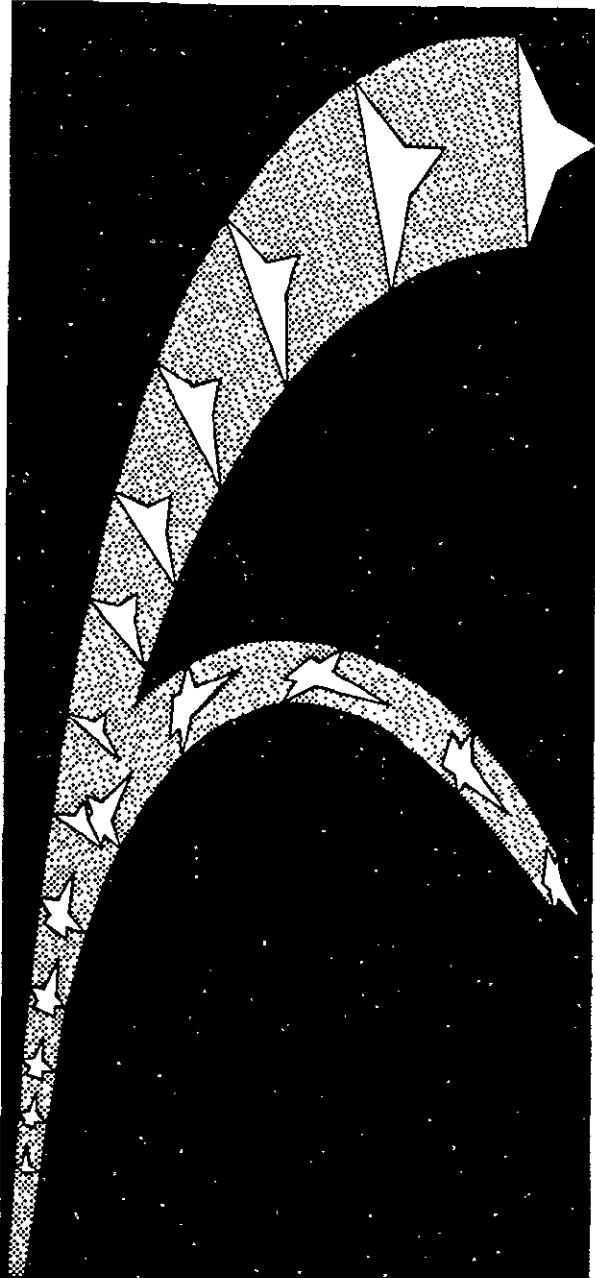


J.L.
M-14
DMS-DR-1159
AUGUST 1971

CR-119988



-SPACE SHUTTLE-

**BASIC HYPERSONIC FORCE DATA
FOR GRUMMAN DELTA WING
ORBITER CONFIGURATIONS
ROS-NBI AND ROS-WBI**

by
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J. Levine, GAC
B. Johannessen, GAC



**GRUMMAN FARMINGDALE
36 INCH HYPERSONIC
TUNNEL**

SADSAC SPACE SHUTTLE
AEROTHERMODYNAMIC
DATA MANAGEMENT SYSTEM

CONTRACT NAS8-4016
MARSHALL SPACE FLIGHT CENTER

SPACE DIVISION  CHRYSLER
CORPORATION

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FACILITY FORM 602

NASA Series Number: S-0604

DMS-DR-1159
AUGUST, 1971

SADSAC/SPACE SHUTTLE

WIND TUNNEL TEST DATA REPORT

CONFIGURATION: Grumman Configurations ROS-NBL and ROS-WBL

TEST PURPOSE: Determine Basic Hypersonic Force Data For Two Delta Wing
Orbiter Configurations

TEST FACILITY: Grumman Farmingdale 36" Hypersonic Tunnel

TESTING AGENCY: Grumman Aerospace Corporation

TEST NO. & DATE: GFHT-019 4/28/71 to 5/7/71

FACILITY COORDINATOR: M. Quan

PROJECT ENGINEER(S): M. Milhous

J. Levine

B. Johannessen

DATA MANAGEMENT SERVICES

LIAISON: John E. Vaughn DATA OPERATIONS: B. J. Fricken
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RELEASE APPROVAL:

N. D. Kemp
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Aero Thermo Data Group

CONTRACT NAS 8-4016

AMENDMENT 153

DRL 184 - 58

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.

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ABSTRACT

Two 1/200 scale models of the Grumman ROS-NBL and ROS-WBL space shuttle orbiters were tested in the GAC Hypersonic Wind Tunnel at a Mach number of 10. Model angle of attack, α , was varied from 20° to 65° at nominal sideslip angles of 0° , -3° , and -10° (Note: See Data Reduction section). Data were taken at approximately 2° increments while the model was being pitched at a rate of 8° per second.

Two different basic configurations were tested, the narrow body ROS-NBL, and the wide body ROS-WBL. Symmetric and asymmetric elevon deflections were tested to determine longitudinal and lateral control effectiveness. The effect of the rudder body flap, an auxiliary ventral fin and a different fuselage nose was also determined.

All testing was conducted without transition.

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SUMMARY

This report presents the details of the first series of hypersonic tests conducted on 1/200 scale models of the Grumman Aerospace ROS-NBL and ROS-WBL orbiter vehicles in the Grumman Farmingdale 36" Hypersonic Tunnel. The period of occupancy was from April 28 to May 7 on a one shift per day basis with the Grumman designation for this test being GFHT-019.

Additional tests were conducted on this same model in other Grumman facilities to more fully cover the Mach number range. The complete series of tests is covered in the following reports:

<u>SADSAC Report No.</u>	<u>Mach No. Range</u>
DMS-DR-1081	0.17
DMS-DR-1161	0.7 to 1.15
DMS-DR-1163	2.0 and 2.5
DMS-DR-1159	10.0

Six component aerodynamic force and moment coefficient data are presented herein in plotted form and cover an angle of attack range from 20° to 65° at nominal values of sideslip of 0°, -3° and -10°.

S U M M A R Y O F S A D S A C N O M E N C L A T U R E

COEFFICIENT	COEFFICIENT NAME	SADSAC NOMENCLATURE		
		BODY AXIS	STABILITY AXIS	WIND AXIS
CA	Total Axial Force	CA	-	-
CAB	Base Axial Force	CAB	-	-
CAF	Forebody Axial Force	CAF	-	-
CD	Total Drag Force	-	CD	CDTOTL
CDB	Base Drag Force	-	CDB	CDBASE
CDF	Forebody Drag Force	-	CDF	CDFORE
CL	Lift Force	-	CL	CL
CN	Normal Force	CN	-	-
CY	Side Force	CY	CY	CC
C _l	Rolling Moment	CBL	CSL	CWL
C _m	Pitching Moment	CLM	CLM	CPM
C _n	Yawing Moment	CYN	CLN	CLN
L/D	Lift-To-Drag Force Ratio	-	L/D	CL/CD
L/D	Lift-To-Forebody Drag Force Ratio	-	L/DF	CL/CDF
N/A	Normal-To-Axial Force Ratio	N/A	-	-
N/A	Normal-To-Forebody Axial Force Ratio	CN/CAF	-	-

CONFIGURATIONS INVESTIGATED

The following model components were utilized during these tests:

- B₁ - basic fuselage for ROS-NB1
- B_{1A} - basic fuselage modified as shown in Figure 6
- B₂ - basic fuselage for ROS-WB1
- W₁ - basic delta wing
- V₁ - basic vertical tail for ROS-NB1
- V₂ - twin body tails, basic tails for ROS-WB1
- F₁ - body flap
- U₁ - ventral fins

Pertinent dimensional information for each of the above components can be found in the "Model Component Description Sheet" section of this report. The data set collation sheets which follow immediately give a complete test configuration summary.

TEST GFHT-019 DATA SET COLLATION SHEET
 BASIC HYPERSONIC FORCE DATA ON TESTS OF TWO
 $\frac{1}{200}$ SCALE MODELS OF THE GAC ROS-NBI AND ROS-WBI ORBITERS

PRETEST
 POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHED.	CONTROL DEFLECTION					NO. OF RUNS	MACH NUMBERS												6					
			α	β	δe_L	δe_R	δF		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
RCT002	B, W, V_1	A	0	0	0	0	-	1	2																	
RCT004	$B, W, -10^\circ V_1$	A	0	-10	0	0	-	1	4																	
RCT005	$B, W, 10^\circ V_1$	A	0	10	0	0	-	1	5																	
RCT006	$B, W, V, F, 10^\circ$	A	0	0	0	10	-	1	6																	
RCT007	$B, W, 10, 10^\circ V, F, 10^\circ$	A	0	10	10	10	-	1	7																	
RCT008	$B, W, -20, -20^\circ V_1$	A	0	-20	-20	0	-	1	8																	
RCT009	$B, W, -40, -40^\circ V_1$	A	0	-40	-40	0	-	1	9																	
RCT011	$B, W, V, U, 10^\circ$	A	0	0	0	0	10	1	11																	
RCT012	$B_{1A} W, V_1$	A	0	0	0	0	-	1	12																	
RCT014	B, V_1	A	0	-	-	0	-	1	14																	
RCT015	$B_2 N, V_2$	A	0	0	0	0	-	1	15																	
RCT016	$B_2 W_1$	A	0	0	0	0	-	1	16																	
RCT017	B, W, V, U_1°	A	0	0	0	0	0	1	17																	
RCT018	B, W, V, U_1°	A	B	0	0	0	0	1	18																	
RCT020	B, W, V_1	A	B	0	0	0	-	1	20																	
RCT021	$B_{1A} W, V_1$	A	B	0	0	0	-	1	21																	
RCT023	B, V_1	A	B	-	-	0	-	1	23																	
RCT024	$B_2 W, V_2$	A	B	0	0	0	-	1	24																	
RCT025	$B_2 W_1$	A	B	0	0	0	-	1	25																	
RCT026	B, W_1, V_1	A	C	0	0	0	-	1	26																	

1 7 13 19 25 31 37 43 49 55 61 67 75 76

CN ICA ICY IGLM CBL CYM BETA IDPVAR(1) | IDPVAR(2) | NDV

COEFFICIENTS:

$$\alpha A = 20^\circ \text{ to } 65^\circ$$

$$\beta B = -10^\circ \cos(\alpha)$$

$$\gamma C = -3^\circ \cos(\alpha)$$

α or β
SCHEDULES

TEST GFHT-019 DATA SET COLLATION SHEET

PRETEST
 POSTTEST

1 7 13 19 25 31 37 43 49 55 61 67 7576
CN CA CY CLM CBL CYN BETA

COEFFICIENTS: 1.000 -1.000 1.000 IDPVAR(1) IDPVAR(2) NDV

$$\begin{aligned} \alpha &= 20^\circ \text{ to } 65^\circ \\ \beta &= -3^\circ \cos(\alpha) \end{aligned}$$

TEST FACILITY DESCRIPTION

GRUMMAN 36-INCH HYPERSONIC TUNNEL

DESCRIPTION: This is an intermittent blowdown to vacuum type tunnel. The test section is 36 inches in diameter. High temperature air from a pebble bed heater is introduced to the test section through fixed contoured, axisymmetric nozzles.

PERFORMANCE PARAMETERS:

Mach Range:	8, 10, 14
Reynolds Number ($\times 10^6$ /ft):	0.2 to 4.5
Stagnation Pressure (psia):	200 to 2200
Dynamic Pressure (psf):	100 to 1200
Stagnation Temperature ($^{\circ}$ R):	1000 to 3500
Run Time (sec):	30 to 60

TESTING CAPABILITIES: Model mounting consists of a water-cooled, sting-balance sector rig which features a model injection system. Instrumentation for force, pressure, and heat transfer measurement is provided. A Schlieren system is available.

TEST CONDITIONS
TEST GEHT 019

BALANCE UTILIZED: CHANCE - VOUGHT .625 in. VB-16

CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE:
NF <u>200 lbs.</u>	$\pm .269$ lbs.	.0060
SF <u>100 lbs.</u>	$\pm .228$ lbs.	.0051
AF <u>60 lbs.</u>	$\pm .178$ lbs.	.0040
PM <u>200 in-lbs.</u>	$\pm .402$ in-lbs.	.0009
YM <u>100 in-lbs.</u>	$\pm .455$ in-lbs.	.0016
RM <u>80 in-lbs.</u>	$\pm .601$ in-lbs.	.0022

COMMENTS:

DATA REDUCTION

A Chance-Vought .625 inch VB-16 six component strain gage balance was used to measure orbiter forces and moments. All final data were presented along and about a set of body axis passing through a nominal center of gravity located at F.S. 1485, W.L. 377 and B.L. 0. Data were converted to standard NASA Coefficients using the following constants:

Reference area: $S_{ref} = 20.689$ sq. in.

Reference length: $l_{ref} = 9.648$ in.

Reference span: $b_{ref} = 5.838$ in.

No adjustment was made to the final data to account for the model base and balance cavity pressure contributions.

Nominal sideslip angles are indicated under the parameter values with each dataset. However, angles of sideslip in the nominal -3° and -10° cases were actually $\beta = -3^\circ \cos(\alpha)$ and $\beta = 10^\circ \cos(\alpha)$ respectively. Care must be exercised when using the data to bear this in mind and to interpret the data accordingly.

Refer to Figure 1 for values of beta as a function of alpha.

SUMMARY DATA PLOT INDEX

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
Fig. 1. Longitudinal Characteristics - Repeatability	(A)		1-8
Fig. 2. Longitudinal Characteristics, Component Breakdown	(A)	Configuration	9-16
Fig. 3. Lateral-Directional Stability, Component Breakdown, 10. Deg. Sting Offset	(B)	Configuration	17-19
Fig. 4. Lateral-Directional Stability, Component Breakdown, 3. Deg. Sting Offset	(B)	Configuration	20-22
Fig. 5. Longitudinal Control Effectiveness, Elevons	(A)	Elevon Deflection	23-30
Fig. 6. Effect of Body Flap	(A)	Flap Deflection	31-38
Fig. 7. Effect of Single Deflected Elevon	(B)	Elevon Deflection	39-41
Fig. 8. Effect of Ventral Fin, Longitudinal	(A)	Configuration	42-49
Fig. 9. Effect of Ventral Fin, Lateral, 10. Deg. Sting Offset	(B)	Configuration	50-52
Fig. 10. Effect of Ventral Fin, Lateral 3. Deg. Sting Offset	(B)	Configuration	53-55
Fig. 11. Effect of Ventral Deflection, Longitudinal	(A)	Ventral Deflection	56-63

SUMMARY DATA PLOT INDEX

(CONTINUED)

TITLE	PLOTTED COEFFICIENTS SCHEDULE	CONDITIONS VARYING	PAGES
Fig. 12. Effect of Ventral Deflection, Lateral	(B)	Ventral Deflection	64-66
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Fig. 14. Effect of Alternate Forebody, Lateral-Directional, 10. Deg. Sting Offset	(B)	Configuration	75-77
Fig. 15. Effect of Alternate Forebody, Lateral-Directional, 3. Deg. Sting Offset	(B)	Configuration	78-80
Fig. 16. Comparison of ROS-NBL and ROS-WBL, Longitudinal	(A)	Configuration	81-88
Fig. 17. ROS-WBL Effect of Twin Vertical Tails, Longitudinal	(A)	Configuration	89-96
Fig. 18. ROS-WBL Effect of Vertical Tails, Lateral, 10. Deg. Sting Offset	(B)	Configuration	97-99

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PLOTTED COEFFICIENTS SCHEDULE:

(A) - CN, CIM, CA, CL, CD, L/D vs. α

CN vs. CIM, CL vs. CD

(B) - CY, CYN CBL vs. α

FIGURES

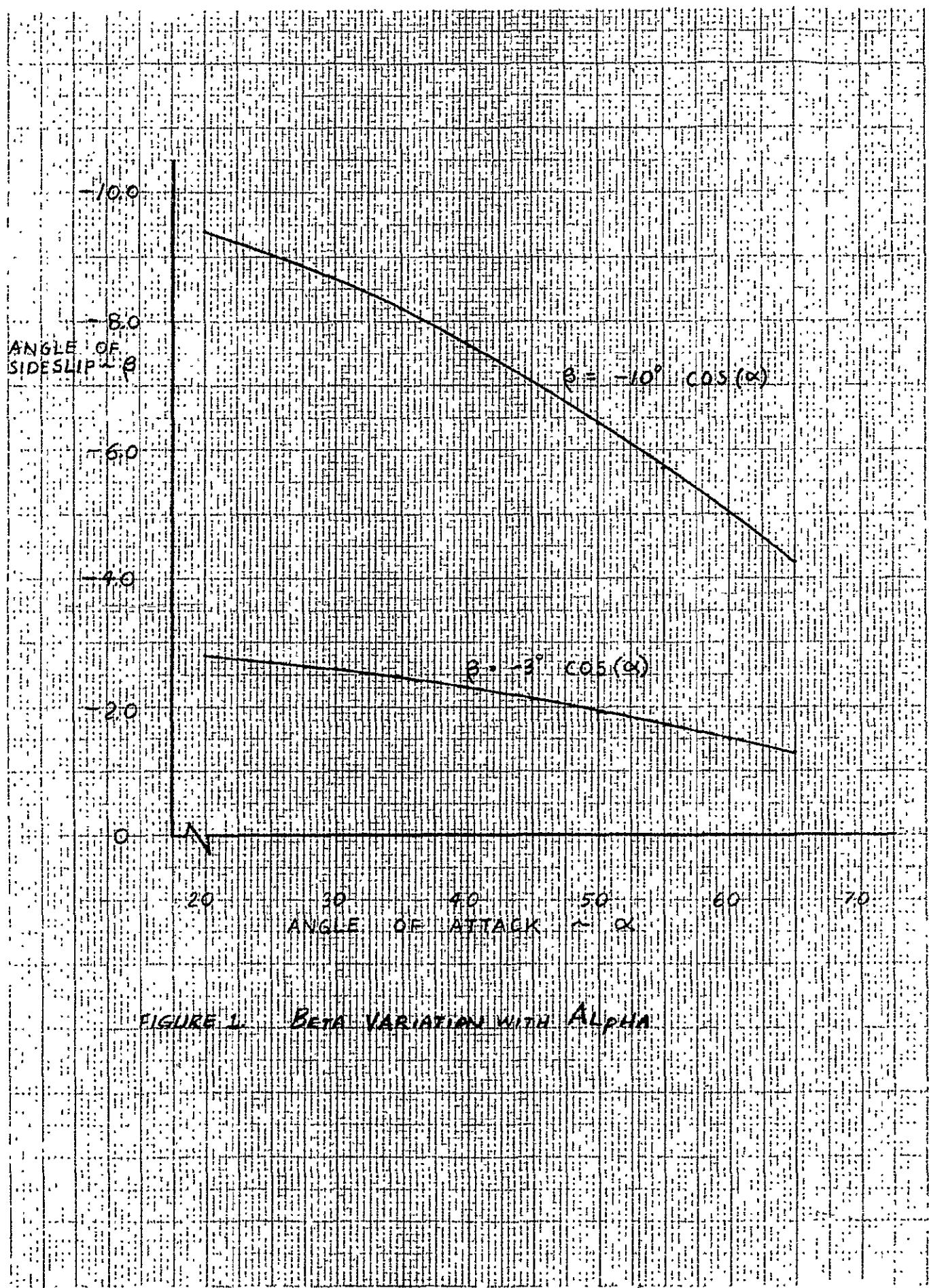


FIGURE 1. BETA VARIATION WITH ALPHIA

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.

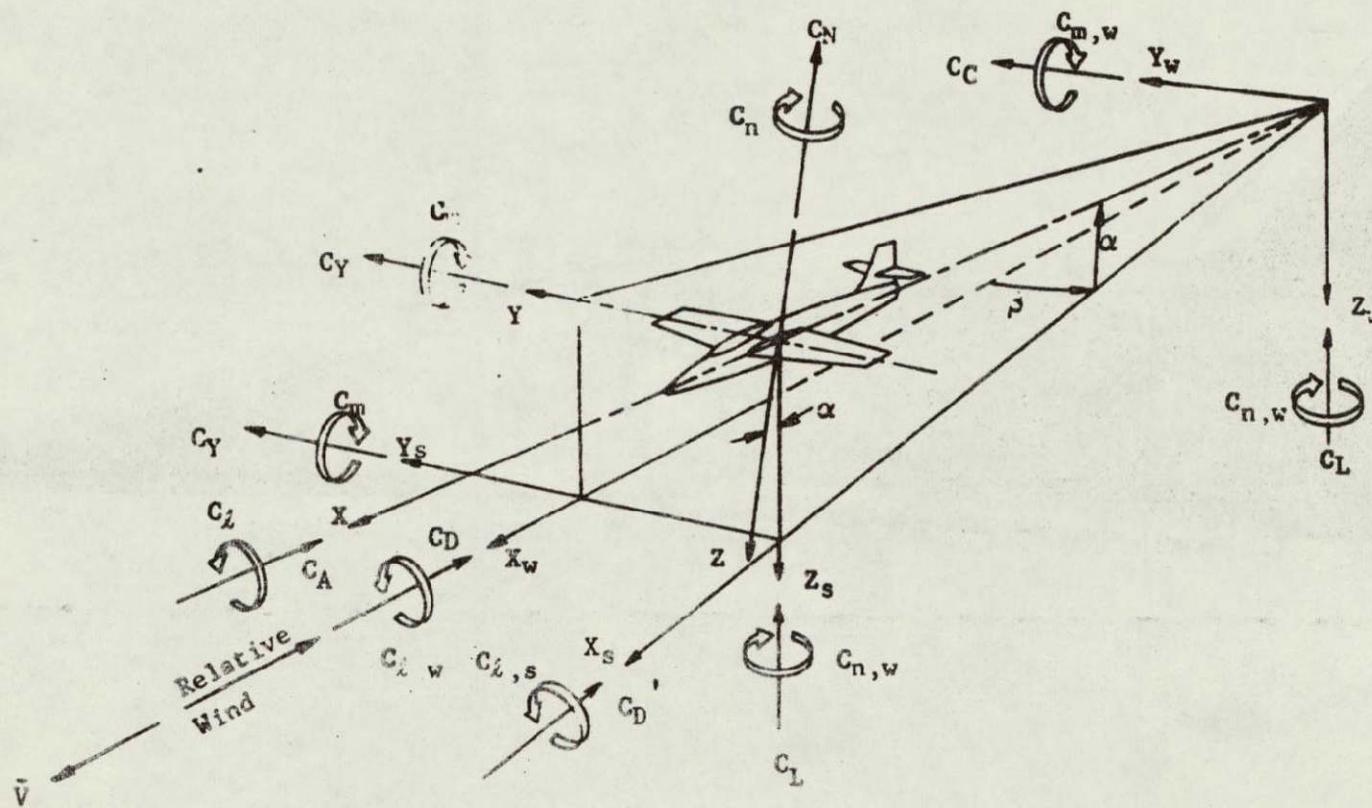
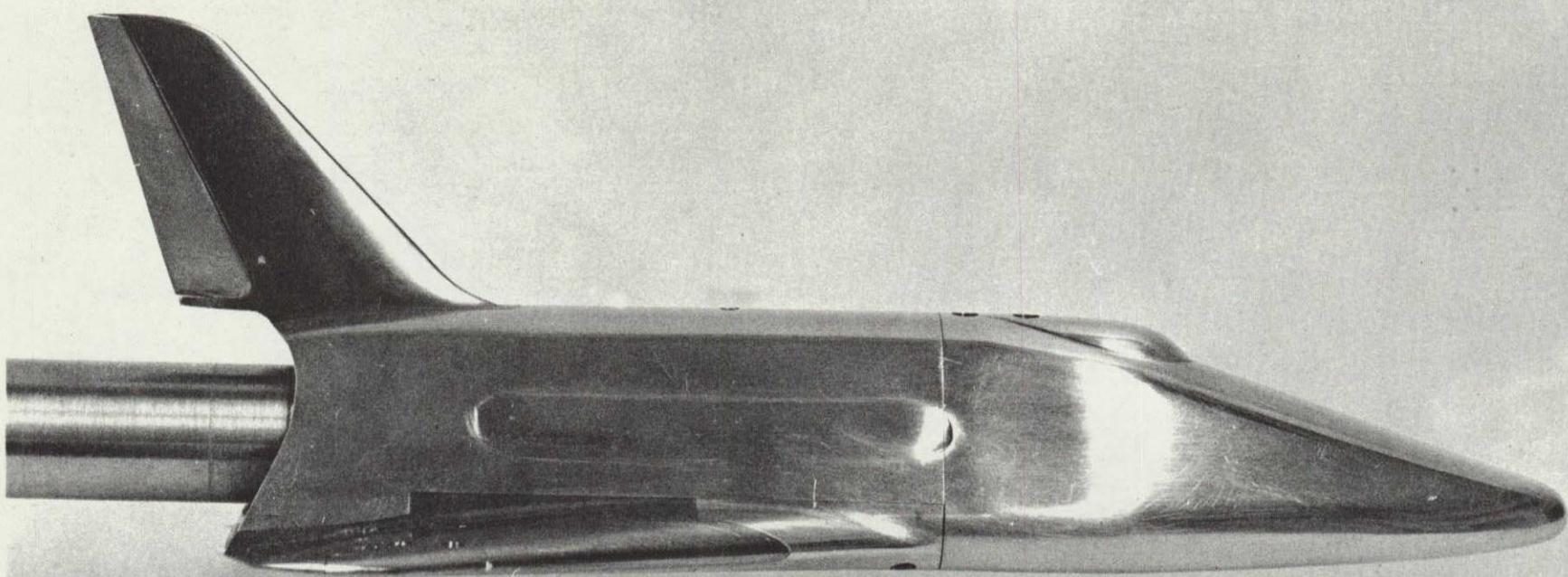


Figure 2. Axis systems, showing direction and sense of force and moment coefficients, angle of attack, and sideslip angle



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FIGURE 3. PHOTOGRAPH OF G.A.C. CONFIGURATION ROS-NB1

REFERENCE DIMENSIONS

$$S_{REF} = 5747 \text{ FT}^2$$

$$l_{REF} = 160.8 \text{ FT.}$$

$$b = 97.3 \text{ FT.}$$

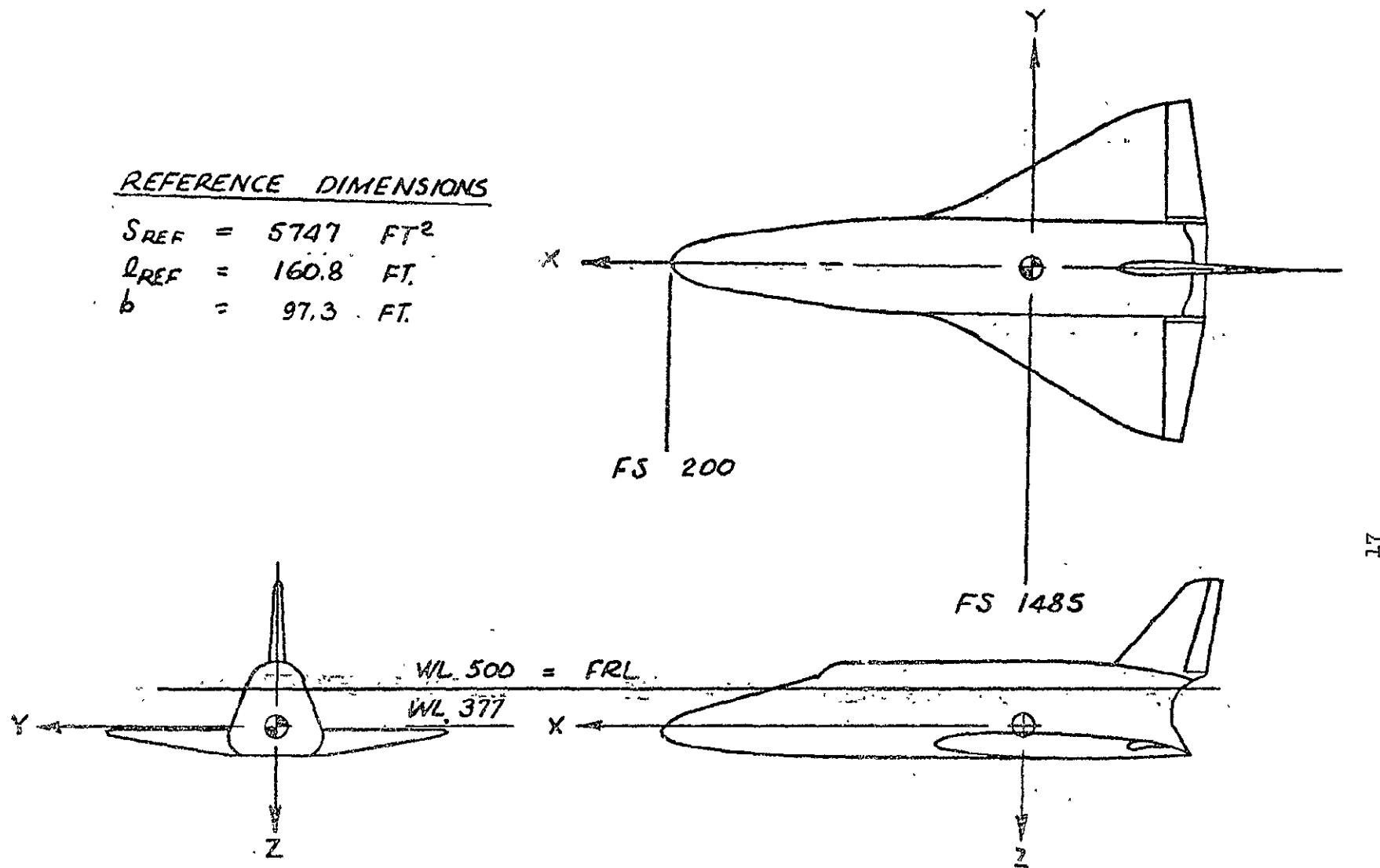


FIGURE 4. GENERAL ARRANGEMENT-RCS-NB1

REFERENCE DIMENSIONS

$$S_{REF} = 5747 \text{ FT}^2$$

$$l_{REF} = 160.8 \text{ FT}$$

$$b = 97.3 \text{ FT}$$

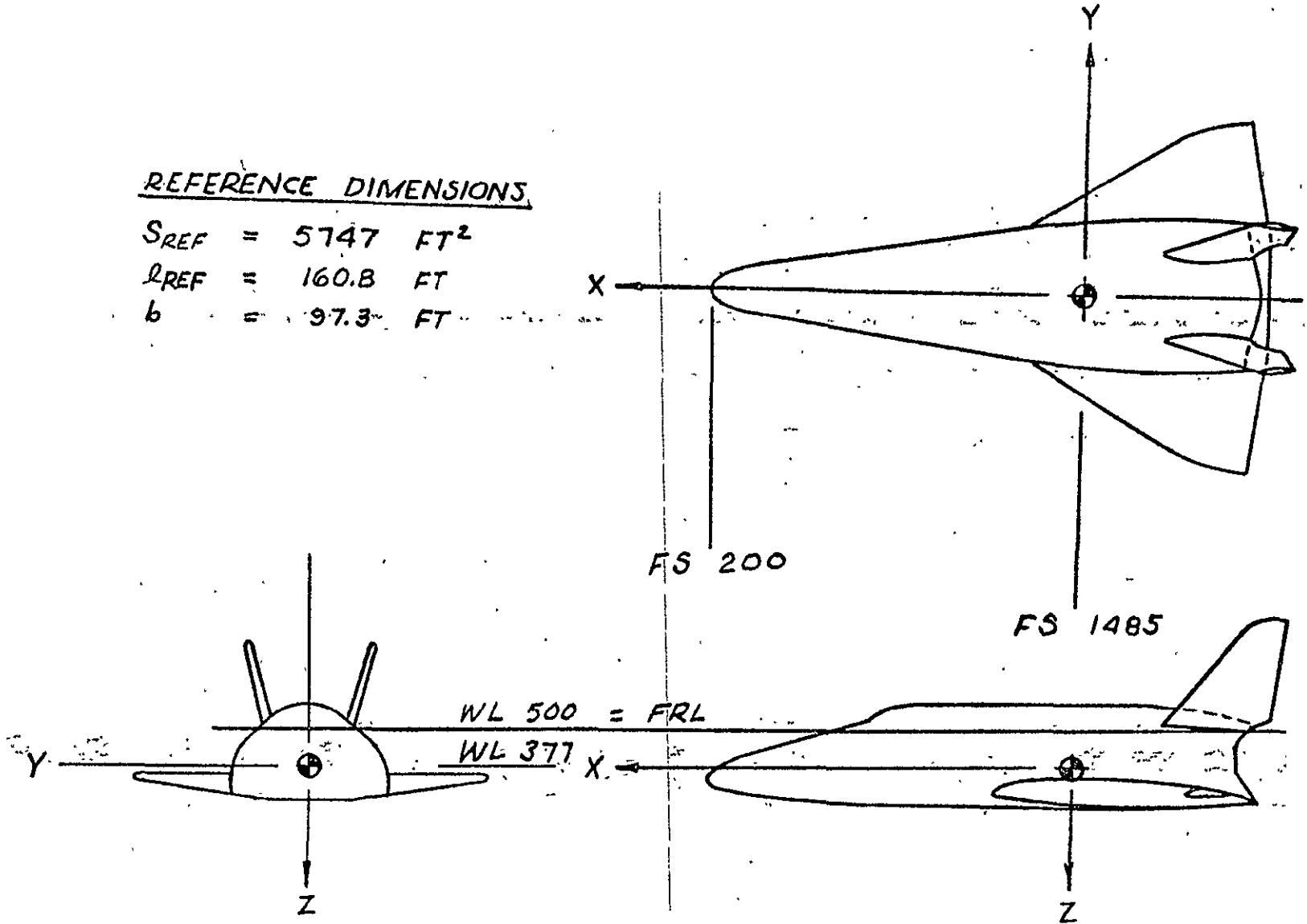


FIGURE 5. GENERAL ARRANGEMENT - ROS-WB1

B_{IA}

Basic ROS-NBI with modifications to lower surface of fuselage and nose. Defined in 518 MOD 909 (Available upon request from Aero Test, x7044) and in cross-sections below.

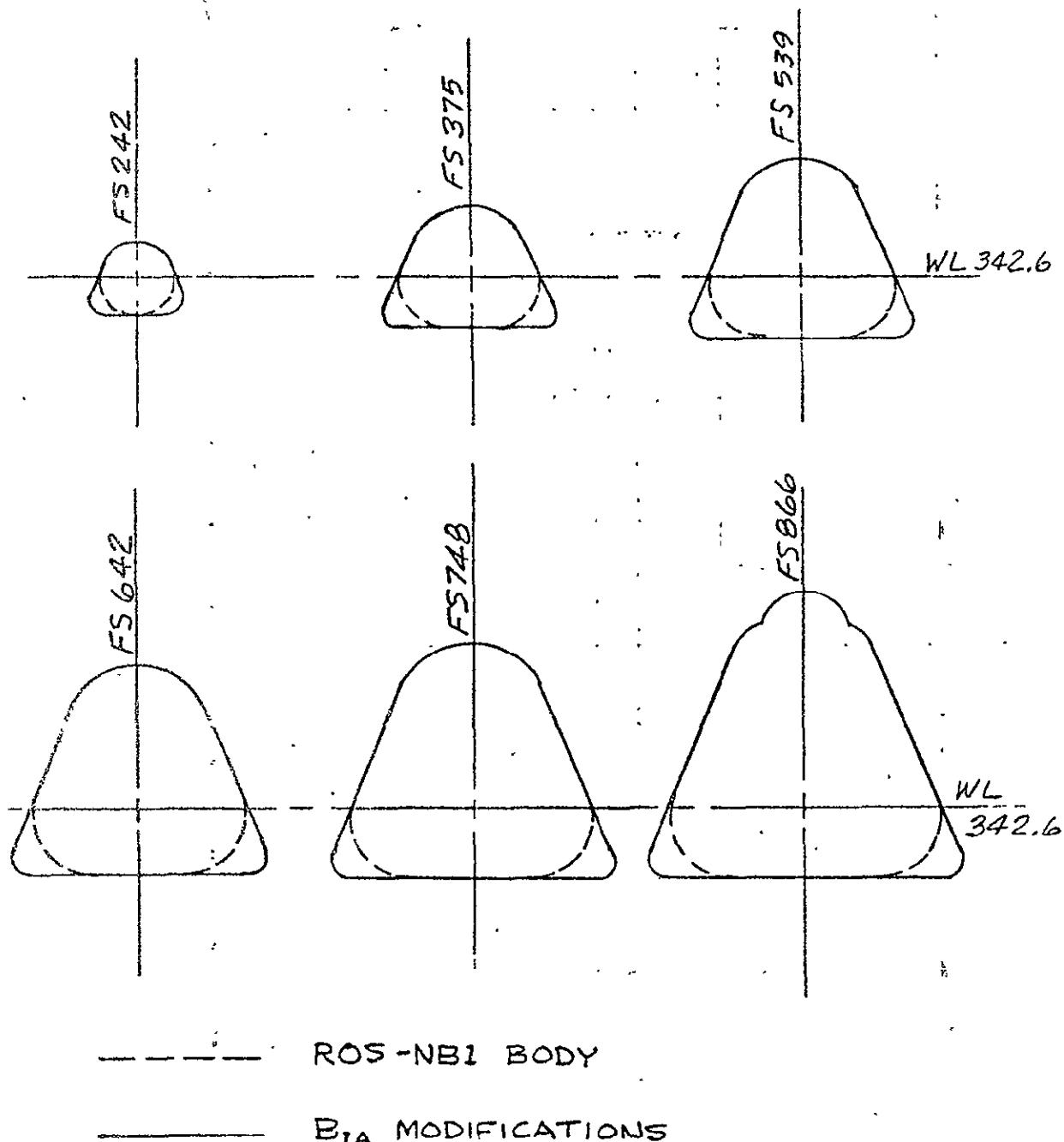
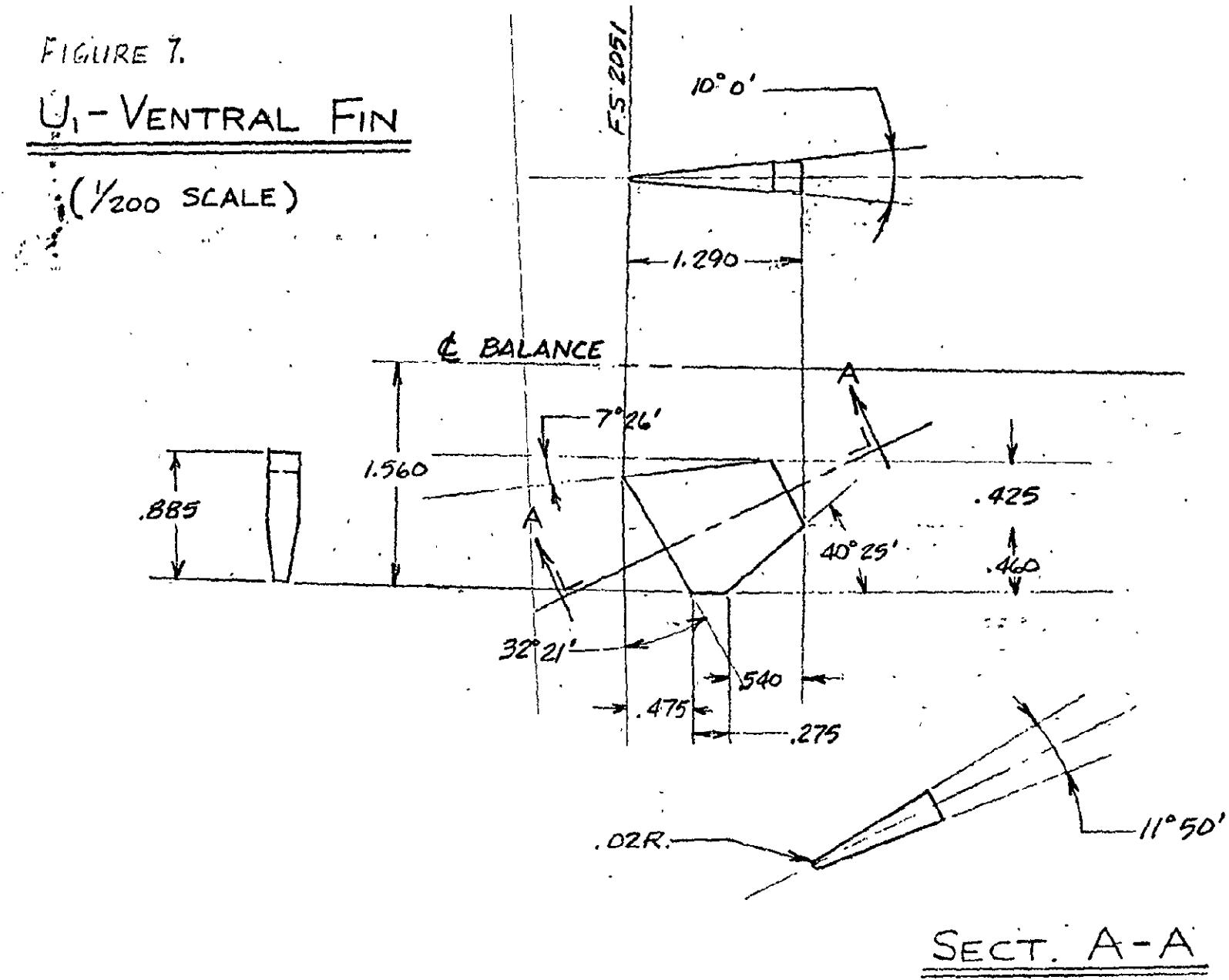


FIGURE 6. ROS NBI BODY, B_1 , AND B_{1A}

FIGURE 7.

U₁-VENTRAL FIN

(1/200 SCALE)



F_1^X

Body flap at lower aft end of vehicle. Hinge line is at FS 1983.125 and dimensions are as noted below. (superscript indicates the deflection angle, with positive deflections T.E. down)

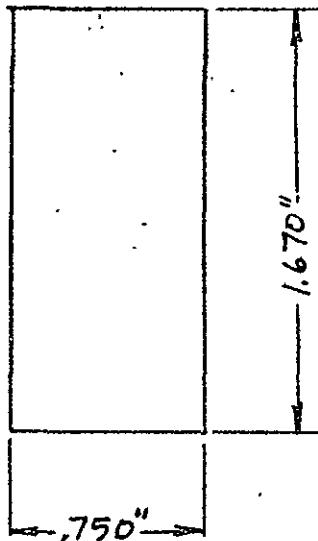


FIGURE 8. BODY FLAP, F_1

MODEL COMPONENT DESCRIPTION SHEETS

MODEL COMPONENT: [BODY - B]

GENERAL DESCRIPTION: BASIC ROS-NBL BODY

DRAWING NUMBER: 518 MOD 900

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u> (FT. OR FT. ²)	<u>MODEL SCALE</u> (IN. OR IN. ²)
Length	<u>160.8</u>	<u>9.648</u>
Max. Width	<u>28.0</u>	<u>1.680</u>
Max. Depth	<u>28.7</u>	<u>1.722</u>
Fineness Ratio	<u>5.61</u>	<u>5.61</u>
Area		
Max. Cross-Sectional	<u>616</u>	<u>2.218</u>
Planform	<u>3990</u>	<u>14.364</u>
Netted	<u>12,610</u>	<u>45.396</u>
Base	<u>590</u>	<u>2.124</u>

MODEL COMPONENT: BODY - B₂

GENERAL DESCRIPTION: BASIC ROS-WBI BODY

DRAWING NUMBER: 518 MOD 903

1/200

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u> (FT. OR FT. ²)	<u>MODEL SCALE</u> (IN. OR IN. ²)
Length	<u>160.8</u>	<u>9.648</u>
Max. Width	<u>44.8</u>	<u>2.688</u>
Max. Depth	<u>28.8</u>	<u>1.728</u>
Fineness Ratio	<u>3.6</u>	<u>3.6</u>
Area		
Max. Cross-Sectional	<u>956</u>	<u>3.442</u>
Planform	<u>5160</u>	<u>18.576</u>
Wetted	<u>13,230</u>	<u>47.628</u>
Base	<u>744</u>	<u>2.678</u>

MODEL COMPONENT: WING - W₁

GENERAL DESCRIPTION: BASIC ROS-NB 1 WING

DRAWING NUMBER: 518 MOD 902

DIMENSIONS: FULL-SCALE MODEL SCALE
TOTAL DATA (FT. OR FT.²) "

Area		
Planform	<u>5747</u>	<u>20.7 in.²</u>
Wetted	<u>7780</u>	<u>.28 in.²</u>
Span (equivalent)	<u>97.3</u>	<u>.584 in.</u>
Aspect Ratio	<u>1.65</u>	<u>1.65</u>
Rate of Taper	<u>1.87</u>	<u>1.87</u>
Taper Ratio	<u>.129</u>	<u>.129</u>
Diehedral Angle, degrees	<u>50</u>	<u>50</u>
Incidence Angle, degrees	<u>+ 2° @ body</u>	<u>-3° @ tip</u>
Aerodynamic Twist, degrees		
Toe-In Angle		
Cant Angle		
Sweep Back Angles, degrees		
Leading Edge	<u>60°</u>	<u>60°</u>
Trailing Edge	<u>-8.4°</u>	<u>-8.4°</u>
0.25 Element Line	<u>42.9°</u>	<u>42.9°</u>
Chords:		
Root (Wing Sta. 0.0)	<u>104.6</u>	<u>.6276 in.</u>
Tip, (equivalent)	<u>13.5</u>	<u>0.81 in.</u>
MAC	<u>59.0</u>	<u>.354 in.</u>
Fus. Sta. of .25 MAC	<u>1580</u>	<u>1580</u>
W.P. of .25 MAC	<u>302.6</u>	<u>302.6</u>
B.L. of .25 MAC	<u>290</u>	<u>290</u>
Airfoil Section		
Root	<u>18% max.camber 10% thickness</u>	
Tip	<u>3% max.camber 10% thickness</u>	

EXPOSED DATA

Area	<u>3217</u>	<u>11.58 in.²</u>
Span, (equivalent)	<u>69.3</u>	<u>4.16 in.</u>
Aspect Ratio	<u>1.5</u>	<u>1.5</u>
Taper Ratio	<u>.172</u>	<u>.172</u>
Chords		
Root	<u>78.25</u>	<u>4.7 in.</u>
Tip	<u>13.5</u>	<u>0.81 in.</u>
MAC	<u>46.4</u>	<u>2.78 in.</u>
Fus. Sta. of .25 MAC		
W.P. of .25 MAC		
B.L. of .25 MAC		

MODEL COMPONENT: Elevon (For the W₁ Wing)

GENERAL DESCRIPTION: Moveable Control Surface Associated With the W₁ Wing

DRAWING NUMBER: 518 MOD 902

1/200

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u> (ft. or ft.)	<u>MODEL SCALE</u> (in. or in. ²)
Area	364	1.310
Span (equivalent)	35.5	2.130
Root chord	12.75	.765
Outb'd equivalent chord	7.75	.465
Ratio Elevator chord/horizontal tail chord		
At Inb'd equiv. chord		
At Outb'd equiv. chord		
Sweep Back Angles, degrees		
Leading Edge	0°	0°
Tailing Edge	-8.4°	-8.4°
Hingeline		
Area Moment (Normal to hinge line)		

MODEL COMPONENT: E VERTICAL TAIL - V₁

GENERAL DESCRIPTION: BASIC ROS-NB 1 VERTICAL TAIL

<u>DRAWING NUMBER:</u>	<u>518 MOD 902</u>	
<u>DIMENSIONS:</u>	<u>FULL-SCALE</u> (FT. OR FT. ²)	<u>MODEL SCALE</u> (IN. OR IN. ²)
Area	<u>.805</u>	<u>.2.898</u>
Span (equivalent)	<u>33.3</u>	<u>1.998</u>
Inb'd equivalent chord	<u>34.6</u>	<u>2.076</u>
Outb'd equivalent chord	<u>13.75</u>	<u>.825</u>
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	<u>.3</u>	<u>.3</u>
At Outb'd equiv. chord	<u>.3</u>	<u>.3</u>
Sweep Back Angles, degrees		
Leading Edge	<u>45°</u>	<u>45°</u>
Tailing Edge	<u>19.7°</u>	<u>19.7°</u>
Hingeline	<u>28.7°</u>	<u>28.7°</u>
Area Moment (Normal to hinge line)	<u>.945</u>	<u>.204</u>
AIRFOIL SECTION	<u>64A010</u>	<u>64A010</u>

MODEL COMPONENT: Rudder (for the V₁ vertical tail)

GENERAL DESCRIPTION: Moveable Control Surface Associated With the V₁
Vertical Tail

DRAWING NUMBER: 518 MOD 902

1/200

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u> (ft. or ft.)	<u>MODEL SCALE</u> (in. or in. ²)
Area	240	.864
Span (equivalent) ROOT	33.3	1.998
Inboard equivalent chord	10.4	.624
Outb'd equivalent chord RUDDER	4.02	.241
Ratio Elevator chord/horizontal tail chord		
At Inb'd equiv. chord	.3	.3
At Outb'd equiv. chord	.3	.3
Sweep Back Angles, degrees		
Leading Edge	29.5°	29.5°
Tailing Edge	19.7°	19.7°
Hingeline		
Area Moment (Normal to hinge line)		

MODEL COMPONENT: TWIN BODY TAILS - V₂

GENERAL DESCRIPTION: BASIC ROS-WBI VERTICAL TAILS

DRAWING NUMBER: 518 MOD 905

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u> (FT. OR FT. ²)	<u>MODEL SCALE</u> (IN. OR IN. ²)
Area	<u>670</u>	<u>2.412</u>
Span (equivalent)	<u>35.5</u>	<u>2.130</u>
Inb'd equivalent chord	<u>33.17</u>	<u>1.990</u>
Outb'd equivalent chord	<u>9.08</u>	<u>.545</u>
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord		
At Outb'd equiv. chord		
Sweep Back Angles, degrees		
Leading Edge	<u>40°</u>	<u>40°</u>
Tailing Edge	<u>8.5°</u>	<u>8.5°</u>
Hingeline		
Area Moment (Normal to hinge line)		
AIRFOIL SECTION	<u>NACA 64A010</u>	<u>NACA 64A010</u>
CANT ANGLE (OUTBOARD)	<u>15°</u>	<u>15°</u>

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; kg/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(PSI) Q(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; $(p-p_\infty)/q$
C_p		
C_p		
C_p		

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

<u>SYMBOL</u>	<u>DEFINITION</u>
F	force; F, lbs
M	moment; M, in-lb

<u>Subscript</u>	<u>Definition</u>
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; $[-1] \left[(p_b - p_\infty)/q \right] (A_b/S)$
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	CIN	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}

NOMENCLATURE (Continued)

Surface Definitions

<u>SYMBOL</u>	<u>SADSAC SYMBOL</u>	<u>DEFINITION</u>
i_t	HORIZT	horizontal tail incidence; positive when trailing edge down; degrees
δ		symmetrical surface deflection angle; degrees; positive deflections are:
	AIRLON	aileron - total aileron deflection; (left aileron - right aileron)/2
	CANARD	canard - trailing edge down
	ELEVON	elevon - trailing edge down
	ELEVTR	elevator - trailing edge down
	FLAP	flap - trailing edge down
	RUDDER	rudder - trailing edge to the left
	SPOILR	spoiler - trailing edge down
	TAB	tab - trailing edge down with respect to control surface
δ		antisymmetrical surface deflection angle, degrees; positive trailing edge down:
	AIL-L	left aileron - trailing edge down
	AIL-R	right aileron - trailing edge down
	ELVN-L	left elevon - trailing edge down
	ELVN-R	right elevon - trailing edge down
	SPLR-L	left spoiler - trailing edge down
	SPLR-R	right spoiler - trailing edge down

<u>SURFACE SUBSCRIPTS</u>	<u>DEFINITION</u>
a	aileron
b	base
c	canard
e	elevator or elevon
f	flap
r	rudder or ruddervator
s	spoiler
t	tail

TABULATED DATA LISTING

A tabulated data listing, consisting of all aero data sets, both original and those created in arriving at the plotted material to be presented subsequently, is available as an addendum to this report. The tabular listing is made up in two sections:

- (a) a brief summary list of all data sets containing the identifier, the descriptor, and the resident dependent variables.
- (b) a full list of all data sets containing all resident or selected aerodynamic coefficients of the data sets as well as the above mentioned information.

The listing is currently sent on limited distribution to the following organizations:

NASA AMES	Mr. V. Stevens
NASA MSC	Mr. Ray Nelson
GAC	Mr. M. Quan

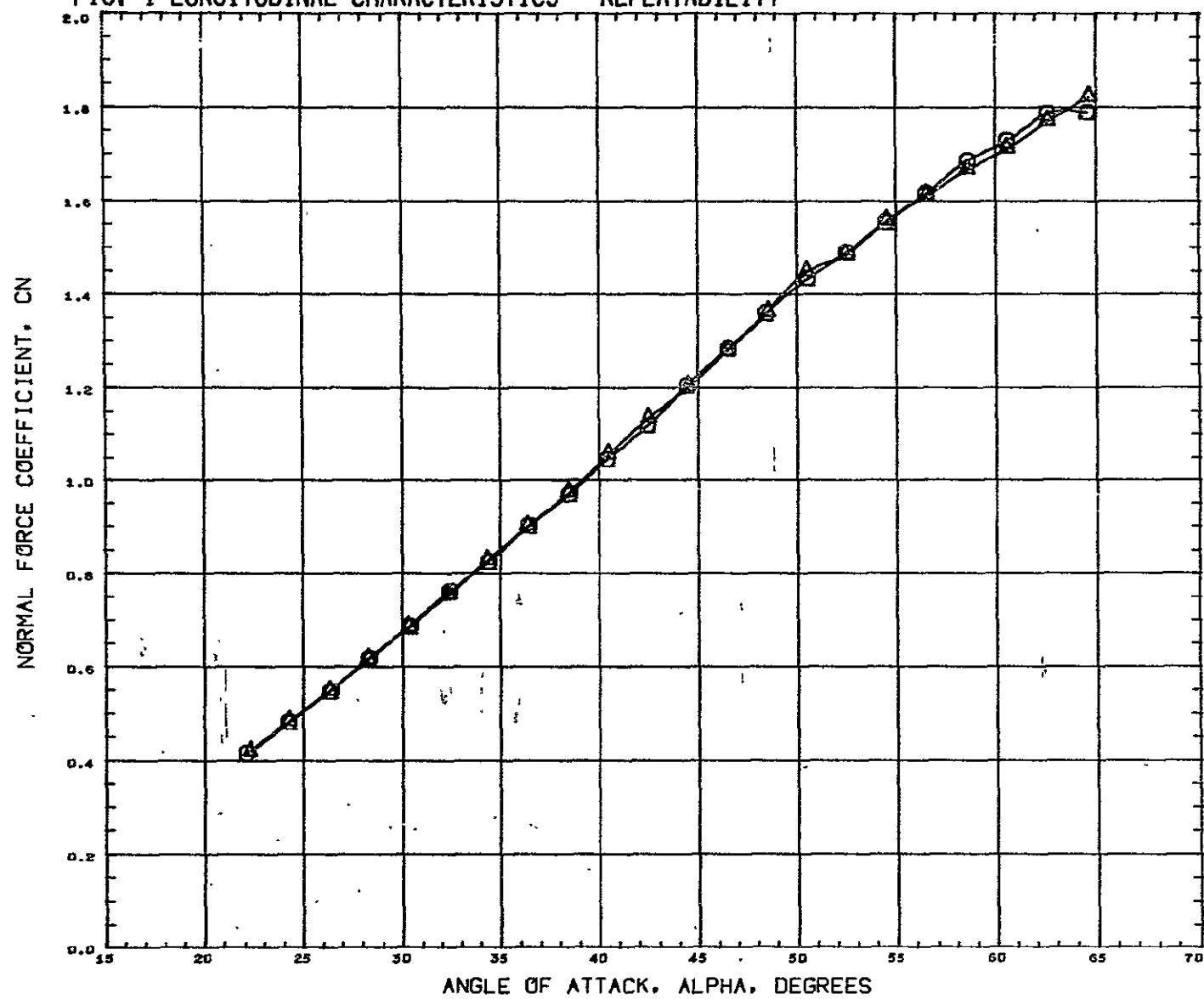
If copies of this listing are desired, please contact the above or the cognizant SADSAC personnel who, for this data, is:

Miss B. J. Fricken
Department 2780
Chrysler Corporation Space Division
New Orleans, La. 70129

(504) 255-2304

PLOTTED DATA

FIG. 1 LONGITUDINAL CHARACTERISTICS - REPEATABILITY



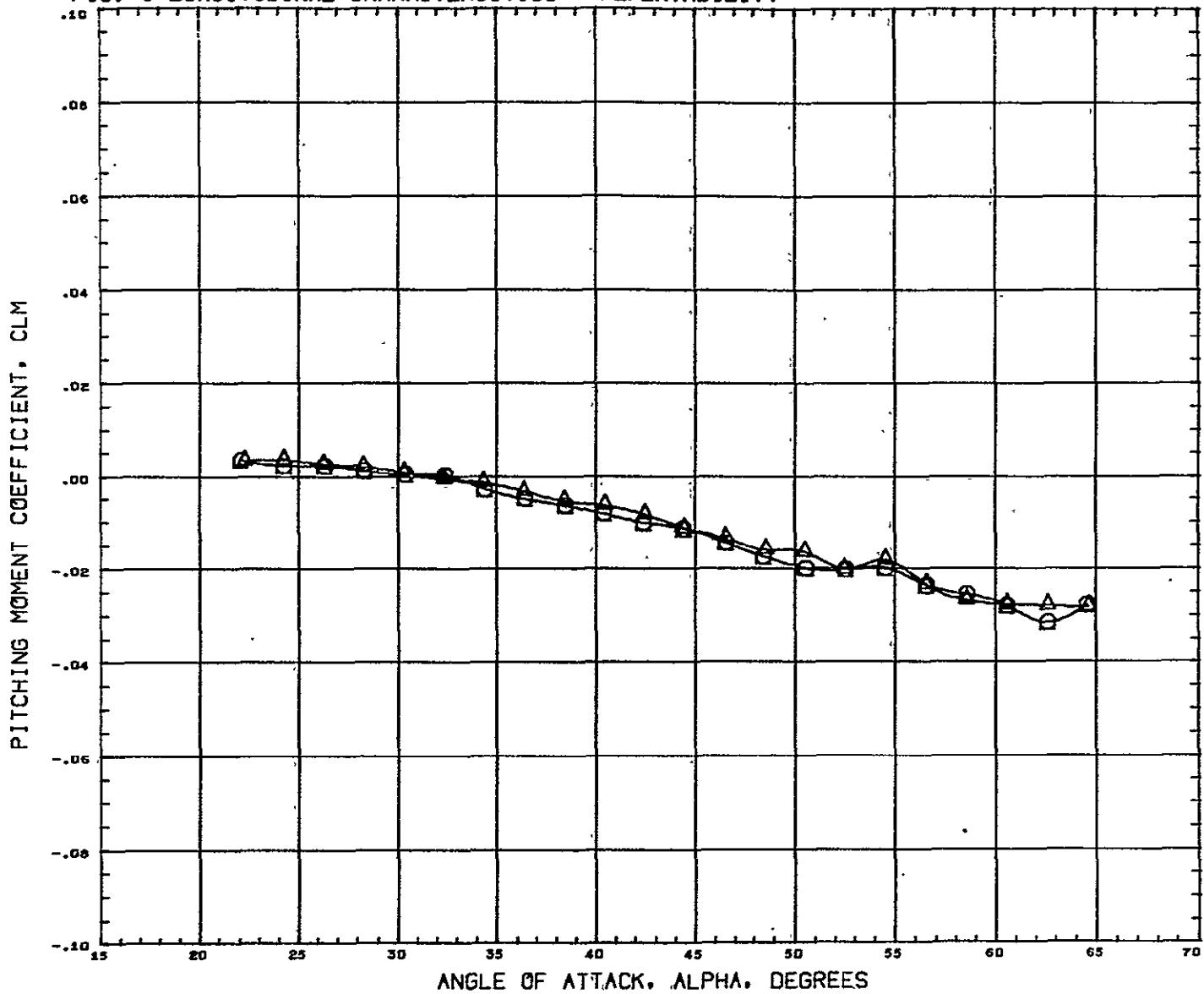
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT001) GFHT B19 CONF. ROS-NB1 B1W1V1
 (DCT002) GFHT B19 CONF. ROS-NB1 B1W1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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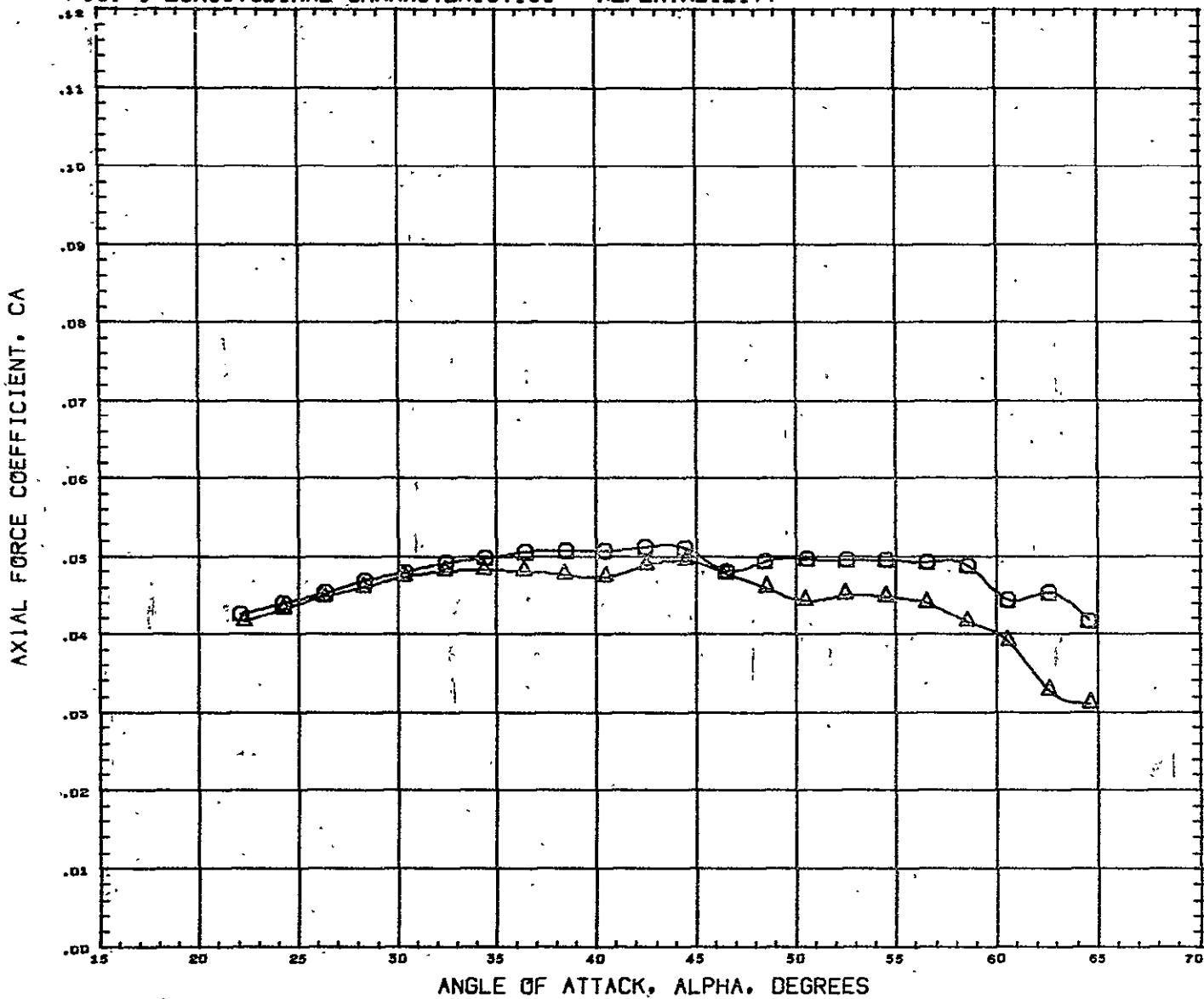
FIG. 1 LONGITUDINAL CHARACTERISTICS - REPEATABILITY



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BOOFLP	REFERENCE INFORMATION
(DCT001)	GFHT D19 CONF. ROS-NB1 BIWIVI	0.000	0.000	0.000	0.000	SREF 20.6890 Sq. IN.
(DCT002)	GFHT D19 CONF. ROS-NB1 BIWIVI	0.000	0.000	0.000	0.000	LREF 9.6480 IN.
						BREF 5.6380 IN.
						XMRP 1485.0040 IN.
						YMRP 0.0000 IN.
						ZMRP 377.0004 IN.
						SCALE 0.0050

MACH 10.130

FIG. 1 LONGITUDINAL CHARACTERISTICS - REPEATABILITY



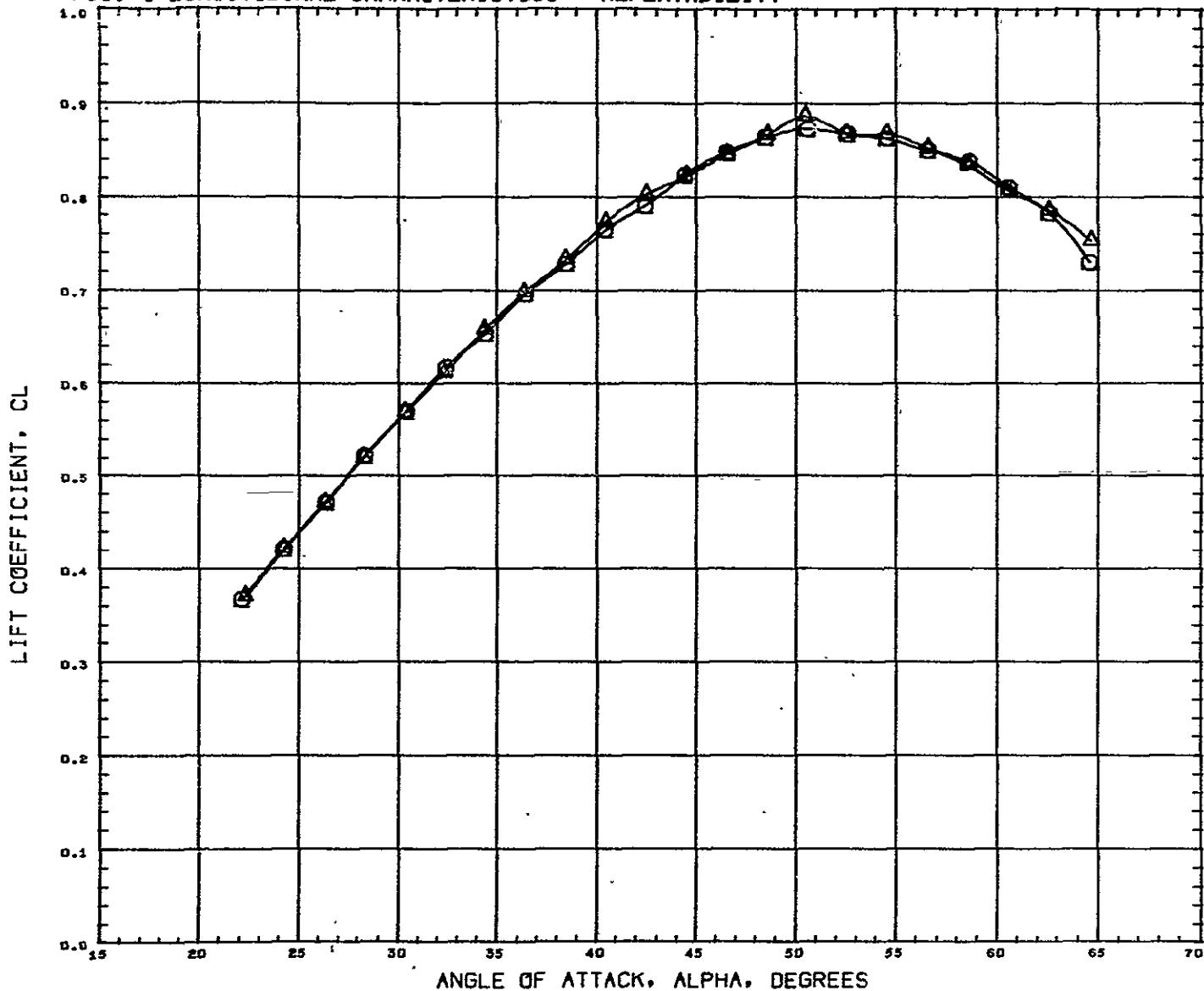
DATA SET SYMBOL CONFIGURATION DESCRIPTION
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 (DCT002) GFHT D19 CONF. ROS-NB1 S1W1V1

BETA	LELEVN	RELEVN	BDFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHRP 1485.0040 IN.
				YHRP 0.0000 IN.
				ZHRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 1 LONGITUDINAL CHARACTERISTICS - REPEATABILITY



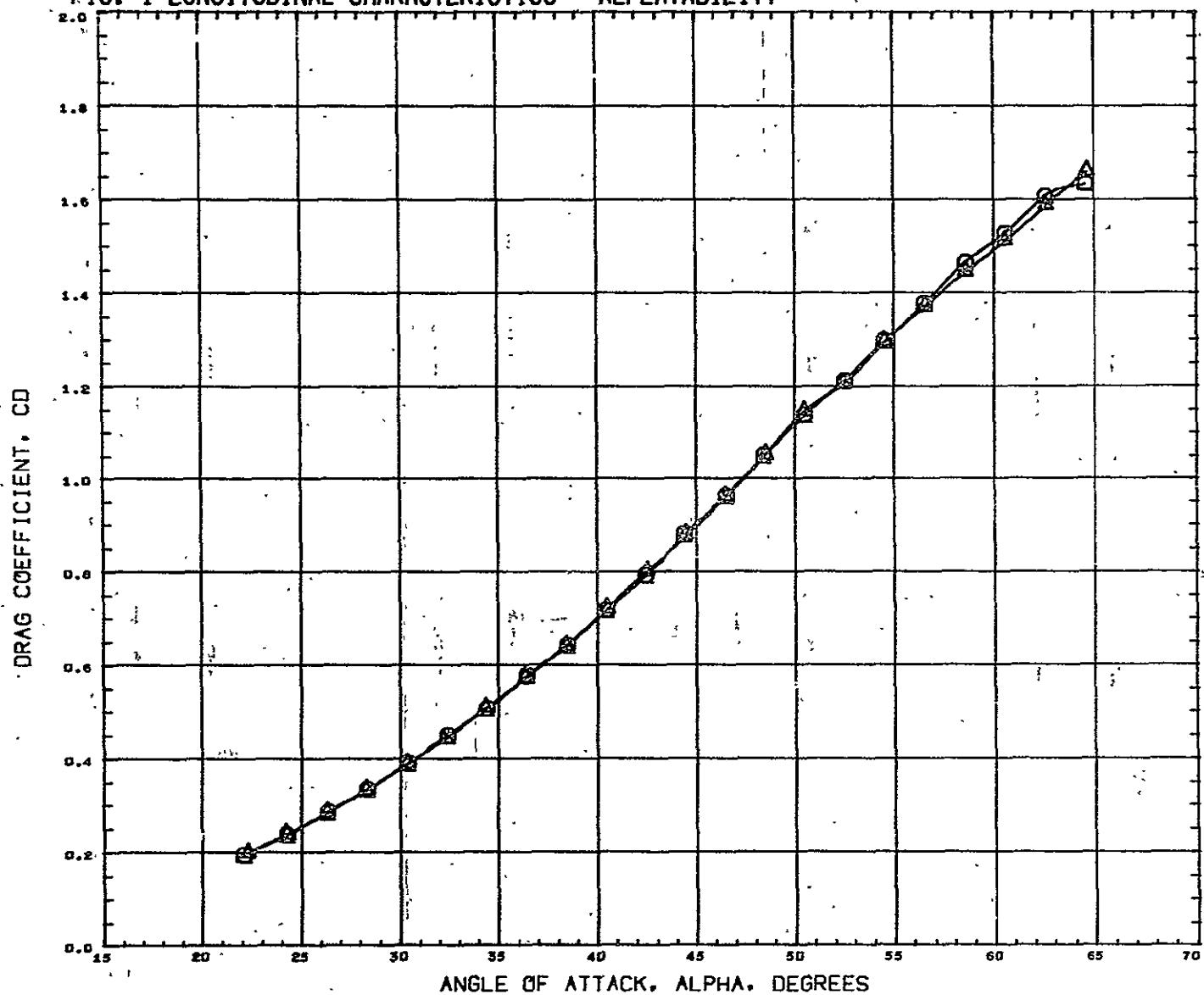
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BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHRP 1485.0040 IN.
				YHRP 0.0000 IN.
				ZHRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

PAGE

FIG. 1 LONGITUDINAL CHARACTERISTICS - REPEATABILITY



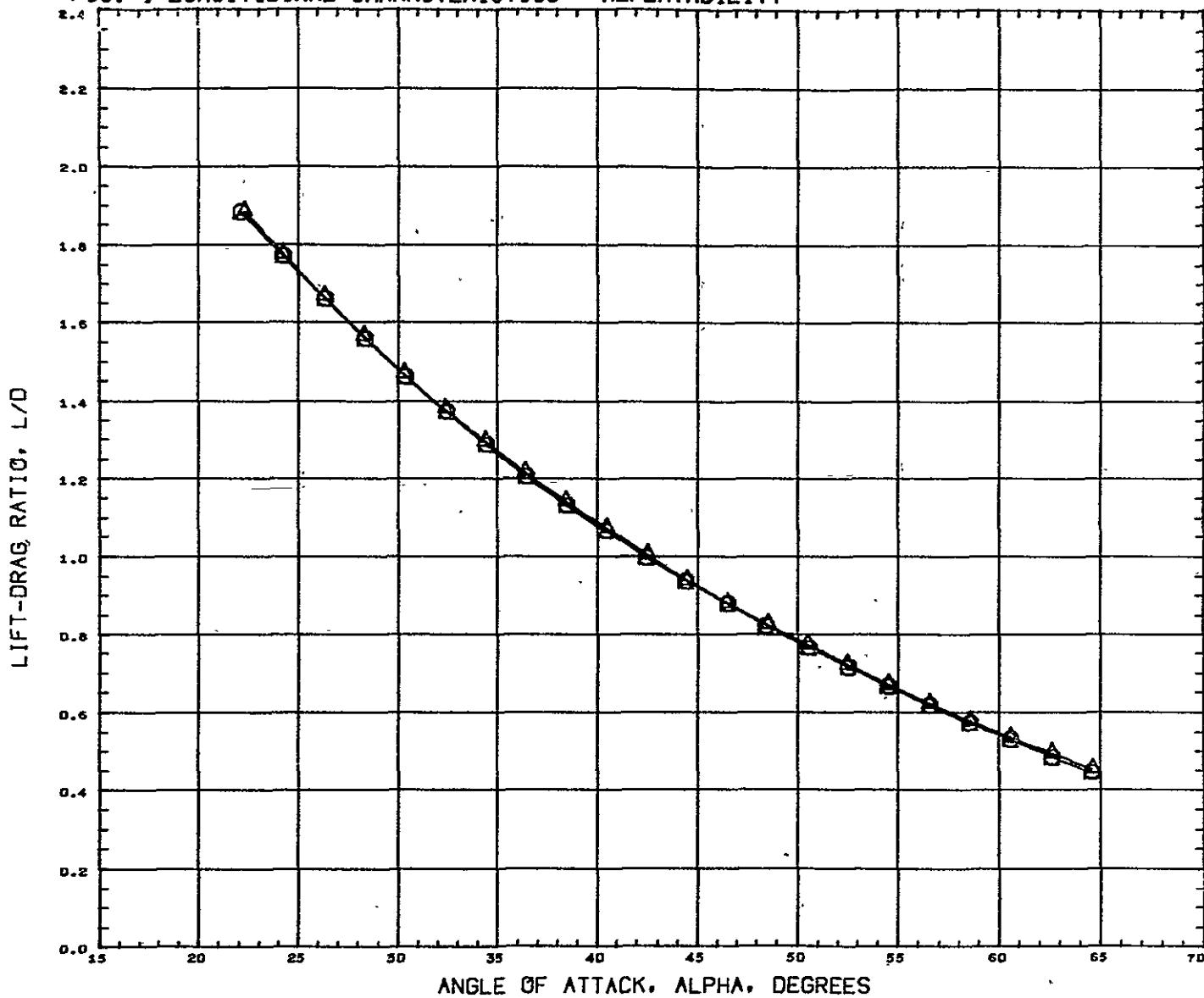
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT001) GFHT D19 CONF. ROS-NB1 BIWIV1
 (DCT002) GFHT D19 CONF. ROS-NB1 BIWIV1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SR.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.0380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 1 LONGITUDINAL CHARACTERISTICS - REPEATABILITY



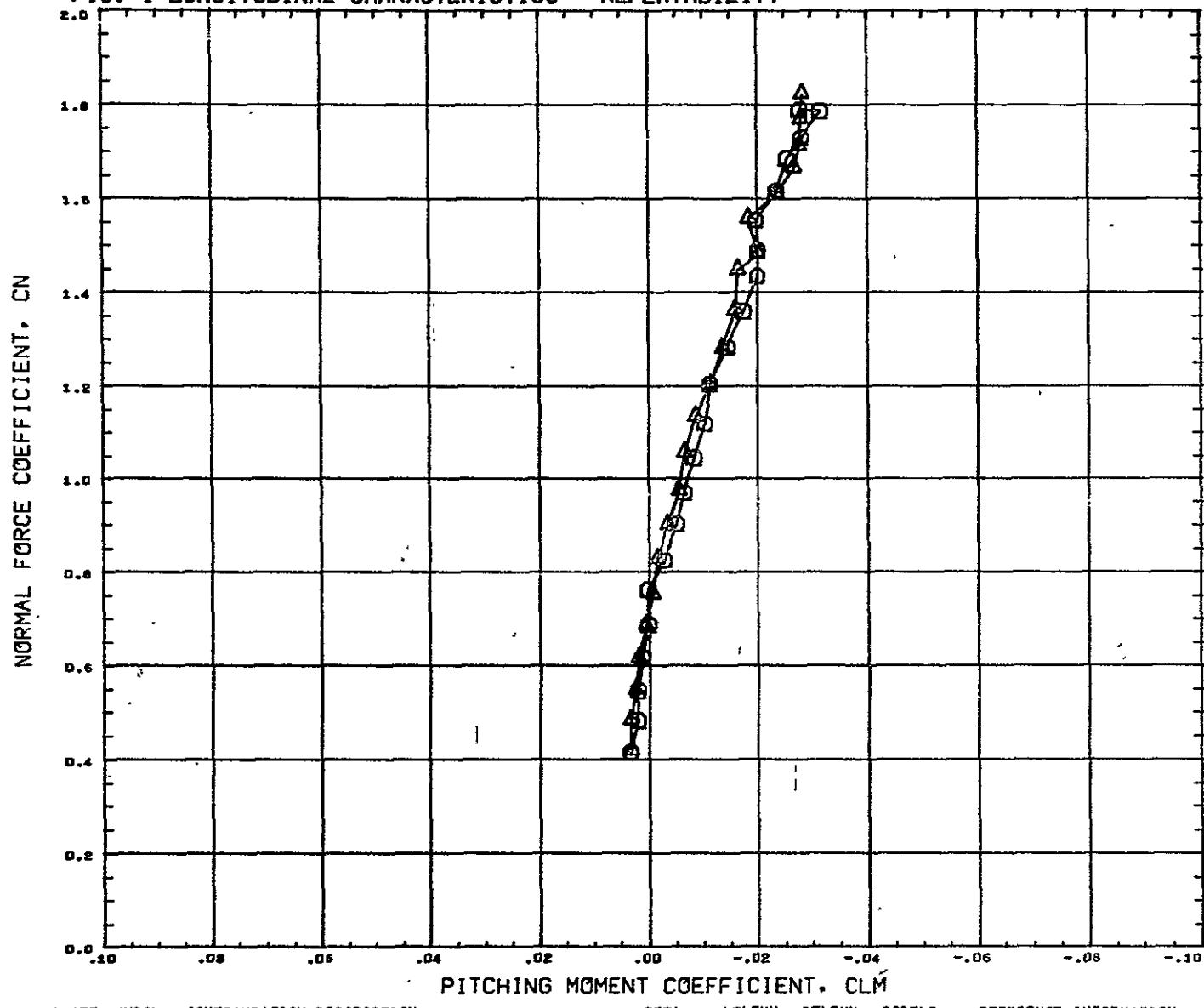
DATA SET SYMBOL CONFIGURATION DESCRIPTION
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 (DCT002) GFHT D19 CONF. ROS-NB1 B1W1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ-IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.6380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

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FIG. 1 LONGITUDINAL CHARACTERISTICS - REPEATABILITY



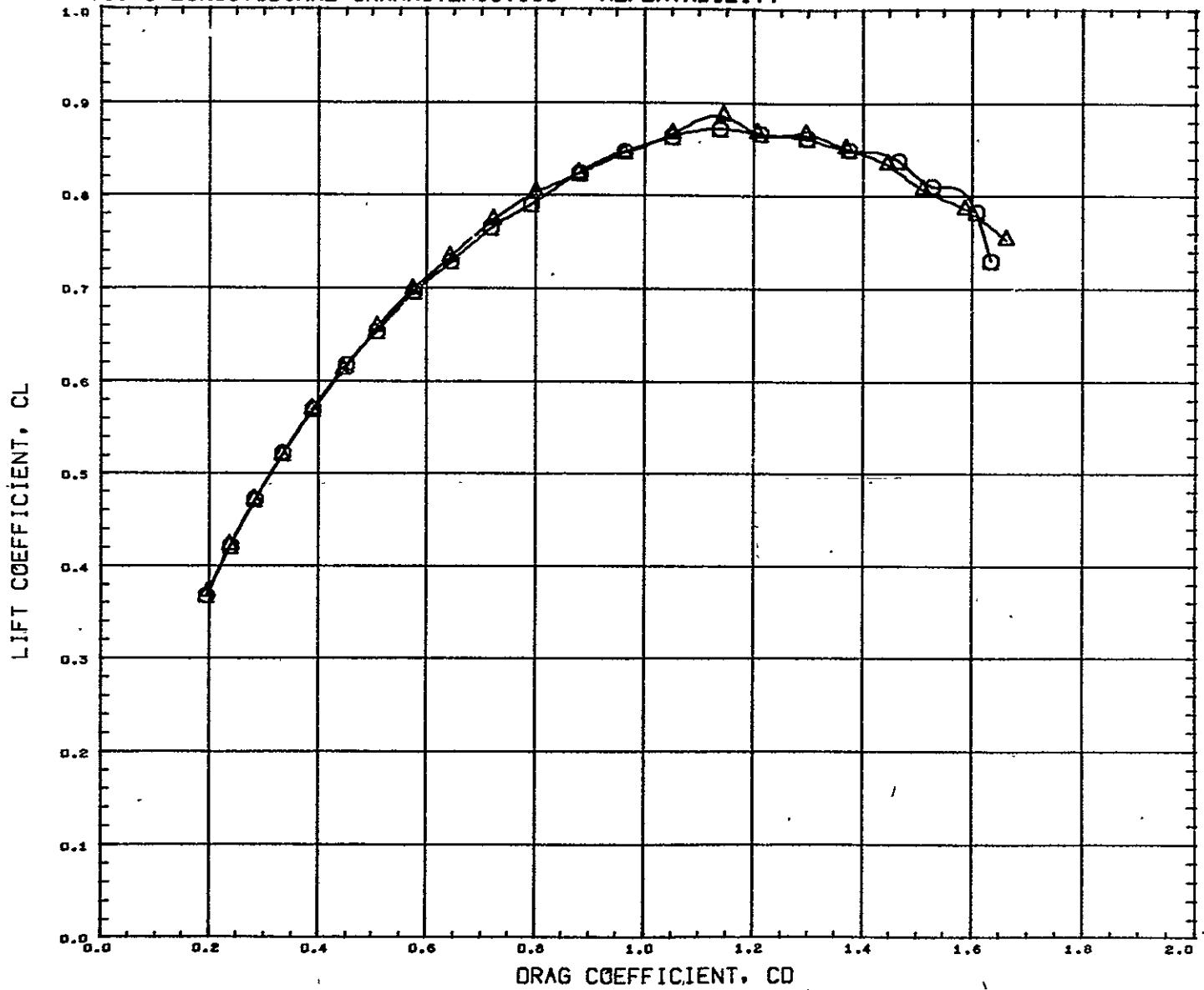
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD01) CFHT D19 CONF. ROS-NB1 B1WIV1
 (DCTD02) CFHT D19 CONF. ROS-NB1 B1WIV1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SG. IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.0380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 1 LONGITUDINAL CHARACTERISTICS - REPEATABILITY



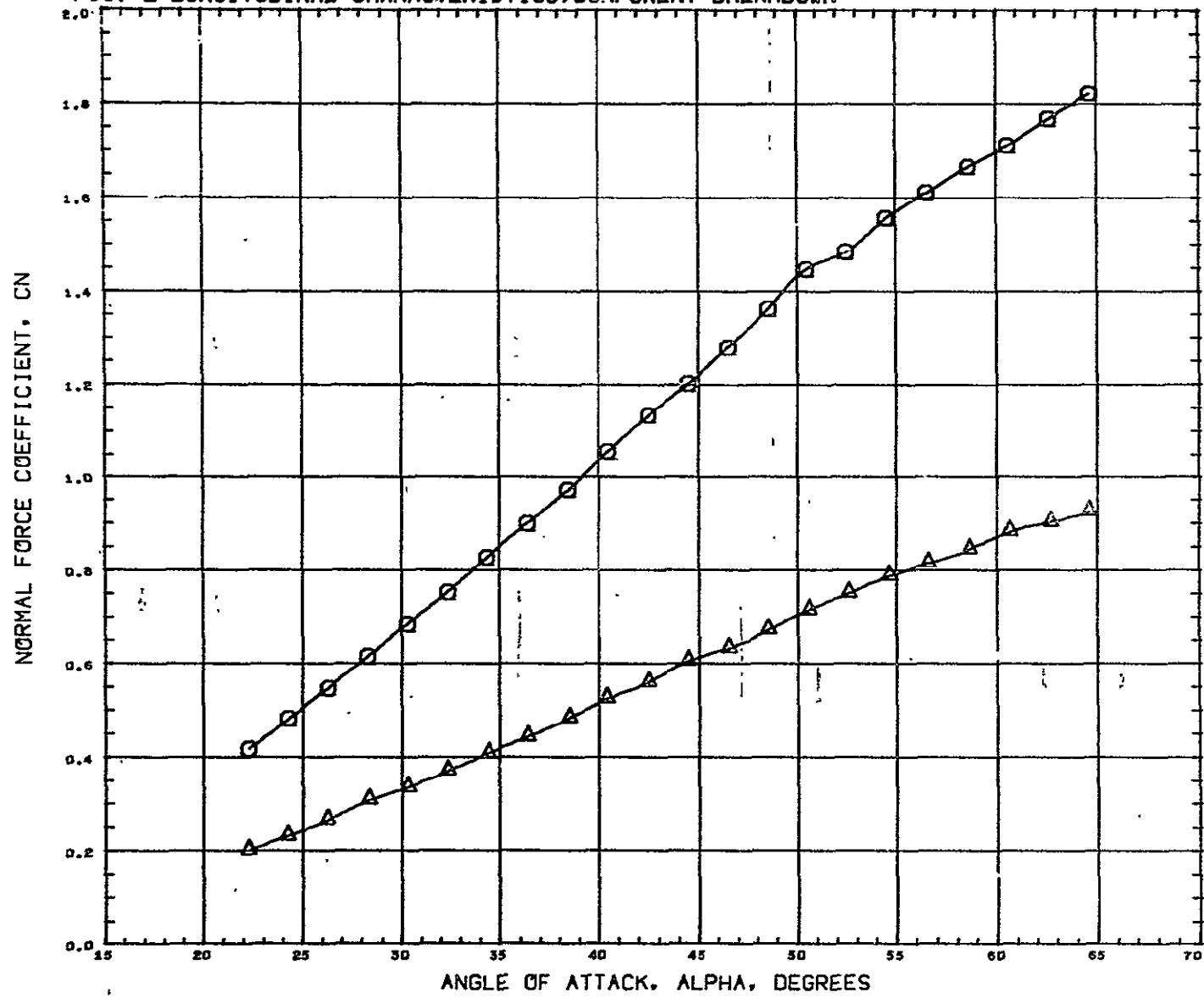
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT001) ○ GFHT D19 CONF. ROS-NB1 BIWIV1
 (DCT002) △ GFHT D19 CONF. ROS-NB1 BIWIV1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.0380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 2 LONGITUDINAL CHARACTERISTICS, COMPONENT BREAKDOWN



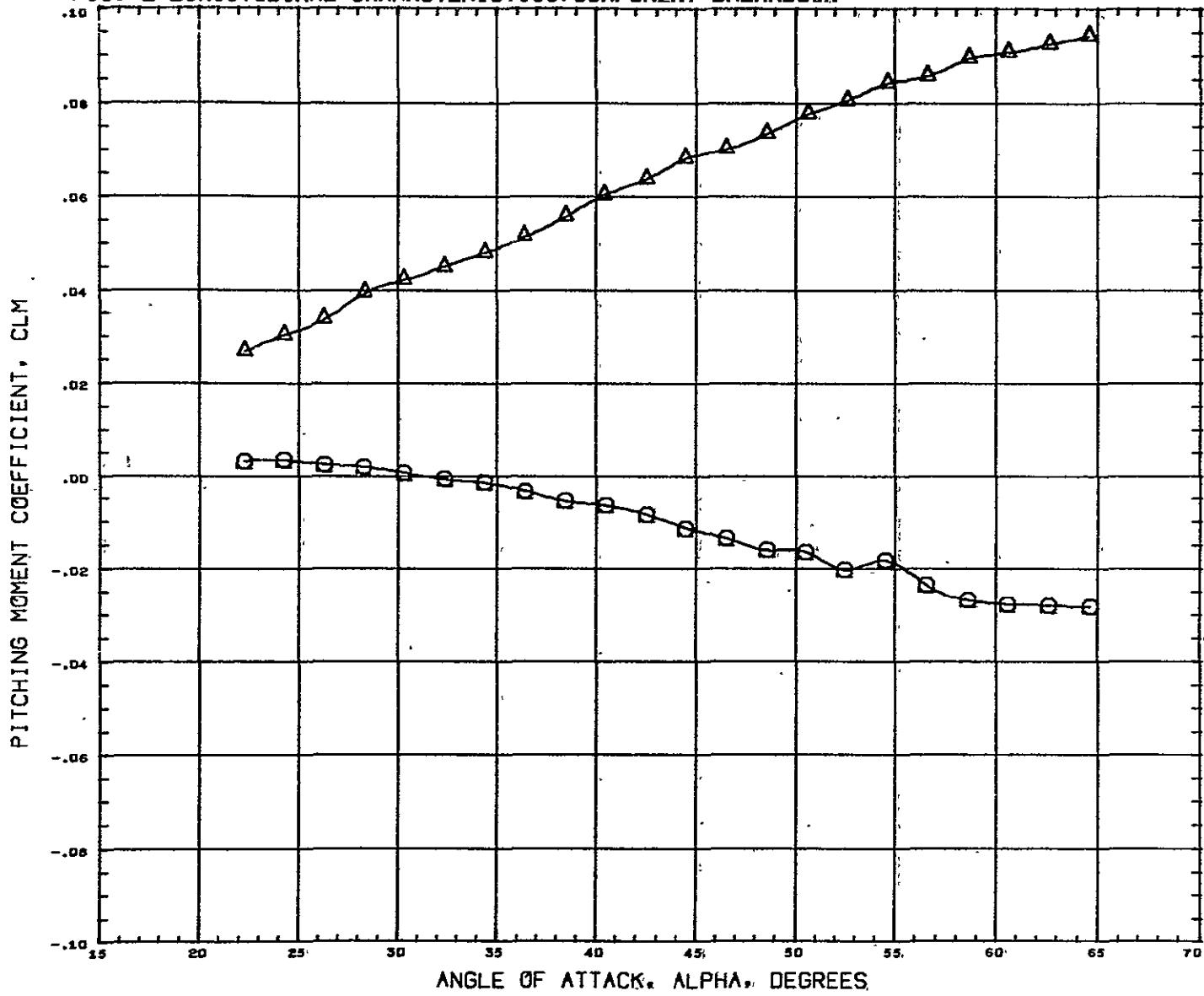
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT B19 CONF. ROS-NB1 B1W1V1
 (DCT014) GFHT B19 CONF. ROS-NB1 B1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHLP 1465.0040 IN.
				YHLP 0.0000 IN.
				ZHLP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 2 LONGITUDINAL CHARACTERISTICS, COMPONENT BREAKDOWN



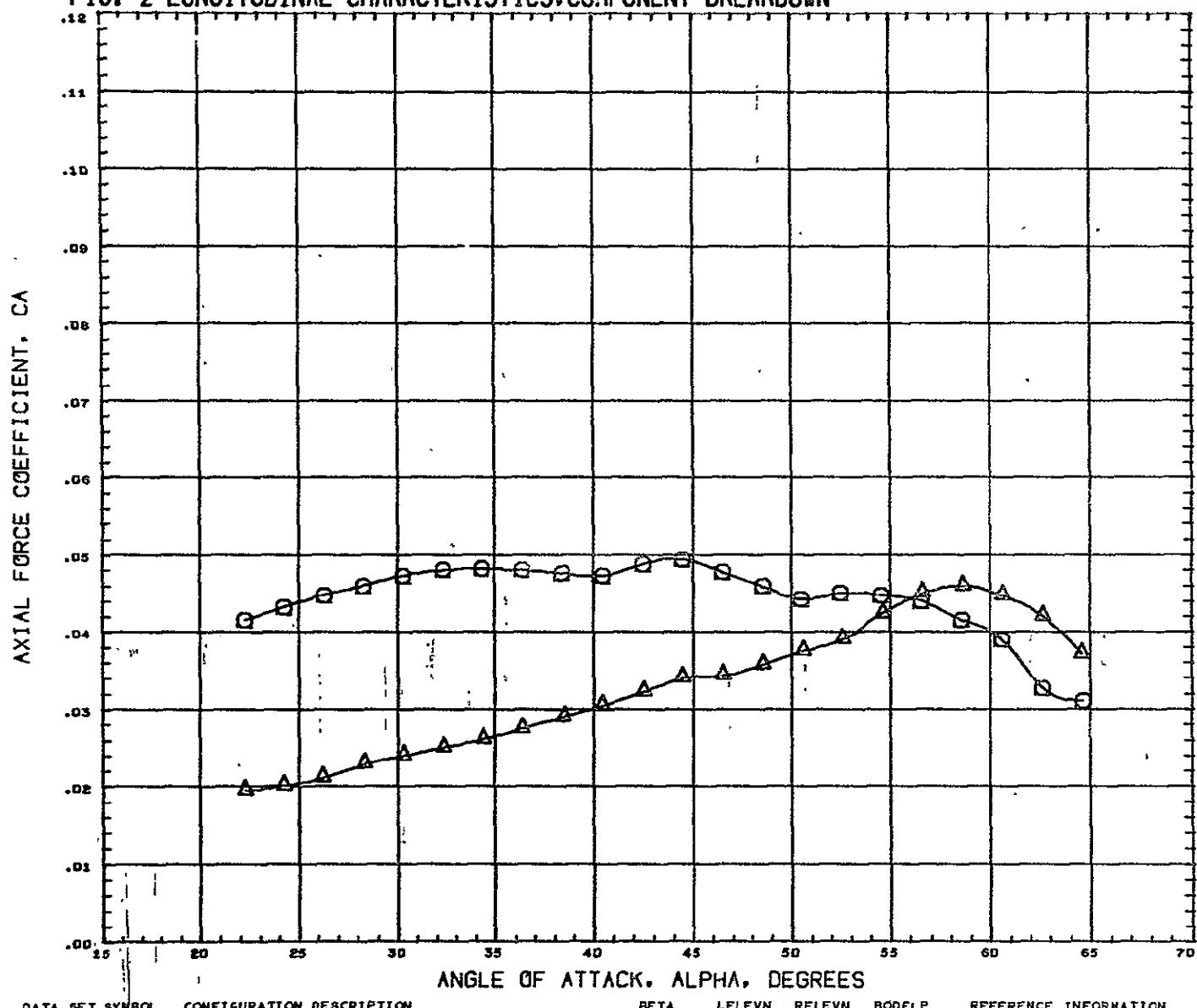
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCT014) GFHT D19 CONF. ROS-NB1 B1V1

BETA	LELEVN	RELEVN	BOFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6690 Sq. IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHRP 1485.0040 IN.
				YHRP 0.0000 IN.
				ZHRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 2 LONGITUDINAL CHARACTERISTICS, COMPONENT BREAKDOWN

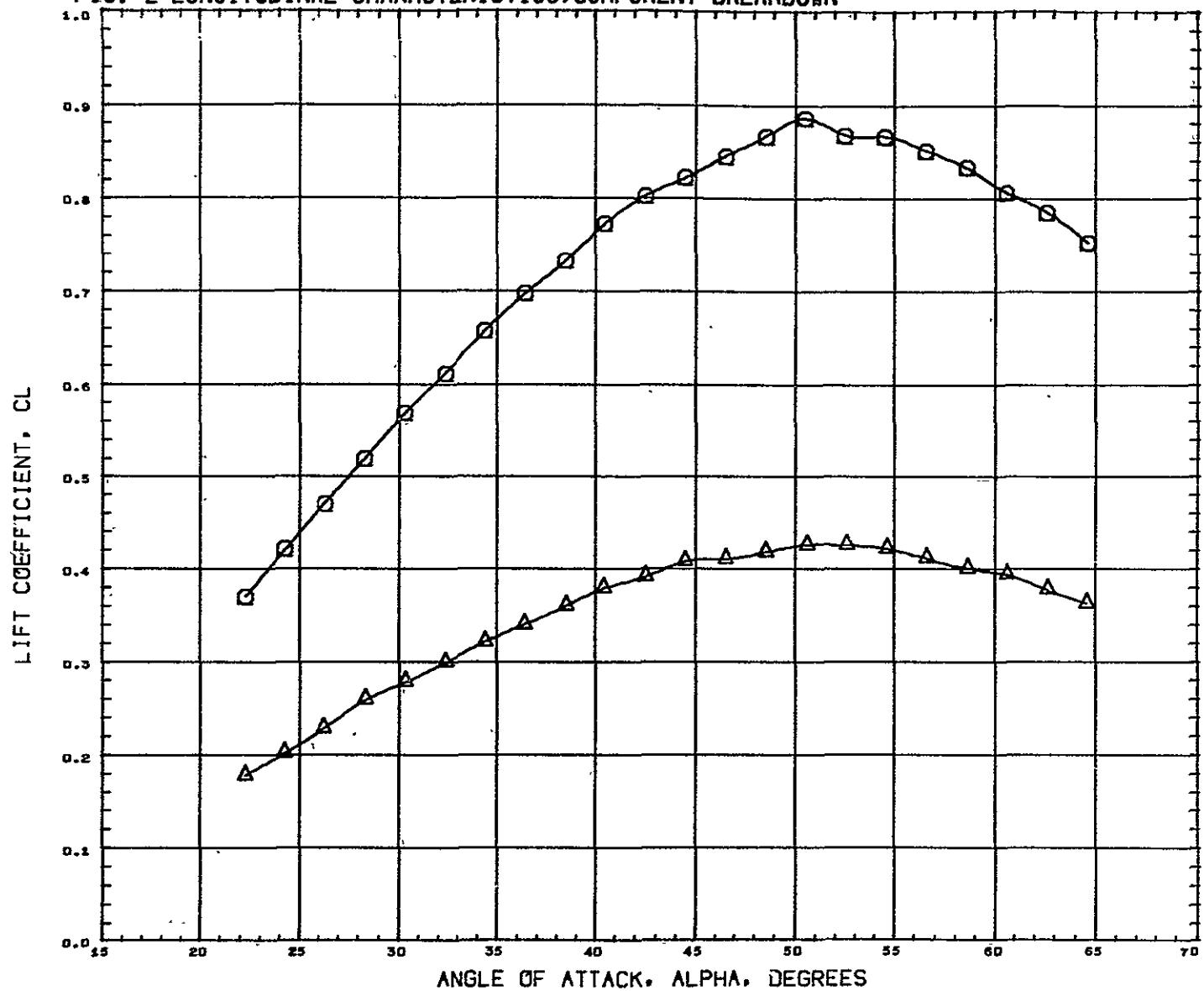


DATA SET SYMBOL CONFIGURATION DESCRIPTION
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 (DCT014) GFHT 019 CONF. ROS-NB1 BIV1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
			0.000	LREF 9.6480 IN.
				DREF 5.8380 IN.
				XHRC 1465.0040 IN.
				YHRC 0.0000 IN.
				ZHRC 377.0004 IN.
				SCALE 0.0050

MACH 10.130

FIG. 2 LONGITUDINAL CHARACTERISTICS, COMPONENT BREAKDOWN



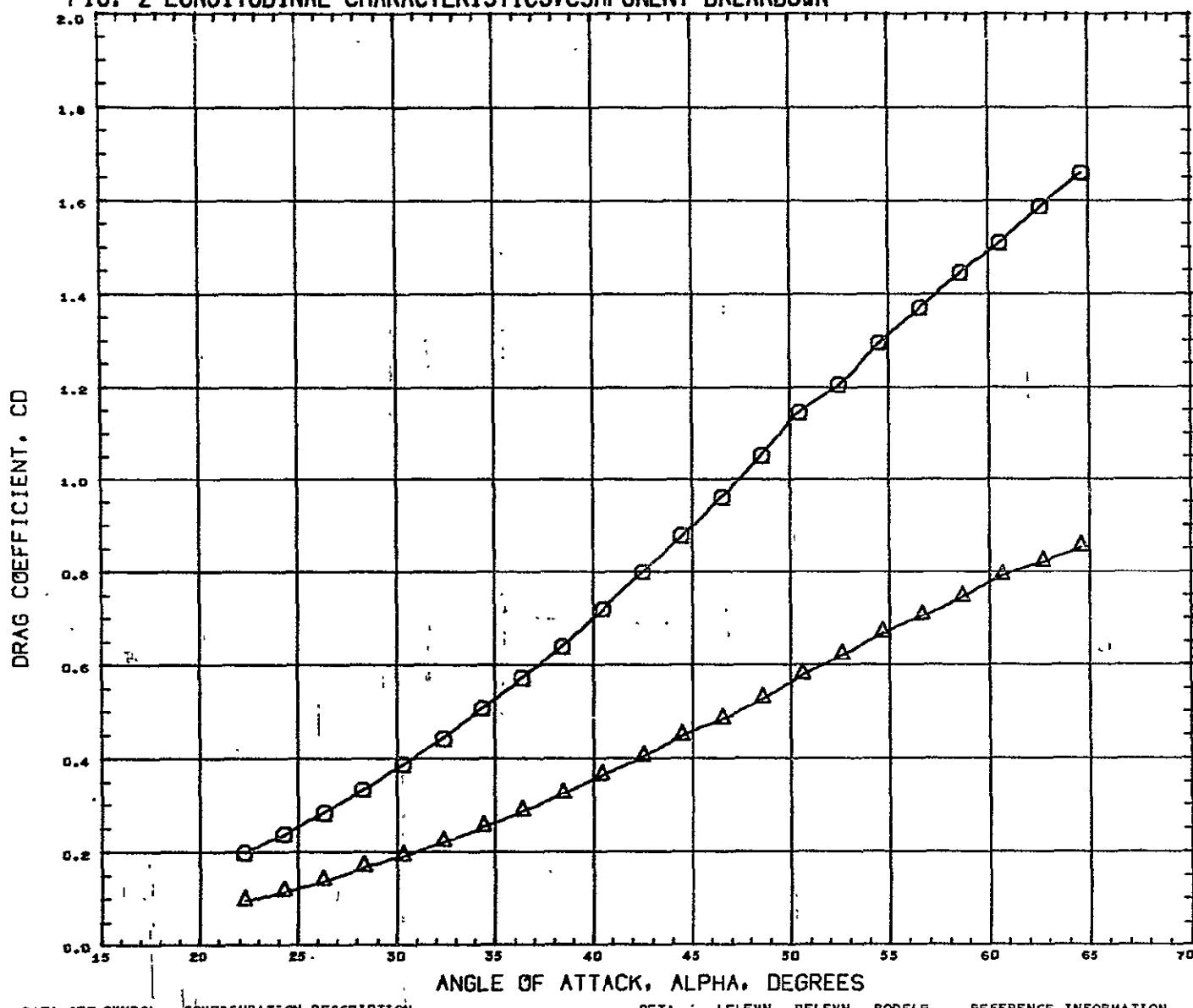
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCT014) GFHT D19 CONF. ROS-NB1 B1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 2 LONGITUDINAL CHARACTERISTICS, COMPONENT BREAKDOWN



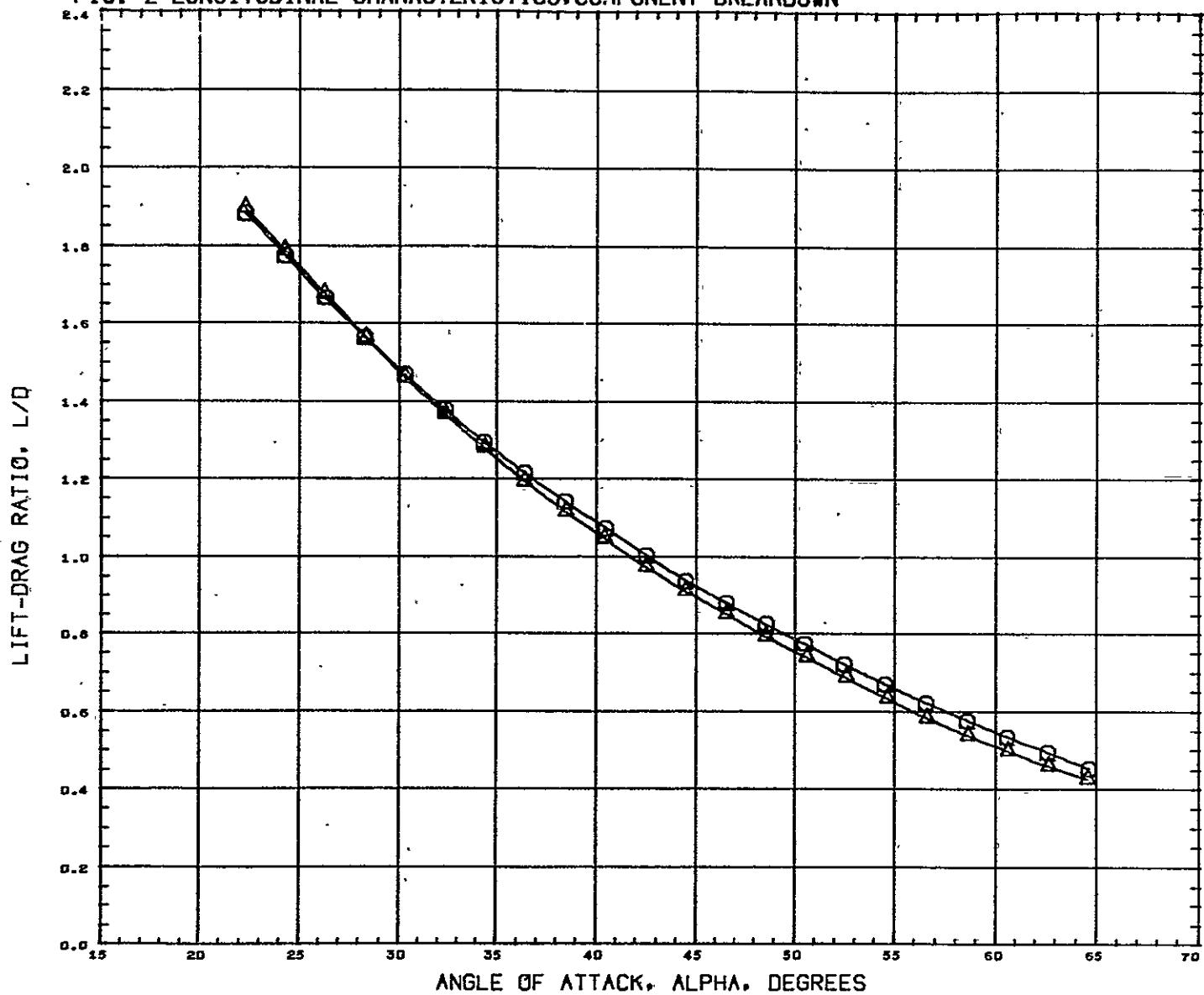
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 (DCT014) GFHT 019 CONF. ROS-NB1 B1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ. IN.
0.000			0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHLP 1485.0040 IN.
				YHLP 0.0000 IN.
				ZHLP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 2 LONGITUDINAL CHARACTERISTICS, COMPONENT BREAKDOWN



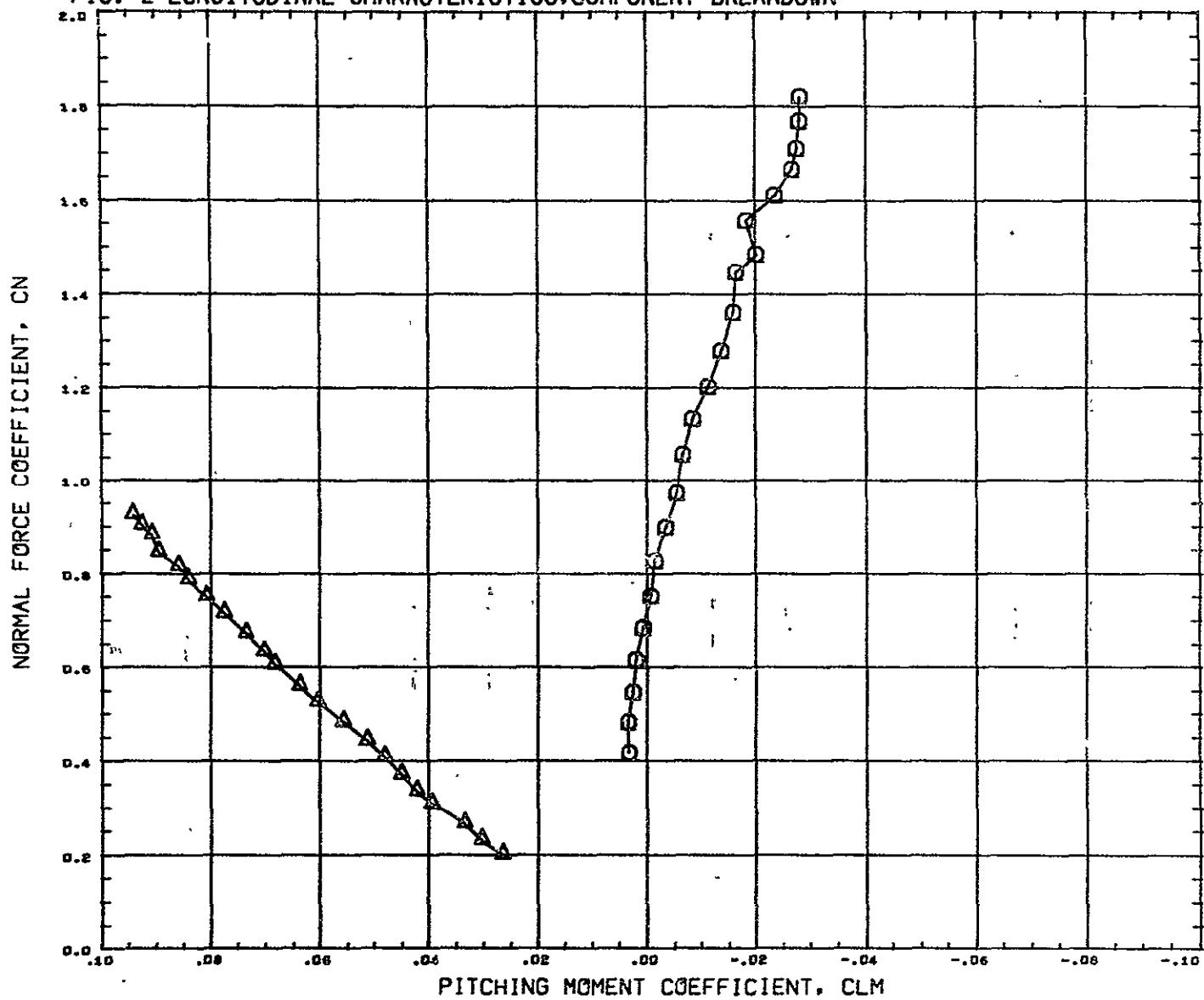
DATA SET SYMBOL CONFIGURATION DESCRIPTION
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 (DCT014) GFHT 019 CONF. ROS-NB1 B1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHRP 1465.0040 IN.
				YHRP 0.0000 IN.
				ZHRP 377.0004 IN.
				SCALE 0.0050

MACH 10.150

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FIG. 2 LONGITUDINAL CHARACTERISTICS, COMPONENT BREAKDOWN



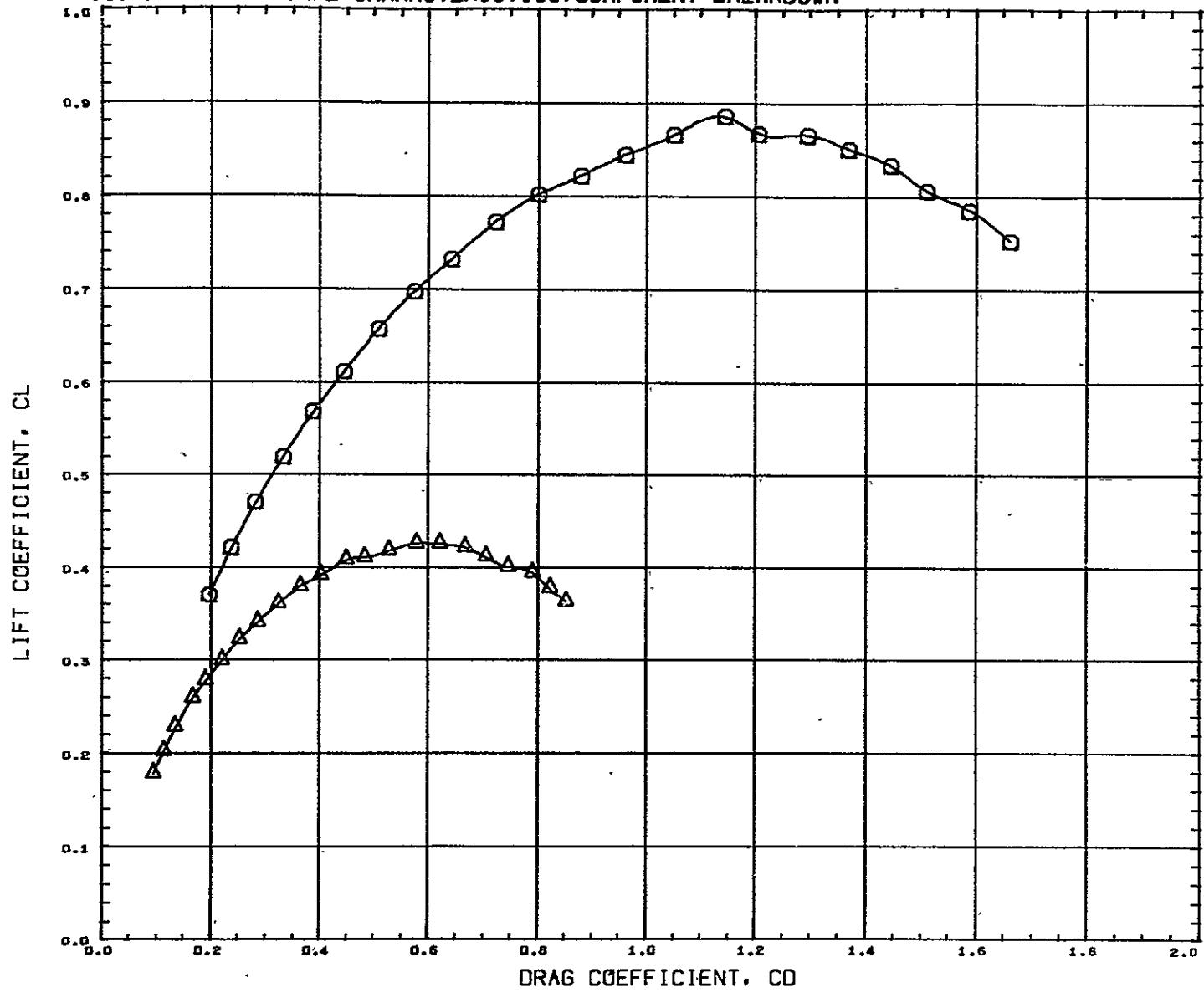
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 (DCT014) GFMT 019 CONF. ROS-NBS BIVS

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0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 2 LONGITUDINAL CHARACTERISTICS, COMPONENT BREAKDOWN



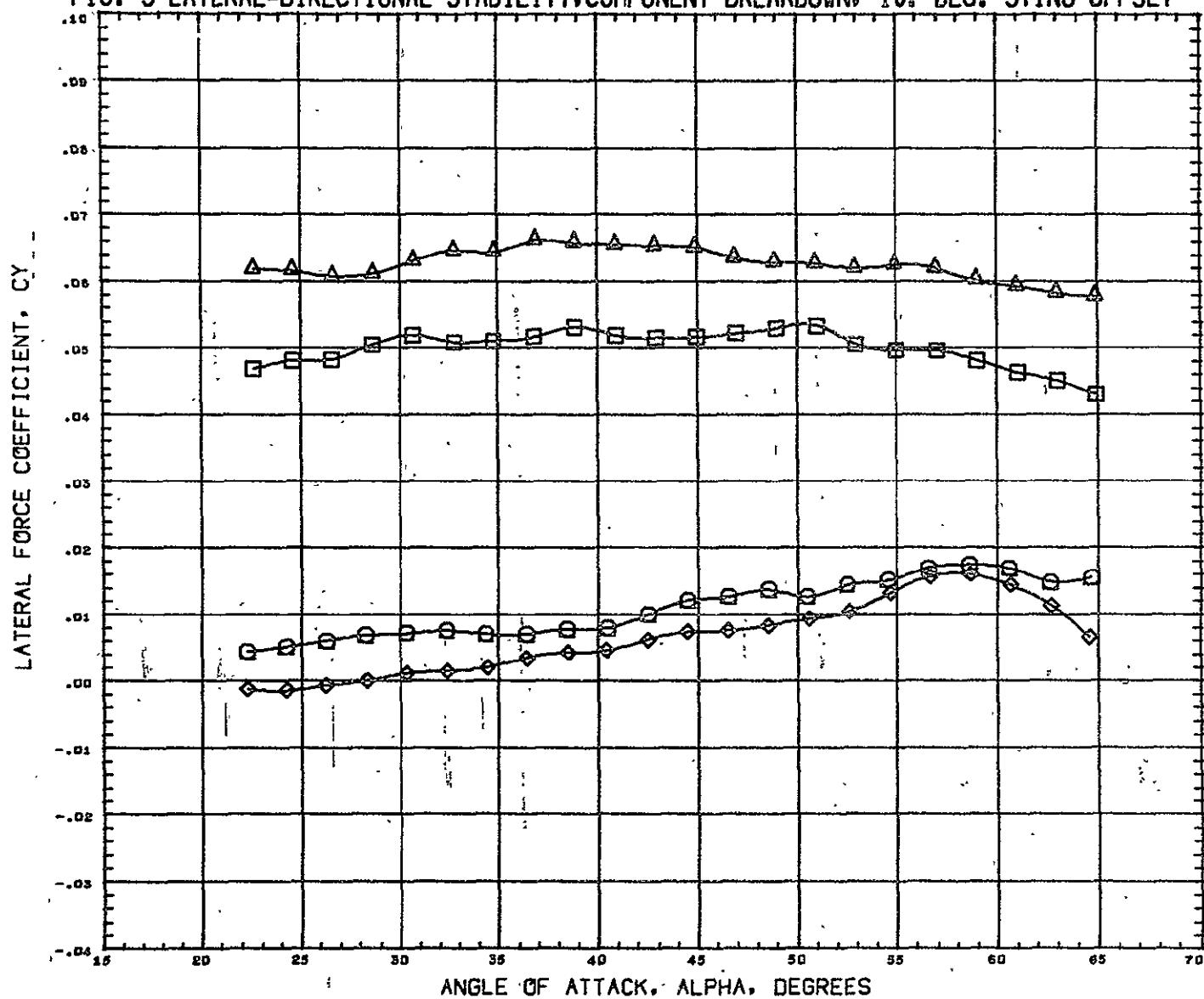
DATA SET SYMBOL CONFIGURATION DESCRIPTION
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 (DCT014) GFHT D19 CONF. ROS-NB1 B1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6690 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZHRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 3 LATERAL-DIRECTIONAL STABILITY, COMPONENT BREAKDOWN, 10. DEG. STING OFFSET

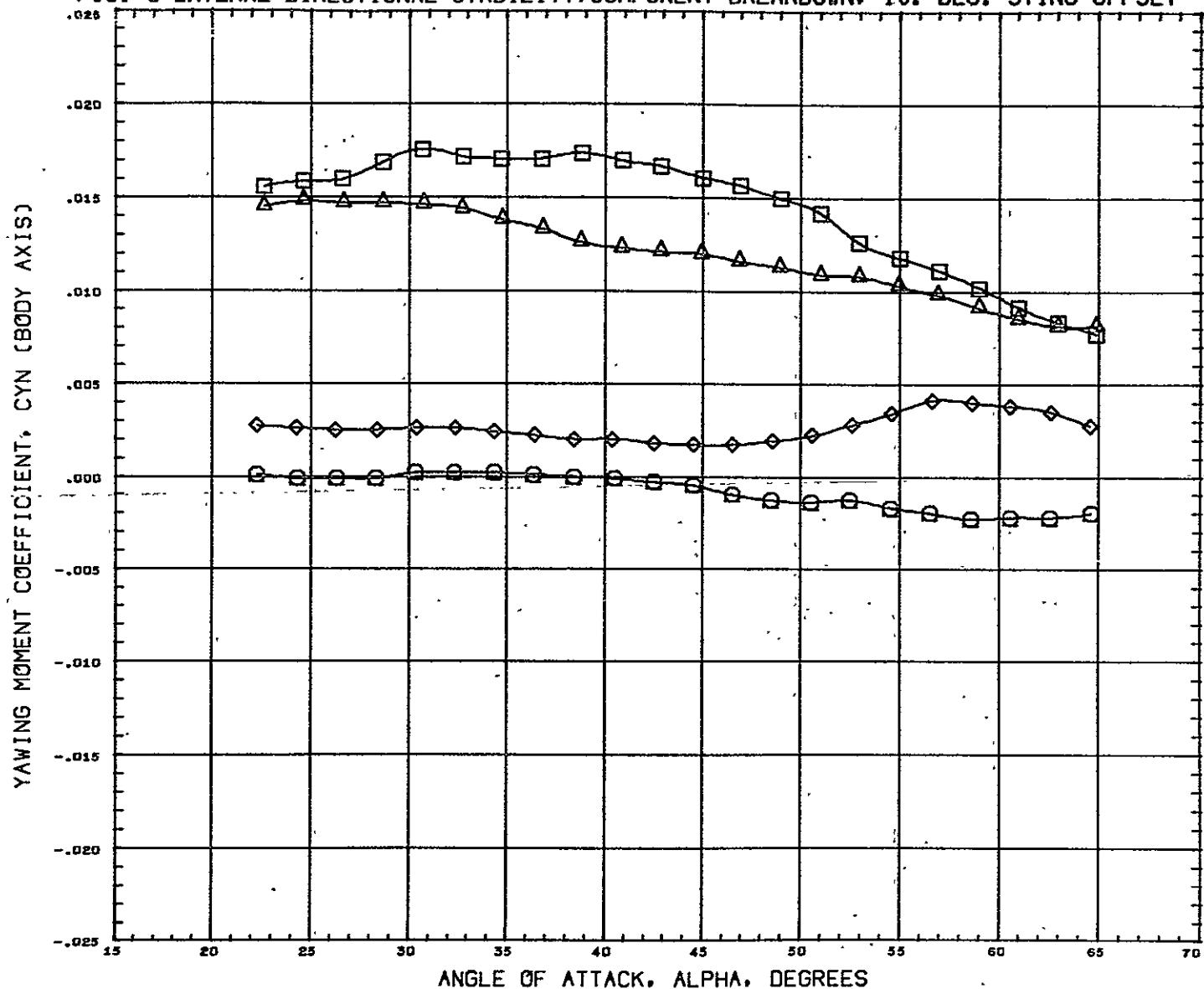


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
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(DCT020)	GFNT 019 ROS-NB1 B1W1V1 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	0.000	LREF 9.6480 IN.
(DCT014)	GFNT 019-CONF. ROS-NB1 B1V1	0.000	0.000	0.000	0.000	BREF 5.8380 IN.
(DCT023)	GFNT 019 ROS-NB1 B1V1 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	0.000	XMRP 1485.0040 IN.
						YMRP 0.0000 IN.
						ZMRP 377.0004 IN.
						SCALE 0.0050

MACH 10.130

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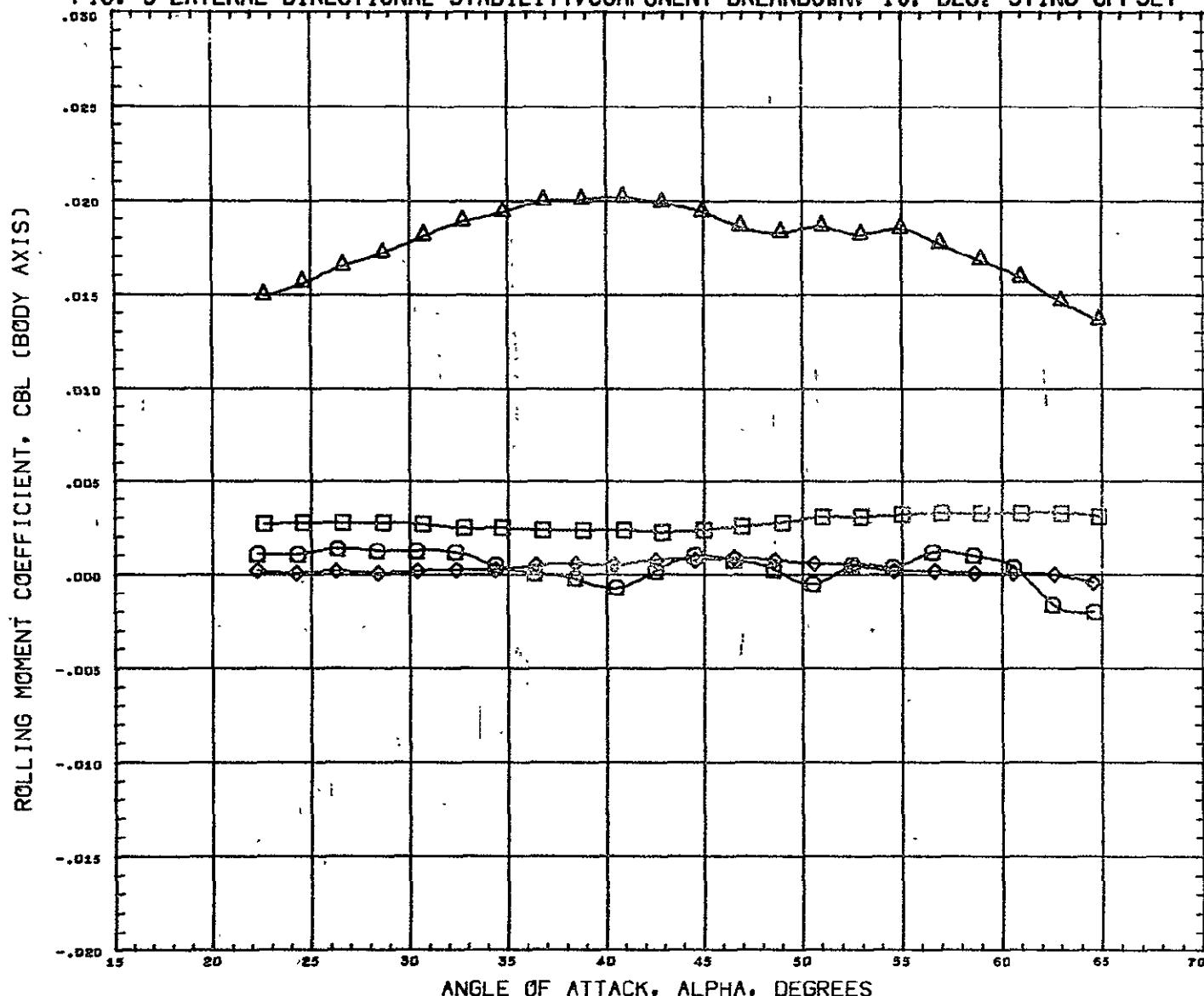
FIG. 3 LATERAL-DIRECTIONAL STABILITY, COMPONENT BREAKDOWN, 10. DEG. STING OFFSET



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT020)	GFHT D19 ROS-NB1 B1W1V1 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	0.000	LREF 9.6480 IN.
(DCT014)	GFHT D19 CONF. ROS-NB1 B1V1	0.000	0.000	0.000	0.000	BREF 5.8380 IN.
(DCT023)	GFHT D19 ROS-NB1 B1V1 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	0.000	XHRF 1485.0040 IN.
						YHRF 0.0000 IN.
						ZHRF 377.0004 IN.
						SCALE 0.0050

MACH 10.130

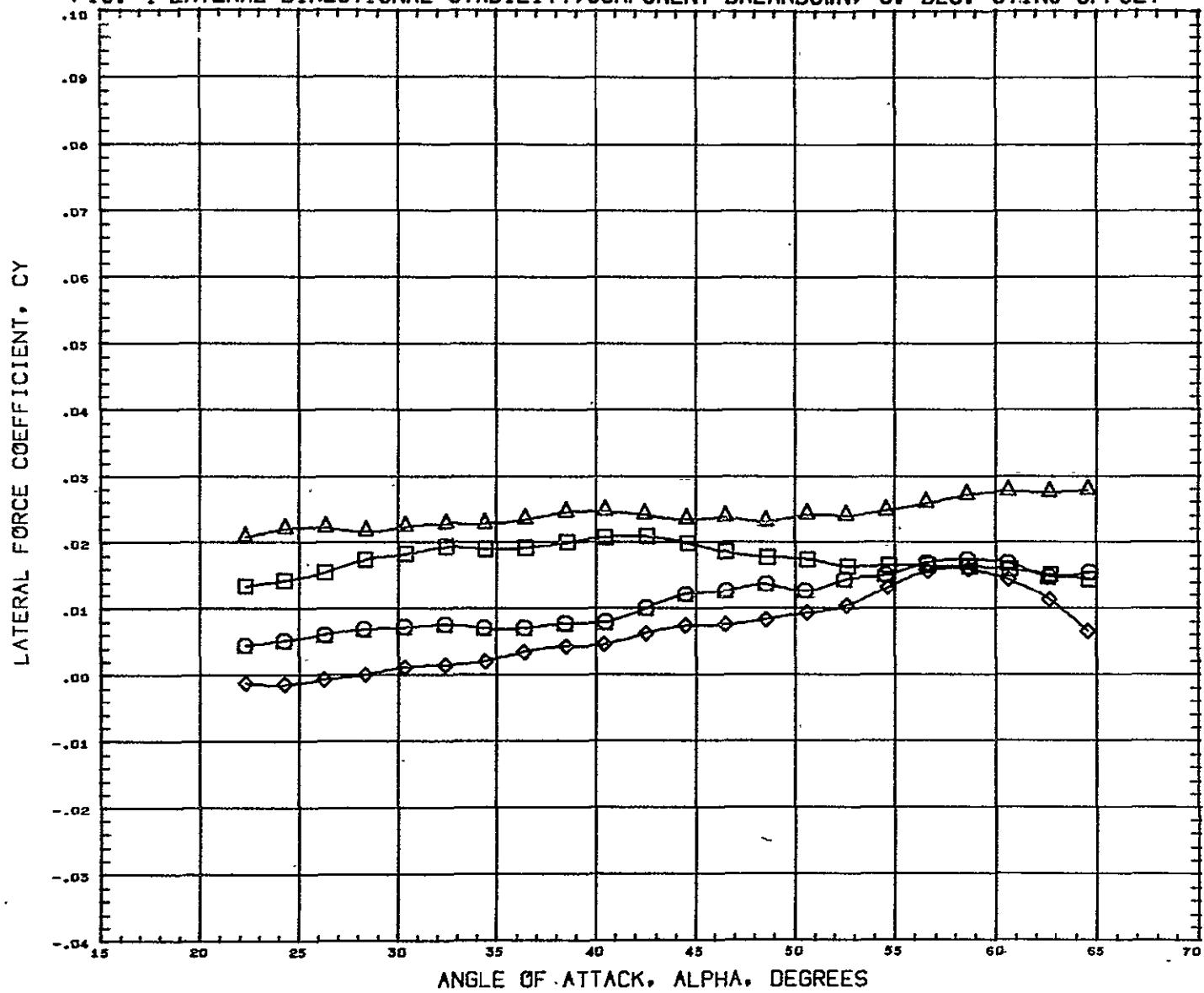
FIG. 3 LATERAL-DIRECTIONAL STABILITY, COMPONENT BREAKDOWN, 10. DEG. STING OFFSET



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT B19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	SREF	20.8690 S& IN.
(DCT020)	GFHT B19 ROS-NB1 B1W1V1 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	LREF	9.6480 IN.
(DCT014)	GFHT B19 CONF. ROS-NB1 B1V1	0.000	0.000	0.000	BREF	5.6380 IN.
(DCT023)	GFHT B19 ROS-NB1 B1V1 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	XHRP	1485.0040 IN.
					YHRP	0.0000 IN.
					ZHRP	377.0004 IN.
					SCALE	0.0050

MACH 10.150

FIG. 4 LATERAL-DIRECTIONAL STABILITY, COMPONENT BREAKDOWN, 3. DEG. STING OFFSET

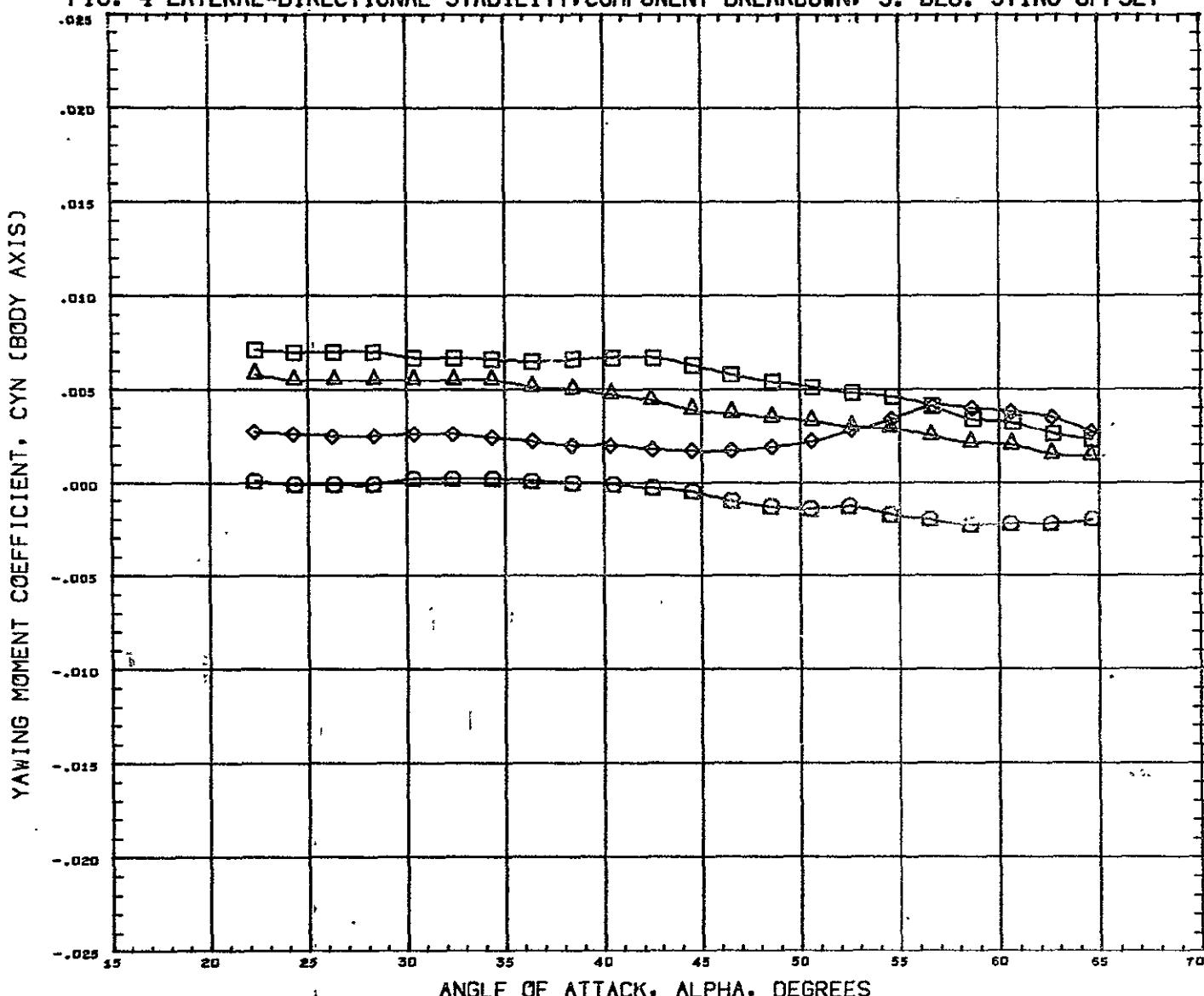


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT 019 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT026)	GFHT 019 ROS-NB1 B1W1V1 BETA IS -3 COS(ALPHA)	0.000	0.000	0.000	0.000	LREF 9.6460 IN.
(DCT014)	GFHT 019 CONF. ROS-NB1 B1V1	0.000	0.000	0.000	0.000	BREF 5.8380 IN.
(DCT030)	GFHT 019 ROS-NB1 B1V1 BETA IS -3 COS(ALPHA)	0.000	0.000	0.000	0.000	XMRP 1485.0040 IN.
						YMRP 0.0000 IN.
						ZMRP 377.0004 IN.
						SCALE 0.0050

MACH 10.130

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FIG. 4 LATERAL-DIRECTIONAL STABILITY, COMPONENT BREAKDOWN, 3. DEG. STING OFFSET



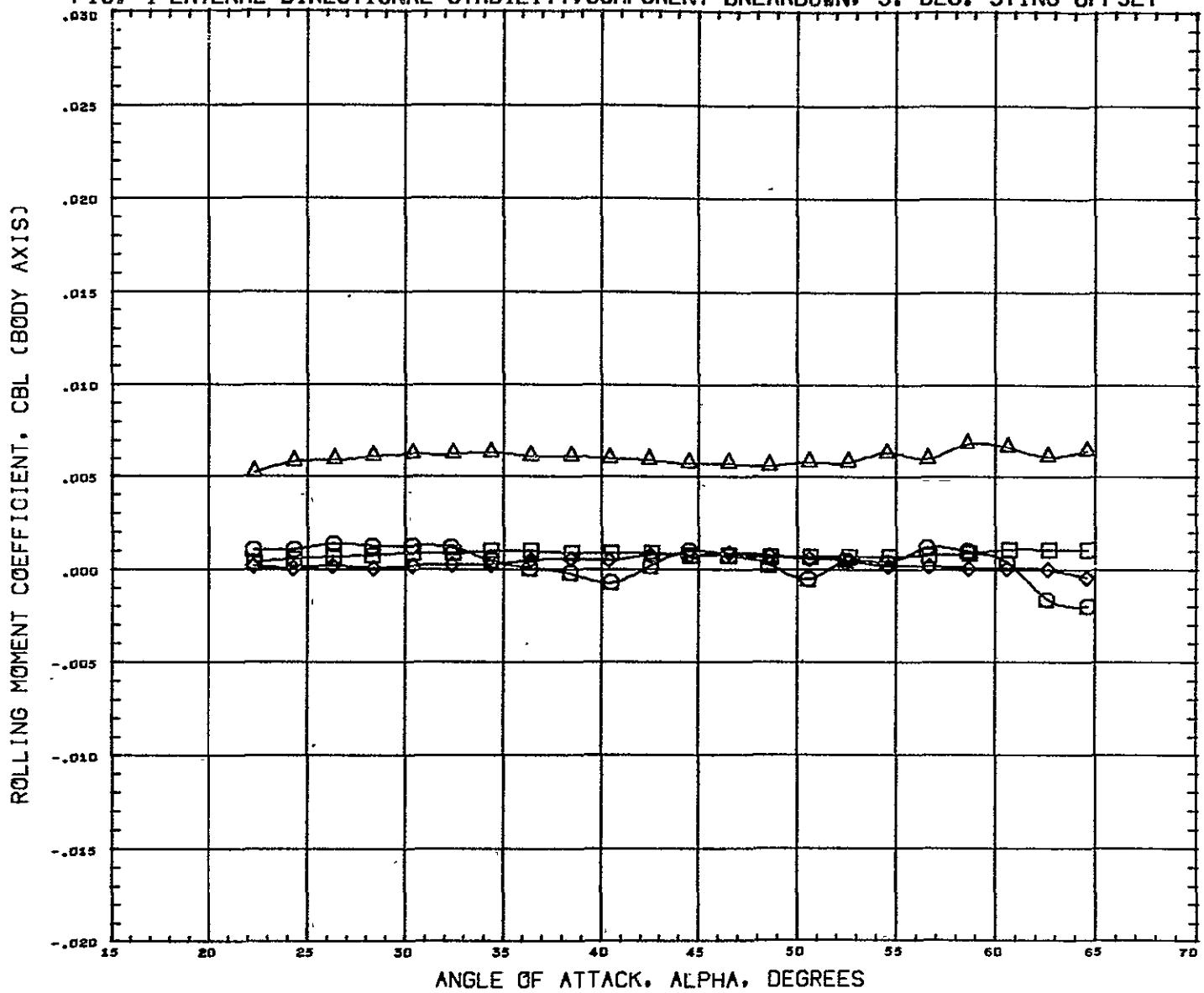
DATA SET SYMBOL CONFIGURATION DESCRIPTION

DATA SET	SYMBOL	CONFIGURATION	DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE	INFORMATION
(DCT002)	○	GFHT D19	CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF	20.6890 SQ.IN.
(DCT026)	△	GFHT D19	ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	LREF	9.6480 IN.
(DCT014)	◇	GFHT D19	CONF. ROS-NB1 B1V1	0.000	0.000	0.000	0.000	BREF	5.6380 IN.
(DCT030)	□	GFHT D19	ROS-NB1 B1V1	0.000	0.000	0.000	0.000	XH _{RP}	1485.0040 IN.
			BETA IS -3 COS(ALPHA)					YH _{RP}	0.0000 IN.
								ZH _{RP}	377.0004 IN.
								SCALE	0.0050

MACH 10.130

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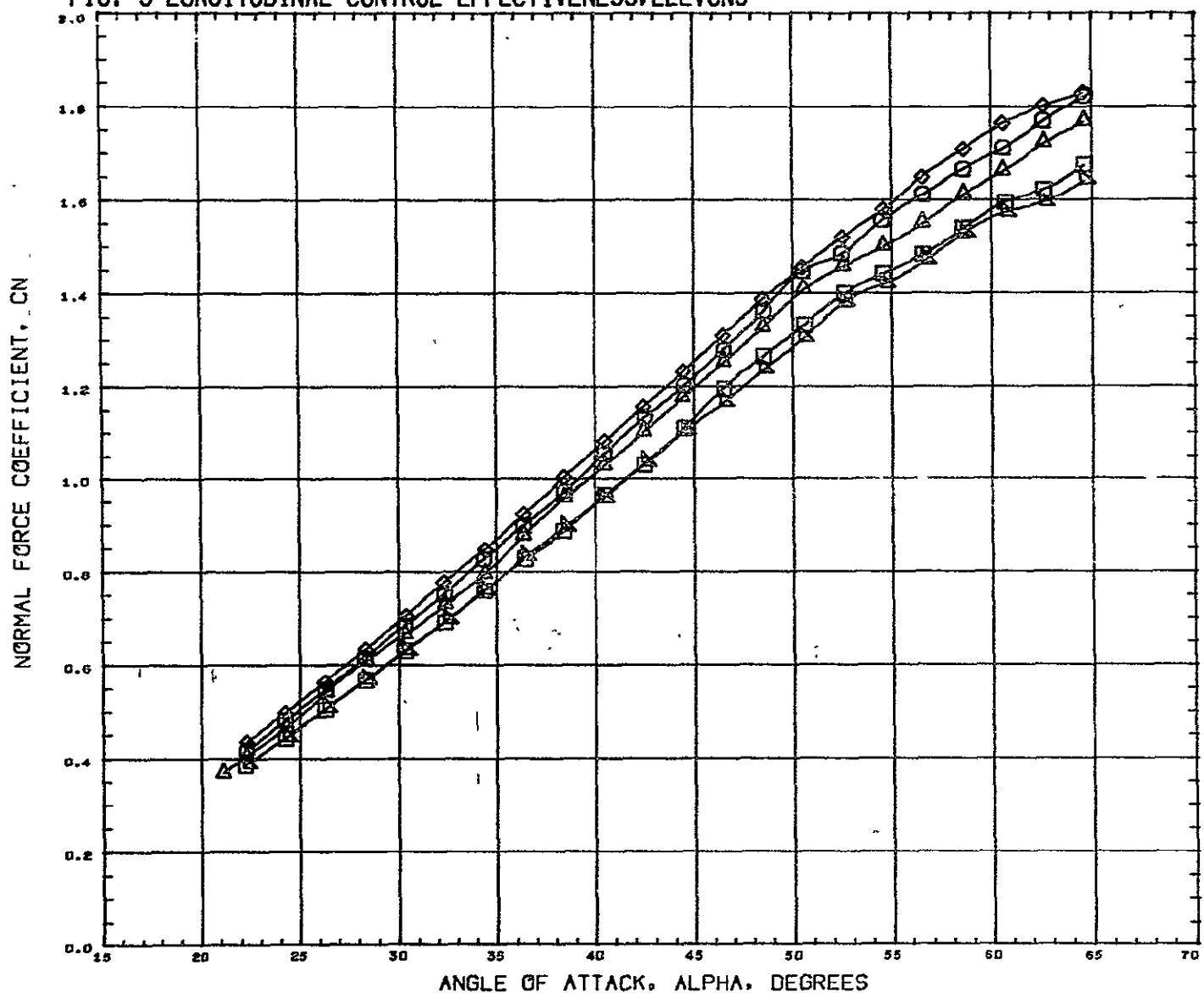
FIG. 4 LATERAL-DIRECTIONAL STABILITY, COMPONENT BREAKDOWN, 3. DEG. STING OFFSET



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT 019 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT026)	GFHT 019 ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	LREF 9.6480 IN.
(DCT014)	GFHT 019 CONF. ROS-NB1 B1V1	0.000	0.000	0.000	0.000	BREF 5.6380 IN.
(DCT030)	GFHT 019 ROS-NB1,B1V1	0.000	0.000	0.000	0.000	XMRP 1485.0040 IN.
	BETA IS -3 COS(ALPHA)					YMRP 0.0000 IN.
						ZMRP 377.0004 IN.
						SCALE 0.0050

MACH 10.130

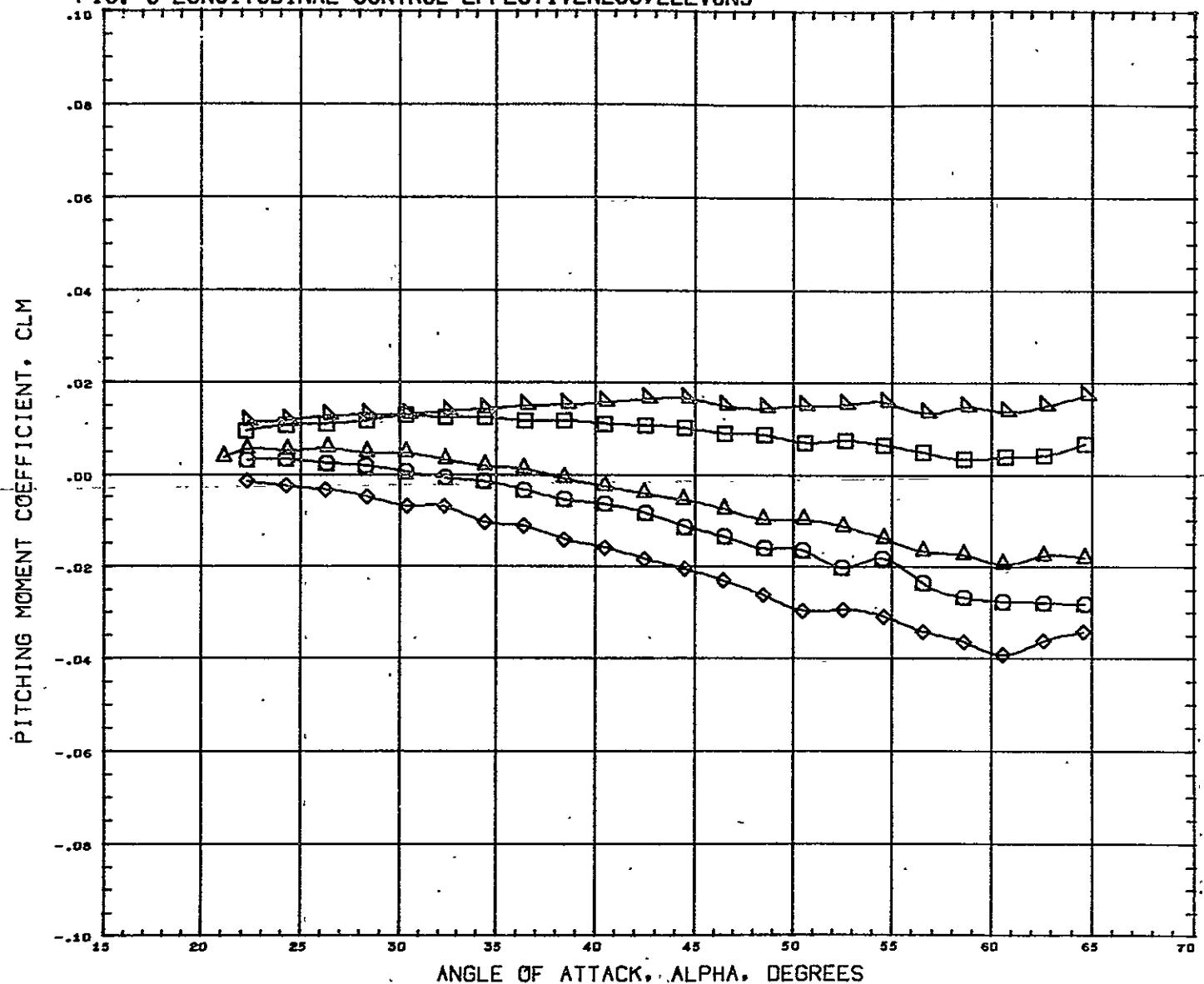
FIG. 5 LONGITUDINAL CONTROL EFFECTIVENESS, ELEVONS



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 Sq. IN.
(DCT004)	GFHT D19 CONF. ROS-NB1 B1W1(-10,0)V1	0.000	-10.000	0.000	0.000	LREF 9.6480 IN.
(DCT005)	GFHT D19 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	BREF 5.9380 IN.
(DCT006)	GFHT D19 CONF. ROS-NB1 B1W1(-20,-20)V1	0.000	-20.000	-20.000	0.000	XHRF 1485.0040 IN.
(DCT009)	GFHT D19 CONF. ROS-NB1 B1W1(-40,-40)V1	0.000	-40.000	-40.000	0.000	YHRF 0.0000 IN.
						ZHRF 377.0004 IN.
						SCALE 0.0050

MACH 10.130

FIG. 5 LONGITUDINAL CONTROL EFFECTIVENESS, ELEVONS



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	○	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT004)	△	GFHT D19 CONF. ROS-NB1 B1W1(-10,0)V1	0.000	-10.000	0.000	0.000	LREF 9.6480 IN.
(DCT005)	◊	GFHT D19 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	BREF 5.6380 IN.
(DCT008)	□	GFHT D19 CONF. ROS-NB1 B1W1(-20,-20)V1	0.000	-20.000	-20.000	0.000	XHRP 1485.0040 IN.
(DCT009)	×	GFHT D19 CONF. ROS-NB1 B1W1(-40,-40)V1	0.000	-40.000	-40.000	0.000	YHRP 0.0000 IN.
							ZHRP 377.0004 IN.
							SCALE 0.0050

MACH 10.130

FIG. 5 LONGITUDINAL CONTROL EFFECTIVENESS, ELEVONS

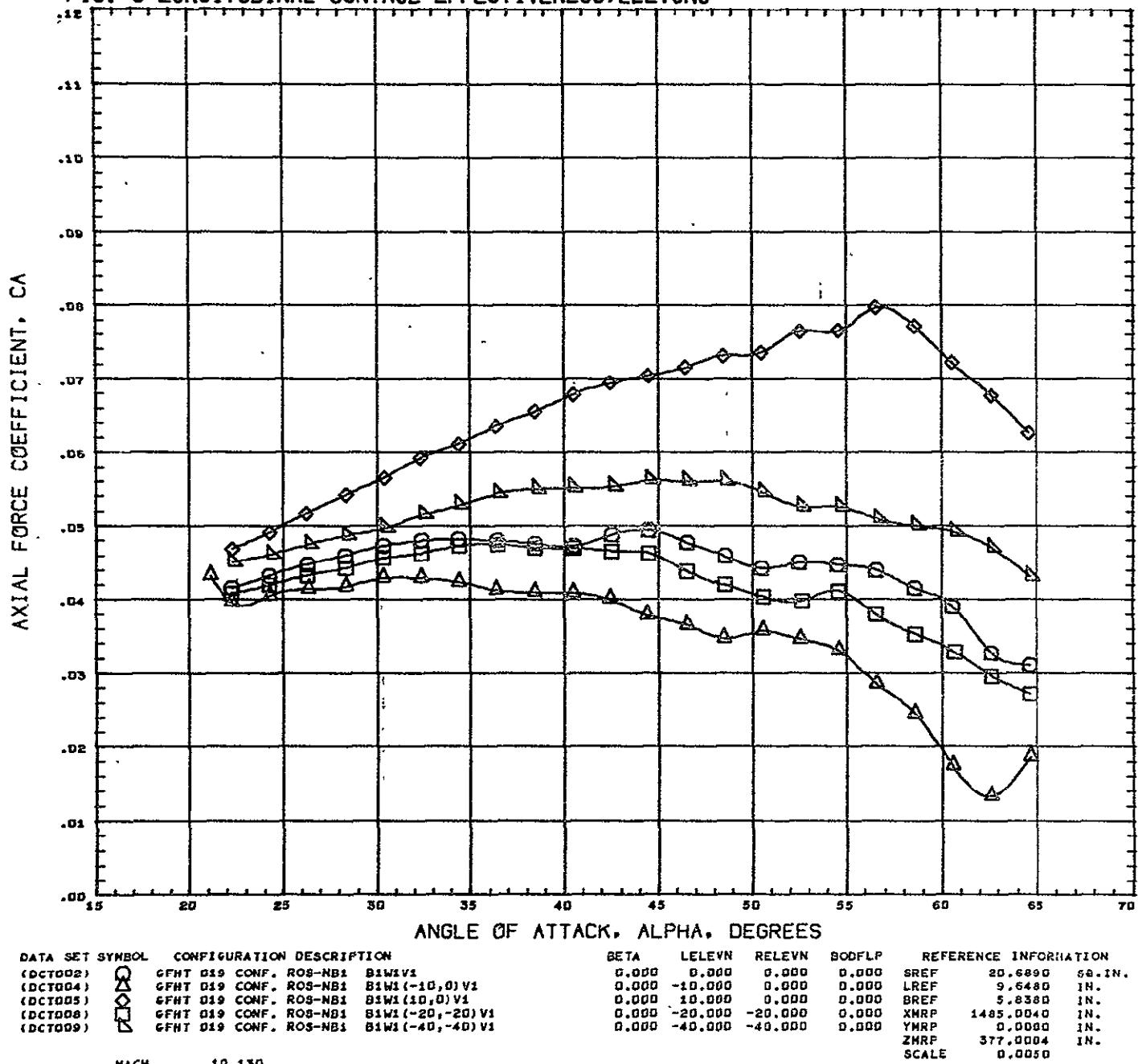
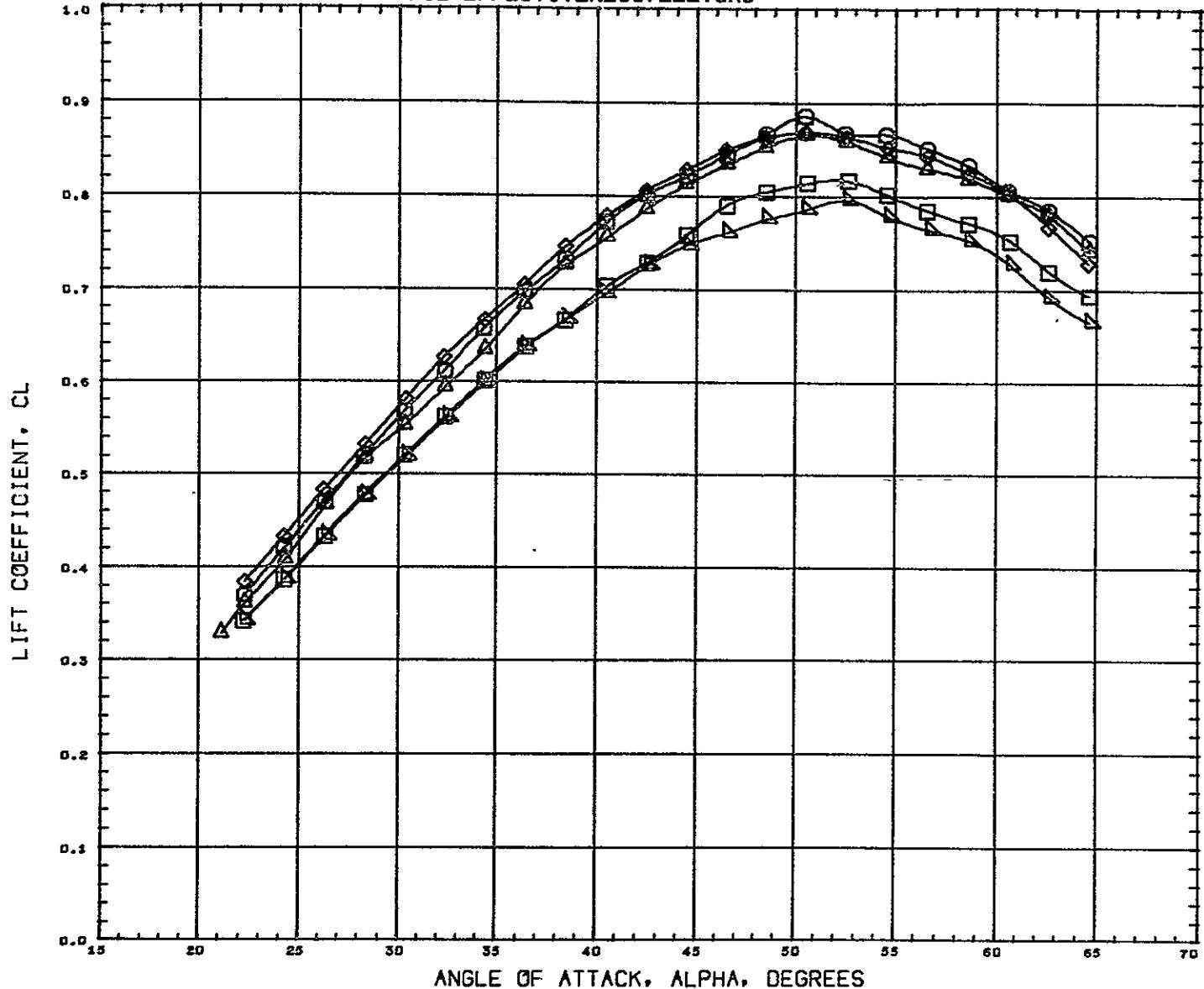


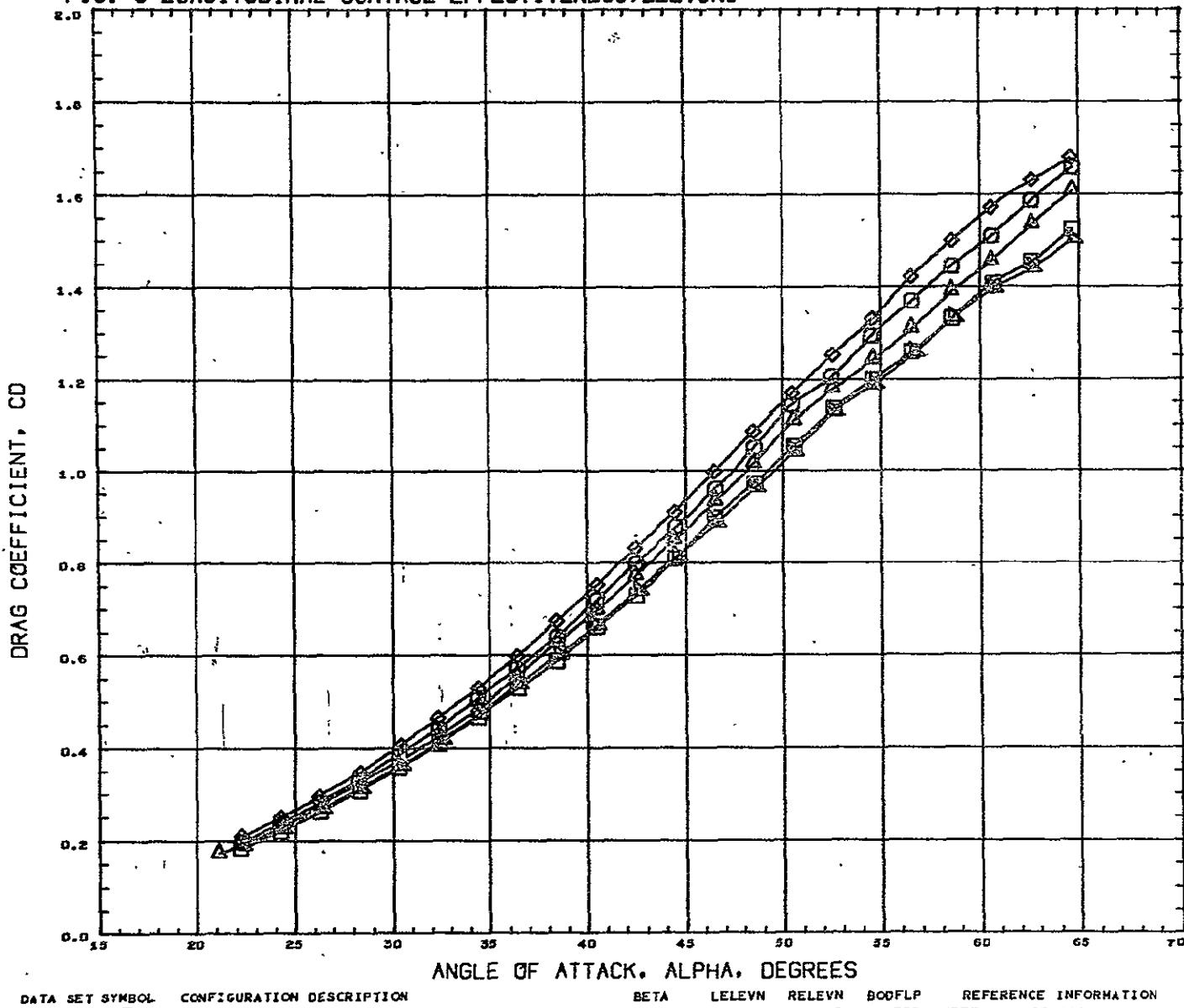
FIG. 5 LONGITUDINAL CONTROL EFFECTIVENESS, ELEVONS



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT004)	GFHT D19 CONF. ROS-NB1 B1W1(-10,0)V1	0.000	-10.000	0.000	0.000	LREF 9.6480 IN.
(DCT005)	GFHT D19 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	BREF 5.6380 IN.
(DCT006)	GFHT D19 CONF. ROS-NB1 B1W1(-20,-20)V1	0.000	-20.000	-20.000	0.000	XHRP 1485.0040 IN.
(DCT009)	GFHT D19 CONF. ROS-NB1 B1W1(-40,-40)V1	0.000	-40.000	-40.000	0.000	YHRP 0.0000 IN.
						ZHRP 377.0004 IN.
						SCALE 0.0050

MACH 10.130

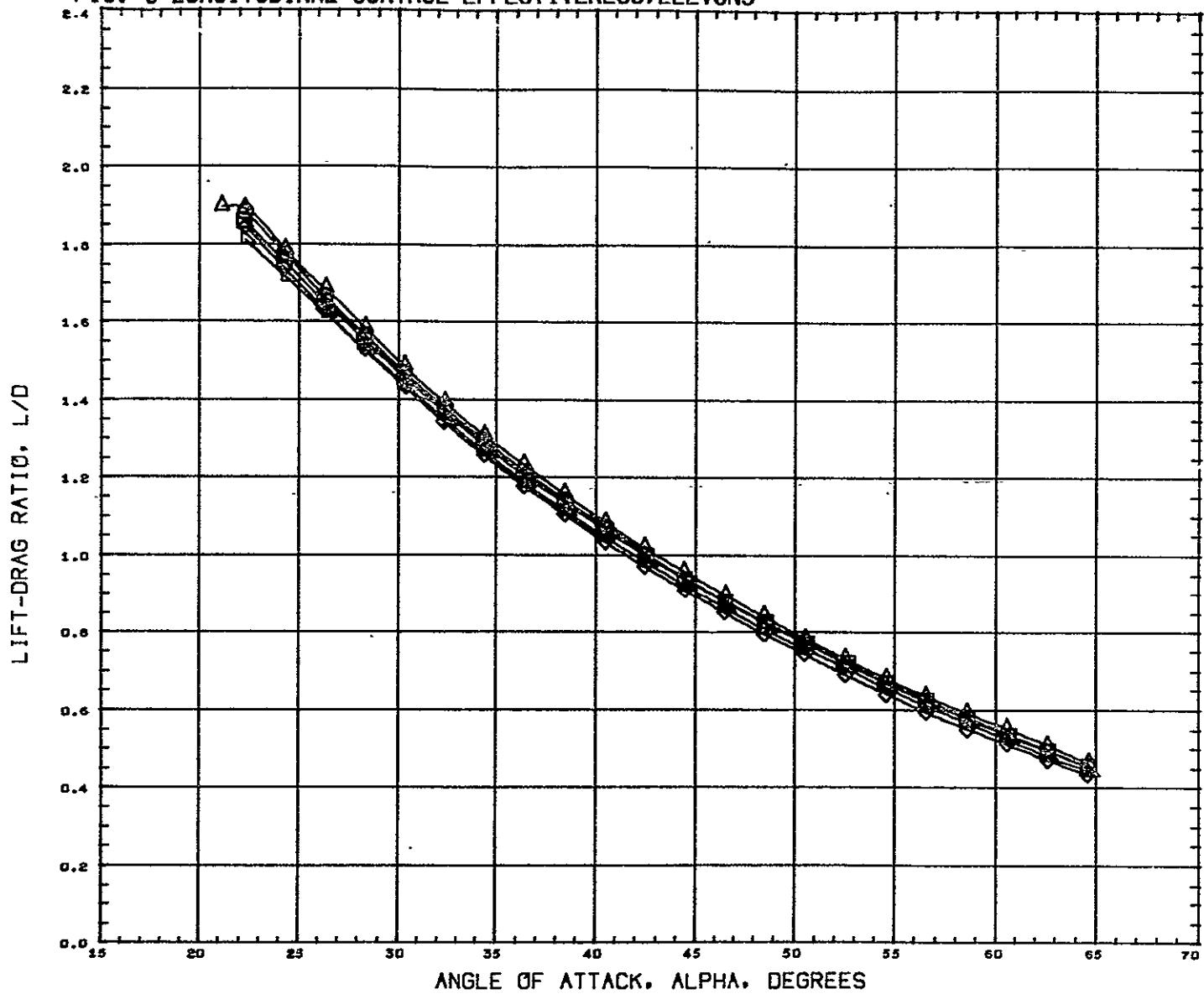
FIG. 5 LONGITUDINAL CONTROL EFFECTIVENESS, ELEVONS



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 50. IN.
(DCT004)	GFHT D19 CONF. ROS-NB1 B1W1(-10,0)V1	0.000	-10.000	0.000	0.000	LREF 9.6480 IN.
(DCT005)	GFHT D19 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	BREF 5.8380 IN.
(DCT008)	GFHT D19 CONF. ROS-NB1 B1W1(-20,-20)V1	0.000	-20.000	-20.000	0.000	XHRP 1485.0040 IN.
(DCT009)	GFHT D19 CONF. ROS-NB1 B1W1(-40,-40)V1	0.000	-40.000	-40.000	0.000	YHRP 0.0000 IN.
						ZHRP 377.0004 IN.
						SCALE 0.0050

MACH 10.130

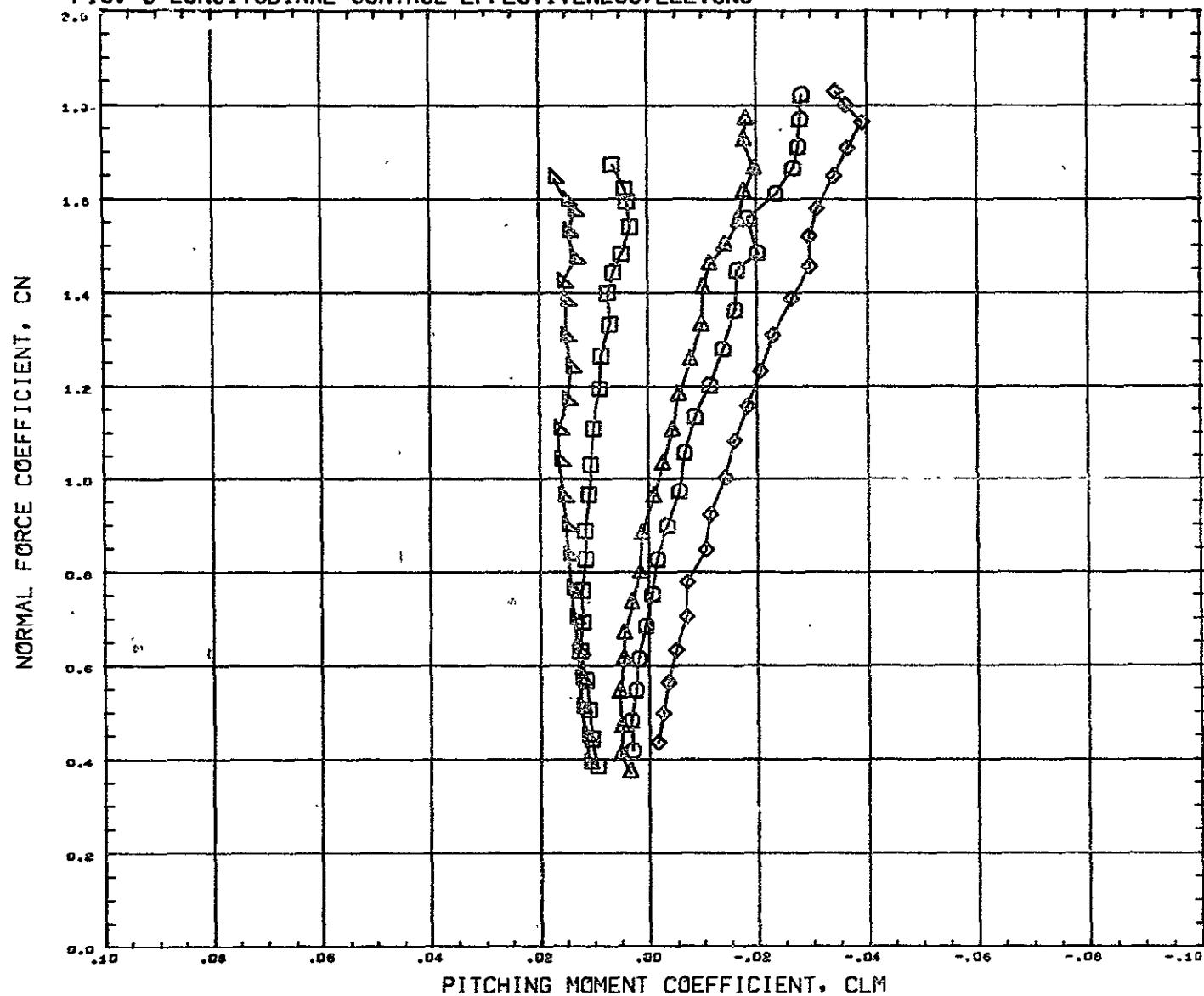
FIG. 5 LONGITUDINAL CONTROL EFFECTIVENESS, ELEVONS



DATA SET SYMBOL		CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION	
(DCT002)	○	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF	20.6890 SQ.IN.
(DCT004)	△	GFHT D19 CONF. ROS-NB1 B1W1(-10,0)V1	0.000	-10.000	0.000	0.000	LREF	9.6480 IN.
(DCT005)	□	GFHT D19 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	BREF	5.8380 IN.
(DCT006)	◇	GFHT D19 CONF. ROS-NB1 B1W1(-20,-20)V1	0.000	-20.000	-20.000	0.000	XHRP	1485.0040 IN.
(DCT009)	×	GFHT D19 CONF. ROS-NB1 B1W1(-40,-40)V1	0.000	-40.000	-40.000	0.000	YHRP	.0.0000 IN.
							ZHRP	377.0004 IN.
							SCALE	0.0050

MACH 10.130

FIG. 5 LONGITUDINAL CONTROL EFFECTIVENESS, ELEVONS

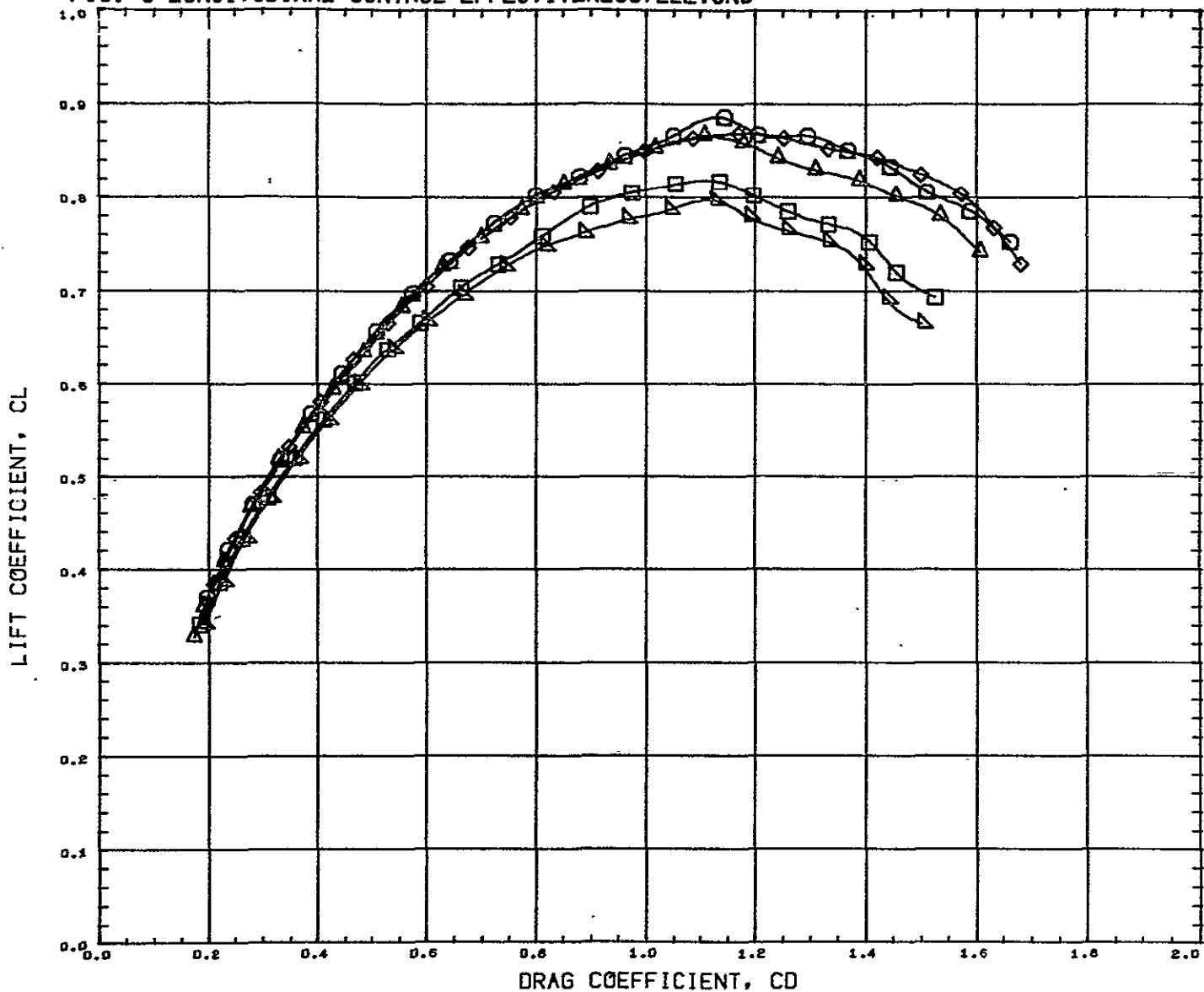


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6690 SR. IN.
(DCT004)	GFHT D19 CONF. ROS-NB1 B1W1(-10,0)V1	0.000	-10.000	0.000	0.000	LREF 9.6480 IN.
(DCT005)	GFHT D19 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	BREF 5.6380 IN.
(DCT008)	GFHT D19 CONF. ROS-NB1 B1W1(-20,-20)V1	0.000	-20.000	-20.000	0.000	XMRP 1485.0040 IN.
(DCT009)	GFHT D19 CONF. ROS-NB1 B1W1(-40,-40)V1	0.000	-40.000	-40.000	0.000	YMRP 0.0000 IN.
						ZMRP 377.0004 IN.
						SCALE 0.0050

MACH 10.130

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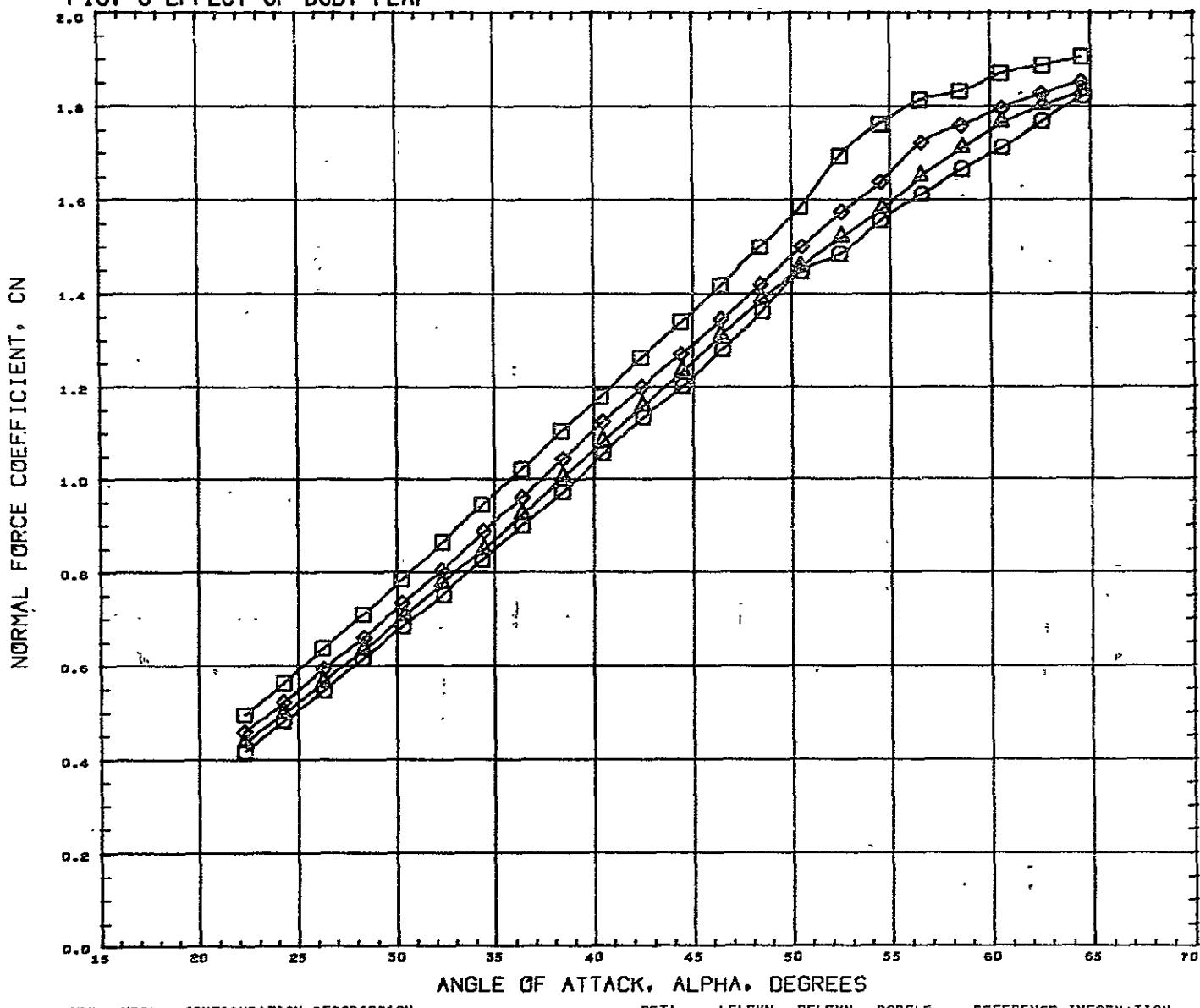
FIG. 5 LONGITUDINAL CONTROL EFFECTIVENESS, ELEVONS



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT 019 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT004)	GFHT 019 CONF. ROS-NB1 B1W1(-10,0)V1	0.000	-10.000	0.000	0.000	LREF 9.6480 IN.
(DCT005)	GFHT 019 CONF. ROS-NB1 B1W1(10,0)V1	0.020	10.000	0.000	0.000	BREF 5.8380 IN.
(DCT008)	GFHT 019 CONF. ROS-NB1 B1W1(-20,-20)V1	0.000	-20.000	-20.000	0.000	XHREF 1485.0040 IN.
(DCT009)	GFHT 019 CONF. ROS-NB1 B1W1(-40,-40)V1	0.000	-40.000	-40.000	0.000	YHREF 0.0000 IN.
						ZHREF 377.0004 IN.
						SCALE 0.0050

MACH 10.130

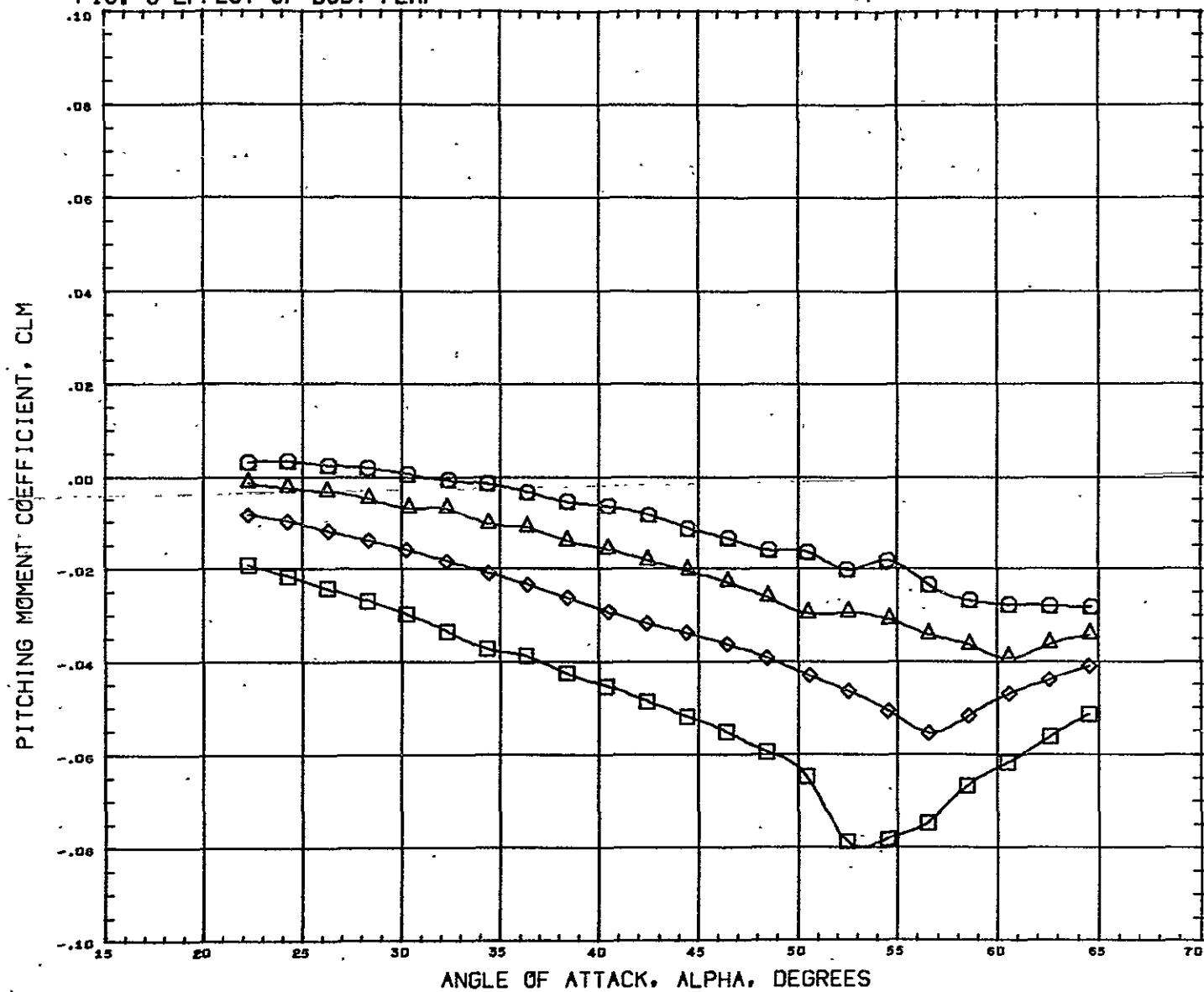
FIG. 6 EFFECT OF BODY FLAP



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 BIWIVI	0.000	0.000	0.000	0.000	SREF 20.6890 IN.
(DCT005)	GFHT D19 CONF. ROS-NB1 BIW1(10,0)V1	0.000	10.000	0.000	0.000	LREF 9.6480 IN.
(DCT006)	GFHT D19 CONF. ROS-NB1 BIWIVIF1(10)	0.000	0.000	0.000	10.000	BREF 5.8380 IN.
(DCT007)	GFHT D19 CONF. ROS-NB1 BIW1(10,10)V1F1(10)	0.000	10.000	10.000	10.000	XHPP 1485.0040 IN. YHPP 0.0000 IN. ZHPP 377.0004 IN. SCALE 0.0050

MACH 10.130

FIG. 6 EFFECT OF BODY FLAP



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BOOFLF	REFERENCE INFORMATION
(DCTD02)	GFHT D19 CONF. ROS-NB1 BIWIVI	0.000	0.000	0.000	0.000	SREF 20.6690 SQ.IN.
(DCTD05)	GFHT D19 CONF. ROS-NB1 BIW1(10,0)V1	0.000	10.000	0.000	0.000	LREF 9.6480 IN.
(DCTD06)	GFHT D19 CONF. ROS-NB1 BIWIV1F1(10)	0.000	0.000	0.000	10.000	BREF 5.8380 IN.
(DCTD07)	GFHT D19 CONF. ROS-NB1 BIW1(10,10)V1F1(10)	0.000	10.000	10.000	10.000	XHRP 1485.0040 IN.
						YHRP 0.0000 IN.
						ZHRP 377.0004 IN.
						SCALE 0.0050

MACH 10.130

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FIG. 6 EFFECT OF BODY FLAP

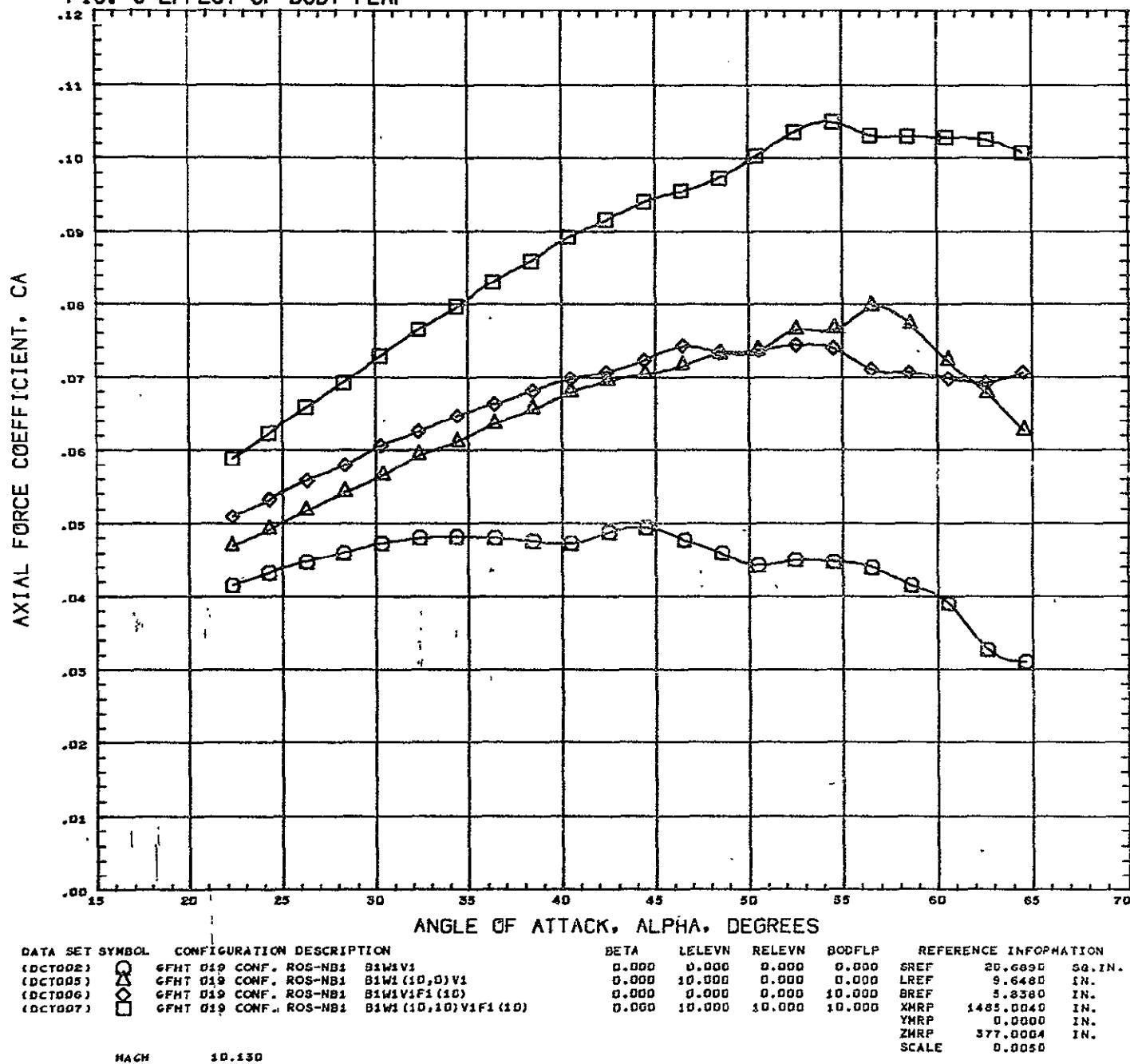
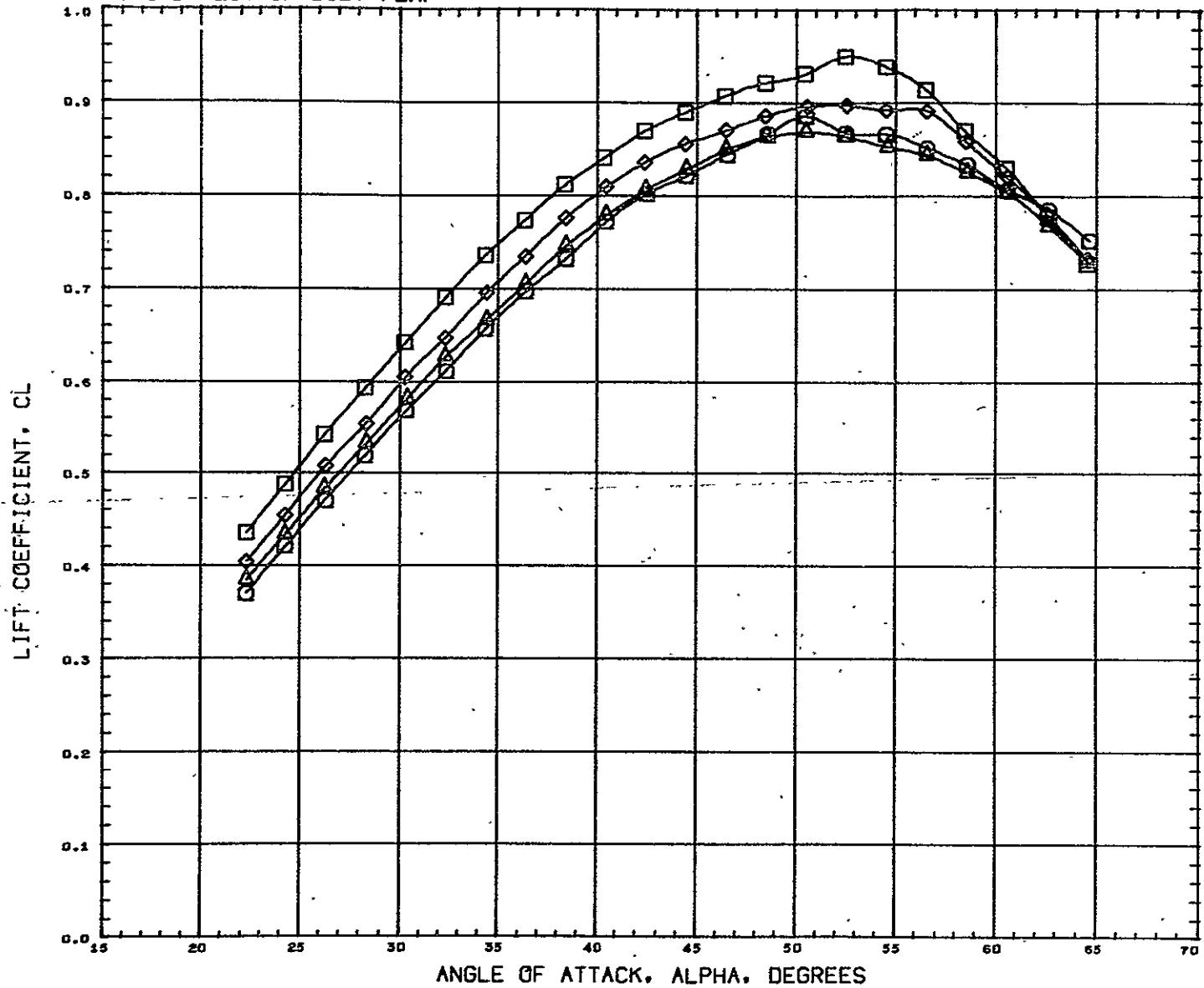


FIG. 6 EFFECT OF BODY FLAP

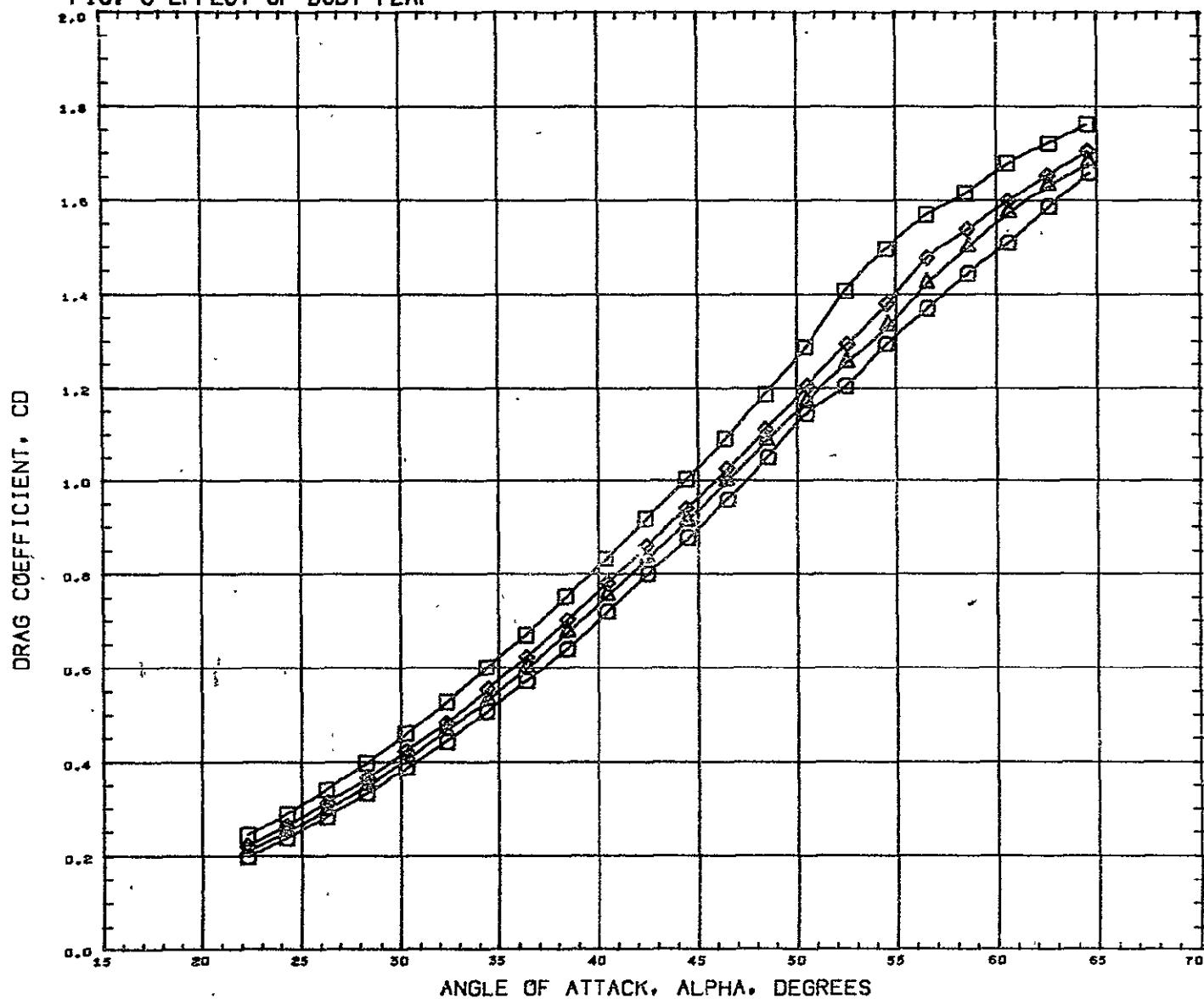


DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(DCT002)	GFHT 019 CONF. ROS-NB1 BIW1V1
(DCT005)	GFHT 019 CONF. ROS-NB1 BIW1(10,0)V1
(DCT006)	GFHT 019 CONF. ROS-NB1 BIW1V1F1 (10)
(DCT007)	GFHT 019 CONF. ROS-NB1 BIW1(10,10)V1F1 (10)

BETA	LELEVN	RELEVN	BODFLP	REFERENCE	INFORMATION
0.000	0.000	0.000	0.000	SREF	20.6890 SQ.IN.
0.000	10.000	0.000	0.000	LREF	9.6480 IN.
0.000	0.000	0.000	10.000	BREF	5.8380 IN.
0.000	10.000	10.000	10.000	XHRP	1485.0040 IN.
				YHRP	0.0000 IN.
				ZHRP	377.0004 IN.
				SCALE	0.0050

MACH 10.150

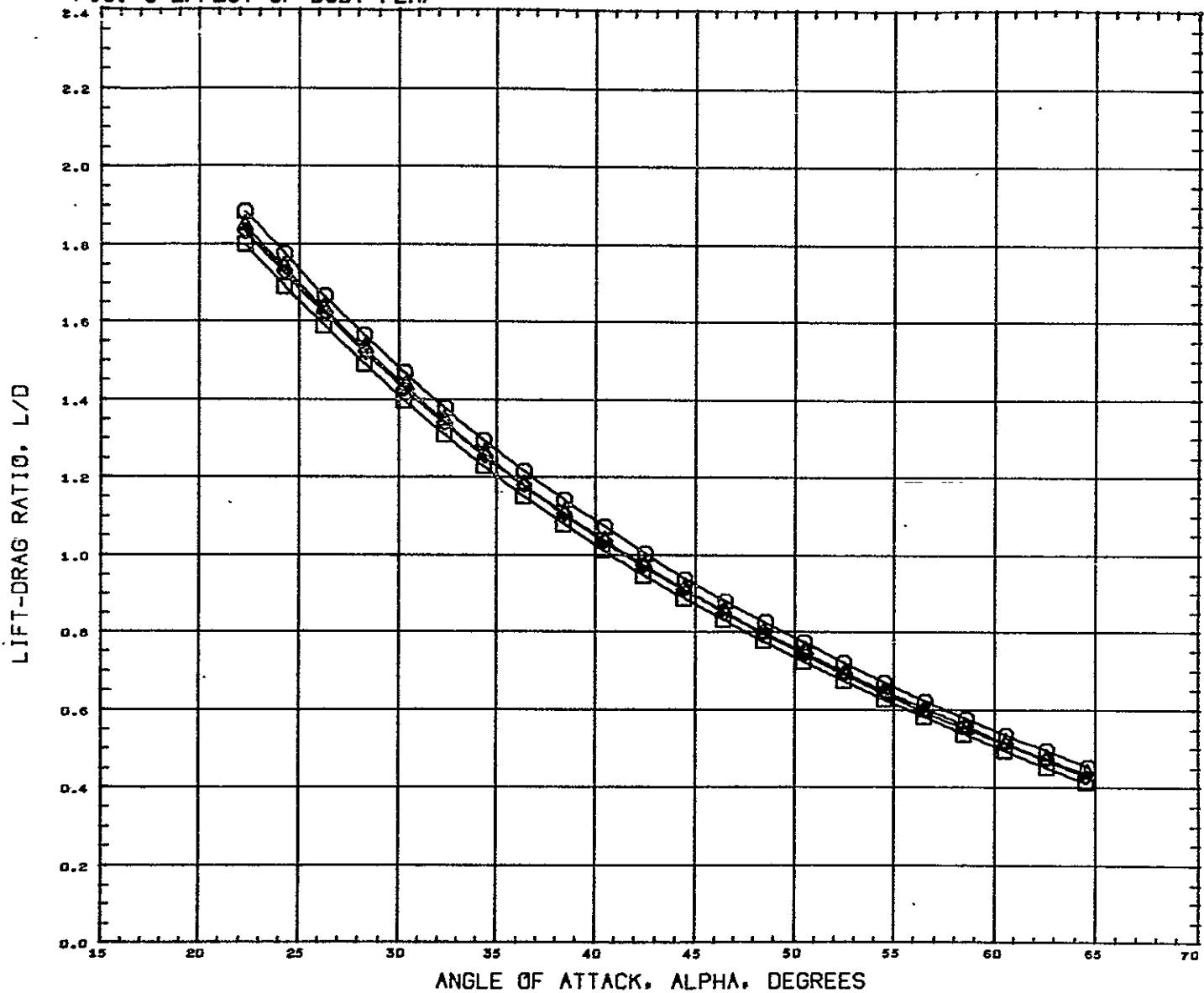
FIG. 6 EFFECT OF BODY FLAP



DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE	INFORMATION
(DCT002)	○	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF	20.6690 SQ.IN.
(DCT005)	△	GFHT D19 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	LREF	9.6480 IN.
(DCT006)	◇	GFHT D19 CONF. ROS-NB1 B1W2V1F1(10)	0.000	0.000	0.000	10.000	BREF	5.8360 IN.
(DCT007)	□	GFHT D19 CONF. ROS-NB1 B1W1(10,10)V1F1(10)	0.000	10.000	10.000	10.000	XMRP	1485.0040 IN.
							YMRP	0.0000 IN.
							ZMRP	377.0004 IN.
							SCALE	0.0050

HACH 10.13C

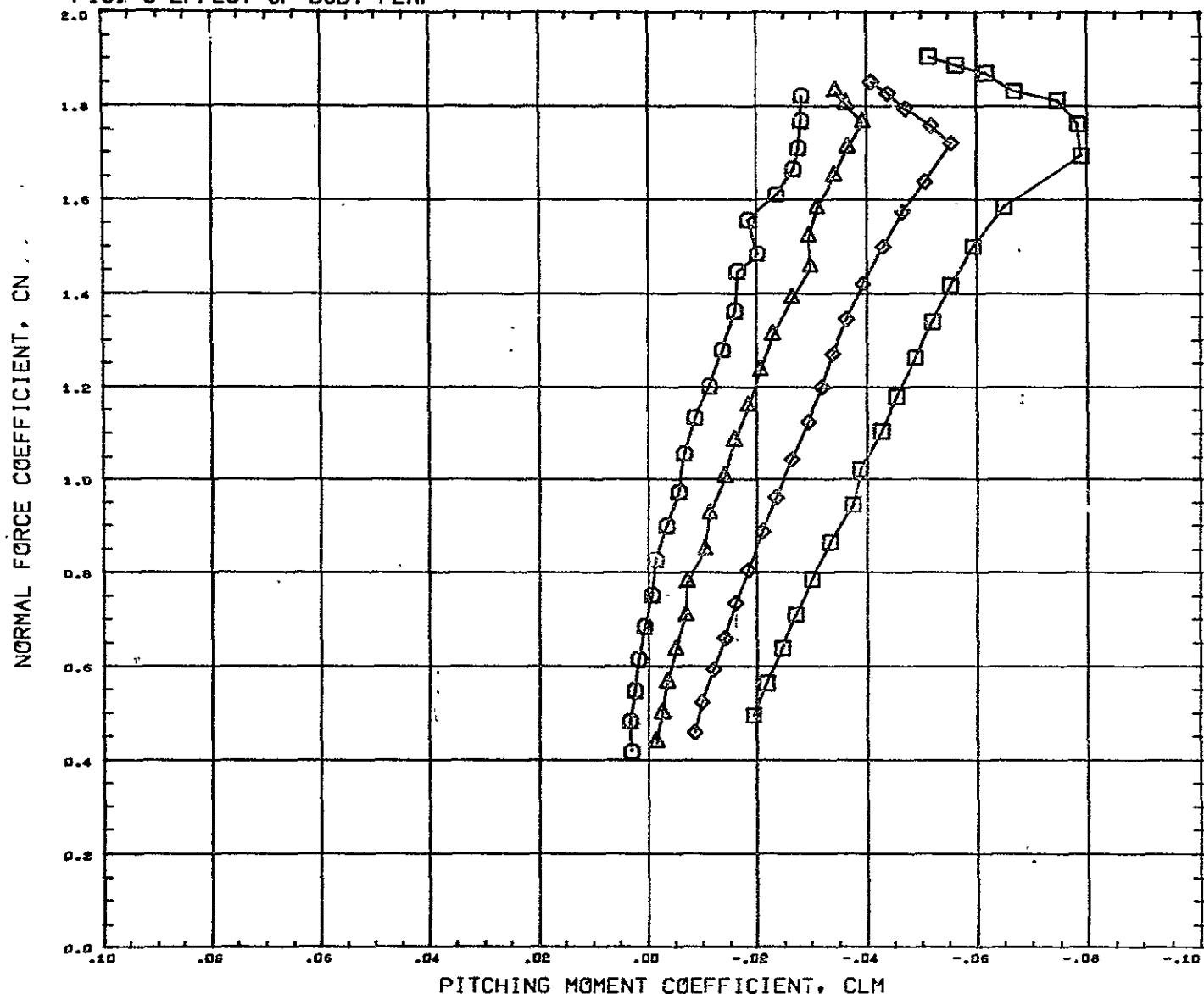
FIG. 6 EFFECT OF BODY FLAP



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT005)	GFHT D19 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	LREF 9.6480 IN.
(DCT006)	GFHT D19 CONF. ROS-NB1 B1W1V1F1(10)	0.000	0.000	0.000	10.000	BREF 5.8380 IN.
(DCT007)	GFHT D19 CONF. ROS-NB1 B1W1(10,10)V1F1(10)	0.000	10.000	10.000	10.000	XHRF 1485.0040 IN.
					YHRF 0.0000 IN.	
					ZHRF 377.0004 IN.	
					SCALE 0.0050	

HACH 10.130

FIG. 6 EFFECT OF BODY FLAP

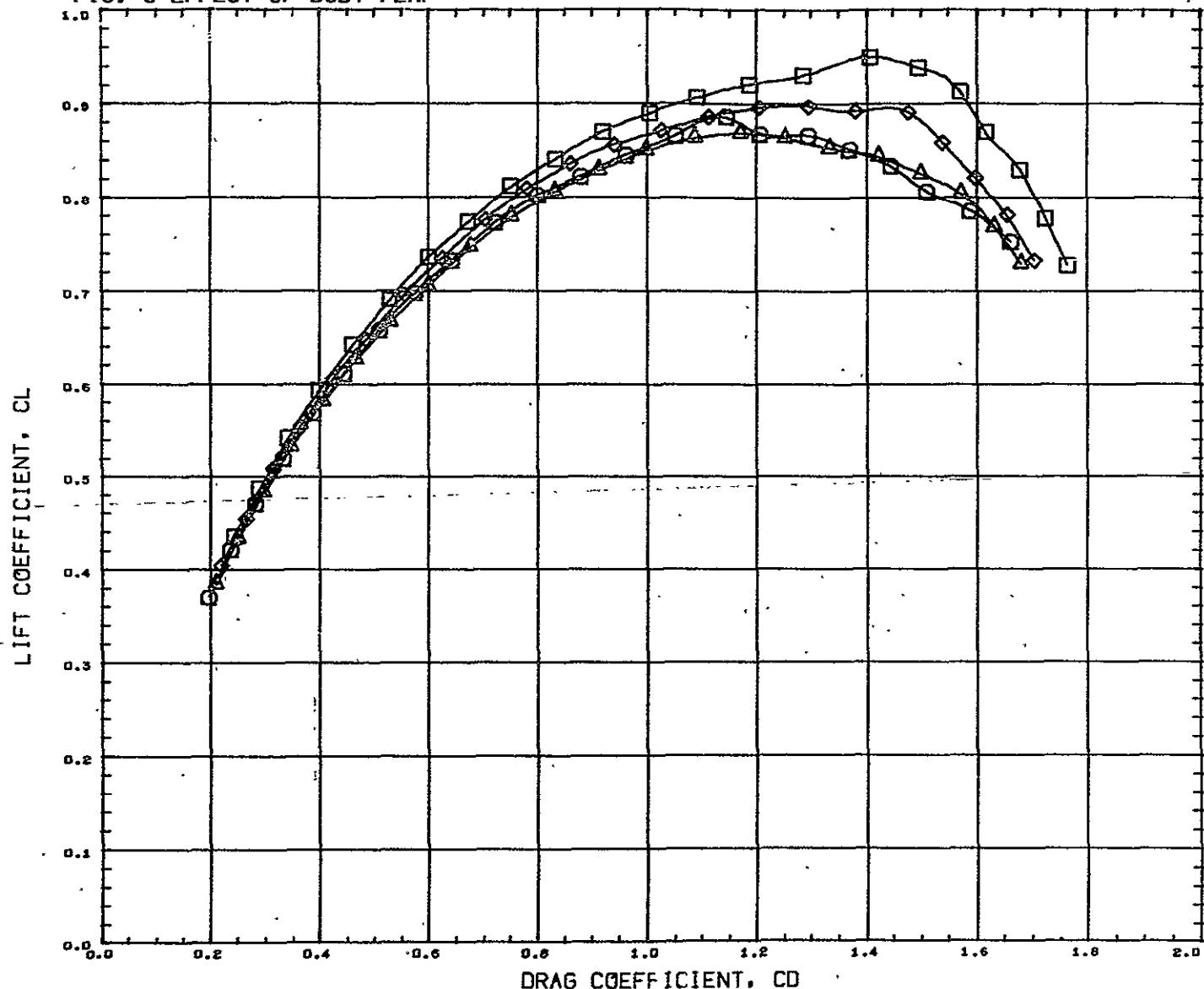


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BEYA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 BIWIV1	0.000	0.000	0.000	0.000	SREF 20.6890 IN.
(DCT003)	GFHT D19 CONF. ROS-NB2 BIW1{10,0}V1	2.000	10.000	0.000	0.000	LREF 9.6480 IN.
(DCT006)	GFHT D19 CONF. ROS-NB1 BIWIVF1{10}	0.000	0.000	0.000	10.000	BREF 5.0380 IN.
(DCT007)	GFHT D19 CONF. ROS-NB1 BIW4{10,10}V1F1{10}	0.000	10.000	10.000	10.000	XHRP 1485.0040 IN. YHRP 0.0000 IN. ZHRP 377.00R4 IN. SCALE 0.0050

MACH 10.130

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FIG. 6 EFFECT OF BODY FLAP

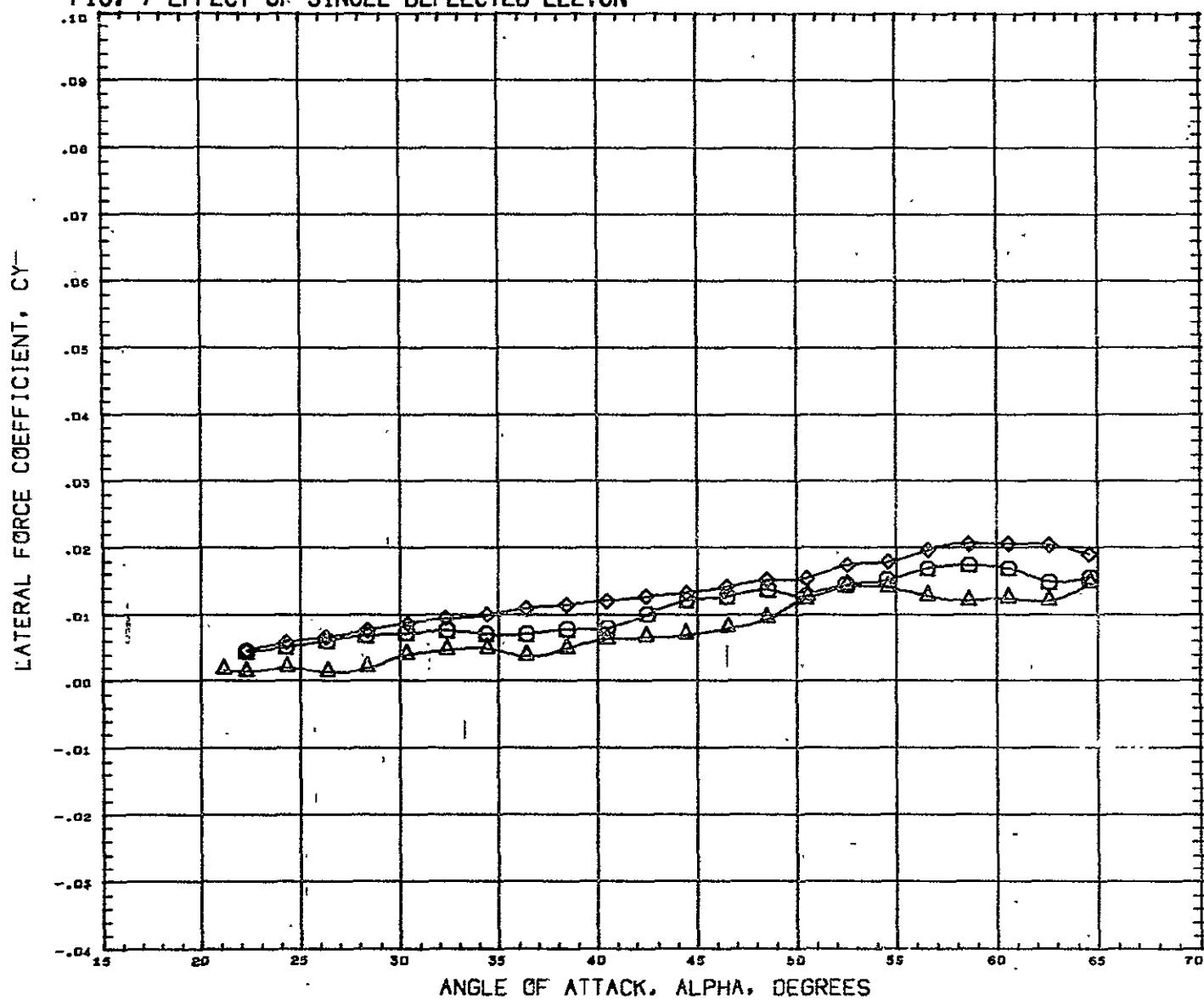


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BOCFLP	REFERENCE INFORMATION
(DCT002)	GFHT 019 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT005)	GFHT 019 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	LREF 9.6480 IN.
(DCT006)	GFHT 019 CONF. ROS-NB1 B1W1V1F1(10)	0.000	0.000	0.000	10.000	BREF 5.4380 IN.
(DCT007)	GFHT 019 CONF. ROS-NB1 B1W1(10,10)V1F1(10)	0.000	10.000	10.000	10.000	XHRF 1485.0040 IN.
						YHRF 0.0000 IN.
						ZHRF 377.0004 IN.
						SCALE 0.0050

MACH 10.130

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FIG. 7 EFFECT OF SINGLE DEFLECTED ELEVON

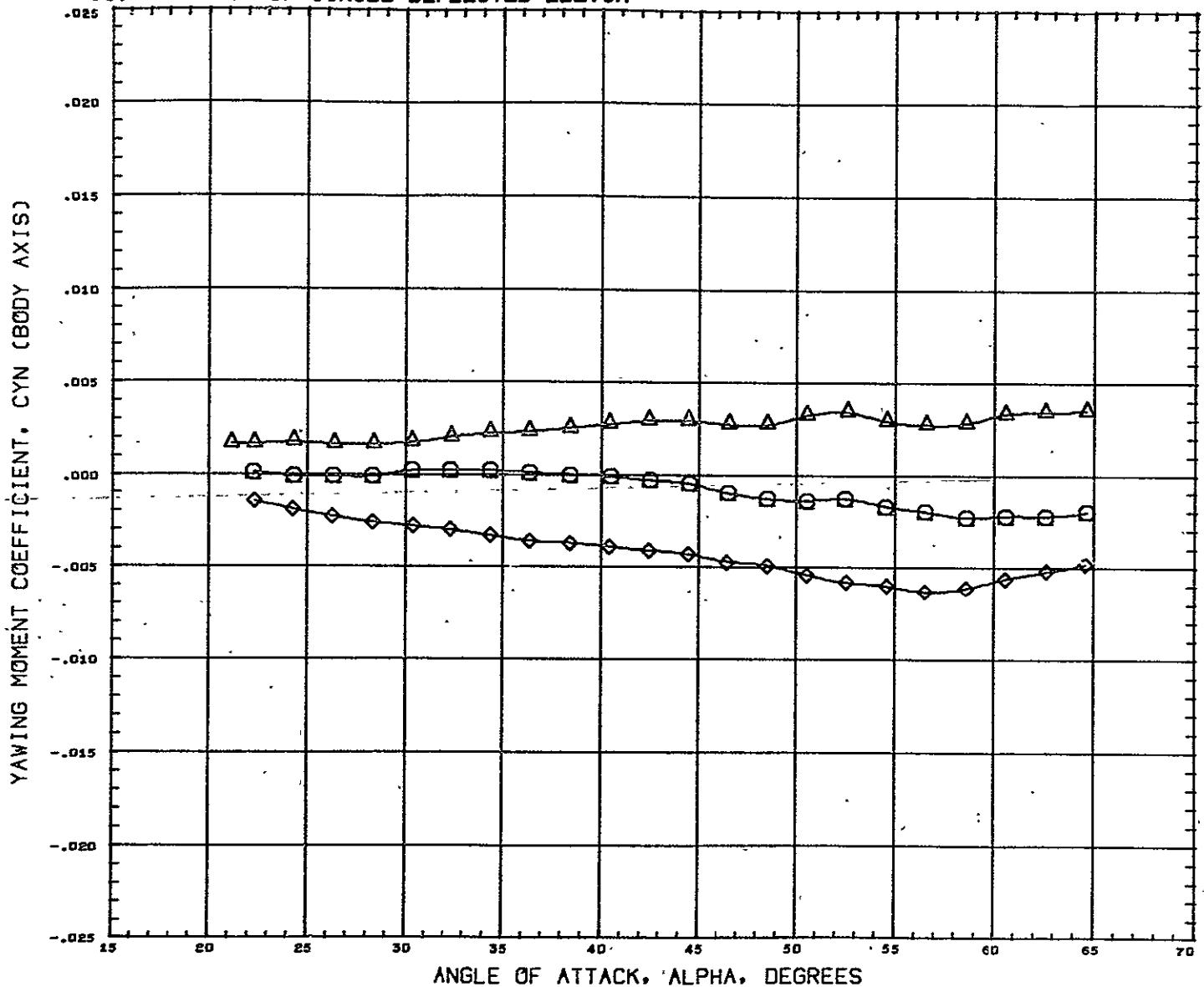


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6880 SQ.IN.
(DCT04)	GFHT D19 CONF. ROS-NB1 B1W1(-10,0)V1	0.000	-10.000	0.000	0.000	LREF 9.6480 IN.
(DCT05)	GFHT D19 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	SREF 5.8380 IN.
						XMRF 1405.0040 IN.
						YMFP 0.0000 IN.
						ZMRP 377.5004 IN.
						SCALE 0.0030

MACH 10.130

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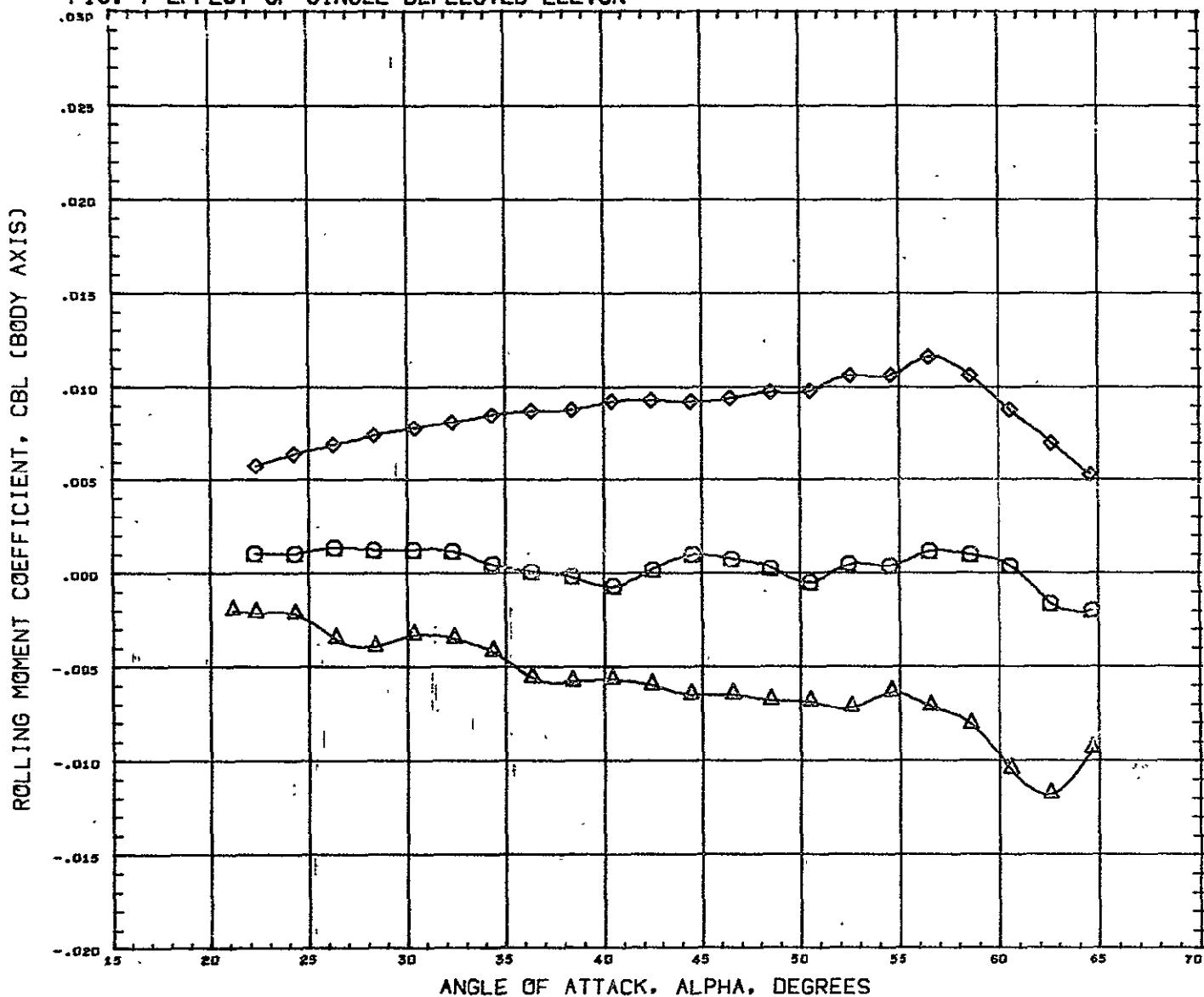
FIG. 7 EFFECT OF SINGLE DEFLECTED ELEVON



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT003)	GFT1 D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT004)	GFT1 D19 CONF. ROS-NB1 B1W1(-10,0)V1	0.000	-10.000	0.000	0.000	LREF 9.6480 IN.
(DCT005)	GFT1 D19 CONF. ROS-NB1 B1W1(10,0)V1	0.000	10.000	0.000	0.000	BREF 5.8380 IN.
					XMRP 1485.0040 IN.	
					YMRP 0.0000 IN.	
					ZMRP 377.0004 IN.	
					SCALE 0.0050	

MACH 10.130

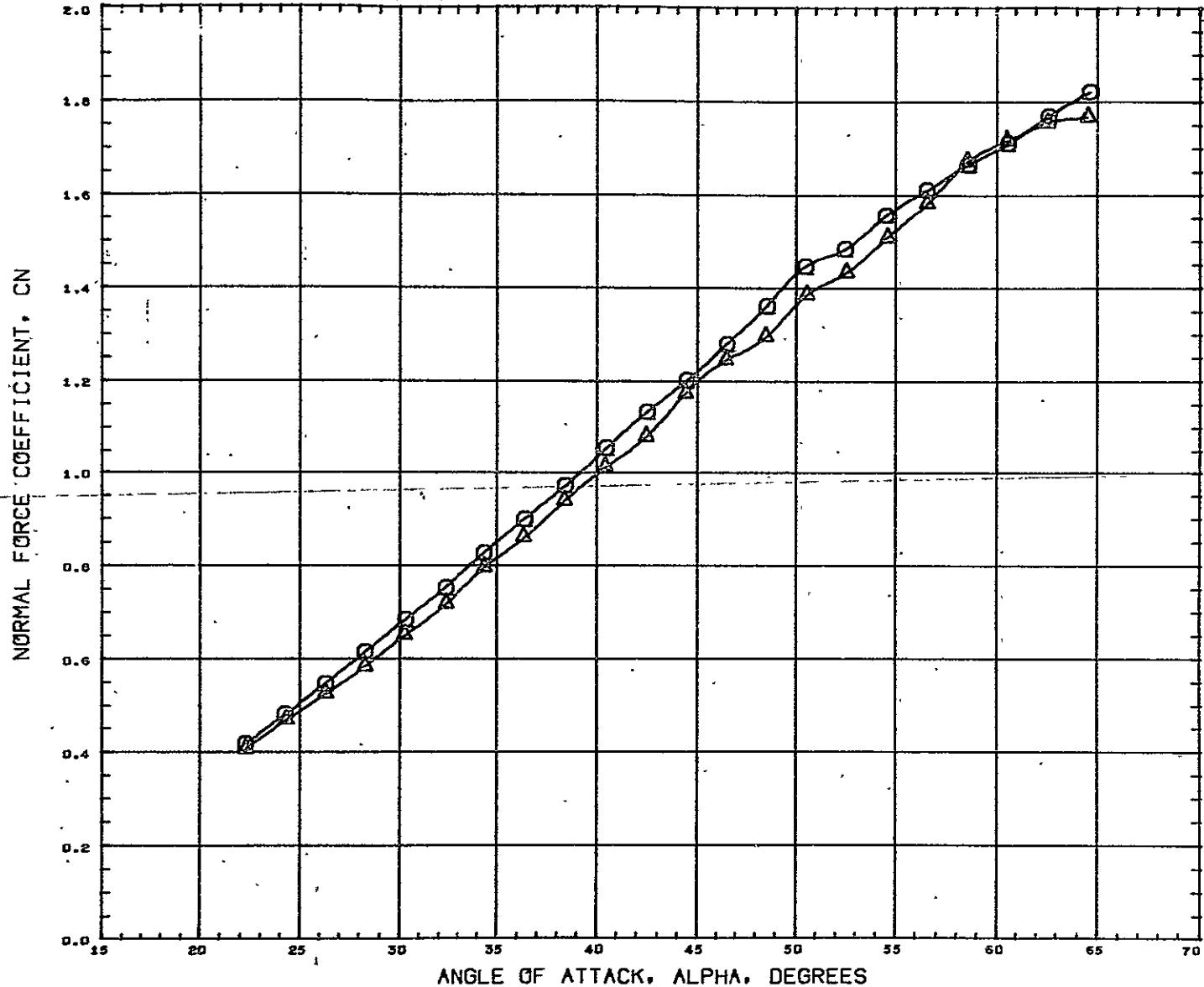
FIG. 7 EFFECT OF SINGLE DEFLECTED ELEVON



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(DCT002)	GFHT D19 CONF. ROS-NB1 B1W1V1
(DCT004)	GFHT D19 CONF. ROS-NB1 B1W1(-10,0)V1
(DCT005)	GFHT D19 CONF. ROS-NB1 B1W1(10,0)V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF . 20.6890 SQ.IN.
0.000	-10.000	0.000	0.000	LREF' 9.6480 IN.
0.000	10.000	0.000	0.000	BREF 5.8380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

FIG. 8 EFFECT OF VENTRAL FIN, LONGITUDINAL



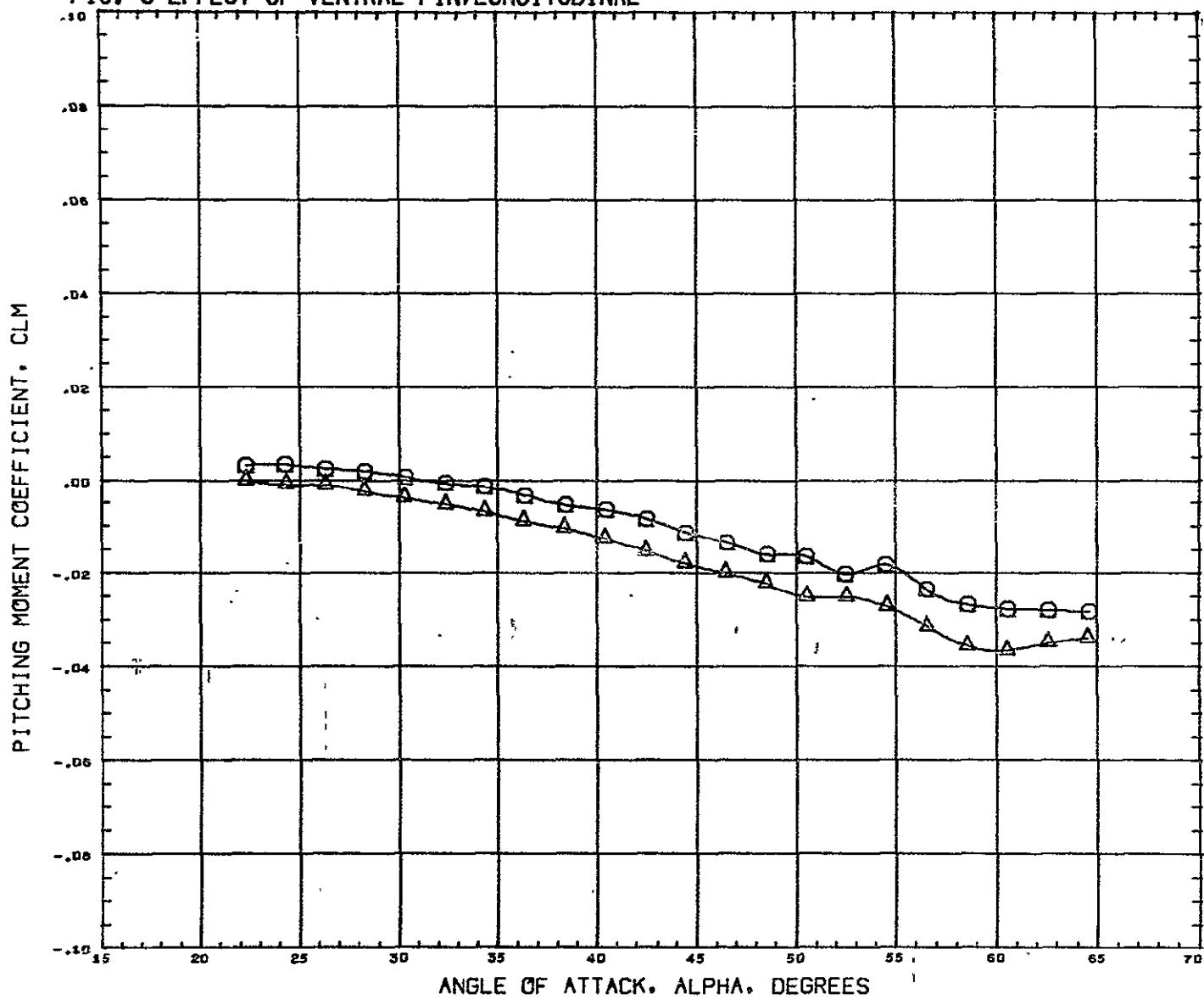
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) \circ GFHT 019 CONF. ROS-NB1 B1WV1
 (DCT017) \triangle GFHT 019 CONF. ROS-NB1 B1WV1U1

BETA VENTRL
 0.000 0.000

REFERENCE INFORMATION
 SREF 20.6890 52. IN.
 LREF 9.6480 IN.
 BREF 5.6386 IN.
 XMRP 1485.0040 IN.
 YMRP 0.0000 IN.
 ZMRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

FIG. 8 EFFECT OF VENTRAL FIN, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCDT02&7) GHT D19 CONF. ROS-NB1 B1W1V1
 (DCDT03&7) GHT D19 CONF. ROS-NB1 B1W1V1U1

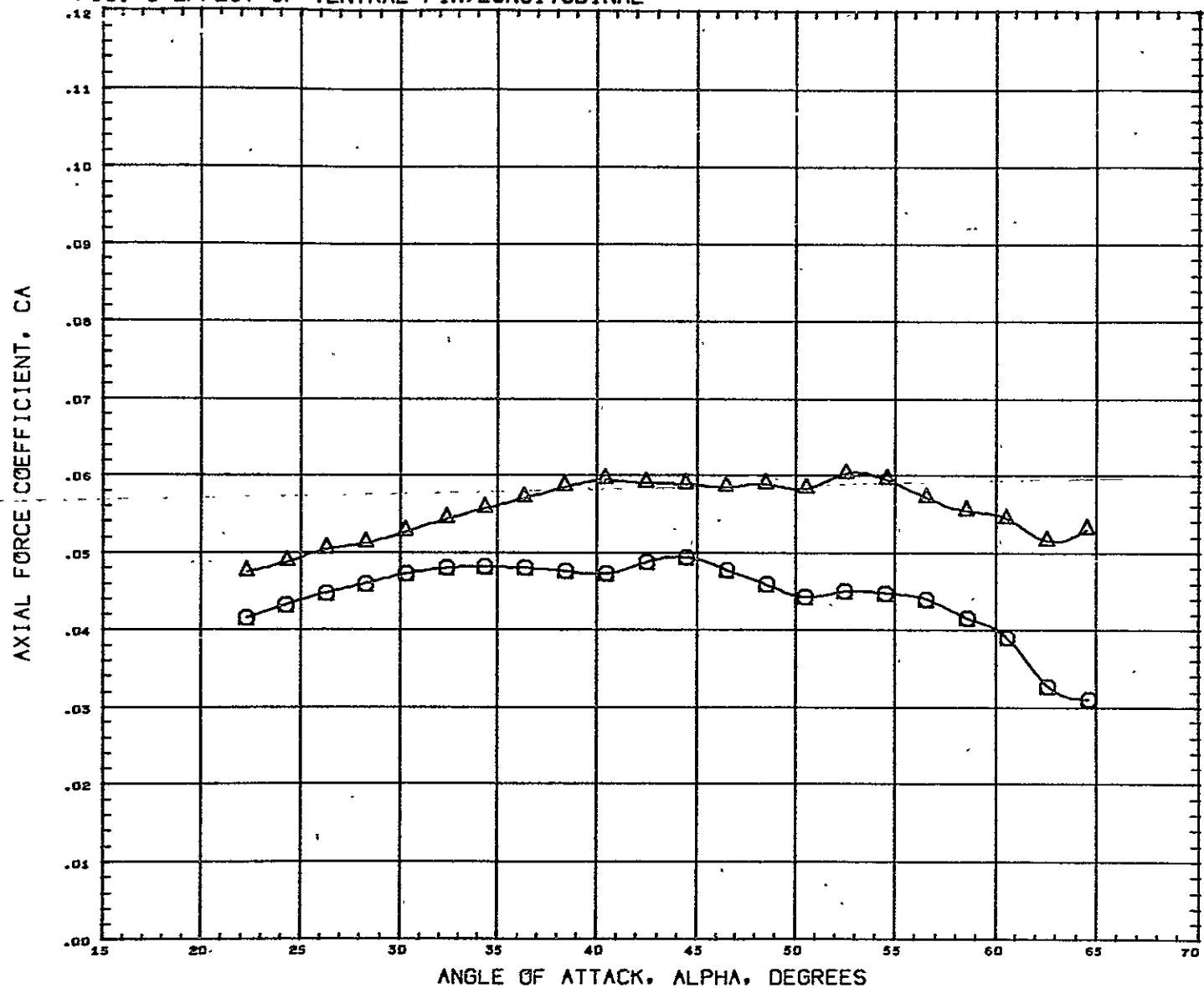
BETA VENTRL
 0.000 0.000 0.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XMRP 1485.0040 IN.
 YMRP 0.0000 IN.
 ZMRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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FIG. 8 EFFECT OF VENTRAL FIN, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 BIWIVI
 (DCT017) GFHT D19 CONF. ROS-NB1 BIWIVIU

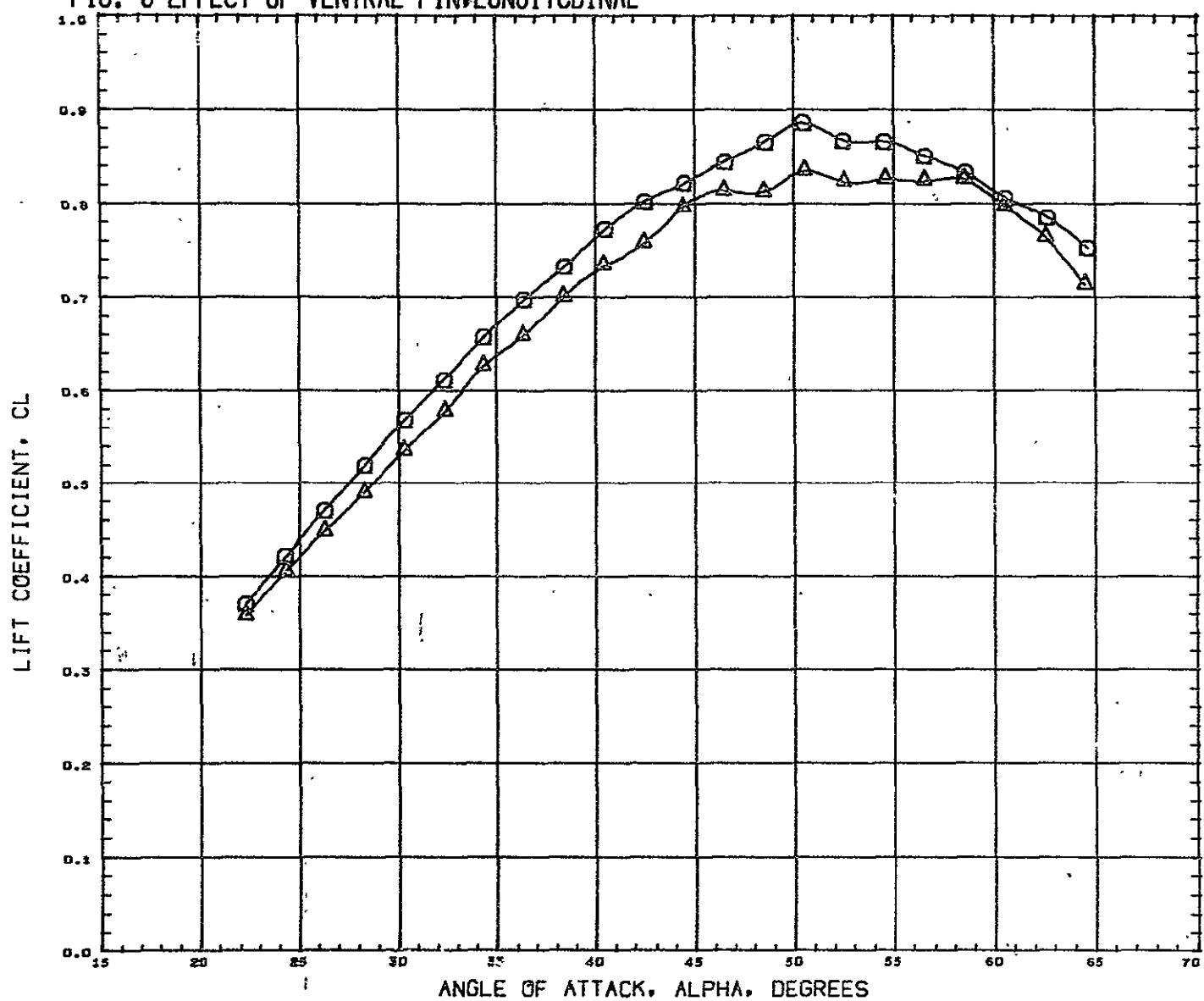
BETA VENTRL
 0.000 0.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XHRF 1485.0040 IN.
 YHRF 0.0606 IN.
 ZHRF 377.0064 IN.
 SCALE 0.0050

MACH 10.150

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FIG. 8 EFFECT OF VENTRAL FIN, LONGITUDINAL



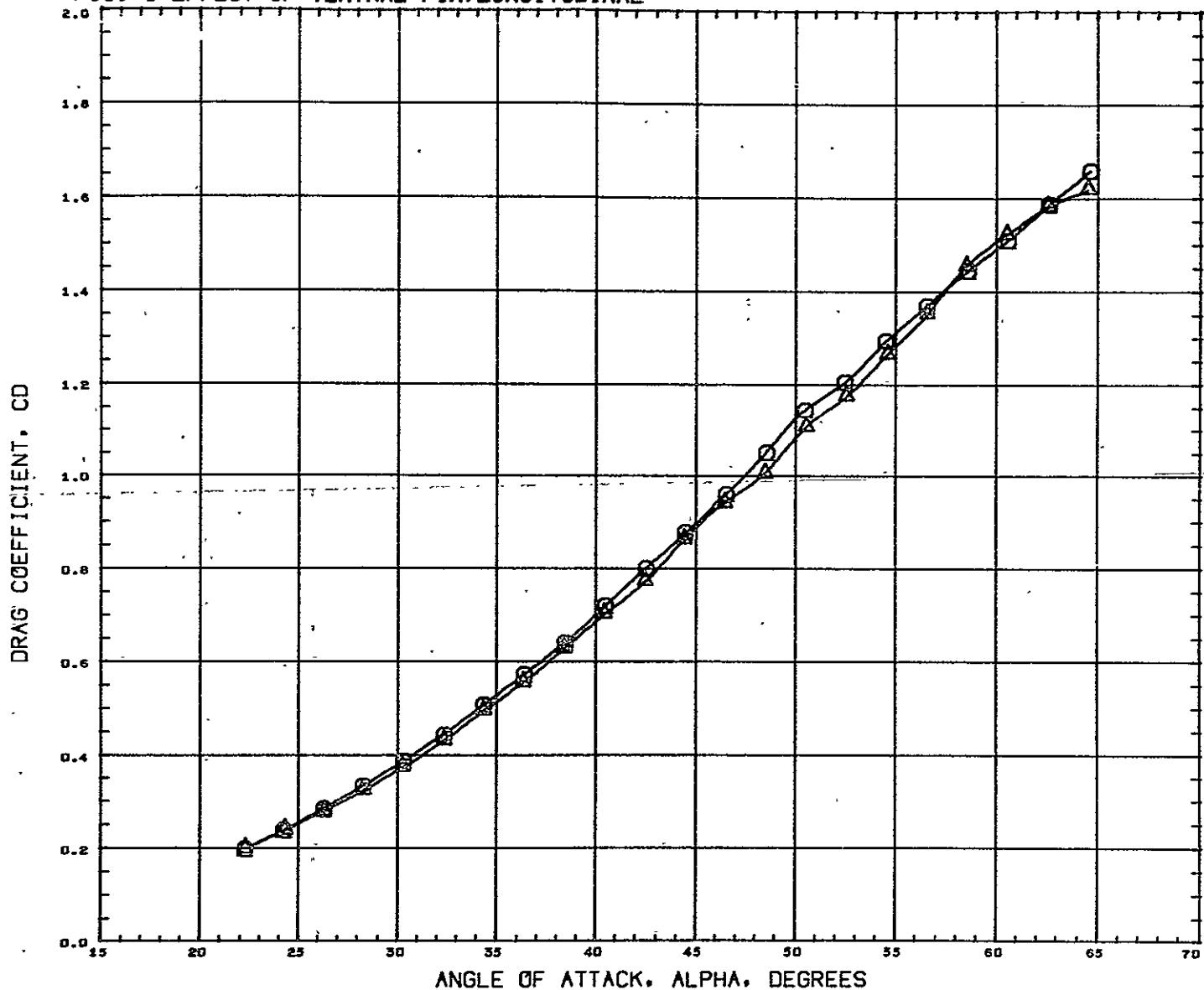
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCT017) GFHT D19 CONF. R28-NB1 B1W1V1U1

BETA VENTRL
 0.000 0.000
 0.005 0.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.6380 IN.
 XHRP 1485.0040 IN.
 YHRP 0.0000 IN.
 ZHRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

FIG. 8 EFFECT OF VENTRAL FIN, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCT017) GFHT D19 CONF. ROS-NB1 B1W1V1U1

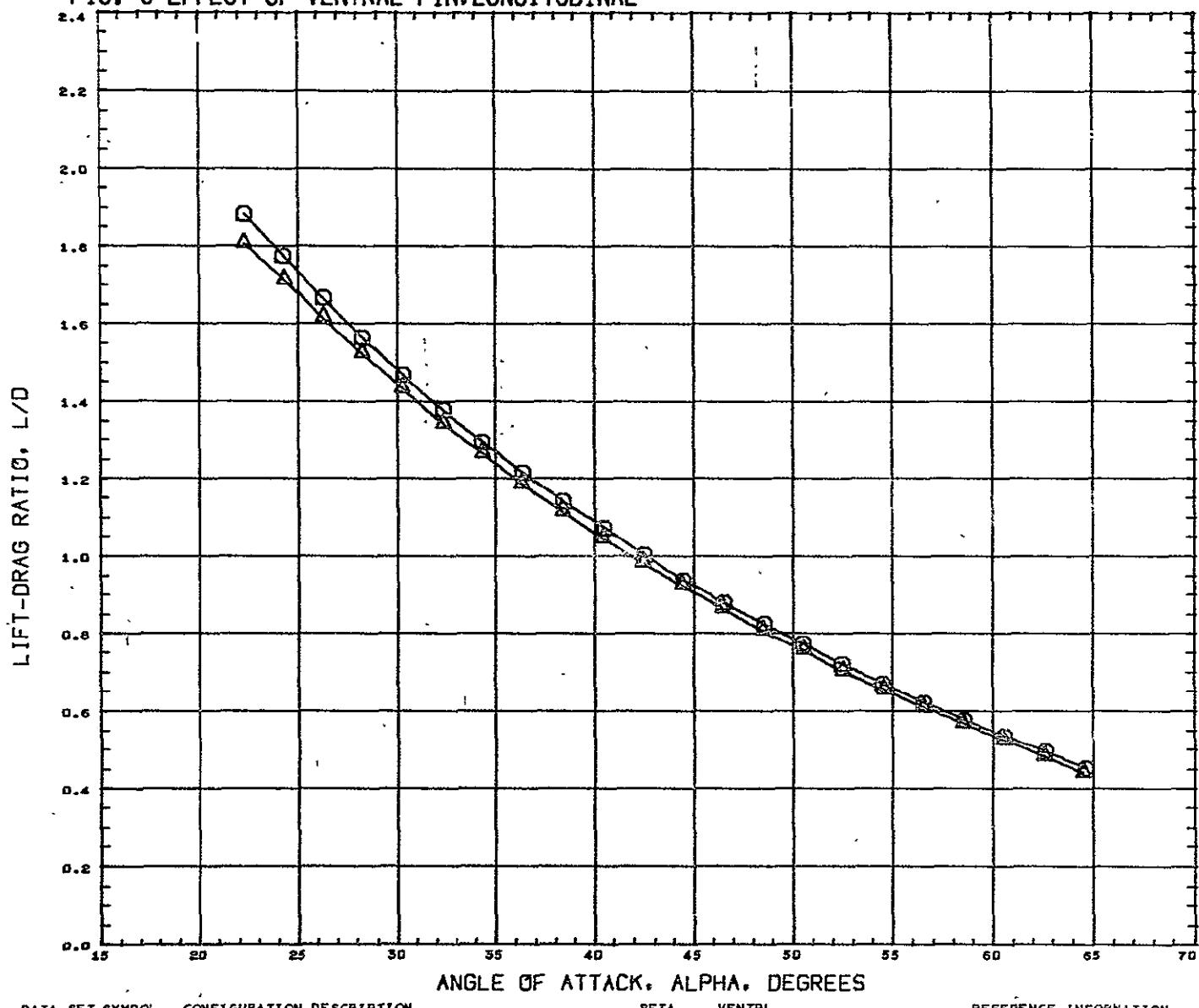
BETA VENTRL
 0.000 0.000
 0.000 0.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.6380 IN.
 XMRP 1485.0040 IN.
 YMRP 0.0000 IN.
 ZMRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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FIG. 8 EFFECT OF VENTRAL FIN: LONGITUDINAL



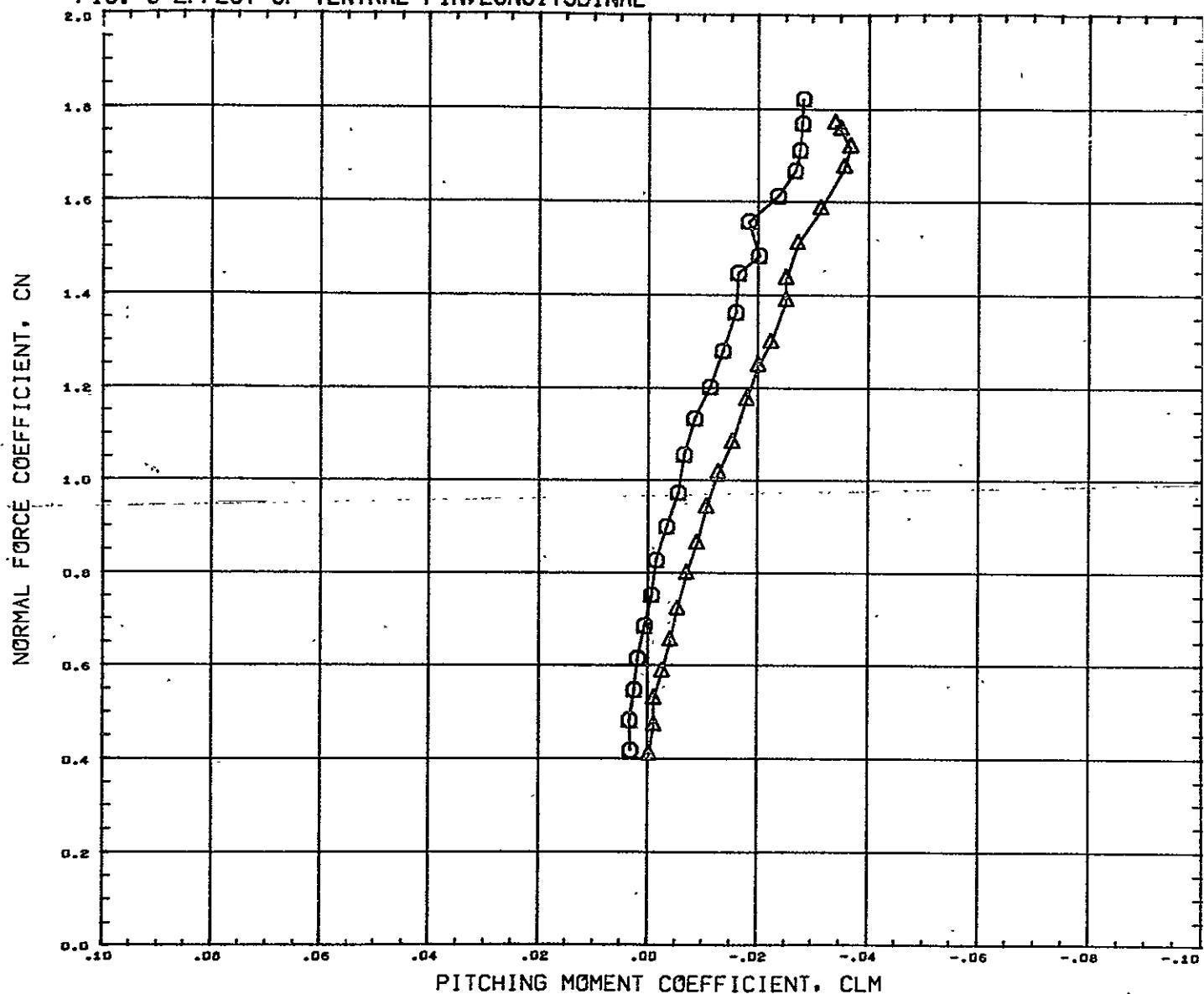
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT 019 CONF. ROS-NB1 B1W1V1
 (DCT017) GFHT 019 CONF. ROS-NB1 B1W1V1U1

BETA VENTRL
 0.000 0.000

REFERENCE INFORMATION
 SREF 20.6490 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.6380 IN.
 XHRP 1465.0040 IN.
 YHRP 0.0000 IN.
 ZHRP 377.0004 IN.
 SCALE 0.0050

MACH 10.150

FIG. 8 EFFECT OF VENTRAL FIN, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCT017) GFHT D19 CONF. ROS-NB1 B1W1V1U1

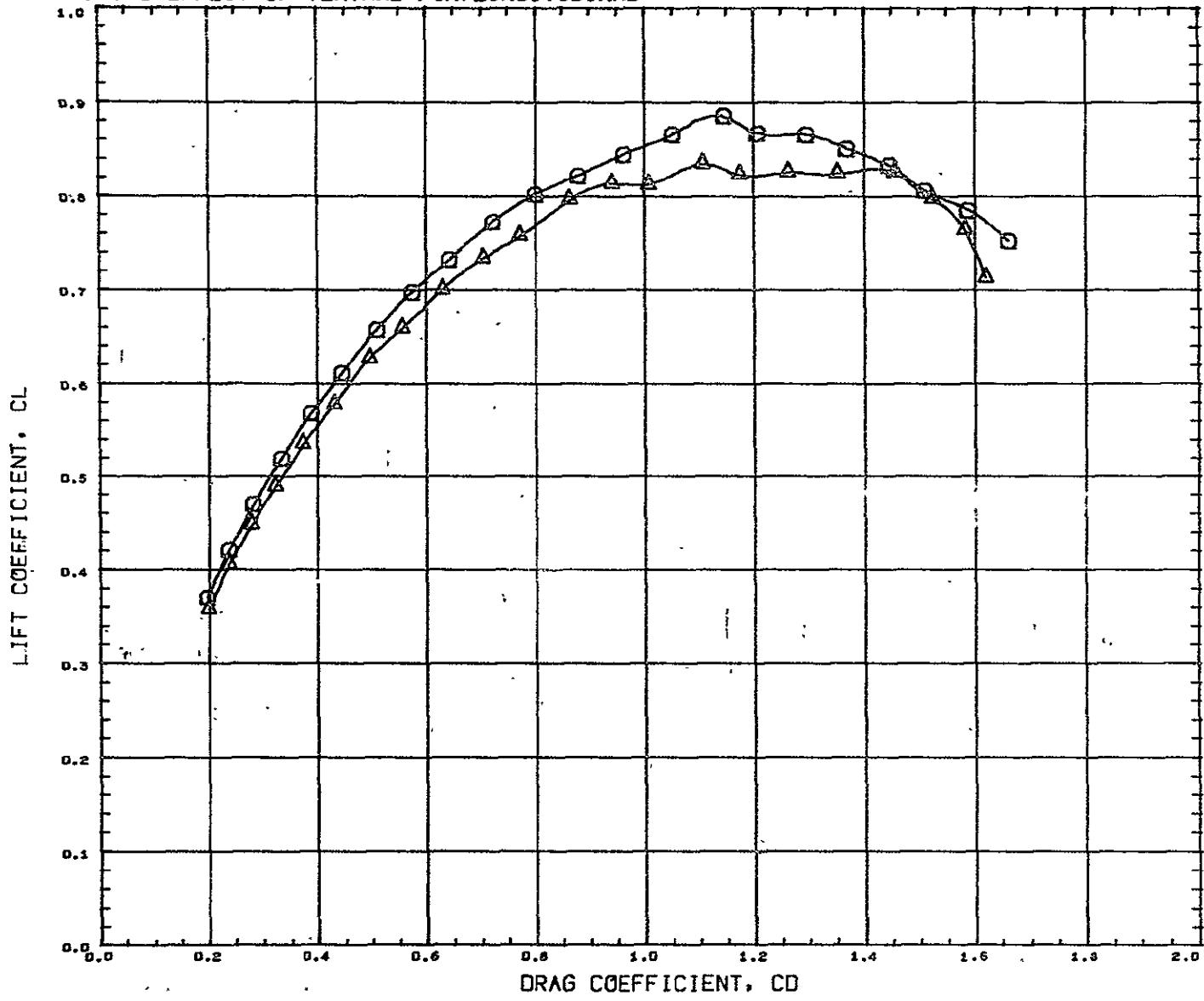
BETA VENTRL
 0.000 0.000

REFERENCE INFORMATION
 SREF 20.6690 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XMRP 1485.0040 IN.
 YMRP 0.0000 IN.
 ZMRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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FIG. 8 EFFECT OF VENTRAL FIN, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 BIWIVI
 (DCT017) GFHT D19 CONF. ROS-NB1 BIWIVIUI

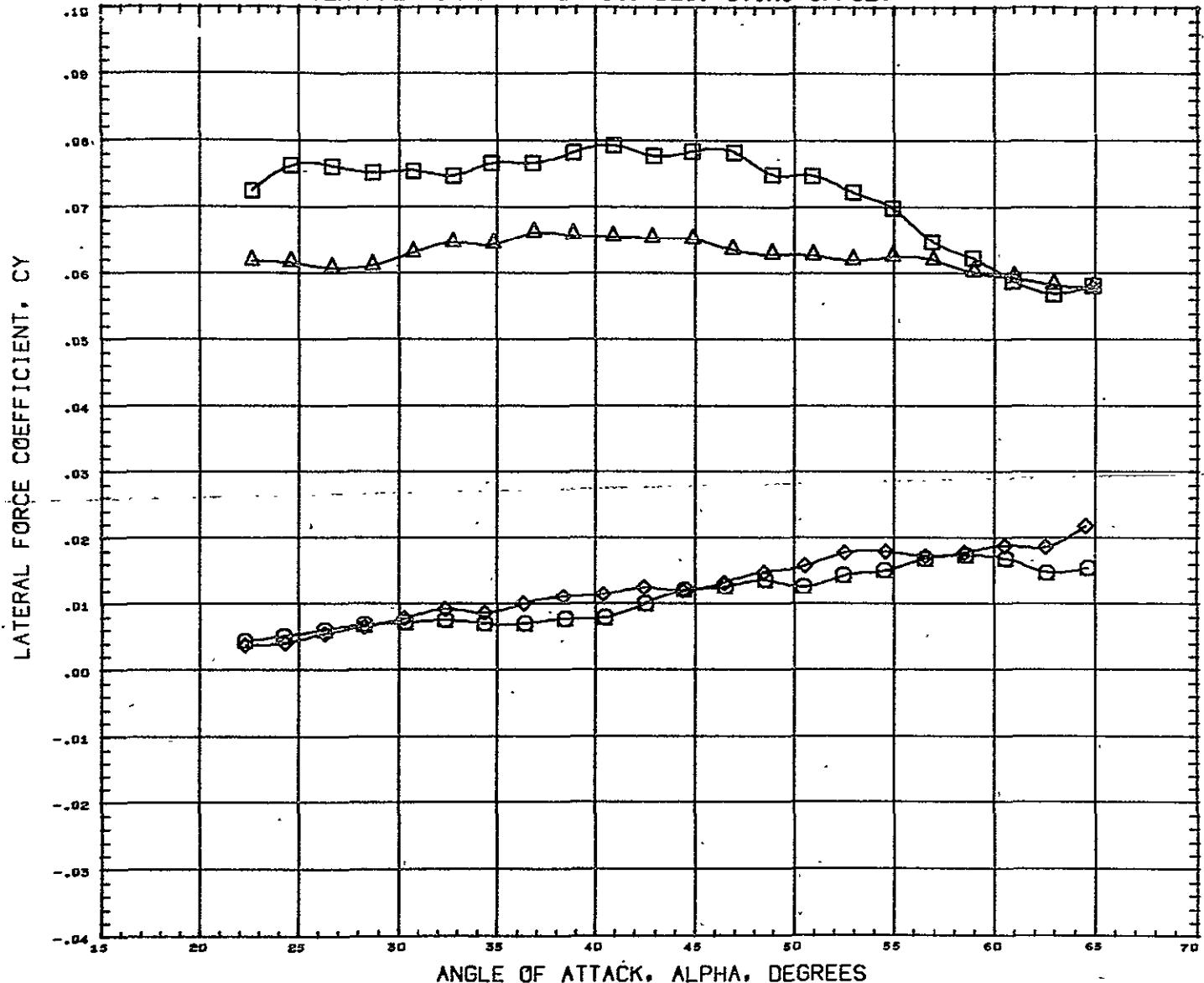
BETA VENTRL
 0.000 0.000
 0.000 0.000

REFERENCE INFORMATION
 SREF 20.6890, SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8360 IN.
 XMRP 1465.0040 IN.
 YMRP 0.0000 IN.
 ZMRP 377.0004 IN.
 SCALE 0.0050

MACH 10.150

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FIG. 9 EFFECT OF VENTRAL FIN-LATERAL, 10. DEG. STING OFFSET



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD02) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCTD20) GFHT D19 ROS-NB1 B1W1V1 BETA IS -10 COS(ALPHA)
 (DCTD17) GFHT D19 CONF. ROS-NB1 B1W1V1V1
 (DCTD18) GFHT D19 ROS-NB1 B1W1V1V1 BETA IS -10 COS(ALPHA)

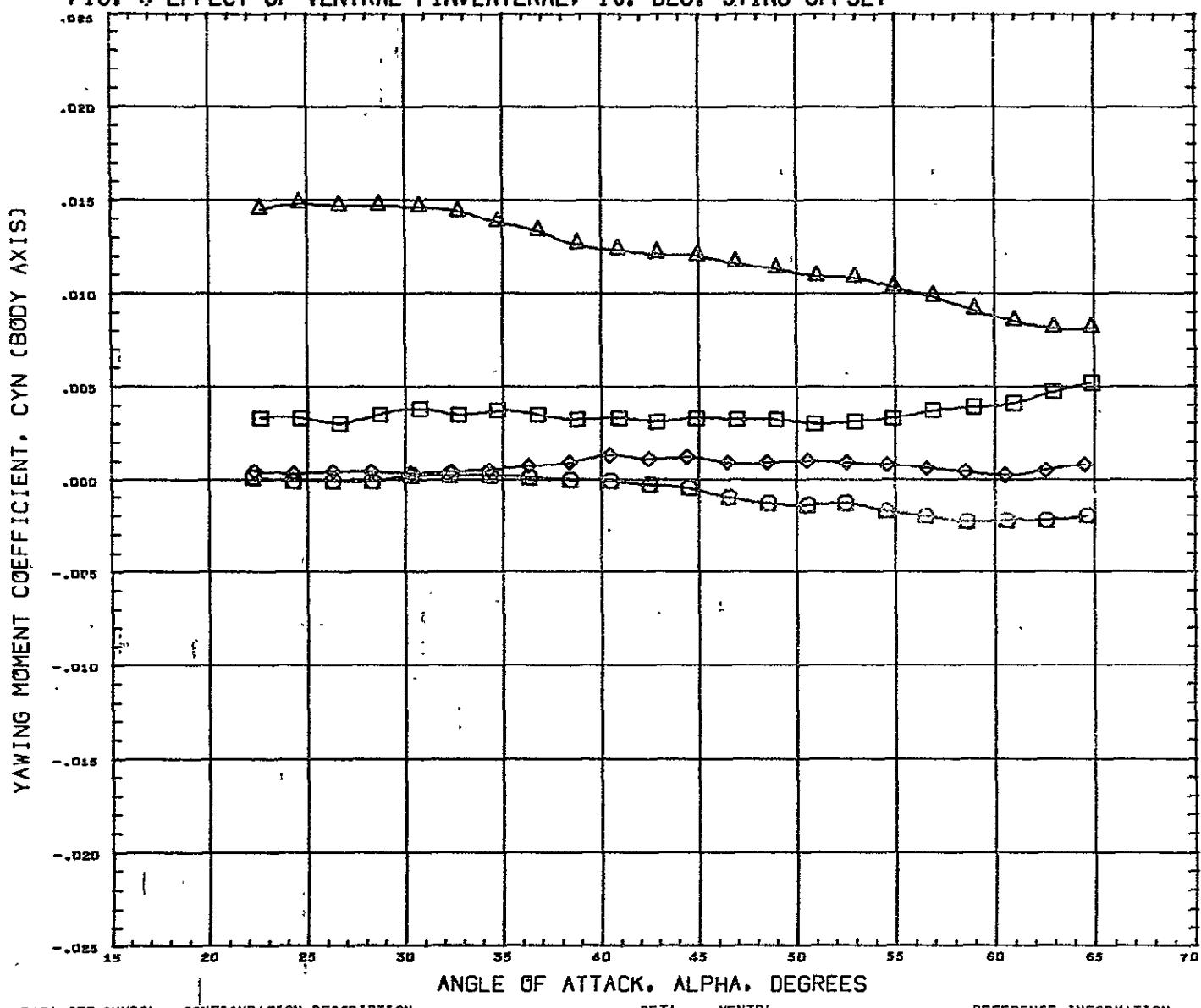
BETA VENTRL
 0.000 0.000
 0.000 0.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XHRP 1485.0040 IN.
 YHRP 0.0000 IN.
 ZHRP 377.0004 IN.
 SCALE 0.0050

HACH 10.130

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FIG. 9 EFFECT OF VENTRAL FIN, LATERAL, 10. DEG. STING OFFSET

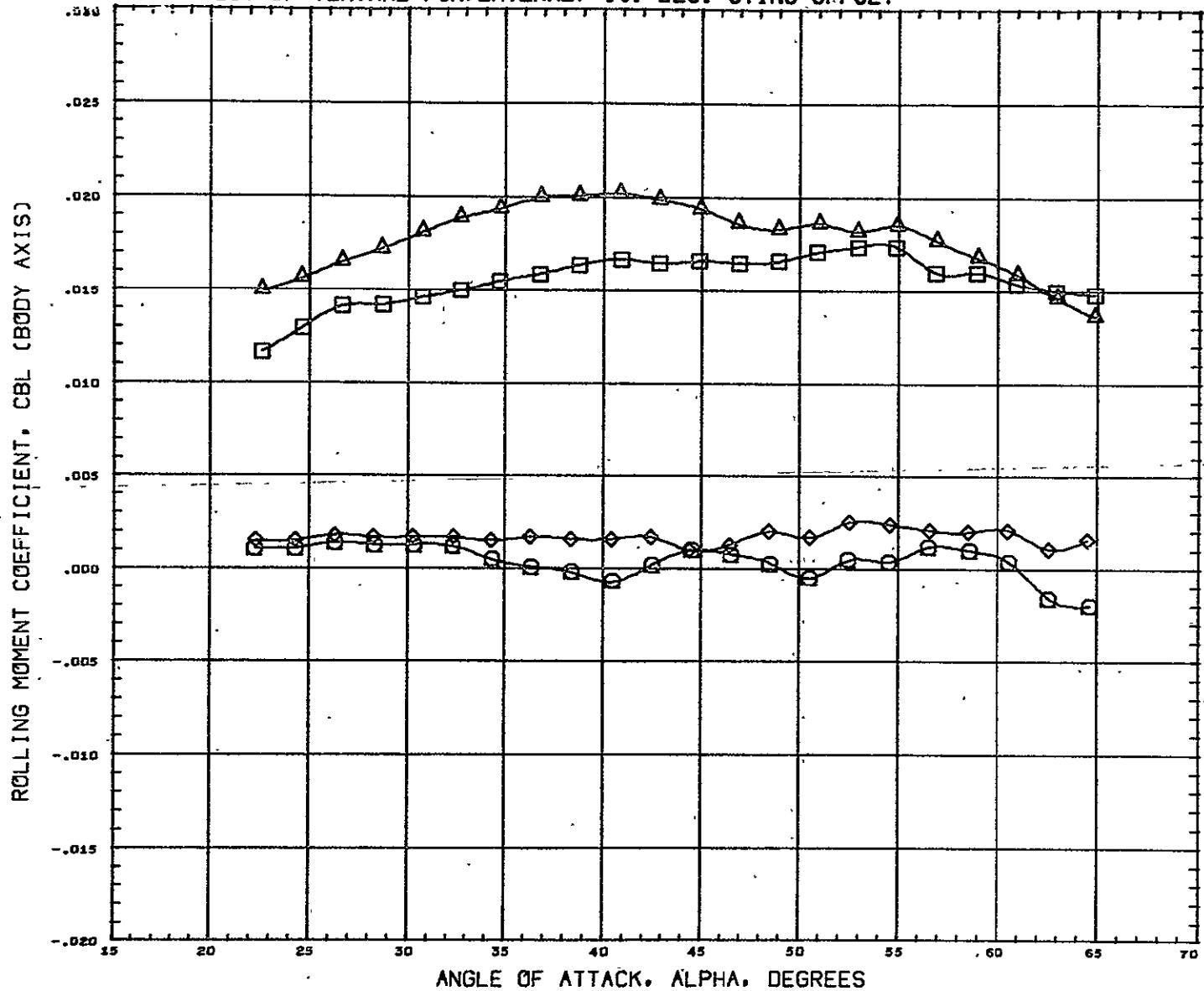


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	VENTRL	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 BIWIVI	0.000		SREF 20.6890 SG.IN.
(DCT020)	GFHT D19 ROS-NB1 BIWIVI BETA IS -10 COS(ALPHA)	0.000	0.000	LREF 9.6480 IN.
(DCT017)	GFHT D19 CONF. ROS-NB1 BIWIVIUI	0.000	0.000	BREF 5.9380 IN.
(DCT036)	GFHT D19 ROS-NB1 BIWIVIUI BETA IS -10 COS(ALPHA)	0.000	0.000	XHRP 1485.0040 IN.
				YHRP 0.0000 IN.
				ZHRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 9 EFFECT OF VENTRAL FIN, LATERAL, 10. DEG. STING OFFSET



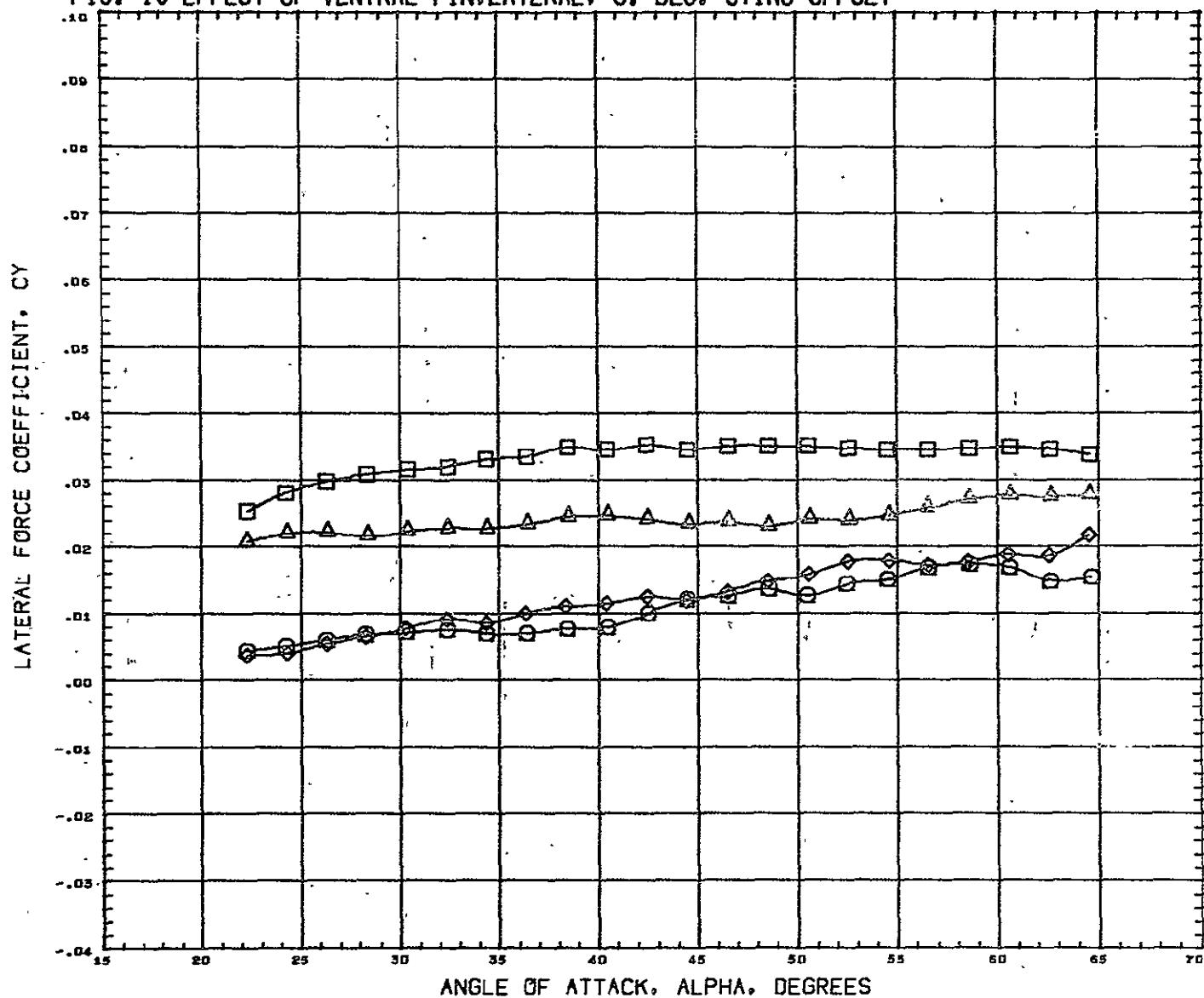
DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(DCT002)	GHTT B19 CONF. ROS-NB1 B1W1V1
(DCT020)	GHTT B19 ROS-NB1 B1W1V1 .BETA IS -10 COS(ALPHA)
(DCT017)	GHTT B19 CONF. ROS-NB1 B1W1V1U1
(DCT018)	GHTT B19 ROS-NB1 B1W1V1U1 BETA IS -10 COS(ALPHA)

BETA	VENTRL
0.000	
0.000	0.000
0.000	0.000

REFERENCE INFORMATION
SREF 20.6890 SQ.IN.
LREF 9.6480 IN.
BREF 5.8380 IN.
XHRP 1485.0040 IN.
YHRP 0.0000 IN.
ZHRP 377.0004 IN.
SCALE 0.0050

MACH 10.130

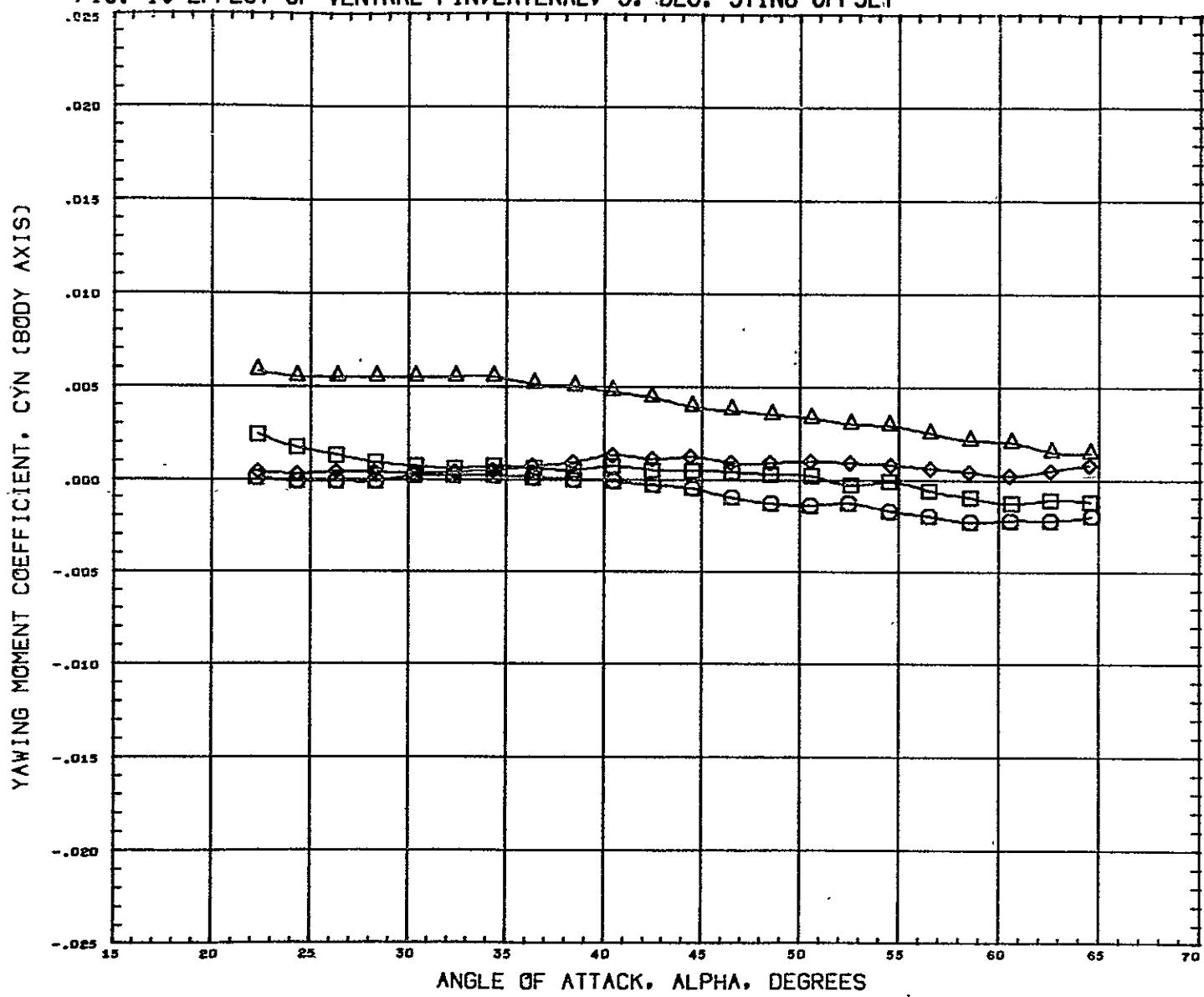
FIG. 10 EFFECT OF VENTRAL FIN, LATERAL, 3. DEG. STING OFFSET



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	VENTRL	REFERENCE INFORMATION
(DCTD22)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000		SREF 20.6890 SQ.IN.
(DCTD26)	GFHT D19 ROS-NB1 B1W1V1 BETA IS -3 COS(ALPHA)	0.000	0.000	LREF 9.6480 IN.
(DCTD17)	GFHT D19 CONF. ROS-NB1 B1W1V1U1	0.000	0.000	BREF 5.8380 IN.
(DCTD27)	GFHT D19 ROS-NB1 B1W1V1U1 BETA IS -3 COS(ALPHA)	0.000	0.000	XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

FIG. 10 EFFECT OF VENTRAL FIN, LATERAL, 3. DEG. STING OFFSET



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) ◻ GFNT D19 CONF. ROS-NB1 B1W1V1
 (DCT026) ▲ GFNT D19 ROS-NB1 B1W1V1 BETA IS -3 COS(ALPHA)
 (DCT017) ◇ GFNT D19 CONF. ROS-NB1 B1W1V1U1
 (DCT027) □ GFNT D19 ROS-NB1 B1W1V1U1 BETA IS -3 COS(ALPHA)

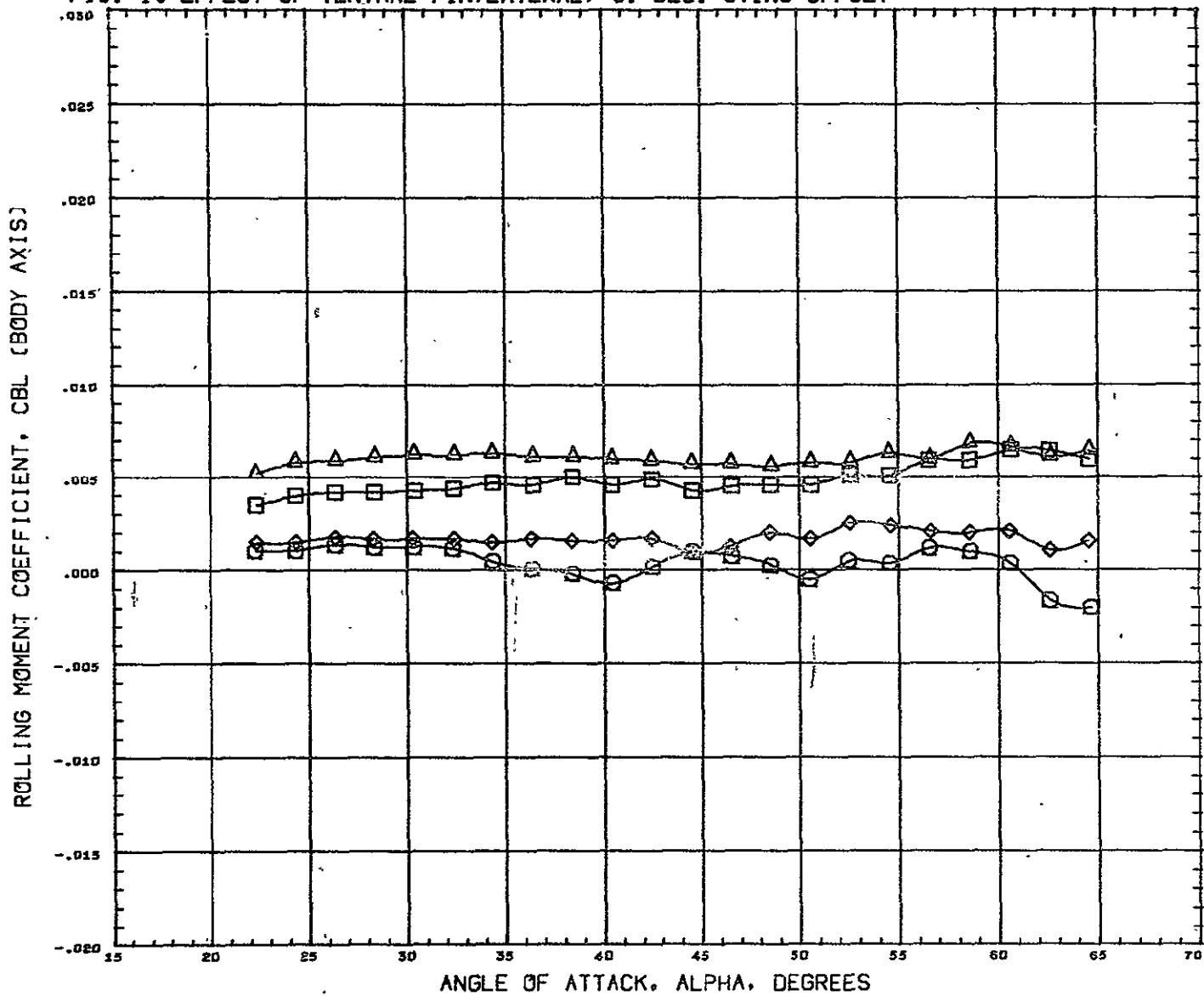
BETA VENTRL
 0.000 0.000 0.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XHRP 1405.0040 IN.
 YHRP 0.0000 IN.
 ZHRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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FIG. 10 EFFECT OF VENTRAL FIN, LATERAL, 3. DEG. STING OFFSET



DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(DCT022)	GFHT D19 CONF. ROS-NB1 B1W1V1
(DCT026)	GFHT D19 ROS-NB1 B1W1V1 BETA IS -3 COS(ALPHA)
(DCT017)	GFHT D19 CONF. ROS-NB1 B1W1V1U1
(DCT027)	GFHT D19 ROS-NB1 B1W1V1U1 BETA IS -3 COS(ALPHA)

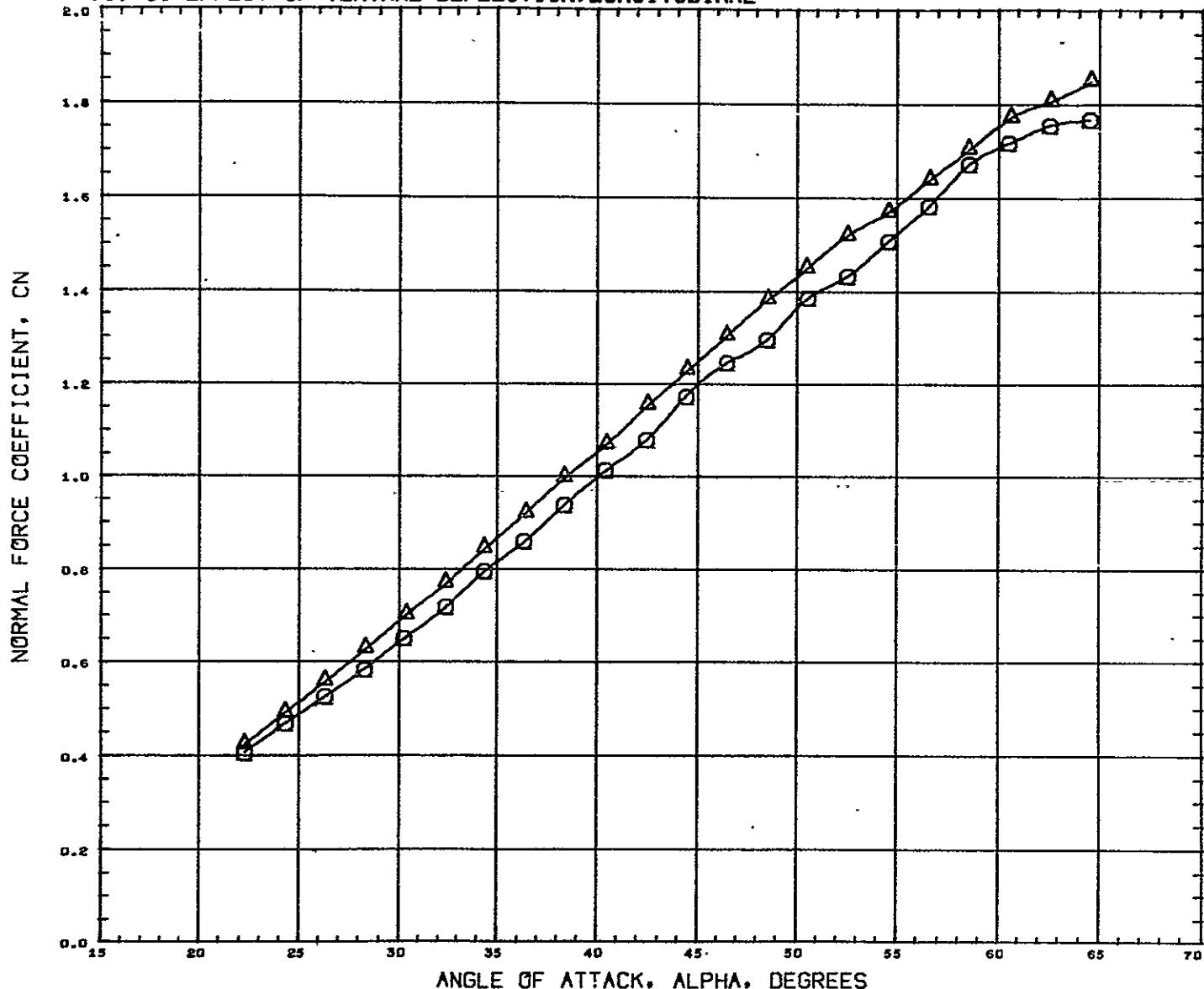
BETA	VENTRL
0.000	
0.000	0.000
0.000	0.000

REFERENCE INFORMATION
SREF 20.6890 S8.IN.
LREF 9.6480 IN.
BREF 5.8380 IN.
XMRP 1485.0040 IN.
YMRP 0.0000 IN.
ZMRP 377.0004 IN.
SCALE 0.0050

MACH 10.130

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FIG. 11 EFFECT OF VENTRAL DEFLECTION, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT017) GFHT D19 CONF. ROS-NB1 B1W1V1U1
 (DCT011) GFHT D19 CONF. ROS-NB1 B1W1V1U1(1D)

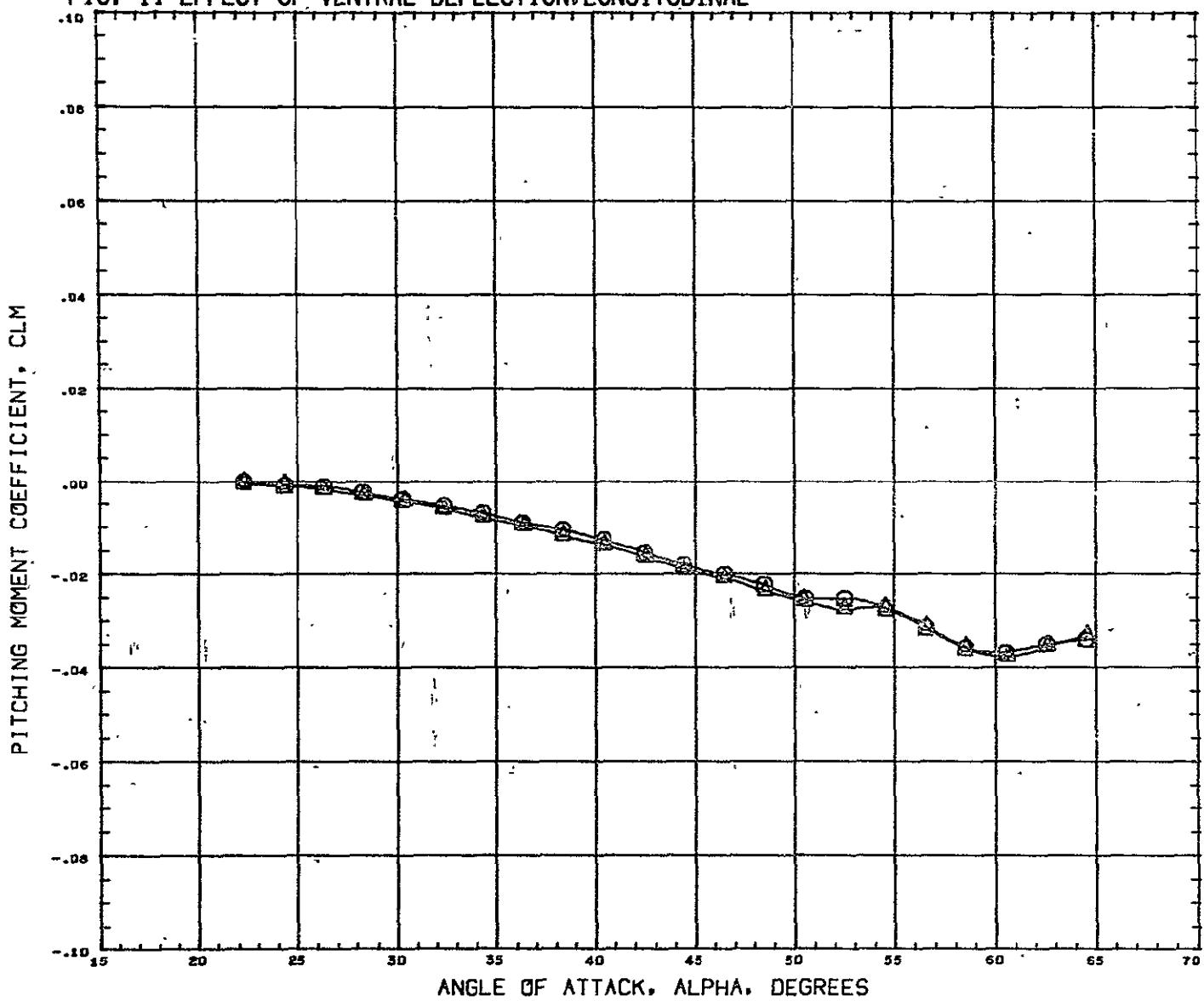
BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6690 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XHRP 1485.0040 IN.
 YHRP 0.0000 IN.
 ZHRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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FIG. 11 EFFECT OF VENTRAL DEFLECTION, LONGITUDINAL



DATA SET/SYMBOL CONFIGURATION DESCRIPTION
 (DCTD017) GFHT D19 CONF. ROS-NB1 B1W1V1U1
 (DCTD11) GFHT D19 CONF. ROS-NB1 B1W1V1U1(10)

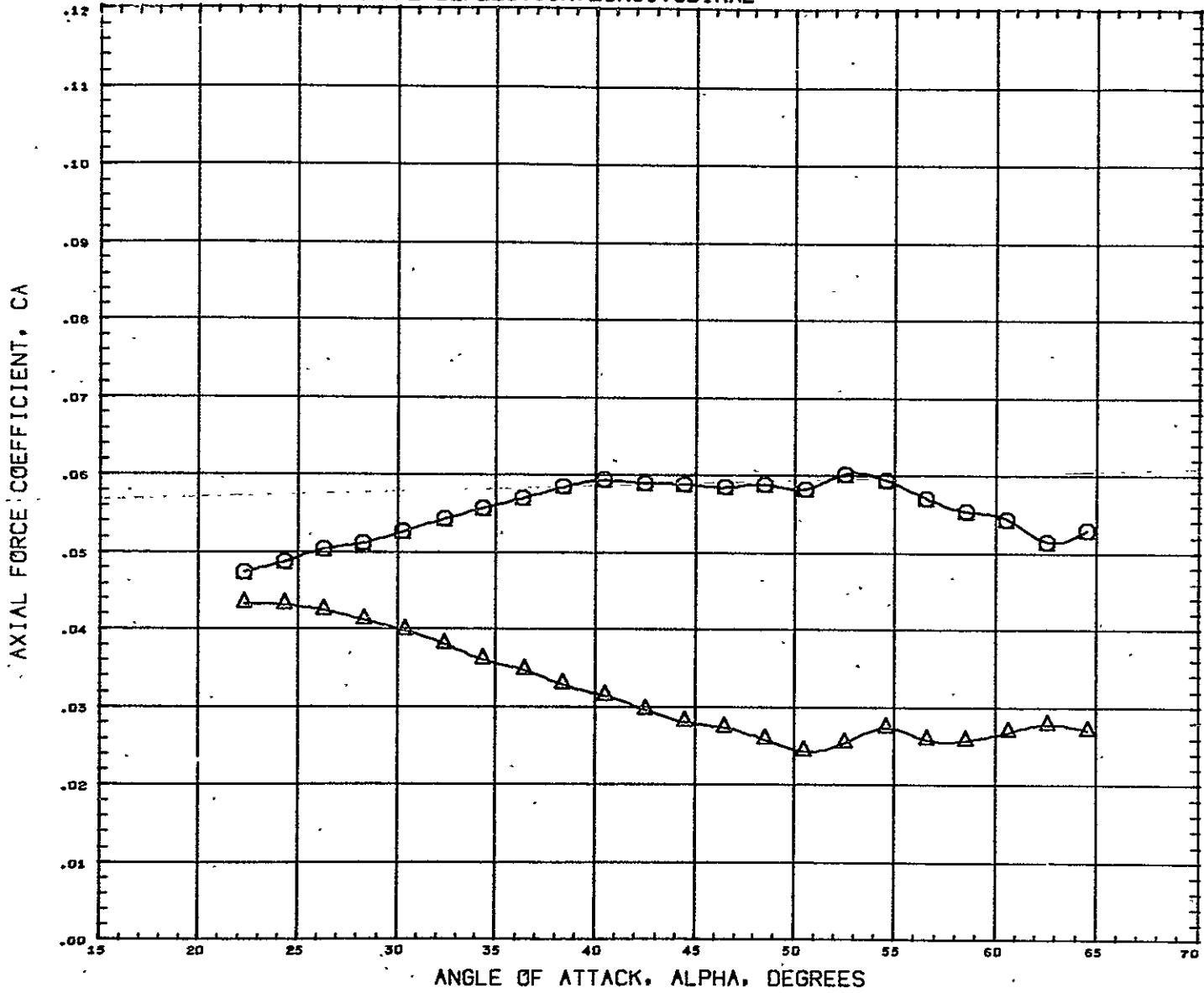
BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XHRF 1485.0040 IN.
 YHRF 0.0000 IN.
 ZHRF 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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FIG. 11 EFFECT OF VENTRAL DEFLECTION, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD17) GFHT D19 CONF. ROS-NB1 B1W1V1U1
 (DCTD11) GFHT D19 CONF. ROS-NB1 B1W1V1U1 (10)

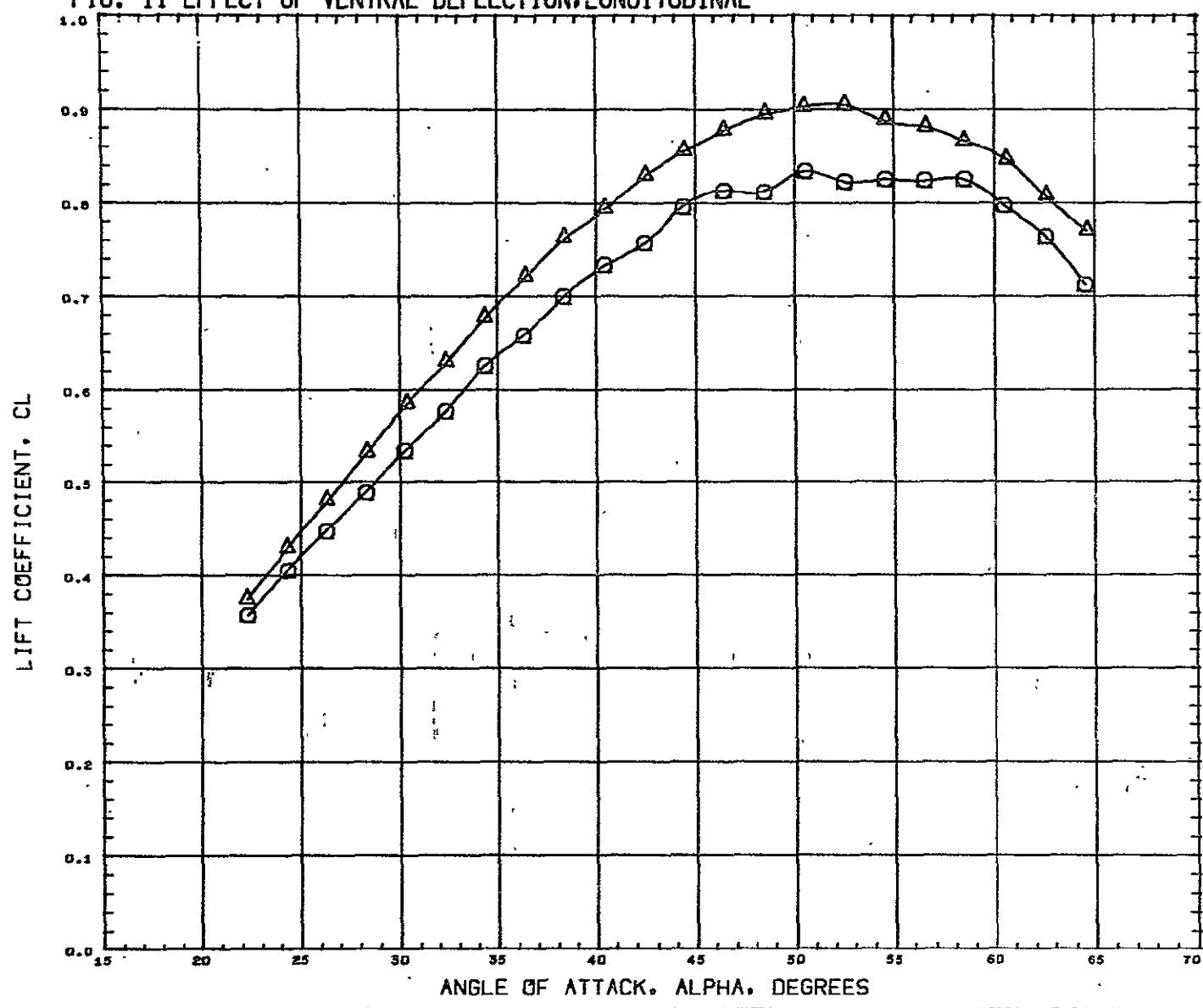
BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6890 SQ. IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XHRP 1485.0040 IN.
 YHRF 0.0000 IN.
 ZHRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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FIG. 11 EFFECT OF VENTRAL DEFLECTION, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD17) CFHT D19 CONF. ROS-NB1 B1W1V1U1
 (DCTD11) CFHT D19 CONF. ROS-NB1 B1W1V1U1(10)

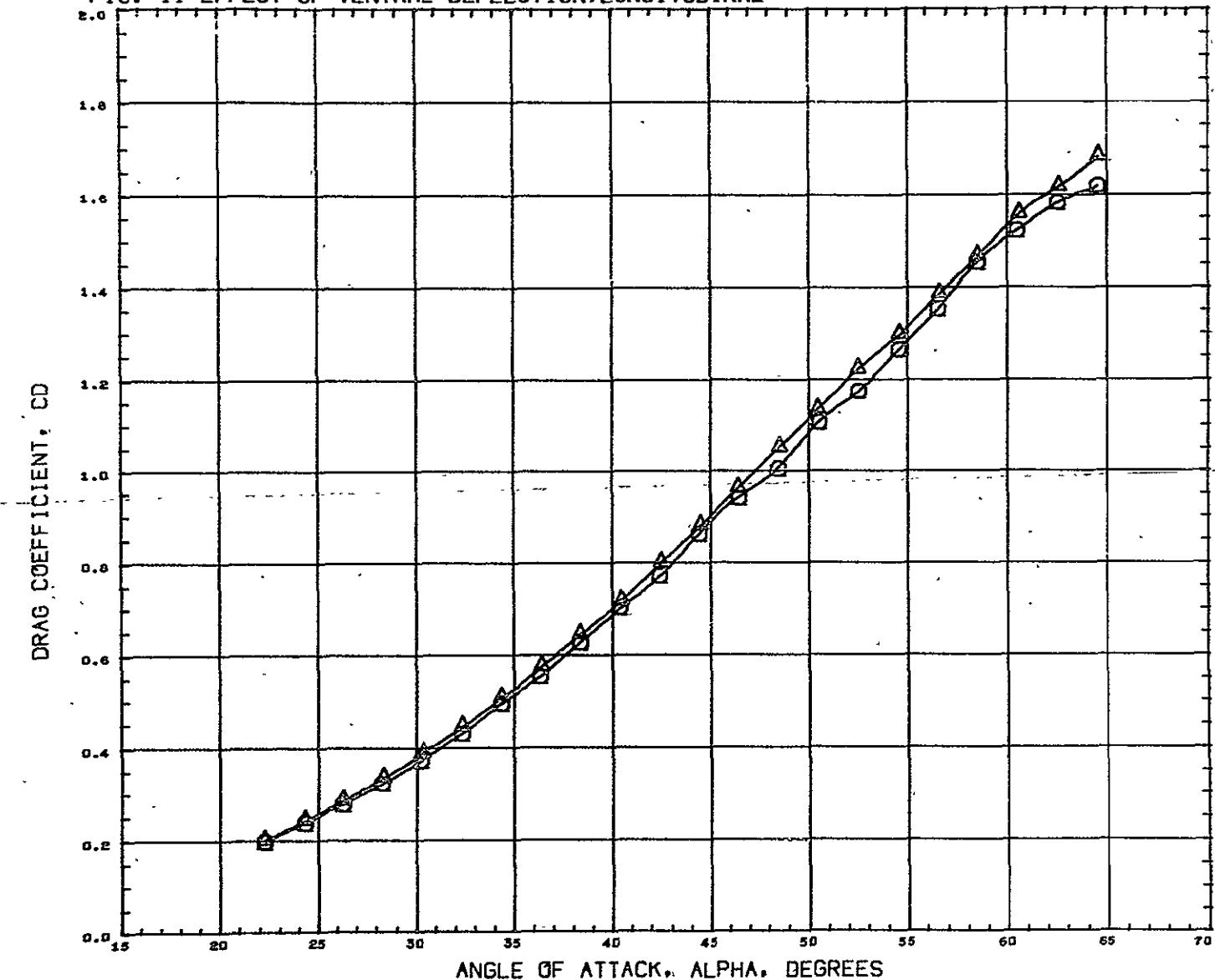
BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6690 SR.IN.
 LREF 9.6480 IN.
 BREF 5.0380 IN.
 XHRF 1485.0040 IN.
 YHRF 0.0000 IN.
 ZHRF 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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FIG. 11 EFFECT OF VENTRAL DEFLECTION, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT017) GFHT B19 CONF. ROS-NB1 BIWIVIUI
 (DCT011) GFHT B19 CONF. ROS-NB1 BIWIVIUI(10)

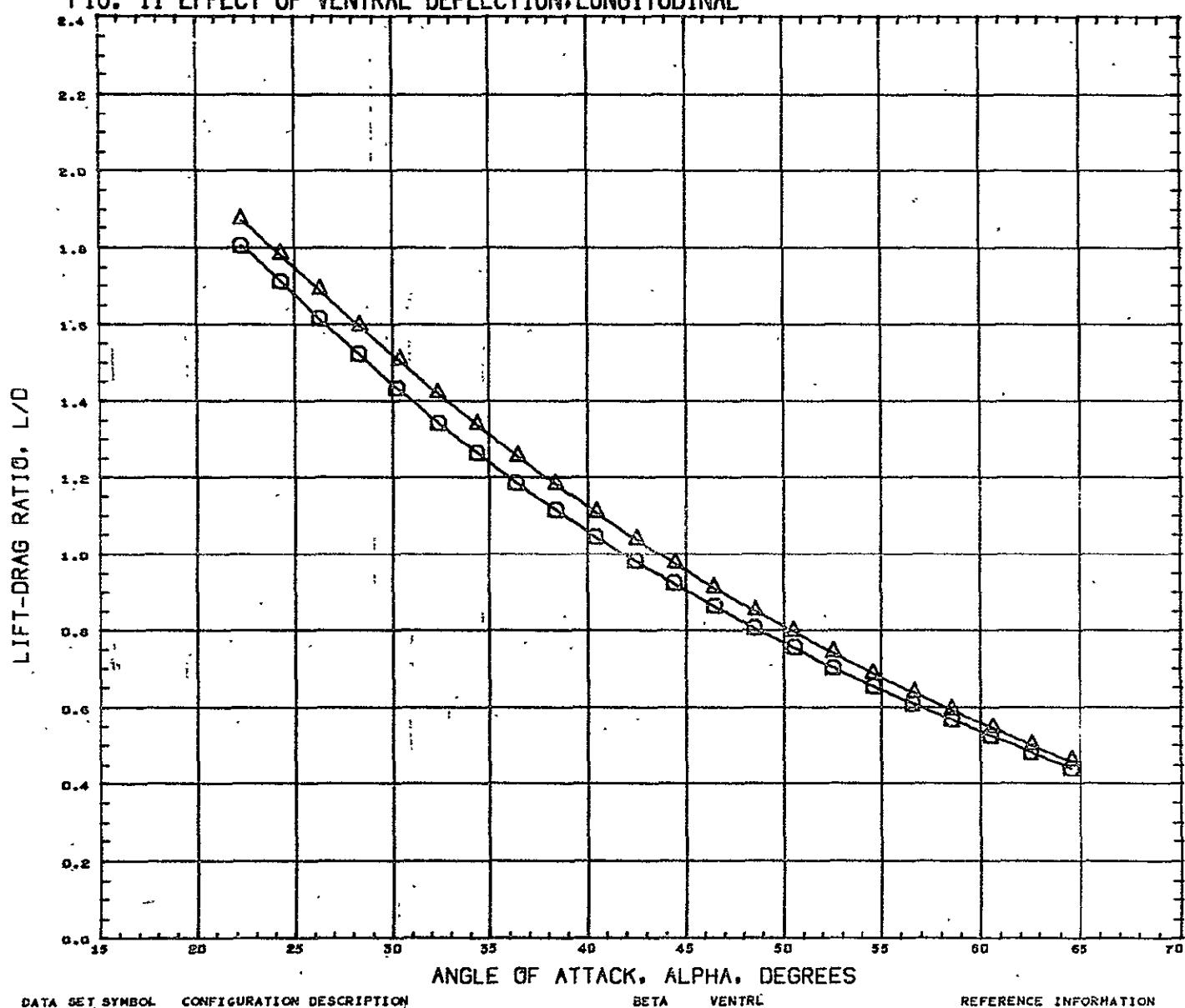
BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XHRP 1485.0040 IN.
 YHRP 0.0000 IN.
 ZHRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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FIG. 11 EFFECT OF VENTRAL DEFLECTION, LONGITUDINAL



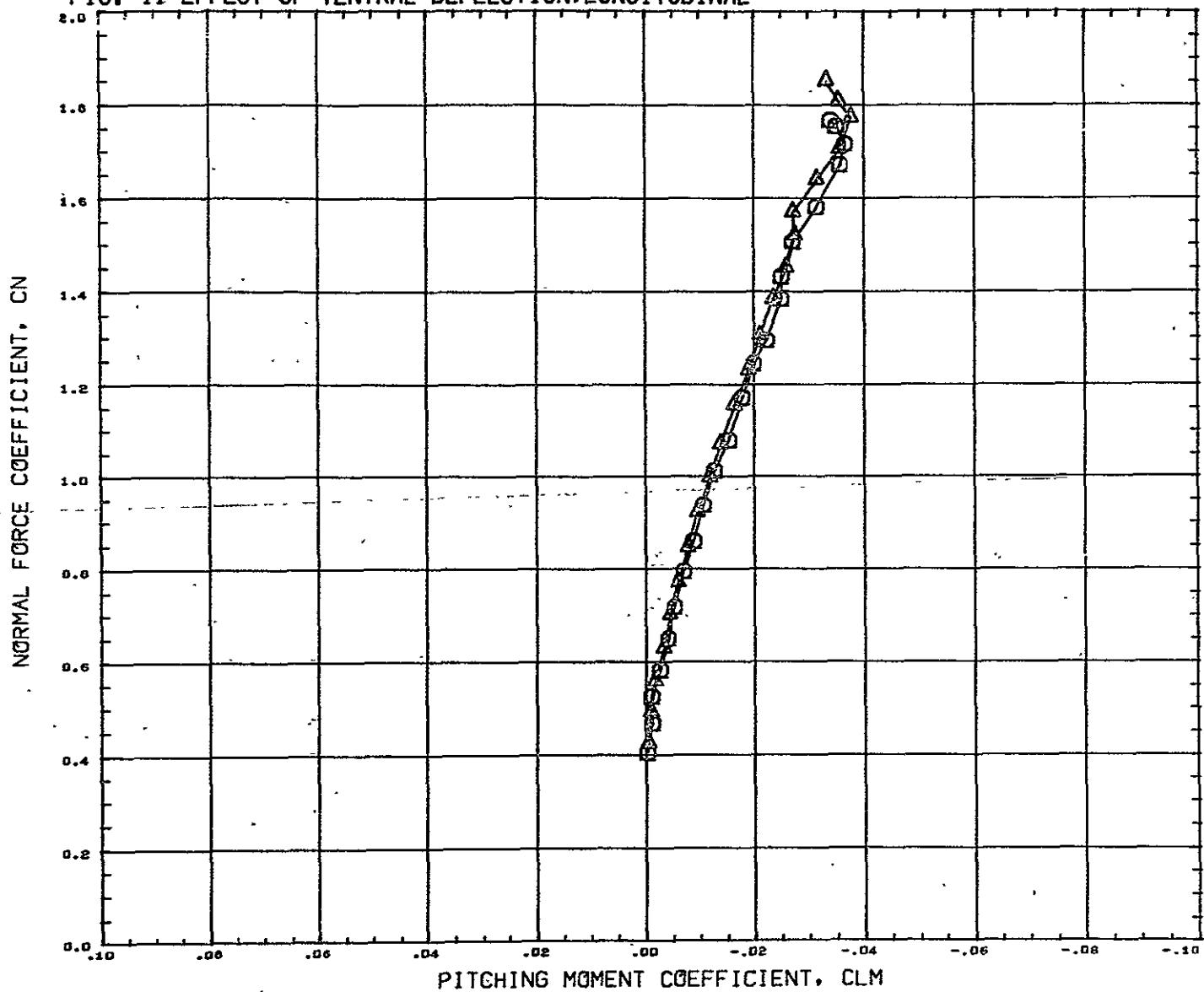
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTG17) GFHT D19 CONF. ROS-NB1 B1W1V1U1
 (DCTG11) GFHT D19 CONF. ROS-NB1 B1W1V1U1(1D)

BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8320 IN.
 XHREF 1465.0040 IN.
 YHREF 0.0000 IN.
 ZHREF 377.0004 IN.
 SCALE 0.0050

MACH 10.330

FIG. 11 EFFECT OF VENTRAL DEFLECTION, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTP17) GFHT D19 CONF. ROS-NB1 B1WIVIUS
 (DCTP11) GFHT D19 CONF. ROS-NB1 B1WIVIUI(1D)

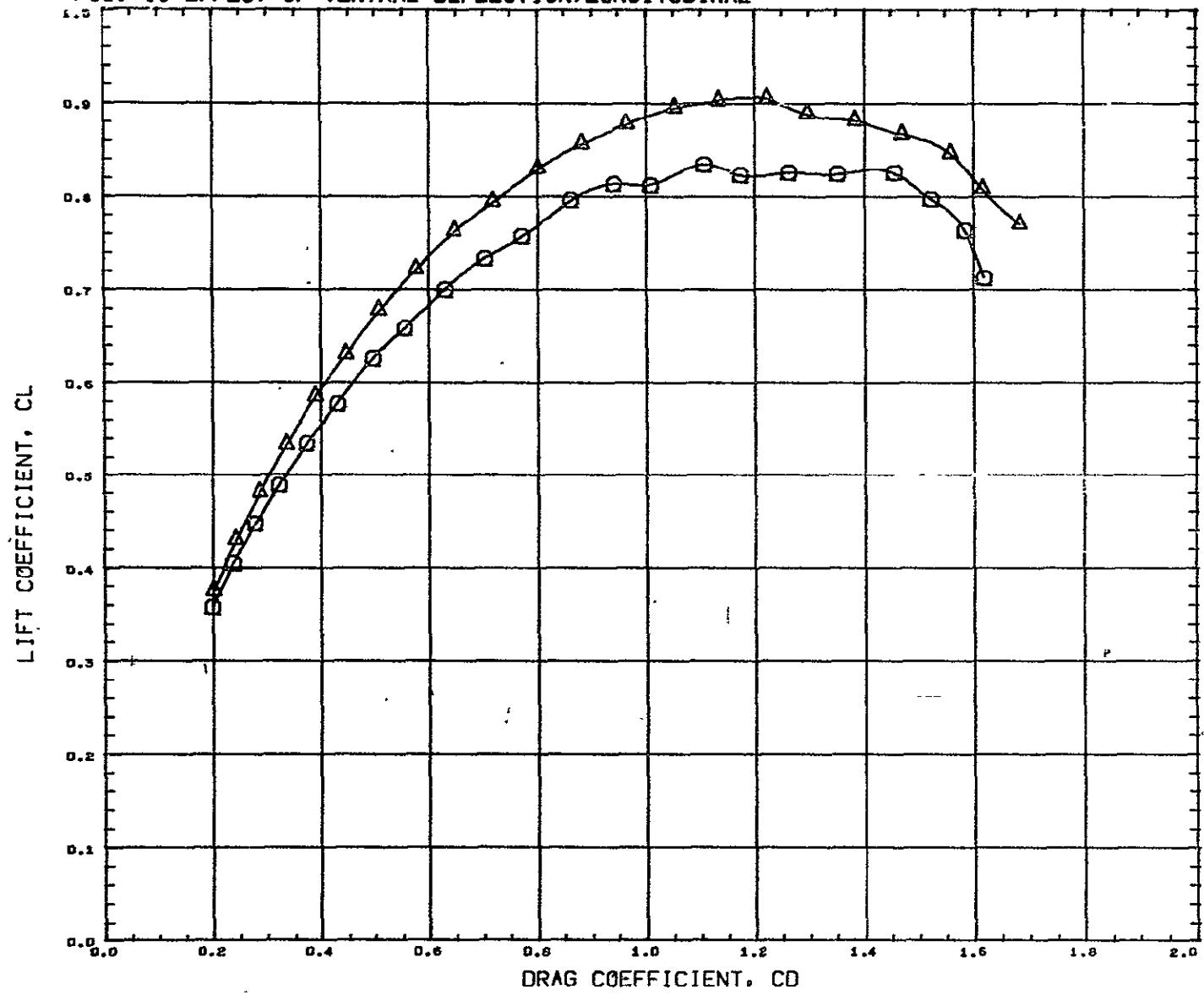
BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6890 SG.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XMRP 1485.0040 IN.
 YMRP 0.0000 IN.
 ZMRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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FIG. 11 EFFECT OF VENTRAL DEFLECTION, LONGITUDINAL



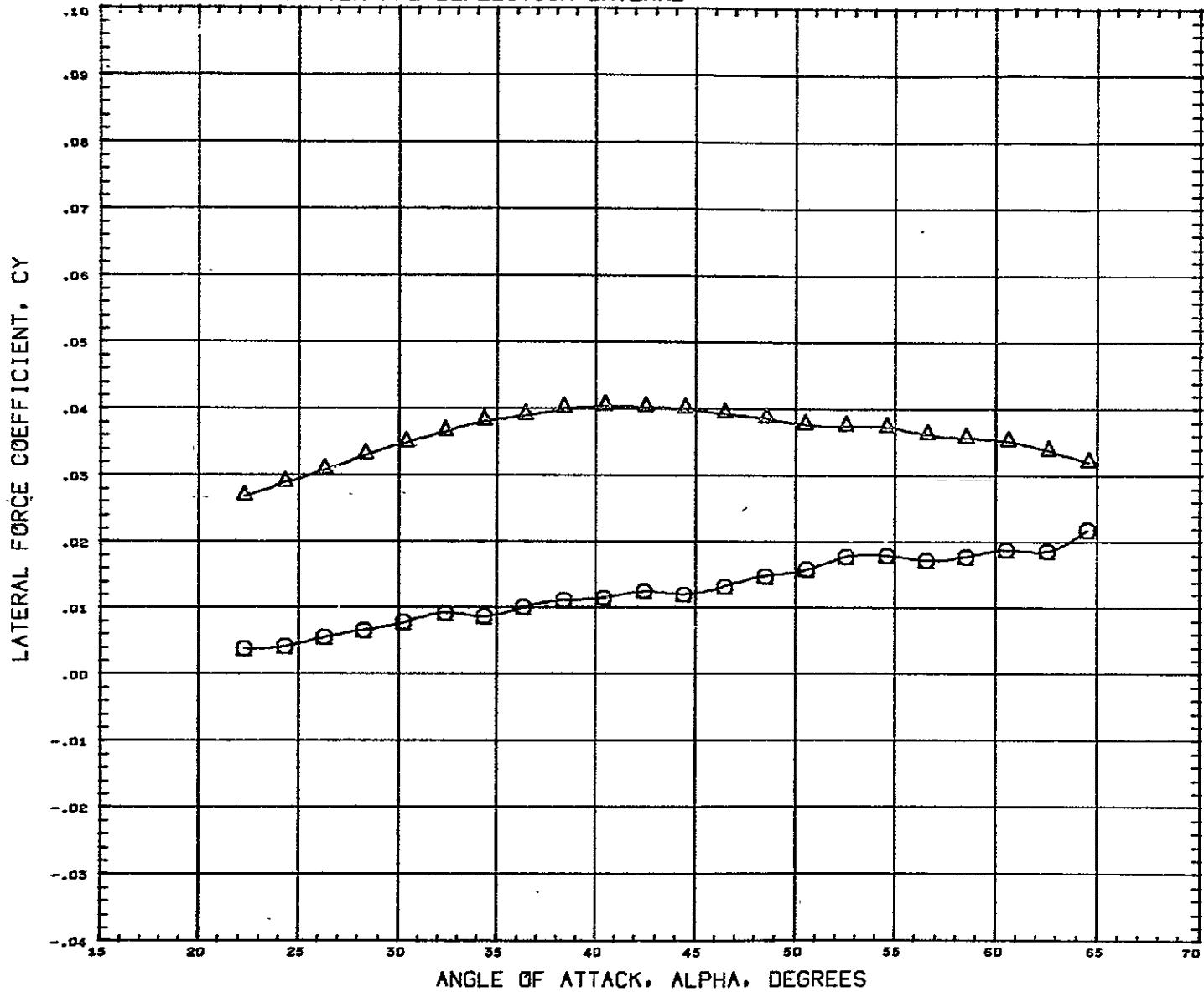
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD17) GFHT D19 CONF. ROS-NB1 B1W1V1U1
 (DCTD11) GFHT D19 CONF. ROS-NB1 B1W1V1U1(1D)

BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6690 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8360 IN.
 XHRP 1485.0040 IN.
 YHRP 0.0000 IN.
 ZHRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

FIG. 12 EFFECT OF VENTRAL DEFLECTION, LATERAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT017) GFHT 019 CONF. ROS-NB1 B1W1V1U1
 (DCT011) GFHT 019 CONF. ROS-NB1 B1W1V1U1(10)

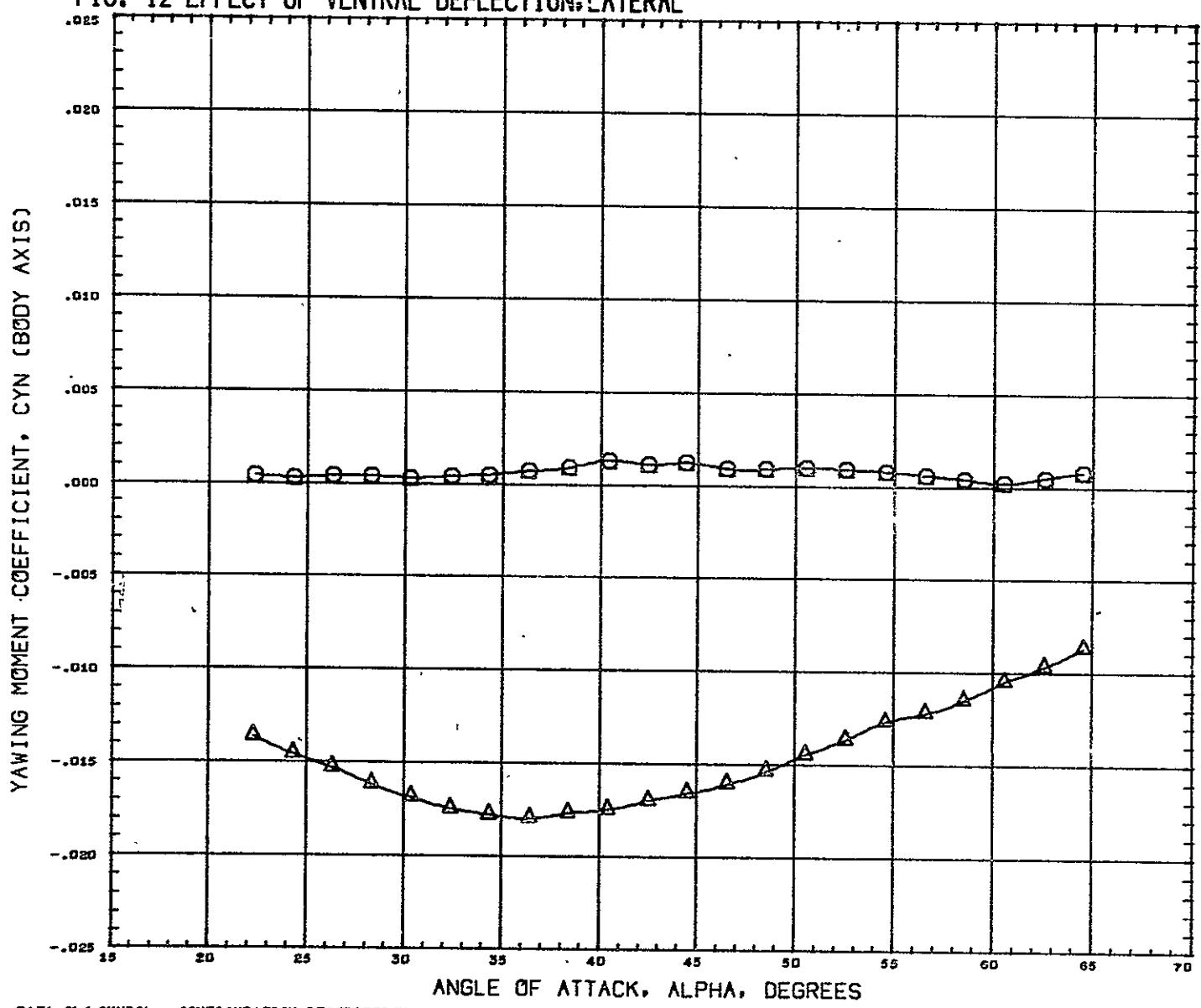
BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6890 SQ. IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XHRP 1485.0040 IN.
 YMRP 0.0000 IN.
 ZHRP 377.0004 IN.
 SCALE 0.0050

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FIG. 12 EFFECT OF VENTRAL DEFLECTION, LATERAL



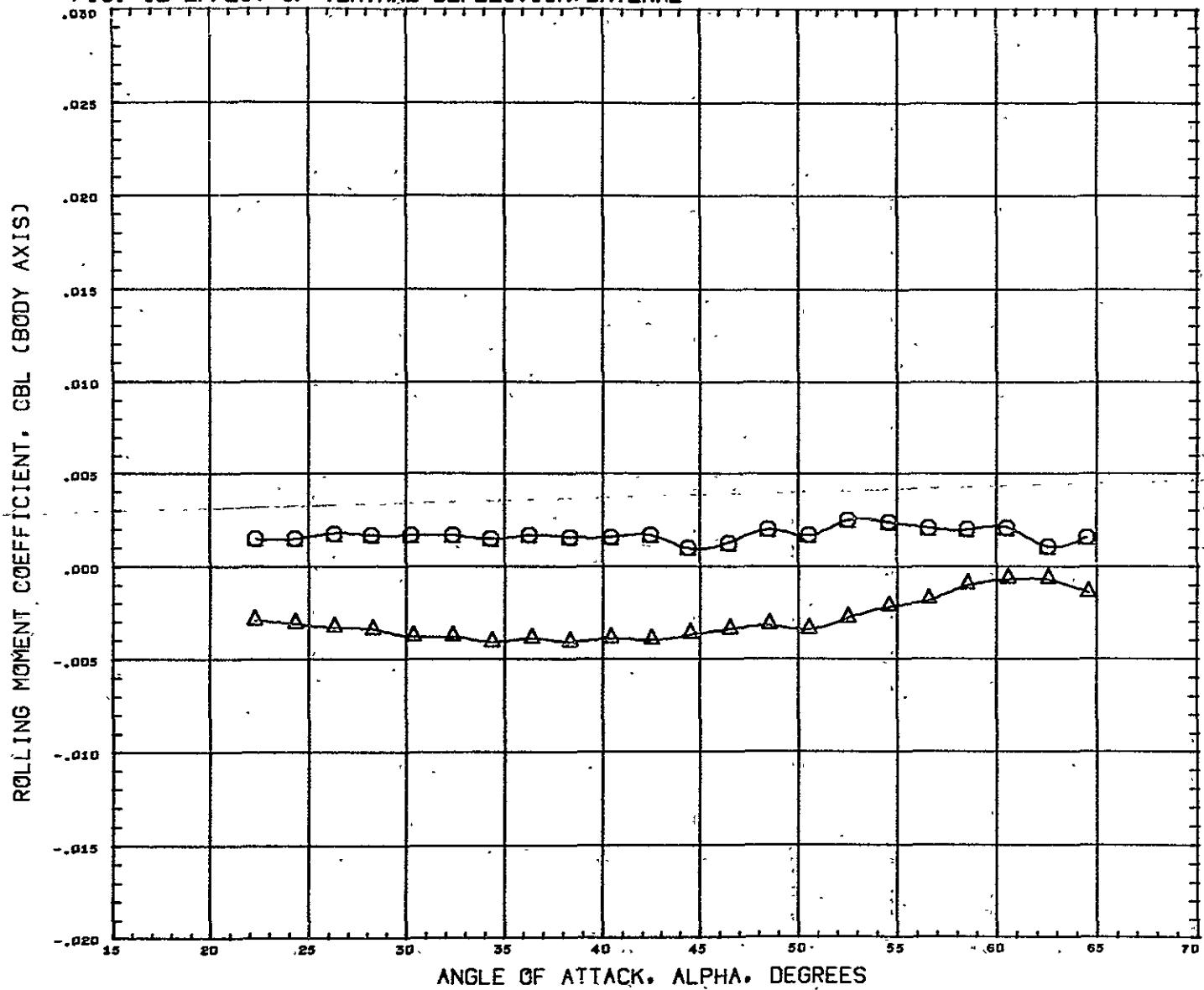
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD17) GFHT D19 CONF. ROS-NB1 BIWIVIUI
 (DCTD11) GFHT D19 CONF. ROS-NB1 BIWIVIUI (10)

BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XHRF 1485.0040 IN.
 YMRF 0.0000 IN.
 ZMRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

FIG. 12 EFFECT OF VENTRAL DEFLECTION, LATERAL



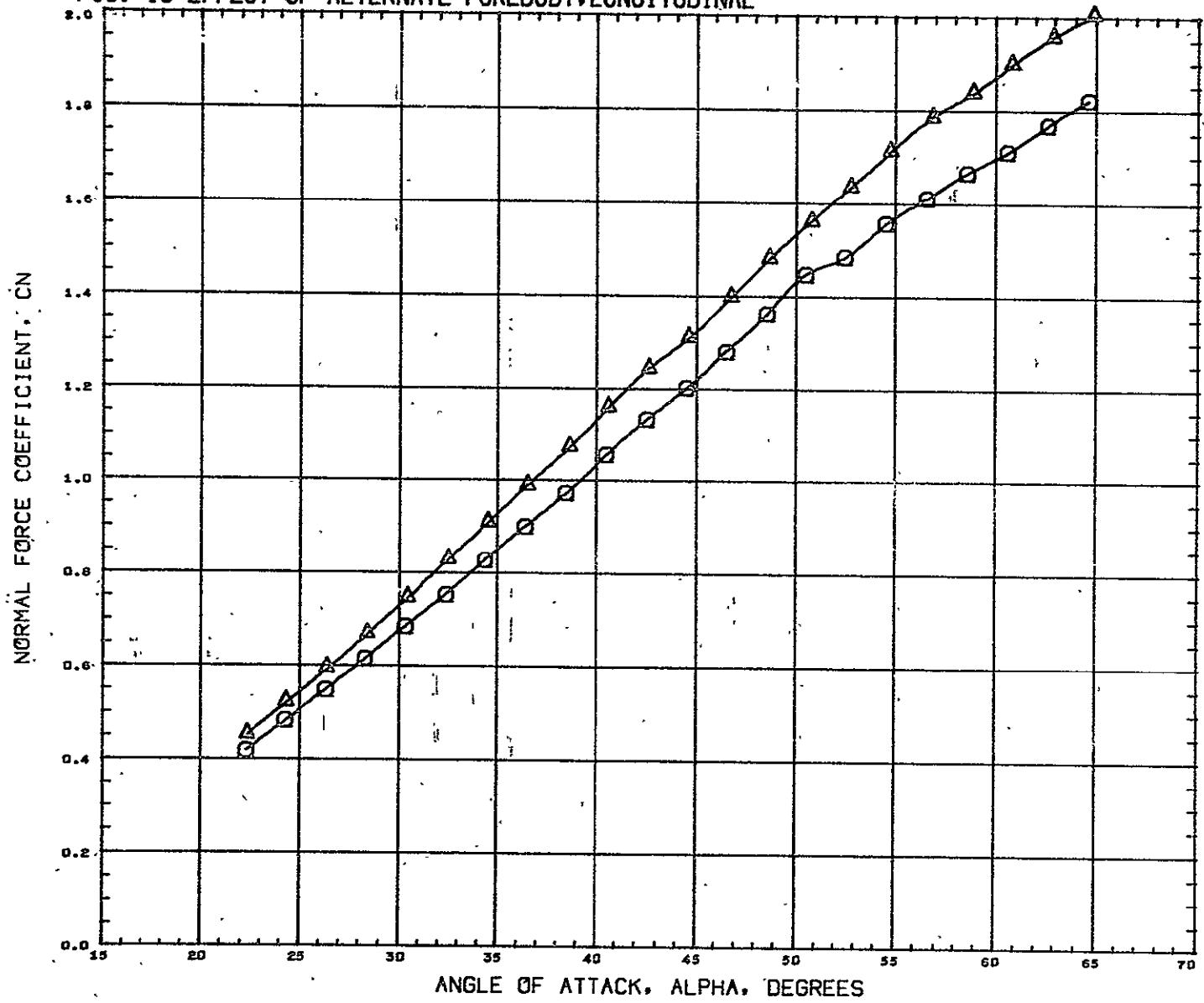
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT017) GFHT 019 CONF. ROS-NB1 B1W1V1U1
 (DCT011) GFHT 019 CONF. ROS-NB1 B1W1V1U1(10)

BETA VENTRL
 0.000 0.000
 0.000 10.000

REFERENCE INFORMATION
 SREF 20.6890 SQ.IN.
 LREF 9.6480 IN.
 BREF 5.8380 IN.
 XMRP 1485.0040 IN.
 YMRP 0.0000 IN.
 ZMRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

FIG. 13 EFFECT OF ALTERNATE FOREBODY, LONGITUDINAL



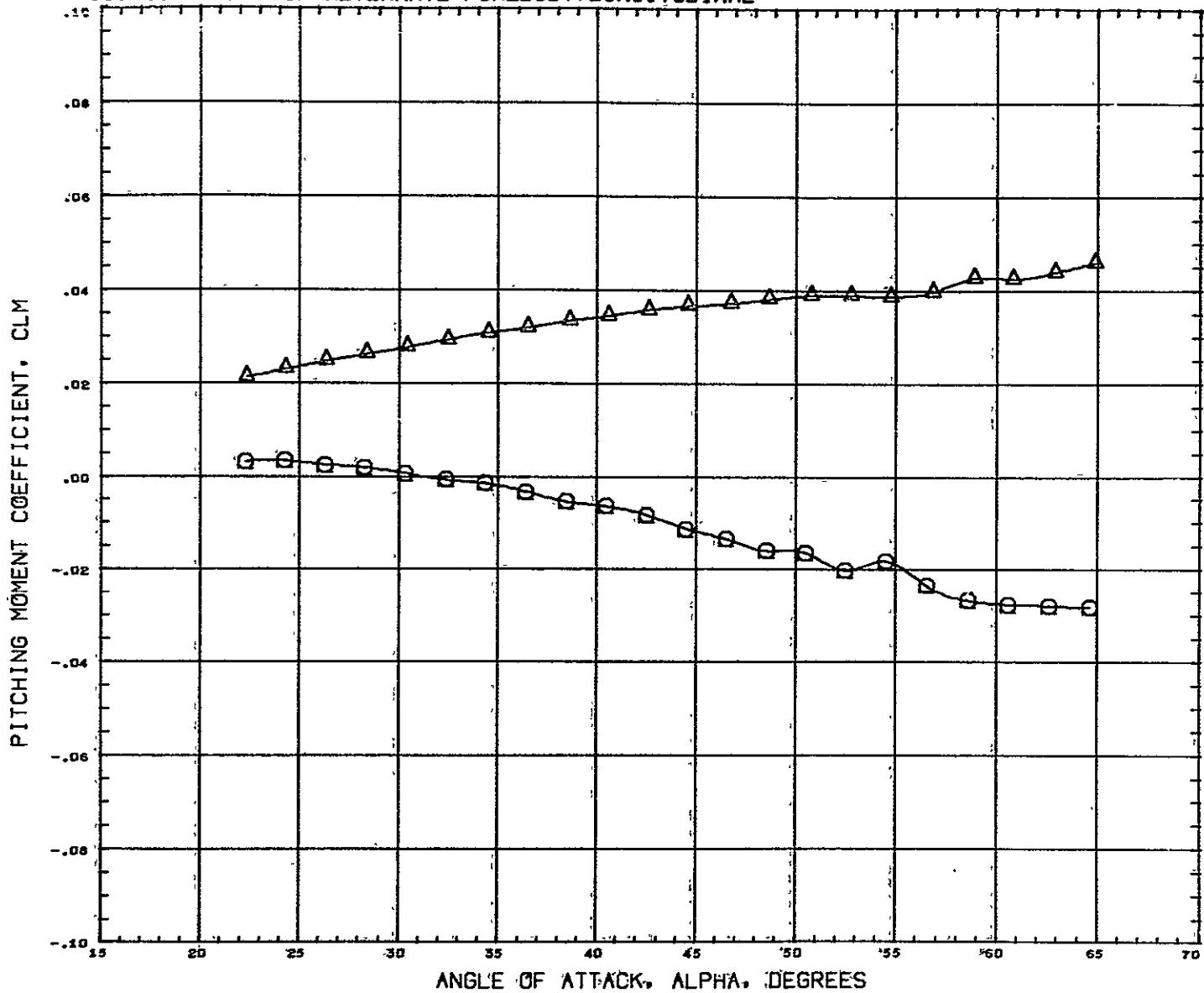
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCT012) GFHT D19 CONF. ROS-NB1 B(1A)W1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6690 SG. IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHRP 1485.0040 IN.
				YHRP 0.0000 IN.
				ZHRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 13 EFFECT OF ALTERNATE FOREBODY, LONGITUDINAL

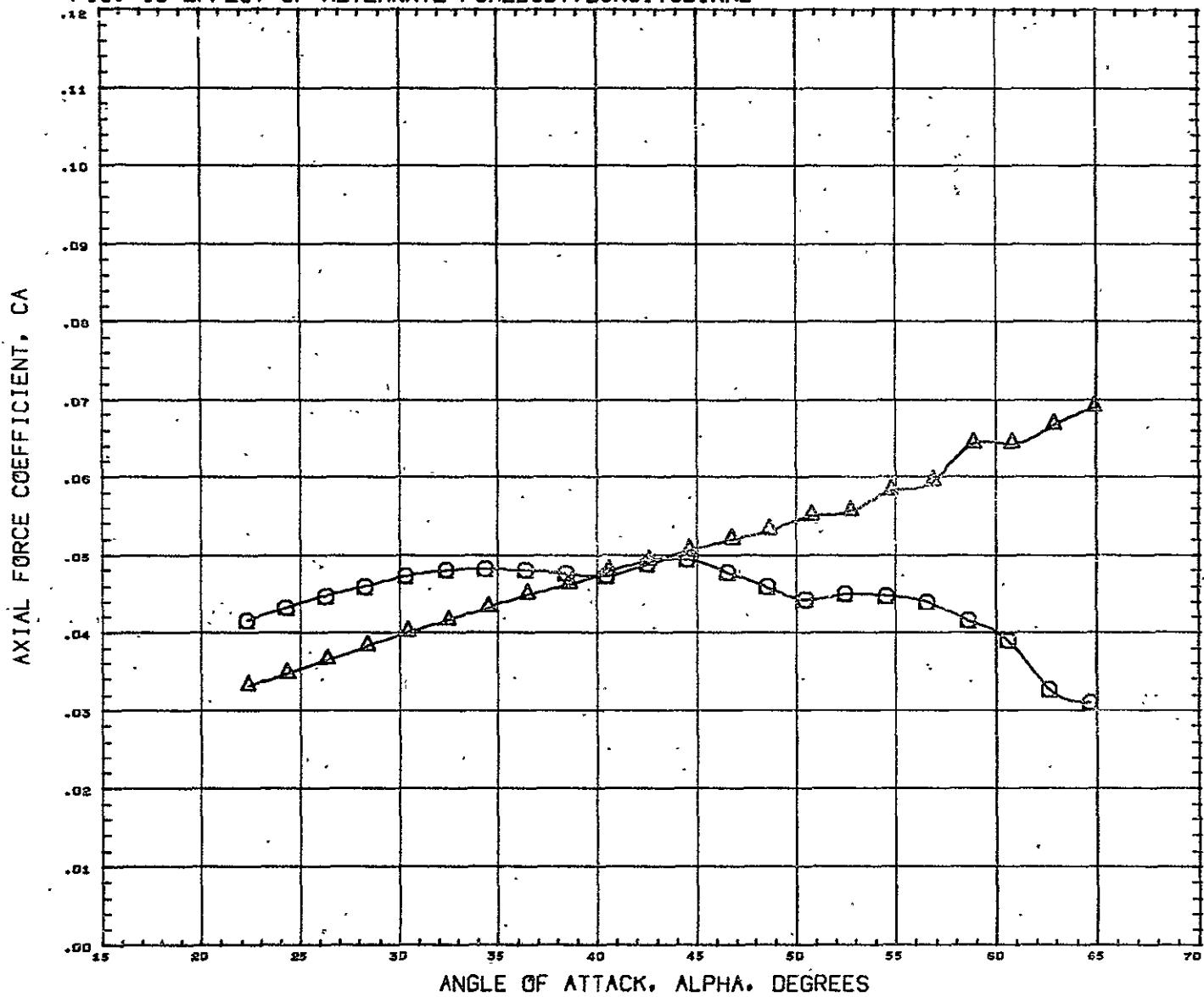


DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD02) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCTD12) GFHT D19 CONF. ROS-NB1 B(1A)W1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SE-IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				'BREF 5.8380 IN.
				'XMRP 1485.0040 IN.
				'YMRP 0.0000 IN.
				'ZMRP 377.0004 IN.
				'SCALE 0.0050

MACH 10.130

FIG. 13 EFFECT OF ALTERNATE FOREBODY, LONGITUDINAL

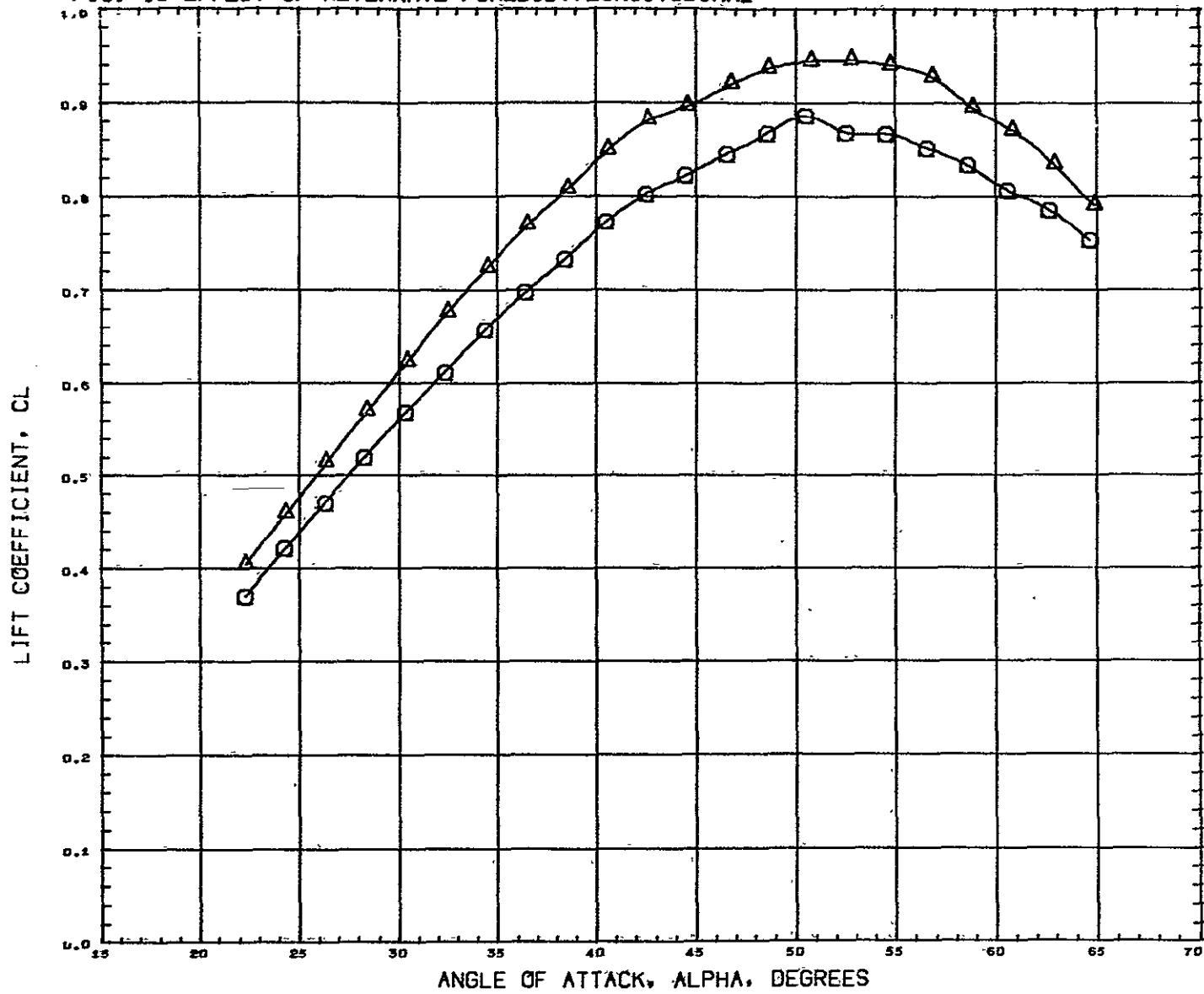


DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT 019.CONF. ROS-NB1 B1W1V1
 (DCT012) GFHT 019 CONF. ROS-NB1 B1(A)W1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE	INFORMATION
0.000	0.000	0.000	0.000	SREF	20.6690 SQ.IN.
0.000	0.000	0.000	0.000	LREF	9.6480 IN.
				BREF	5.8380 IN.
				XHLP	1485.0040 IN.
				YHLP	0.0000 IN.
				ZHLP	377.0004 IN.
				SCALE	0.0050

MACH 10.150

FIG. 13 EFFECT OF ALTERNATE FOREBODY, LONGITUDINAL



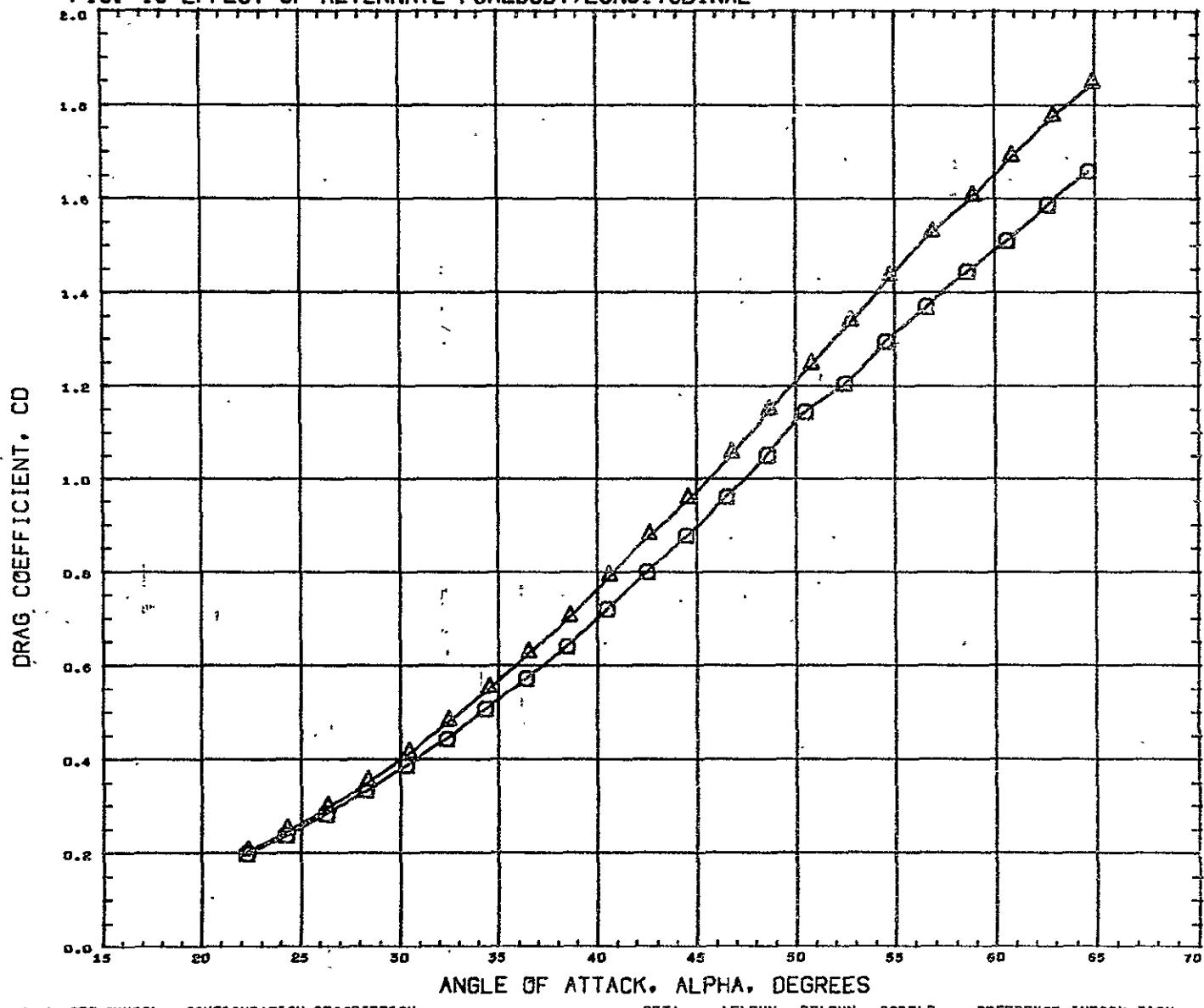
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD02) C GFTD 019 CONF. ROS-NB1 B1W1V1
 (DCTD12) A GFTD 019 CONF. ROS-NB1 B(1A)W1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LRFP 9.6480 IN.
				BRFP 5.8380 IN.
				XMRP 31465.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.530

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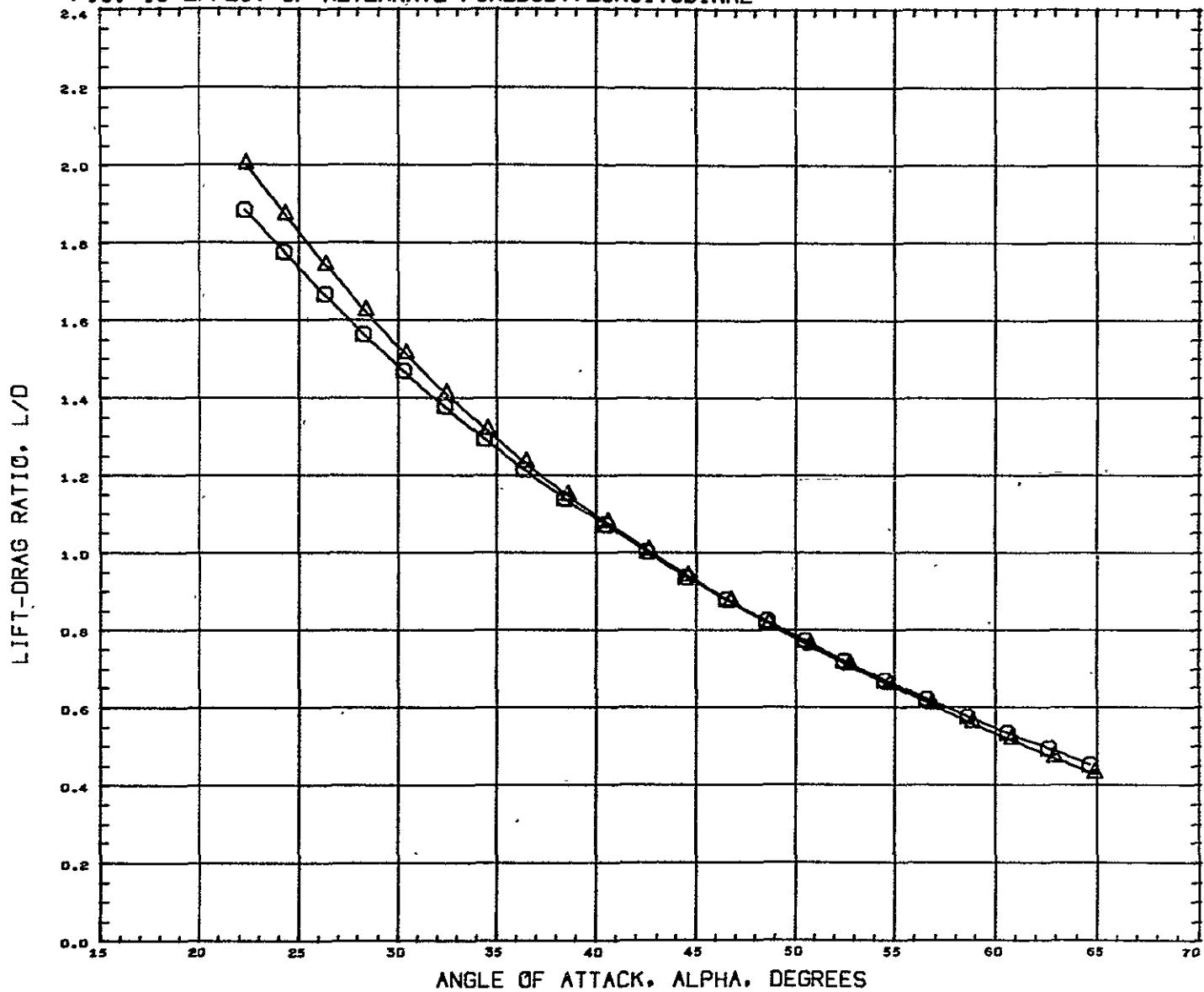
FIG. 13 EFFECT OF ALTERNATE FOREBODY, LONGITUDINAL



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	CFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6090 SQ. IN.
(DCT012)	CFHT D19 CONF. ROS-NB1 B(1A)W1V1	0.000	0.000	0.000	0.000	LREF 9.6480 IN.
						BREF 5.6380 IN.
						XMRP 1465.0040 IN.
						YMRP 0.0000 IN.
						ZMRP 377.0004 IN.
						SCALE 0.0050

MACH 10.130

FIG. 13 EFFECT OF ALTERNATE FOREBODY, LONGITUDINAL



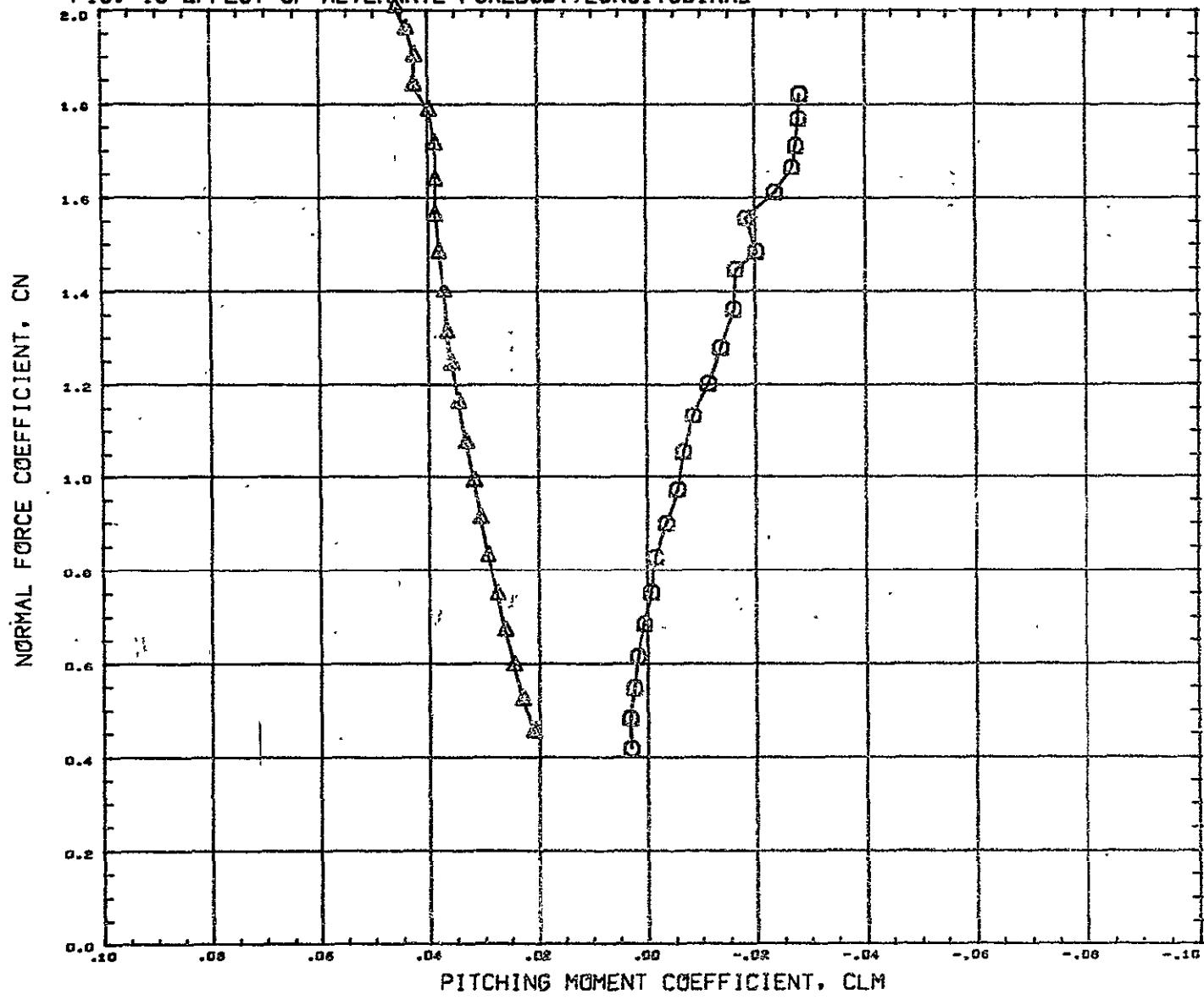
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCT012) GFHT D19 CONF. ROS-NB1 B1SA W1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ. IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 13 EFFECT OF ALTERNATE FOREBODY, LONGITUDINAL



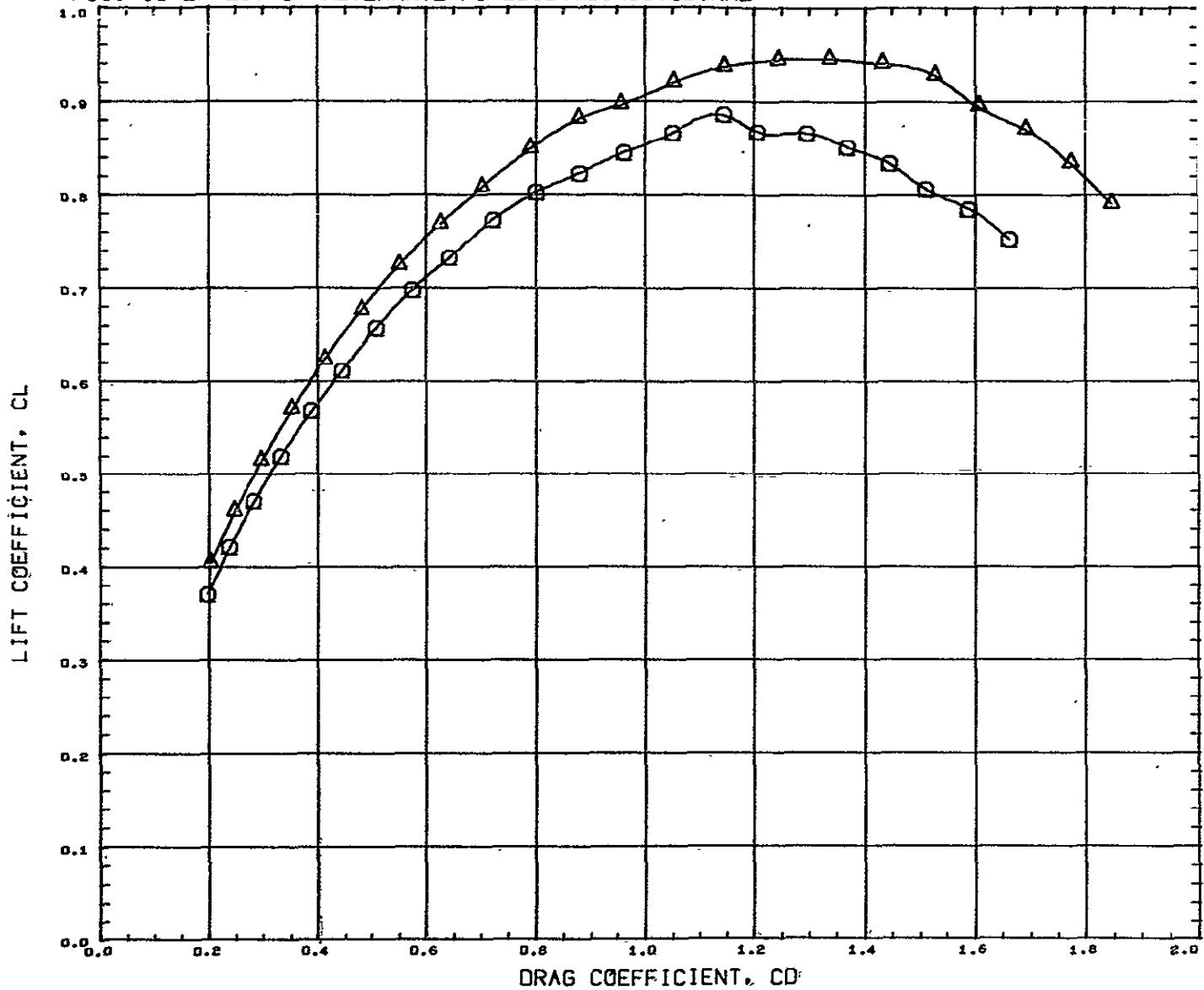
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) O GFTT D19 CONF. ROS-NB1 B1W1V1
 (DCT012) △ GFTT D19 CONF. ROS-NB1 B(1A)W1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ. IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZHRP 577.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 13 EFFECT OF ALTERNATE FOREBODY, LONGITUDINAL



DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCT012) GFHT D19 CONF. ROS-NB1 B(3A)W1V1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XNRP 1485.0040 IN.
				YNRP 0.0000 IN.
				ZNRP 377.0004 IN.
				SCALE 0.0050

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FIG. 14 EFFECT OF ALTERNATE FOREBODY, LATERAL-DIRECTIONAL, 10. DEG. STING OFFSET

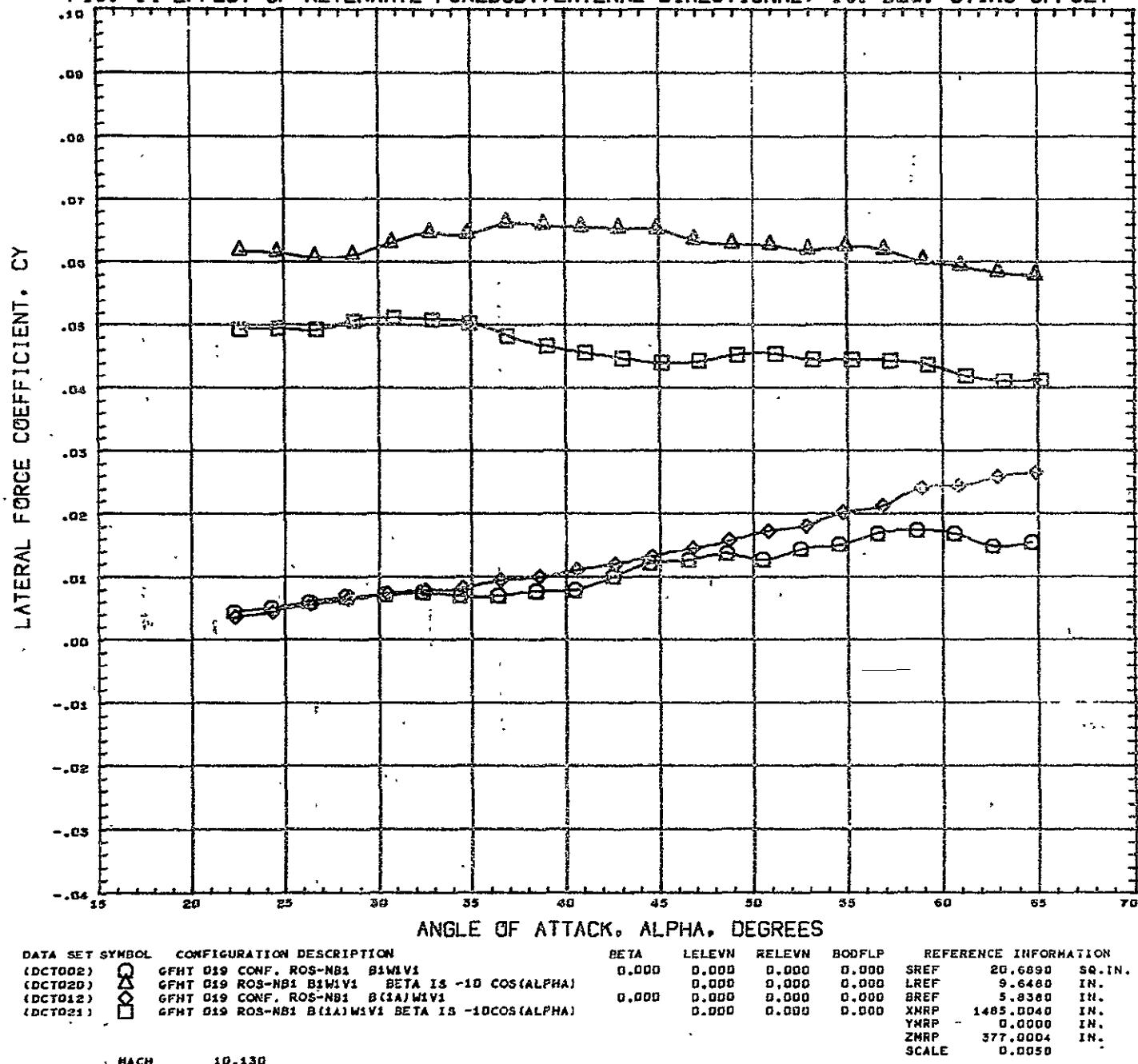
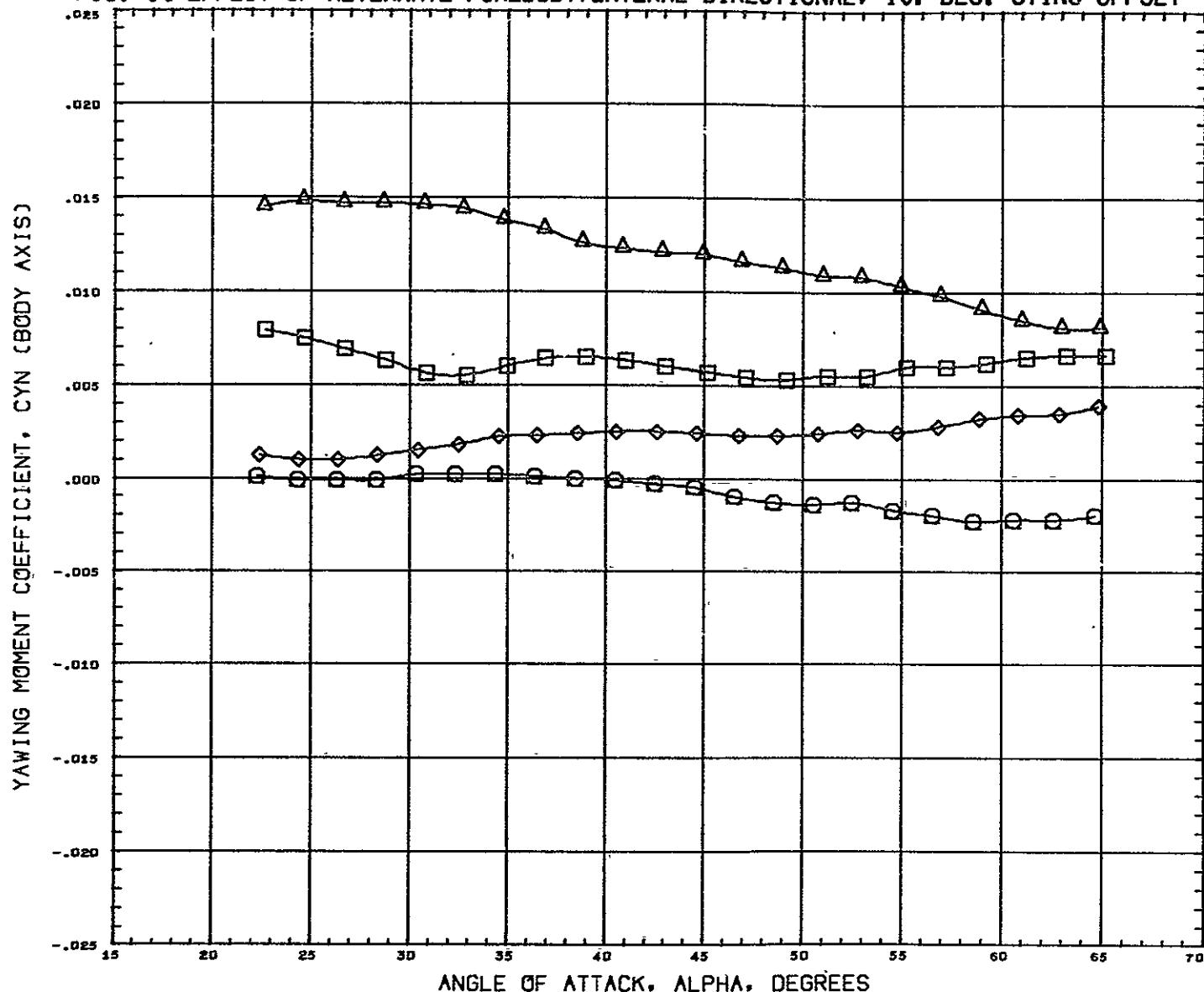


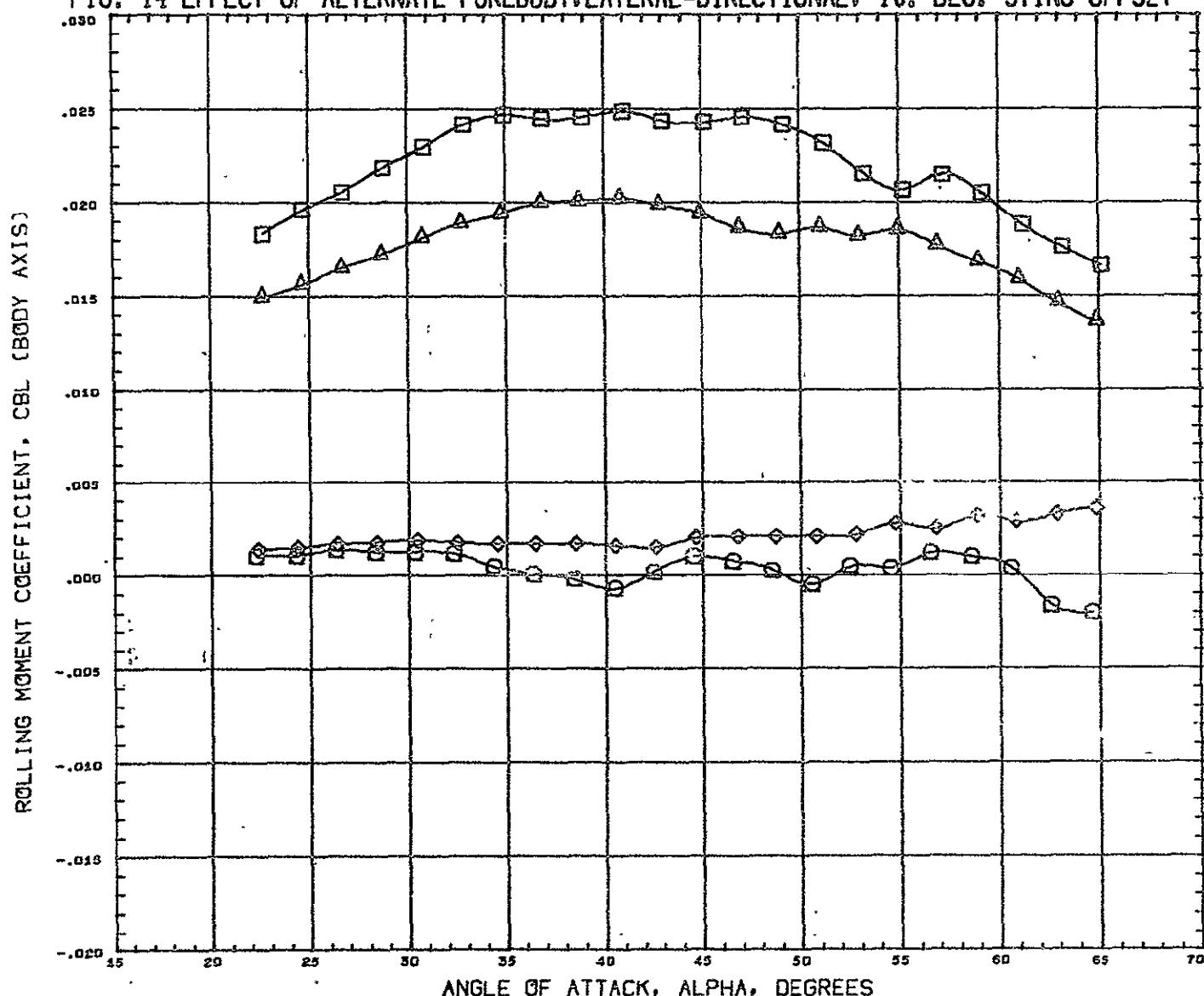
FIG. 14 EFFECT OF ALTERNATE FOREBODY, LATERAL-DIRECTIONAL, 10. DEG. STING OFFSET



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	SREF	20.6890 SQ.IN.
(DCT020)	GFHT D19 ROS-NB1 B1W1V1 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	LREF	9.6480 IN.
(DCT012)	GFHT D19 CONF. ROS-NB1 B(1A)W1V1	0.000	0.000	0.000	BREF	5.6380 IN.
(DCT021)	GFHT D19 ROS-NB1 B(1A)W1V1 BETA IS -10COS(ALPHA)	0.000	0.000	0.000	XMRP	1485.0040 IN.
					YMRP	0.0000 IN.
					ZMRP	377.0004 IN.
					SCALE	0.0050

MACH 10.130

FIG. 14 EFFECT OF ALTERNATE FOREBODY-LATERAL-DIRECTIONAL, 10. DEG. STING OFFSET

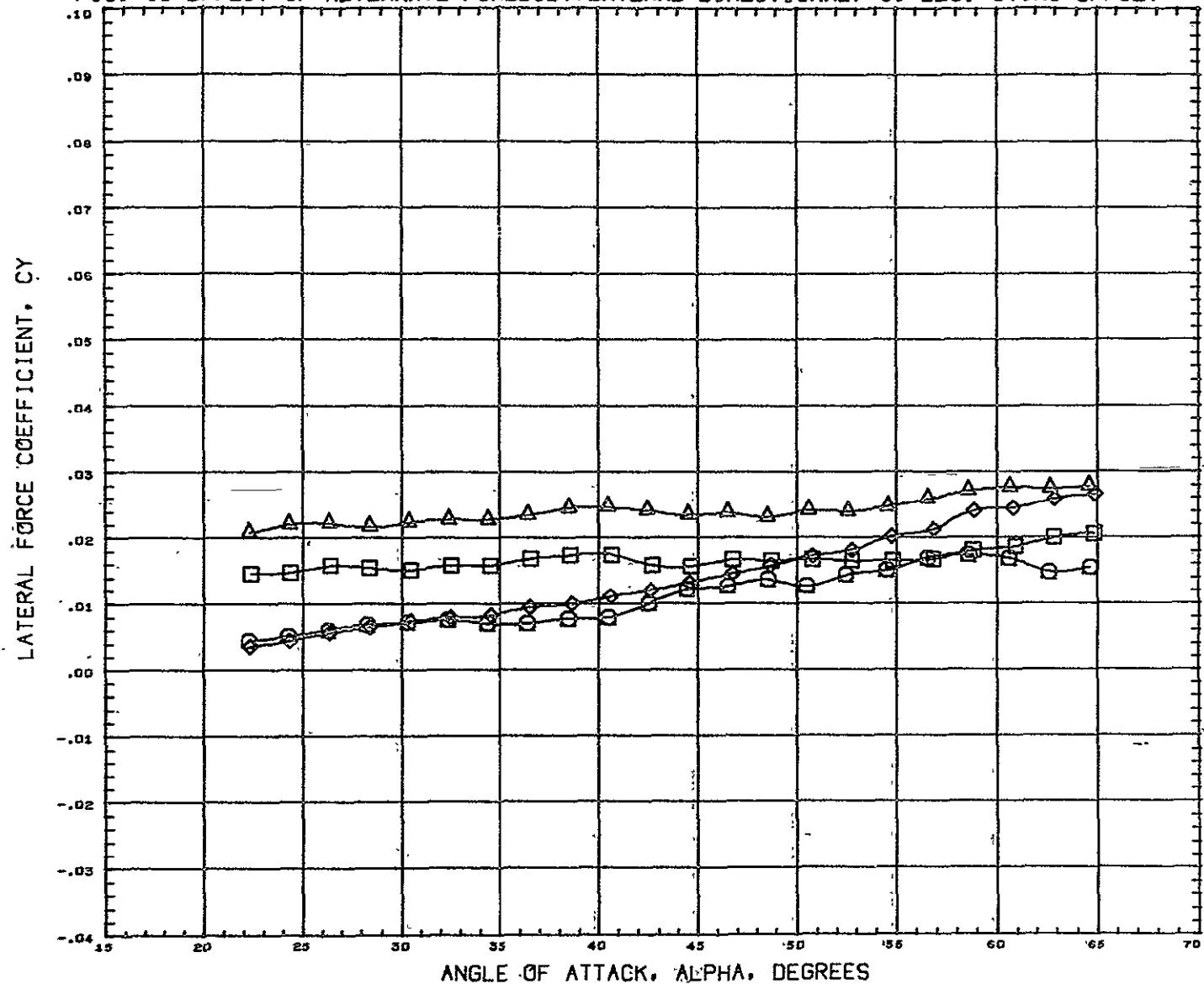


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT02)	GFHT 019 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT020)	GFHT 019 ROS-NB1 B1W1V1 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	0.000	LREF 9.6480 IN.
(DCT012)	GFHT 019 CONF. ROS-NB1 B(1A)W1V1	0.000	0.000	0.000	0.000	BREF 5.8380 IN.
(DCT021)	GFHT 019 ROS-NB1 B(1A)W1V1 BETA IS -10COS(ALPHA)	0.000	0.000	0.000	0.000	XHRP 1485.0040 IN.
						ZHRP 0.0000 IN.
						SCALE 0.0050

MACH 10.130

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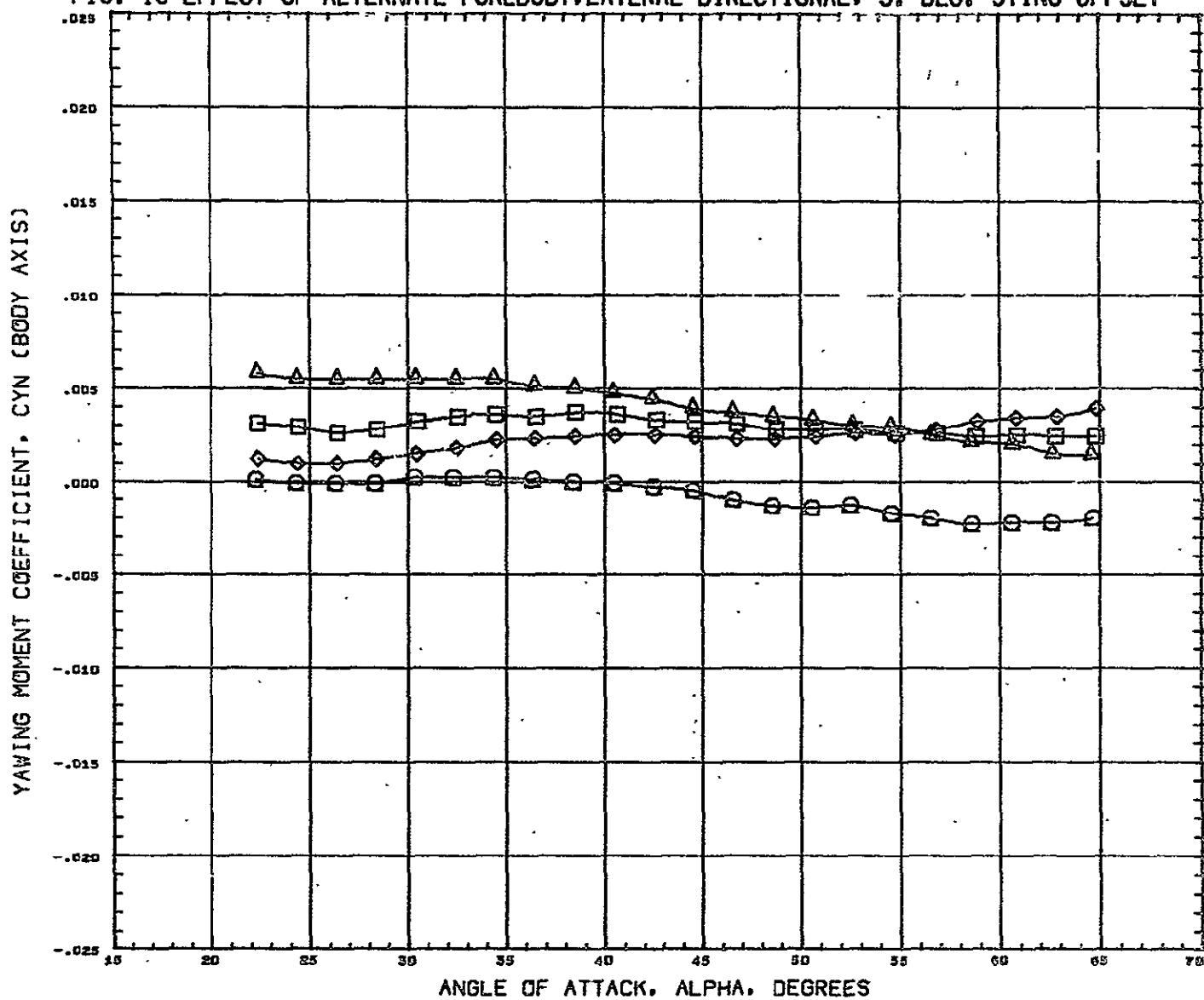
FIG. 15 EFFECT OF ALTERNATE FOREBODY-LATERAL-DIRECTIONAL, 3. DEG. STING OFFSET



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT026)	GFHT D19 ROS-NB1 B1W1V1 BETA IS -3 COS(ALPHA)	0.000	0.000	0.000	0.000	LREF 9.6480 IN.
(DCT012)	GFHT D19 CONF. ROS-NB1 B(1A)W1V1	0.000	0.000	0.000	0.000	BREF 5.8380 IN.
(DCT028)	GFHT D19 ROS-NB1 B(1A)W1V1 BETA IS -3 COS(ALPHA)	0.000	0.000	0.000	0.000	XHRF 1485.0040 IN.
						YHRF 0.0000 IN.
						ZHRF 377.0004 IN.
						SCALE 0.0050

MACH 10.130

FIG. 15 EFFECT OF ALTERNATE FOREBODY, LATERAL-DIRECTIONAL, 3. DEG. STING OFFSET



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE	INFORMATION
(DCT002)	GFHT D19 CONF. ROS-NBI B1WV1	0.000	0.000	0.000	0.000	SREF	20.6090 SR. IN.
(DCT020)	GFHT D19 ROS-NBI B2WV1 BETA IS -3 COS(ALPHA)	0.000	0.000	0.000	0.000	LREF	9.6480 IN.
(DCT012)	GFHT D19 CONF. ROS-NBI B1(A)WV1	0.000	0.000	0.000	0.000	BREF	5.0380 IN.
(DCT028)	GFHT D19 ROS-NBI B1(A)WV1 BETA IS -3 COS(ALPHA)	0.000	0.000	0.000	0.000	XHRP	1485.0040 IN.
						YHRP	0.0000 IN.
						ZWRP	377.0004 IN.
						SCALE	0.0050

MACH 10.150

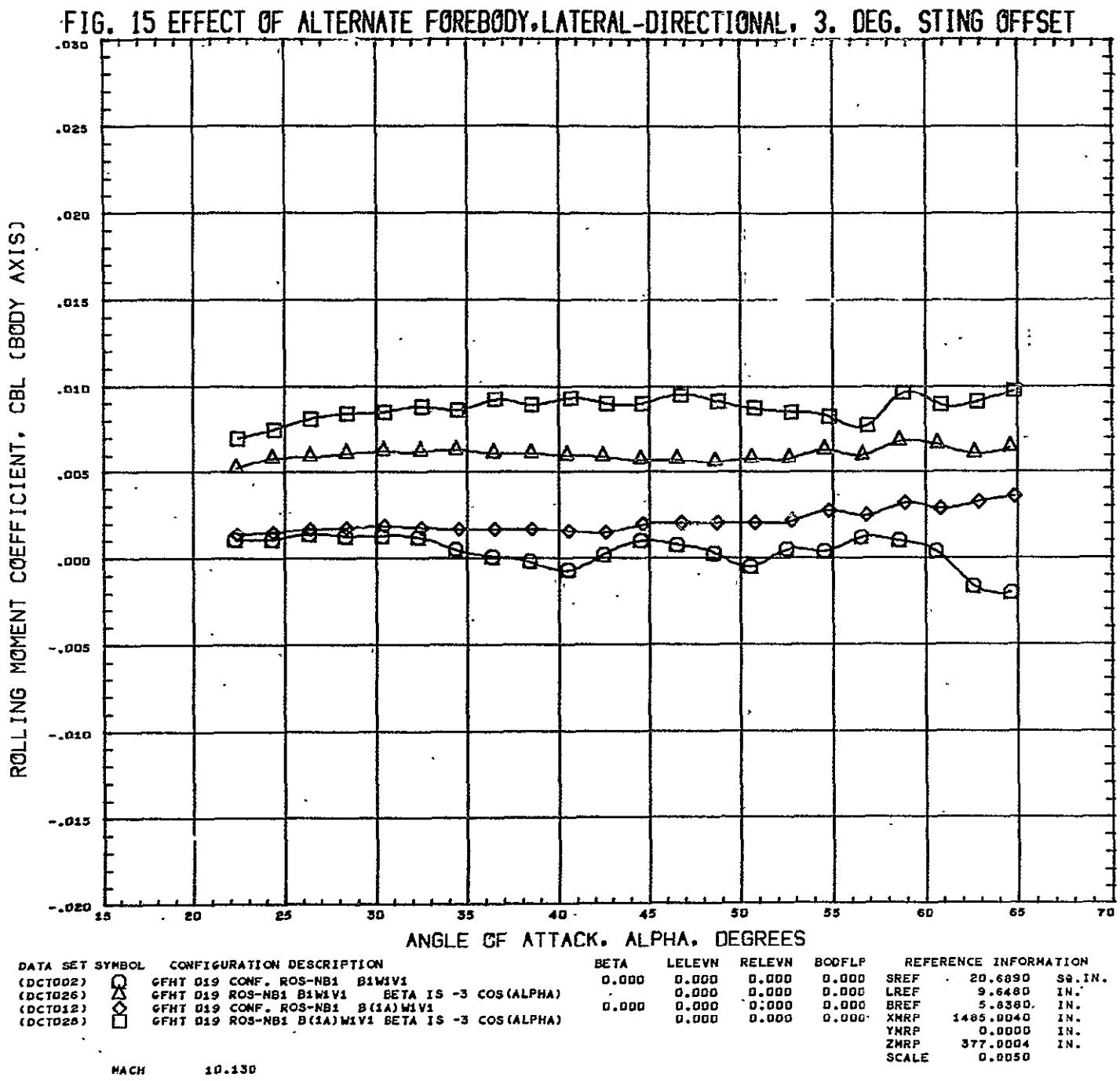


FIG. 16 COMPARISON OF ROS-NB1 AND ROS-WB1, LONGITUDINAL

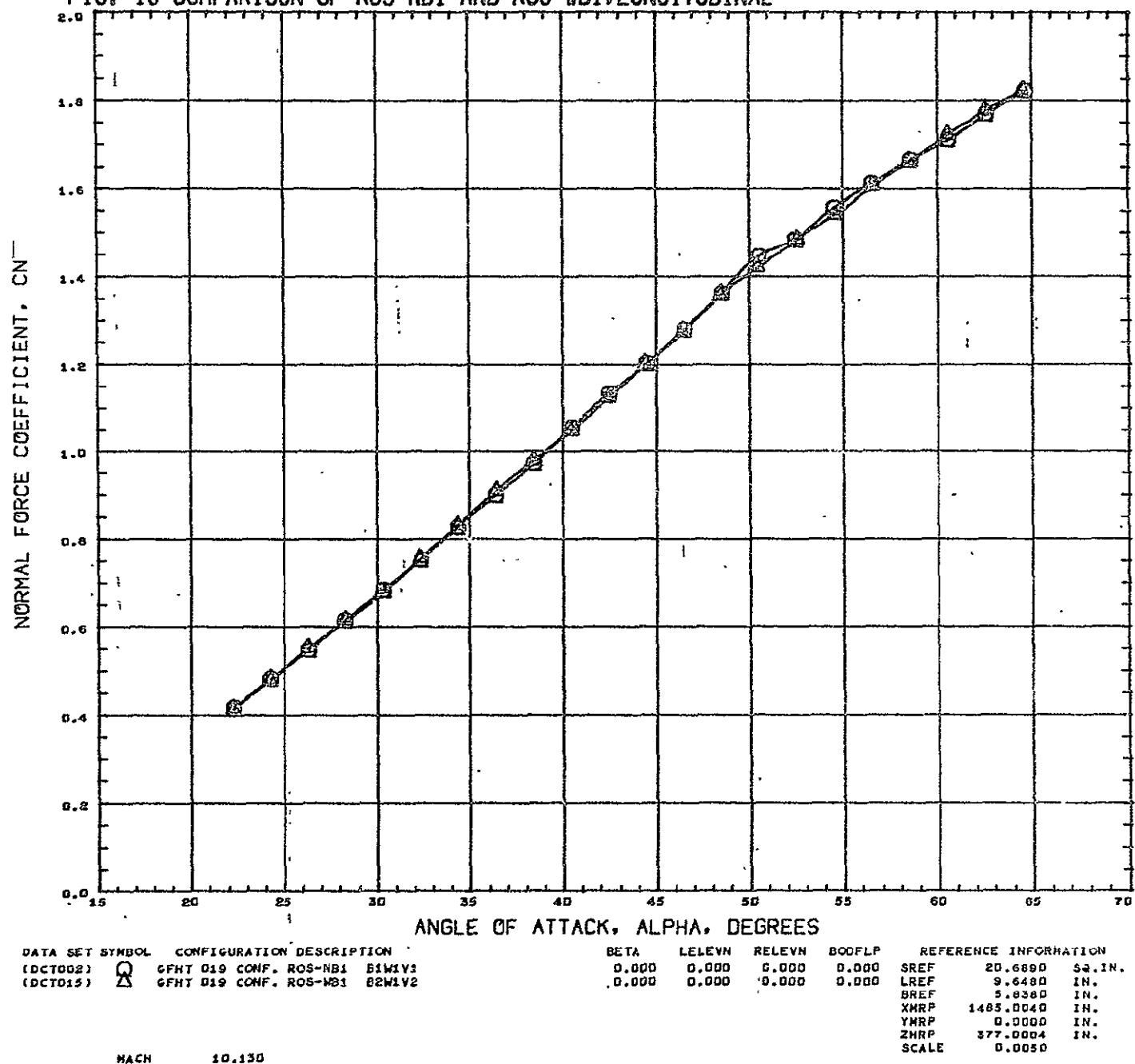
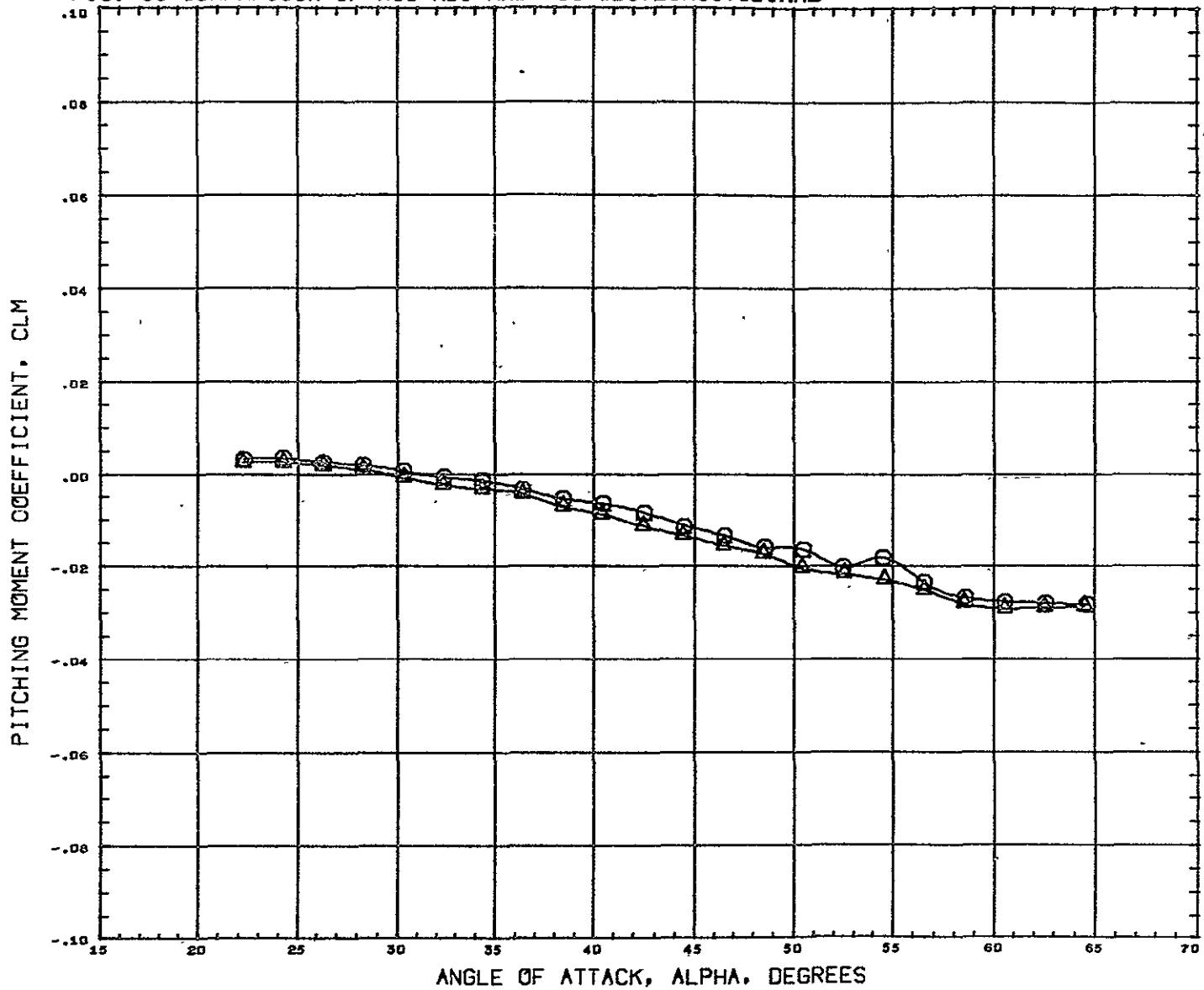


FIG. 16 COMPARISON OF ROS-NB1 AND ROS-WB1, LONGITUDINAL



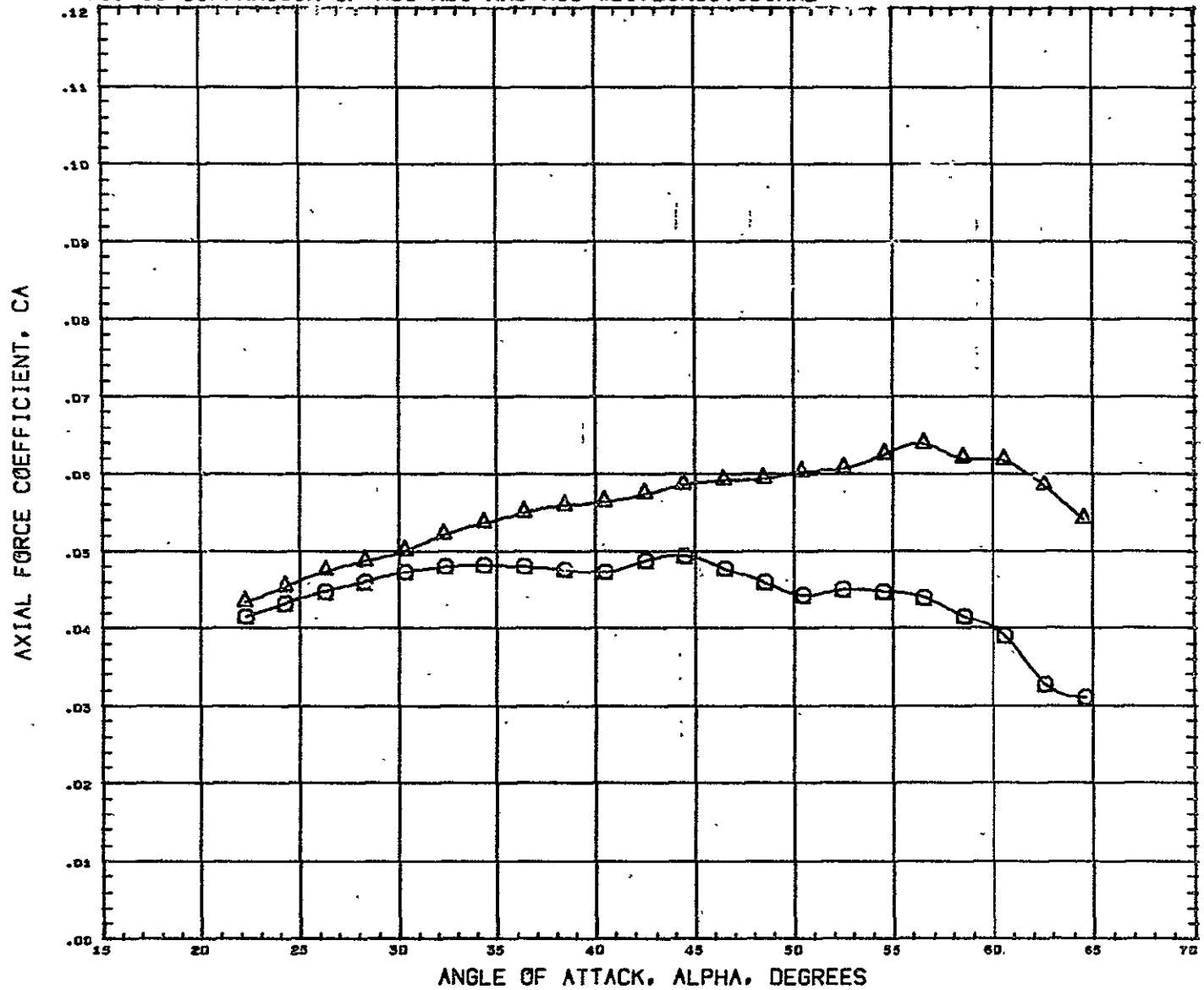
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD02) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCTD15) GFHT D19 CONF. ROS-WB1 B2W1V2

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHRF 1485.0040 IN.
				YHRF 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 16 COMPARISON OF RCS-NB1 AND RCS-WB1, LONGITUDINAL



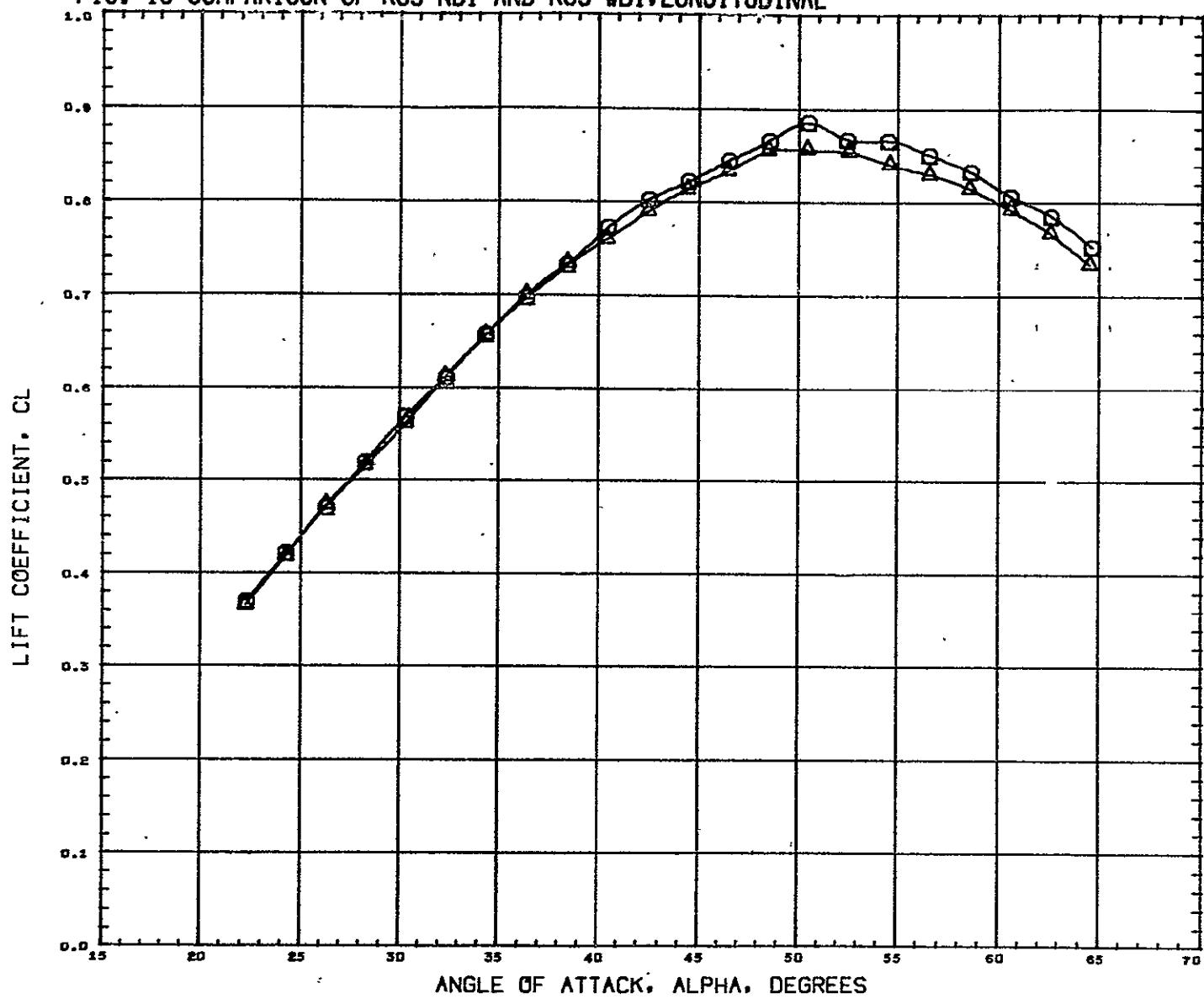
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DC7002) C GFHT D19 CONF. RCS-NB1 B1W1V1
 (DC7015) A GFHT D19 CONF. RCS-WB1 B2W1V2

BETA	LELEVN	RELEVN	BO0FLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.0380 IN.
				XHRP 1485.0040 IN.
				YHRP 0.0000 IN.
				ZHRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

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FIG. 16 COMPARISON OF ROS-NB1 AND ROS-WB1, LONGITUDINAL

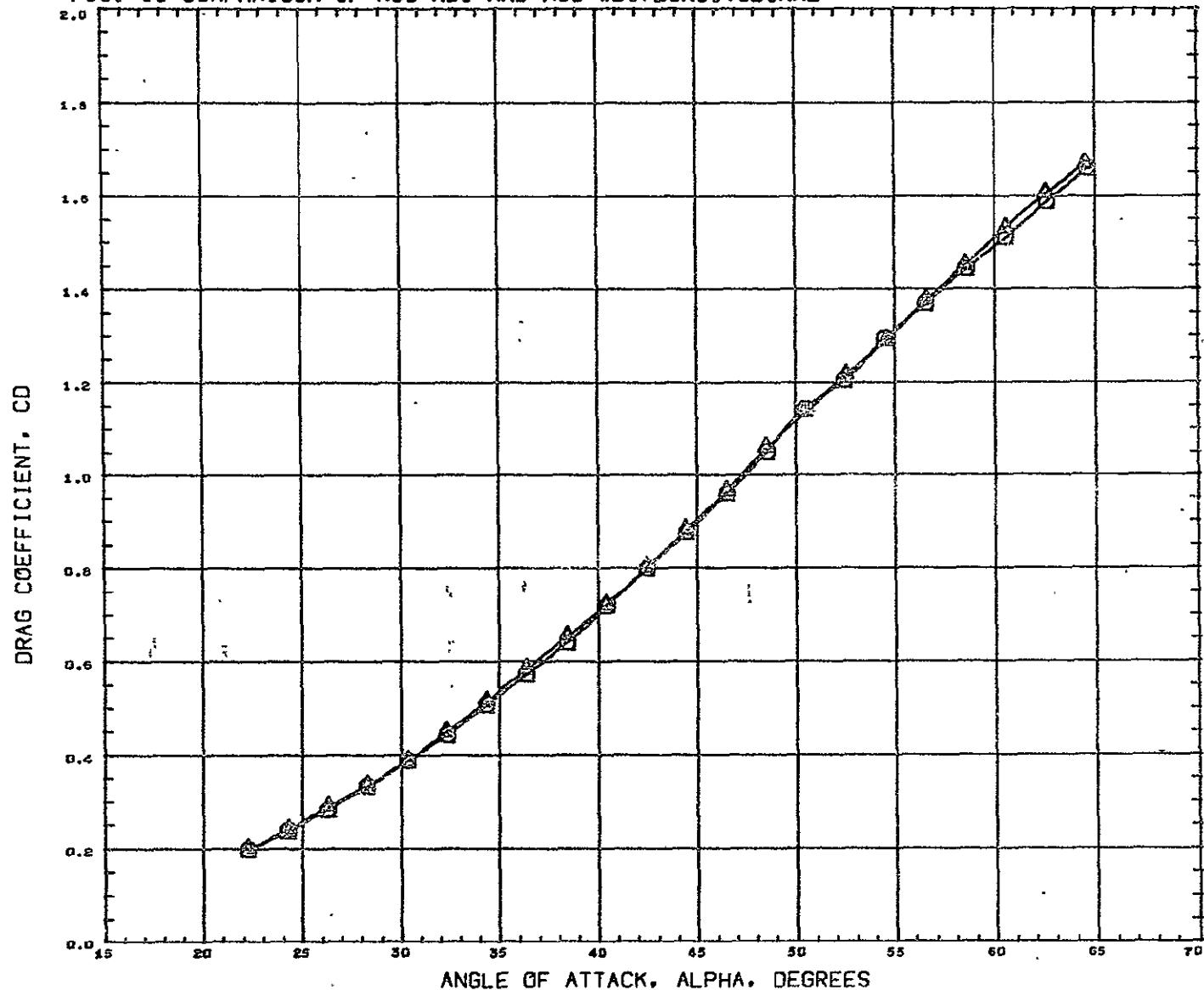


DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCT015) GFHT D19 CONF. ROS-WB1 B2W1V2

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 Sq. IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8360 IN.
				XMRP 1485.0040 IN.
				YNRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

FIG. 16 COMPARISON OF ROS-NB1 AND ROS-WB1, LONGITUDINAL



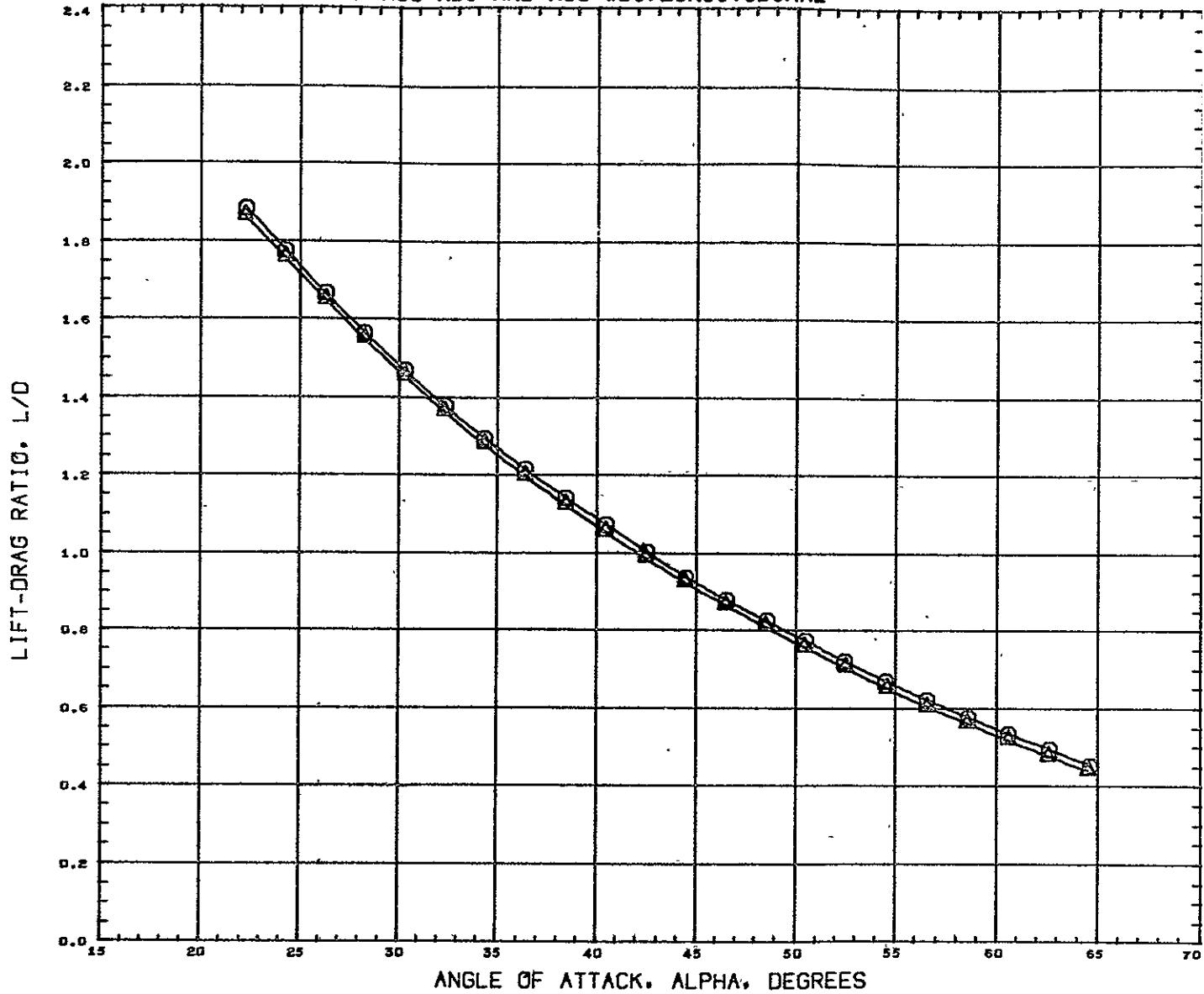
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTB02) A SFMT D19 CONF. ROS-NB1 B1W1V1
 (DCTB15) A SFMT D19 CONF. ROS-WB1 B2W1V2

BETA	LELEVN	RELEVN	BOOFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20,6890 SG. IN.
0.000	0.000	0.000	0.000	LREF 9,6480 IN.
				BREF 5,8380 IN.
				XHLP 1405,0040 IN.
				YHLP 0,0000 IN.
				ZHLP 377,0004 IN.
				SCALE 0,0050

MACH 10.130

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FIG. 16 COMPARISON OF ROS-NB1 AND ROS-WB1, LONGITUDINAL

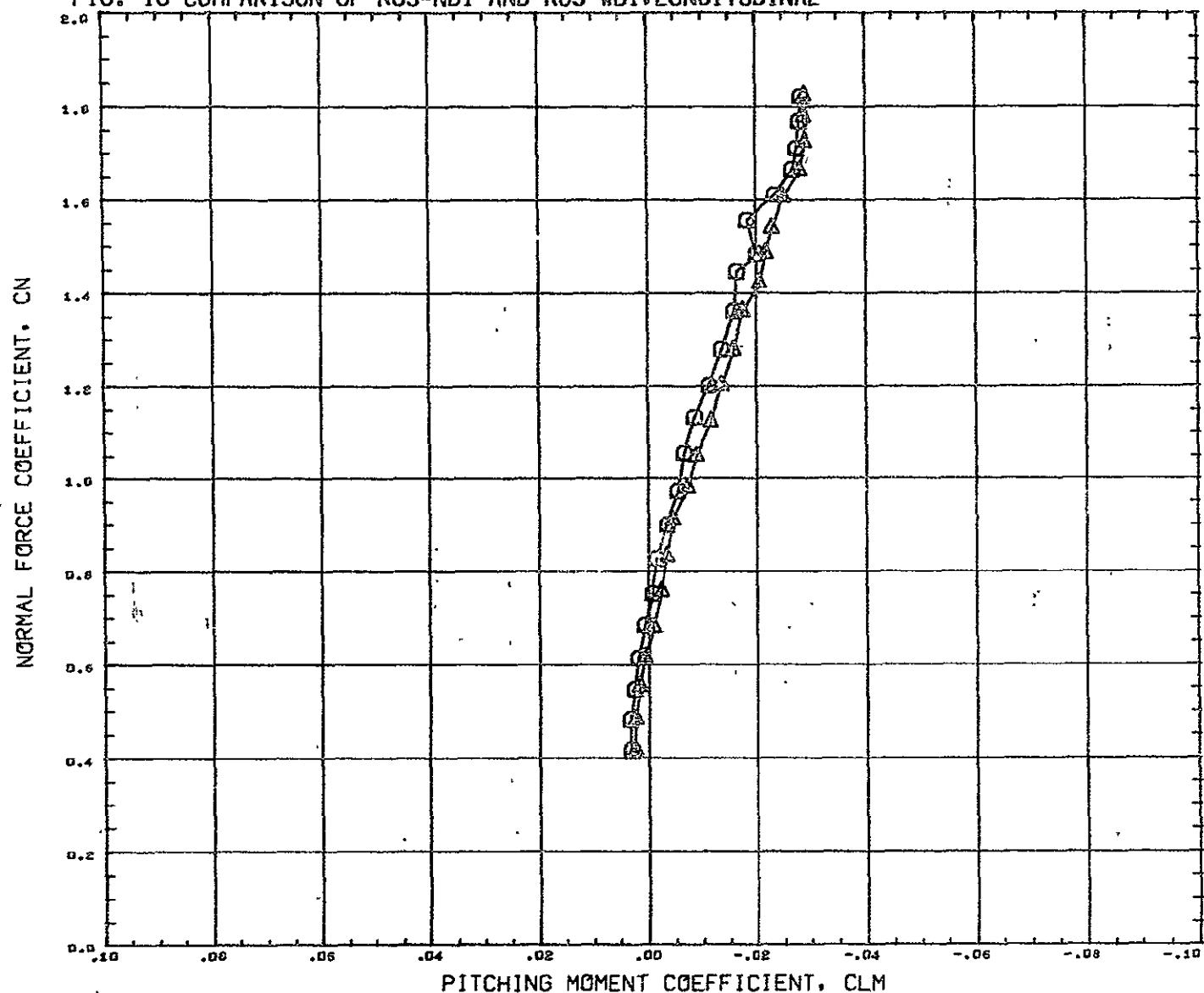


DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD02) GFHT D19 CONF. ROS-NB1 B1W1V1
 (DCTD15) GFHT D19 CONF. ROS-WB1 B2W1V2

BET _A	LELEV _N	RELEV _N	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ. IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

FIG. 16 COMPARISON OF ROS-NB1 AND ROS-WB1, LONGITUDINAL

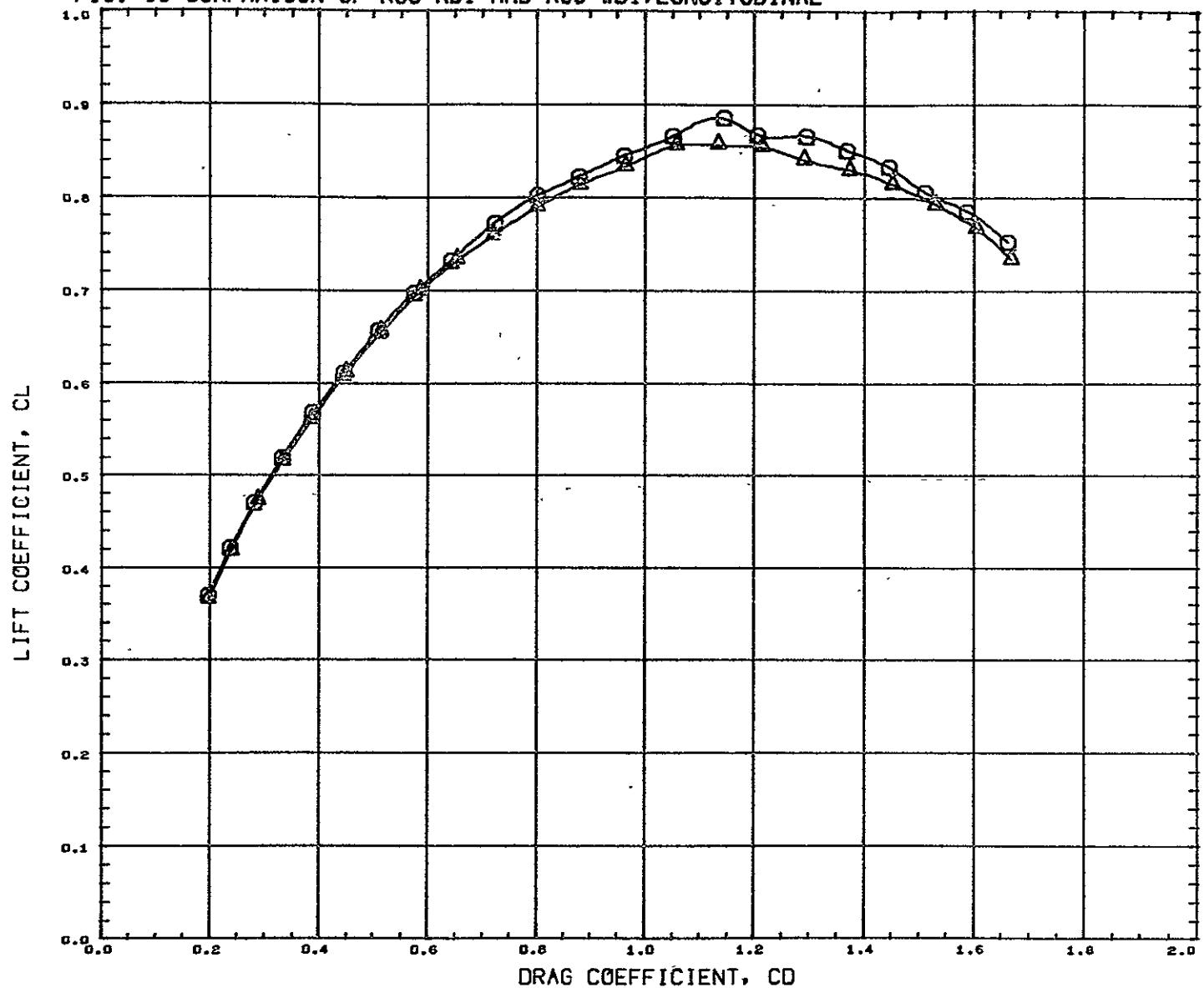


DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCTD02)	GFHT D19 CONF. ROS-NB1 B1W1V1	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCTD15)	GFHT D19 CONF. ROS-WB1 B2W1V2	0.000	0.000	0.000	0.000	LREF 9.6480 IN.
						DREF 5.0380 IN.
						XMRP 1485.0040 IN.
						YMRP 0.0000 IN.
						ZMRP 377.0004 IN.
						SCALE 0.0050

MACH 10.130

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FIG. 16 COMPARISON OF ROS-NB1 AND ROS-WB1, LONGITUDINAL

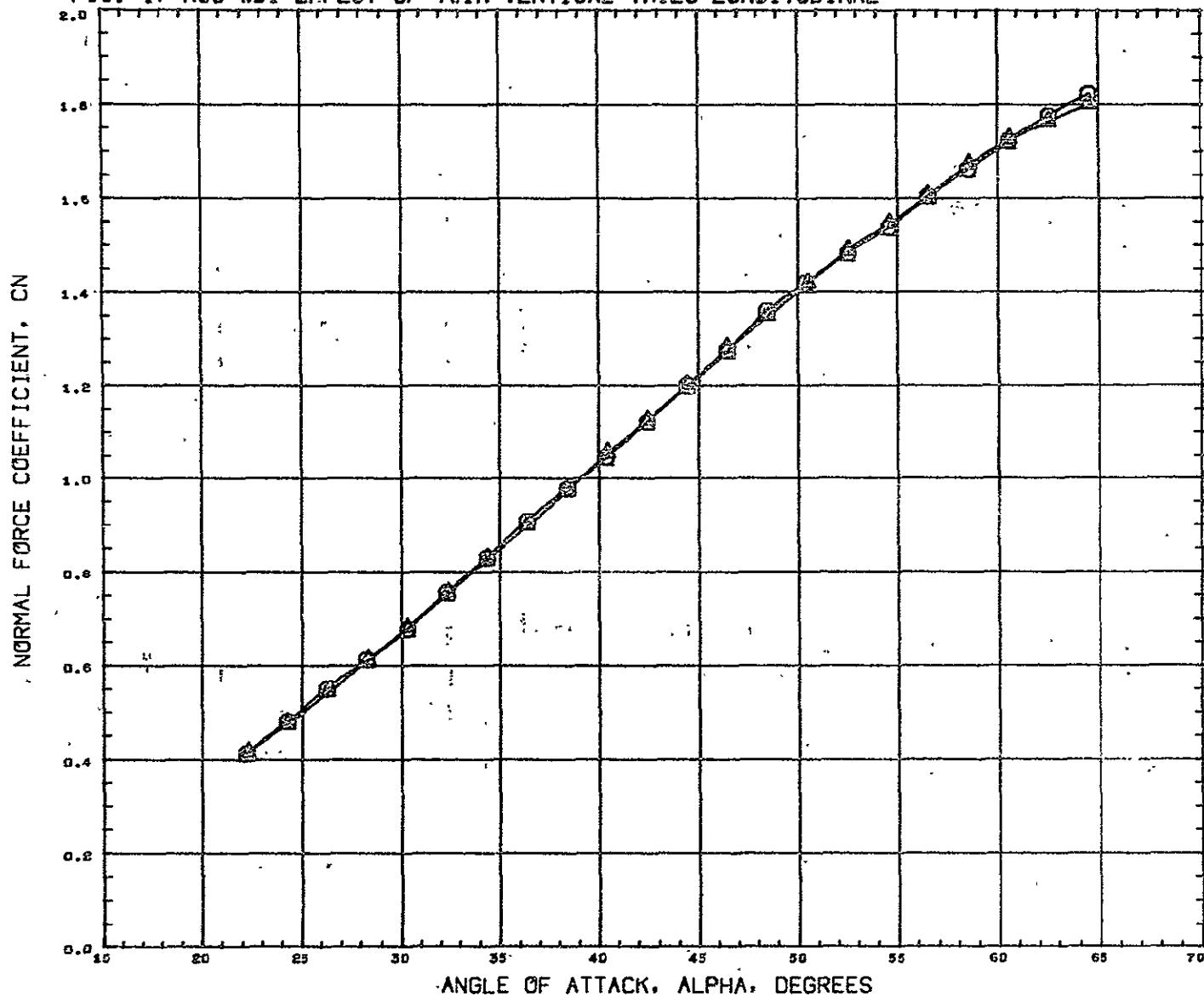


DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT002) GFHT 019 CONF. ROS-NB1 B1W1V1
 (DCT015) GFHT 019 CONF. ROS-WB1 B2W1V2

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

FIG. 17 ROS-WB1 EFFECT OF TWIN VERTICAL TAILS LONGITUDINAL

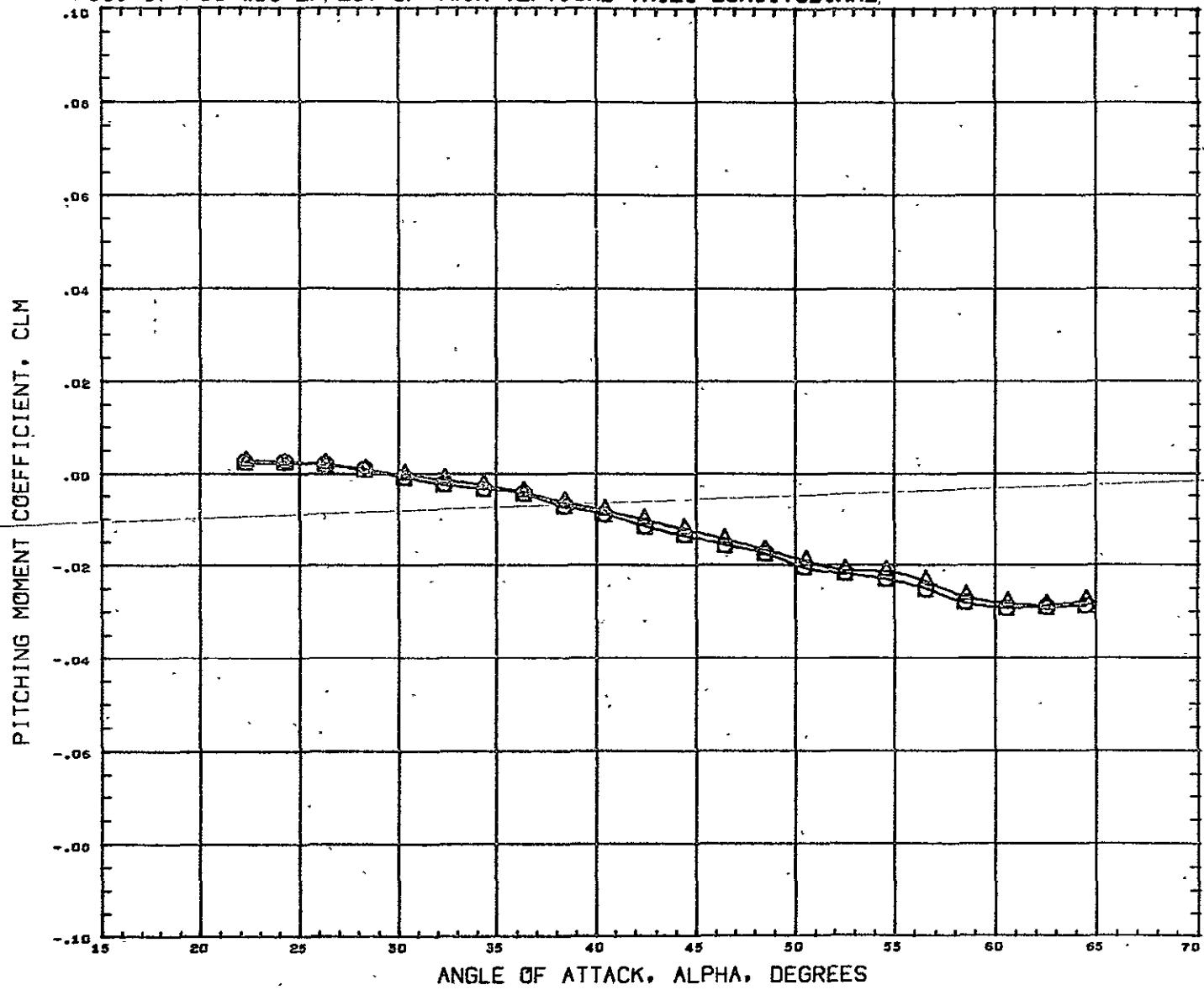


DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD15) GFHT D19 CONF. ROS-WB1 B2W1V2
 (DCTD16) GFHT D19 CONF. ROS-WB1 B2W1

BETA LELEVN RELEVN BCGFLP REFERENCE INFORMATION
 0.000 0.000 0.000 0.000 SREF 20.6890 SQ. IN.
 0.000 0.000 0.000 0.000 LREF 9.6480 IN.
 BREF 5.6380 IN.
 XHRP 1485.0040 IN.
 YHRP 0.0000 IN.
 ZHRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

FIG. 17 ROS-WB1 EFFECT OF TWIN VERTICAL TAILS LONGITUDINAL



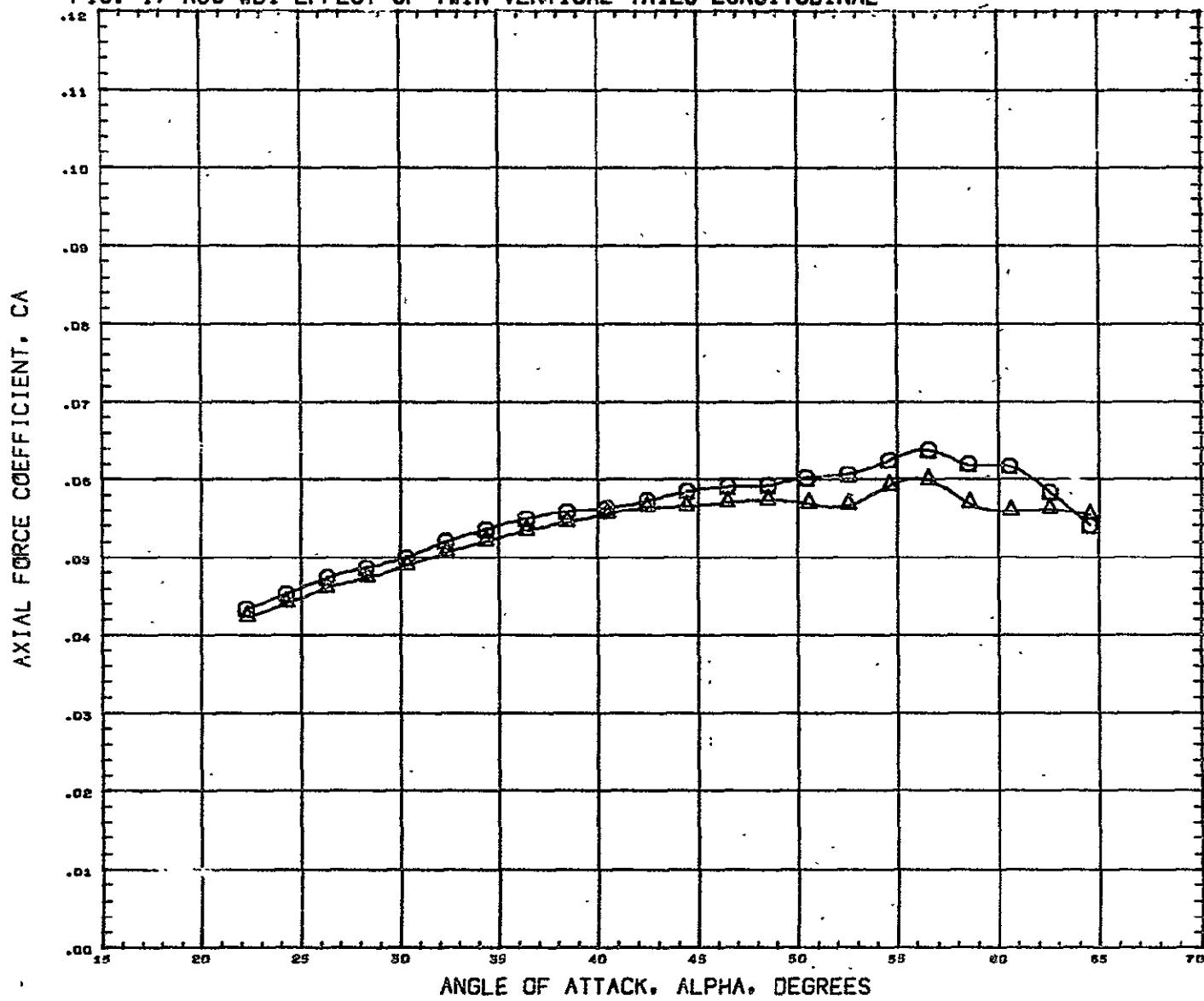
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT015) GFHT D19 CONF. ROS-WB1 B2W1V2
 (DCT016) GFHT D19 CONF. ROS-WB1 B2W1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

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FIG. 17 ROS-WB1 EFFECT OF TWIN VERTICAL TAILS LONGITUDINAL

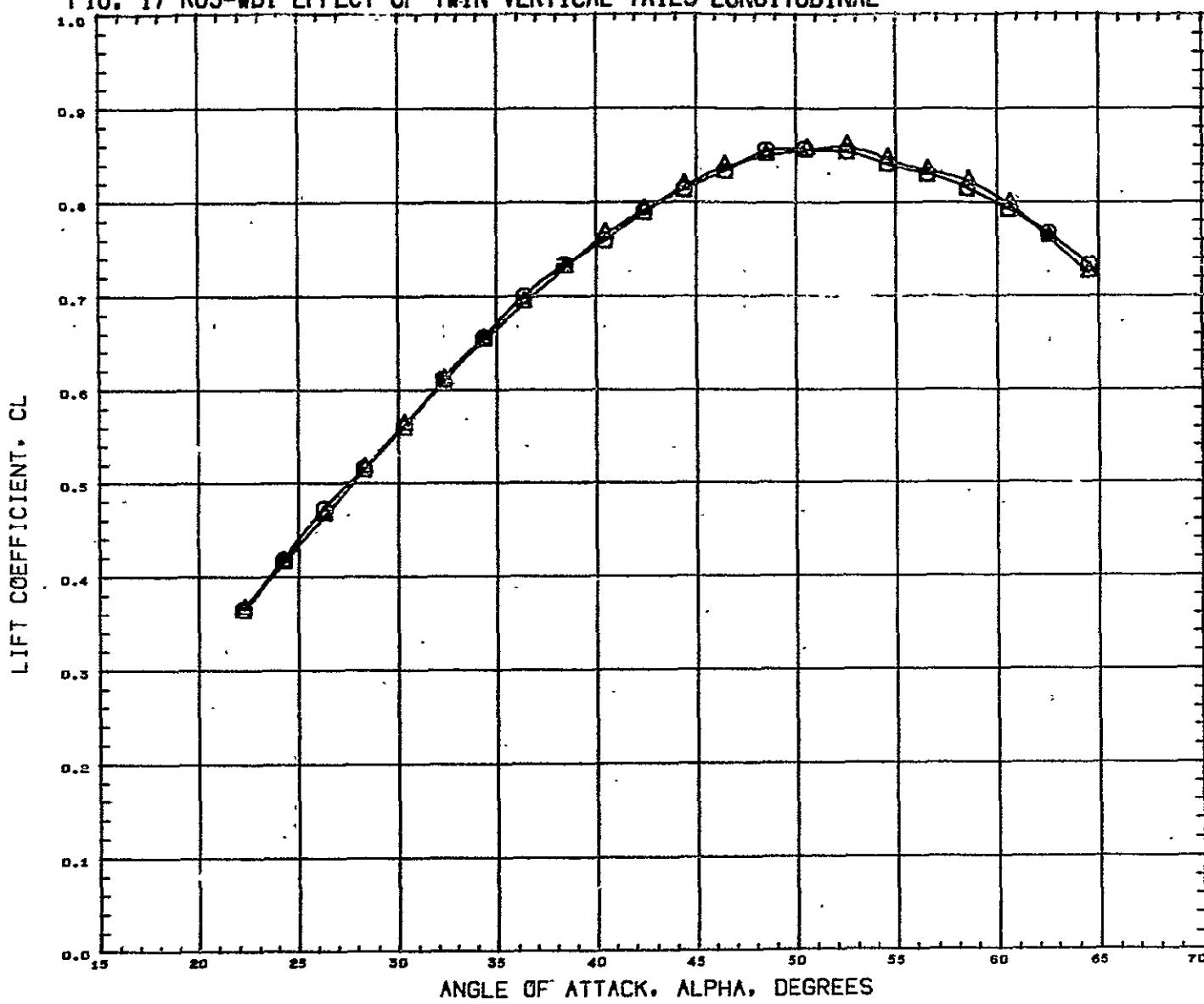


DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT015) GFHT D19 CONF. ROS-WB1 B2W1V2
 (DCT016) GFHT D19 CONF. ROS-WB1 B2W1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6690 IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XMRP 1485.0040 IN.
				YMRP 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

MACH 10.130

FIG. 17 ROS-WBI EFFECT OF TWIN VERTICAL TAILS LONGITUDINAL



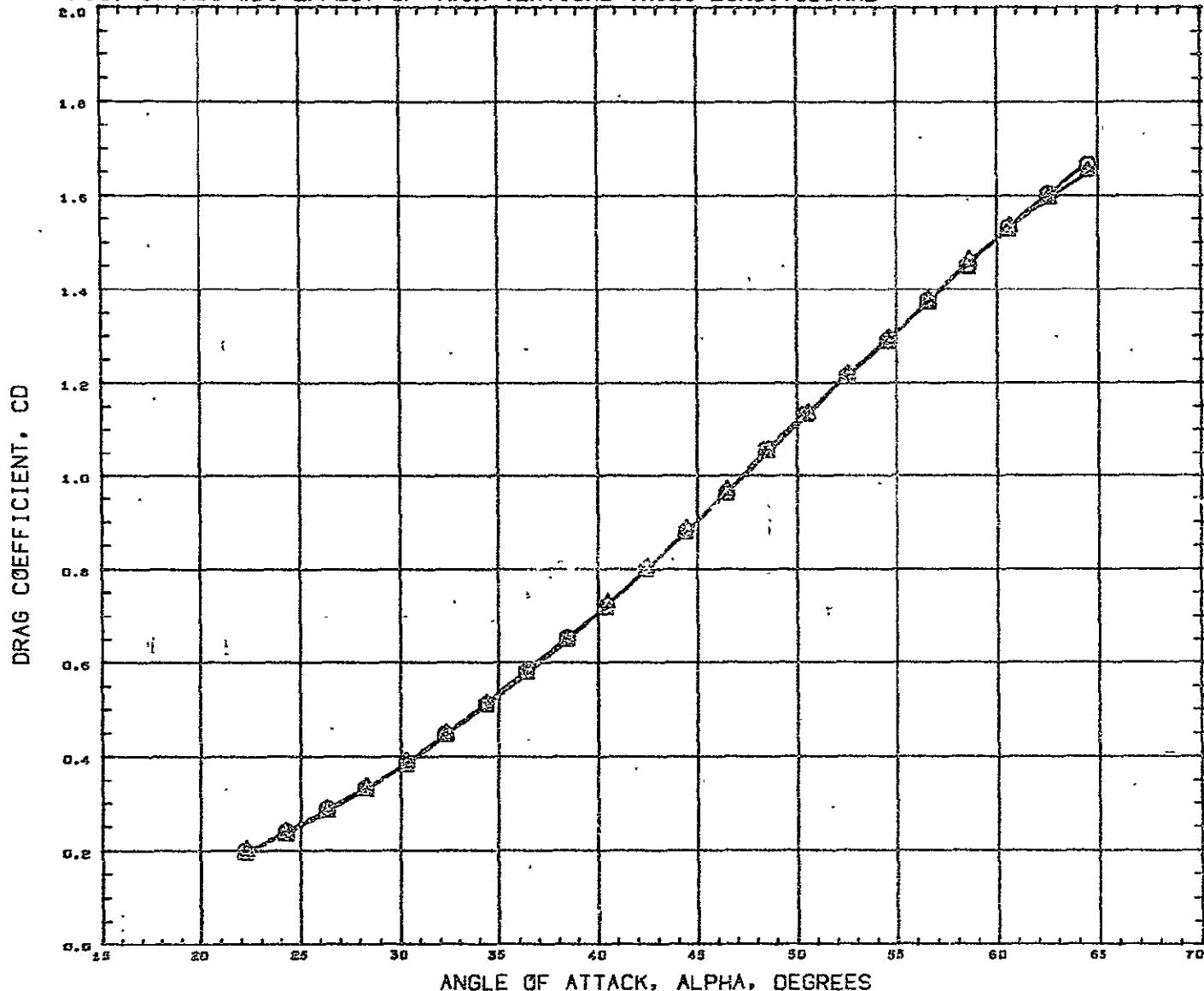
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT015) GFHT D19 CONF. ROS-WBI B2W1V2
 (DCT016) GFHT D19 CONF. ROS-WBI B2W1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHRP 1405.0040 IN.
				YHRP 0.0000 IN.
				ZHRP 377.0004 IN.
				SCALE 0.0050

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FIG. 17 ROS-WB1 EFFECT OF TWIN VERTICAL TAILS LONGITUDINAL



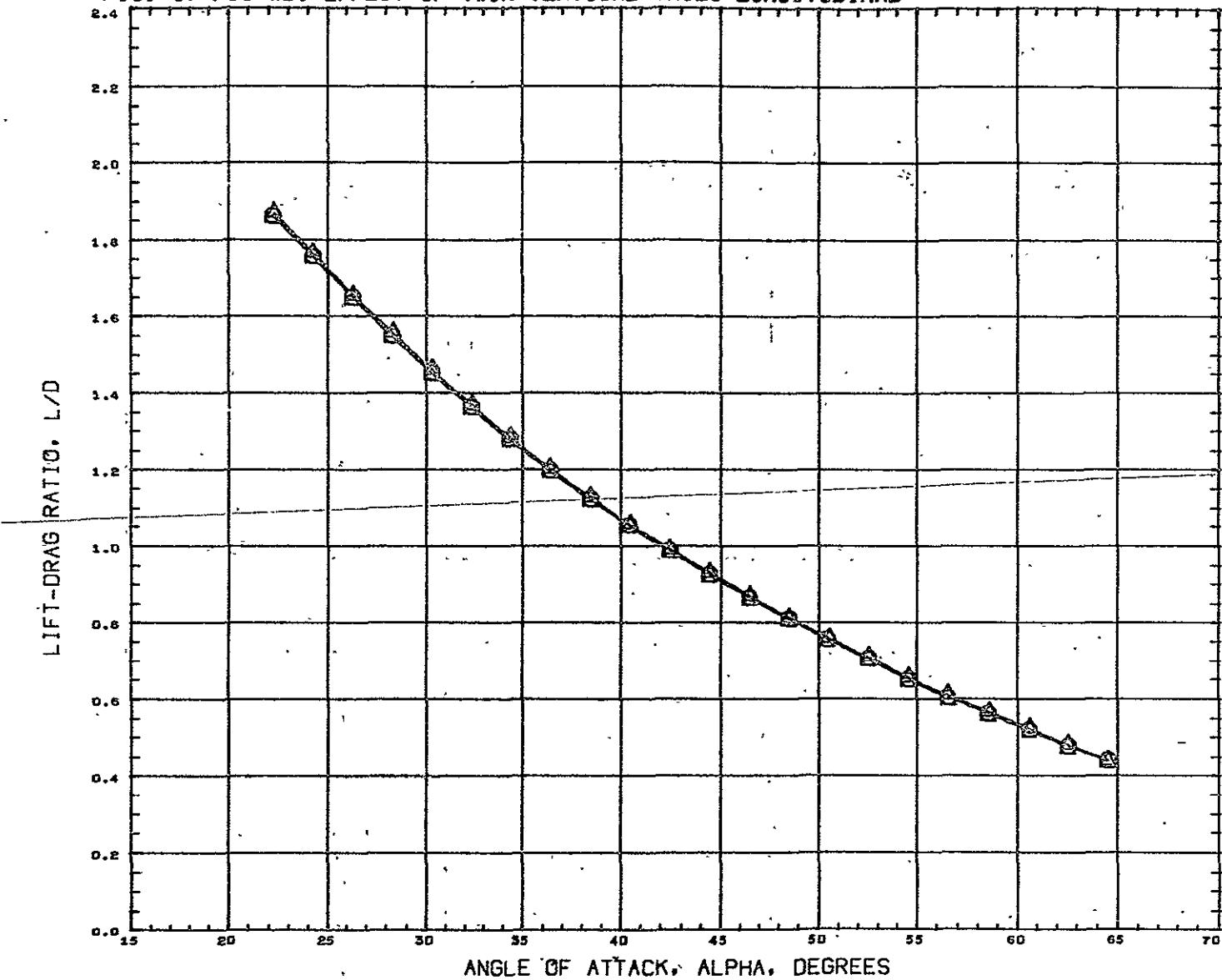
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCTD15) GFHT D15 CONF. ROS-WB1 B2W1V2
 (DCTD16) GFHT D16 CONF. ROS-WB1 B2W1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6690 SQ-IN.
0.000	-0.000	0.000	0.000	LREF 9.6460 IN.
				BREF 5.0380 IN.
				XNRP 1485.0040 IN.
				YNRP 0.0000 IN.
				ZNRP 377.0004 IN.
				SCALE 0.0050

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FIG. 17 ROS-WB1 EFFECT OF TWIN VERTICAL TAILS LONGITUDINAL



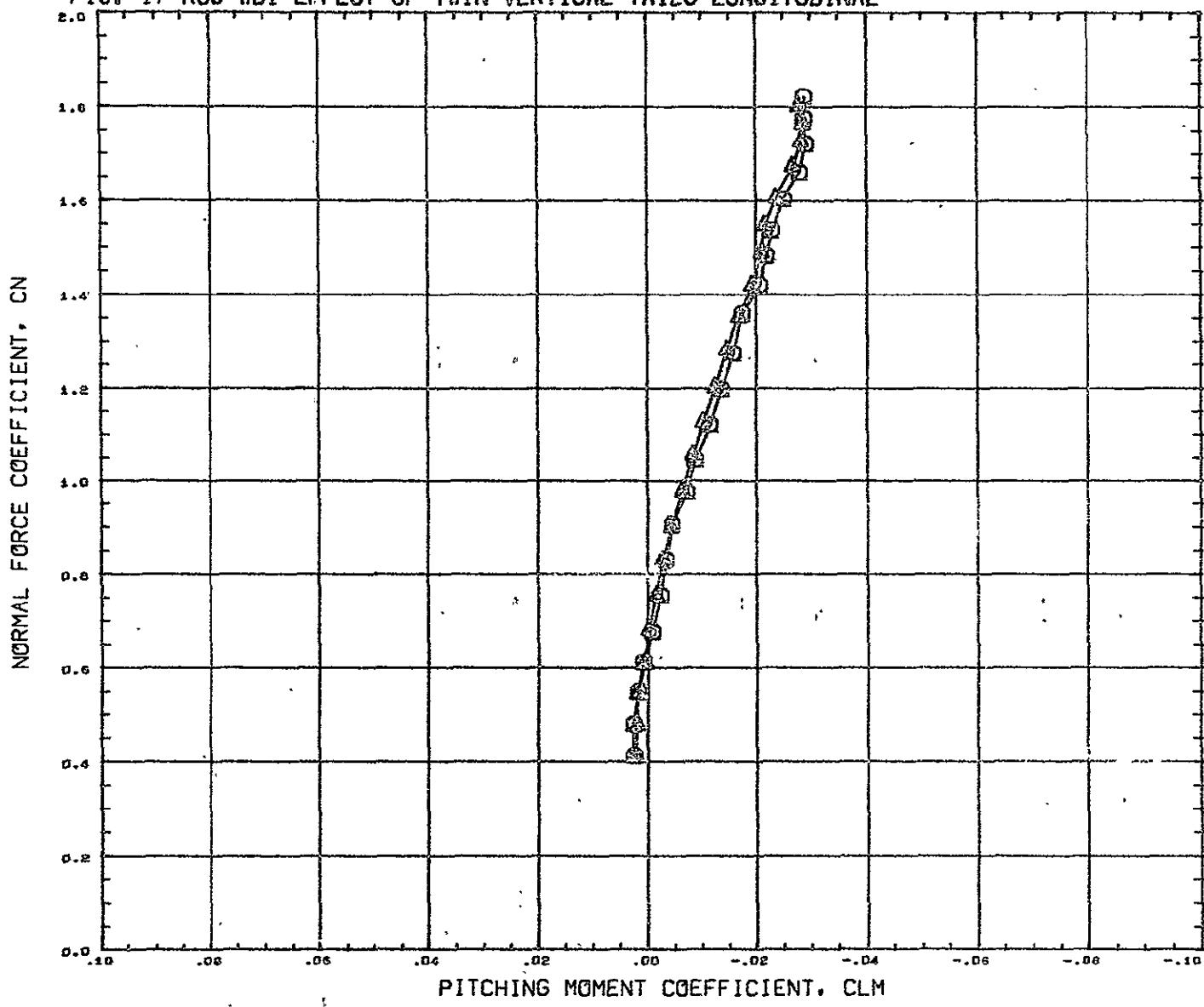
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT015) GFHT B19 CONF. ROS-WB1 B2W1V2
 (DCT016) GFHT B19 CONF. ROS-WB1 B2W1

BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
0.000	0.000	0.000	0.000	LREF 9.6480 IN.
				BREF 5.8380 IN.
				XHRF 1485.0040 IN.
				YHRF 0.0000 IN.
				ZMRP 377.0004 IN.
				SCALE 0.0050

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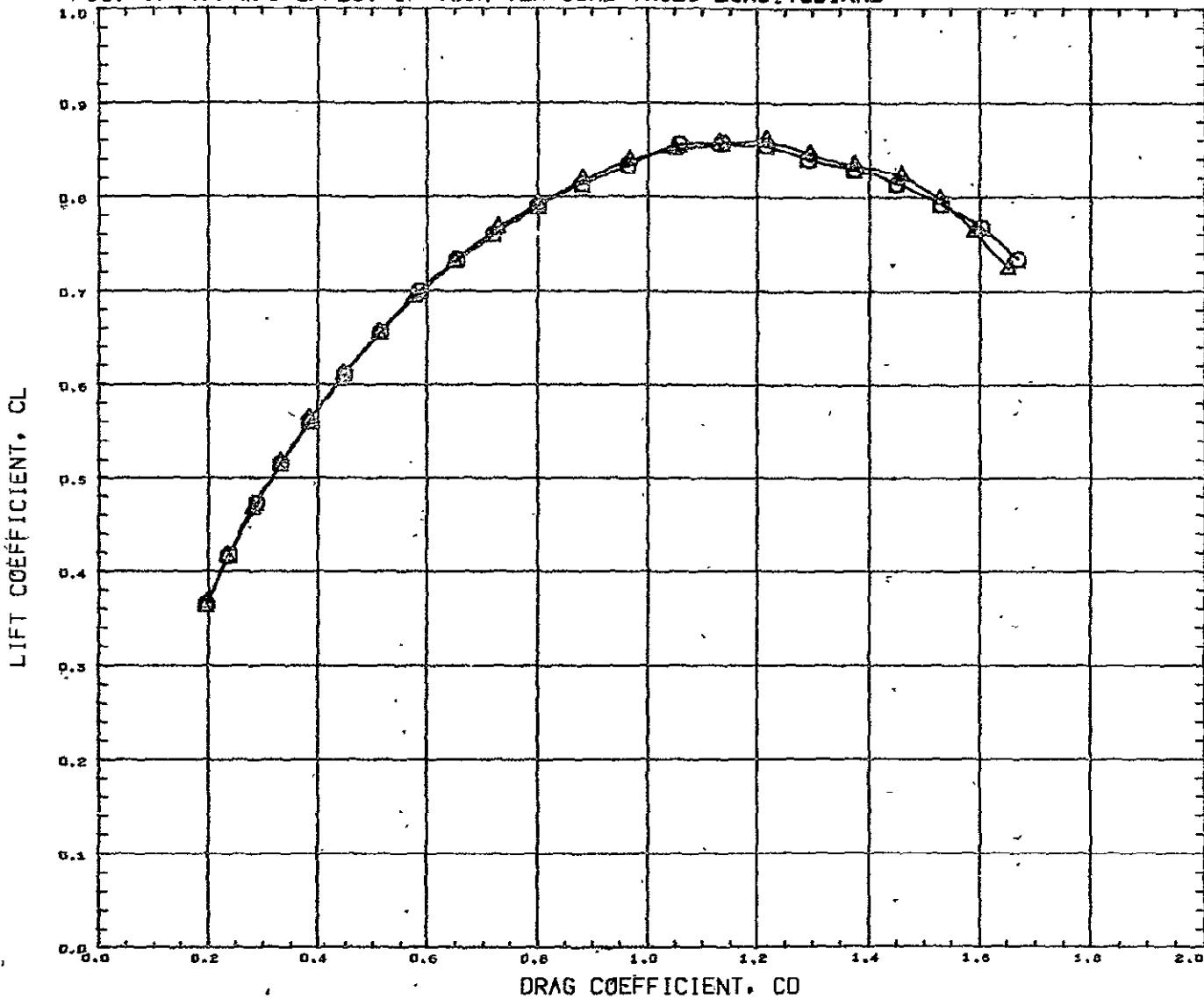
FIG. 17 ROS-WB1 EFFECT OF TWIN VERTICAL TAILS LONGITUDINAL



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BCDFLP	REFERENCE INFORMATION
(DCT015)	GFHT D19 CONF. ROS-WB1 B2WIV2	0.000	0.000	0.000	0.000	SREF 20.6890 SQ.IN.
(DCT016)	GFHT D19 CONF. ROS-WB1 B2WI	0.000	0.000	0.000	0.000	LREF 9.6480 IN.
						BREF 5.8380 IN.
						XHRF 1485.0040 IN.
						YHRF 0.0000 IN.
						ZHRF 377.0004 IN.
						SCALE 0.0050

MACH 10.530

FIG. 17 ROS-WB1 EFFECT OF TWIN VERTICAL TAILS LONGITUDINAL



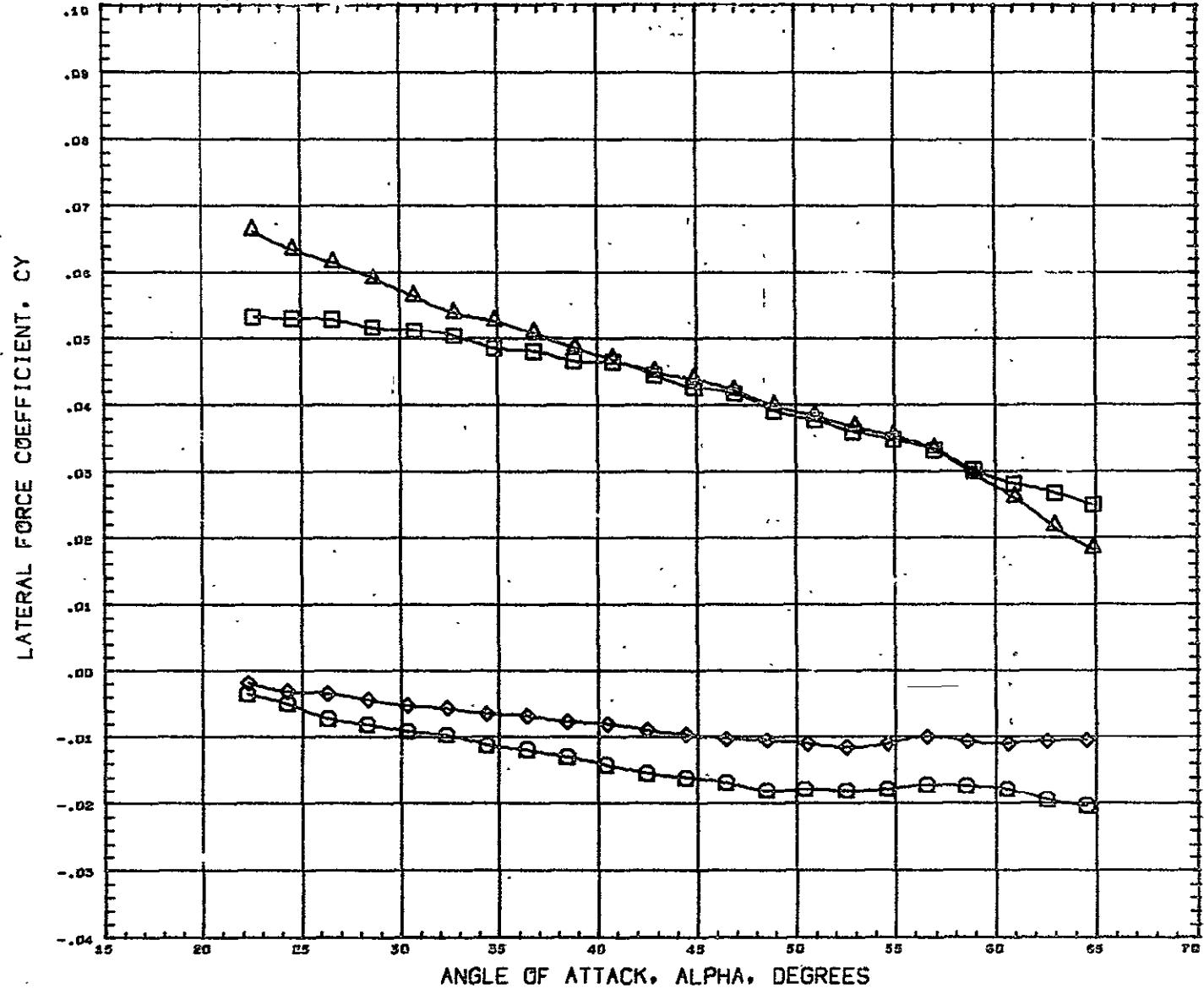
DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (DCT015) GFHT D19 CONF. ROS-WB1 B2W1Y2
 (DCT016) GFHT D19 CONF. ROS-WB1 B2W1

BETA LELEVN RELEVN BODFLP REFERENCE INFORMATION
 0.000 0.000 0.000 0.000 SREF 20.6890 SQ.IN.
 0.000 0.000 0.000 0.000 LREF 9.6480 IN.
 0.000 0.000 0.000 0.000 DREF 5.8380 IN.
 XMRP 1485.0040 IN.
 YMRP 0.0000 IN.
 ZMRP 377.0004 IN.
 SCALE 0.0050

MACH 10.130

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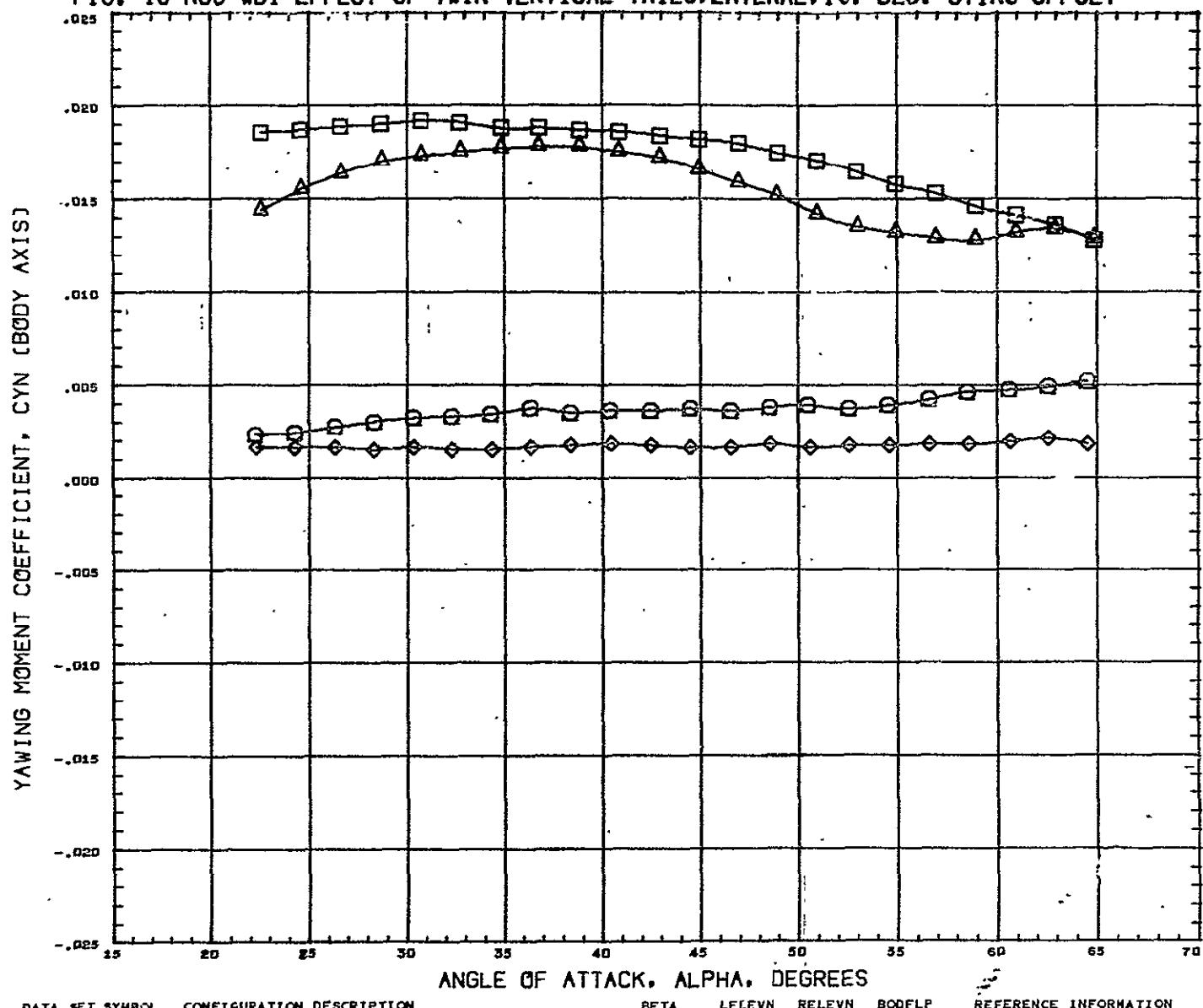
FIG. 18 ROS-WB1 EFFECT OF TWIN VERTICAL TAILS, LATERAL, 10. DEG. STING OFFSET



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCT015)	GFHT 019 CONF. ROS-WB1 B2W1V2	0.000	0.000	0.200	0.000	SREF 20.6890 IN.
(DCT024)	GFHT 019 ROS-WB1 B2W1V2 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	0.000	LREF 9.6480 IN.
(DCT016)	GFHT 019 CONF. ROS-WB1 B2W1	0.000	0.000	0.000	0.000	BREF 5.6380 IN.
(DCT025)	GFHT 019 ROS-WB1 B2W1 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	0.000	XHRP 1485.0040 IN.
						YHRP 0.0000 IN.
						ZHRP 377.0004 IN.
						SCALE 0.0050

MACH 10.138

FIG. 18 ROS-WB1 EFFECT OF TWIN VERTICAL TAILS, LATERAL, 10. DEG. STING OFFSET



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	LELEVN	RELEVN	BODFLP	REFERENCE INFORMATION
(DCTG15)	GFHT D19 CONF. ROS-WB1 B2W1V2	0.000	0.000	0.000	SREF	20.6890 SQ.IN.
(DCTQ24)	GFHT D19 ROS-WB1 B2W1V2 BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	LREF	9.6480 IN.
(DCTD16)	GFHT D19 CONF. ROS-WB1 B2WI	0.000	0.000	0.000	BREF	5.8380 IN.
(DCTQ25)	GFHT D19 ROS-WB1 B2WI BETA IS -10 COS(ALPHA)	0.000	0.000	0.000	XMRP	1485.0040 IN.
					YMRP	0.0000 IN.
					ZMRP	377.0004 IN.
					SCALE	0.0050

MACH 10.130

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FIG. 18 ROS-WB1 EFFECT OF TWIN VERTICAL TAILS, LATERAL, 10. DEG. STING OFFSET

