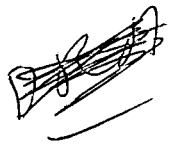


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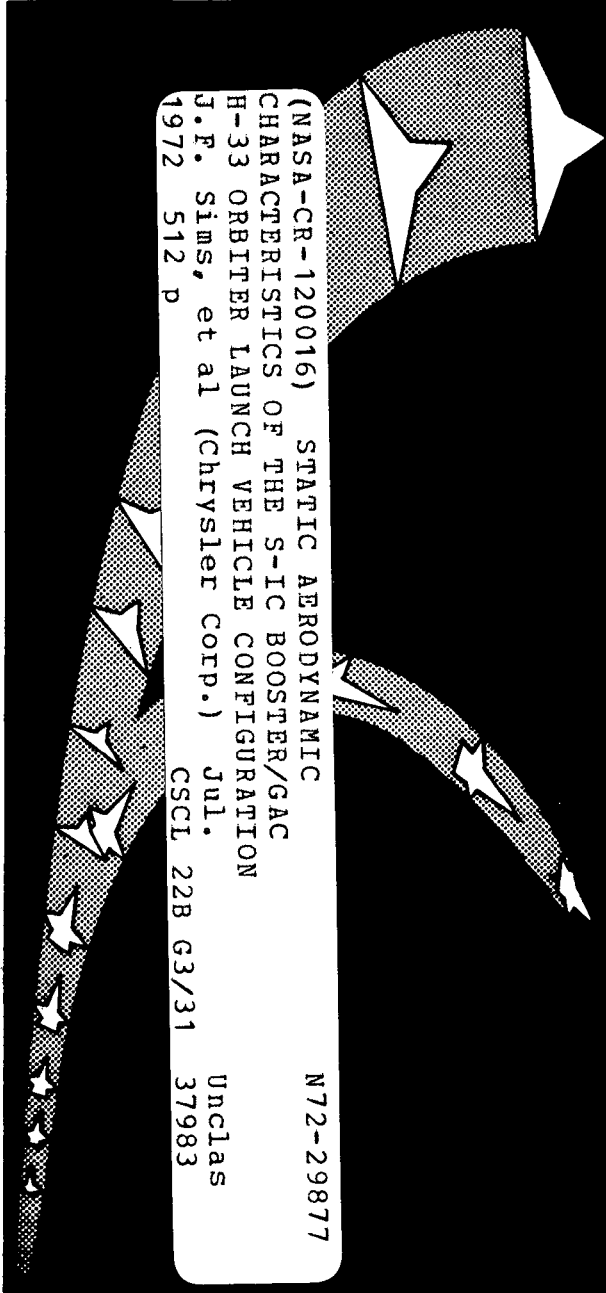
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JULY 1972



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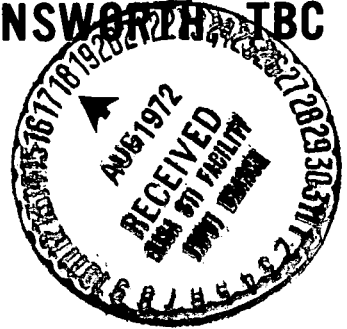


(NASA-CR-120016) STATIC AERODYNAMIC
CHARACTERISTICS OF THE S-IC BOOSTER/GAC
H-33 ORBITER LAUNCH VEHICLE CONFIGURATION
J.F. Sims, et al (Chrysler Corp.) Jul.
1972 512 p
N72-29877
Unclas
37983
CSCCL 228 G3/31

STATIC AERODYNAMIC CHARACTERISTICS OF THE S-IC BOOSTER/GAC H-33 ORBITER LAUNCH VEHICLE CONFIGURATION

by

J.F. SIMS, MSFC
R.W. AINSWORTH, TBC



MSFC 14-INCH
TRISONIC WIND TUNNEL

Marshall Space
Flight Center

SADSAC SPACE SHUTTLE
AEROTHERMODYNAMIC
DATA MANAGEMENT SYSTEM

CONTRACT NAS8-4016
MARSHALL SPACE FLIGHT CENTER

This document should be
referenced as NASA CR-120,016



NASA Series No: S-1043

DMS-DR-1187
CR-120,016
July, 1972

SADSAC/SPACE SHUTTLE

WIND TUNNEL TEST DATA REPORT

CONFIGURATION: .003366 Scale S-IC/Grumman H-33 Drop Tank Orbiter

TEST PURPOSE: Determine Static Aerodynamic Characteristics of the S-IC
Booster/GAC H-33 Orbiter Launch Vehicle Configuration

TEST FACILITY: MSFC 14" Trisonic Wind Tunnel

TESTING AGENCY: The Boeing Company

TEST NO. & DATE: MSFC TWT 502; September 2, 1971

FACILITY COORDINATOR: Mr. Jim Weaver - (NASA/MSFC)

PROJECT ENGINEER(S): Mr. Frank Sims - (NASA/MSFC)
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CONTRACT NAS 8-4016

AMENDMENT 158

DRL 297 - 84a

This report has been prepared by Chrysler Corporation Space Division under a Data Management Contract to the NASA. Chrysler assumes no responsibility for the data presented herein other than its display characteristics.

I

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II

AERODYNAMIC CHARACTERISTICS OF THE
S-IC BOOSTER/GAC H-33 ORBITER LAUNCH
VEHICLE CONFIGURATION
BY
J. F. SIMS, R. W. AINSWORTH

S U M M A R Y

This test was conducted at the MSFC 14-Inch Trisonic Tunnel commencing Thursday, September 2, 1971, and continuing through noon Wednesday, September 8, 1971, for a total of 49 test hours. The test was divided into two parts. The first part, constituting over 80 percent of the entire test, utilized the H-33 orbiter with drop tanks and cradle mounted on an S-IC booster with 75 square-foot fins oriented 45° off the horizontal and vertical reference planes. The booster was sting mounted on the MSFC #200 strain gage balance. Runs were initially made at orbiter incidence angles (relative to the booster centerline) of $+1.24$, 0 and -2 degrees to determine the optimum incidence angle to be used for the remainder of the test. The angle so determined was 0 degrees. Additional testing was performed with drop tanks removed, orbiter vertical tail removed, drop tanks and orbiter wing removed, booster fins removed and booster fins located in the horizontal and vertical reference planes. Runs were also made with the tunnel sting rolled (model and balance) 20° , 45° and 70° to obtain combined α - β data. The angles of attack and sideslip in the data plane were determined as shown in the Data Reduction section.

The second part utilized the H-33 orbiter and cradle only, sting mounted on the MSFC #201 strain gage balance. These data were used in conjunction with MSFC test number 504 (orbiter alone on balance) to determine cradle effects. The model scale was 0.003366.

NOMENCLATURE

(General)

<u>SYMBOL</u>	<u>SADSAC SYMBOL</u>	<u>DEFINITION</u>
α	ALPHA	angle of attack, angle between the projection of the wind X_w -axis on the body X, Z-plane and the body X-axis; degrees
β	BETA	sideslip angle, angle between the wind X_w -axis and the projection of this axis on the body X-Z-plane; degrees
ψ	PSI	yaw angle, angle of rotation about the body Z-axis, positive when the positive X-axis is rotated toward the positive Y-axis; degrees
ϕ	PHI	roll angle, angle of rotation about the body X-axis, positive when the positive Y-axis is rotated toward the positive Z-axis; degrees
ρ		air density; K_g/m^3 , slugs/ft ³
a		speed of sound; m/sec, ft/sec
V		speed of vehicle relative to surrounding atmosphere; m/sec, ft/sec
q	$Q(\text{PSI})$ $Q(\text{PSF})$	dynamic pressure; $1/2\rho V^2$, psi, psf
M	MACH	Mach number; V/a
RN/L	RN/L	Reynolds number per unit length; million/ft
p		static pressure; psi
P		total pressure; psi
C_p	CP	pressure coefficient; $(p-p_\infty)/q$

NOMENCLATURE (Continued)

Reference & C. G. Definitions

<u>SYMBOL</u>	<u>SADSAC SYMBOL</u>	<u>DEFINITION</u>
S		wing area; m^2 , ft^2
S	SREF	reference area; m^2 , ft^2
\bar{c}		wing mean aerodynamic chord or reference chord; m, ft, in (see l_{ref} or LREF)
l_{ref}	LREF	reference length; m, ft, in.; (see \bar{c})
b_{ref}	BREF	wing span or reference span; m, ft, in
A_b		base area; m^2 , ft^2 , in^2
c. g.		center of gravity
MRP	MRP	abbreviation for moment reference point
	XMRP	abbreviation for moment reference point on X-axis
	YMRP	abbreviation for moment reference point on Y-axis
	ZMRP	abbreviation for moment reference point on Z-axis

NOMENCLATURE (Continued)

Axis System General

SYMBOL

DEFINITION

F

force; F, lbs

M

moment; M, in-lb

Subscript

Definition

N

normal force

A

axial force

L

lift force

D

drag force

Y

force or moment about the Y axis

Z

moment about the Z axis

X

moment about the X axis

s

stability axis system

w

wind axis system

ref

reference conditions

∞

free stream conditions

t

total conditions

b

base

NOMENCLATURE (Continued)
Body & Stability Axis System

<u>SYMBOL</u>	<u>SADSAC SYMBOL</u>	<u>DEFINITION</u>
<u>Body Axis System</u>		
C_N	CN	normal force coefficient; F_N/qS
C_A	CA	axial force coefficient; F_A/qS
C_{A_b}	CAB	base axial force coefficient; $\begin{bmatrix} -1 \\ \end{bmatrix} \begin{bmatrix} (P_b - P_\infty)/q \end{bmatrix} (A_b/S)$
C_{A_f}	CAF	forebody axial force coefficient; $C_A - C_{A_b}$
C_n	CYN	yawing moment coefficient; $M_z/qS b_{ref}$
C_l	CBL	rolling moment coefficient; $M_x/qS b_{ref}$
<u>Common to Both Axis Systems</u>		
C_m	CIM	pitching moment coefficient; $M_y/qS l_{ref}$
C_y	CY	side force coefficient; F_y/qS
<u>Stability Axis System</u>		
C_L	CL	lift force coefficient; F_L/qS
C_D	CD	drag force coefficient; F_D/qS
C_{D_b}	CDB	base drag coefficient
C_{D_f}	CDF	forebody drag coefficient; $C_D - C_{D_b}$
C_n	CLN	yawing moment coefficient; $M_{z,s}/qS b_{ref}$
C_l	CSL	rolling moment coefficient; $M_{x,s}/qS b_{ref}$
L/D	L/D	lift-to-drag ratio; C_L/C_D
L/D_f	L/DF	lift to forebody drag ratio; C_L/C_{D_f}

ADDITIONS TO NOMENCLATURE

CNAFO	Zero angle of attack normal force coefficients, $CN(\alpha=0)$
CLMAFO	Zero angle of attack pitching moment coefficient, $CLM(\alpha=0)$
CAAFO	Zero angle of attack total axial force coefficient, $CA(\alpha=0)$
CAFAFO	Zero angle of attack forebody axial force coefficient $CAF(\alpha=0)$
CABAFO	Zero angle of attack base axial force coefficient, $CAB(\alpha=0)$
ALFCNO	Zero normal force angle of attack, $\alpha(CN=0)$
CLMCNO	Zero normal force pitching moment coefficient, $CLM(CN=0)$
DCIM/DCN	Static longitudinal stability derivative, $\delta CLM/\delta CN$
DCYN/DCY	Static lateral stability derivative, $\delta CYN/\delta CY$
CNAAFO	Normal force coefficient derivative, $\delta CN/\delta \alpha(\alpha=0)$
CMAAFO	Pitching moment coefficient derivative, $\delta CLM/\delta \alpha(\alpha=0)$
DCY/DBETA	Side force coefficient derivative, $\delta CY/\delta \beta(\beta=0)$
DCYN/DBETA	Yawing moment coefficient derivative, $\delta CYN/\delta \beta(\beta=0)$
DCBL/DBETA	Rolling moment coefficient derivative, $\delta CBL/\delta \beta(\beta=0)$
CP/D	Longitudinal center of pressure location, $CLMa/CNa(\alpha=0)$
YCP/D	Lateral center of pressure location, $CYN\beta/CY\beta(\beta=0)$
DCN	Normal force coefficient increment, ΔCN
DCIM	Pitching moment coefficient increment, ΔCLM
DCA	Total axial force coefficient increment, ΔCA
DAF	Forebody axial force coefficient increment, ΔCAF
DCNA	Normal force coefficient gradient increment, $\Delta CN\alpha$
DCIMA	Pitching moment coefficient gradient increment, $\Delta CLM\alpha$
DCY	Side force coefficient increment, ΔCY

ADDITIONS TO NOMENCLATURE
(CONTINUED)

DCYN	Yawing moment coefficient increment, Δ CYN
DCBL	Rolling moment coefficient increment, Δ CBL
DCYB	Side force coefficient gradient increment, Δ CY β
DCYNB	Yawing moment coefficient gradient increment, Δ CYN β
DCBLB	Rolling moment coefficient gradient increment, Δ CBL β
DCN(ALPHA=0)	Normal force coefficient increment at ALPHA=0, Δ CN(α =0)
DCIM(ALPHA=0)	Pitching moment coefficient increment at ALPHA=0, Δ CLM(α =0)
DCA(ALPHA=0)	Total axial force coefficient increment at ALPHA=0, Δ CA(α =0)
DCAF(ALPHA=0)	Force axial force coefficient increment at ALPHA=0, Δ CAF(α =0)
DCNA(ALPHA=0)	Normal force coefficient gradient increment at ALPHA=0, Δ CN α (α =0)
DCIMA(ALPHA=0)	Pitching moment coefficient gradient increment at ALPHA=0, Δ CLM α (α =0)
WNGINC	Orbiter incidence angle in degrees relative to booster centerline

CONFIGURATIONS INVESTIGATED

The following models and model components were utilized during this test:

O	Grumman Orbiter Body H-33
V	Orbiter Vertical Stabilizer
W	Orbiter Clipped Delta Wing
T	Orbiter Drop Tanks
C	S-IC/Orbiter Adapter Cradle
B	S-IC Booster
F	S-IC 75 Square-Foot Fins Oriented 45° Off Vertical and Horizontal Reference Plane
F1	S-IC 75 Square-Foot Fins Oriented in Horizontal and Vertical Reference Plane

Pertinent dimensional information is presented in the Model Component Description Section.

TEST FACILITY DESCRIPTION

The Marshall Space Flight Center 14" x 14" Transonic Wind Tunnel is an intermittent blowdown tunnel which operates by high pressure air flowing from storage to either vacuum or atmospheric conditions. A Mach number range from .2 to 5.85 is covered by utilizing two interchangeable test sections. The transonic section permits testing at Mach 0.20 through 2.50, and the supersonic section permits testing at Mach 2.74 through 5.85. Mach numbers between .2 and .9 are obtained by using a controllable diffuser. The range from .95 to 1.3 is achieved through the use of plenum suction and perforated walls. Mach numbers of 1.44, 1.93 and 2.50 are produced by interchangeable sets of fixed contour nozzle blocks. Above Mach 2.50 a set of fixed contour nozzle blocks are tilted and translated automatically to produce any desired Mach number in .25 increments.

Air is supplied to a 6000 cubic foot storage tank at approximately -40°F dew point and 500 psi. The compressor is a three-stage reciprocating unit driven by a 1500 hp motor.

The tunnel flow is established and controlled with a servo actuated gate valve. The controlled air flows through the valve diffuser into the stilling chamber and heat exchanger where the air temperature can be controlled from ambient to approximately 180°F . The air then passes through the test section which contains the nozzle blocks and test region.

Downstream of the test section is a hydraulically controlled pitch sector that provides a total angle of attack range of 20° ($\pm 10^{\circ}$). Sting offsets are available for obtaining various maximum angles of attack up to 25° .

REDUCTION OF DATA

I. S-IC BOOSTER ON BALANCE (RUNS 1 THROUGH 105)

Six component aerodynamic force and moment data were recorded using MSFC internal strain gage balance #200. Two base pressures (C_{Pb1} and C_{Pb2}) and balance cavity pressures (C_{Pc}) were also recorded and utilized to correct the axial force measured (C_{AT}) reading to a condition corresponding to free-stream pressure acting at the base and cavity regions (C_{AF}). The two base pressures were averaged and considered to act as one over the model base.

$$C_{Pb} = \frac{C_{Pb1} + C_{Pb2}}{2}$$

$$C_{AF} = C_{AT} - \left[C_{Pb} \left(\frac{A_b}{S_{ref}} \right) + C_{Pc} \left(\frac{A_{cav}}{S_{ref}} \right) \right]$$

The force and moment data were reduced to coefficient form using the following reference values:

$$S_{ref} = \text{S-IC booster body maximum X-section area} = 1.396 \text{ in}^2$$

$$l_{ref} = b_{ref} = \text{S-IC base diameter} = 1.333 \text{ in.}$$

$$A_b = \text{Booster base area} = 1.039 \text{ in}^2$$

$$A_{cav} = \text{Booster balance cavity X-section area} = 1.131 \text{ in}^2$$

Moment Reference Center:

$$X = 5.399 \text{ inches from S-IC base (5.507" aft of orbiter nose)}$$

$$Y = Z = 0 \text{ inches from S-IC centerline}$$

REDUCTION OF DATA
(Continued)

During one portion of the test (Runs 20 through 31 and 75 through 77) the tunnel sector was pitched $\pm 10^\circ$ with the model and balance rolled 20° , 45° , and 70° . To determine the angle of attack and sideslip in the data plane (rotating body axes) the following were used:

$$\alpha = \text{Tan}^{-1} [\text{Tan } \alpha_s \text{ Cos } \phi] + \Delta\alpha$$

$$\beta = \text{Sin}^{-1} [\text{Sin } \alpha_s \text{ Sin } \phi] + \Delta\beta$$

α_s = Tunnel sector pitch angle

$\Delta\alpha, \Delta\beta$ = Change in angle due to sting deflections

ϕ = Sting roll angle

II. ORBITER PLUS CRADLE ON BALANCE (RUNS 106 THROUGH 122)

Six component aerodynamic force and moment data were recorded using MSFC internal strain gage balance #201. Orbiter base pressures ($C_{P_{b0}}$), balance cavity pressures (C_{P_c}) and cradle base pressures ($C_{P_{bs}}$) were also recorded and utilized to correct the axial force measured (C_{A_T}) reading to a condition corresponding to free-stream pressure acting at the base and cavity regions (C_{A_F}).

$$C_{A_F} = C_{A_T} - \left[C_{P_{b0}} \left(\frac{A_{b0}}{S_{ref}} \right) + C_{P_c} \left(\frac{A_{cav}}{S_{ref}} \right) + C_{P_{bs}} \left(\frac{A_{bc}}{S_{ref}} \right) \right]$$

REDUCTION OF DATA
(Continued)

The force and moment data were reduced to coefficient form using the following reference values:

$$S_{\text{ref}} = \text{S-IC booster body maximum X-section area} = 1.396 \text{ in}^2$$

$$l_{\text{ref}} = b_{\text{ref}} = \text{S-IC base diameter} = 1.333 \text{ in.}$$

$$A_{bO} = \text{Orbiter base area} = 0.362 \text{ in}^2$$

$$A_{\text{cav}} = \text{Orbiter balance cavity X-section area} = 0.399 \text{ in}^2$$

$$A_{bC} = \text{Cradle base area} = 0.371 \text{ in}^2$$

Moment Reference Center:

$$X = 5.507 \text{ inches aft of orbiter nose}$$

$$Y = 0 \text{ inches from balance centerline}$$

$$Z = 0.425 \text{ inches below balance centerline}$$

These values were used so as to locate the moment reference center at the same location as was used for the booster-on-balance portion of the test.

TABLE 1. DATASET COLLATION SHEETS
 TEST TWT #508 DATA SET/RUN NUMBER
 COLLATION SUMMARY

PRETEST
 POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHED.		PARAMETERS/VALUES				NO. of RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)																	
		a	B	Lo	φ				0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.46	1.96	3.5	4.96							
R44031	OWVTCBF	A	0	-2	0			4				11	12	13	14											
R44011	OWVTCBF	I	I	1.24	I			4				7	8	9	10											
R44021	OWVCBF	I	I	1.24	I			2				16	15													
R44041	OWVTCBF	A	0	0	0			11	19	45	46	3	4	5	6	83	76	89	88							
R44045	I	O	B		90			9	36			35	34	33	32	84	73	86	87							
R44042	I	S	S		20			5	20			21	22		23		75									
R44043	I	I	I		45			5	27			26	25		24		76									
R44044	OWVTCBF	S	S		70			5	28			29	30		31		77									
R44101	OWVTCBF1	A	0		0			7	105			47	48		49		80	101	100							
R44105	OWVTCBF1	O	B		90			7	104			52	51		50		79	102	103							
R44051	OWVCBF	A	0		0			7				1	2	17	18		71	90	91							
R44055	OWVCBF	O	B		90			7				37	38	39	40		72	93	92							
R44061	OWVTCB	A	0		0			5				60	59	58	57		82									
R44065	OWVTCB	O	B		90			5				53	54	55	56		81									
R44085	OWVTCBF	O	B		90			7				41	42	43	44		78	94	95							
R44091	OVCBF	A	0		0			7				61	62	63	64		70	98	99							
R44095	OVCBF	O	B	0	90			7				68	67	66	65		69	97	96							

TEST RUN NUMBERS

13

1	7	13	19	25	31	37	43	49	55	61	67	75	76
CLM	ICN	ICY	CPL	CYN	CA	PAE	CAB	CPC	CPB1				10

COEFFICIENTS: SENTINEL SECTOR FOLLOWS DA SCHEDULE. AEB VARY AS F(θ)
 a or B SCHEDULES
DA = -10, -8, -6, -4, -2, -1, 0, 1, 2, 4, 6, 8, 10
CB = -10, -8, -6, -4, -2, -1, 0, 1, 2, 4, 6, 8, 10

TABLE 1. (CONTINUED)

TEST TWT #502 DATA SET/RUN NUMBER

COLLATION SUMMARY

PRETEST

POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHD.		PARAMETERS/VALUES			NO. of RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)													
		a	B	to	∅			0.6	0.9	1.0	1.1	1.2	1.96	3.5	4.76						
R4111	OWVTC	A	O	-	0		8	106	107	108	109	110	118	119	120						
R4115	OWVTC	O	B	-	90		8	115	116	113	112	111	117	122	121						
R4125	OWTC	O	B	-	90		1					116									

TEST RUN NUMBERS

1	7	13	19	25	31	37	43	49	55	61	67	75	76
CLM	ICN	ICY	CBL	CYN	CA	CAF	CAB	CPC	CPS				10

COEFFICIENTS: _____ IDPVAR(1) | IDPVAR(2) | NDV
 a or b _____
 SCHEDULES _____

TABLE 2: TEST CONDITIONS
TEST #502

MACH NUMBER	REYNOLDS NUMBER per unit length	DYNAMIC PRESSURE (pounds/sq. inch)	STAGNATION TEMPERATURE (degrees Fahrenheit)
0.60	5.0x10 ⁶	4.3	100°F (Nominal)
0.70	5.5x10 ⁶	5.5	
0.08	6.0x10 ⁶	6.5	
0.09	6.3x10 ⁶	7.4	
1.00	6.5x10 ⁶	8.1	
1.10	6.6x10 ⁶	8.7	
1.20	6.7x10 ⁶	9.2	
1.46	7.5x10 ⁶	10.8	
1.96	7.6x10 ⁶	11.0	
3.5	7.1x10 ⁶	6.8	
4.96	5.5x10 ⁶	3.1	

BALANCE UTILIZED: MSFC Balance #200 & MSFC Balance #201

CAPACITY: (#200)

CAPACITY: (#201)

COEFFICIENT
TOLERANCE:

NF 175 lbs.
SF 130 lbs.
AF 100 lbs.
PM 185 in.-lbs.
YM 160 in.-lbs.
RM 50 in.-lbs.

60 lbs.
20 lbs.
30 lbs.
120 in.-lbs.
40 in.-lbs.
25 in.-lbs.

COMMENTS:

TABLE 3.
MODEL COMPONENT DESCRIPTIONS

MODEL COMPONENT: BODY - (O) ORBITER

GENERAL DESCRIPTION: 0.003366 SCALE GRUMMAN (H33) ORBITER

DRAWING NUMBER: _____

<u>DIMENSIONS:</u>	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Length	1618.2 in.	5.447 in.
Max. Width	299.5 in.	1.008 in.
Max. Depth	329.8 in.	1.110 in.
Fineness Ratio	5.4	5.4
Areas (Theoretical)		
Max. Cross-Sectional		
Planform	3120 ft ²	5.09 in ²
Wetted (Less Base)	10345 ft ²	16.877 in ²
Base	461 ft ²	0.7521 in ²

TABLE 3. (CONTINUED)

MODEL COMPONENT: BODY - S-IC BOOSTER (B)

GENERAL DESCRIPTION: SATUPN V/S-IC BOOSTER

MODEL SCALE FACTOR 0.003366

DRAWING NUMBER: _____

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u>	<u>MODEL SCALE</u>
Length	1452.76 in. 1515.45 in.	4.890 in. (1) 5.101 in. (2)
Max. Width	562.20 in.	1.893 in.
Max. Depth		
	562.20 in.	1.893 in.
Fineness Ratio	3.83	3.83
Body Diameter	33 ft.	1.333 in.
Max. Cross-Sectional Area	857.14 ft ²	1.396 in ²
Base Area	1332.38 ft ²	2.170 in ²
Cavity	694.43 ft ²	1.131 in ²
Solid Base	637.94 ft ²	1.039 in ²

(1) To end of booster.

(2) To end of engine fairing.

TABLE 3. (CONTINUED)

MODEL COMPONENT: WING (W)

GENERAL DESCRIPTION: CLIPPED DELTA WING FOR H-33 ORBITER (0.003366 SCALE)

DRAWING NUMBER: _____

DIMENSIONS:

FULL-SCALE

MODEL SCALE

TOTAL DATA

Planform Area	4901 ft ²	7.996 in ²
Span (equivalent)	1158.64 in.	3.900 in.
Aspect Ratio	1.902	1.902
Rate of Taper		
Taper Ratio	0.165	0.165
Dihedral Angle, degrees	5°	5°
Incidence Angle, degrees	2°	2°
Aerodynamic Twist, degrees	-5°	-5°
Sweep Back Angles, degrees		
Leading Edge	55°	55°
Trailing Edge	-5°	-5°
Chords		
Root (Wing Sta. 0.0)	1036.84 in.	3.490 in.
Tip	170.83 in.	0.575 in.
Airfoil Section		
Root	t/c = 9.5% Camberred	t/c = 9.5% Camberred
Tip	t/c = 9.5% Camberred	t/c = 9.5% Camberred

TABLE 3. (CONTINUED)

MODEL COMPONENT: VERTICAL STABILIZER (V)

GENERAL DESCRIPTION: CENTERLINE VERTICAL STABILIZER FOR H-33 ORBITER

DRAWING NUMBER: _____

<u>DIMENSIONS:</u>	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
<u>EXPOSED DATA</u>		
Area	855 ft ²	1.395 in ²
Span	406.1 in	1.367 in
Aspect Ratio	1.33	1.33
Taper Ratio	0.392	0.392
Chords		
Root	427.8 in.	1.44 in.
Tip	167.86 in.	0.565 in.
Sweep Back Angles, degrees		
Leading Edge	46.5°	46.5°
Trailing Edge (From Vertical)	21.5°	21.5°
Airfoil Section		
Root	NACA 64A010	NACA 64A010
Tip	NACA 64A010	NACA 64A010

TABLE 3. (CONTINUED)

MODEL COMPONENT: S-IC CRADLE (C)

GENERAL DESCRIPTION: H-33/S-IC CRADLE ASSEMBLY (0.003366 SCALE)

DRAWING NUMBER: _____

<u>DIMENSIONS:</u>	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Length	1568 in.	5.278 in.
Max. Width	204.10 in.	0.687 in.
Max. Depth	204.10 in.	0.687 in.
Fineness Ratio	7.68	7.68
Max. Cross-Sectional Area	227.19 ft ²	0.0371 in ²

TABLE 3. (CONTINUED)

MODEL COMPONENT: DROP TANKS (T)

GENERAL DESCRIPTION: ORBITER EXTERNALLY MOUNTED DROP TANKS (0.003366 SCALE)

DRAWING NUMBER: _____

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u>	<u>MODEL SCALE</u>
Length	1225.49 in.	4.125 in.
Max. Width	178.55 in.	0.601 in.
Max. Depth DIA	178.55 in.	0.601 in.
Fineness Ratio	6.875	6.875

TABLE 3. (CONCLUDED)

MODEL COMPONENT: S-IC FIN (F)

GENERAL DESCRIPTION: 75 SQUARE FOOT S-IC FIN

FOUR USED, EACH ORIENTED ±45° OF HORIZONTAL REFERENCE PLANE

SCALE FACTOR 0.003366

DRAWING NUMBER: _____

<u>DIMENSIONS (EXPOSED):</u>	<u>FULL-SCALE</u>	<u>MODEL SCALE</u>
Area (Single Panel)	75.0 ft ²	0.850 in ²
Semi-Span (Max.)	139.274 in	0.469 in
Root Chord	135.410 in	0.456 in
Tip Chord	55.000 in.	0.185 in.
Taper Ratio	0.406	0.406
Aspect Ratio (Single Panel)	1.796	1.796
Sweep Back Angles, degrees		
Leading Edge	30°	30°
Trailing Edge	0°	0°
Trailing Edge Thickness		
At Root	13.512 in	0.045 in.
At Tip	4.000 in.	0.013 in.

TABLE 4. - INDEX OF MODEL FIGURES

<u>FIGURE NUMBER</u>		<u>PAGE NUMBER</u>
1.	Axis System	28
2.	S-IC/H-33 Grumman Orbiter	29
3.	H-33 Grumman Orbiter With S-IC Cradle	30
4.	Booster and Orbiter Plus Cradle Base Pressure Locations	31
5.	Orbiter Body Model Component (0)	32
6.	Grumman H-33 Orbiter Wing	33
7.	Grumman H-33 Orbiter Vertical Tail	34
8.	Grumman H-33 Orbiter/S-IC Cradle Assembly	35
9.	S-IC Engine Shroud and 75 Sq. Ft. Fin	36
10.	Photograph of Model Installed in MSFC 14" TWT (Side View)	37
11.	Photograph of Model Installed in MSFC 14" TWT (3/4 Side View)	38
12.	MSFC 14" TWT Installation Photograph	39

TABLE 5, INDEX OF DATA FIGURES

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
S-IC Grumman H-33 Drop Tank Orbiter Longitudinal Stability	A	Mach Number	1-90
S-IC Grumman H-33 Drop Tank Orbiter Quartering Wind Alpha Data	A	Roll Angle	91-120
S-IC/Grumman H-33 Drop Tank Orbiter Quartering Wind Beta Data	B	Roll Angle	121-155
S-IC/Grumman H-33 Drop Tank Orbiter Quartering Wind Beta Data	C	Roll Angle	156-160
S-IC/Grumman H-33 Drop Tank Orbiter Lateral Directional Stability	B	Mach Number	161-258
S-IC/Grumman H-33 Drop Tank Orbiter Longitudinal Stability Alpha or CN = 0.0	D	Configuration	259-318
S-IC/Grumman H-33 Drop Tank Orbiter Lateral Stability Beta = 0.0	E	Configuration	319-346
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Incidence Angle	F	Wing Incidence	347-352
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Incidence	G	Mach Number	353-356
Effect of Tanks on Orbiter Incidence	G	Mach Number	357-364
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster	H	Mach Number	365-372

TABLE 5 (CONTINUED)

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster	I	Mach Number	373-382
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fin Orientation	H	Mach Number	383-390
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fin Orientation	I	Mach Number	391-400
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Drop Tanks	H	Mach Number	401-408
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Drop Tanks	I	Mach Number	409-418
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fins	H	Mach Number	419-422
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fins	I	Mach Number	423-427
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Wing	H	Mach Number	428-435
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Wing	I	Mach Number	436-445
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Vertical Tail	I	Mach Number	446-455
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Vertical Tail	I	Mach Number	456-460
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster	J	Configuration	461-466

55

55

TABLE 5 (CONTINUED)

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster	K	Configuration	467-469
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fin Orientation	J	Configuration	470-475
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fin Orientation	K	Configuration	476-478
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Drop Tanks	J	Configuration	479-484
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Drop Tanks	K	Configuration	485-487
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fins	J	Configuration	488-493
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Booster Fins	K	Configuration	494-496
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Wing	J	Configuration	497-502
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Wing	K	Configuration	503-505
S-IC/Grumman H-33 Drop Tank Orbiter Effect of Orbiter Vertical Tail	K	Configuration	506-508

TABLE 5 (CONTINUED)

PLOTTED COEFFICIENTS SCHEDULE:

<u>A</u>		<u>B</u>		<u>C</u>		<u>D</u>		<u>E</u>	
CN	vs. a	CY	vs. β	β	vs. a	CP/D	vs. M	YCP/D	vs. M
CLM	vs. a	CYN	vs. β			CNAFO	vs. M	DCY/DBETA	vs. M
CA	vs. a	CBL	vs. β			CLMAFO	vs. M	DCYN/DBETA	vs. M
CAF	vs. a	CA	vs. β			CNAAFO	vs. M	DCBL/DBETA	vs. M
CAB	vs. a	CAF	vs. β			CMAAFO	vs. M		
DCLM/DCN	vs. a	CAB	vs. β			CAAFO	vs. M		
		DCYN/DCY	vs. β			CAFAFO	vs. M		
						CABAFO	vs. M		
						ALFCNO	vs. M		
						CLMCNO	vs. M		
<u>F</u>		<u>G</u>		<u>H</u>		<u>I</u>			
CLMAFO	vs. M	CNAFO	vs. WNGINC	DCN	vs. a	DCY	vs. β		
CNAFO	vs. M	CLMAFO	vs. WNGINC	DCLM	vs. a	DCYN	vs. β		
CLMCNO	vs. M	CAAFO	vs. WNGINC	DCA	vs. a	DCBL	vs. β		
CAAFO	vs. M	CLMCNO	vs. WNGINC	DCAF	vs. a	DCA	vs. β		
ALFCNO	vs. M					DCAF	vs. β		
CP/D	vs. M								
<u>J</u>		<u>K</u>							
DCN(ALPHA=0)	vs. M	DCYB	vs. M						
DCLM(ALPHA=0)	vs. M	DCYNB	vs. M						
DCA(ALPHA=0)	vs. M	DCBLB	vs. M						
DCAF(ALPHA=0)	vs. M								
DCNA(ALPHA=0)	vs. M								
DCLMA(ALPHA=0)	vs. M								

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27

Notes:

1. Positive directions of force coefficients, moment coefficients, and angles are indicated by arrows.
2. For clarity, origins of wind and stability axes have been displaced from the center of gravity.

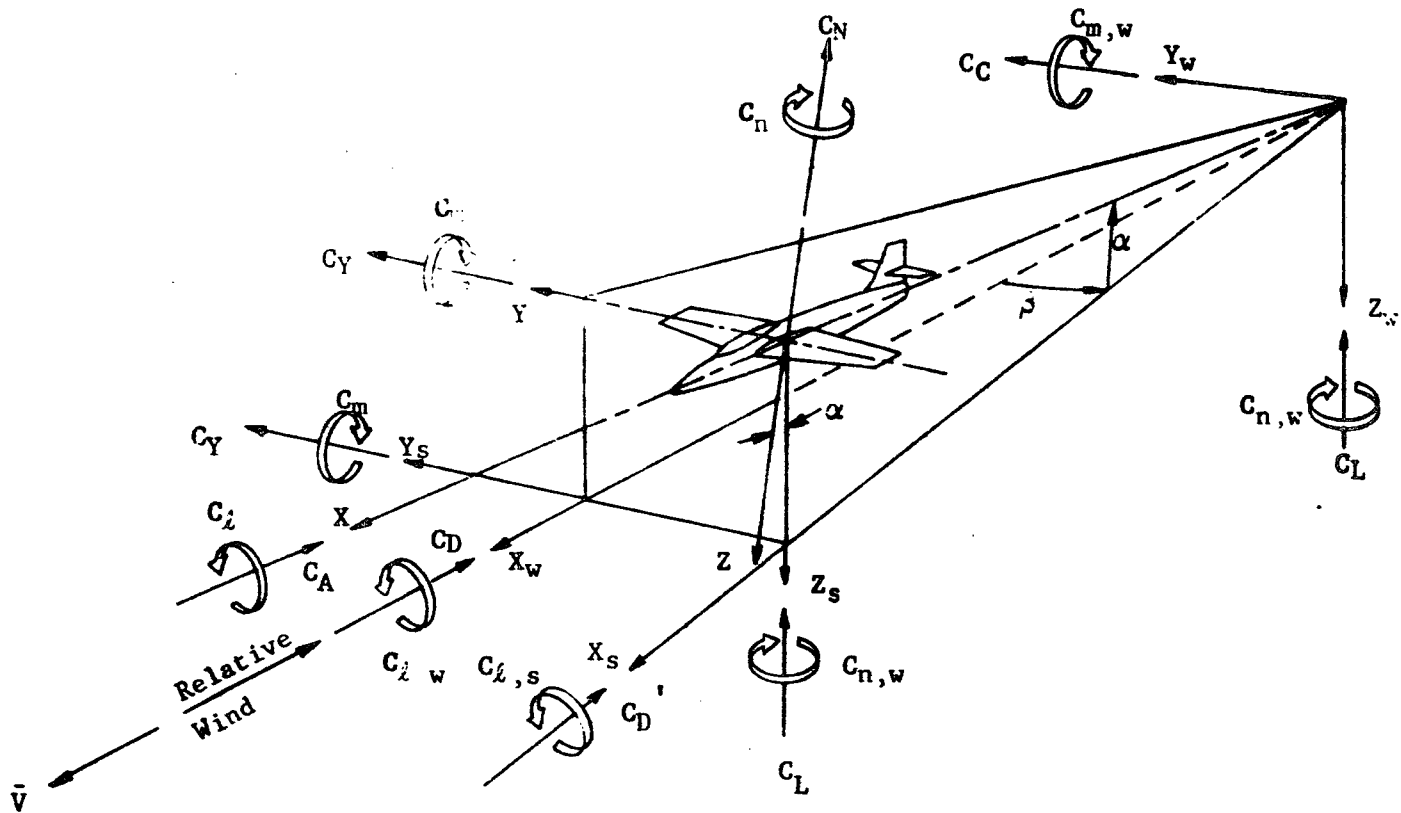


Figure 1. Axis systems, showing direction and sense of force and moment coefficients, angle of attack, and sideslip angle

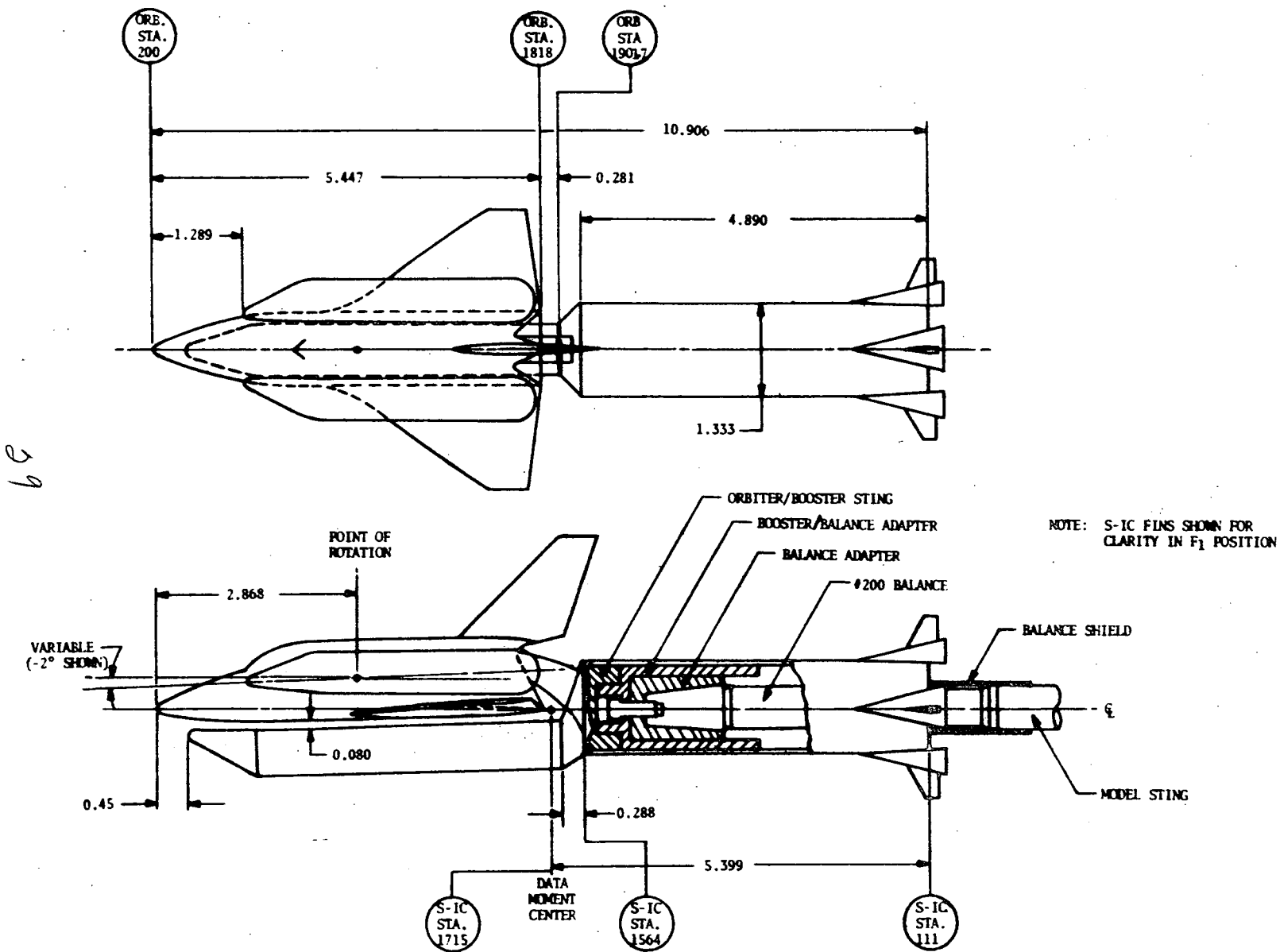


Figure 2. S-IC/H-33 Grumman Orbiter

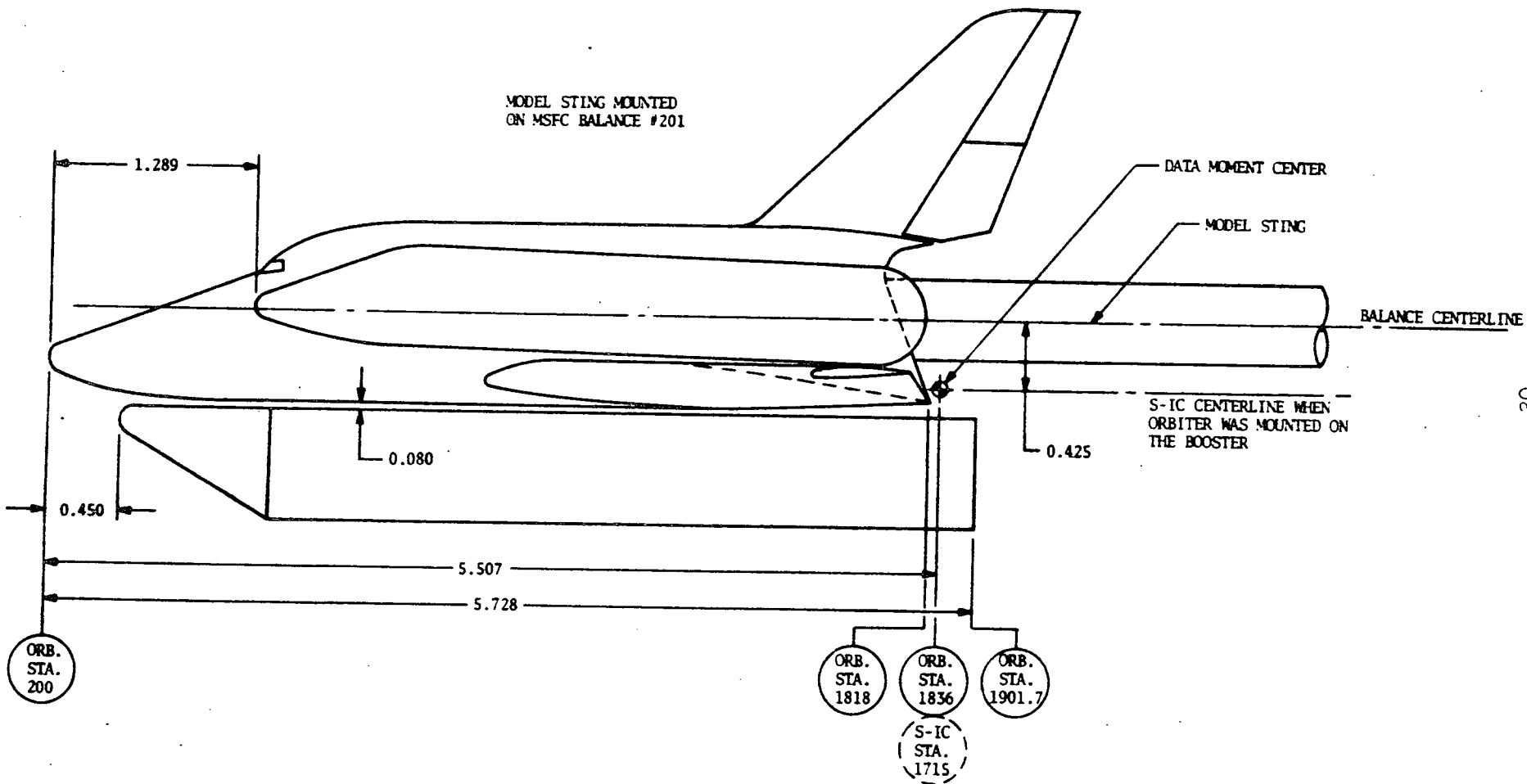


FIGURE 3. H-33 GRUMMAN ORBITER WITH S-IC CRADLE

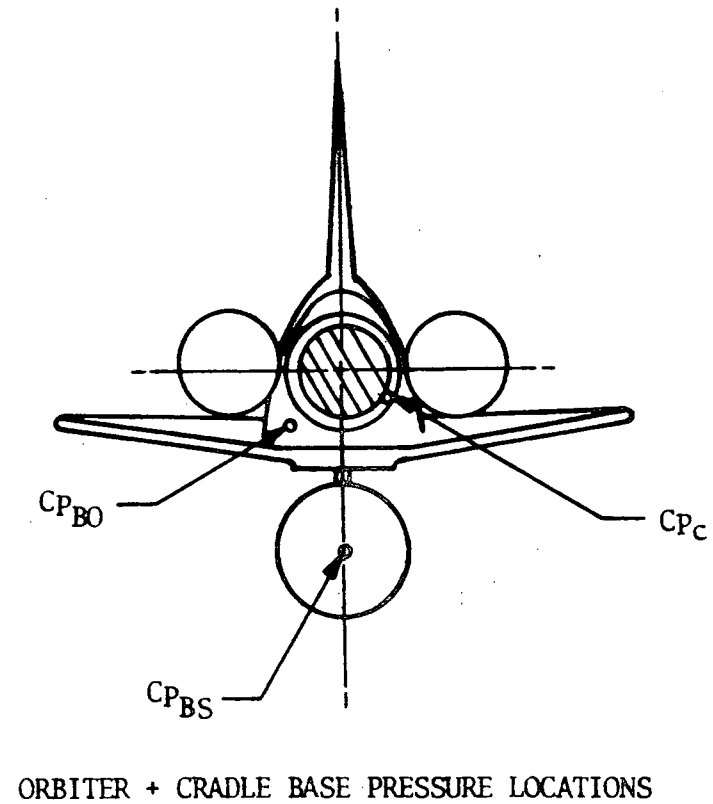
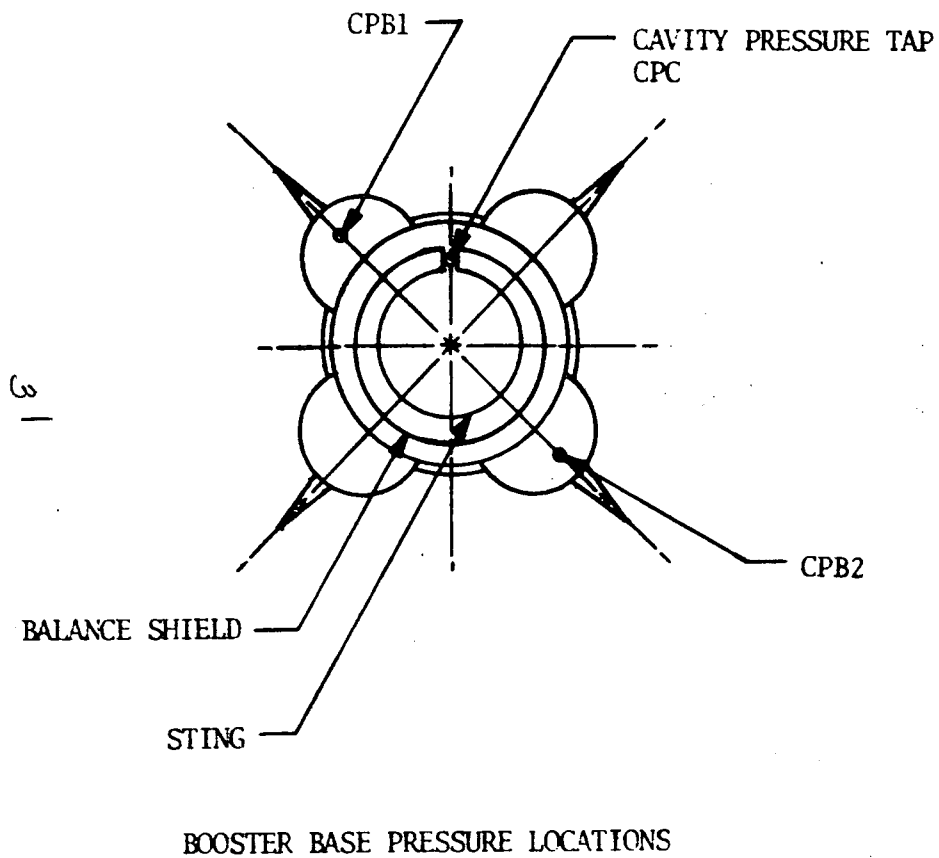
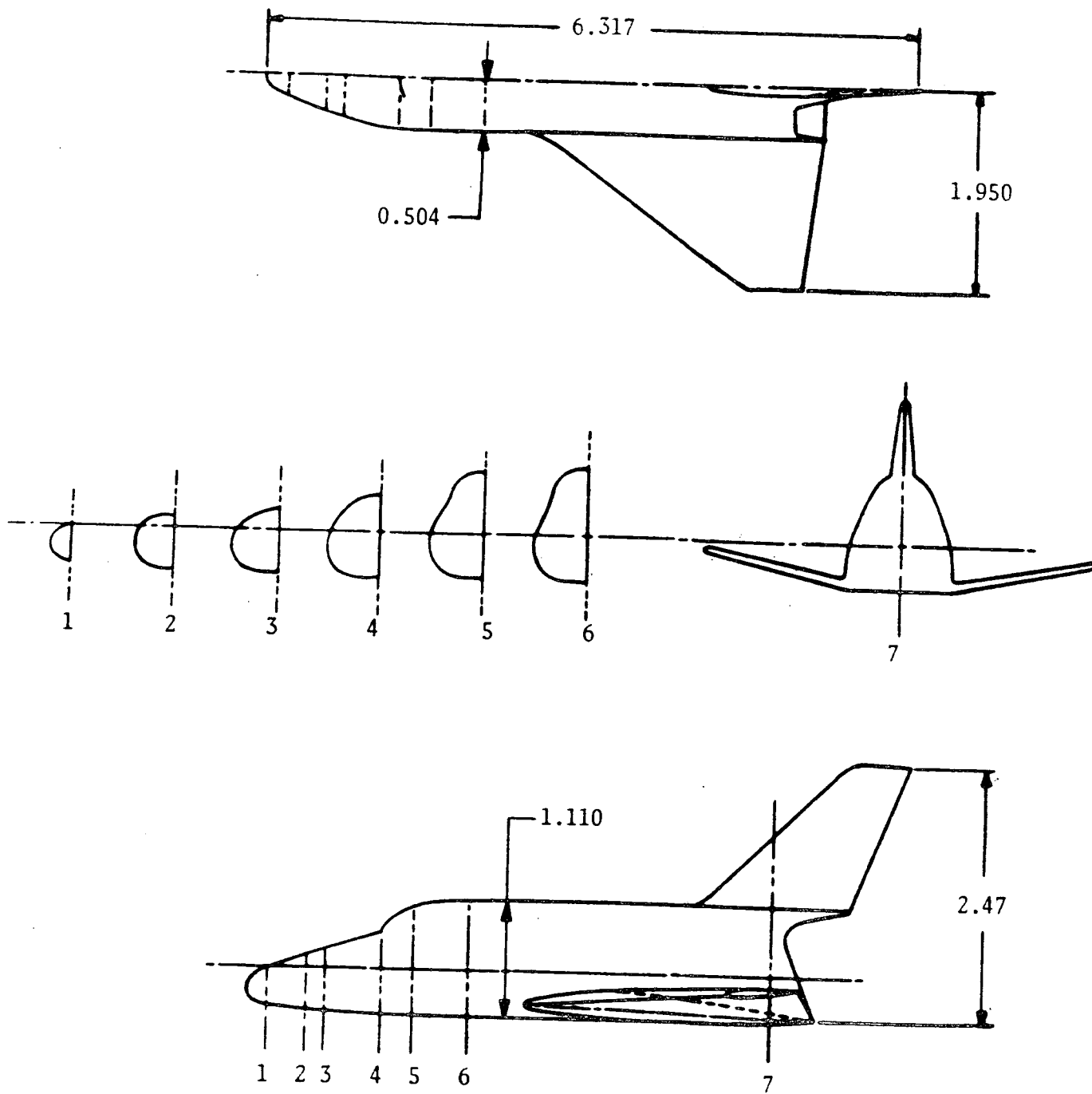


Figure 4. Booster and Orbiter Plus Cradle Base Pressure Locations



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Figure 5. Orbiter Body Model Component (0)

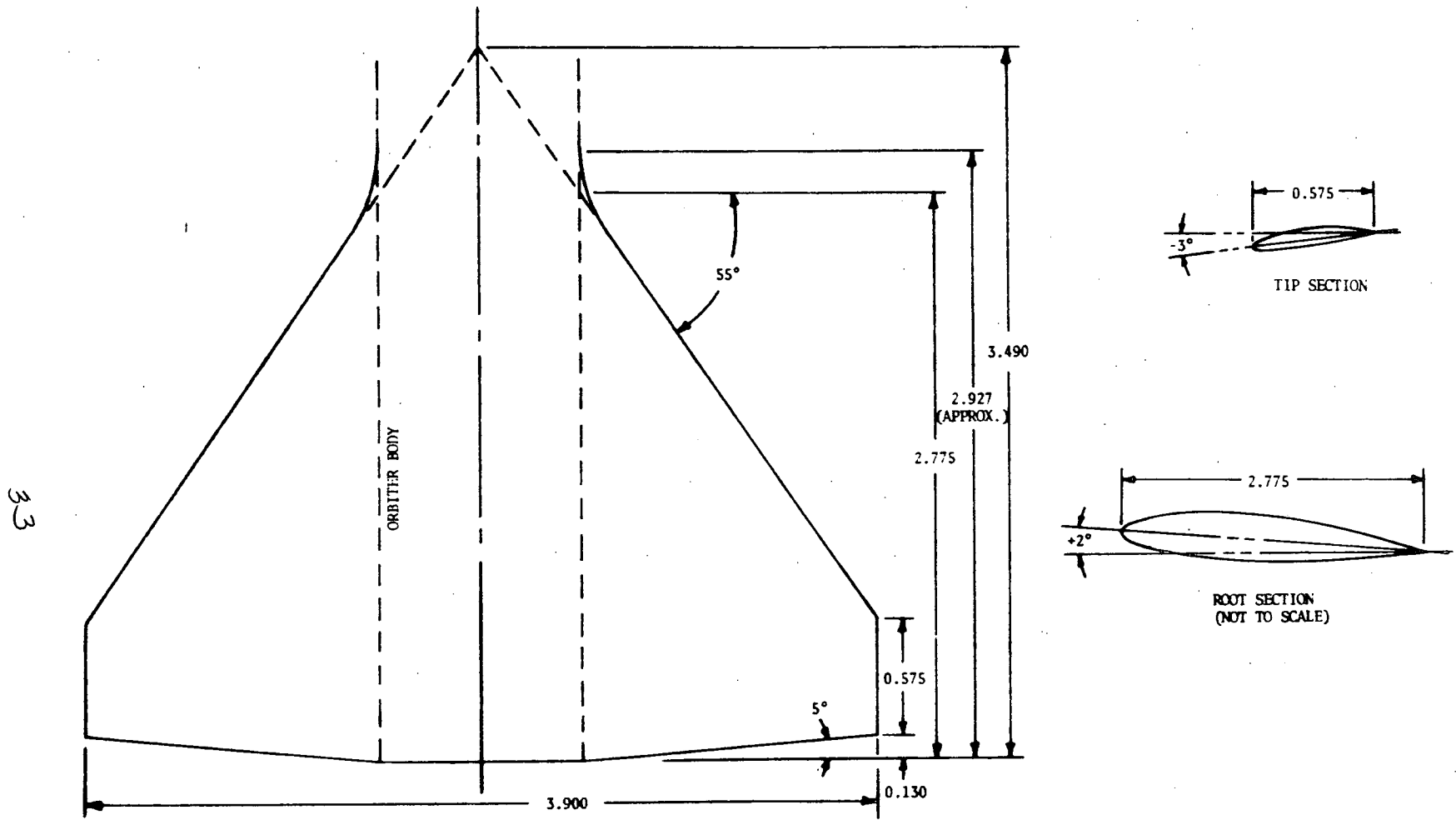


Figure 6. Grumman H-33 Orbiter Wing

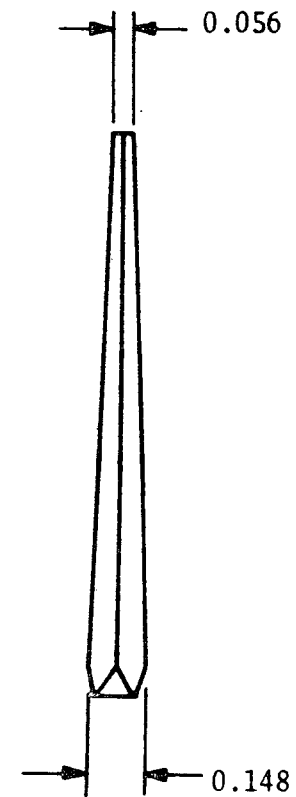
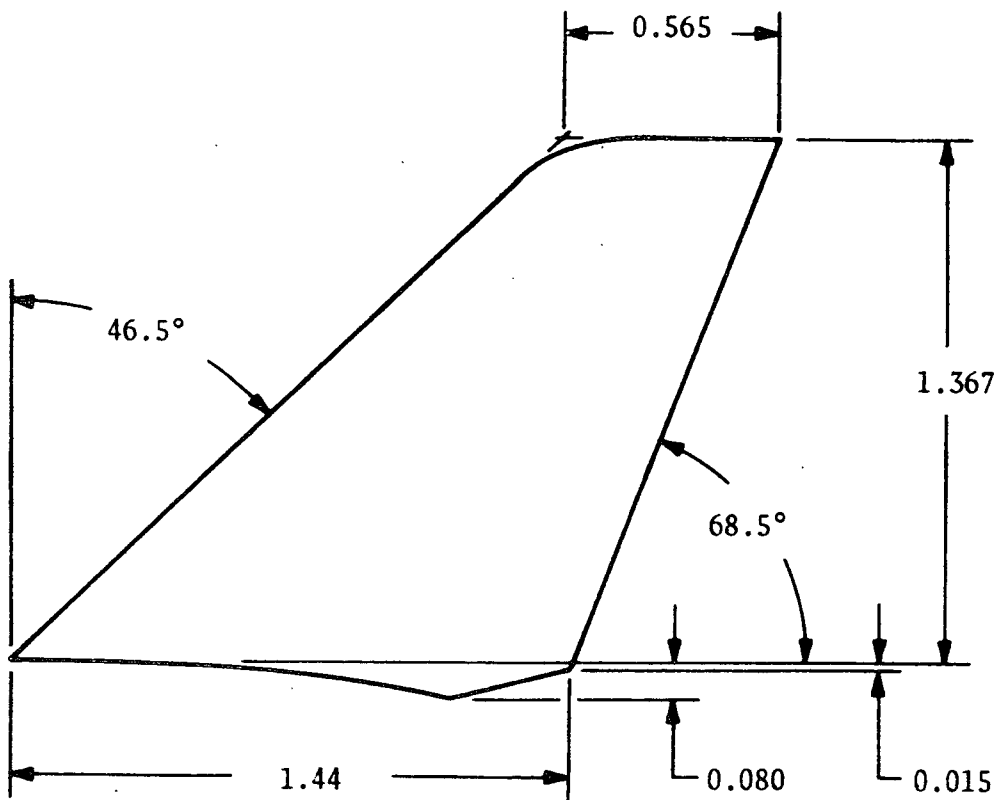
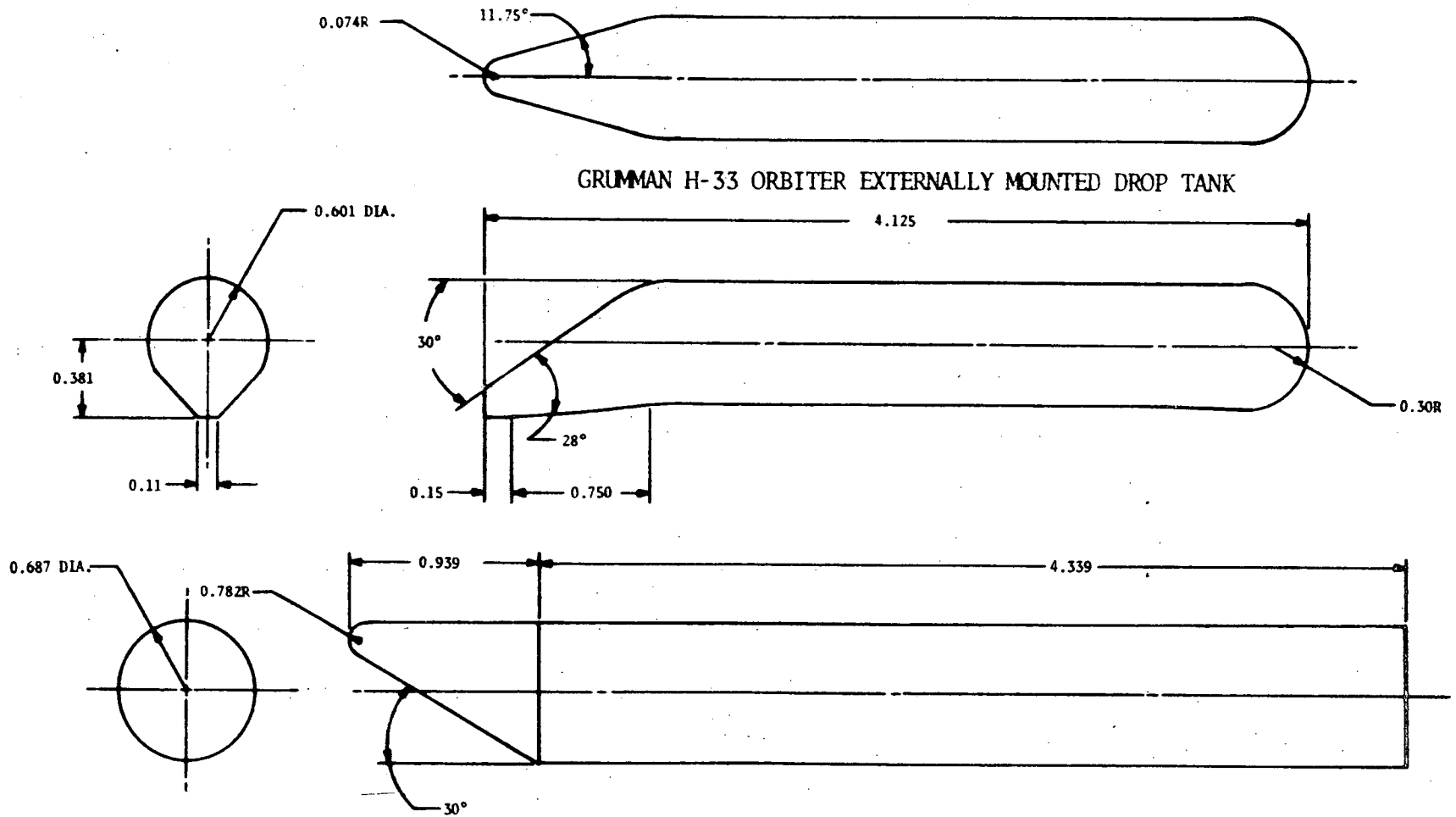


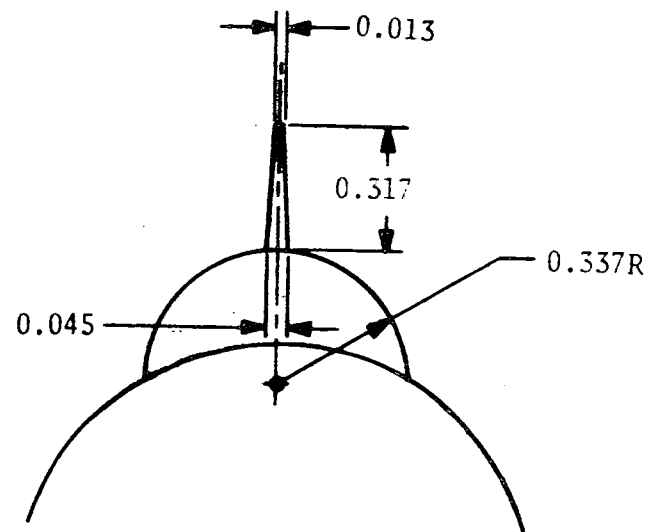
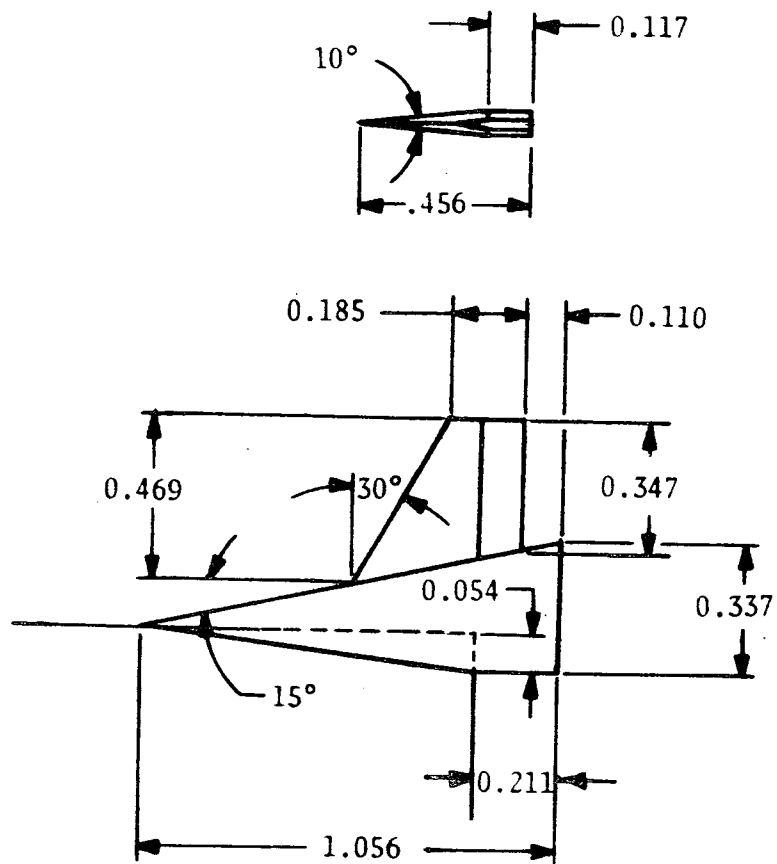
FIGURE 7. GRUMMAN H-33 ORBITER VERTICAL TAIL



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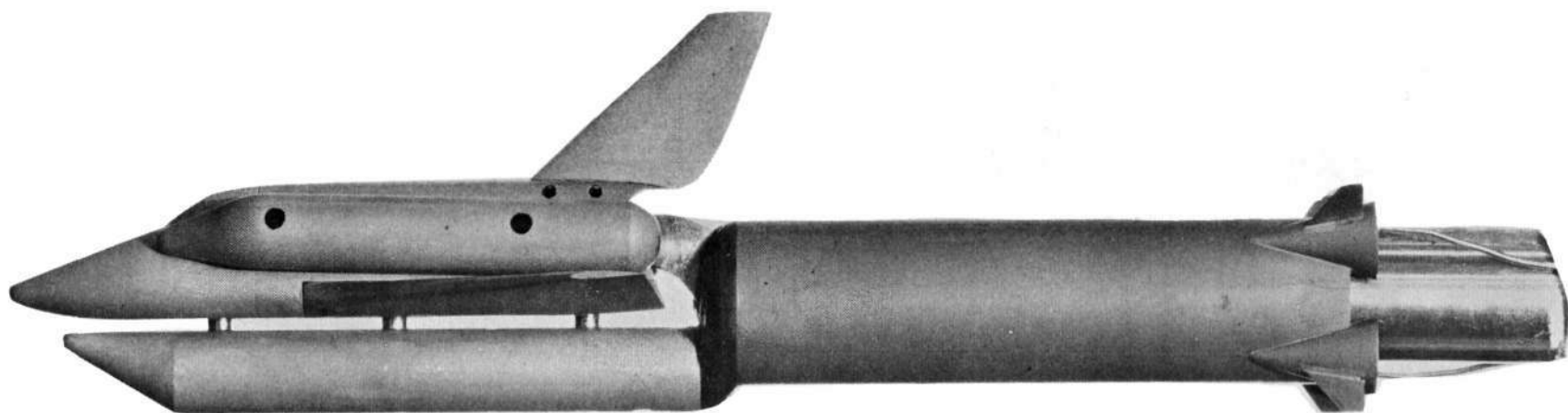
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Figure 8. Grumman H-33 Orbiter/S-IC Cradle Assembly



96

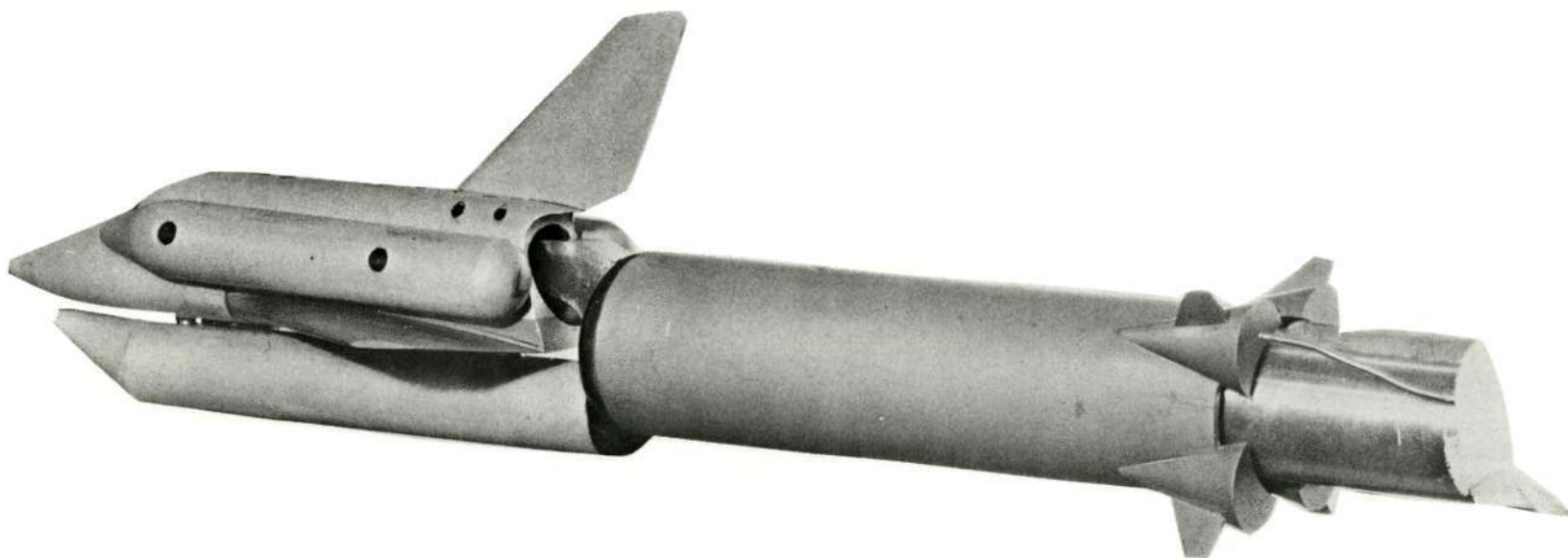
FIGURE 9. S-IC ENGINE SHROUD AND 75 SQ. FT. FIN



MSFC TWT 502
SEPT 8 1971
CONFIG
OWVTCBF



Figure 10. Photograph of Model Installed in MSFC
14" TWT (Side View)



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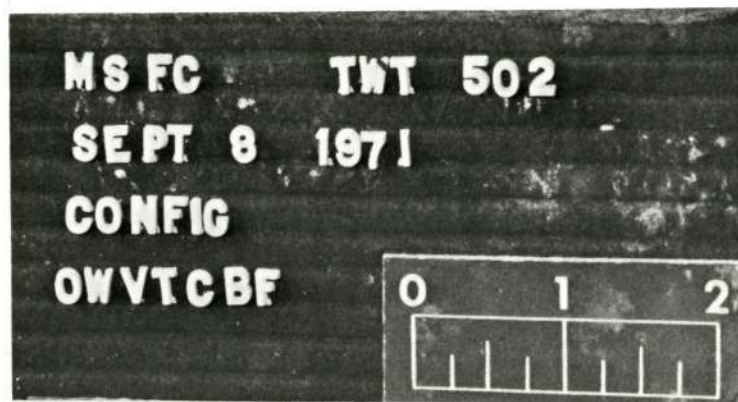
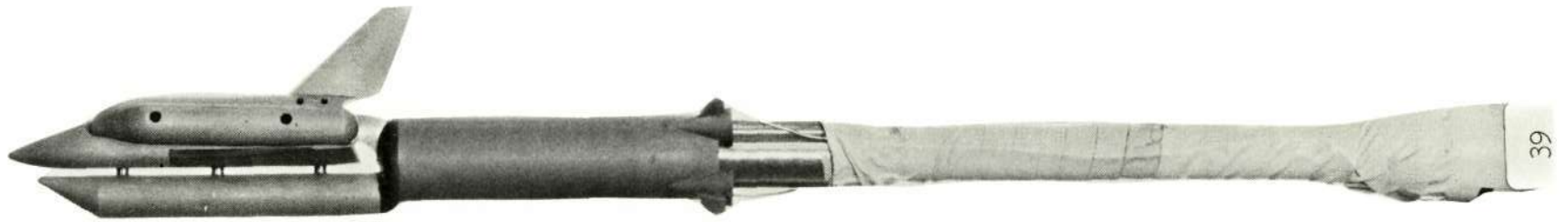


Figure 11. Photograph of Model Installed in MSFC
14" TWT (3/4 Side View)



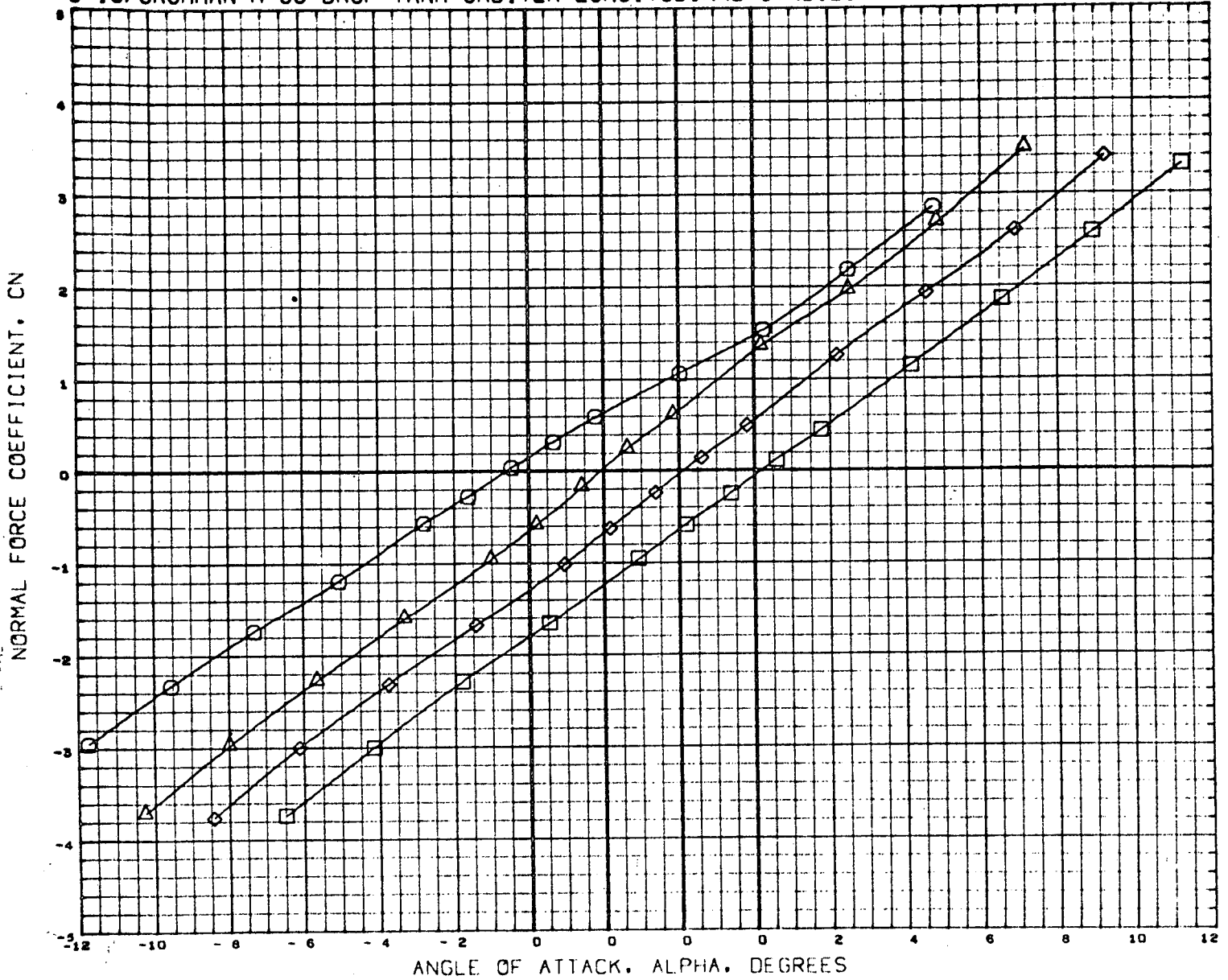
MSFC TWT 502
SEPT 8 1971
CONFIG
OWVTCBF

0	1	2

Figure 12. MSFC 14" TWT Installation Photograph

D A T A F I G U R E S

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

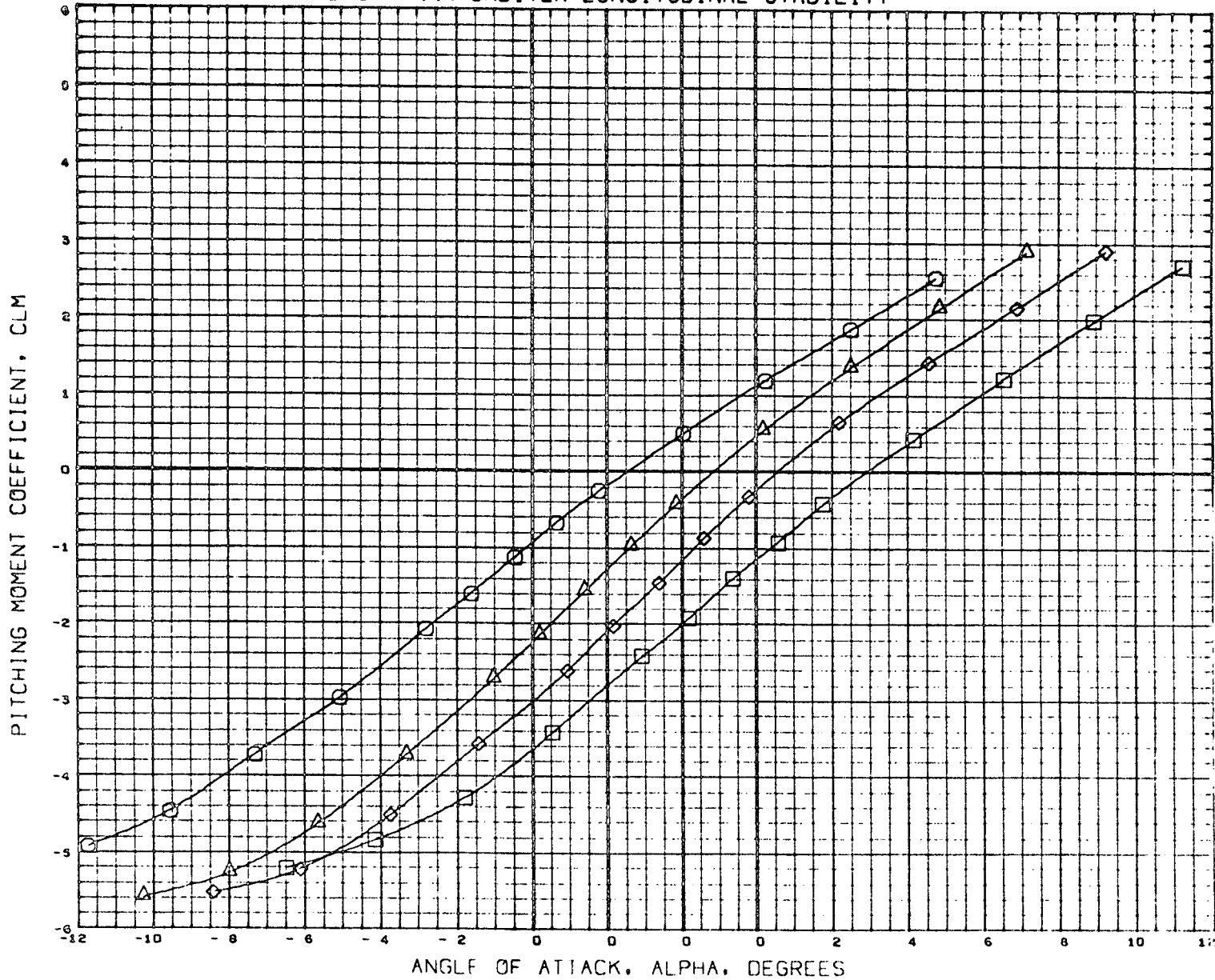


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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

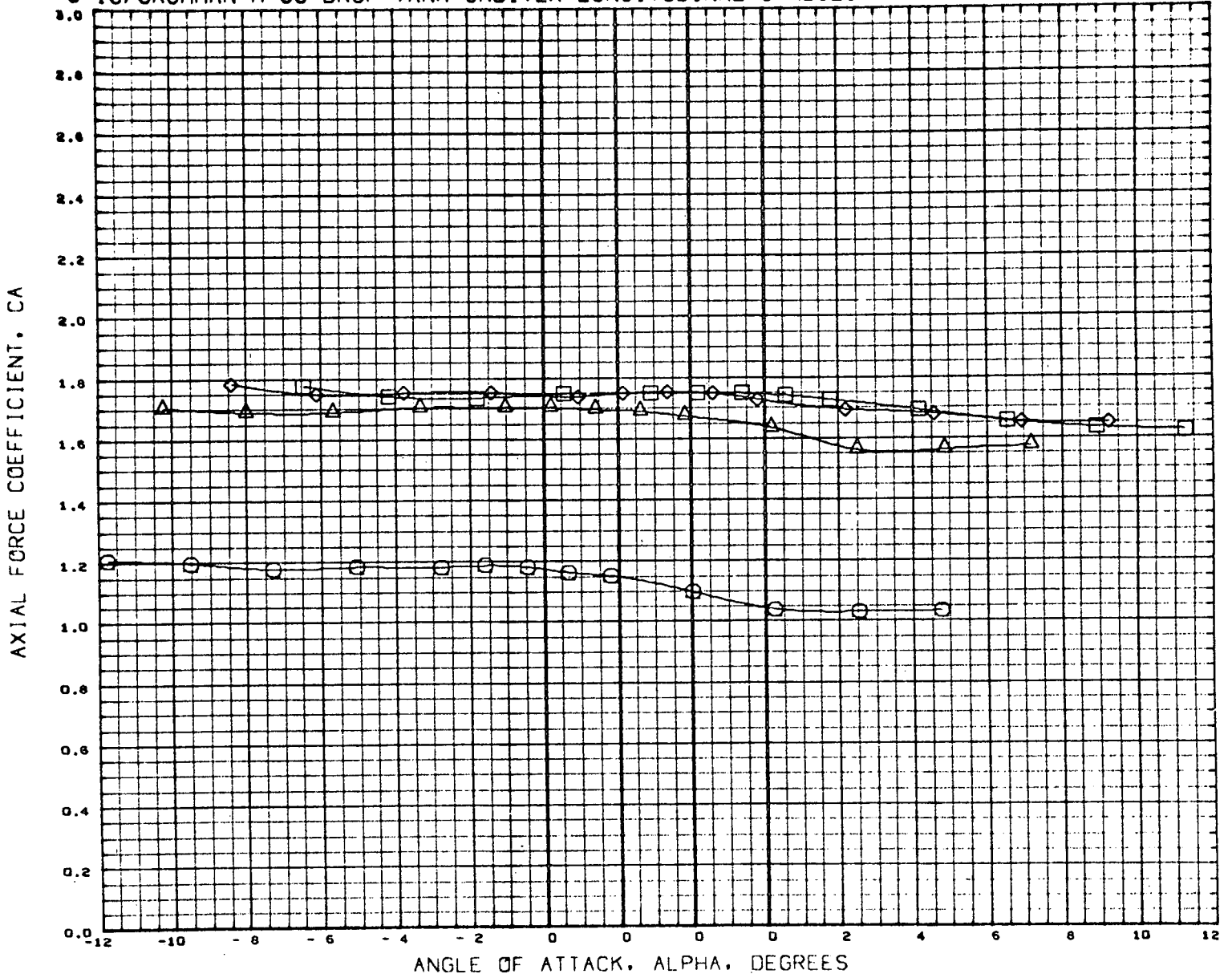


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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



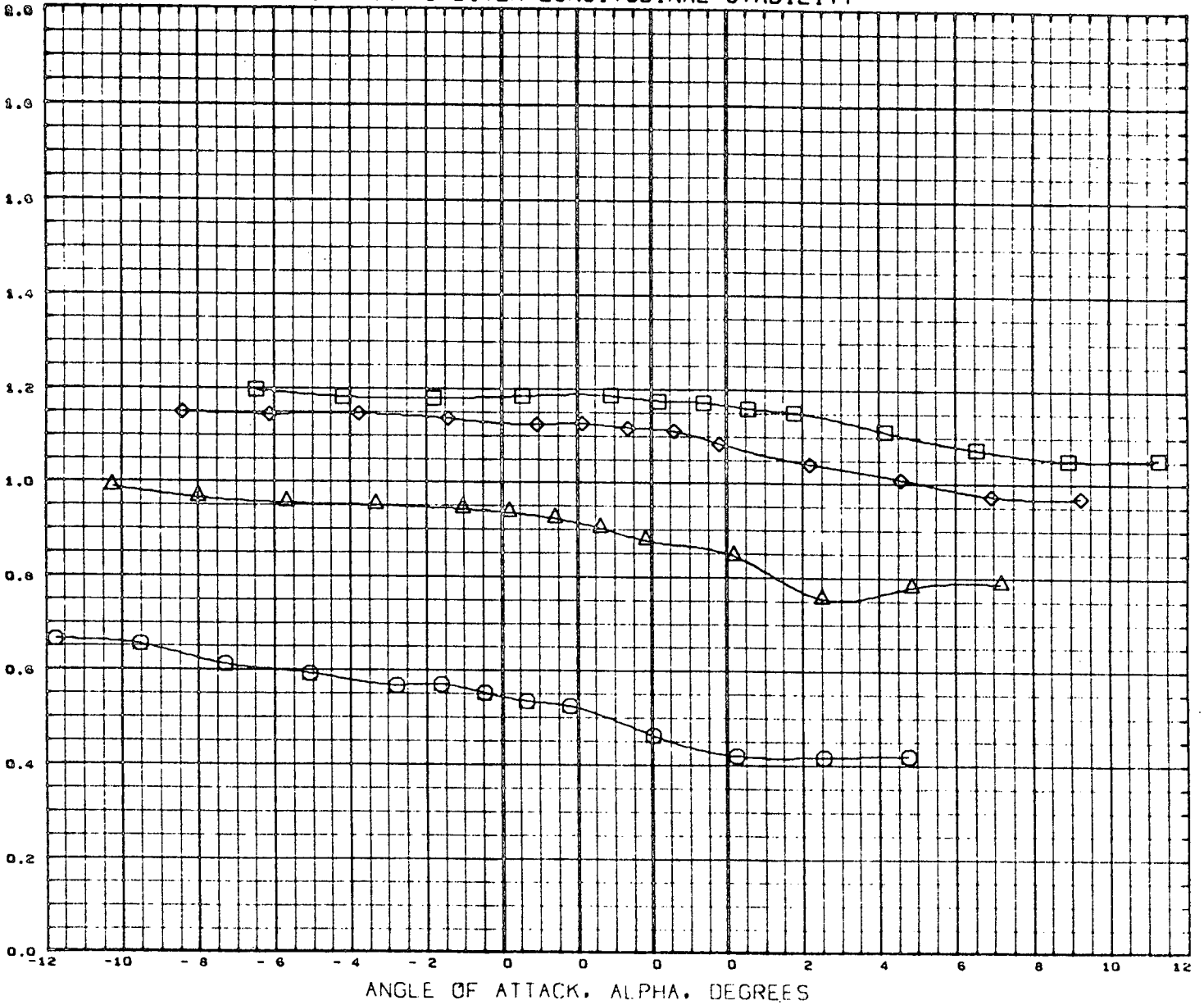
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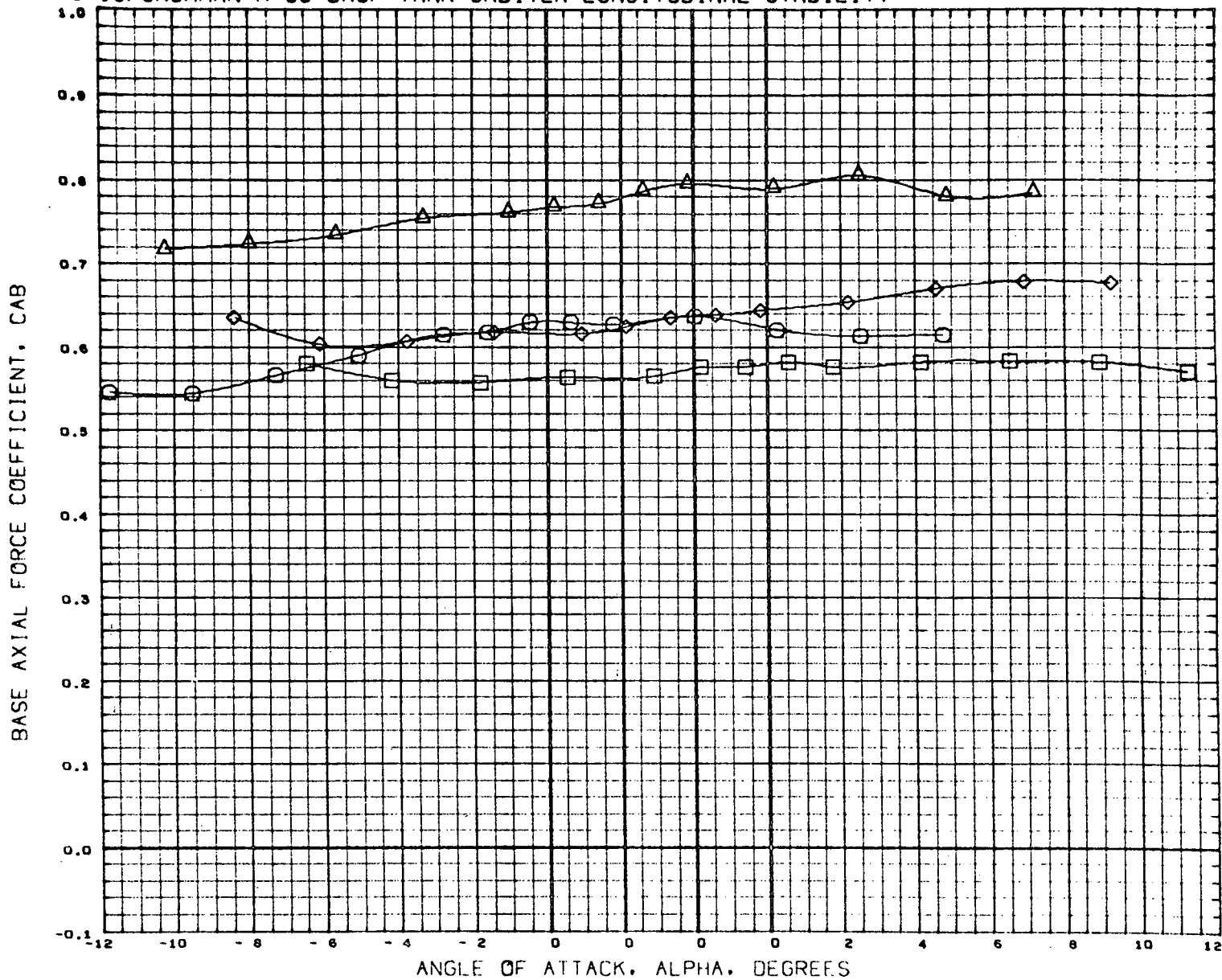
FOREBODY AXIAL FORCE COEFFICIENT, C_{AF}



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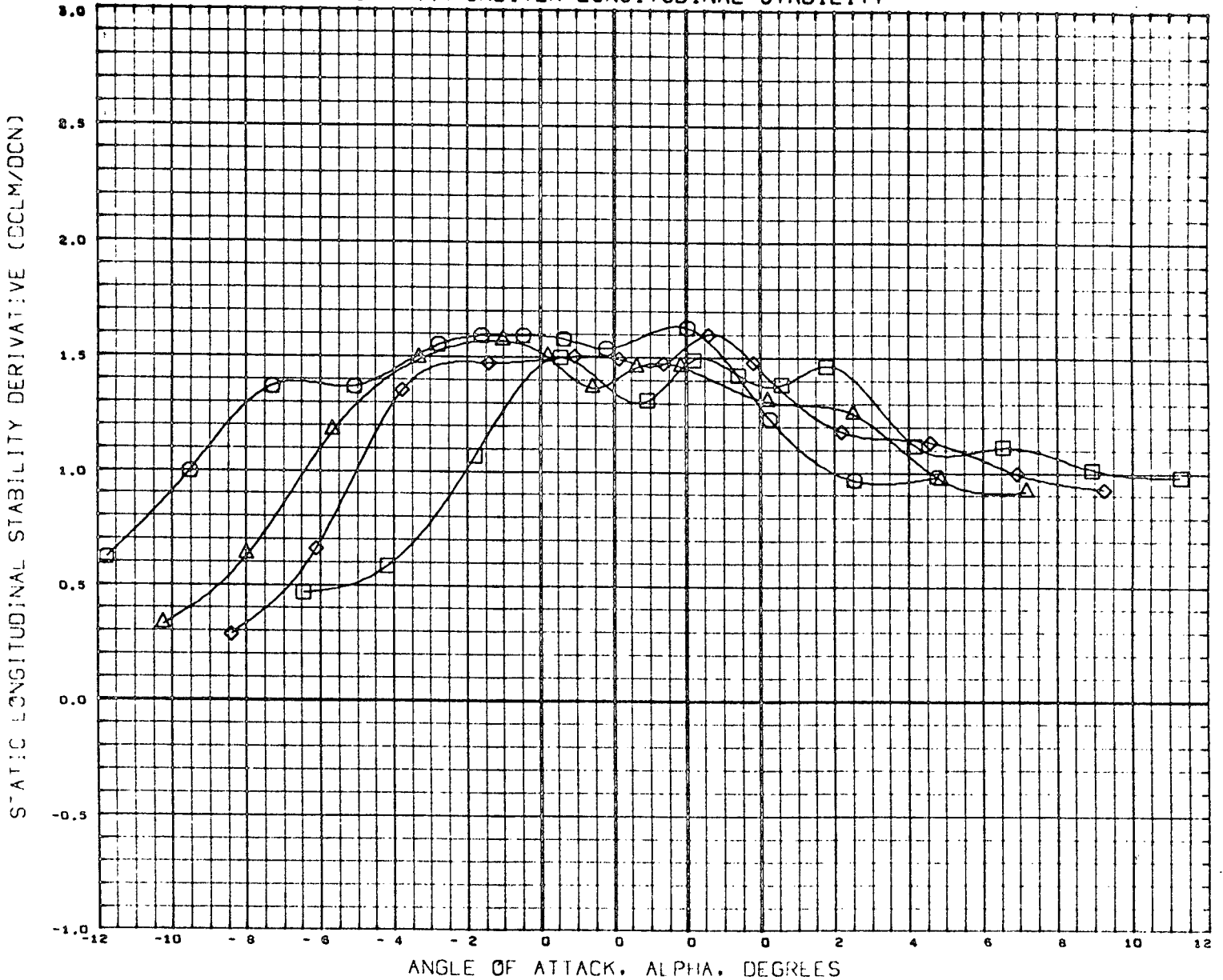


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ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



ANGLE OF ATTACK, ALPHA, DEGREES

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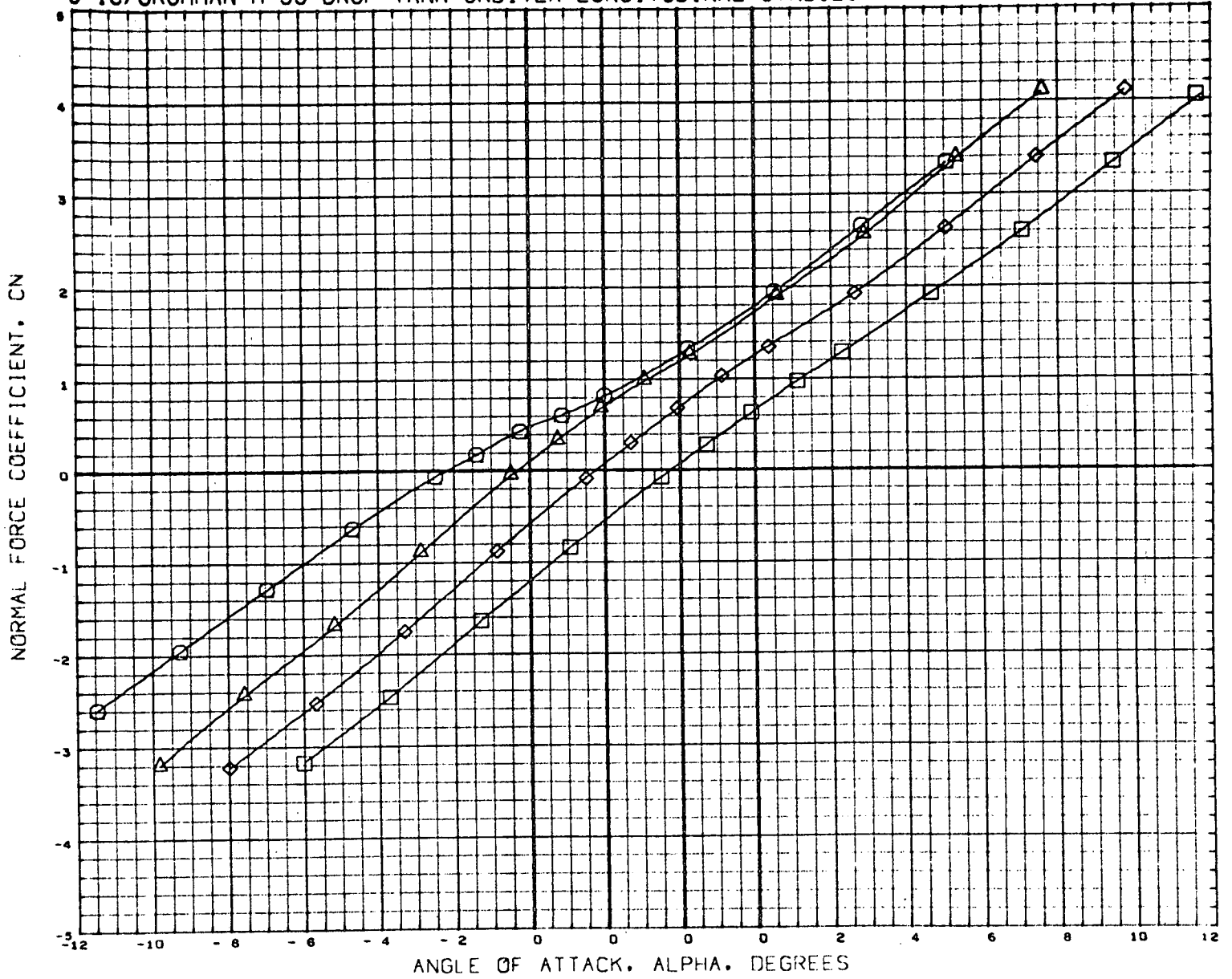
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(C44031) 12 MAY 72

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6

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

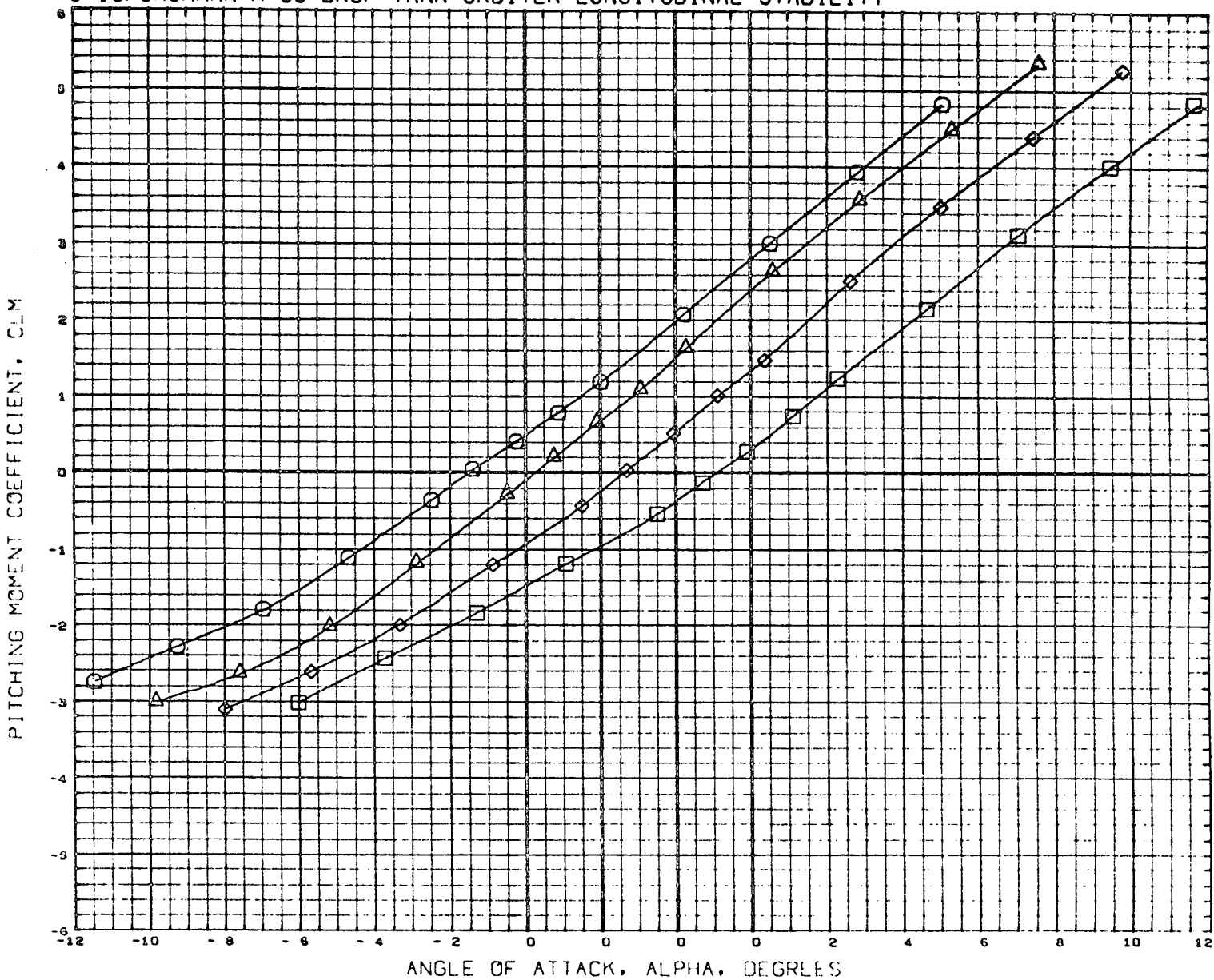


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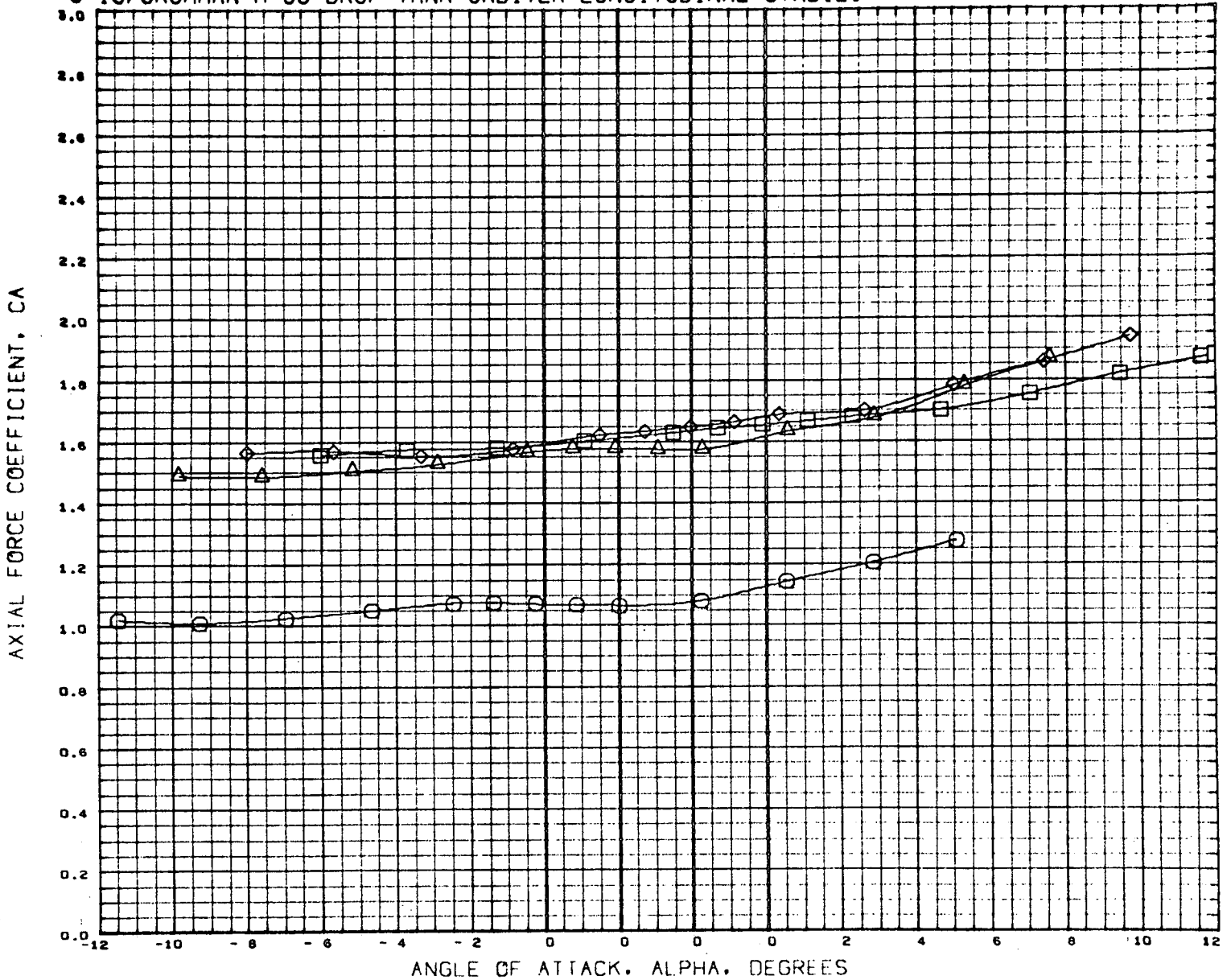


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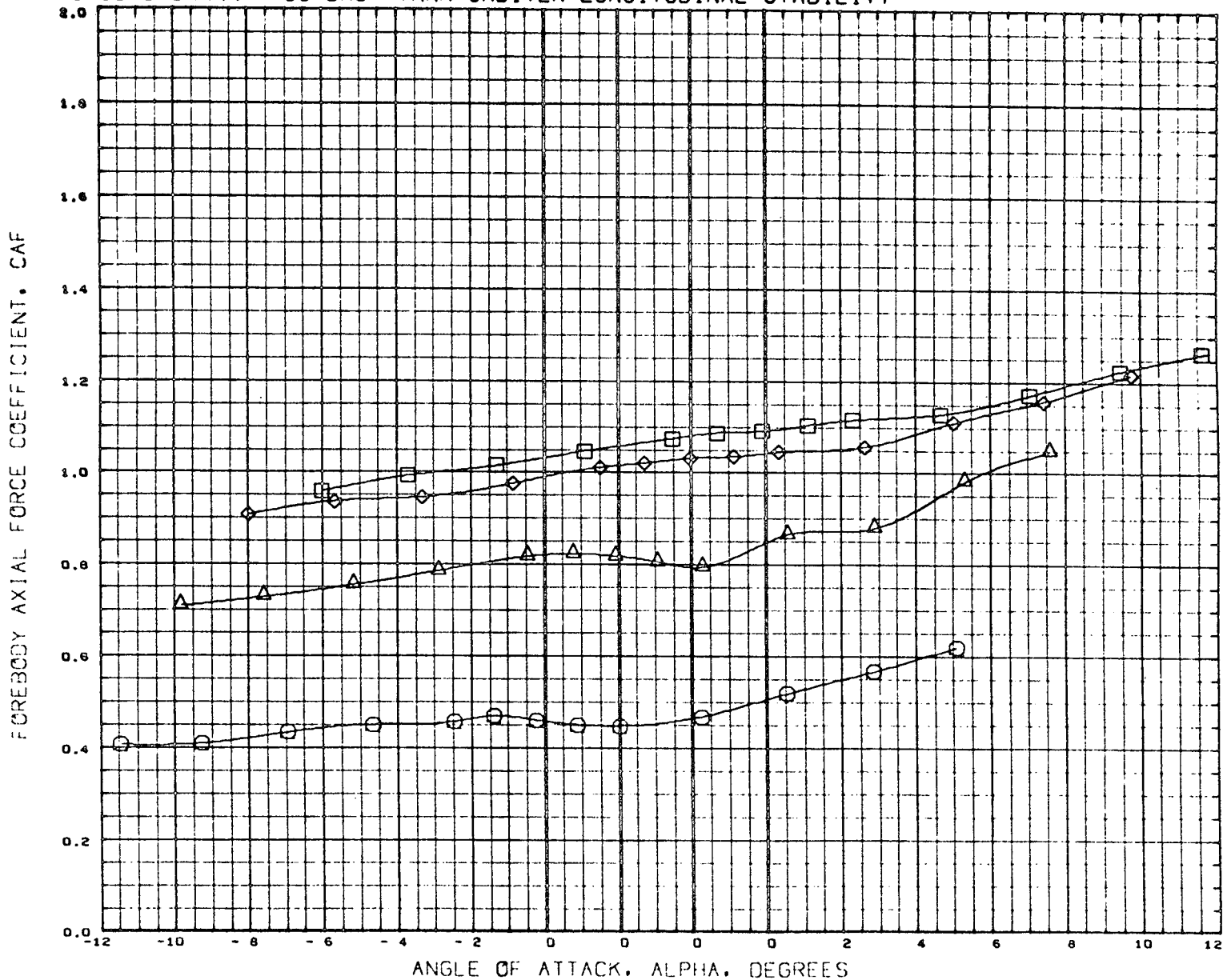
MSC2-MSFC-S1C, H-33 ORBITER

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(C44011) 12 MAY 72

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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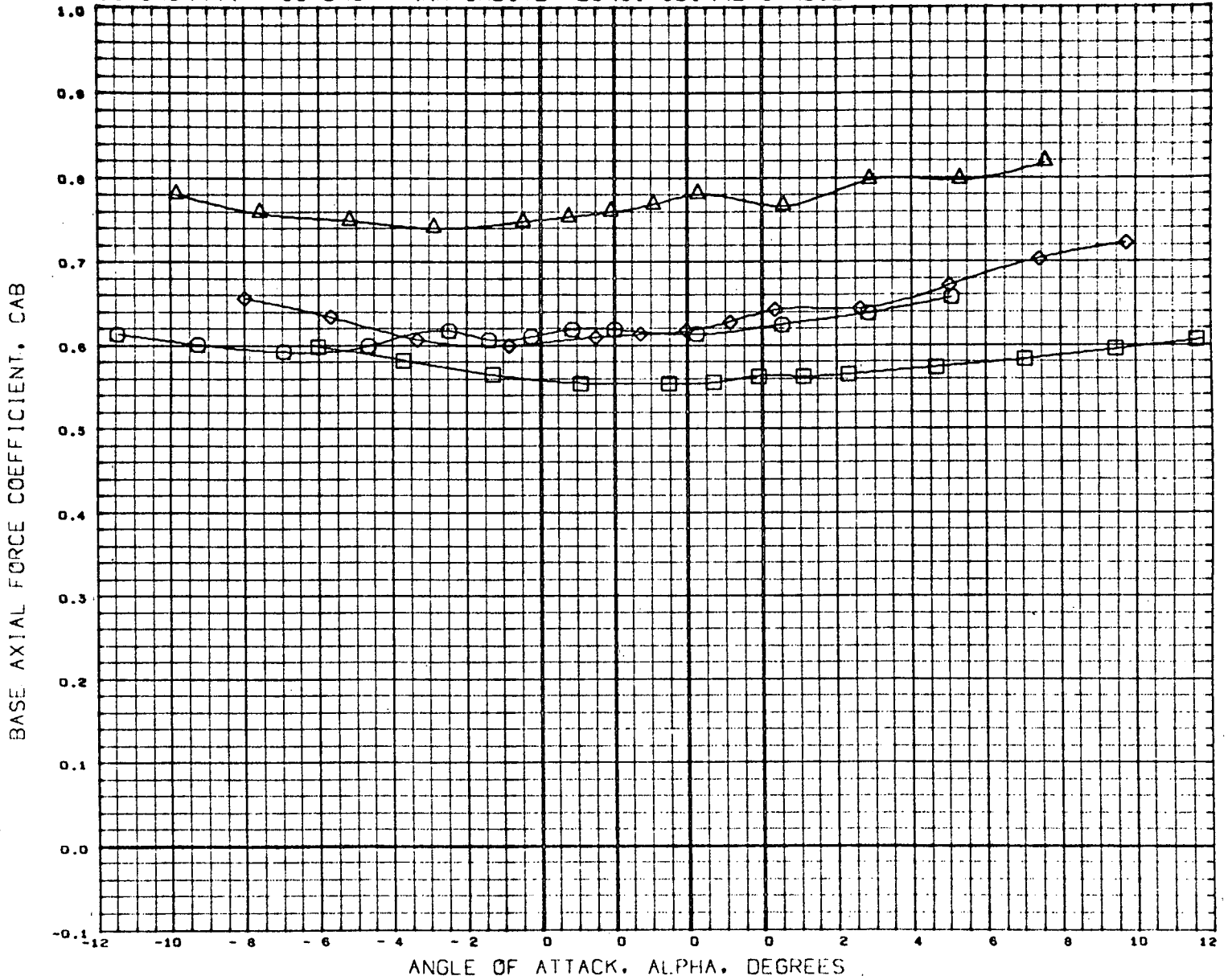
MS32 MS-C SIC H-33 ORBITER

OWVICBF

(C44011) 12 MAY 72

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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◇	0.999	WNGINC	1.240		
○	1.097				
□	1.199				

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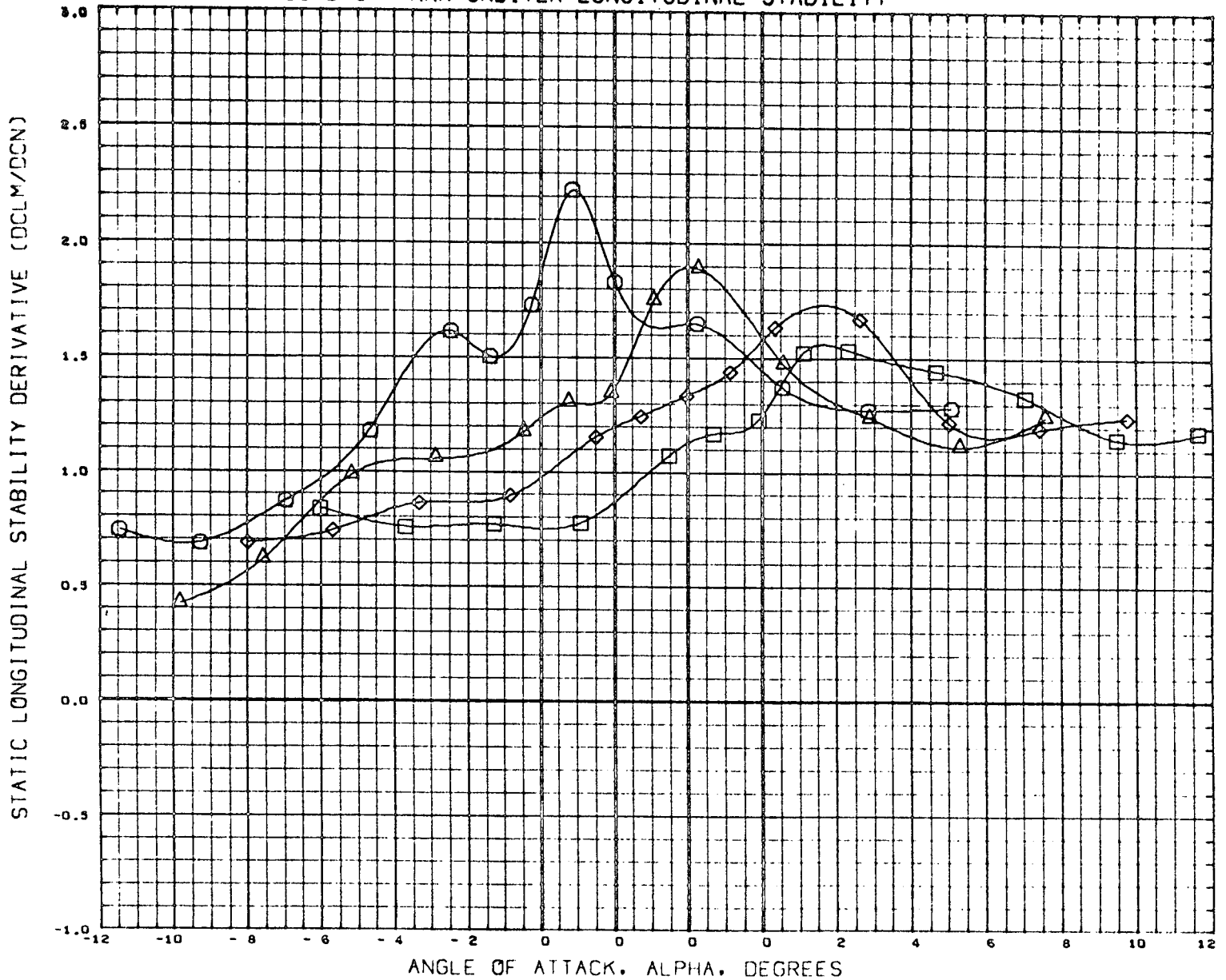
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12 MAY 72

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

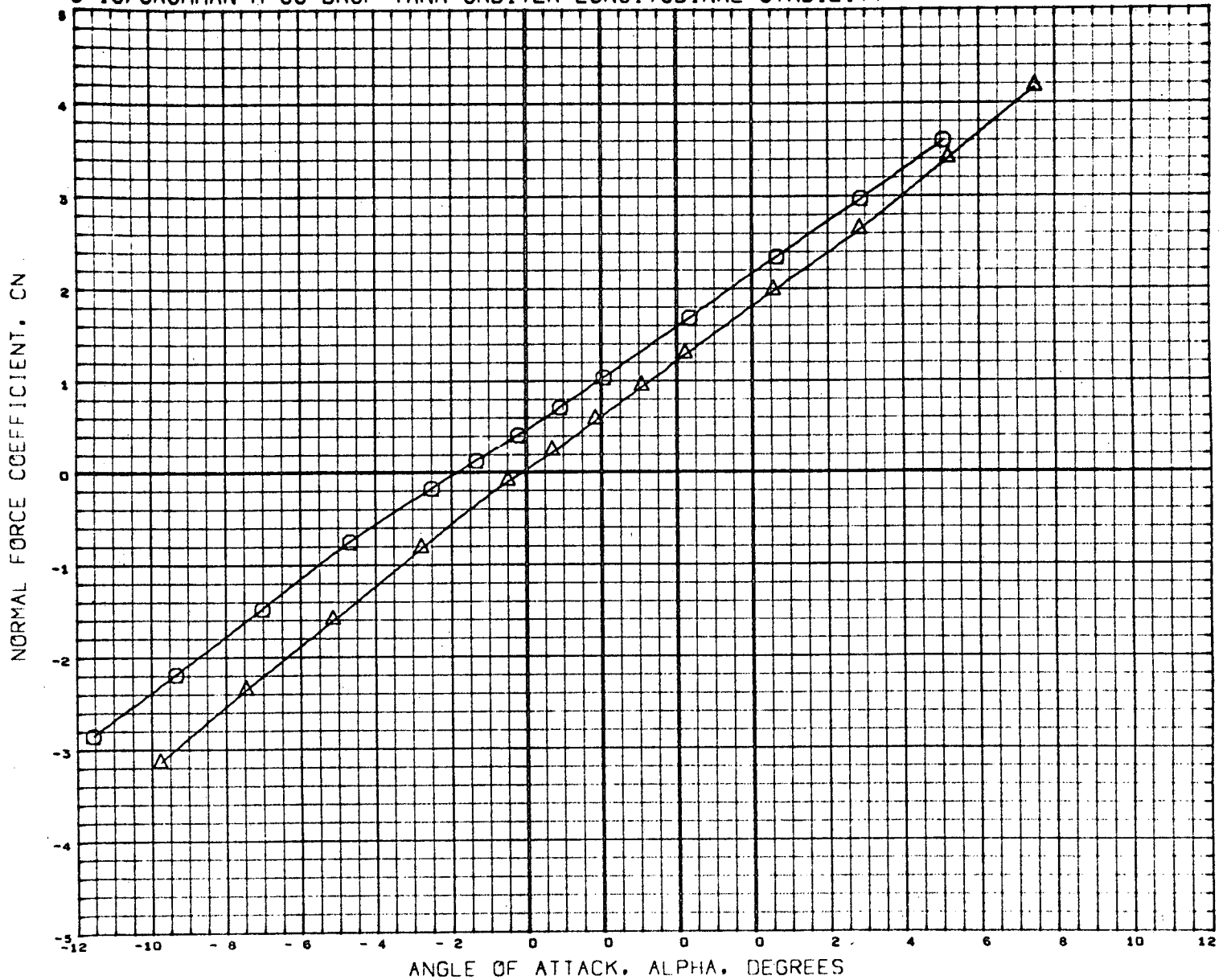


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○	0.999	BETA	0.000	PHI 0.000
△	0.999	WNGINC	1.240	
◇	1.097			
□	1.199			

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
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△	0.999	WINGINC	1.240		

REFERENCE INFORMATION		
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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER

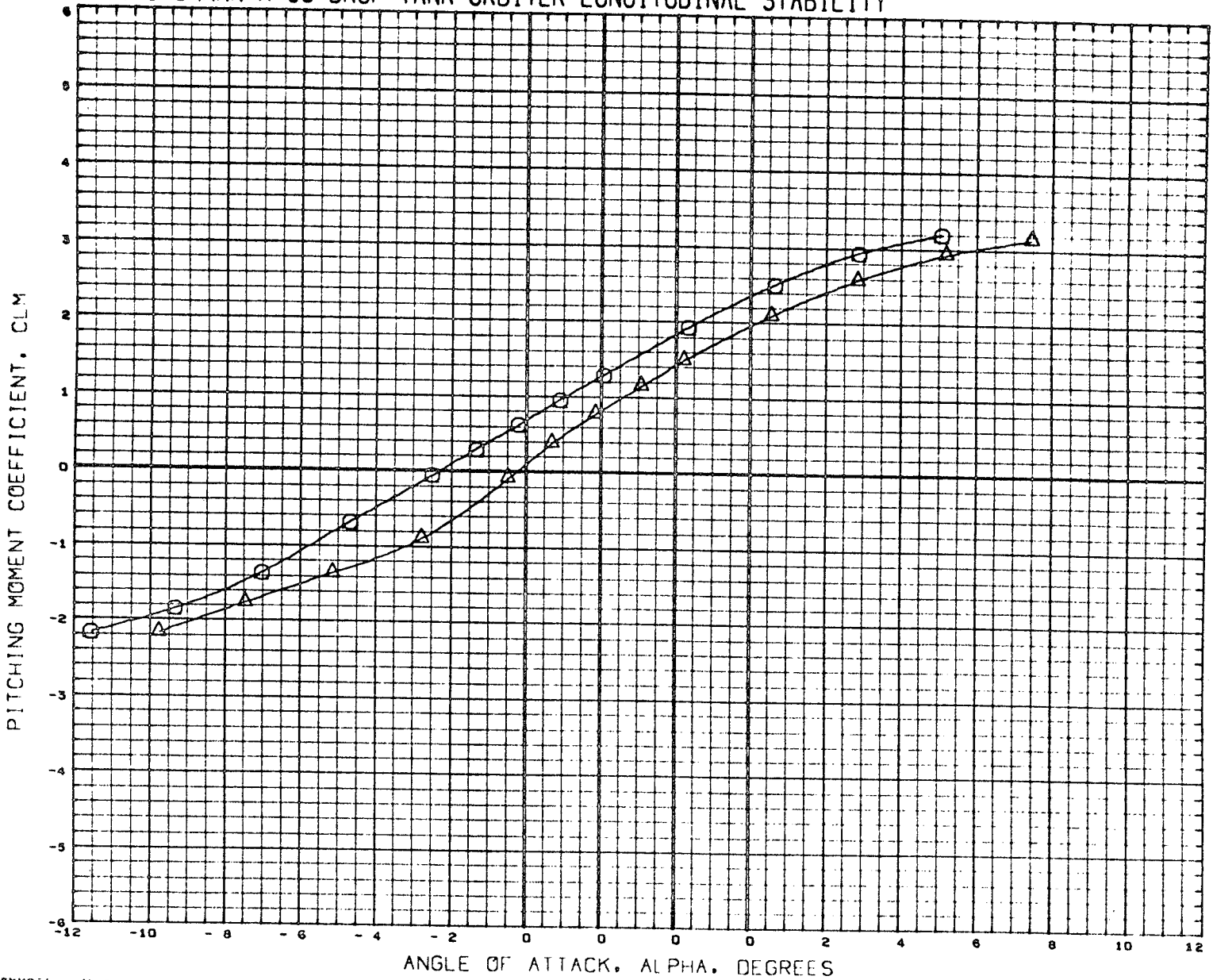
OWVCBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL \bar{X} MACH 0.900 BETA 0.000 PHI 0.000
 0.999 WNGINC 1.240

REFERENCE INFORMATION
 SREF 1.3360 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGC

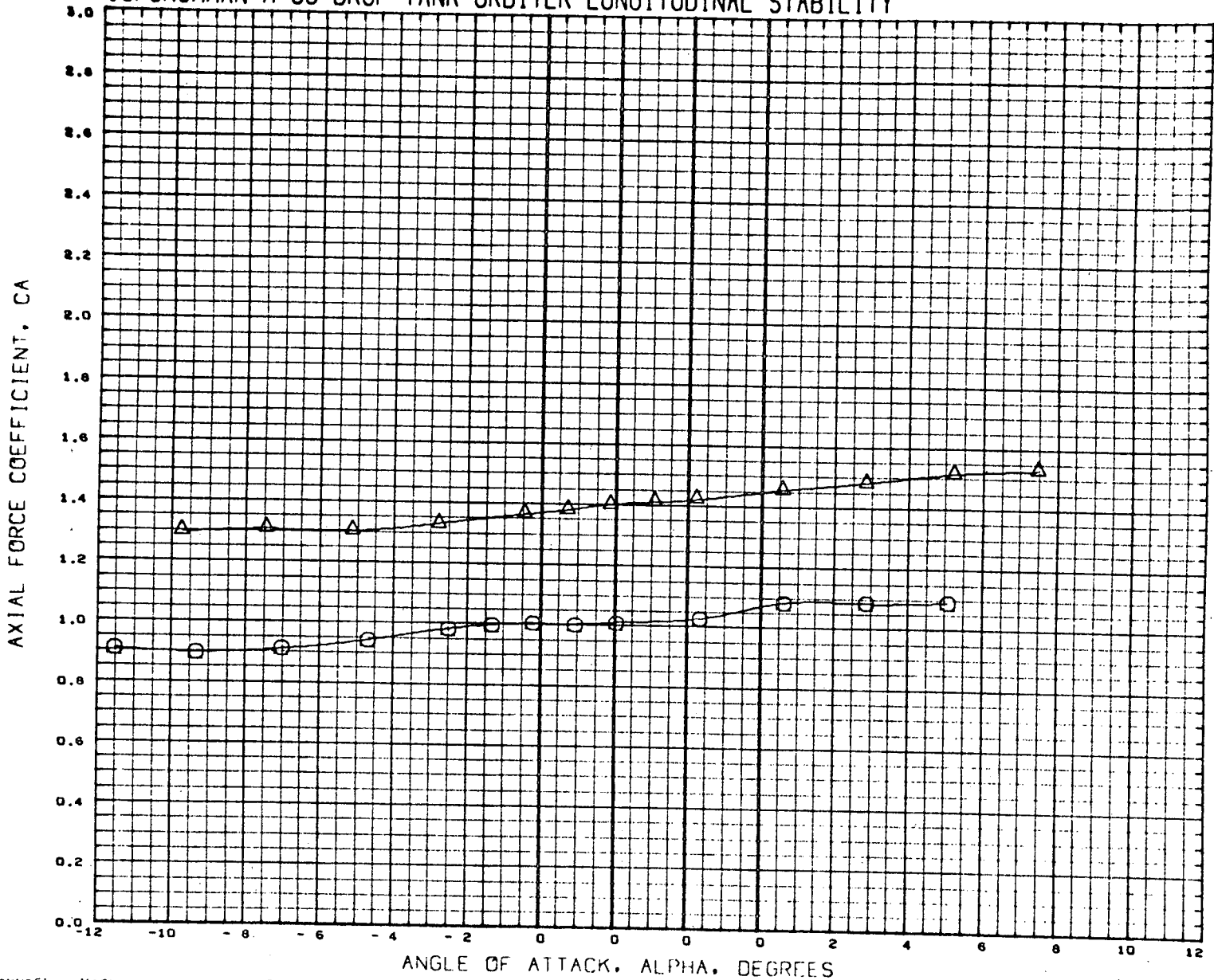
M502-MSFC-S1C H-33 ORBITER

0WVCBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL: Δ MACH 0.900 BETA 0.000 PHI 0.000
 0.999 WING INC 1.240

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
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 BREF 1.3330 IN.
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 ZMRP 0.0000 IN.
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DATA HIST. CODE CCCGC

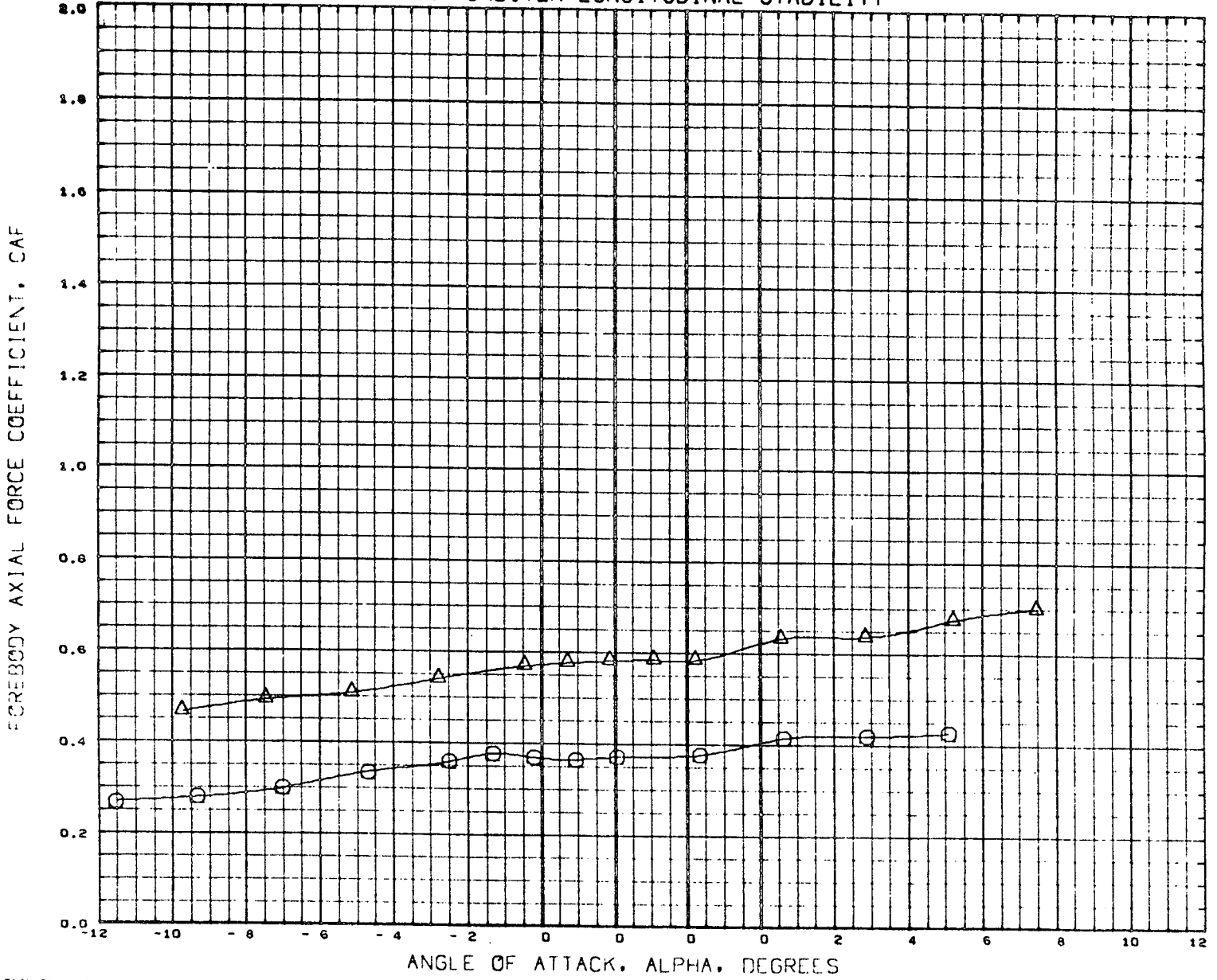
M502-MSFC-S1C H-33 ORBITER

OWVCRF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL MACH BETA PARAMETRIC VALUES PHI 0.000
 X 0.900 0.000 0.000 1.240
 0.999 WINGINC 1.240

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 OREF 1.3330 IN.
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 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGC

M002 MSFC-SIC H-33 ORBITER

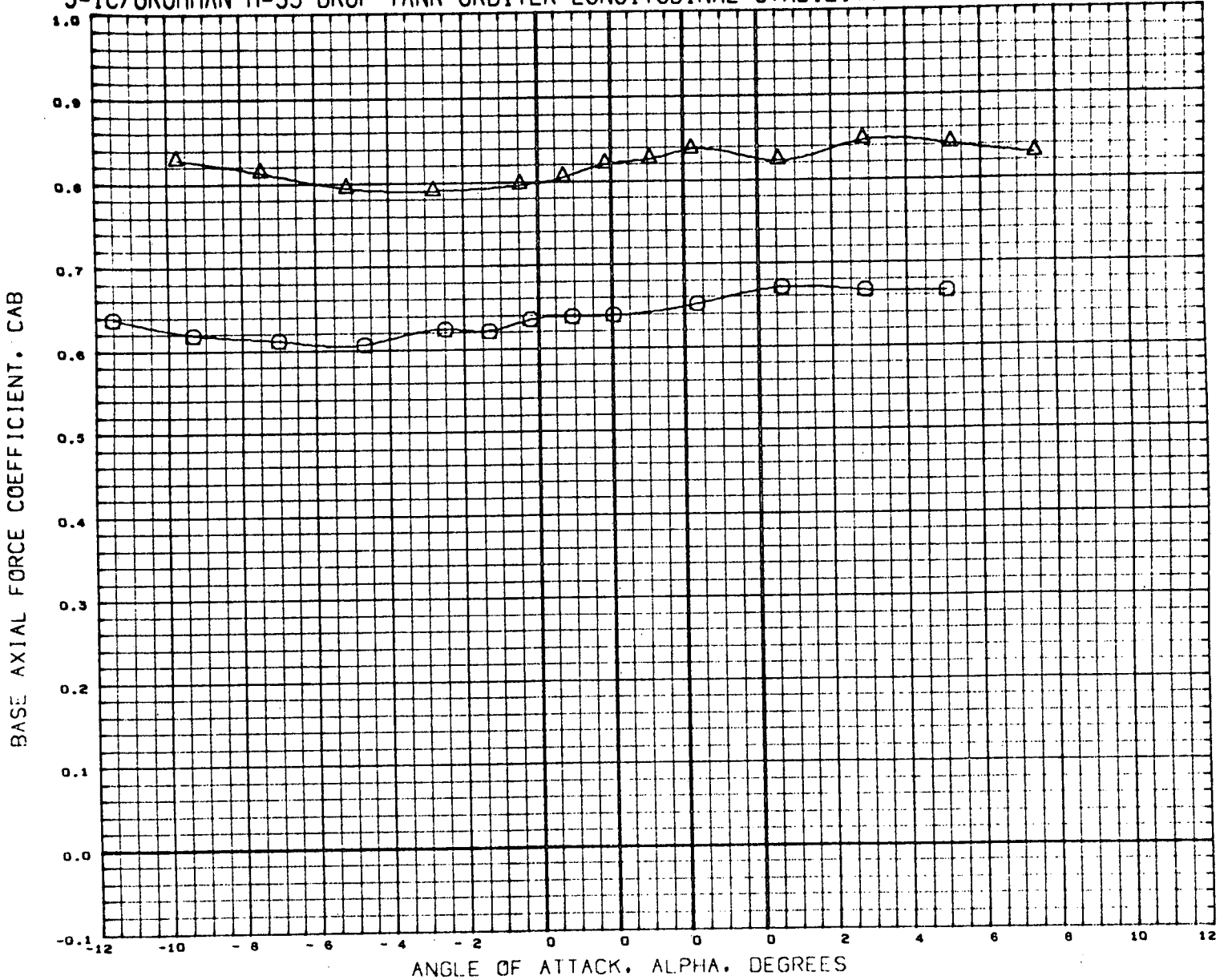
OWVCBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
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△	0.999	WINGINC	1.240		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

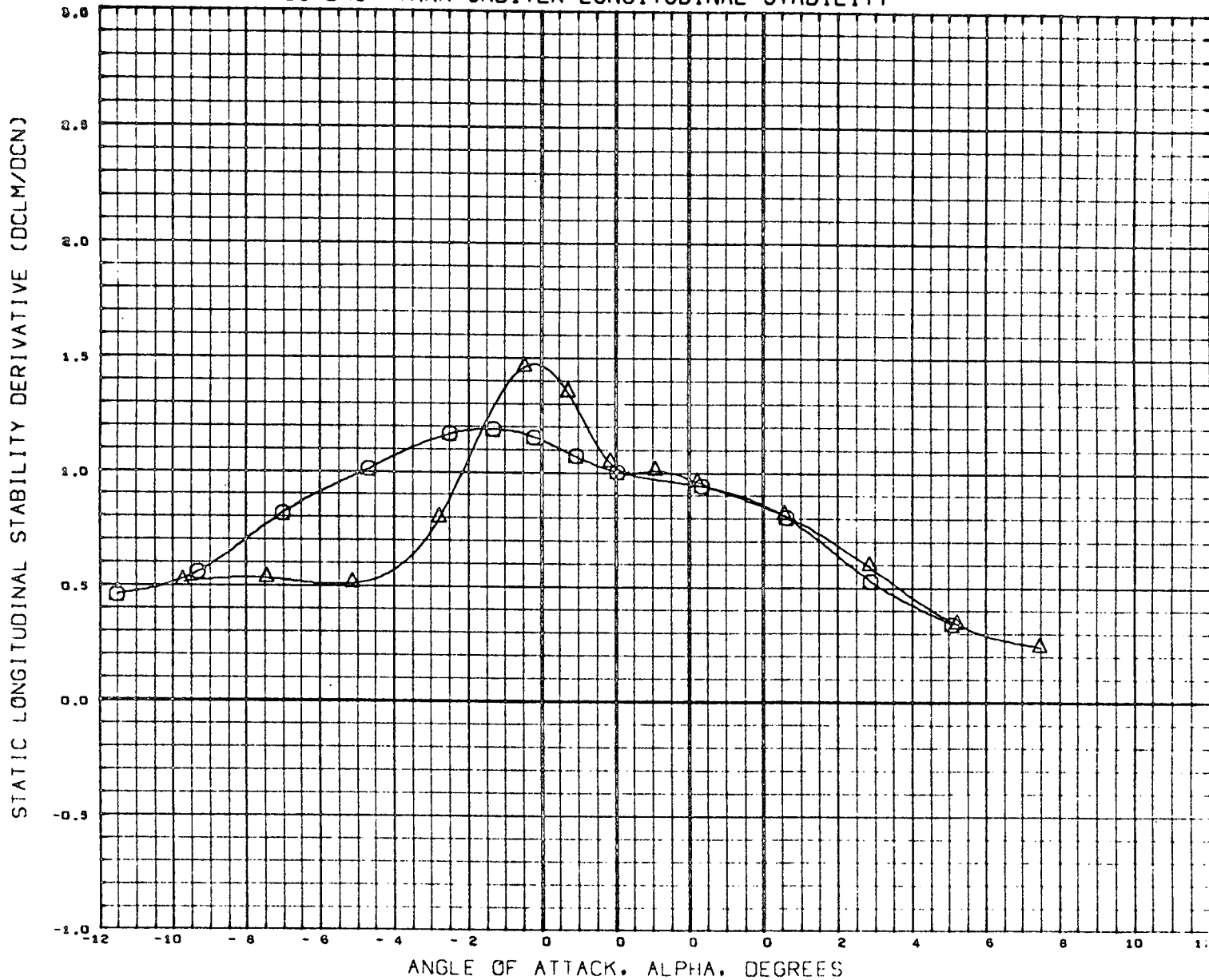
M502-MSFC-S1C H-33 ORBITER

OWVCBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

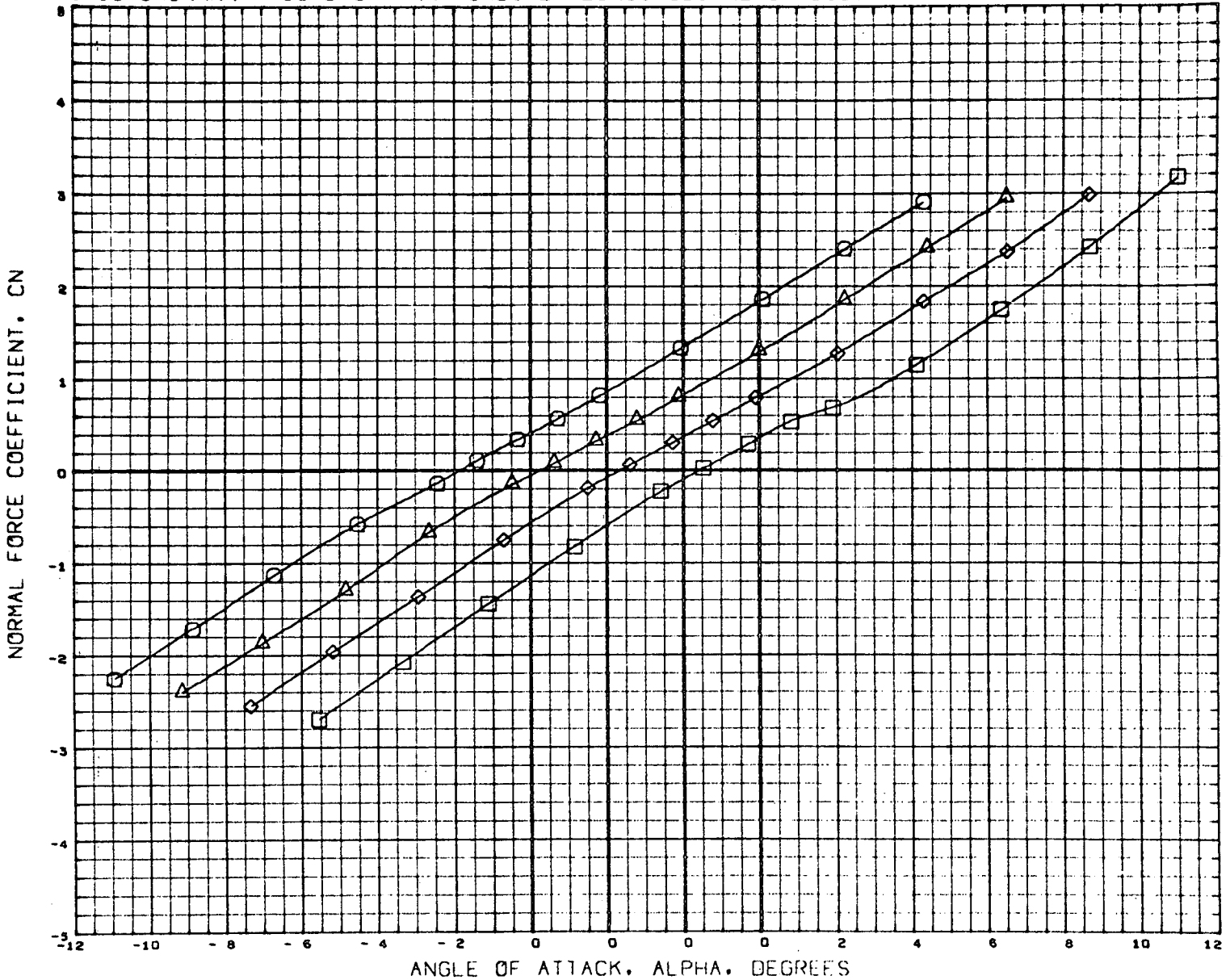


SYMBOL	MACH	PARAMETRIC VALUES			
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△	0.999	WINGINC	1.240		

REFERENCE INFORMATION		
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BREF	1.3330	IN.
YMRP	5.3990	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

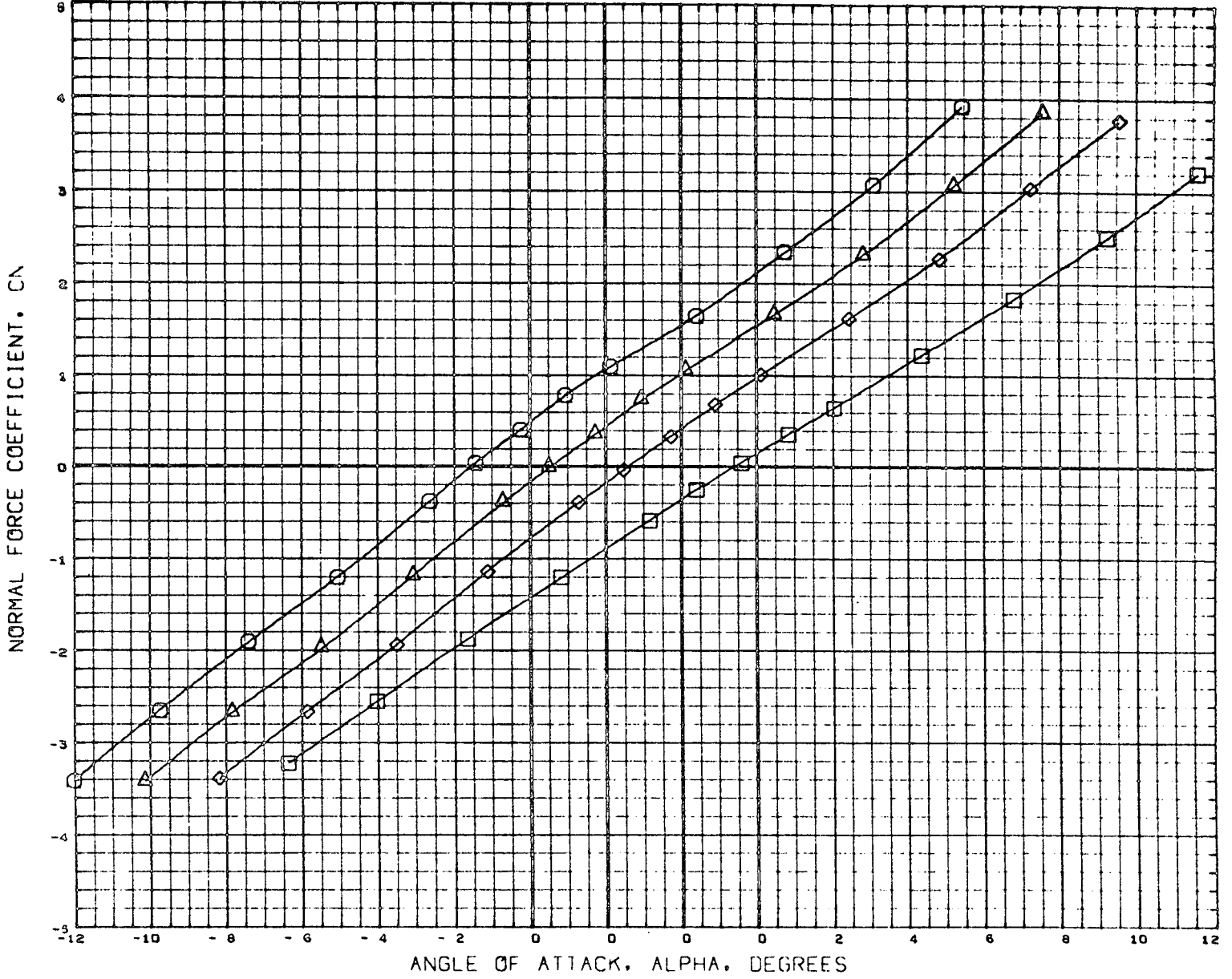


SYMBOL	MACH	PARAMETRIC VALUES			
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△	0.703	WNGINC	0.000		
◇	0.801				
□	0.904				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.999	BETA	0.000	PHI	0.000
△	1.103	WINGINC	0.000		
◇	1.202				
□	1.465				

REFERENCE INFORMATION		
SREF	1.3960	90 IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

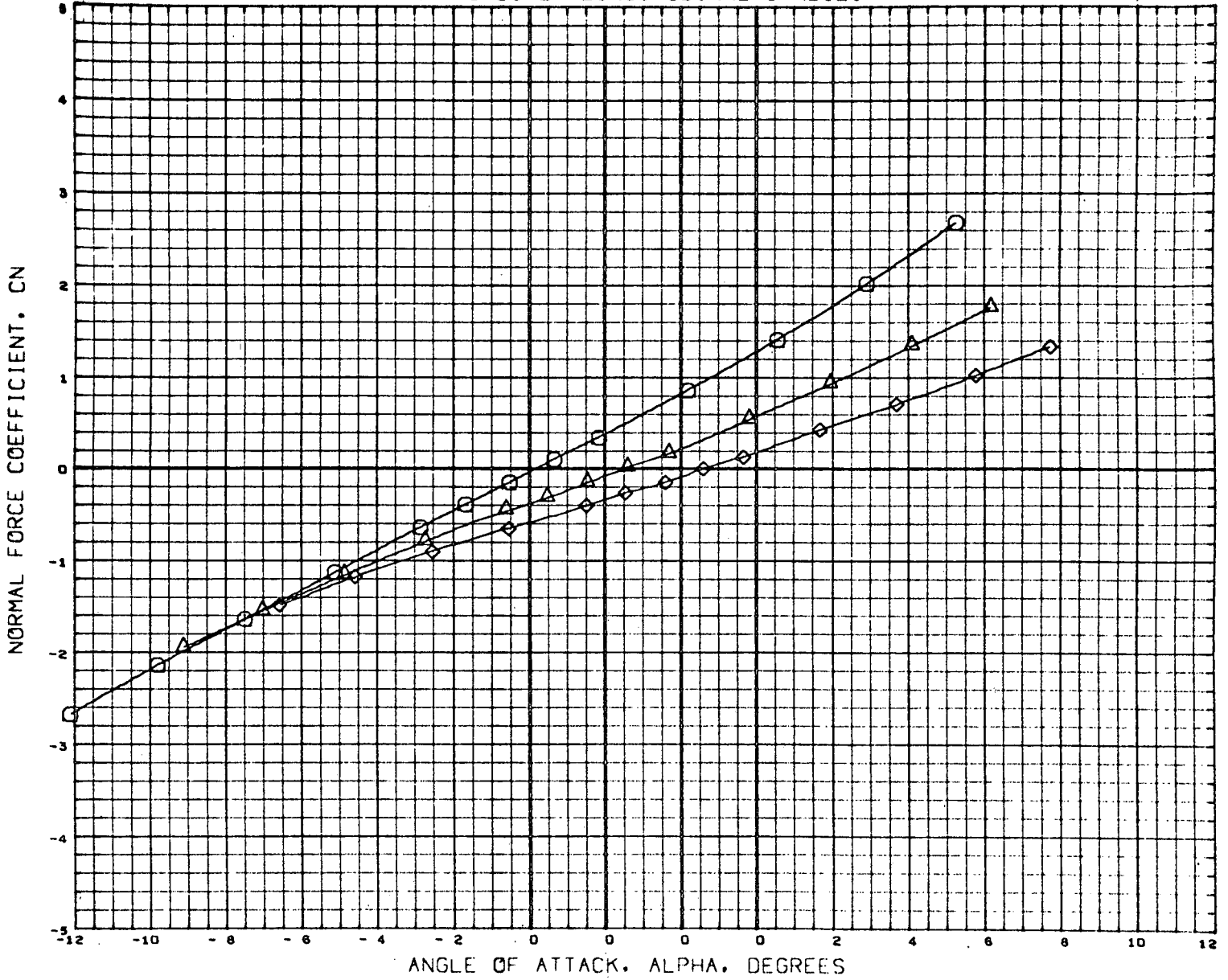
MS02 MSFC-S1C H-33 ORBITER

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(C44041) 12 MAY 72

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
○	1.965	BETA	0.000	PHI	0.000	SREF	1.3960	SQ. IN.
△	3.480	WIGINC	0.000			LREF	1.3330	IN.
◇	4.959					BREF	1.3330	IN.
						XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCC

M502 MSFC-S1C H-33 ORBITER

OWVICBF

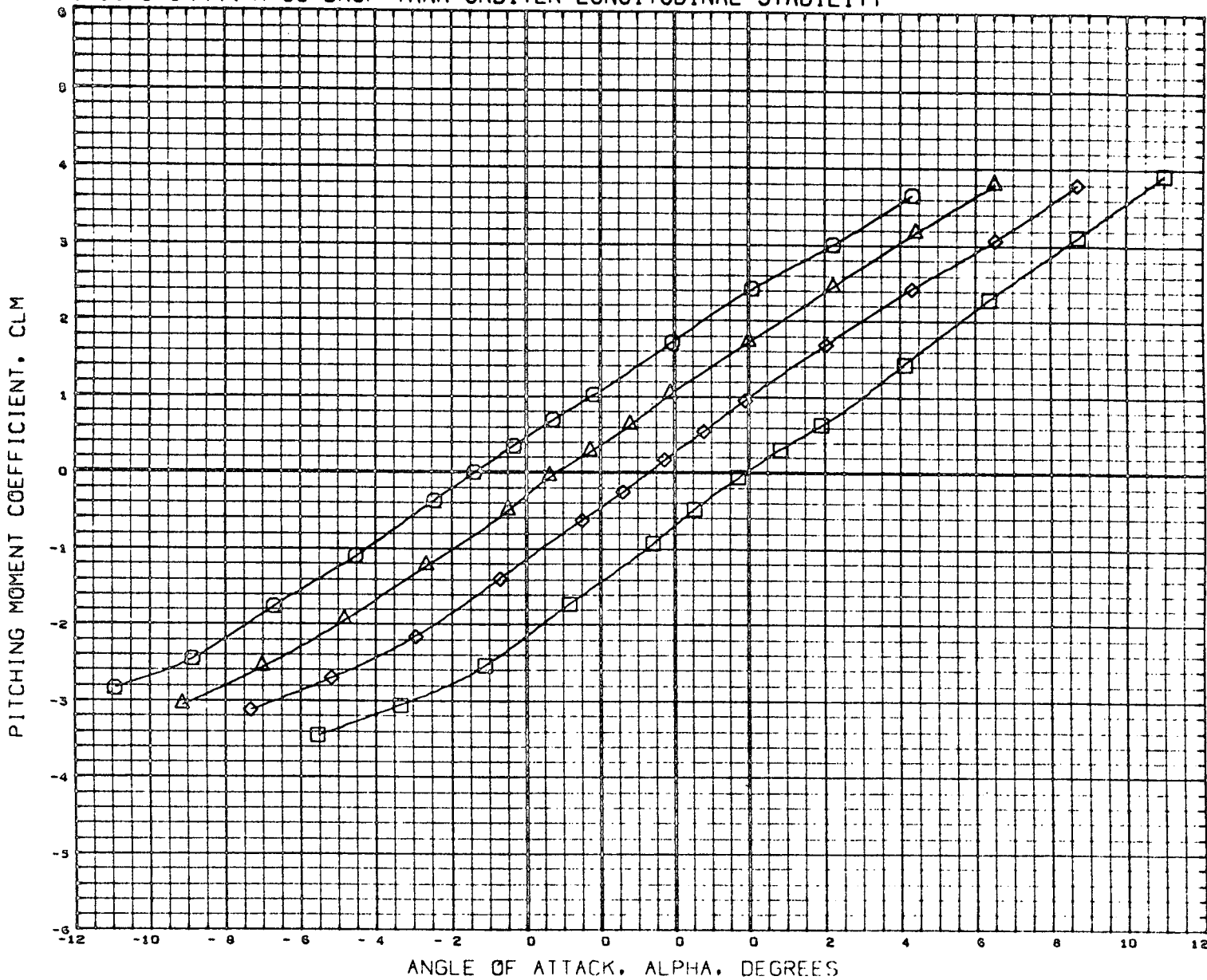
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

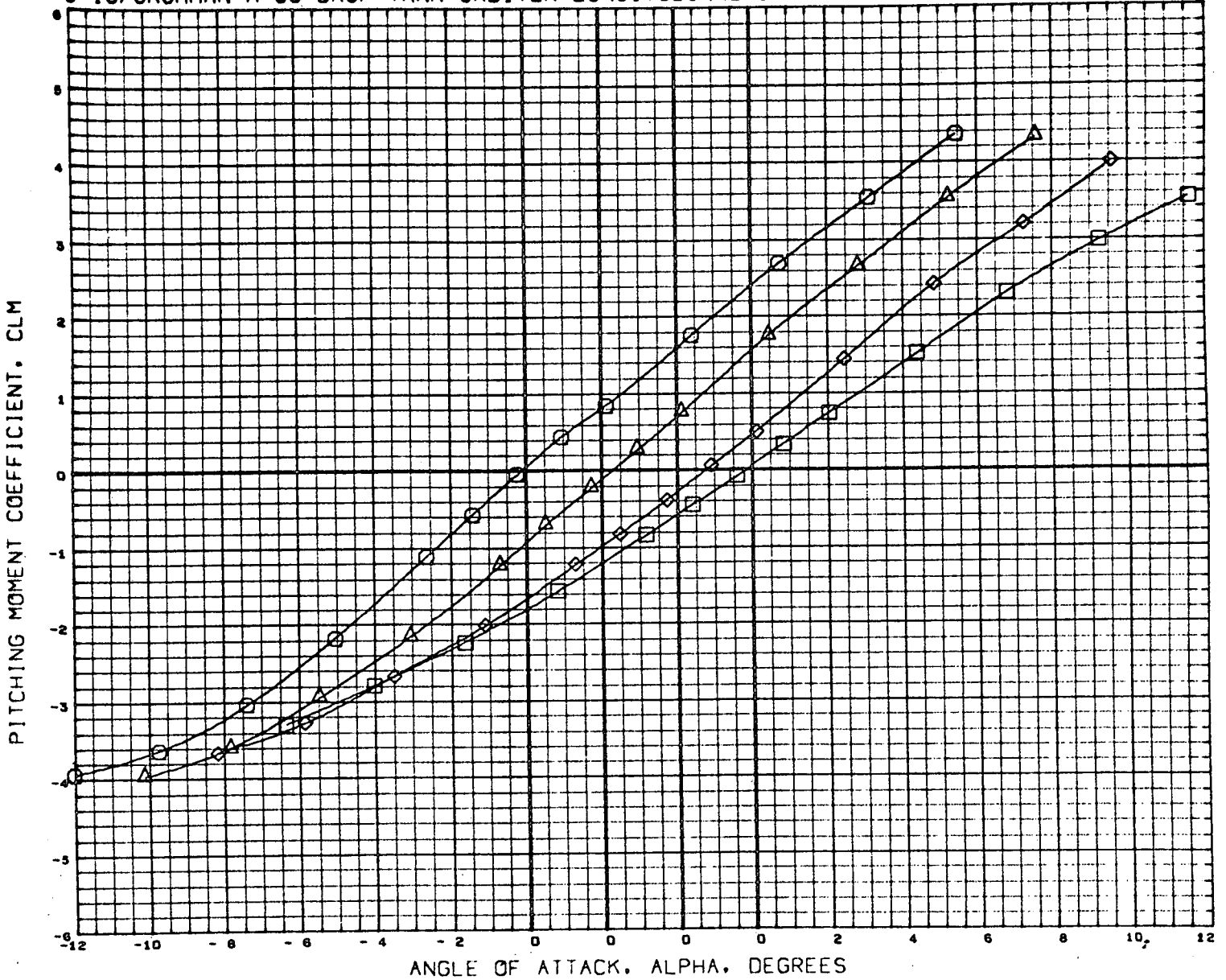


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□	0.604				

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

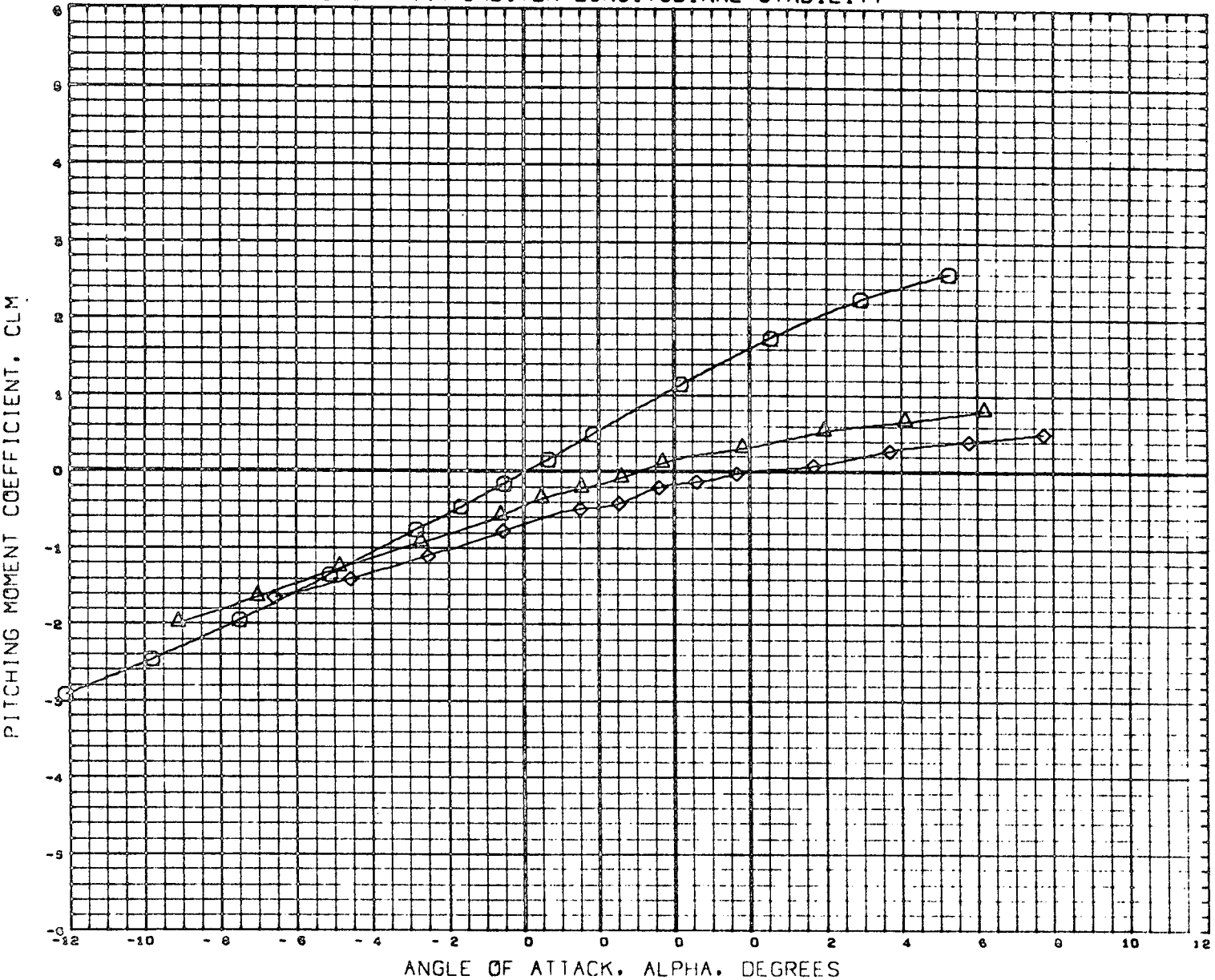
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



PARAMETRIC VALUES				REFERENCE INFORMATION		
SYMBOL	MACH	BETA	PHI	SREF	IN.	IN.
○	0.999	0.000	0.000	1.3960	50.	IN.
△	1.103	WNGINC	0.000	1.3330	IN.	IN.
◇	1.202			1.3330	IN.	IN.
□	1.465			5.3990	IN.	IN.
				YMRP	0.0000	IN.
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

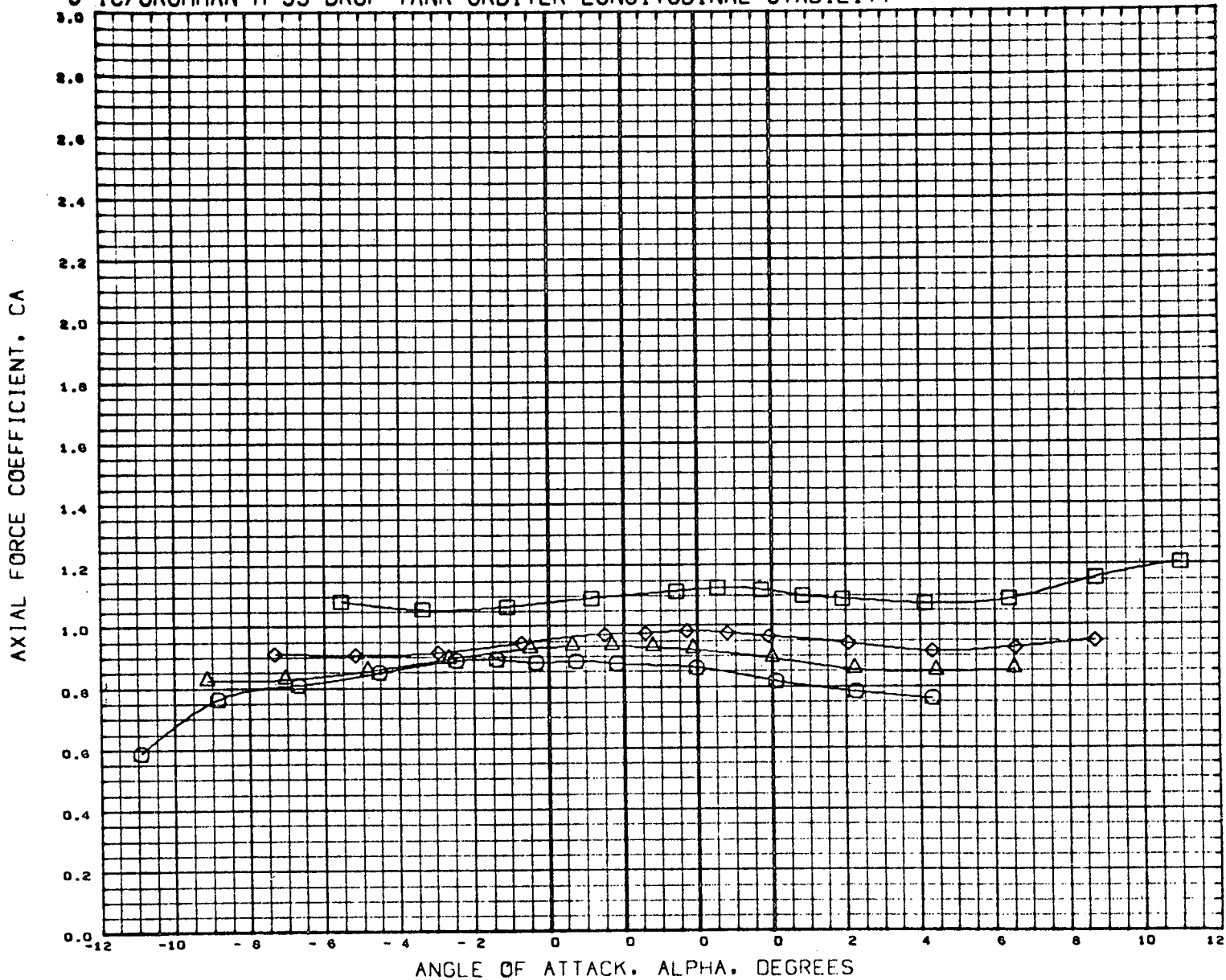


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△	3.480	WIGINC	0.000		
◇	4.950				

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BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.599	BETA	0.000	PHI	0.000
△	0.703	WINGINC	0.000		
◇	0.801				
□	0.904				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCGC

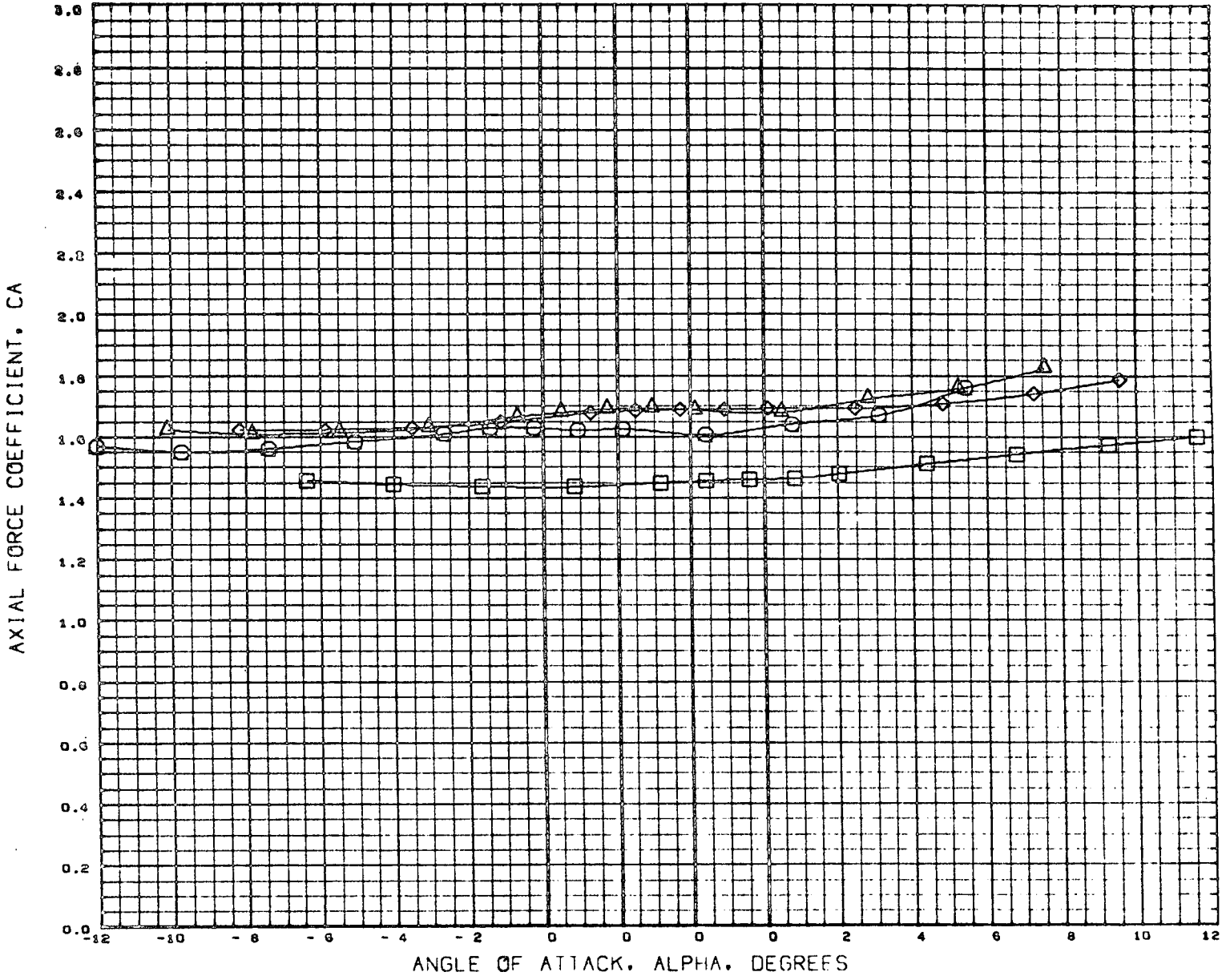
M502-MSFC-S1C H-33 ORBITER

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(C44041) 12 MAY 72

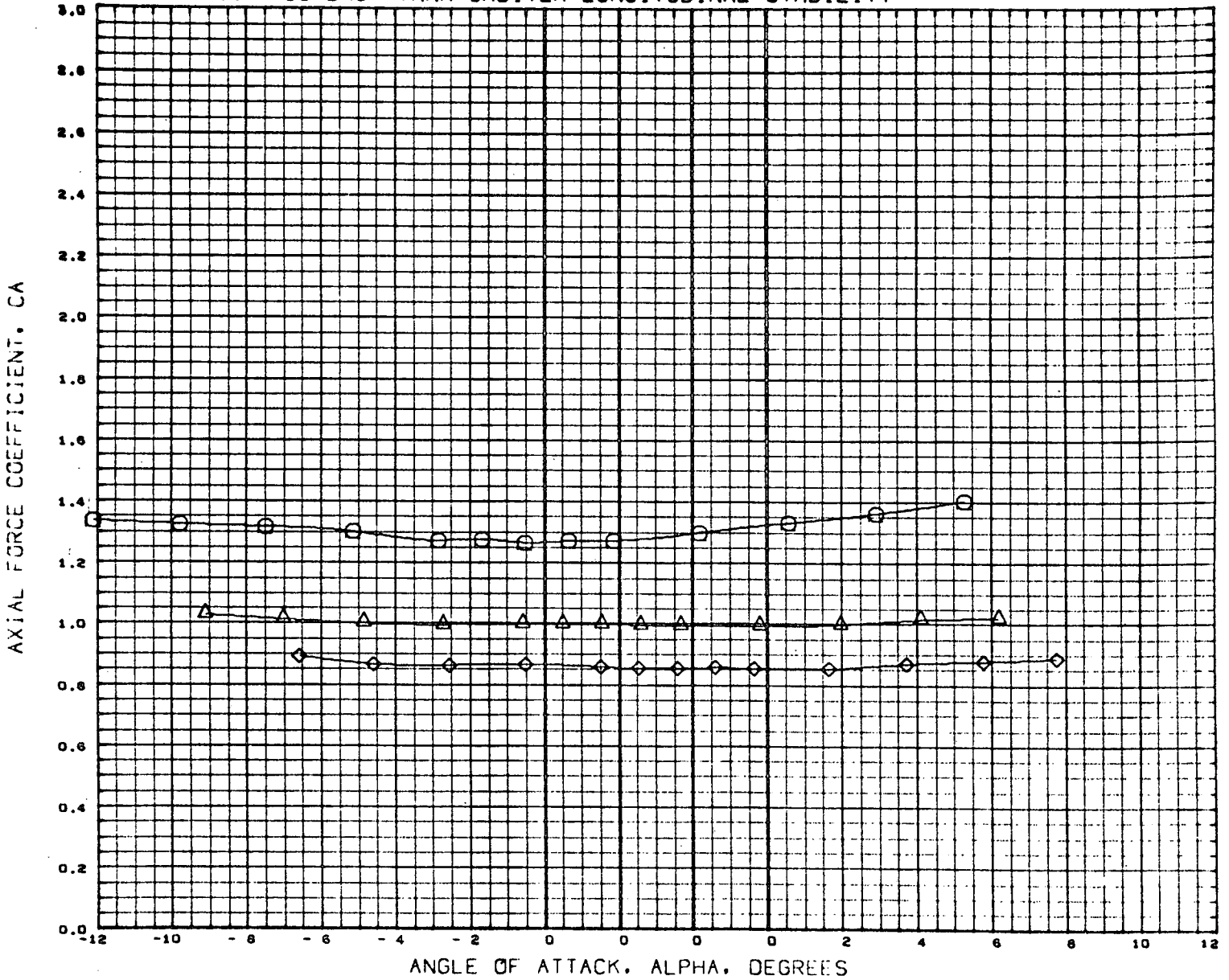
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
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◇	1.202					BREF	1.3330	IN.
□	1.465					XHRP	5.3990	IN.
						YHRP	0.0000	IN.
						ZHRP	0.0000	IN.
						SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL MACH : PARAMETRIC VALUES
 ○ 1.965 BETA 0.000 PHI 0.000
 △ 3.480 WINGINC 0.000
 ◇ 4.959

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
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 ZMRP 0.0000 IN.
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DATA HIST. CODE CCCGC

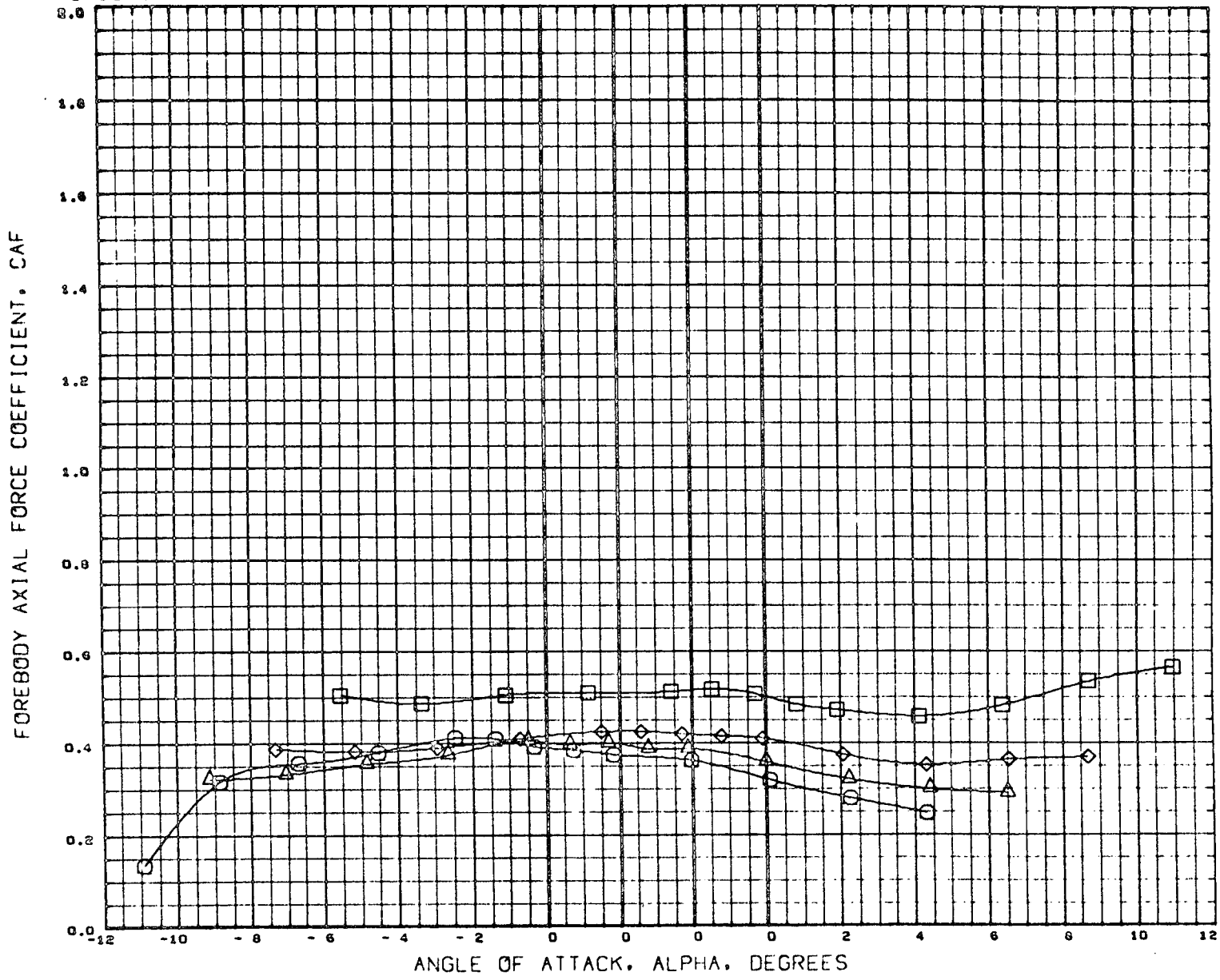
M502-MSFC-S1C H-33 ORBITER

OWVTCBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

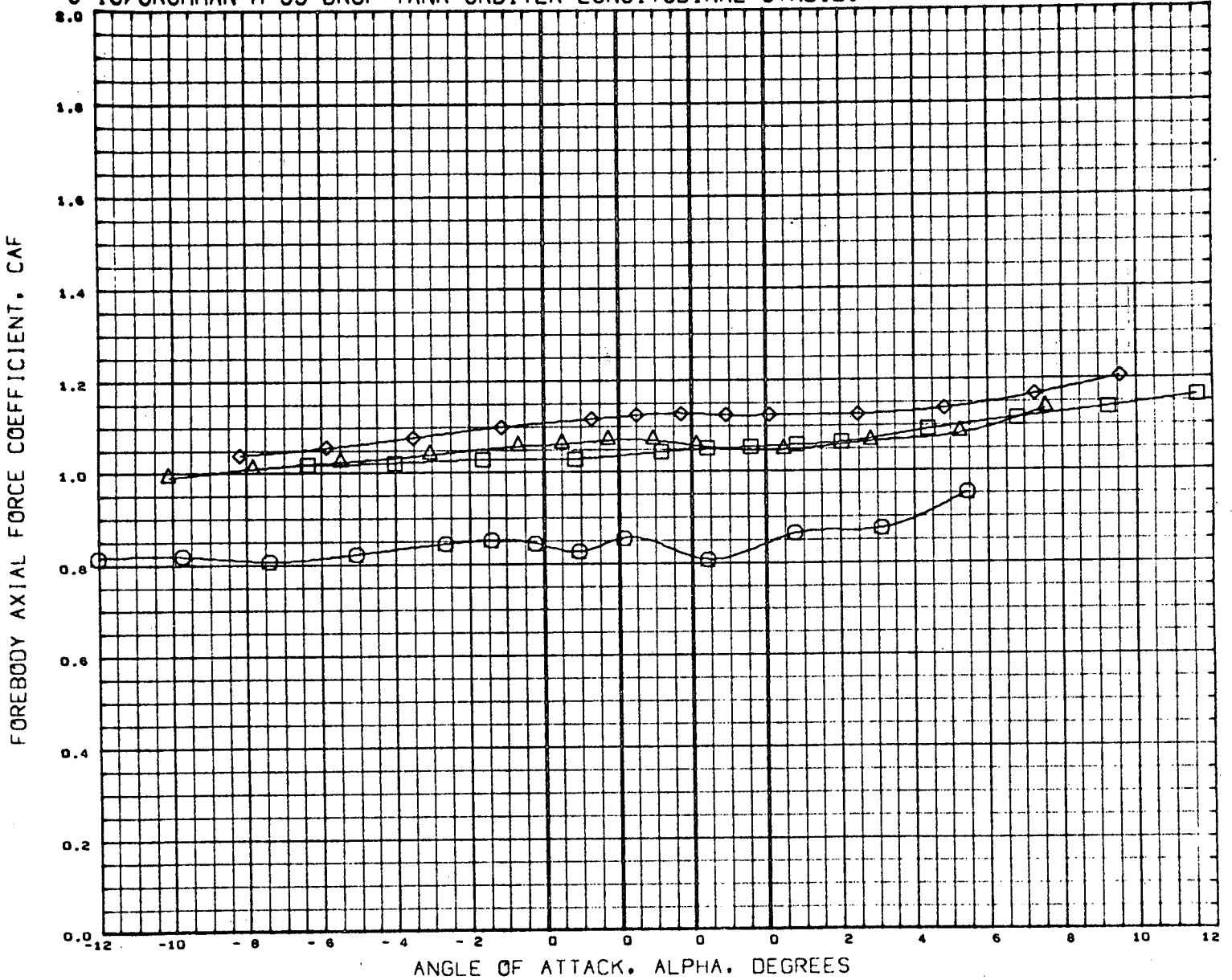


SYMBOL	MACH	PARAMETRIC VALUES			
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△	0.703	WINGINC	0.000		
◇	0.801				
□	0.904				

REFERENCE INFORMATION		
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BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
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△	1.103	WINGINC	0.000		
◇	1.202				
□	1.465				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
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BREF	1.3330	IN.
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YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCC

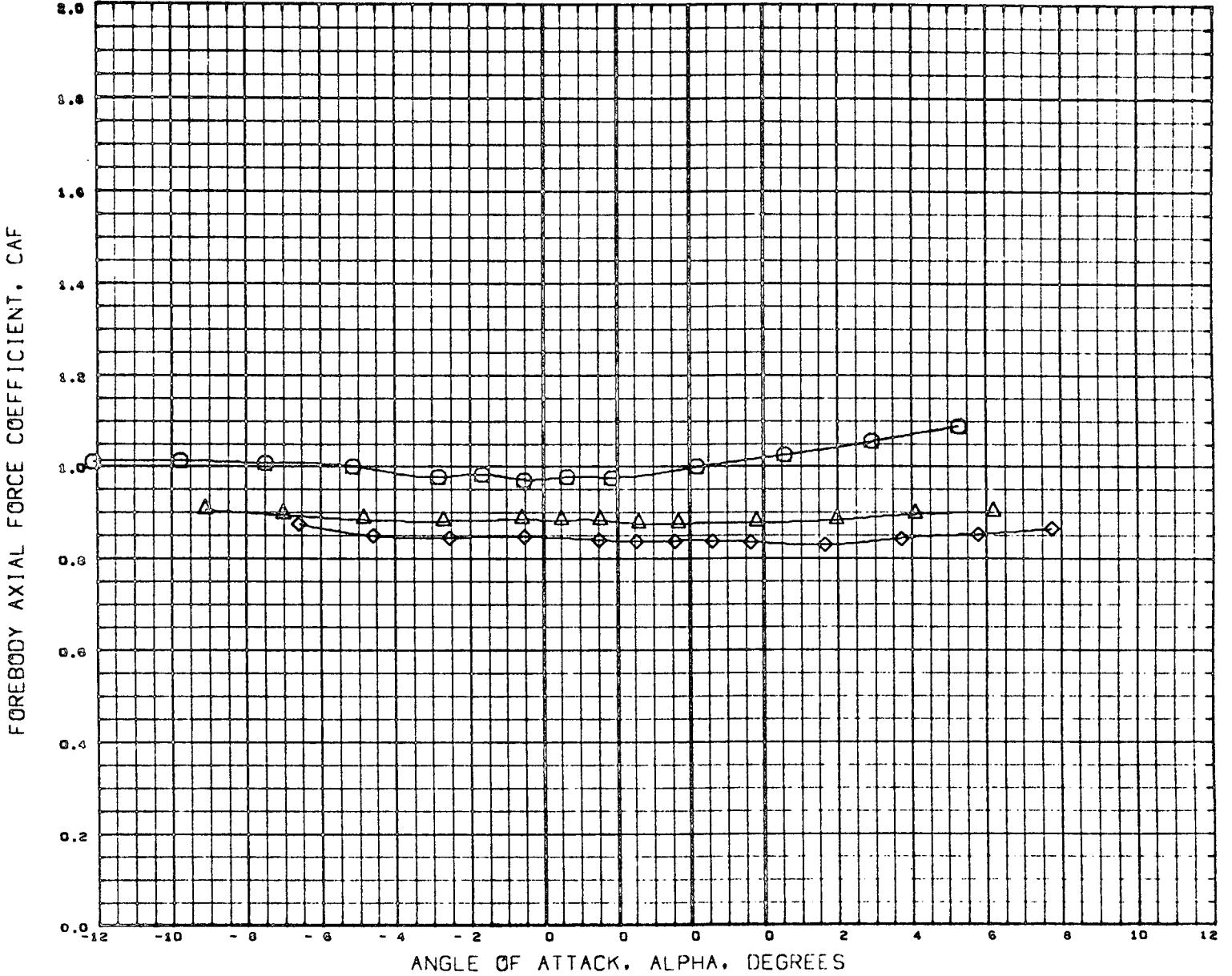
M502-MSFC-S1C H-33 ORBITER

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

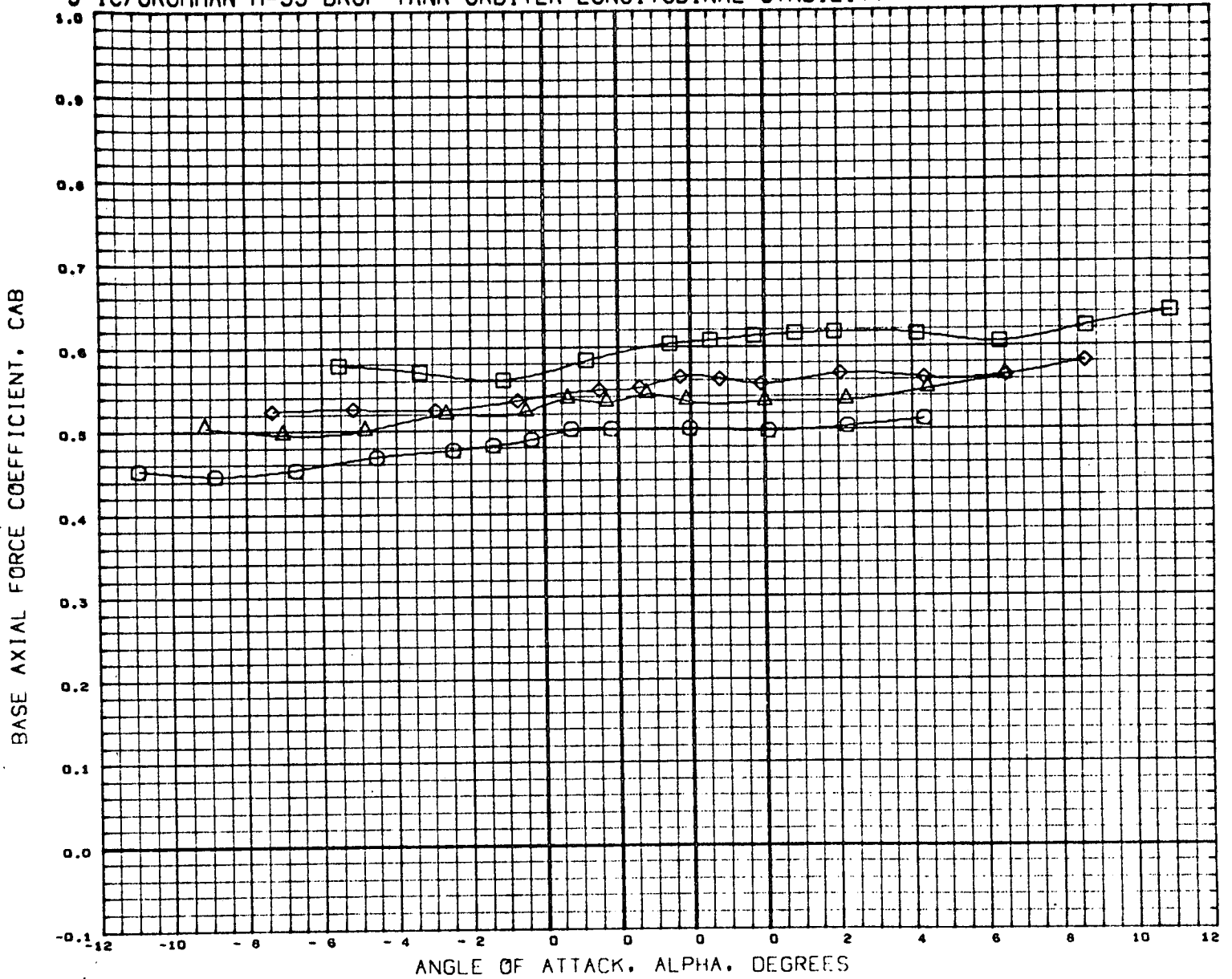


SYMBOL	MACH	PARAMETRIC VALUES			
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◇	4.959				

REFERENCE INFORMATION		
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LREF	1.3330	IN.
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YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

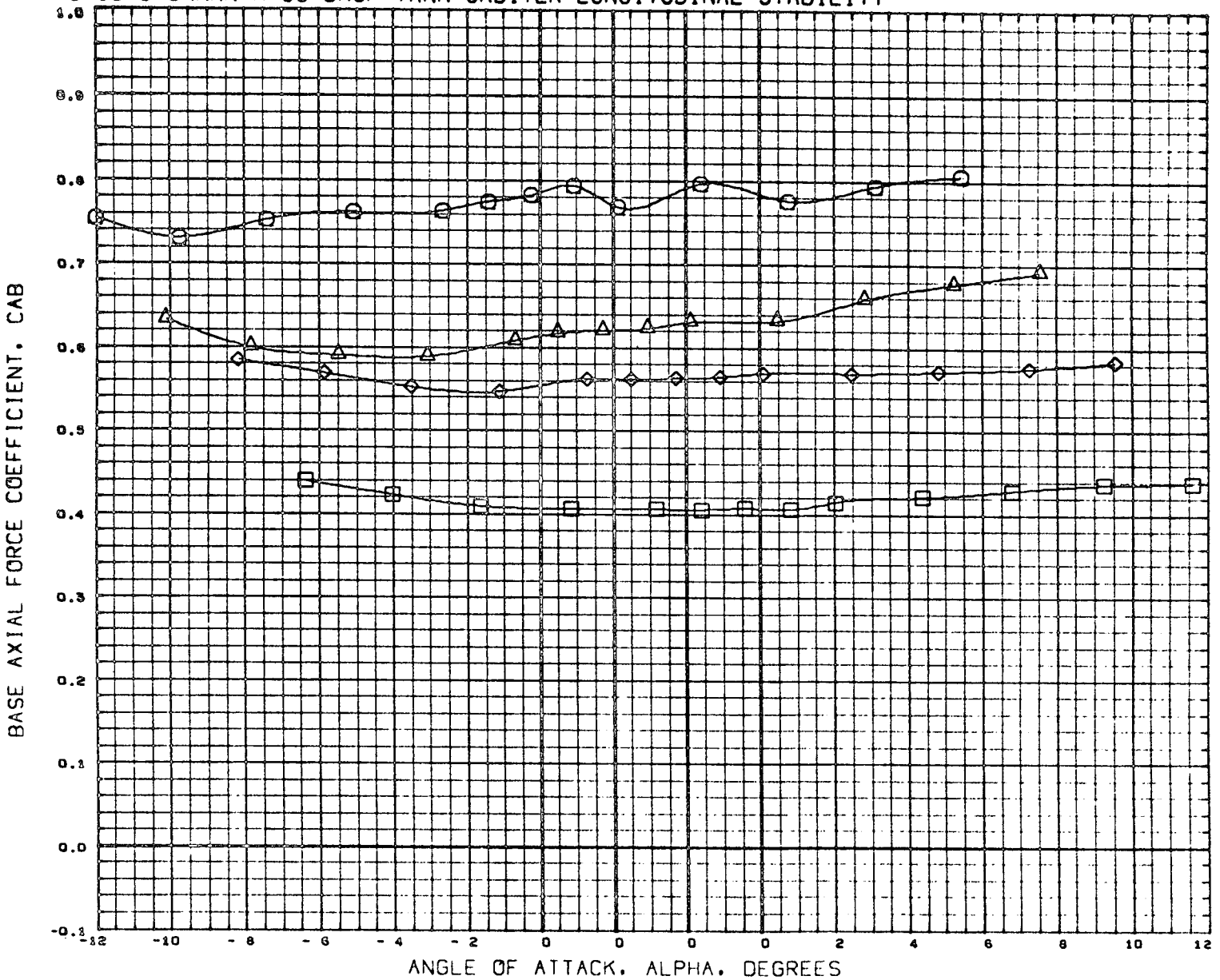


SYMBOL	MACH	PARAMETRIC VALUES		
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△	0.703	0.000		
◇	0.801			
□	0.904			

REFERENCE INFORMATION		
SREF	1.3960	33. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
○	0.939	BETA	0.000	PHI	0.000	SREF	1.3960	SQ. IN.
△	1.103	WING INC	0.000			LREF	1.3330	IN.
◇	1.202					BREF	1.3330	IN.
□	1.463					XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

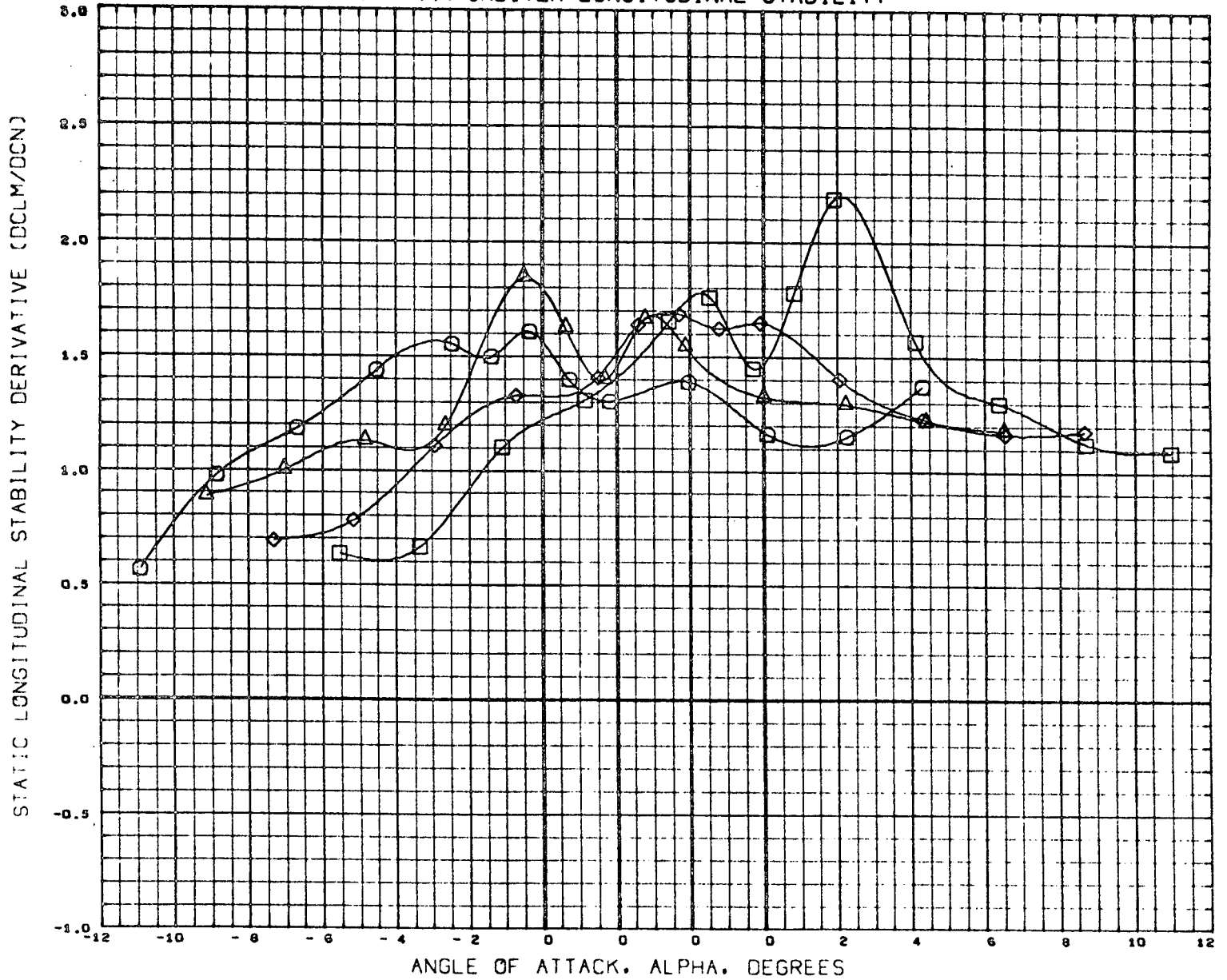


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.965	BETA	0.000	PHI	0.000
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◇	4.959				

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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

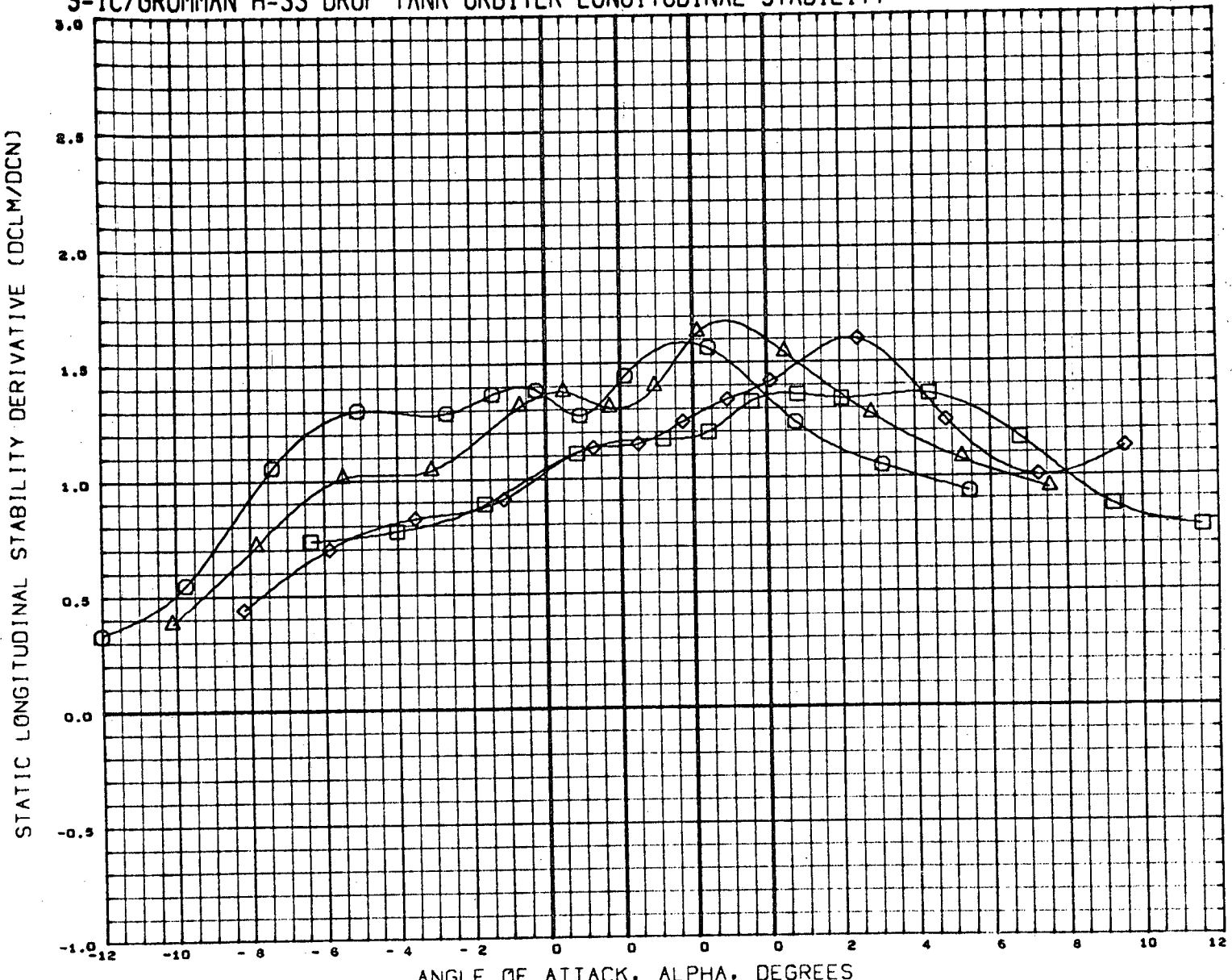


SYMBOL	MACH	PARAMETRIC VALUES			
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◇	0.801				
□	0.904				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

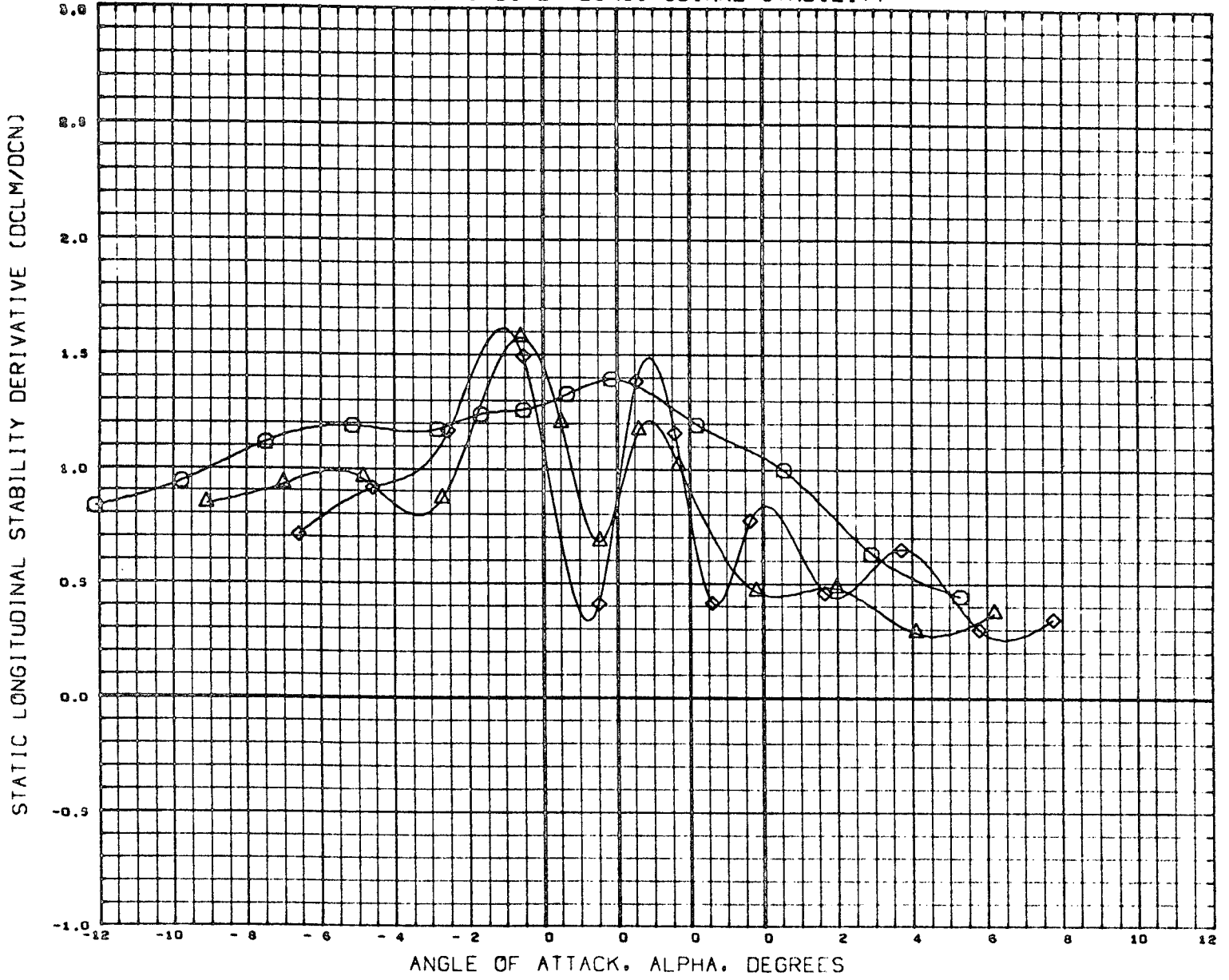


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BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

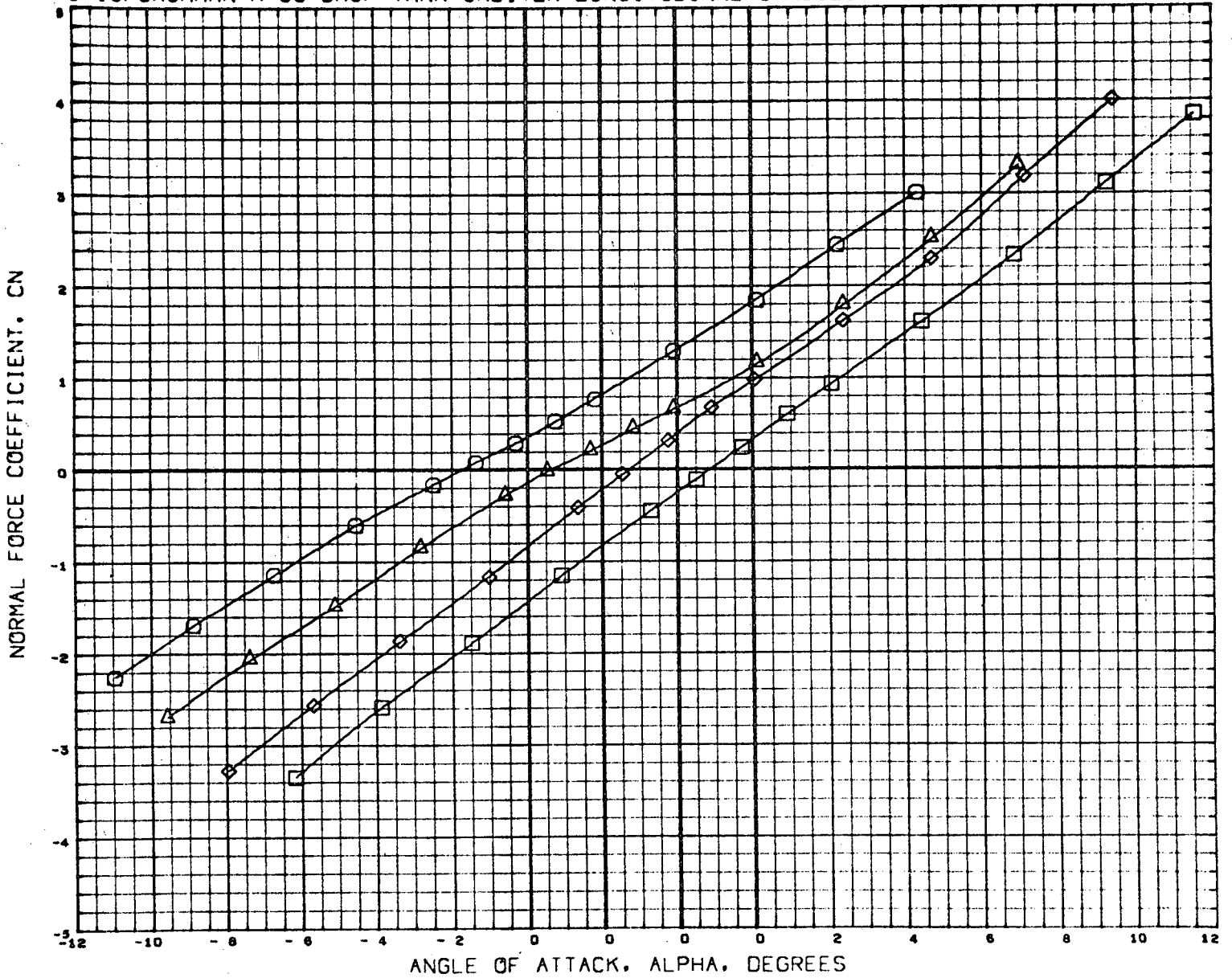


SYMBOL	MACH	PARAMETRIC VALUES		
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△	3.480	WINGINC	0.000	
◇	4.959			

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES		
		BETA	PHI	WNGIN
○	0.599	0.000	0.000	
△	0.901	0.000		
◇	0.998			
□	1.203			

REFERENCE INFORMATION		
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

M502-MSFC-S1C H-33 ORBITER

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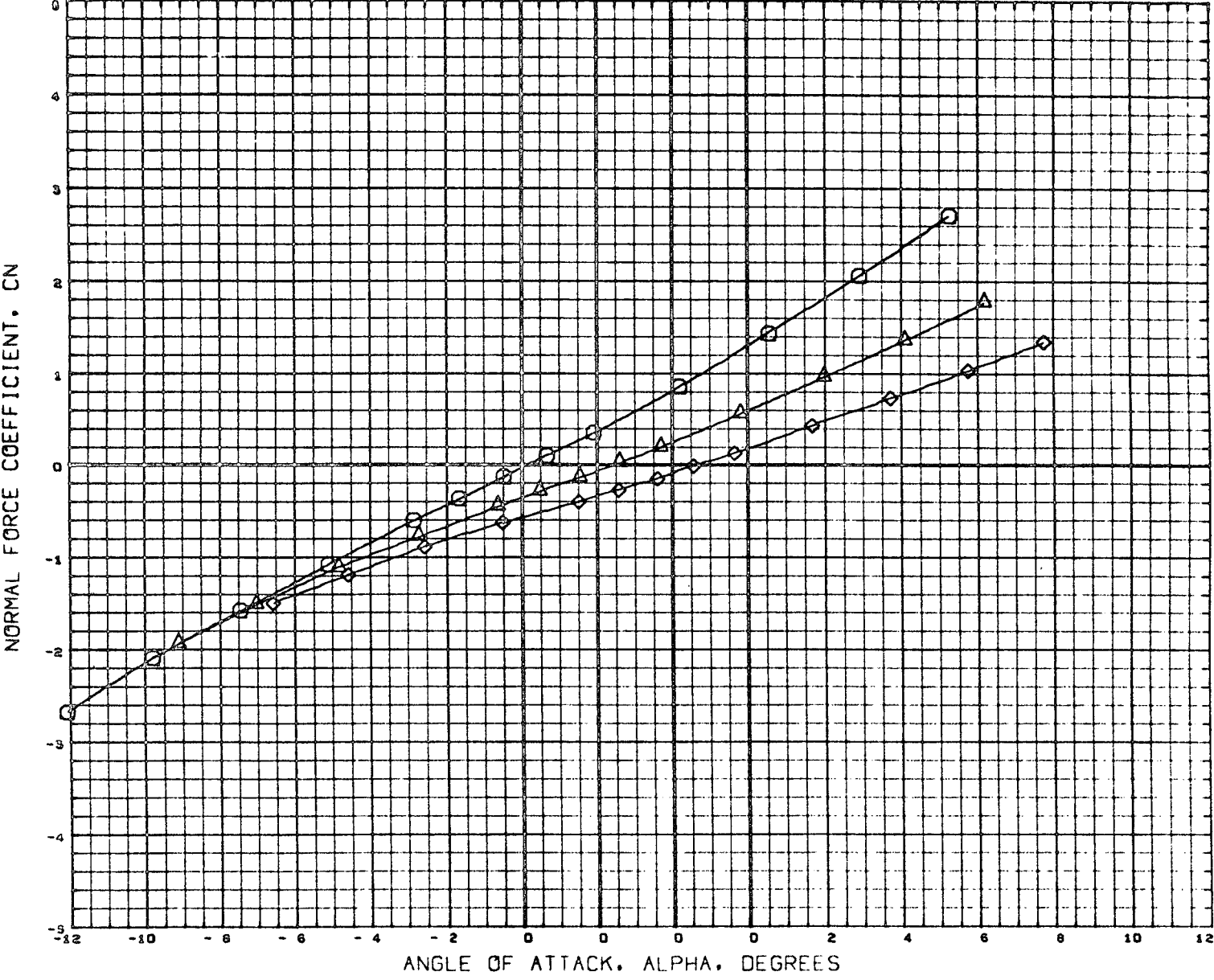
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

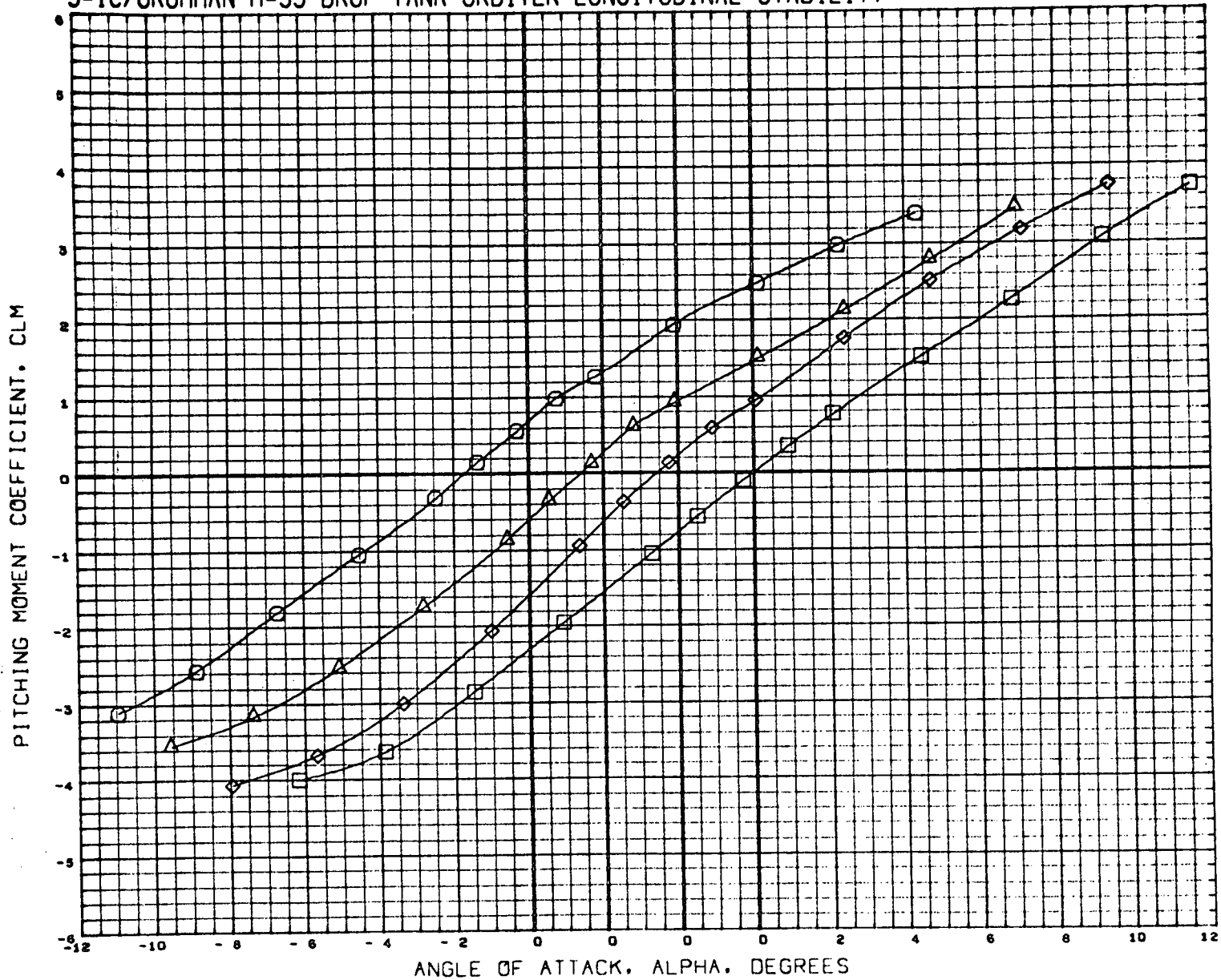


SYMBOL	MACH	BETA	PARAMETRIC VALUES	PHI	
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◇	4.999				

REFERENCE INFORMATION		
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LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

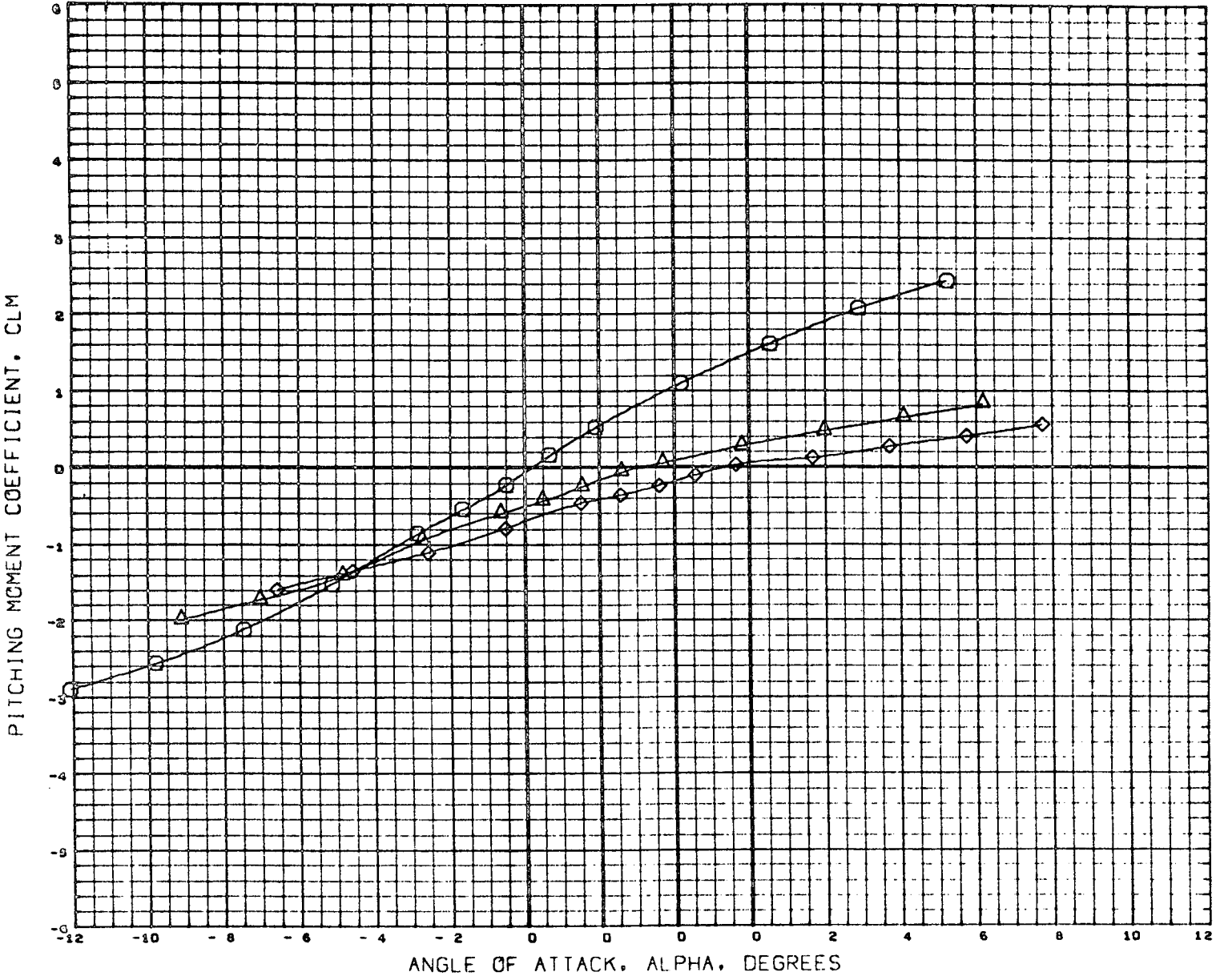
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
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◇	0.998					BREF	1.3330	IN.
□	1.203					XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

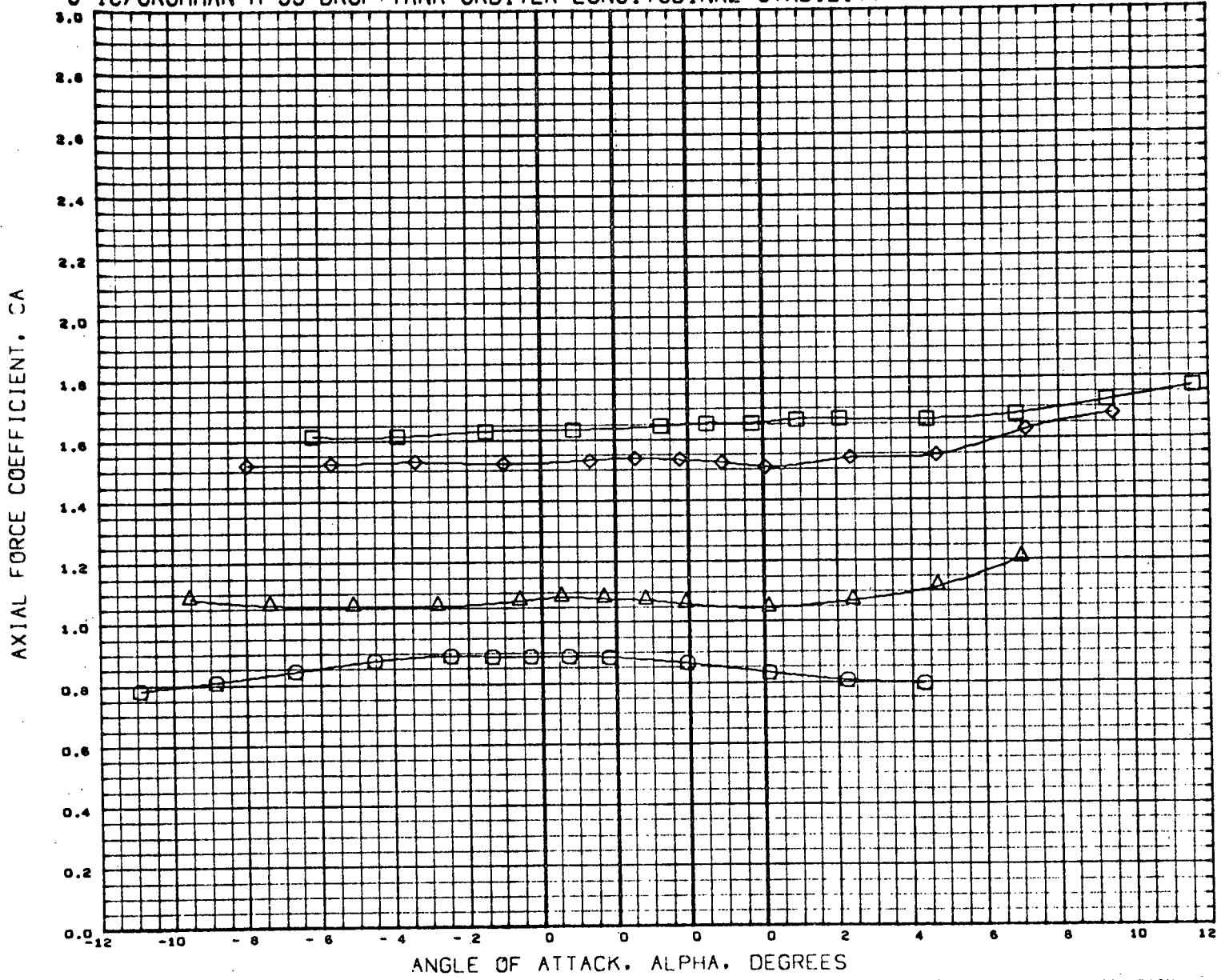


SYMBOL	MACH	BETA	PARAMETRIC VALUES	
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△	3.480	WNGIN	0.000	
◇	4.939			

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BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

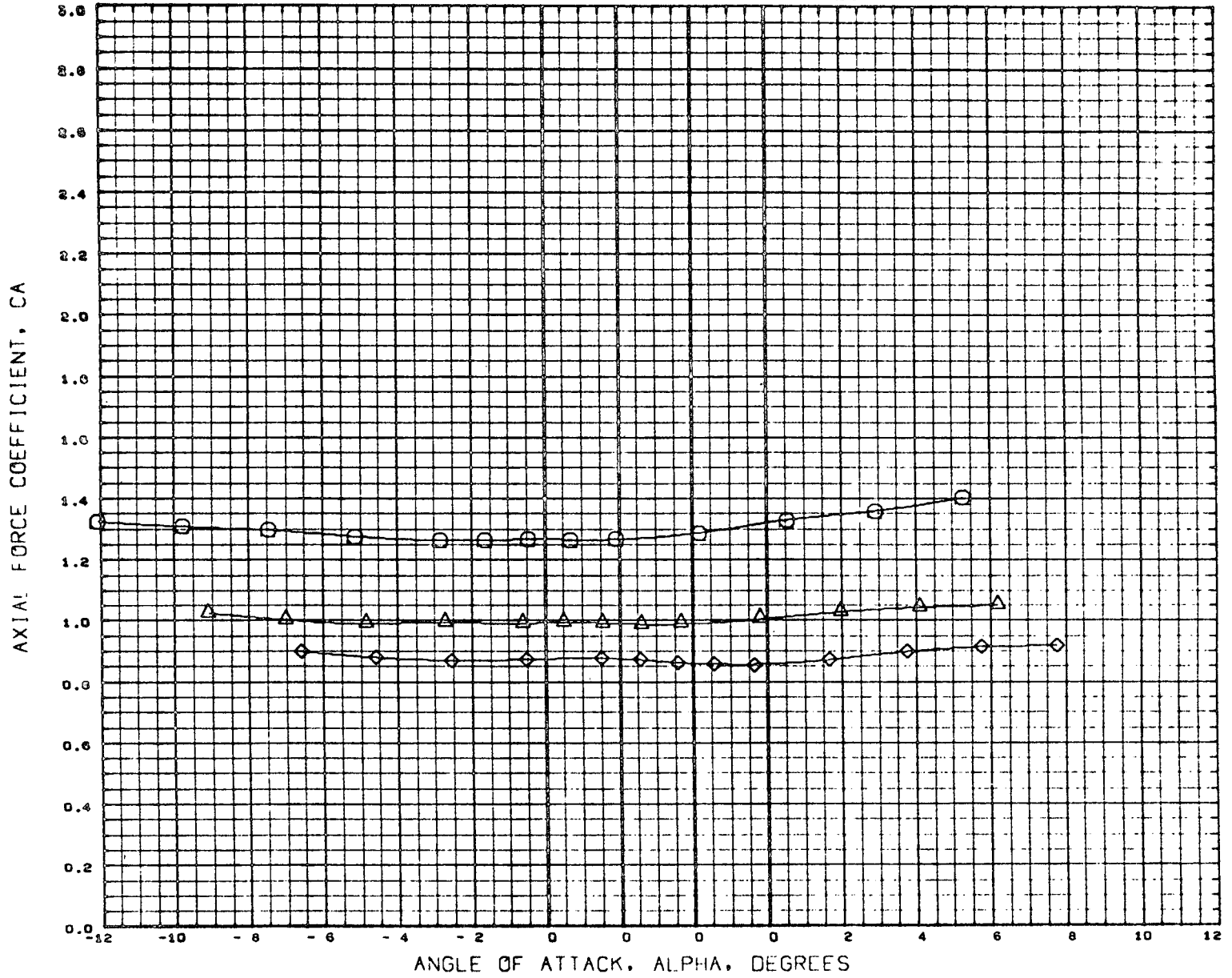


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◇	0.998				
□	1.203				

REFERENCE INFORMATION		
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XMRP	5.3990	IN.
YMRP	0.0000	IN.
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DATA HIST. CODE CCCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

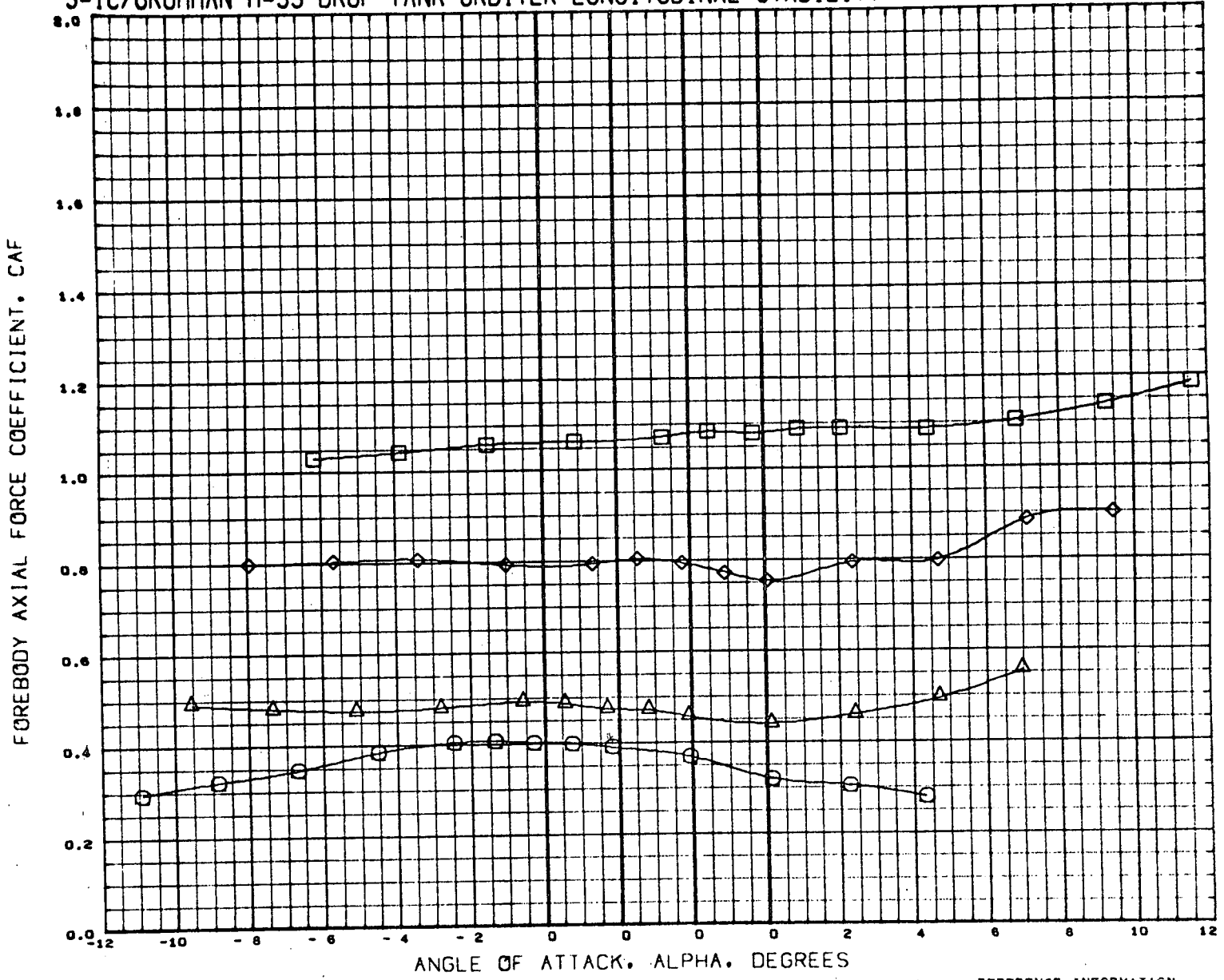


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◇	4.999				

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LREF	1.3330	IN.
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XMRP	5.3990	IN.
YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

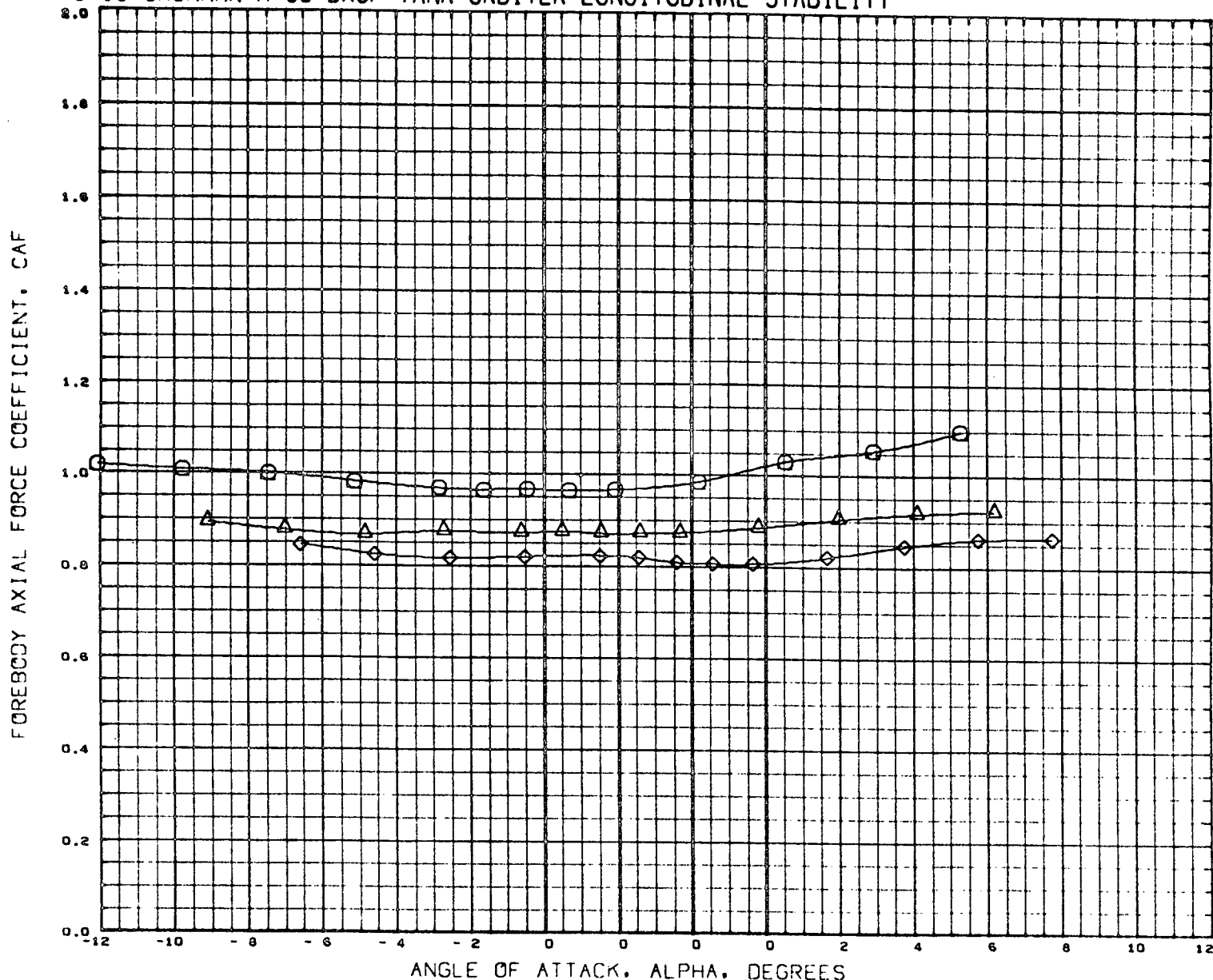


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.999	BETA	0.000	PHI	0.000
△	0.901	WNGIN	0.000		
◇	0.998				
□	1.203				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	BETA	PARAMETRIC VALUES		PHI
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△	3.480	WNGIN	0.000		
◇	4.959				

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LREF	1.3330	IN.
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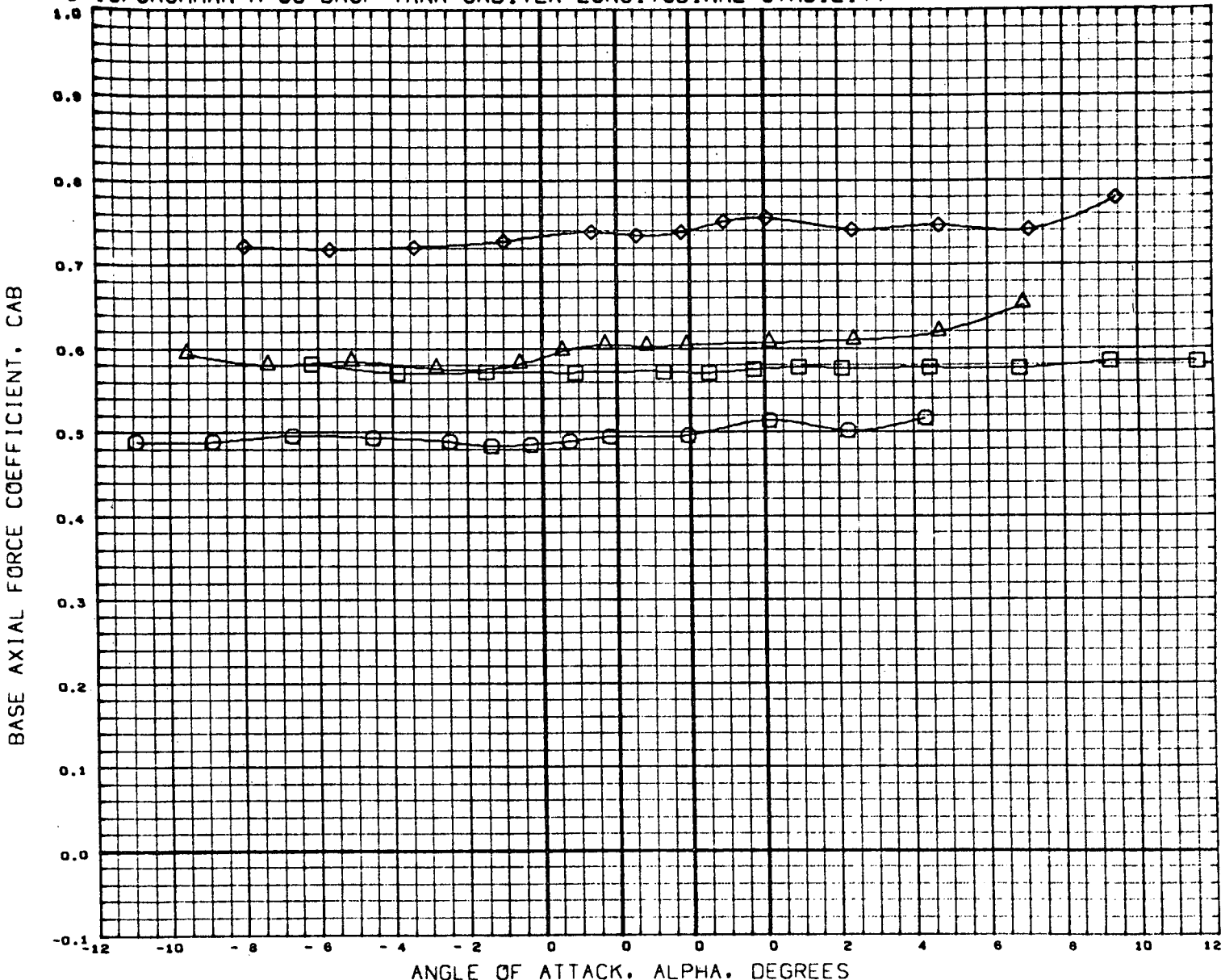
MS02-MSFC SIC H-33 ORBITER

OWVTCBF1

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

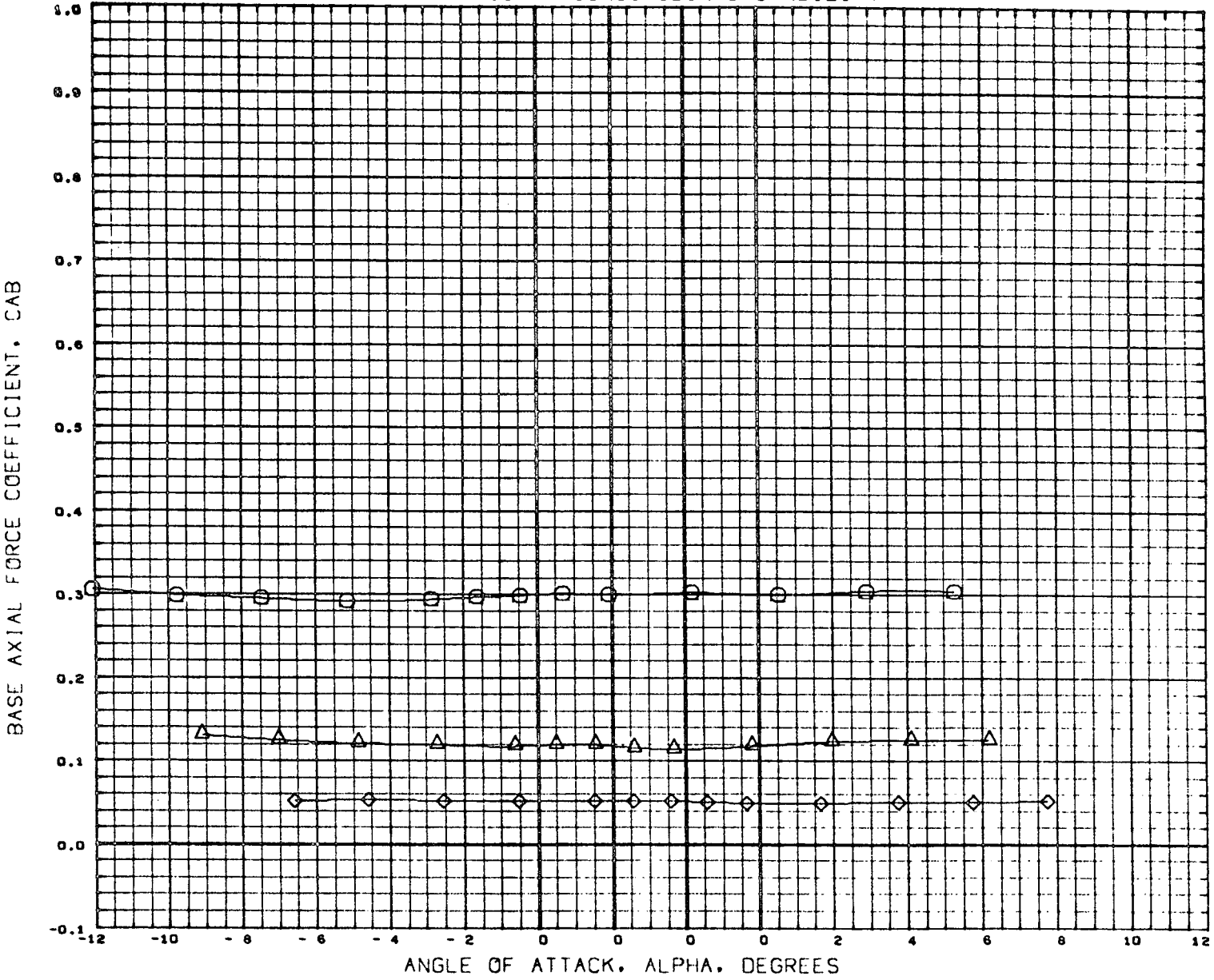


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.999	BETA	0.000	PHI	0.000
△	0.901	WNGIN	0.000		
◇	0.998				
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

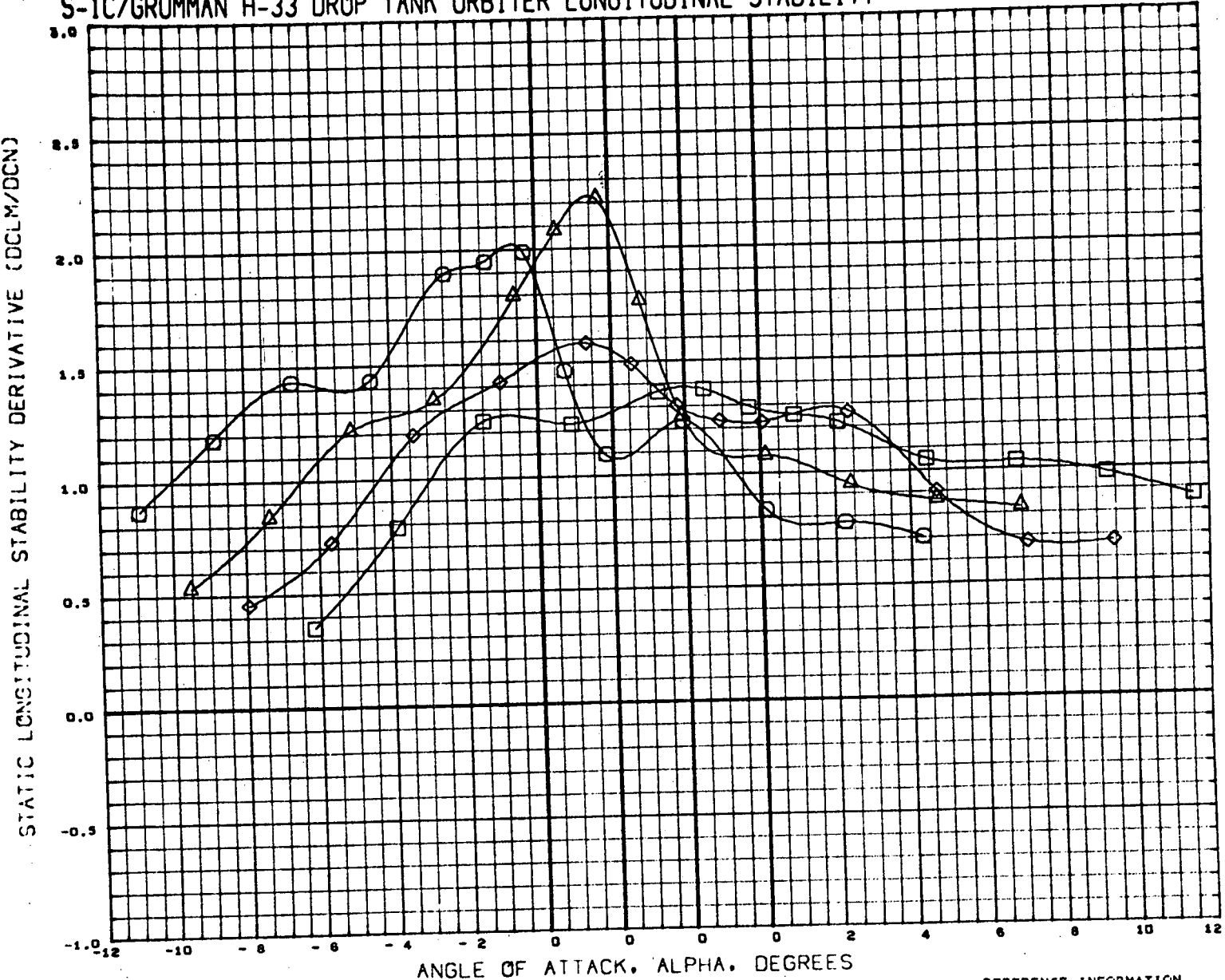


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△	3.480	WNGIN	0.000	
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YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES		
		BETA	PHI	0.000
○	0.599	0.000	0.000	0.000
△	0.901	0.000	0.000	0.000
◇	0.998	0.000	0.000	0.000
□	1.203	0.000	0.000	0.000

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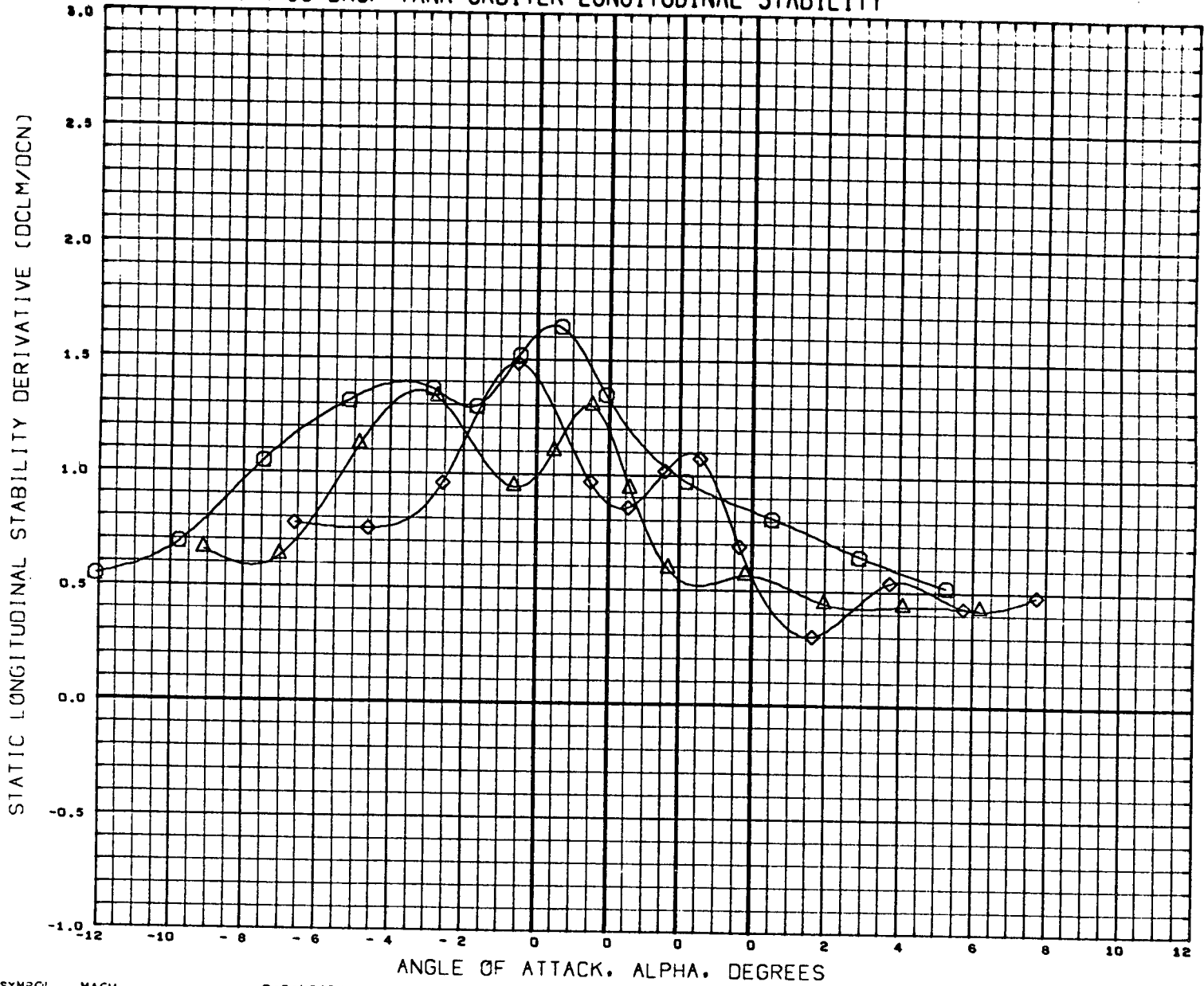
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(C44101) 12 MAY 72

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

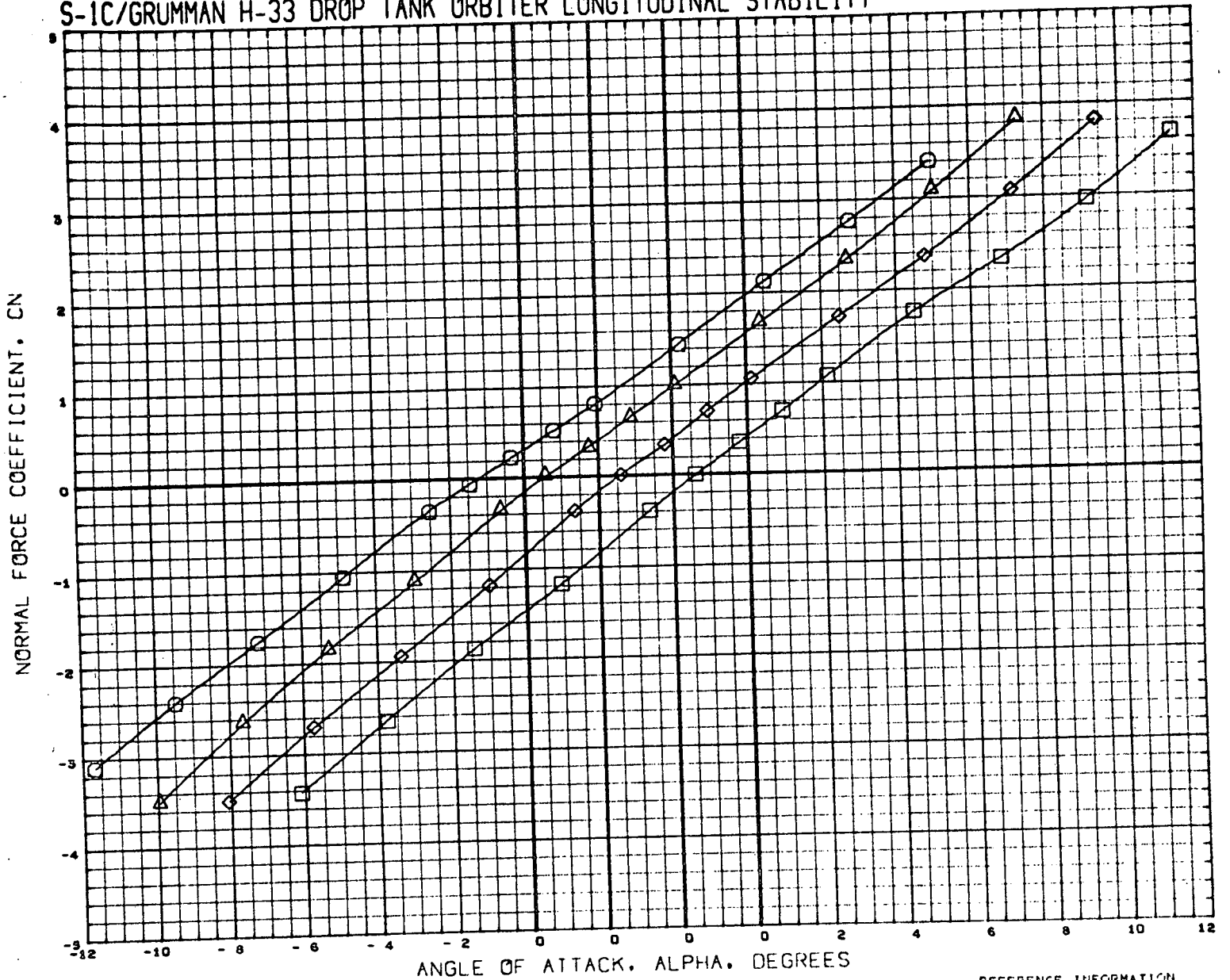


SYMBOL	MACH	PARAMETRIC VALUES			
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△	3.480	WNGIN	0.000		
◇	4.959				

REFERENCE INFORMATION		
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ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
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	1.099				
1.198					

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DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER

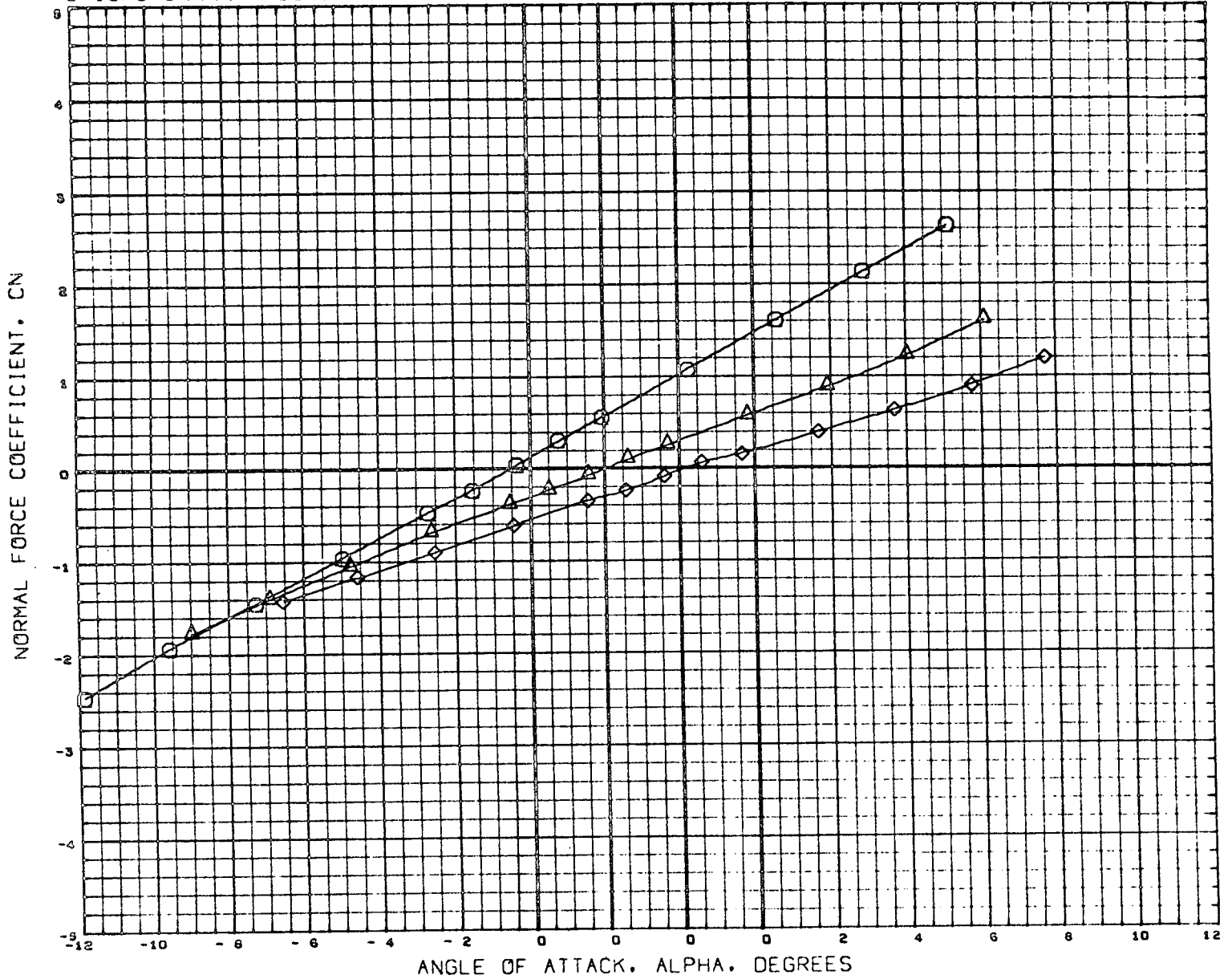
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

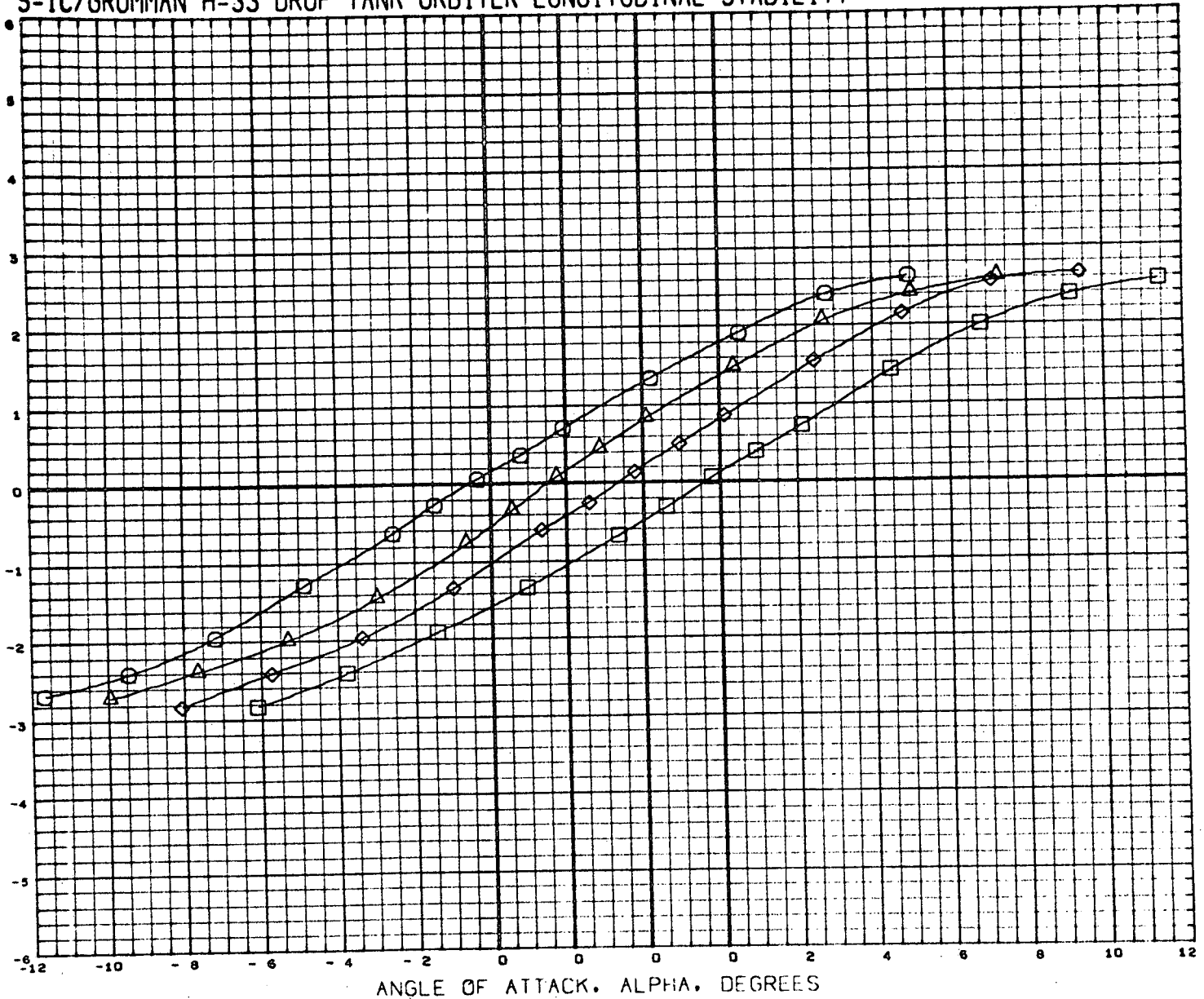


SYMBOL	MACH	BETA	PARAMETRIC VALUES		PHI
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△	3.480	WNGIN	0.000		
◇	4.999				

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
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XMRP	5.3990	IN.
YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



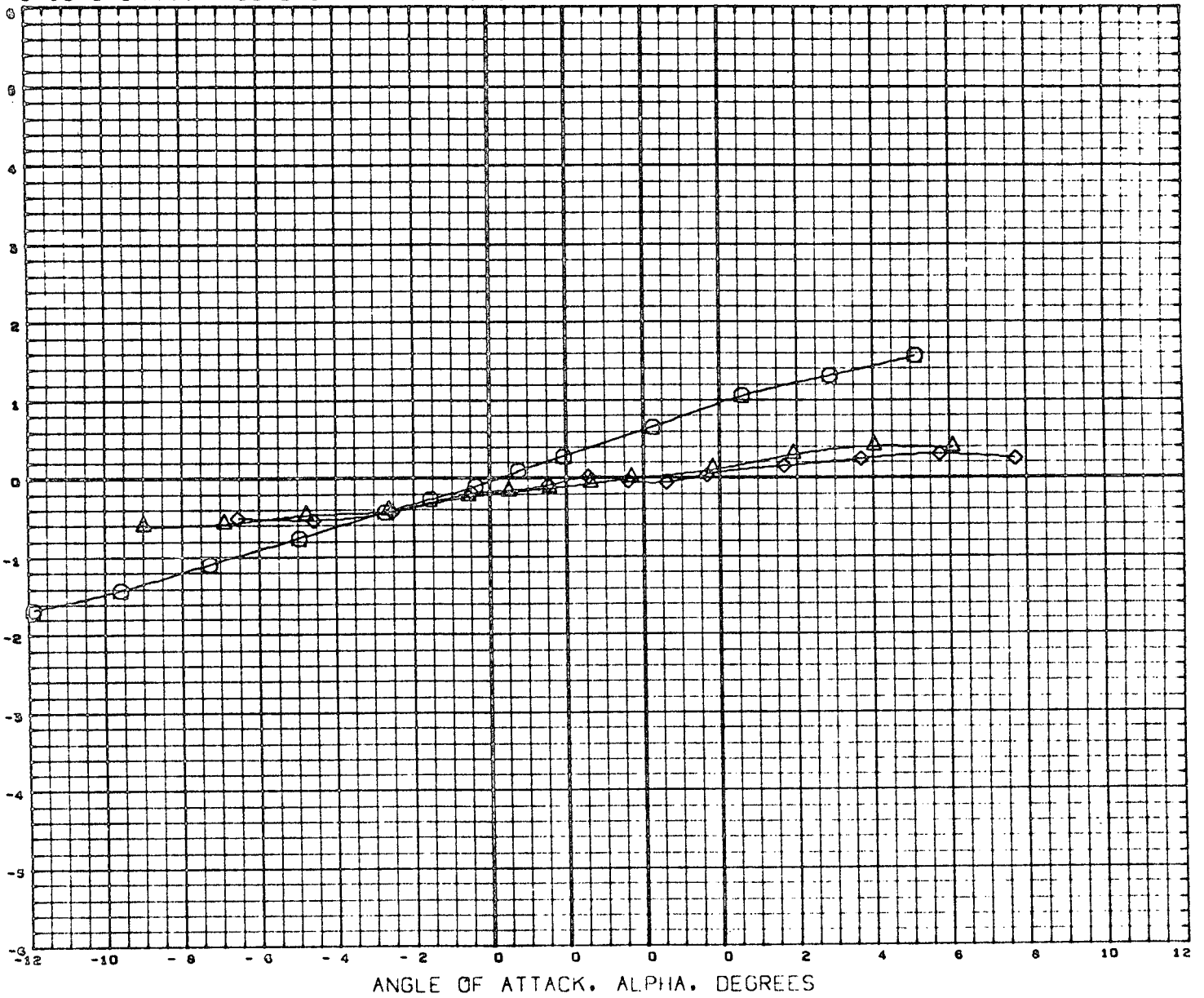
MACH
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 △ 1.000
 ◇ 1.099
 □ 1.198

PARAMETRIC VALUES
 BETA 0.000
 PHI 0.000
 WIGIN 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



MACH 1.965 BETA 0.000 PHI 0.000
 3.480 WNGIN 0.000
 4.959

REFERENCE INFORMATION
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 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
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DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.903	BETA	0.000	PHI	0.000
△	1.000	WIGIN	0.000		
◇	1.099				
□	1.198				

REFERENCE INFORMATION		
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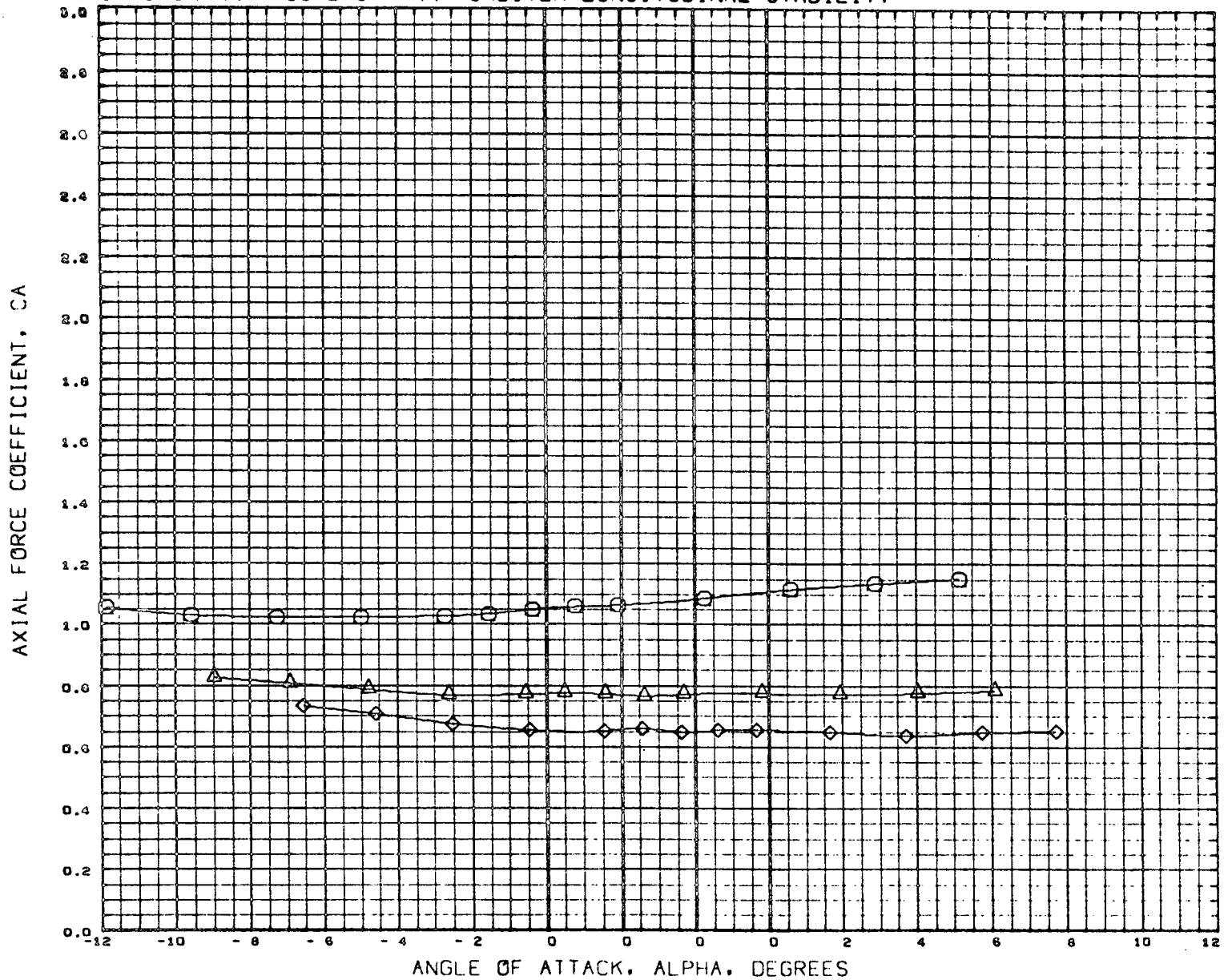
M502-MSFC-S1C H-33 ORBITER

OWVCBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



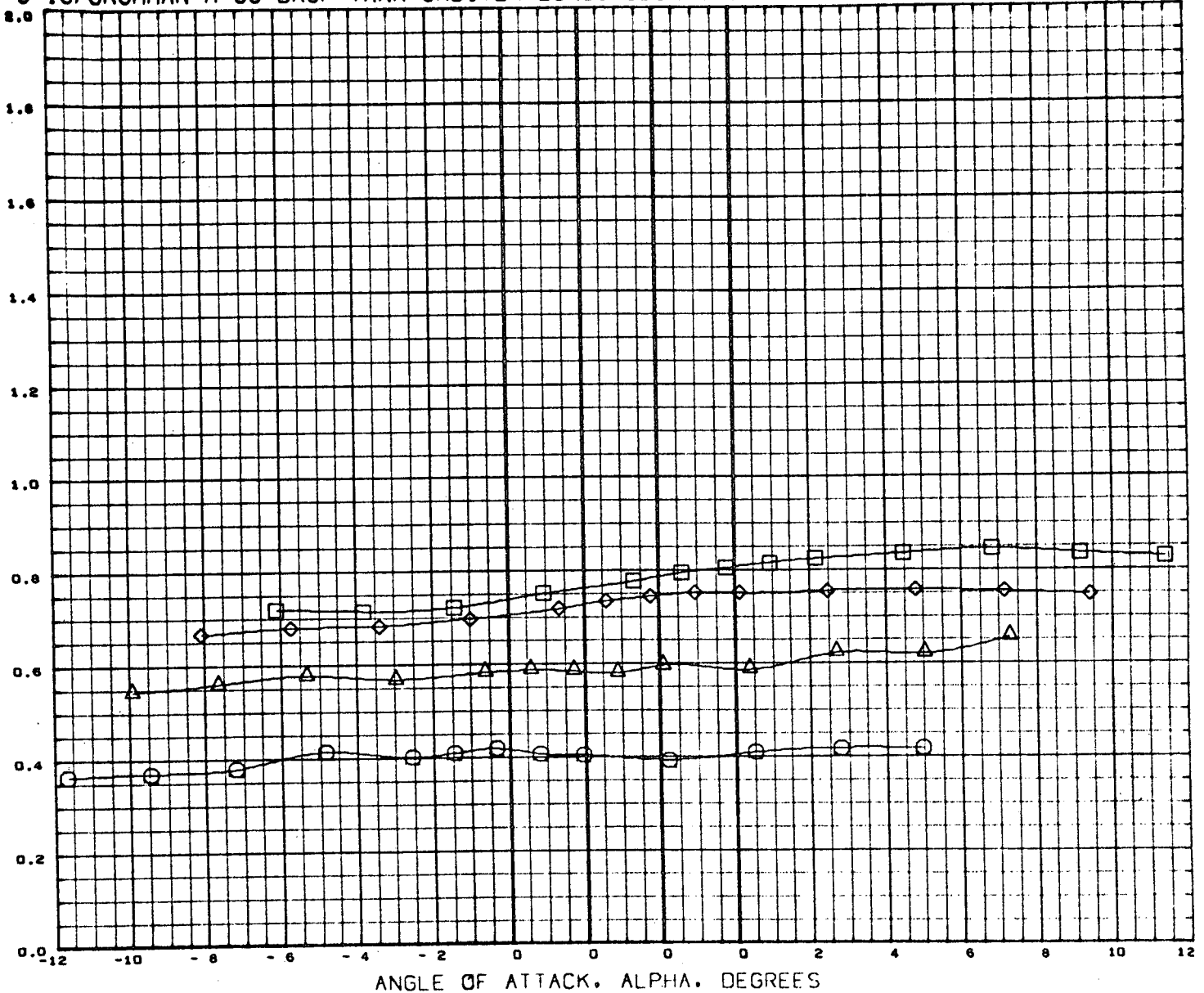
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BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA MIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

FOREBODY AXIAL FORCE COEFFICIENT, CAF



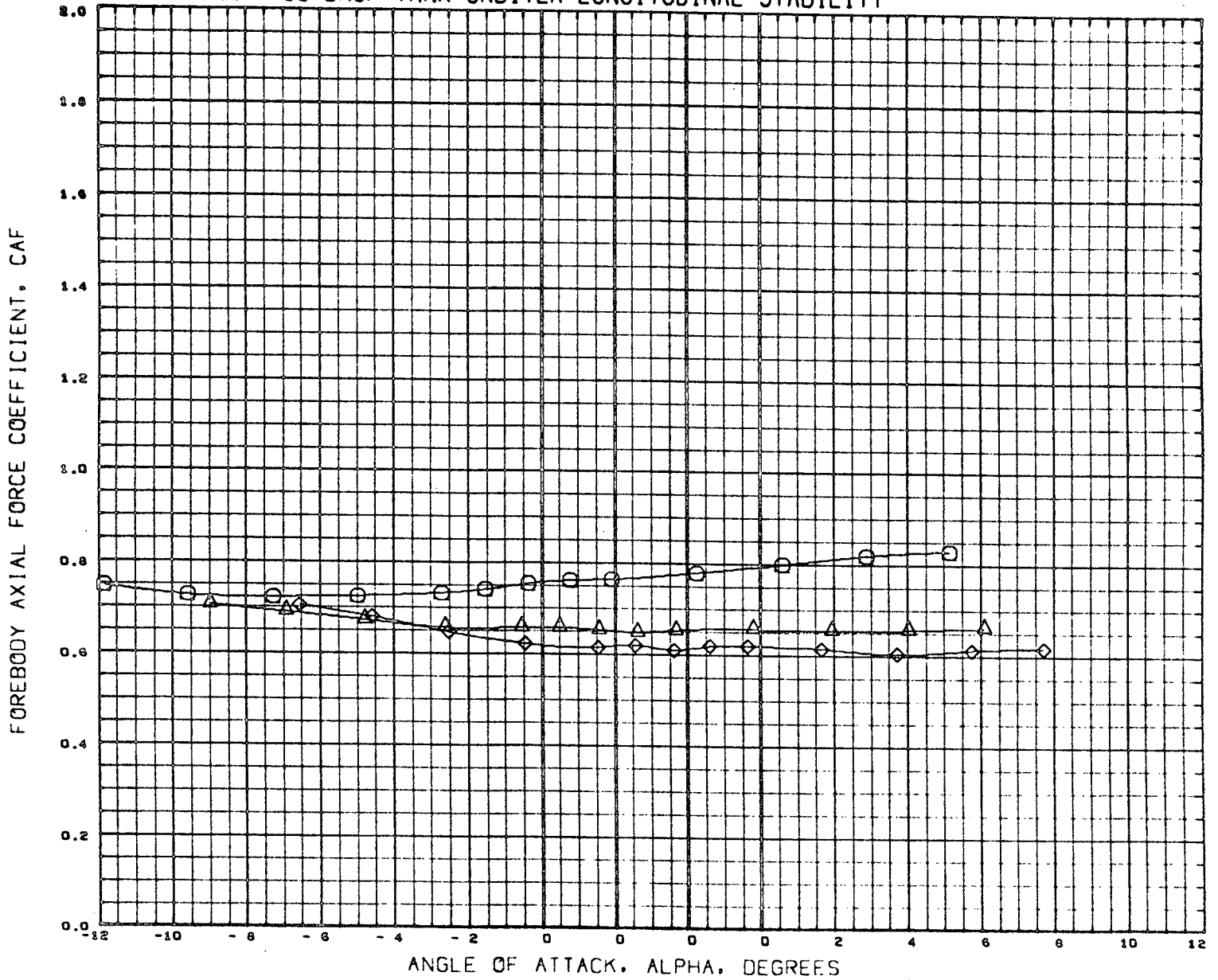
ANGLE OF ATTACK, ALPHA, DEGREES

SYMBOL	MACH	PARAMETRIC VALUES	
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△	1.000	PHI	0.000
◇	1.099	WNCIN	0.000
□	1.198		

REFERENCE INFORMATION		
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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	1.965	BETA	0.000	PHI	0.000
△	3.480	WGIN	0.000		
◇	4.999				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
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M502-MSFC-S1C H-33 ORBITER

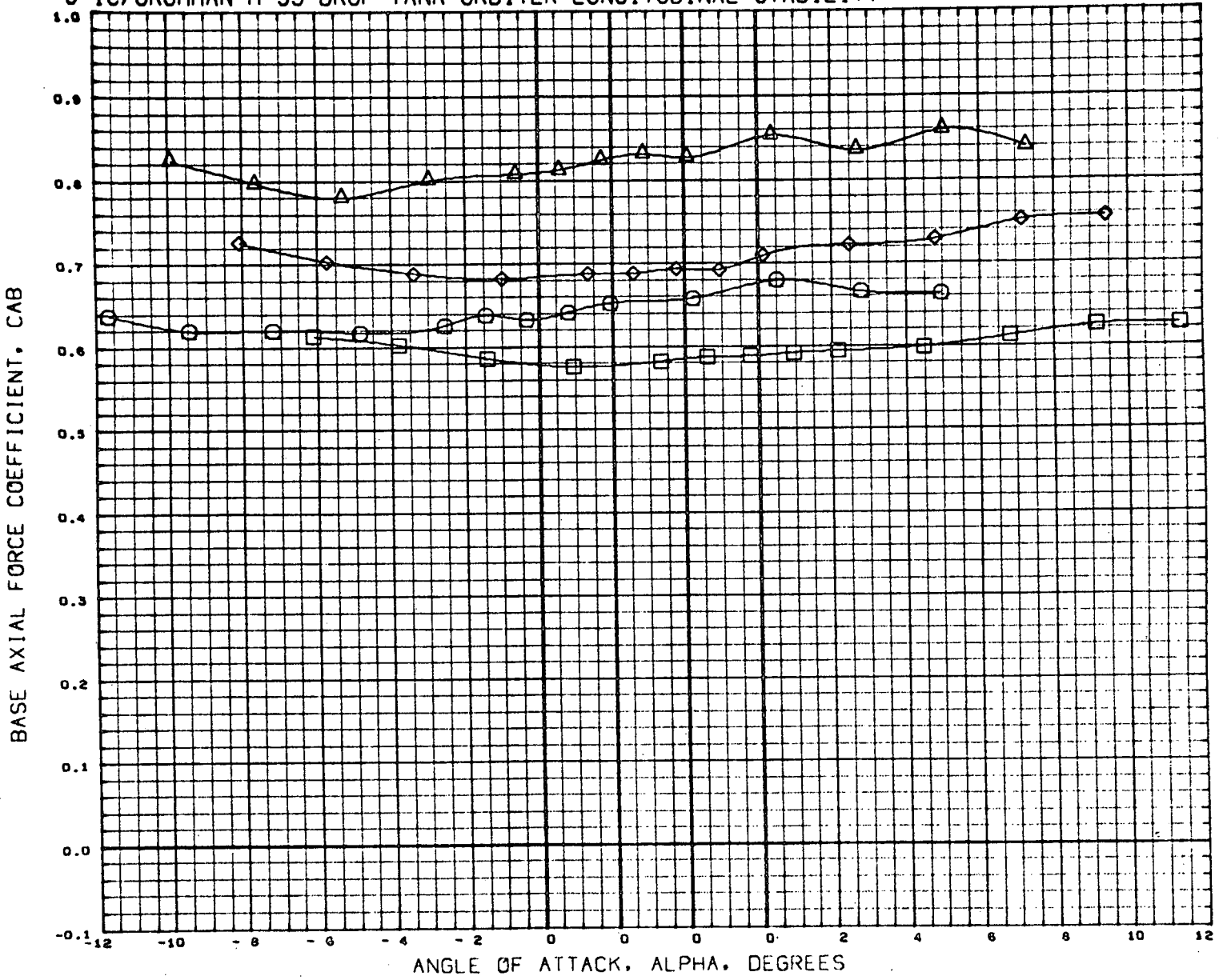
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(C44051) 12 MAY 72

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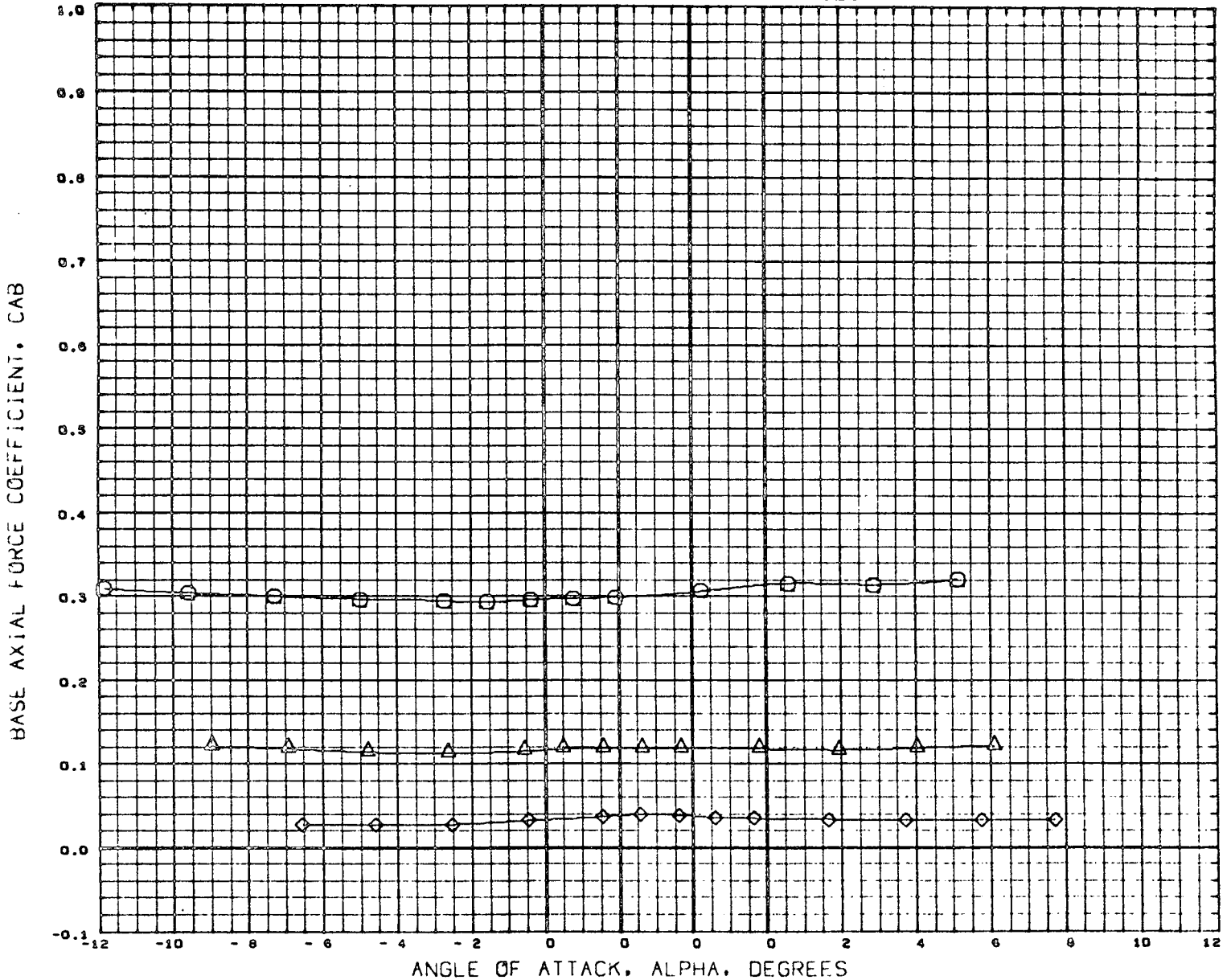
56

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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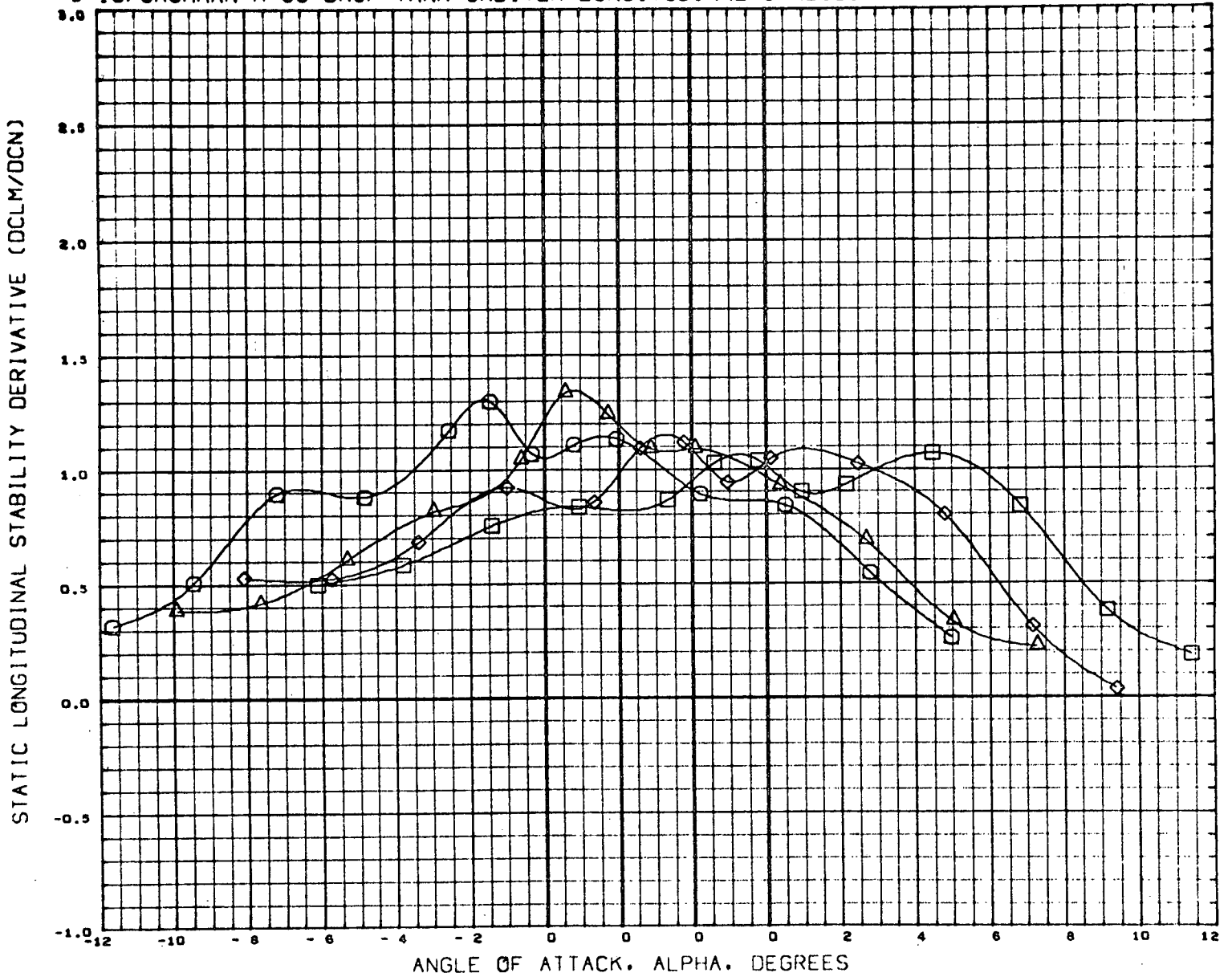
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
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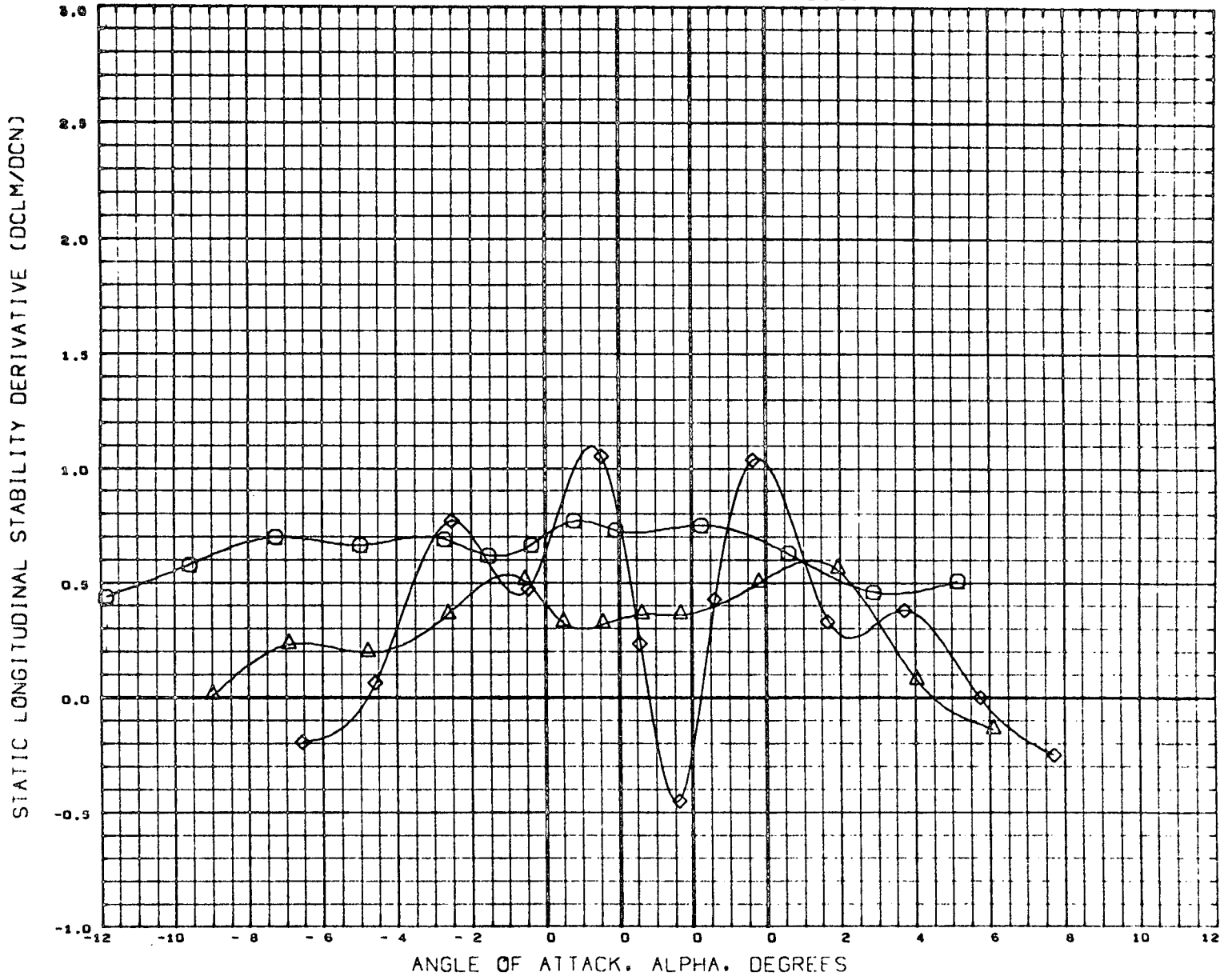
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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M502-MSFC-S1C H-33 ORBITER		OWVCBF		(C44051)	12 MAY 72	PAGE	59	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

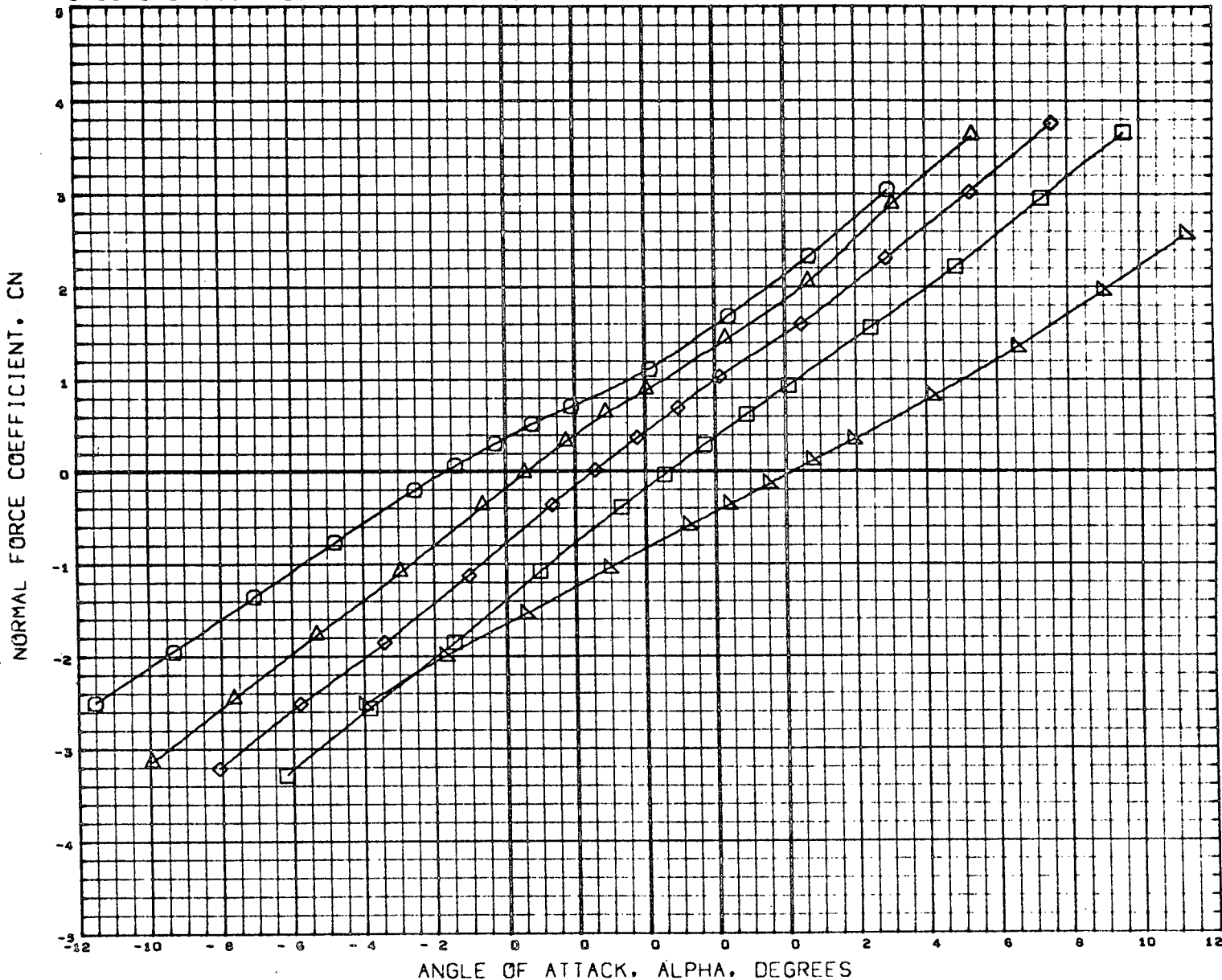


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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

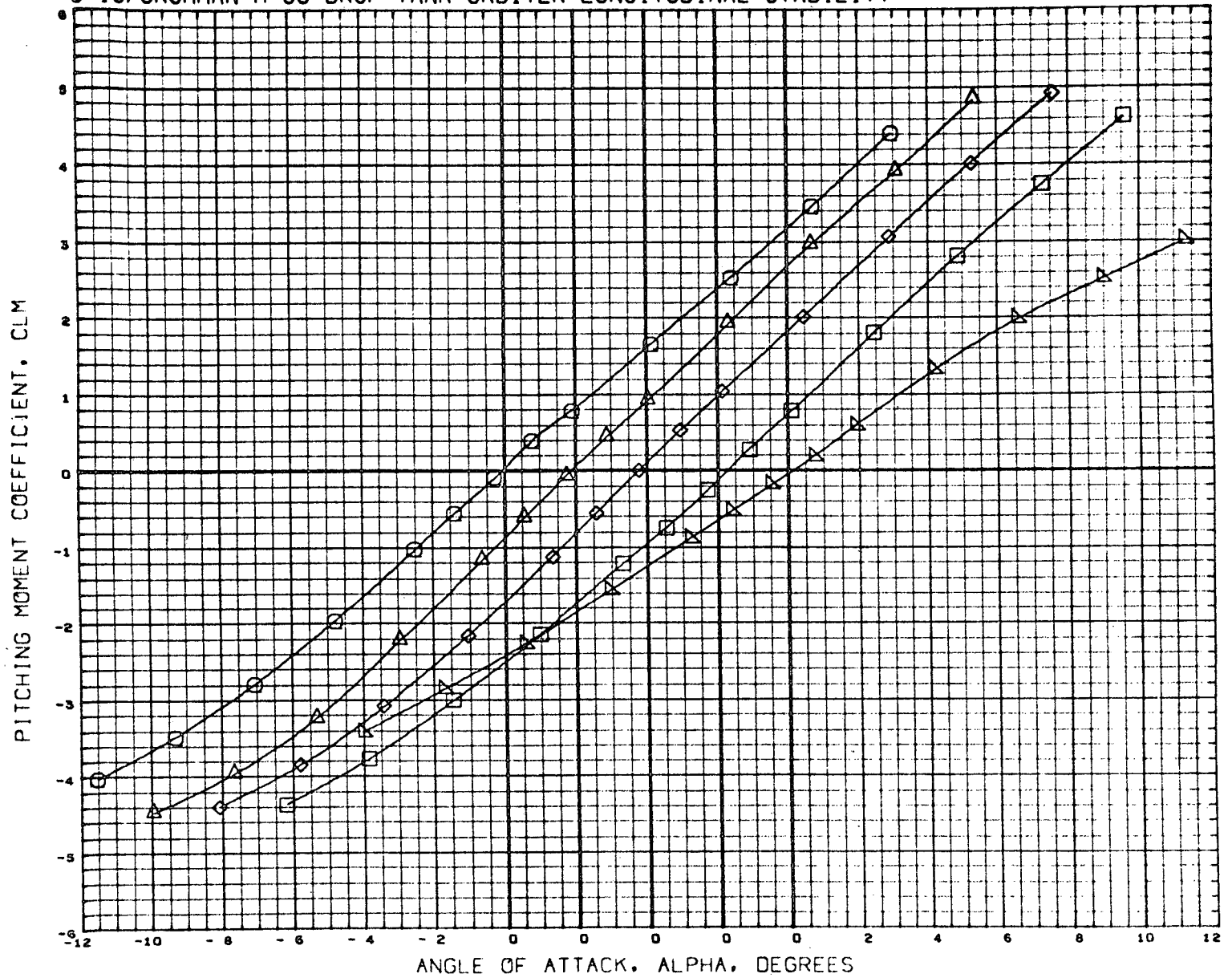


SYMBOL	MACH	PARAMETRIC VALUES			
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DATA HIST. CODE CCCC

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



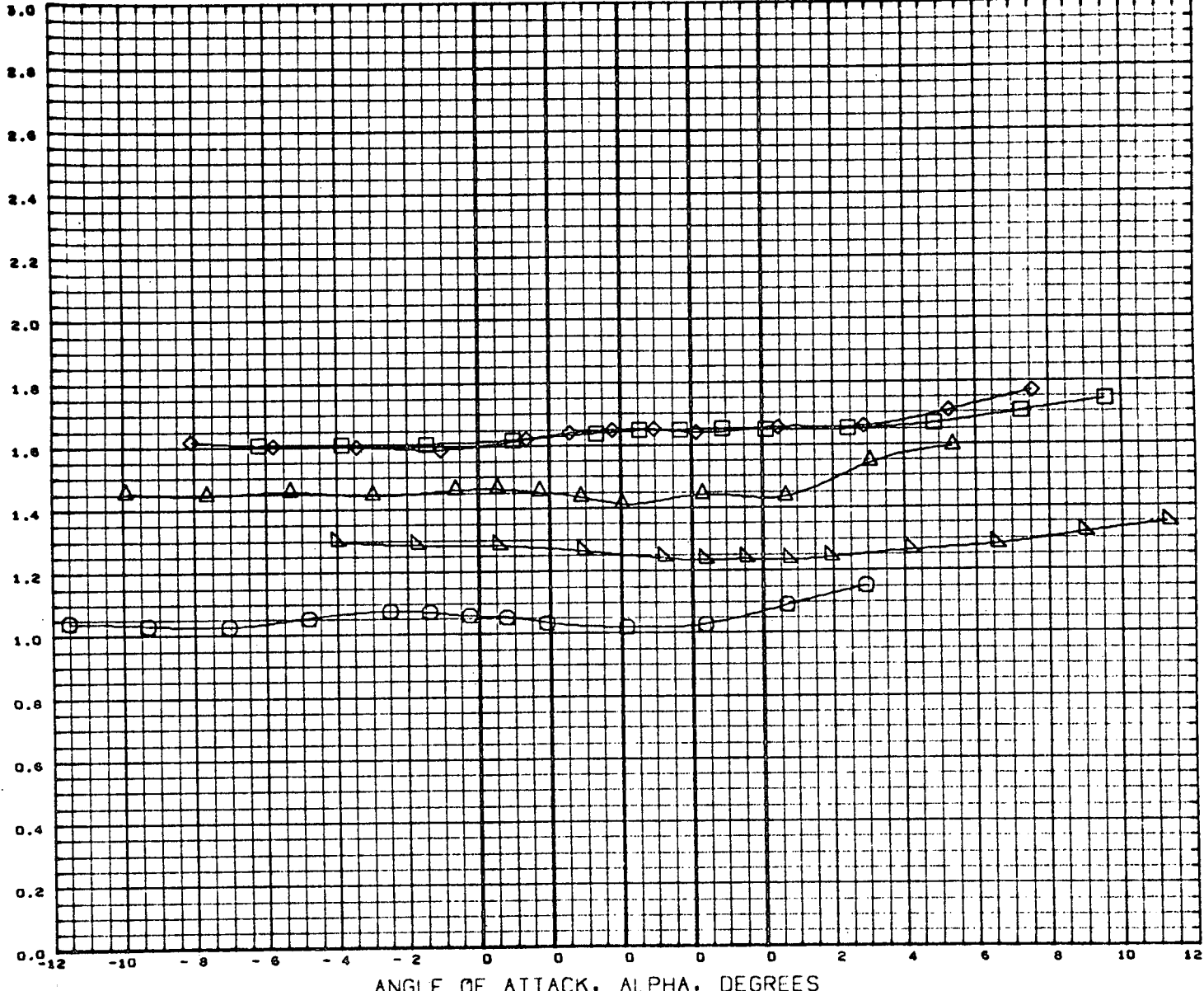
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

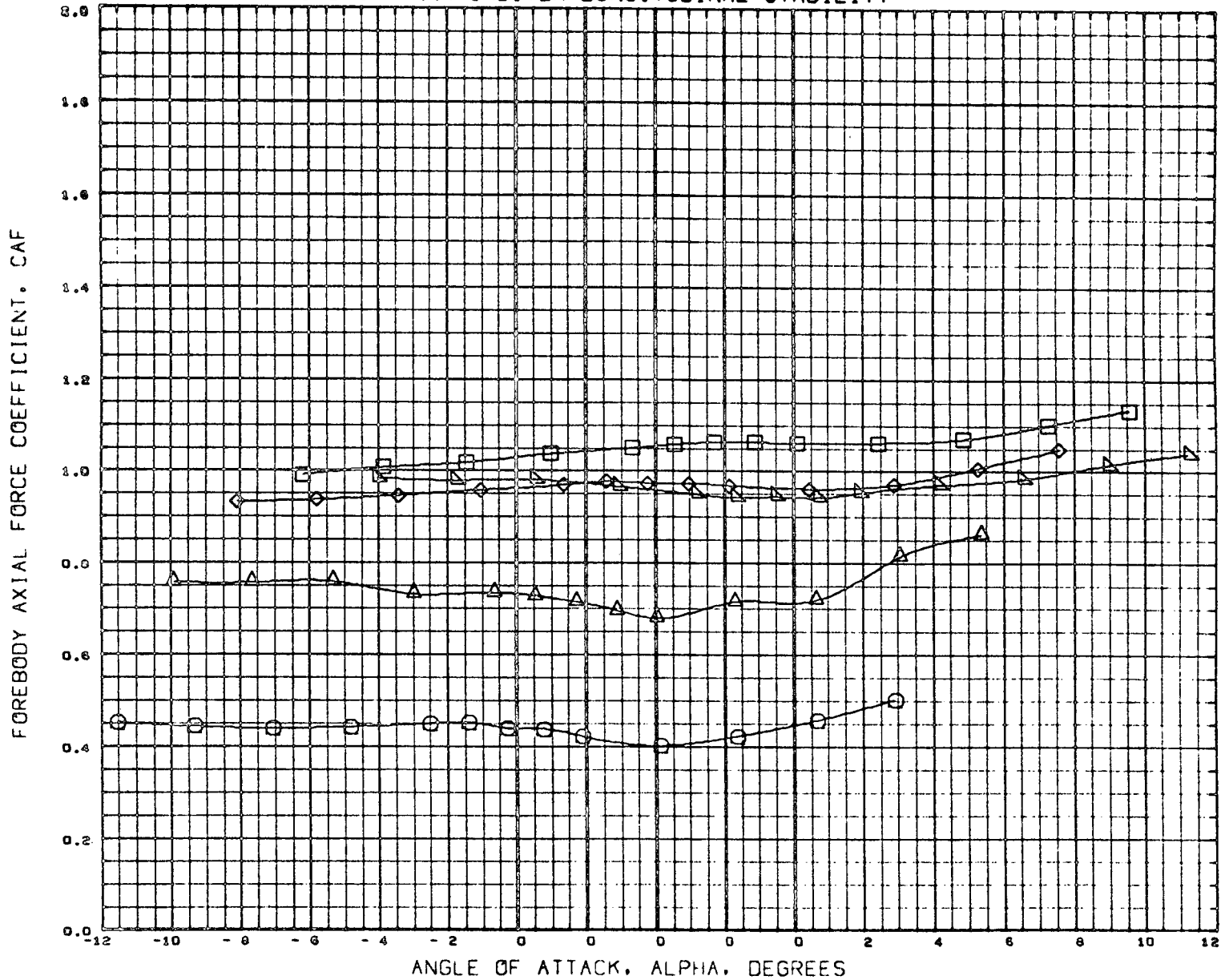
AXIAL FORCE COEFFICIENT, C_X



SYMBOL     	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
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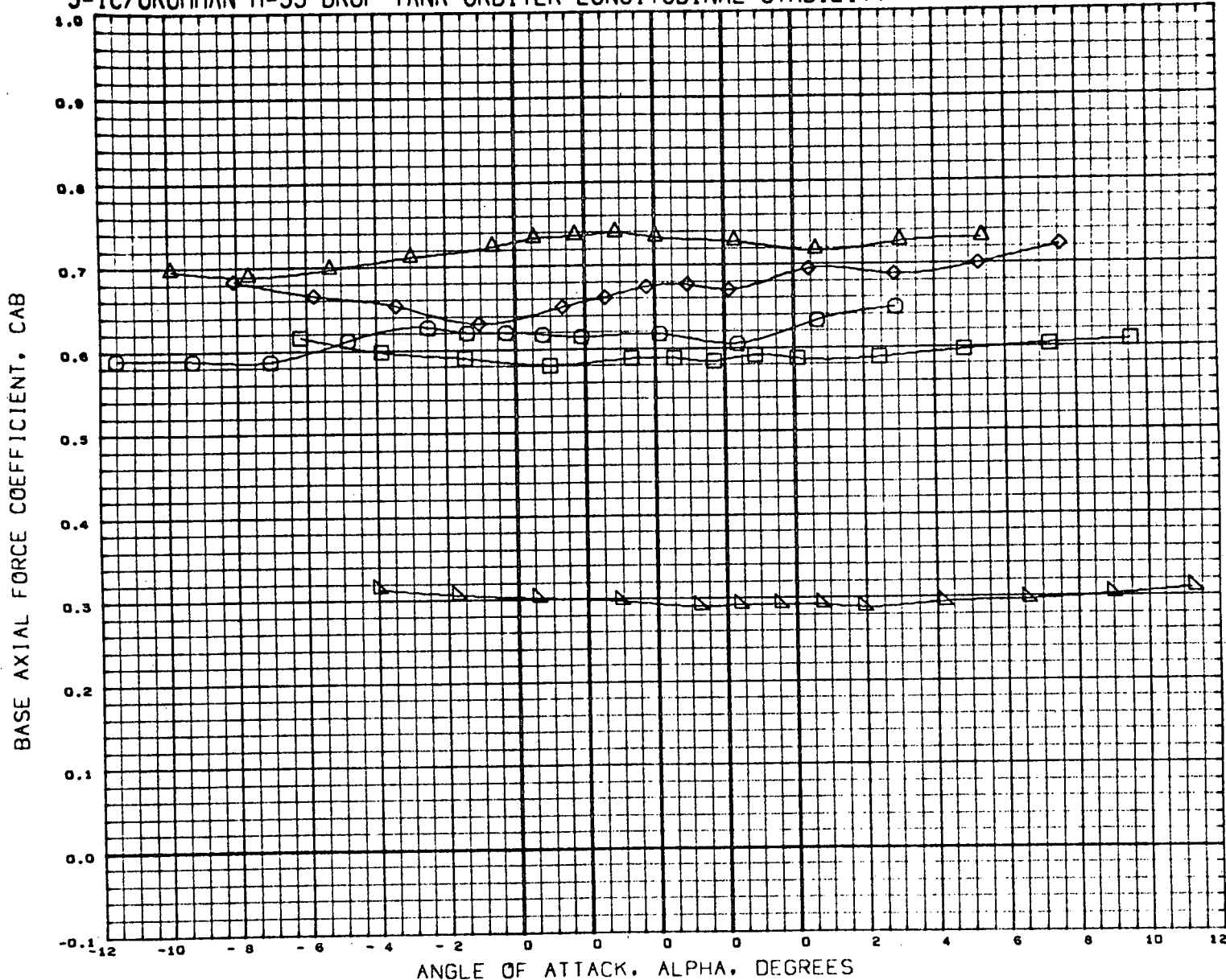
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL		MACH		PARAMETRIC VALUES			REFERENCE INFORMATION		
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◇	◇	0.996	WNCIN	0.000			LREF	1.3330	IN.
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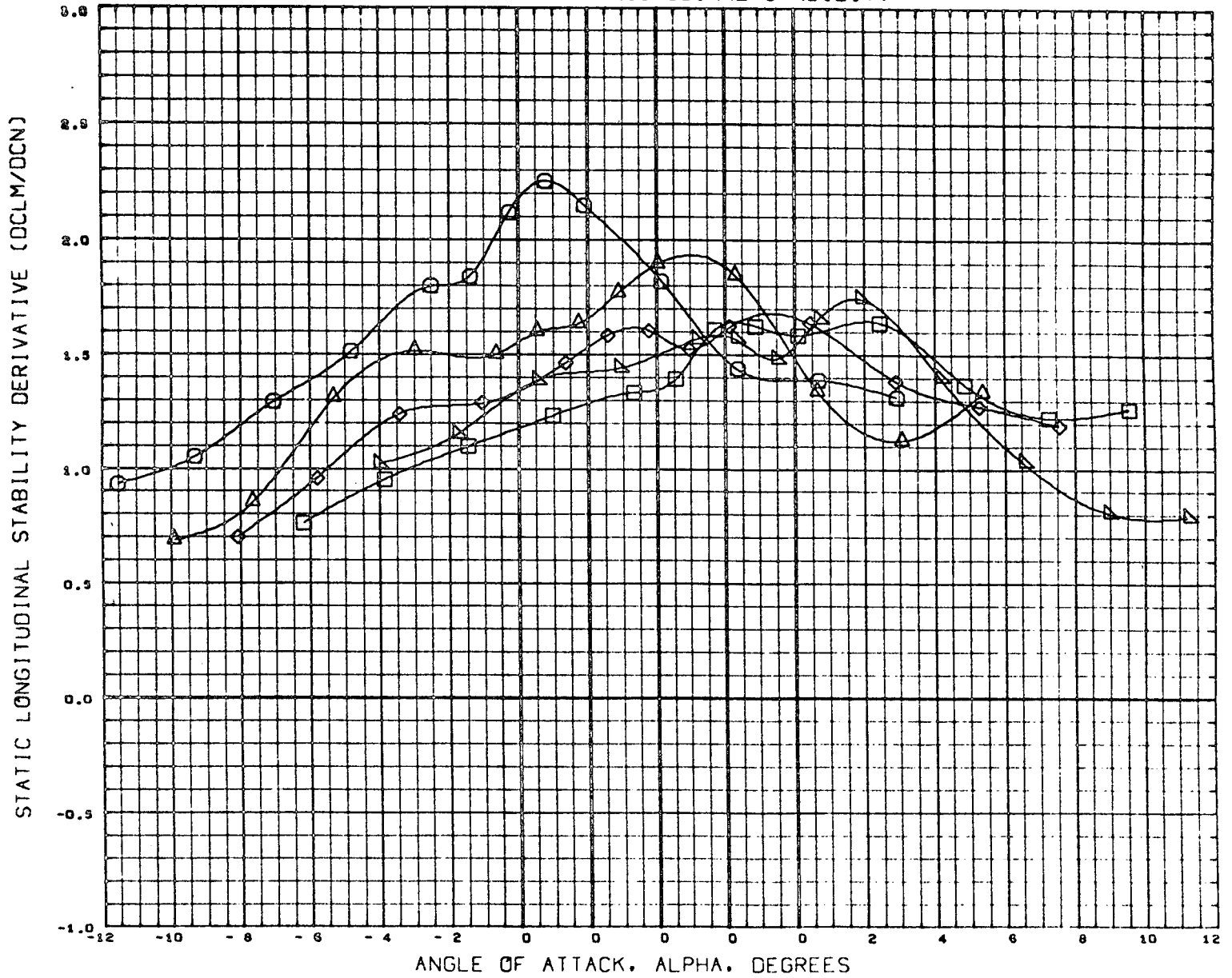
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL 	MACH	PARAMETRIC VALUES		REFERENCE INFORMATION				
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	0.996	WGIN	0.000			LREF	1.3330	IN.
	1.100					BREF	1.3330	IN.
	1.196					XMRP	5.3990	IN.
1.964					YMRP	0.0000	IN.	
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DATA HIST. CODE CCCGC

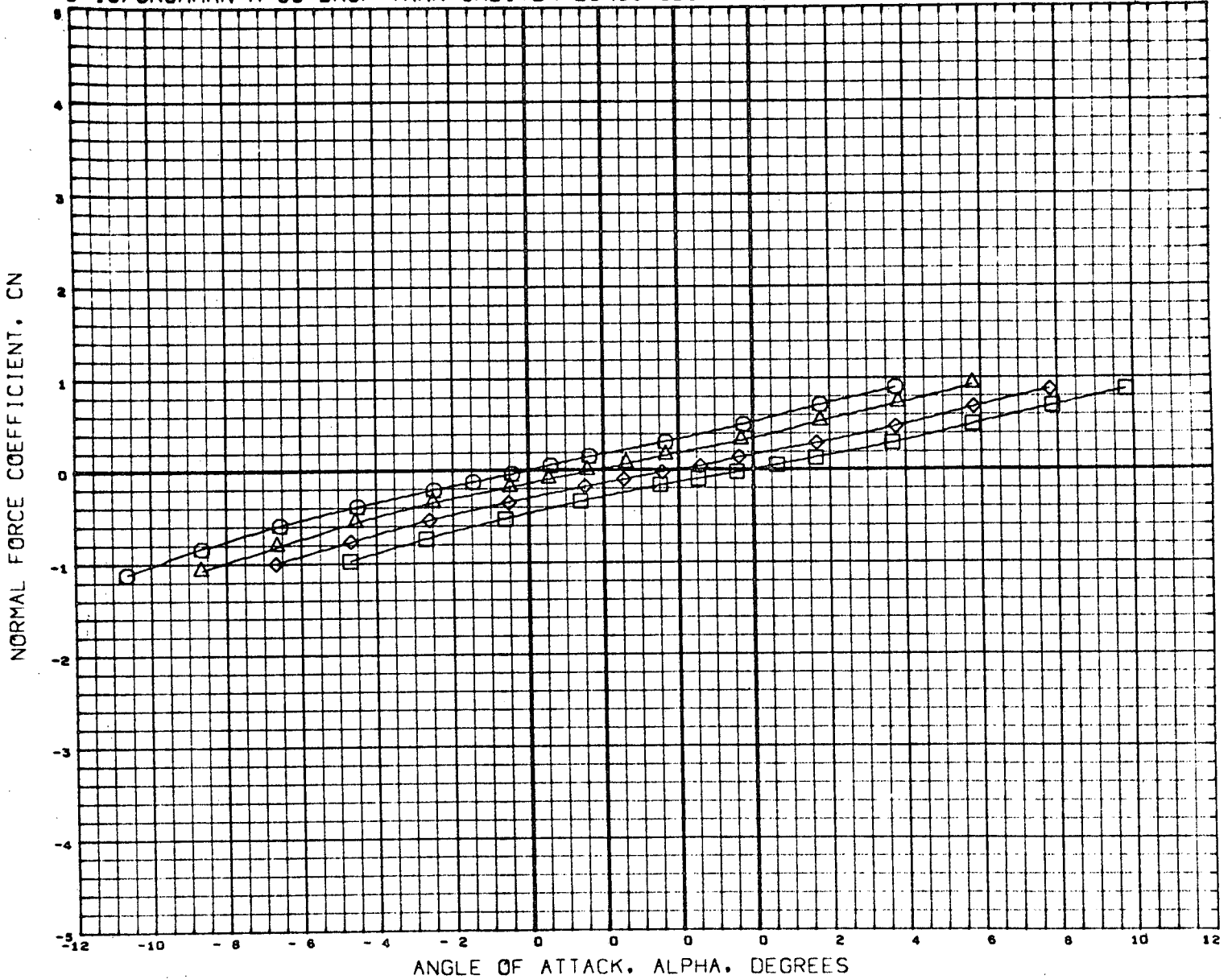
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
○	0.897	BETA	0.000	PHI	0.000	SREF	1.3960	93. IN.
△	0.996	WINGIN	0.000			LREF	1.3330	1N.
◇	1.100					BREF	1.3330	1N.
□	1.196					XMRP	5.3990	1N.
×	1.964					YMRP	0.0000	1N.
						ZMRP	0.0000	1N.
						SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.001	WNGTN	0.000		
◇	1.104				
□	1.205				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

M502-MSFC-S1C H-33 ORBITER

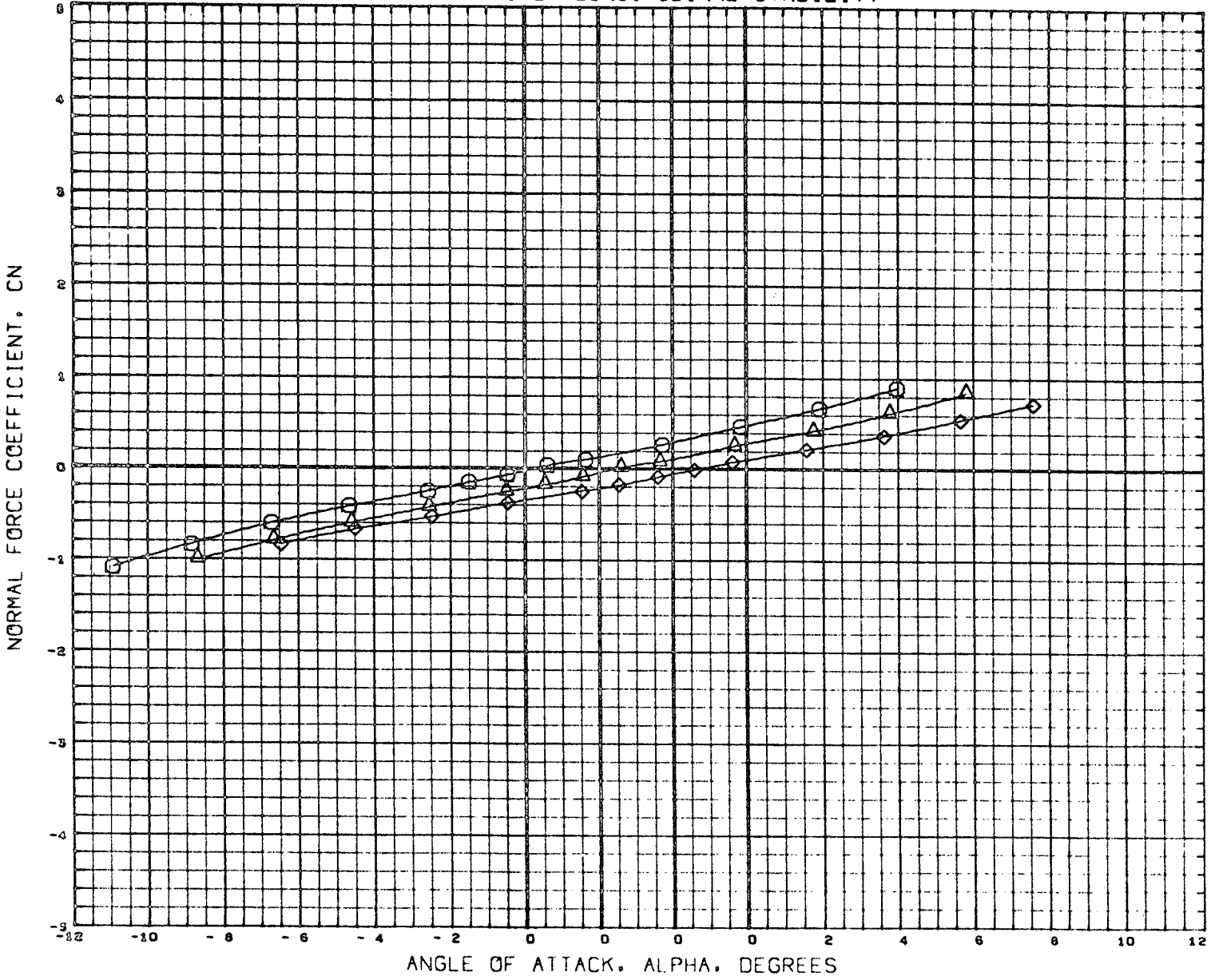
OVCBF

(C44091) 12 MAY 72

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

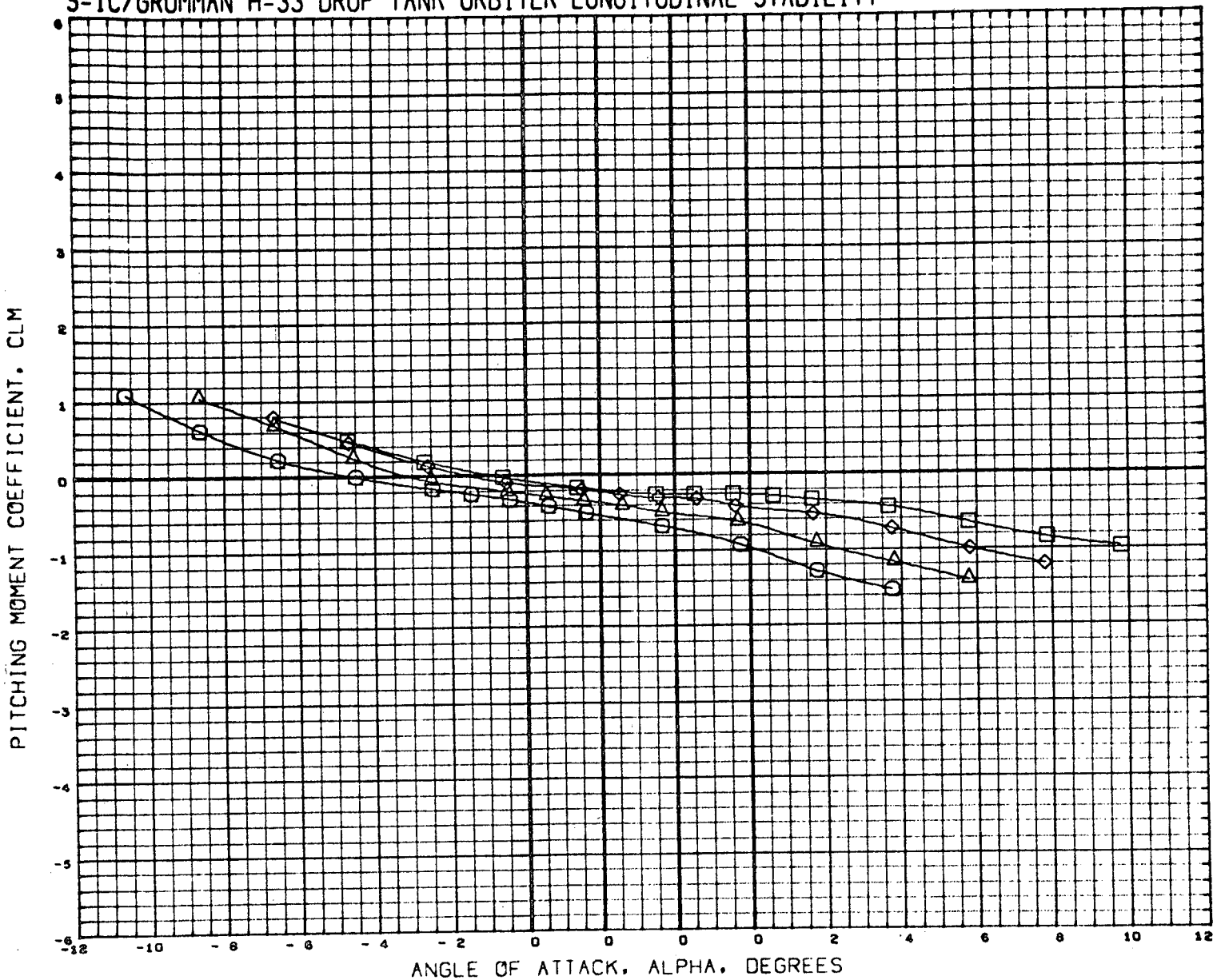


SYMBOL	MACH	PARAMETRIC VALUES			
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△	3.480	WGIN	0.000		
◇	4.959				

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LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

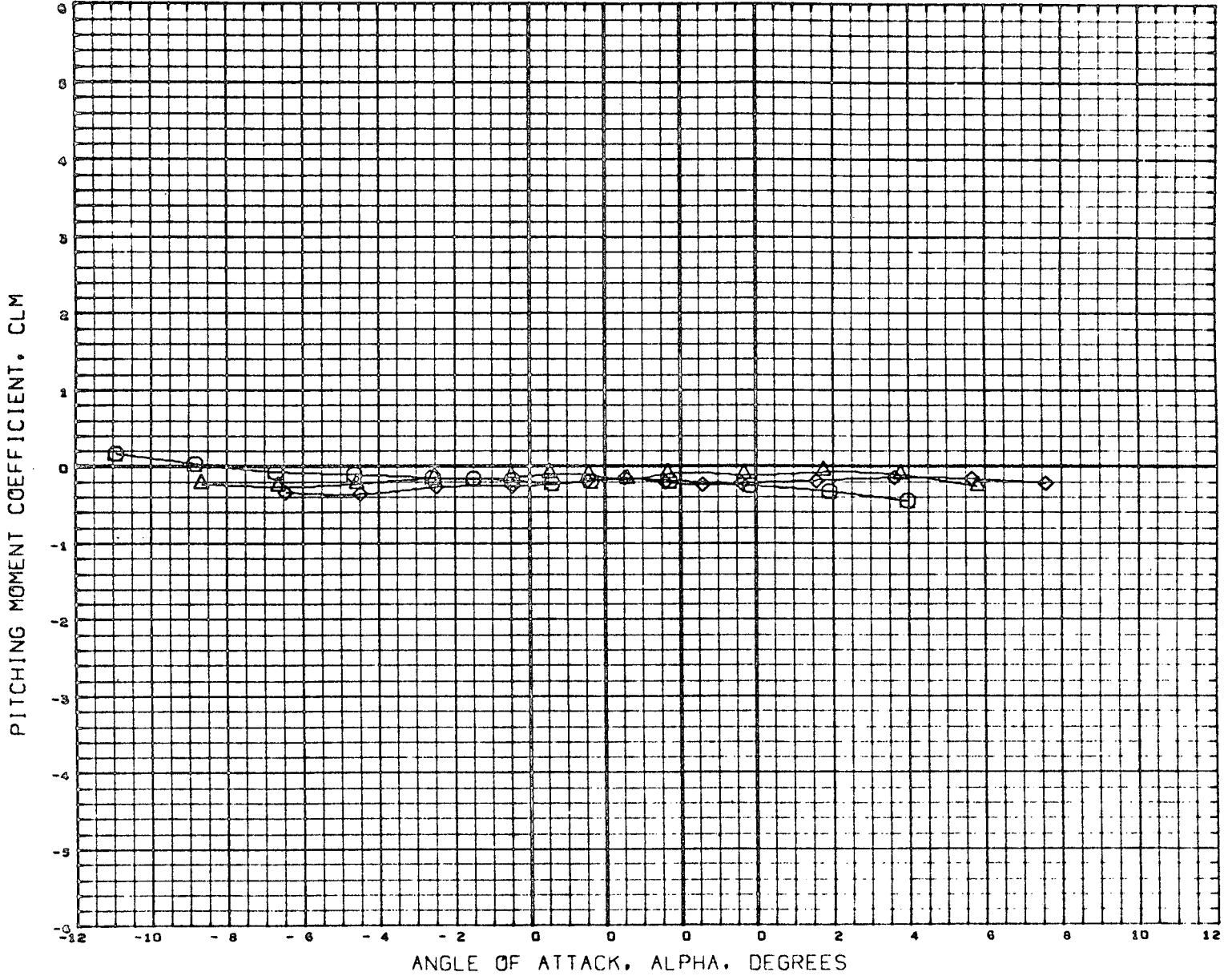
S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL ○ △ ◇ □	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
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	1.001	WNCIN	0.000			LREF	1.3330	IN.
	1.104					BREF	1.3330	IN.
	1.205					XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	BETA	PARAMETRIC VALUES	PHI
○	3.959	0.000	0.000	0.000
△	3.480	0.000	0.000	0.000
◇	4.959	0.000	0.000	0.000

REFERENCE INFORMATION		
SREF	1.3960	SO. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCGC

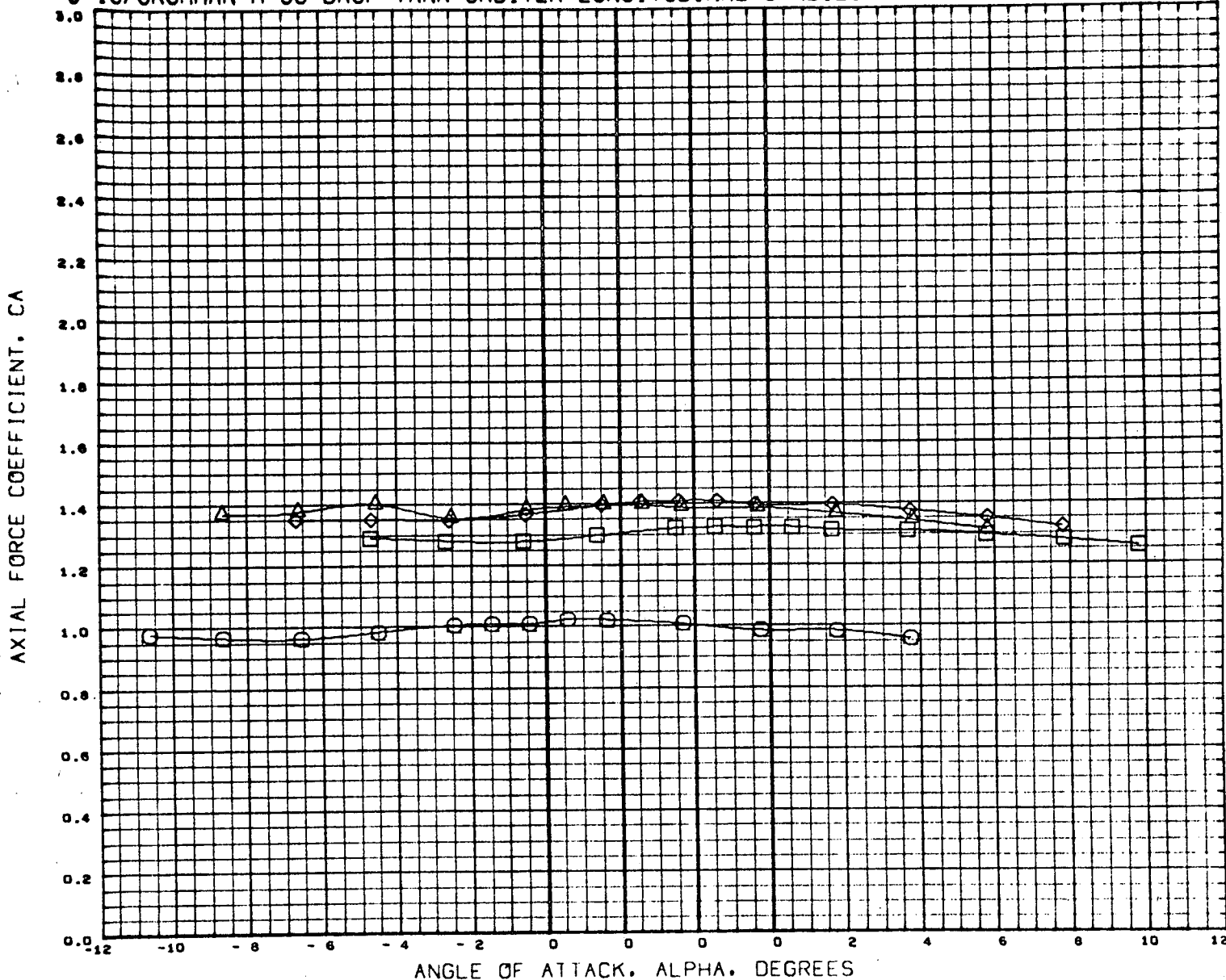
M502-MSFC-S1C H-33 ORBITER

OVCBF

(C44091) 12 MAY 72

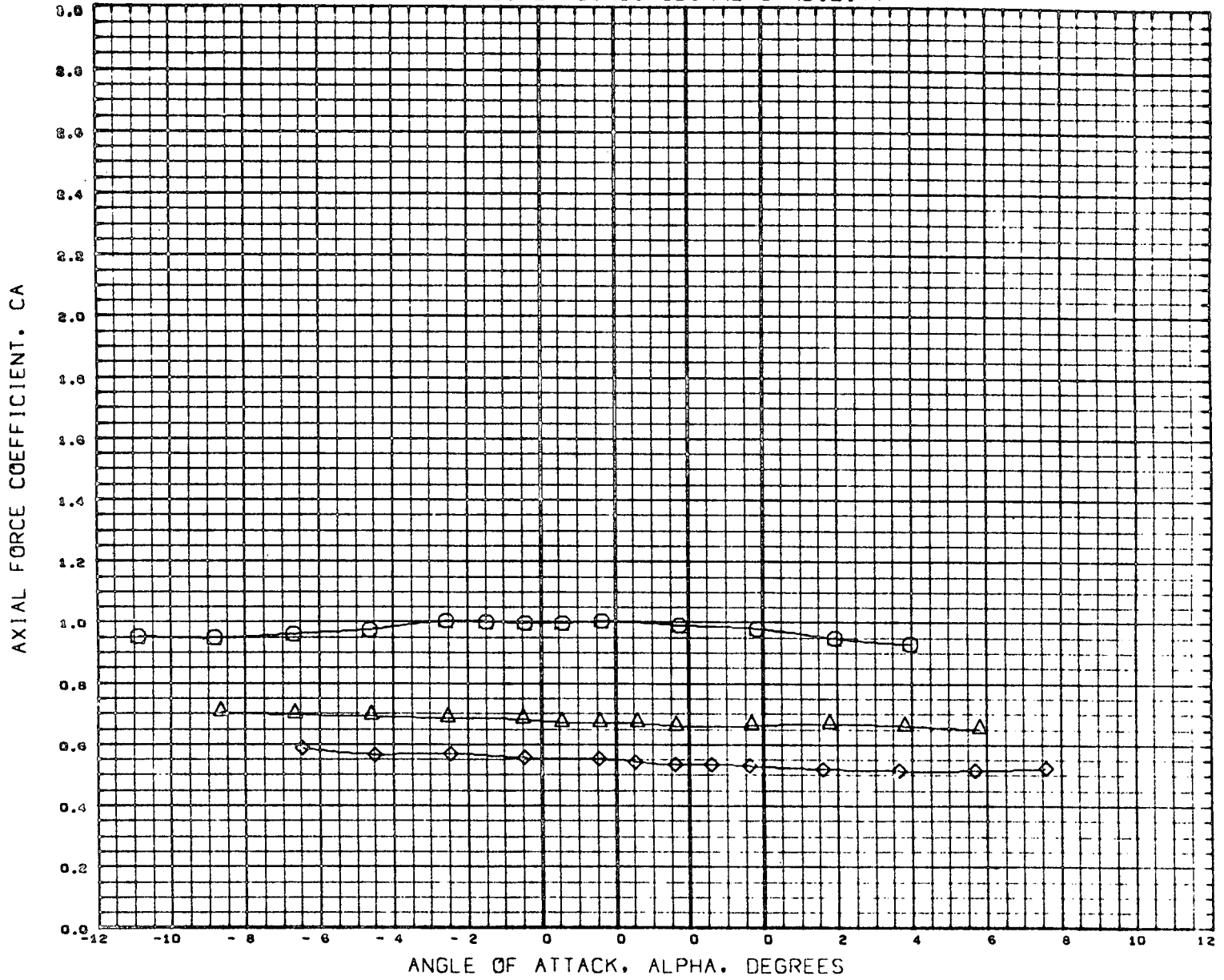
PAGE 70

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL ○ ◇ □	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION	
	0.900	BETA	0.000	PHI	0.000	SREF 1.3960 SQ. IN.
	1.001	WNGIN	0.000			LREF 1.3330 IN.
	1.104					BREF 1.3330 IN.
	1.205					XMRP 5.3990 IN.
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

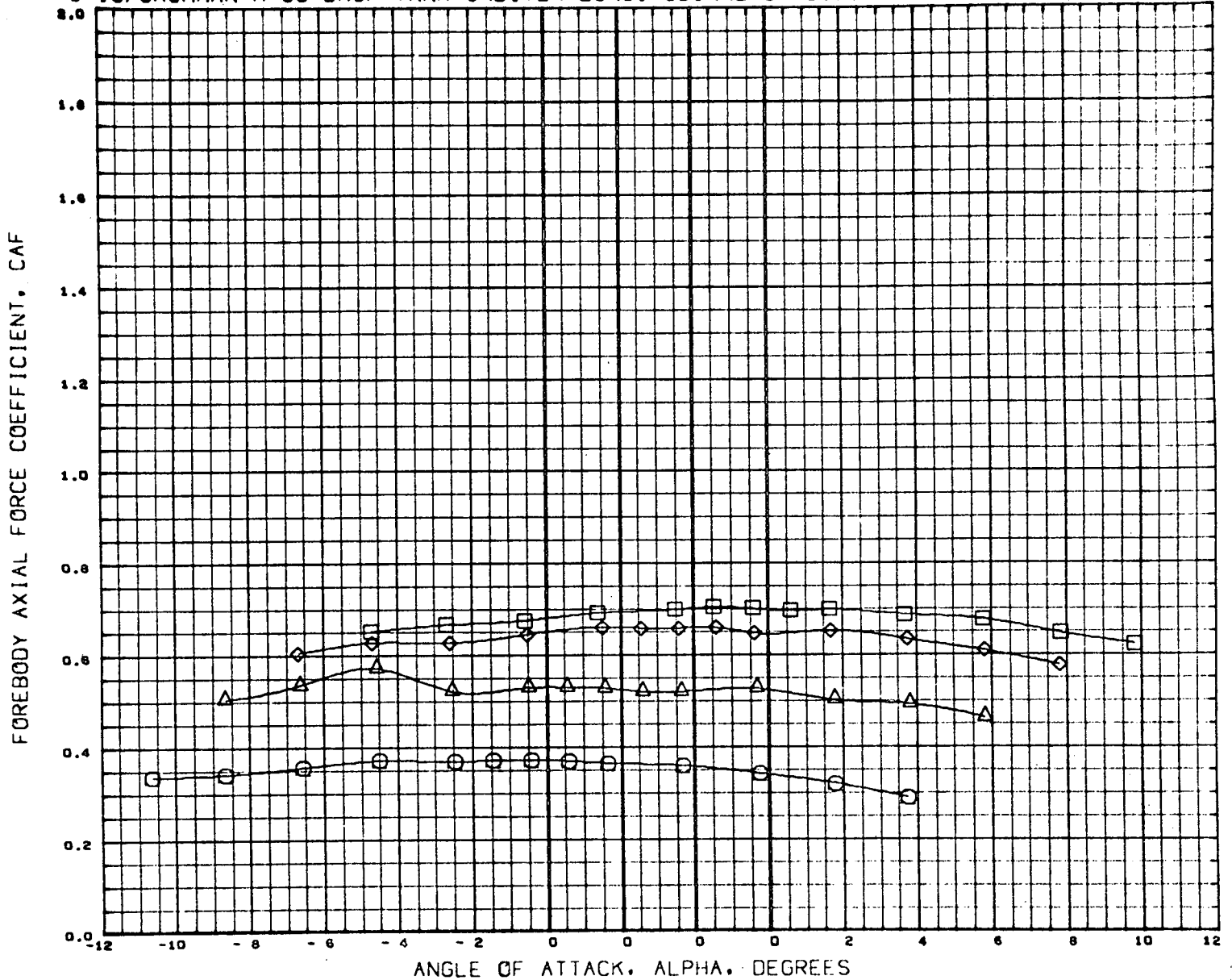


SYMBOL	MACH	PARAMETRIC VALUES		
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△	3.480	WIGIN	0.000	
◇	4.999			

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



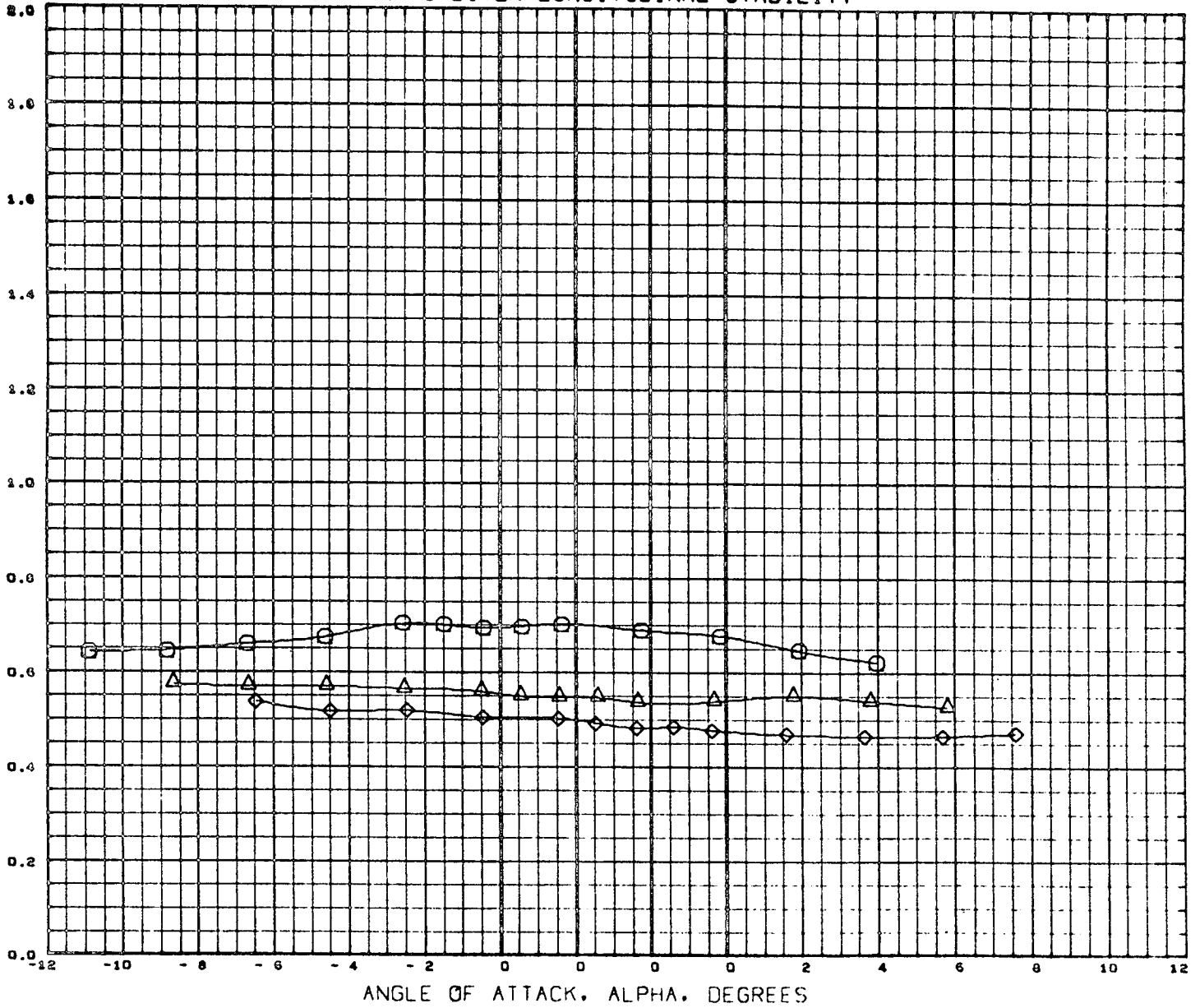
SYMBOL	MACH	PARAMETRIC VALUES			
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△	1.001	WNGIN	0.000		
◇	1.104				
□	1.205				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMHP	5.3990	IN.
YMHP	0.0000	IN.
ZMHP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

FOREBODY AXIAL FORCE COEFFICIENT, CAF



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
○	1.959	BETA	0.000	PHI	0.000	SREF	1.3960	50. IN.
△	3.480	WING IN	0.000			LREF	1.3330	IN.
◇	4.999					BREF	1.3330	IN.
						XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCGGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.001	WGIN	0.000		
◇	1.104				
□	1.205				

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER

OVCBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

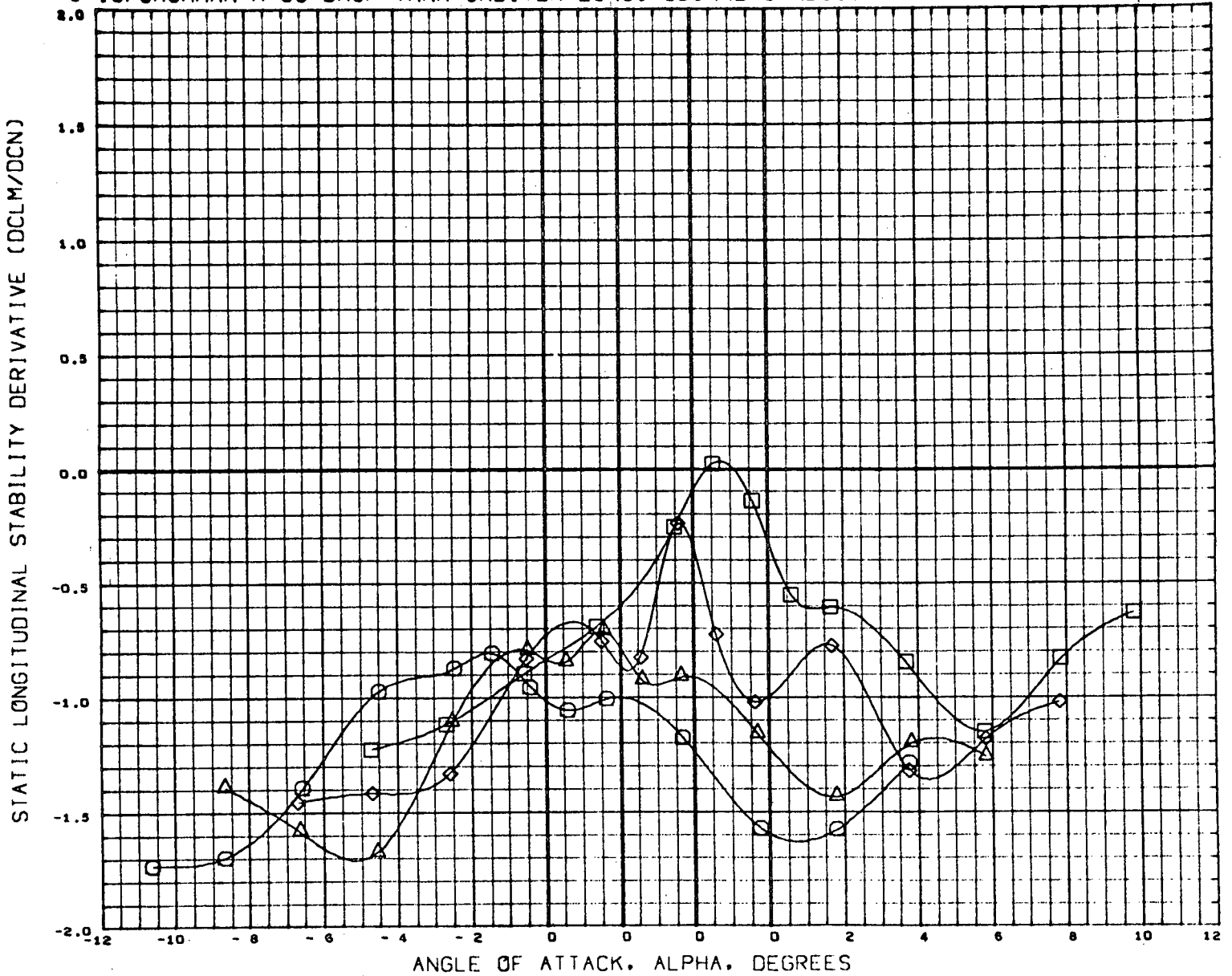


SV: 30L MACH 1.959 BETA 0.000 PHI 0.000
 3.480 WINGIN 0.000
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REFERENCE INFORMATION
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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



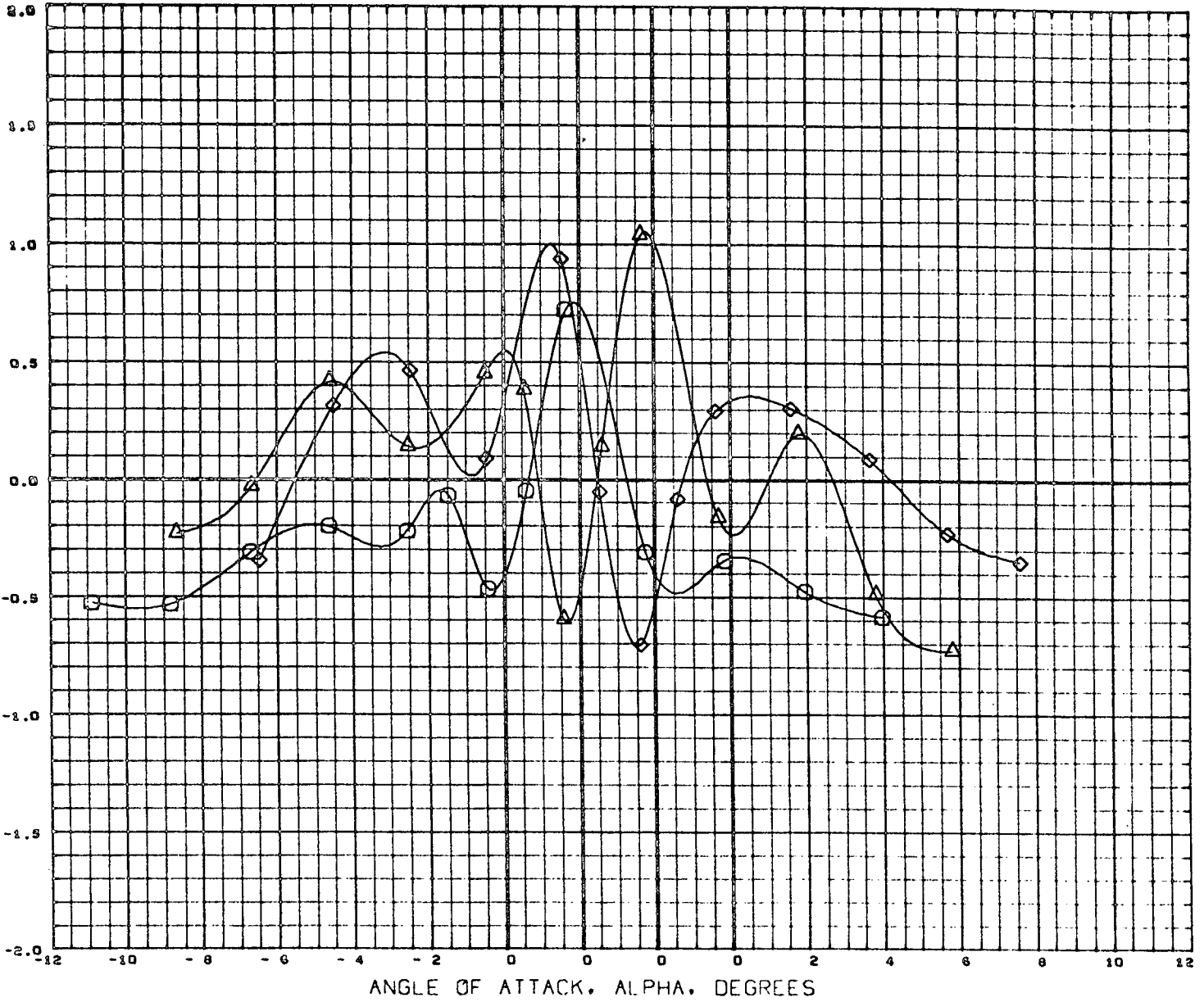
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.001	WNGIN	0.000		
◇	1.104				
□	1.205				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

STATIC LONGITUDINAL STABILITY DERIVATIVE (DCLM/DCN)

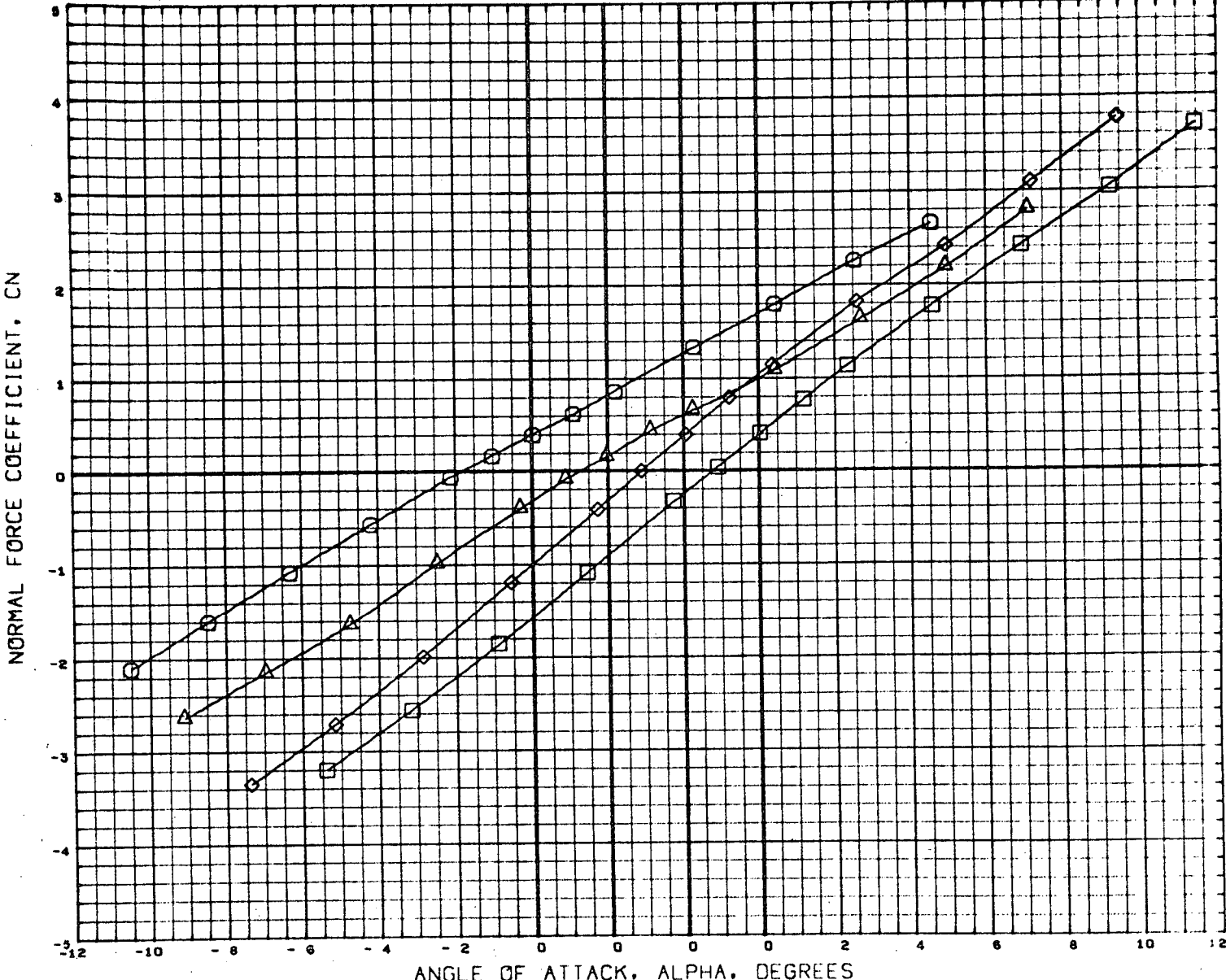


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.959	BETA	0.000	PHI	0.000
△	3.480	WNGIN	0.000		
◇	4.959				

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	5.3990	in.
YMRP	0.0000	in.
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SCALE	0.0034	

DATA MIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



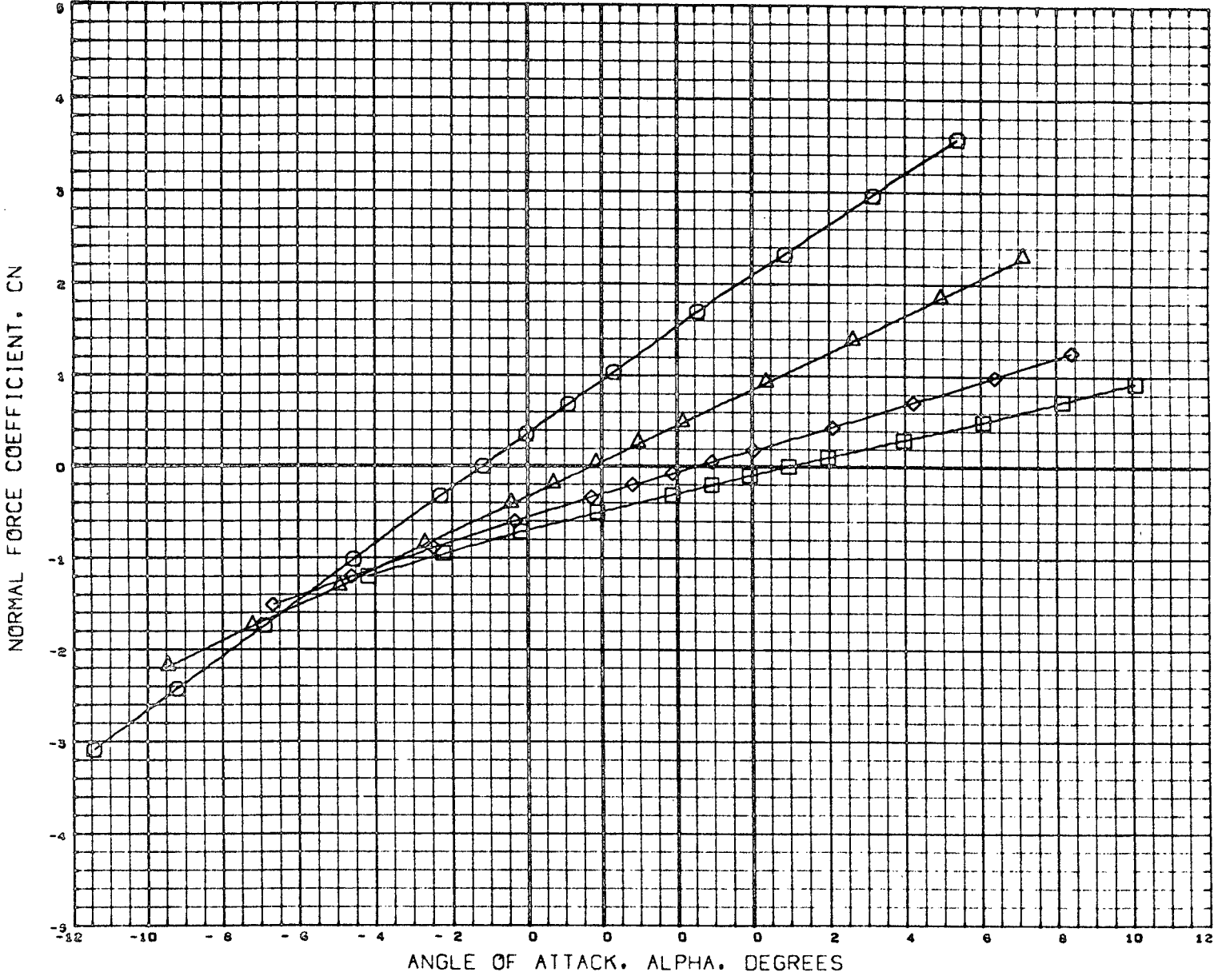
SYMBOL	MACH
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△	0.897
◇	0.999
□	1.039

PARAMETRIC VALUES
BETA 0.000

REFERENCE INFORMATION		
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LREF	1.3330	in.
BREF	1.3330	in.
XMRP	5.5070	in.
YMRP	0.0000	in.
ZMRP	0.4250	in.
SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

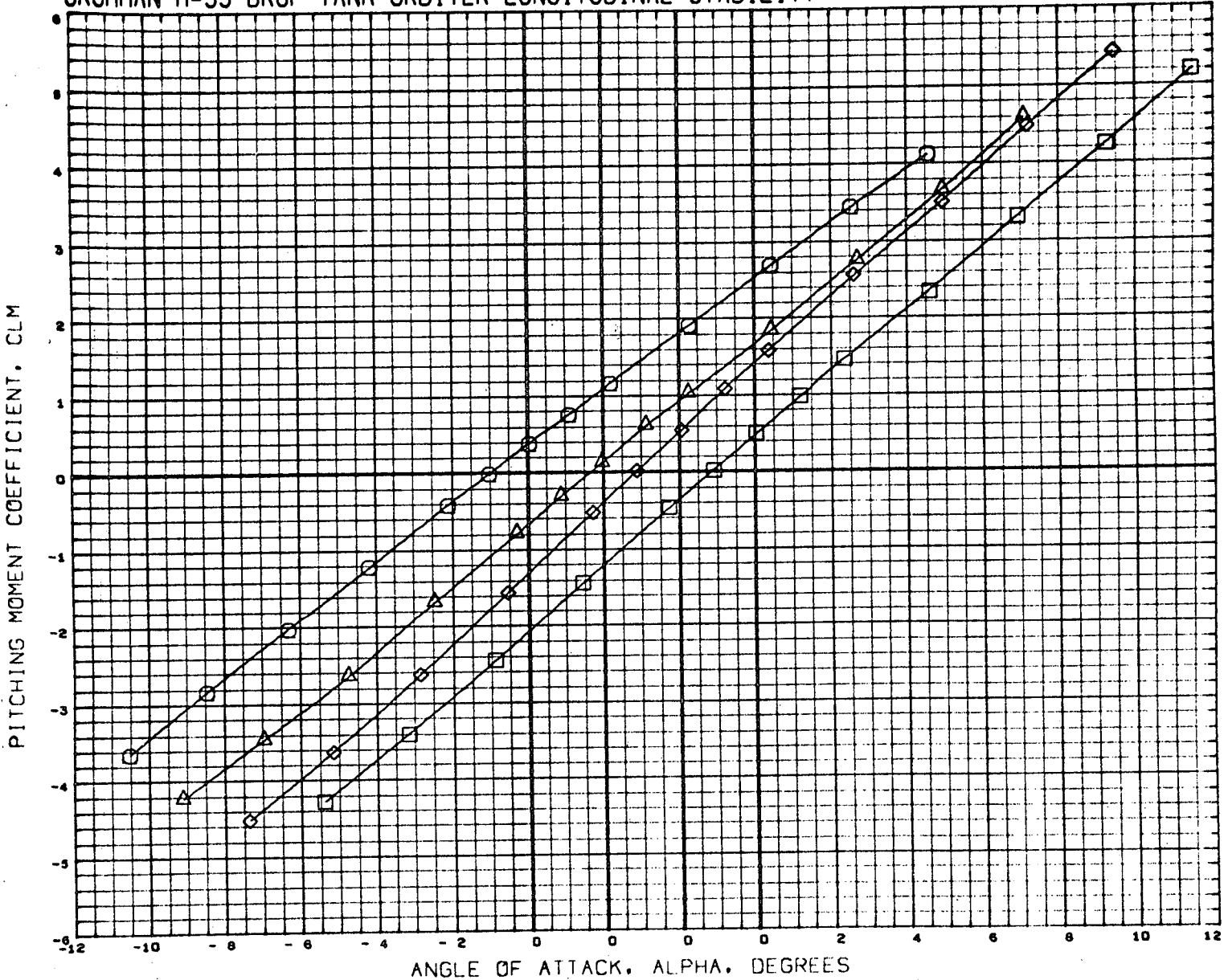


SYMBOL	MACH	BETA	PARAMETRIC VALUES
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◇	3.480		
□	4.939		

DATA HIST. CODE CCGGC

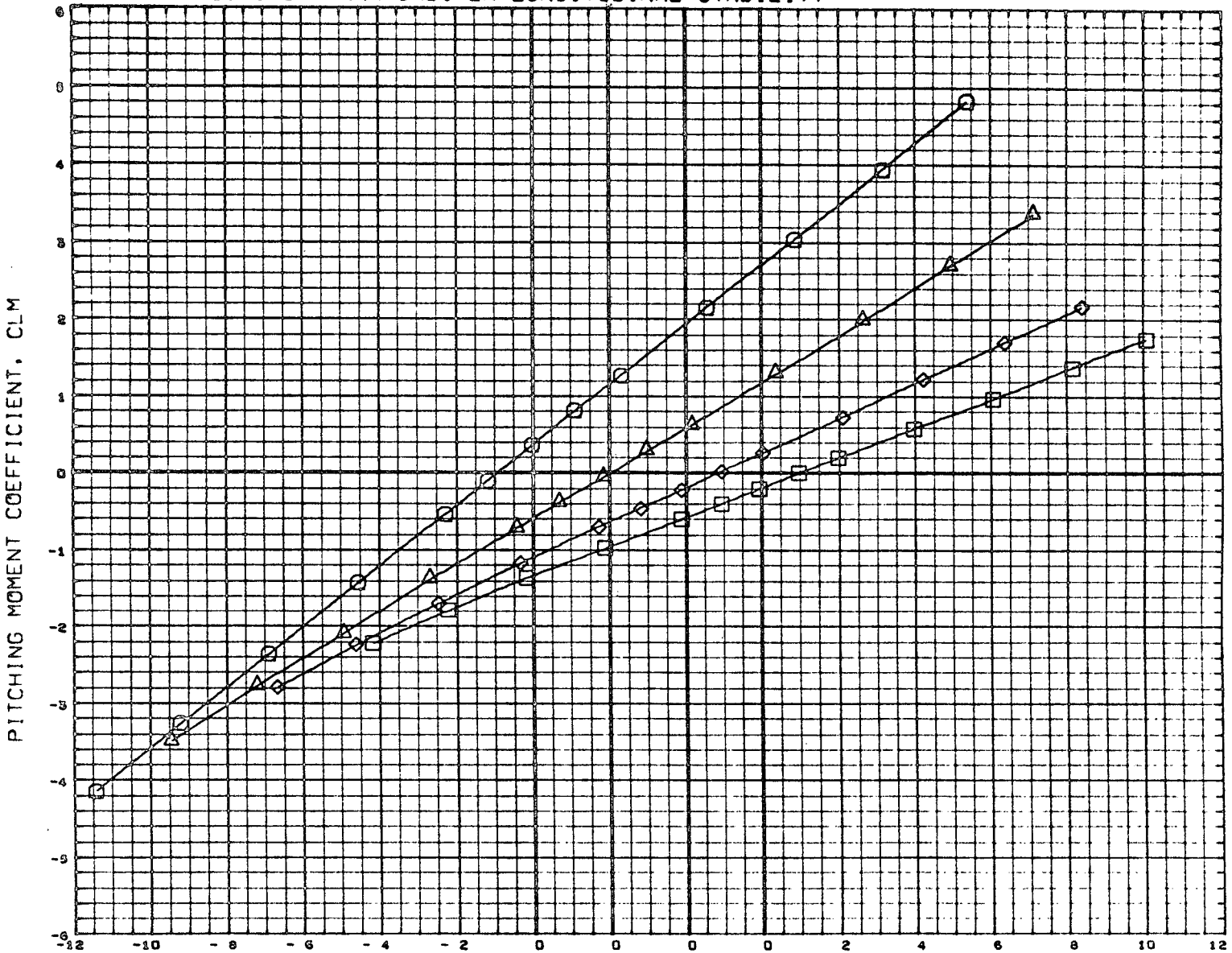
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BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	- 0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	BETA	PARAMETRIC VALUES	REFERENCE INFORMATION
○	0.597		0.000	SREF 1.3960 SQ. IN.
△	0.897			LREF 1.3330 IN.
◇	0.999			BREF 1.3330 IN.
□	1.099			XMRP - 5.5070 IN.
				YMRP 0.0000 IN.
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				SCALE 0.0034
			DATA HIST. CODE CCCC	

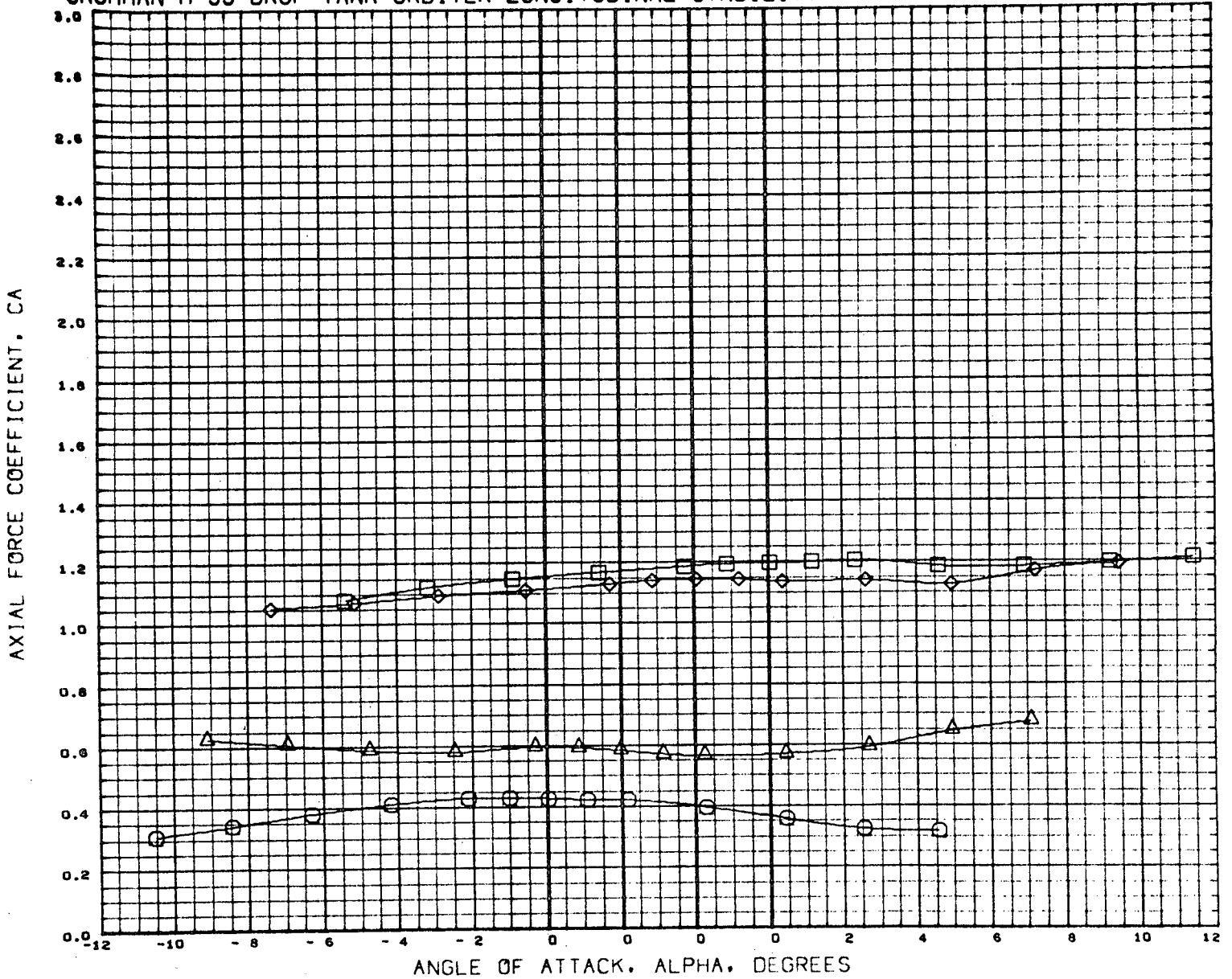
GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



SYMBOL	MACH	BETA	PARAMETRIC VALUES	REFERENCE INFORMATION
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△	1.971			LREF 1.3330 IN.
◇	3.490			BREF 1.3330 IN.
□	4.959			XMRF - 5.5070 IN.
				YMRF 0.0000 IN.
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				SCALE 0.0034

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



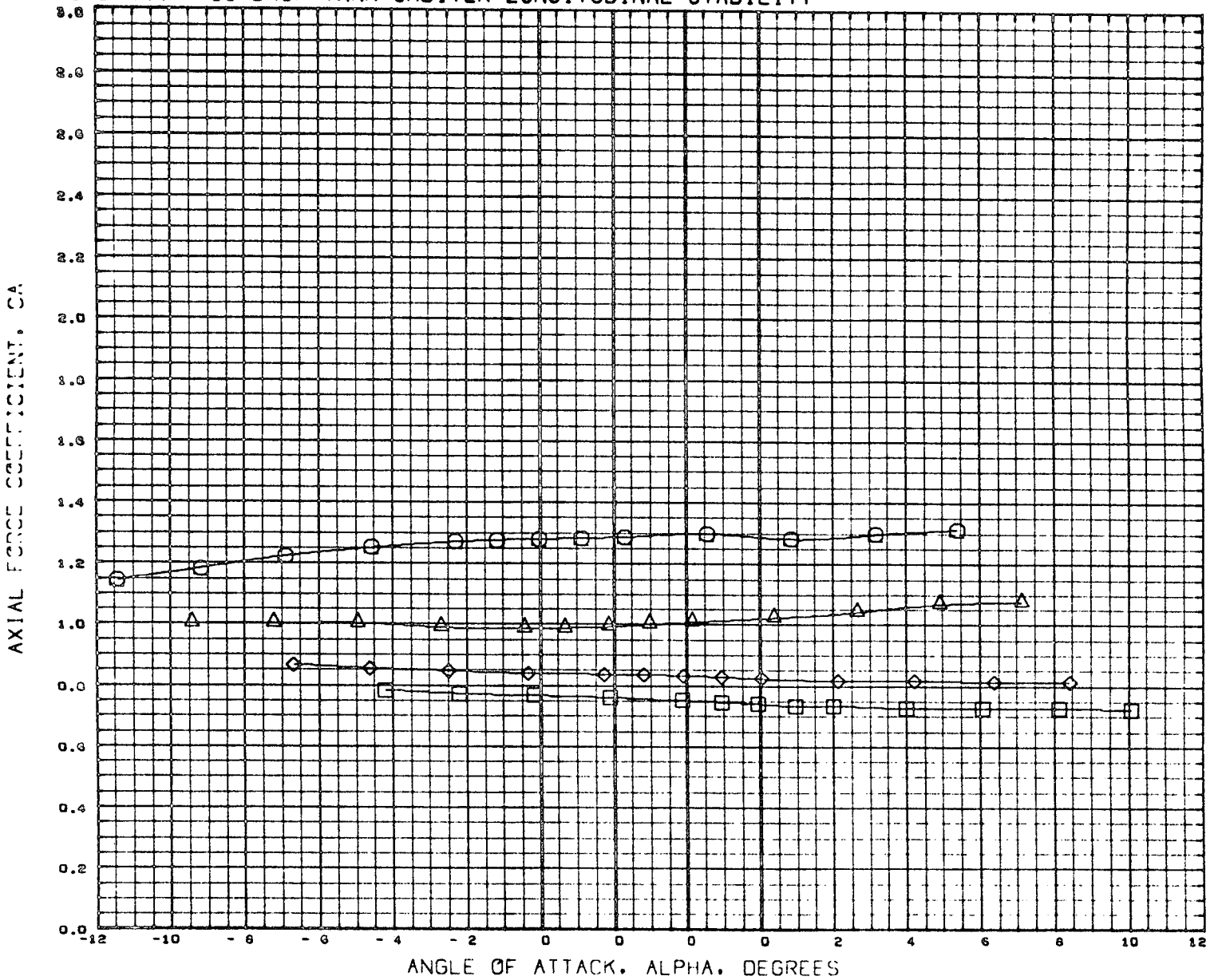
ANGLE OF ATTACK, ALPHA, DEGREES

SYMBOL	MACH	BETA	PARAMETRIC VALUES
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△	0.897		
◇	0.999		
□	1.099		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	- 5.5070	IN.
YMRP	0.0000	IN.
ZMRP	- 0.4250	IN.
SCALE	0.0034	

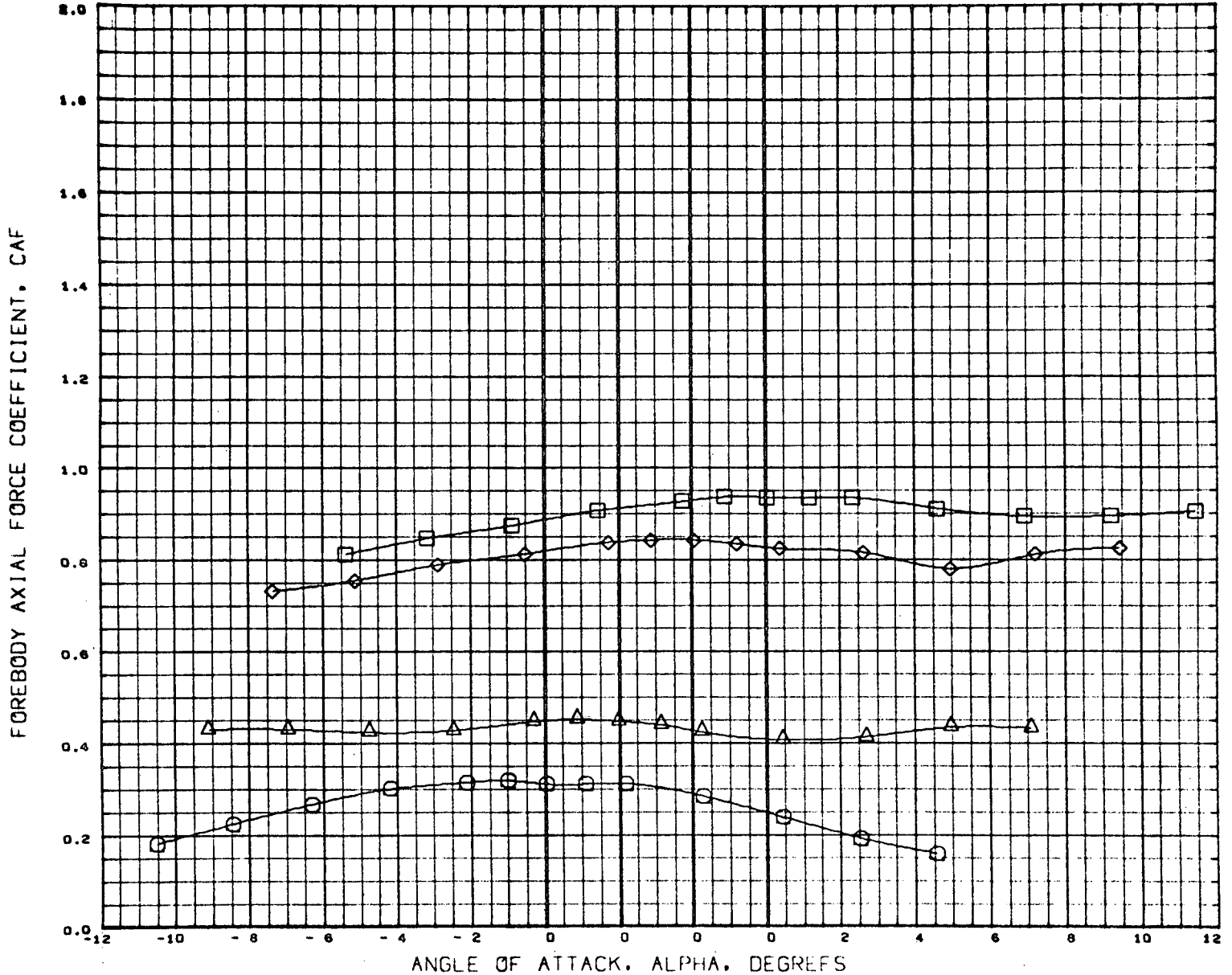
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GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



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△	1.971			LREF 1.3330 IN.
◇	3.480			BREF 1.3330 IN.
□	4.959			XMRP - 5.5070 IN.
				YMRP 0.0000 IN.
				ZMRP - 0.4250 IN.
				SCALE 0.0034

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

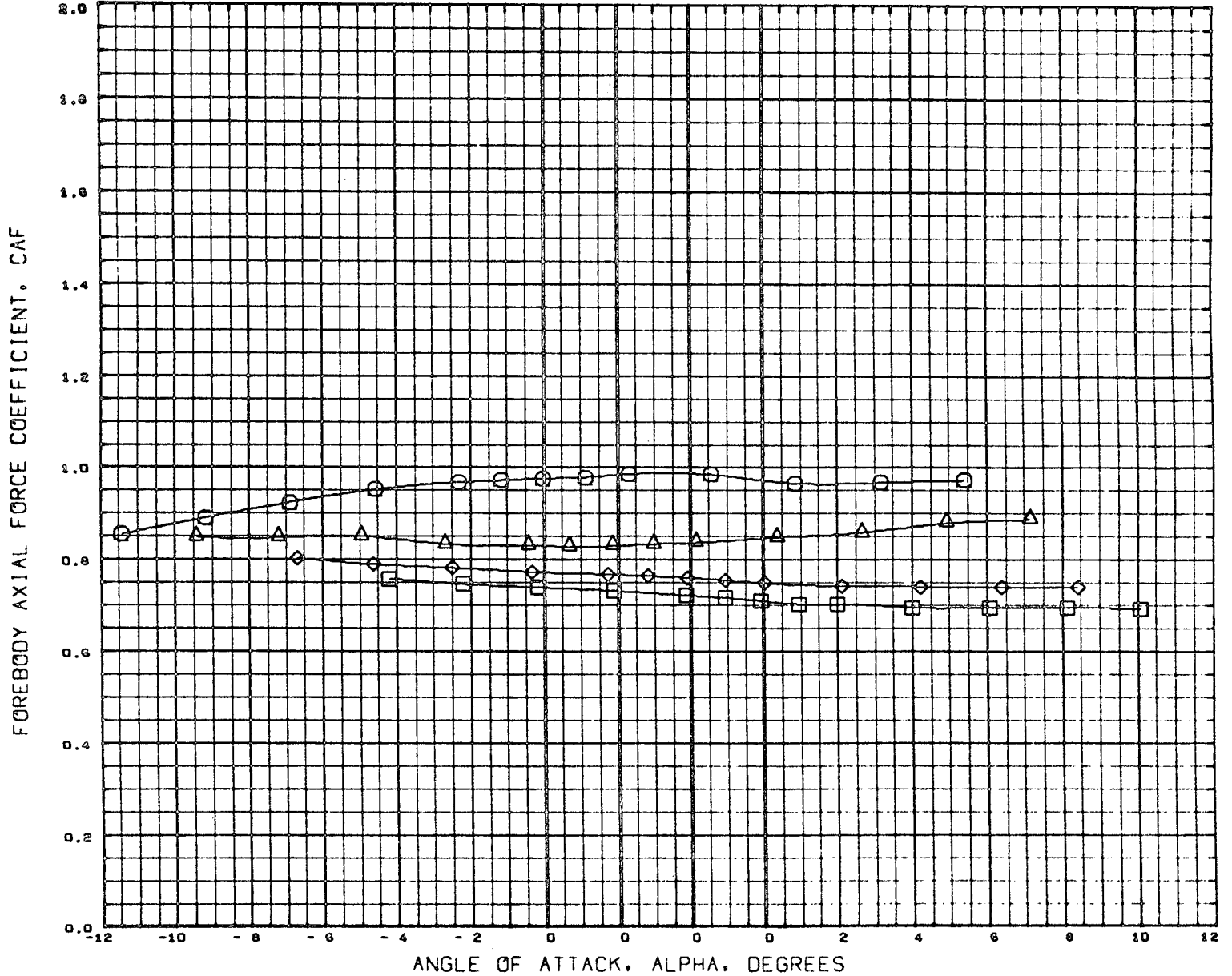


SYMBOL MACH BETA PARAMETRIC VALUES
 ○ 0.597
 △ 0.897
 ◇ 0.999
 □ 1.099

REFERENCE INFORMATION
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 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP - 5.5070 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

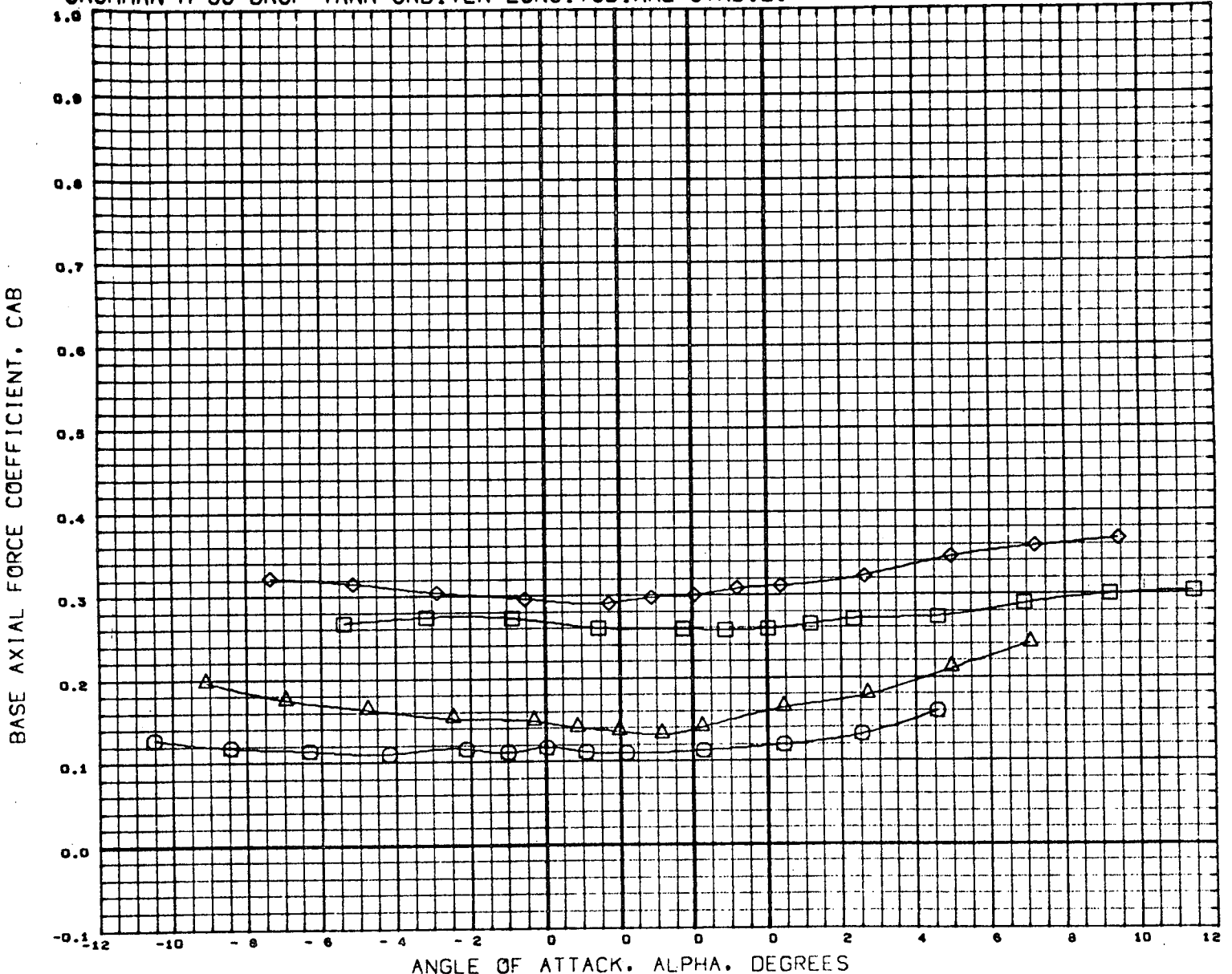


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△	1.971		
◇	3.480		
□	4.939		

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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRF	- 5.5070	IN.
YMRF	0.0000	IN.
ZMRF	- 0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

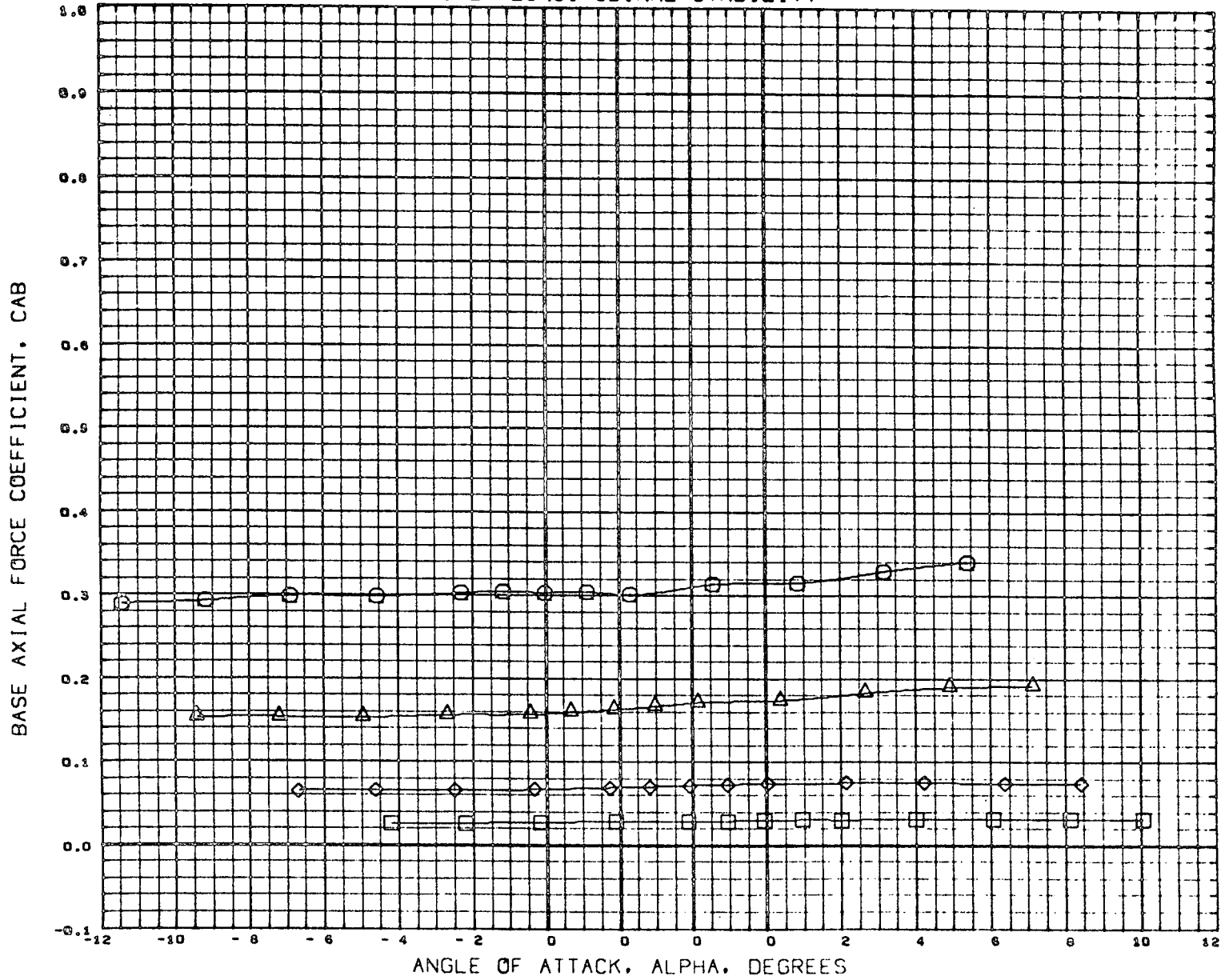


SYMBOL	MACH	BETA	PARAMETRIC VALUES
○	0.597		0.000
△	0.897		
◇	0.999		
□	1.099		

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
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XMRP	- 5.5070	IN.
YMRP	0.0000	IN.
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SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY

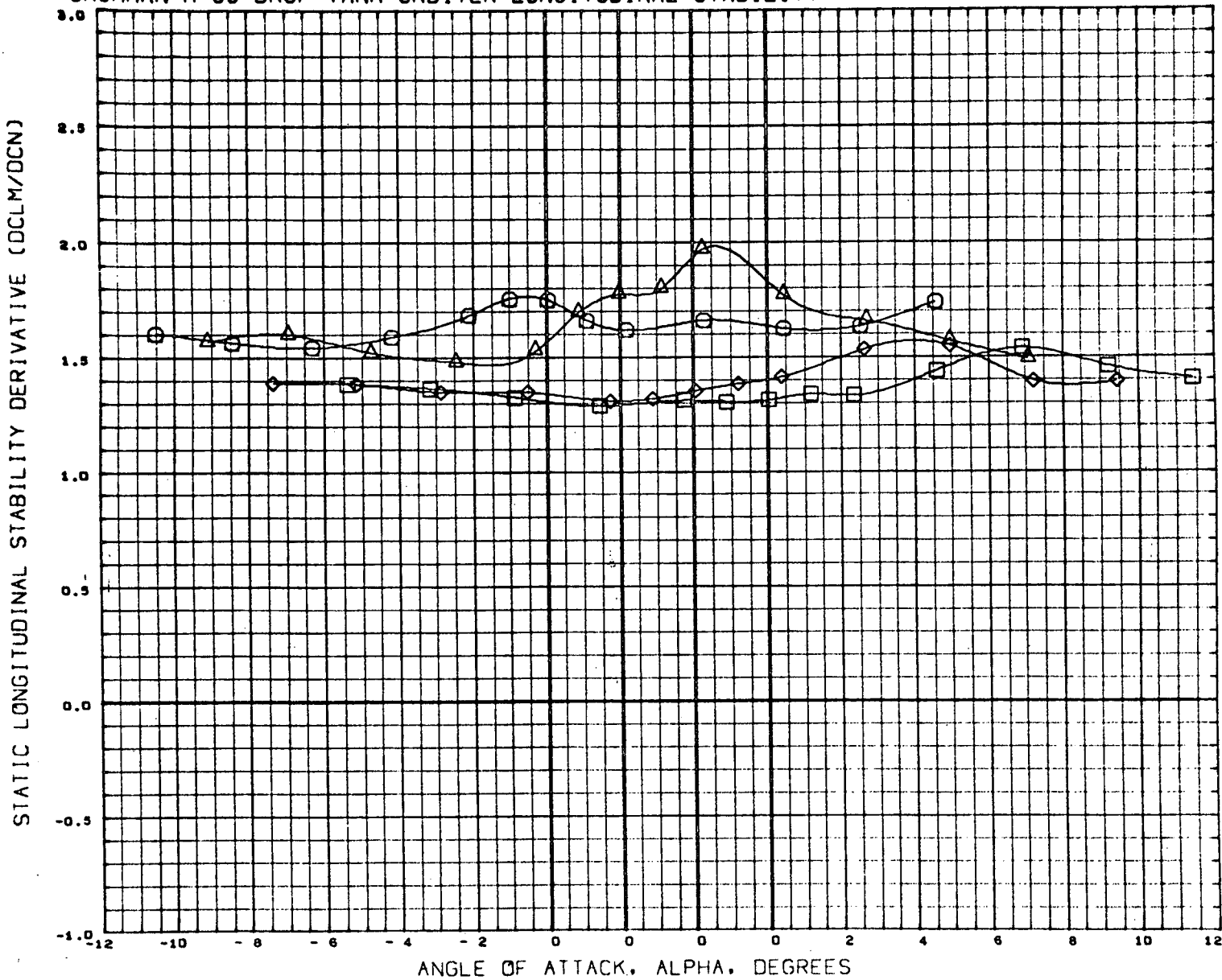


SYMBOL	MACH	BETA	PARAMETRIC VALUES
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◇	3.480		
□	4.959		

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SREF	1.3960	30. IN.
LREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.4250	IN.
SCALE	0.0034	

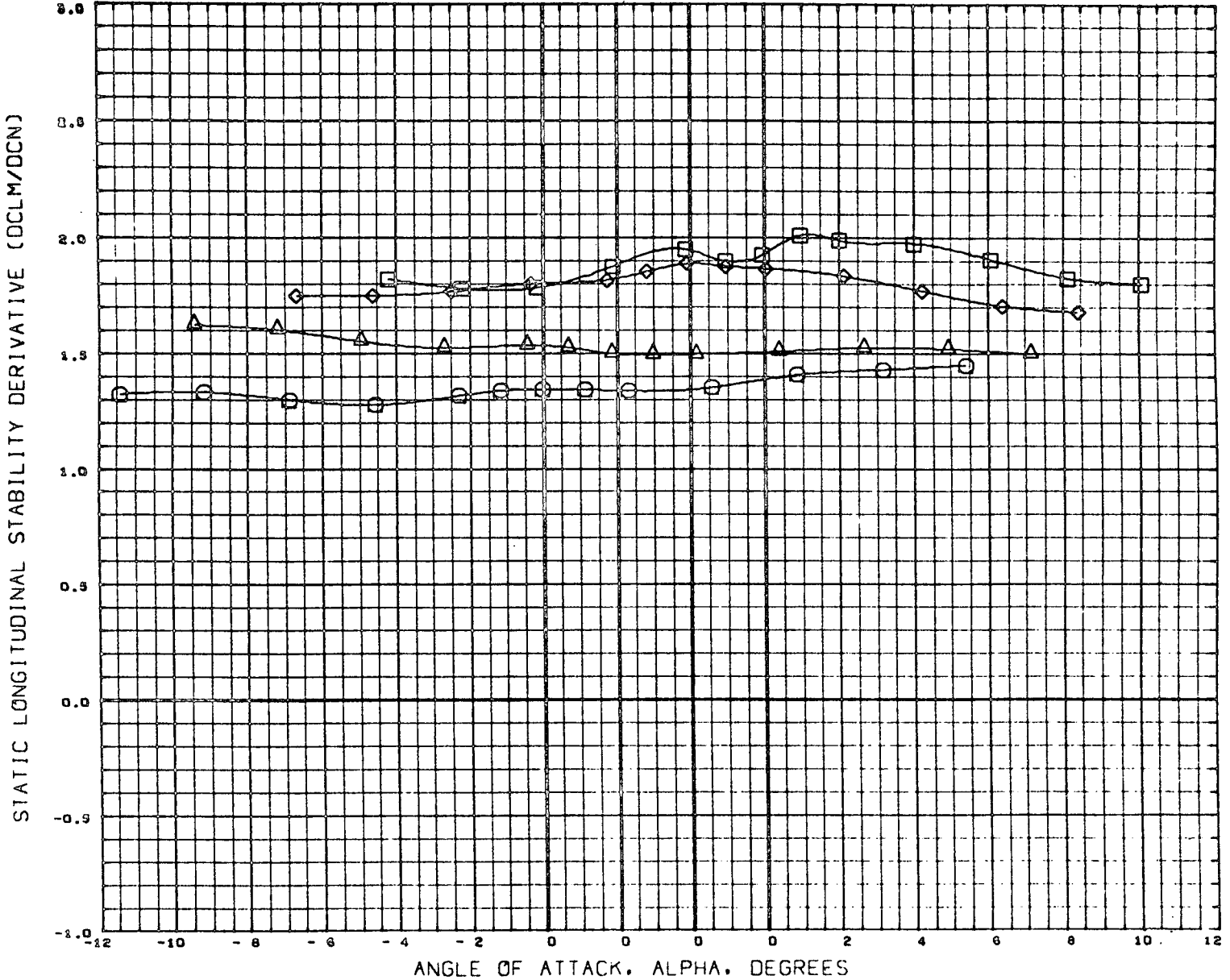
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GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



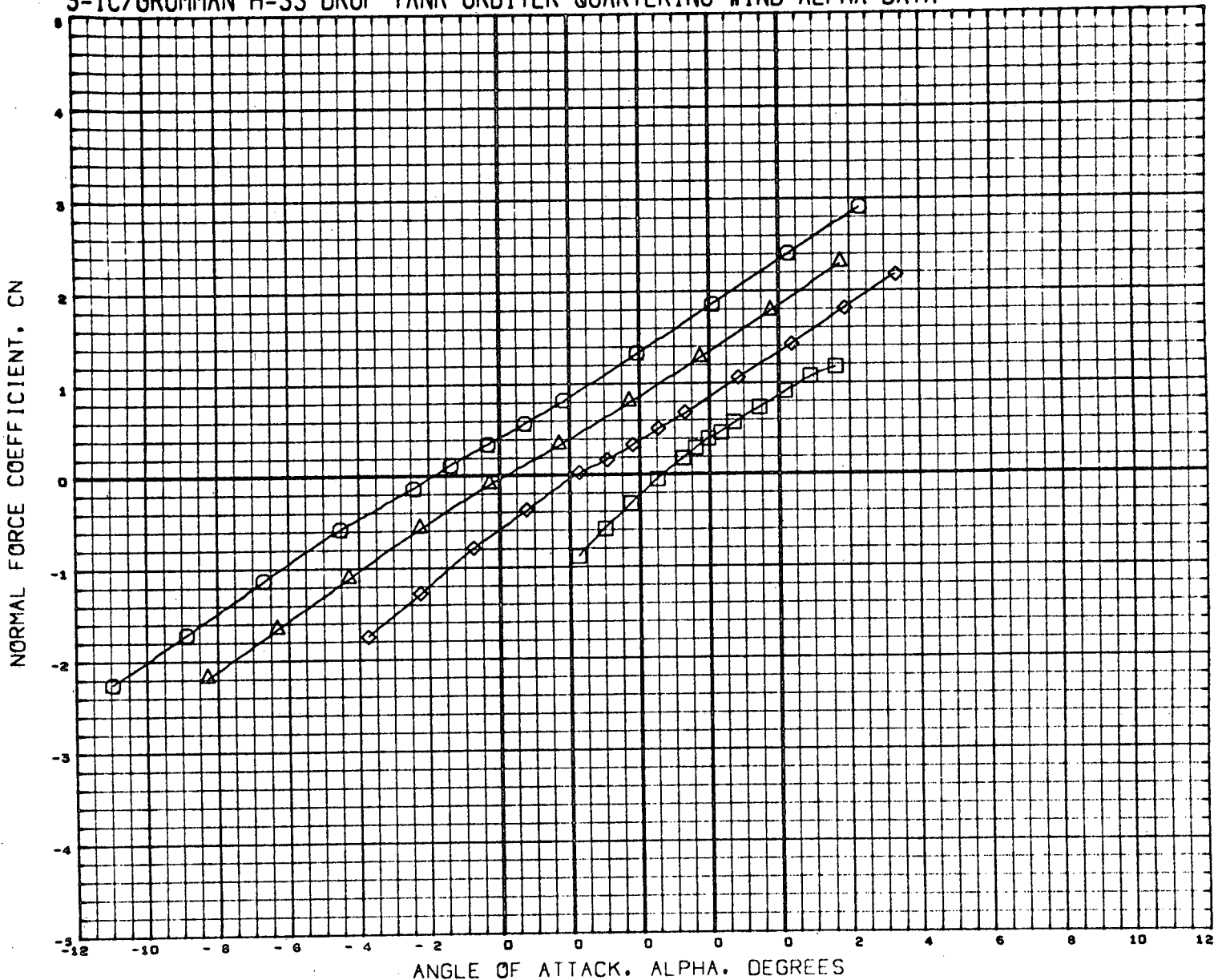
SYMBOL	MACH	BETA	PARAMETRIC VALUES	REFERENCE INFORMATION	
○	0.597		0.000	SREF	1.3960 SQ. IN.
△	0.897			LREF	1.3330 IN.
◇	0.999			BREF	1.3330 IN.
□	1.099			XMRP -	5.5070 IN.
				YMRP	0.0000 IN.
				ZMRP -	0.4250 IN.
				SCALE	0.0034

GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY



<table border="0"> <tr> <td>○</td> <td>△</td> <td>◇</td> <td>□</td> </tr> </table>	○	△	◇	□	<table border="0"> <tr> <td>MACH</td> <td>BETA</td> <td>PARAMETRIC VALUES</td> </tr> <tr> <td>1.195</td> <td>0.000</td> <td></td> </tr> <tr> <td>1.971</td> <td></td> <td></td> </tr> <tr> <td>3.480</td> <td></td> <td></td> </tr> <tr> <td>4.959</td> <td></td> <td></td> </tr> </table>	MACH	BETA	PARAMETRIC VALUES	1.195	0.000		1.971			3.480			4.959			<table border="0"> <tr> <td>DATA HIST. CODE</td> <td>CCCCC</td> </tr> </table>	DATA HIST. CODE	CCCCC	<table border="0"> <tr> <td>REFERENCE INFORMATION</td> <td></td> </tr> <tr> <td>SREF</td> <td>1.3960 SQ. IN.</td> </tr> <tr> <td>LREF</td> <td>1.3330 IN.</td> </tr> <tr> <td>BREF</td> <td>1.3330 IN.</td> </tr> <tr> <td>XMRP</td> <td>- 5.5070 IN.</td> </tr> <tr> <td>YMRP</td> <td>0.0000 IN.</td> </tr> <tr> <td>ZMRP</td> <td>- 0.4250 IN.</td> </tr> <tr> <td>SCALE</td> <td>0.0034</td> </tr> </table>	REFERENCE INFORMATION		SREF	1.3960 SQ. IN.	LREF	1.3330 IN.	BREF	1.3330 IN.	XMRP	- 5.5070 IN.	YMRP	0.0000 IN.	ZMRP	- 0.4250 IN.	SCALE	0.0034
○	△	◇	□																																					
MACH	BETA	PARAMETRIC VALUES																																						
1.195	0.000																																							
1.971																																								
3.480																																								
4.959																																								
DATA HIST. CODE	CCCCC																																							
REFERENCE INFORMATION																																								
SREF	1.3960 SQ. IN.																																							
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XMRP	- 5.5070 IN.																																							
YMRP	0.0000 IN.																																							
ZMRP	- 0.4250 IN.																																							
SCALE	0.0034																																							

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION		
	PHI	MACH	PHI	PHI	PHI	SREF	SQ. IN.	
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△	20.000	0.000	Y44043	45.000	Y44044	1.3330	IN.	
◇	45.000					1.3330	IN.	
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						0.0034		

DATA HIST. CODE CCCG*#A

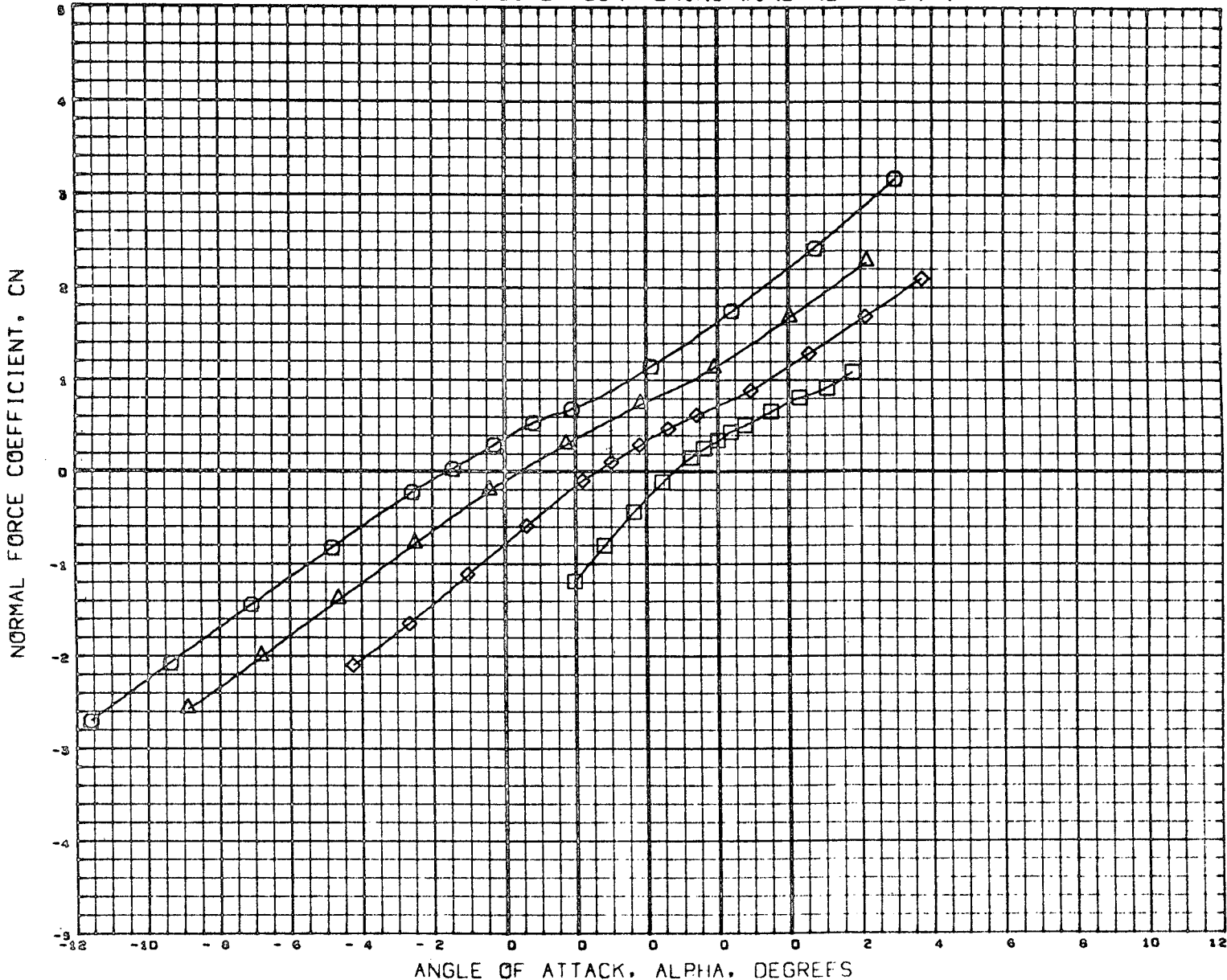
M502-MSFC-S1C H-33 ORBITER

OWVTCBF

(844041) 12 MAY 72

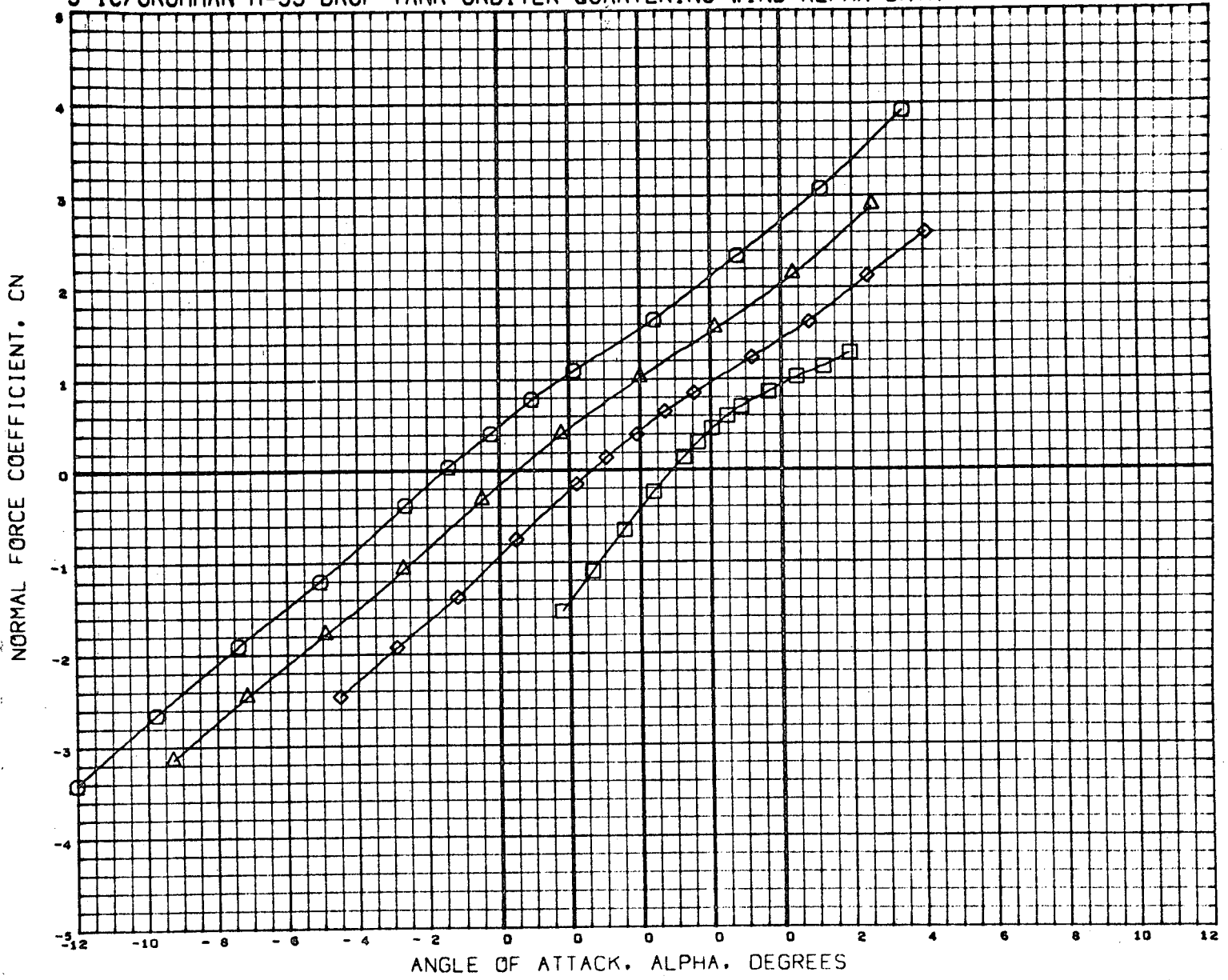
PAGE 91

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



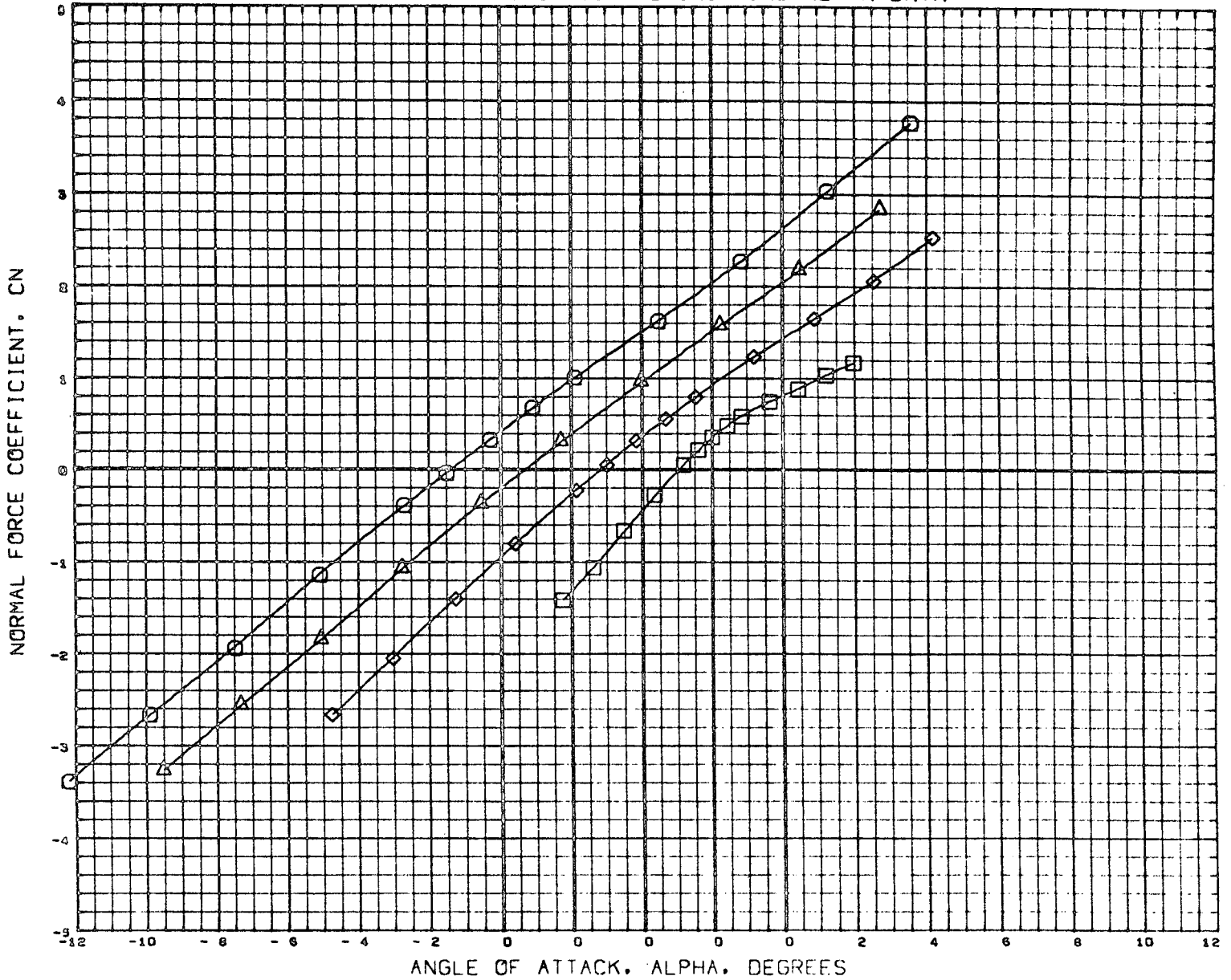
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◇	45.000				Y44043	45.000	Y44044	70.000	BREF 1.3330 IN.
□	70.000								XMRP 5.3990 IN.
									YMRP 0.0000 IN.
									ZMRP 0.0000 IN.
									SCALE 0.0034

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES	DATA SOURCE			REFERENCE INFORMATION		
				PHI	PHI	PHI	SREF	SQ. IN.	
○	0.000	0.999	0.999	844041	0.000	20.000	1.3960	IN.	
△	20.000	0.000	0.000	Y44042	45.000	70.000	1.3330	IN.	
◇	45.000			Y44043			1.3330	IN.	
□	70.000						3.3990	IN.	
							0.0000	IN.	
							0.0000	IN.	
							0.0034	IN.	

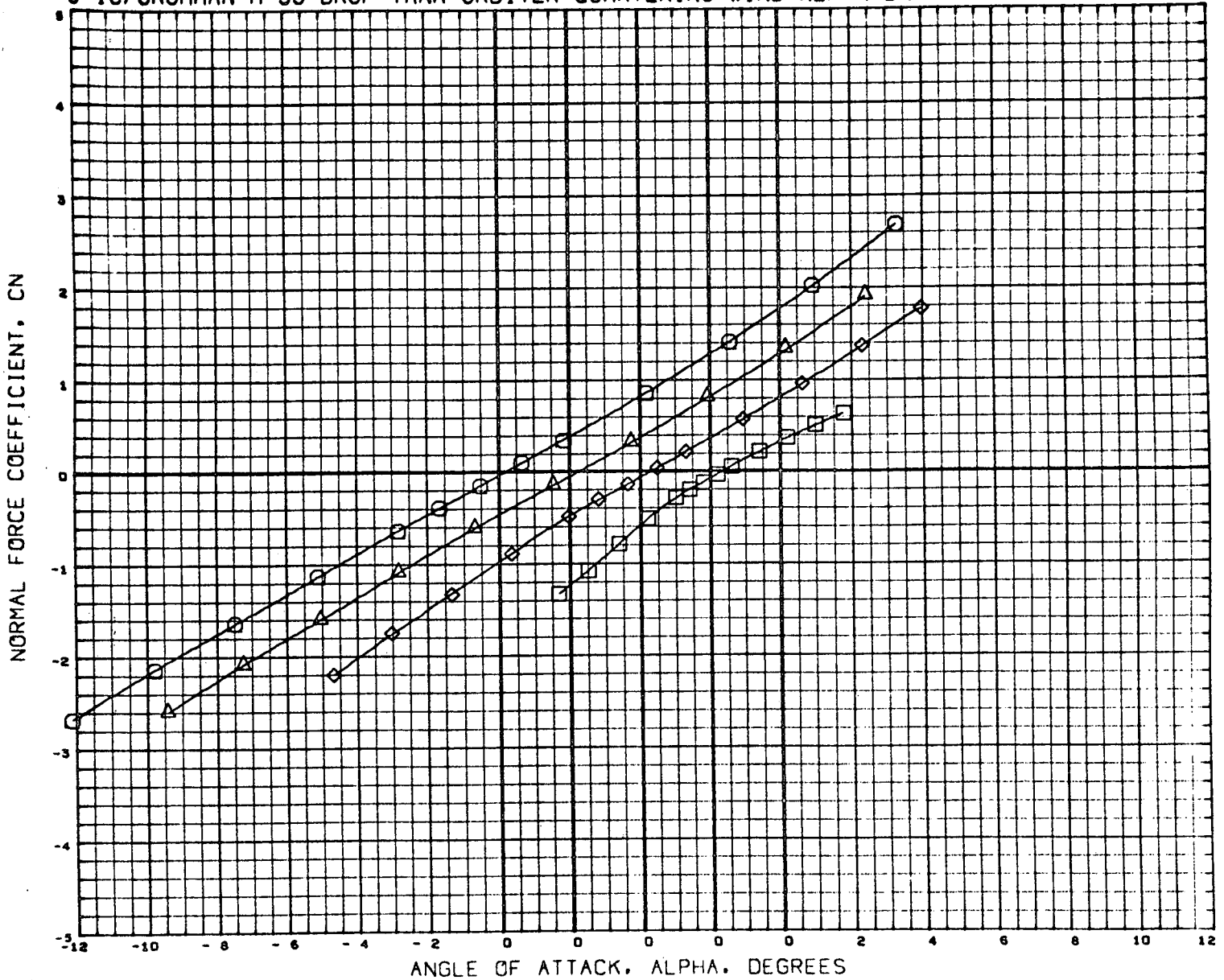
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES	WINGINC	DATA SOURCE	PHI	DATA SOURCE	PHI	REFERENCE INFORMATION
○	0.000	1.202	844041	0.000	Y44042	20.000	SREF	1.3960	30 IN.
△	20.000	0.000	844043	45.000	Y44044	70.000	LREF	1.3330	IN.
◇	45.000						BREF	1.3330	IN.
□	70.000						XMRP	5.3990	IN.
							YMRP	0.0000	IN.
							ZMRP	0.0000	IN.
							SCALE	0.0034	

DATA HIST. CODE CCCC%A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION	
	PHI	MACH	WING INC	DATASET	PHI	DATASET	PHI	SQ. IN.
○	0.000	1.965	0.000	844041	0.000	Y44042	20.000	1.3960
△	20.000			Y44043	45.000	Y44044	70.000	1.3330
◇	45.000							1.3330
□	70.000							3.3990
								0.0000
								0.0000
								0.0034

DATA HIST. CODE CCCGC/A

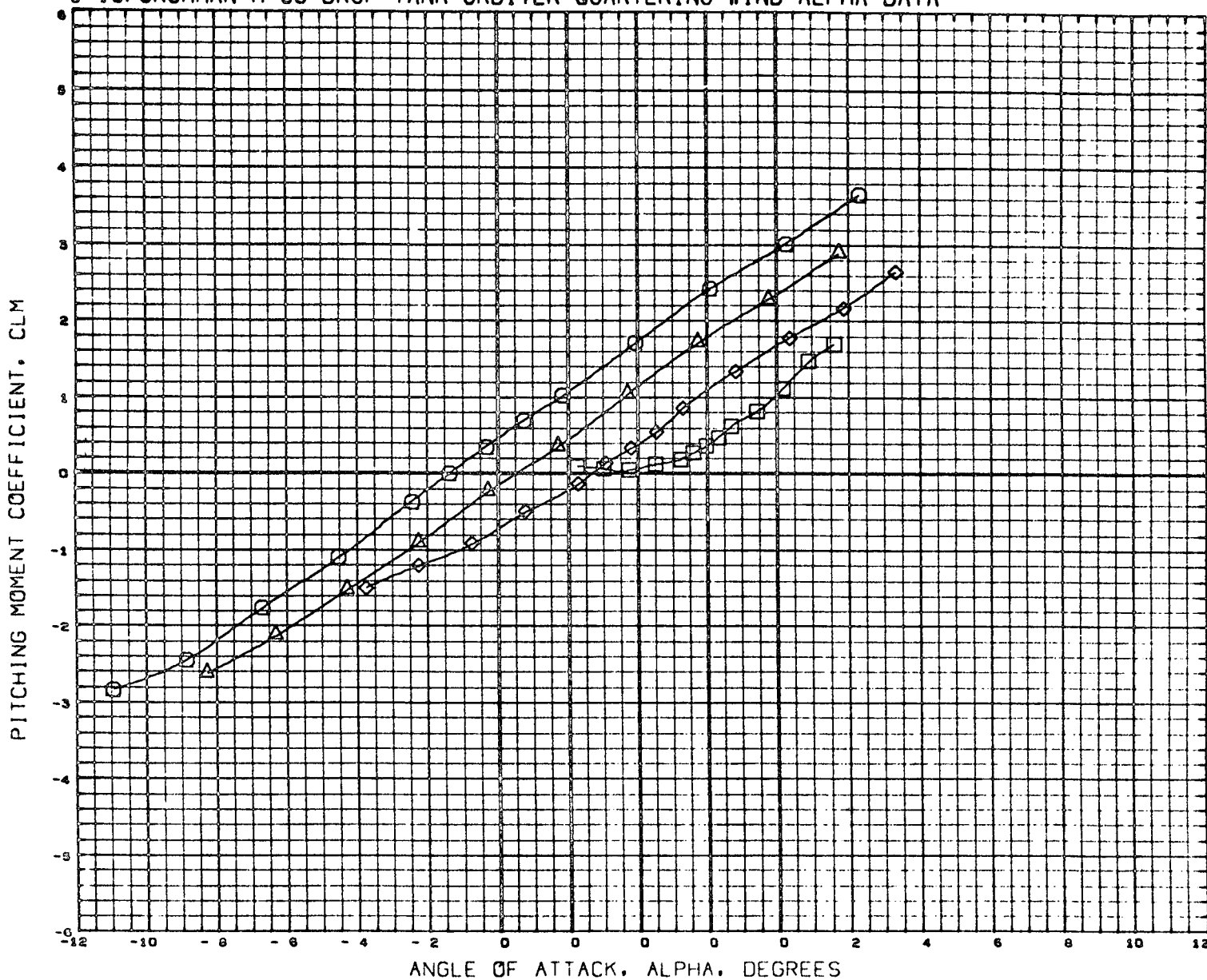
M502-MSFC-S1C H-33 ORBITER

OWVTCBF

(844041) 12 MAY 72

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S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES	WING INC	PARAMETRIC VALUES	DATA SOURCE	PHI	DATA SOURCE	PHI	REFERENCE INFORMATION	SCALE
○	0.000		0.599			844041	0.000	Y44042	20.000	SREF 1.3960	0.0034
△	20.000		0.000			844041	0.000	Y44042	20.000	LREF 1.3330	
◇	45.000					Y44043	45.000	Y44044	70.000	BREF 1.3330	
□	70.000									XMRP 5.3990	
										YMRP 0.0000	
										ZMRP 0.0000	
										SCALE 0.0034	

DATA HIST. CODE CCCGCA

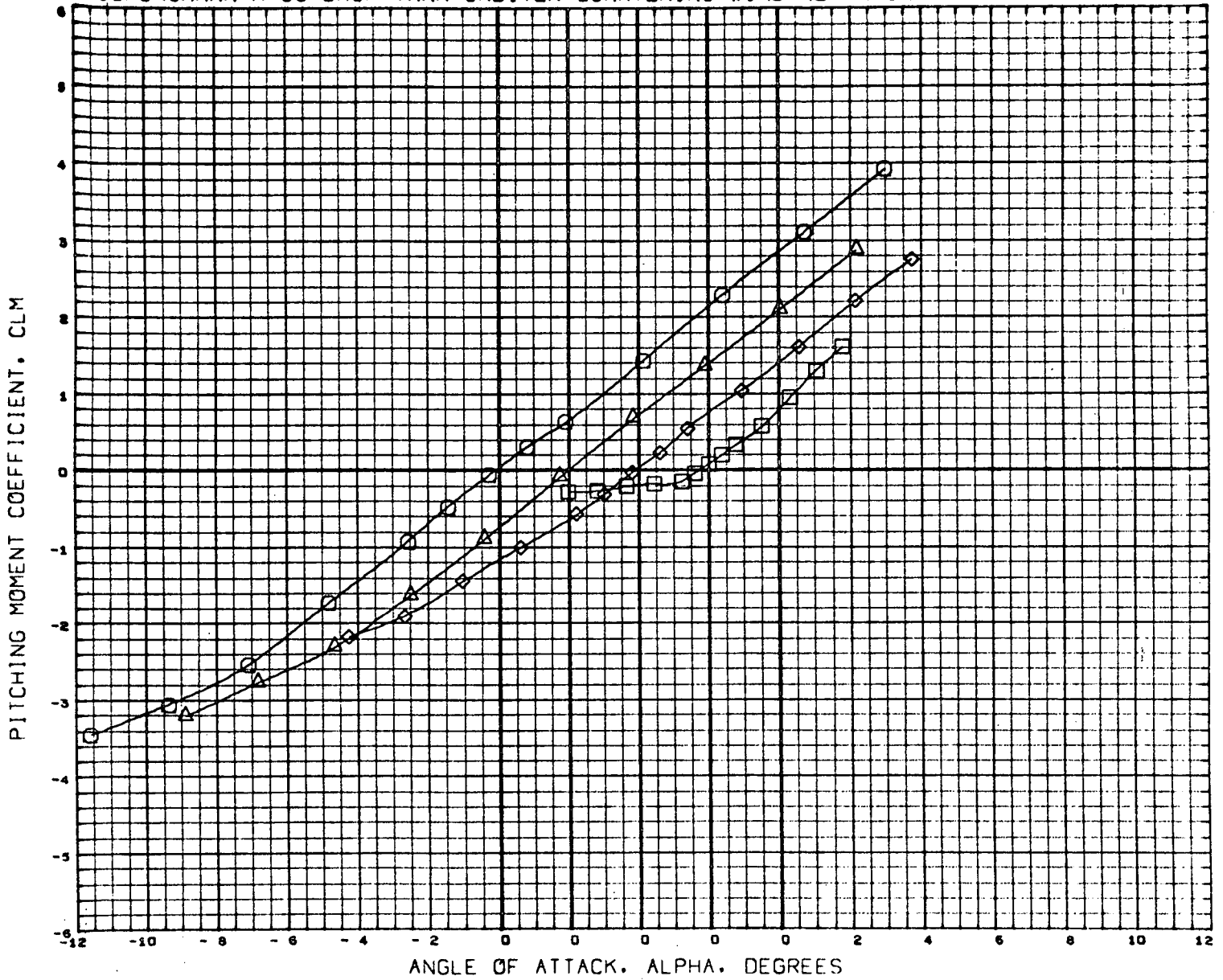
M502-MSFC-S1C H-33 ORBITER

QWVTCBF

(844041) 12 MAY 72

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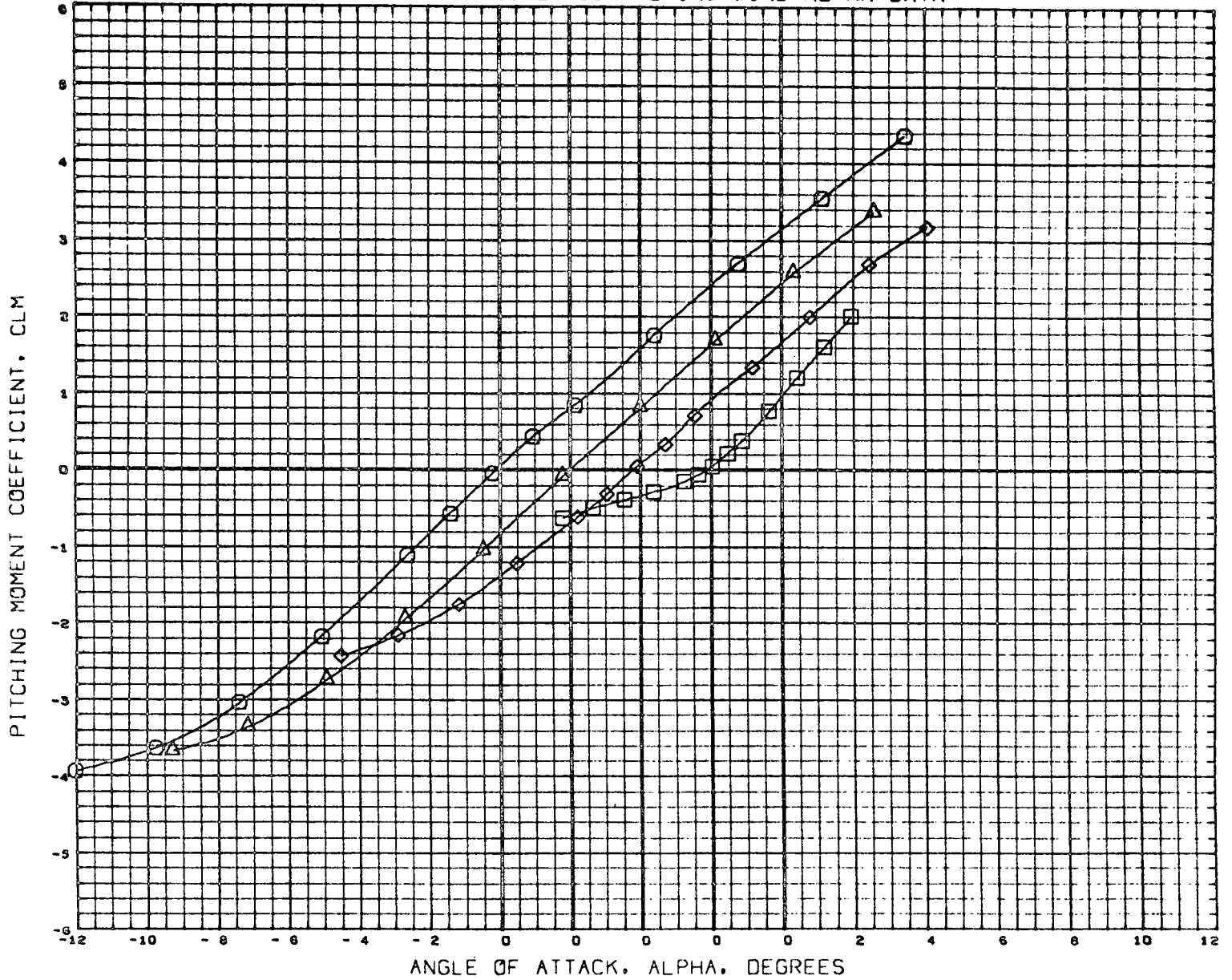
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
	PHI	MACH	WINGINC	PHI	PHI	PHI	SREF	LREF	BREF
○	0.000	0.904	0.000	0.000	20.000	70.000	1.3960	1.3330	1.3330
△	20.000			45.000			5.3990	0.0000	0.0000
◇	45.000						0.0000	0.0000	0.0034
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DATA HIST. CODE CCCC6/A

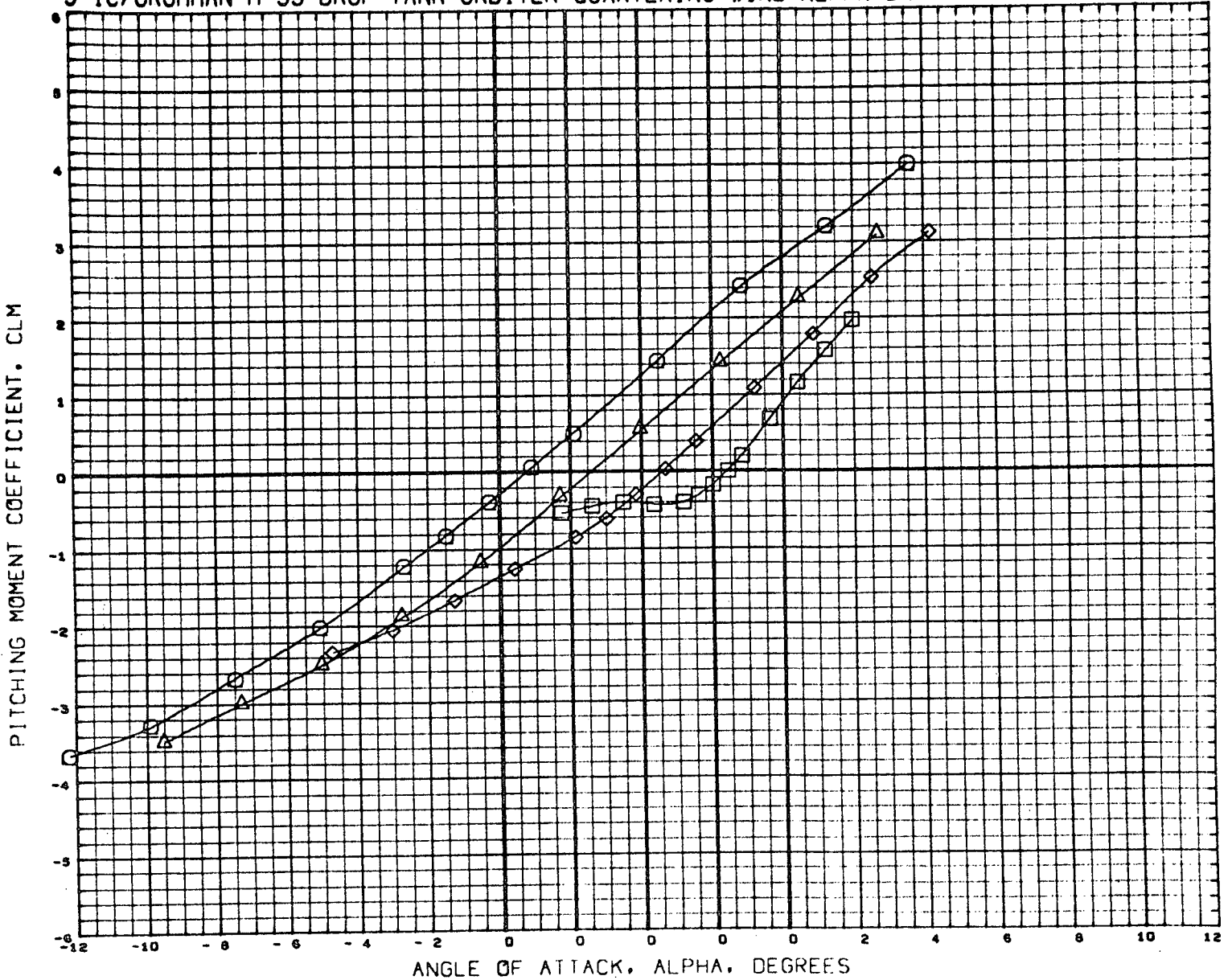
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES	WINGINC	PARAMETRIC VALUES	DATA SOURCE	PHI	DATA SOURCE	PHI	REFERENCE INFORMATION	SREF	IN.
○	0.000		0.999			844041	0.000	Y44042	20.000	LREF	1.3330	IN.
△	20.000		0.000			Y44043	45.000	Y44044	70.000	BREF	1.3330	IN.
◇	45.000									XMRP	5.3990	IN.
□	70.000									YMRP	0.0000	IN.
										ZMRP	0.0000	IN.
										SCALE	0.0034	

DATA HIST. CODE CCCGCA

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION	
		MACH	WINGINC	PHI	PHI	PHI	SQ. IN.	
○	0.000	1.202		844041	0.000	20.000	1.3960	IN.
△	20.000	0.000		Y44042	45.000	70.000	1.3330	IN.
◇	45.000			Y44043			1.3330	IN.
□	70.000						5.3990	IN.
							0.0000	IN.
							0.0000	IN.
							0.0034	IN.

DATA HIST. CODE CCCCQA

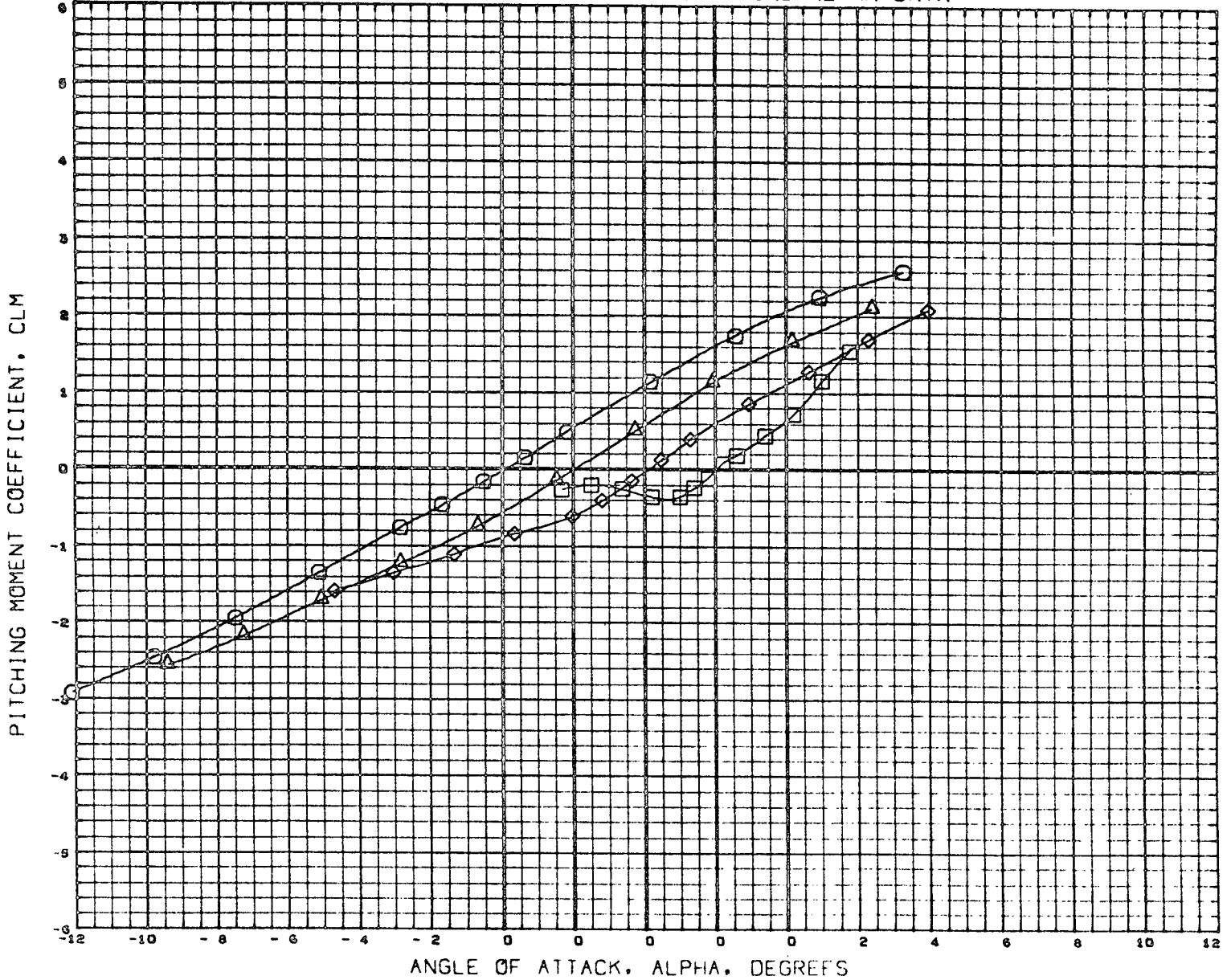
M502-MSFC-S1C H-33 ORBITER

OWVTCBF

(844041) 12 MAY 72

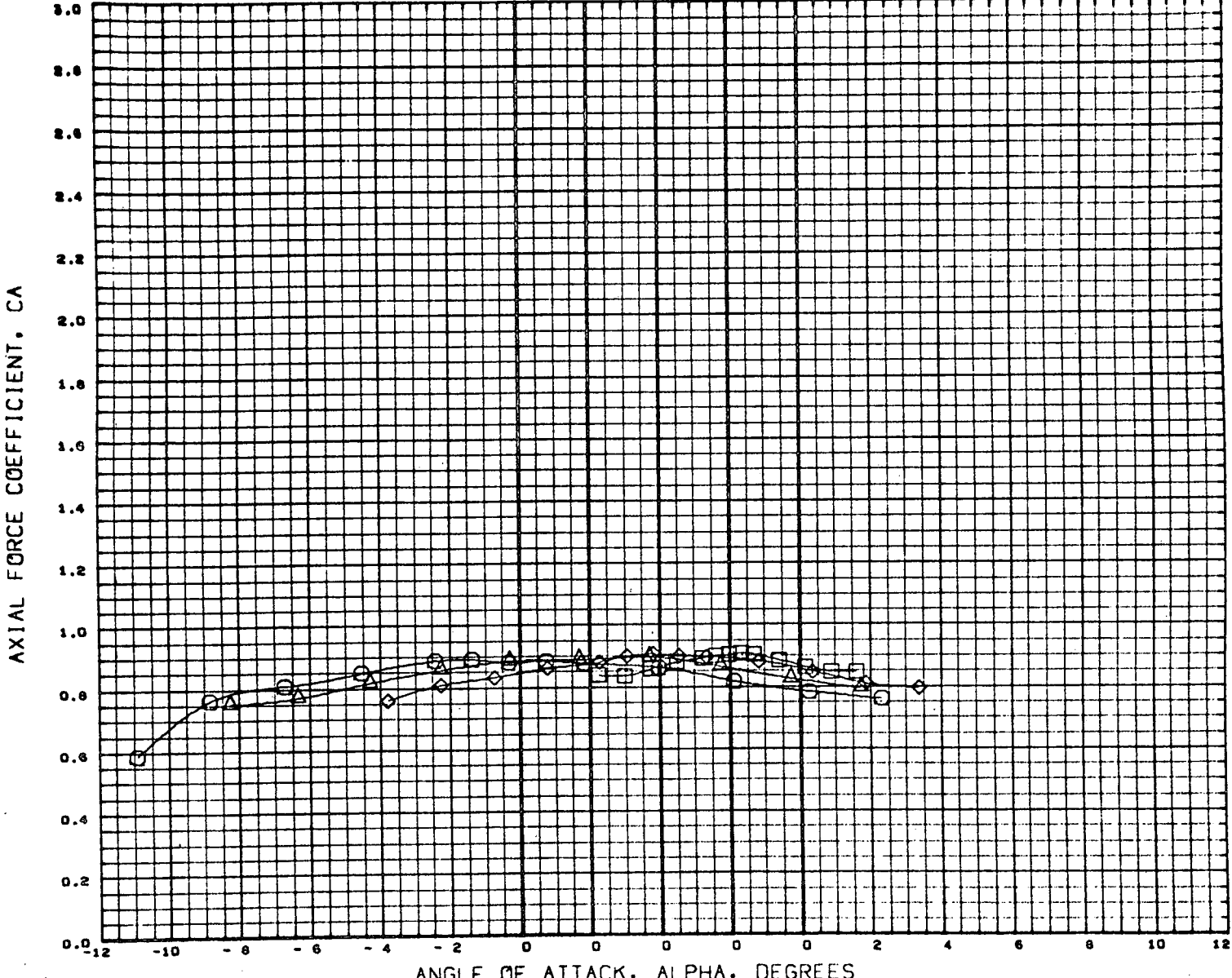
PAGE 99

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES	DATA SOURCE	PHI	DATA SOURCE	PHI	REFERENCE INFORMATION
○	0.000	MACH 1.965	844041	0.000	Y44042	20.000	SREF 1.3960 SQ. IN.
△	20.000	WNGINC 0.000	Y44043	45.000	Y44044	70.000	LREF 1.3330 IN.
◇	45.000						BREF 1.3330 IN.
□	70.000						XMRP 5.3990 IN.
							YMRP 0.0000 IN.
							ZMRP 0.0000 IN.
							SCALE 0.0034

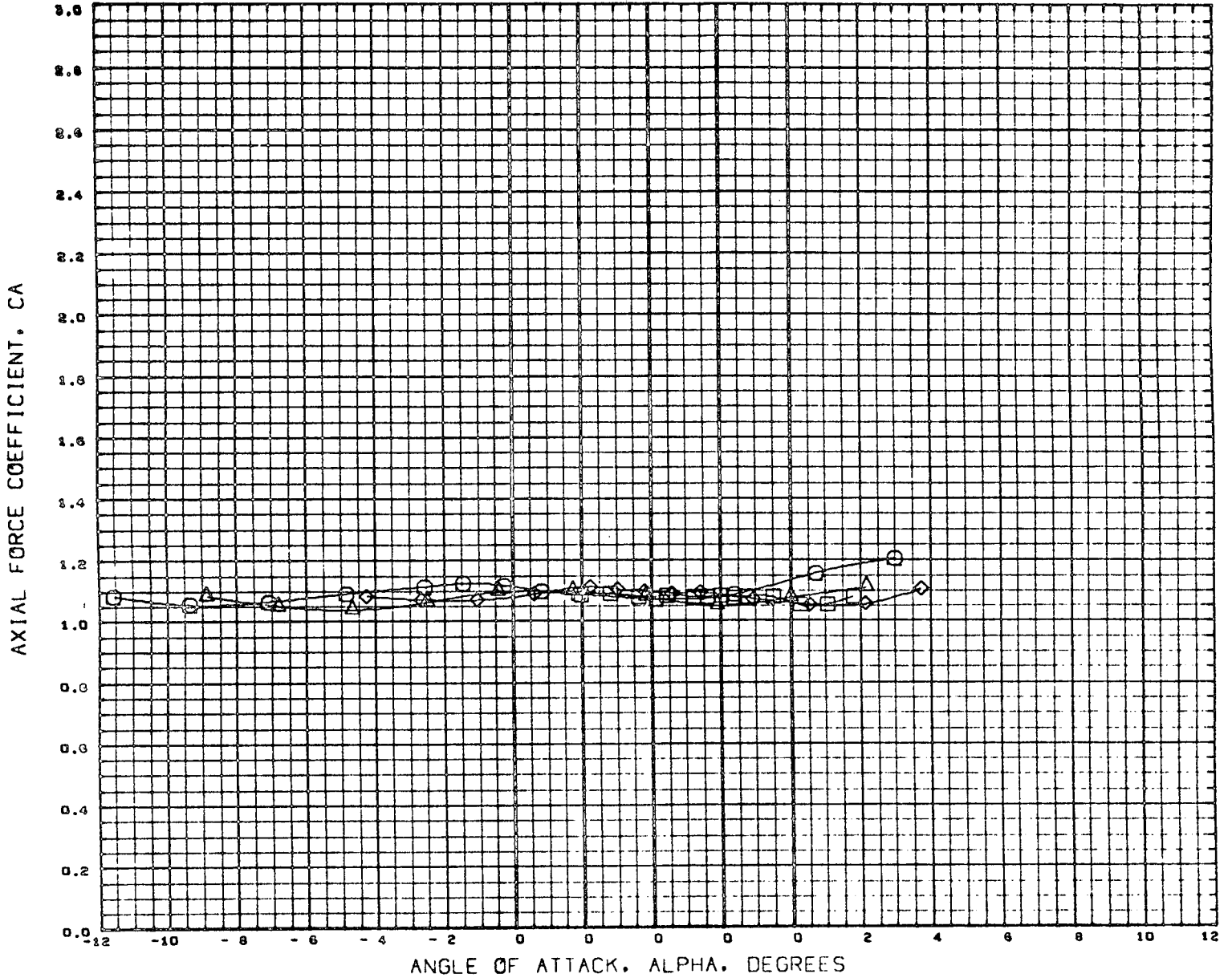
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION							
		MACH	WING INC	PHI	PHI	PHI	SREF	LREF	BREF	XMRP	YMRP	ZMRP	SCALE	
○	0.000	0.599	0.000	844041	0.000	Y44042	20.000	1.3960	1.3330	1.3330	5.3990	0.0000	0.0000	0.0034
△	20.000			Y44043	45.000	Y44044	70.000							
◇	45.000													
□	70.000													

DATA HIST. CODE CCCGC%A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA

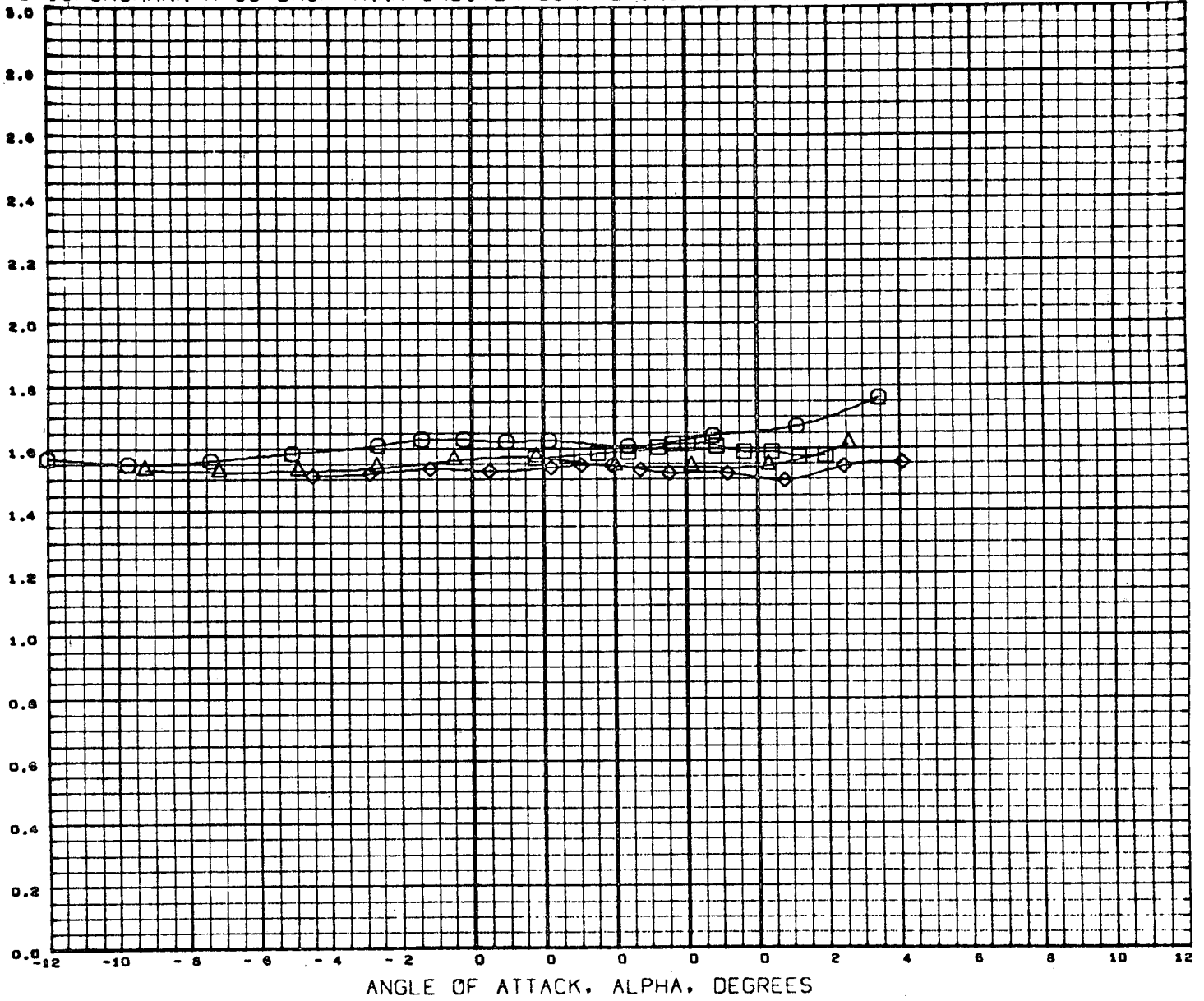


SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION							
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○	0.000	0.904	0.000	844041	0.000	Y44042	20.000	1.3960	1.3330	1.3330	5.3990	0.0000	0.0000	0.0034
△	20.000			844043	45.000	Y44044	70.000							
◇	45.000													
□	70.000													

DATA HIST. CODE CCCGC%A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA

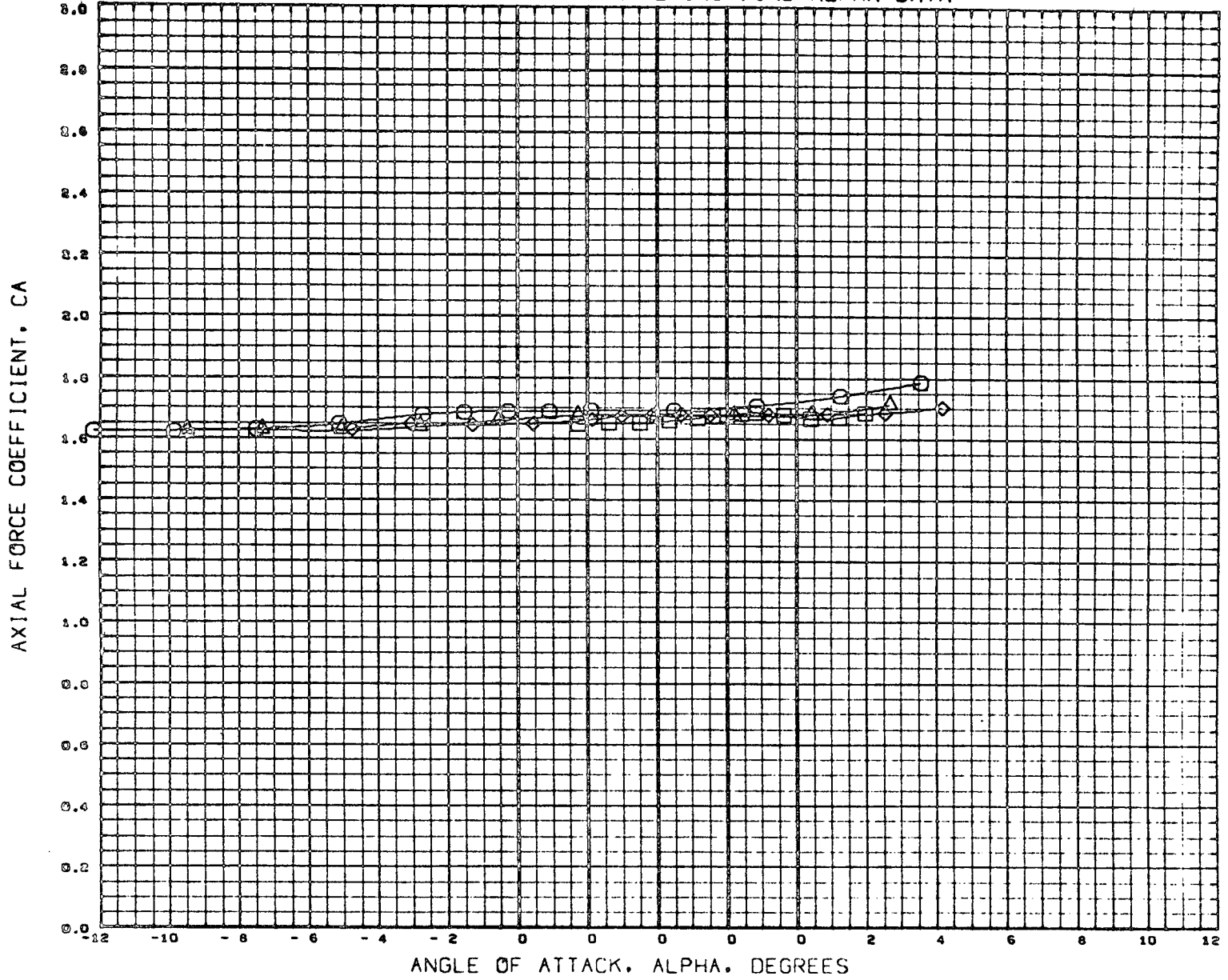
AXIAL FORCE COEFFICIENT, CA



YMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION						
		MACH	WINGINC	PHI	PHI	PHI	SREF	LREF	BREF	XMRP	YMRP	ZMRP	SCALE
○	0.000	0.999	0.000	844041	0.000	Y44042	20.000	1.3960	1.3330	1.3330	5.3990	0.0000	0.0034
△	20.000			Y44043	45.000	Y44044	70.000						
◇	45.000												
□	70.000												

DATA HIST. CODE CCCGC* A

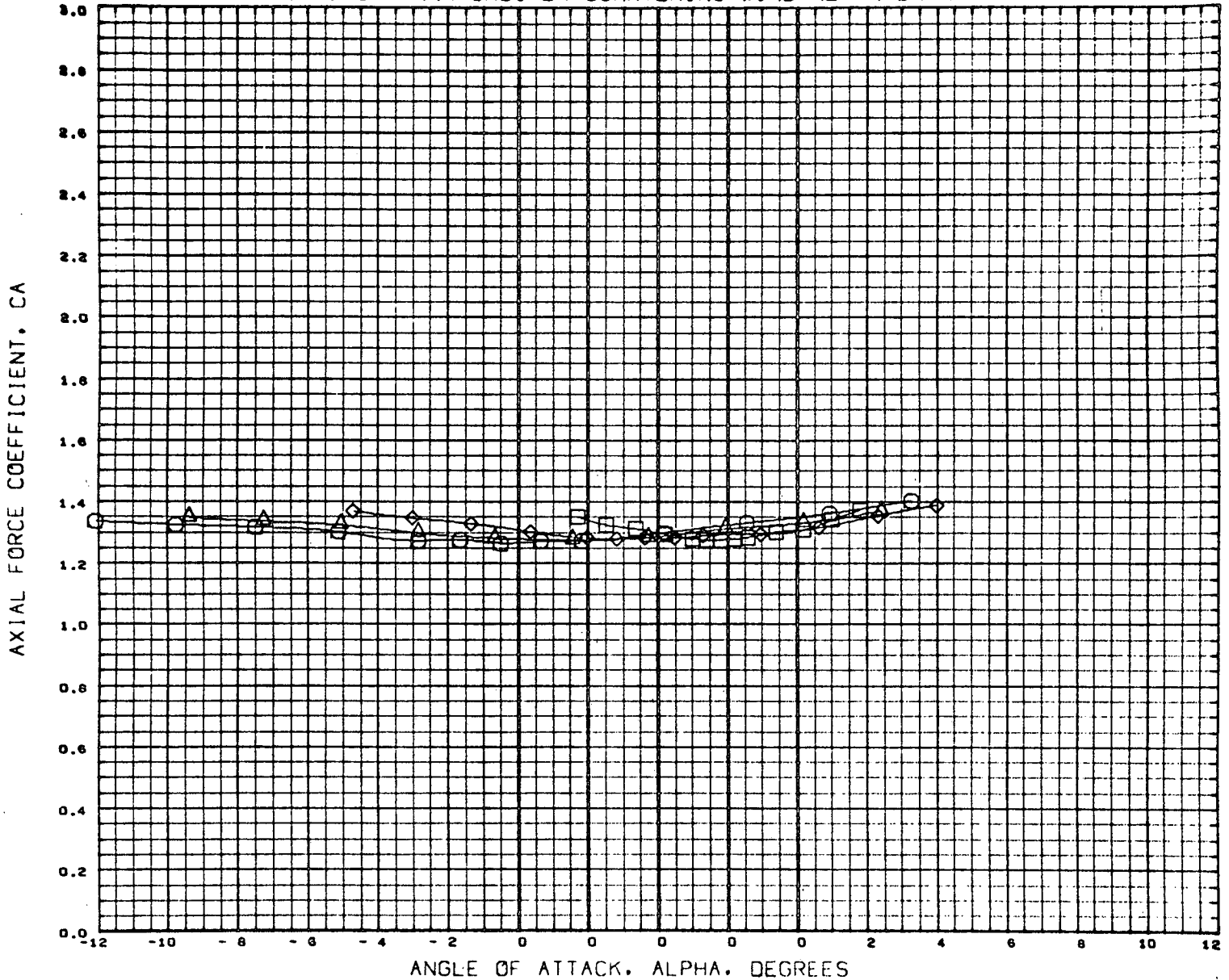
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION			
○	0.000	MACH	1.202	DATASET	PHI	DATASET	PHI	SREF	1.3960	SQ. IN.
△	20.000	WINGINC	0.000	844041	0.000	Y44042	20.000	LREF	1.3330	IN.
◇	45.000			Y44043	45.000	Y44044	70.000	BREF	1.3330	IN.
□	70.000							XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
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DATA HIST. CODE CCCGC#A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA

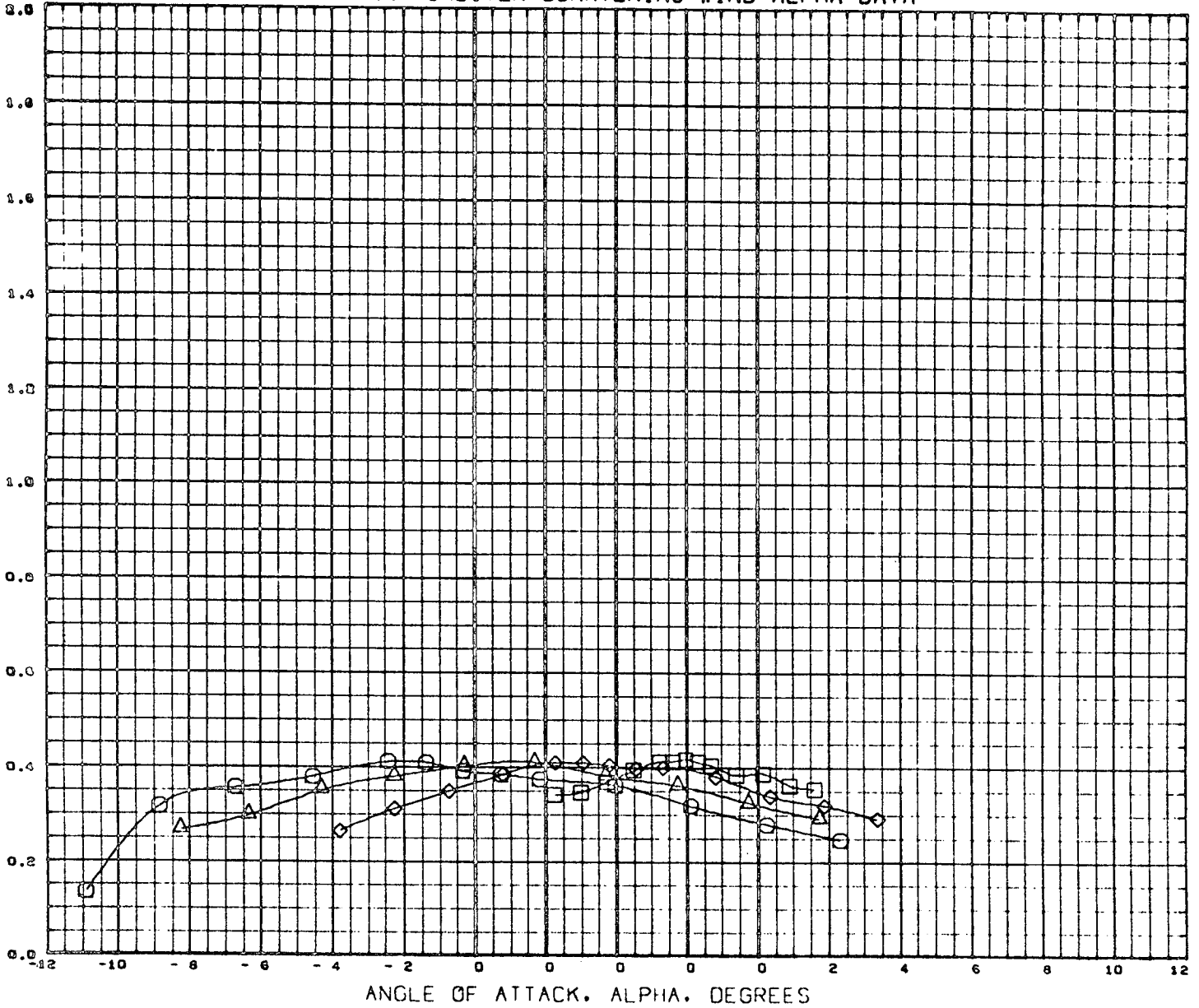


SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION		
		MACH	WING INC	PHI	PHI	PHI	SREF	SQ. IN.	
○	0.000	1.965	0.000	844041	0.000	Y44042	20.000	1.3960	IN.
△	20.000			Y44043	45.000	Y44044	70.000	1.3330	IN.
◇	45.000							1.3330	IN.
□	70.000							5.3990	IN.
								0.0000	IN.
								0.0000	IN.
								0.0034	

DATA HIST. CODE CCCCC#A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA

FOREBODY AXIAL FORCE COEFFICIENT, CAF

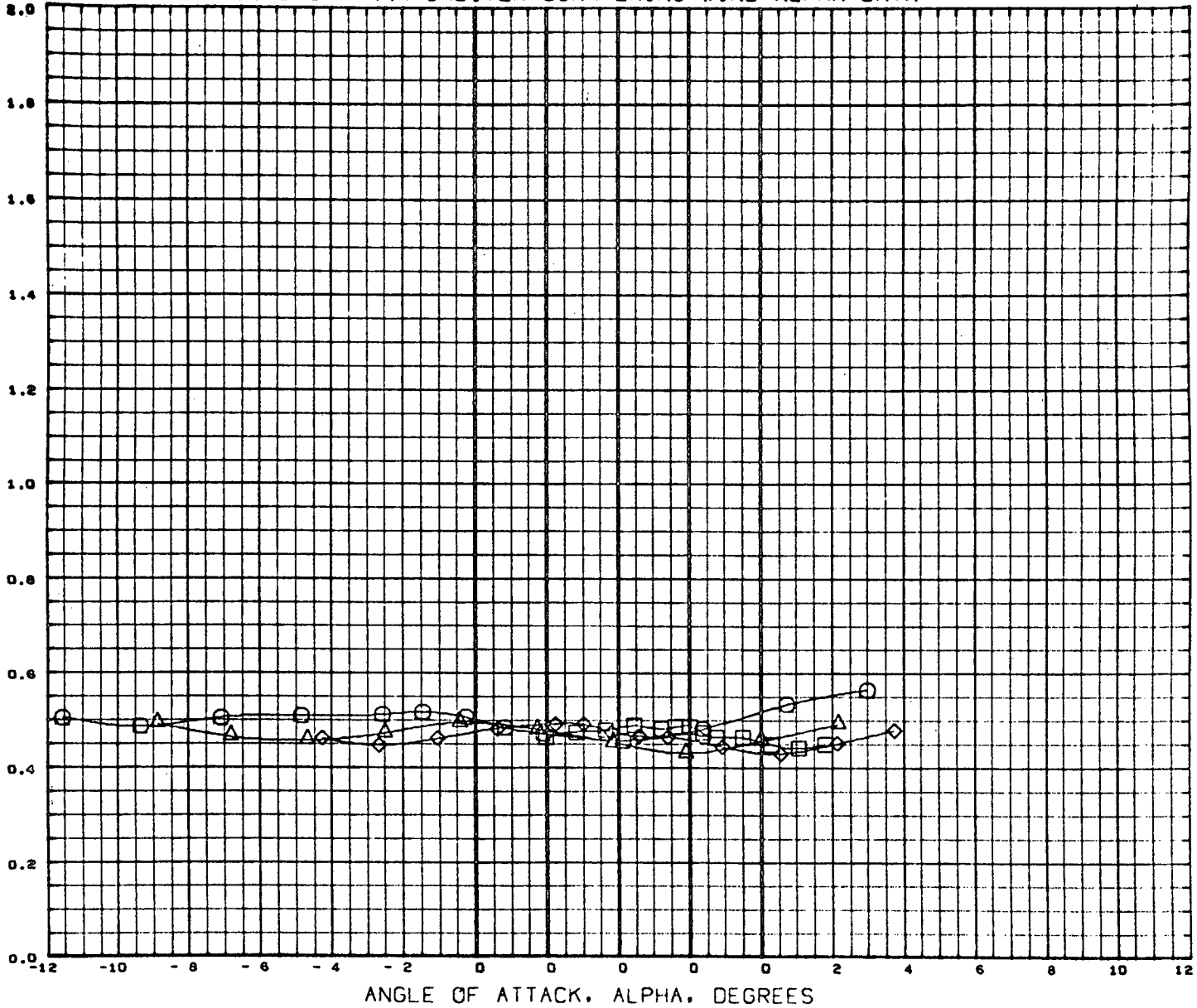


SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION			
○	0.000	MACH	0.599	DATASET	PHI	DATASET	PHI	SREF	1.3960	SQ. IN.
△	20.000	WING INC	0.000	844041	0.000	Y44042	20.000	LREF	1.3330	IN.
◇	45.000			Y44043	45.000	Y44044	70.000	BREF	1.3330	IN.
□	70.000							XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
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DATA HIST. CODE CCCGCA

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA

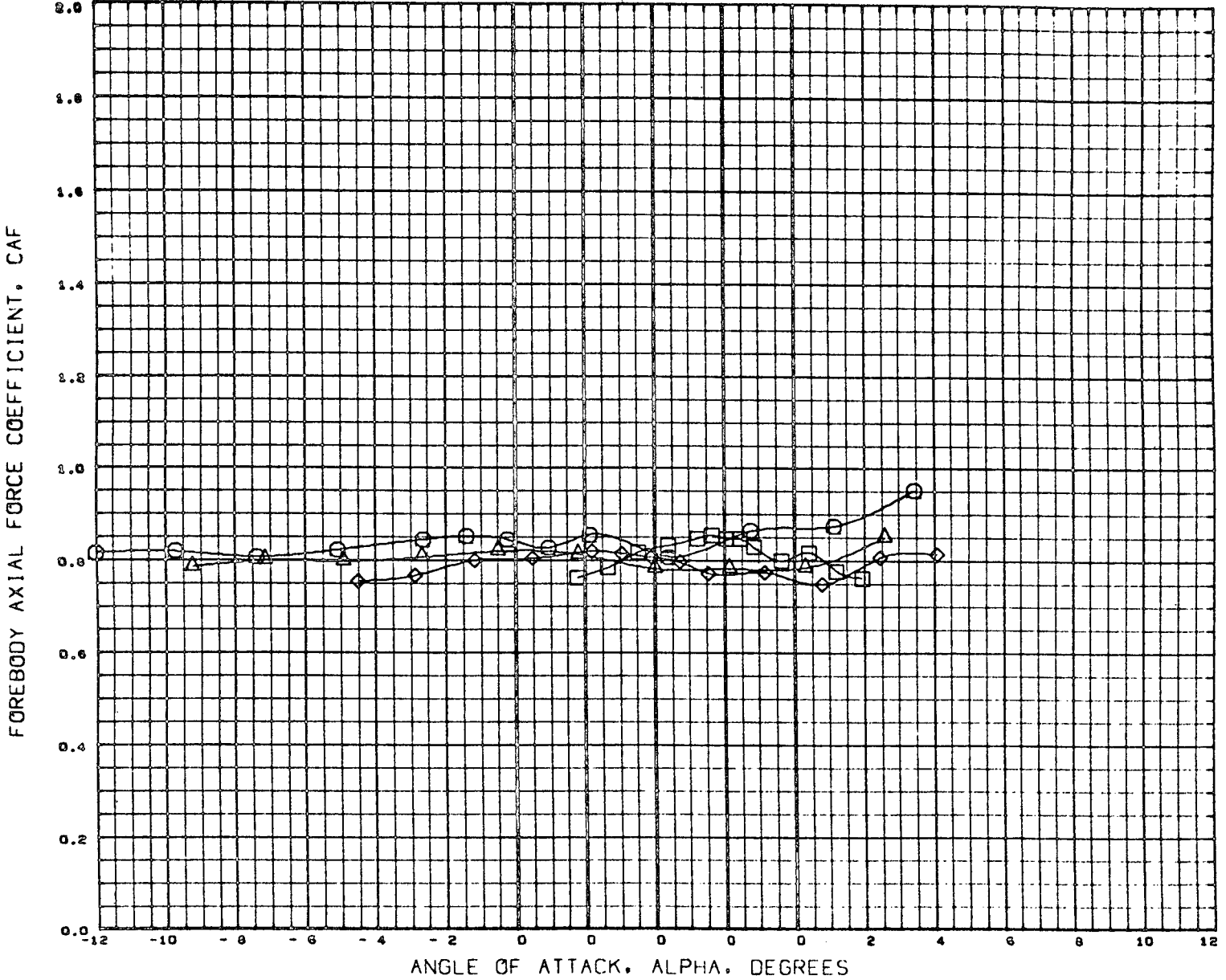
FOREBODY AXIAL FORCE COEFFICIENT, CAF



SYMBOL	PHI	MACH	WING INC	PARAMETRIC VALUES	DATASET	PHI	DATASET	PHI	SREF	LREF	BREF	XMRP	YMRP	ZMRP	SCALE	SO, IN.
○	0.000	0.904	0.000		844041	0.000	Y44042	20.000	1.3960	1.3330	1.3330	5.3990	0.0000	0.0000	0.0034	IN.
△	20.000				Y44043	45.000	Y44044	70.000								IN.
◇	45.000															IN.
□	70.000															IN.

DATA HIST. CODE CCCC#A

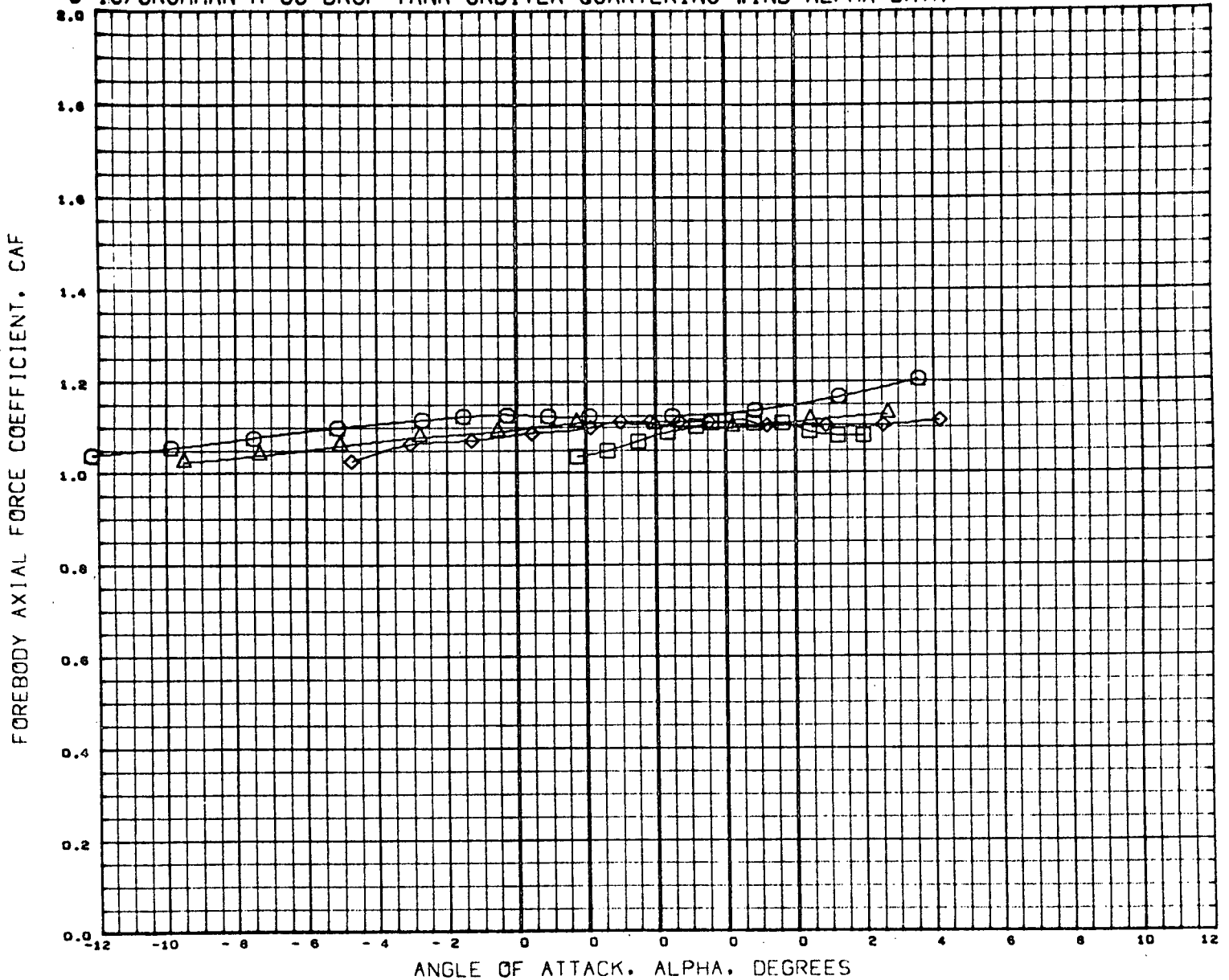
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES	DATA SOURCE			REFERENCE INFORMATION		
○	0.000	MACH 0.999	844041	0.000	Y44042	20.000	SREF 1.3960	30. IN.
△	20.000	WIGINC 0.000	Y44043	45.000	Y44044	70.000	LREF 1.3330	IN.
◇	45.000						BREF 1.3330	IN.
□	70.000						XMRP 5.3990	IN.
							YMRP 0.0000	IN.
							ZMRP 0.0000	IN.
							SCALE 0.0034	

DATA HIST. CODE CCCCC#A

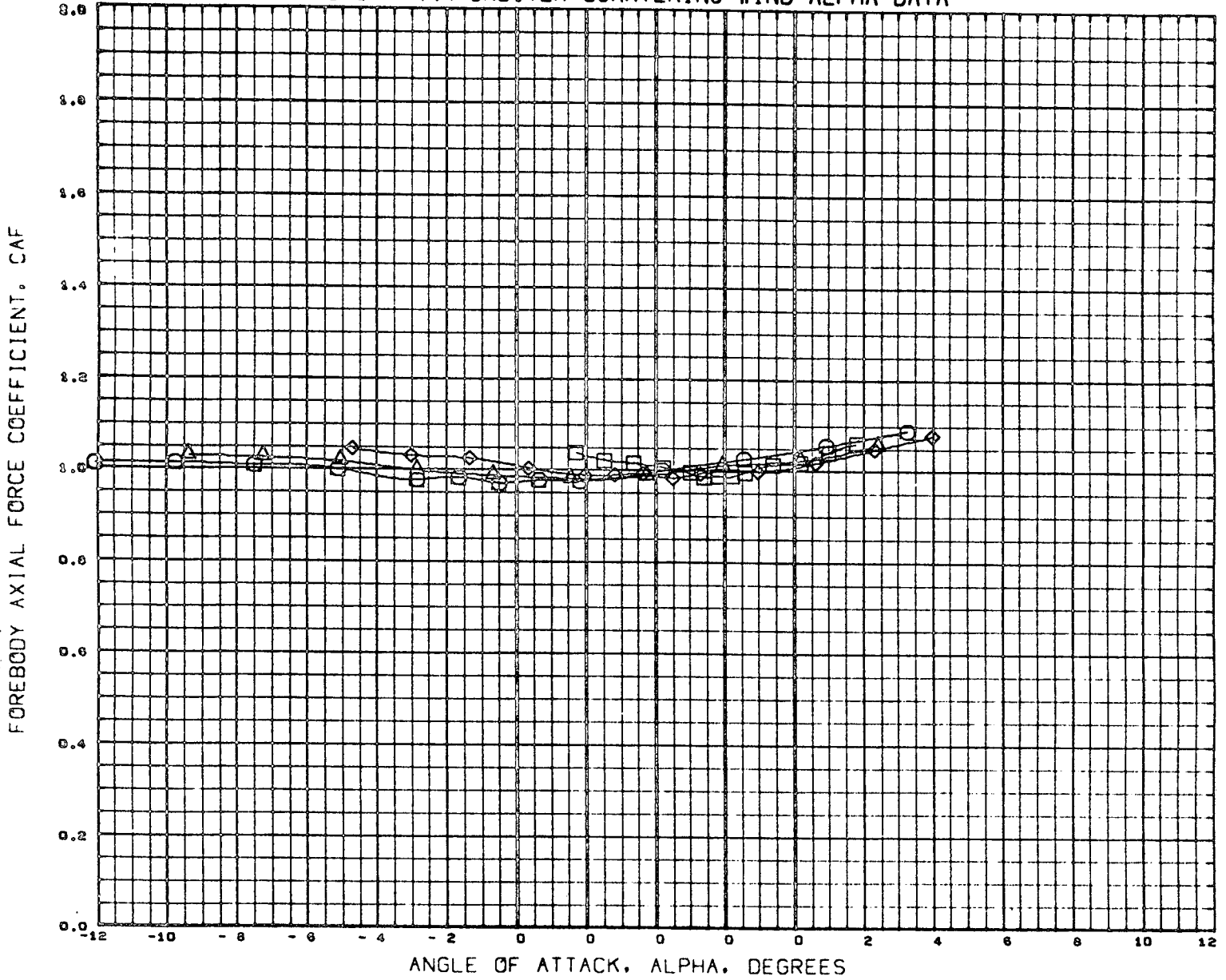
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION		
		MACH	WING INC	PHI	PHI	PHI	SREF	SQ. IN.	
○	0.000	1.202		844041	0.000	20.000	1.3960	IN.	
△	20.000	0.000		Y44042	45.000	70.000	1.3330	IN.	
◇	45.000			Y44043			1.3330	IN.	
□	70.000						5.3990	IN.	
							0.0000	IN.	
							0.0000	IN.	
							0.0034		

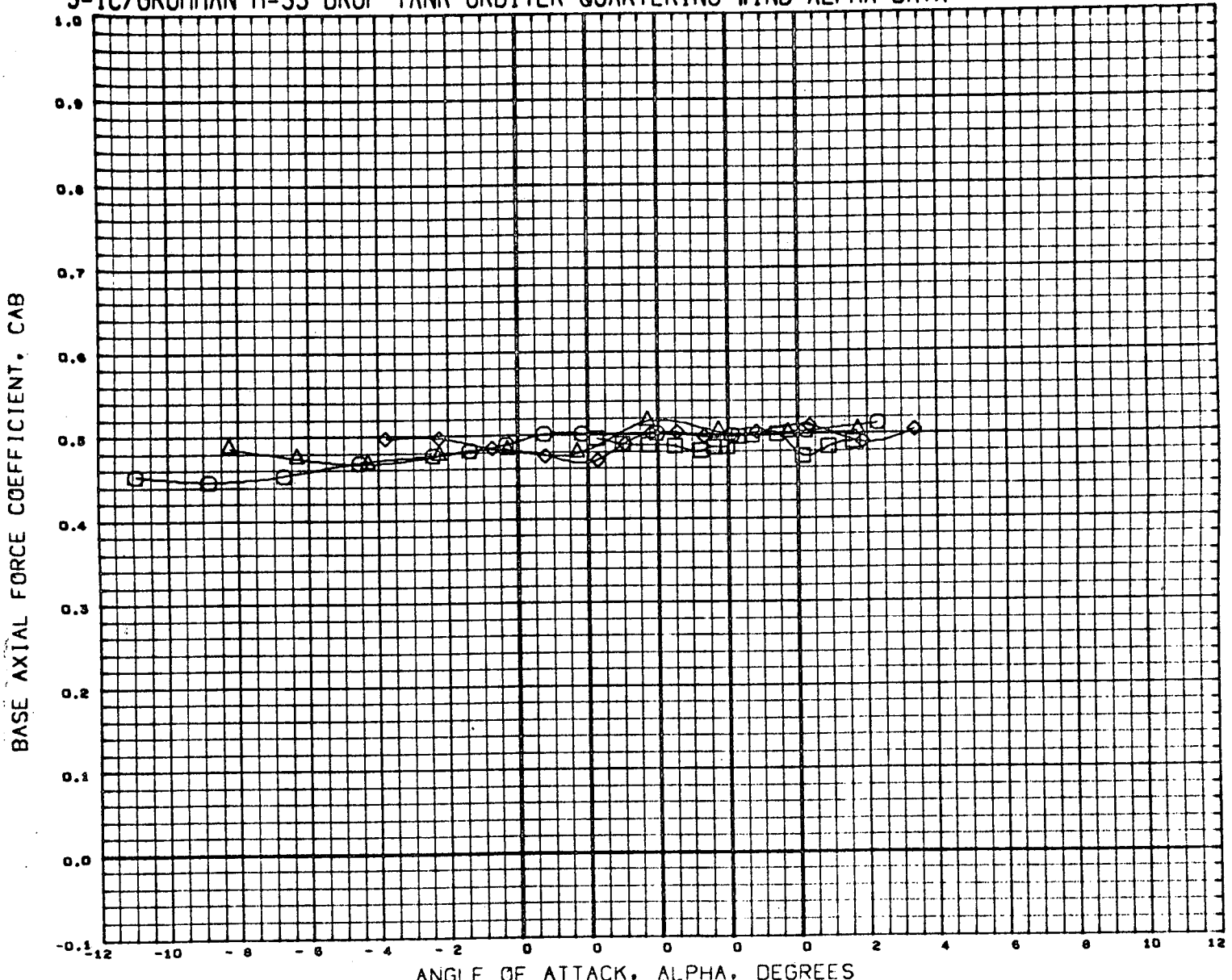
DATA HIST. CODE CCCG6A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



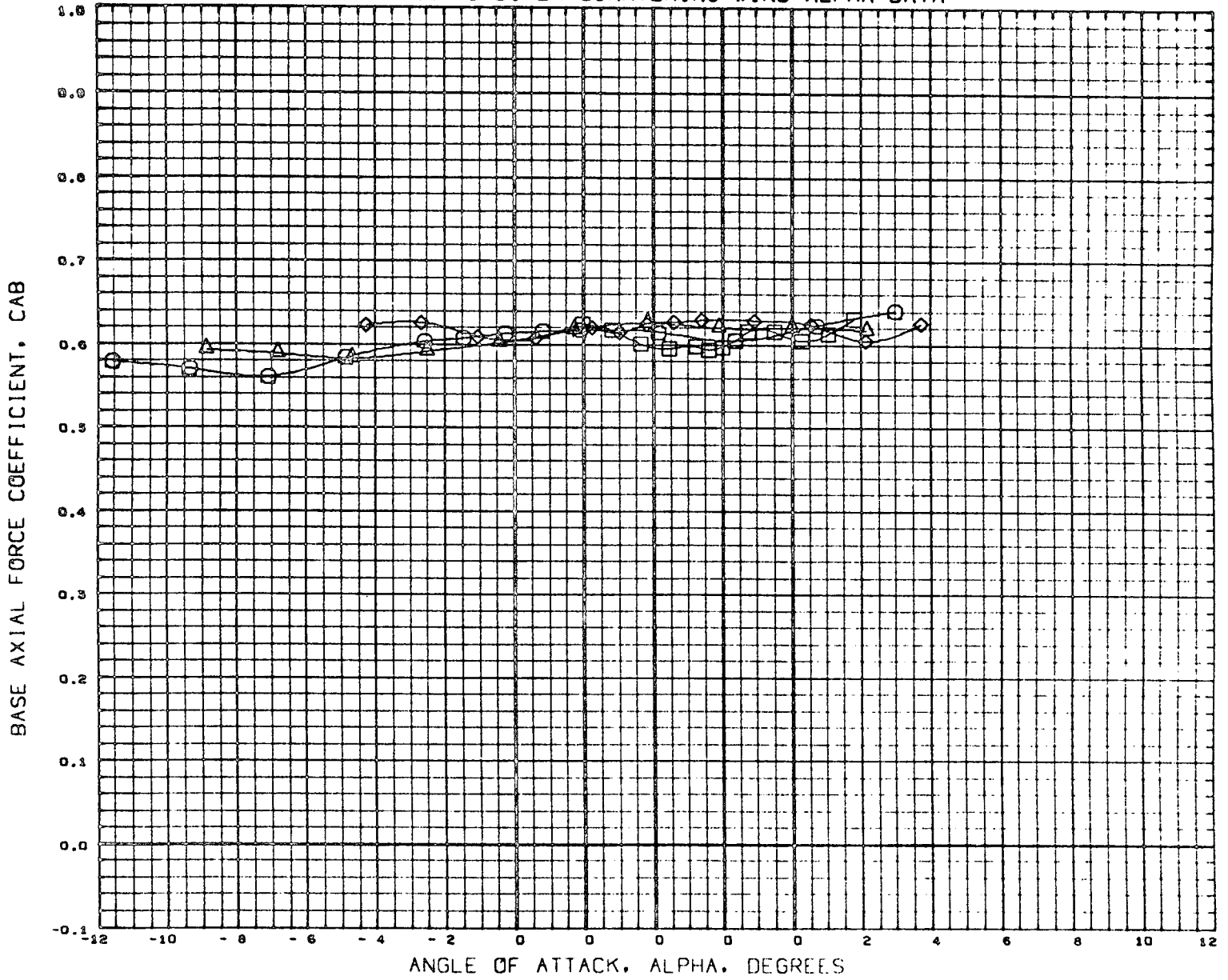
SYMBOL	PHI	PARAMETRIC VALUES	DATA SOURCE	REFERENCE INFORMATION
○	0.000	MACH 1.965	844041	SREF 1.3960 SQ. IN.
△	20.000	WNGTNC 0.000	Y44042	LREF 1.3330 IN.
◇	45.000		Y44044	BREF 1.3330 IN.
□	70.000			XMRP 5.3990 IN.
				YMRP 0.0000 IN.
				ZMRP 0.0000 IN.
				SCALE 0.0034

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES	DATA SOURCE			REFERENCE INFORMATION							
			PHI	PHI	PHI	SREF	LREF	BREF	XMRP	YMRP	ZMRP	SCALE	
○	0.000	MACH 0.599	844041	0.000	Y44042	20.000	1.3960	1.3330	1.3330	5.3990	0.0000	0.0034	50. IN.
△	20.000	WINGINC 0.000	844041	45.000	Y44044	70.000							IN.
◇	45.000												IN.
□	70.000												IN.

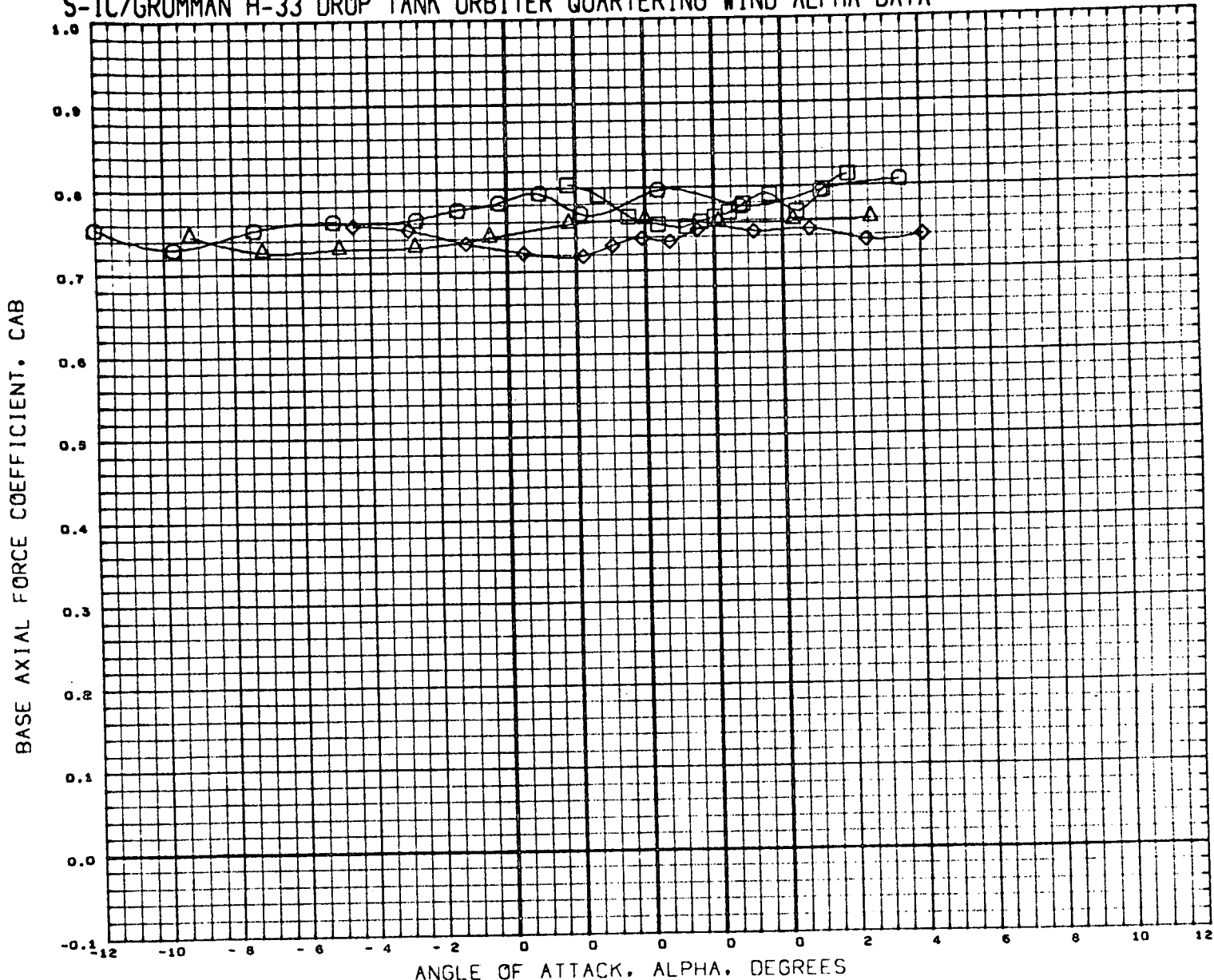
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION		
		MACH	WING INC	DATASET	PHI	DATASET	PHI	SREF	SQ. IN.
○	0.000	0.904		844041	0.000	Y44042	20.000	1.3960	IN.
△	20.000	0.000		Y44043	45.000	Y44044	70.000	1.3330	IN.
◇	45.000							1.3330	IN.
□	70.000							5.3990	IN.
								0.0000	IN.
								0.0000	IN.
								0.0034	IN.

DATA HIST. CODE CCCGC% A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES	DATA SOURCE			REFERENCE INFORMATION								
				DATASET	PHI	DATASET	PHI	SREF	LREF	BREF	XMRP	YMRP	ZMRP	SCALE	SQ. IN.
○	0.000	20.000	0.999	844041	0.000	Y44042	20.000	1.3960	1.3330	1.3330	5.3990	0.0000	0.0000	0.0034	IN.
△	20.000	45.000	0.000	Y44043	45.000	Y44044	70.000								IN.
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□	70.000														IN.

DATA HIST. CODE CCCGC9A

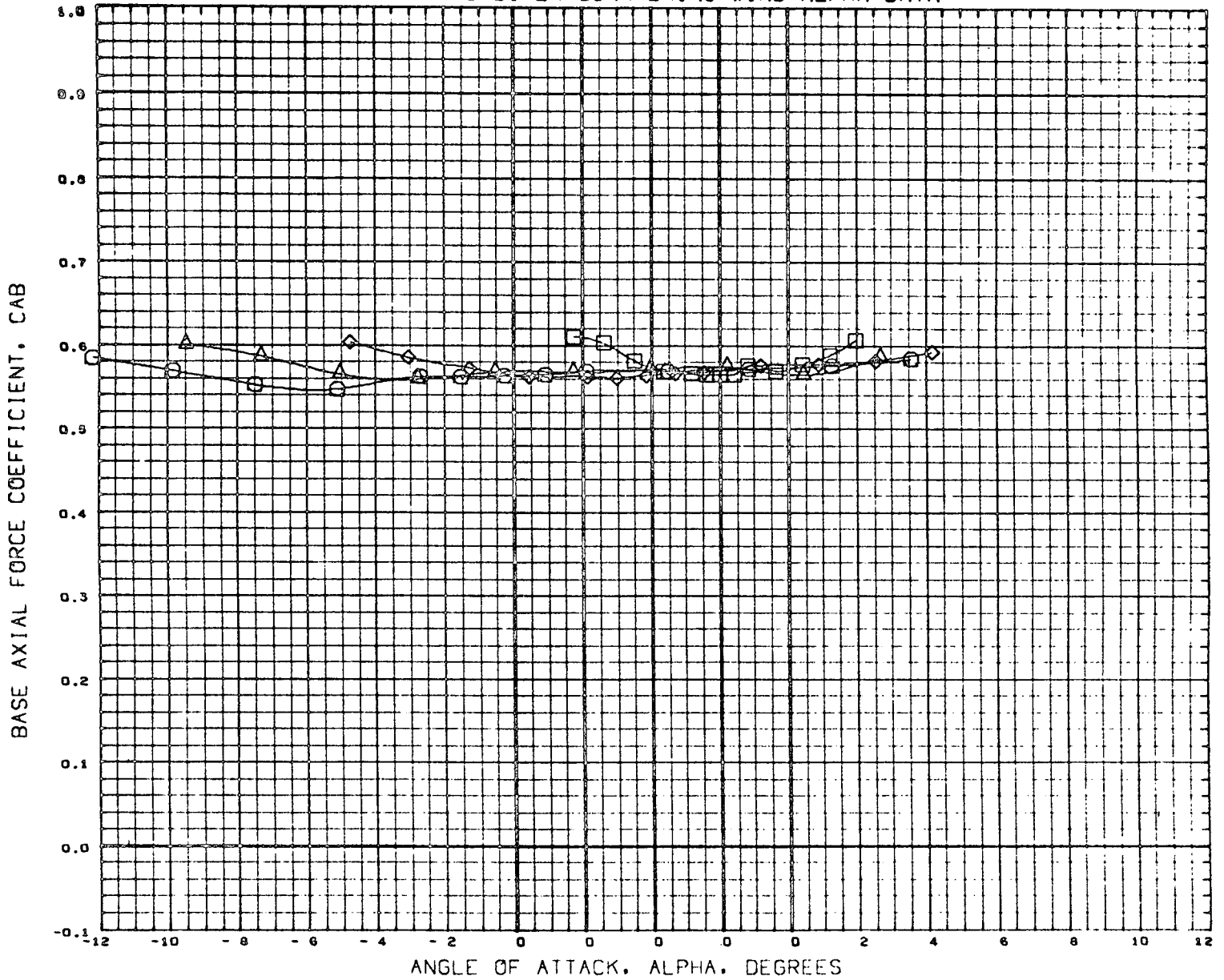
M502-MSFC-S1C H-33 ORBITER

OWVTCBF

(844041) 12 MAY 72

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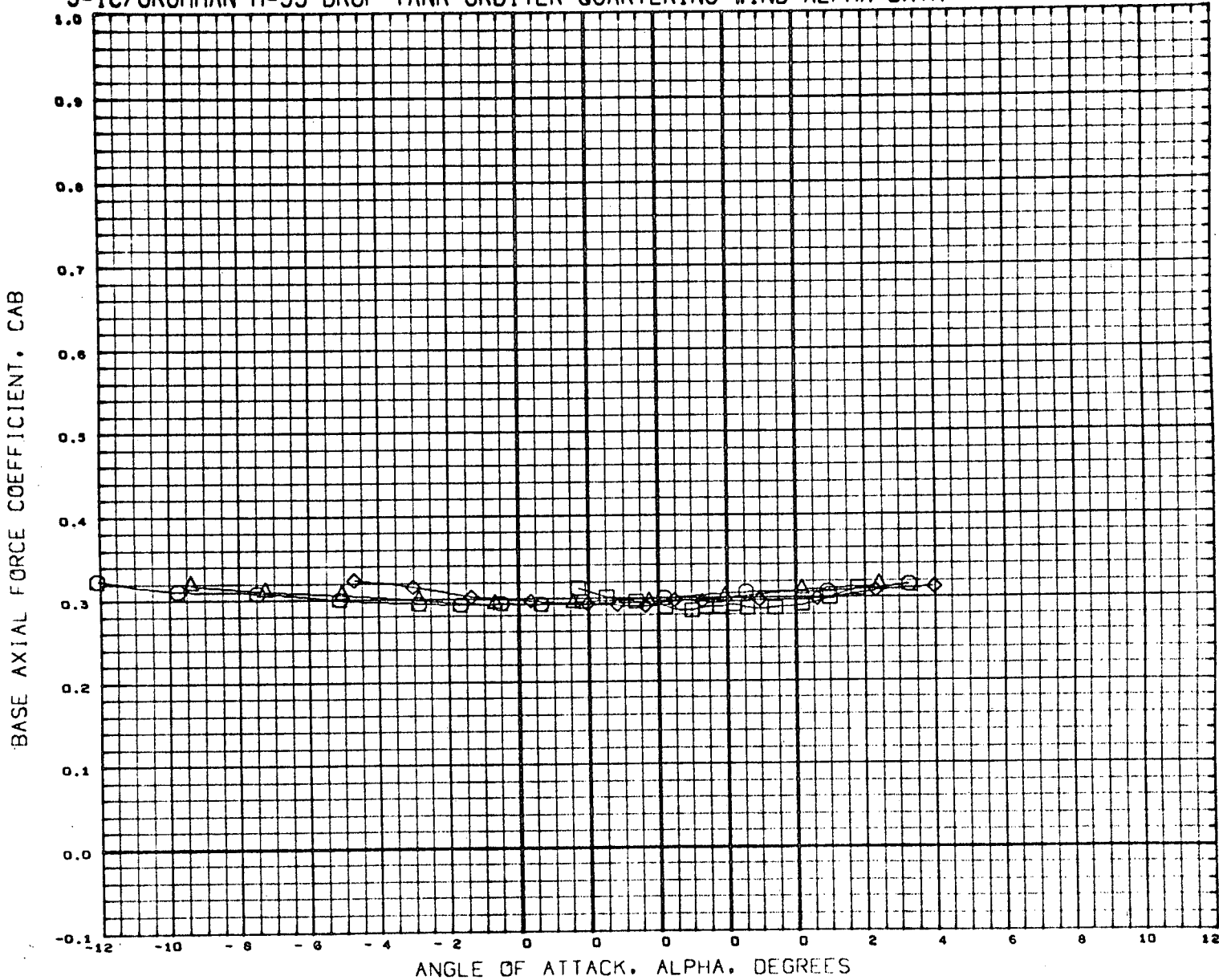
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES	DATA SOURCE	PHI	PHI	REFERENCE INFORMATION
○	0.000	20.000	1.202	844041	0.000	20.000	SREF 1.3960 SQ. IN.
△	20.000	45.000	0.000	Y44042	45.000	70.000	LREF 1.3330 IN.
◇	45.000			Y44043			BREF 1.3330 IN.
□	70.000						XMRP 5.3990 IN.
							YMRP 0.0000 IN.
							ZMRP 0.0000 IN.
							SCALE 0.0034

DATA HIST. CODE CCCGC#A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA

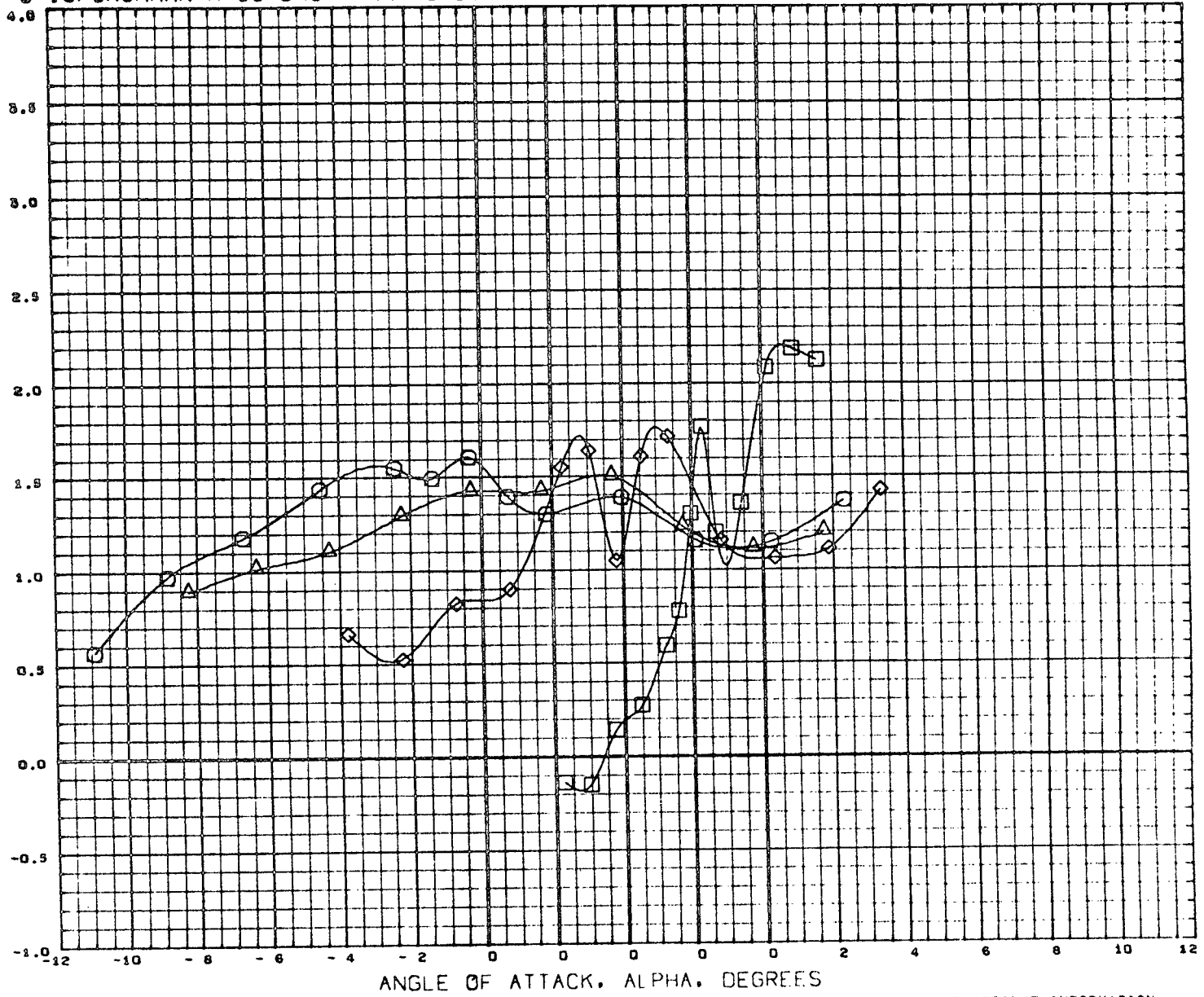


SYMBOL	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION							
	PHI	MACH	WING INC	PHI	PHI	PHI	SREF	LREF	BREF	XMRP	YMRP	ZMRP	SCALE	SQ. IN.
○	0.000	1.965	0.000	844041	0.000	20.000	1.3960	1.3330	1.3330	5.3990	0.0000	0.0000	0.0034	IN.
△	20.000	1.965	0.000	844041	0.000	20.000	1.3960	1.3330	1.3330	5.3990	0.0000	0.0000	0.0034	IN.
◇	45.000	1.965	0.000	Y44042	45.000	70.000	1.3960	1.3330	1.3330	5.3990	0.0000	0.0000	0.0034	IN.
□	70.000	1.965	0.000	Y44043	45.000	70.000	1.3960	1.3330	1.3330	5.3990	0.0000	0.0000	0.0034	IN.

DATA HIST. CODE CCCC4A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA

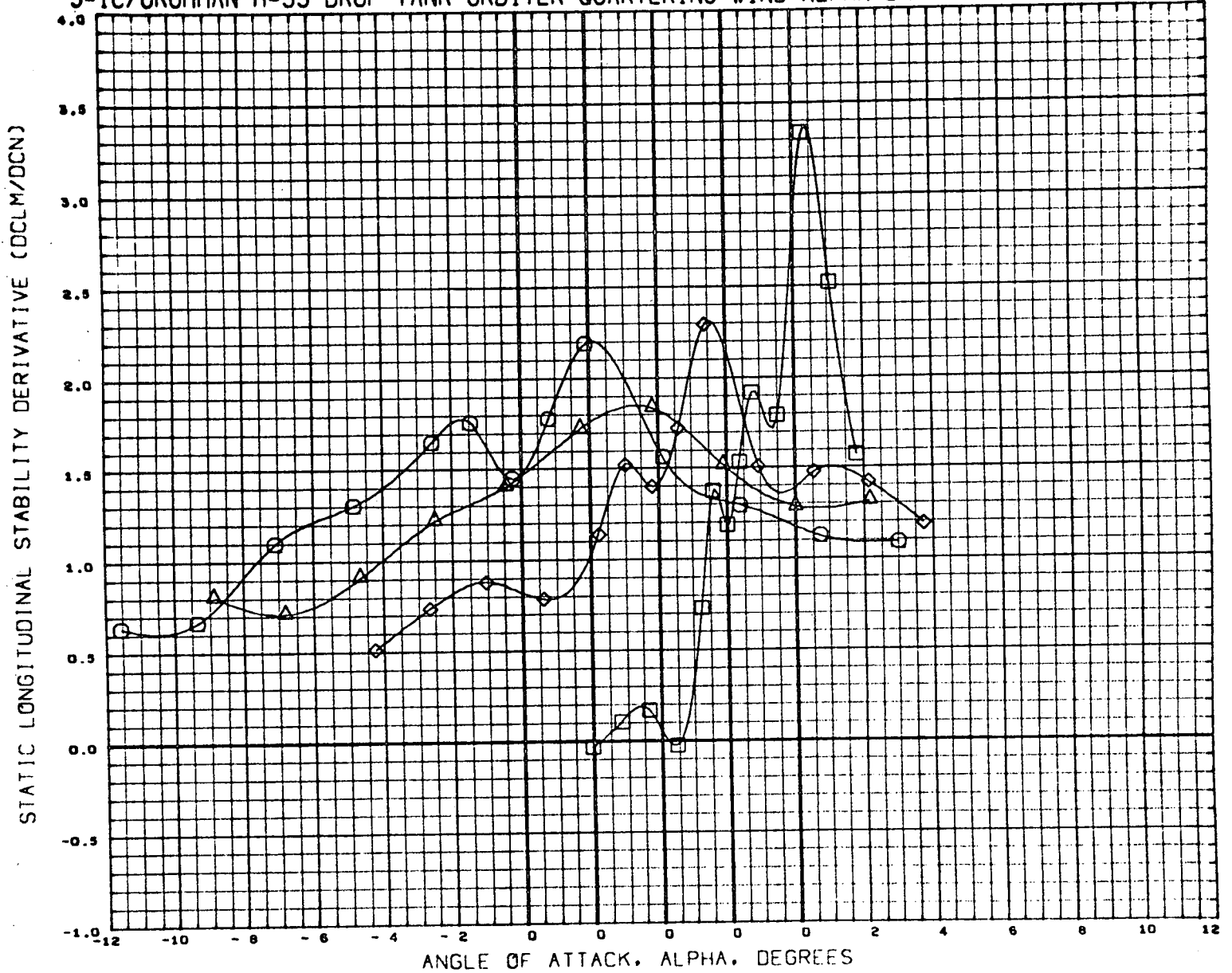
STATIC LONGITUDINAL STABILITY DERIVATIVE (DCLM/DCN)



SYMBOL	PHI	MACH	PARAMETRIC VALUES	DATA SOURCE			REFERENCE INFORMATION		
				PHI	PHI	PHI	SREF	SO. IN.	
○	0.000	0.599		844041	0.000	Y44042	20.000	1.3960	IN.
△	20.000	0.000		844041	0.000	Y44042	20.000	1.3330	IN.
◇	45.000			Y44043	45.000	Y44044	70.000	1.3330	IN.
□	70.000							5.3990	IN.
								0.0000	IN.
								0.0000	IN.
								0.0034	

DATA HIST. CODE CCCGC#A

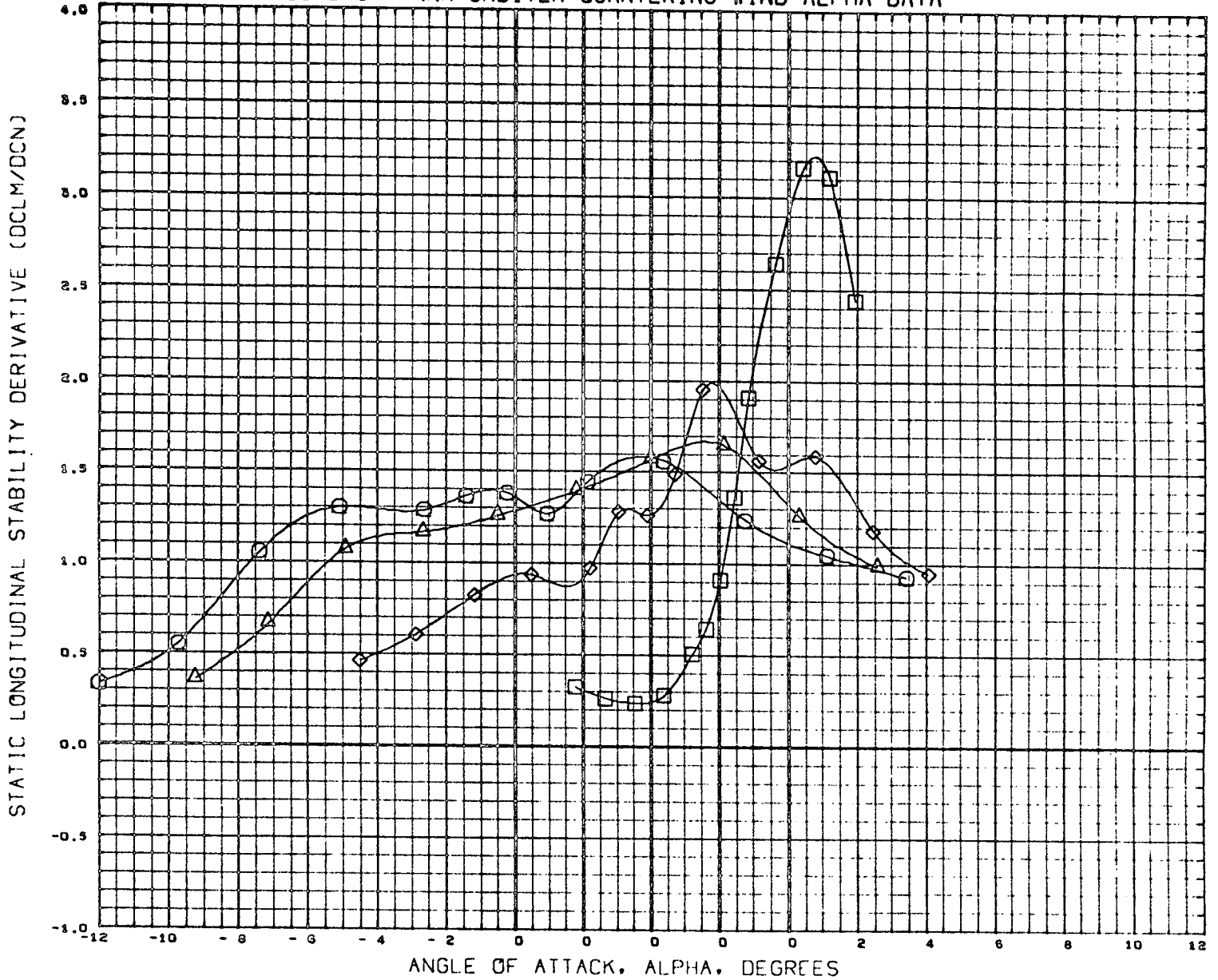
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES	DATA SOURCE			REFERENCE INFORMATION		
				PHI	DATASET	PHI	SREF	SQ. IN.	
○	0.000	20.000	0.904	0.000	Y44042	20.000	1.3960	IN.	
△	20.000	45.000	0.000	45.000	Y44043	45.000	1.3330	IN.	
◇	45.000	70.000				70.000	1.3330	IN.	
□	70.000						5.3990	IN.	
							0.0000	IN.	
							0.0000	IN.	
							SCALE	0.0034	

DATA HIST. CODE CCCGC#A

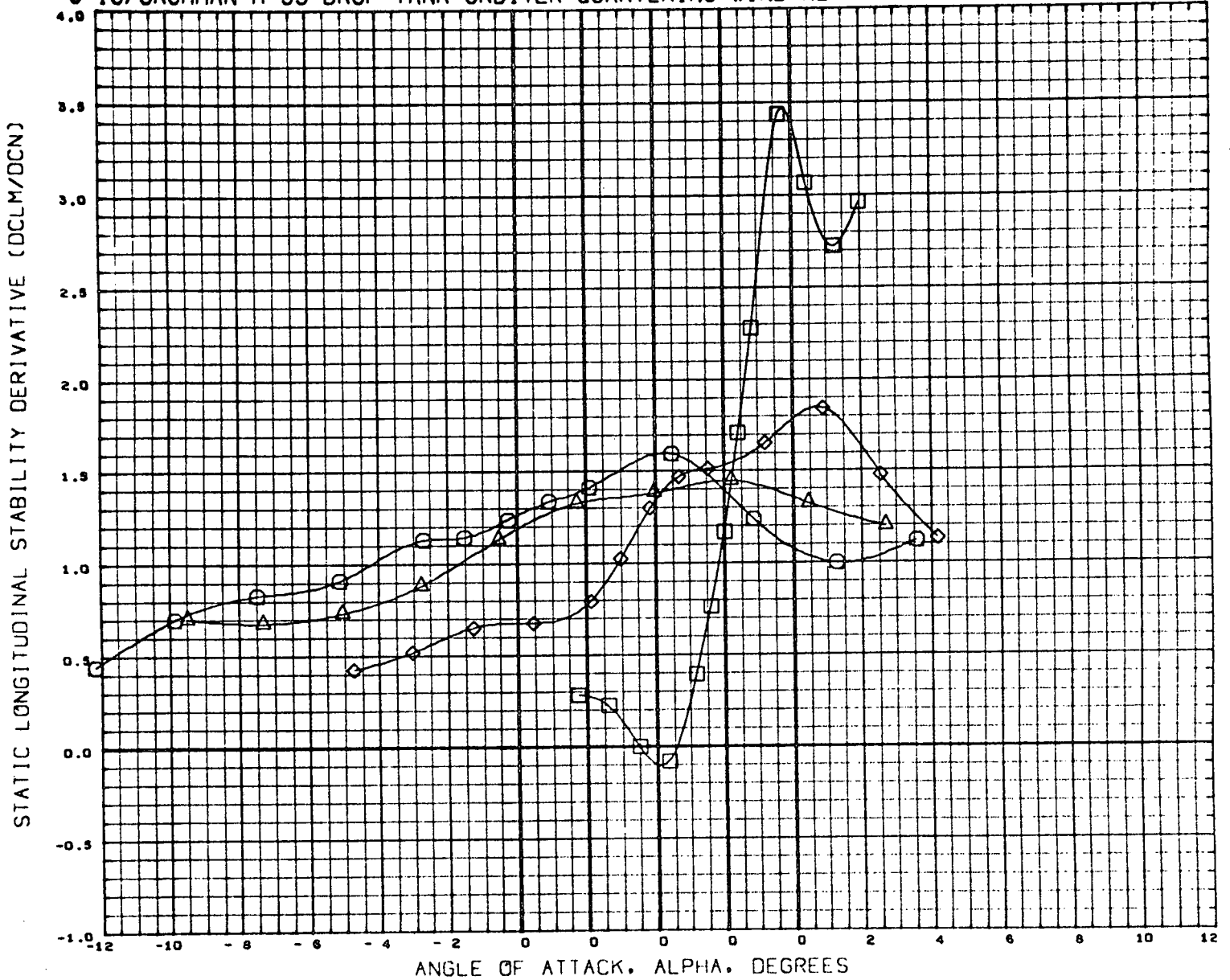
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	PARAMETRIC VALUES	DATA SOURCE				REFERENCE INFORMATION		
○	0.000	MACH 0.999	844041	PHI 0.000	Y44042	PHI 20.000	SREF	1.3960	SQ. IN.
△	20.000	WING INC 0.000	844041	PHI 0.000	Y44042	PHI 20.000	LREF	1.3330	IN.
◇	45.000		Y44043	PHI 45.000	Y44044	PHI 70.000	BREF	1.3330	IN.
□	70.000						XMRP	5.3990	IN.
							YMRP	0.0000	IN.
							ZMRP	0.0000	IN.
							SCALE	0.0034	IN.

DATA HIST. CODE CCCGC#A

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES	DATA SOURCE			REFERENCE INFORMATION		
				PHI	PHI	PHI	SREF	SQ. IN.	
○	0.000	1.202		844041	0.000	Y44042	20.000	1.3960	IN.
△	20.000	0.000		844041	45.000	Y44044	70.000	1.3330	IN.
◇	45.000							1.3330	IN.
□	70.000							5.3990	IN.
								0.0000	IN.
								0.0000	IN.
								0.0034	IN.

DATA HIST. CODE CCCGC#A

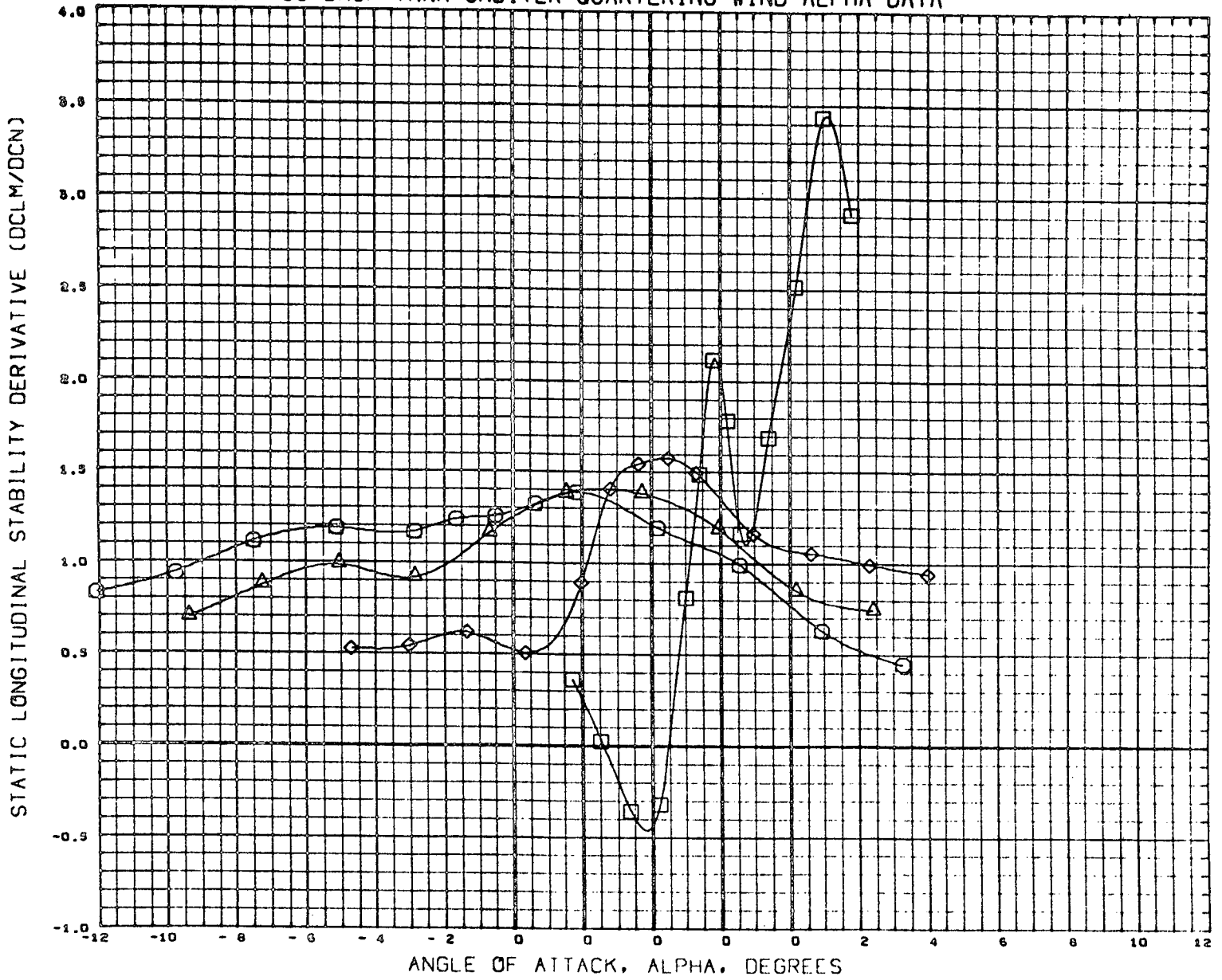
M502-MSFC-S1C H-33 ORBITER

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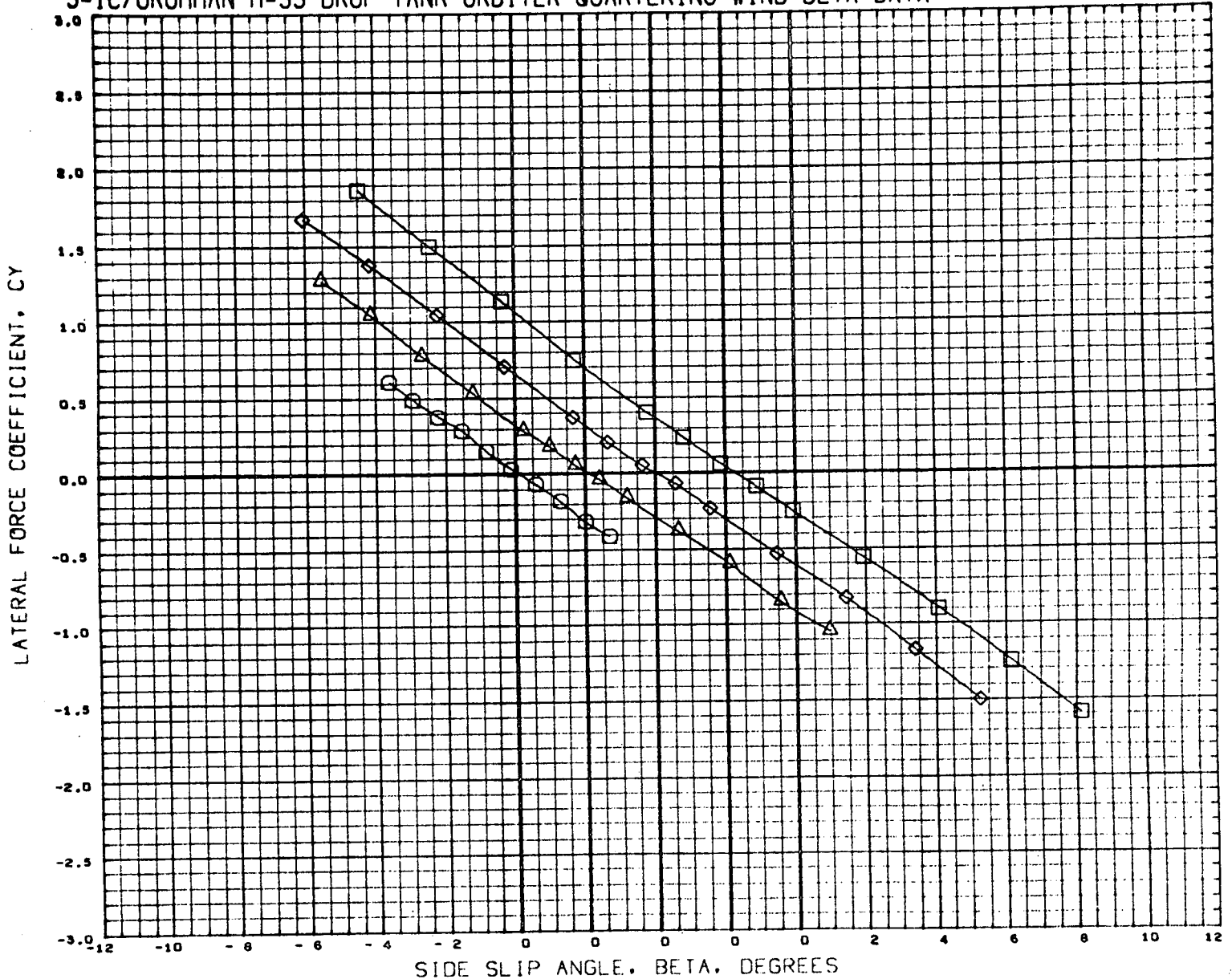
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND ALPHA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES	WING INC	DATA SOURCE	PHI	DATA SOURCE	PHI	REFERENCE INFORMATION
○	0.000	1.965			844041	0.000	Y44042	20.000	SREF 1.3960 SQ. IN.
△	20.000	0.000			844041	0.000	Y44042	20.000	LREF 1.3330 IN.
◇	45.000				Y44043	45.000	Y44044	70.000	CREF 1.3330 IN.
□	70.000								XMRP 5.3990 IN.
									YMRP 0.0000 IN.
									ZMRP 0.0000 IN.
									SCALE 0.0034

DATA HIST. CODE CCCC#A

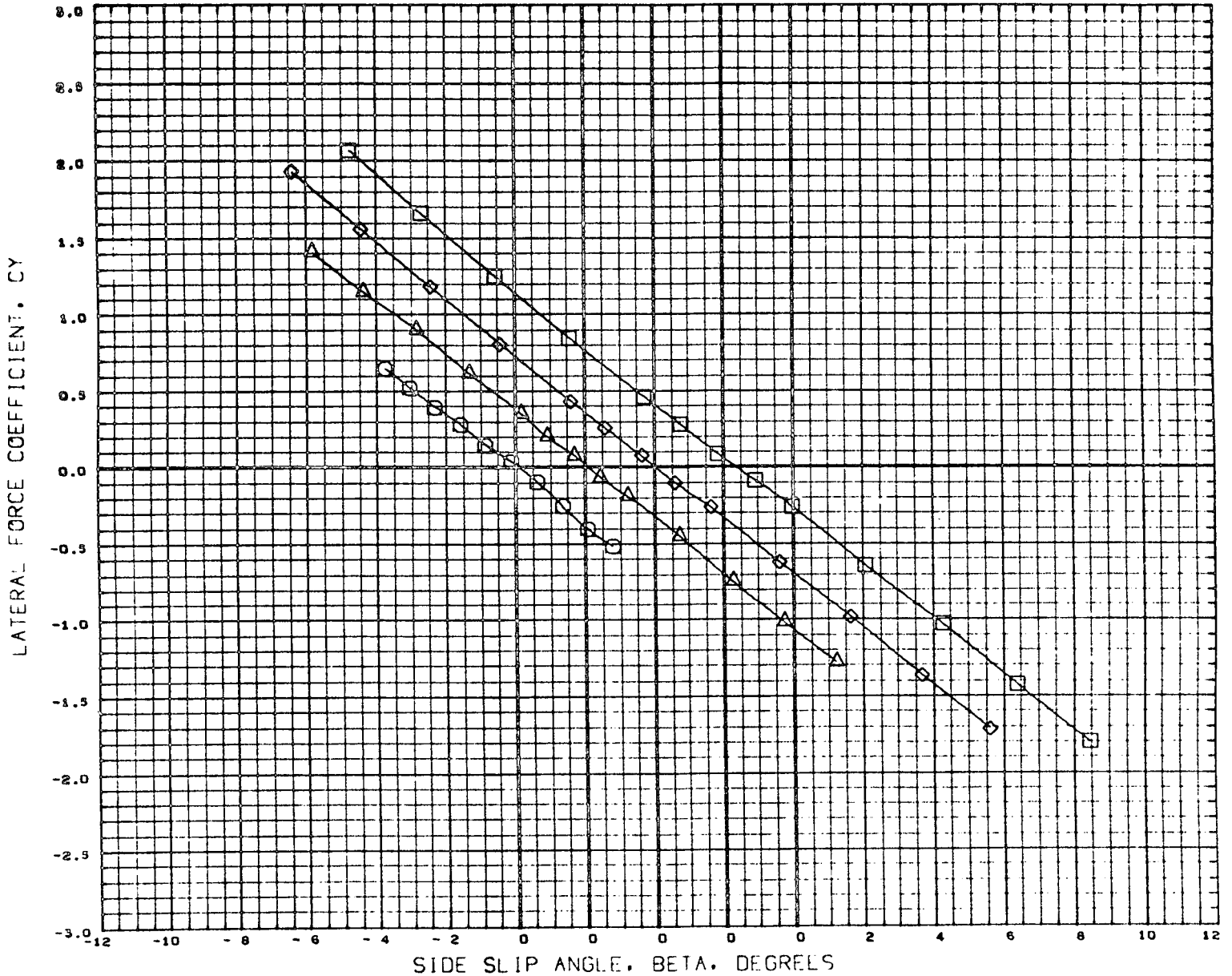
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WING INC	0.000	PHI	DATASET	PHI	SREF	SO. IN.	
○	20.000	0.599			C44042	20.000	C44043	45.000	1.3960	IN.
△	45.000				C44042	70.000	Z44045	90.000	1.3330	IN.
◇	70.000								1.3330	IN.
□	90.000								5.3930	IN.
									0.0000	IN.
									0.0000	IN.
									0.0034	IN.

DATA HIST. CODE CCGC

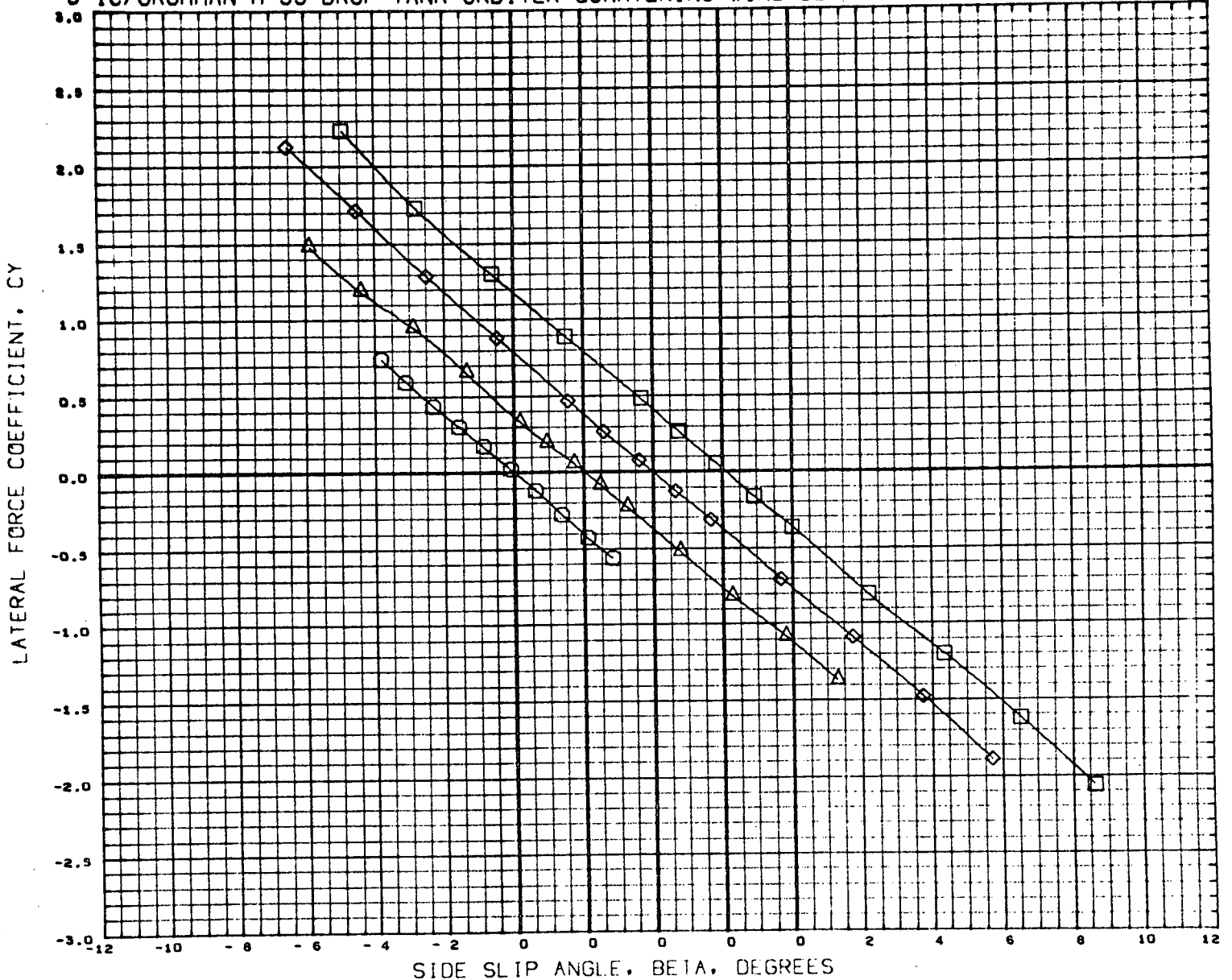
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MASH	WING INC	0.000	PHI	DATASET	PHI	SREF	SQ. IN.	
○	20.000							1.3960		
△	45.000				C44042	20.000	C44043	1.3330	IN.	
◇	70.000				C44044	70.000	Z44045	1.3330	IN.	
□	90.000							5.3990	IN.	
								0.0000	IN.	
								0.0000	IN.	
								0.0034		

DATA HIST. CODE CCCGC

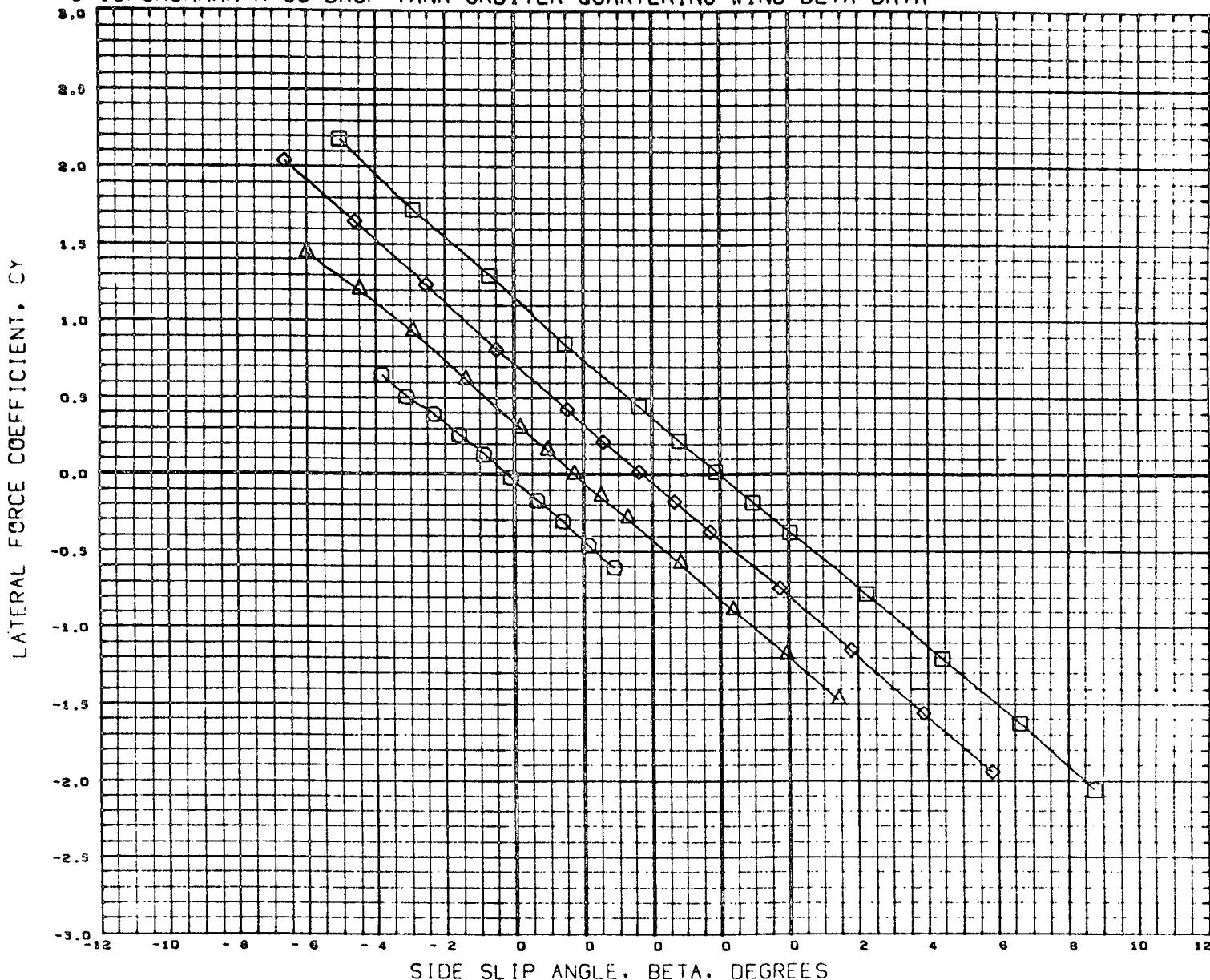
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION			
			1.001	WINGINC	0.000	DATASET	PHI	DATASET	PHI	SREF	SO. IN.
○	20.000					C44042	20.000	C44043	45.000	1.3960	IN.
△	45.000					C44044	70.000	Z44045	90.000	1.3330	IN.
◇	70.000									1.3330	IN.
□	90.000									5.3990	IN.
										0.0000	IN.
										0.0000	IN.
										0.0034	

DATA HIST. CODE CCCC

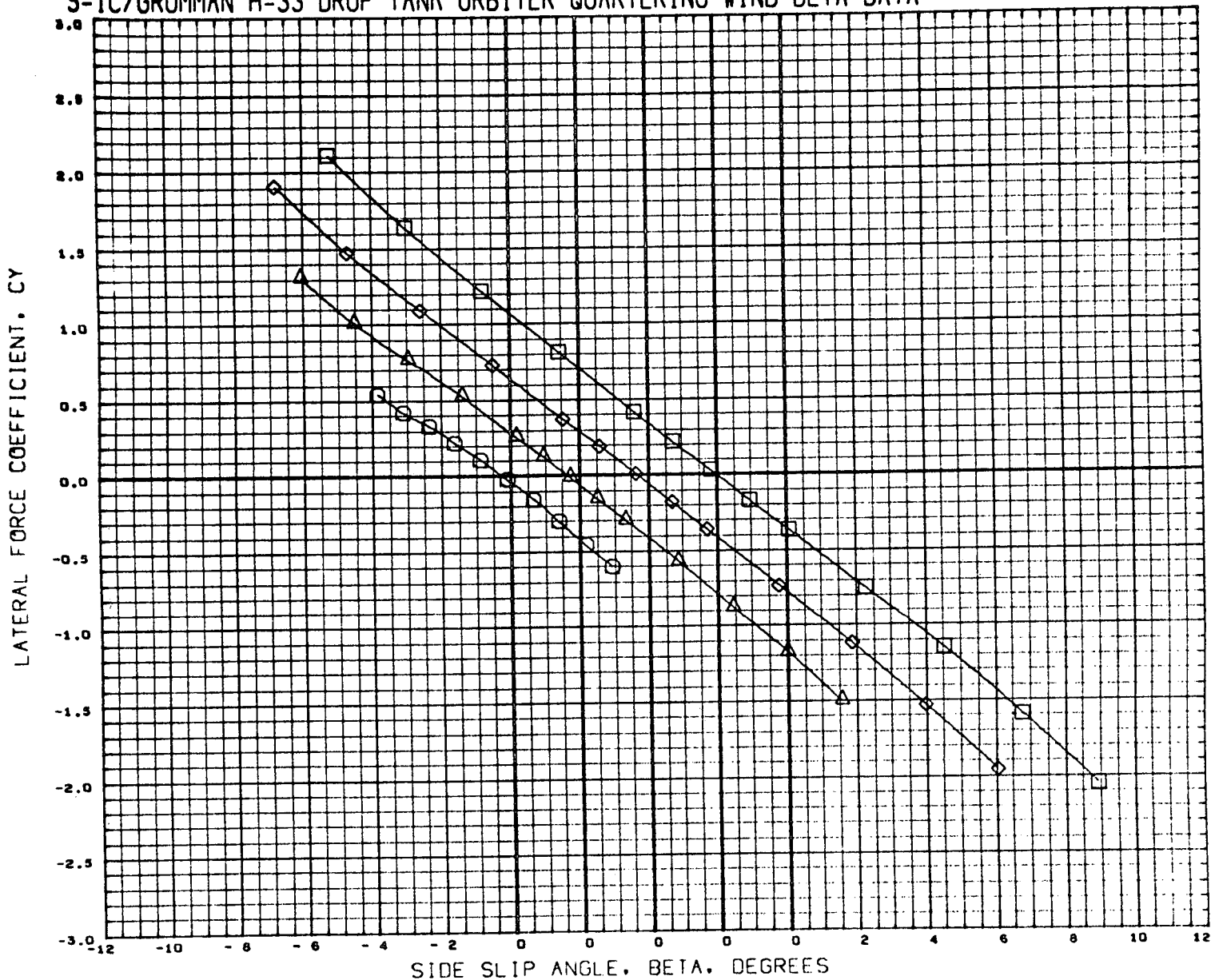
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES	DATA SOURCE	REFERENCE INFORMATION
○	20.000	MACH 1.198 WING INC 0.000	DATASET PHI DATASET PHI	SREF 1.3960 SQ. IN.
△	45.000		C44042 20.000 C44043 45.000	LREF 1.3330 IN.
◇	70.000		C44044 70.000 Z44045 90.000	BREF 1.3330 IN.
□	90.000			XMRP 5.3990 IN.
				YMRP 0.0000 IN.
				ZMRP 0.0000 IN.
				SCALE 0.0034

DATA HIST. CODE CCCC

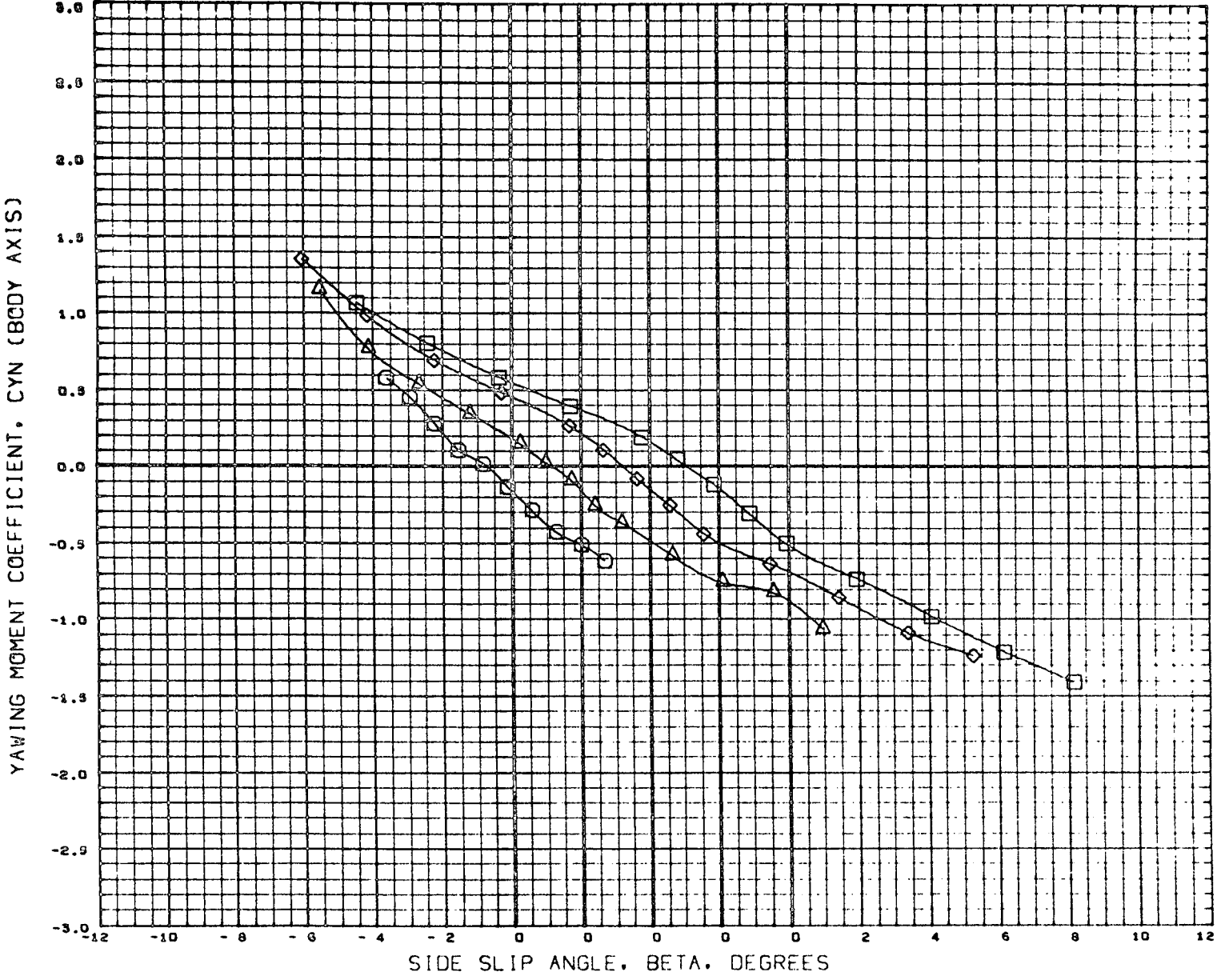
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES	DATA SOURCE	REFERENCE INFORMATION
○	20.000	MACH 1.964 WINGINC 0.000	PHI DATASET PHI DATASET PHI	SREF 1.3960 SQ. IN.
△	45.000		C44042 20.000 C44043 45.000	LREF 1.3330 IN.
◇	70.000		C44044 70.000 Z44045 90.000	BREF 1.3330 IN.
□	90.000			XMRP 5.3990 IN.
				YMRP 0.0000 IN.
				ZMRP 0.0000 IN.
				SCALE 0.0034

DATA HIST. CODE CCCC

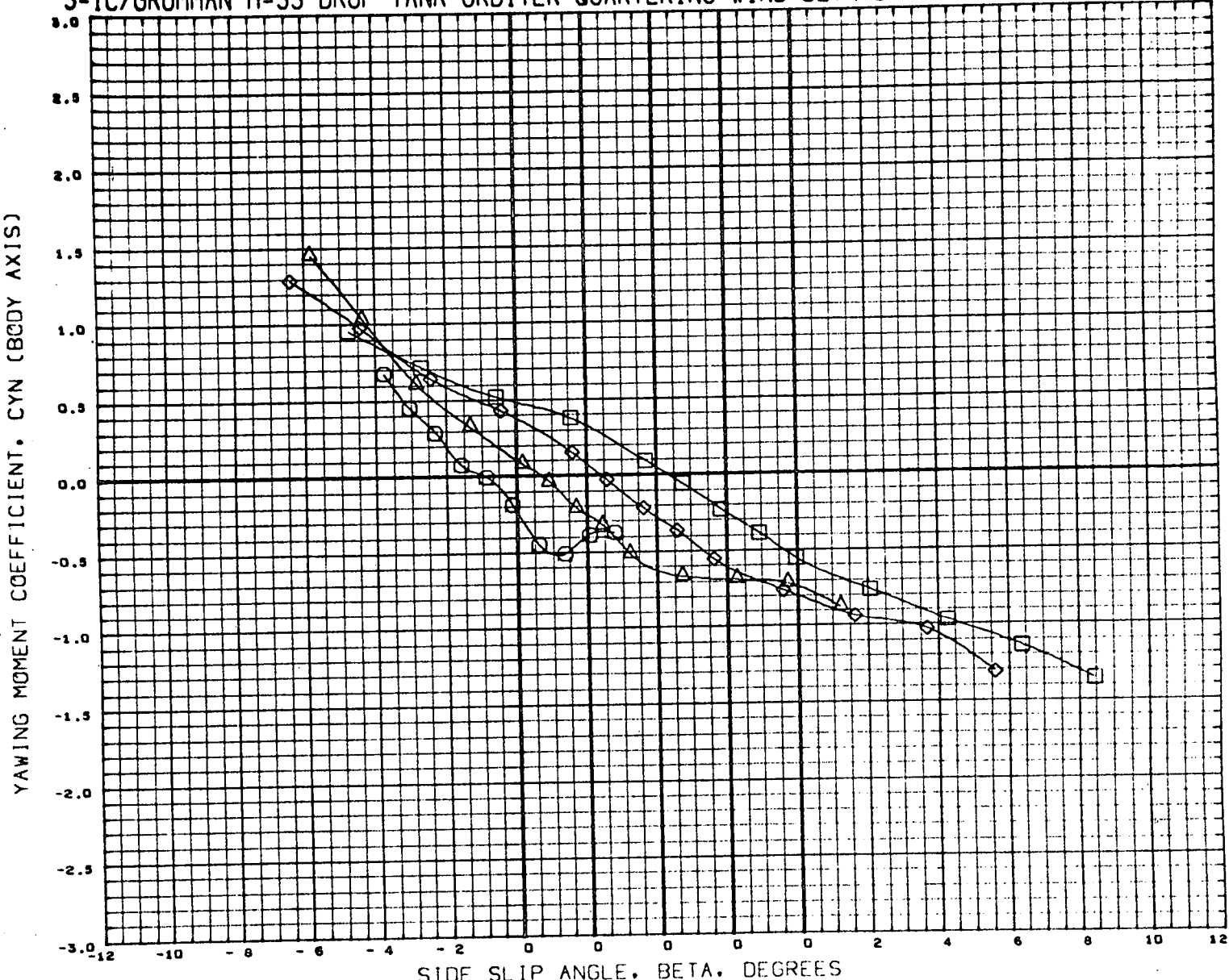
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WINGINC	0.000	PHI	DATASET	PHI	SREF	SQ. IN.	
○	20.000	0.599						1.3960	SQ. IN.	
△	45.000				C44042	20.000	C44043	1.3330	IN.	
◇	70.000				C44044	70.000	Z44045	1.3330	IN.	
□	90.000							5.3990	IN.	
								0.0000	IN.	
								0.0000	IN.	
								0.0034		

DATA MIST. CODE CCCCC

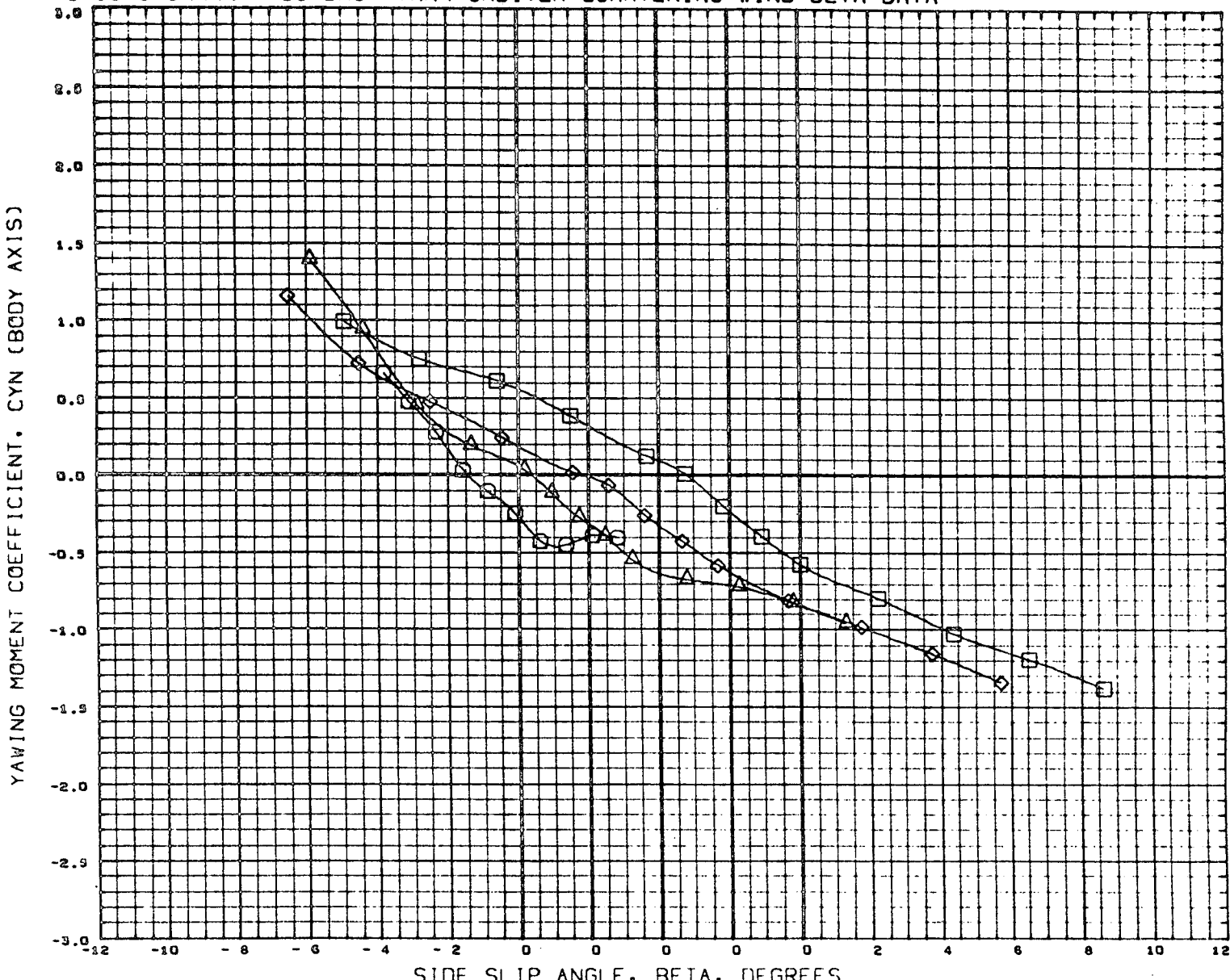
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION	
		MACH	WINGINC	PHI	PHI	PHI	SREF	SO. IN.
○	20.000	0.899	0.000	C44042	20.000	45.000	1.3960	IN.
△	45.000			C44044	70.000	90.000	1.3330	IN.
◇	70.000						1.3330	IN.
□	90.000						5.3990	IN.
							0.0000	IN.
							0.0000	IN.
							0.0034	

DATA HIST. CODE CCCGC

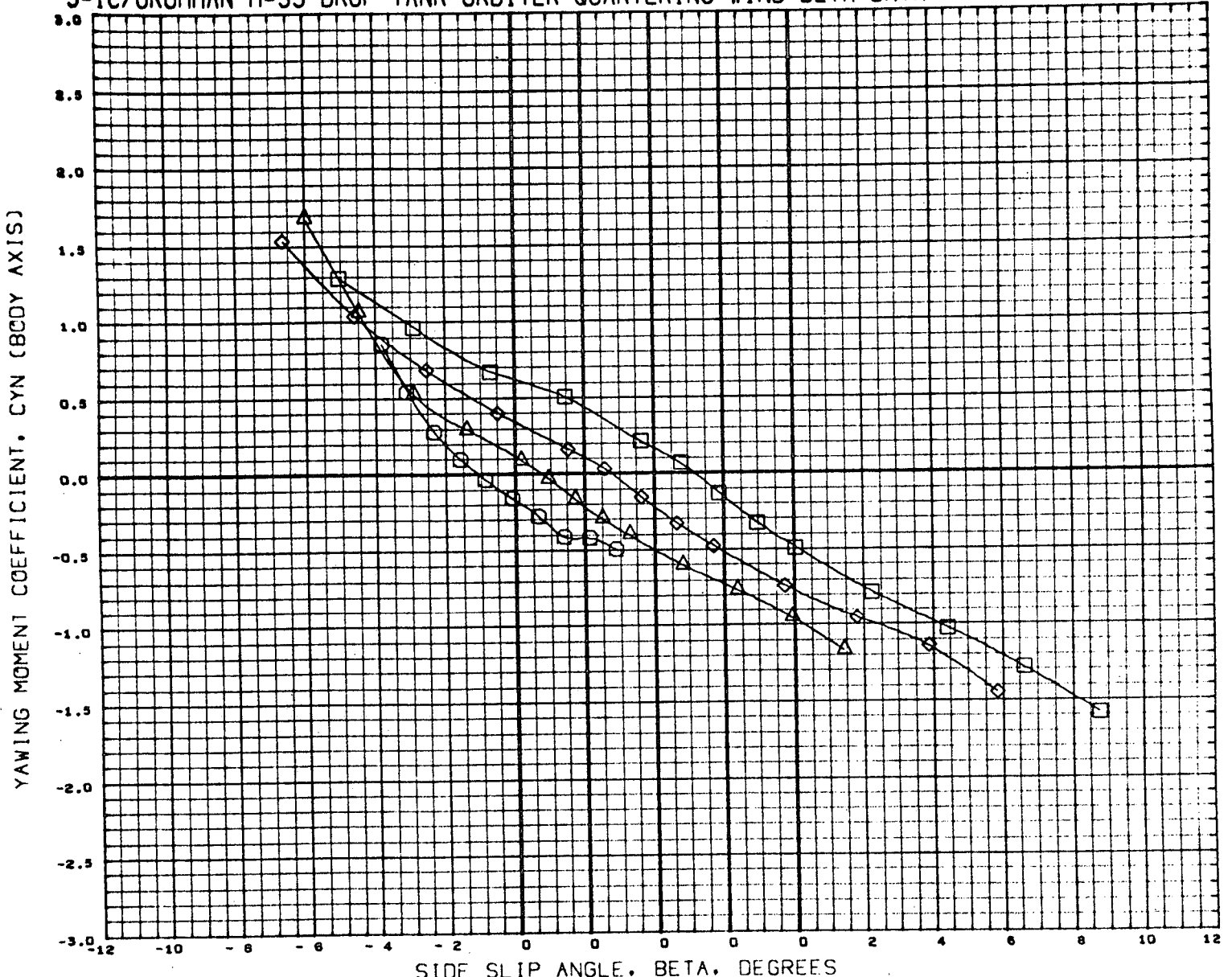
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION			
		MACH	WNGINC	0.000	PHI	PHI	PHI	SREF	SQ.IN.		
△	20.000	1.001			C44042	20.000	C44043	45.000	LREF	1.3330	IN.
◇	45.000				C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
○	70.000								XMRP	5.3990	IN.
□	90.000								YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGC

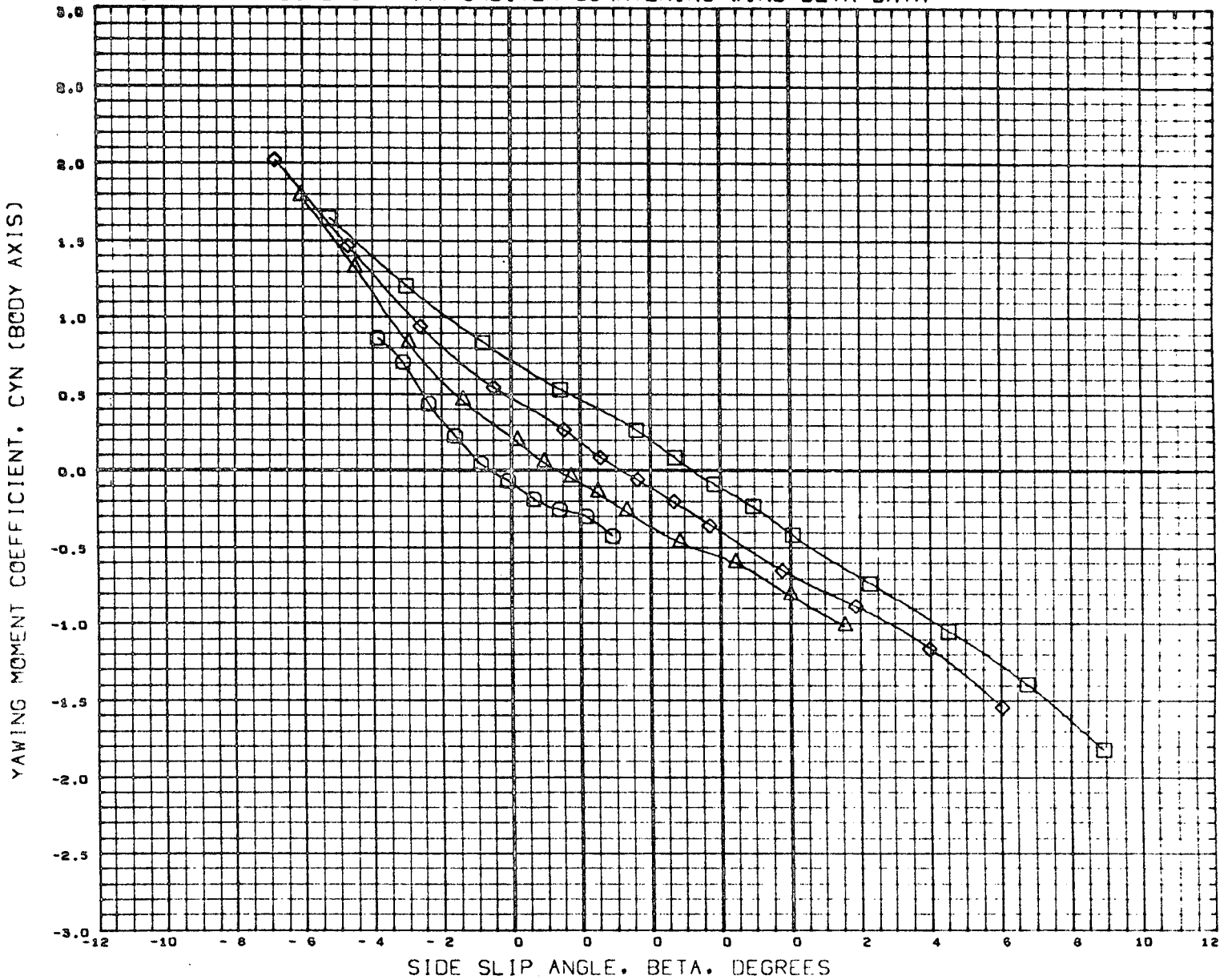
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION	
		MACH	WING INC	PHI	DATASET	PHI	SREF	SO. IN.
○	20.000	1.198	0.000	20.000	C44042	45.000	1.3960	IN.
△	45.000			70.000	C44043	90.000	1.3330	IN.
◇	70.000				Z44045		1.3330	IN.
□	90.000						5.3990	IN.
							0.0000	IN.
							0.0000	IN.
							0.0034	

DATA HIST. CODE CCCGC

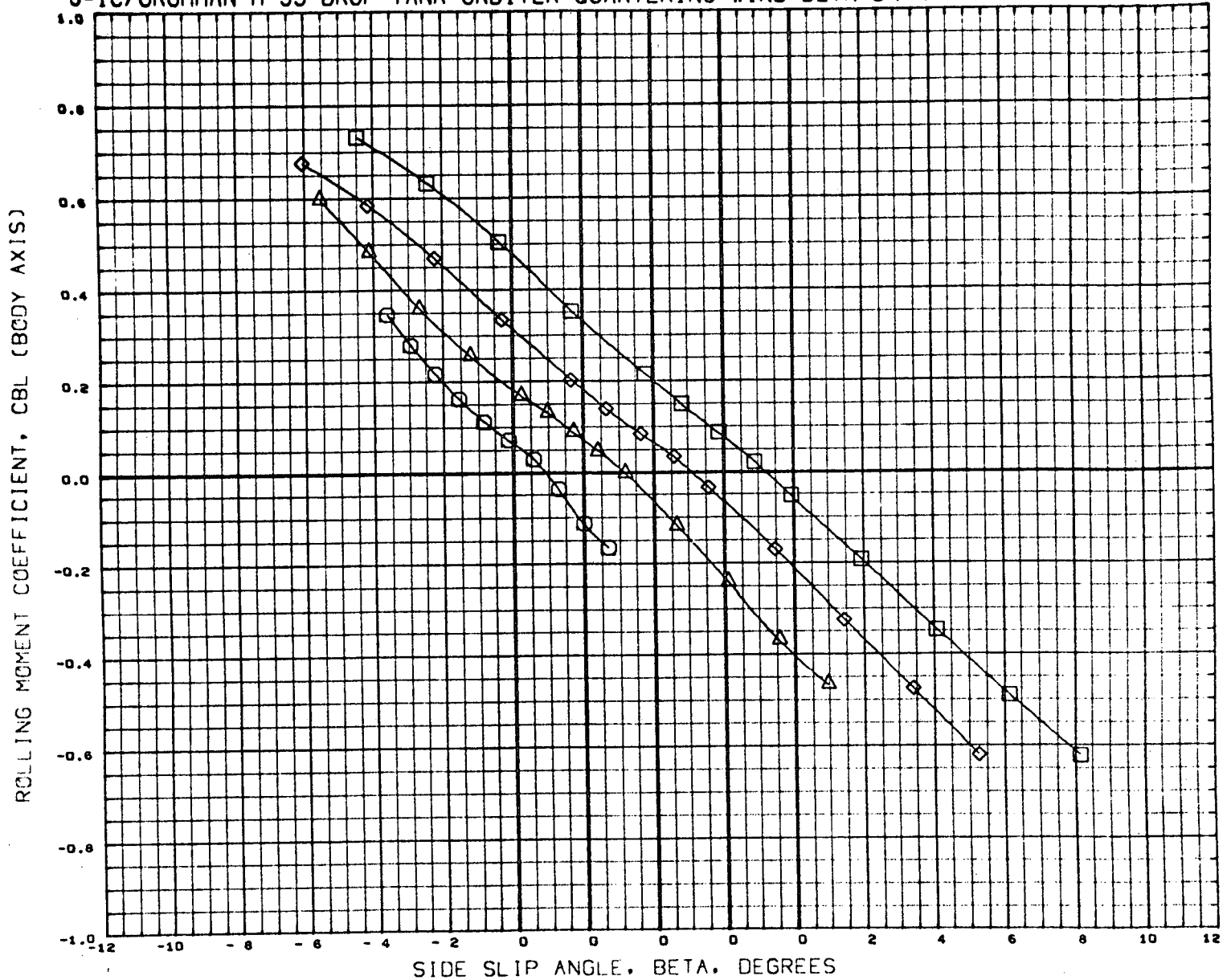
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION				
○	20.000	MACH	1.964	WNGINC	0.000	DATASET	PHI	DATASET	PHI	SREF	1.3960	33. IN.
△	45.000					C44042	20.000	C44043	45.000	LREF	1.3330	IN.
◇	70.000					C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
□	90.000									XMRP	5.3990	IN.
										YMRP	0.0000	IN.
										ZMRP	0.0000	IN.
										SCALE	0.0034	IN.

DATA HIST. CODE CCCCC

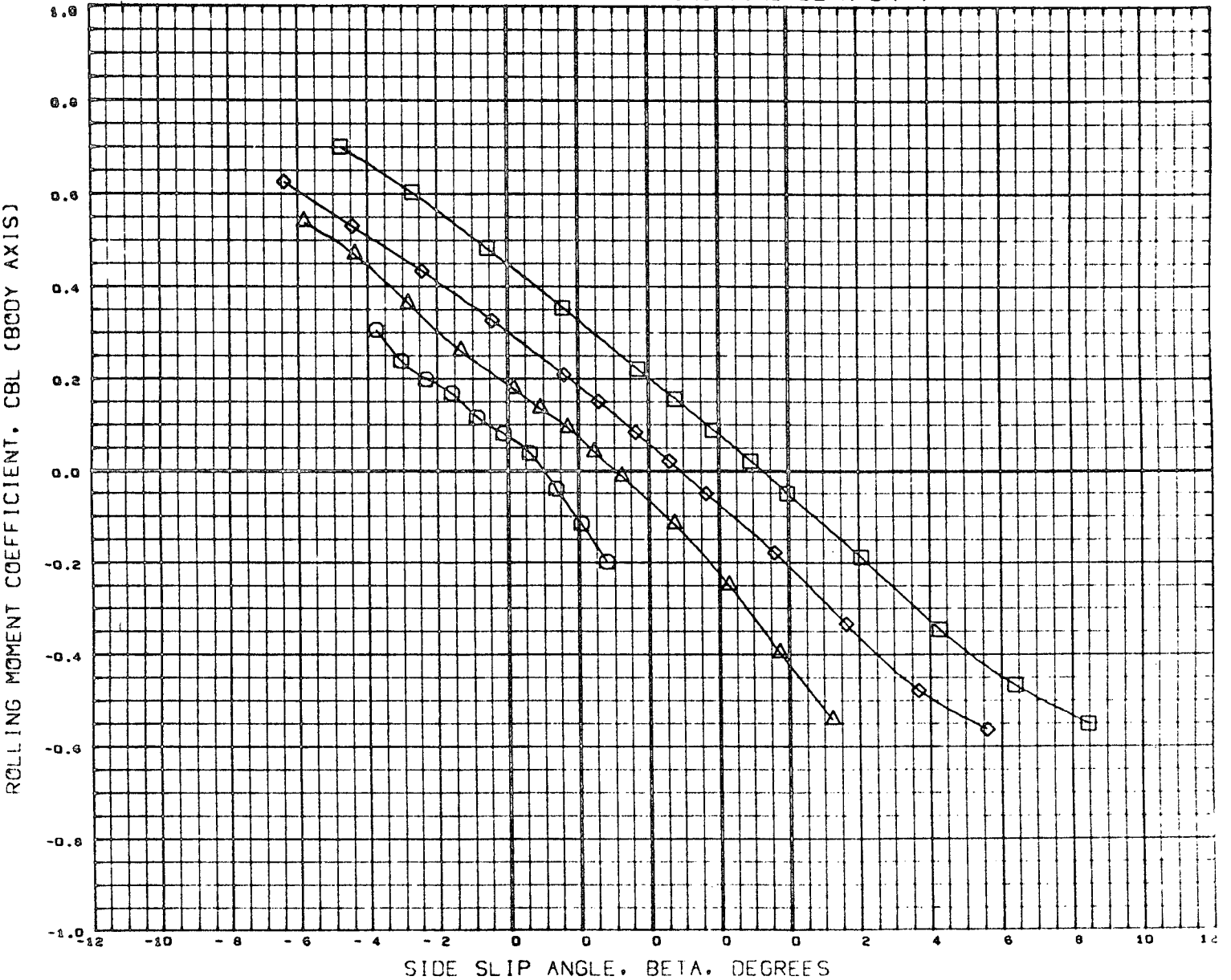
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION		
○	20.000		0.599	WING INC	0.000	PHI	20.000	SREF	1.3960	50. IN.
△	45.000					PHI	45.000	LREF	1.3330	IN.
◇	70.000					PHI	70.000	BREF	1.3330	IN.
□	90.000					PHI	90.000	XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

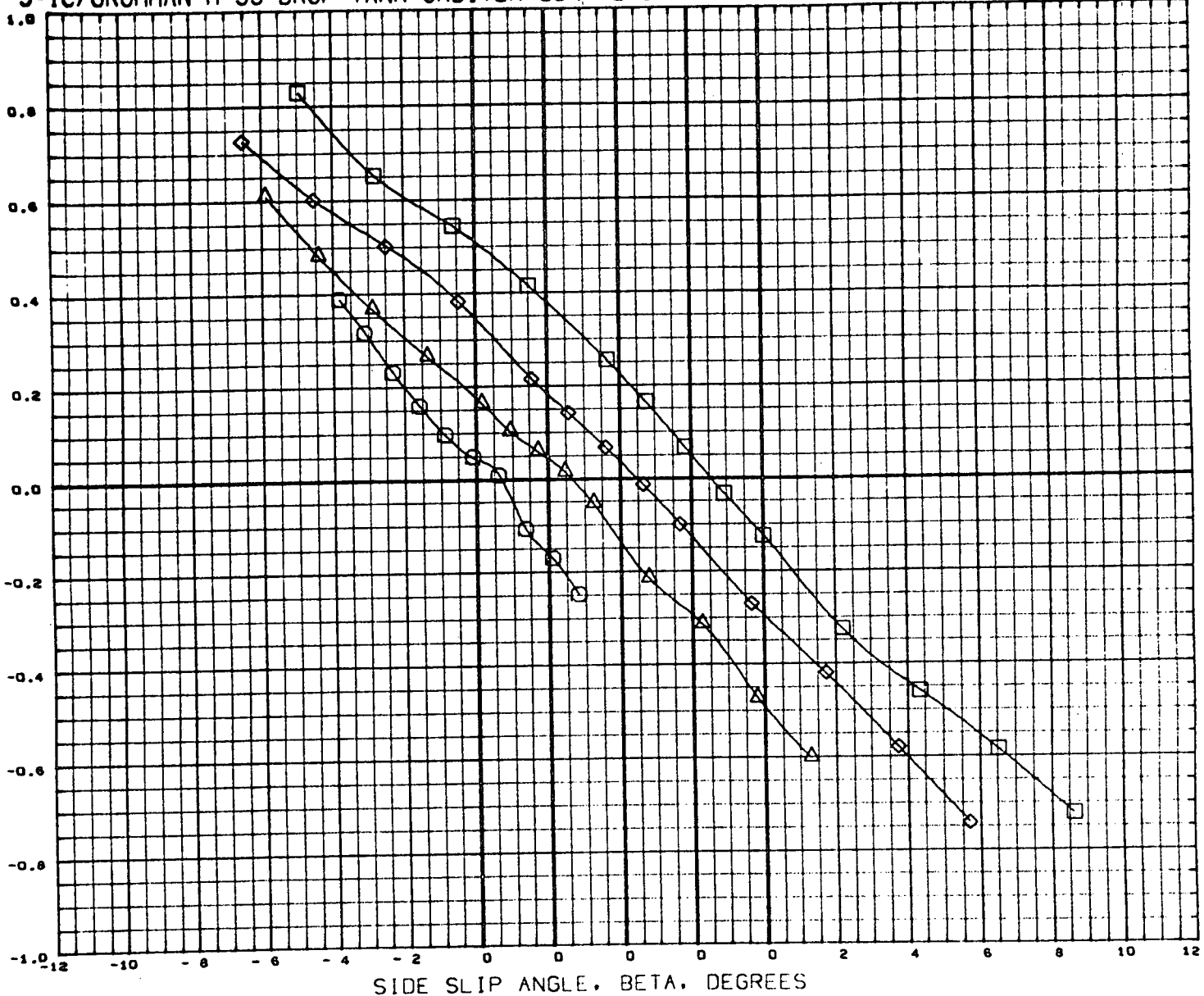


SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WINGINC	0.000	PHI	DATASET	PHI	SREF	59. IN.	
○	20.000	0.899	0.000	C44042	20.000	C44043	45.000	LREF	1.3330	IN.
△	45.000			C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
◇	70.000							XMRP	5.3990	IN.
□	90.000							YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

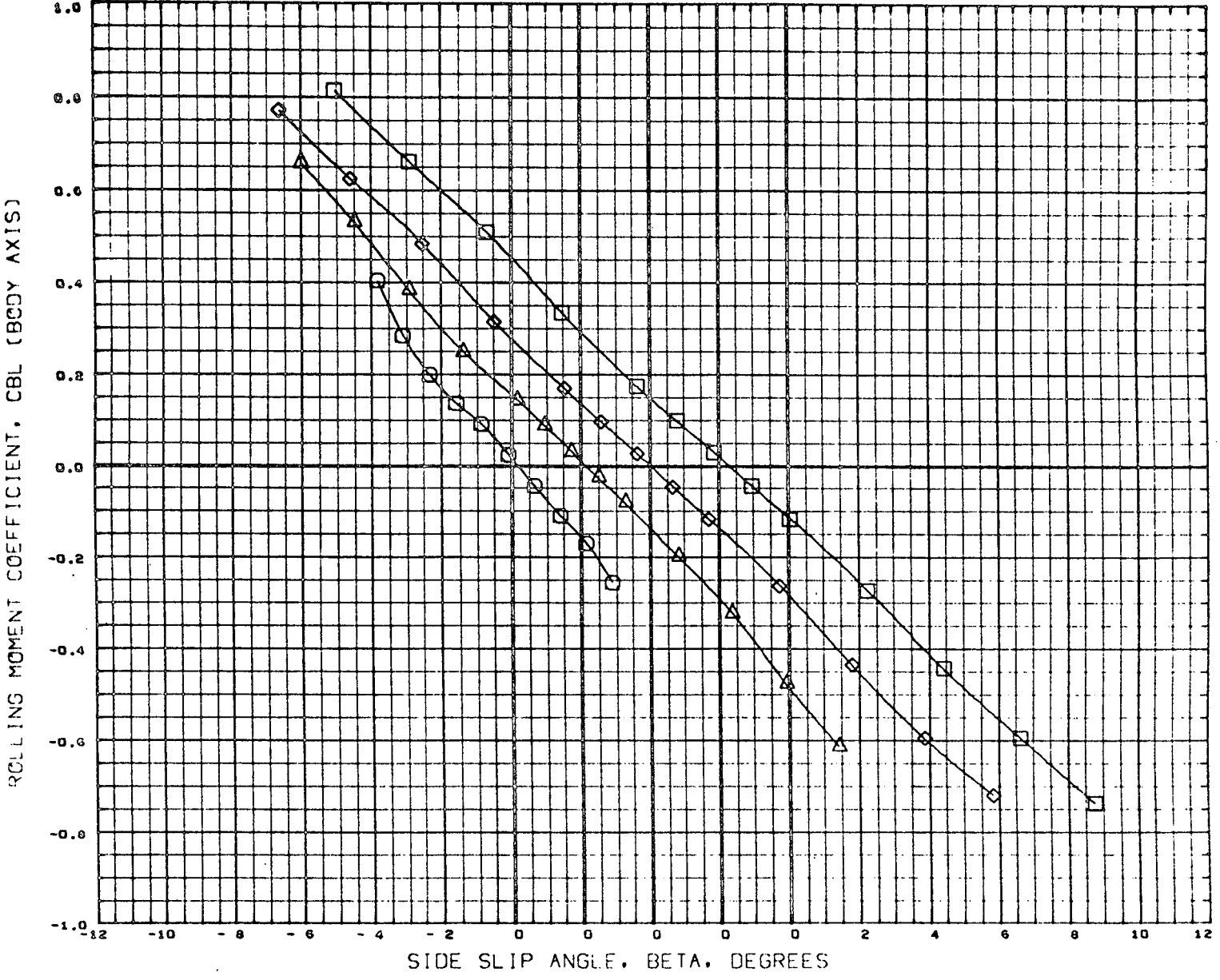
ROLLING MOMENT COEFFICIENT, CBL (BODY AXIS)



MBOL ○ △ ◇ □	PHI	PARAMETRIC VALUES	DATA SOURCE		REFERENCE INFORMATION		
	20.000	1.001 WINGINC 0.000	PHI	PHI	SREF	1.3960	30. IN.
	45.000		20.000	45.000	LREF	1.3330	IN.
	70.000		70.000	90.000	BREF	1.3330	IN.
	90.000				XMRP	5.3990	IN.
					YMRP	0.0000	IN.
					ZMRP	0.0000	IN.
					SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



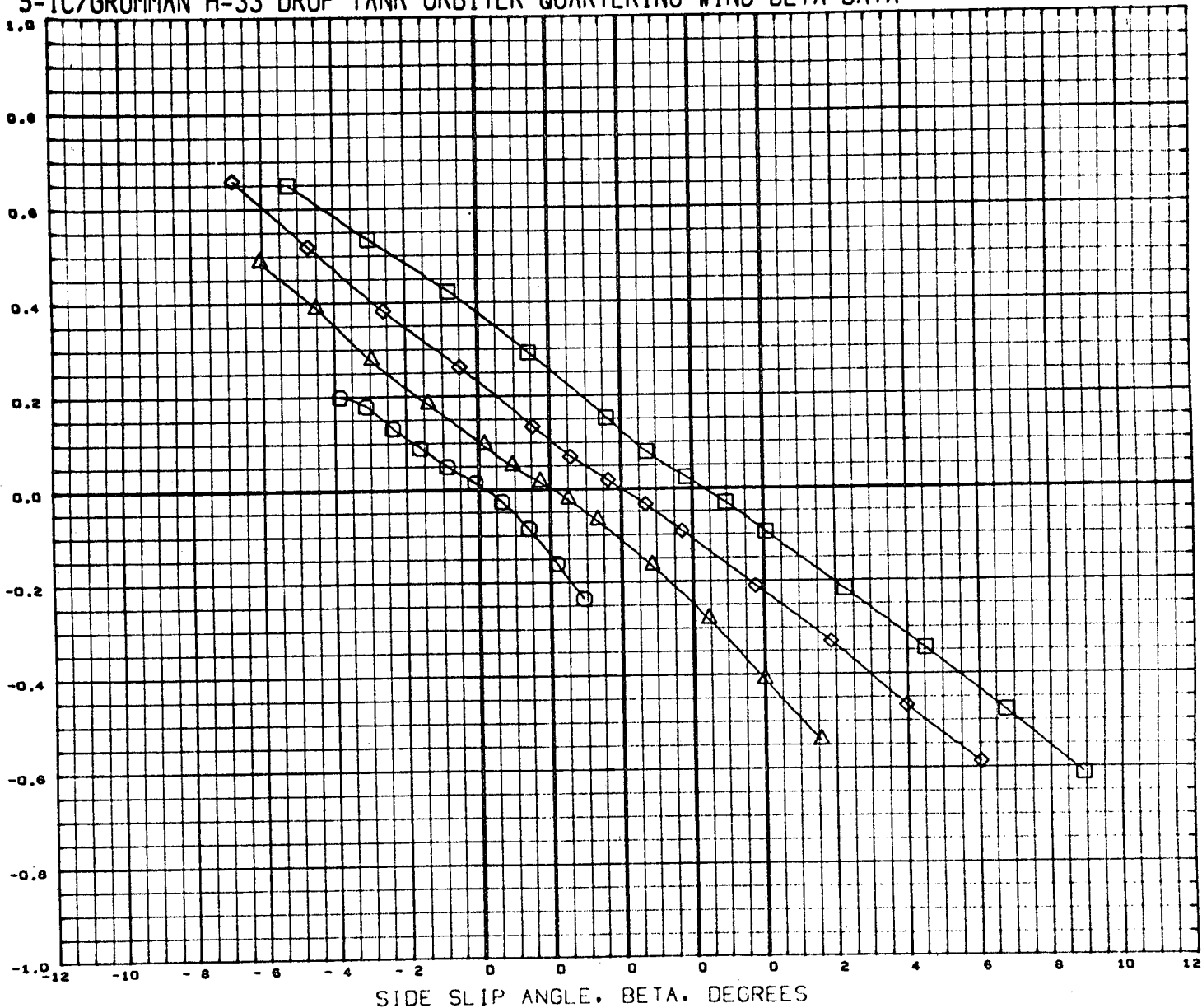
SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION			
		MACH	WINGINC	0.000	PHI	DATASET	PHI	SREF	SQ. IN.		
○	20.000	1.199			C44042	20.000	C44043	45.000	LREF	1.3330	IN.
△	45.000				C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
◇	70.000								XMRP	5.3990	IN.
□	90.000								YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGC

c-4

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

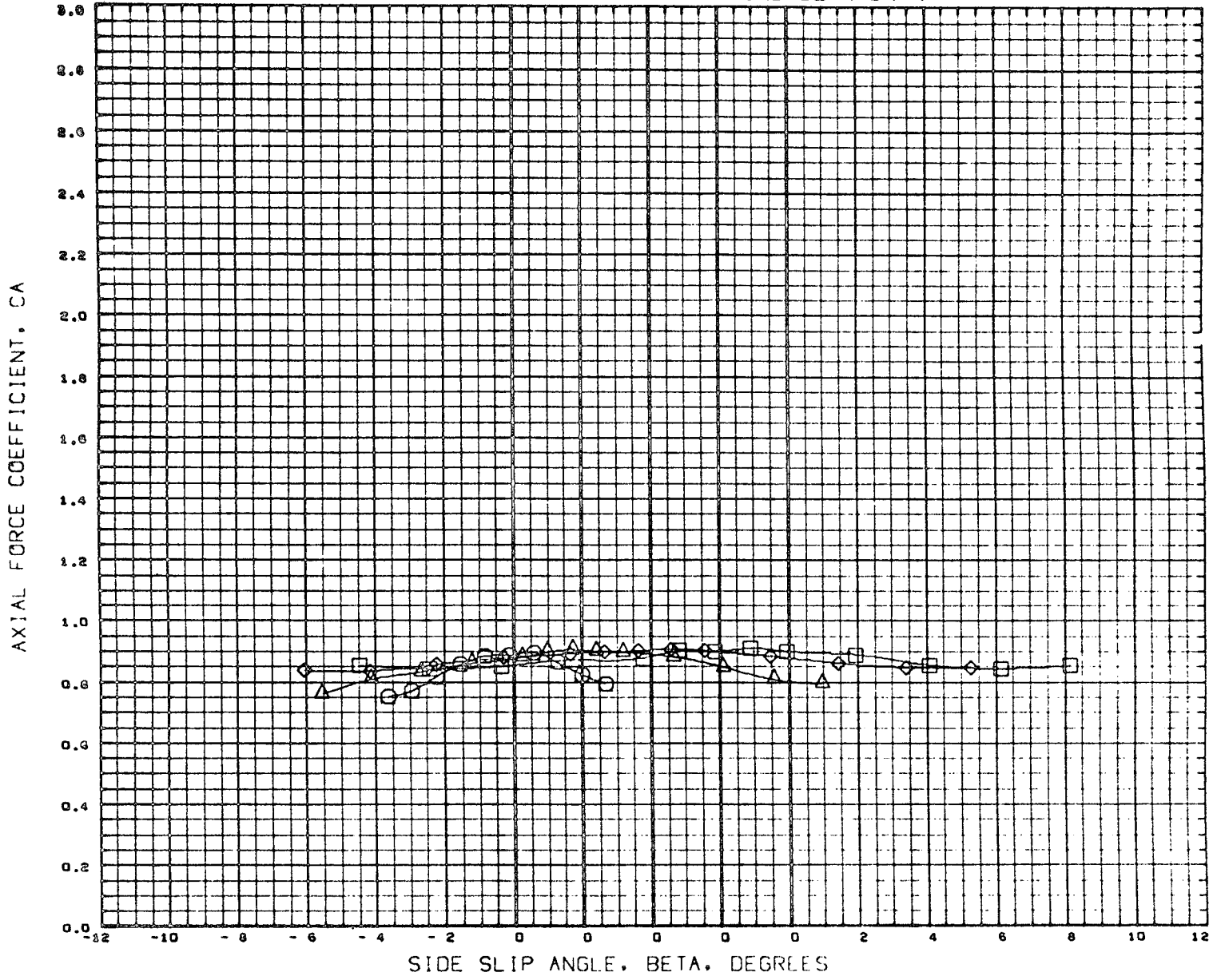
ROLLING MOMENT COEFFICIENT, CBL (BODY AXIS)



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WING INC	0.000	PHI	PHI	PHI	SREF	SQ. IN.	
○	20.000	1.964		0.000	C44042	20.000	C44043	45.000	1.3960	IN.
△	45.000				C44044	70.000	Z44045	90.000	1.3330	IN.
◇	70.000								1.3330	IN.
□	90.000								5.3990	IN.
									0.0000	IN.
									0.0000	IN.
									0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
○	20.000	MACH	0.599	WING INC	0.000	DATASET	PHI	SREF	1.3960	50. IN.
△	45.000					C44042	20.000	LREF	1.3330	IN.
◇	70.000					C44044	70.000	BREF	1.3330	IN.
□	90.000							XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCC

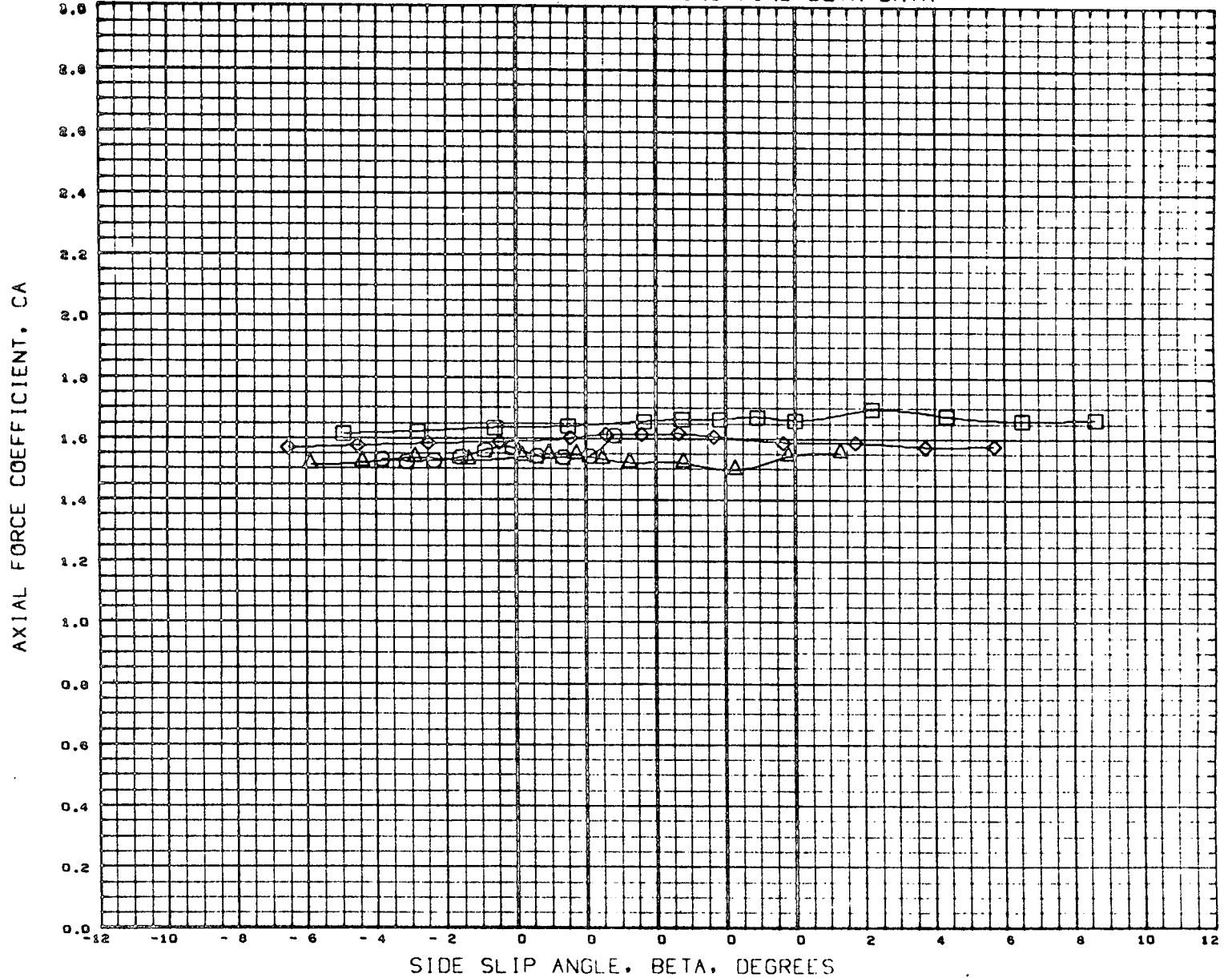
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
			0.899	WNGINC	0.000	PHI	DATASET	PHI	SREF	SO. IN.	
○	20.000					20.000	C44043	45.000	1.3960	IN.	
△	45.000					45.000	C44043	90.000	1.3330	IN.	
◇	70.000					70.000	Z44045		1.3330	IN.	
□	90.000								5.3990	IN.	
									0.0000	IN.	
									0.0000	IN.	
									0.0034	IN.	

DATA HIST. CODE CCCC.

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

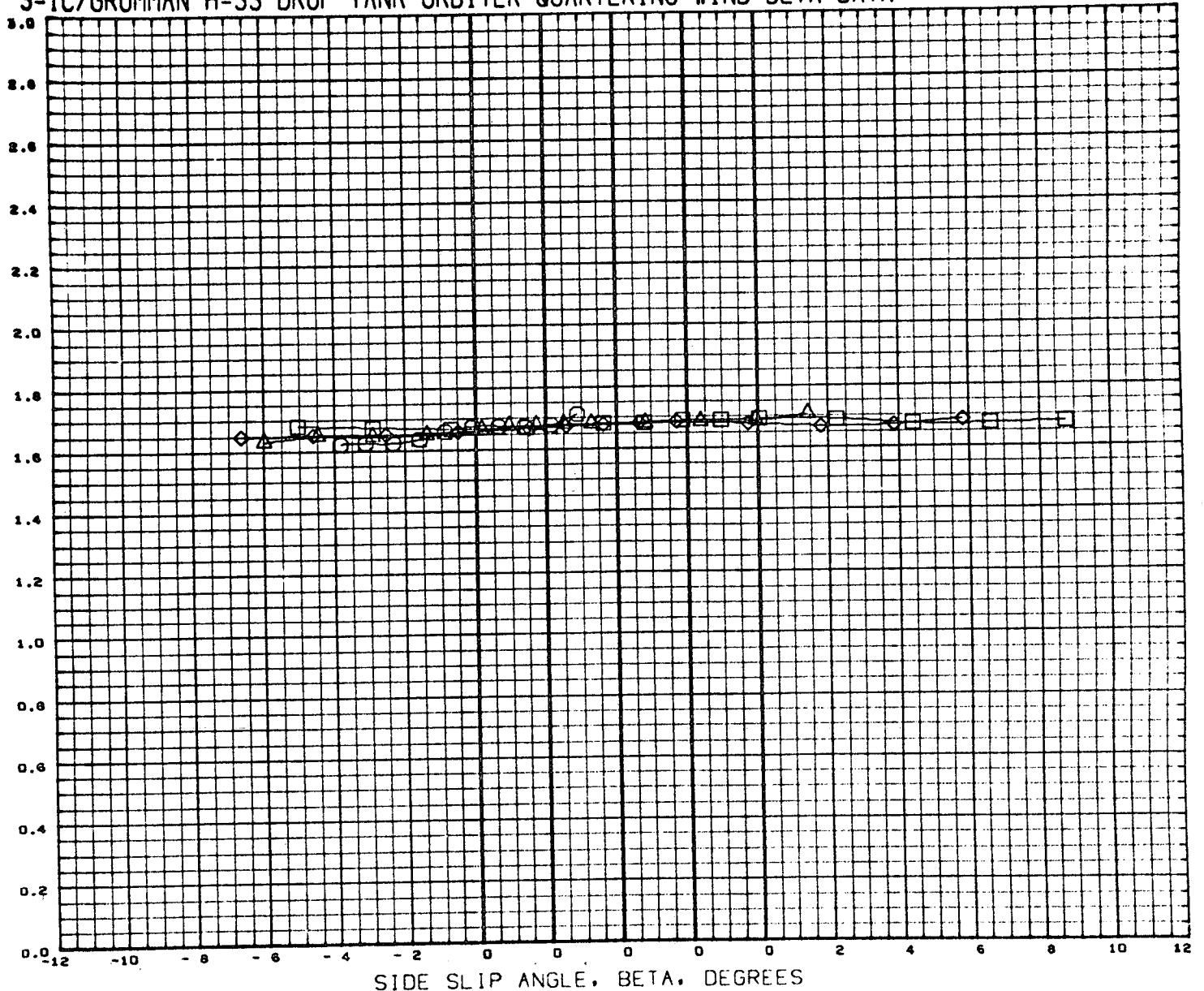


SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION					
○	20.000	MACH	1.001	WNGTNC	0.000	DATASET	PHI	DATASET	PHI	SREF	1.3960	50. IN.
△	45.000					C44042	20.000	C44043	45.000	LREF	1.3330	IN.
◇	70.000					C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
□	90.000									XMRP	5.3990	IN.
										YMRP	0.0000	IN.
										ZMRP	0.0000	IN.
										SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

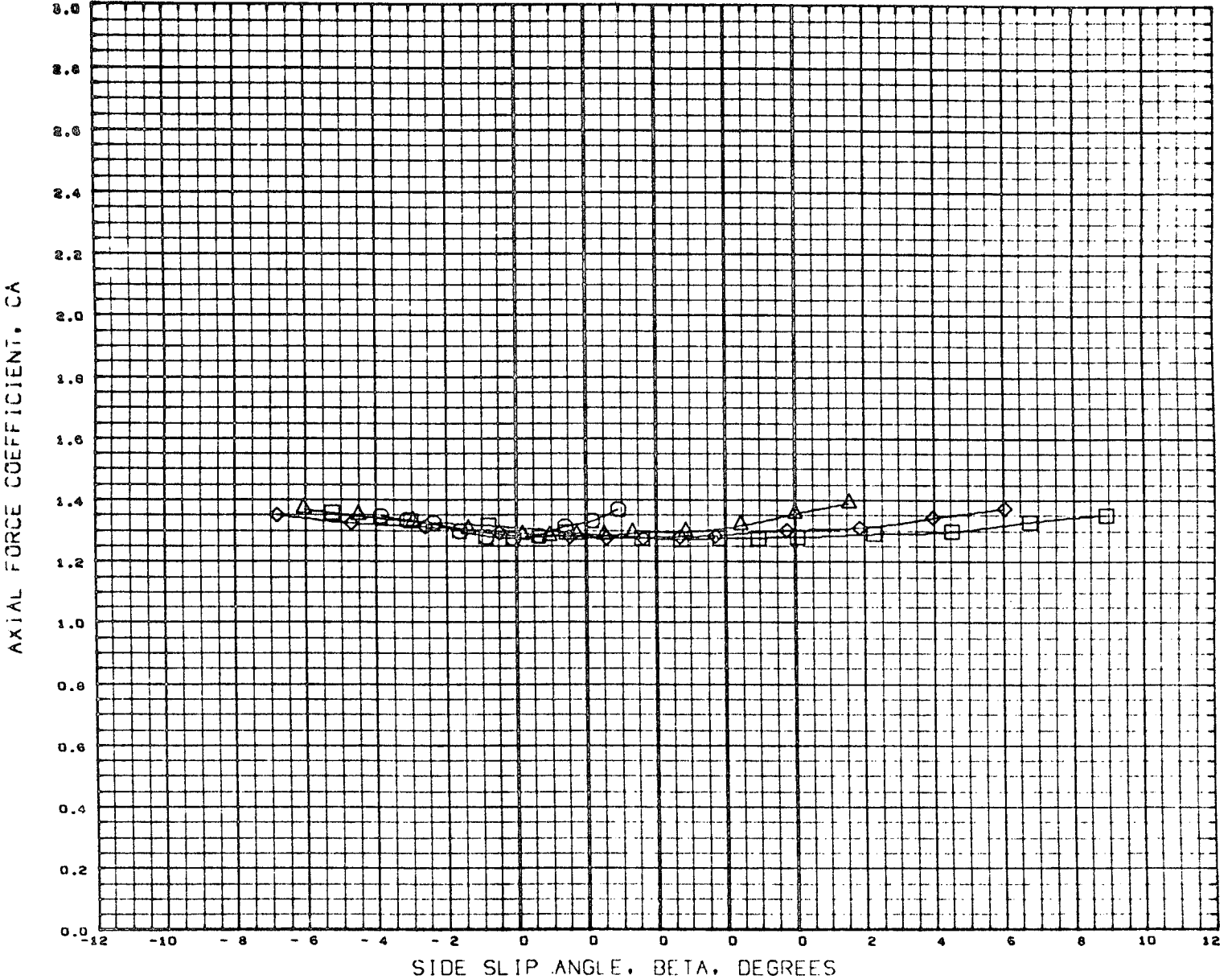
AXIAL FORCE COEFFICIENT, CA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WING INC	0.000	DATASET	PHI	DATASET	PHI	SREF	SO. IN.
○	20.000	1.198			C44042	20.000	C44043	45.000	1.3960	IN.
△	45.000				C44042	20.000	Z44043	90.000	1.3330	IN.
◇	70.000				C44044	70.000			1.3330	IN.
□	90.000								5.3990	IN.
									0.0000	IN.
									0.0000	IN.
									0.0034	

DATA HIST. CODE CCCGC

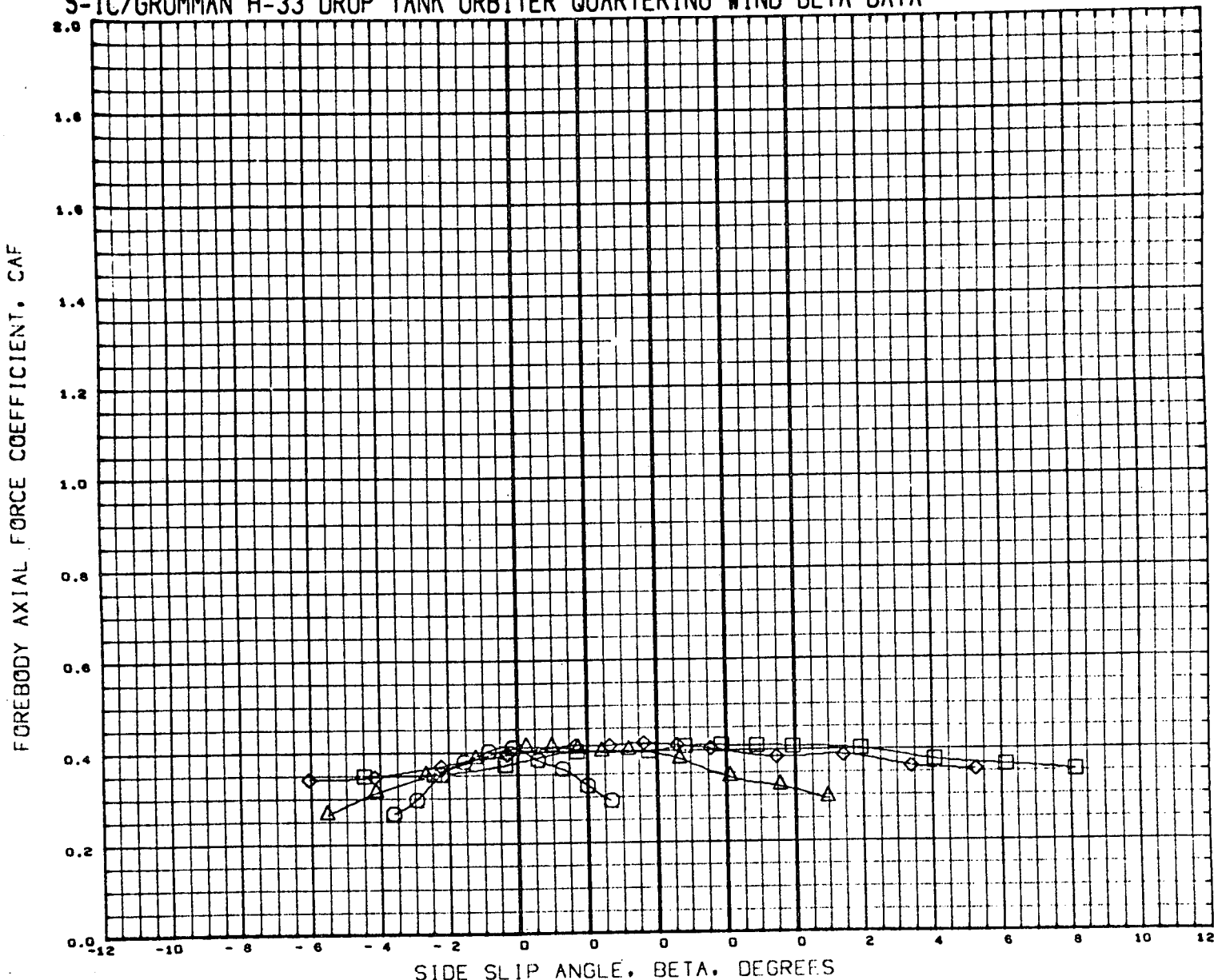
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
○	20.000	MACH	1.964	WING INC	0.000	PHI	20.000	SREF	1.3960	SO. IN.
◇	45.000					PHI	45.000	LREF	1.3330	IN.
◇	70.000					PHI	70.000	BREF	1.3330	IN.
◇	90.000					PHI	90.000	XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCC

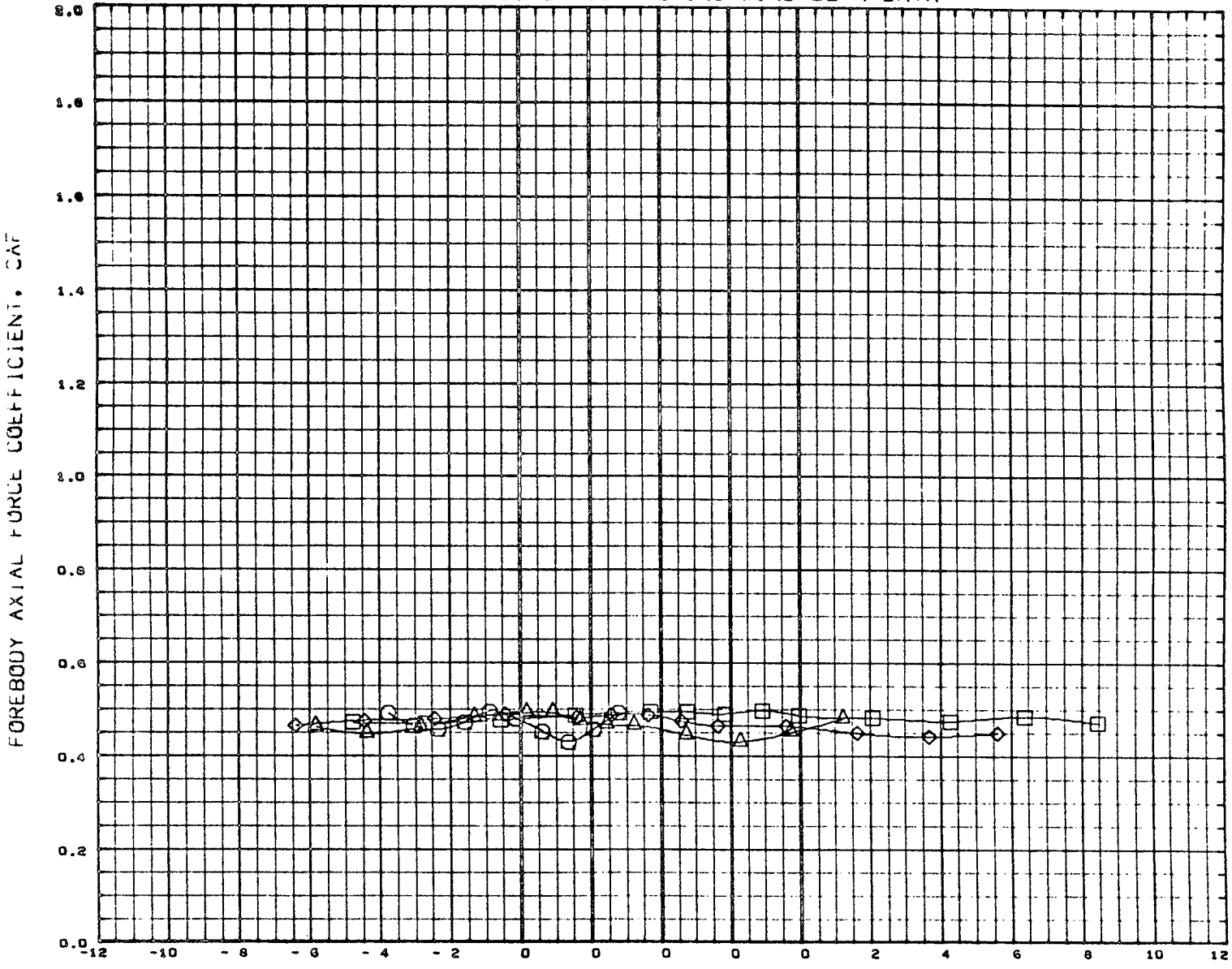
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PARAMETRIC VALUES				DATA SOURCE			REFERENCE INFORMATION		
	PHI	MACH	WNGINC	0.000	PHI	DATASET	PHI	SREF	SO. IN.	
○	20.000	0.599			20.000	C44042	45.000	1.3960	50. IN.	
△	45.000				70.000	C44043	90.000	1.3330	IN.	
◇	70.000					Z44045		1.3330	IN.	
□	90.000							5.3990	IN.	
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

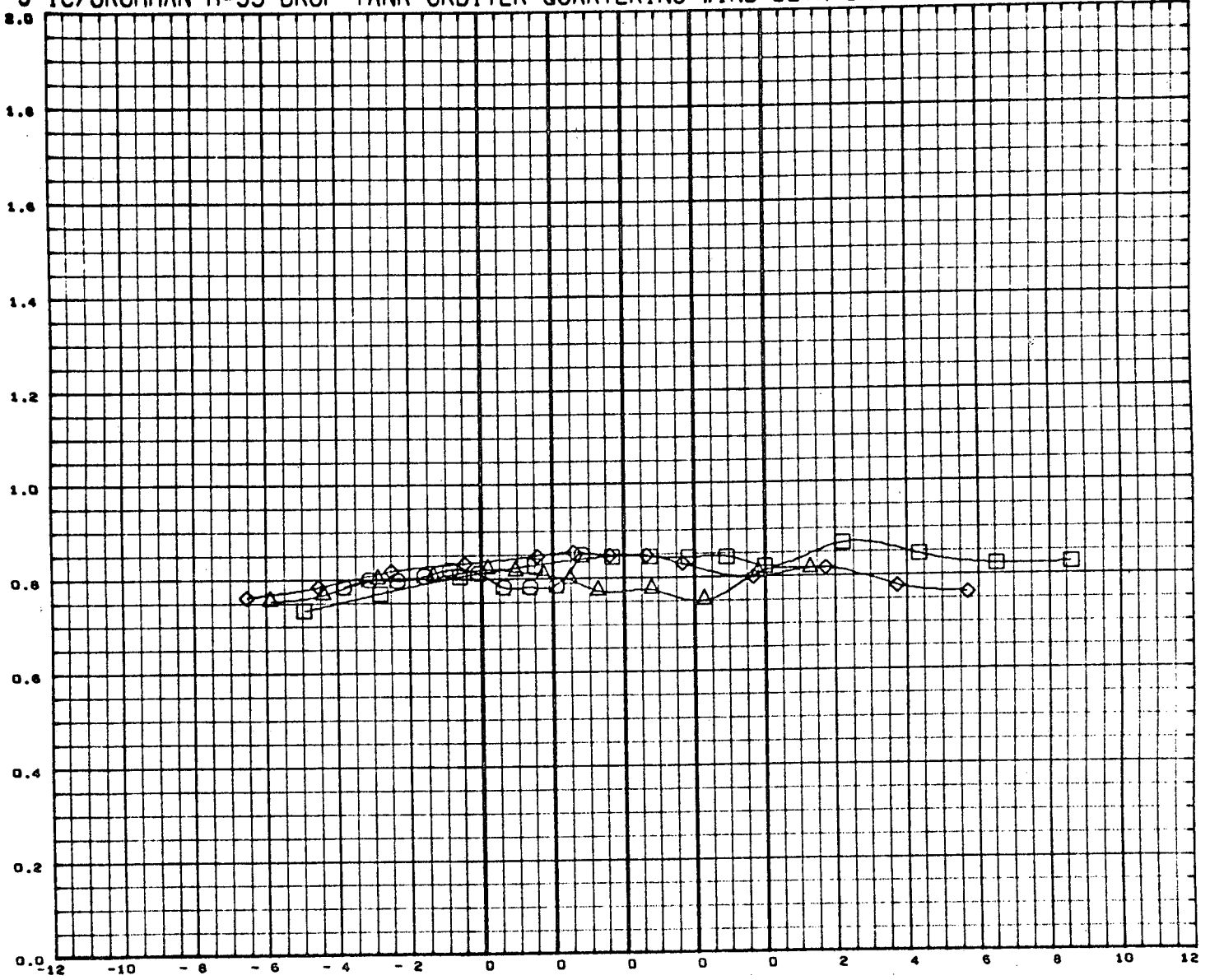


SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
○	20.000	MACH	0.899	WNGINC	0.000	PHI		SREF	1.3960	SQ. IN.
△	45.000				DATA SET	PHI	DATA SET	LREF	1.3330	IN.
◇	70.000				C44042	20.000	C44043	BREF	1.3330	IN.
□	90.000				C44044	70.000	Z44045	XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	IN.

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

FOREBODY AXIAL FORCE COEFFICIENT, CAF

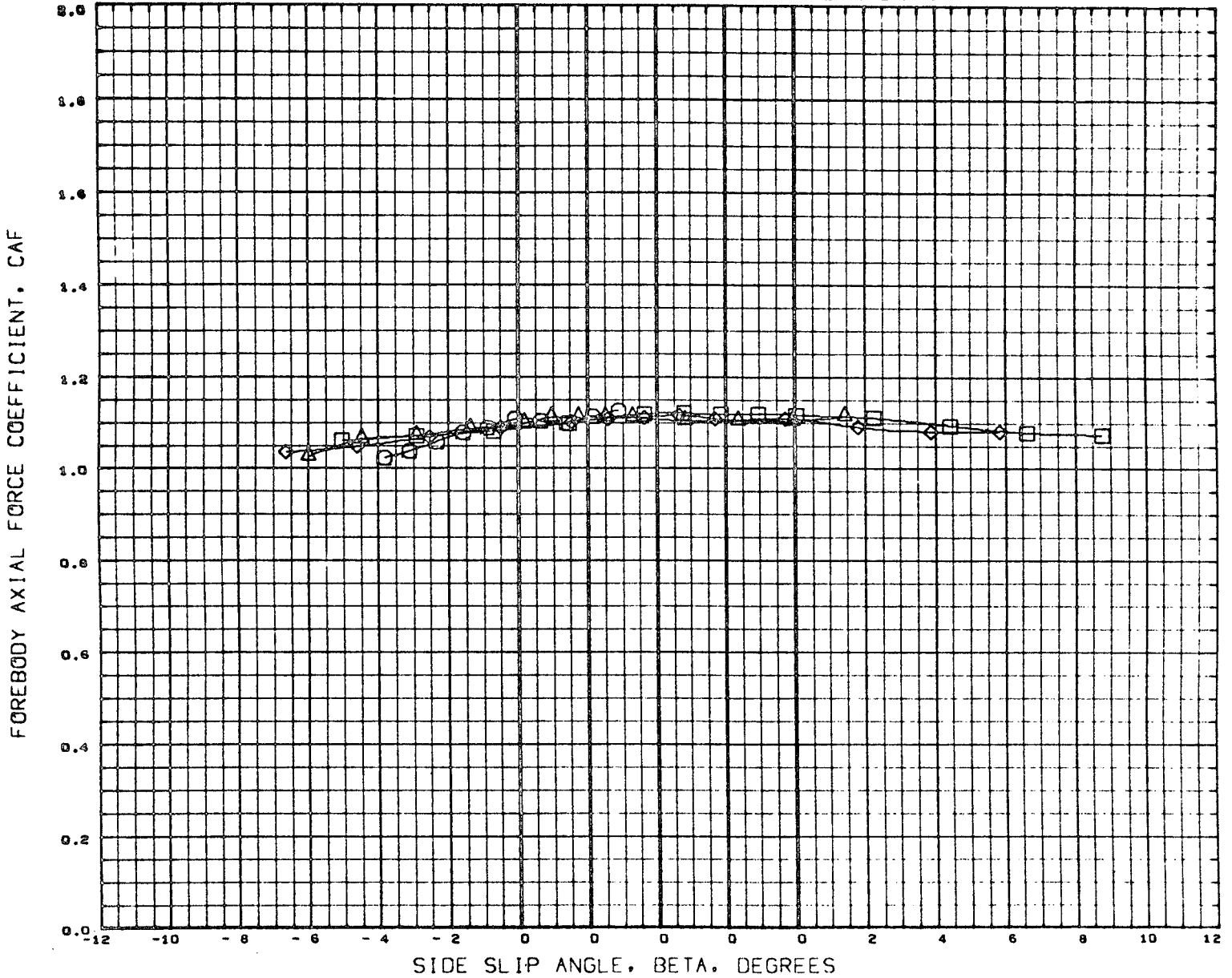


SIDE SLIP ANGLE, BETA, DEGREES

SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WNGINC	0.000	PHI	DATASET	PHI	SREF	30.IN.	
◇	20.000	1.001			PHI	DATASET	PHI	SREF	1.3960	30.IN.
△	45.000				20.000	C44043	45.000	LREF	1.3330	IN.
□	70.000				C44044	Z44045	90.000	BREF	1.3330	IN.
○	90.000							XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

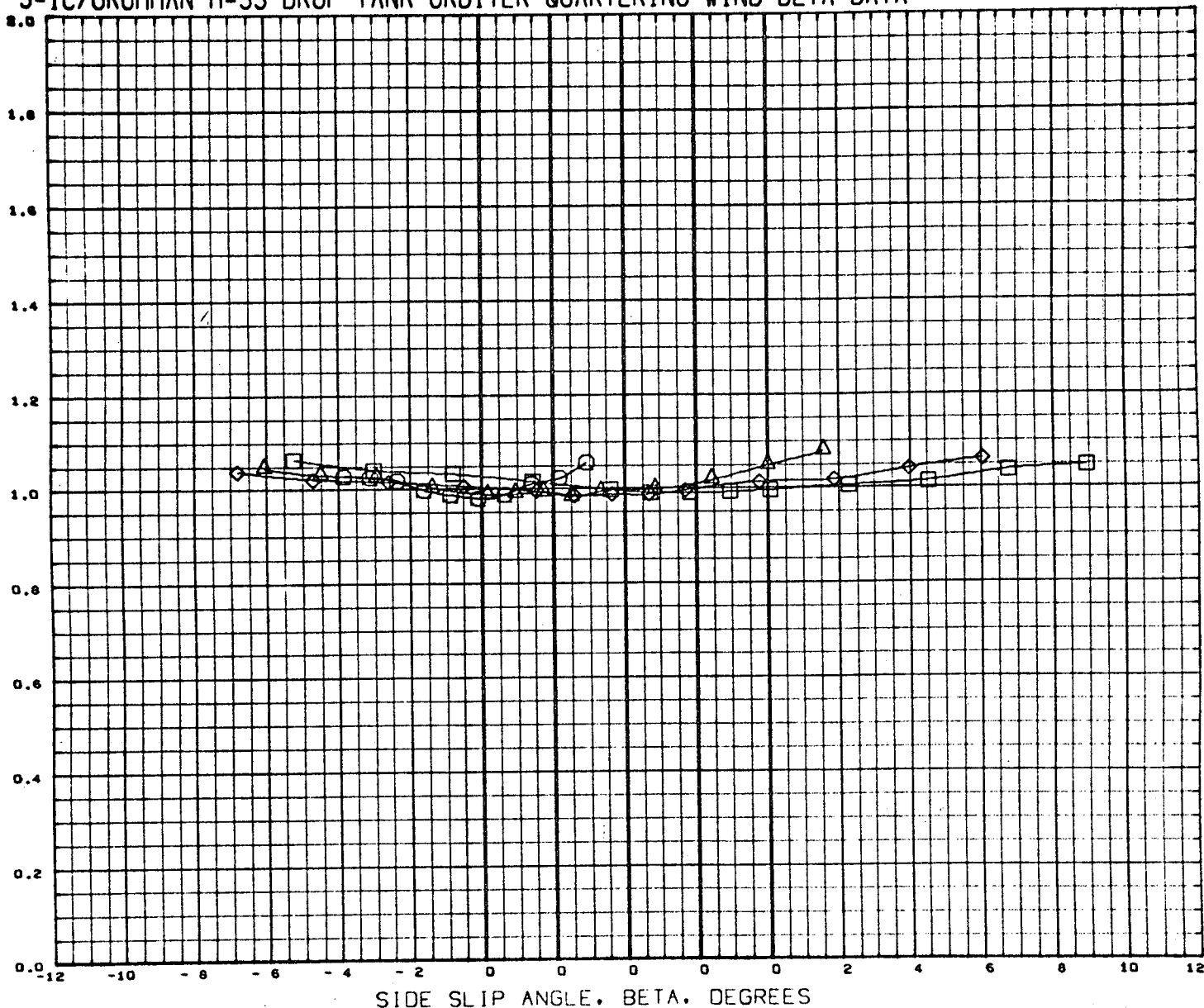


SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION			
		MASH	1.198	WNGINC	0.000	PHI	DATASET	PHI	SREF	SCALE	
○	20.000										
◇	45.000				C44042	20.000	C44043	45.000	LREF	1.3330	IN.
◇	70.000				C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
□	90.000								XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCGG

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

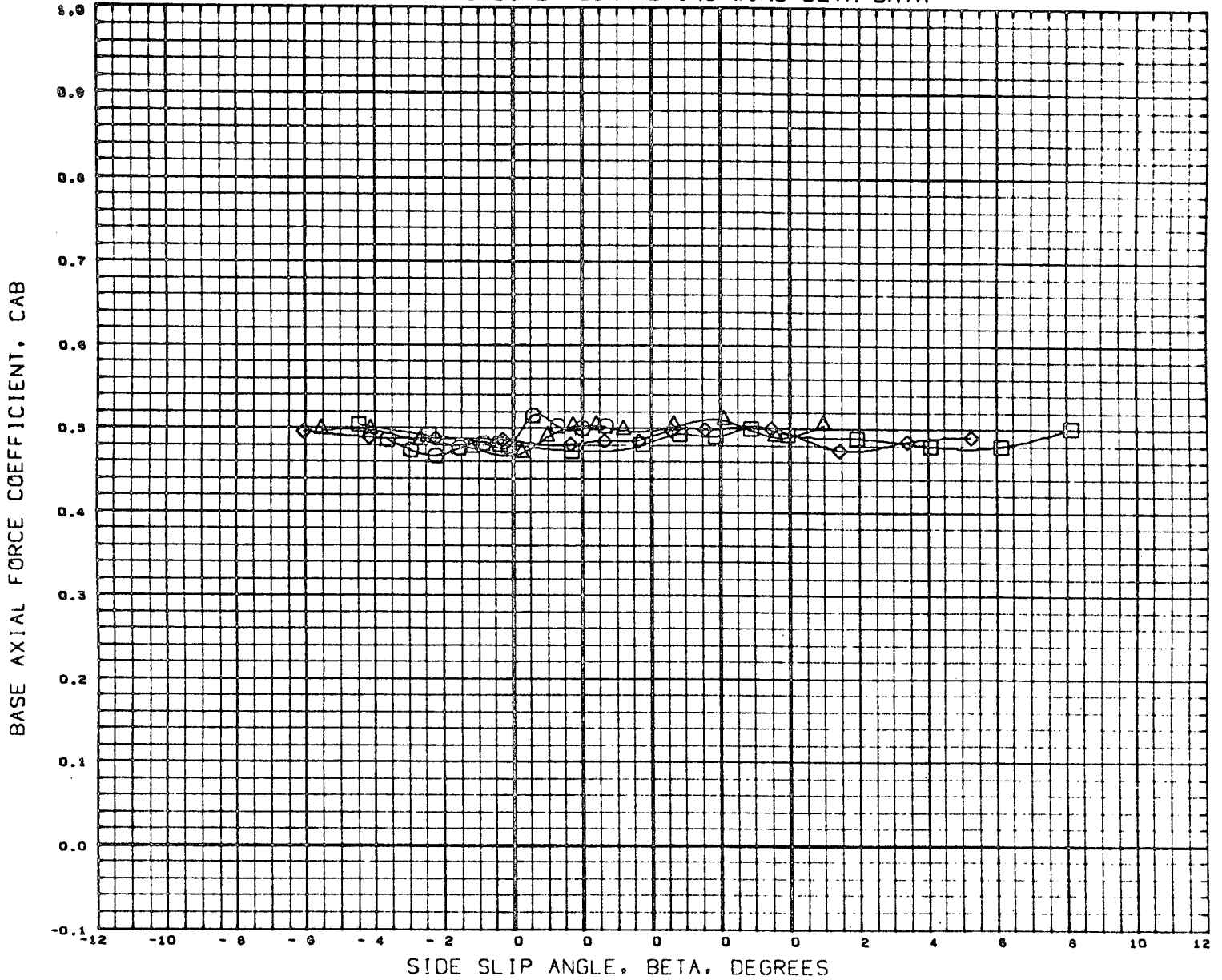
FOREBODY AXIAL FORCE COEFFICIENT, CAF



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WINGINC	D,000	PHI	DATASET	PHI	SREF	SQ. IN.	
○	20.000	1.964		0.000	C44042	20.000	45.000	1.3960	IN.	
△	45.000				C44043	45.000	90.000	1.3330	IN.	
◇	70.000				C44044	70.000		1.3330	IN.	
□	90.000							5.3990	IN.	
								0.0000	IN.	
								0.0000	IN.	
								0.0034	IN.	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

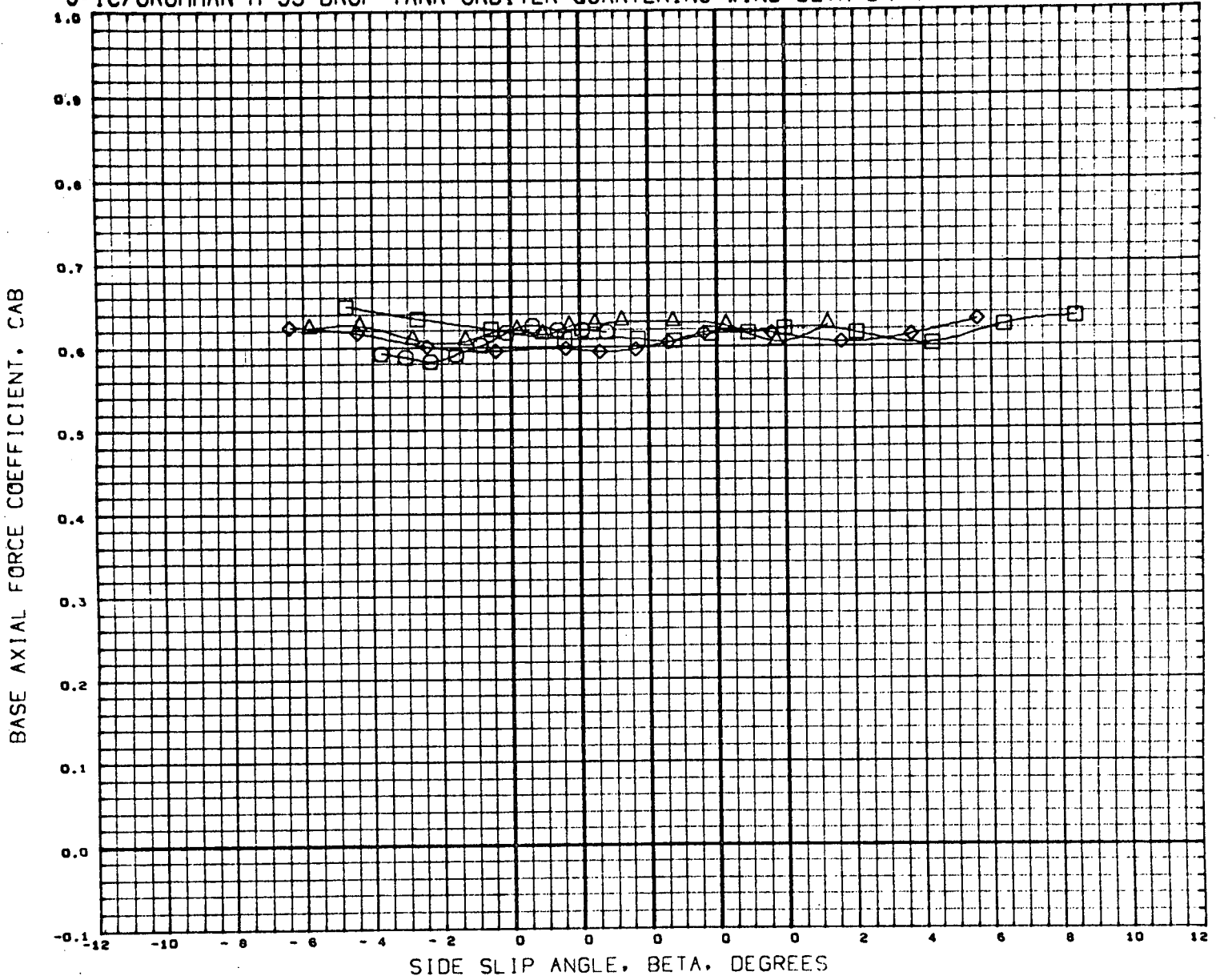


SIDE SLIP ANGLE, BETA, DEGREES

SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WING INC	0.000	PHI	PHI	PHI	SREF	IN.	
○	20.000	0.599						1.3960	90. IN.	
△	45.000				C44042	20.000	C44043	1.3330	IN.	
◇	70.000				C44044	70.000	Z44045	1.3330	IN.	
□	90.000							5.3990	IN.	
								0.0000	IN.	
								0.0000	IN.	
								0.0034	IN.	

DATA HIST. CODE CCCC

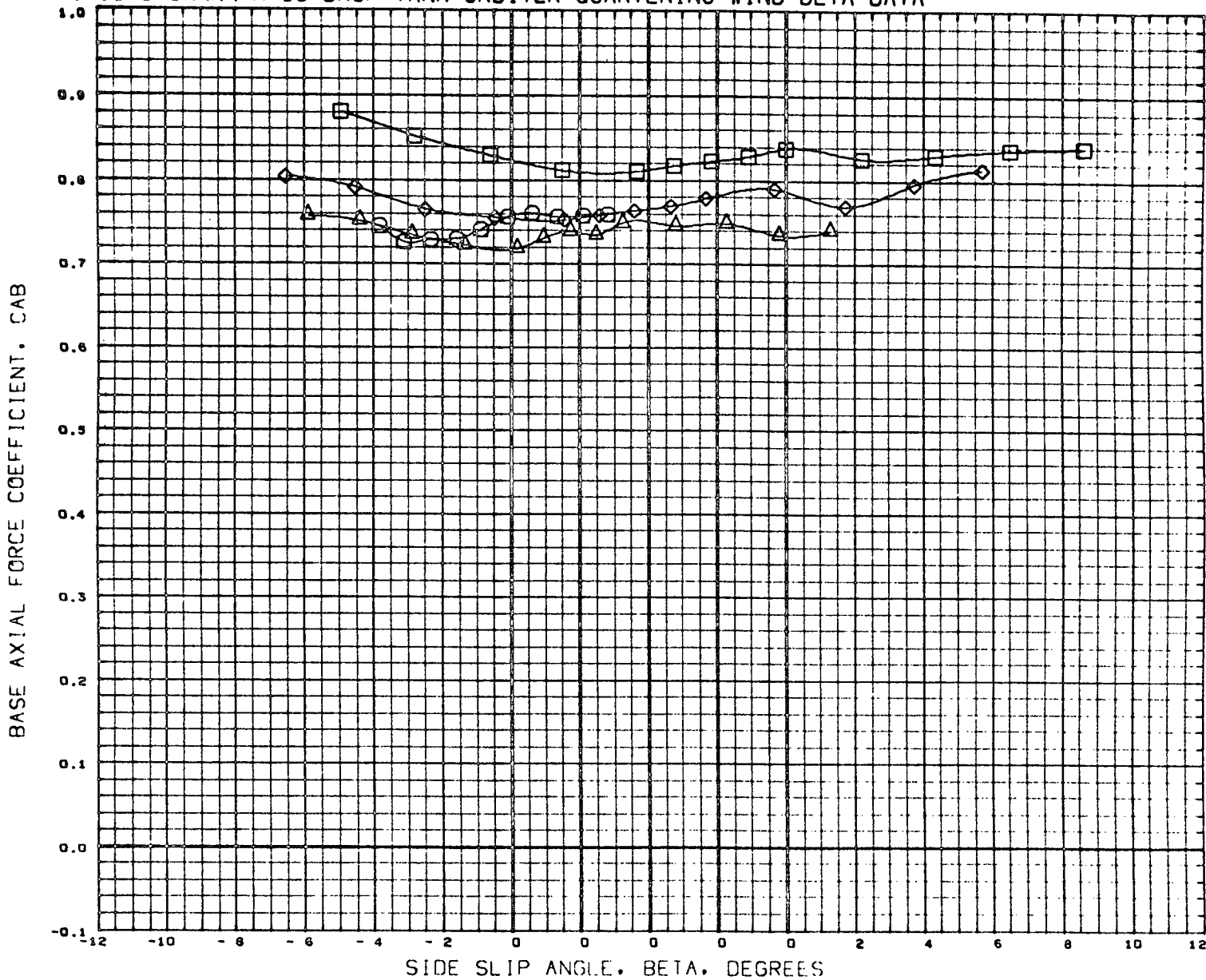
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	MACH	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION				
			0.899	WNGTNC	0.000	DATASET	PHI	DATASET	PHI	SREF	SQ. IN.	
○	20.000					C44042	20.000	C44043	45.000	LREF	1.3330	IN.
△	45.000					C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
◇	70.000									XMRP	5.3990	IN.
□	90.000									YMRP	0.0000	IN.
										ZMRP	0.0000	IN.
										SCALE	0.0034	

DATA HIST. CODE CCCC

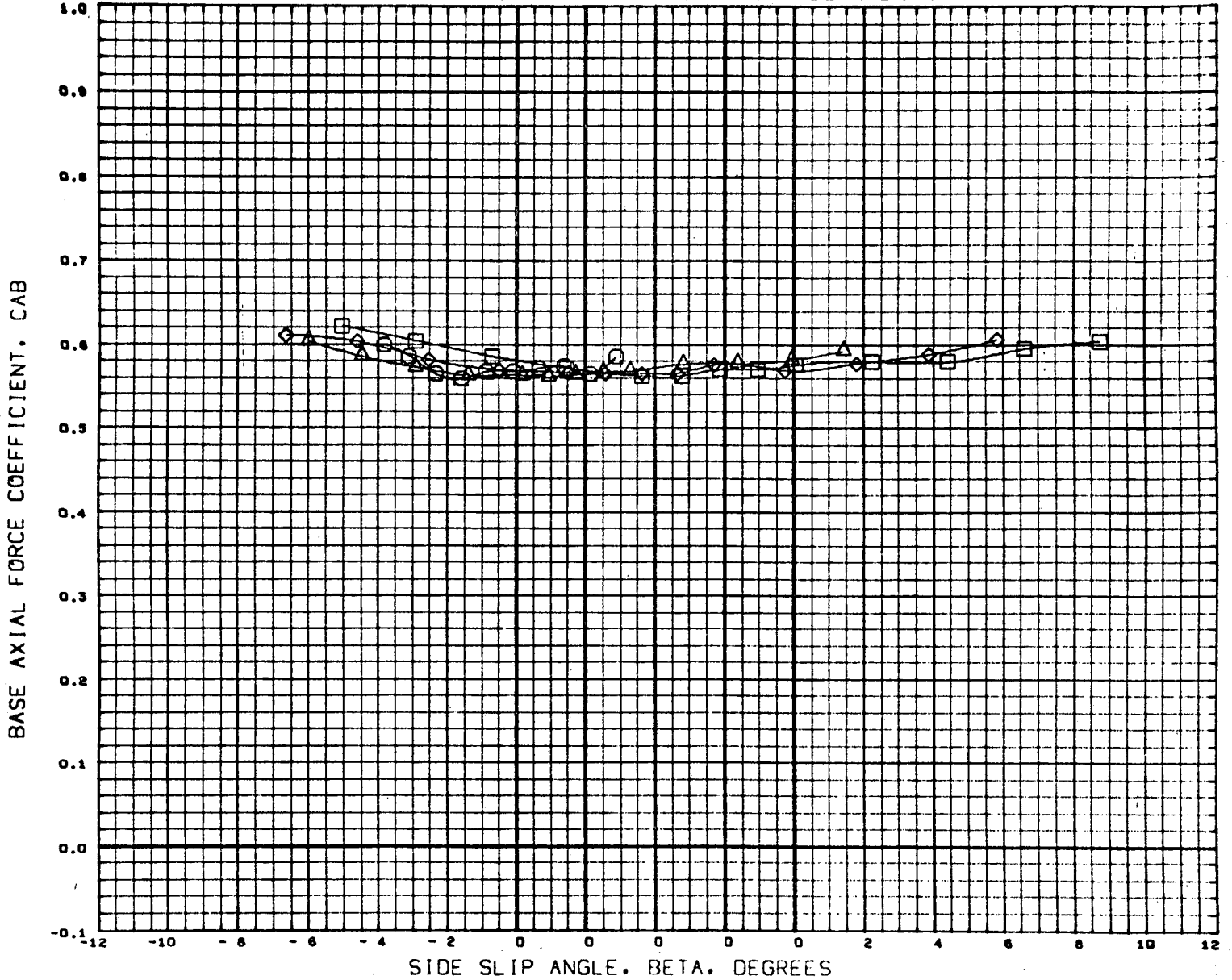
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION			
○	20.000	MACH	1.001	WINGINC	0.000	PHI	20.000	45.000	SREF	1.3960	SQ. IN.
△	45.000					PHI	45.000	70.000	LREF	1.3330	IN.
◇	70.000					PHI	70.000	90.000	BREF	1.3330	IN.
□	90.000								XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCC

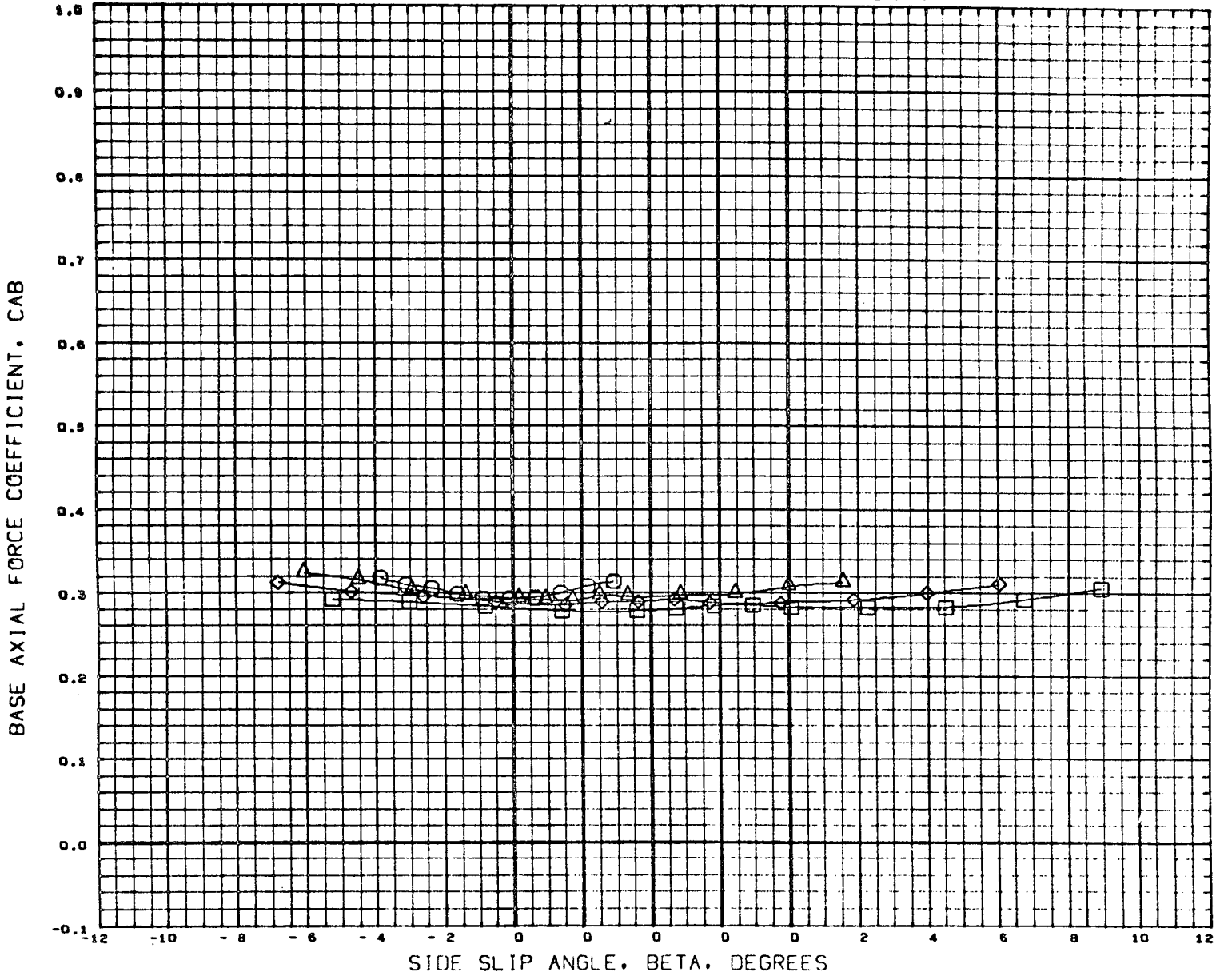
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION				
○	20.000	MACH	1.198	WINGINC	0.000	DATASET	PHI	DATASET	PHI	SREF	1.3960	50. IN.
△	45.000					C44042	20.000	C44043	45.000	LREF	1.3330	IN.
◇	70.000					C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
□	90.000									XMRP	5.3990	IN.
										YMRP	0.0000	IN.
										ZMRP	0.0000	IN.
										SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

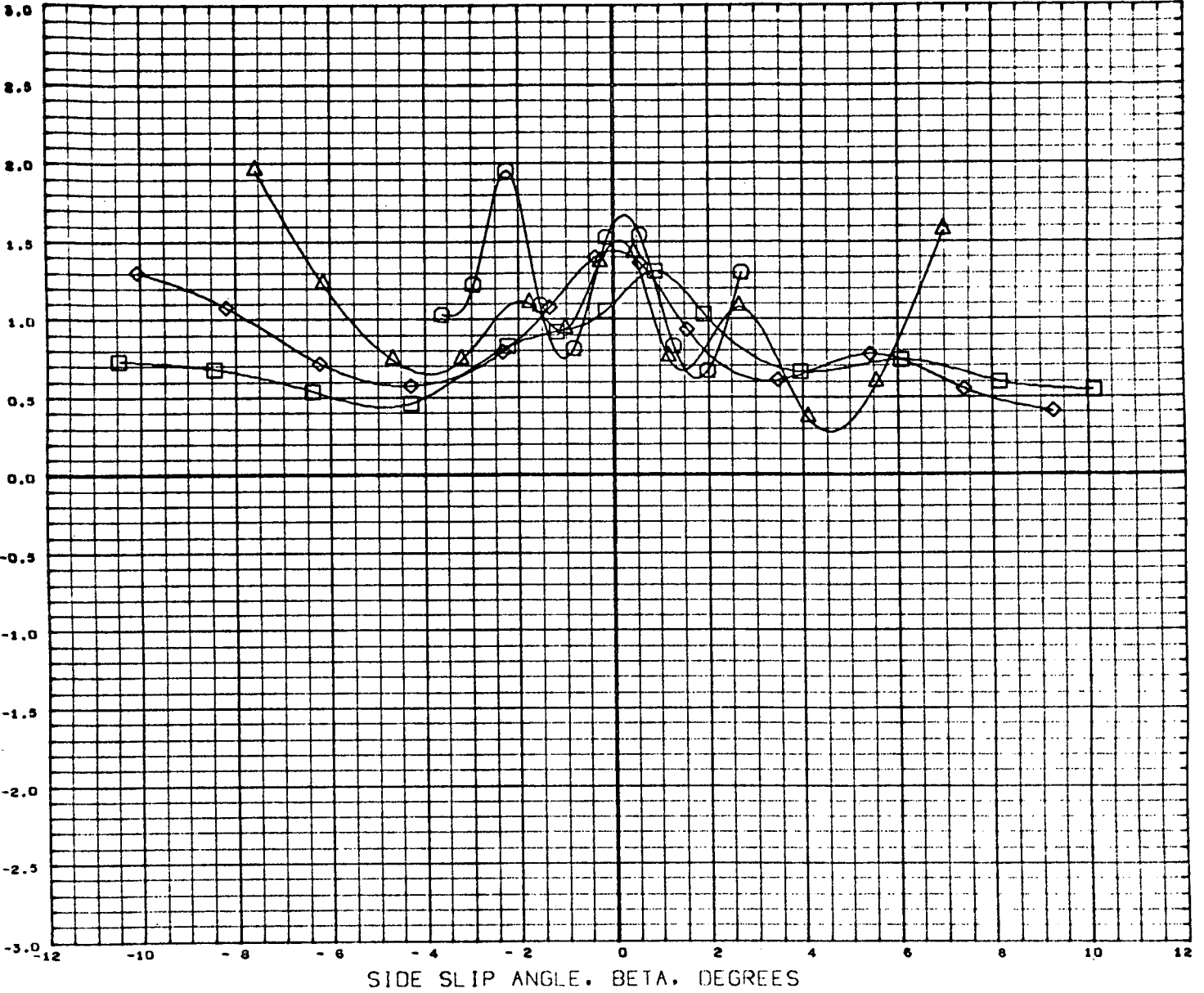


SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WINGINC	0.000	PHI	DATASET	PHI	SREF	SQ. IN.	
○	20.000	1.964						1.3960		
△	45.000				C44042	20.000	C44043	1.3330	IN.	
◇	70.000				C44044	70.000	Z44045	1.3330	IN.	
□	90.000							5.3990	IN.	
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

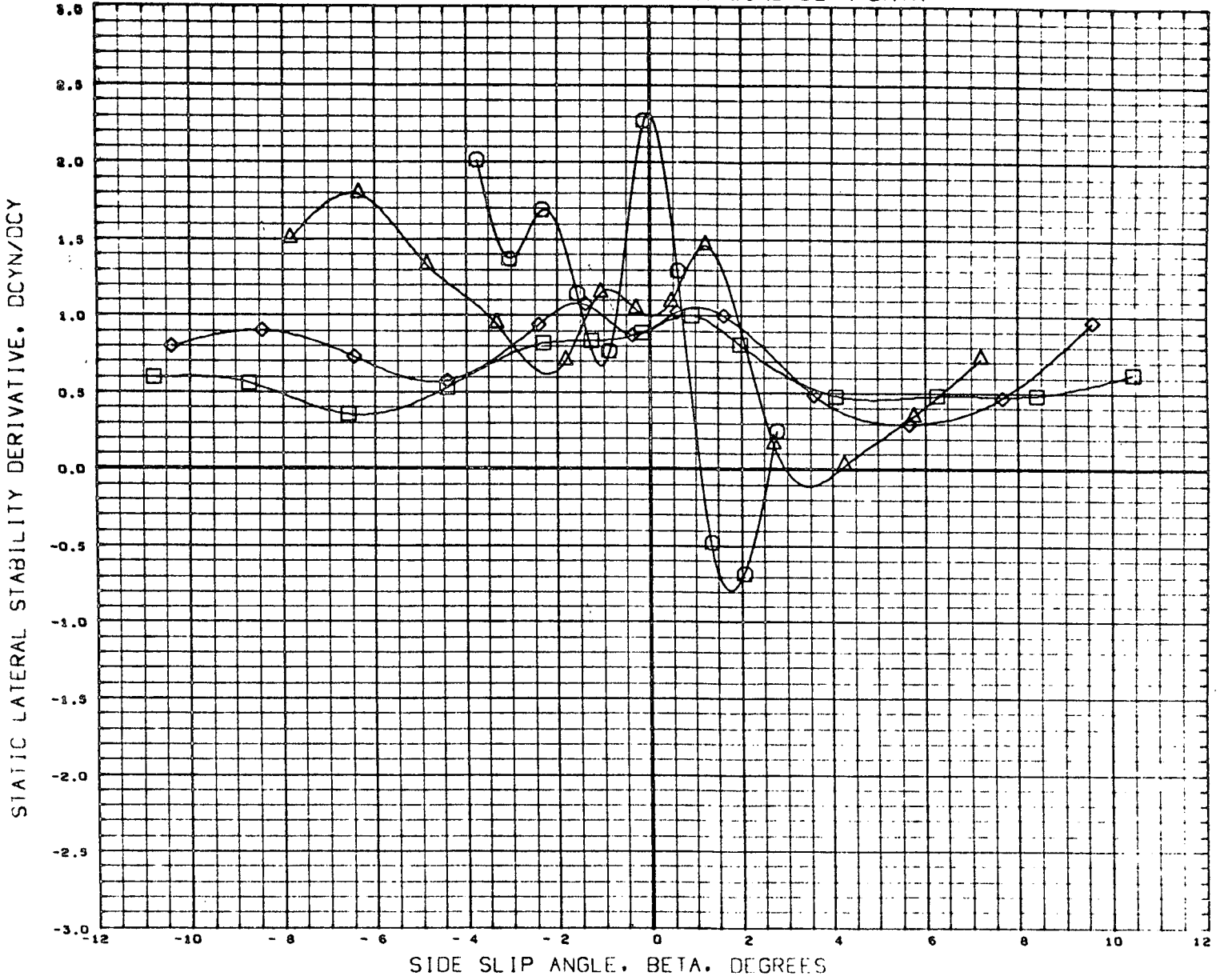
STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION				
○	20.000	MACH	0.599	WINGINC	0.000	DATASET	PHI	DATASET	PHI	SREF	1.3960	SQ. IN.
△	45.000					C44042	20.000	C44043	45.000	LREF	1.3330	IN.
◇	70.000					C44044	70.000	Z44045	90.000	BREF	1.3330	IN.
□	90.000									XMRP	5.3990	IN.
										YMRP	0.0000	IN.
										ZMRP	0.0000	IN.
										SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

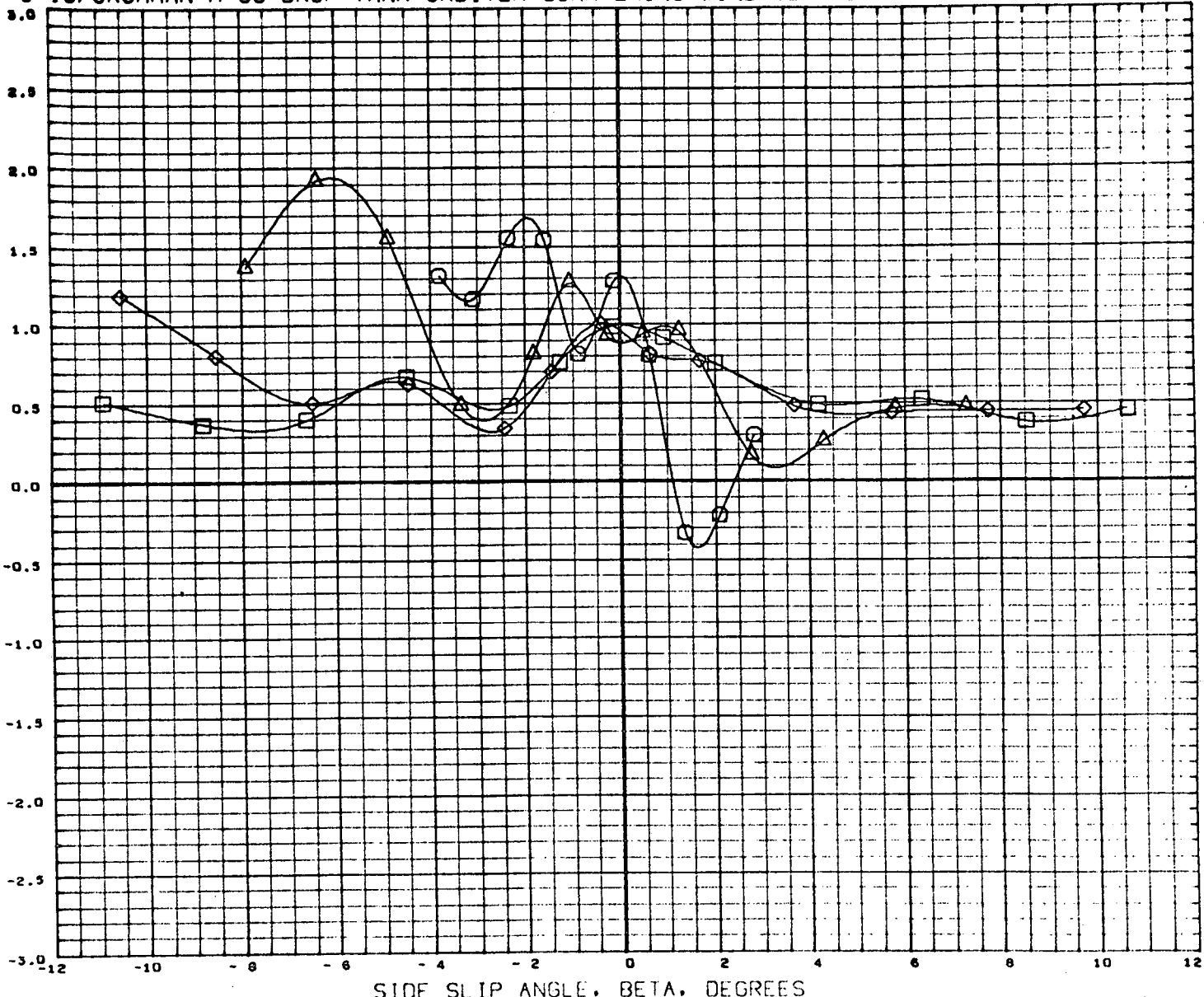


SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
○	20.000	MACH	0.899	WNGINC	0.000	PHI	20.000	SREF	1.3960	90.1%
△	45.000					PHI	45.000	LREF	1.3330	IN.
◇	70.000					PHI	70.000	BREF	1.3330	IN.
□	90.000					PHI	90.000	XMRP	5.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

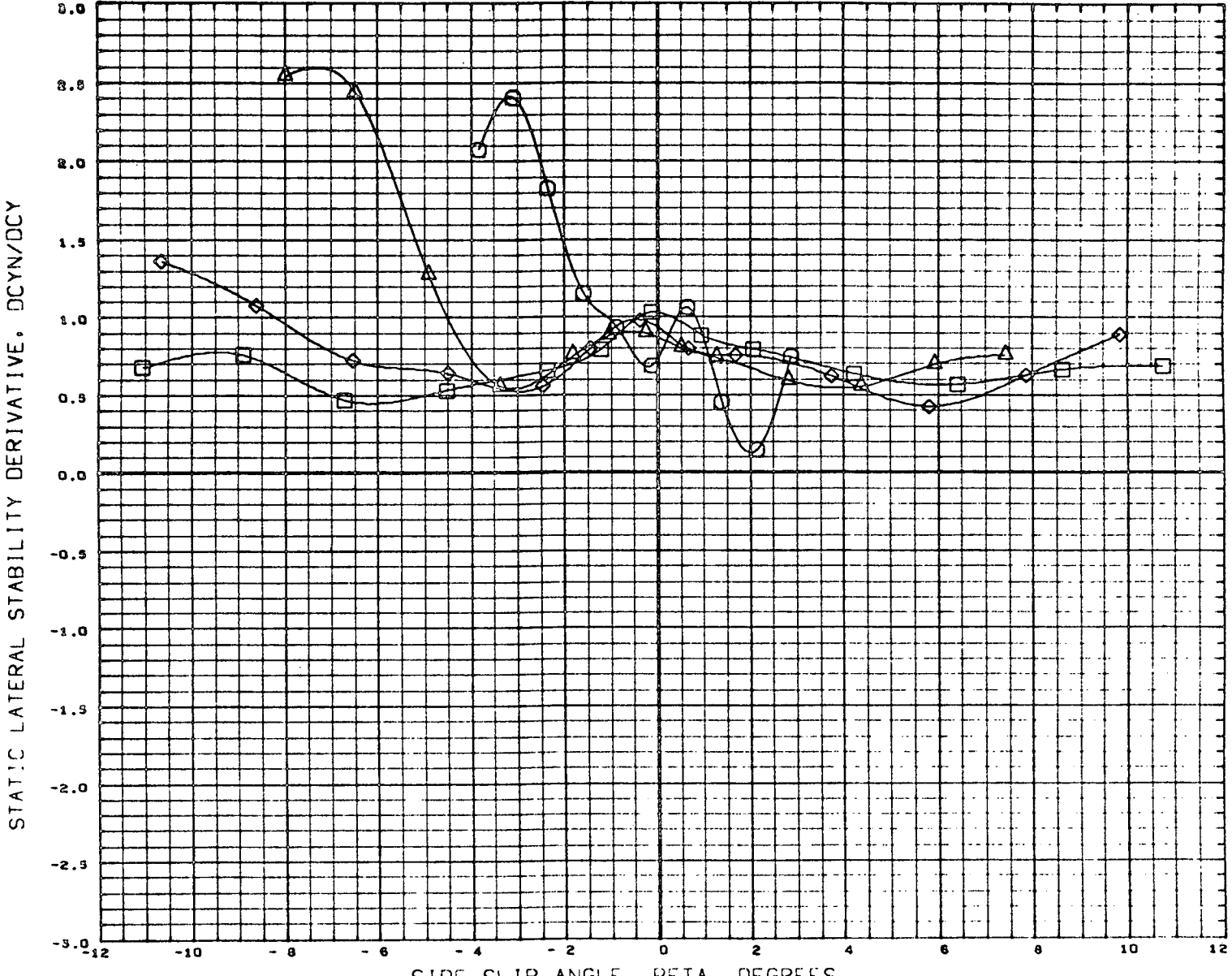
STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION				
○	20.000	MACH	1.001	WNGINC	0.000	PHI	20.000	20.000	SREF	1.3960	50. IN.
△	45.000						45.000	45.000	LREF	1.3330	IN.
◇	70.000						70.000	70.000	BREF	1.3330	IN.
□	90.000						90.000	90.000	XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WING INC	0.000	PHI	DATASET	PHI	SREF	50. IN.	
○	20.000							1.3960	50. IN.	
△	45.000				C44042	20.000	C44043	1.3330	IN.	
◇	70.000				C44044	70.000	Z44045	1.3330	IN.	
□	90.000							5.3390	IN.	
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA

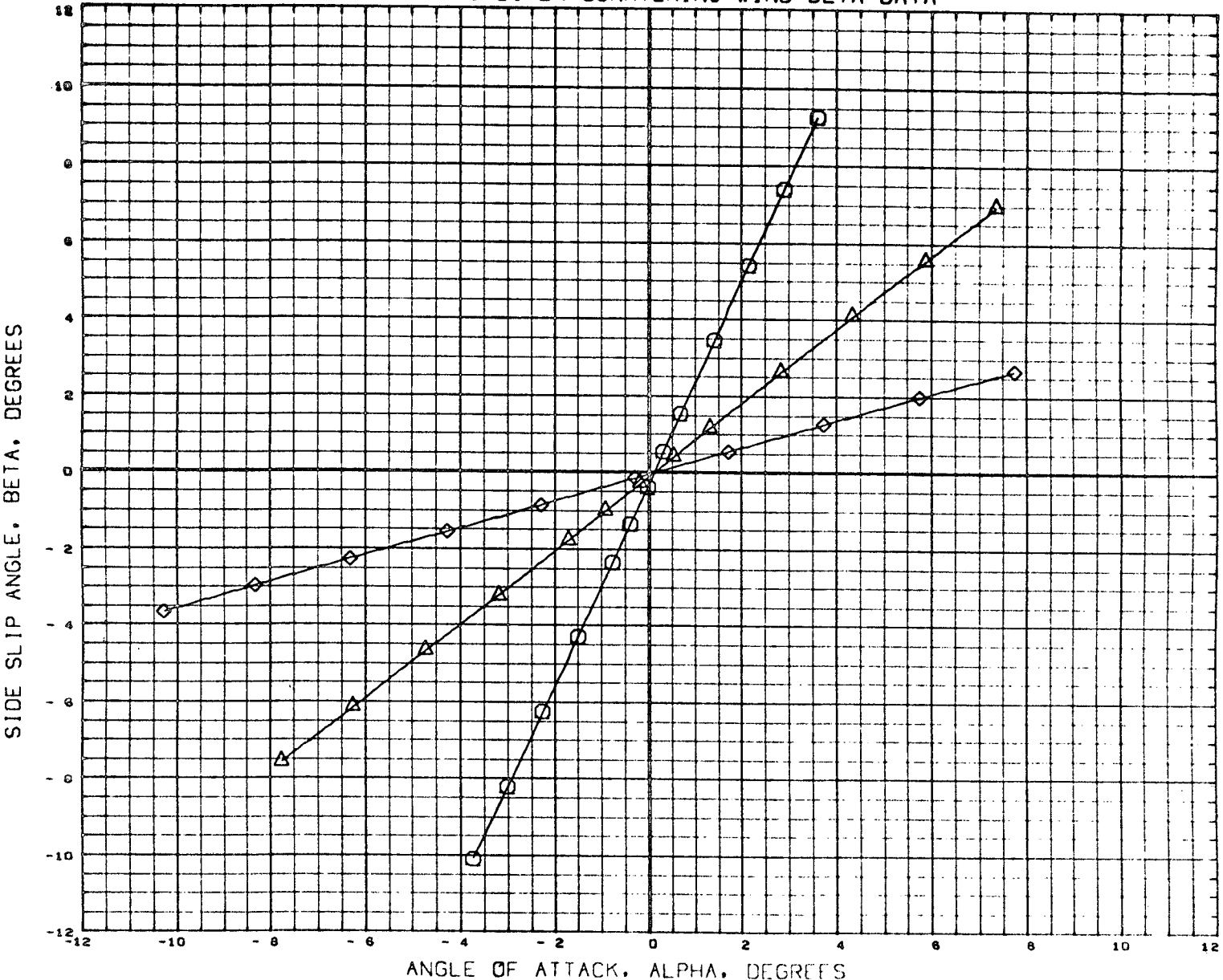
STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY



YMBOL	PARAMETRIC VALUES				DATA SOURCE			REFERENCE INFORMATION		
	PHI	MACH	WINGINC	0.000	PHI	DATASET	PHI	SREF	SO. IN.	
○	20.000	1.964			20.000	C44042	45.000	1.3960	IN.	
△	45.000				70.000	C44043	90.000	1.3330	IN.	
◇	70.000					Z44045		1.3330	IN.	
□	90.000							5.3990	IN.	
								0.0000	IN.	
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCC

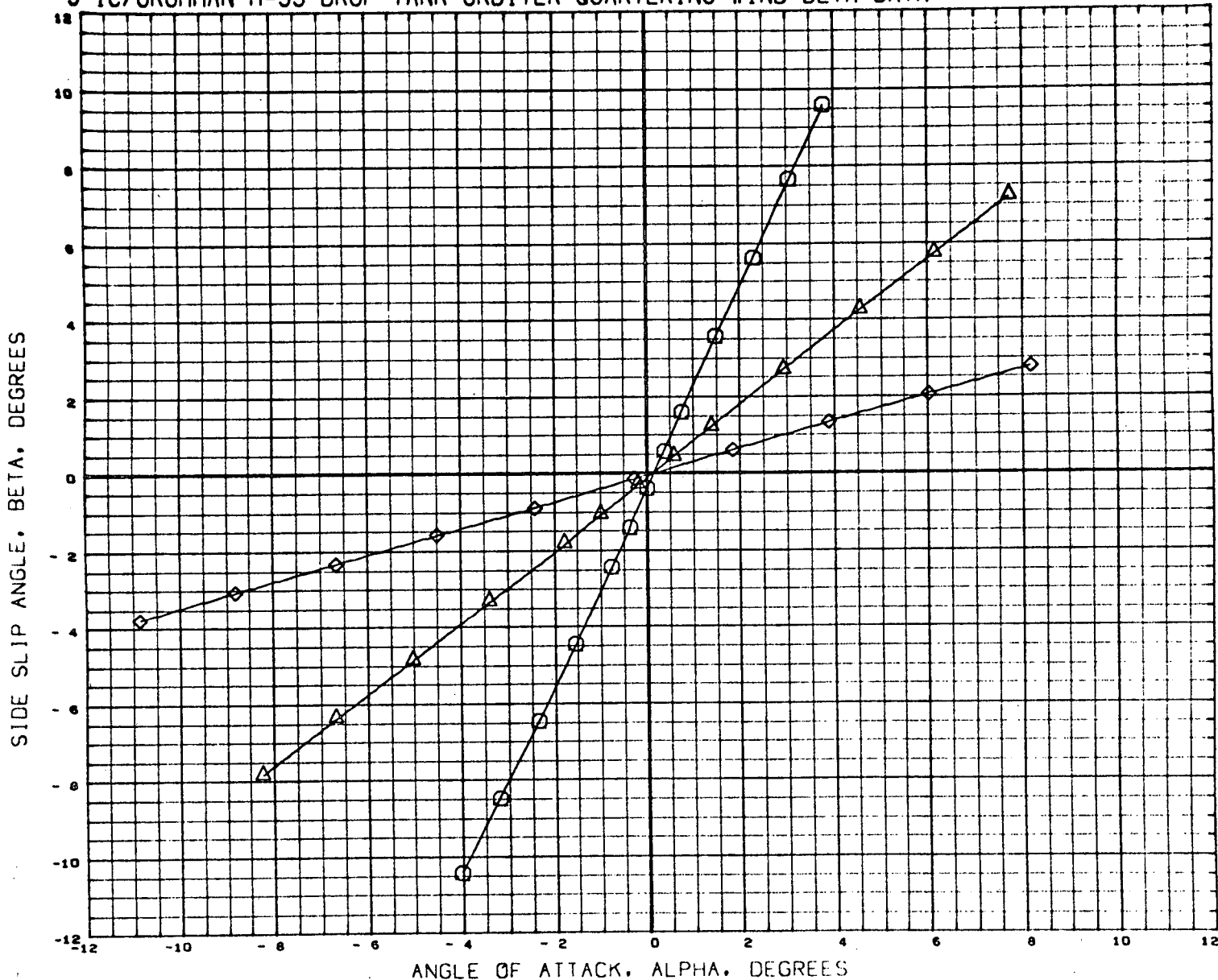
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION			
○	70.000	MACH	0.600	WINGINC	0.000	PHI	70.000	W44044	SREF	1.3960	50. IN.
△	45.000					PHI	45.000	W44043	LREF	1.3330	IN.
◇	20.000					PHI	20.000	W44042	BREF	1.3330	IN.
									XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCL

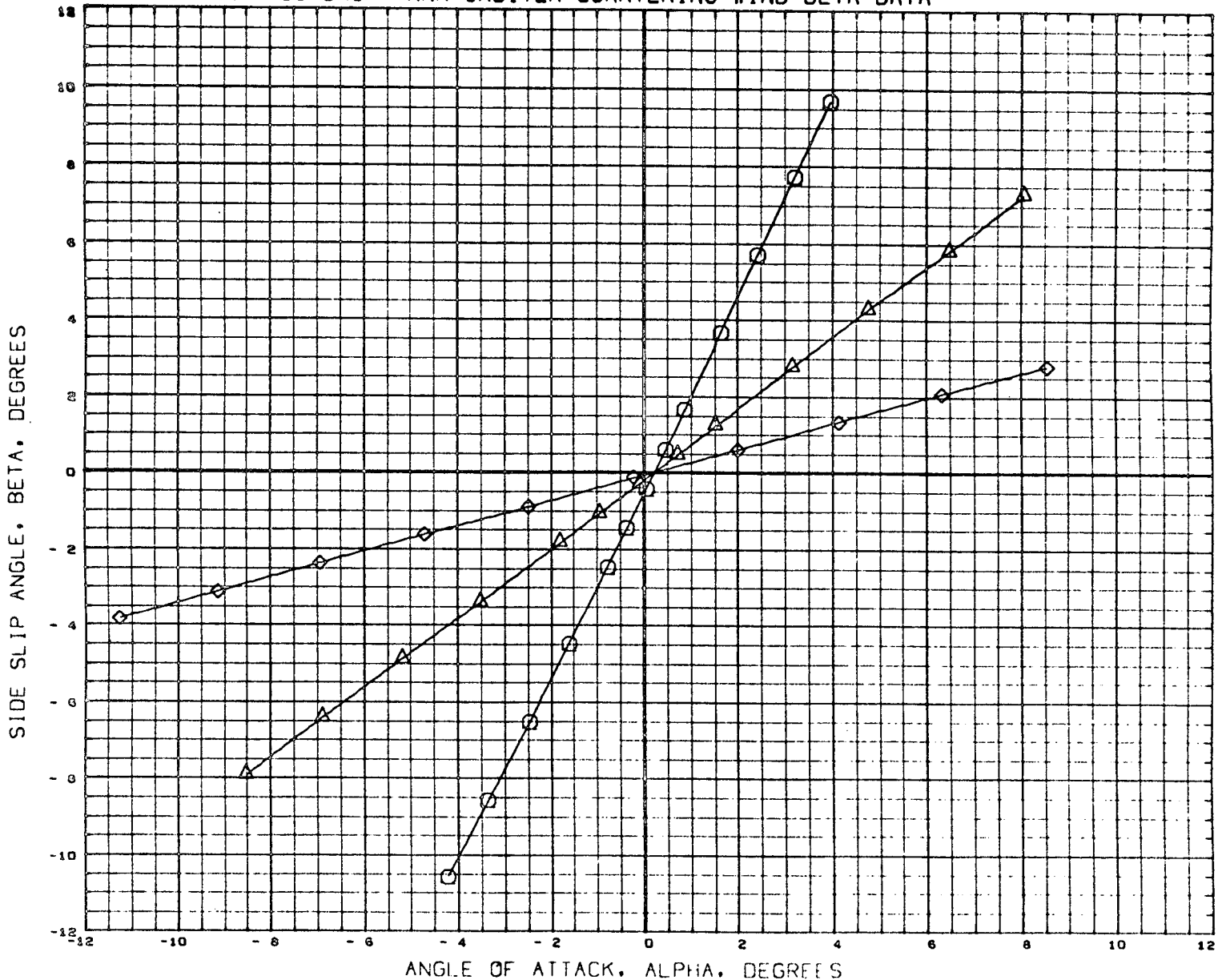
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WING INC	0.000	PHI	PHI	PHI	SREF	IN.	
○	70.000	0.899	0.000	W44044	70.000	70.000	1.3960	50. IN.		
△	45.000			W44044	45.000	45.000	1.3330	IN.		
◇	20.000			W44042	20.000		1.3330	IN.		
							XMRP	5.3990	IN.	
							YMRP	0.0000	IN.	
							ZMRP	0.0000	IN.	
							SCALE	0.0034		

DATA HIST. CODE CCCL

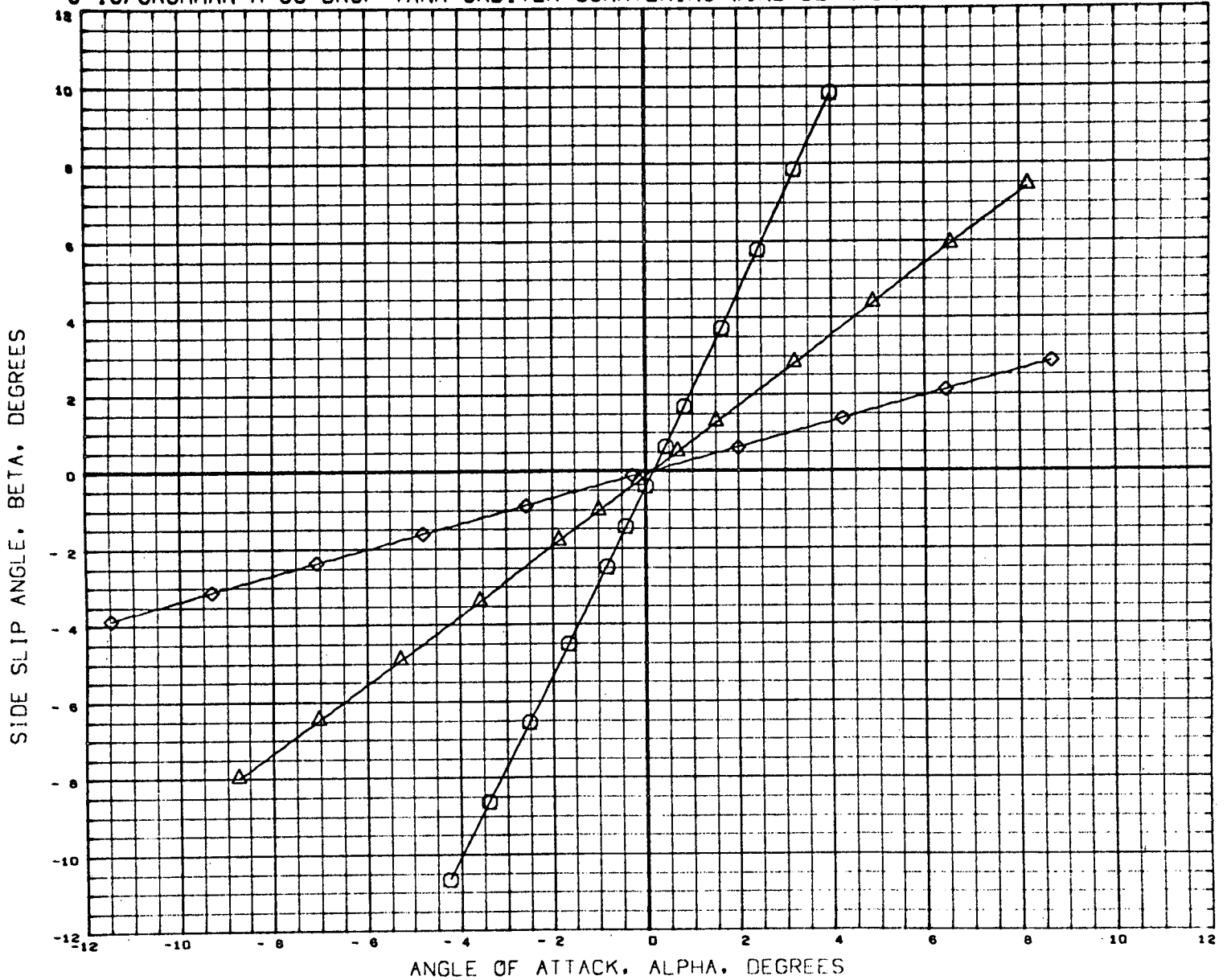
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION				
○	70.000	MACH	1.000	WNGINC	0.000	PHI	70.000	W44044	SPEF	1.3960	SQ. IN.
△	45.000					PHI	45.000	W44043	LREF	1.3330	IN.
◇	20.000					PHI	20.000	W44042	BREF	1.3330	IN.
									XMRP	5.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCL

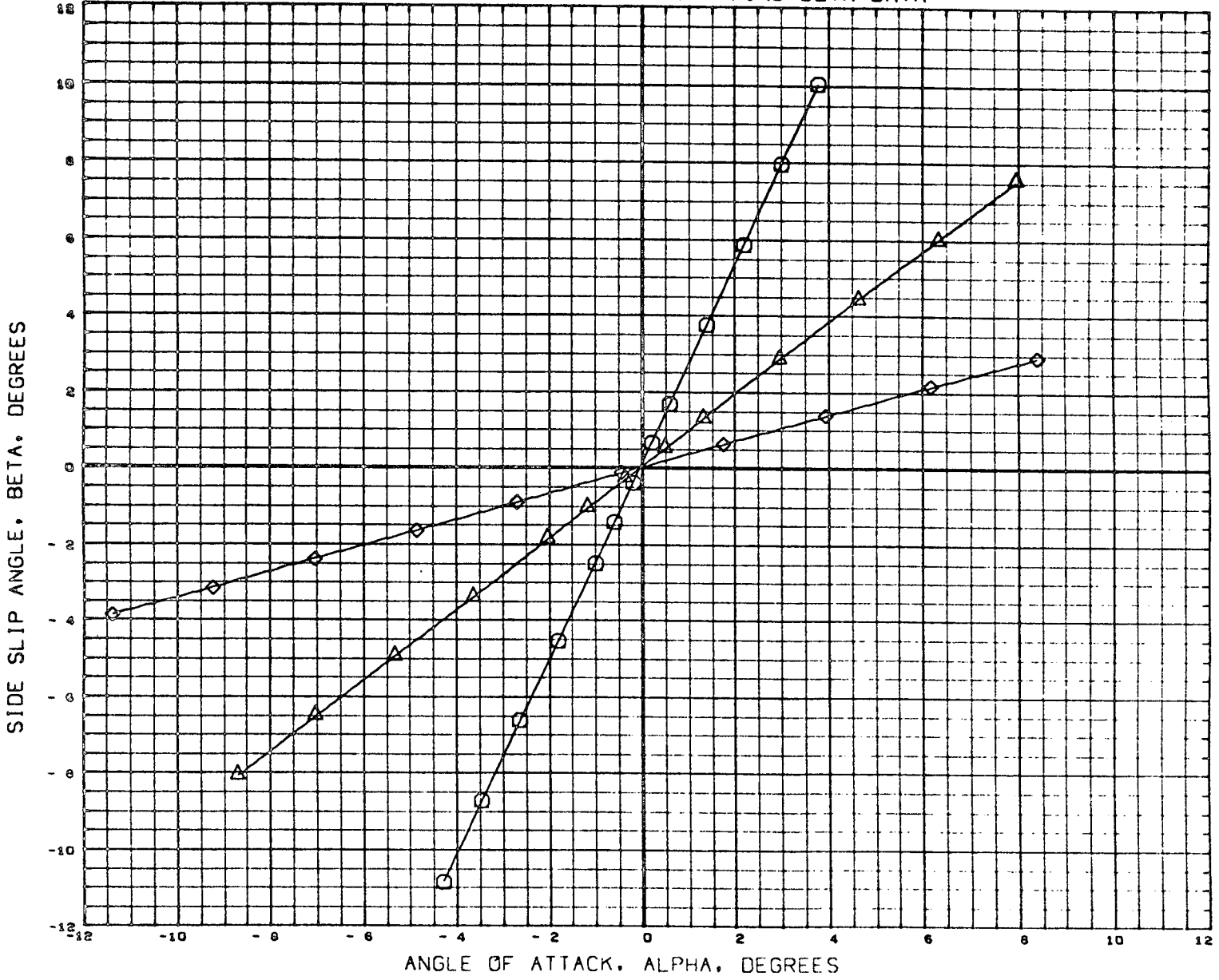
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		MACH	WING INC	0.000	PHI	PHI	PHI	SREF	SQ. IN.	
○	70.000	1.200	0.000	W44044	70.000	45.000	1.3960	50. IN.		
△	45.000			W44042	20.000		1.3330	IN.		
◇	20.000						1.3330	IN.		
							5.3990	IN.		
							0.0000	IN.		
							0.0000	IN.		
							0.0034			

DATA HIST. CODE CCCL

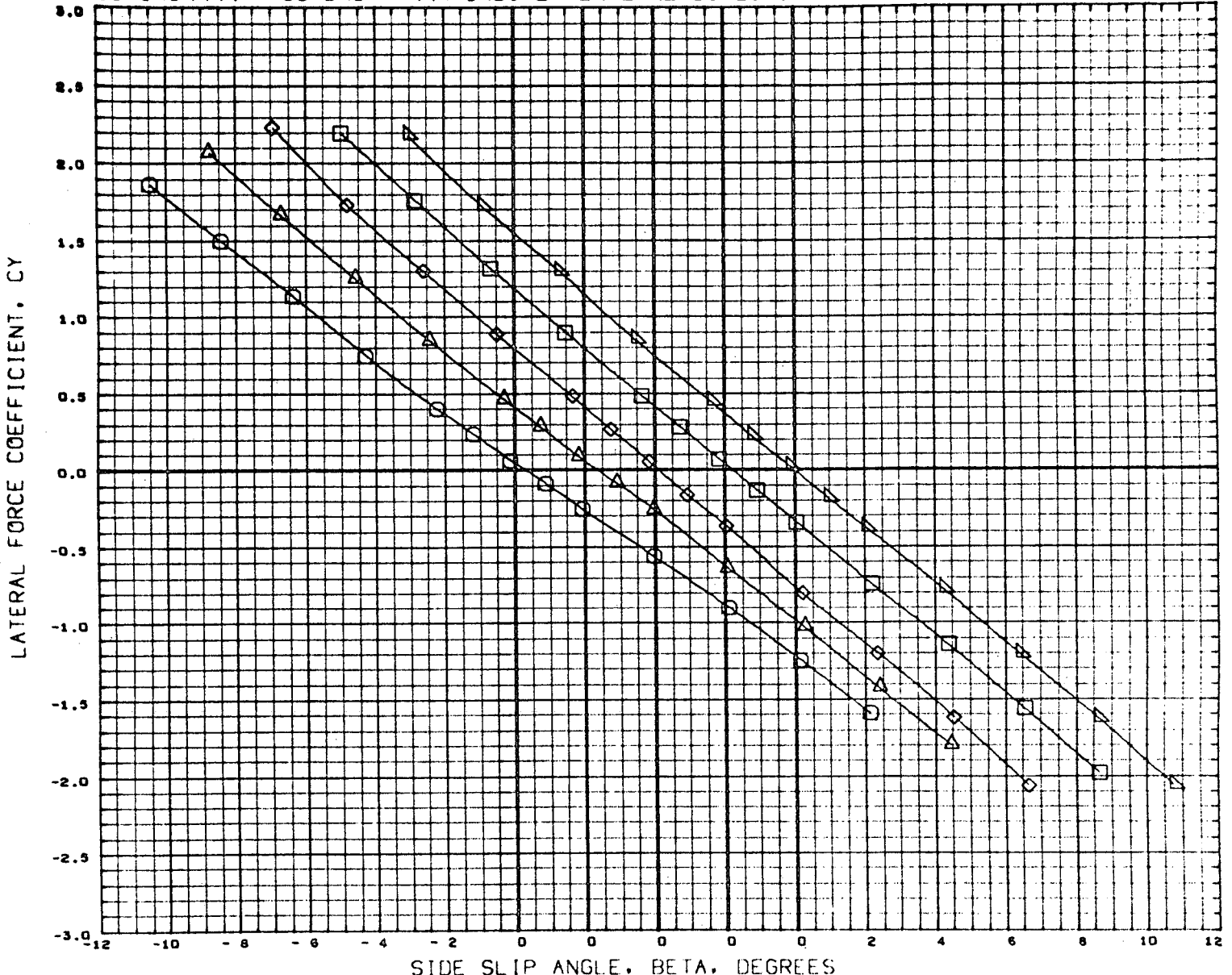
S-1C/GRUMMAN H-33 DROP TANK ORBITER QUARTERING WIND BETA DATA



SYMBOL	PHI	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
○	70.000	MACH	1.961	WINGINC	0.000	PHI	70.000	SREF	1.3960	50. IN.
△	45.000					PHI	45.000	LREF	1.3330	IN.
◇	20.000					PHI	20.000	BREF	1.3330	IN.
								XMRP	3.3990	IN.
								YMRP	0.0000	IN.
								ZMRP	0.0000	IN.
								SCALE	0.0034	

DATA HIST. CODE CCCL

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

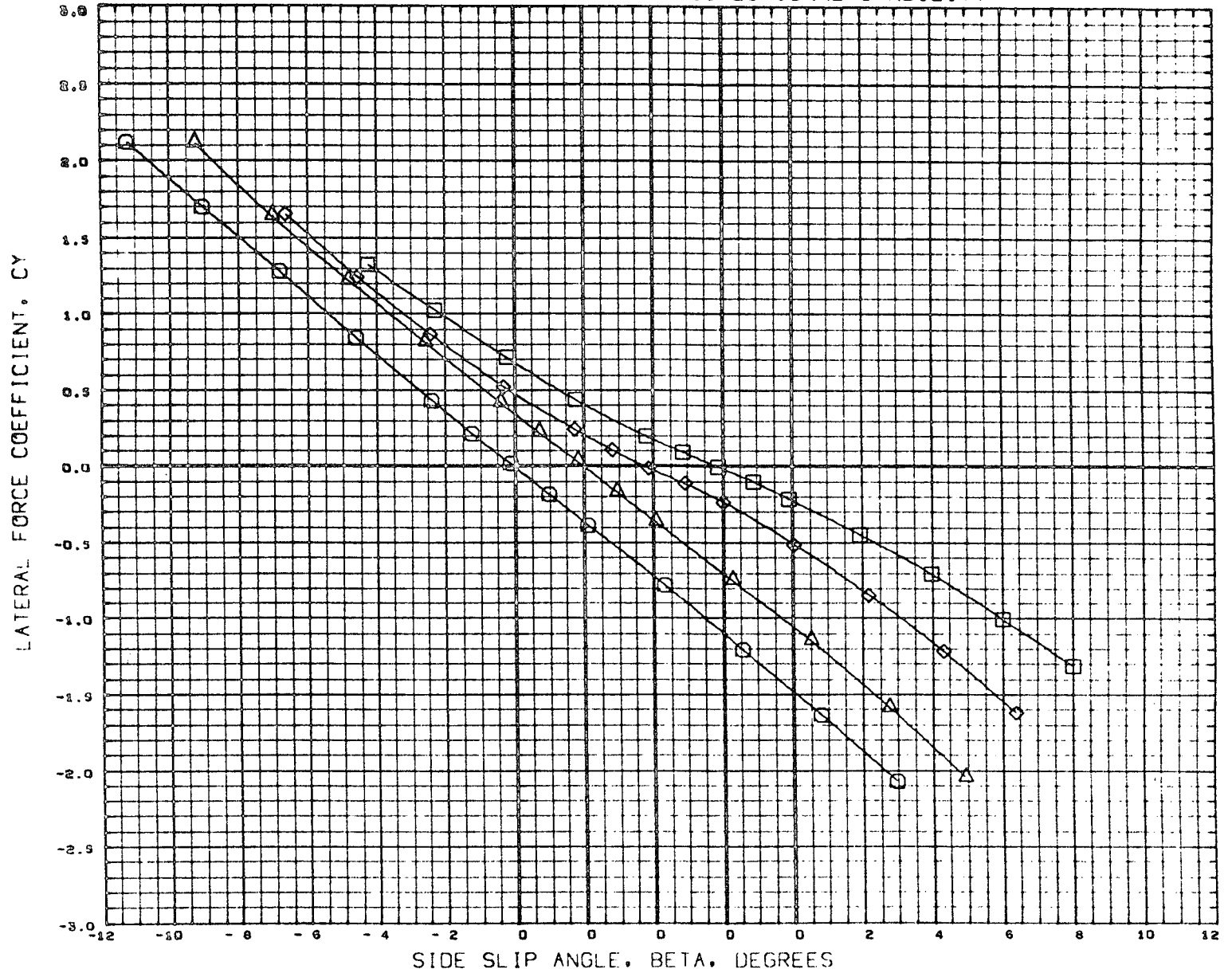


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.604	ALPHA	0.000	PHI	90.000
△	0.907	WINGINC	0.000		
□	1.001				
◇	1.102				
▽	1.201				

DATA HIST. CODE *ACCCGC

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3930	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

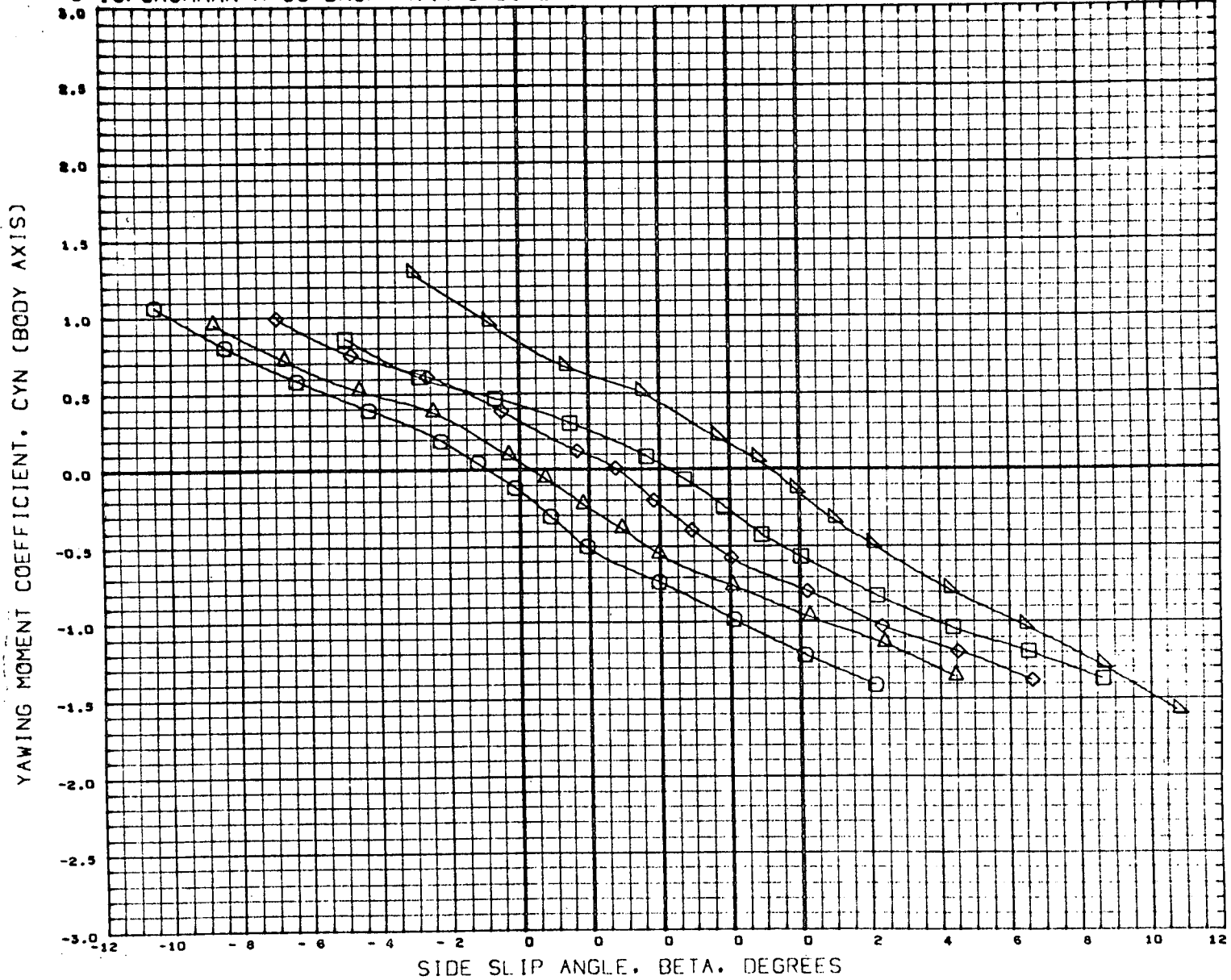


SYMBOL	MACH	PARAMETRIC VALUES		
○	1.463	ALPHA	0.000	PHI 90.000
△	1.964	WNGINC	0.000	
◇	3.480			
□	4.939			

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE #ACCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

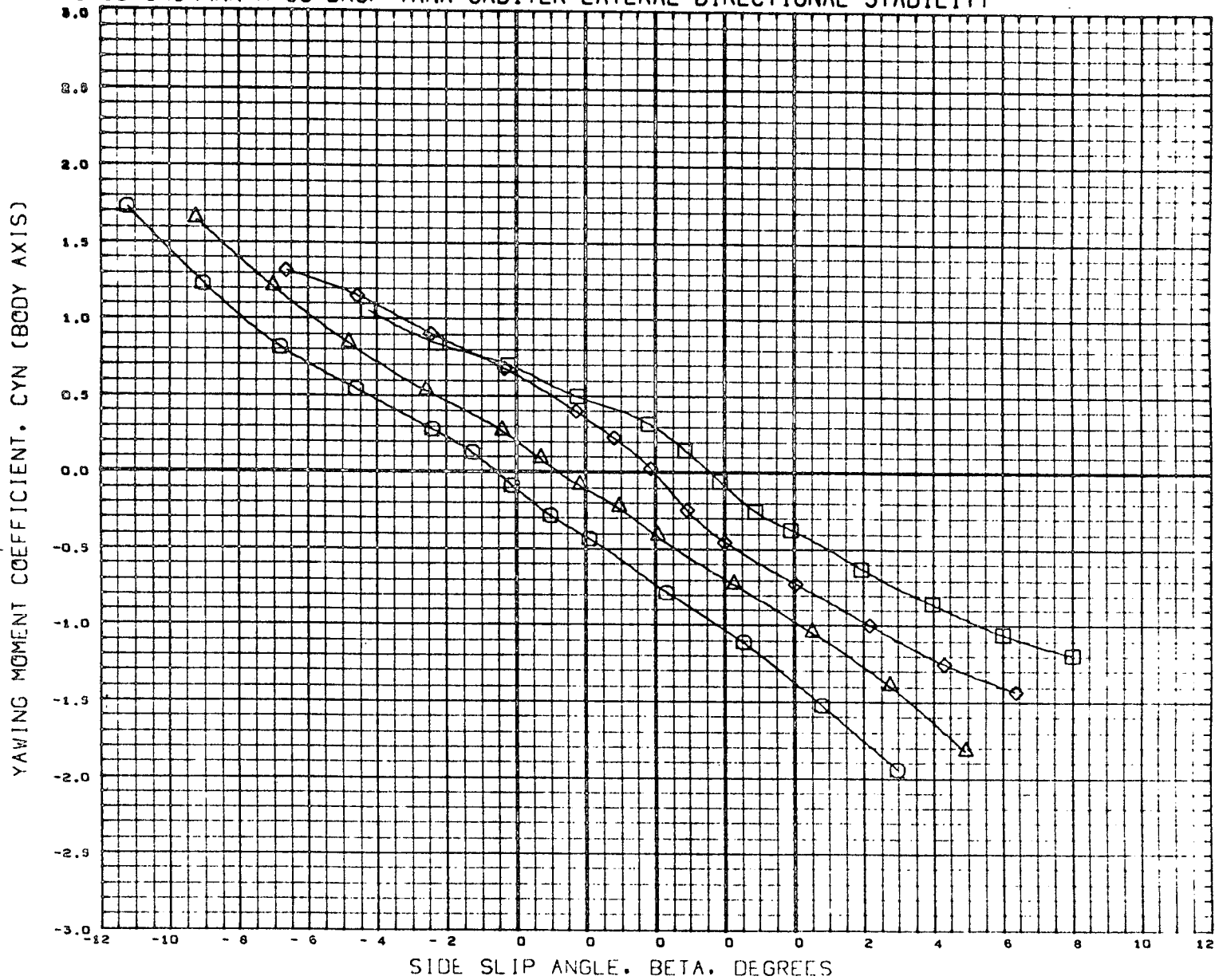


SYMBOL	MACH	ALPHA	PHI	PARAMETRIC VALUES
○	0.604	0.000	90.000	
△	0.907	0.000		
◇	1.001			
□	1.102			
▽	1.201			

DATA HIST. CODE #ACCCGC

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

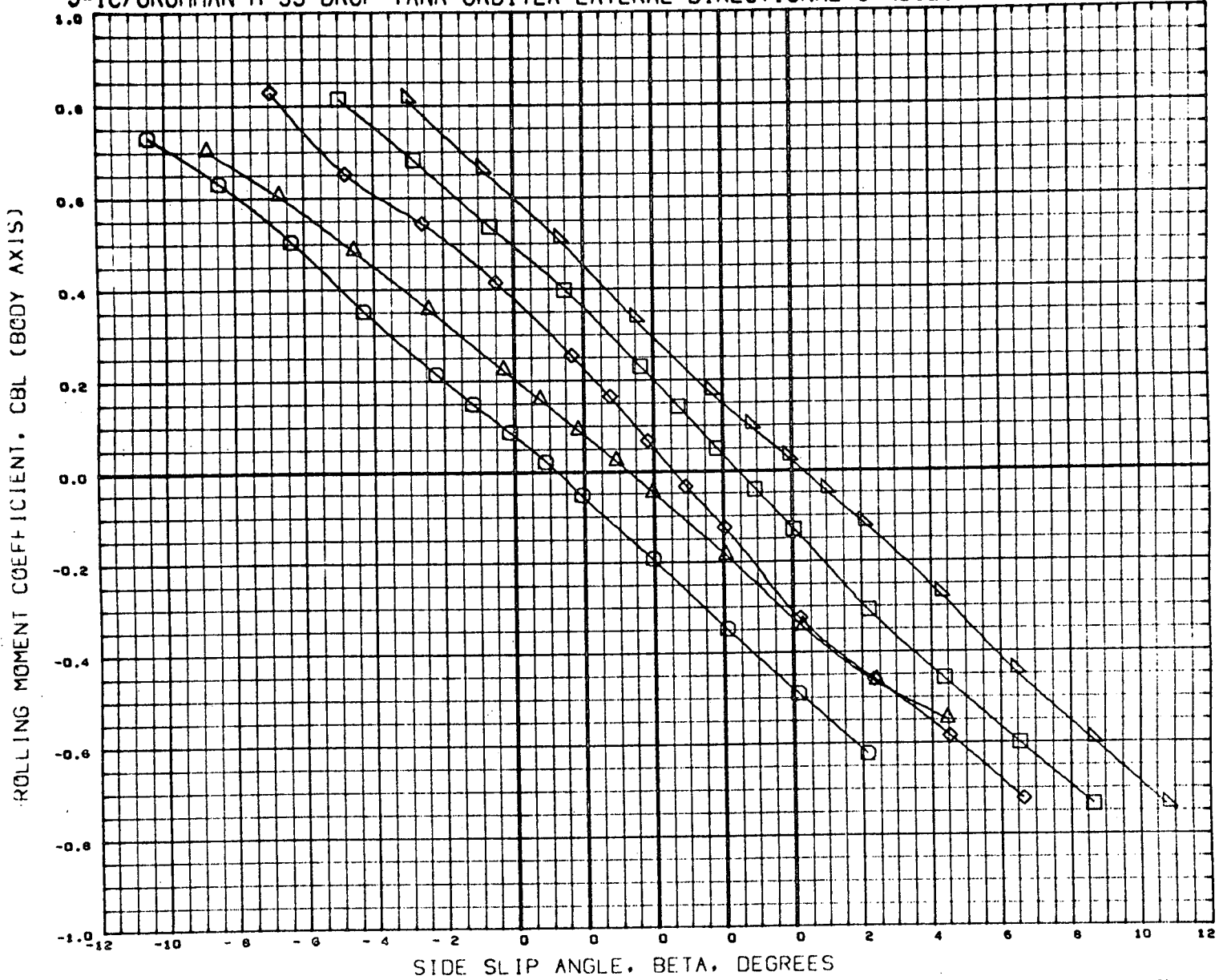


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.463	ALPHA	0.000	PHI	90.000
△	1.964	WINGINC	0.000		
◇	3.480				
□	4.959				

REFERENCE INFORMATION		
SREF	1.3960	SQ. FT.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRF	5.3990	IN.
YMRF	0.0000	IN.
ZMRF	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE ACCCGC

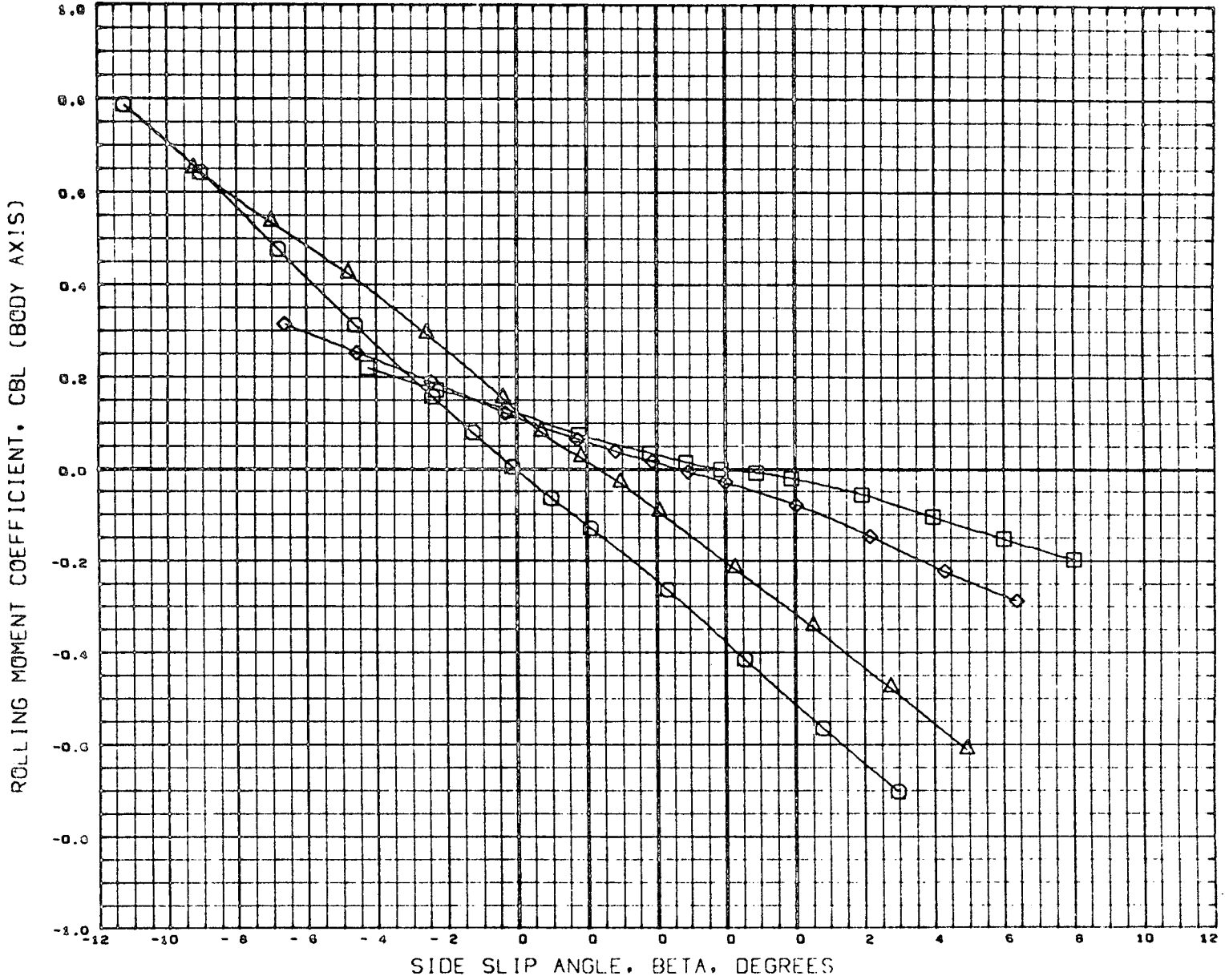
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.604	ALPHA	0.000	PHI	90.000
△	0.907	WING INC	0.000		
◇	1.001				
□	1.102				
▽	1.201				
		DATA HIST. CODE	*ACC66C		

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	5.3990	in.
YMRP	0.0000	in.
ZMRP	0.0000	in.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

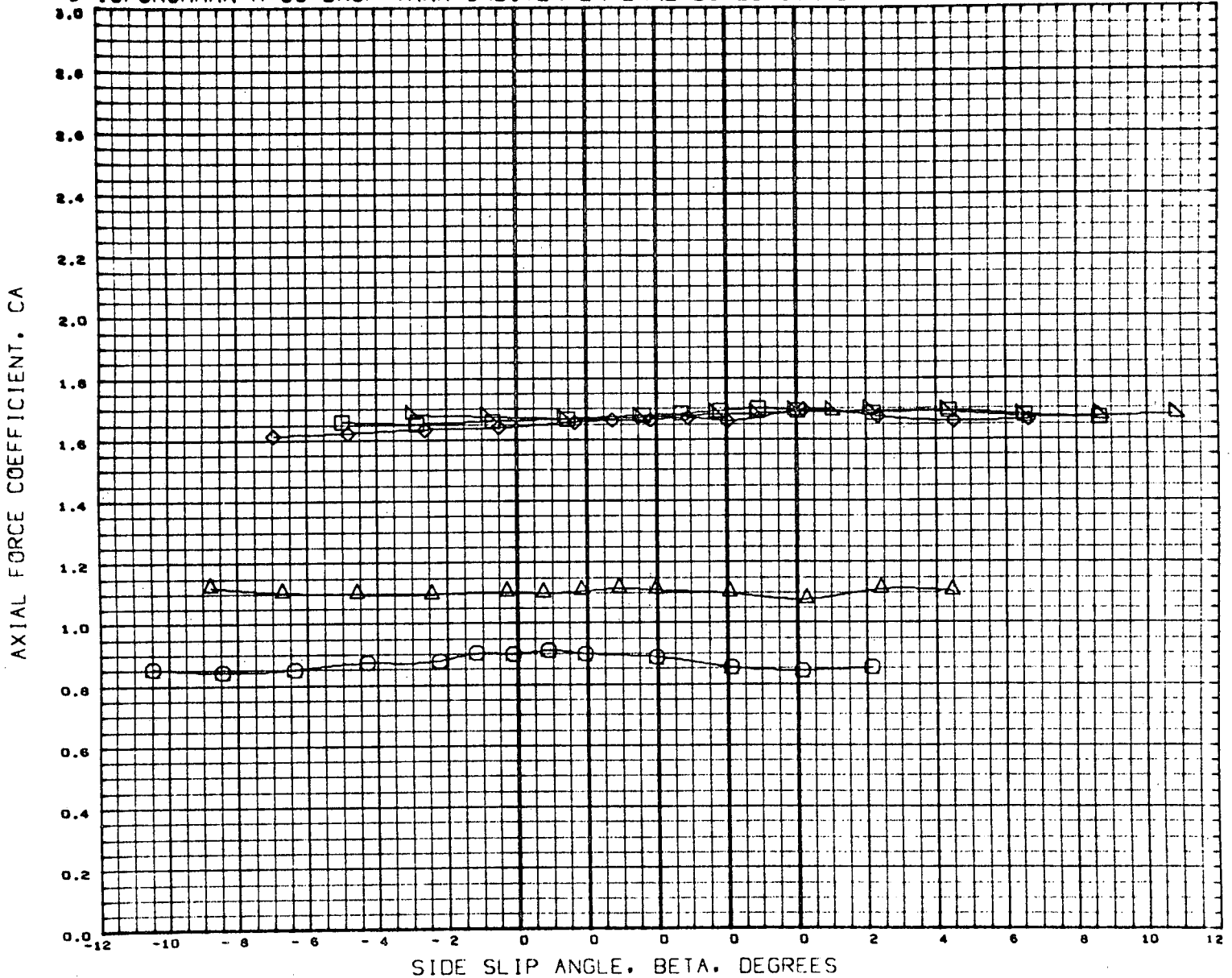


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES		PHI
○	1.463	0.000	0.000	90.000	
△	1.964	WINGINC	0.000		
◇	3.480				
□	4.999				

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	5.3990	in.
YMRP	0.0000	in.
ZMRP	0.0000	in.
SCALE	0.0034	

DATA HIST. CODE *ACCCGC

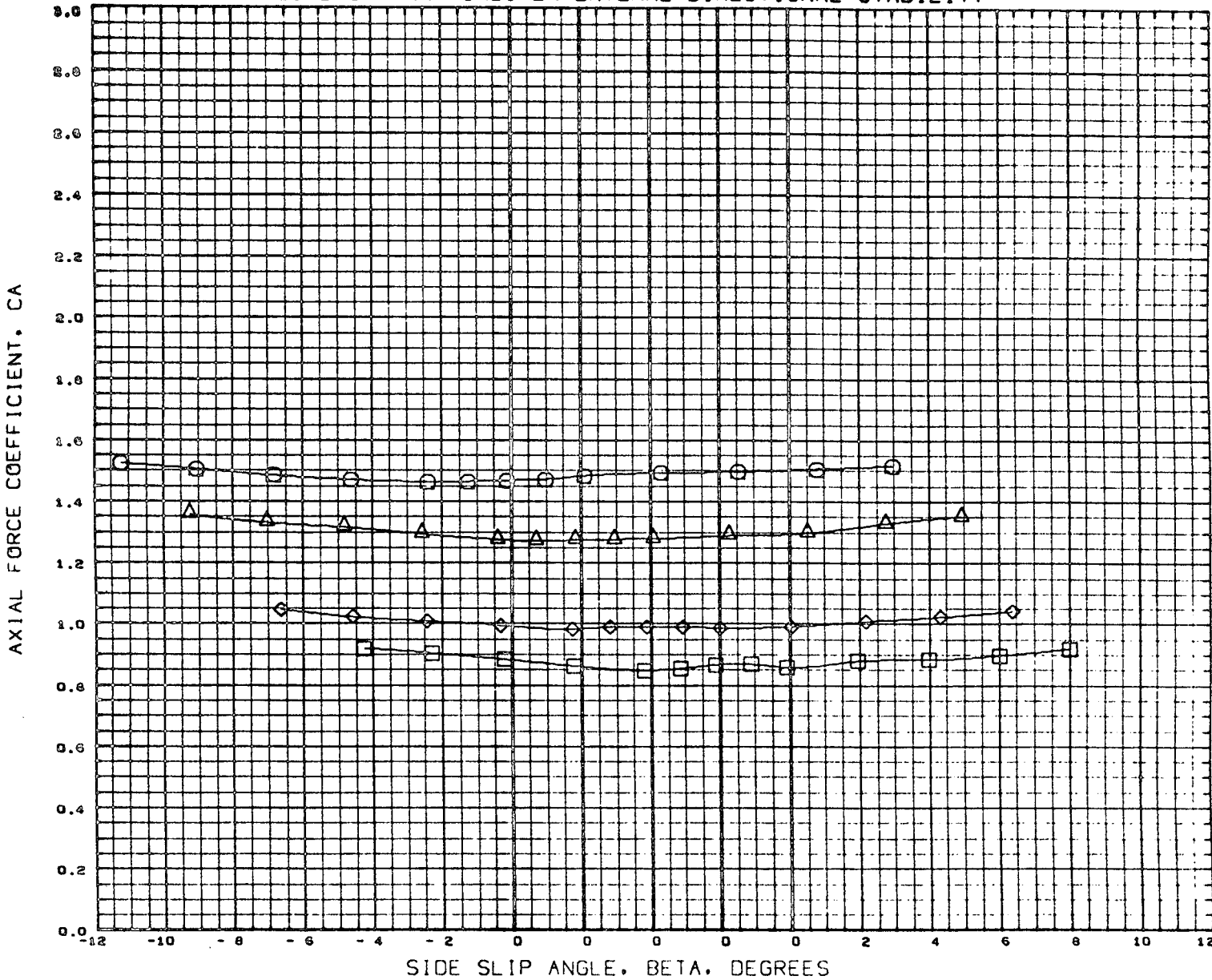
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL ◇ △ □ ○	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
	0.604	ALPHA	0.000	PHI	90.000	SREF	1.3960	SQ. IN.
	0.907	WINGINC	0.000			LREF	1.3330	IN.
	1.001					BREF	1.3330	IN.
	1.102					XMRP	5.3990	IN.
1.201					YMRP	0.0000	IN.	
					ZMRP	0.0000	IN.	
					SCALE	0.0034		

DATA HIST. CODE #ACCCGC

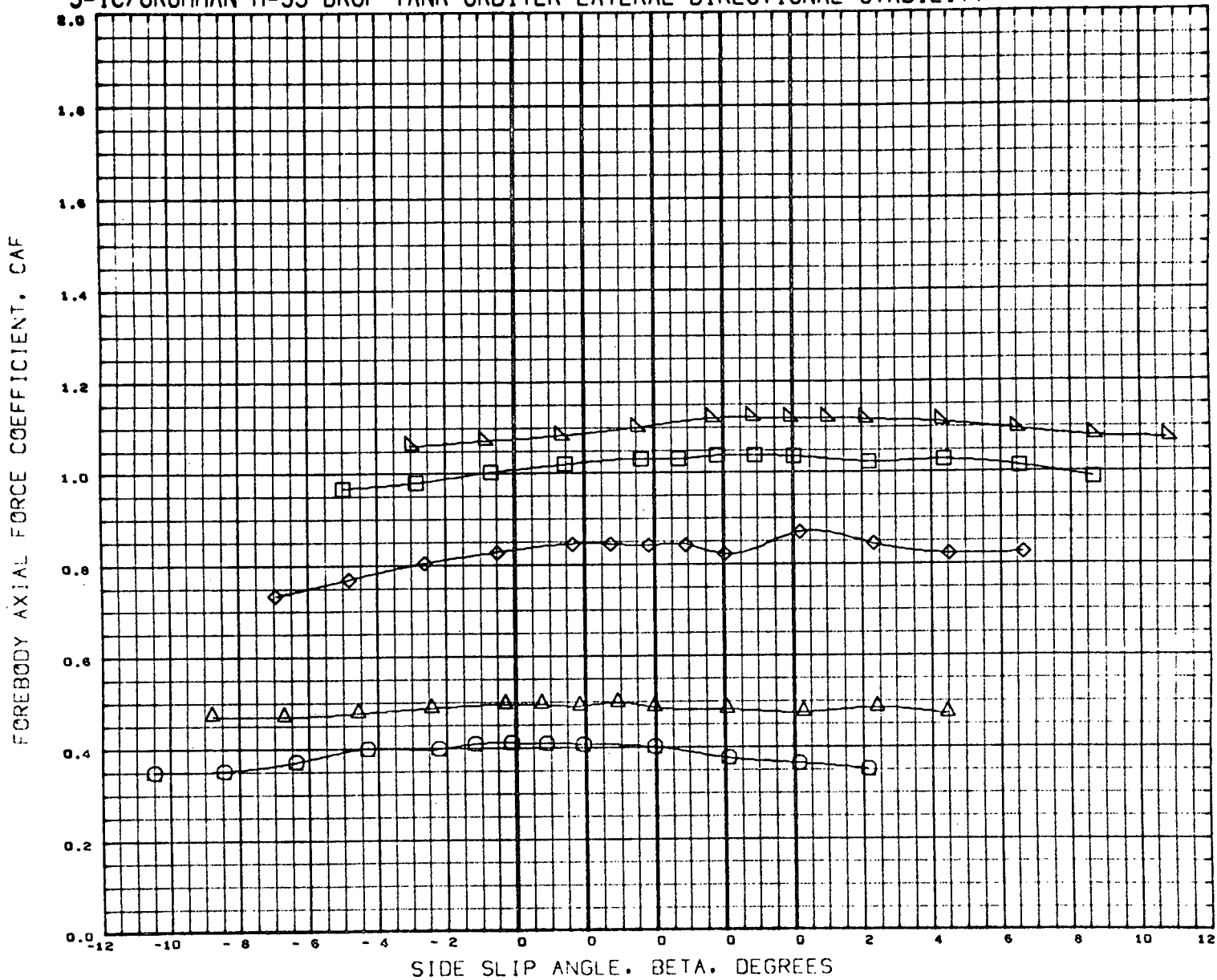
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
○	1.463	ALPHA	0.000	PHI	90.000	SREF	1.3960	SQ. FT.
△	1.964	WNGINC	0.000			LREF	1.3330	IN.
◇	3.480					BREF	1.3330	IN.
□	4.999					XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE #ACCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

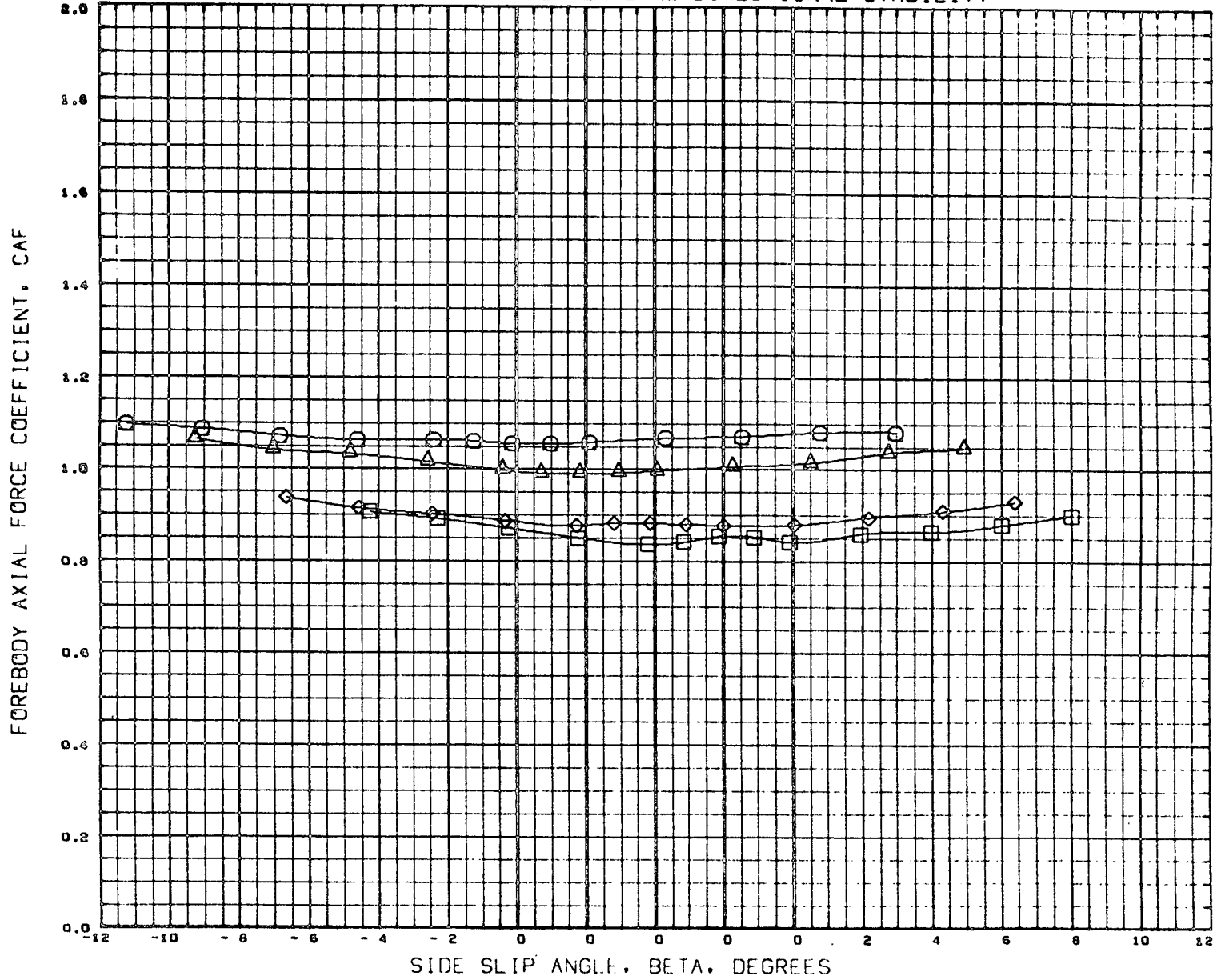


SYMBOL	MACH		PARAMETRIC VALUES	
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○	1.001		WINGEN 0.000	
◇	1.102			
□	1.201			

DATA HIST. CODE #ACCCGC

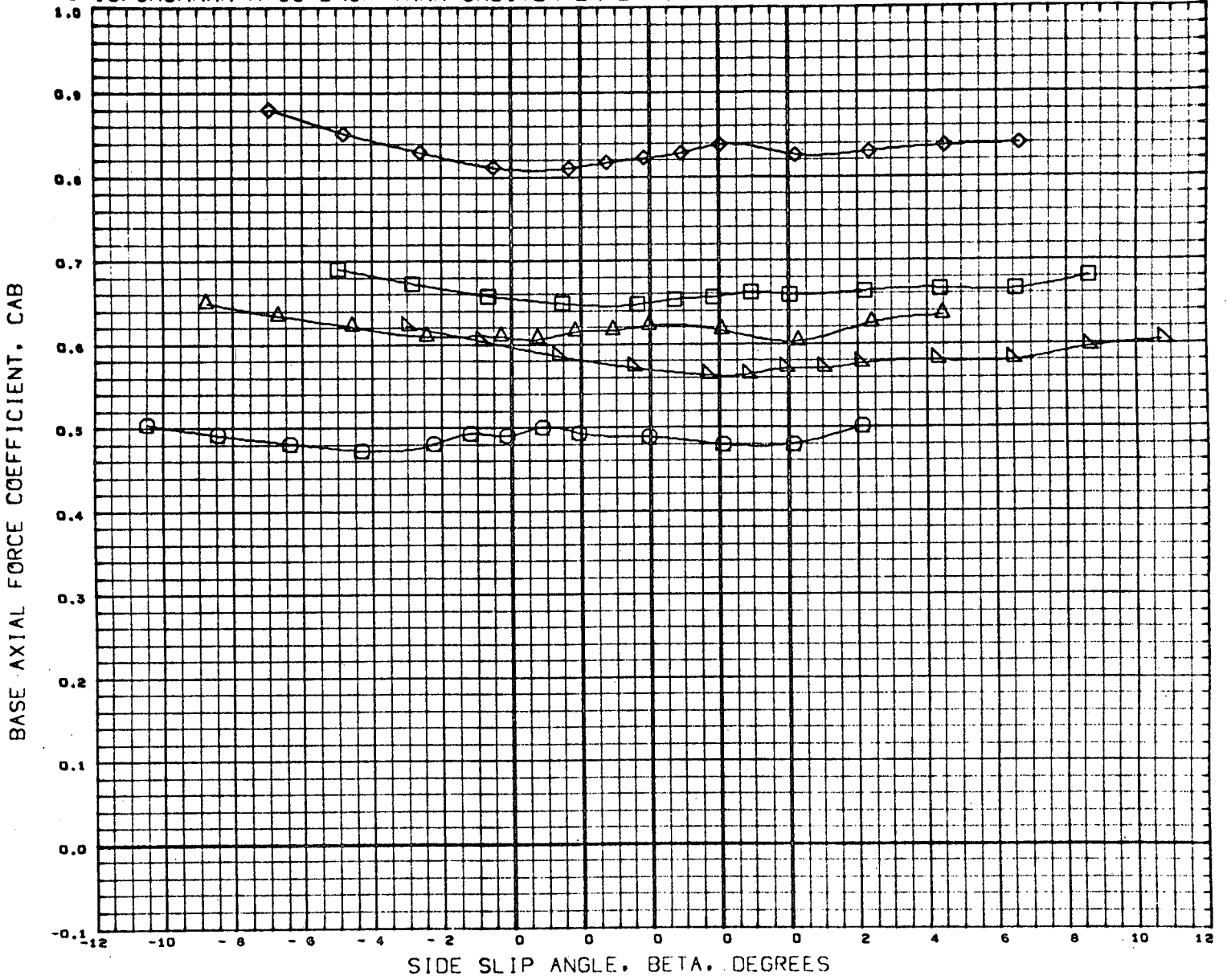
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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL ○ △ ◇ □	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION	
	1.463	ALPHA	0.000	PHI	90.000	SREF 1.3960 SQ. IN.
	1.964	WNGINC	0.000			LREF 1.3330 IN.
	3.460					BREF 1.3330 IN.
	4.959					XMRP 5.3990 IN.
						YMRP 0.0000 IN.
						ZMRP 0.0000 IN.
						SCALE 0.0034

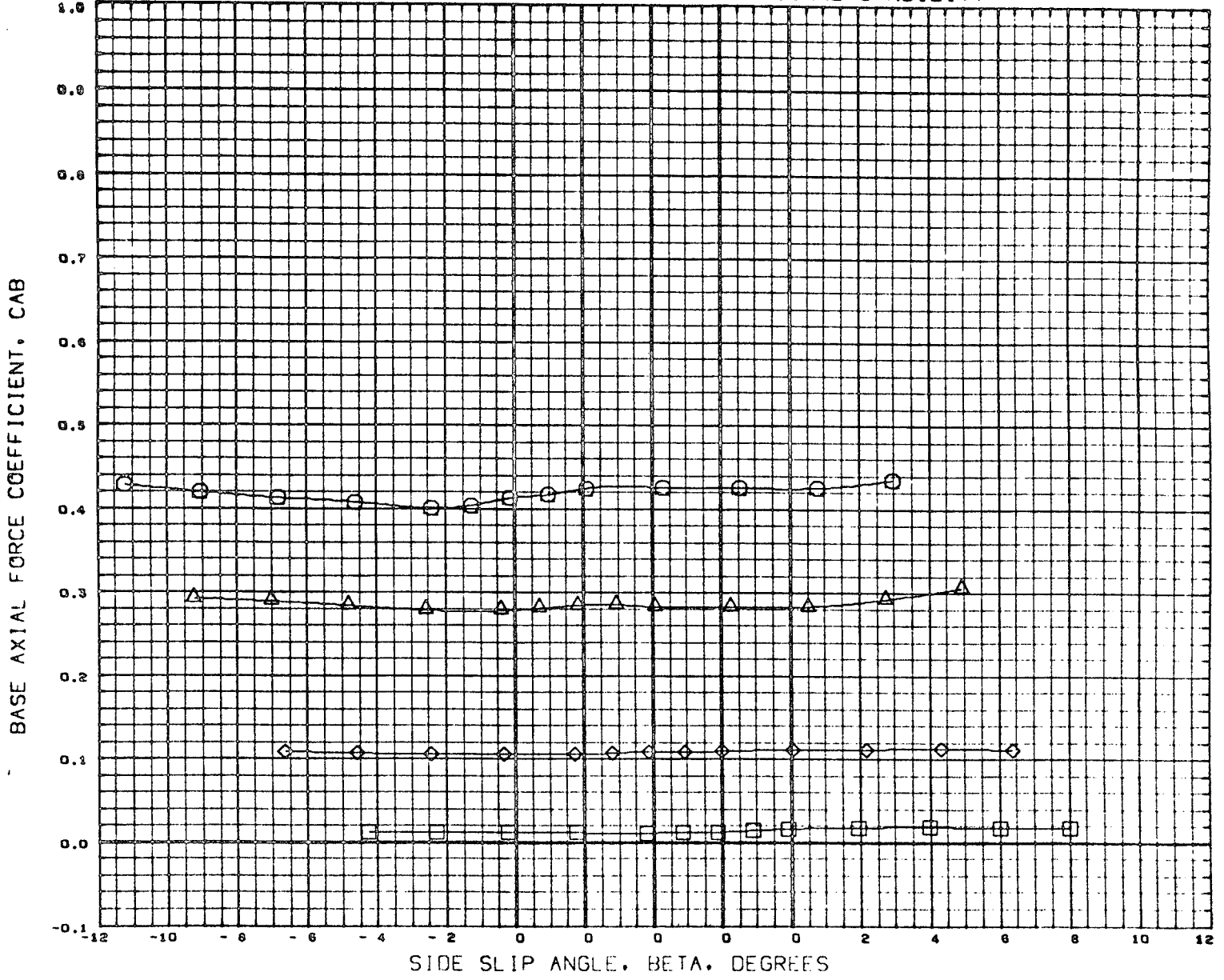
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION	
		ALPHA	PHI	90.000	SREF	SQ. IN.
◇	0.604	0.000	0.000	0.000	1.3960	IN.
△	0.907	0.000	0.000	0.000	1.3330	IN.
□	1.001				1.3330	IN.
○	1.102				5.3990	IN.
▽	1.201				0.0000	IN.
					0.0000	IN.
					0.0034	

DATA HIST. CODE #ACCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



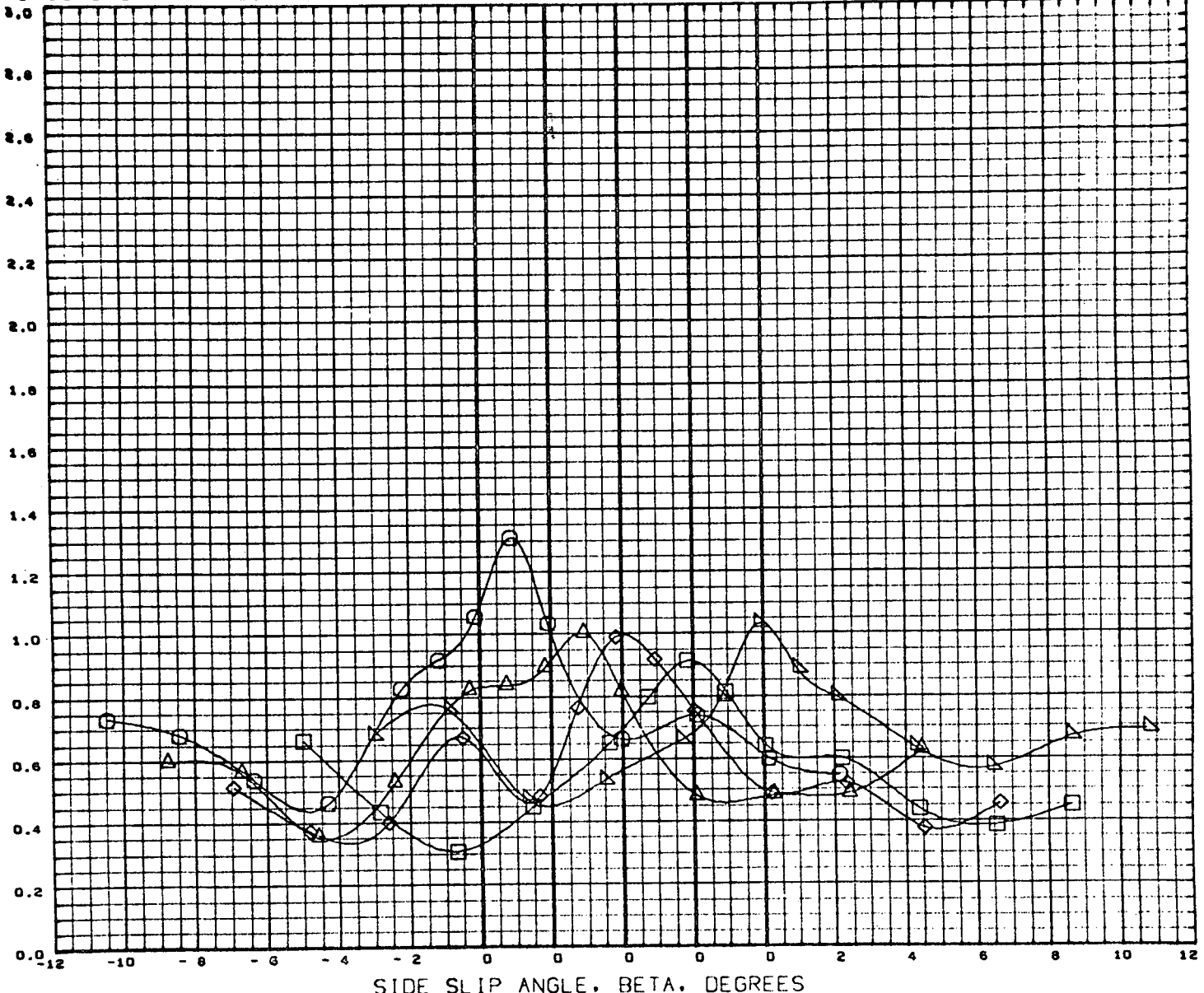
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.463	ALPHA	0.000	PHI	90.000
△	1.964	WINGINC	0.000		
◇	3.460				
□	4.950				

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	5.3990	in.
YMRP	0.0000	in.
ZMRP	0.0000	in.
SCALE	0.0034	

DATA HIST. CODE #ACCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

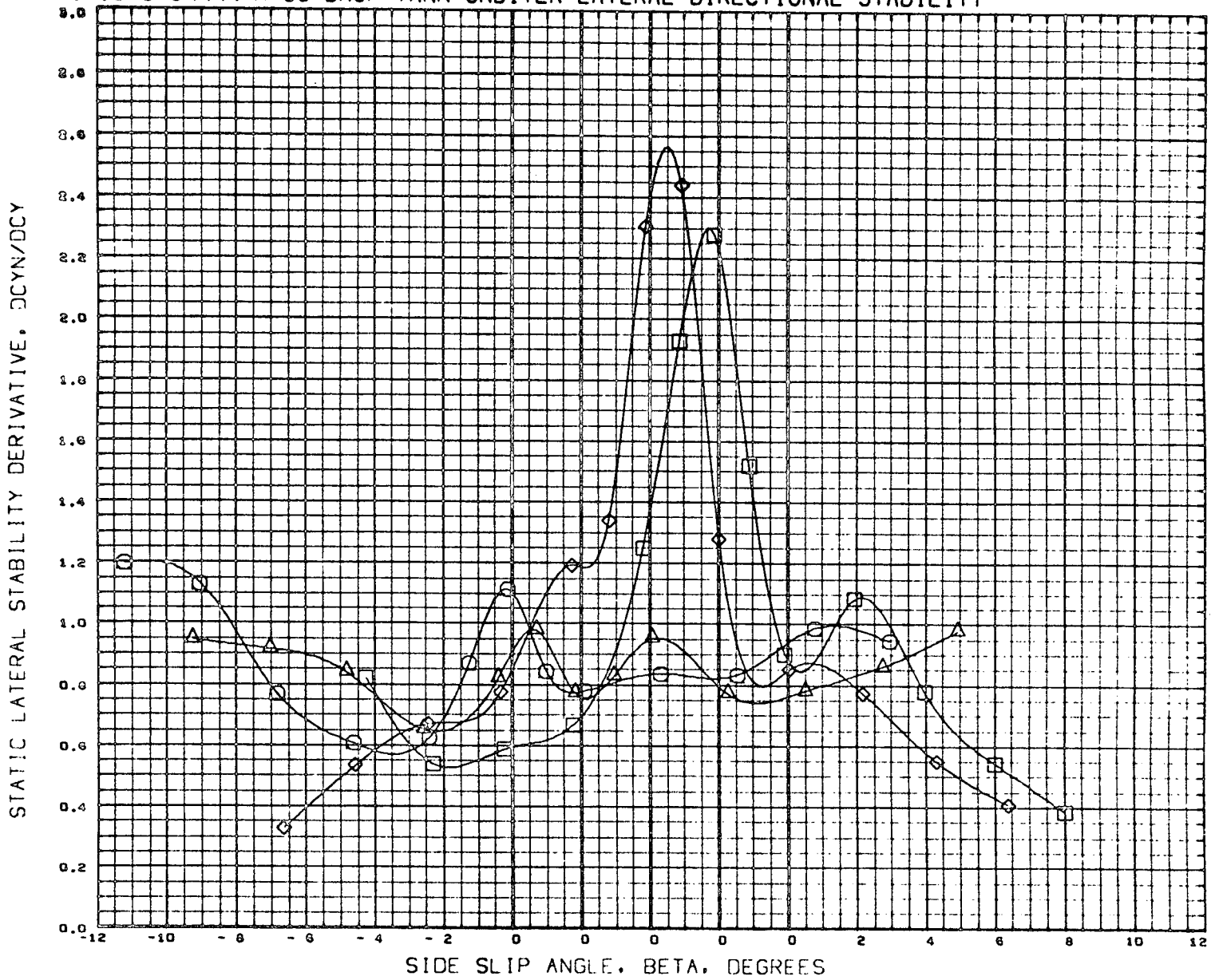
STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
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△	0.907	WNGINC	0.000			LREF	1.3330	IN.
◇	1.001					BREF	1.3330	IN.
□	1.102					XMRP	5.3990	IN.
×	1.201					YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE *ACCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

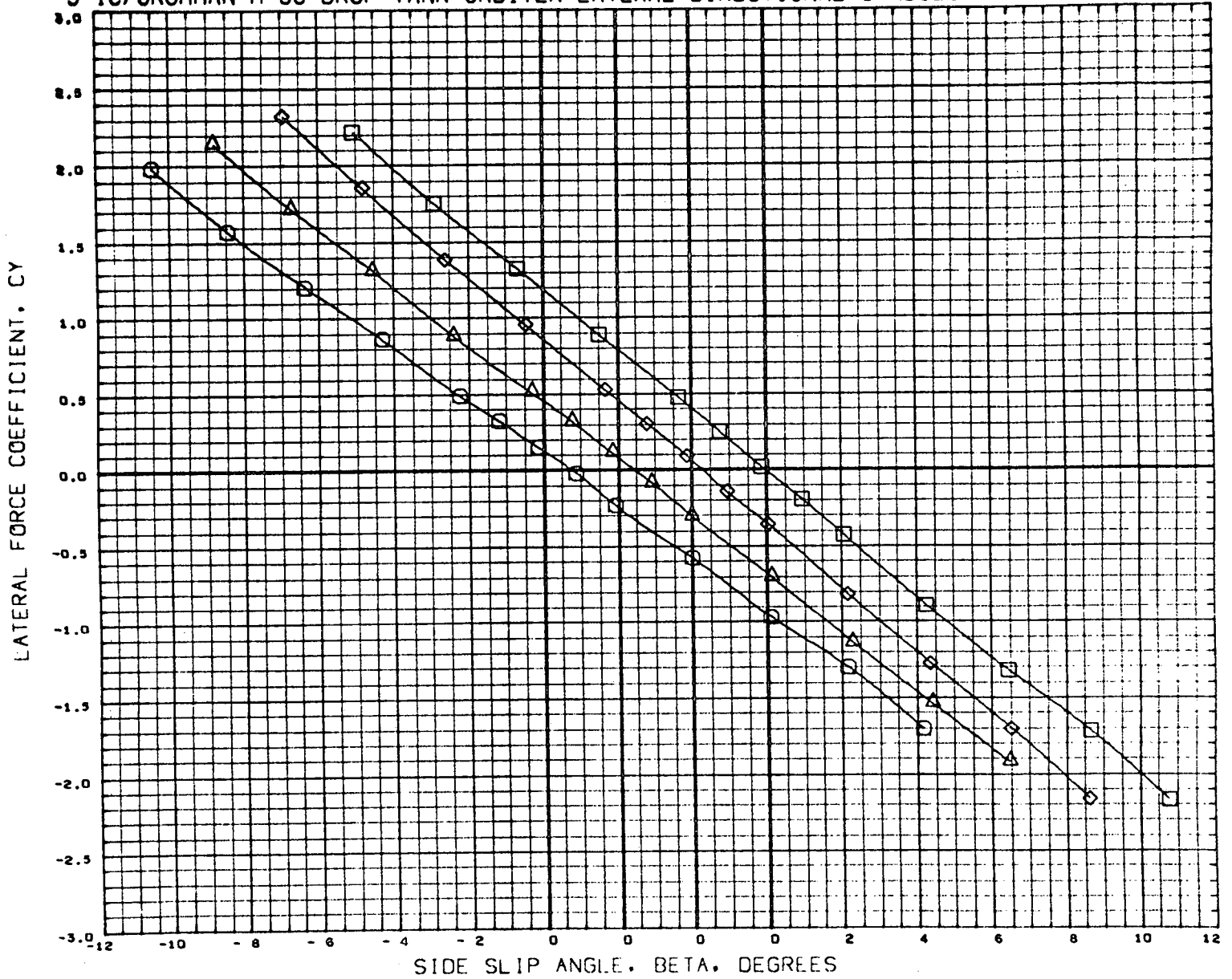


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.463	ALPHA	0.000	PHI	90.000
△	1.964	WNGINC	0.000		
◇	3.480				
□	4.959				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XM RP	5.3990	IN.
YM RP	0.0000	IN.
ZM RP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE #ACCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	ALPHA	WING IN	PARAMETRIC VALUES	PHI	90.000
○	0.596			0.000		
△	0.903			0.000		
◇	0.997					
□	1.200					

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

M502-MSEC-S1C H-33 ORBITER

OWVCBF1

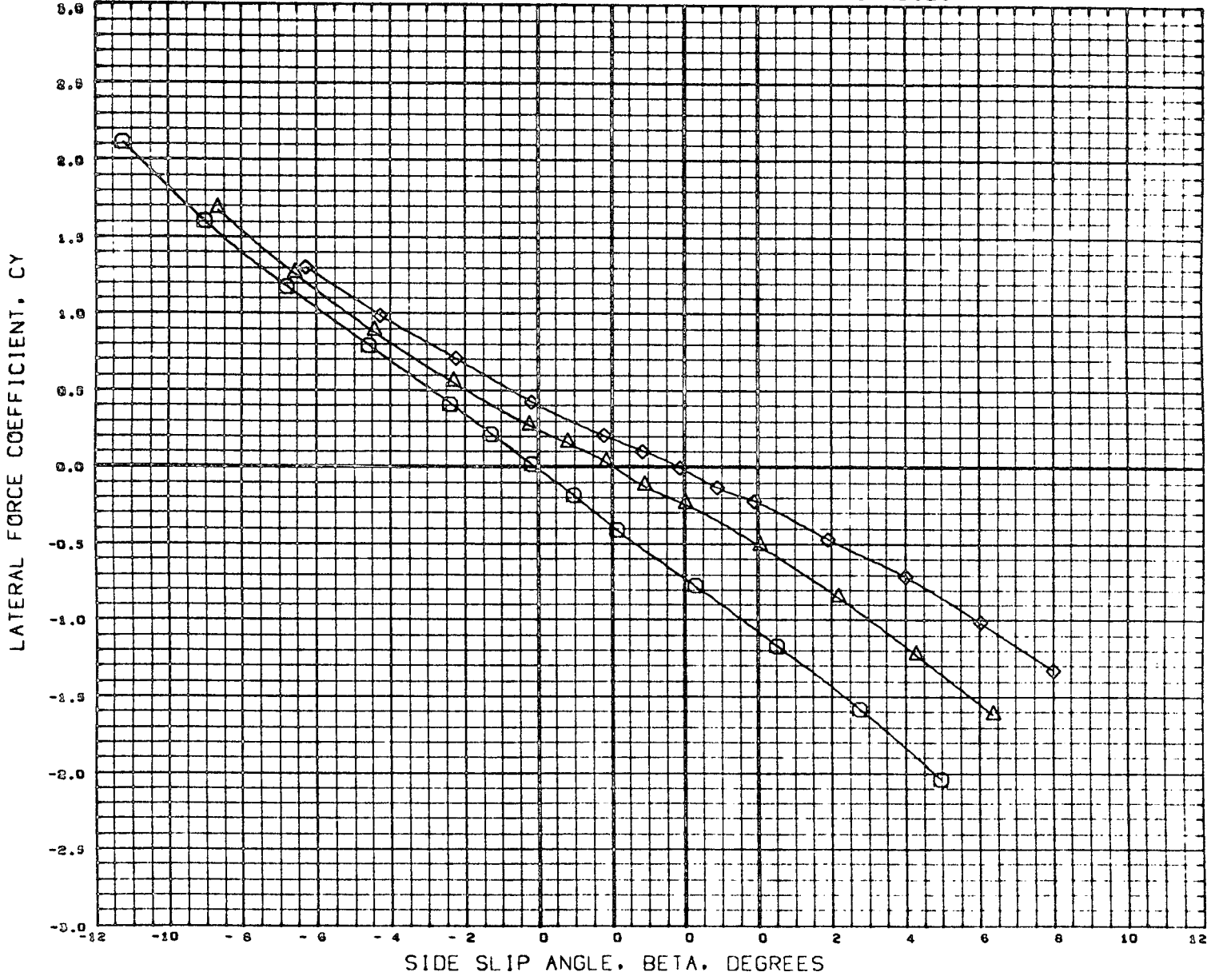
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

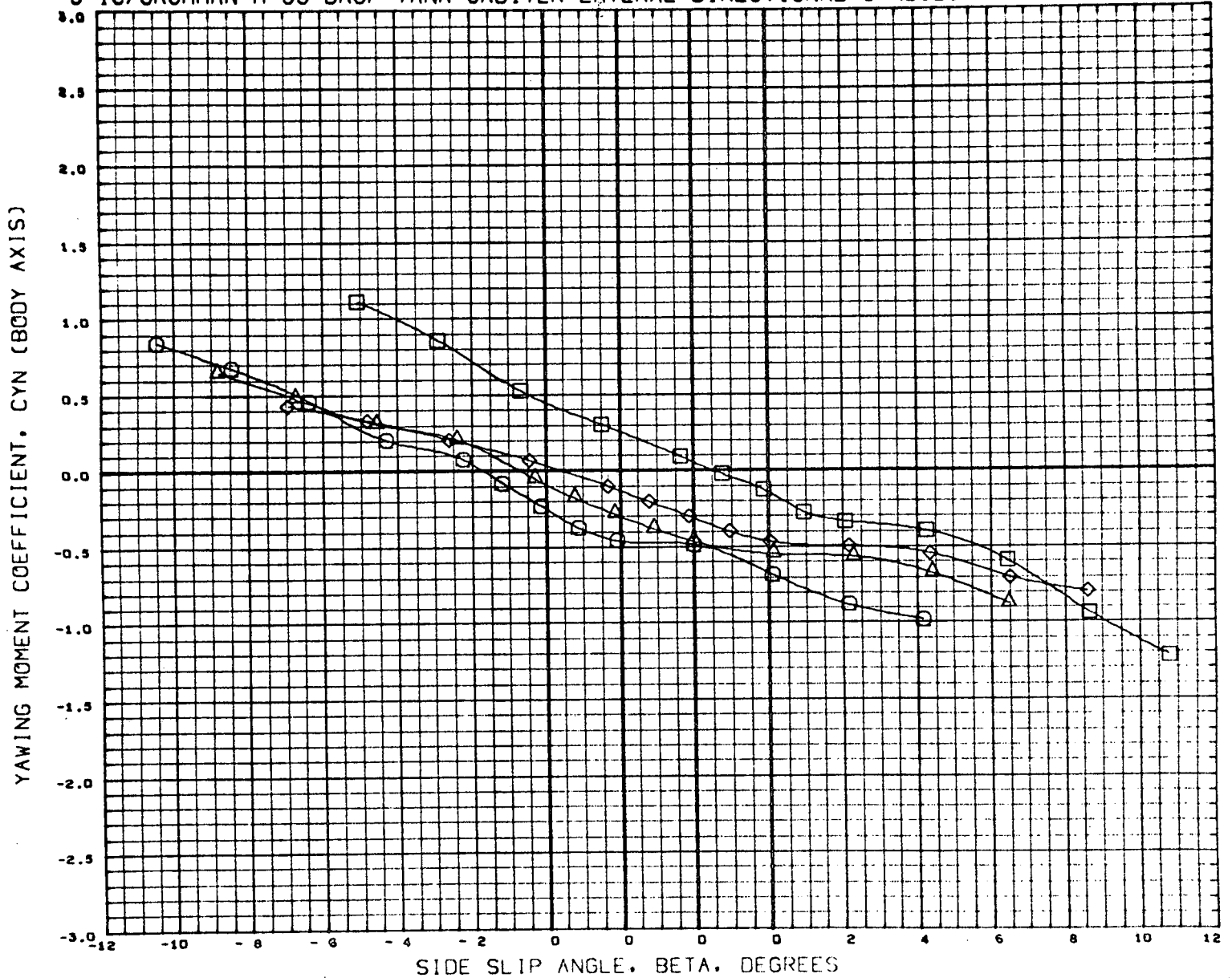


SYMBOL	MACH	PARAMETRIC VALUES		
○	1.964	ALPHA	0.000	PHI 90.000
△	3.480	WNGIN	0.000	
◇	4.999			

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

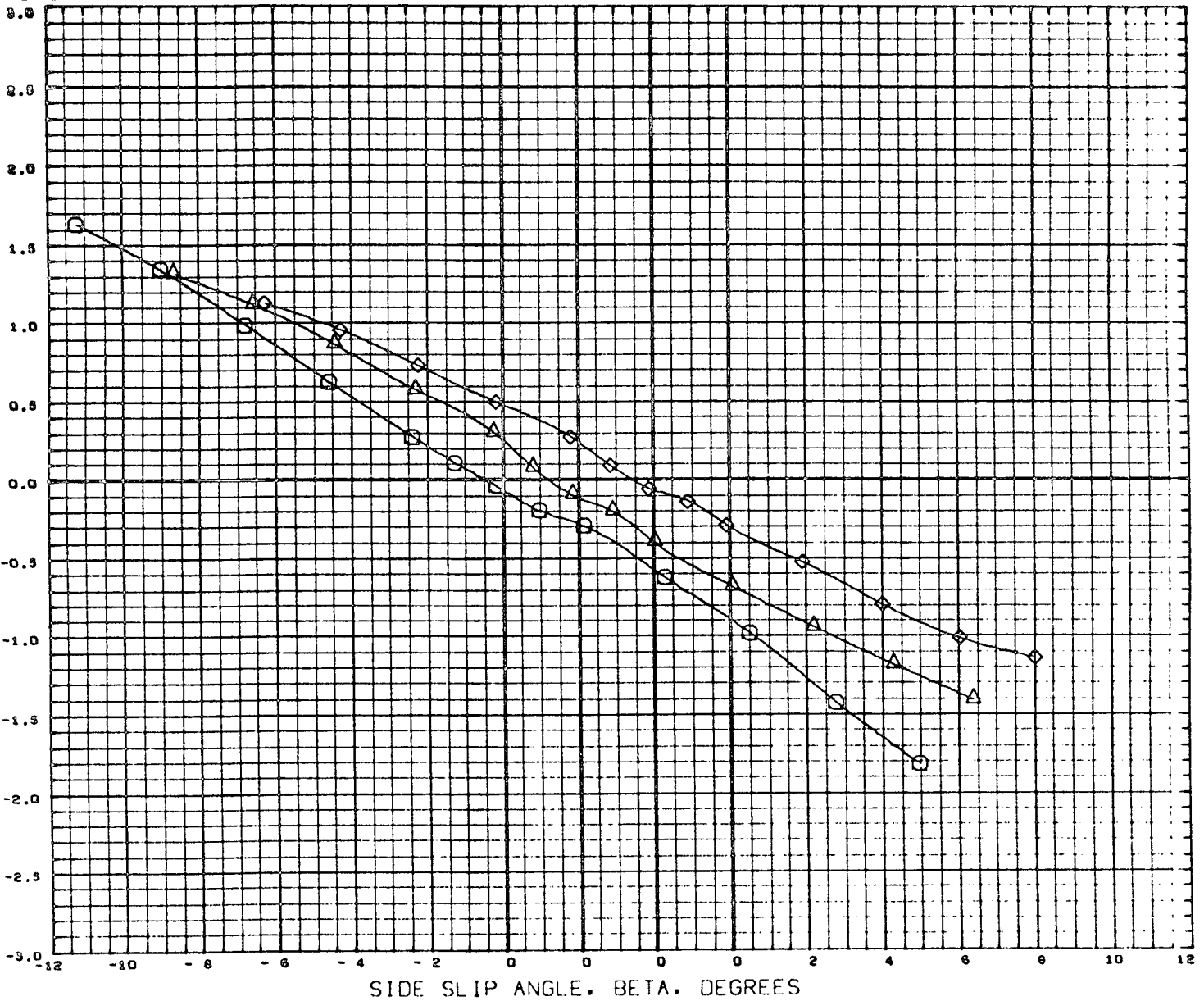
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL ○ △ ◇ □	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
	0.596	ALPHA	0.000	PHI	90.000	SREF	1.3960	50. IN.
	0.903	WINGIN	0.000			LREF	1.3330	IN.
	0.997					BREF	1.3330	IN.
1.200					XMRP	5.3990	IN.	
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

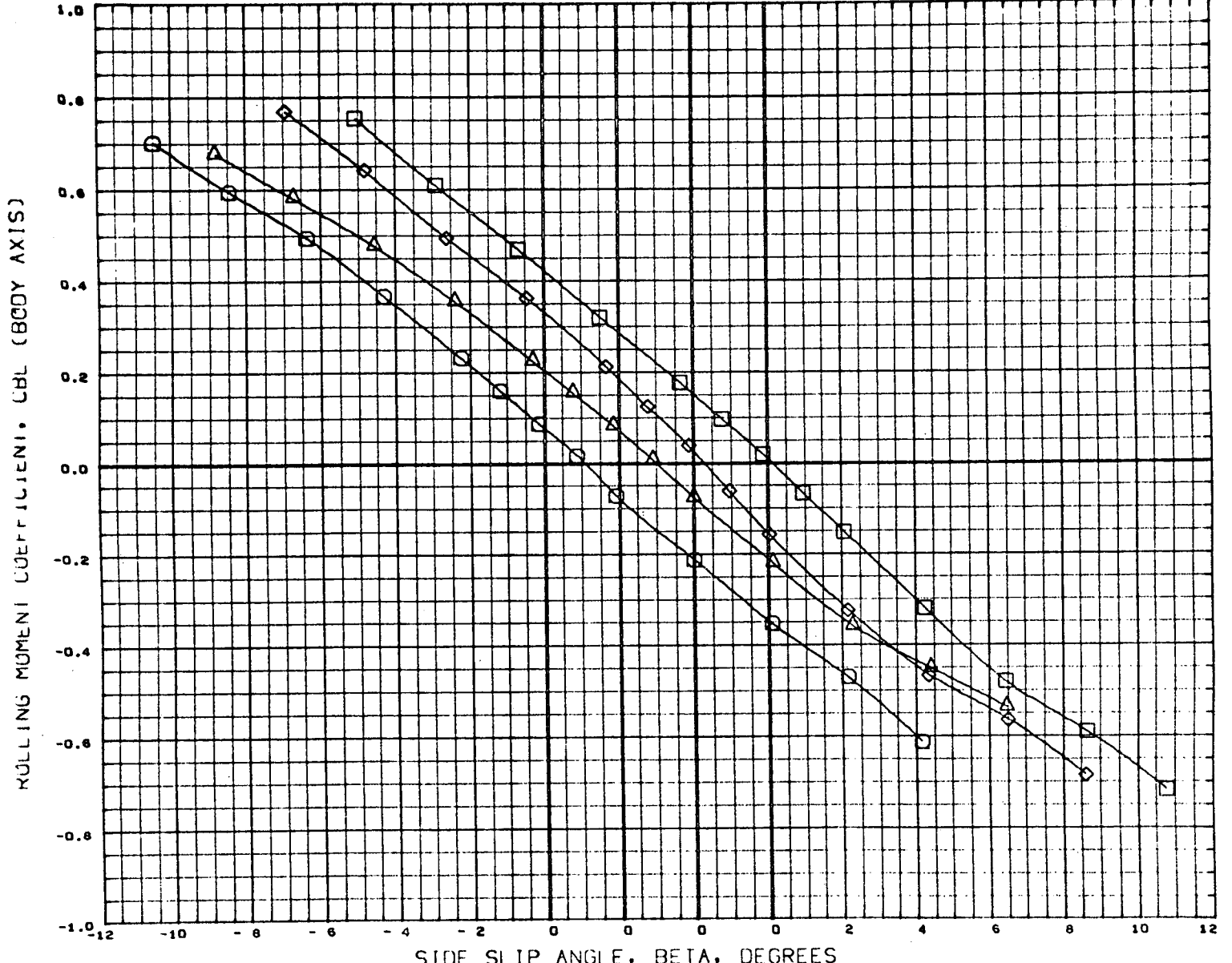


SYMBOL	MACH	PARAMETRIC VALUES		
○	1.964	ALPHA	0.000	PHI 90.000
△	3.480	WINGEN	0.000	
◇	4.959			

REFERENCE INFORMATION		
SREF	1.3960	SQ. FT.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



YMOOL	MACH	PARAMETRIC VALUES			
○	0.596	ALPHA	0.000	PHI	90.000
△	0.903	WNGIN	0.000		
◇	0.997				
□	1.200				

REFERENCE INFORMATION		
SREF	1.3960	59. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE : CCCC

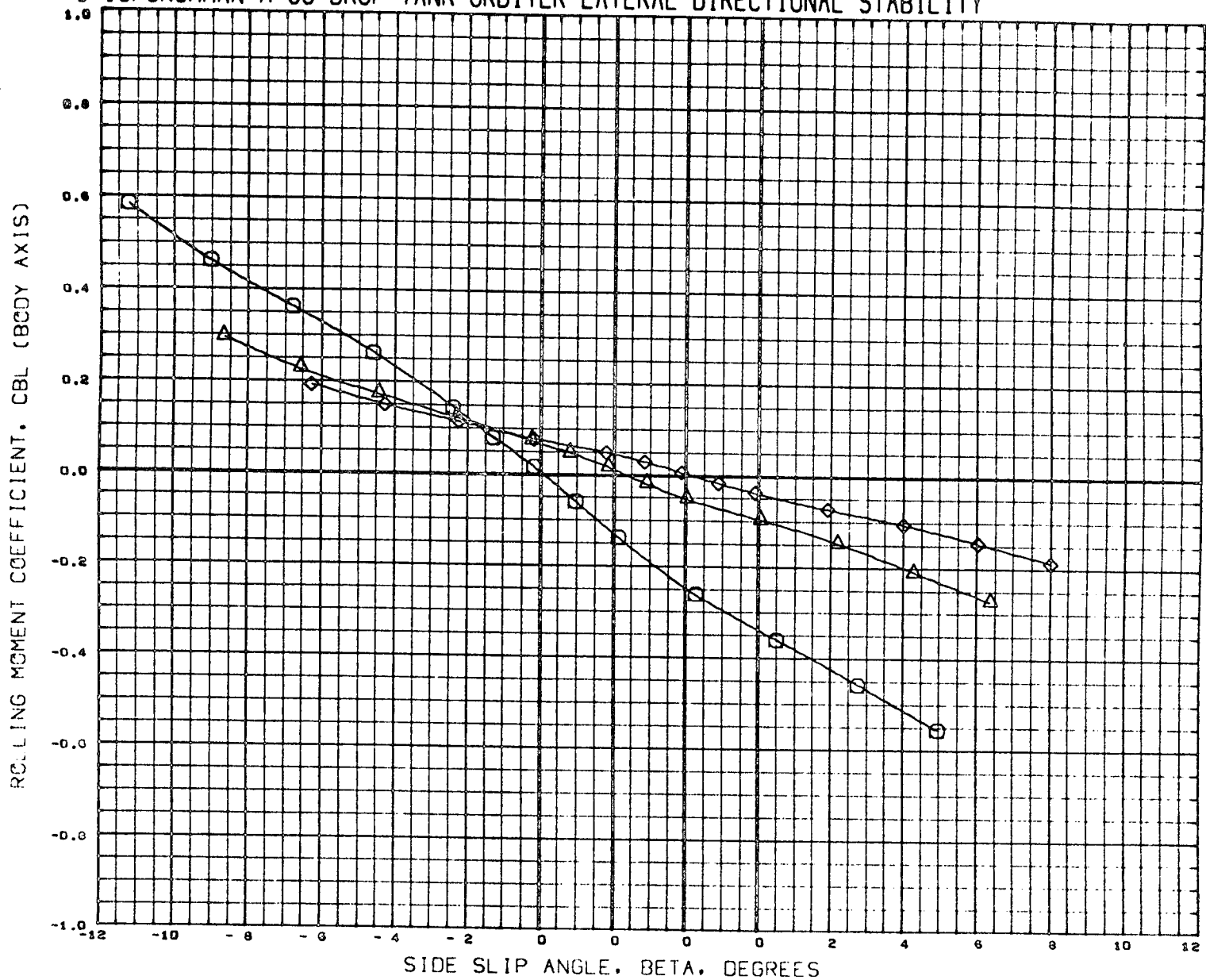
M502-MSFC-S1C H-33 ORBITER

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

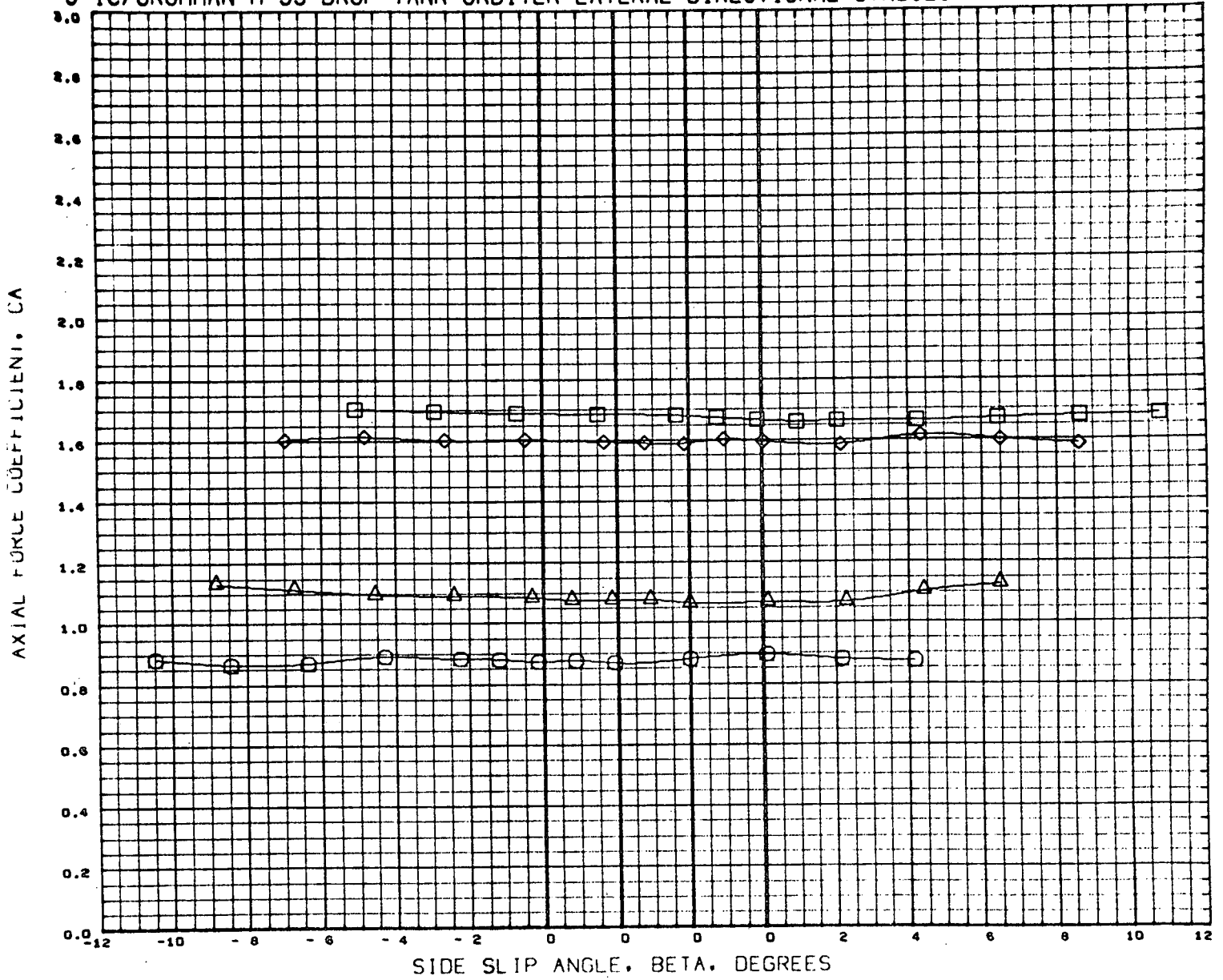


SYMBOL	MACH	PARAMETRIC VALUES			
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△	3.480	WNGIN	0.000		
◇	4.959				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

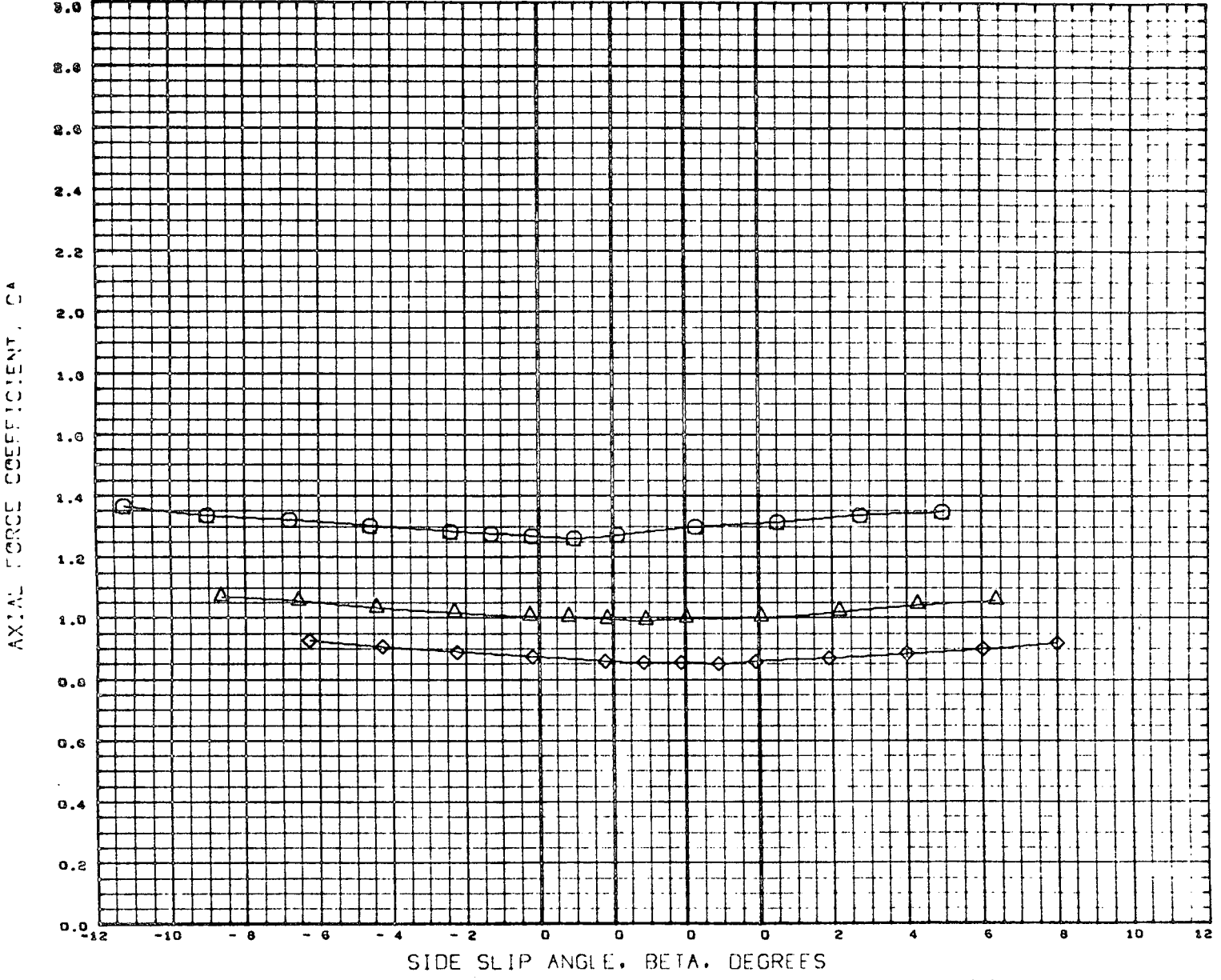
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL ○ △ ◇ □	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION	
	0.596	ALPHA	0.000	PHI	90.000	SREF 1.3960 SQ. IN.
	0.903	WINGIN	0.000			LREF 1.3330 IN.
	0.997					BREF 1.3330 IN.
1.200						XMRP 5.3990 IN.
						YMRP 0.0000 IN.
						ZMRP 0.0000 IN.
						SCALE 0.0034

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

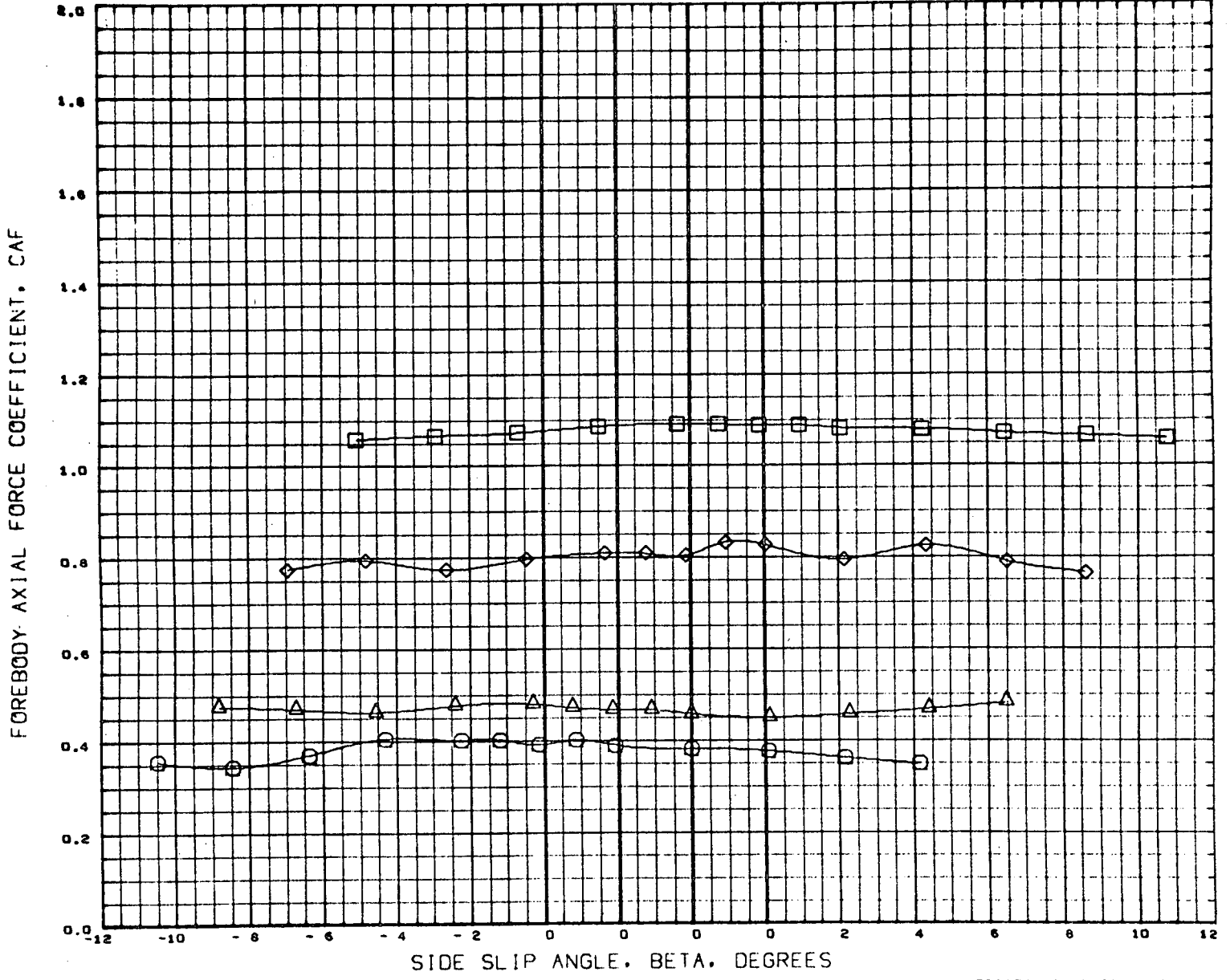


SYMBOL	MACH	PARAMETRIC VALUES		
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△	3.480	WNGIN	0.000	
◇	4.959			

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

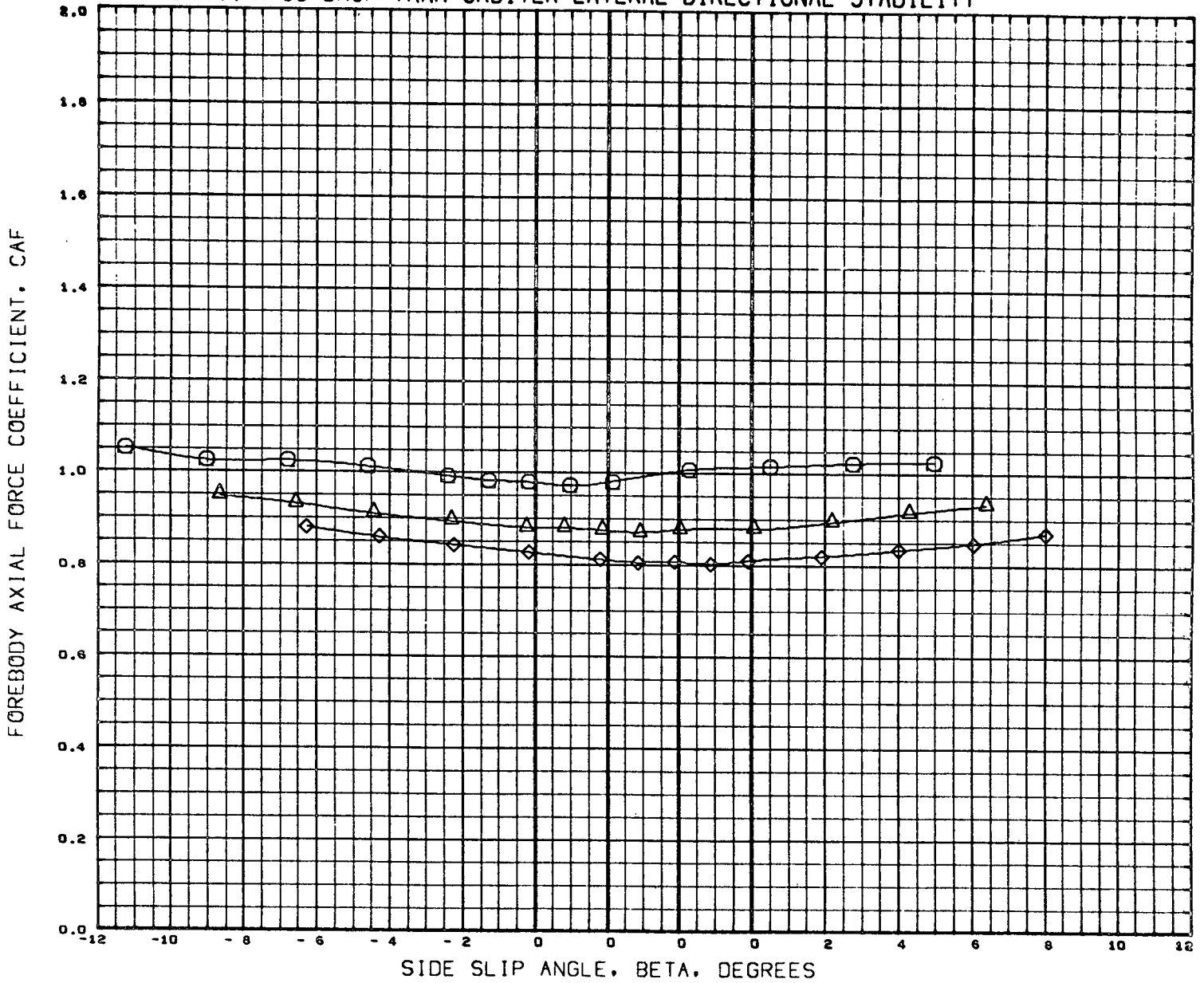
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES		REFERENCE INFORMATION				
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△	0.903	WNGIN	0.000			LREF	1.3330	IN.
◇	0.997					BREF	1.3330	IN.
□	1.200					XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES
○	1.964	ALPHA 0.000 PHI 90.000
△	3.480	WNGIN 0.000
◇	4.959	

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	5.3990	in.
YMRP	0.0000	in.
ZMRP	0.0000	in.
SCALE	0.0034	

DATA HIST. CODE CCCGC

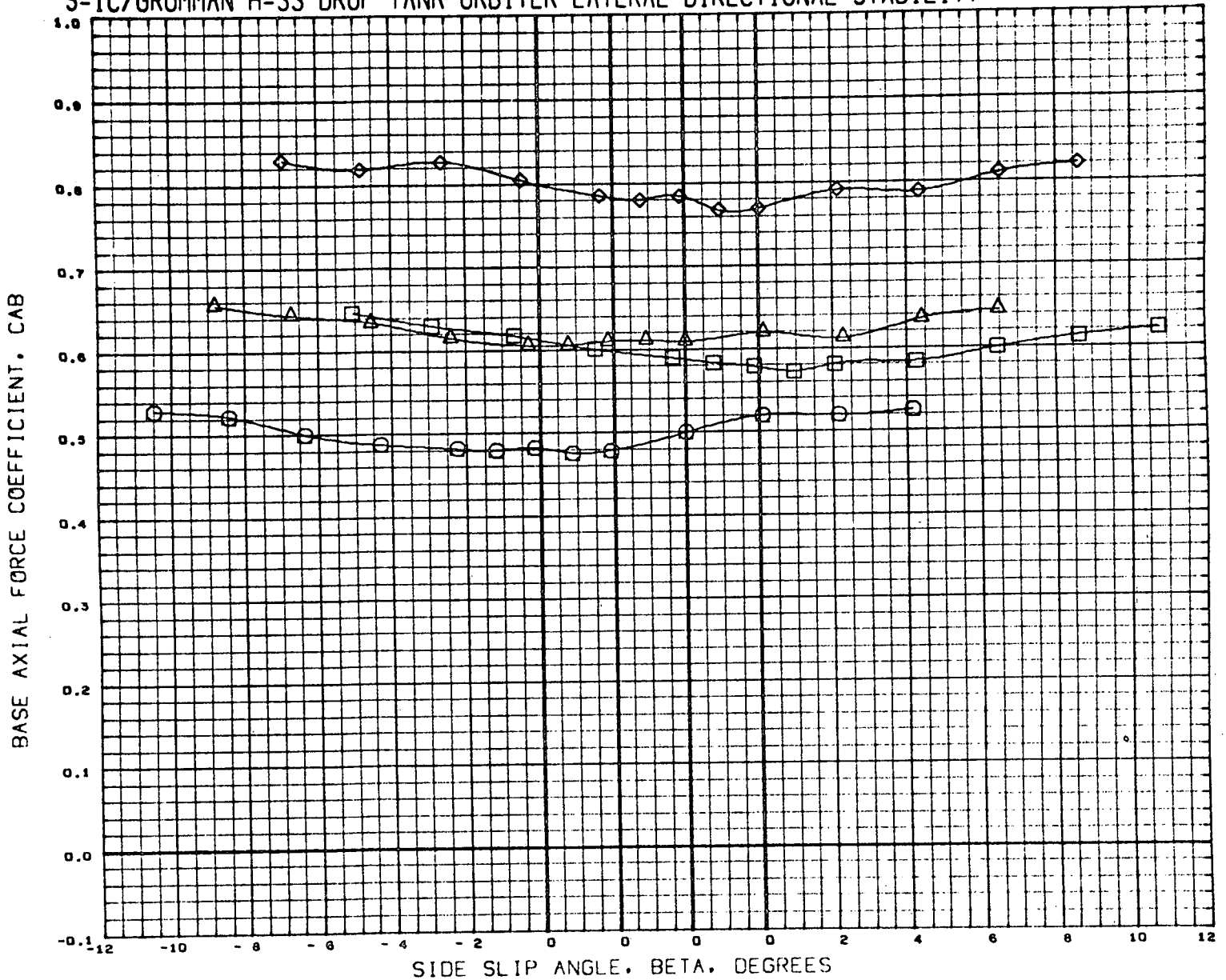
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES		
○	0.596	ALPHA	0.000	PHI 90.000
△	0.903	WNGIN	0.000	
◇	0.997			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

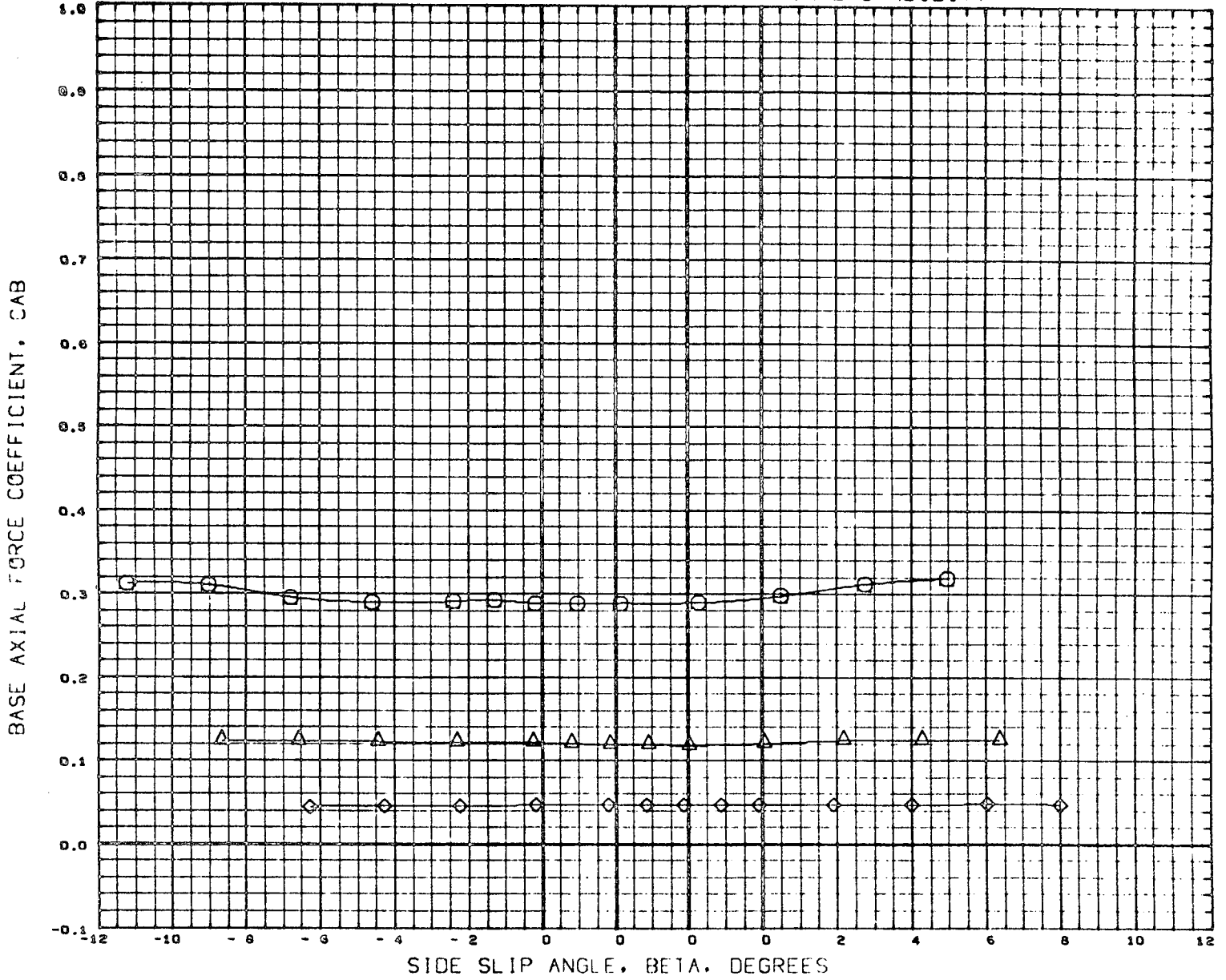
M502-MSFC-S1C H-33 ORBITER

OWVCBF1

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



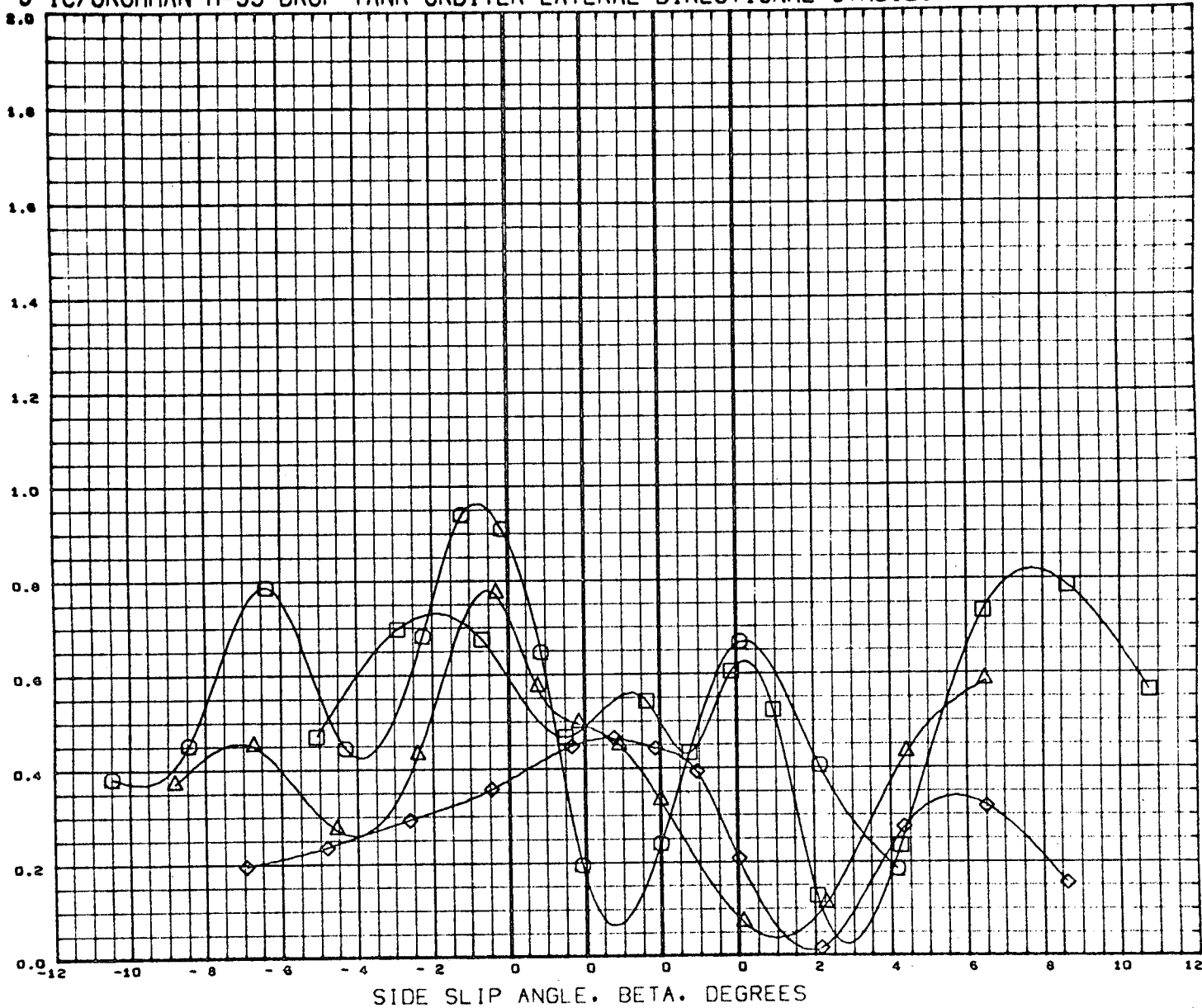
SYMBOL	MACH	PARAMETRIC VALUES		
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◇	4.950			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA MIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.596	ALPHA	0.000	PHI	90.000
△	0.903	WNGIN	0.000		
◇	0.997				
□	1.200				

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

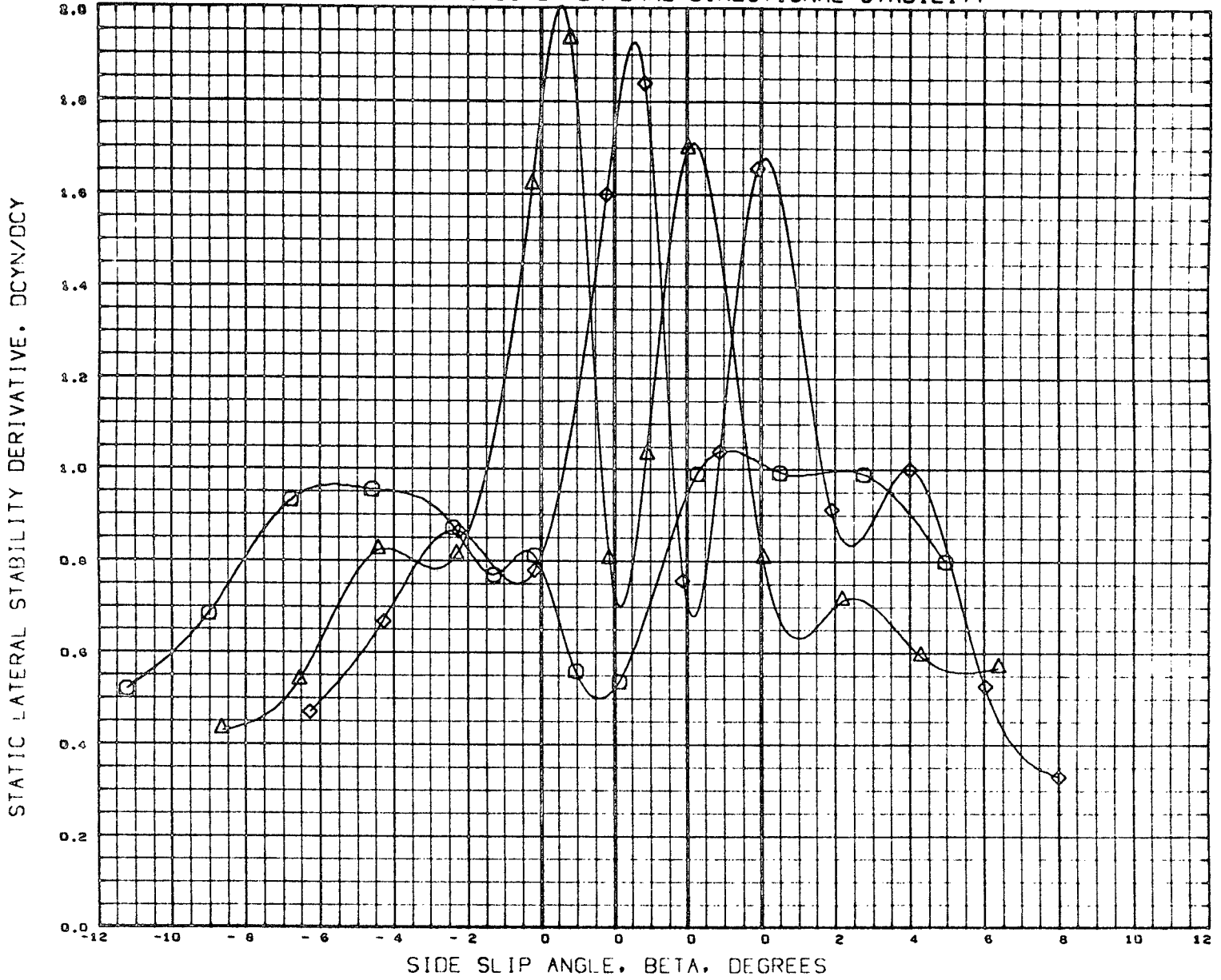
M502-MSFC-S1C H-33 ORBITER

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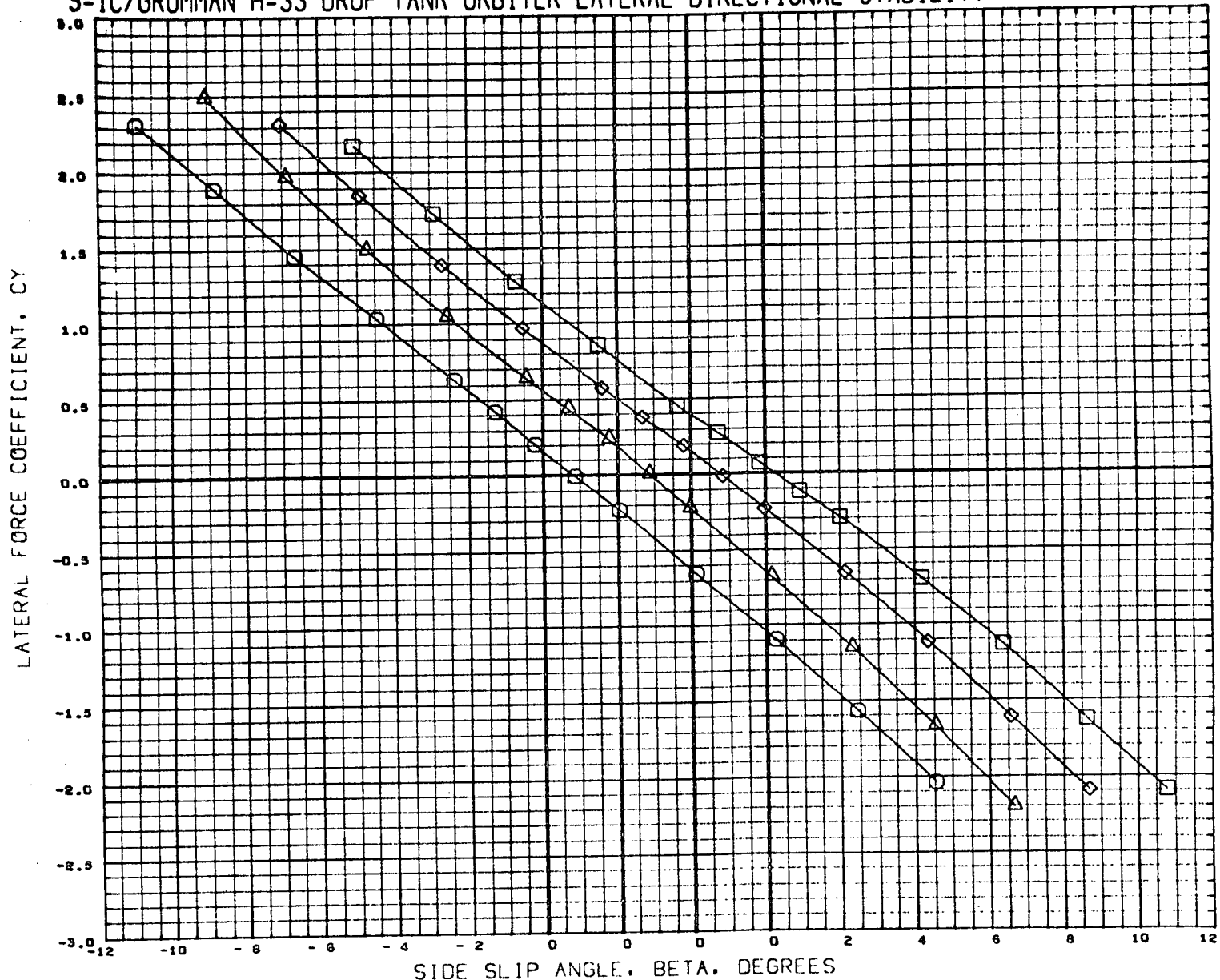
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES		REFERENCE INFORMATION				
○	1.964	ALPHA	0.000	PHI	90.000	SREF	1.3960	sq. IN.
△	3.480	WRIGIN	0.000			LREF	1.3330	IN.
◇	4.959					BREF	1.3330	IN.
						XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

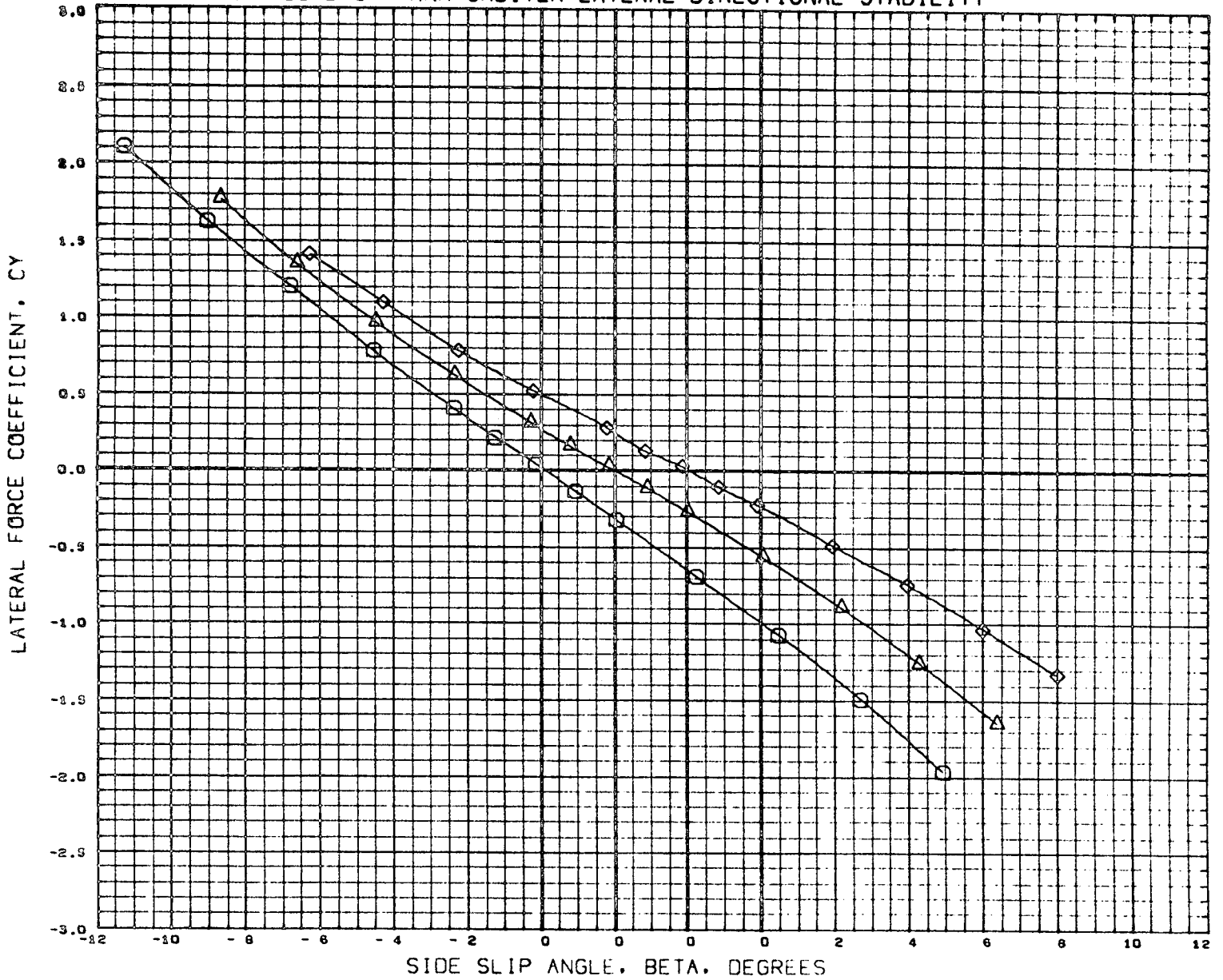


SYMBOL	MACH	ALPHA	WINGIN	PARAMETRIC VALUES	PHI
○	0.901			0.000	90.000
△	1.004			0.000	
◇	1.102				
□	1.199				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRF	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
○	1.985		0.000	PHI 90.000
△	3.480	WIGIN	0.000	
◇	4.959			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

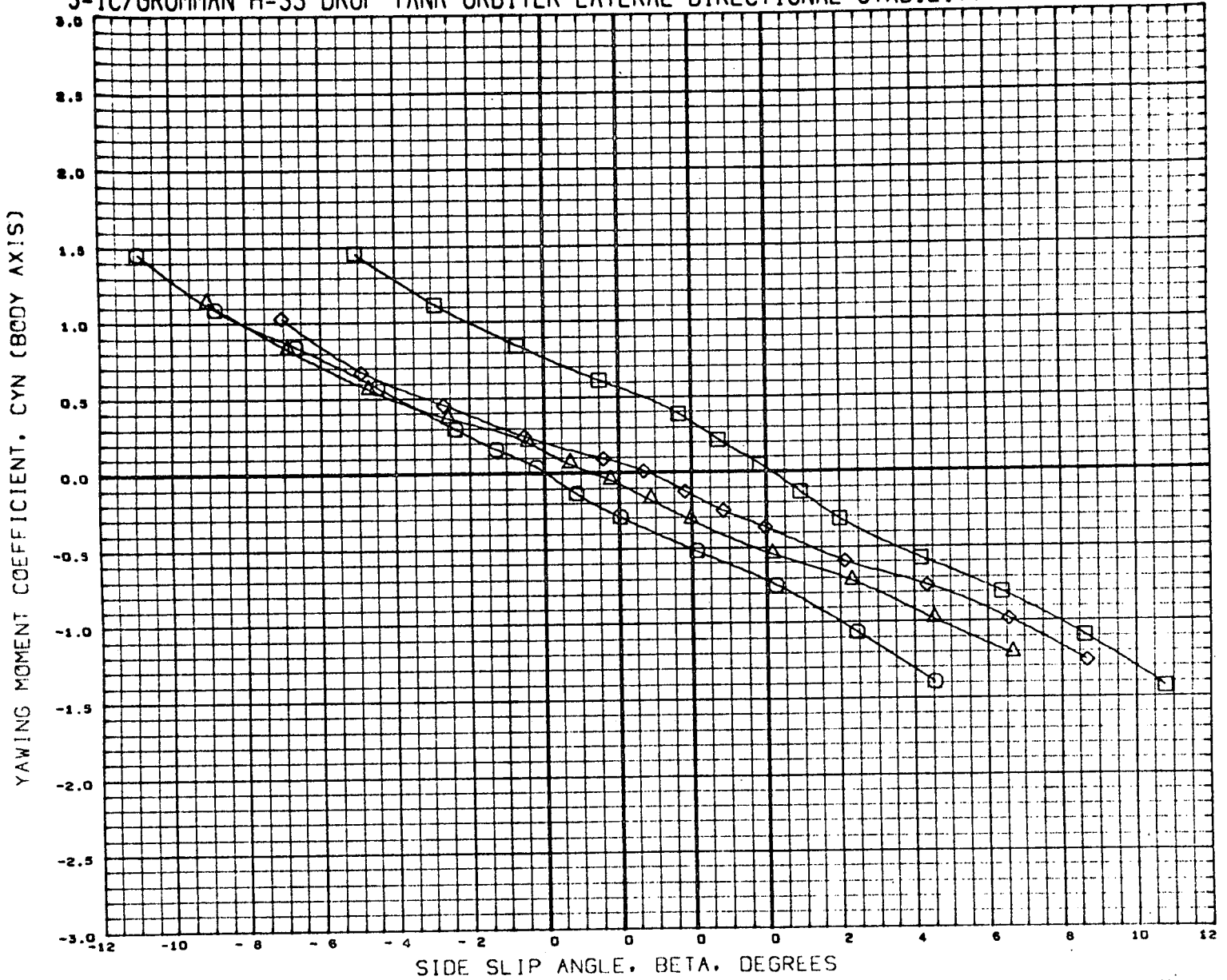
M502-MSFC-S1C H-33 ORBITER

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

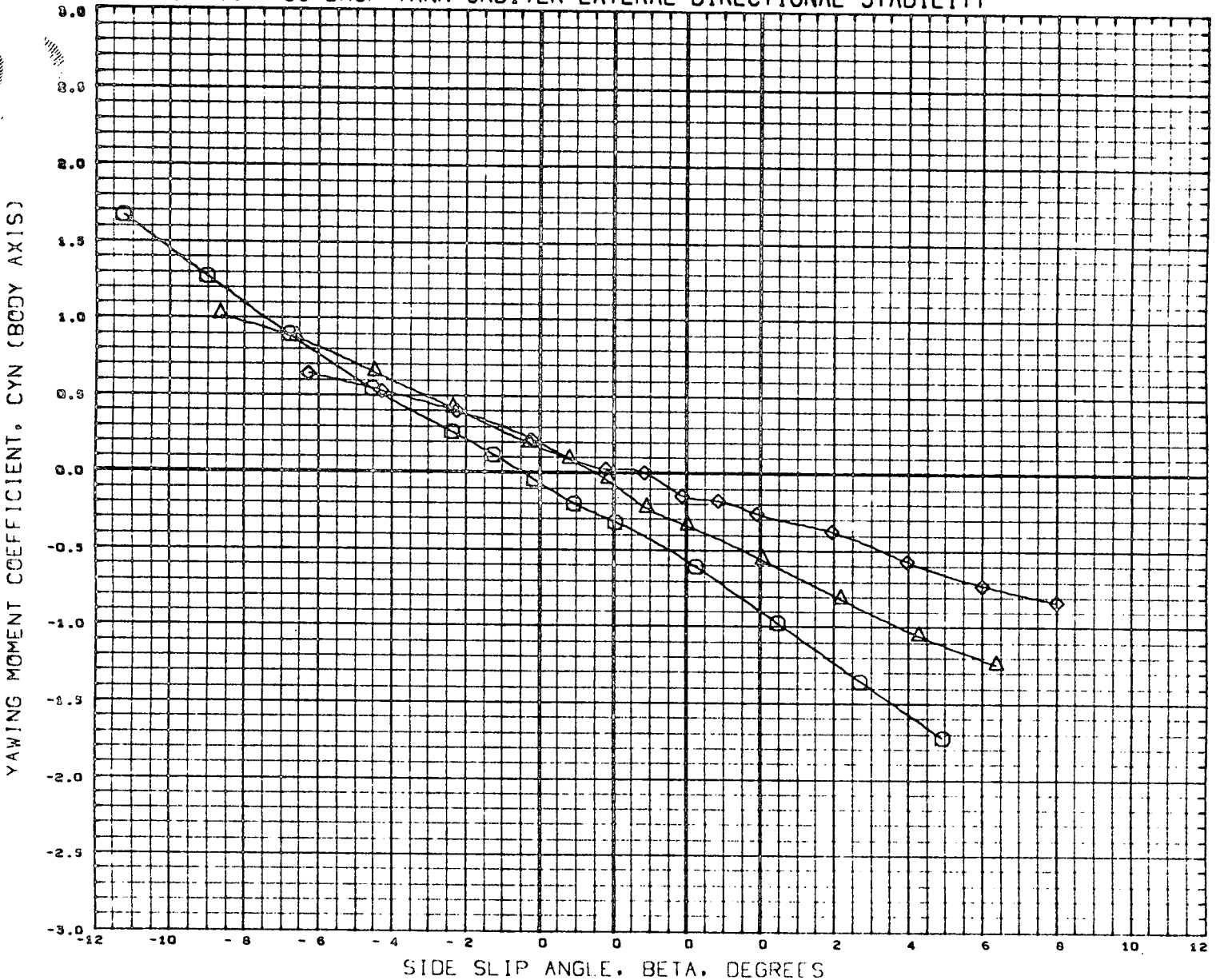


SYMBOL	MACH	PARAMETRIC VALUES		
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△	1.004	WNGIN	0.000	
◇	1.102			
□	1.199			

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



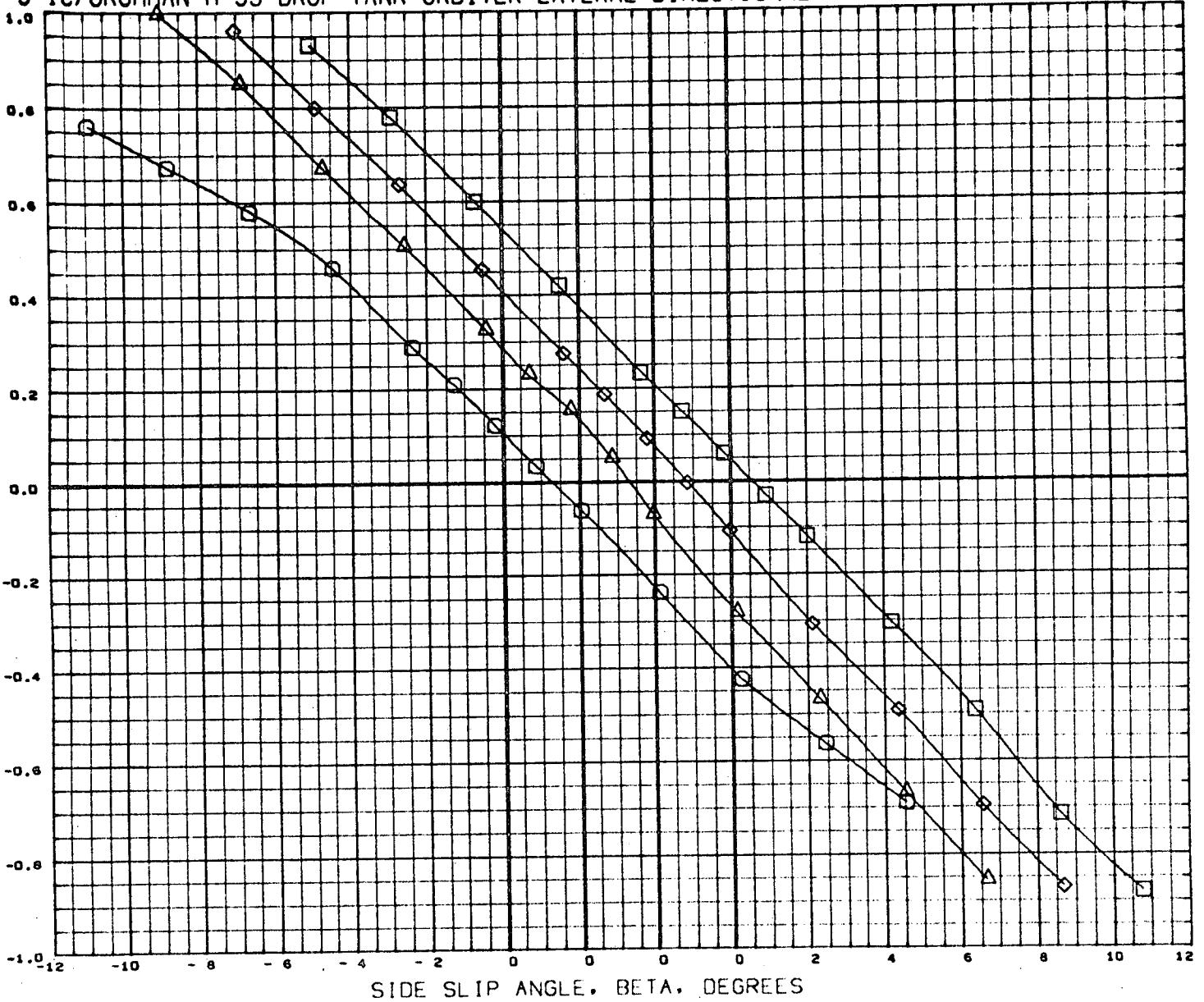
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◇	4.959			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC6C

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

ROLLING MOMENT COEFFICIENT, CBL (BODY AXIS)



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.901	ALPHA	0.000	PHI	90.000
△	1.004	WNGIN	0.000		
◇	1.102				
□	1.199				

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

M502-MSFC-SIC H-33 ORBITER

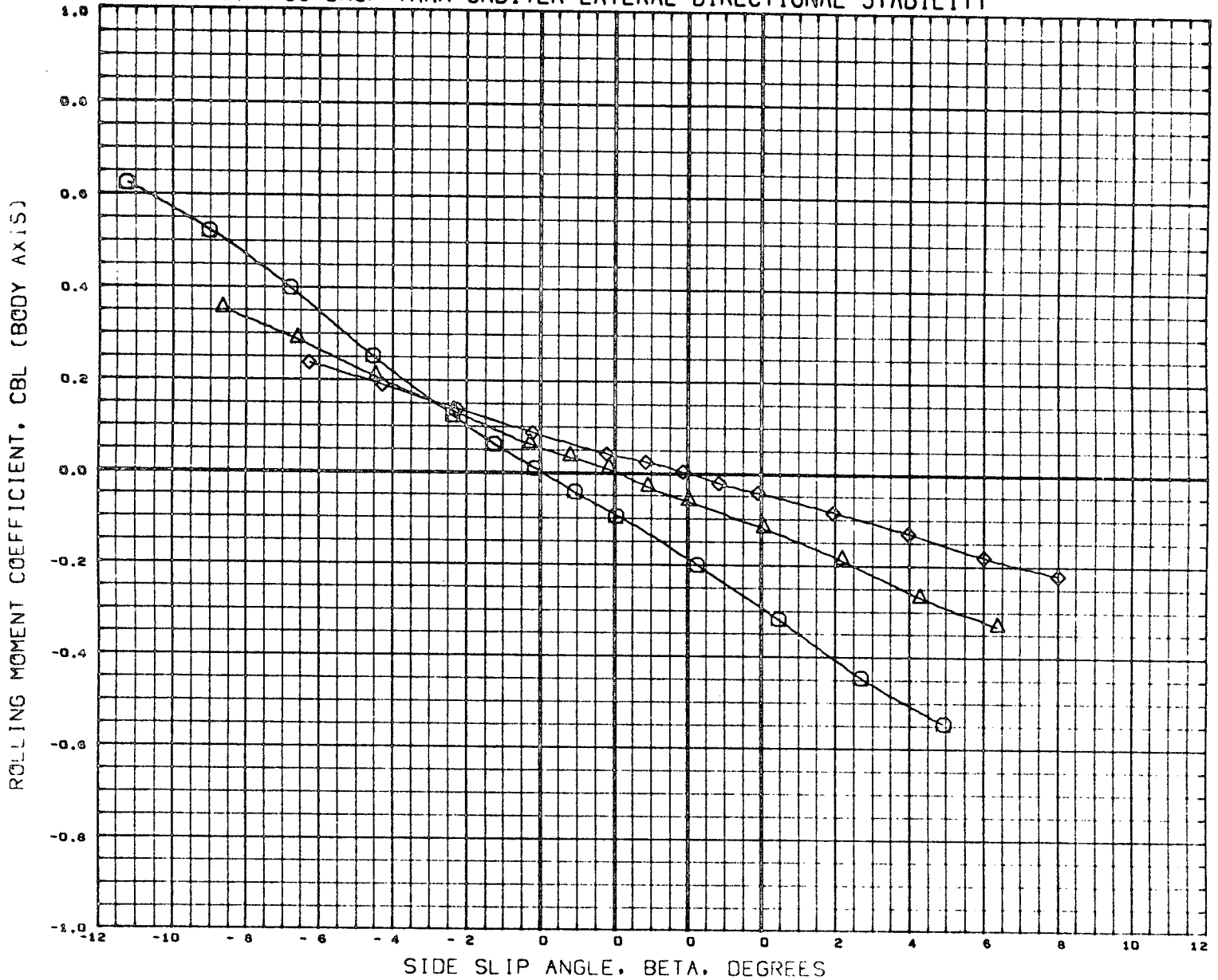
OWVTBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
○	1.965	0.000	PHI	90.000
△	3.480	0.000	WINGIN	
◇	4.959			

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

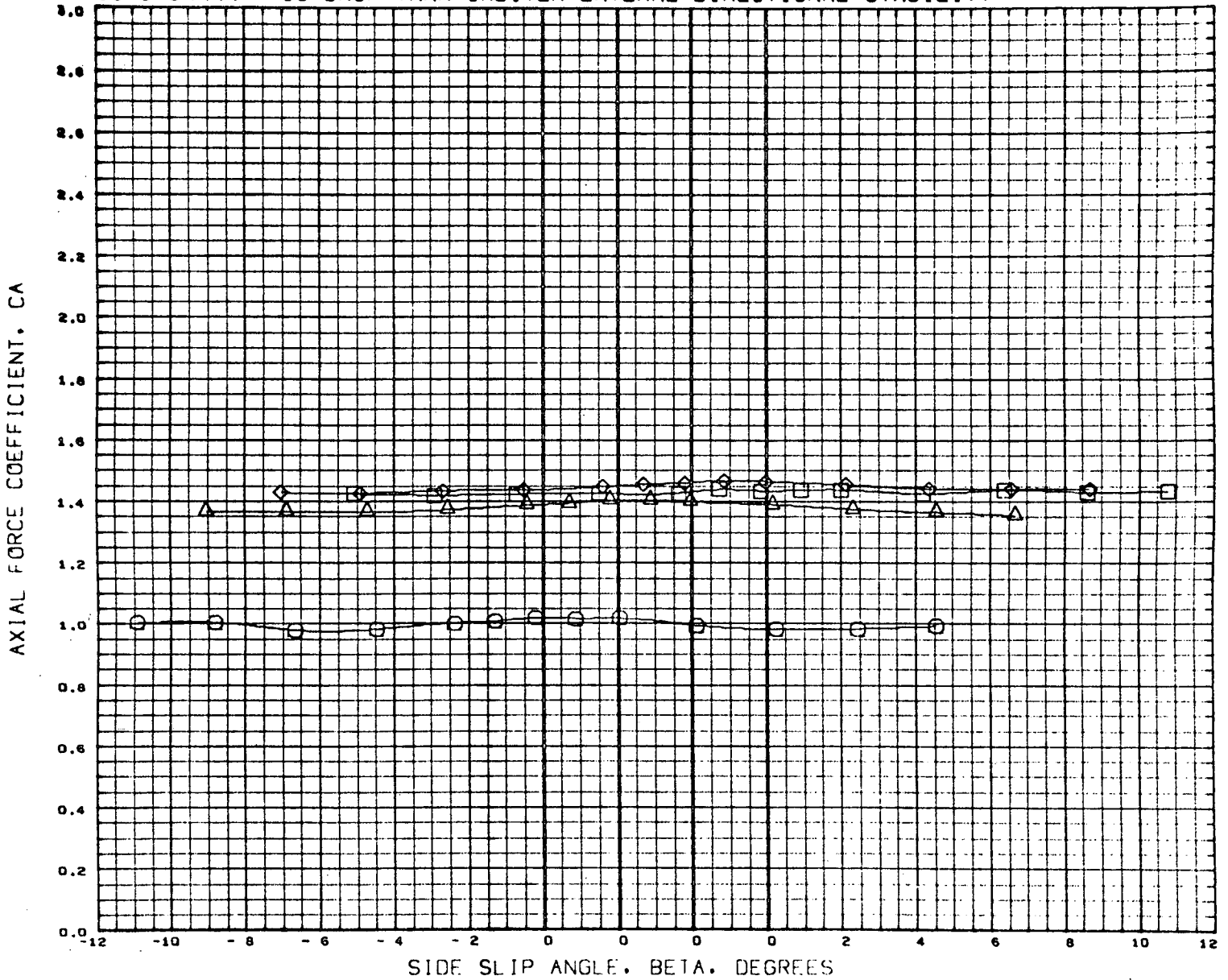
M502-MSFC-S1C H-33 ORBITER

OWVTBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

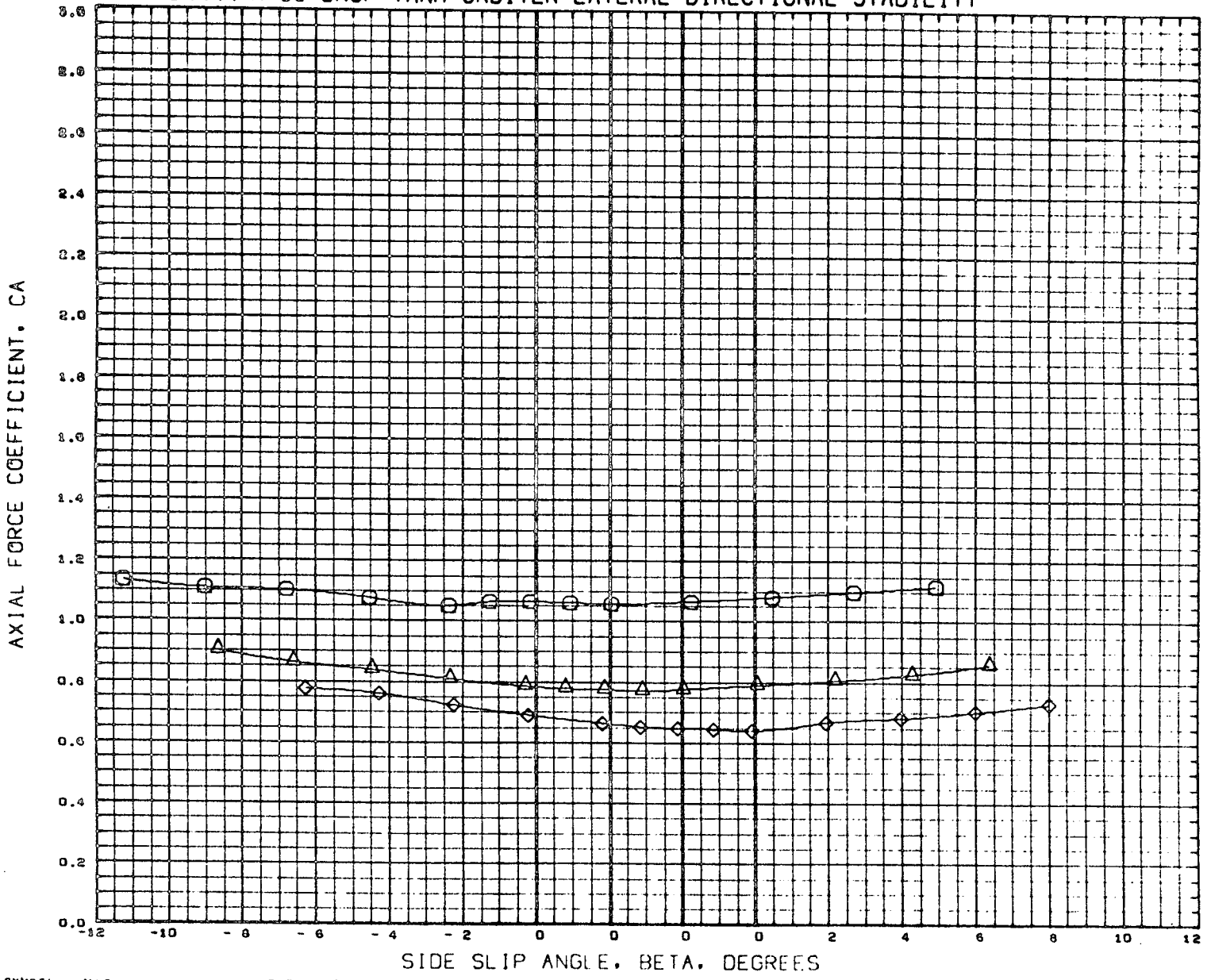


SYMBOL	MACH	PARAMETRIC VALUES		
		ALPHA	PHI	90.000
○	0.901	0.000	0.000	
△	1.004	0.000	0.000	
◇	1.102			
□	1.199			

REFERENCE INFORMATION		
SREF	1.3960	SO. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

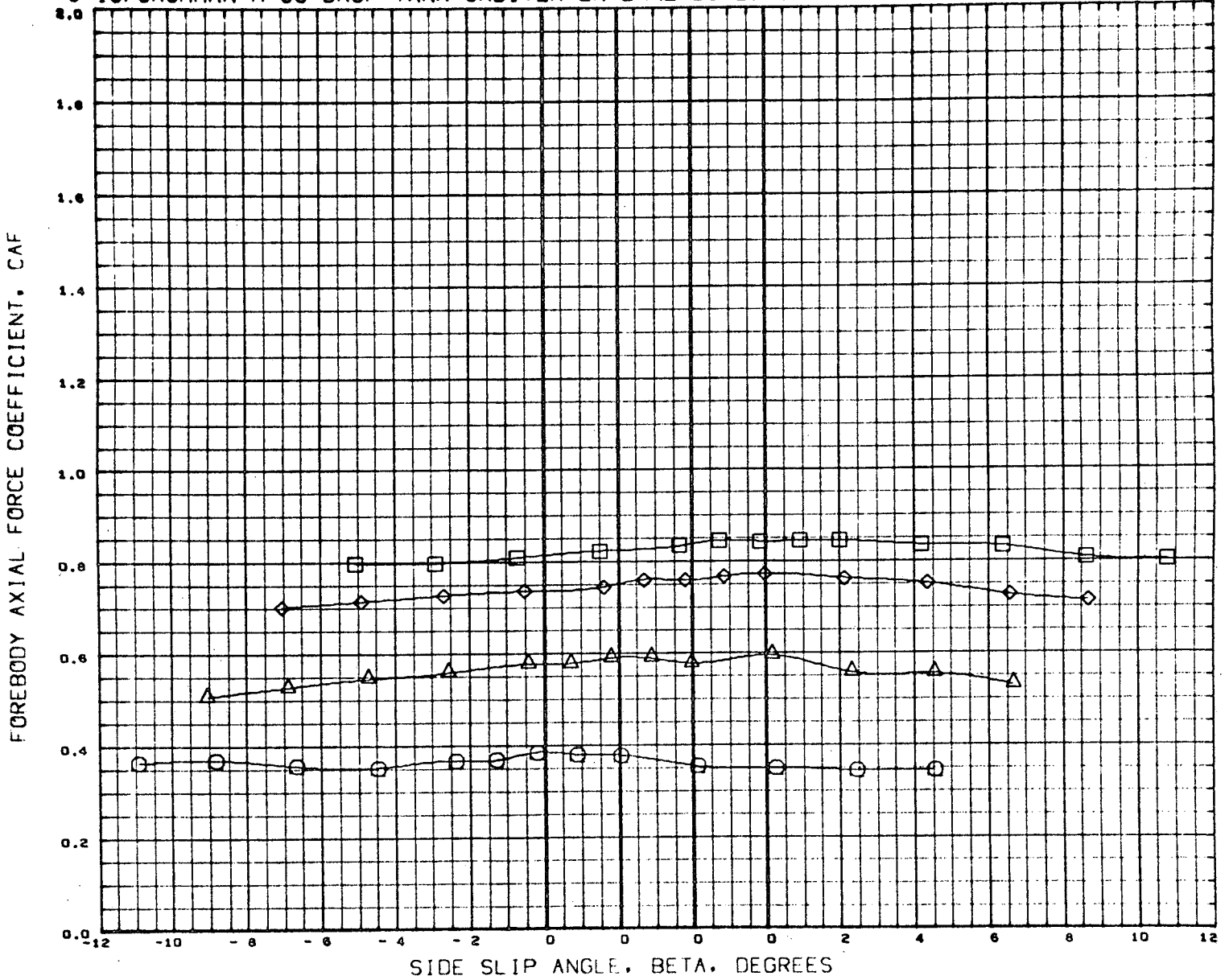


SYMBOL	MACH	PARAMETRIC VALUES		
○	1.965	ALPHA	0.000	PHI 90.000
△	3.460	WINGIN	0.000	
◇	4.959			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

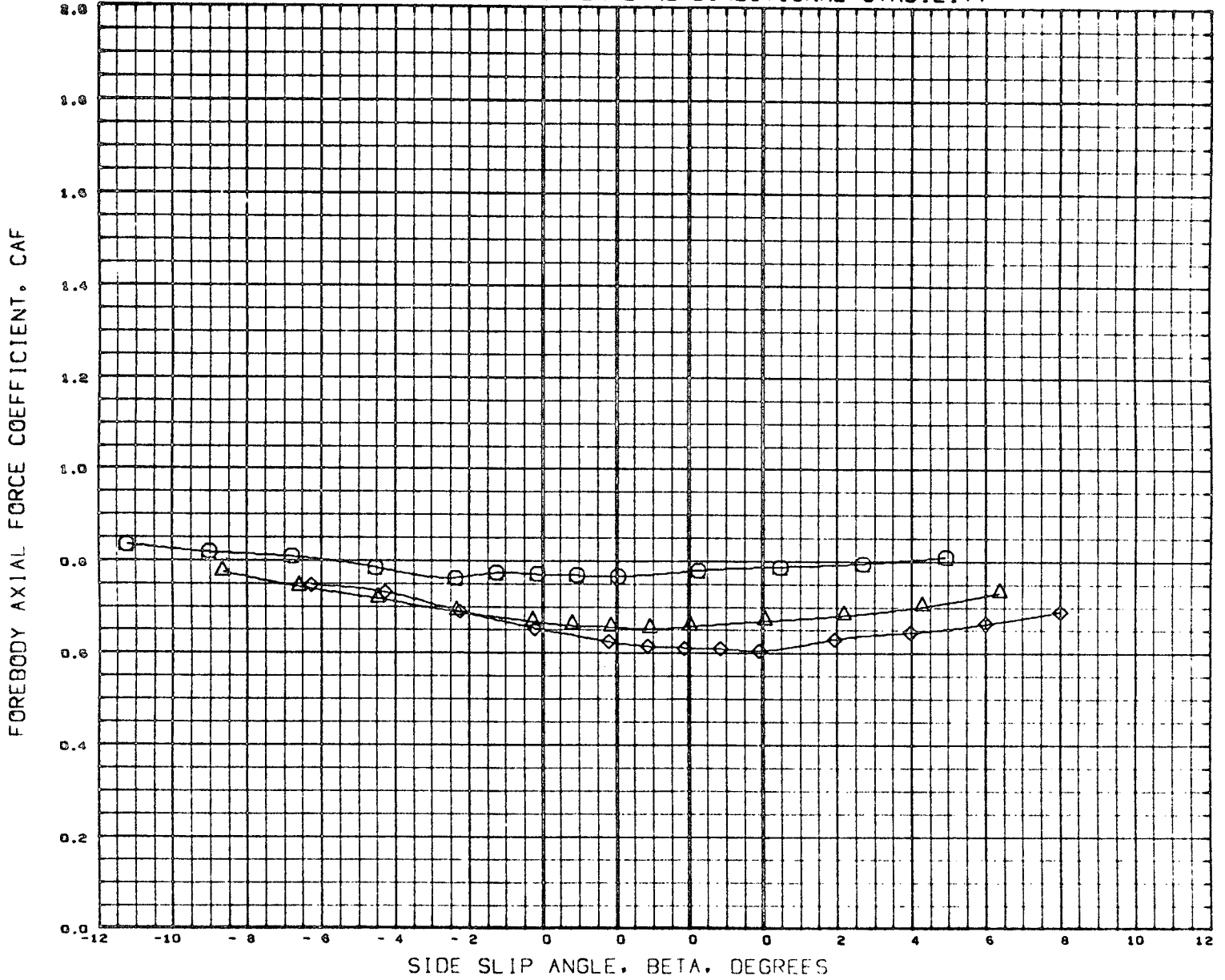


SYMBOL	MACH	PARAMETRIC VALUES		
○	0.901	ALPHA	0.000	PHI 90.000
△	1.004	WNGIN	0.000	
◇	1.102			
□	1.199			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

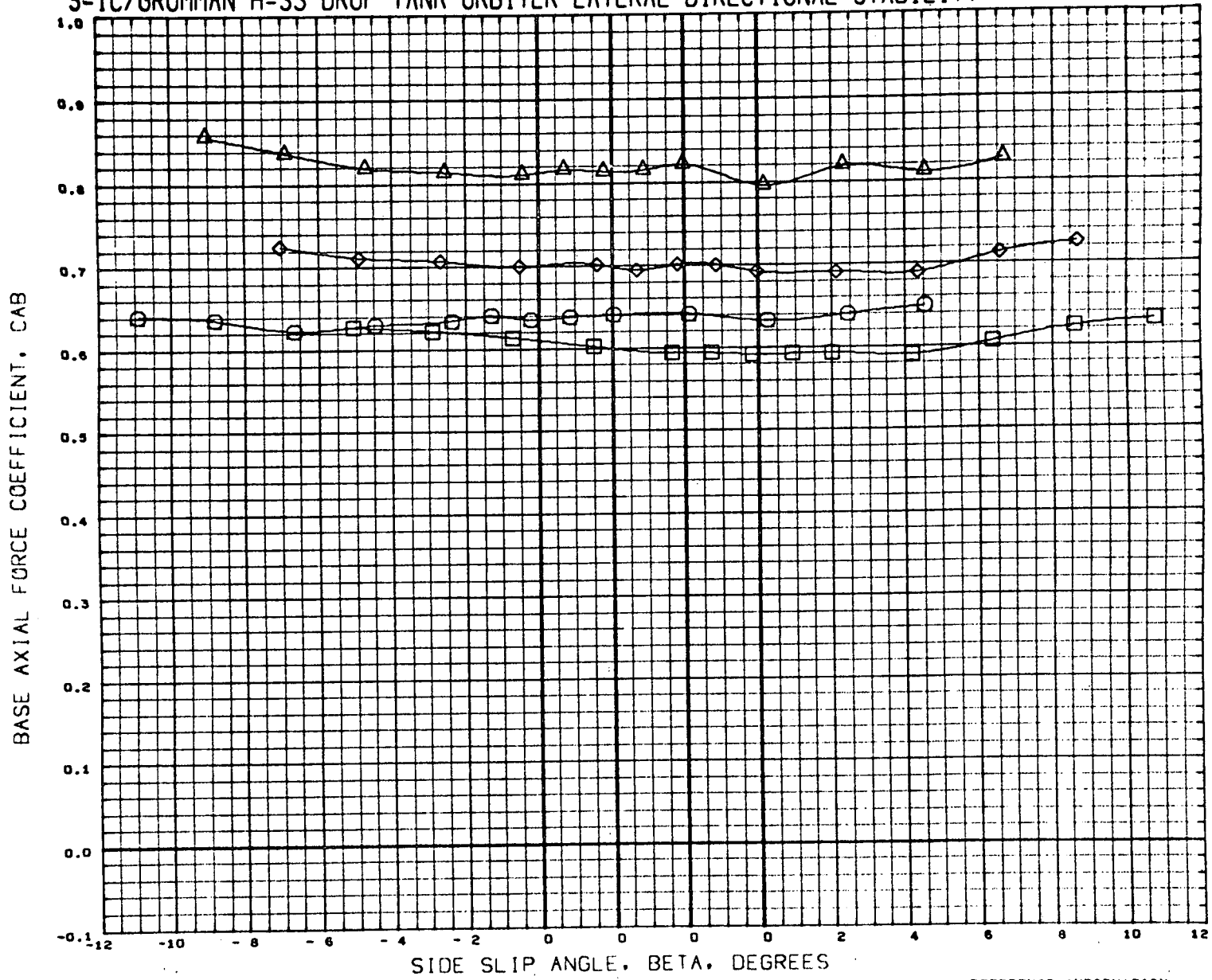


SYMBOL	MACH	PARAMETRIC VALUES		
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△	3.480	WINGIN	0.000	
◇	4.959			

REFERENCE INFORMATION		
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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES		
		ALPHA	PHI	90.000
○	0.901	WNGIN	0.000	
◇	1.004		0.000	
△	1.102			
□	1.199			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

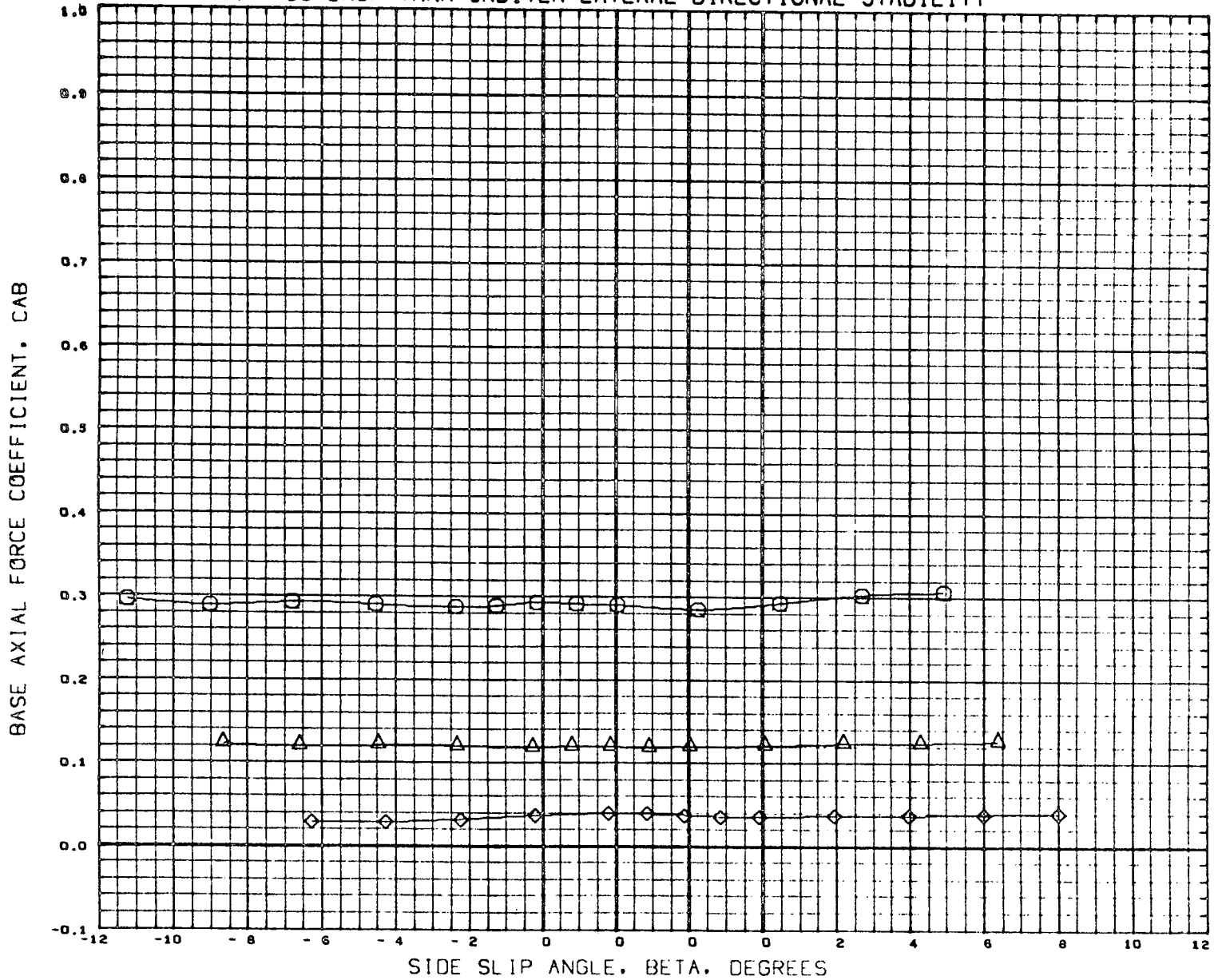
M502-MSFC-S1C H-33 ORBITER

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	PHI
○	1.965	0.000	90.000	
△	3.480	0.000		
◇	4.959			

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCCC

M502-MSFC-S1C H-33 ORBITER

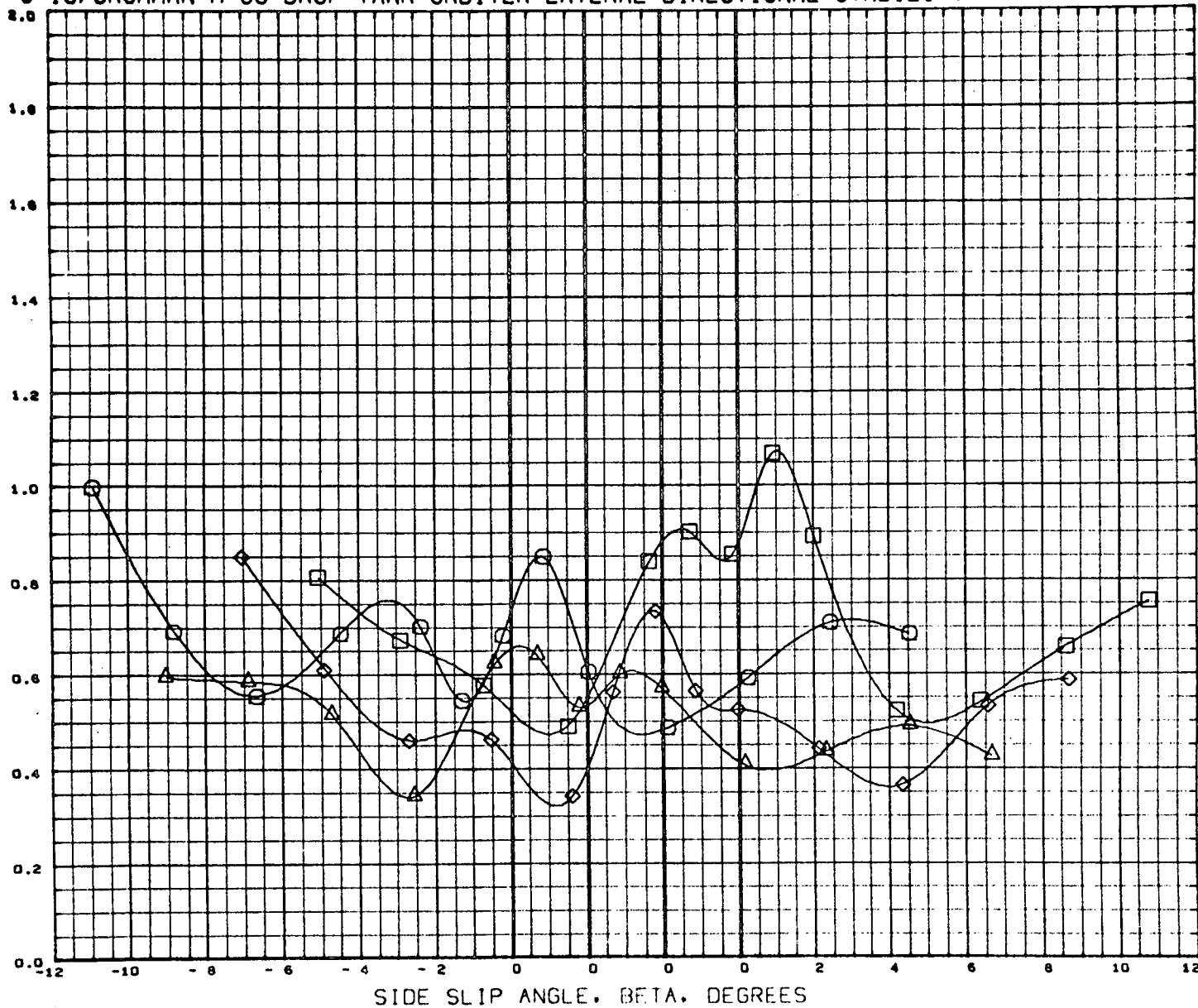
OWVTBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY



SYMBOL	MACH	PARAMETRIC VALUES		
○	0.901	ALPHA	0.000	PHI 90.000
△	1.004	WNGIN	0.000	
◇	1.102			
□	1.199			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER

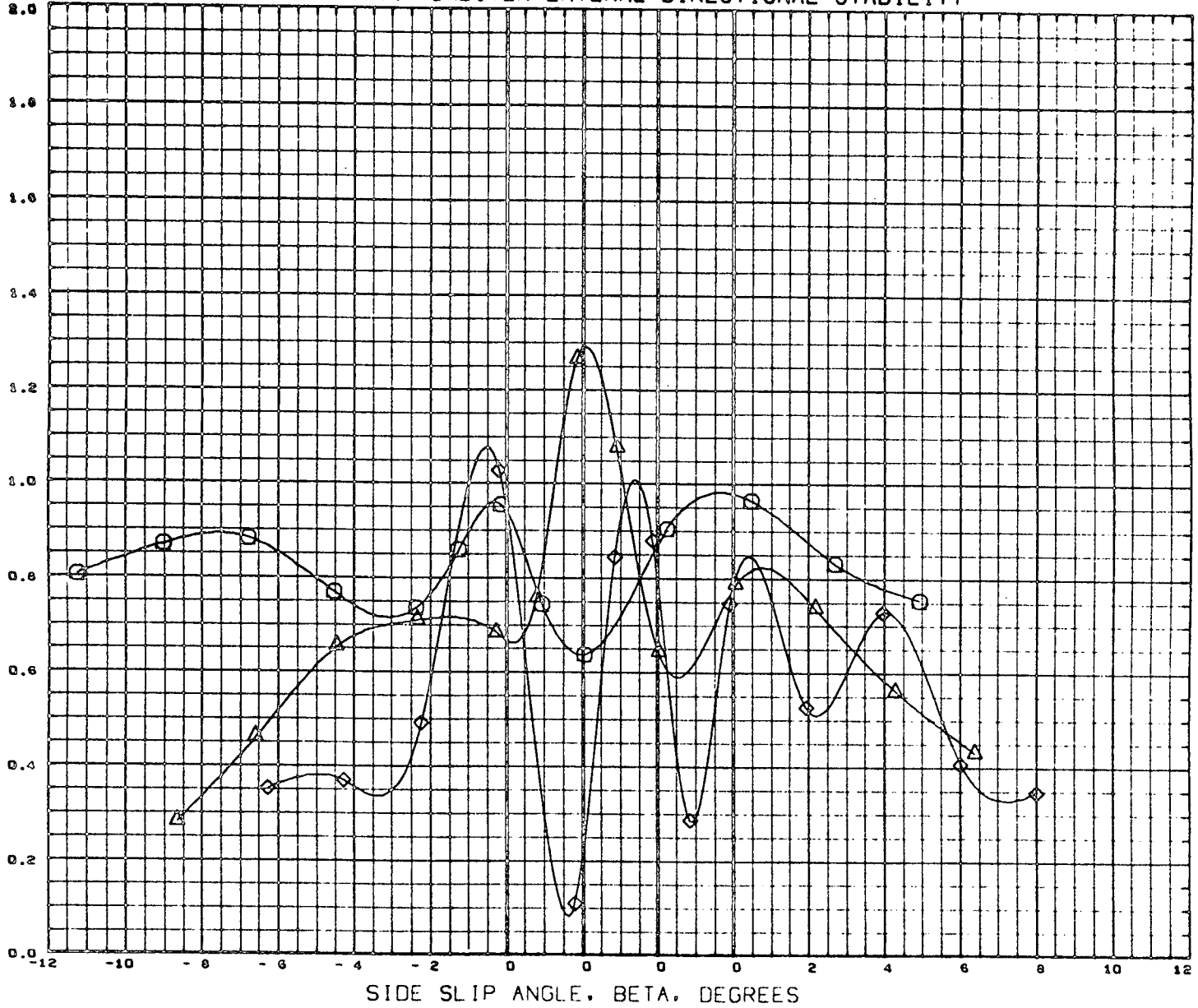
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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

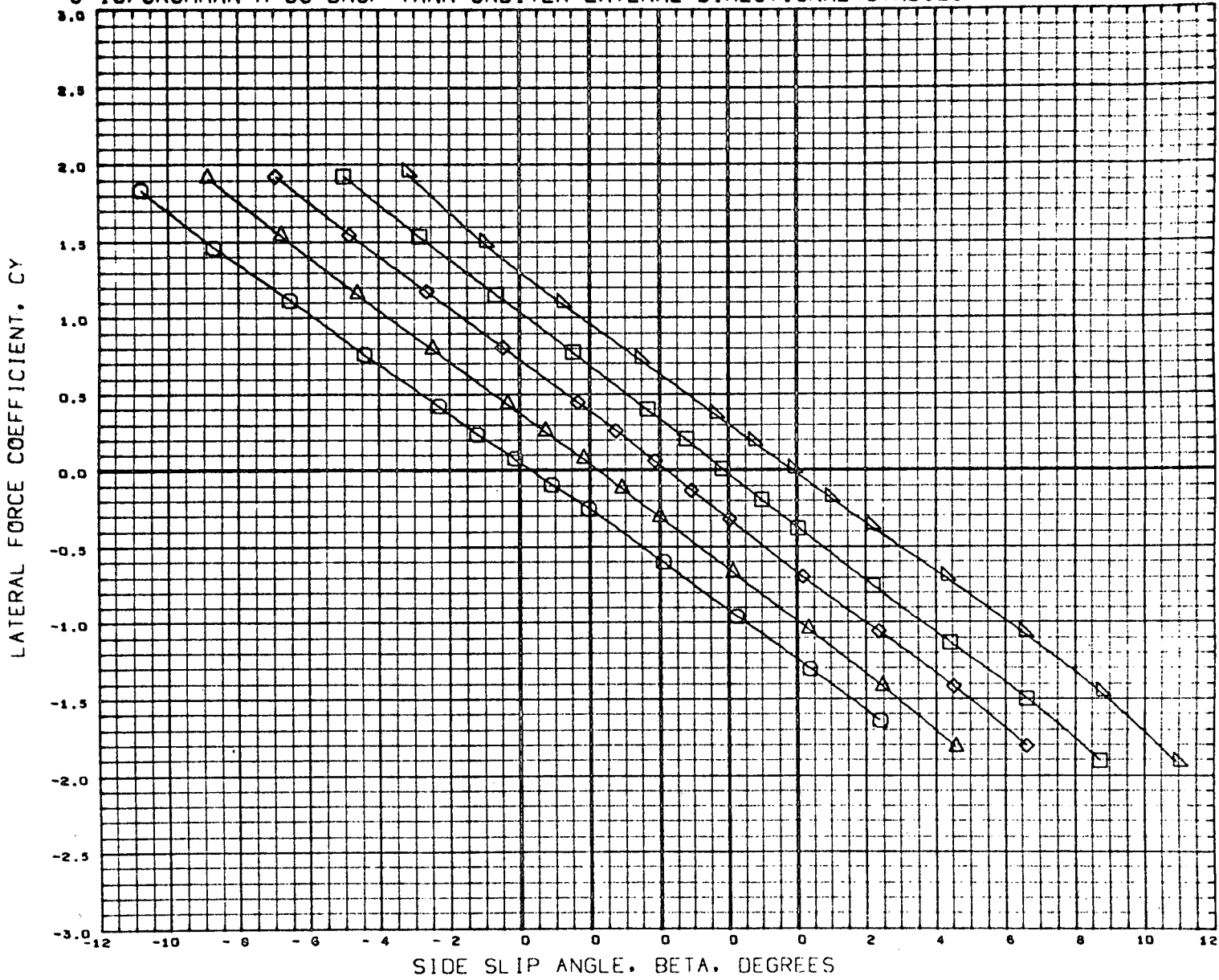
STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
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◇	4.999					BREF	1.3330	IN.
						XMRP	3.3990	IN.
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						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCC

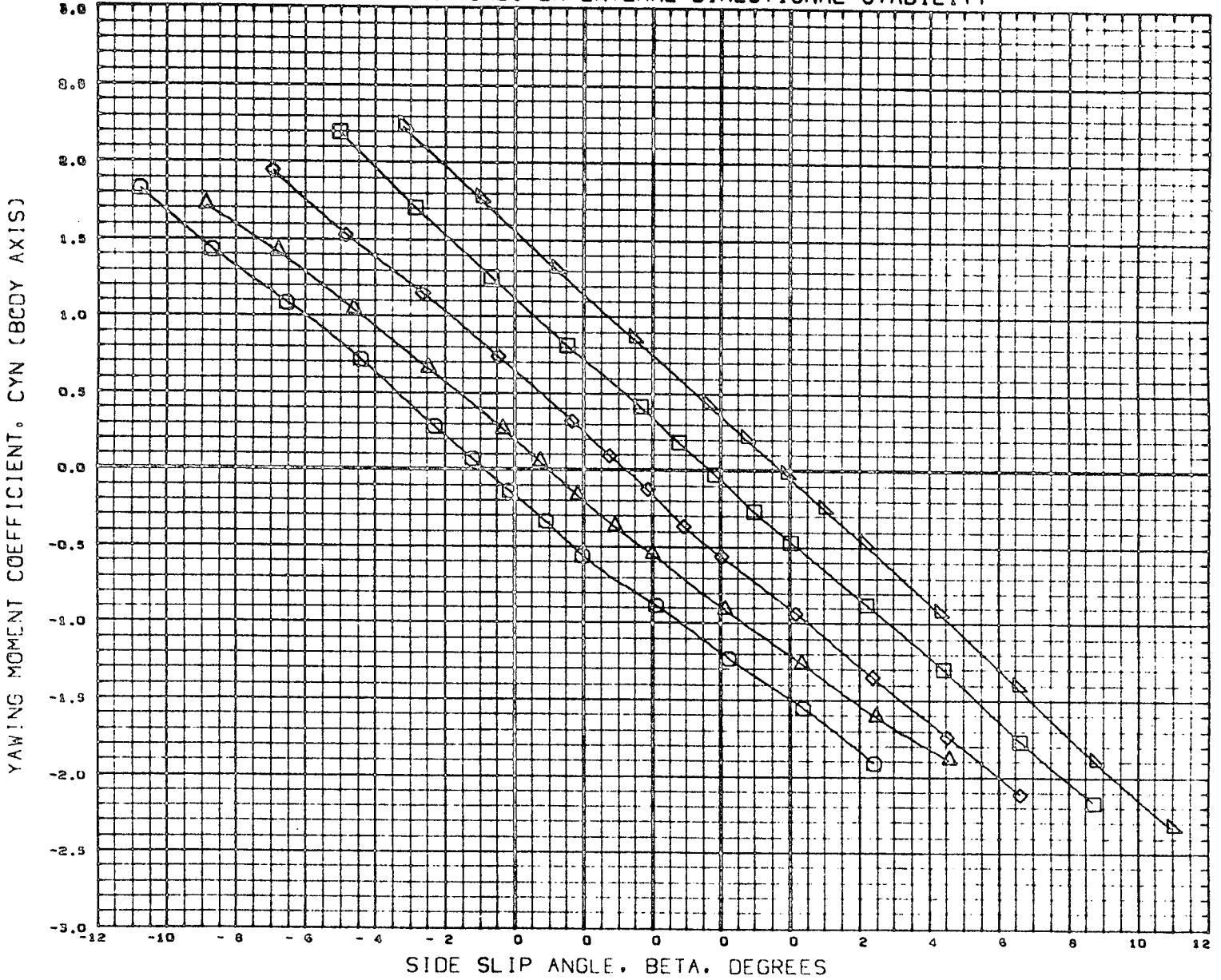
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL MACH PARAMETRIC VALUES
 ○ 0.899 ALPHA 0.000 PHI 90.000
 □ 1.006 WNGIN 0.000
 △ 1.092
 ◇ 1.196
 ☆ 1.963
 DATA HIST. CODE CCCGC

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

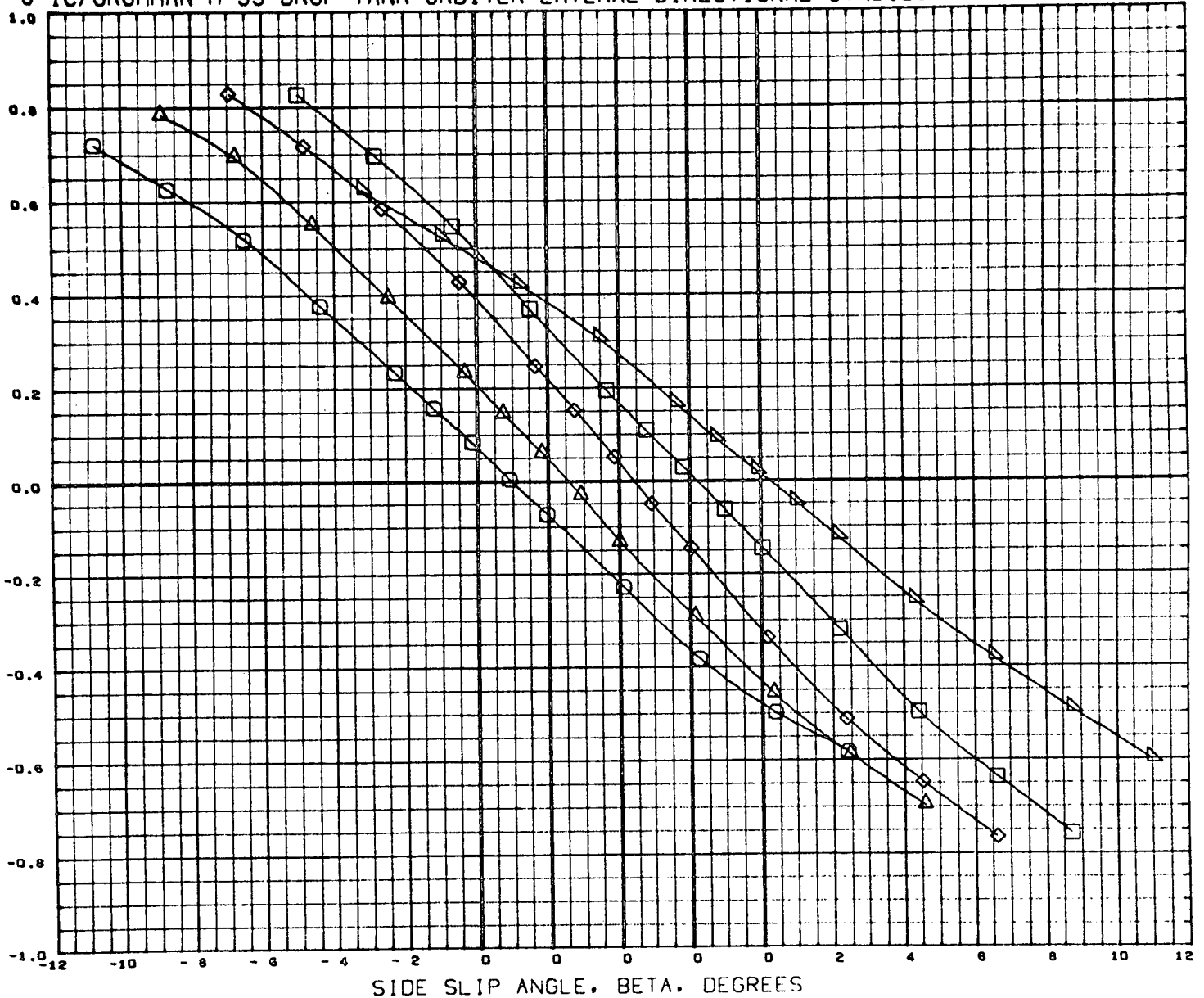
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES		REFERENCE INFORMATION				
○	0.899	ALPHA	0.000	PHI	90.000	SREF	1.3960	SQ. IN.
△	1.006	WIGIN	0.000			LREF	1.3330	IN.
□	1.092					BREF	1.3330	IN.
◇	1.190					XMRP	5.3990	IN.
*	1.983					YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	
		DATA HIST. CODE	CCCCC					

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

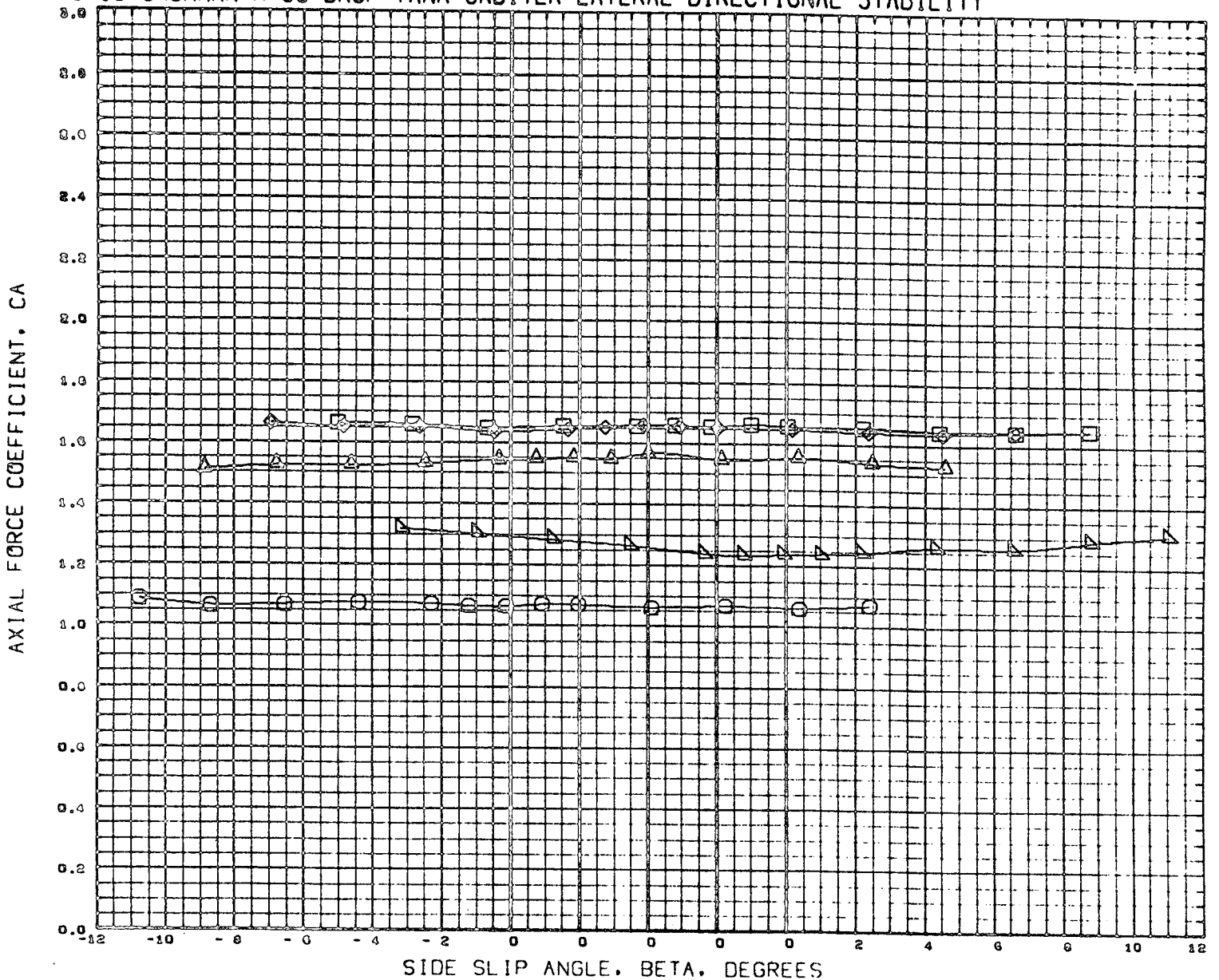
ROLL MOMENT COEFFICIENT, CBL (BODY AXIS)



SYMBOL	MACH	PARAMETRIC VALUES			
○	0.899	ALPHA	0.000	PHI	90.000
△	1.006	WNGIN	0.000		
□	1.092				
◇	1.196				
☆	1.963				
		DATA HIST. CODE	CCCCC		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

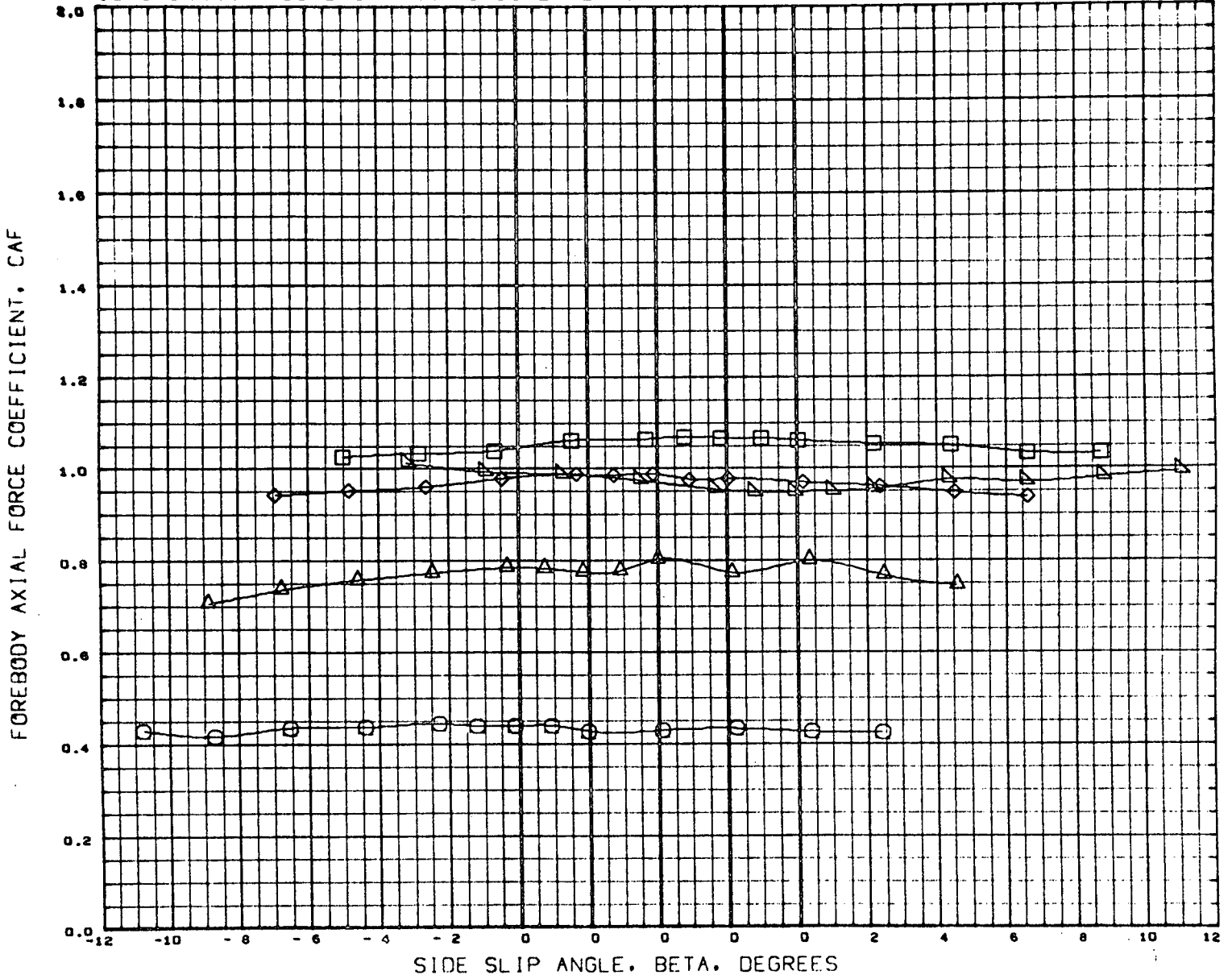
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION		
		ALPHA	PHI	90.000	SREF	sq. in.	
○	0.999	0.000	0.000	1.3960	sq. in.		
△	1.000	0.000	0.000	1.3330	sq. in.		
◇	1.092			1.3330	sq. in.		
□	1.190			5.3990	sq. in.		
▽	1.993			0.0000	sq. in.		
				0.0000	sq. in.		
				0.0034	sq. in.		

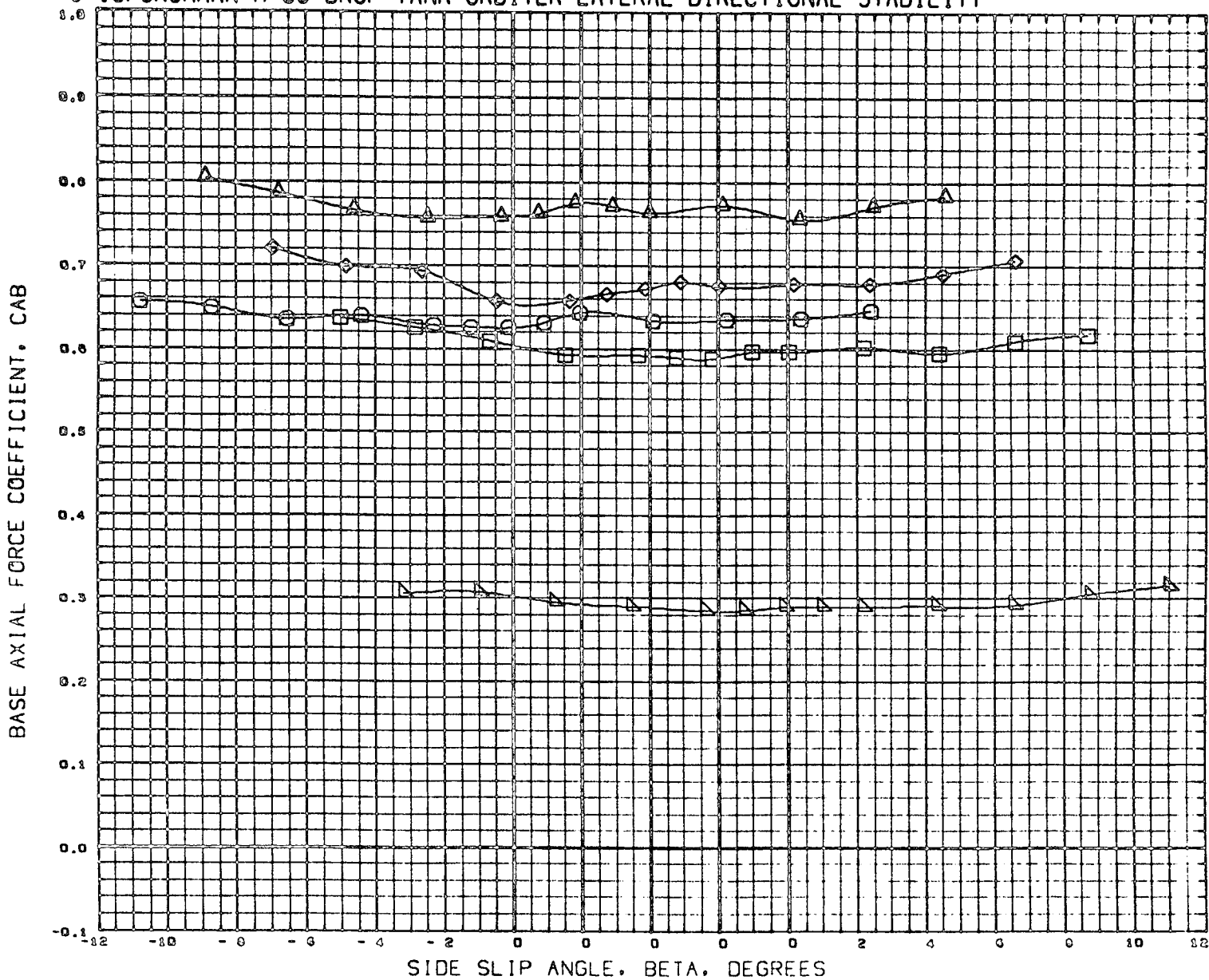
DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
○	0.899	ALPHA	0.000	PHI	90.000	SREF	1.3960	SQ. IN.
△	1.006	WNGIN	0.000			LREF	1.3330	IN.
◇	1.092					BREF	1.3330	IN.
□	1.196					XMRP	5.3990	IN.
▽	1.963					YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



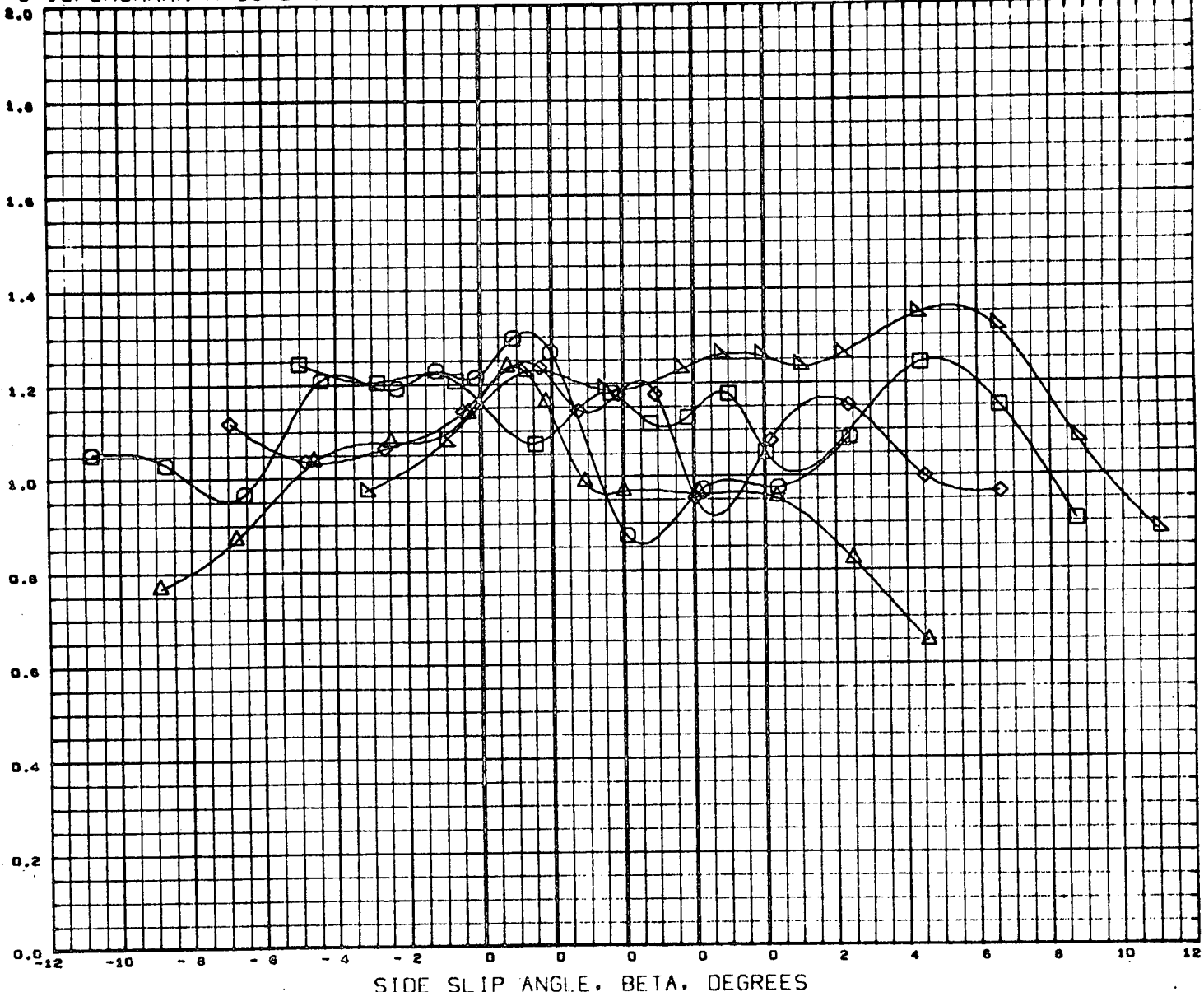
SYMBOL	MACH	PARAMETRIC VALUES			
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◇	1.006	WINGEN	0.000		
○	1.002				
□	1.100				
▽	1.003				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
○	0.899	ALPHA	0.000	PHI	90.000	SREF	1.3960	30. IN.
□	1.006	WNGIN	0.000			LREF	1.3330	IN.
△	1.092					BREF	1.3330	IN.
◇	1.196					XMRP	5.3990	IN.
▽	1.963					YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCGC

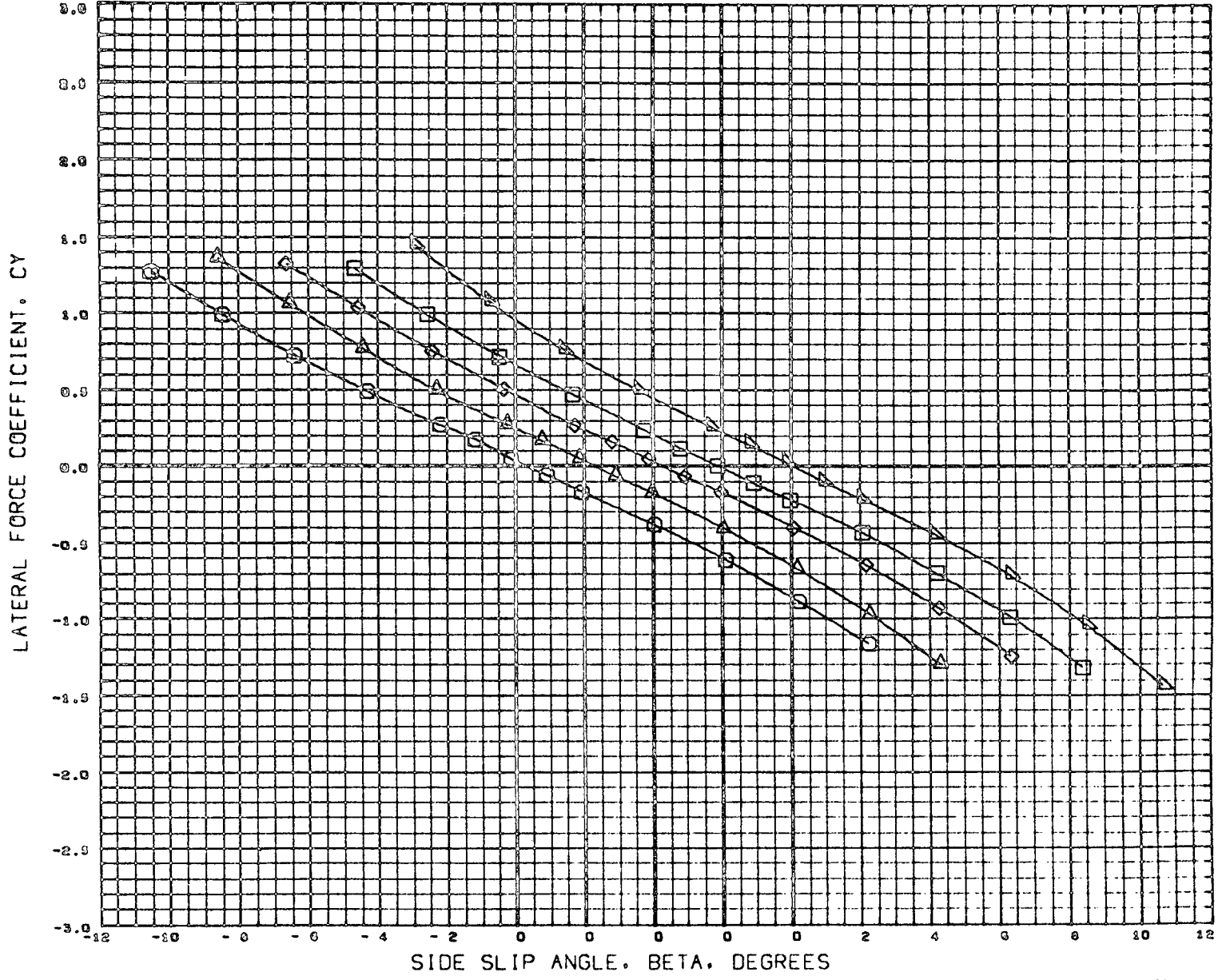
M502-MSFC-S1C H-33 ORBITER

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

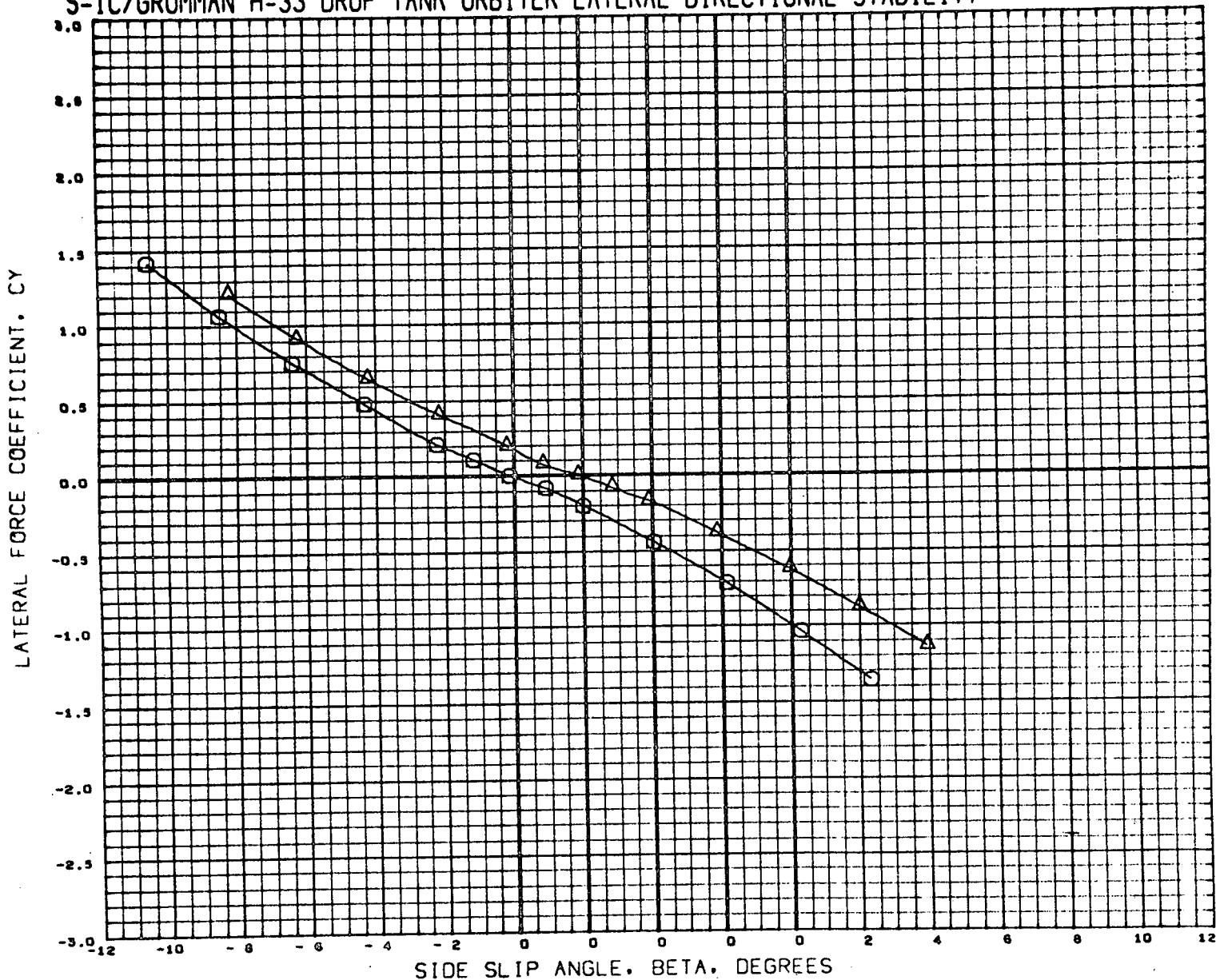


SYMBOL	MACH	PARAMETRIC VALUES		
○	0.009	ALPHA	0.000	PHI 90.000
△	0.007	WNGIN	0.000	
◇	1.102			
□	1.203			
▽	1.000			

DATA HIST. CODE CCCCC

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3690	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

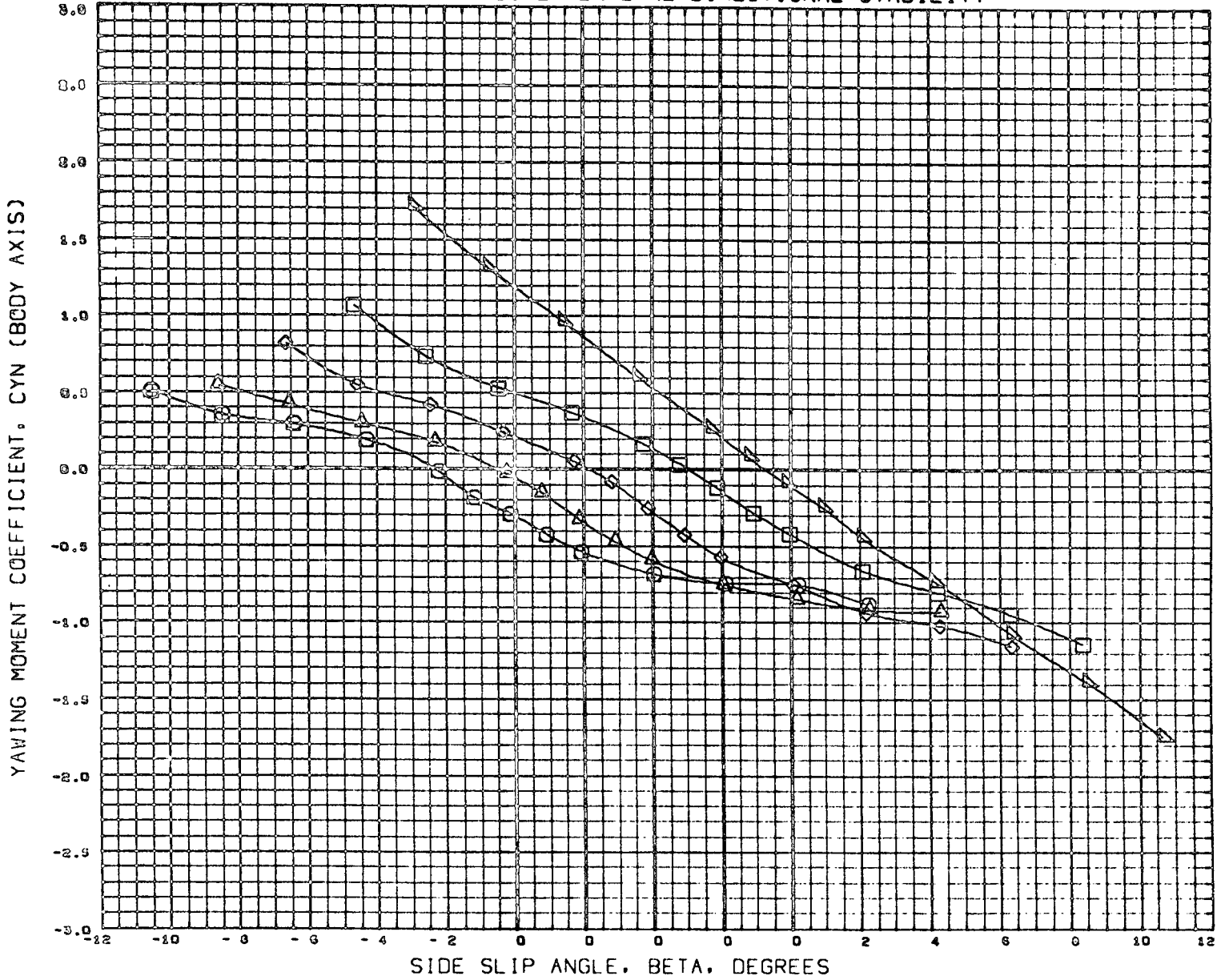


SYMBOL	MACH	PARAMETRIC VALUES			
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WNGTN	0.000		

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

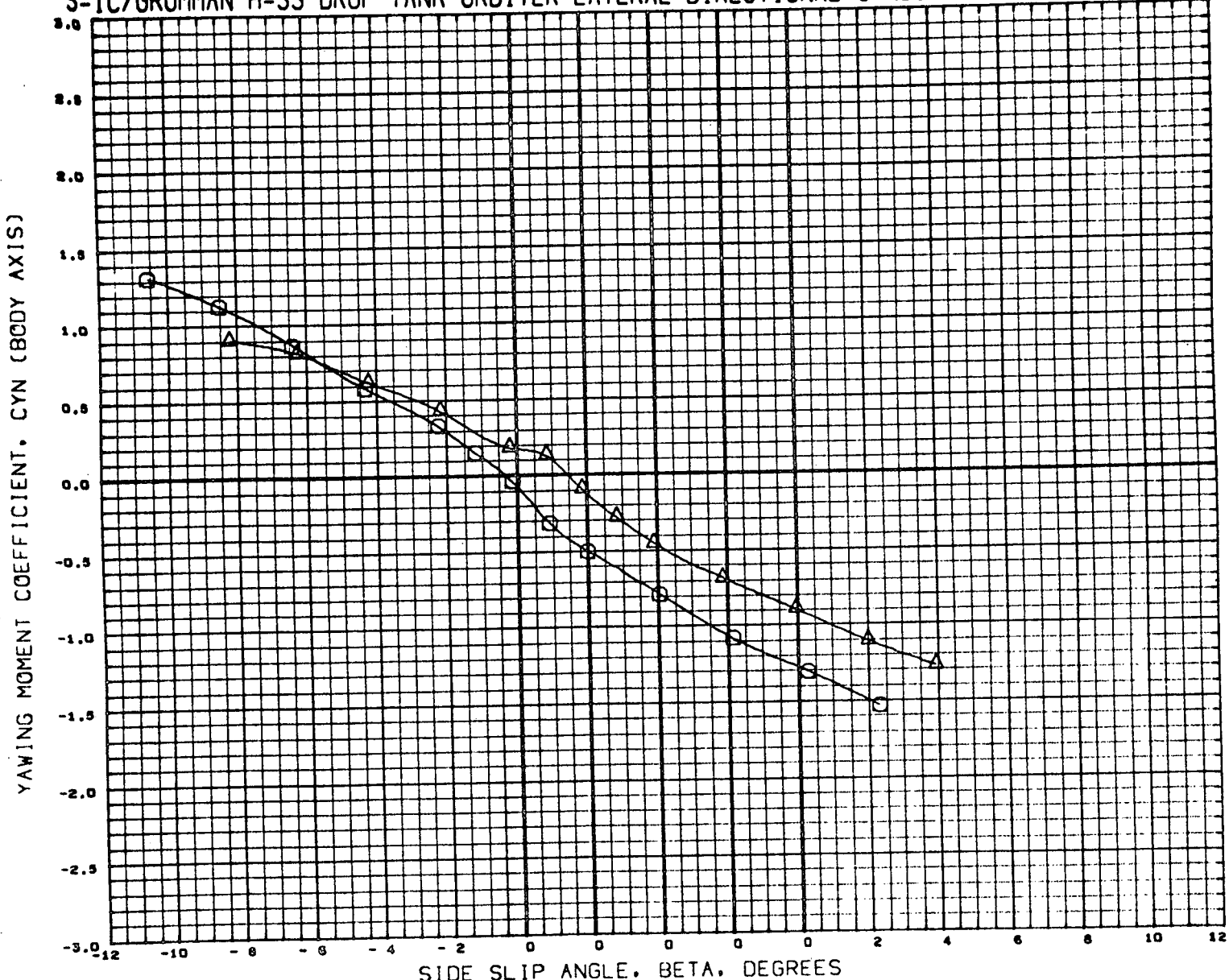


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.909	ALPHA	0.000	PHI	90.000
◇	0.907	WNCIN	0.000		
◇	1.102				
◇	1.203				
◇	1.990				

DATA MIST. CODE CCCC

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
YMRP	5.3990	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL MACH PARAMETRIC VALUES
 ○ 3.480 ALPHA 0.000 PHI 90.000
 △ 4.959 WNGIN 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGC

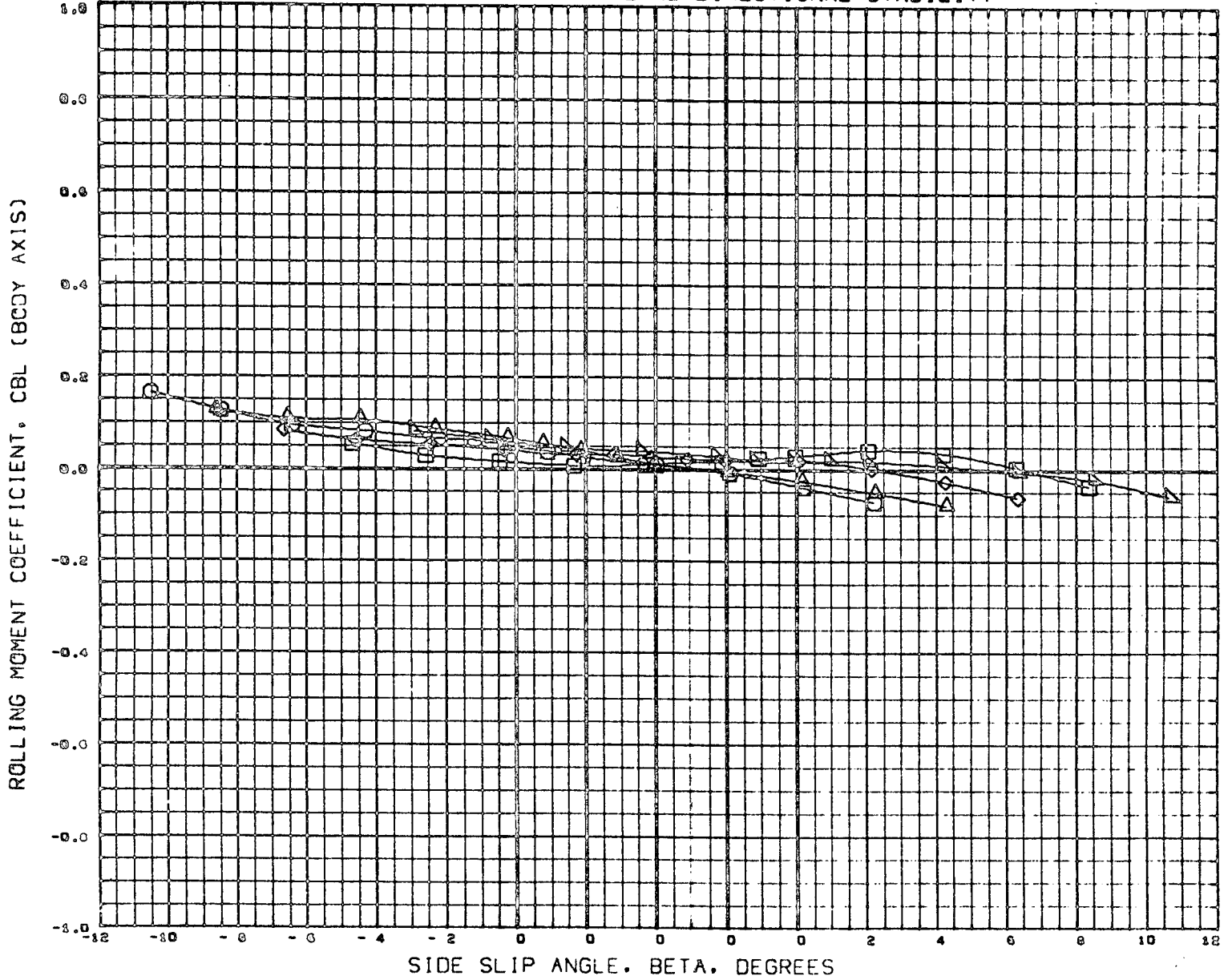
M502-MSFC-S1C H-33 ORBITER

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

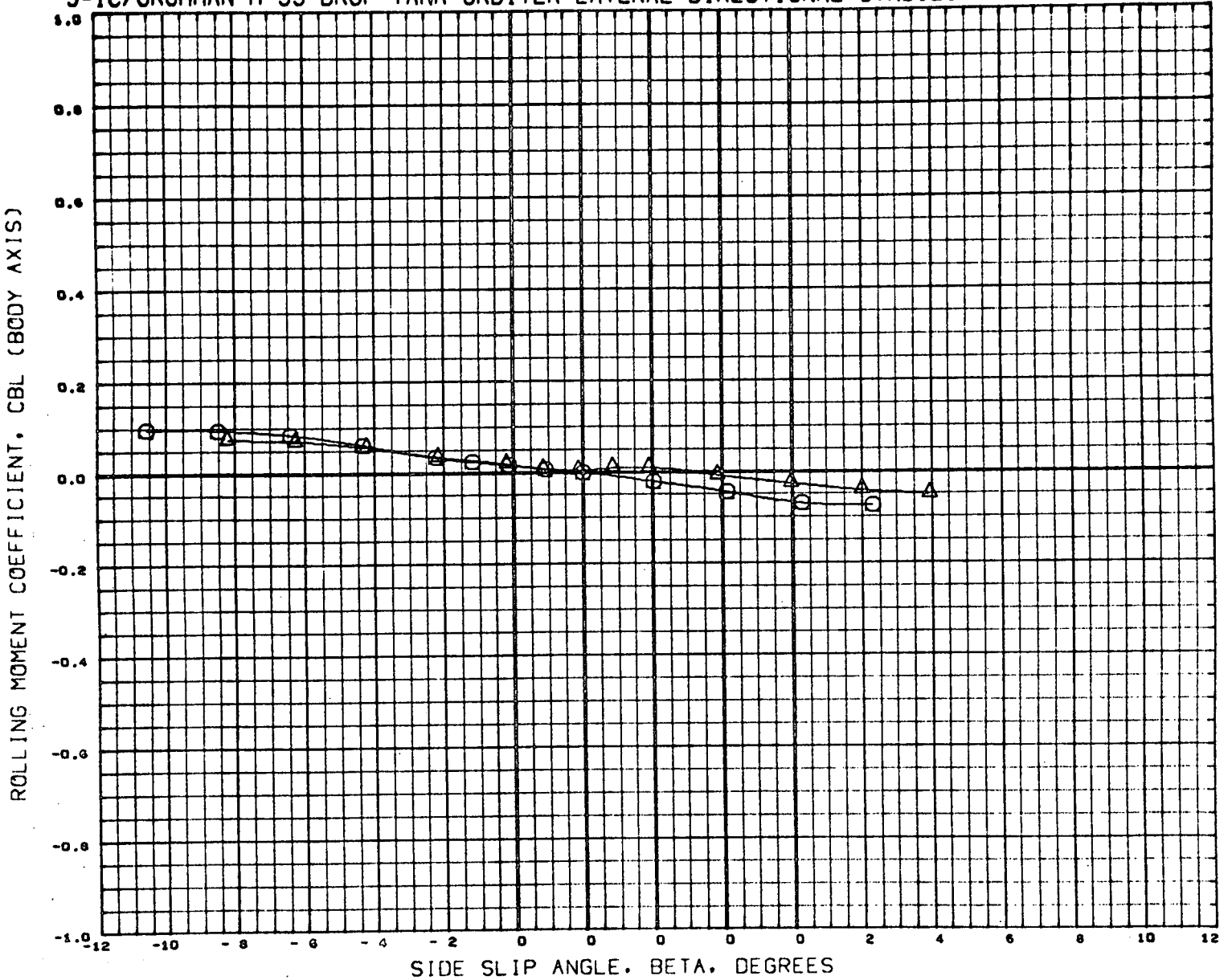


SYMBOL	MACH	PARAMETRIC VALUES		
		ALPHA	PHI	
○	0.905	0.000	90.000	
△	0.997	0.000		
□	1.102			
◇	1.203			
	1.960			

REFERENCE INFORMATION		
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LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRF	0.0000	IN.
ZMRF	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC6C

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WGIN	0.000		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

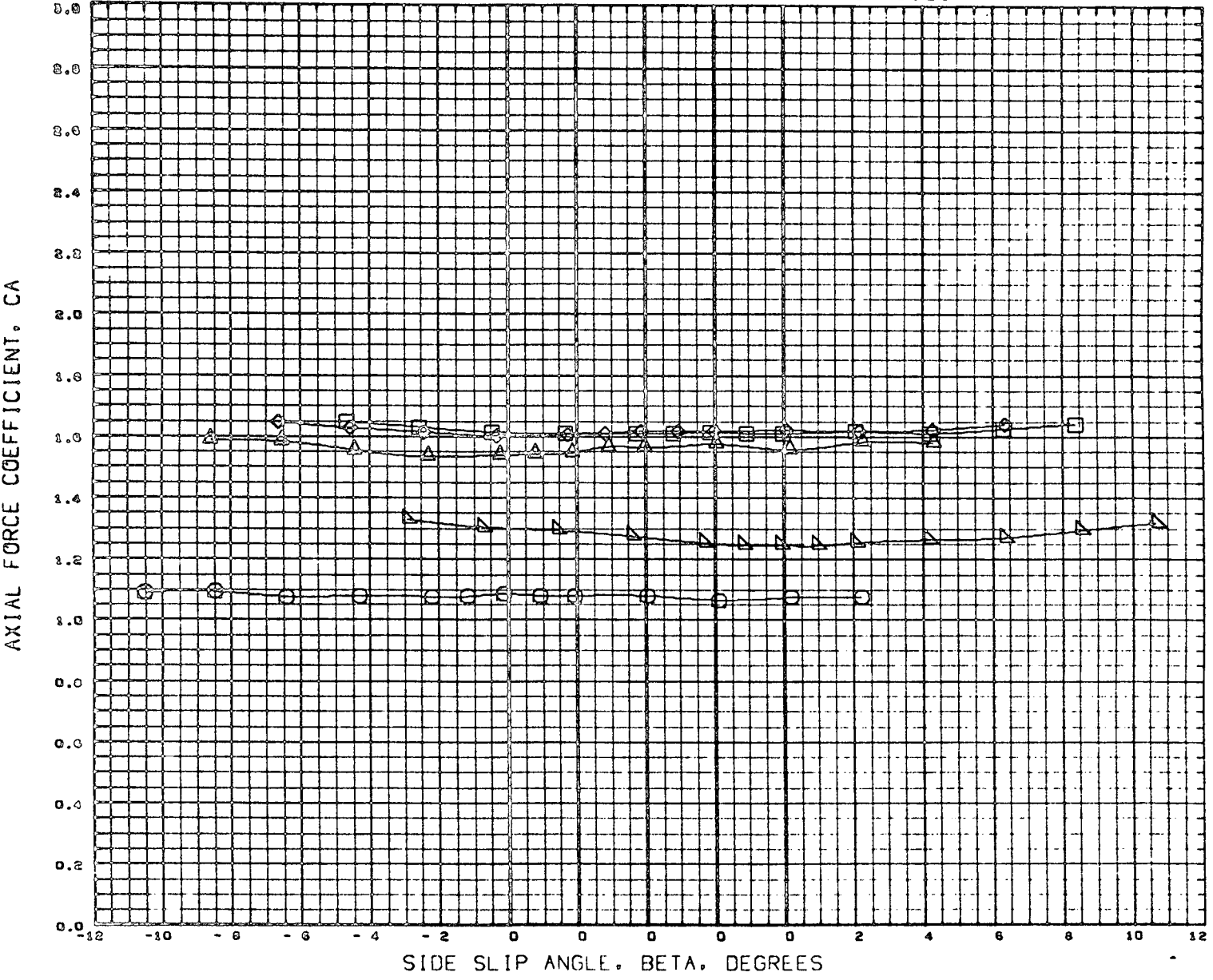
M502-MSFC-S1C H-33 ORBITER

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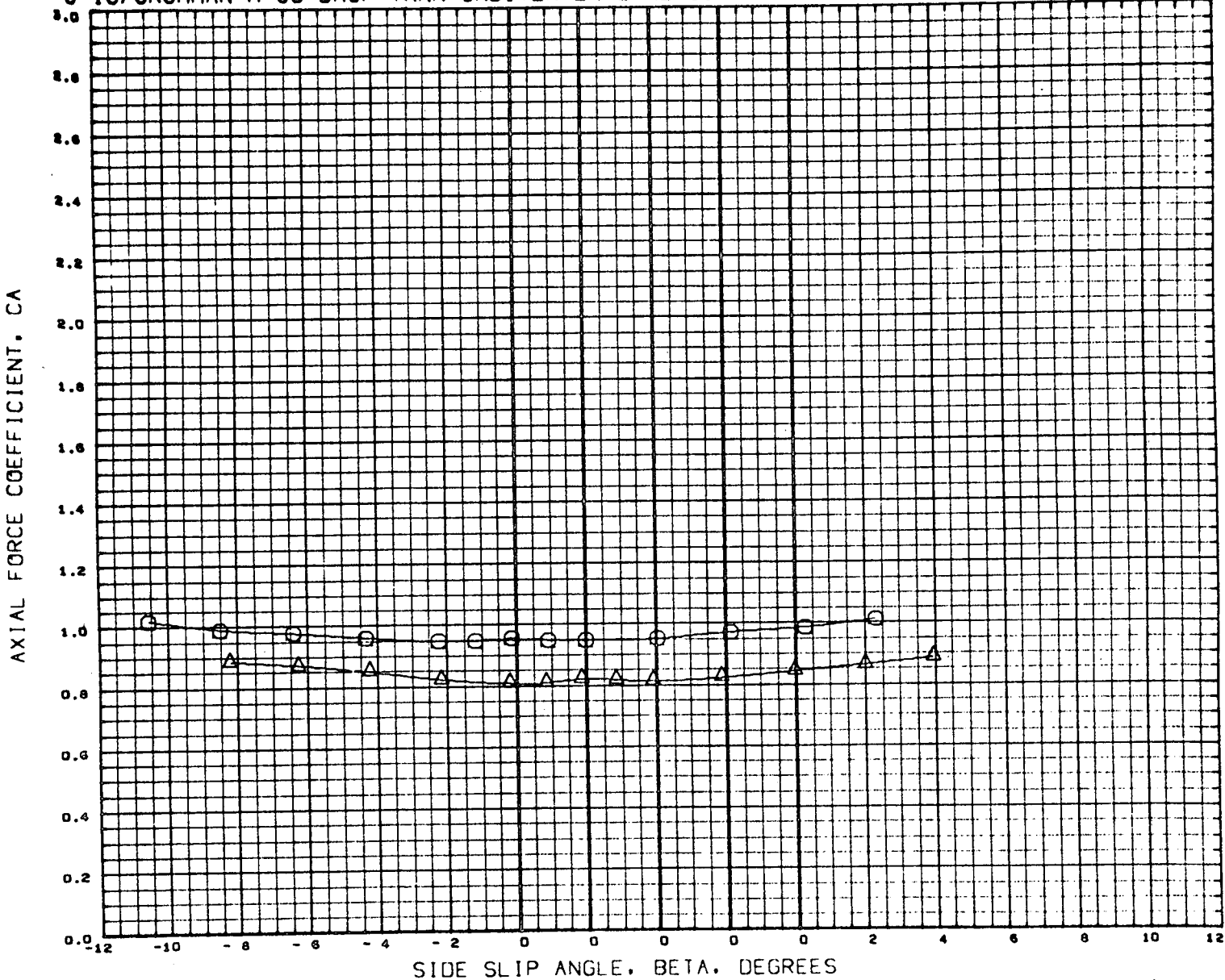
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
○	0.909	ALPHA	0.000	PHI	90.000	SREF	1.3960	sq. in.
△	0.997	WNGIN	0.000			LREF	1.3330	in.
◇	1.102					BREF	1.3330	in.
□	1.203					XMRP	3.3990	in.
▽	1.000					YMRP	0.0000	in.
						ZMRP	0.0000	in.
						SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

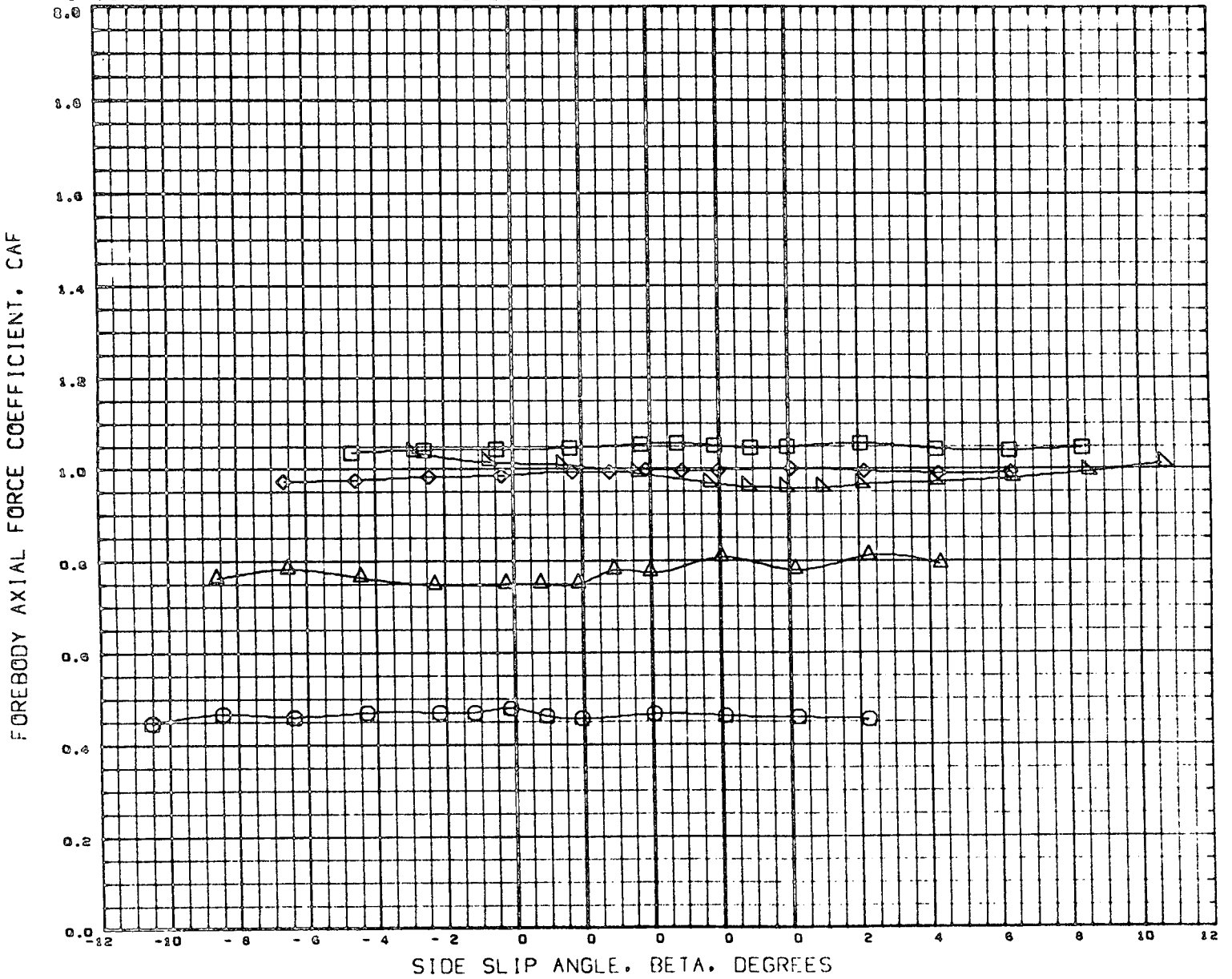


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES		
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△	4.939	WIGIN	0.000		

REFERENCE INFORMATION		
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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3390	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

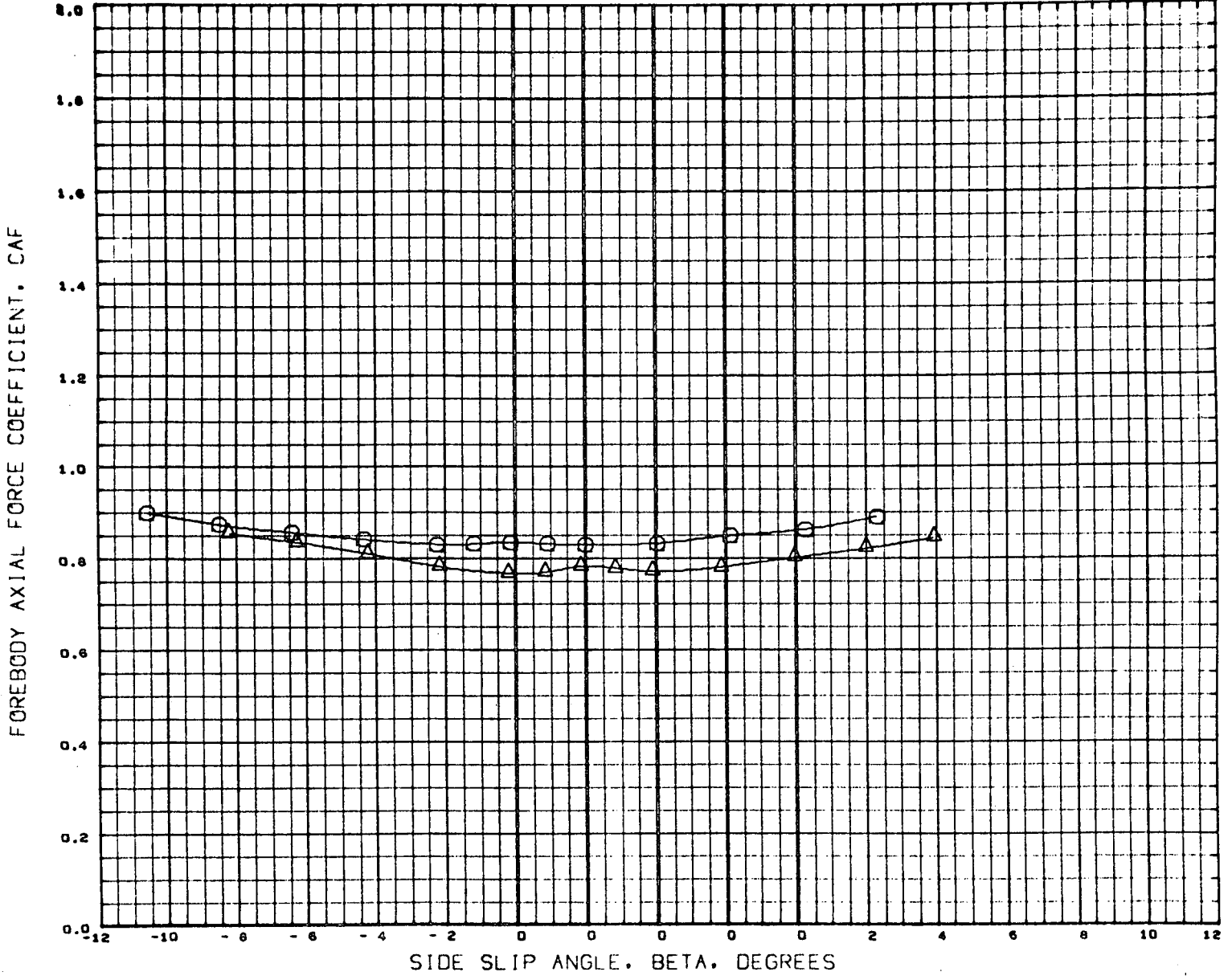
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL 	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION	
	0.905	ALPHA	0.000	PHI	90.000	SREF 1.3960 SQ. IN.
	0.997	WINGIN	0.000			LREF 1.3330 IN.
	1.102					BREF 1.3330 IN.
	1.203					XMRP 5.3990 IN.
1.960					YMRP 0.0000 IN.	
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						SCALE 0.0034

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

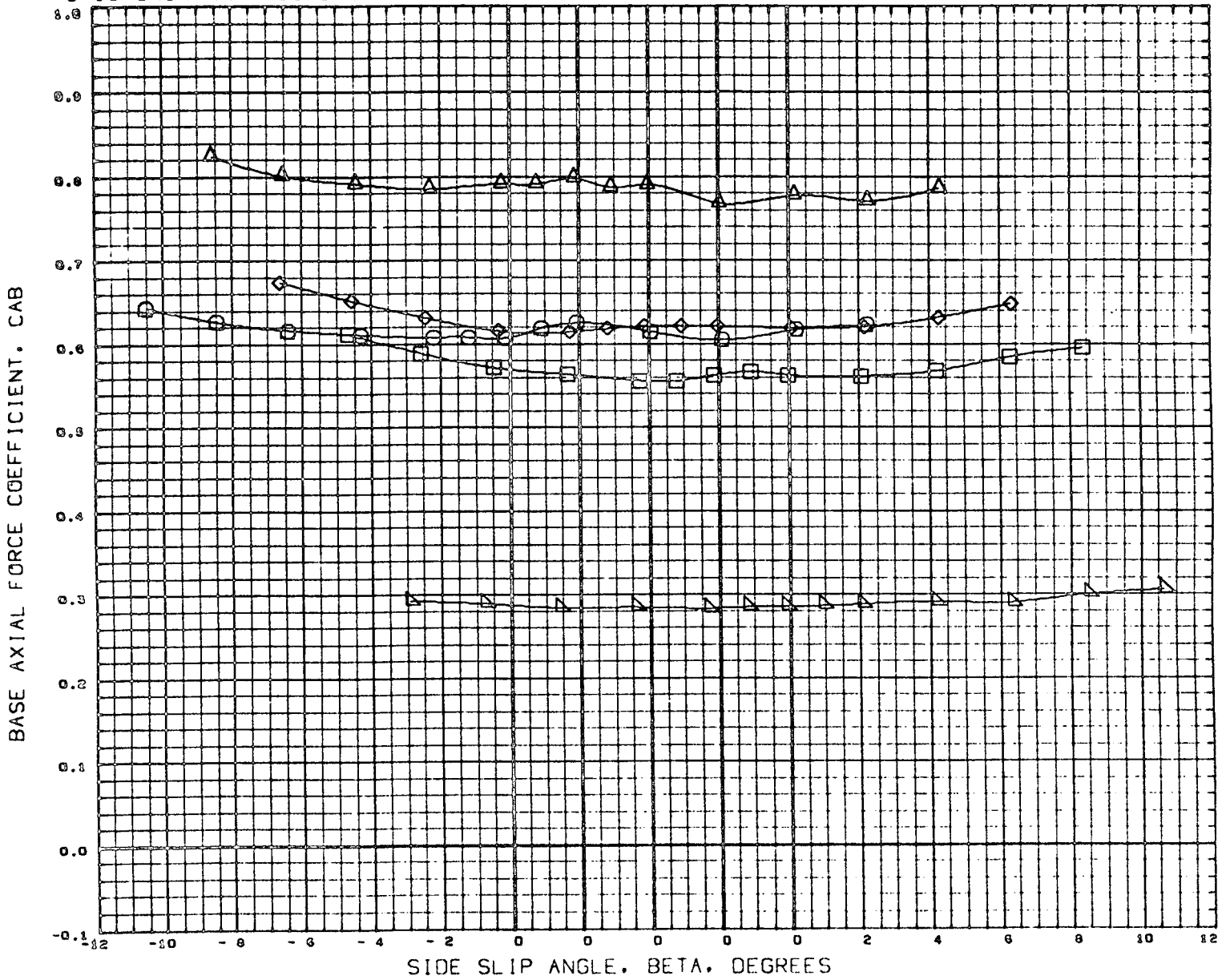


SYMBOL	MACH	PARAMETRIC VALUES	
○	3.480	ALPHA	0.000
△	4.959	WINGIN	0.000
		PHI	90.000

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

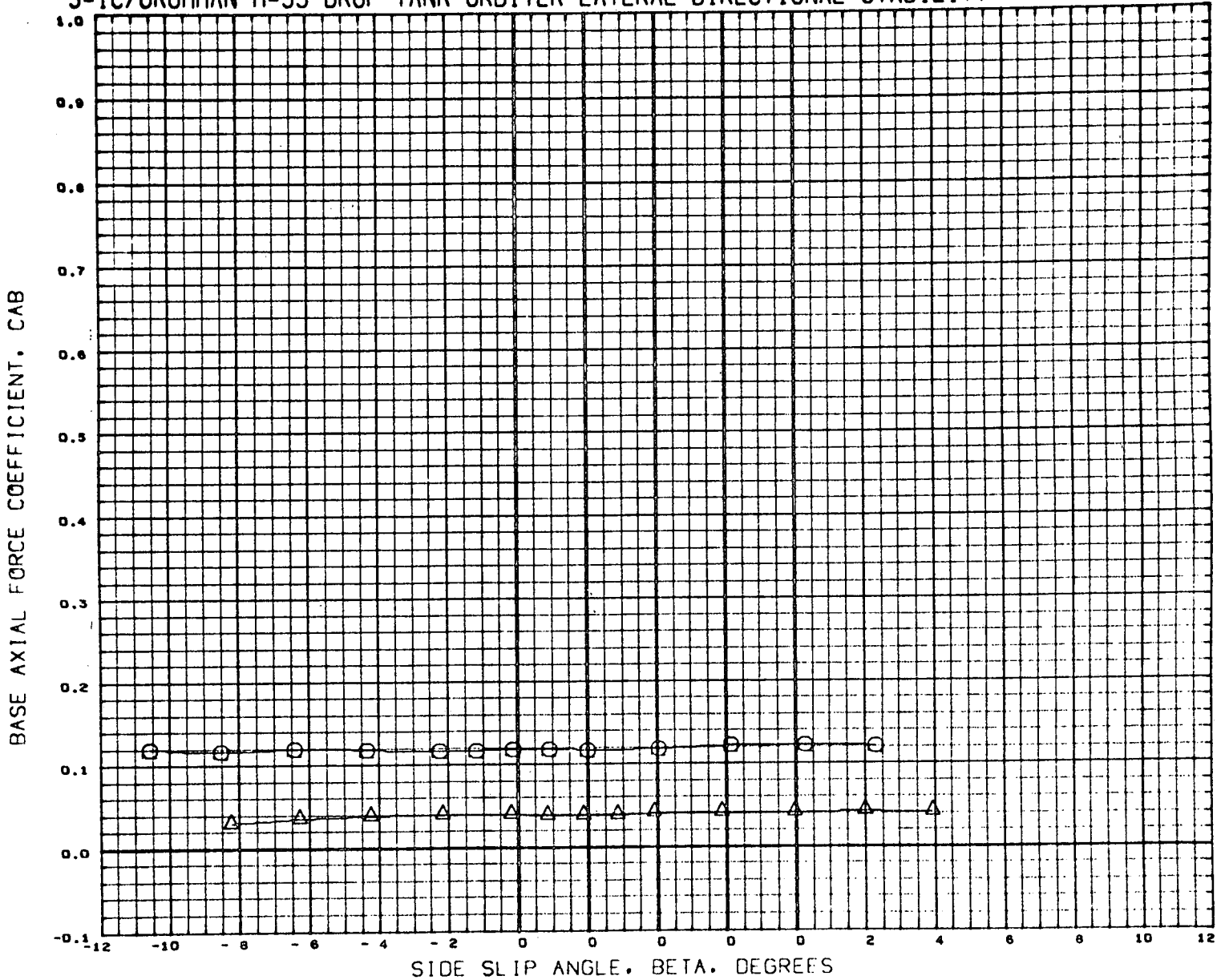
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
△	0.903	ALPHA	0.000	PHI	90.000
◇	0.997	WNGIN	0.000		
○	1.102				
□	1.203				
	1.960				
		DATA HIST. CODE	CCCCC		

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WIGIN	0.000		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

M502-MSFC-S1C H-33 ORBITER

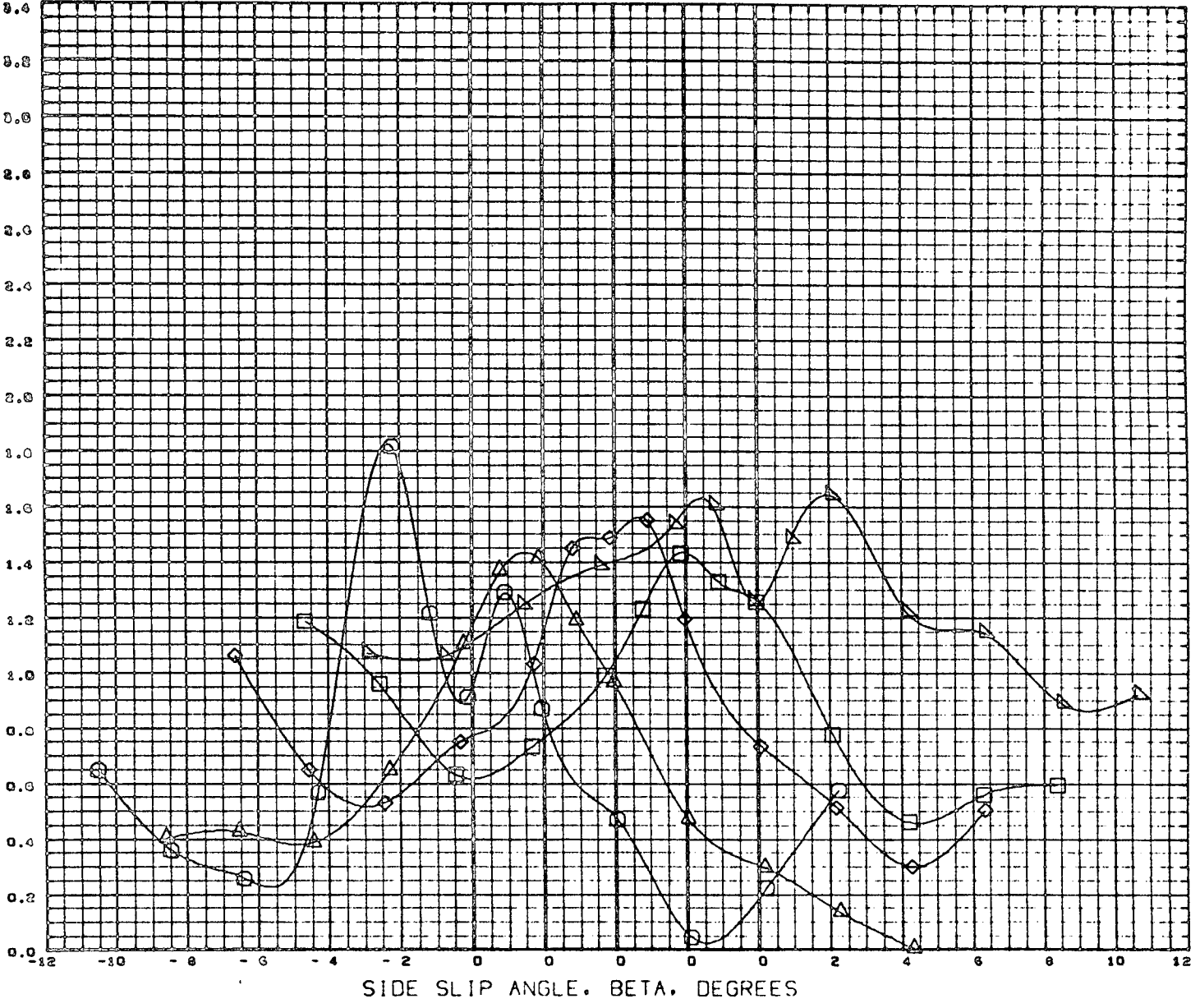
OWTCBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY

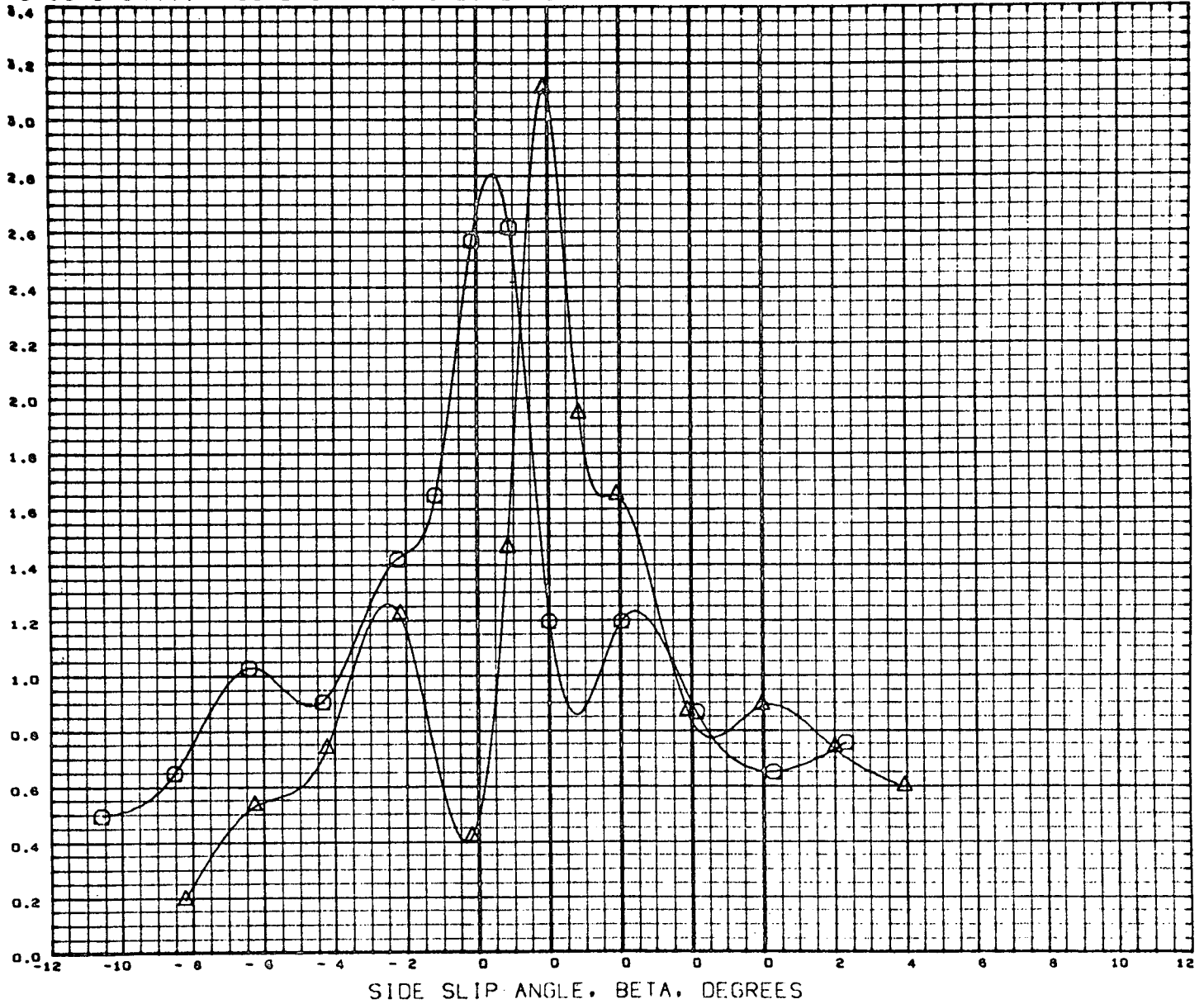


SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
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◇	0.997	WIGIN	0.000			LREF	1.3330	IN.
□	1.102					BREF	1.3330	IN.
△	1.203					XMRP	5.3990	IN.
▽	1.960					YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY

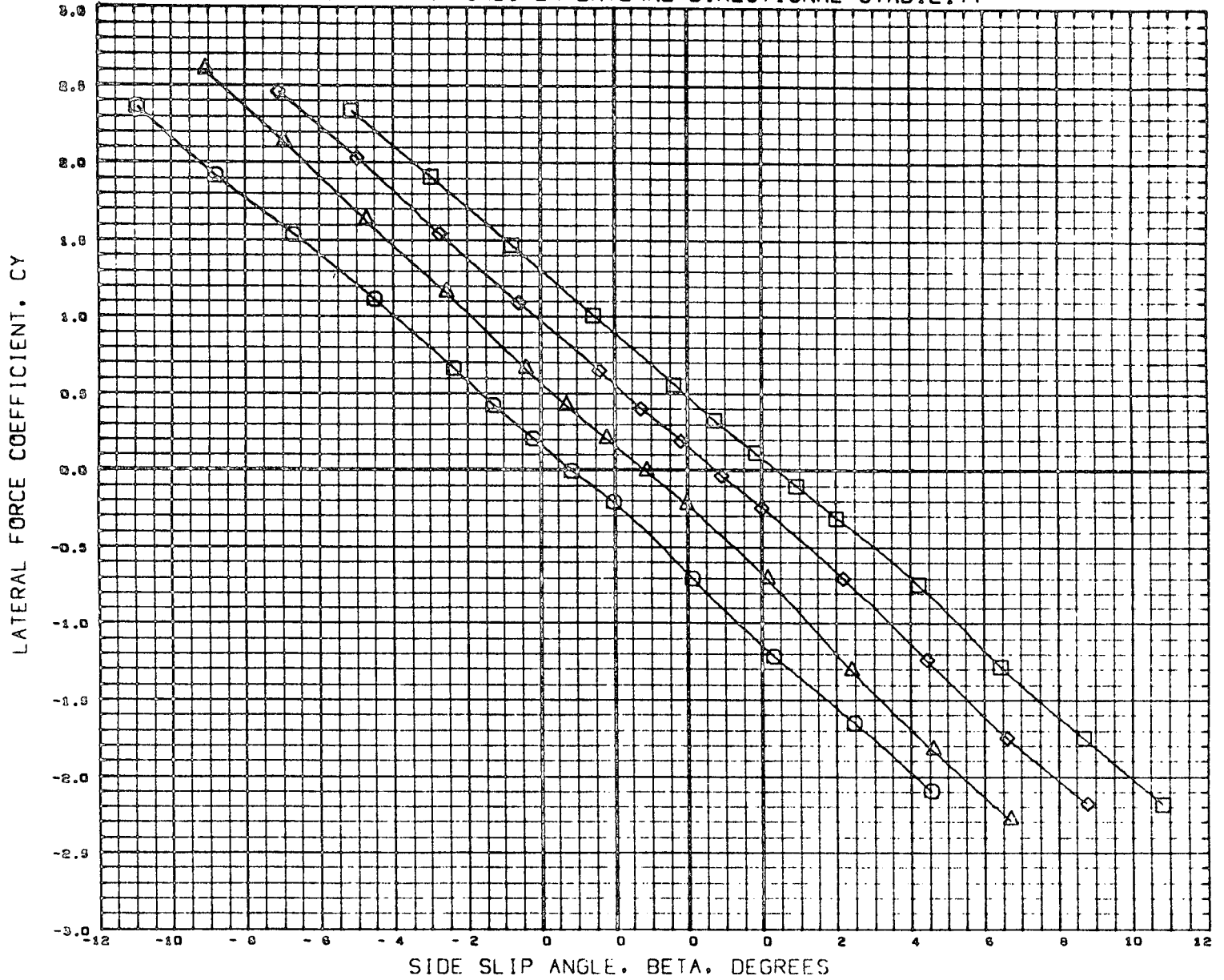


SYMBOL	MACH	PARAMETRIC VALUES			
○	3.480	ALPHA	0.000	PHI	90.000
△	4.959	WINGIN	0.000		

REFERENCE INFORMATION		
SREF	1.3960	33. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES		
○	0.900	ALPHA	0.000	PHI 90.000
△	0.999	WIGIN	0.000	
◇	1.101			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
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BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

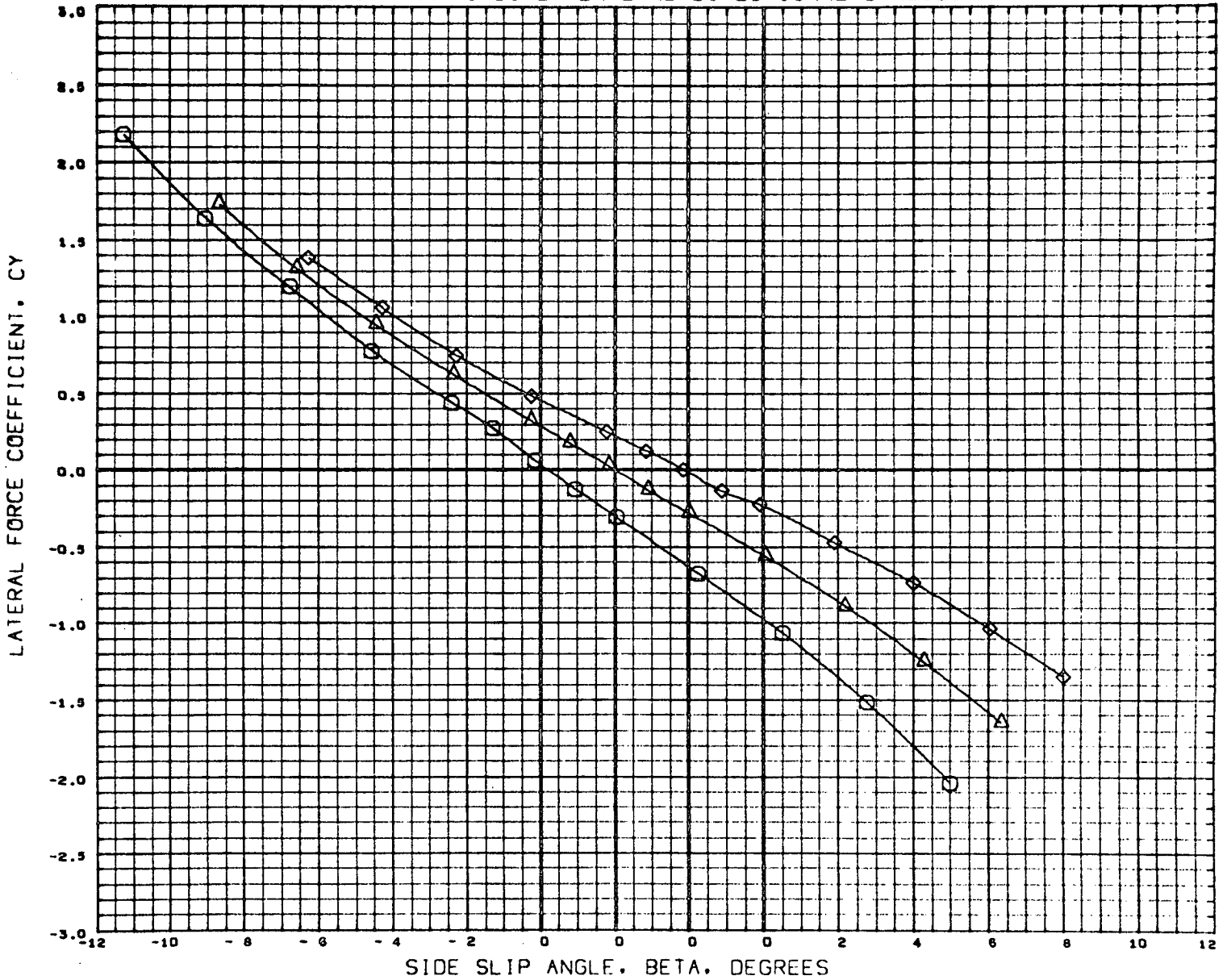
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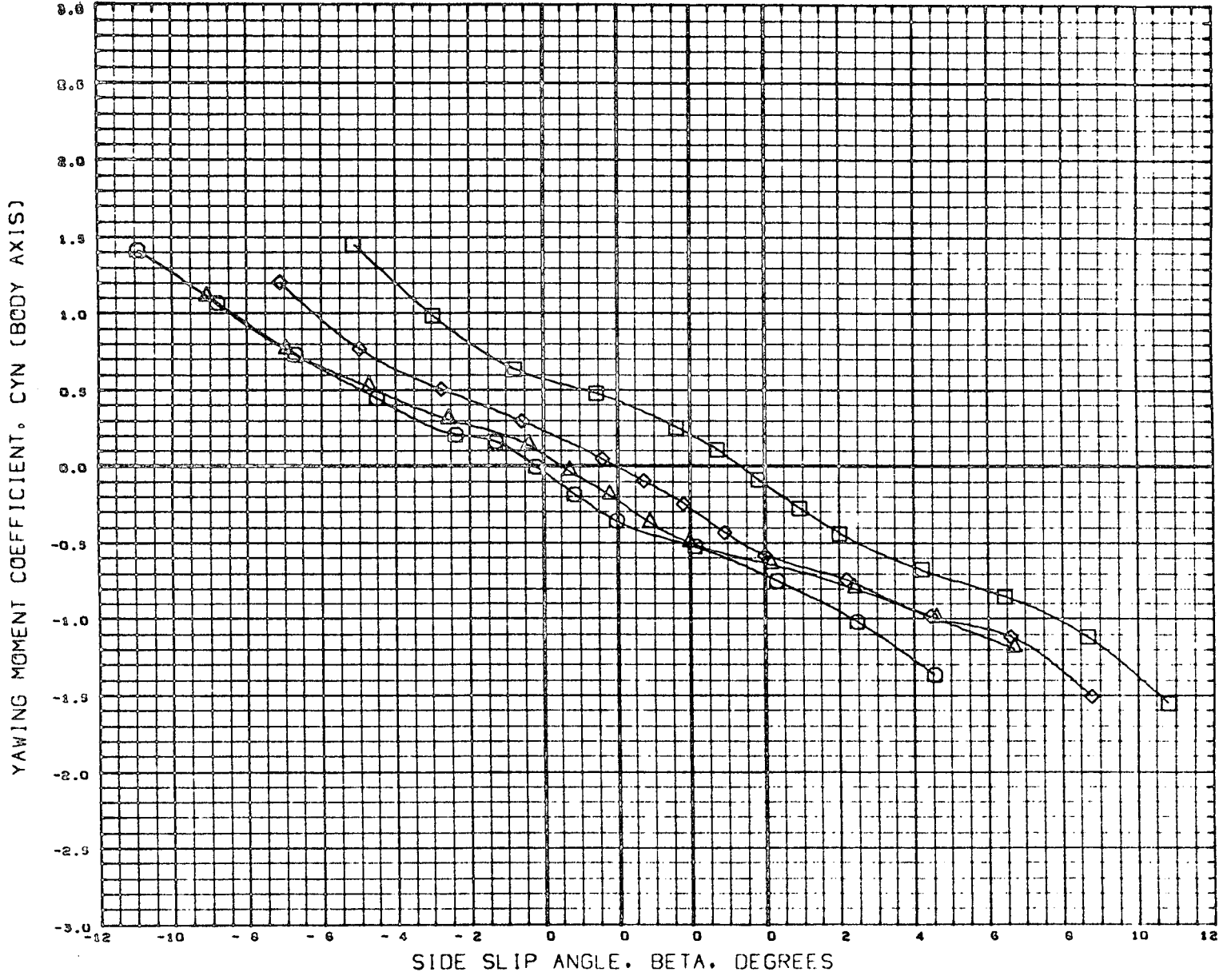


SYMBOL	MACH	PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI 90.000
△	3.480	WNGIN	0.000	
◇	4.939			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

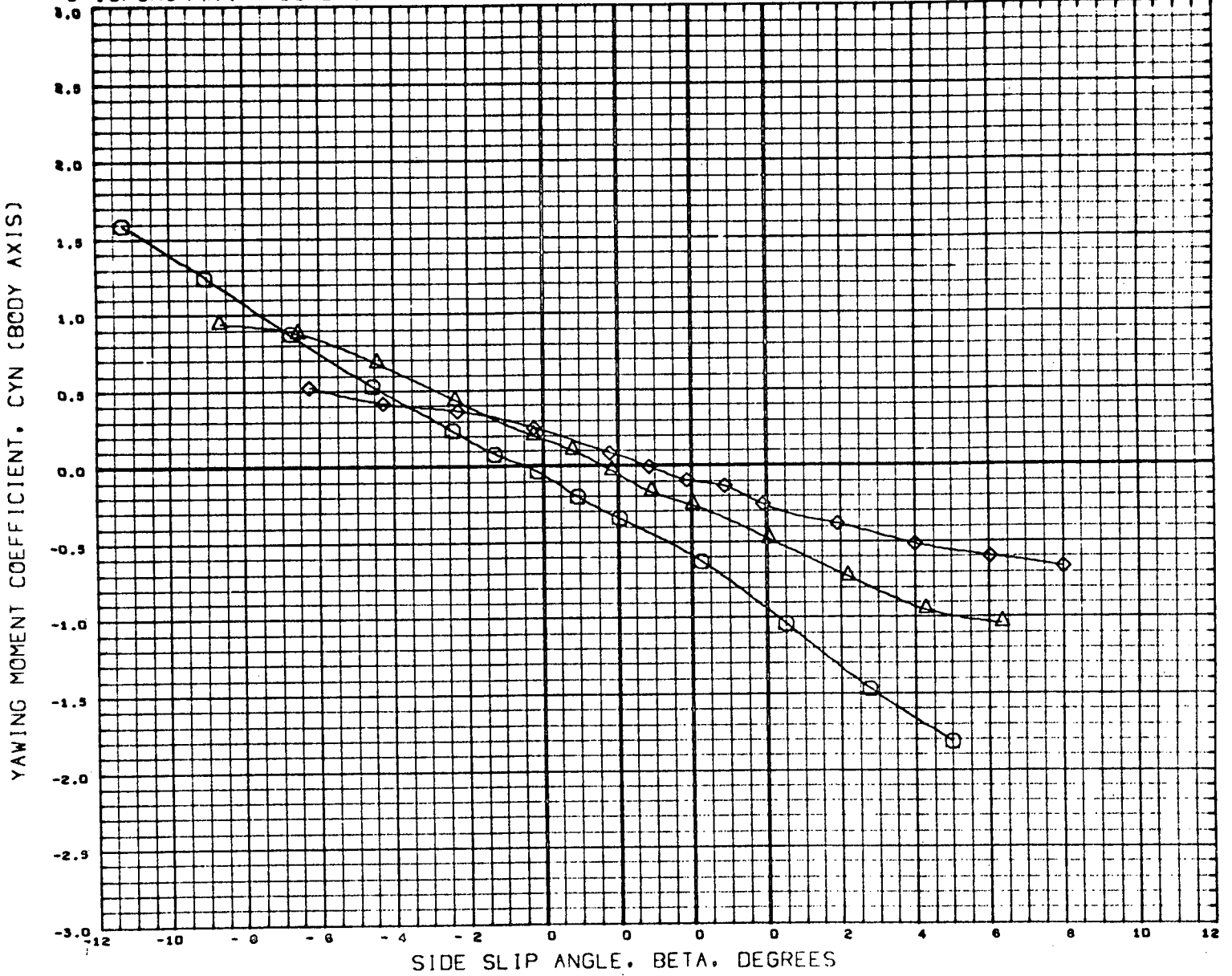


SYMBOL	MACH	PARAMETRIC VALUES		REFERENCE INFORMATION	
○	0.900	ALPHA	0.000	PHI	90.000
△	0.999	WINGIN	0.000		
◇	1.101				
□	1.209				

DATA HIST. CODE	CCCCC				
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SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

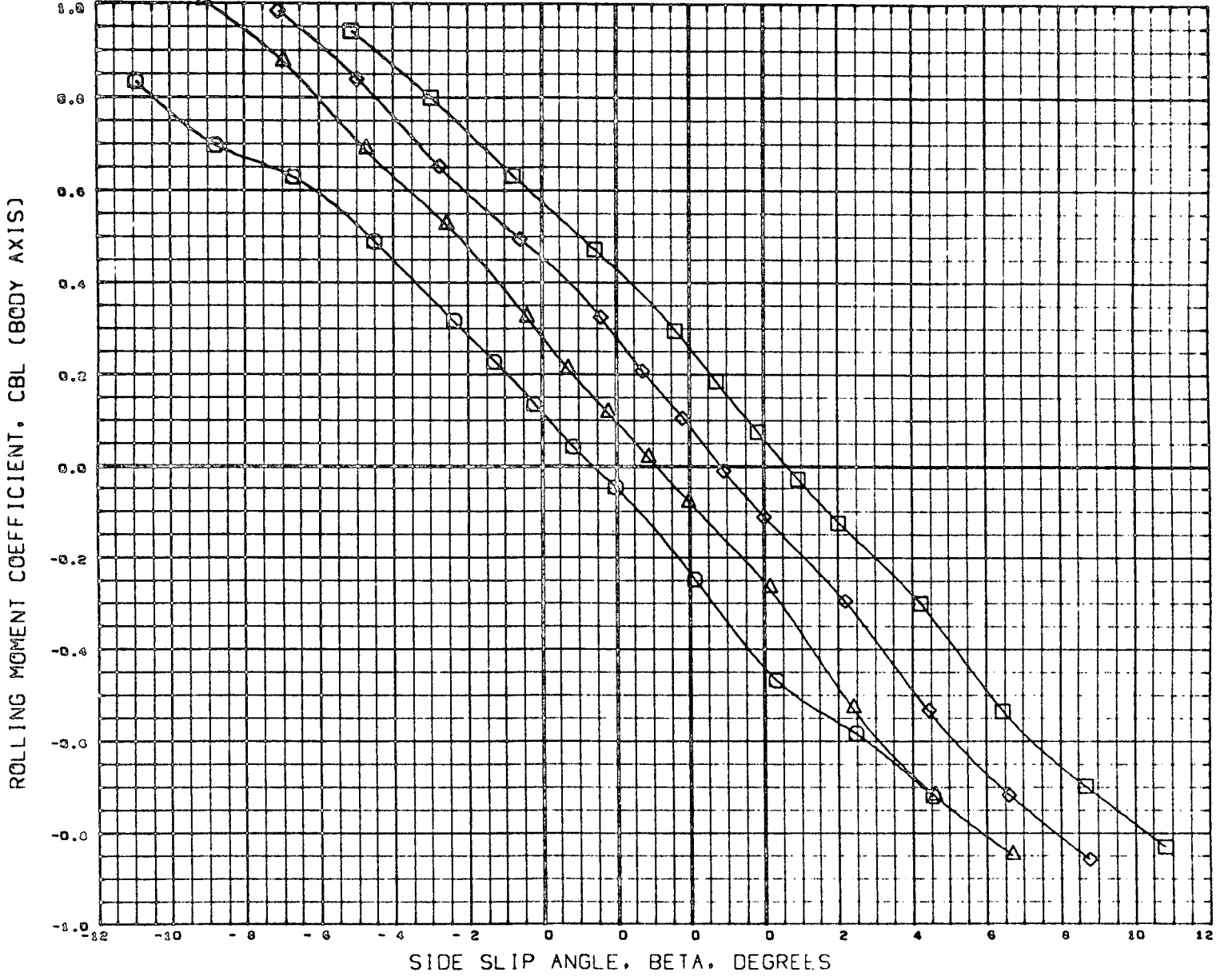


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
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◇	4.939			

REFERENCE INFORMATION		
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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

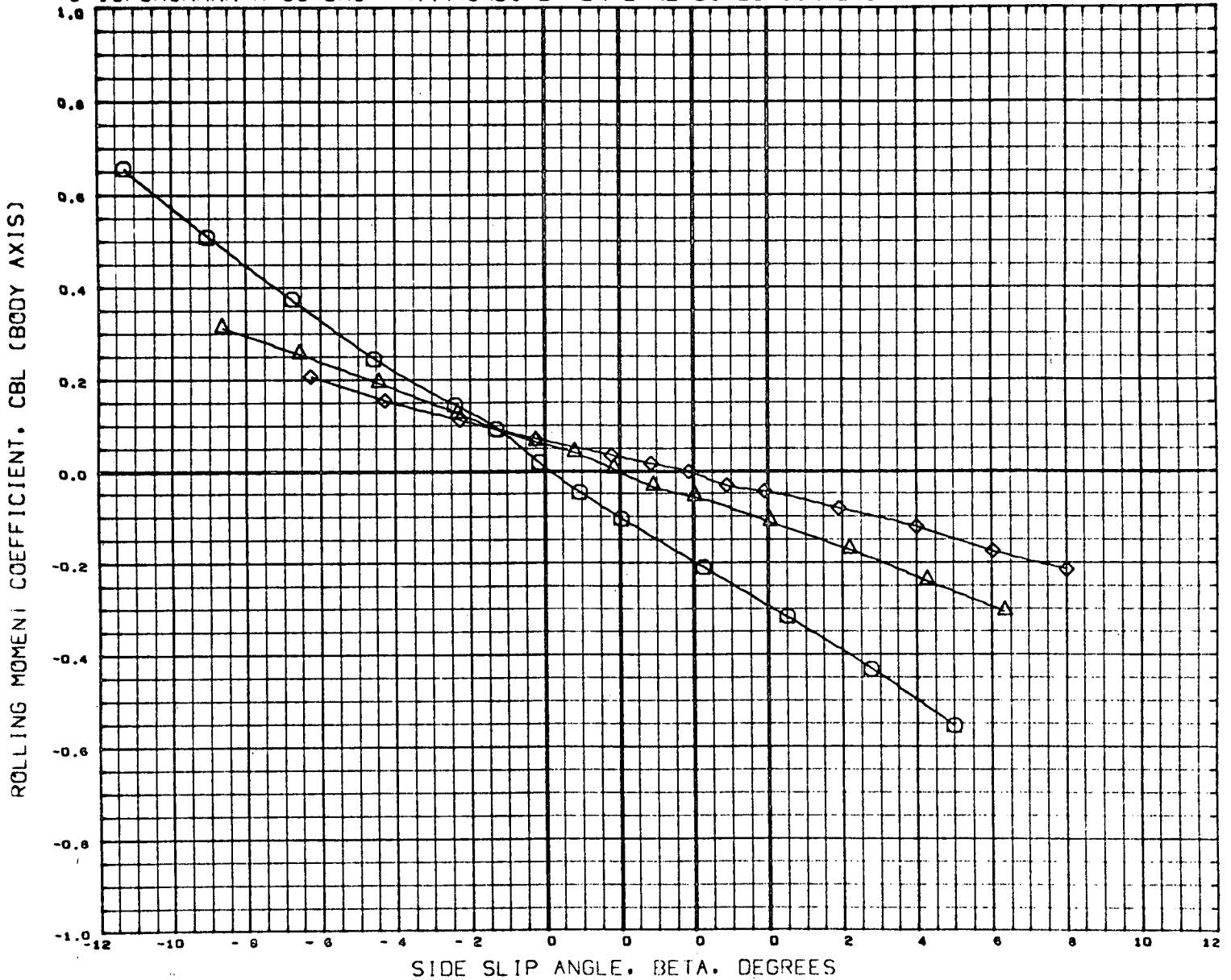


SYMBOL	MACH	PARAMETRIC VALUES		
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△	0.990	WIGIN	0.000	
◇	1.103			
□	1.205			

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

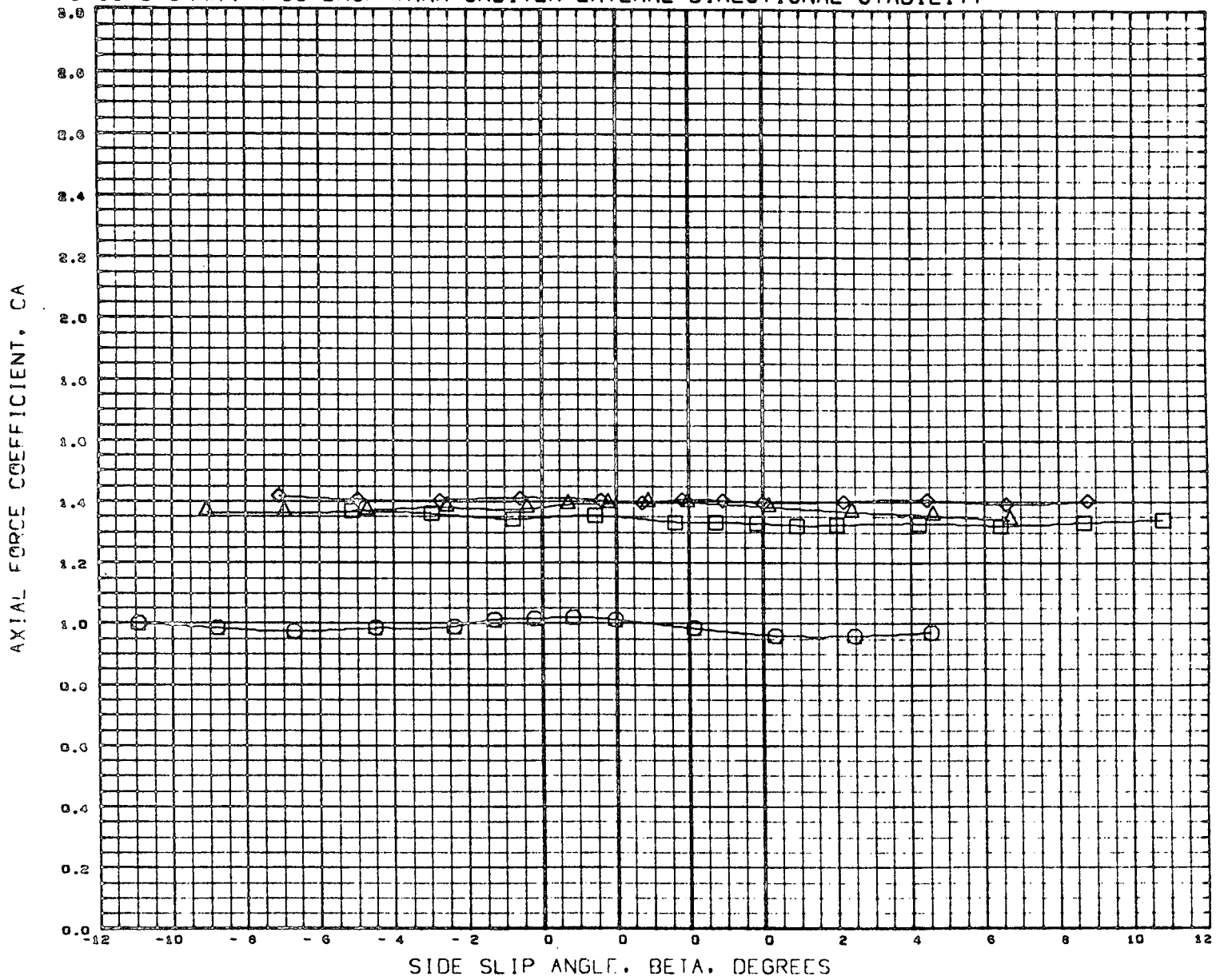


SYMBOL	MACH	PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI 90.000
△	3.480	WNGIN	0.000	
◇	4.959			

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

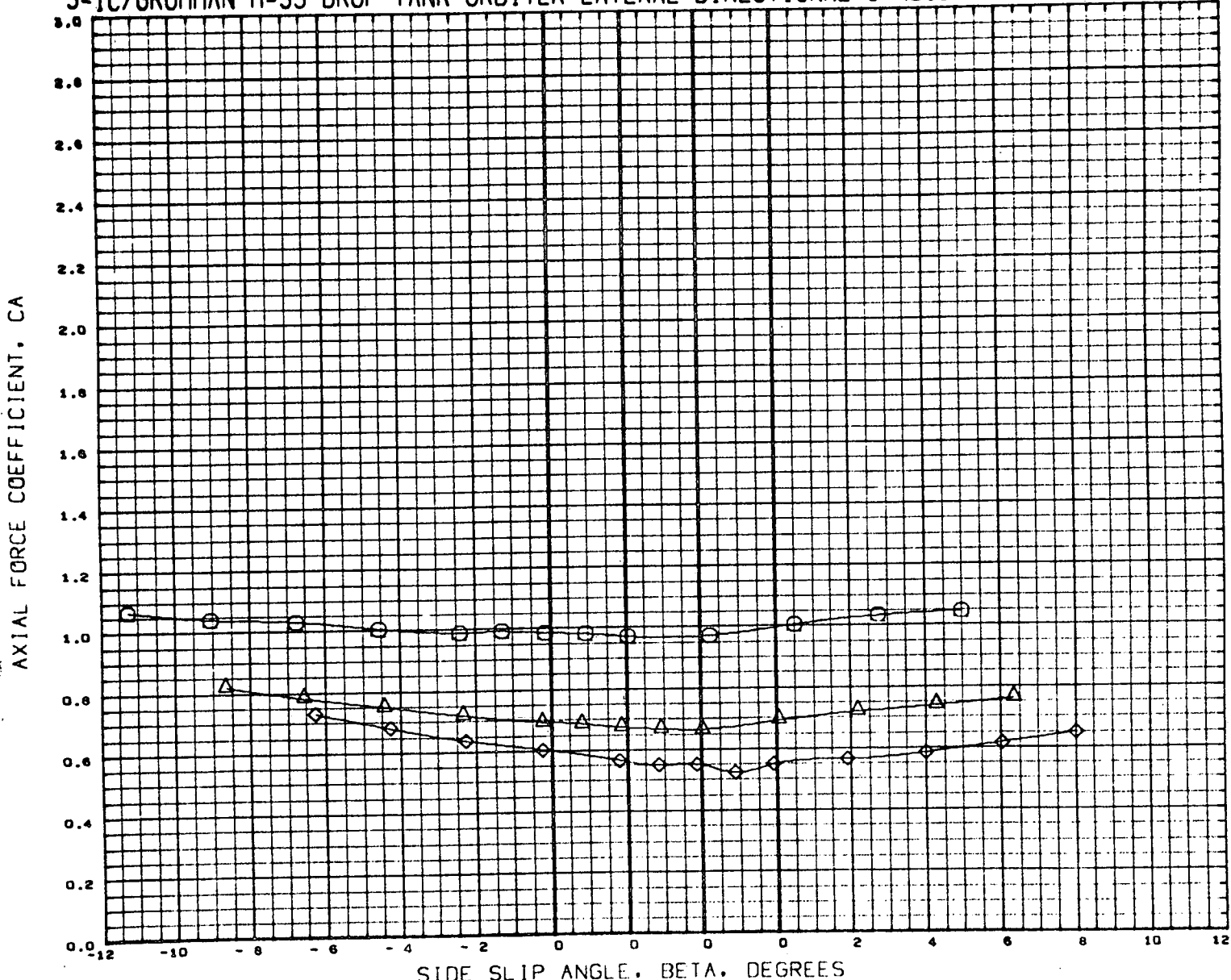


SYMBOL	MACH	PARAMETRIC VALUES			
△	0.900	ALPHA	0.000	PHI	90.000
□	0.990	WNGIN	0.000		
◇	1.101				
○	1.209				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

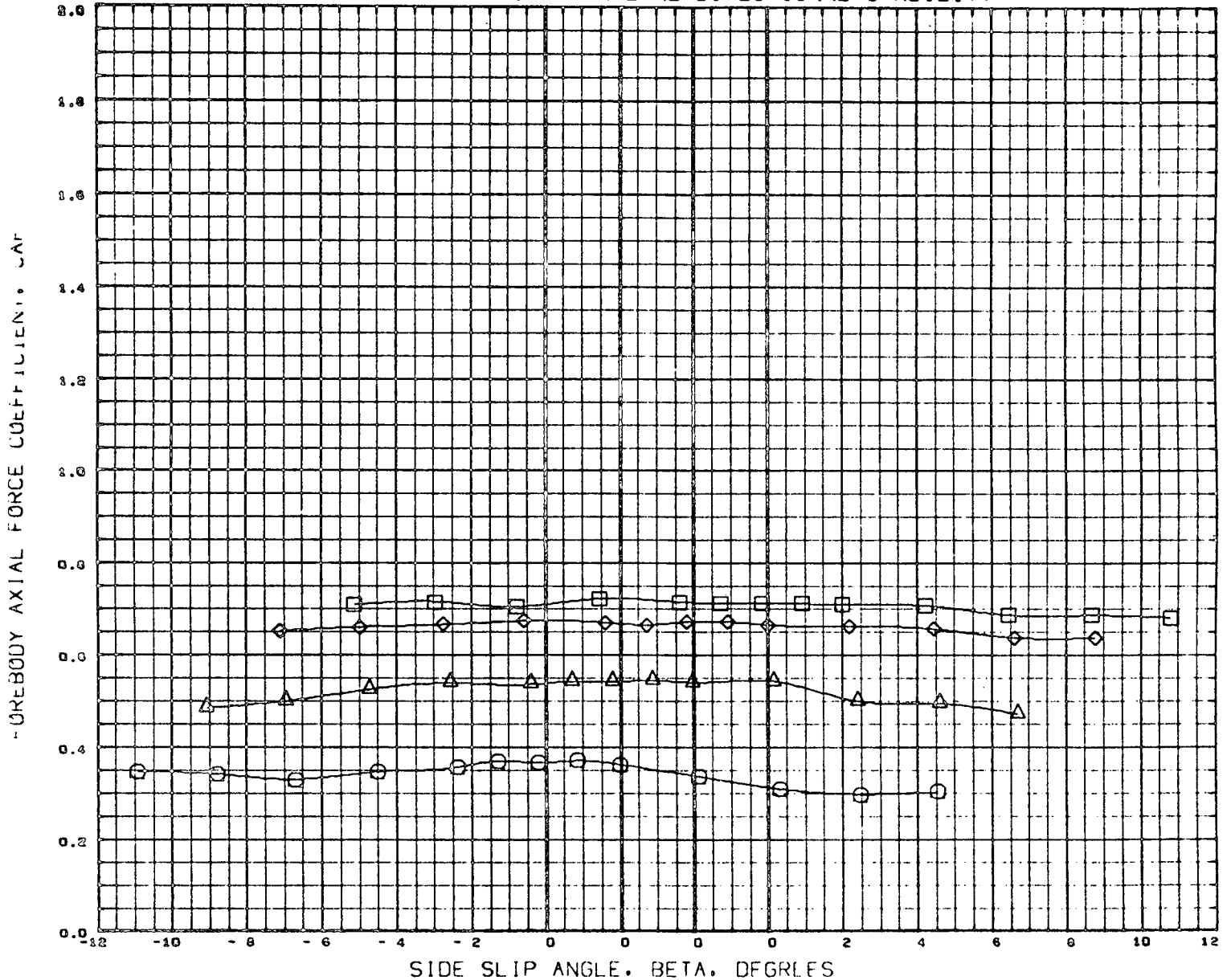


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	PHI	90.000
○	1.960	0.000			
△	3.480	0.000			
◇	4.959	0.000			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

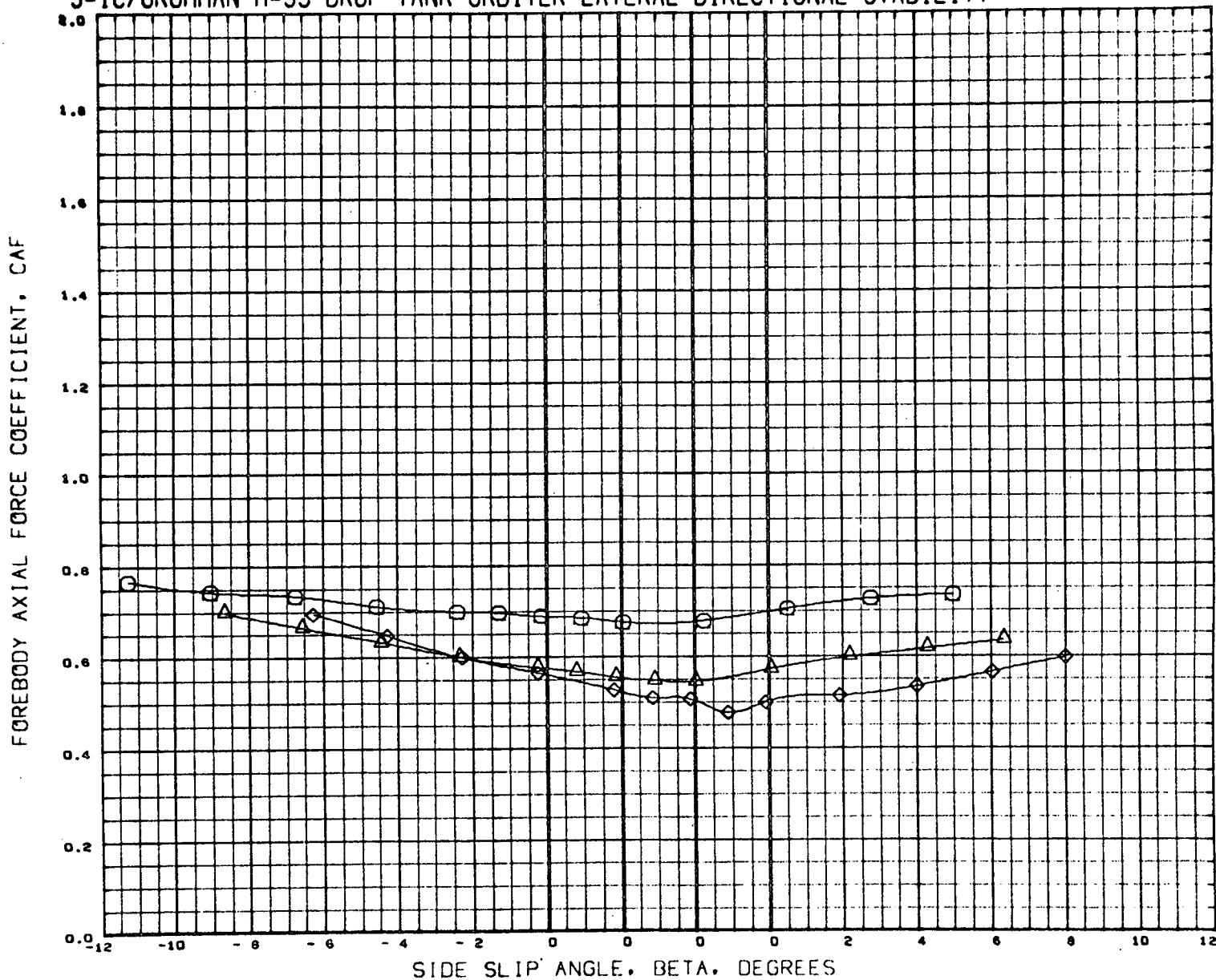
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
○	0.900	ALPHA	0.000	PHI	90.000	SREF	1.3960	sq. IN.
△	0.998	WNGIN	0.000			LREF	1.3330	IN.
◇	1.101					BREF	1.3330	IN.
□	1.209					XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

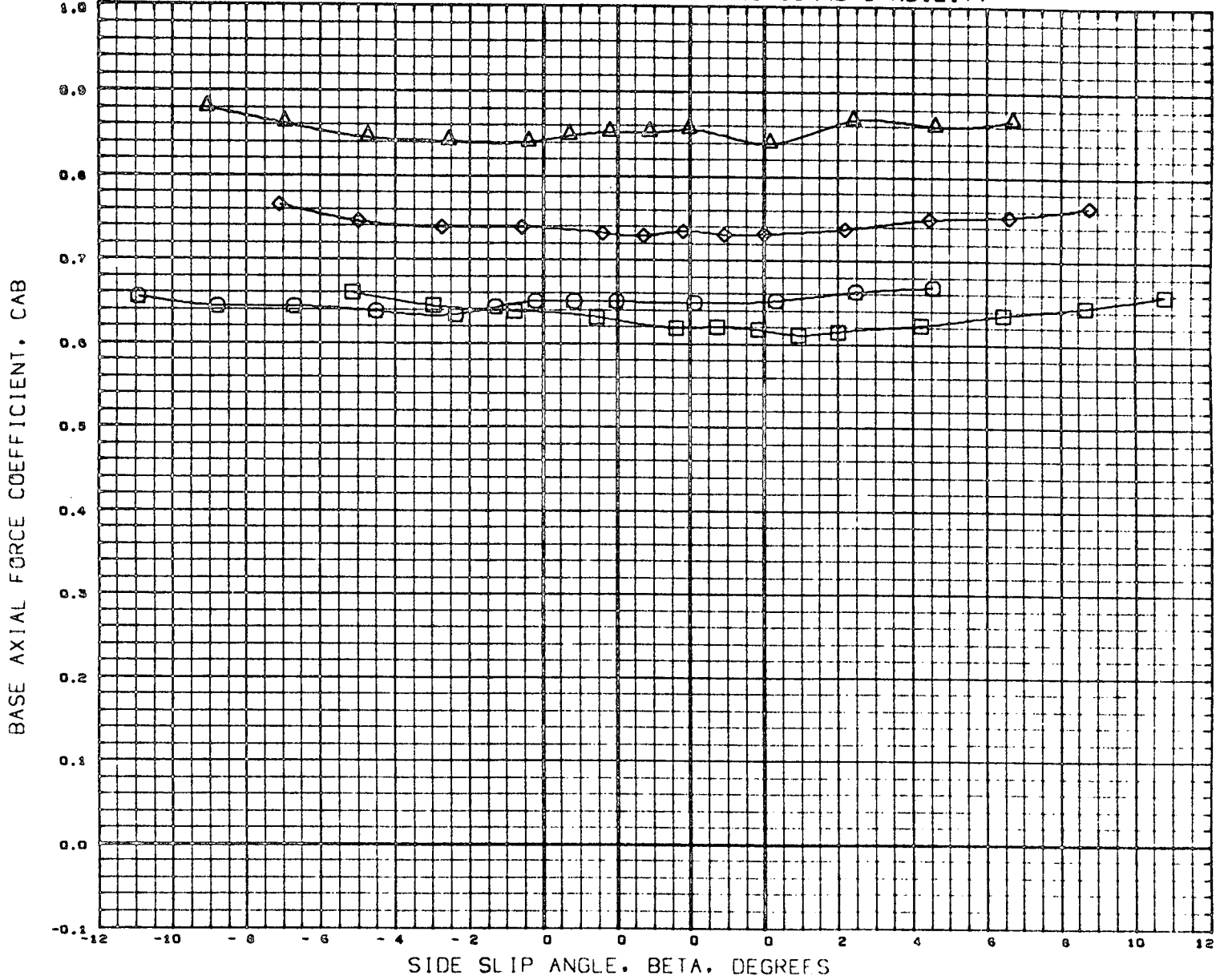


SYMBOL	MACH	PARAMETRIC VALUES			
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△	3.460	WNGIN	0.000		
◇	4.950				

REFERENCE INFORMATION		
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LREF	1.3330	IN.
BREF	1.3330	IN.
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

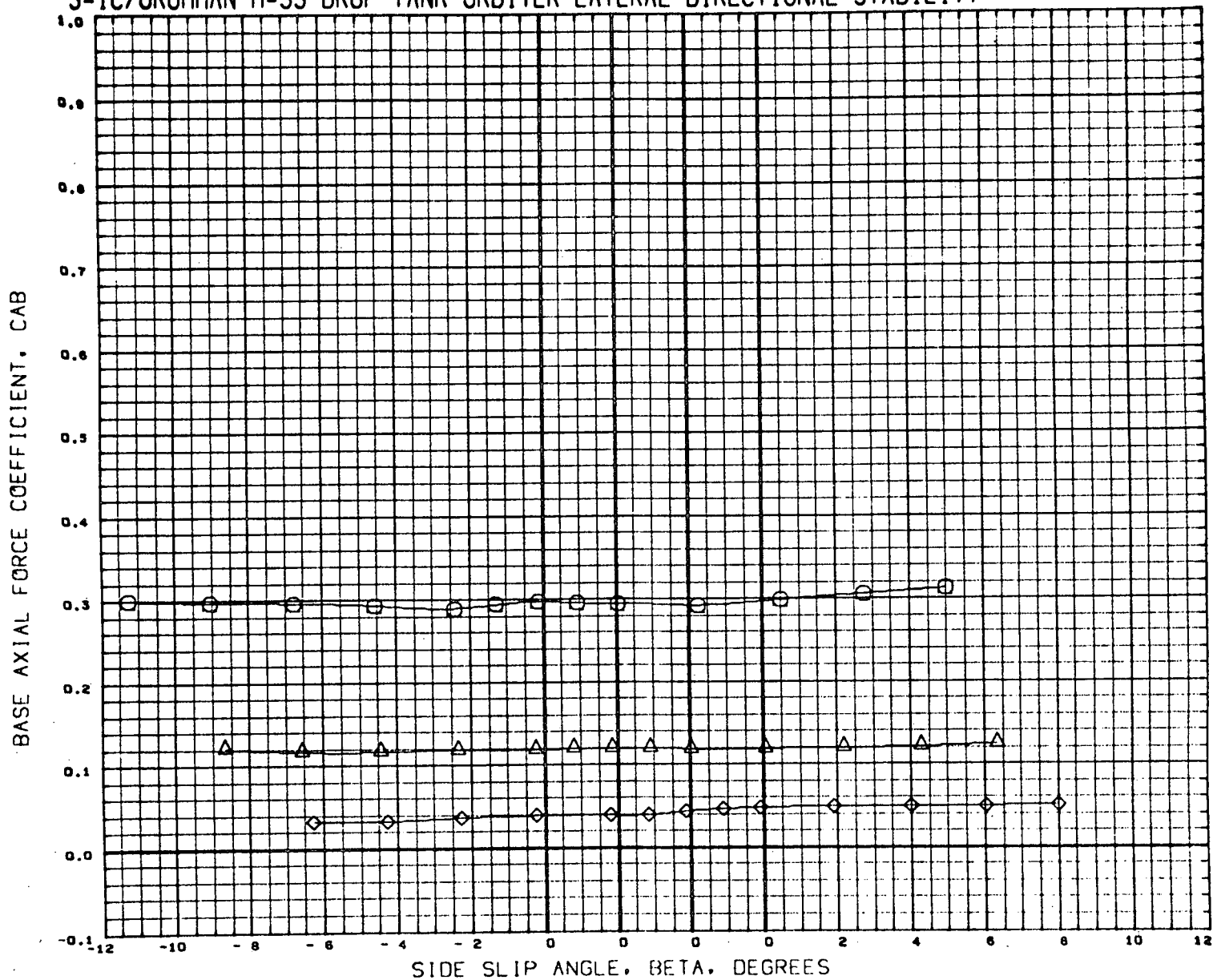
S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES		REFERENCE INFORMATION				
○	0.900	ALPHA	0.000	PHI	90.000	SREF	1.3960	SQ. IN.
△	0.990	WNGIN	0.000			LREF	1.3330	IN.
◇	1.103					BREF	1.3330	IN.
□	1.209					XMRP	3.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.480	WNCIN	0.000		
◇	4.959				

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

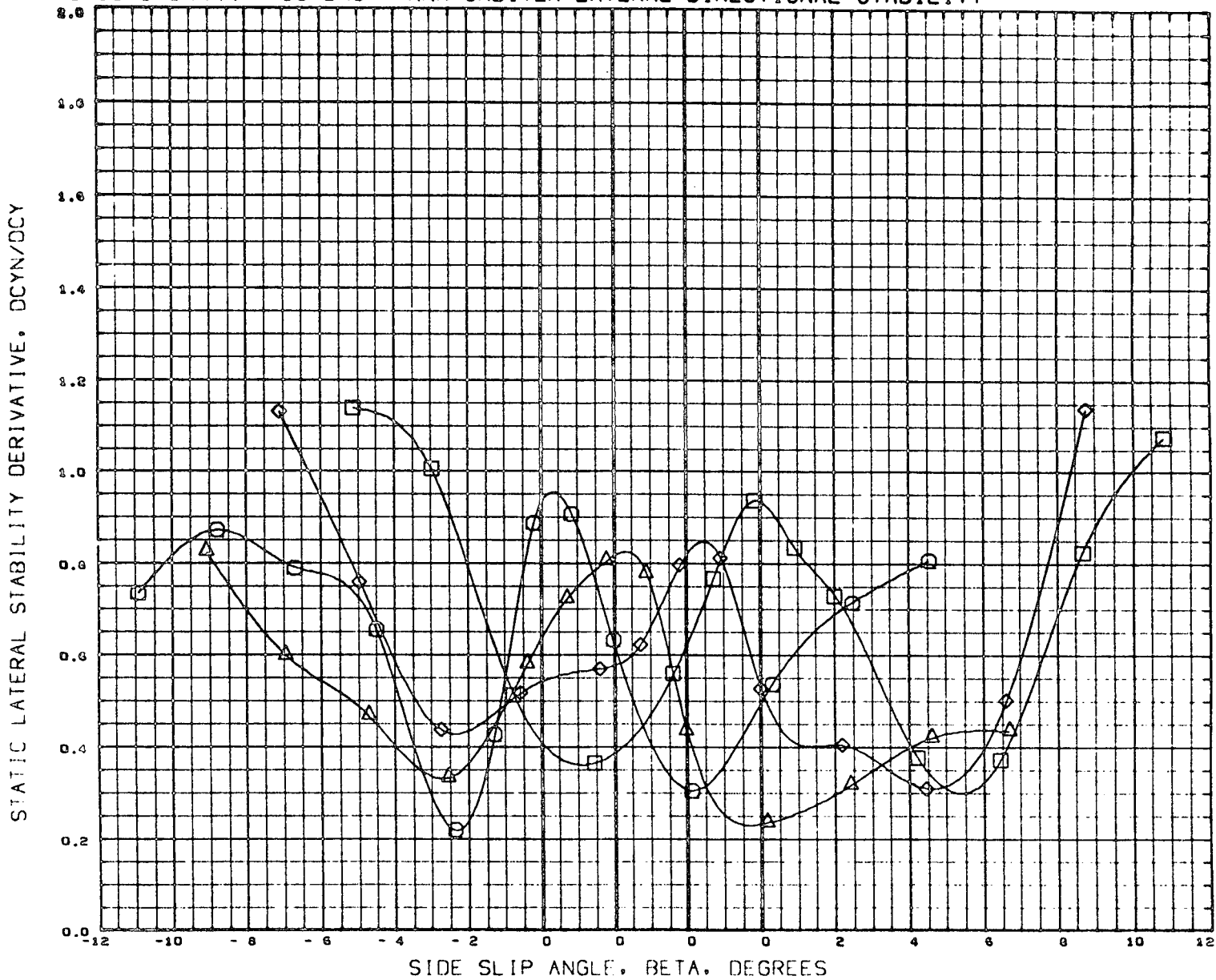
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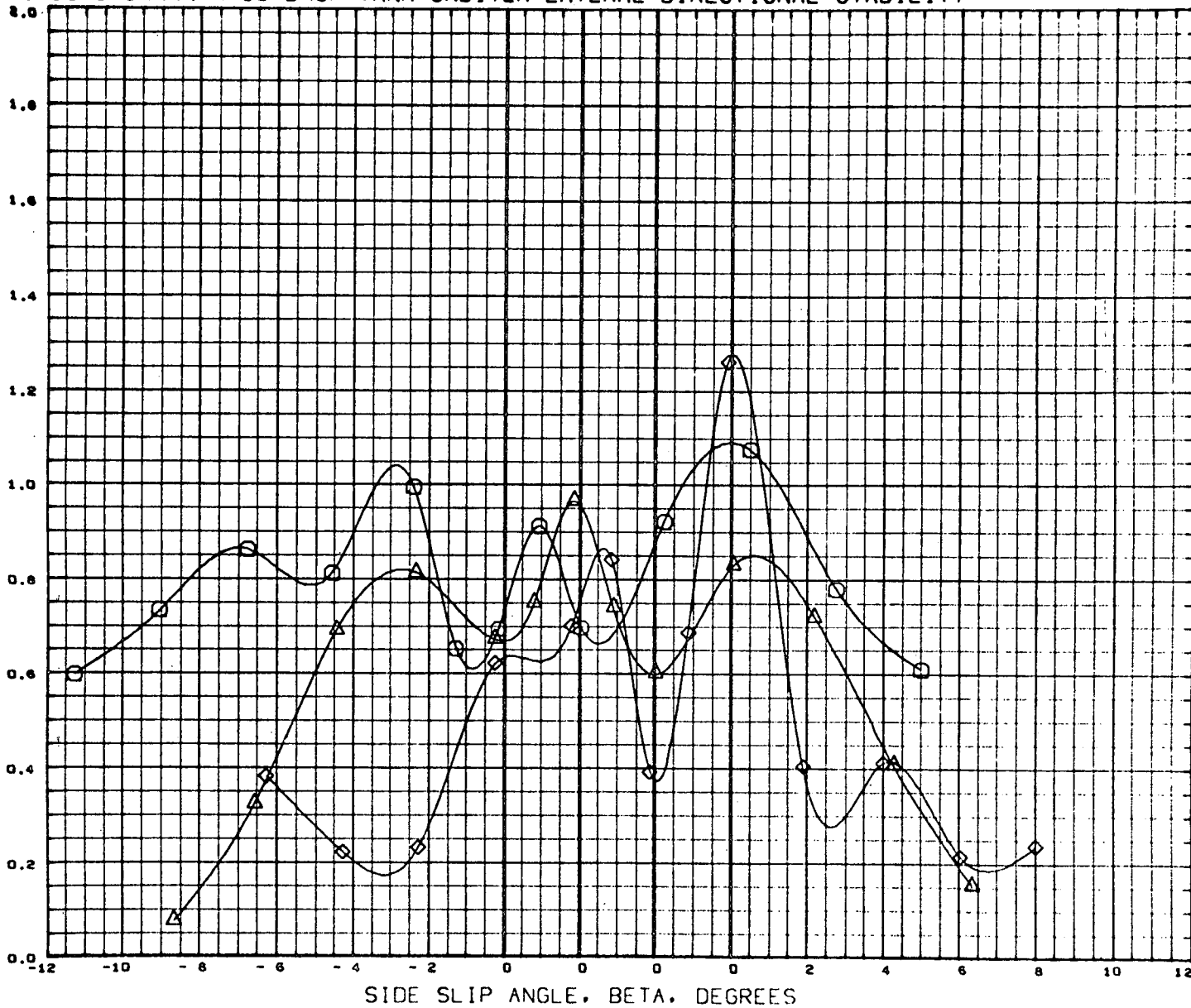
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○	0.900					
□	0.998					
△	1.101					
◇	1.203					

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY

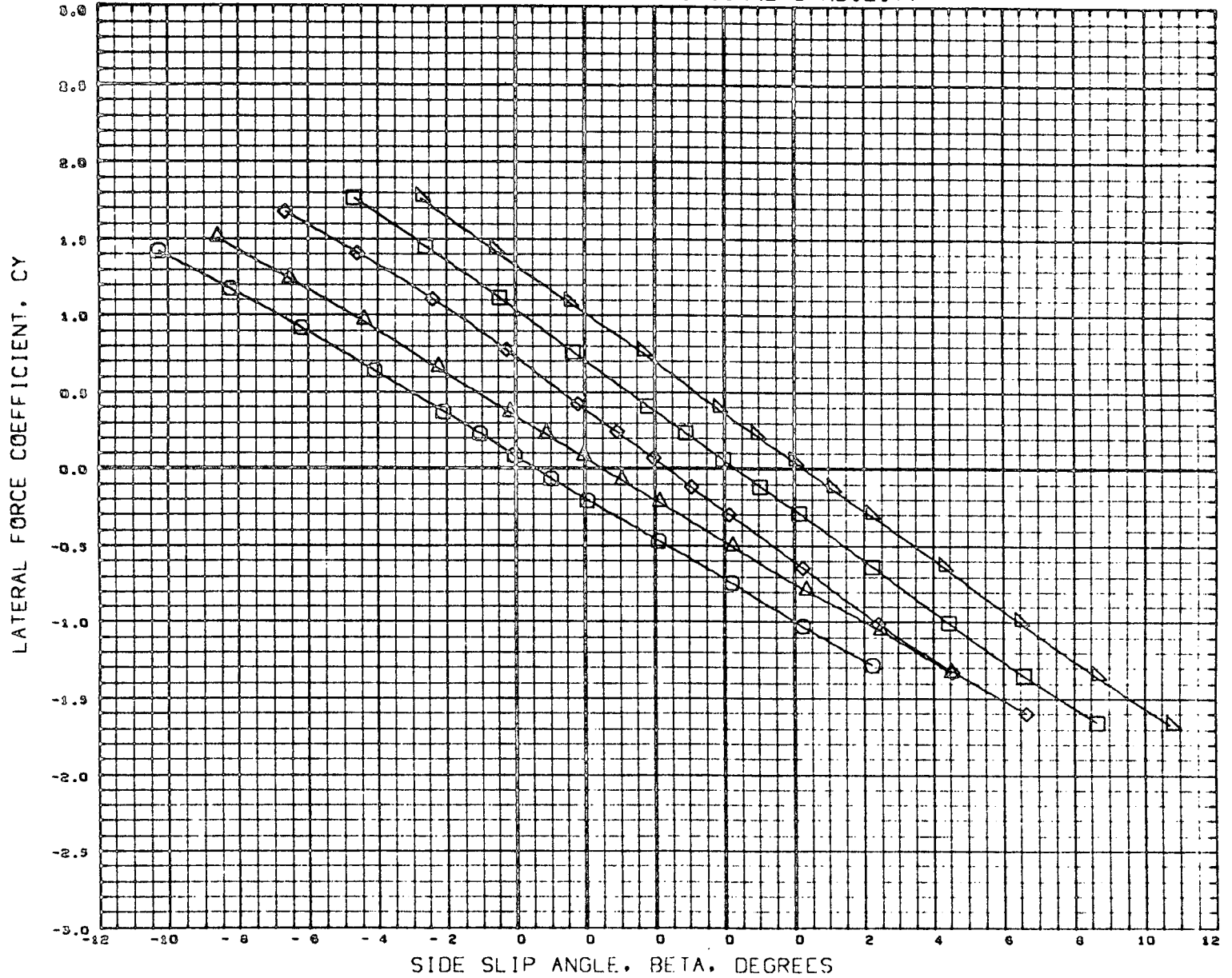


SYMBOL	MACH	PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI 90.000
△	3.480	WNGIN	0.000	
◇	4.959			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

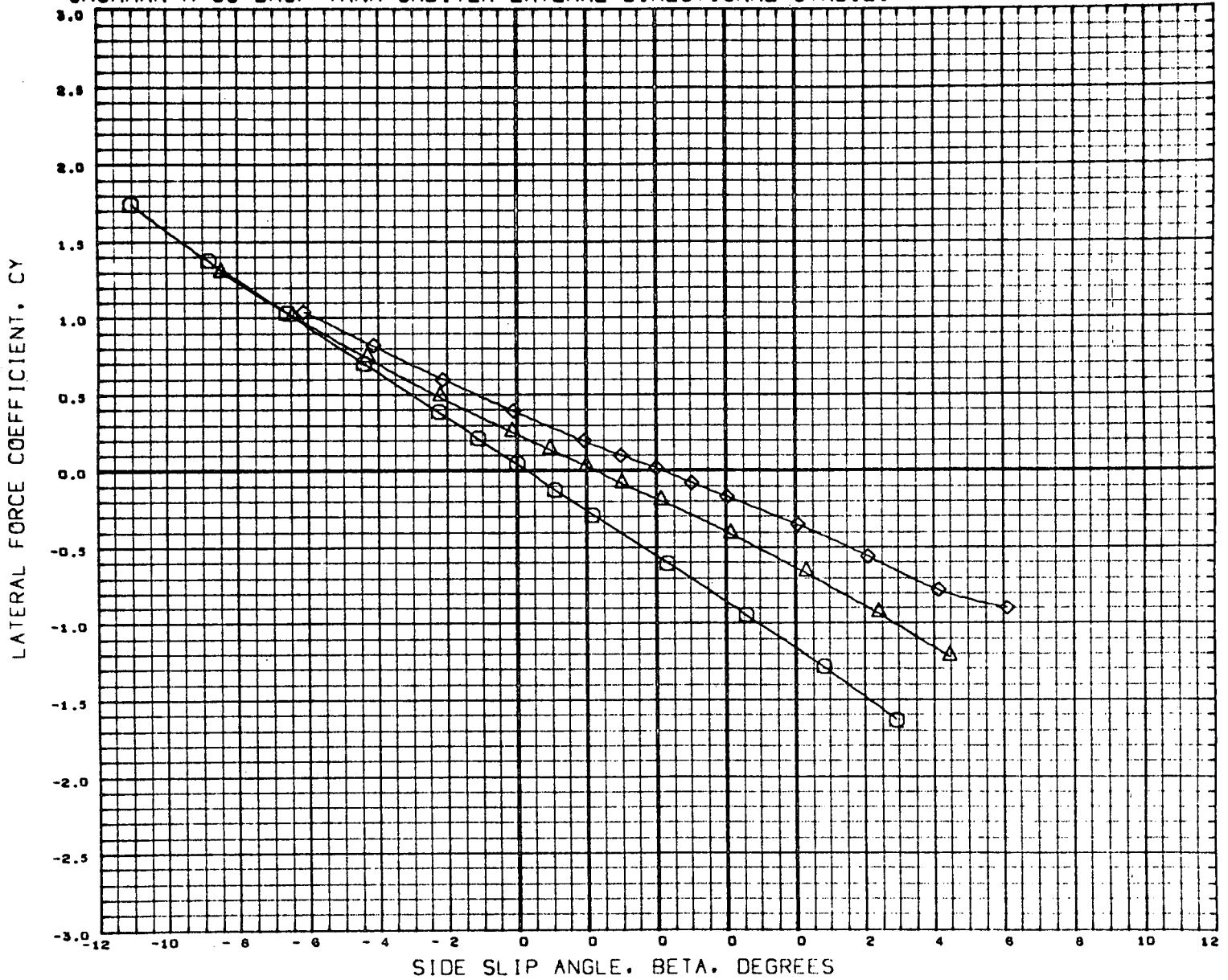


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	0.596	0.000	
□	0.895		
△	0.990		
◇	1.100		
▽	1.196		

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	- 5.3070	IN.
YMRP	0.0000	IN.
ZMRP	- 0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

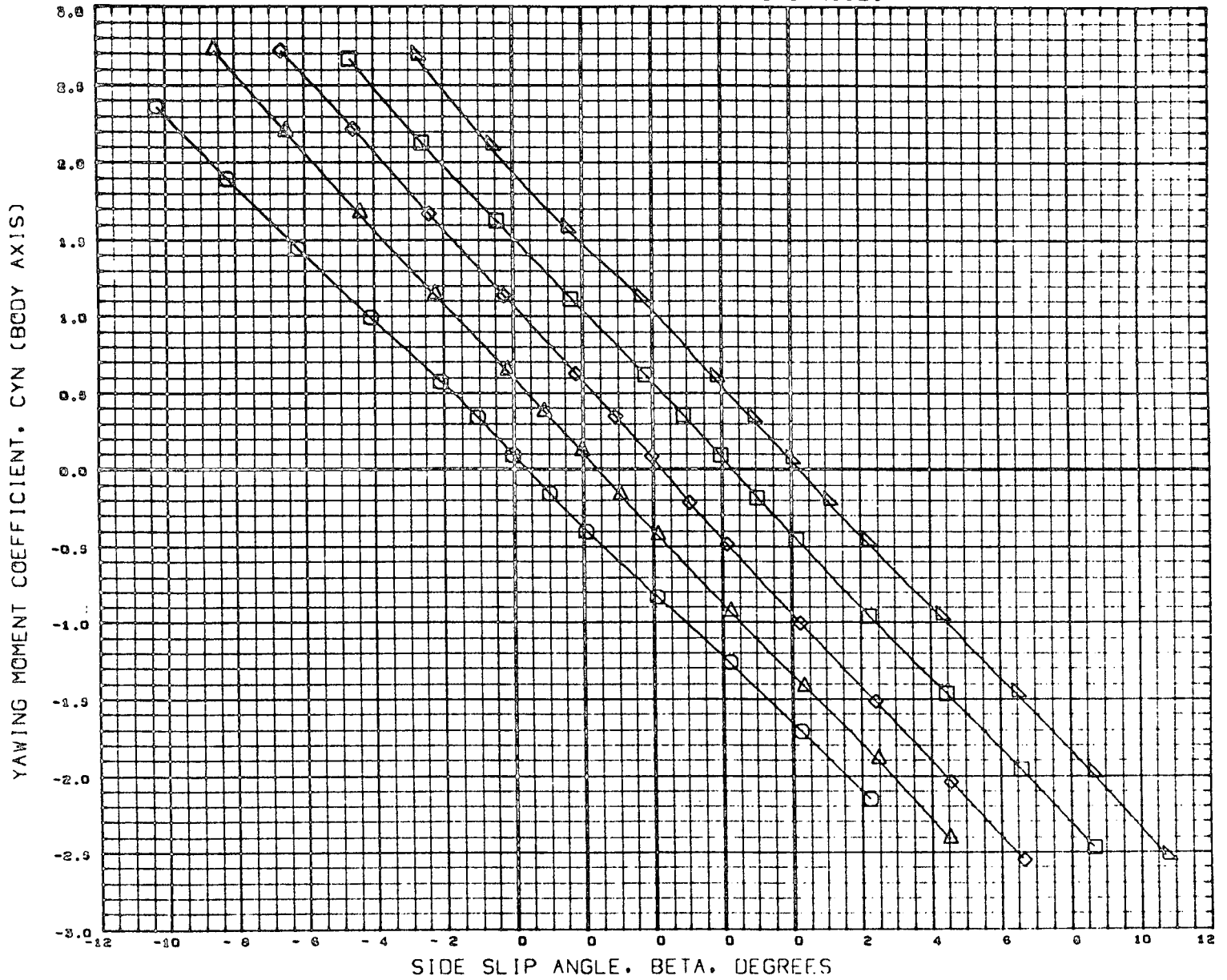


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	1.959	0.000	
△	3.480		
◇	4.959		

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	- 5.5070	in.
YMRP	0.0000	in.
ZMRP	- 0.4250	in.
SCALE	0.0034	

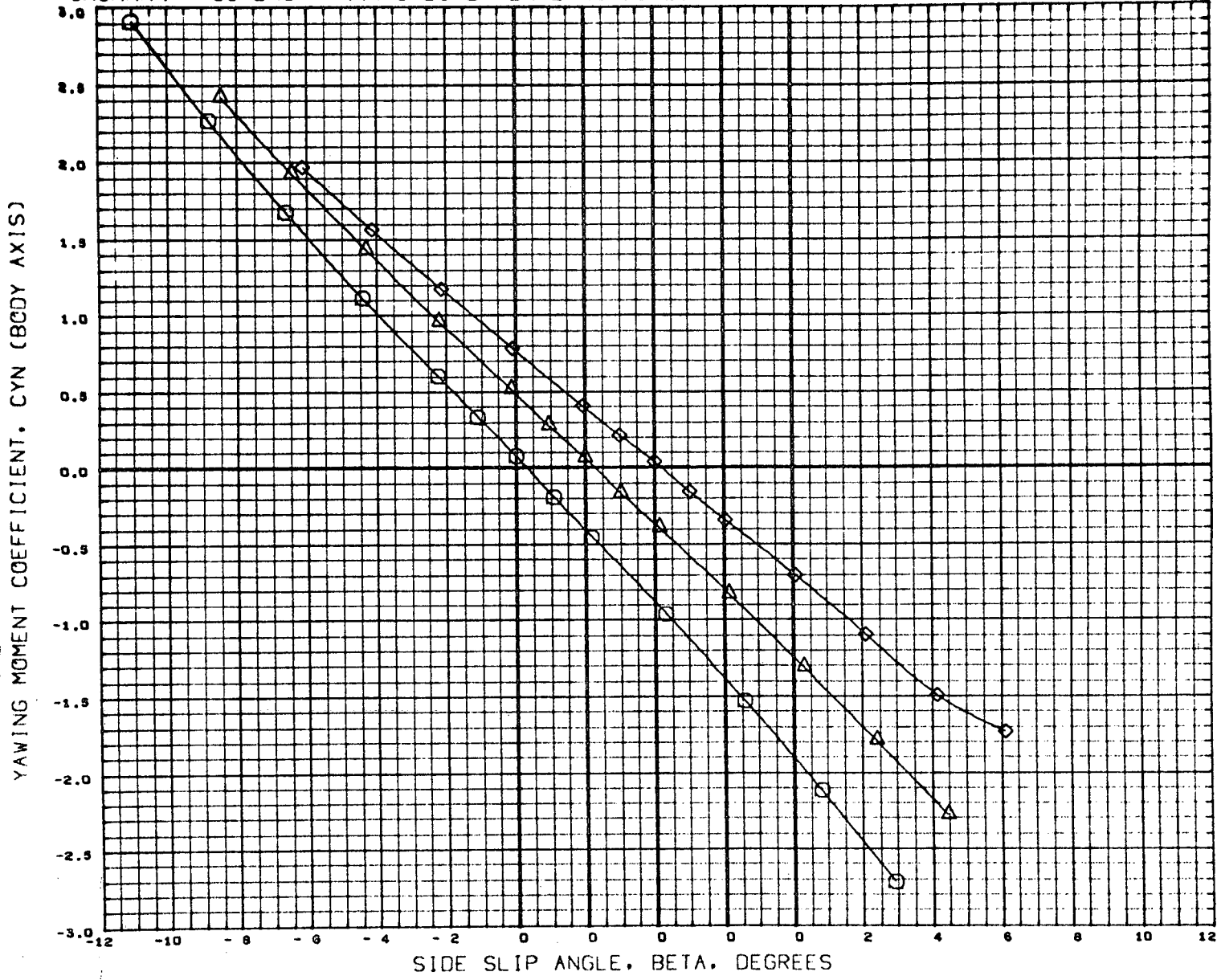
DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES	REFERENCE INFORMATION
○	0.996	ALPHA 0.000	SREF 1.3960 SQ. IN.
□	0.995		LREF 1.3330 IN.
△	0.994		BREF 1.3330 IN.
◇	1.100		XMRP - 5.5070 IN.
▽	1.190		YMRP 0.0000 IN.
×			ZMRP - 0.4250 IN.
		DATA HIST. CODE CCCC	SCALE 0.0034

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

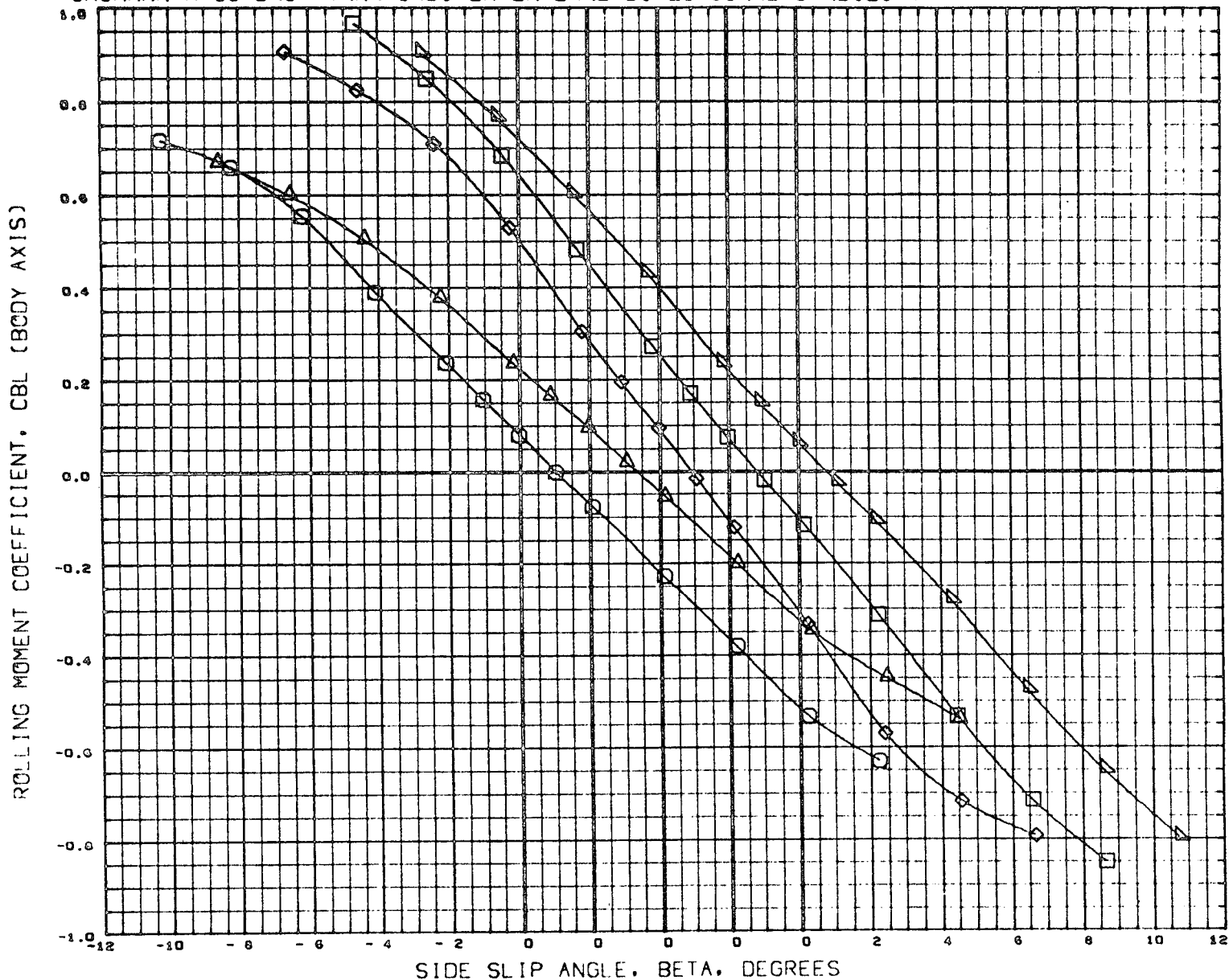


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	1.959		0.000
△	3.480		
◇	4.959		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	- 5.5070	IN.
YMRP	0.0000	IN.
ZMRP	- 0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

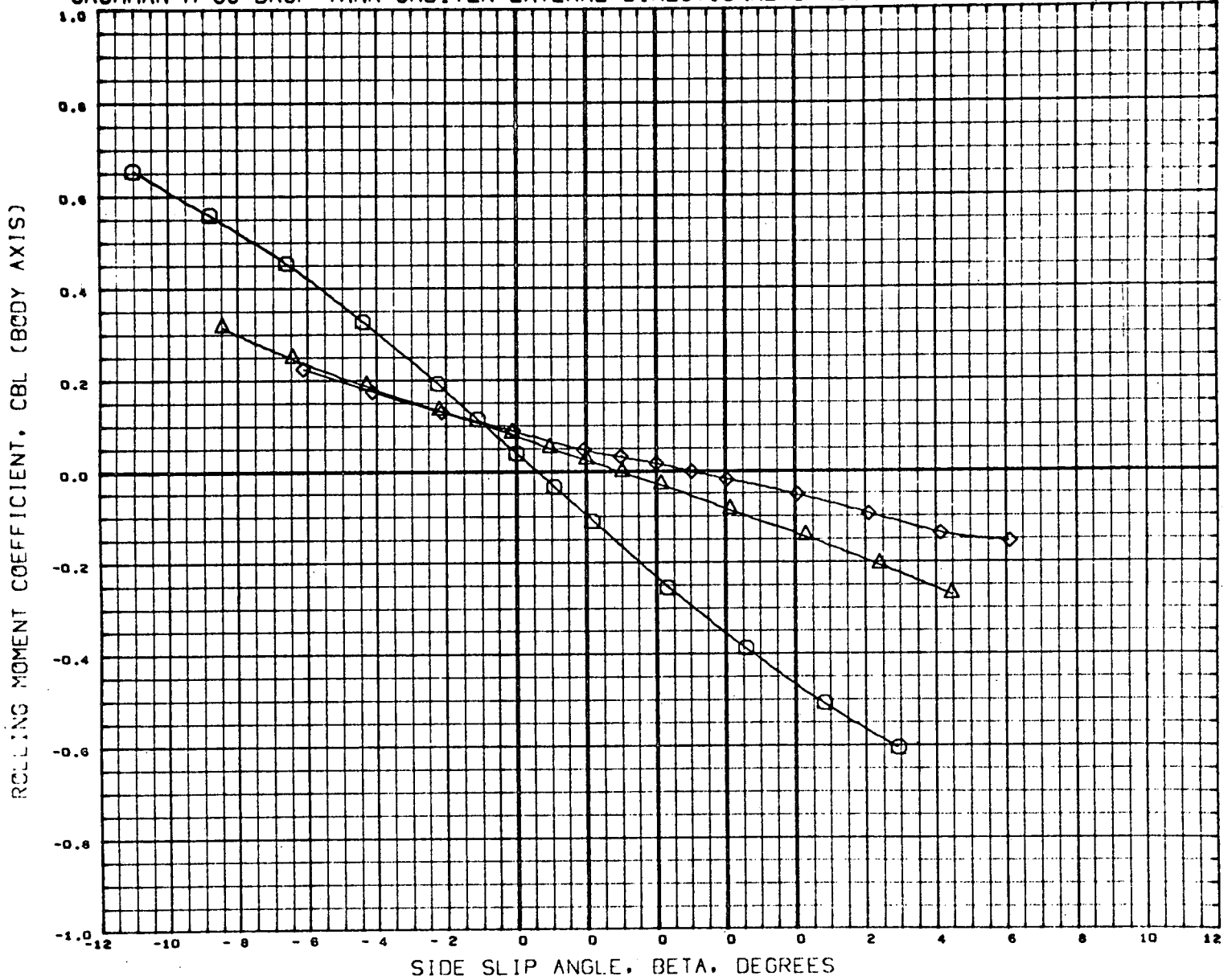


SYMBOL	MACH	PARAMETRIC VALUES
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□	0.995	
△	0.994	
○	1.100	
×	1.190	

DATA HIST. CODE CCCGC

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	5.5070	in.
YMRP	0.0000	in.
ZMRP	0.4250	in.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

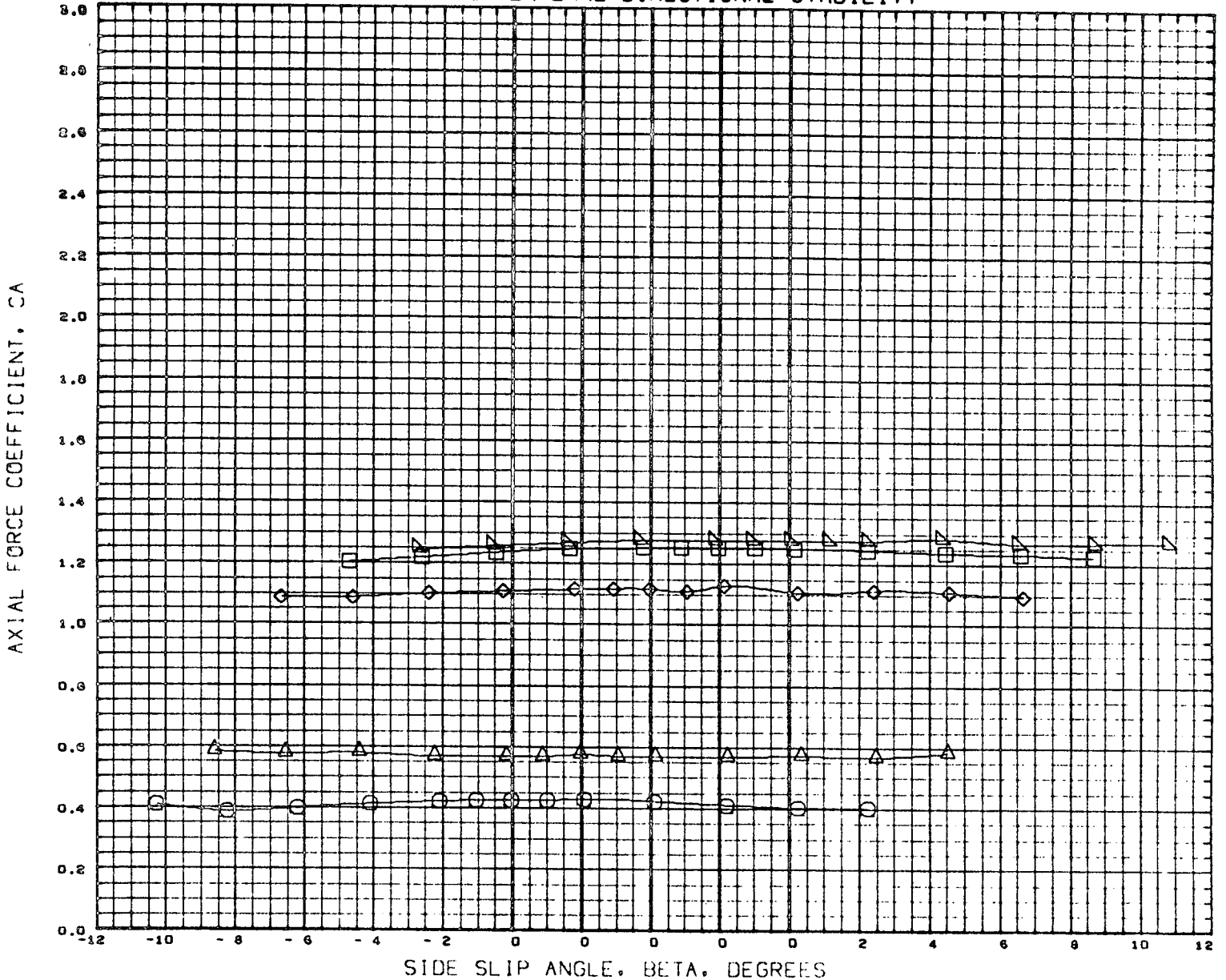


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	1.959	0.000	
△	3.480		
◇	4.959		

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRF	5.5070	in.
YMRF	0.0000	in.
ZMRF	0.4250	in.
SCALE	0.0034	

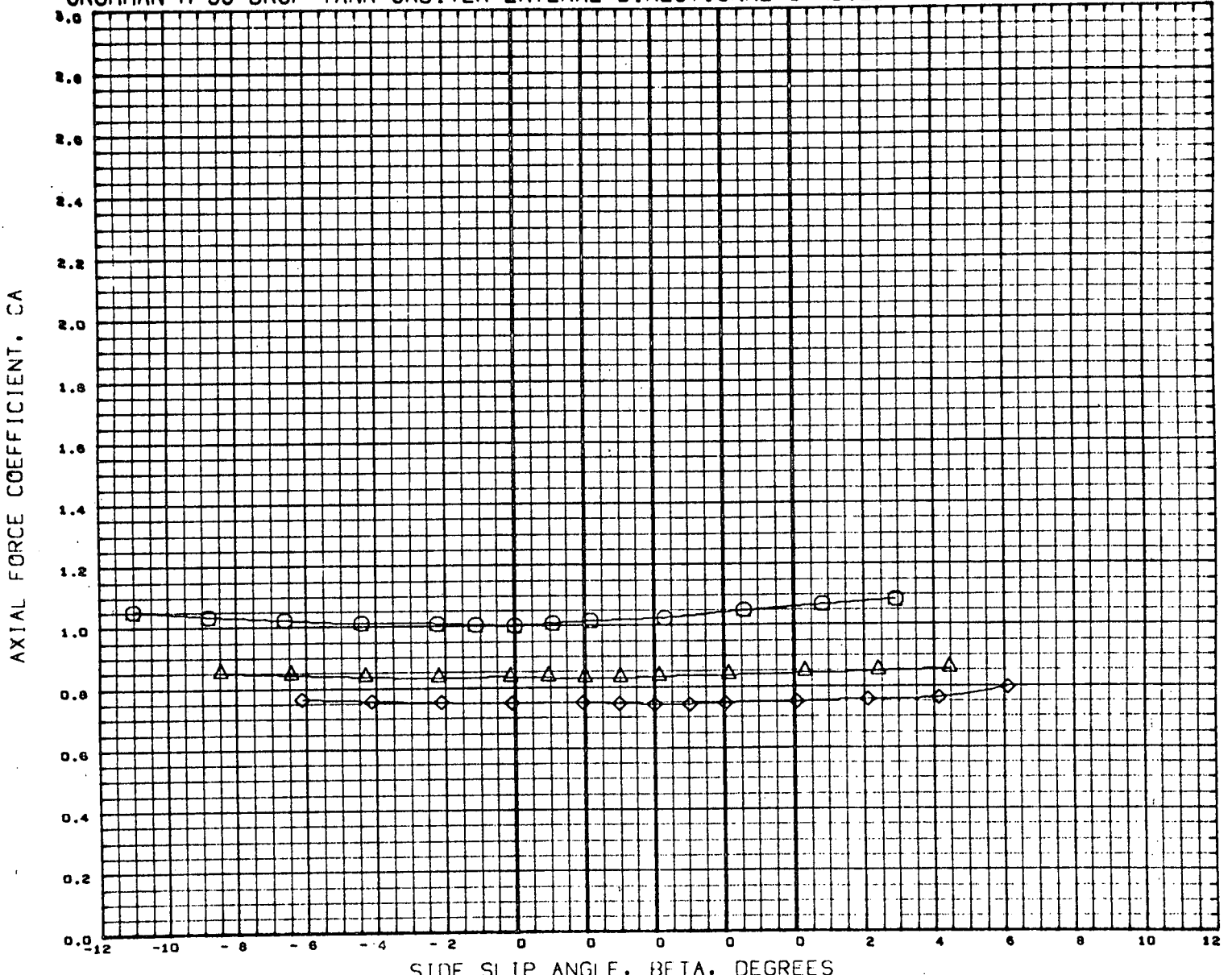
DATA HIST. CODE CCGG

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES	REFERENCE INFORMATION
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◇	0.693		LREF 1.3330 IN.
△	0.994		BREF 1.3330 IN.
○	1.100		XMRP - 5.5070 IN.
	1.196		YMRP 0.0000 IN.
			ZMRP - 0.4250 IN.
			SCALE 0.0034
	DATA HIST. CODE	CCCCC	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

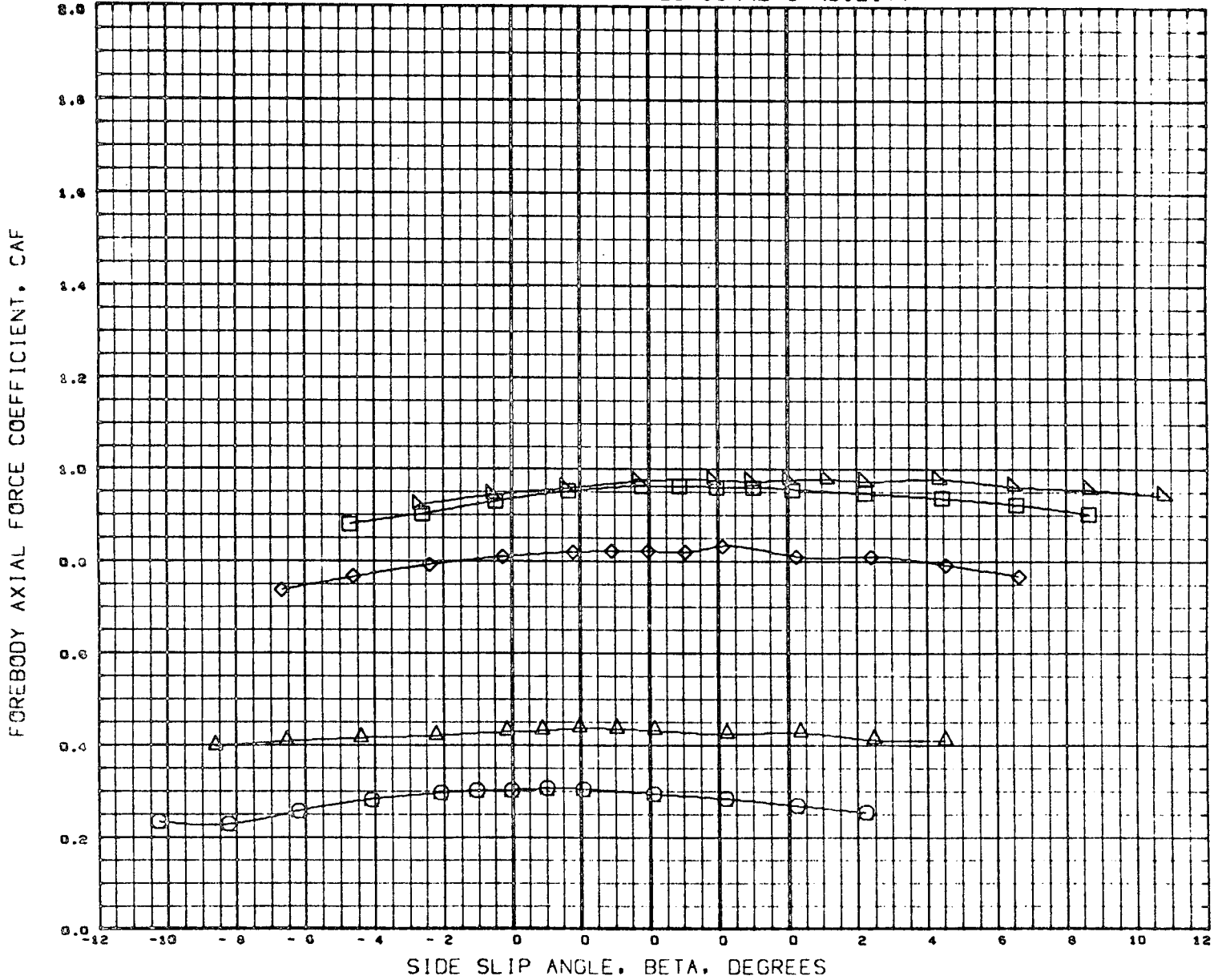


SYMBOL MACH ALPHA PARAMETRIC VALUES
 ○ 1.959
 △ 3.480
 ◇ 4.959

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP - 5.5070 IN.
 YMRP 0.0000 IN.
 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

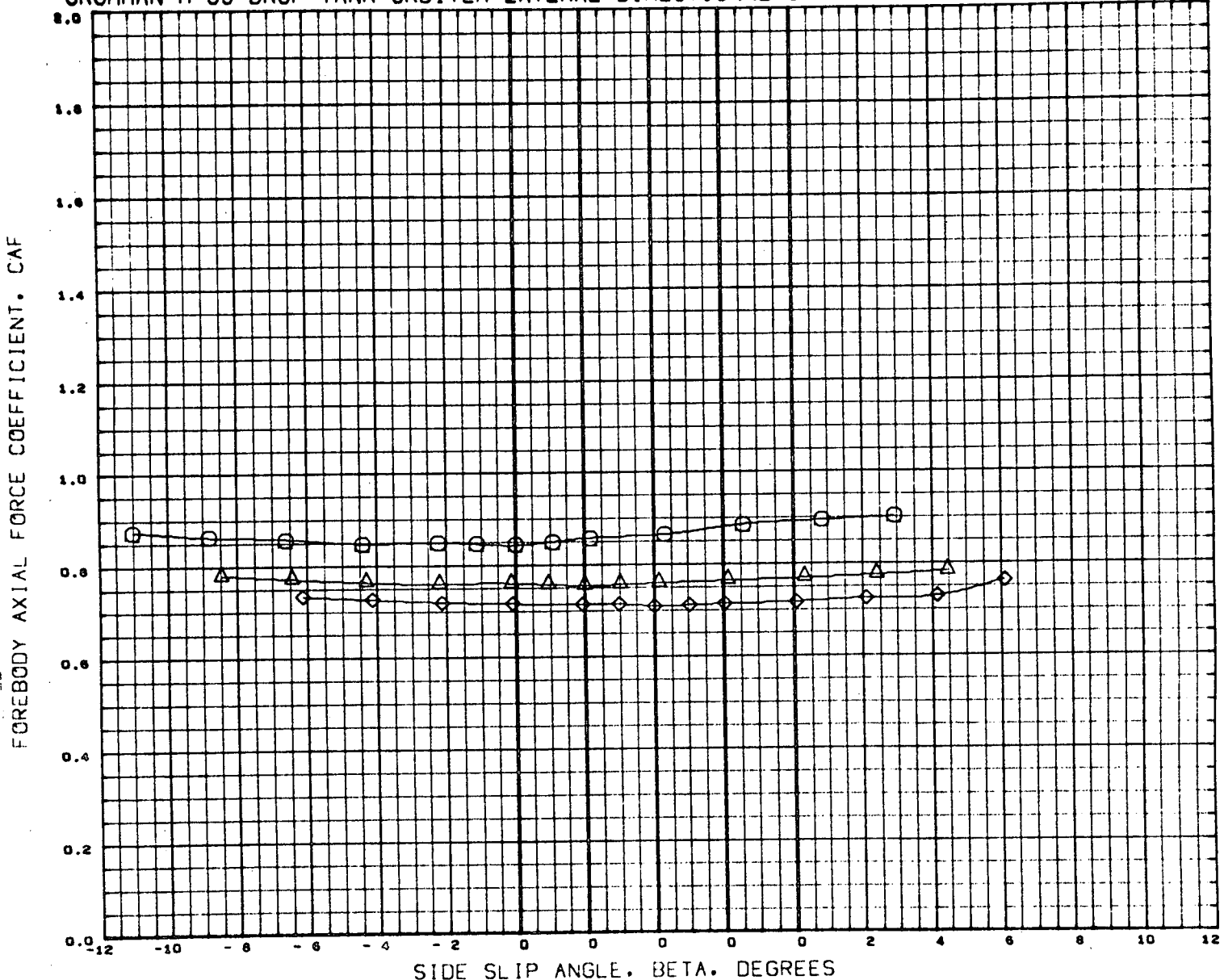


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	0.996	0.000	0.000
△	0.995		
◇	0.994		
□	1.100		
▽	1.196		

DATA HIST. CODE CCCC

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP -	5.5070	IN.
YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

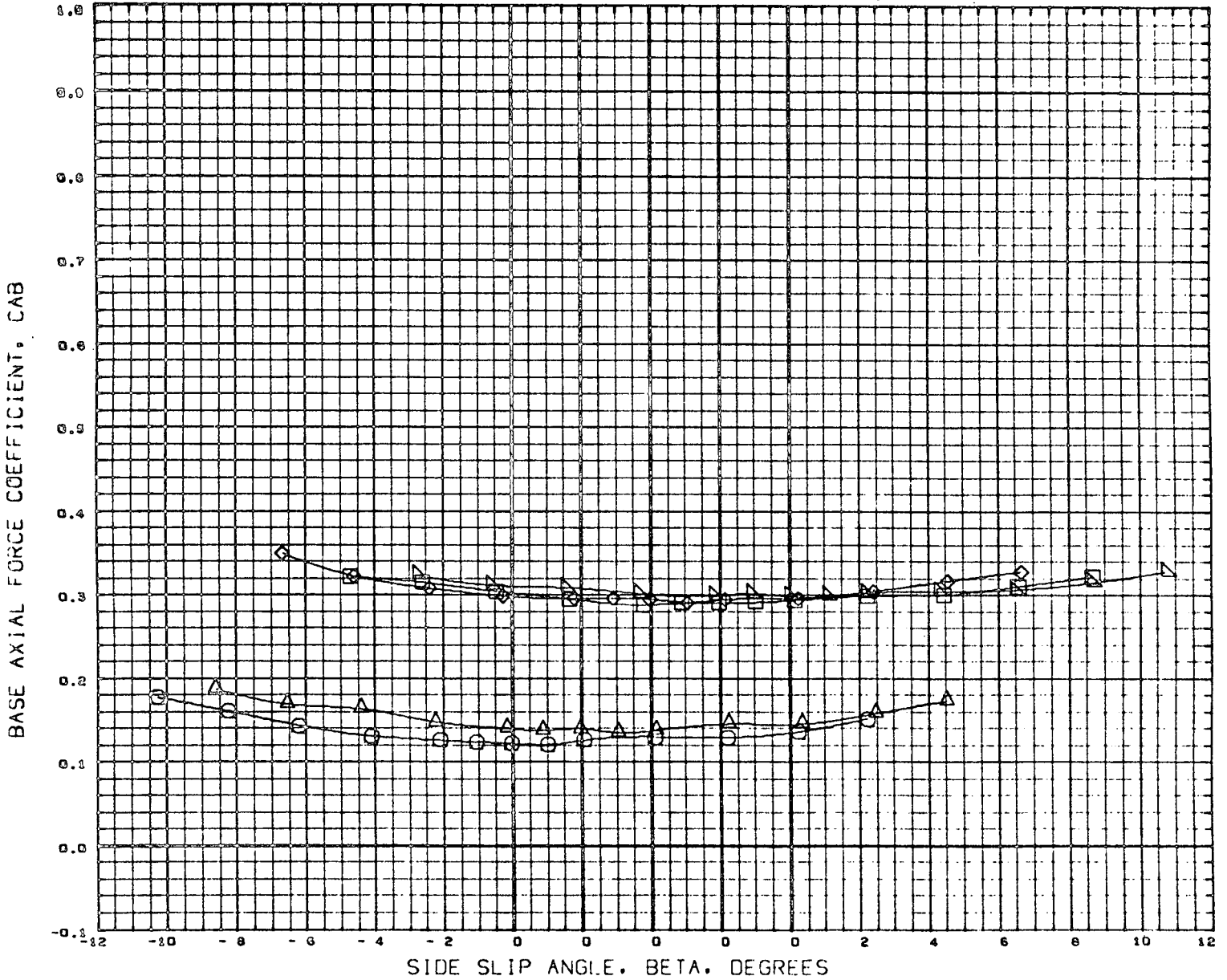


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	1.959		0.000
△	3.480		
◇	4.959		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.5070	IN.
YMRP	0.0000	IN.
ZMRP	0.4250	IN.
SCALE	0.0034	

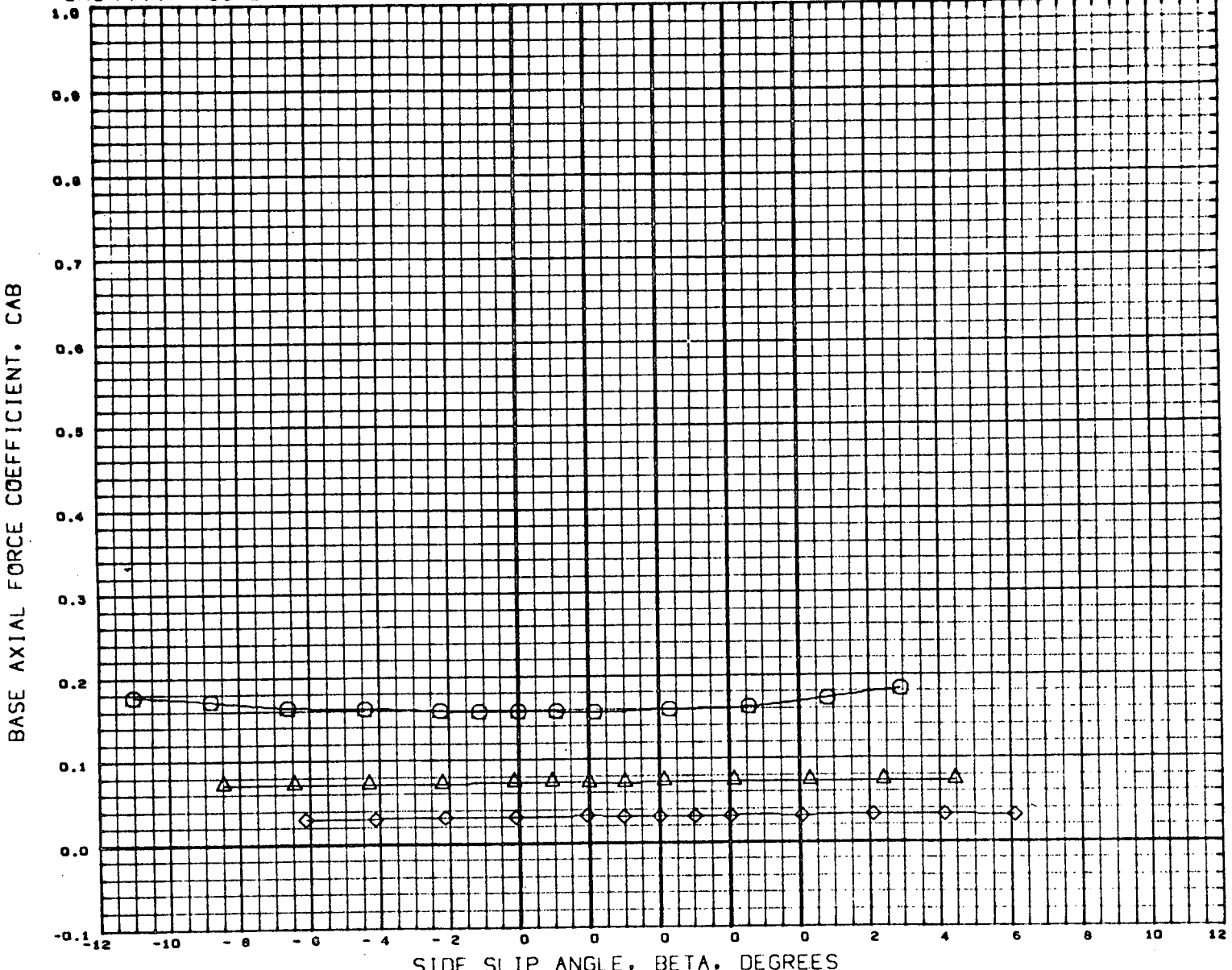
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GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL	MACH	PARAMETRIC VALUES	REFERENCE INFORMATION
○	0.396	ALPHA 0.000	SREF 1.3960 SQ. IN.
△	0.699		LREF 1.3330 IN.
◇	0.694		BREF 1.3330 IN.
□	1.100		XMRP - 5.5070 IN.
◇	1.190		YMRP 0.0000 IN.
			ZMRP - 0.4250 IN.
			SCALE 0.0034

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

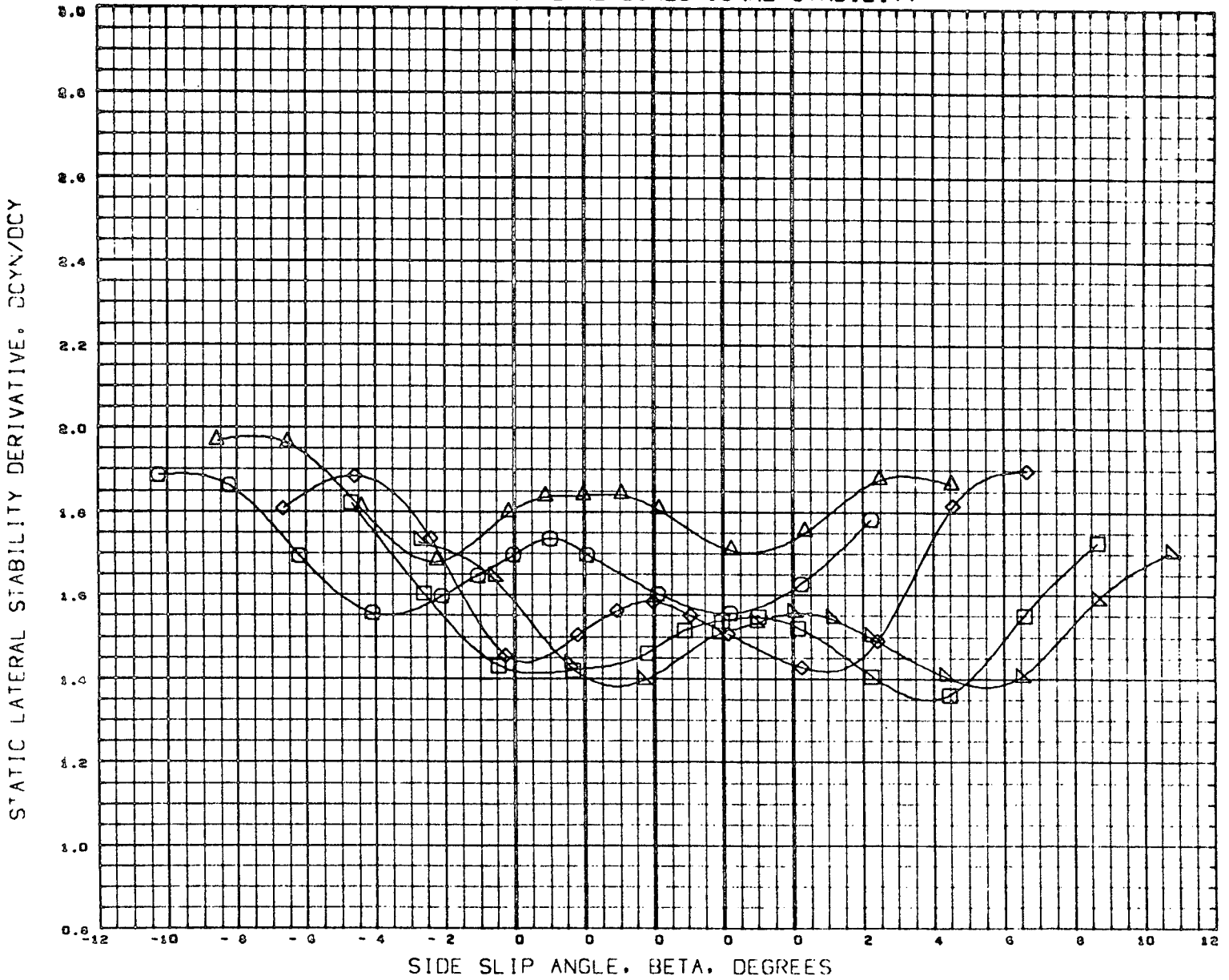


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	1.959	0.000	
△	3.480		
◇	4.959		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3070	IN.
YMRP	0.0000	IN.
ZMRP	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



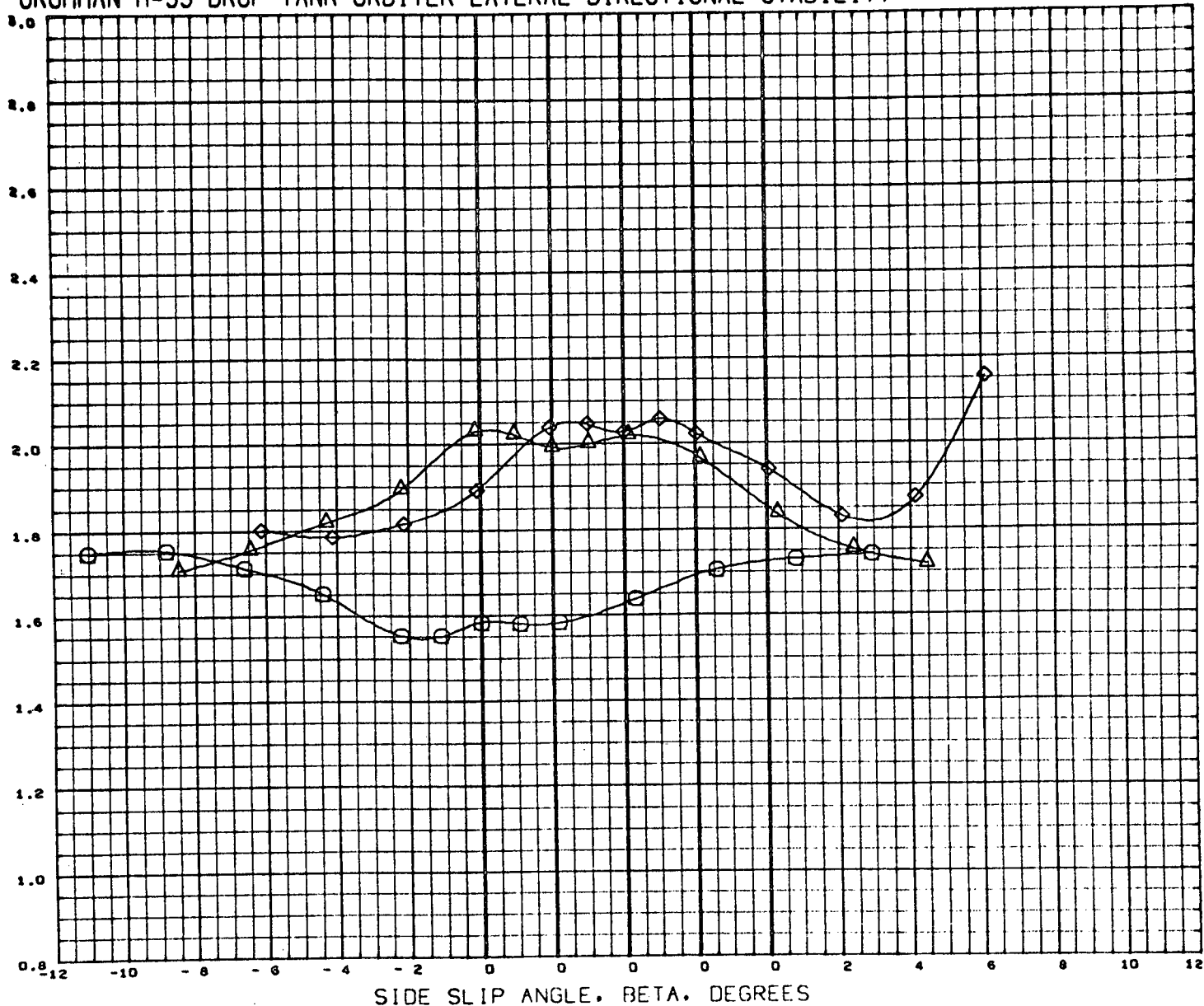
SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	0.996	0.000	
◇	0.995	0.000	
□	0.994	0.000	
△	1.100	0.000	
▽	1.100	0.000	

DATA HIST. CODE CCCCC

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRF	5.5070	IN.
YMRF	0.0000	IN.
ZMRF	0.4250	IN.
SCALE	0.0034	

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

STATIC LATERAL STABILITY DERIVATIVE, DCYN/DCY



SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	1.959		0.000
△	3.480		
◇	4.959		

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.5070	IN.
YMRP	0.0000	IN.
ZMRP	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGC

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OWVTC

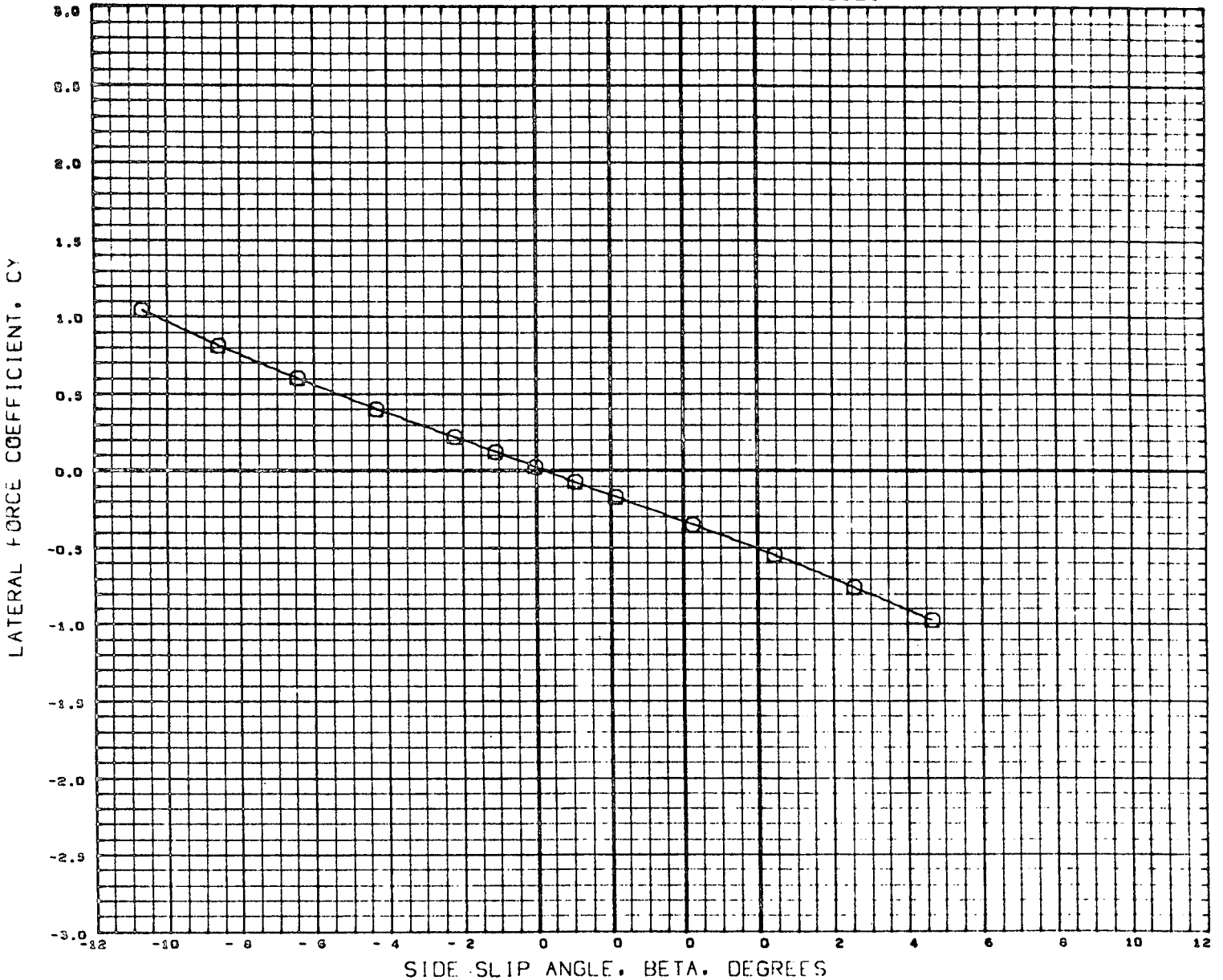
(C44115)

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GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



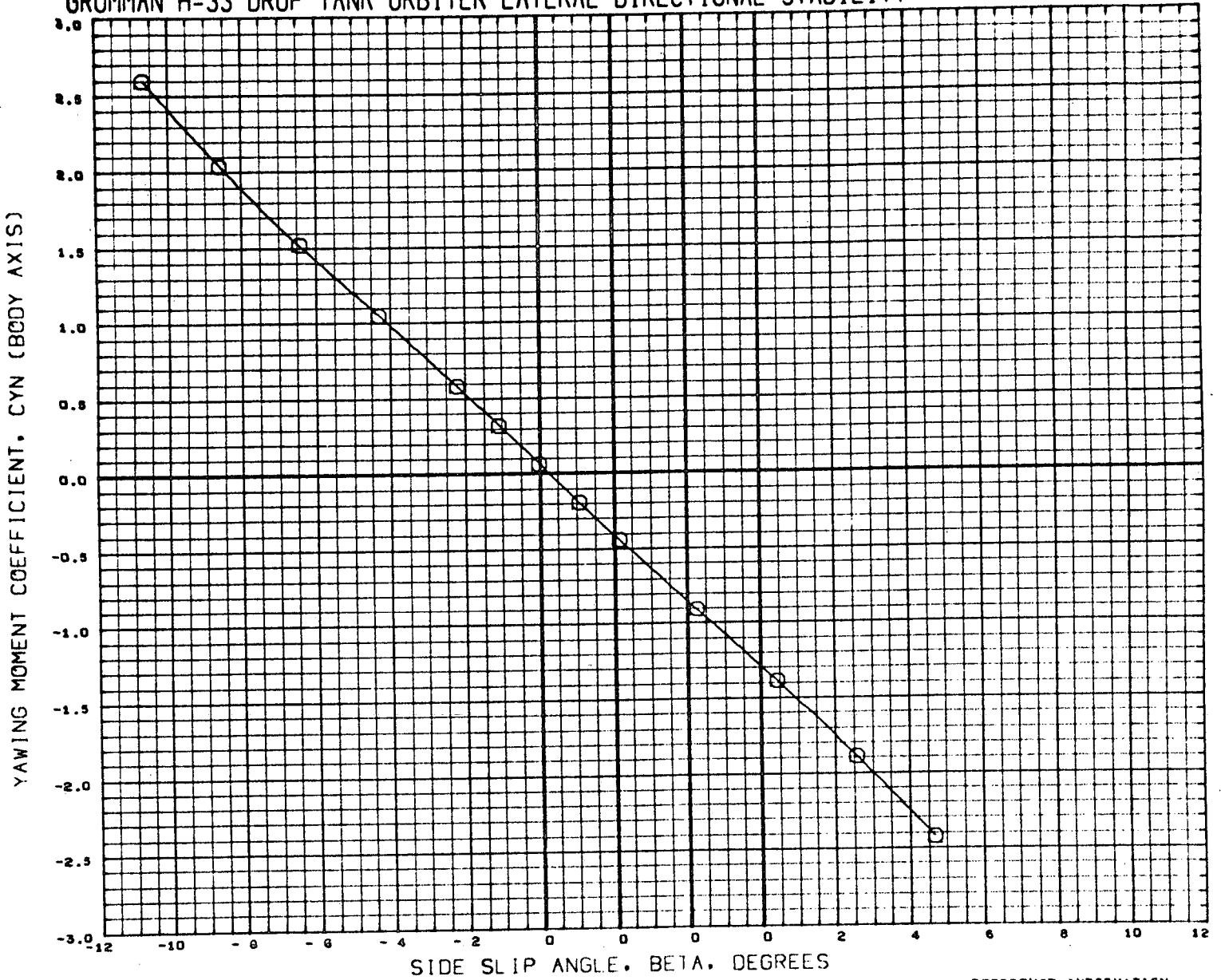
SYMBOL MACH PARAMETRIC VALUES
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REFERENCE INFORMATION
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 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP - 5.5070 IN.
 YMRP 0.0000 IN.
 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGC

C. 6

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL MACH ALPHA PARAMETRIC VALUES
 ○ 1.196 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP - 5.5070 IN.
 YMRP 0.0000 IN.
 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGC

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OWTC

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GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

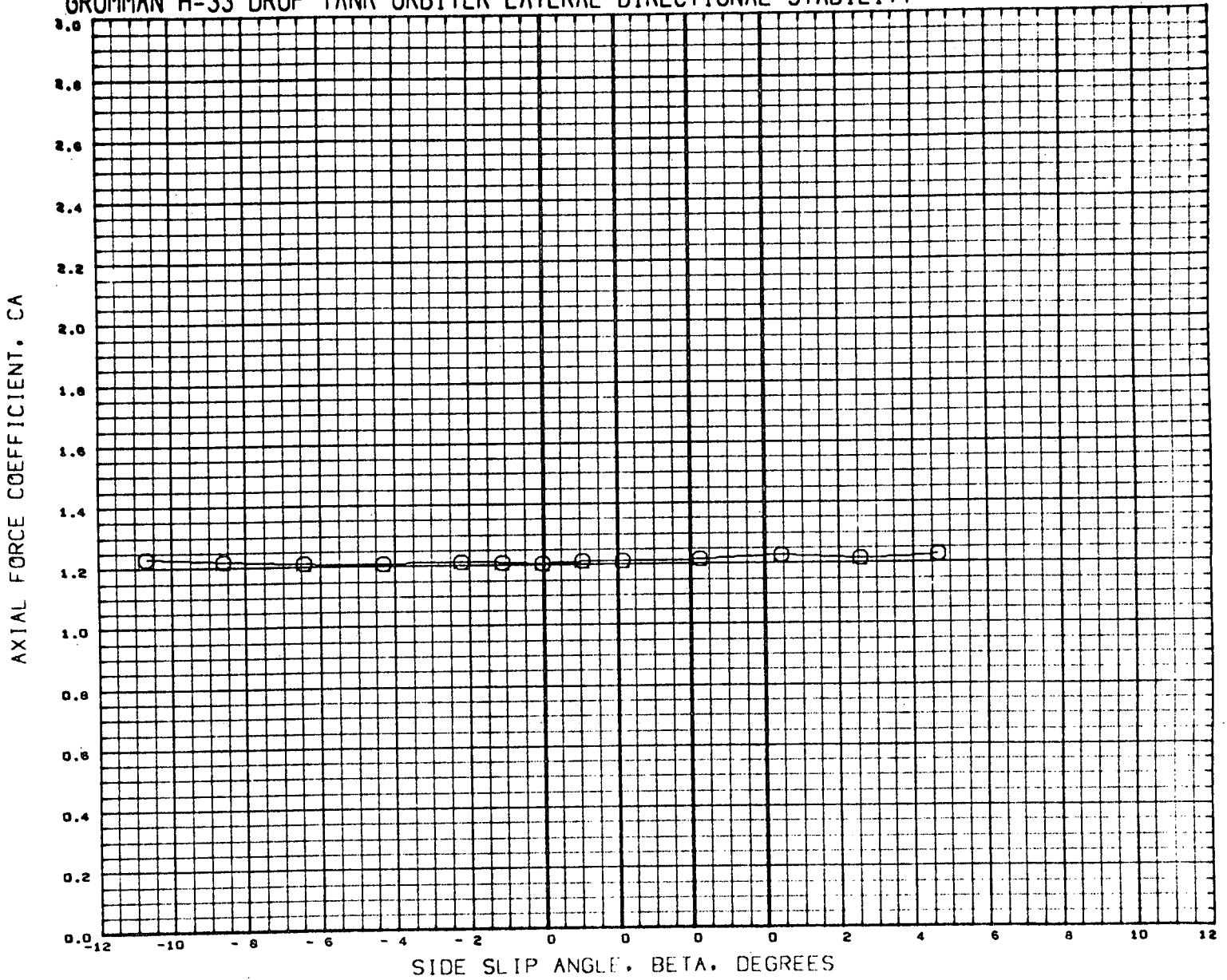


SYMBOL ○ MACH 1.196 ALPHA 0.000 PARAMETRIC VALUES

REFERENCE INFORMATION
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 BREF 1.3330 IN.
 XMRP - 5.5070 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCCC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY

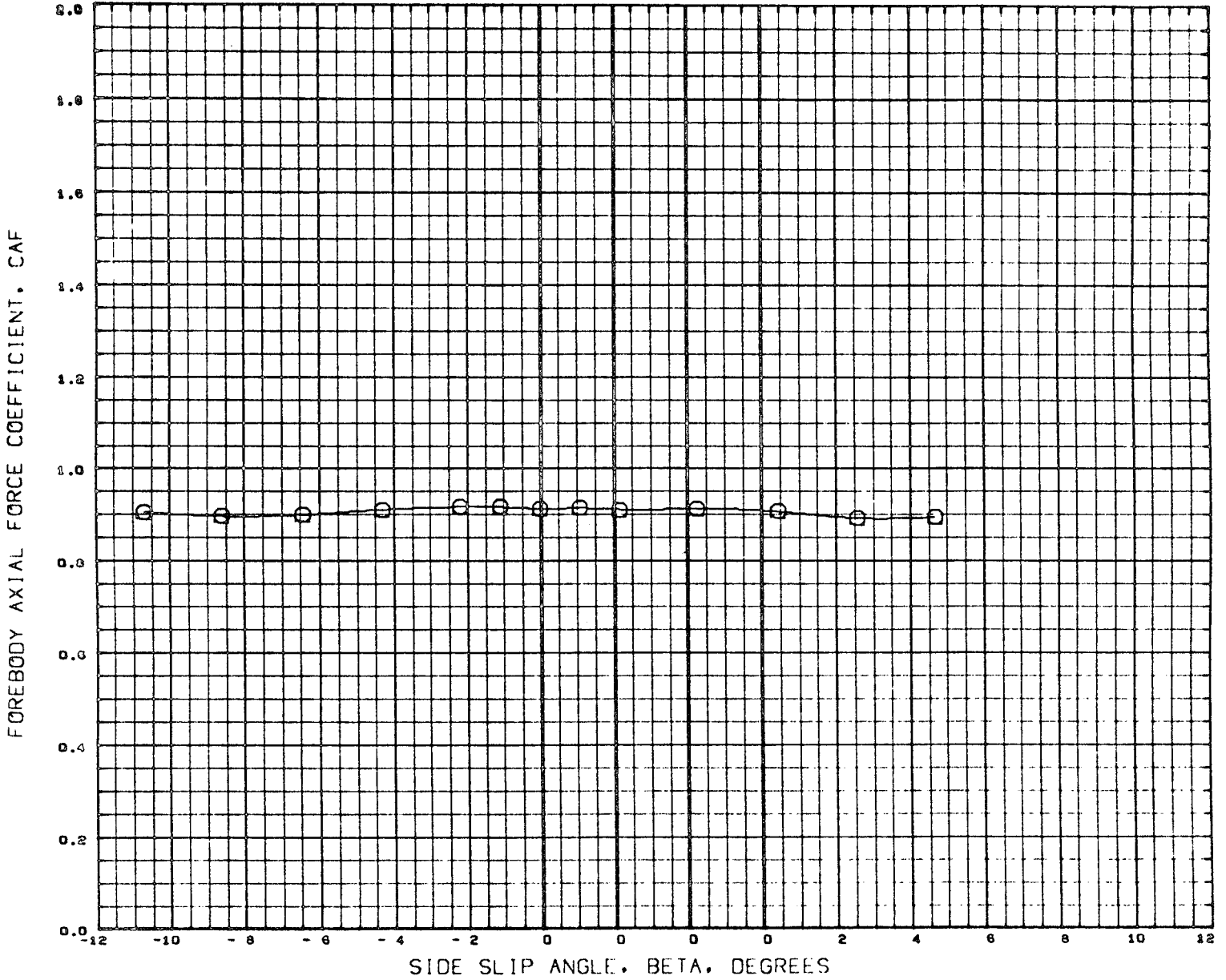


SYMBOL ○ MACH 1.198 ALPHA 0.000
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 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCCCC

GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL \circ MACH 1.196 ALPHA 0.000 PARAMETRIC VALUES

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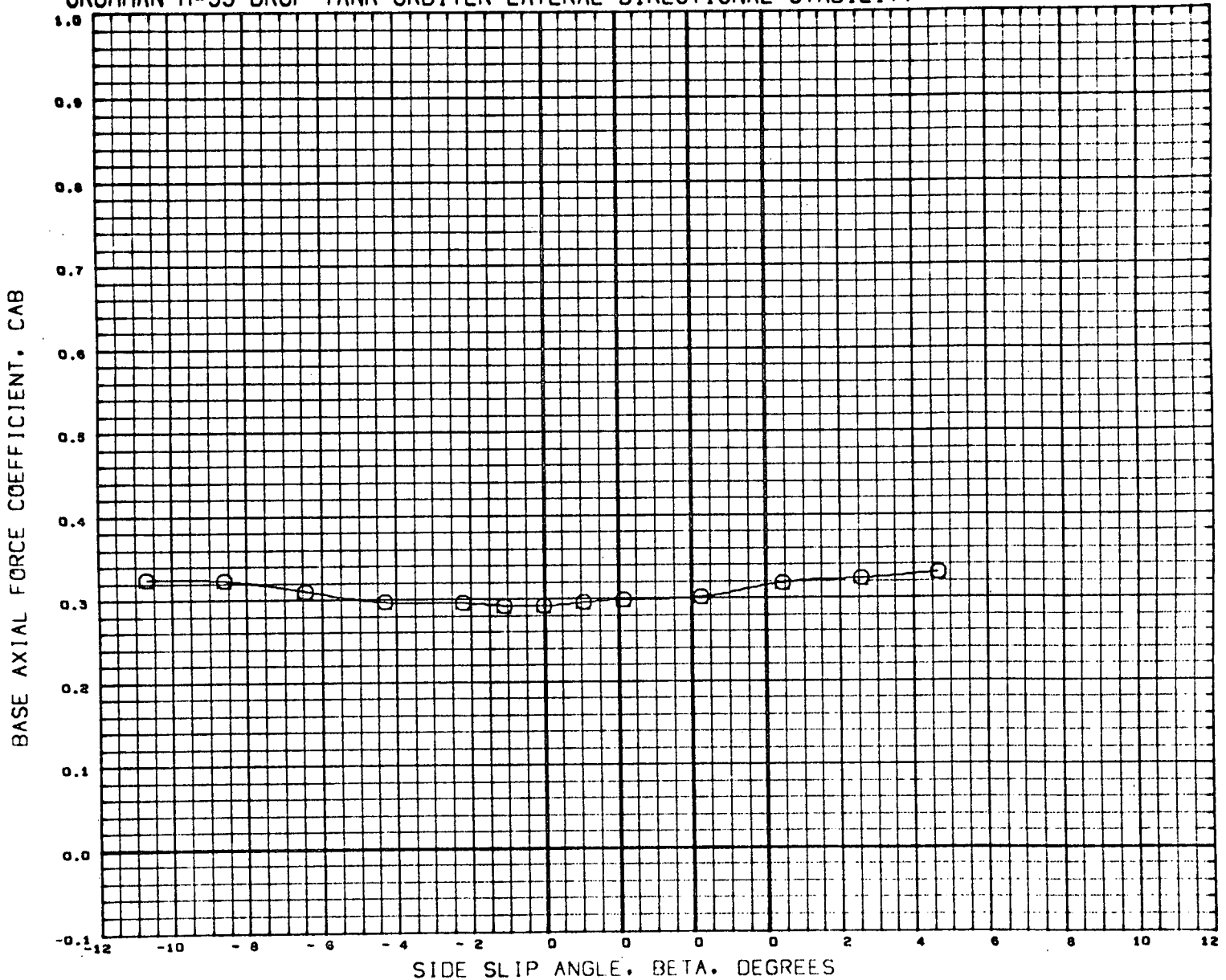
M502-MSFC-H-33 ORBITER PLUS CRADLE

OWTC

(C44125) 12 MAY 72

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GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



SYMBOL \circ MACH 1.196 ALPHA 0.000 PARAMETRIC VALUES

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
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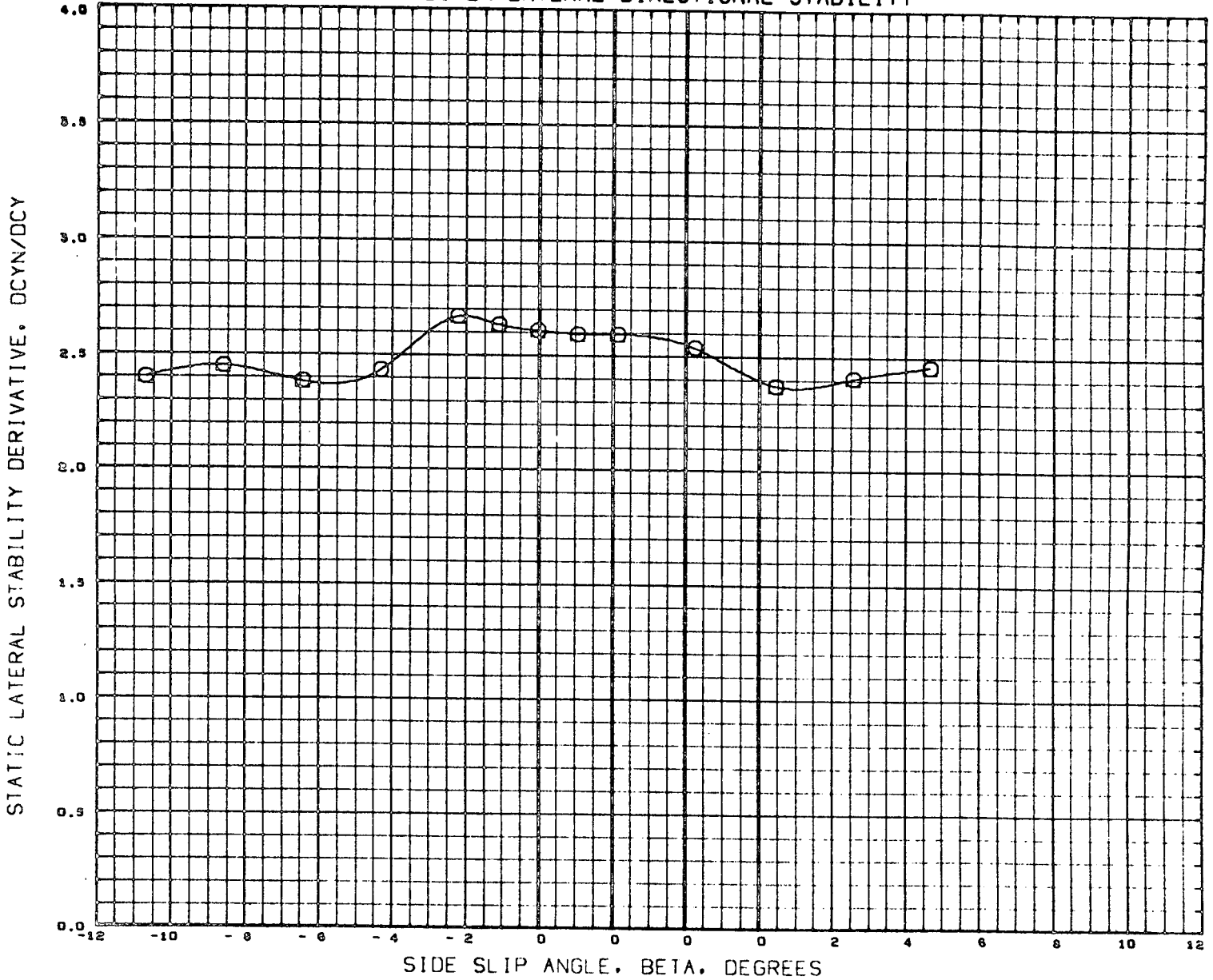
M502-MSFC-H-33 ORBITER PLUS CRADLE

OWTC

(C44125) 12 MAY 72

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GRUMMAN H-33 DROP TANK ORBITER LATERAL DIRECTIONAL STABILITY



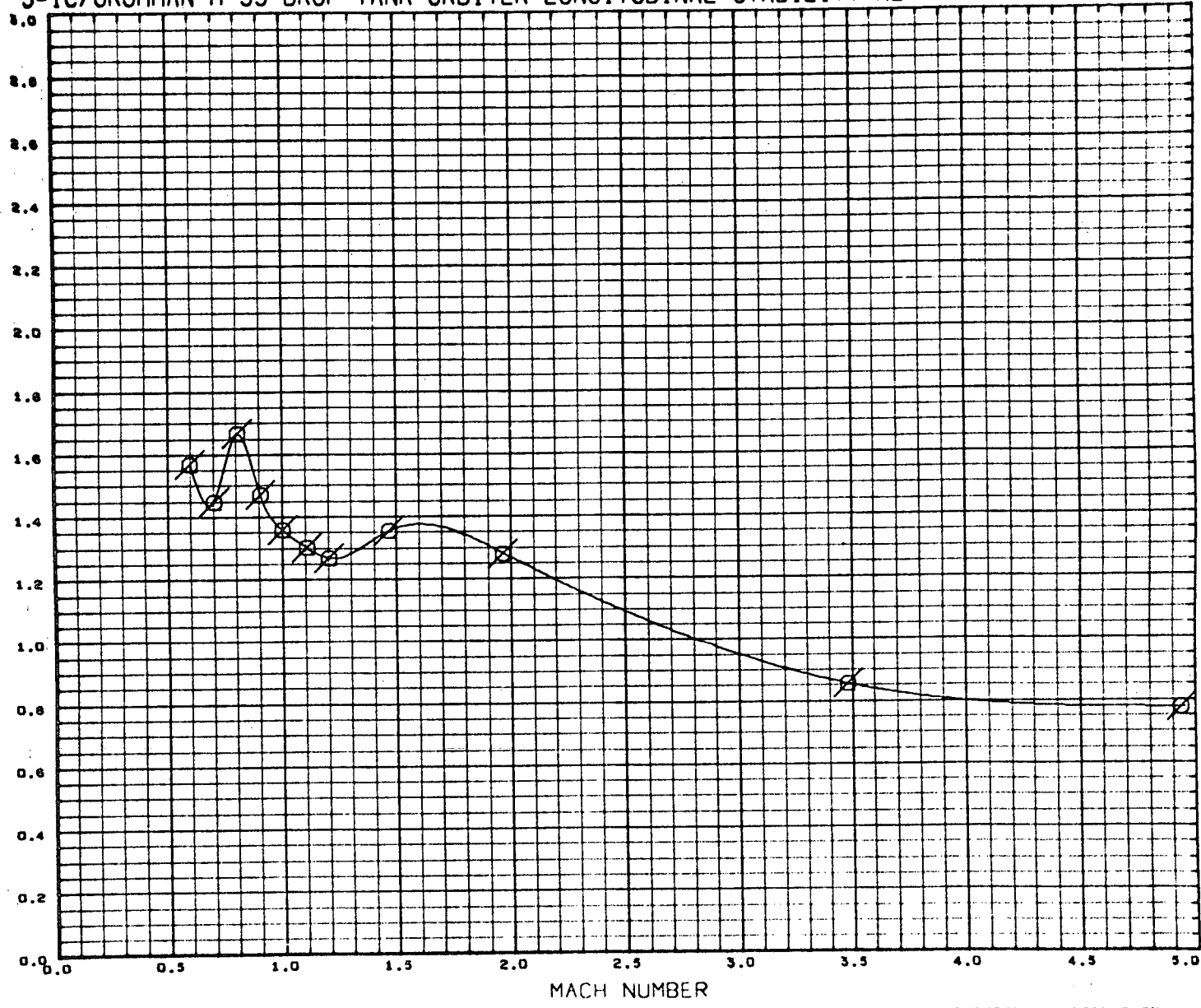
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DATA HIST. CODE CCCGC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

LONGITUDINAL CENTER OF PRESSURE LOCATION, CP/D



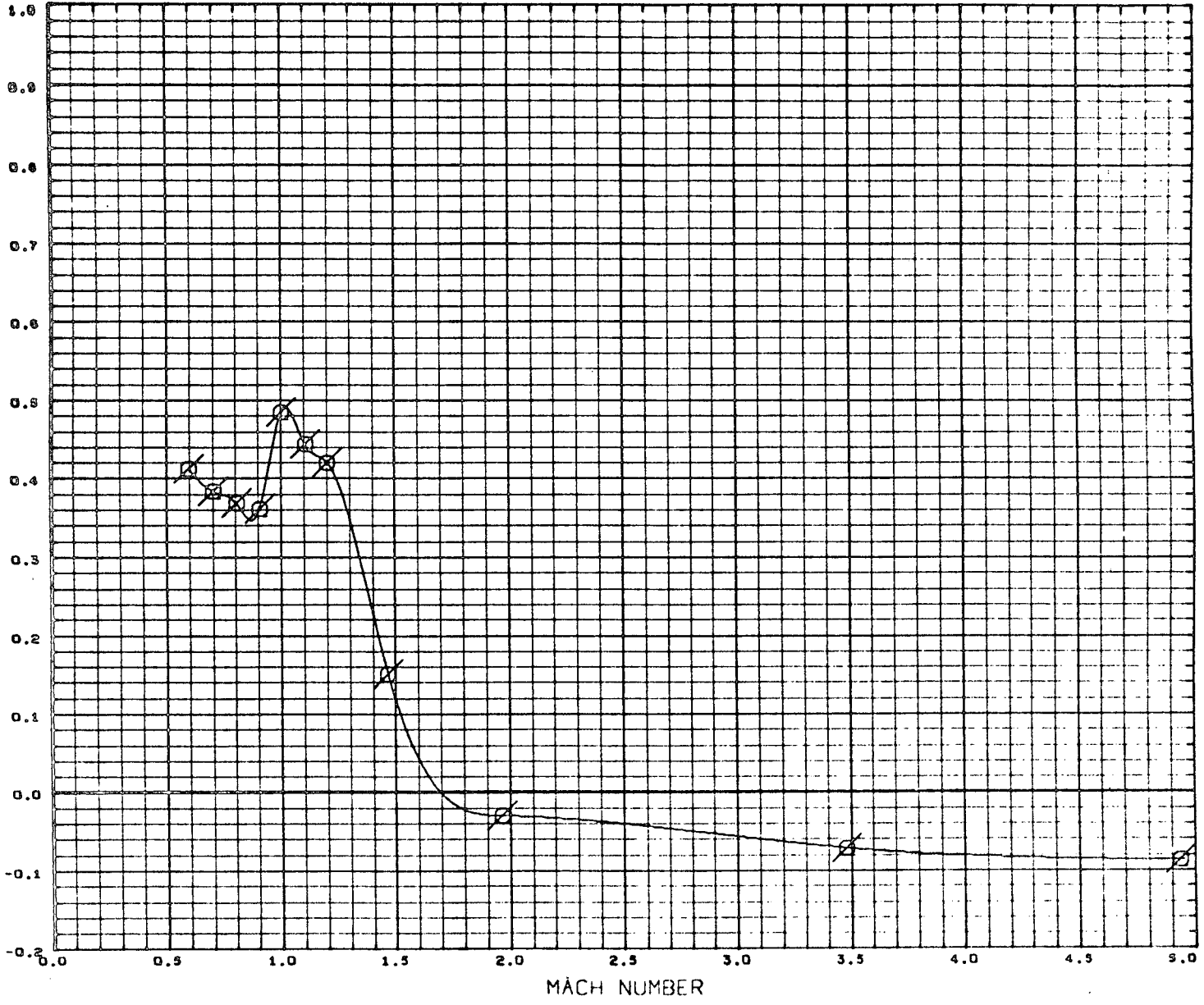
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

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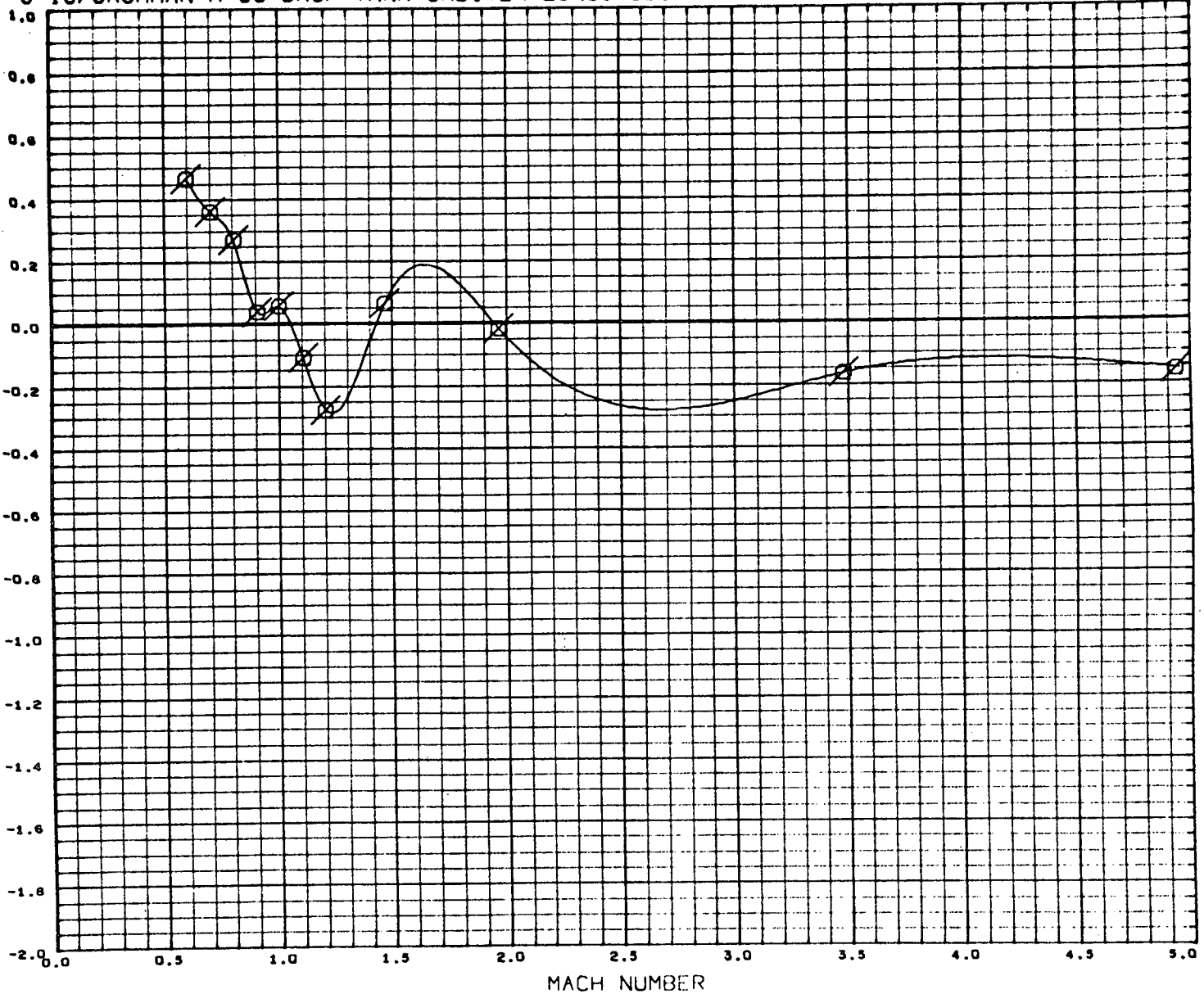
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DATA HIST. CODE CCCCFF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK PITCHING MOMENT COEFFICIENT, $CLM(\alpha=0)$ CLMAFG

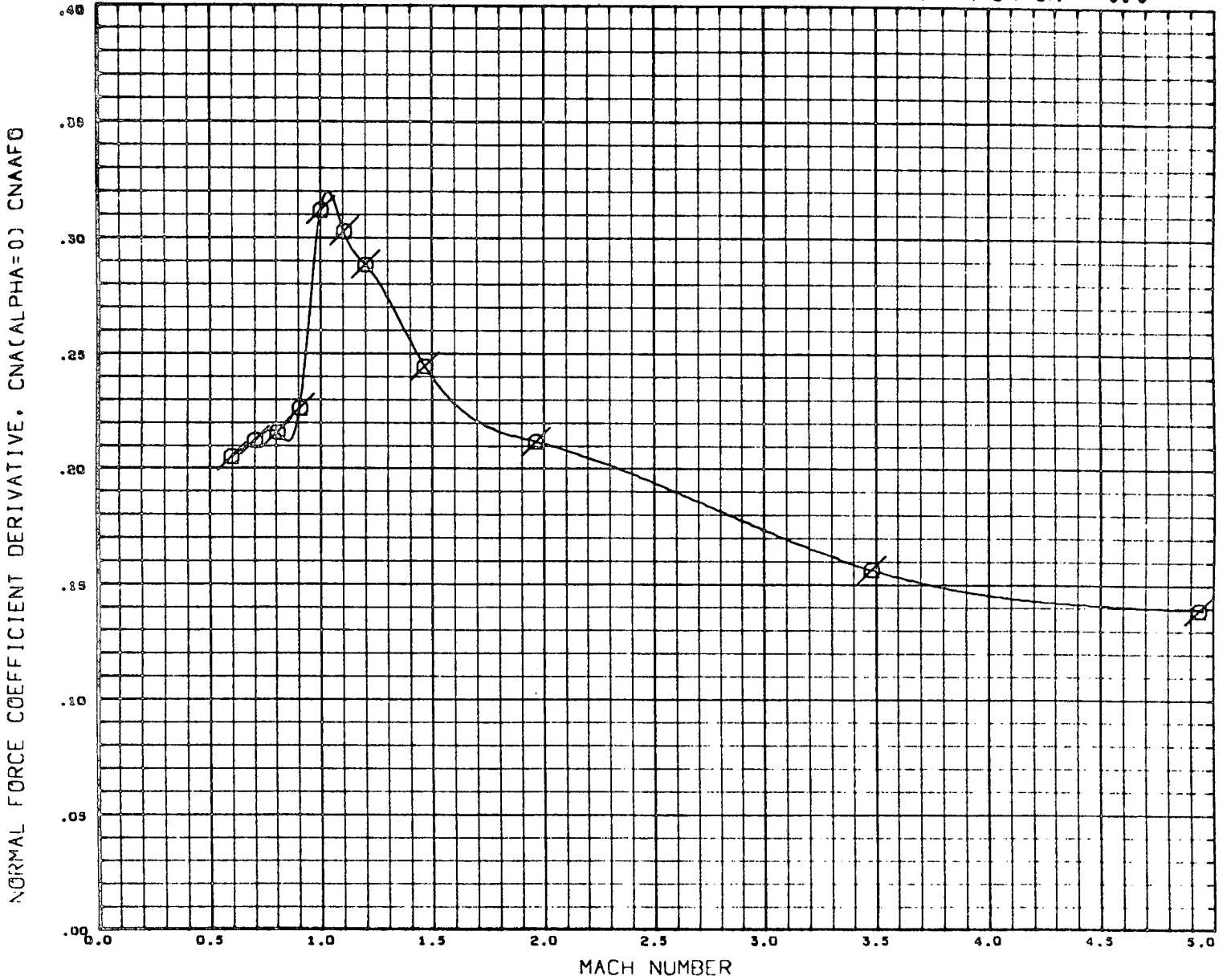


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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



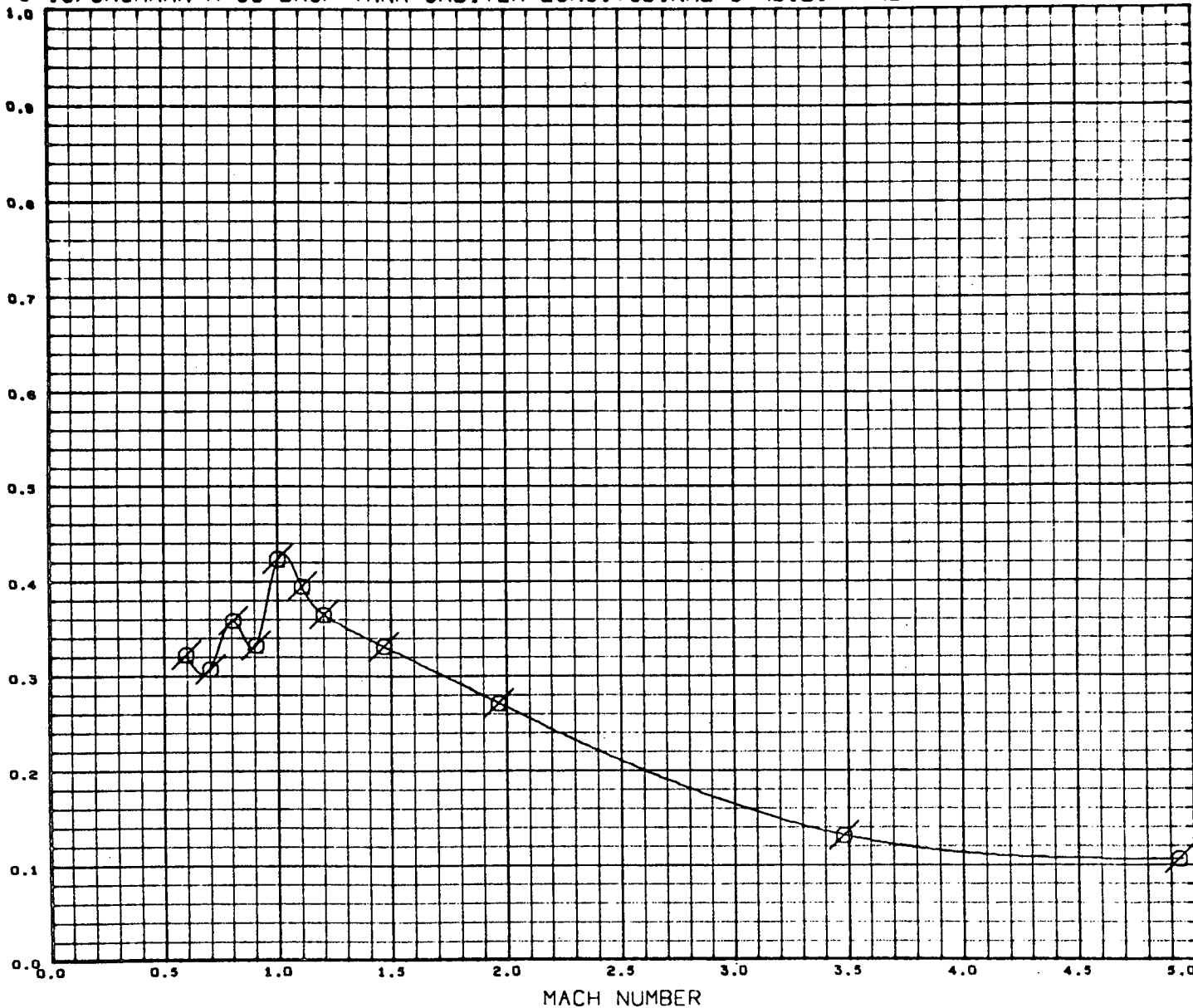
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DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

PITCH MOMENT COEFFICIENT DERIVATIVE, CLMA(ALPHA=0) CMAAFC



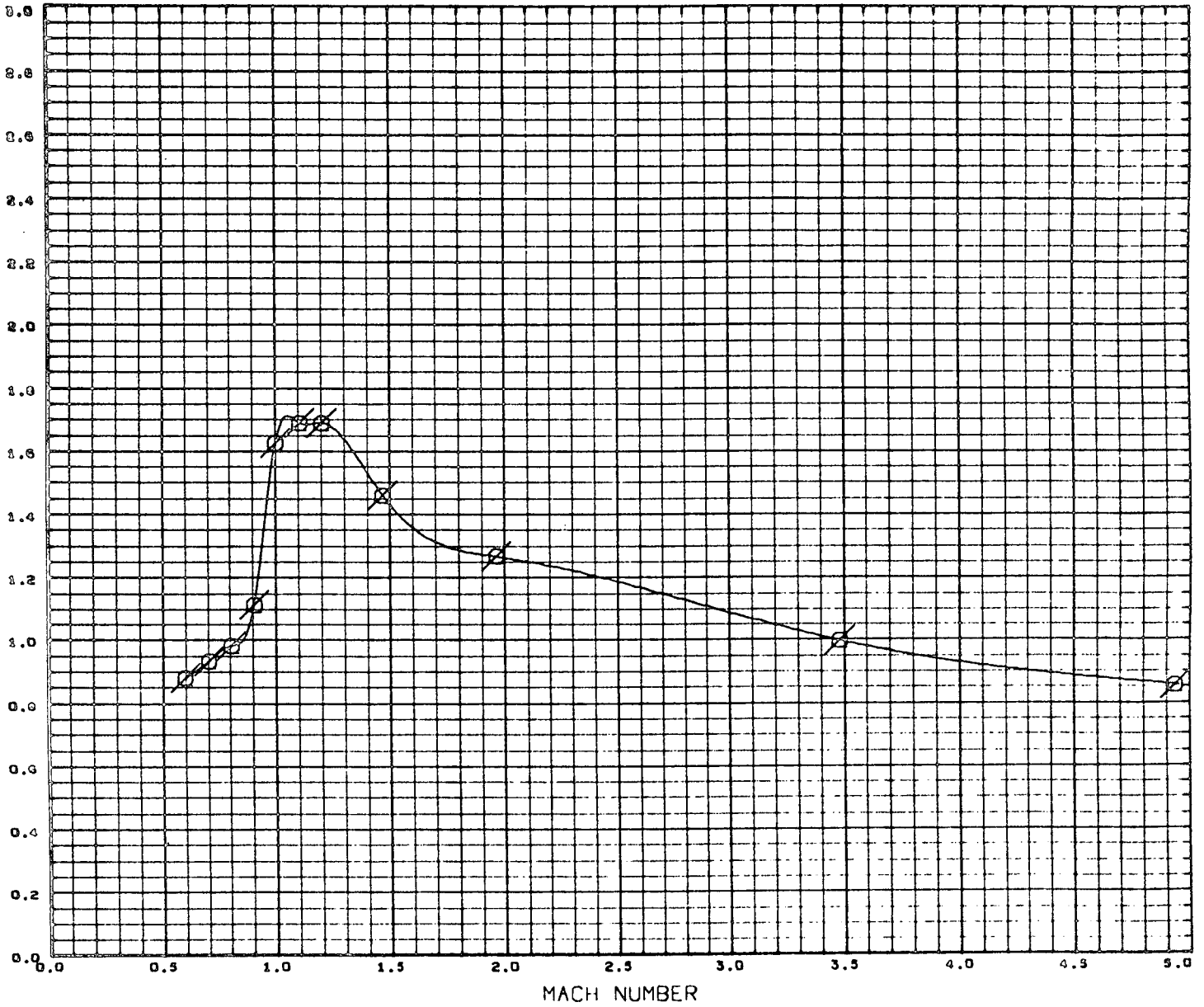
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

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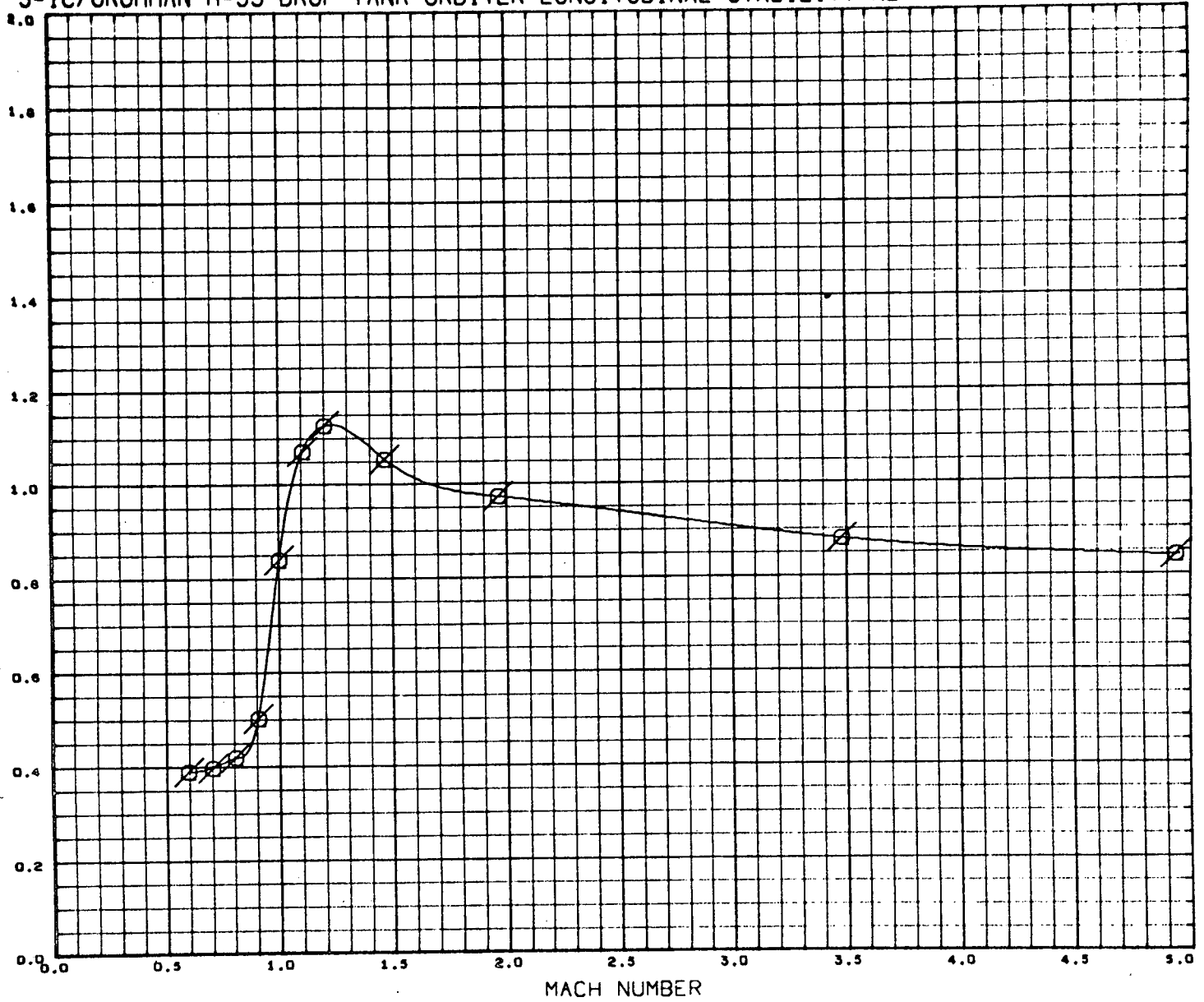
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

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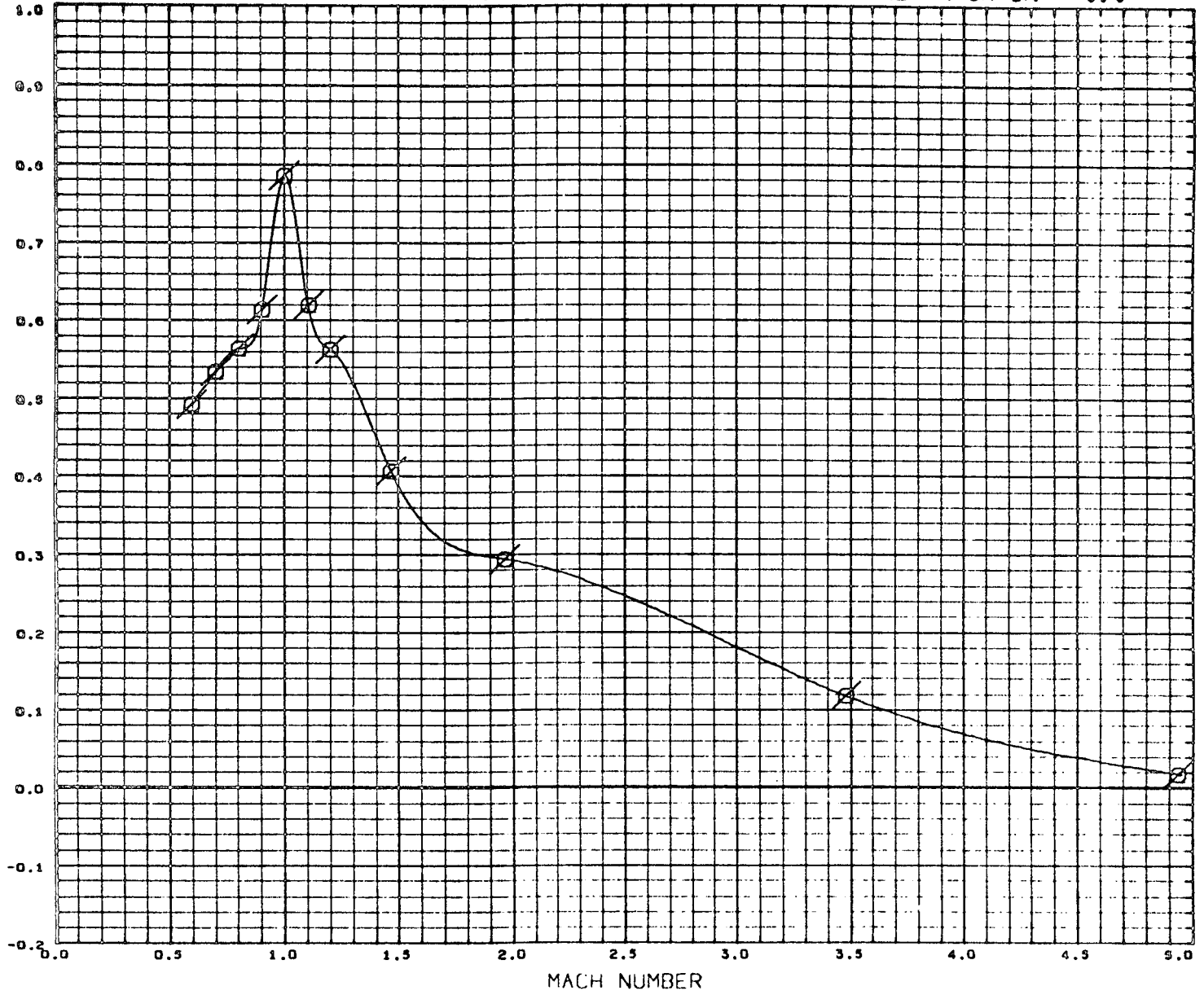
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

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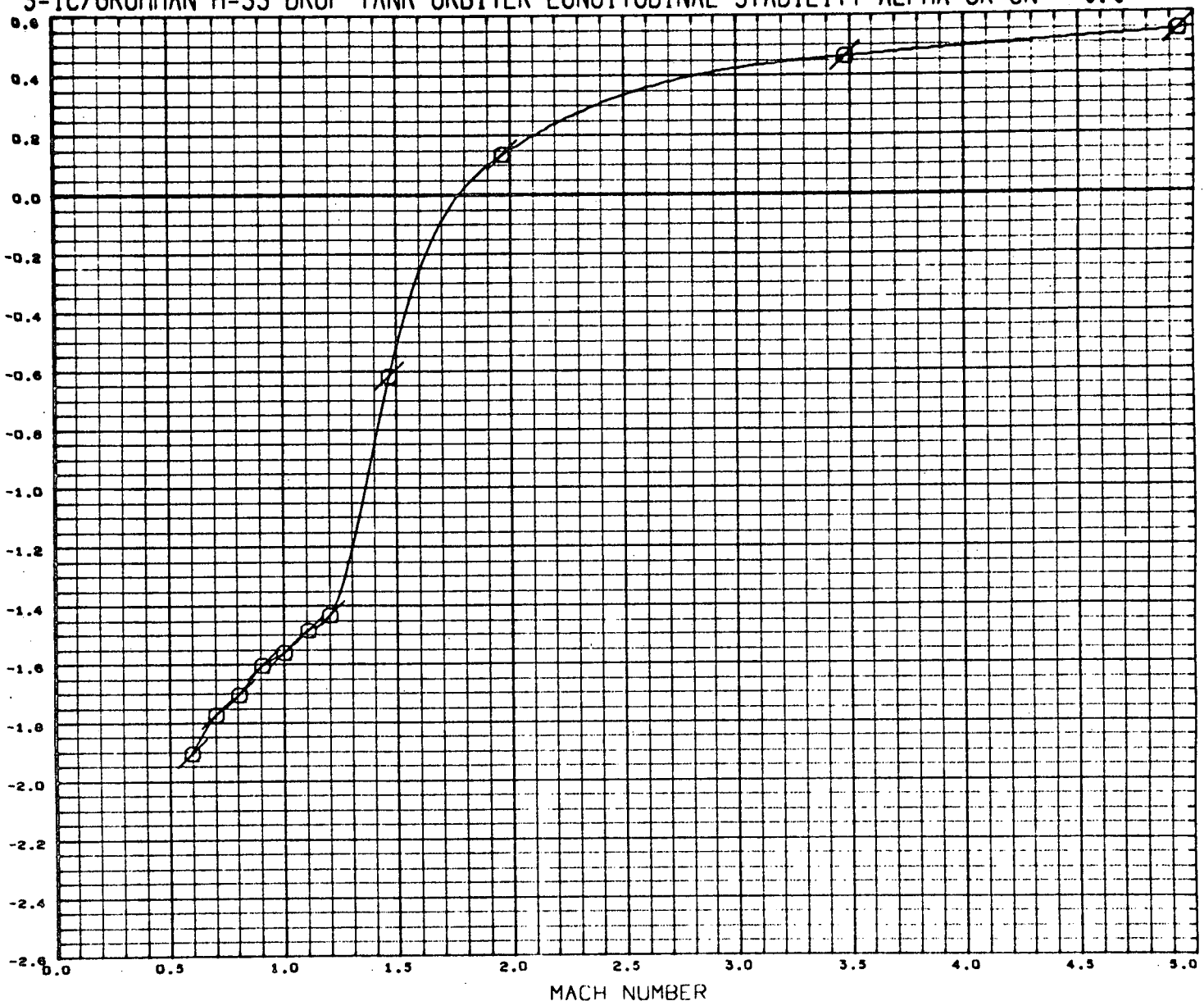
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DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

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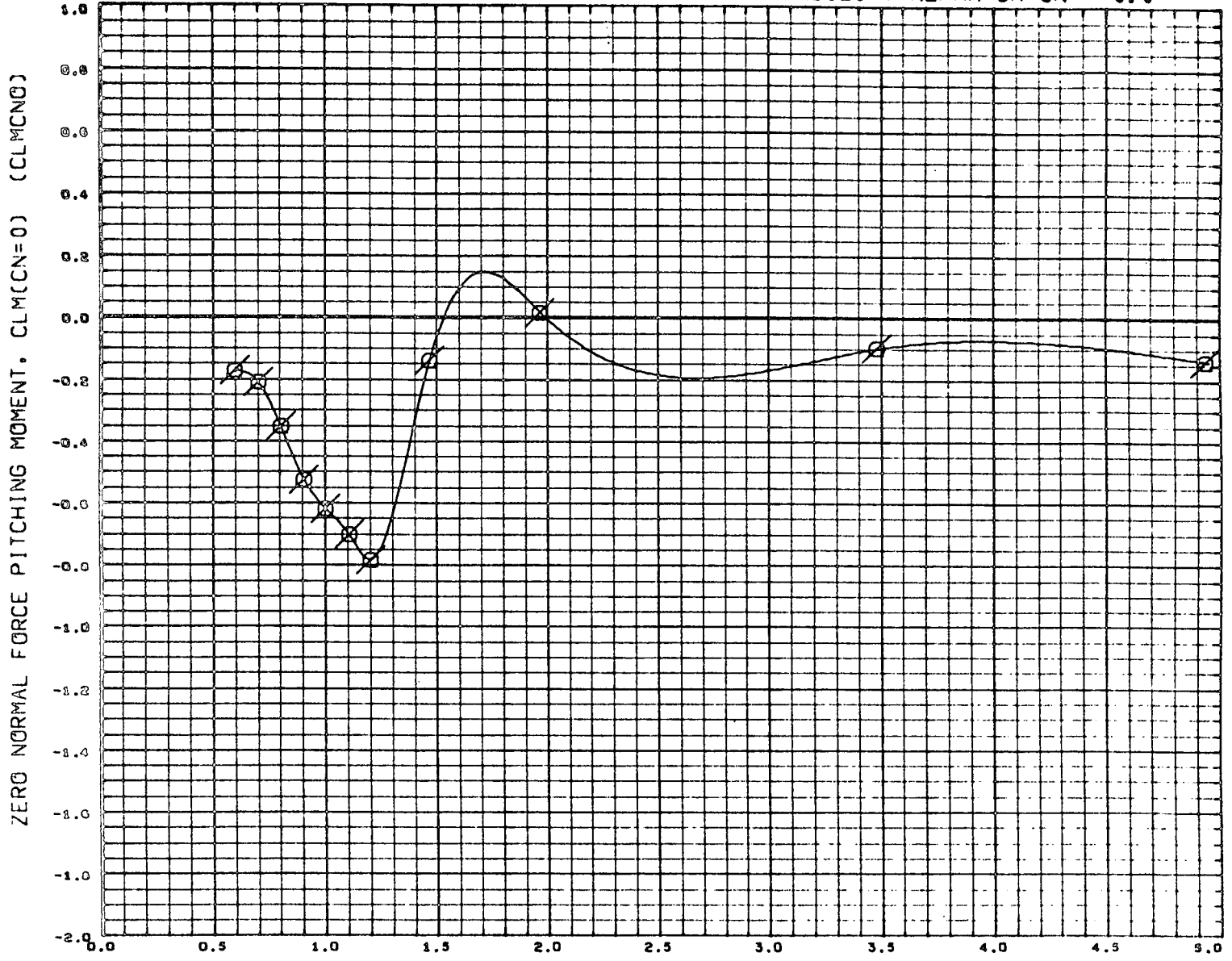


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DATA HIST. CODE CCCGCF

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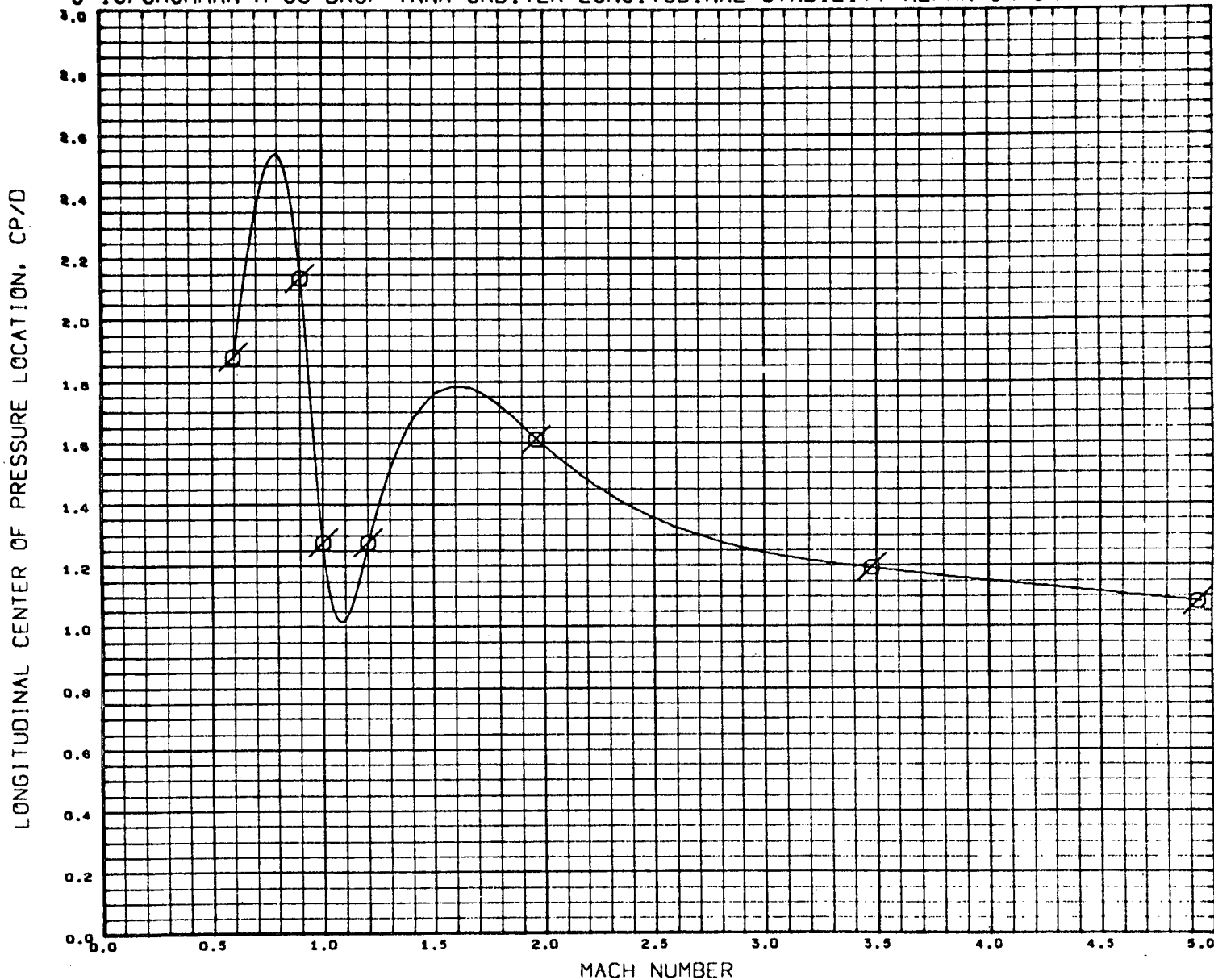


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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



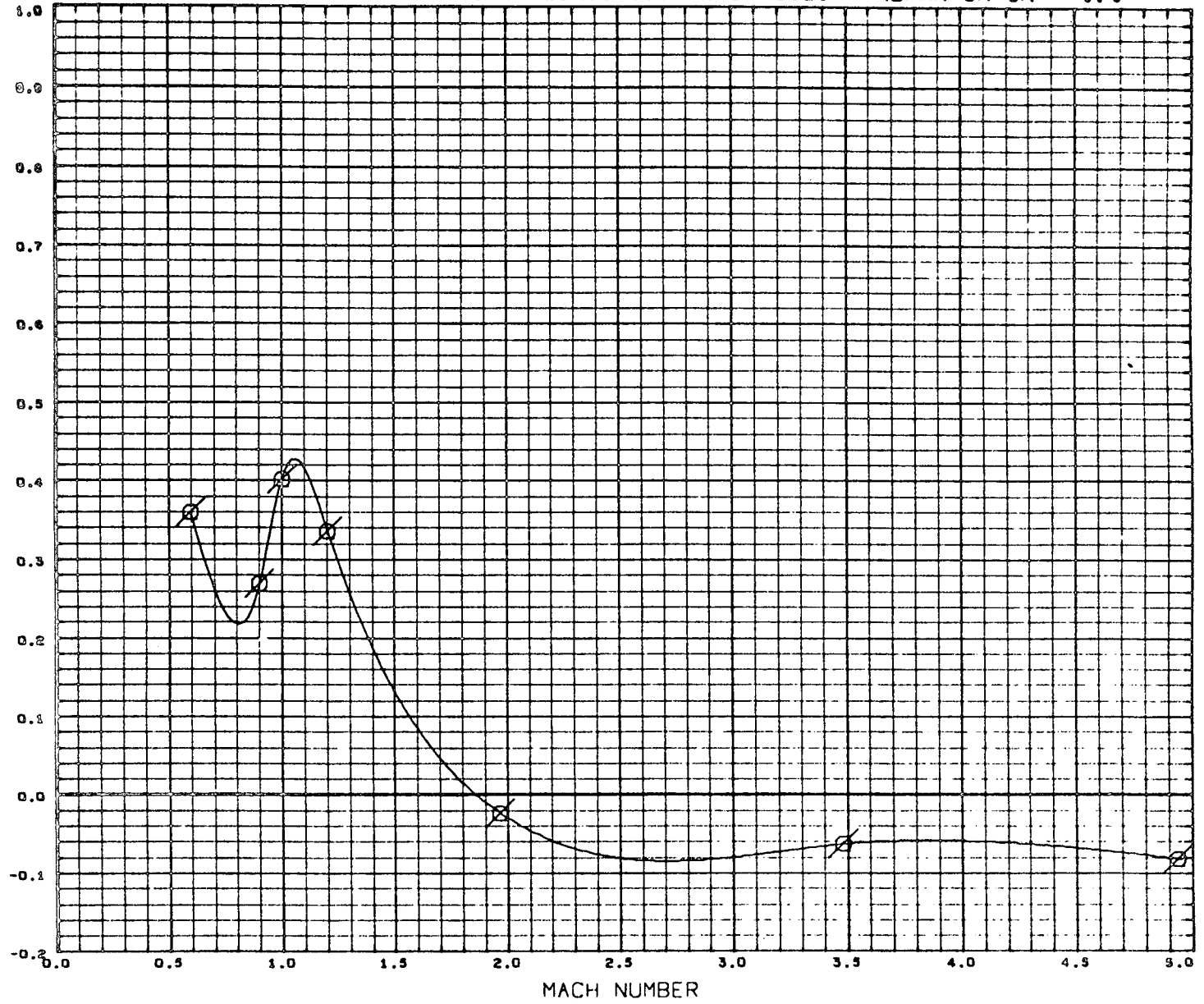
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DATA HIST. CODE CCCCFF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK NORMAL FORCE COEFFICIENT, CN(ALPHA=0) CNAFC



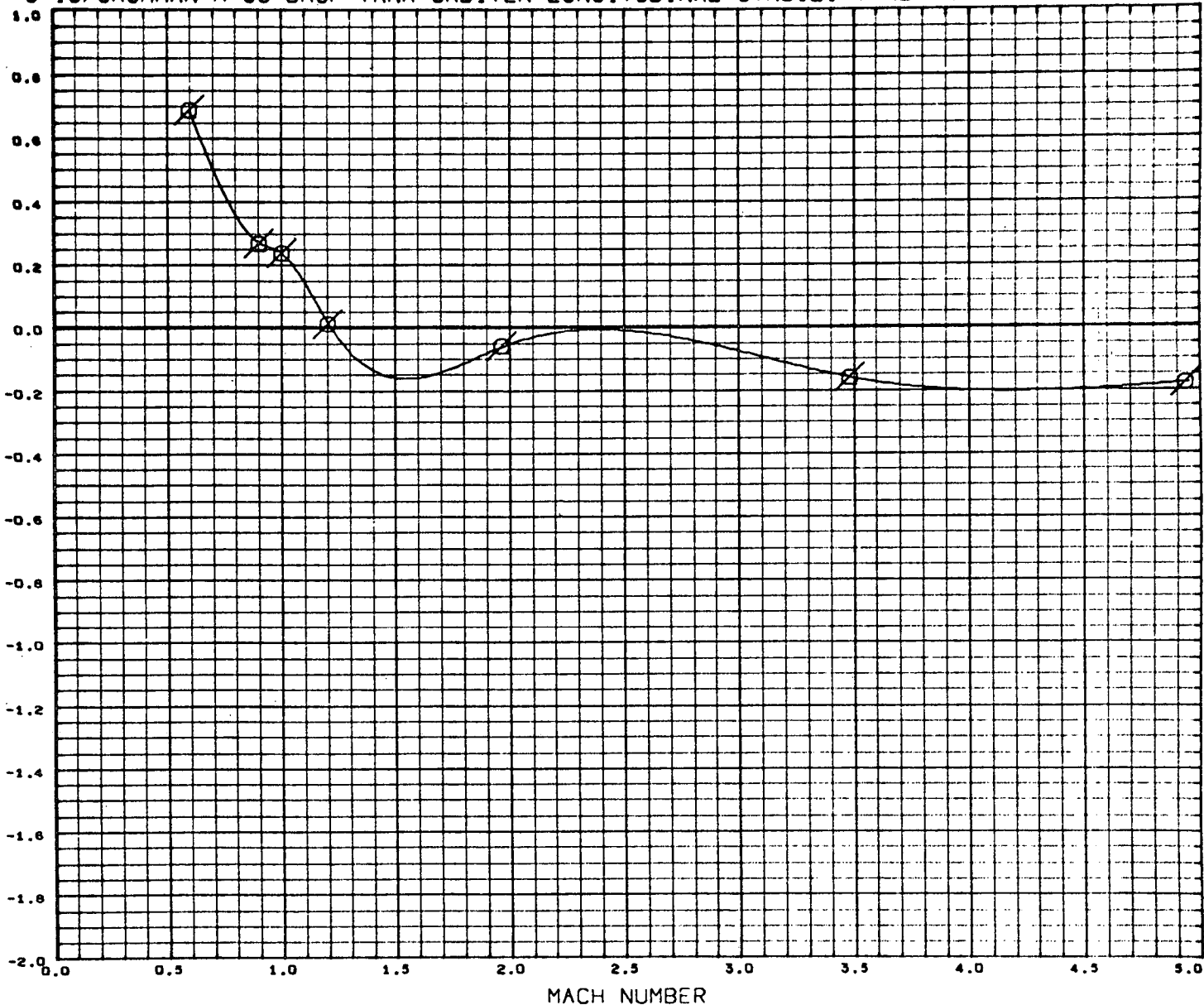
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DATA MIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK PITCHING MOMENT COEFFICIENT; CLM(ALPHA=0) CLMAFO



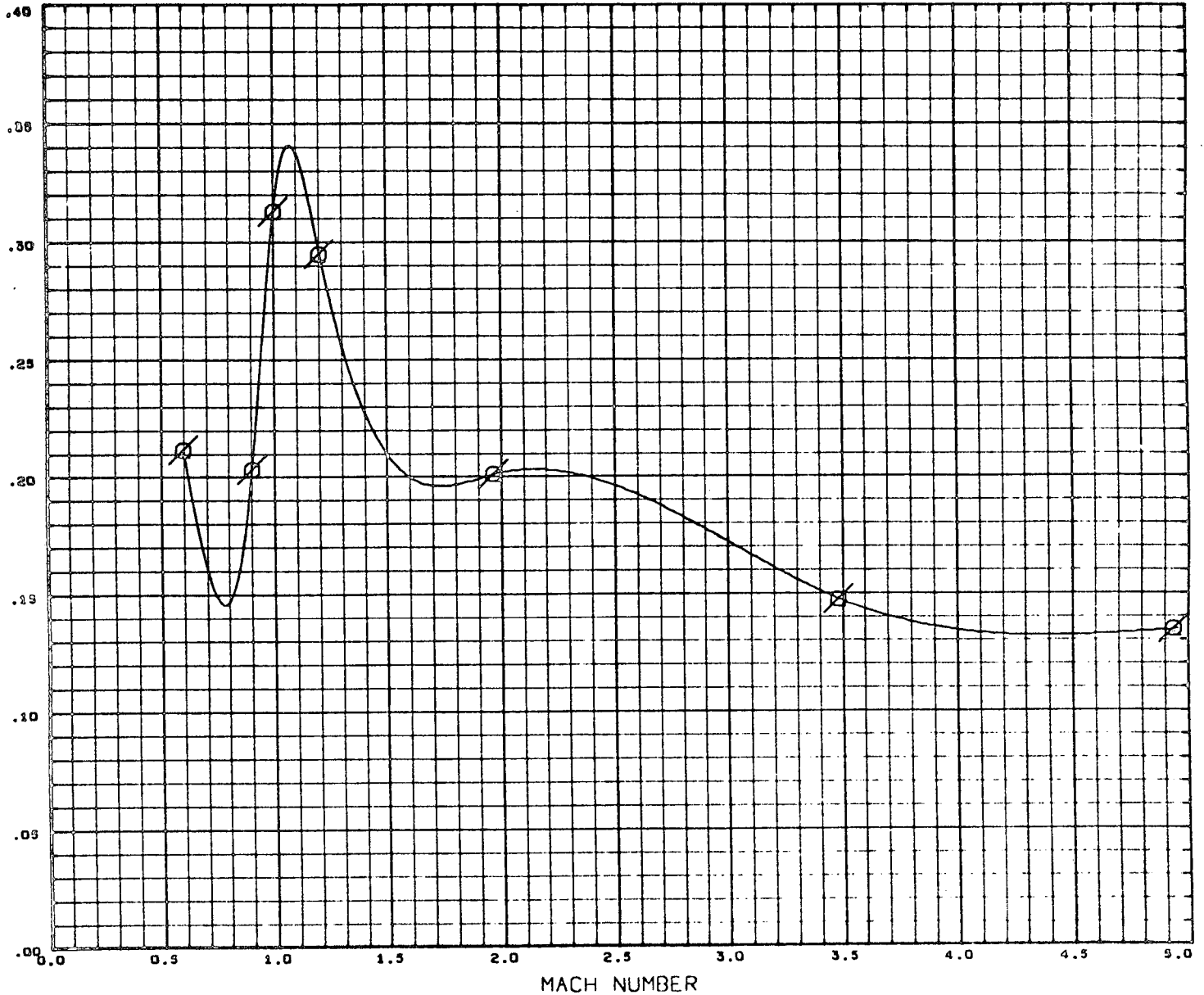
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

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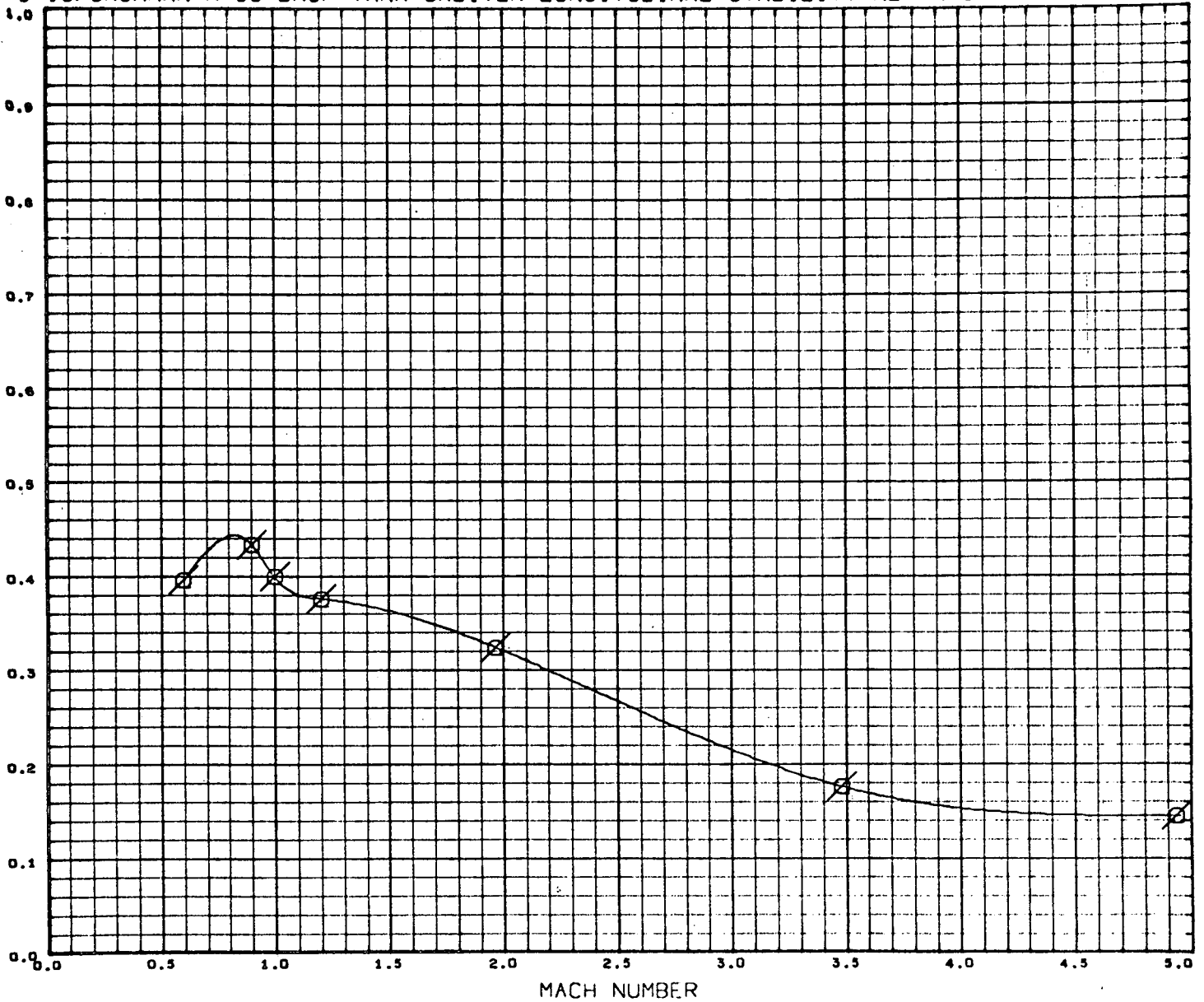
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DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

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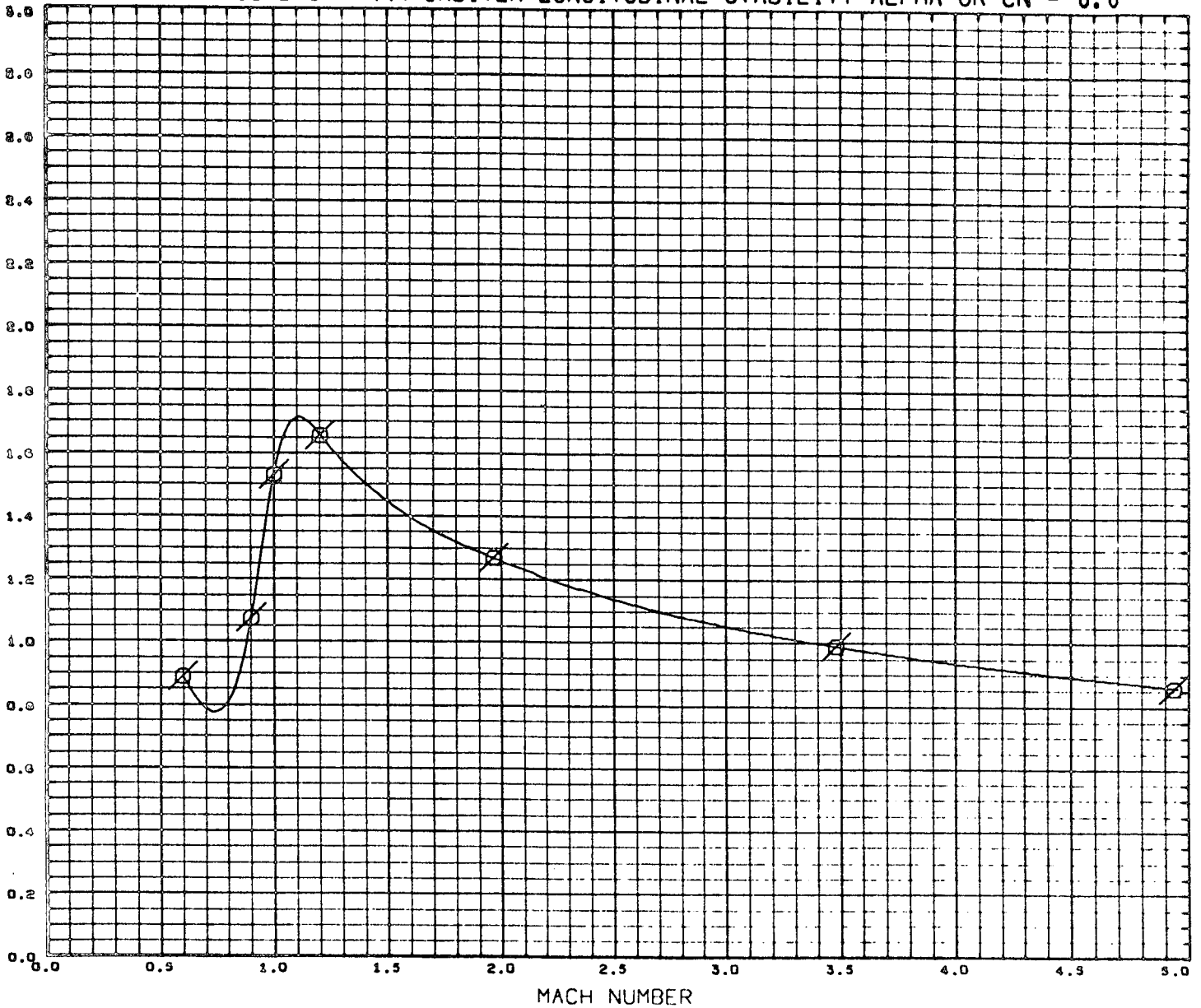
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

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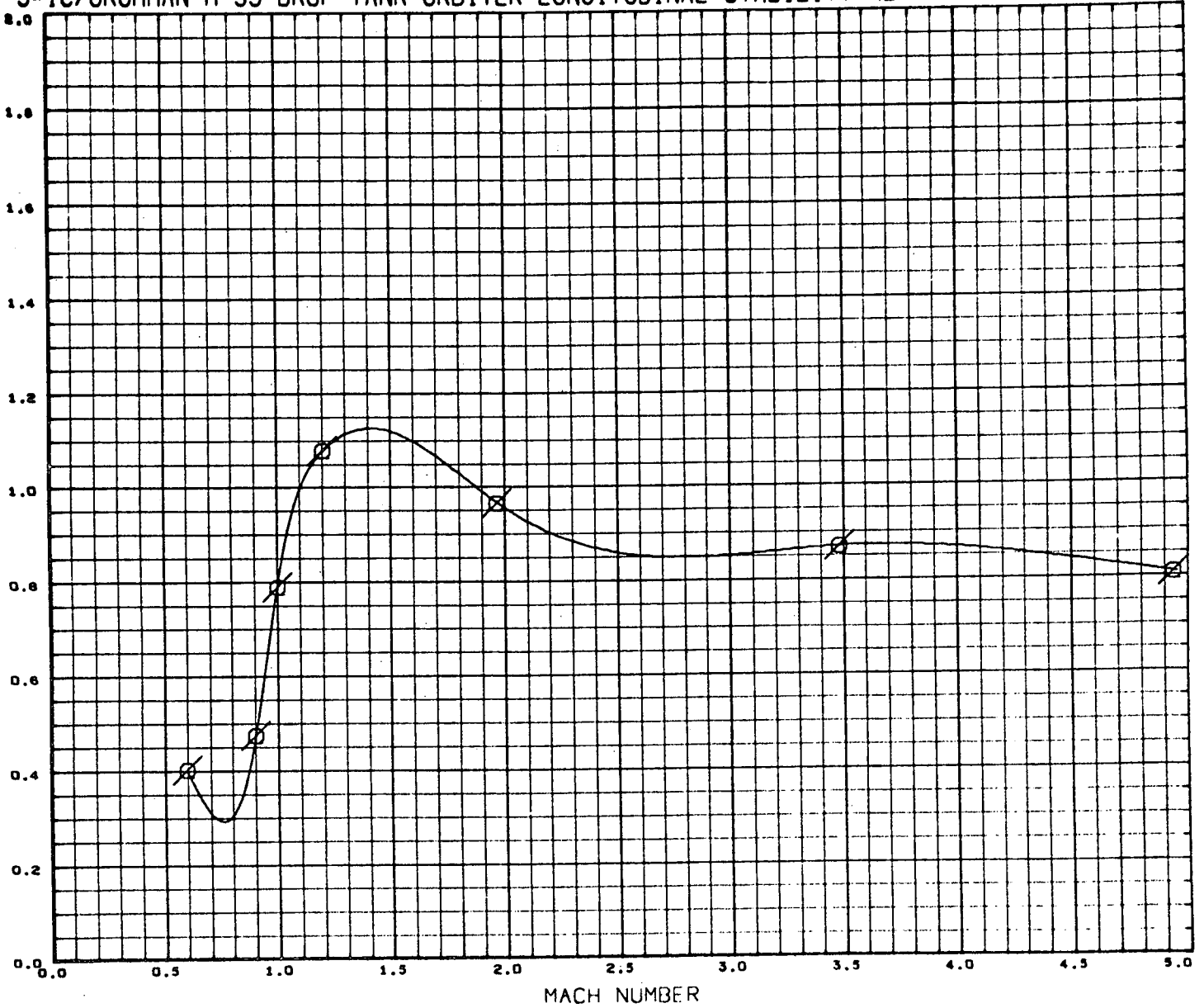
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK FOREBODY AXIAL FORCE COEFF. $C_{AF}(\alpha=0)$ CAFAFC



PARAMETRIC VALUES
 BETA 0.000 PHI 0.000
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REFERENCE INFORMATION
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DATA HIST. CODE CCCGCF

M502-MSFC-S1C H-33 ORBITER

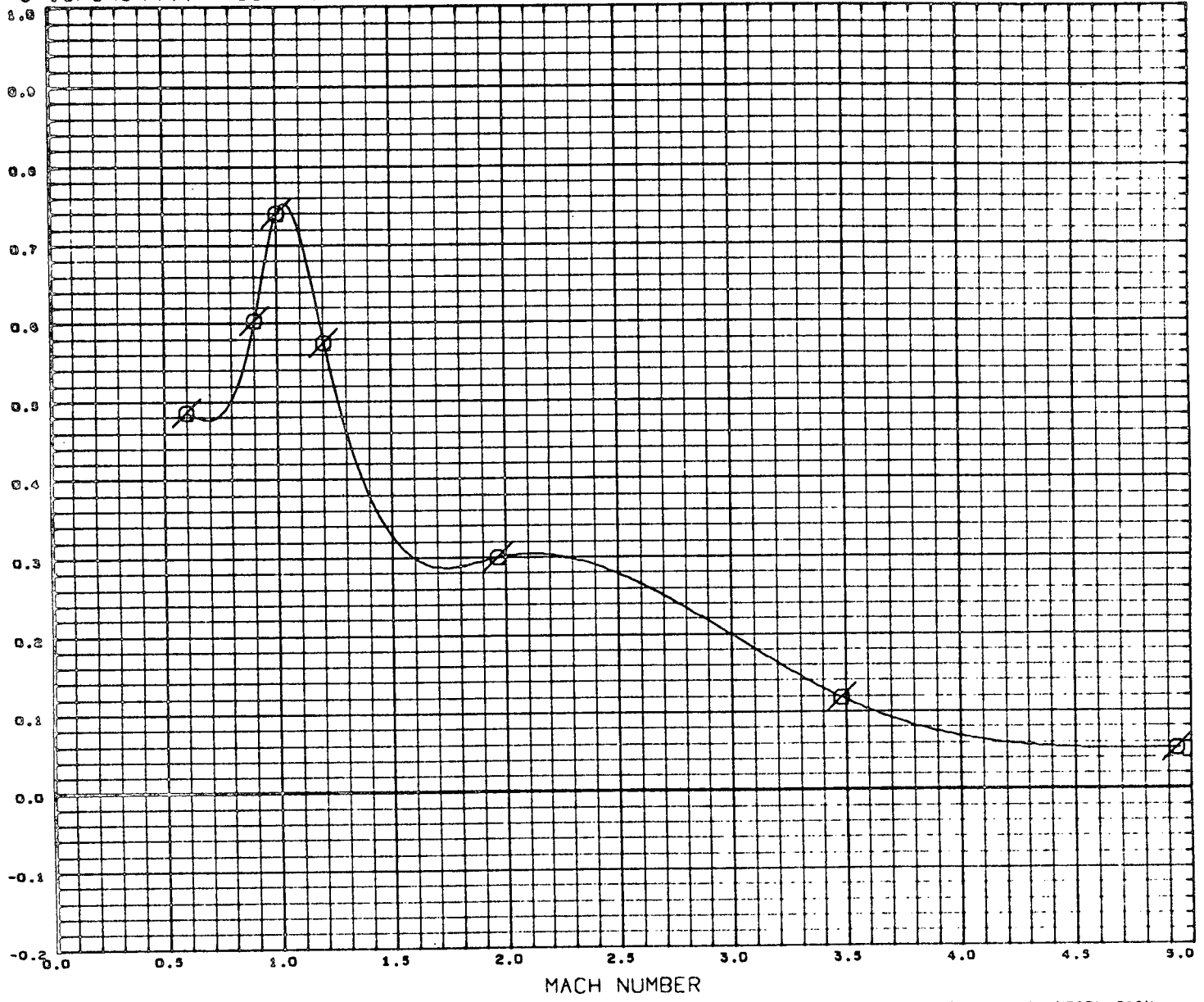
OWVTCBF1

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK BASE AXIAL FORCE COEFFICIENT, CAB(ALPHA=0) CABAF0

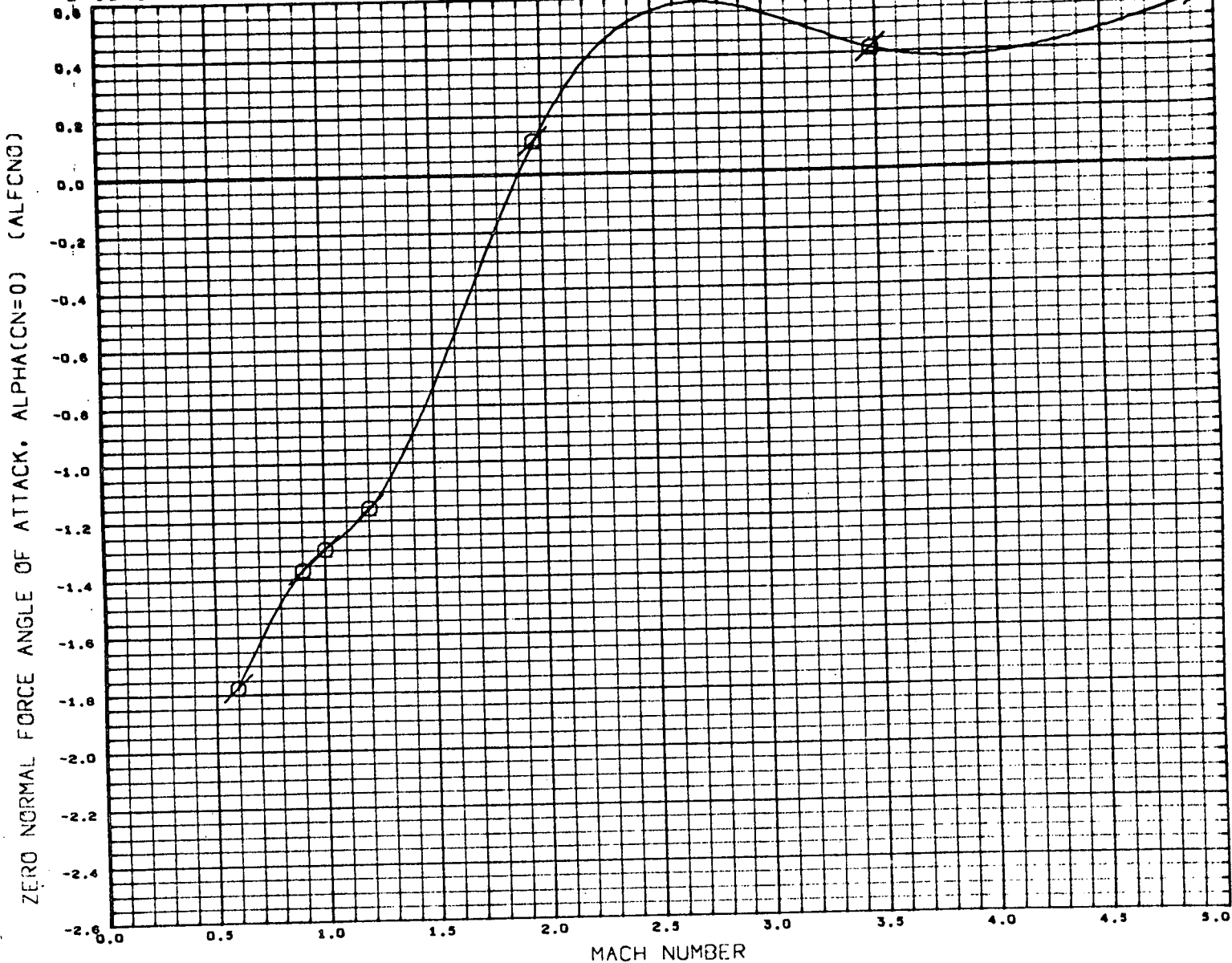


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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES
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REFERENCE INFORMATION
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DATA HIST. CODE CCCGCF

M502-MSFC-S1C H-33 ORBITER

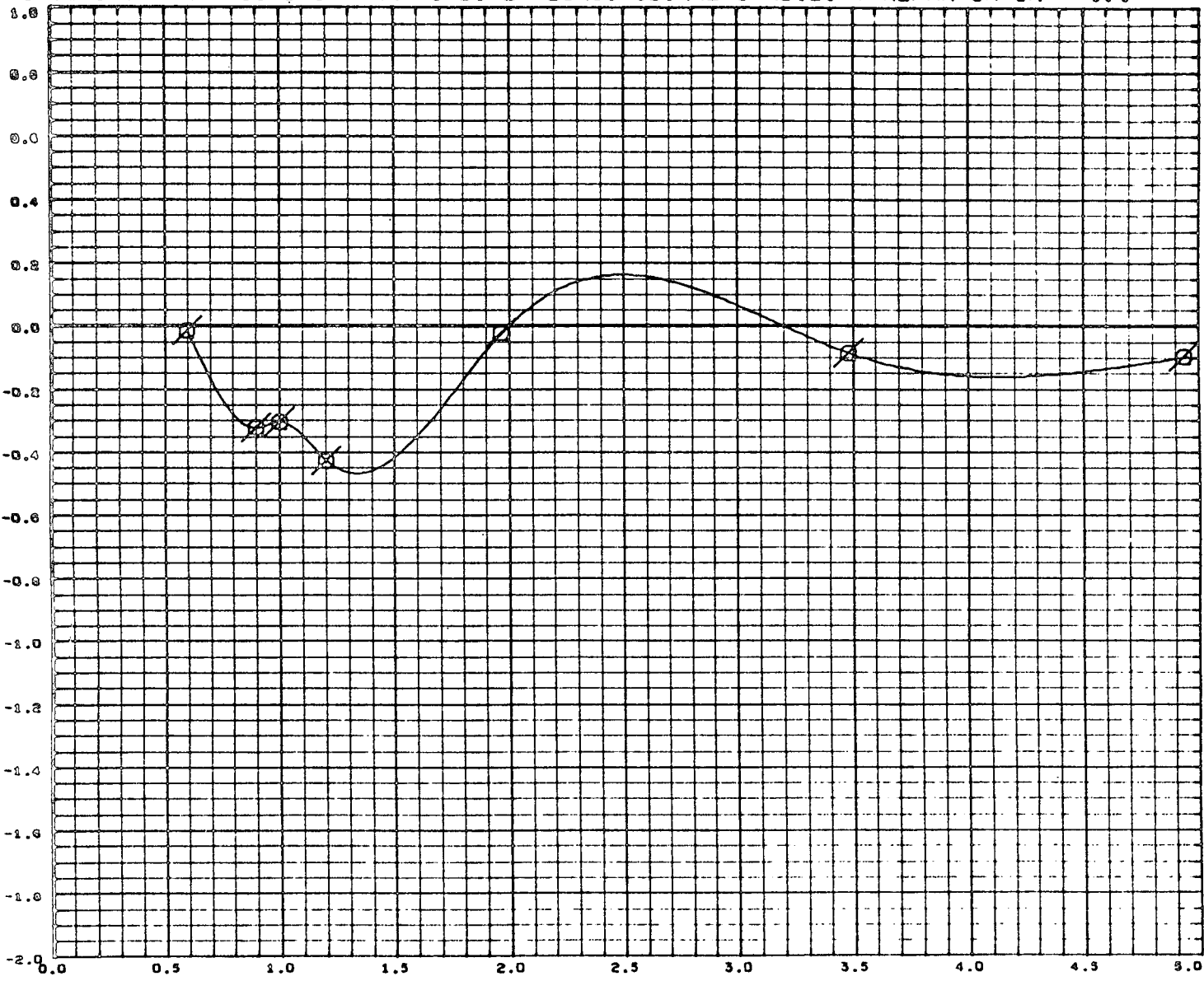
OWVTCBF1

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO NORMAL FORCE PITCHING MOMENT, CLM(CN=0) (CLMCN0)



MACH NUMBER

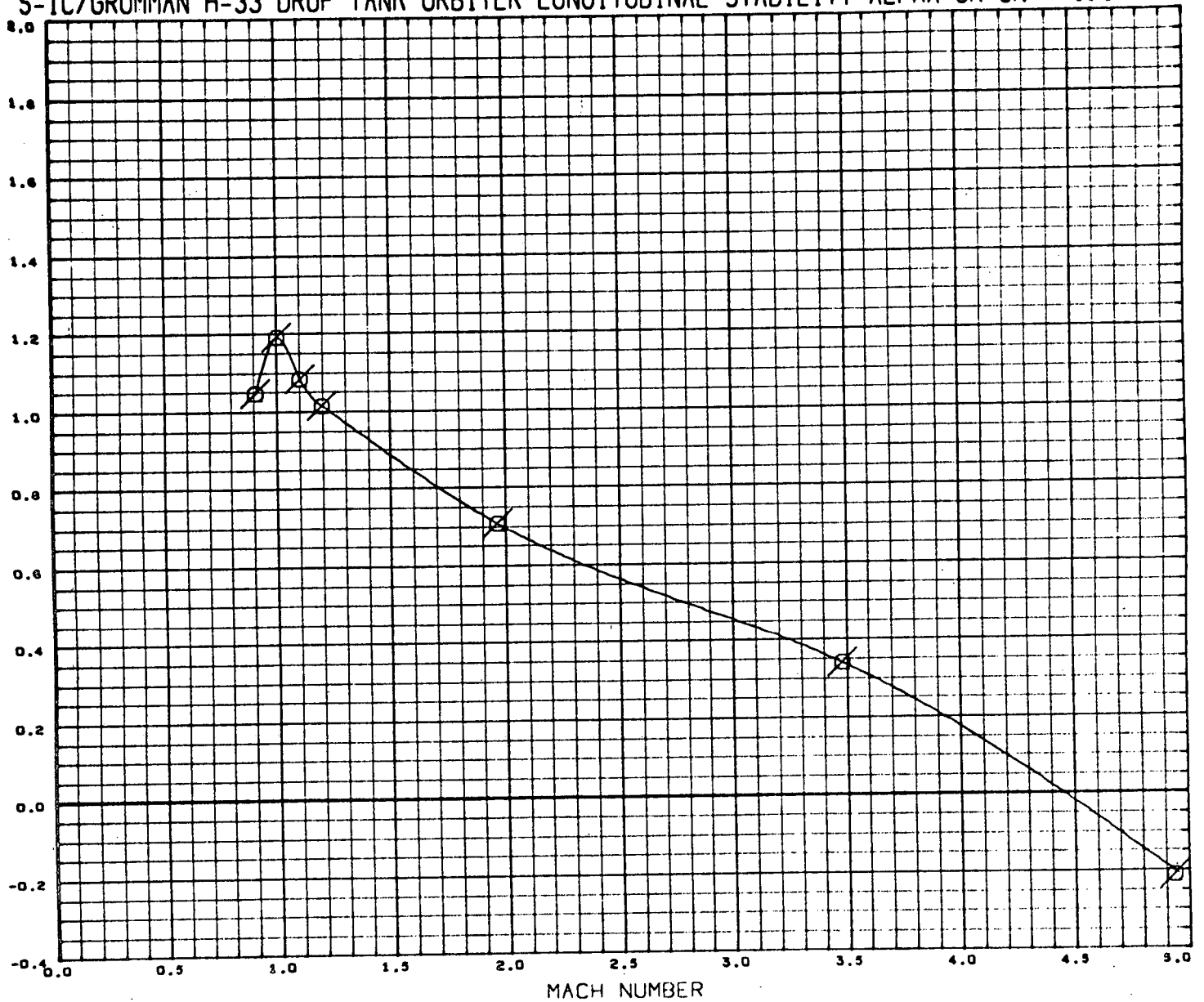
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

LONGITUDINAL CENTER OF PRESSURE LOCATION, CP/D



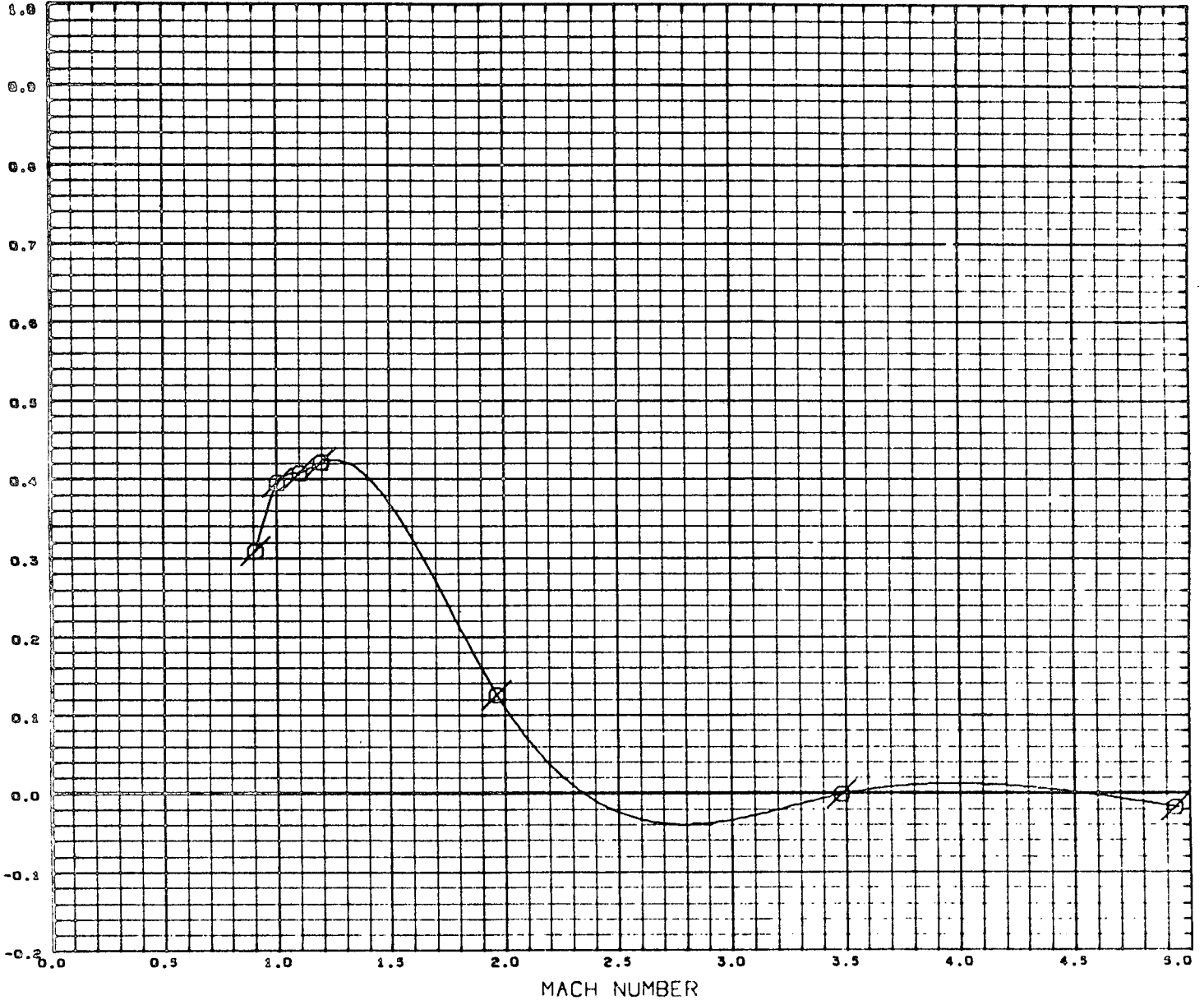
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DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

% RC ANGLE OF ATTACK NORMAL FORCE COEFFICIENT, CN(ALPHA=0) CNAFO



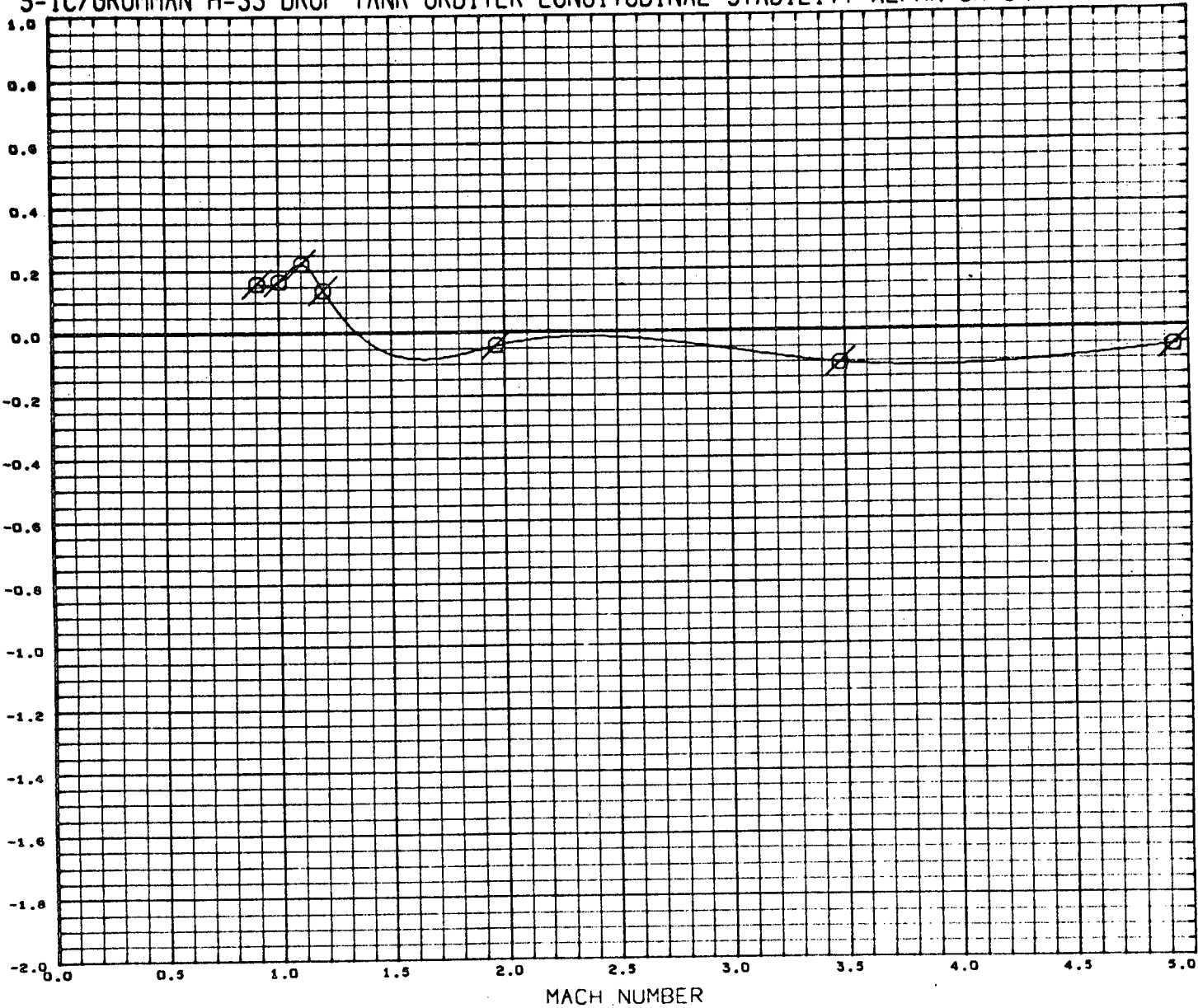
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK PITCHING MOMENT COEFFICIENT, CLM(ALPHA=0) CLMAFC



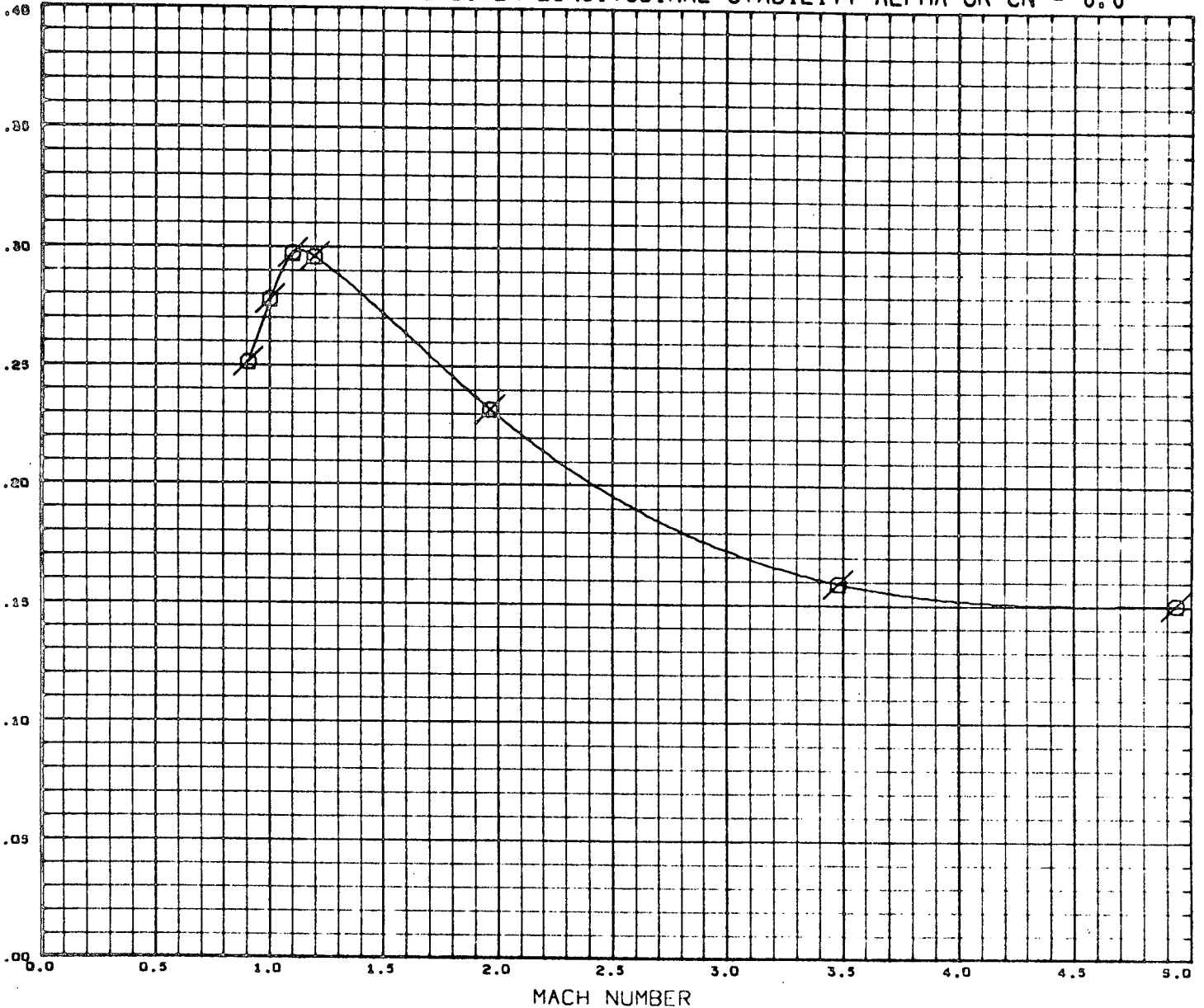
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

NORMAL FORCE COEFFICIENT DERIVATIVE, CNA(ALPHA=0) CNAAF0



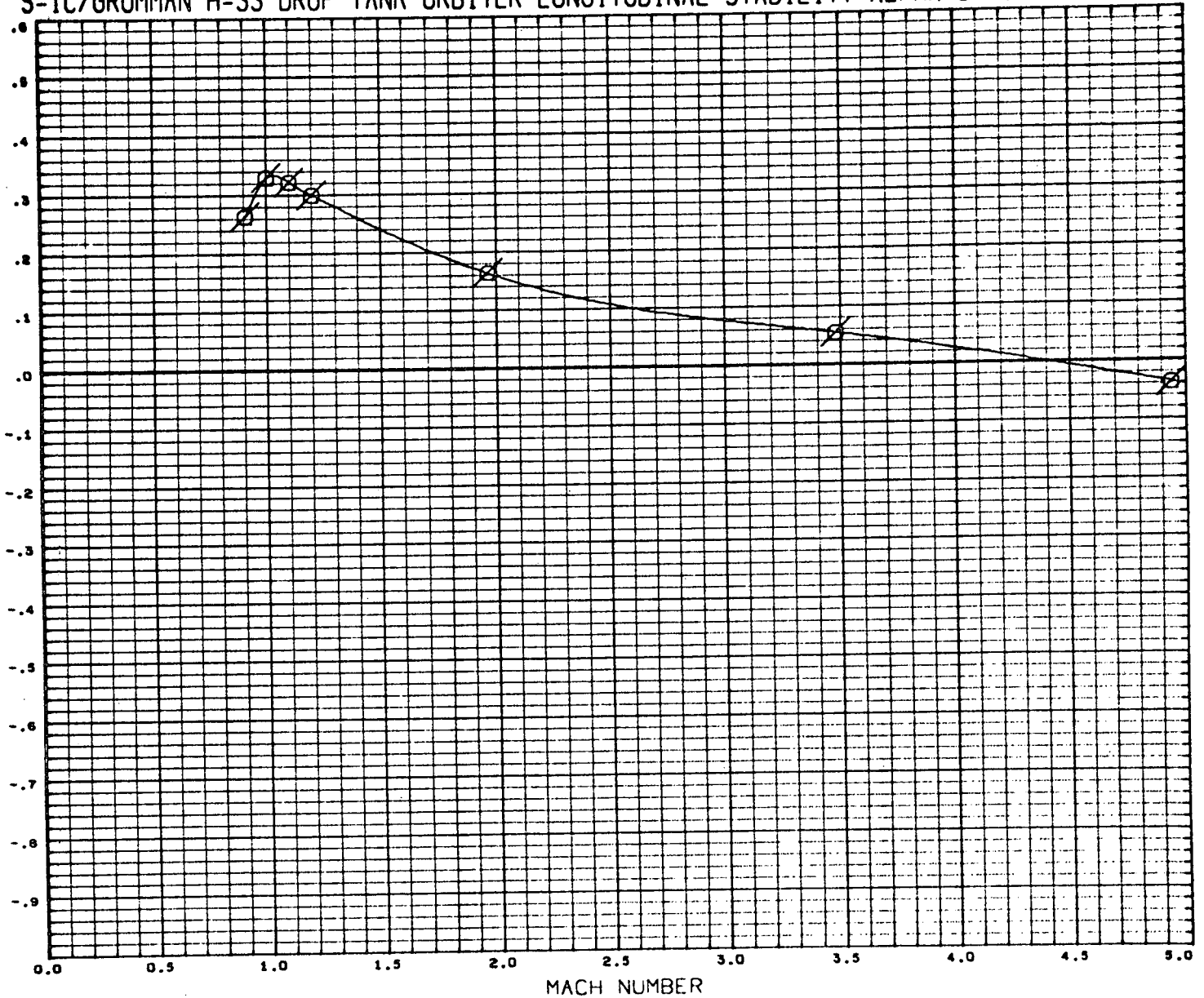
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

PITCH MOMENT COEFFICIENT DERIVATIVE, CLMA(ALPHA=0) CMAAFC



PARAMETRIC VALUES
 BETA 0.000 PHI 0.000
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M502-MSFC-S1C H-33 ORBITER

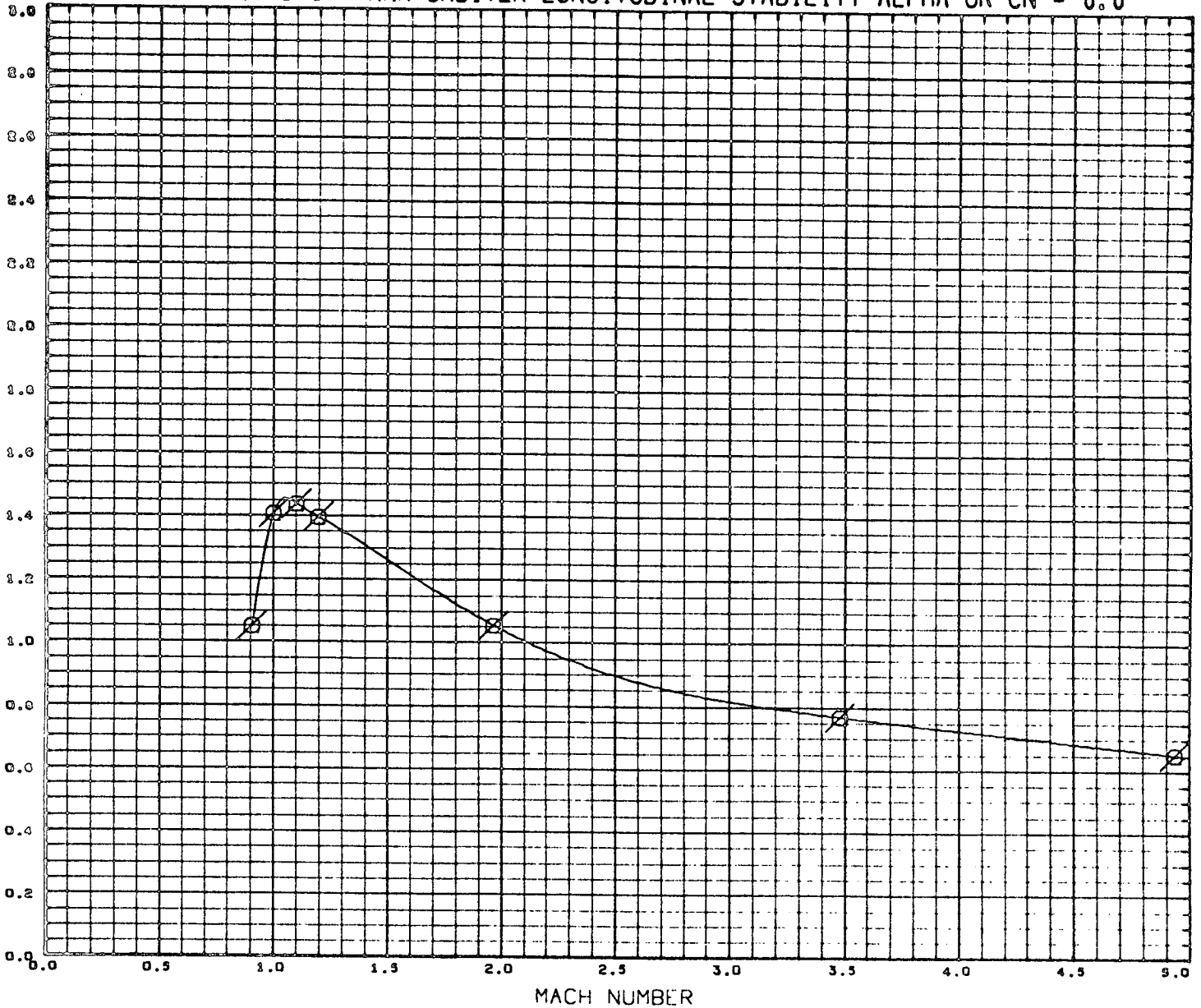
OWVCBF

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK TOTAL AXIAL FORCE COEFF. CA(ALPHA=0) CAAFO



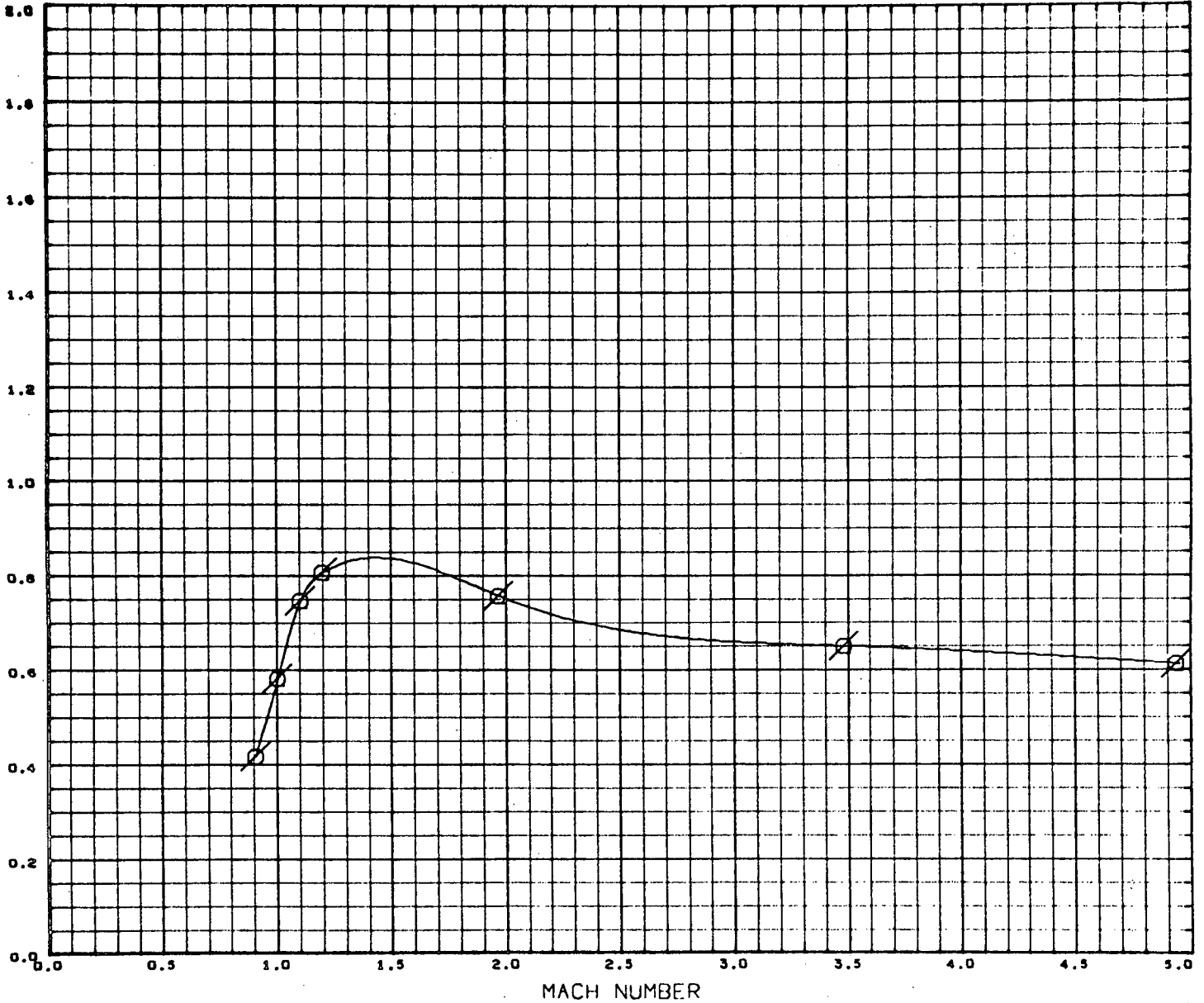
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DATA MIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK FOREBODY AXIAL FORCE COEFF. $C_{AF}(\alpha=0)$ CAFAFC



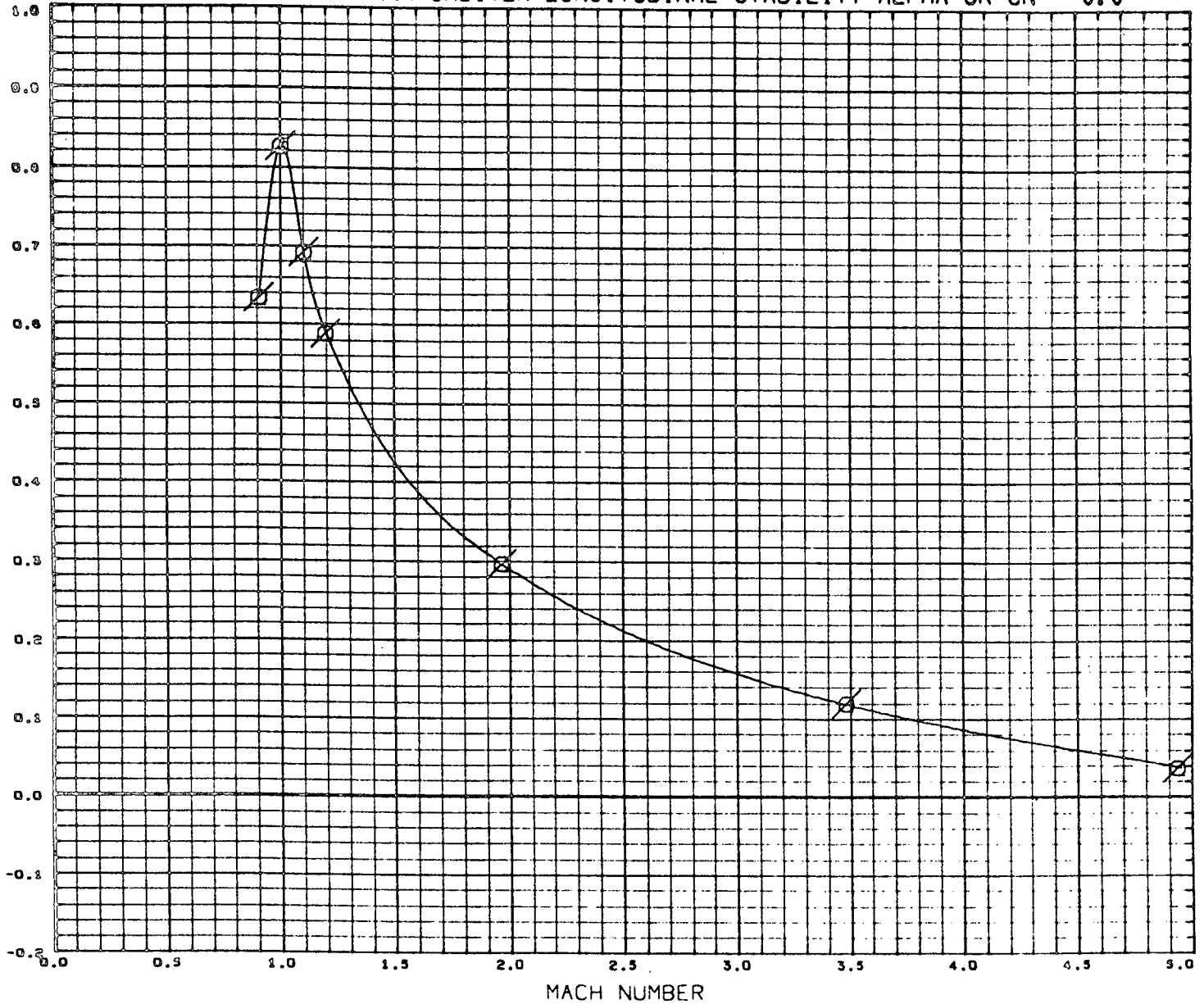
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK BASE AXIAL FORCE COEFFICIENT, CAB(ALPHA=0) CABAF0

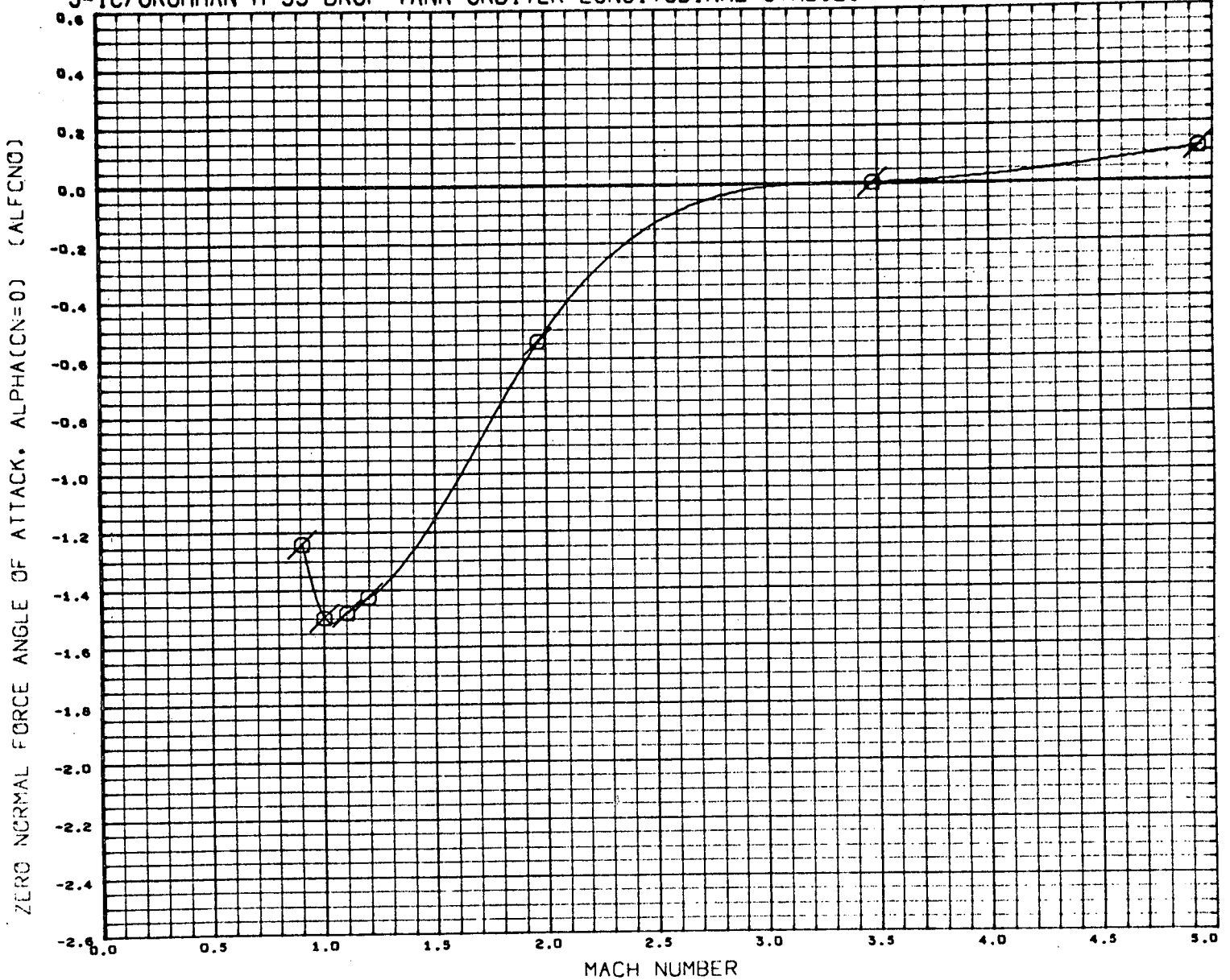


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 WNGIN 0.000

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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

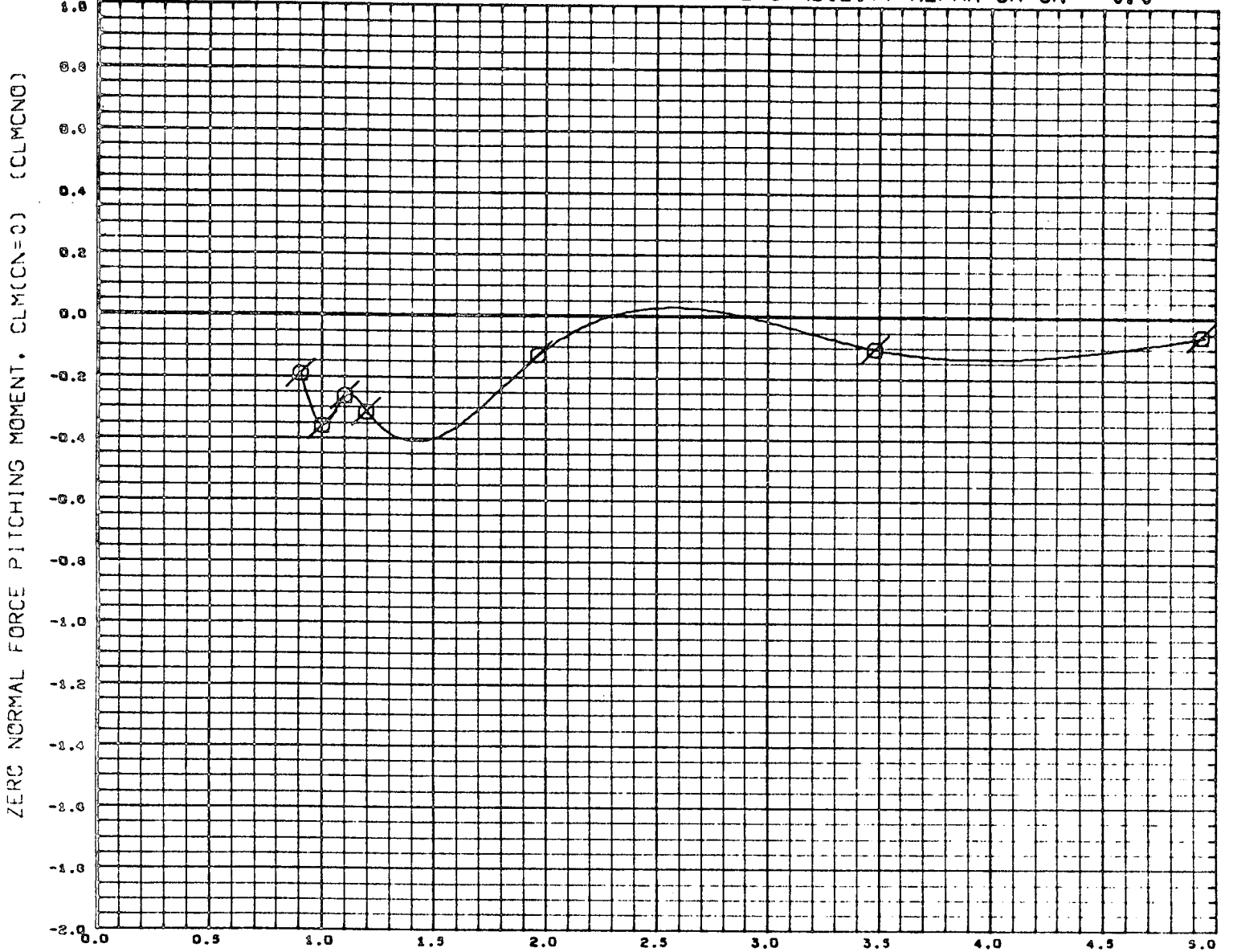


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 WNGIN 0.000

REFERENCE INFORMATION
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 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES
 BETA 0.000 PHI 0.000
 WNGIN 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
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 BREF 1.3330 IN.
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 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES
 BETA 0.000 PHI 0.000
 WNGIN 0.000

REFERENCE INFORMATION
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 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK NORMAL FORCE COEFFICIENT, CN(ALPHA=0) CNAFG



PARAMETRIC VALUES
 BETA 0.000 PHI 0.000
 WNGIN 0.000

REFERENCE INFORMATION
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 BREF 1.3330 IN.
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 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCCCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK PITCHING MOMENT COEFFICIENT, CLM(ALPHA=0) CLMAFO



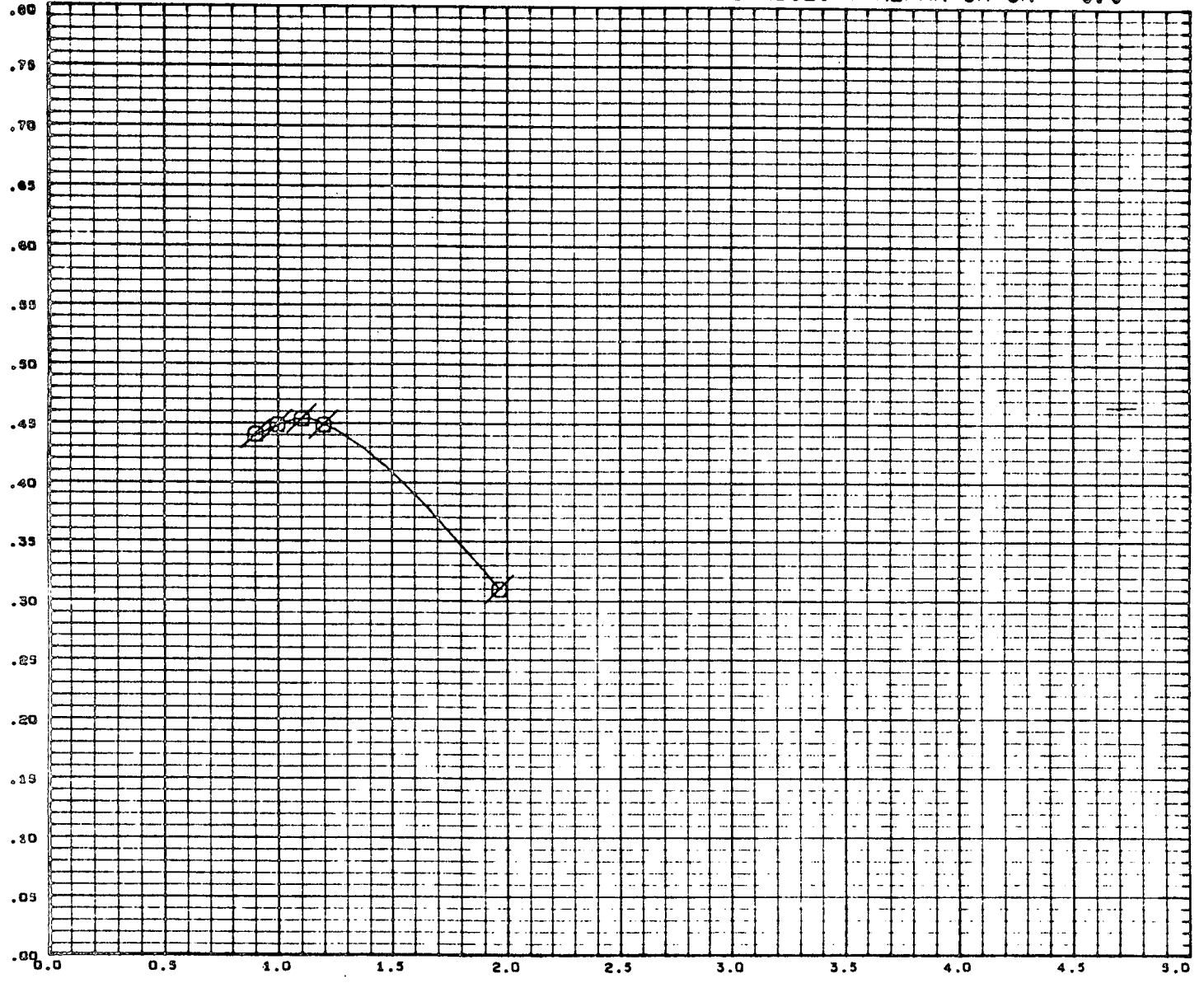
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 YMRF 0.0000 IN.
 ZMRF 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

PITCH MOMENT COEFFICIENT DERIVATIVE, CLMA(ALPHA=0) CMAAFC



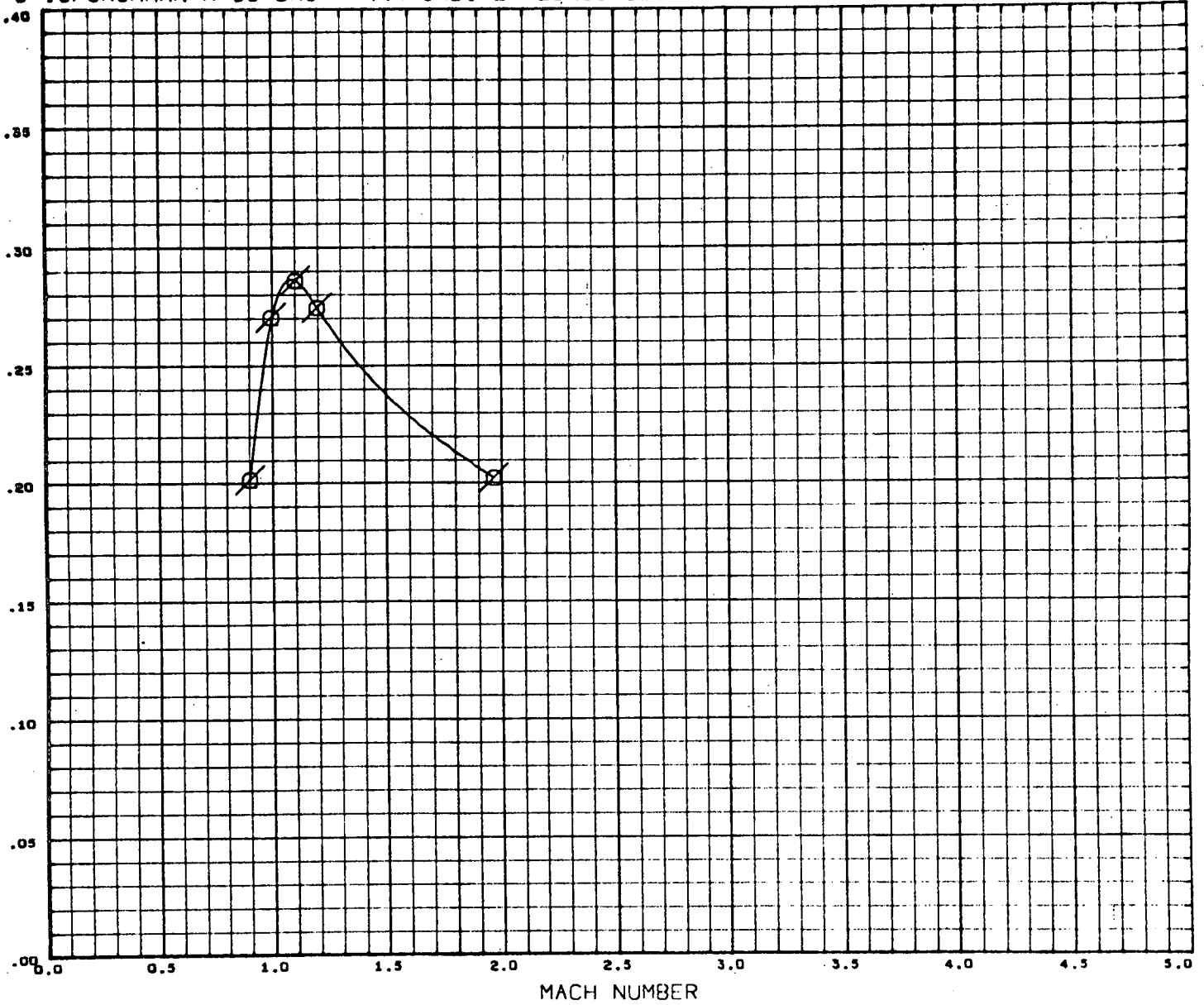
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

NORMAL FORCE COEFFICIENT DERIVATIVE, $C_{NA}(\alpha=0)$ CNAAF0



PARAMETRIC VALUES
 BETA 0.000 PHI 0.000
 WNGIN 0.000

REFERENCE INFORMATION
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 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCCFC

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK TOTAL AXIAL FORCE COEFF. CA(ALPHA=0) CAAFO



MACH NUMBER

PARAMETRIC VALUES

BETA 0.000 PHI 0.000
WNGIN 0.000

REFERENCE INFORMATION

SREF 1.3960 SQ. IN.
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

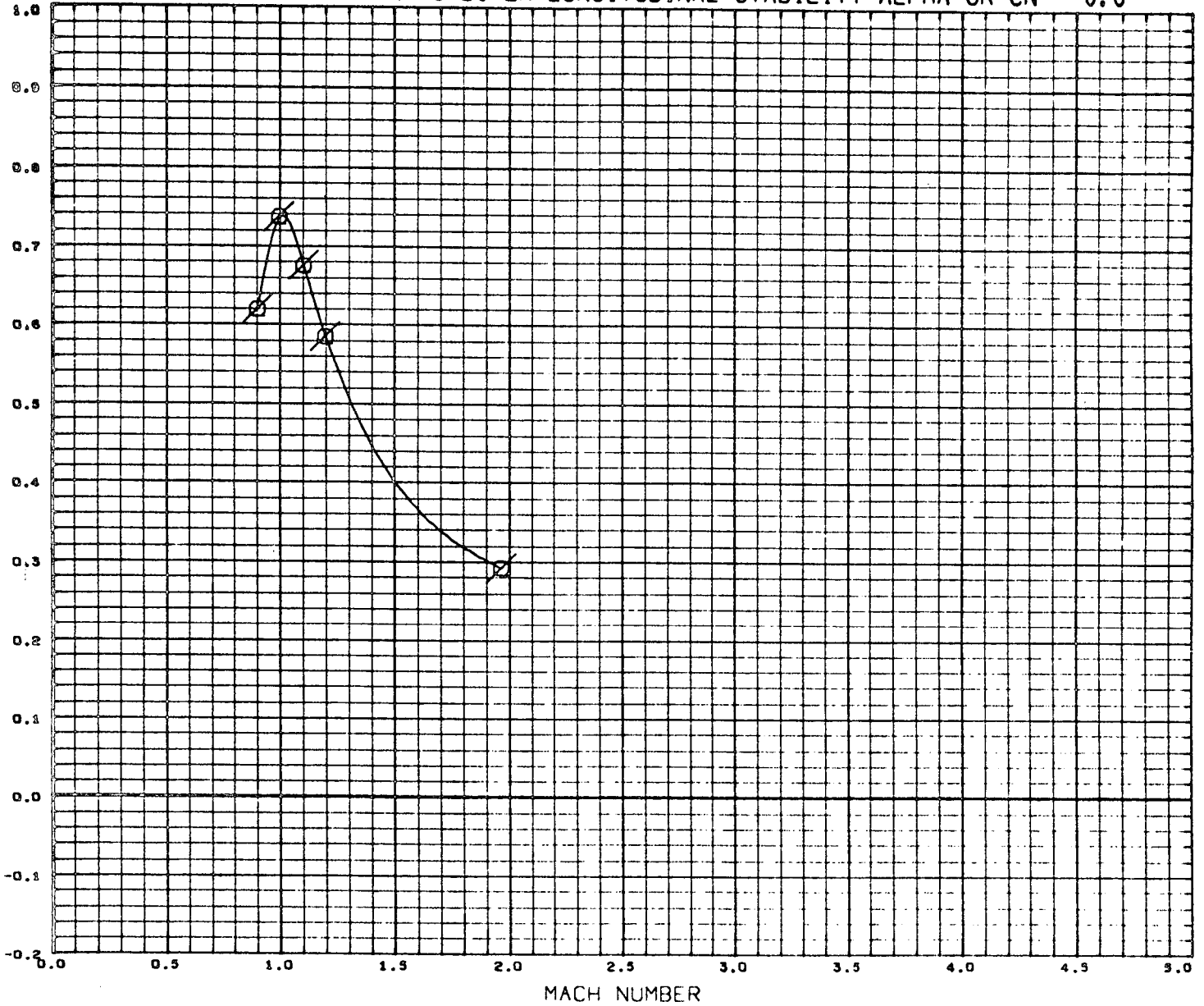
ZERO ANGLE OF ATTACK FOREBODY AXIAL FORCE COEFF. $C_{AF}(\alpha=0)$ CAFAFC



PARAMETRIC VALUES		REFERENCE INFORMATION	
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WGIN	0.000	SREF	1.3960 SQ. IN.
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		YMRP	0.0000 IN.
		ZMRP	0.0000 IN.
		SCALE	0.0034
DATA HIST. CODE CCCCFC			

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK BASE AXIAL FORCE COEFFICIENT, CAB(ALPHA=0) CABAF0



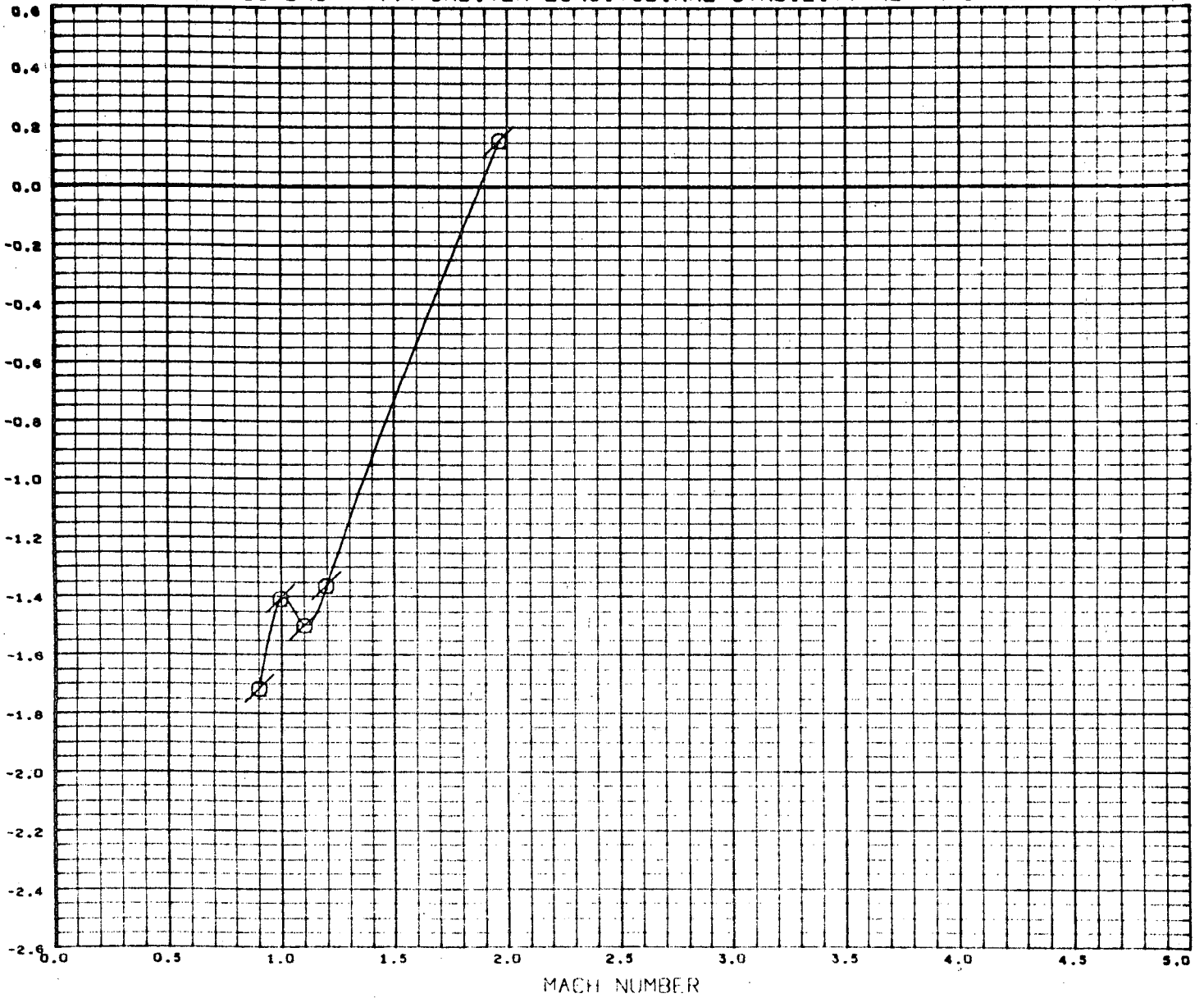
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 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO NORMAL FORCE ANGLE OF ATTACK, ALPHA(CN=0) (ALFCND)



PARAMETRIC VALUES

BETA 0.000 PHI 0.000
WNGIN 0.000

REFERENCE INFORMATION

SREF 1.3960 SQ. IN.
LREF 1.3330 IN.
BREF 1.3330 IN.
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YMRP 0.0000 IN.
ZMRP 0.0000 IN.
SCALE 0.0034

DATA HIST. CODE CCCCCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO NORMAL FORCE PITCHING MOMENT, CLM(CN=0) (CLMCN0)

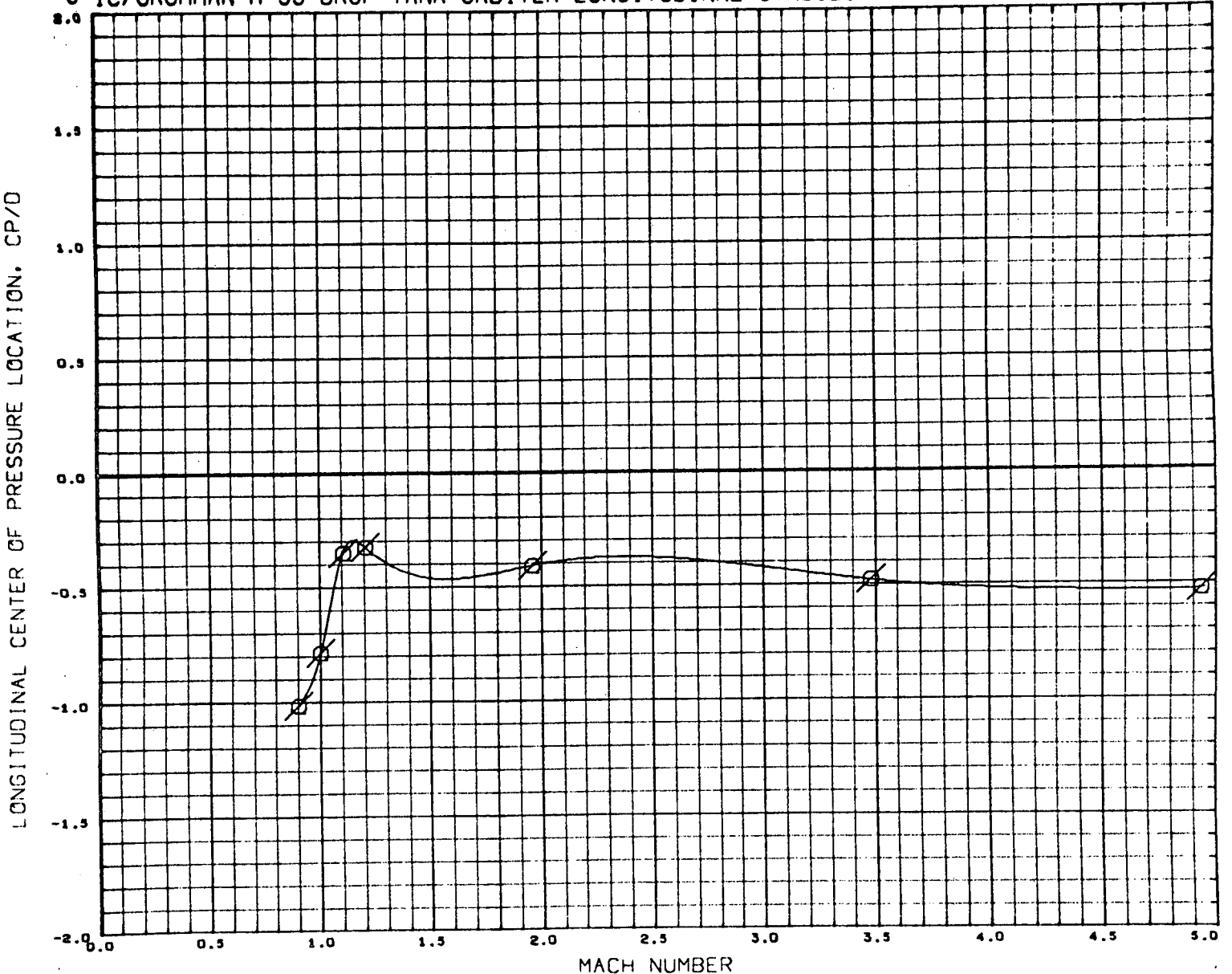


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REFERENCE INFORMATION
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 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

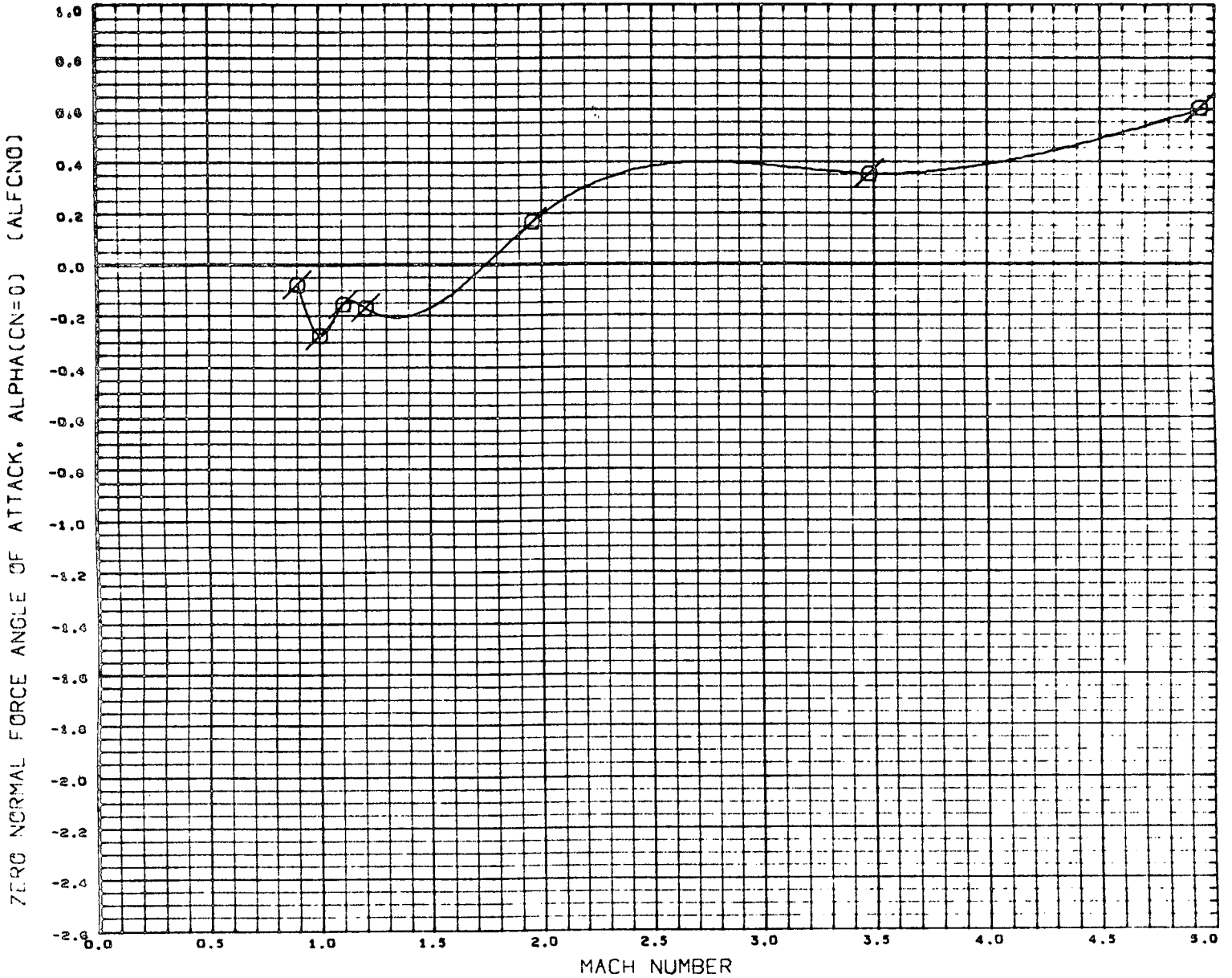


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REFERENCE INFORMATION
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



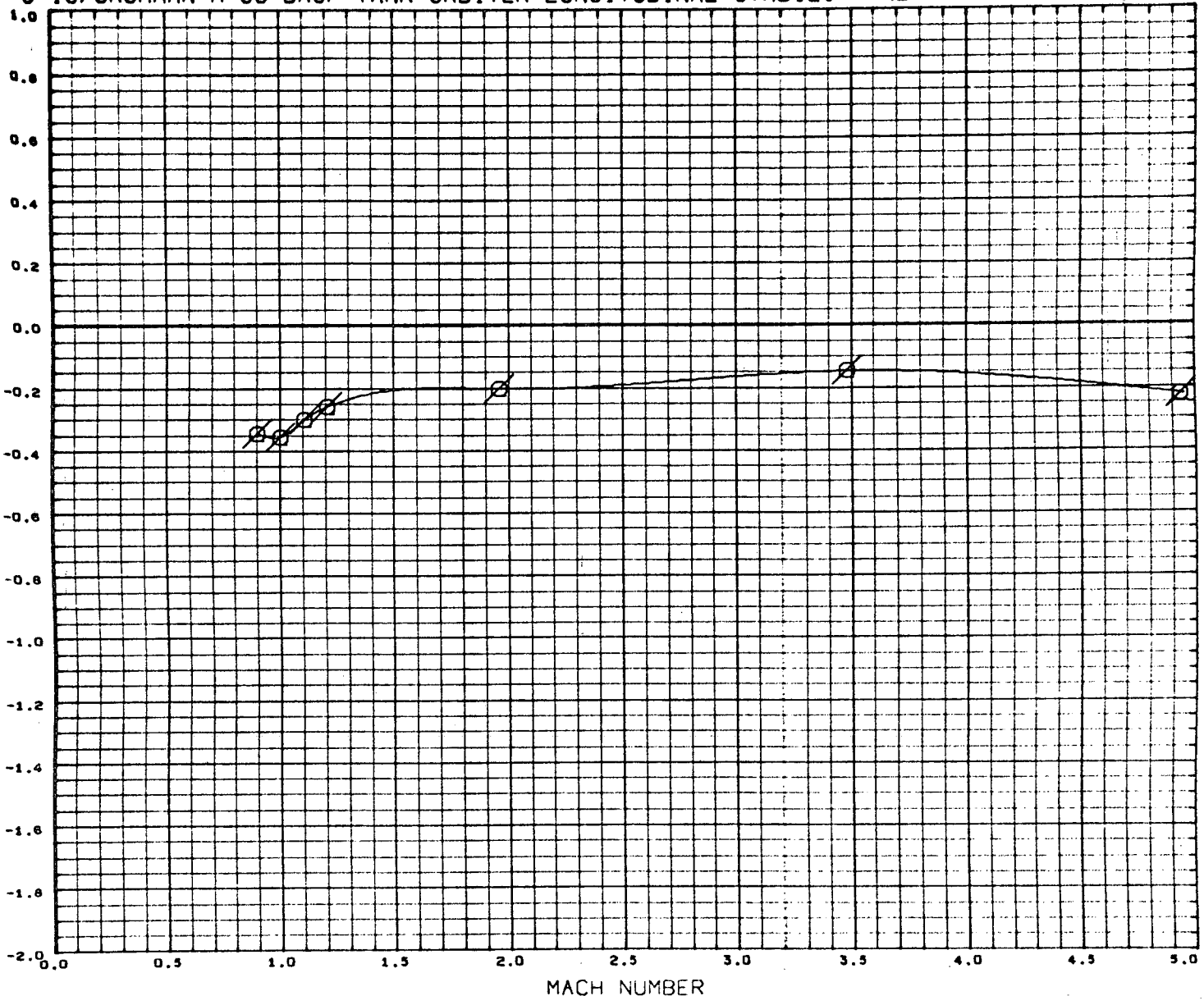
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 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK PITCHING MOMENT COEFFICIENT, $CLM(\alpha=0)$ CLMAFO



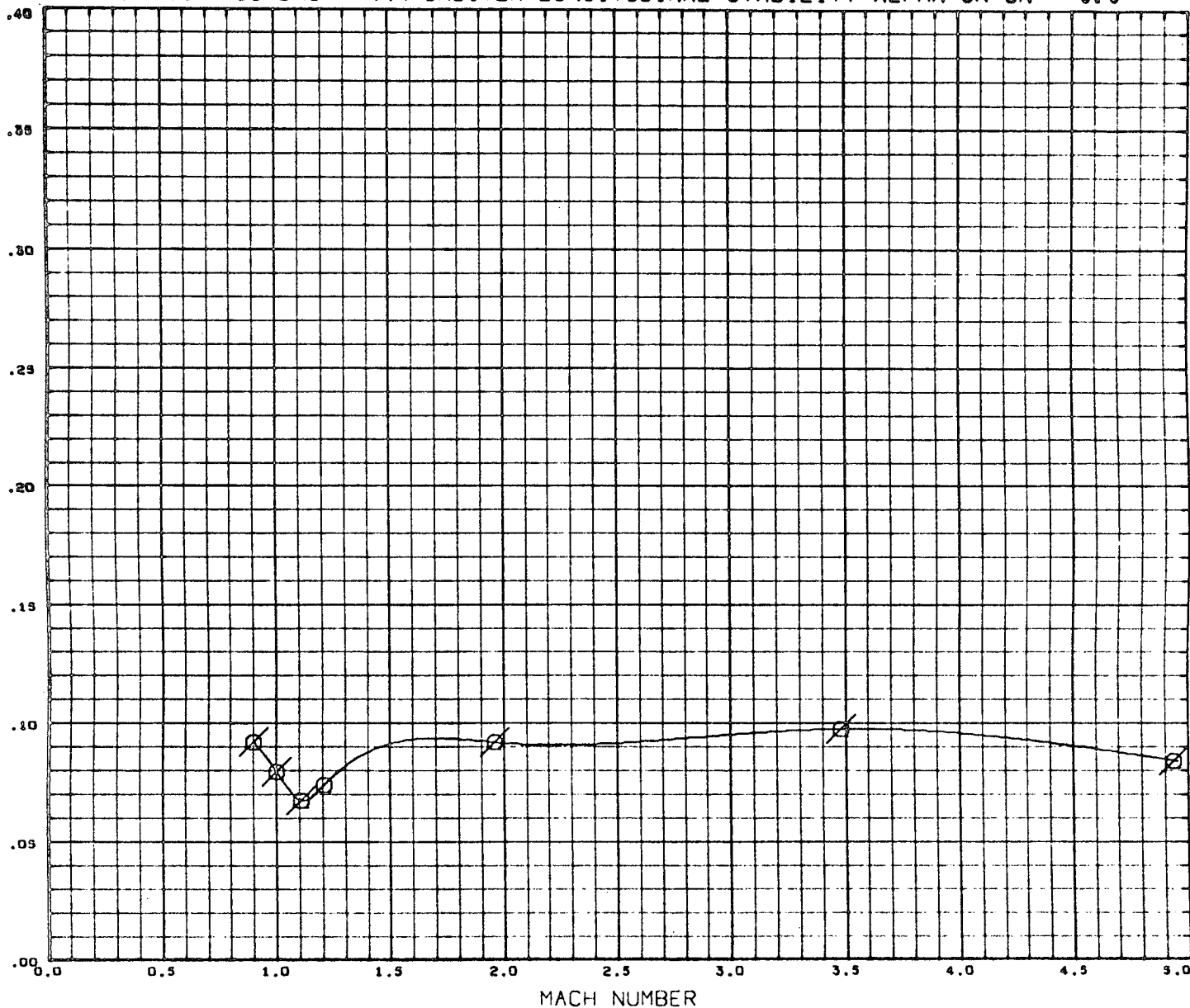
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 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

NORMAL FORCE COEFFICIENT DERIVATIVE, $C_{N(\alpha)}$



PARAMETRIC VALUES
 BETA 0.000 PHI 0.000
 WNGIN 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
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 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

PITCH MOMENT COEFFICIENT DERIVATIVE, CLMA(ALPHA=0) CMAAFC



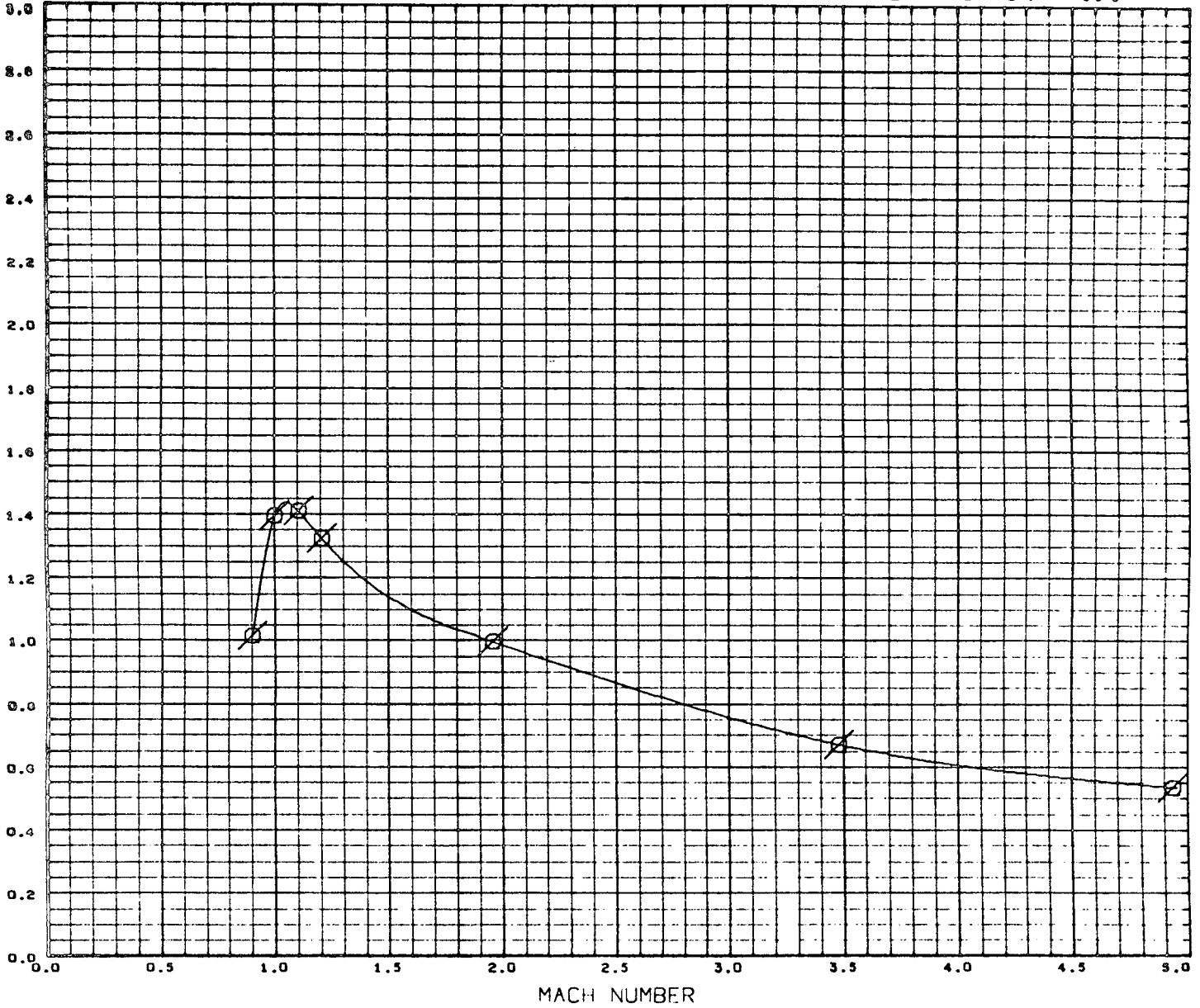
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 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK TOTAL AXIAL FORCE COEFF. CA(ALPHA=0) CAAFC



PARAMETRIC VALUES

BETA 0.000 PHI 0.000
 WINGIN 0.000

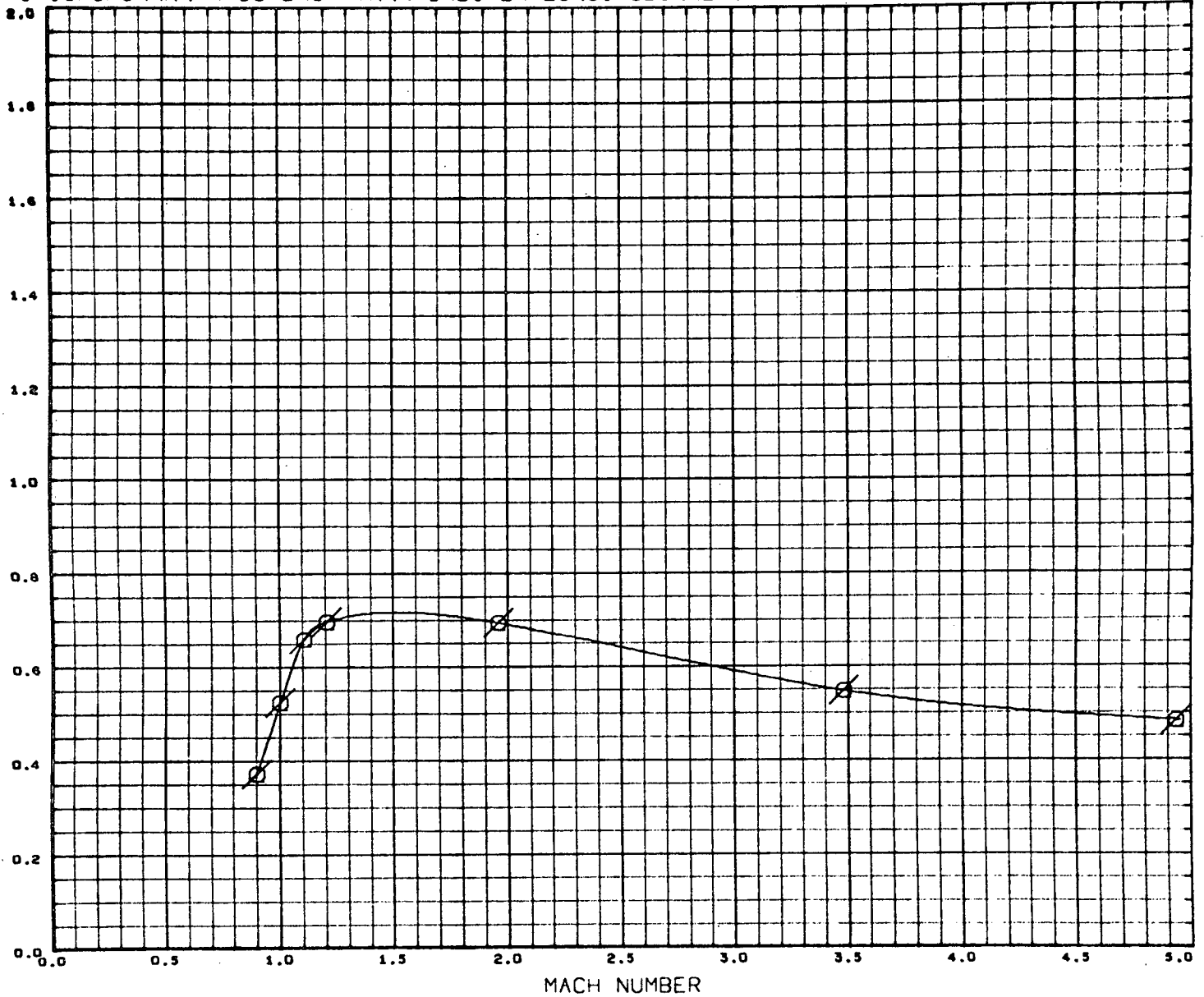
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 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK FOREBODY AXIAL FORCE COEFF. CAF(ALPHA=0) CAFAFG



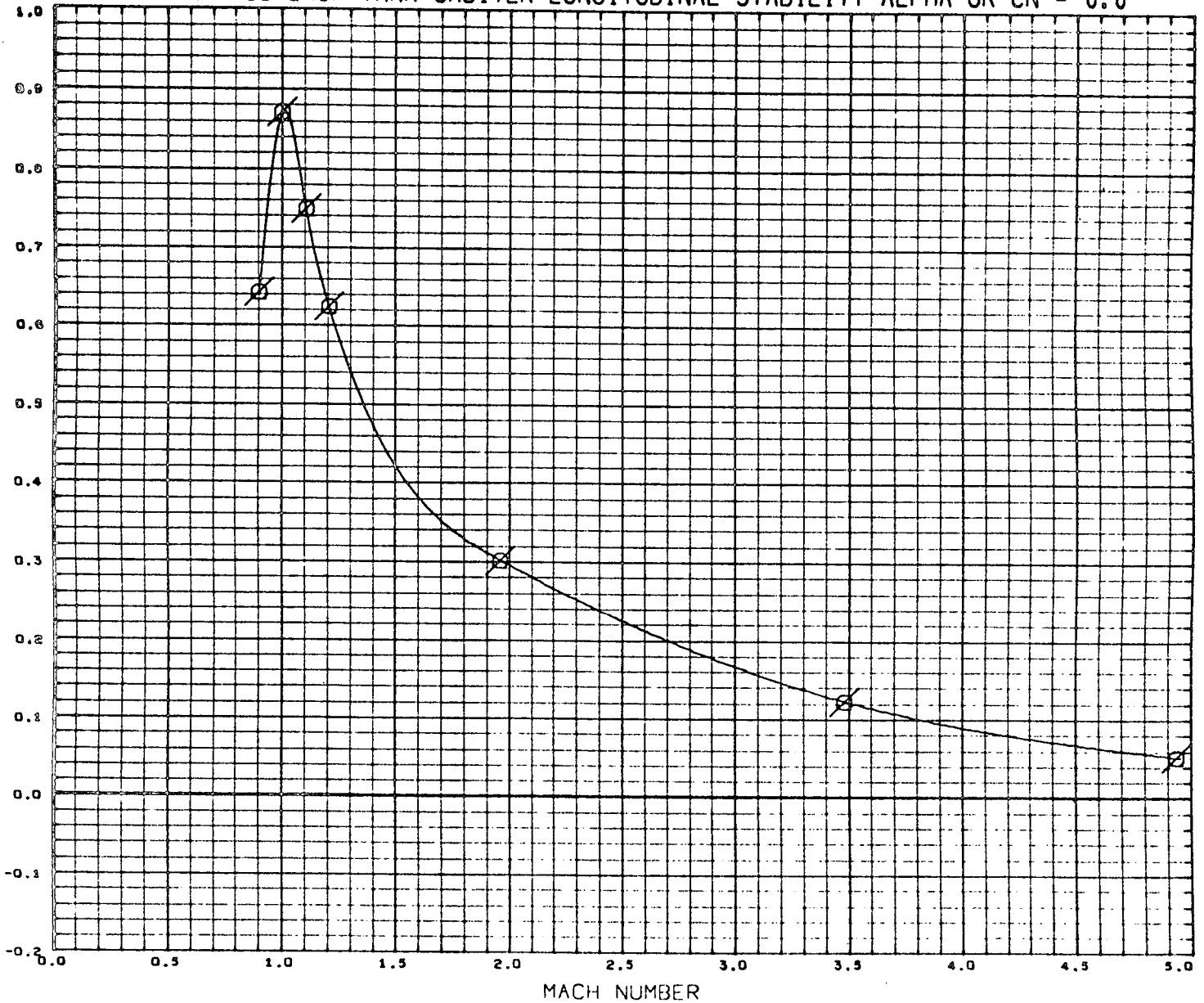
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 WNGIN 0.000

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 XMRF 5.3990 IN.
 YMRF 0.0000 IN.
 ZMRF 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK BASE AXIAL FORCE COEFFICIENT, CAB(ALPHA=0) CABAF0

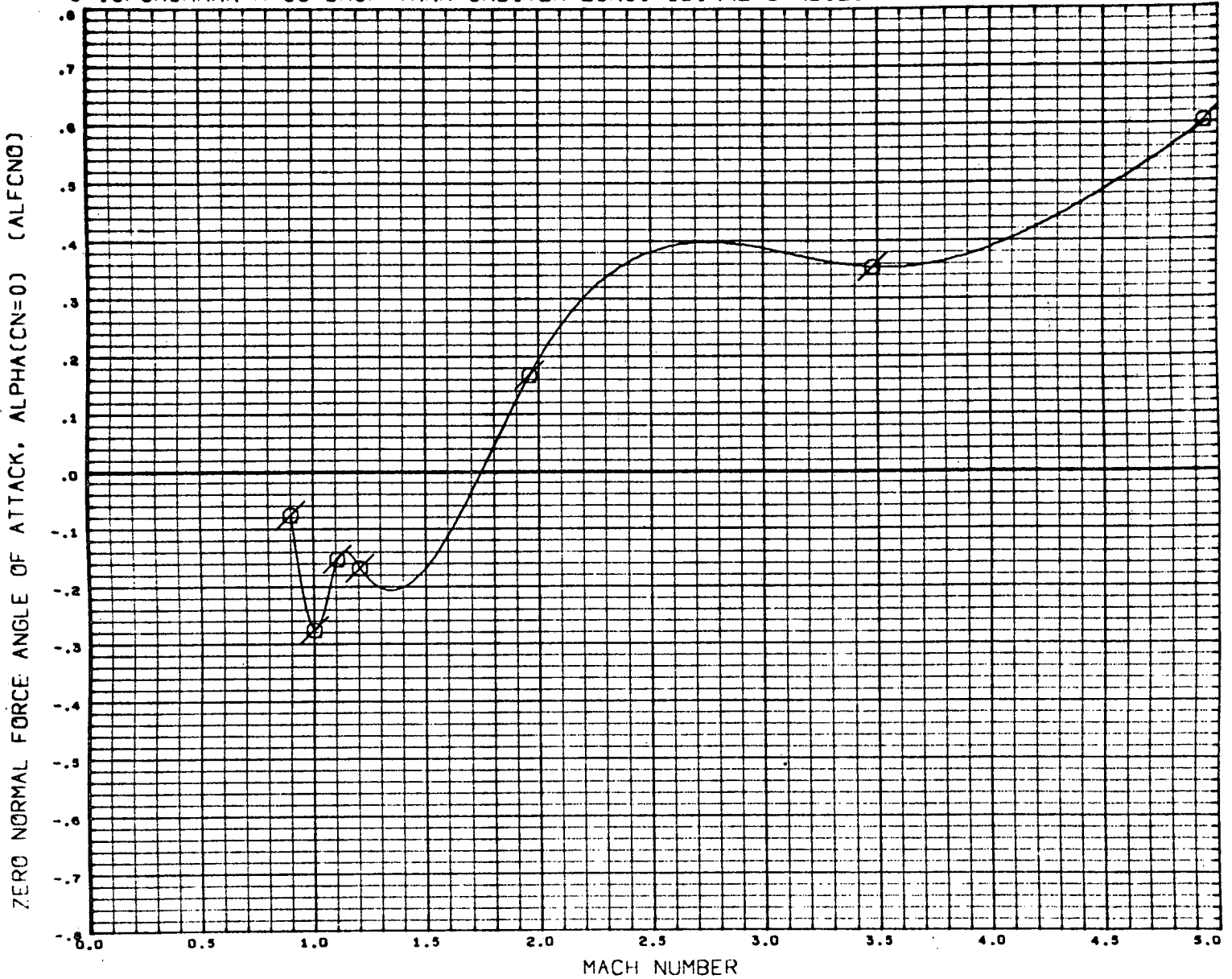


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REFERENCE INFORMATION
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 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



PARAMETRIC VALUES
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 WIGIN 0.000

REFERENCE INFORMATION
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 YMRP 0.0000 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCGCF

MS02-MSFC-S1C H-33 ORBITER

OVCBF

(D44091)

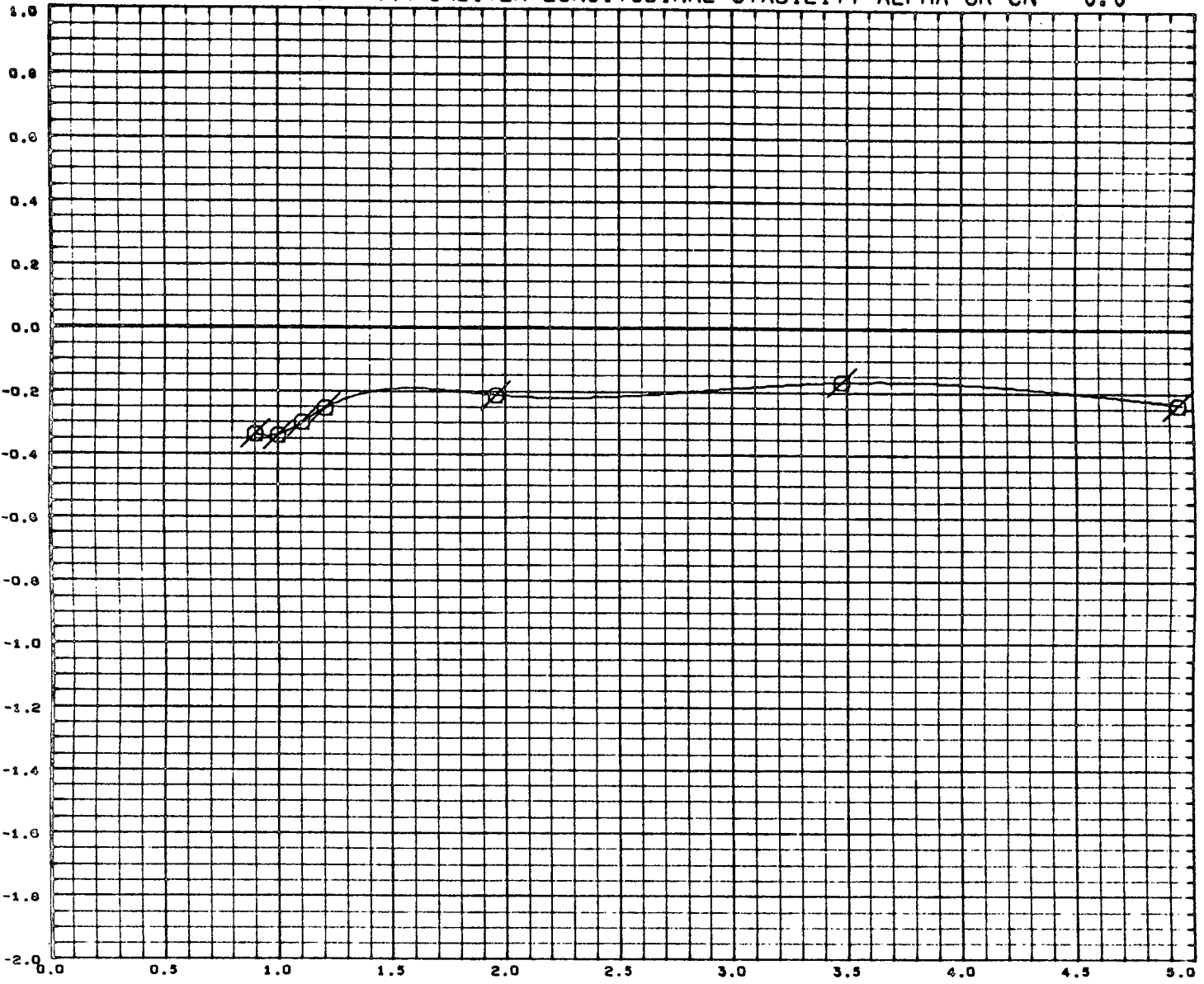
12 MAY 72

PAGE

307

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO NORMAL FORCE PITCHING MOMENT, CLM(CN=0) (CLM(0))



MACH NUMBER

PARAMETRIC VALUES

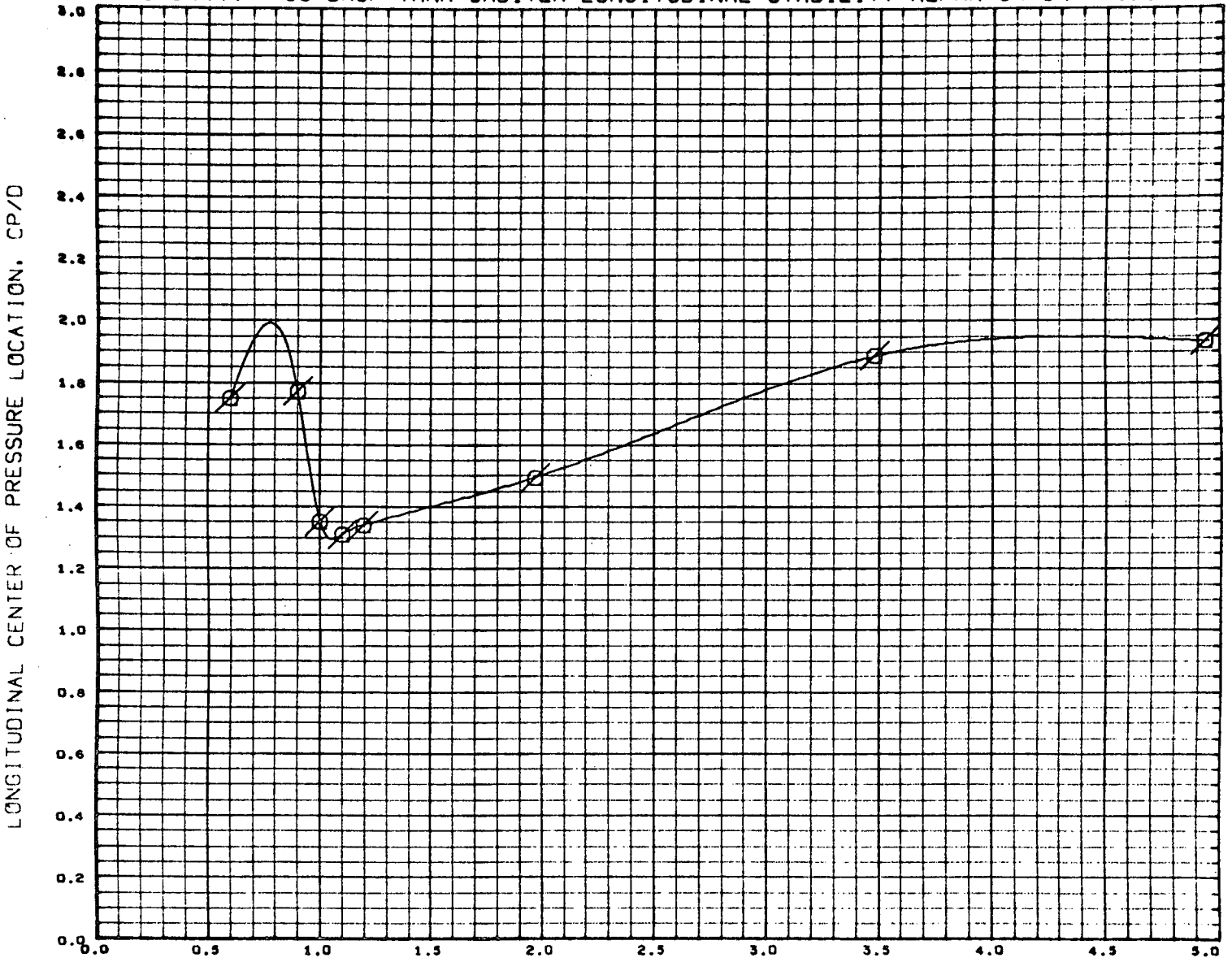
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YMRP 0.0000 IN.
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

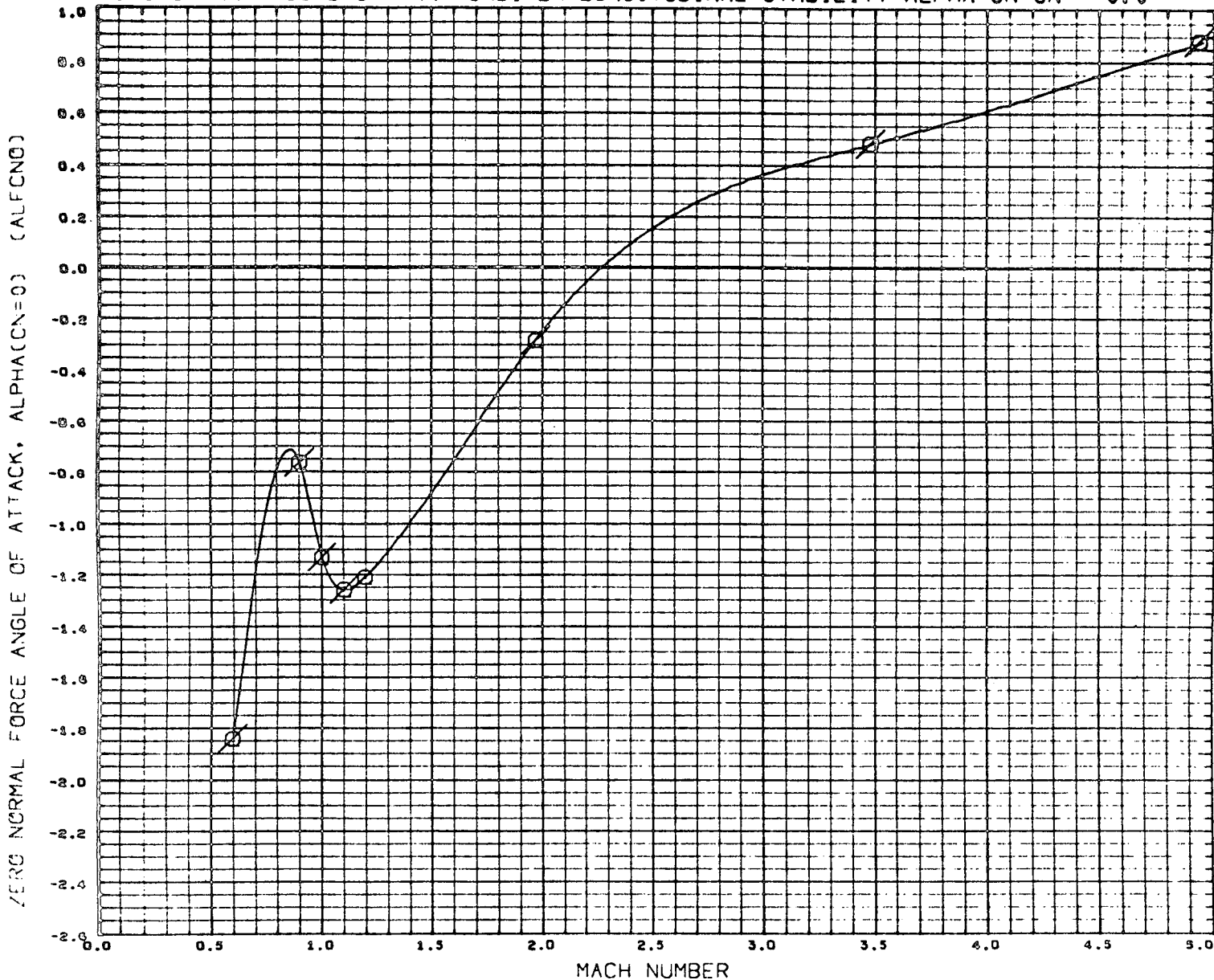


BETA 0.000
 PARAMETRIC VALUES

REFERENCE INFORMATION
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 BREF 1.3330 IN.
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 YMRP 0.0000 IN.
 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



BETA PARAMETRIC VALUES
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REFERENCE INFORMATION

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YMRP	0.0000	IN.
ZMRP -	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK PITCHING MOMENT COEFFICIENT, $CLM(\alpha=0)$ CLMAFC



BETA 0.000
PARAMETRIC VALUES

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP - 5.5070 IN.
 YMRP - 0.0000 IN.
 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCF

M502-MSFC-H-33 ORBITER PLUS CRADLE

OWVTC

(D44111)

12 MAY 72

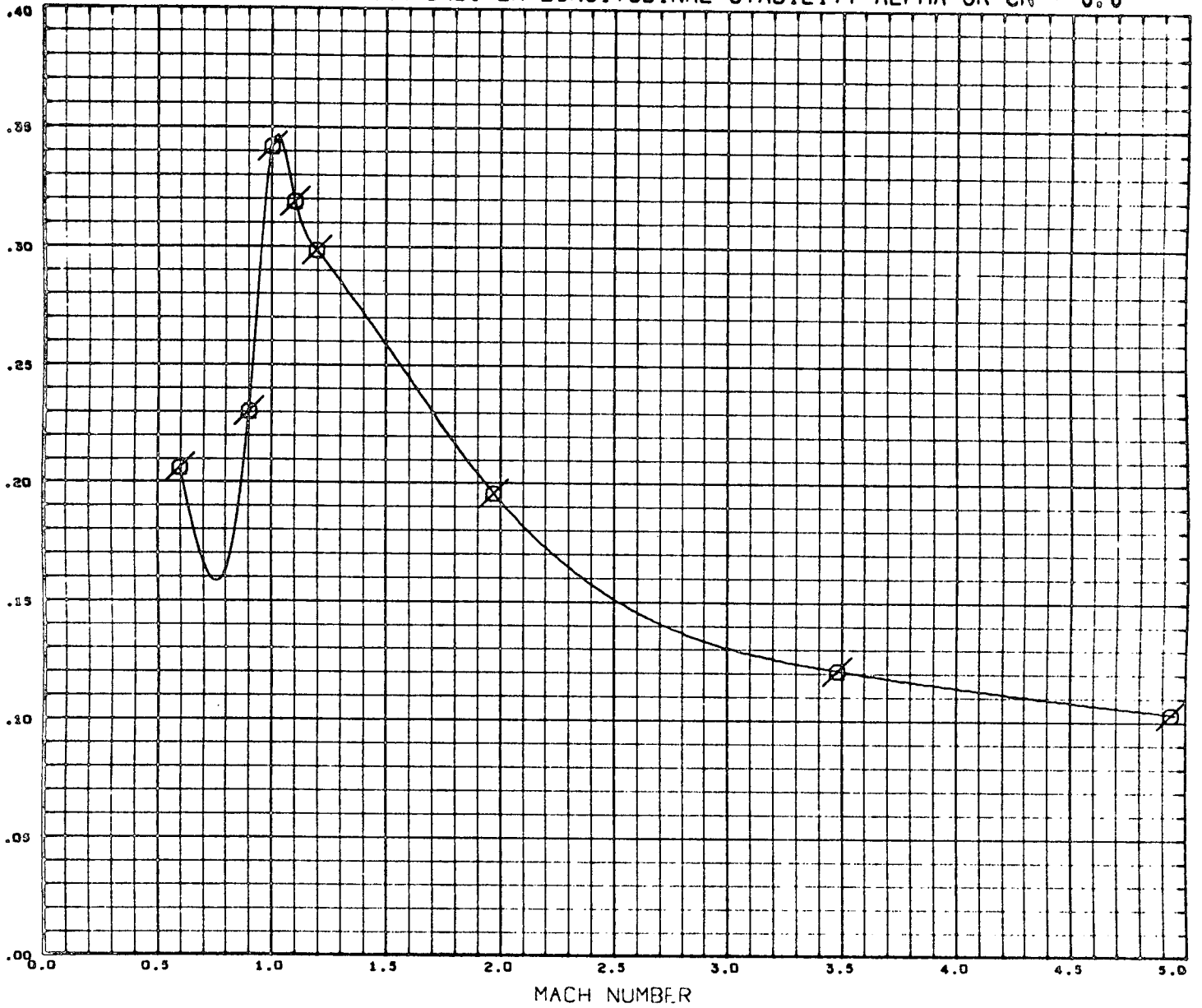
PAGE

311

C-7

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

NORMAL FORCE COEFFICIENT DERIVATIVE, $C_{NA}(\alpha=0)$ CNAAFQ



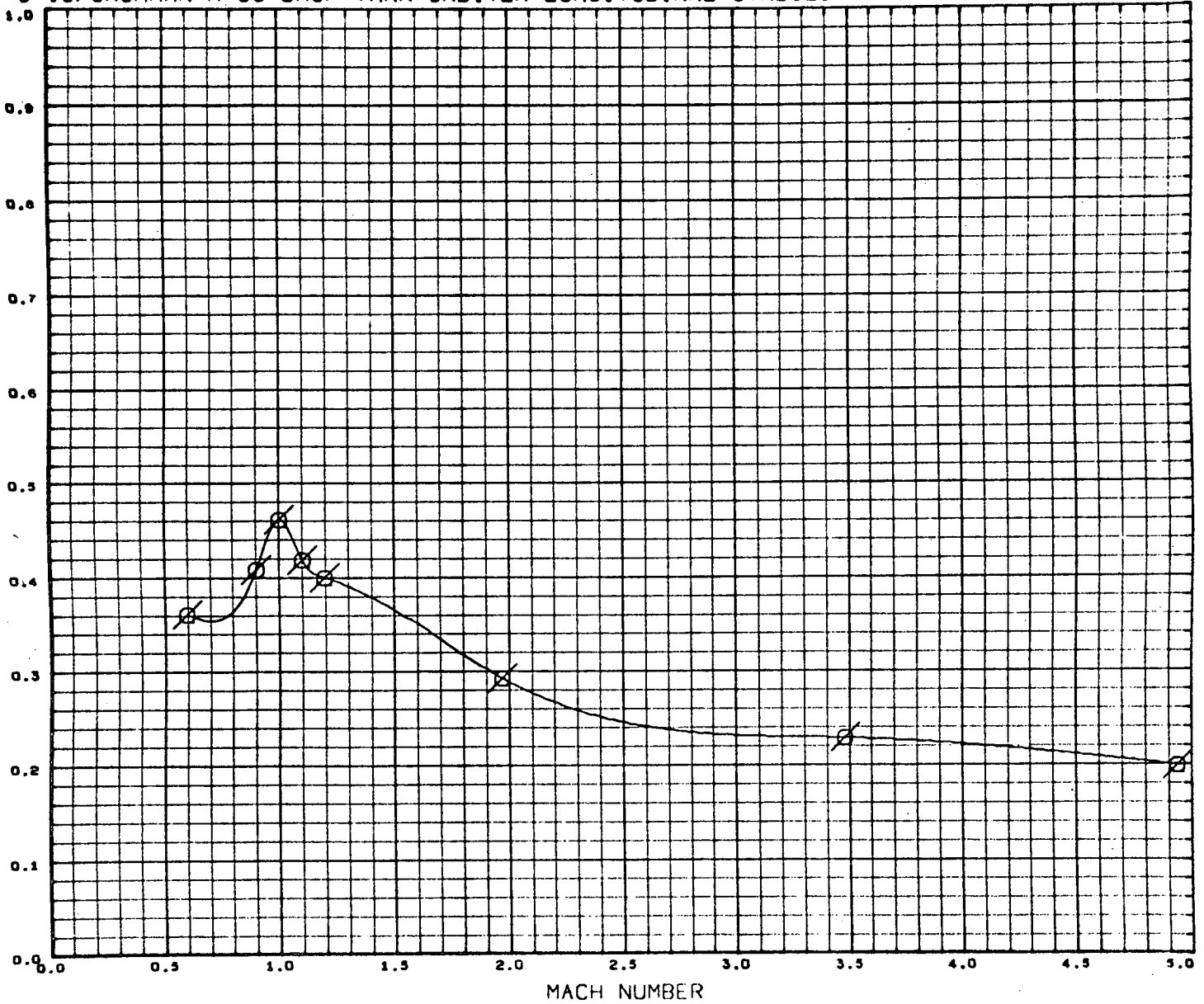
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REFERENCE INFORMATION
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BREF 1.3330 IN.
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YMRP 0.0000 IN.
ZMRP - 0.4250 IN.
SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

PITCH MOMENT COEFFICIENT DERIVATIVE, $CL_{M\alpha}(\alpha=0)$ CMAAFG



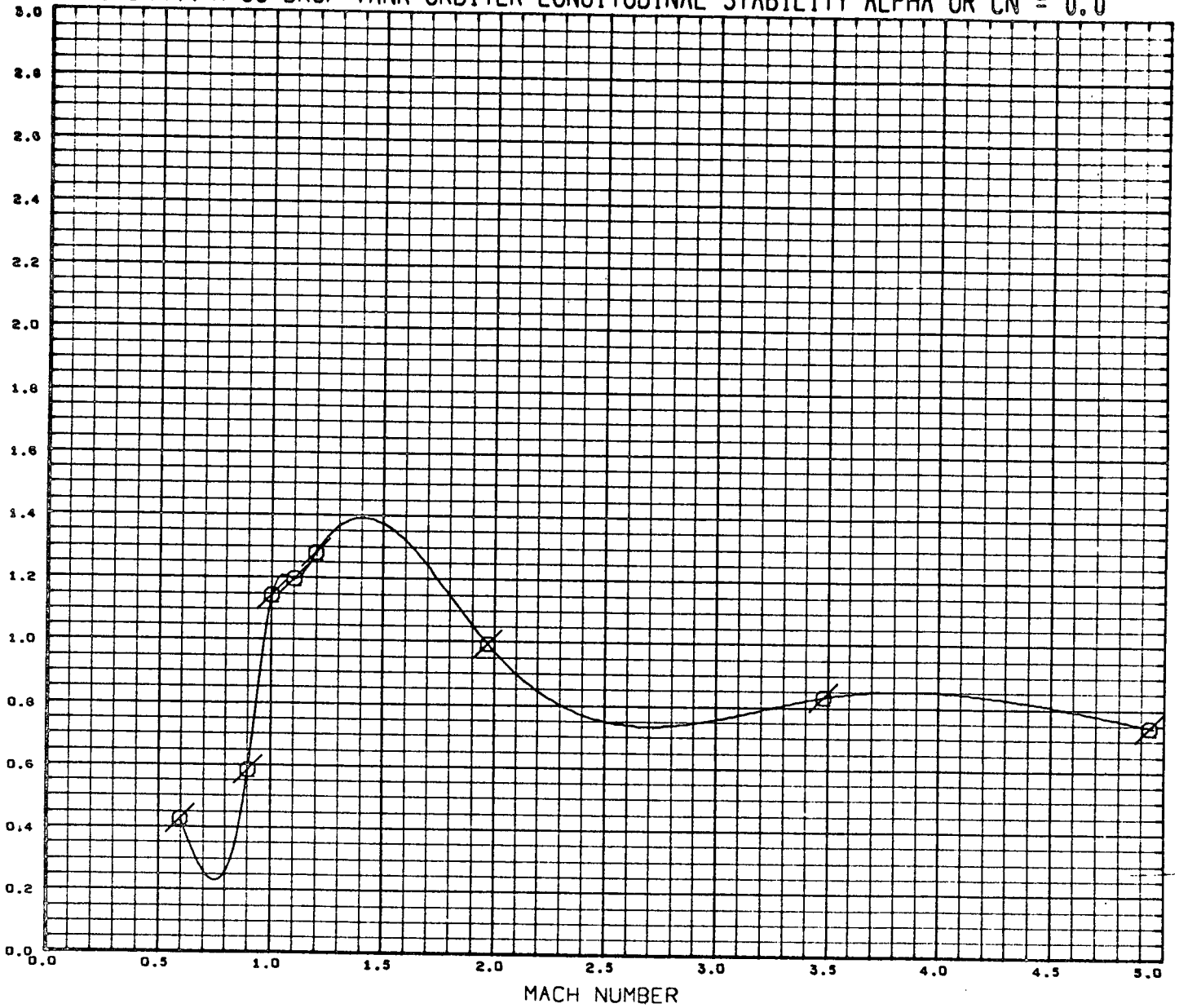
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REFERENCE INFORMATION
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 BREF 1.3330 IN.
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 YMRP 0.0000 IN.
 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK TOTAL AXIAL FORCE COEFF. CA(ALPHA=0) CAAFO



BETA PARAMETRIC VALUES
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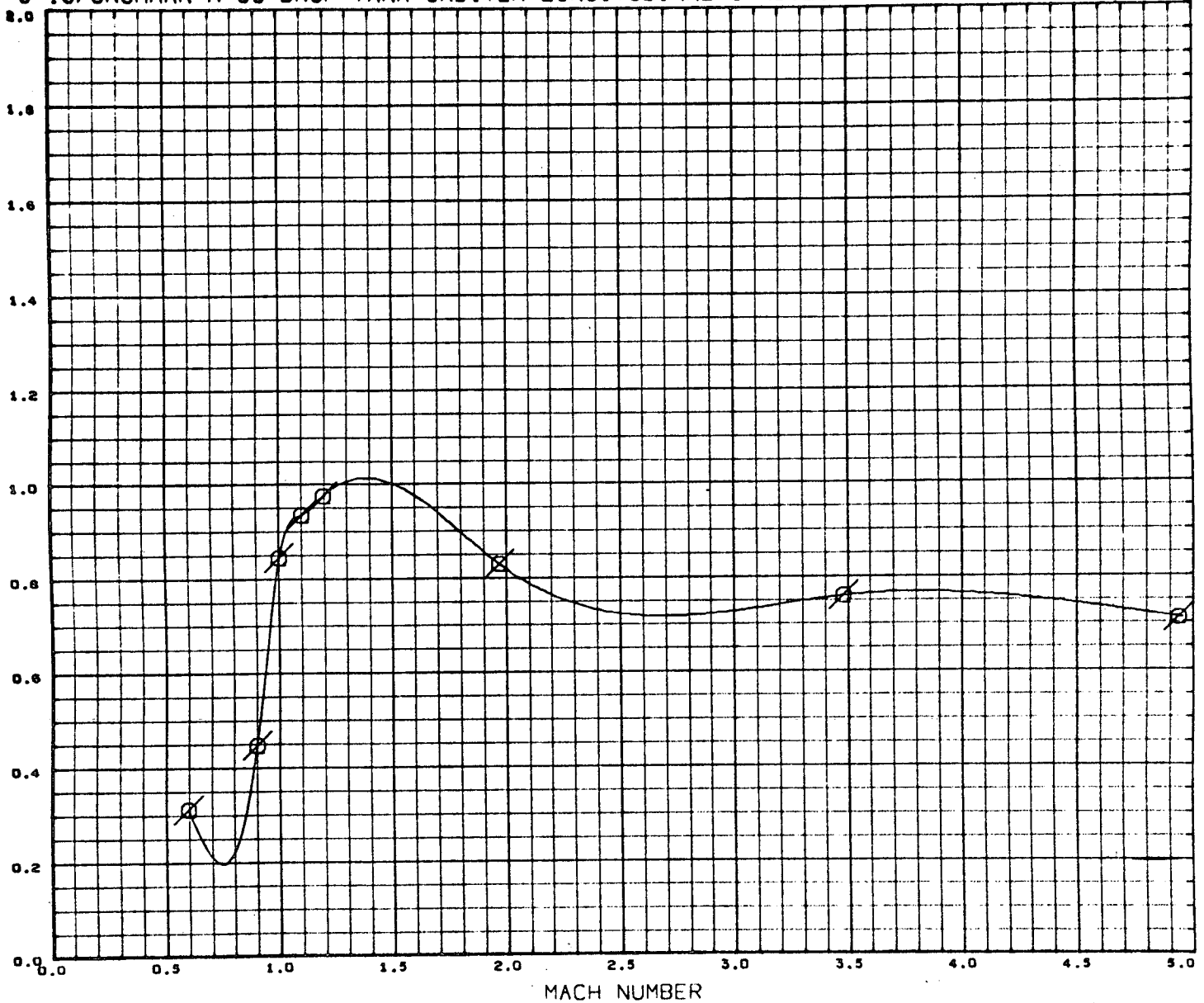
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REFERENCE INFORMATION

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YMRF	0.0000	IN.
ZMRF	0.4250	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK FOREBODY AXIAL FORCE COEFF. CAF (ALPHA=0) CAFAFO



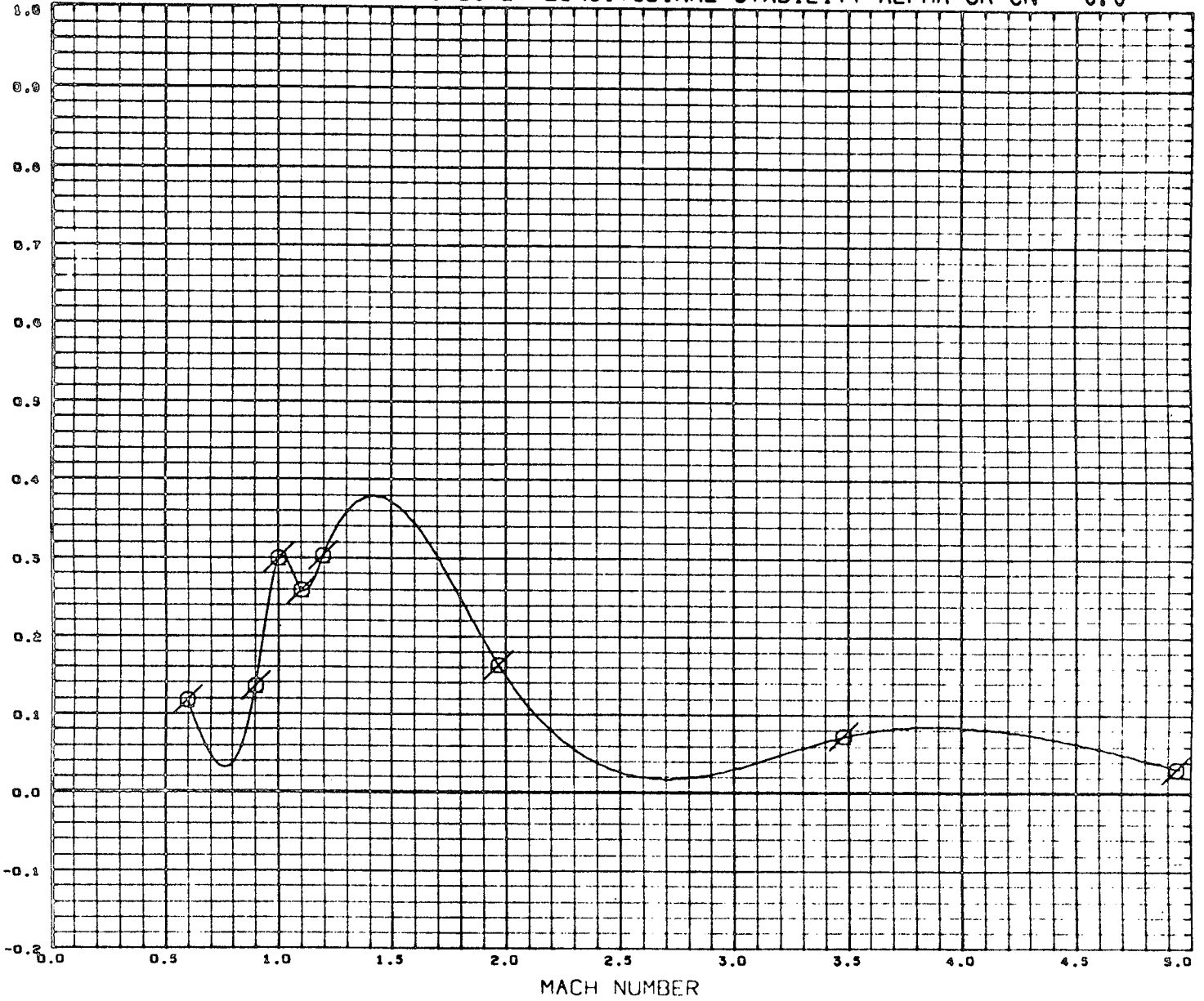
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 SCALE 0.0034

DATA HIST. CODE CCGGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO ANGLE OF ATTACK BASE AXIAL FORCE COEFFICIENT, CAB(ALPHA=0) CABAF0

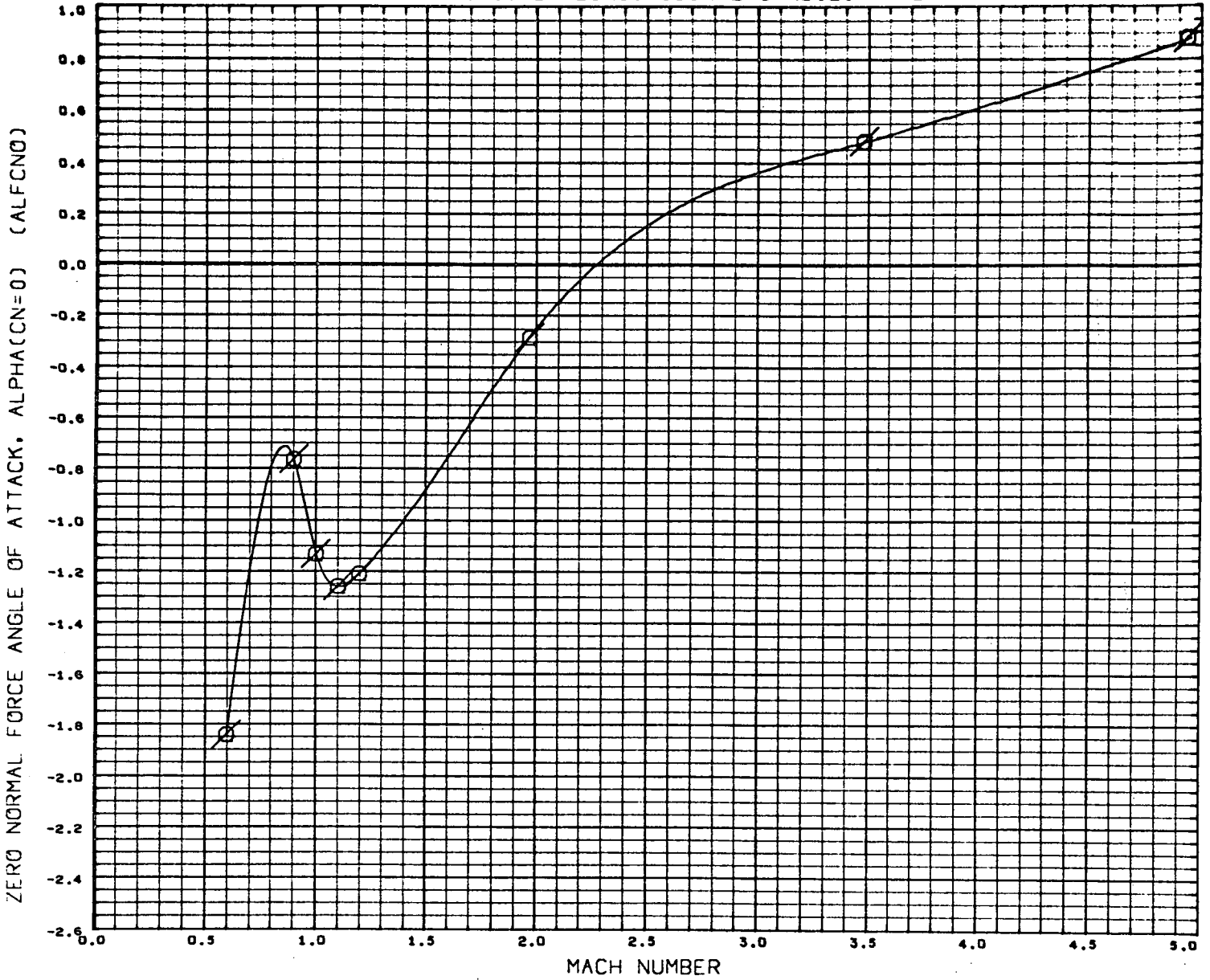


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REFERENCE INFORMATION
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0



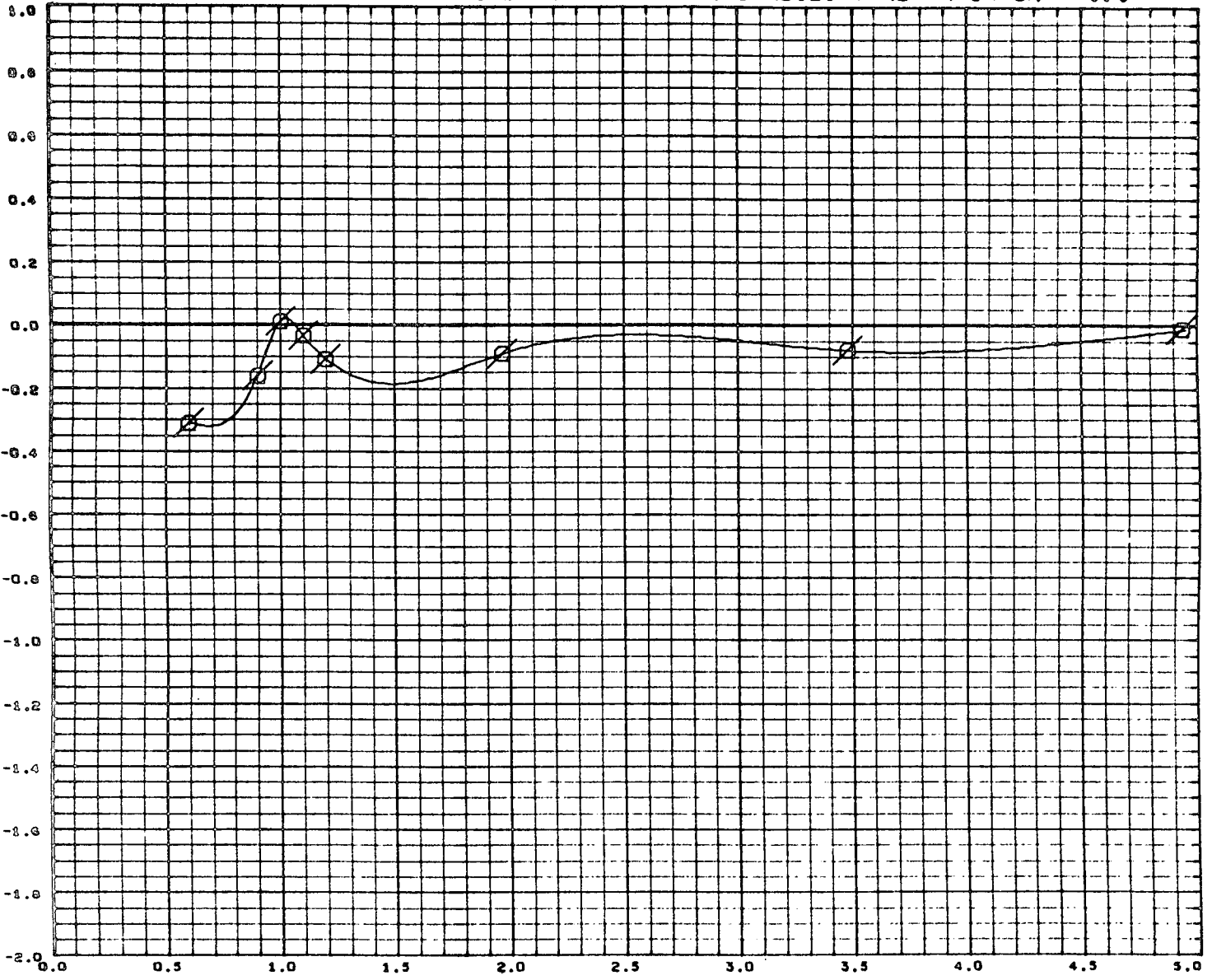
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REFERENCE INFORMATION
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 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LONGITUDINAL STABILITY ALPHA OR CN = 0.0

ZERO NORMAL FORCE PITCHING MOMENT, $CLM(CN=0)$ (CLMCN0)



MACH NUMBER

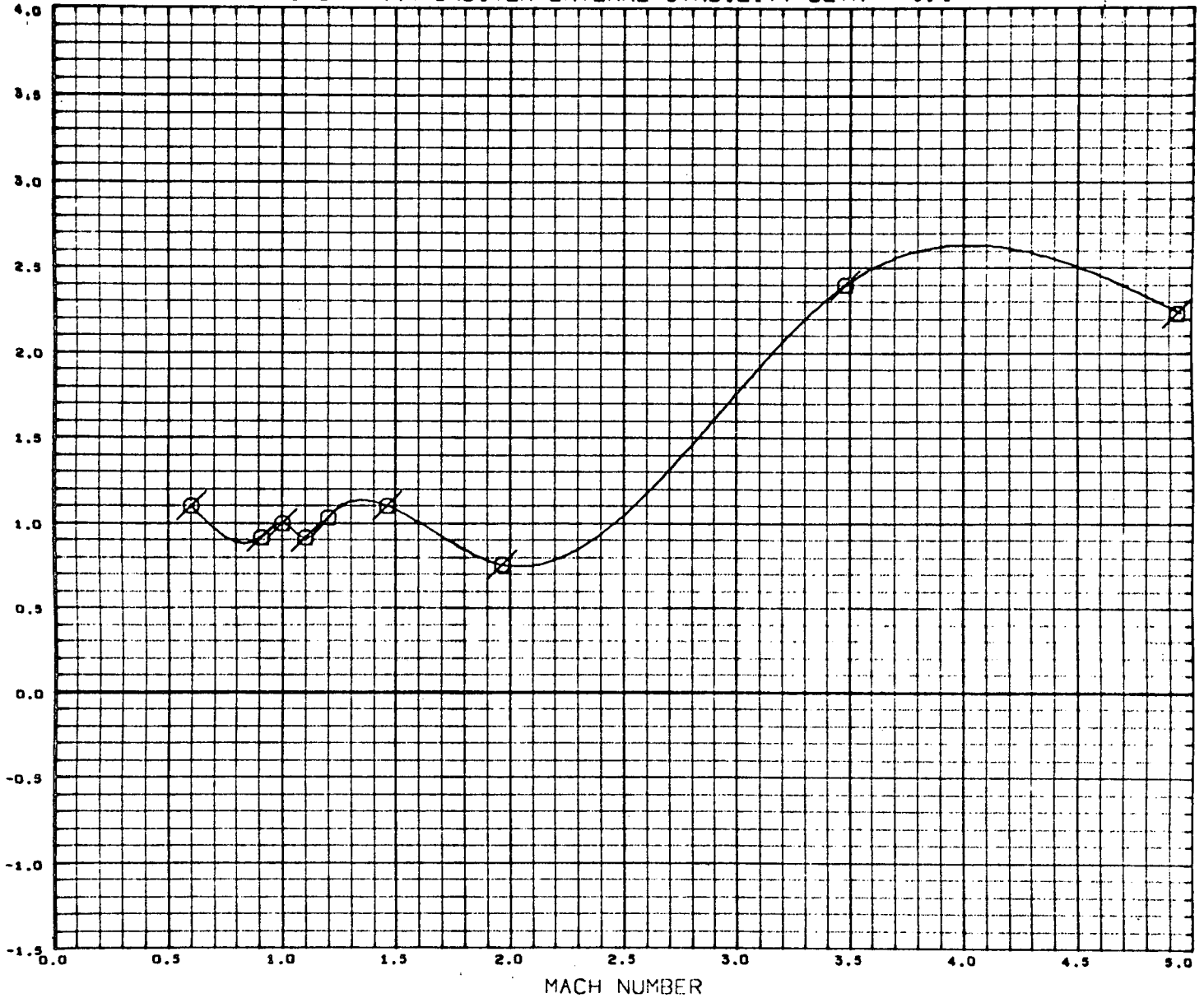
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REFERENCE INFORMATION
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YMRP 0.0000 IN.
ZMRP - 0.4250 IN.
SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

LATERAL-DIRECTIONAL CENTER OF PRESSURE LOCATION, YCP/D

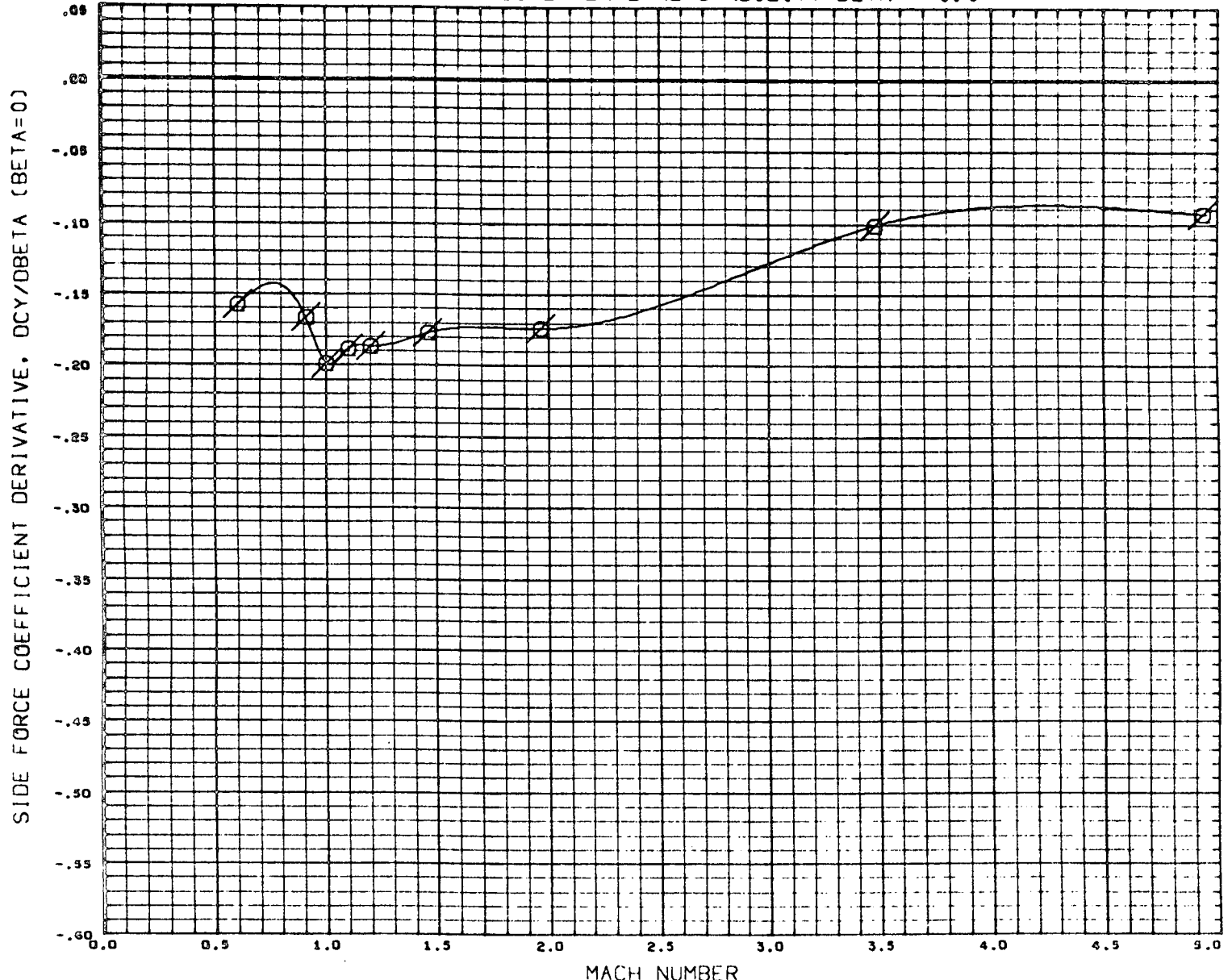


PARAMETRIC VALUES
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 WNGINC 0.000

REFERENCE INFORMATION
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 BREF 1.3330 IN.
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 SCALE 0.0034

DATA HIST. CODE #ACC66CF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



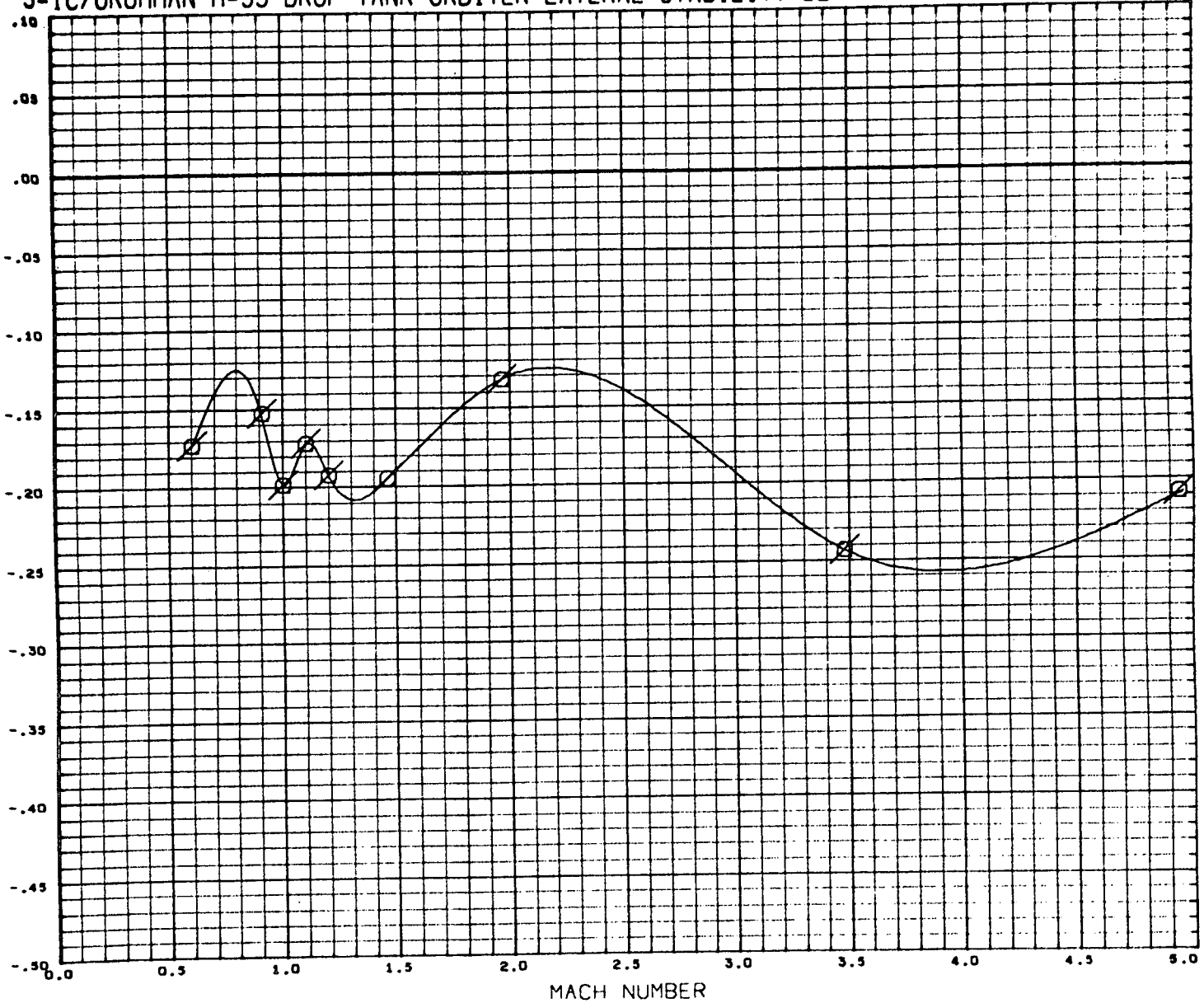
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 BREF 1.3330 IN.
 XMRF 5.3990 IN.
 YMRF 0.0000 IN.
 ZMRF 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE *ACC6CF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

YAWING MOMENT COEFFICIENT DERIVATIVE, DCYN/OBETA (BETA=0)



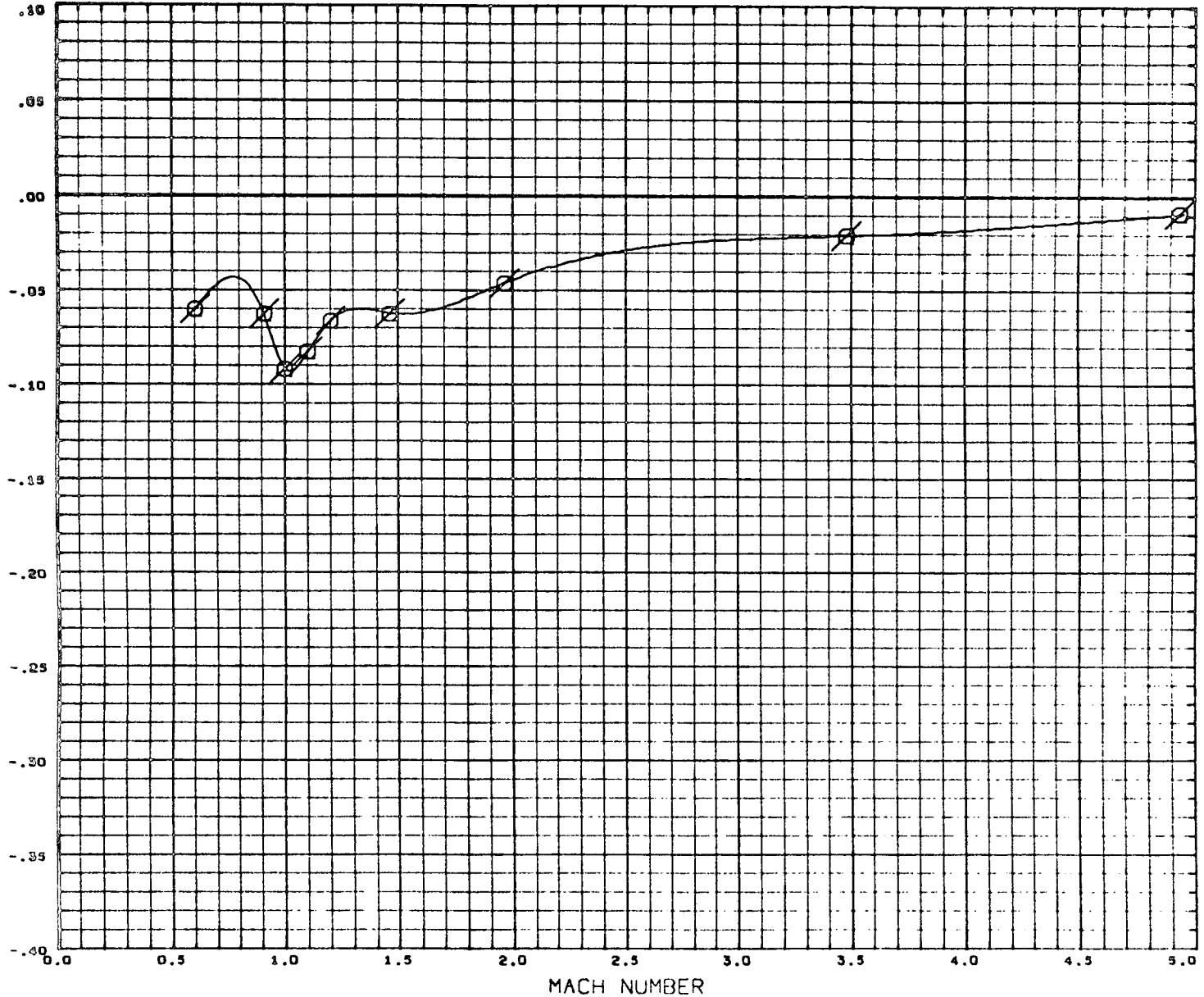
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DATA HIST. CODE *ACCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

ROLLING MOMENT COEFFICIENT DERIVATIVE, DCBL/DBETA (BETA=0)



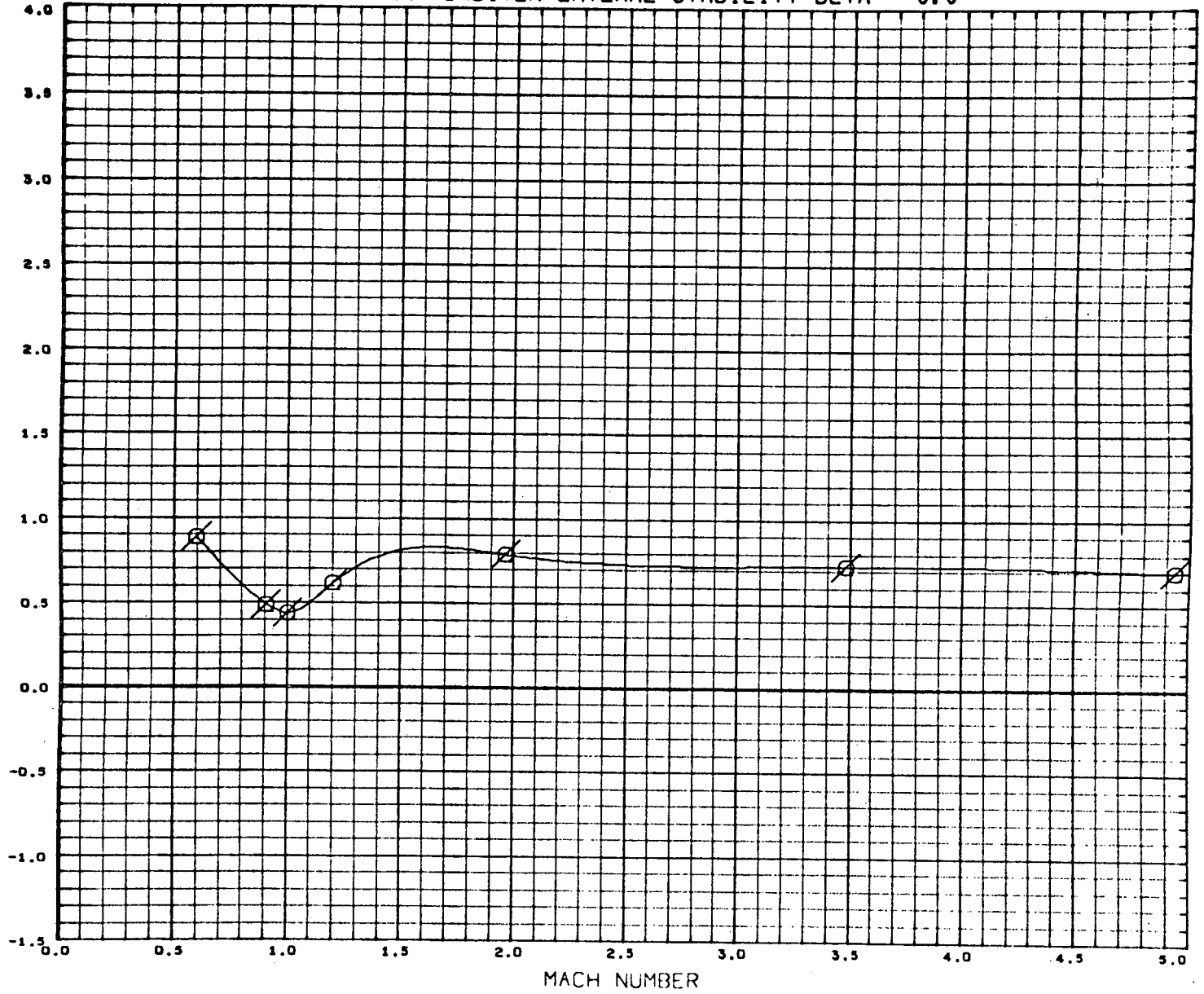
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 ZMRP 0.0000 IN.
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DATA HIST. CODE *ACCCGCF

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LATERAL-DIRECTIONAL CENTER OF PRESSURE LOCATION, YCP/D

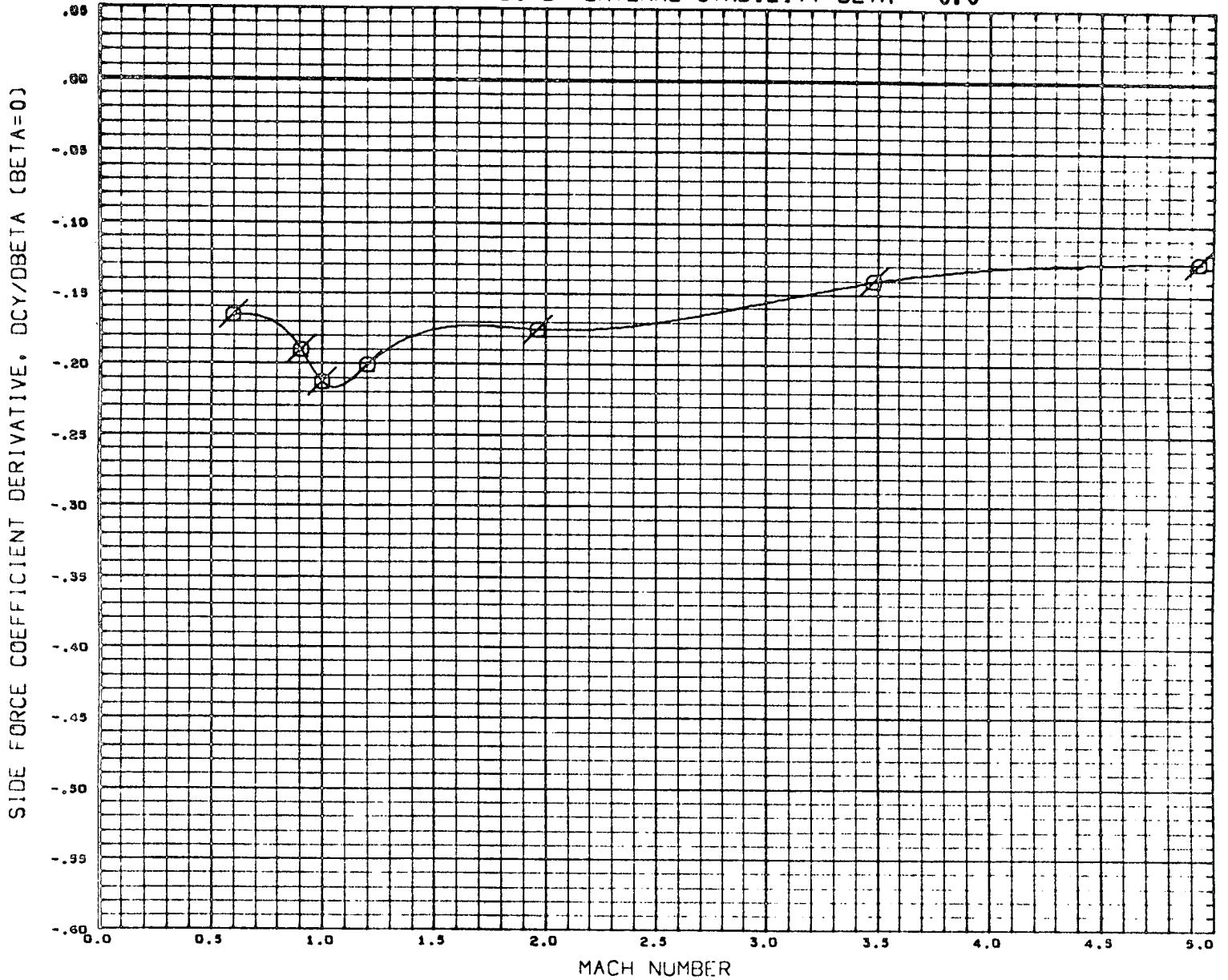


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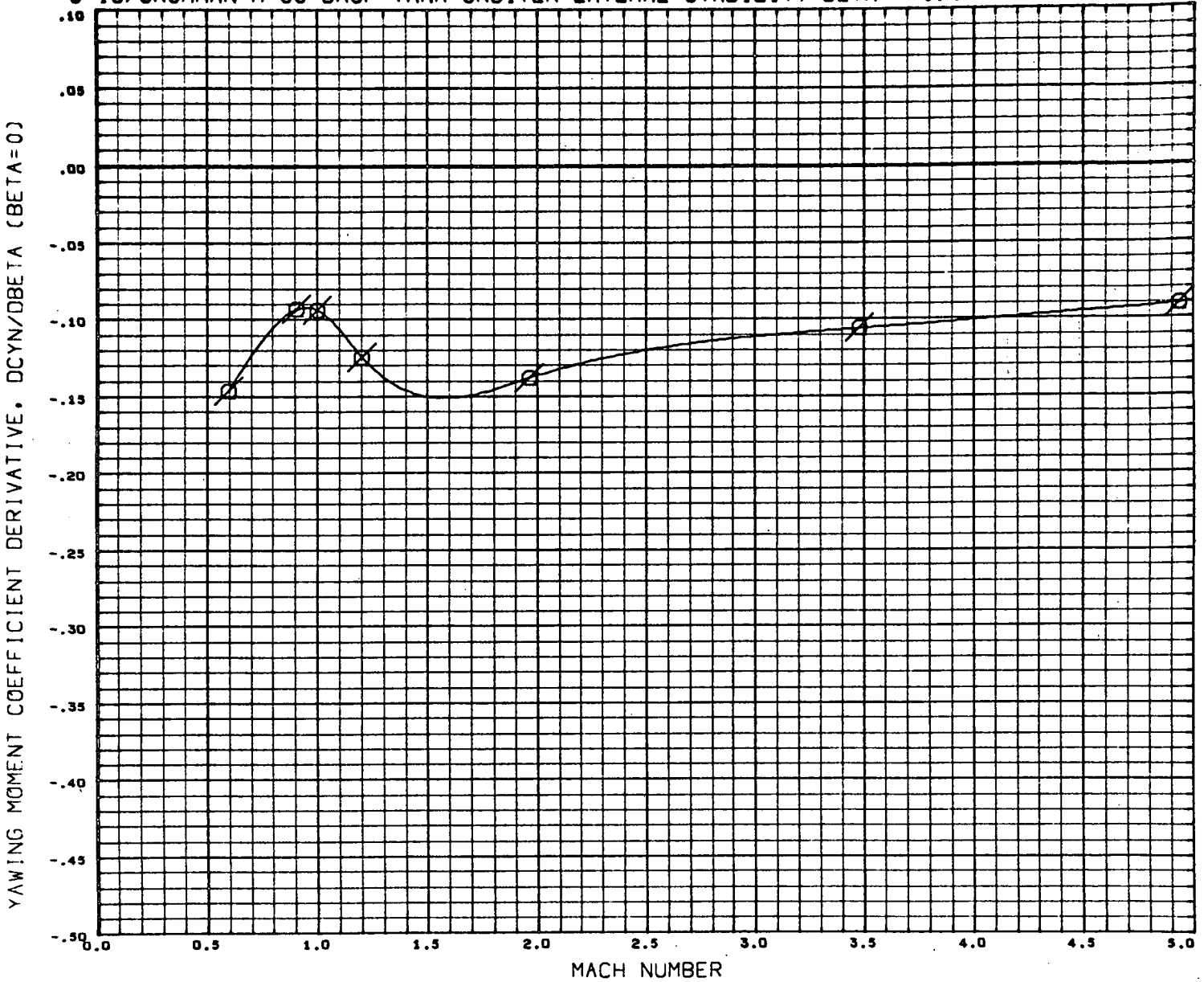


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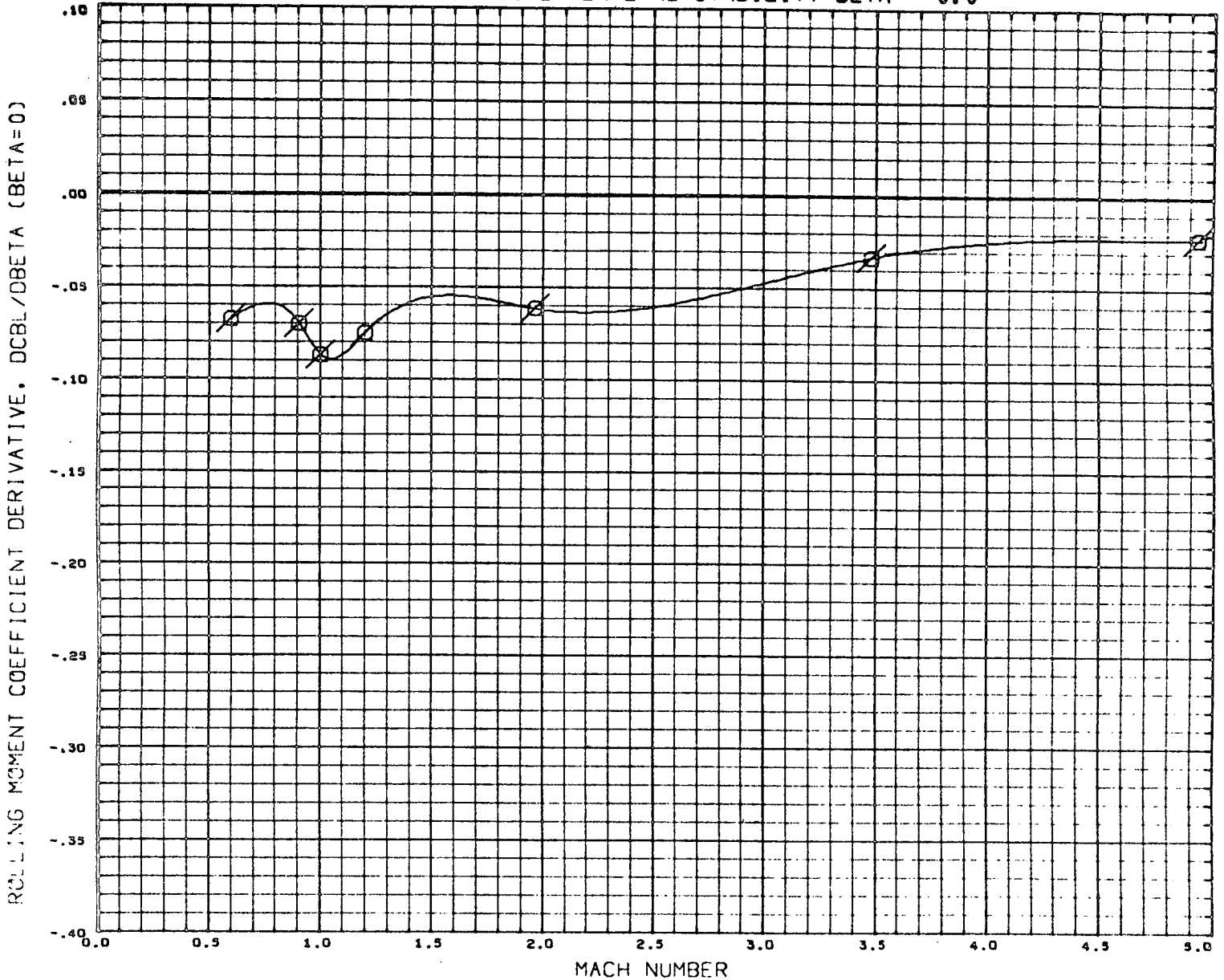


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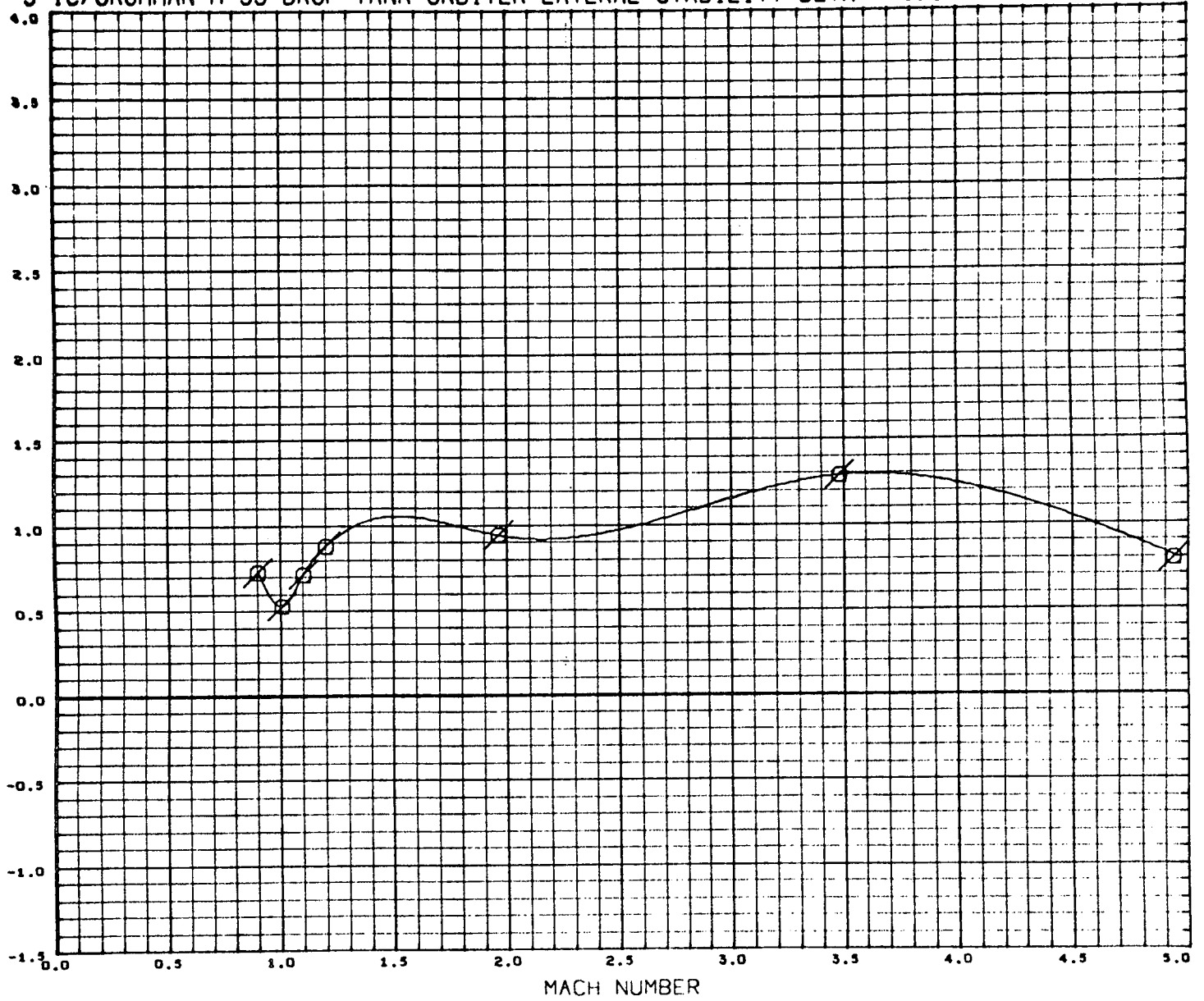
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 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

LATERAL-DIRECTIONAL CENTER OF PRESSURE LOCATION, YCP/D

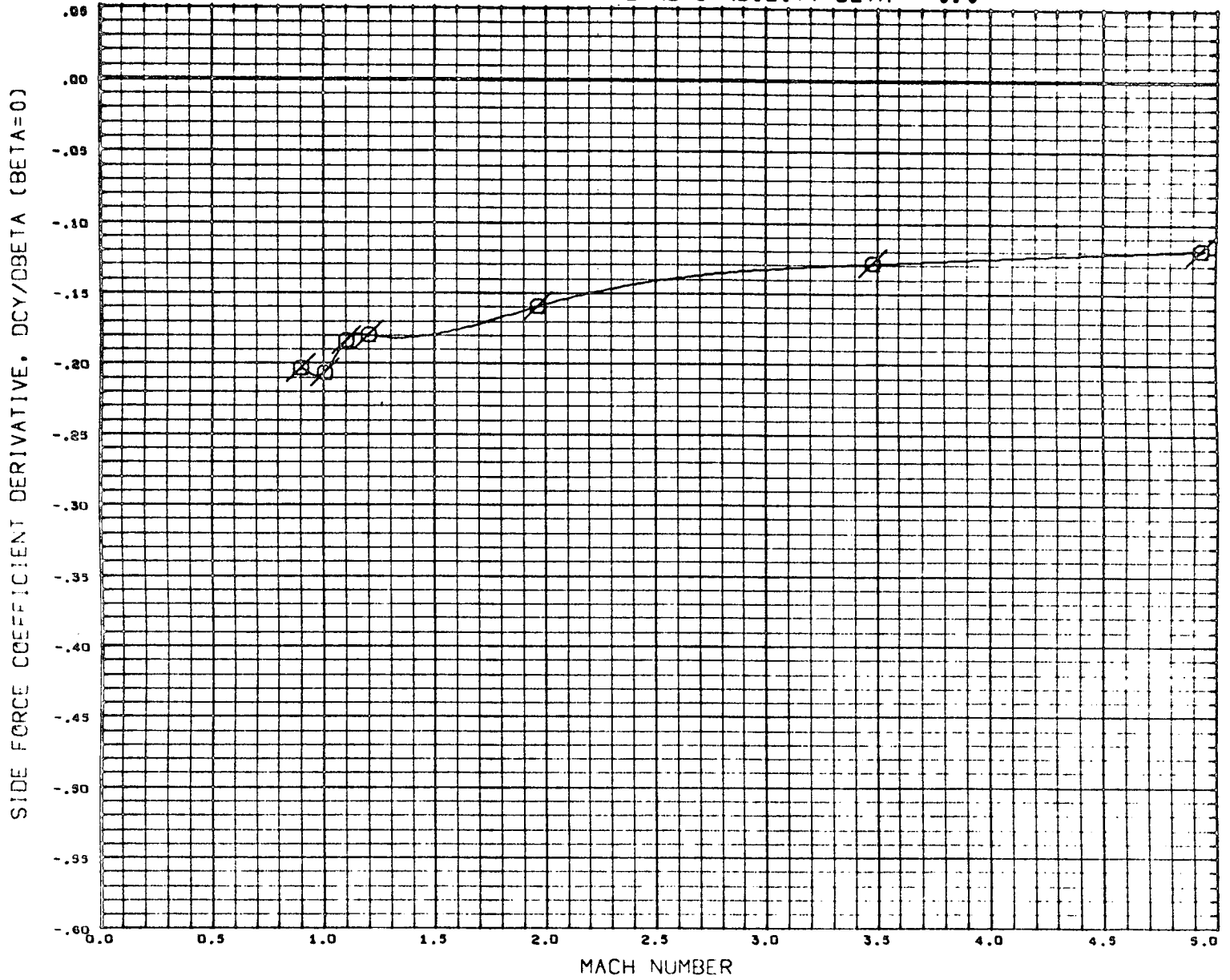


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REFERENCE INFORMATION
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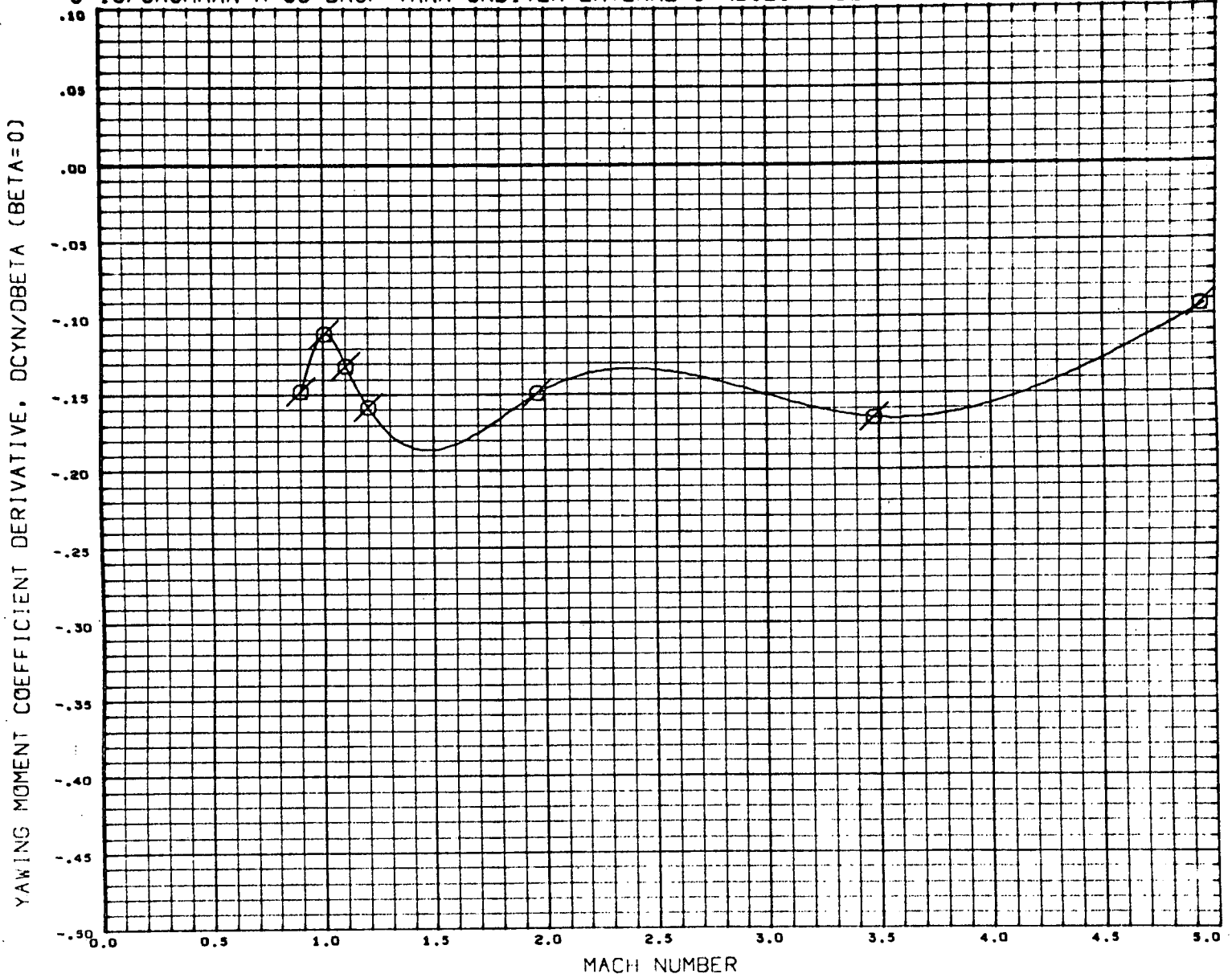


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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES
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REFERENCE INFORMATION
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DATA HIST. CODE CCCGCF

M502-MSFC SIC H-33 ORBITER

OWVTBF

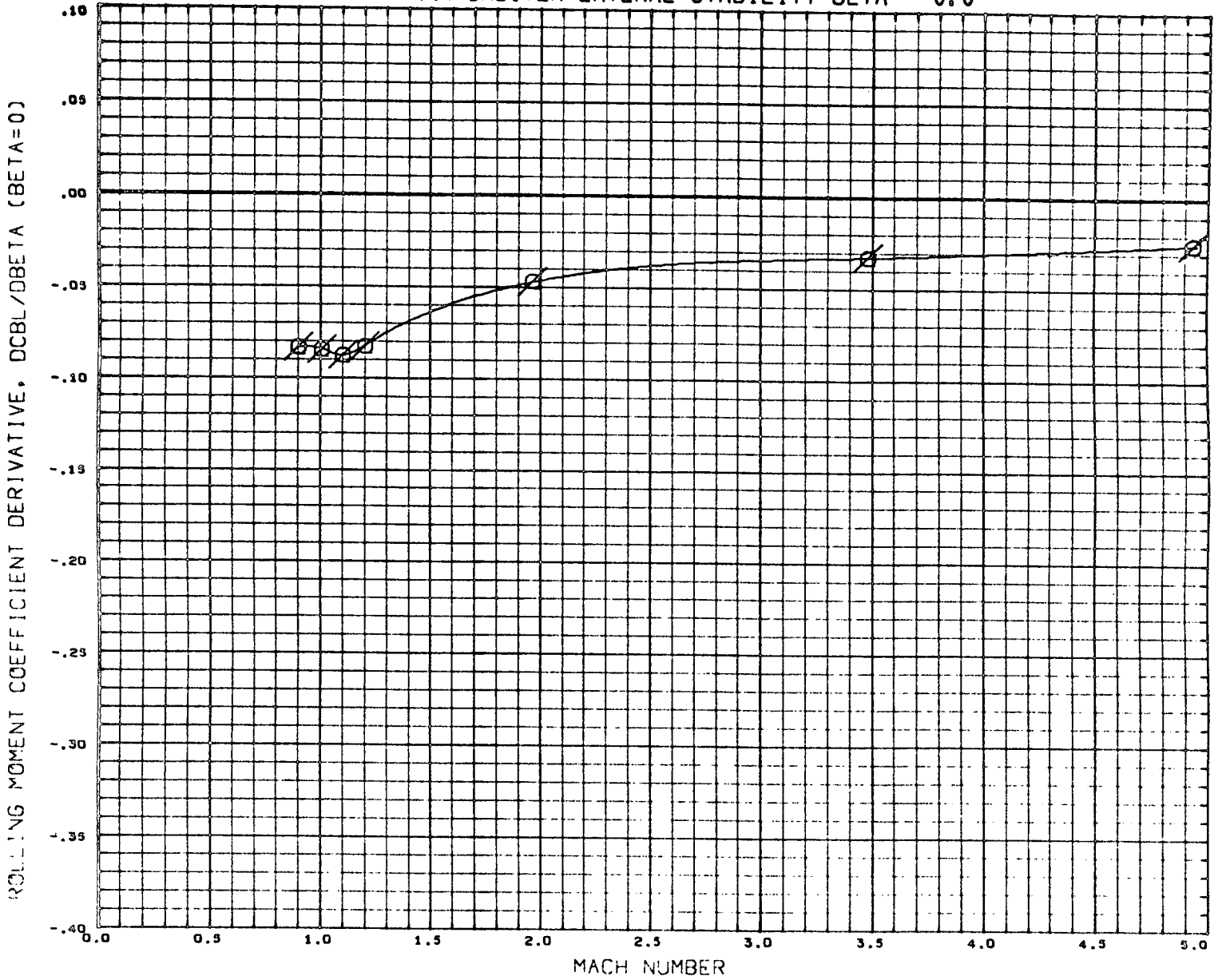
(D44055)

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



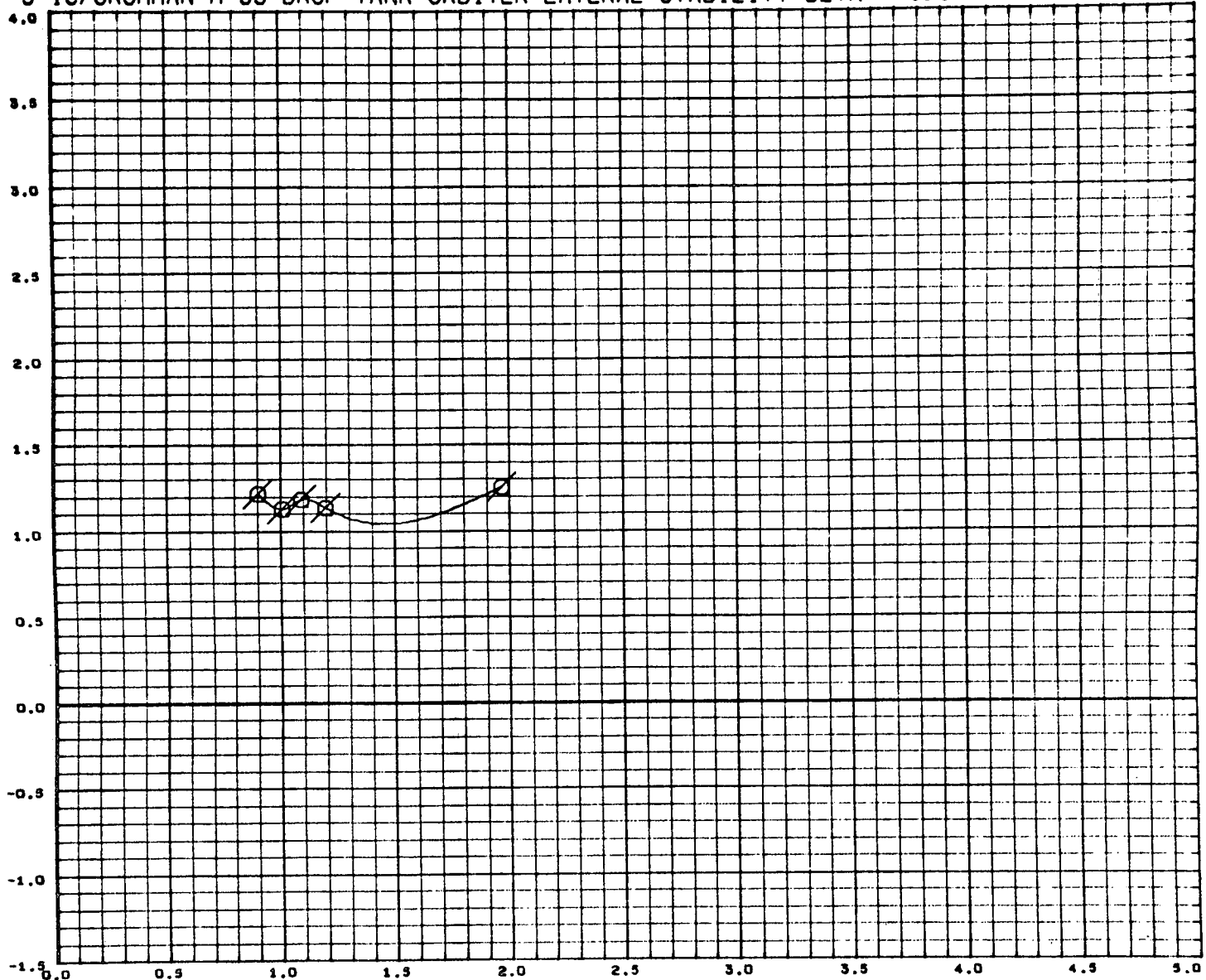
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 ZMRP 0.0000 IN.
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

LATERAL-DIRECTIONAL CENTER OF PRESSURE LOCATION, YCP/D



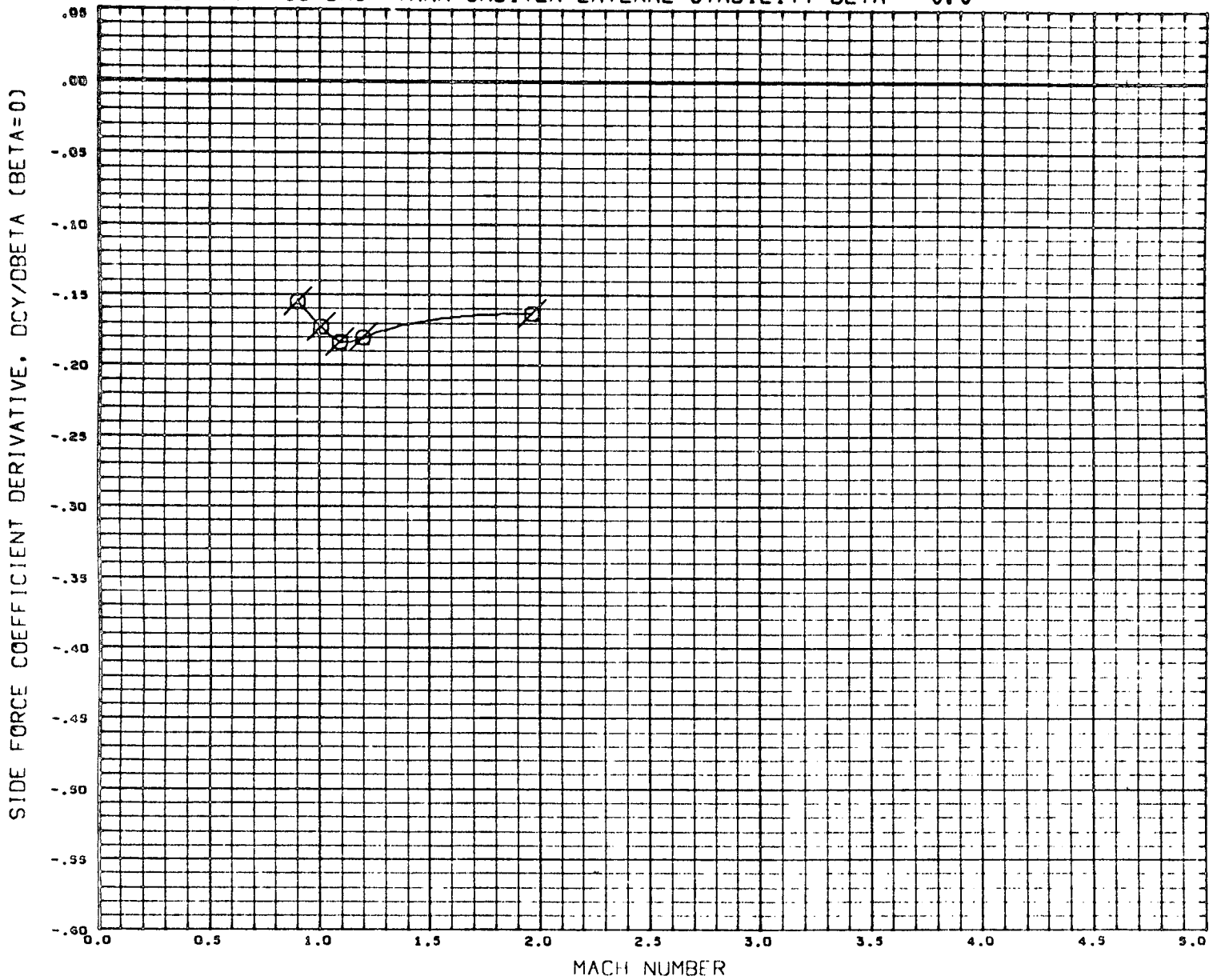
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REFERENCE INFORMATION
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



PARAMETRIC VALUES
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REFERENCE INFORMATION
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 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

YAWING MOMENT COEFFICIENT DERIVATIVE, DCYN/DBETA (BETA=0)

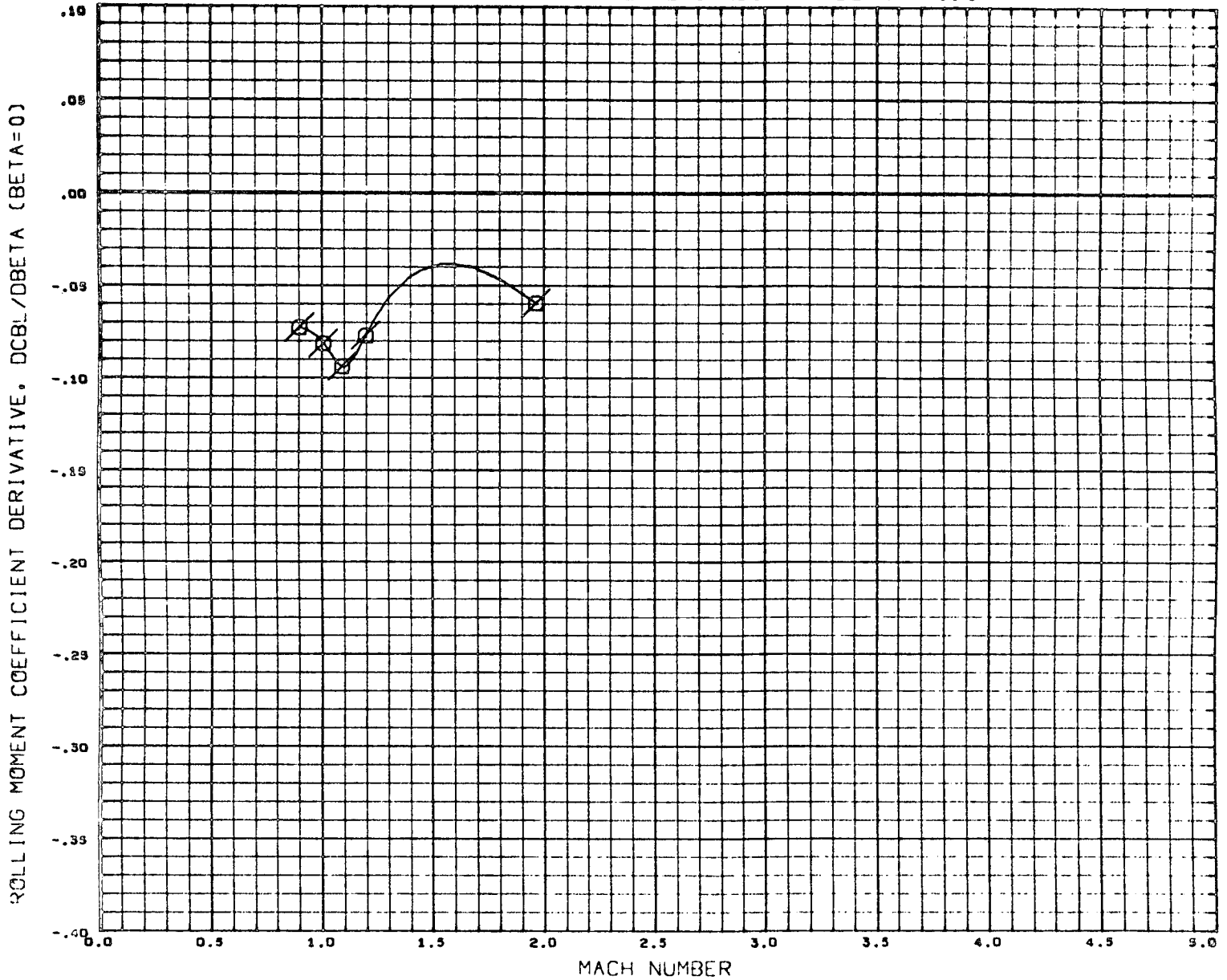


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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



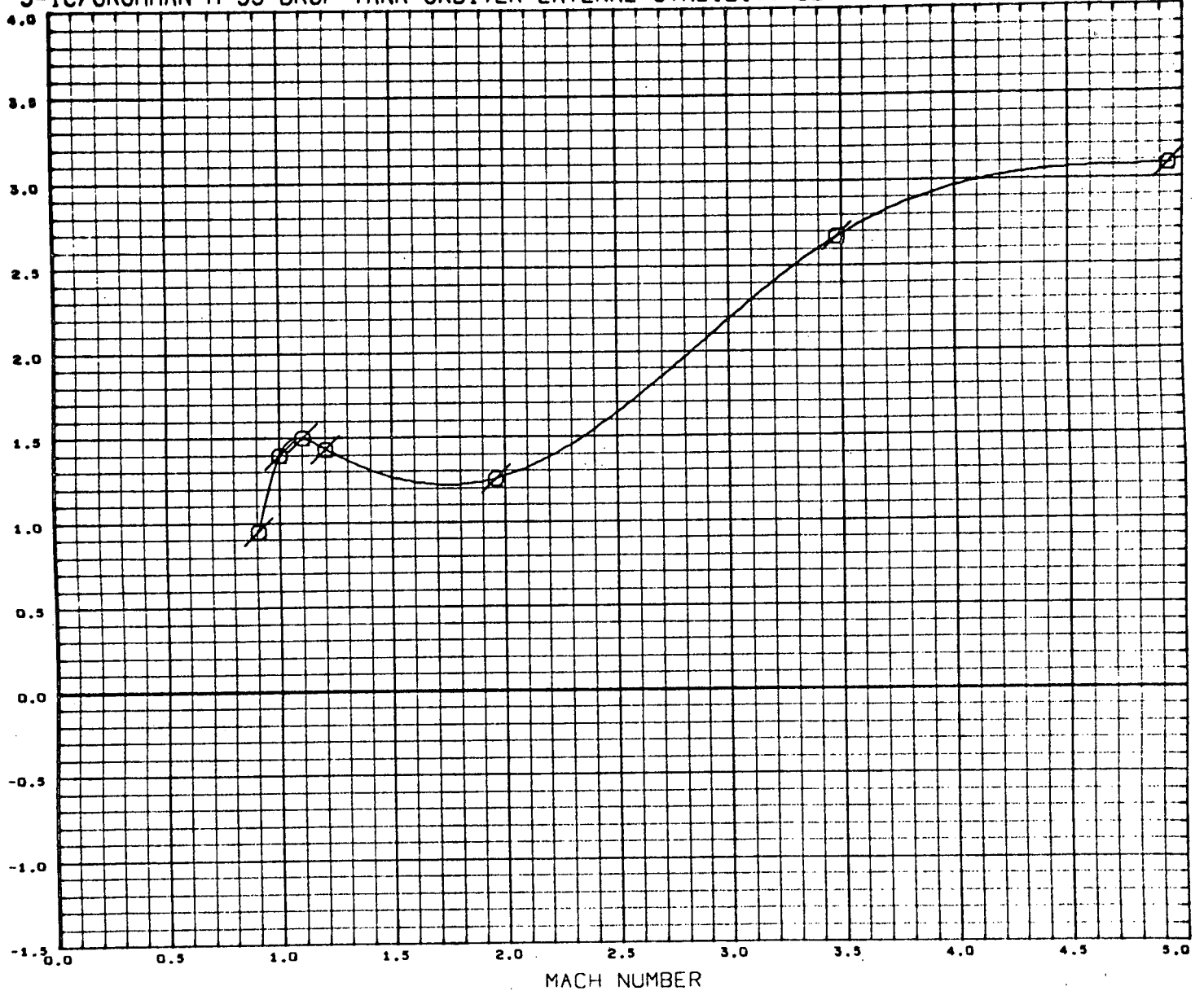
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 SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

LATERAL-DIRECTIONAL CENTER OF PRESSURE LOCATION, YCP/D

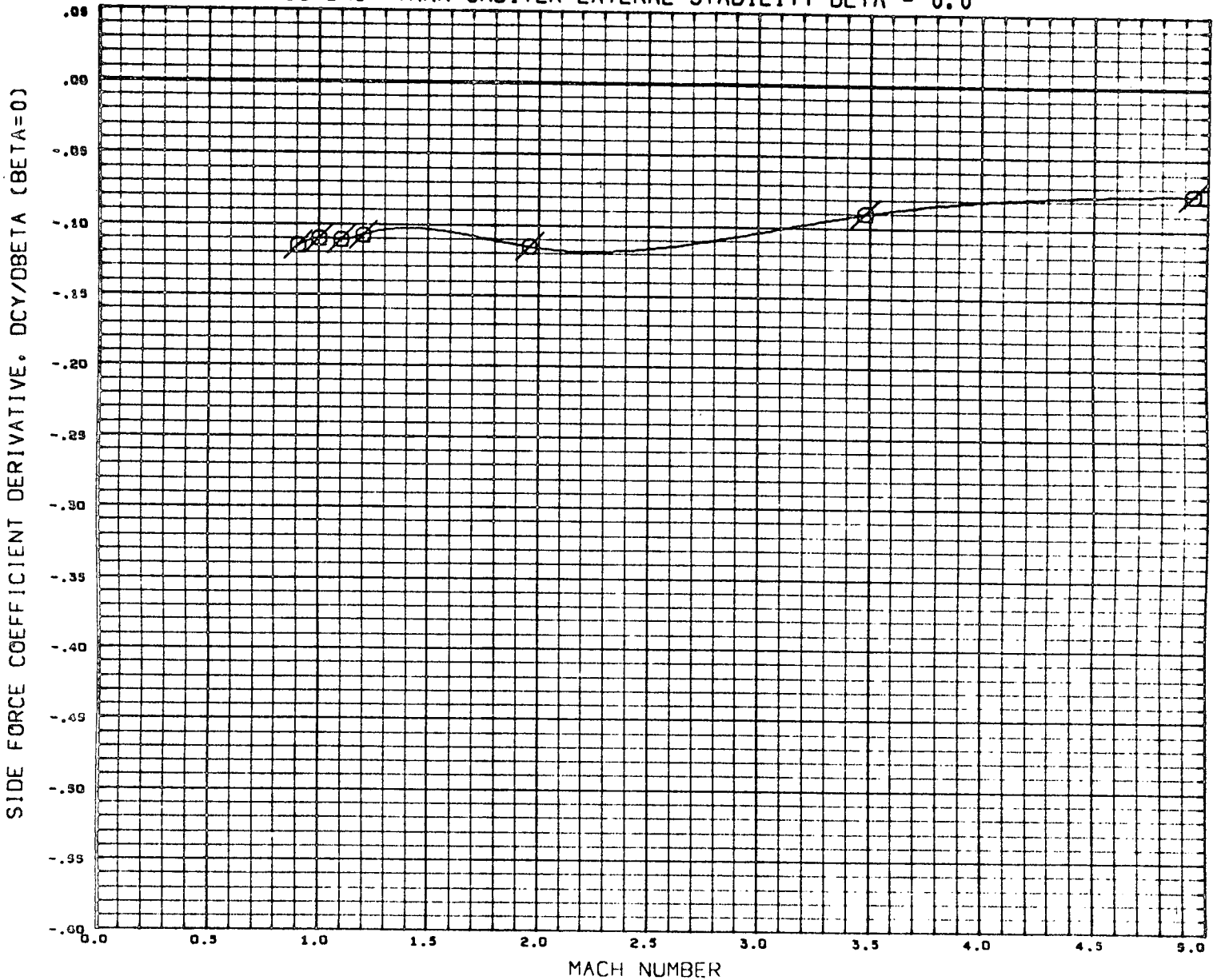


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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



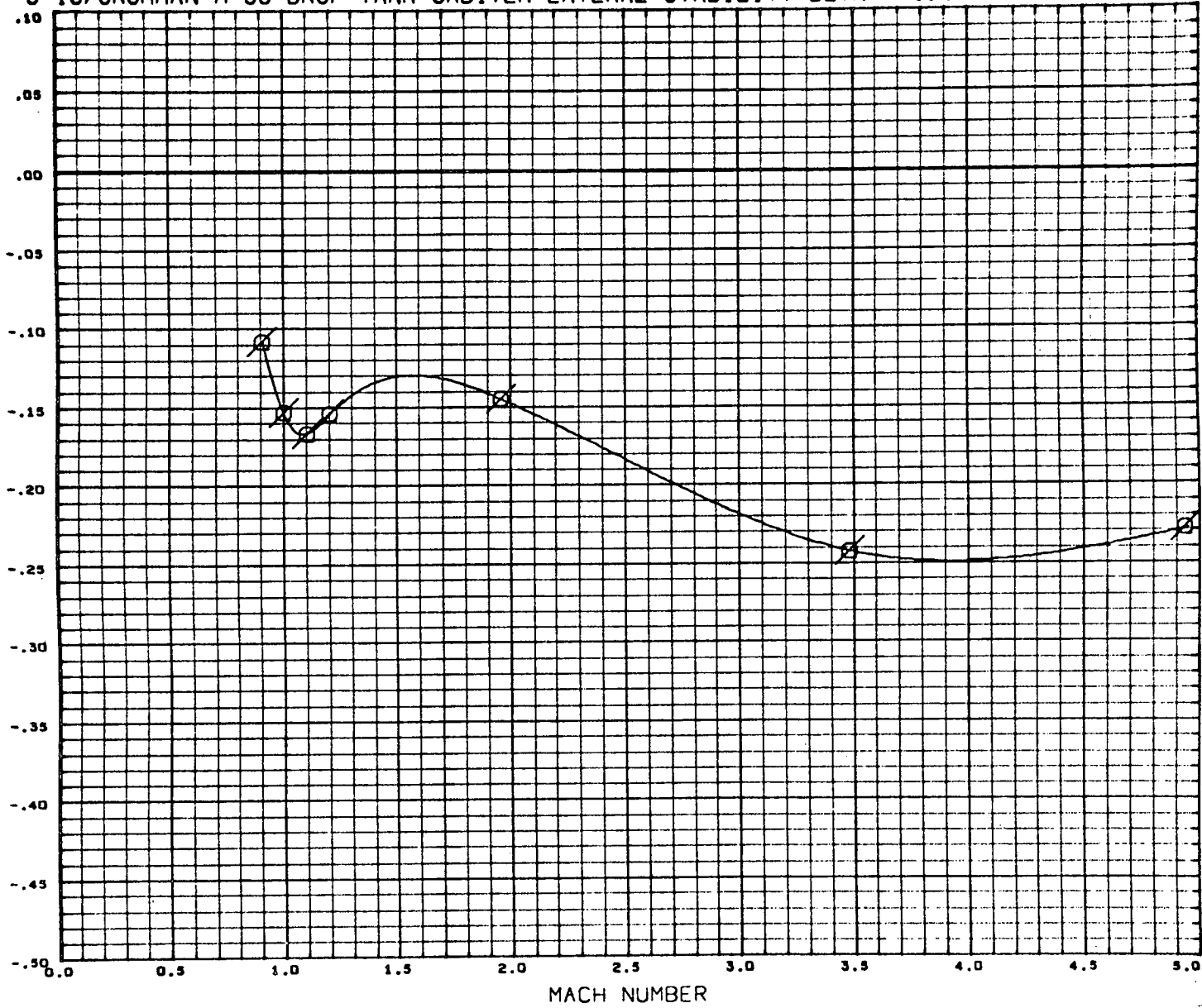
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

YAWING MOMENT COEFFICIENT DERIVATIVE, DCYN/DBETA (BETA=0)



PARAMETRIC VALUES
 ALPHA 0.000 PHI 90.000
 WNGIN 0.000

REFERENCE INFORMATION
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DATA HIST. CODE CCCGCF

MS02-MSFC-S1C H-33 ORBITER

OWTCBF

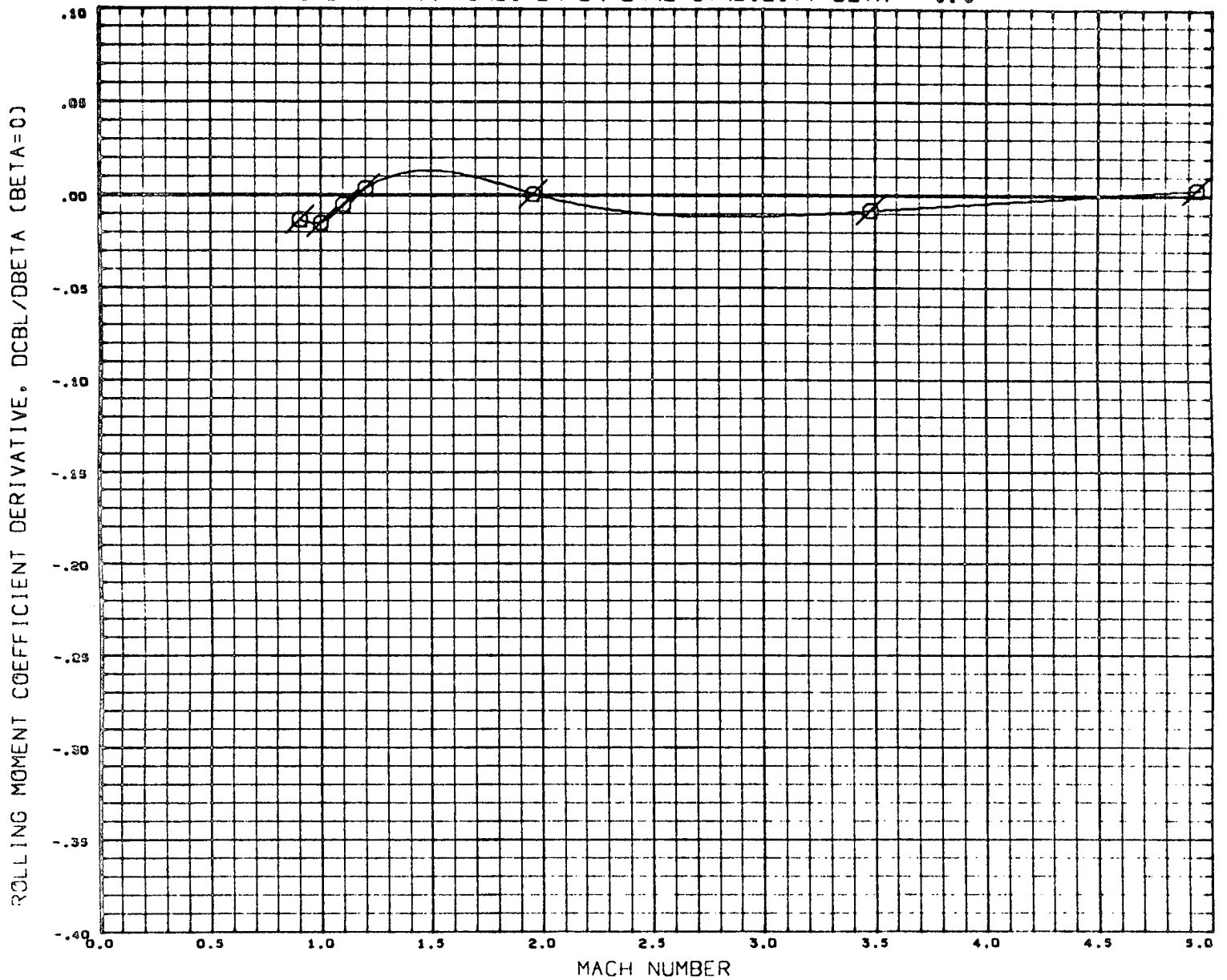
(044085)

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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



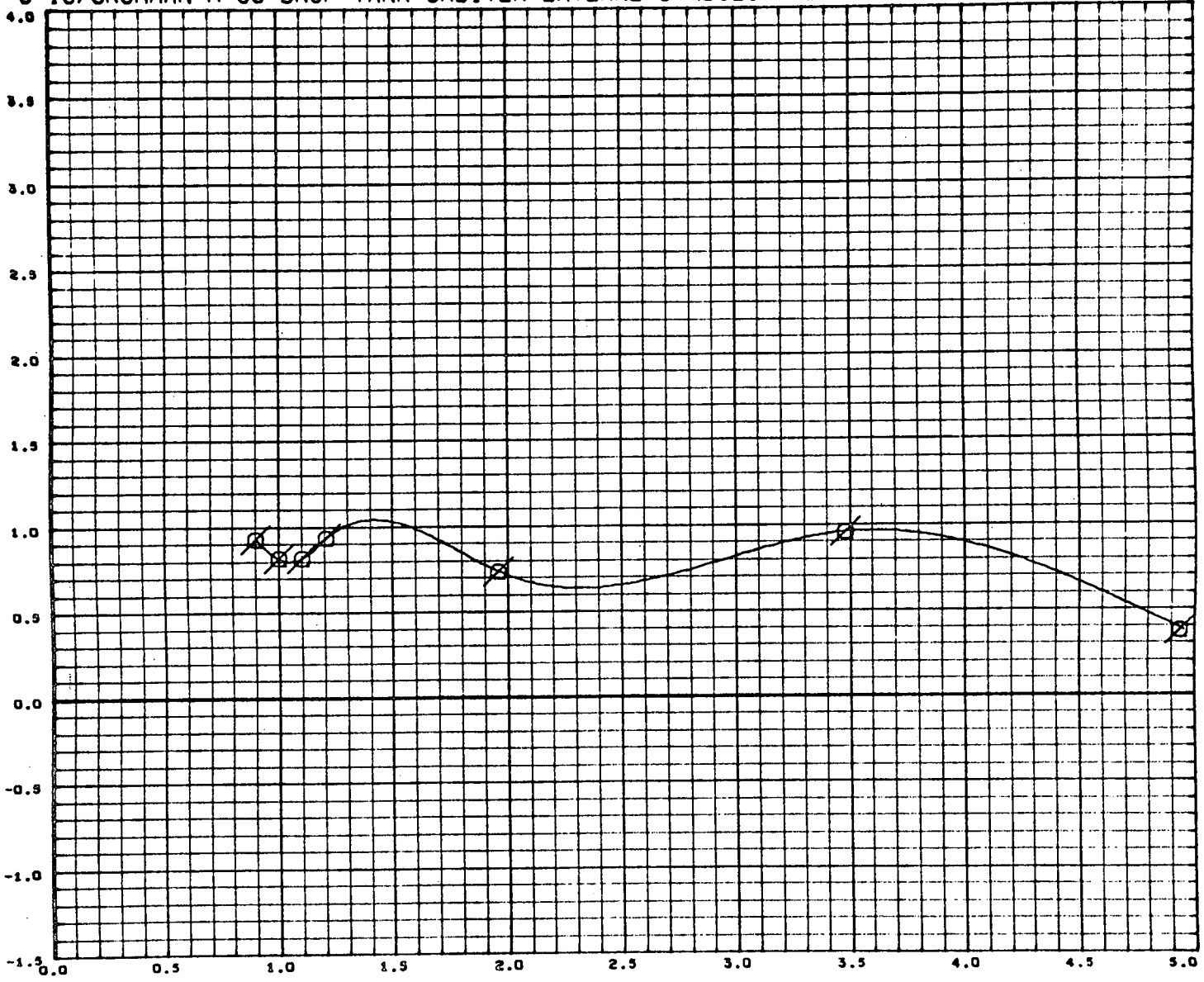
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DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

LATERAL-DIRECTIONAL CENTER OF PRESSURE LOCATION, YCP/D

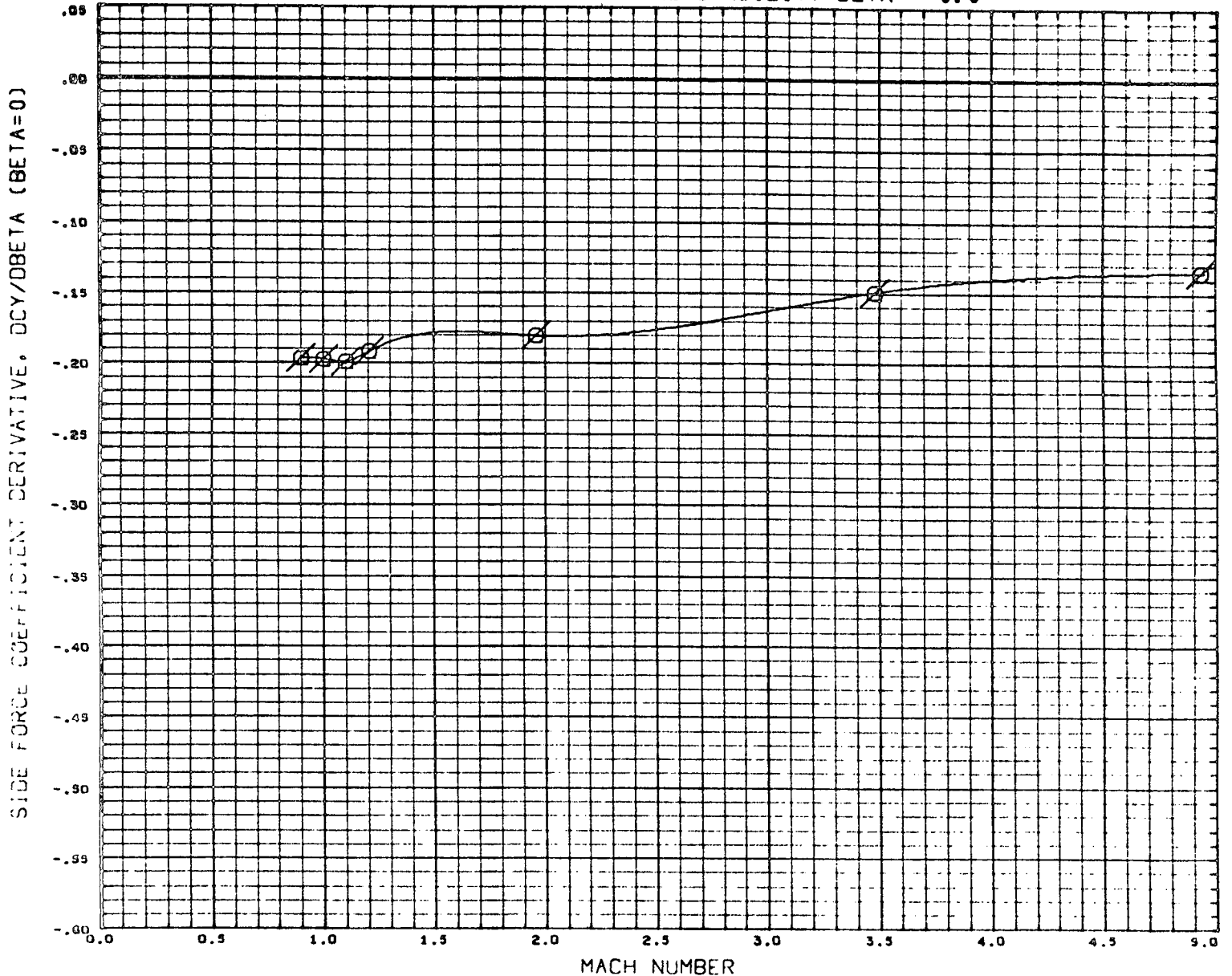


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DATA HIST. CODE CCCGCF

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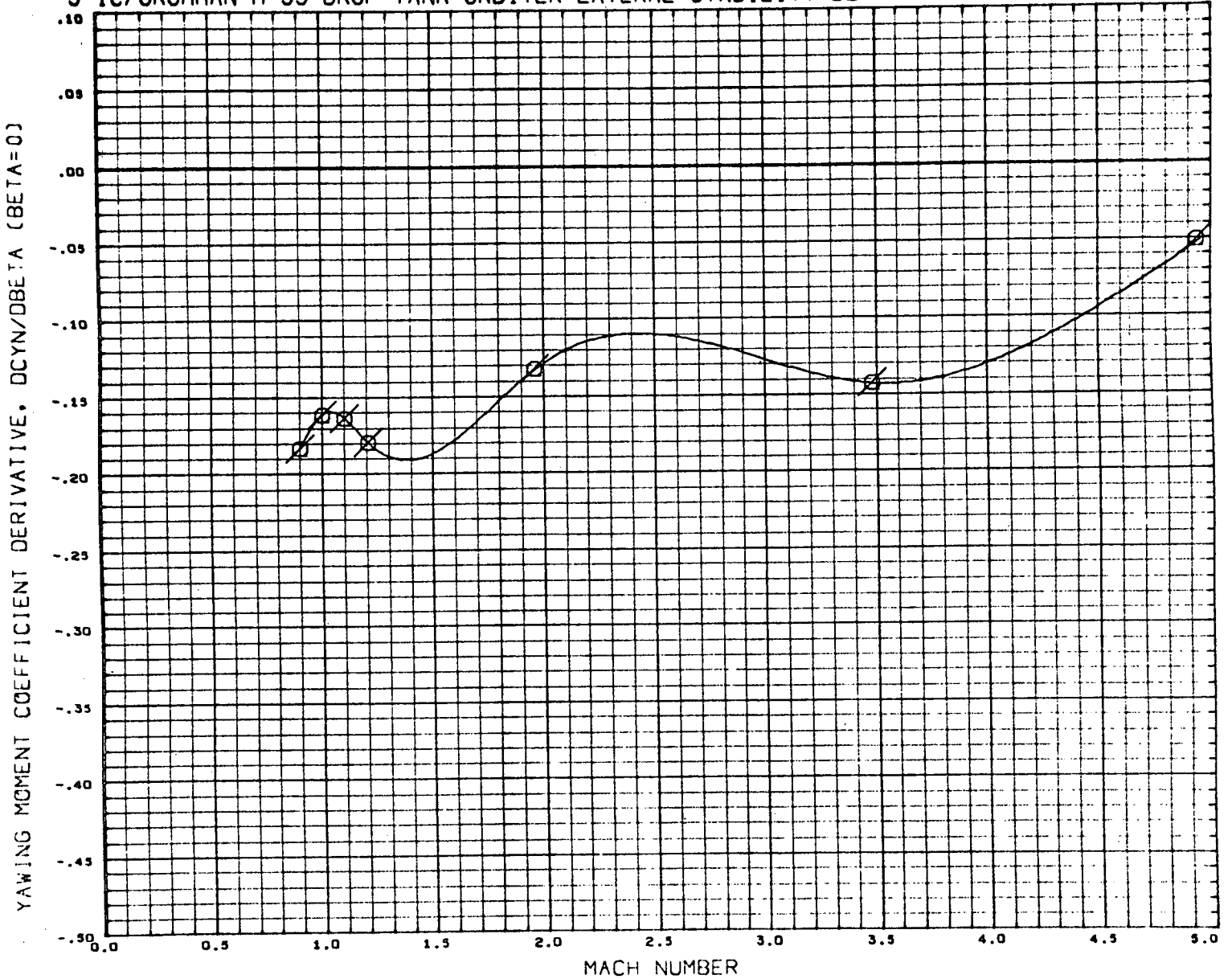


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S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



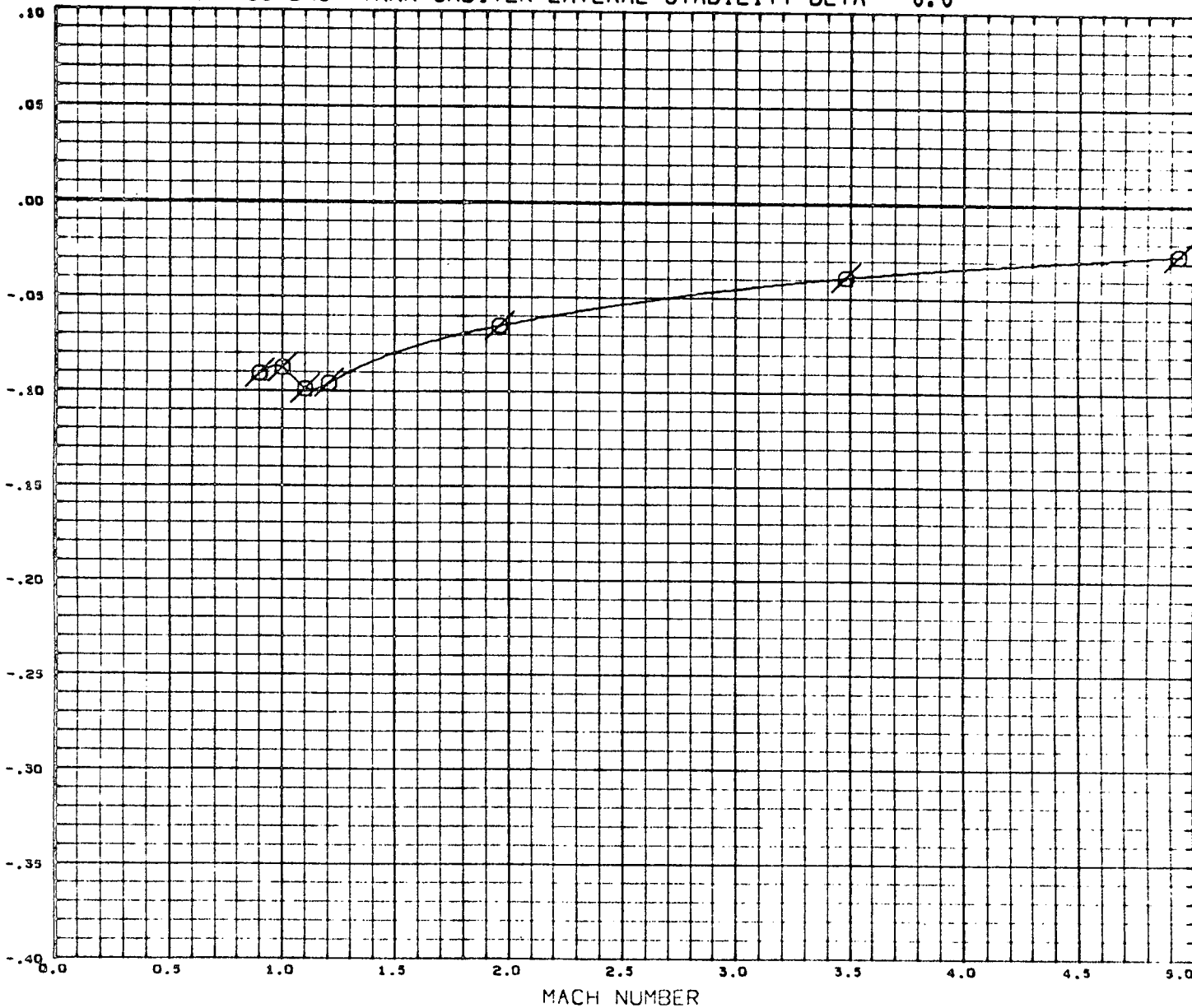
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REFERENCE INFORMATION
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 ZMRF 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

ROLLING MOMENT COEFFICIENT DERIVATIVE, DCBL/DBETA (BETA=0)

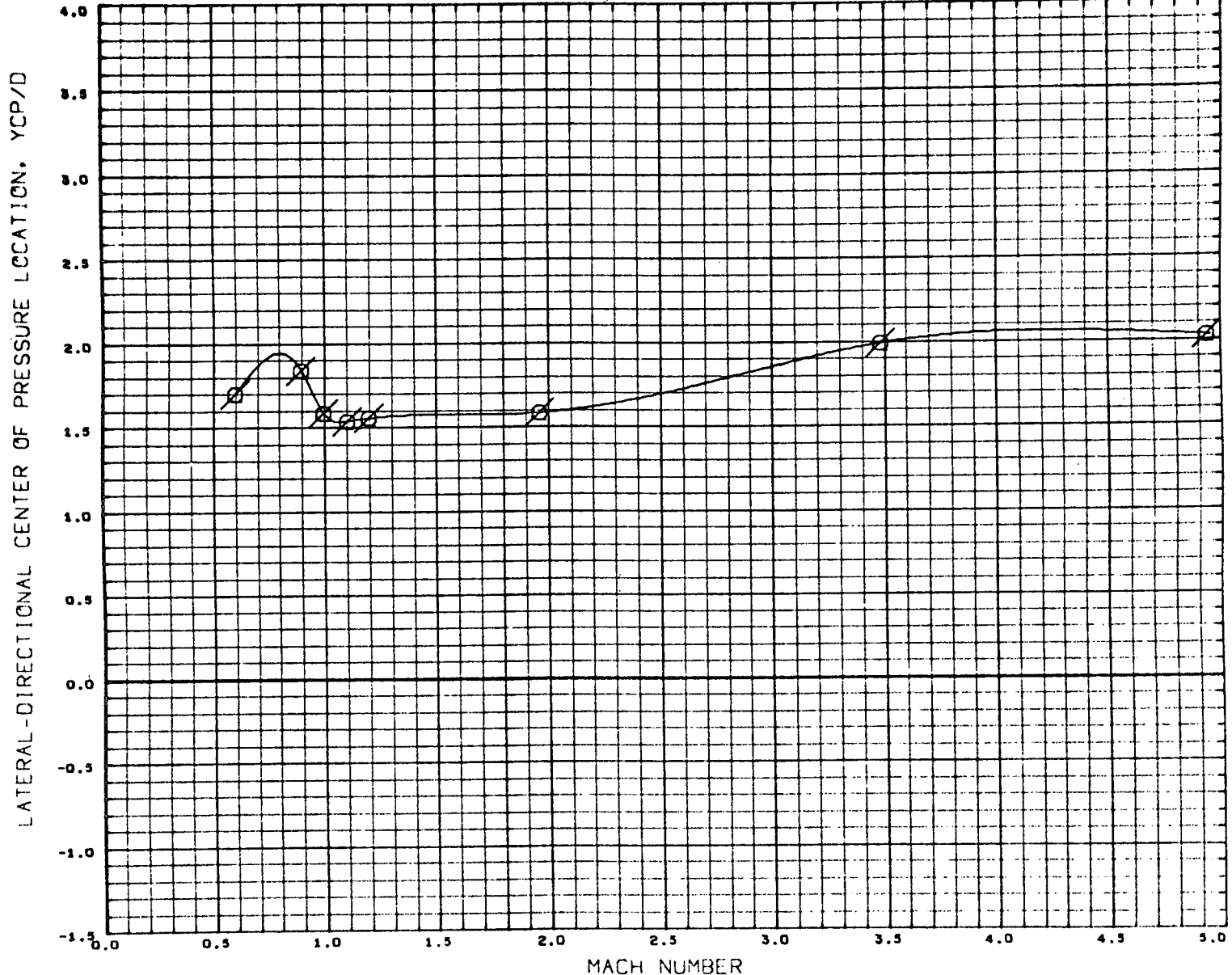


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DATA HIST. CODE CCCC6F

GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

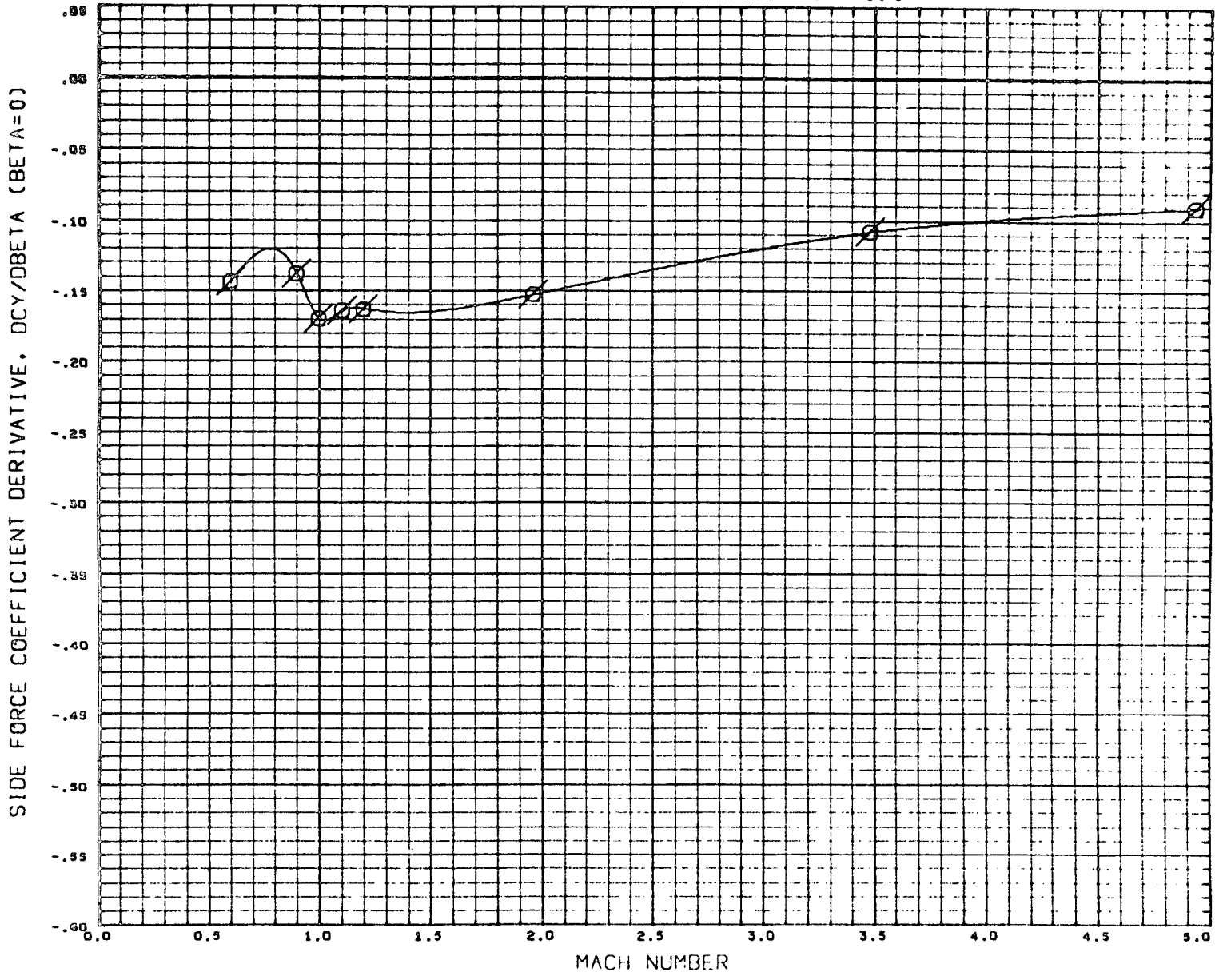


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GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



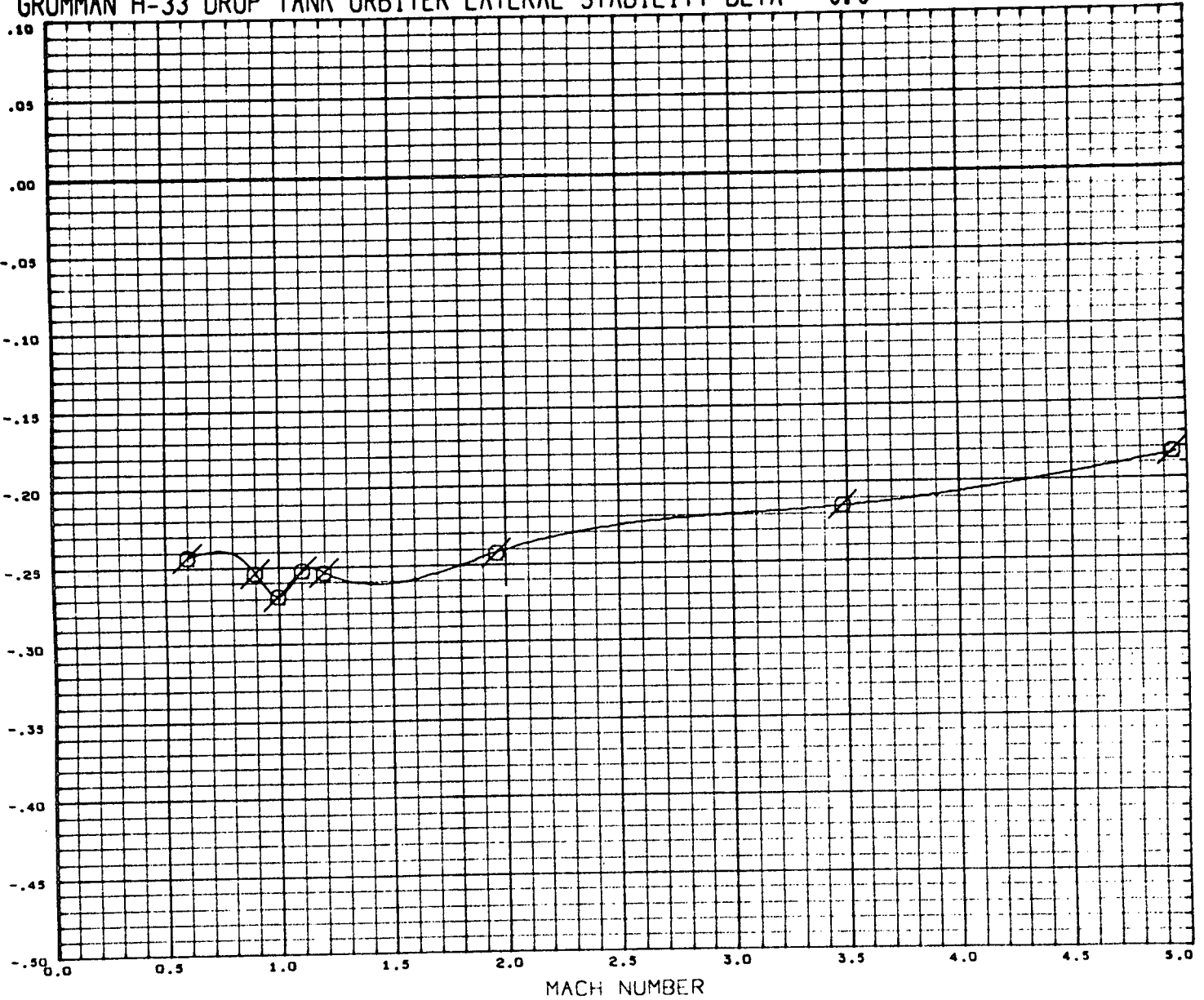
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SCALE 0.0034

DATA HIST. CODE CCCGCF

GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0

YAWING MOMENT COEFFICIENT DERIVATIVE, DCYN/OBETA (BETA=0)



PARAMETRIC VALUES
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REFERENCE INFORMATION
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SCALE 0.0034

DATA HIST. CODE CCCGCF

M502-MSFC H-33 ORBITER PLUS CRADLE

OWVTC

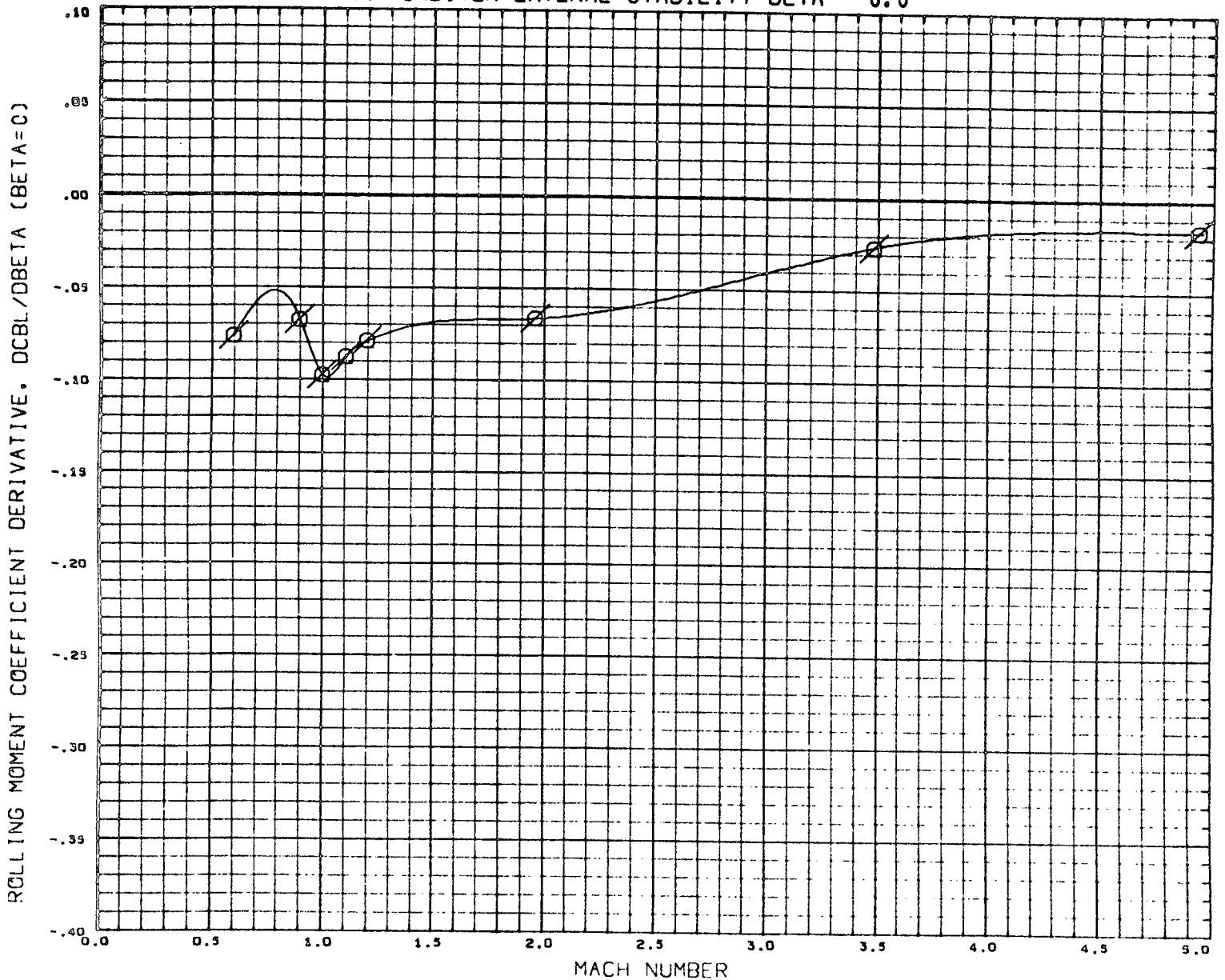
(D44115)

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GRUMMAN H-33 DROP TANK ORBITER LATERAL STABILITY BETA = 0.0



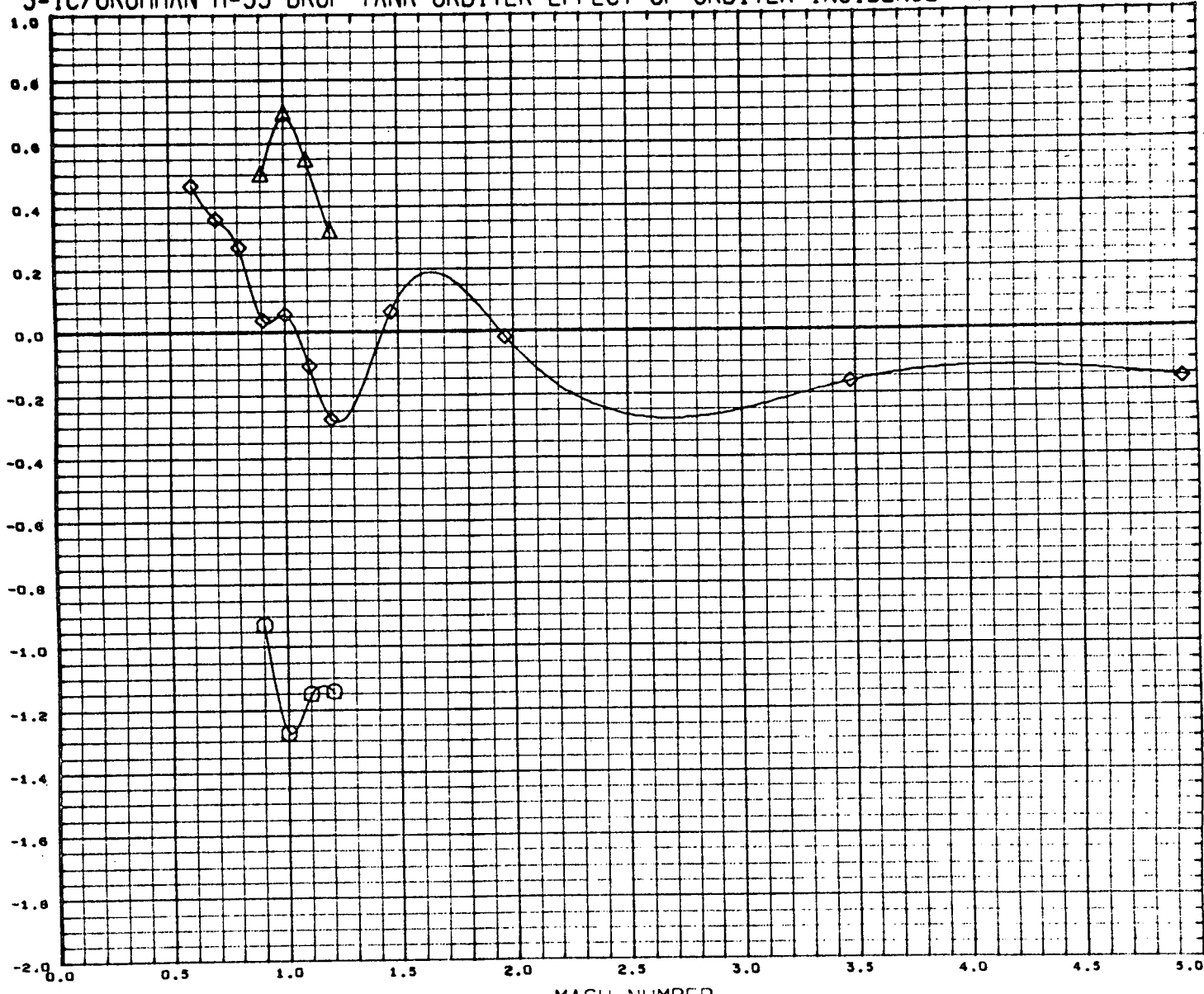
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ZMRP - 0.4250 IN.
SCALE 0.0034

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE

ZERO ANGLE OF ATTACK PITCHING MOMENT COEFFICIENT, CLM(ALPHA=0) CLMAFO

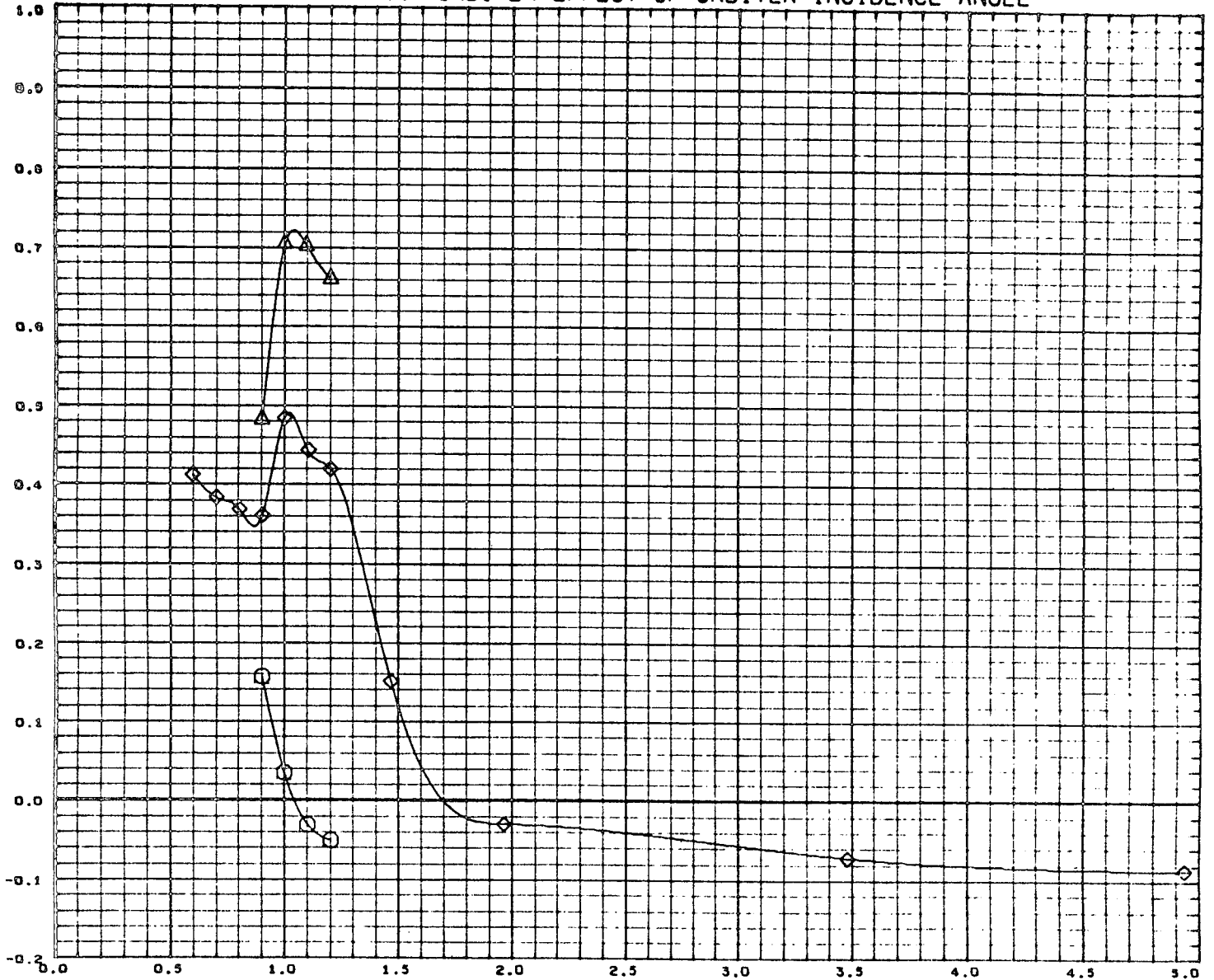


WING INC	PARAMETRIC VALUES	DATA SOURCE	REFERENCE INFORMATION
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0.000			XMRP 5.3990 IN.
			YMRP 0.0000 IN.
			ZMRP 0.0000 IN.
			SCALE 0.0034

DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE

/FRG ANGLE OF ATTACK NORMAL FORCE COEFFICIENT, CN(ALPHA=0) CNAFG



MACH NUMBER

SYMBOL	WING INC	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION			
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○	0.000					D44041	0.000		1.3330	IN.
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DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE

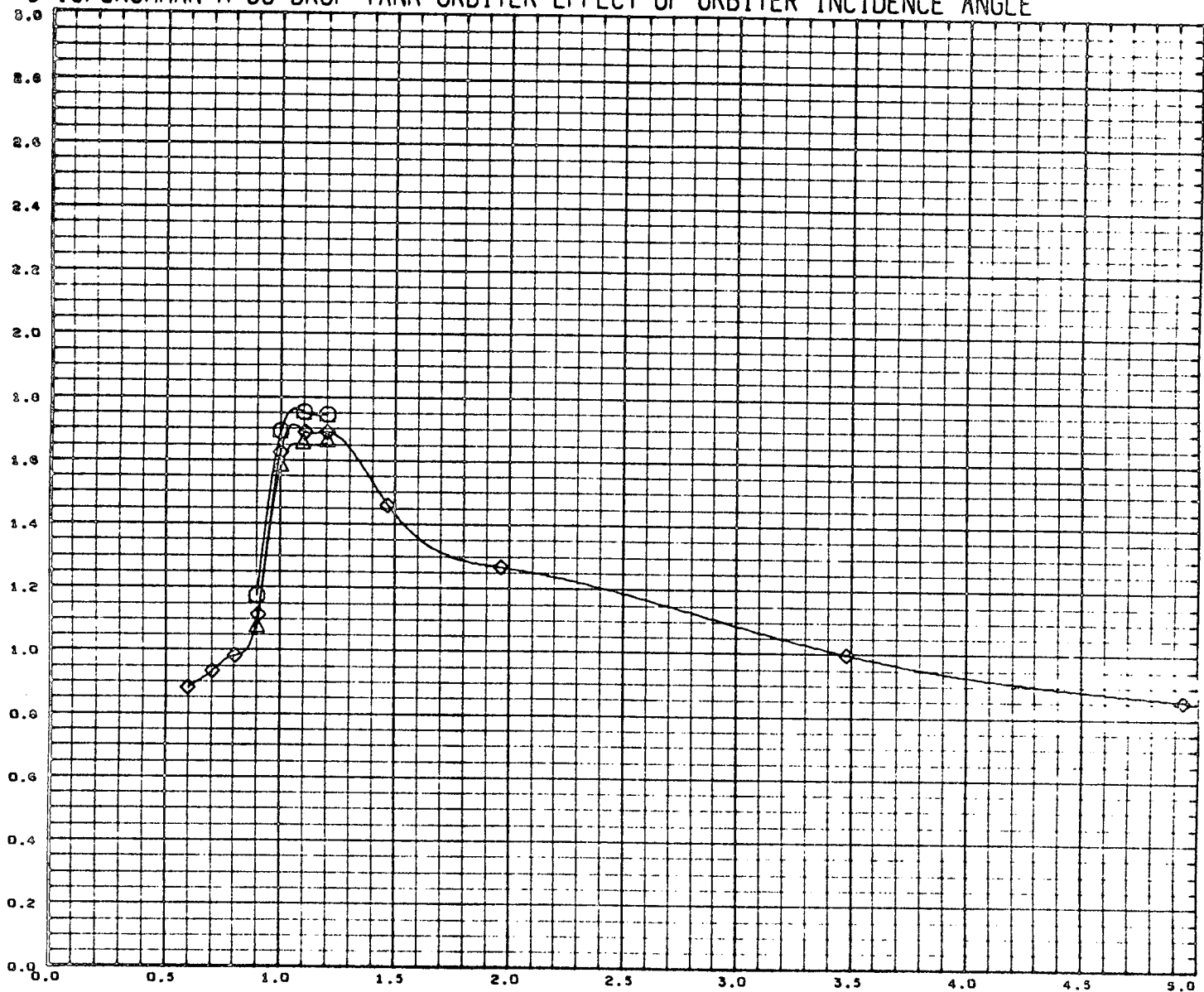


SYMBOL	WING INC	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION			
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◇	0.000	0.000	0.000	0.000	D44041	D44011	1.240	BREF	1.3330	IN.
								XMRP	5.3990	IN.
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								SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE

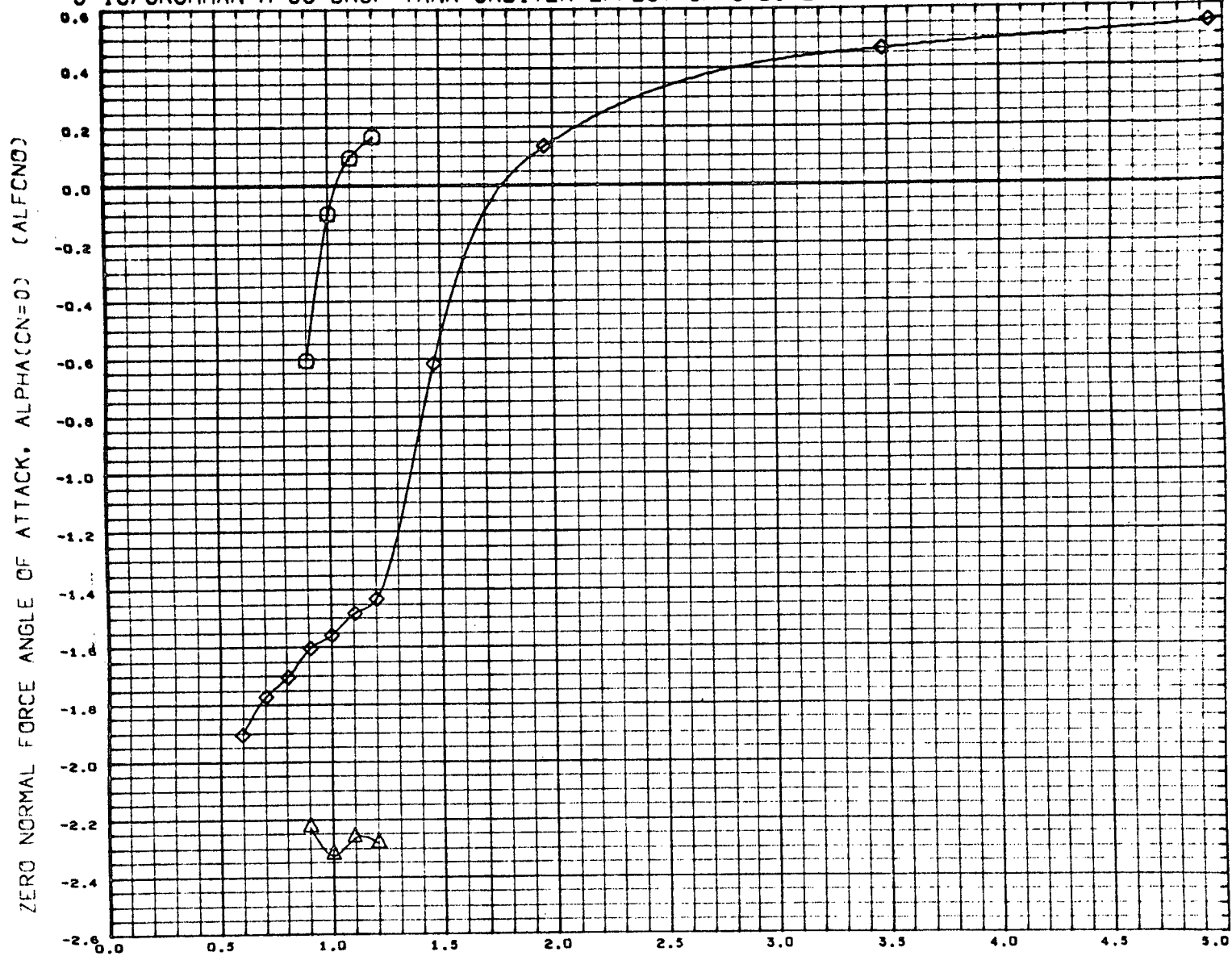
ZERO ANGLE OF ATTACK TOTAL AXIAL FORCE COEFF. CA(ALPHA=0) CAAF0



SYMBOL	WING INC	PARAMETRIC VALUES		DATA SOURCE		REFERENCE INFORMATION				
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DATA HIST. CODE CCCGCF

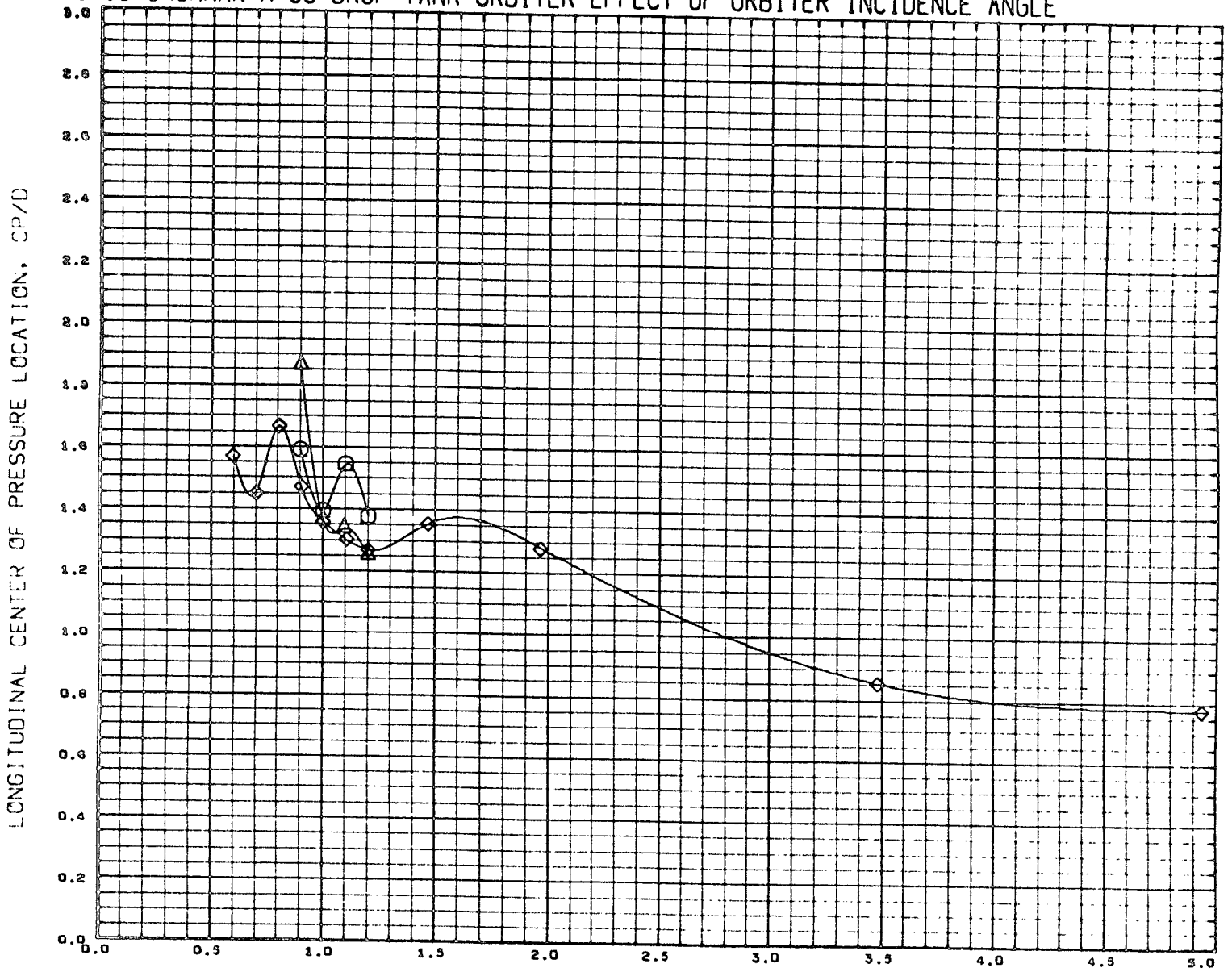
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE



SYMBOL	WINGINC	PARAMETRIC VALUES	DATA SOURCE	REFERENCE INFORMATION
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				YMRP 0.0000 IN.
				ZMRP 0.0000 IN.
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DATA HIST. CODE CCCC6F

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE ANGLE

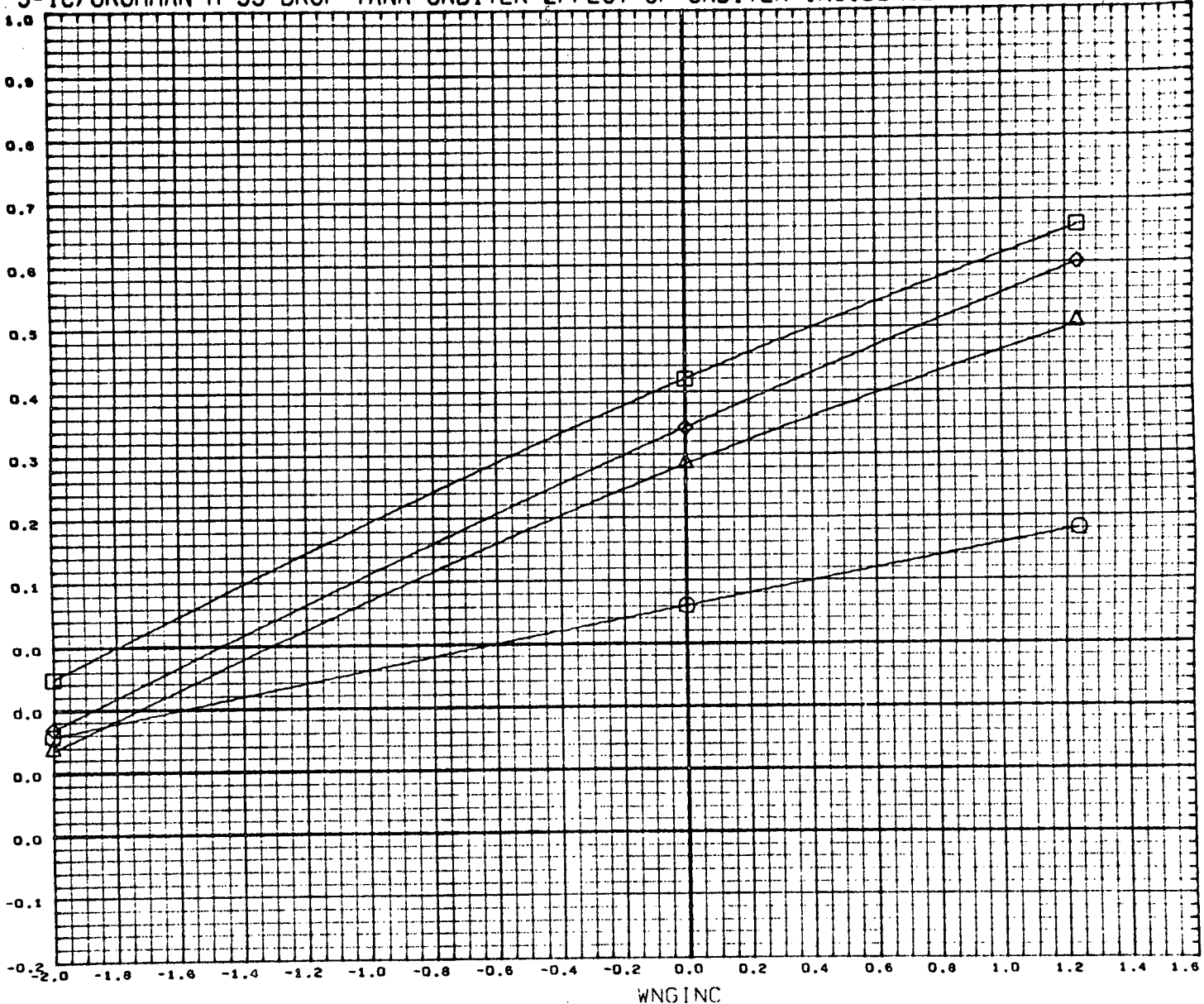


SYMBOL	WING INC	PARAMETRIC VALUES		DATA SOURCE		REFERENCE INFORMATION		
○	2.000	BETA	0.000	PHI	0.000	SRF	1.3960	53. IN.
△	1.240					LREF	1.3330	IN.
◇	0.000					BREF	1.3330	IN.
						XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	IN.

DATA HIST. CODE CCCCFC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE

ZERO ANGLE OF ATTACK NORMAL FORCE COEFFICIENT, $C_N(\alpha=0)$ CNAFC

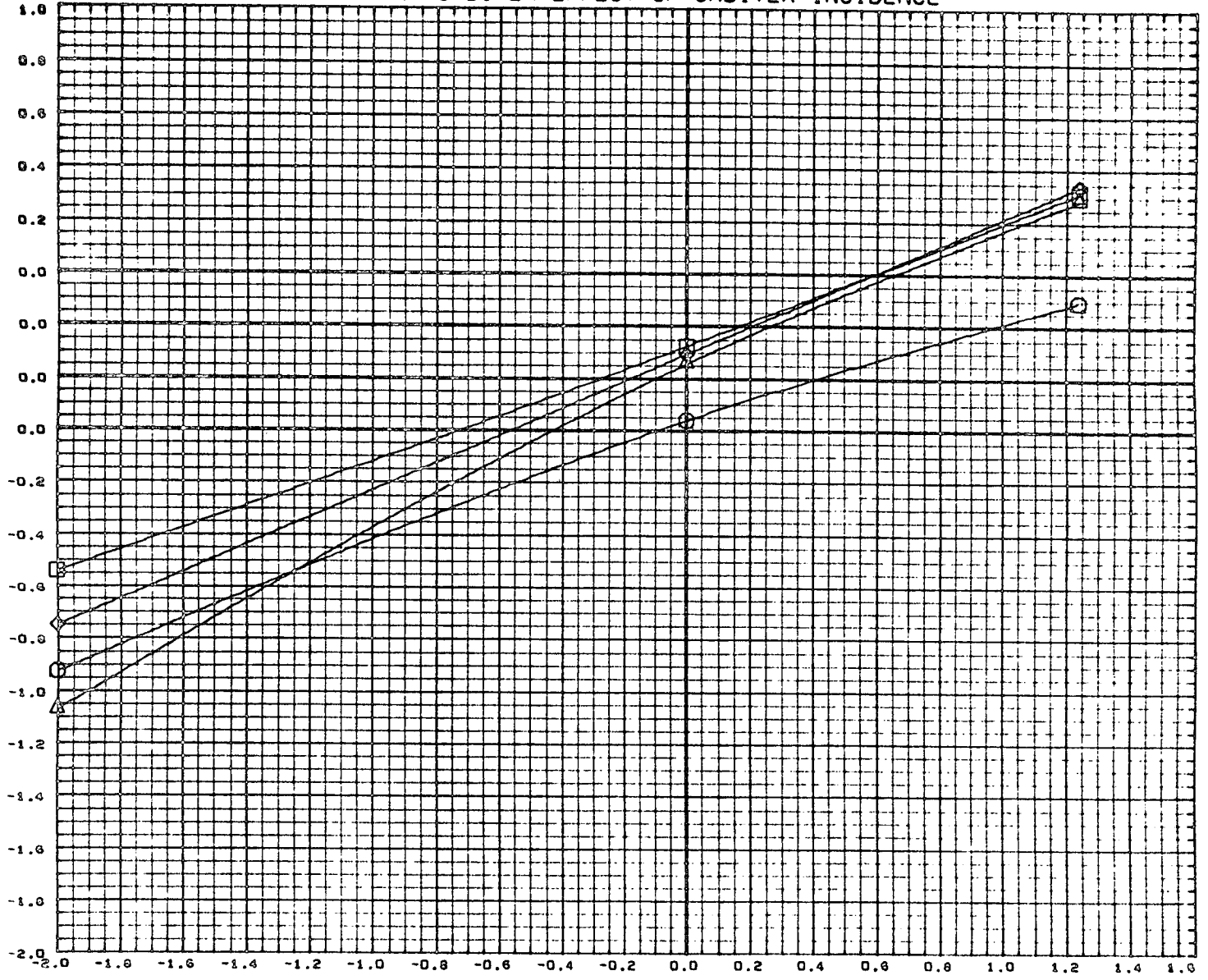


SYMBOL	MACH	PARAMETRIC VALUES		DATA SOURCE		REFERENCE INFORMATION					
		BETA	PHI	WNGINC	DATASET	SREF	LREF	BREF			
○	0.900	0.000	0.000	0.000	D44031	2.000	F44041	0.000	1.3960	50. IN.	
△	1.001				D44031	2.000	F44041	0.000	1.3330	IN.	
◇	1.102				D44011	1.240			1.3330	IN.	
□	1.202								5.3990	IN.	
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE

SYMBOL



SYMBOL	MACH	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION		
		BETA	PHI	DATASET	WING INC	DATASET	WING INC	SREF	SO. IN.
	0.900		0.000	0.000				1.3960	50. IN.
	1.001			D44031	2.000	F44041	0.000	1.3330	IN.
	1.102			D44011	1.240			1.3330	IN.
	1.202							5.3990	IN.
								0.0000	IN.
								0.0000	IN.
								0.0034	IN.

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE

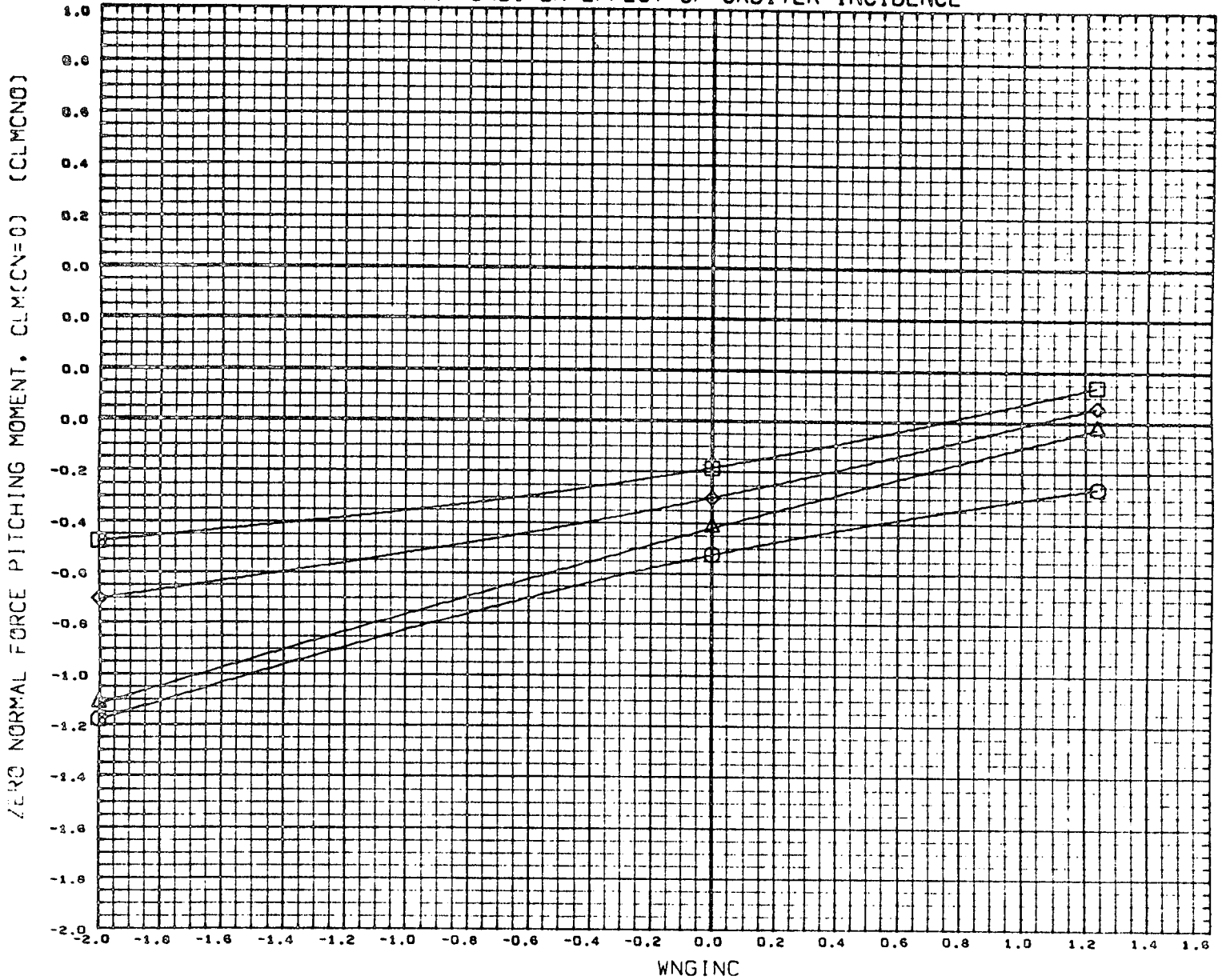
ZERO ANGLE OF ATTACK TOTAL AXIAL FORCE COEFF. CA(ALPHA=0) CAAFC



SYMBOL	MACH	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION		
		BETA	PHI	DATASET	WNGINC	DATASET	WNGINC	SREF	SO. IN.
1080	0.900	0.000	0.000	D44031	2.000	F44041	0.000	1.3960	IN.
	1.001			D44011	1.240			1.3330	IN.
	1.102							1.3330	IN.
	1.202							5.3990	IN.
								0.0000	IN.
								0.0000	IN.
								0.0034	IN.

DATA HIST. CODE CCCGCF

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER INCIDENCE



SYMBOL	MACH	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION				
		BETA	PHI	0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	SQ. (IN.)	
◇	0.900		0.000	0.000	D44031	2.000	F44041	0.000	1.3960	IN.	
△	1.001								1.3330	IN.	
○	1.102								1.3330	IN.	
□	1.202								5.3990	IN.	
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGCF

EFFECT OF TANKS ON ORBITER INCIDENCE

ZERO ANGLE OF ATTACK NORMAL FORCE COEFFICIENT, CN(ALPHA=0) CNAFO

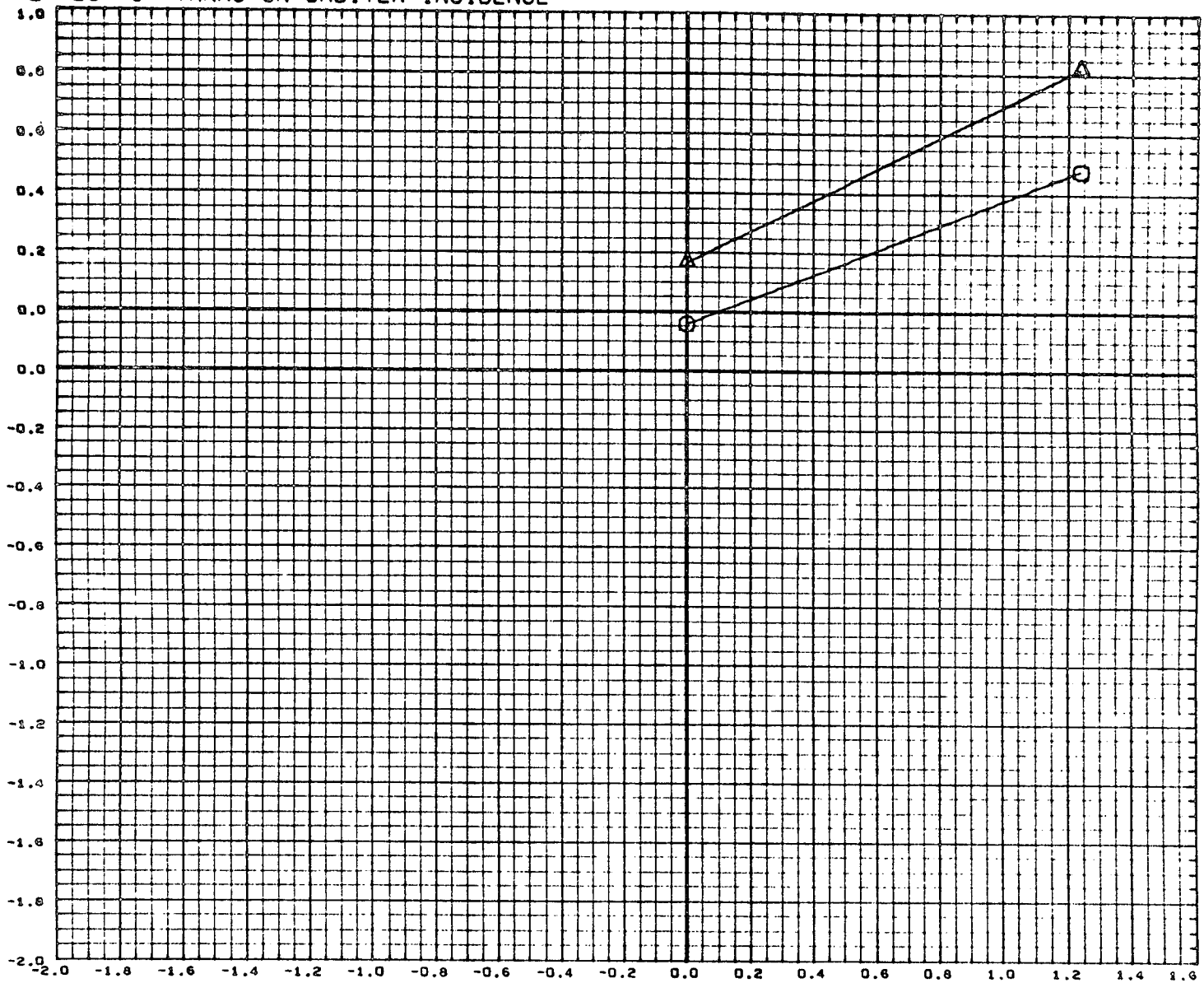


SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		BETA	PHI	0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	SQ. IN.
△	0.903			0.000	Z44051	0.000	D44021	1.240	1.3960	IN.
○	1.000								1.3330	IN.
									1.3330	IN.
									5.3990	IN.
									0.0000	IN.
									0.0000	IN.
									0.0034	IN.

DATA HIST. CODE CCCGCF#AM

EFFECT OF TANKS ON ORBITER INCIDENCE

ZERO ANGLE OF ATTACK PITCHING MOMENT COEFFICIENT, CLM(ALPHA=0) CLMAFO

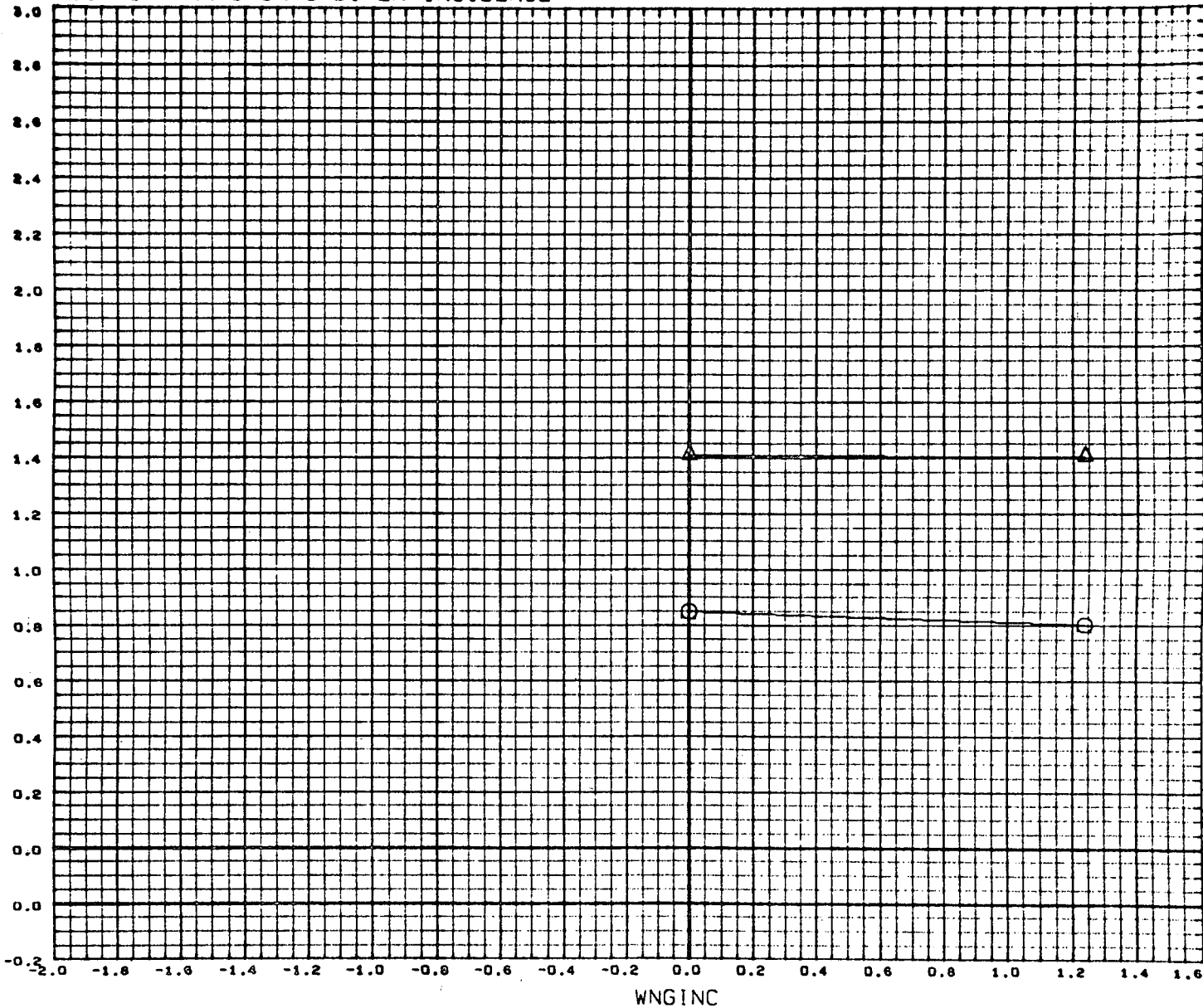


PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION							
MACH	0.903	BEIA	0.000	PHI	0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ. IN.
	1.000					244051	0.000	044021	1.240	LREF	1.3330	IN.
										BREF	1.3330	IN.
										XMRP	5.3990	IN.
										YMRP	0.0000	IN.
										ZMRP	0.0000	IN.
										SCALE	0.0034	IN.

DATA HIST. CODE CCCGCF*AM

EFFECT OF TANKS ON ORBITER INCIDENCE

ZERO ANGLE OF ATTACK TOTAL AXIAL FORCE COEFF. CA(ALPHA=0) CAAF0



SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION			
		BETA	PHI		WNGINC	DATASET	WNGINC	SREF	SQ. IN.		
○	0.903		0.000	0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	1.3960	SQ. IN.
△	1.000				Z44051	0.000	044021	1.240	LREF	1.3330	IN.
									BREF	1.3330	IN.
									XMRP	3.3990	IN.
									YMRP	0.0000	IN.
									ZMRP	0.0000	IN.
									SCALE	0.0034	

DATA HIST. CODE CCCGCF*AM

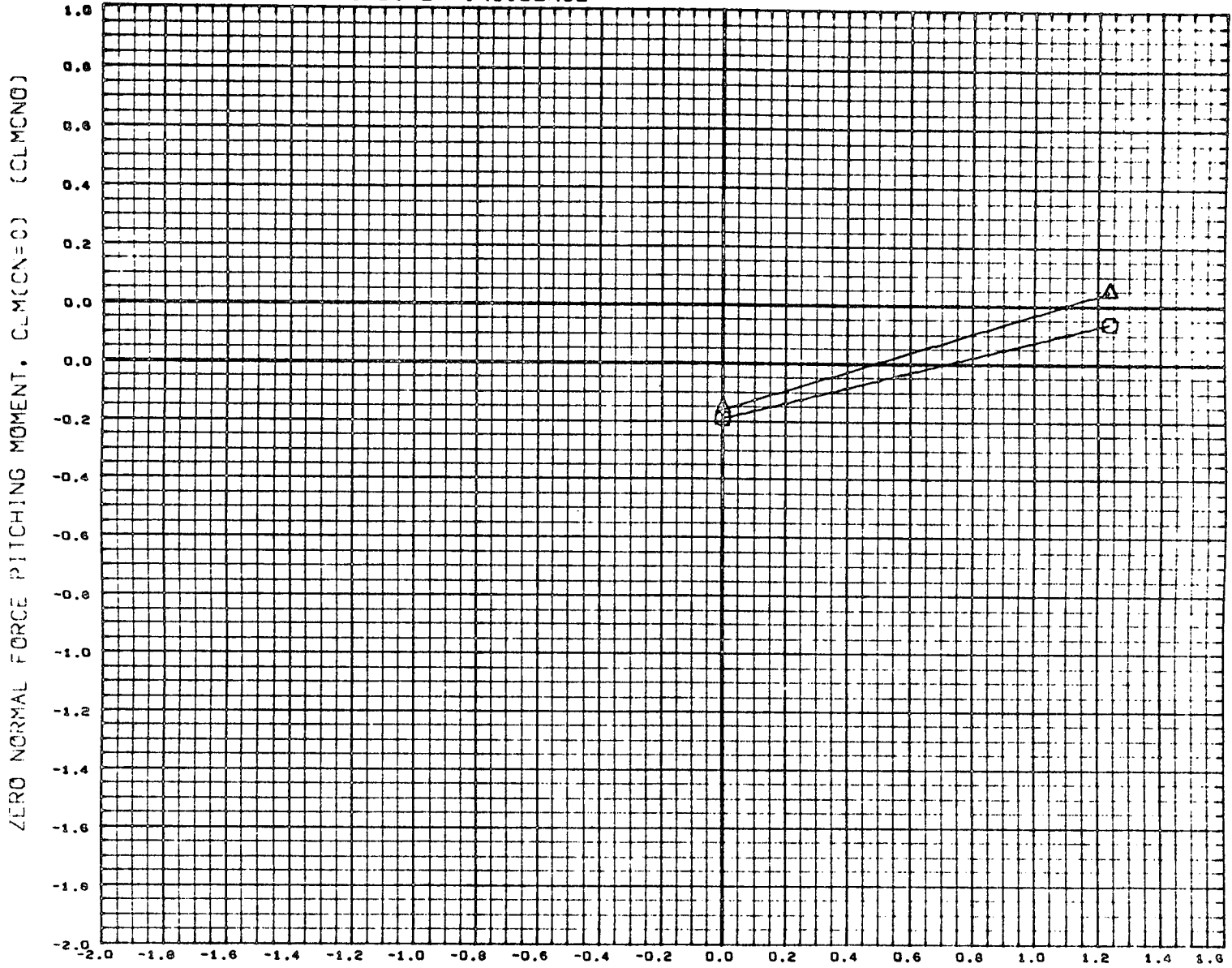
M502-MSFC-S1C H-33 ORBITER

OWVCBF

(Z44051) 12 MAY 72

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EFFECT OF TANKS ON ORBITER INCIDENCE

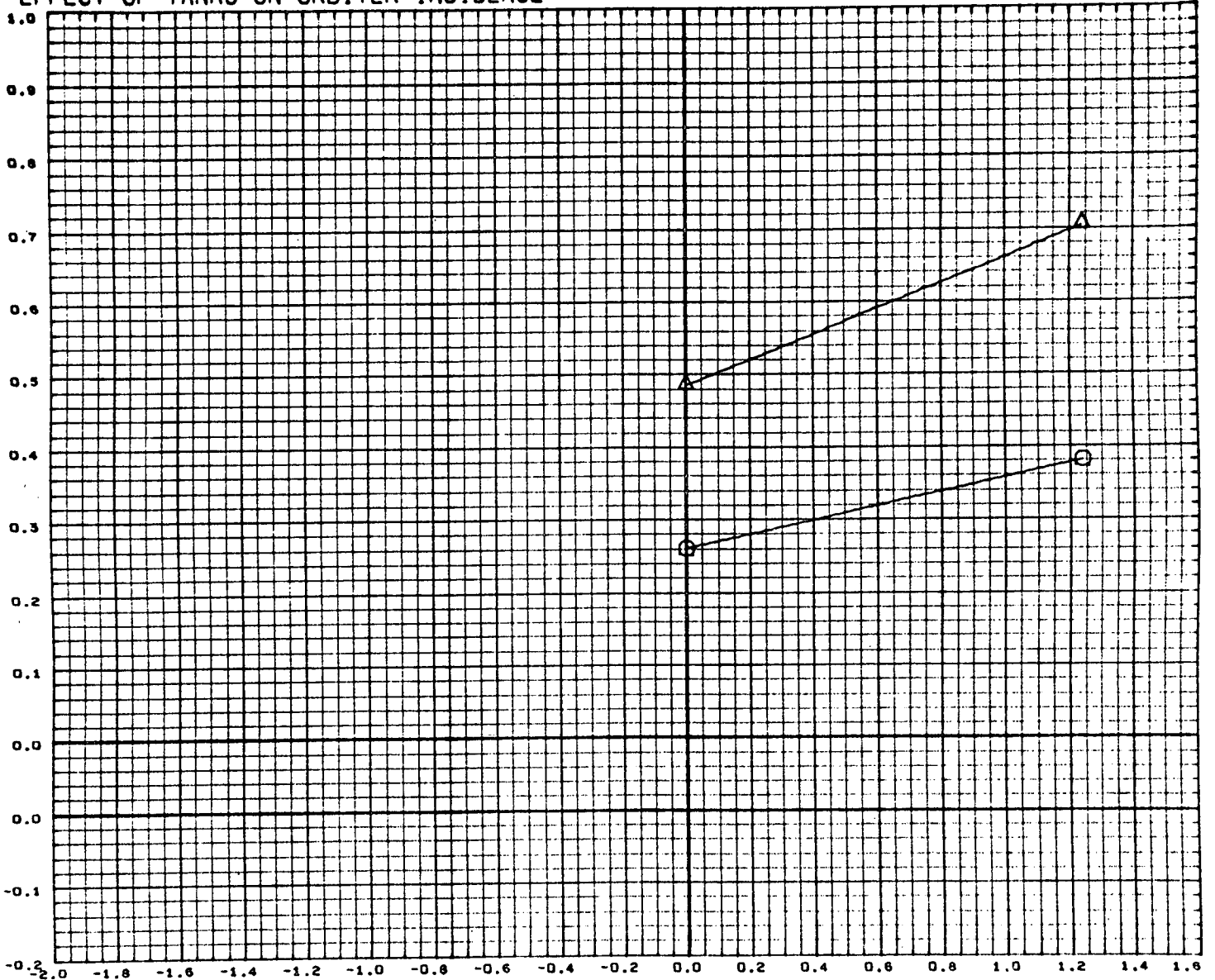


SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		BETA	PHI	0.000	DATASET	WNGINC	DATASET	WNGINC	SREF	SO. IN.
△	0.903				Z44051	0.000	D44021	1.240	1.3960	IN.
○	1.000								1.3330	IN.
									1.3330	IN.
									5.3390	IN.
									0.0000	IN.
									0.0000	IN.
									0.0034	

DATA HIST. CODE CCCGCF#AM

EFFECT OF TANKS ON ORBITER INCIDENCE

ZERO ANGLE OF ATTACK NORMAL FORCE COEFFICIENT, CN(ALPHA=0) CNAFC



SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		BETA	PHI	0.000	WNGINC	DATASET	WNGINC	SREF	SO. IN.	
○	0.904			0.000	Q44041	0.000	Q44011	1.240	1.3360	IN.
△	0.999								1.3330	IN.
									1.3330	IN.
									5.3990	IN.
									0.0000	IN.
									0.0000	IN.
									0.0034	IN.

DATA HIST. CODE CCCGCF#A

M502-MSFC-S1C H-33 ORBITER

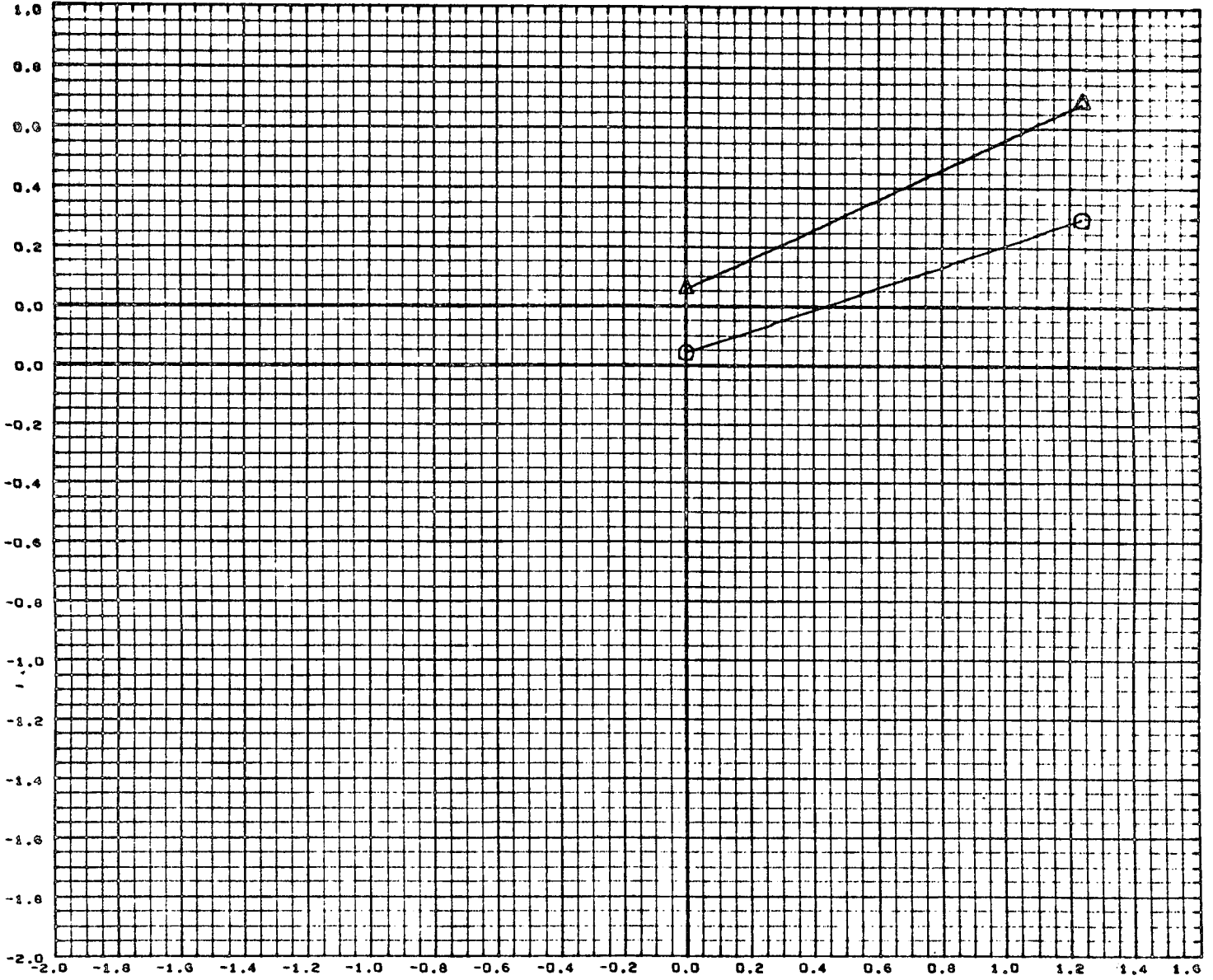
OWVTCBF

(Q44041) 12 MAY 72

PAGE 361

EFFECT OF TANKS ON ORBITER INCIDENCE

ZERO ANGLE OF ATTACK PITCHING MOMENT COEFFICIENT, CLMCLINMA-03 CLMATS

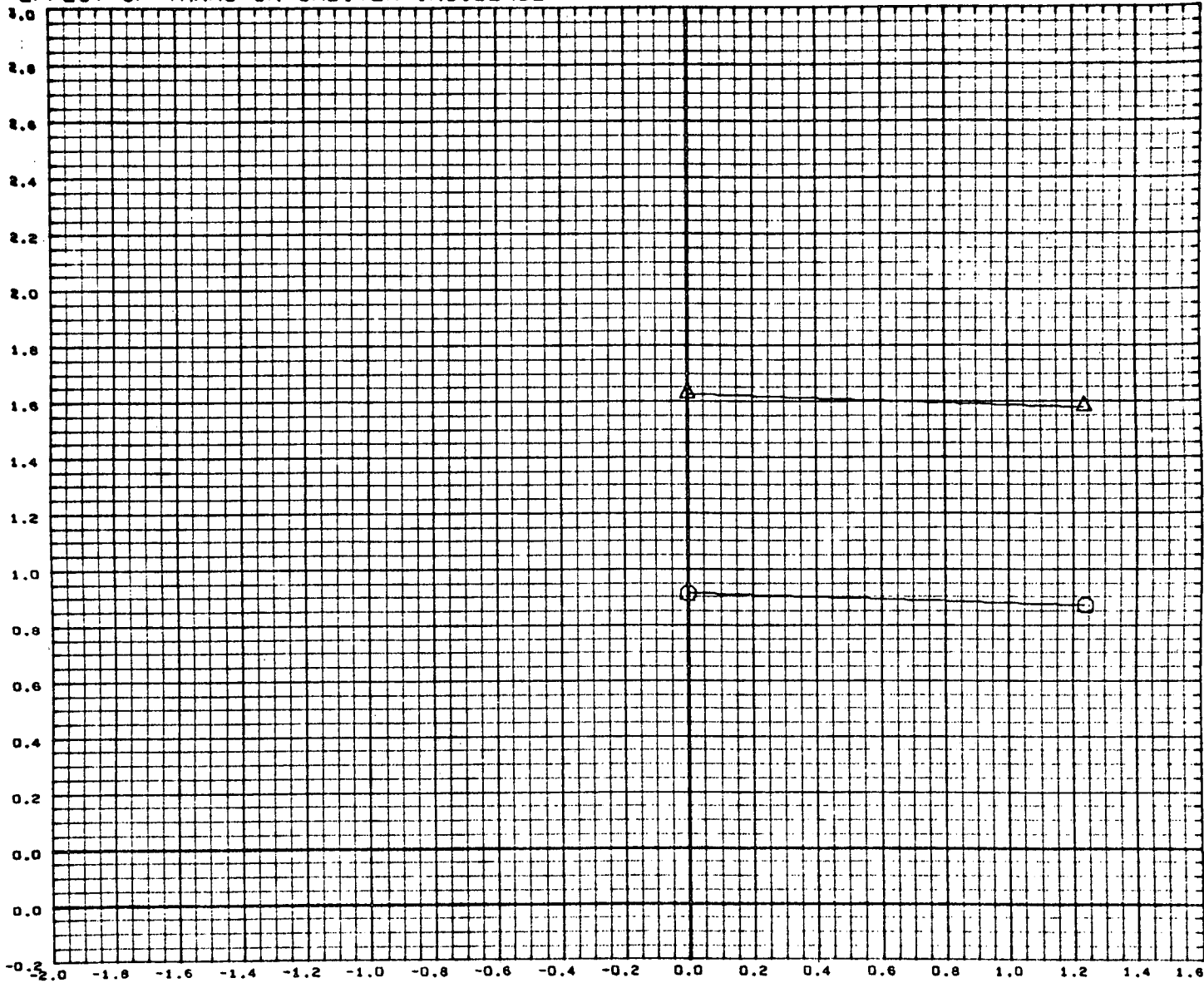


SYMBOL	MACH	PARAMETRIC VALUES			DATA SOURCE			REFERENCE INFORMATION		
		BETA	PHI	0.000	WNGINC	Q44011	WNGINC	SREF	SQ. IN.	
△	0.904	0.000	0.000	Q44041	0.000	Q44011	1.240	1.3960	30. IN.	
○	0.999							LREF 1.3330	IN.	
								BREF 1.3330	IN.	
								XMRP 5.3990	IN.	
								YMRP 0.0000	IN.	
								ZMRP 0.0000	IN.	
								SCALE 0.0034		

DATA HIST. CODE CCGGCF#A

EFFECT OF TANKS ON ORBITER INCIDENCE

ZERO ANGLE OF ATTACK TOTAL AXIAL FORCE COEFF. CA(ALPHA=0) CAAF0



SYMBOL	MACH	PARAMETRIC VALUES		DATA SOURCE			REFERENCE INFORMATION			
		BETA	PHI	WNGINC	DATASET	WNGINC	SREF	SO. IN.		
⊗	0.904		0.000	0.000	Q44041	0.000	Q44011	1.240	1.3960	30. IN.
	0.999								1.3330	IN.
									1.3330	IN.
									5.3990	IN.
									0.0000	IN.
									0.0000	IN.
									0.0034	

DATA HIST. CODE CCCGCF#A

MS02-MSFC-S1C H-33 ORBITER

OWVICBF

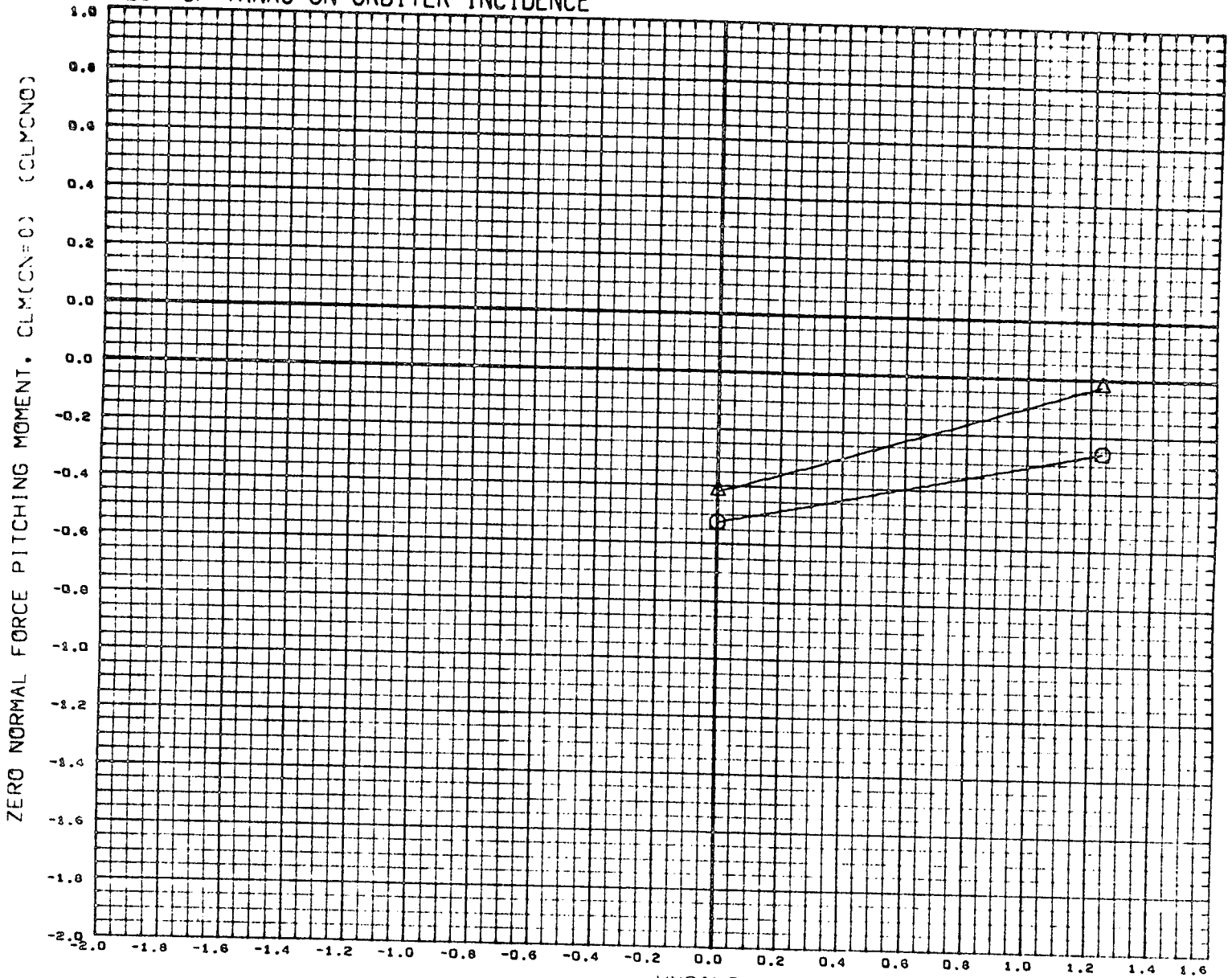
(Q44041)

12 MAY 72

PAGE

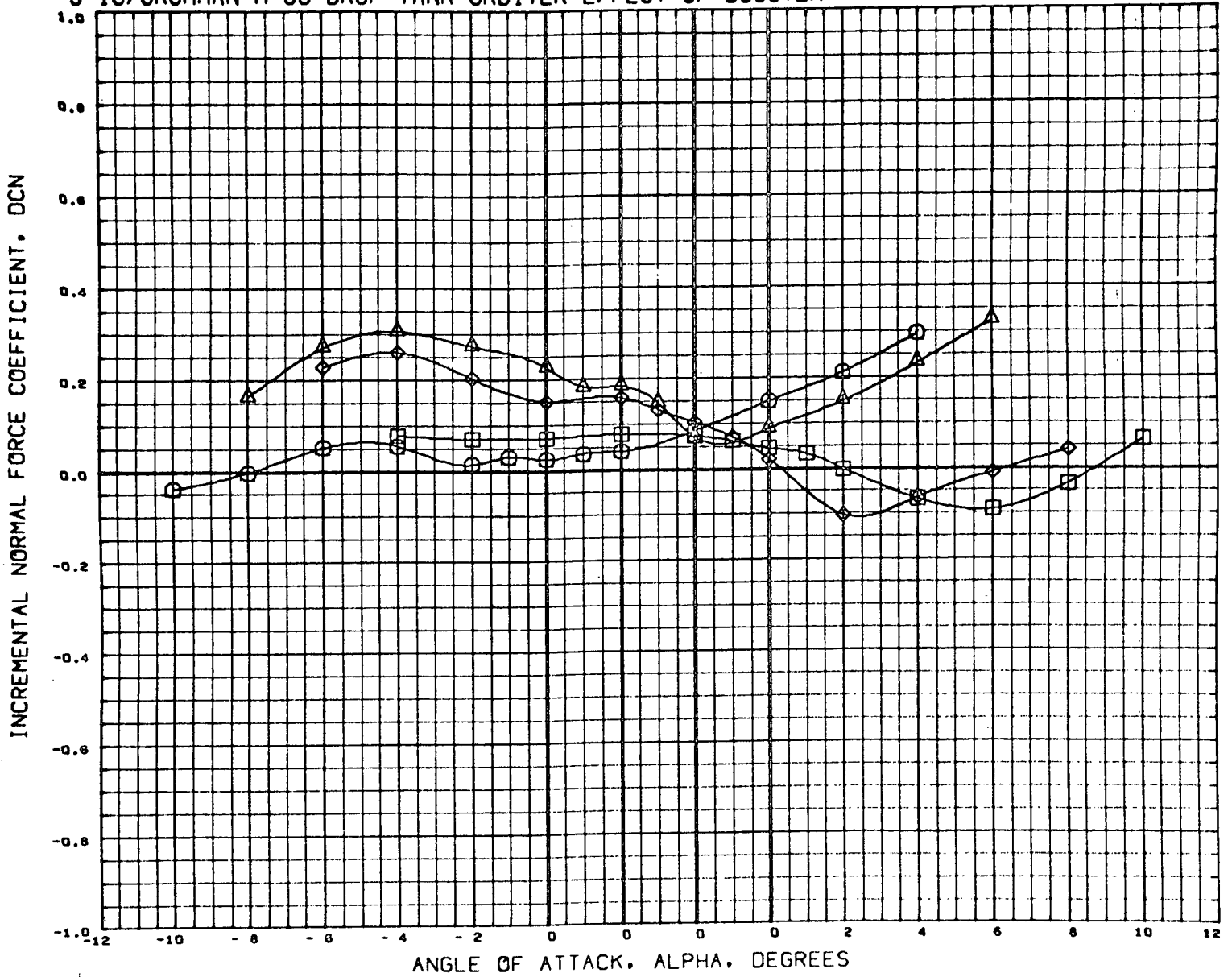
363

EFFECT OF TANKS ON ORBITER INCIDENCE



SYMBOL	MACH	PARAMETRIC VALUES	DATA SOURCE	REFERENCE INFORMATION
△	0.994	BETA = 0.000 PHI	0.000 DATASET Q44041	WNGINC 1.240
○	0.999			
		DATA HIST. CODE CCCGCF/A		

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

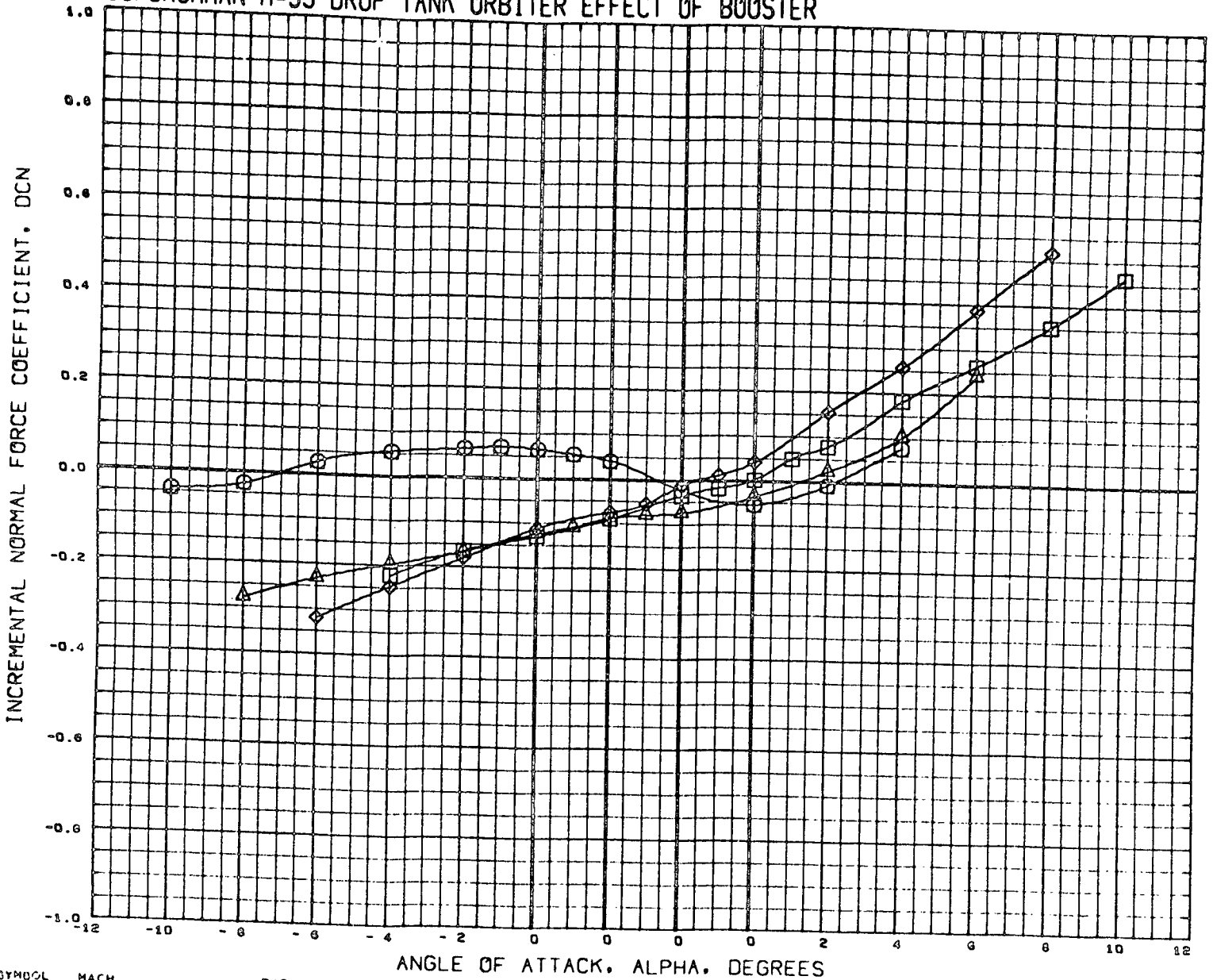


SYMBOL
 ○ 0.600
 ◇ 0.900
 △ 1.000
 □ 1.100

PARAMETRIC VALUES
 BETA 0.000
 DATA HIST. CODE CCCI0A0C

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

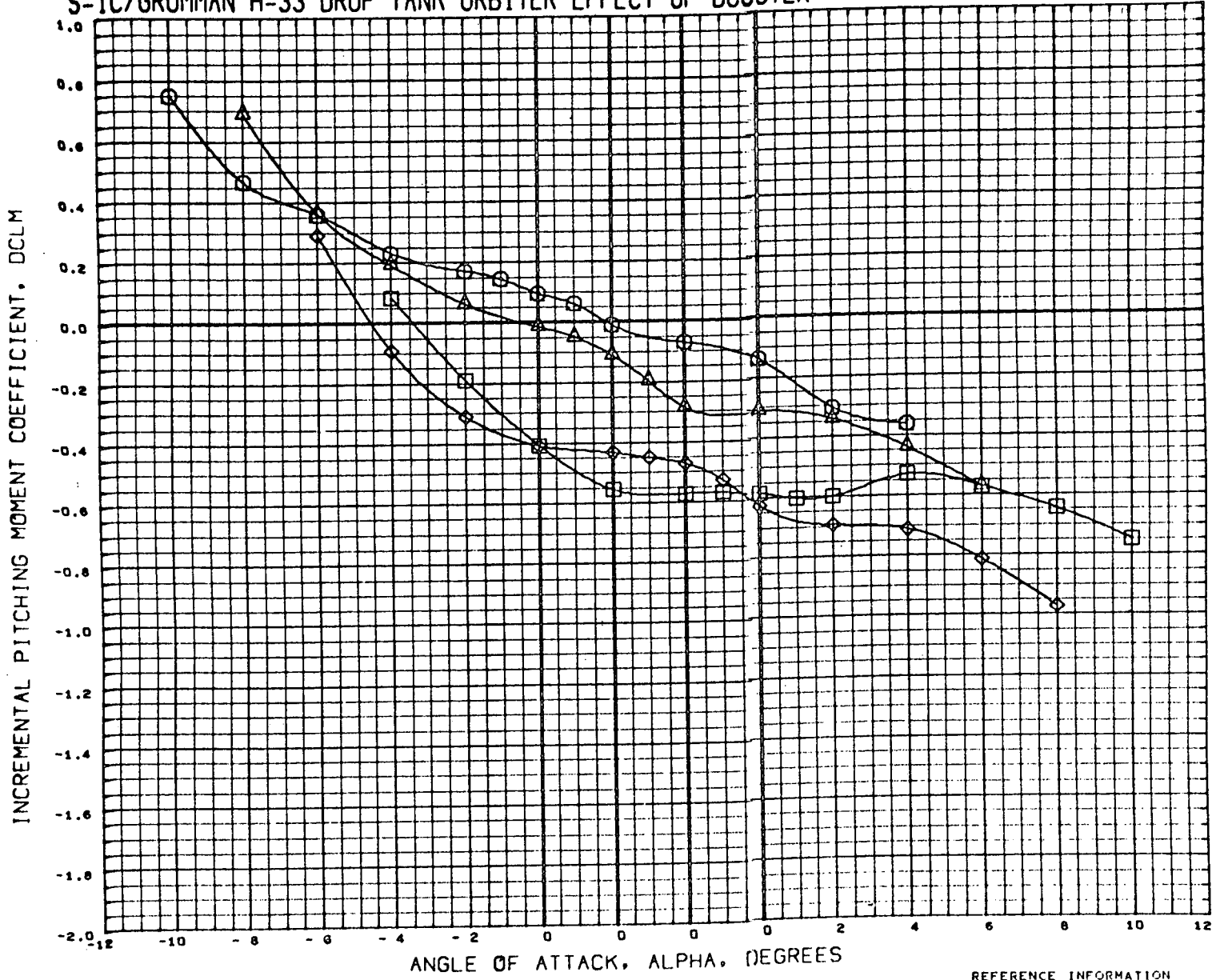


SYMBOL MACH BETA PARAMETRIC VALUES
 ○ 1.200
 ◇ 1.960
 □ 3.900
 ◻ 4.900

DATA HIST. CODE CCCI4A*C

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

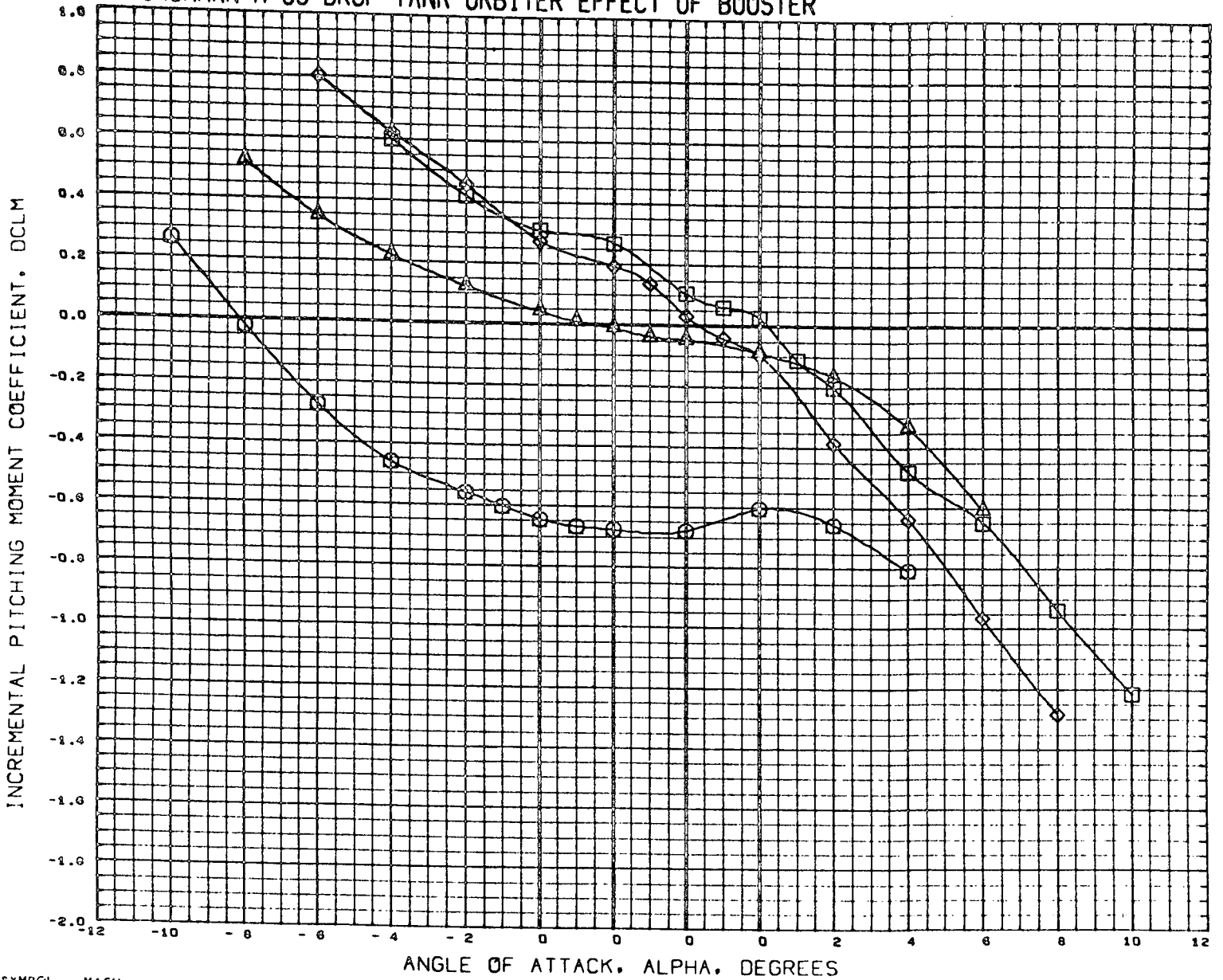


SYMBOL	MACH	BETA	PARAMETRIC VALUES
○	0.600	0.000	
△	0.900		
◇	1.000		
□	1.100		

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC19A9C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

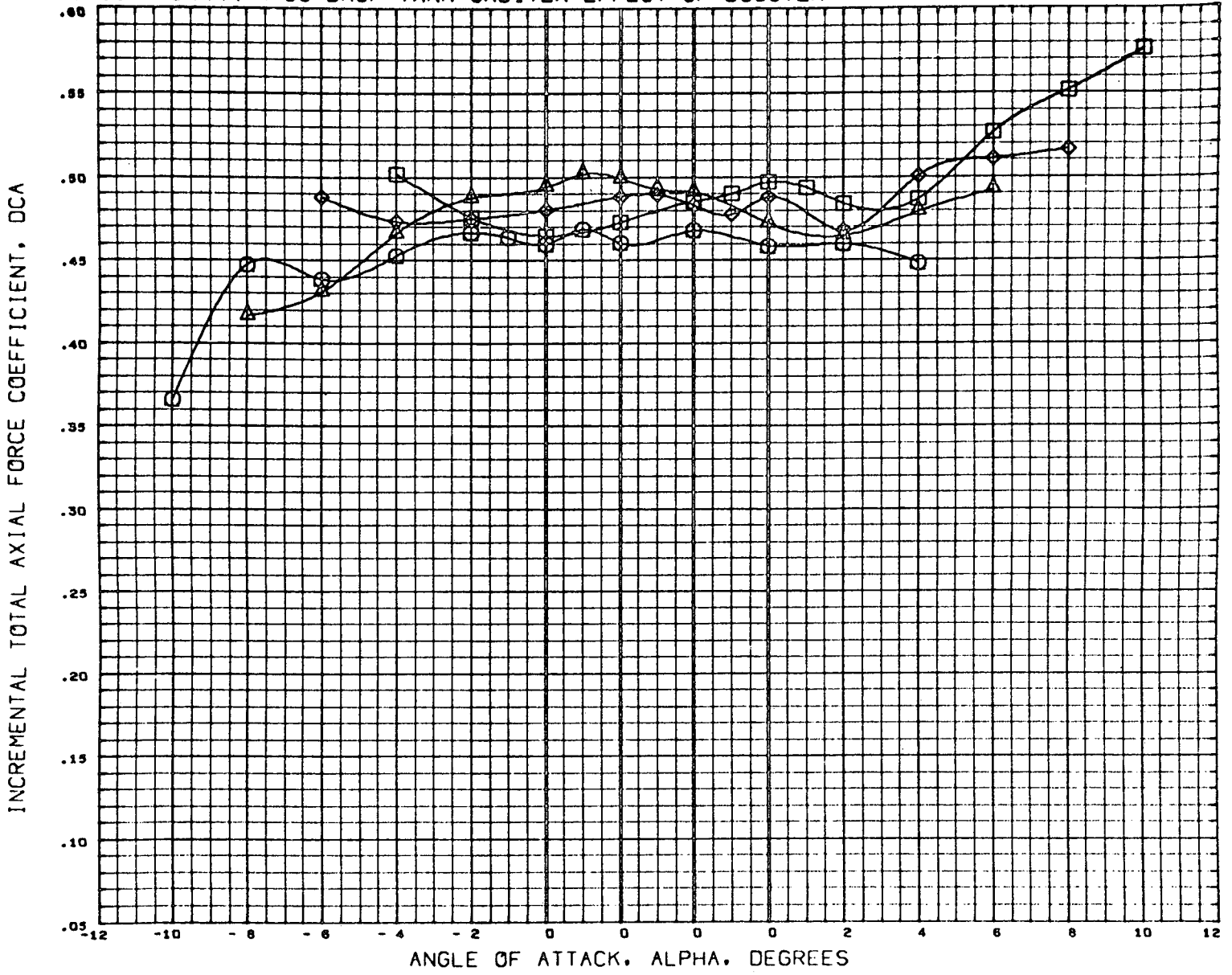


SYMBOL MACH BETA PARAMETRIC VALUES
 ○ 1.200
 △ 1.960
 ◇ 3.900
 □ 4.960

DATA HIST. CODE CCCI*A*C

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 3.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

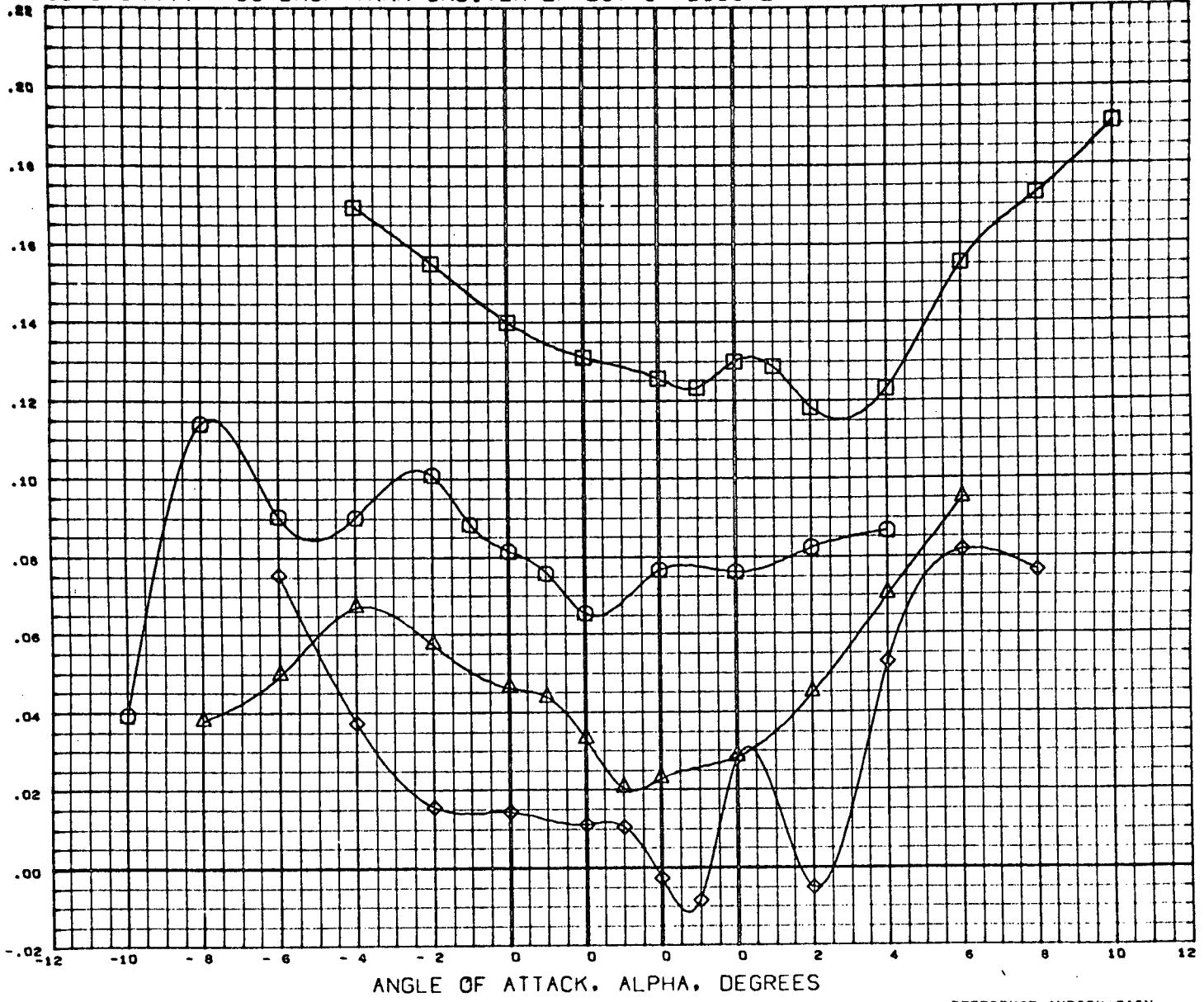


SYMBOL	MACH	BETA	PARAMETRIC VALUES	REFERENCE INFORMATION	
○	0.600		0.000	SREF	1.3960 SQ. IN.
◇	0.900			LREF	1.3330 IN.
◇	1.000			BREF	1.3330 IN.
◇	1.100			XMRP	5.3990 IN.
				YMRP	0.0000 IN.
				ZMRP	0.0000 IN.
				SCALE	0.0034

DATA HIST. CODE CCC12A2C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

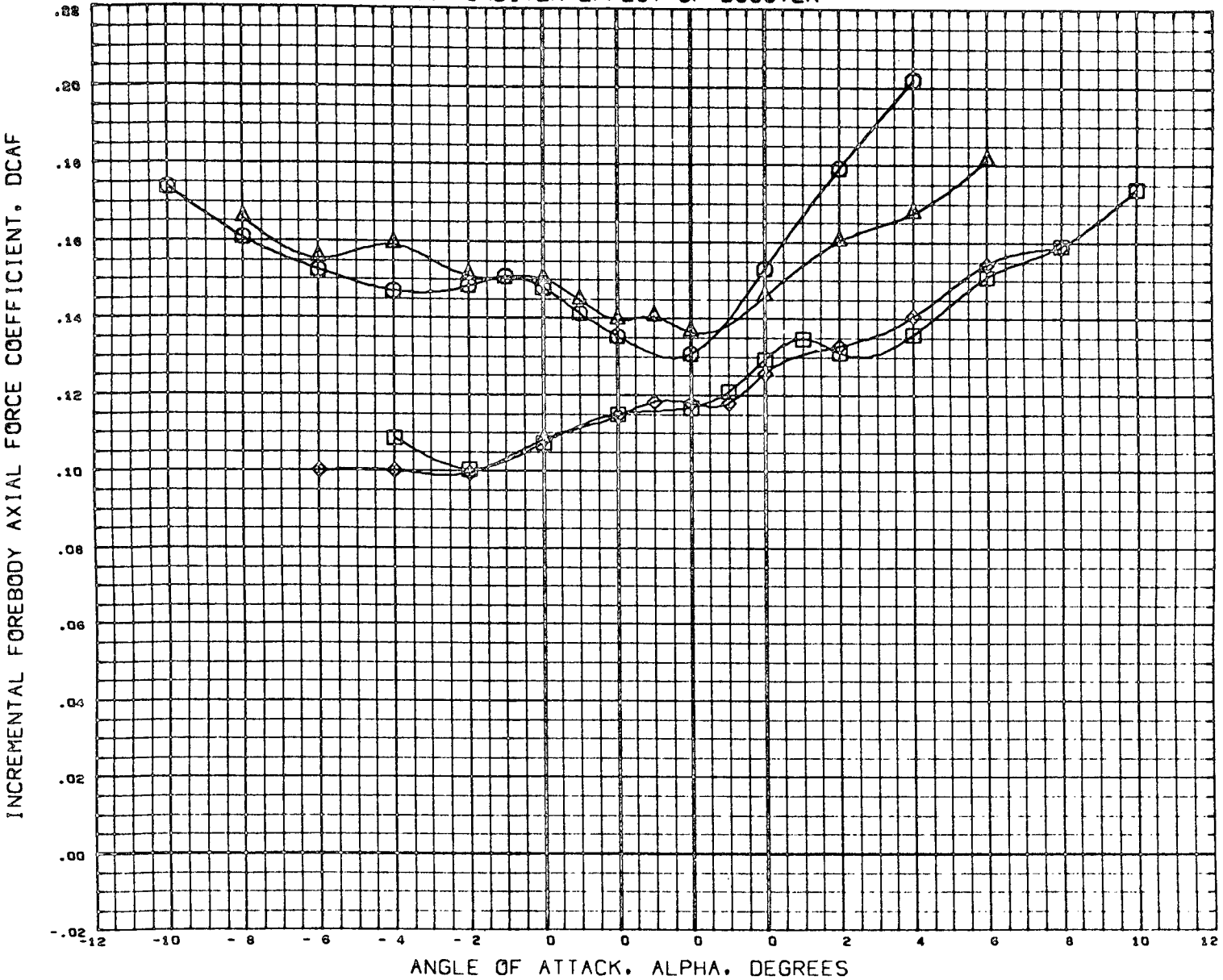
INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, DCAF



SYMBOL ○ ◇ □	MACH	BETA	PARAMETRIC VALUES	REFERENCE INFORMATION	
	0.600		0.000	SREF	1.3960 SQ. IN.
	0.900			LREF	1.3330 IN.
	1.000			BREF	1.3330 IN.
	1.100			XMRP	5.3990 IN.
				YMRP	0.0000 IN.
				ZMRP	0.0000 IN.
				SCALE	0.0034

DATA HIST. CODE CCCI*A*C

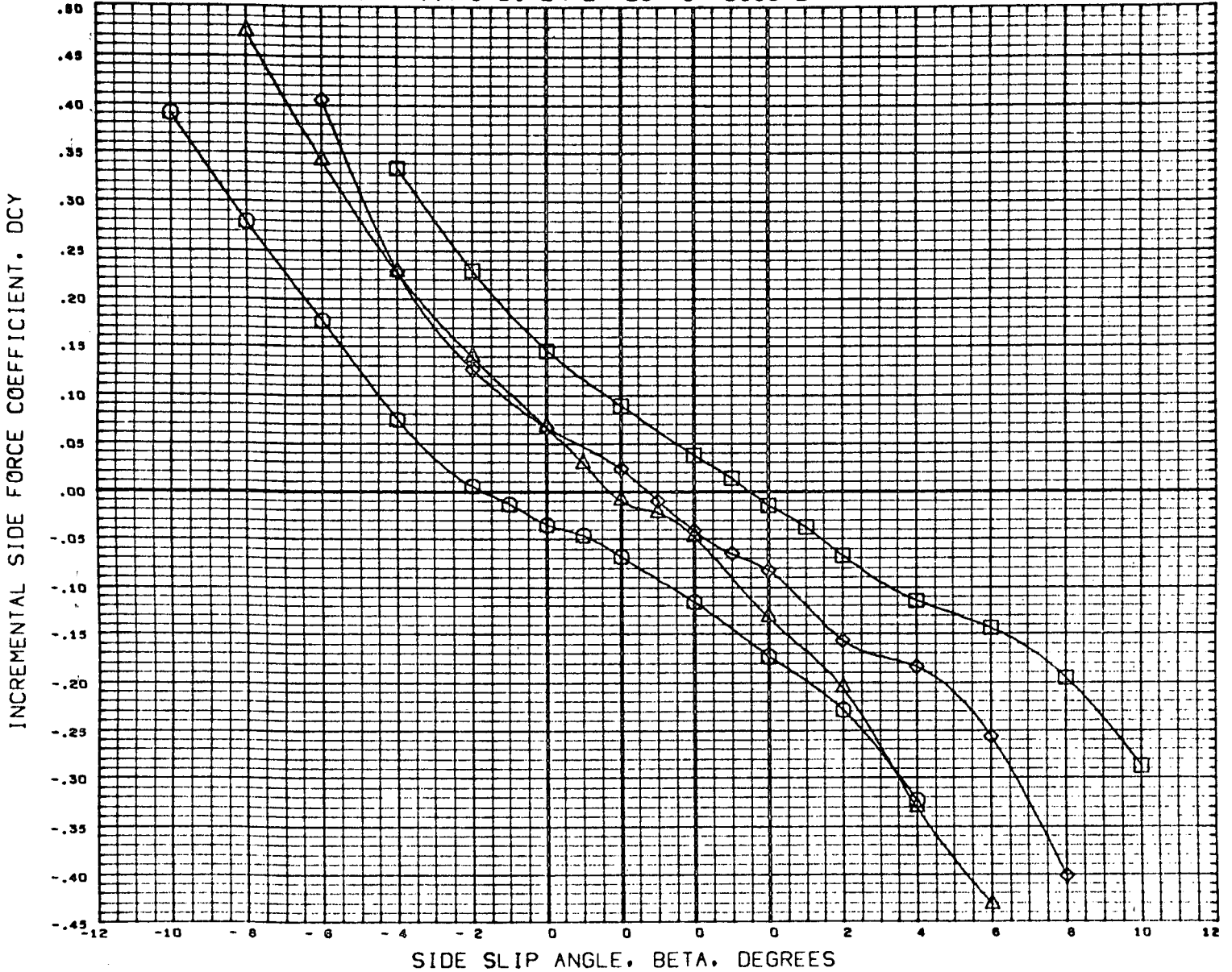
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL	MACH	BETA	PARAMETRIC VALUES	REFERENCE INFORMATION
○	1.200	0.000		SREF 1.3960 SQ. IN.
△	1.960			LREF 1.3330 IN.
◇	3.300			BREF 1.3330 IN.
□	4.960			XMRP 5.3990 IN.
				YMRP 0.0000 IN.
				ZMRP 0.0000 IN.
				SCALE 0.0034

DATA HIST. CODE CCCI#A+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



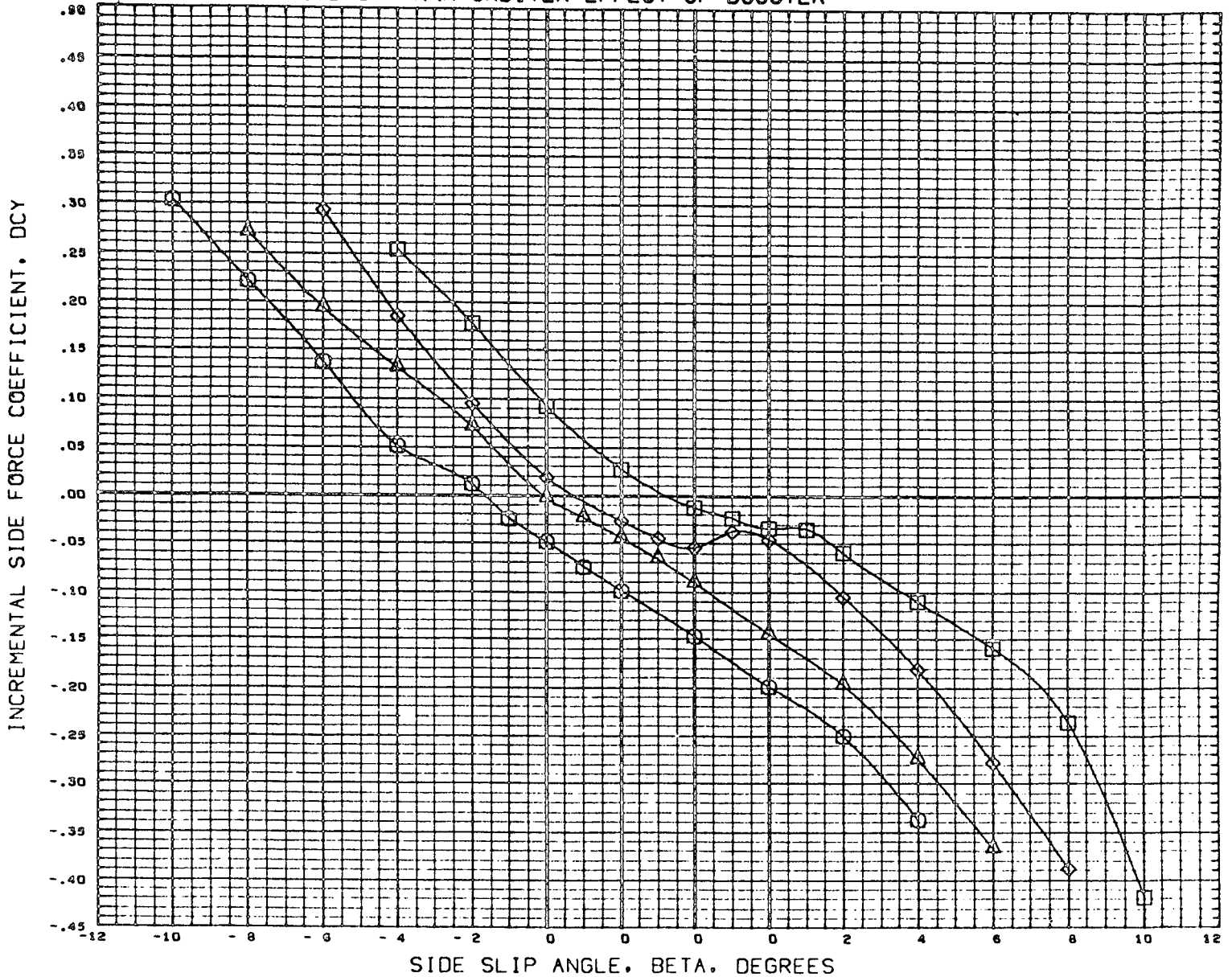
SYMBOL MACH ALPHA PARAMETRIC VALUES
 ○ 0.600
 ◇ 0.900
 ◊ 1.000
 □ 1.100

DATA HIST. CODE #ACCCI#A#C

REFERENCE INFORMATION

SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

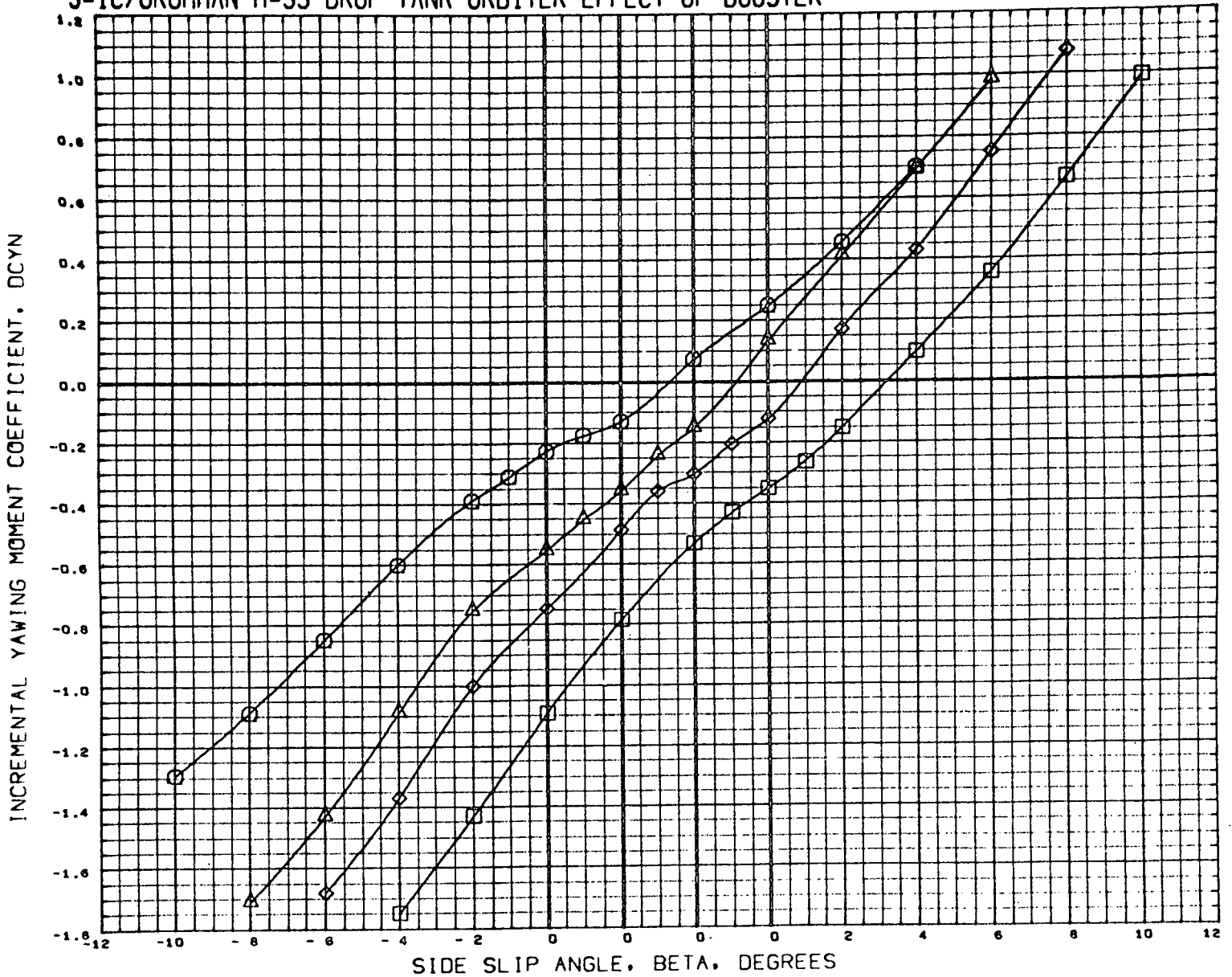


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	1.200	0.000	
△	1.960	0.000	
◇	3.900	0.000	
□	4.960	0.000	

DATA HIST. CODE #ACCCI#A+C

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

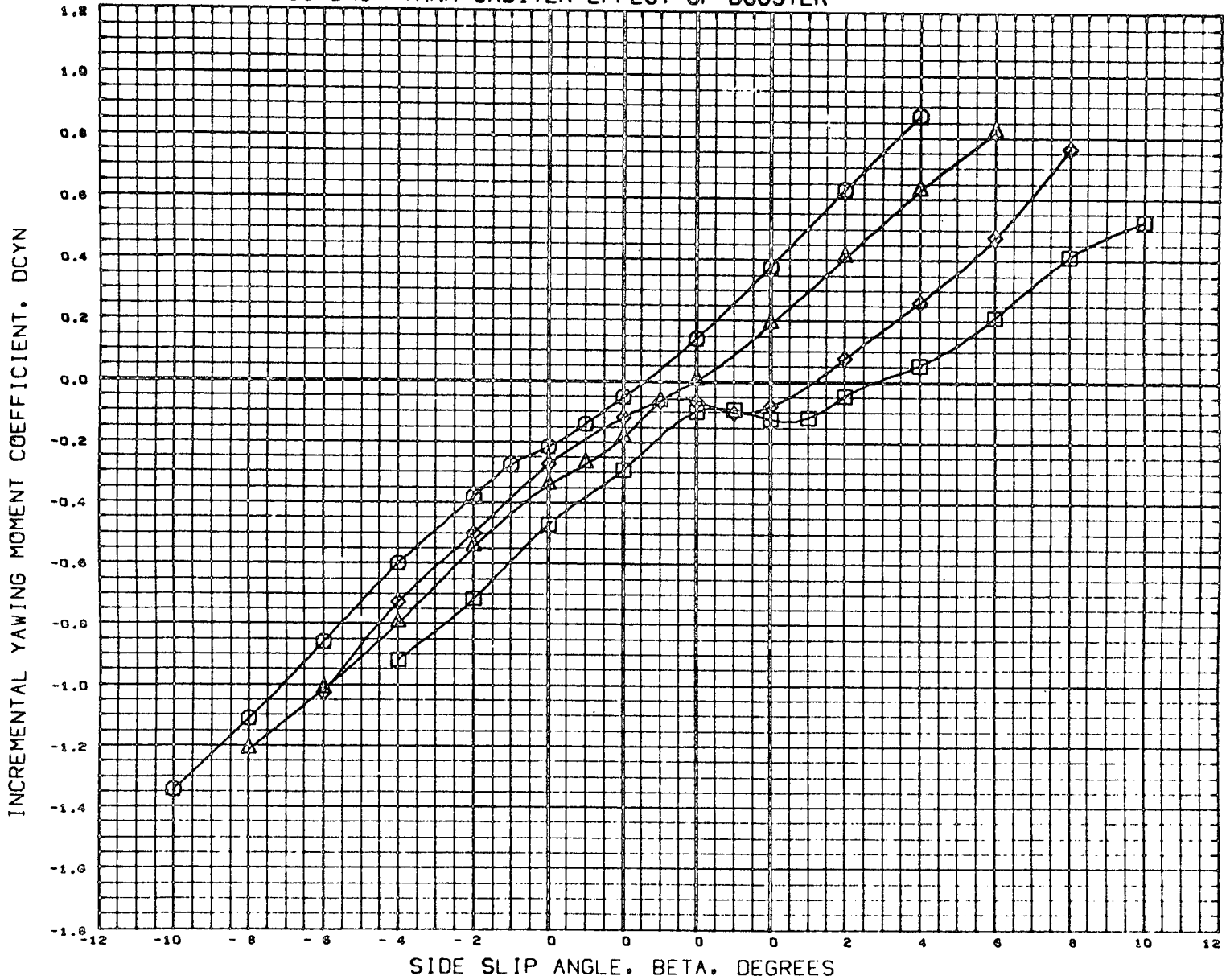


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	0.600	0.000	
◇	0.900	0.000	
△	1.000	0.000	
□	1.100	0.000	

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

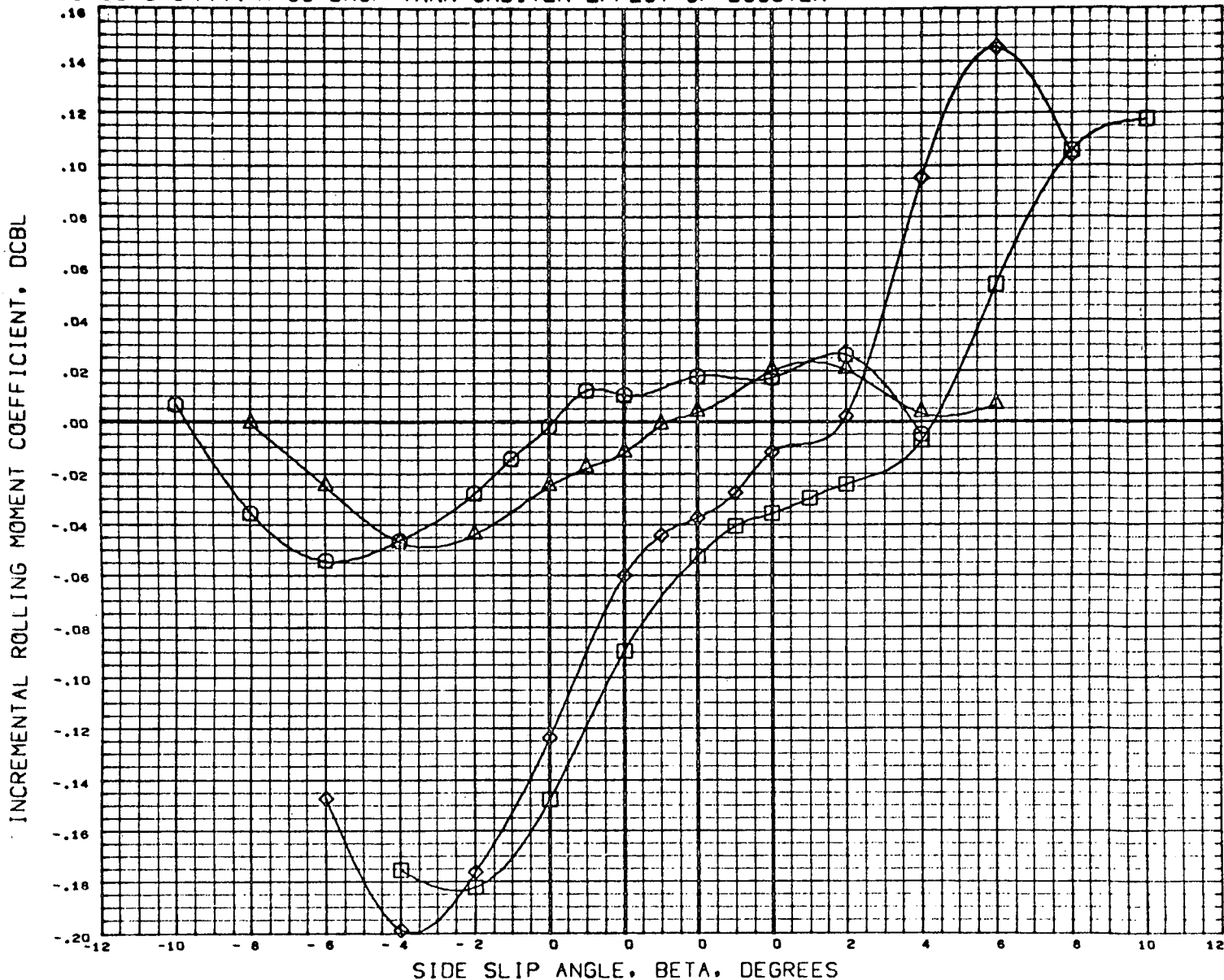


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	1.200		0.000
◇	1.960		
◇	3.900		
□	4.960		

DATA HIST. CODE *ACCCI*A%C

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

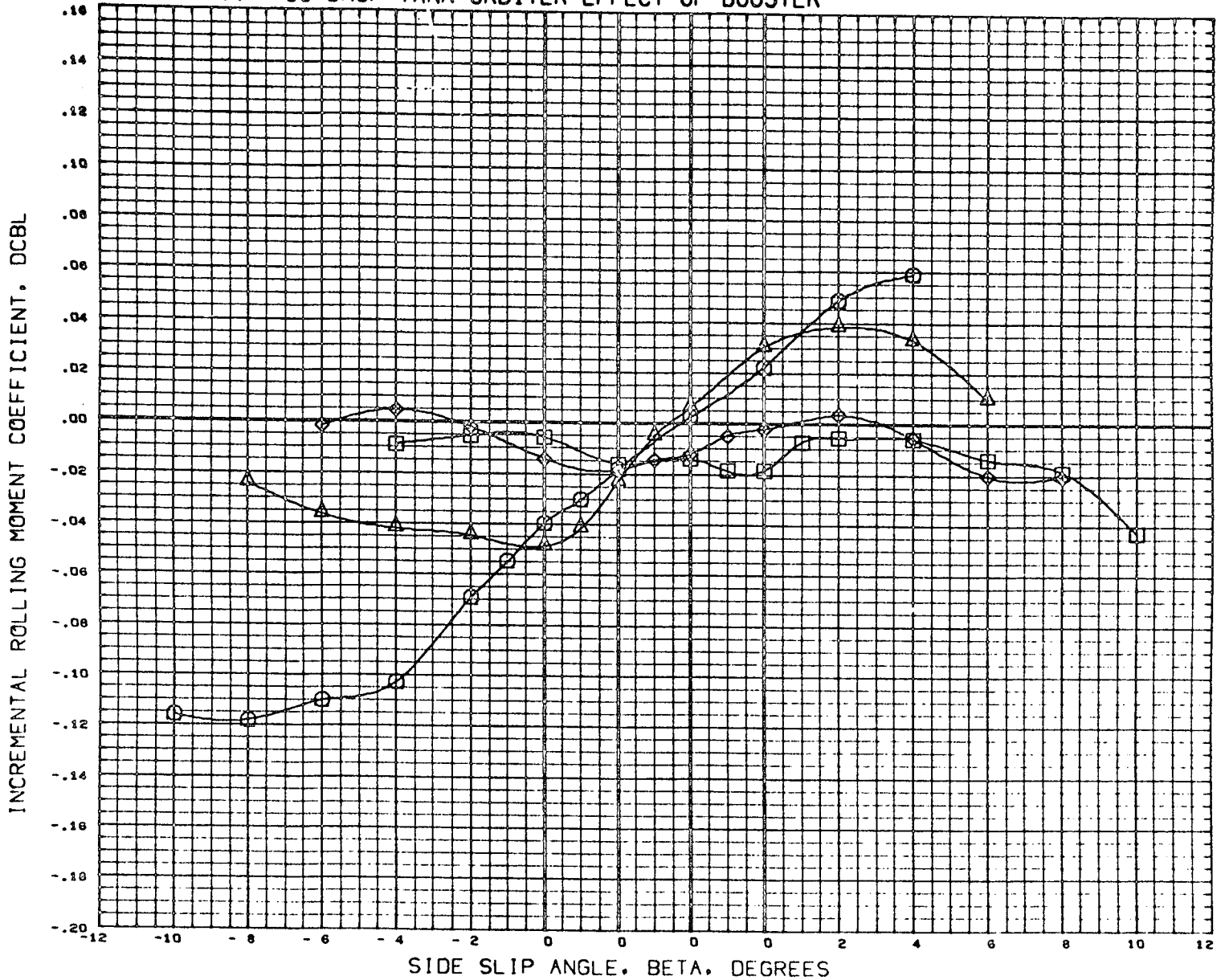


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	0.600	0.000	
△	0.900	0.000	
◇	1.000	0.000	
□	1.100	0.000	

DATA HIST. CODE *ACCC1*A*G

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	IN.

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

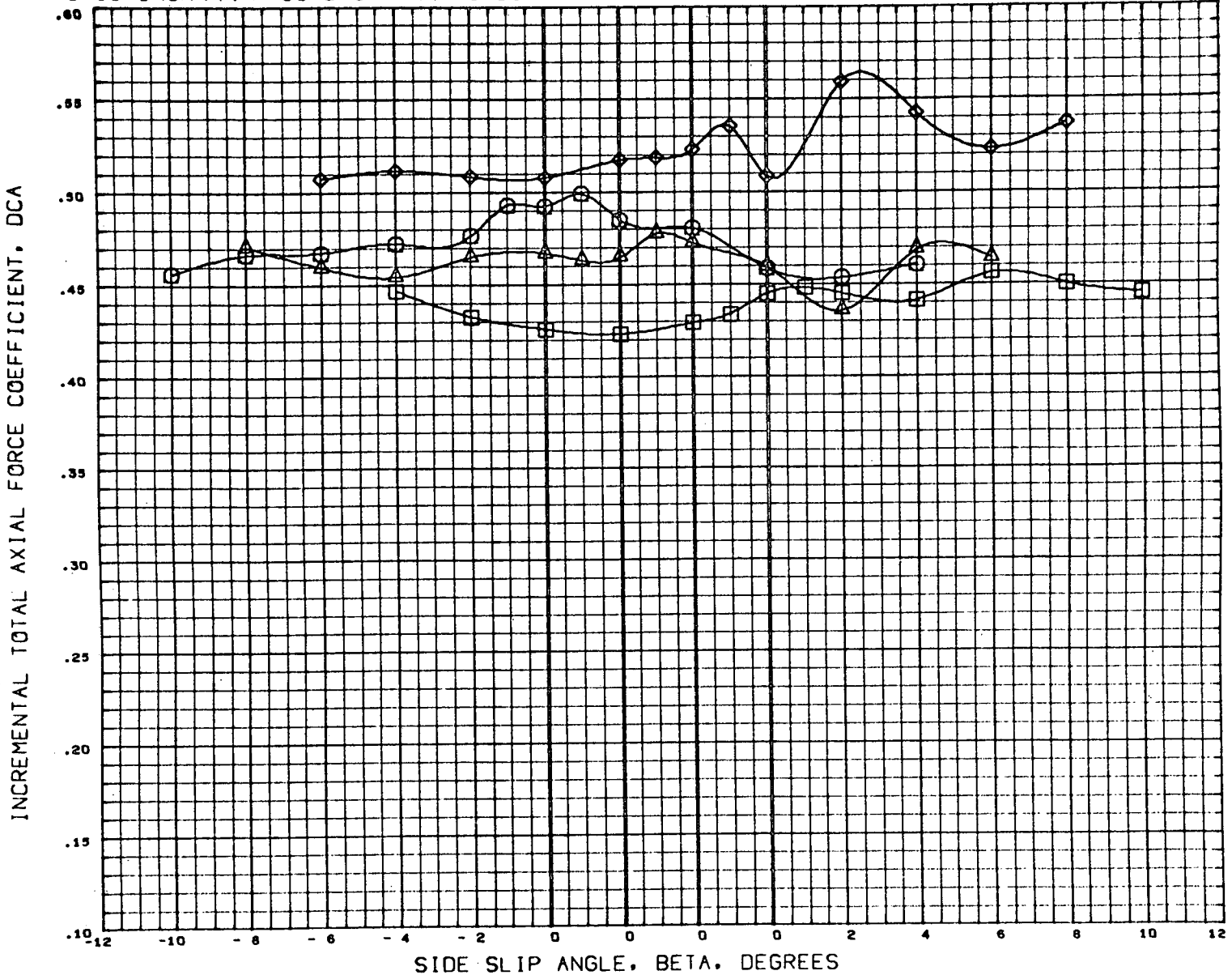


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	1.200		0.000
◇	1.960		
△	3.500		
□	4.960		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI#A*C

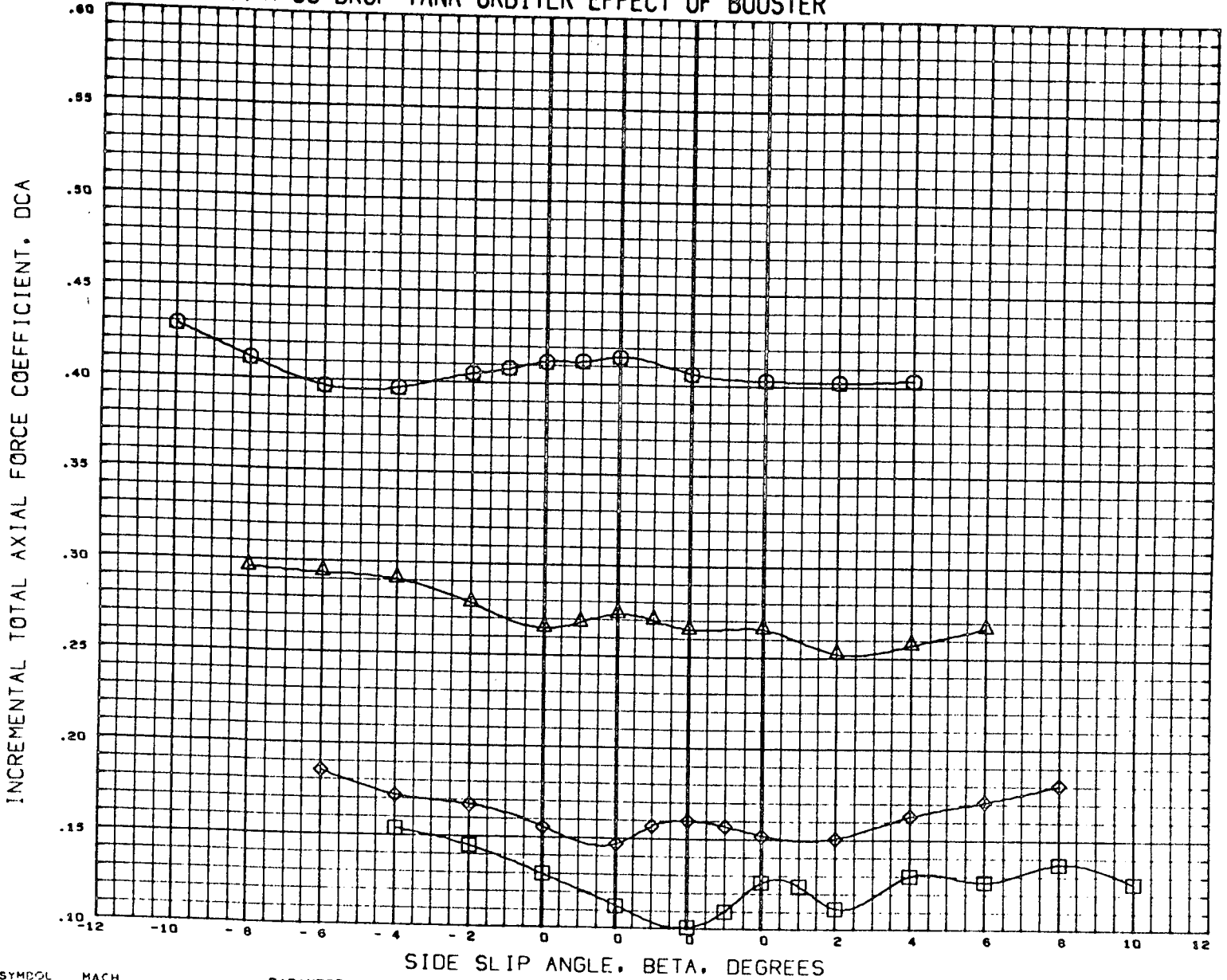
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL ○ ◇ □	MACH	PARAMETRIC VALUES	REFERENCE INFORMATION	
	0.600	ALPHA 0.000	SREF	1.3960 SQ. IN.
	0.900		LREF	1.3330 IN.
	1.000		BREF	1.3330 IN.
	1.100		XMRP	5.3990 IN.
			YMRP	0.0000 IN.
			ZMRP	0.0000 IN.
			SCALE	0.0034

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



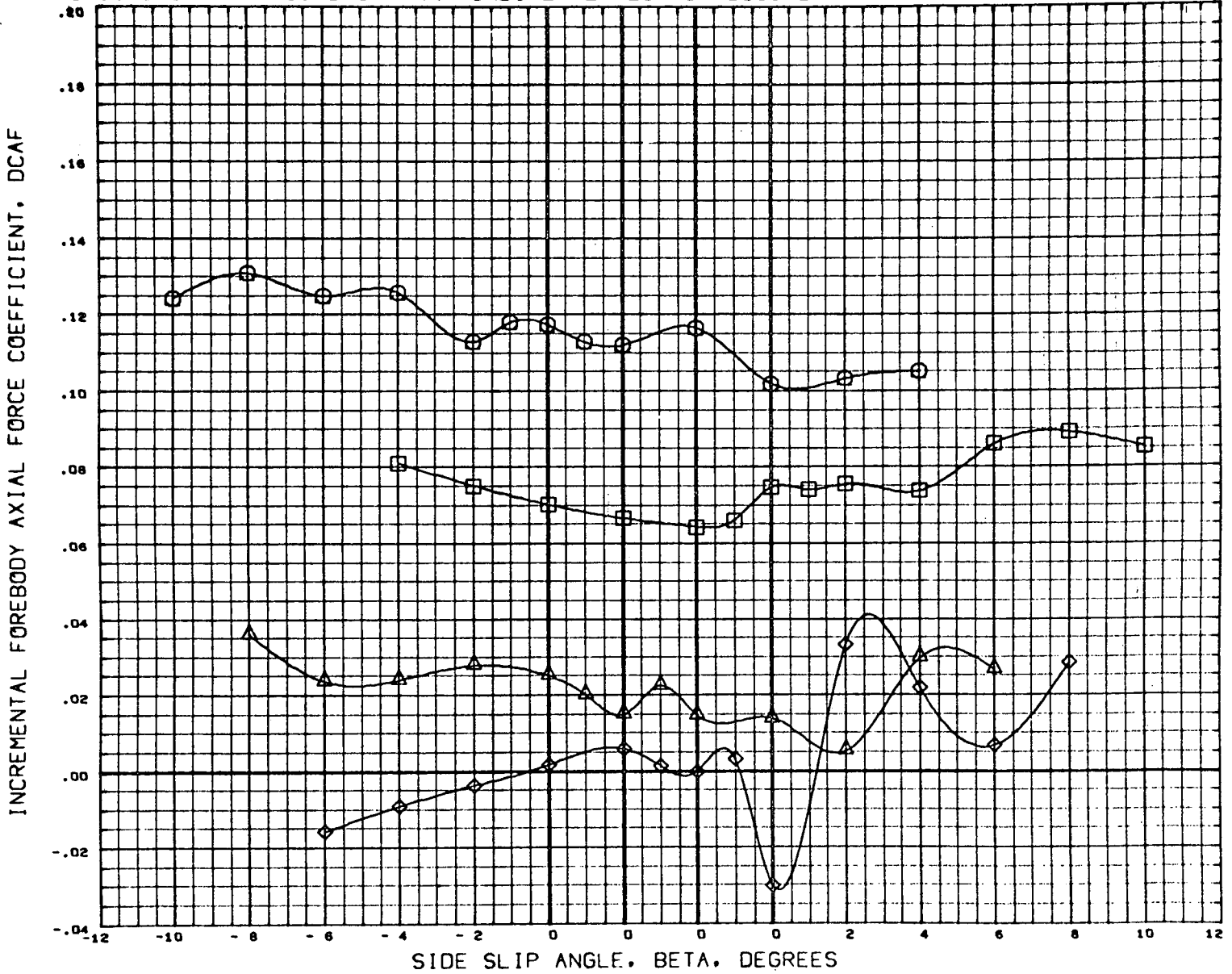
SYMBOL MACH ALPHA PARAMETRIC VALUES
 ○ 1.200
 △ 1.960
 ◇ 3.900
 □ 4.960

DATA HIST. CODE *ACCC1*A*C

REFERENCE INFORMATION

SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

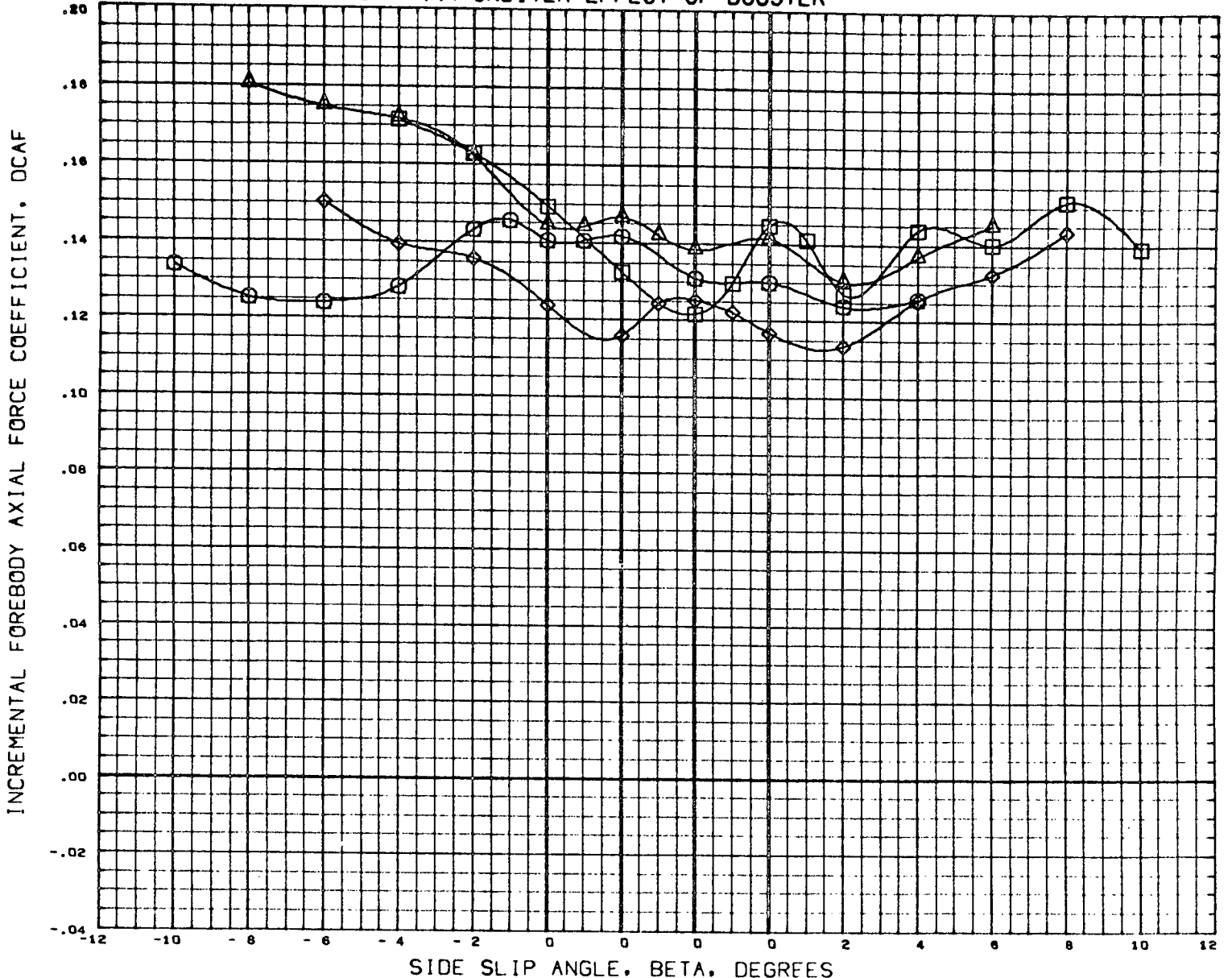


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES
○	0.600		0.000
◇	0.900		
◇	1.000		
□	1.100		

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI#A#C

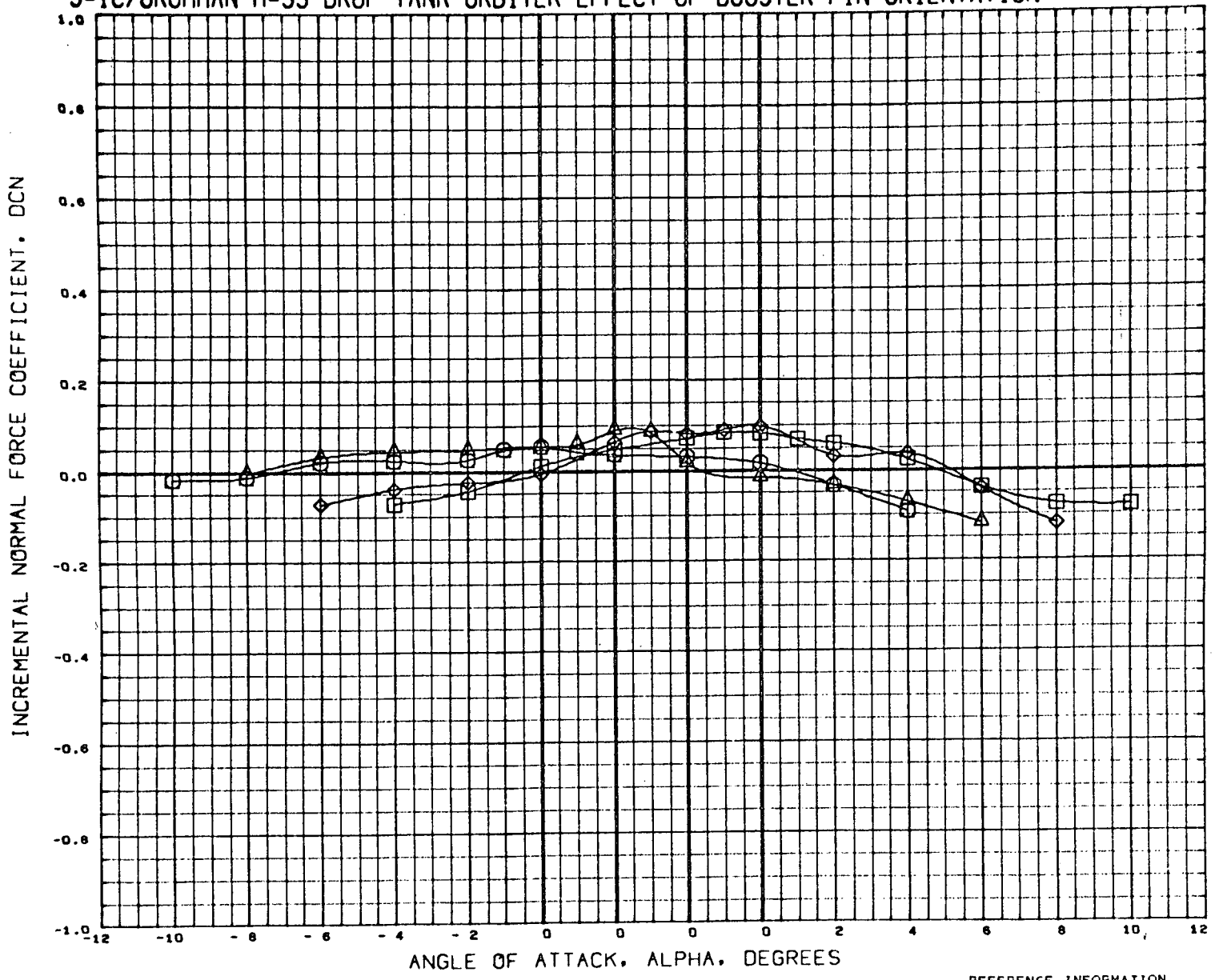
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	REFERENCE INFORMATION
○	1.200		0.000	SREF 1.3960 50. IN.
△	1.960			LREF 1.3330 IN.
◇	3.500			BREF 1.3330 IN.
□	4.960			XMRP 5.3990 IN.
				YMRP 0.0000 IN.
				ZMRP 0.0000 IN.
				SCALE 0.0034

DATA HIST. CODE *ACCCT#A#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

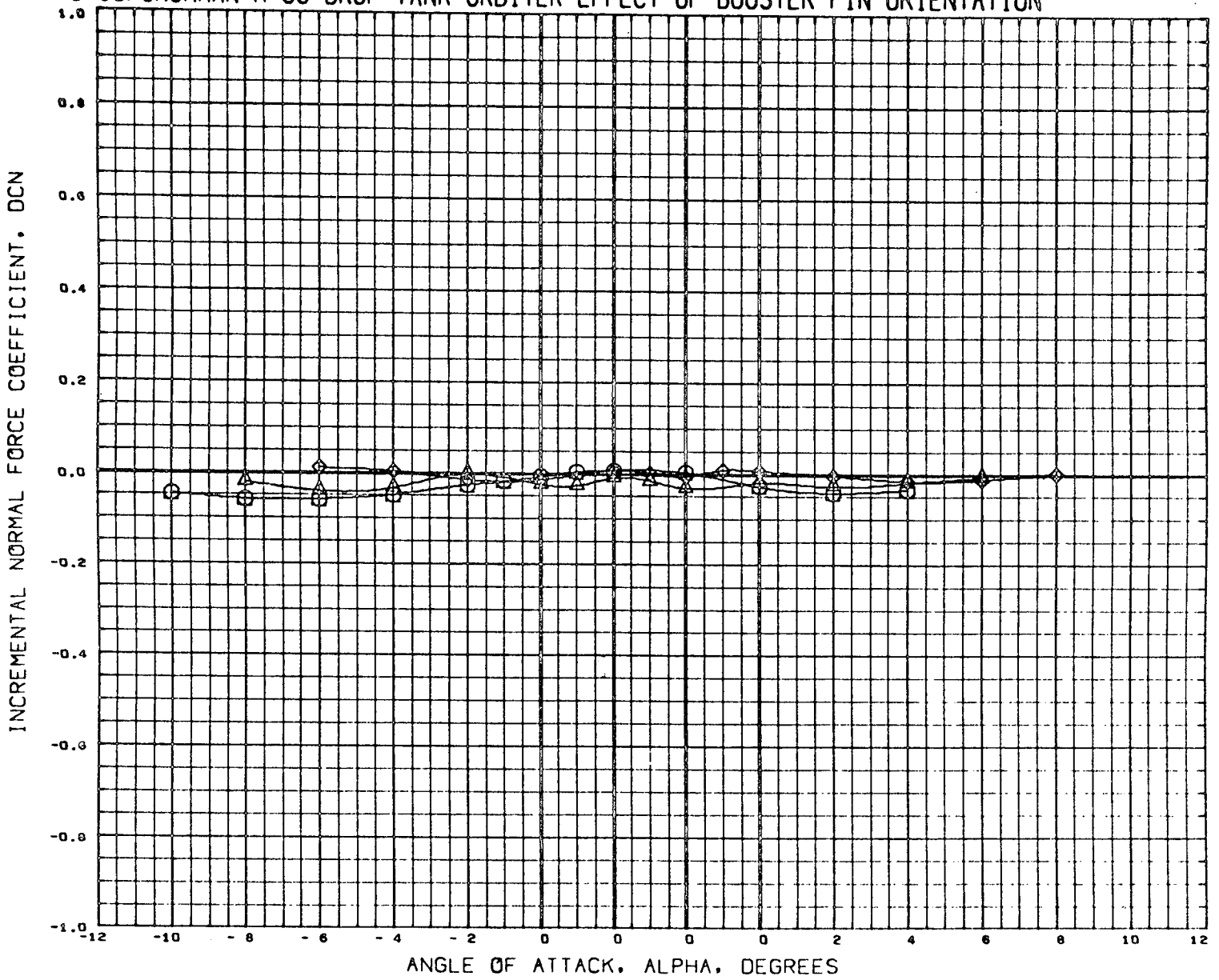


SYMBOL	MACH	PARAMETRIC VALUES		
		BETA	PHI	
○	0.600	0.000	0.000	
◇	0.900			
△	1.000			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	5.3990	in.
YMRP	0.0000	in.
ZMRP	0.0000	in.
SCALE	0.0034	

DATA HIST. CODE CCC1*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

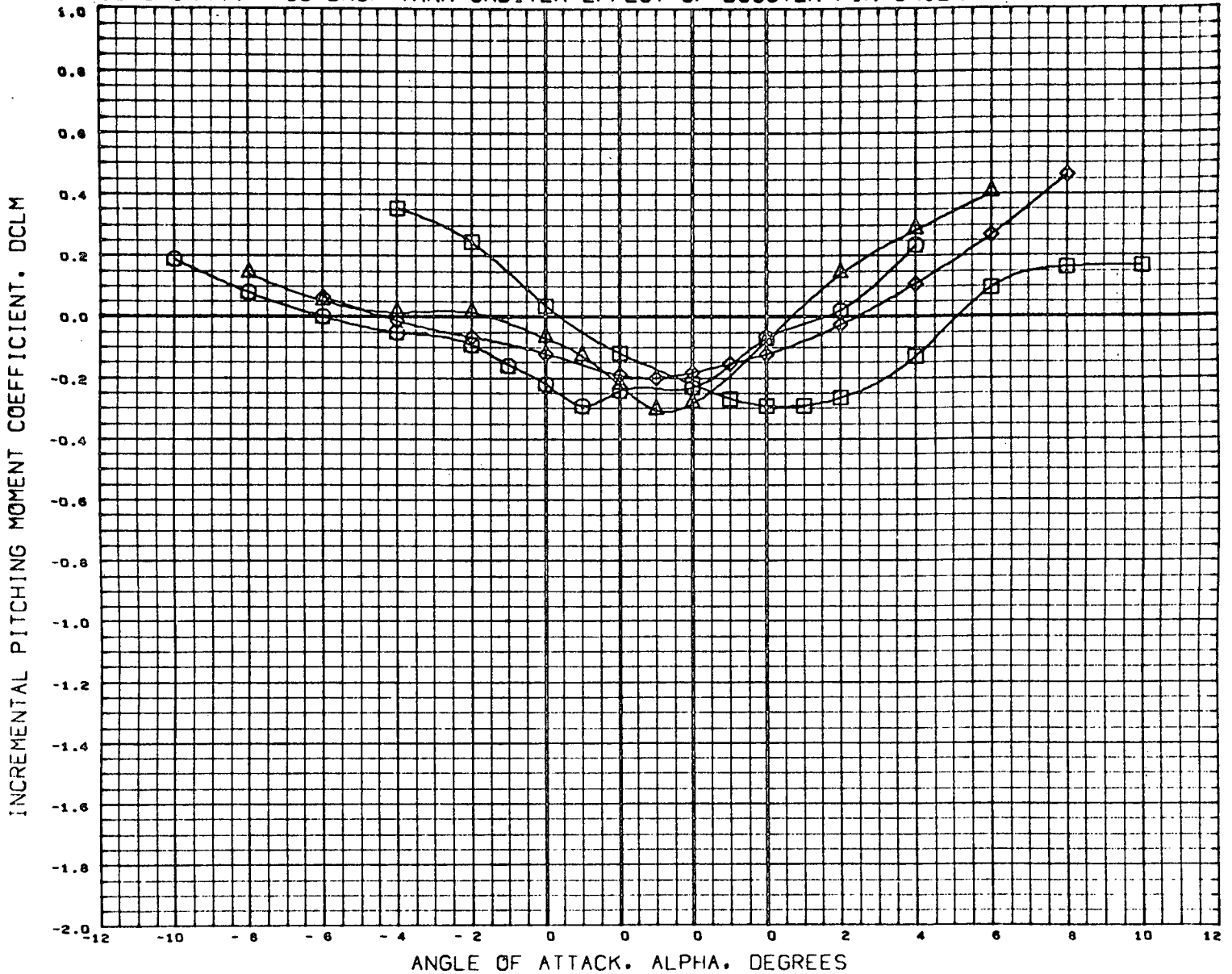


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.300				
◇	4.960				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI9A4C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

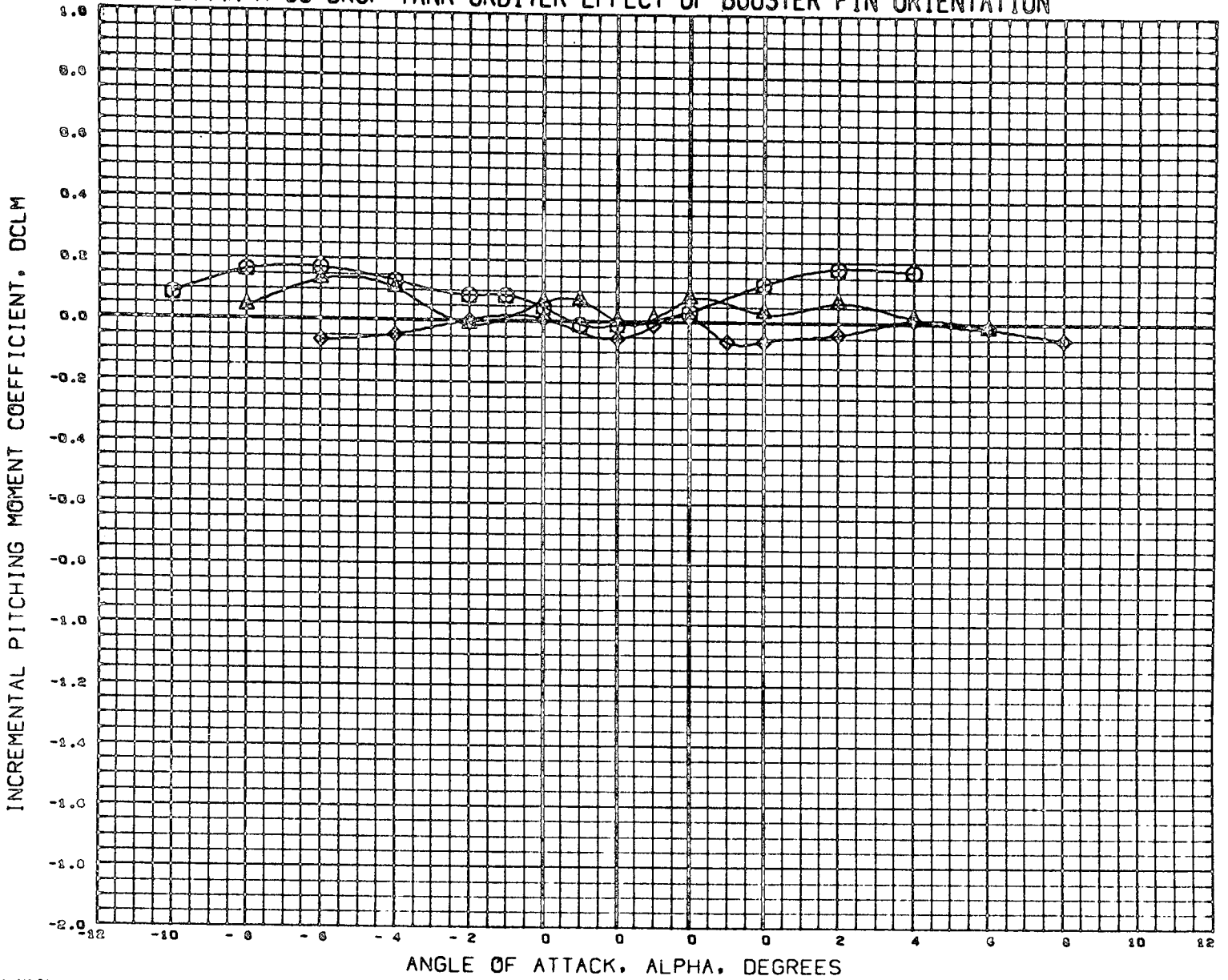


SYMBOL	MACH	BETA	PARAMETRIC VALUES	
○	0.600		0.000	PHI 0.000
△	0.900			
◇	1.000			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC19A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

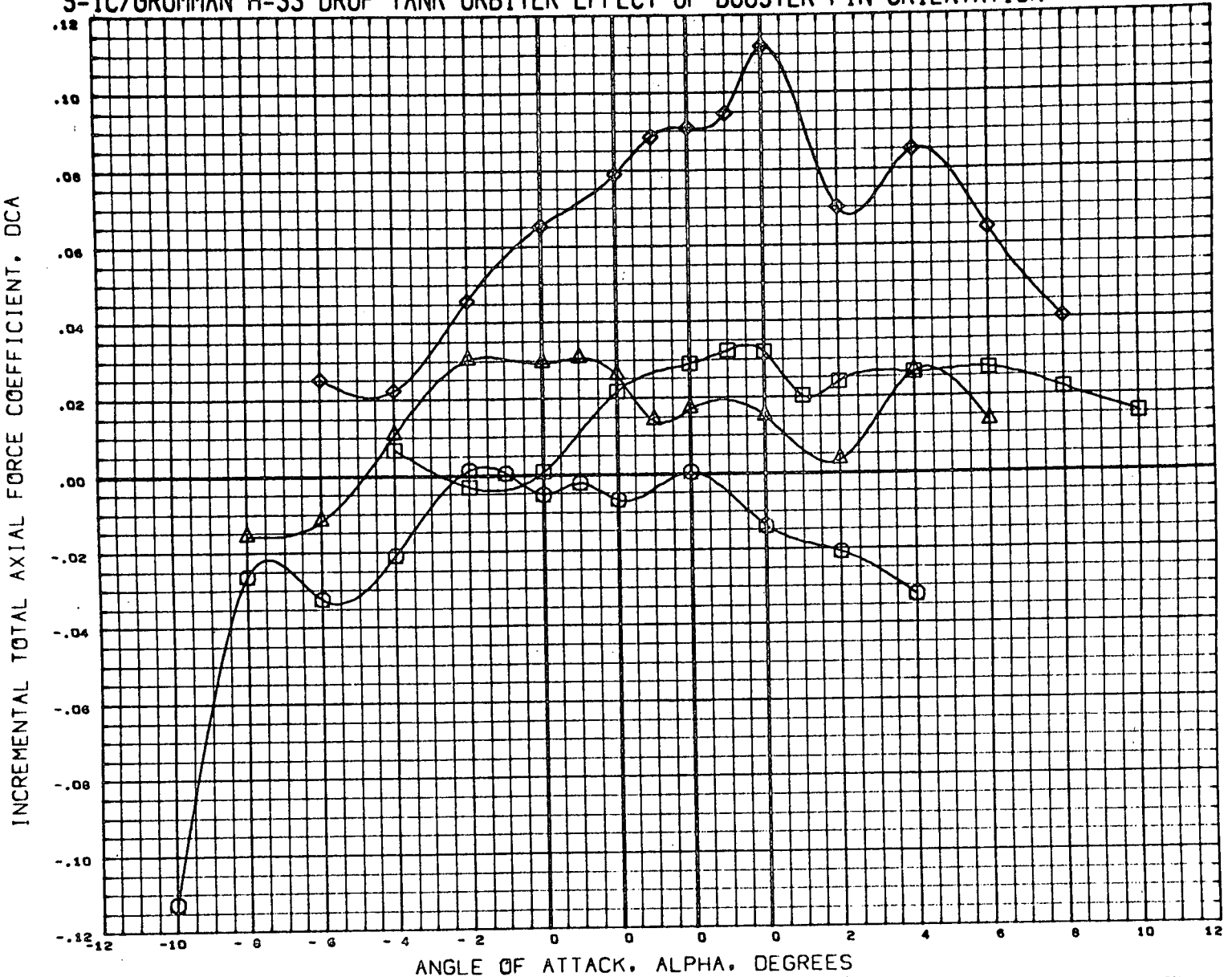


SYMBOL	MACH	BETA	PARAMETRIC VALUES	
			0.000	PHI 0.000
○	1.960			
△	3.900			
◇	4.000			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC1#A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

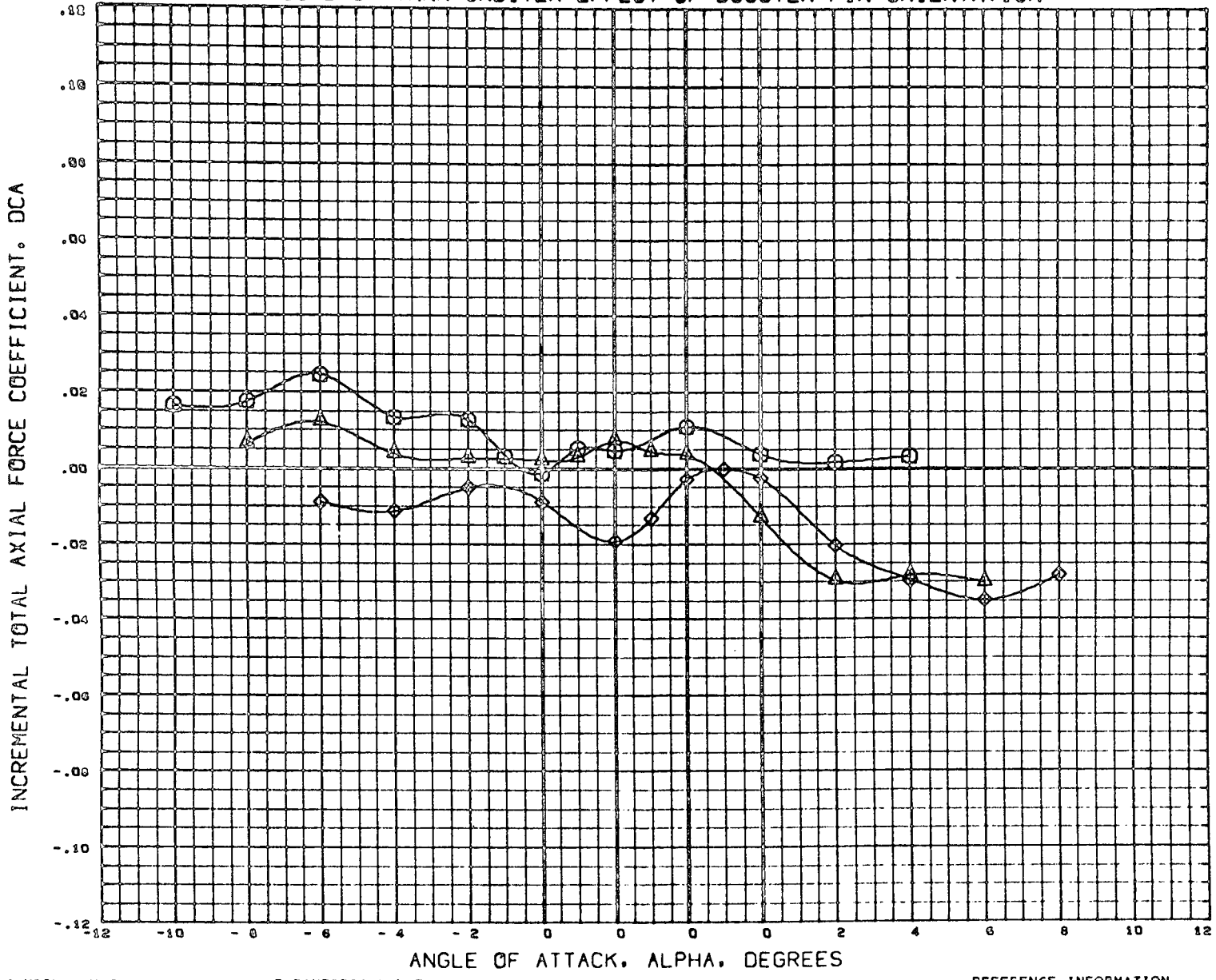


SYMBOL	MACH	BETA	PARAMETRIC VALUES	
○	0.600		0.000	PHI 0.000
△	0.900			
◇	1.000			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XM RP	5.3990	IN.
YM RP	0.0000	IN.
ZM RP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*A#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



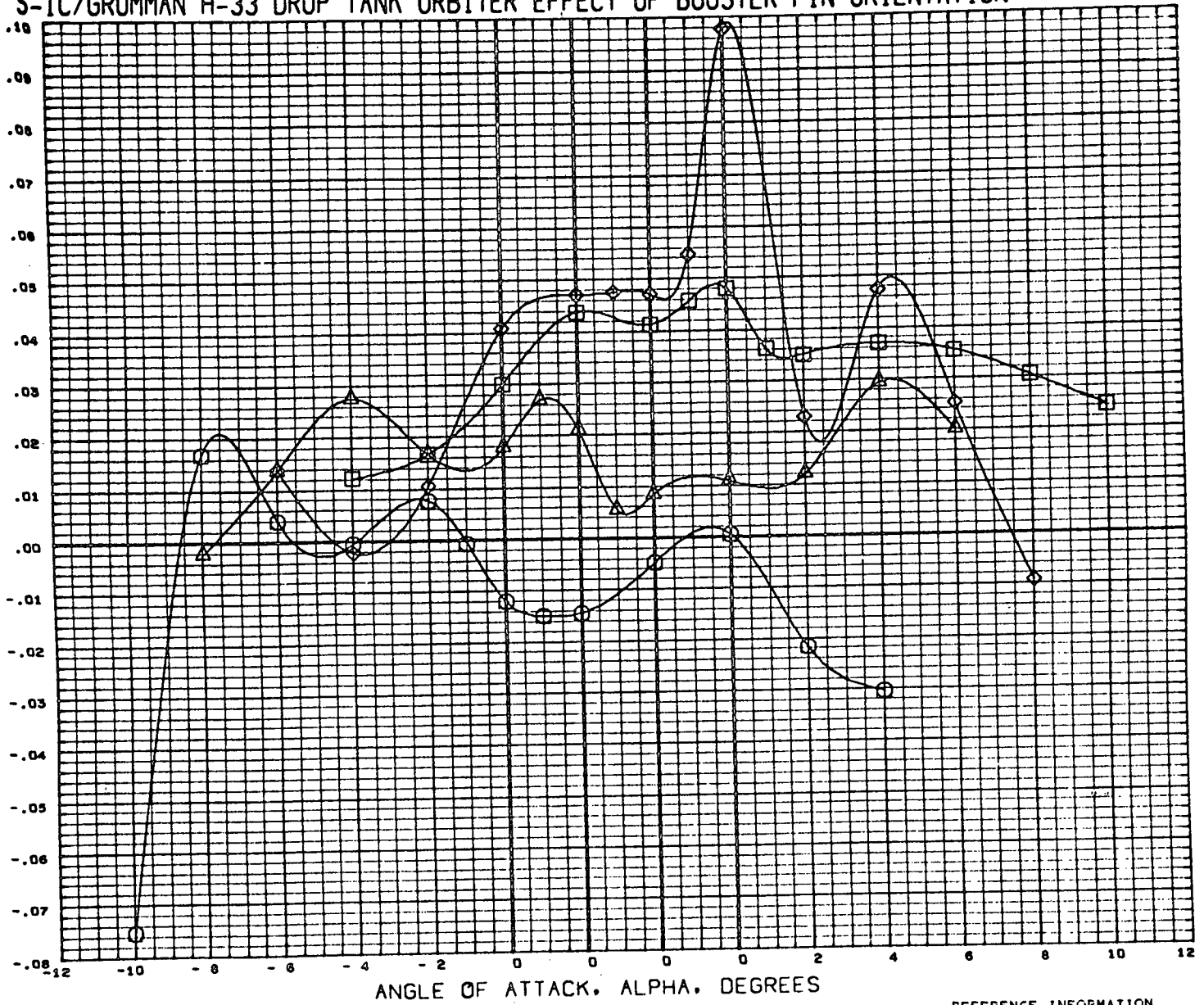
SYMBOL	MACH	BETA	PARAMETRIC VALUES	
○	1.960		0.000	PHI 0.000
△	3.900			
◇	4.900			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI#A#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, DCAF

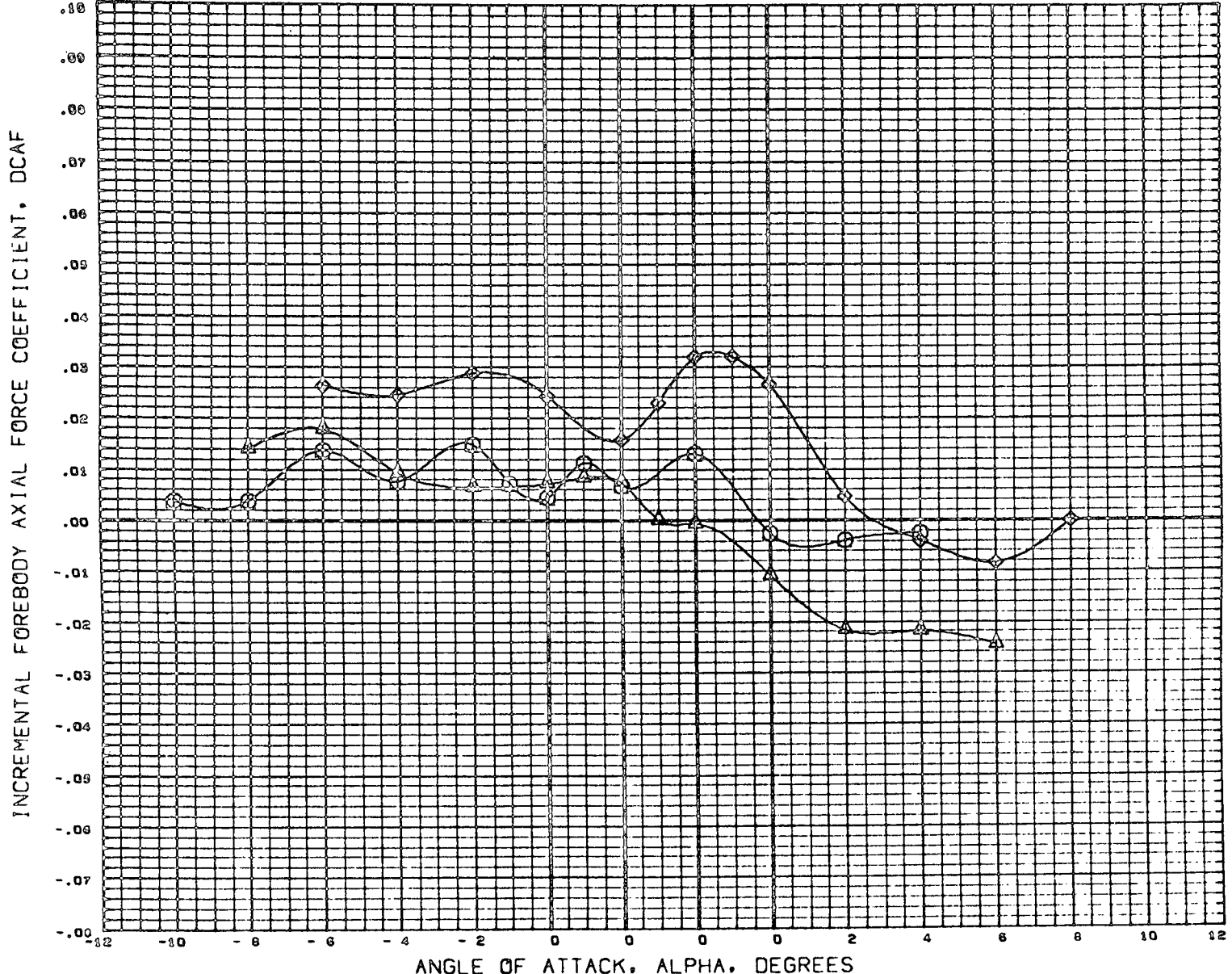


SYMBOL	MACH	PARAMETRIC VALUES	
		BETA	PHI
○	0.600	0.000	0.000
△	0.900		
◇	1.000		
□	1.200		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI+4+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

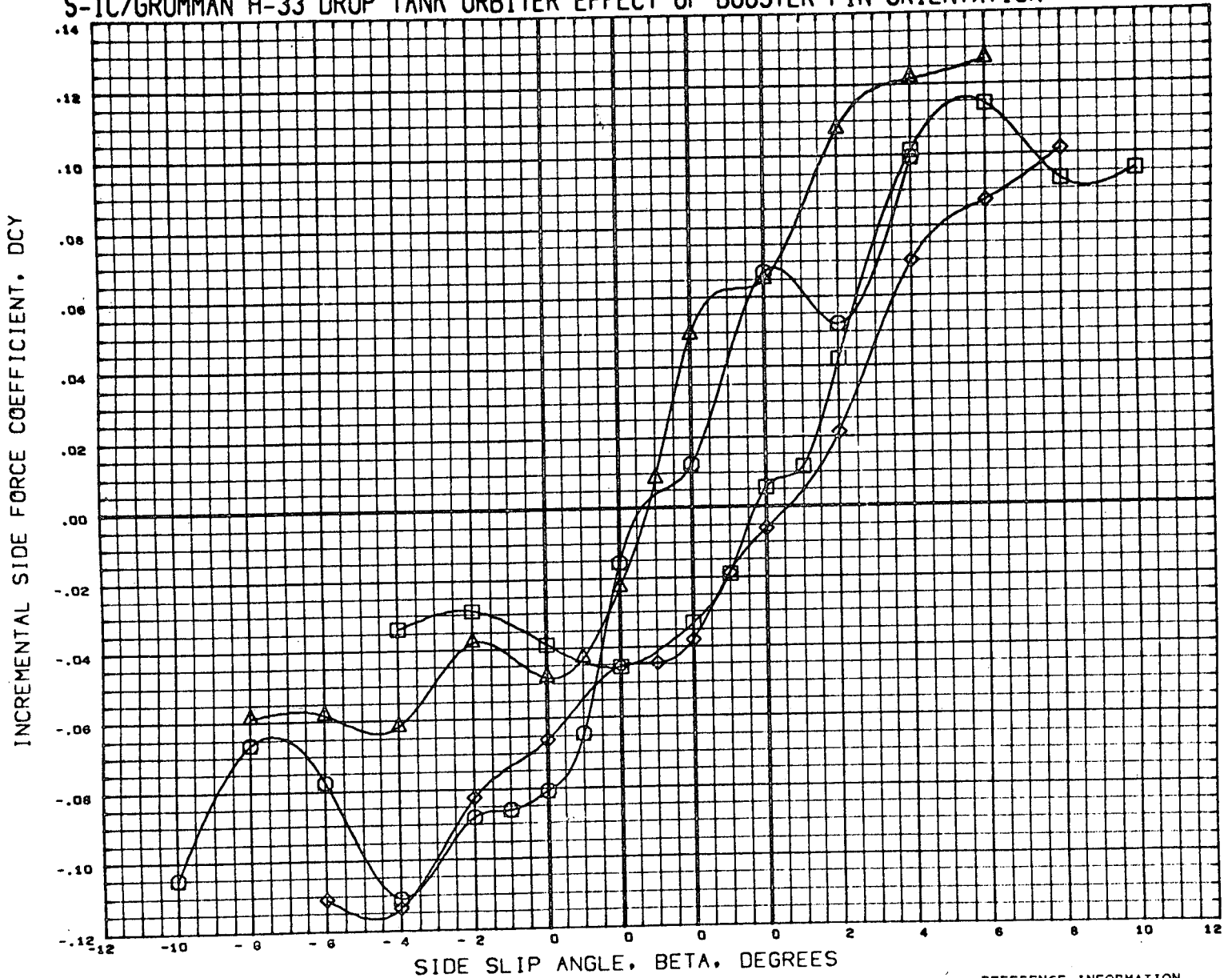


SYMBOL MACH PARAMETRIC VALUES
 ○ 1.960 BETA 0.000 PHI 0.000
 △ 3.500
 ◇ 4.980

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCC1*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

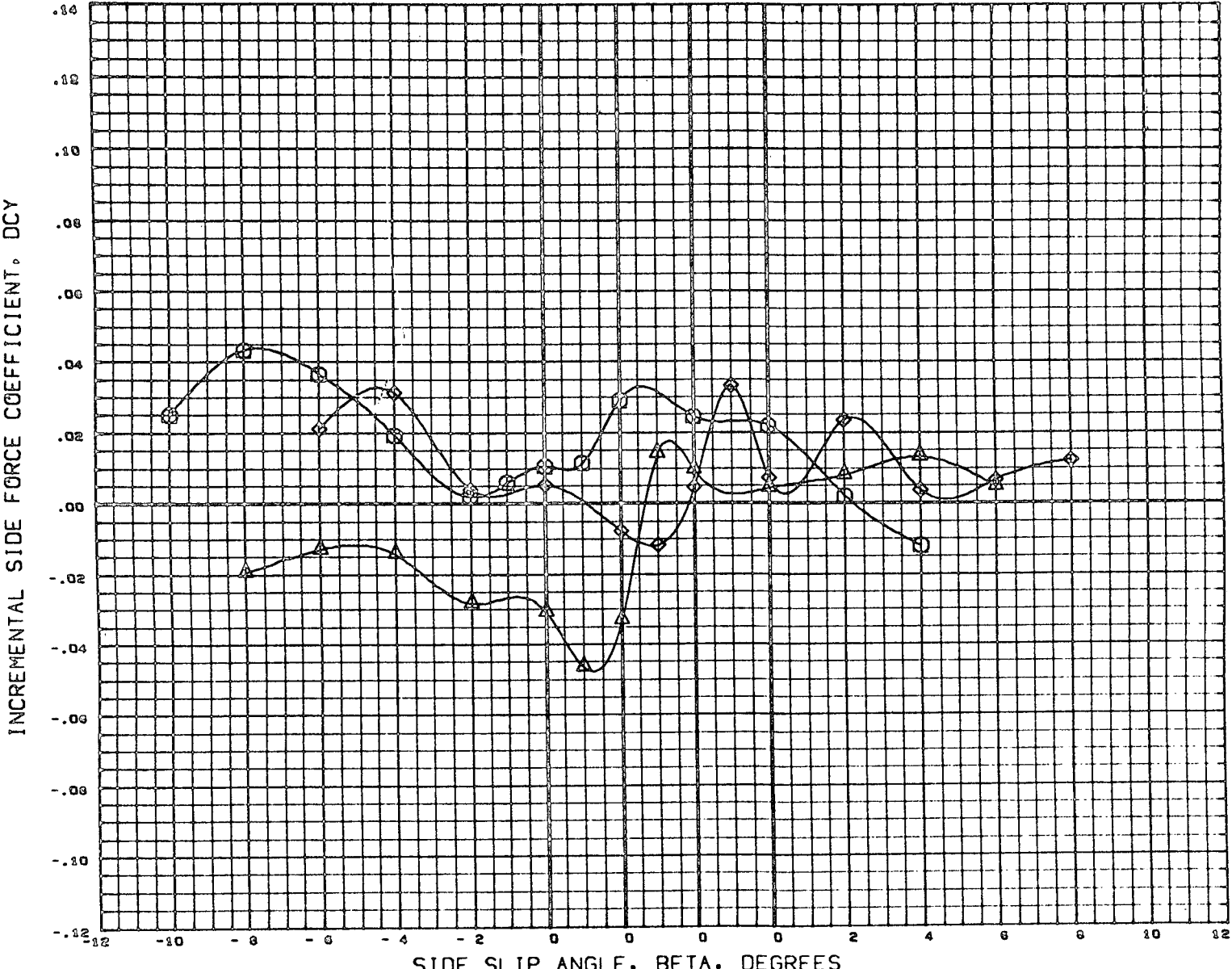


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	PHI	90.000
○	0.600		0.000		
△	0.900				
◇	1.000				
□	1.200				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

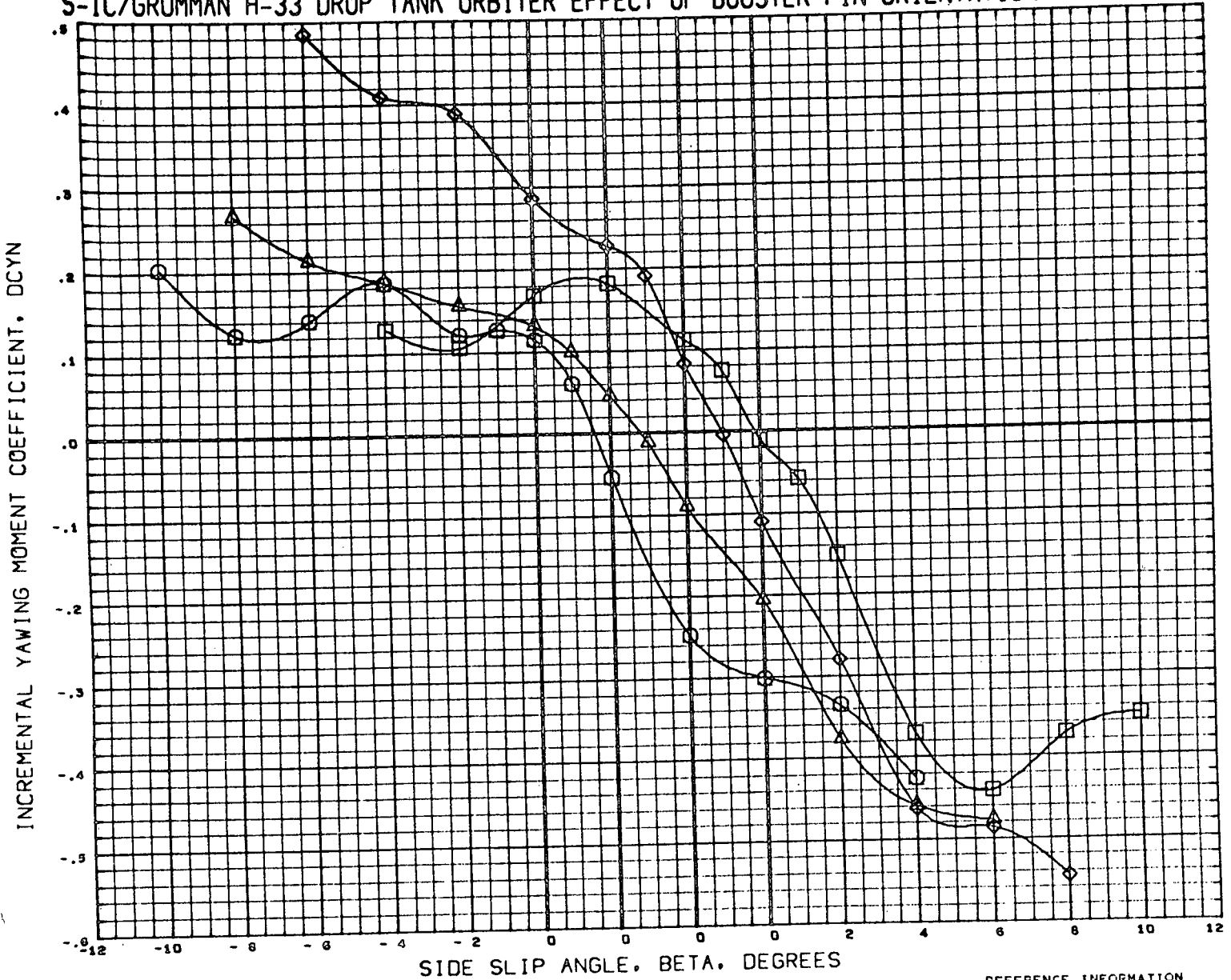


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES		PHI
○	1.960		0.000		90.000
△	3.900				
◇	4.960				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

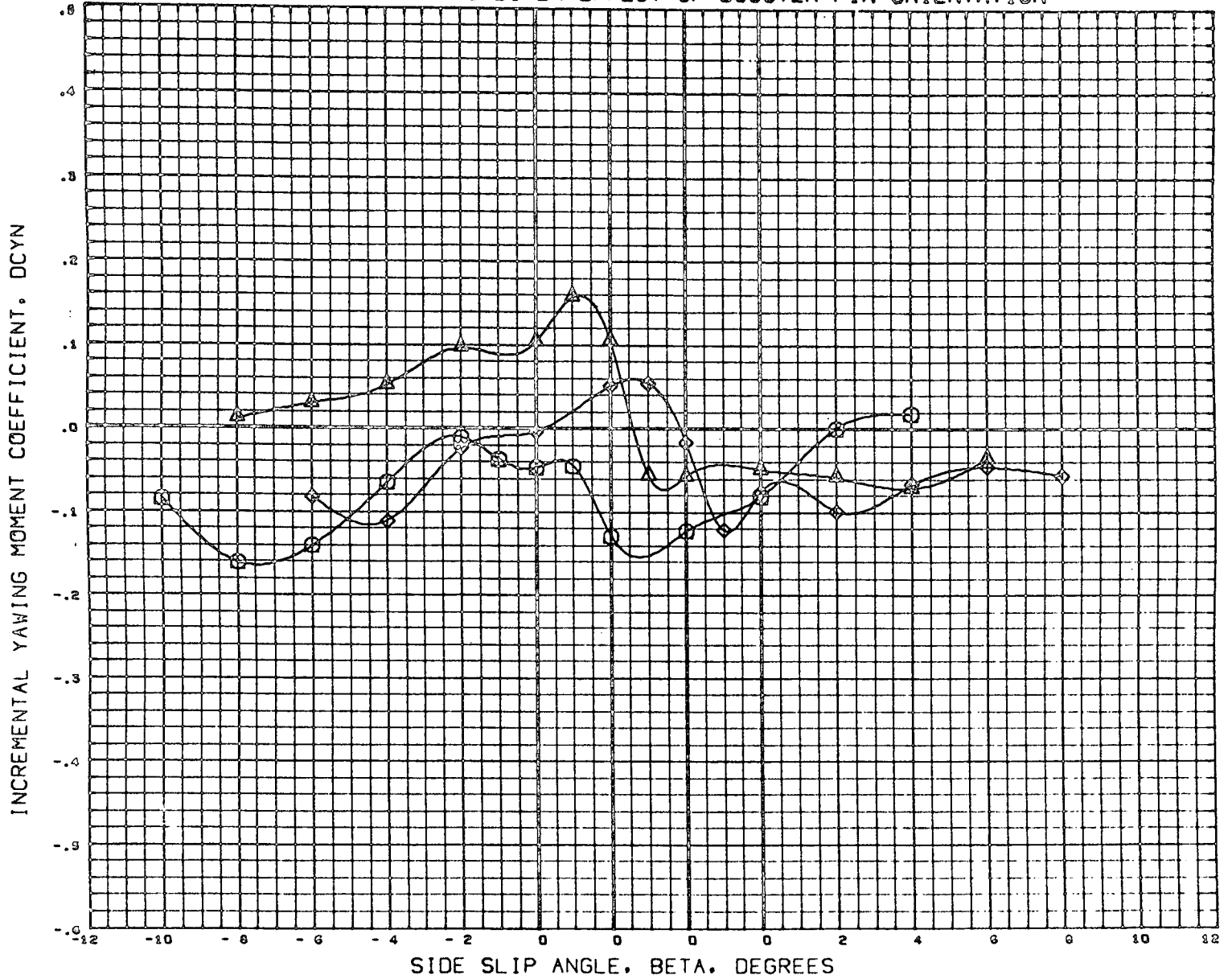


SYMBOL	MACH		PARAMETRIC VALUES	
	0.600	ALPHA	0.000	PHI
○	0.900			90.000
◇	1.000			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

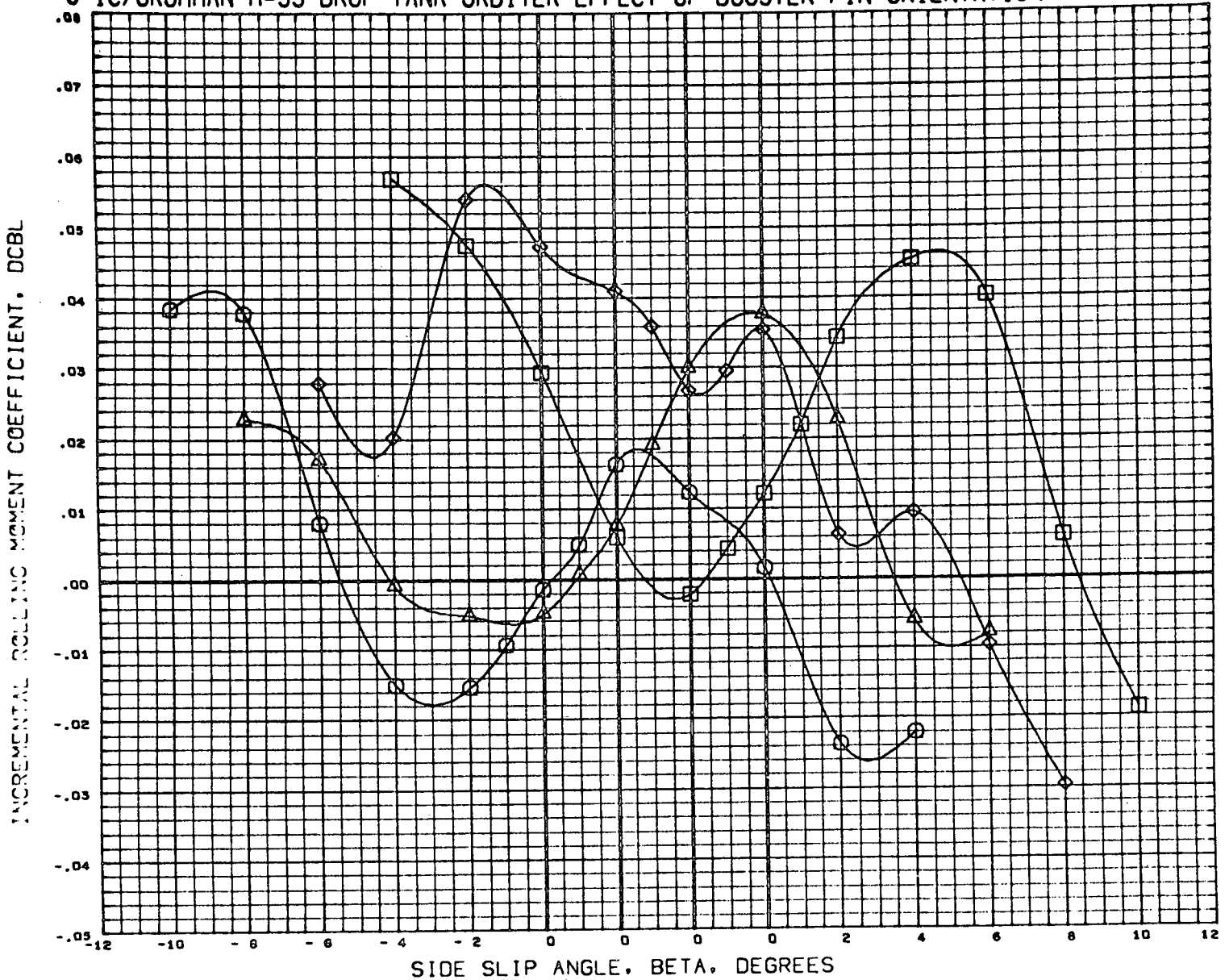


SYMBOL MACH PARAMETRIC VALUES
 ○ 1.960 ALPHA 0.000 PHI 90.000
 △ 3.900
 ◇ 4.960

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 3.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

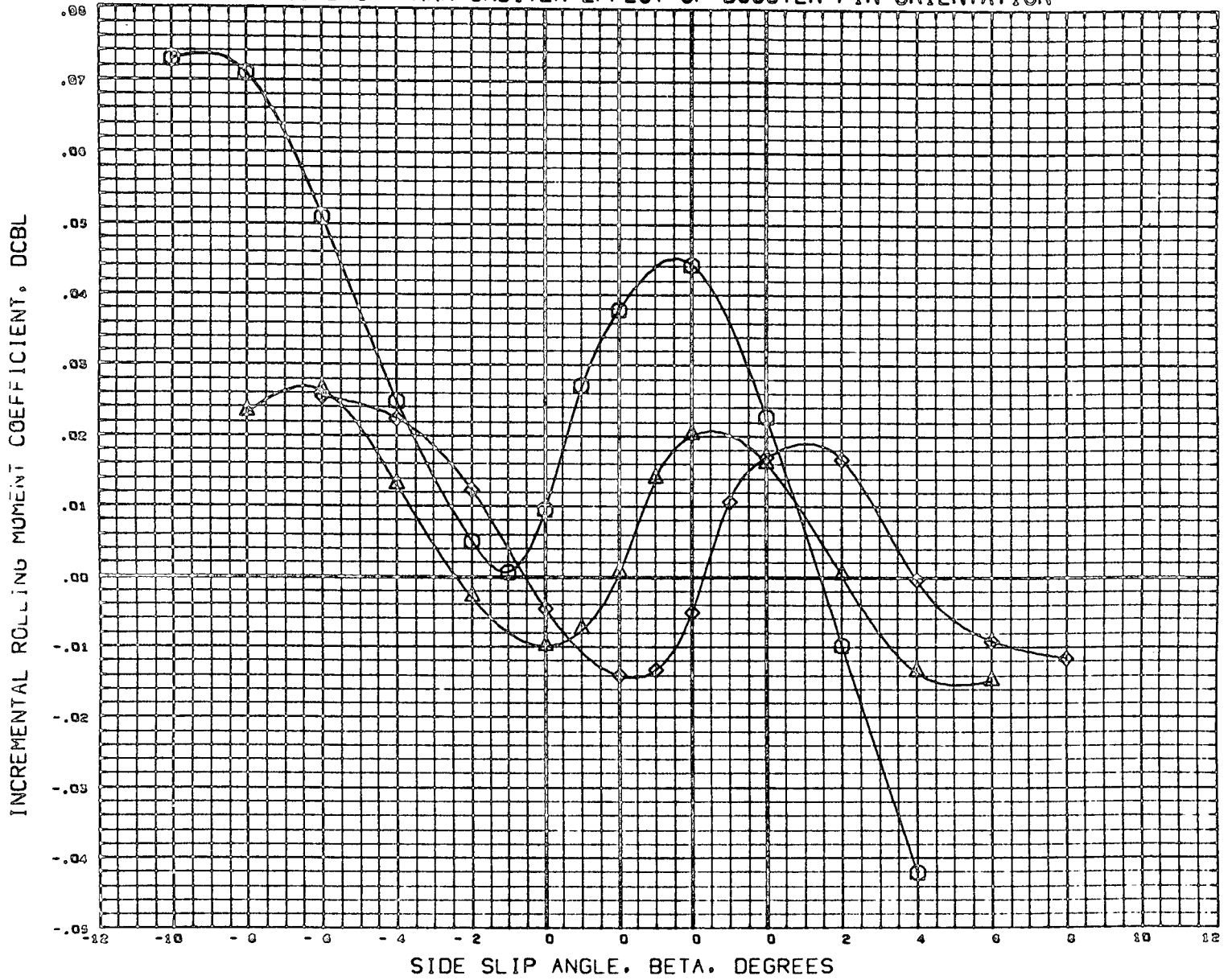


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES		PHI	90.000
○	0.600					
△	0.900					
◇	1.000					
□	1.200					

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI#A9C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

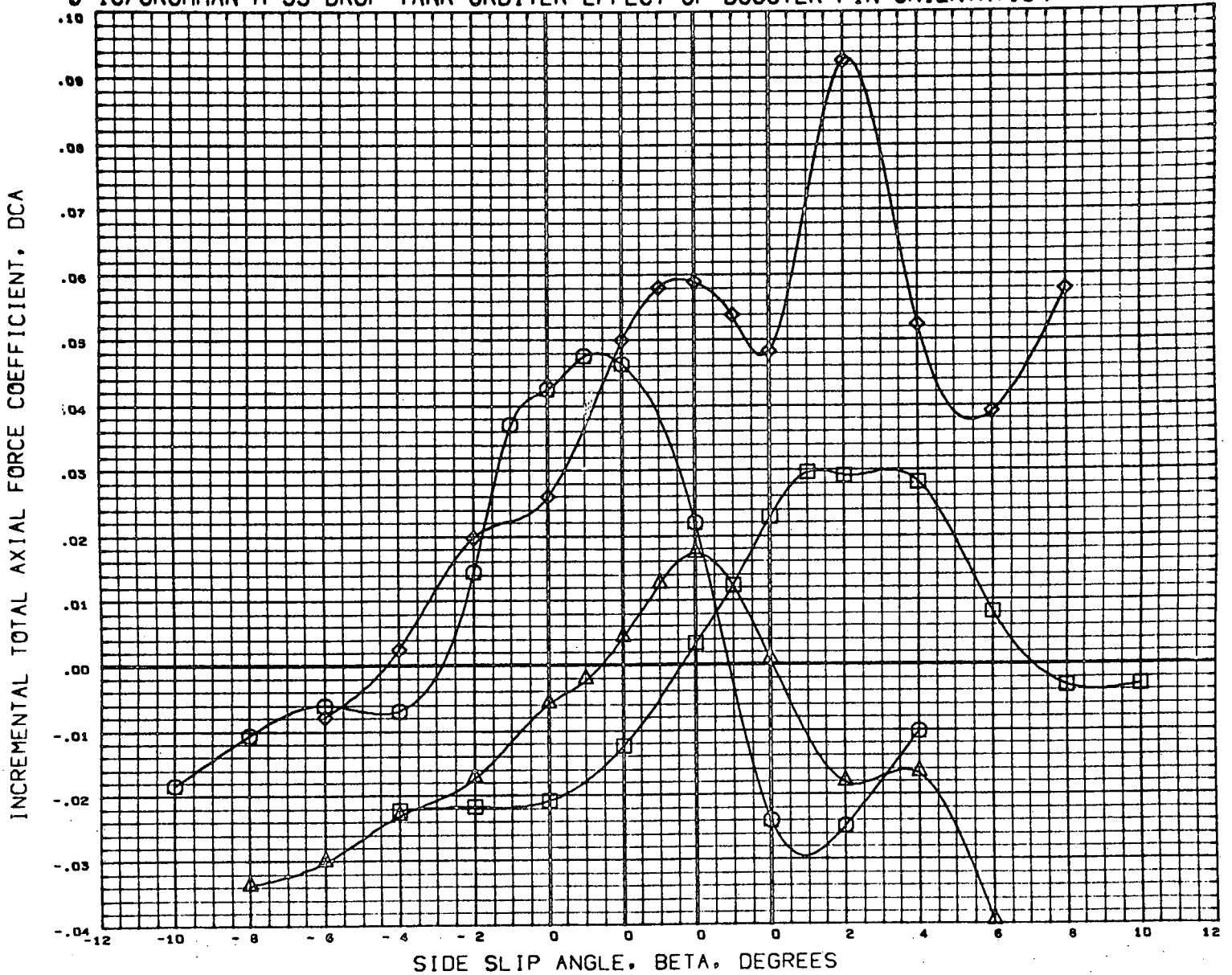


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES		PHI
○	1.960		0.000		90.000
△	3.900				
◇	4.960				

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*#*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

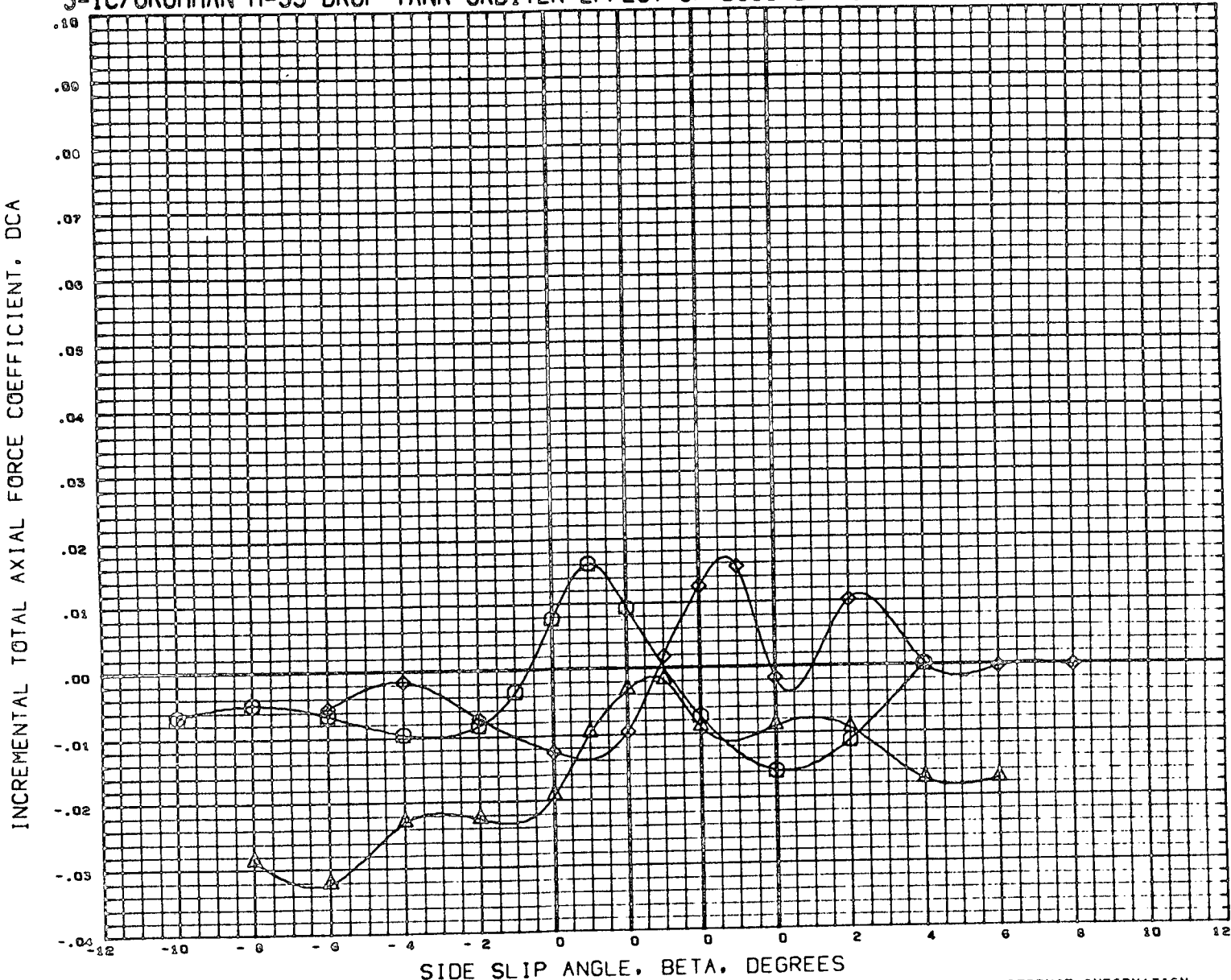


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
○	0.600	0.000	PHI	90.000
◇	0.900			
△	1.000			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



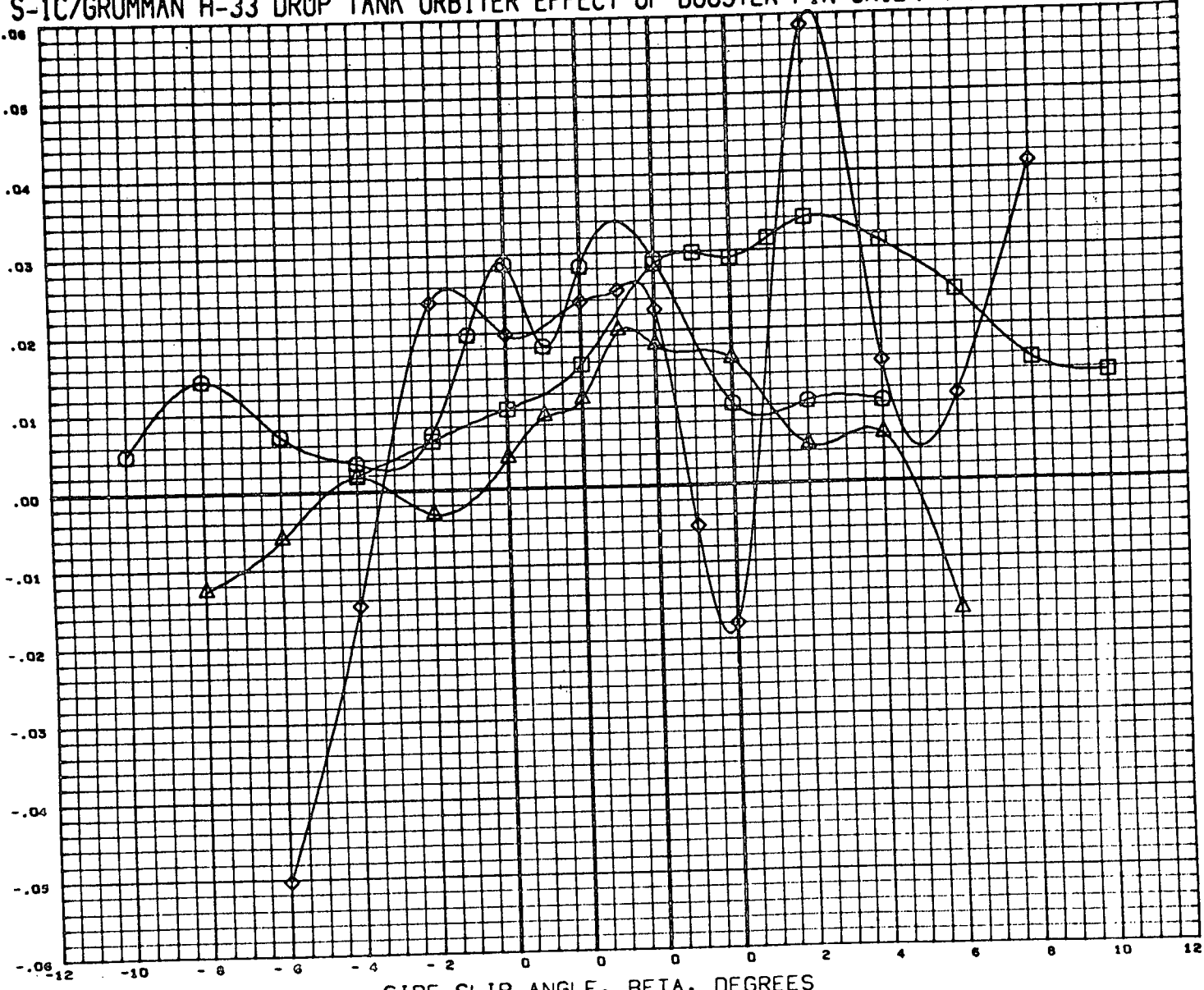
SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
○	3.960	0.000	PHI	90.000
△	3.900			
◇	4.000			

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, DCAF

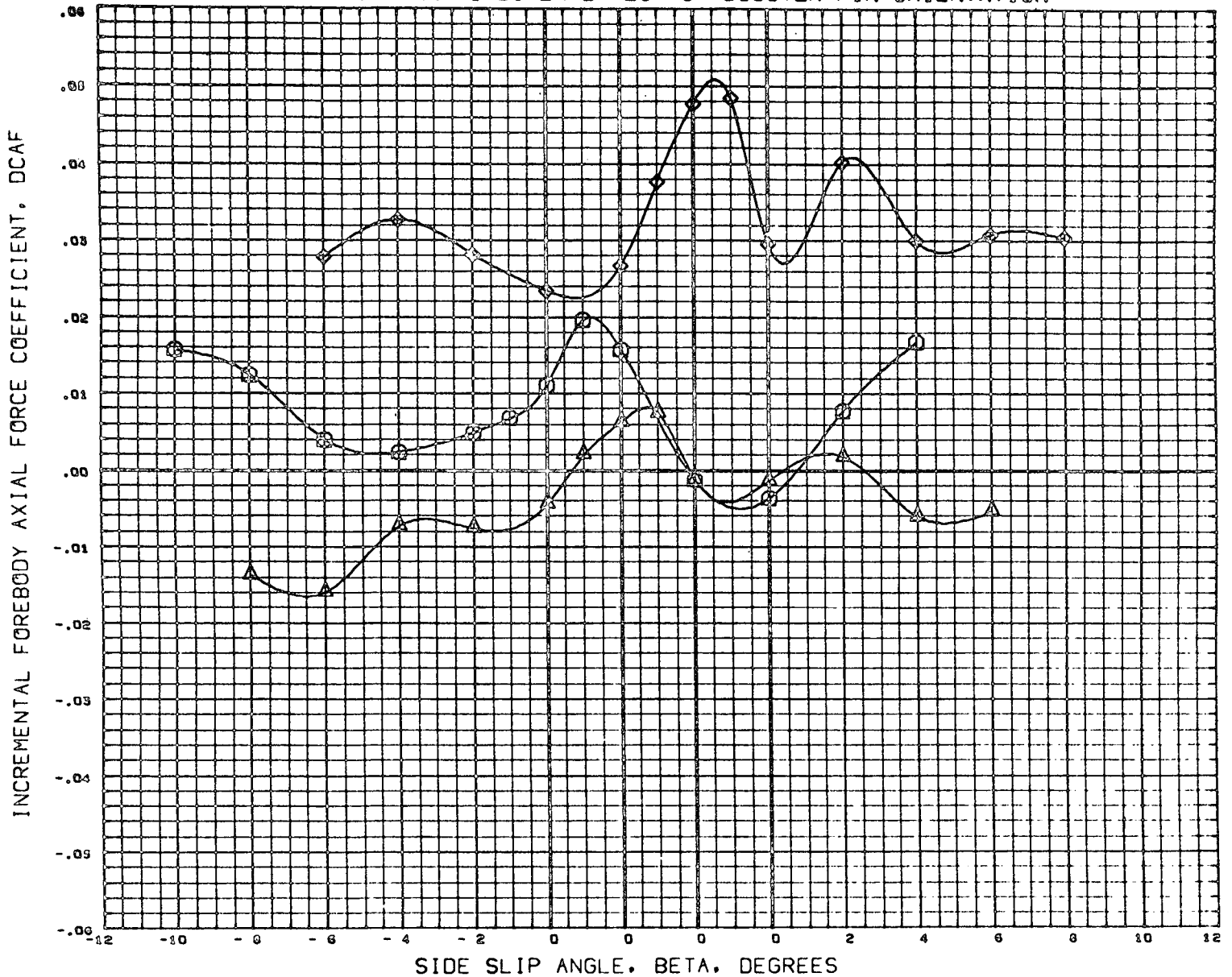


SYMBOL	MACH	PARAMETRIC VALUES	
		ALPHA	PHI
○	0.600	0.000	90.000
△	0.900		
◇	1.000		
□	1.200		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI#A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

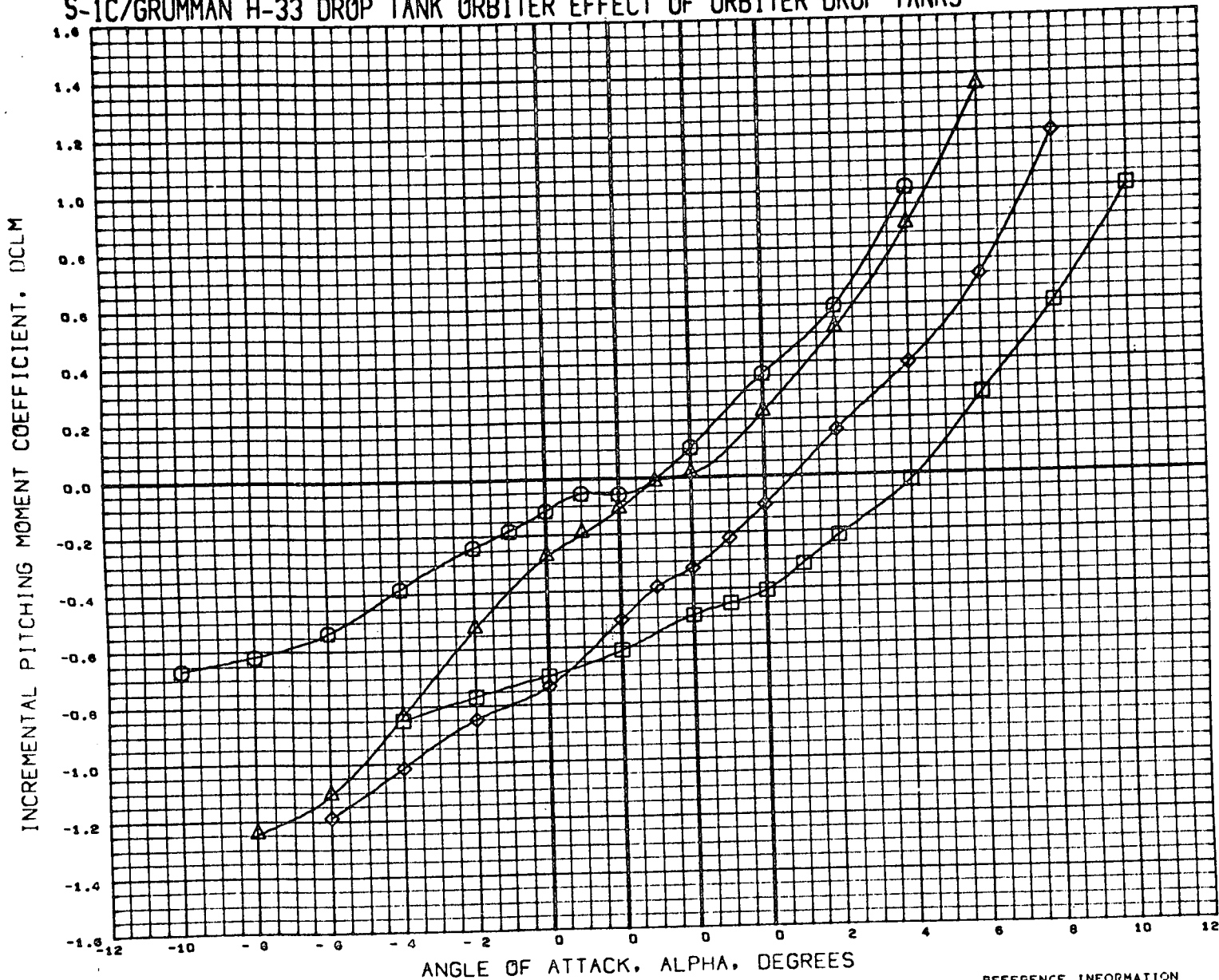


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
○	1.960	0.000	PHI	90.000
△	3.900			
◇	4.960			

REFERENCE INFORMATION		
SREF	1.3960	SO. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

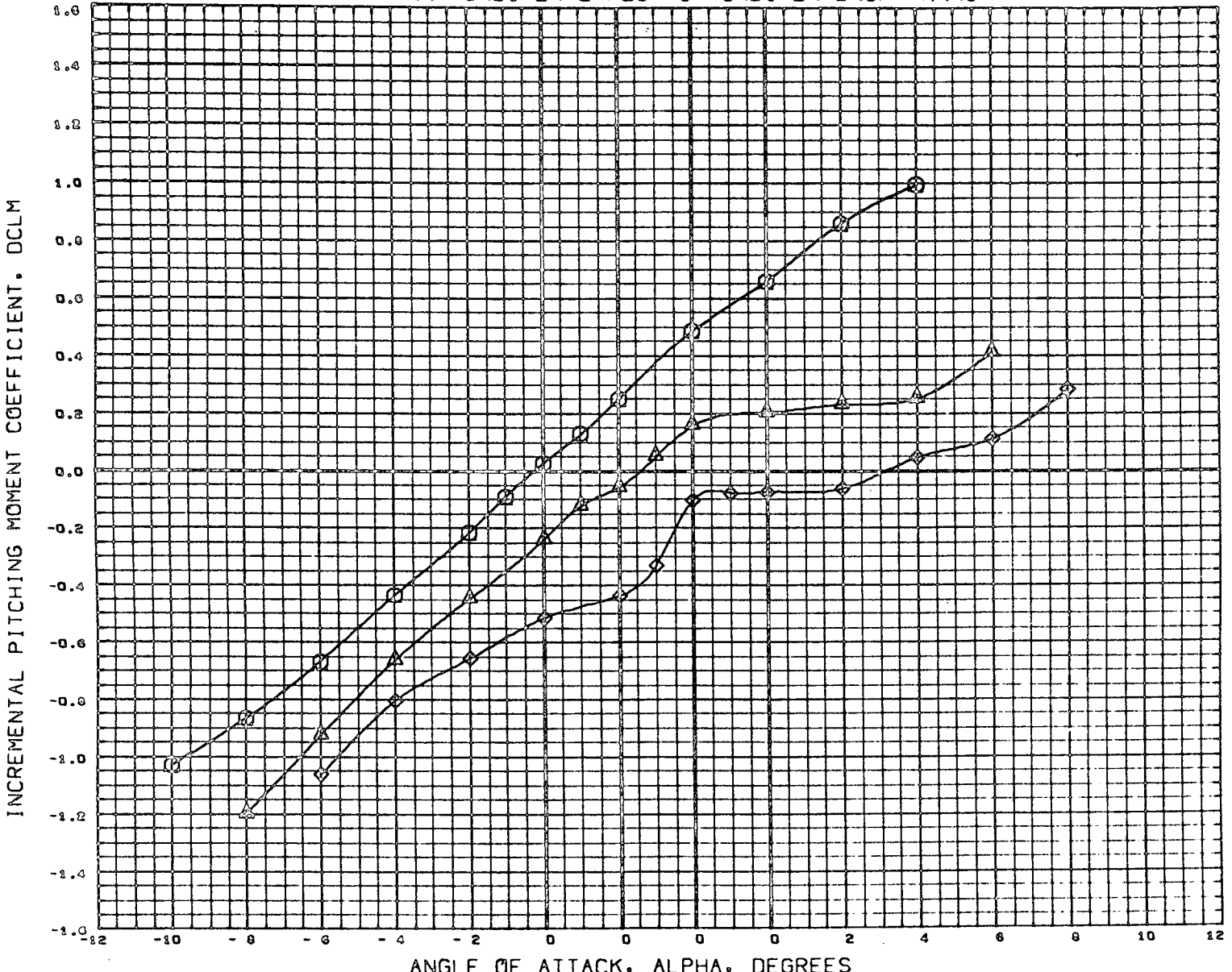


SYMBOL MACH BETA PARAMETRIC VALUES PHI 0.000
 ○ 0.900
 △ 1.000
 ◇ 1.100
 □ 1.200

REFERENCE INFORMATION
 SREF 1.3960 90. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRF 5.3990 IN.
 YMRF 0.0000
 ZMRF 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCI*A%C

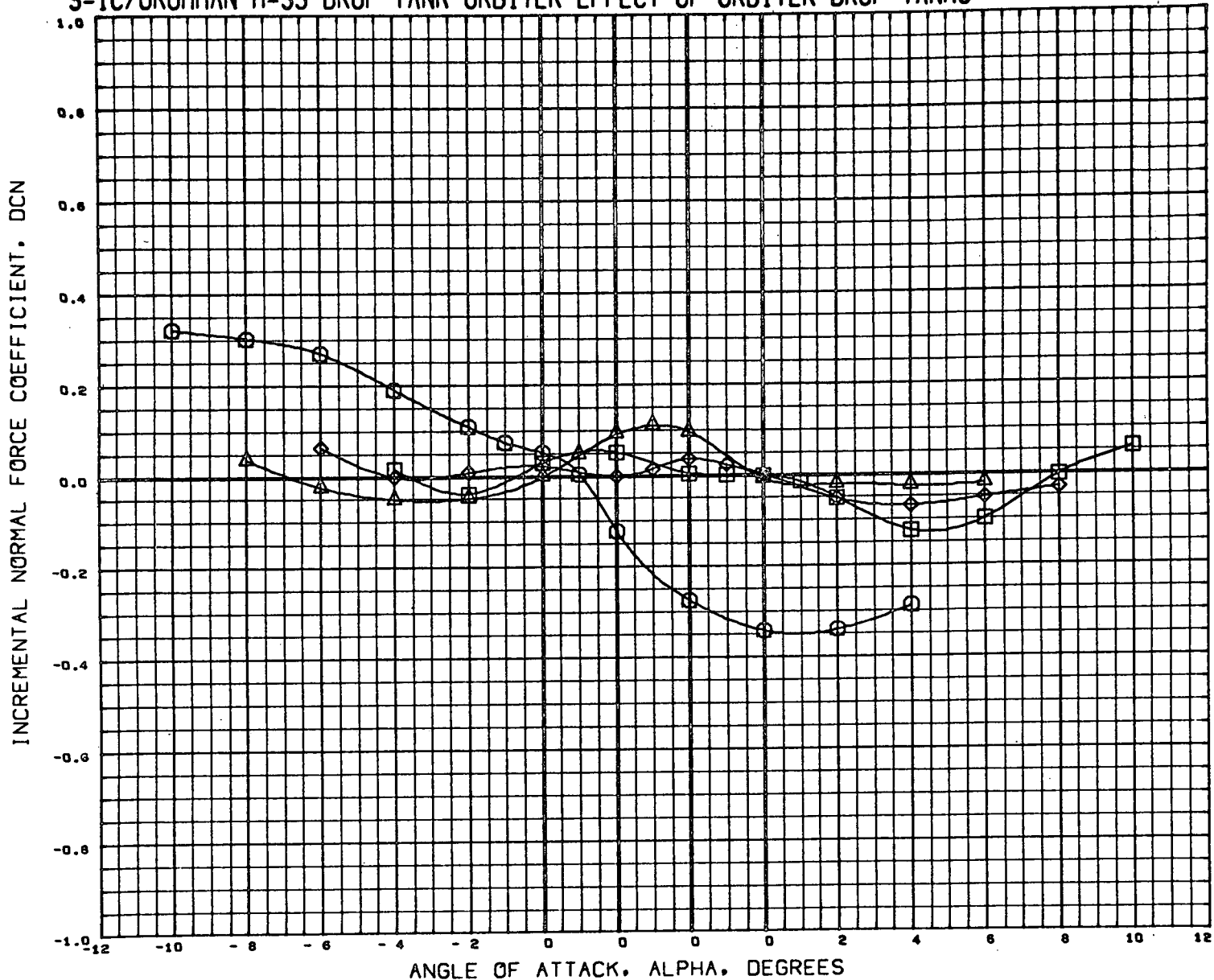
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
○	1.960	BETA	0.000	PHI	0.000	SREF	1.3960	SQ. IN.
△	3.900					LREF	1.3330	IN.
◇	4.960					BREF	1.3330	IN.
						XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCI#A#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

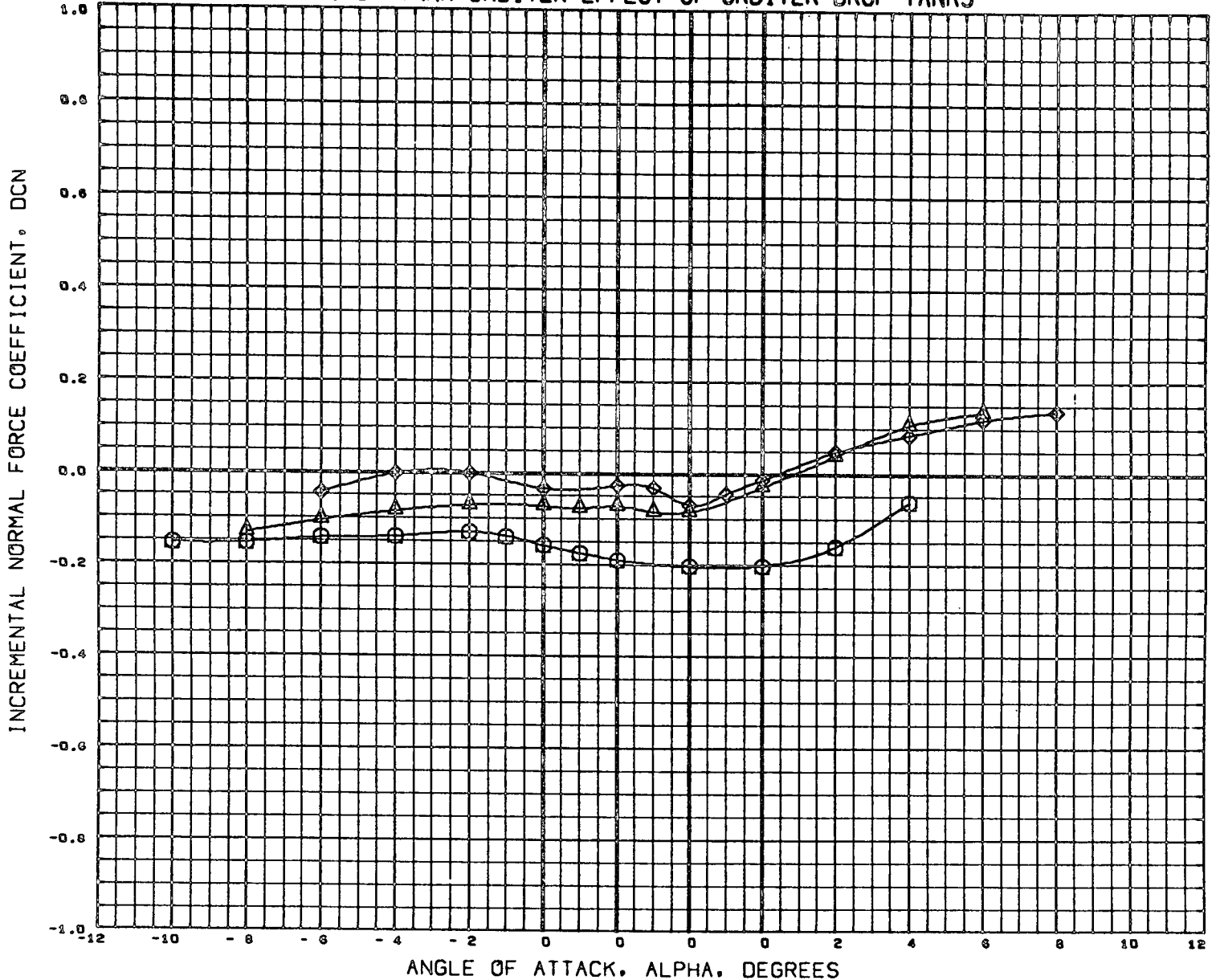


SYMBOL	MACH	BETA	PARAMETRIC VALUES	
○	0.900	0.000	PHI	0.000
△	1.000			
◇	1.100			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*A+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



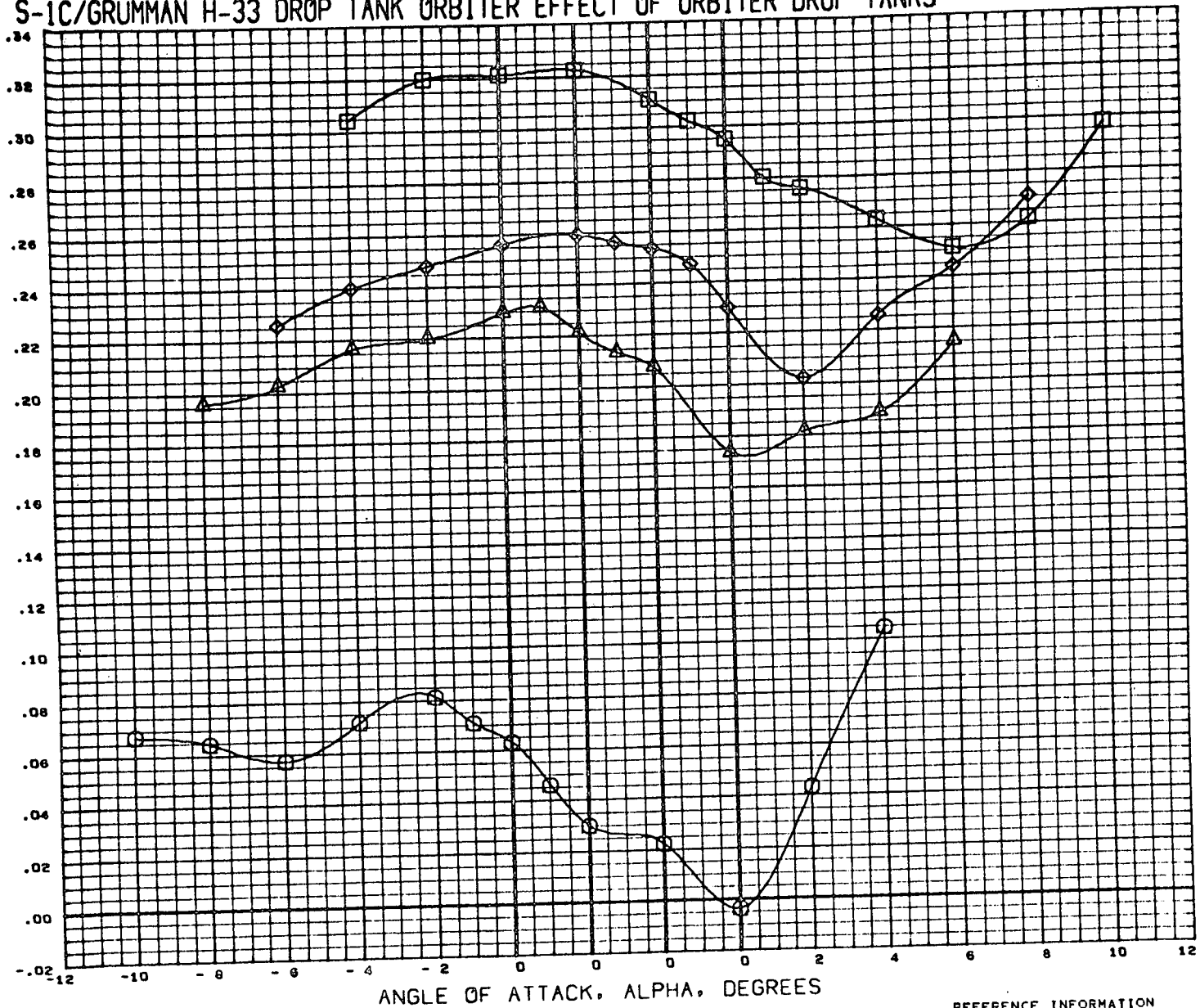
SYMBOL	MACH	BETA	PARAMETRIC VALUES	
○	1.960	0.000	PHI	0.000
△	3.500			
◇	4.960			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI#A+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

INCREMENTAL TOTAL AXIAL FORCE COEFFICIENT, CDA

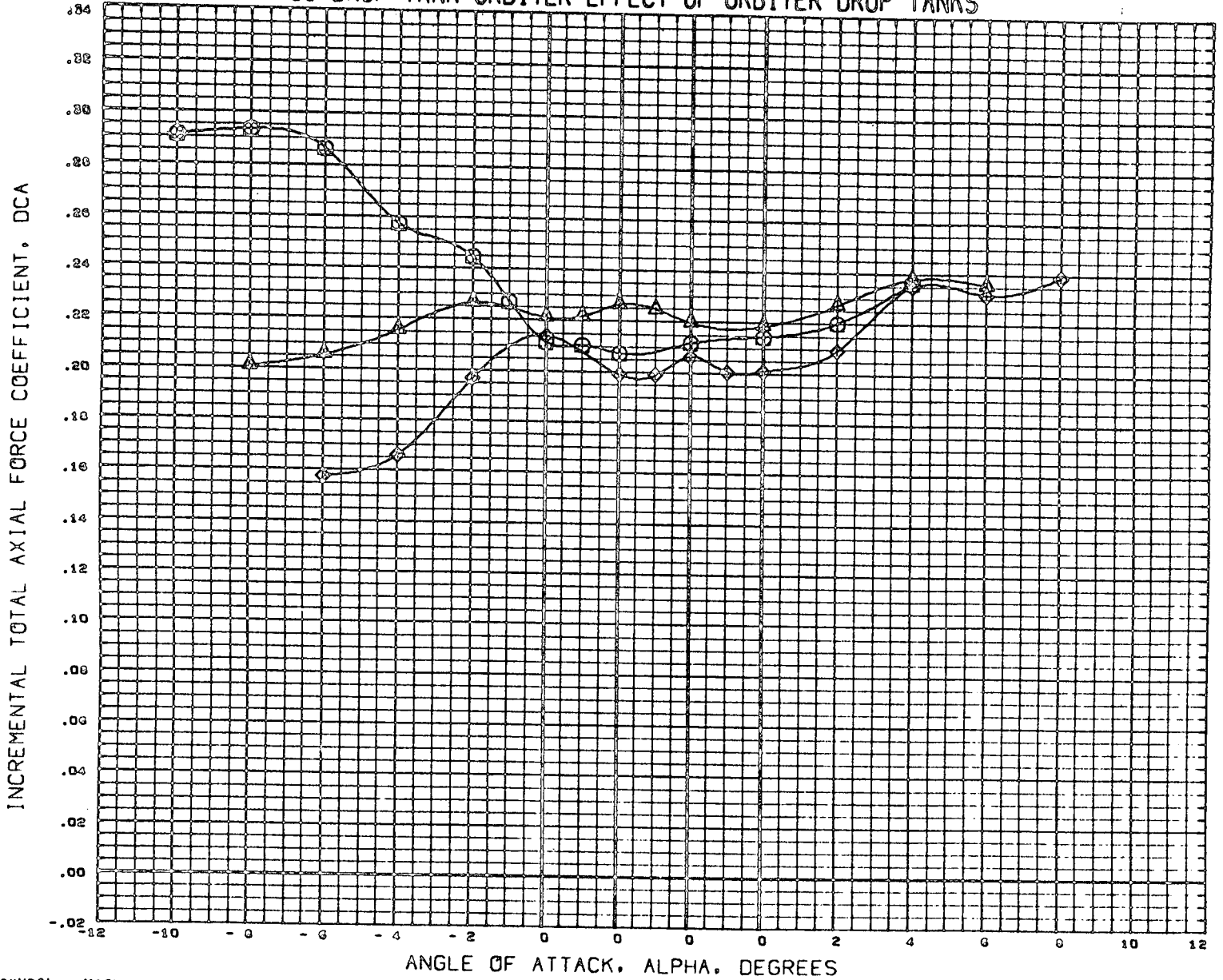


SYMBOL	MACH	PARAMETRIC VALUES	
		BETA	PHI
○	0.900	0.000	0.000
◇	1.000		
△	1.100		
□	1.200		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI* A * C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



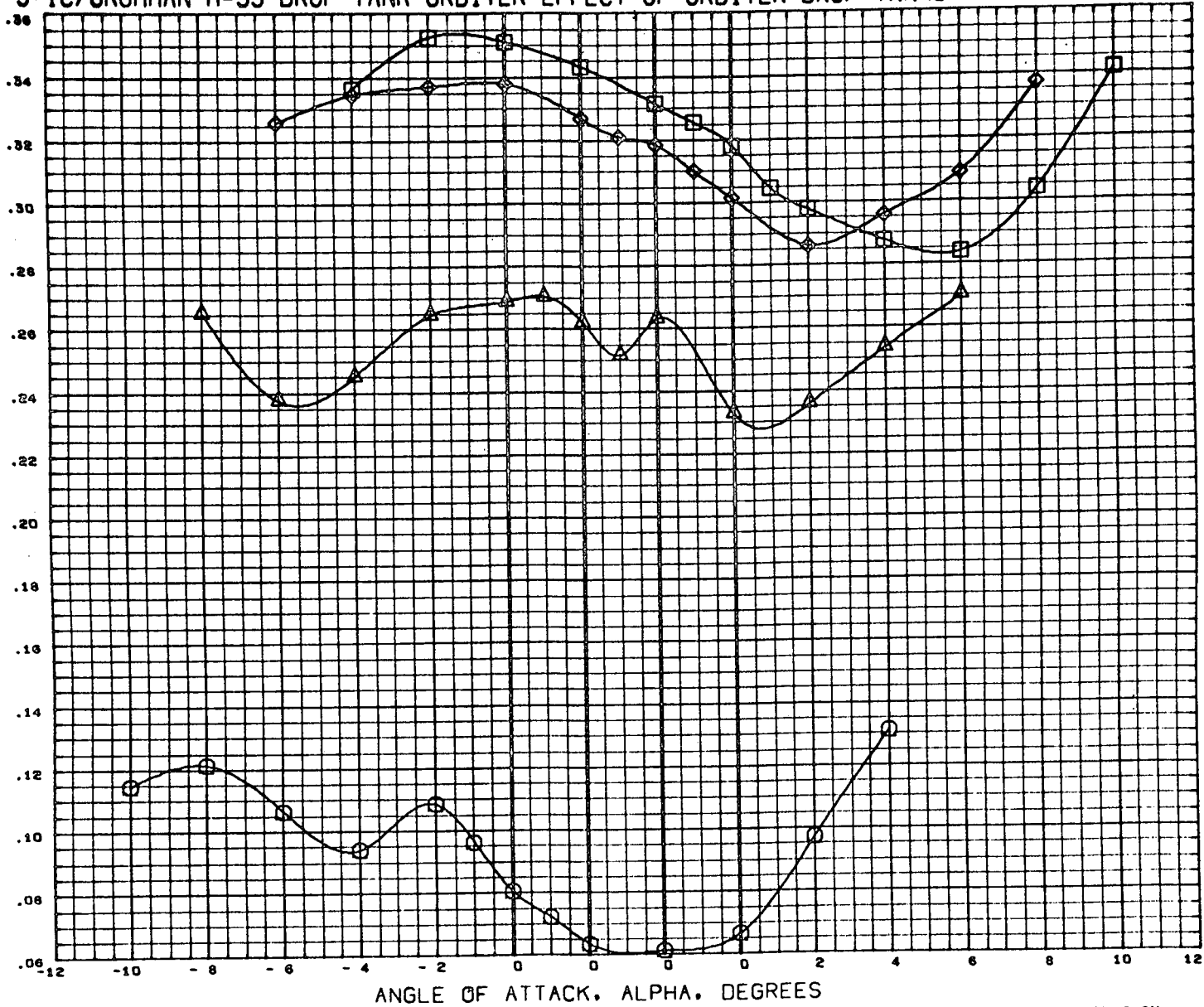
SYMBOL	MACH	BETA	PARAMETRIC VALUES	
○	1.960		0.000	PHI 0.000
△	3.900			
◇	4.960			

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	9.3990	in.
YMRP	0.0000	in.
ZMRP	0.0000	in.
SCALE	0.0034	

DATA HIST. CODE CCCI*A%C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, DCAF



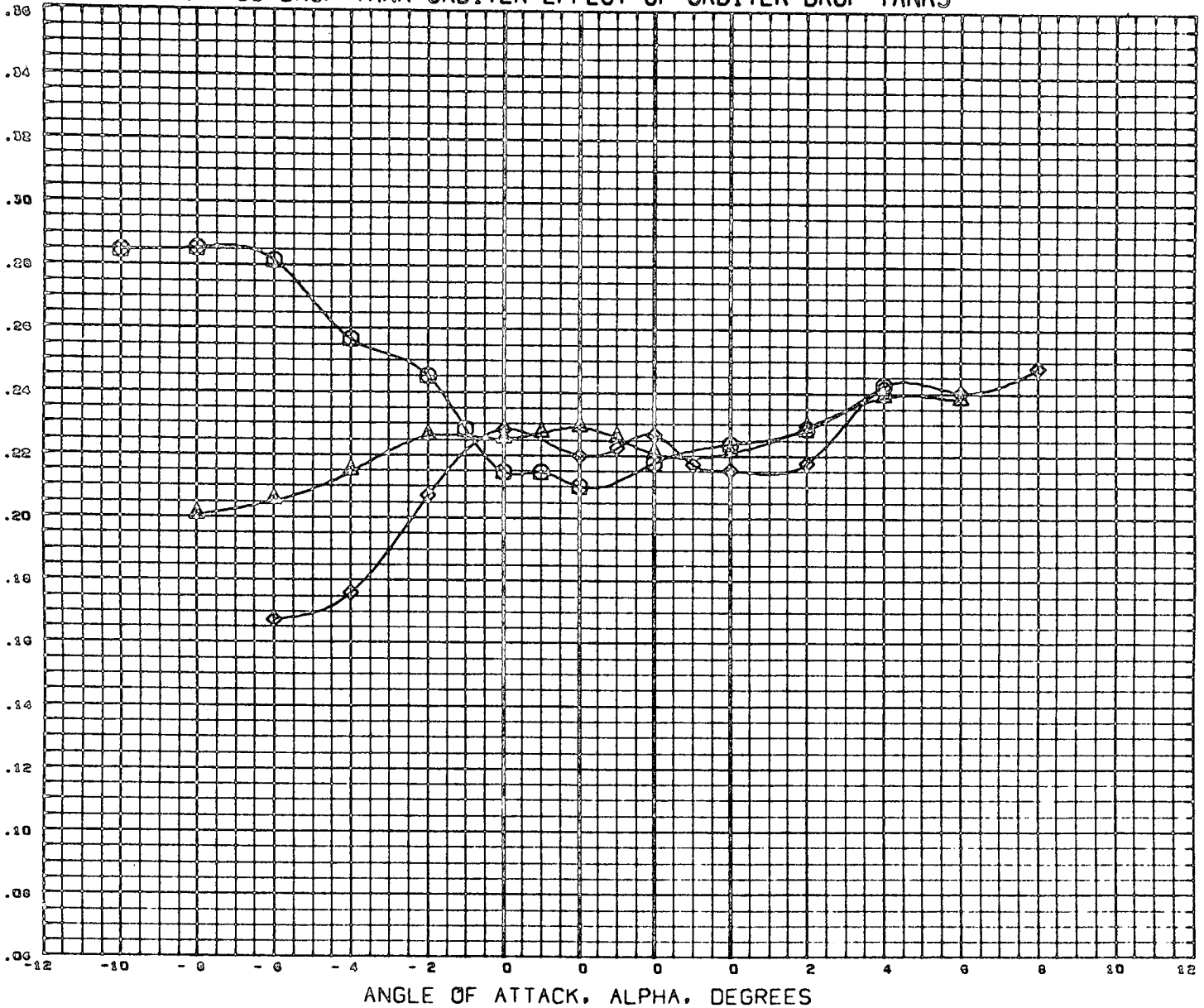
SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
◇	1.000				
◇	1.100				
□	1.200				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
YMRP	5.3990	IN.
ZMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, DCAF

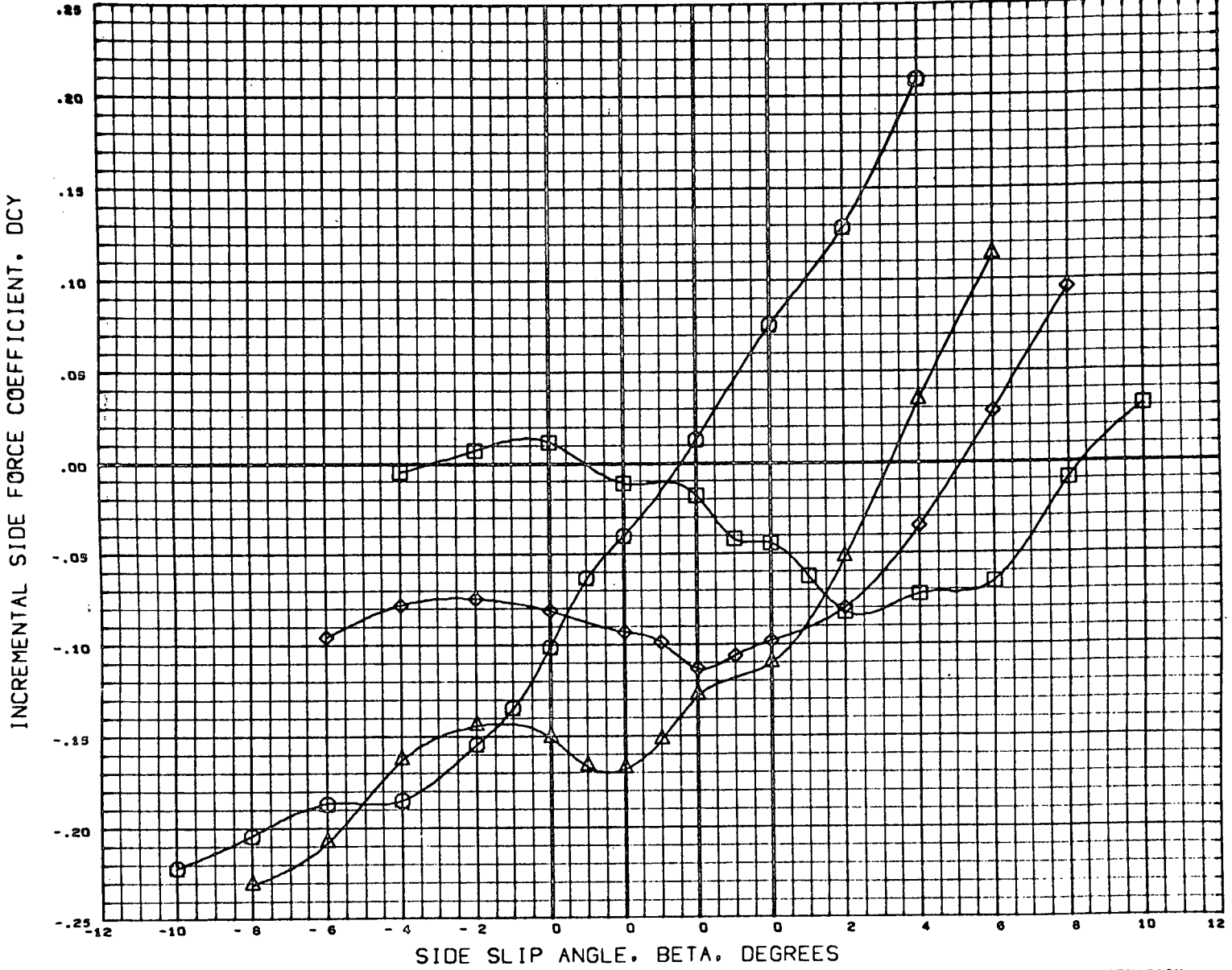


SYMBOL	PARAMETRIC VALUES		
	MACH	BETA	PHI
○	1.900	0.000	0.000
△	3.900		
◇	4.900		

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*A+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

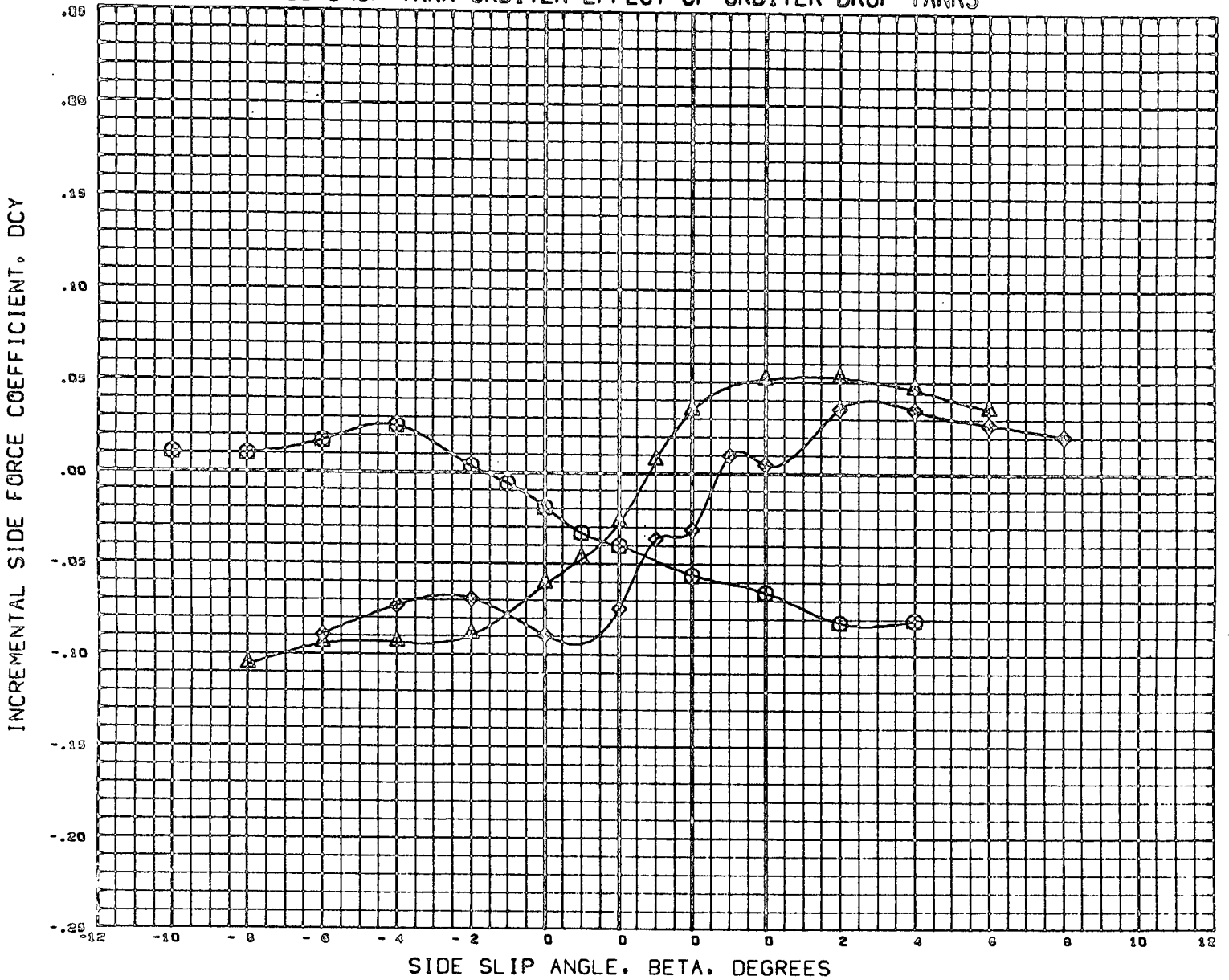


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
○	0.900	0.000	PHI	90.000
◇	1.000			
△	1.100			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XM RP	5.3990	IN.
YM RP	0.0000	IN.
ZM RP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

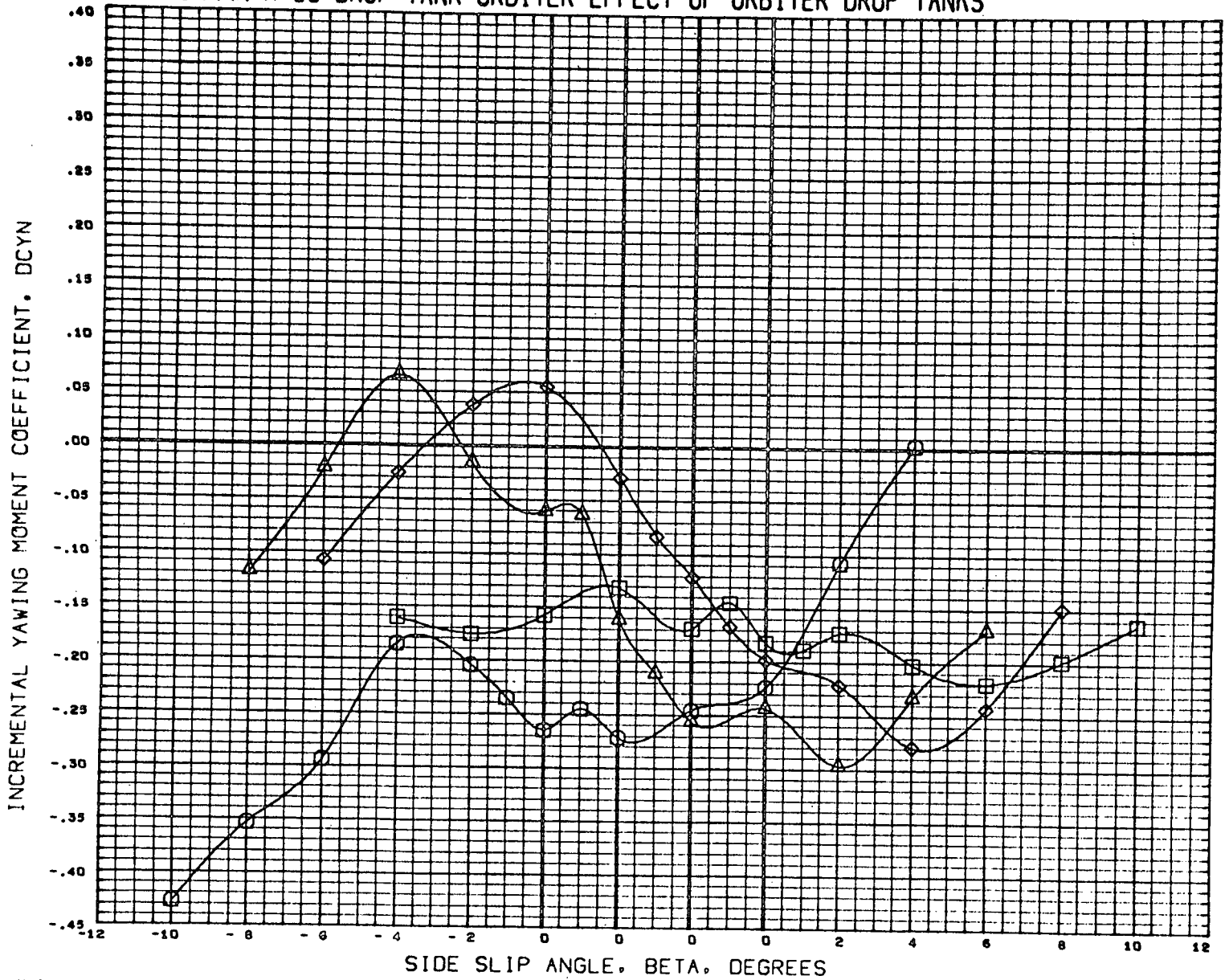


SYMBOL MACH ALPHA PARAMETRIC VALUES PHI 90.000
 ○ 1.960
 △ 3.900
 ◇ 4.960

REFERENCE INFORMATION
 SREF 1.3980 90. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 9.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE *ACCCT*4*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

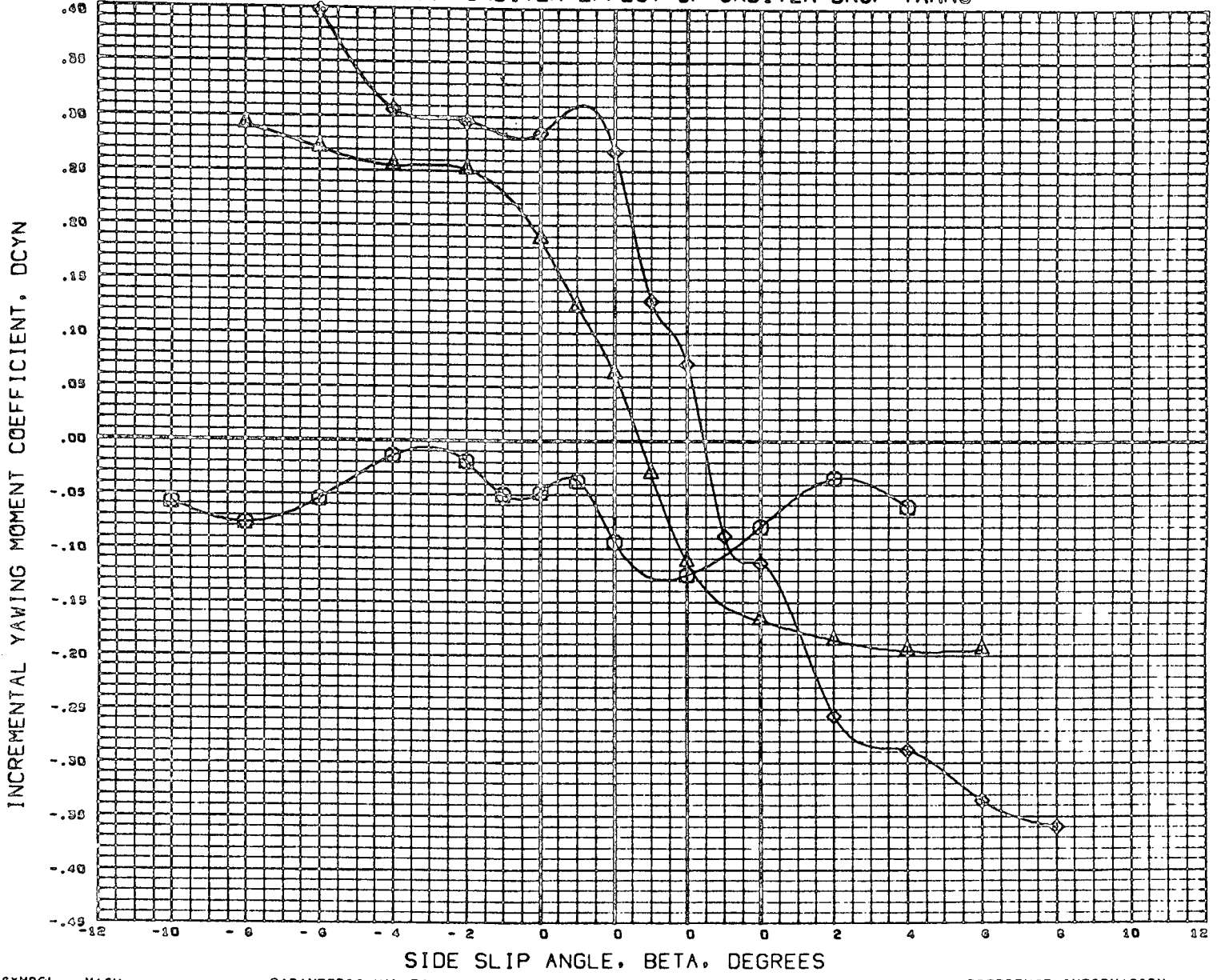


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
○	0.900	0.000	PHI	90.000
◇	1.000			
◇	1.100			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

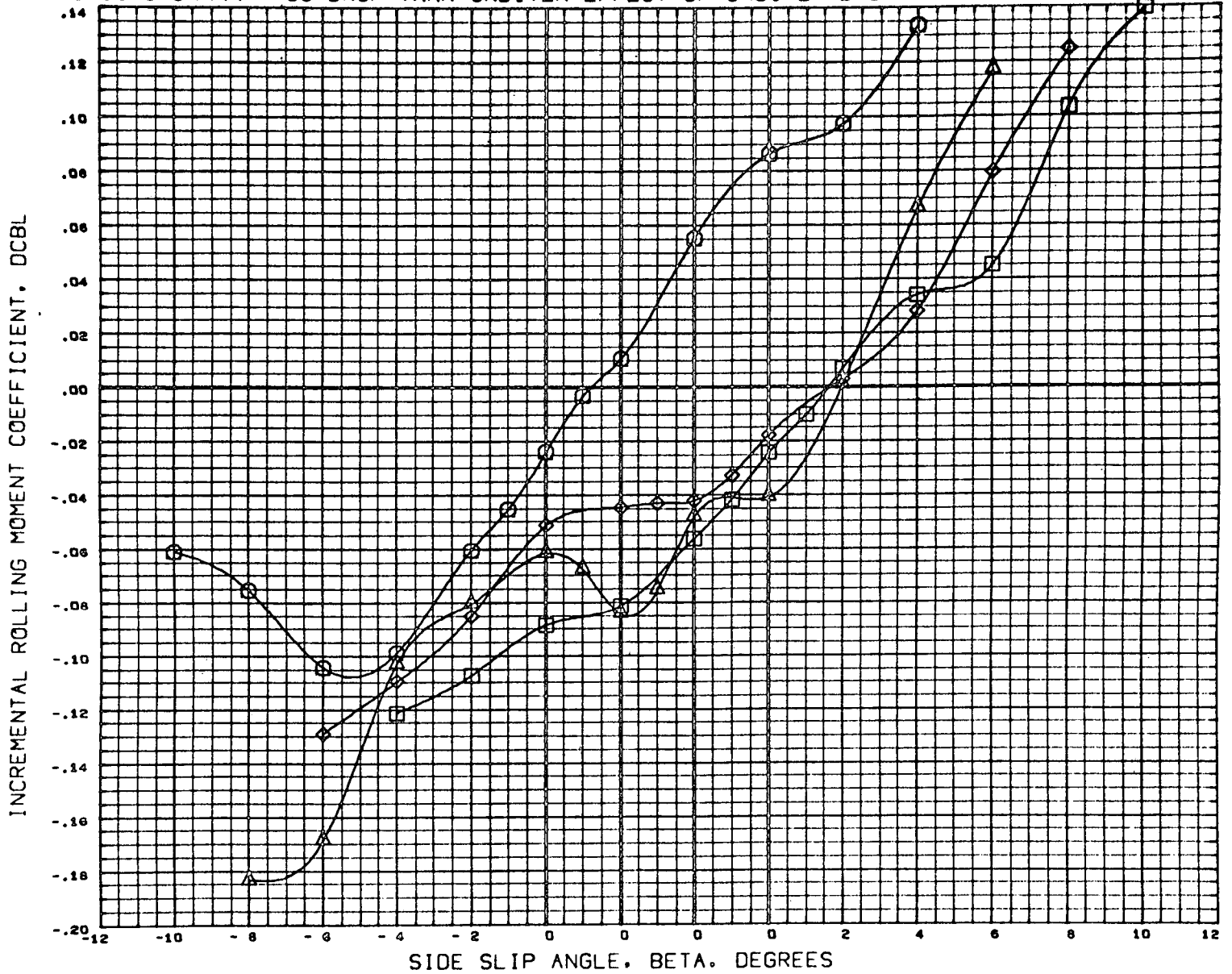
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL		MACH		PARAMETRIC VALUES		REFERENCE INFORMATION	
○	1.960	ALPHA	0.000	PHI	90.000	SREF	1.3960 SQ. IN.
△	3.900					LREF	1.3330 IN.
◇	4.900					BREF	1.3330 IN.
						XMRP	9.3990 IN.
						YMRP	0.0000 IN.
						ZMRP	0.0000 IN.
						SCALE	0.0034

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

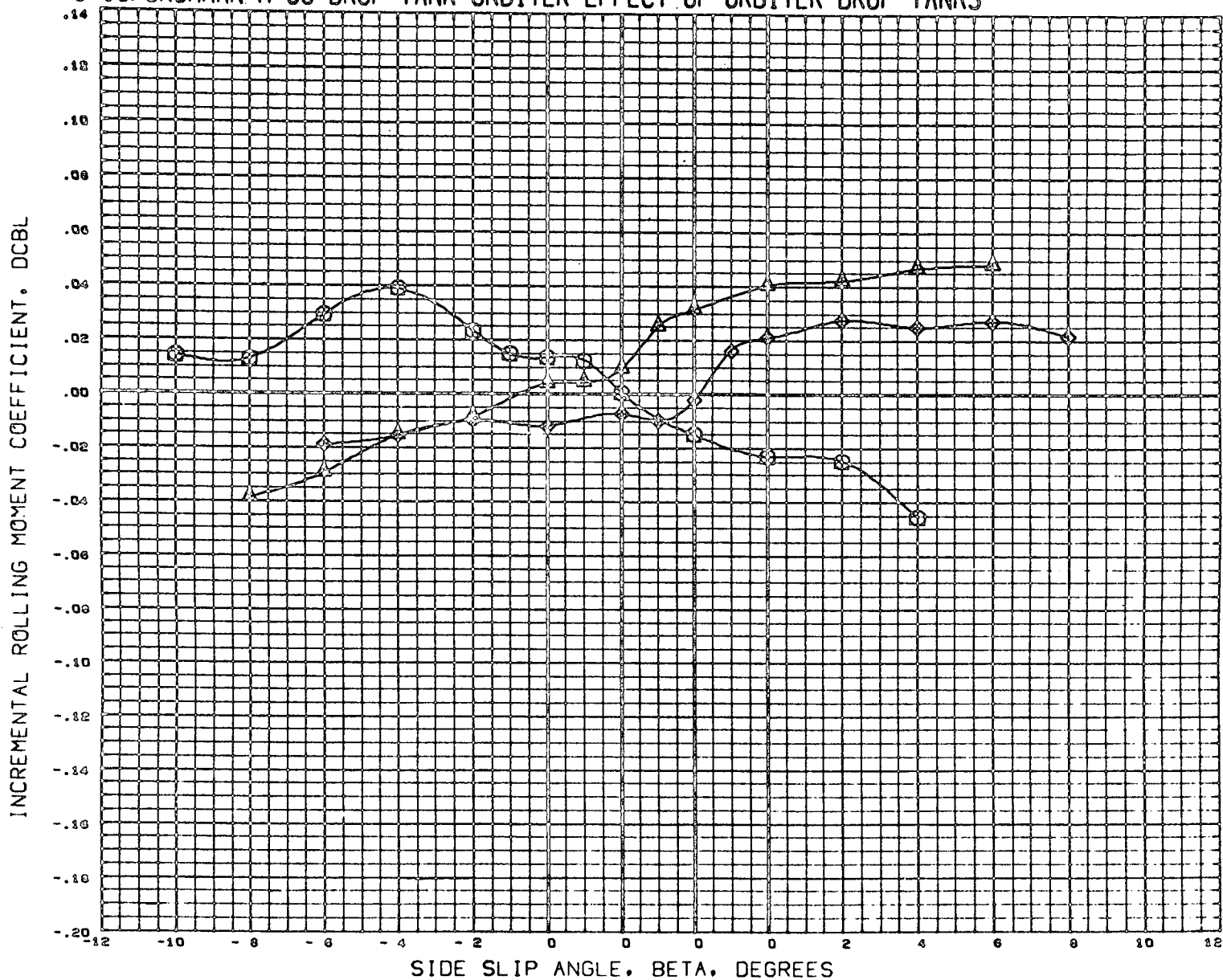


SYMBOL	MACH	PARAMETRIC VALUES		
		ALPHA	PHI	90.000
○	0.900	0.000	90.000	
◇	1.000			
△	1.100			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*#A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

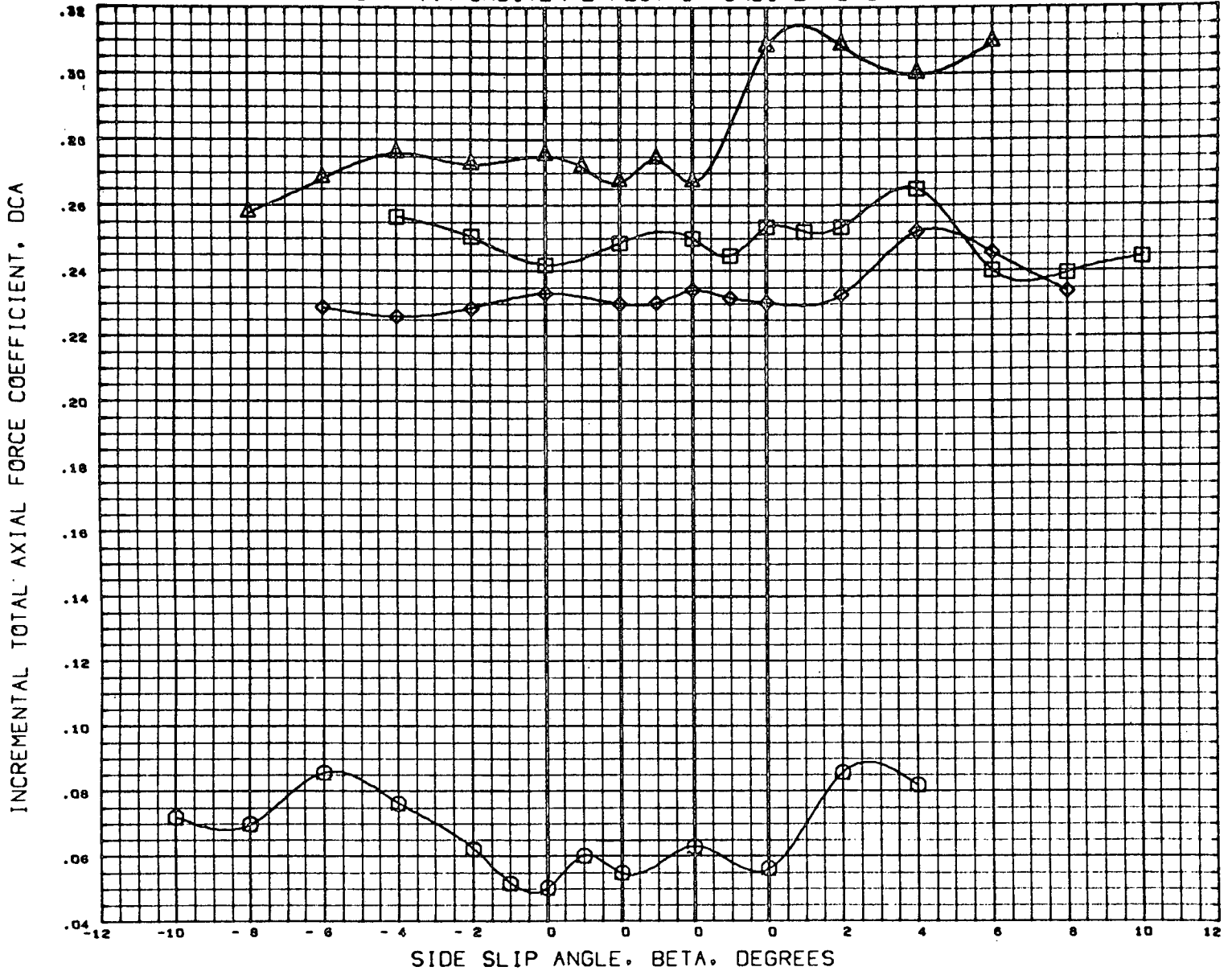


SYMBOL	MACH	PARAMETRIC VALUES	
○	1.960	ALPHA	0.000
△	3.500	PHI	90.000
◇	4.960		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

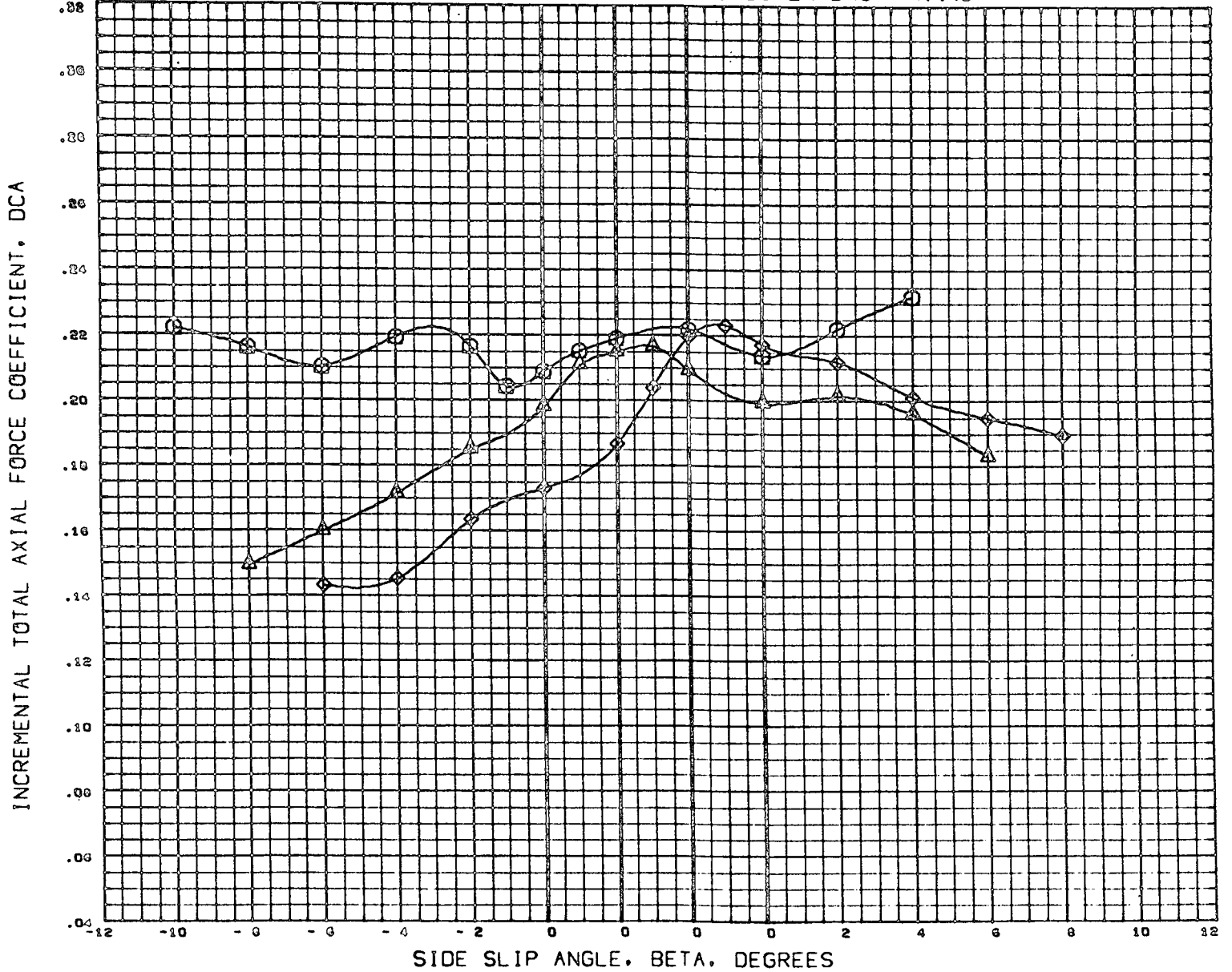


SYMBOL	MACH	PARAMETRIC VALUES	
		ALPHA	PHI
○	0.900	0.000	90.000
△	1.000		
◇	1.100		
□	1.200		

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZHRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

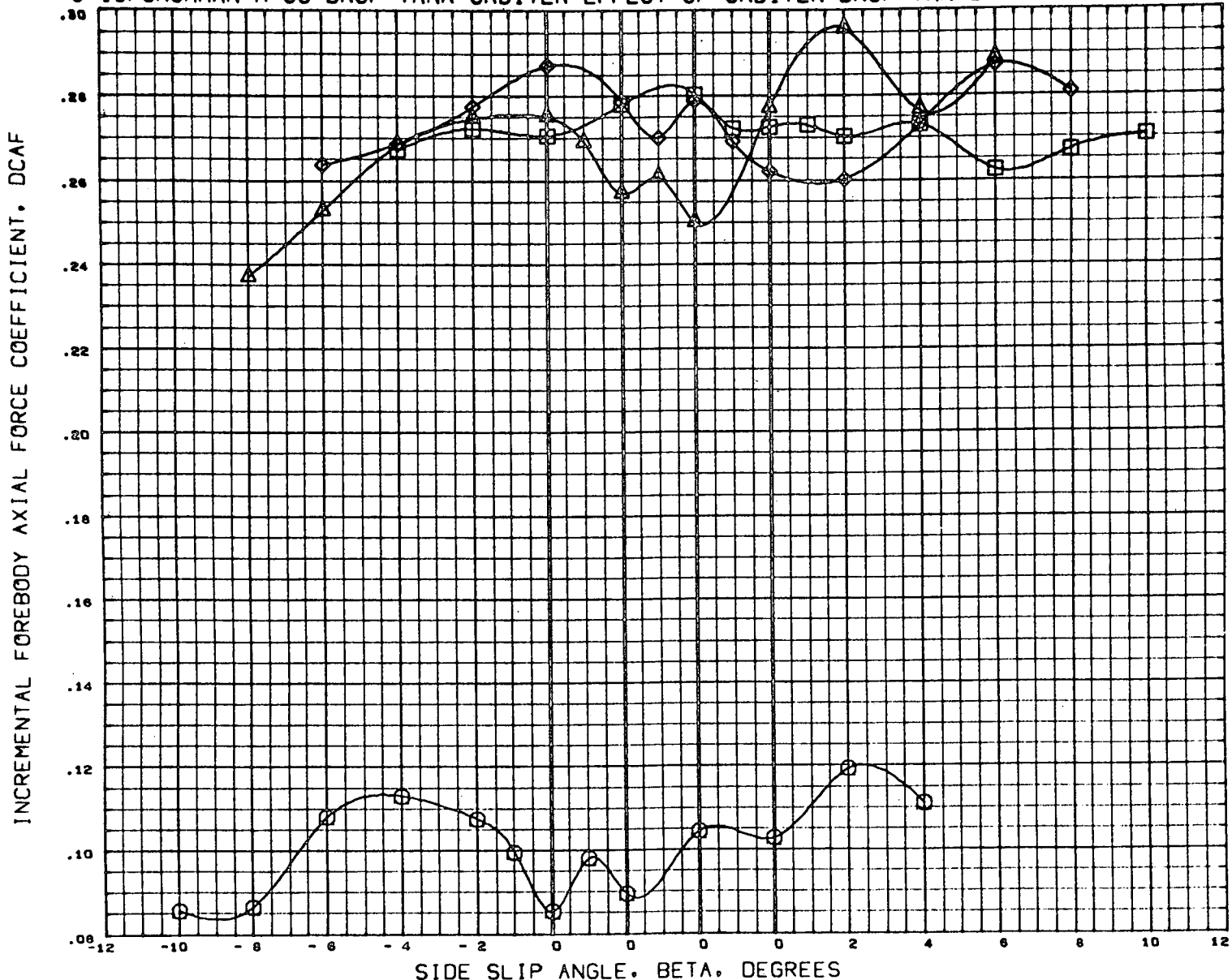


SYMBOL	MACH	PARAMETRIC VALUES
○	1.960	ALPHA 0.000 PHI 90.000
△	3.500	
◇	4.960	

REFERENCE INFORMATION		
SREF	1.3960	90 IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

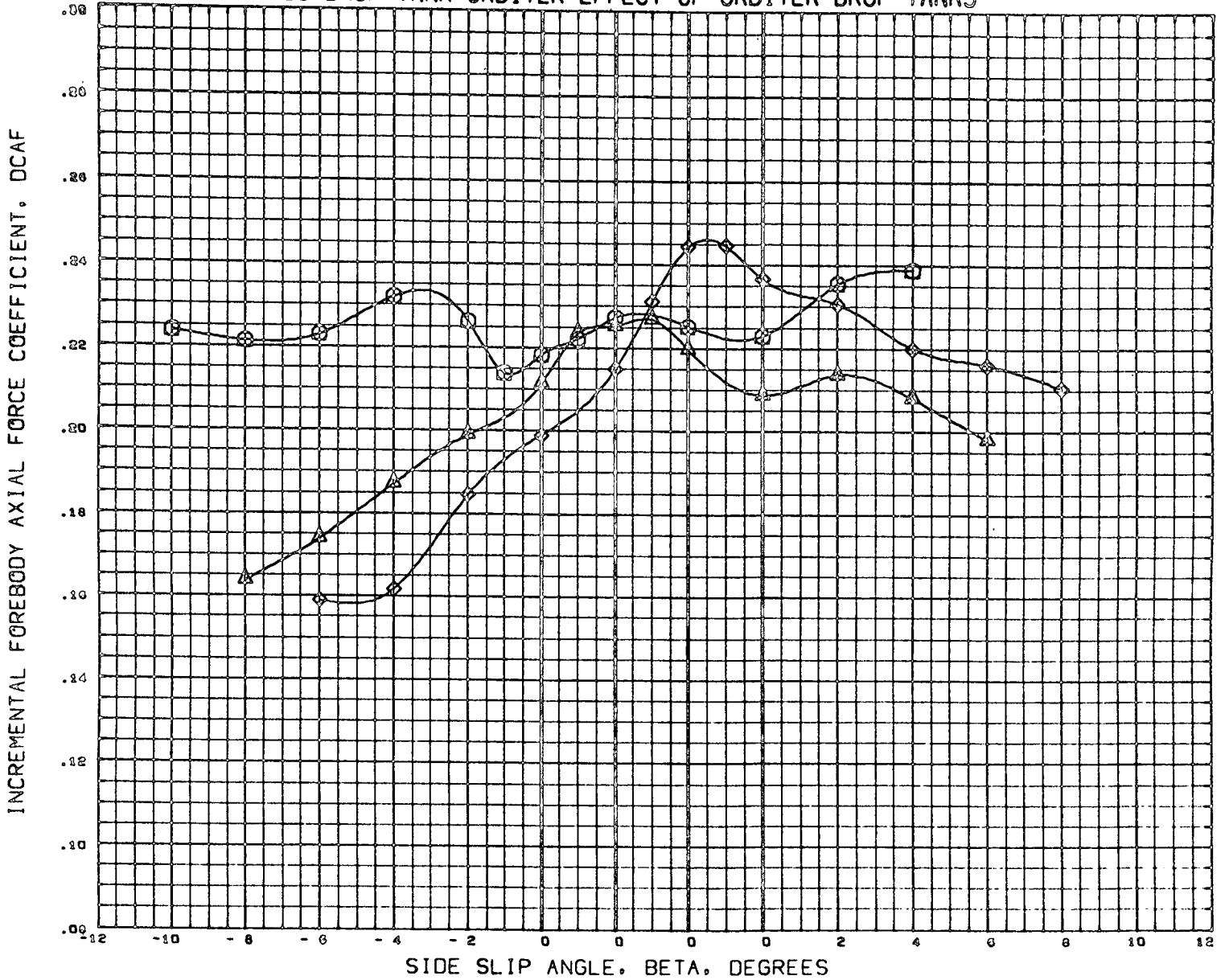


SYMBOL MACH PARAMETRIC VALUES
 ○ 0.900 ALPHA 0.000 PHI 90.000
 ◇ 1.000
 △ 1.100
 □ 1.200

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE #ACCCI*4A*0

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

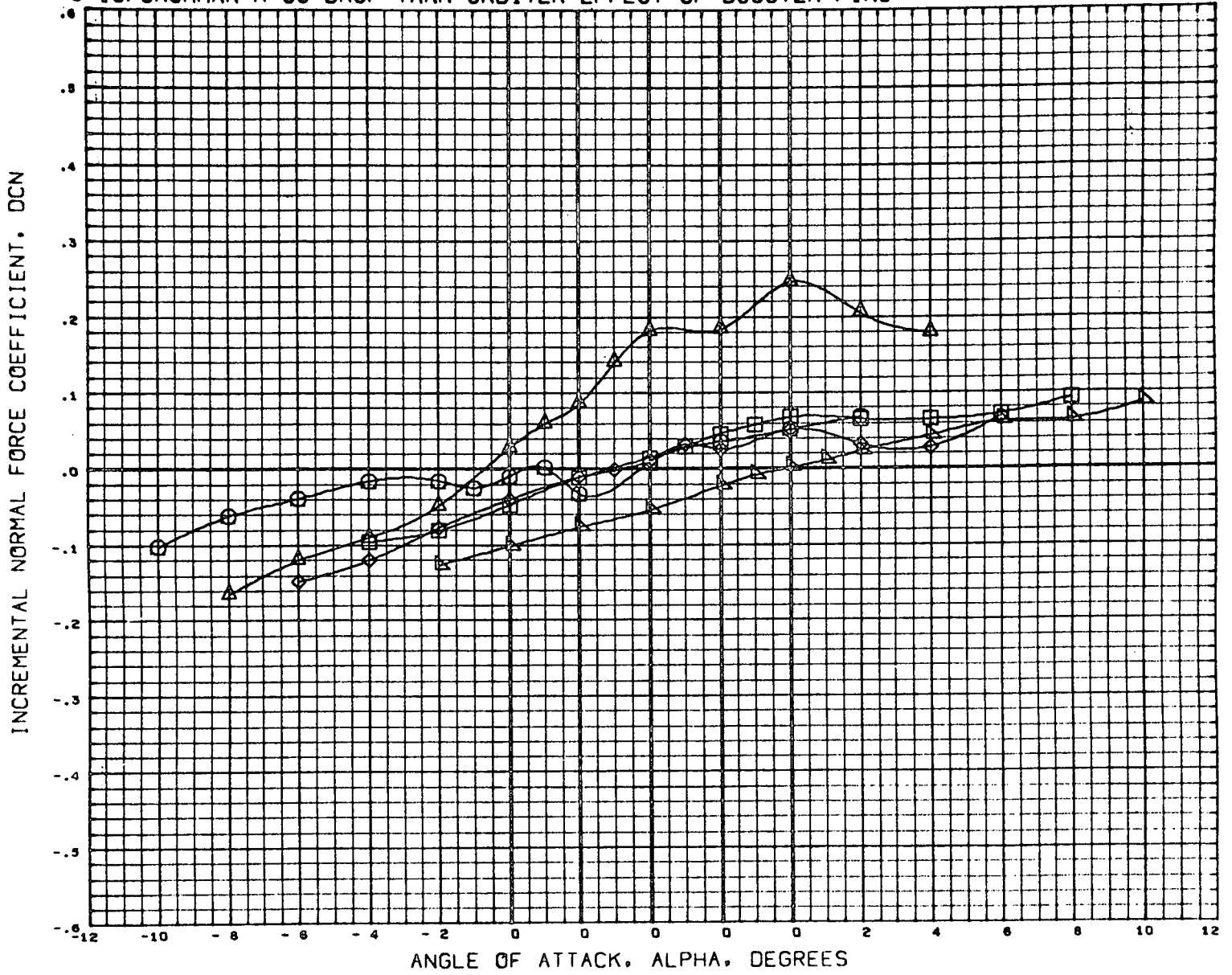


SYMBOL	MACH	PARAMETRIC VALUES
○	1.960	ALPHA 0.000 PHI 90.000
△	3.900	
◇	4.960	

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

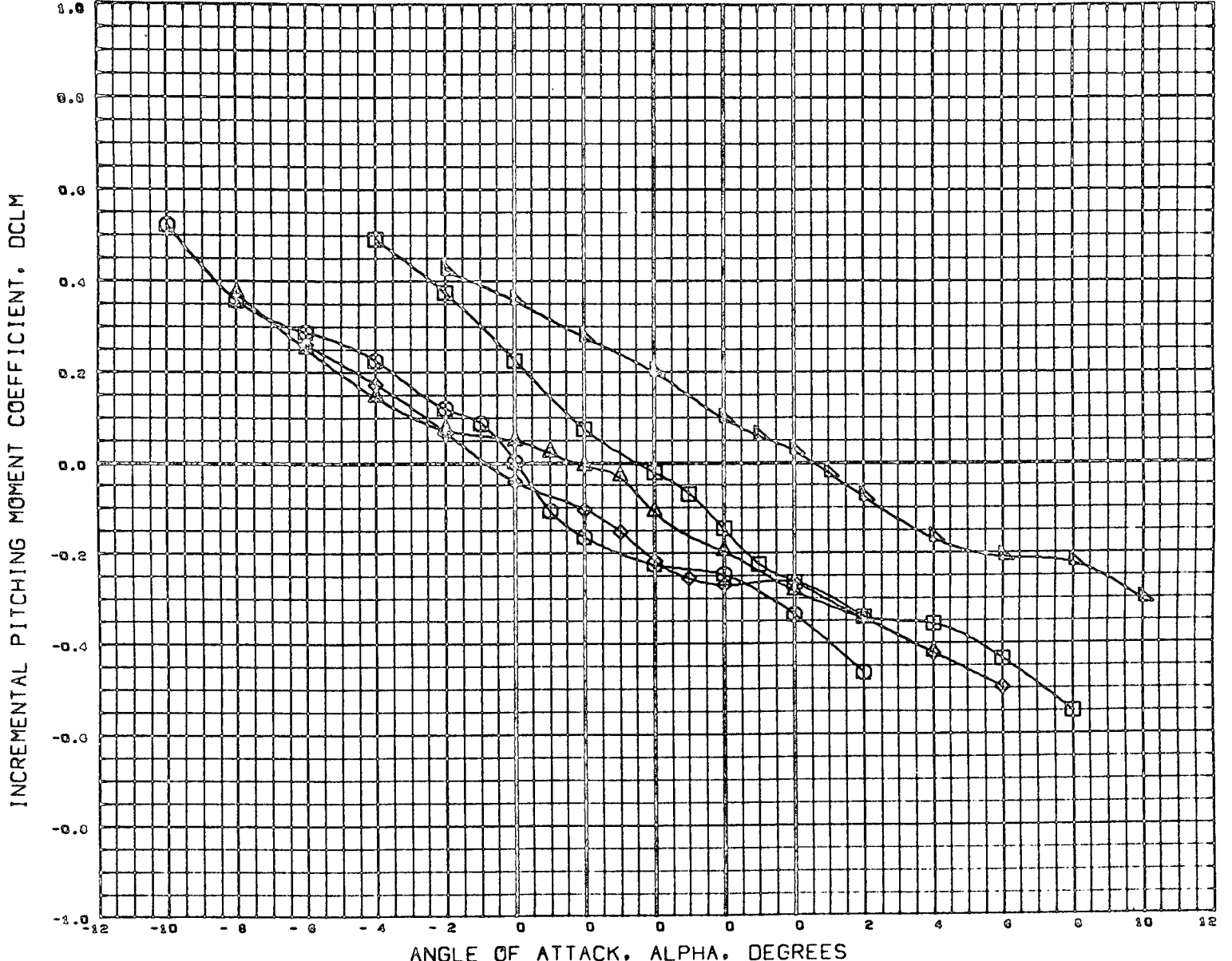
DATA HIST. CODE 9ACCCI#A+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



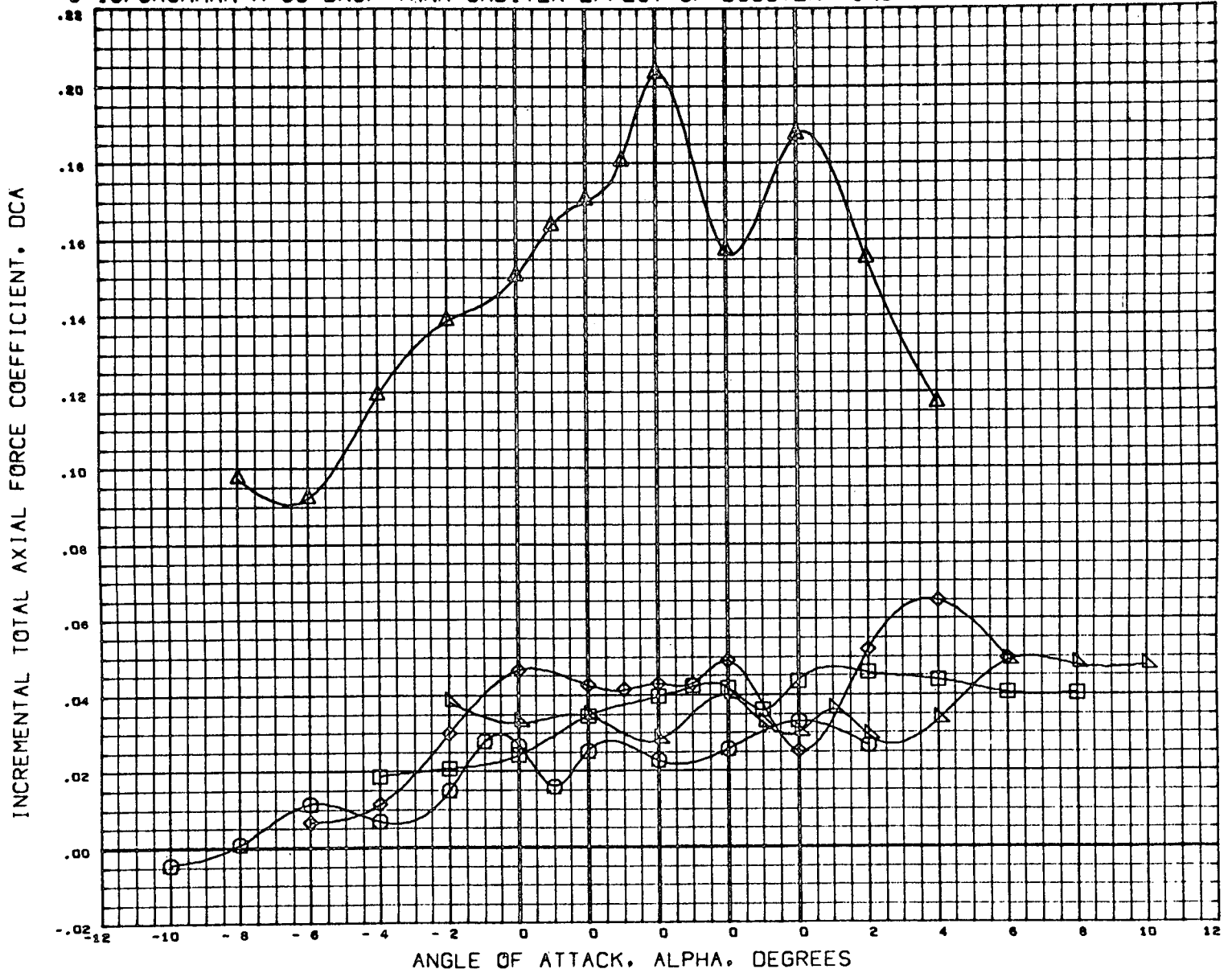
SYMBOL		MACH		PARAMETRIC VALUES		REFERENCE INFORMATION	
○	◇	0.900	BETA	0.000	PHI	0.000	SREF 1.3960 SQ. IN.
◇	◇	1.000					LREF 1.3330 IN.
◇	◇	1.100					BREF 1.3330 IN.
◇	◇	1.200					XMRP 3.3990 IN.
◇	◇	1.960					YMRP 0.0000 IN.
							ZMRP 0.0000 IN.
							SCALE 0.0034
DATA HIST. CODE CCC1*A+C							

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL		MACH	PARAMETRIC VALUES		REFERENCE INFORMATION				
○	◇	0.900	BETA	0.000	PHI	0.000	SREF	1.3960	90. IN.
◇	◇	1.000					LREF	1.3330	IN.
◇	◇	1.100					BREF	1.3330	IN.
◇	◇	1.200					XMRP	9.3990	IN.
◇	◇	1.300					YMRP	0.0000	IN.
◇	◇						ZMRP	0.0000	IN.
							SCALE	0.0034	
			DATA MIST. CODE	CCCI*#*C					

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

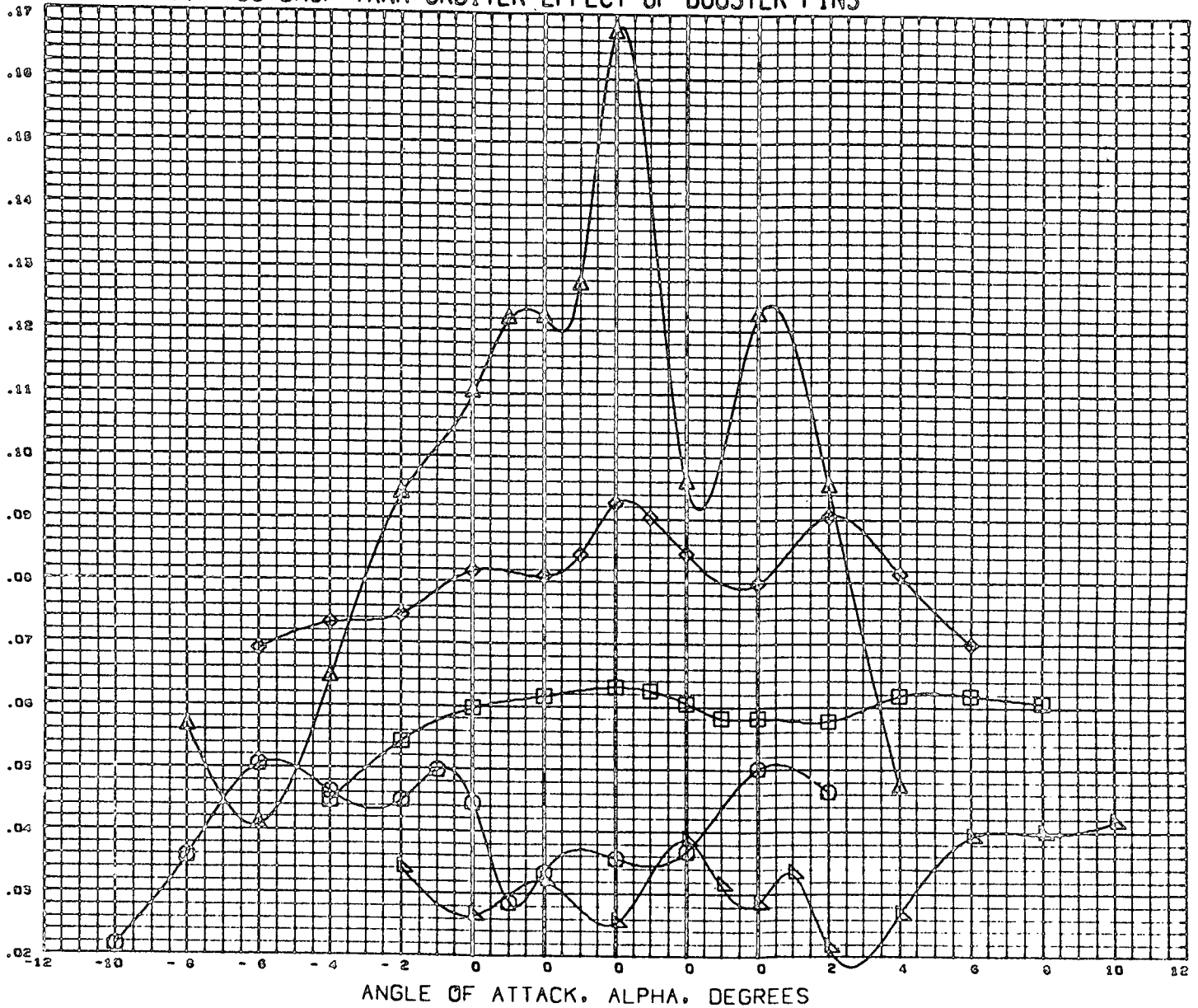


SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION		
		BETA	0.000	PHI	0.000	SREF	SQ. IN.
○	0.900					1.3960	
◇	1.000					1.3330	IN.
◇	1.100					1.3330	IN.
□	1.200					5.3990	IN.
◇	1.980					0.0000	IN.
						ZMRP	0.0000
						SCALE	0.0034

DATA HIST. CODE CCC14A#C

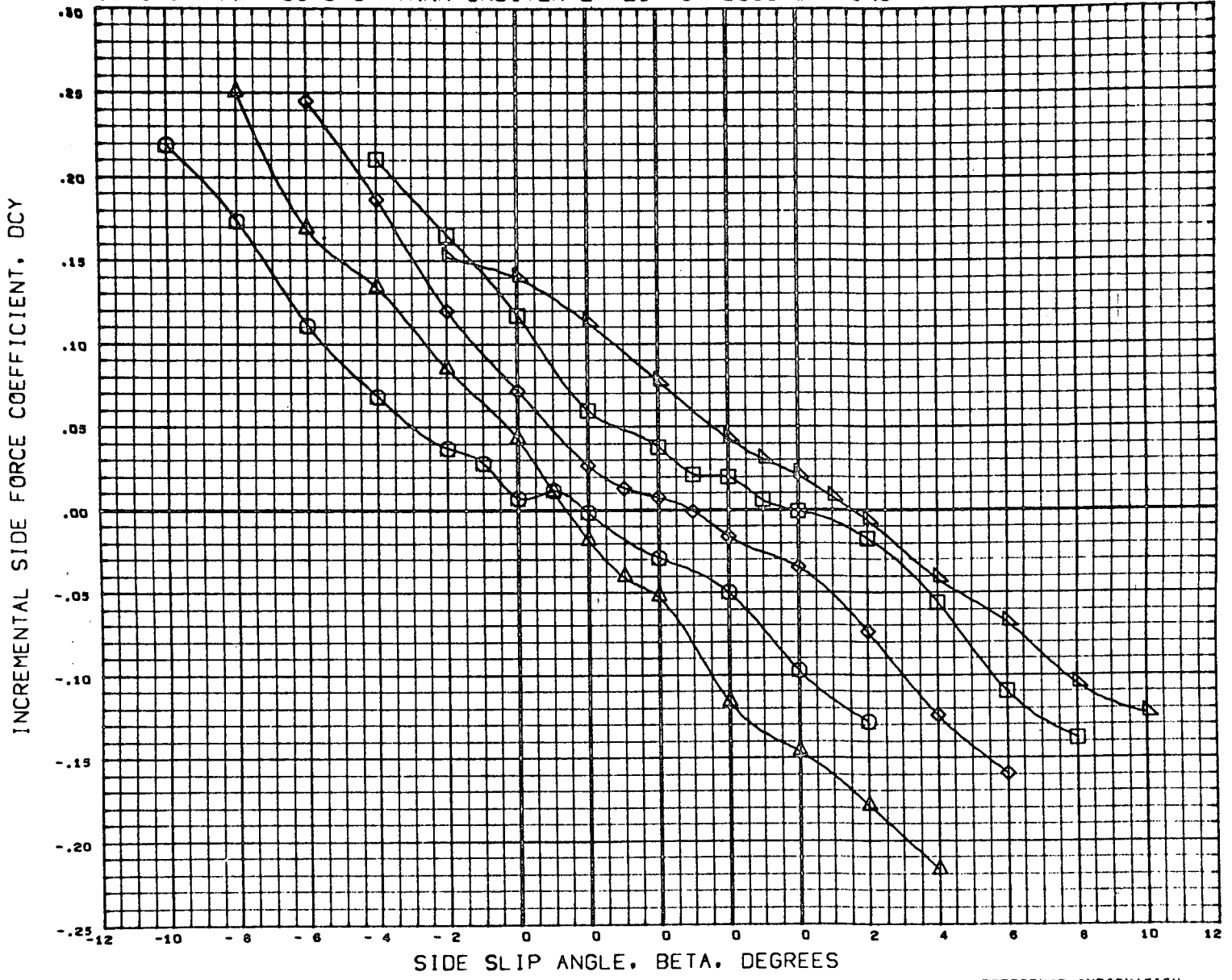
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, DCAF



SYMBOL	MACH	PARAMETRIC VALUES		REFERENCE INFORMATION	
○	0.900	BETA	0.000	PHI	0.000
◇	1.000				
◇	1.100				
◇	1.200				
◇	1.300				
		DATA HIST. CODE	CCCI*AC		
					SREF 1.3960 SQ. IN.
					LREF 1.3330 IN.
					BREF 1.3330 IN.
					XMRP 5.3990 IN.
					YMRP 0.0000 IN.
					ZMRP 0.0000 IN.
					SCALE 0.0034

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

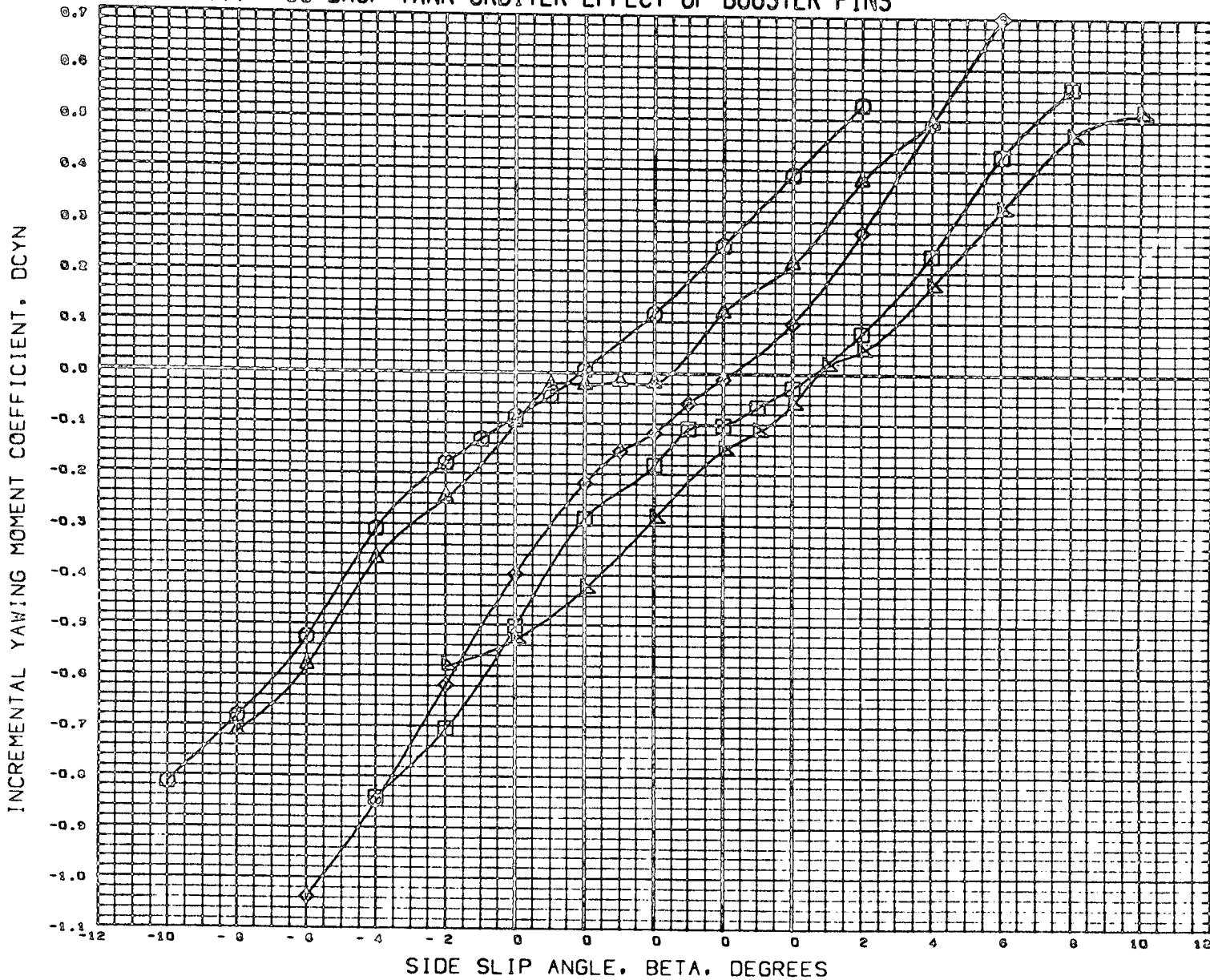


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES		PHI
○	0.900		0.000		90.000
◇	1.000				
△	1.100				
□	1.200				
▽	1.960				

DATA HIST. CODE *ACCCI#A+C

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

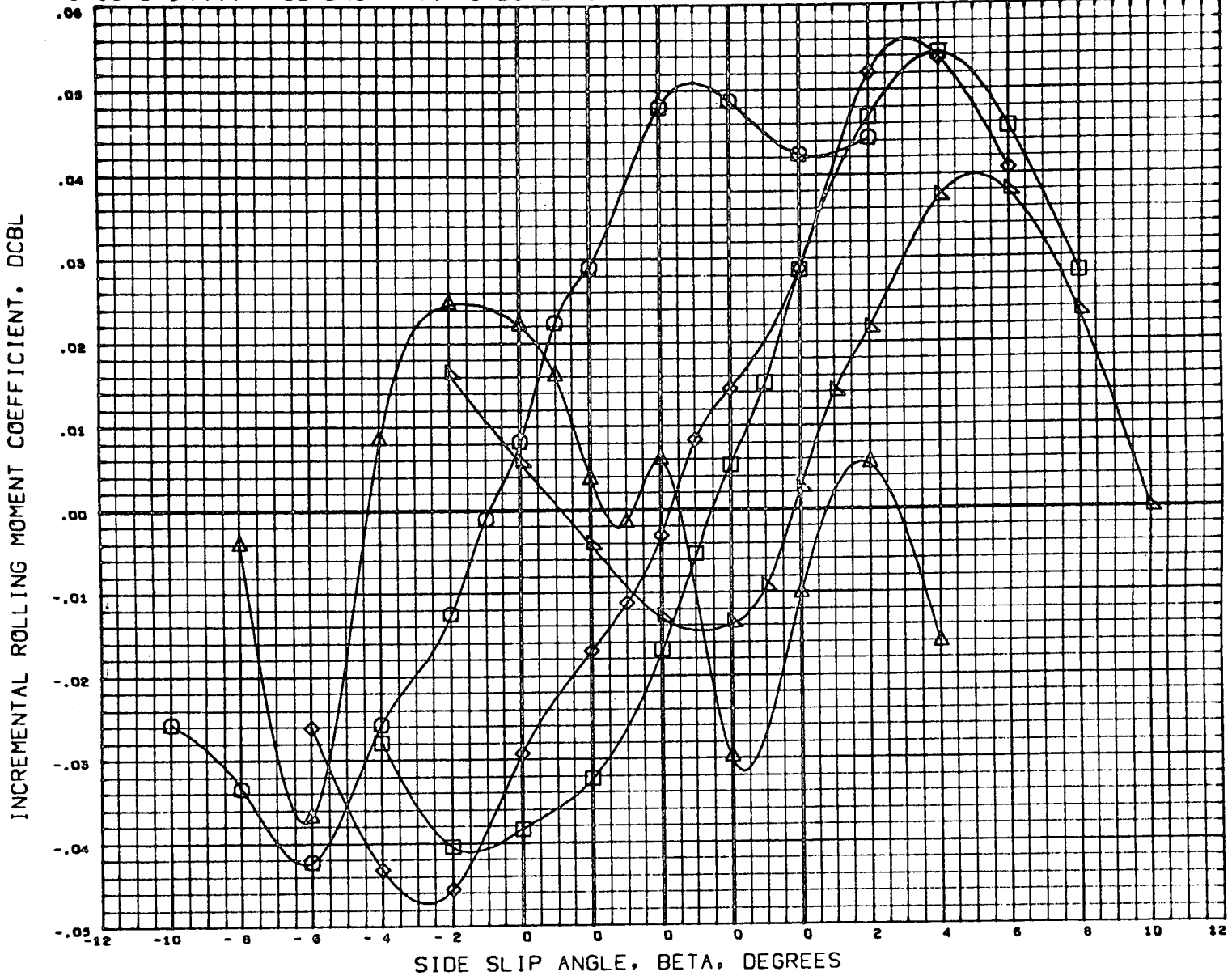


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	PHI	90.000
○	0.900				
◇	1.000				
□	1.100				
△	1.200				
▽	1.900				

DATA HIST. CODE *ACCCI4A*C

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

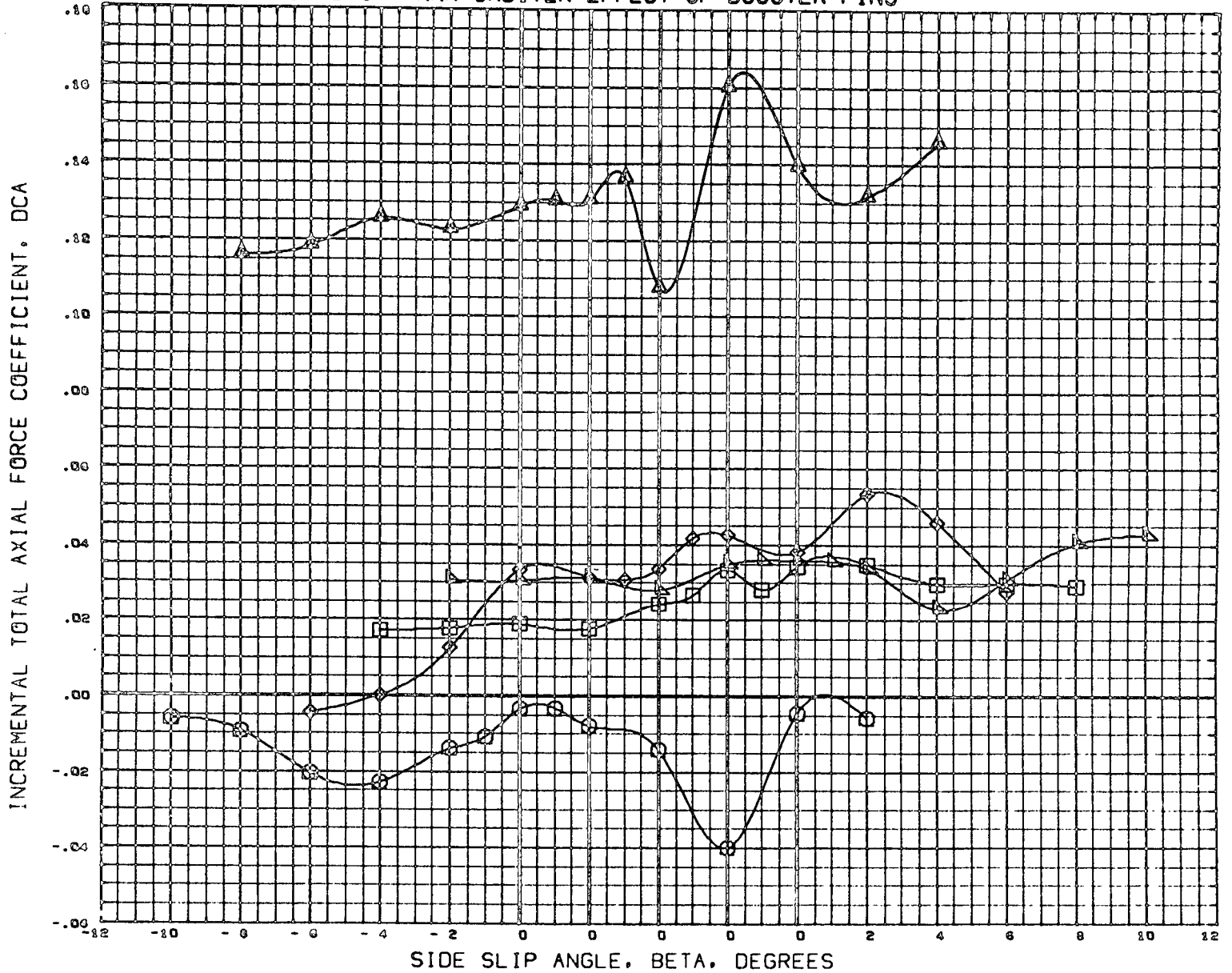
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION	
		ALPHA	PHI			
○	0.900	0.000	90.000	SREF	1.3960	SQ. IN.
◇	1.000			LREF	1.3330	IN.
△	1.100			BREF	1.3330	IN.
□	1.200			XMRP	5.3990	IN.
◇	1.960			YMRP	0.0000	IN.
				ZMRP	0.0000	IN.
				SCALE	0.0034	

DATA HIST. CODE *ACCCI*#A#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

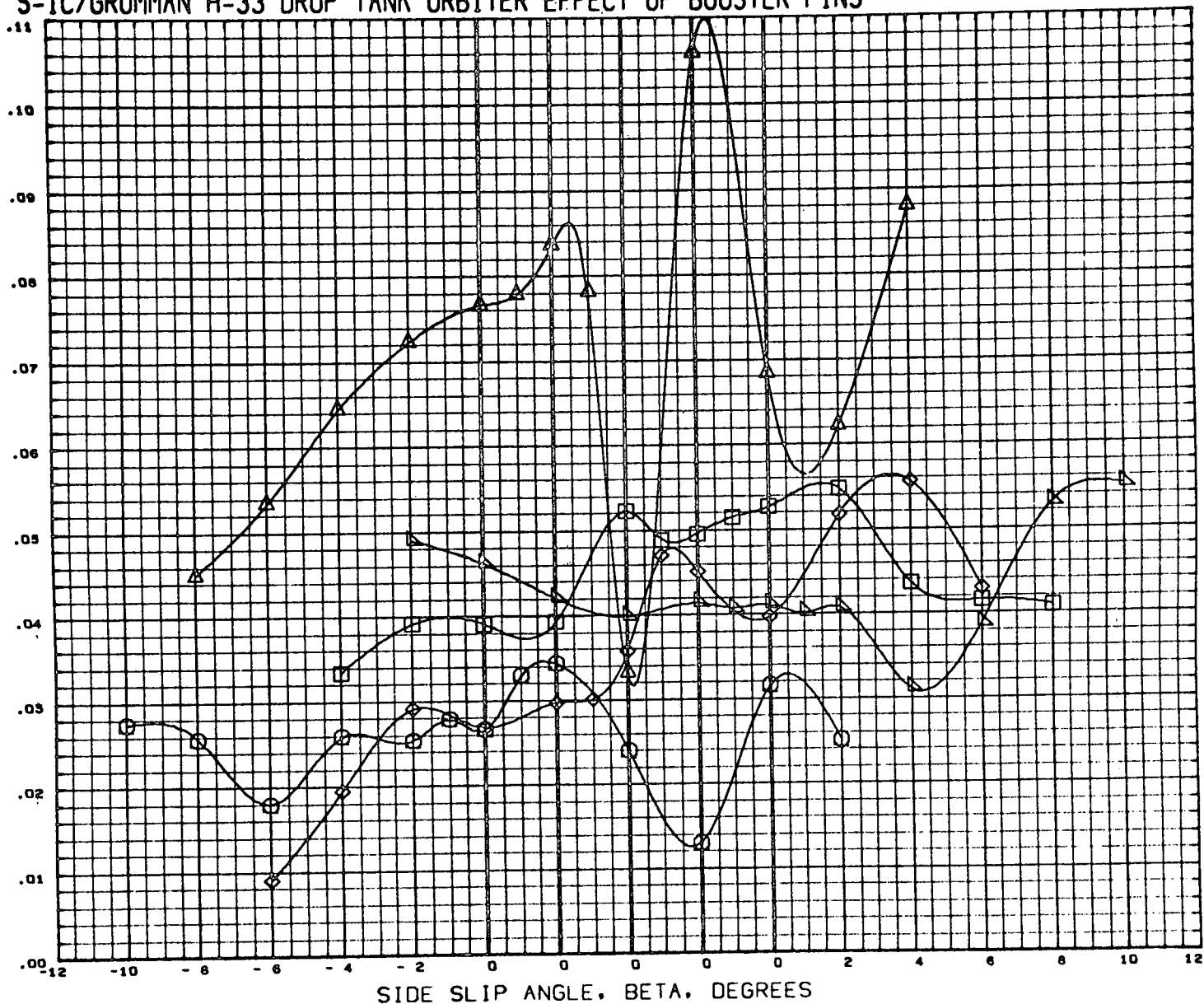


SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION	
		ALPHA	PHI			
○	0.900	0.000	90.000	SREF	1.3960	SQ. IN.
◇	1.000			LREF	1.3330	IN.
□	1.100			BREF	1.3330	IN.
△	1.200			XMRP	5.3990	IN.
○	1.300			YMRP	0.0000	IN.
				ZMRP	0.0000	IN.
				SCALE	0.0034	

DATA HIST. CODE #ACCCI*A#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, DCAF

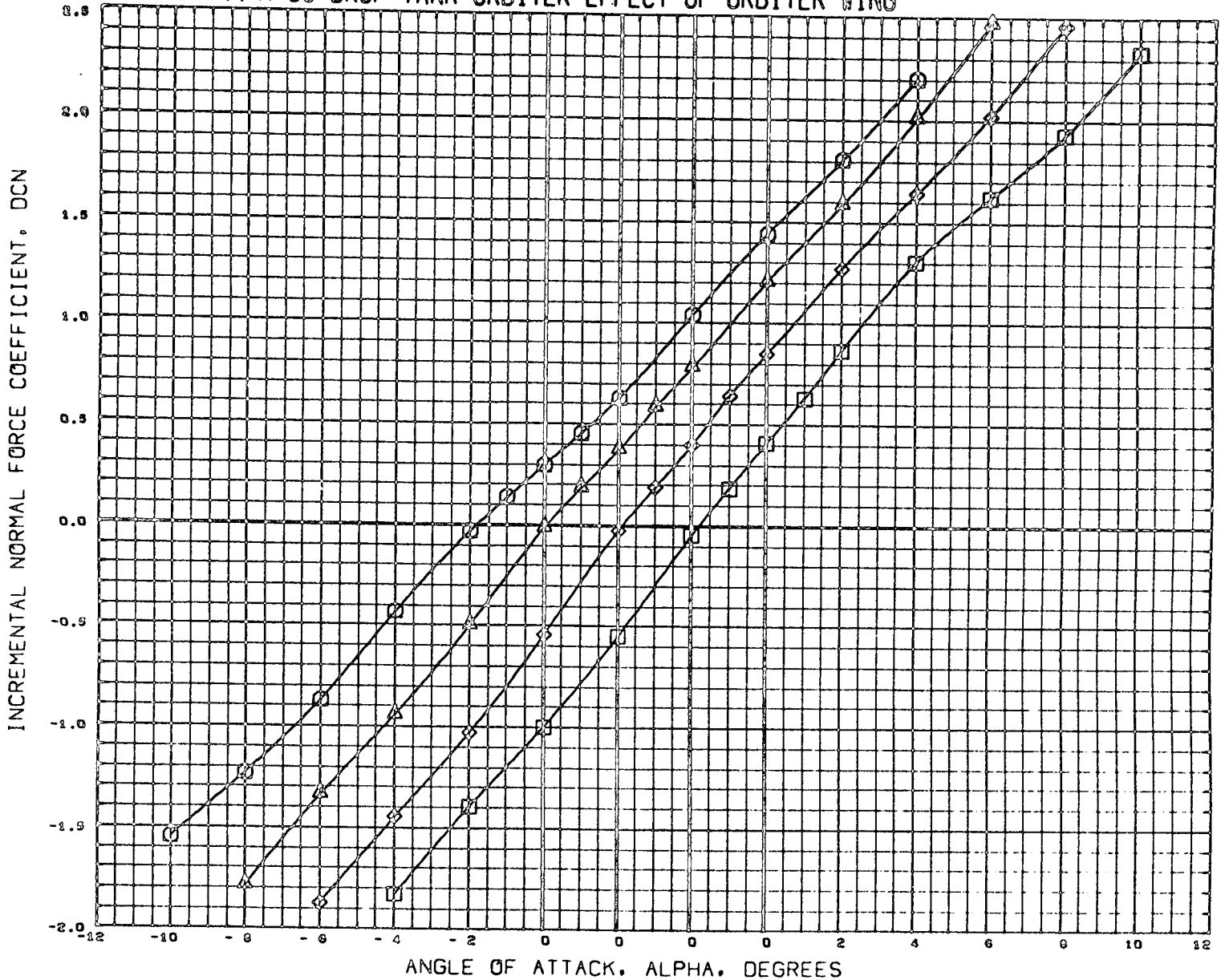


SYMBOL	MACH	PARAMETRIC VALUES	
○	0.900	ALPHA	0.000
◇	1.000	PHI	90.000
◇	1.100		
□	1.200		
△	1.360		

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCT#A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

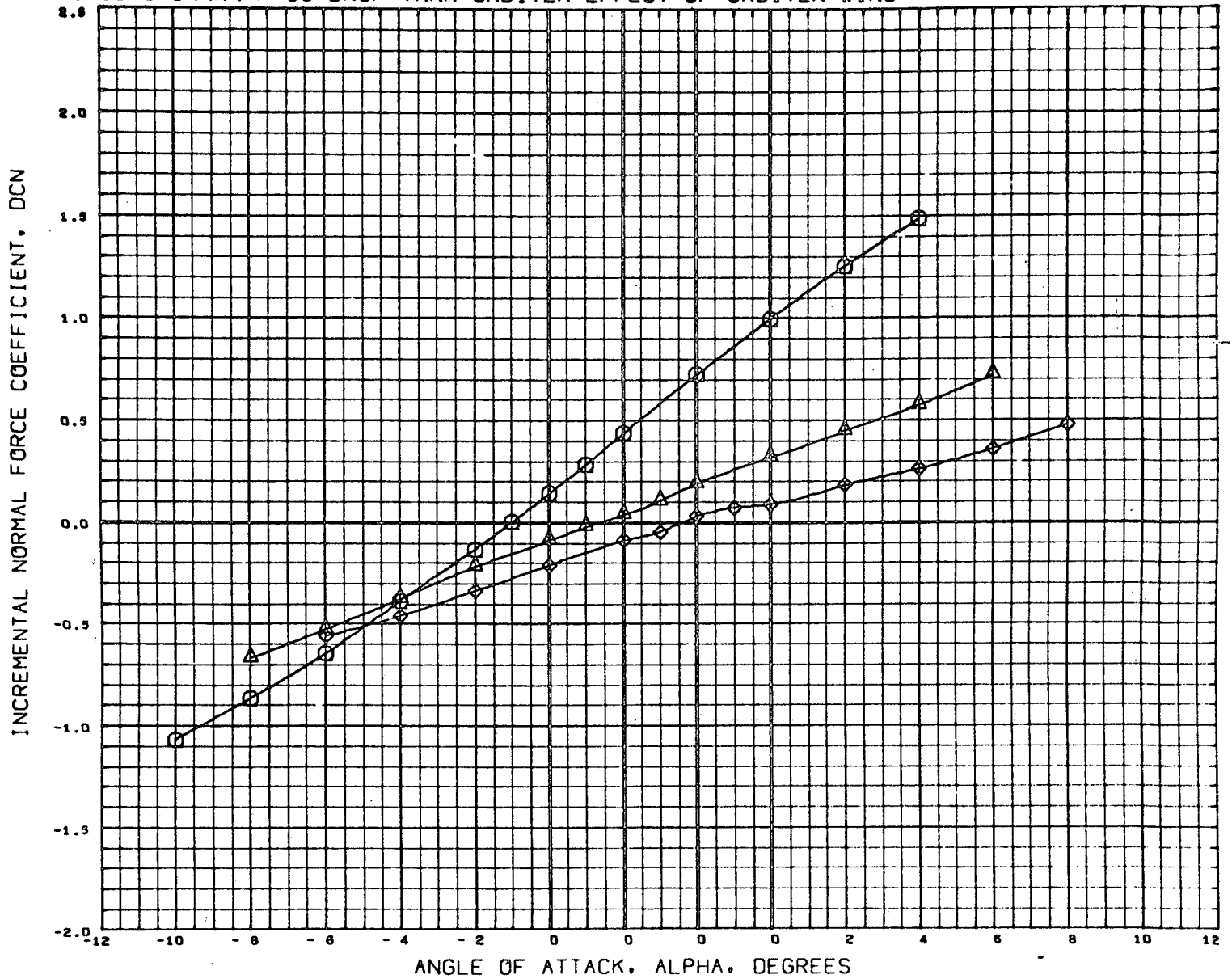


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
◇	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



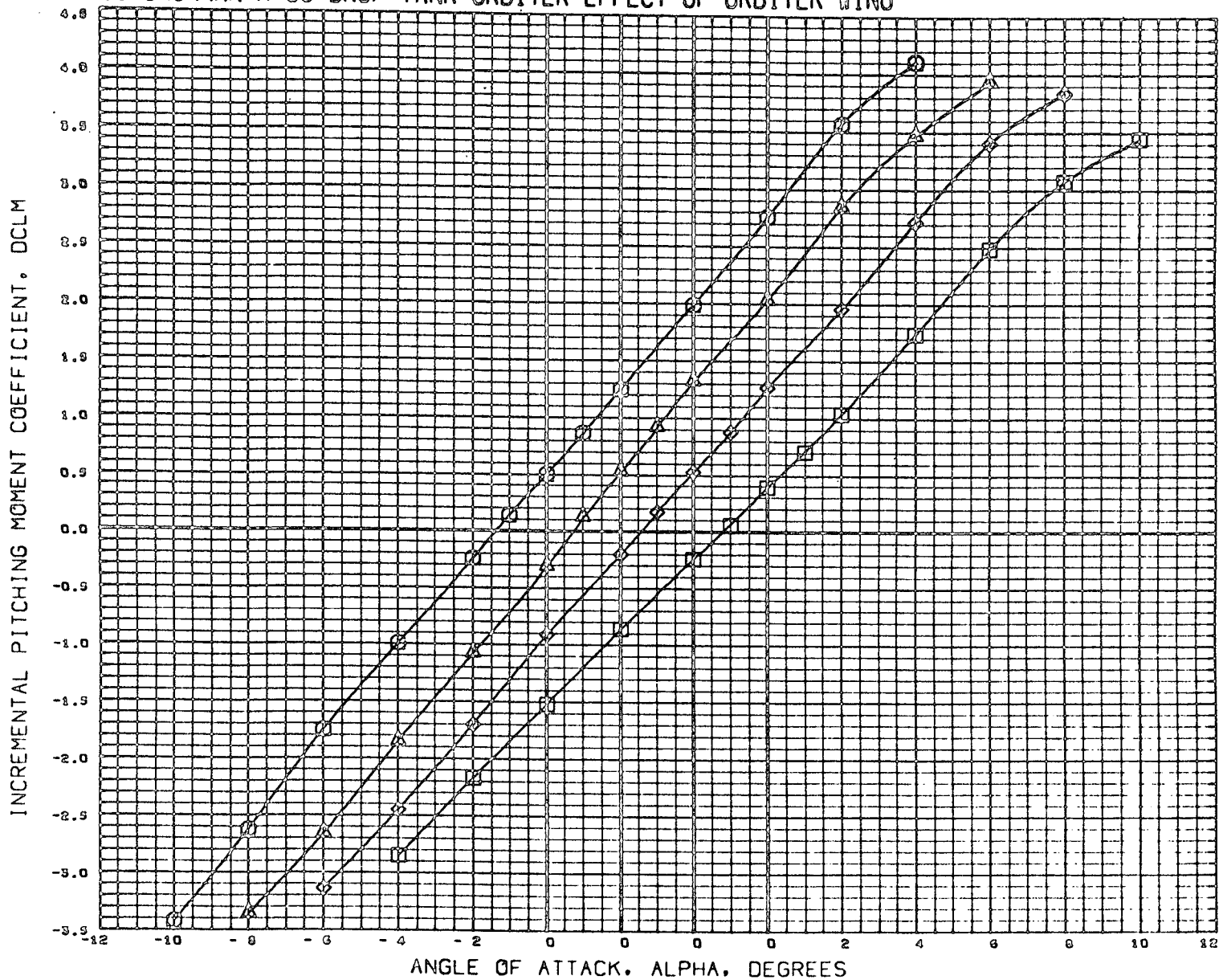
SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.500	WNGIN	0.000		
◇	4.960				

REFERENCE INFORMATION		
SREF	1.3960	90 IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC14C

C9

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

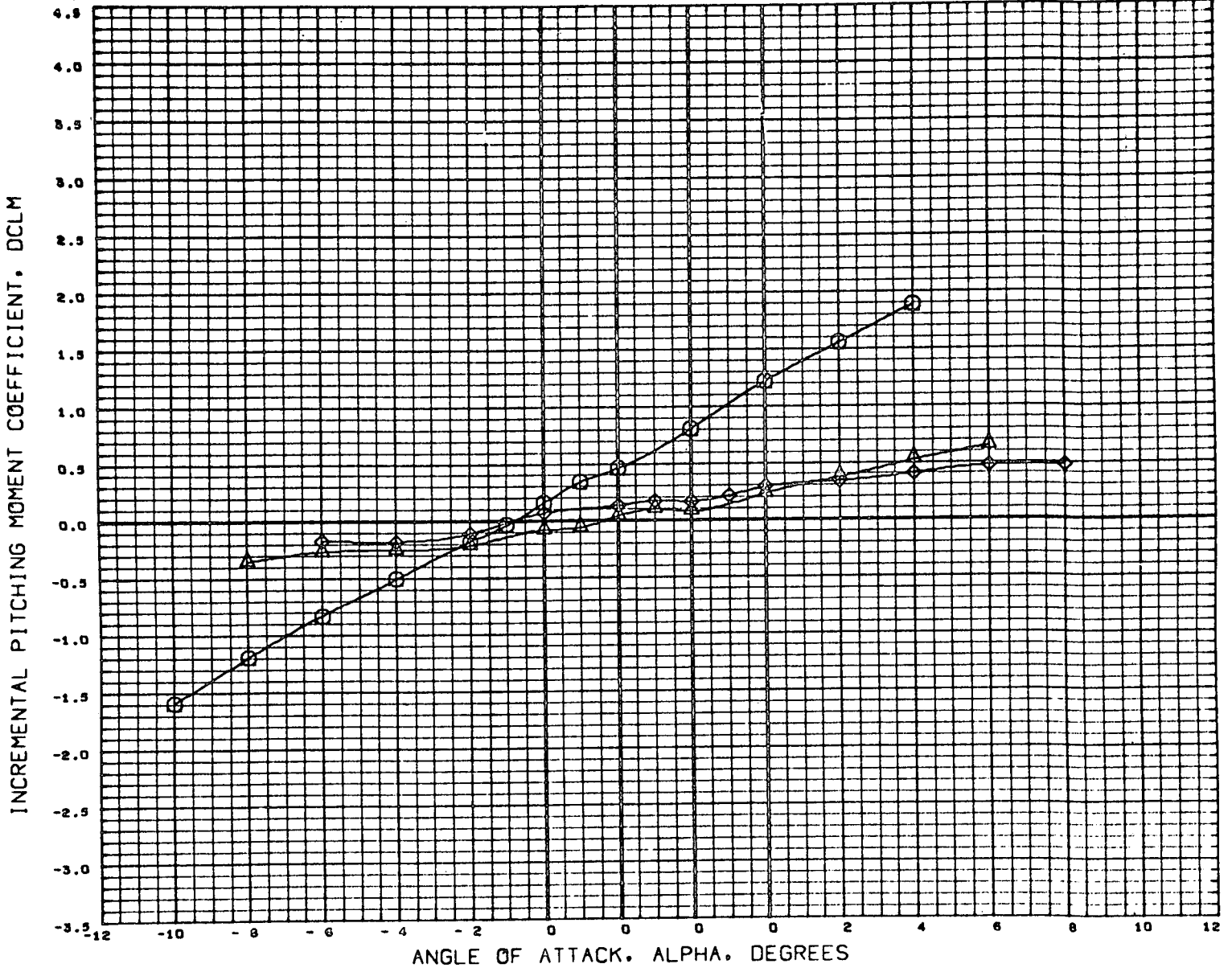


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA MIST. CODE CCCI* C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

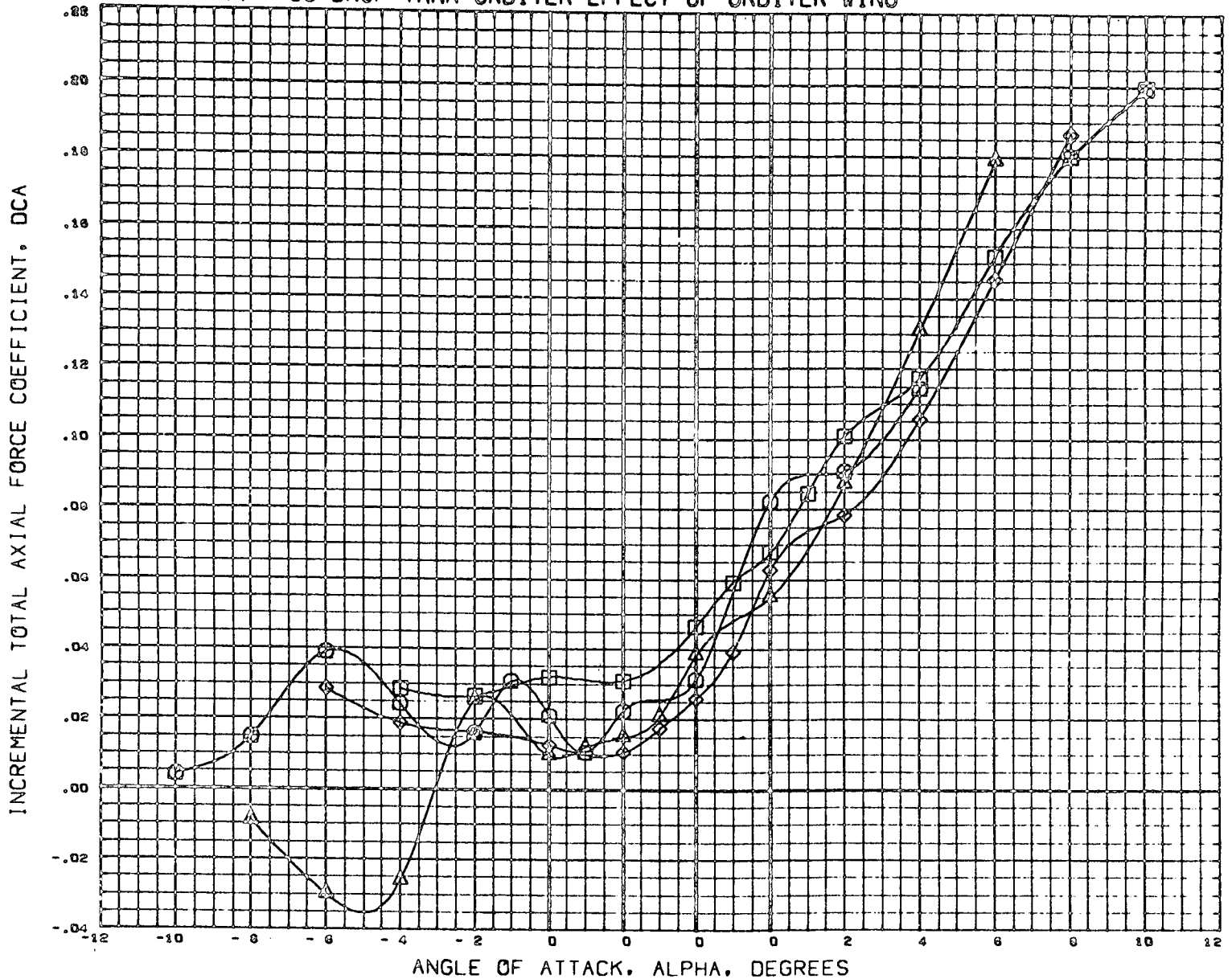


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.500	WNGIN	0.000		
◇	4.960				

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	5.3990	in.
YMRP	0.0000	in.
ZMRP	0.0000	in.
SCALE	0.0034	

DATA HIST. CODE CCCI+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

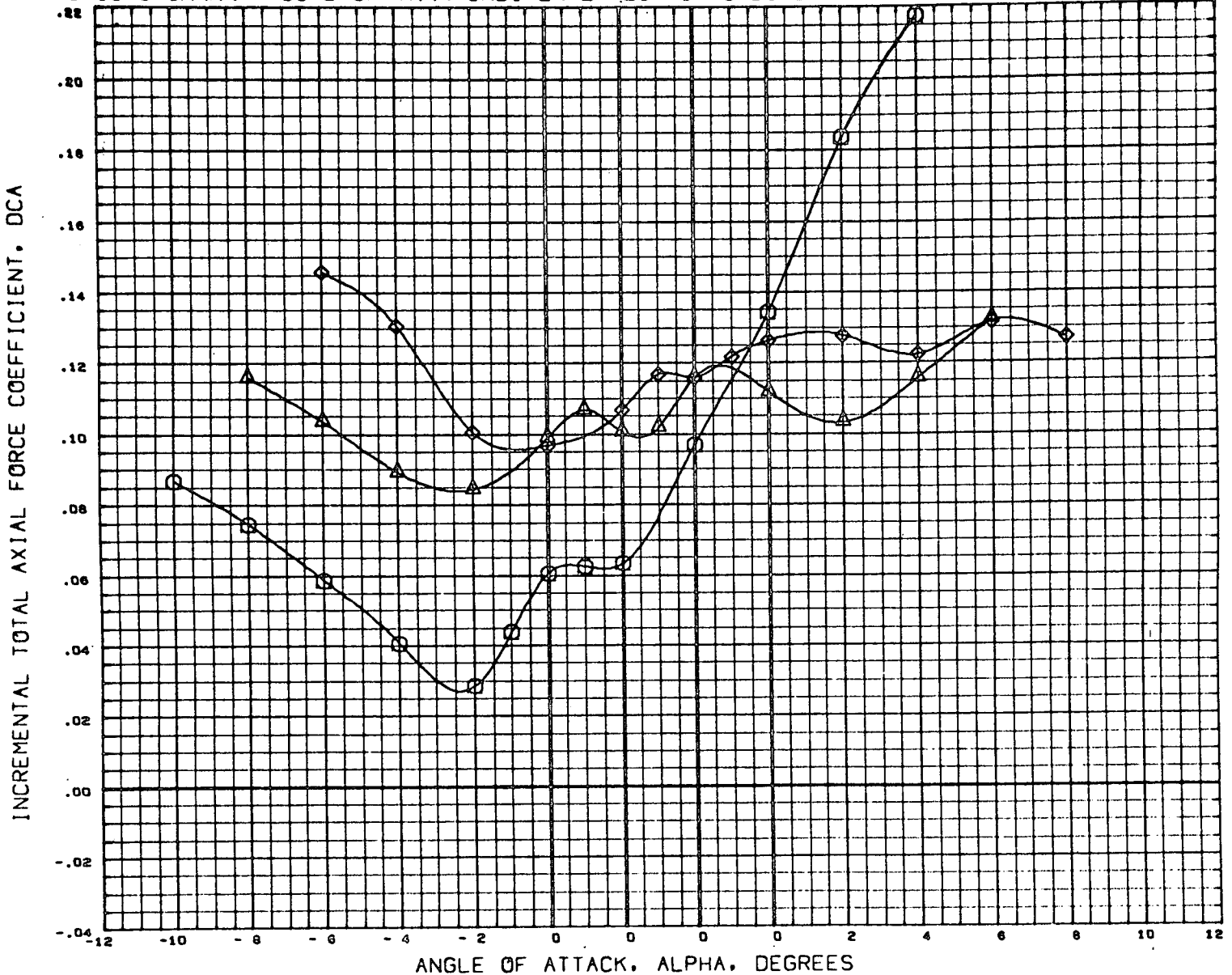


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA MIST. CODE CCC14C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

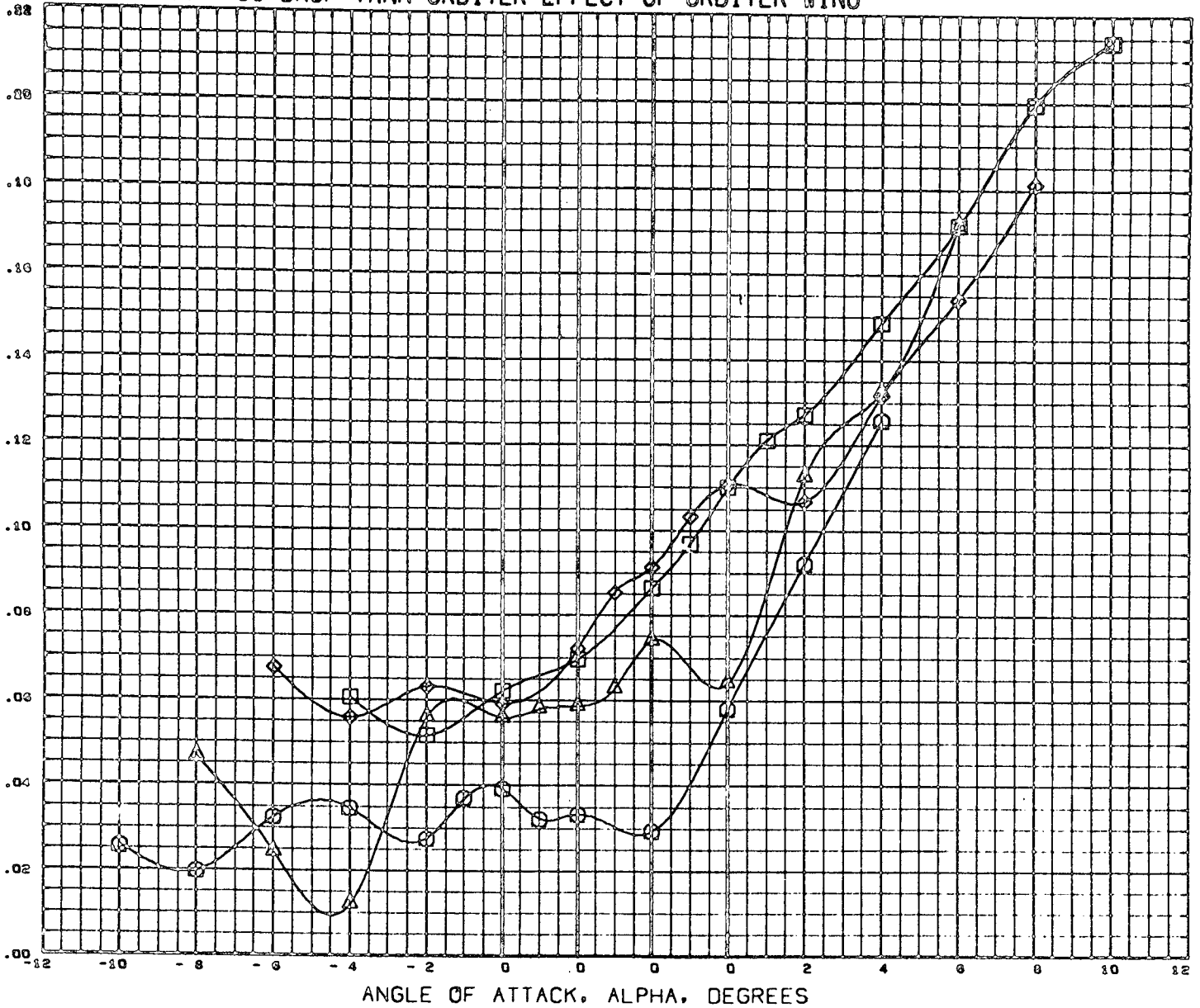


SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
○	1.960	BETA	0.000	PHI	0.000	SREF	1.3960	SQ. IN.
△	3.500	WNGIN	0.000			LREF	1.3330	IN.
◇	4.960					BREF	1.3330	IN.
						XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCI+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, DCAF

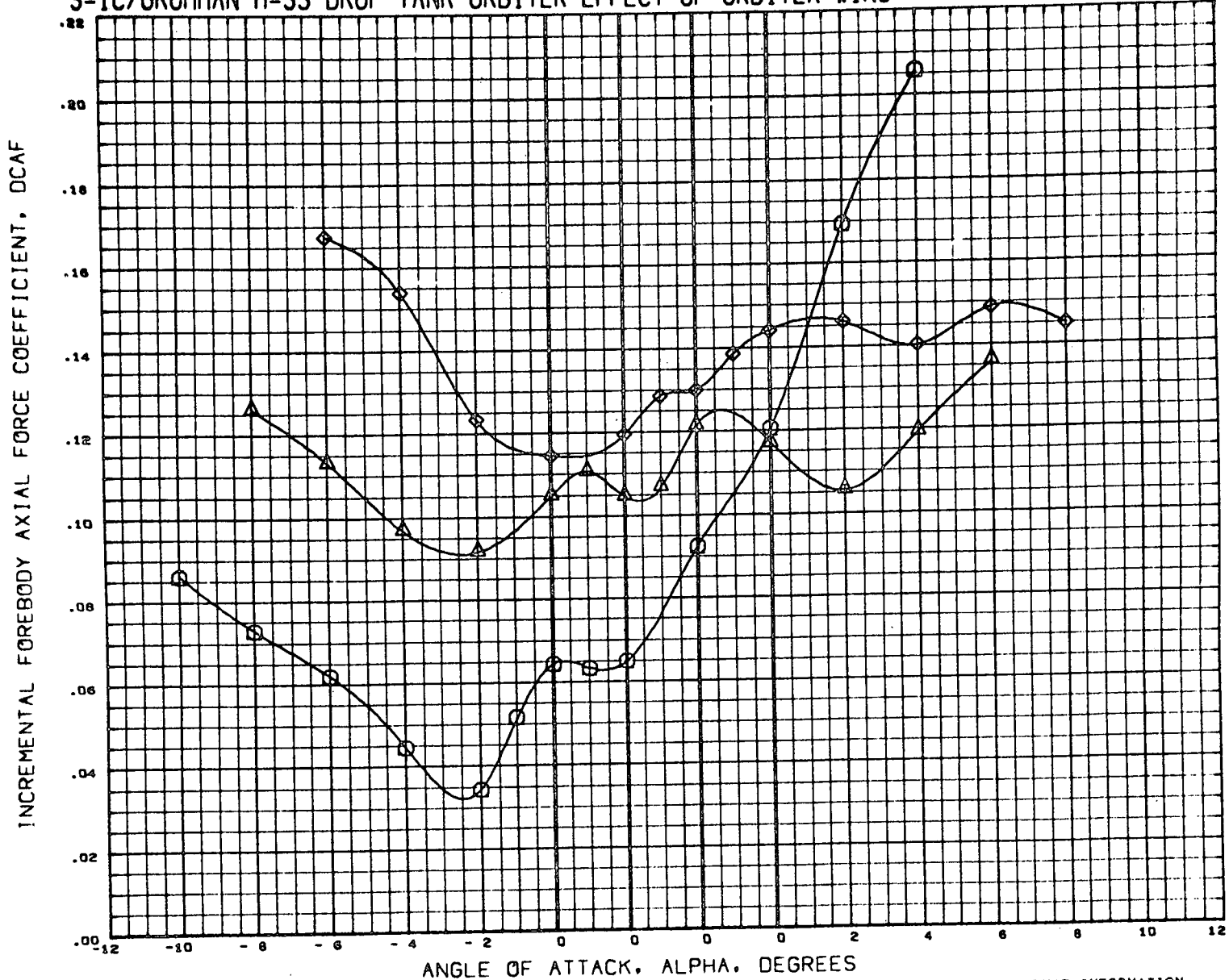


SYMBOL	MACH	PARAMETRIC VALUES			
○	0.900	BETA	0.000	PHI	0.000
△	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC14C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

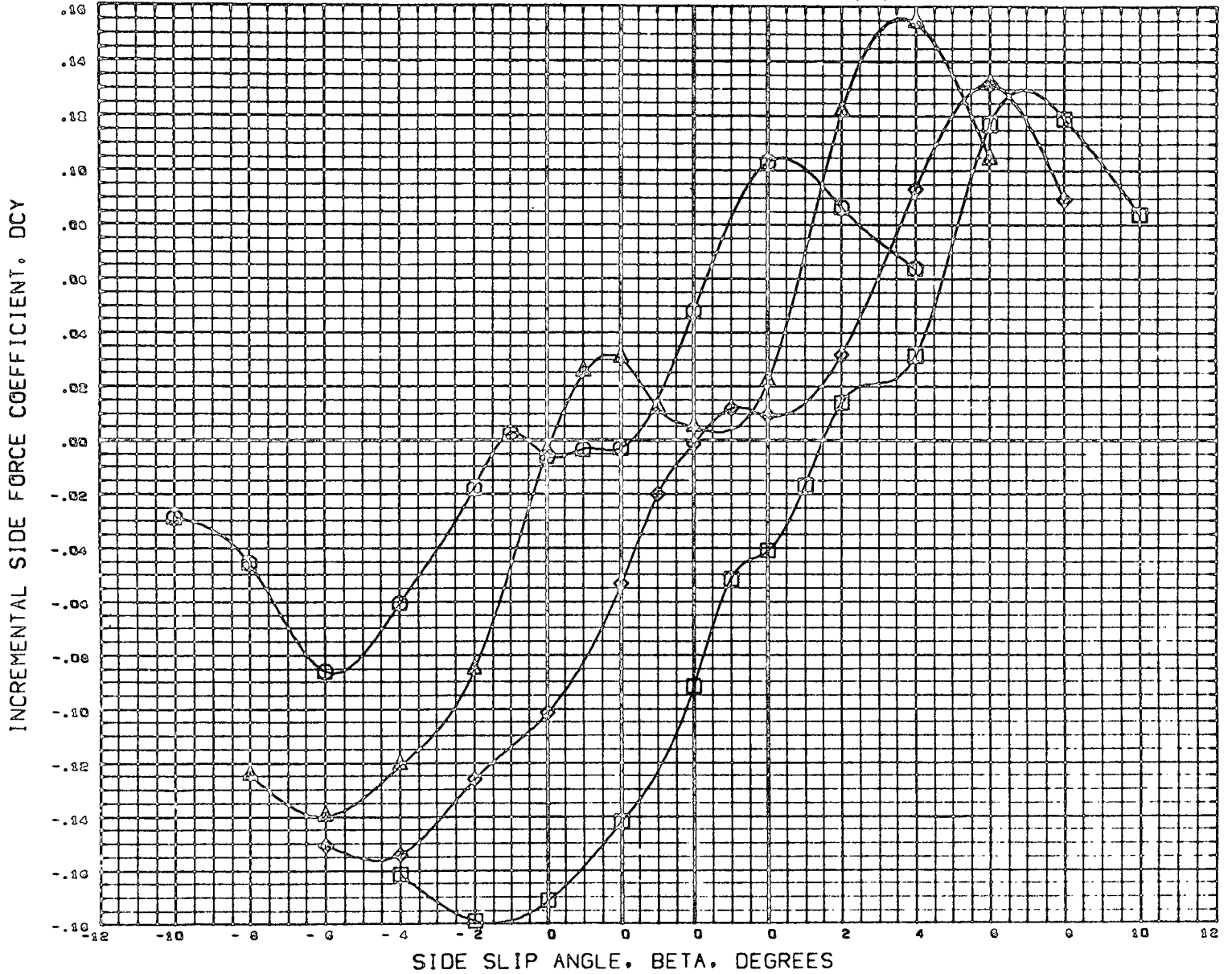


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	BETA	0.000	PHI	0.000
△	3.500	WINGIN	0.000		
◇	4.960				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

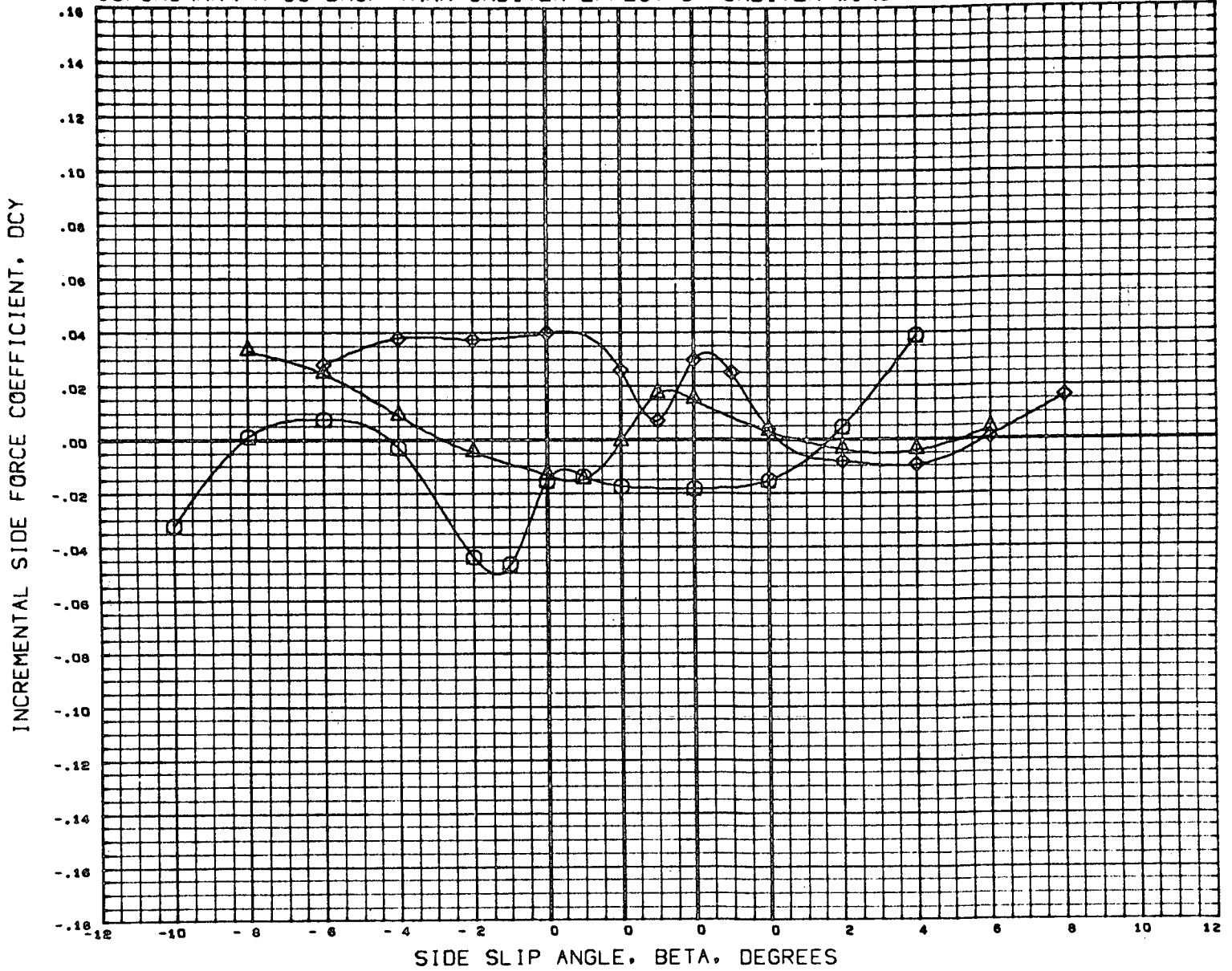


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	PHI	90.000
○	0.900		0.000		
△	1.000	WNGIN	0.000		
◇	1.100				
□	1.200				

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

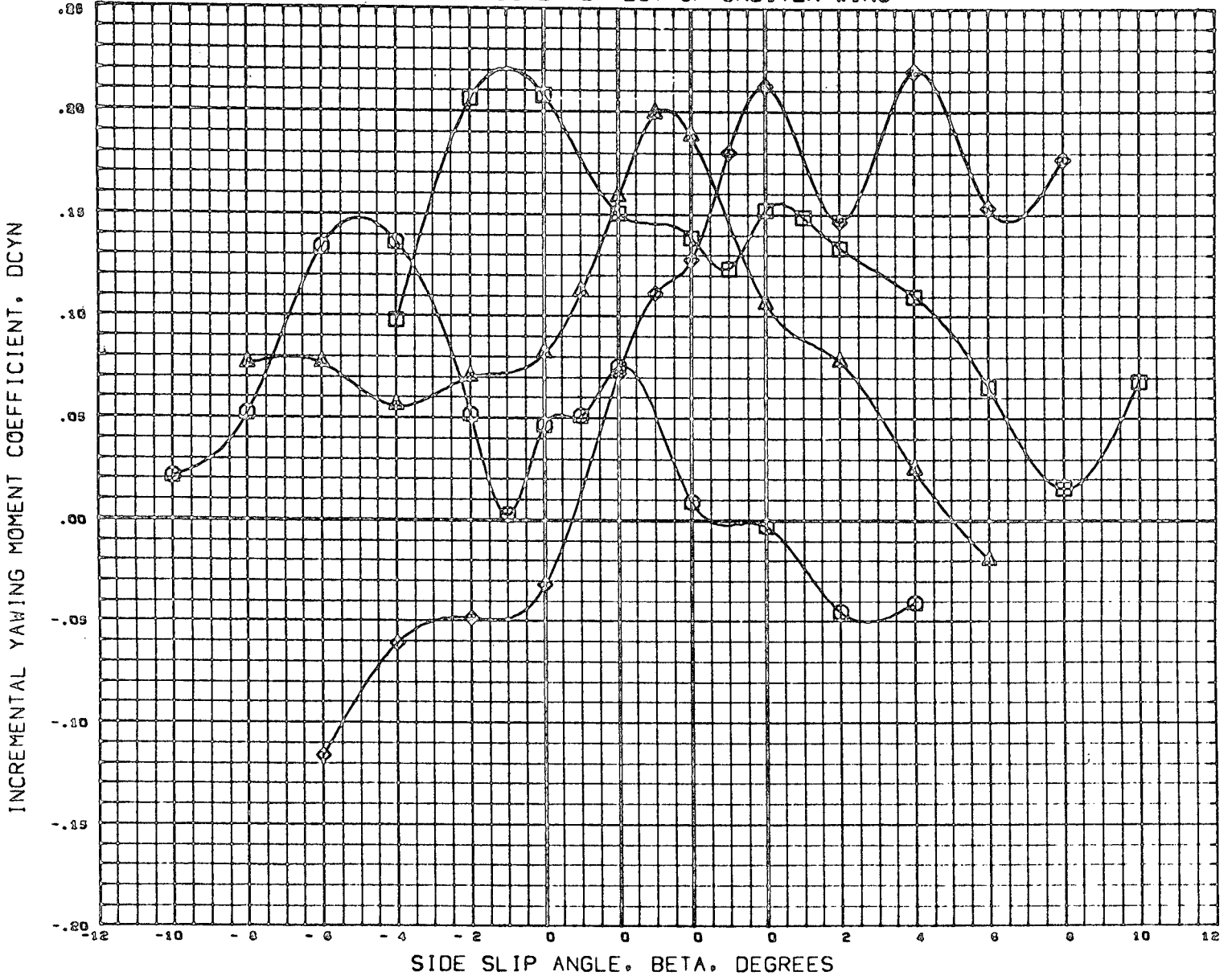


SYMBOL	MACH	PARAMETRIC VALUES			
○	1.960	ALPHA	0.000	PHI	90.000
△	3.500	WNGIN	0.000		
◇	4.960				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI9C

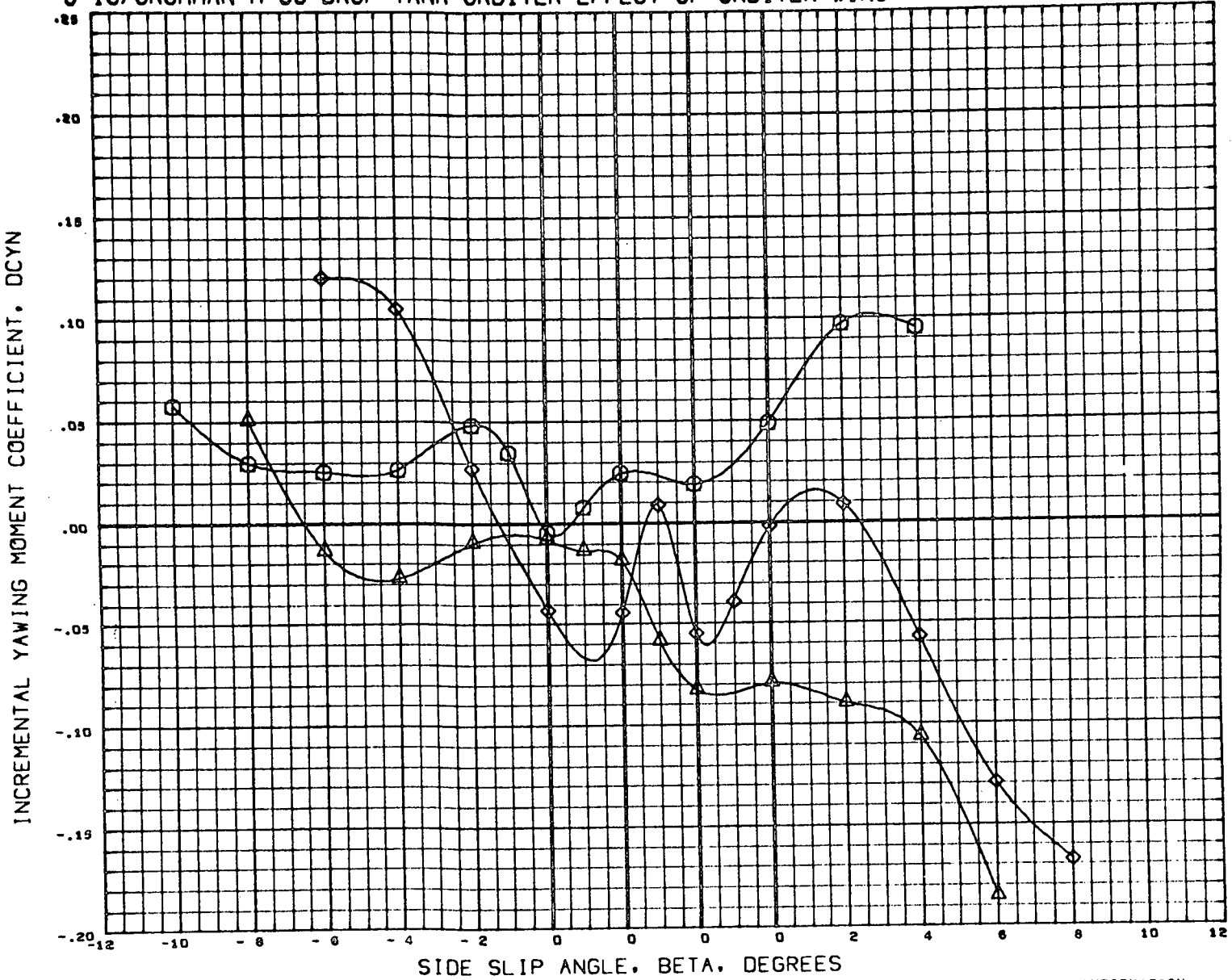
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
○	0.900	ALPHA	0.000	PHI	90.000	SREF	1.3960	SQ. IN.
◇	1.000	WNGIN	0.000			LREF	1.3330	IN.
△	1.100					BREF	1.3330	IN.
□	1.200					HMRP	3.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE CCCI*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

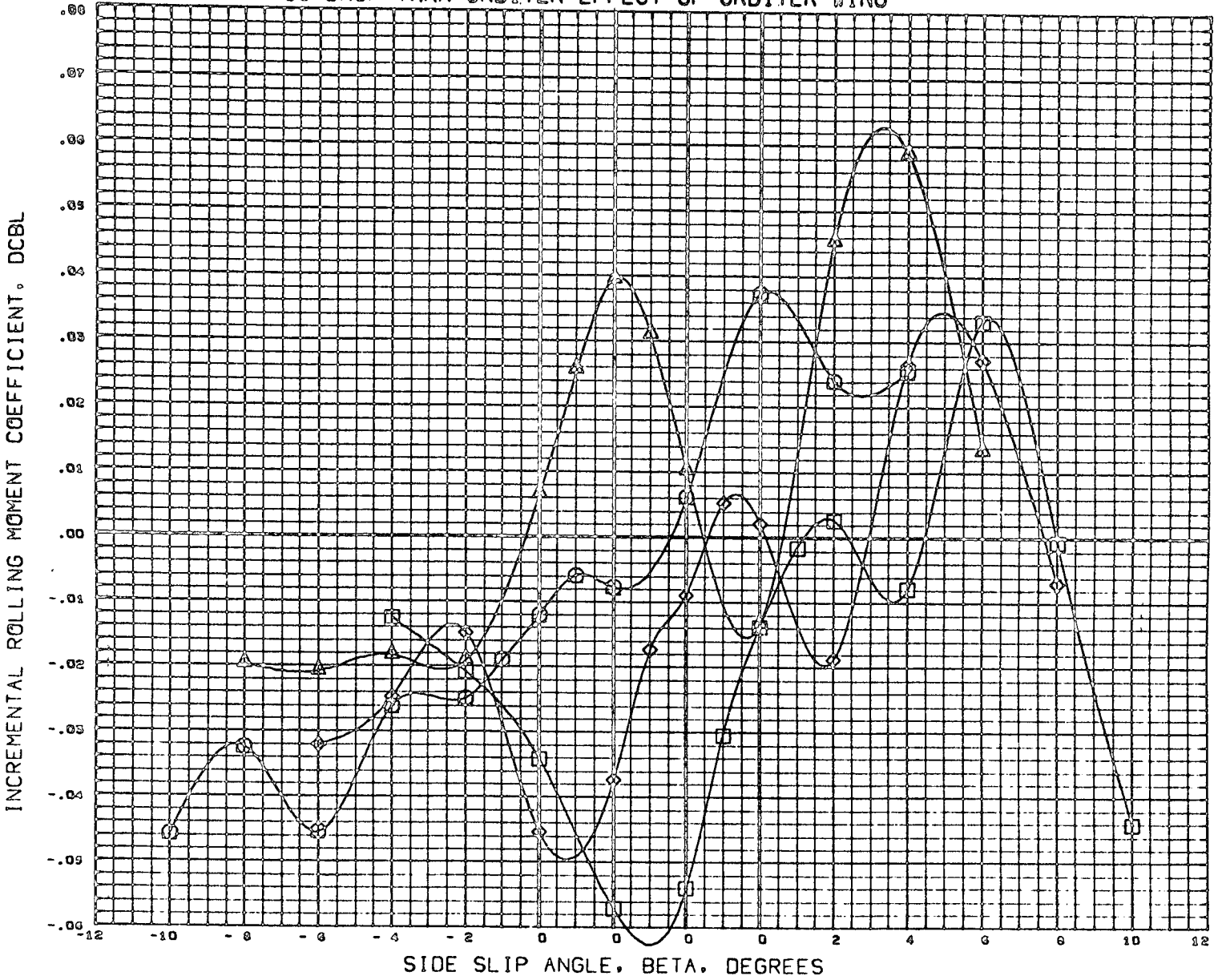


SYMBOL	MACH	PARAMETRIC VALUES		
◇	1.960	ALPHA	0.000	PHI 90.000
△	3.500	WNGIN	0.000	
□	4.960			

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC1+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

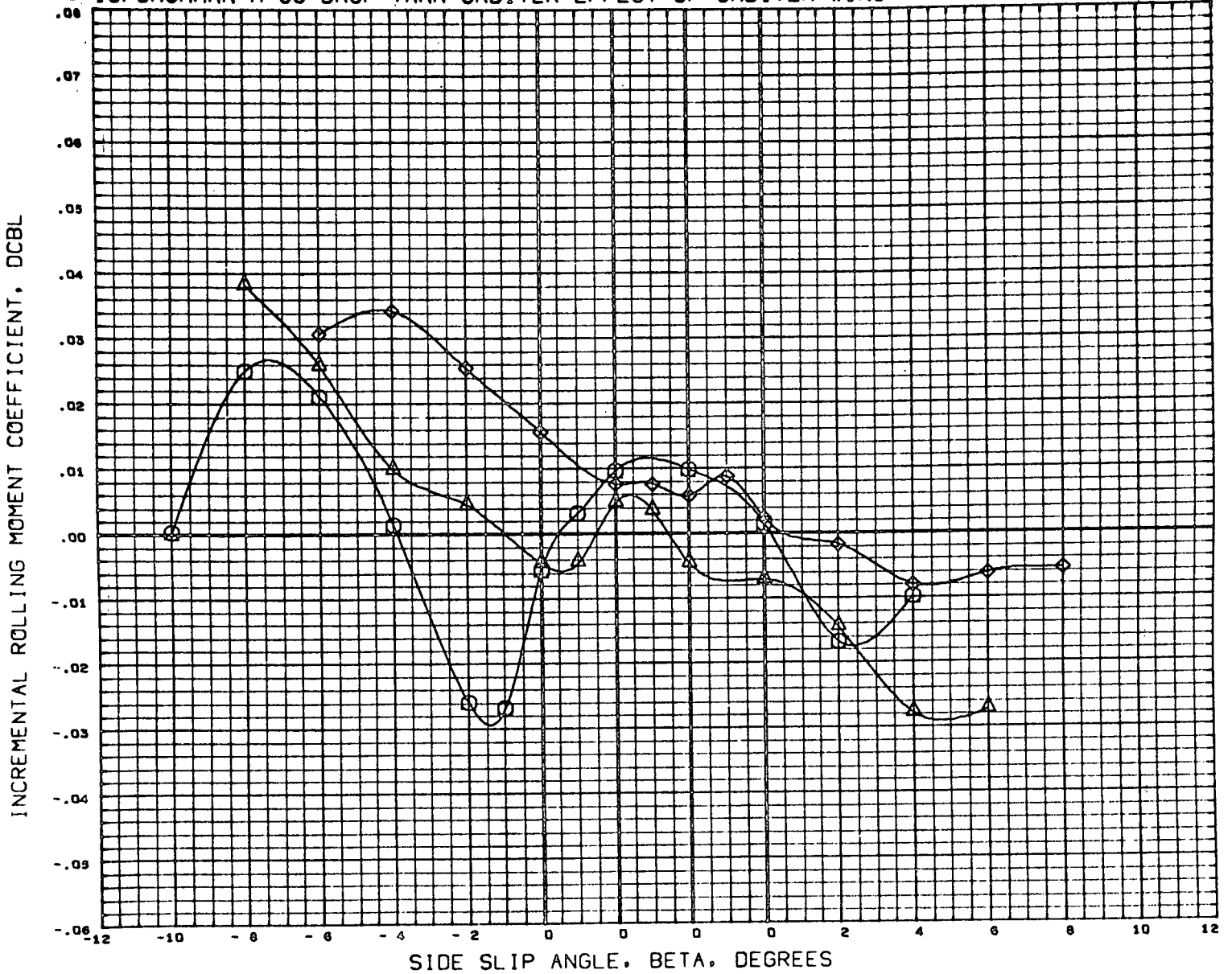


SYMBOL	MACH	PARAMETRIC VALUES		
○	0.900	ALPHA	0.000	PHI 90.000
△	1.000	WINGIN	0.000	
◇	1.100			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3980	SQ. IN.
LREF	1.3930	IN.
BREF	1.3930	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC14C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

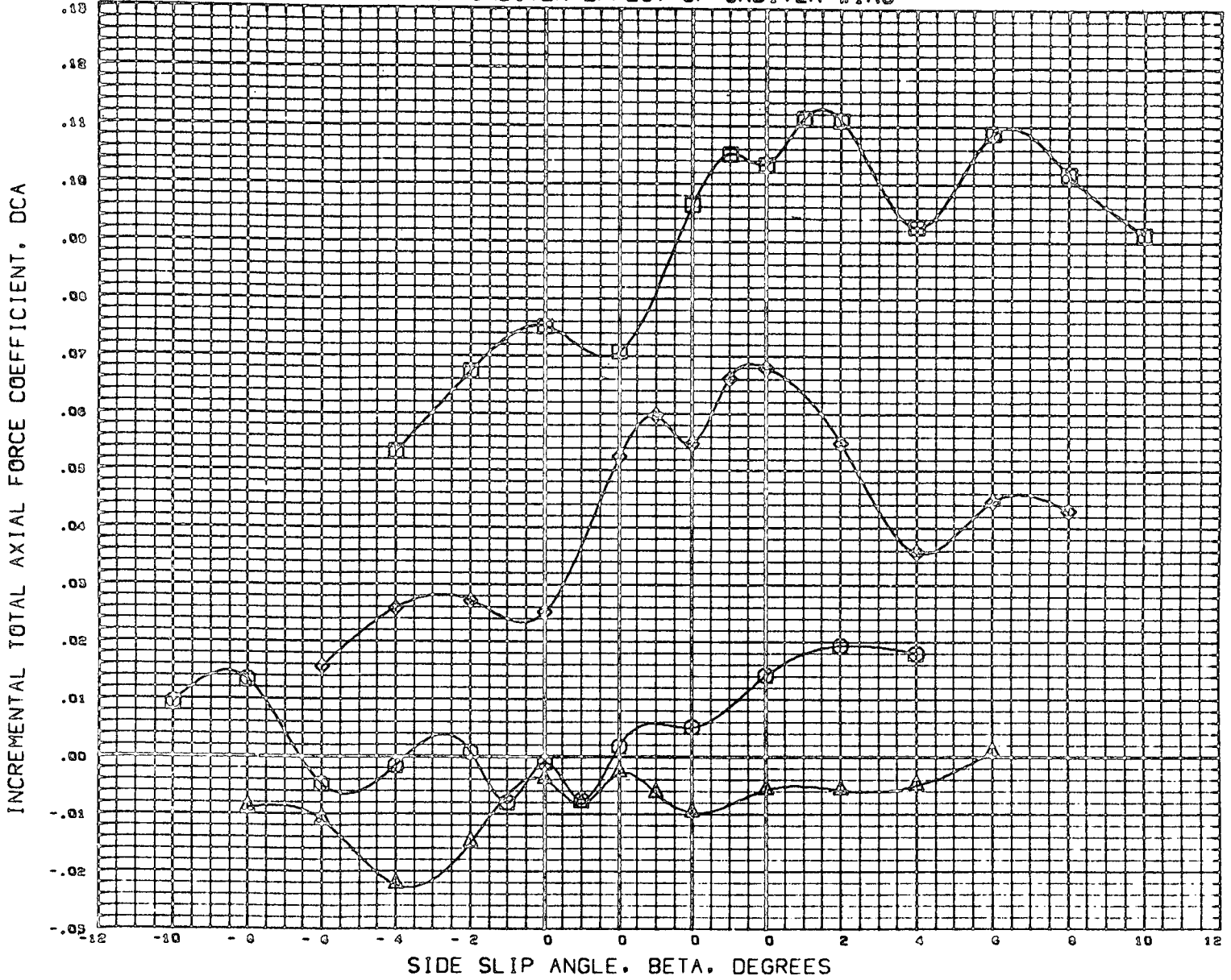


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES		
○	1.960		0.000	PHI	90.000
△	3.300	WNGIN	0.000		
◇	4.960				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST: CODE CCCI*0

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

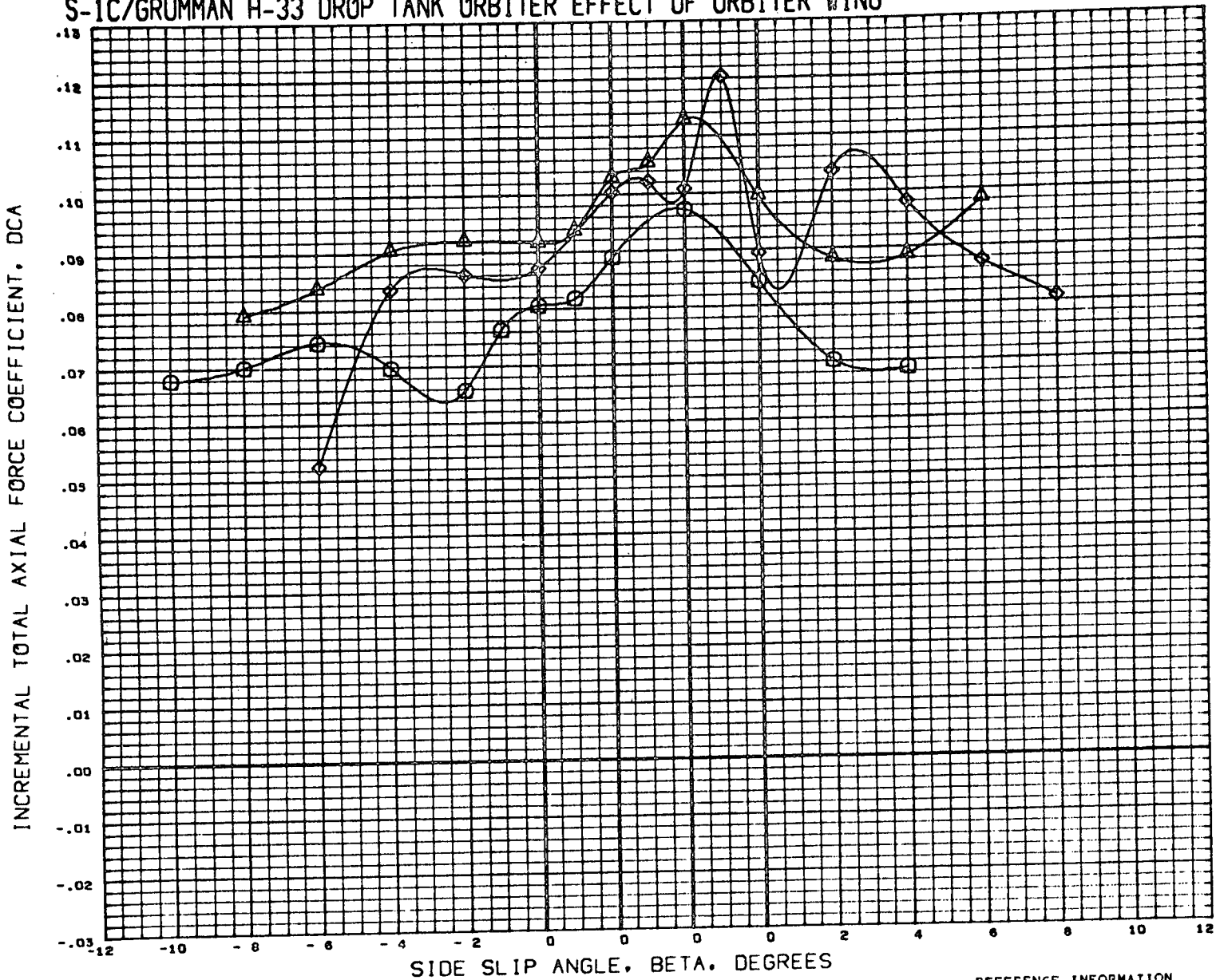


SYMBOL	MACH	PARAMETRIC VALUES
○	0.900	ALPHA 0.000 PHI 90.000
◇	1.000	WNGIN 0.000
△	1.100	
□	1.200	

REFERENCE INFORMATION		
SREF	1.3960	90 IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCI*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

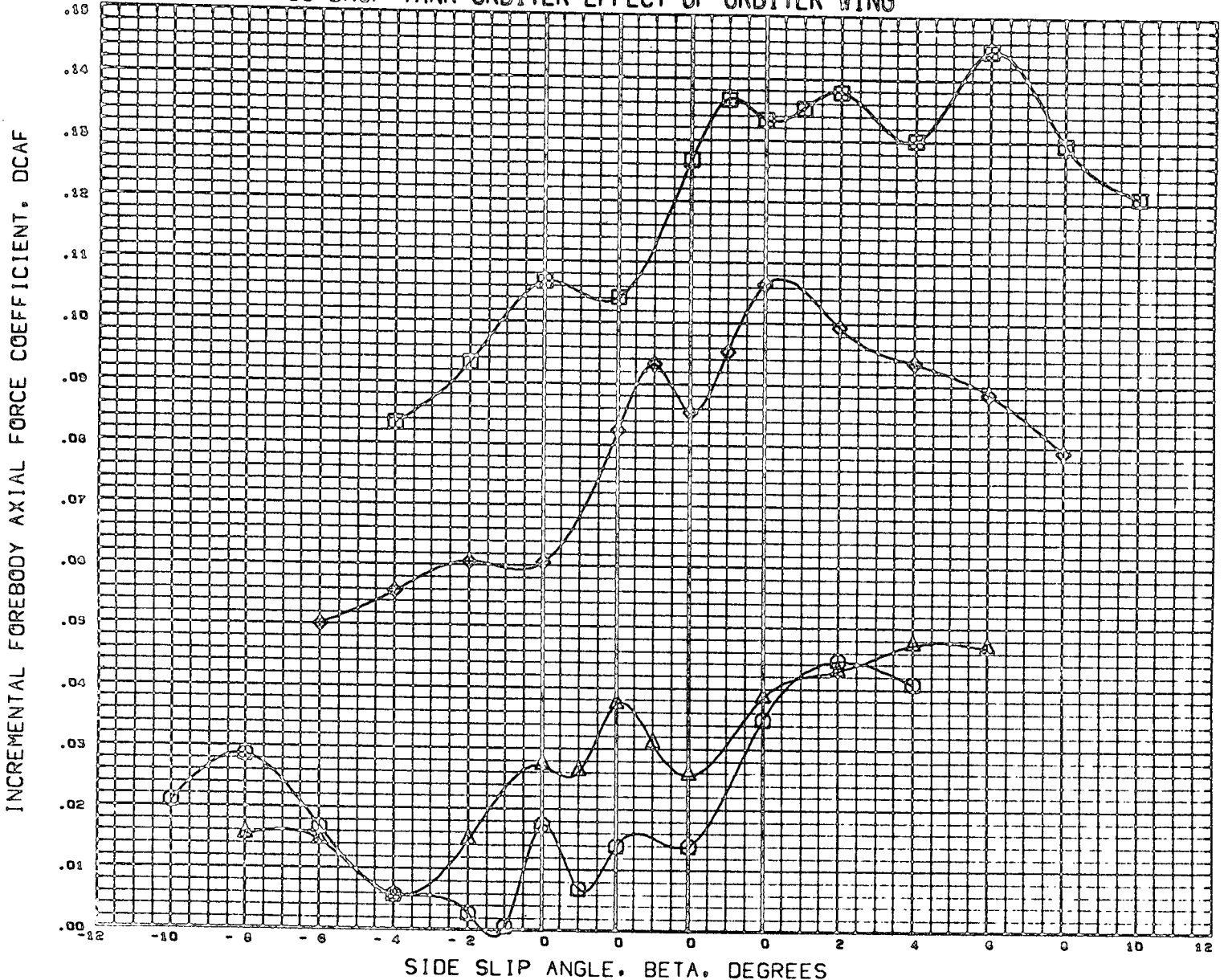


SYMBOL	MACH	PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI 90.000
△	3.900	WNGIN	0.000	
◇	4.960			

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC1*6

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

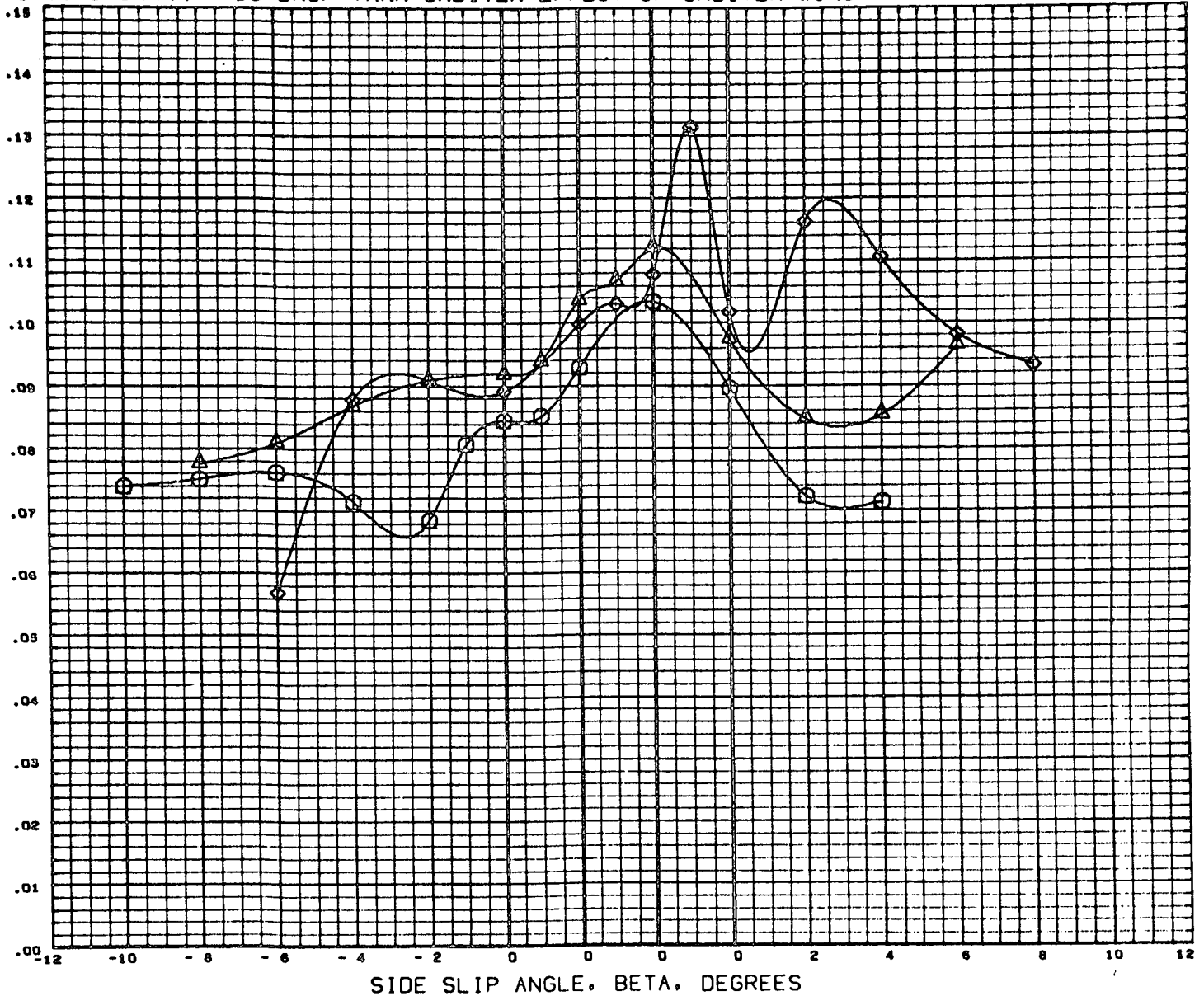


SYMBOL MACH PARAMETRIC VALUES
 ○ 0.900 ALPHA 0.000 PHI 90.000
 △ 1.000 ANGIN 0.000
 ◇ 1.100
 □ 1.200
 DAYA MIST. CODE CCC1+C

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 9.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, DCAF

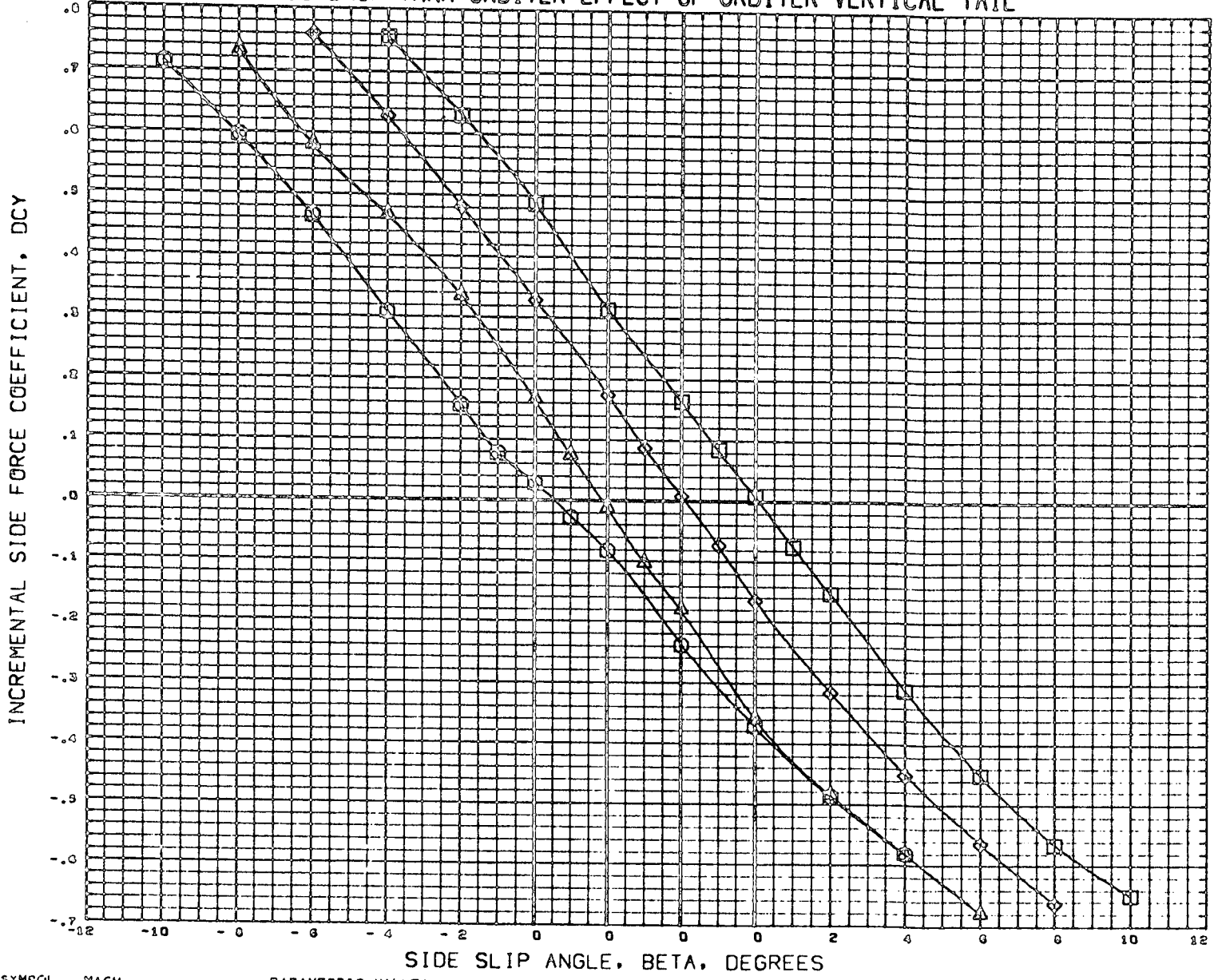


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	PHI	90.000
○	1.960	0.000			
△	3.900	WNGIN	0.000		
◇	4.960				

REFERENCE INFORMATION		
SREF	1.3960	50. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCC19C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

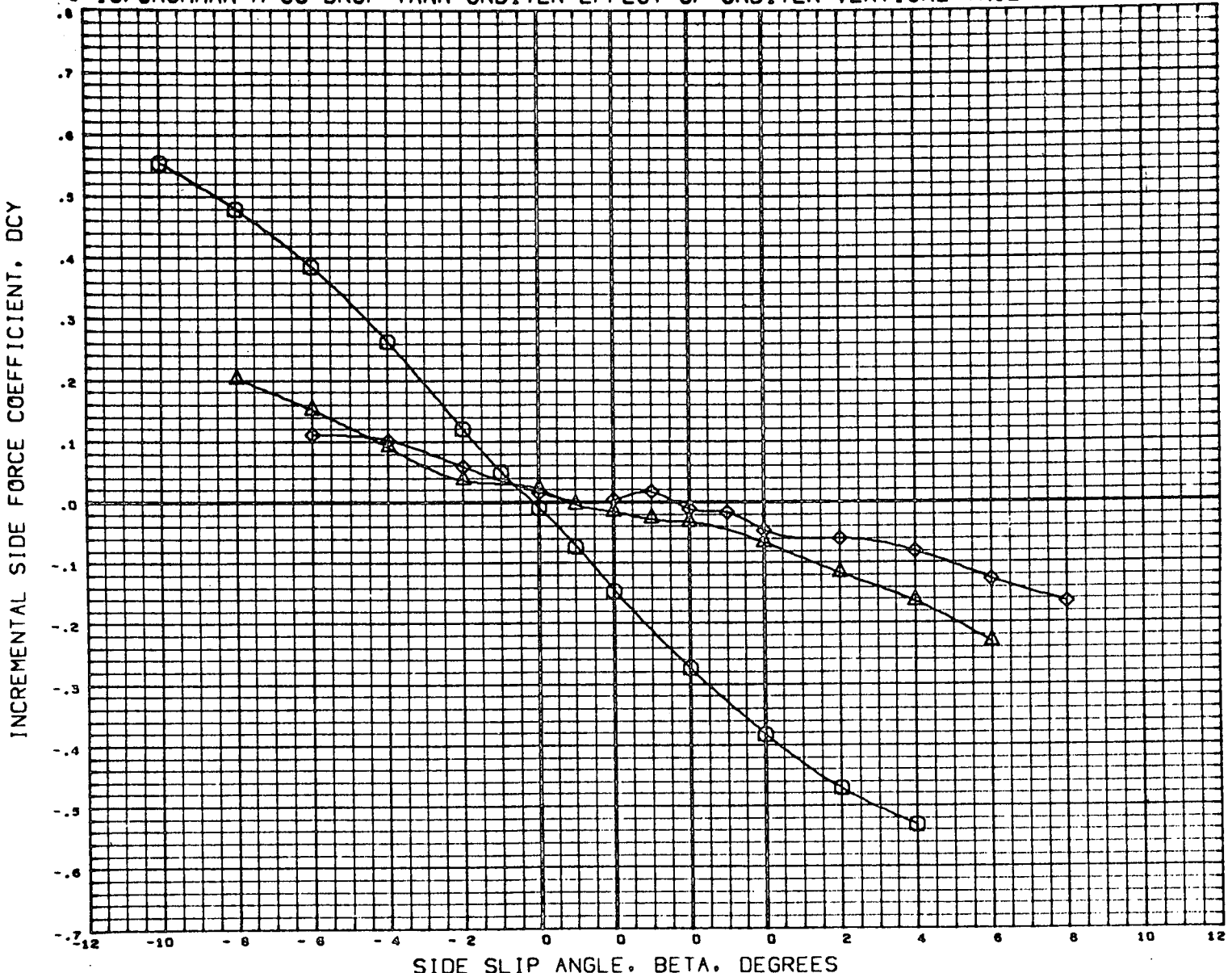


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
○	0.900	0.000	PHI	90.000
◇	1.000			
△	1.100			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCC1#A*C

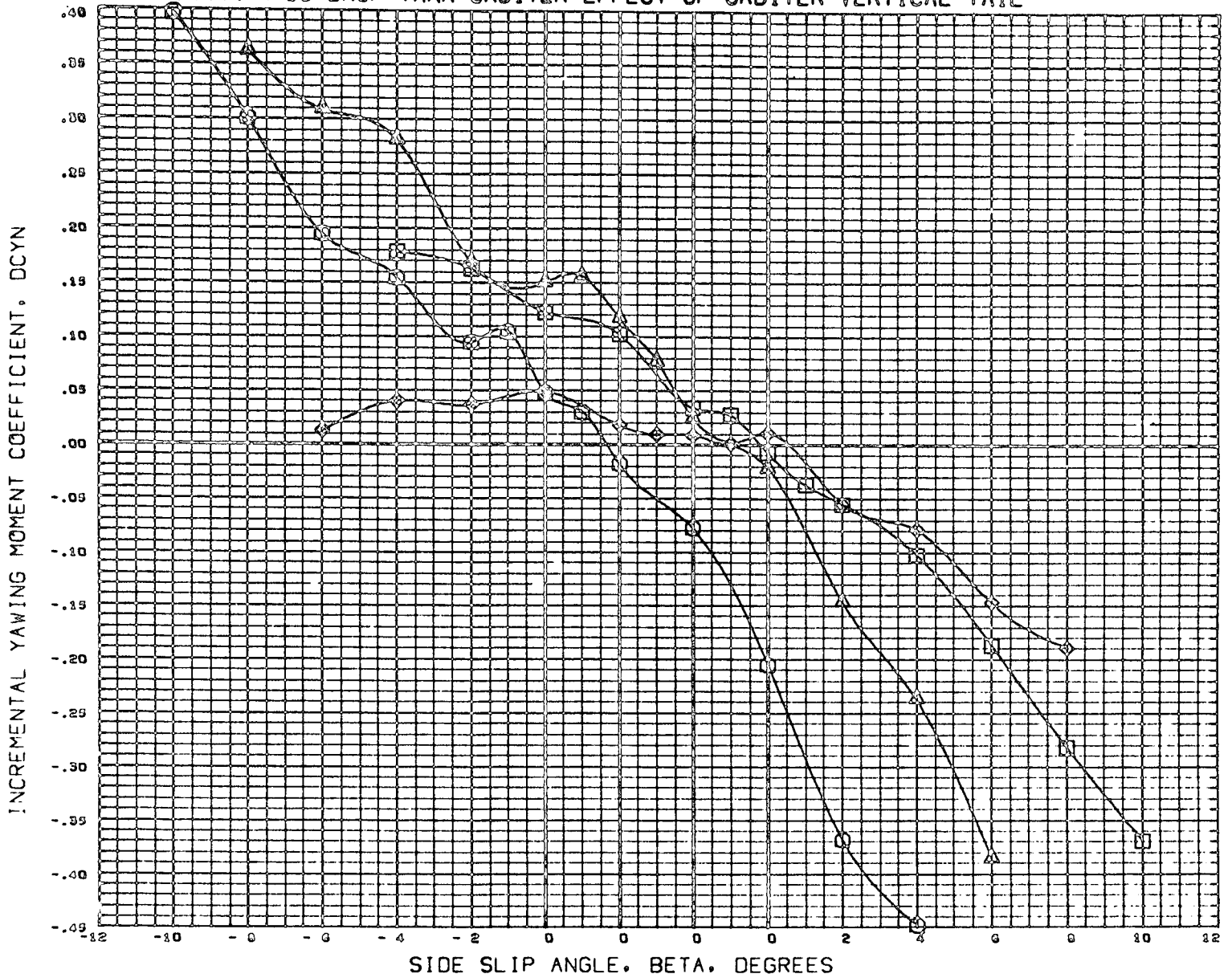
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL ○ △ ◇	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION			
	1.960	ALPHA	0.000	PHI	90.000	SREF	1.3960	SO, IN.
	3.500					LREF	1.3330	IN.
4.960						BREF	1.3330	IN.
						XMRP	5.3990	IN.
						YMRP	0.0000	IN.
						ZMRP	0.0000	IN.
						SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

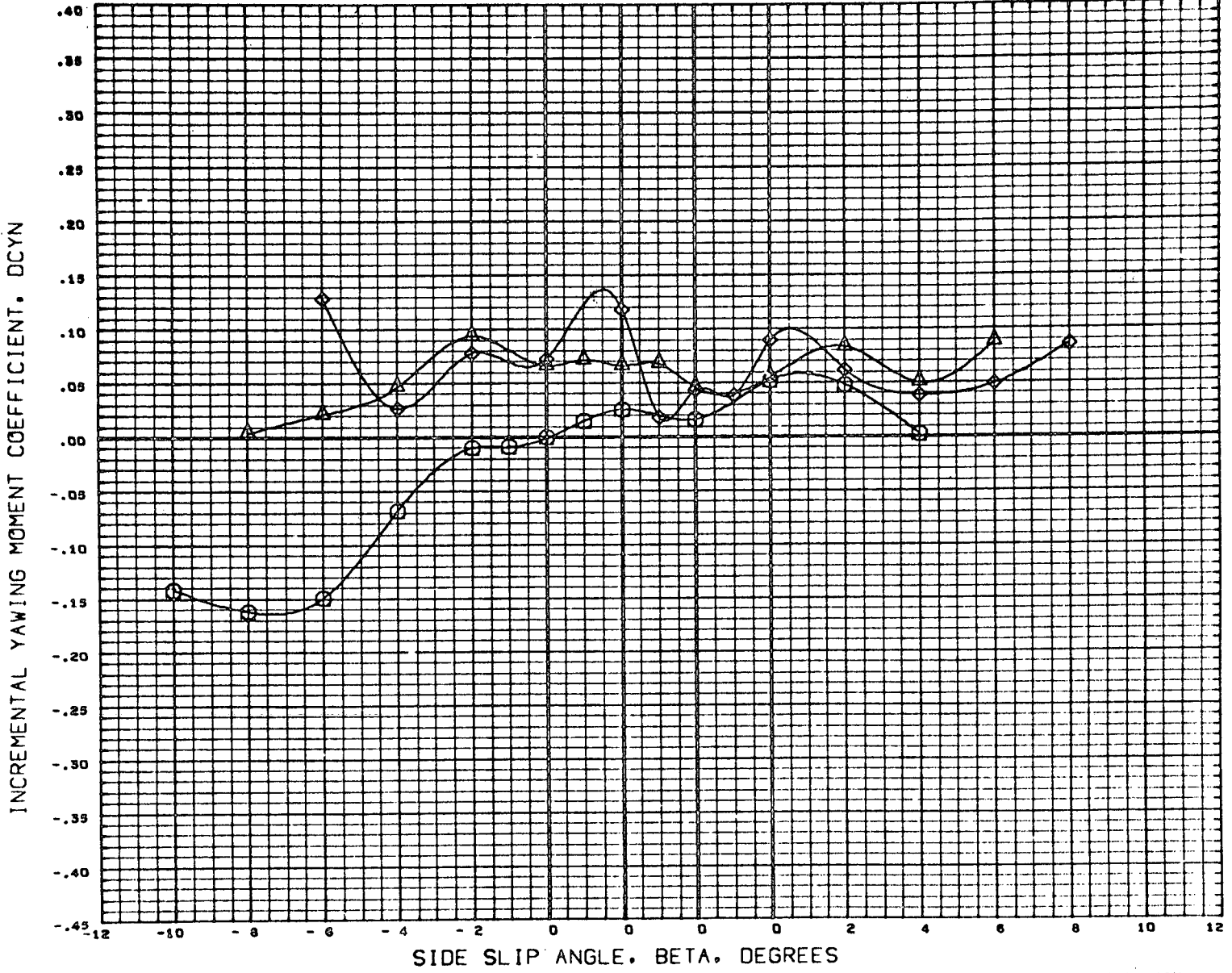
S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL	MACH	ALPHA	PARAMETRIC VALUES		REFERENCE INFORMATION	
○	0.900	0.000	PHI	90.000	SREF	1.3960 90. IN.
△	1.000				LREF	1.3330 IN.
◇	1.100				BREF	1.3330 IN.
□	1.200				XMRP	9.3990 IN.
					YMRP	0.0000 IN.
					ZMRP	0.0000 IN.
					SCALE	0.0034

DATA HIST. CODE *ACCCI*#A#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

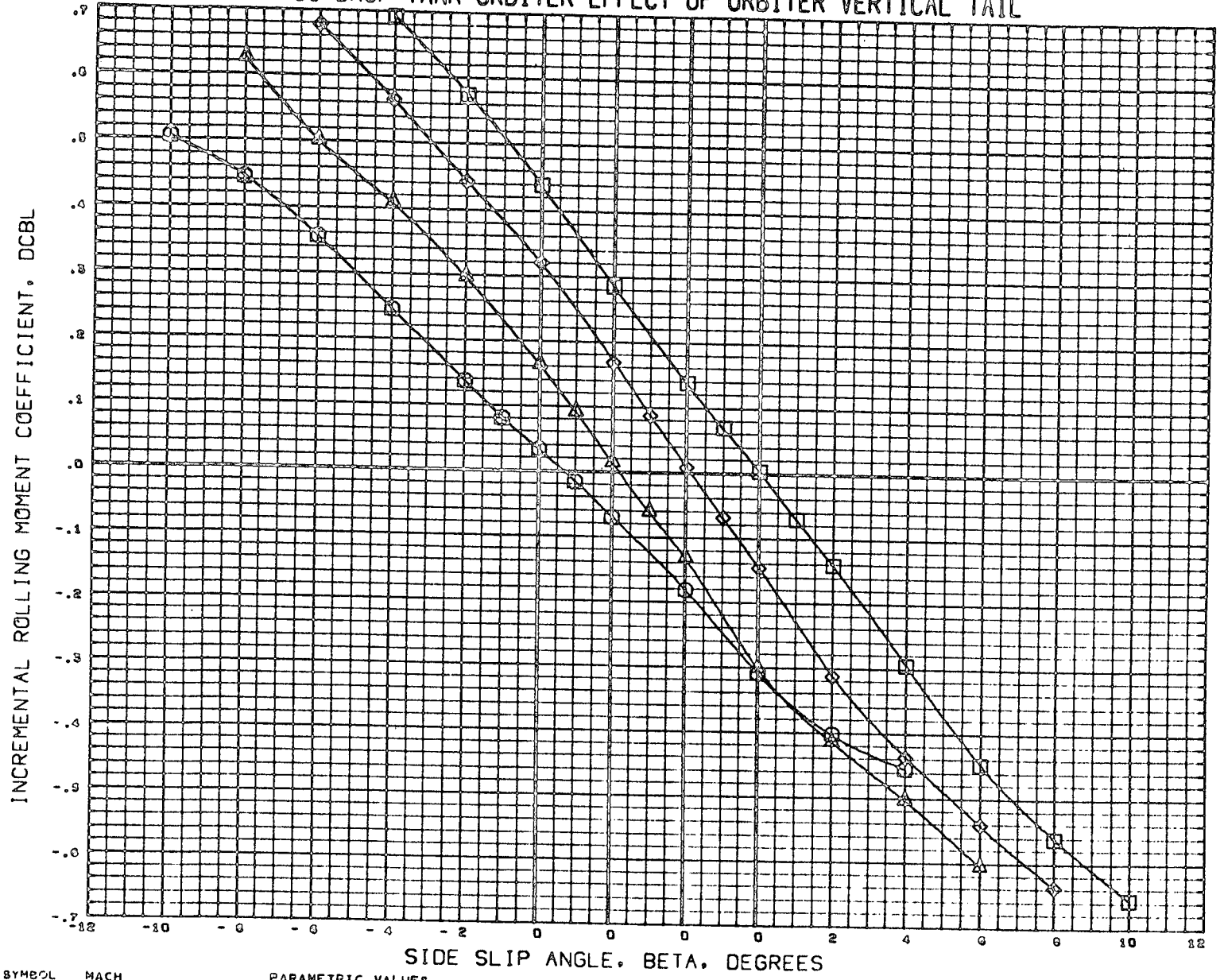


SYMBOL	MACH	PARAMETRIC VALUES		
○	1.960	ALPHA	0.000	PHI 90.000
△	3.900			
◇	4.960			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



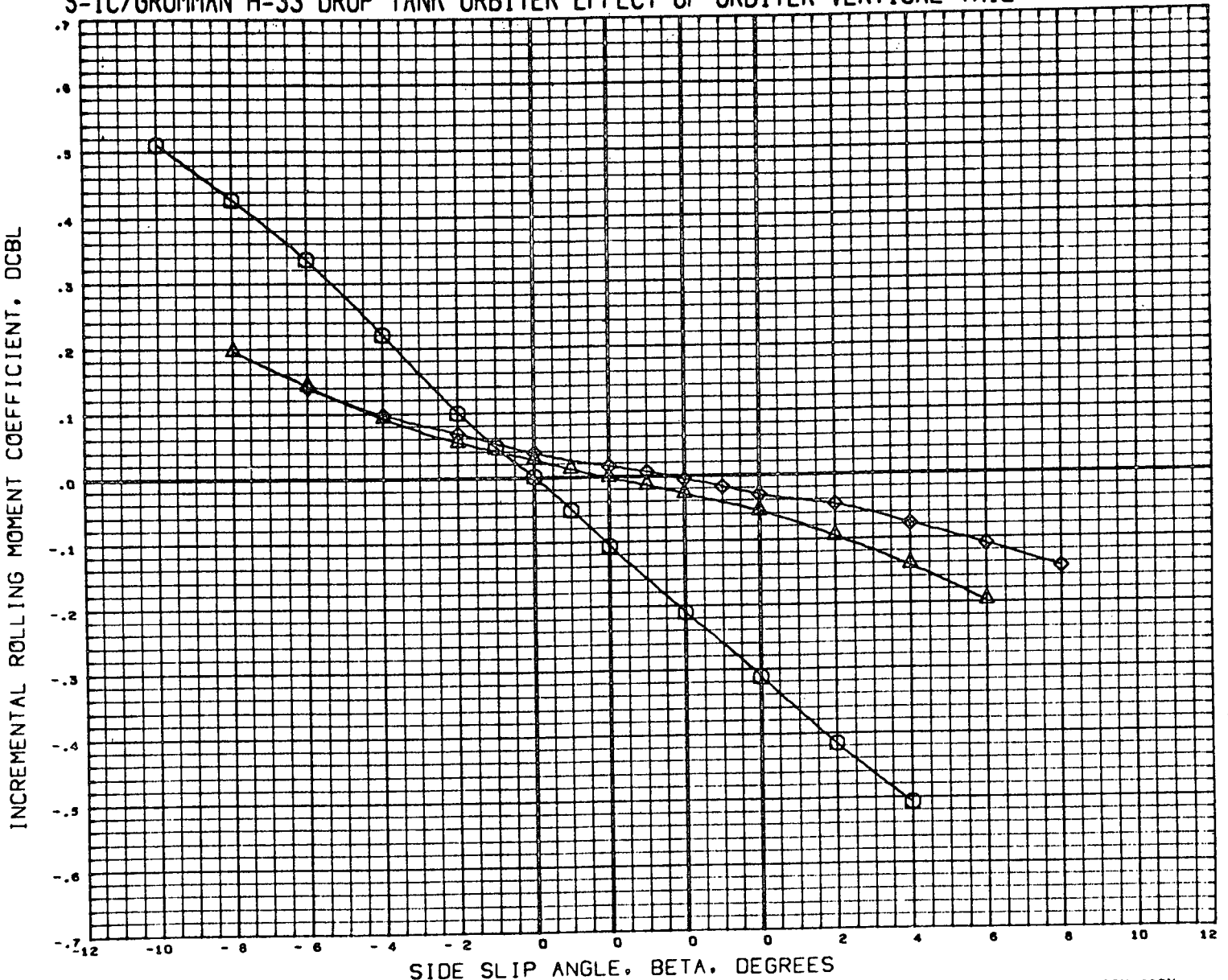
SYMBOL MACH
 ○ 0.900
 △ 1.000
 ◇ 1.100
 □ 1.200

PARAMETRIC VALUES
 ALPHA 0.000
 PHI 90.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

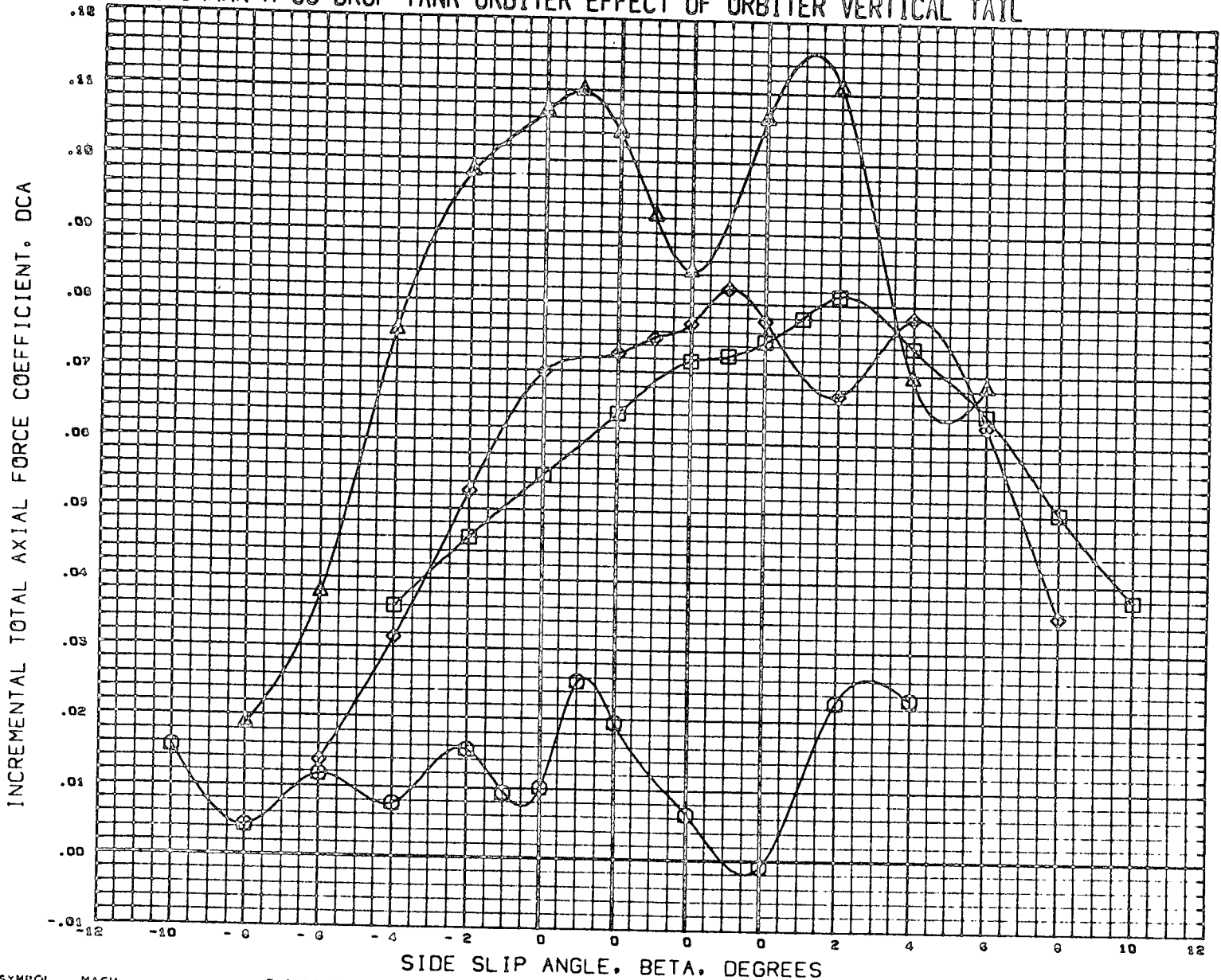


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
○	1.960	0.000	PHI	90.000
△	3.500			
◇	4.960			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI#A#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

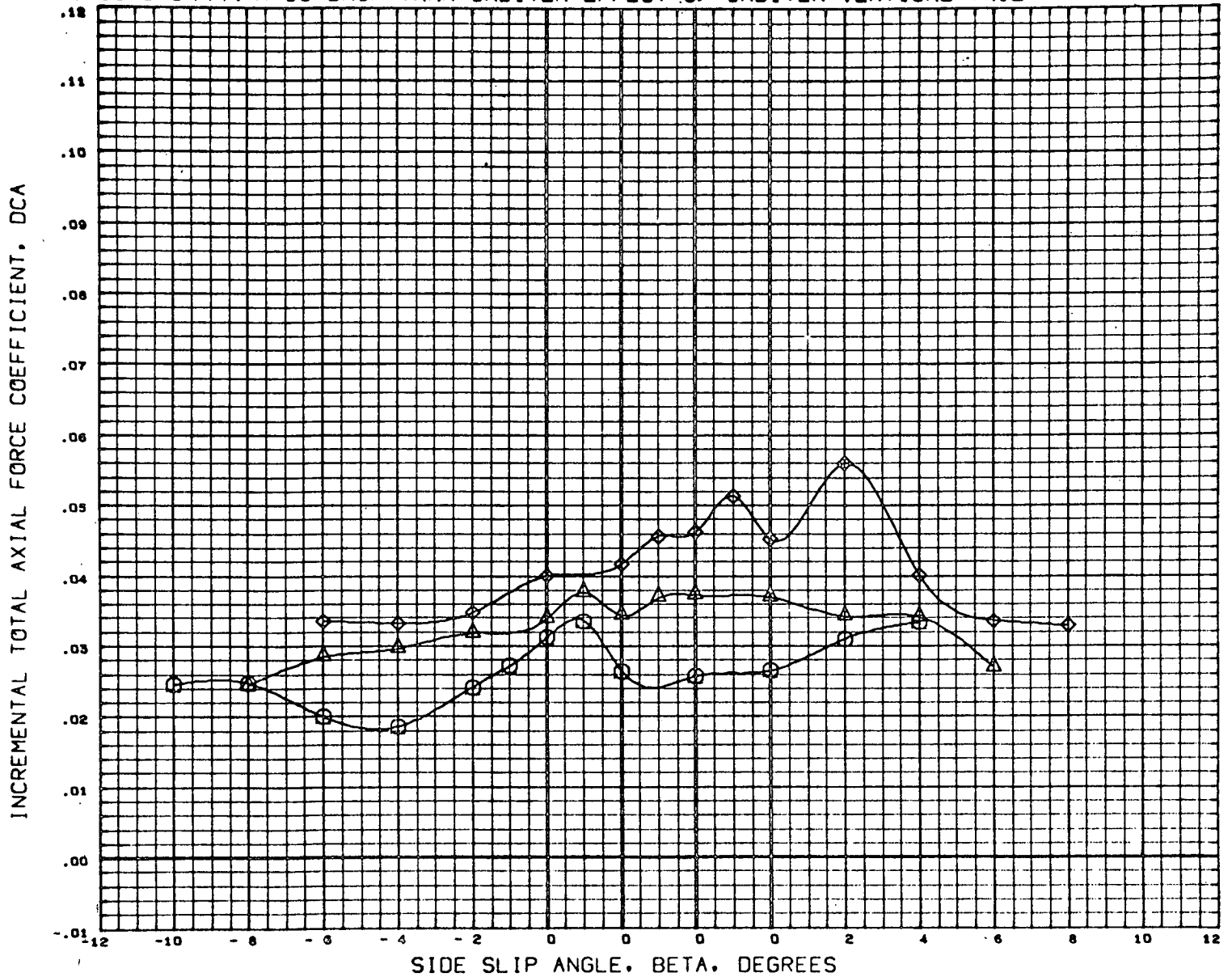


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	PHI
○	0.900		0.000	90.000
◇	1.000			
◇	1.100			
□	1.200			

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

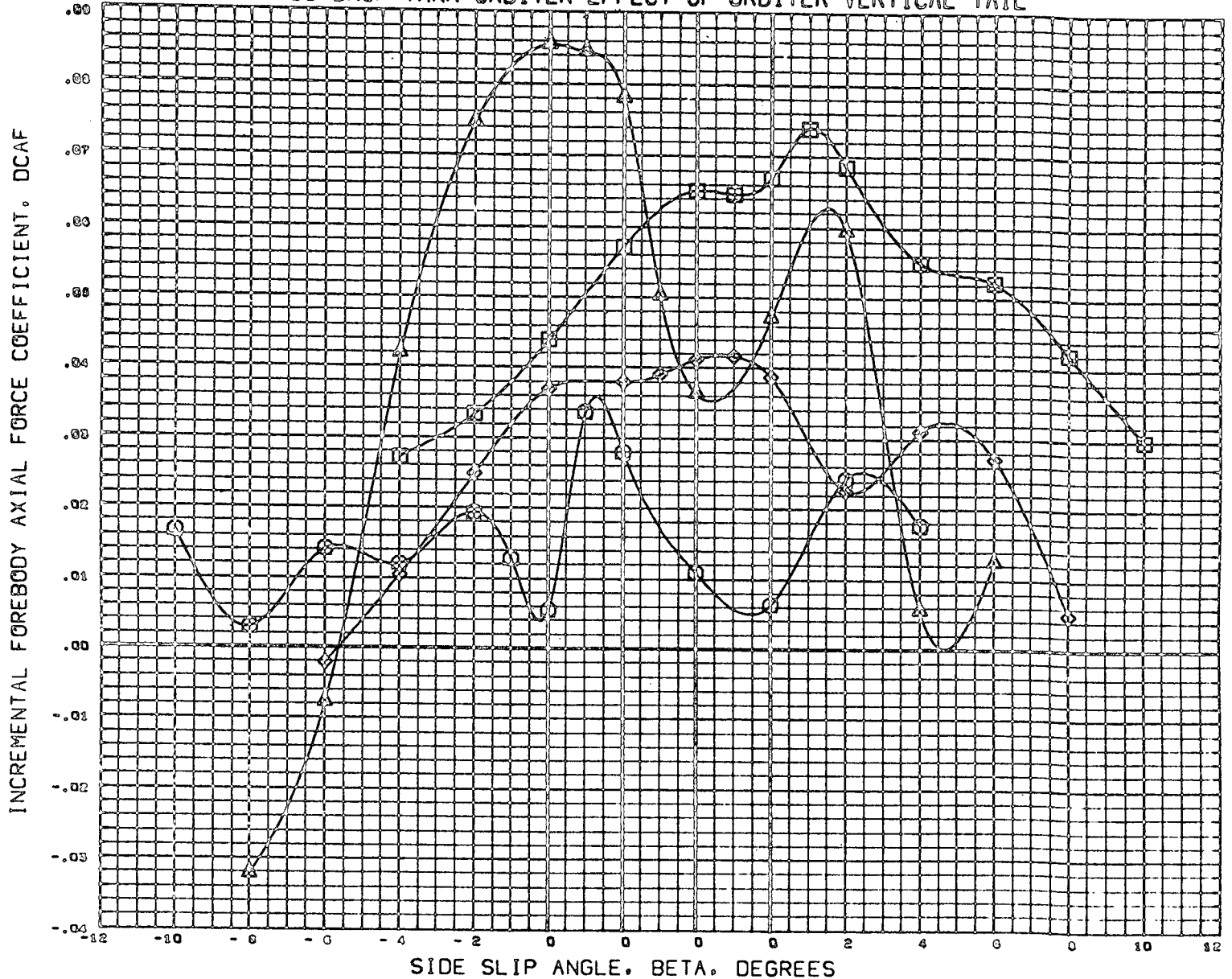


SYMBOL	MACH	PARAMETRIC VALUES			
◇	1.960	ALPHA	0.000	PHI	90.000
△	3.300				
○	4.960				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE #ACCCI#A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

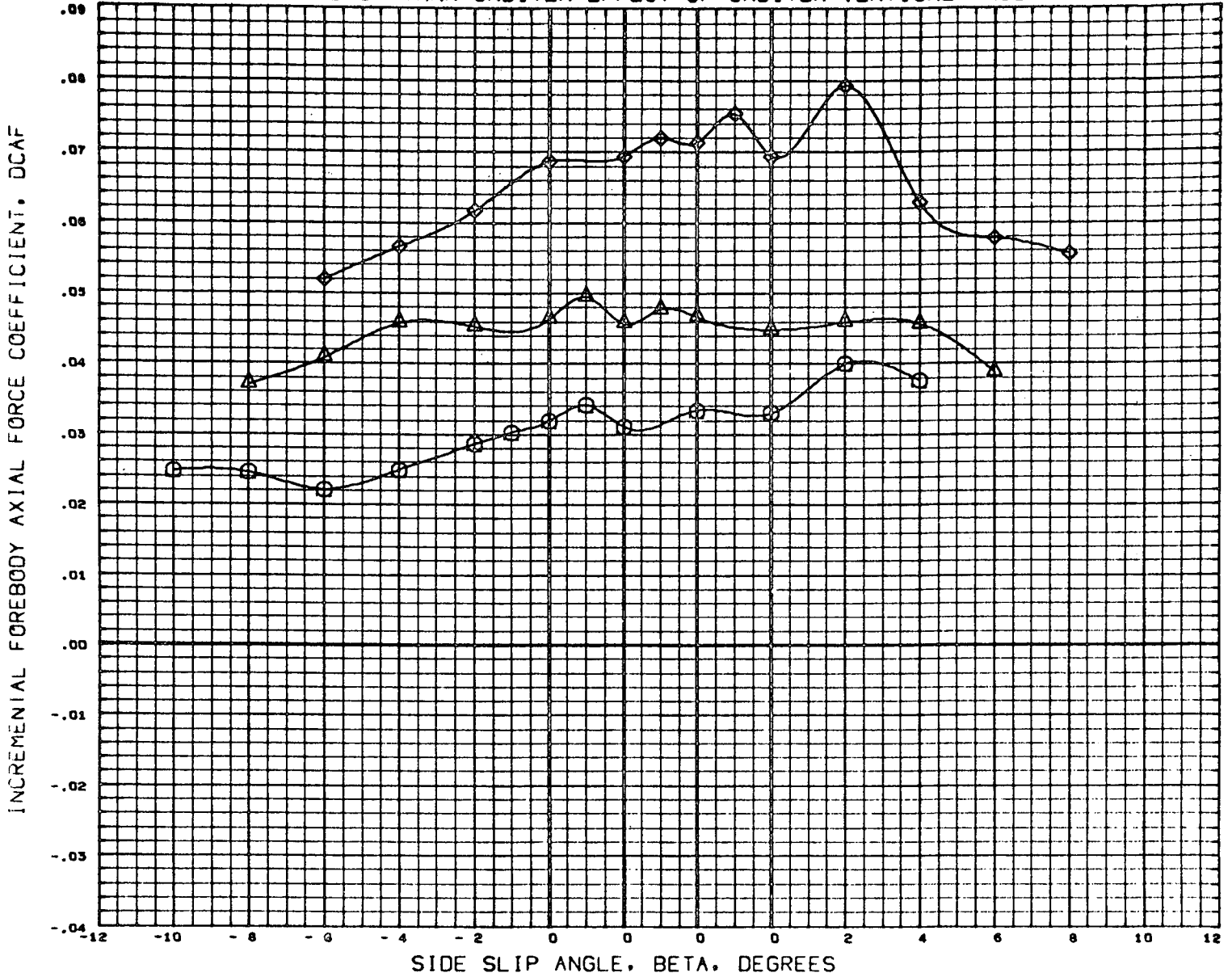


SYMBOL	MACH	ALPHA	PARAMETRIC VALUES	
○	0.900	0.000	PHI	90.000
△	1.000			
◇	1.100			
□	1.200			

REFERENCE INFORMATION		
GREP	1.3960	SG. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	9.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA MIST. CODE *ACCCI*#*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

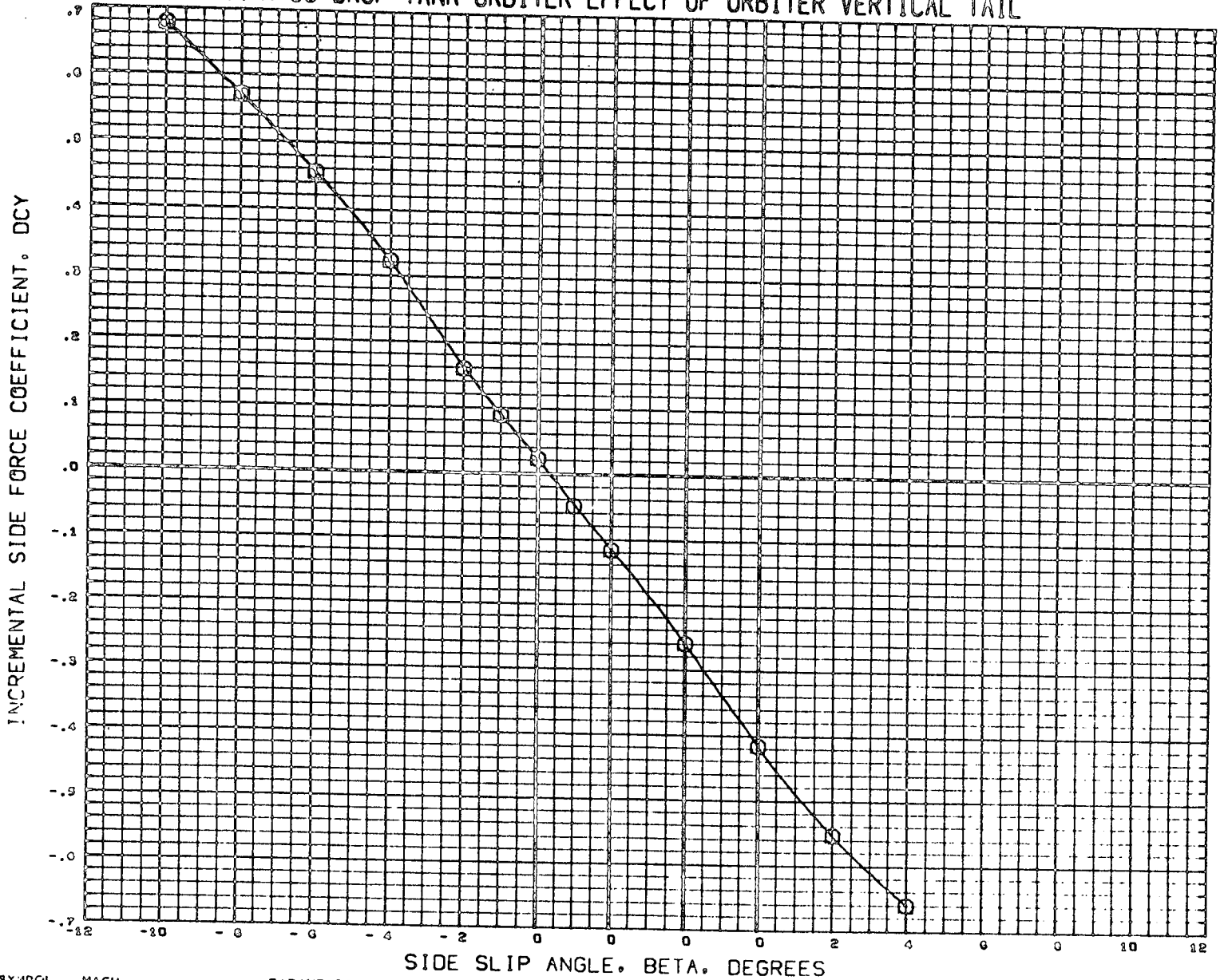


SYMBOL	◇	MACH	PARAMETRIC VALUES			
	◇	1.980	ALPHA	0.000	PHI	90.000
	◇	3.500				
	◇	4.980				

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



SYMBOL MACH ALPHA PARAMETRIC VALUES
 ○ 1.200 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP - 5.9070 IN.
 YMRP 0.0000 IN.
 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCCI*A*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

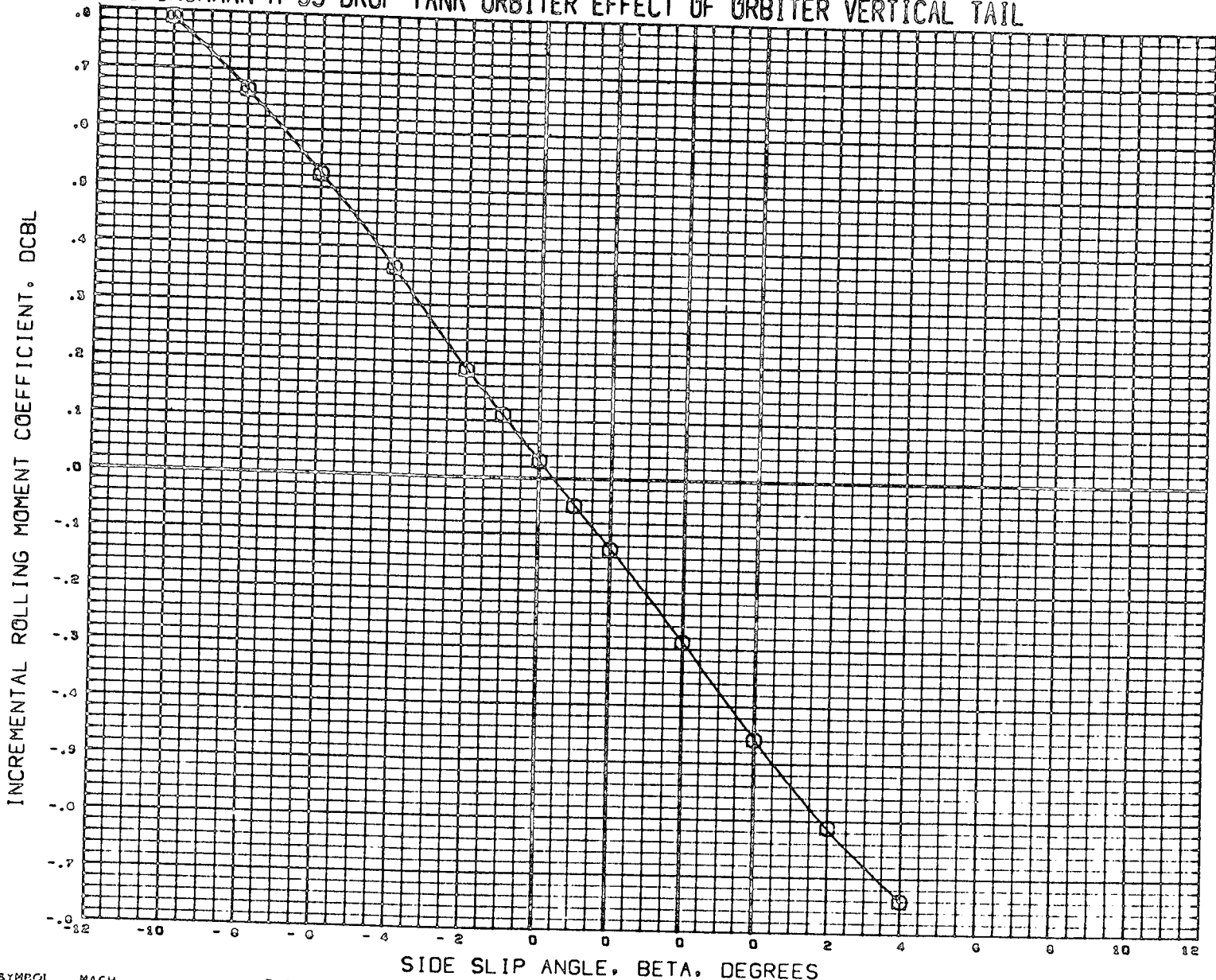


SYMBOL MACH PARAMETRIC VALUES
 ○ 1.200 ALPHA 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP - 5.5070 IN.
 YMRP 0.0000 IN.
 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCC1#A#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

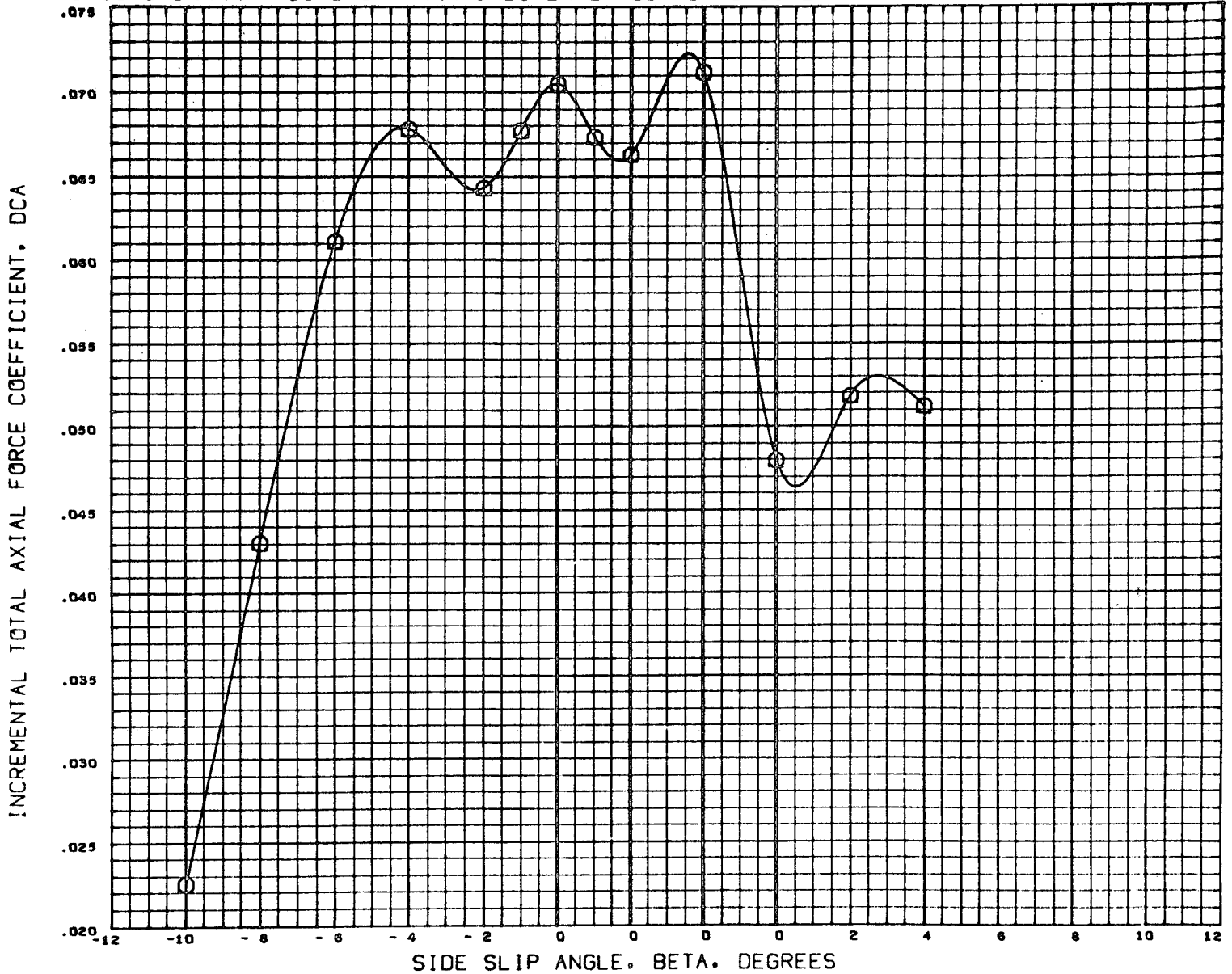


SYMBOL ○ MACH 1.200 ALPHA 0.000
 PARAMETRIC VALUES

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP - 9.9070 IN.
 YMRP - 0.0000 IN.
 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCC14A#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



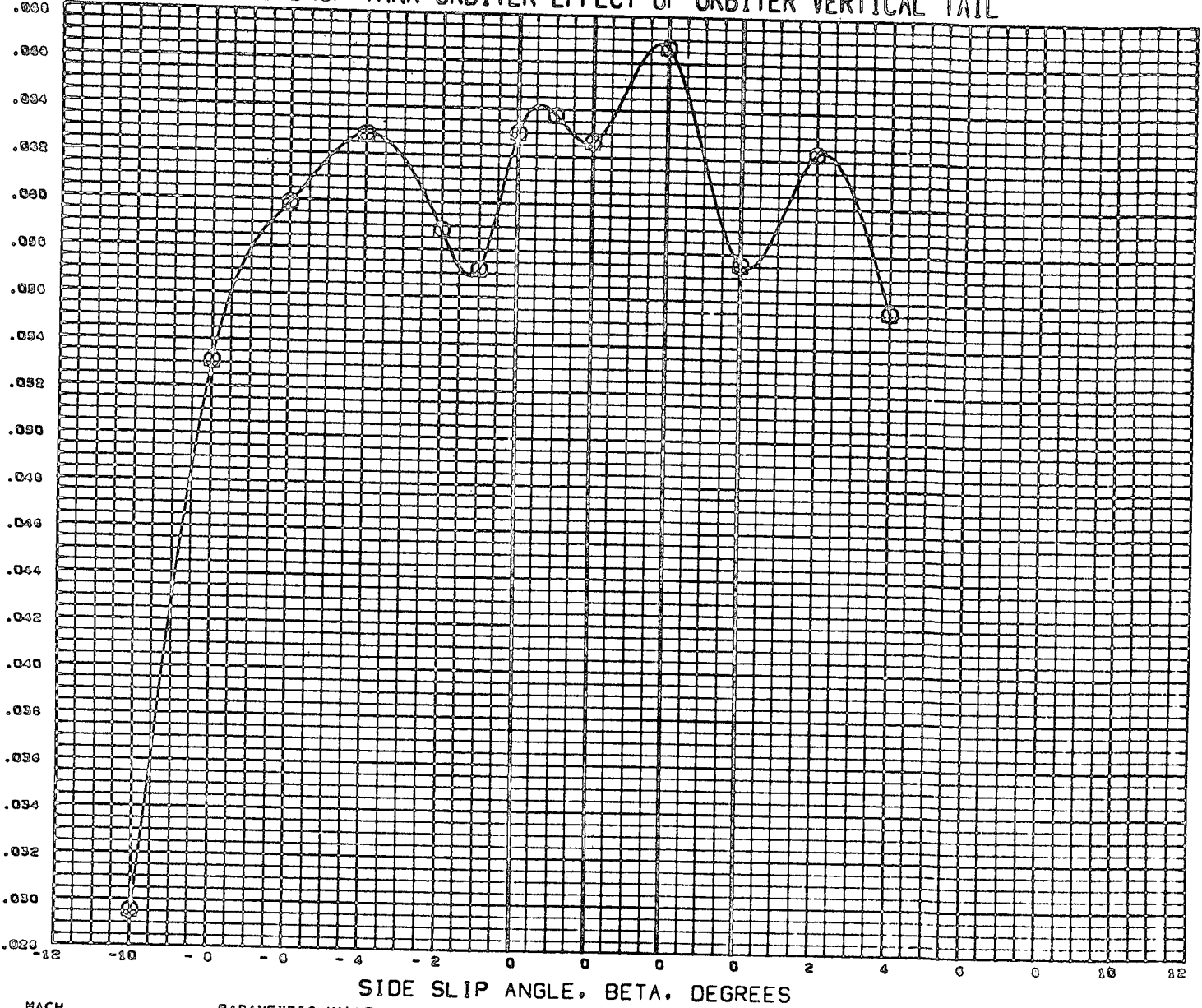
SYMBOL MACH ALPHA PARAMETRIC VALUES
 O 1.200 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP - 5.9070 IN.
 YMRP - 0.0000 IN.
 ZMRP - 0.4250 IN.
 SCALE 0.0034

DATA HIST. CODE CCC1#A+C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, DCAF



SYMBOL \circ MACH 1.200 ALPHA 0.000
 PARAMETRIC VALUES

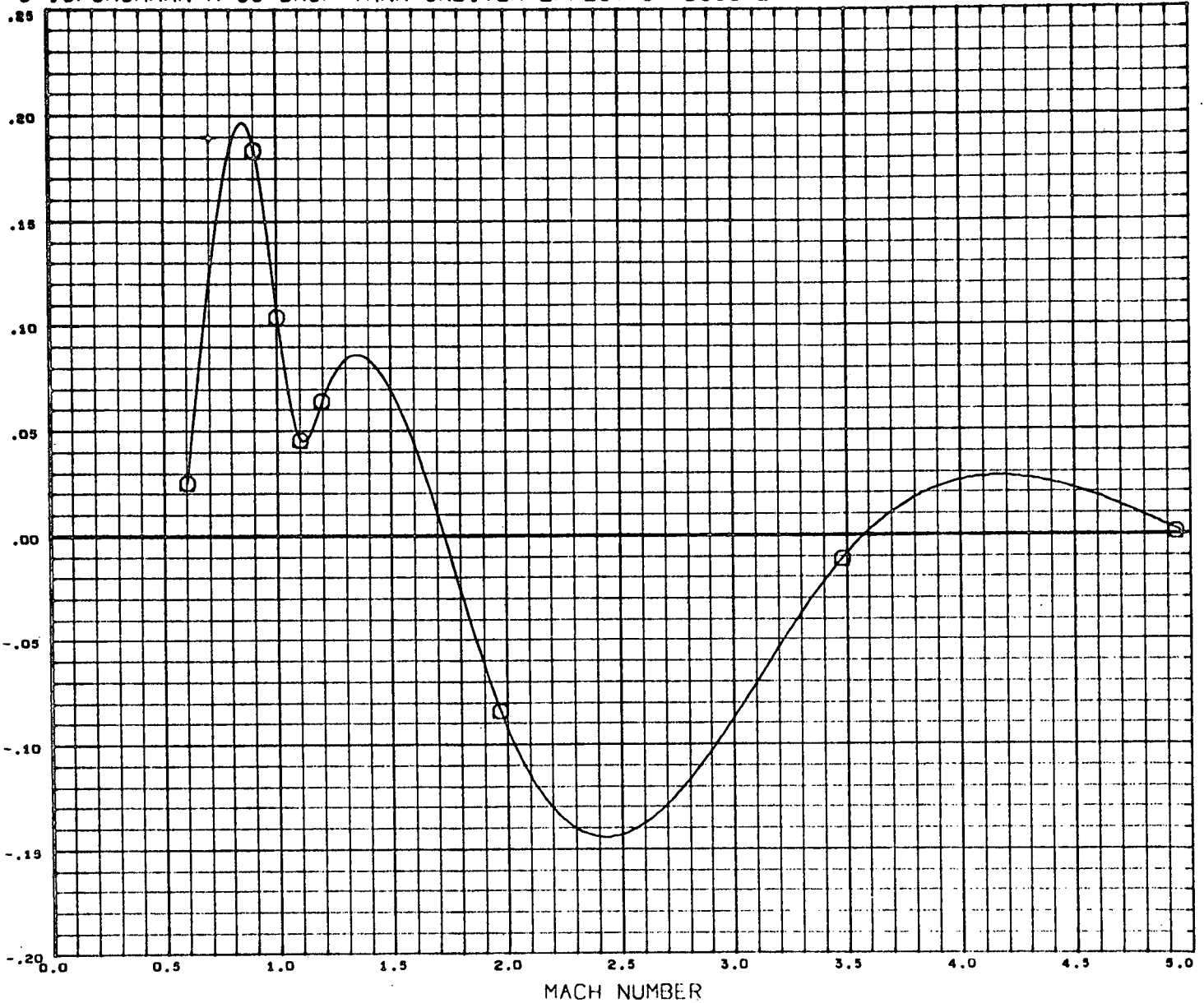
REFERENCE INFORMATION		
SREF	1.3960	SO. IN.
LREF	1.3930	IN.
BREF	1.3930	IN.
XMRP	9.9070	IN.
YMRP	0.0000	IN.
ZMRP	0.4250	IN.
SCALE	0.0034	

DATA HIST. CODE CCC1*A*C

M502-MSFC-S1C INCREMENTAL DATA(OWVTC-OWTC)

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

INCREMENTAL NORMAL FORCE COEFFICIENT, ALPHA=0, DCN(ALPHA=0)

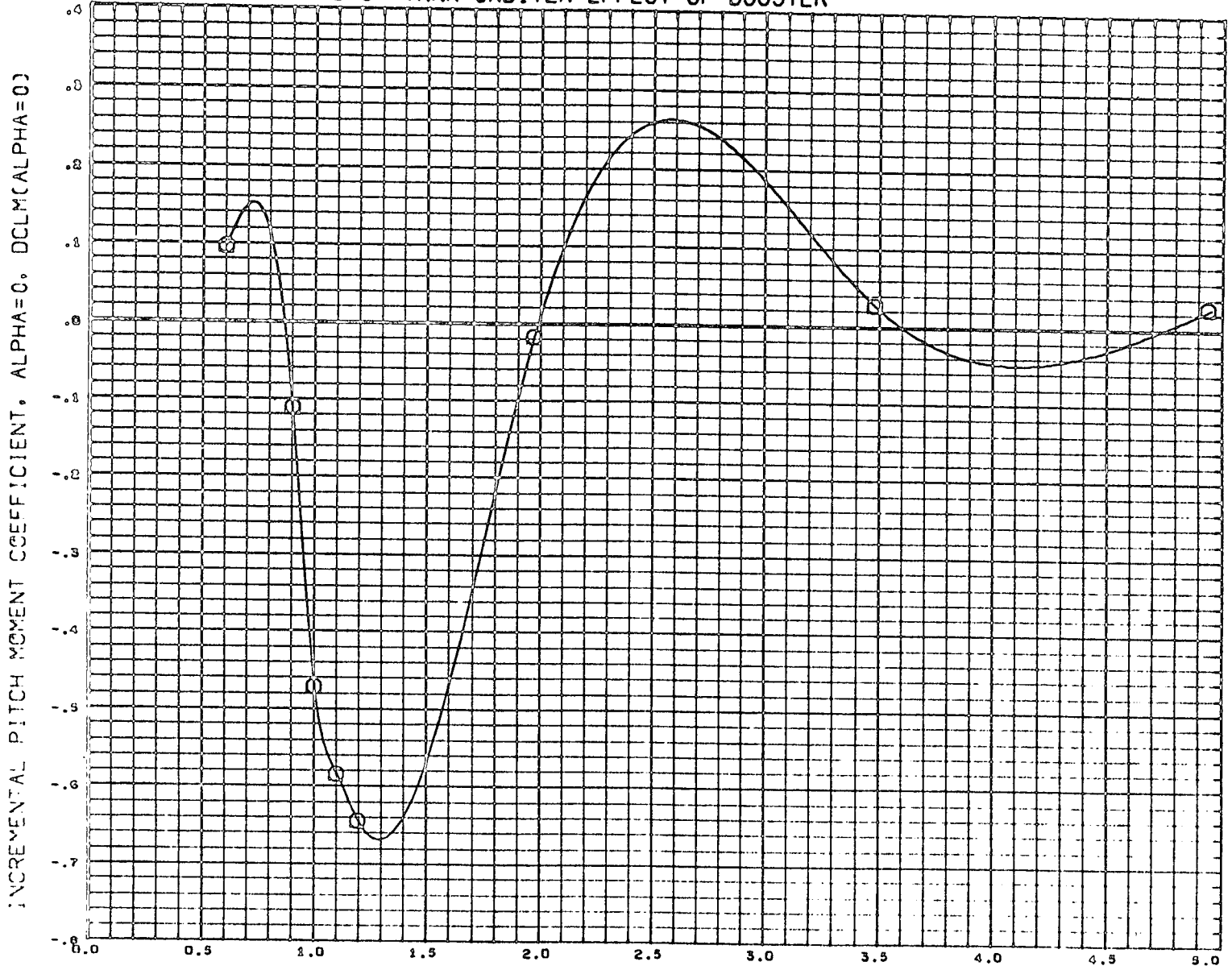


SYMBOL () ALPHA 0.000 BETA 0.000 PARAMETRIC VALUES 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 DREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE 40060111C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

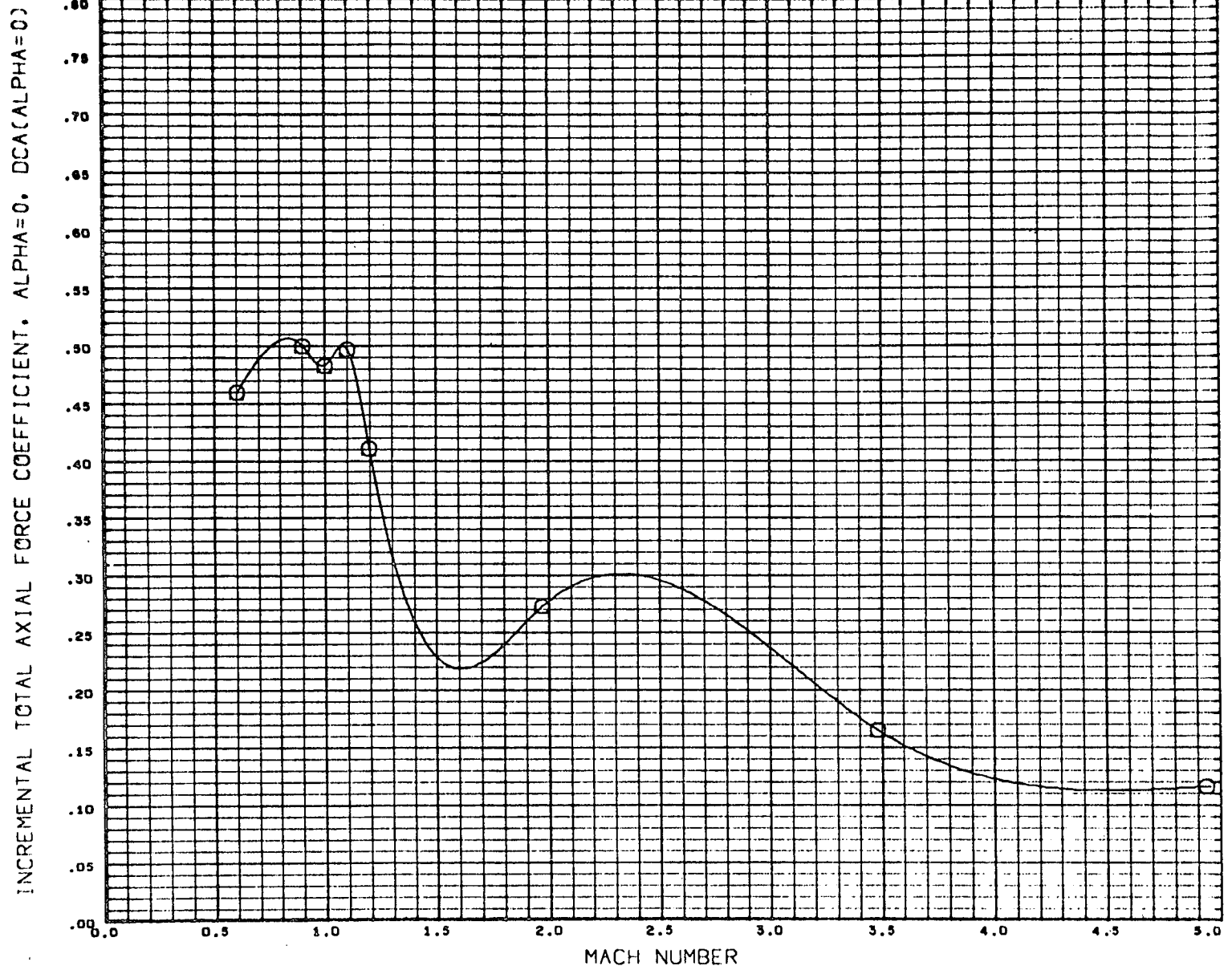


SYMBOL ○ ALPHA 0.000 BETA 0.000 PARAMETRIC VALUES

REFERENCE INFORMATION		
SREF	1.3960	30. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCBGB114C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



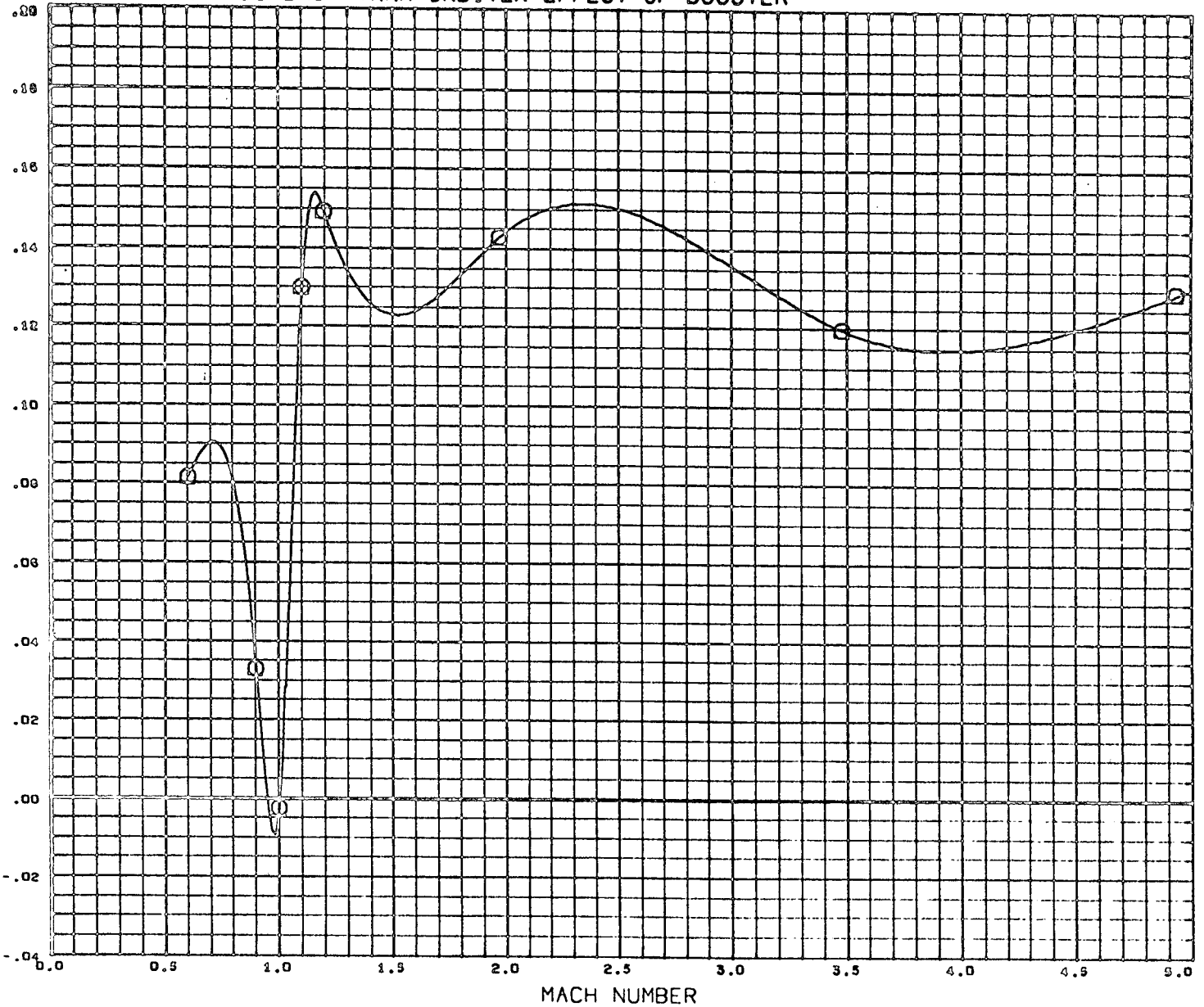
SYMBOL ○ ALPHA 0.000 BETA 0.000 PARAMETRIC VALUES 0.000

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCG111/C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, ALPHA=0, DCAF(ALPHA=0)

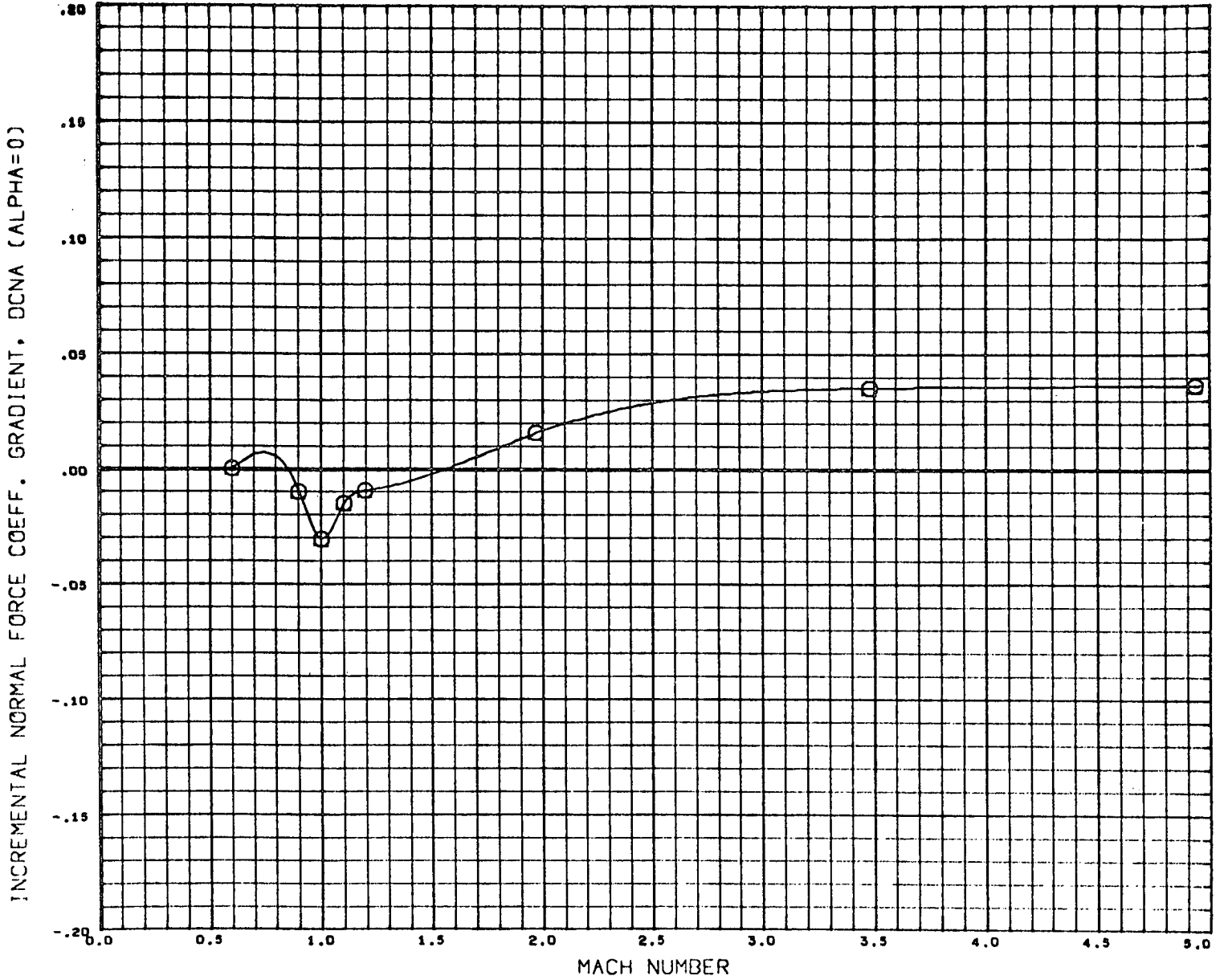


SYMBOL ALPHA 0.000 BETA PARAMETRIC VALUES 0.000

REFERENCE INFORMATION		
SREF	1.3960	sq. in.
LREF	1.3330	in.
BREF	1.3330	in.
XMRP	9.3990	in.
YMRP	0.0000	in.
ZMRP	0.0000	in.
SCALE	0.0034	

DATA HIST. CODE CCCG114C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

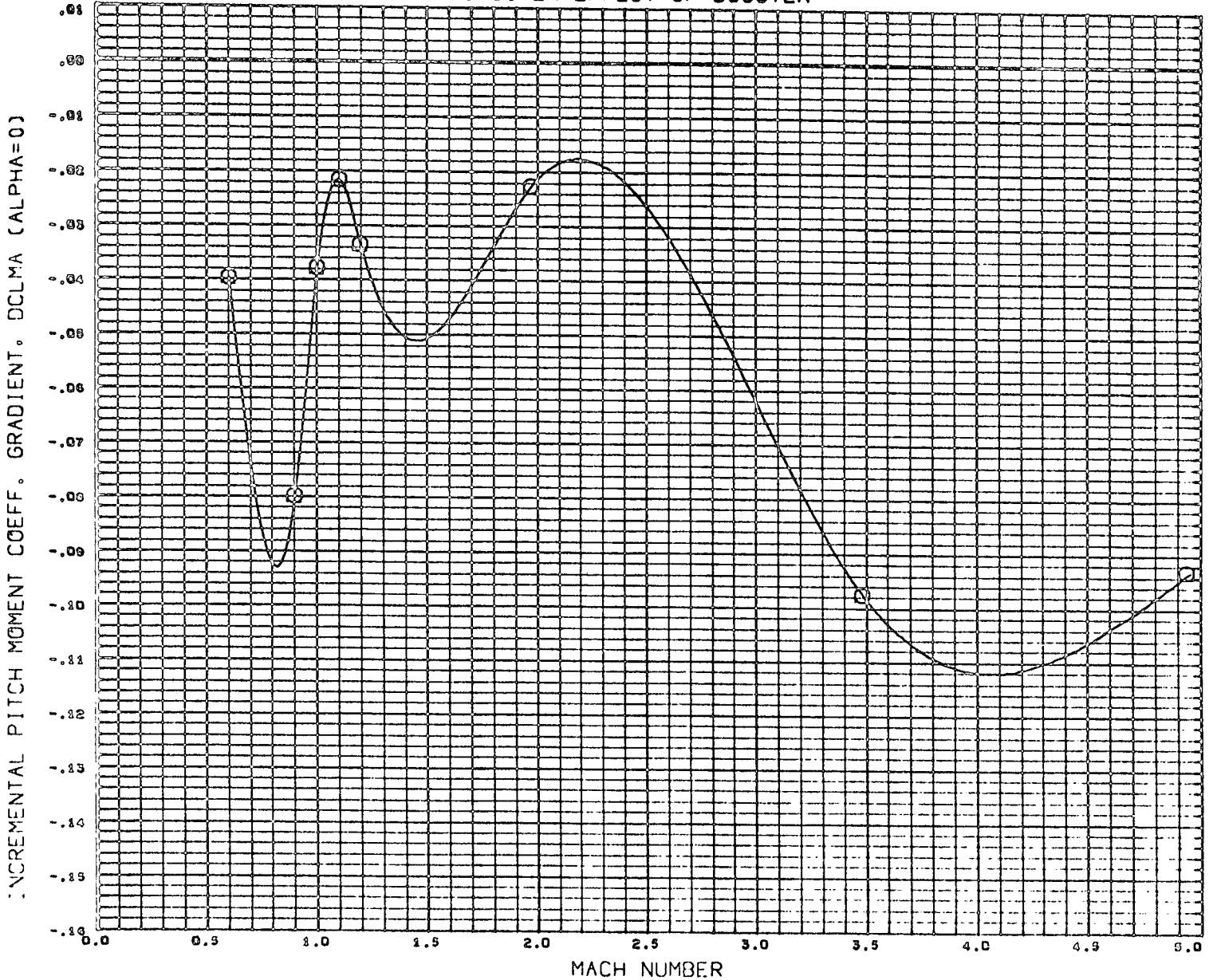


SYMBOL ALPHA BETA PARAMETRIC VALUES
 ○ 0.000 0.000 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC114C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

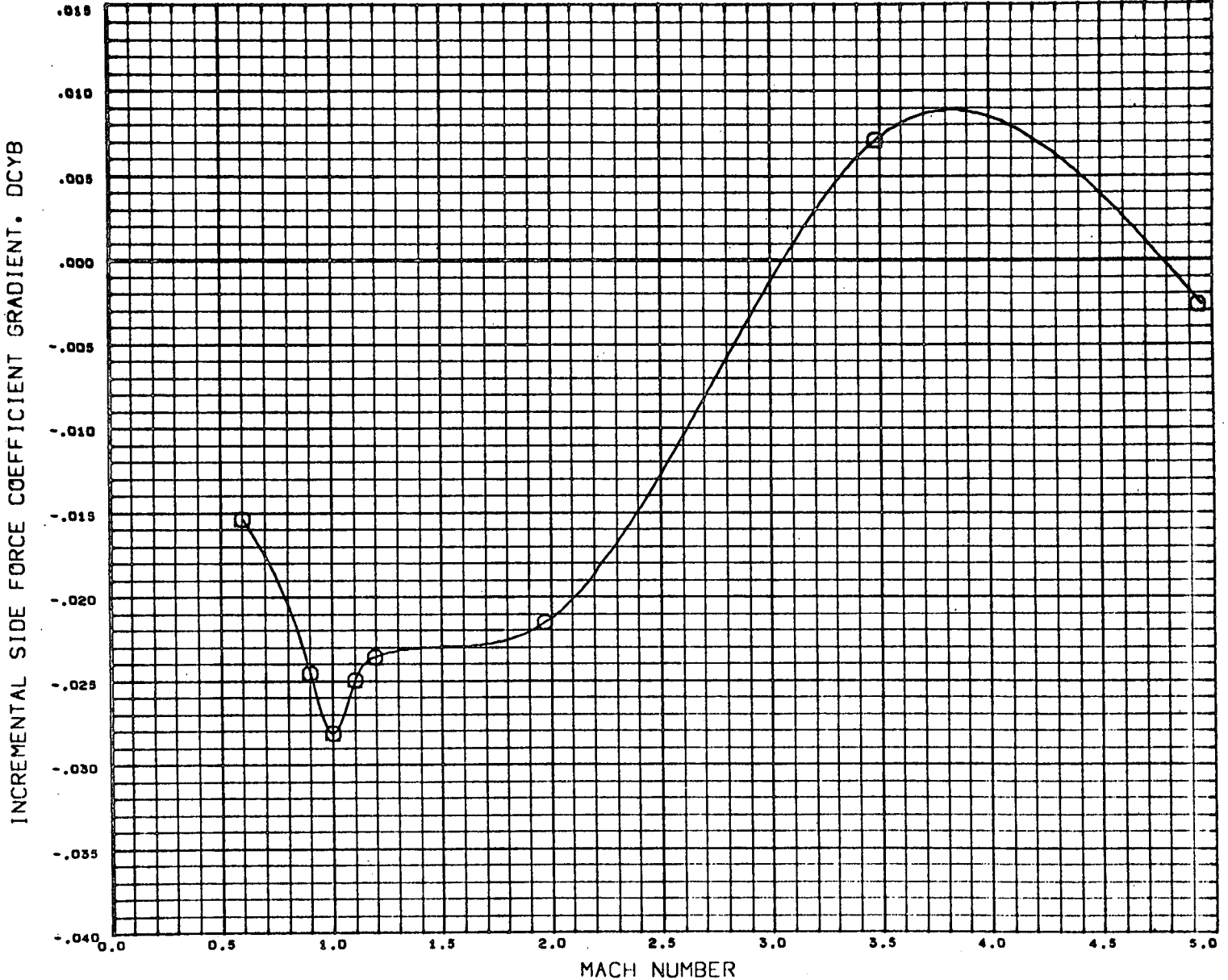


SYMBOL () ALPHA 0.000 BETA 0.000 PARAMETRIC VALUES 0.000

REFERENCE INFORMATION
 SREF 1.3960 50. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3980 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

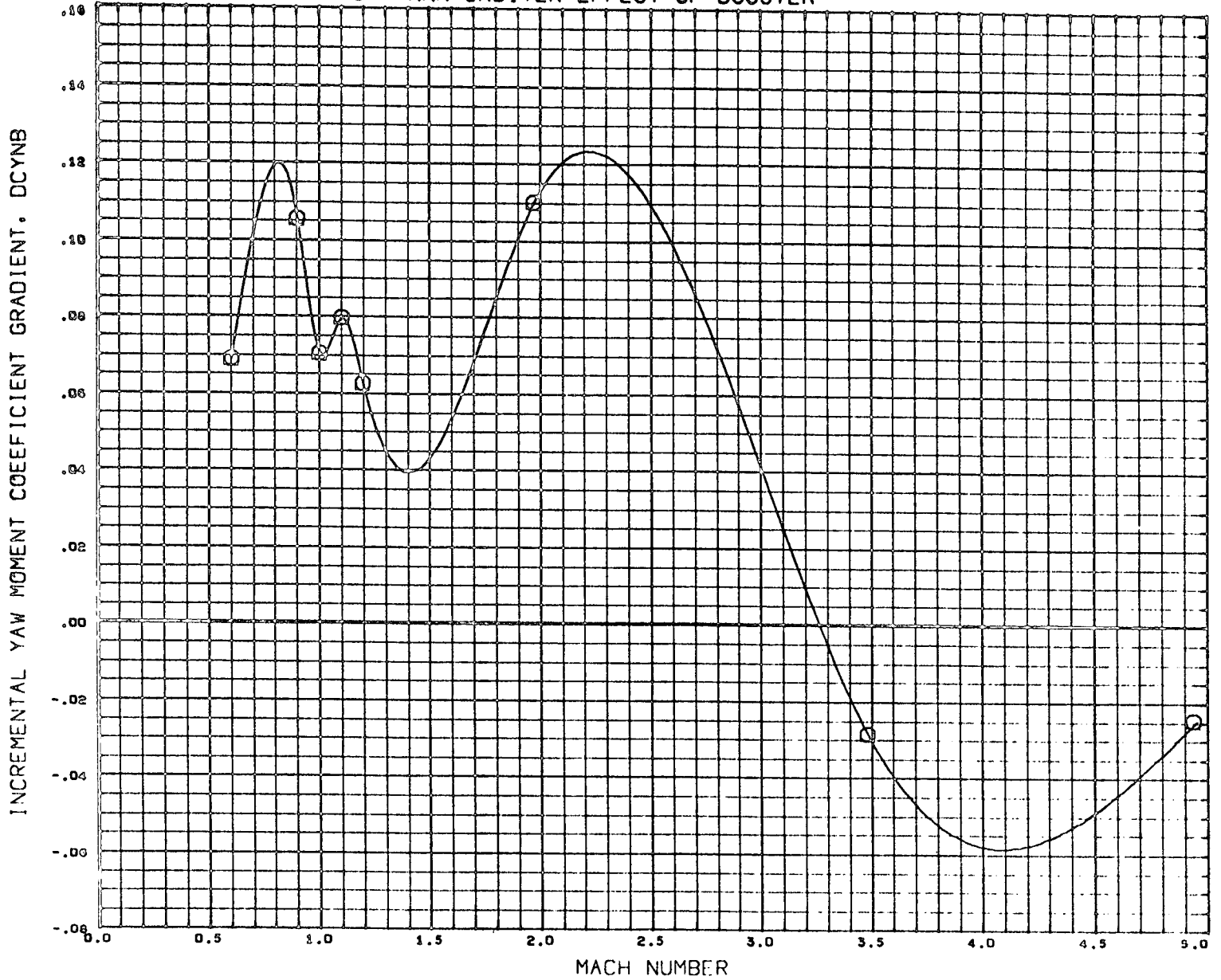


SYMBOL BETA ALPHA PARAMETRIC VALUES
 ○ 0.000 0.000 0.000

REFERENCE INFORMATION		
SREF	1.3960	89. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	3.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCGCI1%C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER



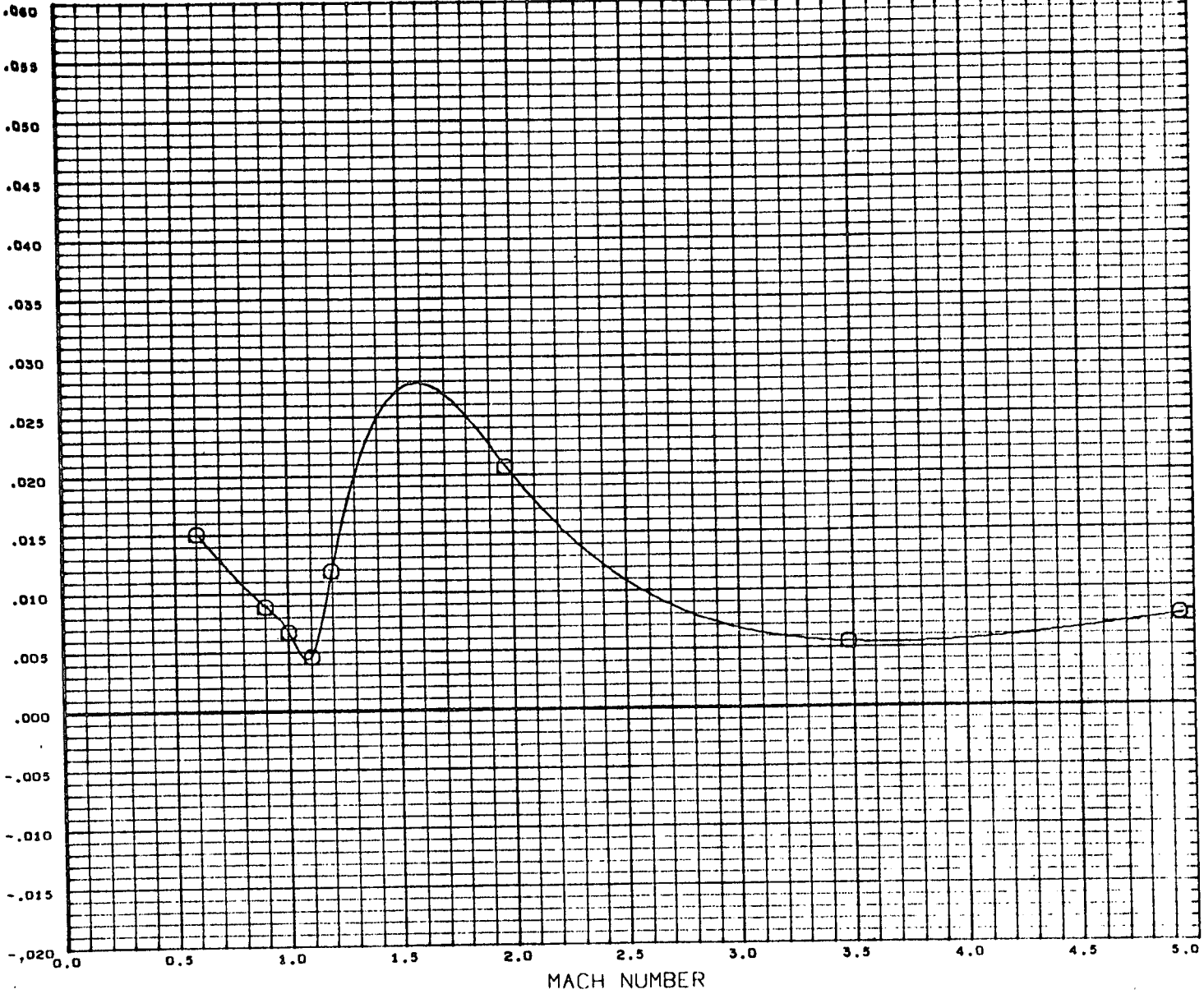
SYMBOL BETA ALPHA PARAMETRIC VALUES
 ○ 0.000 0.000 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE #ACCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER

INCREMENTAL ROLLING MOMENT COEFFICIENT GRADIENT, DCBLB

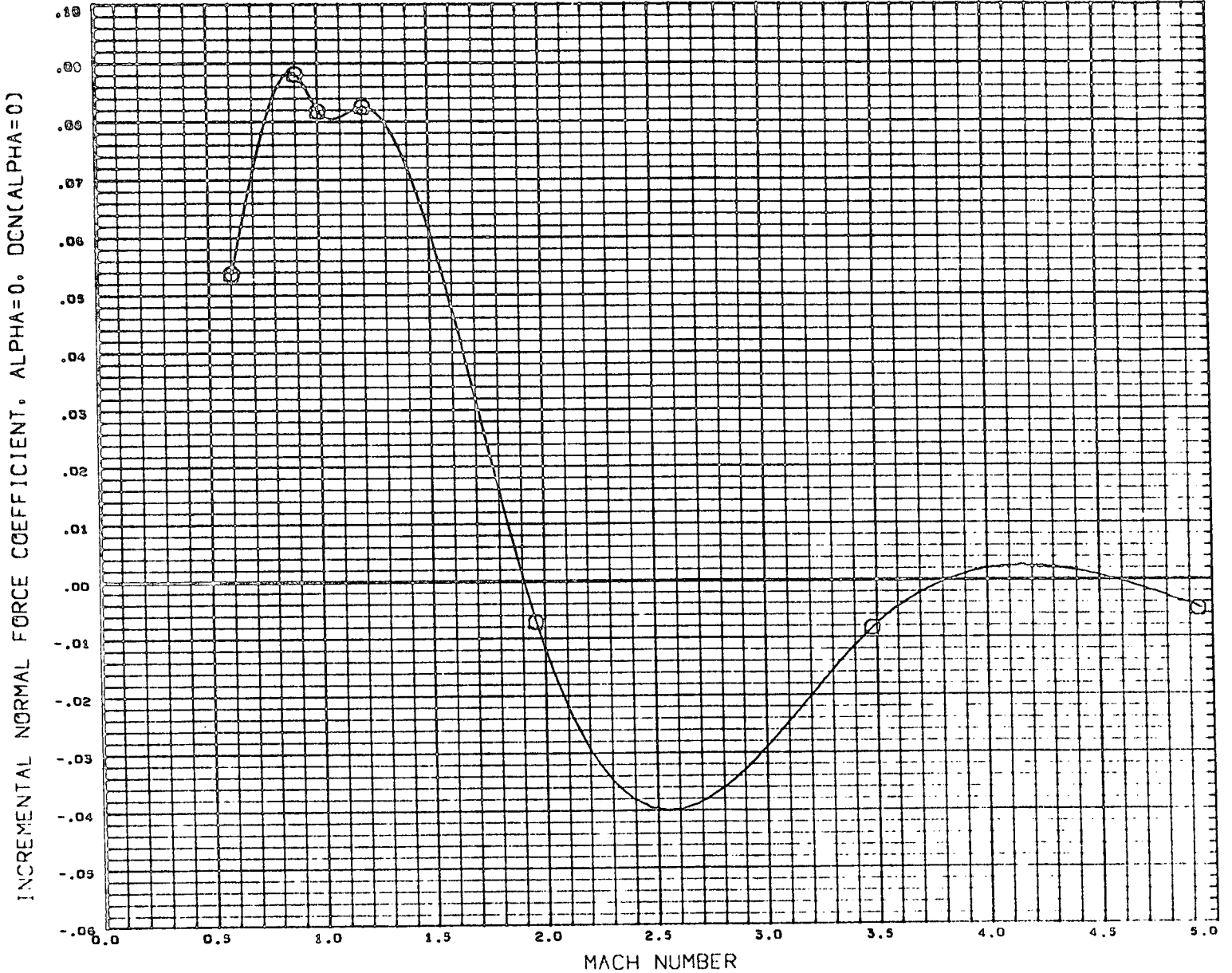


SYMBOL BETA ALPHA PARAMETRIC VALUES
 ○ 0.000 0.000 0.000

REFERENCE INFORMATION
 SREF 1.3960 50. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE #ACCCG111#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



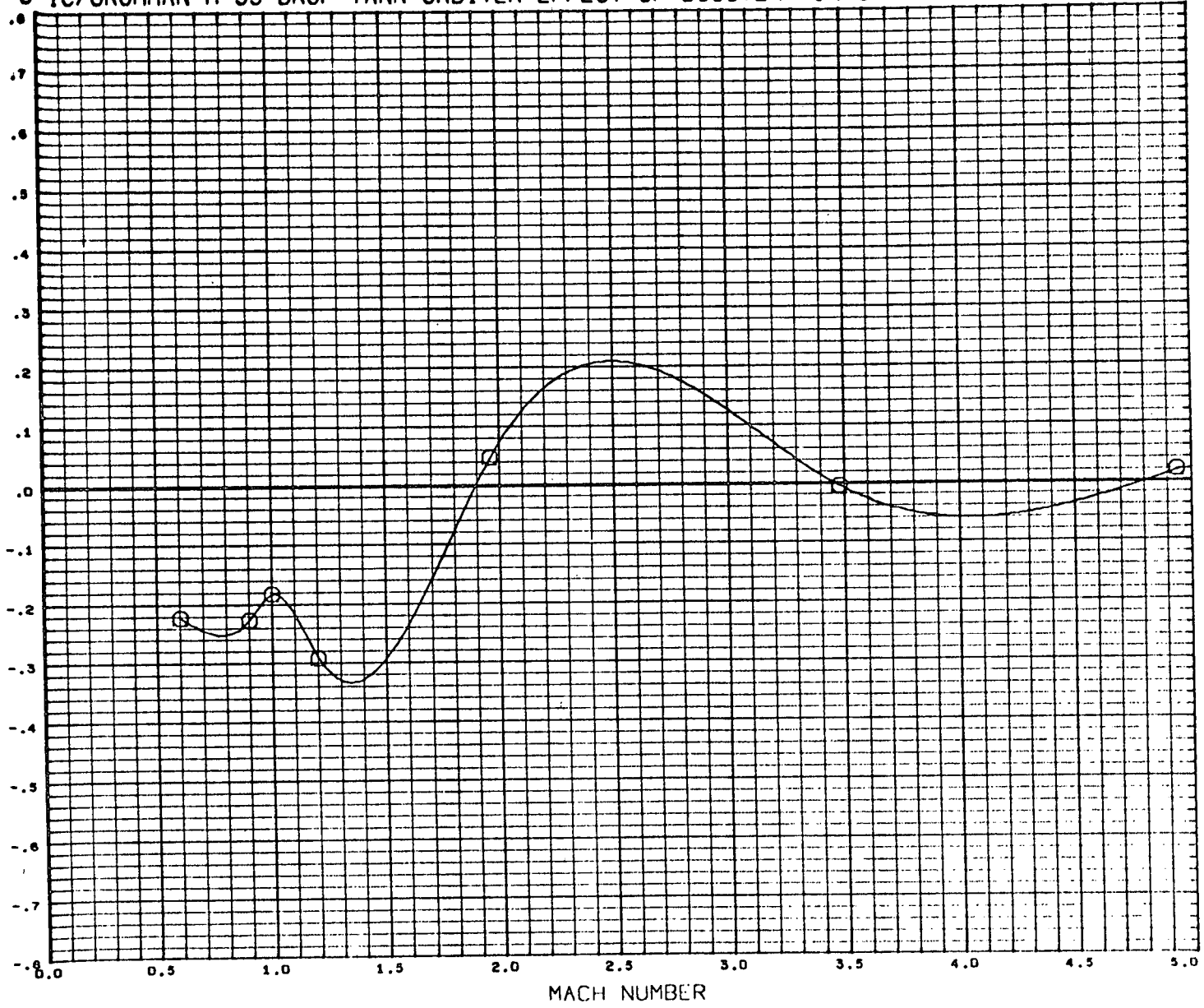
SYMBOL () ALPHA 0.000 BETA 0.000 PHI 0.000

REFERENCE INFORMATION
 SREF 1.3960 50. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3590 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

INCREMENTAL PITCH MOMENT COEFFICIENT, ALPHA=0, DCLM(ALPHA=U)

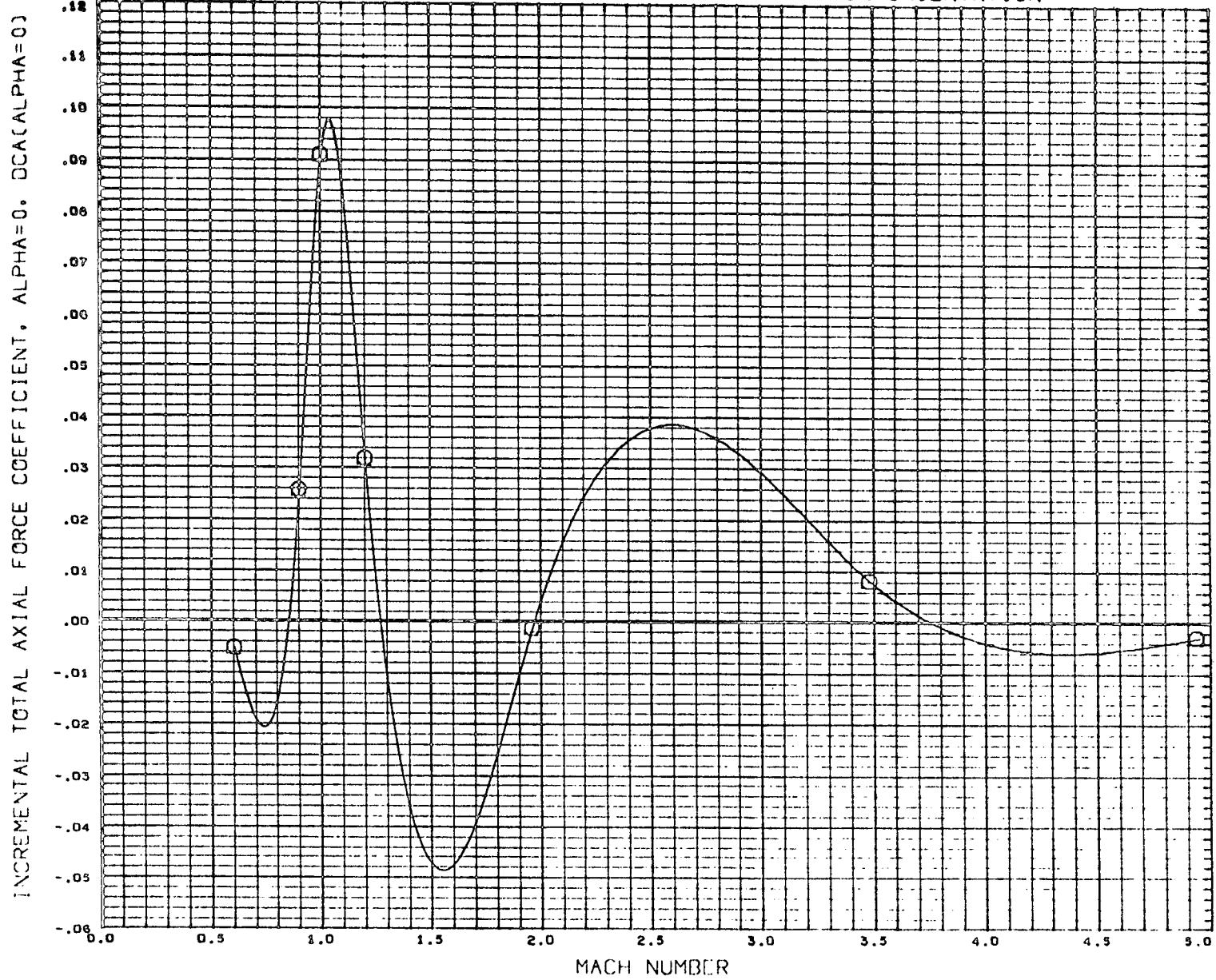


SYMBOL () ALPHA 0.000 BETA PARAMETRIC VALUES 0.000 PHI 0.000

REFERENCE INFORMATION
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 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCGCL11C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



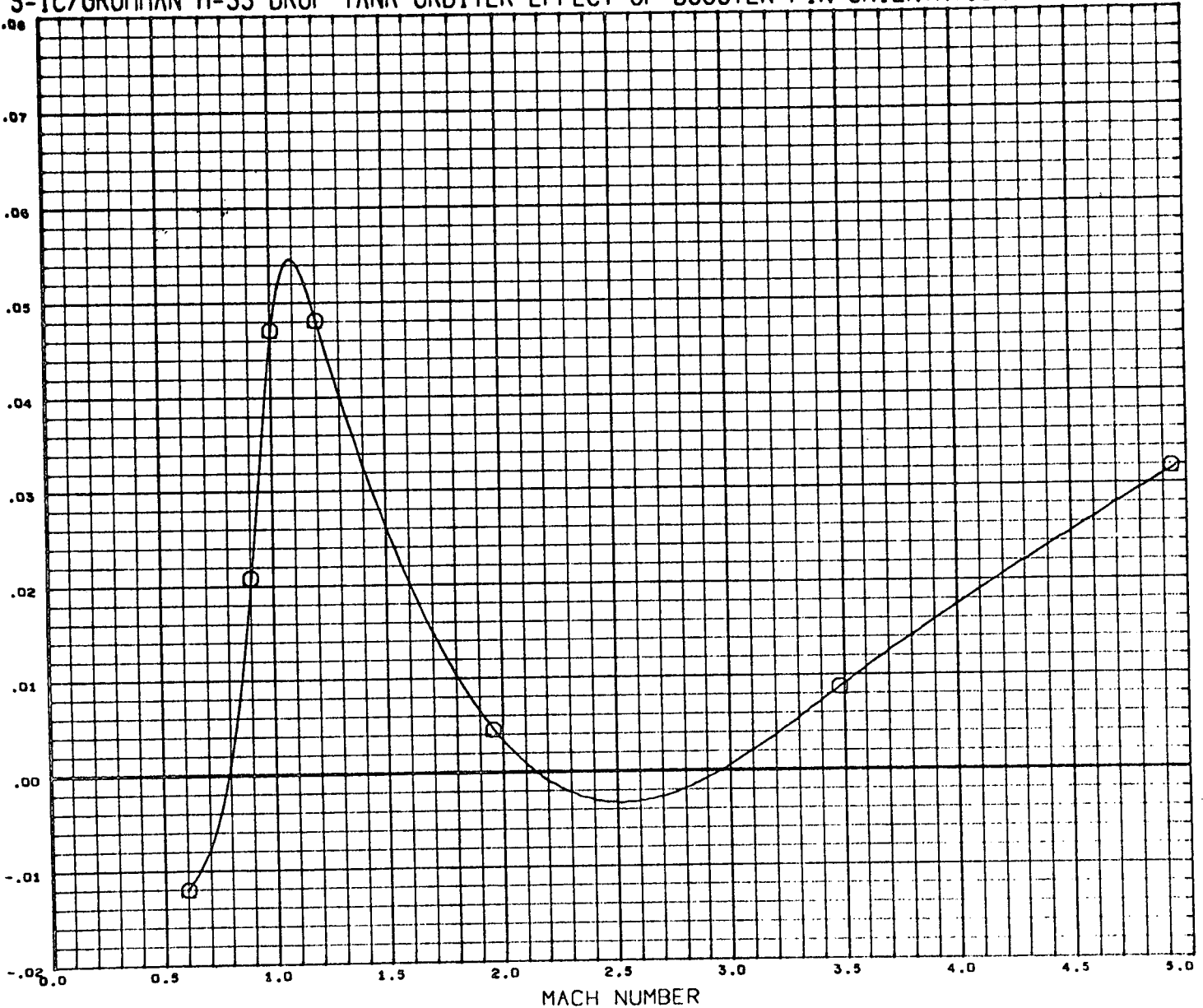
SYMBOL ○ ALPHA 0.000 BETA 0.000 PHI 0.000

REFERENCE INFORMATION
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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC116C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, ALPHA=0, DCAF(ALPHA=0)



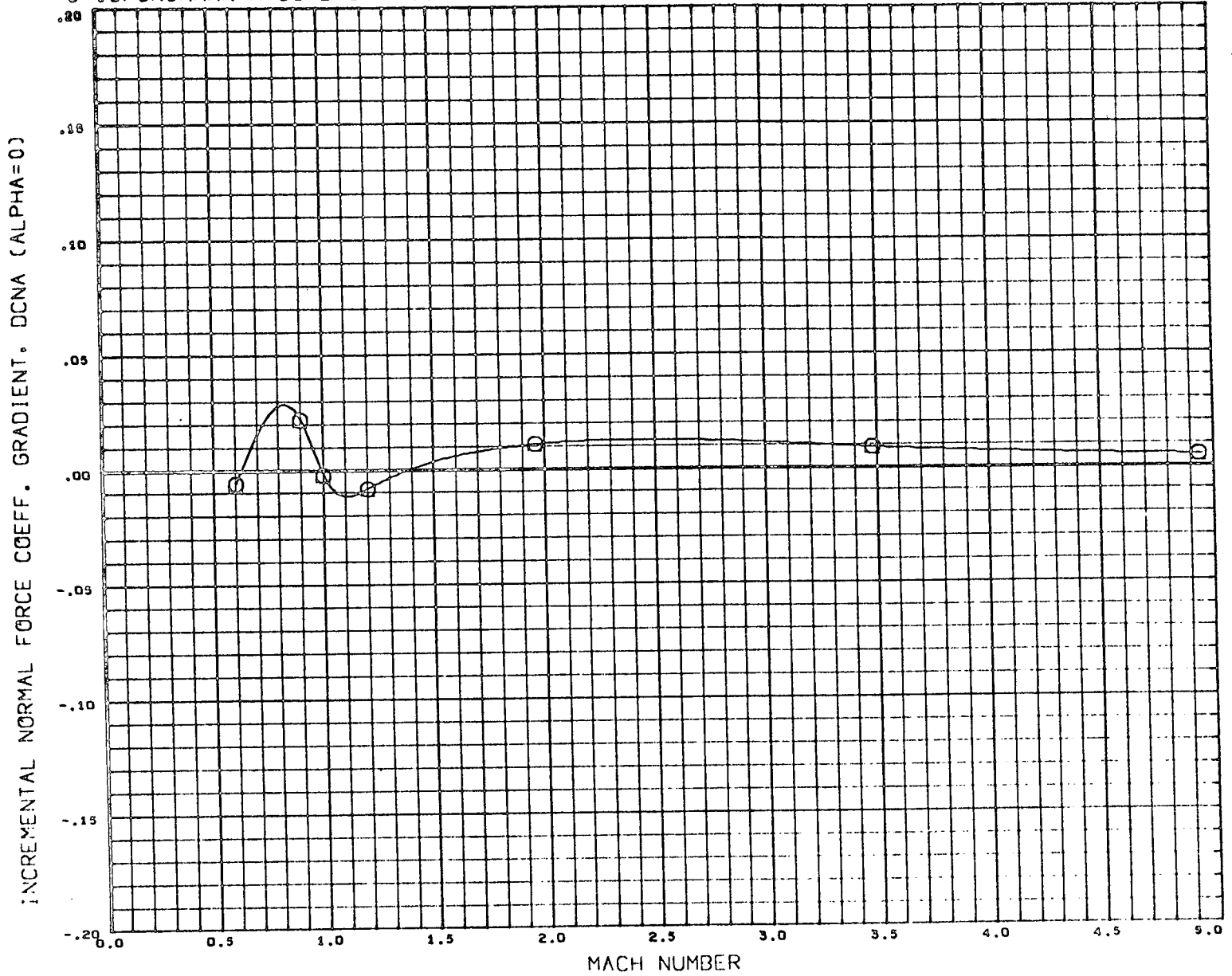
SYMBOL ALPHA 0.000 BETA 0.000 PHI 0.000

PARAMETRIC VALUES 0.000 0.000 0.000

REFERENCE INFORMATION
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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



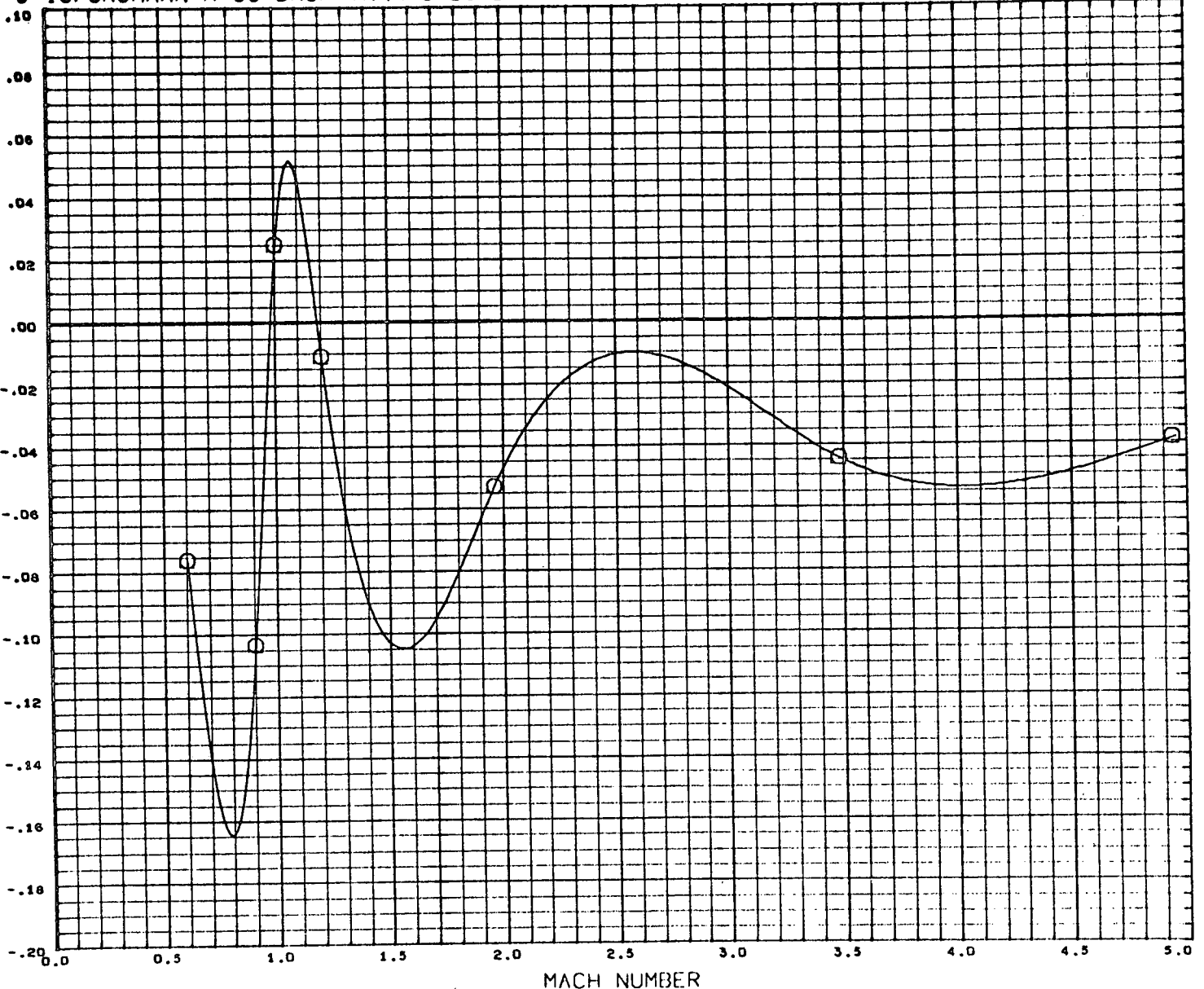
SYMBOL ALPHA BETA PARAMETRIC VALUES PHI 0.000

REFERENCE INFORMATION
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 XMRP 5.3920 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

INCREMENTAL PITCH MOMENT COEFF. GRADIENT, DCLMA (ALPHA=0)

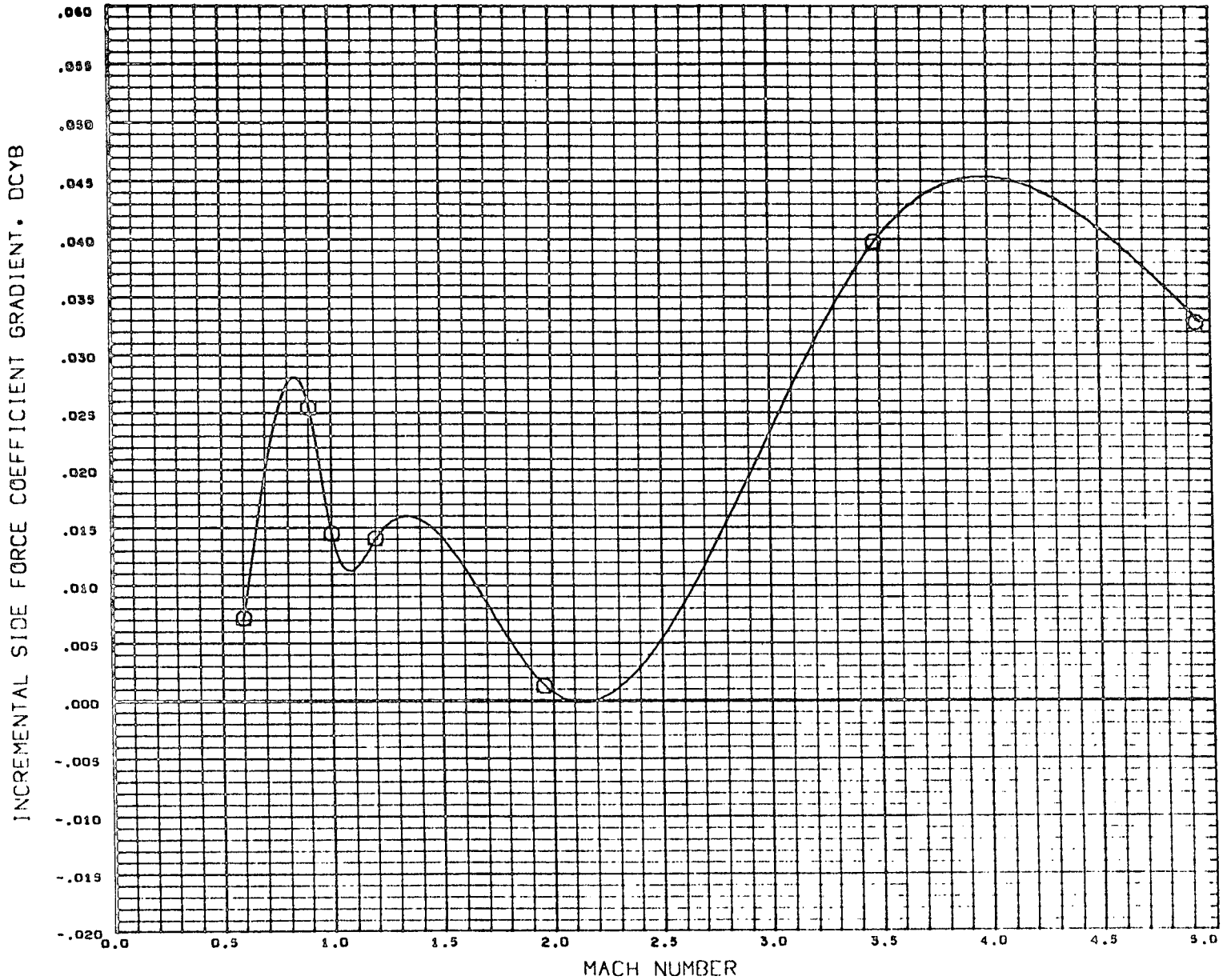


SYMBOL \circ ALPHA 0.000 BETA 0.000 PHI 0.000

REFERENCE INFORMATION
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 YMRP 0.0000 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

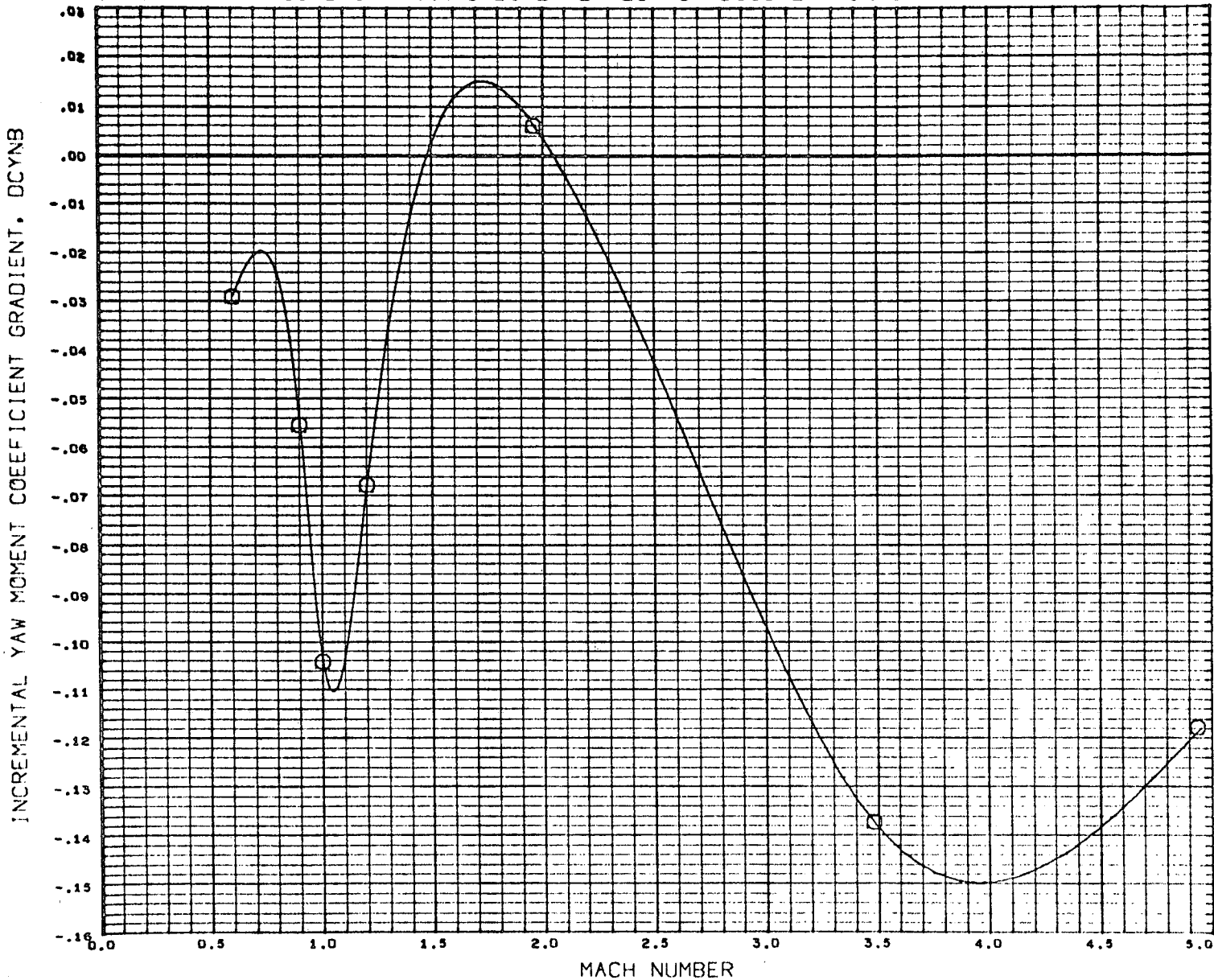


SYMBOL BETA ALPHA PARAMETRIC VALUES
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REFERENCE INFORMATION
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 LREF 1.3330 IN.
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 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE *ACCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION



SYMBOL BETA ALPHA PARAMETRIC VALUES PHI 90.000

○ 0.000 0.000

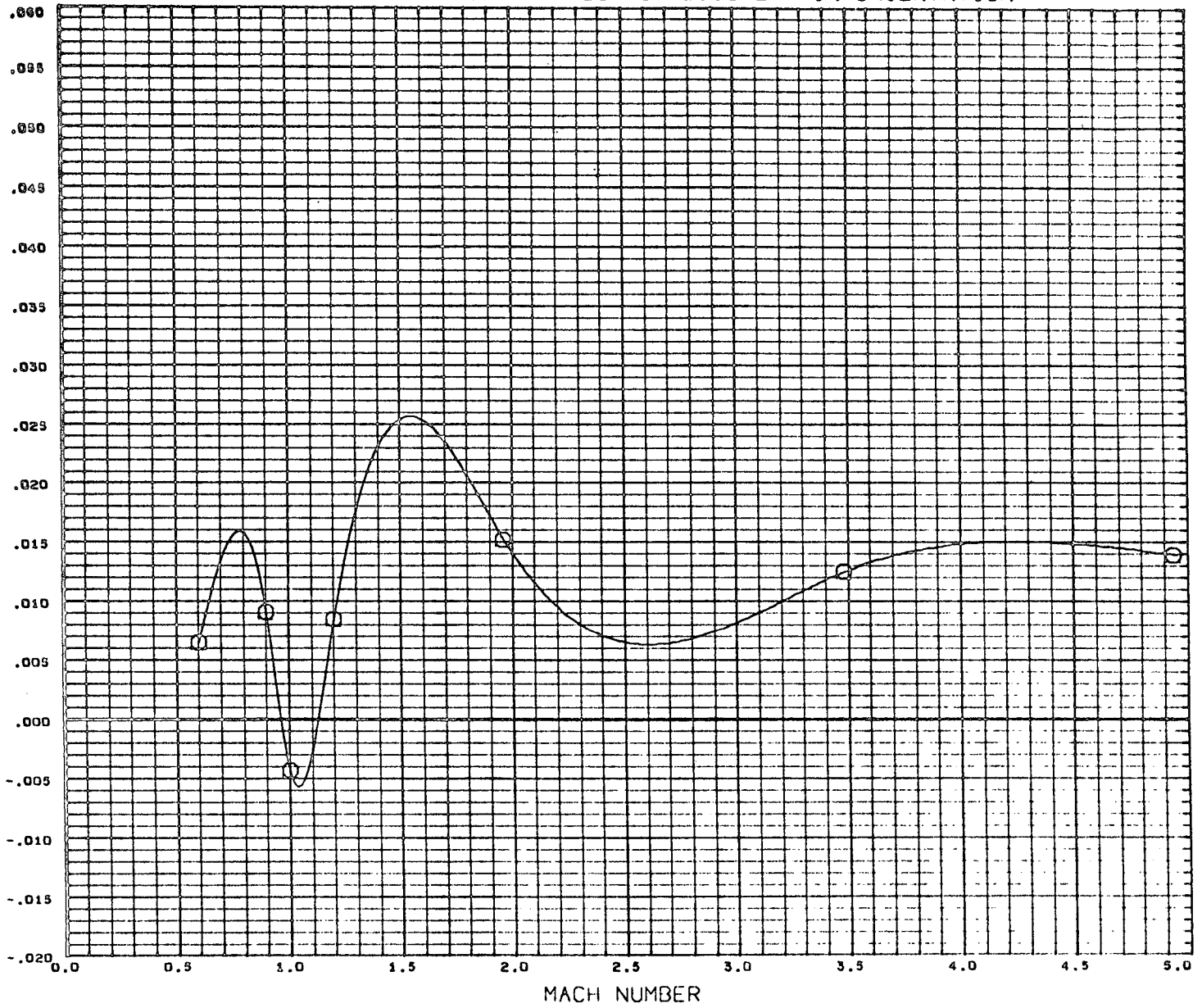
REFERENCE INFORMATION

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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE #ACCCGCI1*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FIN ORIENTATION

INCREMENTAL ROLLING MOMENT COEFFICIENT GRADIENT, DCBLB



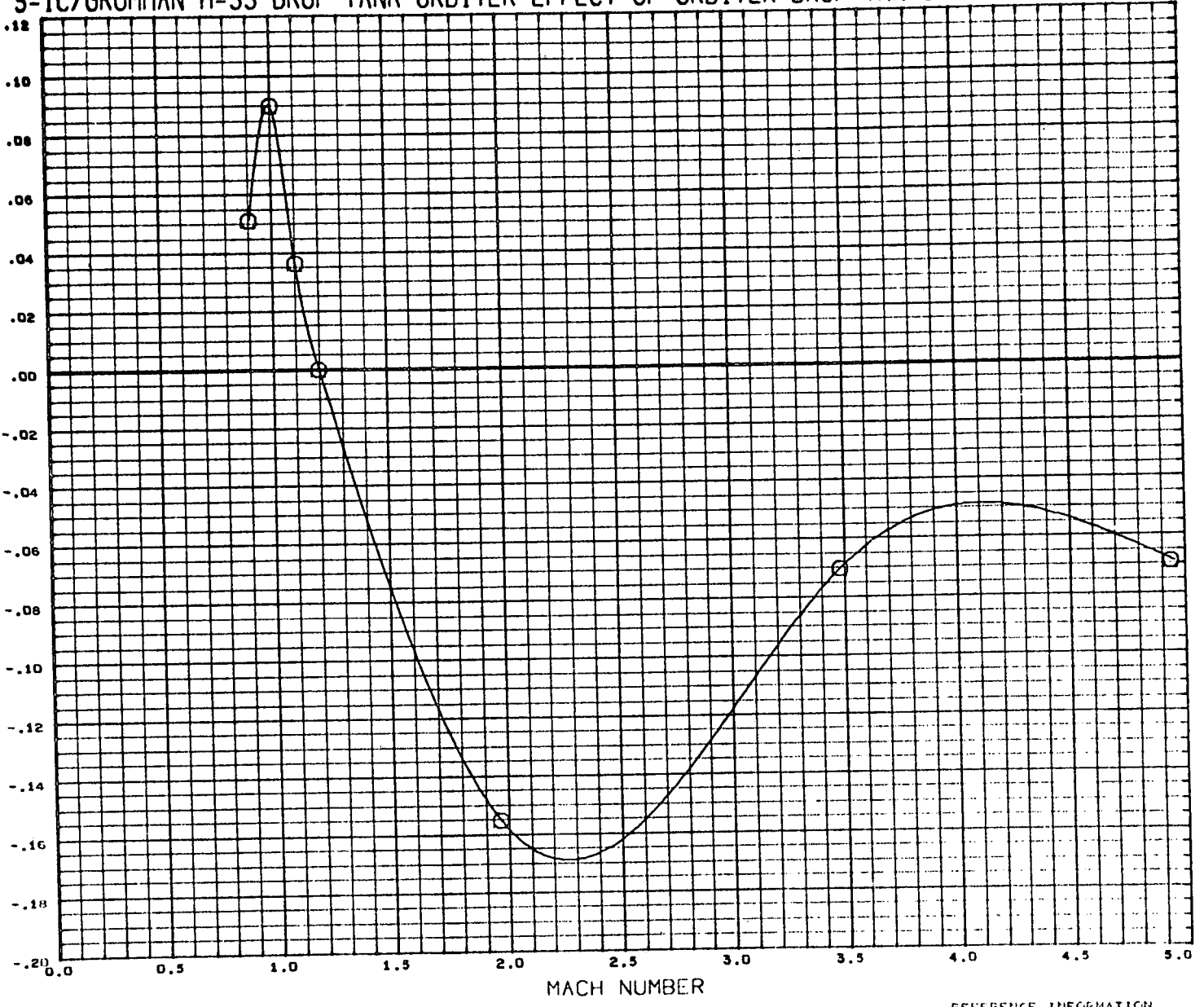
SYMBOL () BETA 0.000 ALPHA 0.000 PHI 90.000

REFERENCE INFORMATION
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 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE *ACCCG11#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

INCREMENTAL NORMAL FORCE COEFFICIENT, ALPHA=0, DCN(ALPHA=0)

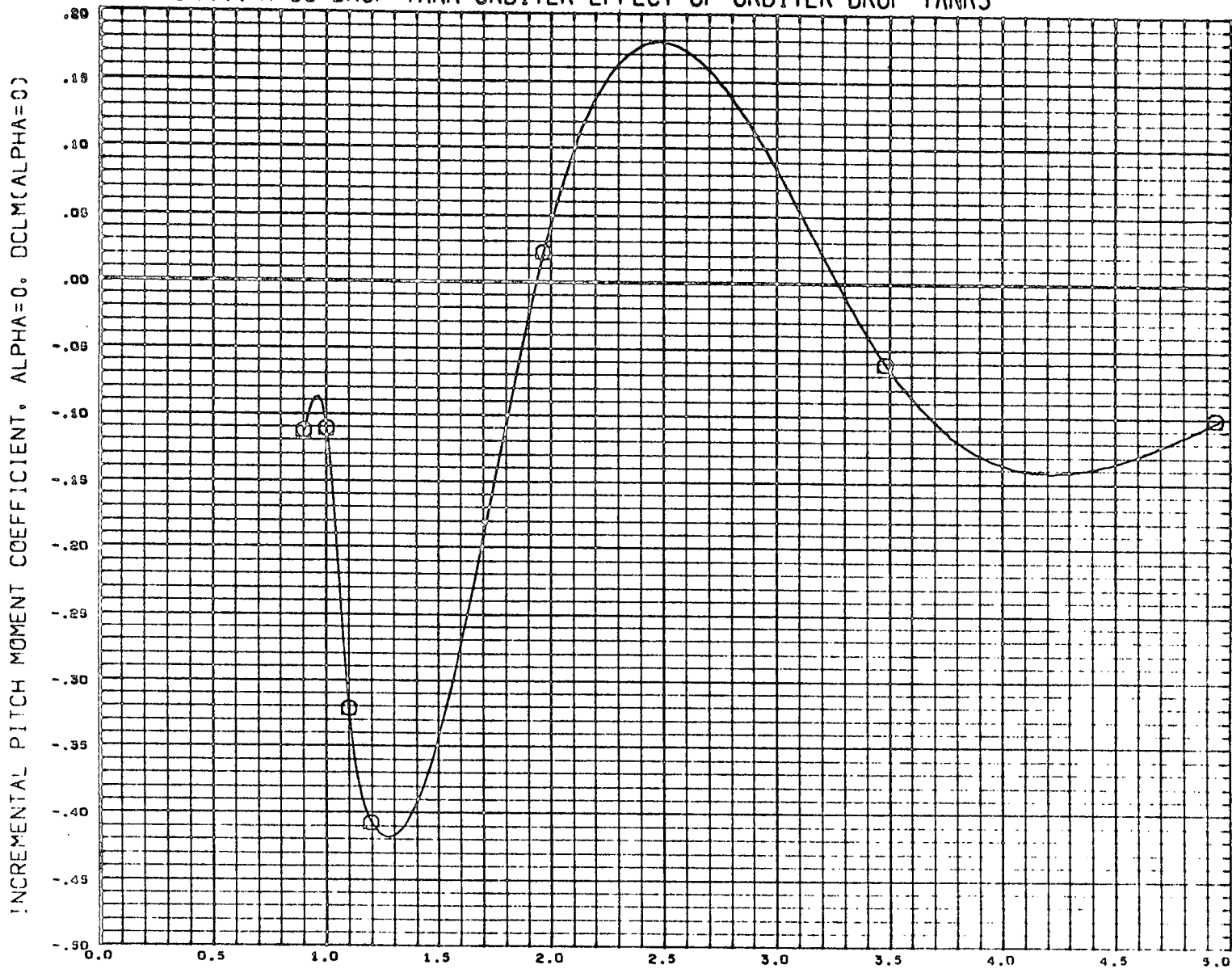


SYMBOL ○ ALPHA 0.000 BETA 0.000 PHI 0.000
 PARAMETRIC VALUES 0.000

REFERENCE INFORMATION
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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

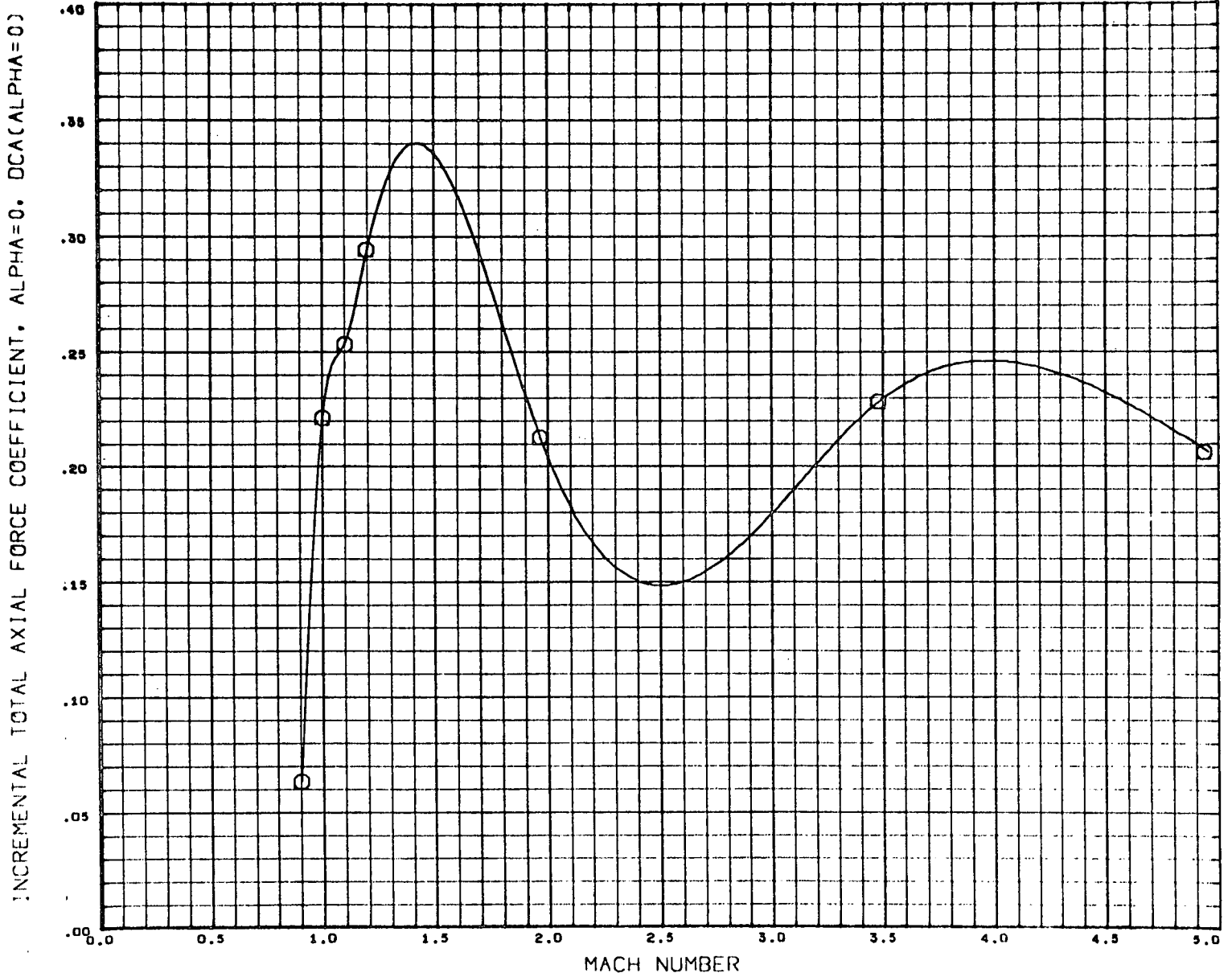


SYMBOL () ALPHA 0.000 BETA DATA PARAMETRIC VALUES 0.000 PHI 0.000

REFERENCE INFORMATION
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 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL ○ ALPHA 0.000 BETA 0.000 PHI 0.000

PARAMETRIC VALUES

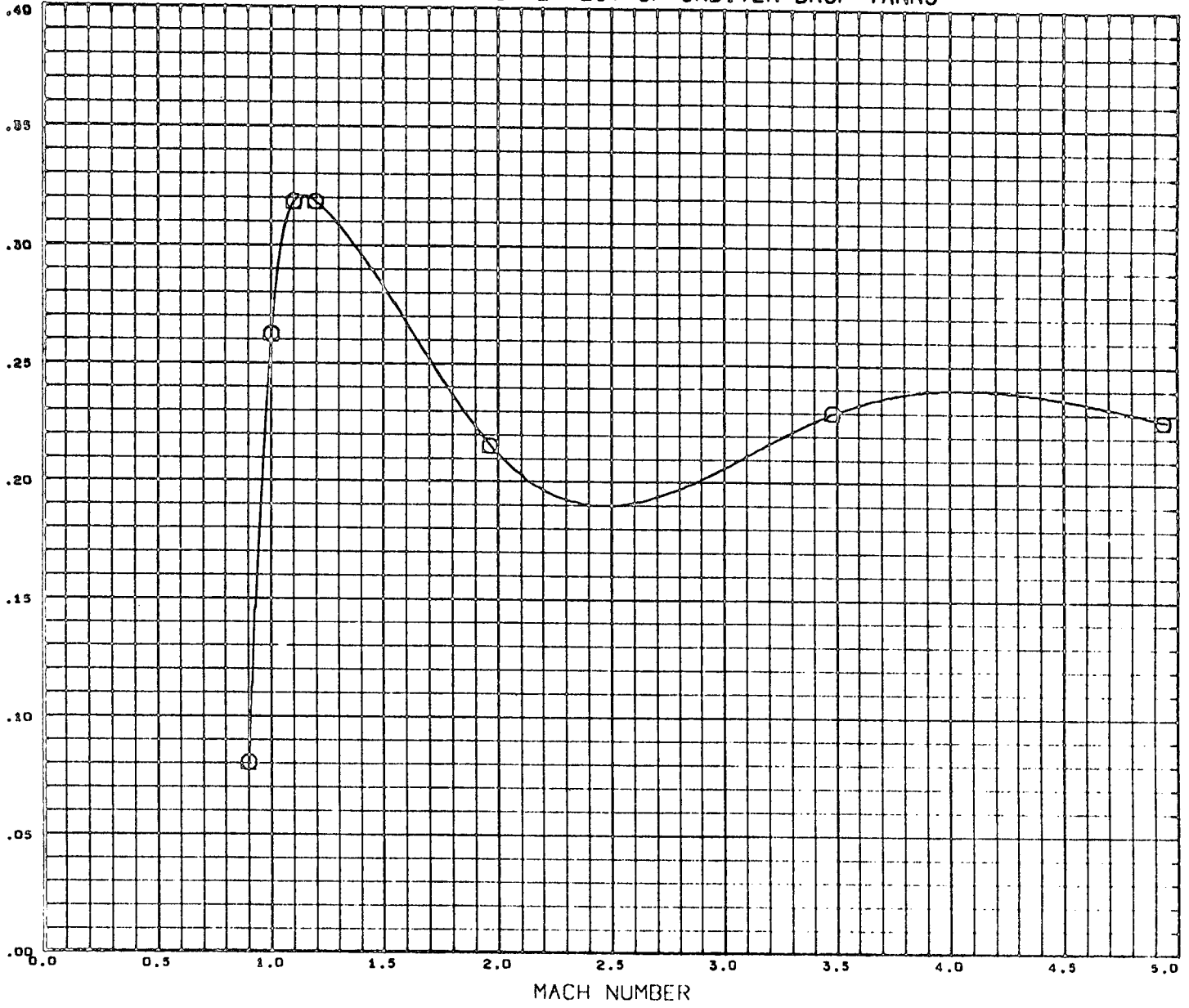
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XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC111C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, ALPHA=0, DCAF (ALPHA=0)



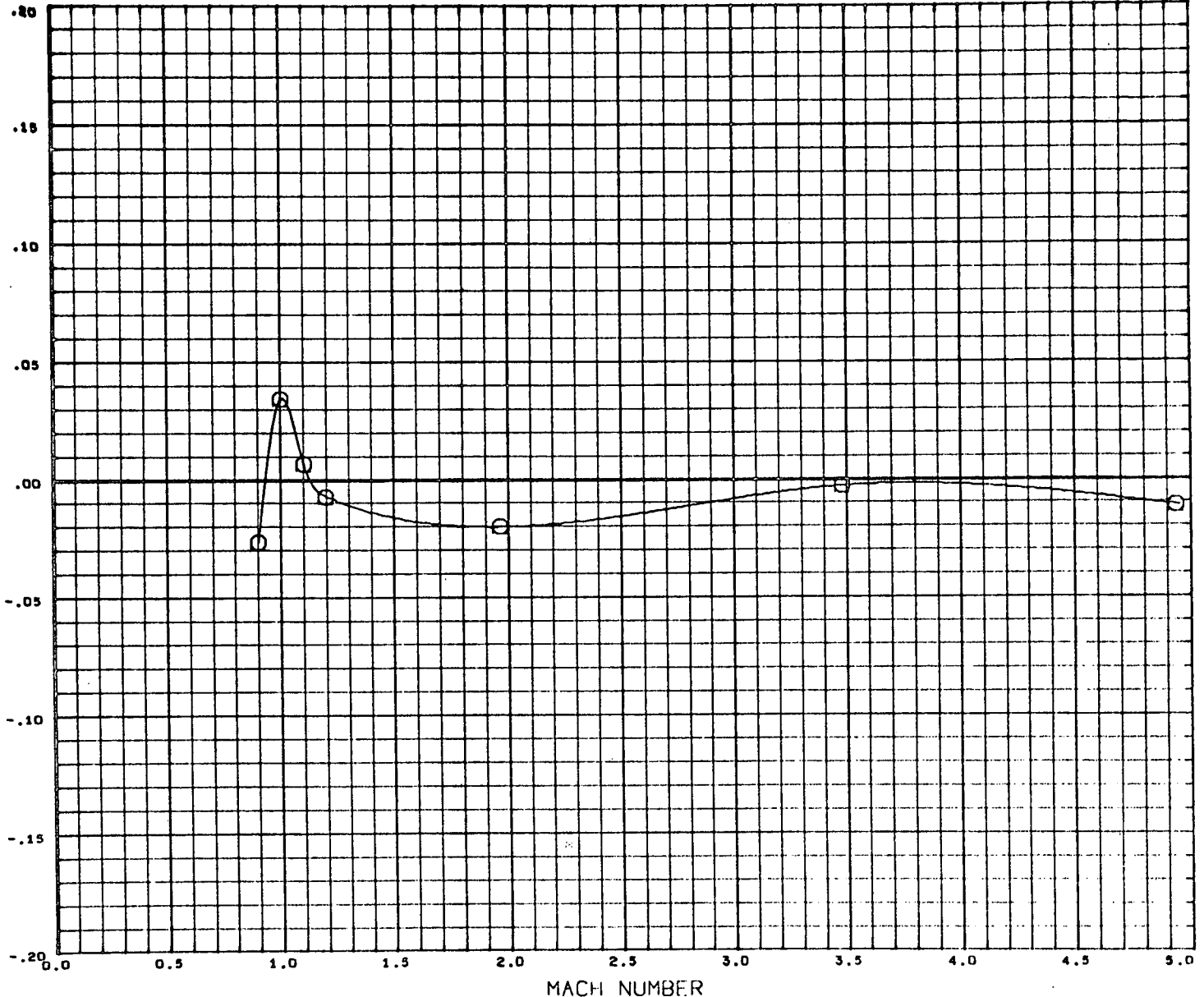
SYMBOL ○
 ALPHA 0.000
 BETA
 PARAMETRIC VALUES
 0.000 PHI 0.000

REFERENCE INFORMATION
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 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3900 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC111C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

INCREMENTAL NORMAL FORCE COEFF. GRADIENT, DCNA (ALPHA=0)



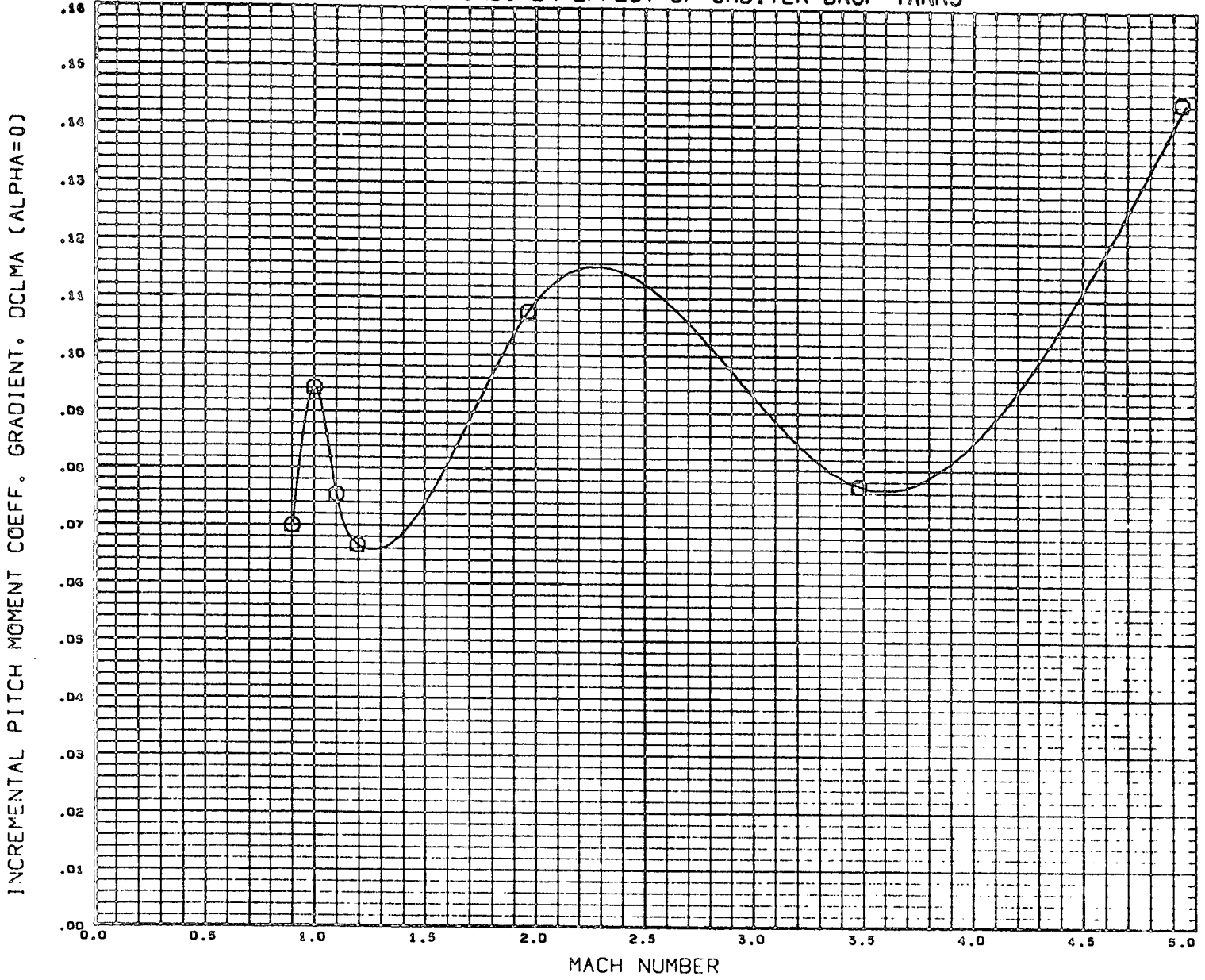
SYMBOL ALPHA BETA PARAMETRIC VALUES PHI 0.000

REFERENCE INFORMATION

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XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC111C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS



SYMBOL ALPHA BETA PARAMETRIC VALUES PHI 0.000

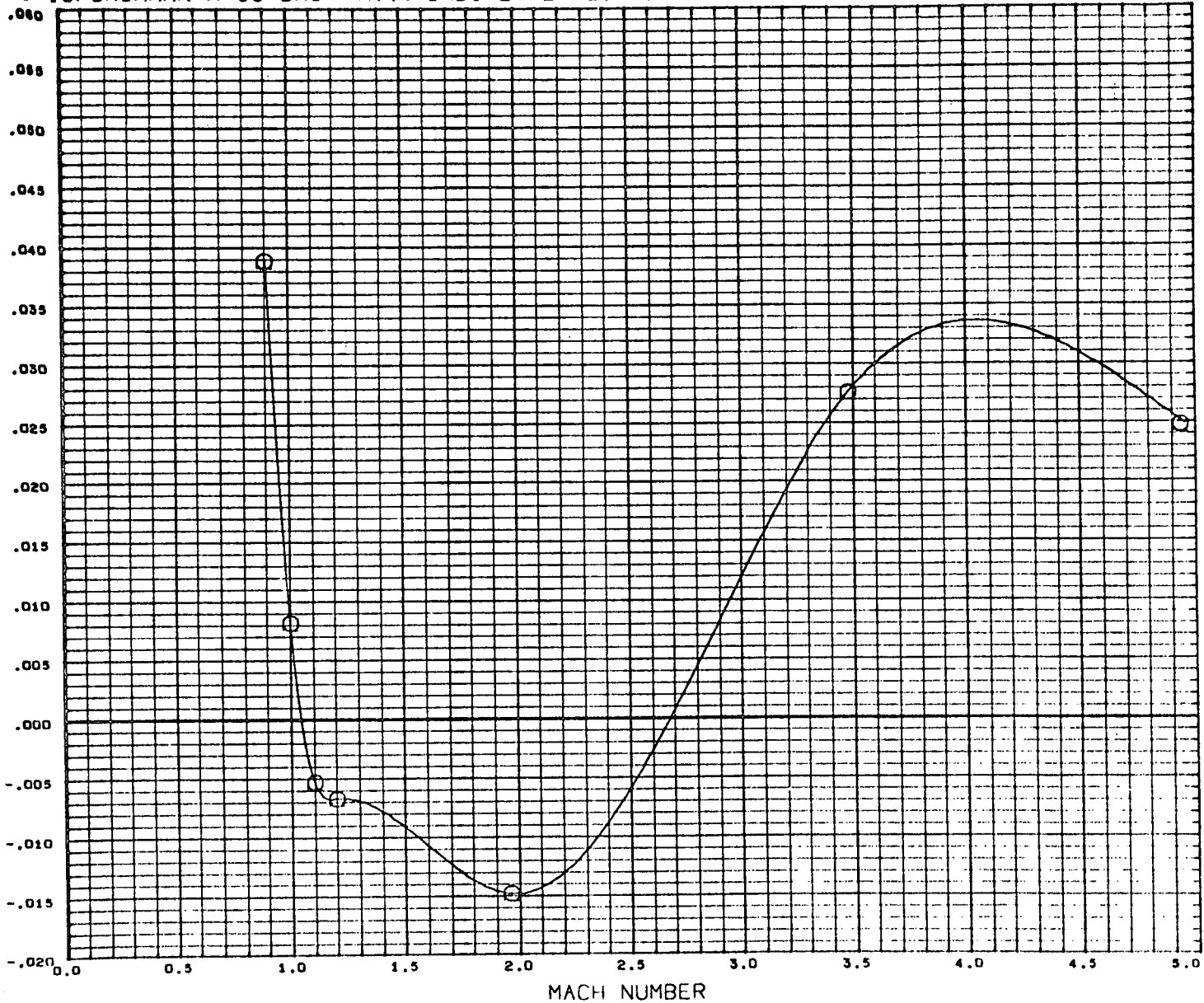
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ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCC111#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

INCREMENTAL SIDE FORCE COEFFICIENT GRADIENT, DCYB



SYMBOL ○ BETA 0.000 ALPHA 0.000 PHI 90.000

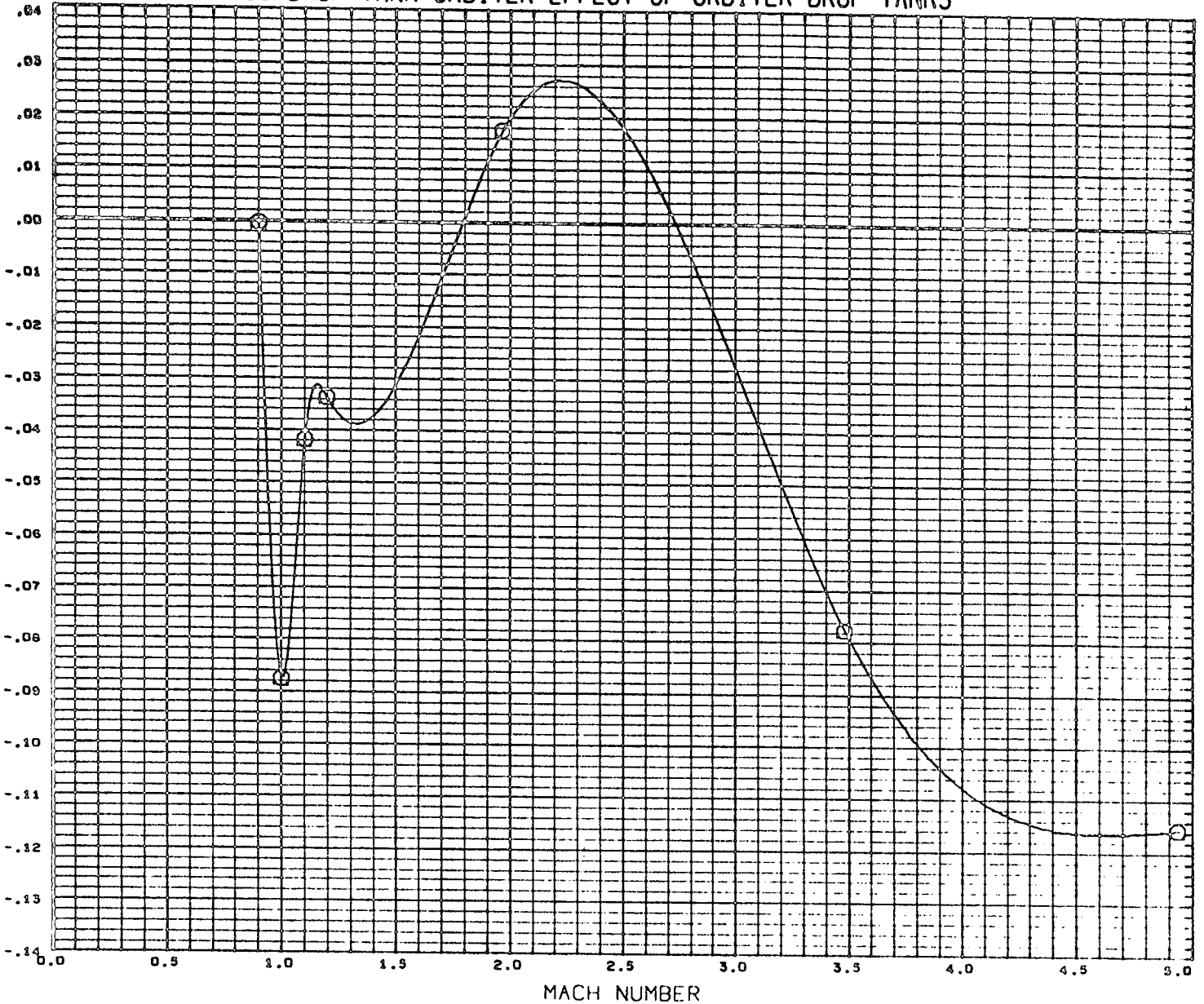
PARAMETRIC VALUES 0.000 PHI 90.000

REFERENCE INFORMATION
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 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE #ACCCGCI1#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

INCREMENTAL YAW MOMENT COEFFICIENT GRADIENT, DCYNB



SYMBOL () BETA 0.000 ALPHA 0.000 PH1 90.000

PARAMETRIC VALUES

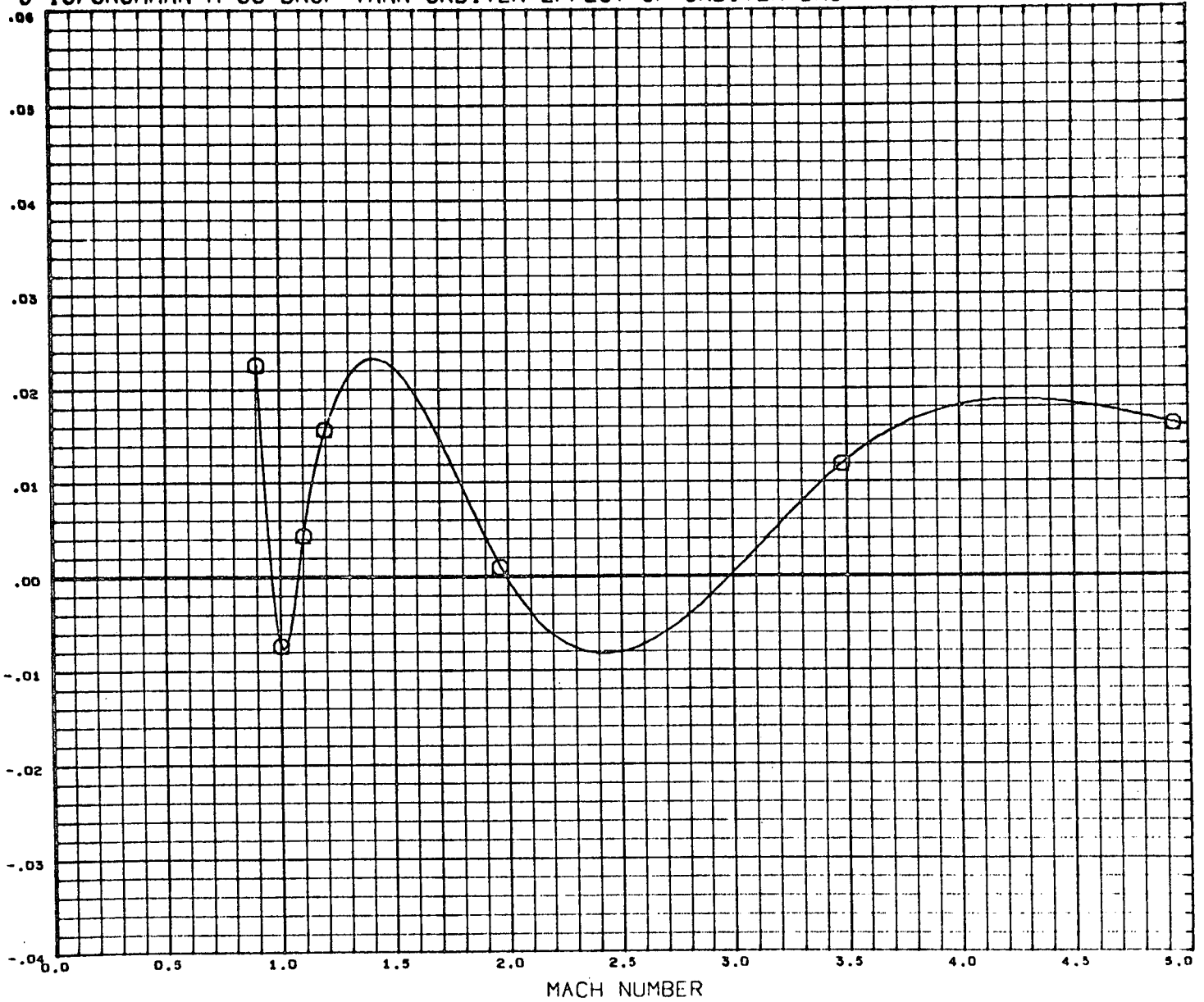
REFERENCE INFORMATION

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XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE *ACCCGCI1*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER DROP TANKS

INCREMENTAL ROLLING MOMENT COEFFICIENT GRADIENT, DC9LB



SYMBOL	BETA	PARAMETRIC VALUES
○	0.000	ALPHA 0.000 PHI 90.000

REFERENCE INFORMATION		
SREF	1.3960	90. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3900	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE #ACCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



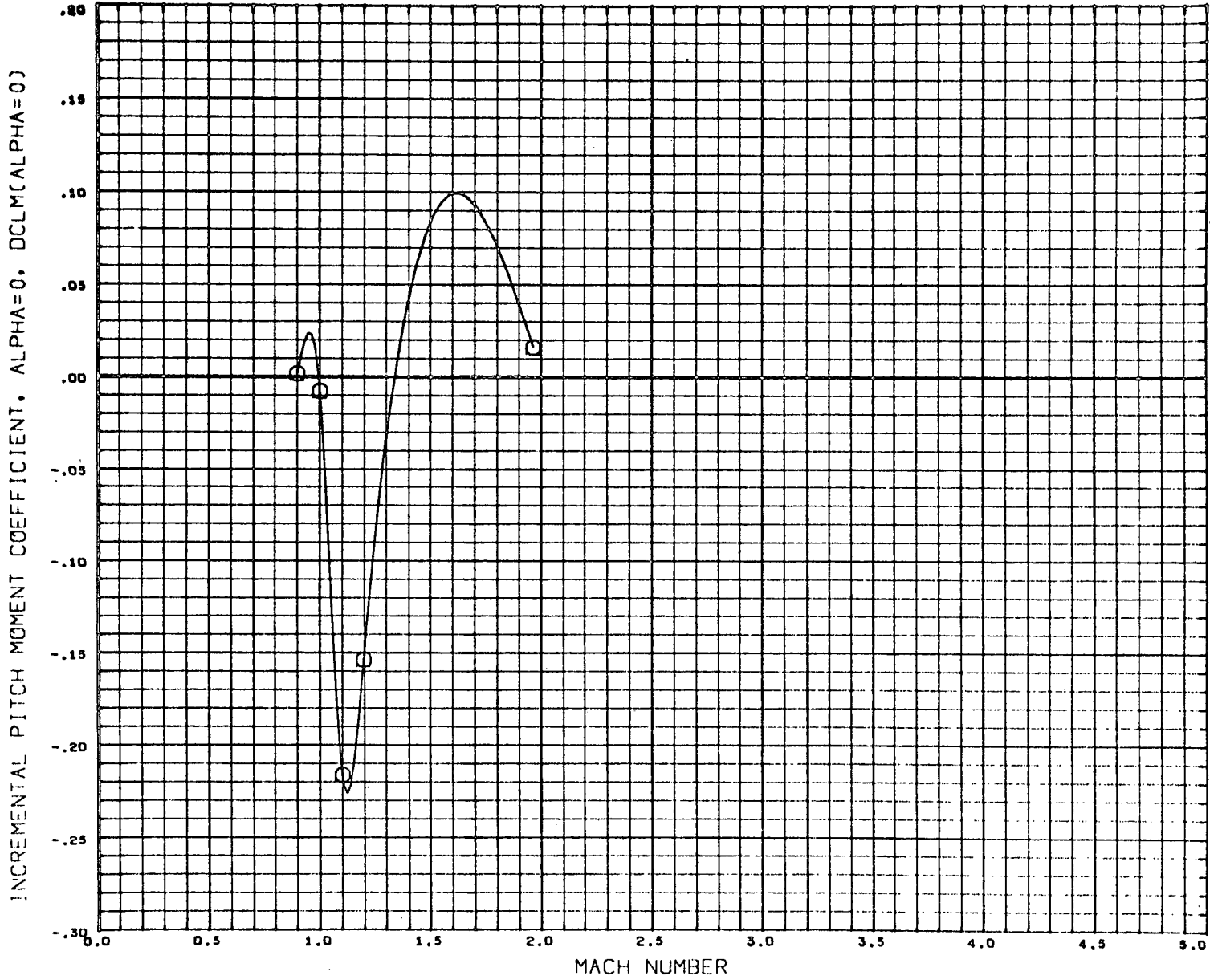
SYMBOL ALPHA BETA PARAMETRIC VALUES PHI 0.000

REFERENCE INFORMATION
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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCC112C

C-10

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



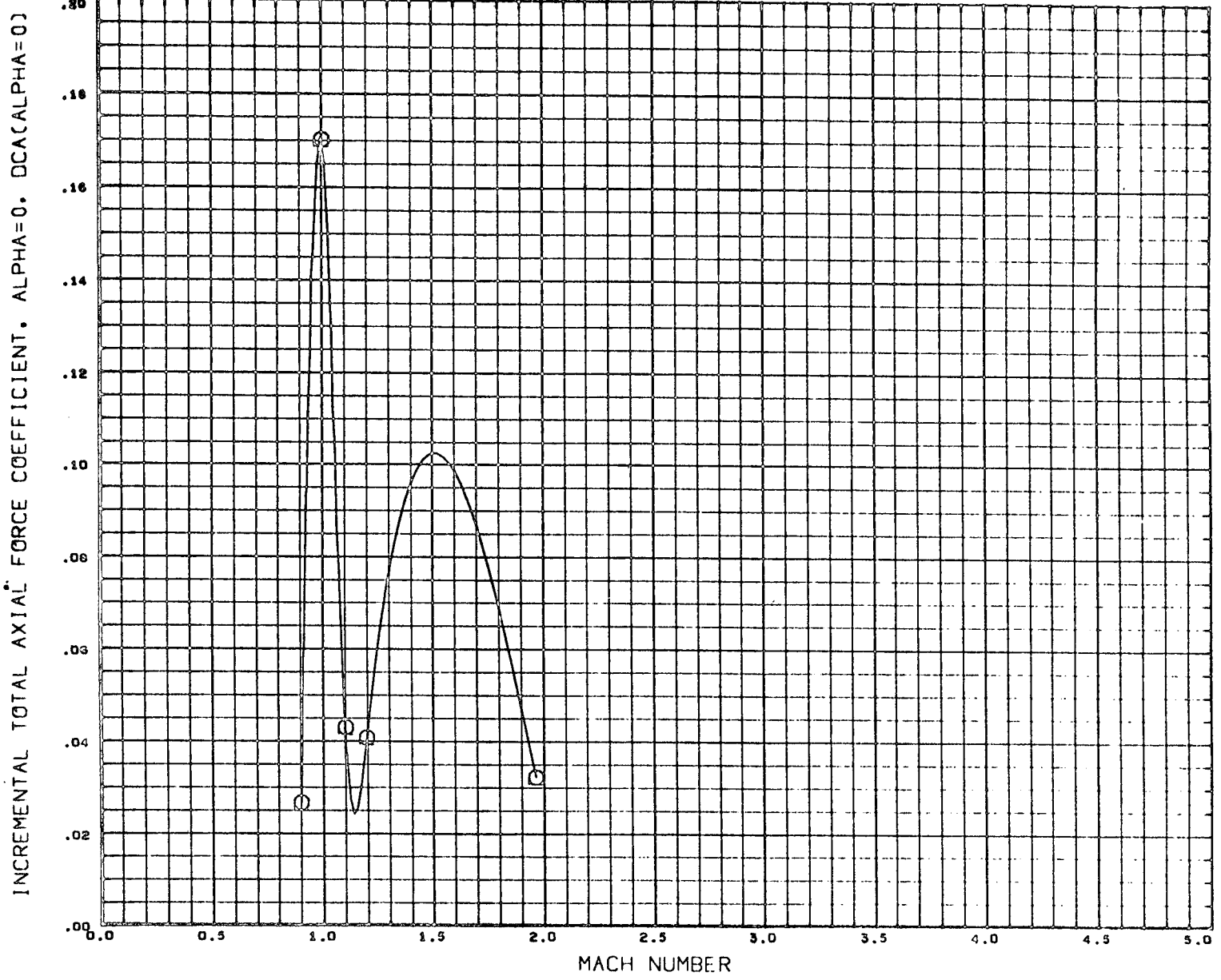
SYMBOL ALPHA BETA PARAMETRIC VALUES PHI

REFERENCE INFORMATION

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XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



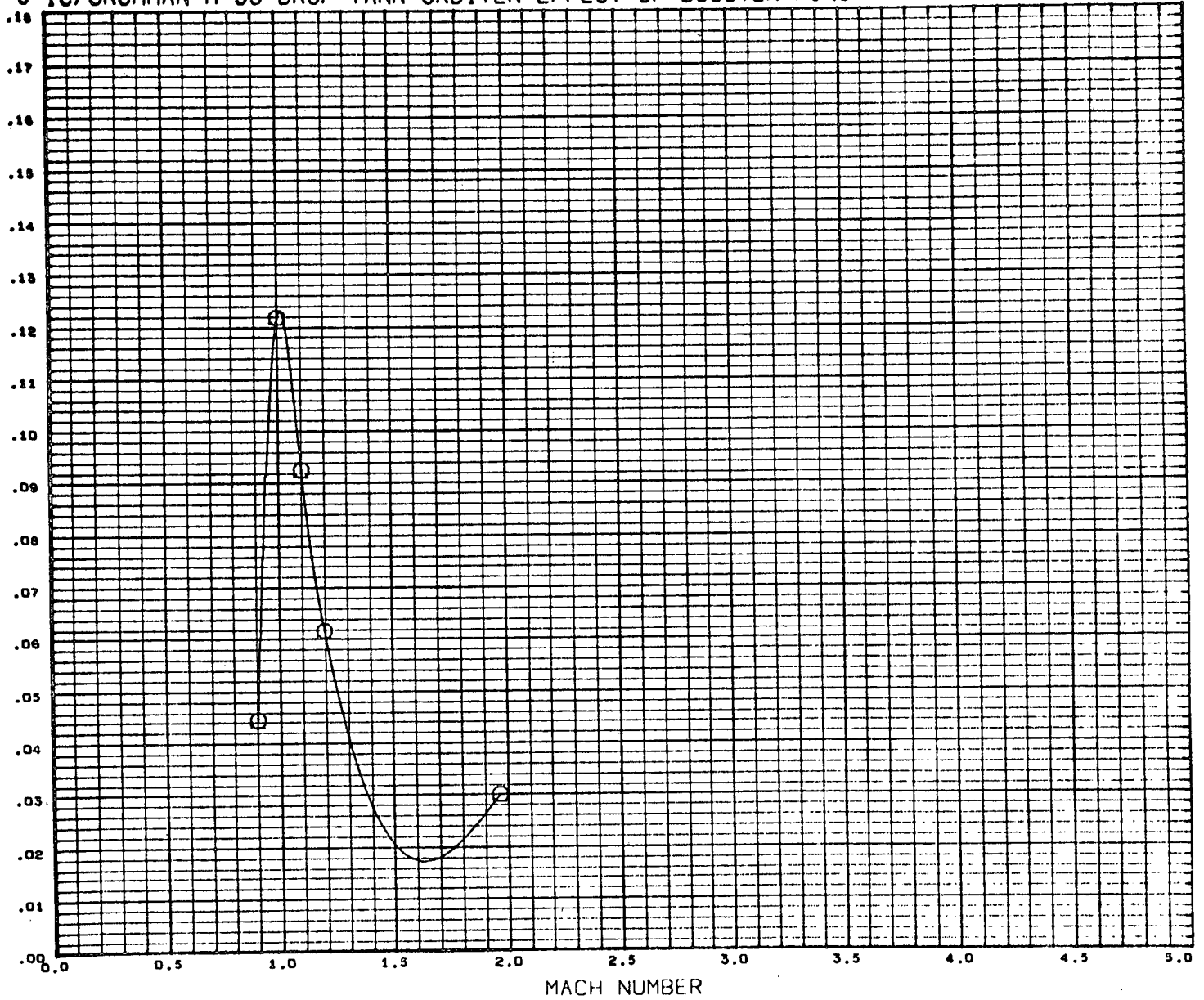
SYMBOL ALPHA BETA PARAMETRIC VALUES PHI 0.000

REFERENCE INFORMATION
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 BREF 1.3330 IN.
 XMRP 5.3390 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC111#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

INCREMENTAL FOREBODY AXIAL FORCE COEFFICIENT, ALPHA=0, DCAF (ALPHA=0)



SYMBOL ○
 ALPHA 0.000
 BETA 0.000
 PARAMETRIC VALUES
 PHI 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCC114C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

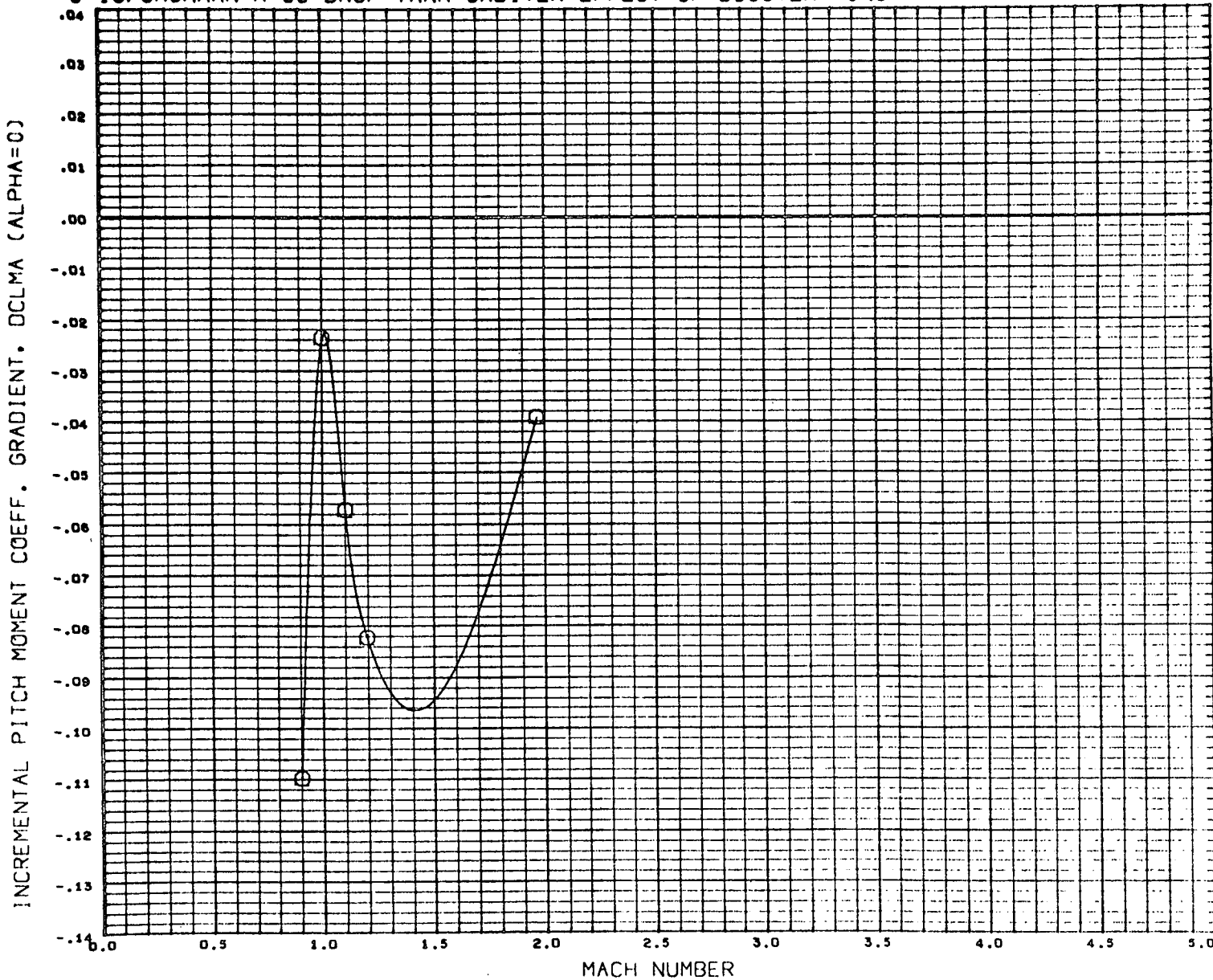


SYMBOL ALPHA PARAMETRIC VALUES
 ○ 0.000 BETA 0.000 PHI 0.000

REFERENCE INFORMATION
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 YMRP 0.0000 IN.
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DATA HIST. CODE CCCC1114C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

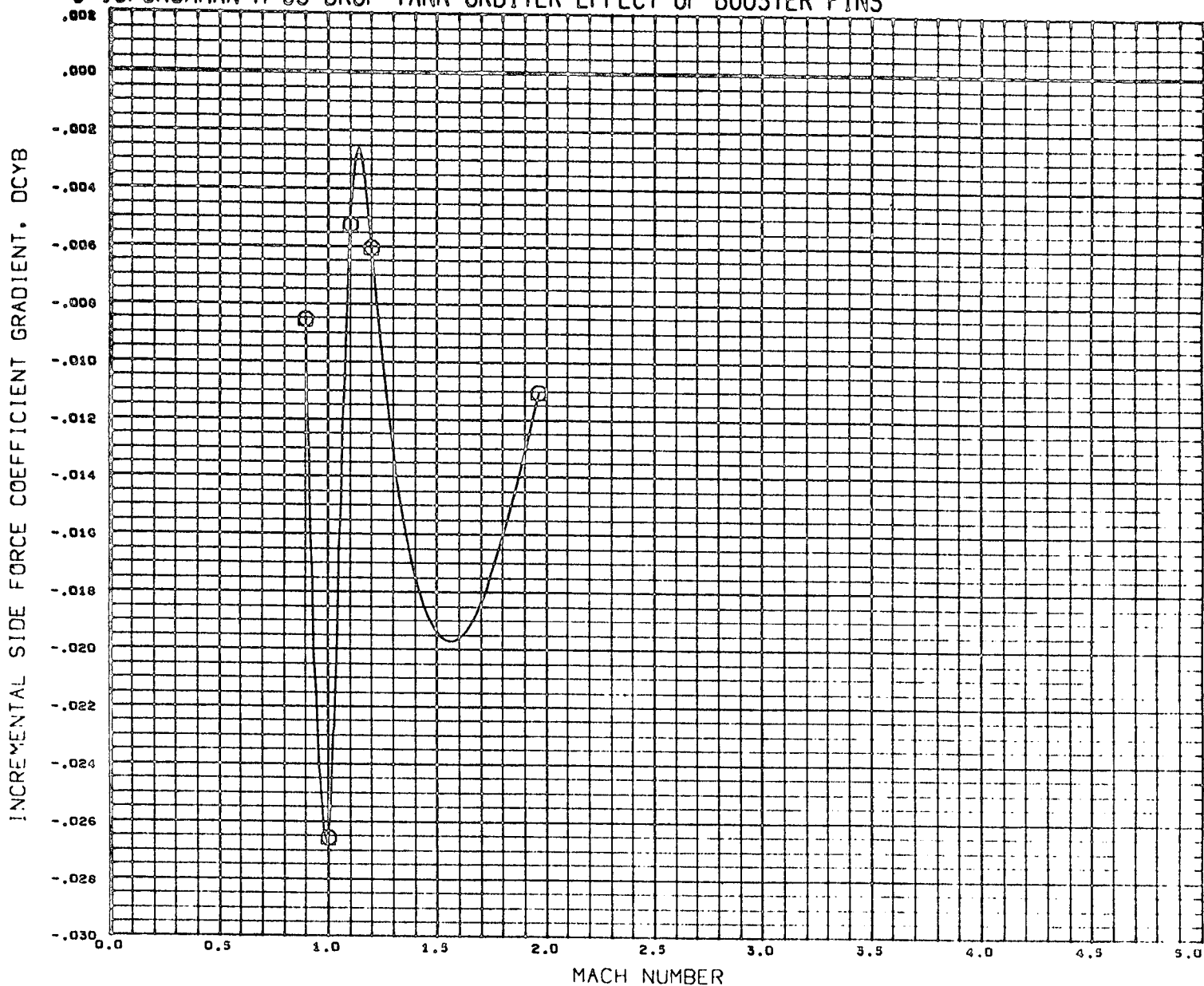


SYMBOL ○ ALPHA 0.000 BETA 0.000 PHI 0.000

REFERENCE INFORMATION
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 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC114C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



SYMBOL \bigcirc BETA 0.000 ALPHA 0.000 PHIC 90.000

PARAMETRIC VALUES

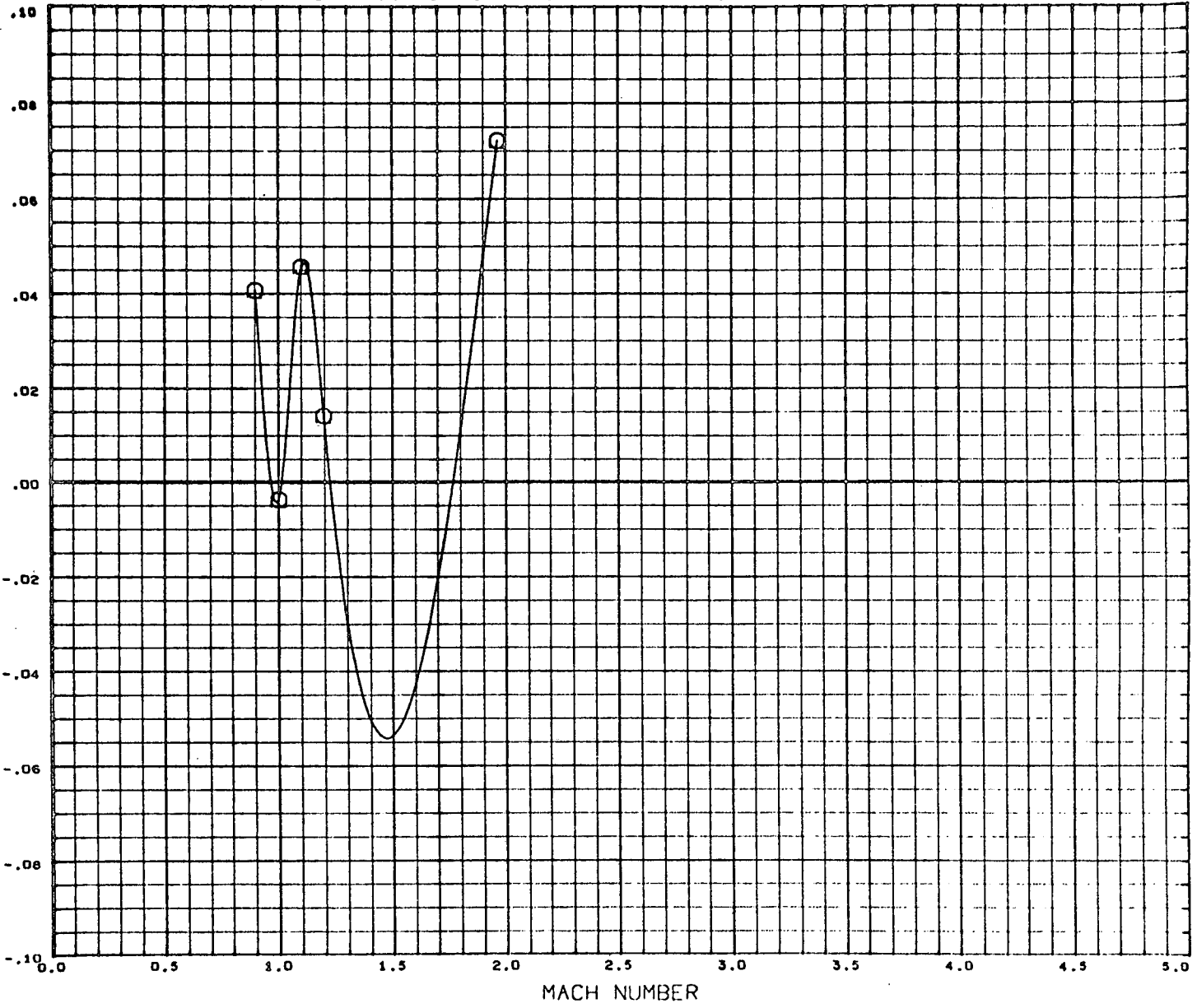
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YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE #ACCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS

INCREMENTAL YAW MOMENT COEFFICIENT GRADIENT, DCYNB

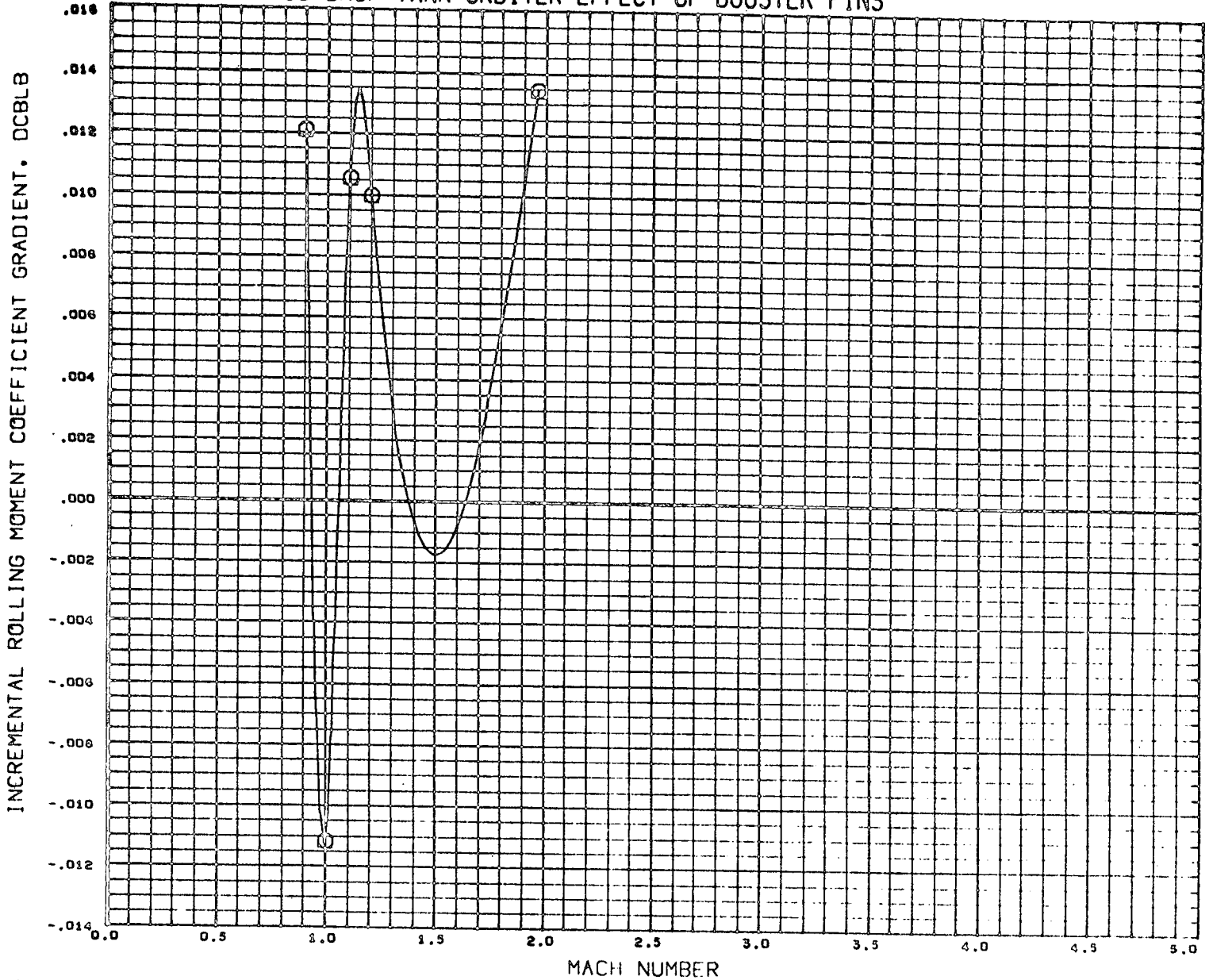


SYMBOL ○ BETA 0.000 ALPHA 0.000 PHI 90.000
 PARAMETRIC VALUES

REFERENCE INFORMATION
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 BREF 1.3330 IN.
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 YMRP 0.0000 IN.
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 SCALE 0.0034

DATA HIST. CODE #ACCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF BOOSTER FINS



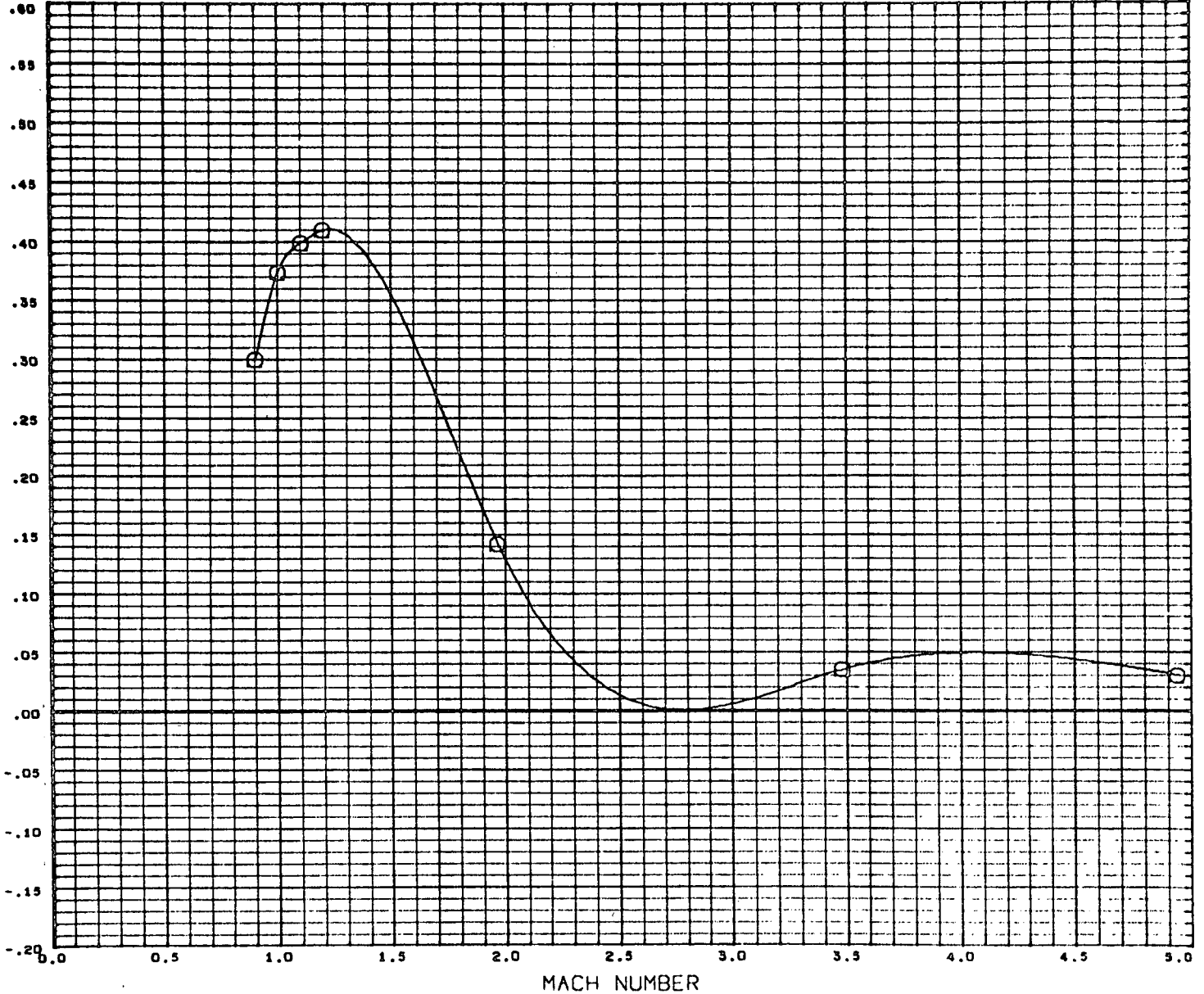
SYMBOL ○ BETA 0.000 ALPHA 0.000 PH1 90.000
 PARAMETRIC VALUES

REFERENCE INFORMATION
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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE *ACCCG11*C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

INCREMENTAL NORMAL FORCE COEFFICIENT, ALPHA=0, DCN(ALPHA=0)

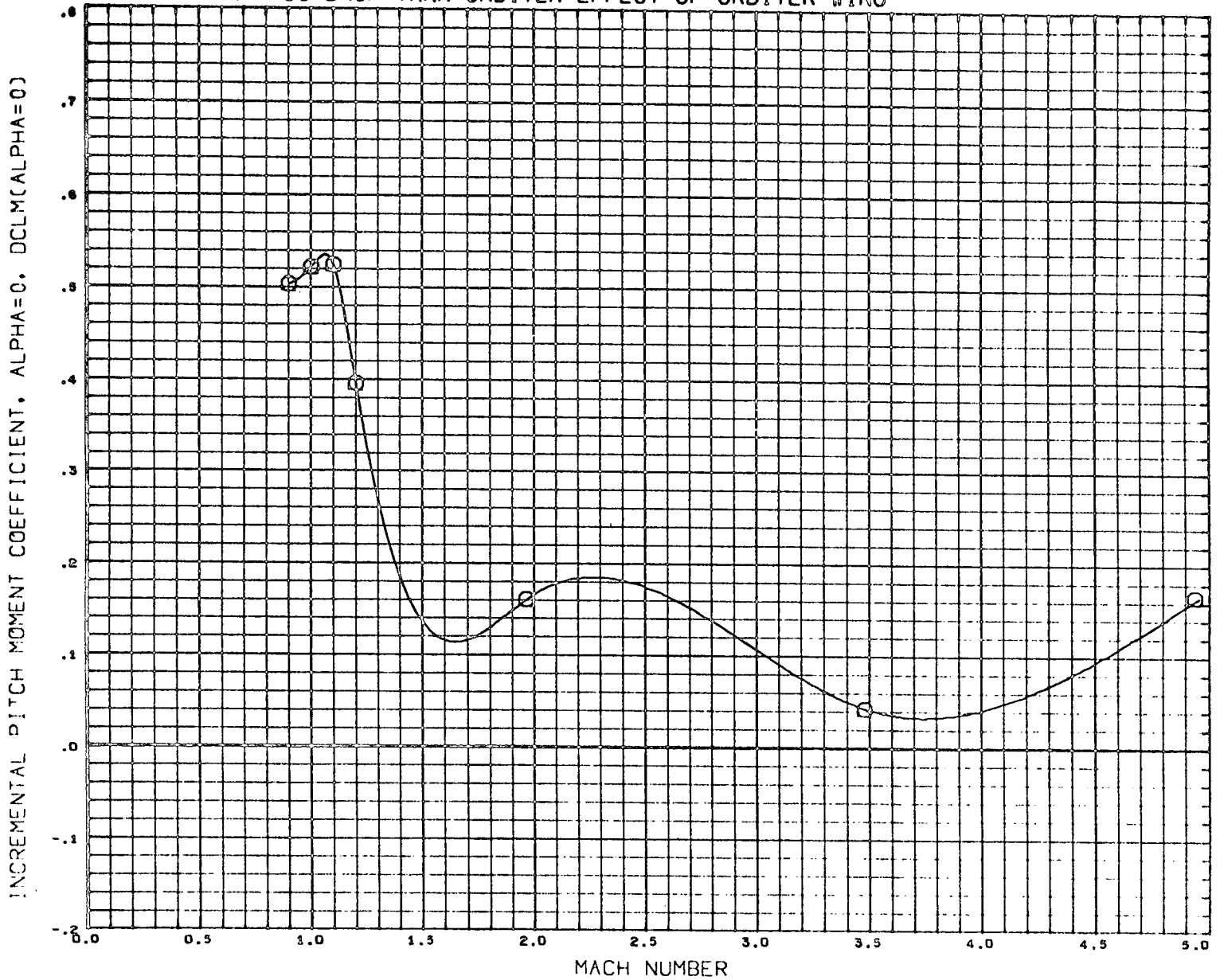


SYMBOL: ○ ALPHA 0.000 BETA 0.000 WNG IN 0.000
 PARAMETRIC VALUES PHI 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCC114C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

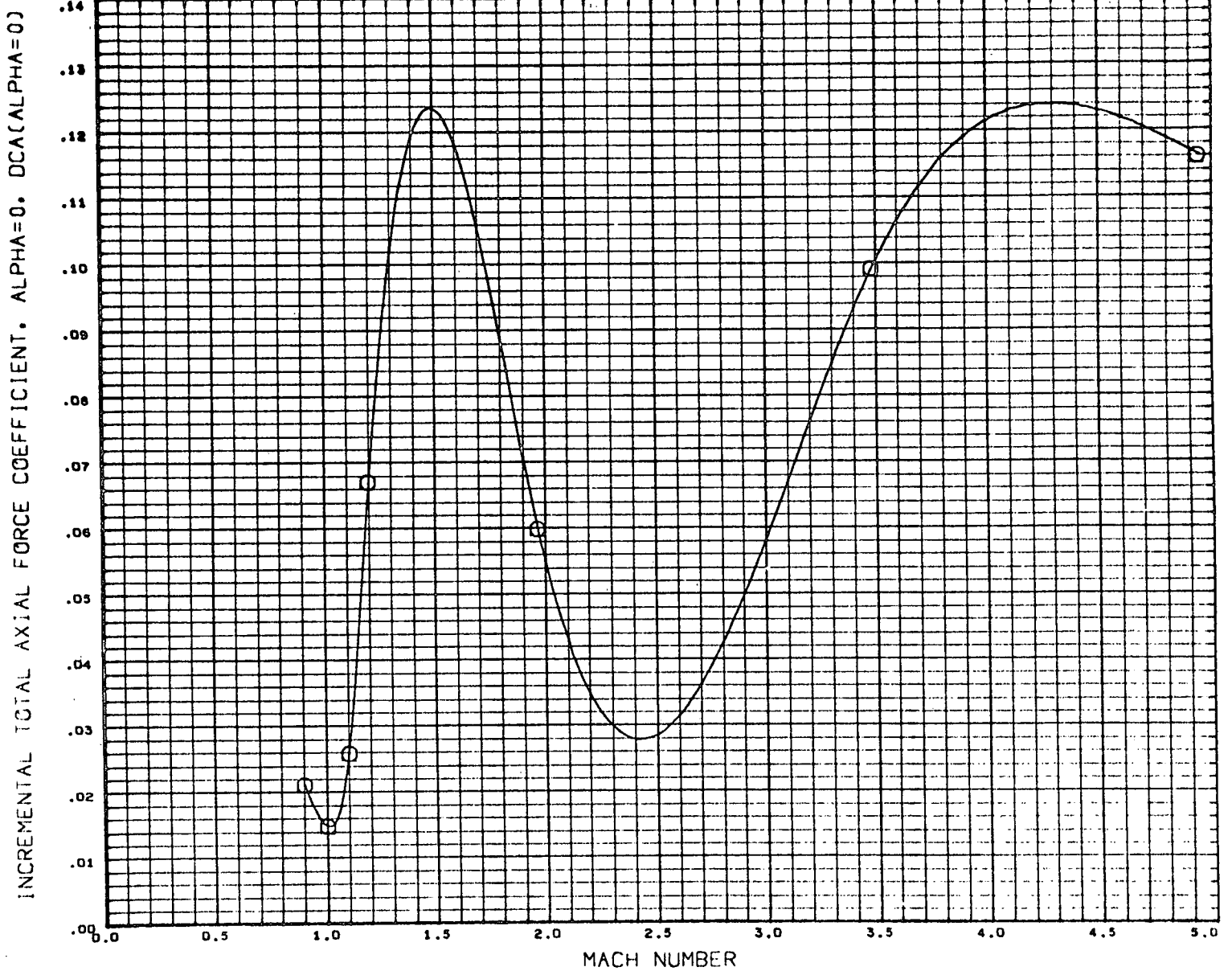


SYMBOL () ALPHA 0.000 BETA 0.000 PHI 0.000
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REFERENCE INFORMATION
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 SCALE 0.0034

DATA HIST. CODE CCCGCI114C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

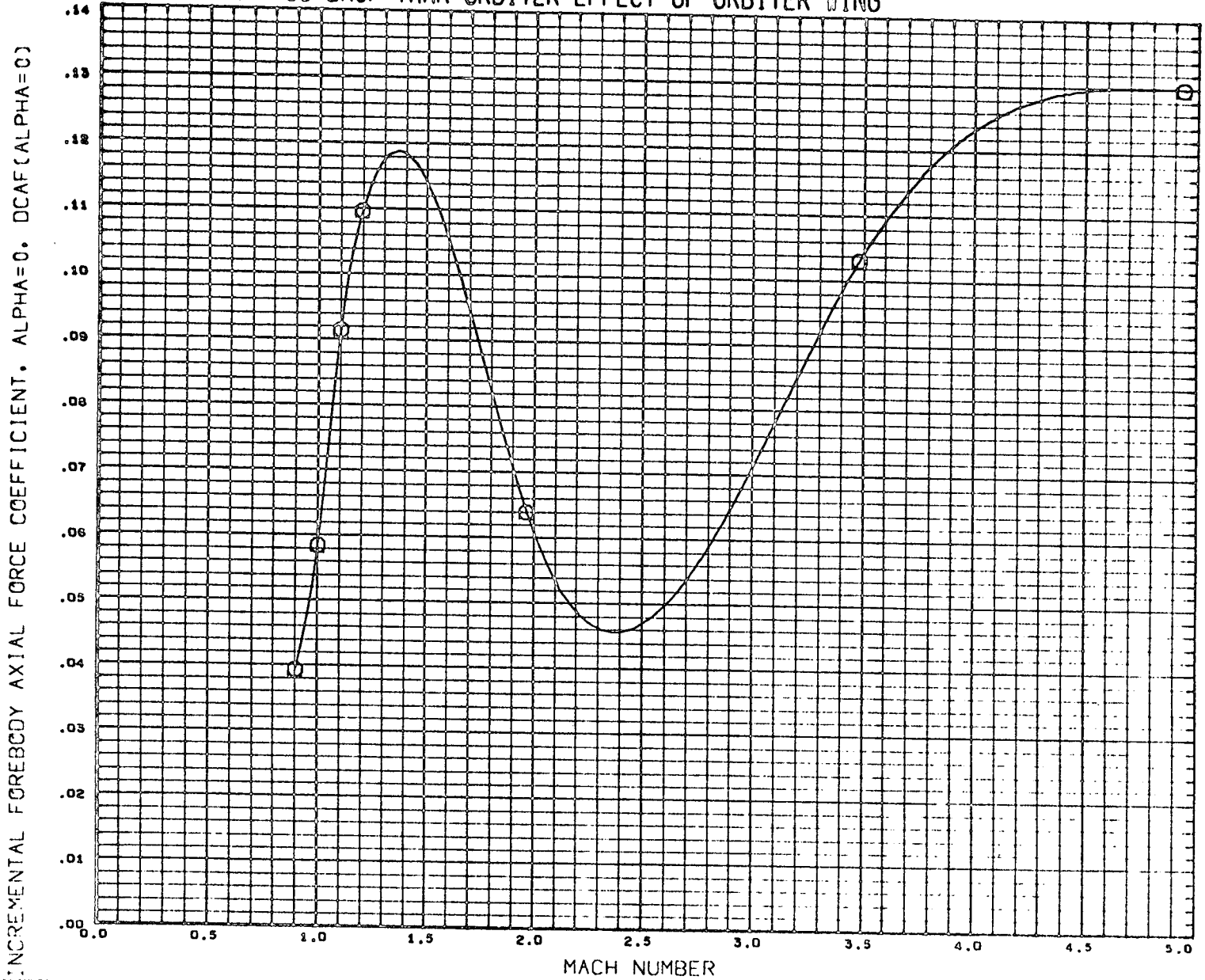


SYMBOL ○ ALPHA 0.000 BETA 0.000 WIDTH 0.000
 PARAMETRIC VALUES PHI 0.000

REFERENCE INFORMATION
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 SCALE 0.0034

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

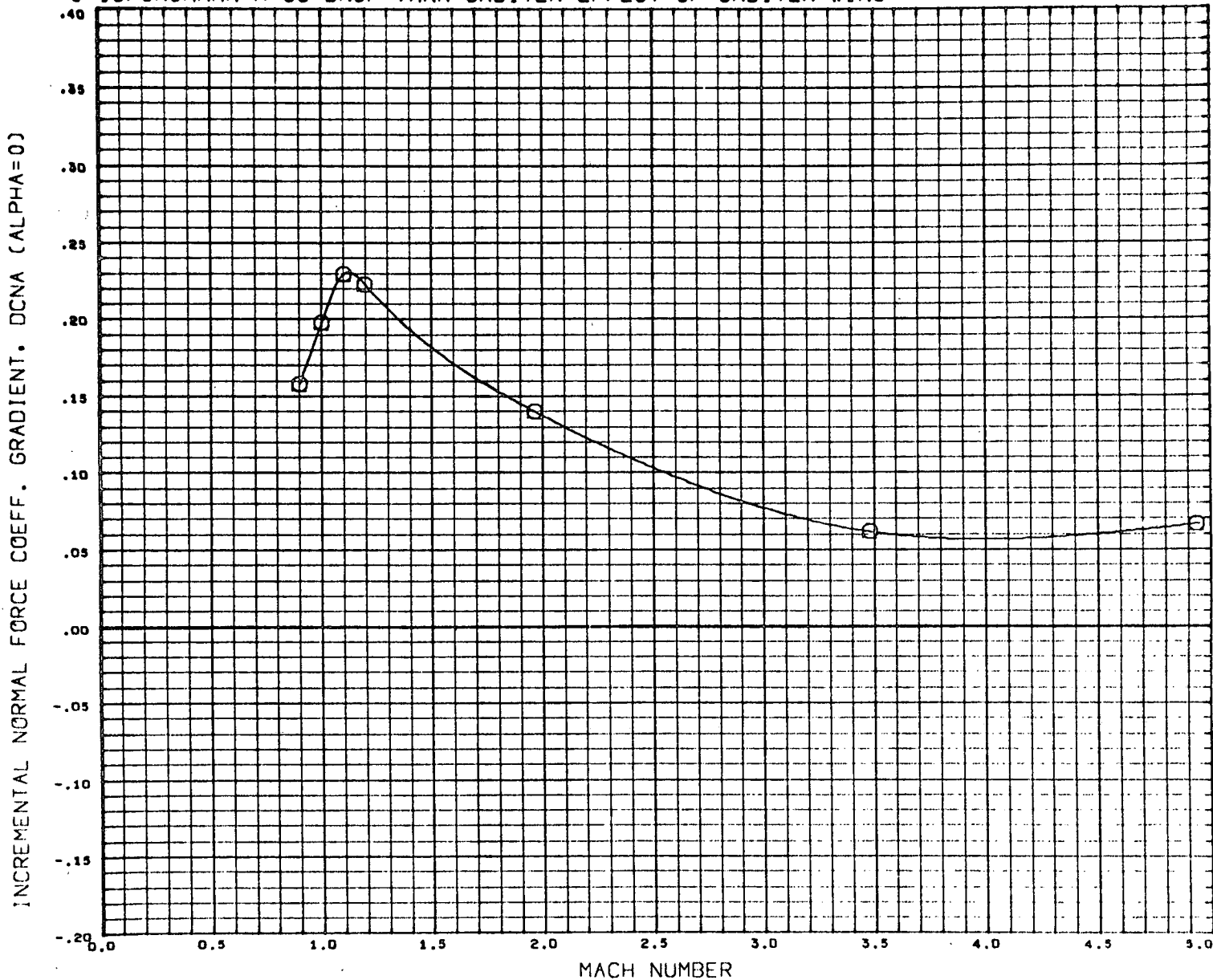


SYMBOL ○
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 BETA 0.000
 WNGIN 0.000
 PARAMETRIC VALUES
 PHI 0.000

REFERENCE INFORMATION
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 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
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 SCALE 0.0034

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

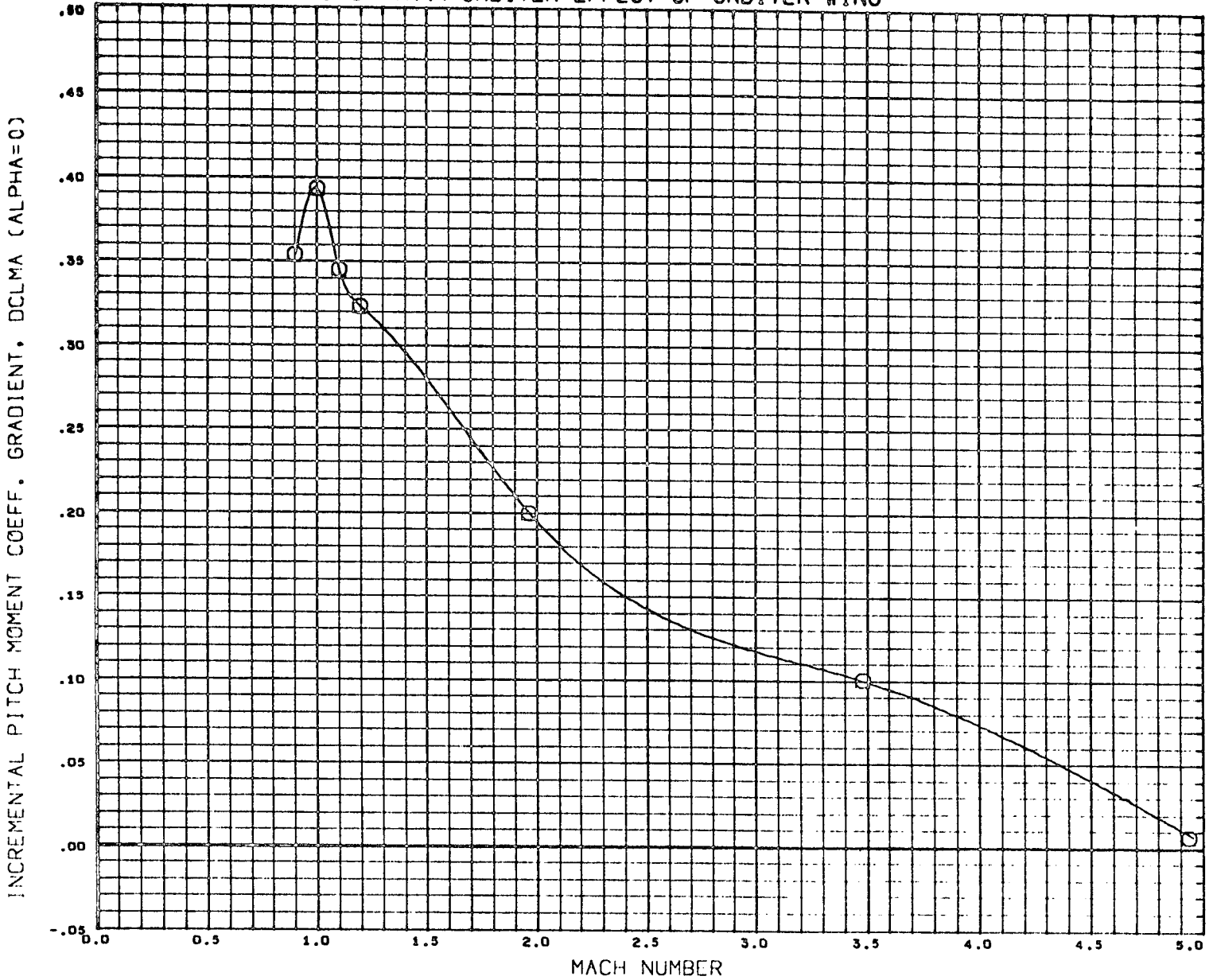


SYMBOL ○ ALPHA 0.000 BETA 0.000 WNGIN 0.000
 PARAMETRIC VALUES PHI 0.000

REFERENCE INFORMATION
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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCI1#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING



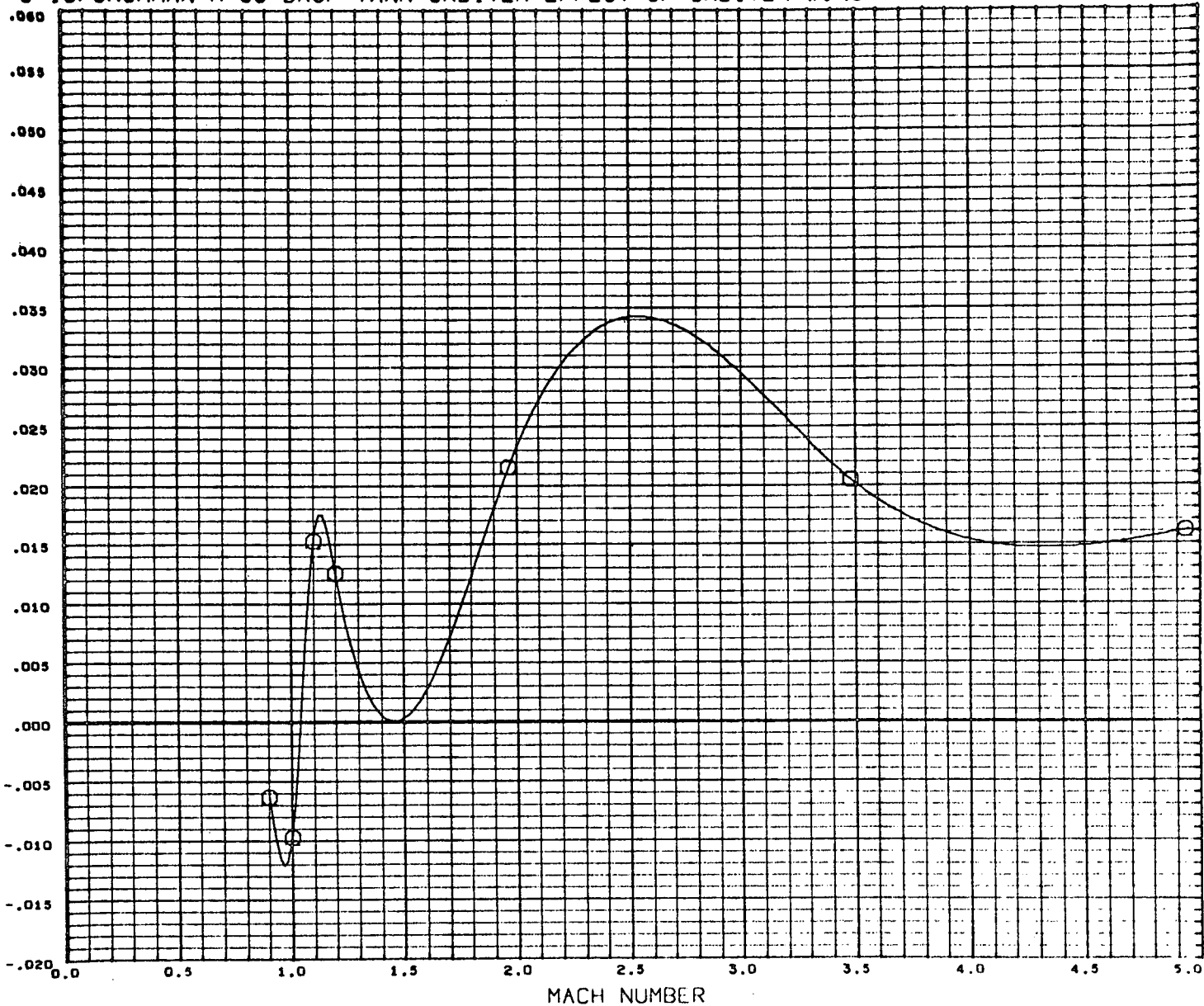
SYMBOL ○ ALPHA 0.000 BETA 0.000 PHI 0.000
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REFERENCE INFORMATION
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 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCG111*0

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

INCREMENTAL SIDE FORCE COEFFICIENT GRADIENT, DCYB

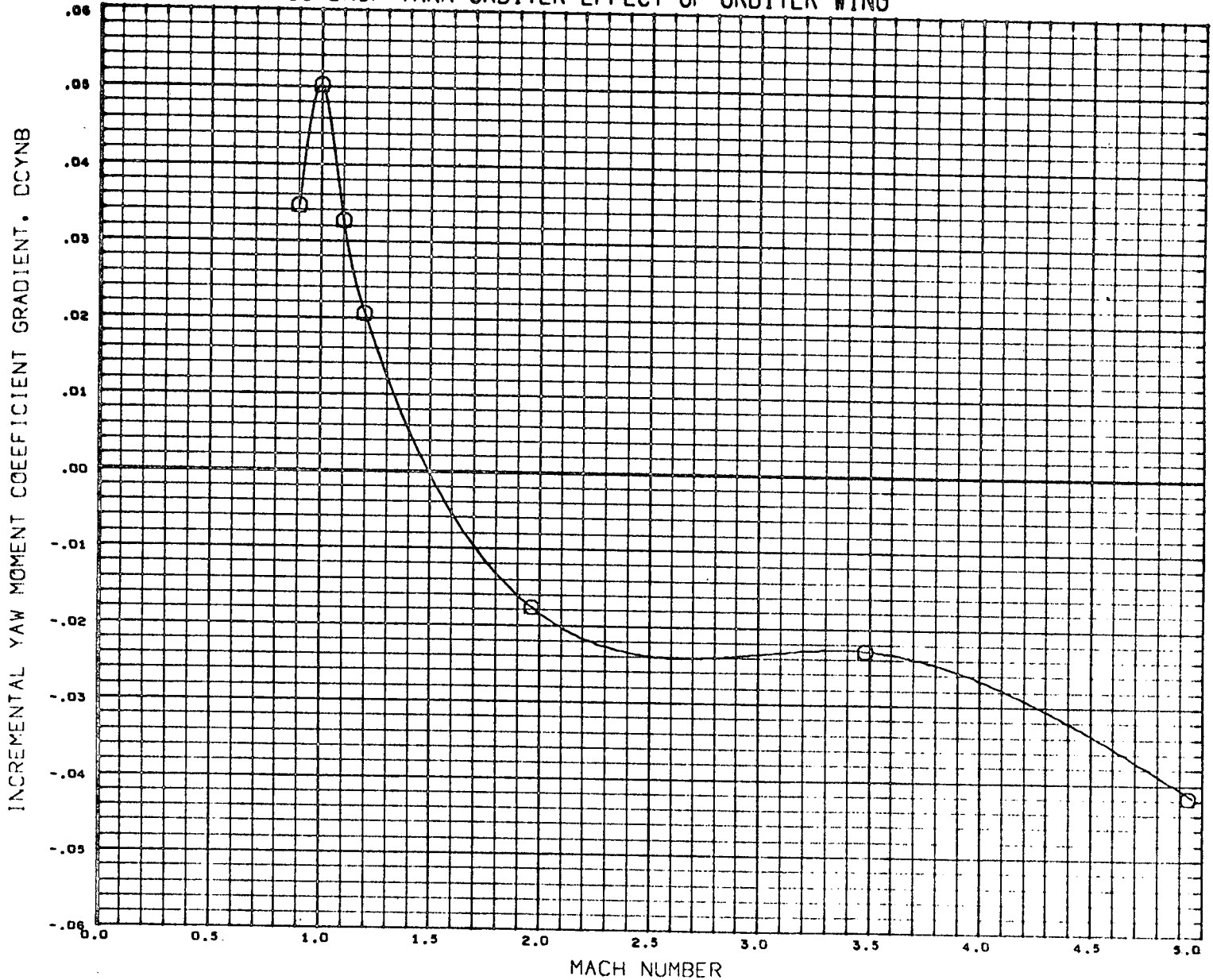


SYMBOL	BETA	PARAMETRIC VALUES			
○	0.000	ALPHA	0.000	PHI	90.000
		WNGTH	0.000		

REFERENCE INFORMATION		
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LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

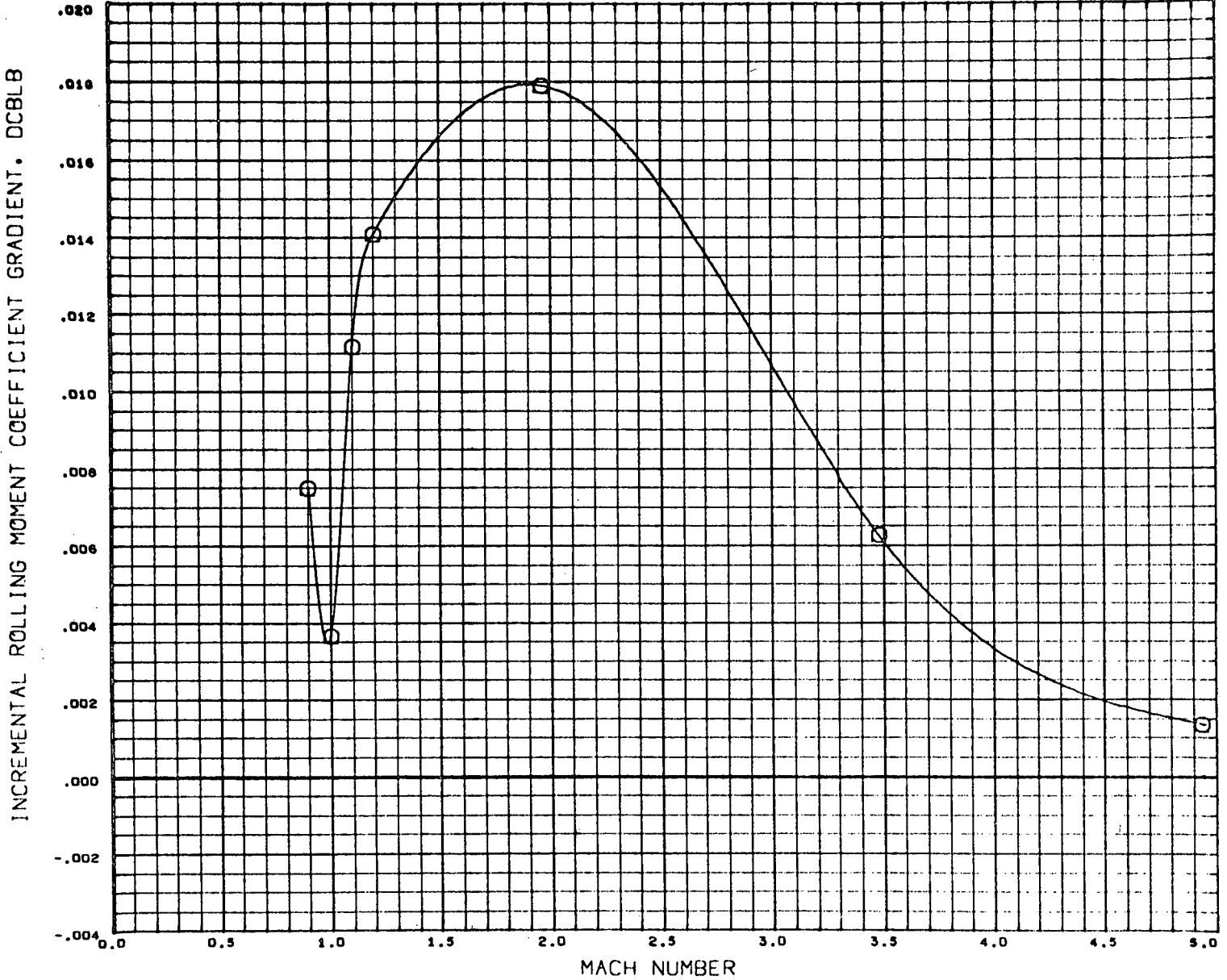


SYMBOL \circ BETA 0.000 ALPHA 0.000 PHI 90.000
 WNGIN 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3090 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCC114C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER WING

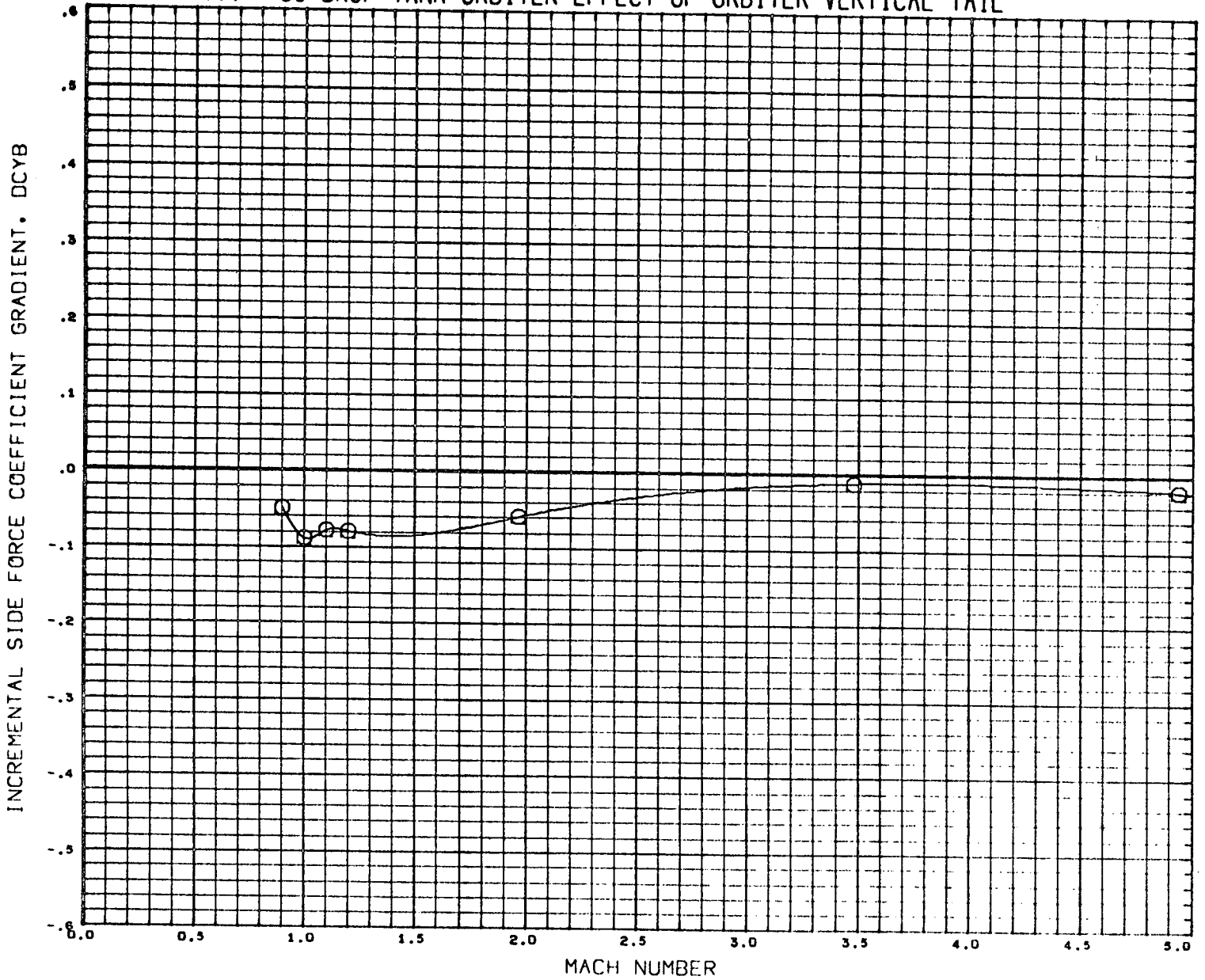


SYMBOL BETA ALPHA PARAMETRIC VALUES PHI 90.000
 ○ 0.000 WNGIN 0.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE CCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL



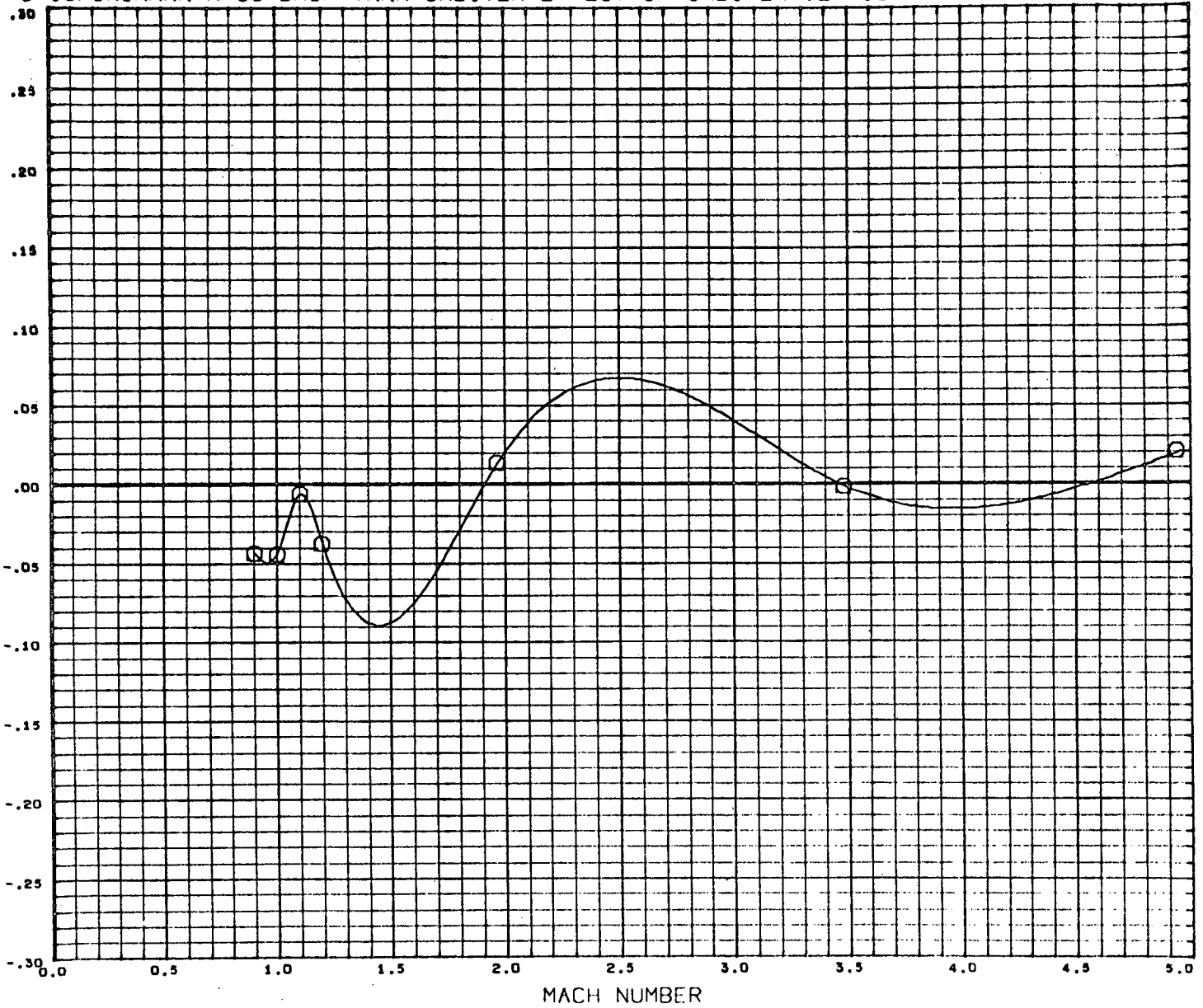
SYMBOL \circ BETA 0.000 ALPHA 0.000 PHI 90.000
 PARAMETRIC VALUES

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE *ACCCGCI1#C

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

INCREMENTAL YAW MOMENT COEFFICIENT GRADIENT, DCYNB



SYMBOL	BETA	PARAMETRIC VALUES			
○	0.000	ALPHA	0.000	PHI	90.000

REFERENCE INFORMATION		
SREF	1.3960	SQ. IN.
LREF	1.3330	IN.
BREF	1.3330	IN.
XMRP	5.3990	IN.
YMRP	0.0000	IN.
ZMRP	0.0000	IN.
SCALE	0.0034	

DATA HIST. CODE #ACCCGCIIC

S-1C/GRUMMAN H-33 DROP TANK ORBITER EFFECT OF ORBITER VERTICAL TAIL

INCREMENTAL ROLLING MOMENT COEFFICIENT GRADIENT, DCBLB



SYMBOL \circ BETA 0.000 ALPHA 0.000 PHI 90.000

PARAMETRIC VALUES
0.000 PHI 90.000

REFERENCE INFORMATION
 SREF 1.3960 SQ. IN.
 LREF 1.3330 IN.
 BREF 1.3330 IN.
 XMRP 5.3990 IN.
 YMRP 0.0000 IN.
 ZMRP 0.0000 IN.
 SCALE 0.0034

DATA HIST. CODE #ACCCGCIIC