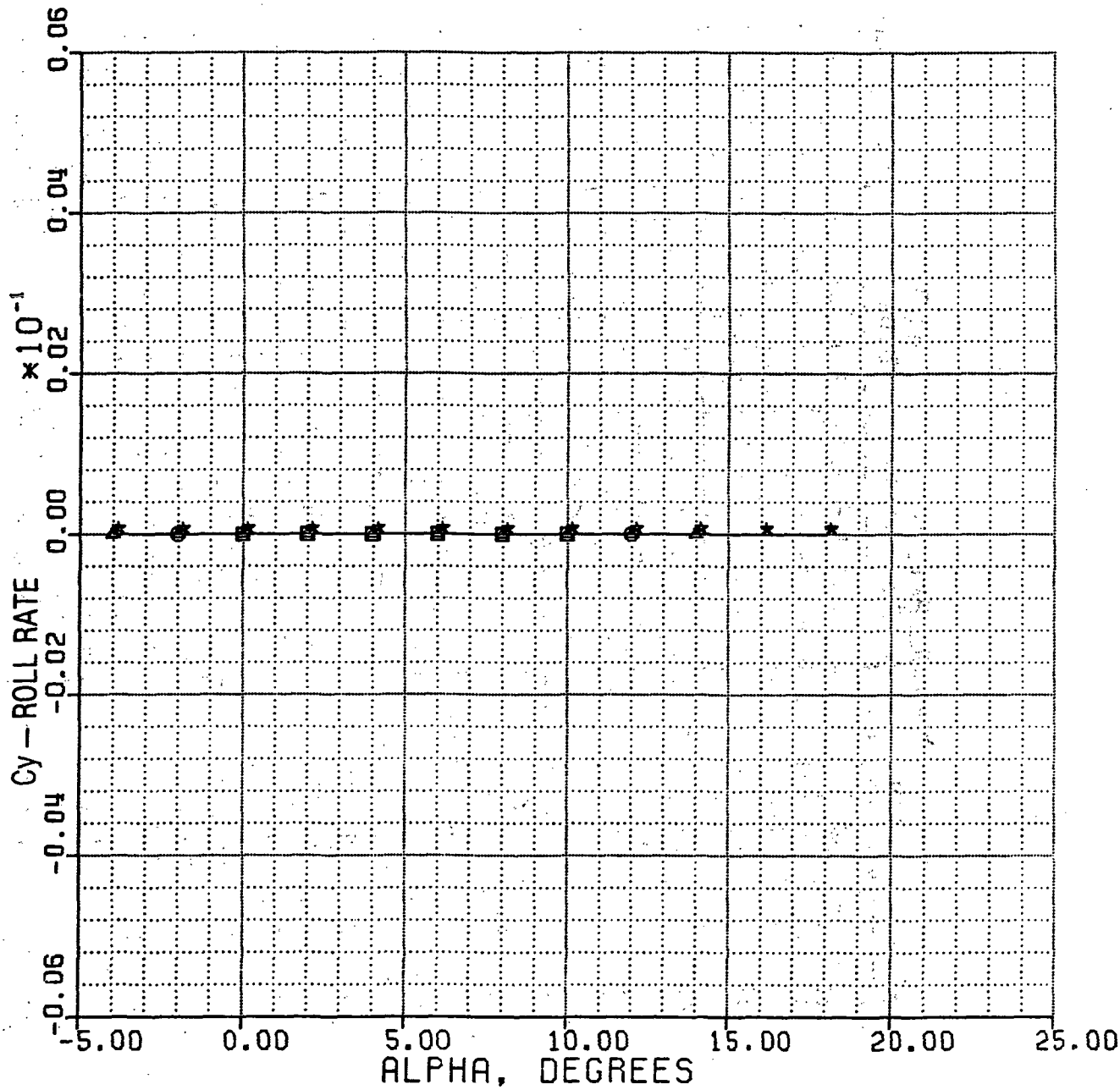

Figure 104(d)

Cy — ROLL RATE VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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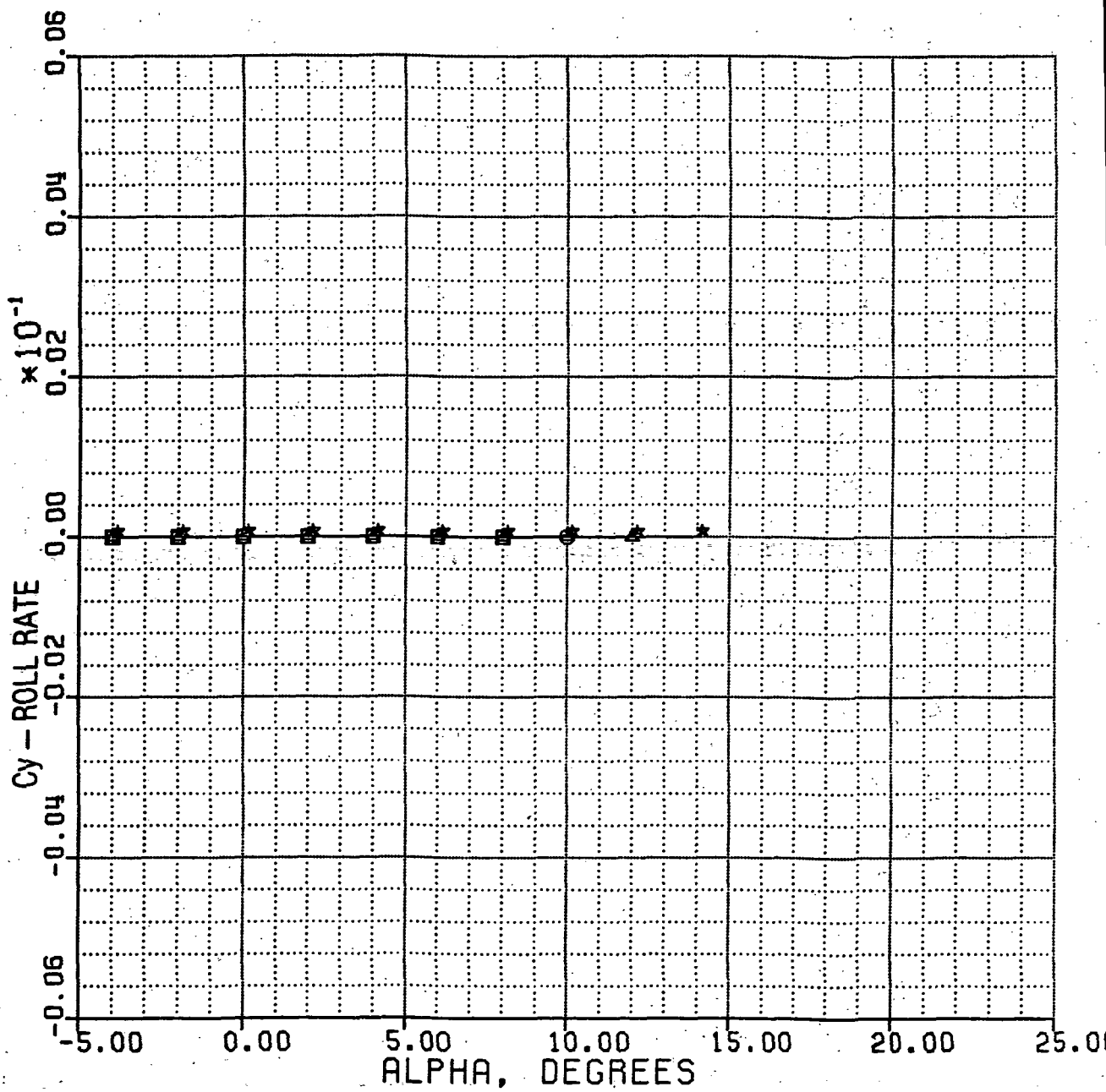

Figure 104(e)

Cy — ROLL RATE VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

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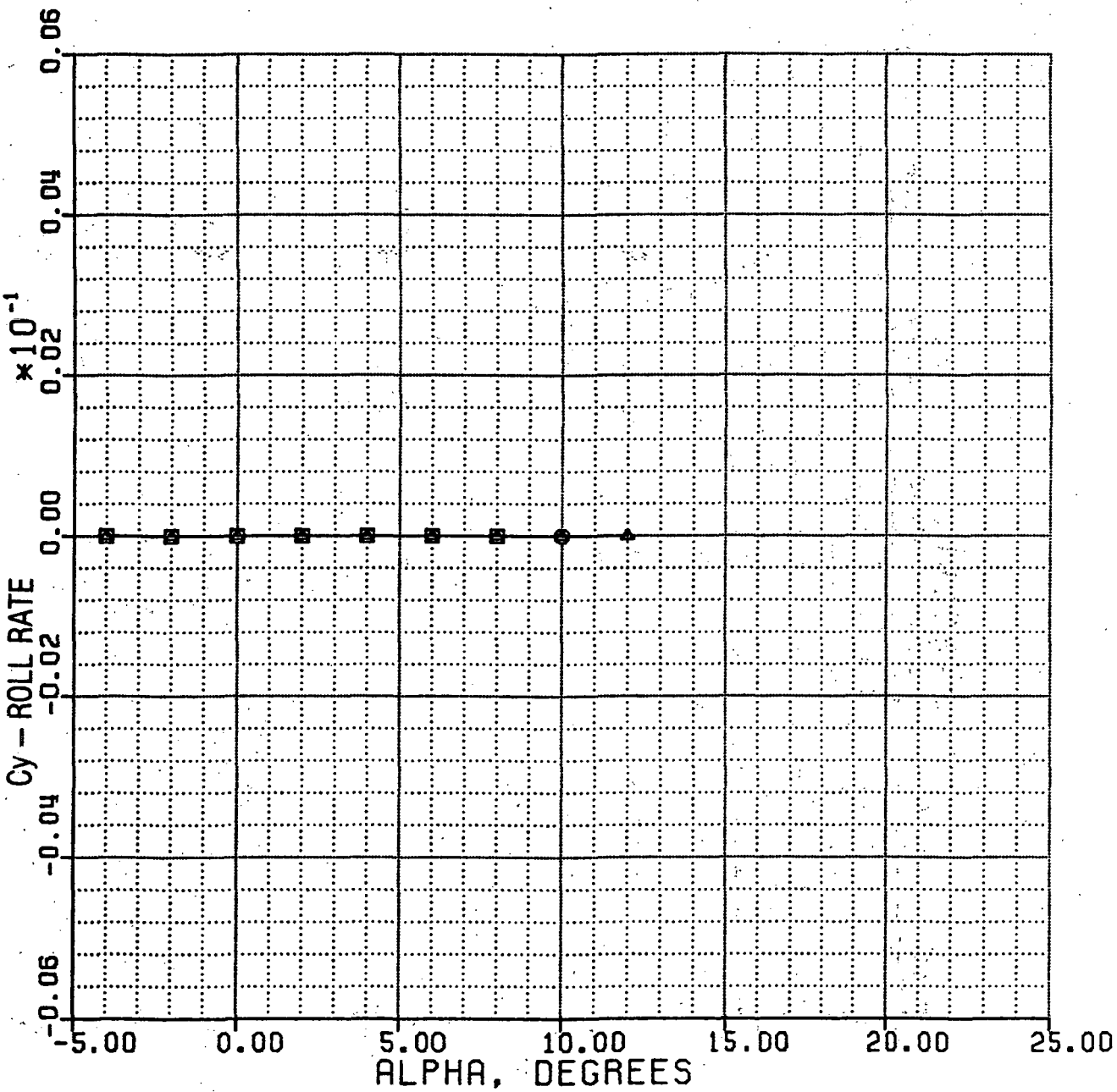

Figure 104(f)

Cl – ROLL RATE VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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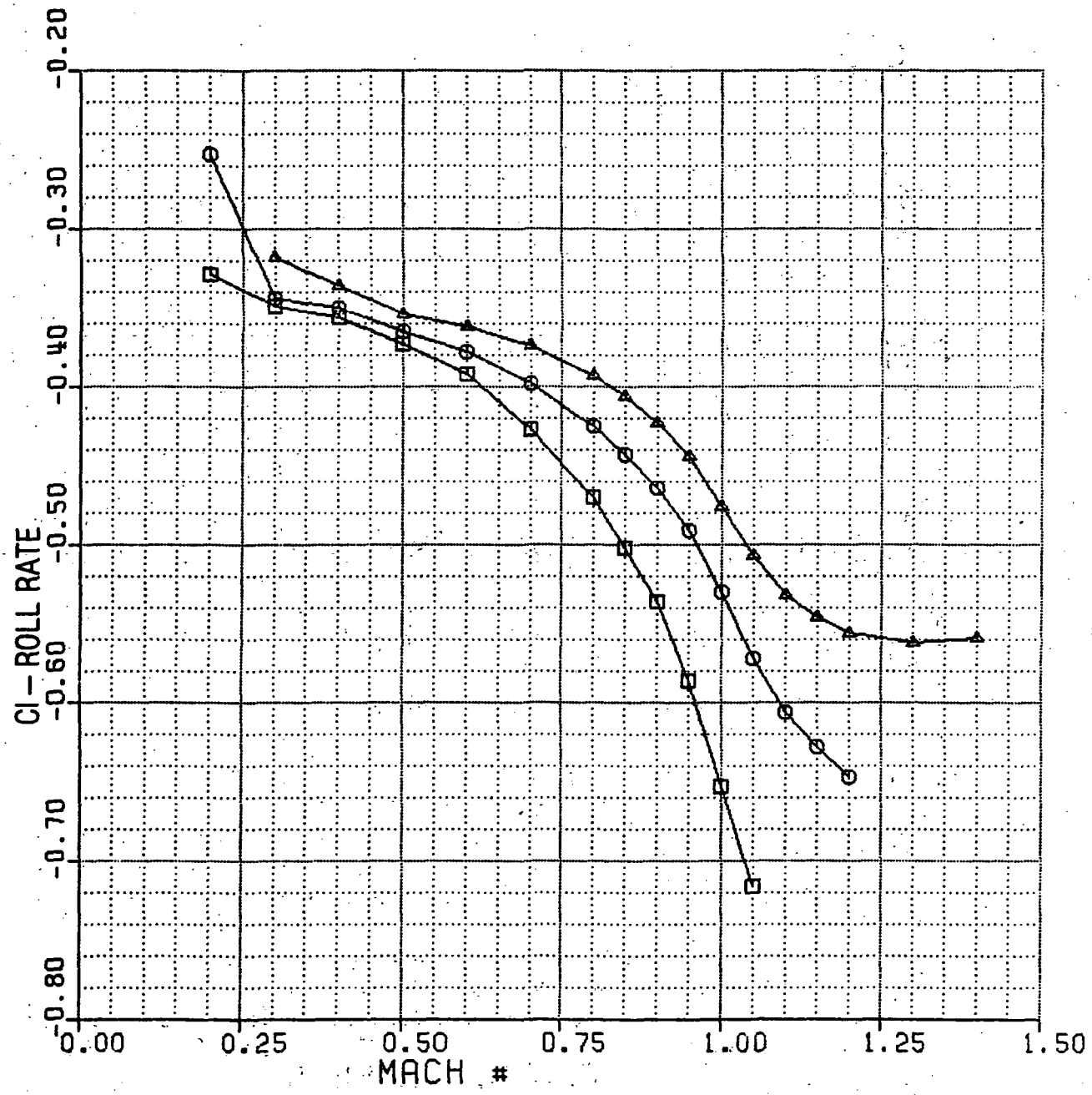

Figure 105(a)

Cl — ROLL RATE VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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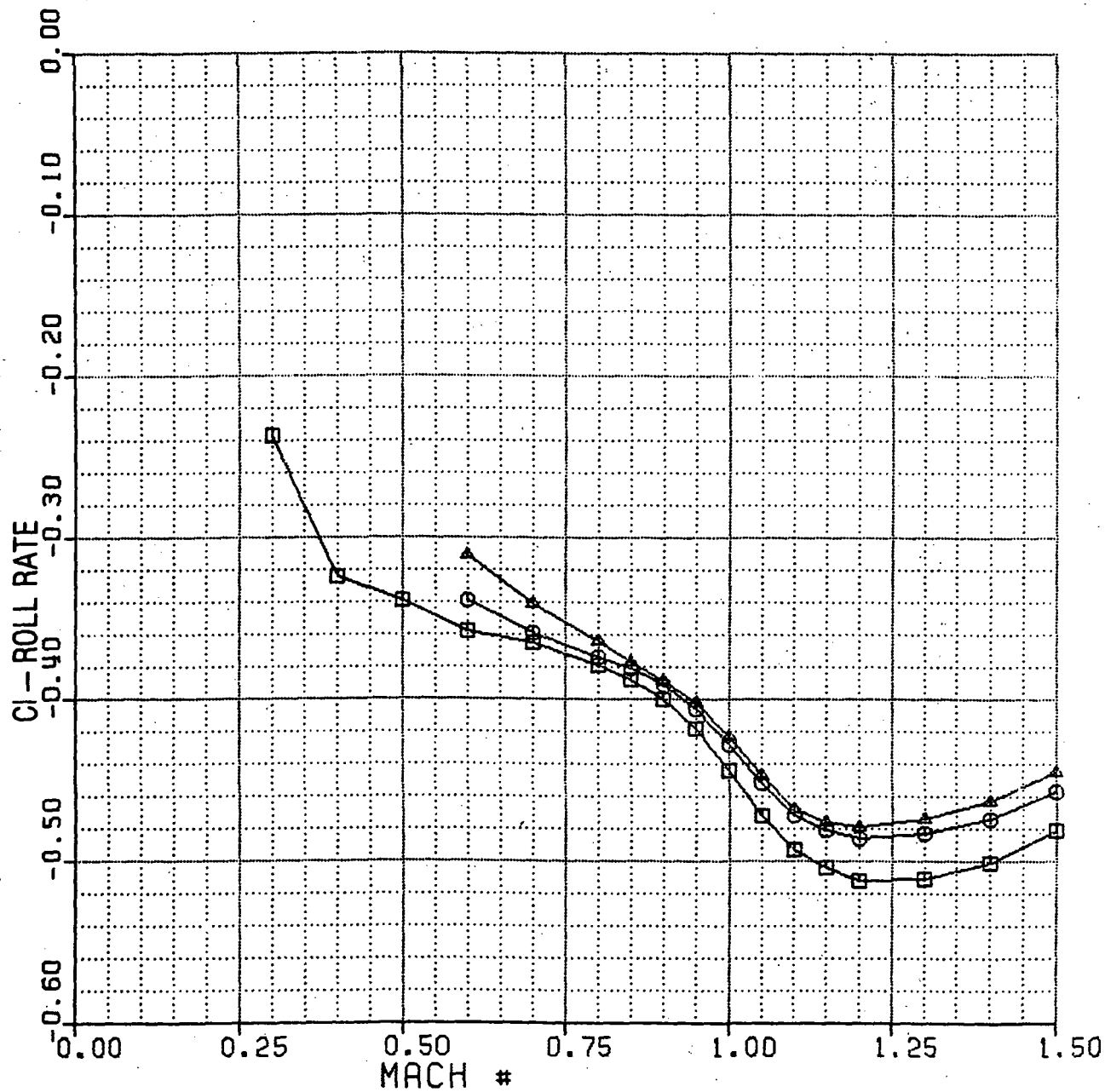

Figure 105(b)

CI — ROLL RATE VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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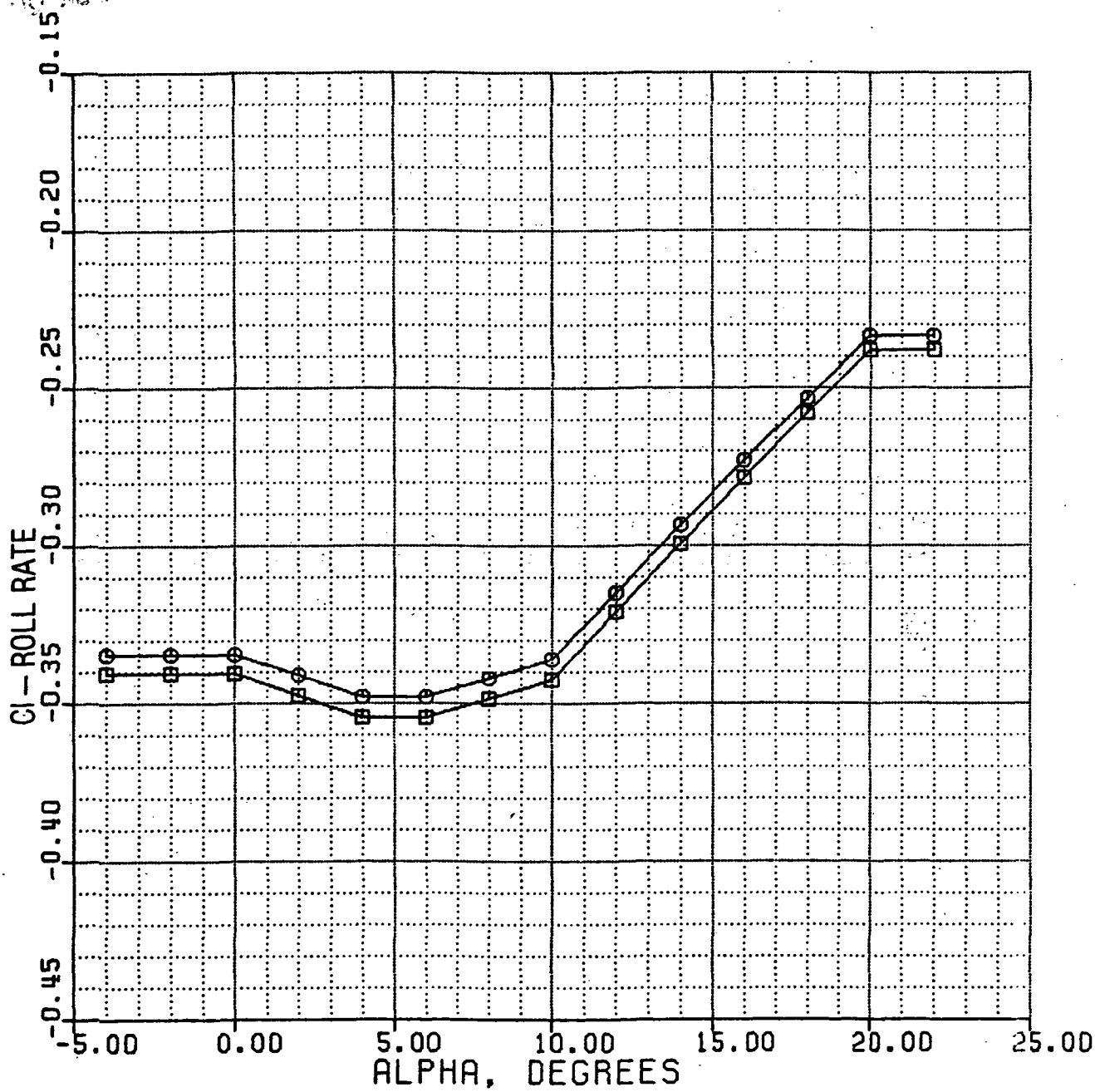

Figure 106(a)

Cl – ROLL RATE VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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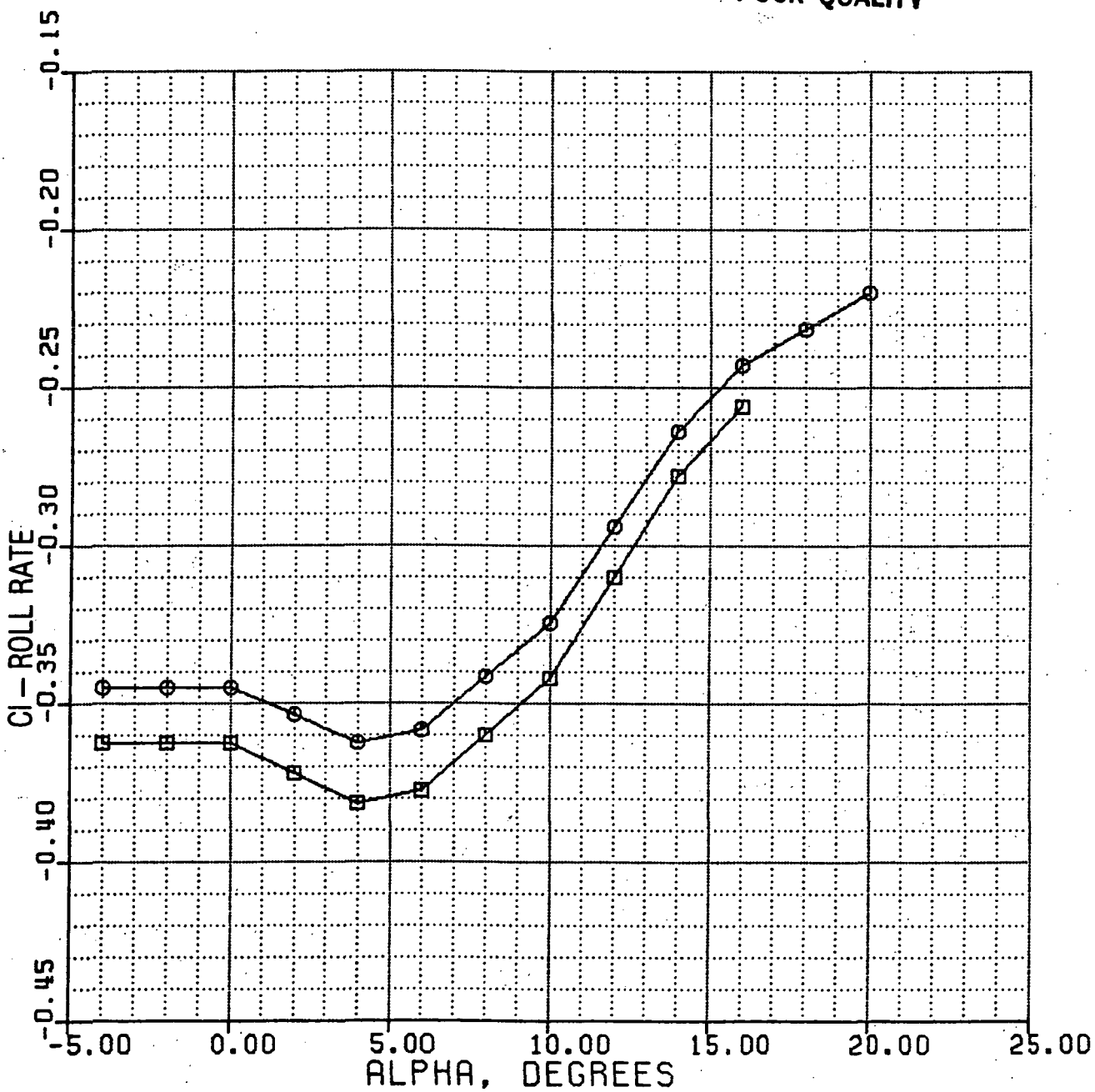

Figure 106(b)

Cl – ROLL RATE VS ALPHA

6-30-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10
ALT = 20K	ALP: -4 TO 12
ALP = 30K	ALP: -4 TO 14
ALT = 40K	ALP: -4 TO 18
ALT = 50K	ALP: -4 TO 22

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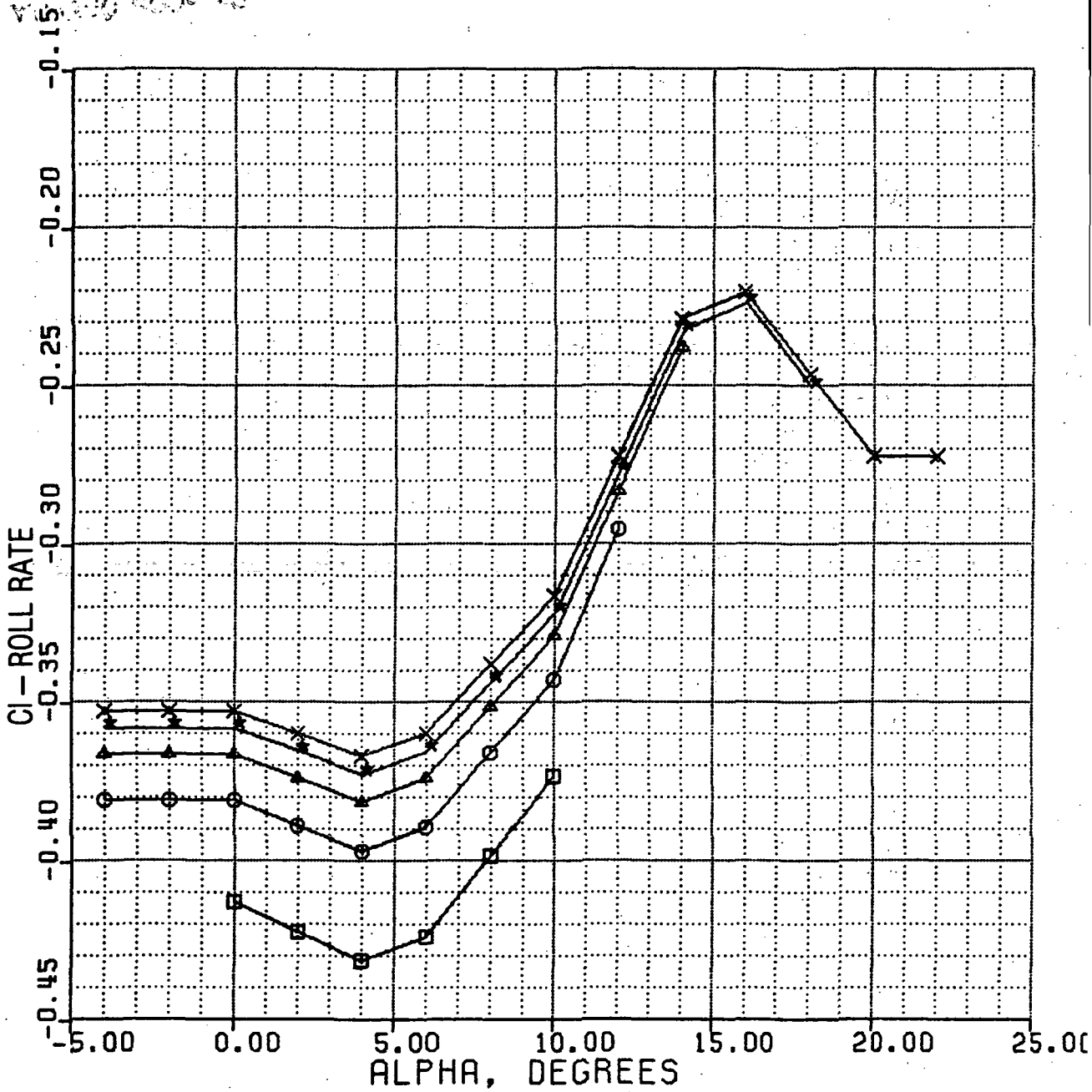

Figure 106(c)

CI – ROLL RATE VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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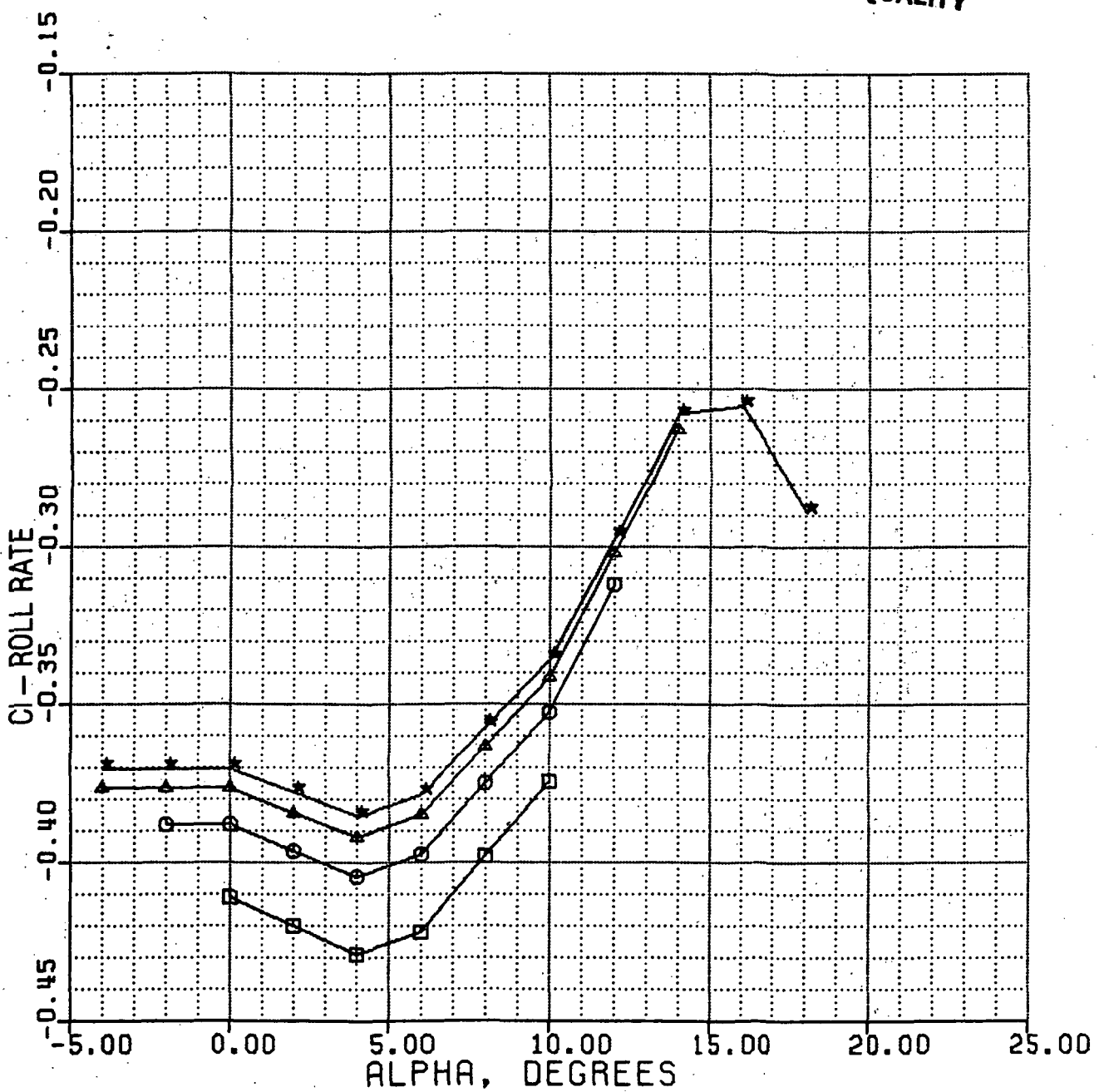

Figure 106(d)

Cl – ROLL RATE VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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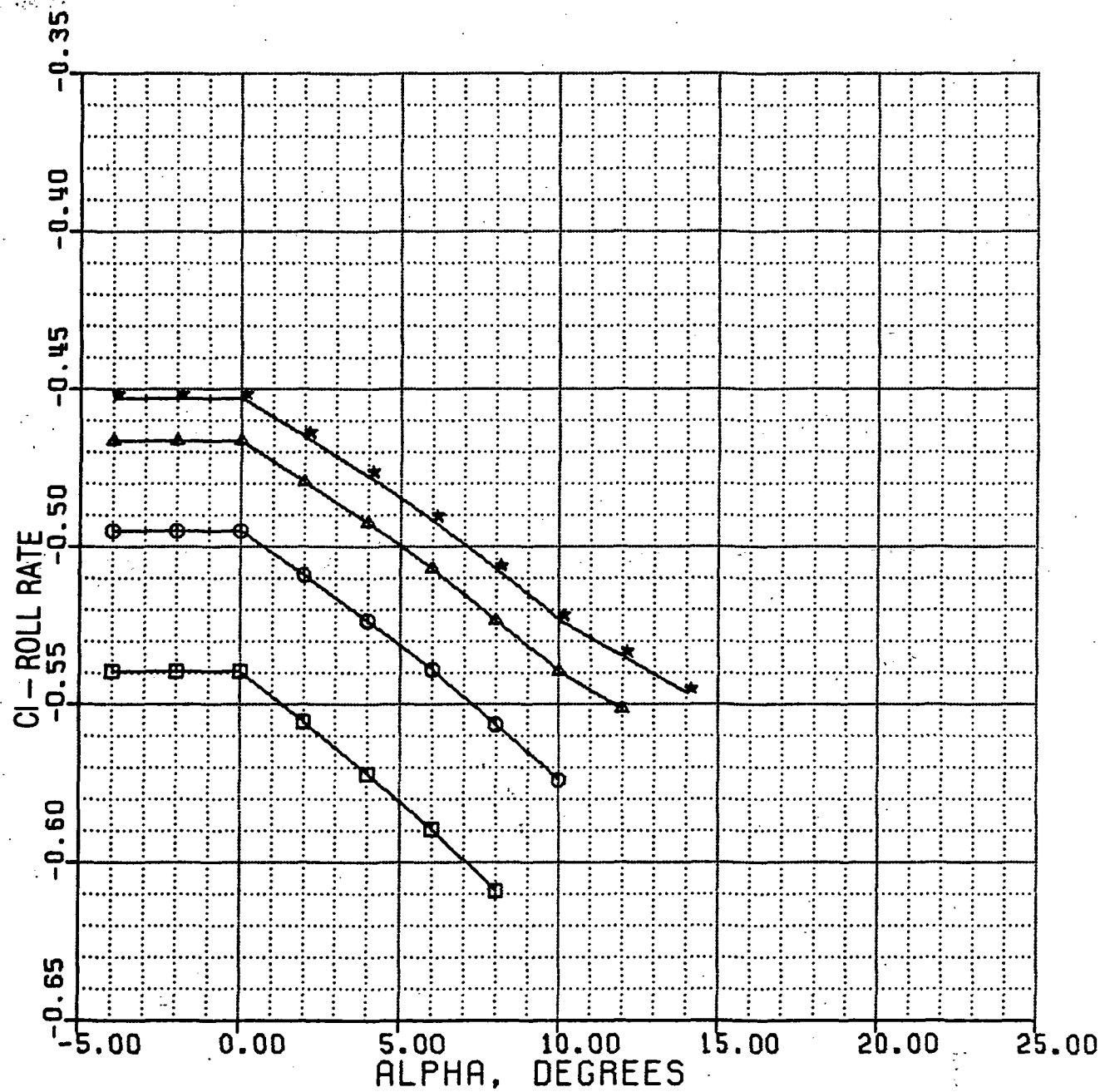

Figure 106(e)

Cl – ROLL RATE VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

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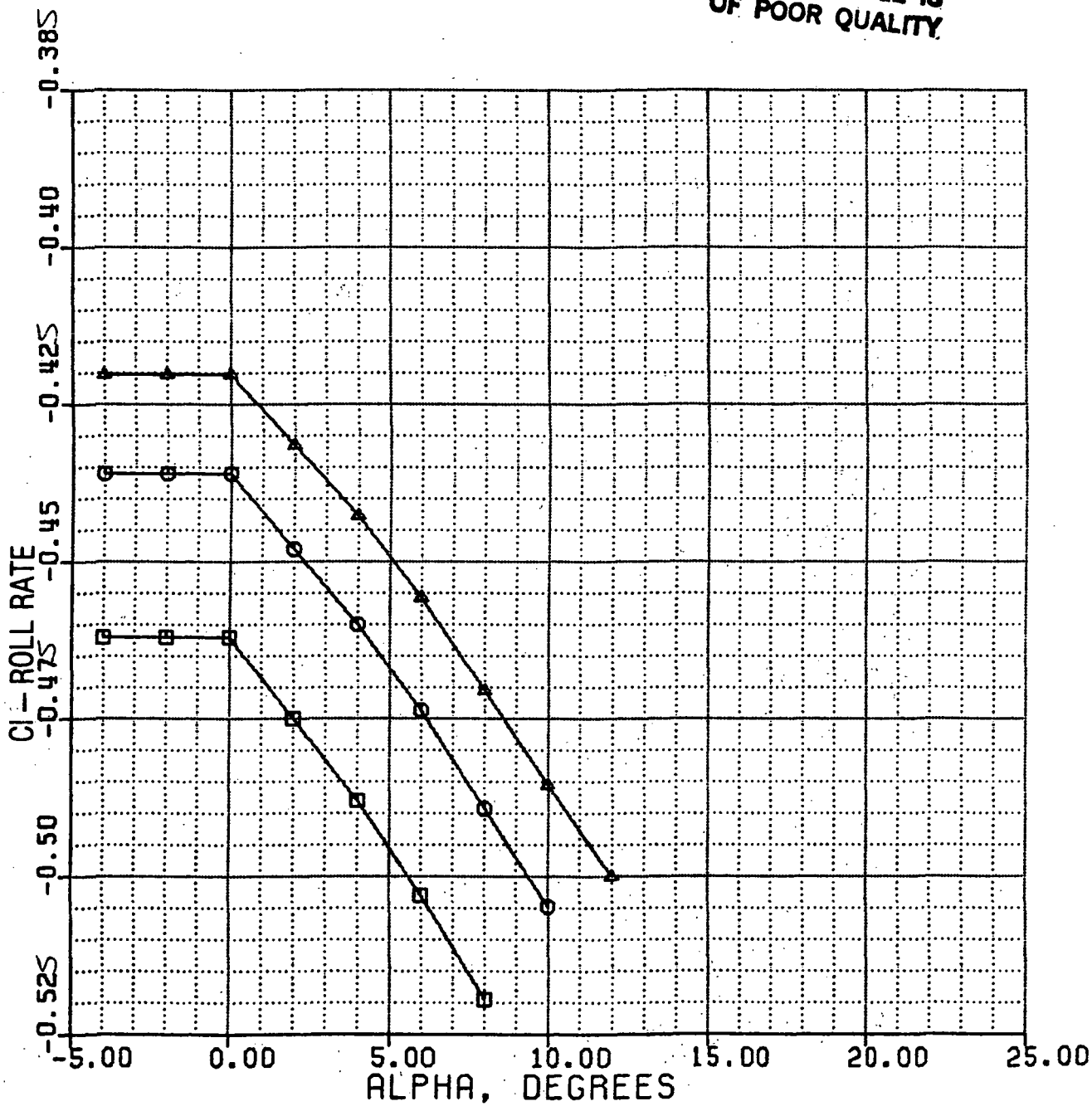

Figure 106(f)

Cn — ROLL RATE VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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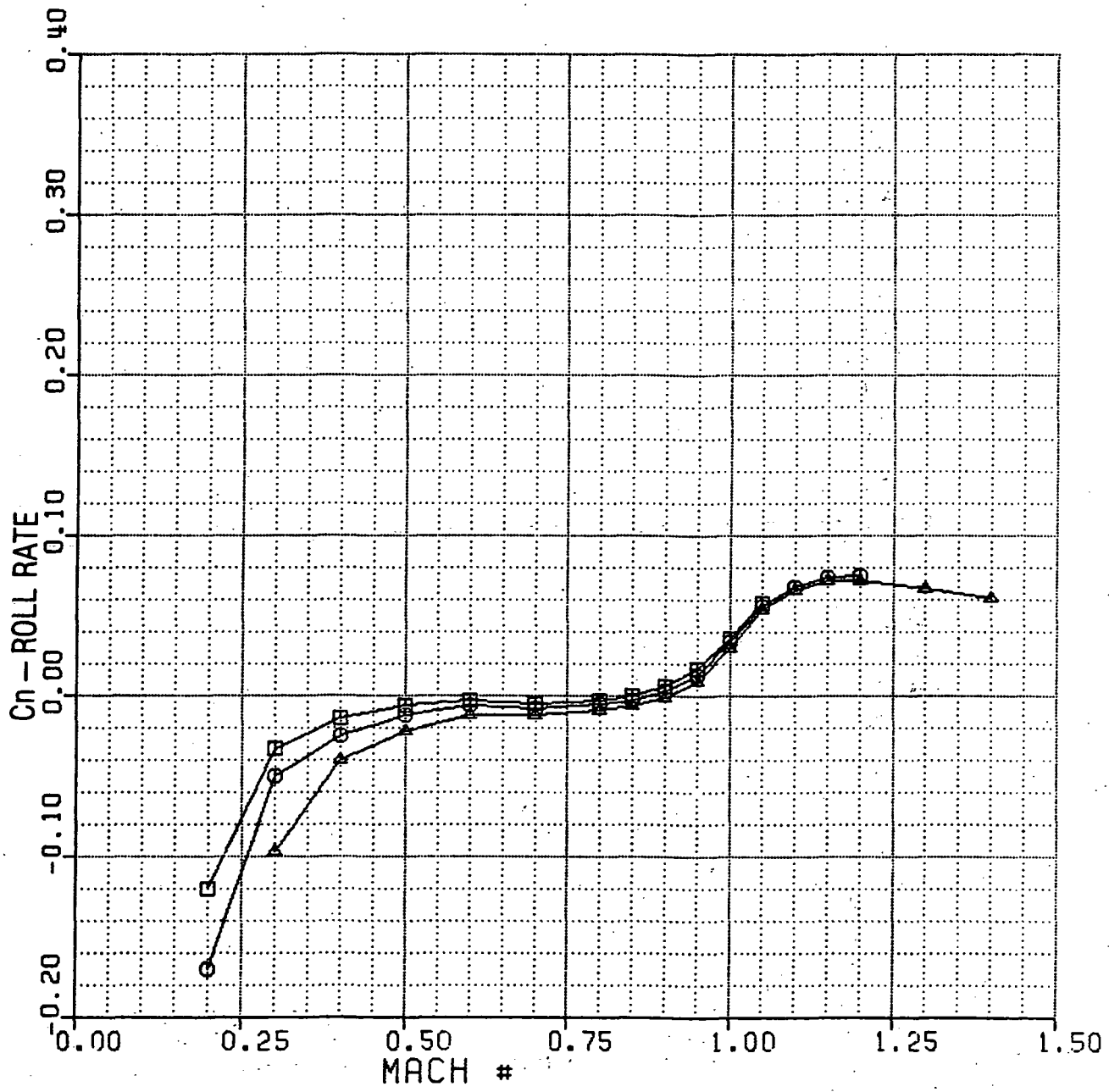

Figure 107(a)

Cn – ROLL RATE VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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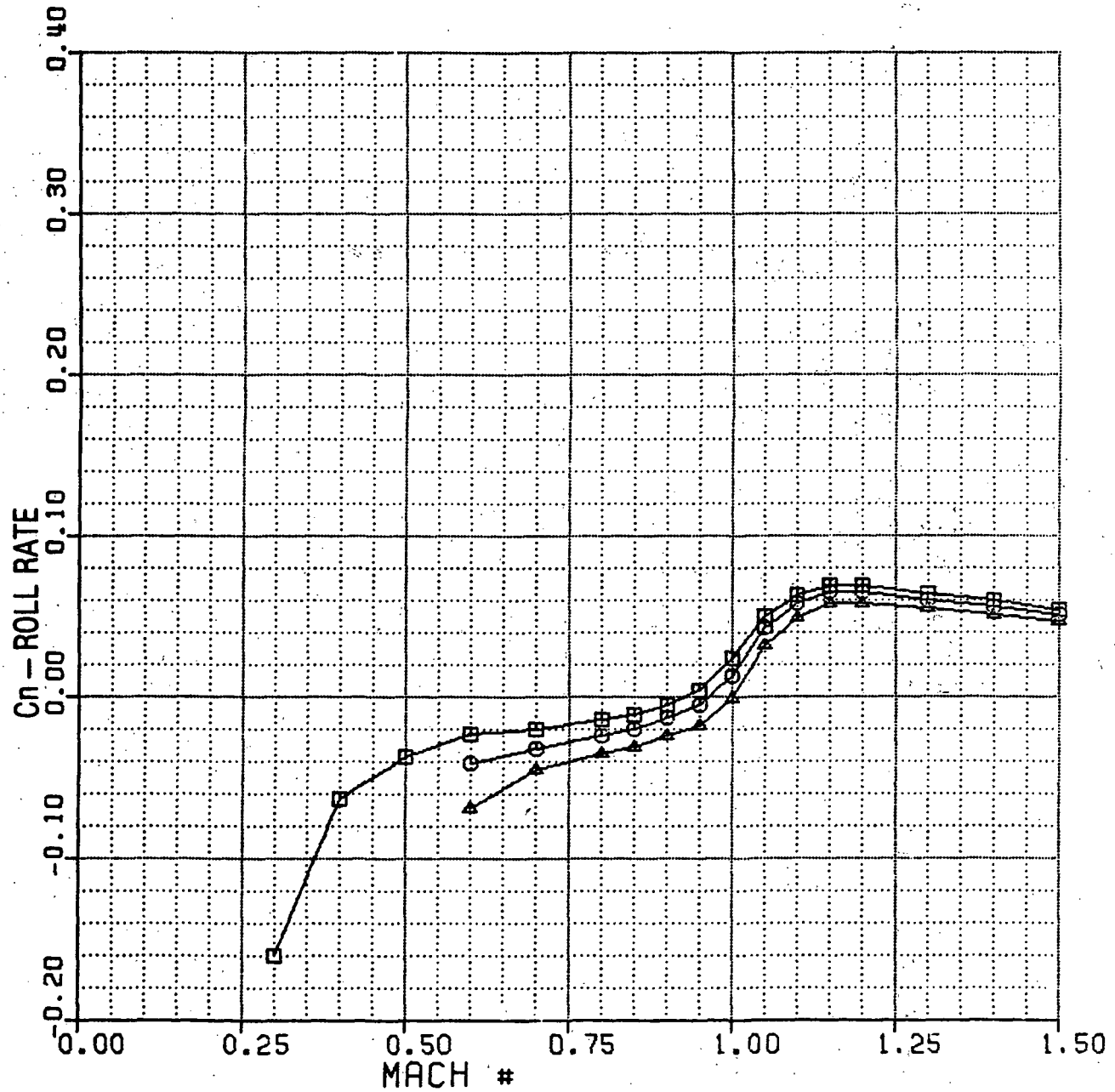

Figure 107(b)

Cn – ROLL RATE VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA-TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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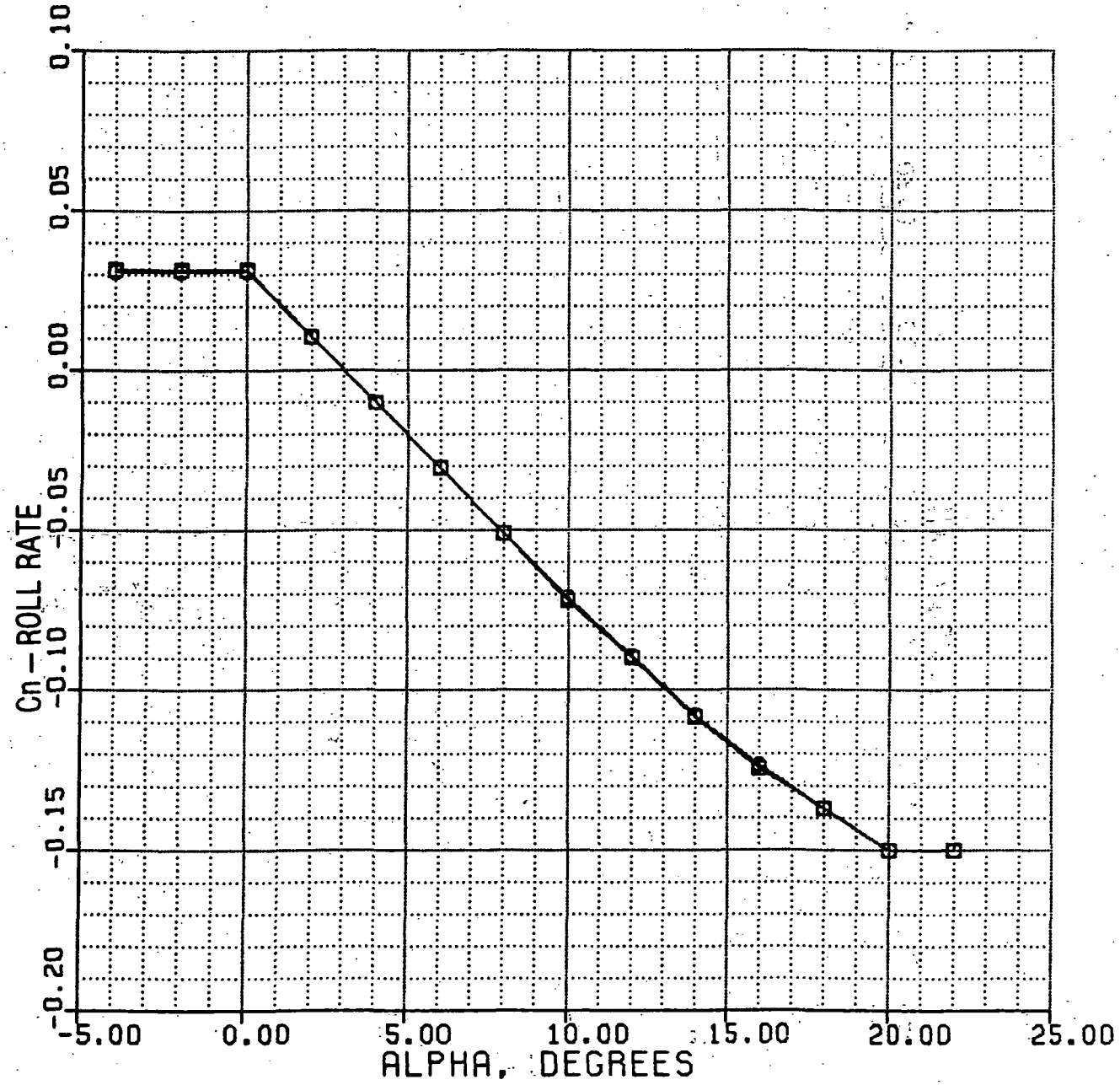

Figure 108(a)

Cn — ROLL RATE VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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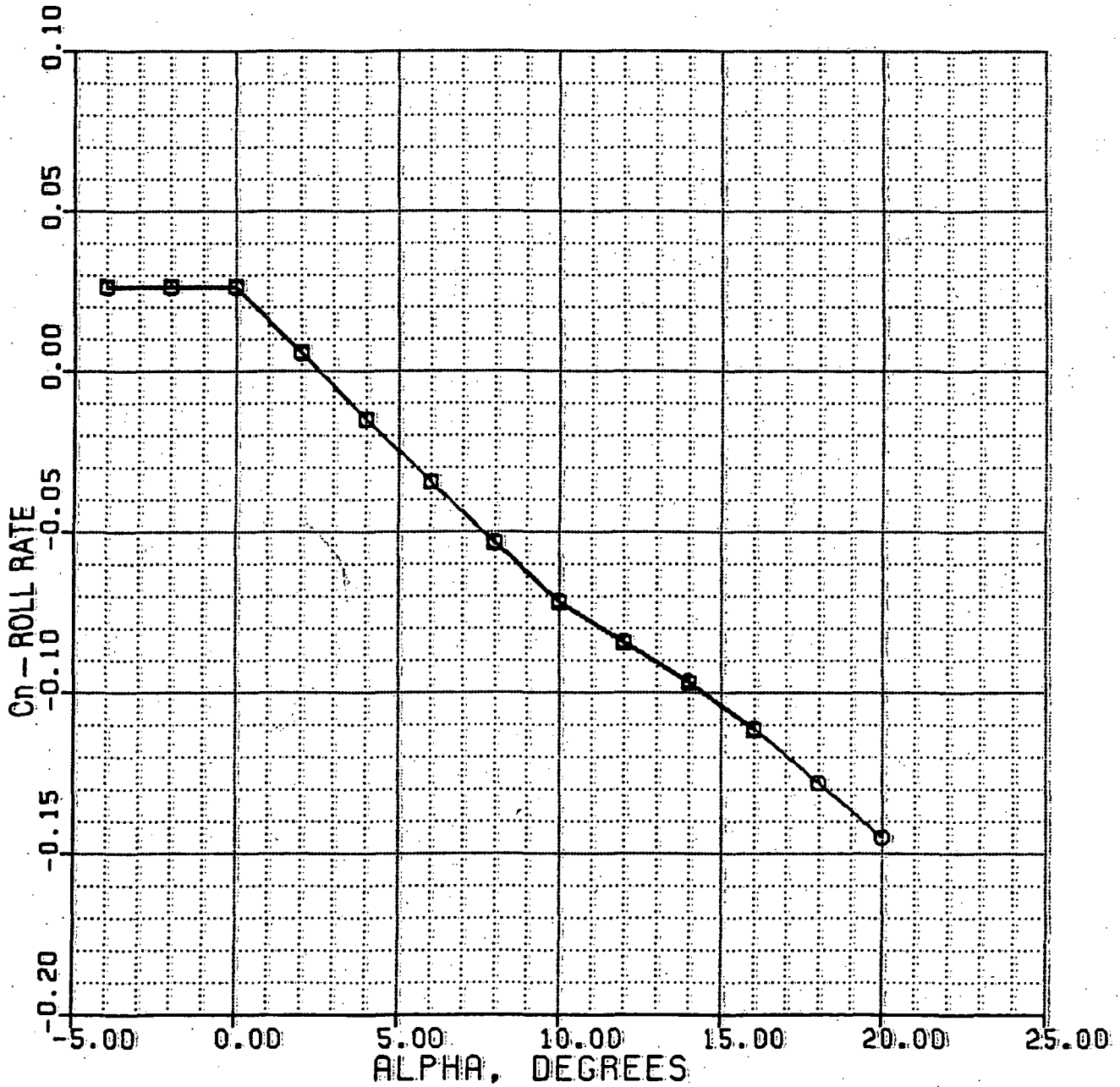

Figure 108(b)

Cn – ROLL RATE VS ALPHA

6-30-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10
ALT = 20K	ALP: -4 TO 12
ALP = 30K	ALP: -4 TO 14
ALT = 40K	ALP: -4 TO 18
ALT = 50K	ALP: -4 TO 22

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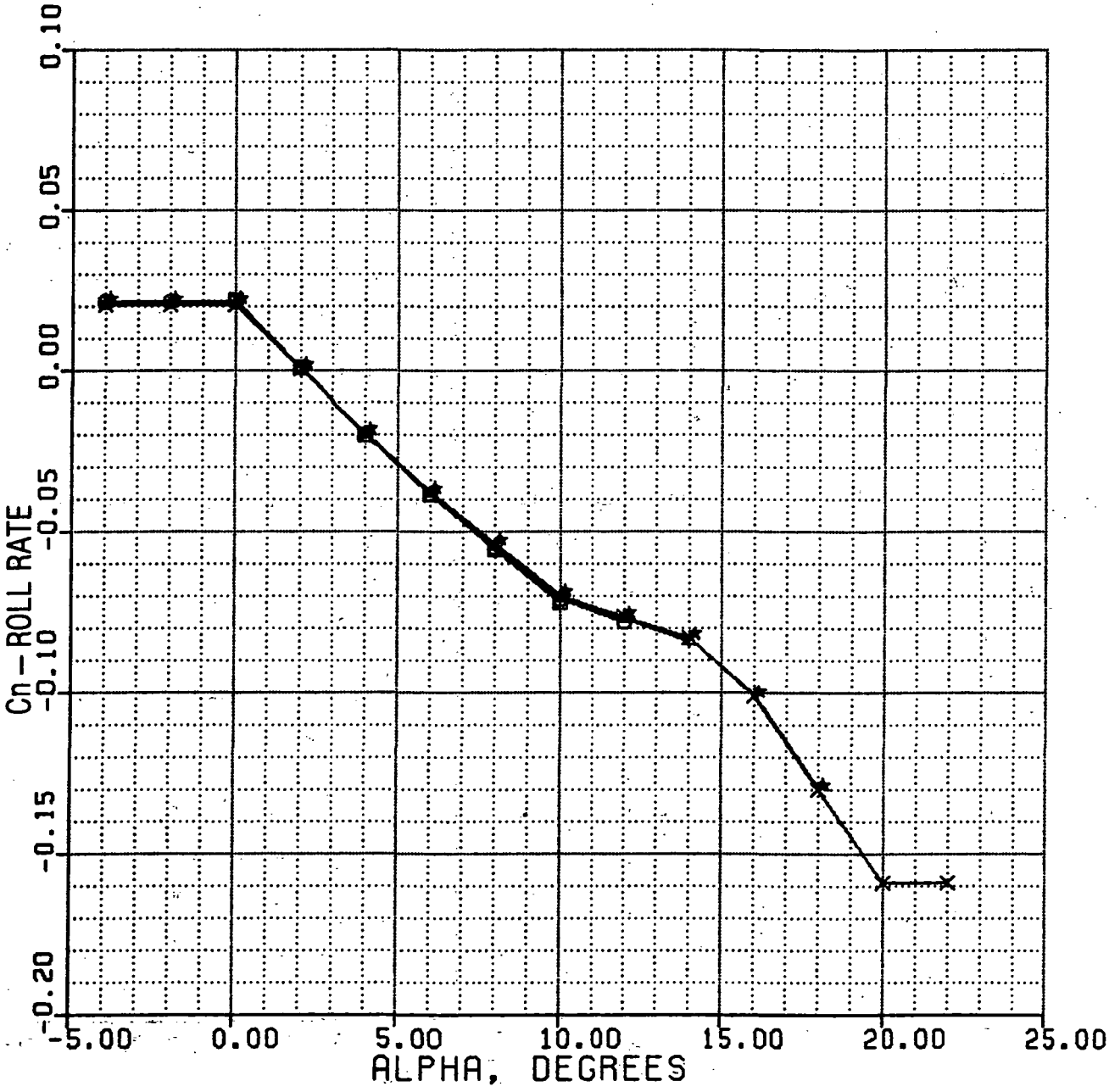

Figure 108(c)

Cn – ROLL RATE VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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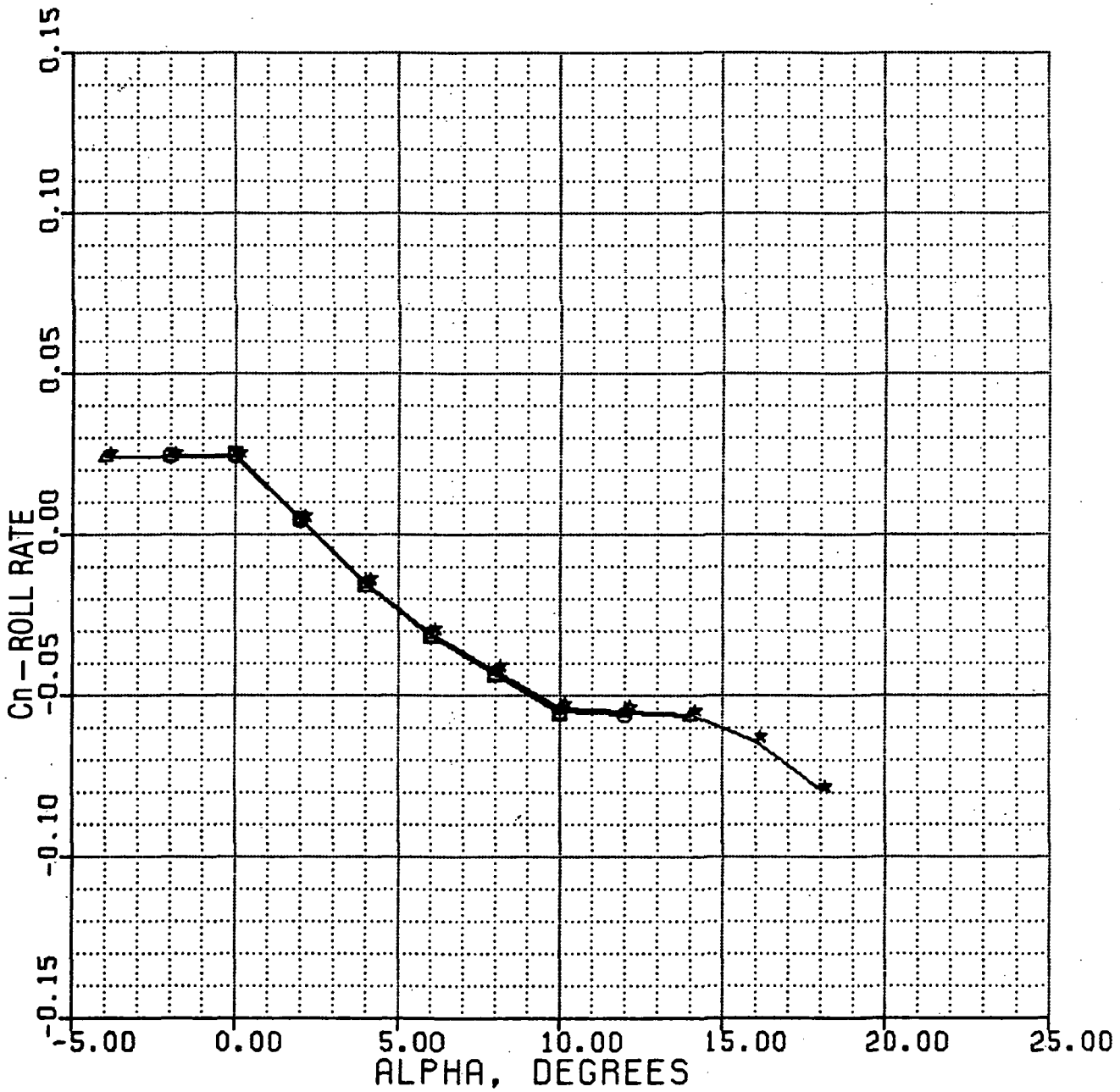

Figure 108(d)

Cn – ROLL RATE VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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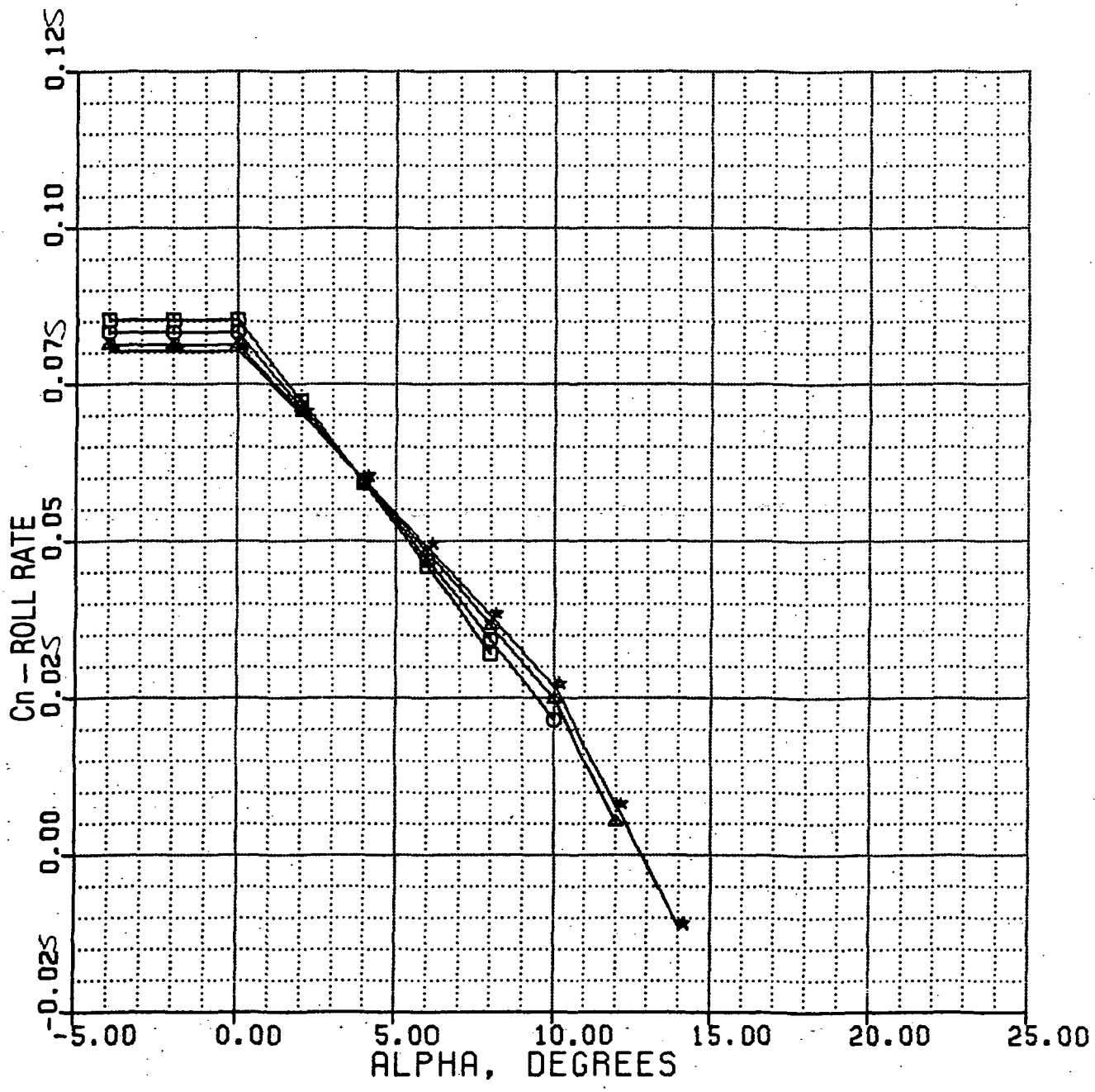

Figure 108(e)

Cn – ROLL RATE VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

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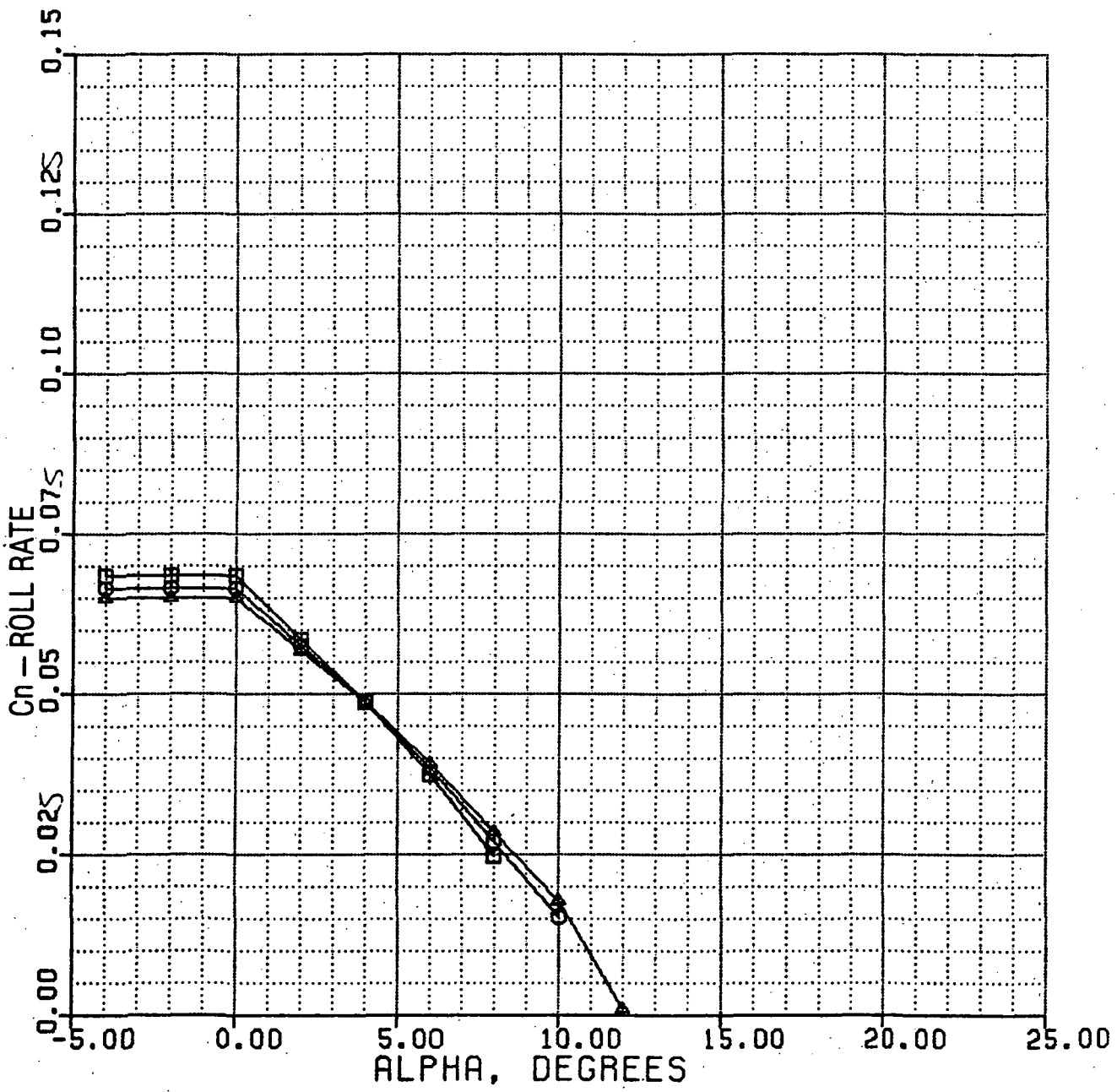

Figure 108(f)

Cy – YAW RATE VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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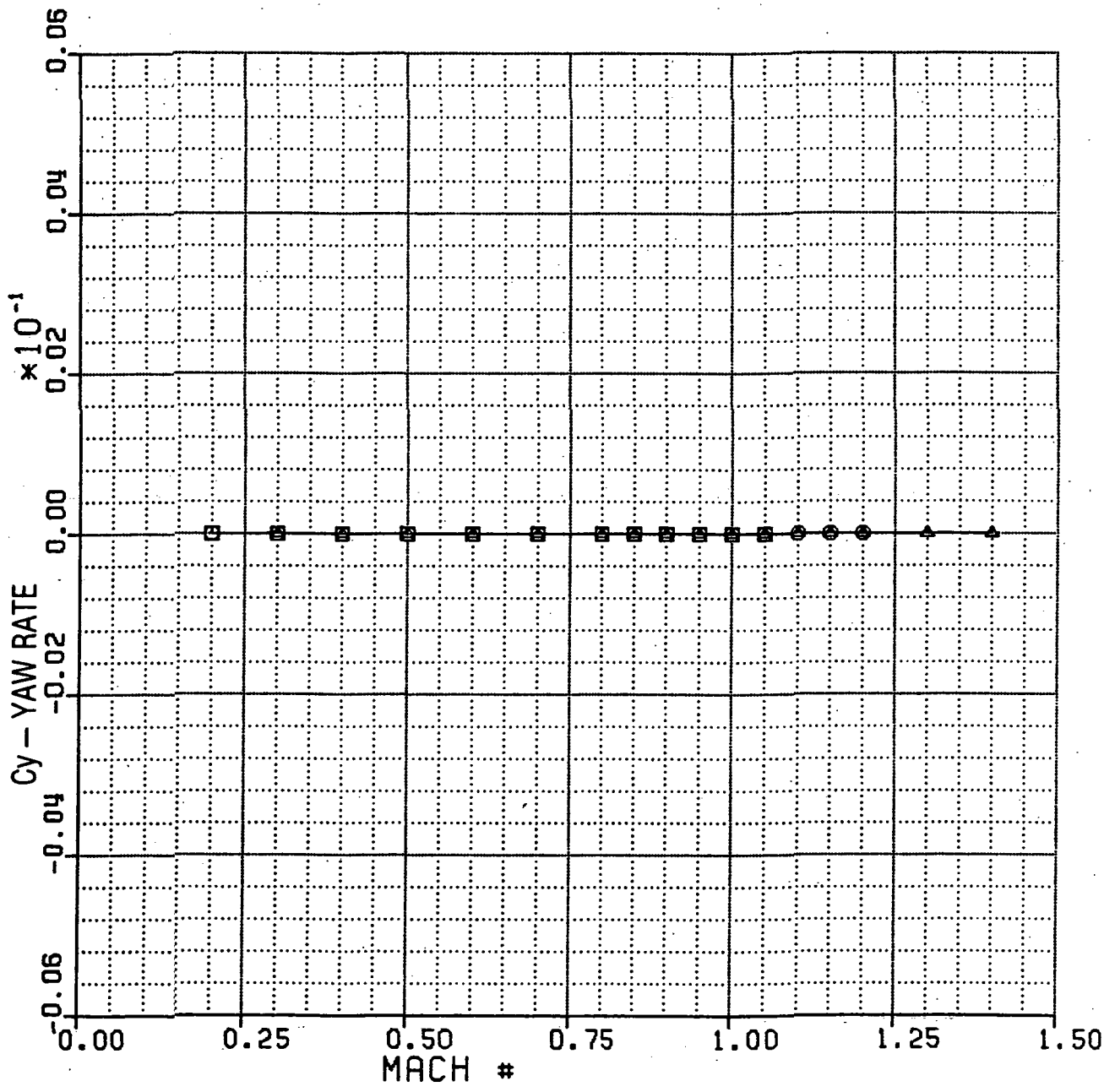

Figure 109(a)

Cy – YAW RATE VS MACH

7-27-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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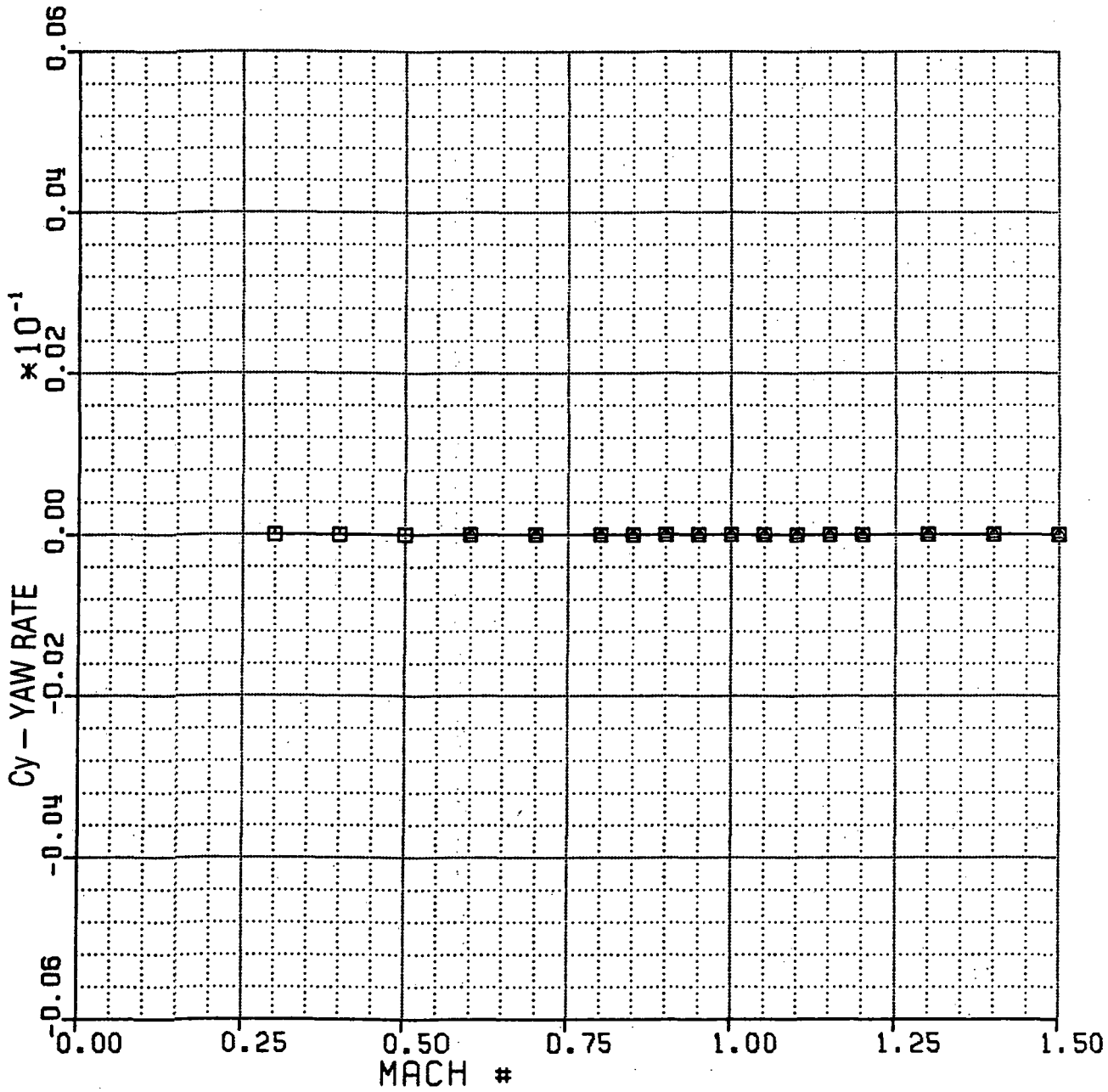

Figure 109(b)

Cy – YAW RATE VS ALPHA

7-26-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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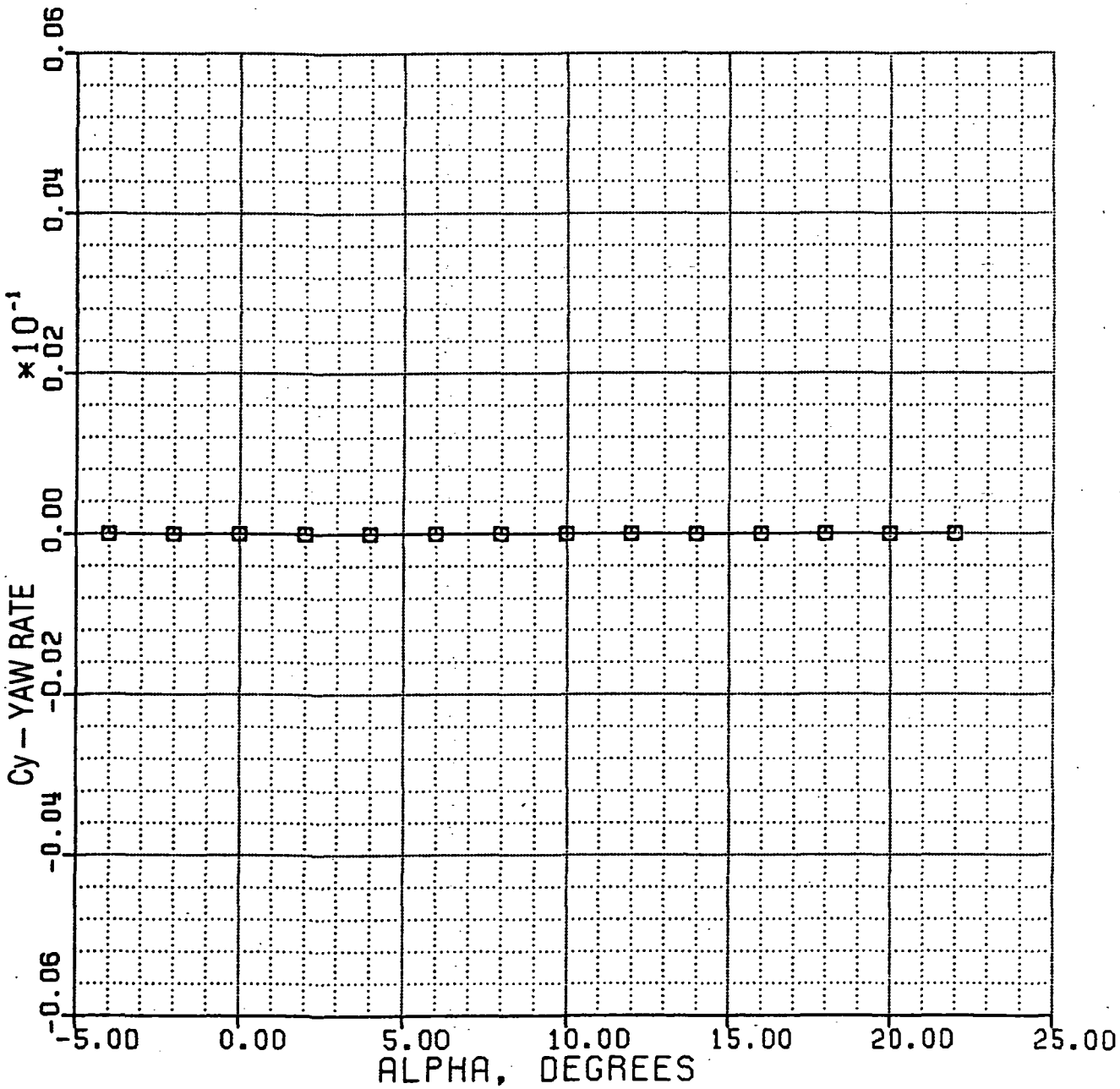

Figure 110(a)

Cy – YAW RATE VS ALPHA

7-26-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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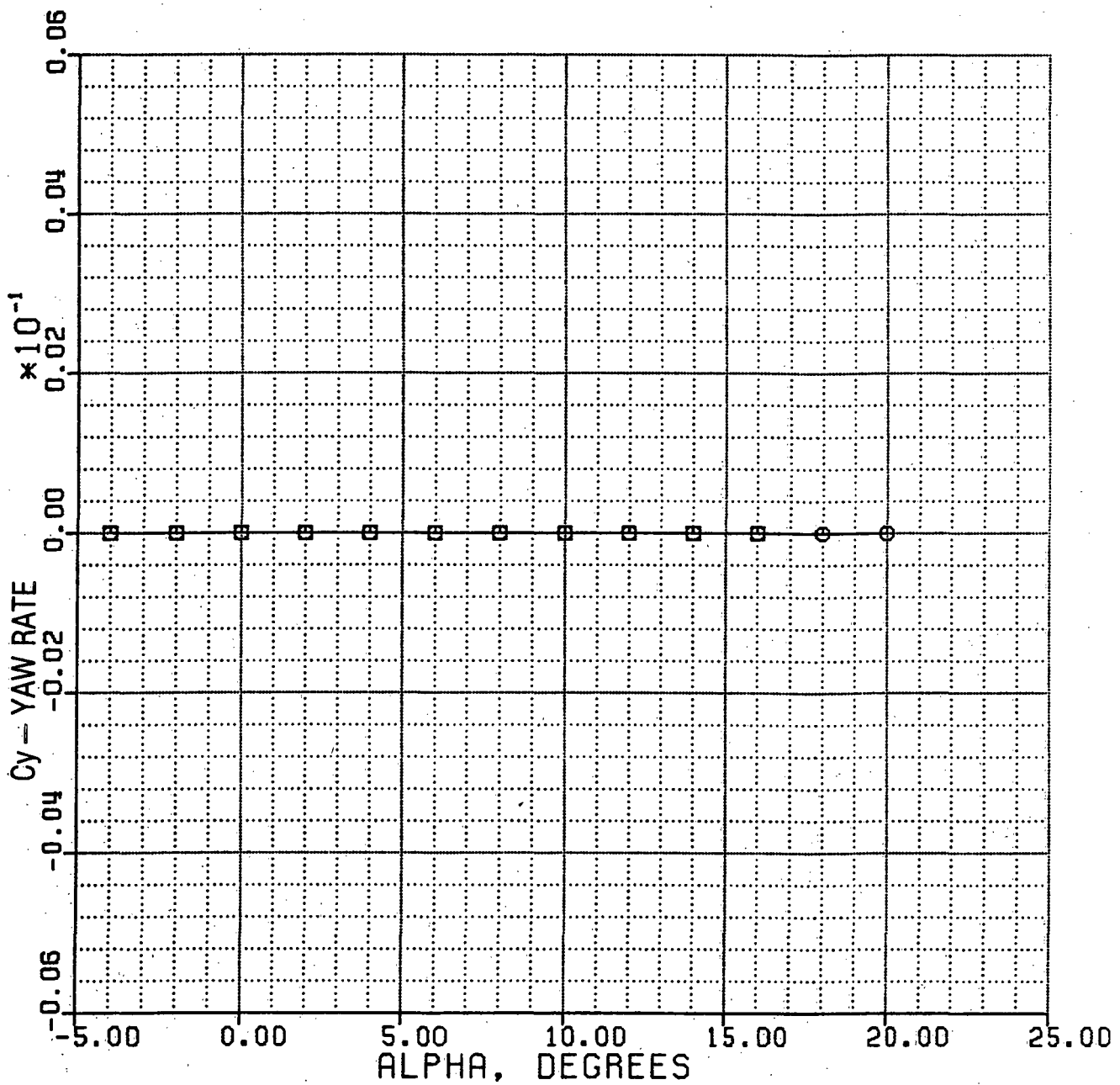

Figure 110(b)

Cy — YAW RATE VS ALPHA

7-26-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALT = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22

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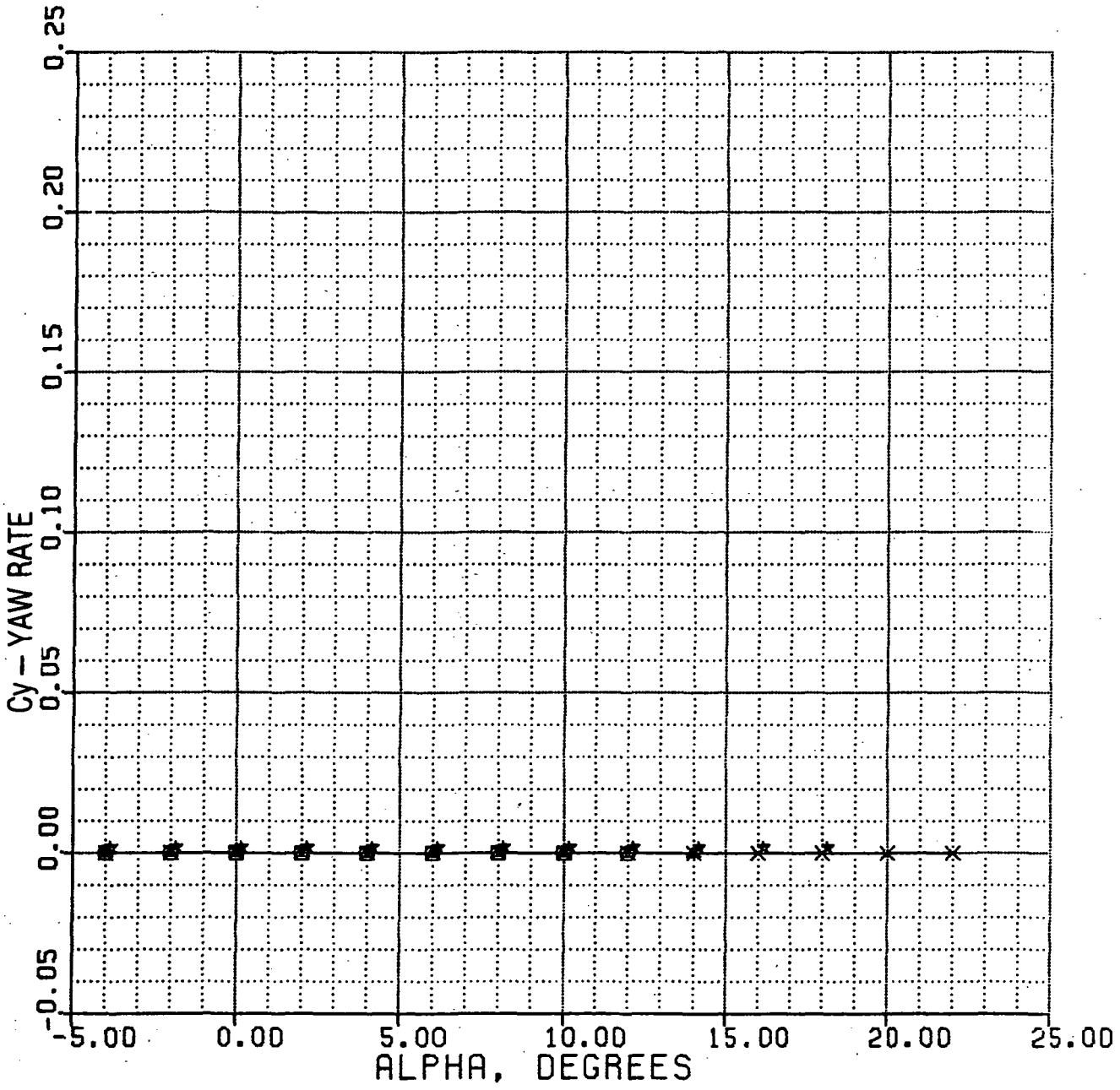

Figure 110(c)

Cy — YAW RATE VS ALPHA

7-27-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 18

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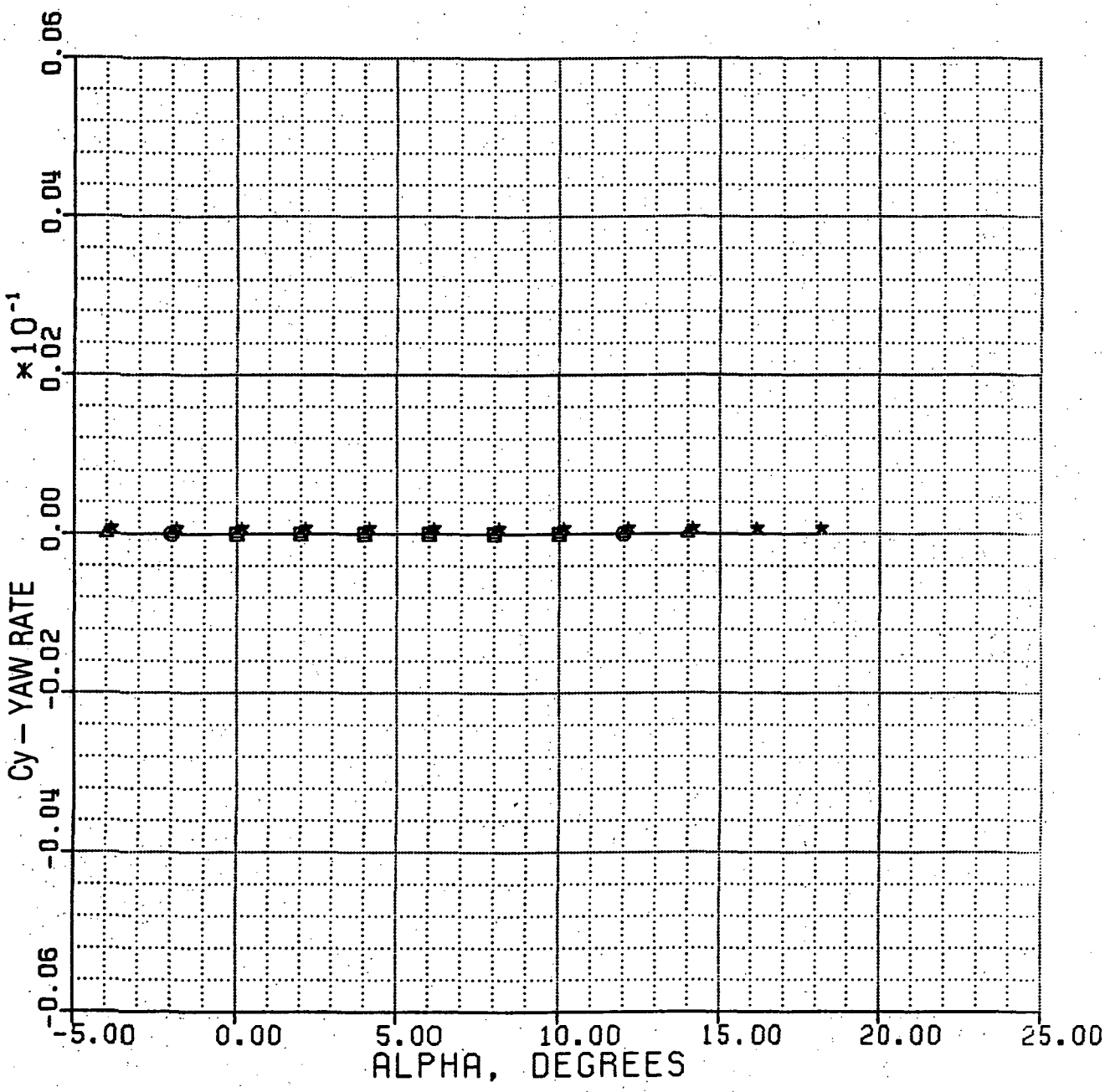

Figure 110(d)

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Cy — YAW RATE VS ALPHA

7-27-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

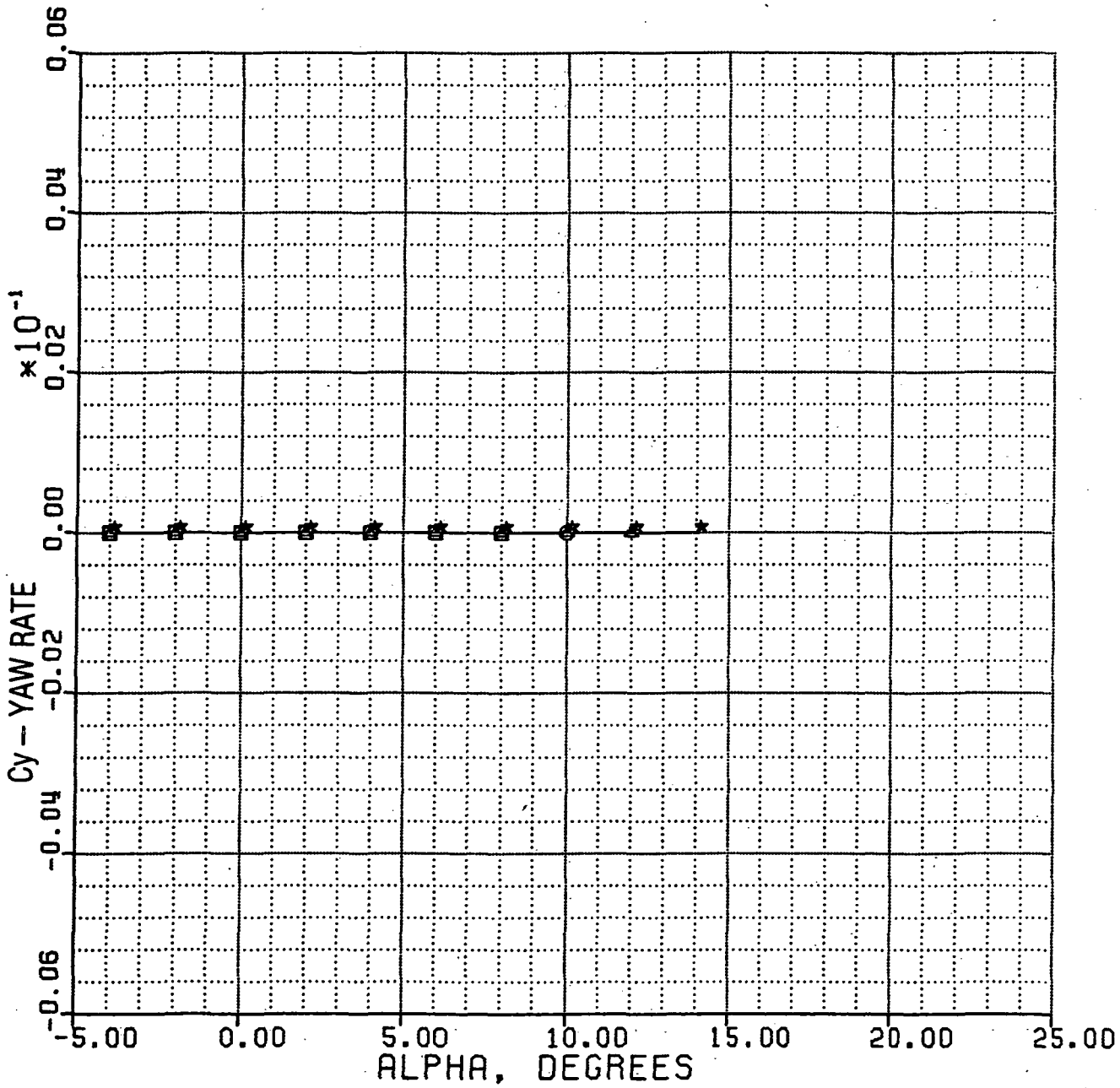

Figure 110(e)

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Cy — YAW RATE VS ALPHA

7-27-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

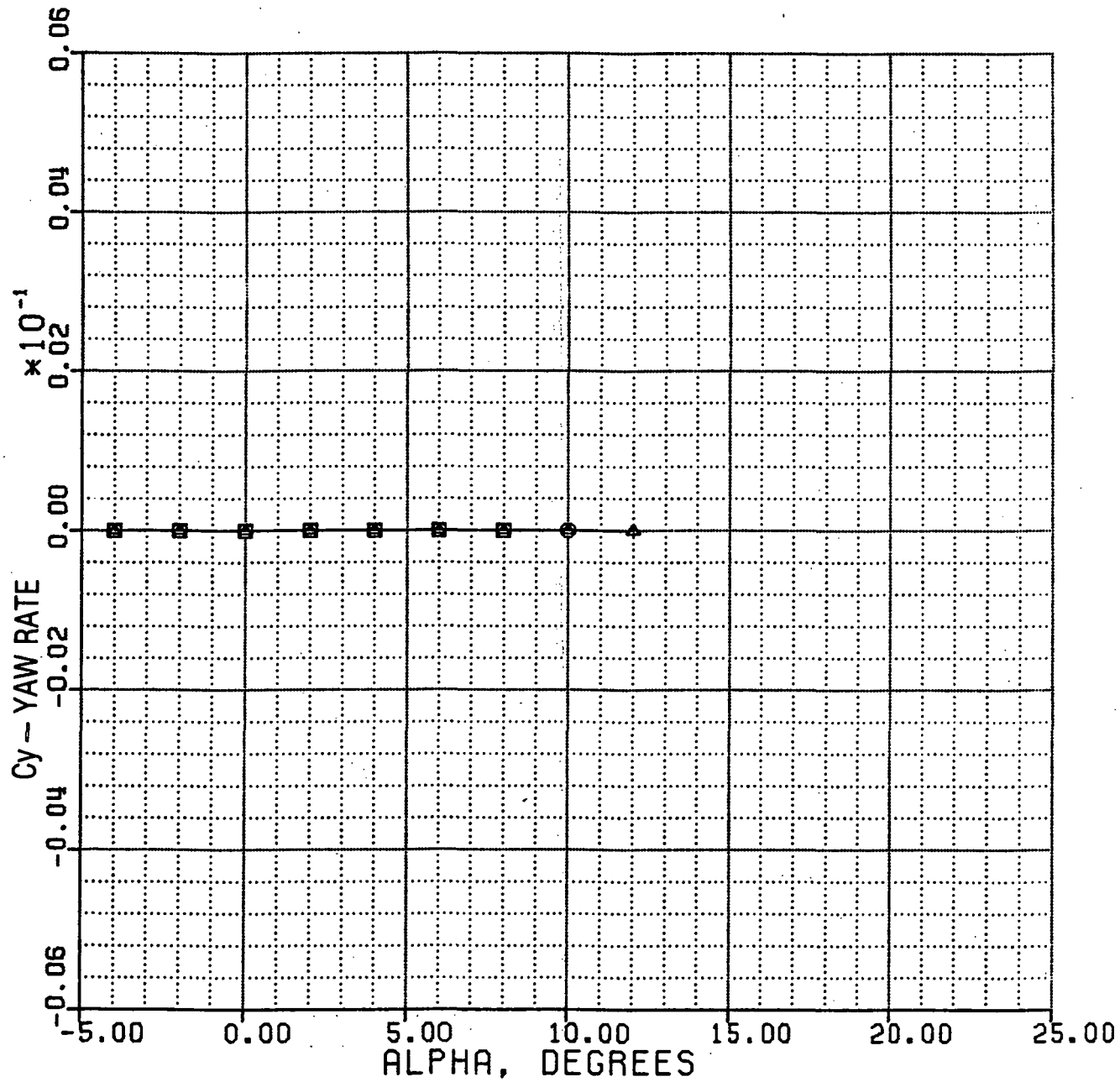

Figure 110(f)

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Cl – YAW RATE VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

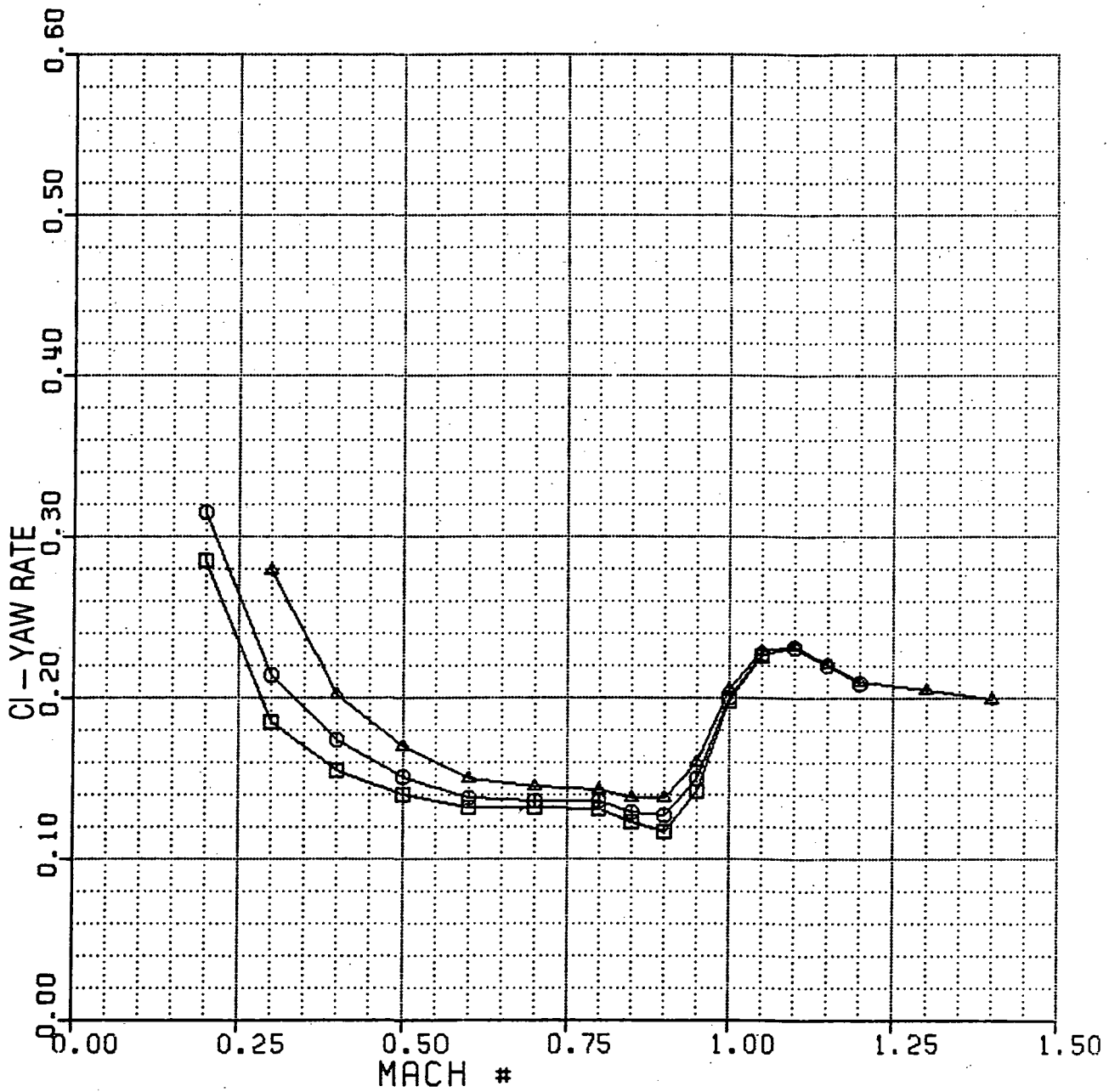

Figure 111(a)

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Cl – YAW RATE VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

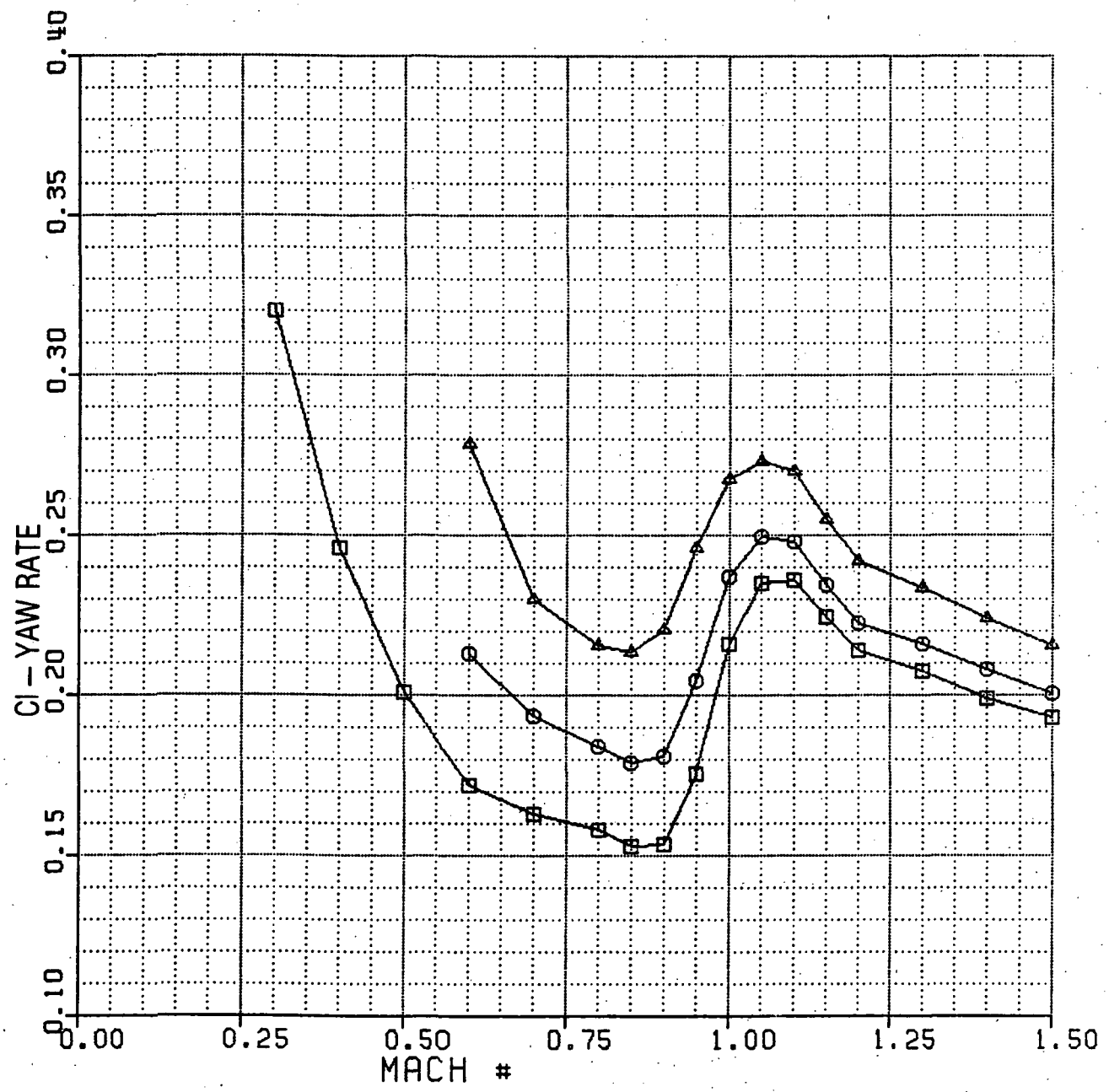

Figure 111(b)

Cl – YAW RATE VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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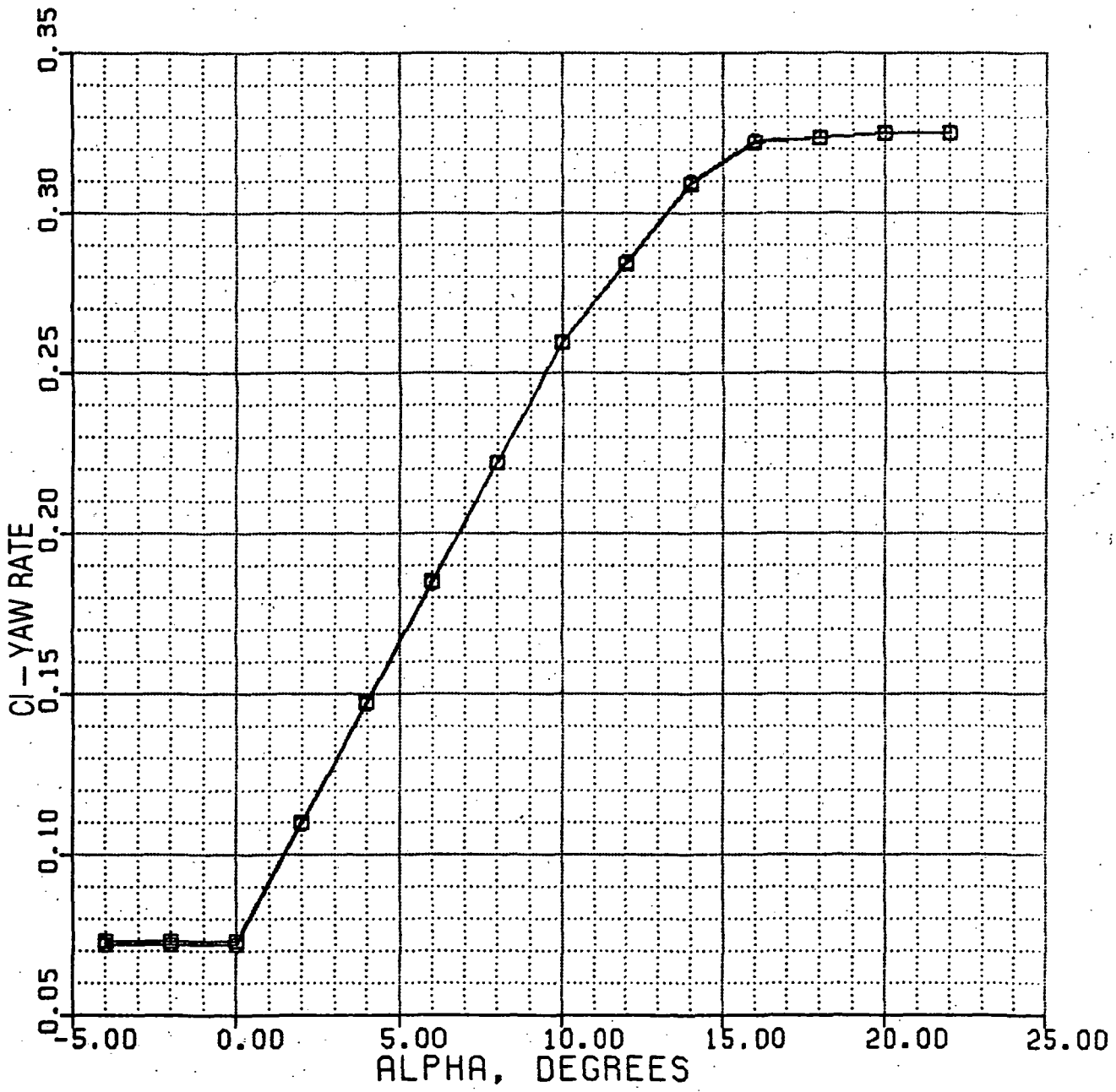

Figure 112(a)

Cl – YAW RATE VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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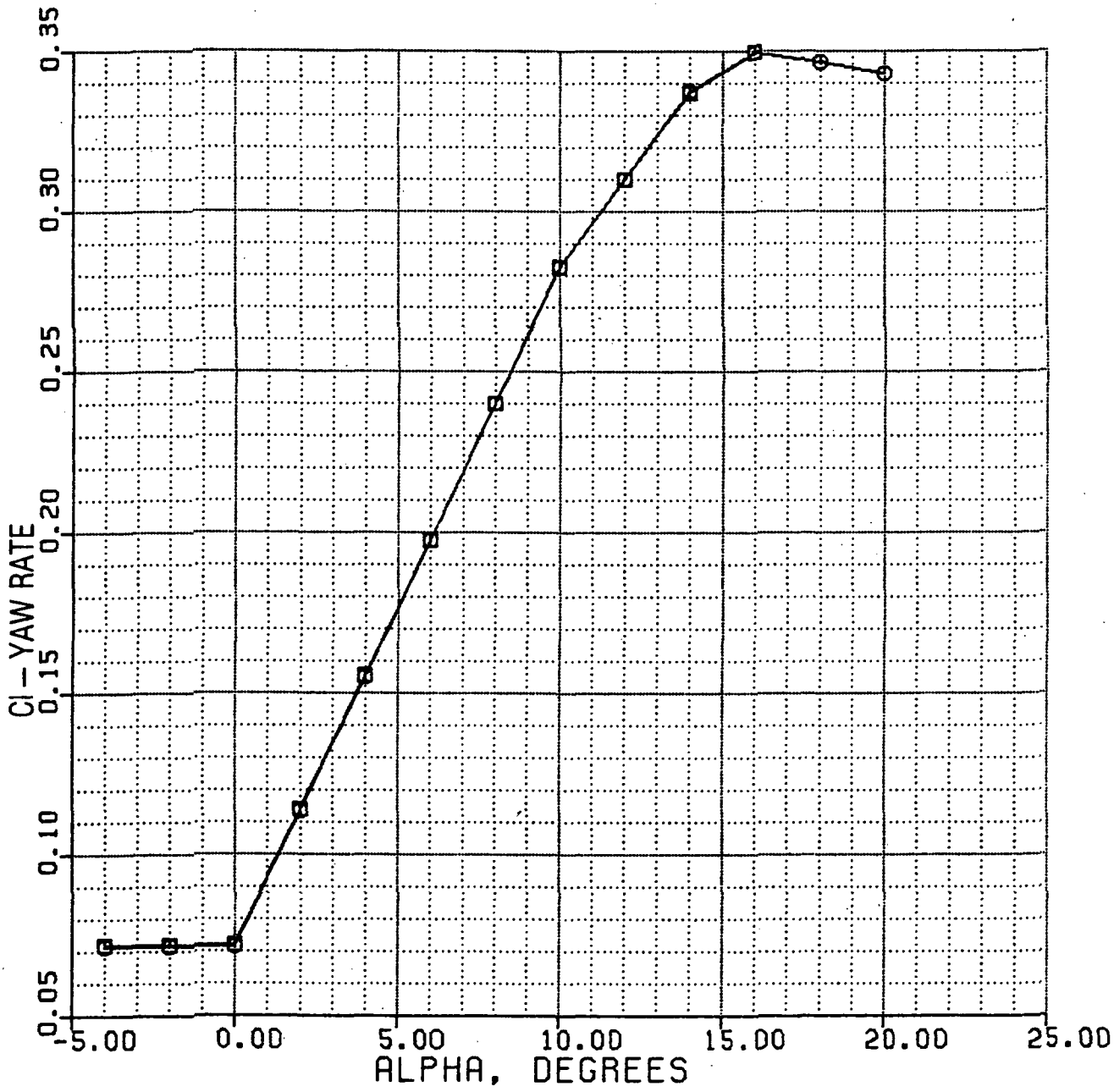

Figure 112(b)

Cl — YAW RATE VS ALPHA

6-30-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K	ALP: 0 TO 10
ALT = 20K	ALP: -4 TO 12
ALP = 30K	ALP: -4 TO 14
ALT = 40K	ALP: -4 TO 18
ALT = 50K	ALP: -4 TO 22

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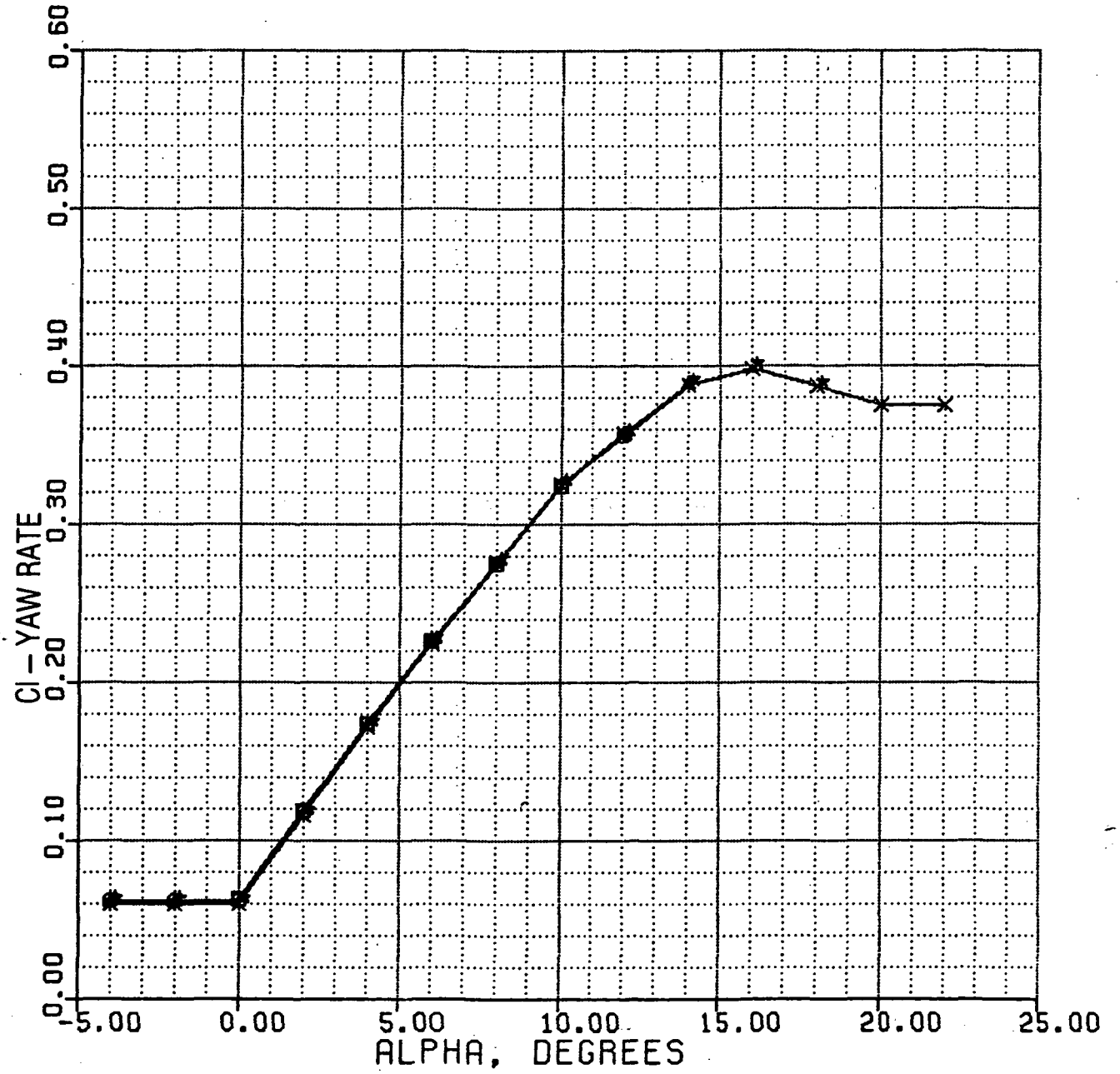

Figure 112(c)

Cl – YAW RATE VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: 0 TO 10
ALT = 30K ALP: -2 TO 12
ALT = 40K ALP: -4 TO 14
ALT = 50K ALP: -4 TO 16

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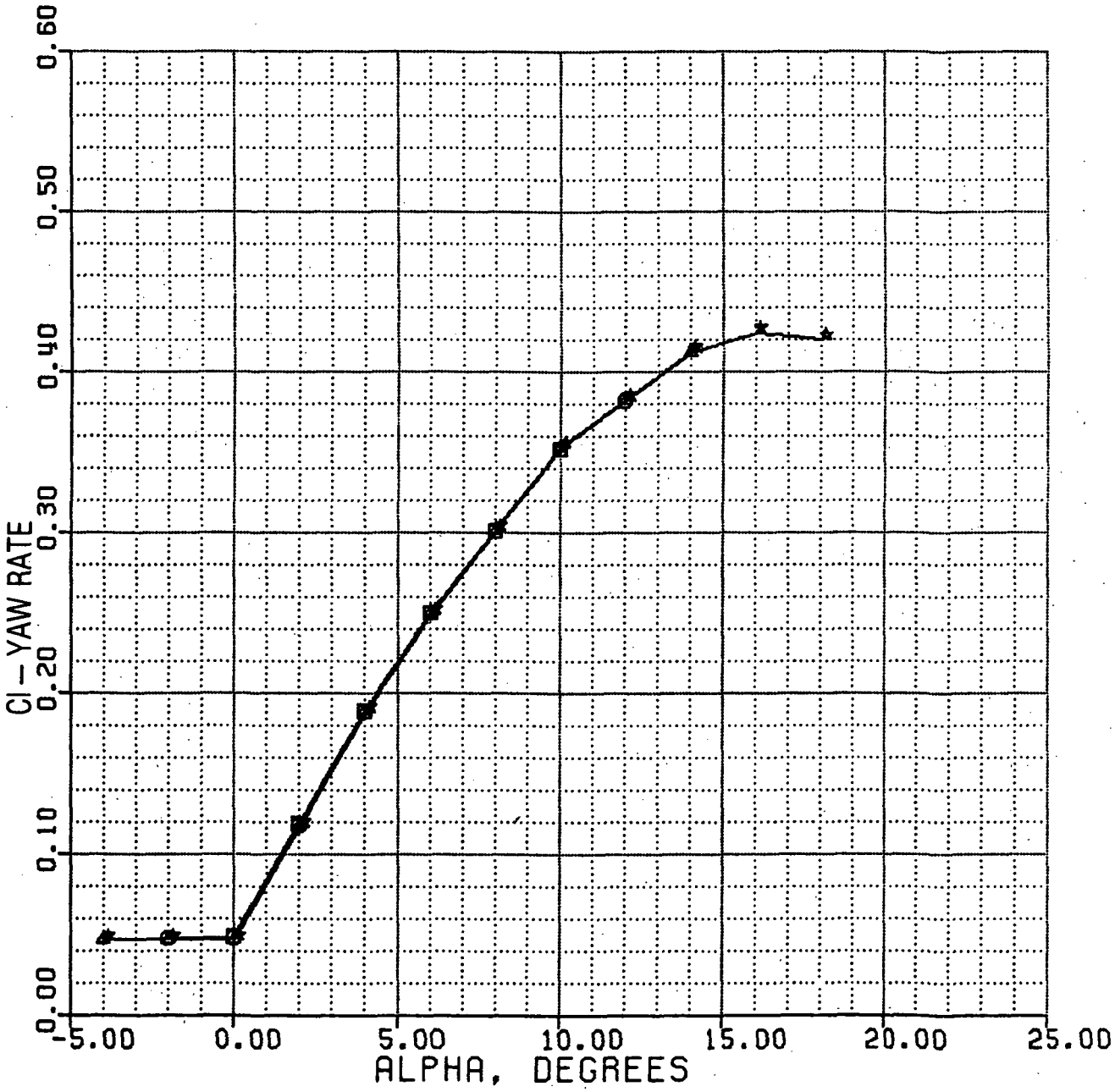

Figure 112(d)

Cl – YAW RATE VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K	ALP: -4 TO 8
ALT = 30K	ALP: -4 TO 10
ALT = 40K	ALP: -4 TO 12
ALT = 50K	ALP: -4 TO 14

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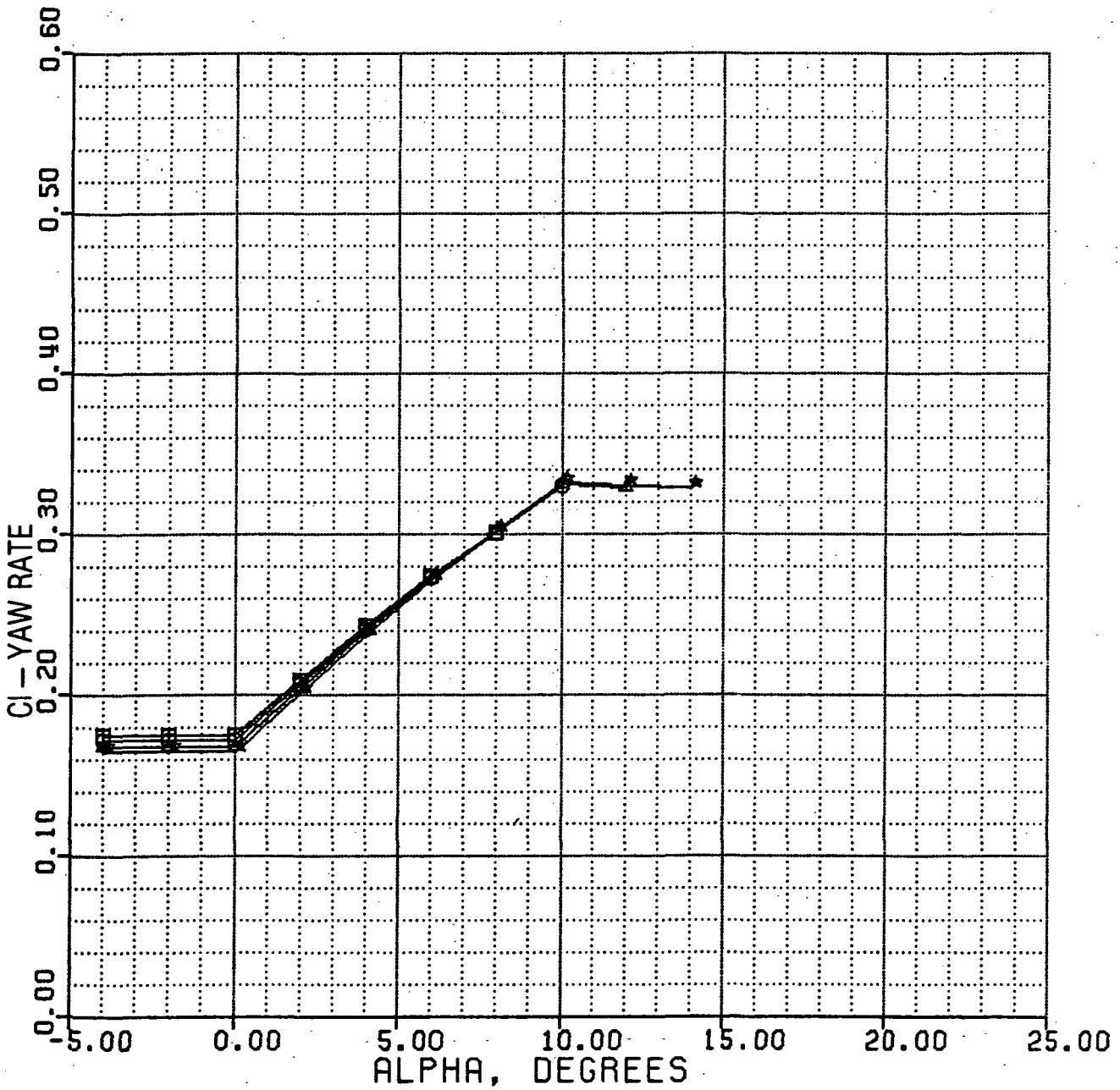

Figure 112(e)

Cl – YAW RATE VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8
ALT = 40K ALP: -4 TO 10
ALT = 50K ALP: -4 TO 12

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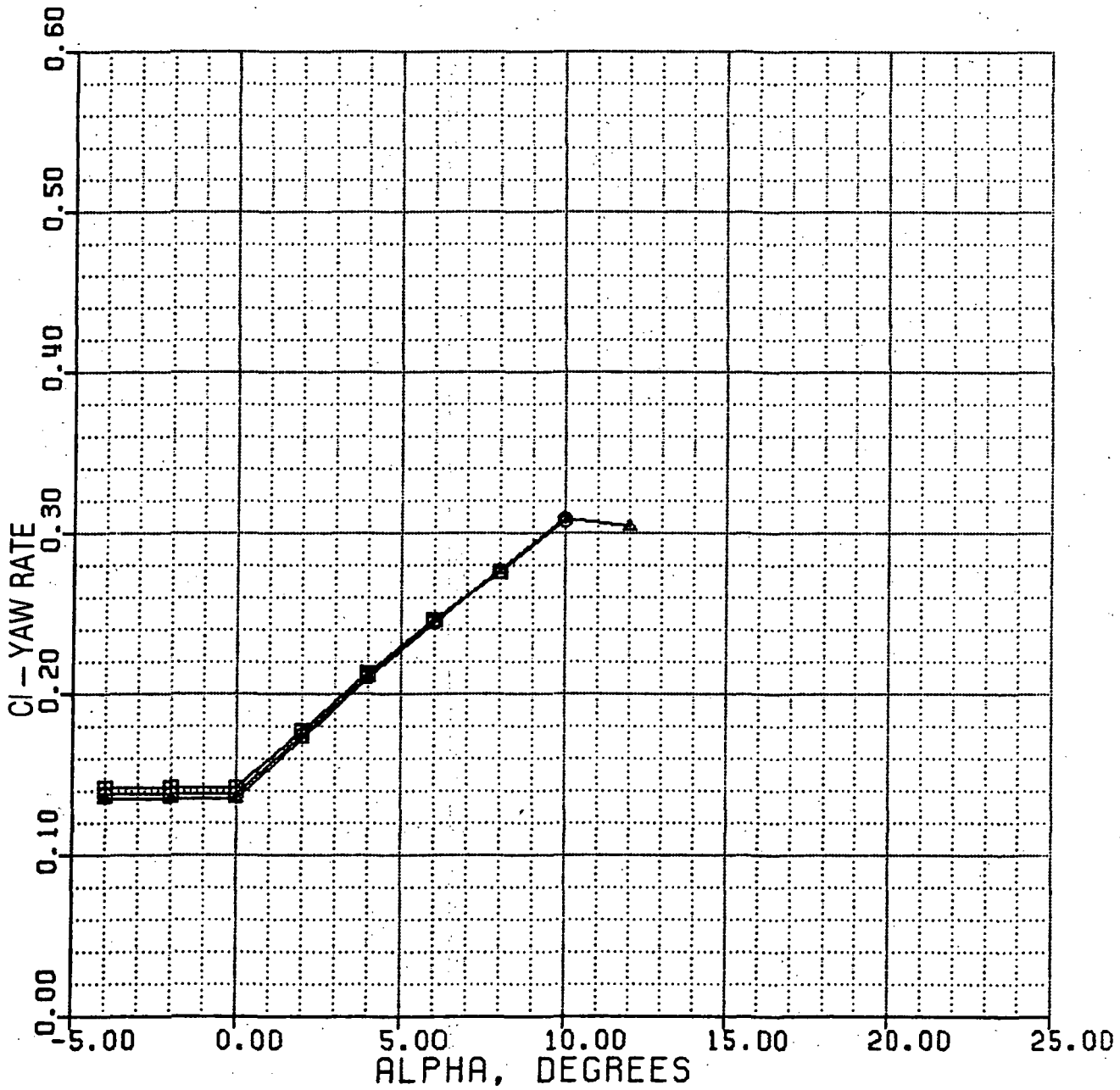

Figure 112(f)

Cn – YAW RATE VS MACH

7-6-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = S.L. M# = .2 TO 1.05
ALT = 10K M# = .2 TO 1.2
ALT = 20K M# = .3 TO 1.4

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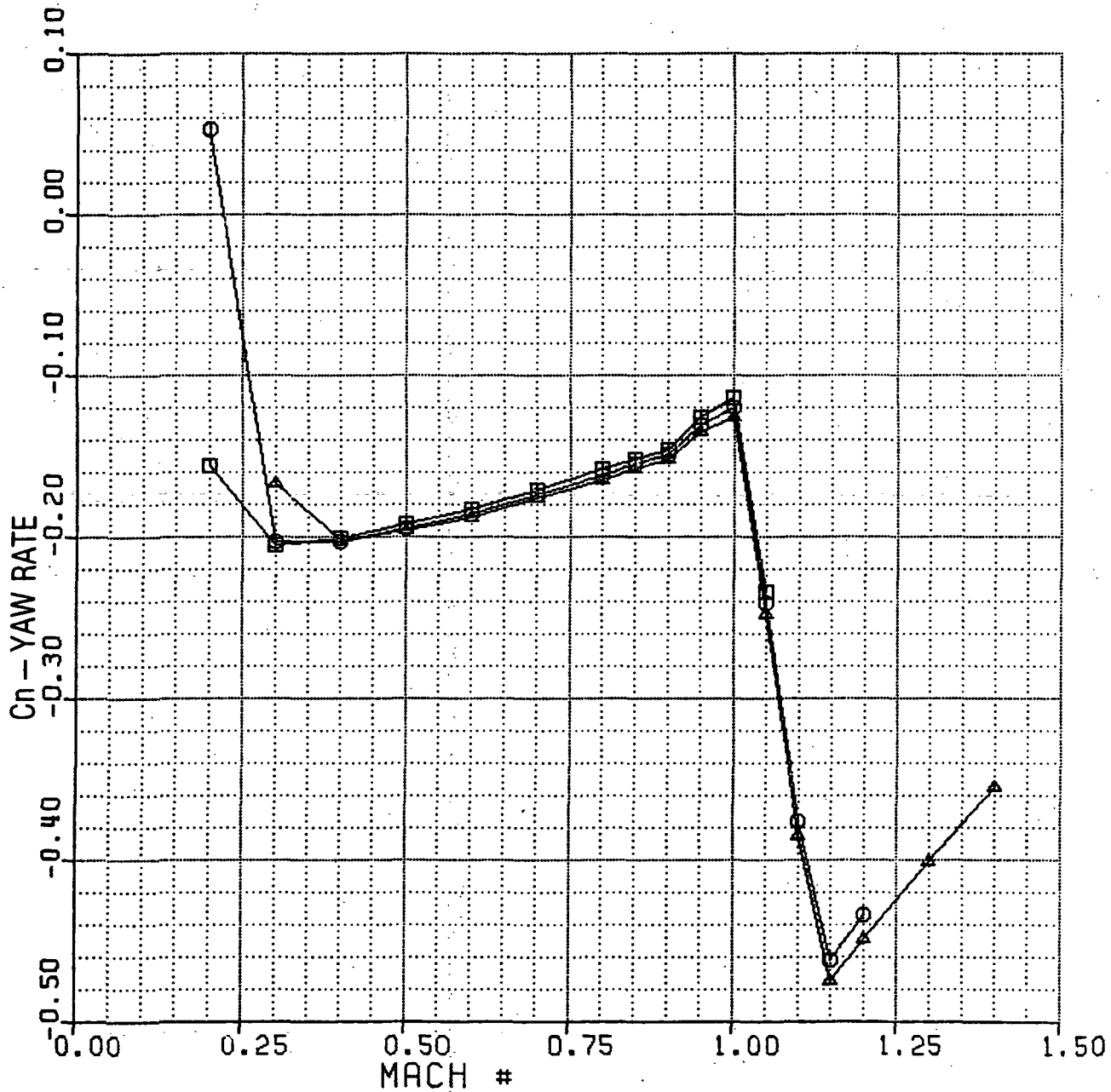

Figure 113(a)

Cn – YAW RATE VS MACH

7-7-83 X-29A 1-G TRIM NORMAL MODE

XCG = 451.0 WT = 15K

ALT = 30K M# = .3 TO 1.5
ALT = 40K M# = .6 TO 1.5
ALT = 50K M# = .6 TO 1.5

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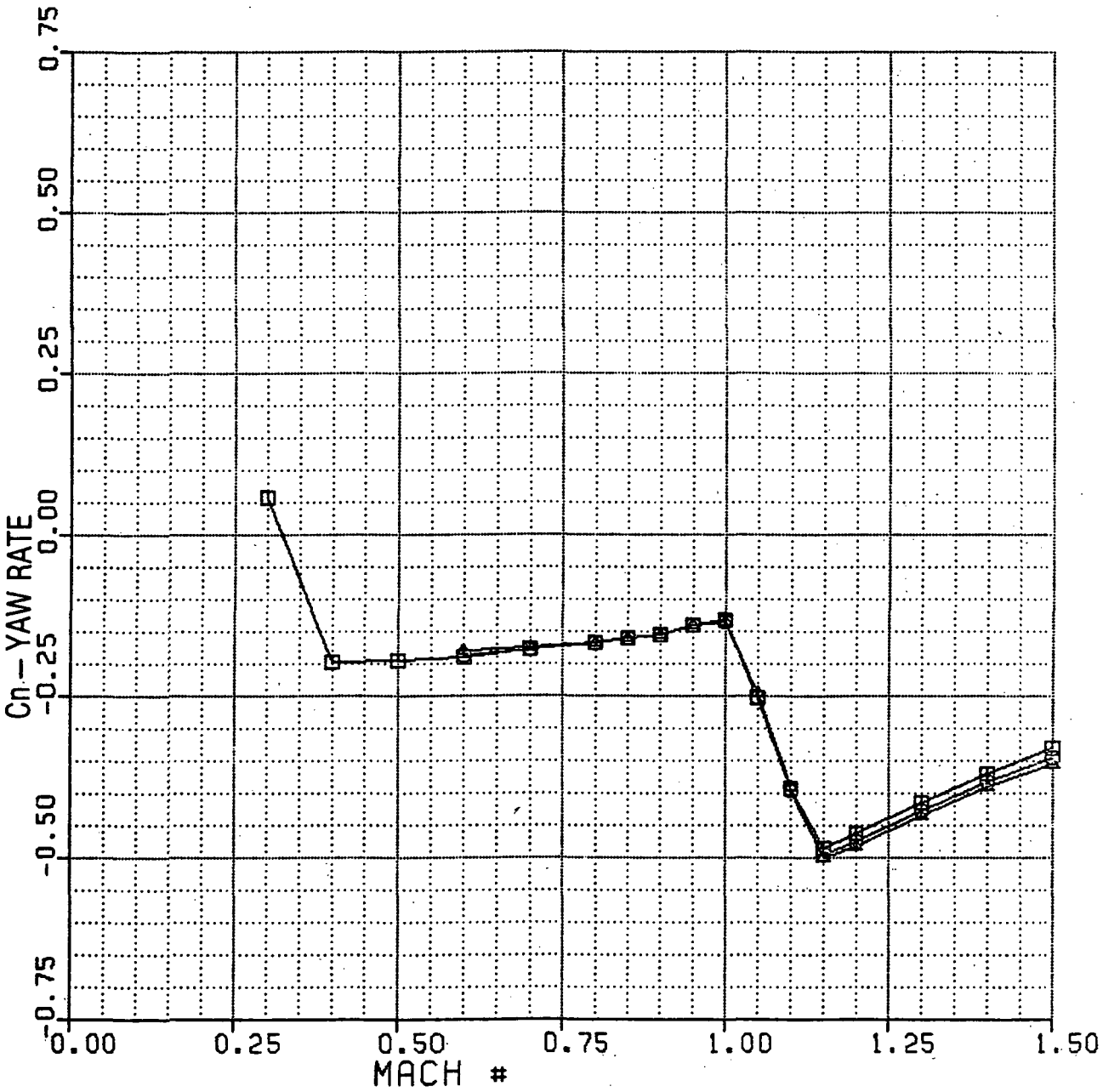

Figure 113(b)

Cn — YAW RATE VS ALPHA

6-16-83 X-29A M# = 0.4 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = S.L. ALP: -4 TO 22

ALT = 10K ALP: -4 TO 22

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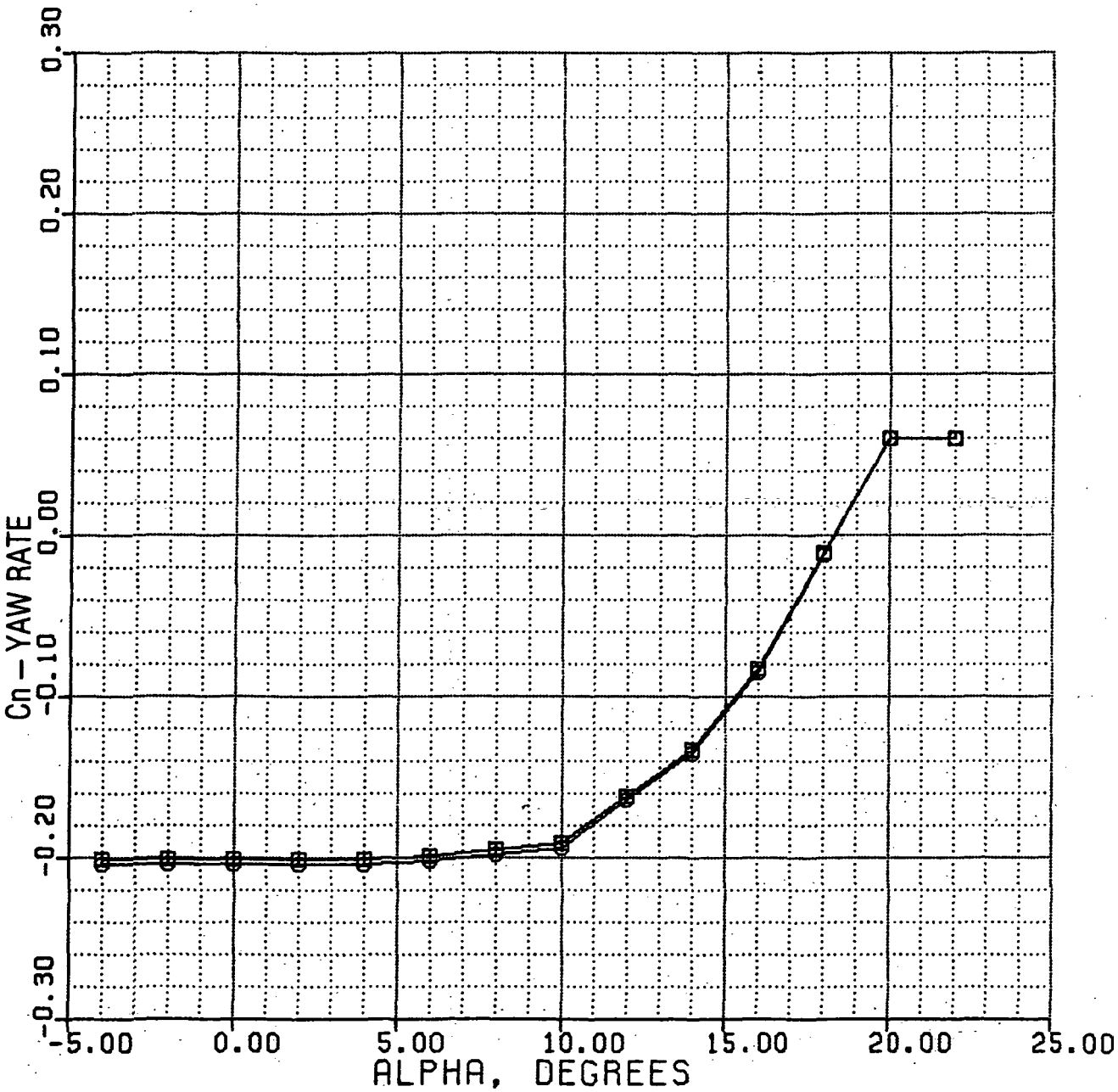

Figure 114(a)

Cn — YAW RATE VS ALPHA

6-17-83 X-29A M# = 0.6 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: -4 TO 16

ALT = 20K ALP: -4 TO 20

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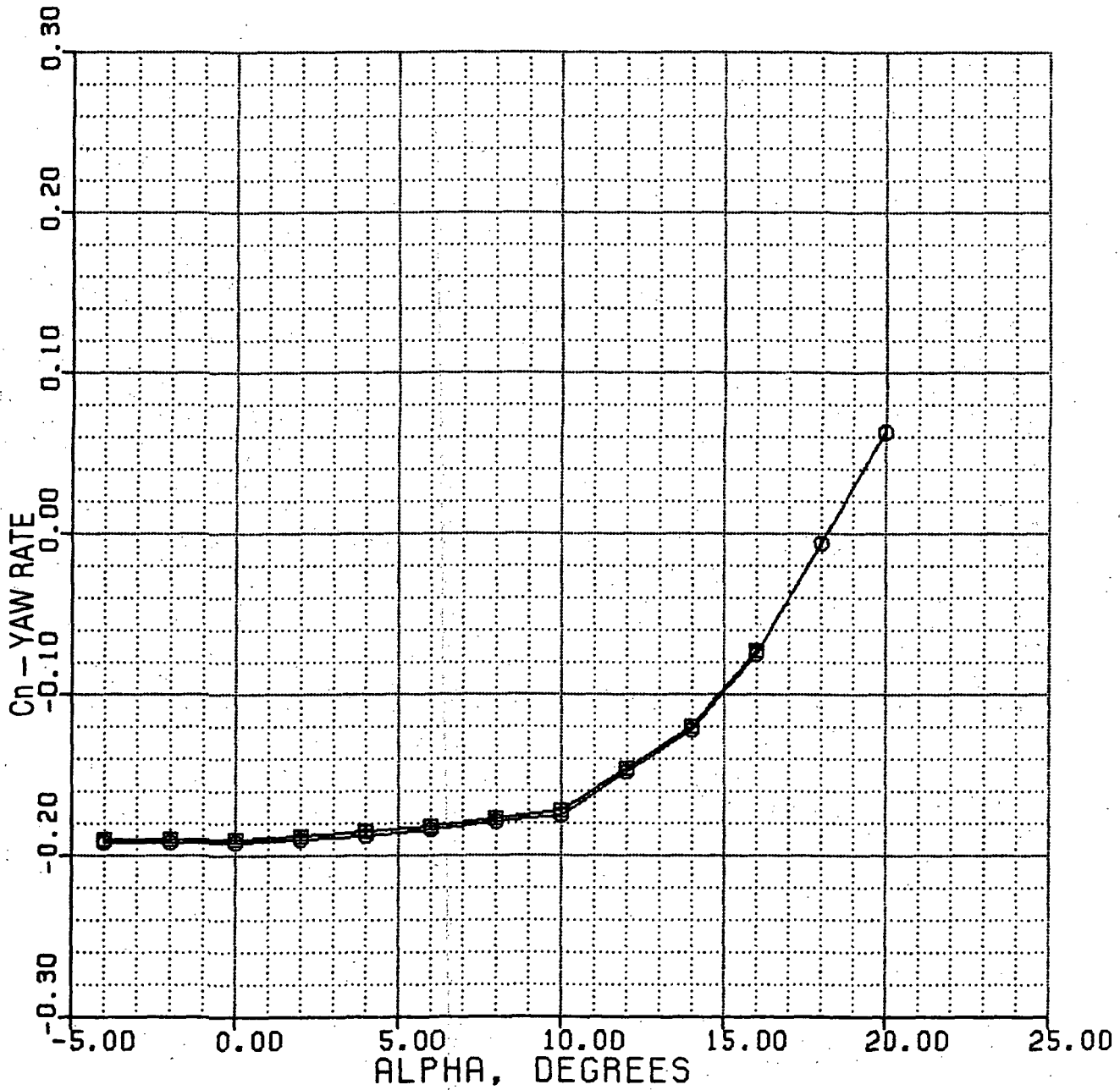

Figure 114(b)

Cn — YAW RATE VS ALPHA

6-30-83 X-29A M# = 0.8 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 10K ALP: 0 TO 10
ALT = 20K ALP: -4 TO 12
ALP = 30K ALP: -4 TO 14
ALT = 40K ALP: -4 TO 18
ALT = 50K ALP: -4 TO 22

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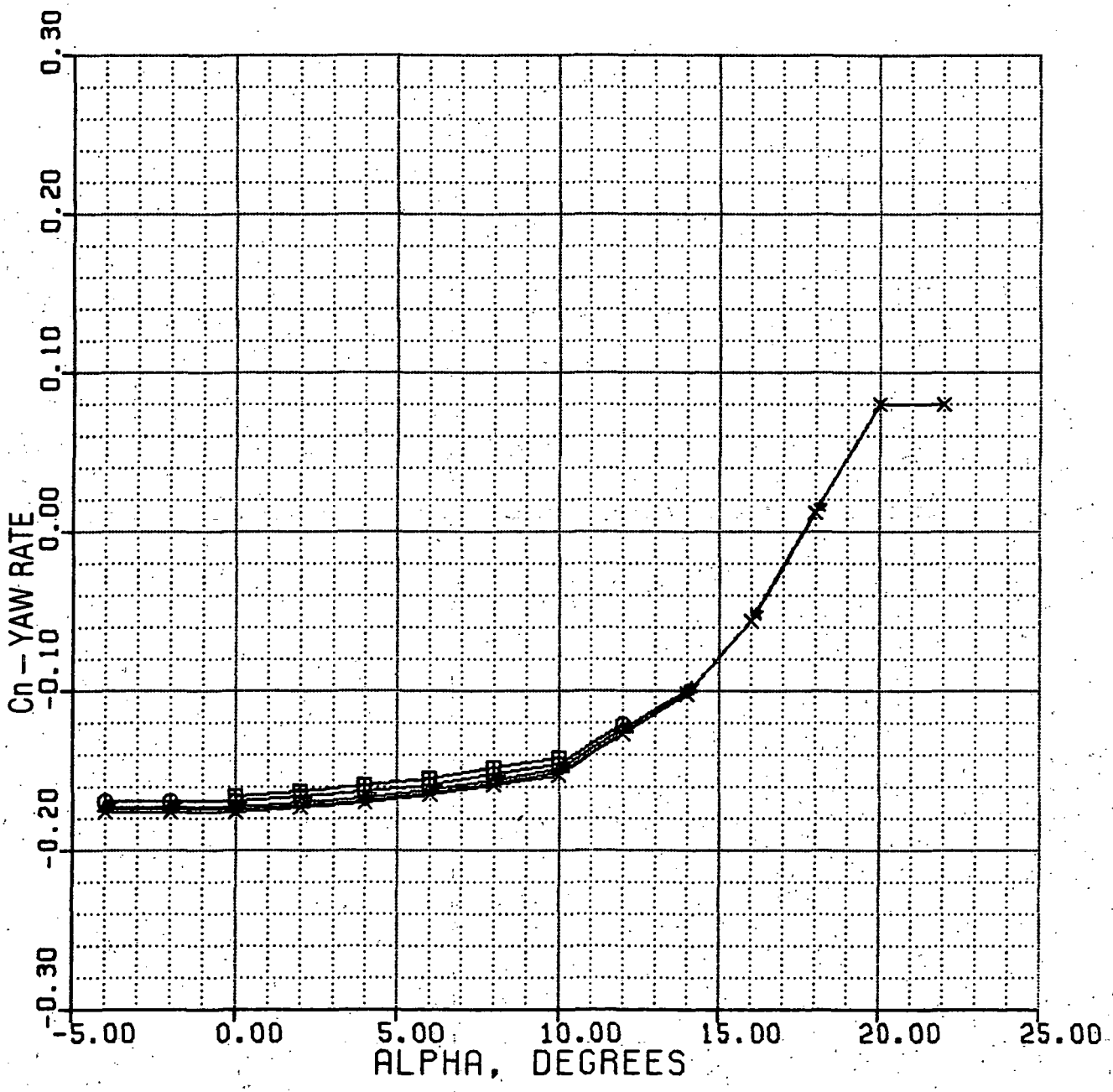

Figure 114(c)

Cn – YAW RATE VS ALPHA

7-1-83 X-29A M# = 0.9 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K	ALP:	0 TO 10
ALT = 30K	ALP:	-2 TO 12
ALT = 40K	ALP:	-4 TO 14
ALT = 50K	ALP:	-4 TO 18

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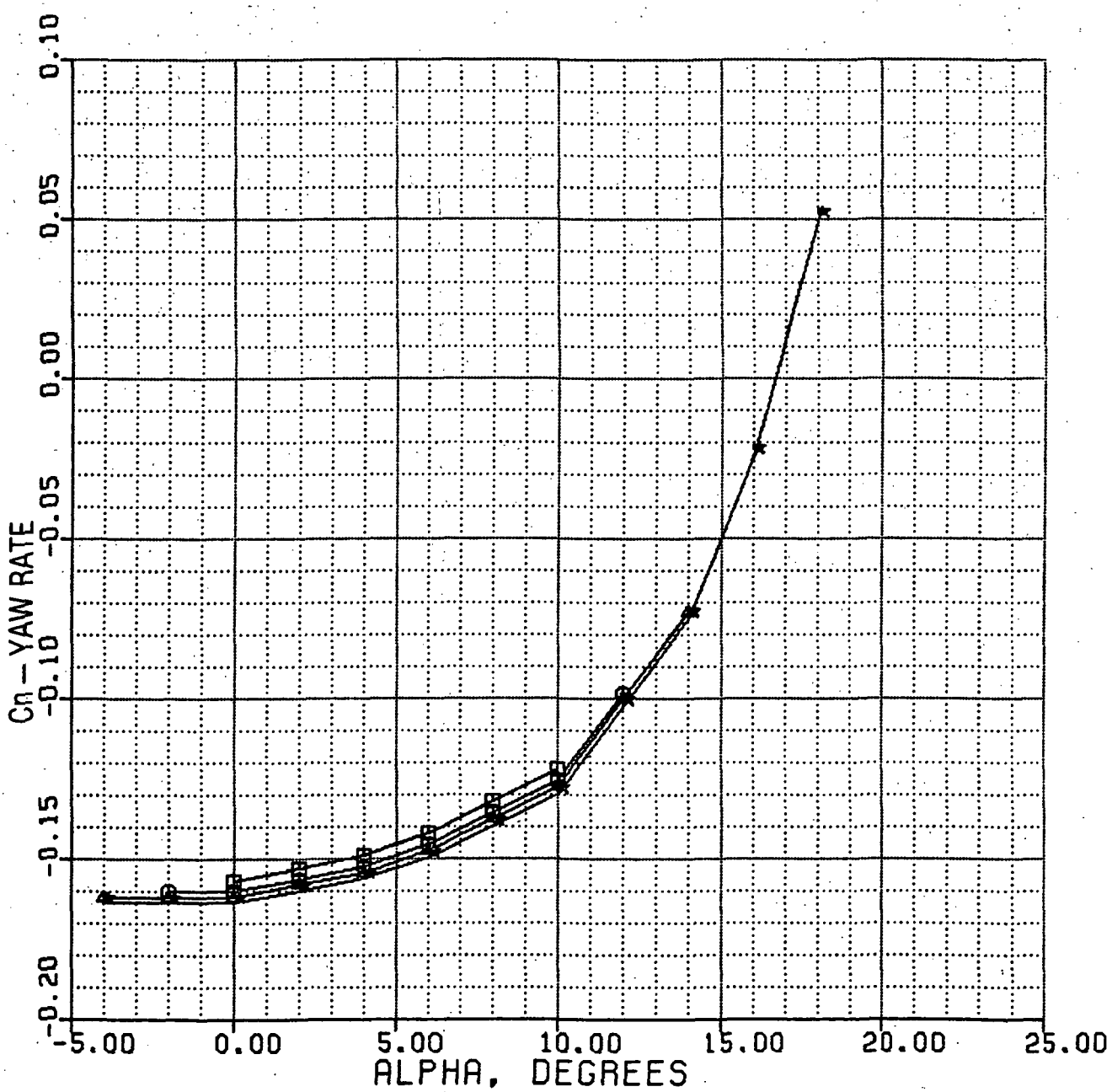

Figure 114(d)

Cn — YAW RATE VS ALPHA

7-1-83 X-29A M# = 1.2 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 20K ALP: -4 TO 8
ALT = 30K ALP: -4 TO 10
ALT = 40K ALP: -4 TO 12
ALT = 50K ALP: -4 TO 14

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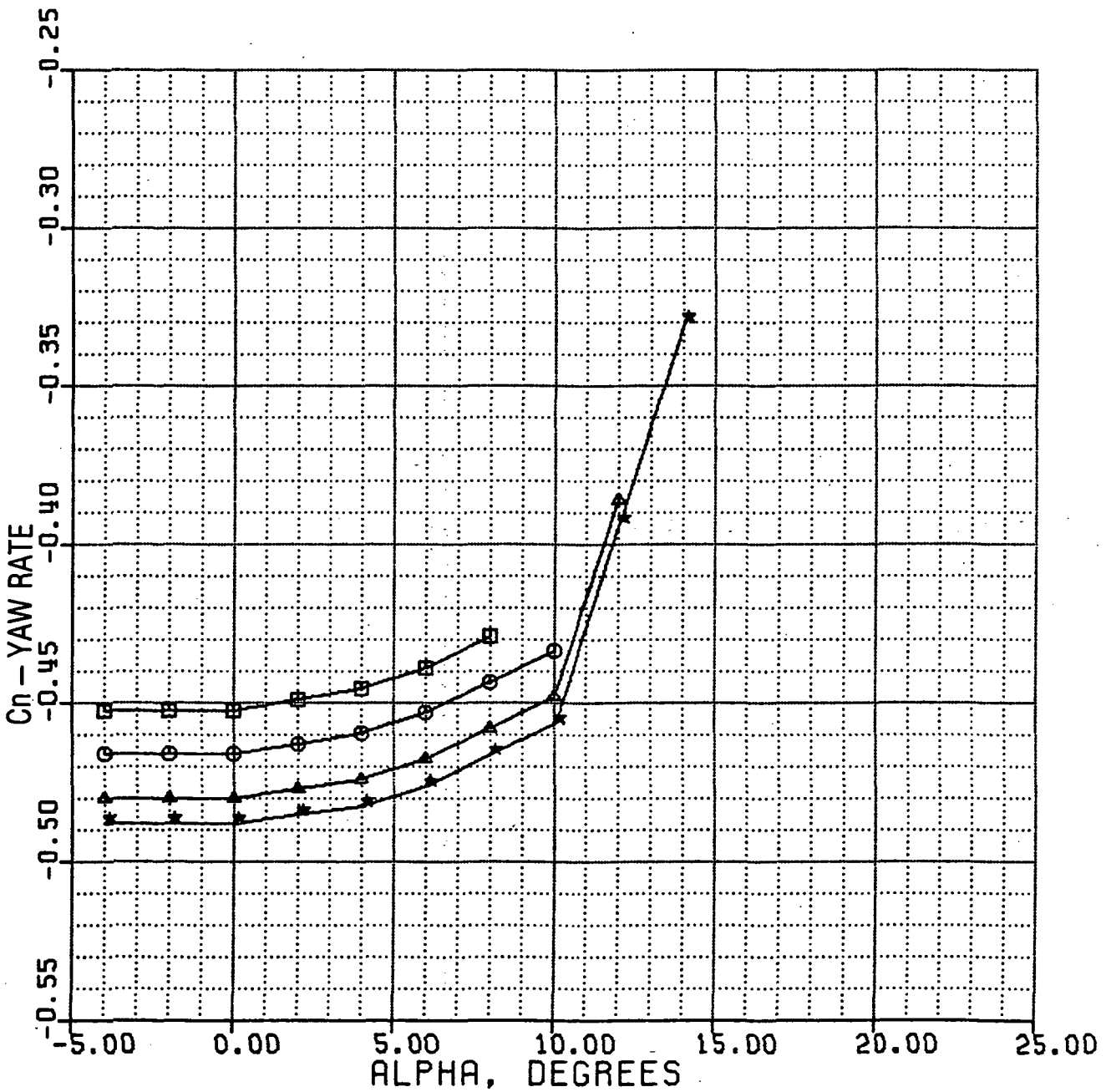

Figure 114(e)

Cn – YAW RATE VS ALPHA

7-1-83 X-29A M# = 1.5 NORMAL MODE

XCG = 451.0 WT = 15K ALPHA TRIM

ALT = 30K ALP: -4 TO 8

ALT = 40K ALP: -4 TO 10

ALT = 50K ALP: -4 TO 12

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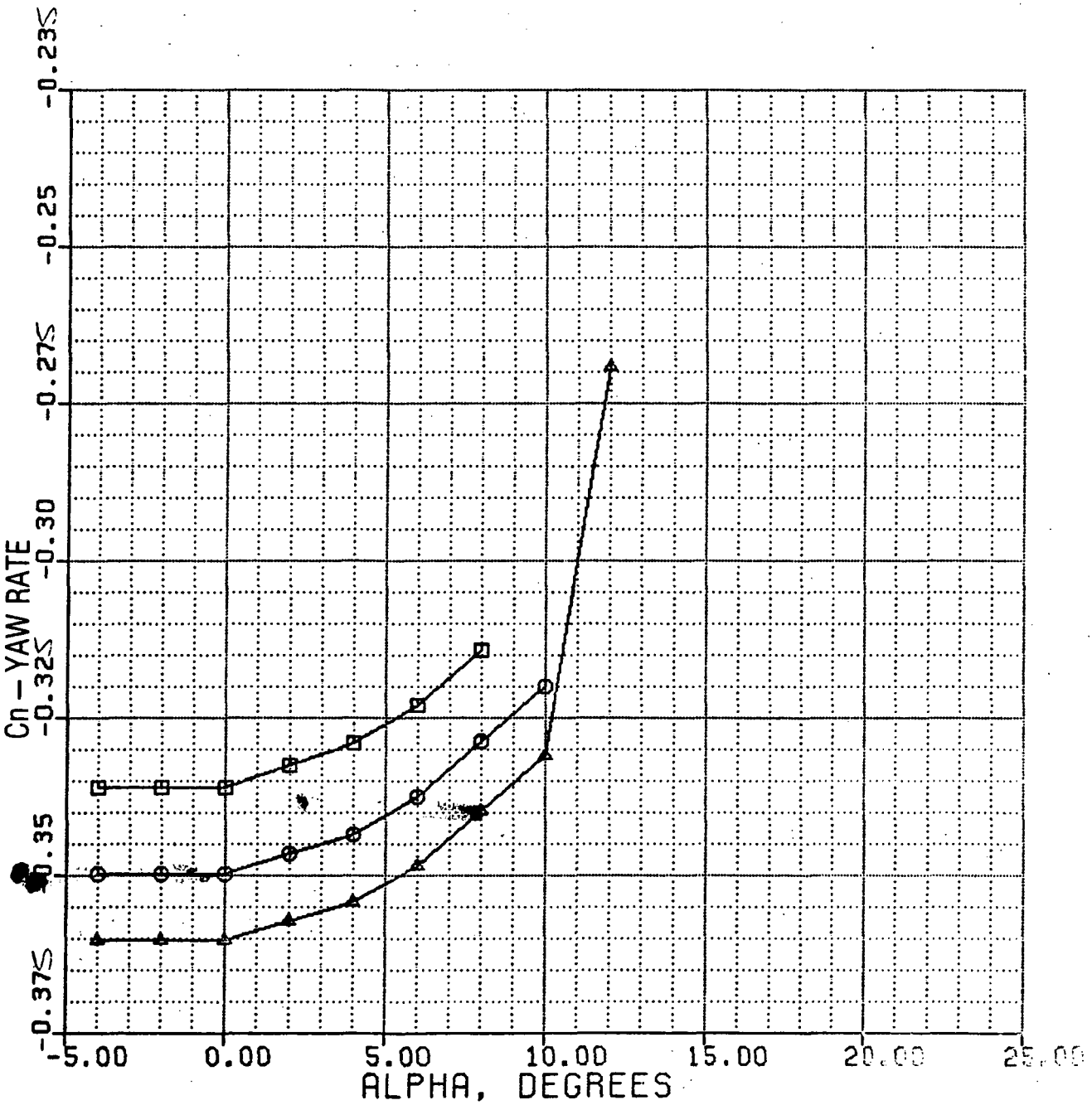

Figure 114(f)

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15. Supplementary Notes

16. Abstract

The locally linearized longitudinal and lateral-directional aerodynamic stability and control derivatives for the X-29A aircraft were calculated for altitudes ranging from sea level to 50,000 ft, Mach numbers from 0.2 to 1.5, and angles of attack from -5° to 25°. Several other parameters were also calculated, including aerodynamic force and moment coefficients, control surface position, normal acceleration, static margin, and reference angle of attack.

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