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RESULTS OF TESTS ON A 0.004-SCALE

SPACE SHUTTLE LAUNCH CONFIGURATION (MODEL 74ØTS) IN

THE NASA/MSFC 14-INCH TRISONIC WIND TUNNEL

(FA28)

SPACE SHUTTLE AEROTHERMODYNAMIC DATA REPORT

Data Management SERVICES

HUNTSVILLE ELECTRONICS DIVISION CHRYSLER CORPORATION

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by

W. F. Braddock
Lockheed Missiles and Space Company, Inc.
Huntsville Research and Engineering Center

Prepared under NASA Contract Number NAS9-16283

by

Data Management Services
Chrysler Huntsville Electronics Division
Slidell Engineering Office
New Orleans, Louisiana 70189

for

Engineering Analysis Division

Johnson Space Center
National Aeronautics and Space Administration
Houston, Texas

WIND TUNNEL TEST SPECIFICS:

Test Number:	MSFC 14TWT 656
NASA Series Number:	FA28
Model Number:	74 ØTS
Test Dates:	July 10 - August 9, 1979
Occupancy Hours:	184

FACILITY COORDINATOR:

C. D. Andrews
NASA-George C. Marshall Space Flight Center
Mail Code ED32
Marshall Space Flight Center
Huntsville, Alabama 35812
Phone: (205) 453-5558

PROJECT ENGINEERS:

W. F. Braddock
Lockheed Missiles & Space Co.,Inc
Huntsville Research & Engrg Center
Cummins Research Park
4800 Bradford Drive
Huntsville, Alabama 35805

Paul E. Ramsey
NASA/MSFC
Mail Code ED32
Marshall Space Flight Center
Huntsville, Alabama 35812
Phone: (205) 453-3152

DATA MANAGEMENT SERVICES:

Prepared by: J. E. Vaughn

Approved: J. L. Glynn, Manager
Data Operations

Concurrence: N. D. Kemp, Manager
Data Management Services

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RESULTS OF TESTS ON A 0.004 SCALE SPACE SHUTTLE LAUNCH CONFIGURATION (MODEL 740TS) IN THE NASA/MSFC 14-INCH TRISONIC WIND TUNNEL (FA28)

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W. F. Braddock
Lockheed Missiles and Space Company, Inc.
Huntsville Research and Engineering Center

ABSTRACT

A wind tunnel test was conducted to determine ways to alleviate the forward Orbiter/ET attach point loads and verify previous six-component data taken at the Arnold Engineering and Development Center. The test was conducted with an SSLV model in the Marshall Space Flight Center's 14 x 14 Inch Trisonic Wind Tunnel. The 0.004-scale model (74-OTS) was instrumented with a six-component balance measuring Orbiter loads, a three-component balance measuring Orbiter wing loads, and gages to measure both inboard and outboard elevon hinge moments. The test, TWT-656 (NASA Series No. FA28), occupied the facility between 10 July and 9 August 1979. One hundred twenty-two (122) data runs (pitch and yaw polars) were performed during this test. The total angle of attack and yaw ranges that were covered were from +8 to -8 degrees. The primary test Mach numbers were 0.60, 0.90, 1.05, 1.10 and 1.25. Test Reynolds numbers were between 4.9×10^6 and 9.1×10^6 per foot. The roll angles were 0, 90 and -90 degrees. Aerodynamics of the following configurations were investigated: (1) Orbiter alone; (2) Orbiter alone without wing gap sealed; (3) ET without protuberances; (4) base line Space Shuttle Launch Vehicle; (5) multiple body flap deflections; and (6) transition grit on Orbiter wing.

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PLOT SCHEDULES:

A) C_N, C_m, C_A vs α

B) C_{N_W}, C_{B_W}, C_{T_W} vs α

C) $C_{h_{e_o}}$, $C_{h_{e_I}}$ vs α

D) C_Y, C_n, C_ℓ vs β

E) C_{N_W}, C_{B_W}, C_{T_W} vs β

F) $C_{h_{e_o}}$, $C_{h_{e_I}}$ vs β

NOMENCLATURE

Symbol	Mnemonic	Description
A_{BF}		body flap planform area, in^2
$A_{b_{ORB}}$		total orbiter base area, in^2
AF		axial force, lb
B_W		balance root bending moment of orbiter wing, in.-lb.
b	BREF	reference length for lateral-directional coefficients, in.
b_w		orbiter wing span, in
$\overline{C}$		orbiter wing mean aerodynamic chord, in.
$C_{A_{b_{ORB}}}$		orbiter base axial force coefficient on $A_{b_{ORB}}$
$C_{A_{f_{ORB}}}$		orbiter forebody axial force coefficient
$C_{A_{T_{ORB}}}$	CA	orbiter total axial force coefficient
$C_{B_{\ell_{ORB}}}$	CBL	rolling moment coefficient for the orbiter
$C_{B_{\ell_{f_{ORB}}}}$		forebody rolling moment coefficient for the orbiter referenced to MRP
C_{B_W}	CBW	orbiter wing root bending moment coefficient
$\overline{C}_e$		orbiter elevon mean aerodynamic chord
$C_{h_{e_I}}$	CHEI	orbiter inboard elevon hinge moment coefficient
$C_{h_{e_O}}$	CHEØ	orbiter outboard elevon hinge moment coefficient

NOMENCLATURE (Continued)

Symbol	Mnemonic	Description
$C_{m_{ORB}}$	CLM	orbiter total pitching moment coefficient referenced to MRP
$C_{m_{BF_{ORB}}}$		orbiter body flap pitching moment coefficient referenced to MRP
$C_{m_{b_{ORB}}}$		orbiter base pitching moment coefficient referenced to MRP
$C_{m_{f_{ORB}}}$		orbiter forebody pitching moment coefficient referenced to MRP
$C_{N_{ORB}}$	CN	orbiter total normal force coefficient
$C_{N_{f_{ORB}}}$		orbiter forebody normal force coefficient
$C_{N_{BF_{ORB}}}$		orbiter body flap normal force coefficient
$C_{N_{b_{ORB}}}$		orbiter base normal force coefficient
C_{N_W}	CNW	orbiter wing normal force coefficient
C_{T_W}	CTW	orbiter wing torsion moment coefficient
$C_{P_{ORB}}$	CPB	base pressure coefficient for the orbiter
$C_{Y_{ORB}}$	CY	orbiter side force coefficient
$C_{Y_{f_{ORB}}}$		orbiter forebody side force coefficient
$C_{Y_{N_{ORB}}}$	CYN	total yawing moment coefficient for the orbiter referenced to MRP

NOMENCLATURE (Continued)

Symbol	Mnemonic	Description
$C_{Y_{N_{f_{ORB}}}}$		forebody yawing moment coefficient for the orbiter referenced to MRP
ET		external tank
$F_{A_{BORB}}$		balance axial force for the orbiter, lb
$F_{N_{BORB}}$		balance normal force for the orbiter, lb
$F_{Y_{BORB}}$		balance side force for the orbiter, lb
H_{e_I}		inboard balance elevon hinge moment for the orbiter, in.-lb
H_{e_O}		outboard balance elevon hinge moment for the orbiter, in.-lb
i_b		effective orbiter base cant angle, deg
L_{REF}	LREF	reference length for longitudinal coefficients, in.
M	MACH	Mach number
MRP		moment reference point
MSFC		Marshall Space Flight Center
$M_{X_{BORB}}$		balance rolling moment for the orbiter, in.-lb
$M_{Y_{BORB}}$		balance pitching moment for the orbiter, in.-lb
$M_{Z_{BORB}}$		balance yawing moment for the orbiter, in.-lb
N_W		balance orbiter wing normal force, lb
N_F		normal force, lb

NOMENCLATURE (Continued)

Symbol	Mnemonic	Description
P_∞		tunnel freestream static pressure, psia
P_{ORB}		base pressure for the orbiter, psia
P_t	PT	tunnel freestream total pressure, psia
PM		pitching moment, in.-lb
q		tunnel freestream dynamic pressure, psia
RM		rolling moment, in.-lb
RN	RN/L	Reynolds number per unit length, per foot
S_e		elevon reference area, in^2
S_{REF}	SREF	reference area, in^2
SF		side force, lb
SRB		solid rocket booster
SSLV		Space Shuttle Launch Vehicle
	SCALE	model scale ratio
T_t		tunnel freestream total temperature, F
T_W		orbiter wing balance torsion moment, in.-lb
TWT		trisonic wind tunnel
$\overline{X}_{BF_{ORB}}$		X distance from MRP to centroid of body flap, in.
$\overline{X}_{b_{ORB}}$		X distance from MRP to centroid of orbiter base, in.
X_T, T_T, Z_T		ET coordinate system, in
X_{T_O}		X moment transfer from orbiter balance to MRP, in.

NOMENCLATURE (Concluded)

Symbol	Mnemonic	Description
YM		yawing moment, in.-lb
$\bar{Z}_{bORB}$		Z distance from MRP to centroid of orbiter base, in.
Z_{T_O}		Z moment transfer from orbiter balance to MRP, in.
X Y Z	XMRP YMRP ZMRP	longitudinal (X), lateral (Y) and vertical (Z) location of moment reference point on the vehicle
α	ALPHA	model angle of attack, deg.
α_T		total angle of attack, deg
α'		preset model attitude, measured with sector at zero, deg
β	BETA	model angle of sideslip, deg
δ_{BF}	BDFLAP	orbiter body flap deflection angle, deg
δ_{EI}	ELV-IB	inboard elevon deflection angle, deg
δ_{EO}	ELV-OB	outboard elevon deflection angle, deg
ϕ	PHI	aerodynamic roll angle (including all offsets and deflections), deg

INTRODUCTION

The wind tunnel test described herein was conducted to determine ways to alleviate the forward Orbiter/ET attach point loads and verify previous six-component data taken at the Arnold Engineering and Development Center.

A 0.004-scale model of the Space Shuttle Launch Vehicle (SSLV) was used to perform the test in the Marshall Space Flight Center's 14 x 14-Inch Trisonic Wind Tunnel. The External Tank (ET) was suspended between the two Solid Rocket Boosters (SRB) which were each mounted on a dummy balance and sting. The Orbiter was mounted on a six-component balance and sting. The Orbiter right wing was mounted on a three-component balance and the two left elevons were instrumented to measure hinge moment.

The Orbiter model was tested alone for one series of runs. For the remainder of the test, the entire SSLV model was tested with configuration changes confined to changes in the ET protuberances and Orbiter body flap positions.

Data from this test are presented as Orbiter aerodynamic coefficients versus Orbiter angle of attack or angle of side slip. Several comparisons are presented of data from test runs using the model with different Orbiter body flap positions.

INTRODUCTION (Concluded)

This report presents a description of the model, test hardware, configurations investigated, test program, test facility, instrumentation, data reduction and data evaluation.

MODEL DESCRIPTION

The model was a 0.004-scale representation of a Space Shuttle Launch Vehicle (SSLV) 5 configuration, including an Orbiter, an External Tank (ET) and two Solid Rocket Boosters (SRB). The general arrangement of the model and the major dimensions are shown in Fig. 1. Model dimensional data sheets are presented in Table I.

The model parts were machined from stainless steel. The model was originally fabricated for test IA 140 (TWT-641) in conformance with the line drawings as listed below:

Configuration	Drawing
Orbiter	VC70-000002
Forward Body and Cabin	VL70-000202C
Mid-Body-Wing/Glove Fairing	VL70-000200B
Aft Body	VL70-000203
Vertical Tail	FL70-000146A
Wing Tip	VL70-006092
OMS/RCS Pods	VL70-008410, 008401
Tank	VC78-000002B
SRB	VC77-000002B

In preparation for this and other tests, using this model, several modifications have been made and are listed below.

- The ET nose was updated to a sharp cone.
- The Orbiter/ET attach structure was modeled in more detail.
- The SRB aft attach rings were modified to resemble the most recent configuration and were shifted aft 6 in. full scale (or 0.024 in. model scale).
- SRB separation motors were simulated on the aft skirt.
- A tunnel was simulated on the SRBs extending from the shoulder to the flare exit plane.
- Additional body flap and elevons were fabricated to simulate additional deflection angles.
- A metric wing was fabricated to OML 14414.1 REV. C/D (Orbiter 102).
- A second ET (both nose and afterbody) was fabricated with no protuberances.

The nomenclature for the model and various attachments is as follows:

O_2	102 Orbiter
B_{62}	Body
C_{12}	Canopy
F_{10}	Body Flap
M_{16}	OMS Pod
N_{28}	OMS Nozzles
R_5	Rudder
V_8	Vertical Tail
W_2	Wing
W_{127}	Wing
E_2	Elevons

E_{62}	Elevon
A_T	Attach structure on ET
AT_{16}	Forward Attach Structure
AT_{17}	Left Rear Attach Structure
AT_{18}	Right Rear Attach Structure
FR_6	Rear Attach Structure Fairing
P_N	ET nose with protuberances
PT_{20}	Nose Cone Lines
T_{20}	External Tank
P_A	ET afterbody with protuberances
FL_5	LOX Feedline
FL_6	Pressure Feedline
FL_9	LH Umbilical Feedline
PT_{13}	ET Protuberance (LOX Recirc. Lwne)
PT_{14}	ET Protuberance (LOX Pressure Line)
PS_7	SRB Protuberance (Attach Ring)
W_N	ET nose with no protuberances
W_A	ET afterbody with no protuberances
S_3, T_3	Balance in sting-supported Orbiter. ET attached to sting-supported SRBs
S_{25}	Booster Solid Rocket Motor

The model was supported in the test section by three straight stings. One sting supported the Orbiter through its base on a six-component

balance. The ET and SRBs (when present) were supported by the other two stings, through the SRB bases, with a dummy balance in each SRB. The three straight stings were all held in an adapter which, in turn, was mounted in the chuck of the tunnel sector. The Orbiter/ET attach structure (including feed lines) was mounted on the ET model.

CONFIGURATIONS INVESTIGATED

Six configurations were used during this test. Three configurations had the Orbiter alone. Three configurations had the full Space Shuttle Launch Vehicle (SSLV) "stack". All six configurations and their variations from nominal SSLV configuration were:

$O_2W_2E_2$

No ET, SRBs or Orbiter/ET attach structure.

$O_2W_2E_2$ Wing Gap Waxed

The gap in the metric right wing filled with wax.

$O_2W_2E_2$ Wing Wax Cut

Wax separated from the Orbiter fuselage using a fine wire. The resulting gap was sealed by covering it with a thin layer of the wax.

$O_2W_2E_2W_NW_AA_TT_3S_3$

No protuberances on the ET except nose probe, attach structure and Orbiter/ET propellant feed lines.

$O_2W_2E_2P_NP_AA_TT_3S_3$

Nominal SSLV configuration

$O_2W_2E_2P_NP_AA_TT_3S_3$ W/grit on wings

Grit placed on leading 10 percent of both upper and lower surfaces of each wing.

Table II delineates the variables for each particular configuration investigated while Table III gives the tunnel conditions set for each of the 7 Mach numbers tested.

TEST FACILITY DESCRIPTION

The Marshall Space Flight Center's 14 x 14-Inch Trisonic Wind Tunnel is an intermittent blowdown tunnel which operates by high pressure air flowing from storage to either vacuum or atmospheric conditions. A Mach number range from 0.2 to 5.00 is covered by utilizing two interchangeable test sections. The transonic section permits testing at Mach 0.20 through 2.50, and the supersonic section permits testing at Mach 2.74 through 5.00. Mach numbers between 0.2 and 0.9 are obtained by using a controllable diffuser. The range from 0.95 to 1.3 is achieved through the use of plenum suction and perforated walls. Mach numbers of 1.46, 1.96 and 2.50 are produced by interchangeable sets of fixed contour nozzle blocks. Above Mach 2.50 a set of fixed contour nozzle blocks are tilted and translated automatically to produce any desired Mach number in 0.25 increments.

Air is supplied to a 6000 cubic foot storage tank at approximately -40 F dew point and 500lb/in^2 absolute. The compressor is a three-stage reciprocating unit driven by a 1500 hp motor.

The tunnel flow is established and controlled with a servo-actuated gate valve. The controlled air flows through the valve diffuser into the stilling chamber and heat exchanger where the air temperature can be controlled from ambient to approximately 200 F. The air then passes through the test section which contains the nozzle blocks and test region.

TEST FACILITY DESCRIPTION (Concluded)

Downstream of the test section is a hydraulically controlled pitch sector that provides a total angle of attack range of 20 deg (±10 deg). Sting offsets are available for obtaining various maximum angles of attack up to 90 deg.

The variable diffuser section has movable floor and ceiling panels which are the primary means of controlling the subsonic Mach numbers and permitting more efficient running at supersonic Mach numbers. The sector assembly and diffuser telescope to allow easy access to the model and test section.

Tunnel flow is exhausted through an acoustically damped tower to atmosphere or into the vacuum field of 42,000 ft^3. The vacuum tanks are evacuated by vacuum pumps driven by electric motors rated at a total of 500 hp.

Data are recorded by a solid state digital data acquisition system. The data are converted to coefficient form, tabulated and cards punched for a permanent record at the completion of each run.

DATA REDUCTION

The parameters that were measured during the test were:

- Wind tunnel conditions (P_∞, P_t, T_t)
- Inclination of model support mechanism (sector angle)
- Preset model attitude, α'
- Six-component force and moment data for the Orbiter
- Three-component force and moment data for the Orbiter right wing
- Hinge moments for the Orbiter two left elevons.

The wind tunnel conditions and the angle of the model support mechanism were measured with the normal facility instrumentation.

The preset model attitude (α') was measured with an inclinometer.

The six-component Orbiter force and moment data were measured using MSFC balance number 239. The balance capacities are presented in Table III.

The three-component wing force and moment data were measured with a strain gage balance. The balance was designed specifically for this application and consisted of a rectangular gaged beam, bolted on one end to the right (metric) wing and on the other end to the center section of the Orbiter wing assembly.

Elevon hinge moments were measured using strain gages. The gages were mounted directly to flexures machined at the hinge line of the removable elevons.

The wind tunnel conditions were used to calculate the Mach number, the dynamic pressure, and the Reynolds number. The angle of the model support mechanism and the preset model attitude were used to calculate the model angle of attack and angle of side slip, with corrections made for sting and balance deflections.

$$\alpha = \tan^{-1} (\cos\phi \ \tan\alpha_T)$$

$$\beta = \sin^{-1} (\sin\phi \ \sin\alpha_T)$$

The following equations were used for the calculation of data coefficients.

Total Coefficient

$$C_{N_{ORB}} = \frac{F_{N_{BORB}}}{qS_{REF}}$$

$$C_{m_{ORB}} = \frac{M_{Y_{BORB}}}{qS_{REF}\ L_{REF}} + C_{N_{ORB}} * \frac{X_{T_O}}{L_{REF}} - C_{A_{T_{ORB}}} \frac{Z_{T_O}}{L_{REF}}$$

$$C_{A_{T_{ORB}}} = \frac{F_{A_{BORB}}}{qS_{REF}}$$

$$C_{Y_{N_{ORB}}} = M_{Z_{BORB}}/qS_{REF}\ L_{REF} + C_{Y_{ORB}} * \frac{X_{T_O}}{L_{REF}}$$

$$C_{B_{\ell_{ORB}}} = \frac{M_{X_{BORB}}}{qS_{REF}\ L_{REF}} - C_{Y_{ORB}} * \frac{Z_{T_O}}{L_{REF}}$$

$$C_{Y_{ORB}} = F_{Y_{BORB}}/qS_{REF}$$

Pressure Coefficients

$$C_{P_{ORB}} = (P_{ORB} - P_\infty)/q$$

Wing Coefficients

$$C_{N_W} = \frac{N_W}{qS_{REF}}$$

$$C_{B_W} = \frac{B_W}{qS_{REF}\ b_w}$$

$$C_{T_W} = \frac{T_W}{qS_{REF}\ \bar{\bar{C}}}$$

Hinge Moment Coefficients

$$C_{he_I} = \frac{H_{e_I}}{qS_e\ \bar{C}_e}$$

$$C_{he_O} = \frac{H_{e_O}}{qS_e\ \bar{C}_e}$$

If forebody coefficients are desired, the following equations can be used.

Orbiter Forebody Axial Force Coefficients ($C_{A_{f_{ORB}}}$)

$$C_{A_{f_{ORB}}} = C_{A_{T_{ORB}}} - C_{A_{b_{ORB}}}$$

where

$$C_{A_{b_{ORB}}} = -C_{P_{ORB}} \left(\frac{A_{b_{ORB}}}{S_{REF}}\right)$$

Orbiter Forebody Normal Force Coefficient ($C_{N_{f_{ORB}}}$)

$$C_{N_{f_{ORB}}} = C_{N_{ORB}} - C_{N_{b_{ORB}}} - C_{N_{BF_{ORB}}}$$

where

$$C_{N_{b_{ORB}}} = - C_{P_{ORB}} \left(\frac{A_{b_{ORB}}}{S_{REF}}\right) \tan i_b$$

and

$$C_{N_{BF_{ORB}}} = - C_{P_{ORB}} \left(\frac{A_{BF}}{S_{REF}}\right)$$

Orbiter Forebody Pitching Moment Coefficient ($C_{m_{f_{ORB}}}$)

$$C_{m_{f_{ORB}}} = C_{m_{ORB}} - C_{m_{b_{ORB}}} - C_{m_{BF_{ORB}}}$$

where

$$C_{m_{b_{ORB}}} = C_{N_{b_{ORB}}} \bar{X}_{b_{ORB}}/L_{REF} - C_{A_{b_{ORB}}} \left(\bar{Z}_{b_{ORB}}/L_{REF}\right)$$

and

$$C_{m_{BF_{ORB}}} = C_{N_{BF_{ORB}}} \left(\bar{X}_{BF_{ORB}}/L_{REF}\right)$$

Orbiter Forebody Side Force Coefficient ($C_{Y_{f_{ORB}}}$), Yawing Moment Coefficient ($C_{Y_{N_{f_{ORB}}}}$), and Rolling Moment Coefficient ($C_{B_{\ell_{f_{ORB}}}}$)

$$C_{Y_{f_{ORB}}} = C_{Y_{ORB}}$$

$$C_{Y_{N_{f_{ORB}}}} = C_{Y_{N_{ORB}}}$$

$$C_{B_{\ell_{f_{ORB}}}} = C_{B_{\ell_{ORB}}}$$

Figure 1b illustrates the body axis system. The reference dimensions and constants are:

Symbol	Full Scale	Model Scale
A_{BF}	142.6 ft^2	0.329 in^2
$A_{b_{ORB}}$	436.7 ft^2	1.006 in^2
b_w	78.056 ft	3.747 in
$\overline{C}_e$	90.7 in.	0.3628 in.
$\overline{C}$	474.8 in.	1.8992 in.
i_b	14.75 deg	14.75 deg
L_{REF}	1290.3 in.	5.1612 in
MRP (6-comp)	X_T 976 in.	3.904 in.
	Y_T 0 in.	0 in.
	Z_T 400 in.	1.600 in.
S_e	210.0 ft^2	0.4838 in^2
S_{REF}	2690.0 ft^2	6.198 in^2
$\overline{X}_{b_{ORB}}$	-1263.0 in.	-5.052 in.
$\overline{X}_{BF_{ORB}}$	-1329.7 in.	-5.319 in.
X_{T_O}	-909.50 in.	-3.638 in.
$\overline{Z}_{b_{ORB}}$	-326.5 in.	-1.306 in.
Z_{T_O}	-341.5 in.	-1.366 in.

DATA REDUCTION (Concluded)

Symbol	Full Scale	Model Scale
MRP for Wing	$X_{O_{wing}}$ = 1307 in.	5.228 in.
	$Y_{O_{wing}}$ = 105 in.	0.420 in.
	$X_{O_{elevon}}$ = 1387 in.	5.548 in.

DATA EVALUATION

In evaluating the data presented in this report, the following should be kept in mind.

- Elevon hinge moments were measured with gages whose electrical centers were forward of the elevon hinge lines by the following amounts.

  Inboard elevon: 0.064 in.

  Outboard elevon: 0.034 in.

- The metric elevons (left side) were fabricated with slots along their hinge lines, both top and bottom, which form the hinge moment flexure and provide a space for the strain gages and the leads. Wax was used to cover the slot and form a smooth contour. The hinge moment gages were sensitive to the restrictions of both the wax and the tape. Care was taken to minimize these restrictions.

- Run numbers 16/9 through 23/0 had the gap between the metric right wing and the Orbiter fuselage filled with wax. This seal prevented air flow through the gap, but static loadings indicated the wax may also have restricted the movement of the wing to an extent that it could affect the data. After run 23/0, an improved wax seal was used that minimized this restriction. (See section on Configurations Investigated).

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4. Allen, E. C., "Results of Experimental Investigations in the MSFC TWT to Determine Effects of A Multiple Sting Support System on the Mated Vehicle Aerodynamics Utilizing a 0.004 Scale (74-OTS, 77-0) Shuttle Vehicle 5 (IA140A/B)" Data Management Services DR-2335, NASA-CR 151,783. October 1979.

TABLE I.

MODEL DIMENSIONAL DATA

MODEL COMPONENT : BODY - B62

GENERAL DESCRIPTION : Configuration 140 C/D orbiter fuselage, MCR 200-R_4 Similar to 140 A/B fuselage except aft body revised and improved midbody-wing-boot fairing, X_o = 940 to X_o = 1040.

MODEL SCALE: 0.004

DRAWING NUMBER : VL70-000140C, -000202C, 000205A, -000200B, -000203A.

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (IML: Fwd Sta. X_o=238), In.	1290.3	5.161
Length (OML: Fwd Sta. X_o=235), In.	1293.3	5.173
Max Width (@ X_o = 1528.3), In.	264.0	1.056
Max Depth (@ X_o = 1464), In.	250.0	1.000
Fineness Ratio	4.899	4.899
Area - Ft^2		
Max. Cross-Sectional	340.885	0.0055
Planform		
Wetted		
Base		

(Continued)

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MODEL DIMENSIONAL DATA

MODEL COMPONENT : CANOPY - C_{12}

GENERAL DESCRIPTION : Configuration 140 C/D orbiter canopy vehicle cabin No. 31 updated to MCR 200-R_4. Used with fuselage B_{62}.

MODEL SCALE: 0.004

DRAWING NUMBER : VL70-000140C, -000202B, -000204

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (X_o= 434.643-578), in.	143.357	0.573
Max Width (@ X_o = 513.127), In.	152.412	0.610
Max Depth (Z_o = 501 to 449.39), In.	51.61	0.206
Fineness Ratio		
Area		
Max. Cross-Sectional		
Planform		
Wetted		
Base		

DMS 014

Table 1 (Continued)

MODEL COMPONENT: ELEVON - E_{62}

GENERAL DESCRIPTION: Split elevon, identical to E_{43} except the Y_o location of the mid-span elevon split line and gap width.

MODEL SCALE: 0.004

DRAWING NUMBER: None

DIMENSIONS:	FULL SCALE	MODEL SCALE
Elevon Split:		
Right-hand at Y_o, in.	296.00	1.184
Left-hand at Y_o, in.	288.00	1.152
Elevon Gap:		
Right-hand, in.	6.25	0.025
Left-hand, in.	6.75	0.027

(Continued)

MODEL DIMENSIONAL DATA

MODEL COMPONENT : BODY FLAP - F_{10}

GENERAL DESCRIPTION : Configuration 140C/D body flap. Hingeline located at X_o = 1532, Z_o = 238.

MODEL SCALE: 0.0040

DRAWING NUMBER : VL70-000140C, VL70-355114

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (X_o=1525.5 to X_o=1613), In.	87.50	0.350
Max Width (@ L.E., X_o=1525.5), In.	256.00	1.024
Max Depth (X_o = 1532), In.	19.798	0.792
Fineness Ratio		
Area - Ft^2		
Max. Cross-Sectional (@ H.L.)	35.196	0.00056
Planform	135.00	0.0022
Wetted		
Base (X_Q = 1613)	4.89	0.000078

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MODEL DIMENSIONAL DATA

MODEL COMPONENT : OMS POD - M_{16}

GENERAL DESCRIPTION : Configuration 140C orbiter OMS pod - short pod.

MODEL SCALE: 0.0040

DRAWING NUMBER : VL70-008401, VL70-008410 - plus 1/24 added to simulate TPS

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (OMS Fwd Sta X_o=1310.5), In.	258.50	1.034
Max Width (@ X_o = 1511), In.	136.8	0.547
Max Depth (@ X_o = 1511), In.	74.70	0.299
Fineness Ratio	2.484	2.484
Area		
Max. Cross-Sectional	58.865	0.0094
Planform		
Wetted		
Base		

Table I (Continued)

MODEL DIMENSIONAL DATA

MODEL COMPONENT: OMS NOZZLES - N_{28}

GENERAL DESCRIPTION: Configuration 140A/B Orbiter OMS nozzles

MODEL SCALE: 0.0040

DRAWING NUMBER: VL70-000140A (Location); SS-A90106, RELEASE 5 (Contour)

DIMENSIONS:	FULL SCALE	MODEL SCALE
MACH NO.		
Length - In.		
Gimbal Point to Exit Plane		
Throat to Exit Plane		
Diameter - In.		
Exit		
Throat		
Inlet		
Area - ft^2		
Exit		
Throat		
Gimbal Point (Station) - In.		
Left Nozzle		
X	1518.0	6.072
Y	- 88.0	- 0.352
Z	492.0	1.968
Right Nozzles		
X	1518.00	6.072
Y	88.0	0.352
Z	492.0	1.968
Null Position - Deg.		
Left Nozzle		
Pitch	$15^{\circ}49'$	$15^{\circ}49'$
Yaw	$12^{\circ}17'$	$12^{\circ}17'$
Right Nozzle		
Pitch	$15^{\circ}49'$	$15^{\circ}49'$
Yaw	$12^{\circ}17'$	$12^{\circ}17'$

TABLE I **MODEL DIMENSIONAL DATA** (Continued)

MODEL COMPONENT R5 - Rudder

GENERAL DESCRIPTION 2A and 3 configuration per Rockwell lines VL70-000095 and VL70-000139

SCALE MODEL = 0.004

DRAWING NUMBER VL70-000139, VL70-000095

DIMENSIONS	FULL SCALE	MODEL SCALE
Area ~ Ft^2	106.38	0.00170
Span (equivalent) ~ IN.	201.0	0.8040
Inb'd equivalent chord	91.585	0.36634
Outb'd equivalent chord	50.833	0.20333
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	0.400	0.400
At Outb'd equiv. chord	0.400	0.400
Sweep Back Angles, degrees		
Leading Edge	34.83	34.83
Trailing Edge	26.25	26.25
Hingeline	34.83	34.83
Area Moment (Normal to hinge line) Ft^3 Product of area and mean chord	526.13	0.00003

TABLE I. ---- Continued

MODEL COMPONENT: VERTICAL - V_8

GENERAL DESCRIPTION: Configuration 140C/D orbiter vertical tail (identical to configuration 140A/B vertical tail).

MODEL SCALE: 0.0040

DRAWING NUMBER: VL70-000140C, -000146B

DIMENSIONS:

	FULL SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo) - Ft^2		
Planform	413.253	0.0068
Span (Theo) - In.	315.720	1.263
Aspect Ratio	1.675	1.675
Rate of Taper	0.507	0.507
Taper Ratio	0.404	0.404
Sweep-Back Angles, Degrees.		
Leading Edge	45.000	45.000
* Trailing Edge	26.2	26.2
0.25 Element Line	41.130	41.130
Chords:		
Root (Theo) WP	268.500	1.074
Tip (Theo) WP	108.470	0.434
MAC	199.808	0.799
Fus. Sta. of .25 MAC	1463.50	5.854
W.P. of .25 MAC	635.522	2.542
B.L. of .25 MAC	0.000	0.000
Airfoil Section		
Leading Wedge Angle - Deg.	10.000	10.000
Trailing Wedge Angle - Deg.	14.920	14.920
Leading Edge Radius	2.00	0.008
Void Area	13.17	0.00021
Covered Area		
Blanketed Area	0.00	0.000

TABLE I Continued

MODEL COMPONENT: WING - W_{127}

GENERAL DESCRIPTION: Configuration 140C/D orbiter wing, MCR 200-B_4, similar to 140A/B wing W_{116} but with refinements: improved wing-boot-midbody fairing (X_o=940 to X_o=1040); elevon split line relocated from Y_o=281 to Y_o=312.5.

TEST NO. DRAWING NO.: VL70-000140C, -000200B

DIMENSIONS:	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo.) Ft^2		
Planform	2690.00	0.043
Span (Theo. In.	936.68	3.747
Aspect Ratio	2.265	2.265
Rate of Taper	1.177	1.177
Taper Ratio	0.200	0.200
Dihedral Angle, degrees	3.500	3.500
Incidence Angle, degrees	0.500	0.500
Aerodynamic Twist, degrees	3.000	3.000
Sweep Back Angles, degrees		
Leading Edge	45.000	45.000
Trailing Edge	-10.056	-10.056
0.25 Element Line	35.209	35.209
Chords:		
Root (Theo) B.P.0.0.	689.24	2.757
Tip, (Theo) B.P. 468.34	137.85	0.551
MAC	474.81	1.899
Fus. Stat. of .25 MAC	1136.83	4.547
W.P. of .25 MAC	290.58	1.162
B.L. of .25 MAC	182.13	0.729
EXPOSED DATA		
Area (Theo) Ft^2	1751.50	7.006
Span, (Theo) In. BP108	720.68	2.883
Aspect Ratio	2.059	2.059
Taper Ratio	0.245	0.245
Chords		
Root BP108	562.09	2.248
Tip 1.00 $\frac{b}{2}$	137.85	0.551
MAC	392.83	1.531
Fus. Sta. of .25 MAC	1185.98	4.744
W.P. of .25 MAC	294.30	1.177
B.L. of .25 MAC	251.77	1.007
Airfoil Section		
(Rockwell Mod NASA XXXX-64)		
Root $\frac{b}{2}$ =	0.113	0.113
Tip $\frac{b}{2}$ =	0.12	0.12
Data for (1) of (2) Sides		
Leading Edge Cuff		
Planform Area Ft^2	113.18	0.453
Leading Edge Intersects Fus M.L. @ Sta.	500.00	2.000
Leading Edge Intersects Wing @ Sta	1024.00	4.096

TABLE I. (Continued)

MODEL COMPONENT: ATTACH STRUCTURE - AT_{16}

GENERAL DESCRIPTION: Forward orbiter/ET attach structure (2 member structure)

MODEL SCALE: 0.0040 MODEL DRAWING: SS-A00117

DRAWING NO.: VL78-000062B, SK-H-4011

DIMENSIONS:

MEMBER		FULL SCALE	MODEL SCALE
#1	X_o	394.38	1.578
	Y_o	0.00	0.00
	Z_o	LWR ML	LWR ML
	X_T	1131.00	4.524
	Y_T	561.298	0.187
	Z_T	561.298	2.245
#2	X_o	394.38	1.578
	Y_o	0	0
	Z_o	LWR ML	LWR ML
	X_T	1131.00	4.524
	Y_T	- 46.8	- 0.187
	Z_T	561.298	2.245
Diameter of members: (In.)		5.70	0.0228

TABLE I. (Continued)

MODEL COMPONENT: ATTACH STRUCTURE - AT_{17}

GENERAL DESCRIPTION: Left rear orbiter/ET attach structure (2 member structure)

MODEL SCALE: 0.004

DRAWING NO.: VL78-000062B, SK-H-4013. MODEL DRAWING: SS-A00117

DIMENSIONS: #	MEMBER		FULL SCALE	MODEL SCALE
	#1	X_o	1317	5.258
		Y_o	- 96.5	-0.386
		Z_o	267.5	1.070
		X_T	2058.0	8.232
		Y_T	- 125.827	-0.503
		Z_T	515.5	2.062
	#2	X_o	1317.0	5.258
		Y_o	- 96.5	-0.386
		Z_o	267.5	1.070
		X_T	2058.0	8.232
		Y_T	- 125.827	-0.503
		Z_T	515.5	2.062

Diameter of Members: #1 11.5 In. Dia. F.S.

#2 15.5 In. Dia. F.S.

TABLE I. (Continued)

MODEL COMPONENT: ATTACH STRUCTURE - AT_{18}

GENERAL DESCRIPTION: Right rear orbiter/ET attach structure (3 member structure)

MODEL SCALE: 0.004

DRAWING NO.: VL78-000062B, SK-H-4013 MODEL DRAWING: SS-A00117

DIMENSIONS:

MEMBER		FULL SCALE	MODEL SCALE
#1	X_o	1317.00	5.258
	Y_o	+ 96.5	+ .386
	Z_o	267.5	1.070
	X_T	1872.0	7.488
	Y_T	+ 125.827	+0.503
	Z_T	515.5	2.062
#2	X_o	1317.0	5.258
	Y_o	+ 96.5	+0.386
	Z_o	267.5	1.070
	X_T	2058.0	8.232
	Y_T	+ 125.827	0.503
	Z_T	515.5	2.062
#3	X_o	1317.0	5.258
	Y_o	54.40	0.218
	Z_o	19.30	0.077
	X_T	2058.0	8.232
	Y_T	2.5	0.010
	Z_T	567.6	2.270

Diameter of Members: (In.)		
	#1	15.5
	#2	11.5
	#3	4.5

TABLE I. (Continued)

MODEL COMPONENT: FEEDLINE - FL_5

GENERAL DESCRIPTION: LOX feedline simulated between ET and Orbiter.

MODEL SCALE: 0.0040 MODEL DRAWING: SS-A00117

DRAWING NO.: VL78-000062B

DIMENSIONS:

		FULL SCALE	MODEL SCALE
Leading edge at:	X_T	1033.3	4.132
	Y_T	70.0	0.280
	X_T	1033.3	4.132
	Y_T	- 70.0	- 0.280
Trailing edge at:	X_T	2071.50	8.286
	Y_T	70.00	0.280
	X_T	2071.50	8.286
	Y_T	70.00	0.280
Diameter, In.		18.80	0.188

Centerline of LOX feedline located radially at $\phi = 23^{\circ}24'$

TABLE I. (Continued)

MODEL COMPONENT: PRESSURE LINE - FL_6

GENERAL DESCRIPTION: Max. cross-sectional area simulating LH_2 pressure line and electrical conduit box between ET and Orbiter.

MODEL SCALE: 0.0040

DRAWING NO.: VL78-000062B MODEL DRAWING: SS-A00117

DIMENSIONS:		FULL SCALE	MODEL SCALE
Leading edge at:	X_T	1127.1	4.508
	Y_T	110.3	0.441
Trailing edge at:	X_T	2062.1	8.248
	Y_T	110.3	0.441

Centerline of LH pressure line located radially at $\phi = 33^{\circ}45'$.

TABLE I. (Continued)

MODEL COMPONENT : LH_2 UMBILICAL FEEDLINE - FL_9

GENERAL DESCRIPTION : LH_2 Umbilical Feedline with an electrical quick-disconnect box between the Orbiter and ET.

MODEL SCALE: 0.0040

DRAWING NUMBER : VL78-000062B

DIMENSIONS :	FULL SCALE	MODEL SCALE
Centerline at X	2071.5	8.286
Max Width	31.2	0.125
Max Depth	37.5	0.150
Diameter	17.0	0.068
Area		
Max. Cross-Sectional		
Planform		
Wetted		
Base		

TABLE I. (Continued)

MODEL COMPONENT: REAR ATTACH STRUCTURE FAIRING - FR_6

GENERAL DESCRIPTION: Rear ET/Orbiter attach structure cross-member or beam fairing used in conjunction with AT_{12}, AT_{13}, FL_1 and FL_2.

MODEL SCALE: 0.0040

DRAWING NO.: VL78-000062B MODEL DRAWING: SS-A01256

DIMENSIONS:

		FULL SCALE	MODEL SCALE
Leading edge centerline at	X_T	2036.67	8.147
	Y_T	0.00	0.00
	Z_T	183.00	0.732
Maximum length, In.		64.00	0.256
Maximum width, In.		190.00	0.760

MODEL COMPONENT: ET PROTUBERANCE - PT_{13}

GENERAL DESCRIPTION: Maximum cross-sectional area simulating LOX recirculation line and electrical conduit box on planform view of External Tank, T_{20}.

MODEL SCALE: 0.0040 MODEL DRAWING: SS-A00117

DRAWING NO.: VL78-000062B

DIMENSIONS:

		FULL SCALE	MODEL SCALE
Leading edge at:	X_T	1208.3	4.833
	Y_T	+ 95.0	+ 0.380
	X_T	1208.3	4.833
	Y_T	- 95.0	- 0.380
Trailing edge at:	X_T	2060.5	8.242
	Y_T	95.0	0.380
	X_T	2060.5	8.242
	Y_T	- 95.0	- 0.380

Centerline of LOX recirculation line located radially at $\phi = 33^{\circ}45'$.

TABLE I. (Continued)

MODEL COMPONENT: ET PROTUBERANCE - PT_{14}

GENERAL DESCRIPTION: LOX pressure line on Tank T_{20}.

MODEL SCALE: 0.0040

DRAWING NO.: VL78-000062B

DIMENSIONS:

		FULL SCALE	MODEL SCALE
Leading edge at:	X_T	355.90	1.424
	Y_T	6.0	0.024
Trailing edge at:	X_T	2060.5	8.242
	Y_T	87.0	0.348

Centerline of LOX pressure line located radially at $\phi = 23^{\circ}24'$.

TABLE I. (Continued)

MODEL COMPONENT: NOSE CONE LINES - PT_{20}

GENERAL DESCRIPTION: Maximum cross-sectional area simulating the LOX pressure line and electrical conduit on top of external tank (T_{20}) nose cone area.

MODEL SCALE: 0.0040

DRAWING NO.:

DIMENSIONS:		FULL SCALE	MODEL SCALE
Leading edge at:	X_T	360.92	1.444
	Y_T	34.0	0.136
Trailing edge at:	X_T	955.1	3.820
	Y_T	336.5	1.346

Centerline of lines located radially at $\phi = 33^{\circ}45'$.

TABLE I. (Continued)

MODEL COMPONENT : EXTERNAL TANK - T_{20}

GENERAL DESCRIPTION : External Oxygen-Hydrogen tank WITH 600" CIRCULAR ARC OGIVE NOSE.

MODEL SCALE: 0.0040

DRAWING NUMBER : VL72-000131, VL78-000062 B

DIMENSIONS :

	FULL SCALE	MODEL SCALE
Length, In. (Nose @ X_o=328.92)	1846.905	7.388
Max Width Dia, In. @ X_o=975.675	338.2	1.333
Max Depth , In.	333.2	1.333
Fineness Ratio	5.65713	5.65713
Area - Ft^2		
Max. Cross-Sectional	605.534	0.0096
Major Cross section	594.679	0.0095
WP of tank centerline (Z), In.	400.000	0.0064
Base (on 330.2 dia.)	594.679	0.0095

TABLE I. (Continued)

MODEL COMPONENT: SRB PROTUBERANCE - PS_7

GENERAL DESCRIPTION: SRB/ET attach ring: two attach rings and one structural ring.

MODEL SCALE: 0.0040

DRAWING NUMBER: VL77-000066

DIMENSIONS (DATA FOR 1 OF 2):	FULL SCALE	MODEL SCALE
Centerline at X_B	1511	6.044
	1517	6.068
	1840	7.360
Width	10	0.040
Height	10	0.040

TABLE I. (Concluded)

MODEL DIMENSIONAL DATA

MODEL COMPONENT : BOOSTER SOLID ROCKET MOTOR S_{25}

GENERAL DESCRIPTION : The BSRM is an external propulsion system which is jettisoned and recoverable after burnout. The BSRM's can be refurbished and reused after recovery. S_{22} with rocket motor nozzle removed.

MODEL SCALE: 0.0040

DRAWING NUMBER : VC77-000002C, VC70-000002A, VC72-000002C

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length, In.	1725.20	6.901
Max Width, Tank Dia., In.	146.00	0.584
Max Depth, Aft shroud dia., In.	208.20	0.833
Fineness Ratio	8.286	8.286
Area, Ft^2		
Max. Cross-Sectional	236.423	0.0038
Planform		
Wetted		
Base		
WP of BSRM centerline (Z_T)	400.00	1.600
FS of BSRM nose (X_T)	743.0	2.972
BP of BSRM centerline (Y_T)	250.5	1.002

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TABLE II.

TEST: FA28 (MSFC TWT-656) — DATA SET/RUN NUMBER COLLATION SUMMARY — DATE: 8/9/79

DATA SET IDENTIFIER	CONFIGURATION	PARAMETERS α	β	φ	δ_{e_I}	δ_{e_O}	δ_{BF}	P_T	MACH NUMBERS 0.60	0.90	0.95	1.05	1.10	1.15	1.25
R1Z001	$O_2W_2E_2$	A	0	0	10	5	0	22	16/0	15/0		14/0	13/0		12/0
02	WING GAP WAKED	A	0	0						17/0					18/0
03		0	B	90					23/0	22/0		21/0	20/0		19/0
04	WING WAX CUT	A	0	0						24/0					25/0
05	$O_2W_2E_2W_NW_AA_TT_3S_3$	A	0	0					30/0	29/0		28/0	27/0		26/0
06		0	A	90					31/0	32/0		33/0	34/0		35/0
07		0	A	-90											36/0
08	$O_2W_2E_2P_NP_AA_TT_3S_3$	A	0	0					43/1	40/2	41/0	39/0	38/0	42/1	37/1
09		0	A	90					44/1	45/0		46/2	47/1		48/0
10		A	0	0			8		53/0	52/0		51/0	50/0		49/1
11		0	A	90			8		54/0	55/0		56/0	57/0		58/0
12		0	A	90			16		63/0	62/0		61/0	60/0		59/0
13		A	0	0			16		64/0	65/0		66/0	67/0		68/0
14		A	0	0			0	30	73/0	72/0		71/0	70/0		69/1
15		0	A	90			0	30	74/0	75/0		76/0	77/0		78/0
16	W/GRIT ON WINGS	0	A	90			0	22	83/0	82/0		81/0	80/0		79/0
17		A	0	0			0	22	84/0	85/0		86/0	87/0		88/0

TEST RUN NUMBERS

R BETA ALPHA | CN | CLM | CY | CYN | CBL | CA | CPB | | | MACH | ALPHA BETA | 8

S BETA ALPHA | CNW | CBW | CTW | CHEI | CHEO | | | | | MACH | ALPHA BETA | 6

IDVAR (1) IDVAR (2) NDV

α OR β SCHEDULES: A = 0°, ±2°, ±4°, ±6°, ±8°; B = 0°, ±2°, ±4°, ±6°

COEFFICIENTS

TABLE III

TEST : FA28 (TWT-656)

DATE : 8/9/79

TEST CONDITIONS

MACH NUMBER	REYNOLDS NUMBER (per unit length)	DYNAMIC PRESSURE (pounds/sq. inch)	STAGNATION PRESSURE (pounds/sq.inch)
0.60	4.95×10^6	4.35	22
0.90	6.25	7.37	
0.95	6.38	7.77	
1.05	6.58	8.45	
1.10	6.67	8.73	
1.15	6.71	8.96	
1.25	6.69	9.29	
0.60	6.75×10^6	5.93	30
0.90	8.52	10.06	
1.05	8.97	11.53	
1.10	9.09	11.90	
1.25	9.12	12.67	

BALANCE UTILIZED: MSFC #239 in Orbiter

	CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE:
NF	200 lb.	±1.0 lb	±0.016
SF	100 lb	±0.5 lb	±0.008
AF	50 lb	±0.25 lb	±0.004
PM	200 in-lb	±0.99 in-lb	±0.0031
RM	50 in-lb	±0.25 in-lb	±0.0018
YM	100 in-lb	±0.49 in-lb	±0.0016

COMMENTS: Stagnation Temperature = 100°F

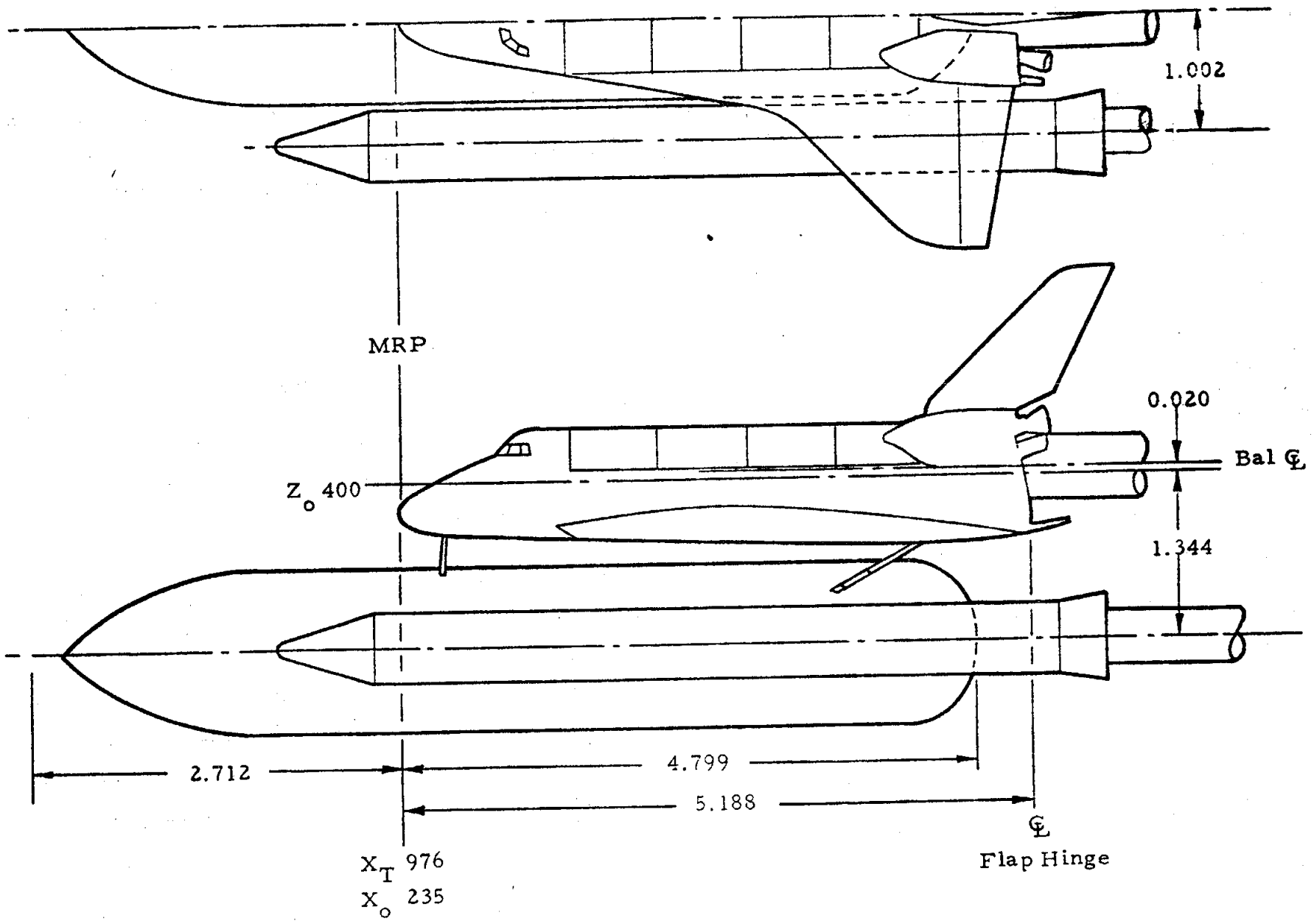

Fig. 1a. General Arrangement of Launch Vehicle Model

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

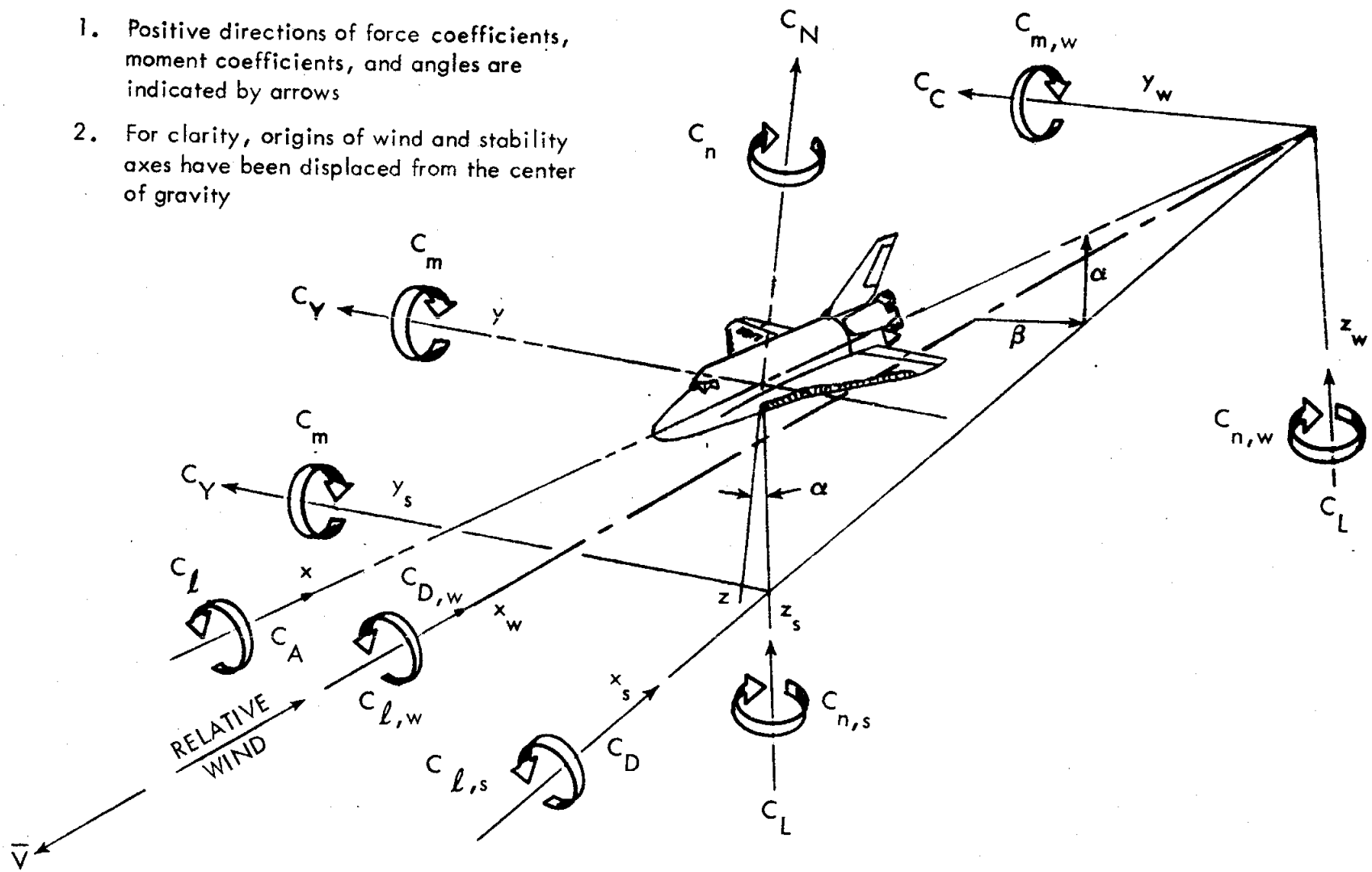

Fig. 1b. Axis Systems

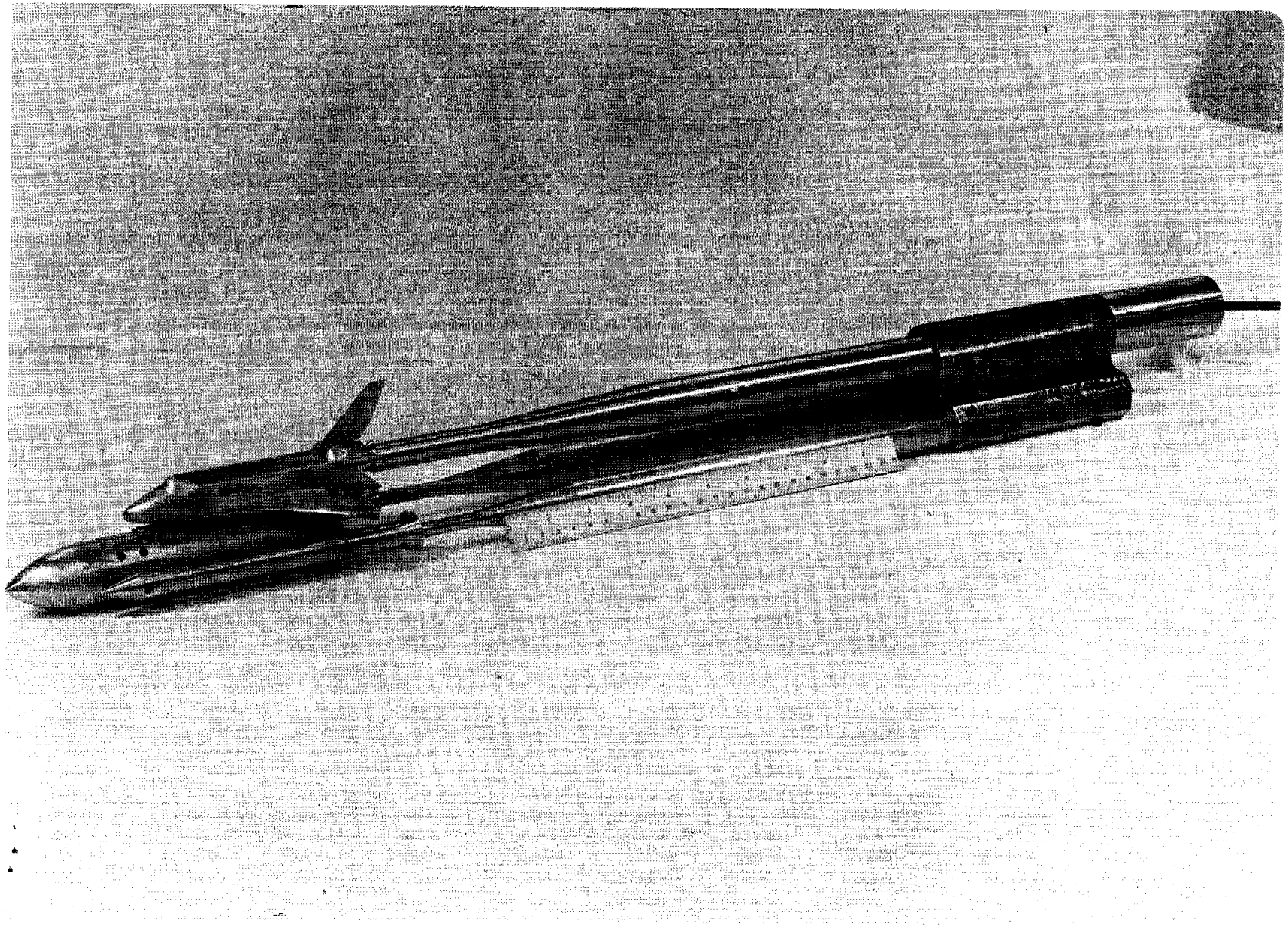

Figure 2. Photograph of Typical Model-Sting Arrangement

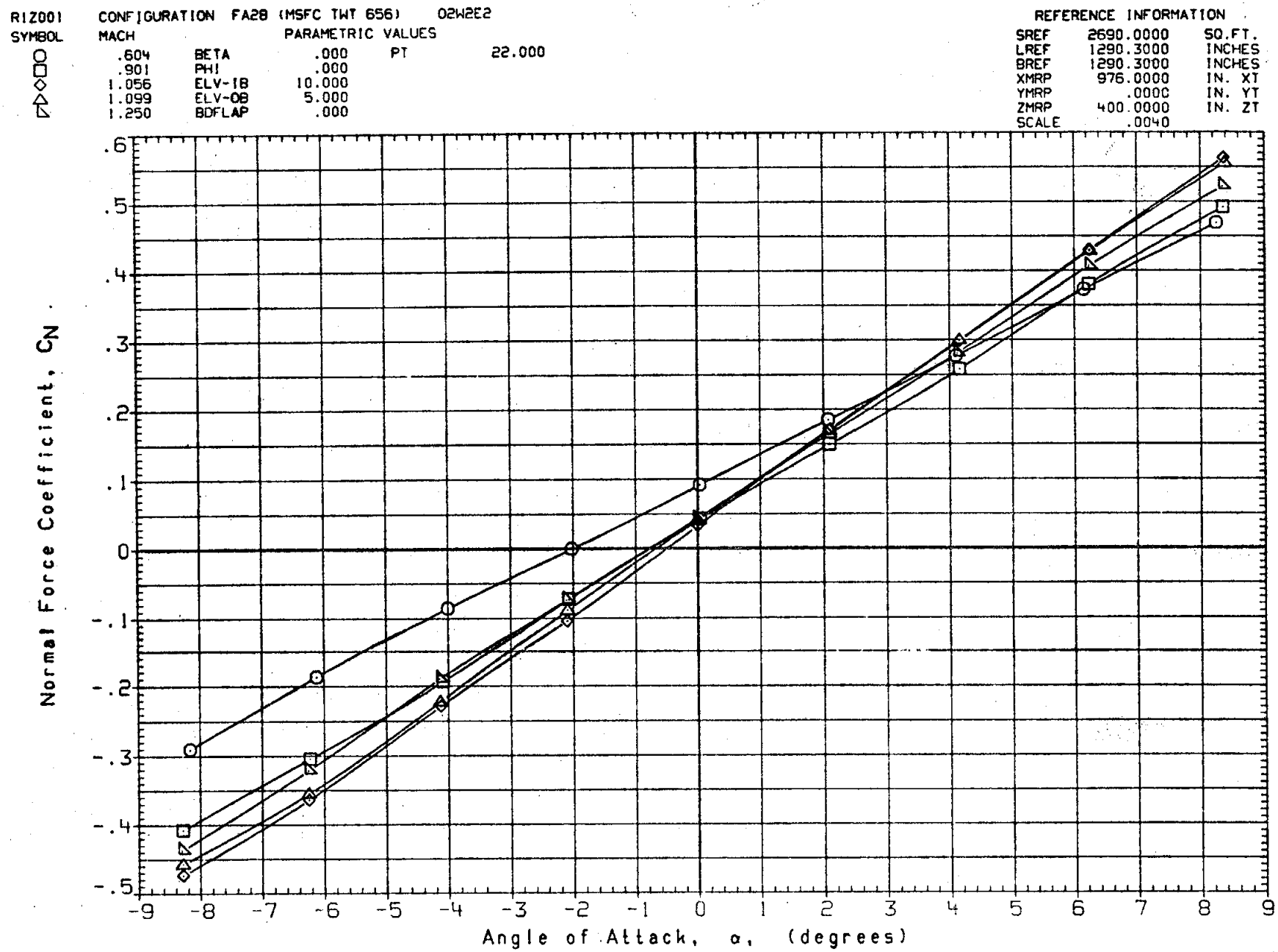

FIG. 3 ORBITER LONGITUDINAL CHARACTERISTICS

DATE 12 MAR 80

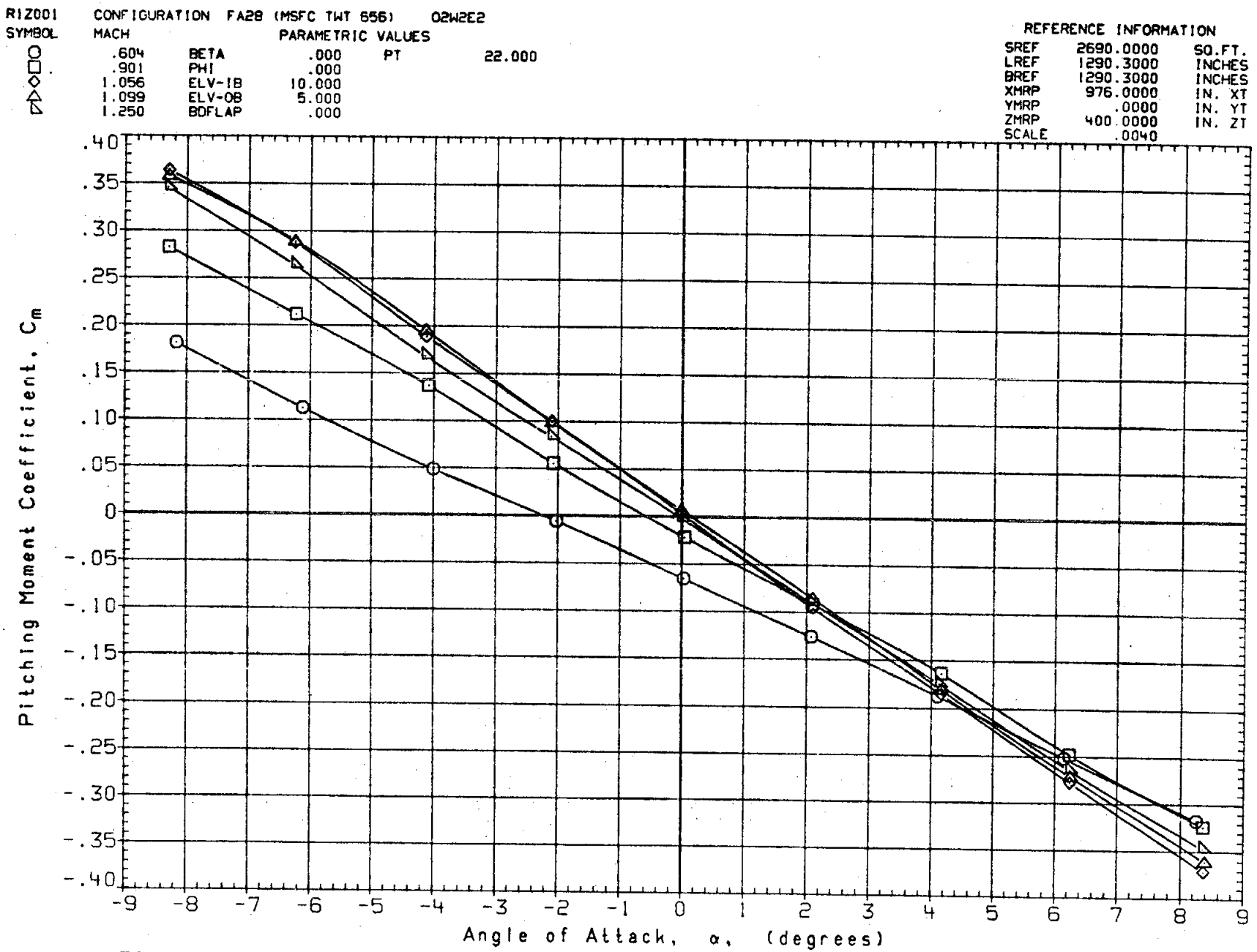

FIG. 3 ORBITER LONGITUDINAL CHARACTERISTICS

DATE 12 MAR 80

R1Z001 CONFIGURATION FA28 (MSFC TWT 656) 02W2E2

SYMBOL	MACH	PARAMETRIC VALUES			
○	.604	BETA	.000	PT	22.000
□	.901	PHI	.000		
◇	1.056	ELV-IB	10.000		
△	1.099	ELV-OB	5.000		
◺	1.250	BDFLAP	.000		

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

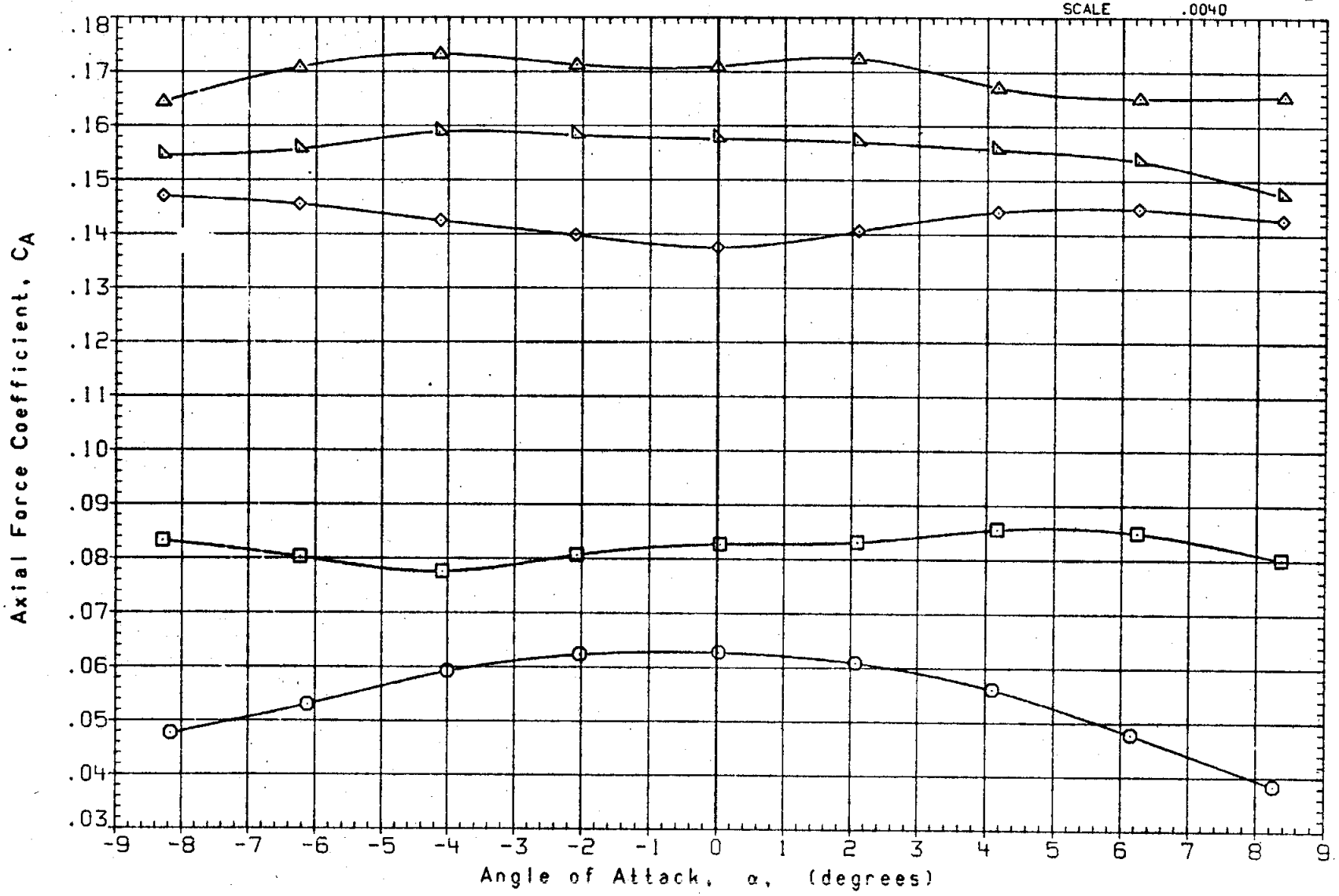

FIG. 3 ORBITER LONGITUDINAL CHARACTERISTICS

DATE 12 MAR 80

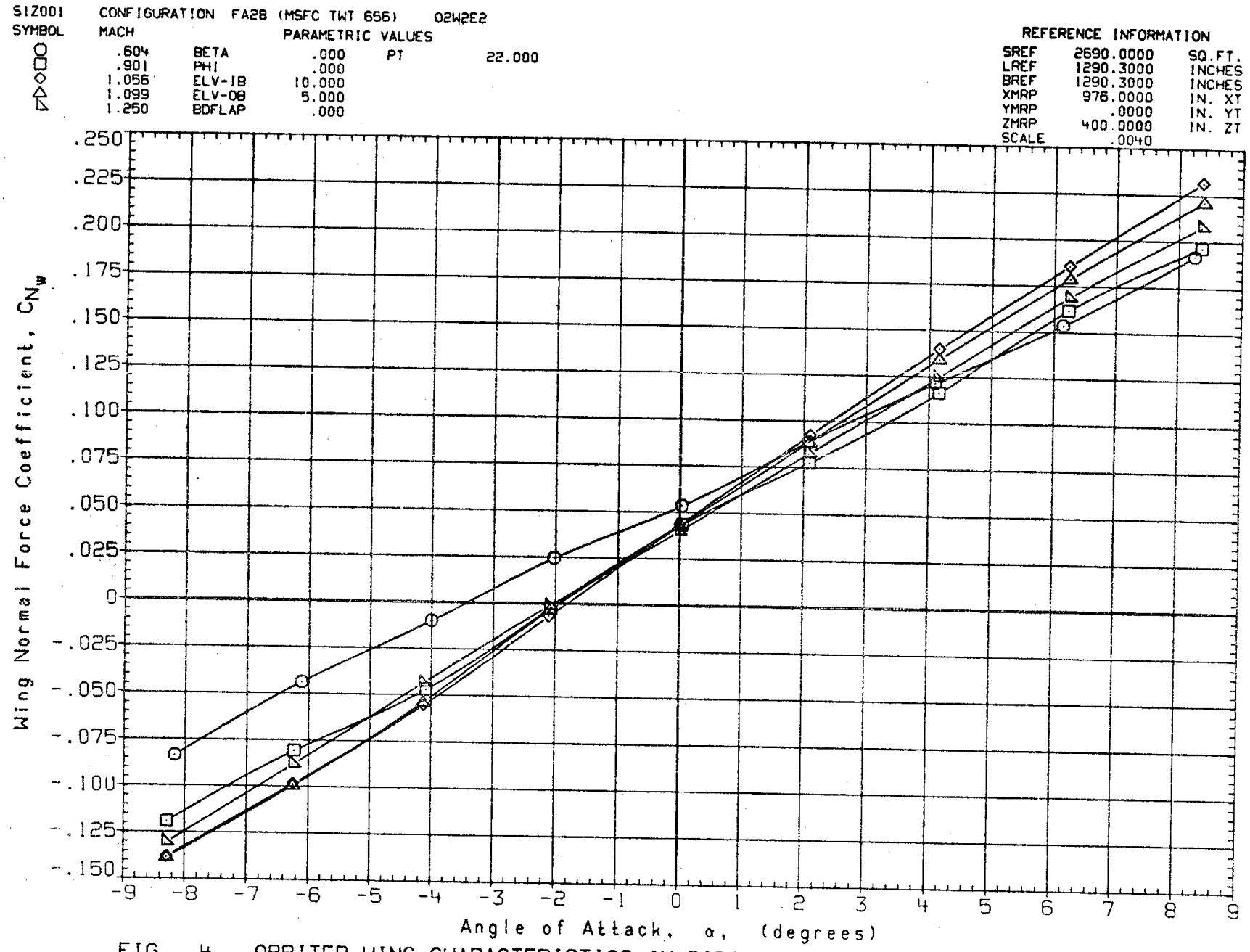

FIG. 4 ORBITER WING CHARACTERISTICS IN PITCH

DATE 12 MAR 80

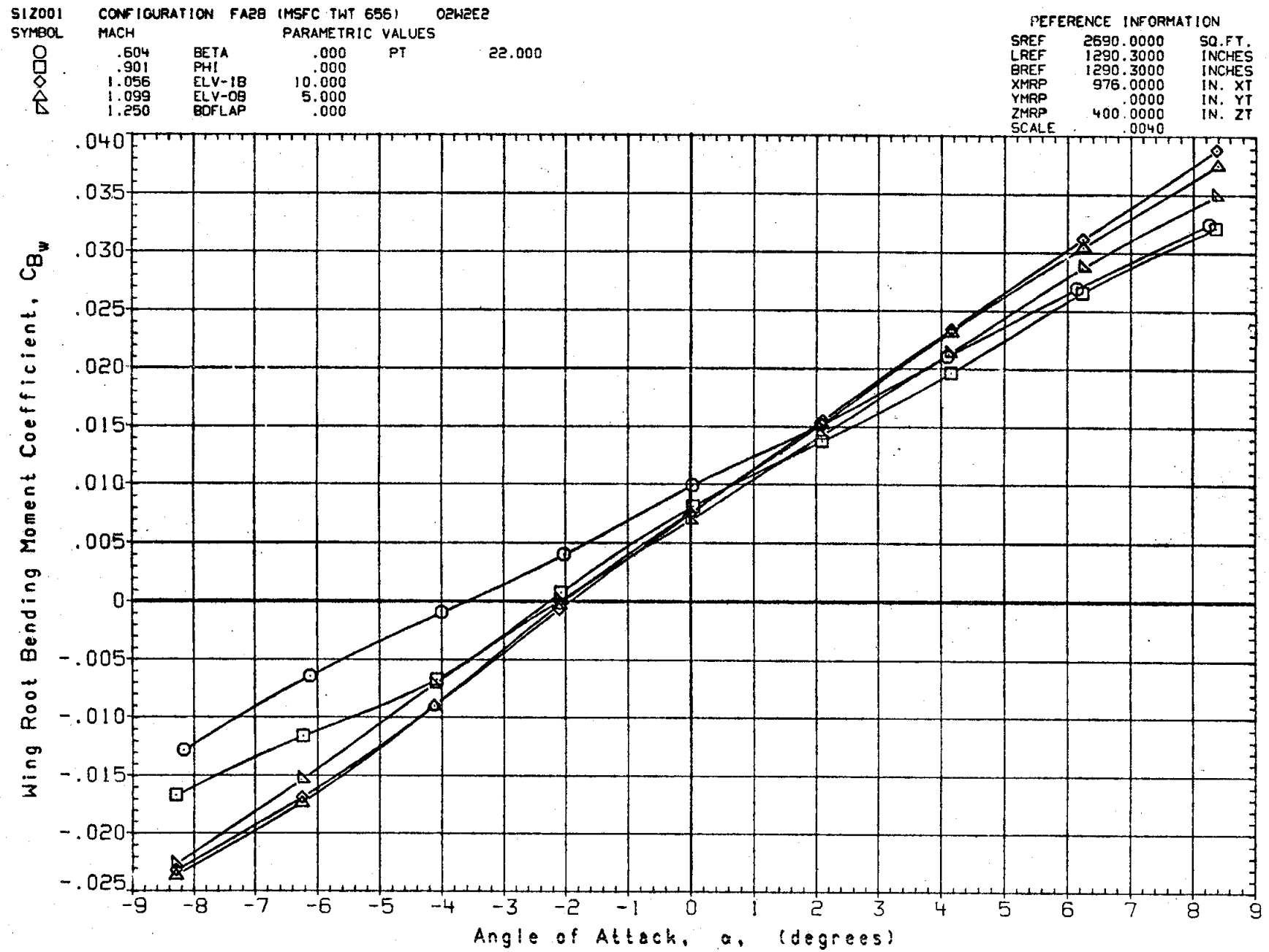

FIG. 4 ORBITER WING CHARACTERISTICS IN PITCH

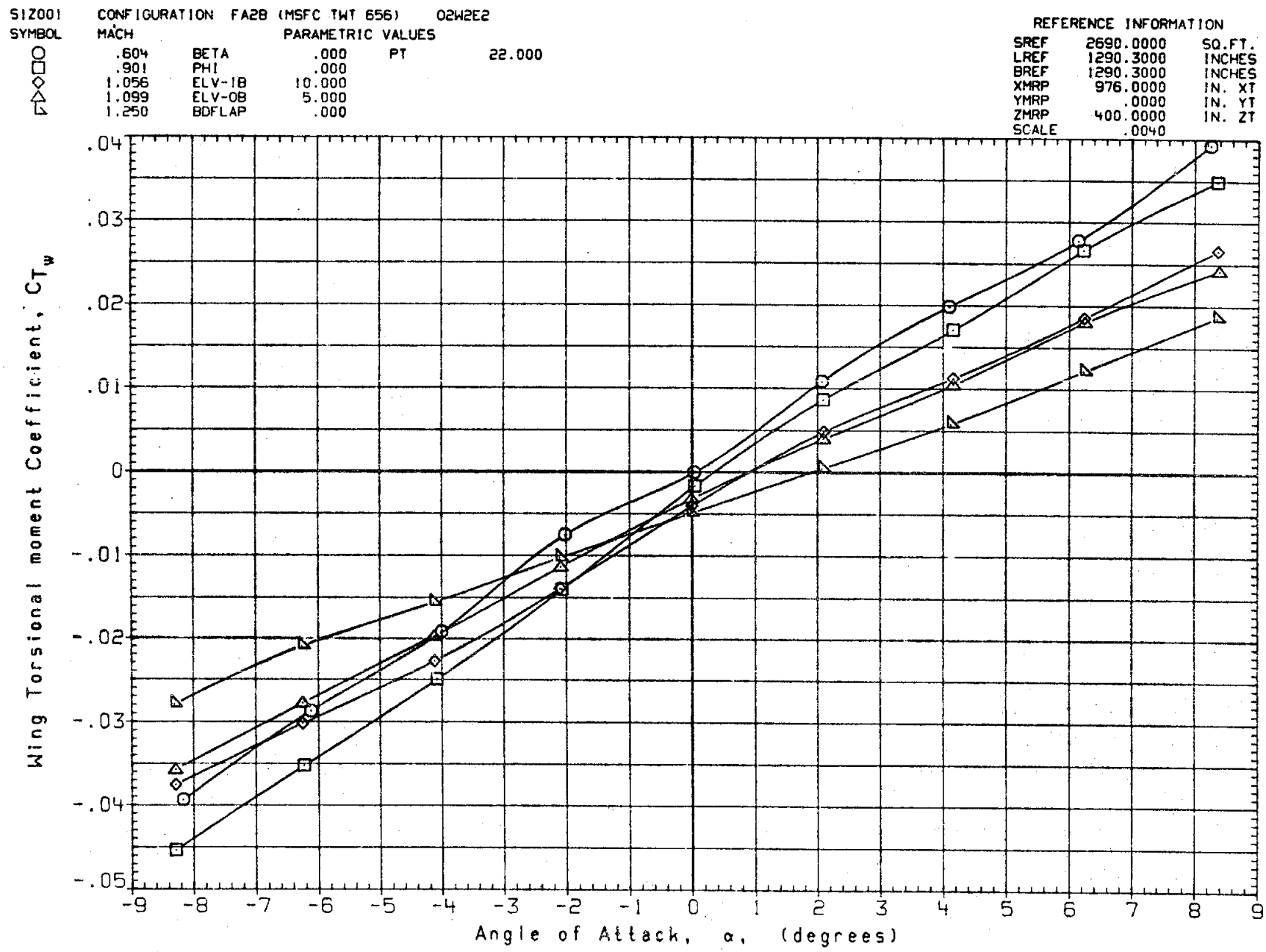

FIG. 4 ORBITER WING CHARACTERISTICS IN PITCH

SIZ001 CONFIGURATION FA28 (MSFC TWT 656) 02W2E2

SYMBOL	MACH	PARAMETRIC VALUES			
○	.604	BETA	.000	PT	22.000
□	.901	PHI	.000		
◇	1.056	ELV-IB	10.000		
△	1.099	ELV-OB	5.000		
◺	1.250	BDFLAP	.000		

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

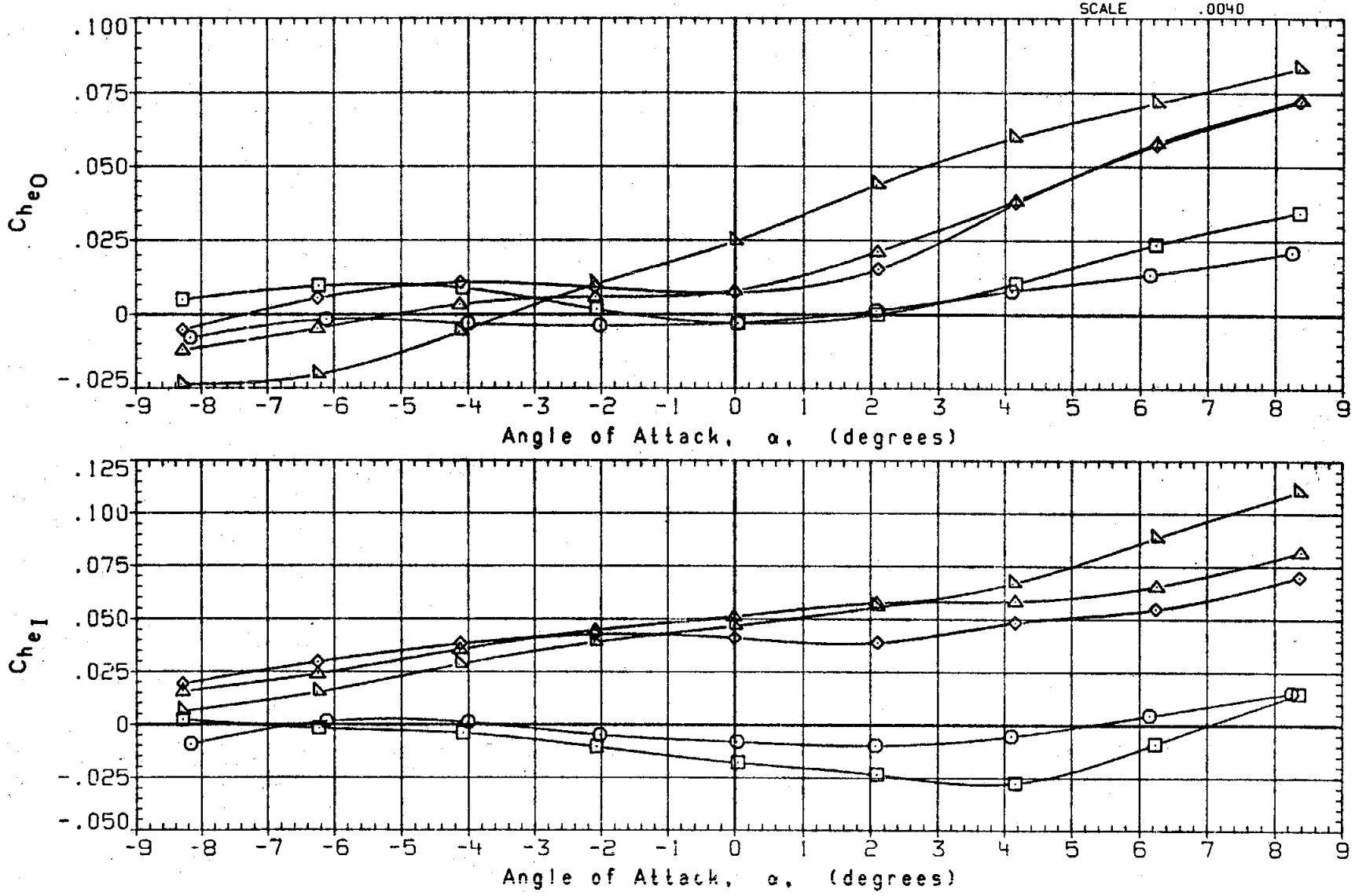

FIG. 5 ORBITER ELEVON CHARACTERISTICS IN PITCH

DATE 12 MAR 80

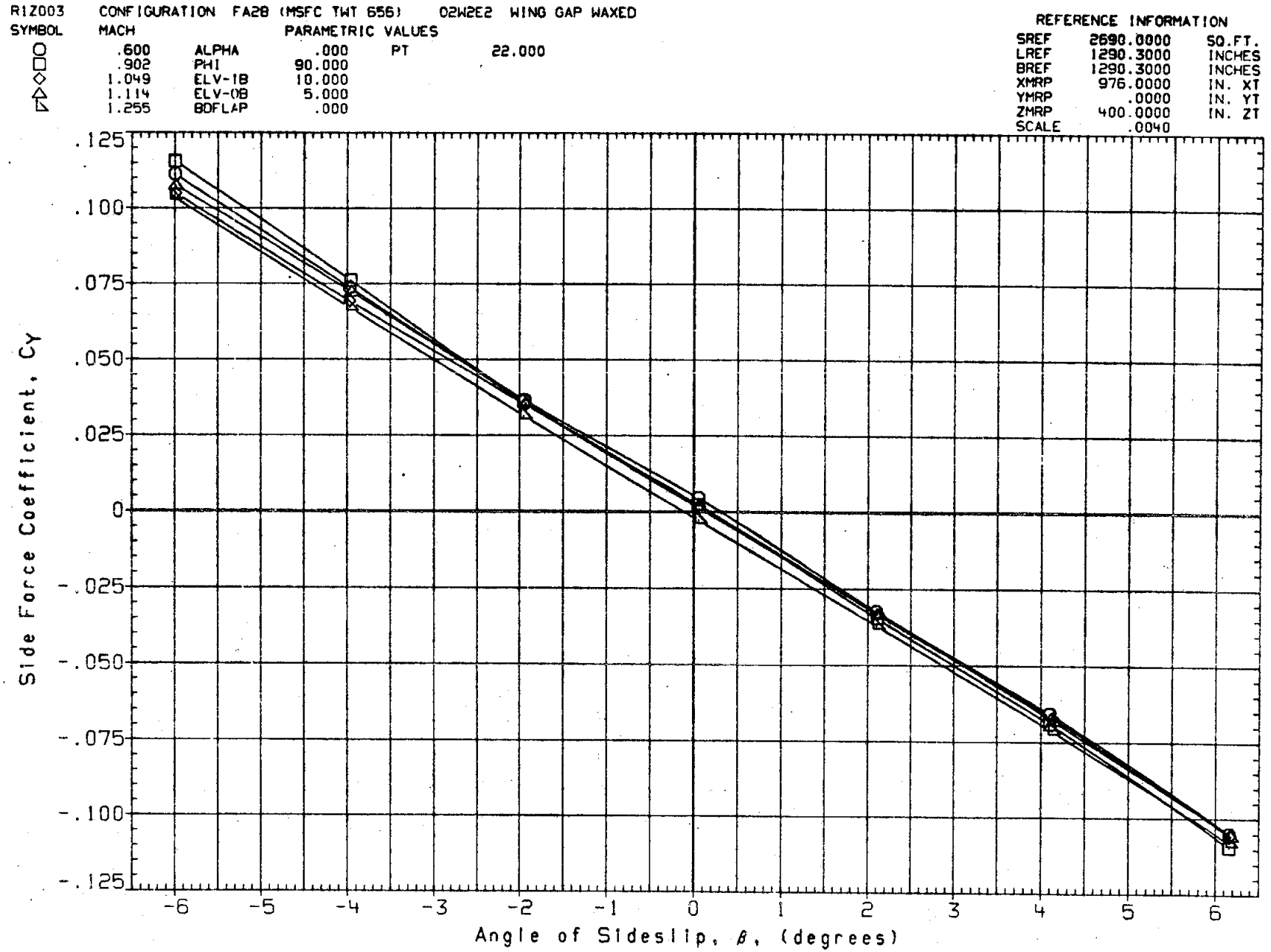

FIG. 6 ORBITER LATERAL DIRECTIONAL CHARACTERISTICS

DATE 12 MAR 80

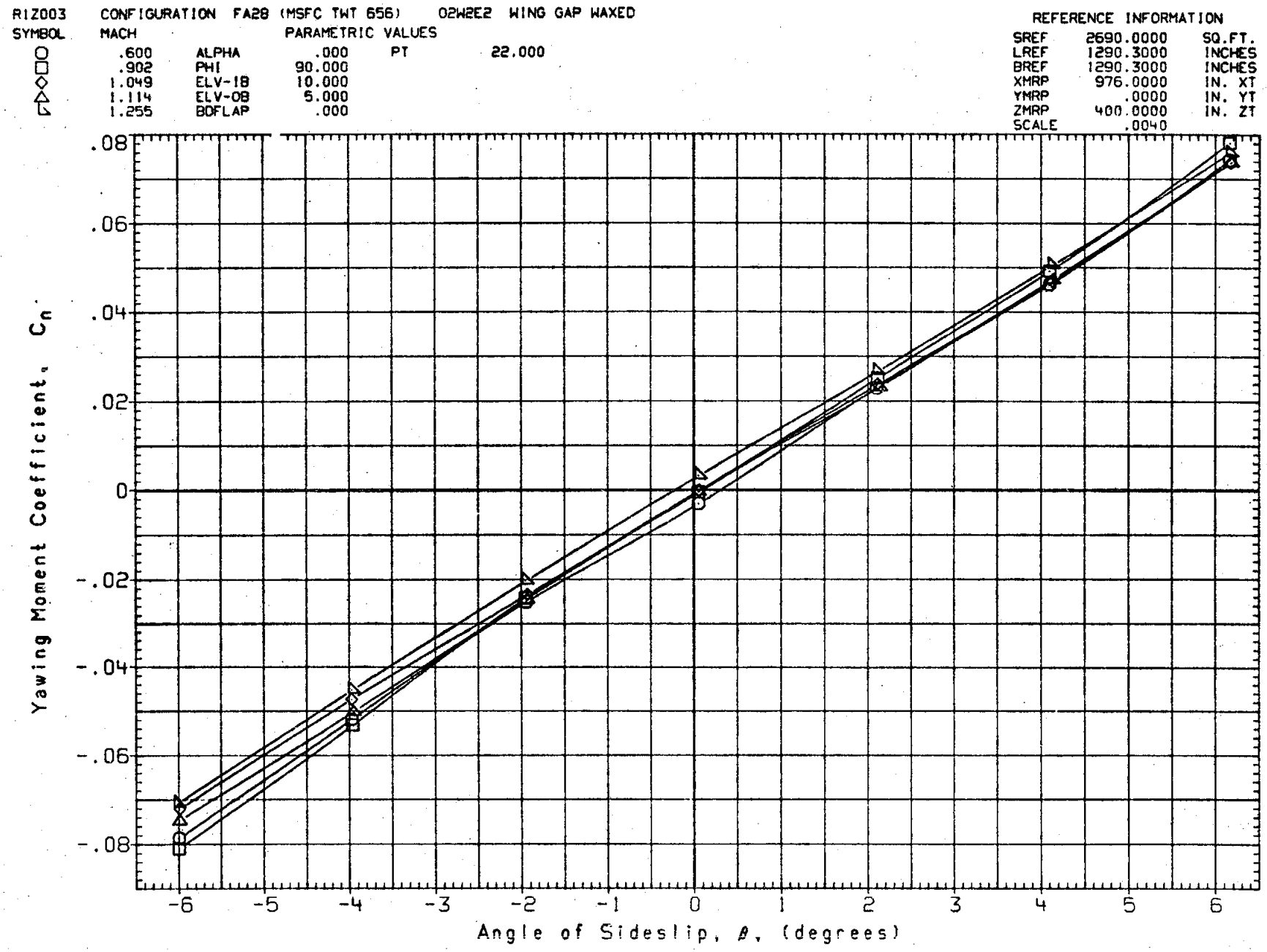

FIG. 6 ORBITER LATERAL DIRECTIONAL CHARACTERISTICS

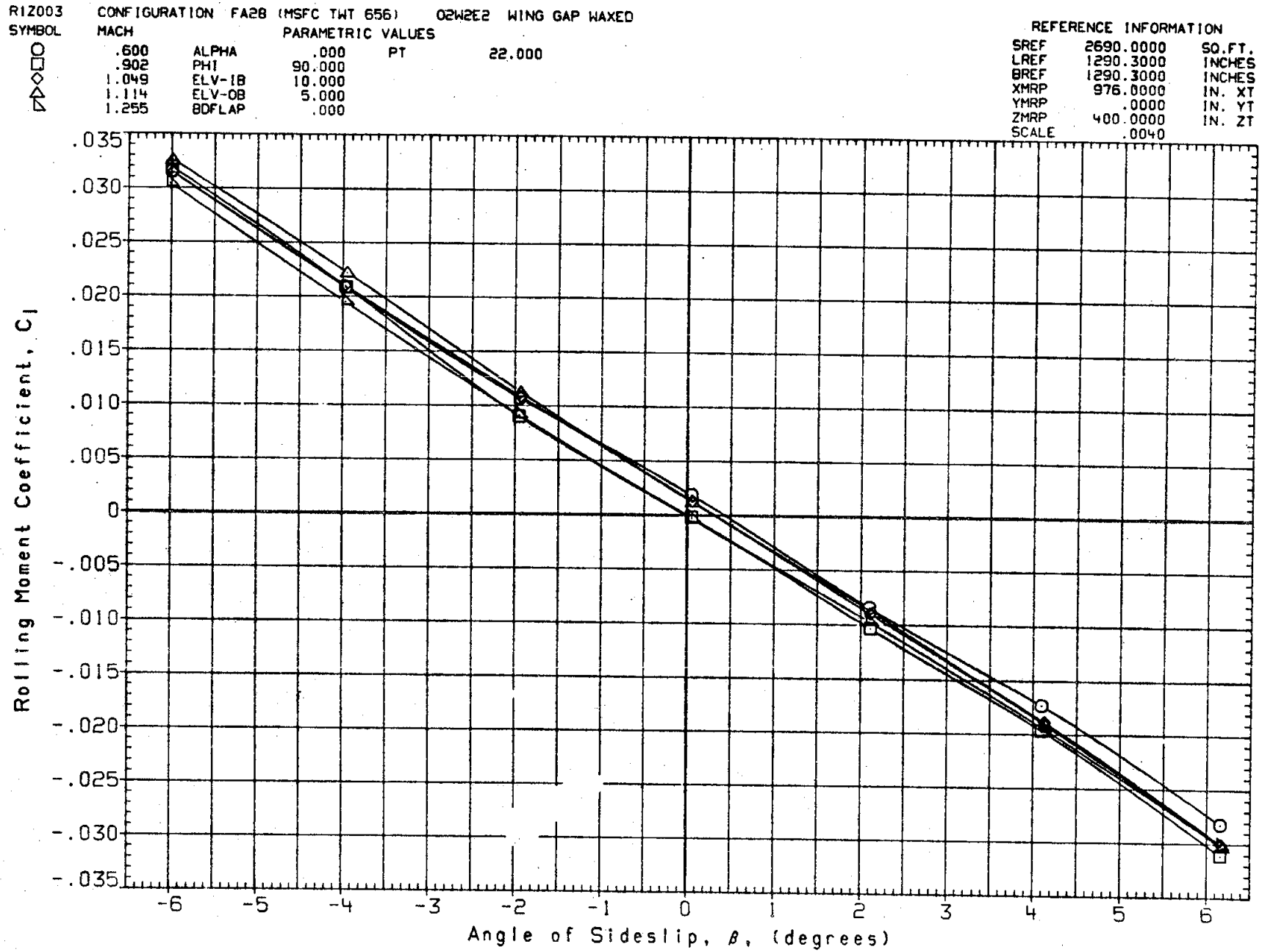

FIG. 6 ORBITER LATERAL DIRECTIONAL CHARACTERISTICS

DATE 12 MAR 80

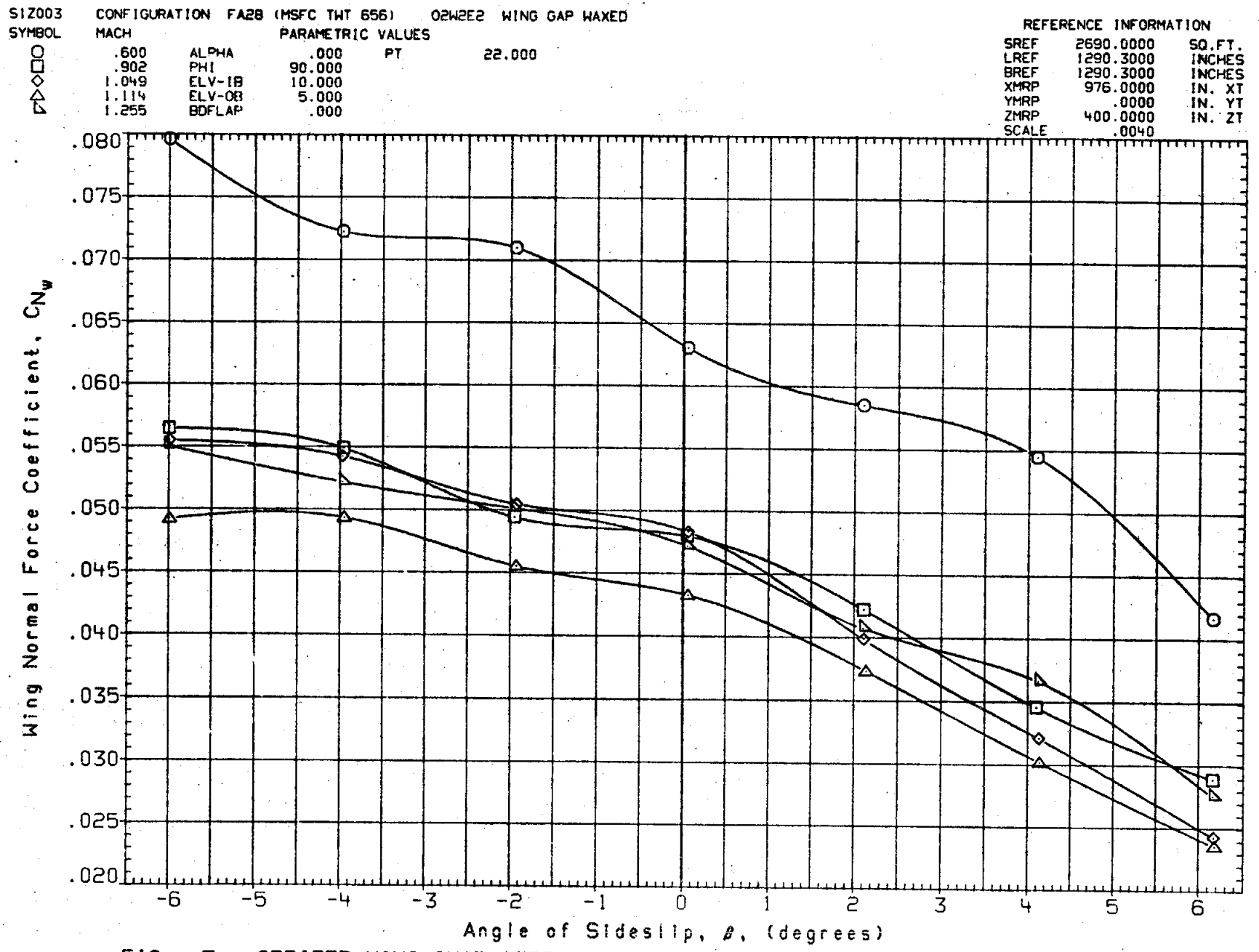

FIG. 7 ORBITER WING CHARACTERISTICS IN YAW

DATE 12 MAR 80

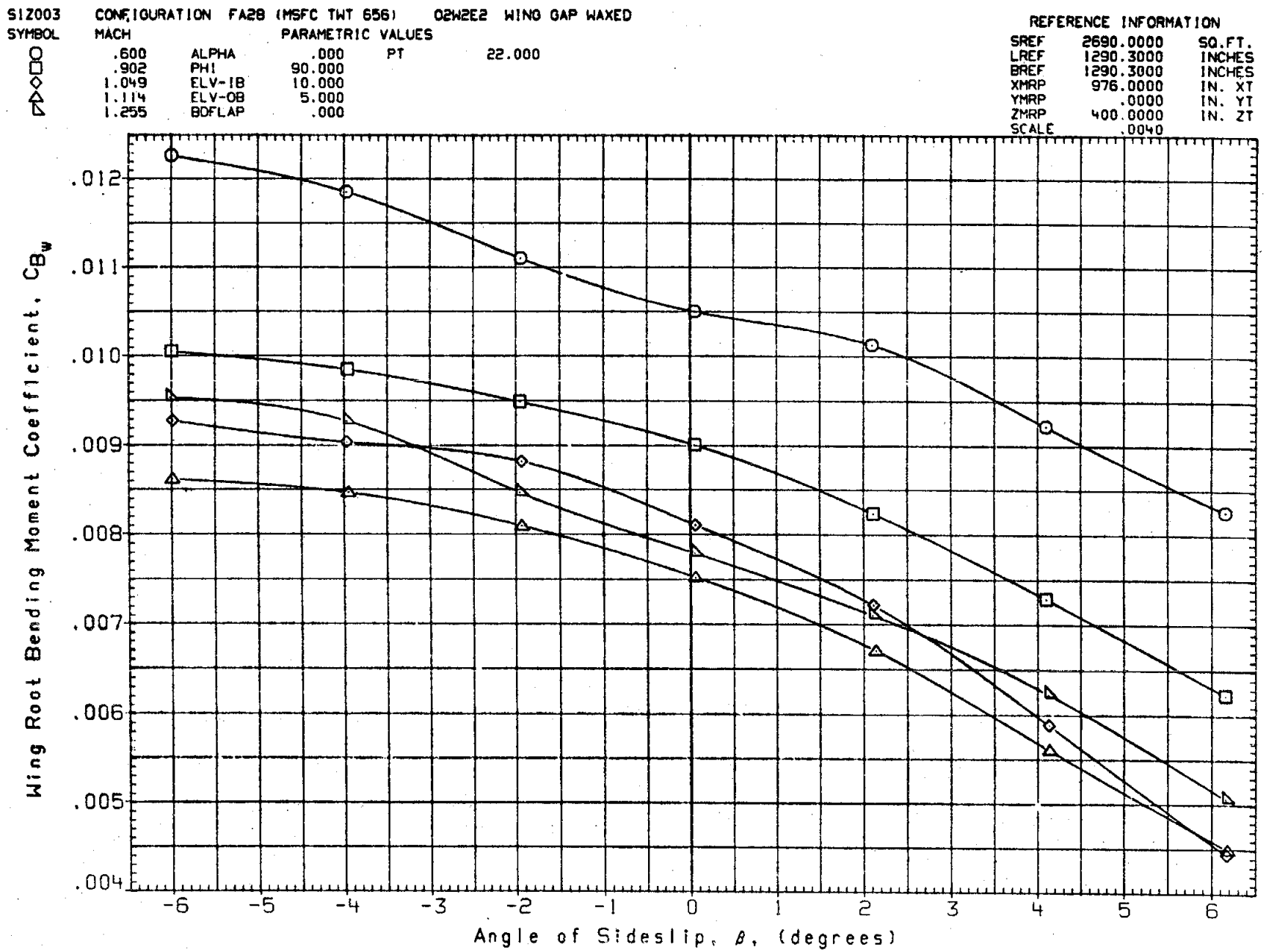

FIG. 7 ORBITER WING CHARACTERISTICS IN YAW

DATE 12 MAR 80

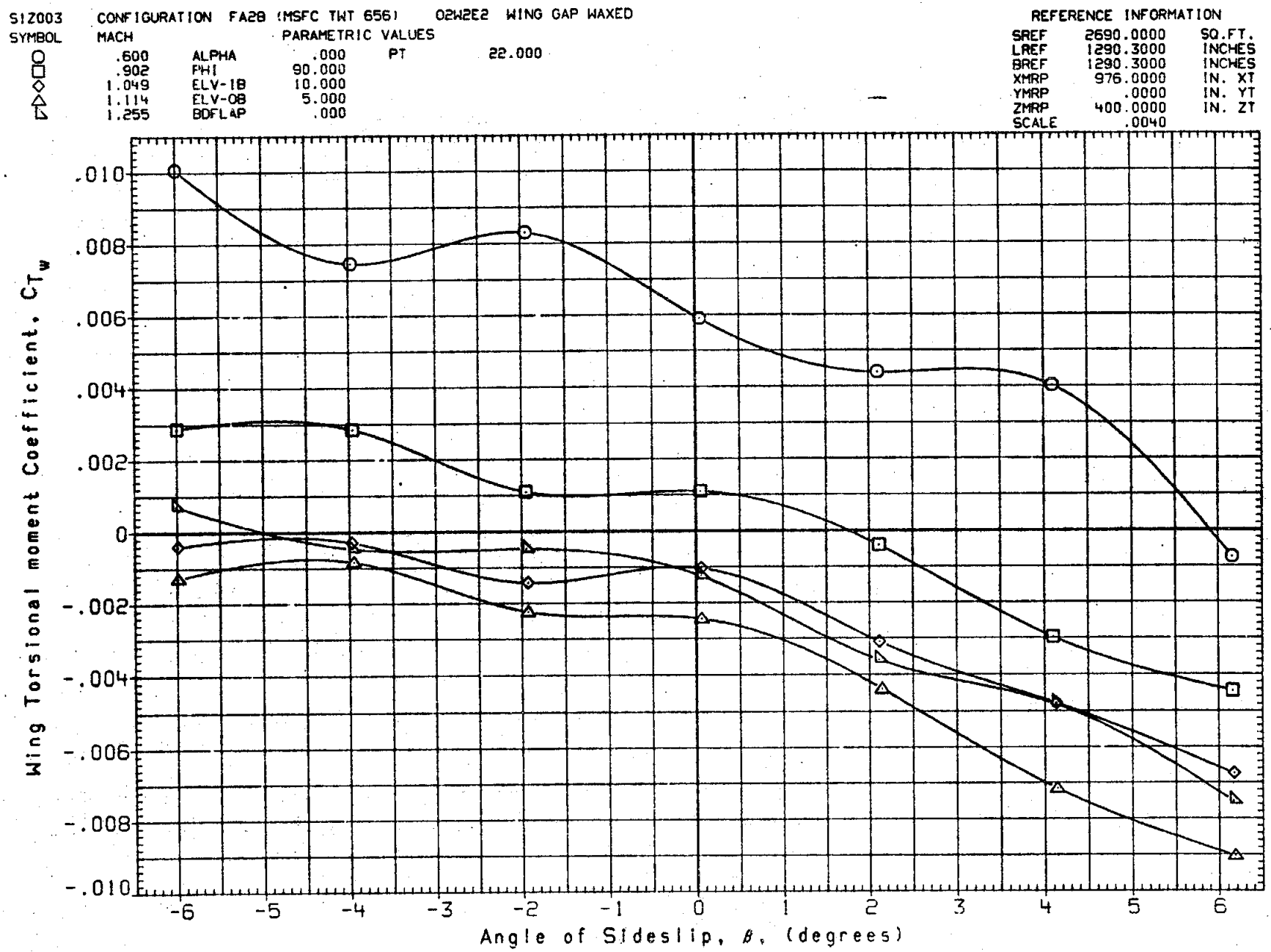

FIG. 7 ORBITER WING CHARACTERISTICS IN YAW

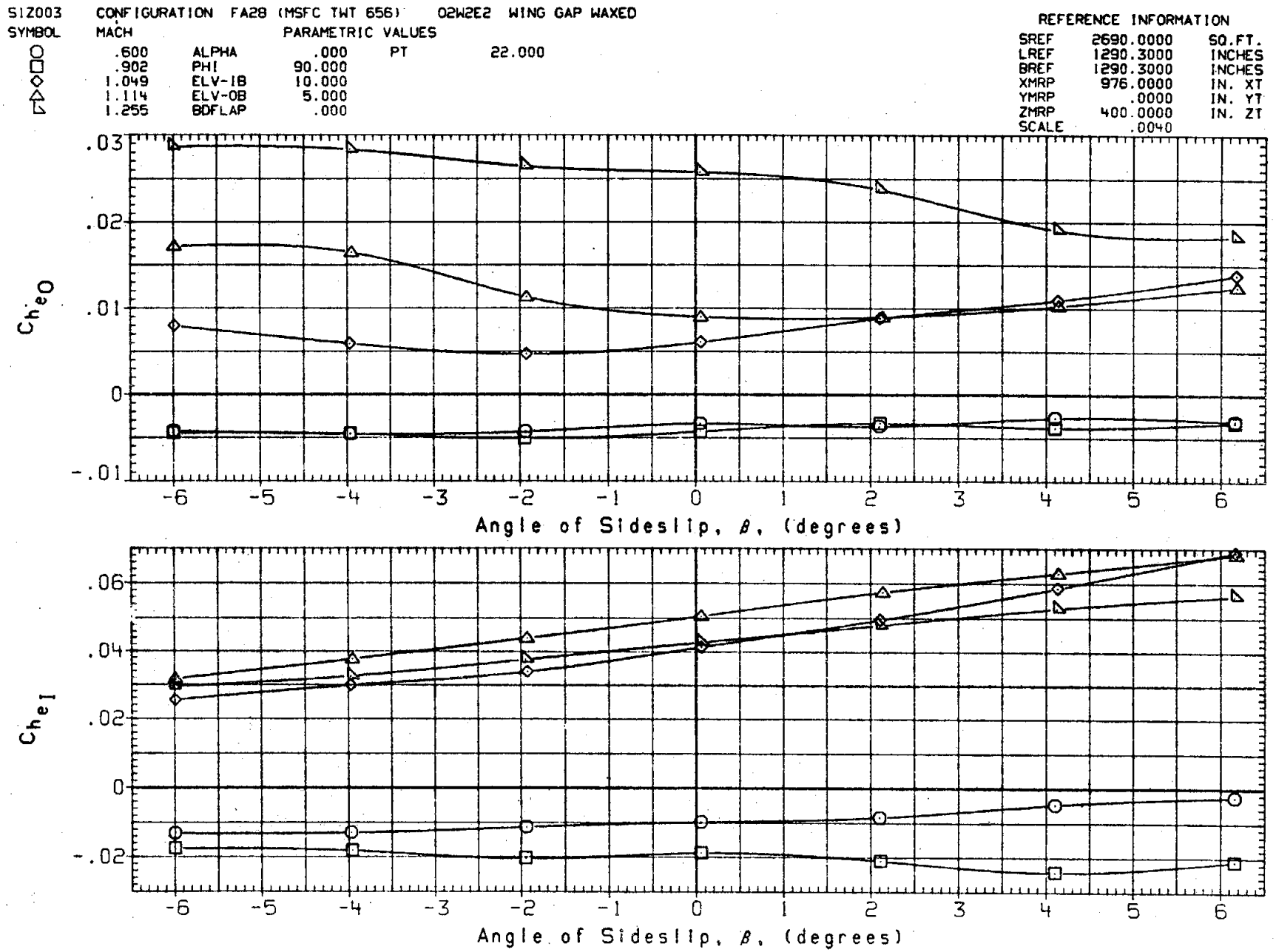

FIG. 8 ORBITER ELEVON CHARACTERISTICS IN YAW

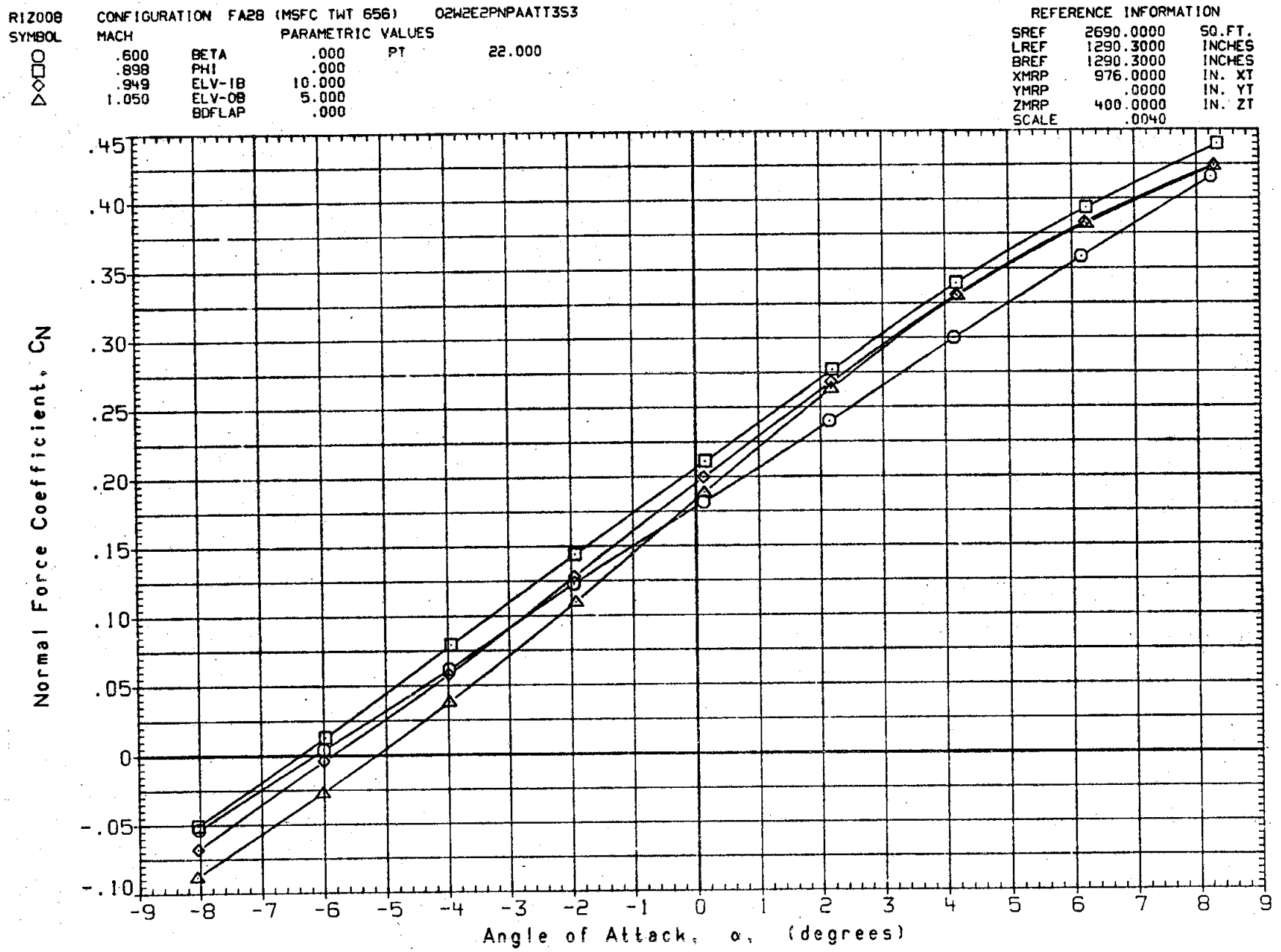

FIG. 9 LAUNCH VEHICLE LONGITUDINAL CHARACTERISTICS

DATE 12 MAR 80

R1Z008 CONFIGURATION FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3

SYMBOL	MACH	PARAMETRIC VALUES			
○	1.099	BETA	.000	PT	22.000
□	1.149	PHI	.000		
◇	1.246	ELV-1B	10.000		
		ELV-CB	5.000		
		BDFLAP	.000		

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

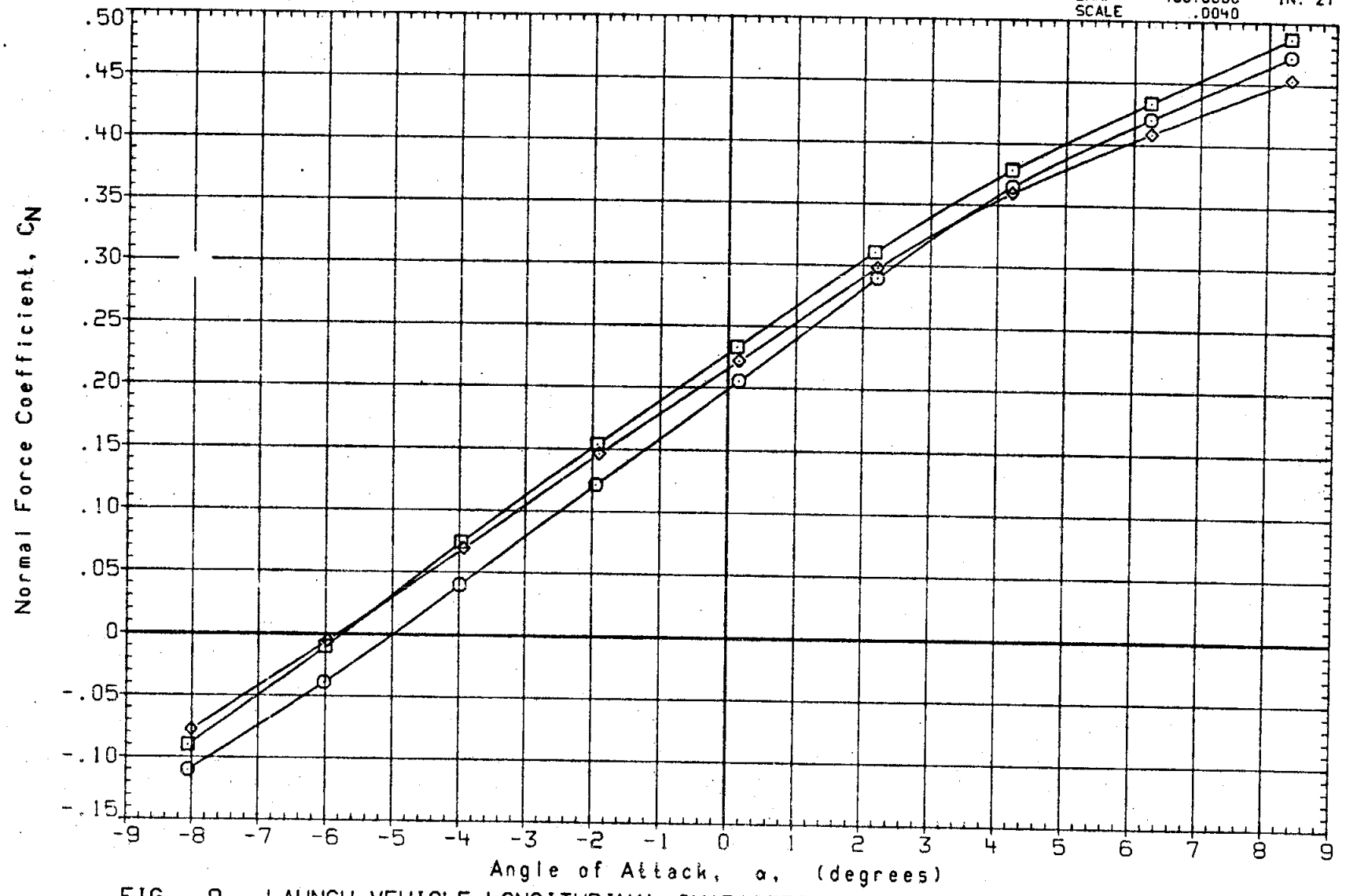

FIG. 9 LAUNCH VEHICLE LONGITUDINAL CHARACTERISTICS

DATE 12 MAR 80

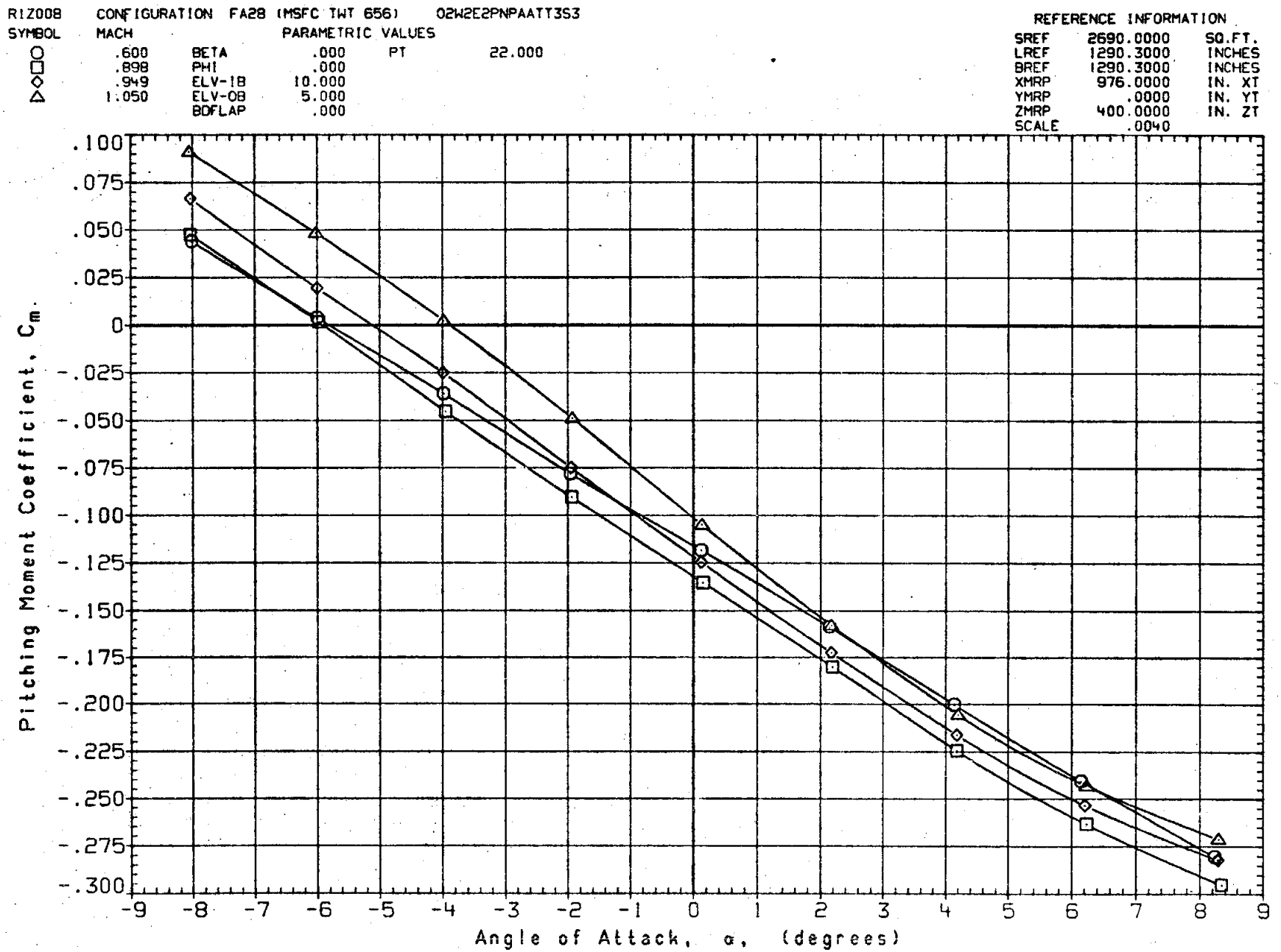

FIG. 9 LAUNCH VEHICLE LONGITUDINAL CHARACTERISTICS

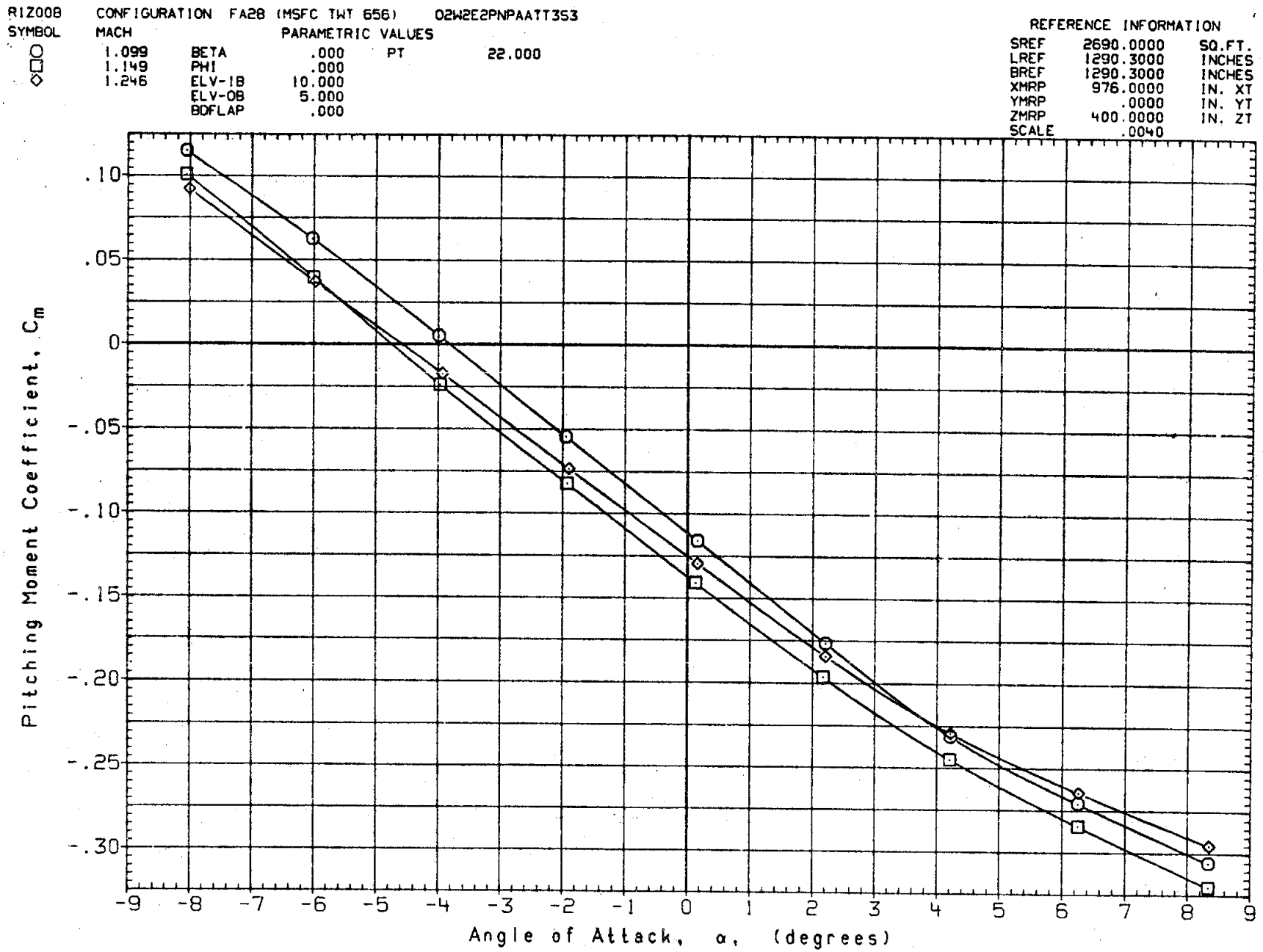

FIG. 9 LAUNCH VEHICLE LONGITUDINAL CHARACTERISTICS

DATE 12 MAR 80

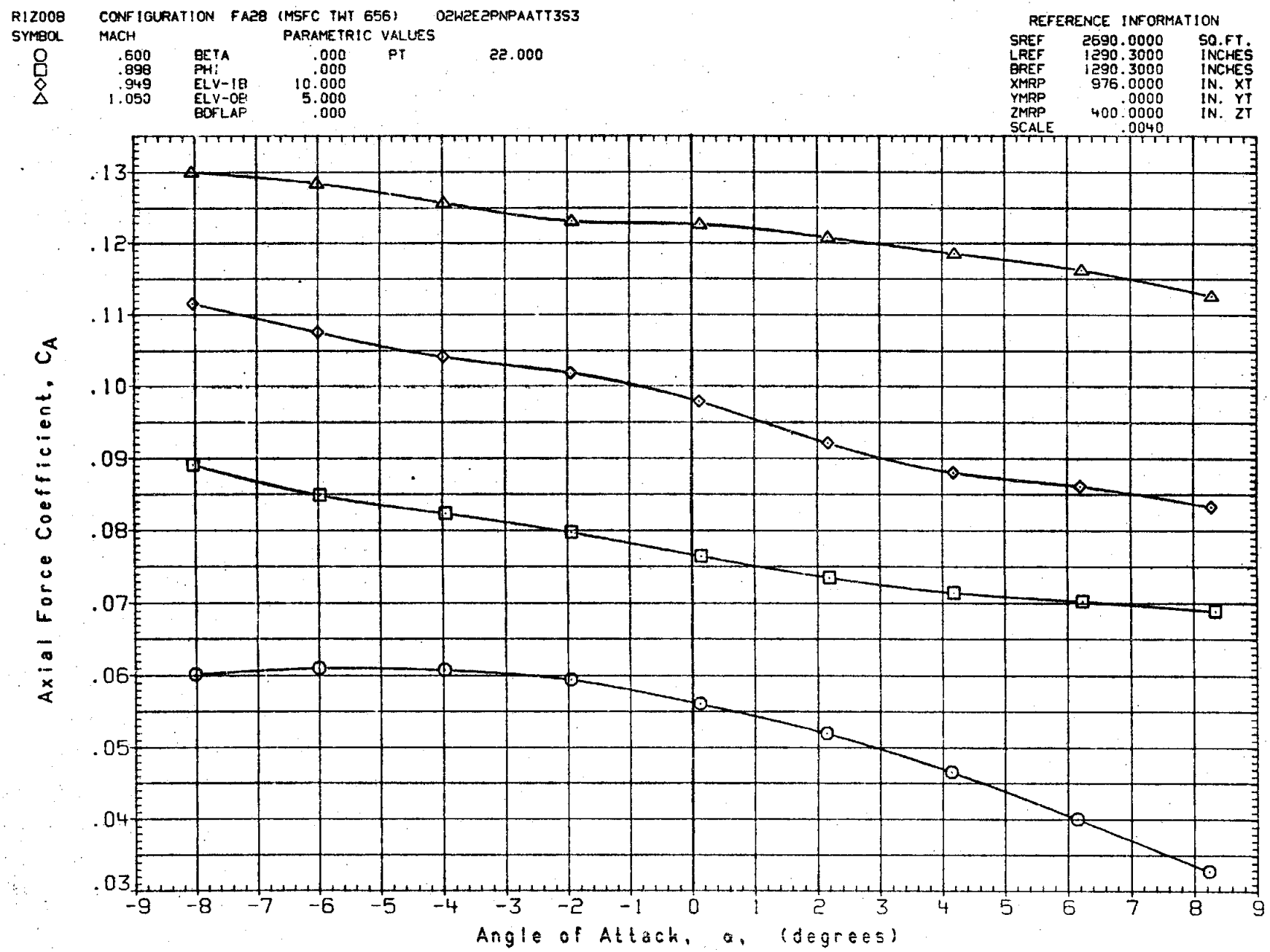

FIG. 9 LAUNCH VEHICLE LONGITUDINAL CHARACTERISTICS

DATE 12 MAR 80

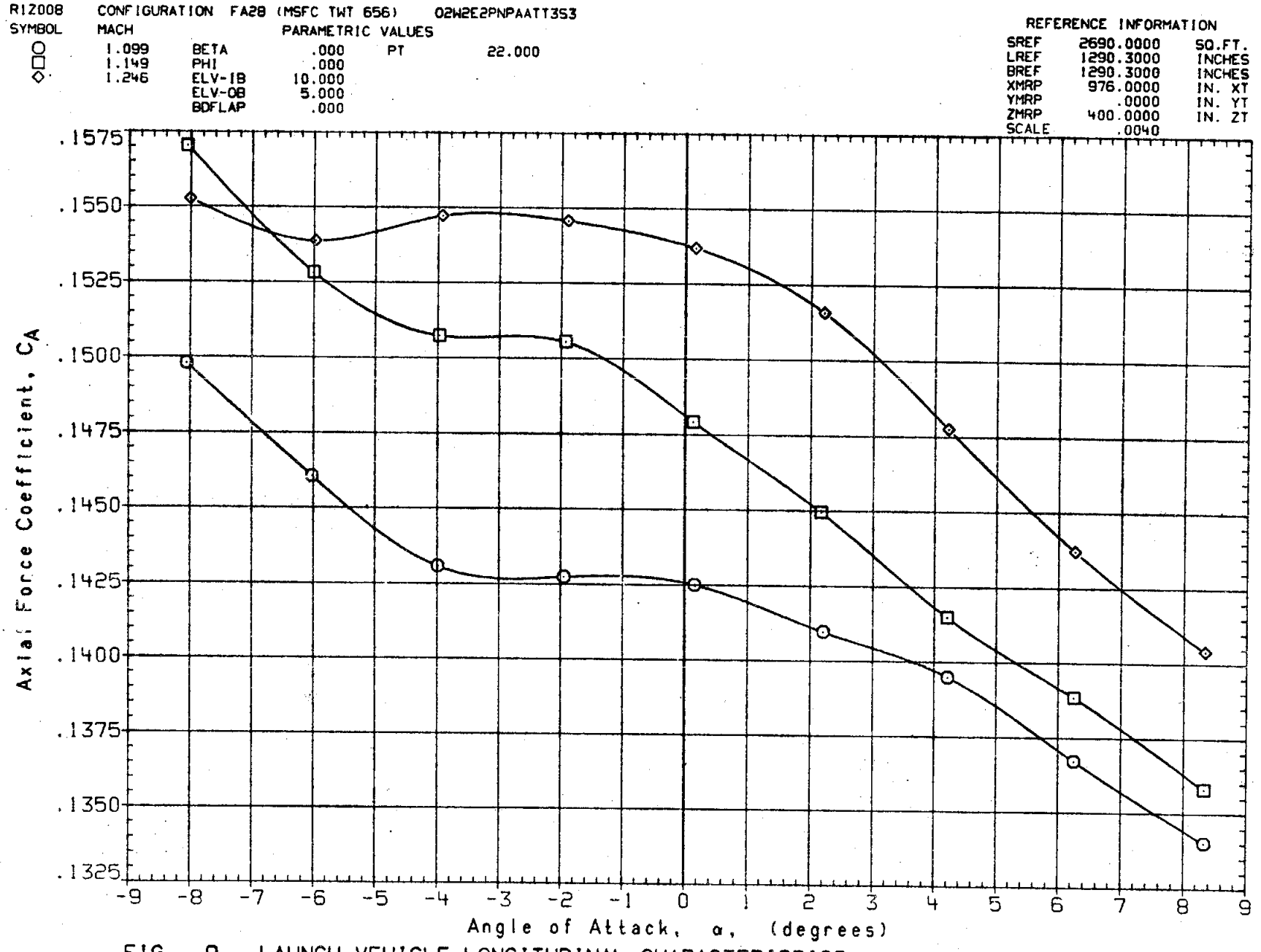

FIG. 9 LAUNCH VEHICLE LONGITUDINAL CHARACTERISTICS

DATE 12 MAR 80

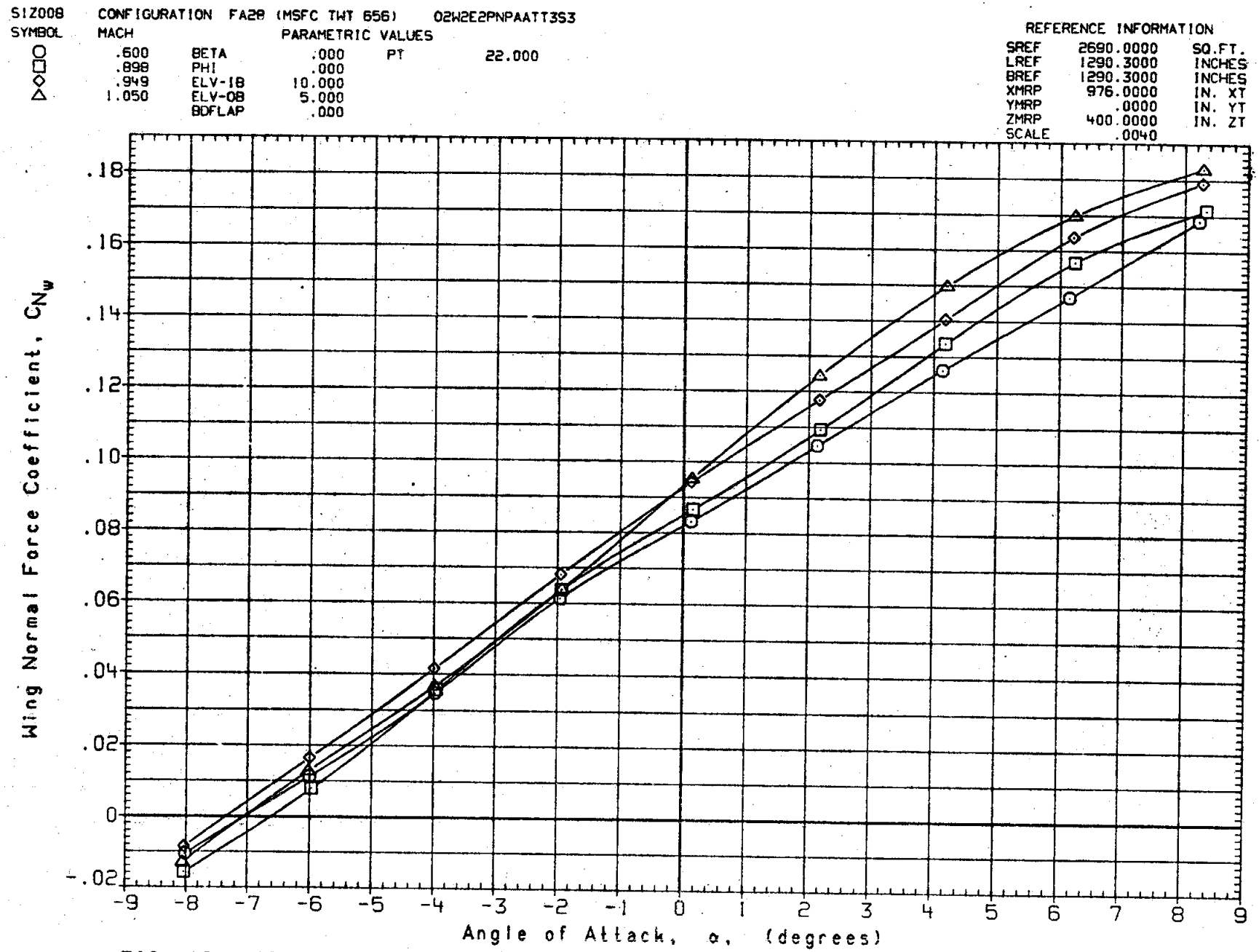

FIG. 10 ORBITER WING CHARACTERISTICS IN PITCH (LAUNCH CONFIGURATION)

DATE 12 MAR 80

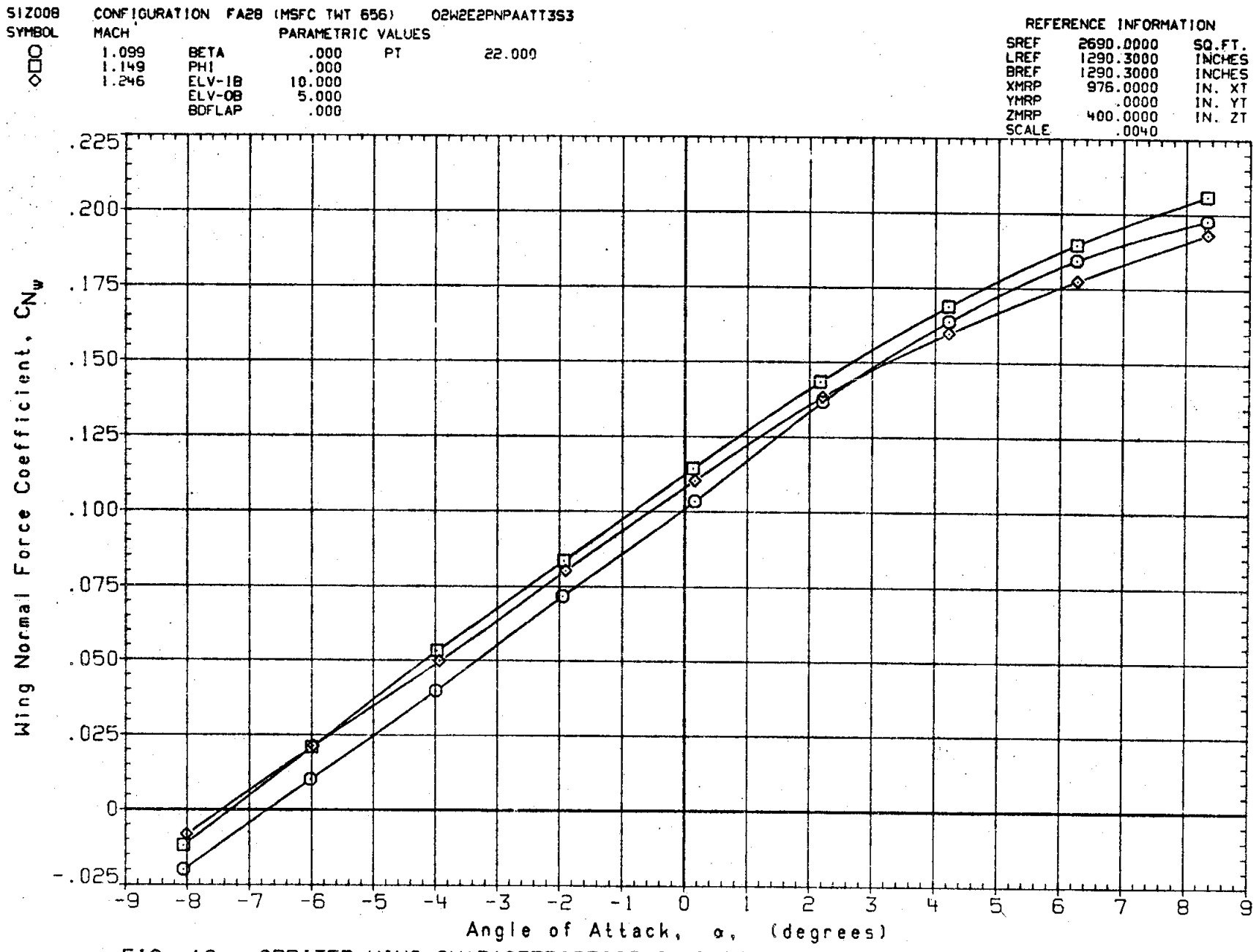

FIG. 10 ORBITER WING CHARACTERISTICS IN PITCH (LAUNCH CONFIGURATION)

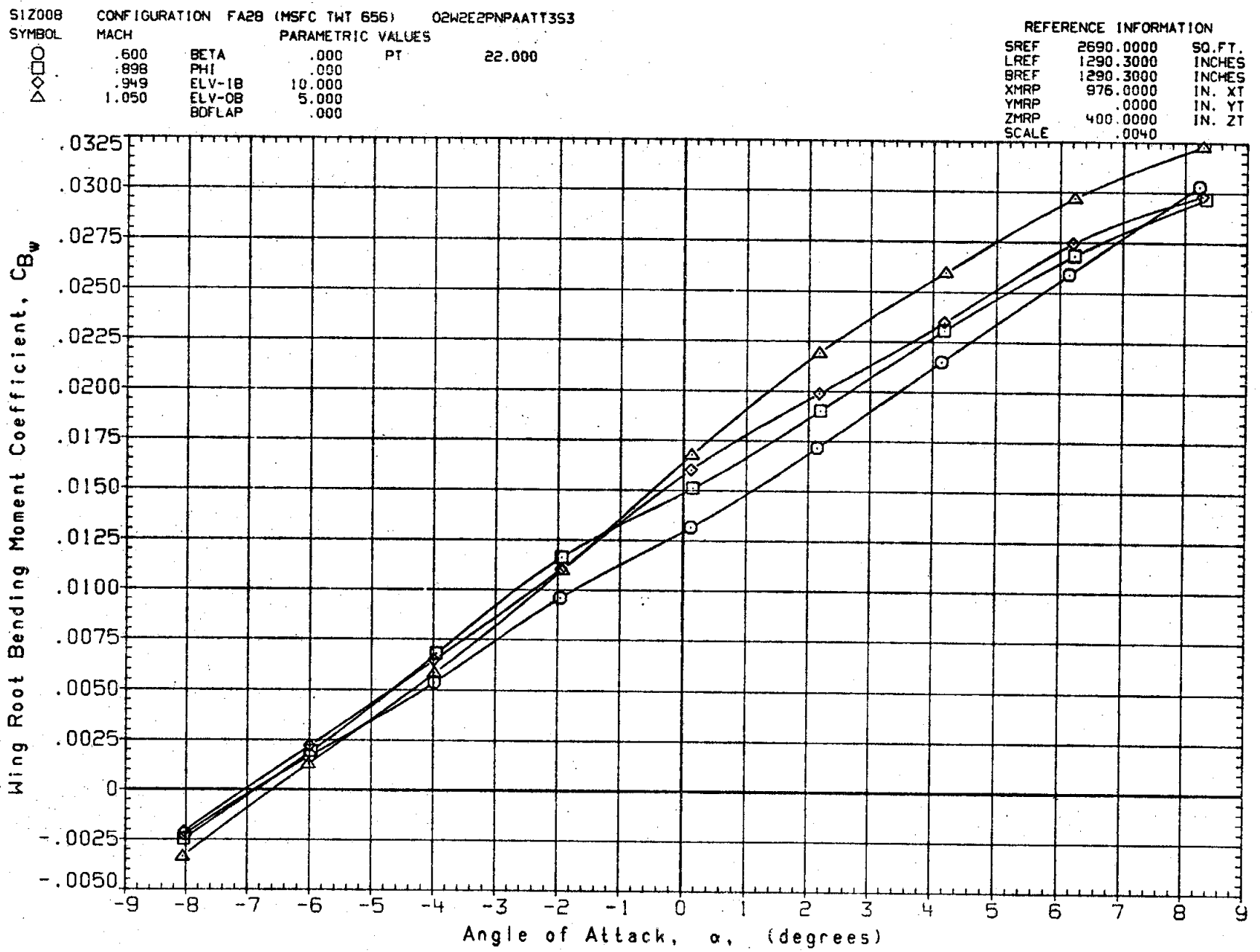

FIG. 10 ORBITER WING CHARACTERISTICS IN PITCH (LAUNCH CONFIGURATION)

DATE 12 MAR 80

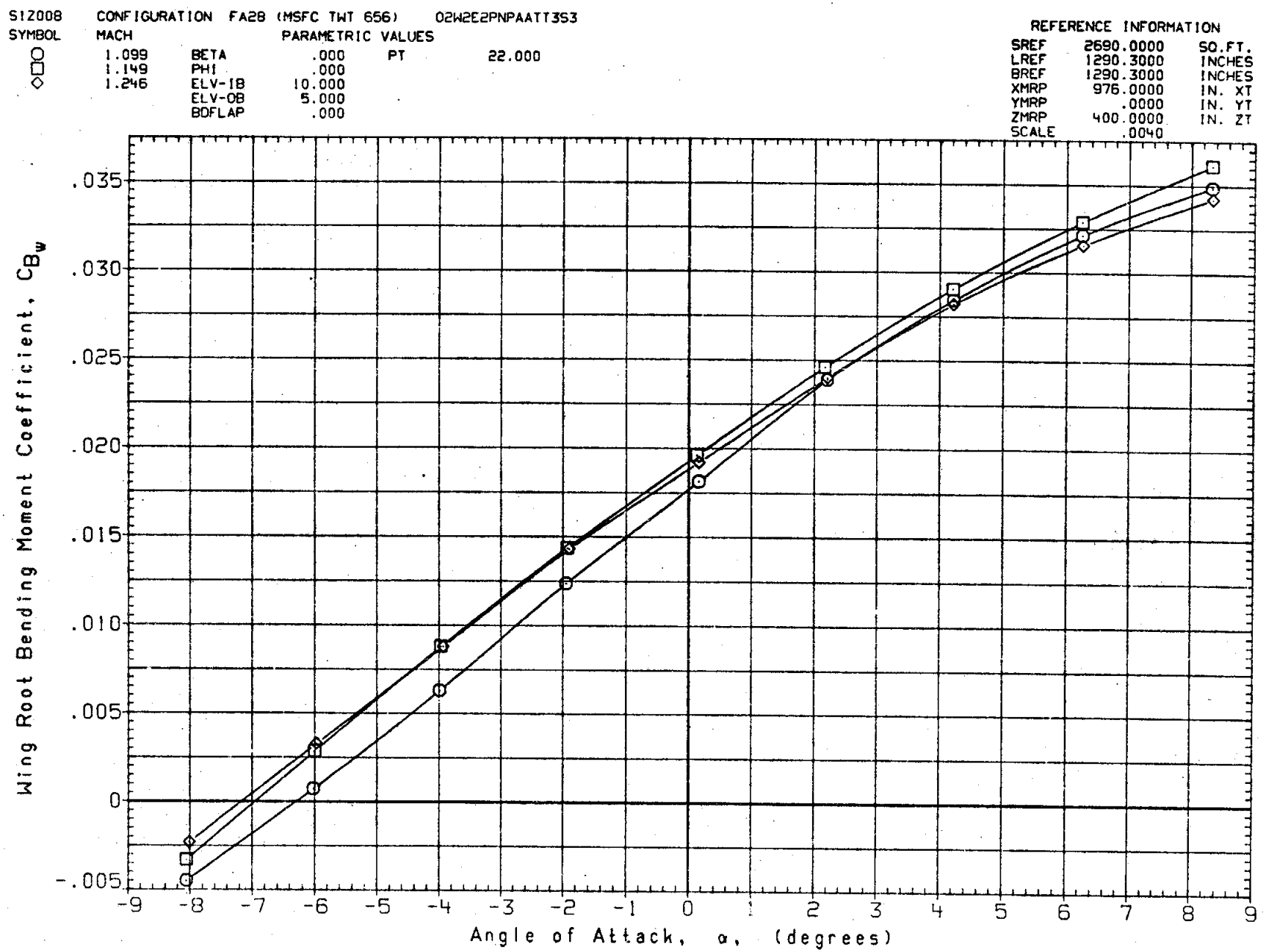

FIG. 10 ORBITER WING CHARACTERISTICS IN PITCH (LAUNCH CONFIGURATION)

DATE 12 MAR 80

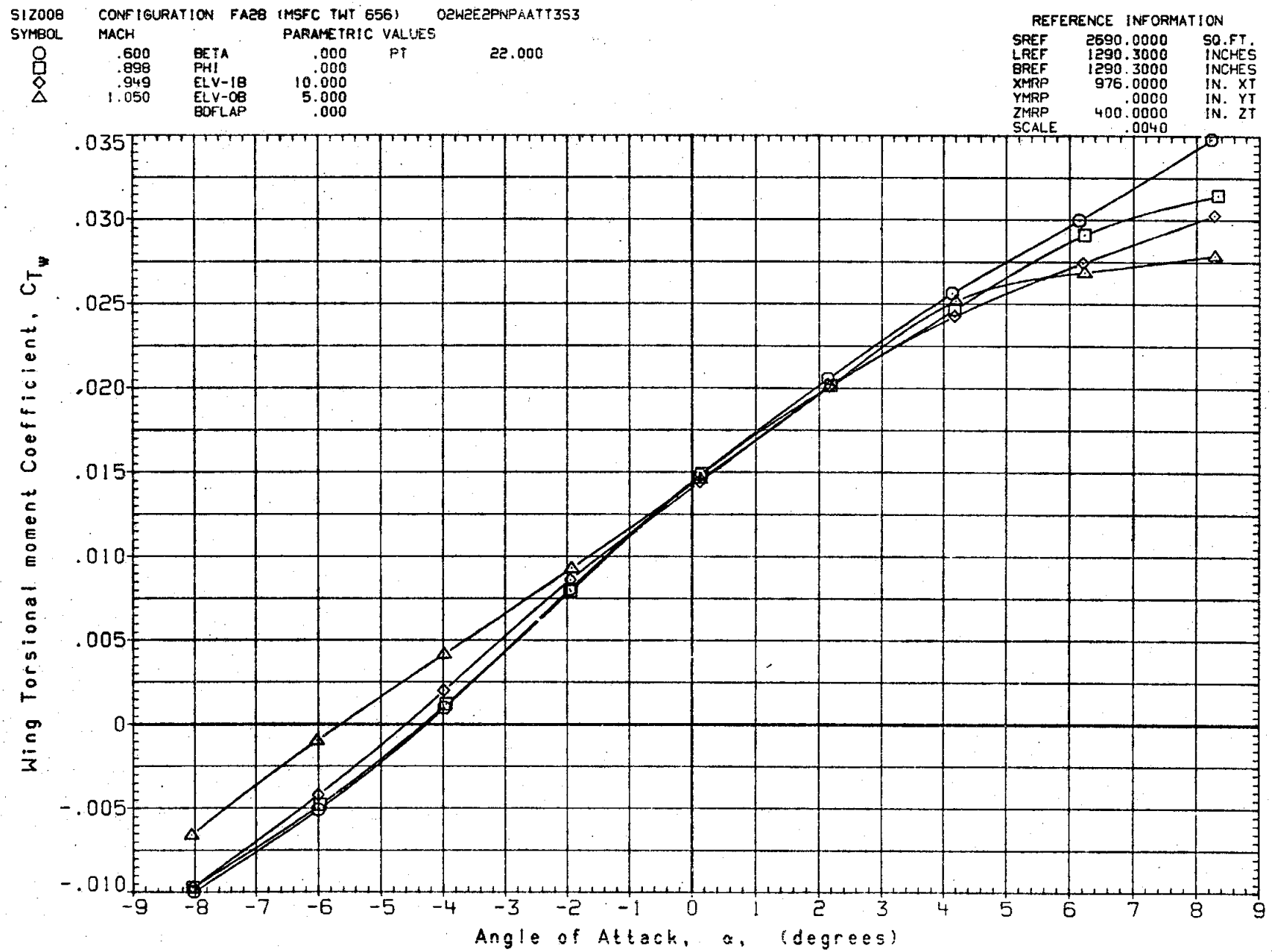

FIG. 10 ORBITER WING CHARACTERISTICS IN PITCH (LAUNCH CONFIGURATION)

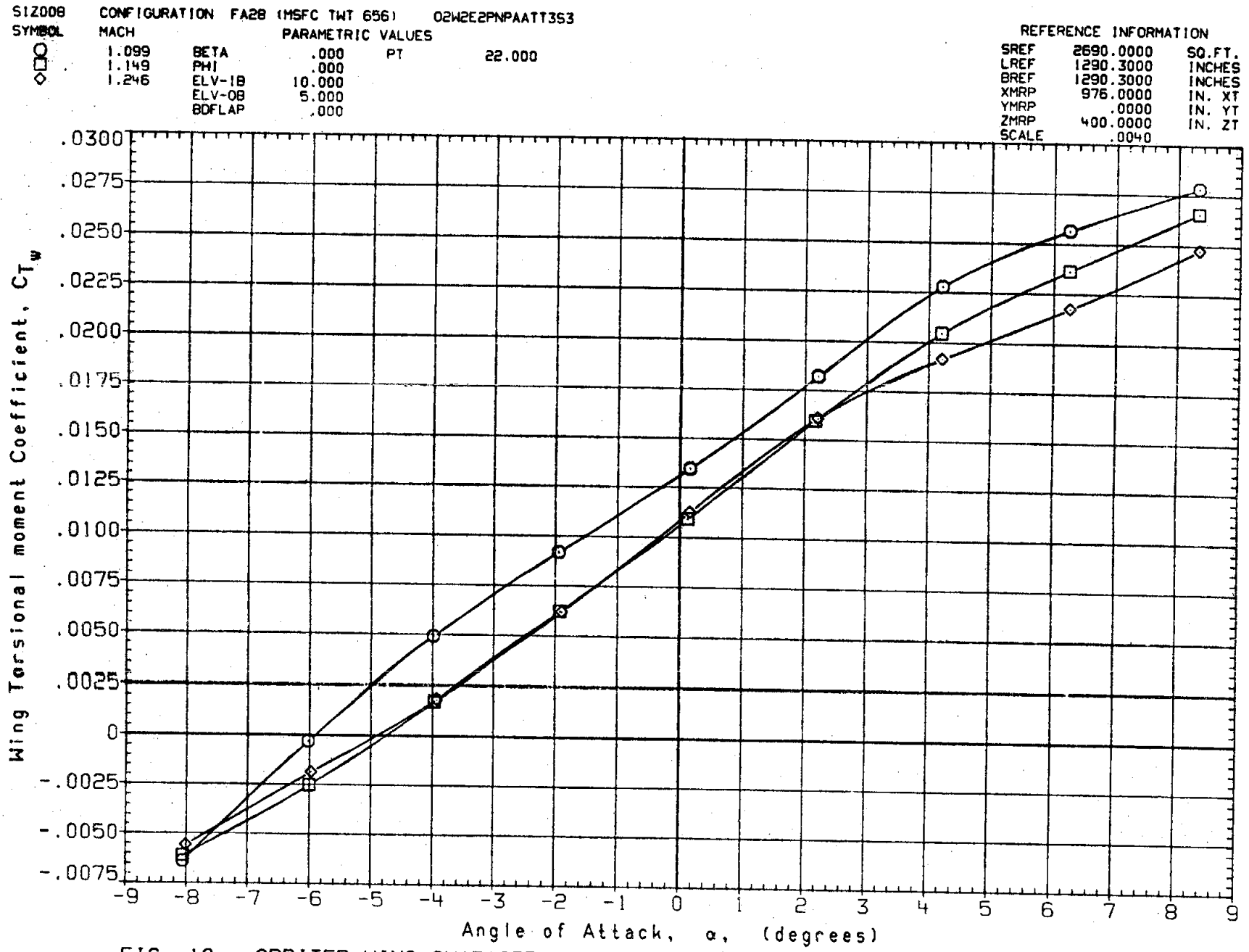

FIG. 10 ORBITER WING CHARACTERISTICS IN PITCH (LAUNCH CONFIGURATION)

DATE 12 MAR 80

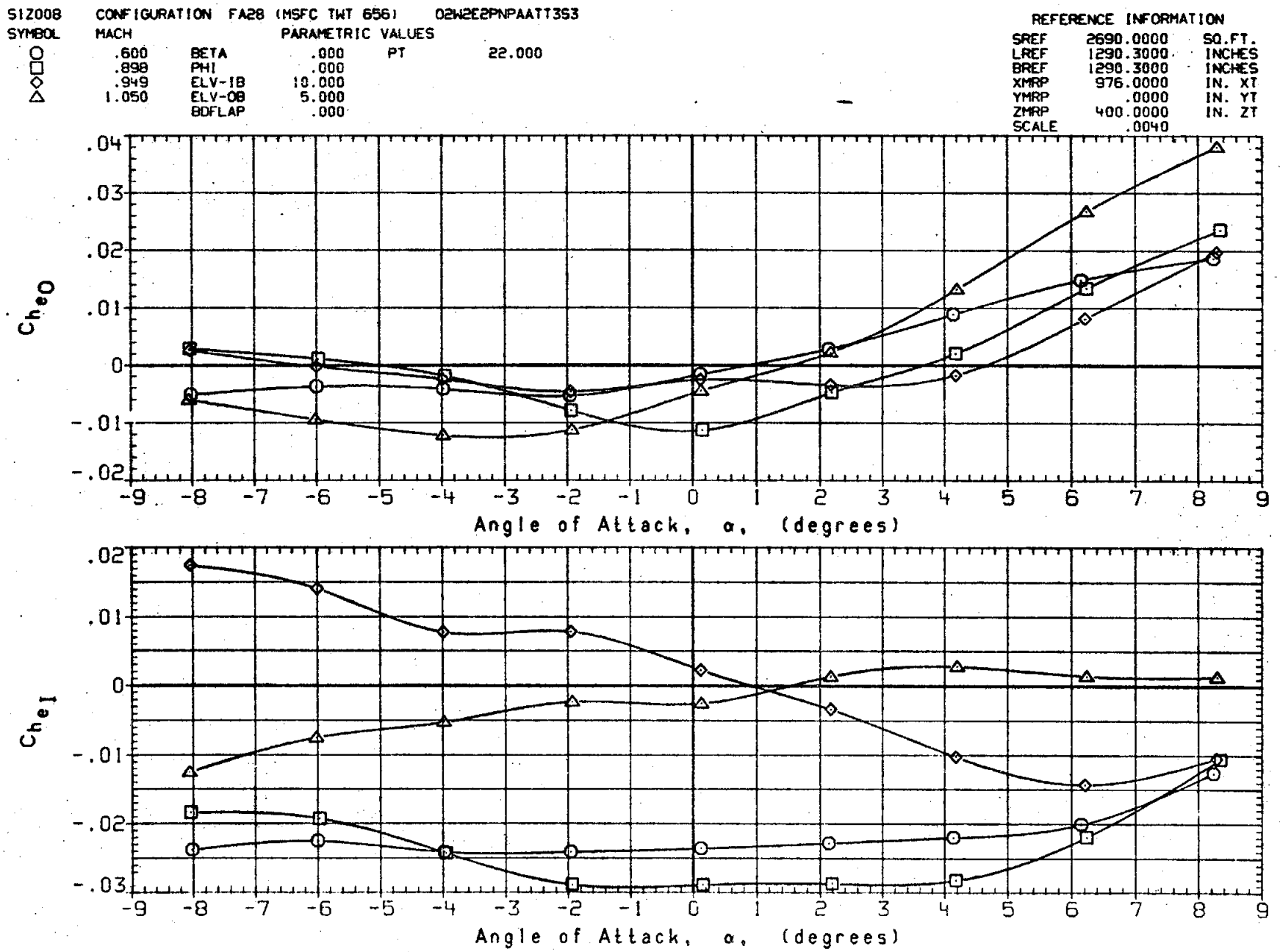

FIG. 11 ORBITER ELEVON CHARACTERISTICS IN PITCH (LAUNCH CONFIGURATION)

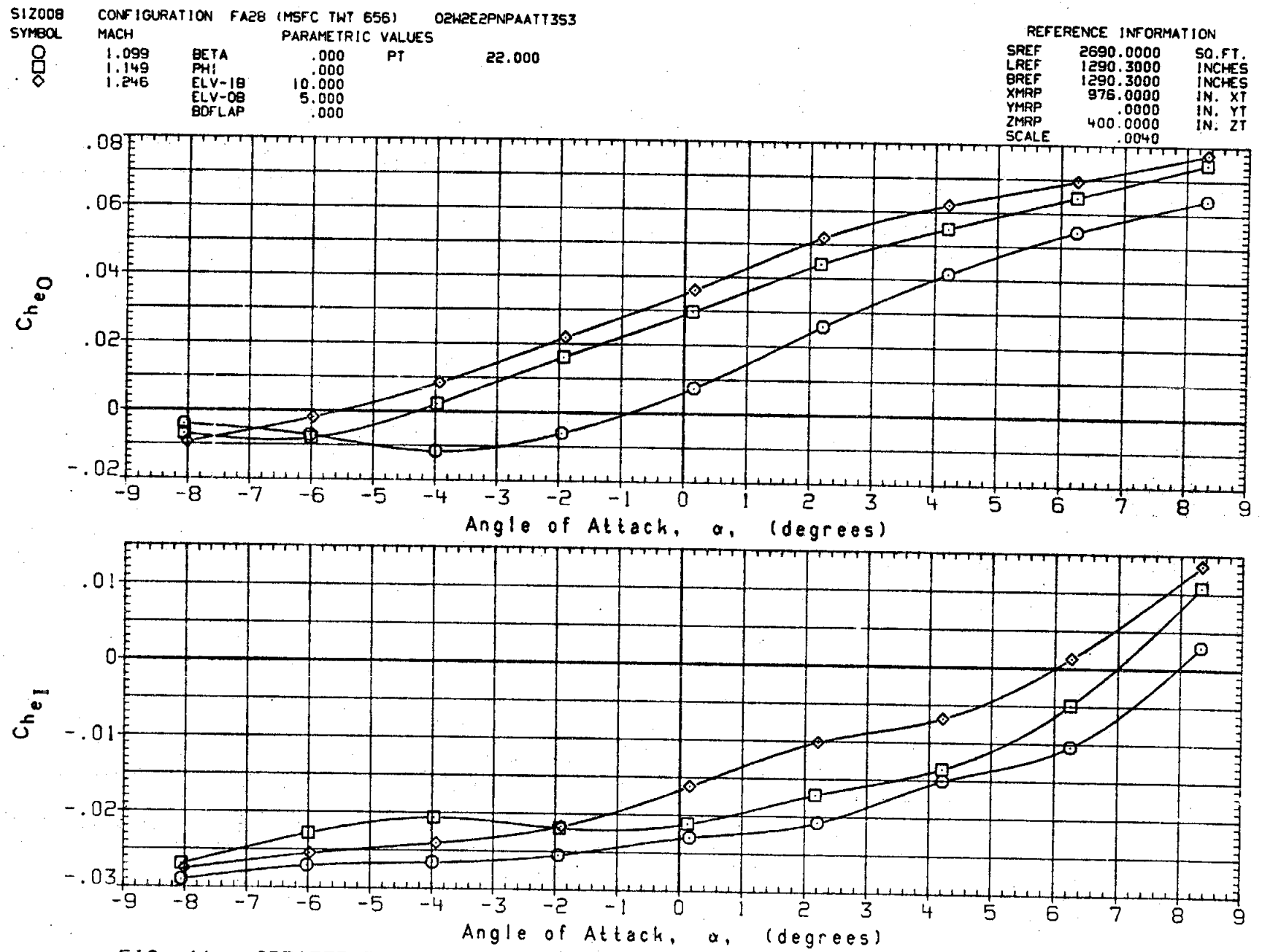

FIG. 11 ORBITER ELEVON CHARACTERISTICS IN PITCH (LAUNCH CONFIGURATION)

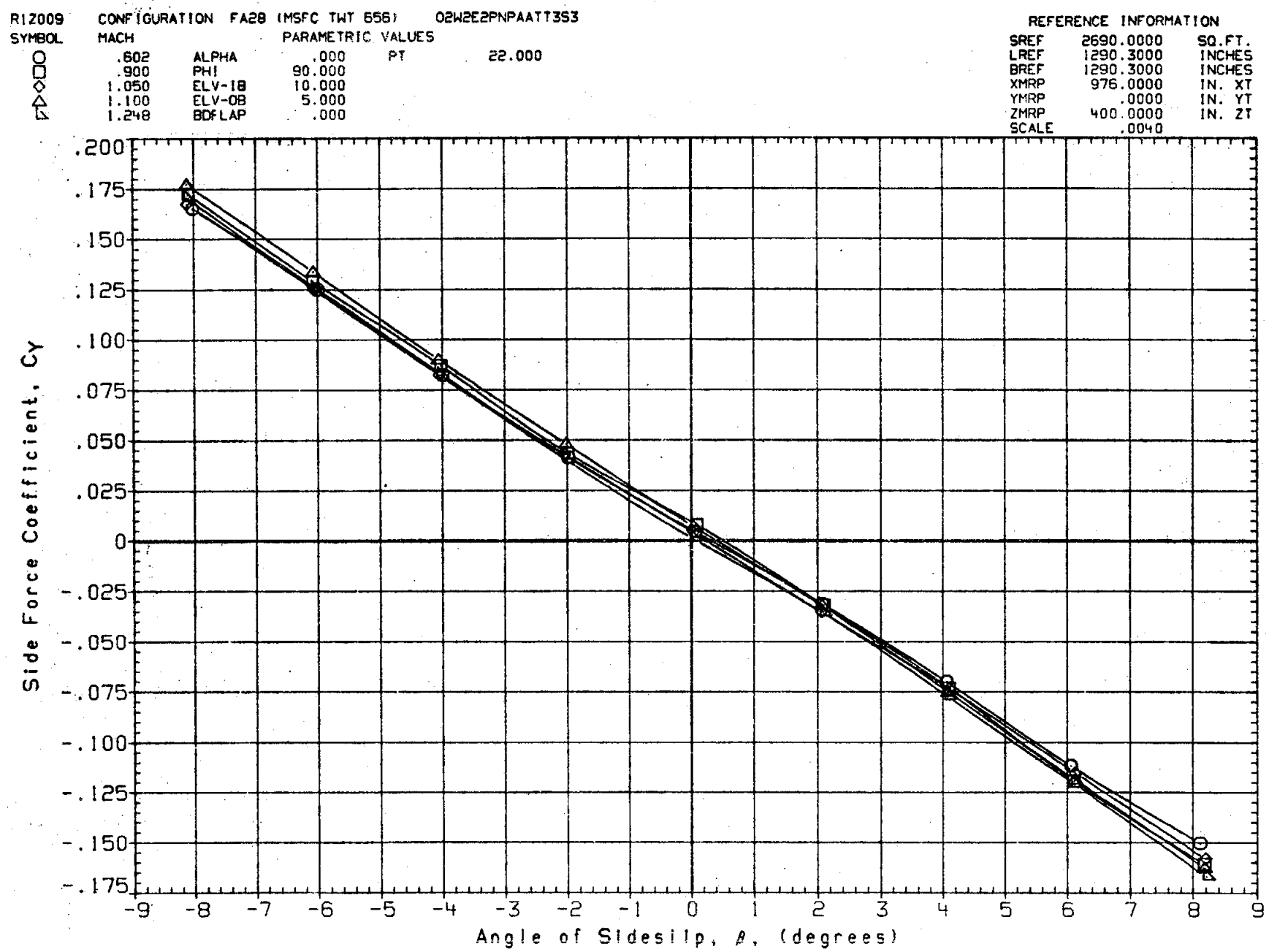

FIG. 12 LAUNCH VEHICLE LATERAL-DIRECTIONAL CHARACTERISTICS

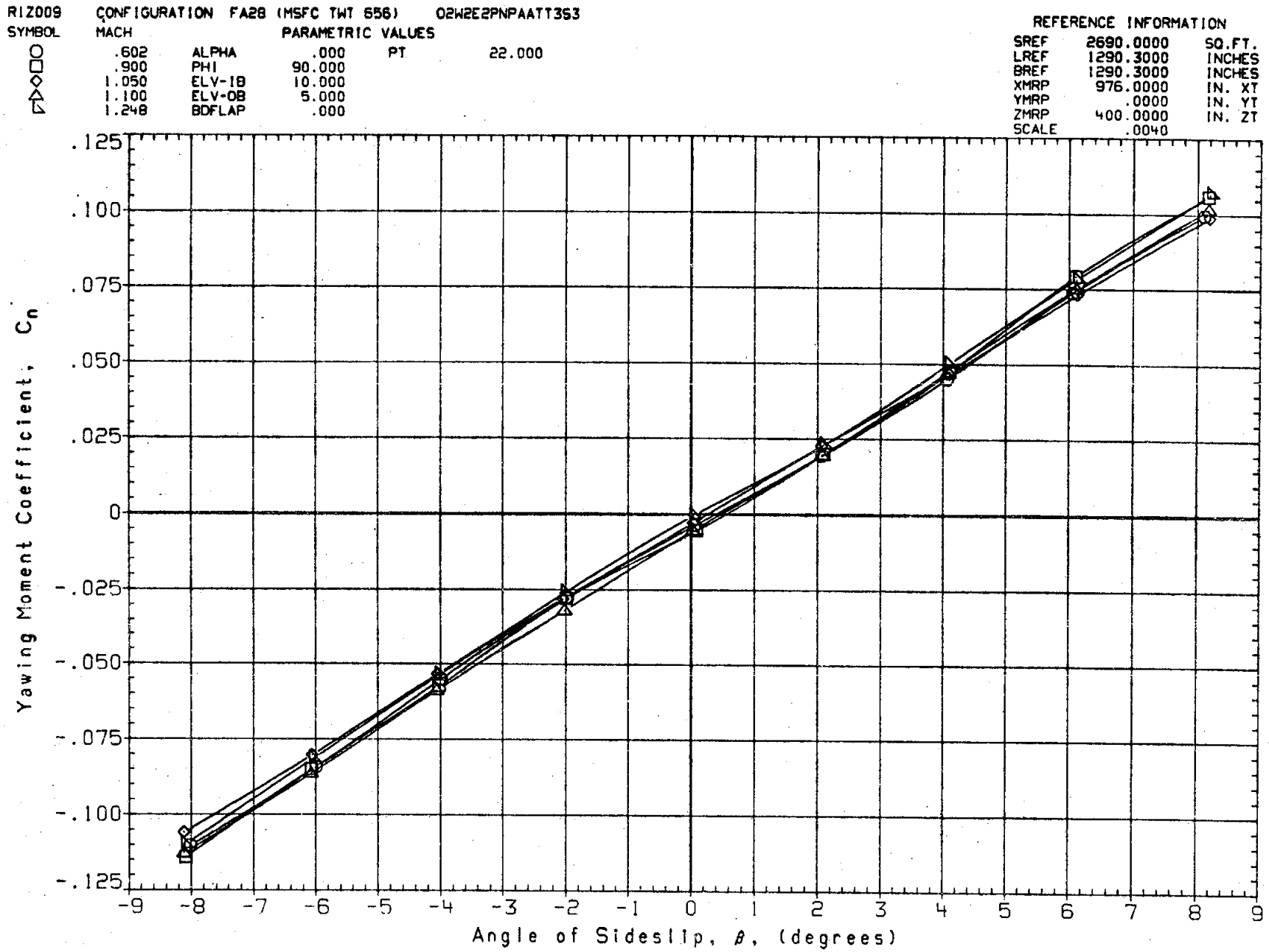

FIG. 12 LAUNCH VEHICLE LATERAL-DIRECTIONAL CHARACTERISTICS

DATE 12 MAR 80

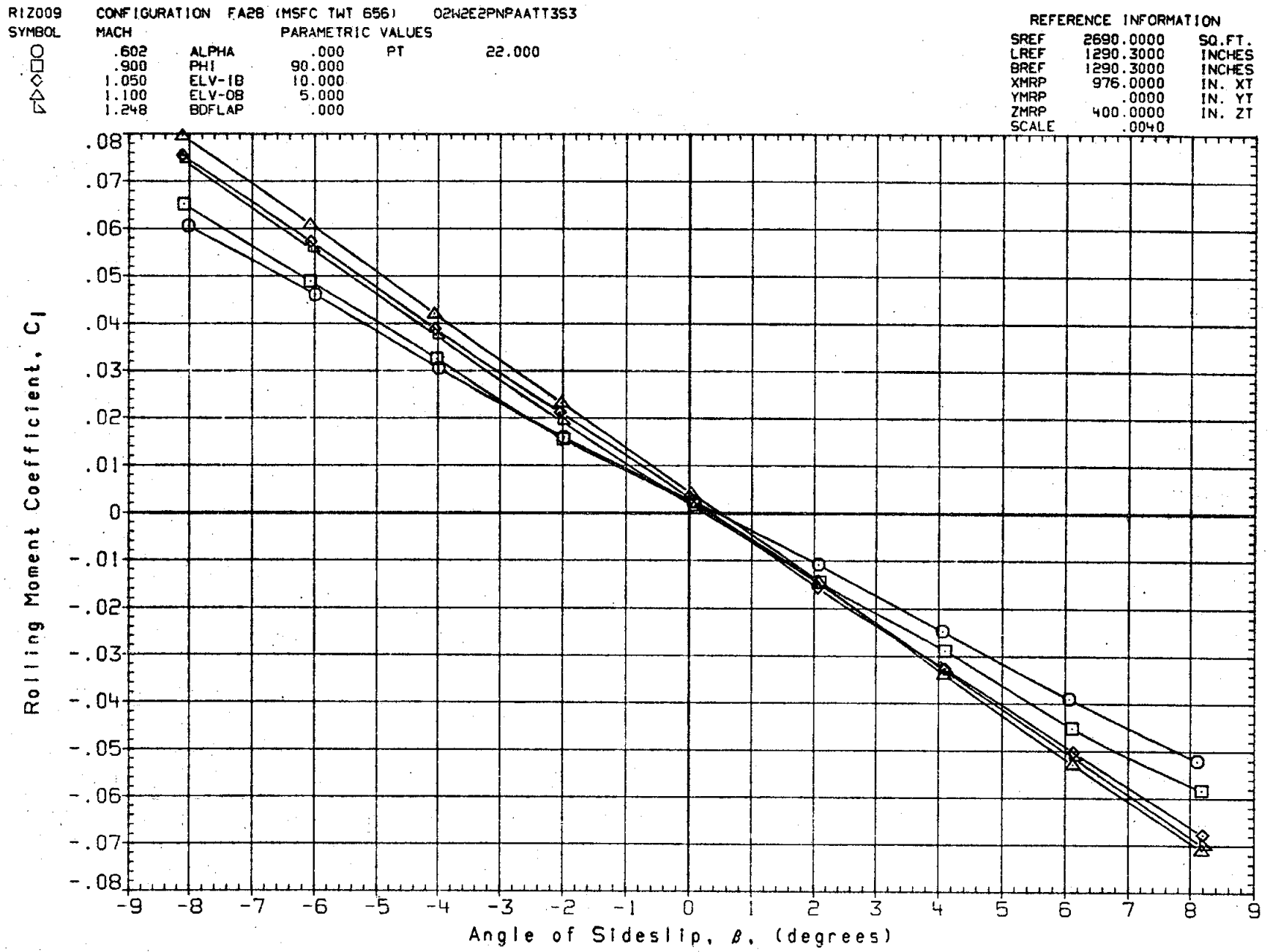

FIG. 12 LAUNCH VEHICLE LATERAL-DIRECTIONAL CHARACTERISTICS

DATE 12 MAR 80

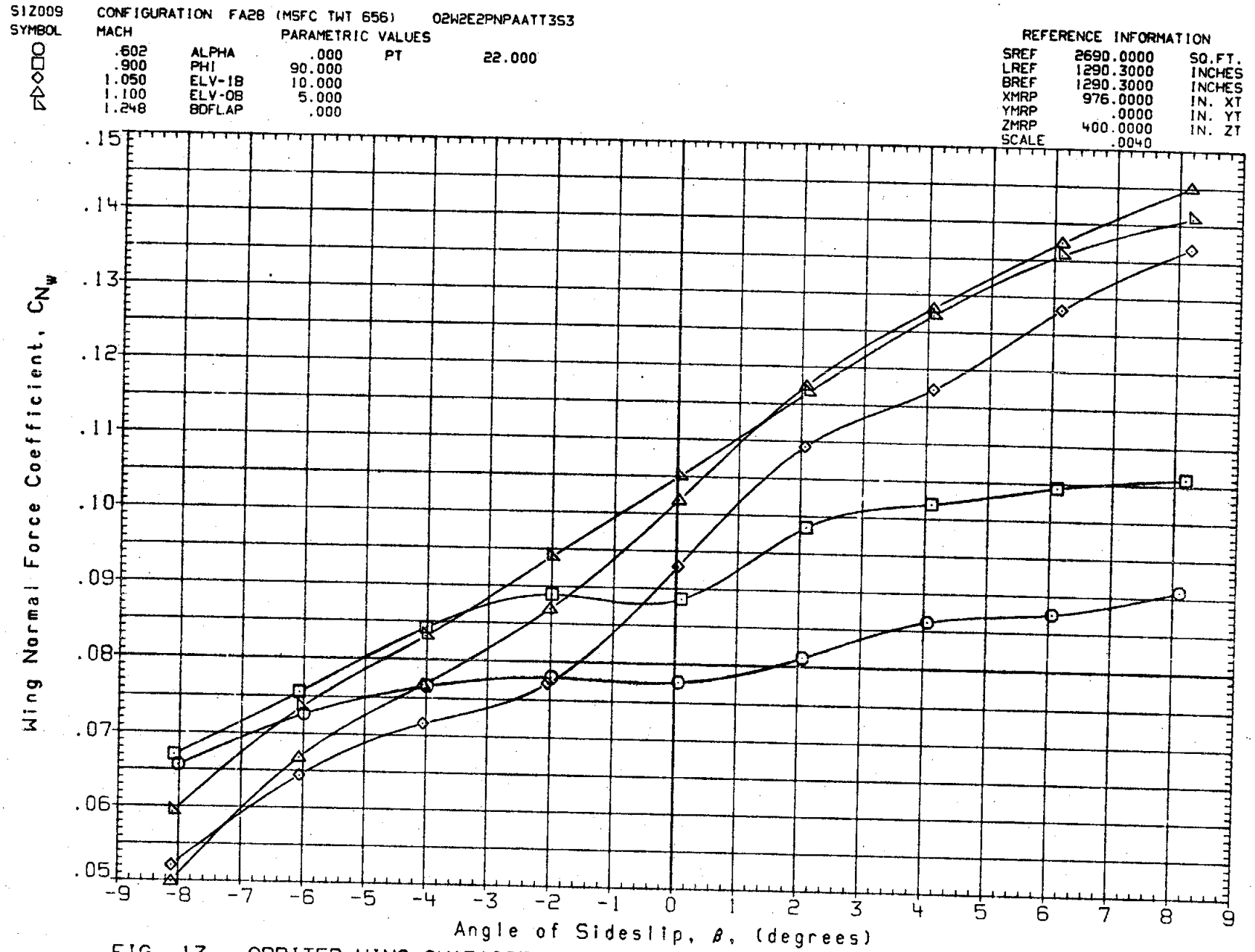

FIG. 13 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIGURATION)

DATE 12 MAR 80

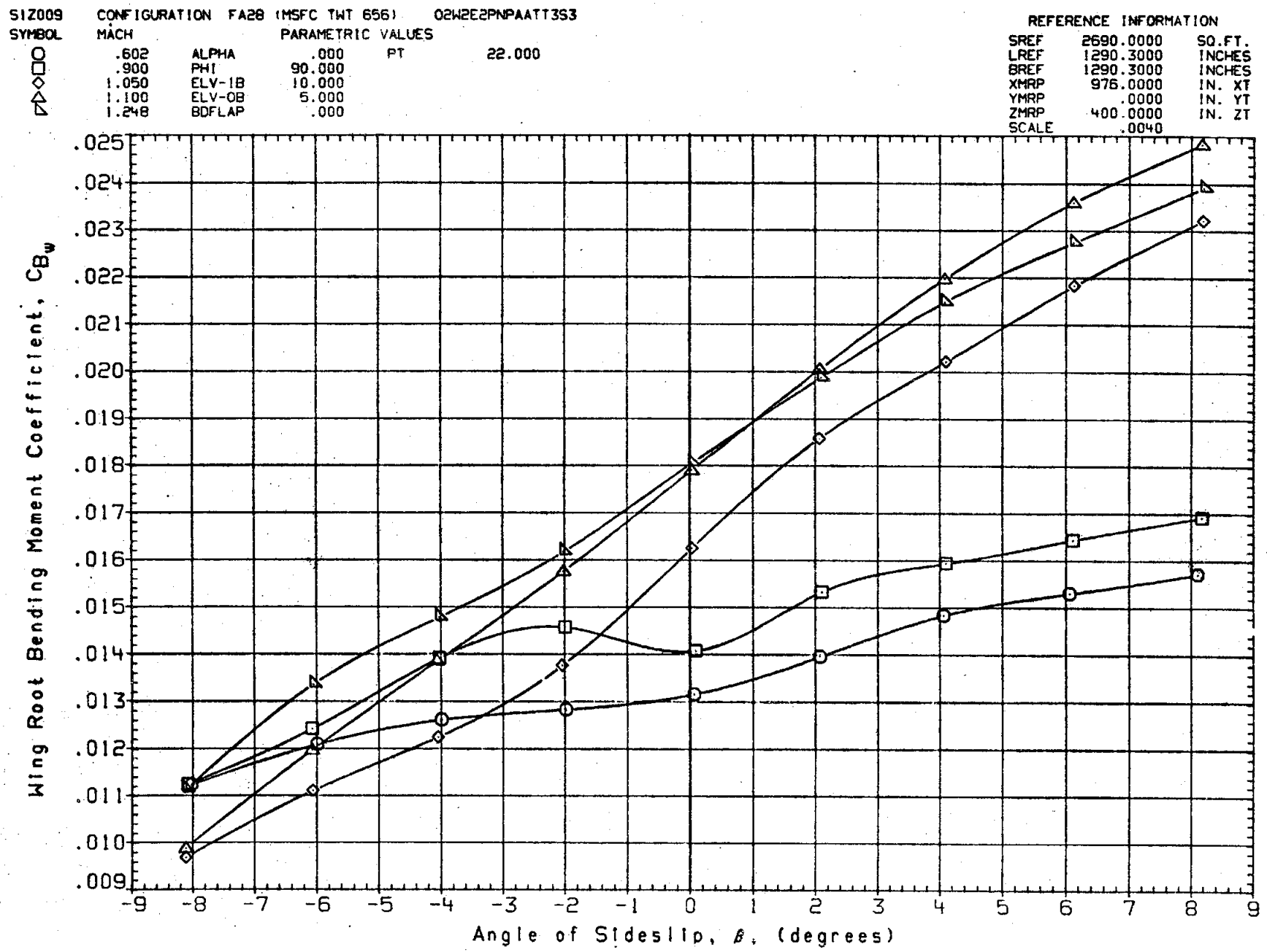

FIG. 13 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIGURATION)

DATE 12 MAR 80

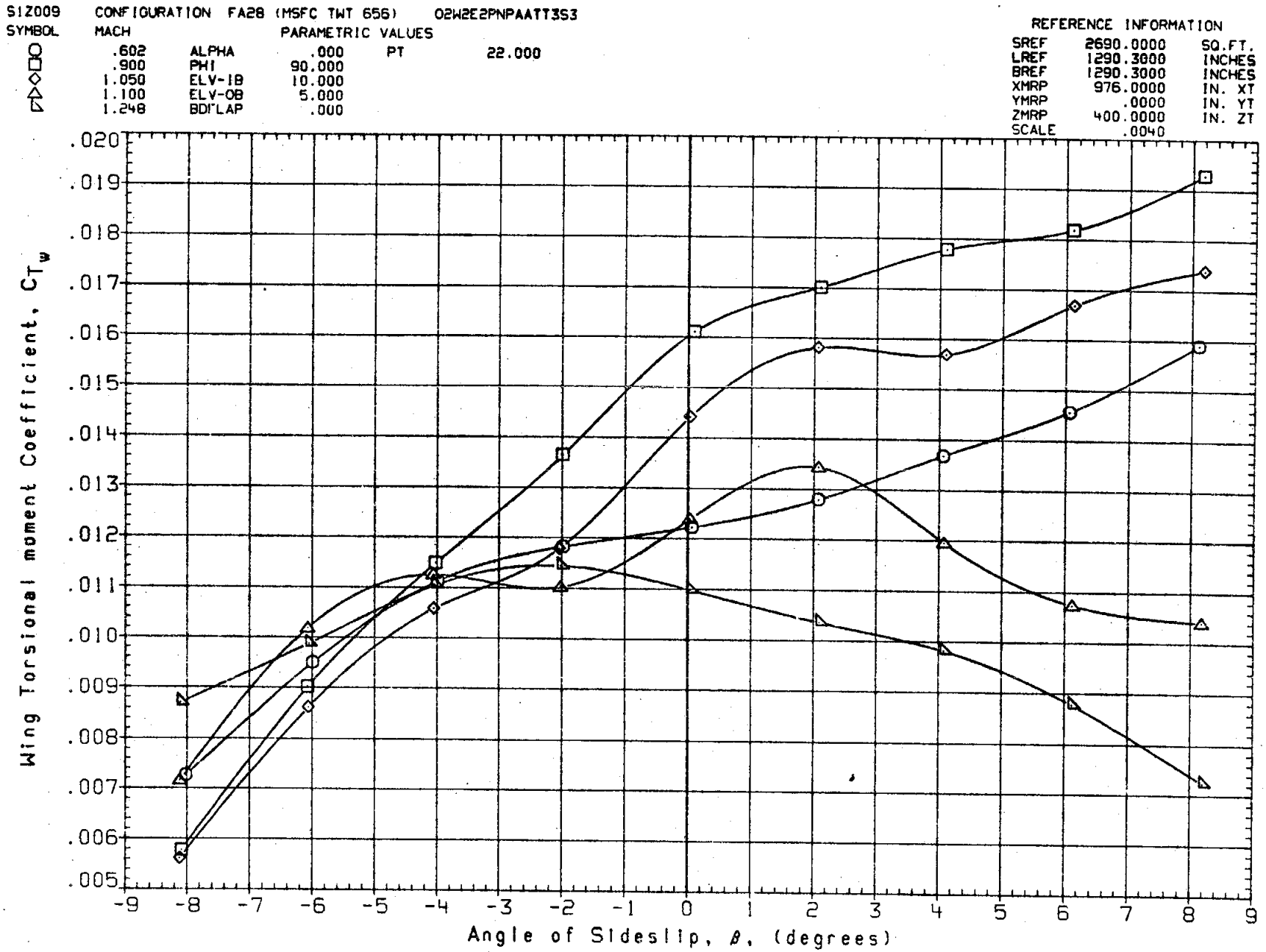

FIG. 13 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIGURATION)

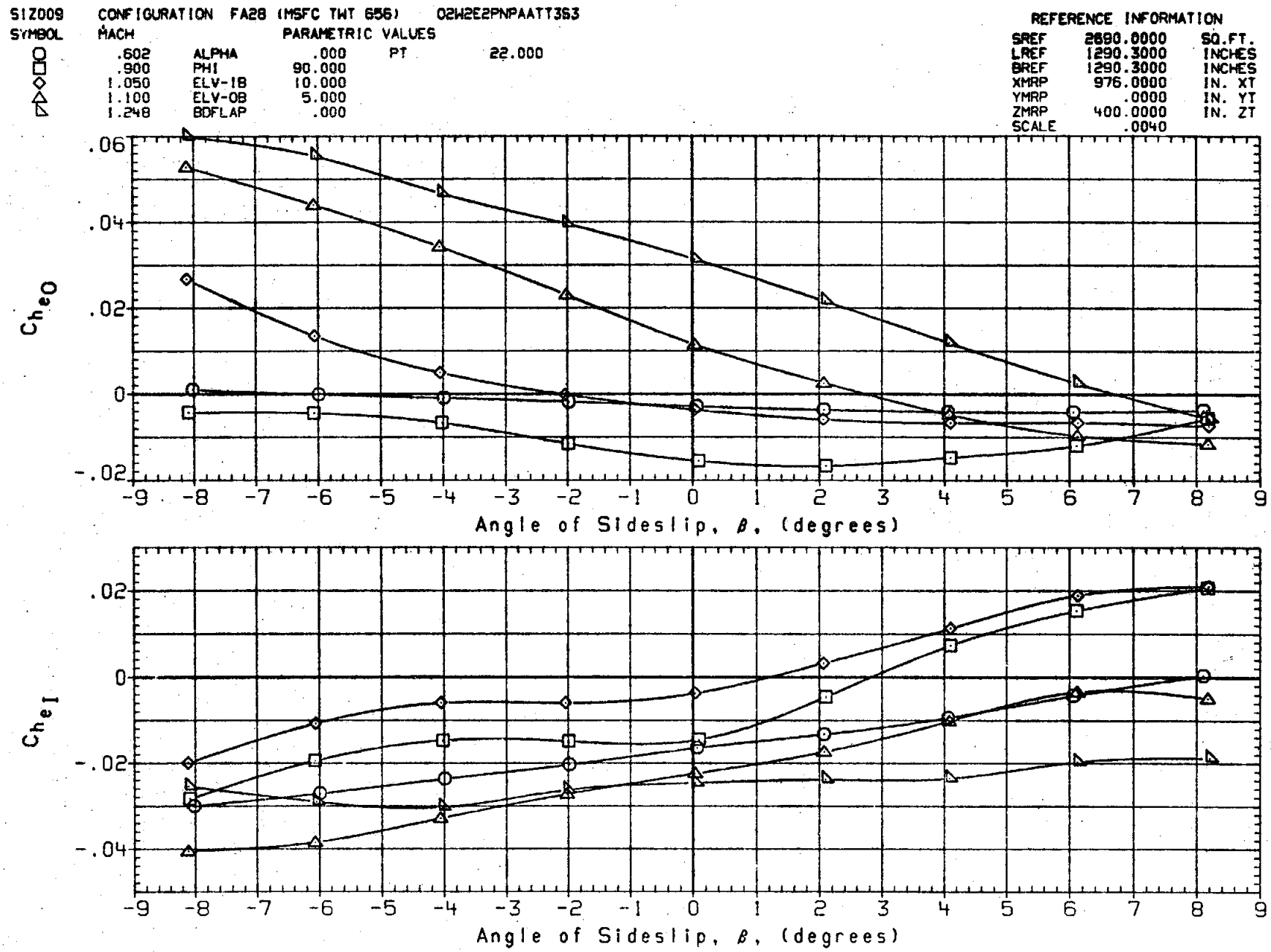

FIG. 14 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIGURATION)

DATA SET	SYMBOL	CONFIGURATION	BETA	ELV-IB	ELV-OB	BDFLAP
R1Z001	○	FA28 (MSFC TWT 656) O2W2E2	.000	10.000	5.000	.000
R1Z002	□	FA28 (MSFC TWT 656) O2W2E2 WING GAP WAXED	.000	10.000	5.000	.000
R1Z004	◇	FA28 (MSFC TWT 656) O2W2E2 WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

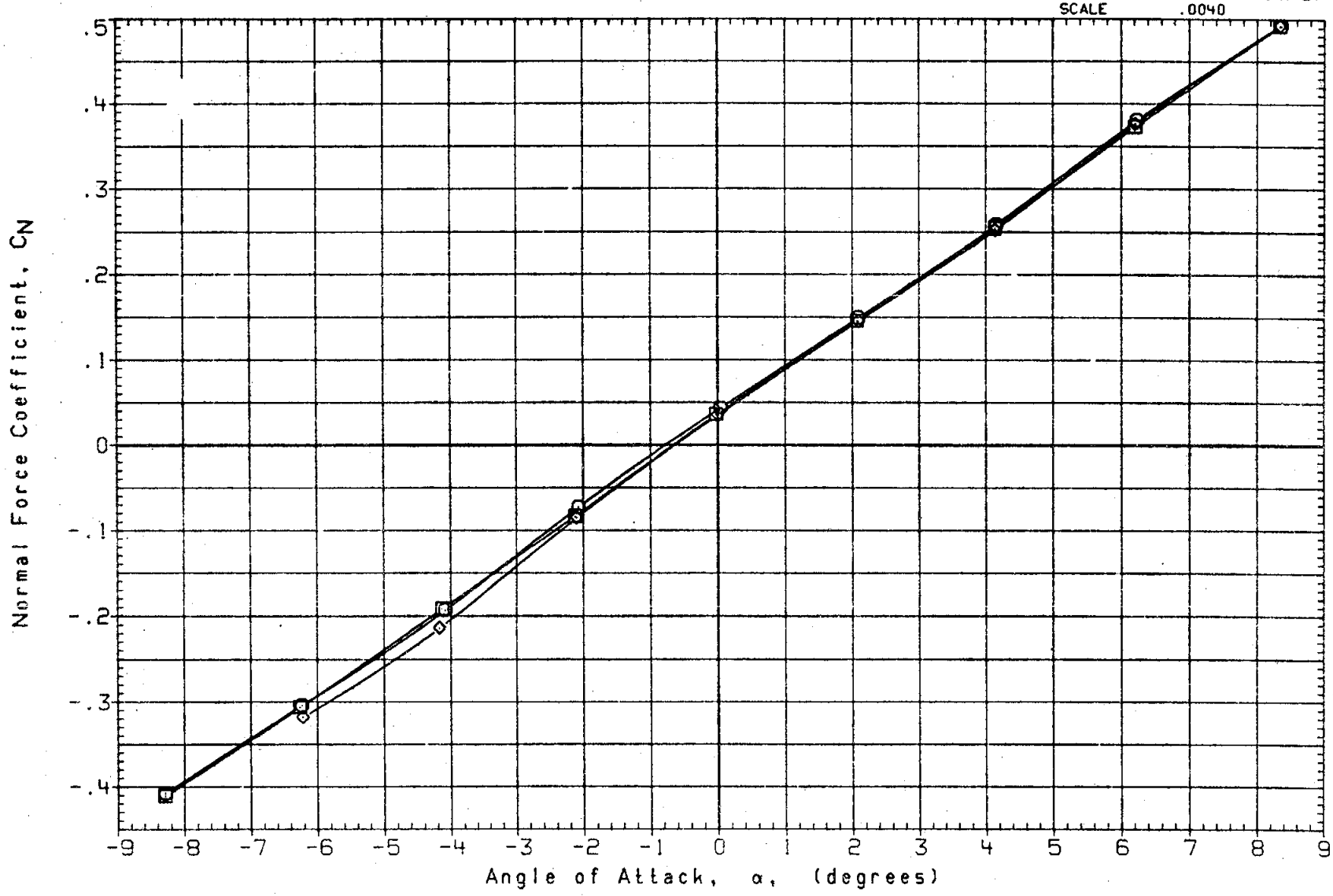

FIG. 15 EFFECT OF WING WAX ON ORBITER LONGITUDINAL CHARACTERISTICS

(A) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
R1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
R1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
R1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

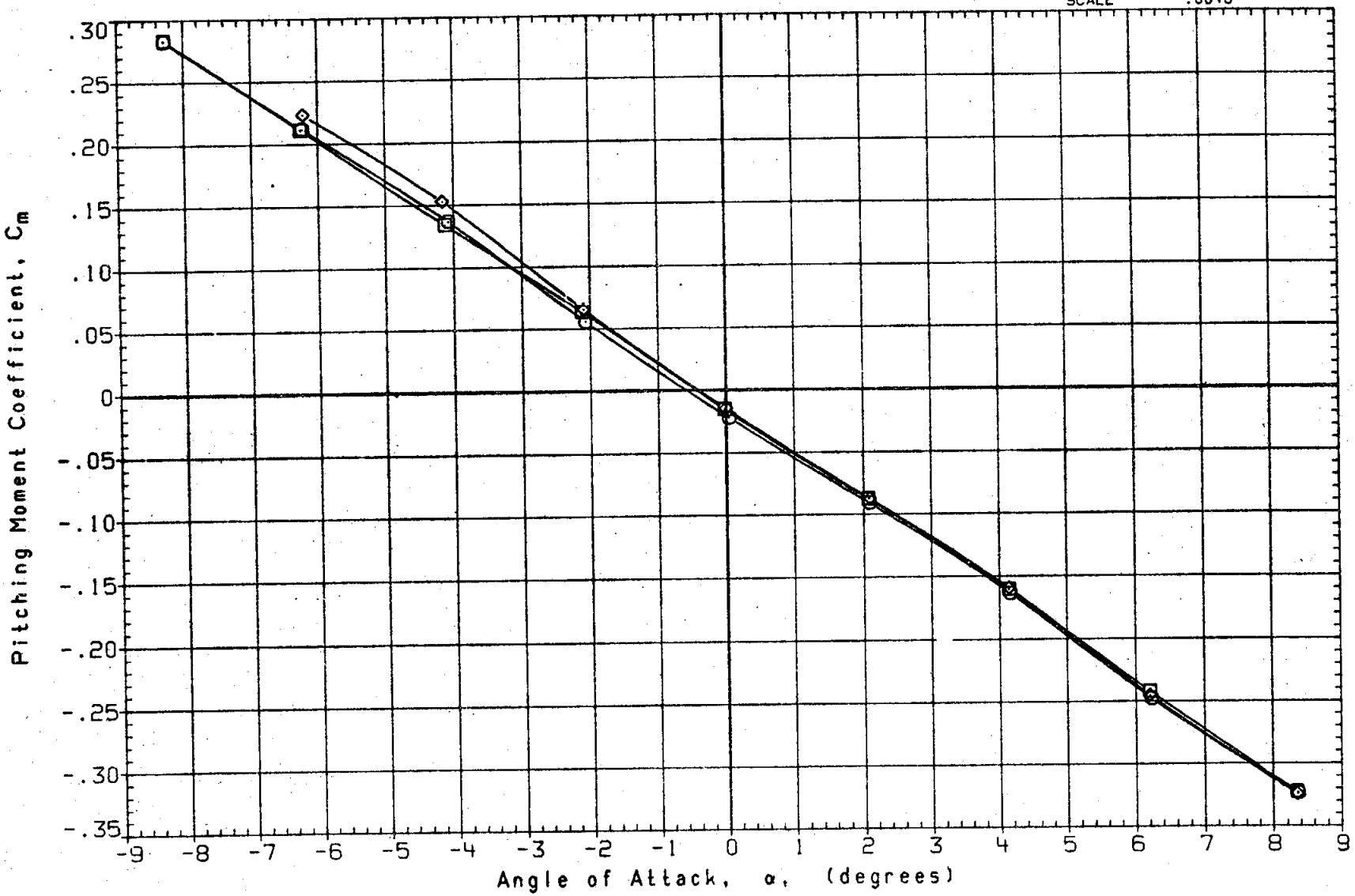

FIG. 15 EFFECT OF WING WAX ON ORBITER LONGITUDINAL CHARACTERISTICS

(A)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
R1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
R1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
R1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

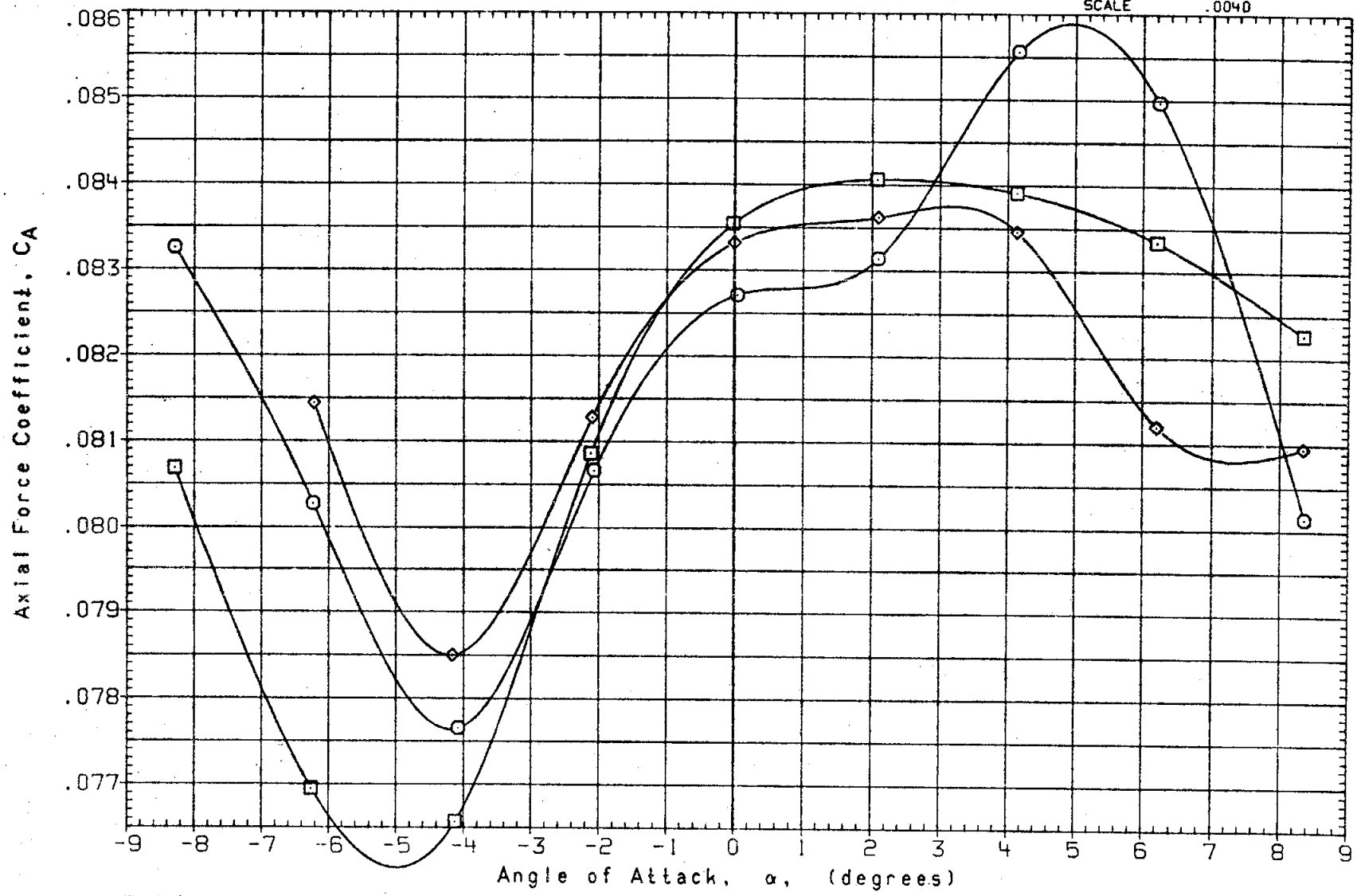

FIG. 15 EFFECT OF WING WAX ON ORBITER LONGITUDINAL CHARACTERISTICS

(A) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
R1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
R1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
R1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

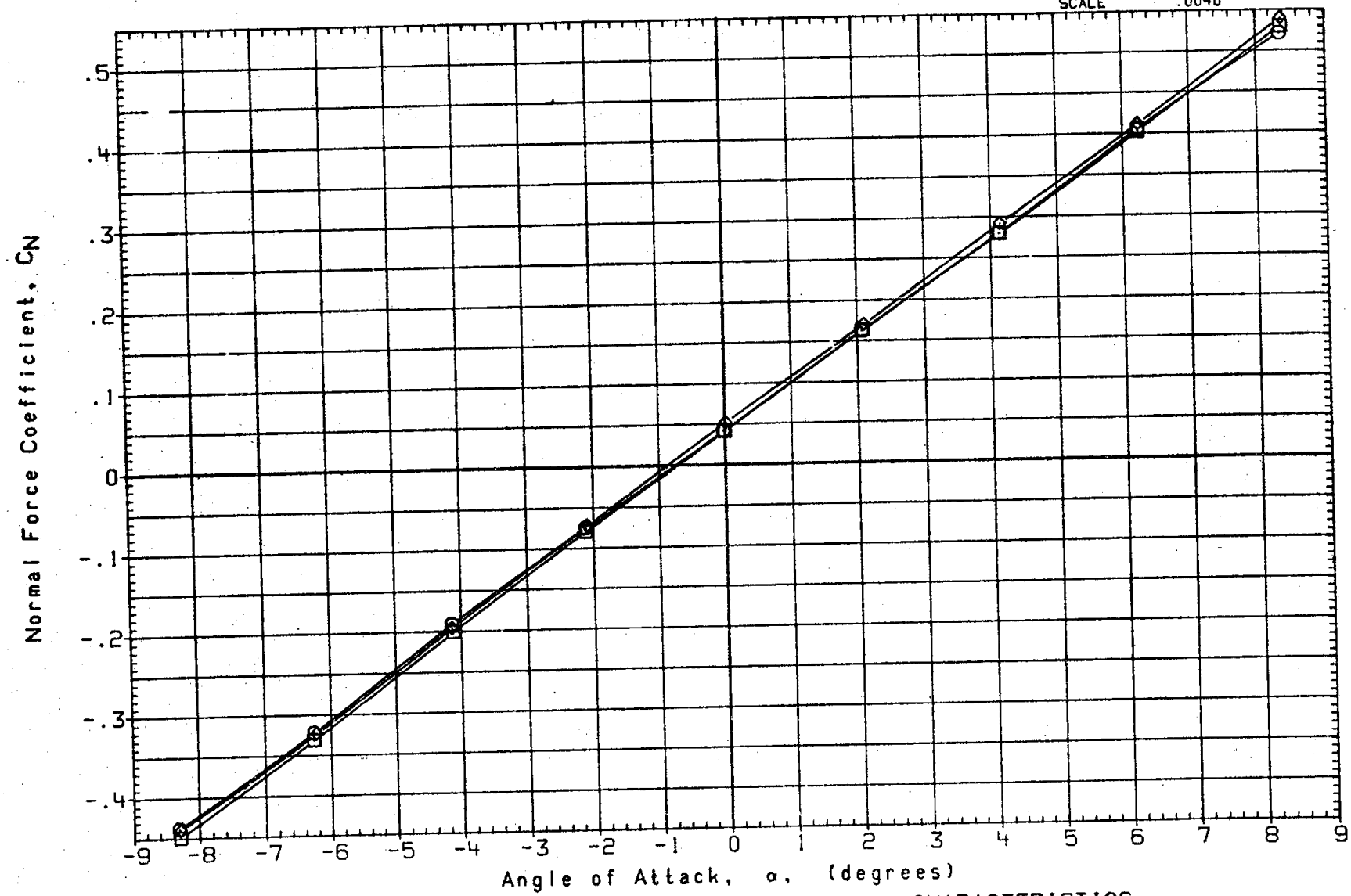

FIG. 15 EFFECT OF WING WAX ON ORBITER LONGITUDINAL CHARACTERISTICS

(B) MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
R1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
R1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
R1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

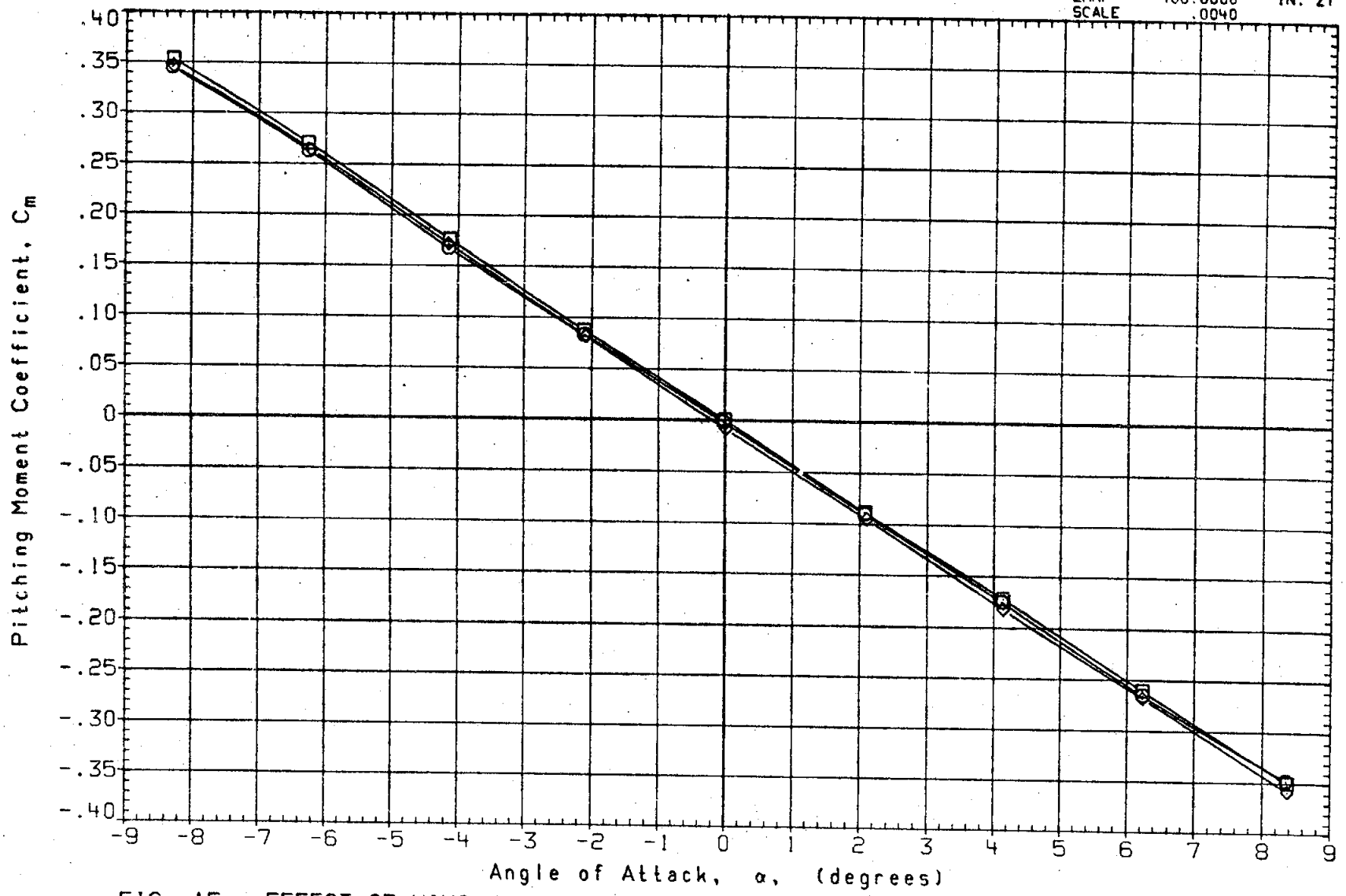

FIG. 15 EFFECT OF WING WAX ON ORBITER LONGITUDINAL CHARACTERISTICS

(B) MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
R1Z001	○	FA28 (MSFC TWT 656)	O2W2E2		.000	10.000	5.000	.000
R1Z002	□	FA28 (MSFC TWT 656)	O2W2E2	WING GAP WAXED	.000	10.000	5.000	.000
R1Z004	◇	FA28 (MSFC TWT 656)	O2W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

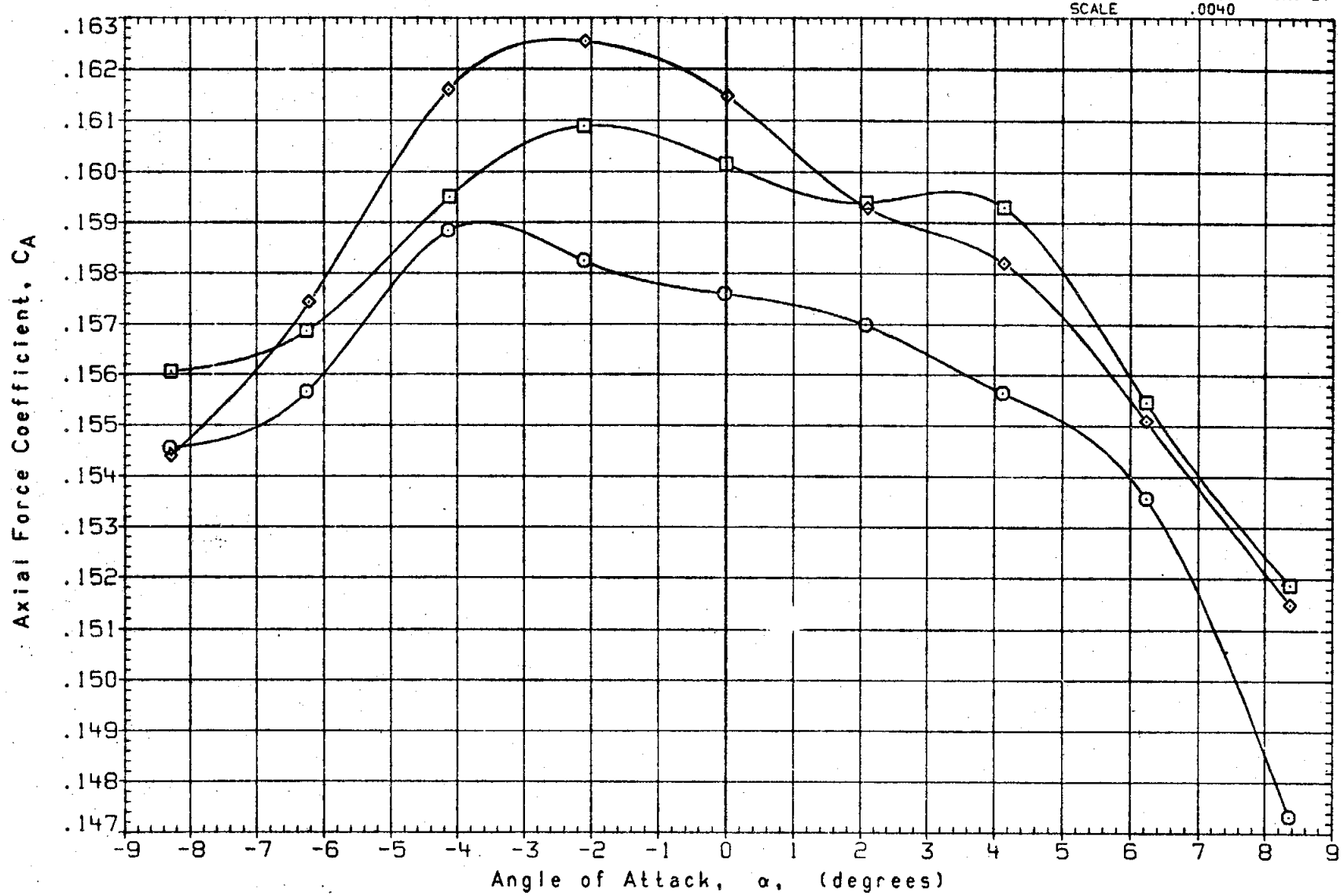

FIG. 15 EFFECT OF WING WAX ON ORBITER LONGITUDINAL CHARACTERISTICS

(B)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
S1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
S1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
S1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

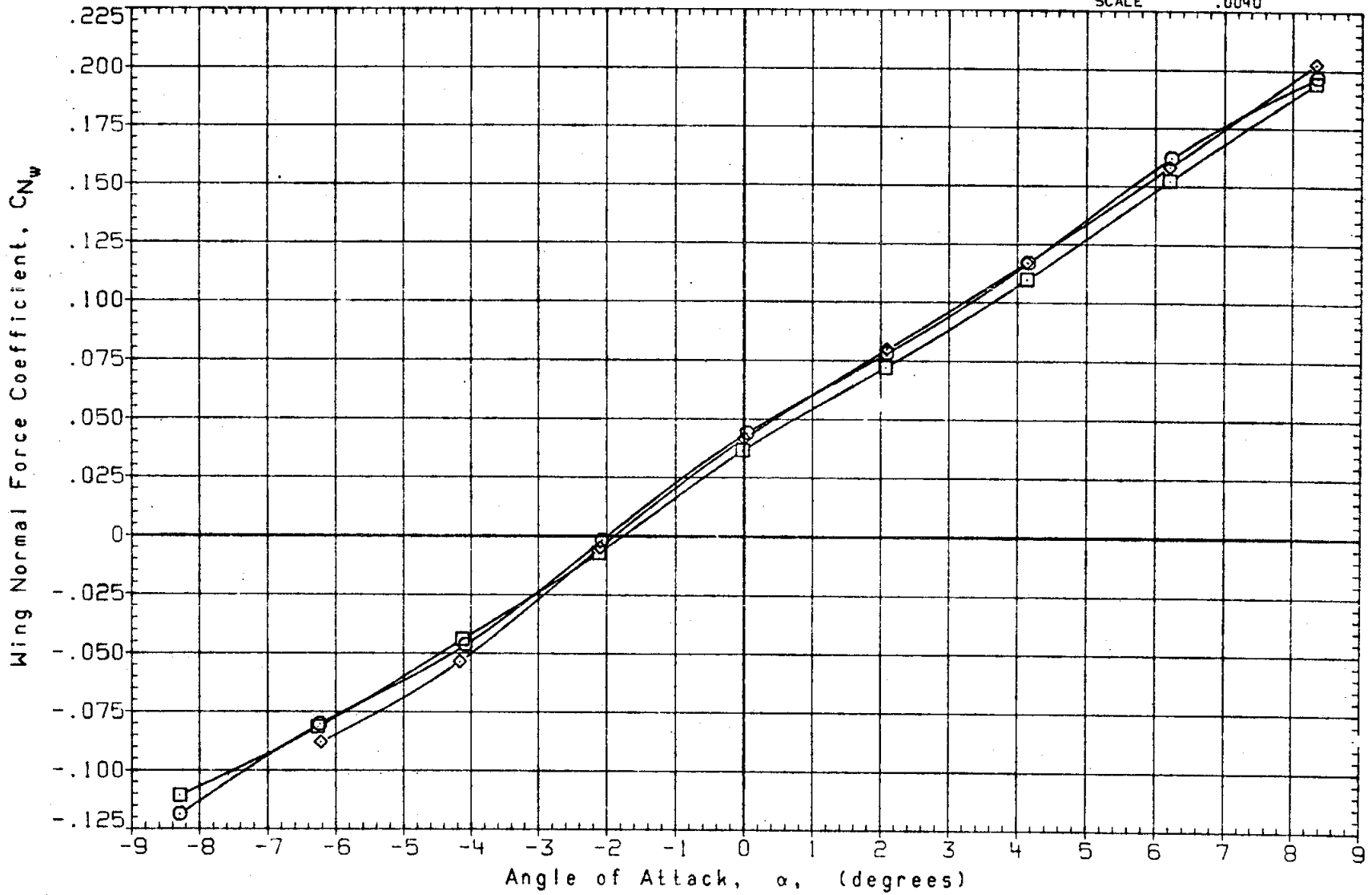

FIG. 16 EFFECT OF WING WAX ON ORBITER WING CHARACTERISTICS IN PITCH

(A) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
S1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
S1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
S1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

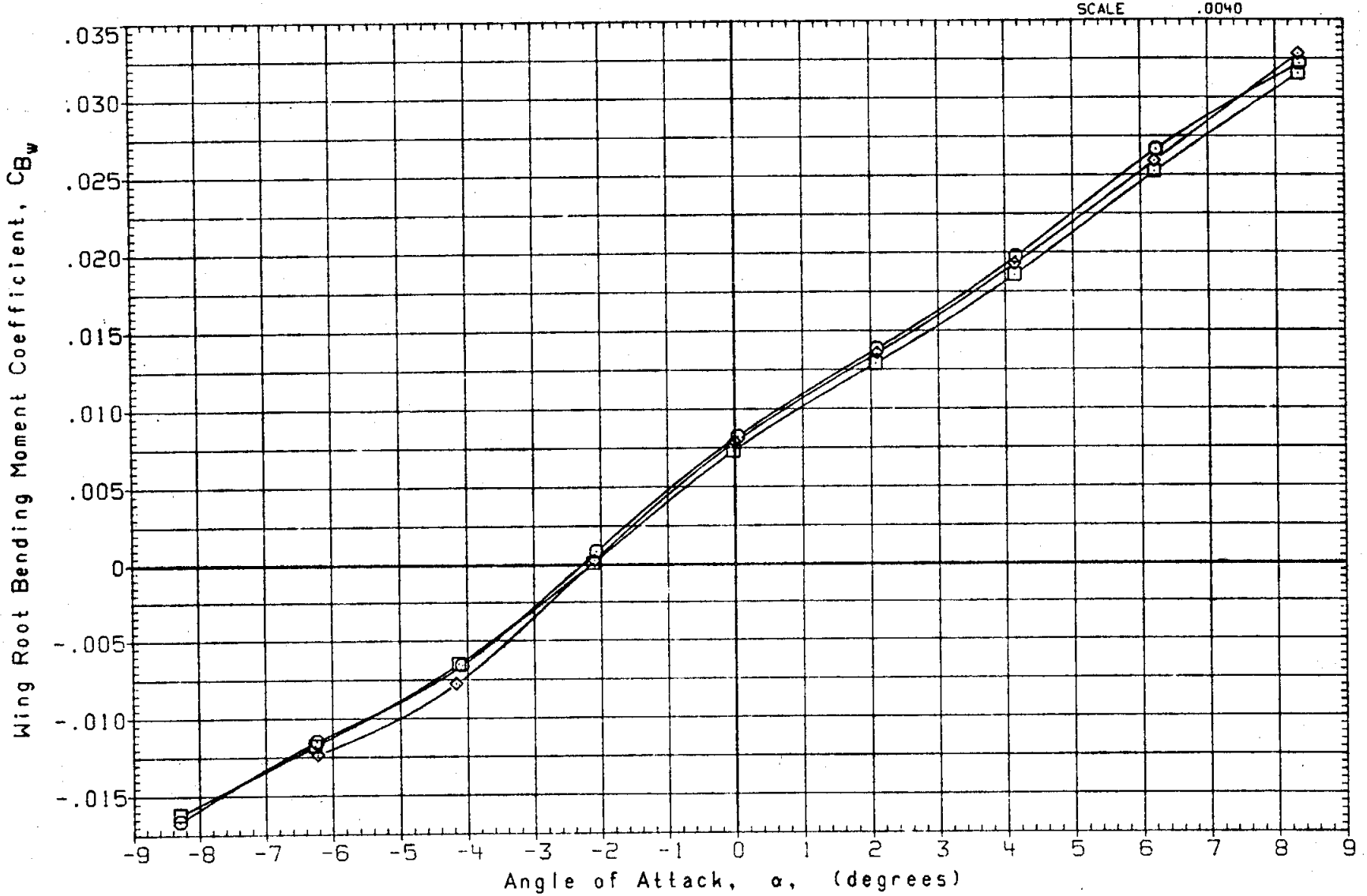

FIG. 16 EFFECT OF WING WAX ON ORBITER WING CHARACTERISTICS IN PITCH

(A)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
S1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
S1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
S1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

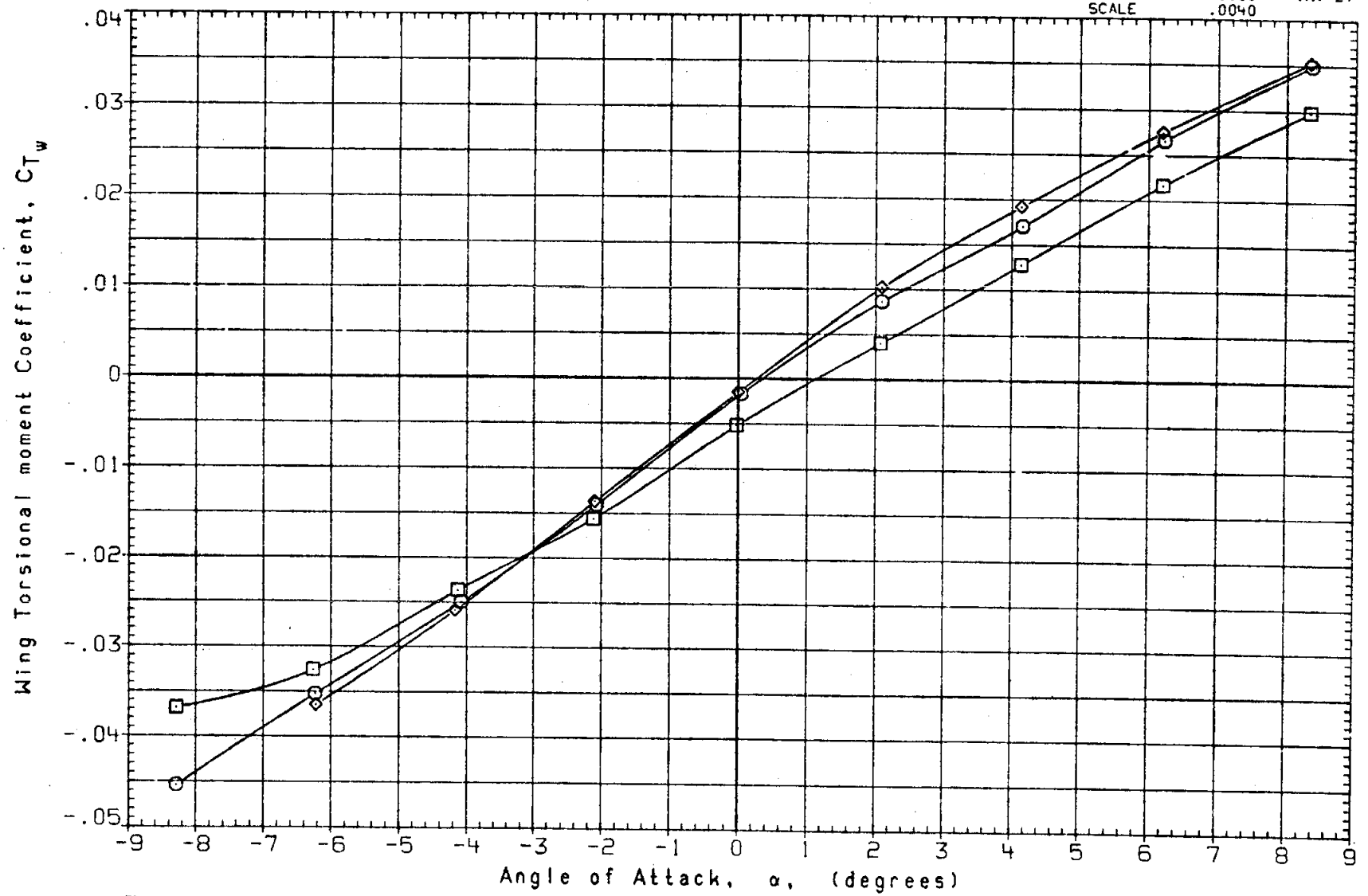

FIG. 16 EFFECT OF WING WAX ON ORBITER WING CHARACTERISTICS IN PITCH

(A) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
S1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
S1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
S1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	[illegible]

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

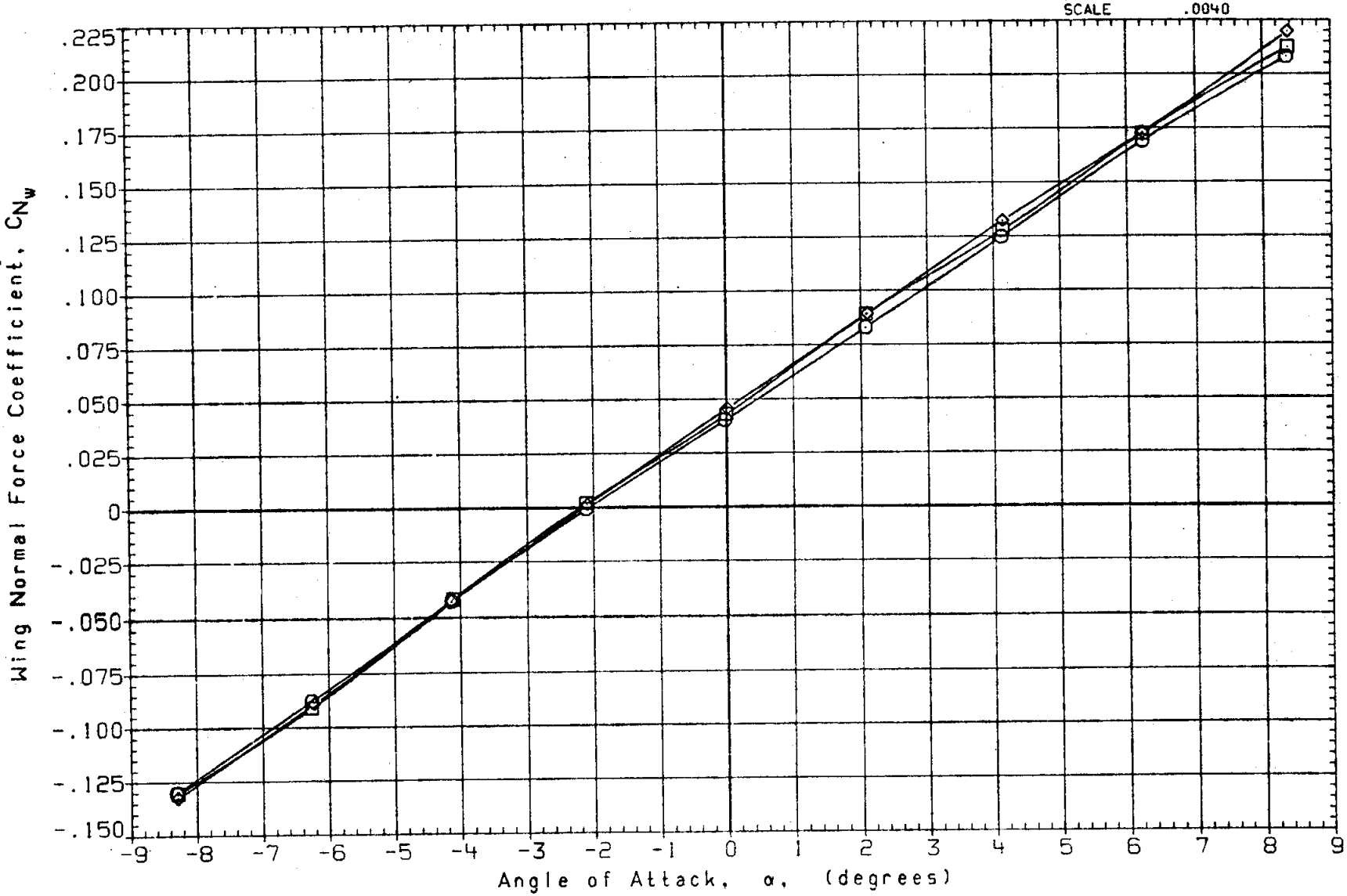

FIG. 16 EFFECT OF WING WAX ON ORBITER WING CHARACTERISTICS IN PITCH

(B)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
S1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
S1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
S1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

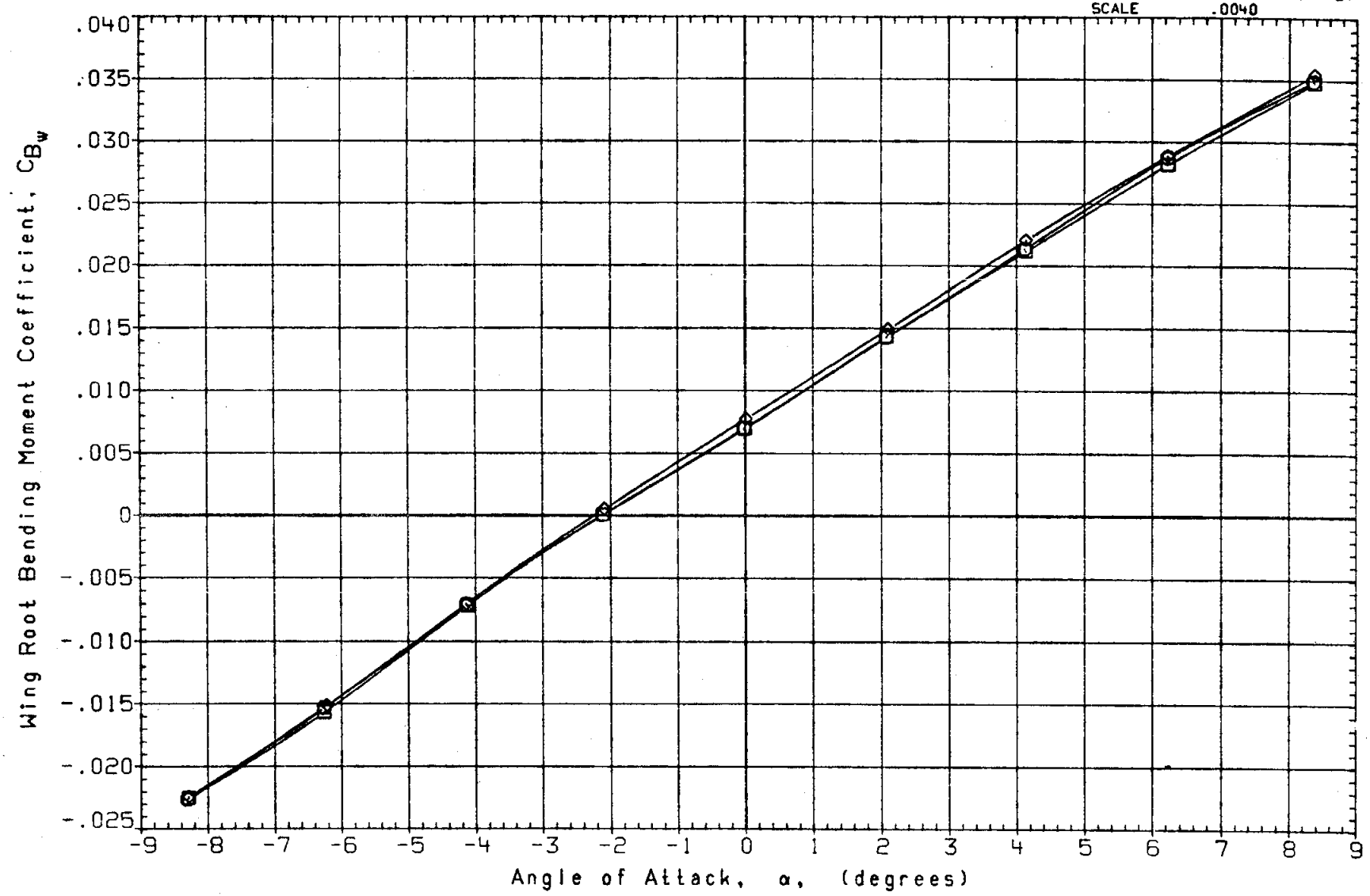

FIG. 16 EFFECT OF WING WAX ON ORBITER WING CHARACTERISTICS IN PITCH

(B)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
S1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
S1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
S1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

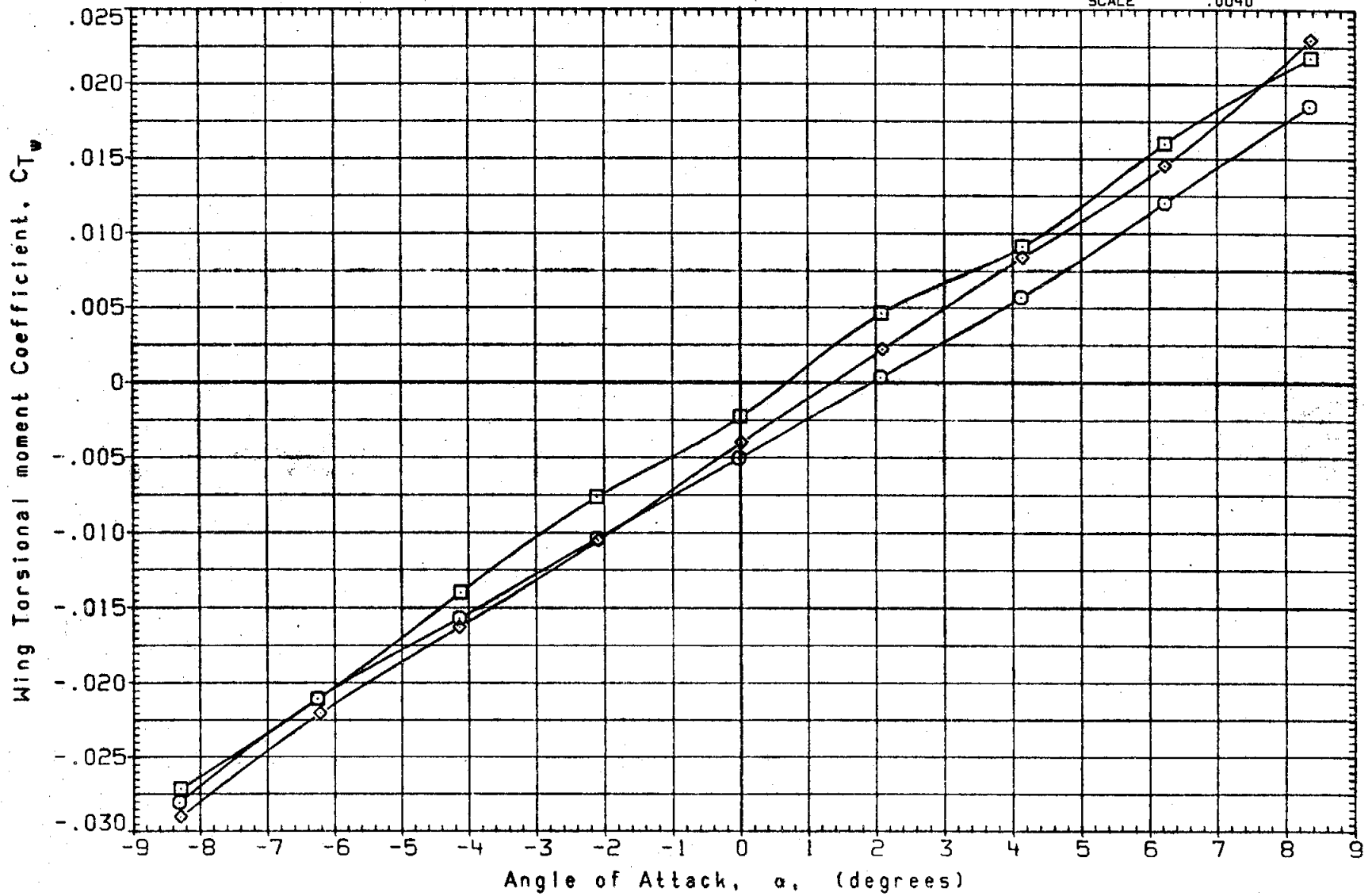

FIG. 16 EFFECT OF WING WAX ON ORBITER WING CHARACTERISTICS IN PITCH

(B)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
S1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
S1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
S1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

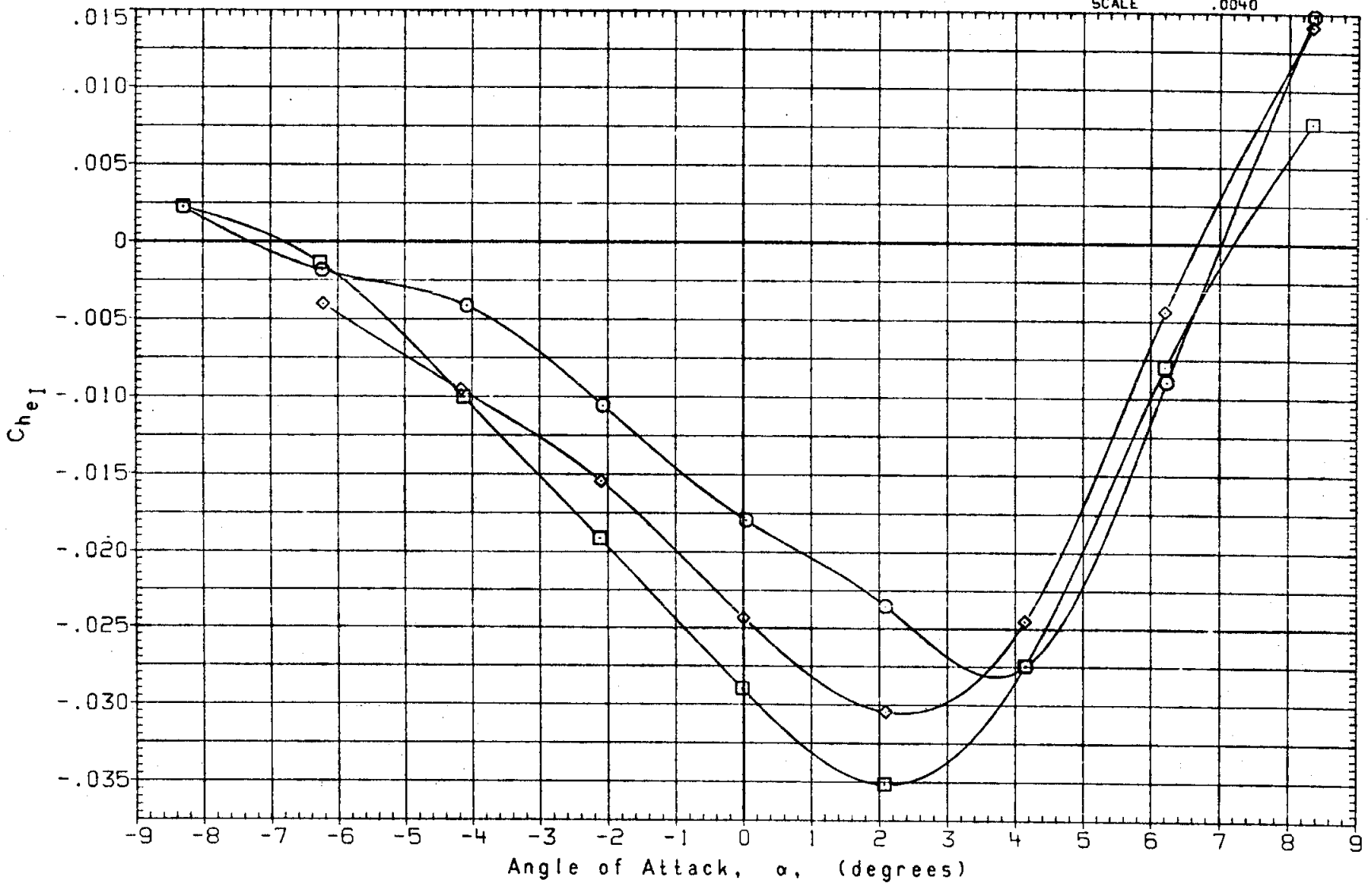

FIG. 17 EFFECT OF WING WAX ON ORBITER ELEVON CHARACTERISTICS IN PITCH

(A) MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA	ELV-IB	ELV-OB	BDFLAP
S1Z001	○	FA28 (MSFC TWT 656)	O2W2E2	.000	10.000	5.000	.000
S1Z002	□	FA28 (MSFC TWT 656)	O2W2E2 WING GAP WAXED	.000	10.000	5.000	.000
S1Z004	◇	FA28 (MSFC TWT 656)	O2W2E2 WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

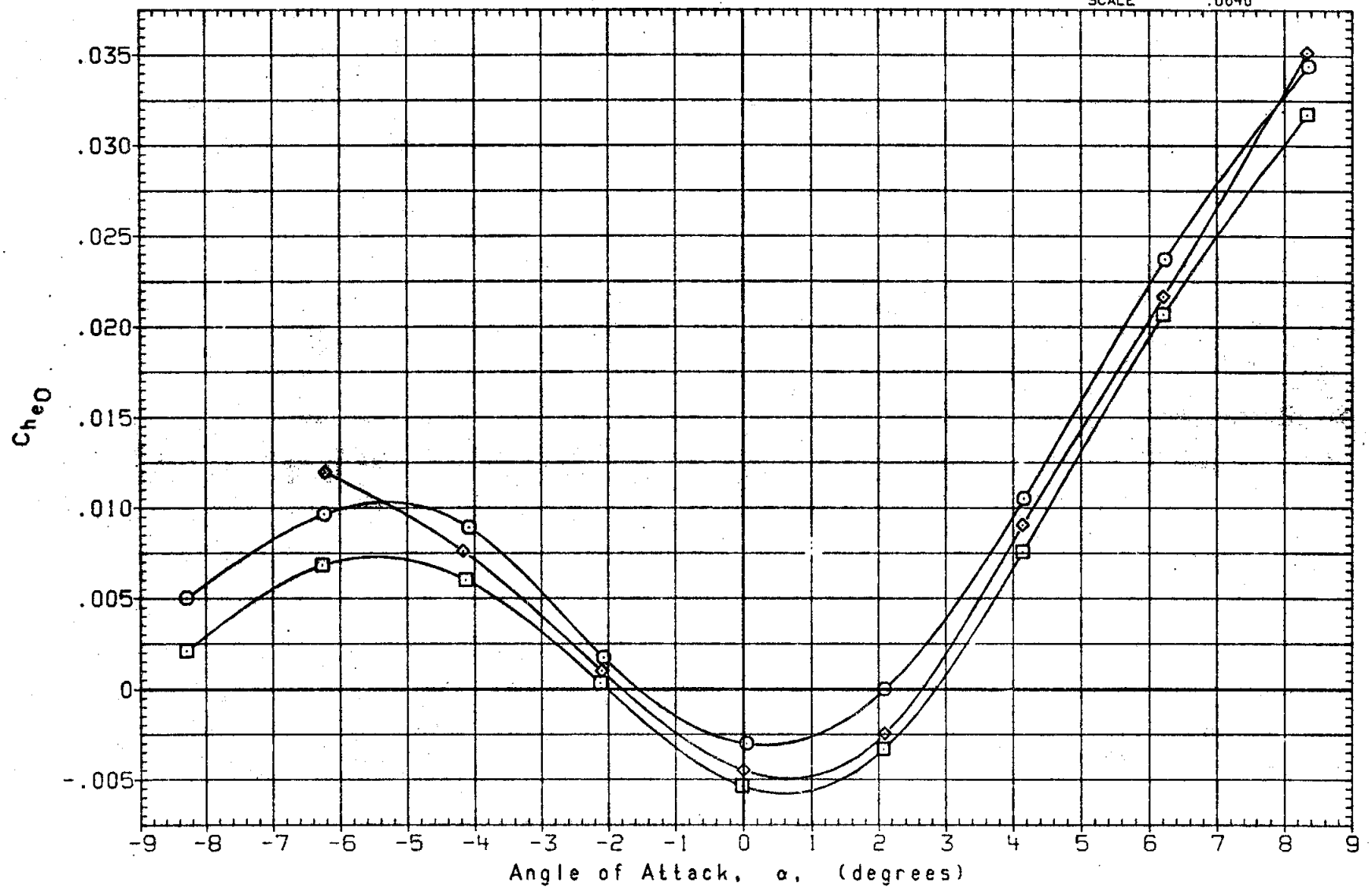

FIG. 17 EFFECT OF WING WAX ON ORBITER ELEVON CHARACTERISTICS IN PITCH

(A)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
S1Z001	○	FA28 (MSFC TWT 656)	02W2E2		.000	10.000	5.000	.000
S1Z002	□	FA28 (MSFC TWT 656)	02W2E2	WING GAP WAXED	.000	10.000	5.000	.000
S1Z004	◇	FA28 (MSFC TWT 656)	02W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

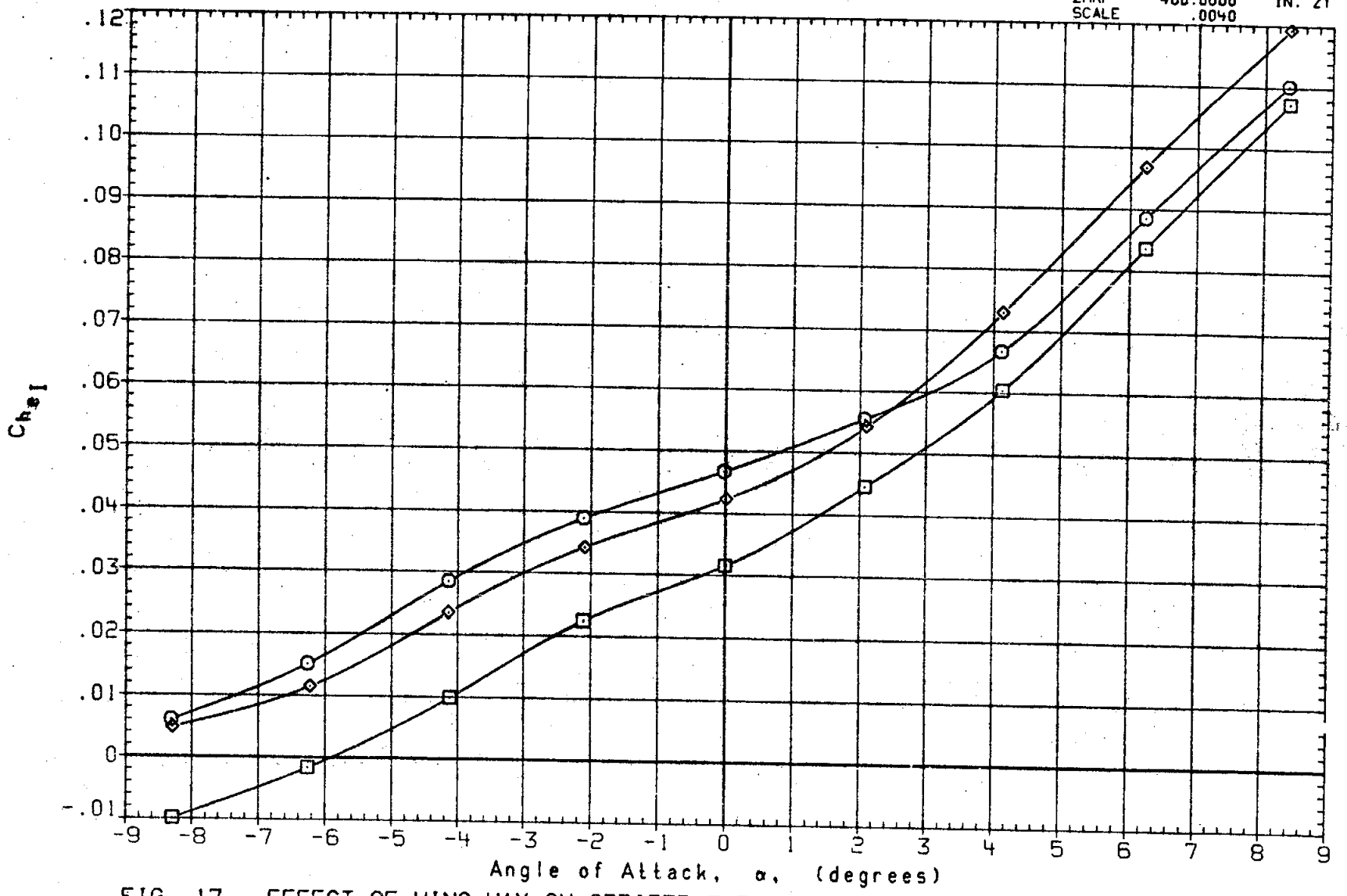

FIG. 17 EFFECT OF WING WAX ON ORBITER ELEVON CHARACTERISTICS IN PITCH

(B) MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION			BETA	ELV-IB	ELV-OB	BDFLAP
S1Z001	○	FA28 (MSFC TWT 656)	O2W2E2		.000	10.000	5.000	.000
S1Z002	□	FA28 (MSFC TWT 656)	O2W2E2	WING GAP WAXED	.000	10.000	5.000	.000
S1Z004	◇	FA28 (MSFC TWT 656)	O2W2E2	WING WAX CUT	.000	10.000	5.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

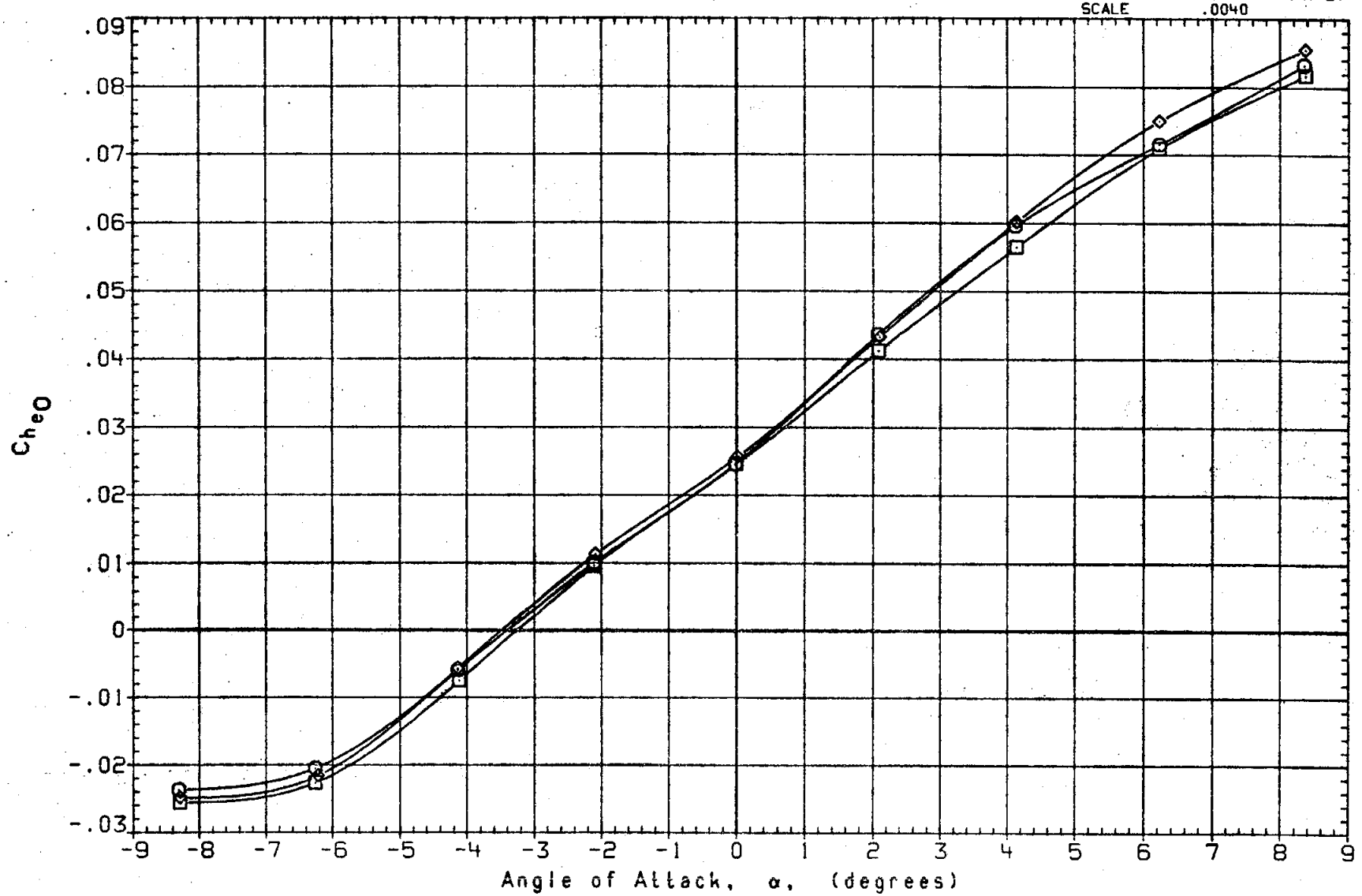

FIG. 17 EFFECT OF WING WAX ON ORBITER ELEVON CHARACTERISTICS IN PITCH

(B)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

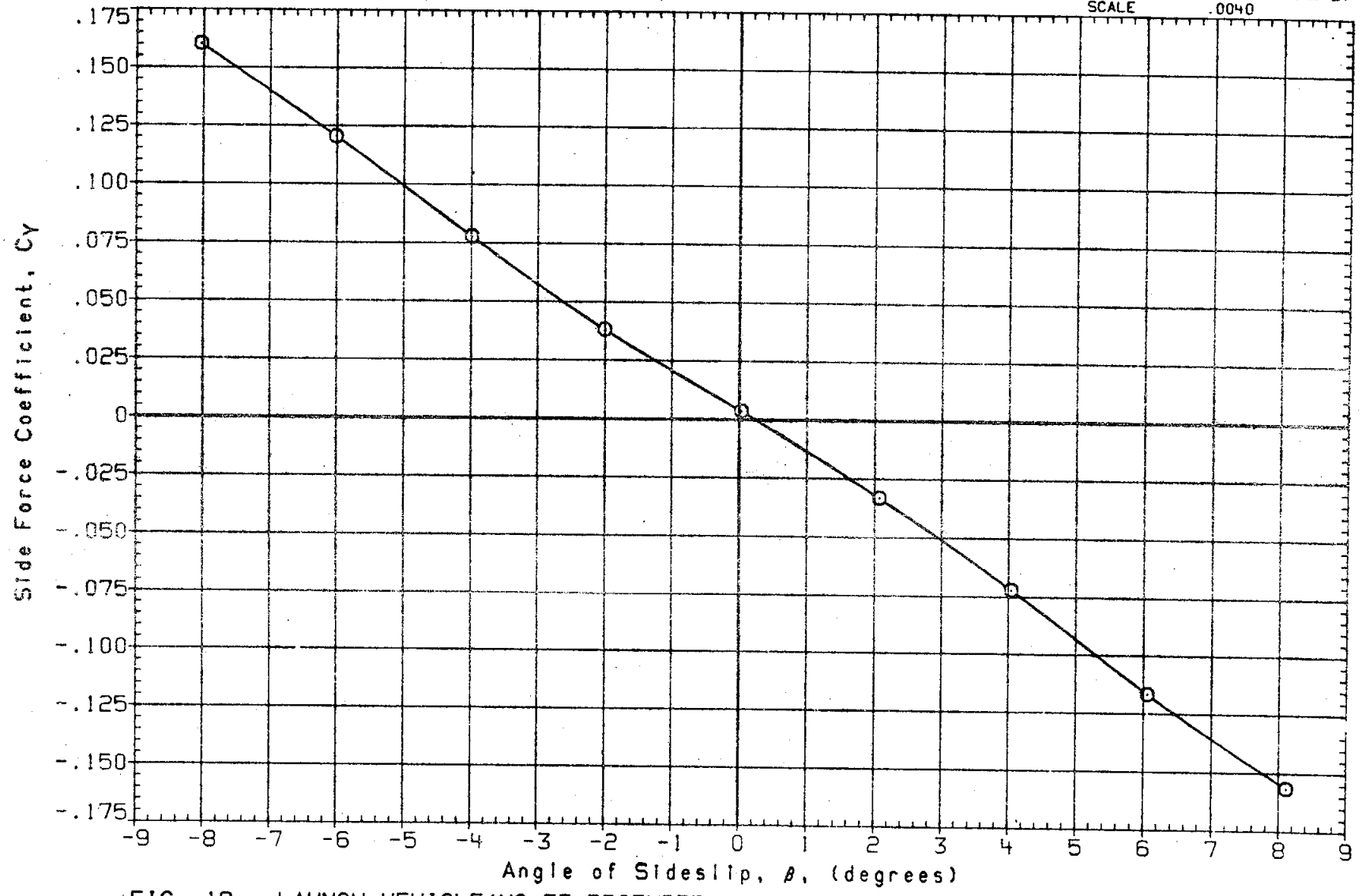

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

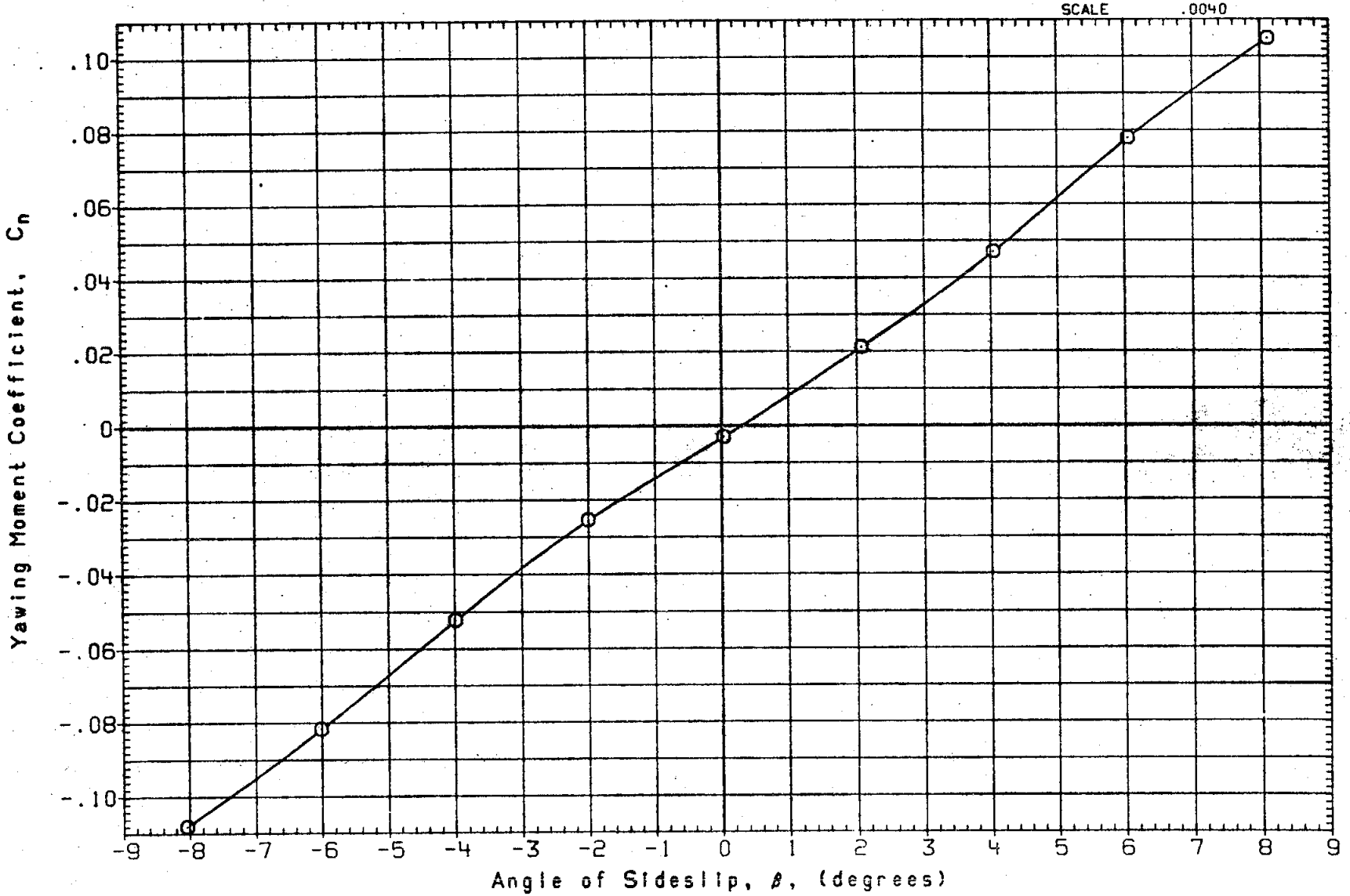

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R12006	○	FA28 (MSFC TWT 658)	O2W2E2WNWAATT3S3	.000	90.000
R12007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2890.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

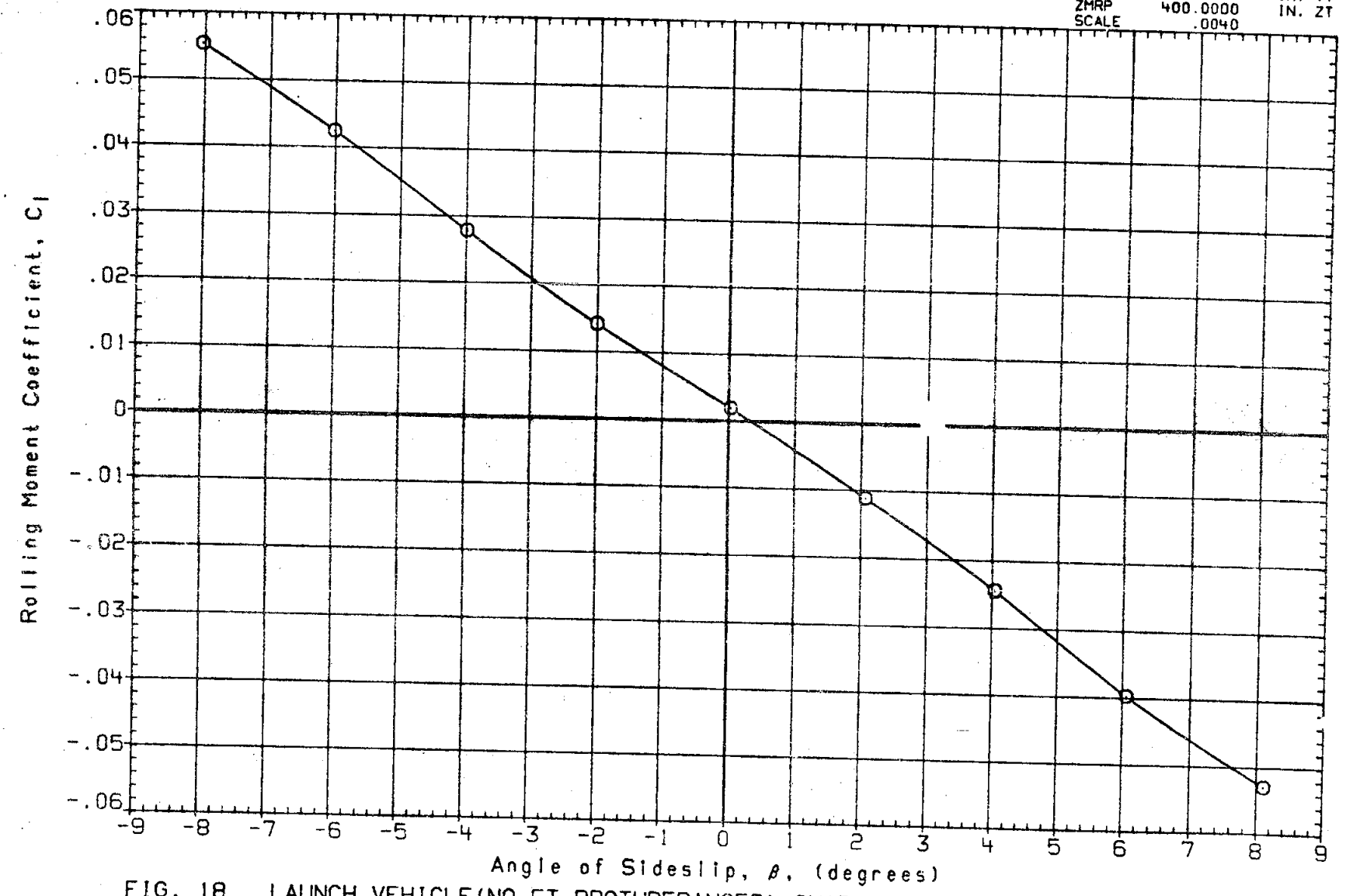

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(A)MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
R1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

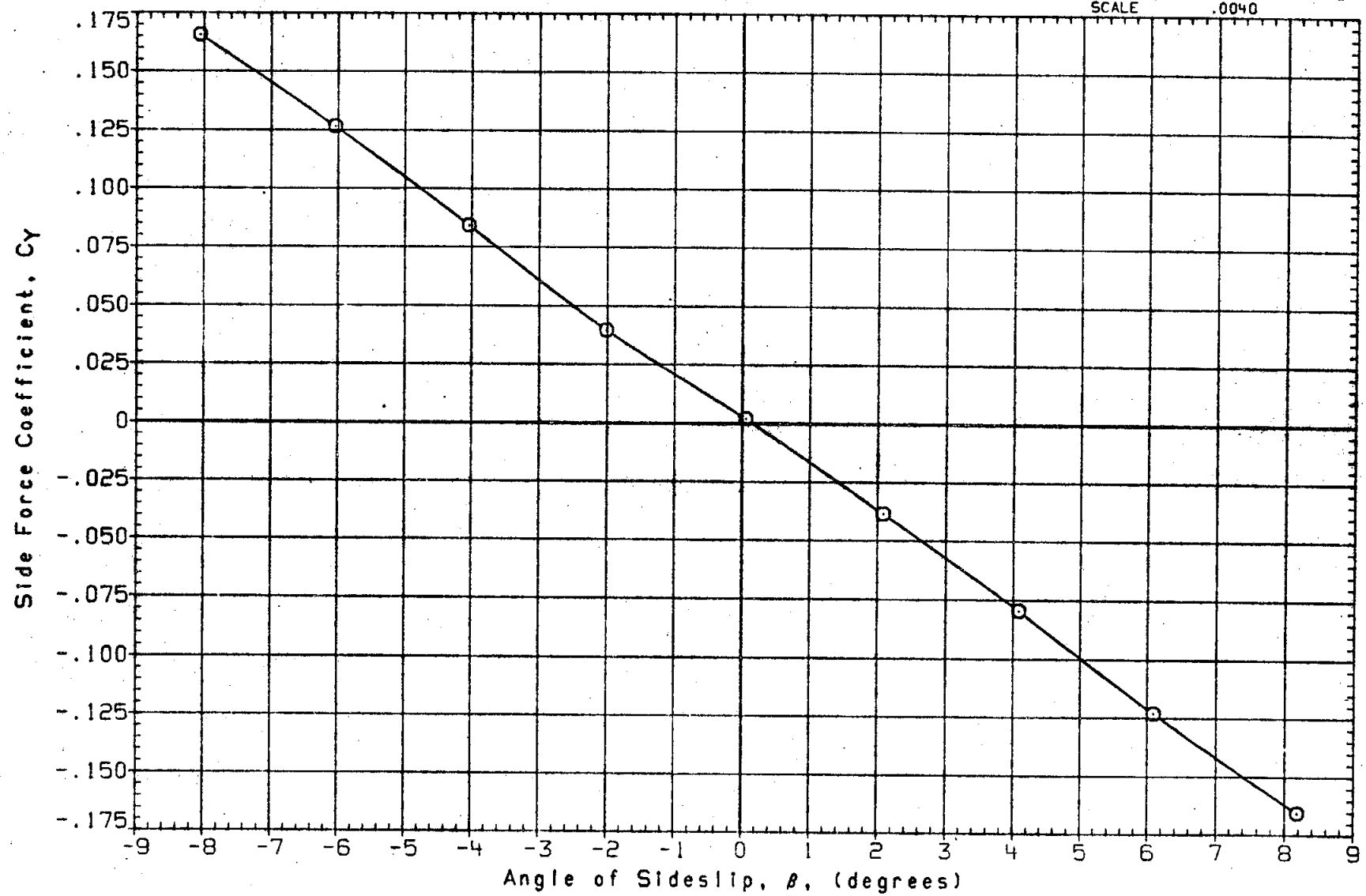

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA2B (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

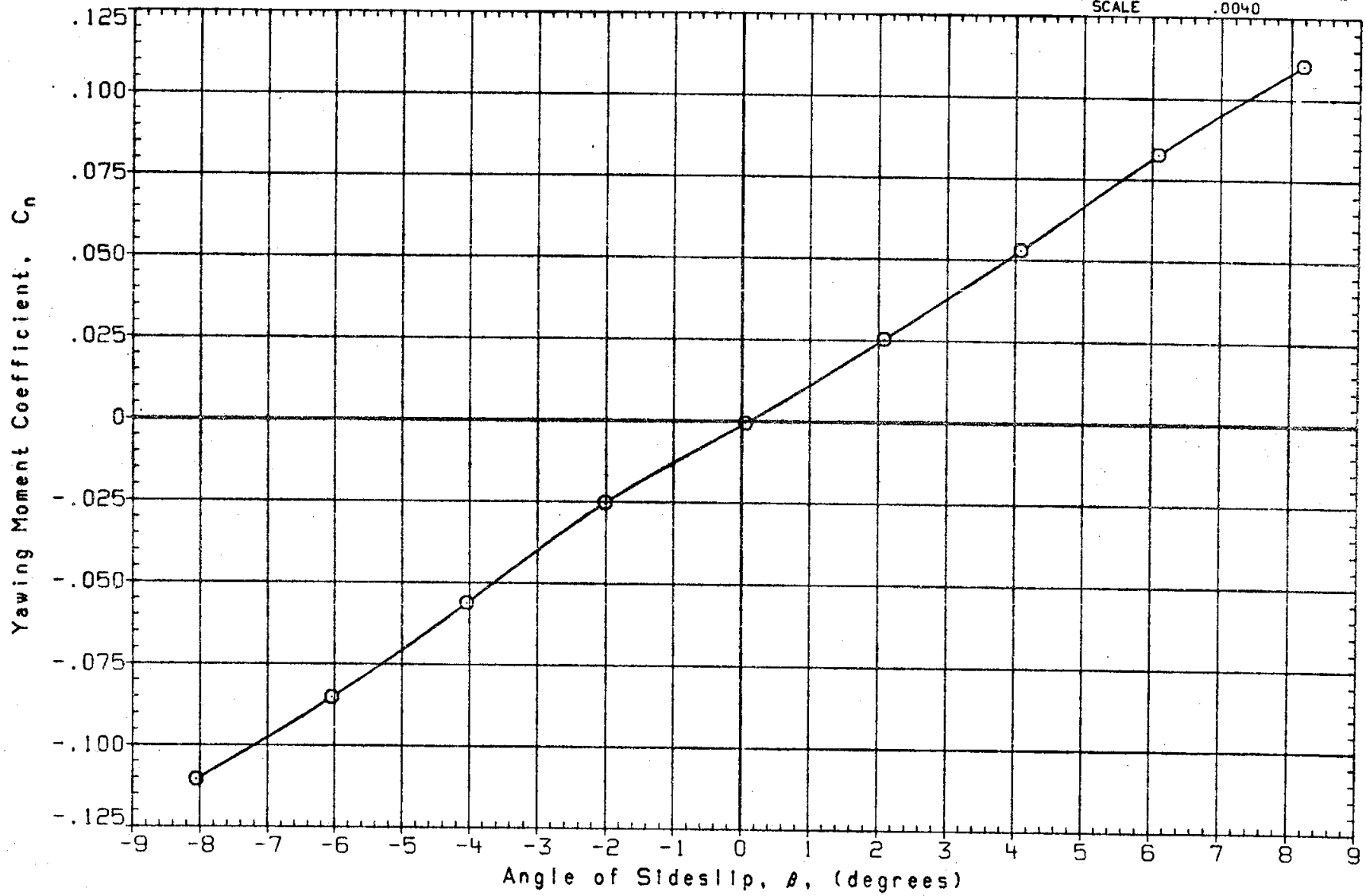

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	O	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
R1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

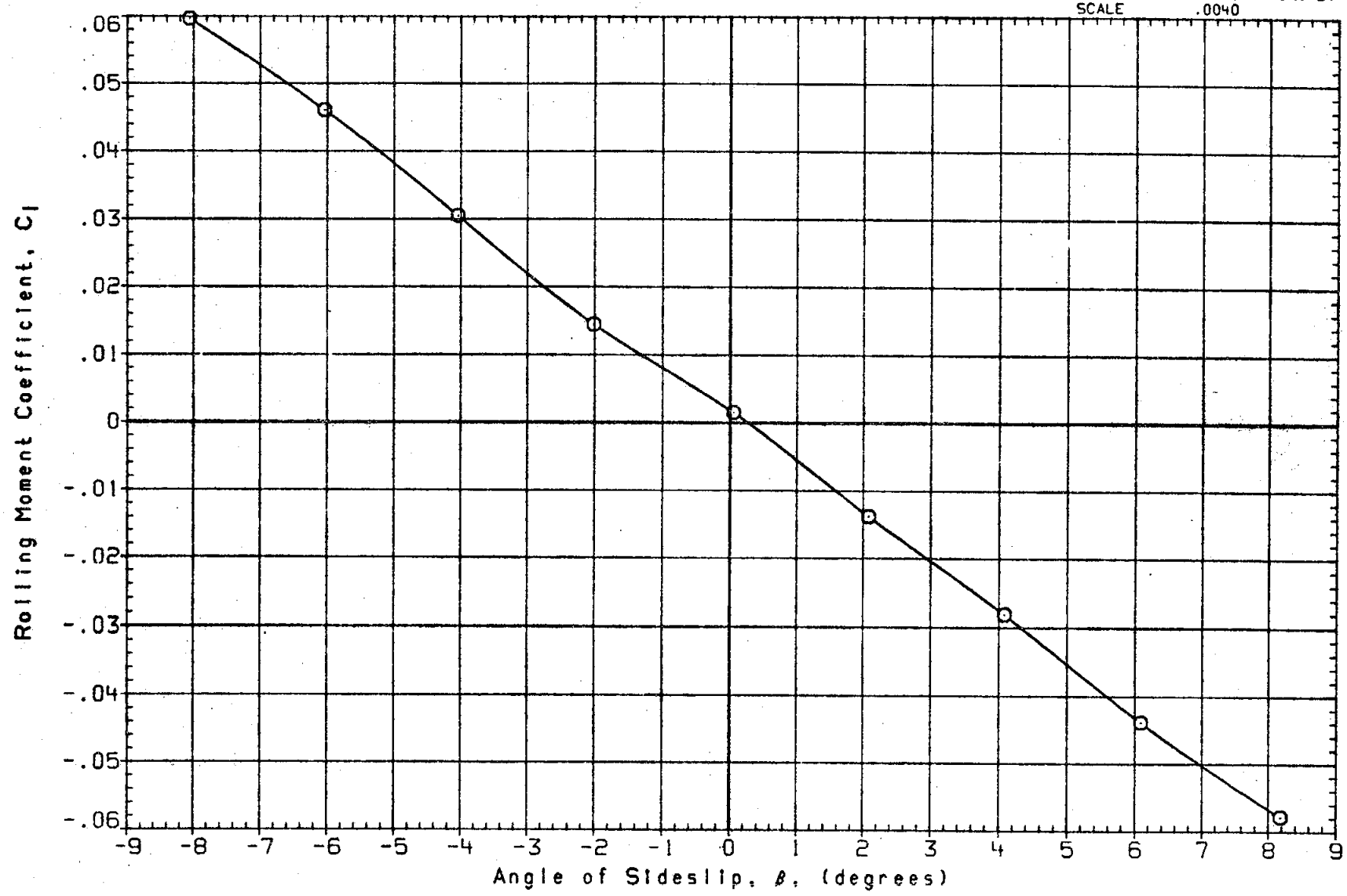

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
RIZ006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT353	.000	90.000
RIZ007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

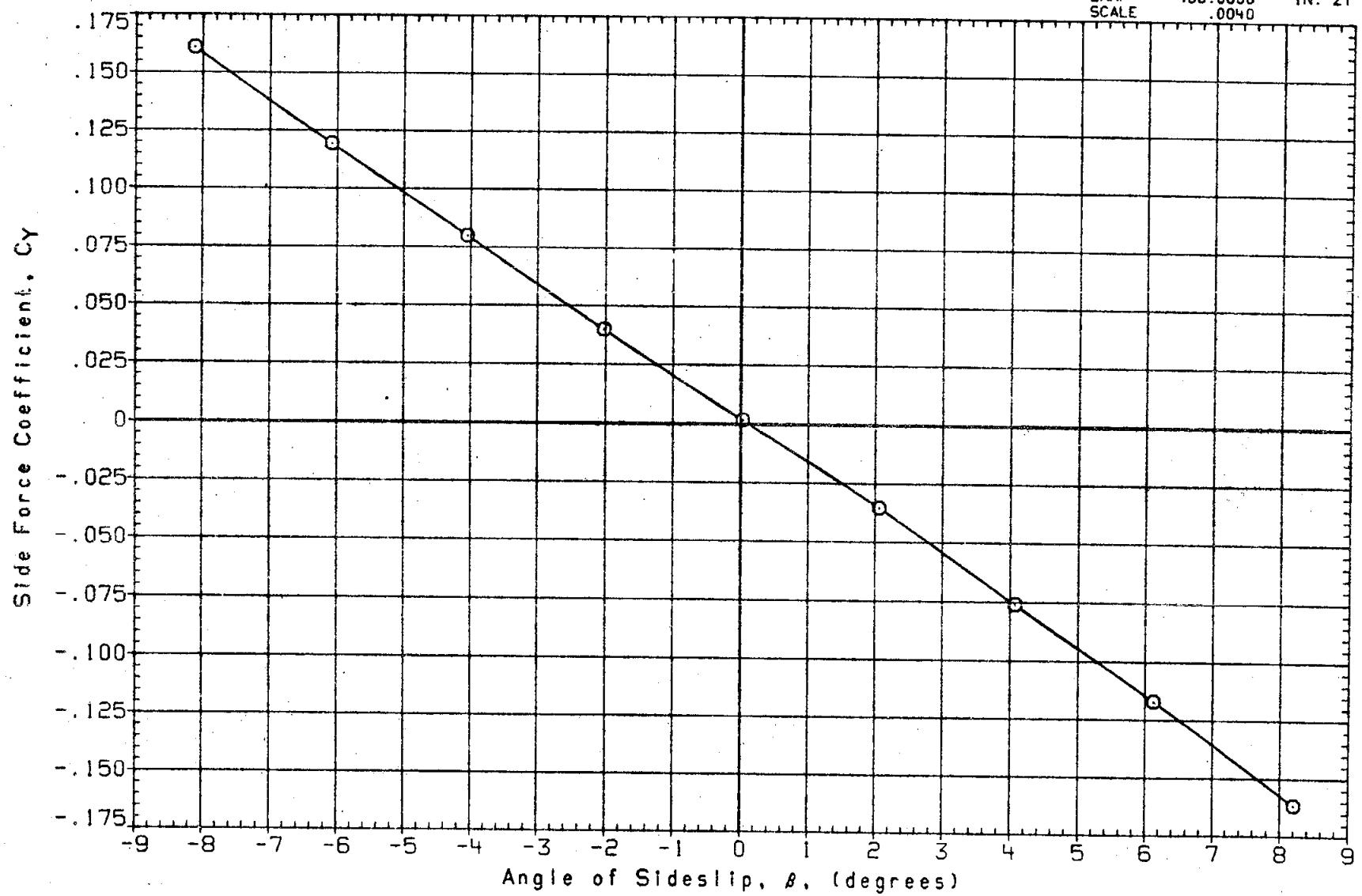

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

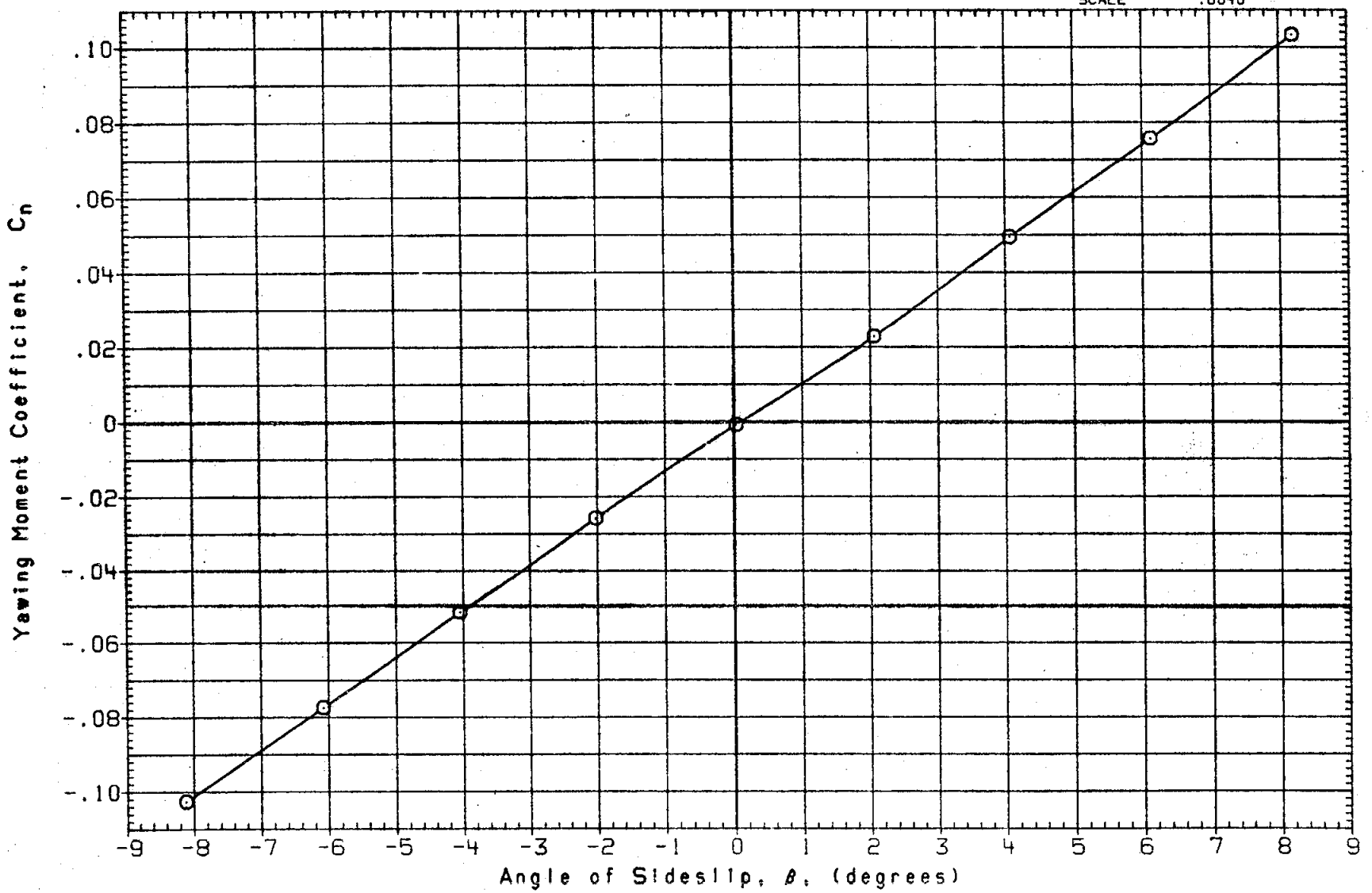

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

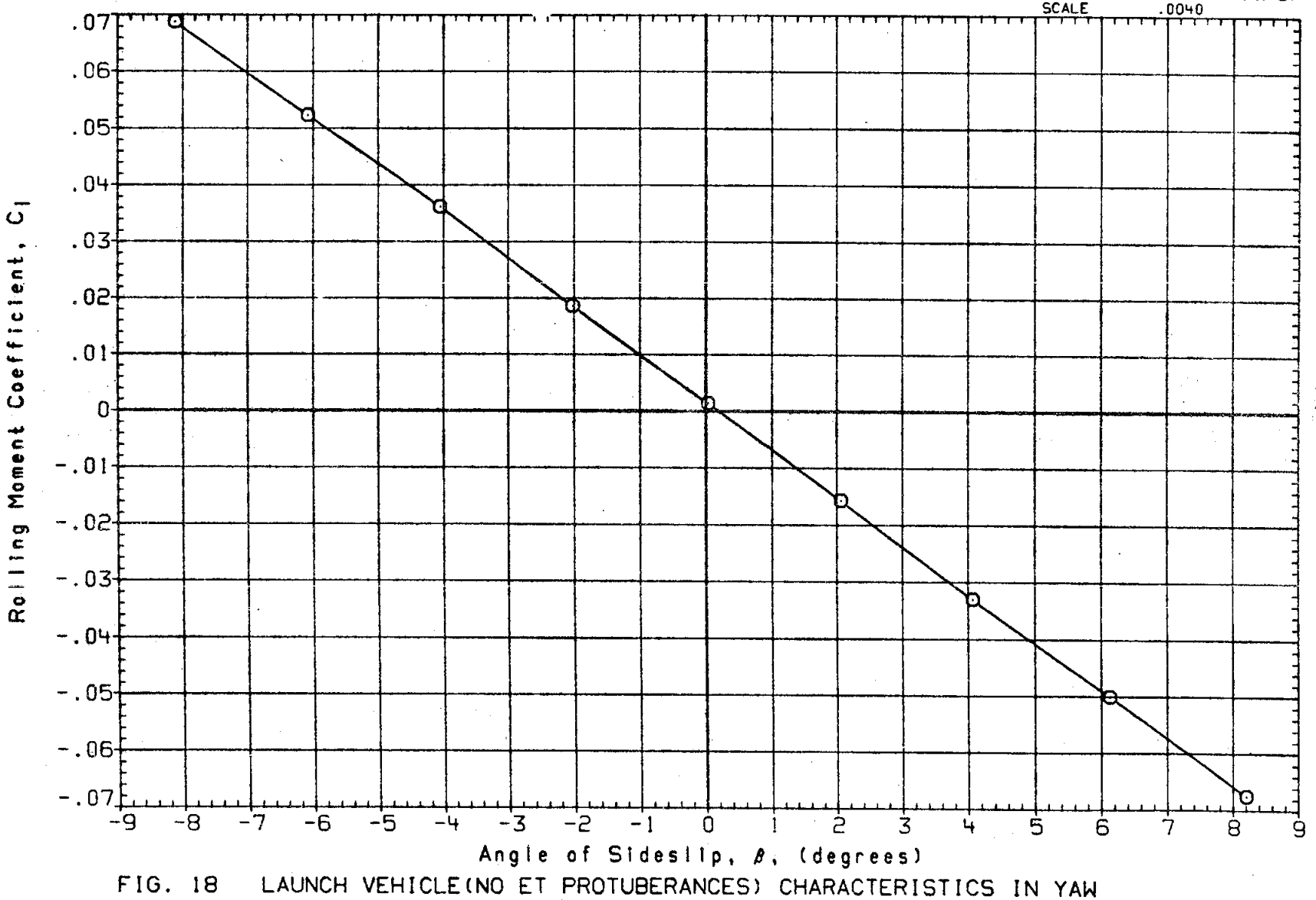

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
R1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

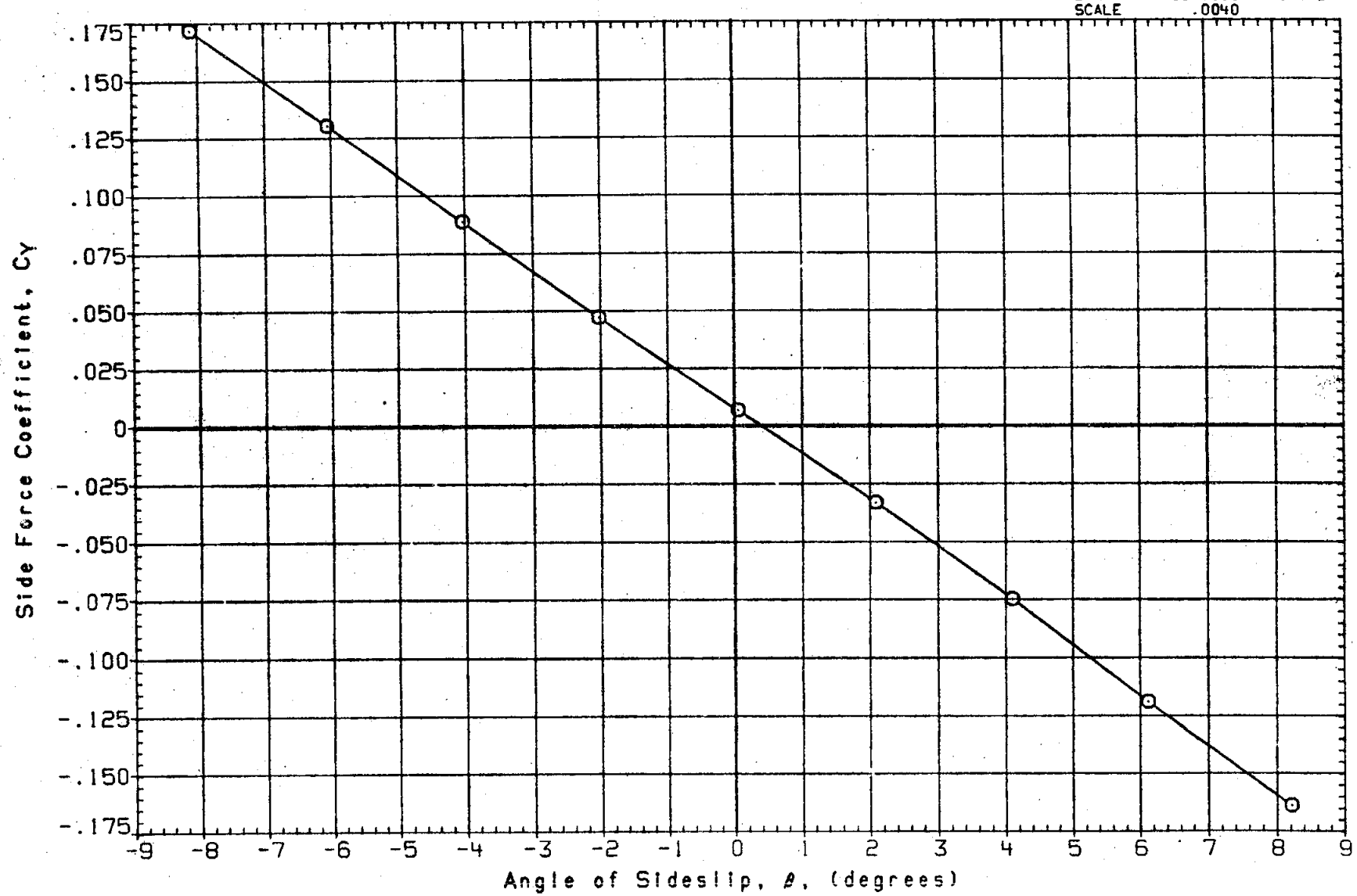

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R12006	○	FA28 (MSFC TWT 856)	02W2E2WNWAATT3S3	.000	90.000
R12007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

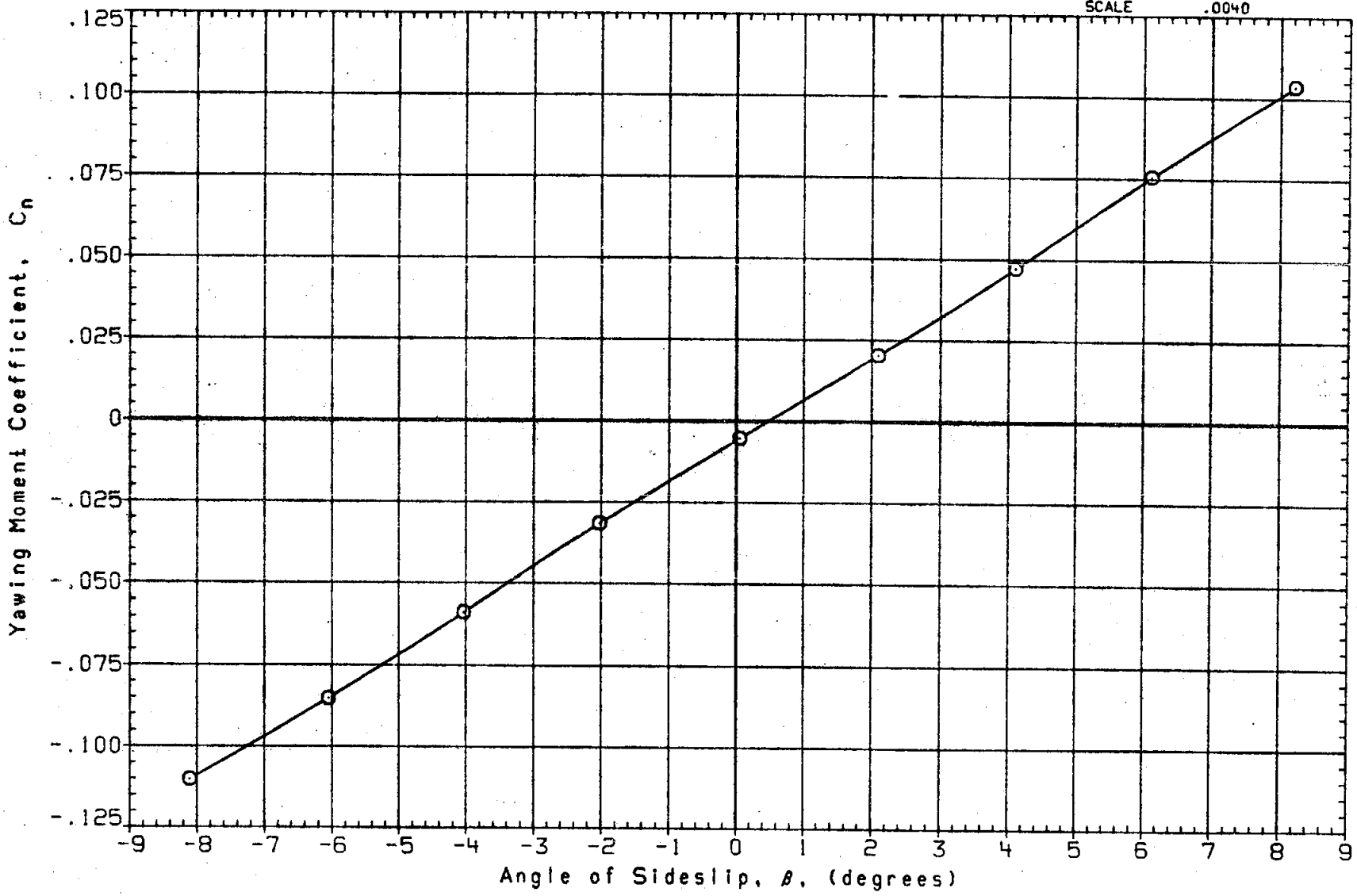

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

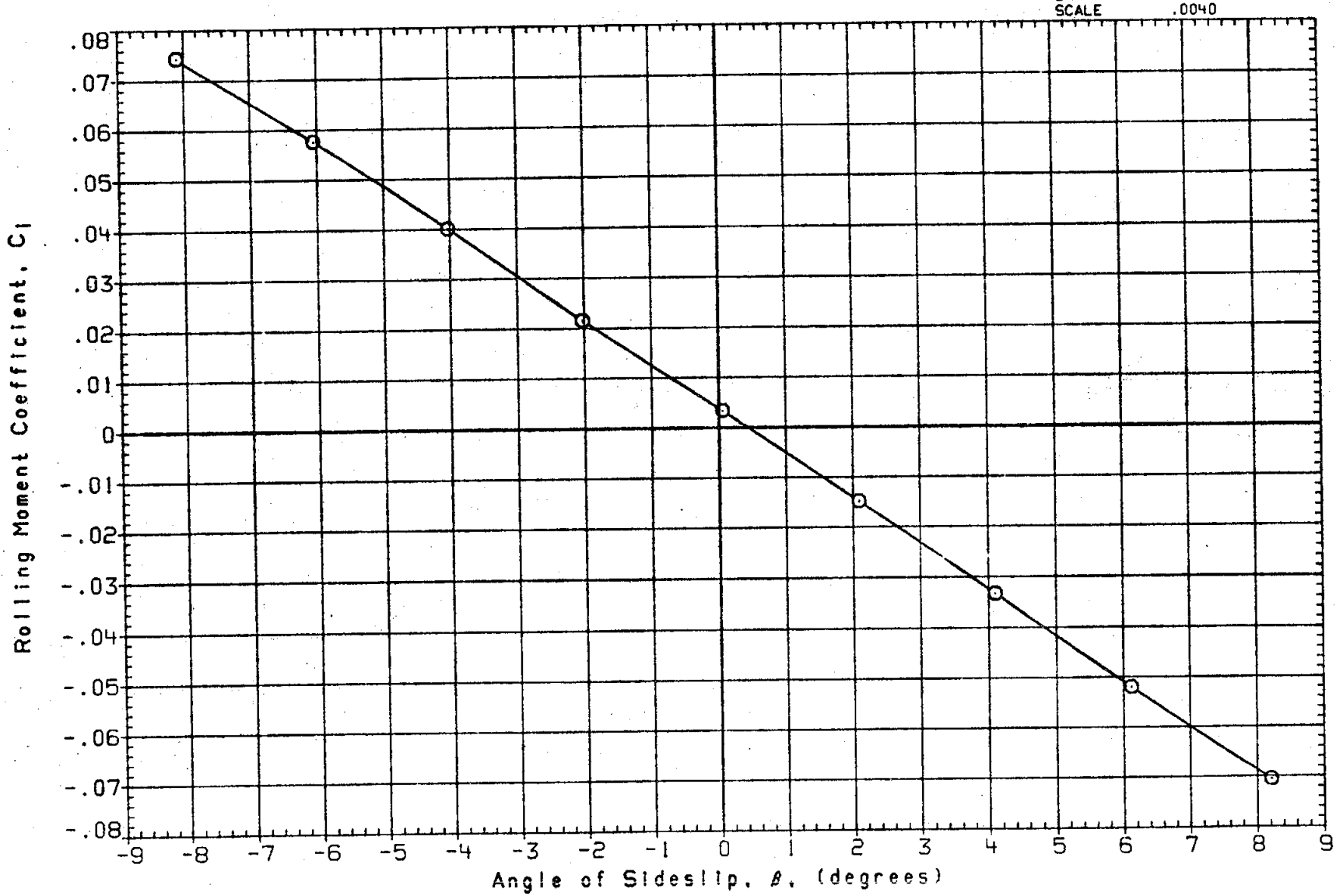

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z007	□	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

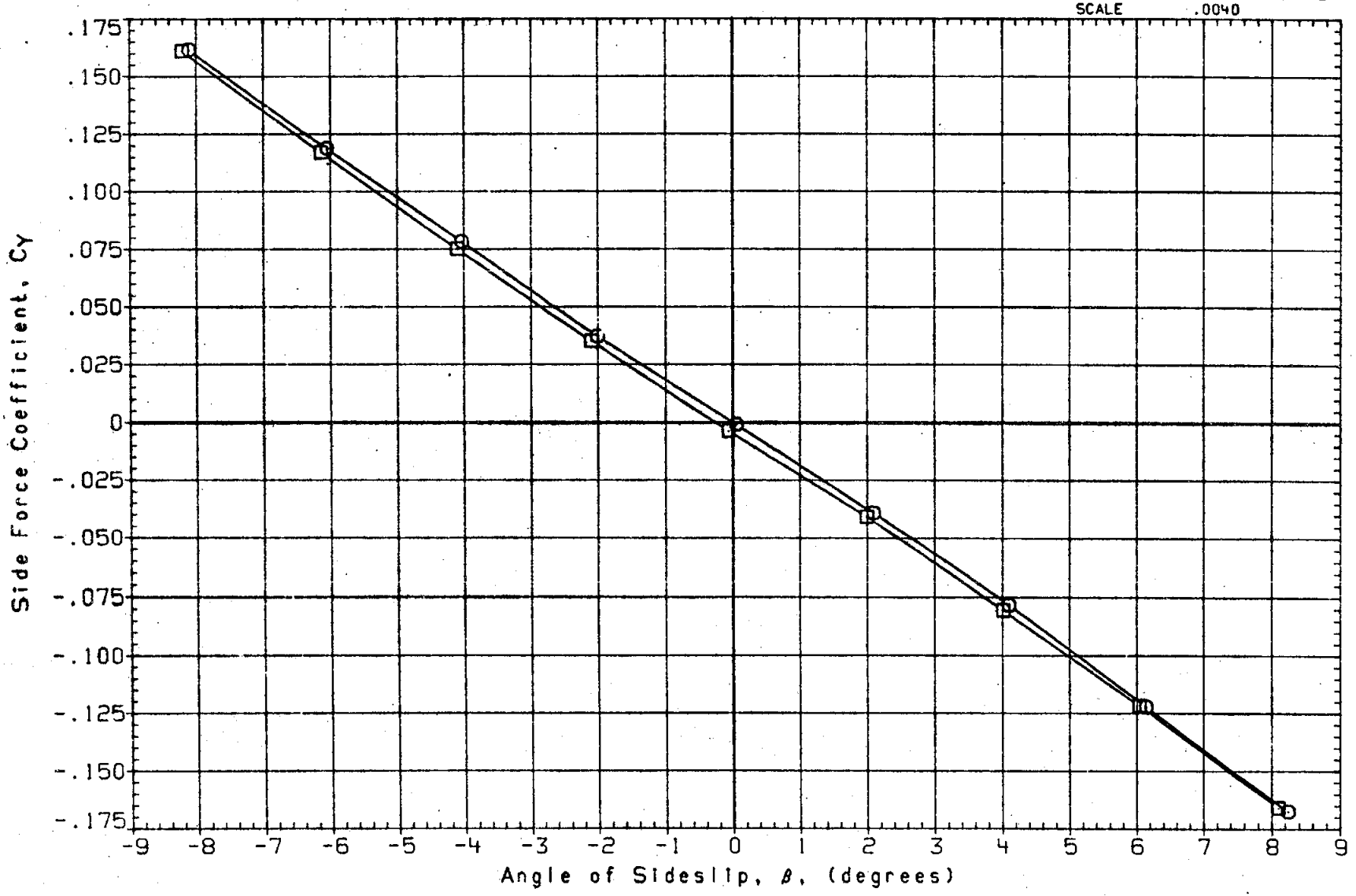

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(E)MACH = 1.25 DATE 12 MAR 80 PAGE 64

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
RIZ006	○	FA28 (MSFC TWT 656) 02W2E2WNWAATT3S3	.000	90.000
RIZ007	□	FA28 (MSFC TWT 656) 02W2E2WNWAATT3S3	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

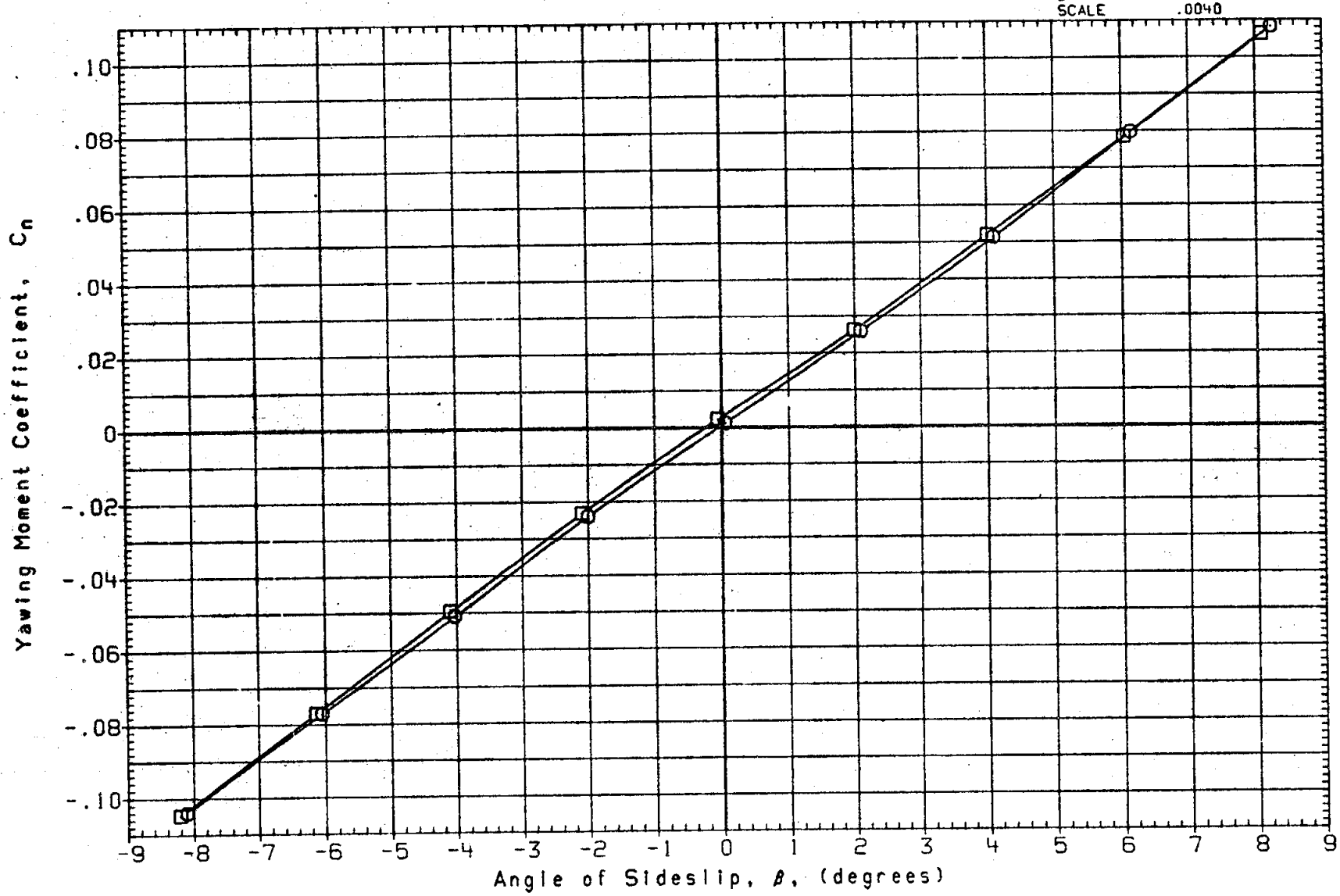

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z007	□	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

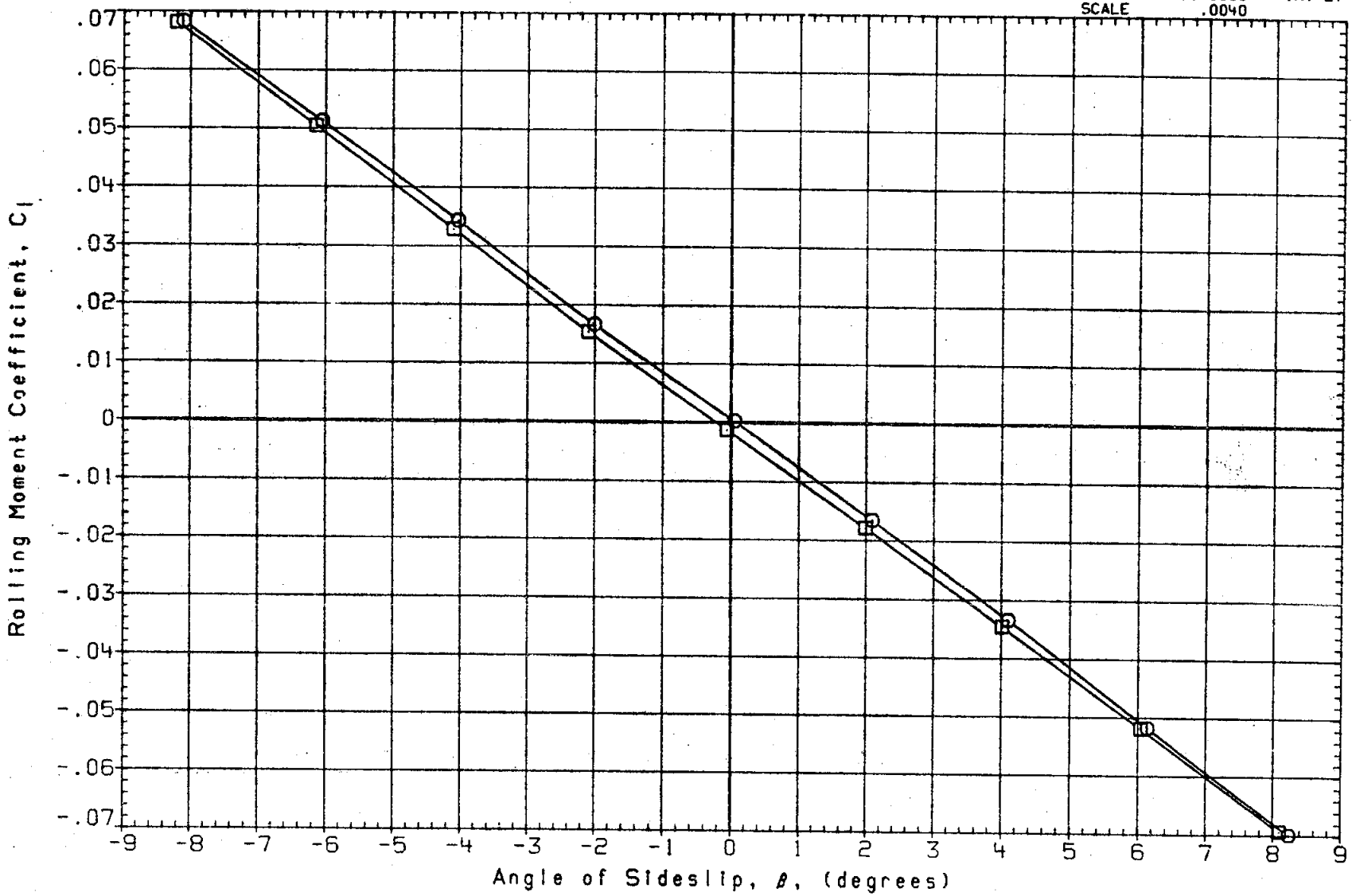

FIG. 18 LAUNCH VEHICLE(NO ET PROTUBERANCES) CHARACTERISTICS IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

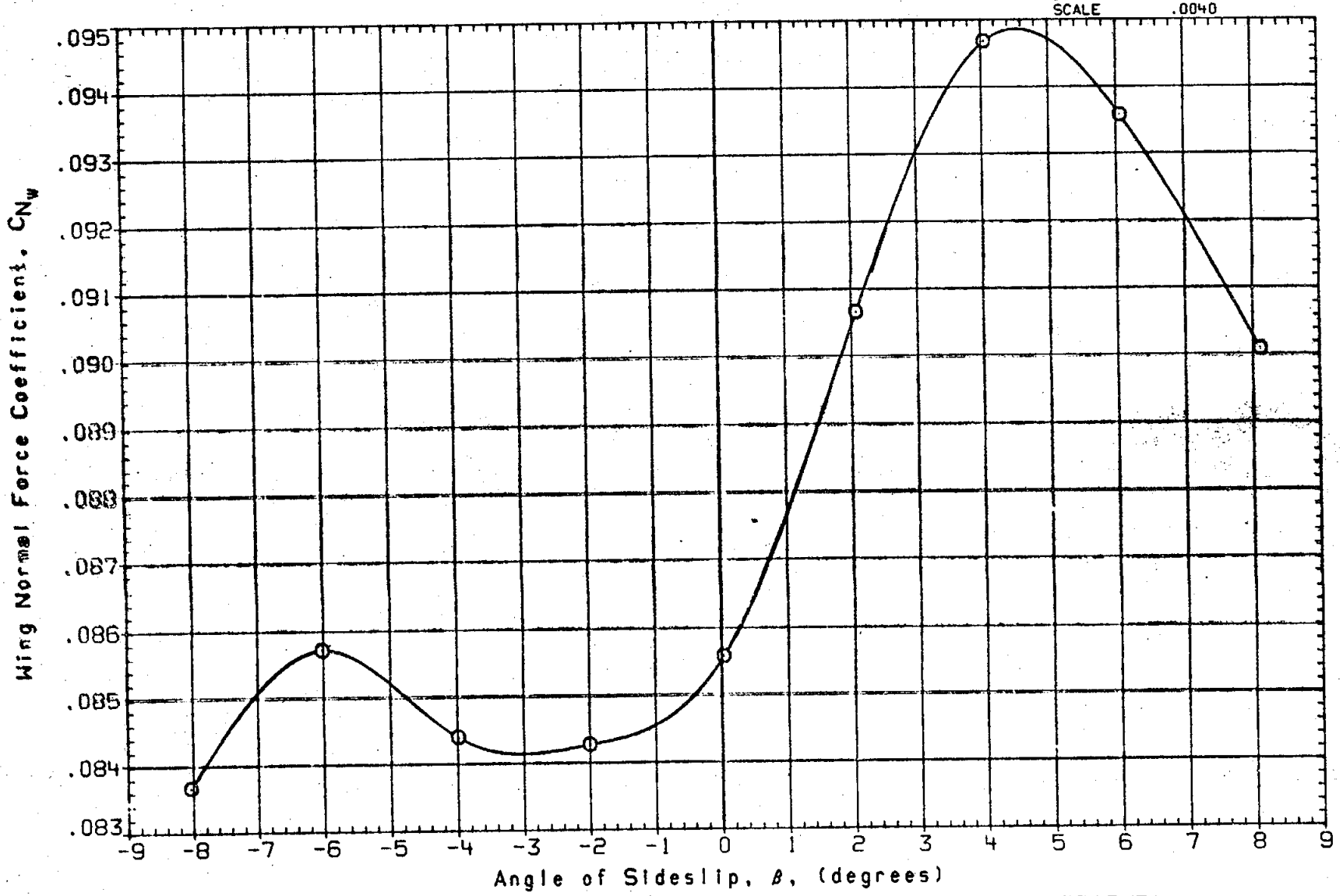

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(A) MACH = .60 DATE 12 MAR 80

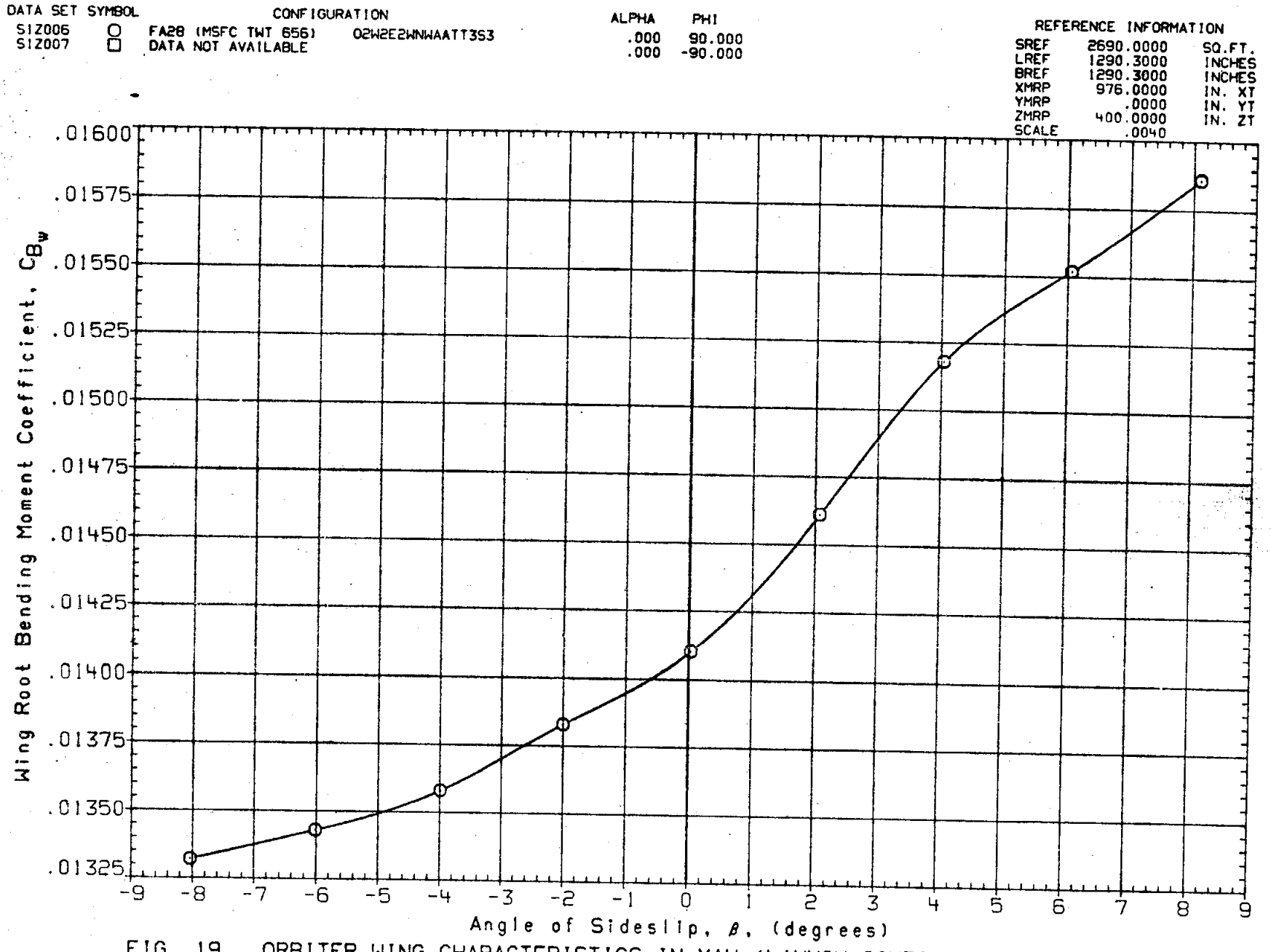

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(A) MACH = .60

DATE 12 MAR 80

PAGE 3

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

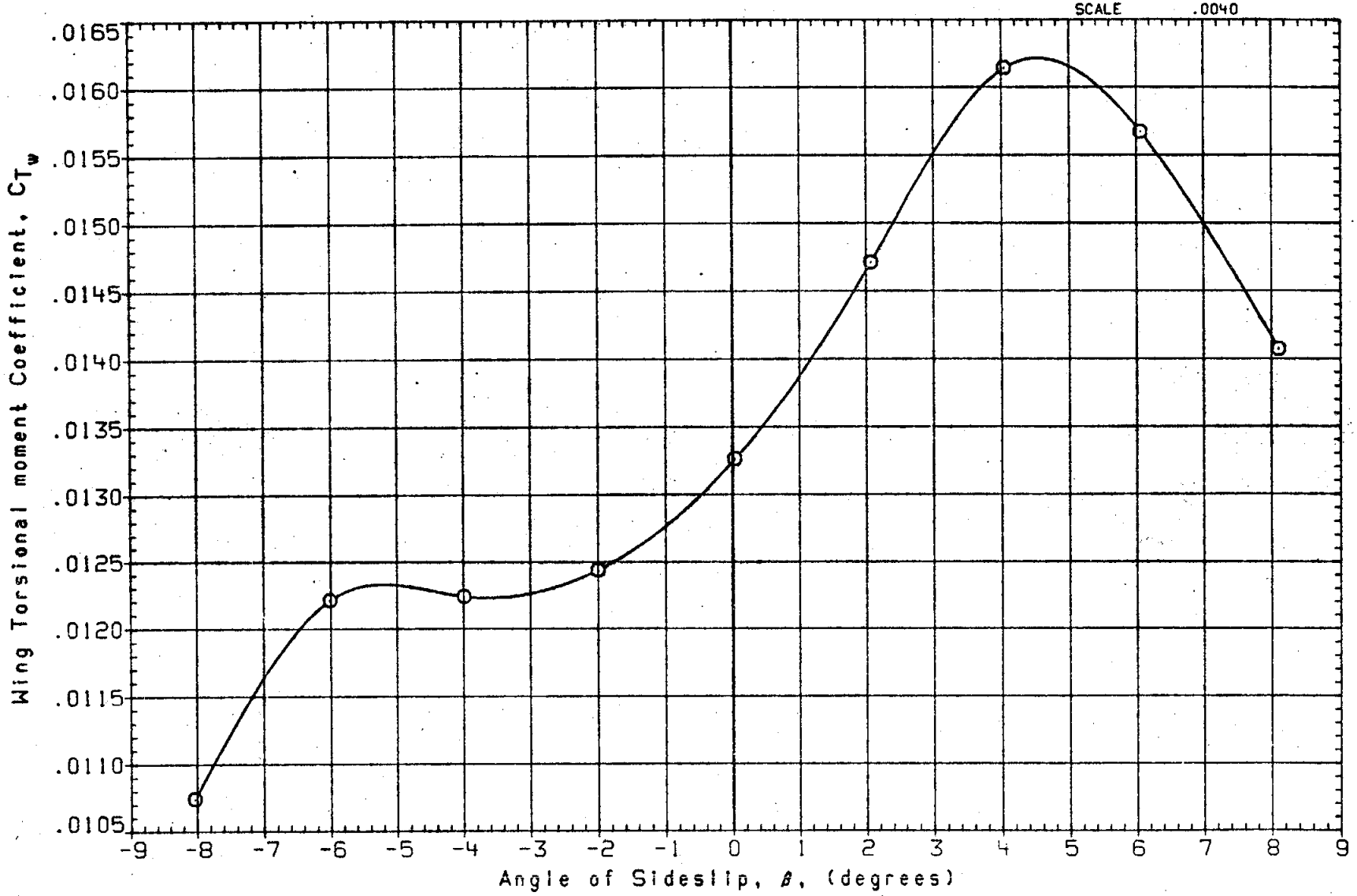

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(A)MACH = .60 DATE 12 MAR 80 PAGE 69

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT.
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

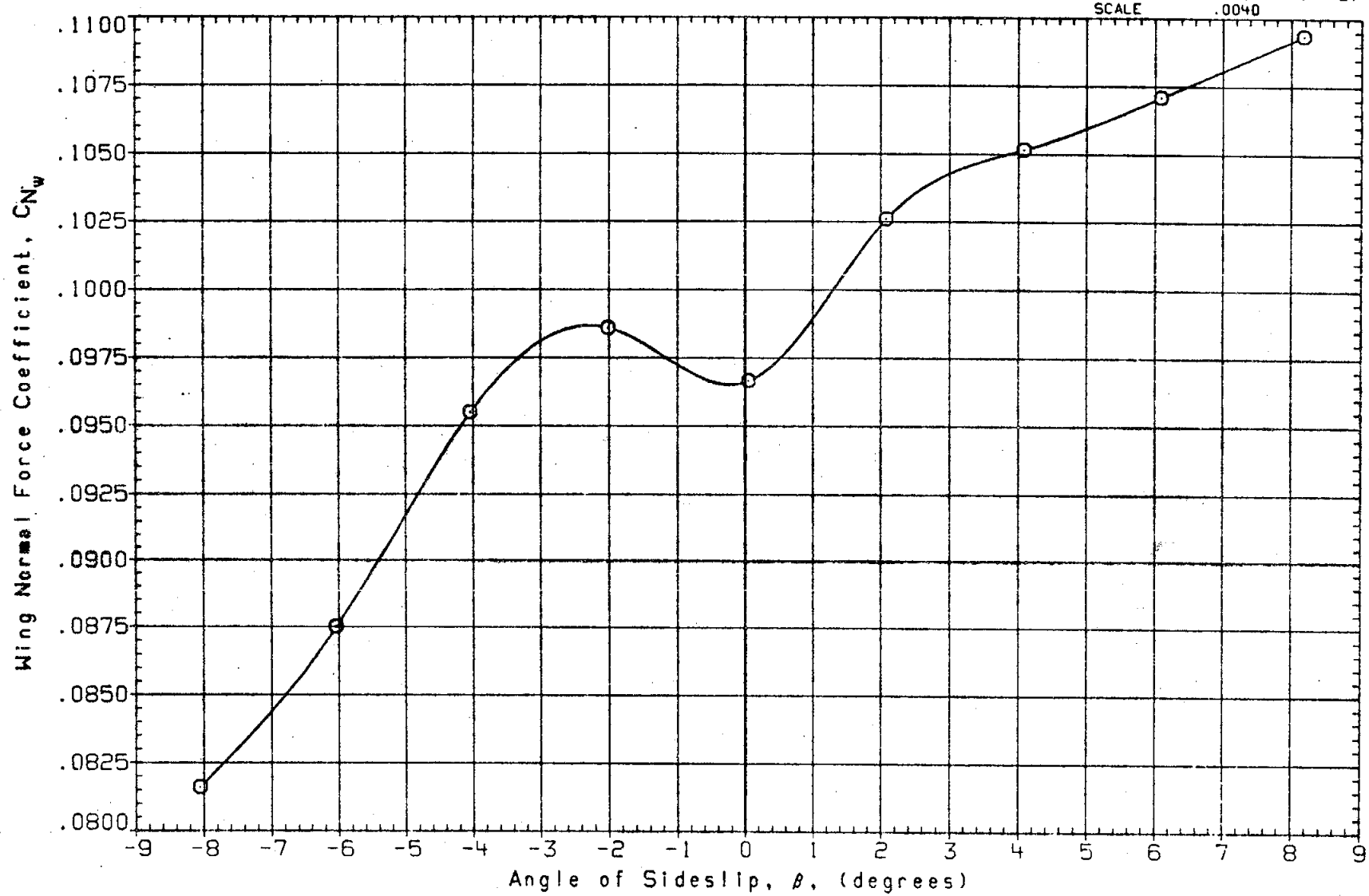

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	975.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

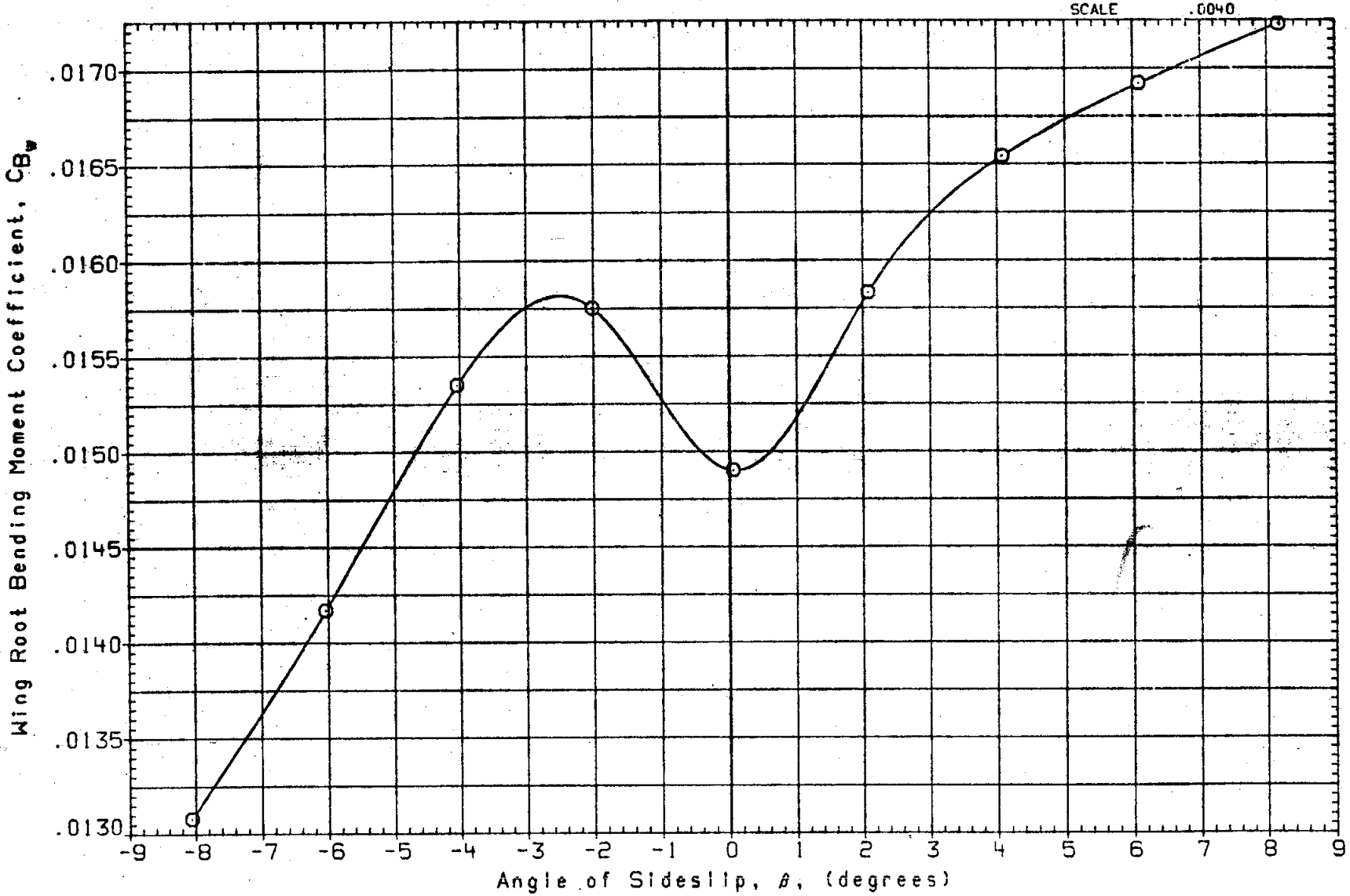

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(B)MACH = .90 DATE 12 MAR 80 PAGE 71

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

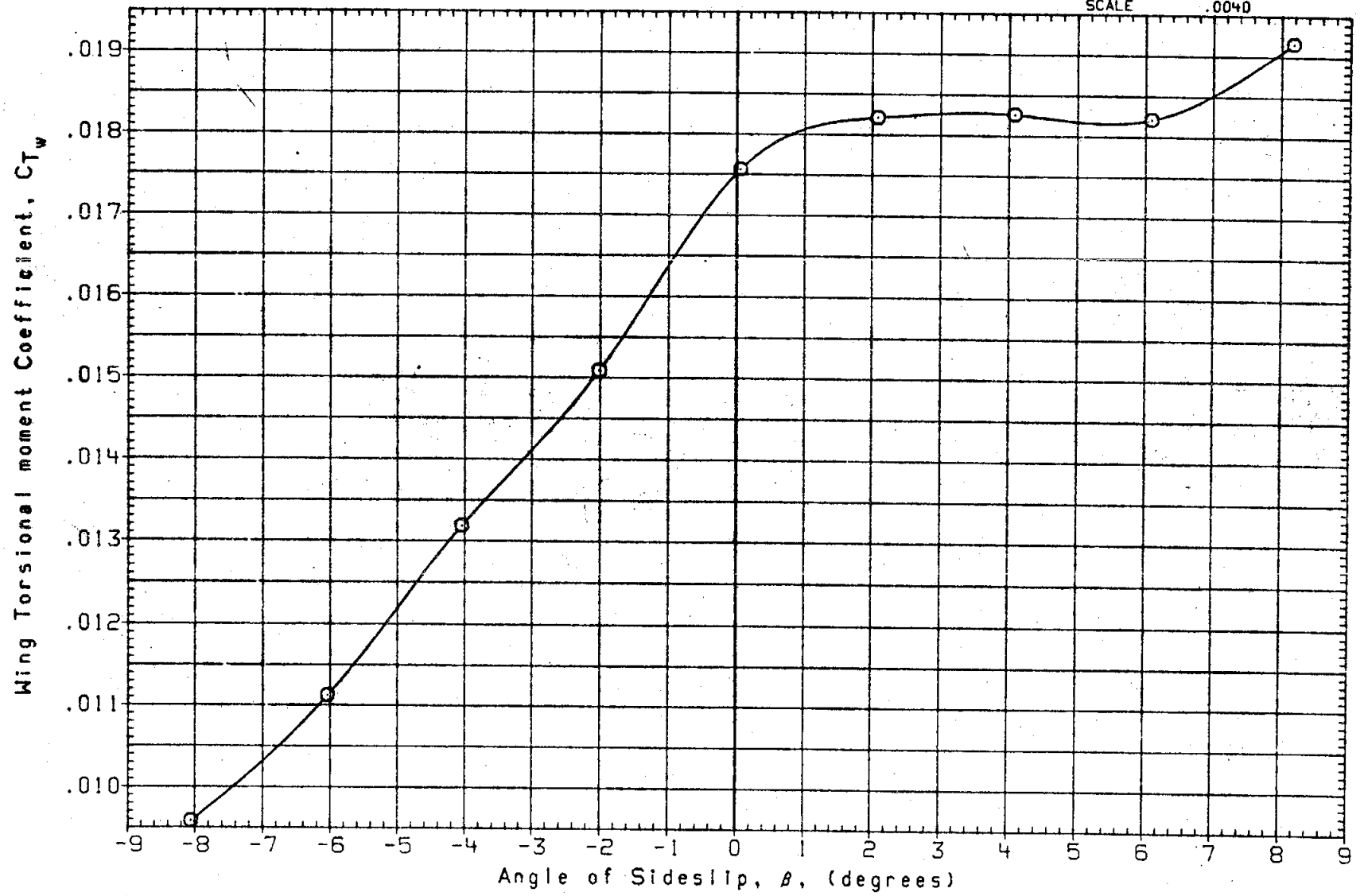

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(B) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3
S1Z007	□	DATA NOT AVAILABLE	

ALPHA	PHI
.000	90.000
.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

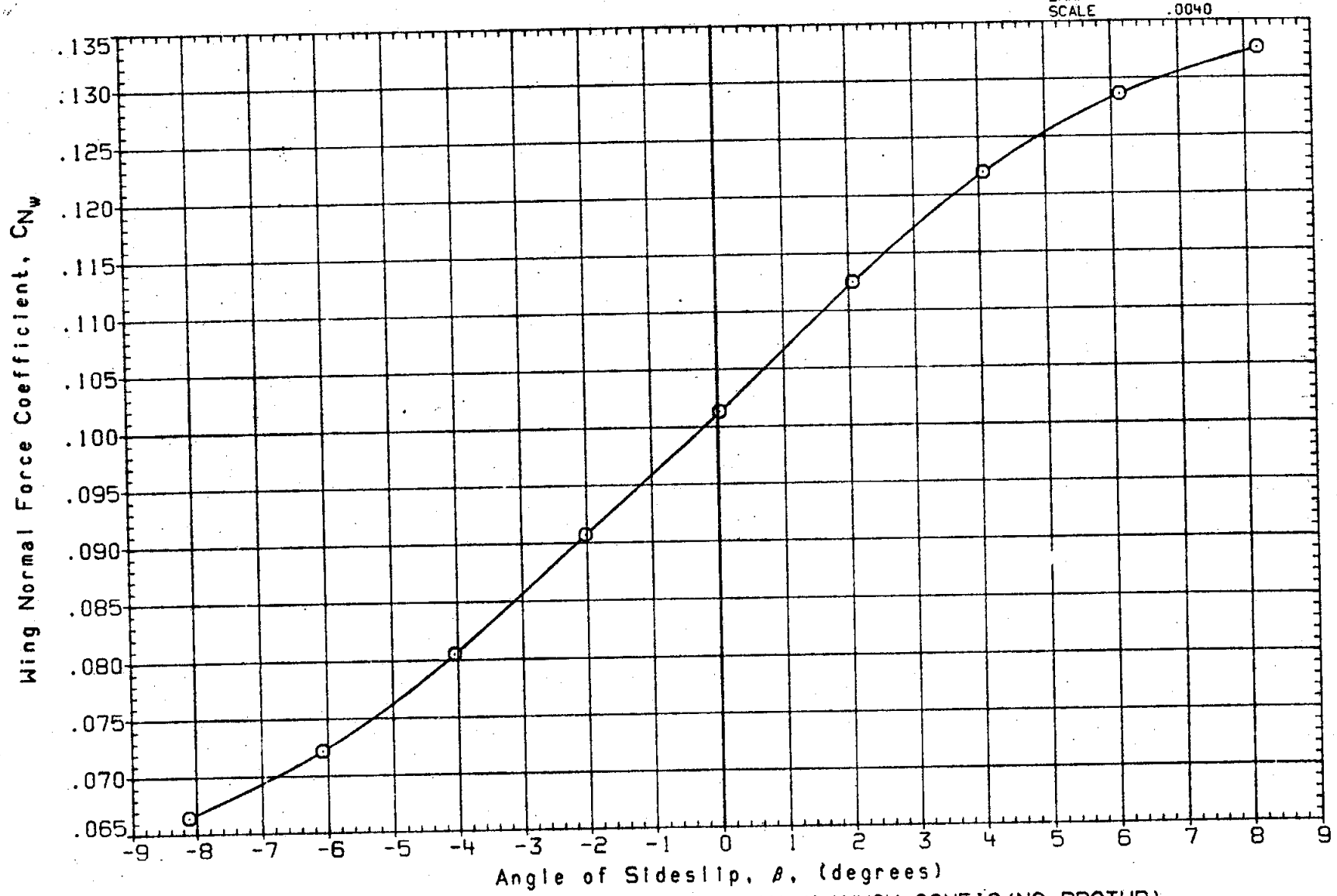

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

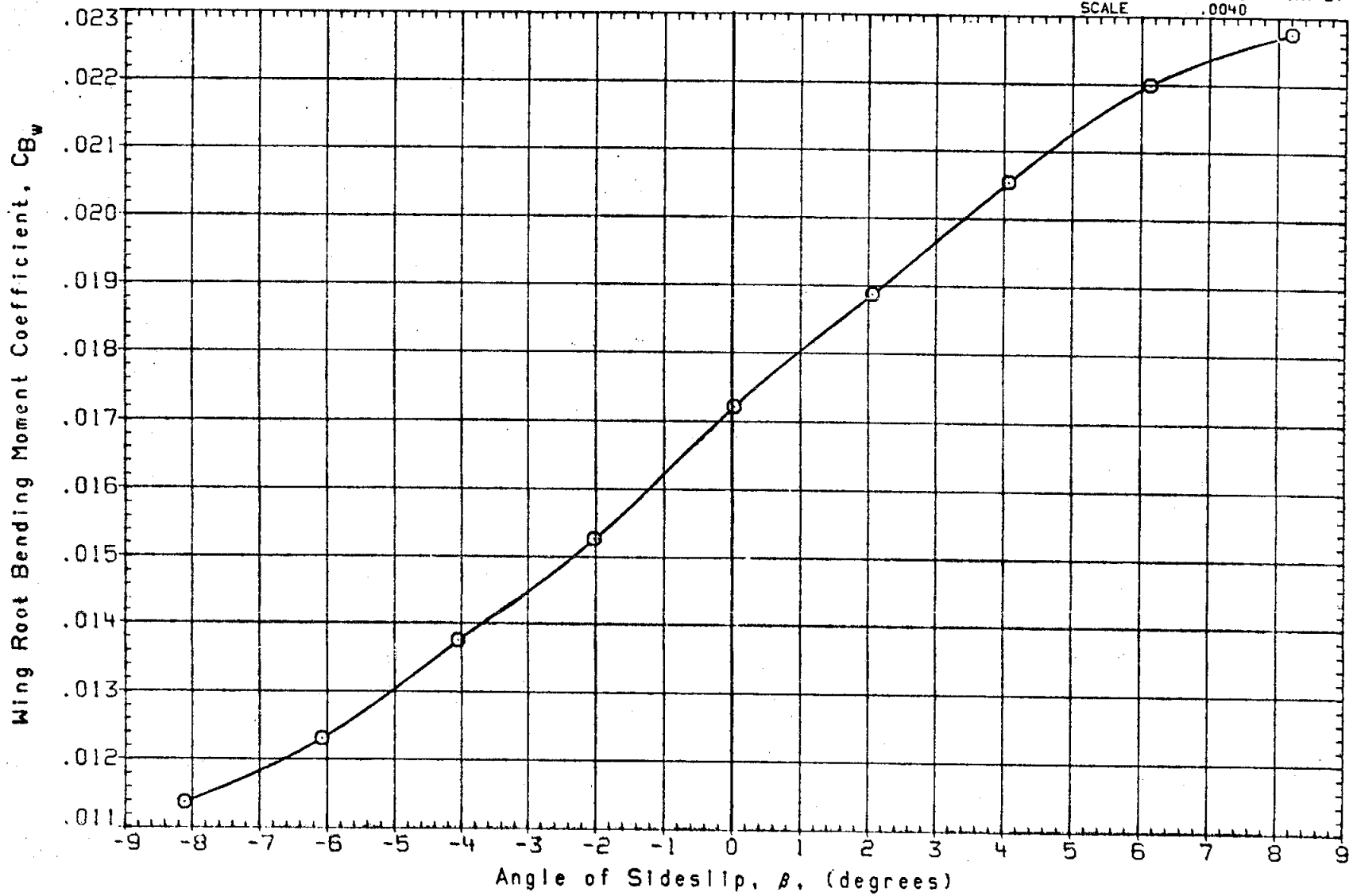

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656) 02W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

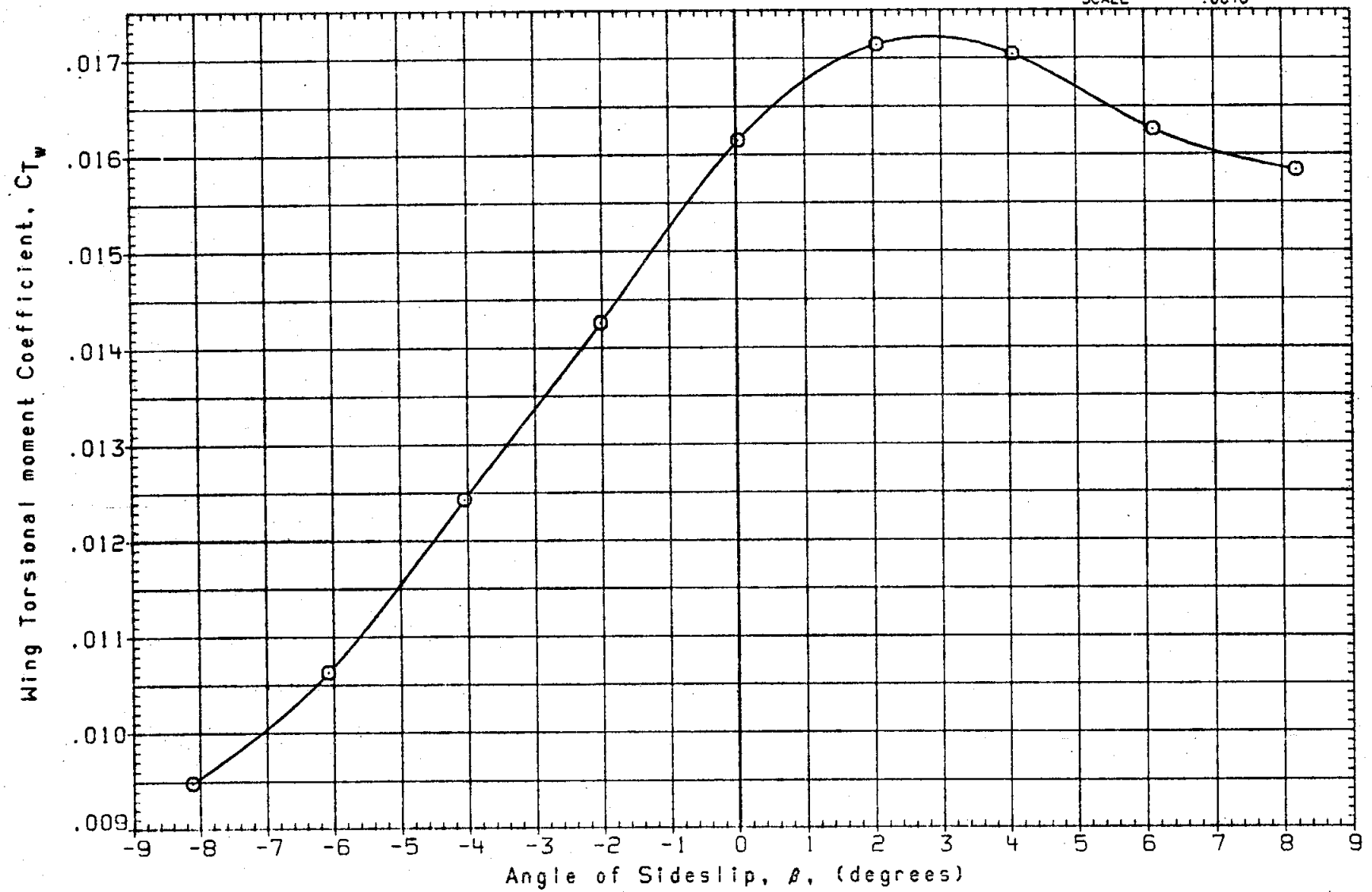

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(C)MACH = 1.05 DATE 12 MAR 80 PAGE 75

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

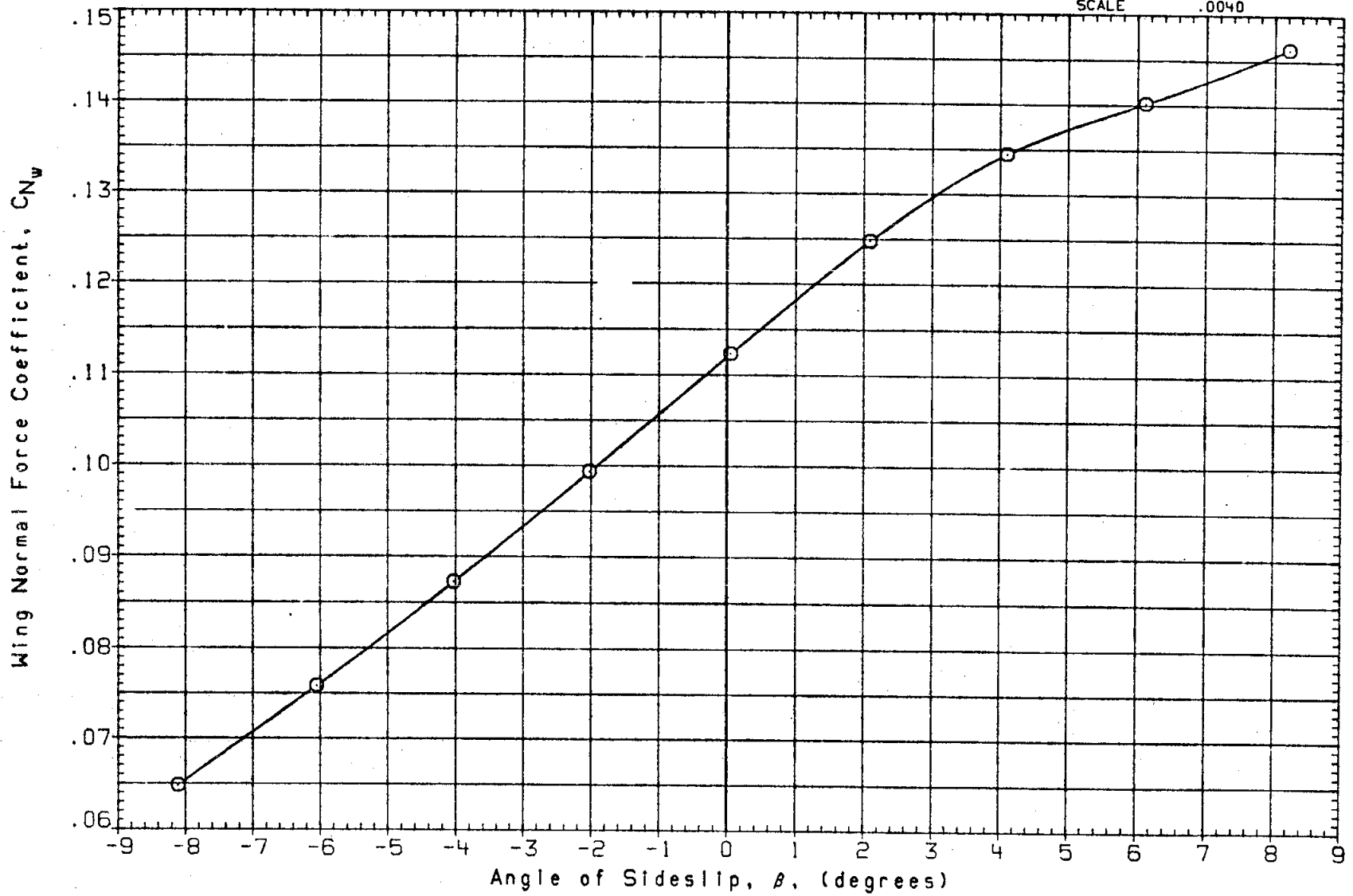

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

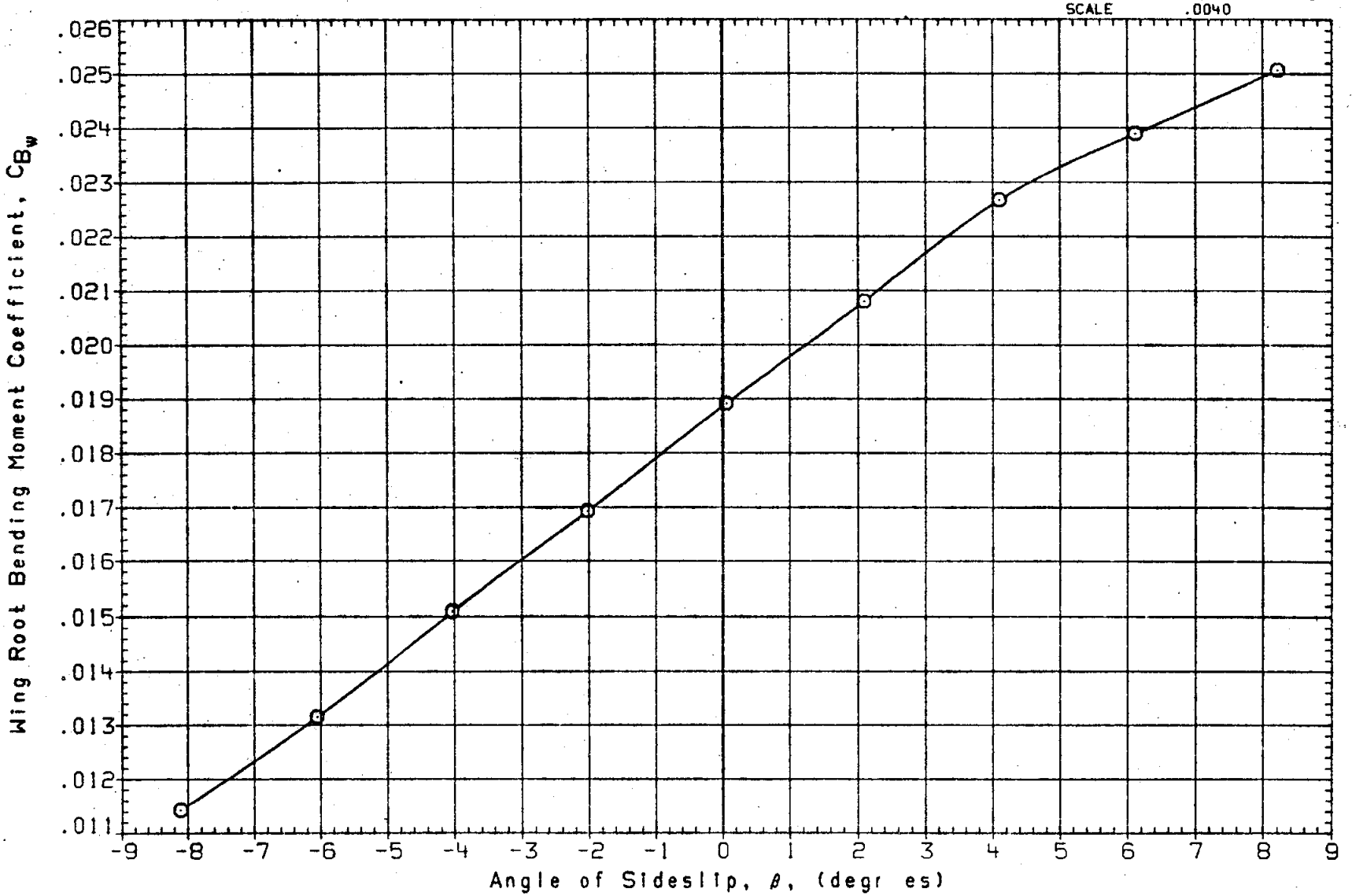

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(D)MACH = 1.10 DATE 12 MAR 80 PAGE 77

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

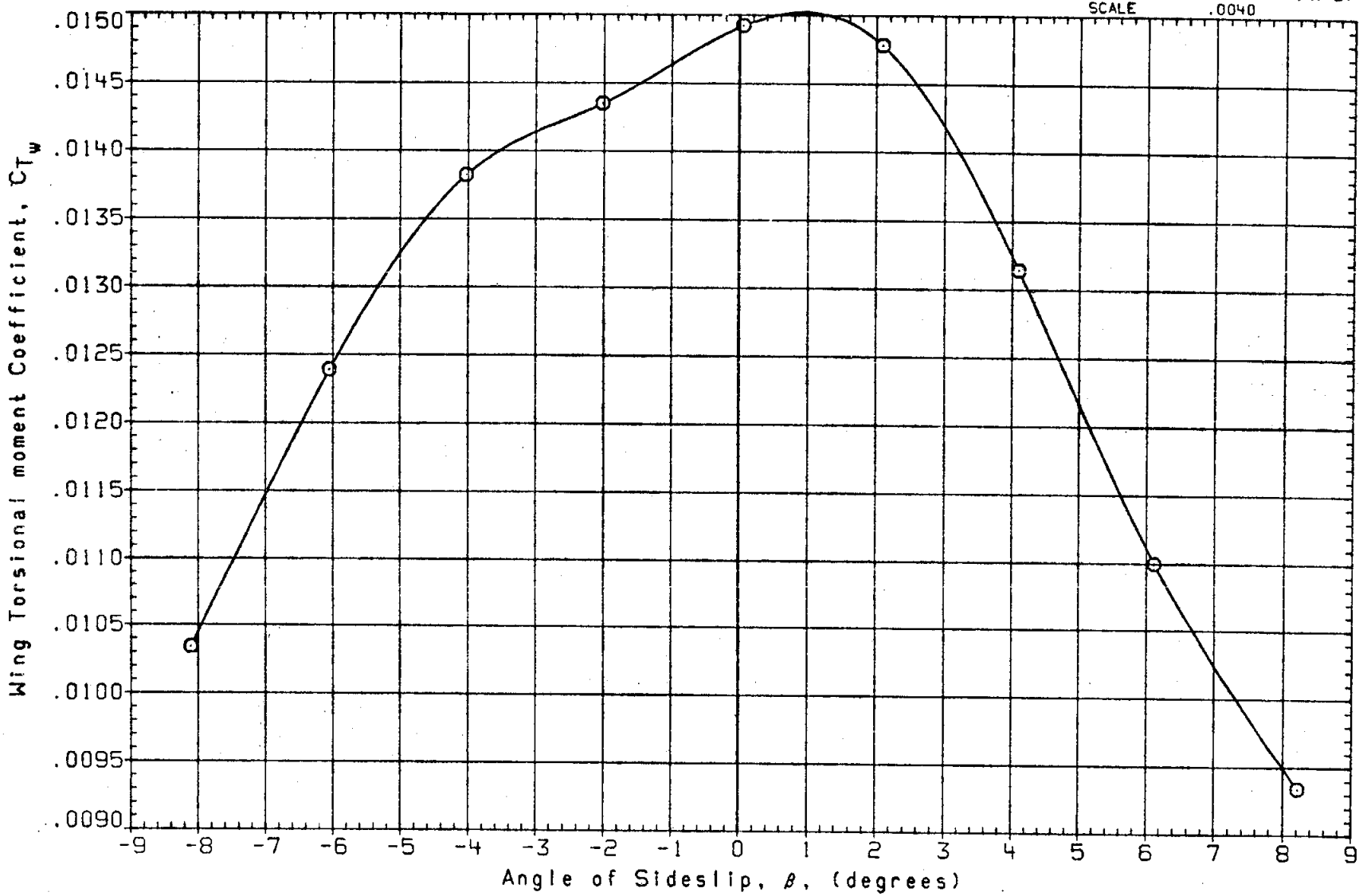

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

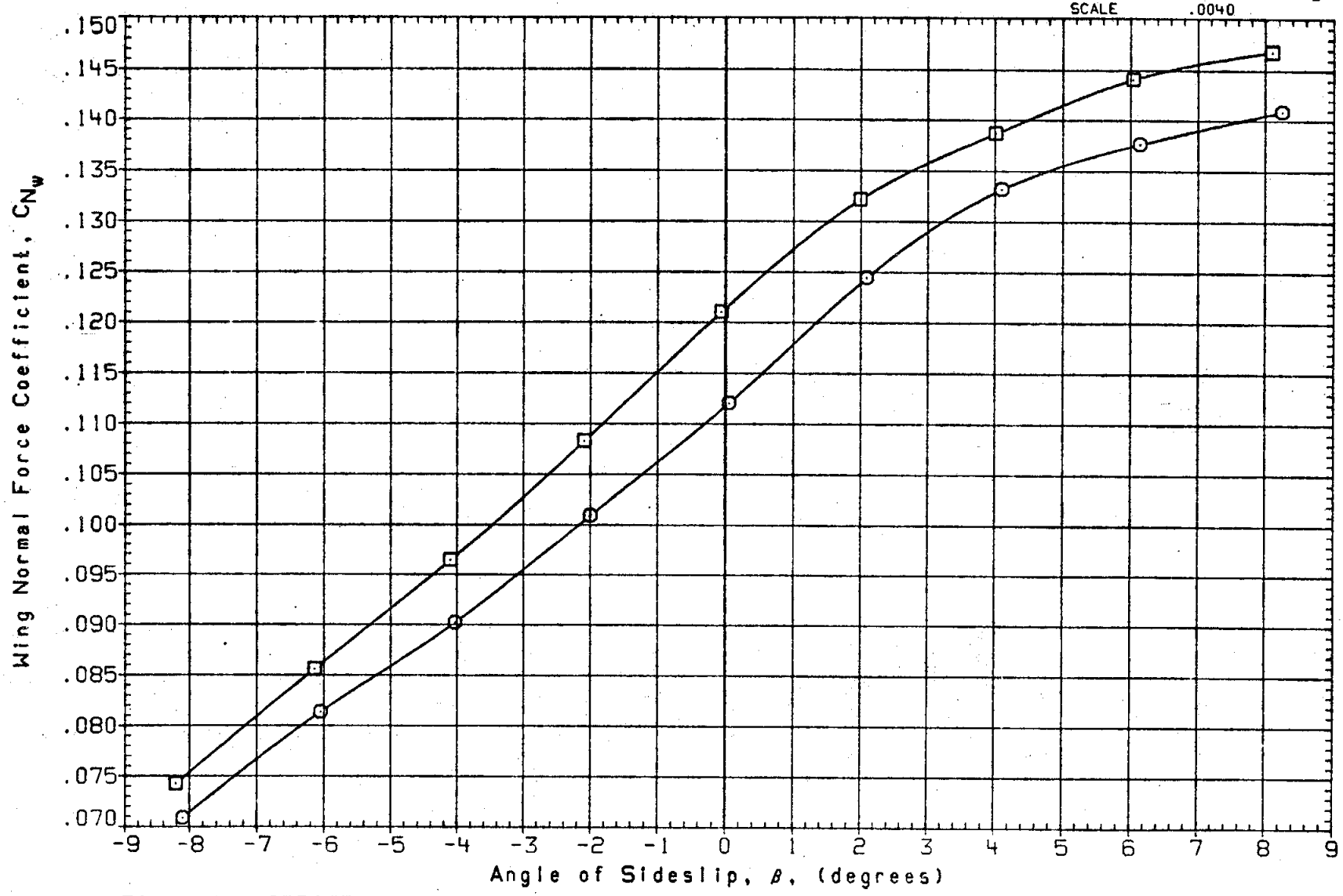

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

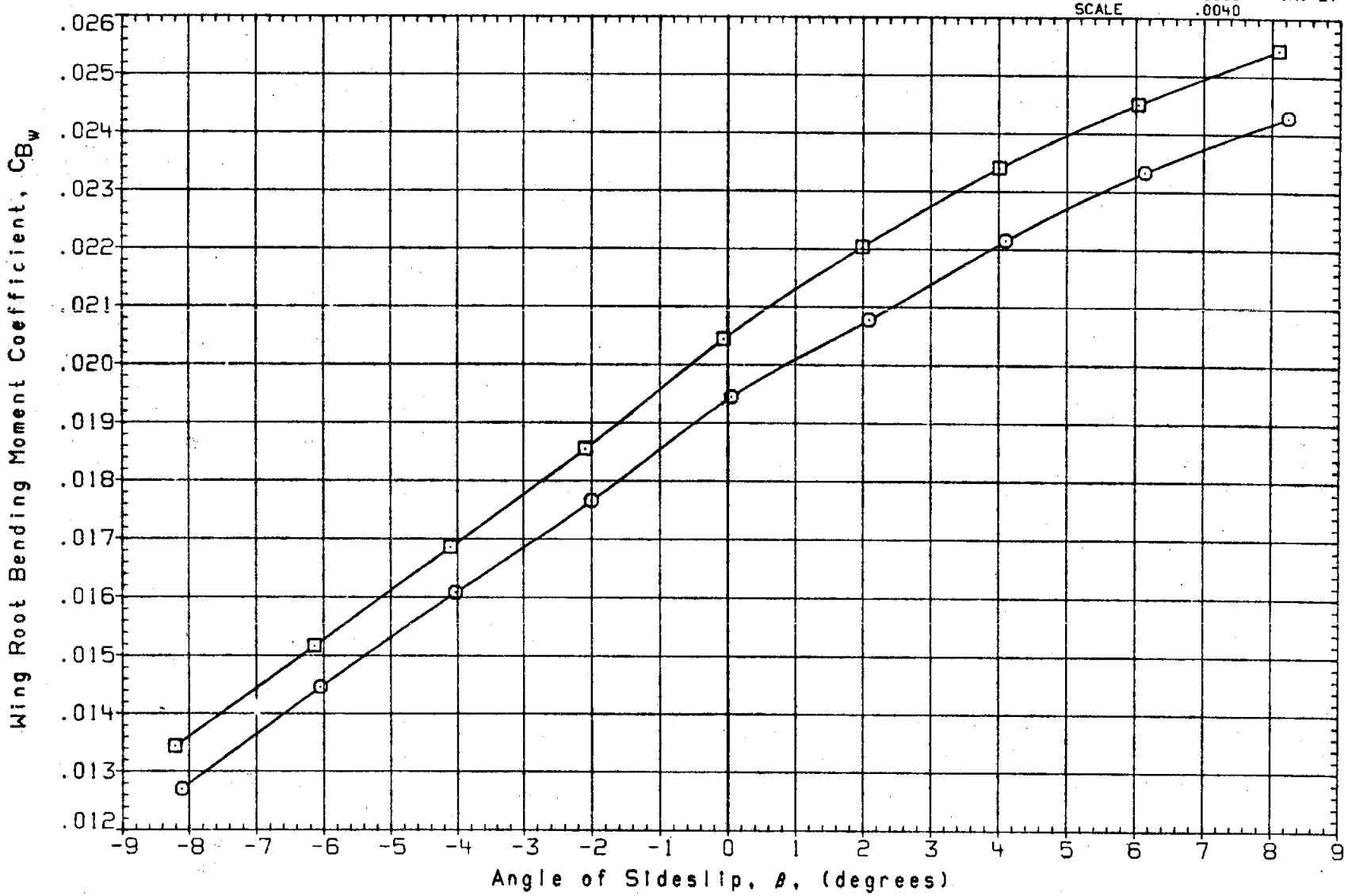

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

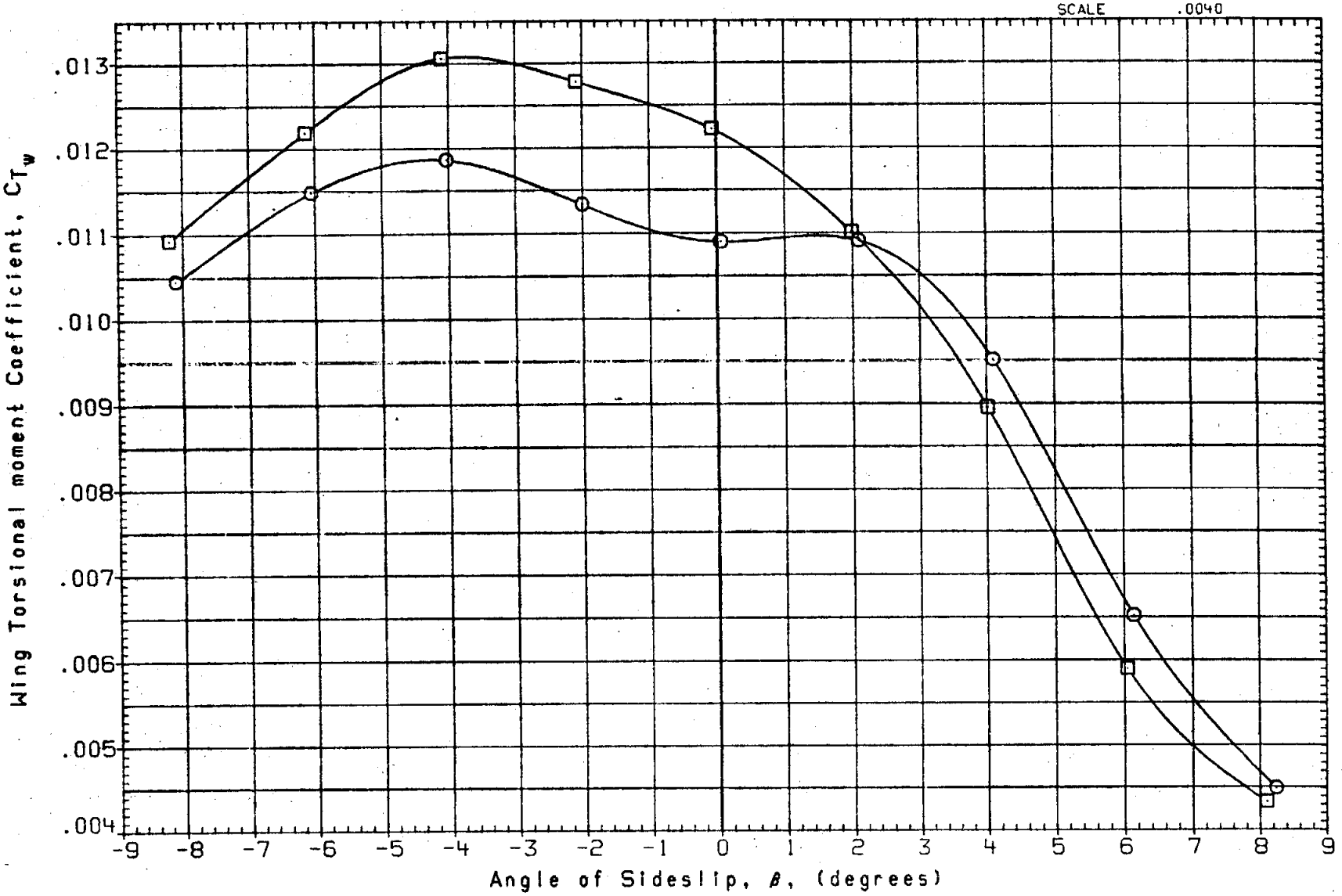

FIG. 19 ORBITER WING CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

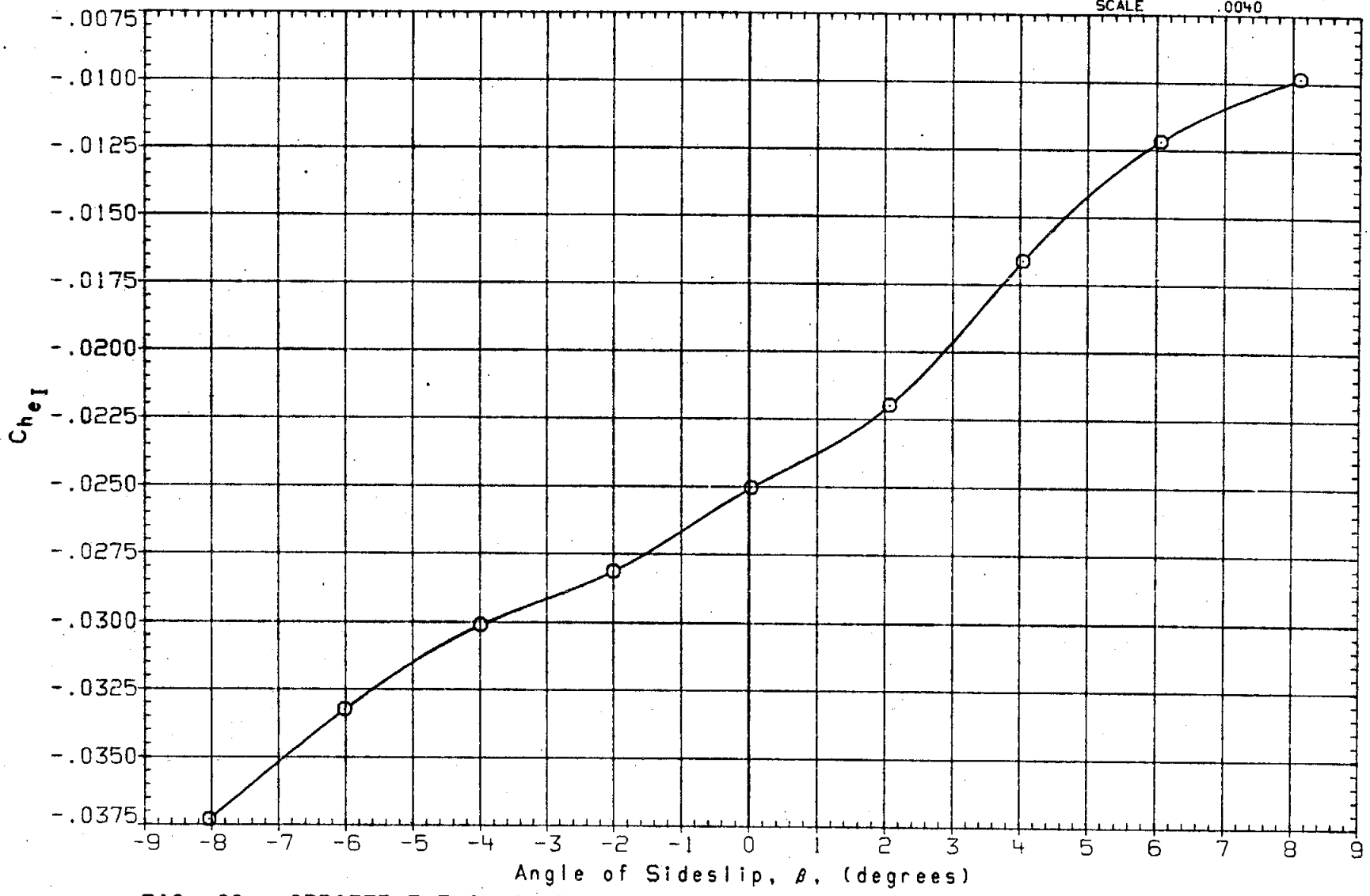

FIG. 20 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

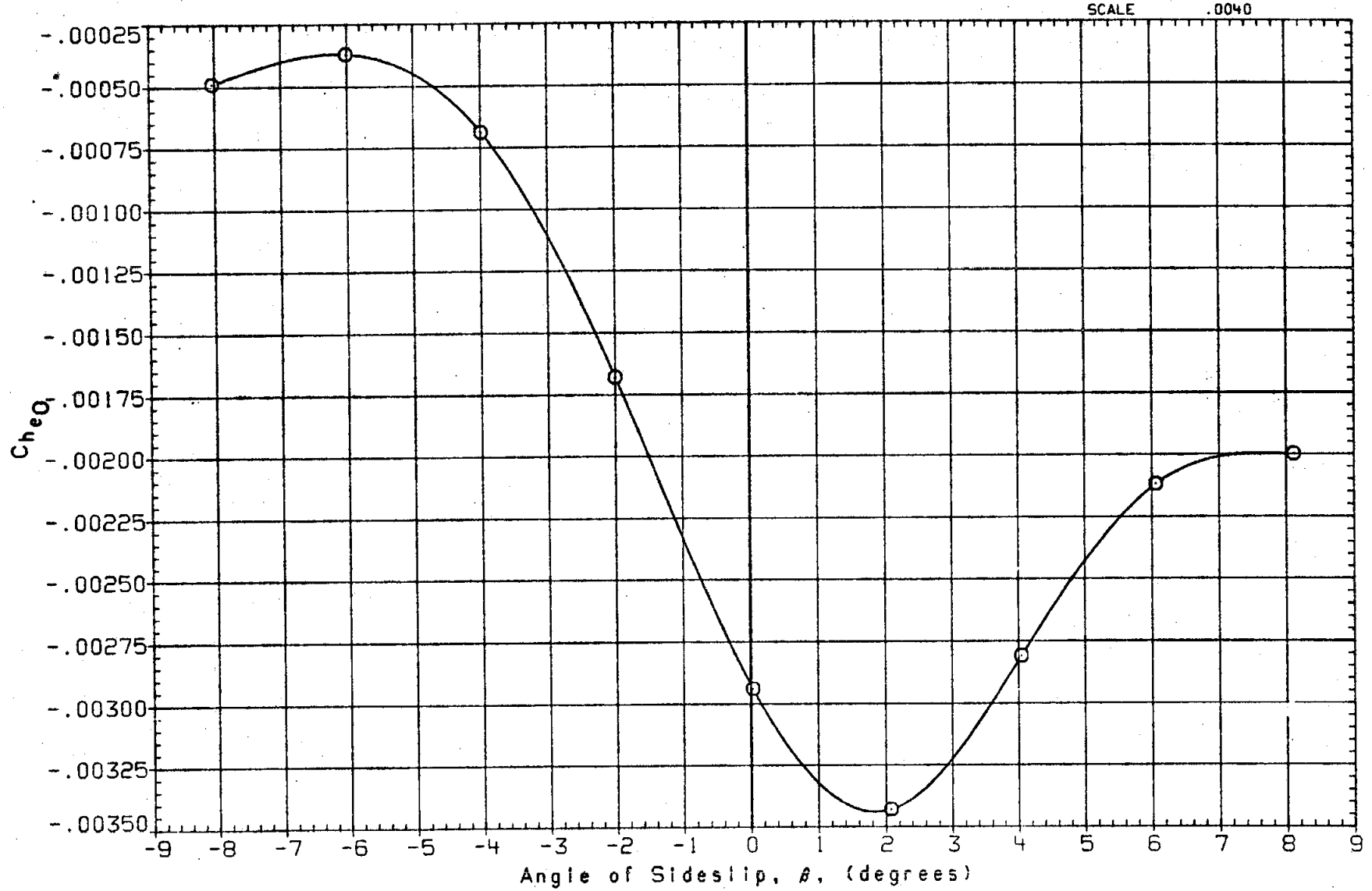

FIG. 20 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(A)MACH = .60 DATE 12 MAR 80 PAGE 83

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT353	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

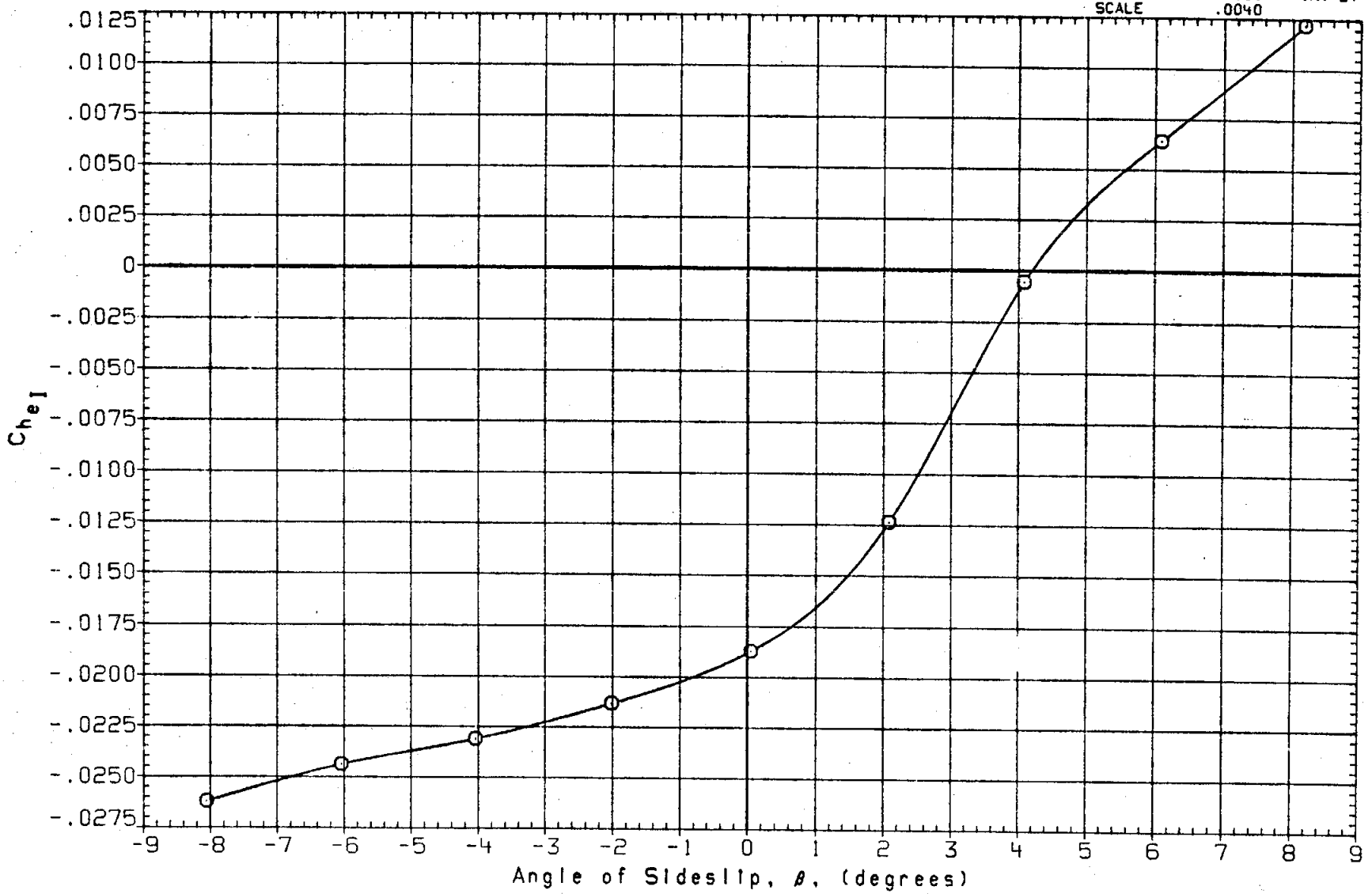

FIG. 20 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

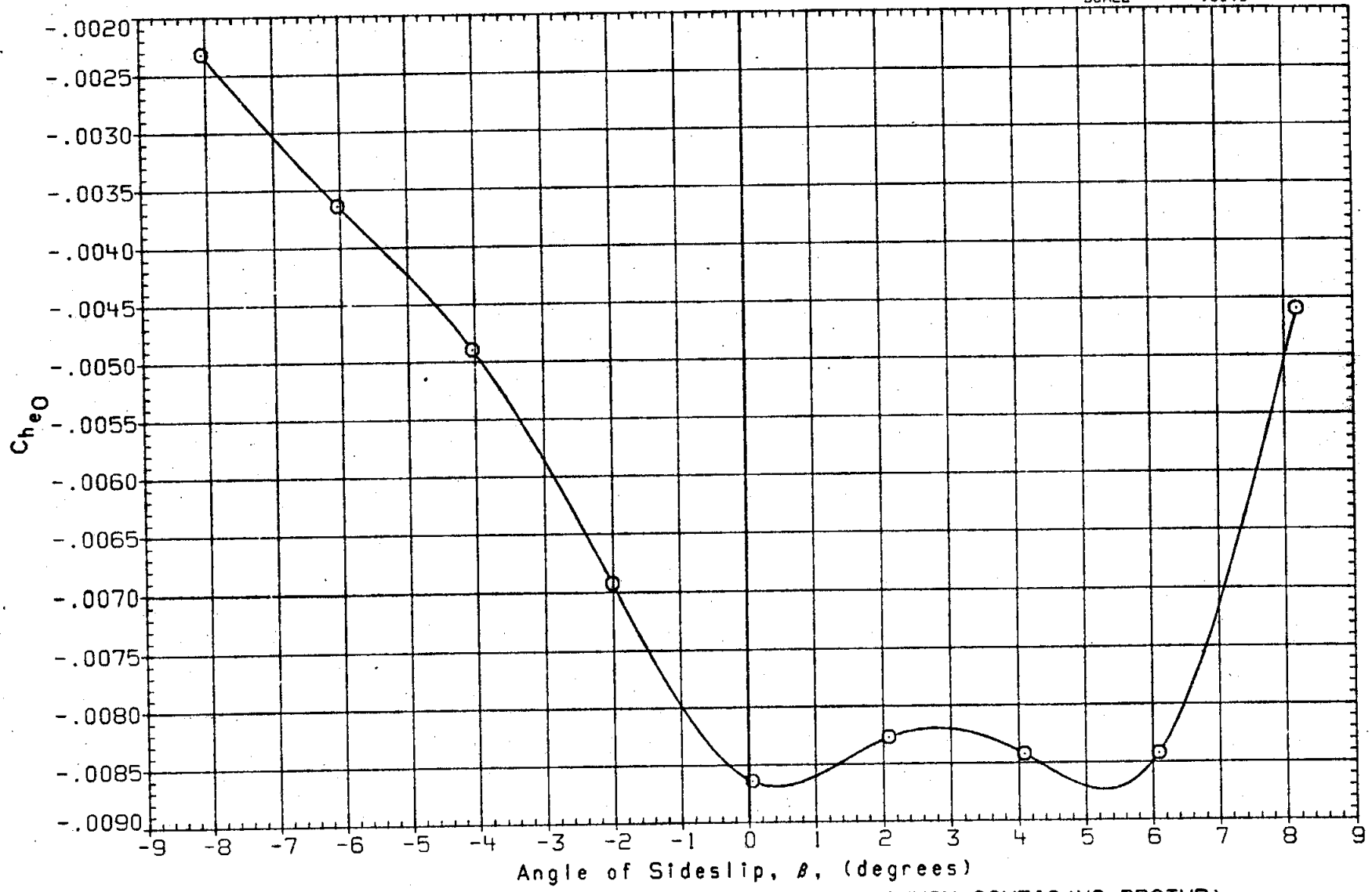

FIG. 20 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656) 02W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

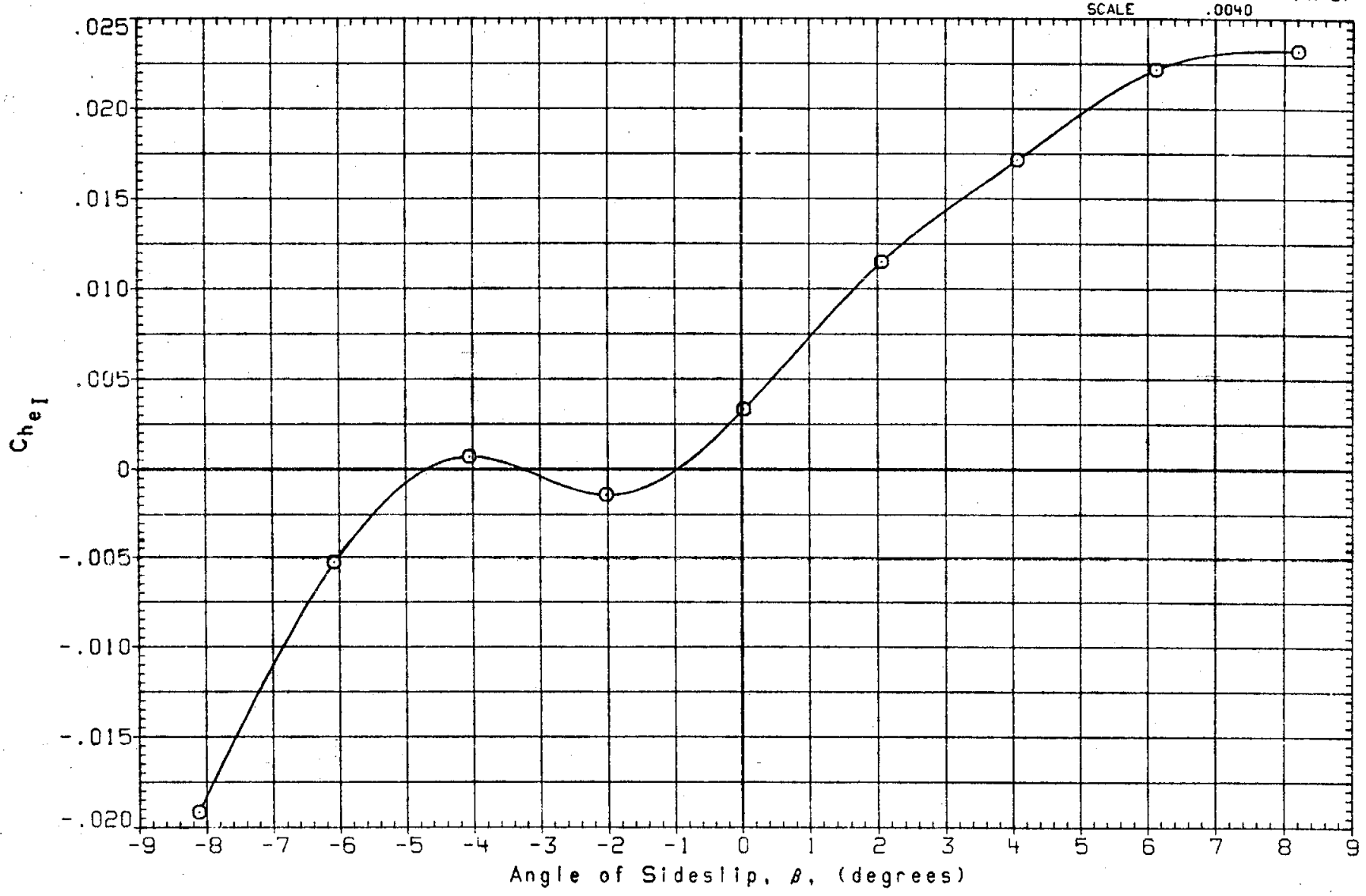

FIG. 20 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

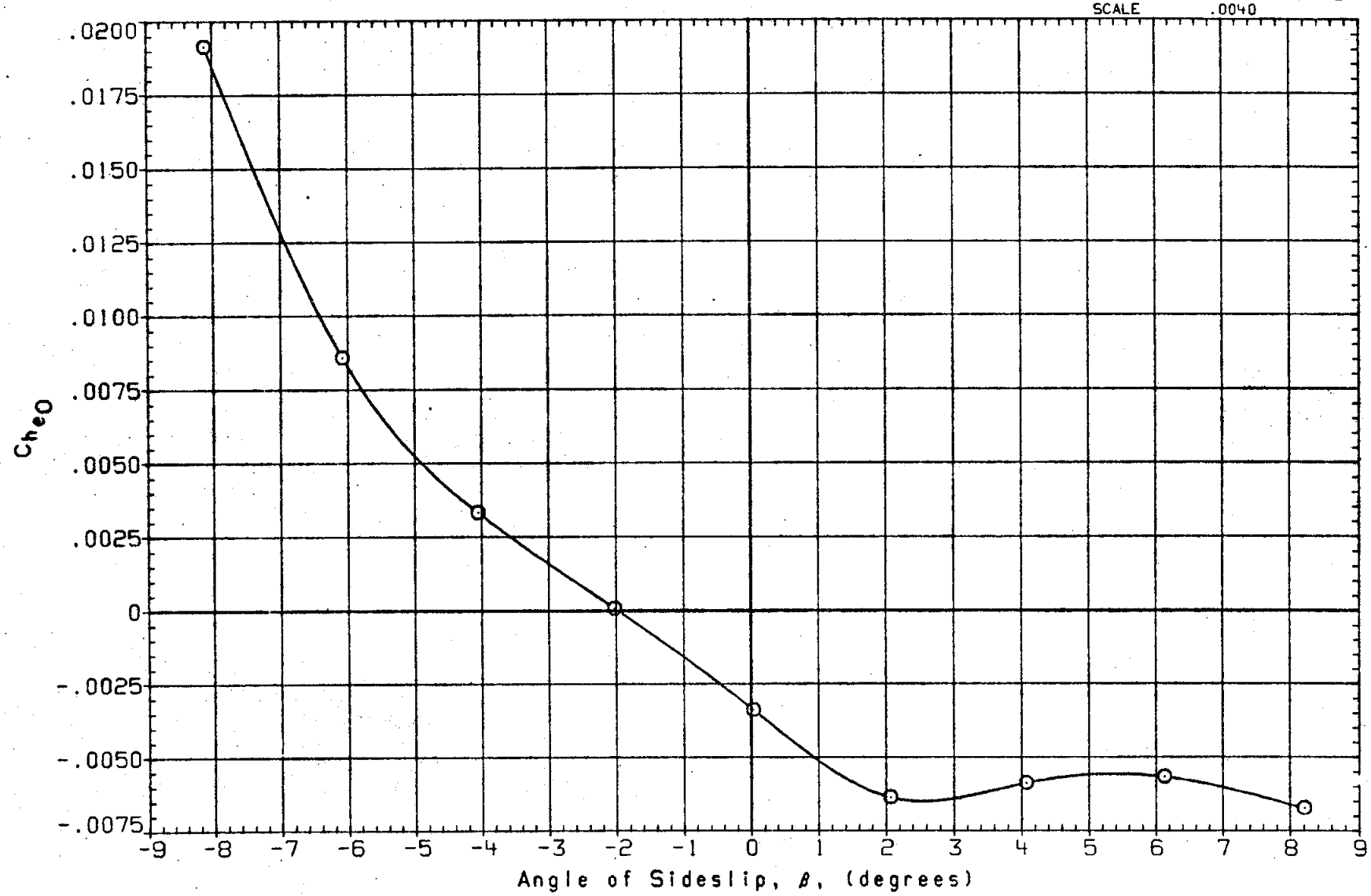

FIG. 20 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(C)MACH = 1.05 DATE 12 MAR 80 PAGE 87

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656) 02W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

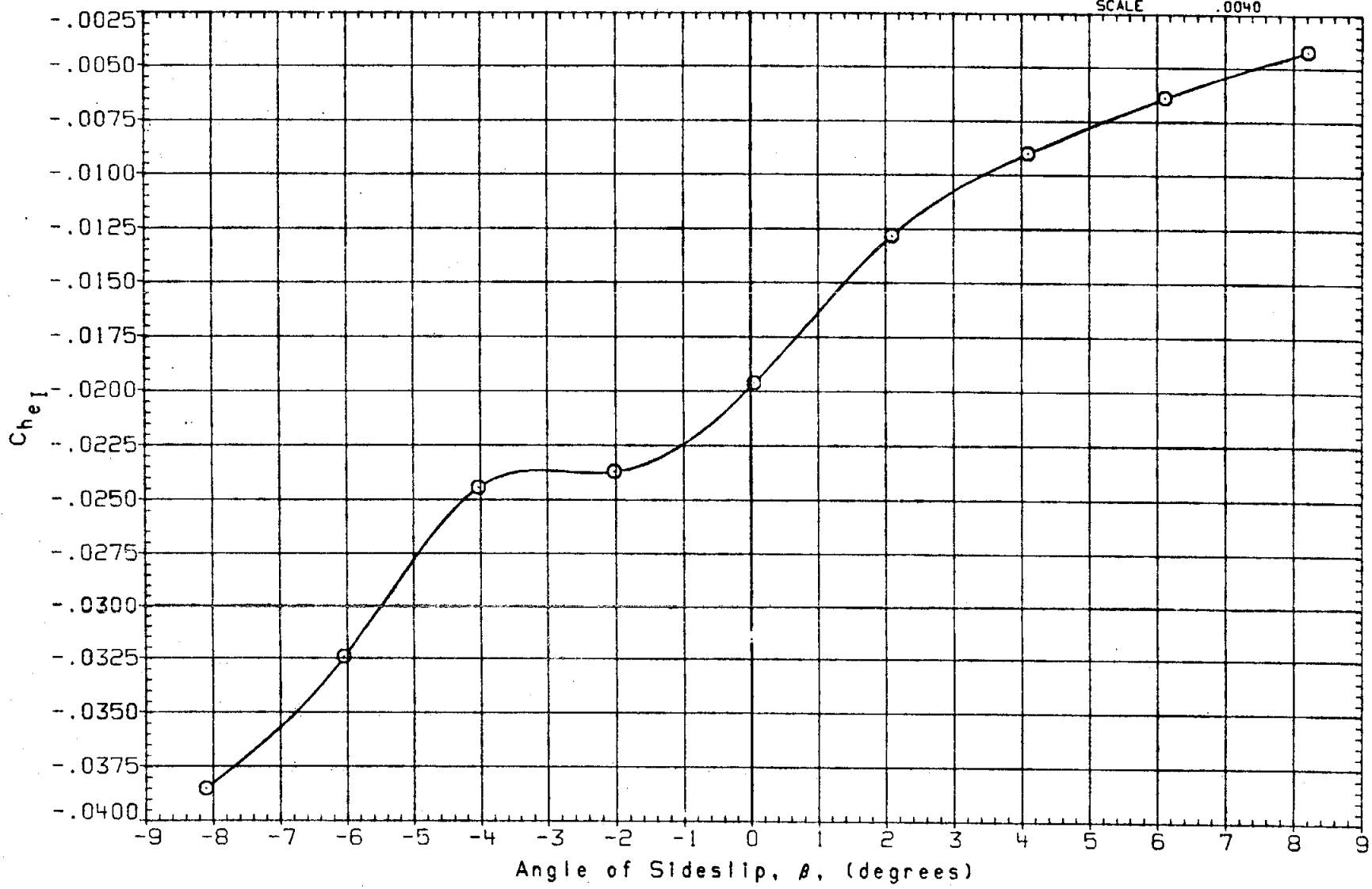

FIG. 20 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	DATA NOT AVAILABLE		.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

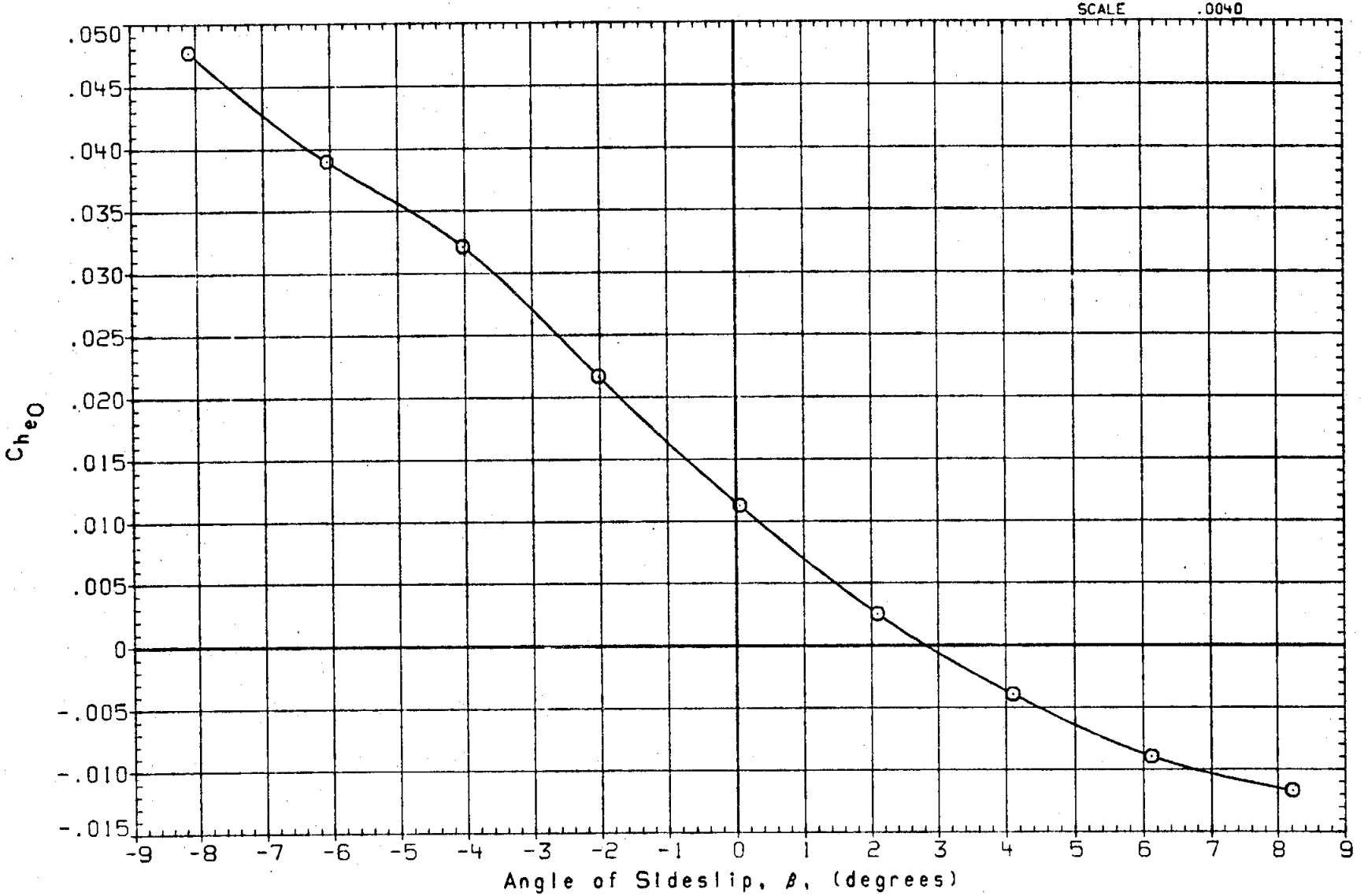

FIG. 20 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z007	□	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

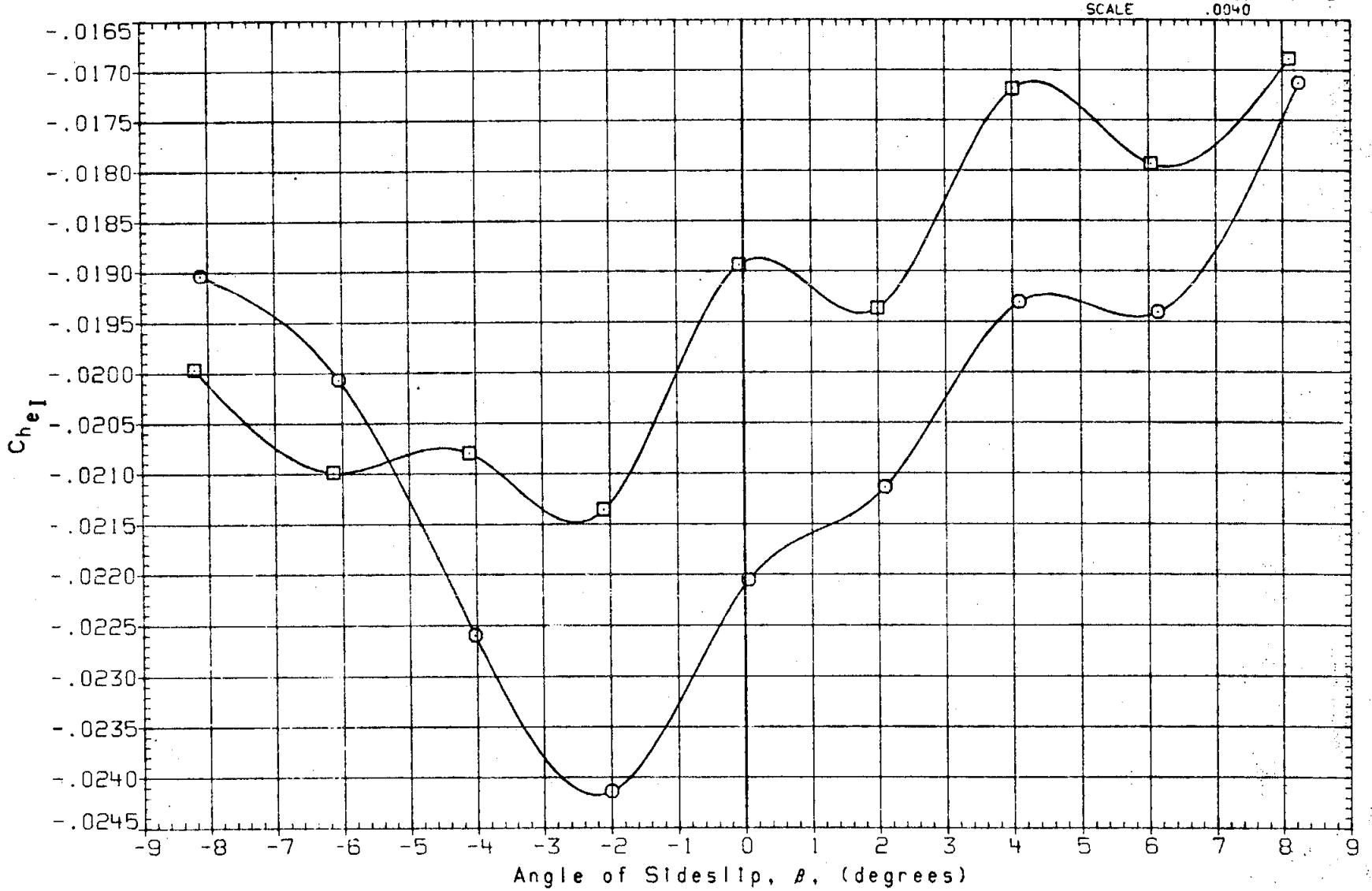

FIG. 20 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z007	□	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	-90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

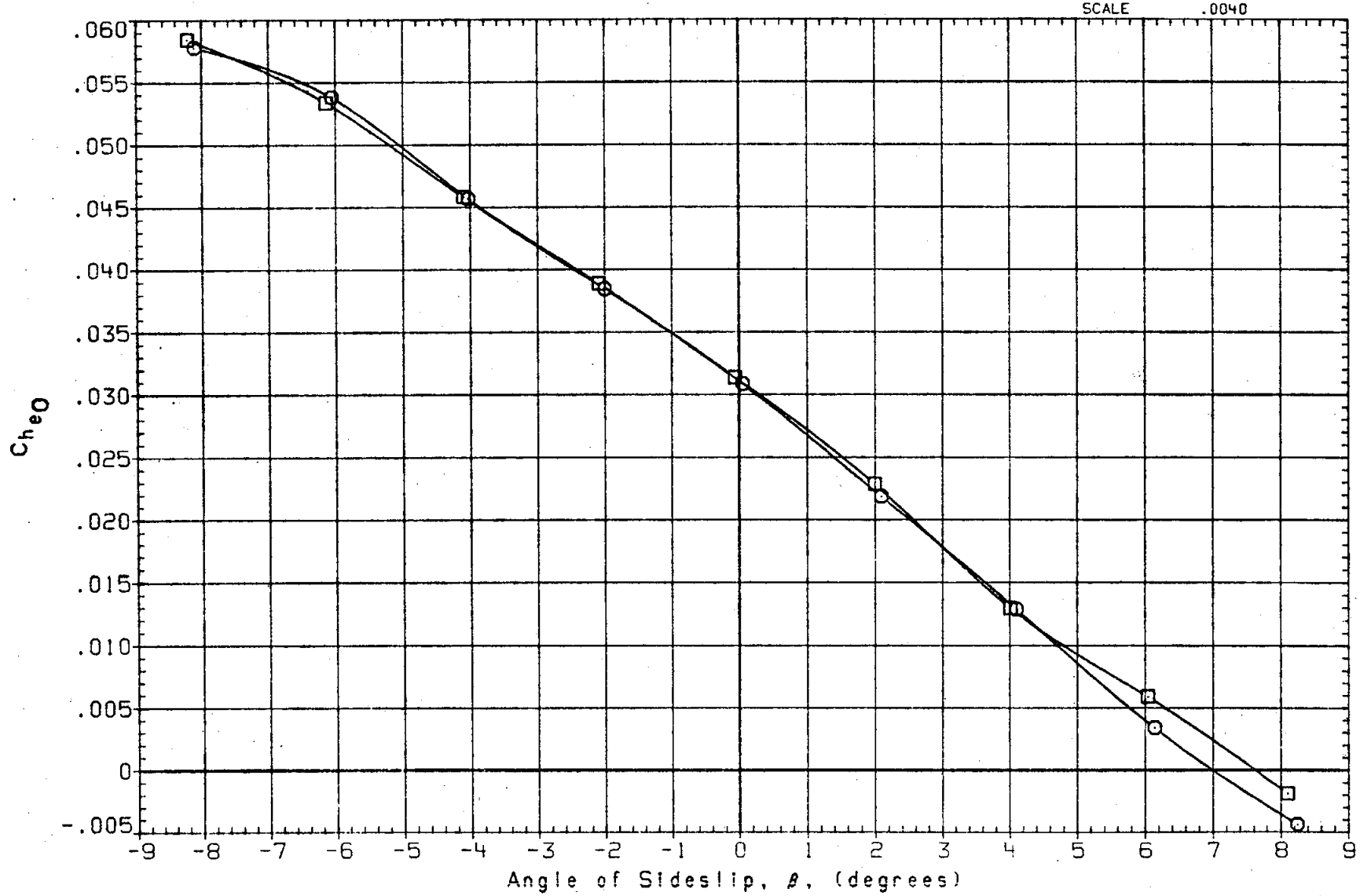

FIG. 20 ORBITER ELEVON CHARACTERISTICS IN YAW (LAUNCH CONFIG/NO PROTUB)

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

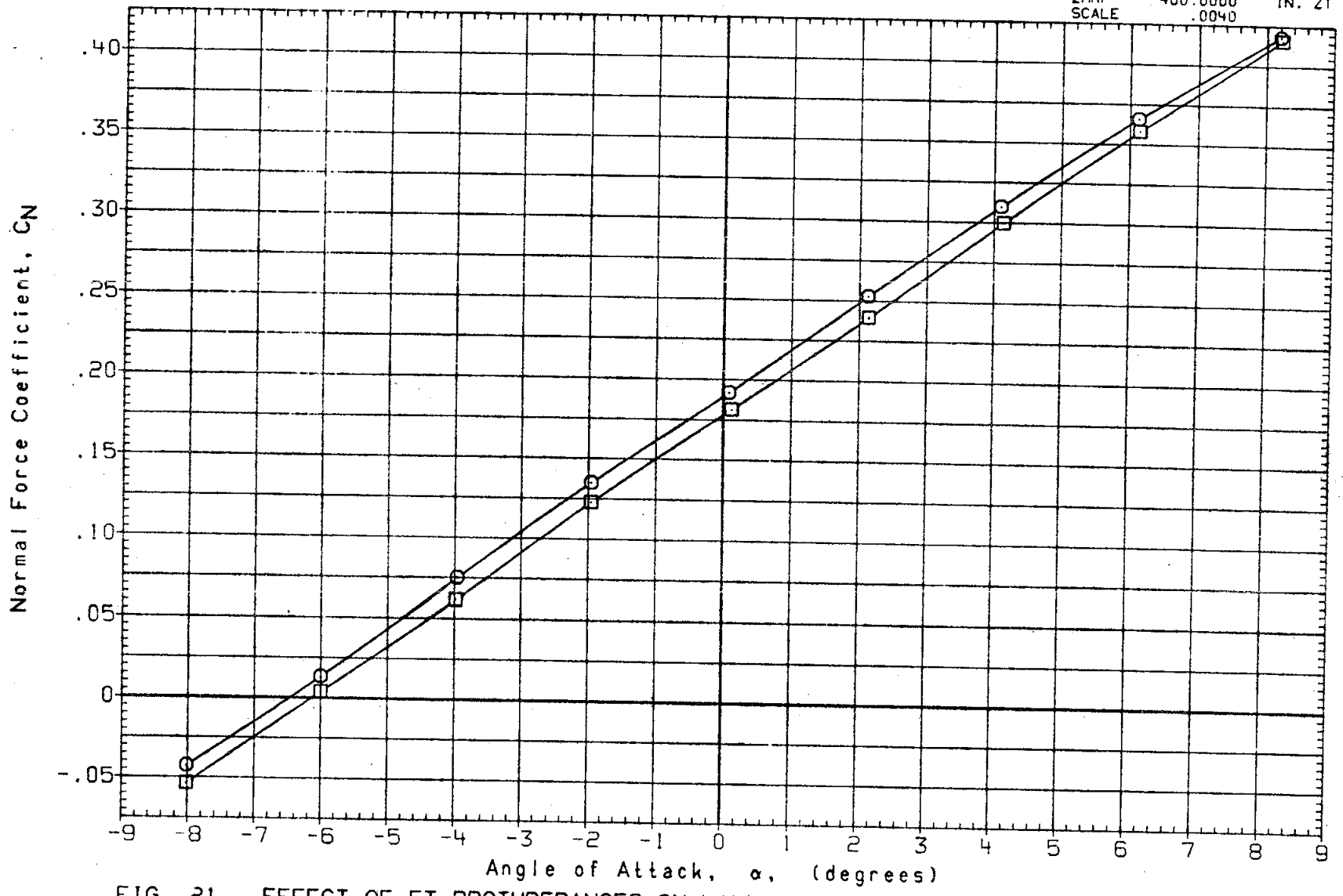

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

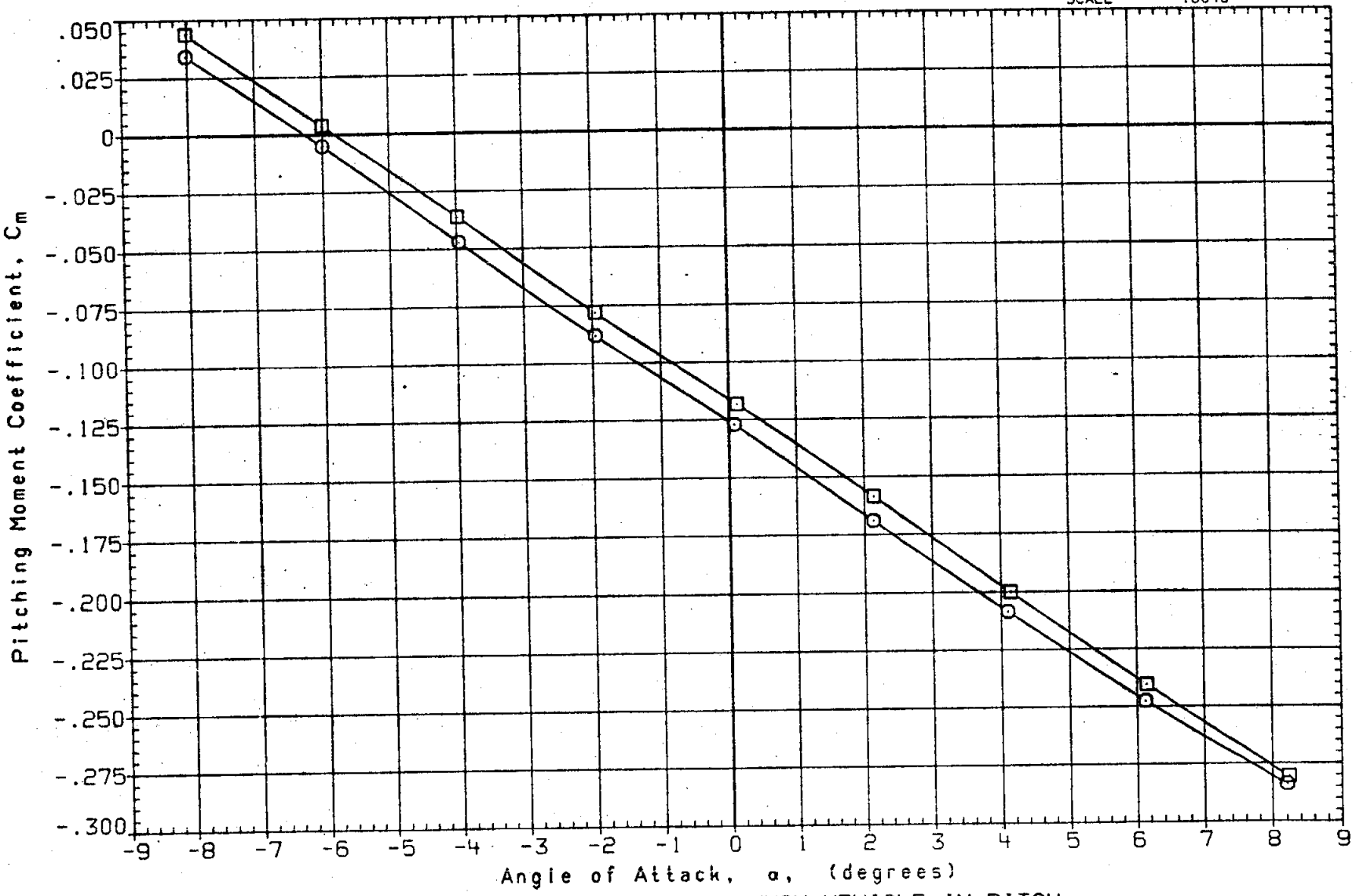

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

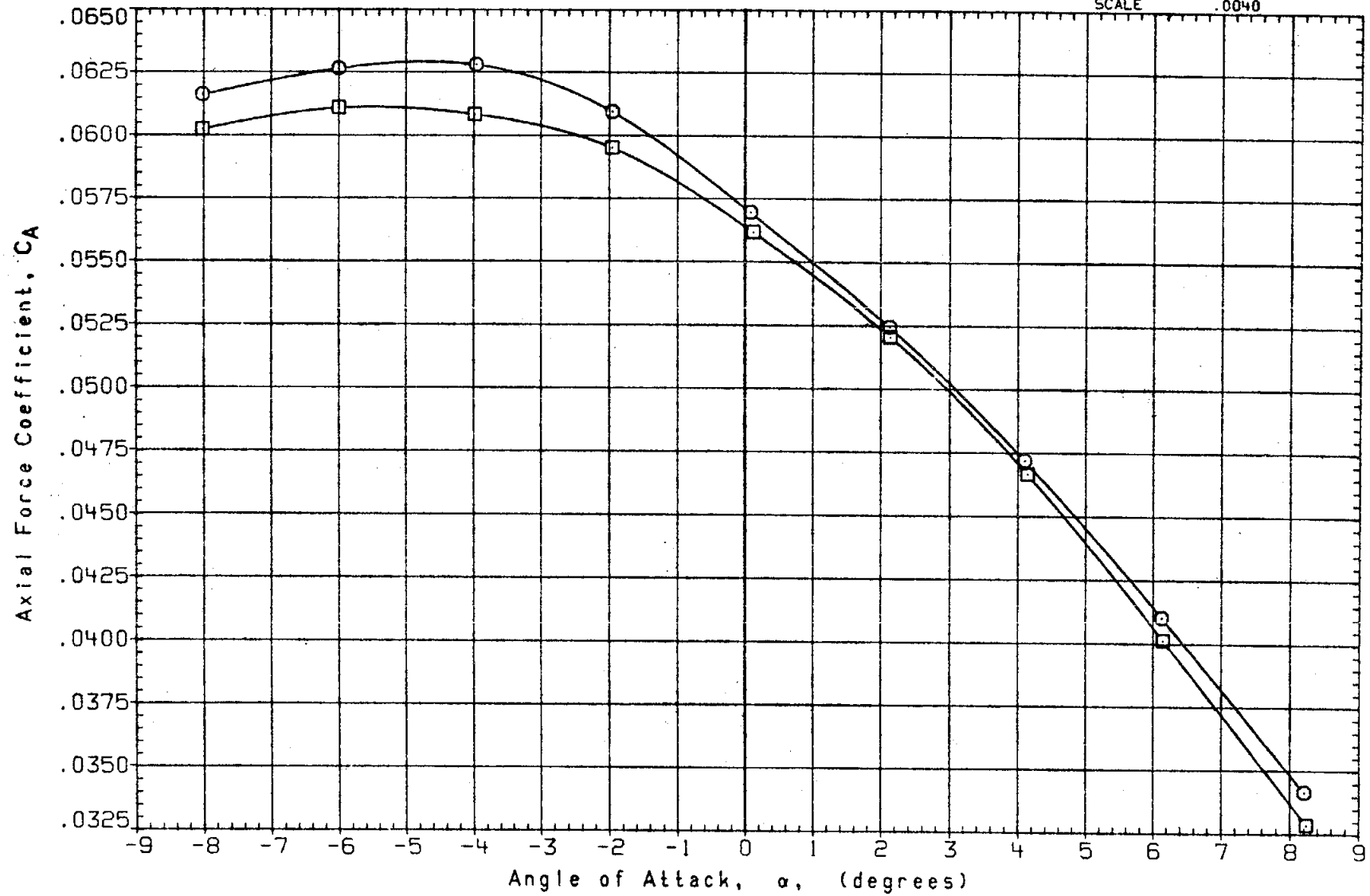

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

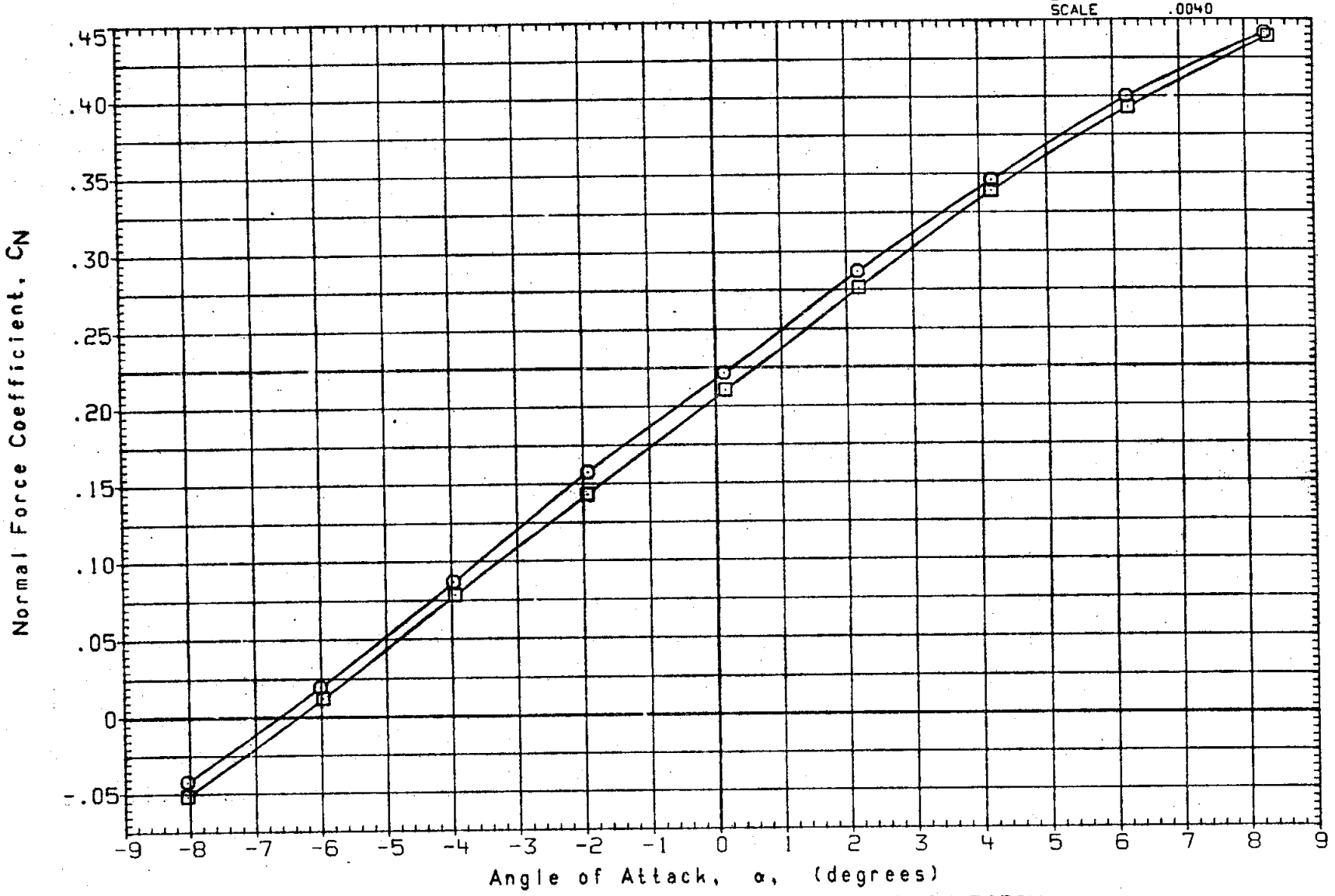

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

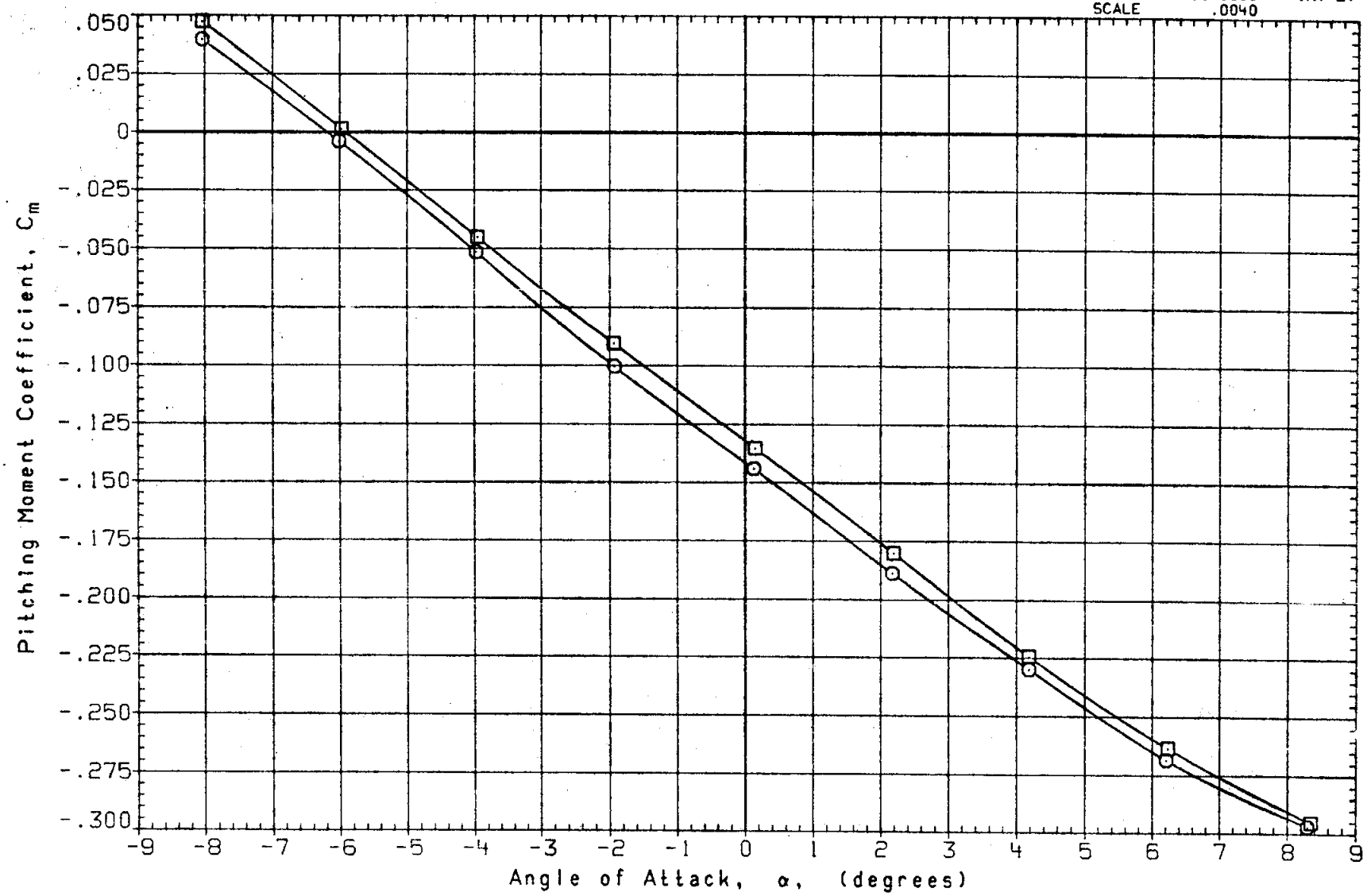

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(B) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

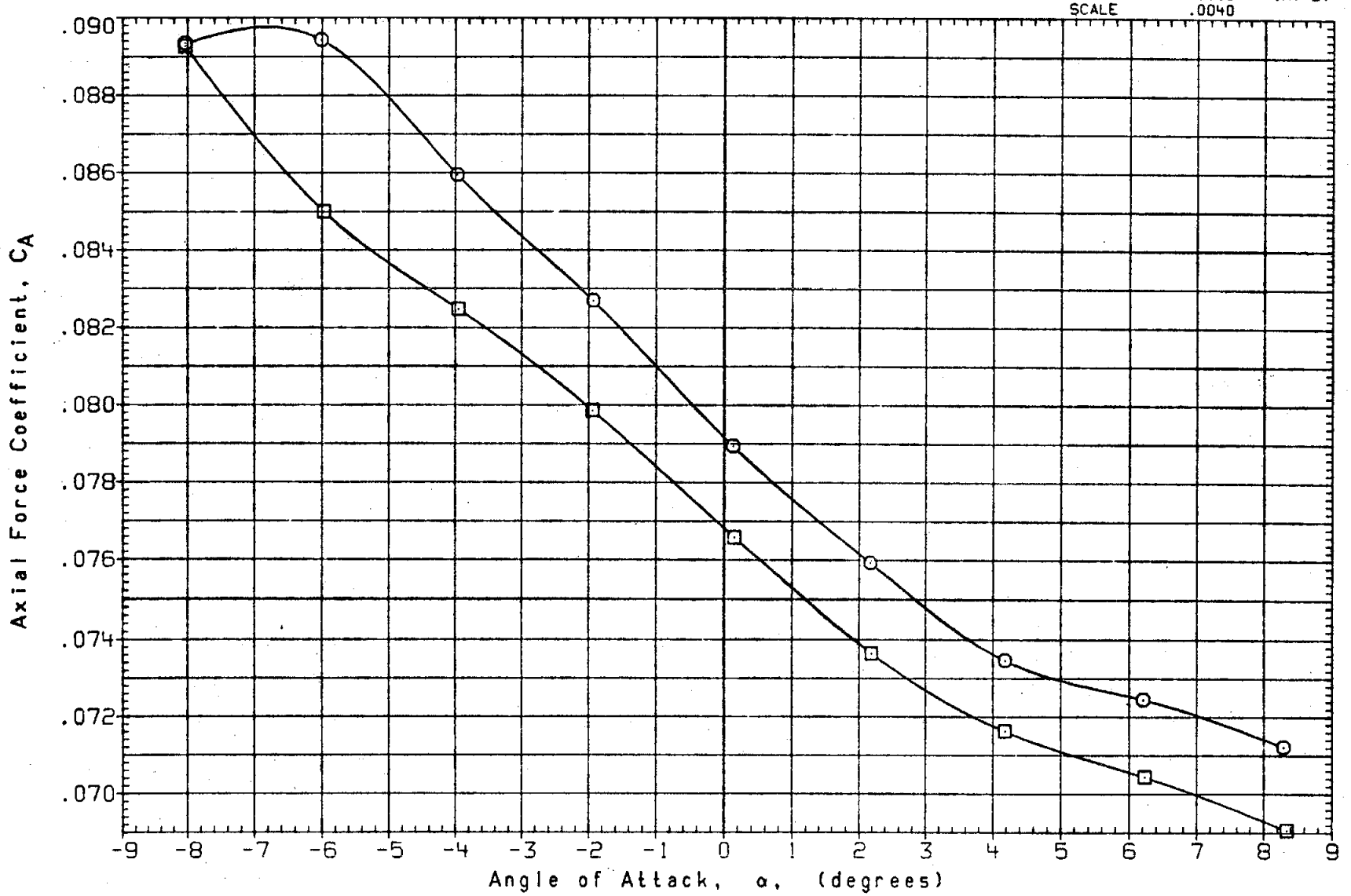

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

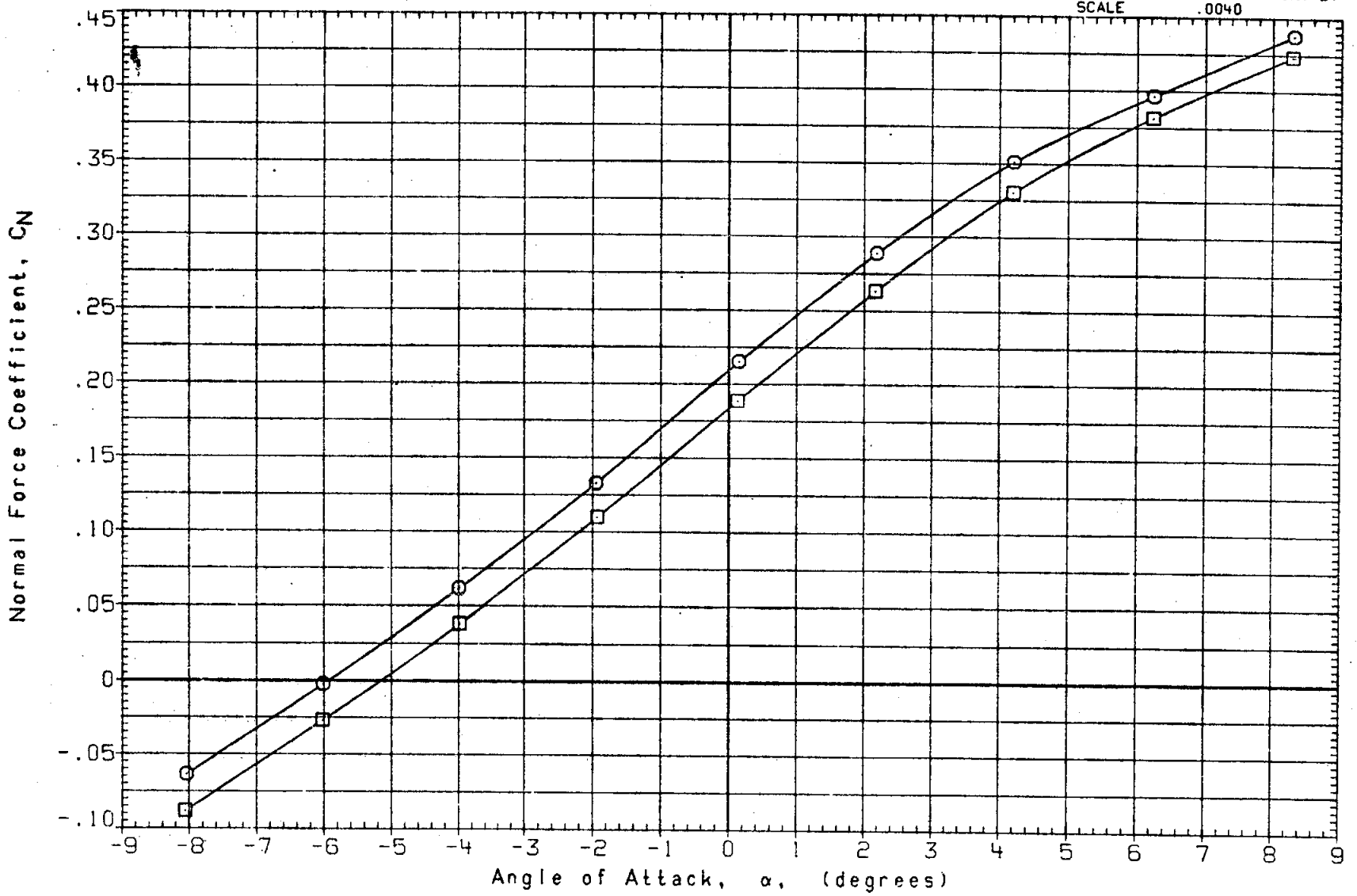

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

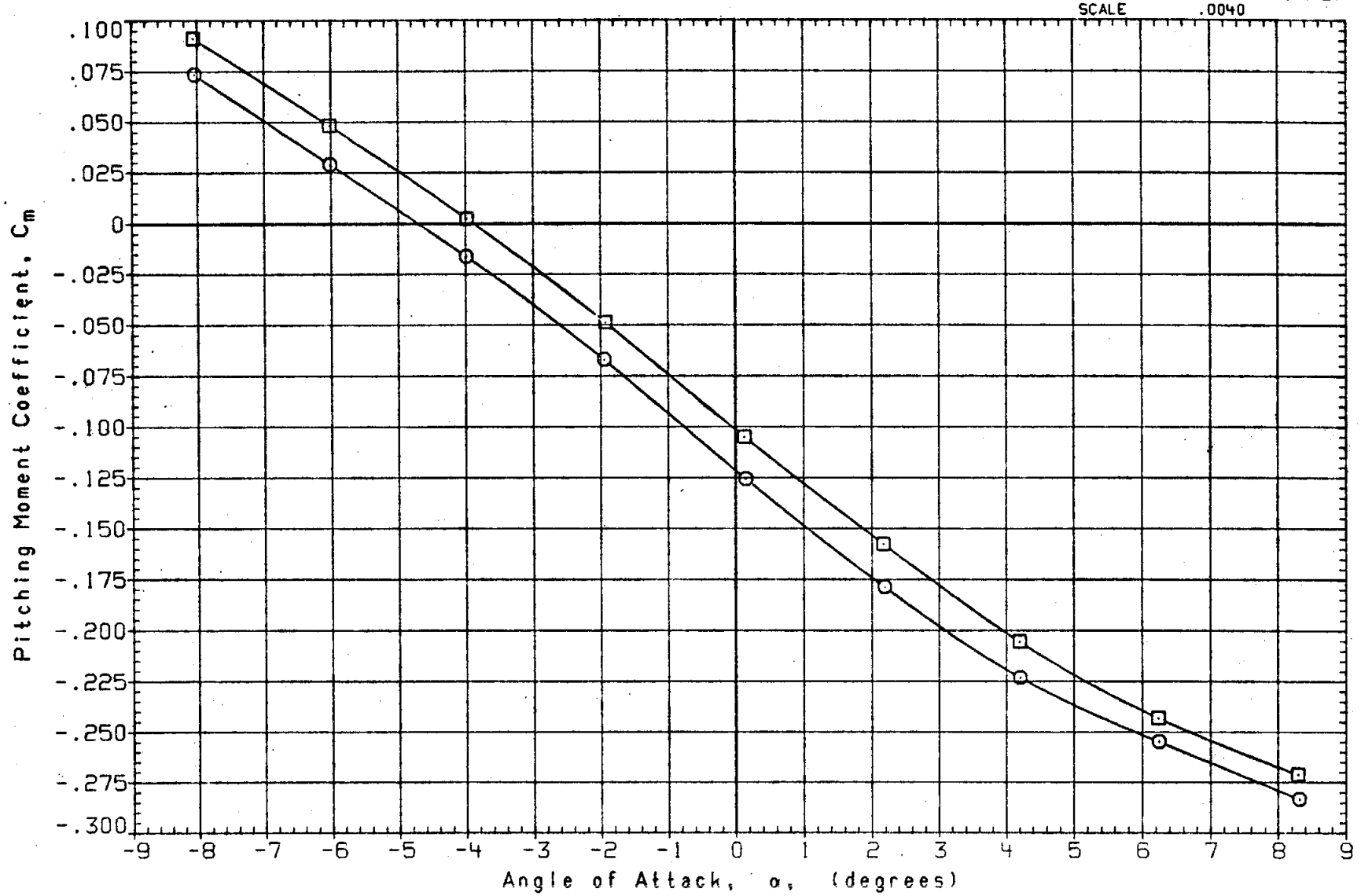

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80 PAGE 99

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

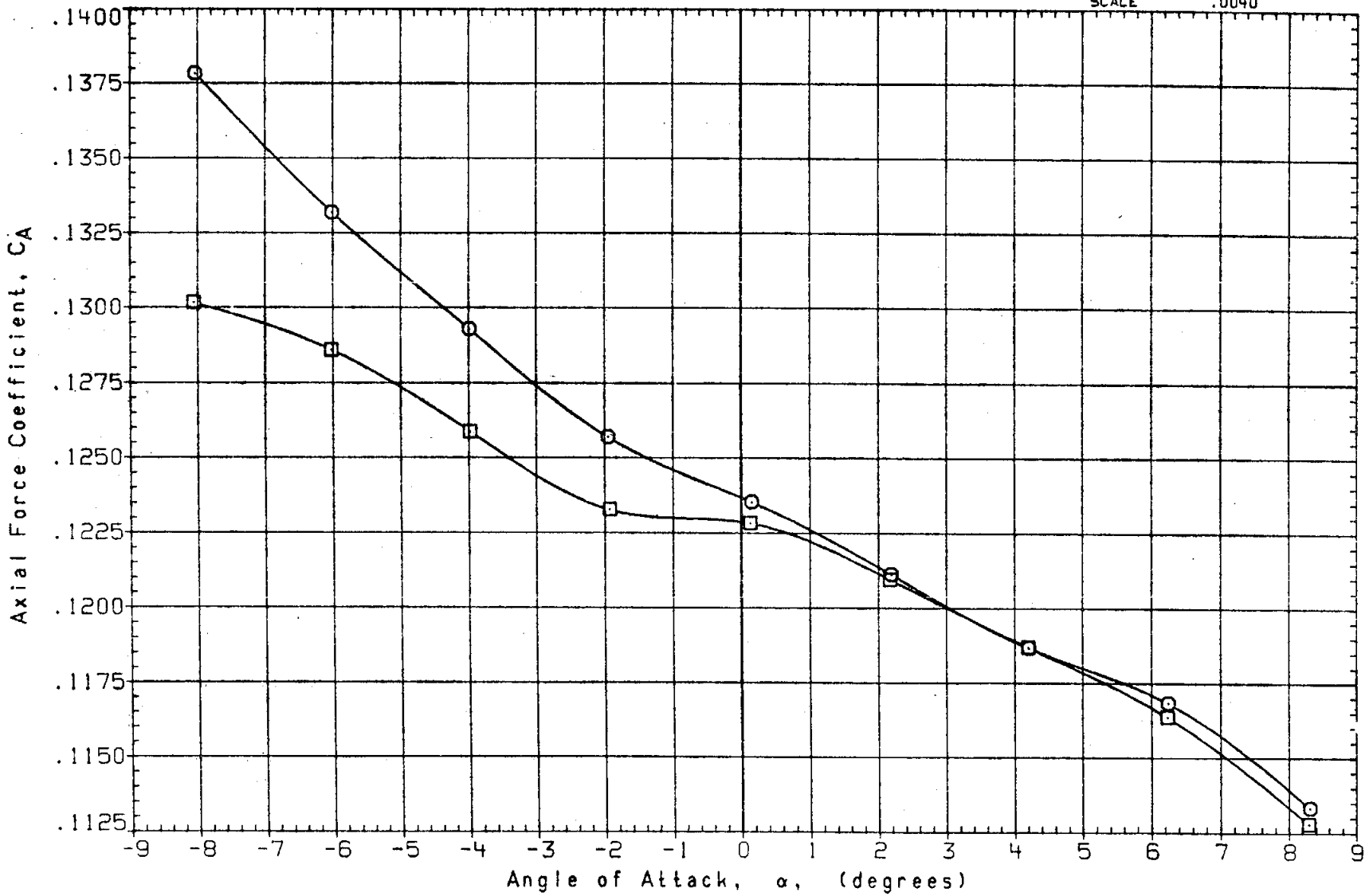

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

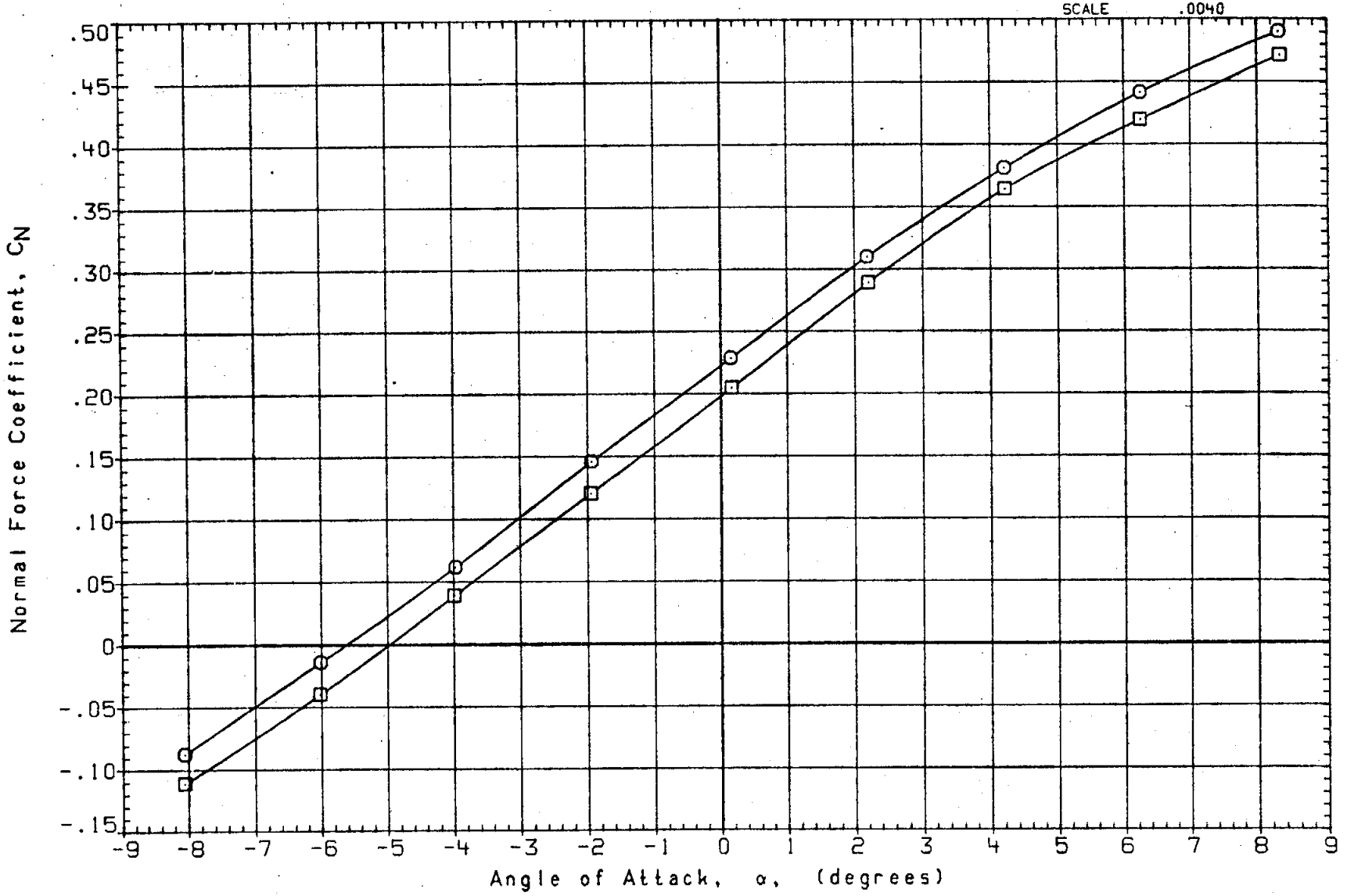

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT353	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT353	.000

REFERENCE INFORMATION

SREF	2880.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

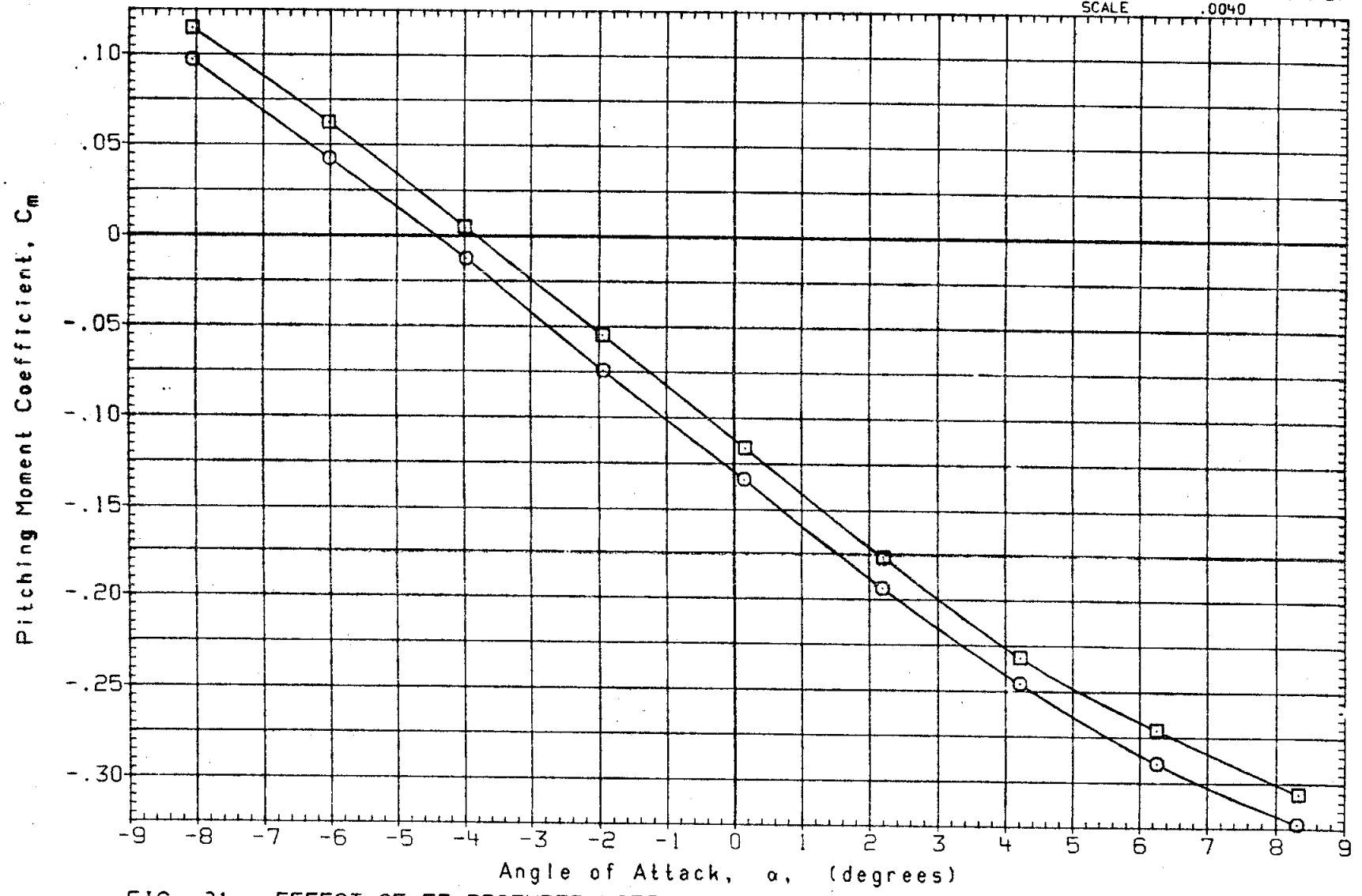

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400 0000	IN. ZT
SCALE	.0040	

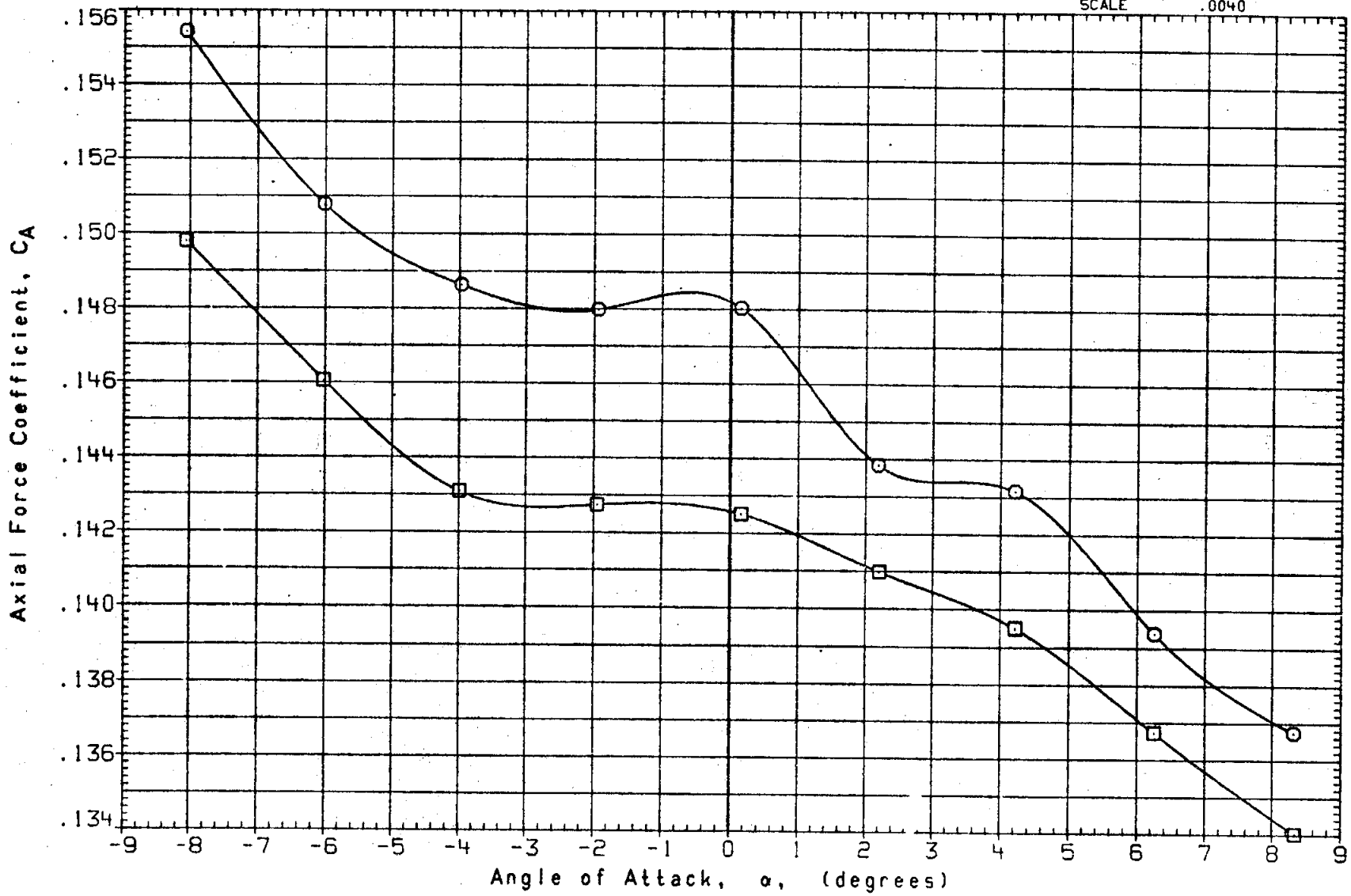

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT353	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT353	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

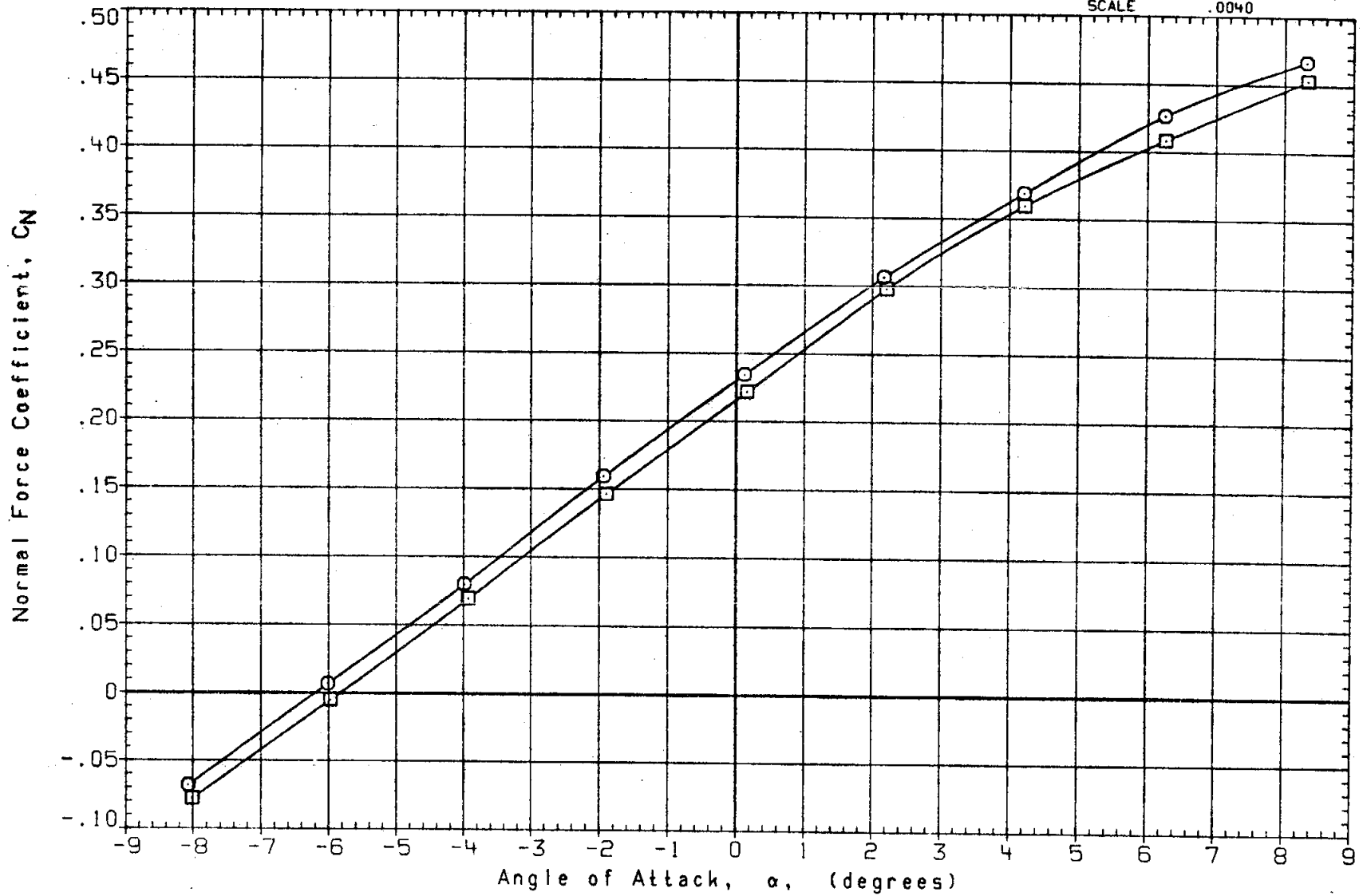

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

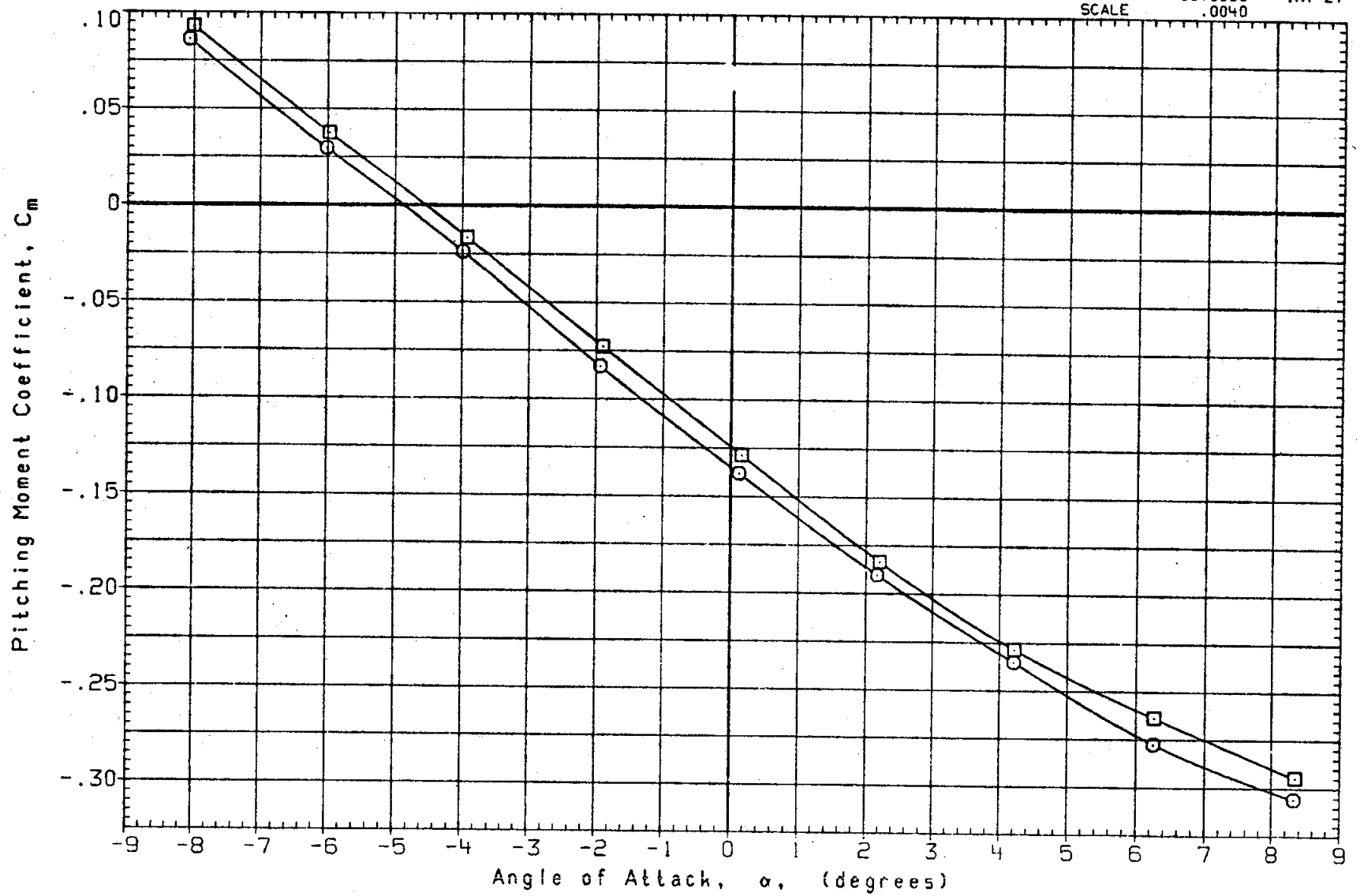

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
R1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

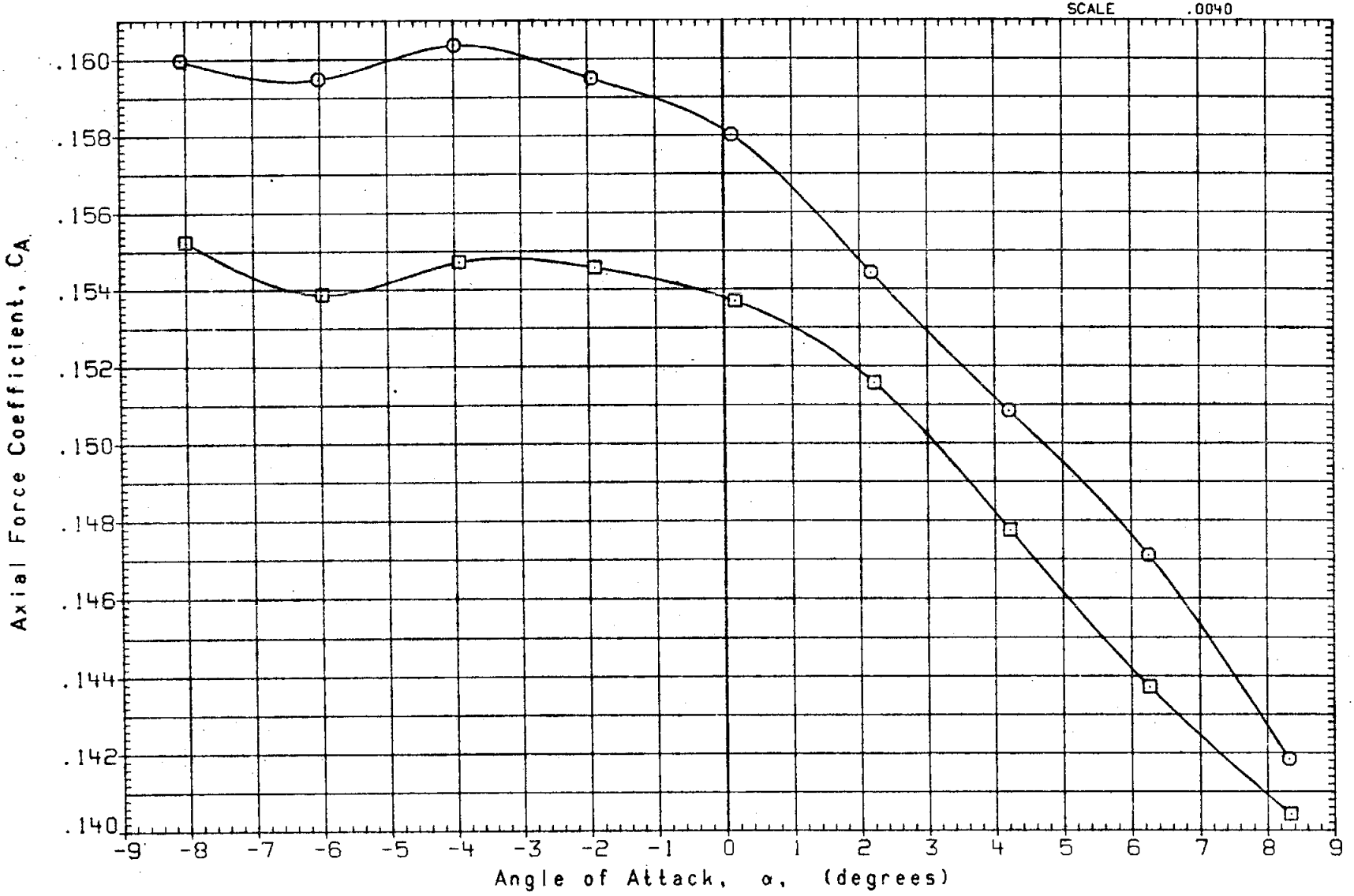

FIG. 21 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

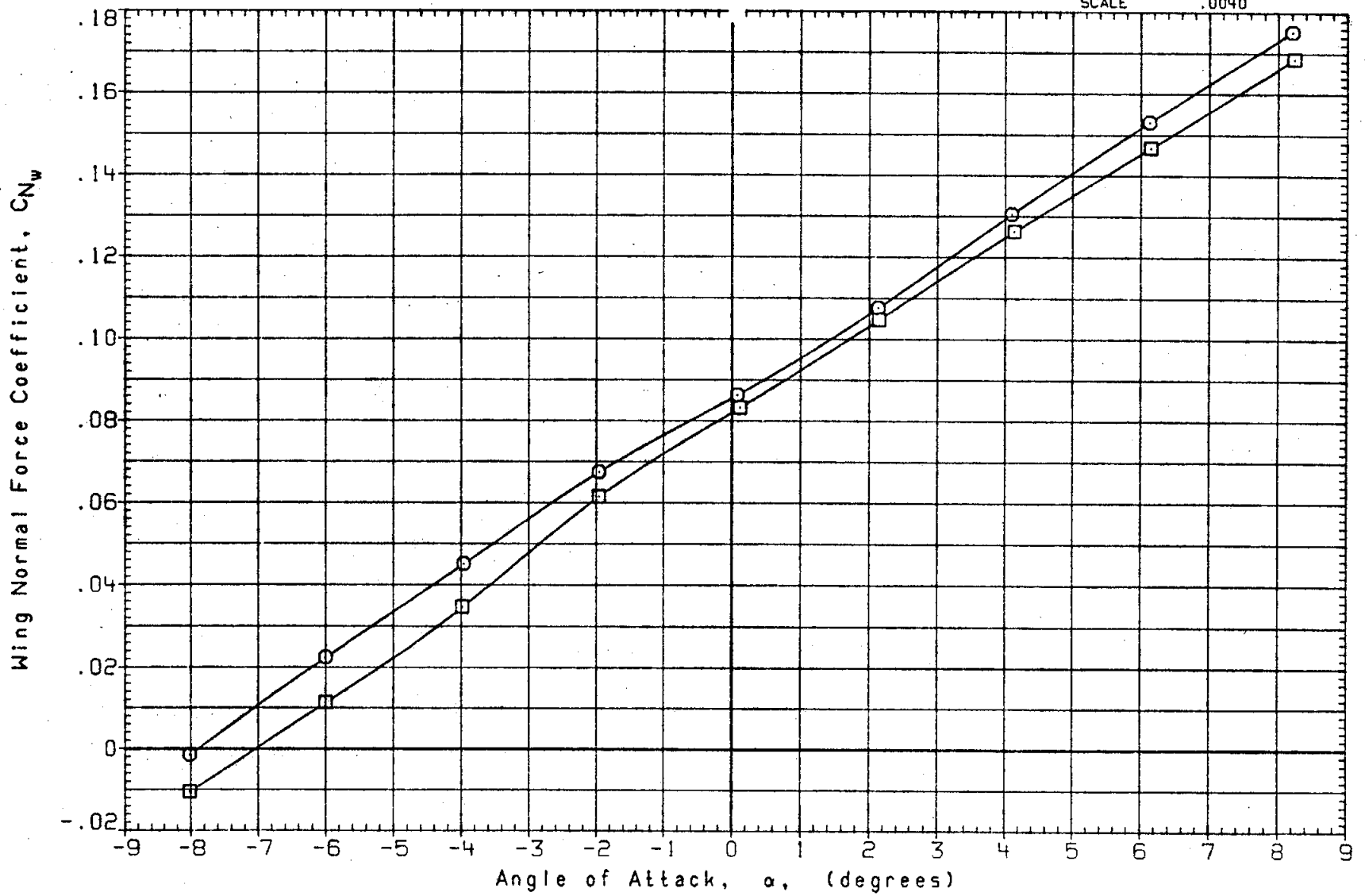

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

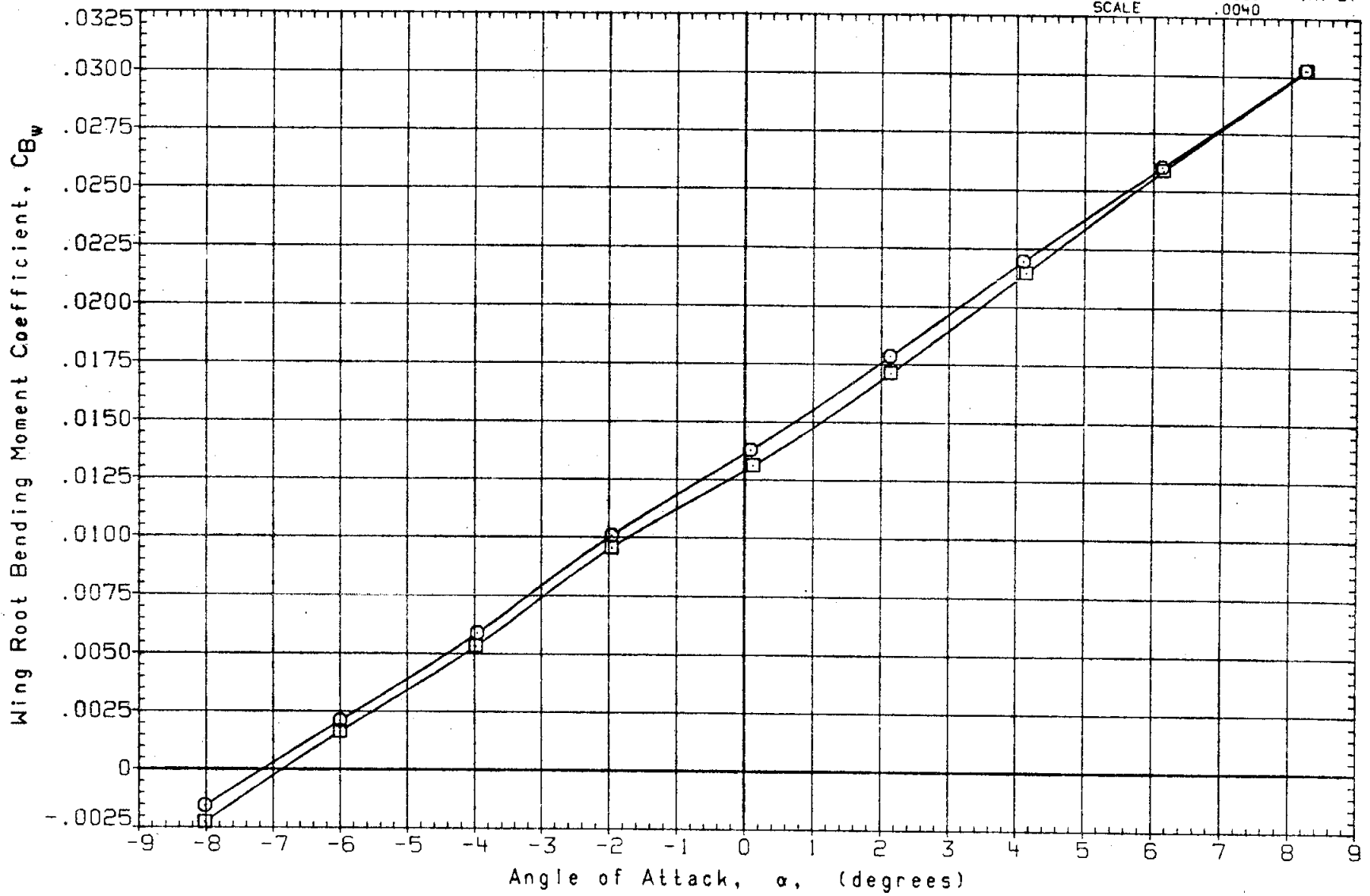

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

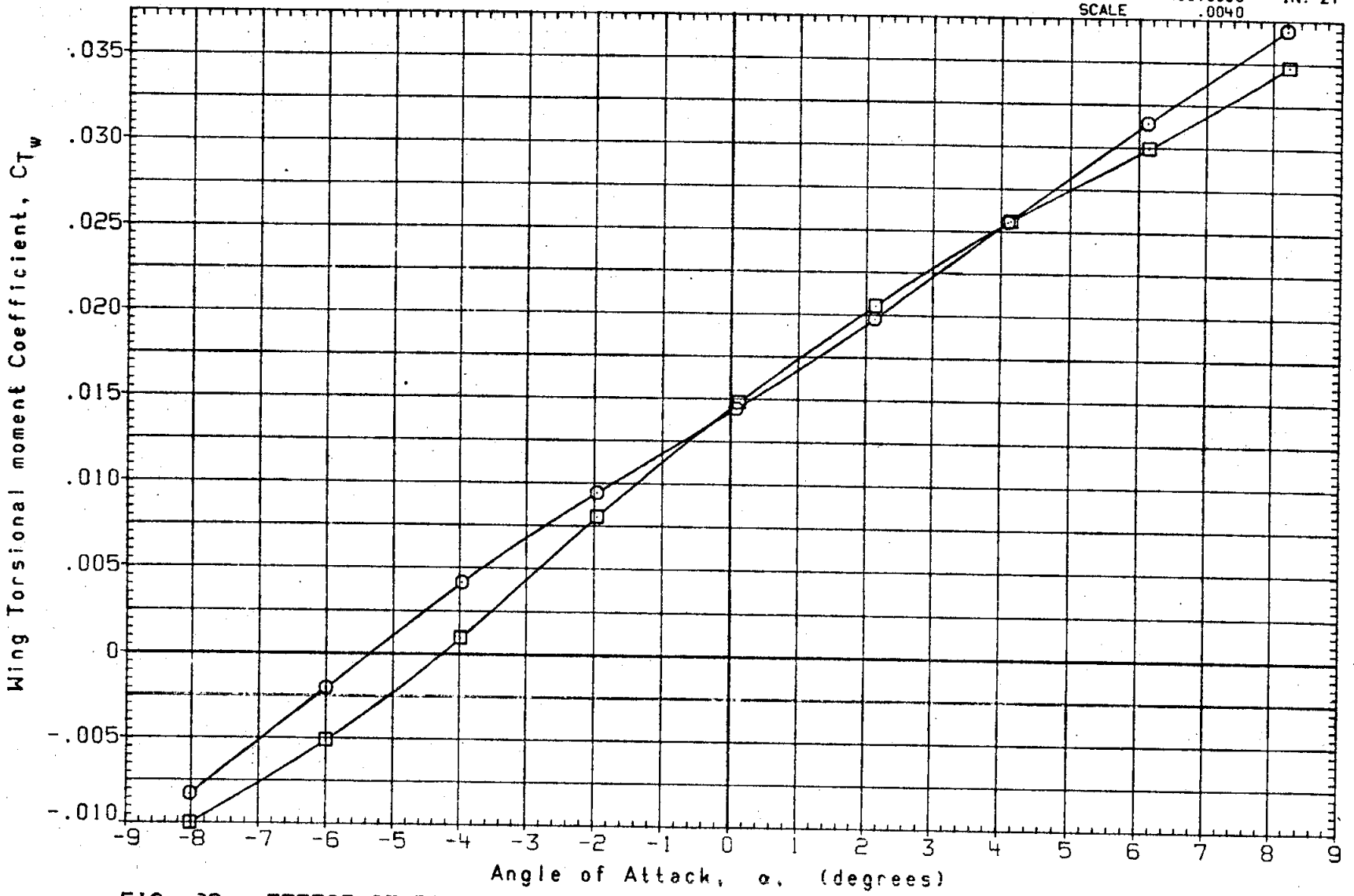

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

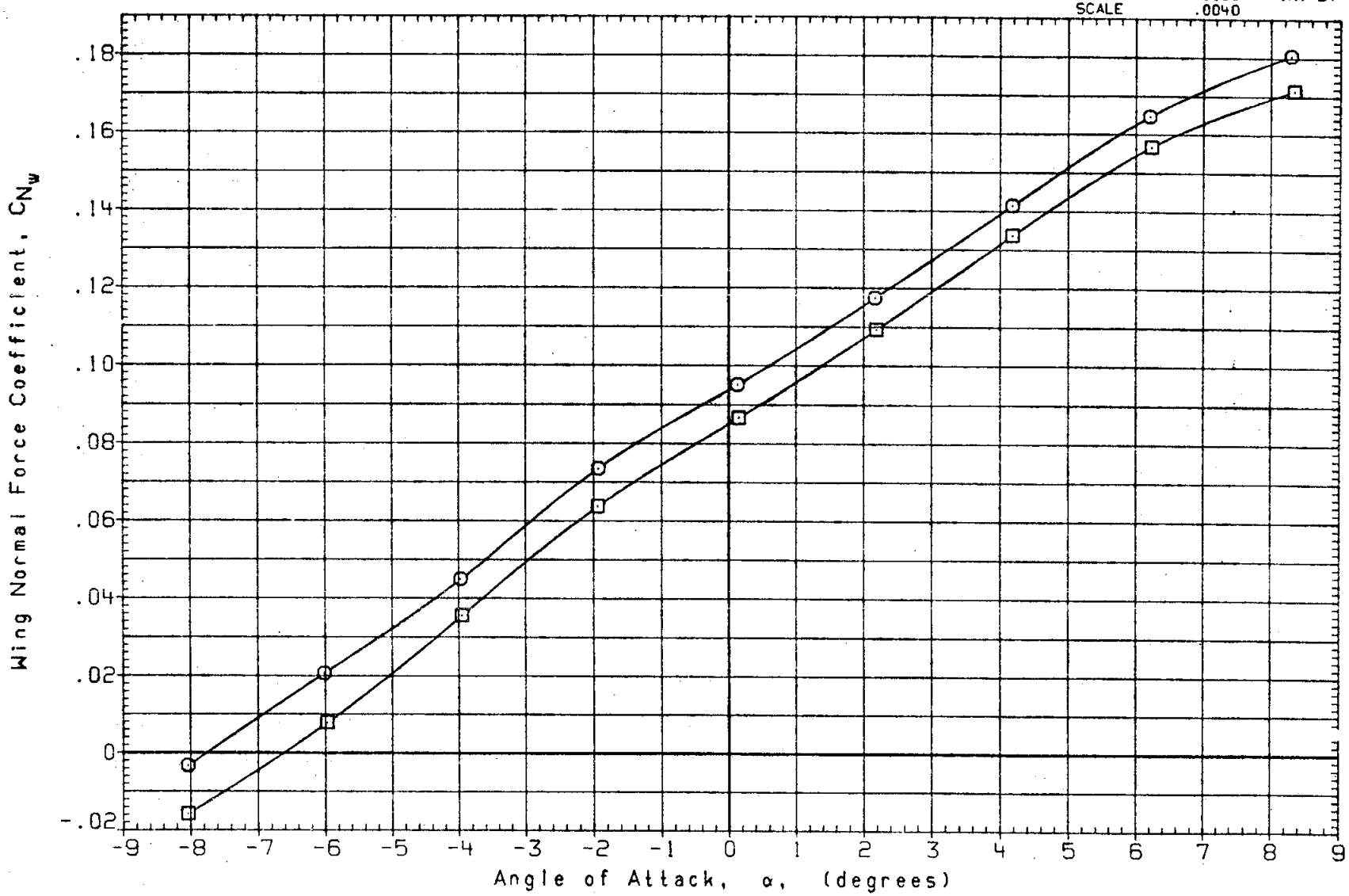

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

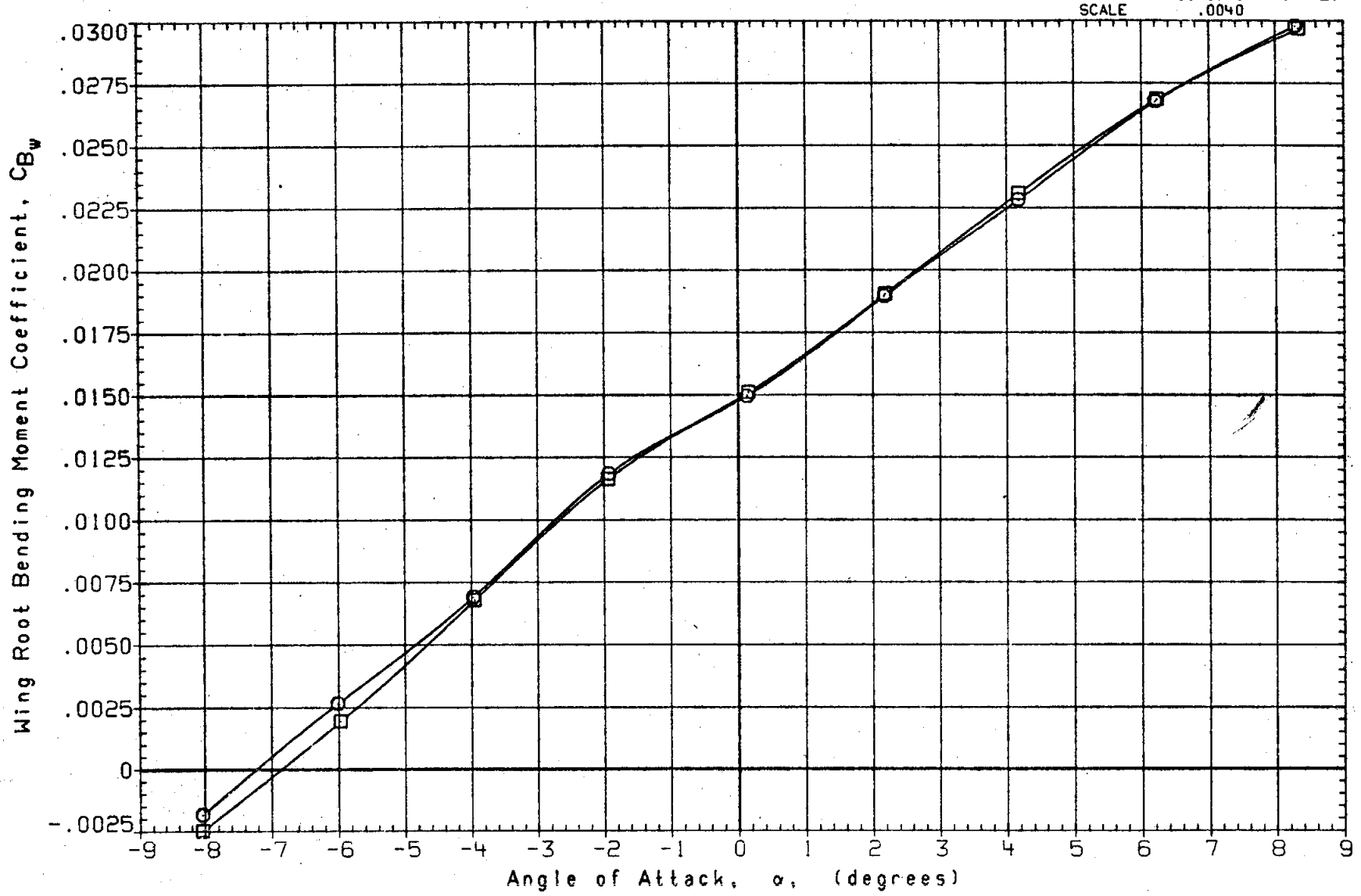

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80 PAGE 111

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

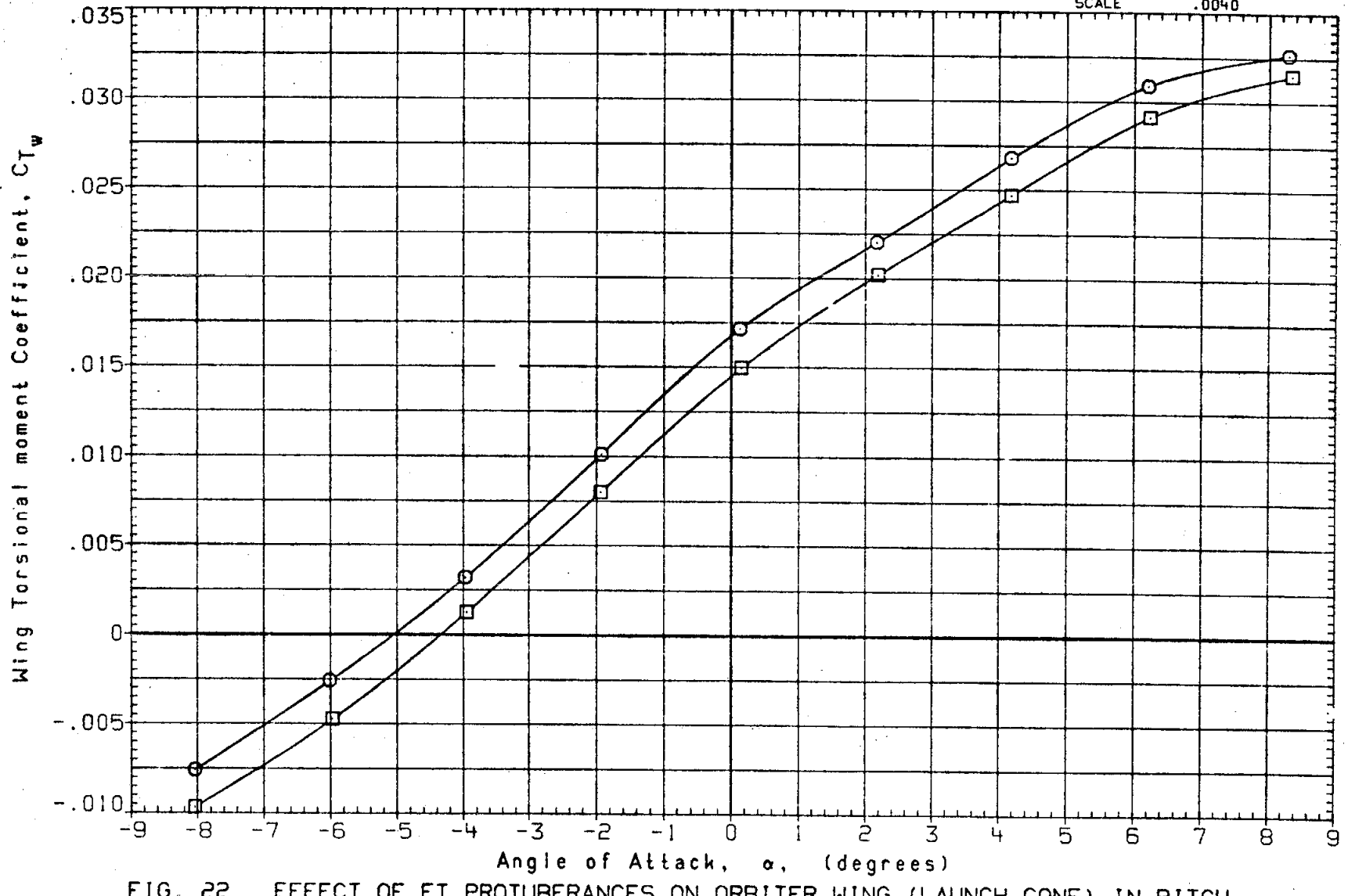

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

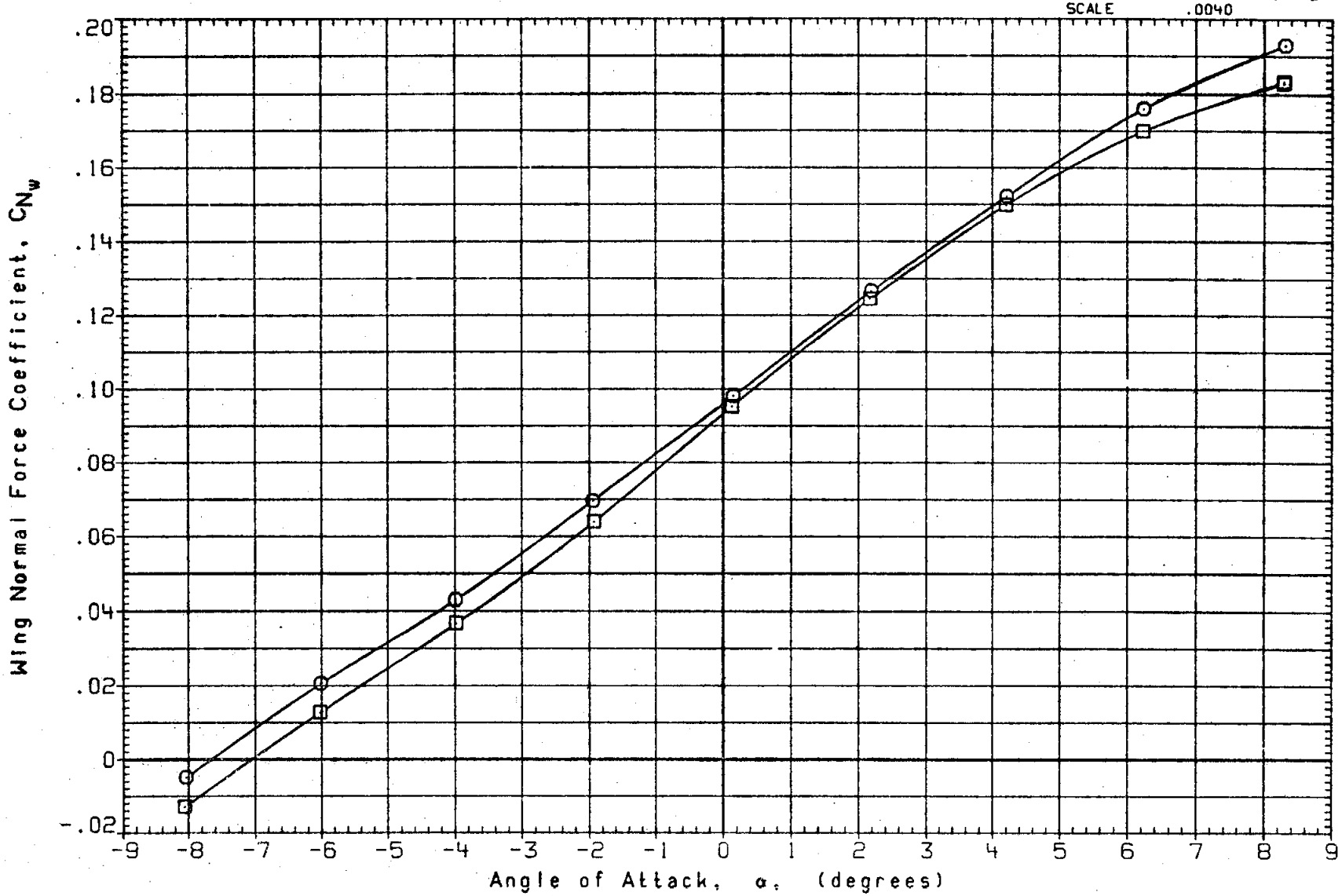

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

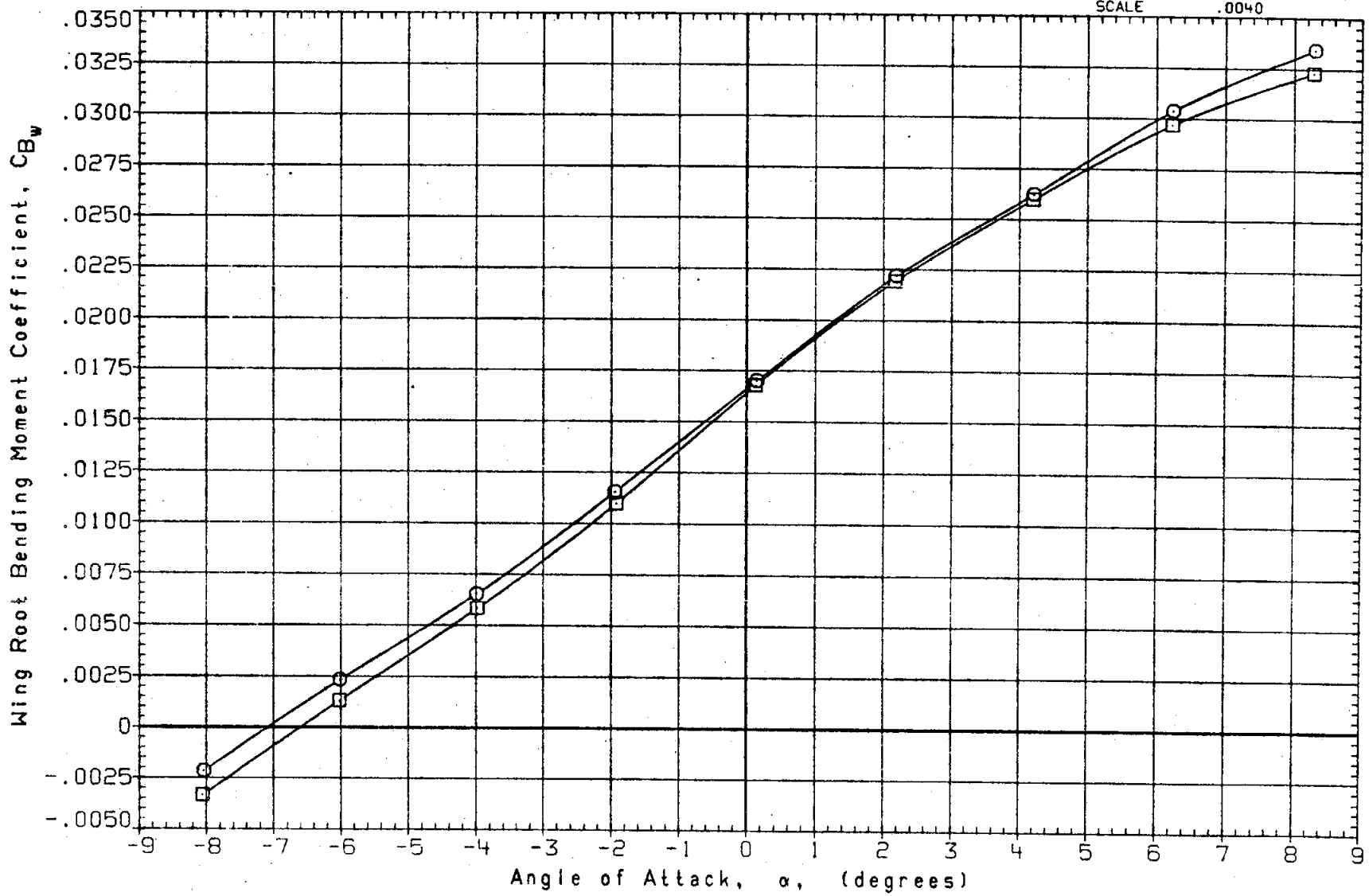

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

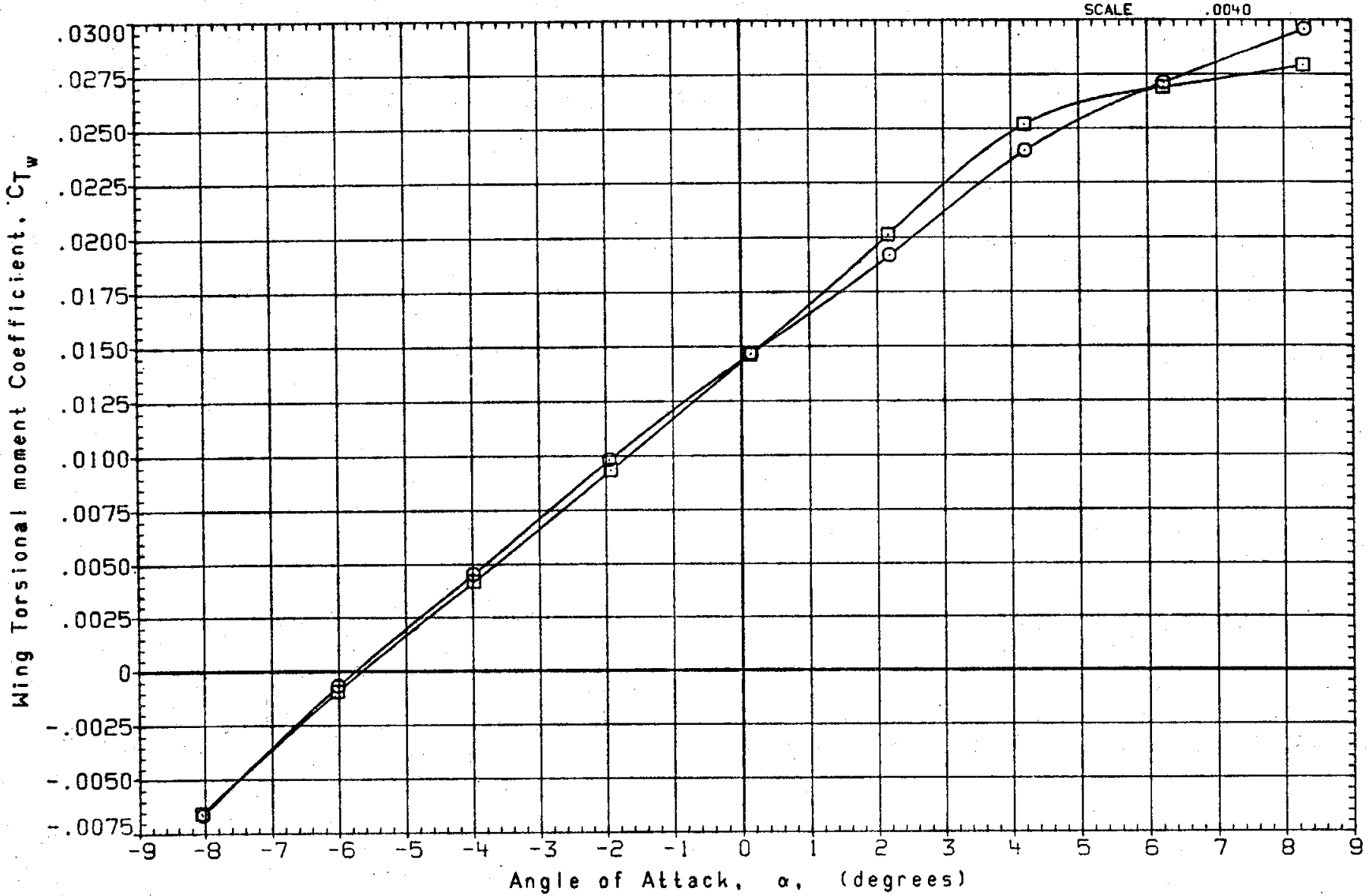

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

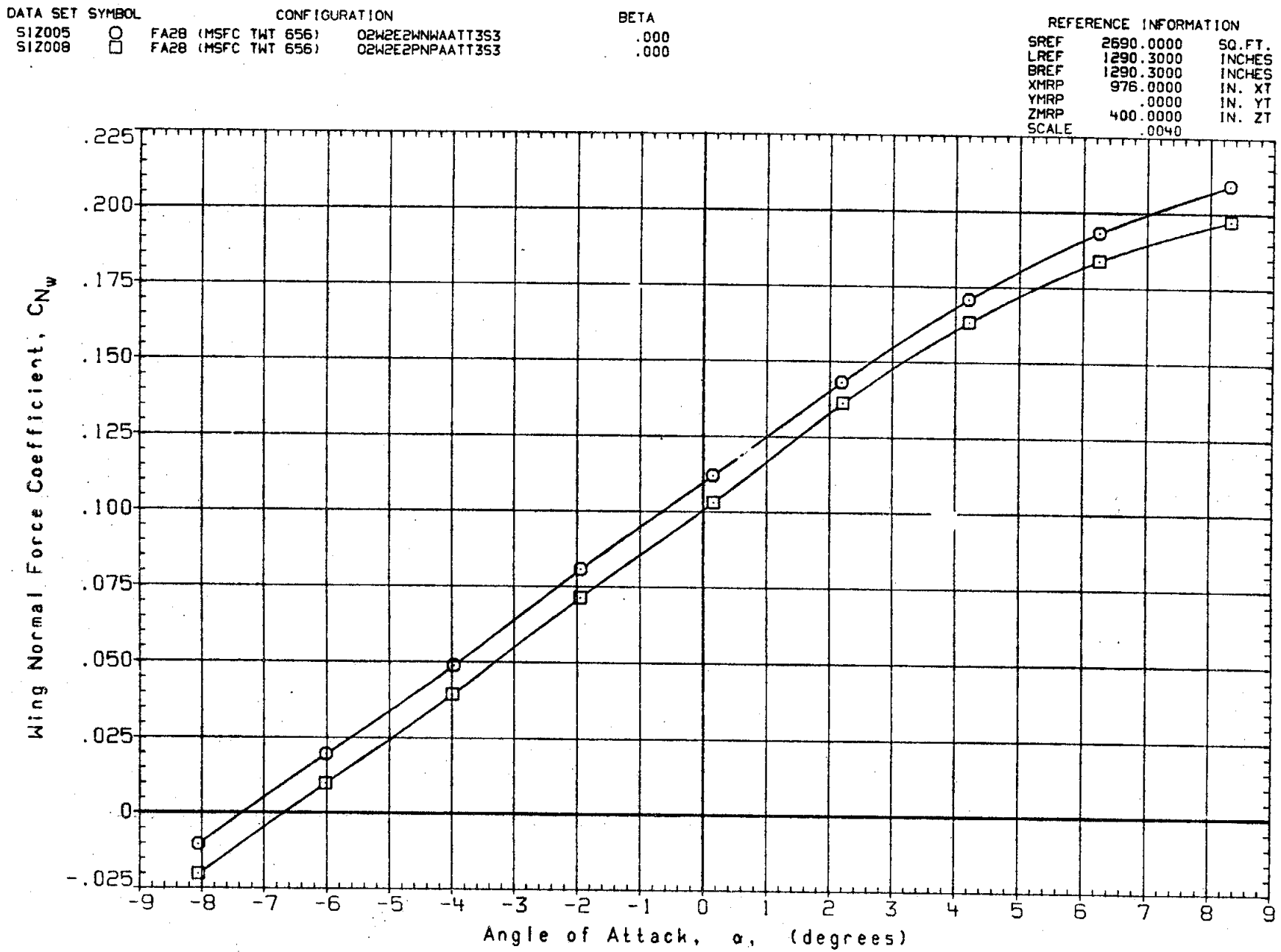

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

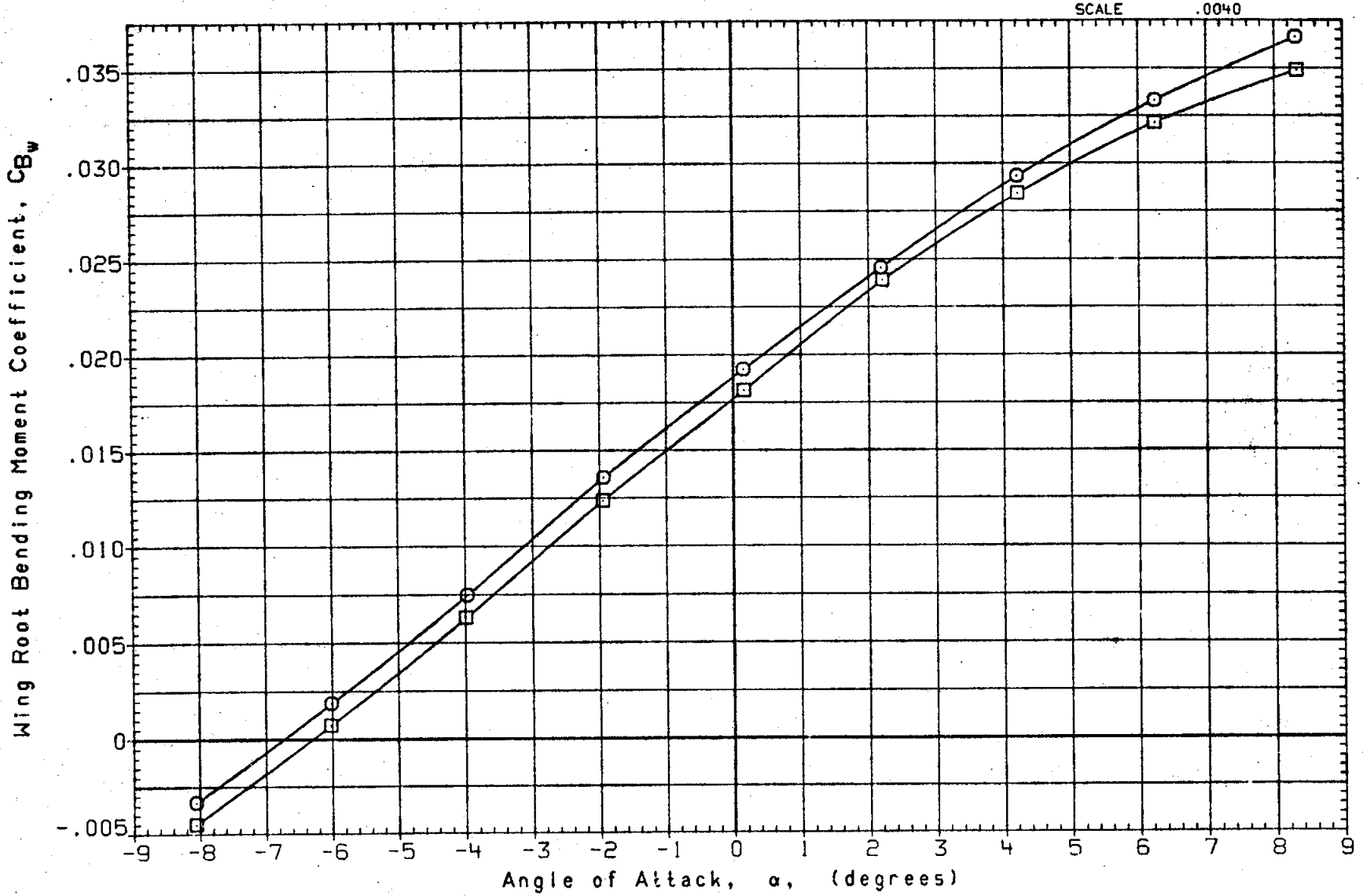

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

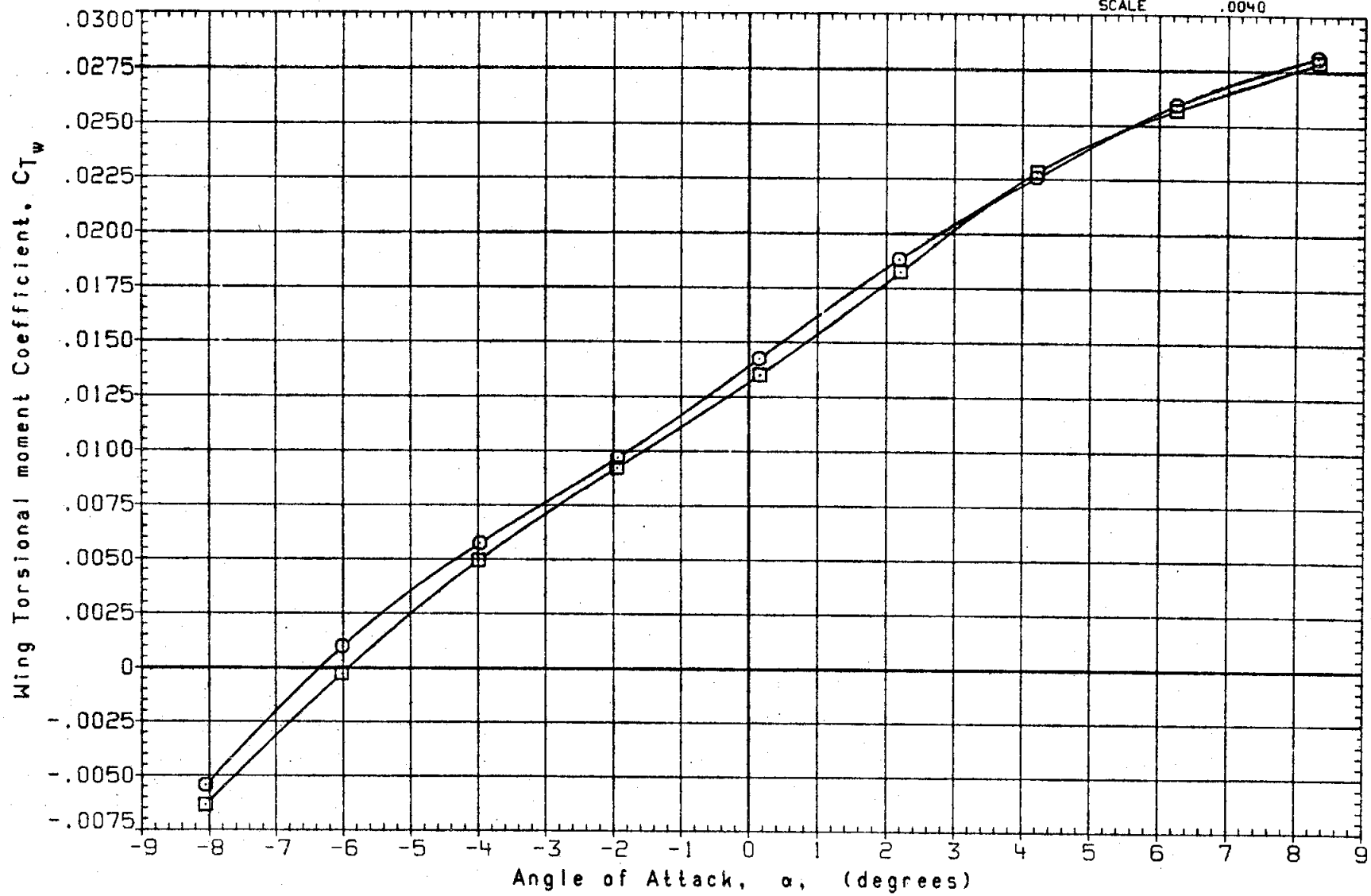

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

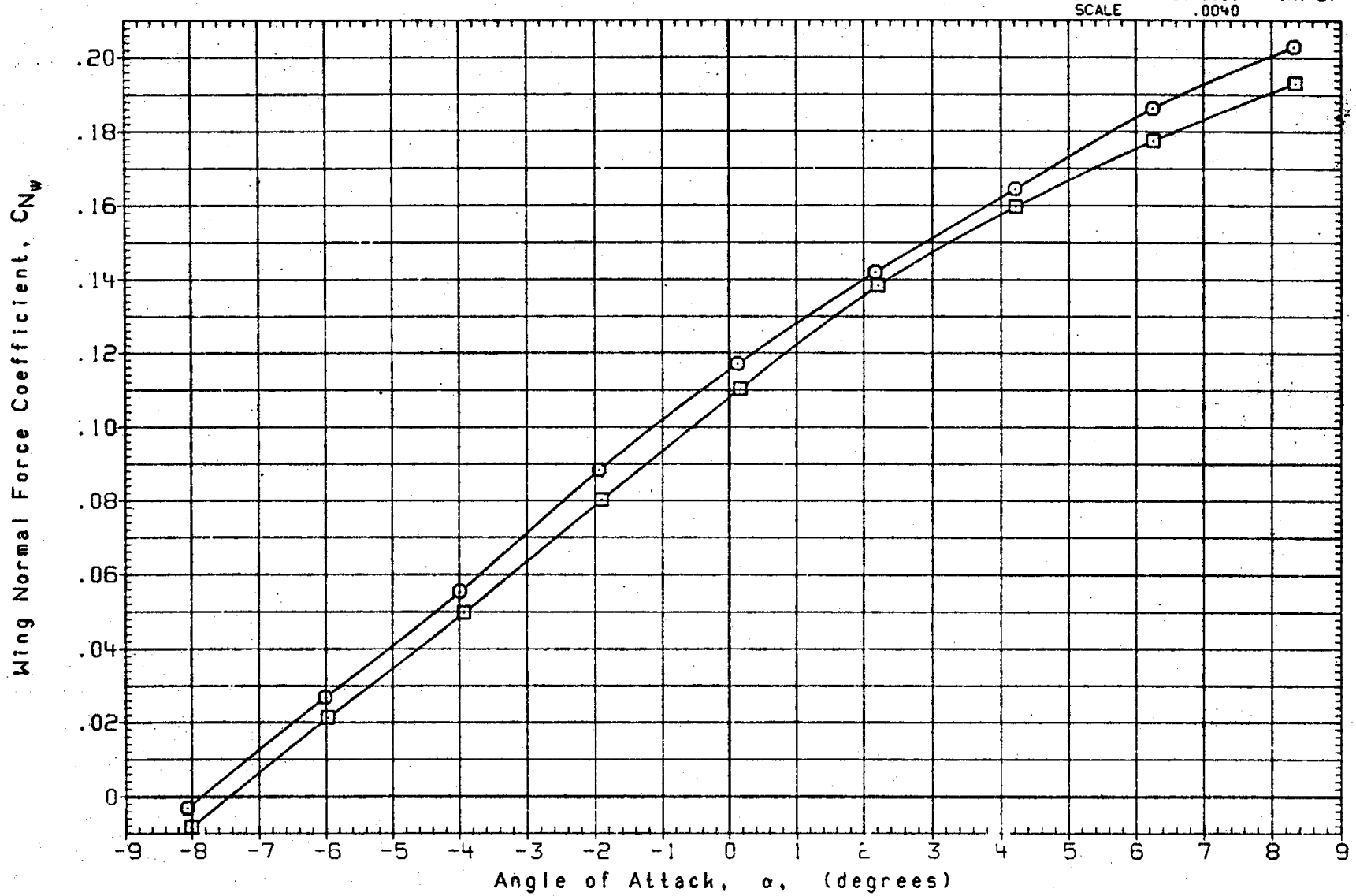

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

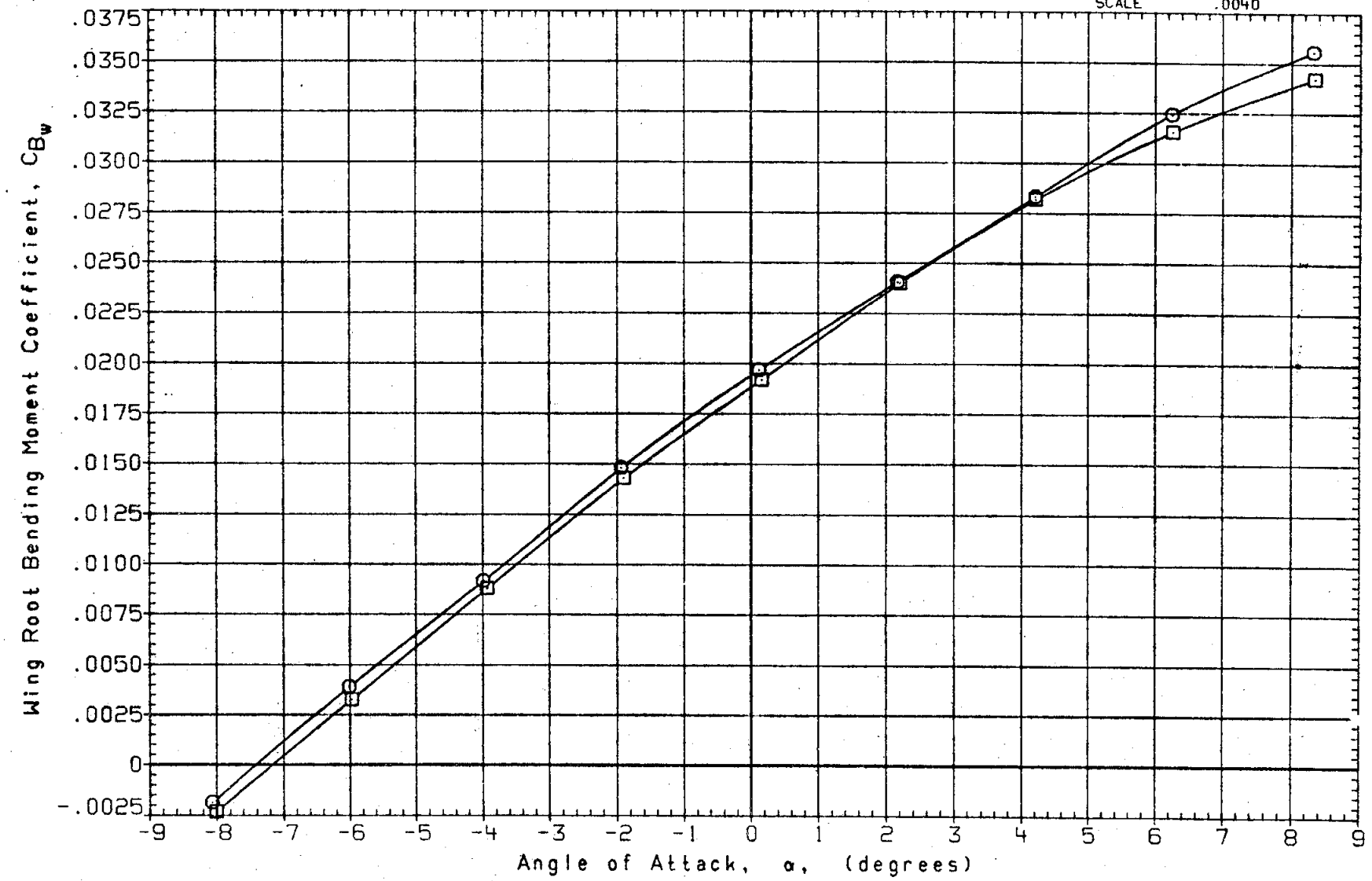

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

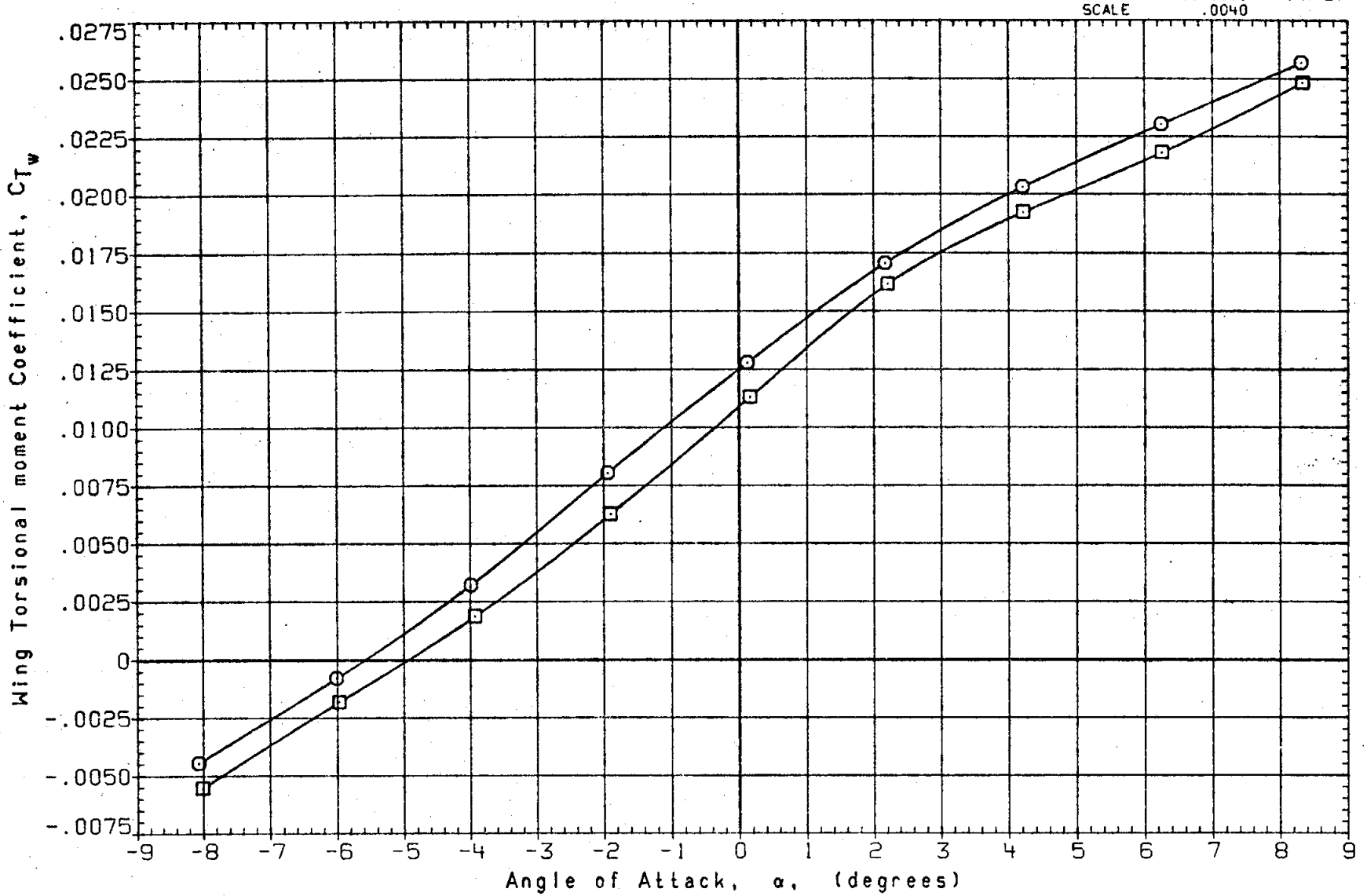

FIG. 22 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80 PAGE 121

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2C2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

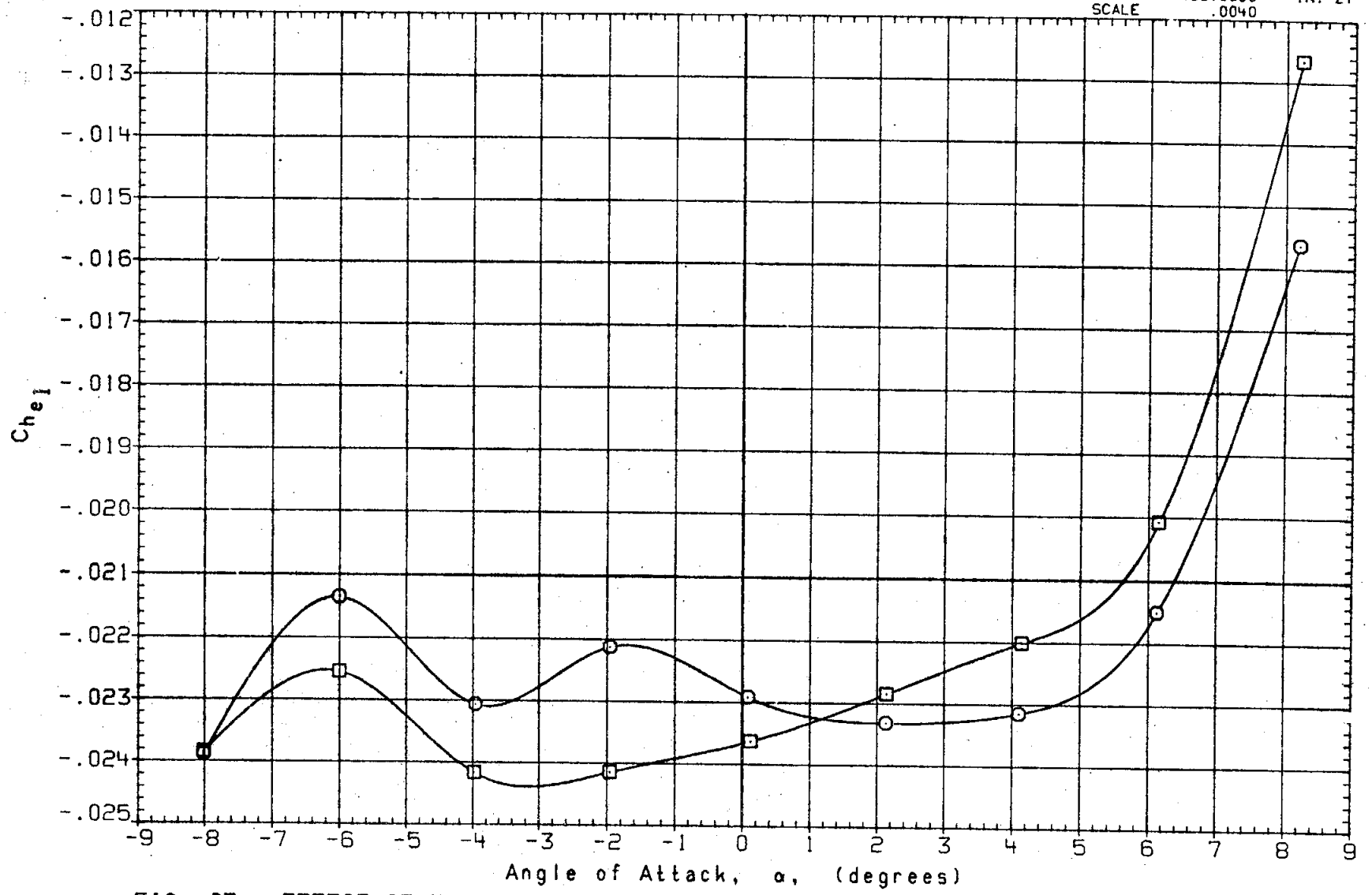

FIG. 23 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

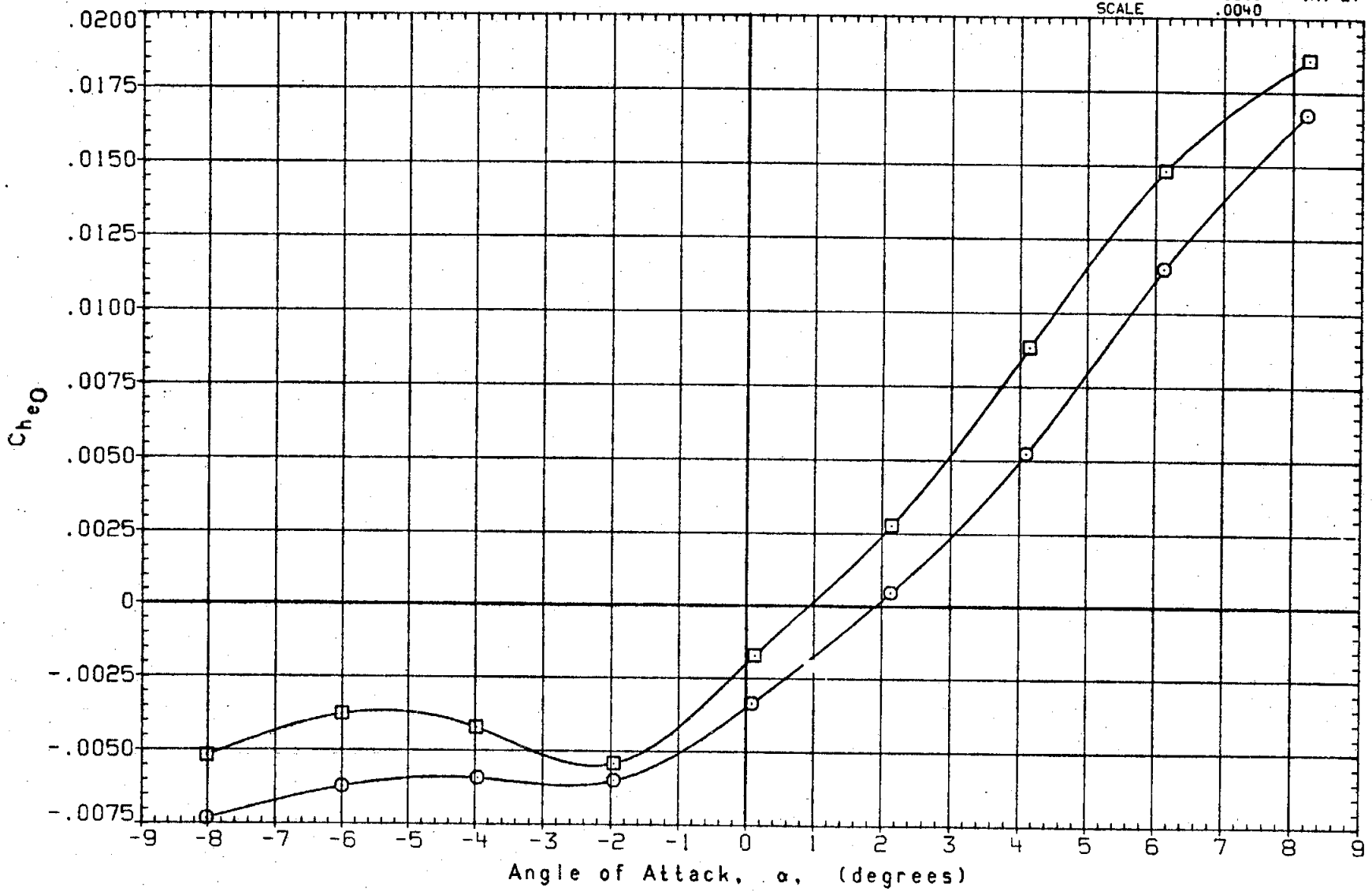

FIG. 23 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

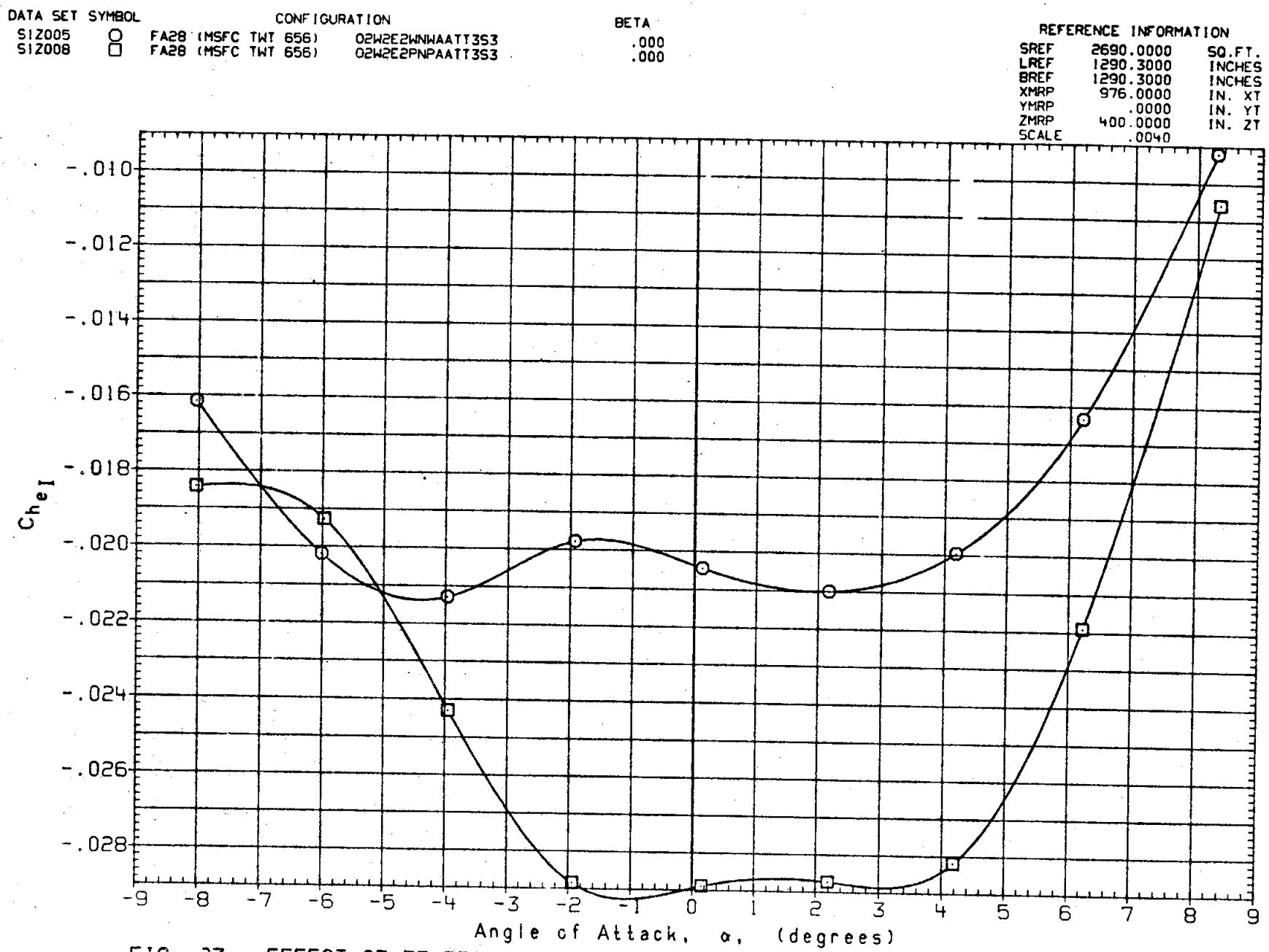

FIG. 23 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(B) MACH = .90

DATE 12 MAR 80

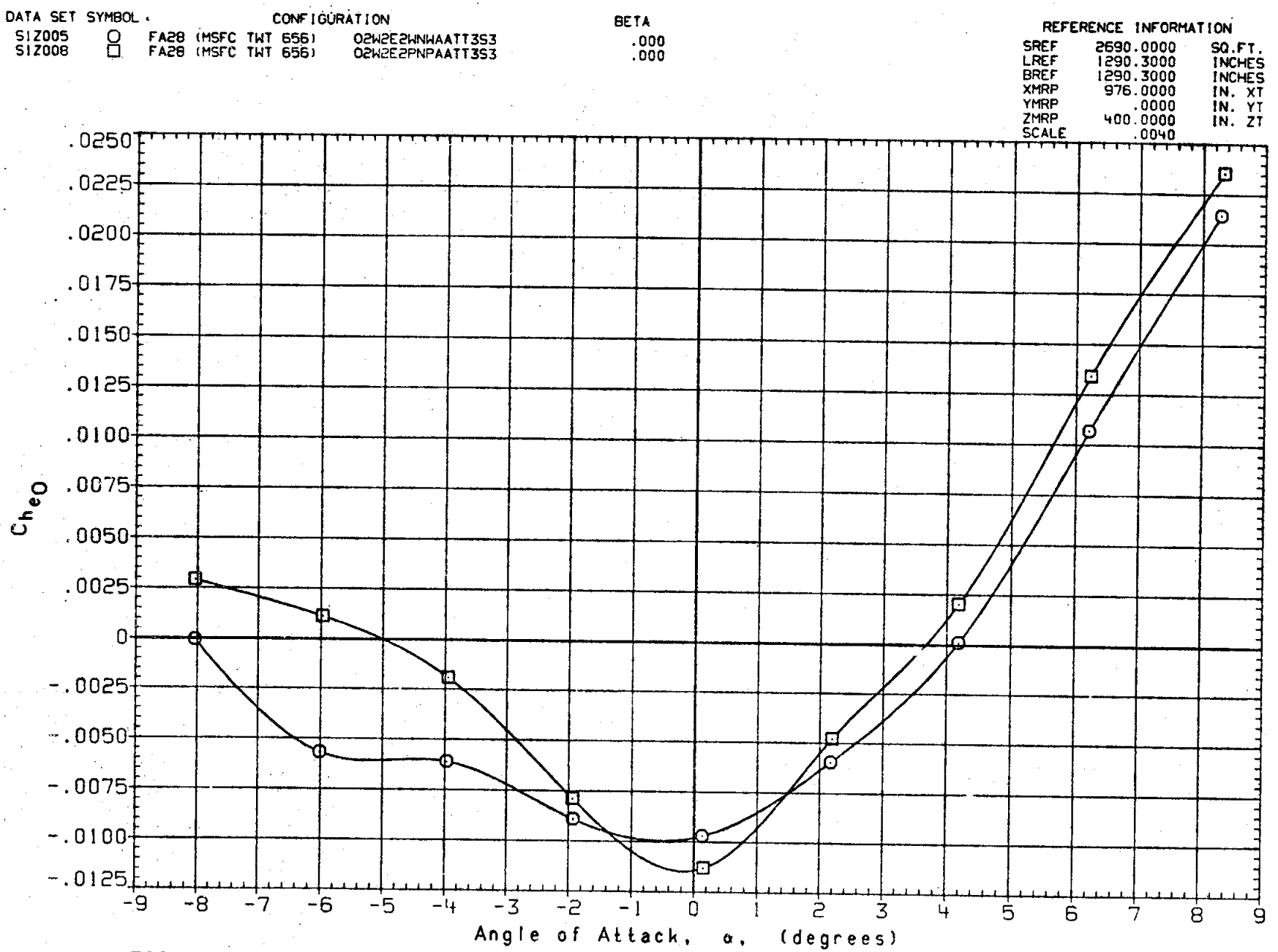

FIG. 23 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

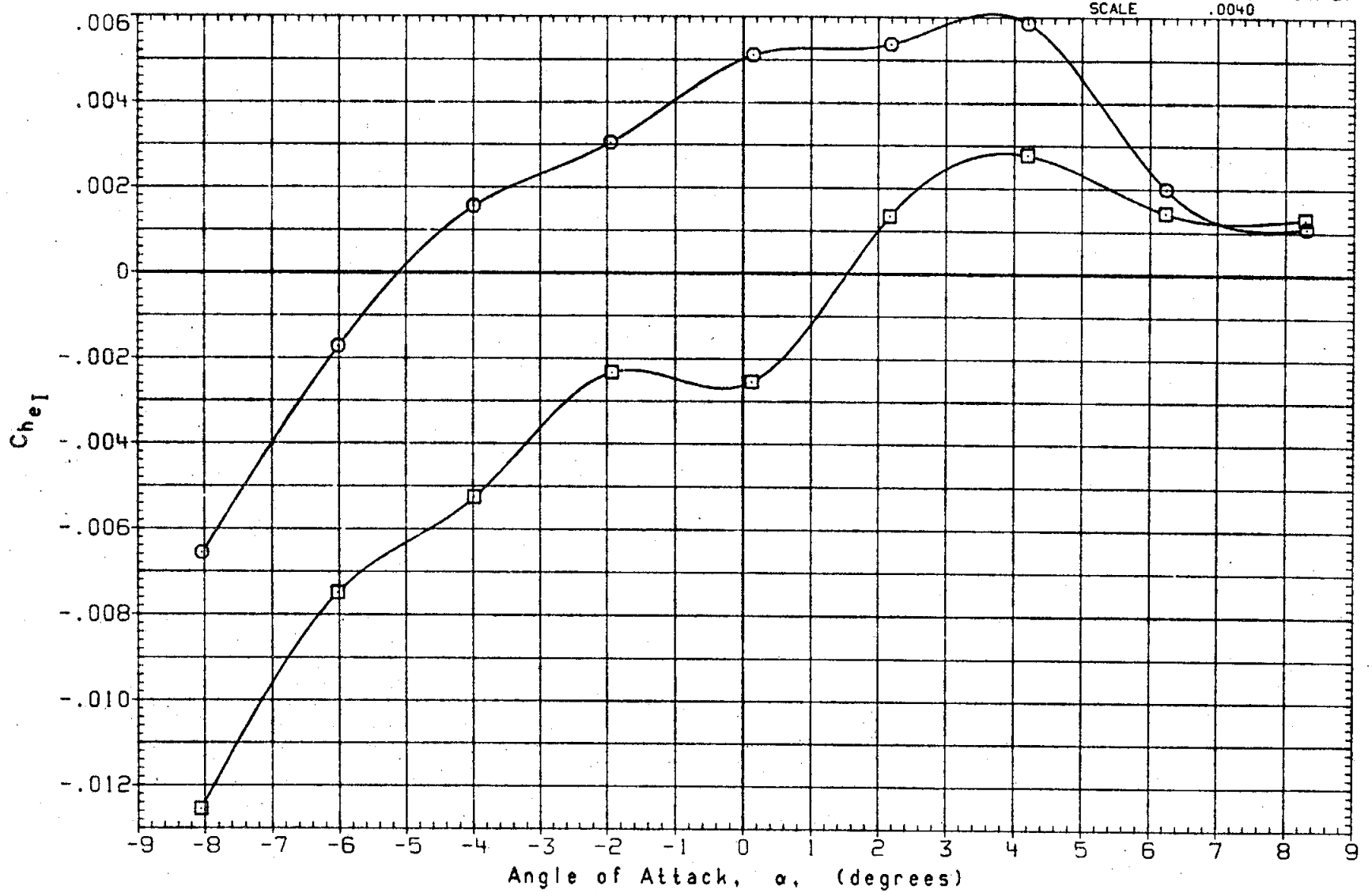

FIG. 23 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

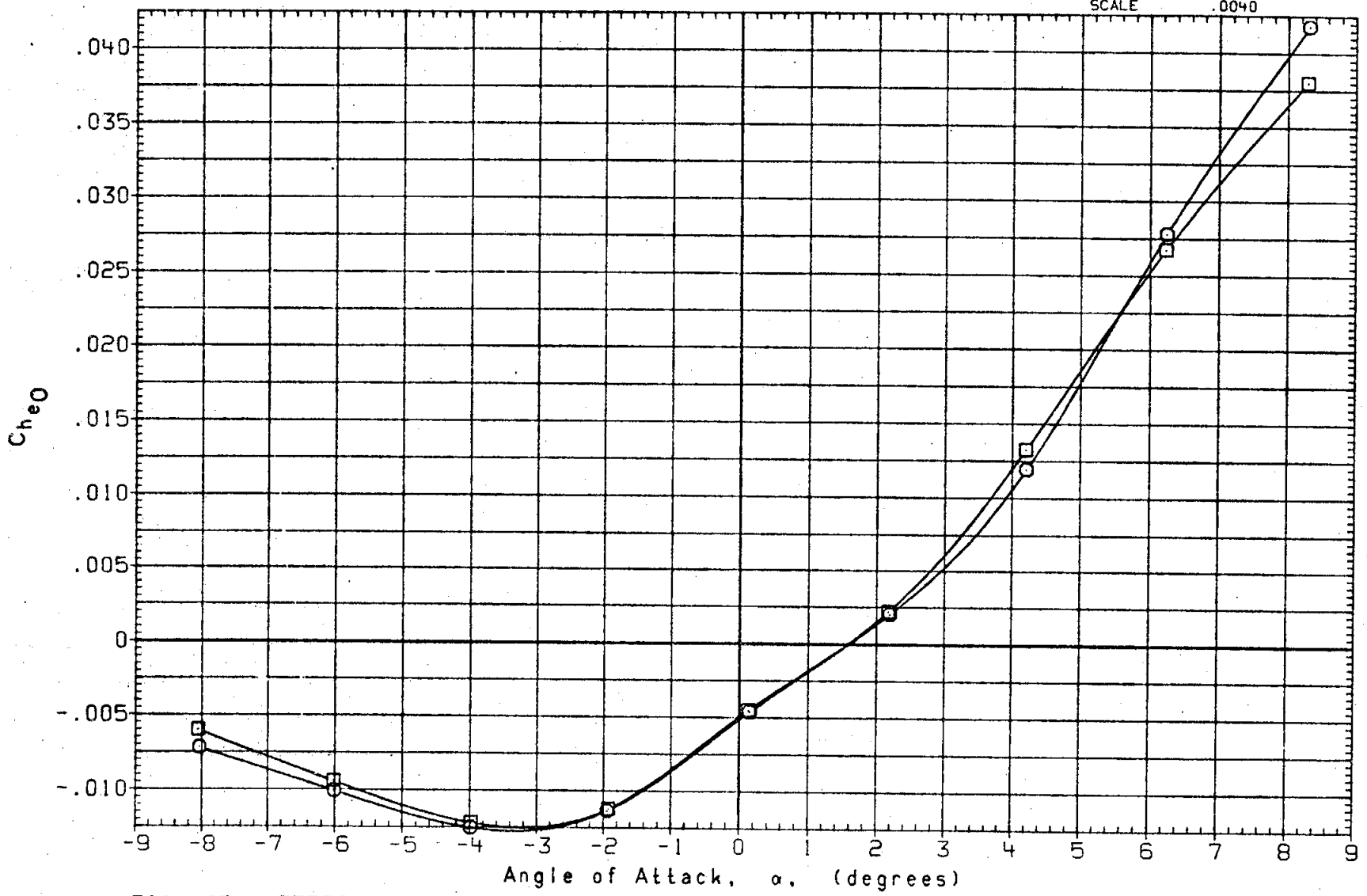

FIG. 23 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

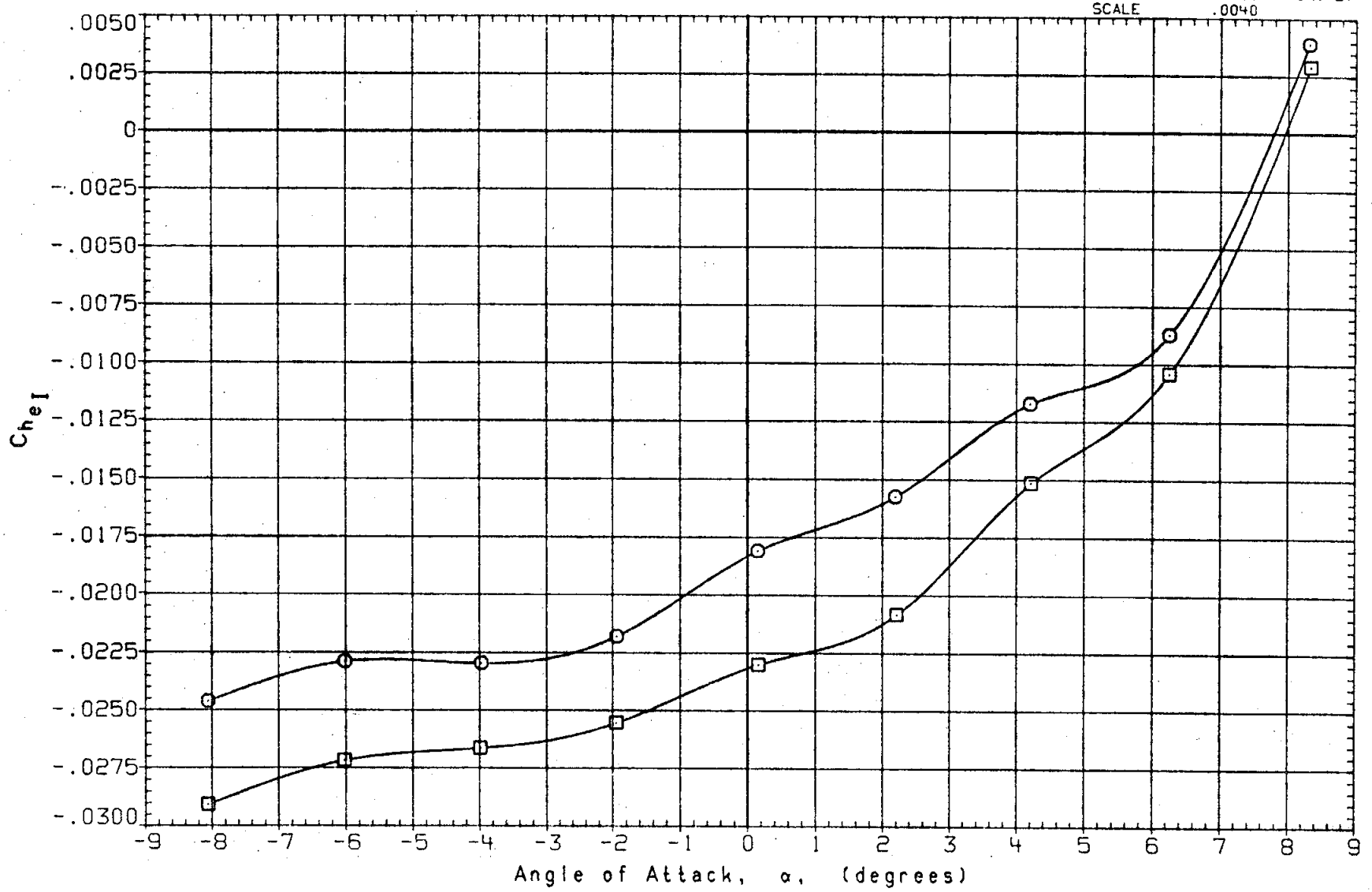

FIG. 23 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

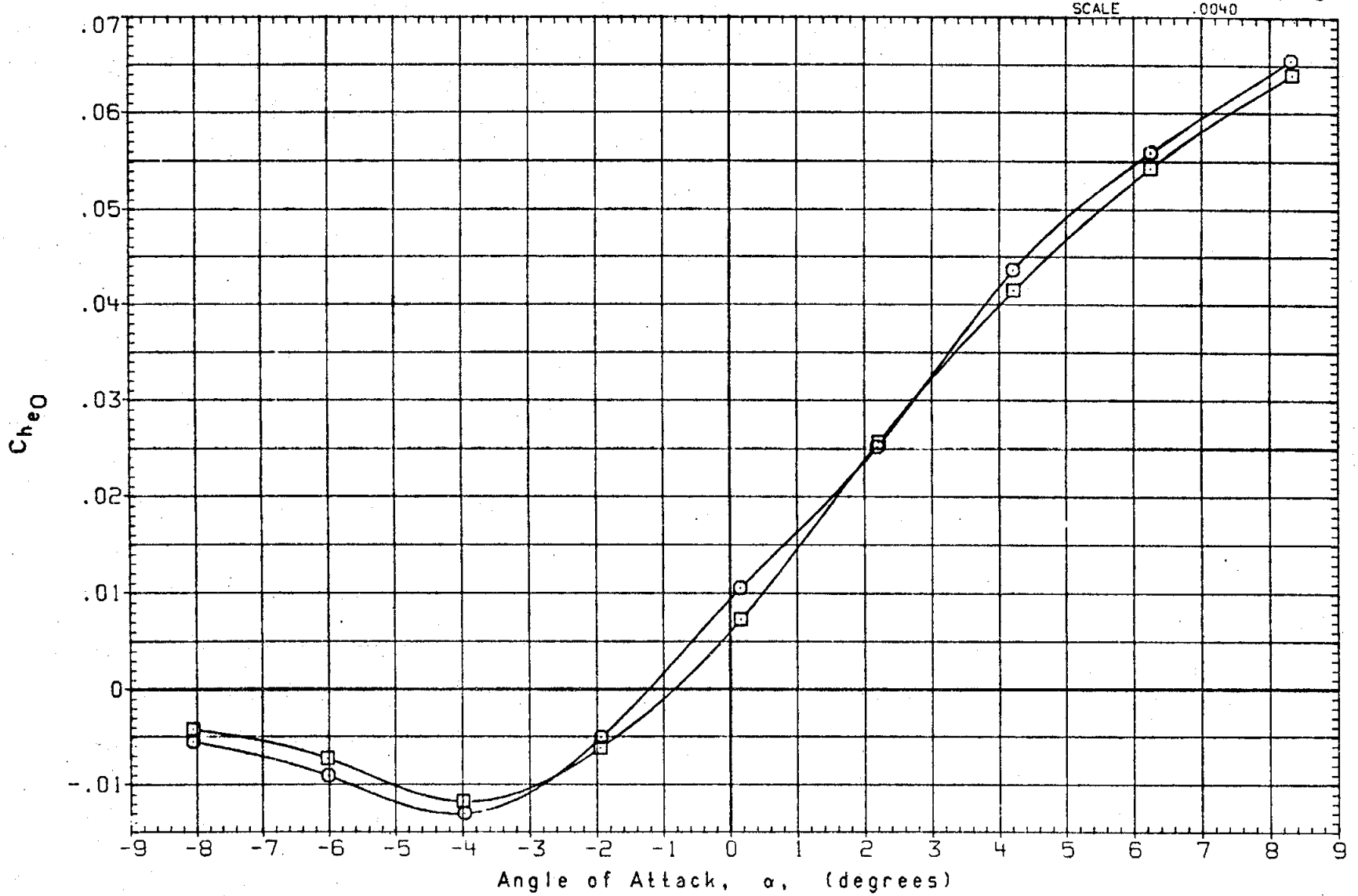

FIG. 23 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

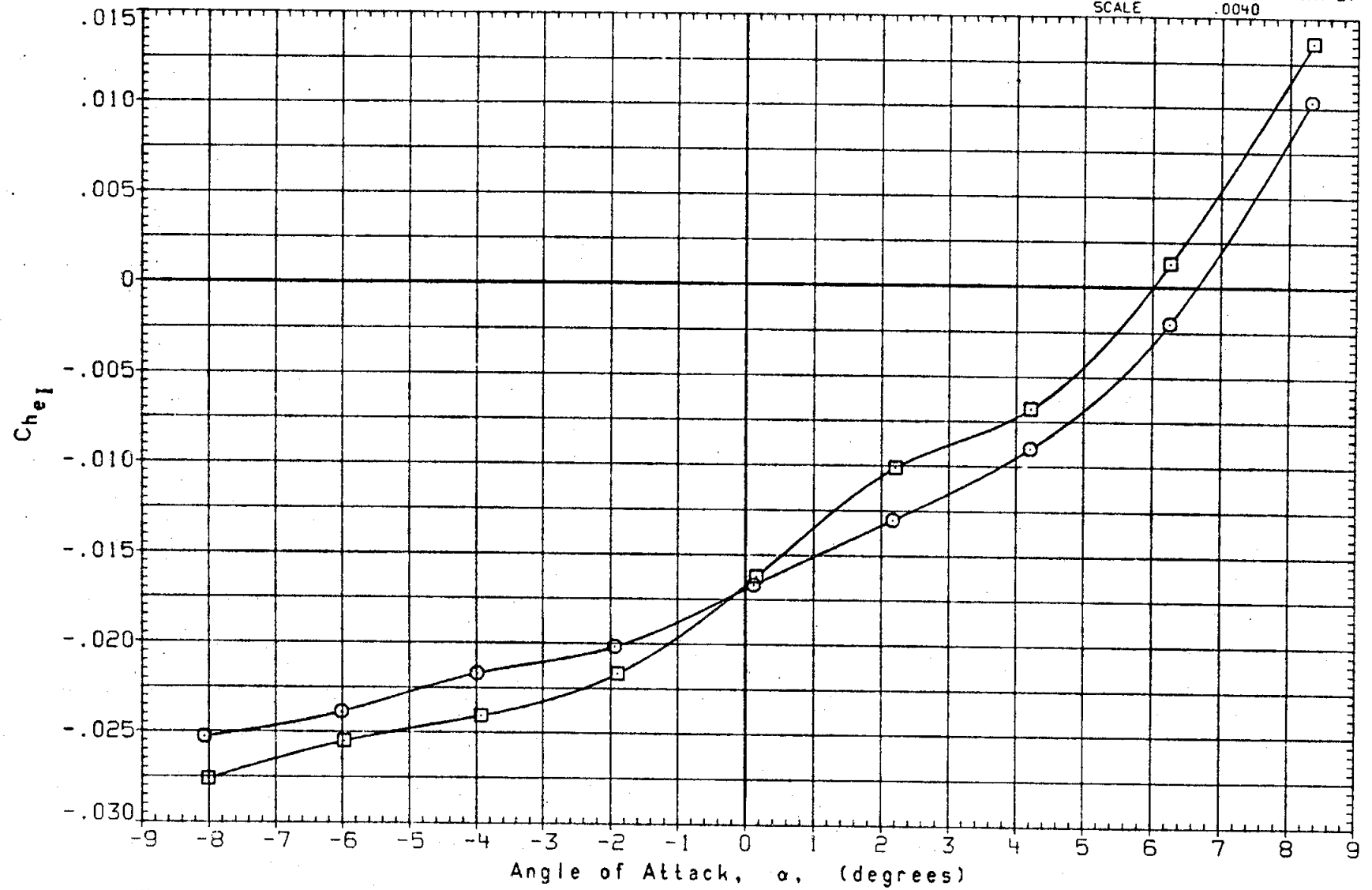

FIG. 23 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z005	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000
S1Z008	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

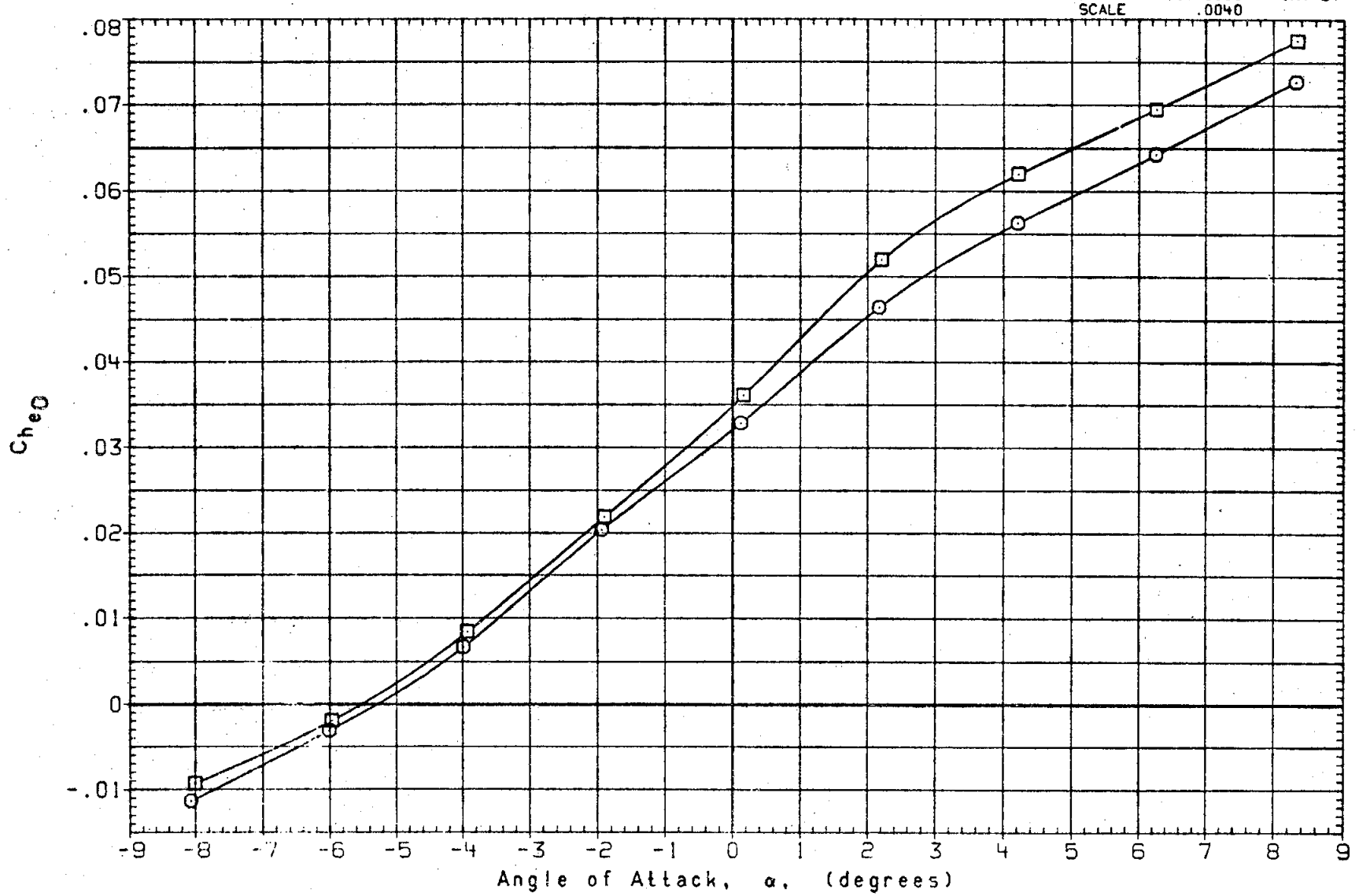

FIG. 23 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

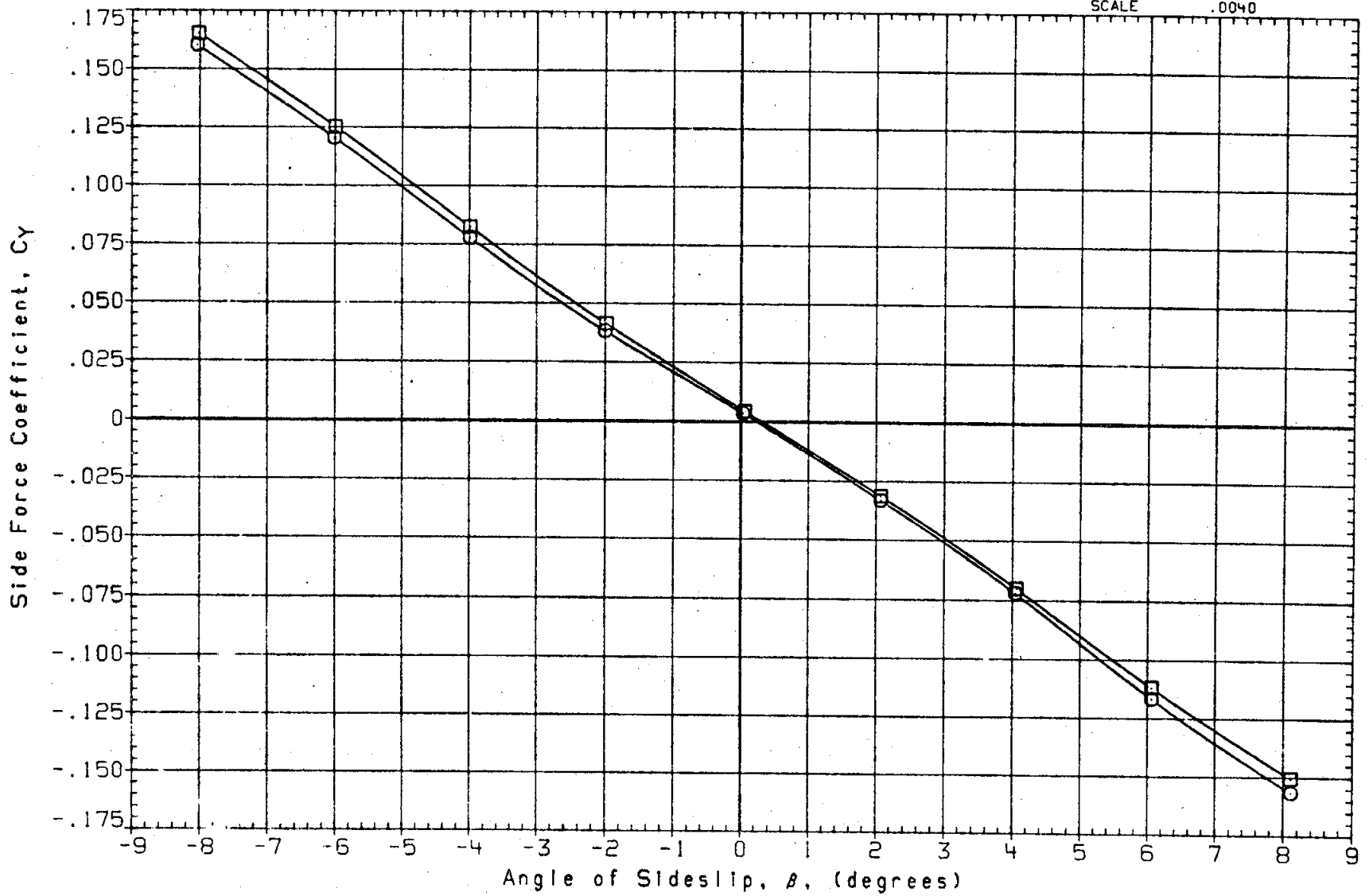

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

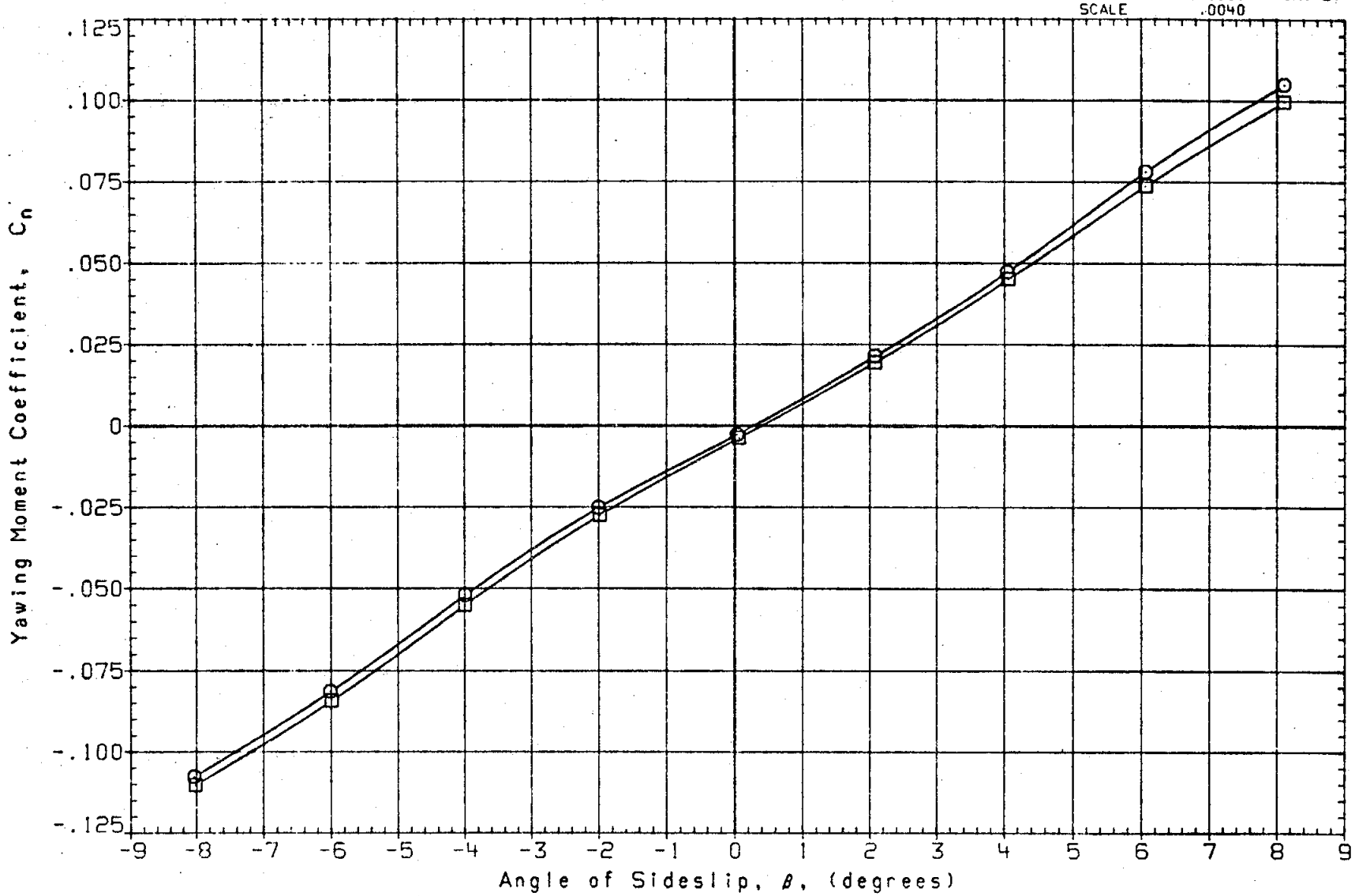

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

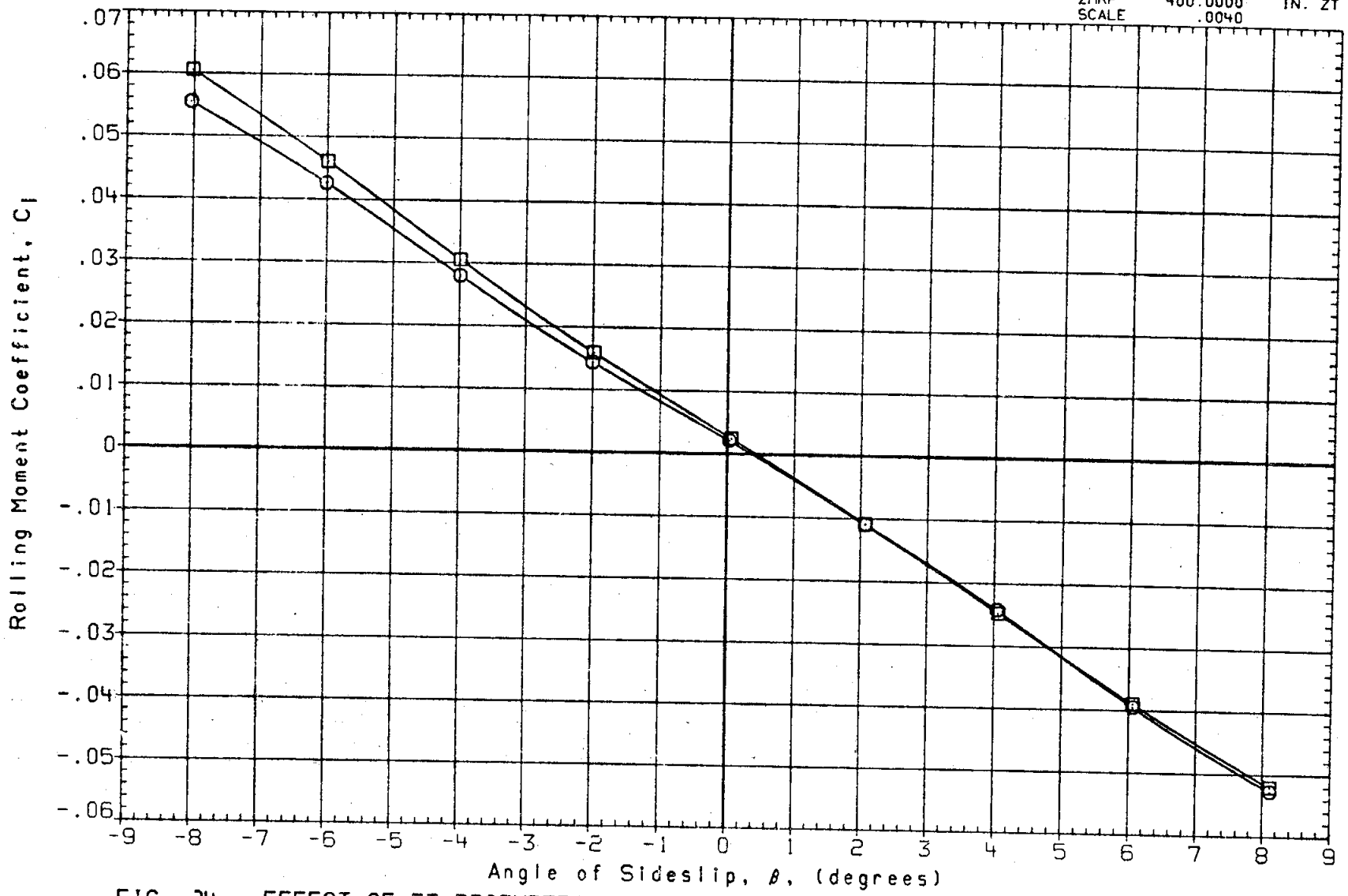

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

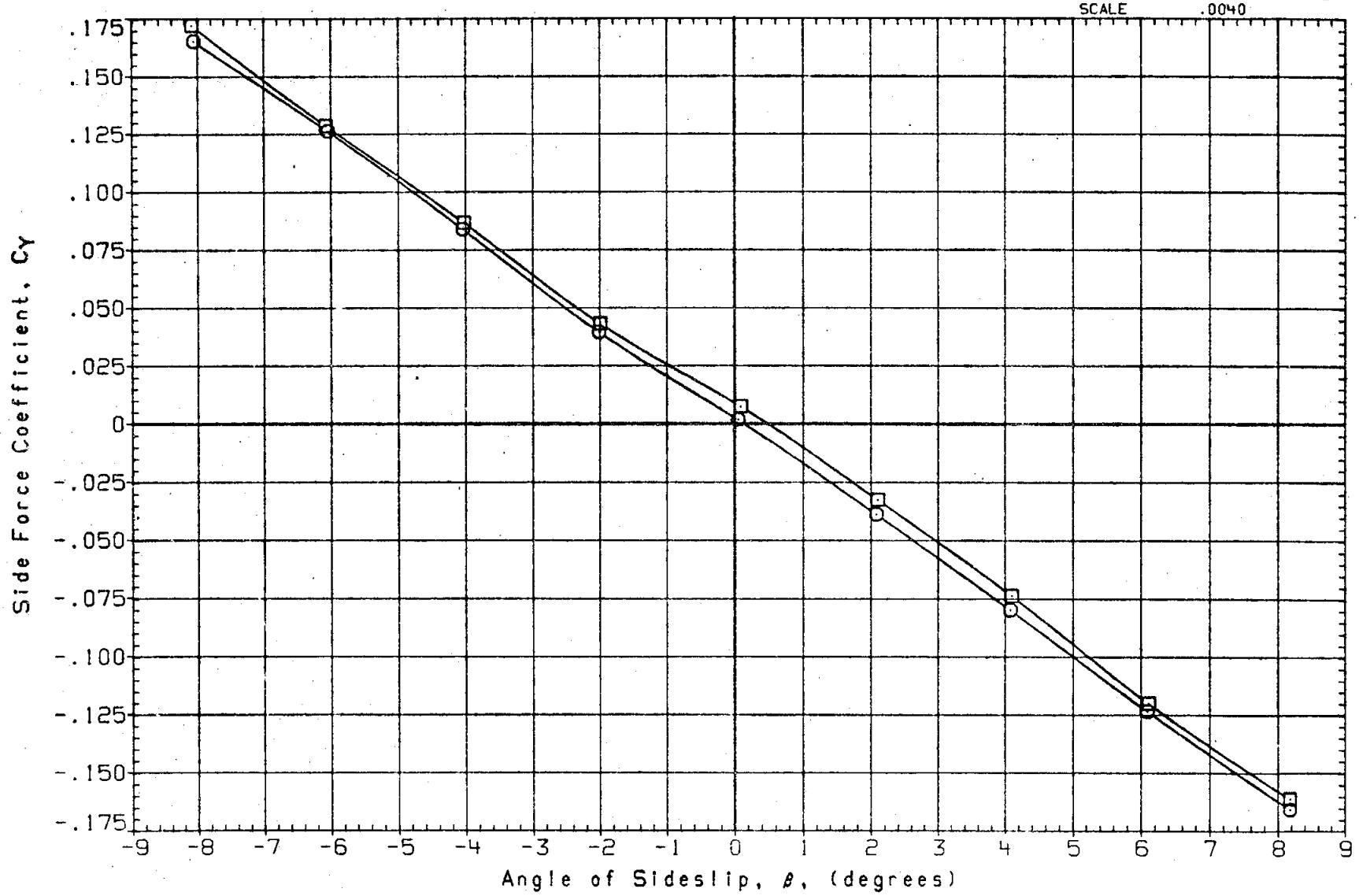

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
RIZ006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
RIZ009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

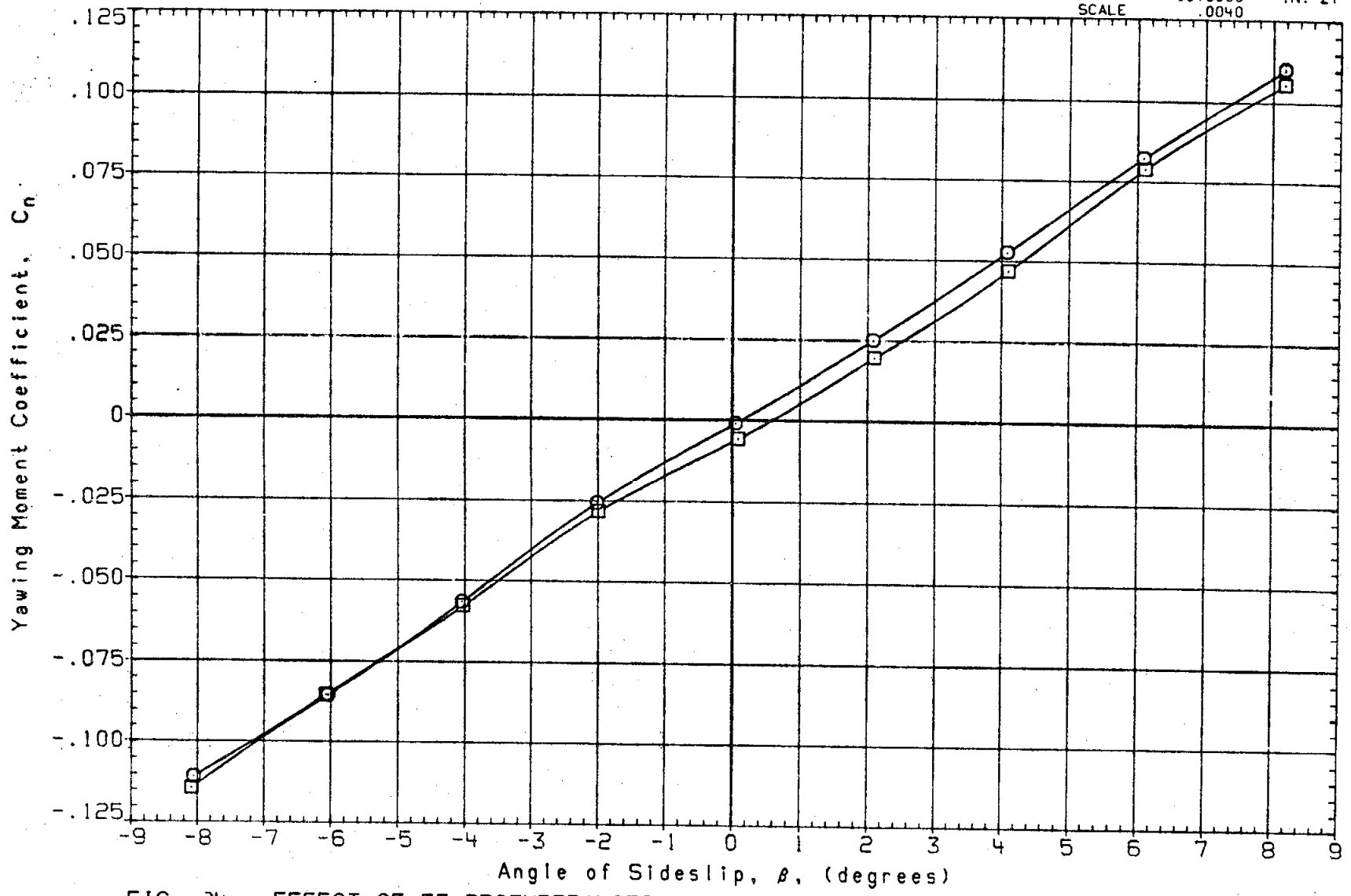

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(B) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

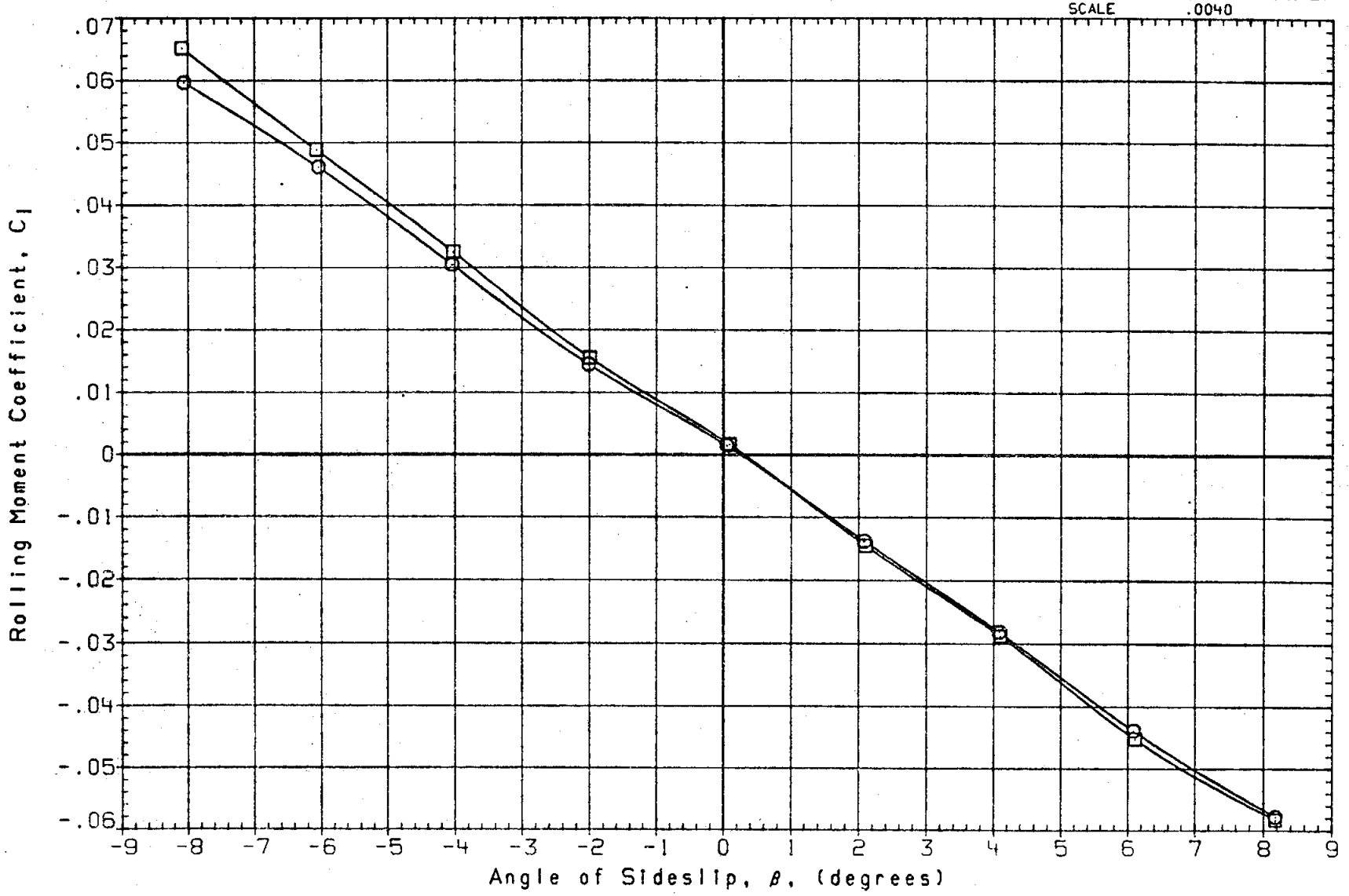

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

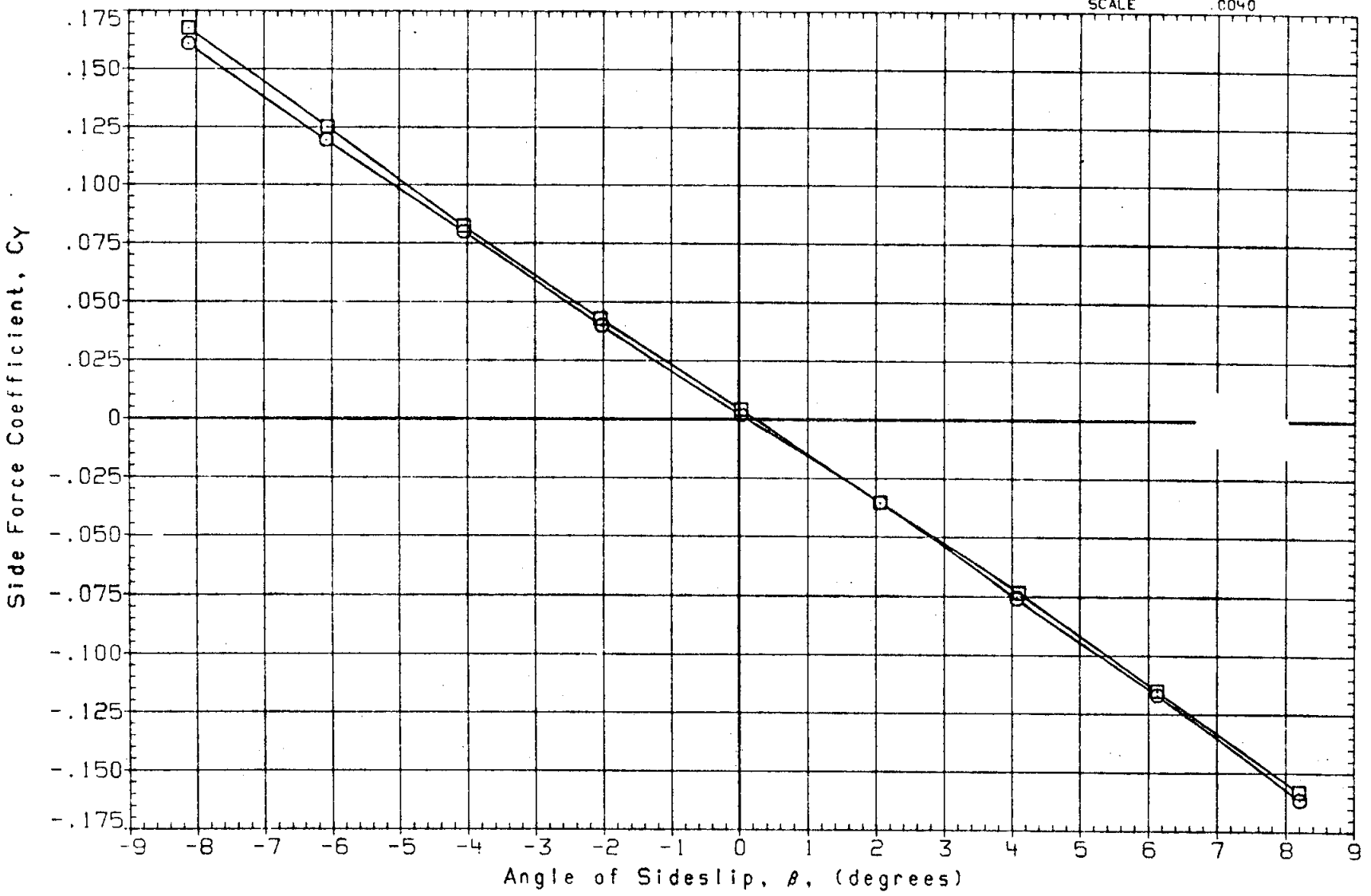

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

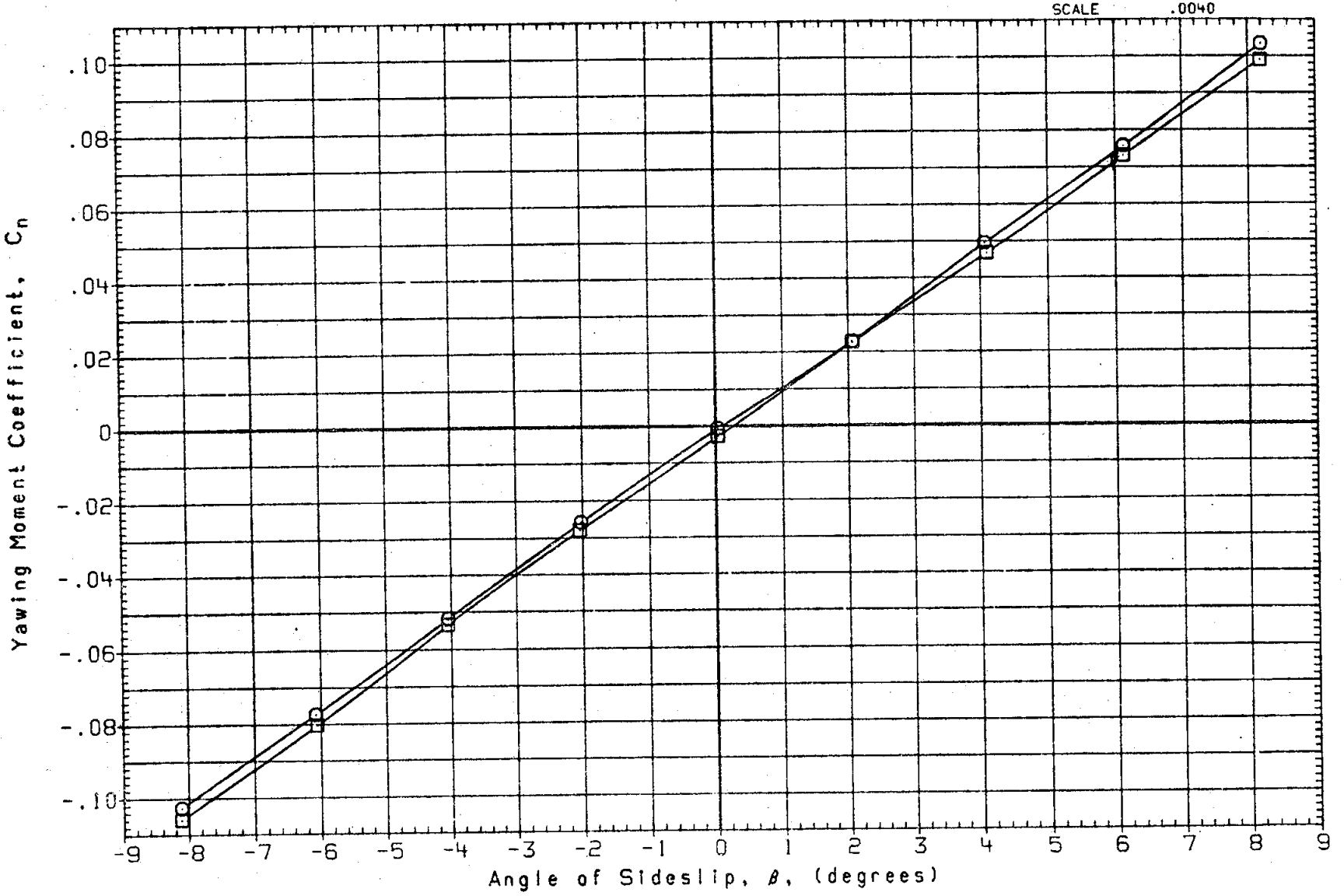

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

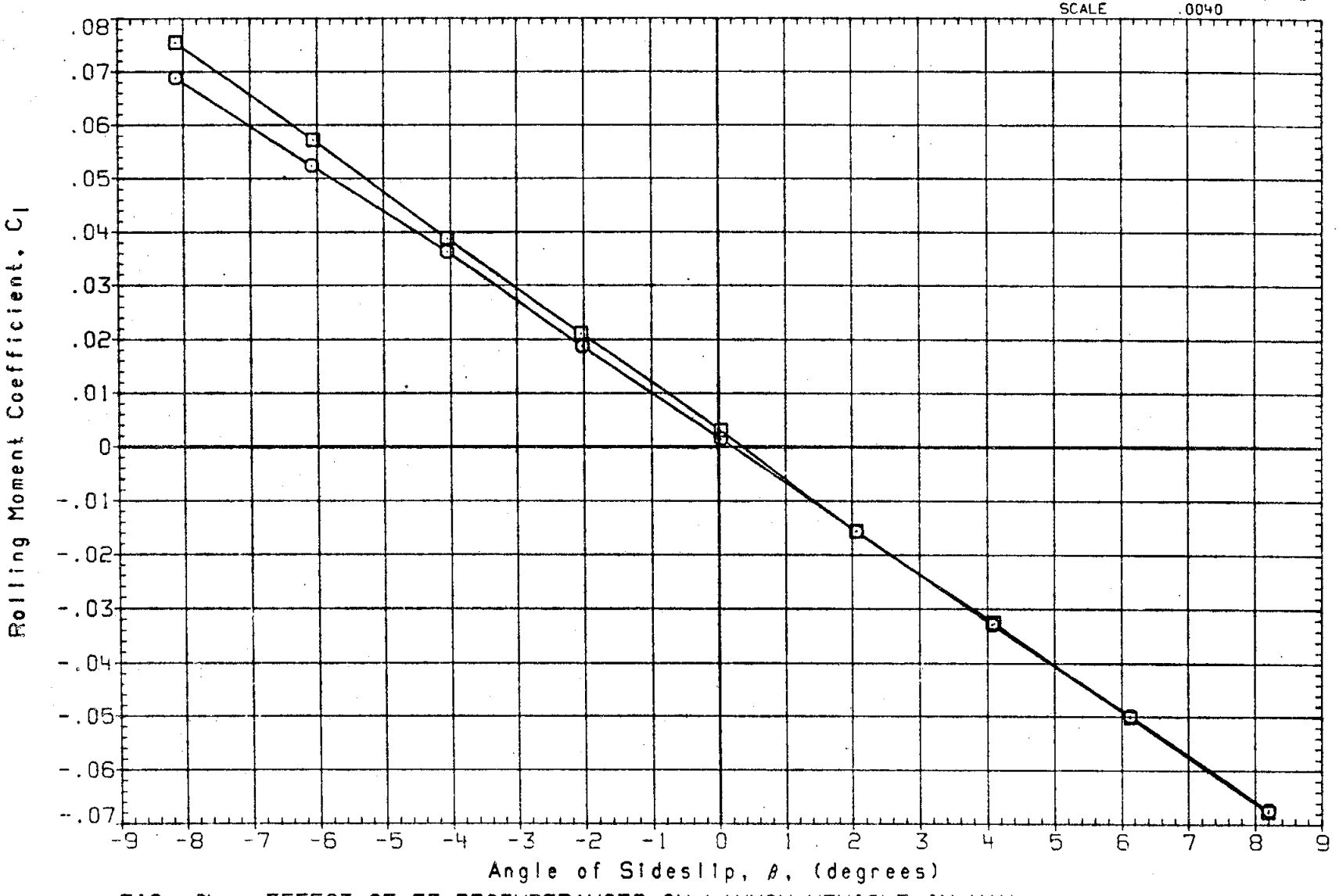

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

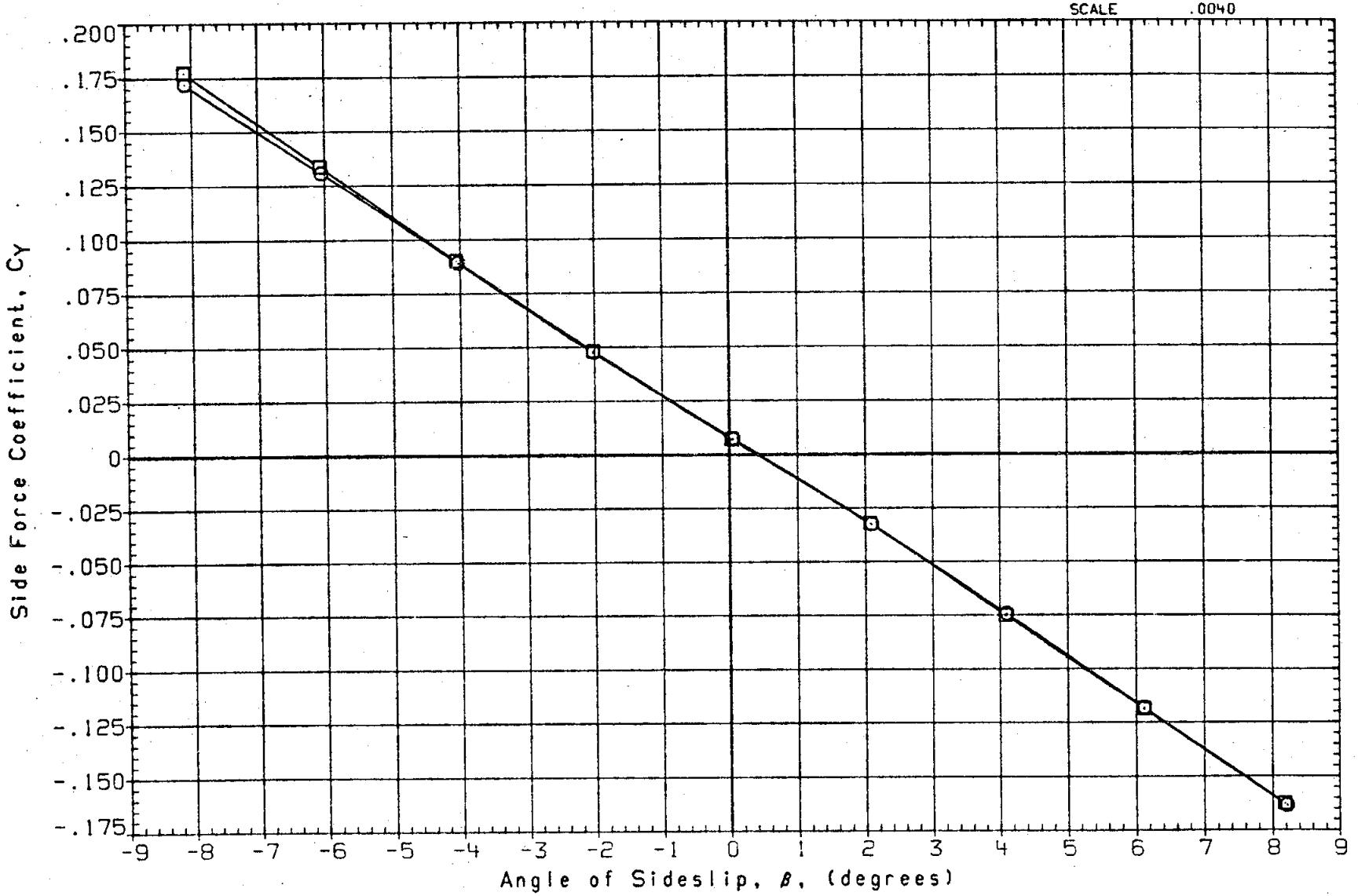

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

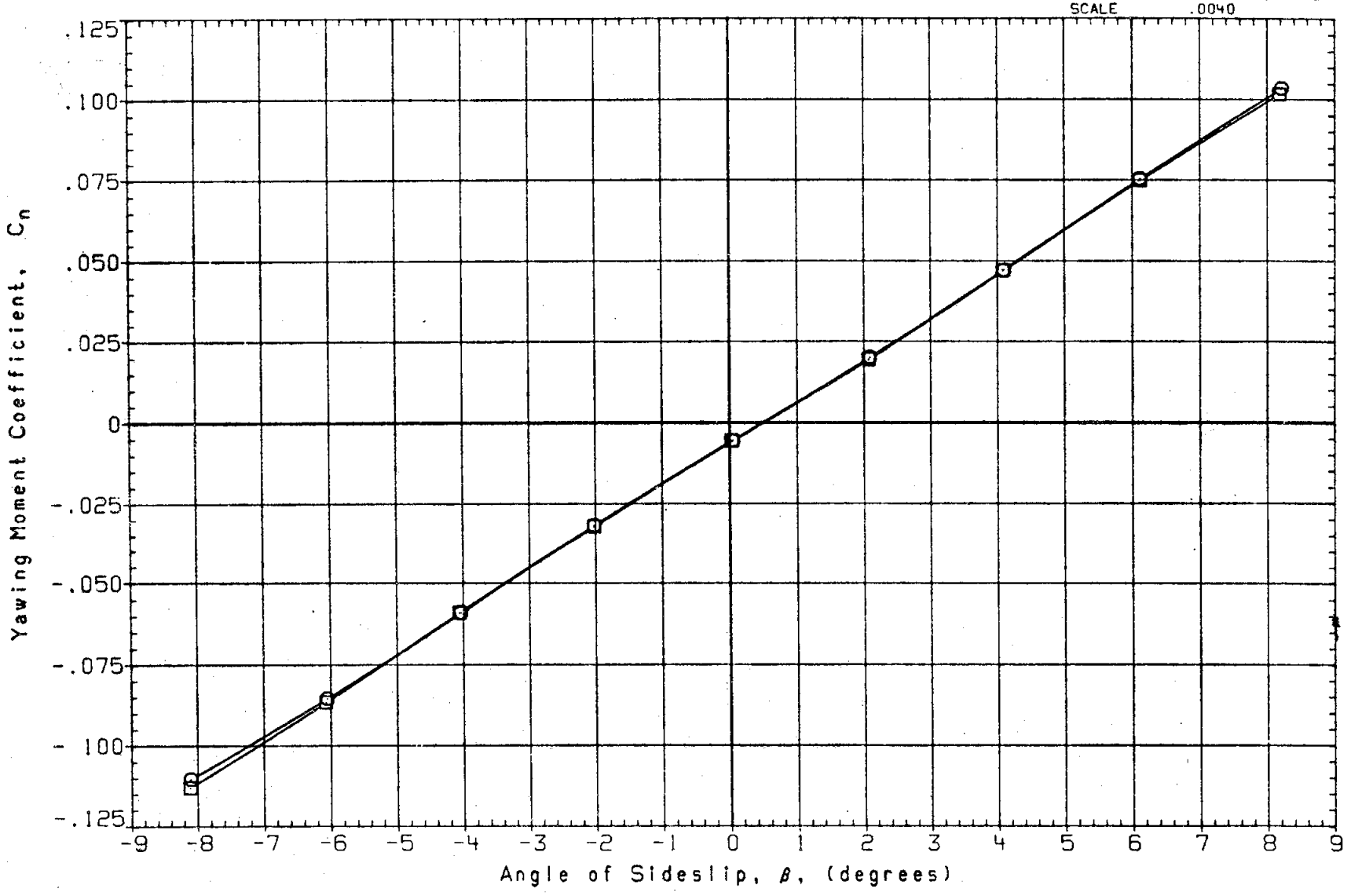

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

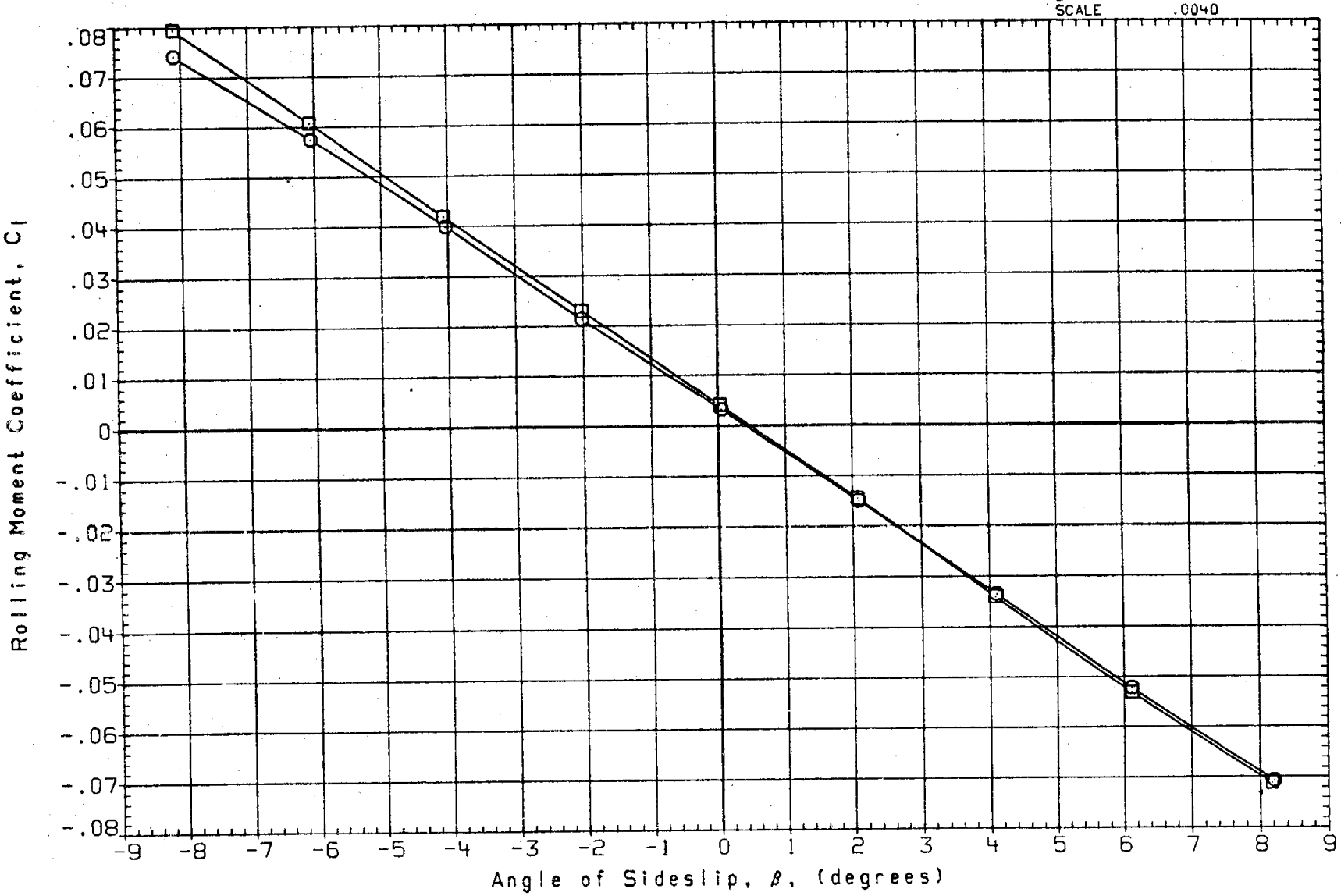

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

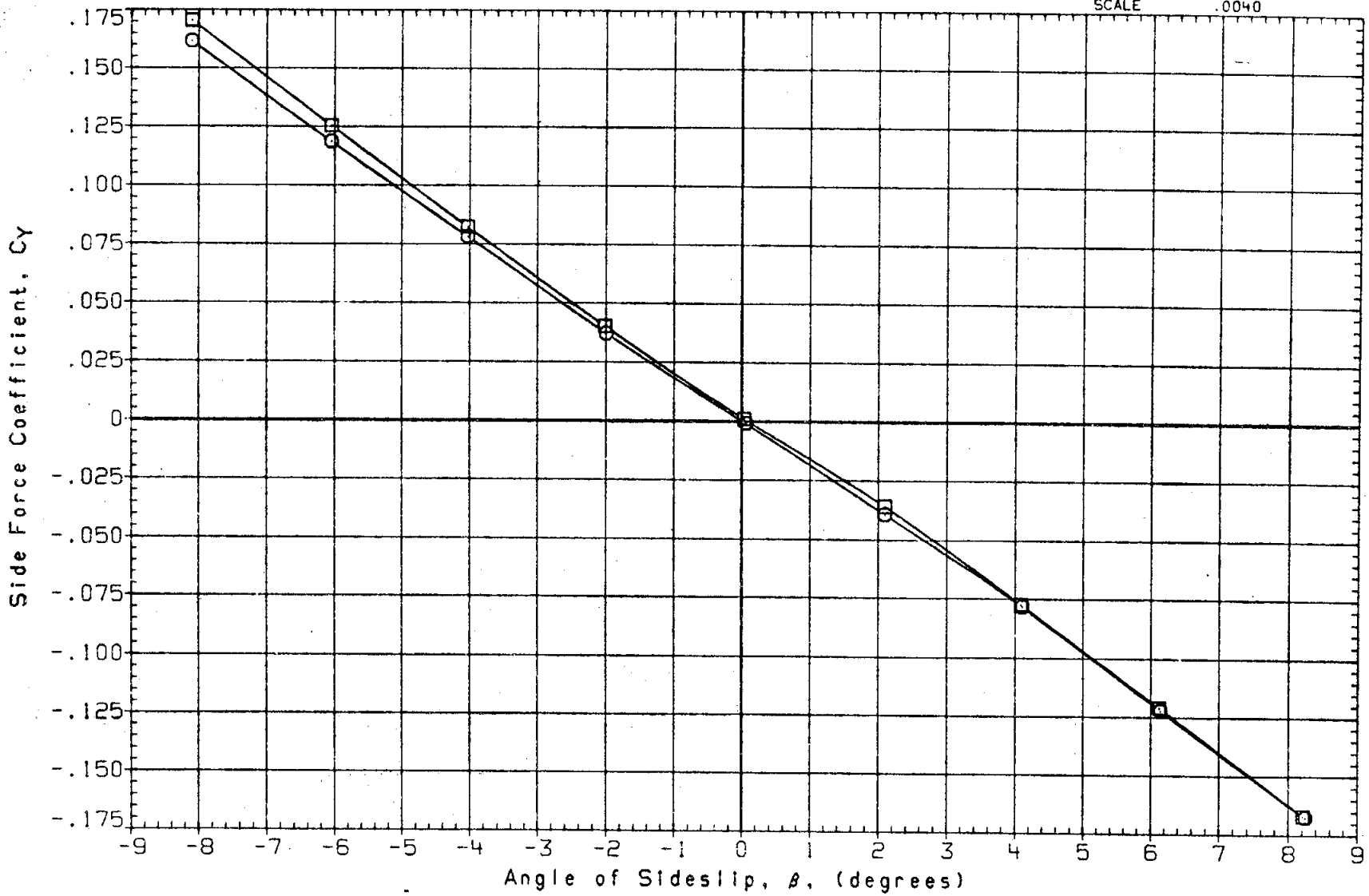

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(E) MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

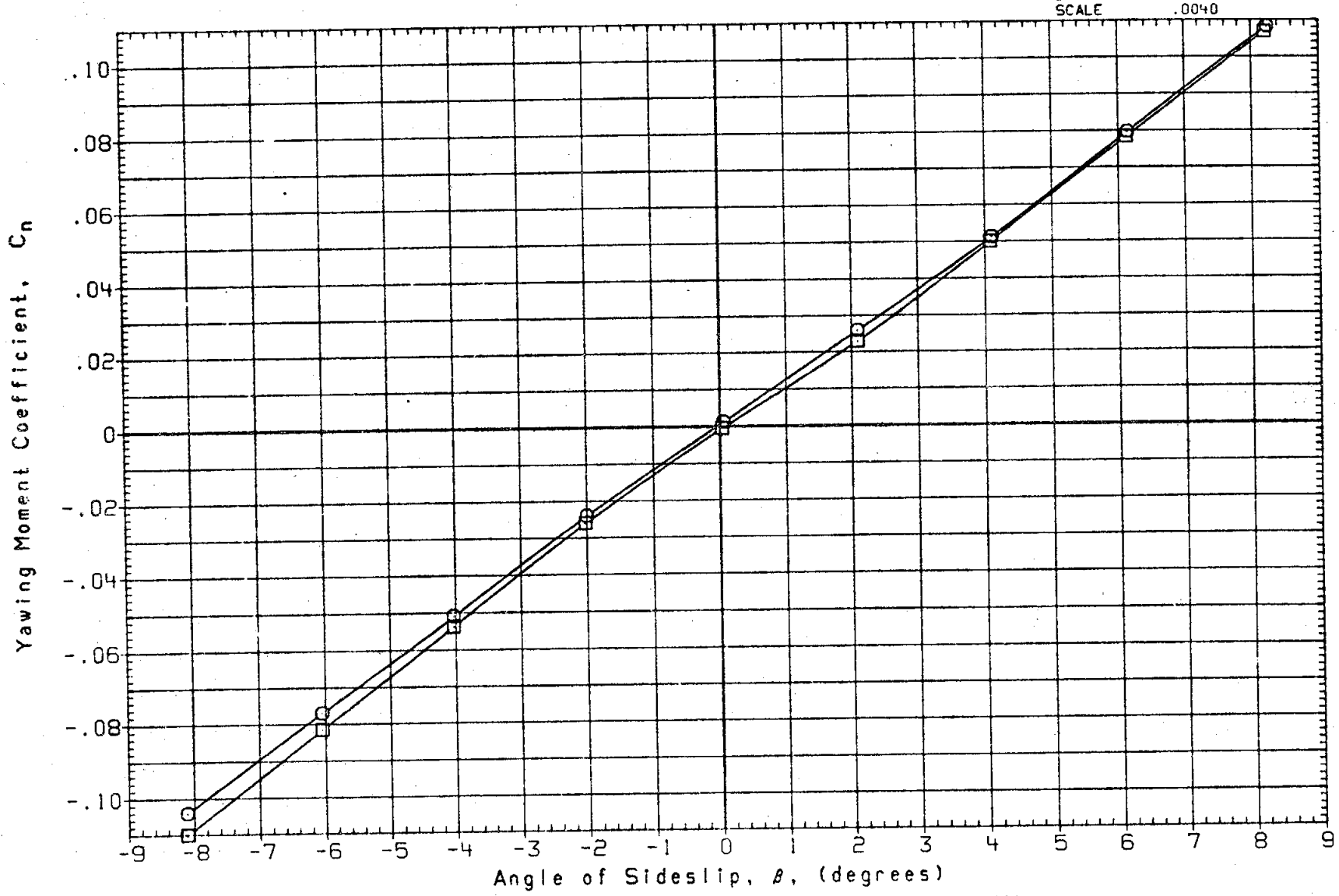

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
R1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

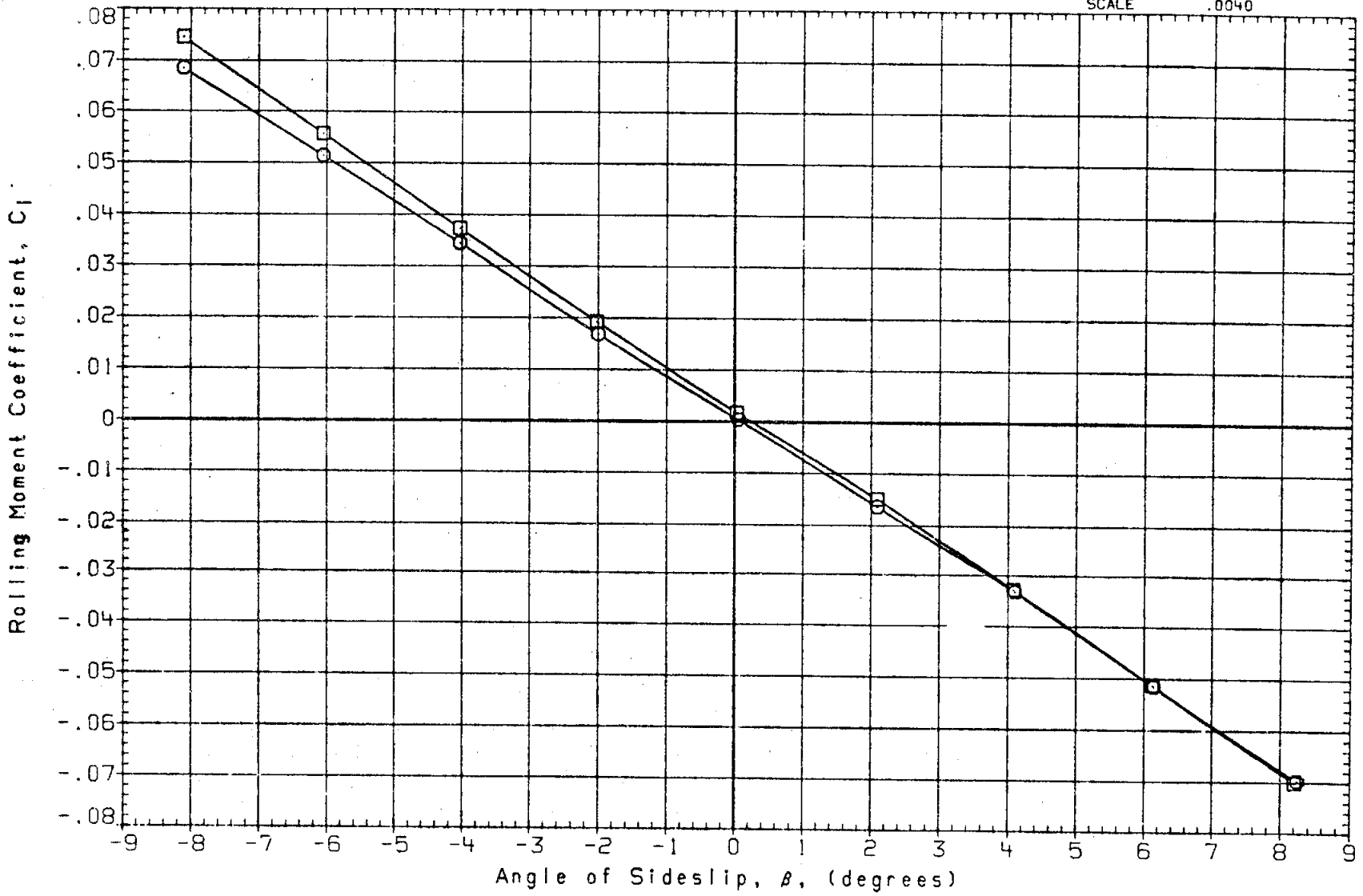

FIG. 24 EFFECT OF ET PROTUBERANCES ON LAUNCH VEHICLE IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

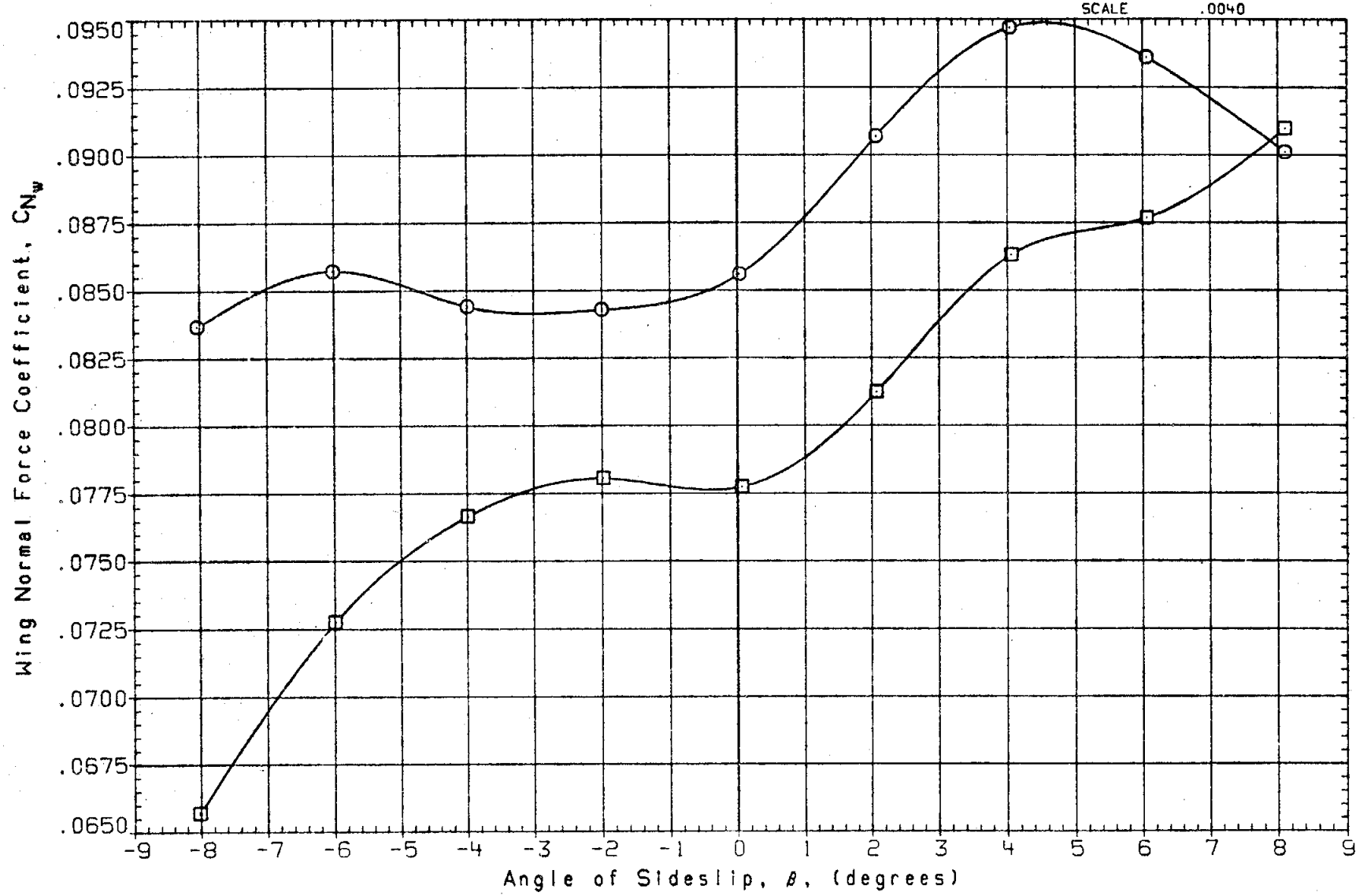

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

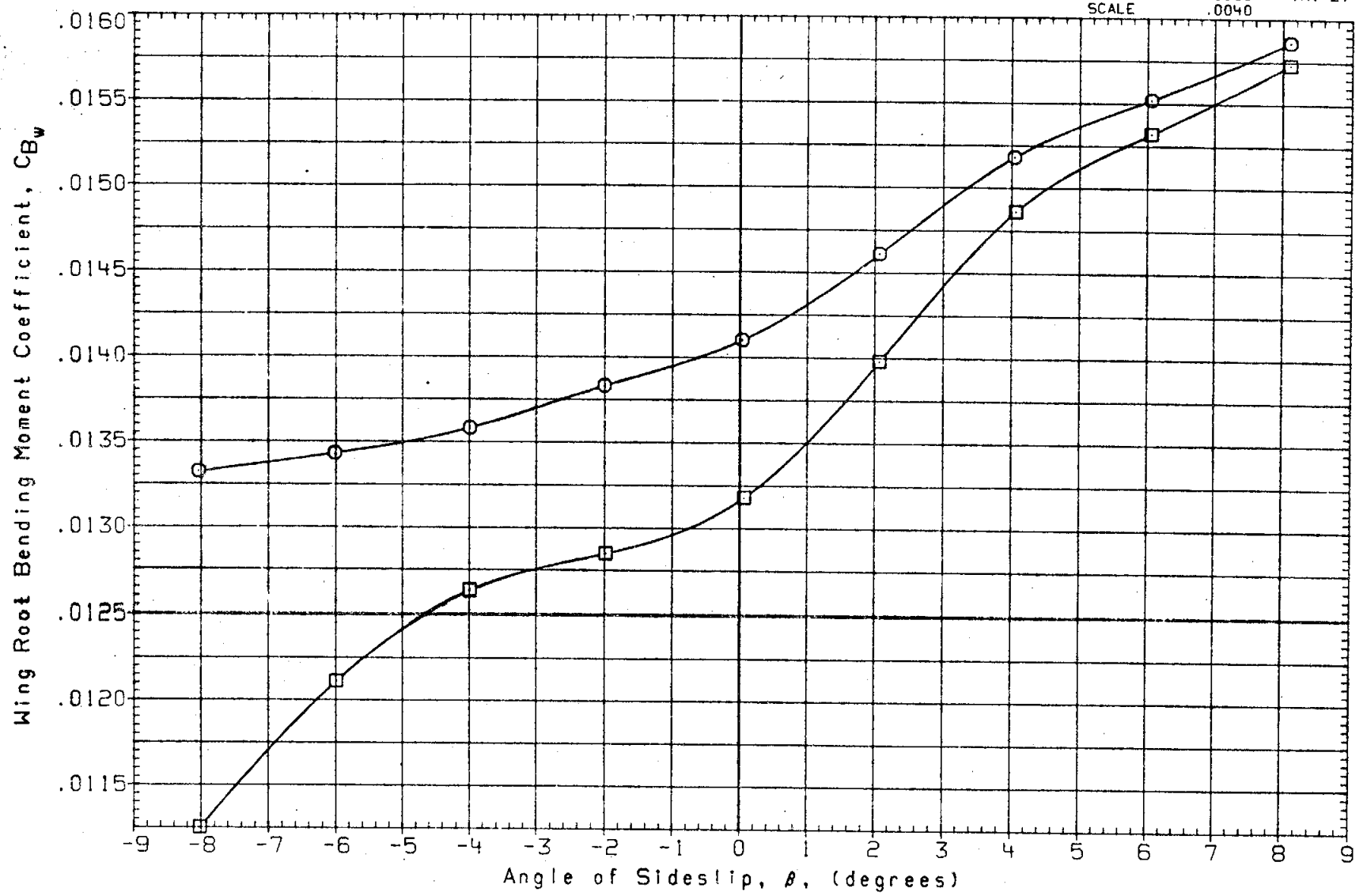

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

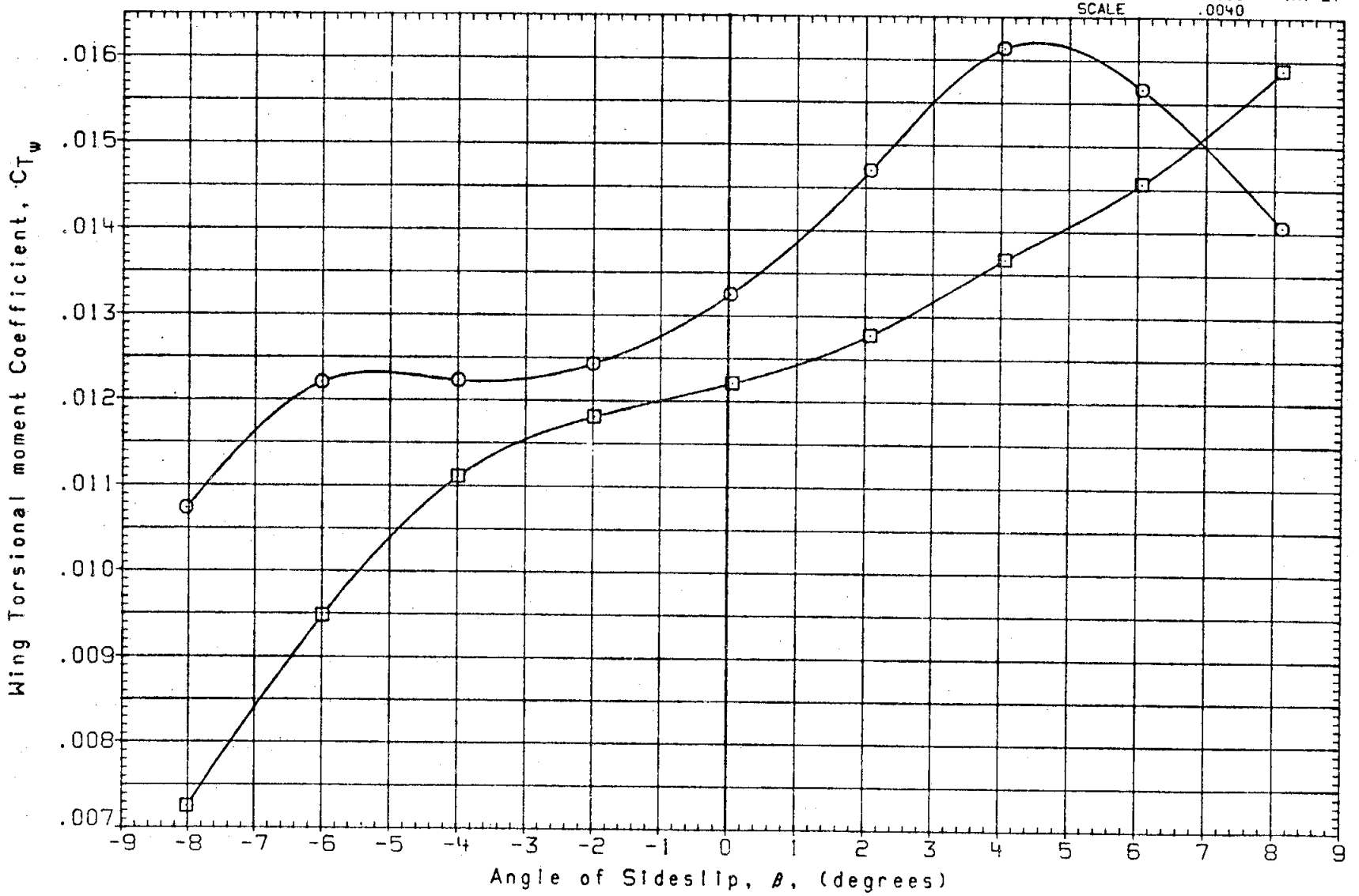

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(A) MACH = .60 DATE 12 MAR 80

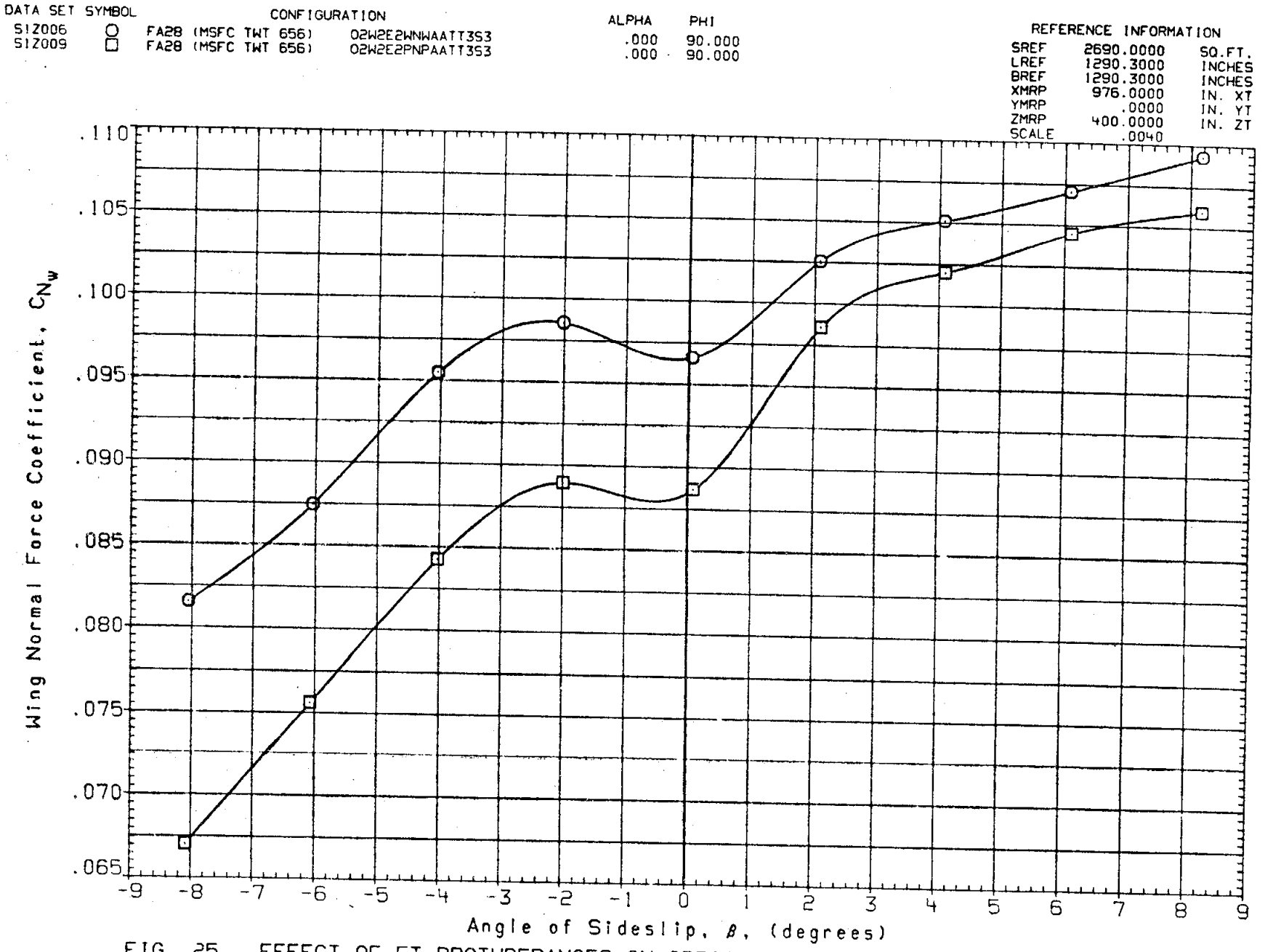

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(B) MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

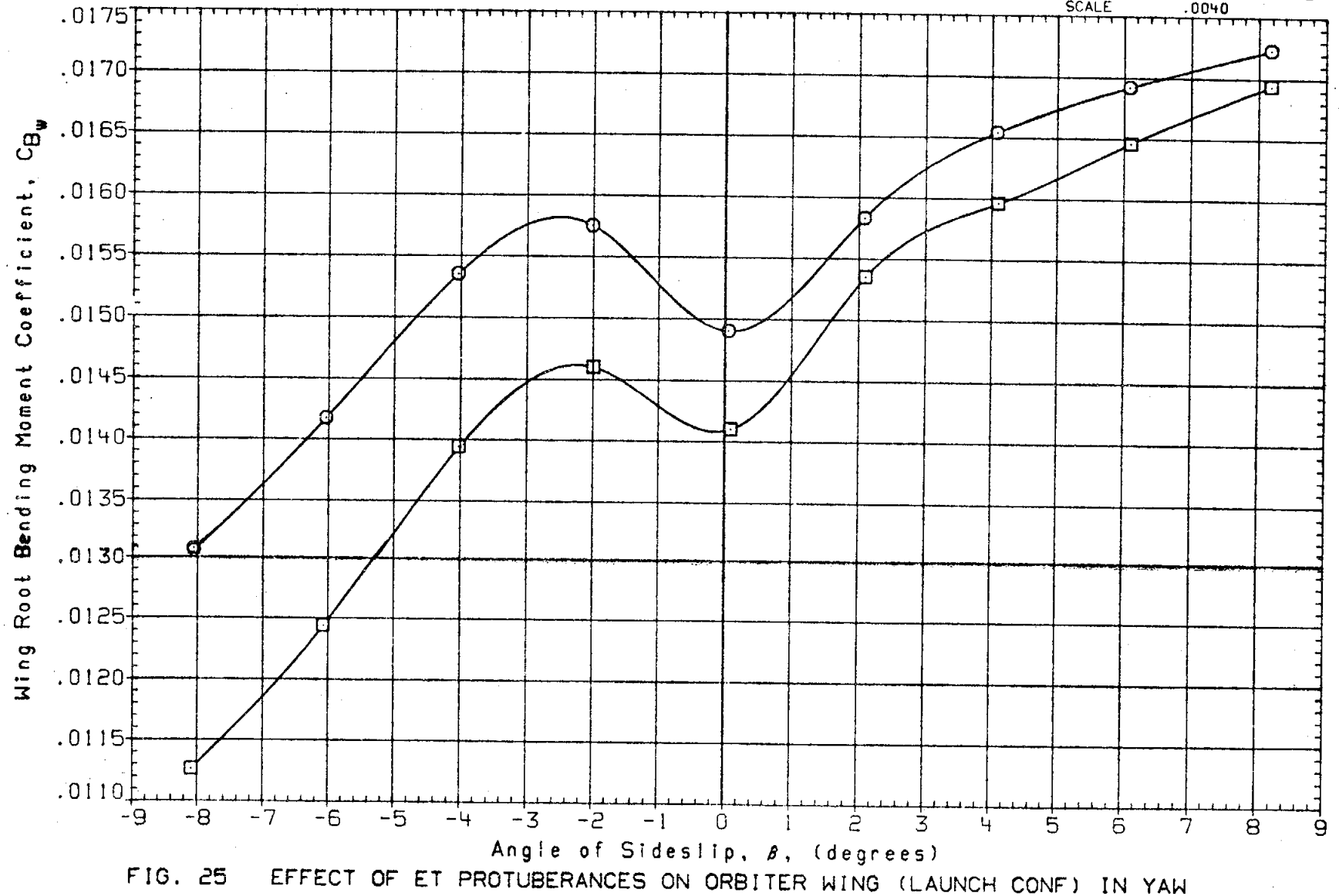

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(B)MACH = .90

DATE 12 MAR 80

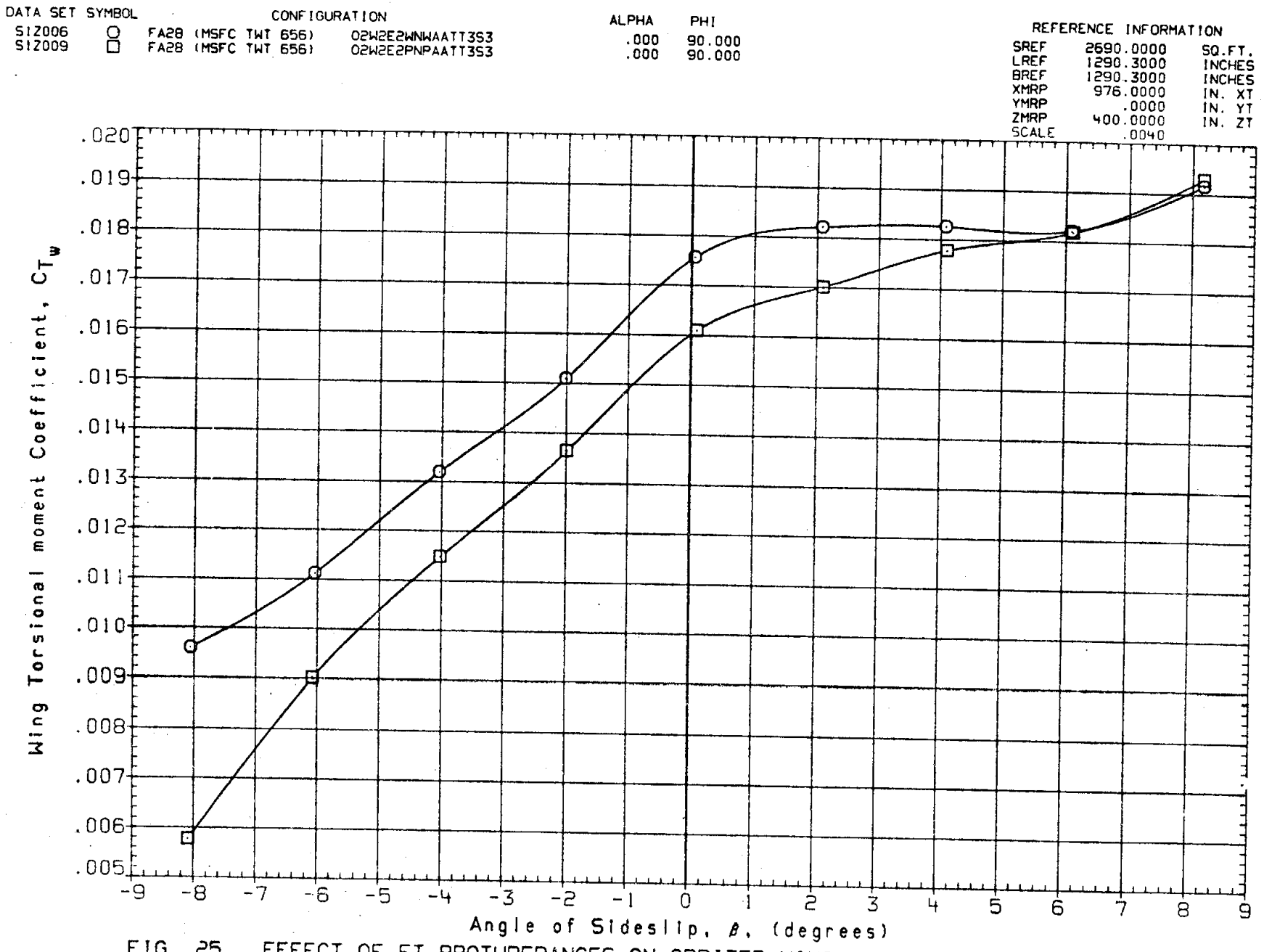

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(B)MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

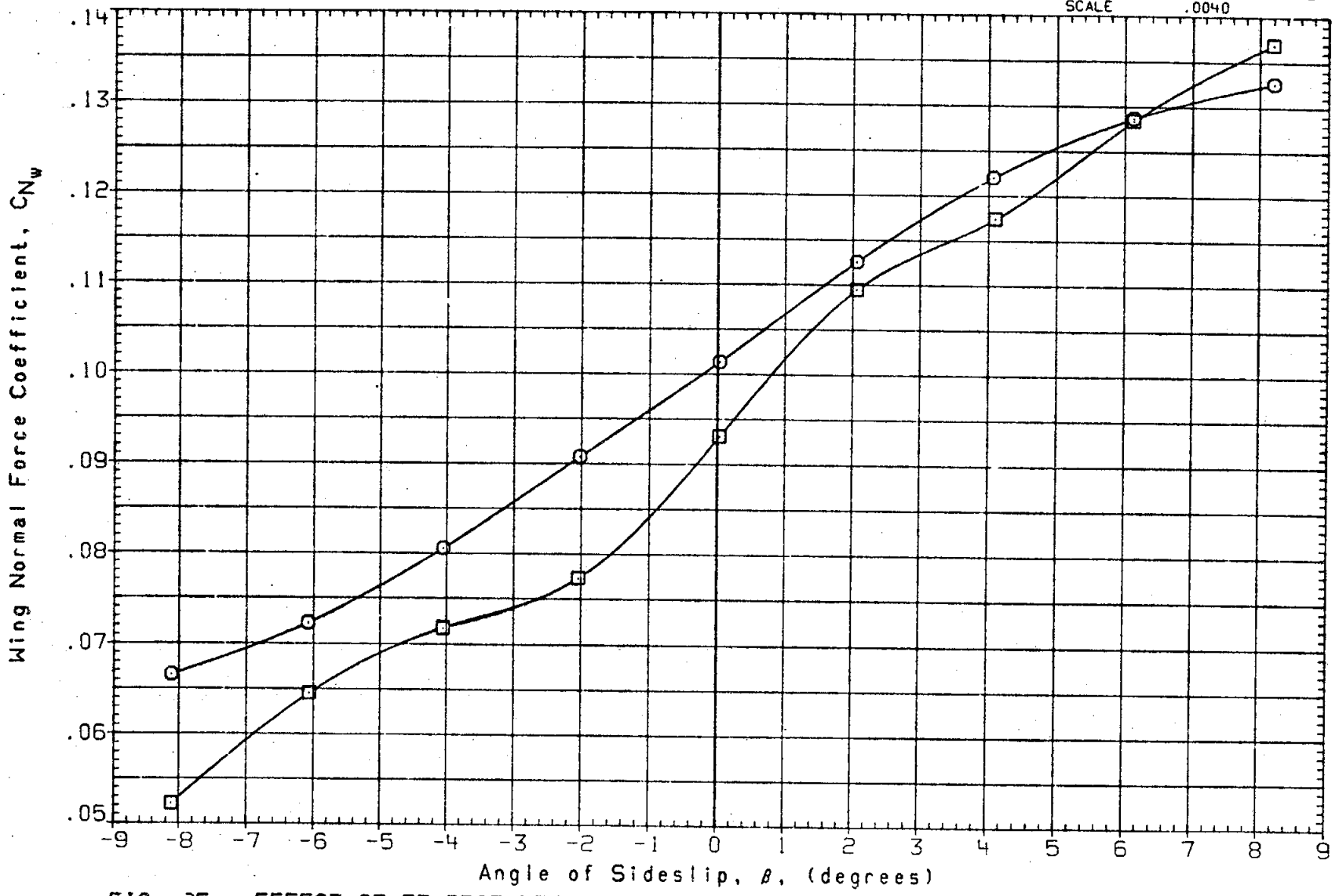

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

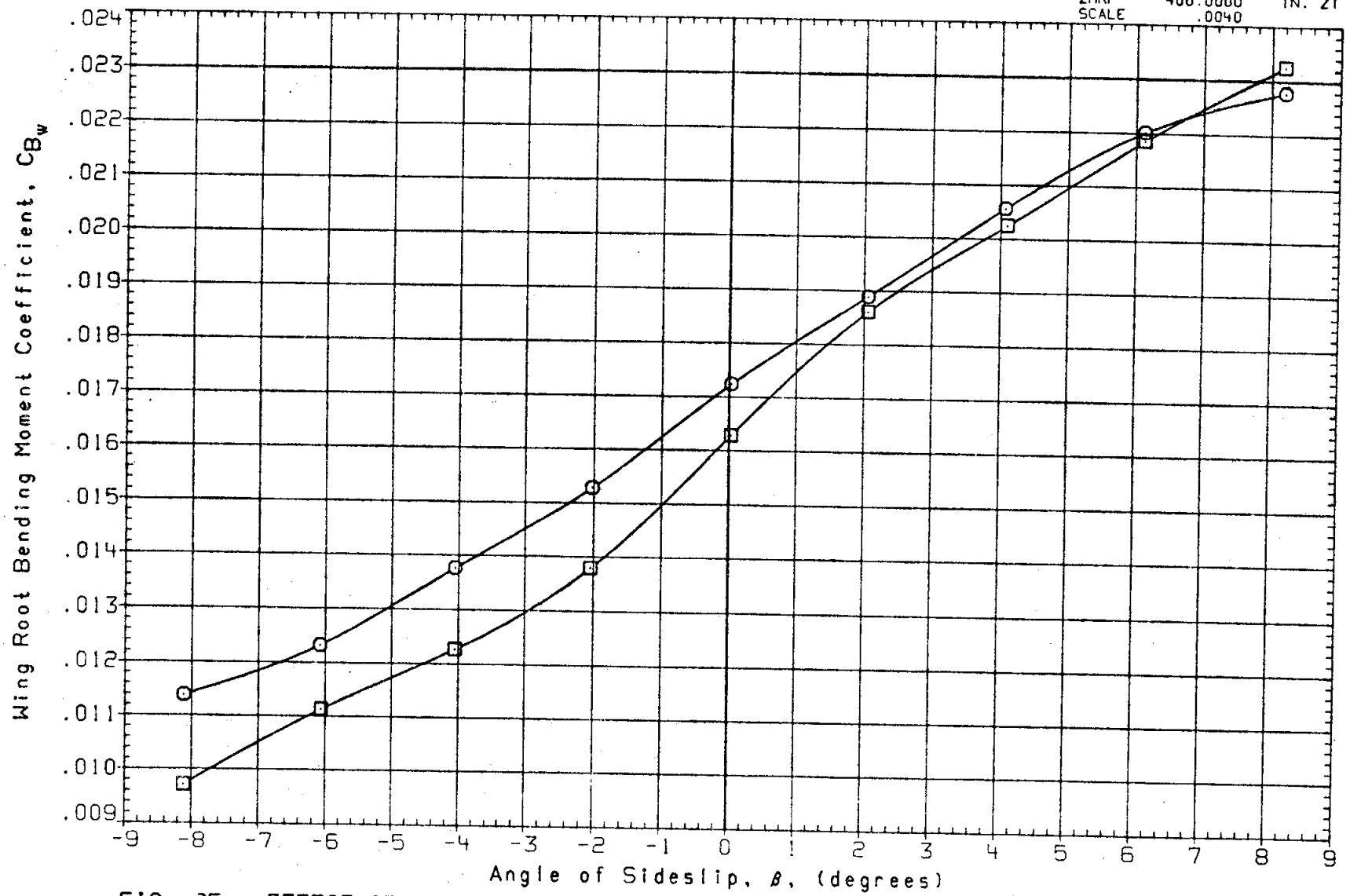

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

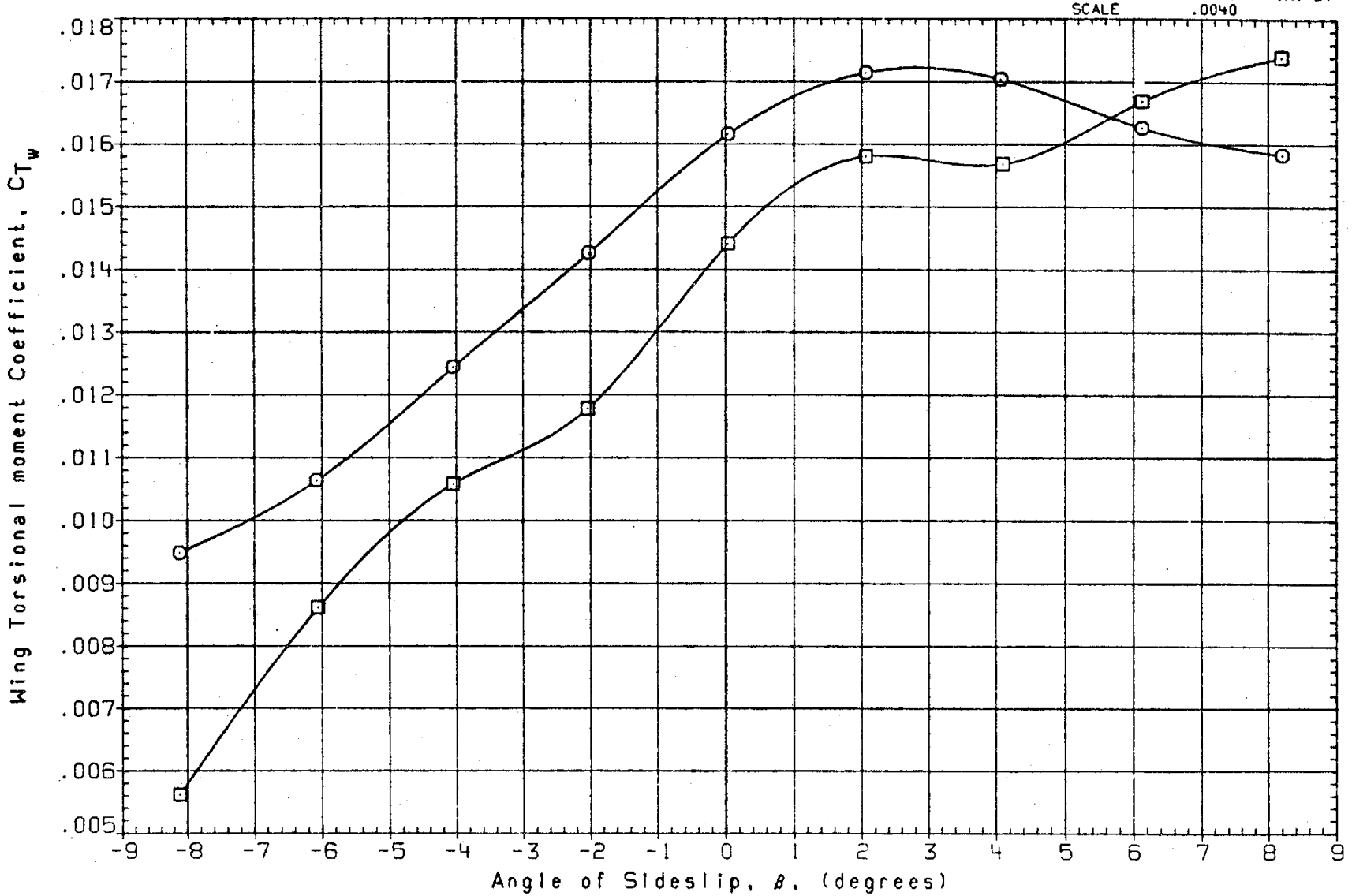

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

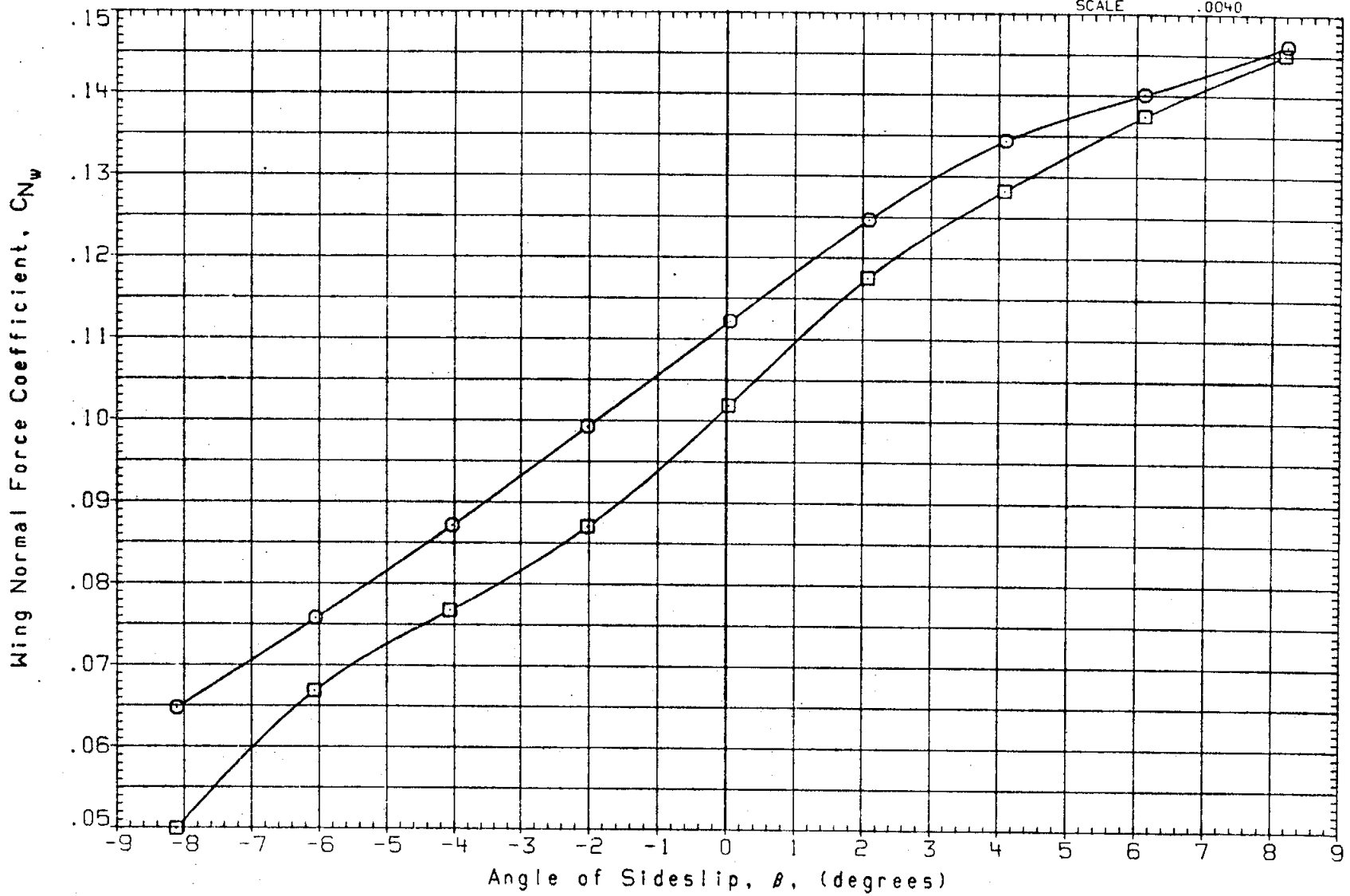

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

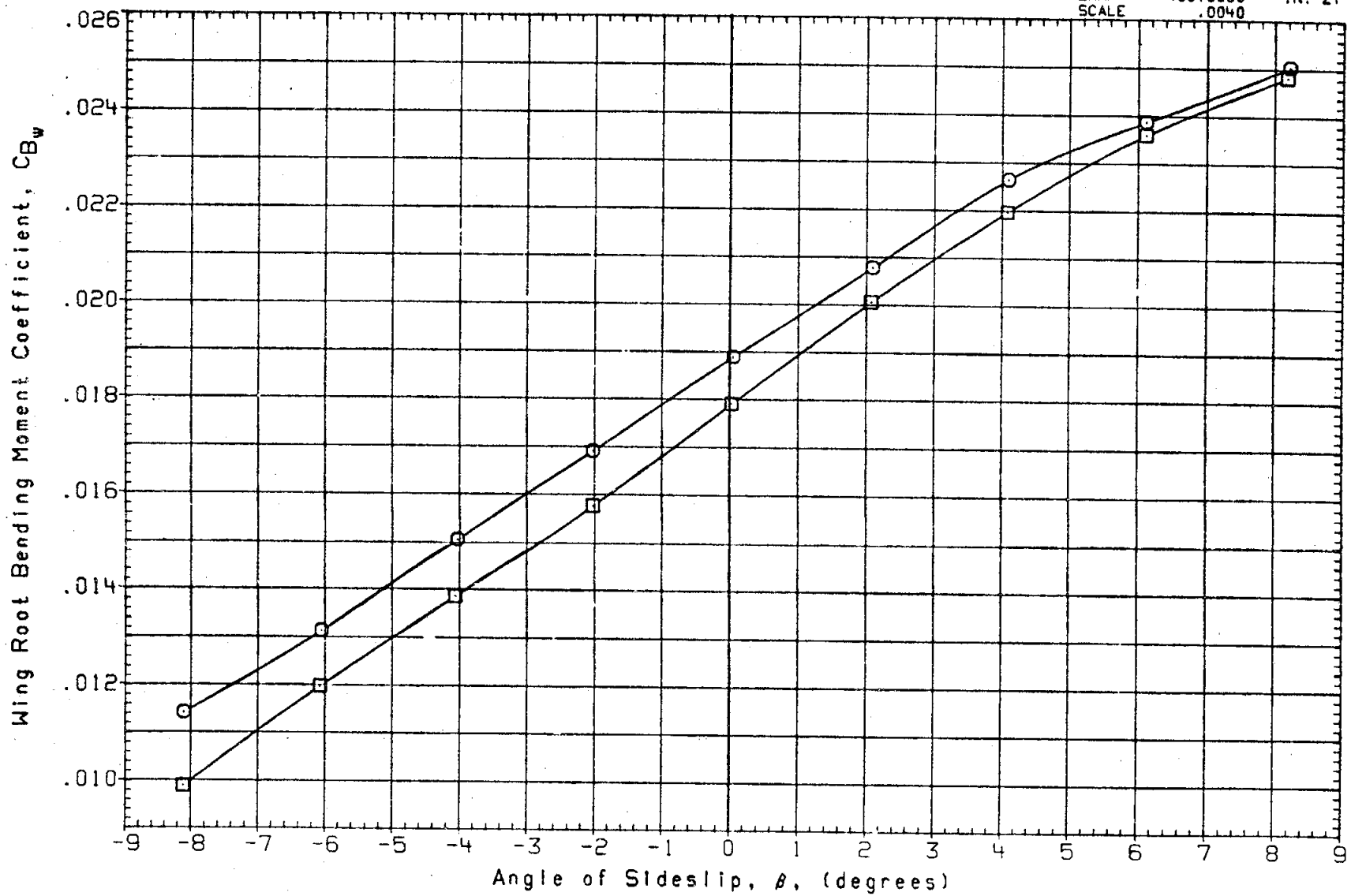

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

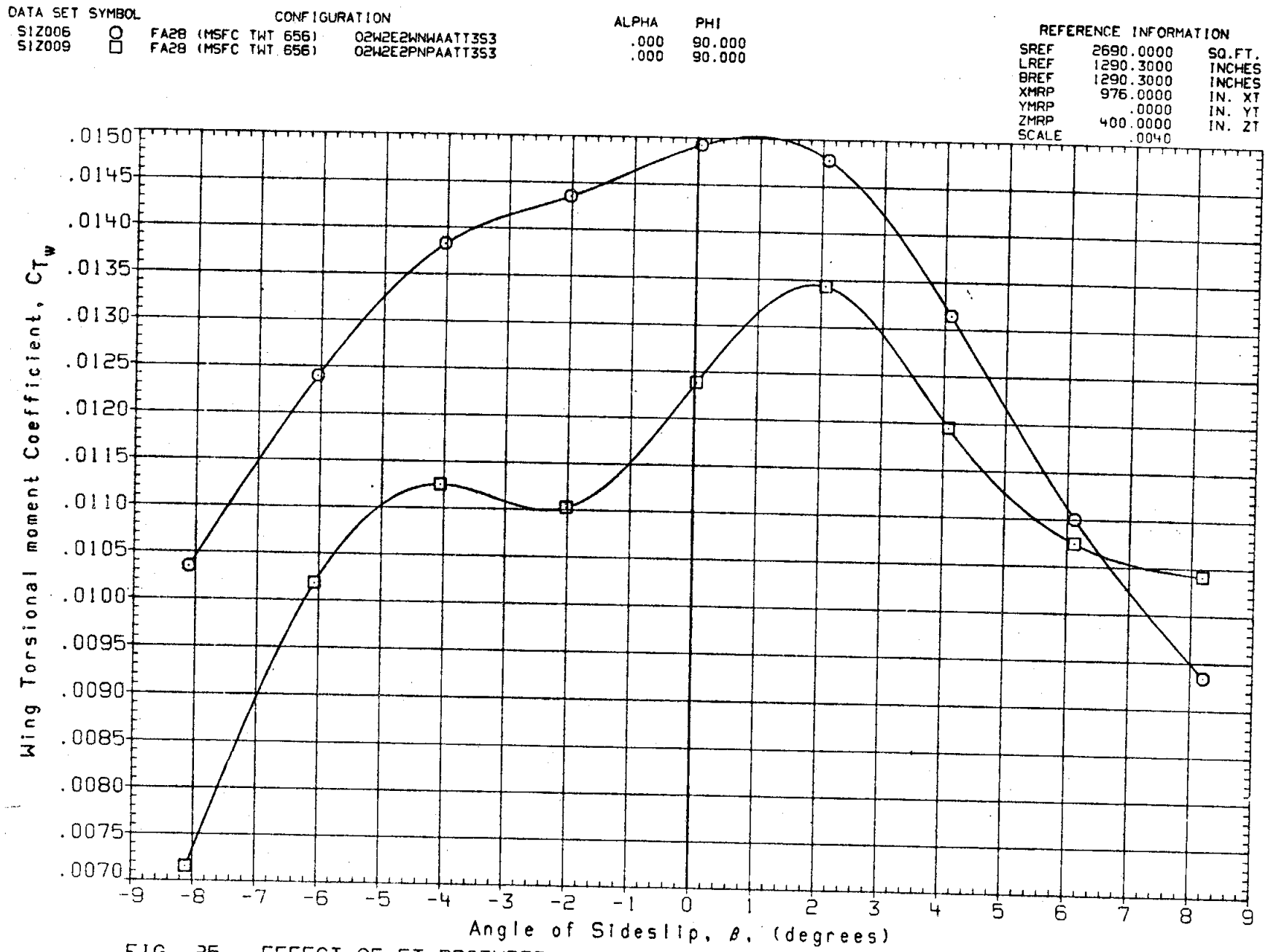

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

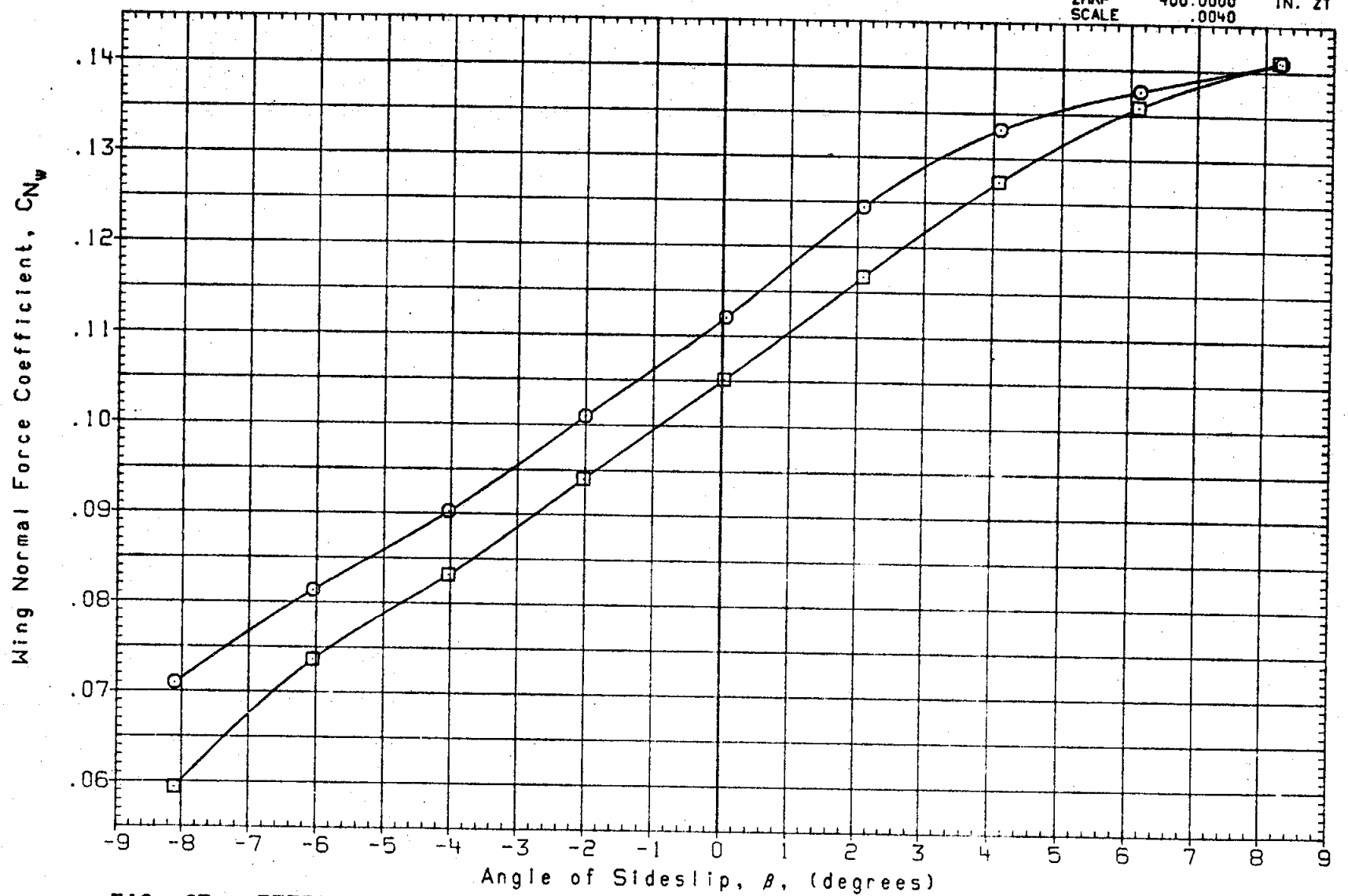

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

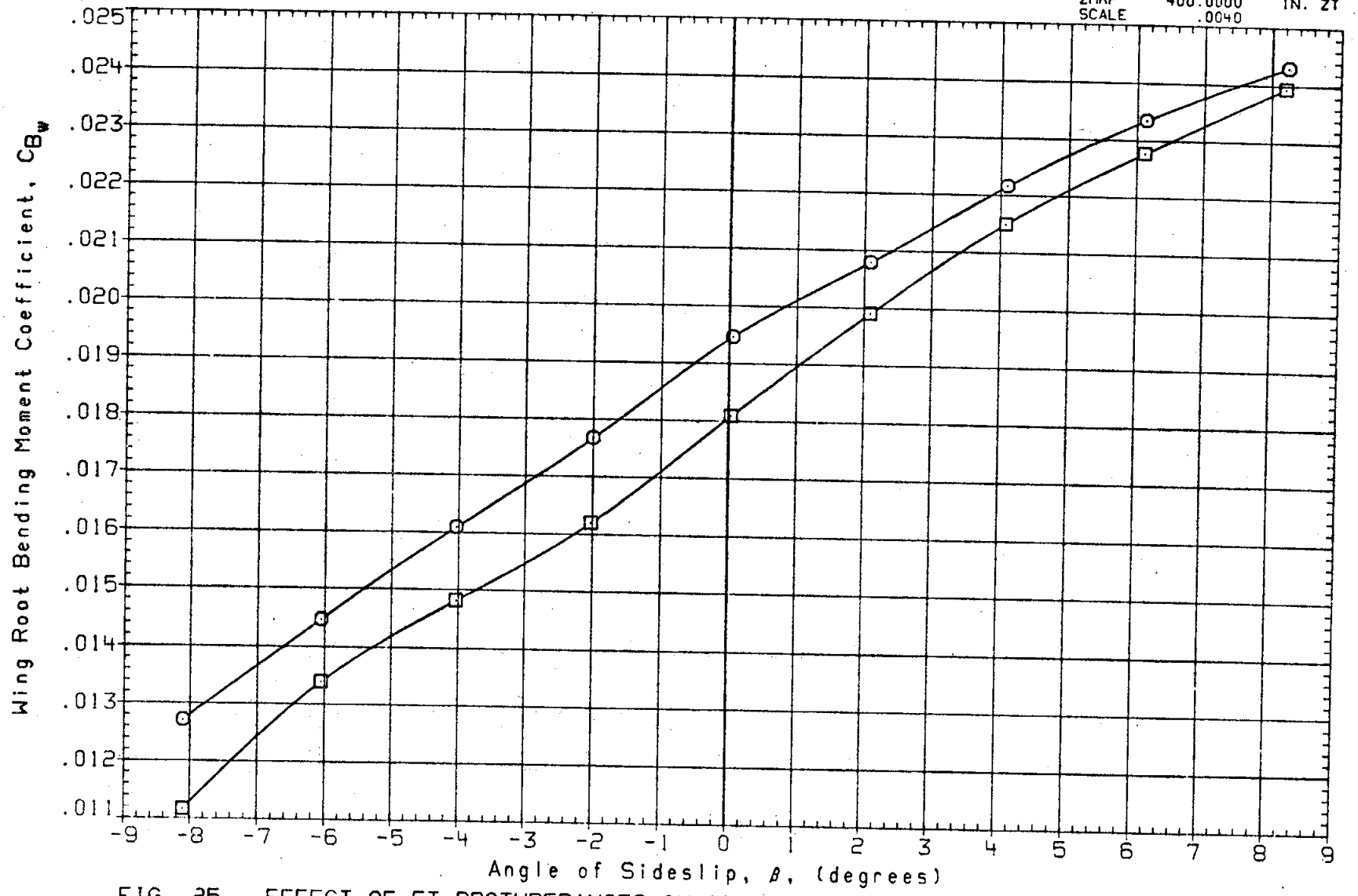

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25

DATE 12 MAR 80

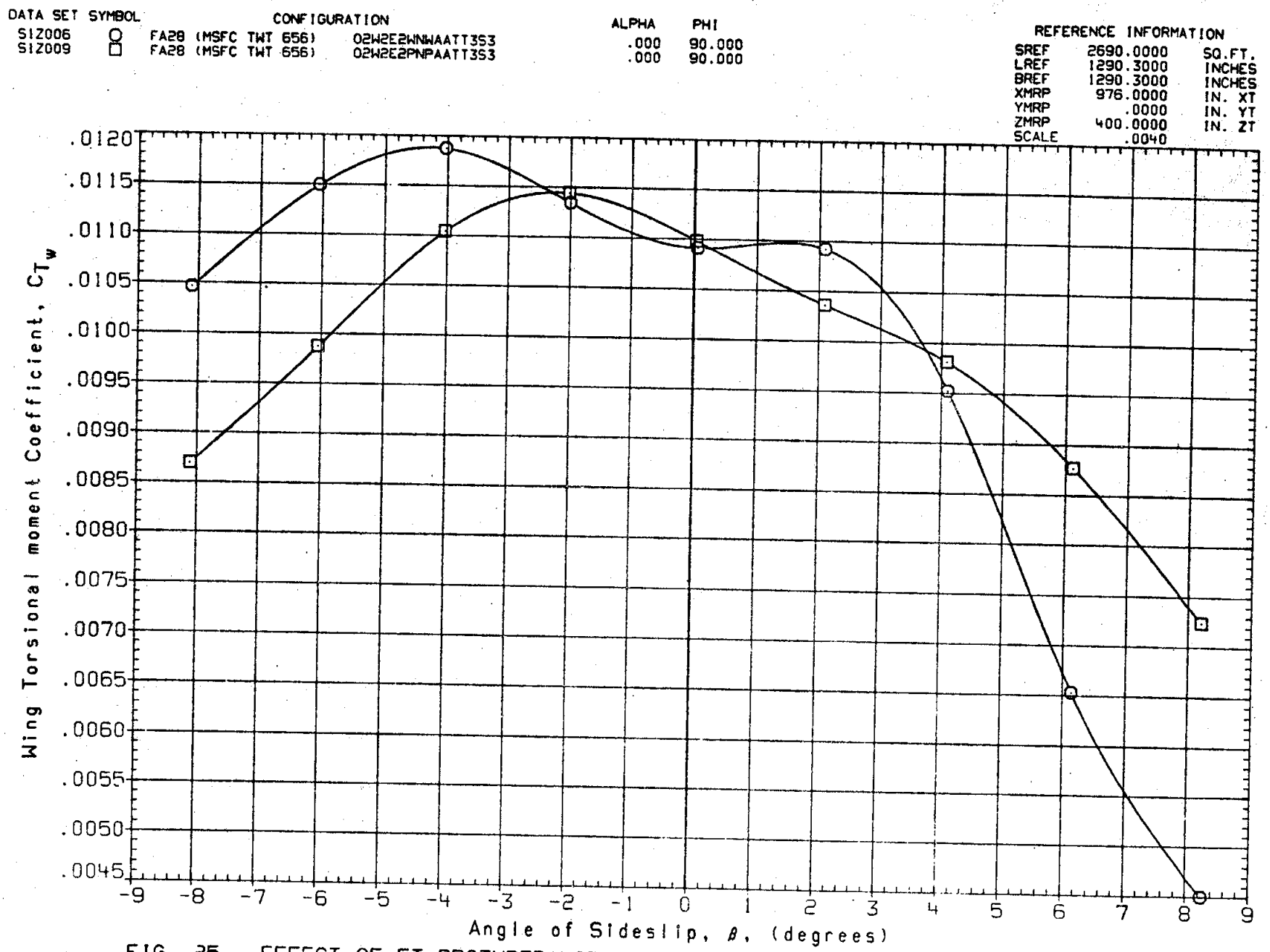

FIG. 25 EFFECT OF ET PROTUBERANCES ON ORBITER WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

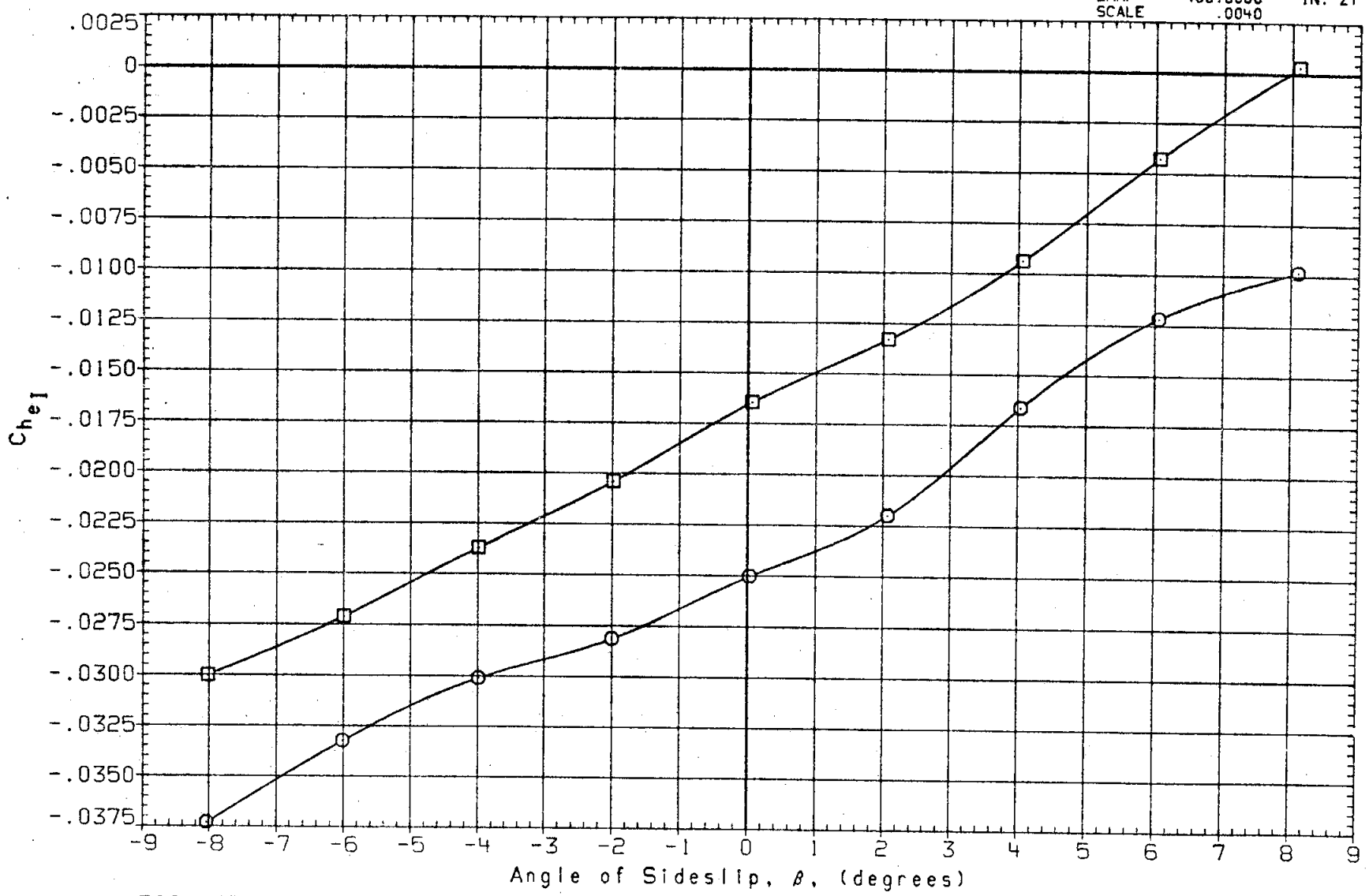

FIG. 26 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

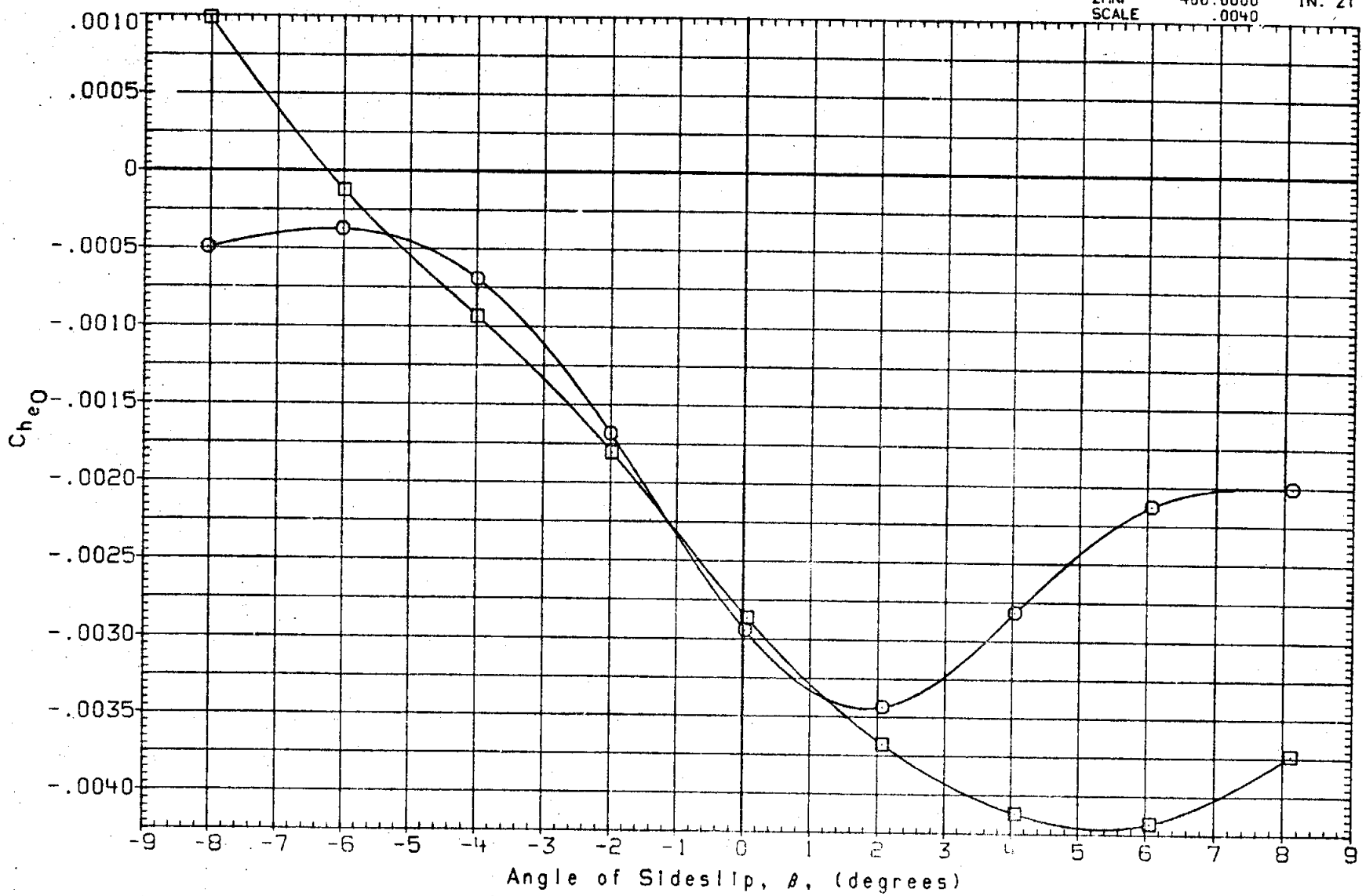

FIG. 26 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

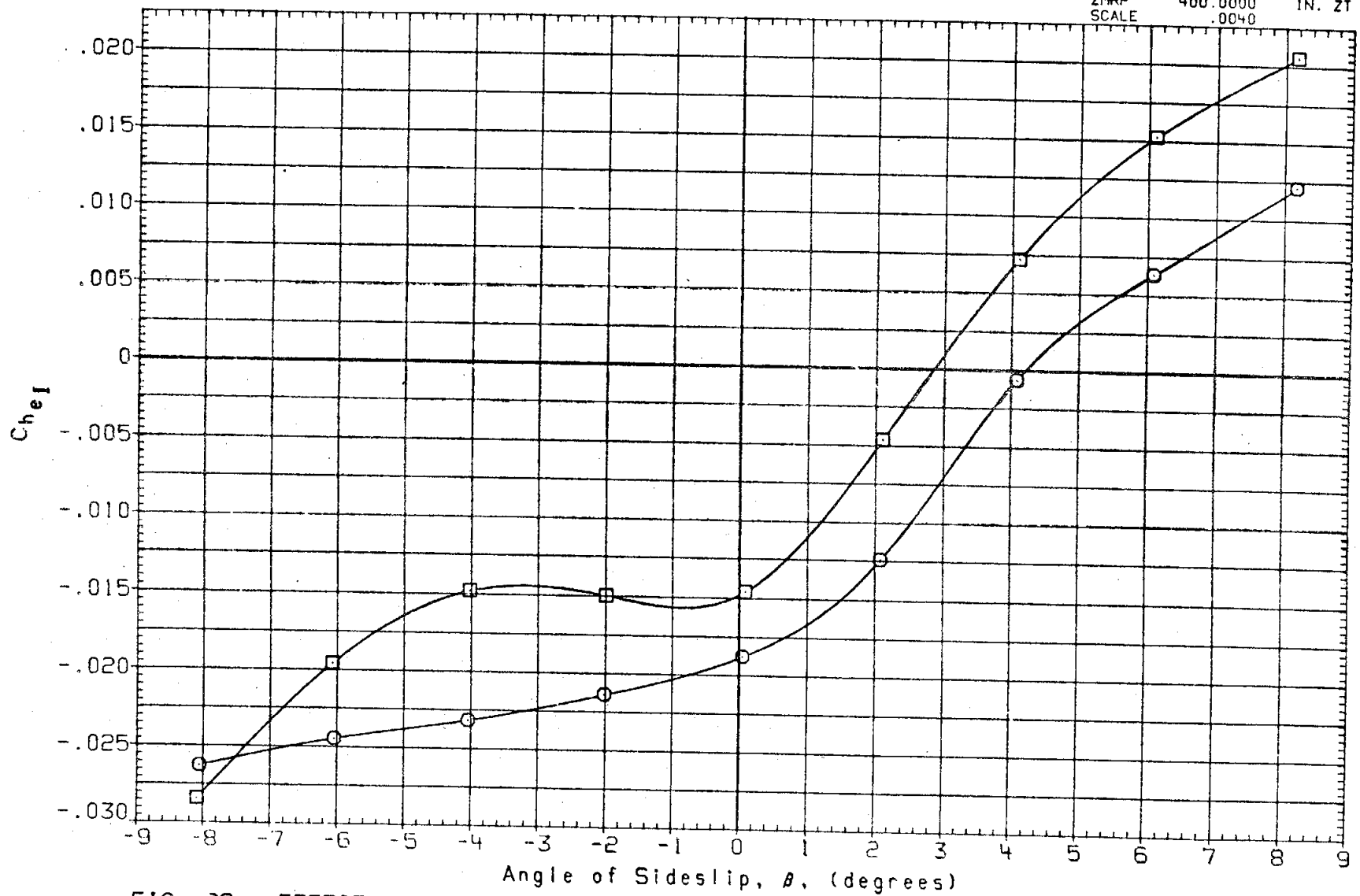

FIG. 26 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(B)MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
51Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
51Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

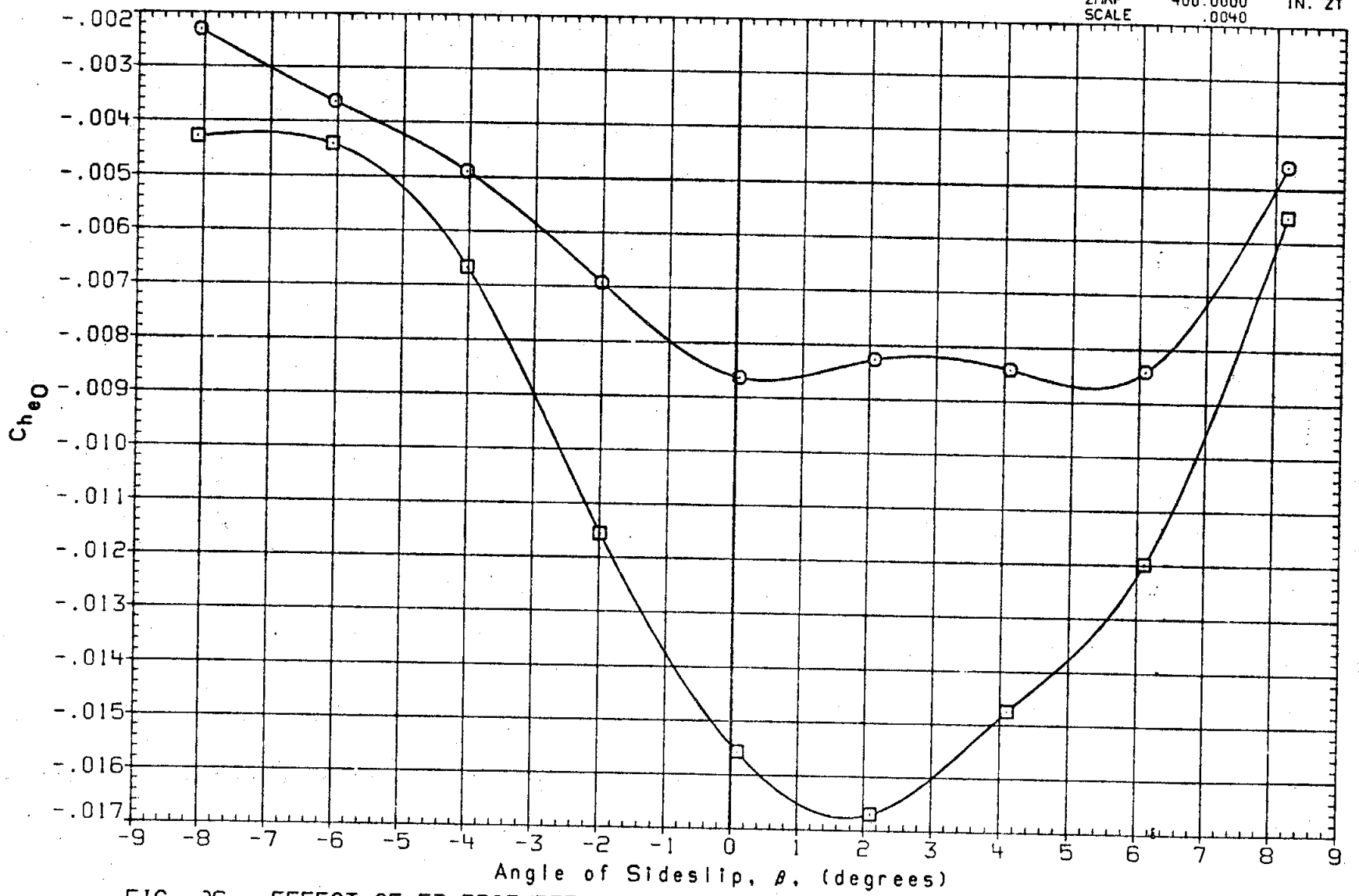

FIG. 26 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(B) MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

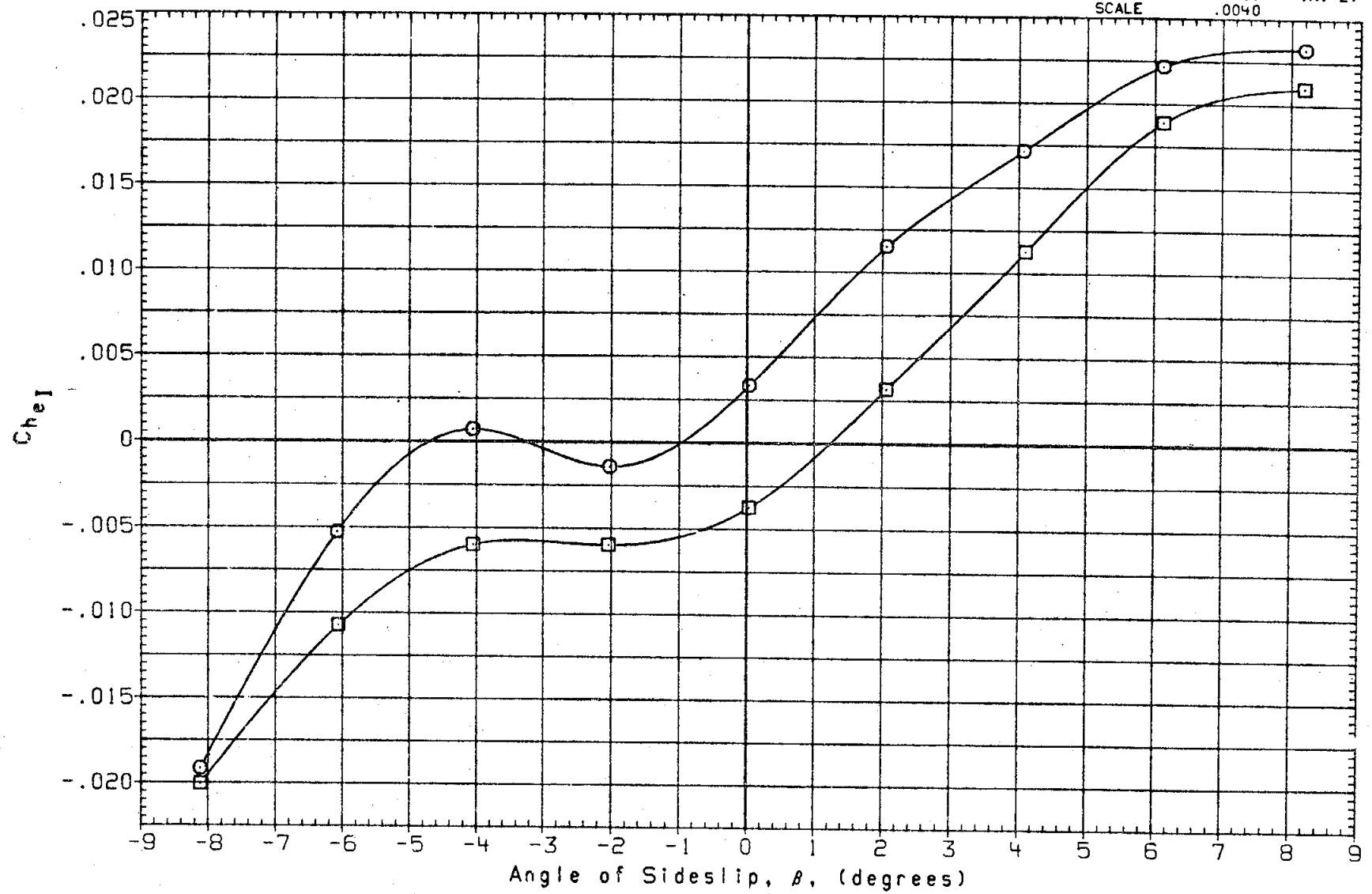

FIG. 26 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

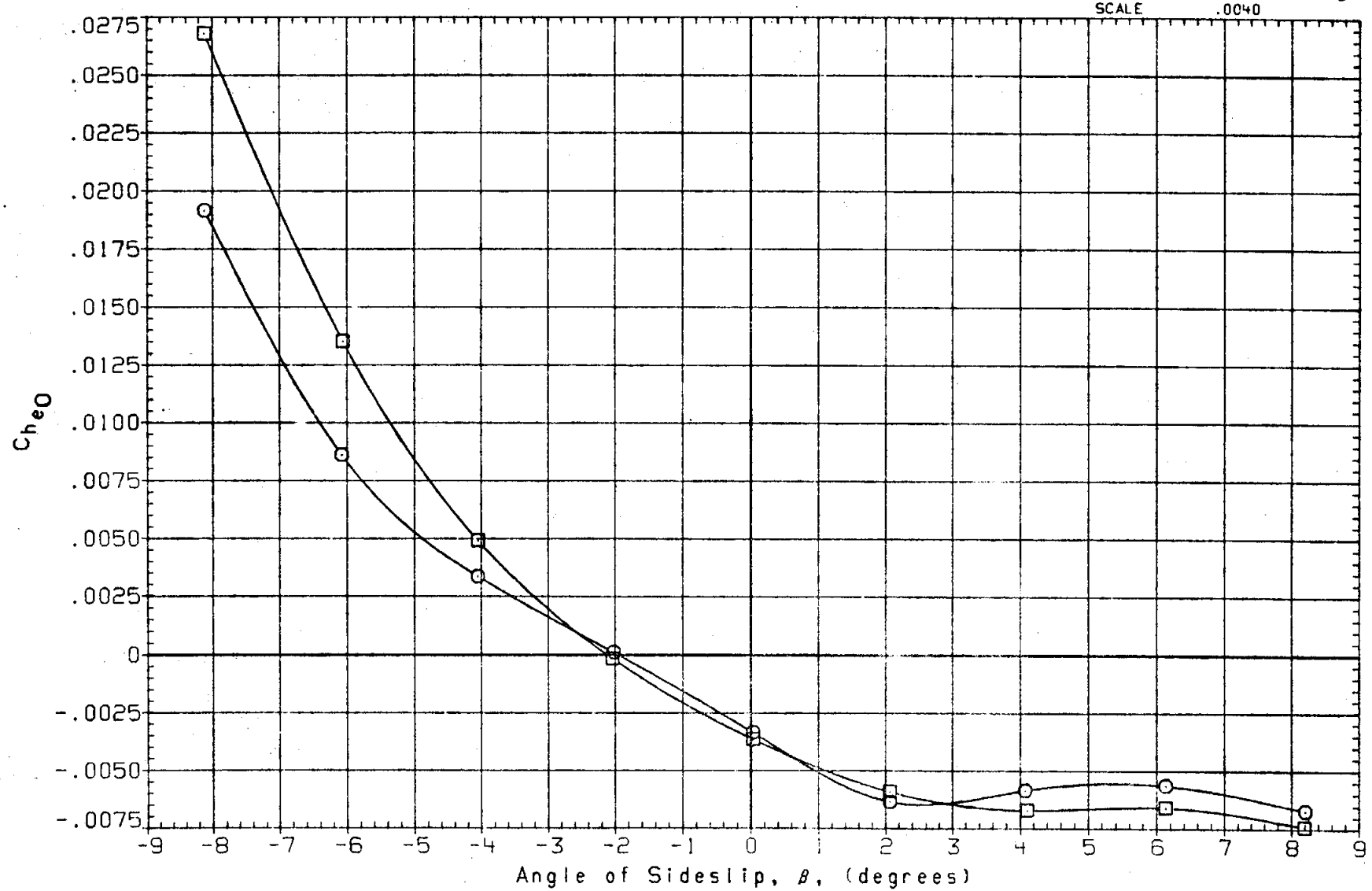

FIG. 26 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

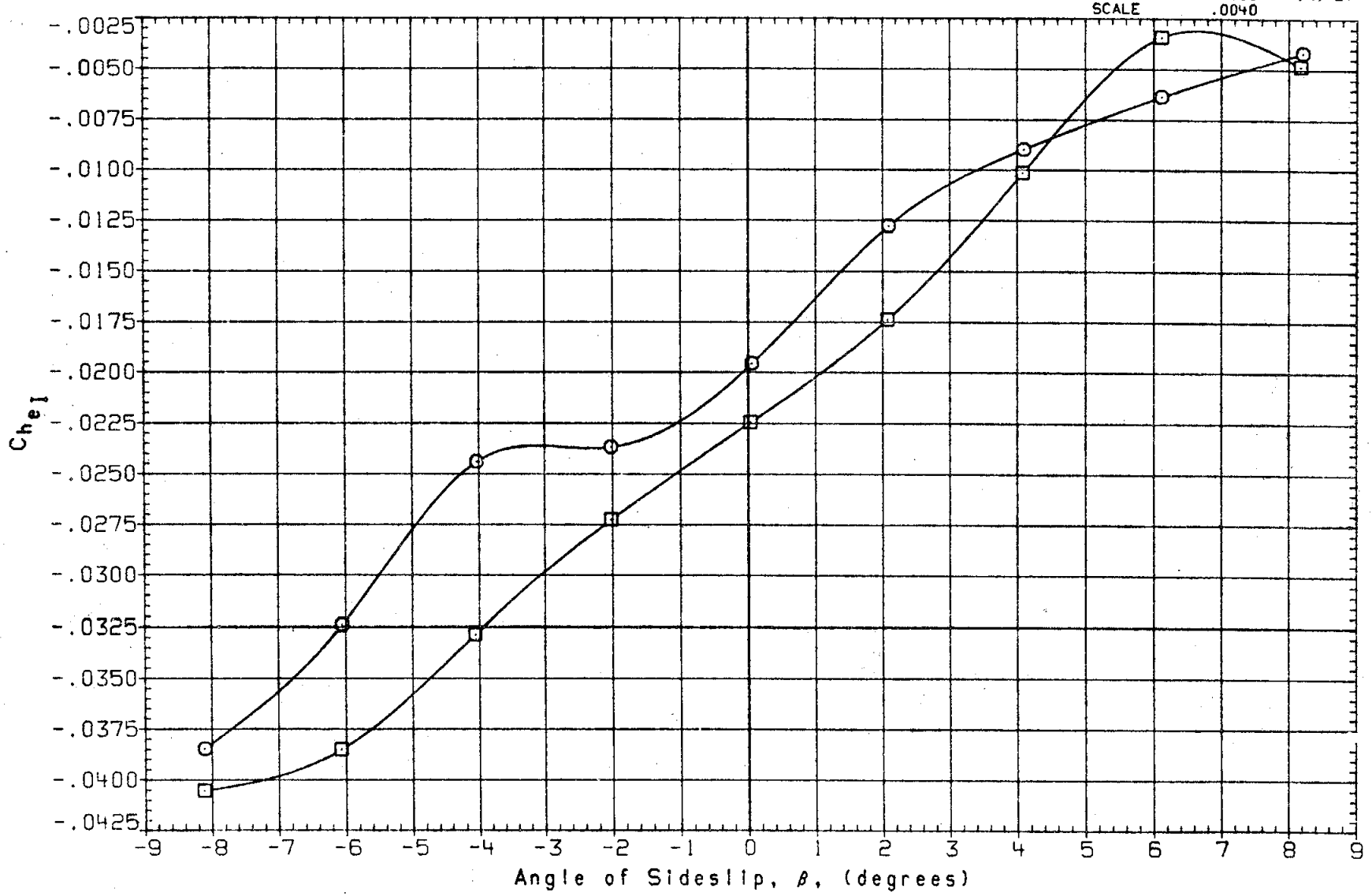

FIG. 26 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

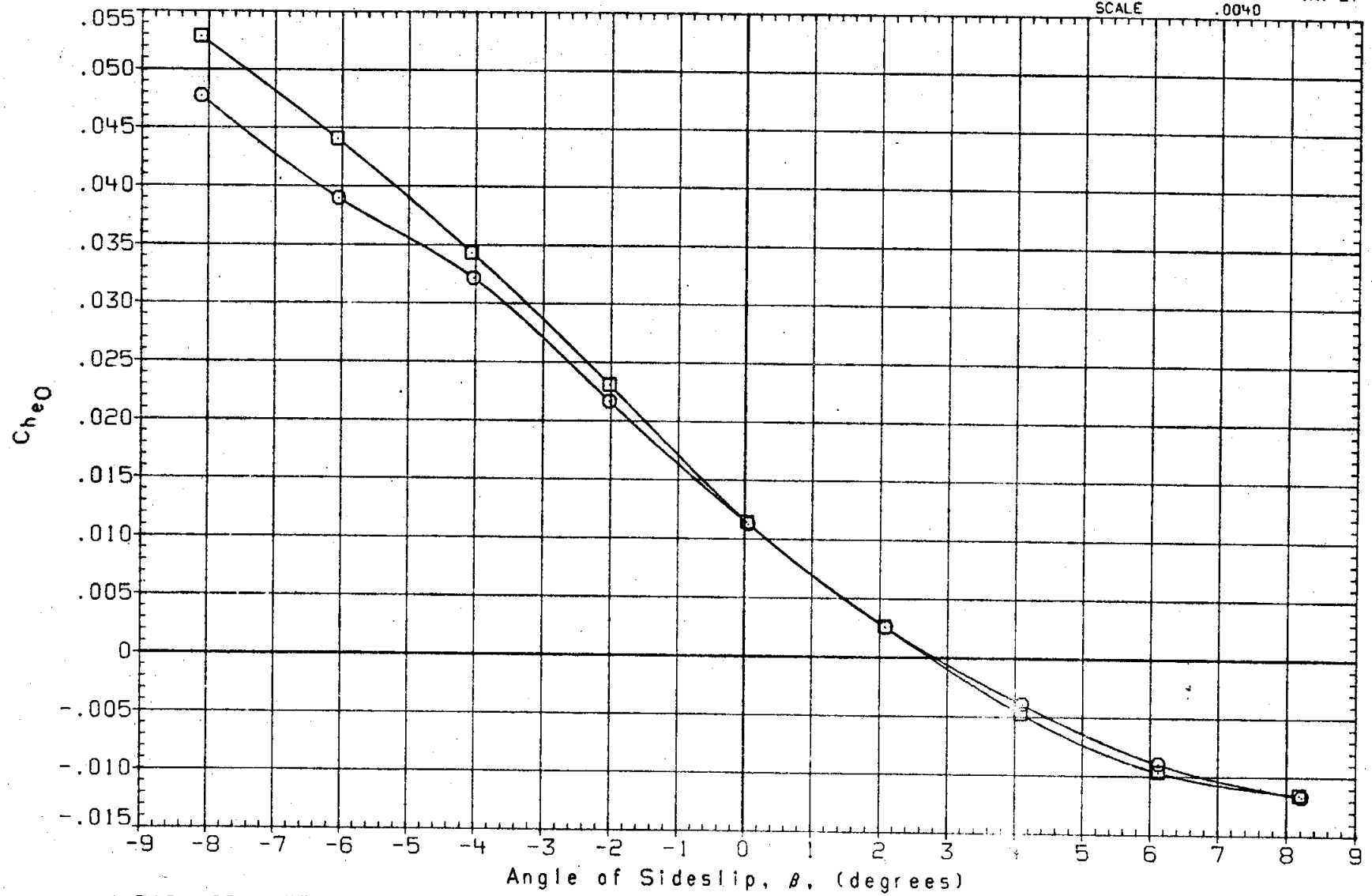

FIG. 26 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	02W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

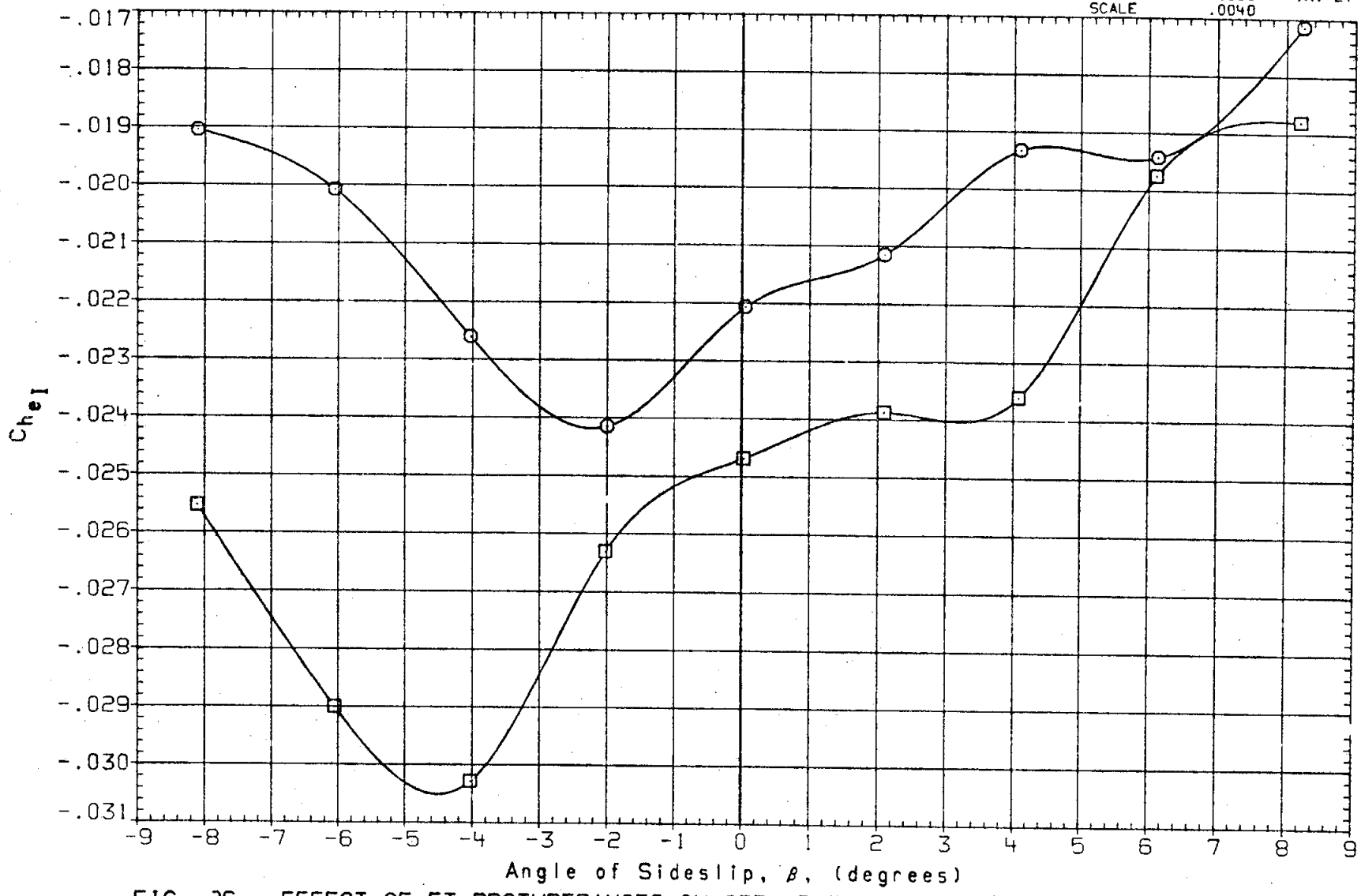

FIG. 26 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z006	○	FA28 (MSFC TWT 656)	O2W2E2WNWAATT3S3	.000	90.000
S1Z009	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

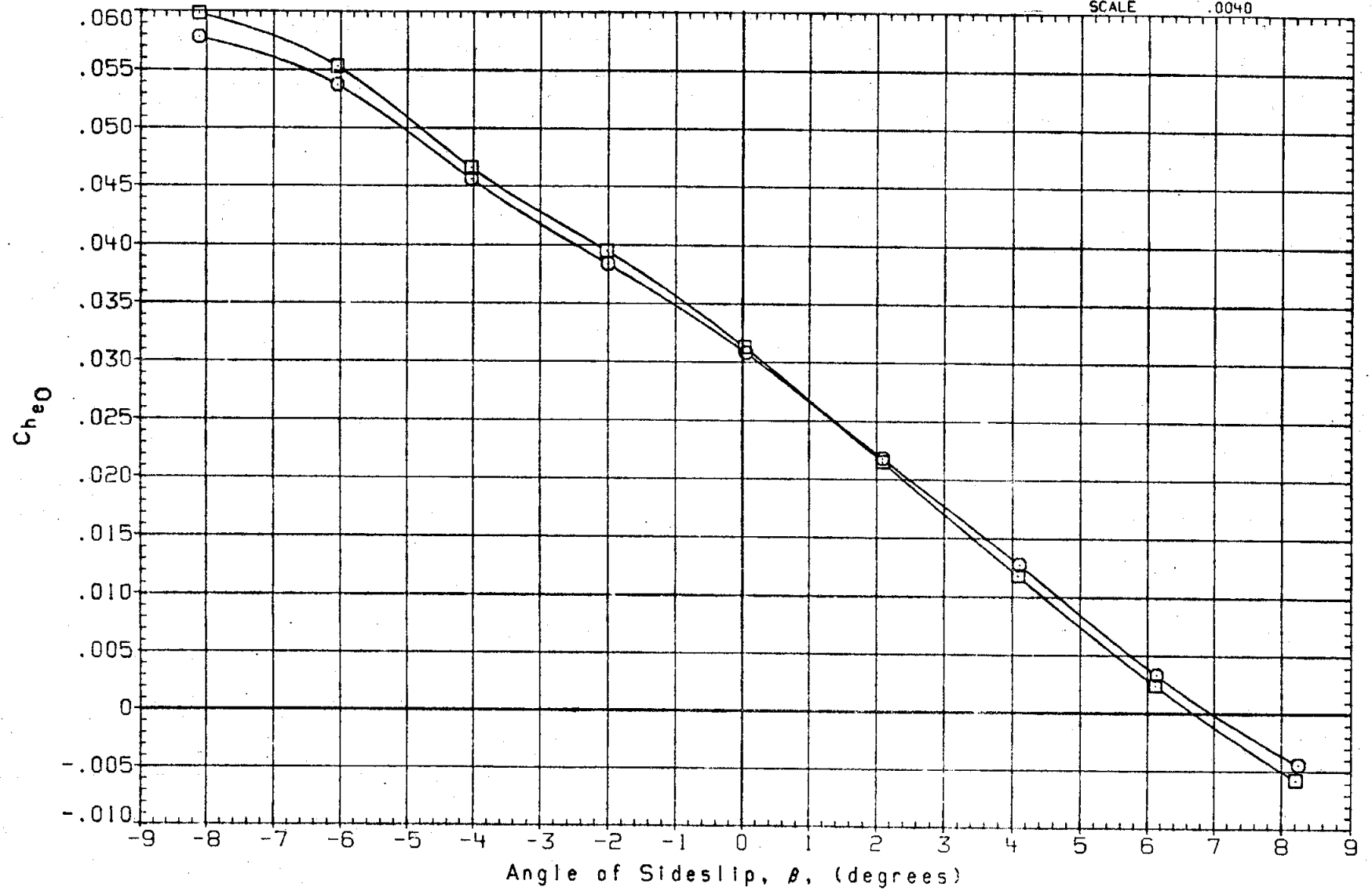

FIG. 26 EFFECT OF ET PROTUBERANCES ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

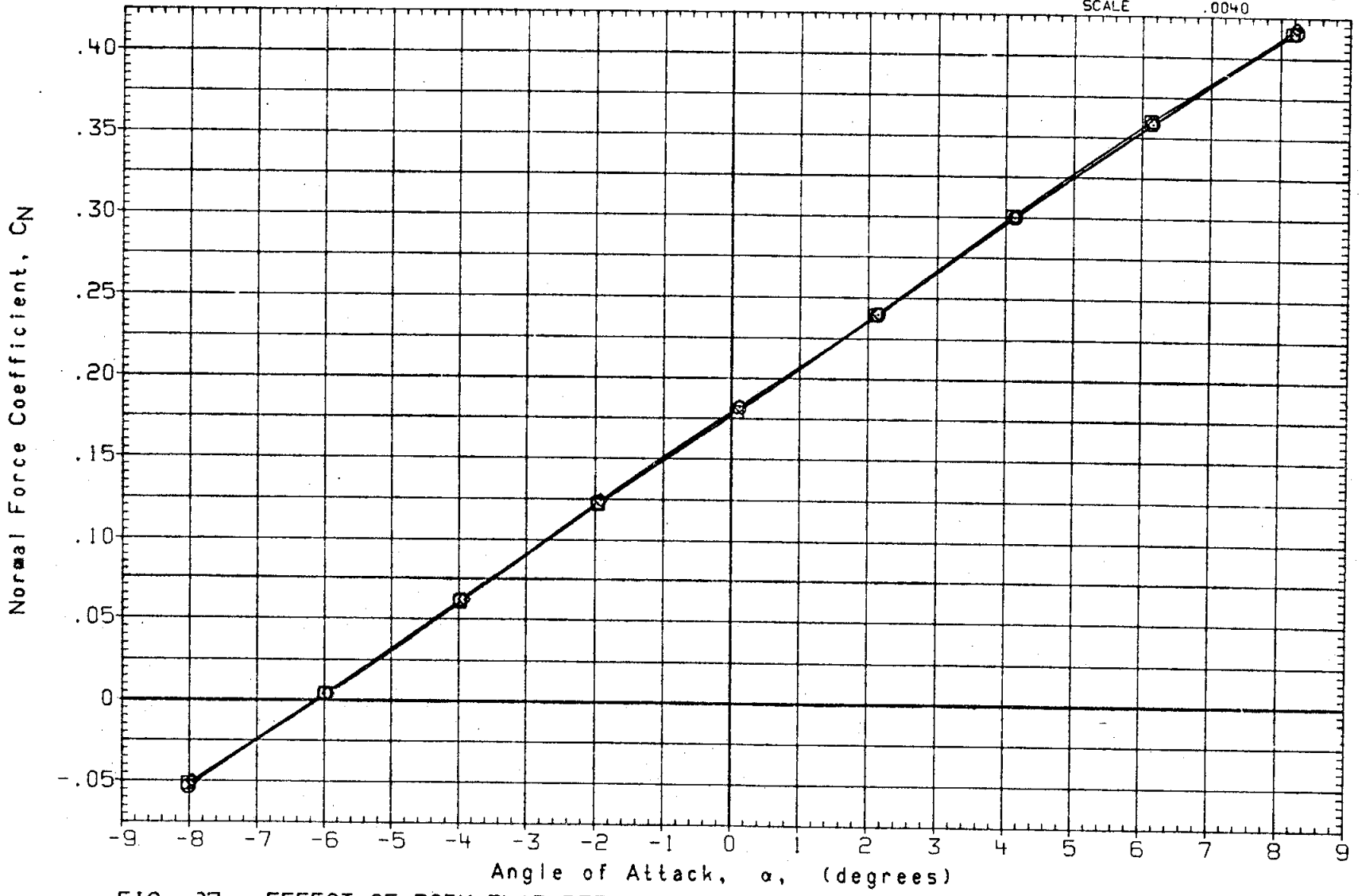

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

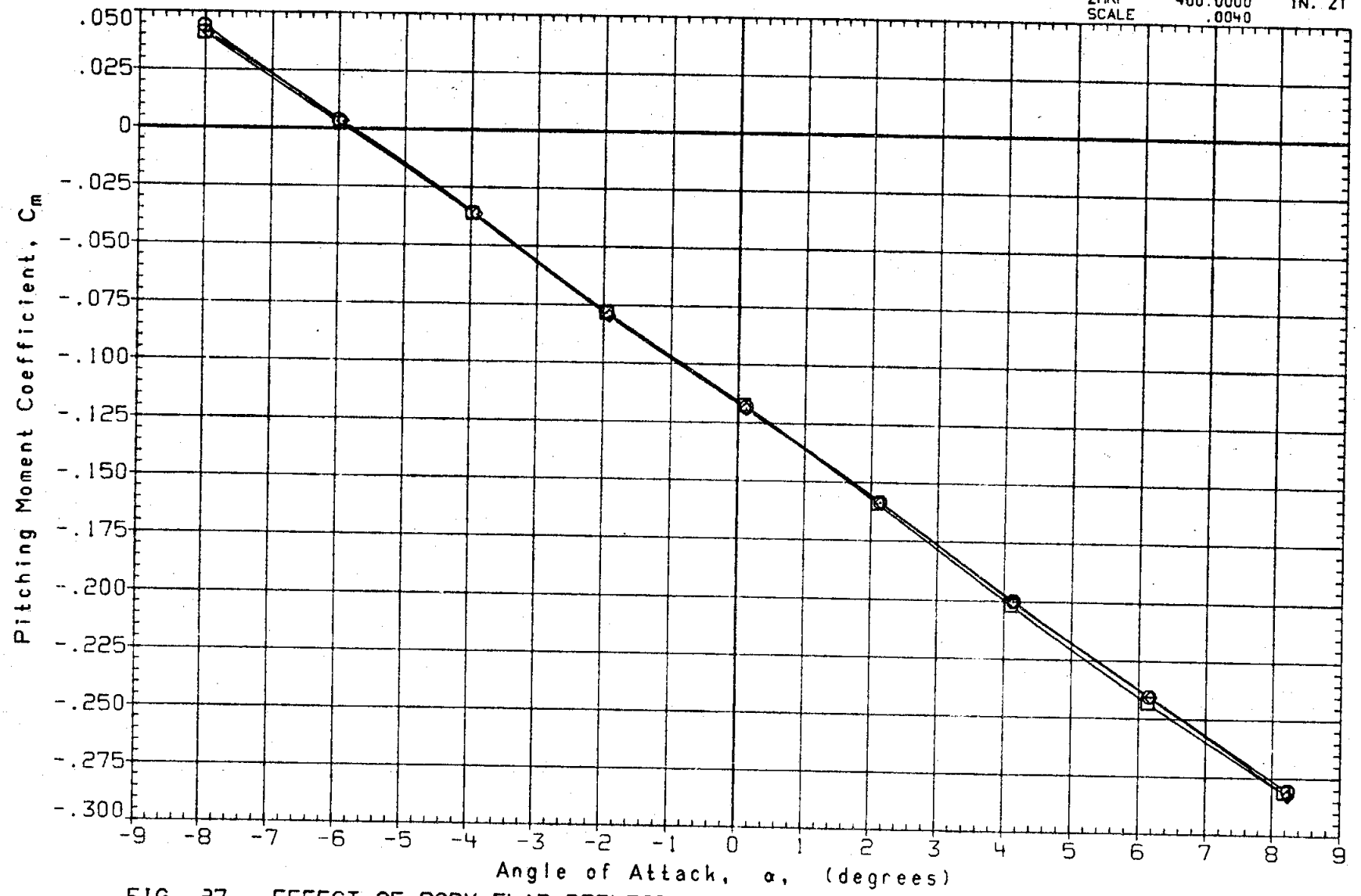

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

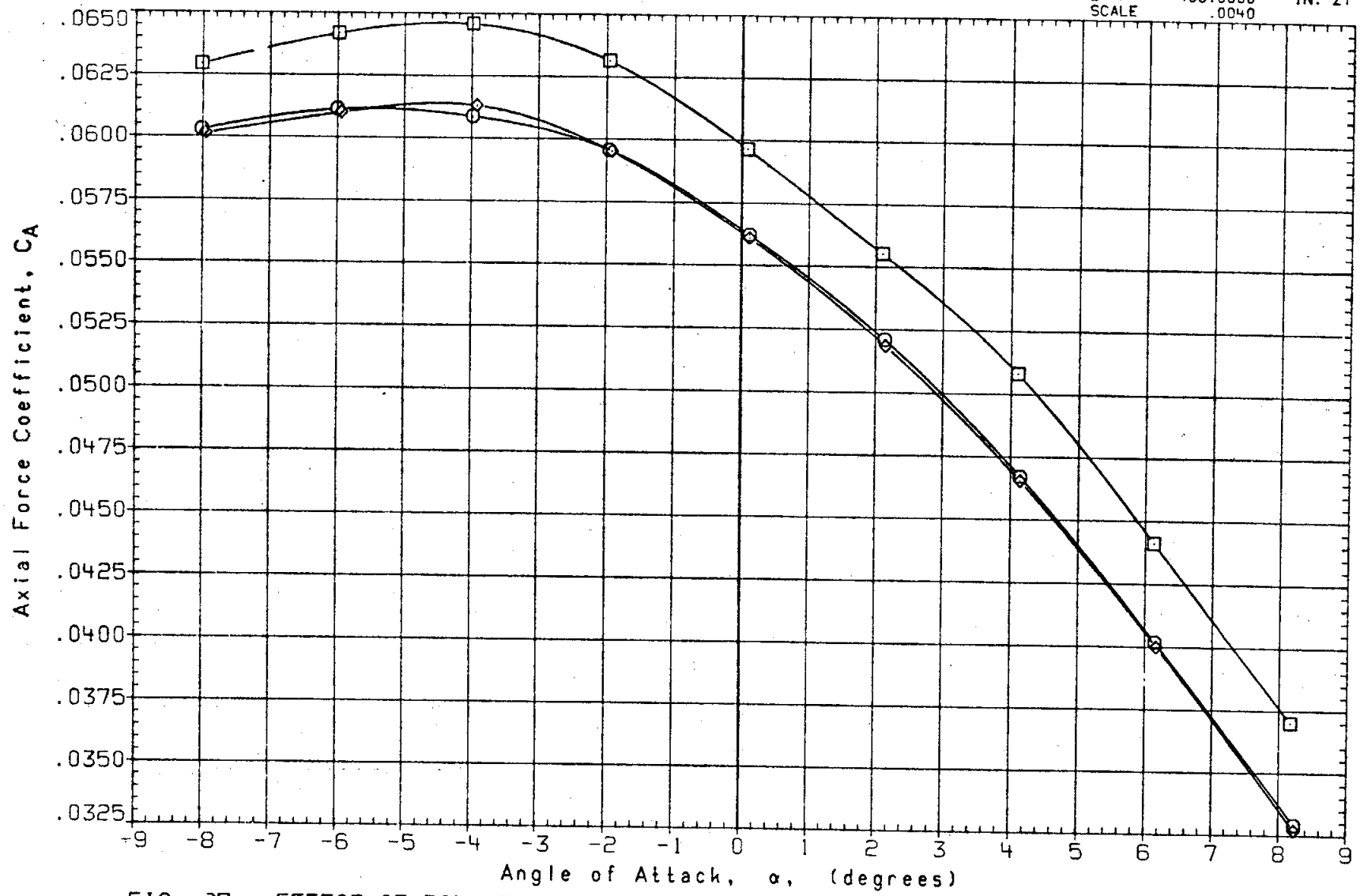

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

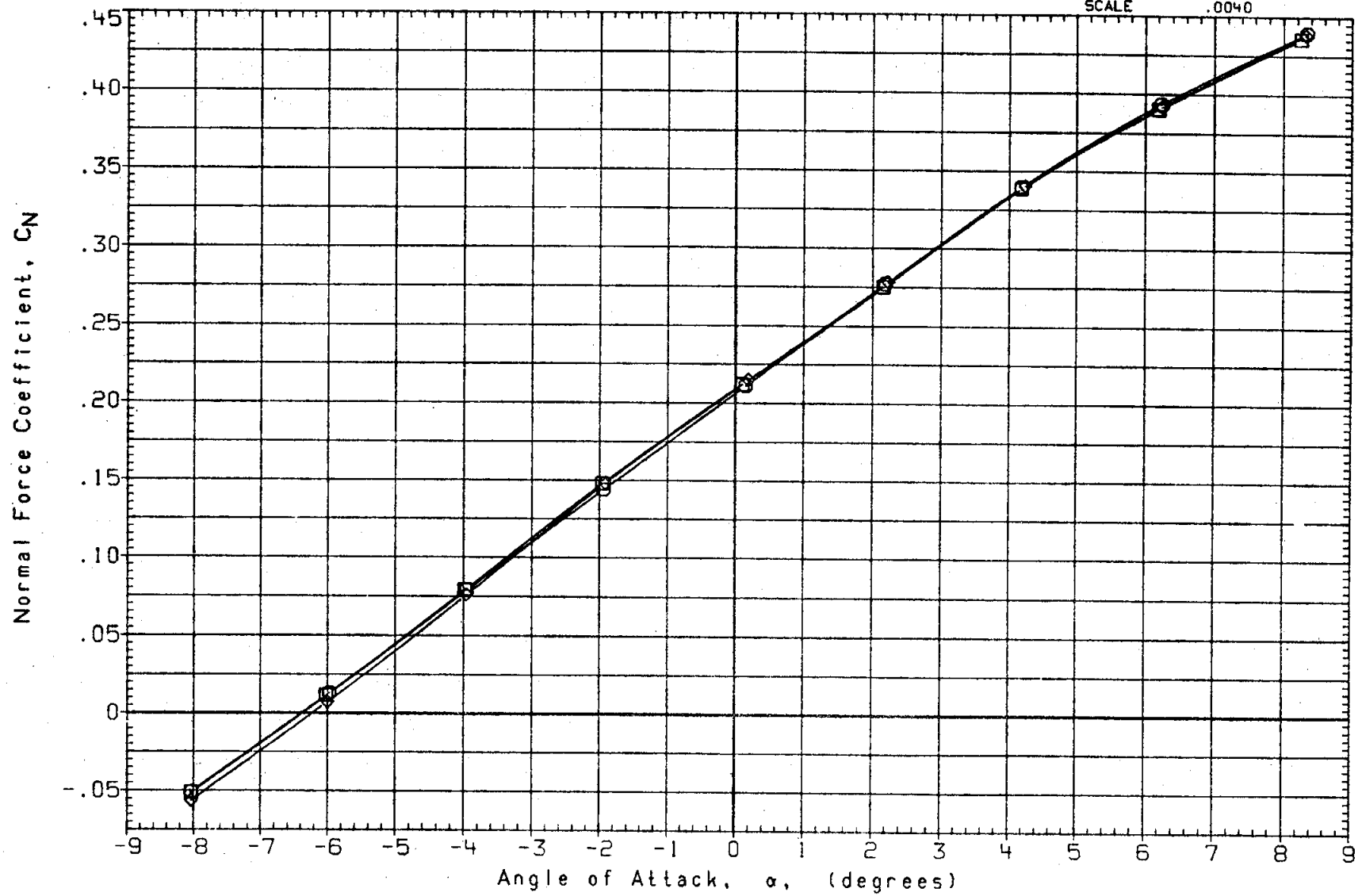

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

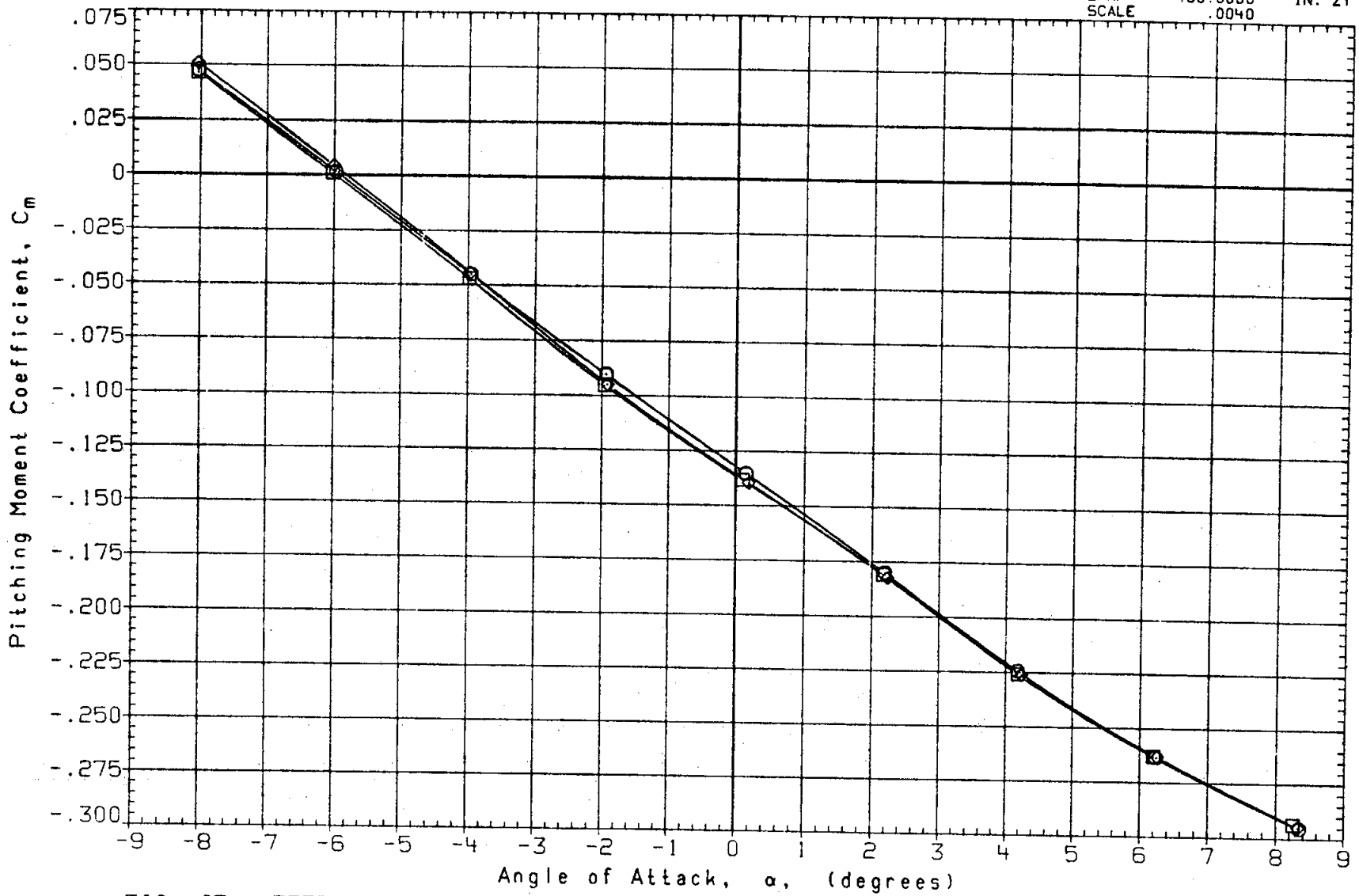

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA29 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

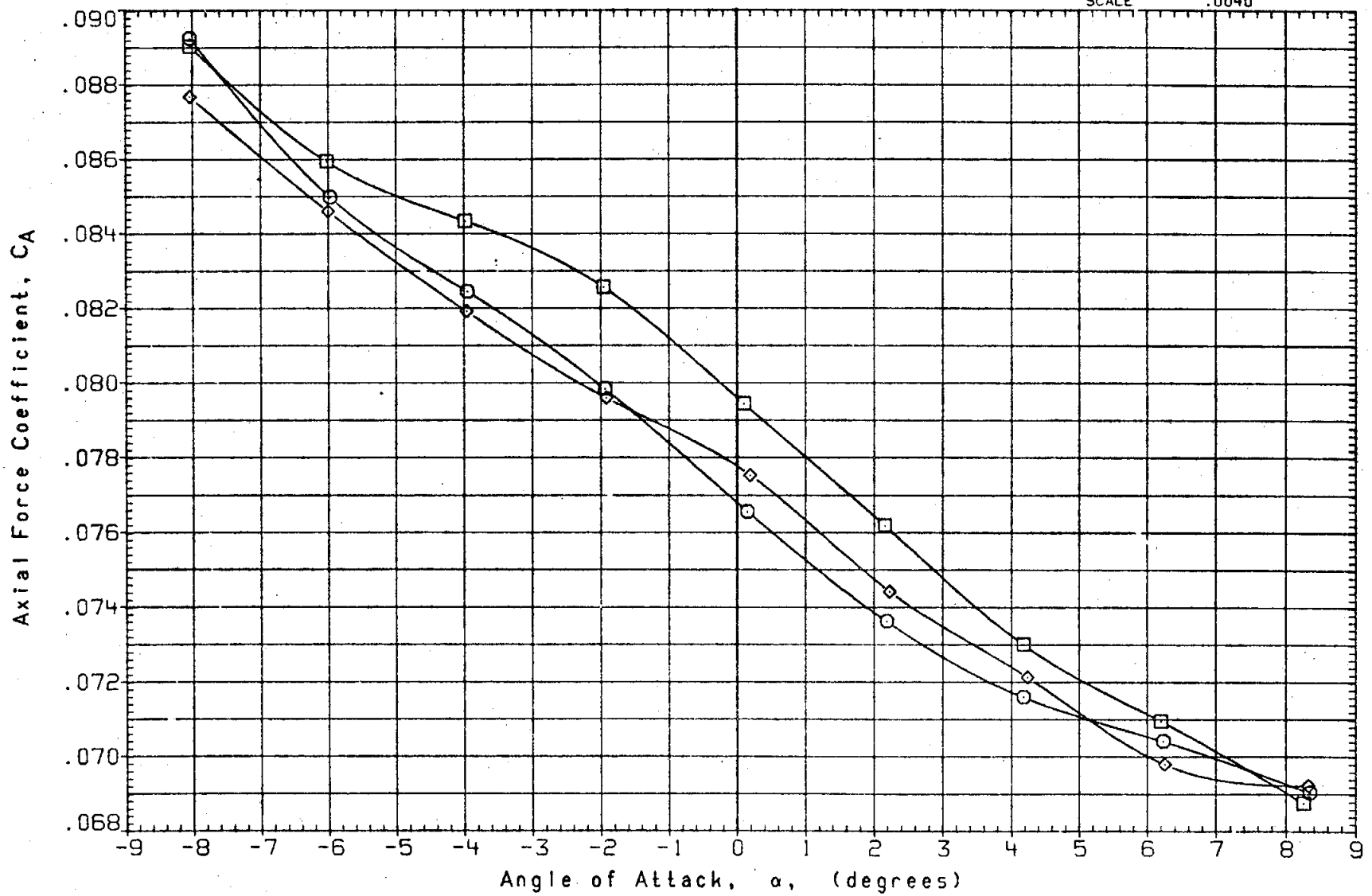

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

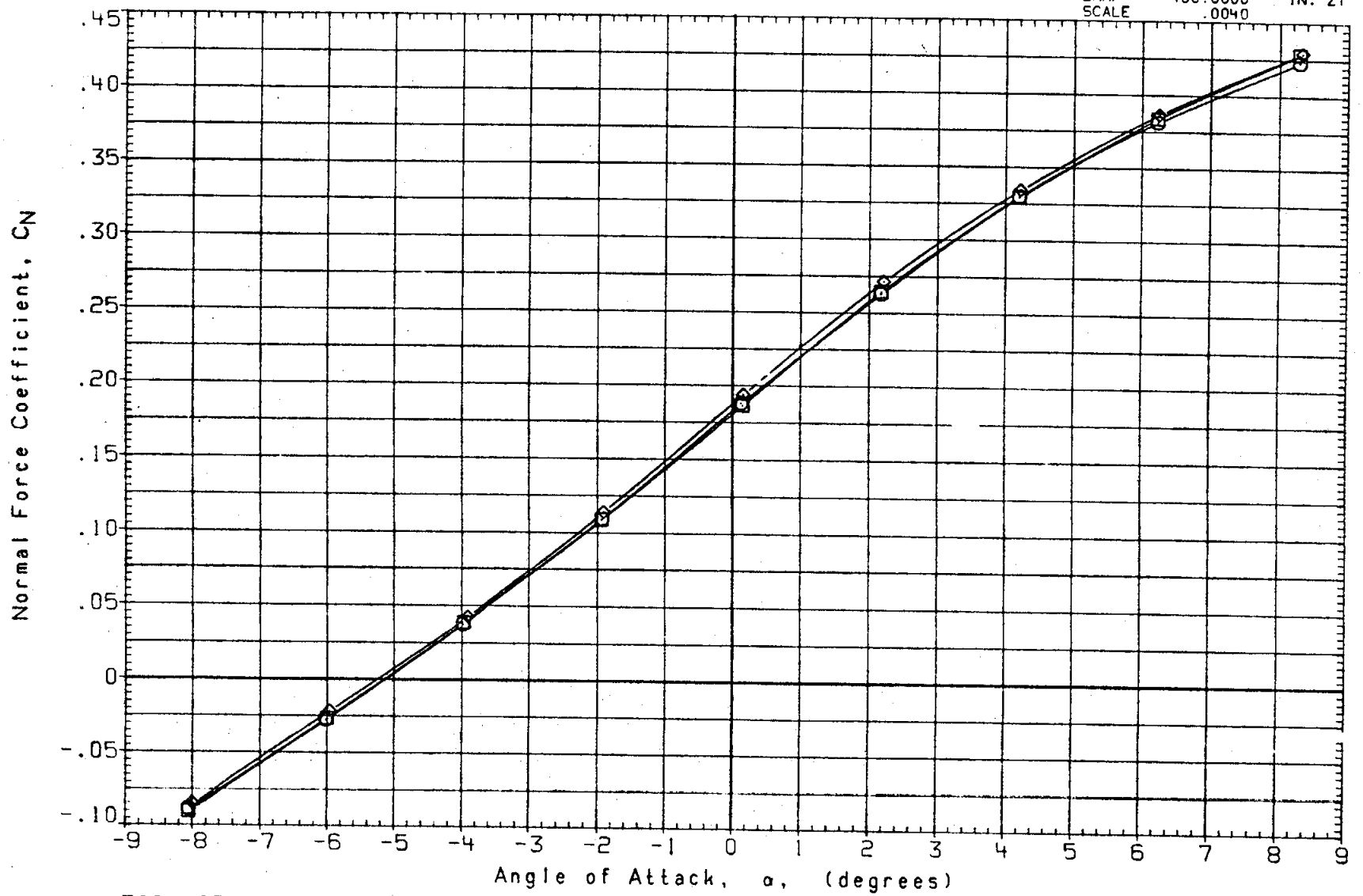

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(C) MACH = 1.05

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

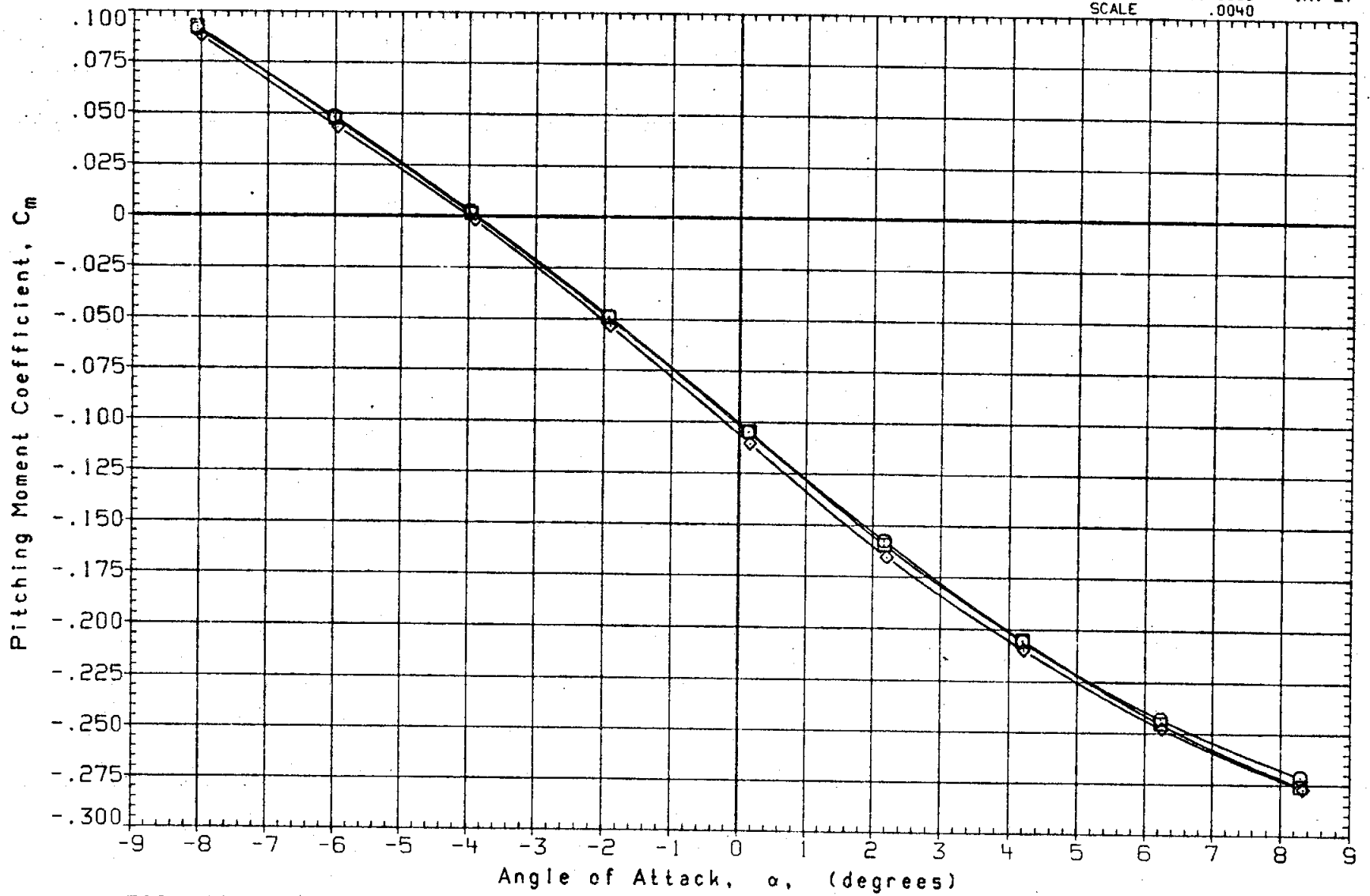

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(C)MACH = 1.05

DATE 12 MAR 80

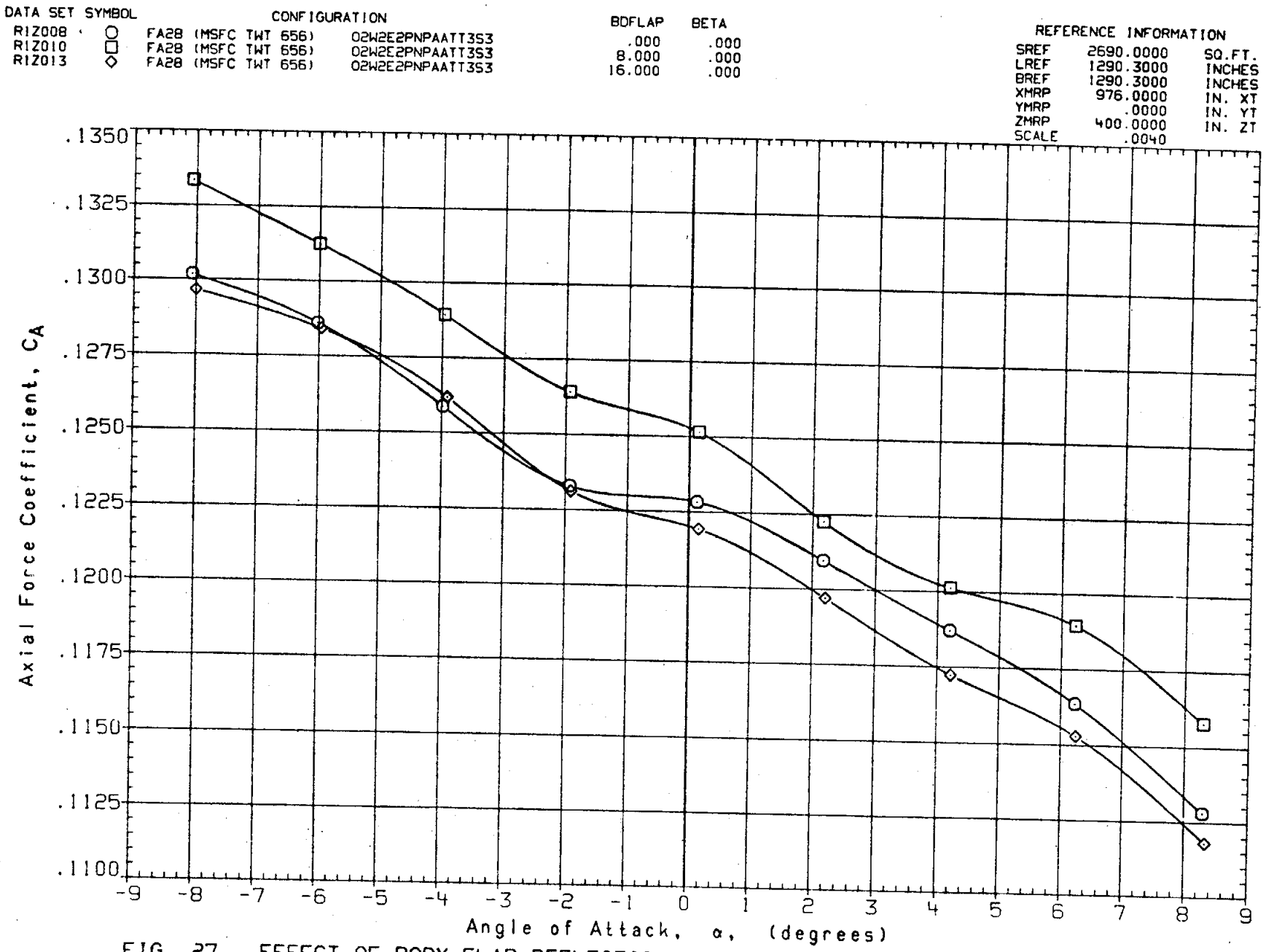

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(C) MACH = 1.05

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

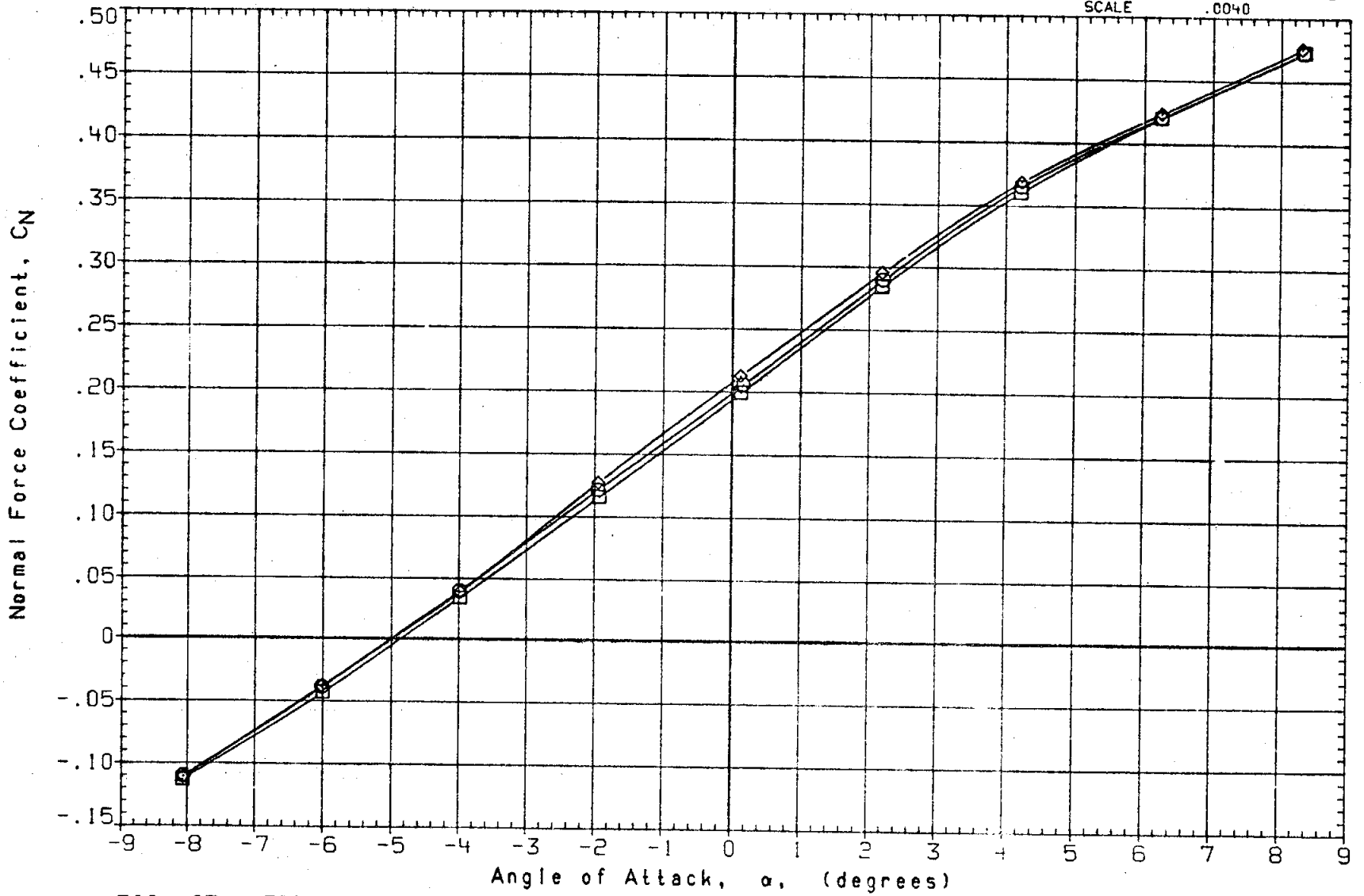

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

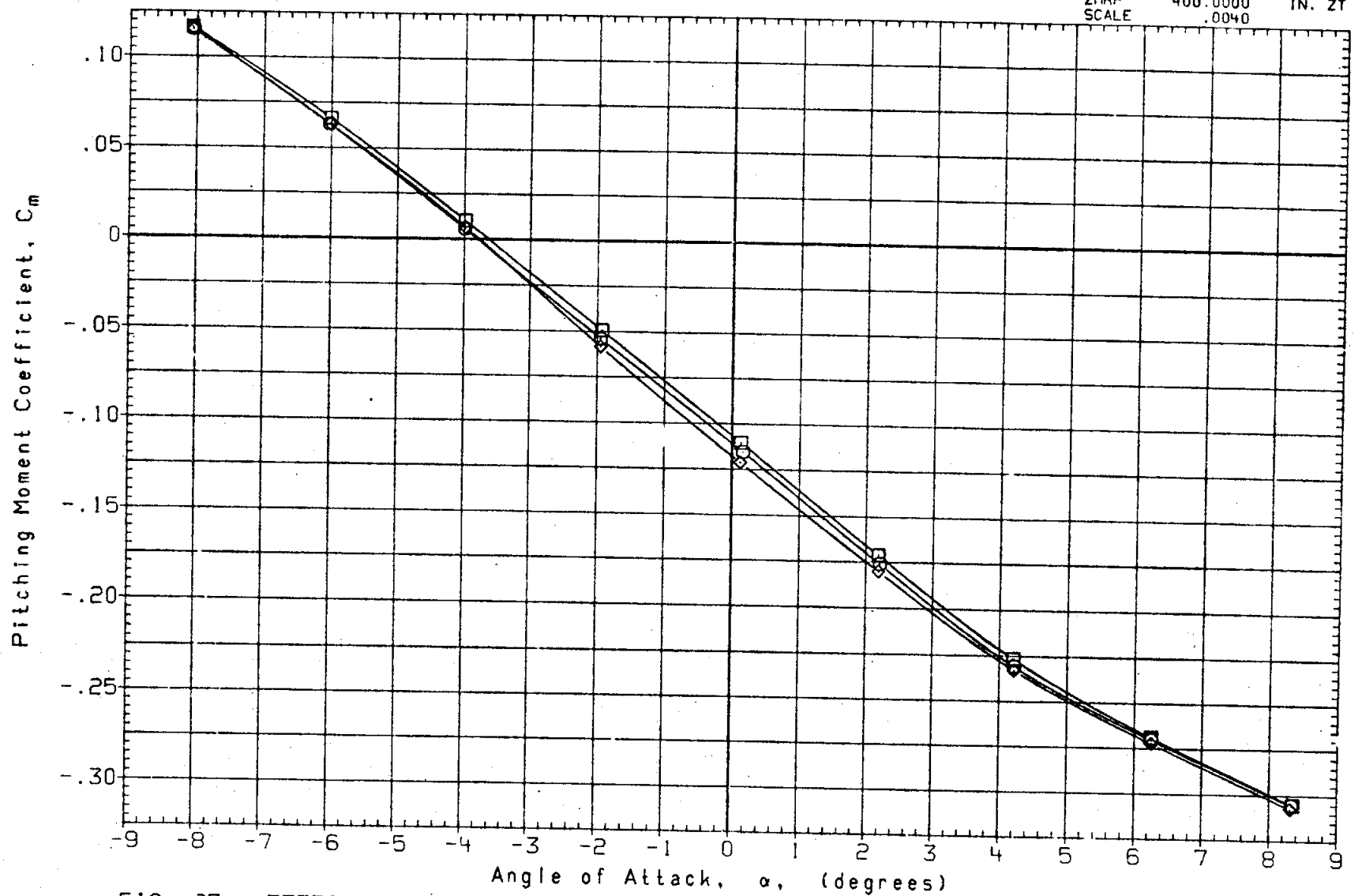

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(D) MACH = 1.10

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

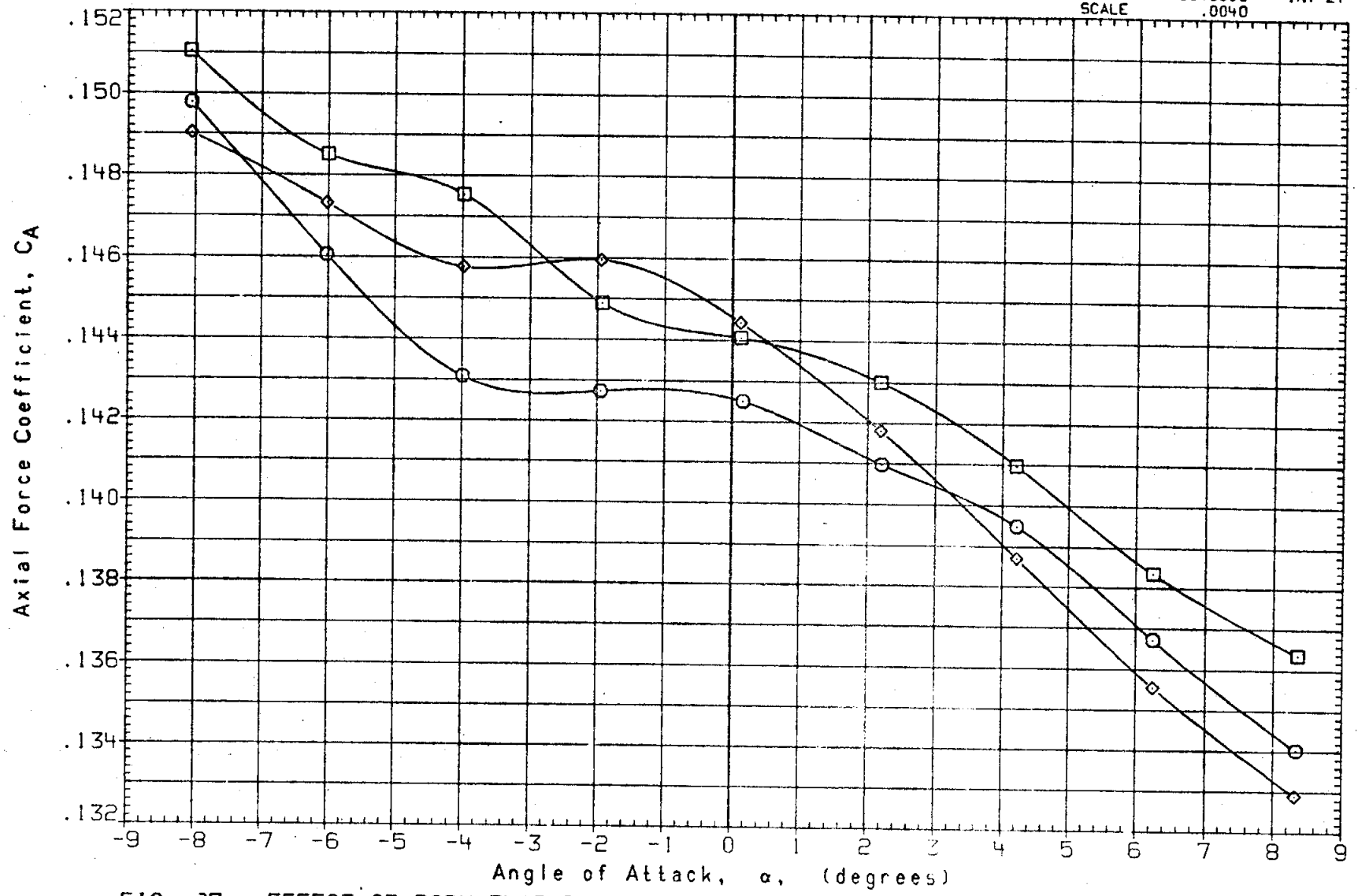

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

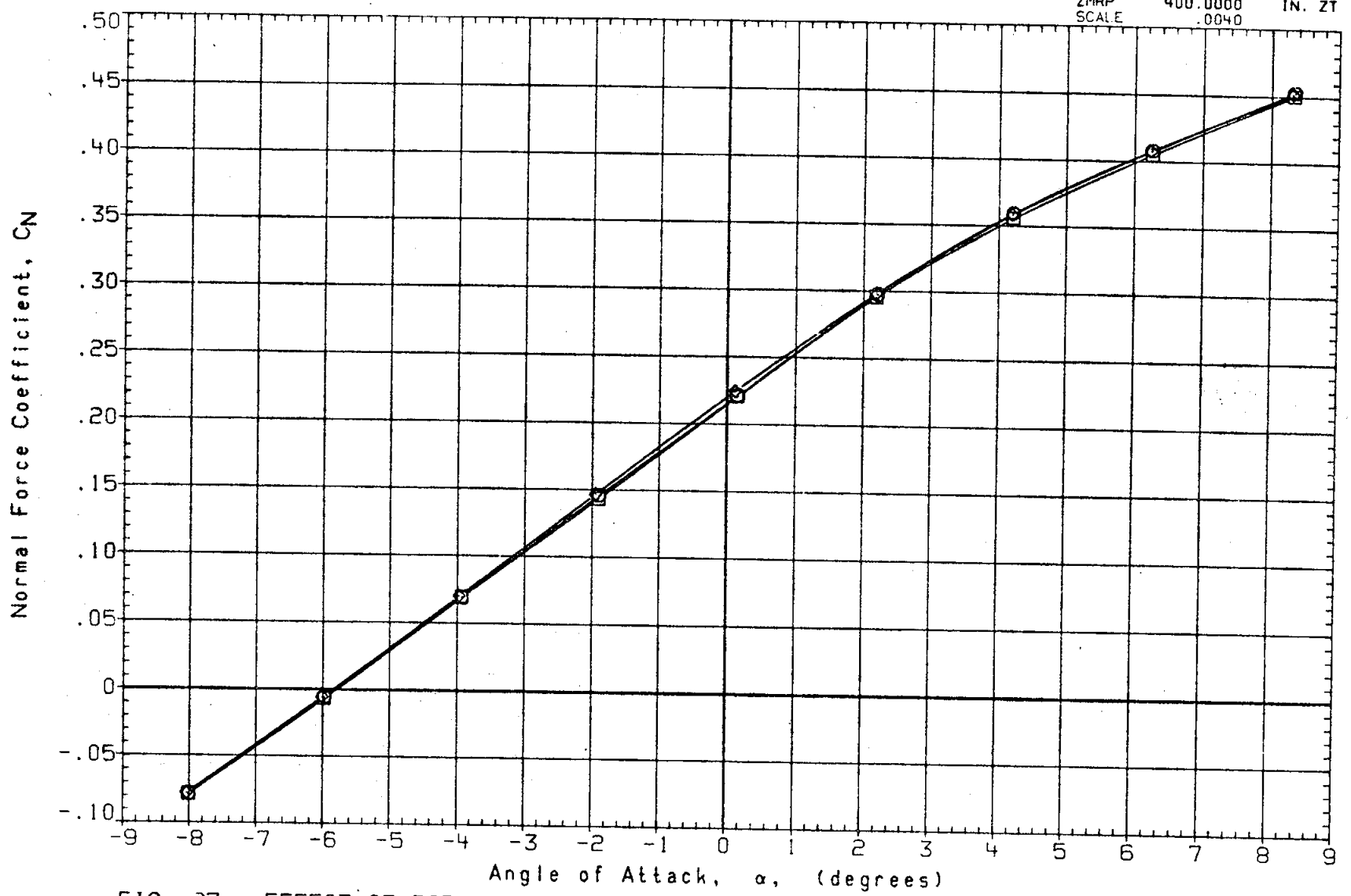

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

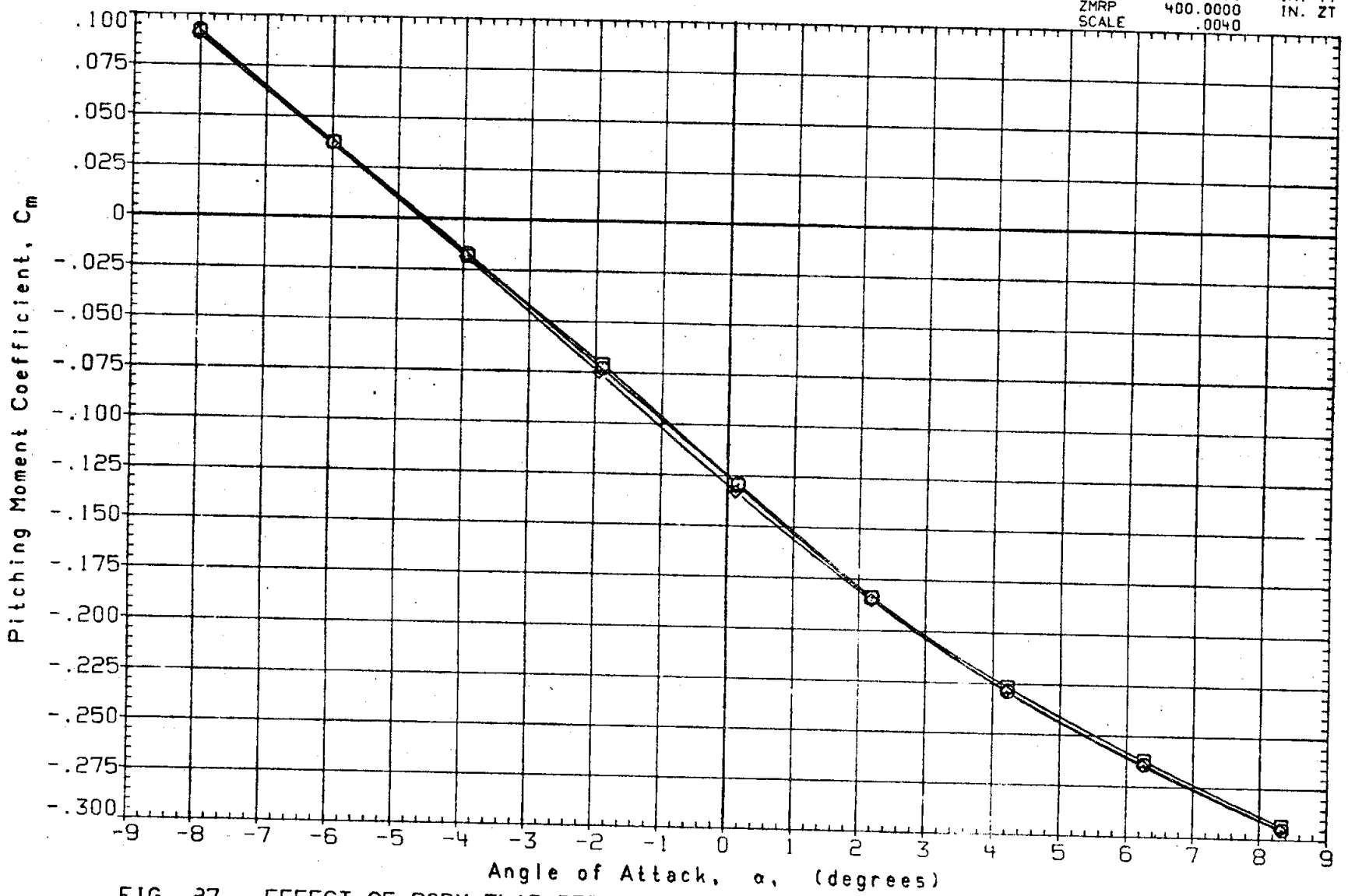

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
R1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
R1Z013	◇	FA23 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

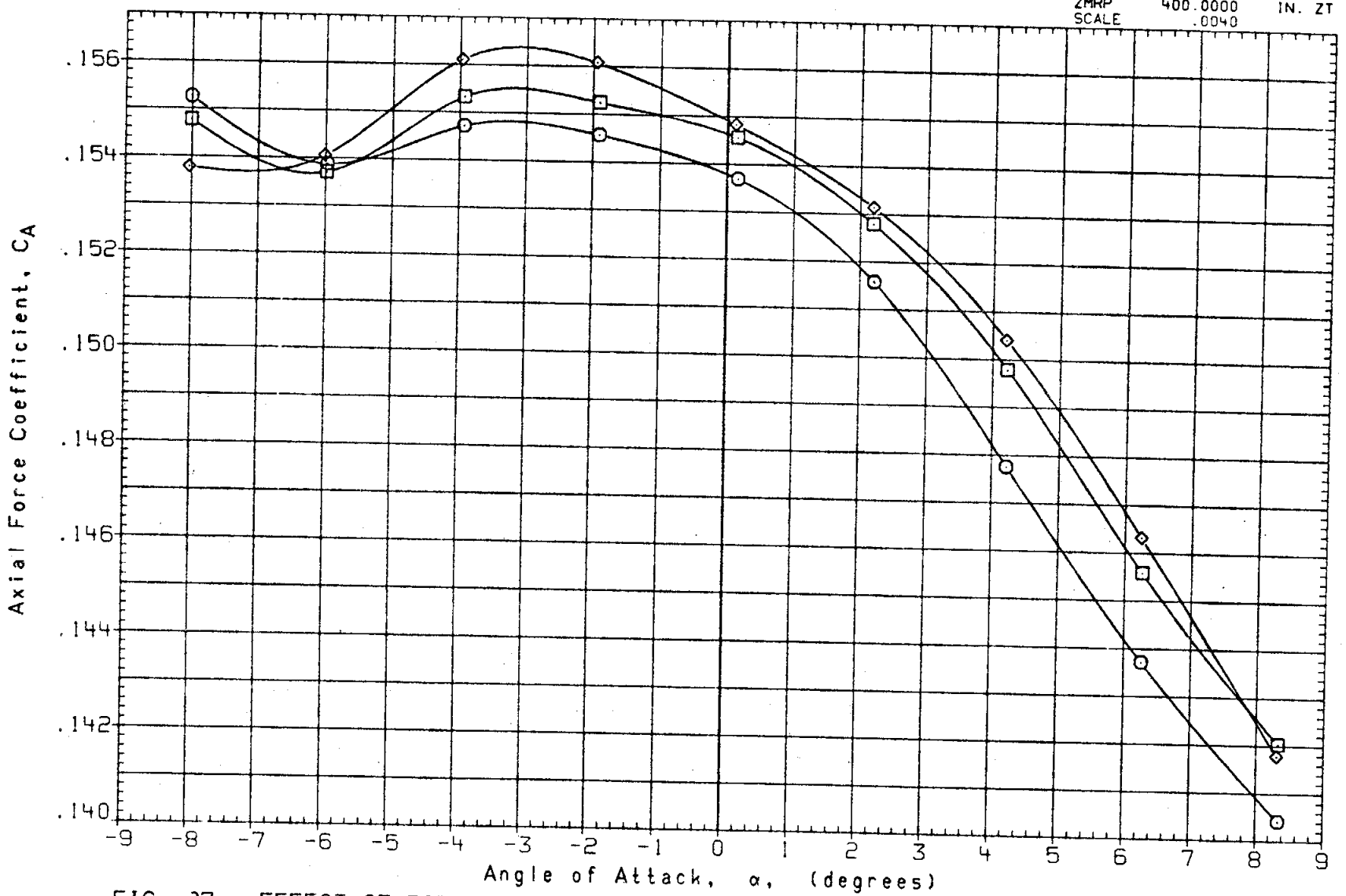

FIG. 27 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

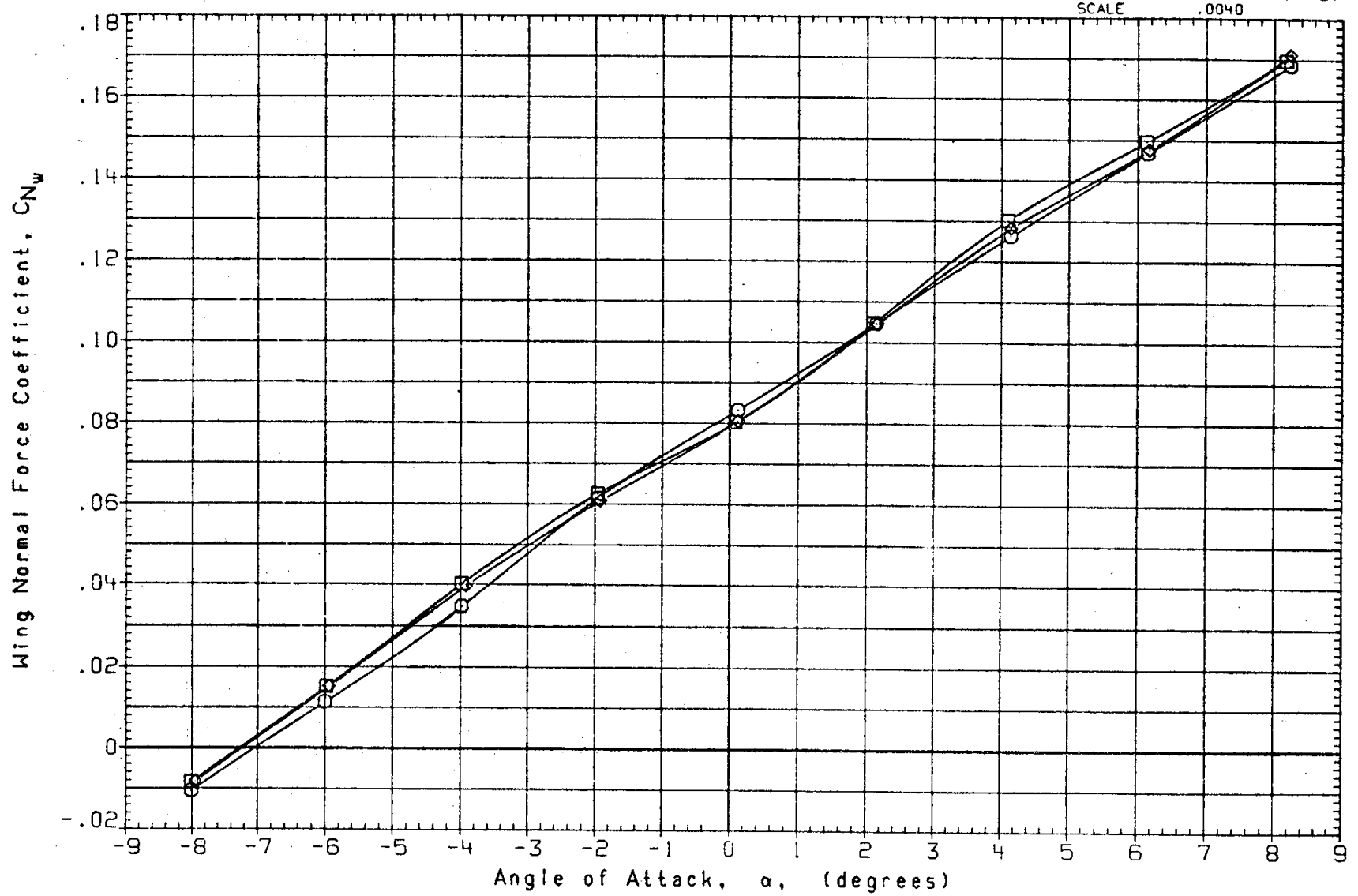

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

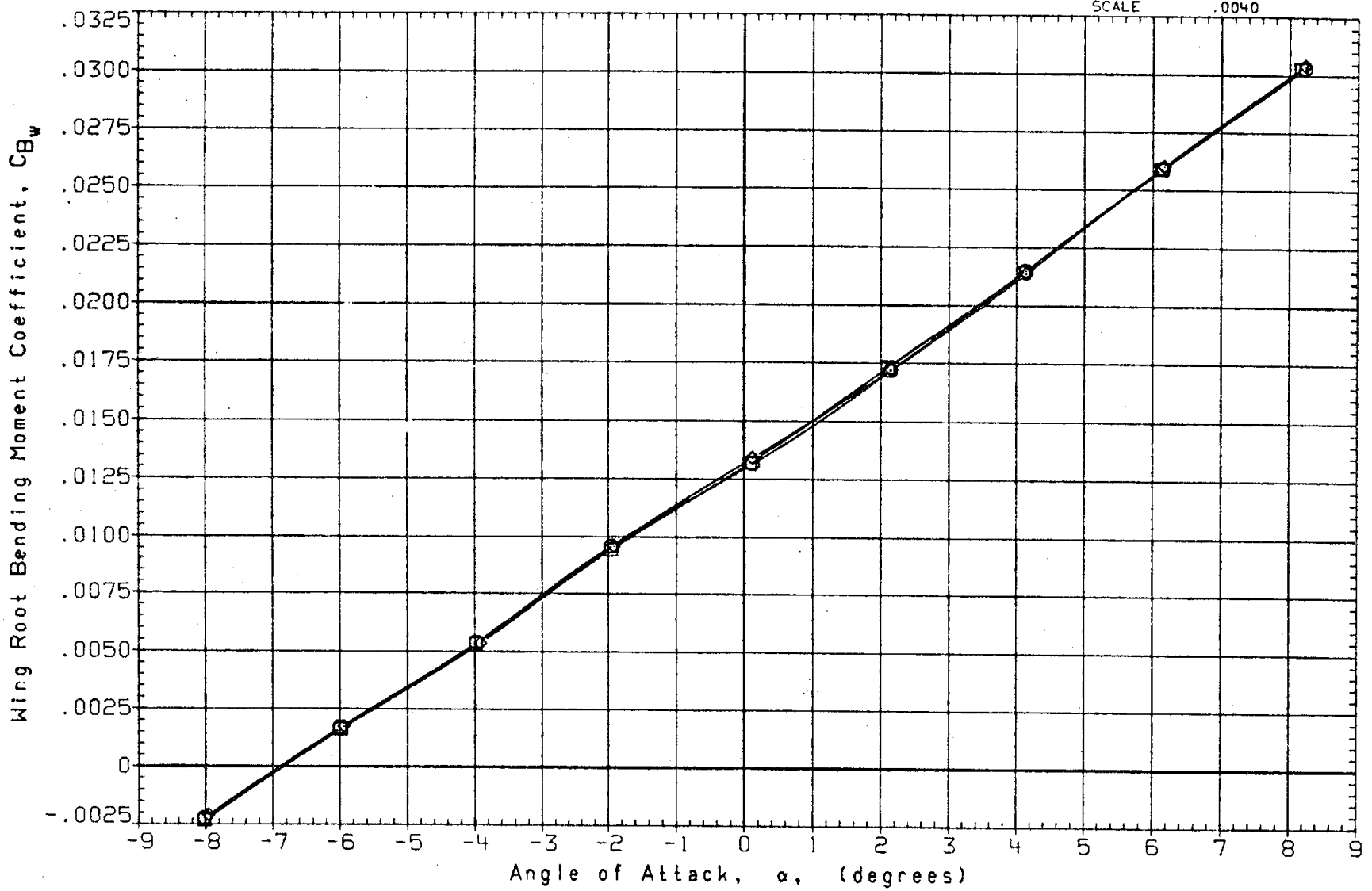

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

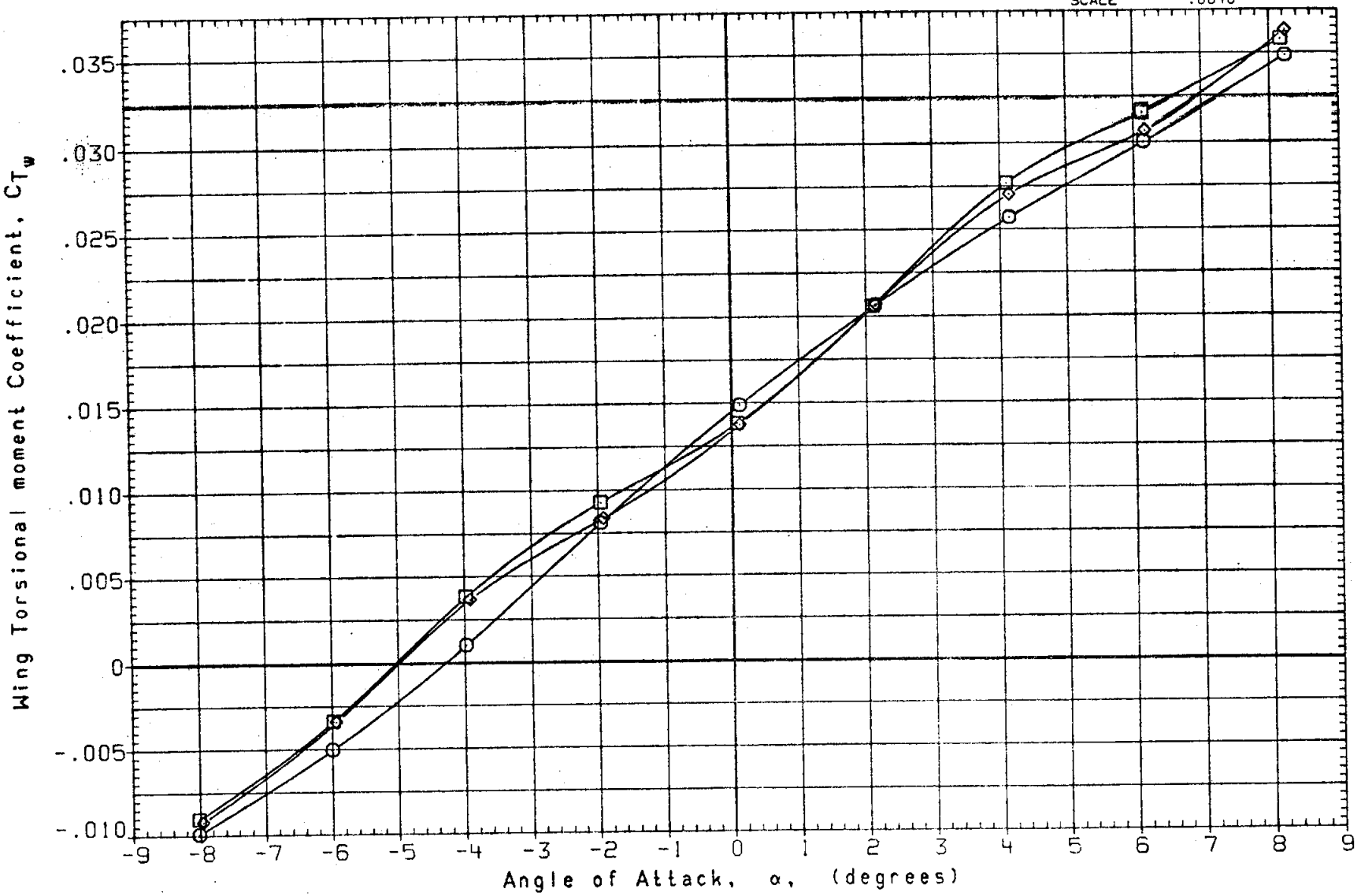

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

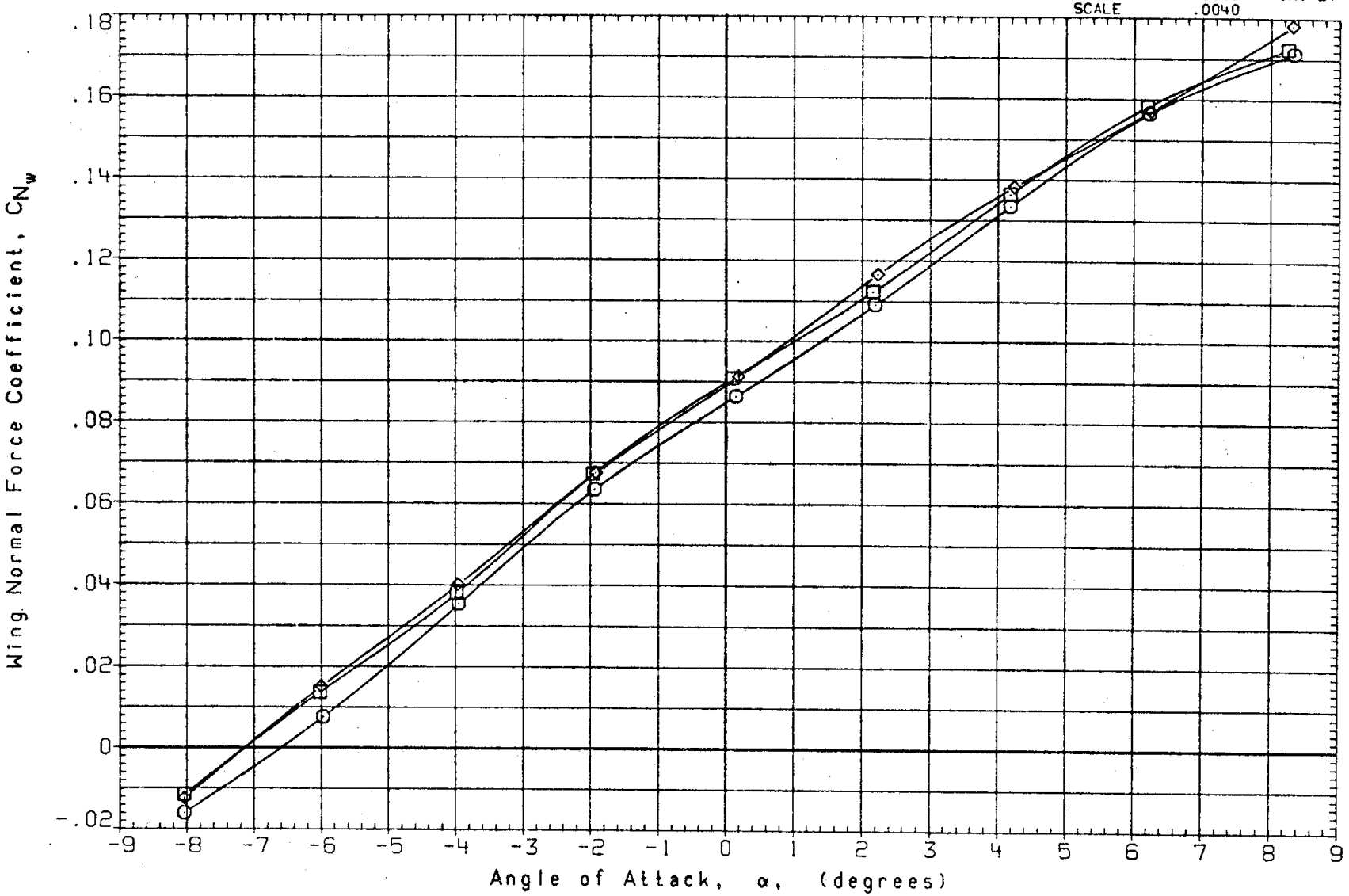

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

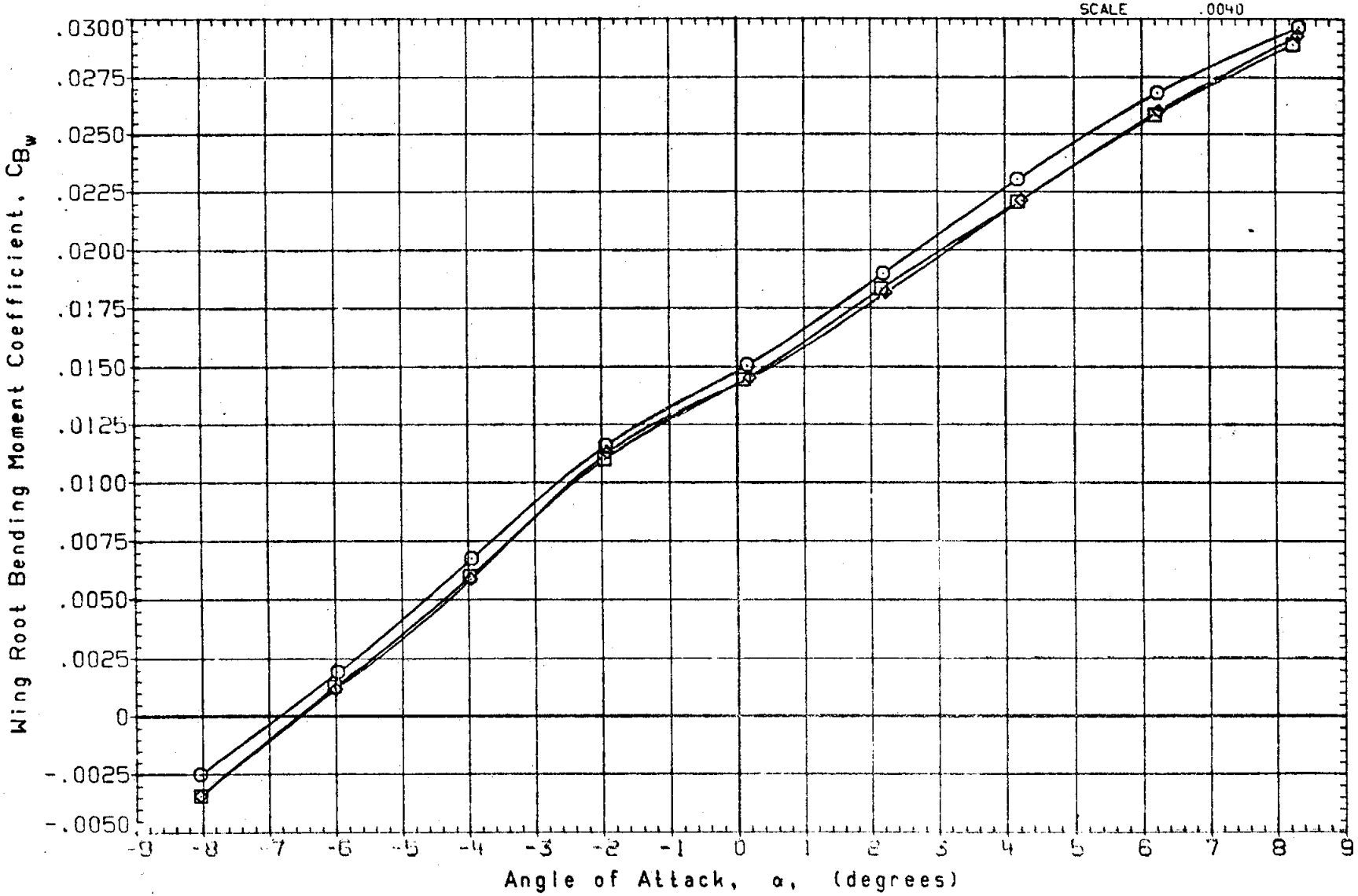

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

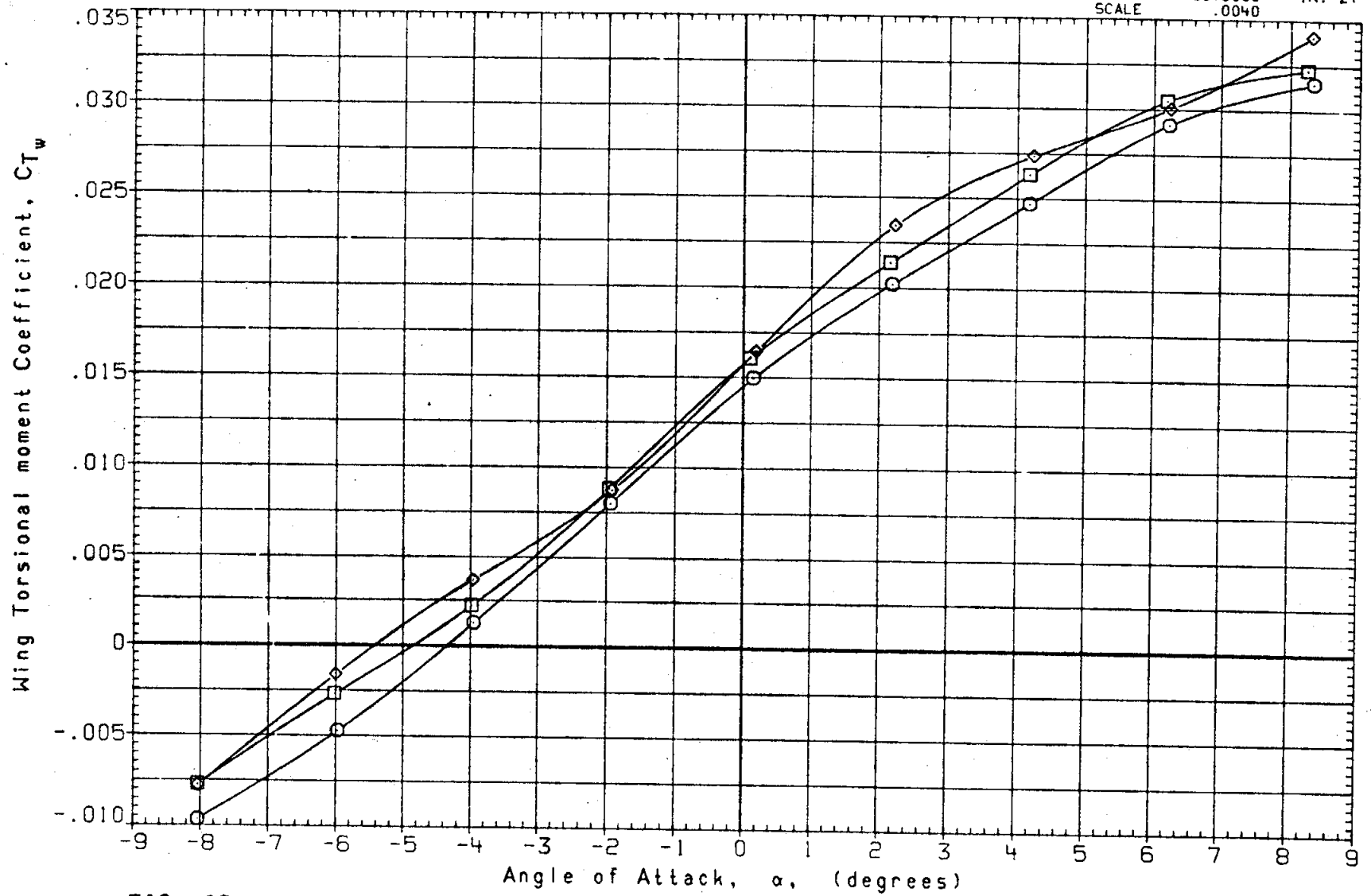

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(B) MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

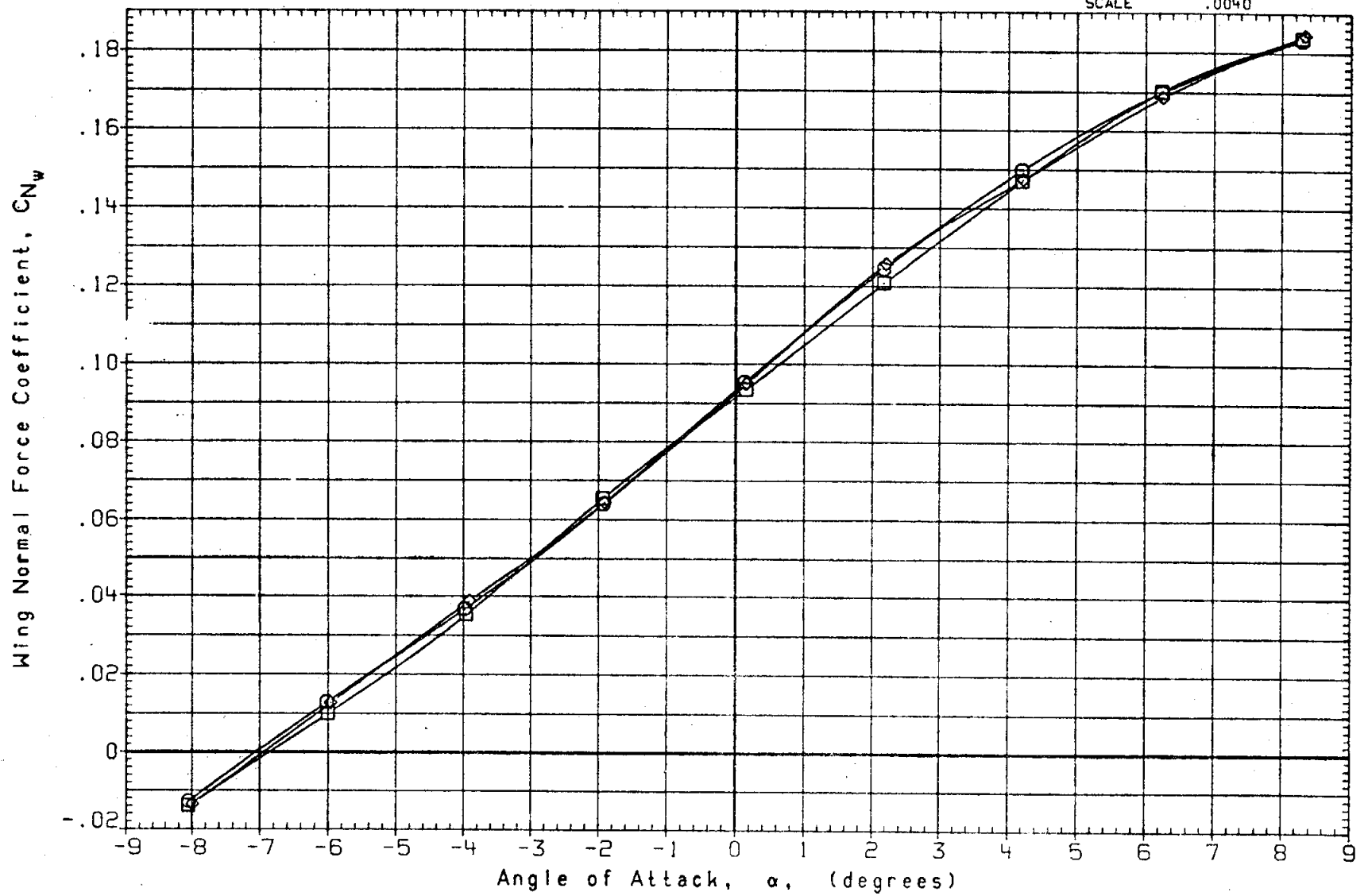

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

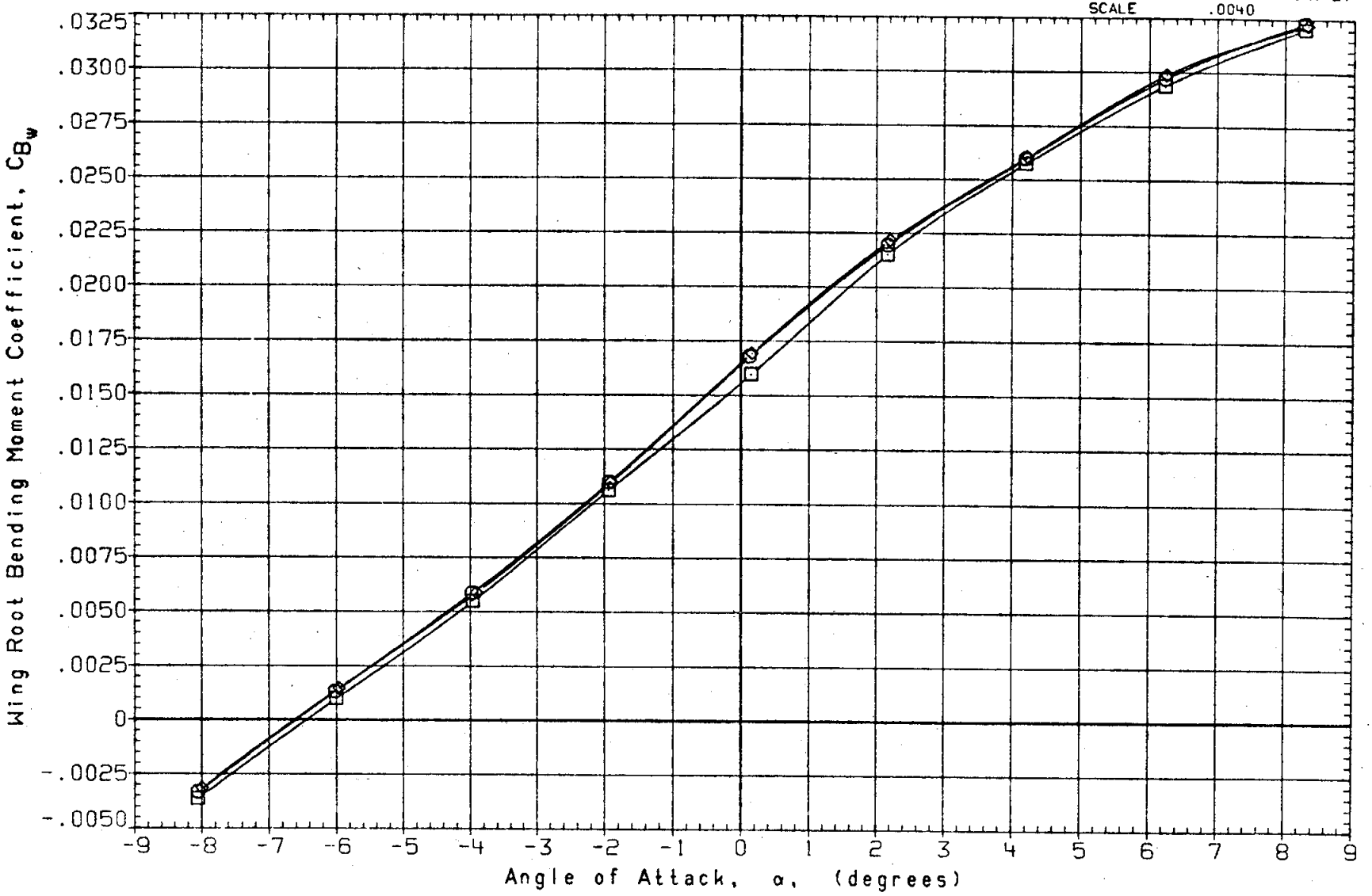

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z01[illegible]	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z01[illegible]	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

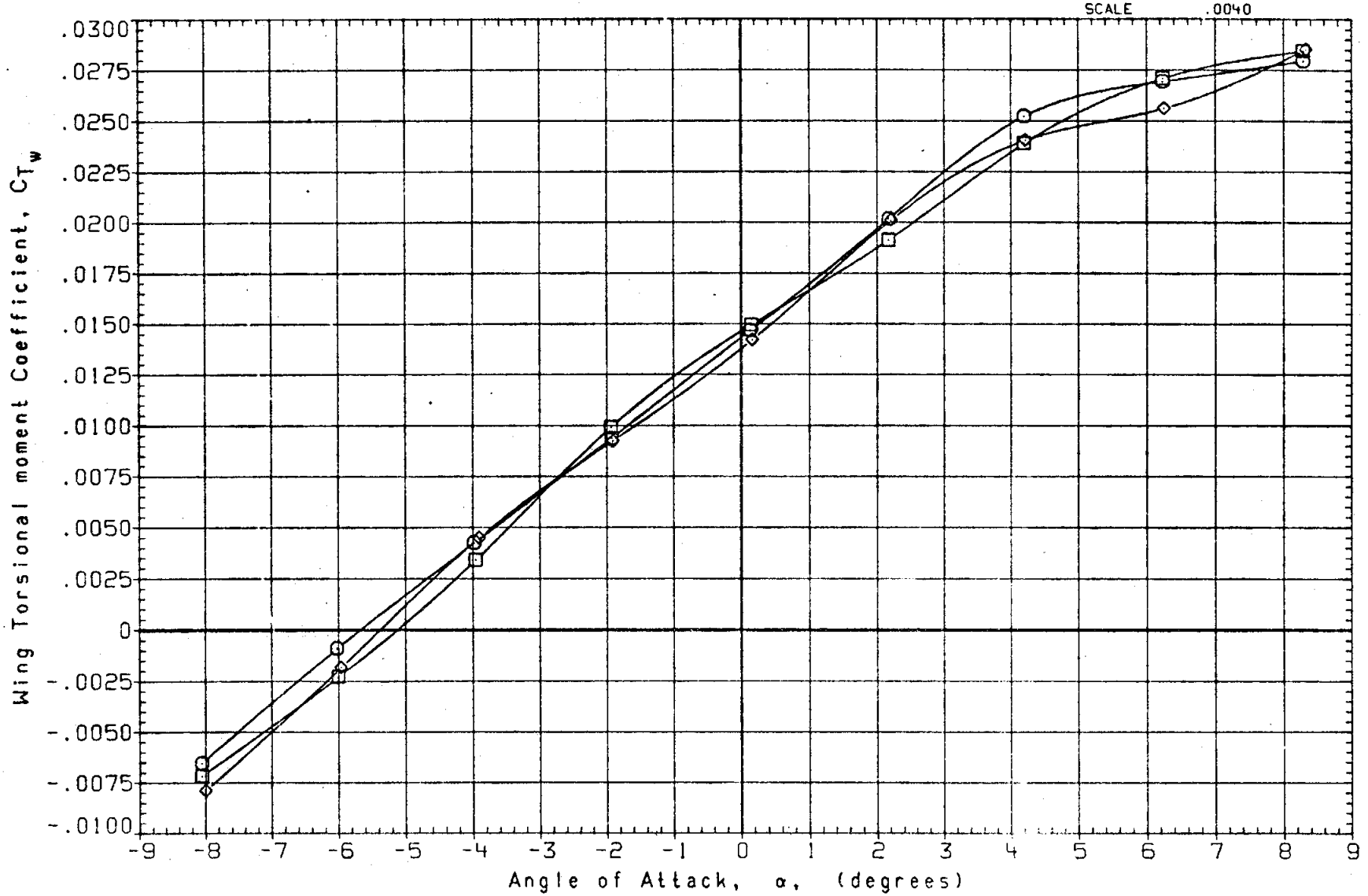

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

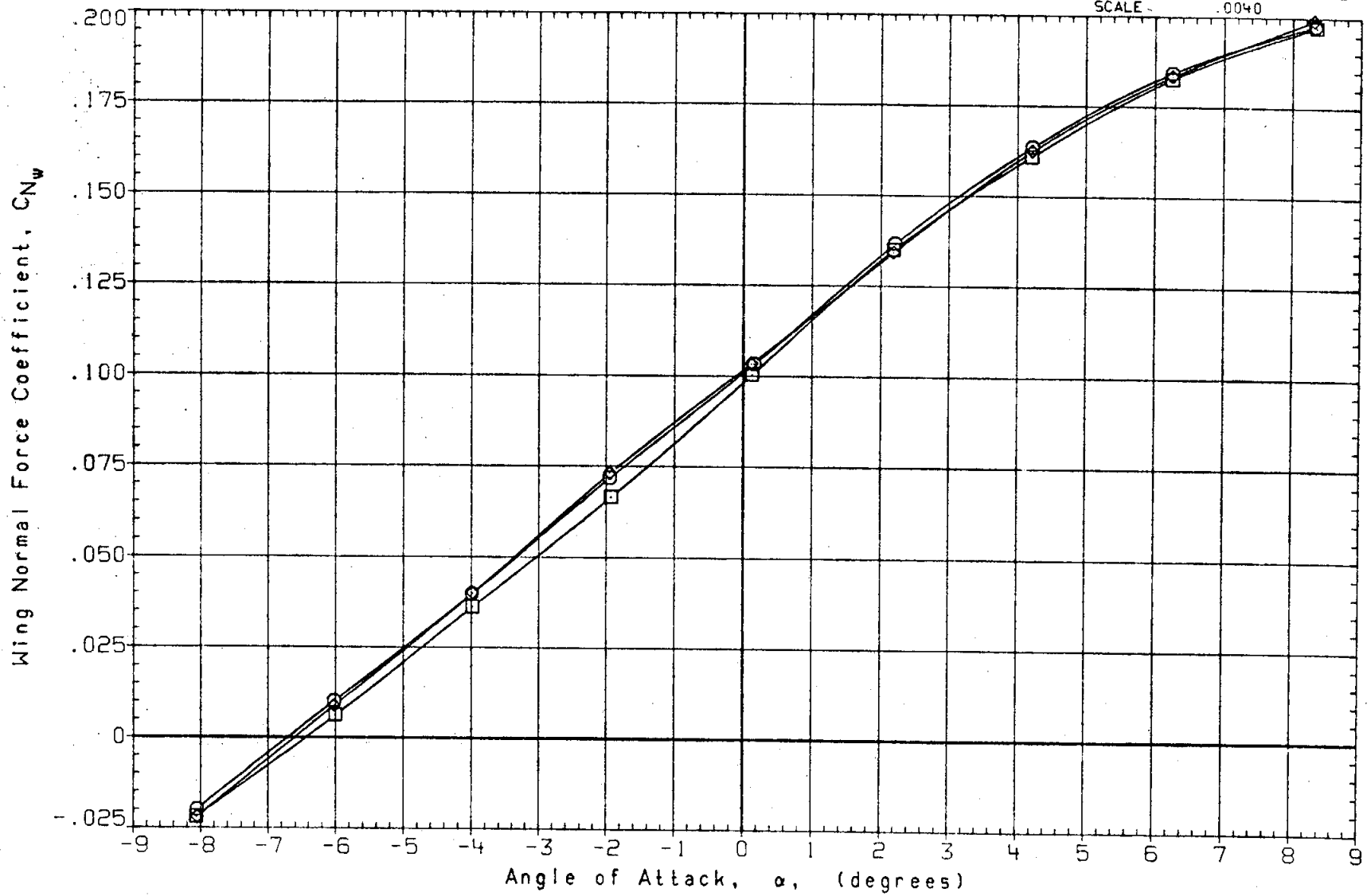

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

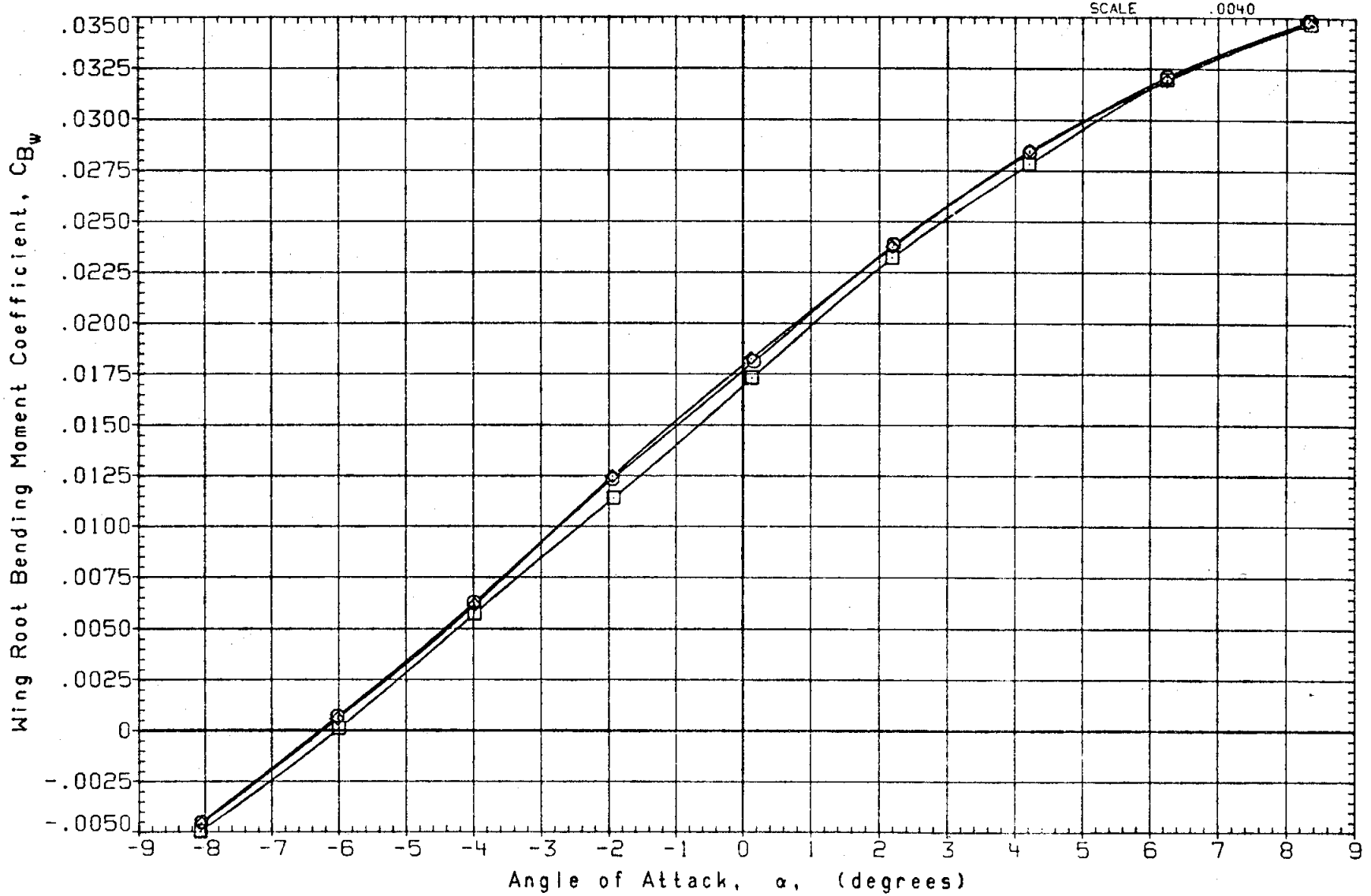

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

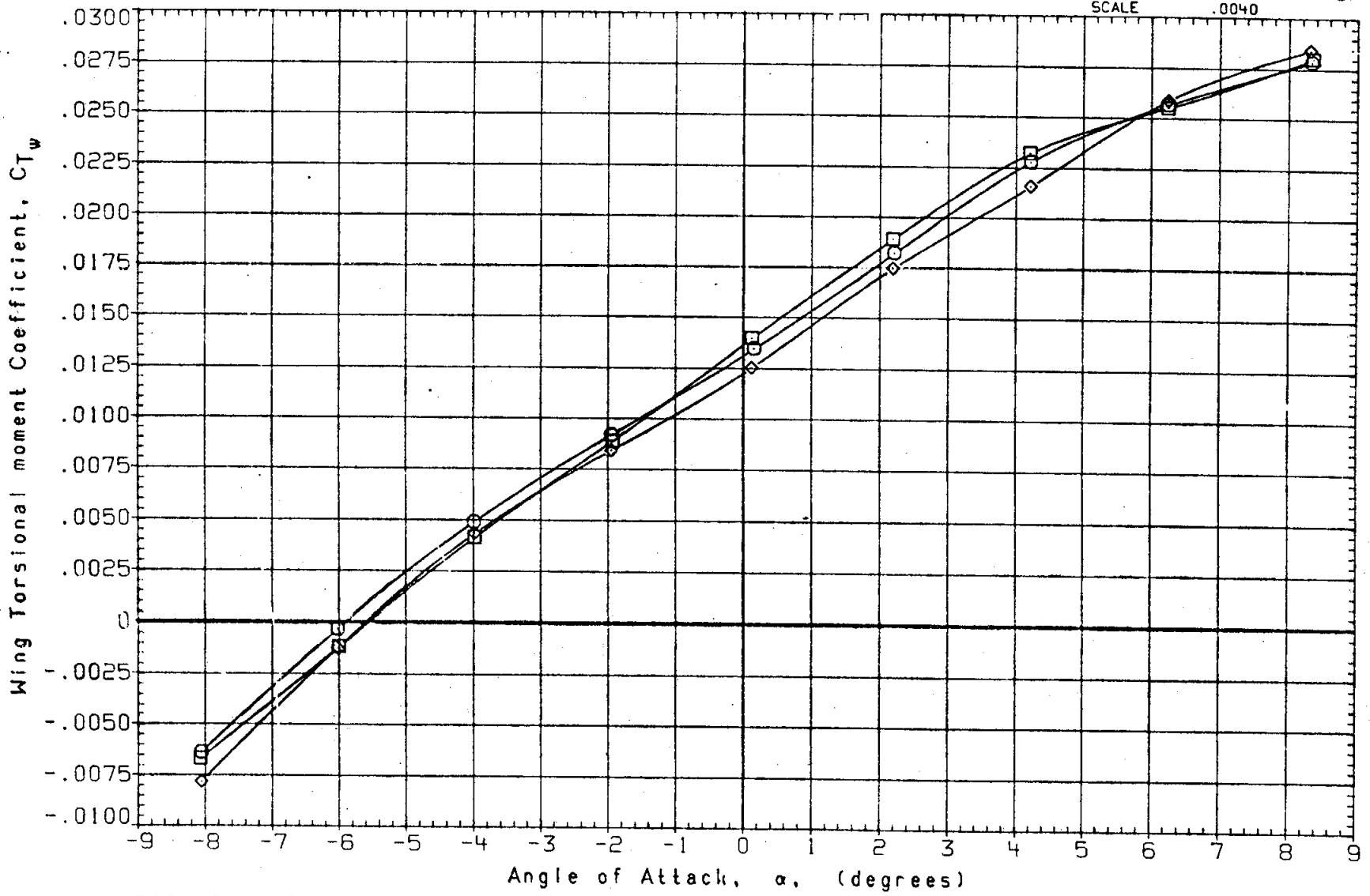

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

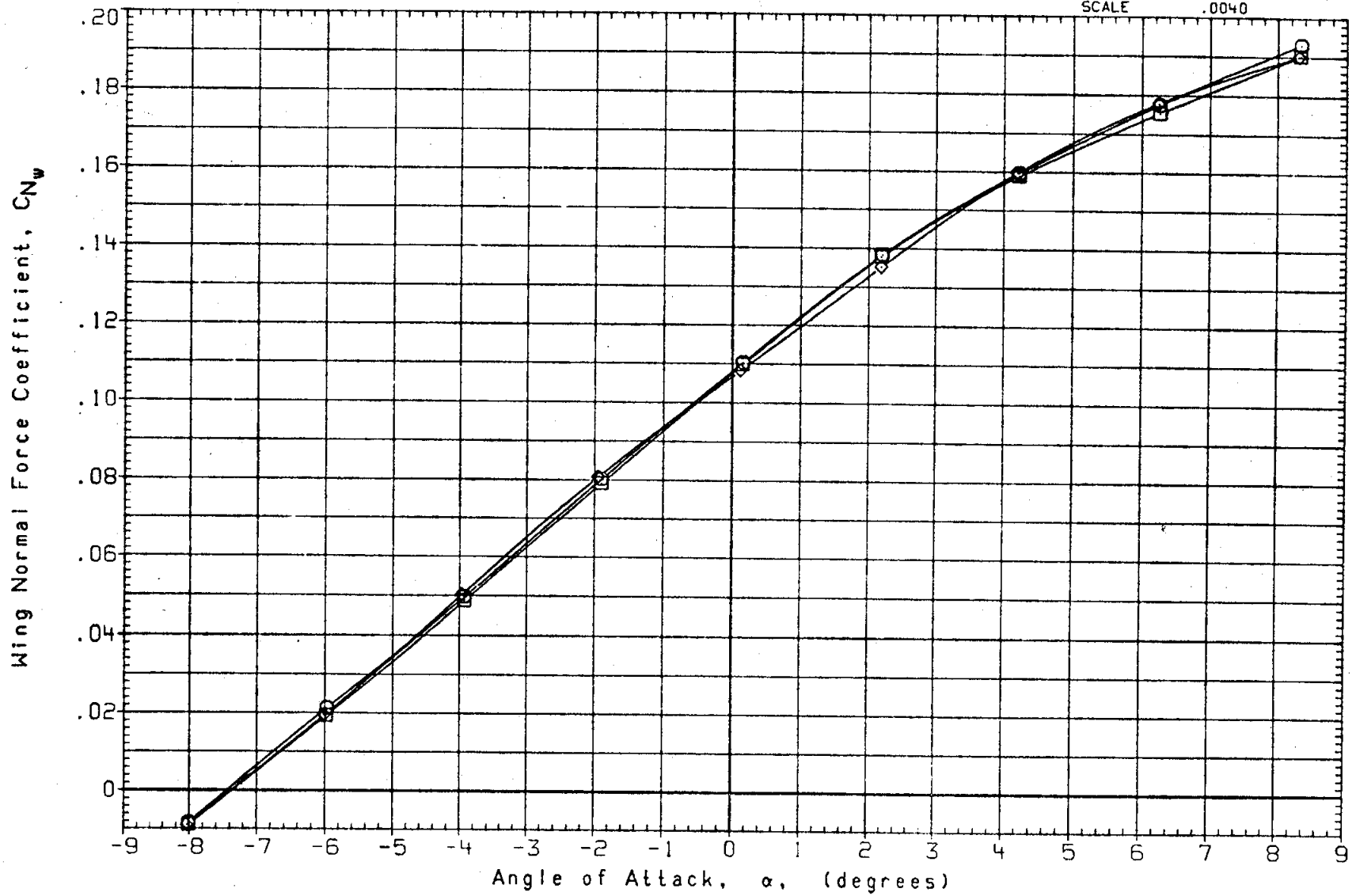

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

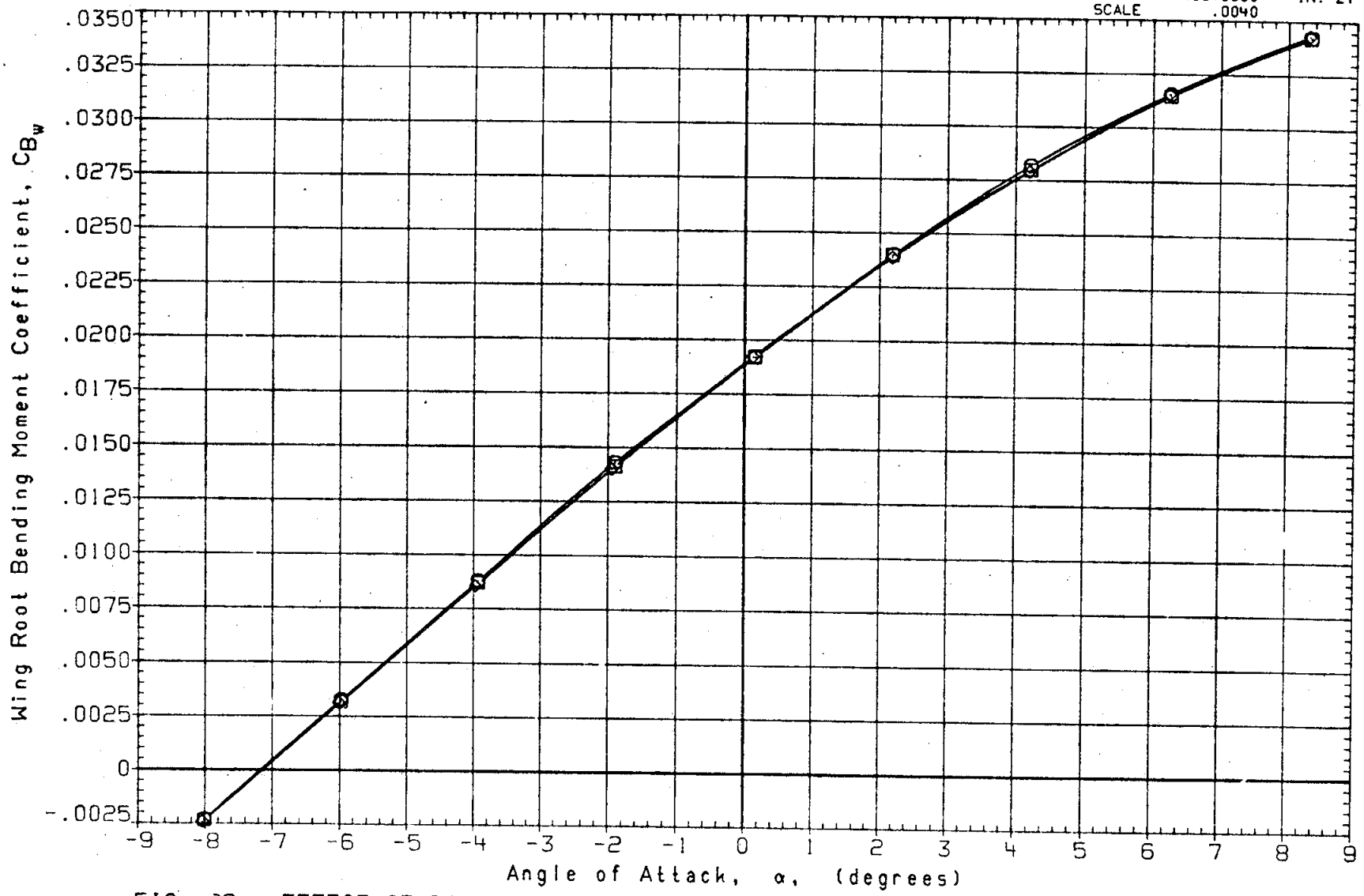

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA29 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

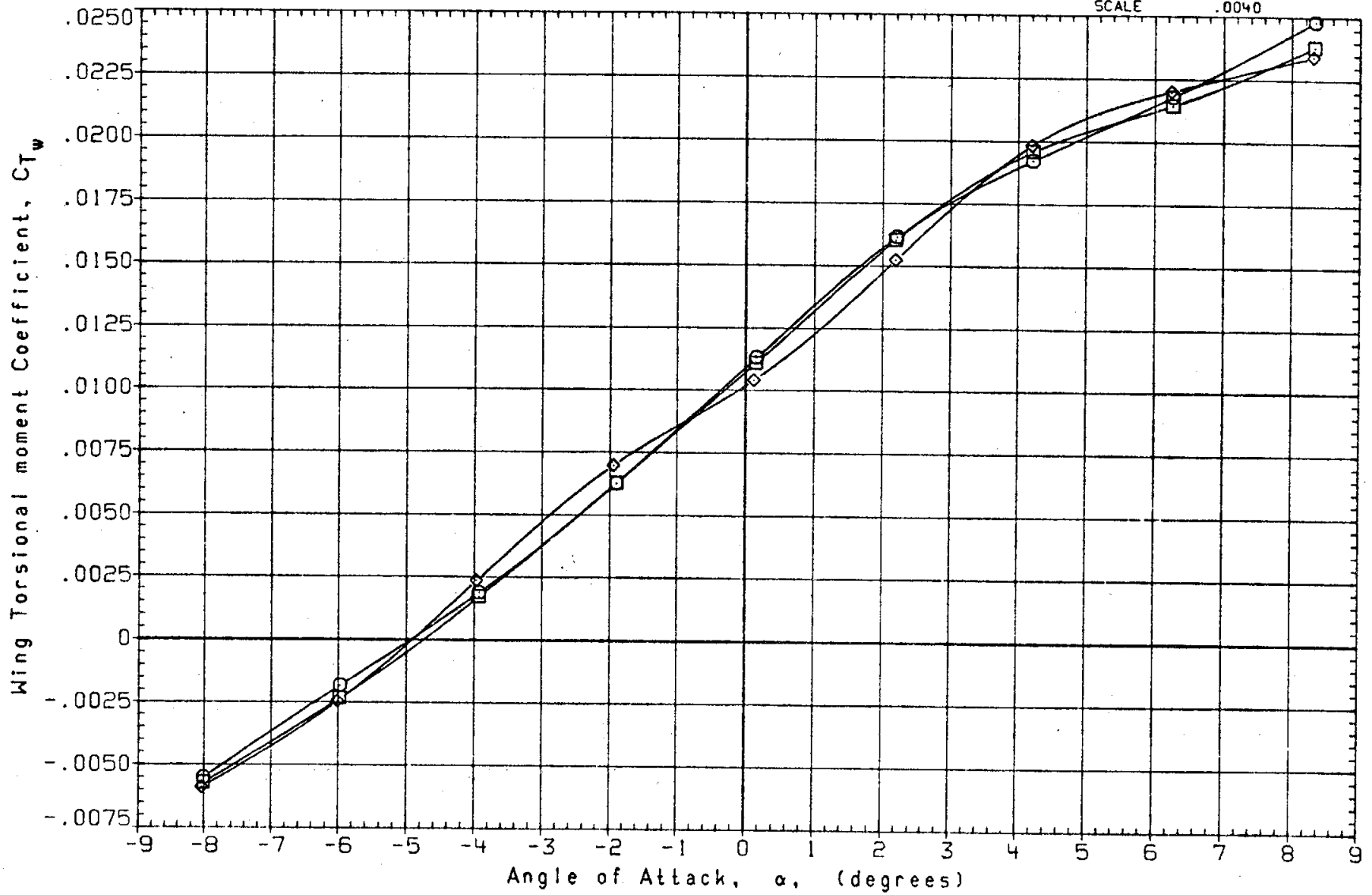

FIG. 28 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

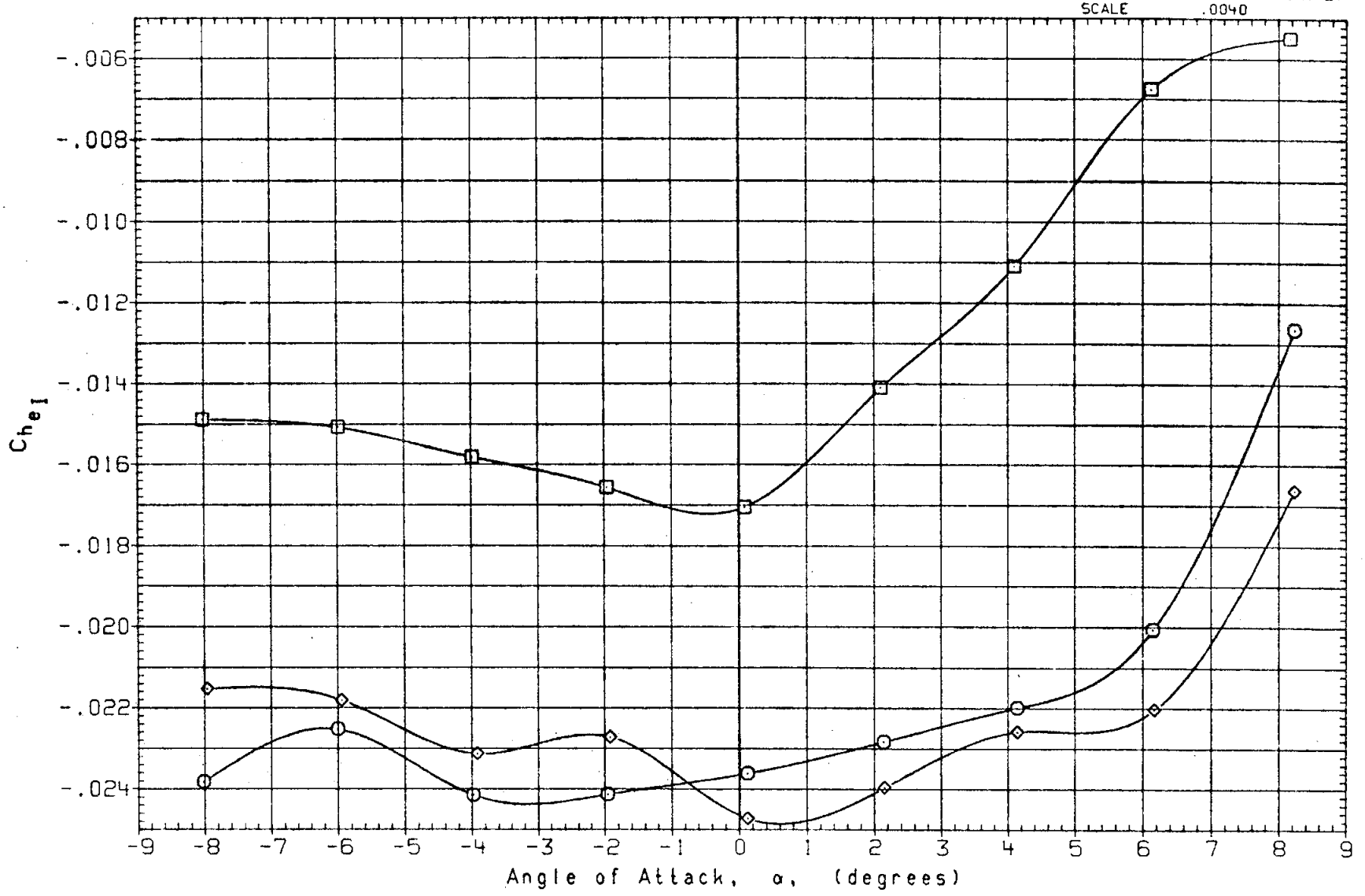

FIG. 29 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

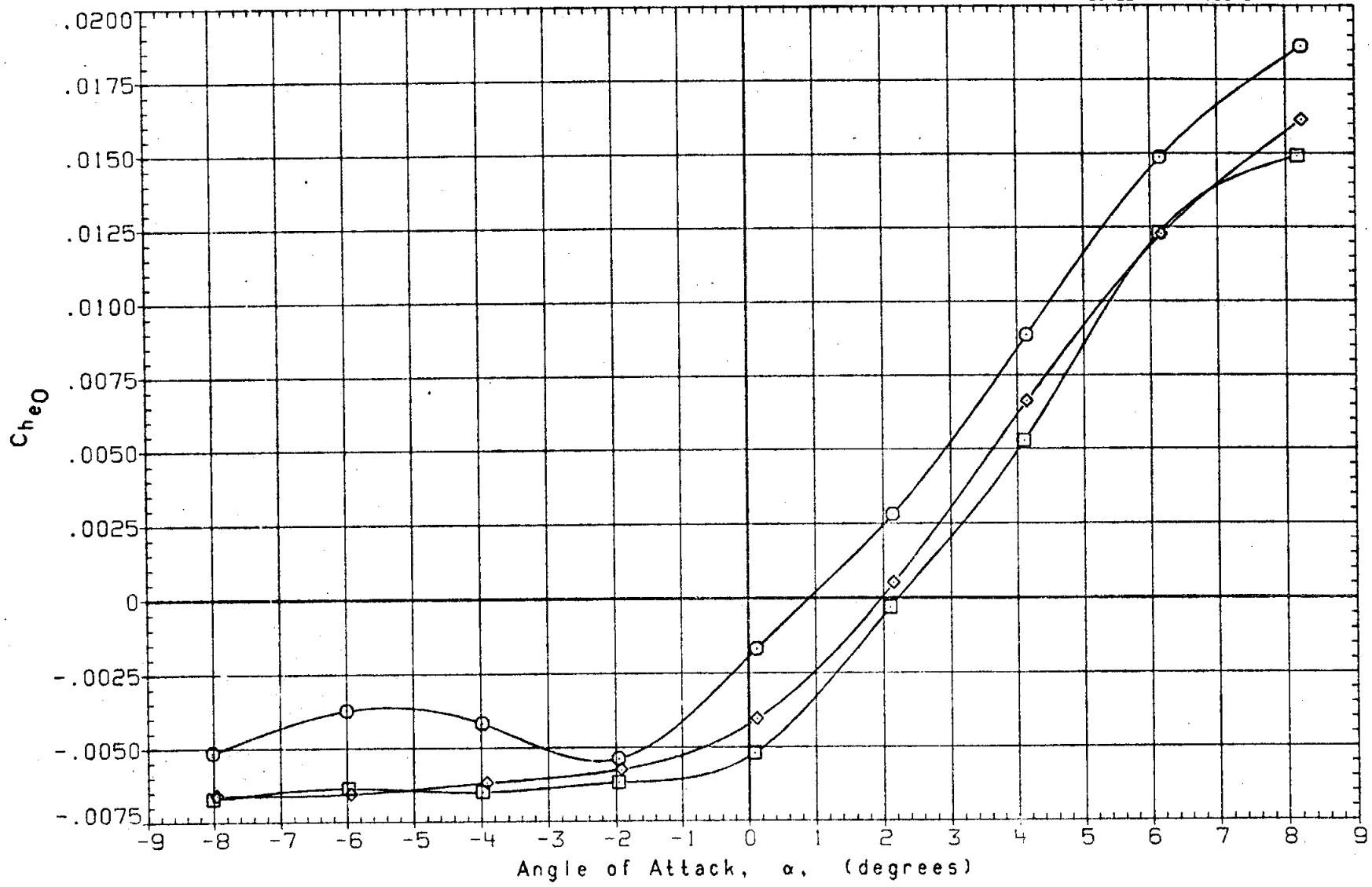

FIG. 29 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

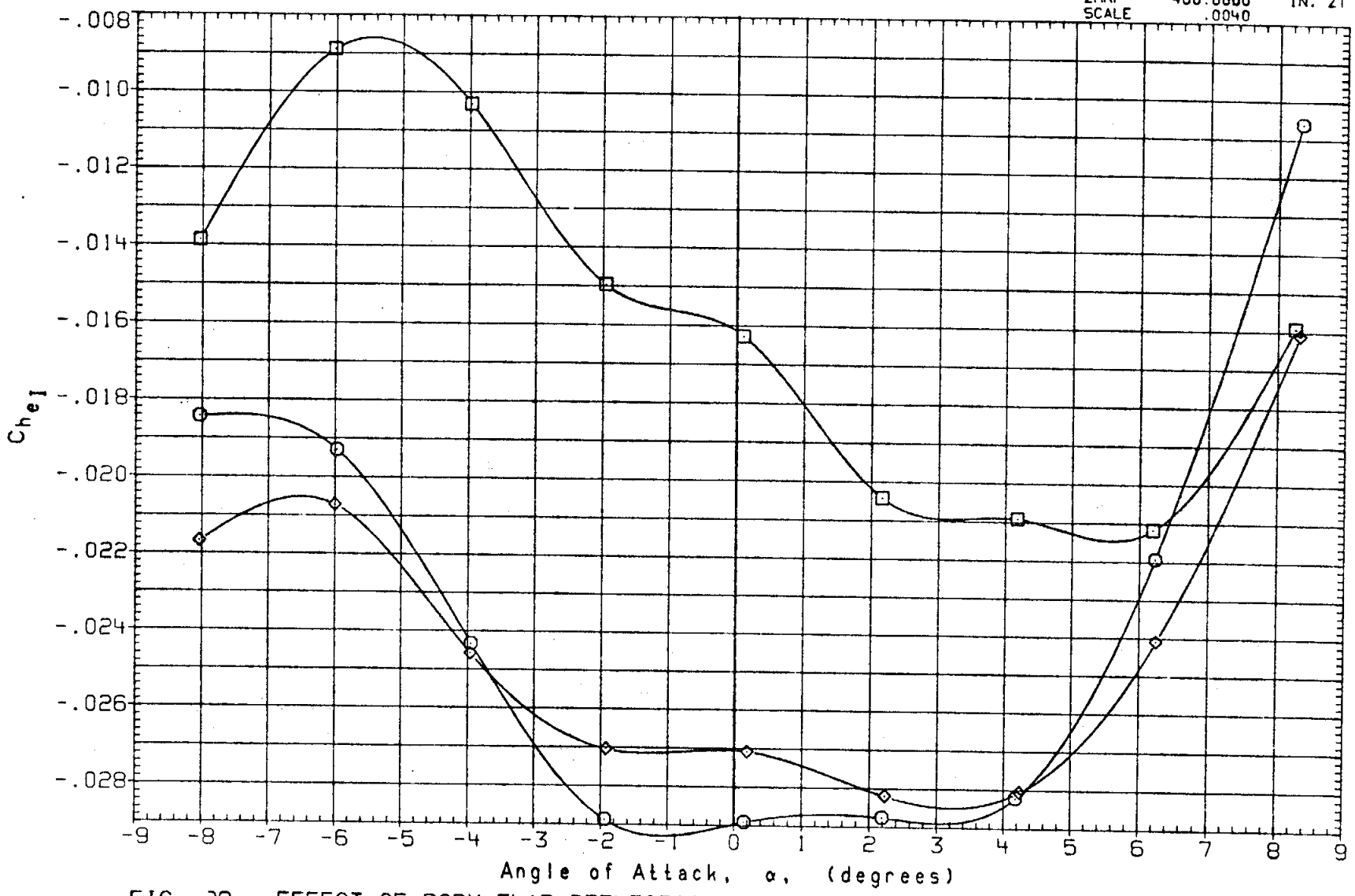

FIG. 29 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(B)MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

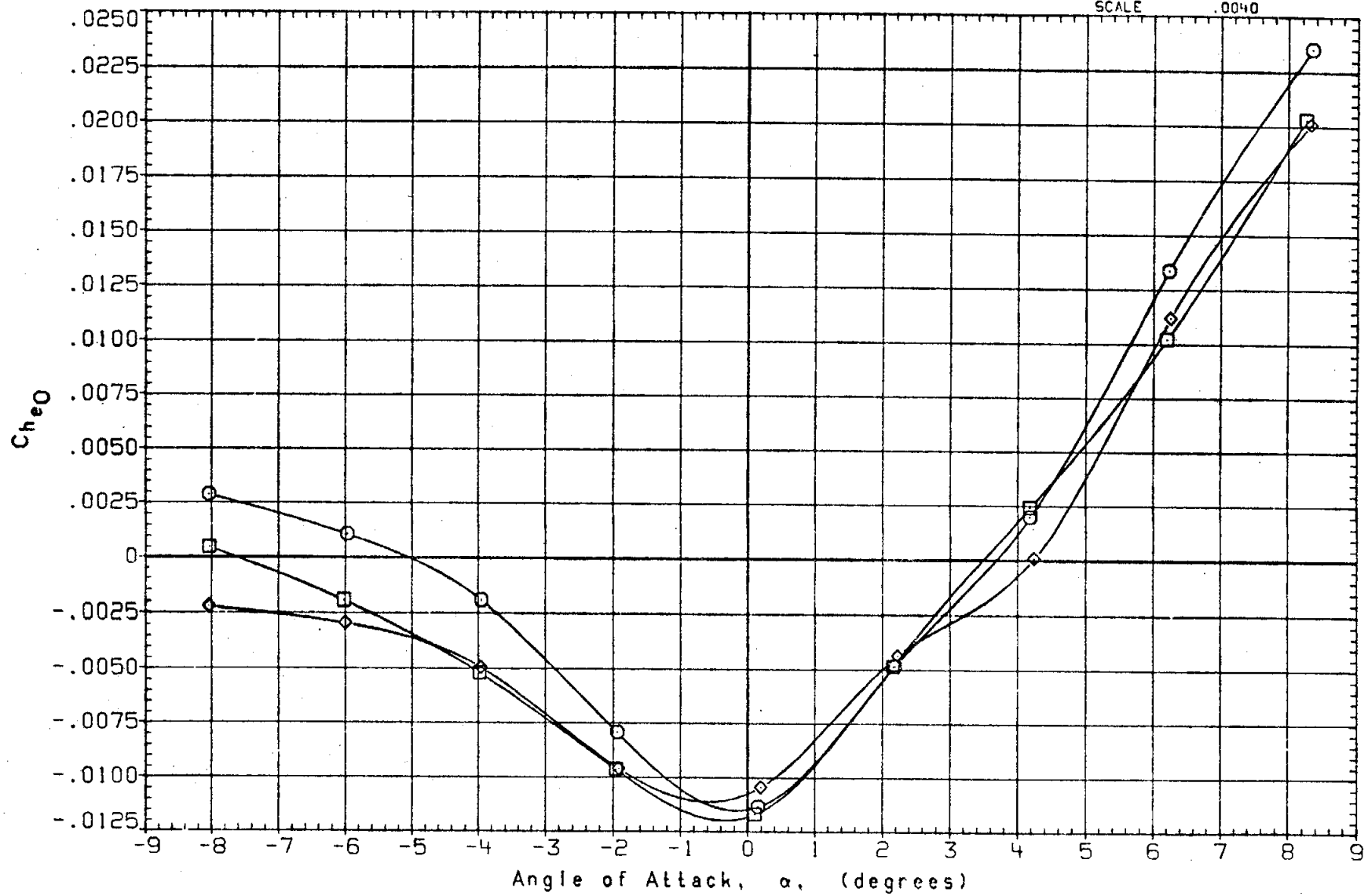

FIG. 29 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

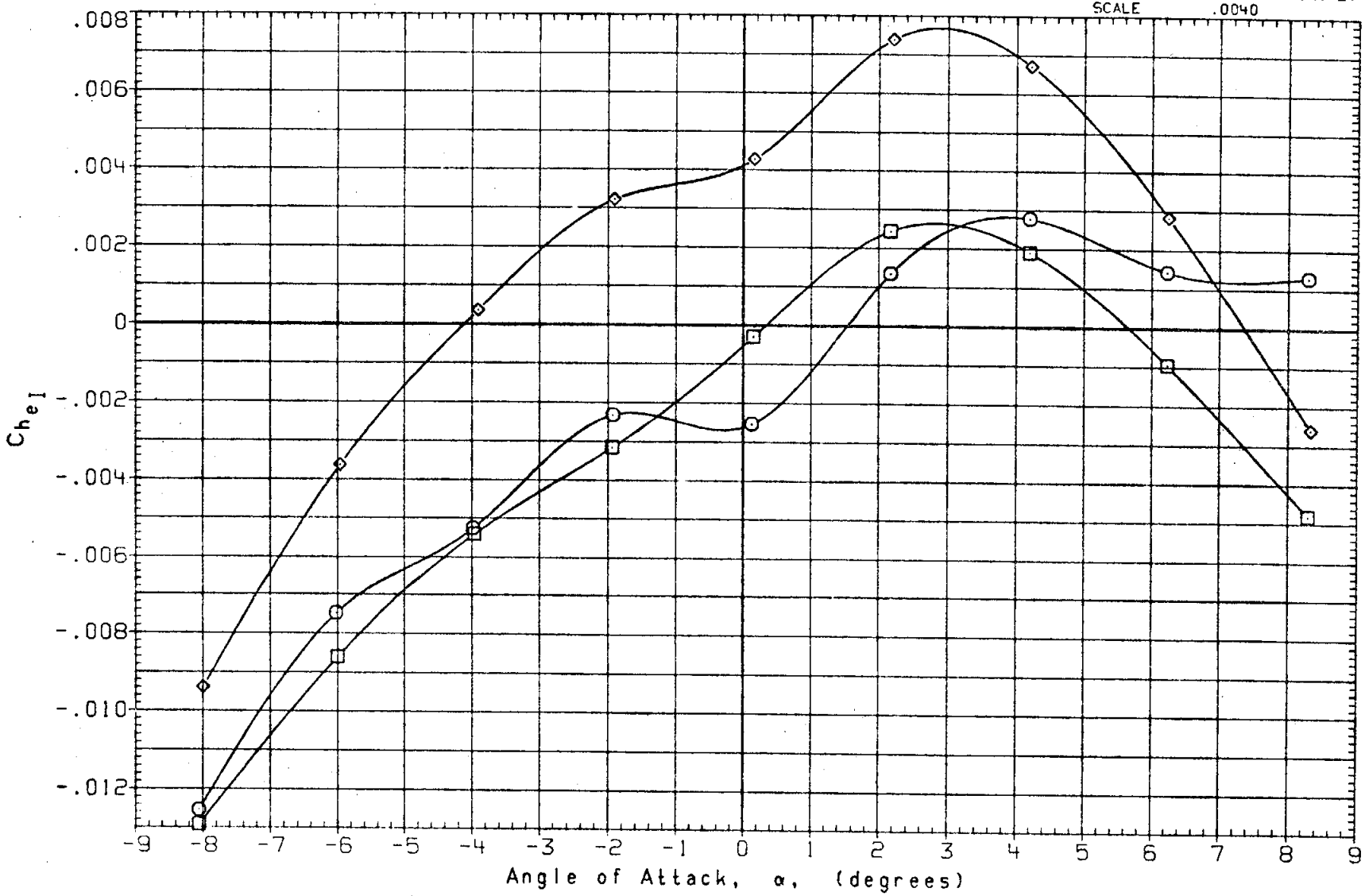

FIG. 29 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

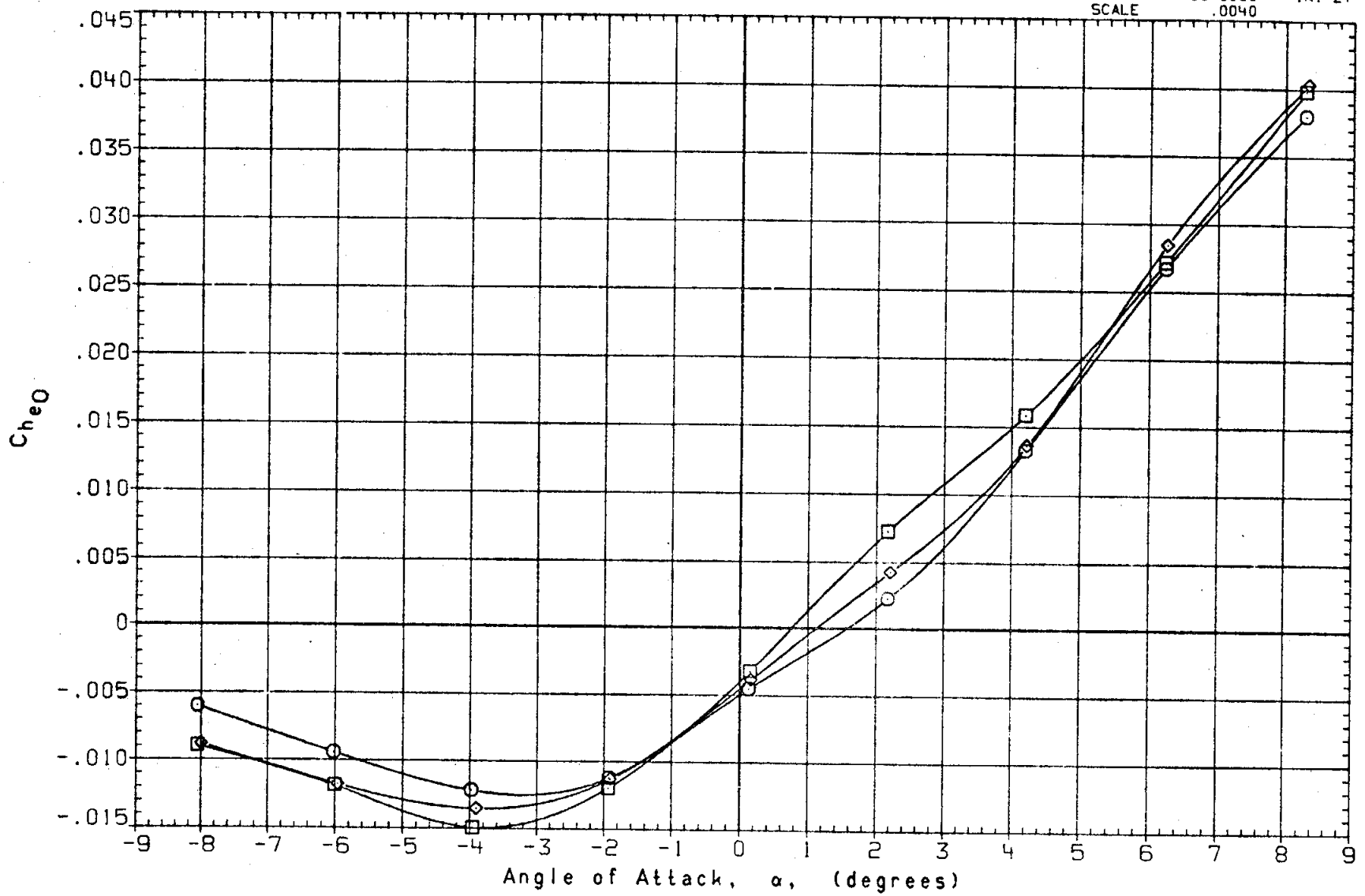

FIG. 29 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

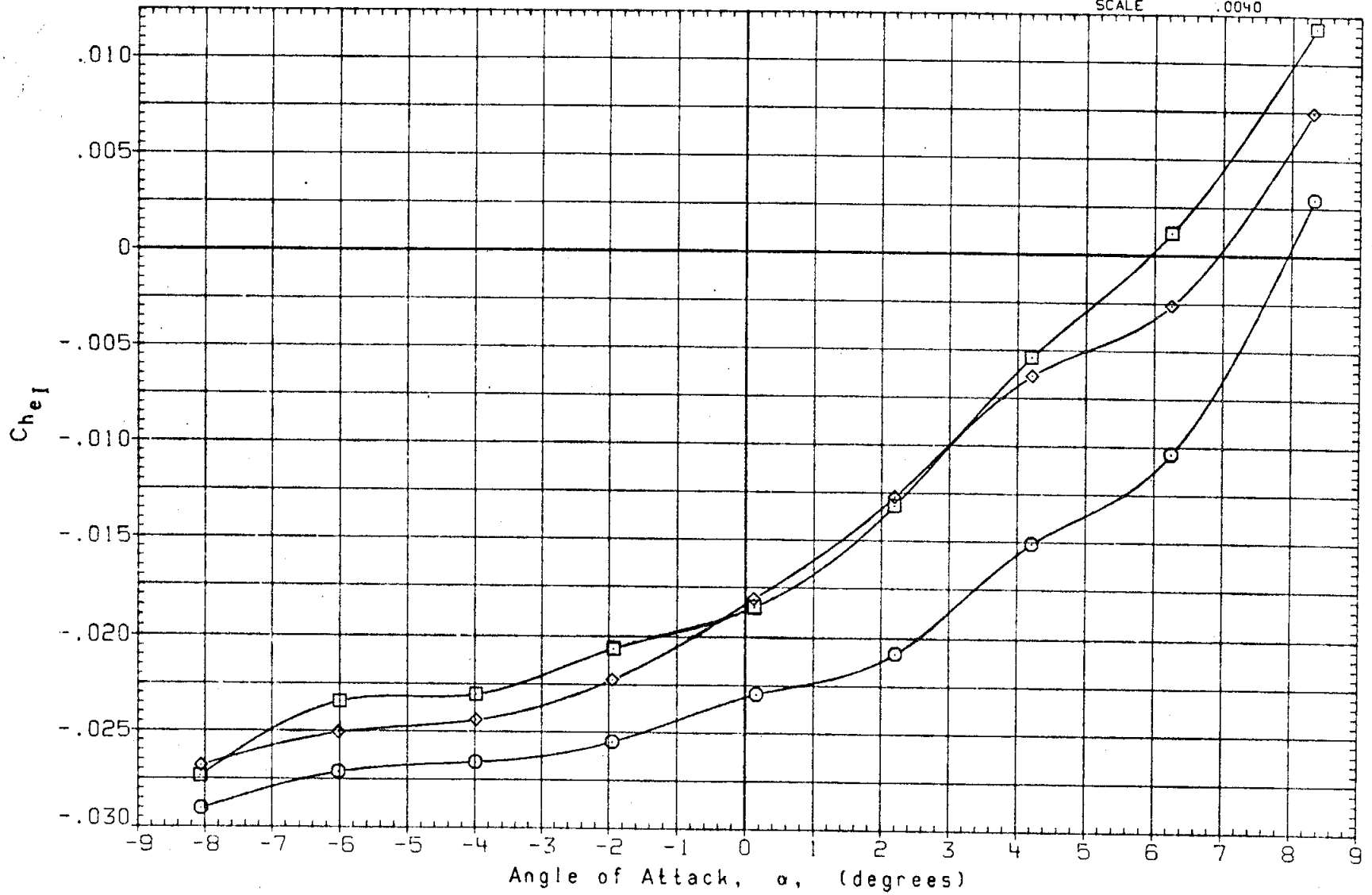

FIG. 29 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

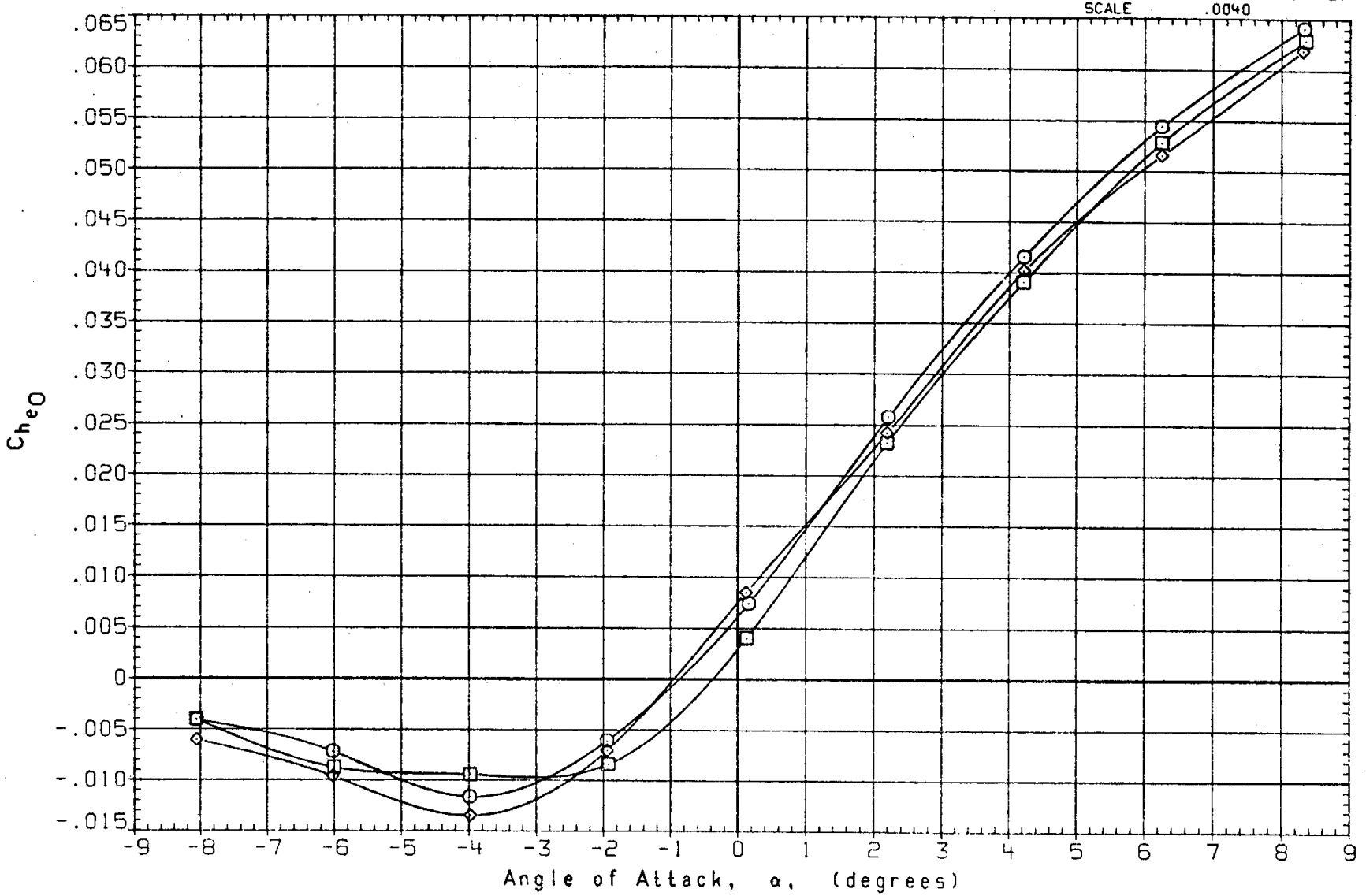

FIG. 29 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

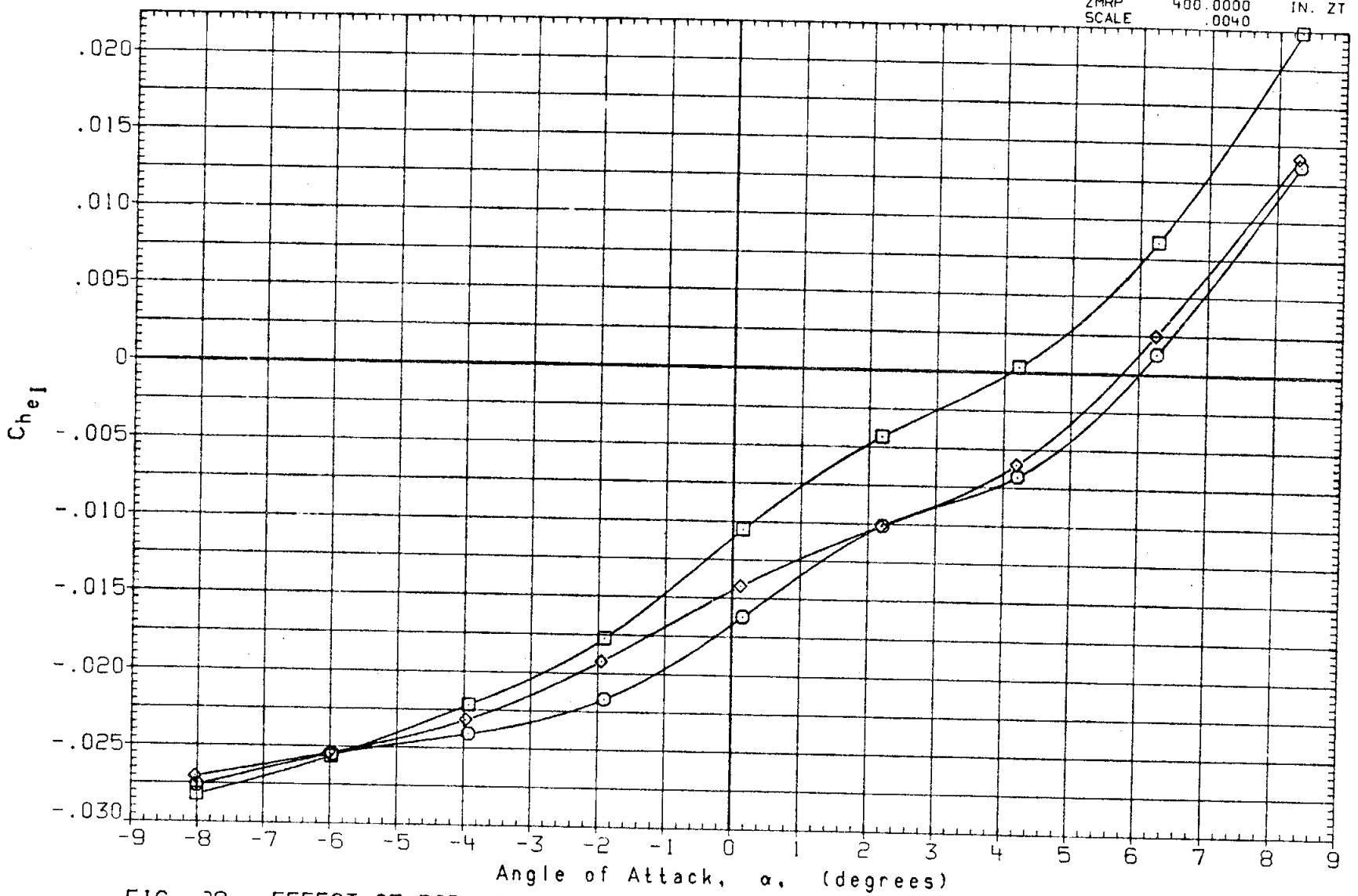

FIG. 29 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(E)MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000
S1Z010	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000
S1Z013	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

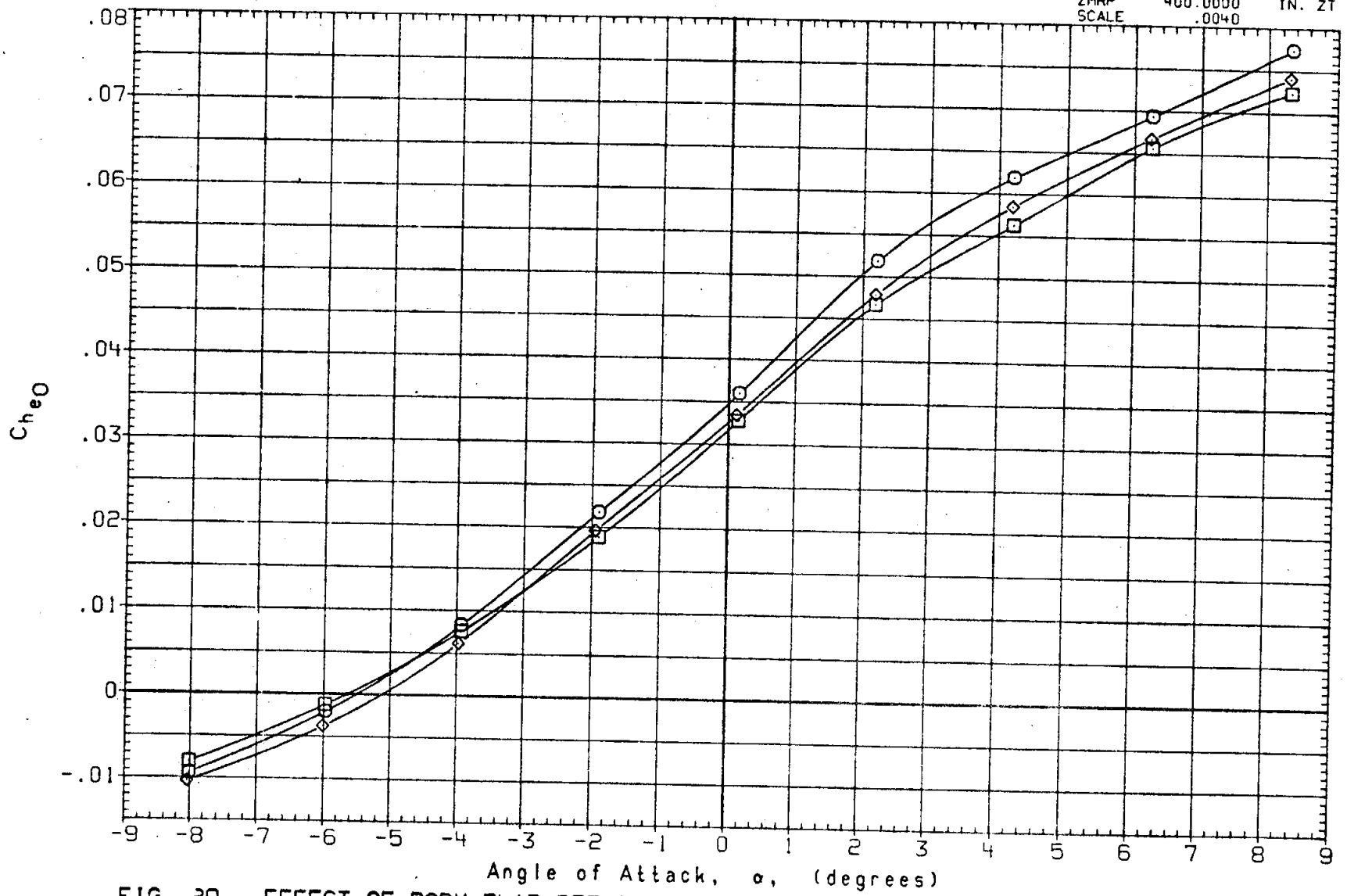

FIG. 29 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(E)MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

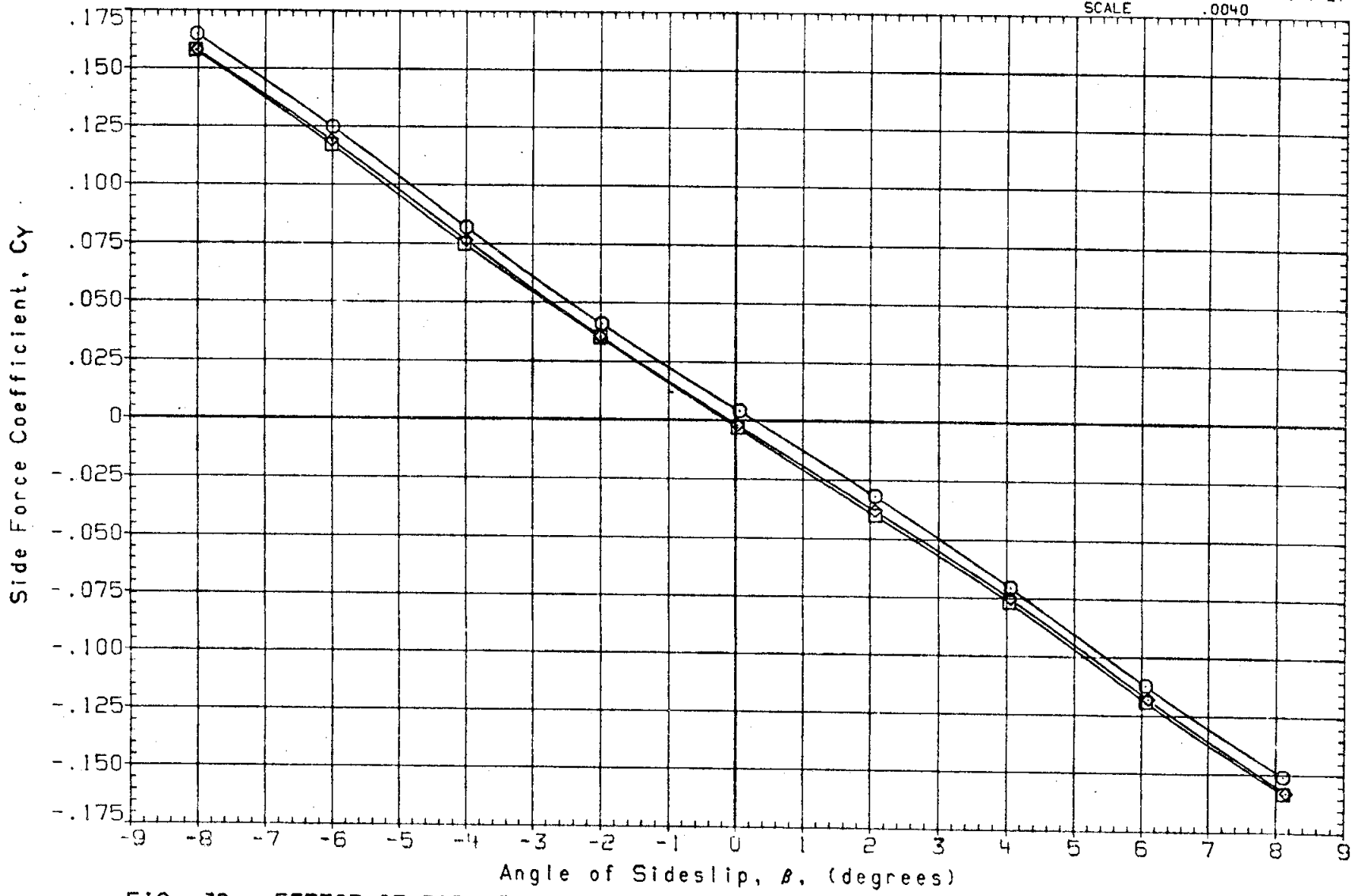

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

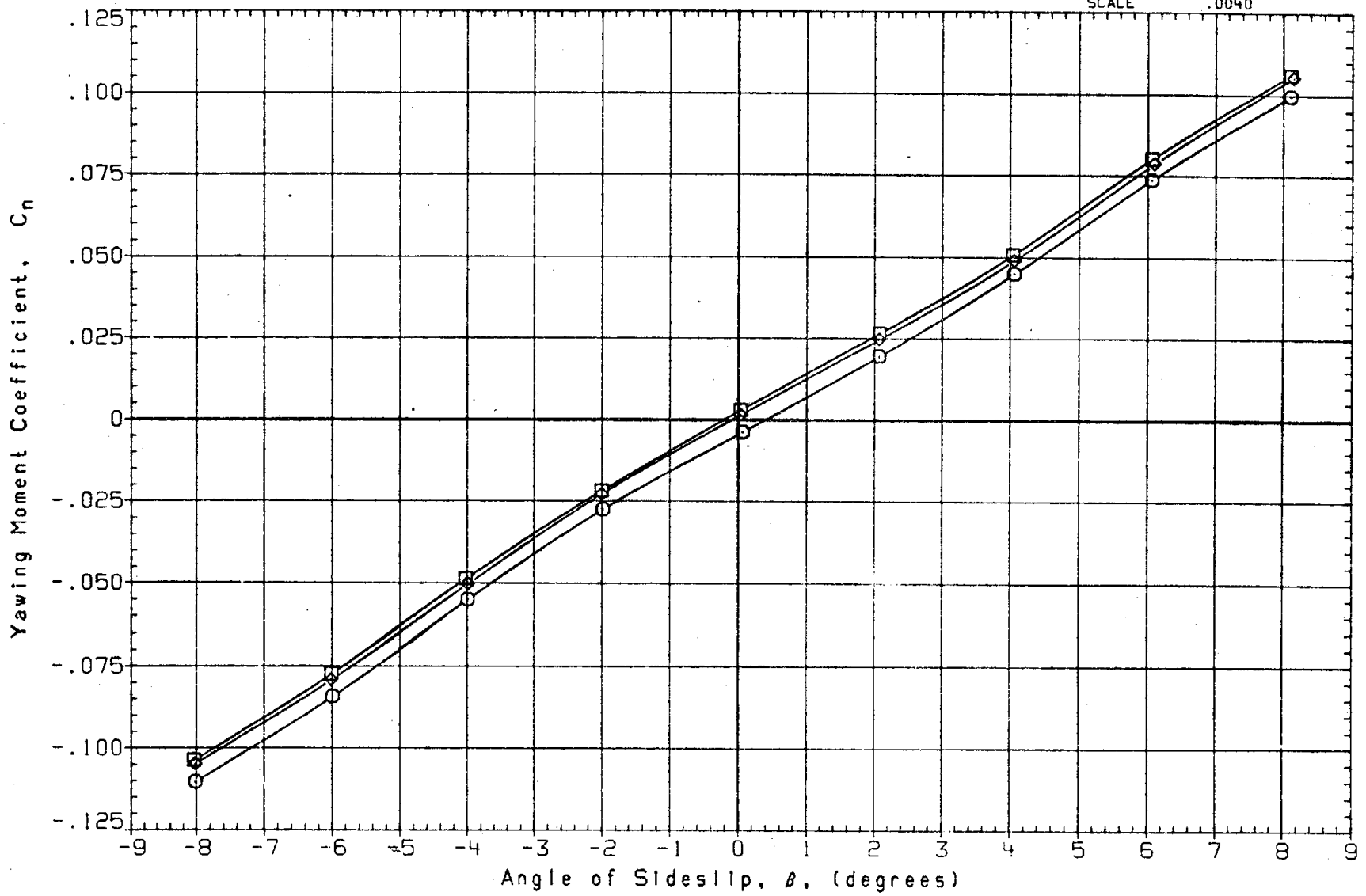

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMPOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

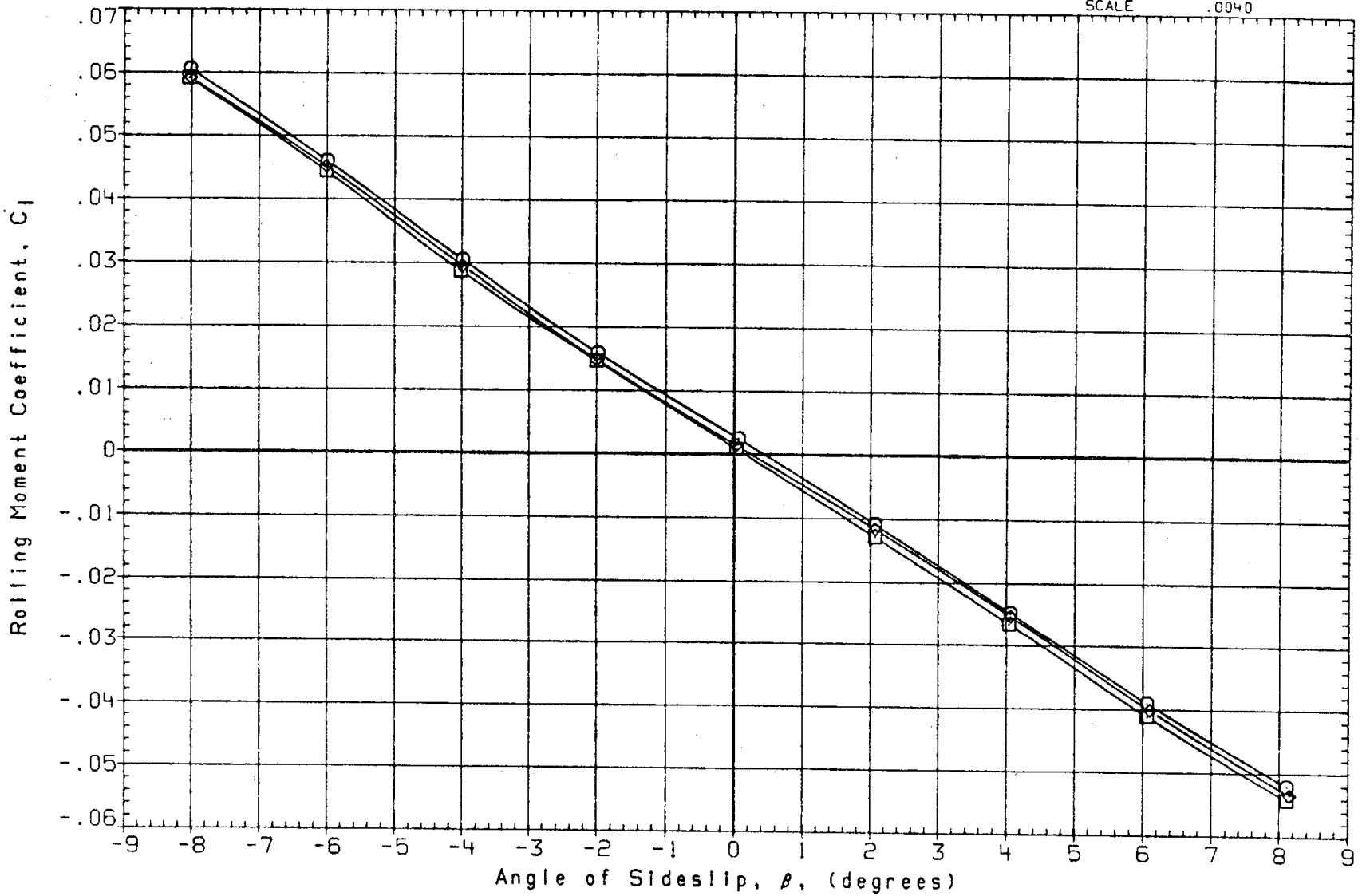

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

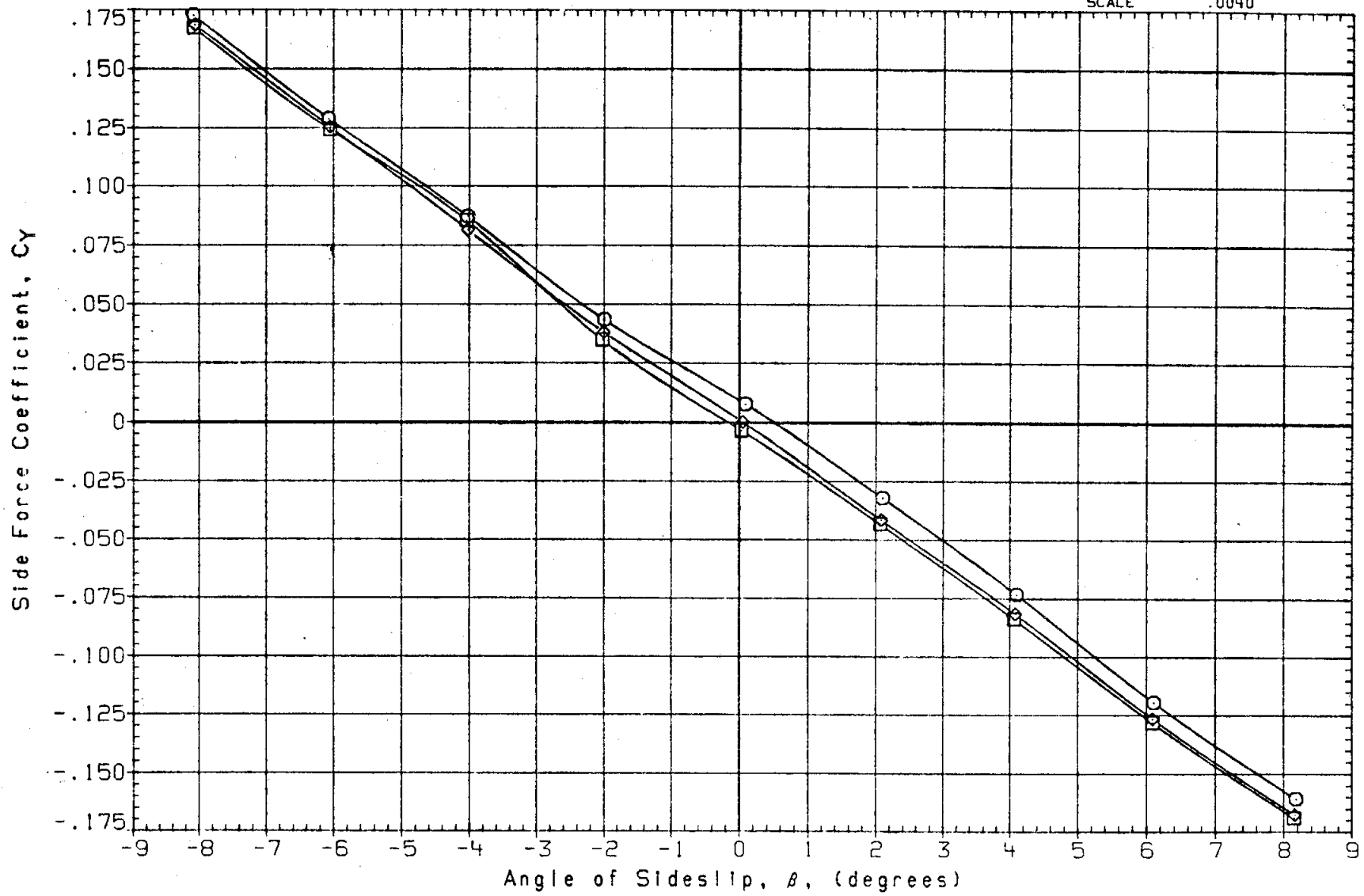

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

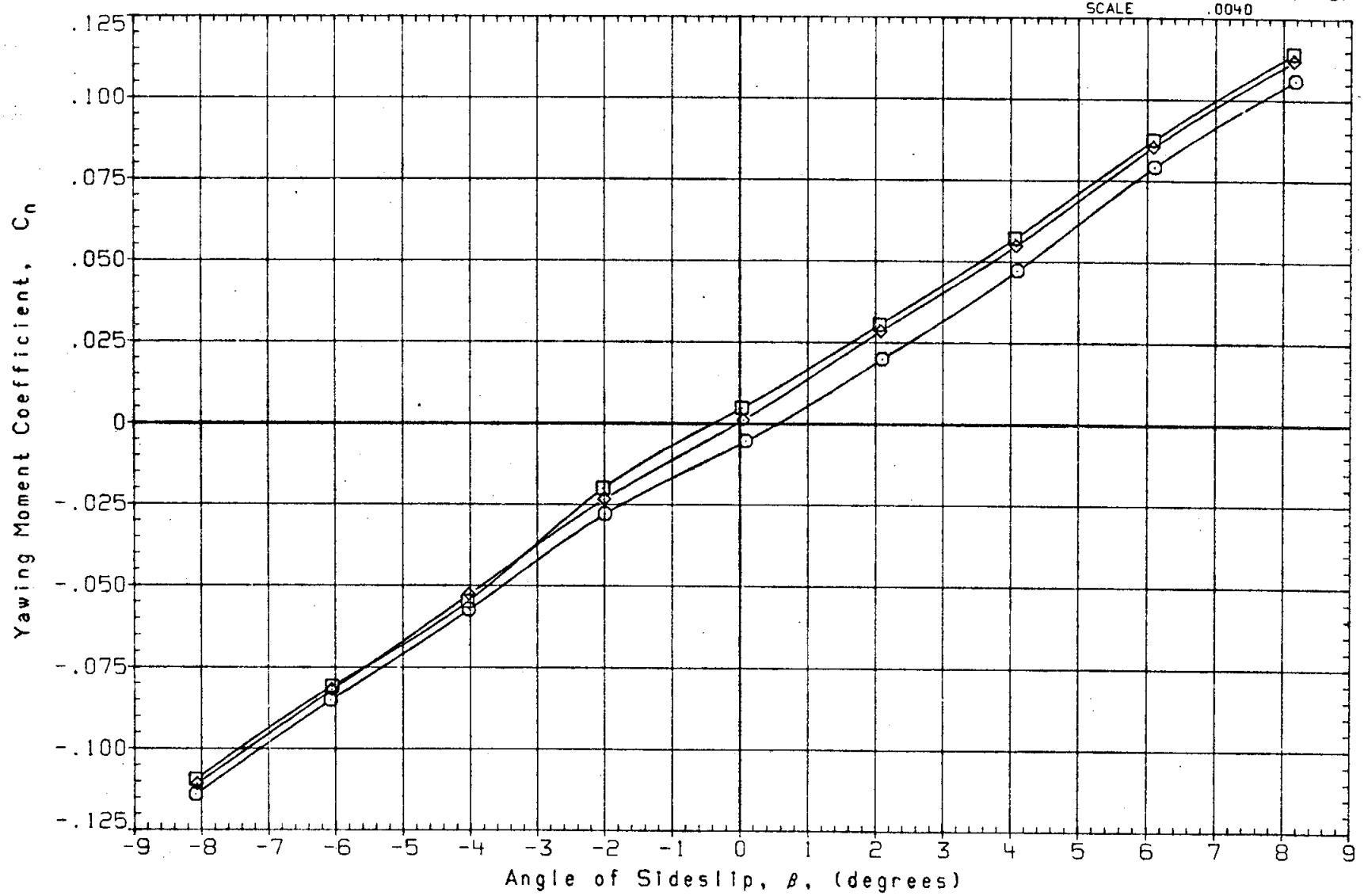

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(B) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

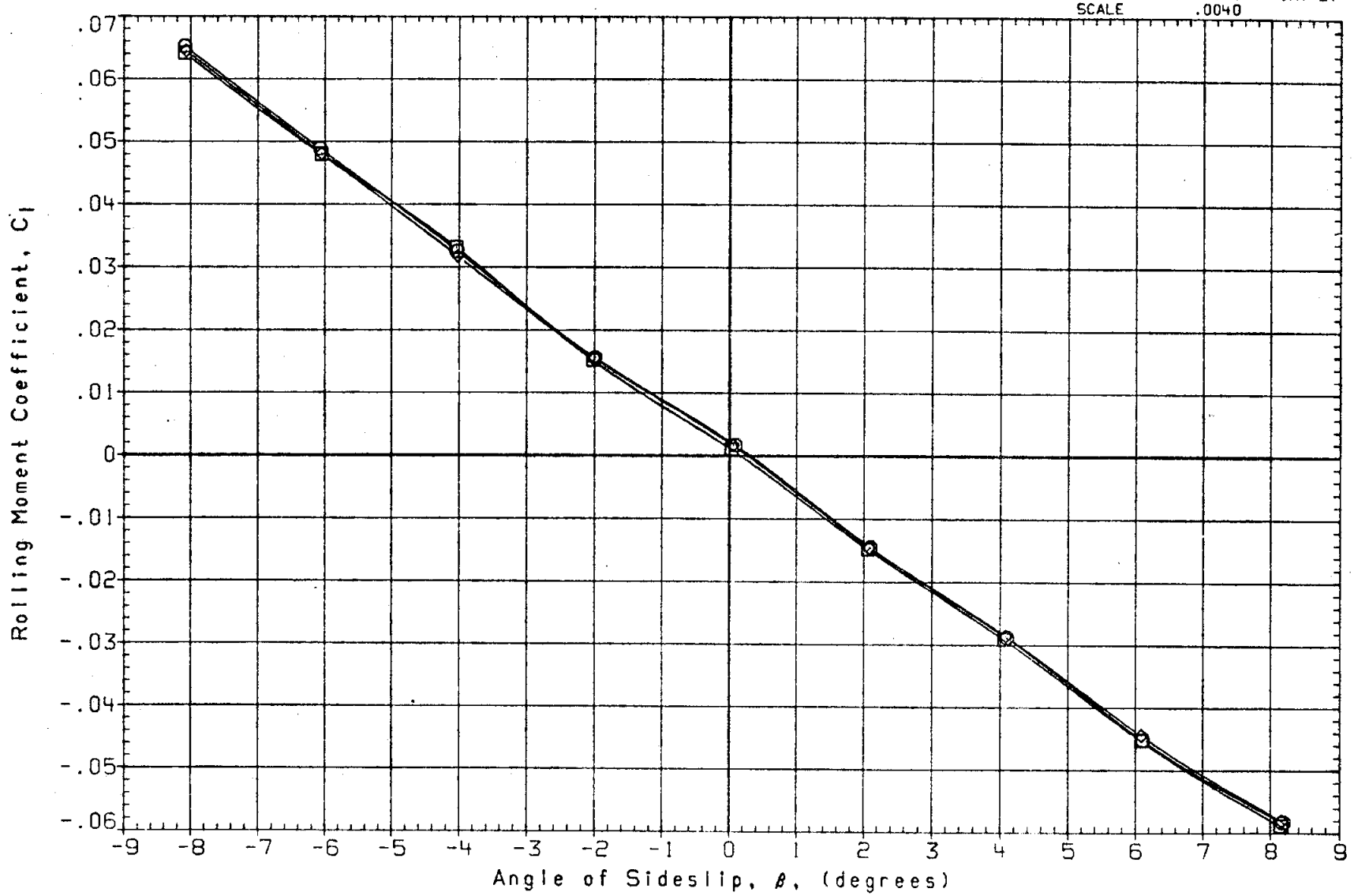

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

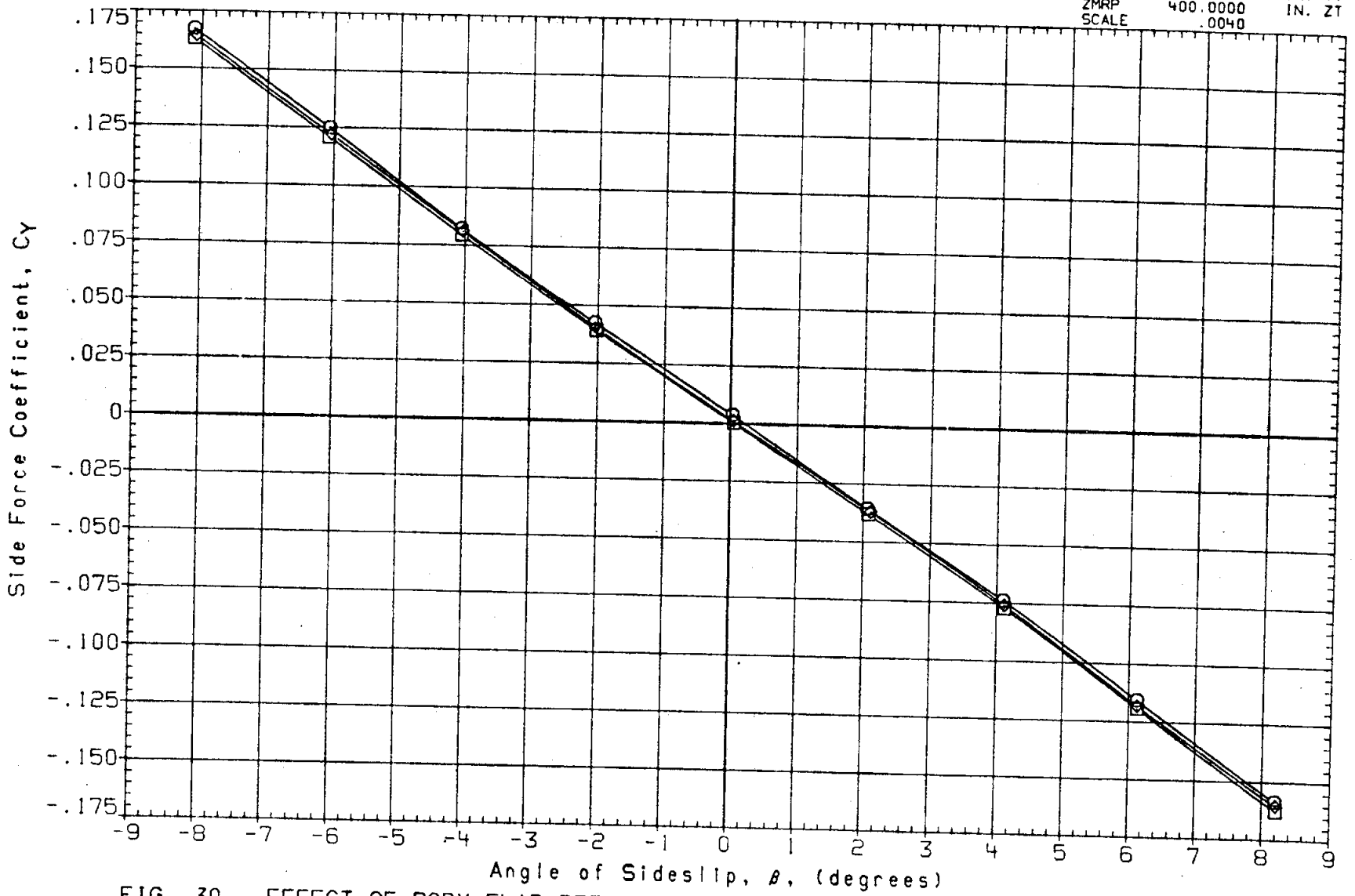

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(C) MACH = 1.05

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

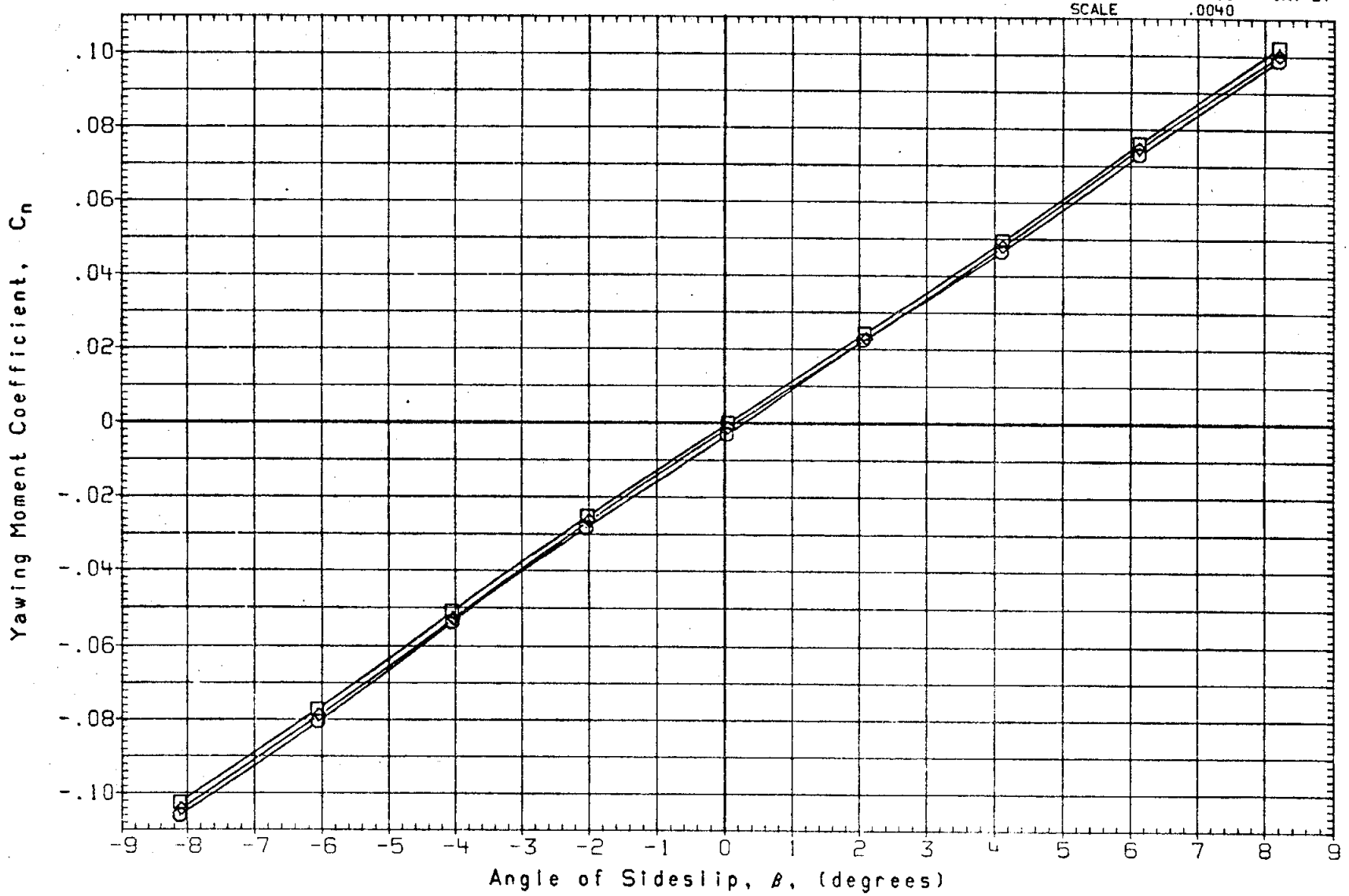

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

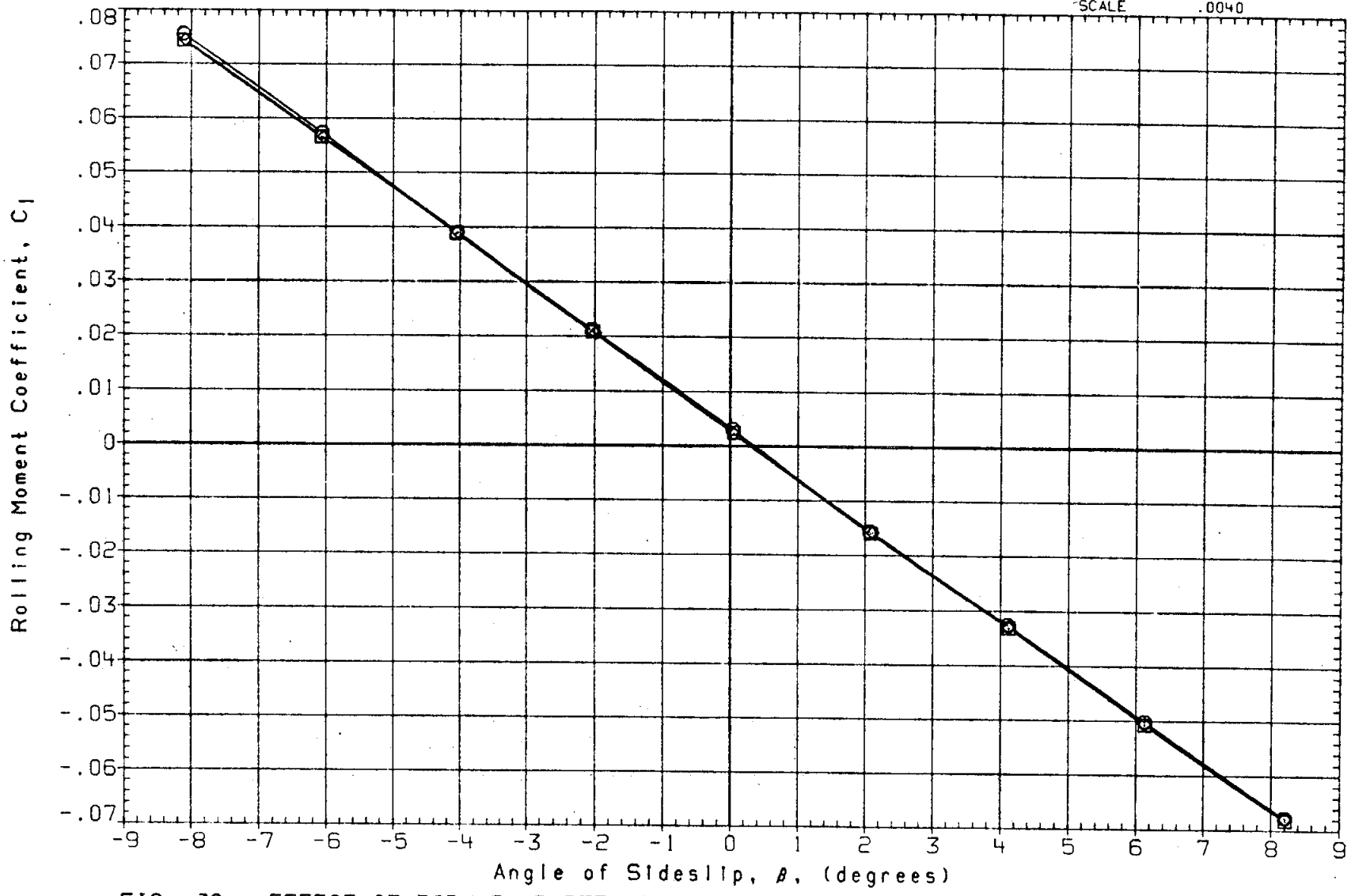

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

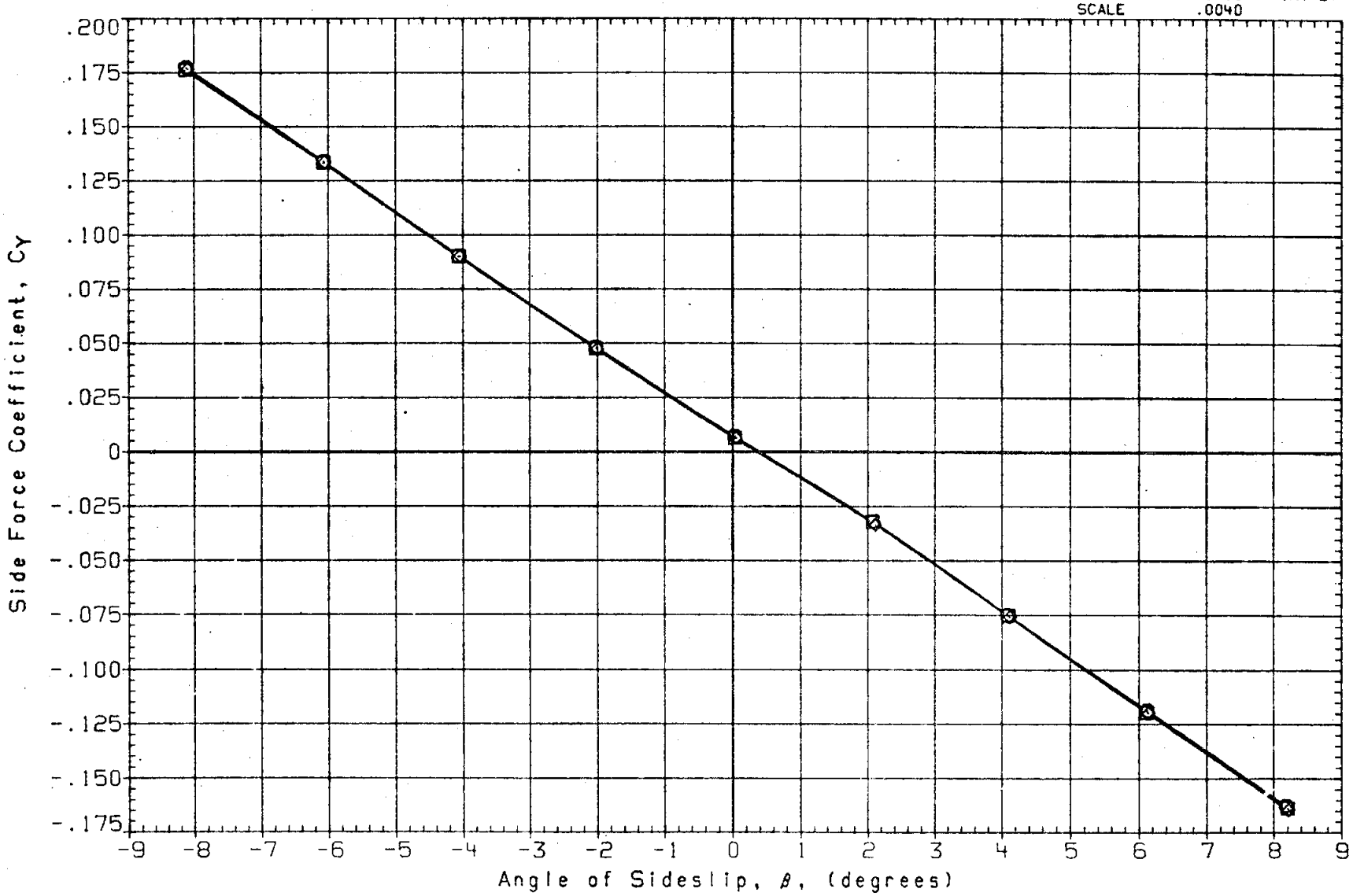

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

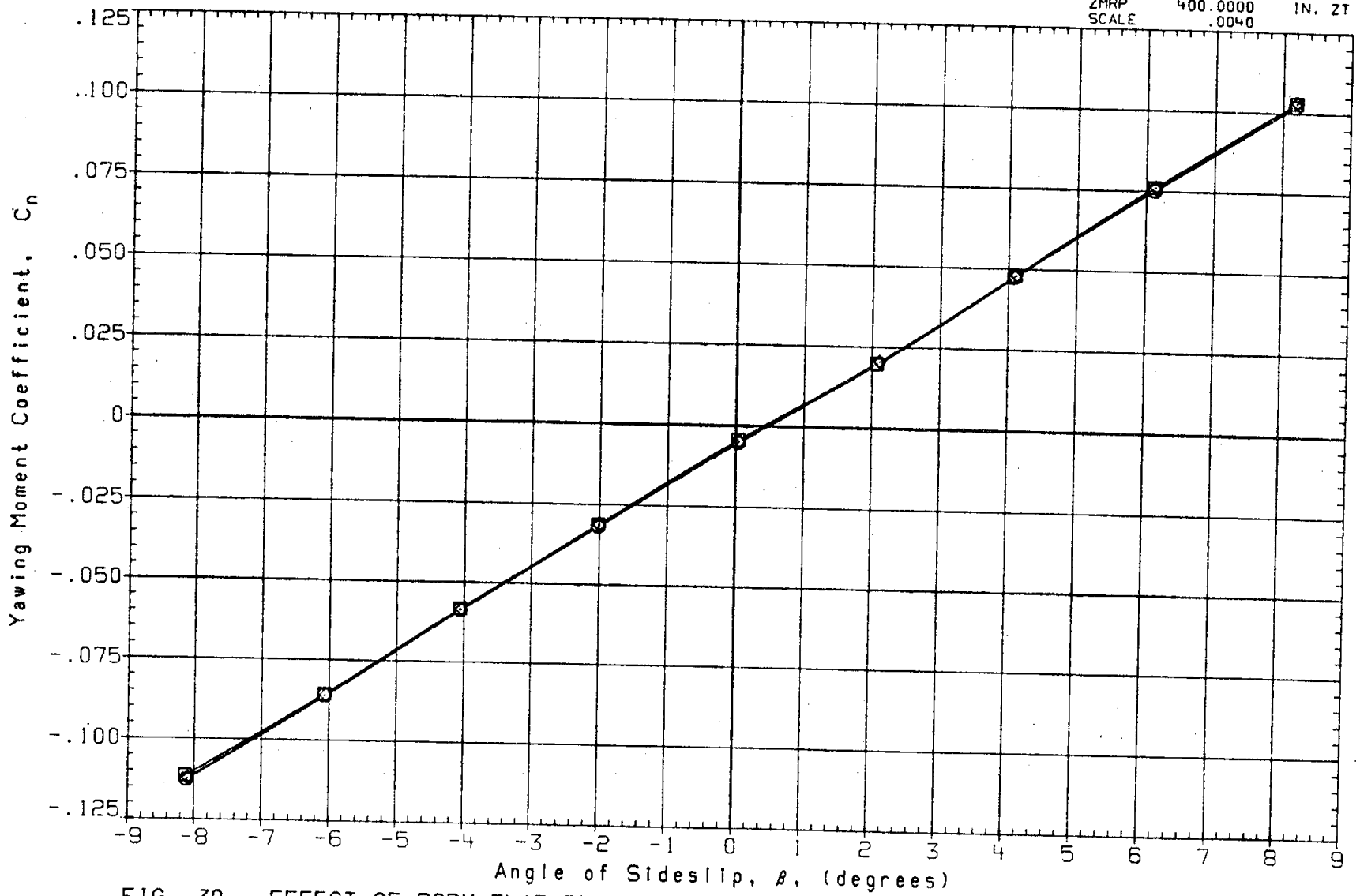

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

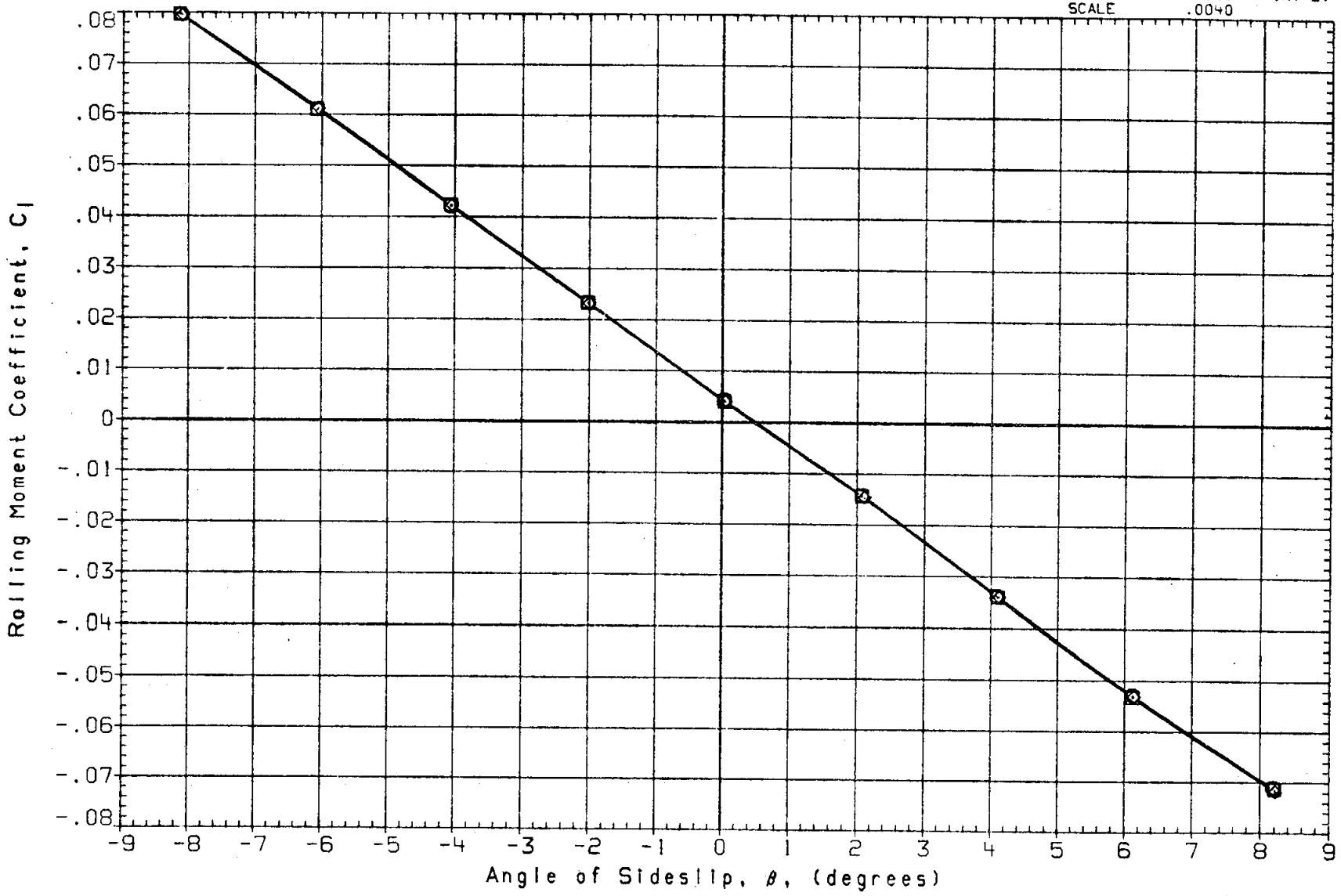

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

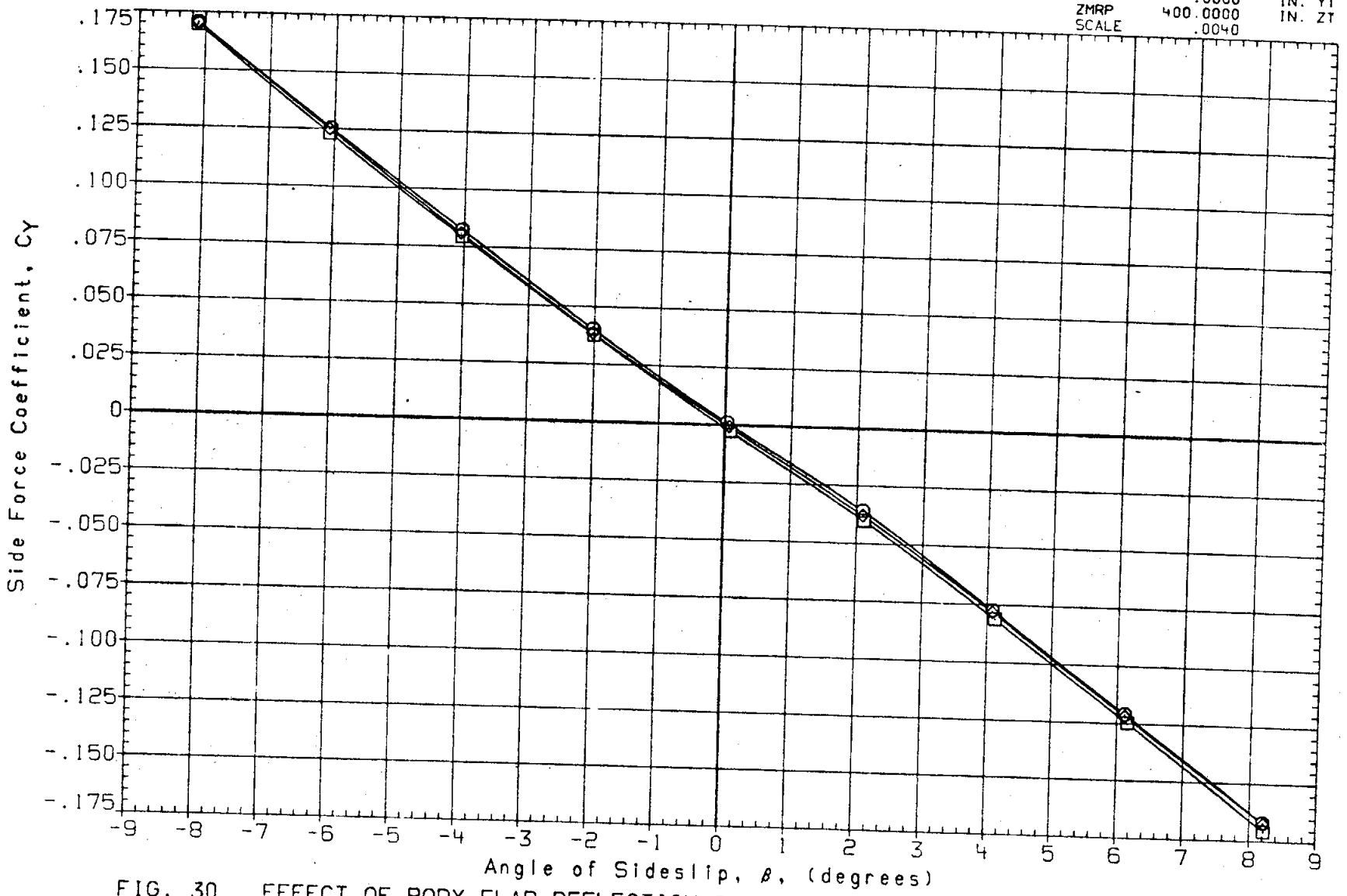

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(E) MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

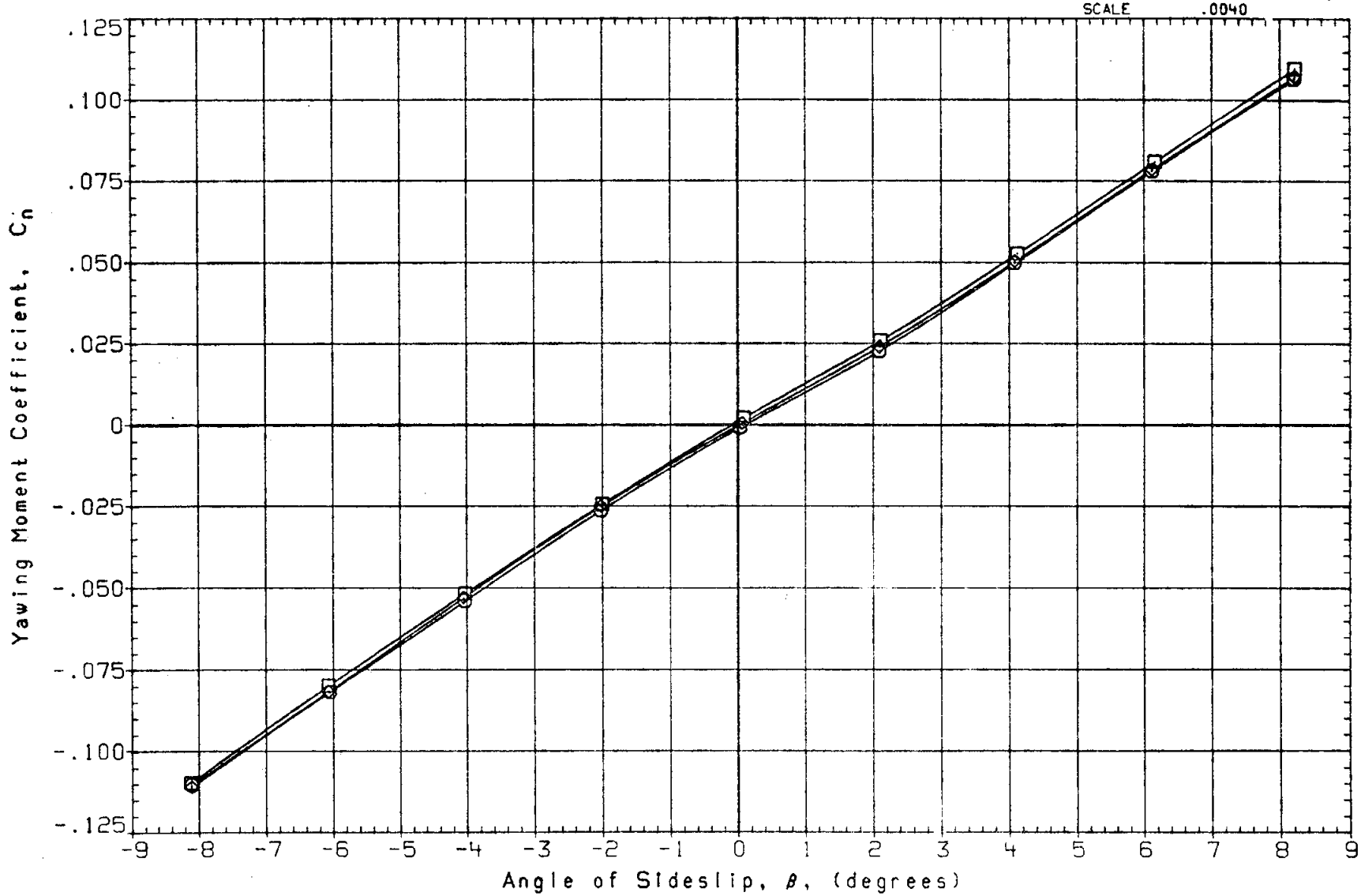

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
R1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
R1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

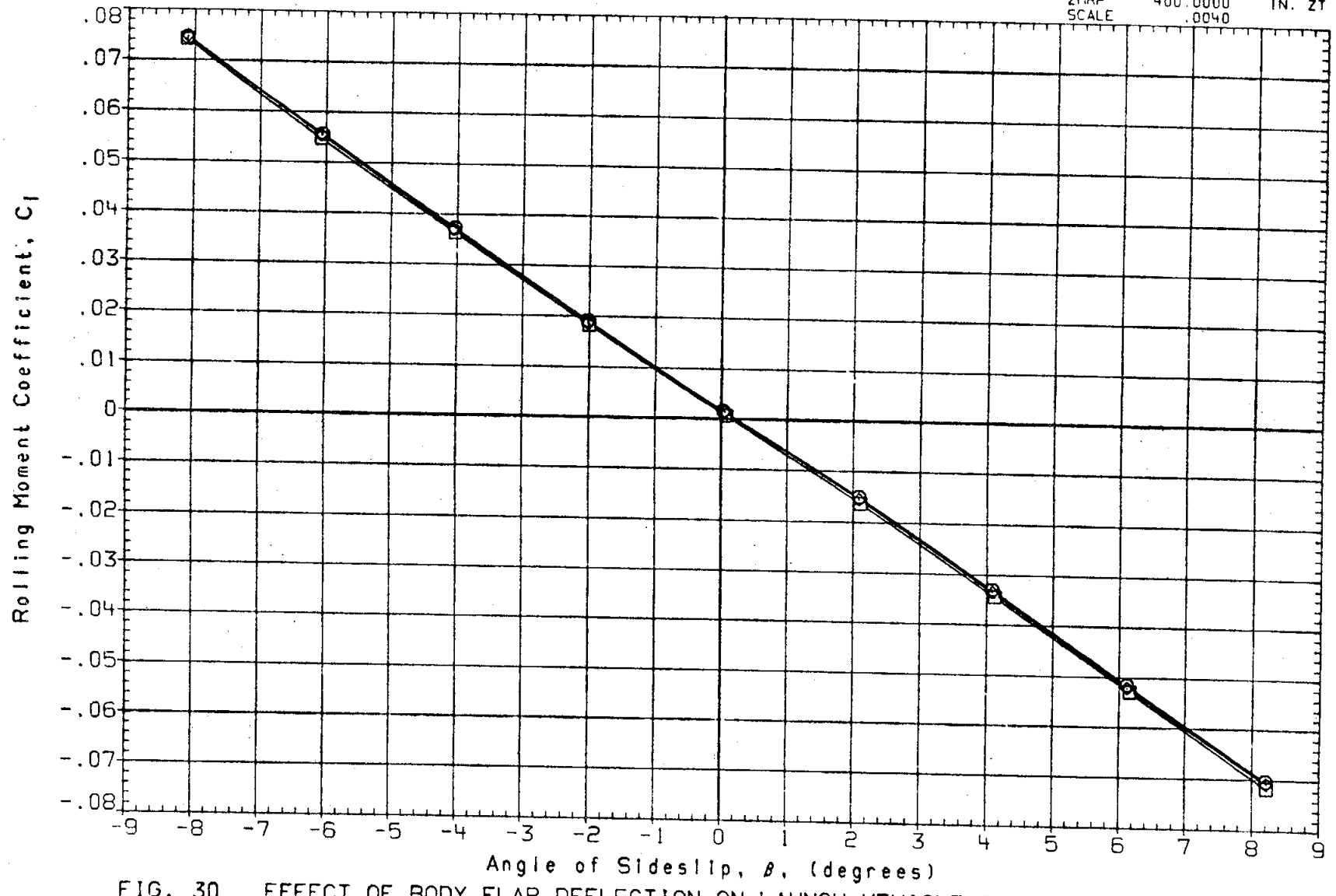

FIG. 30 EFFECT OF BODY FLAP DEFLECTION ON LAUNCH VEHICLE IN YAW

(E) MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

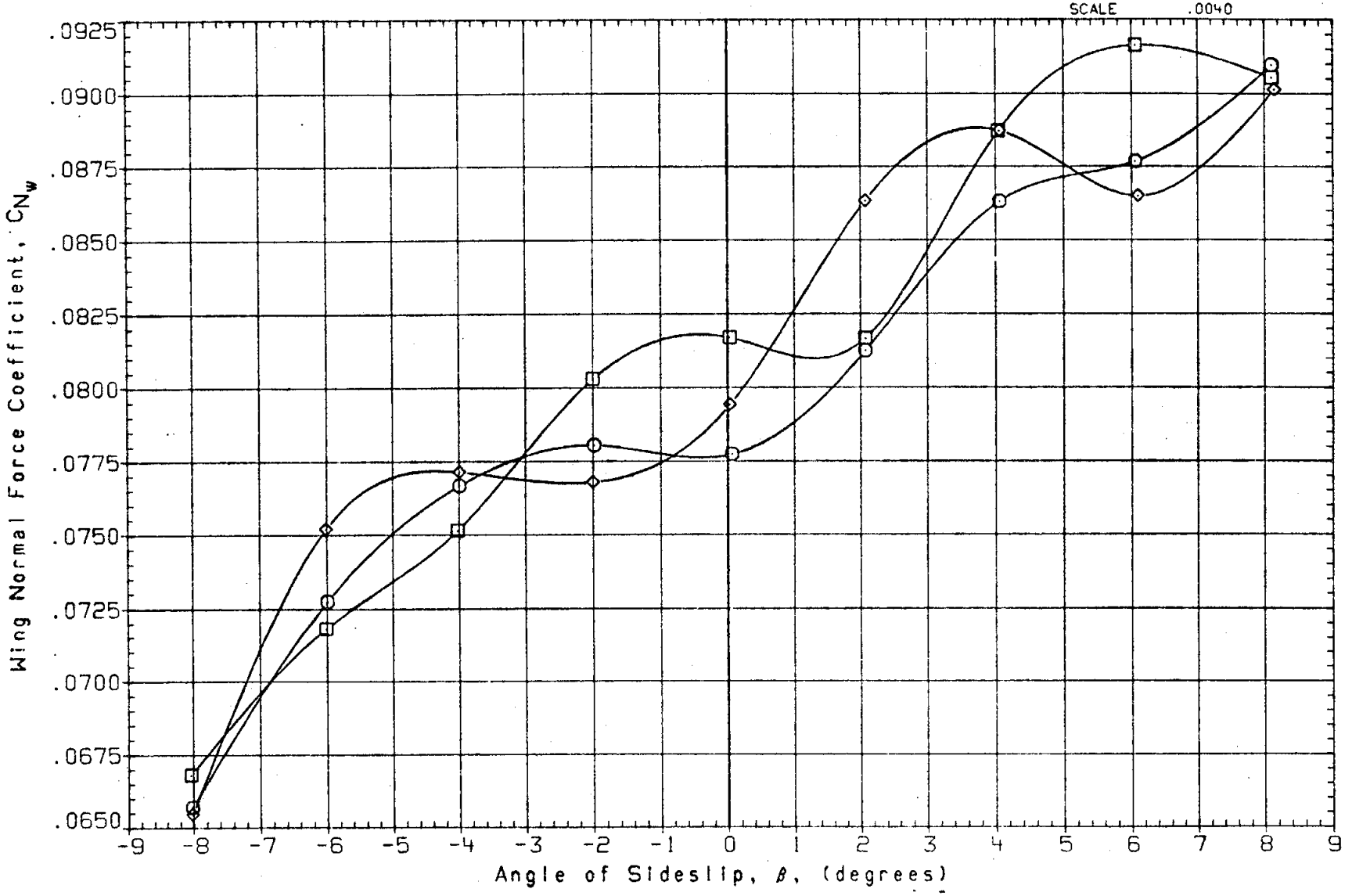

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BOFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

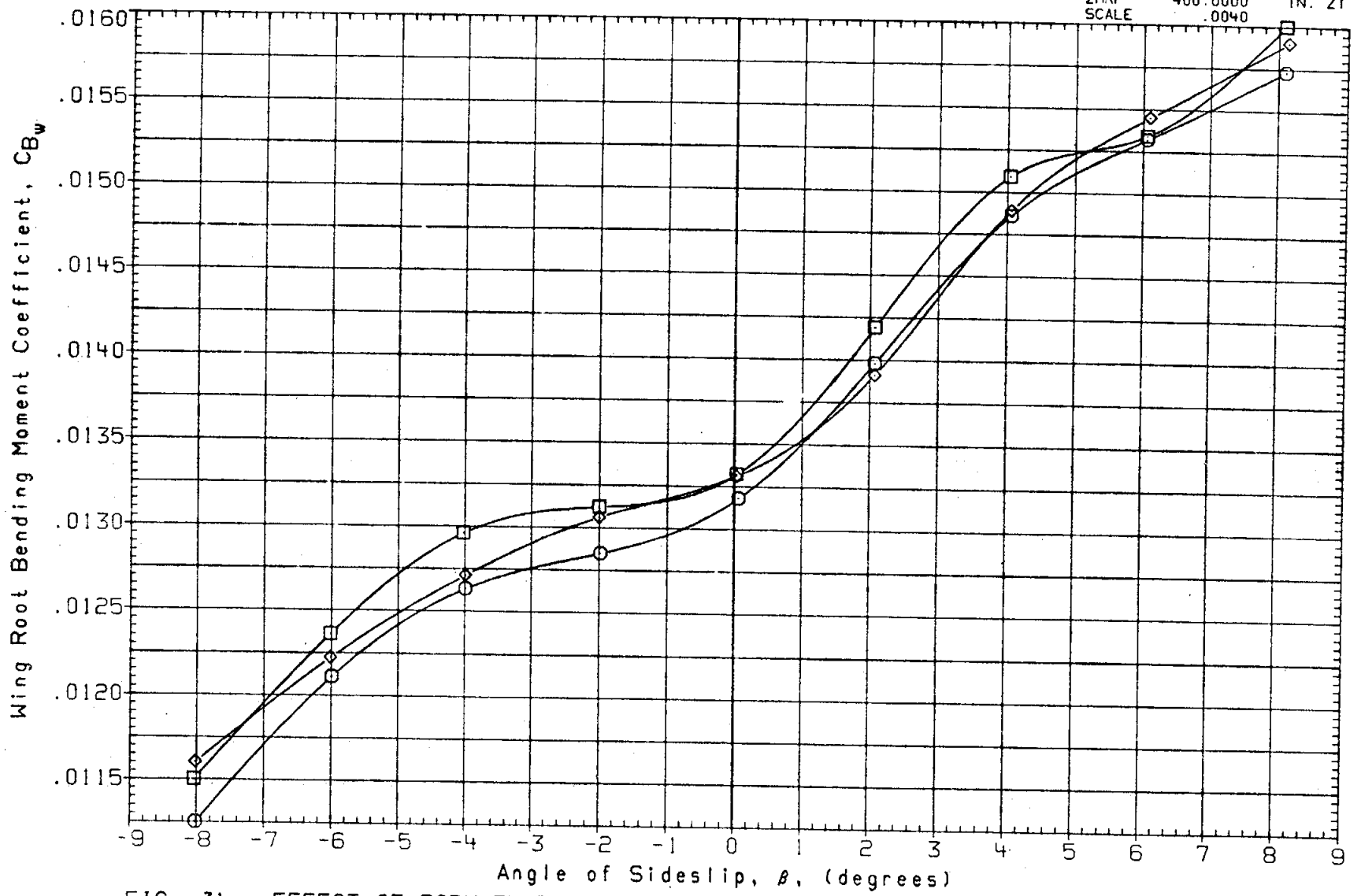

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

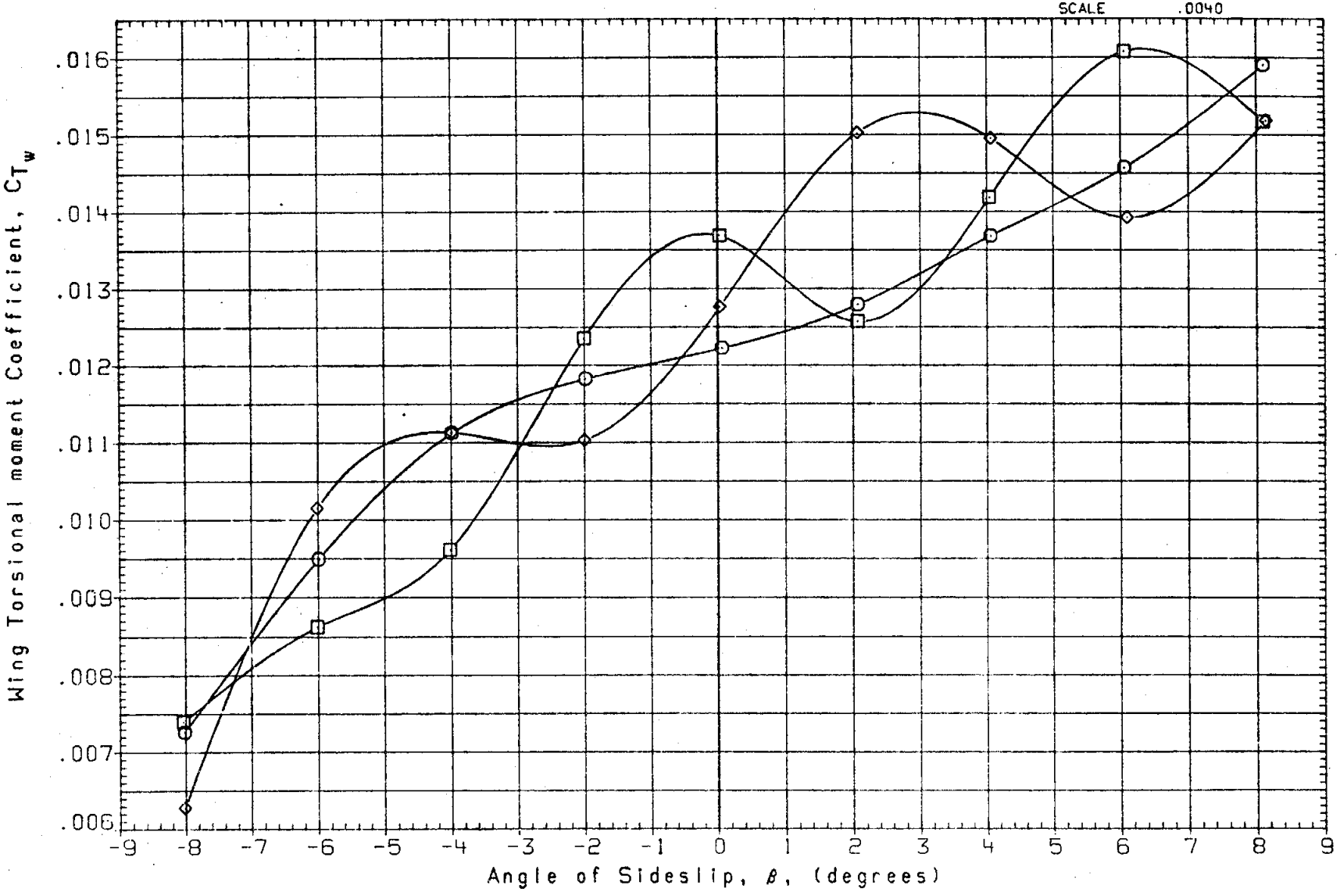

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

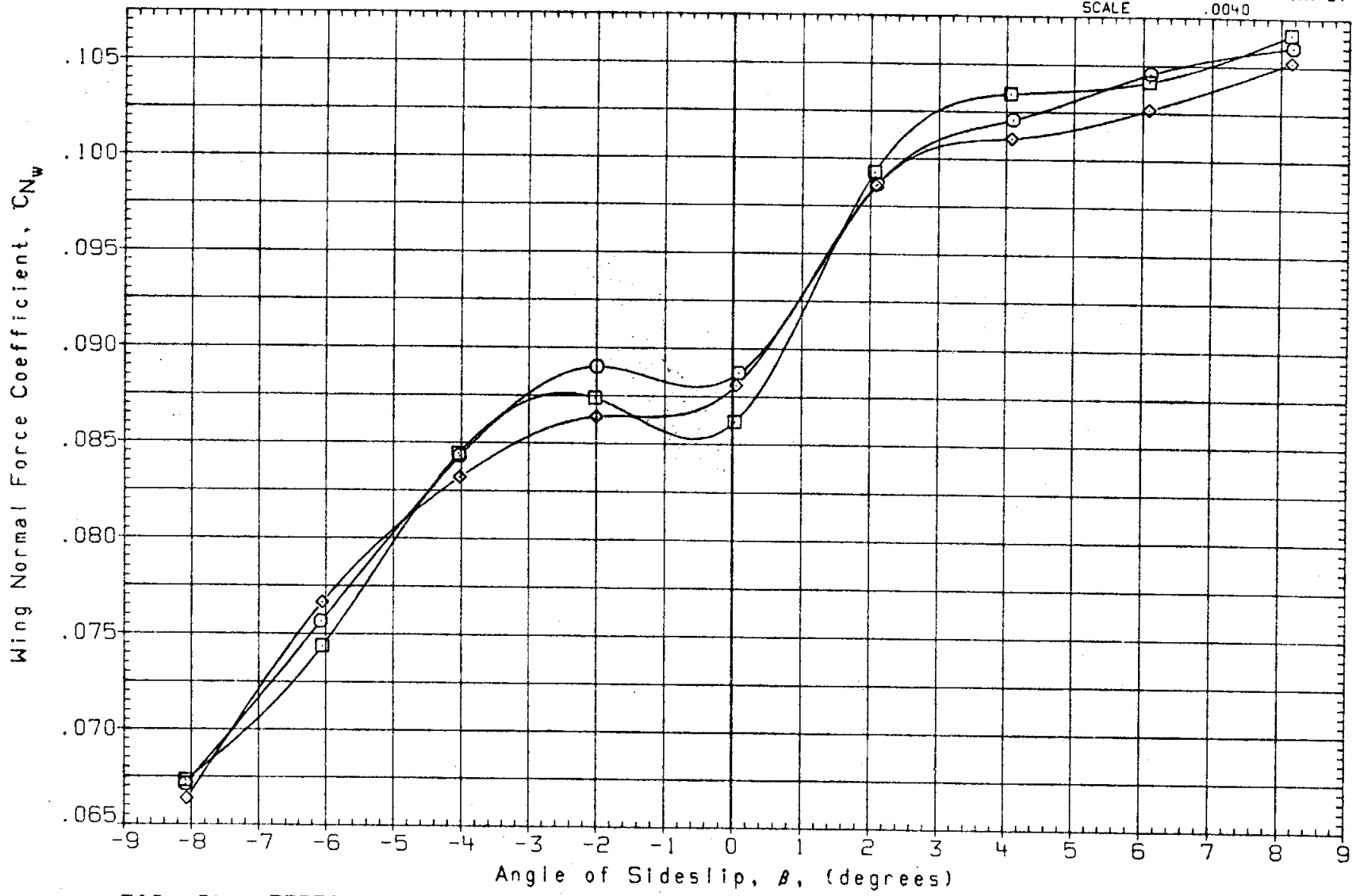

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(B) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

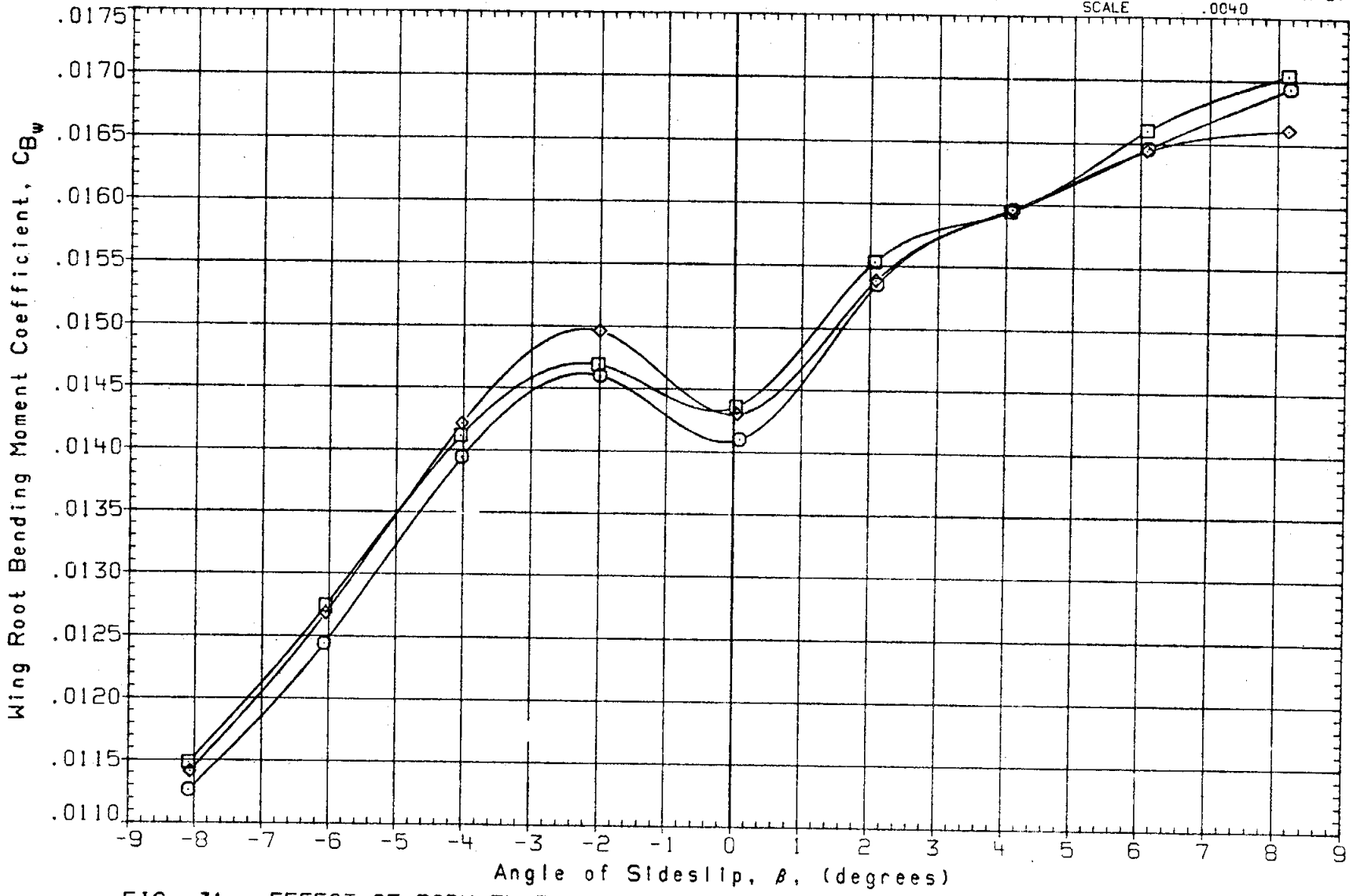

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

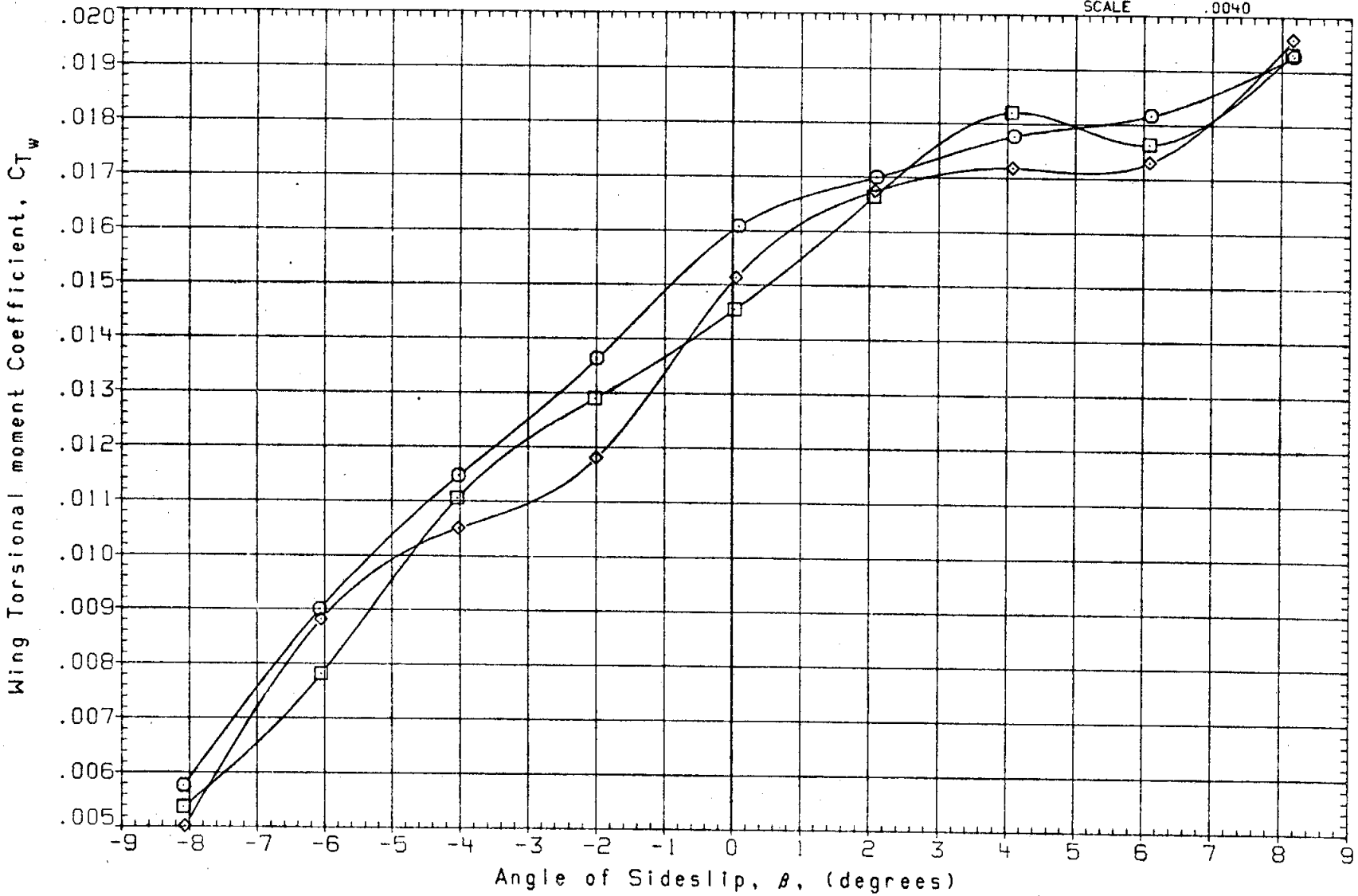

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

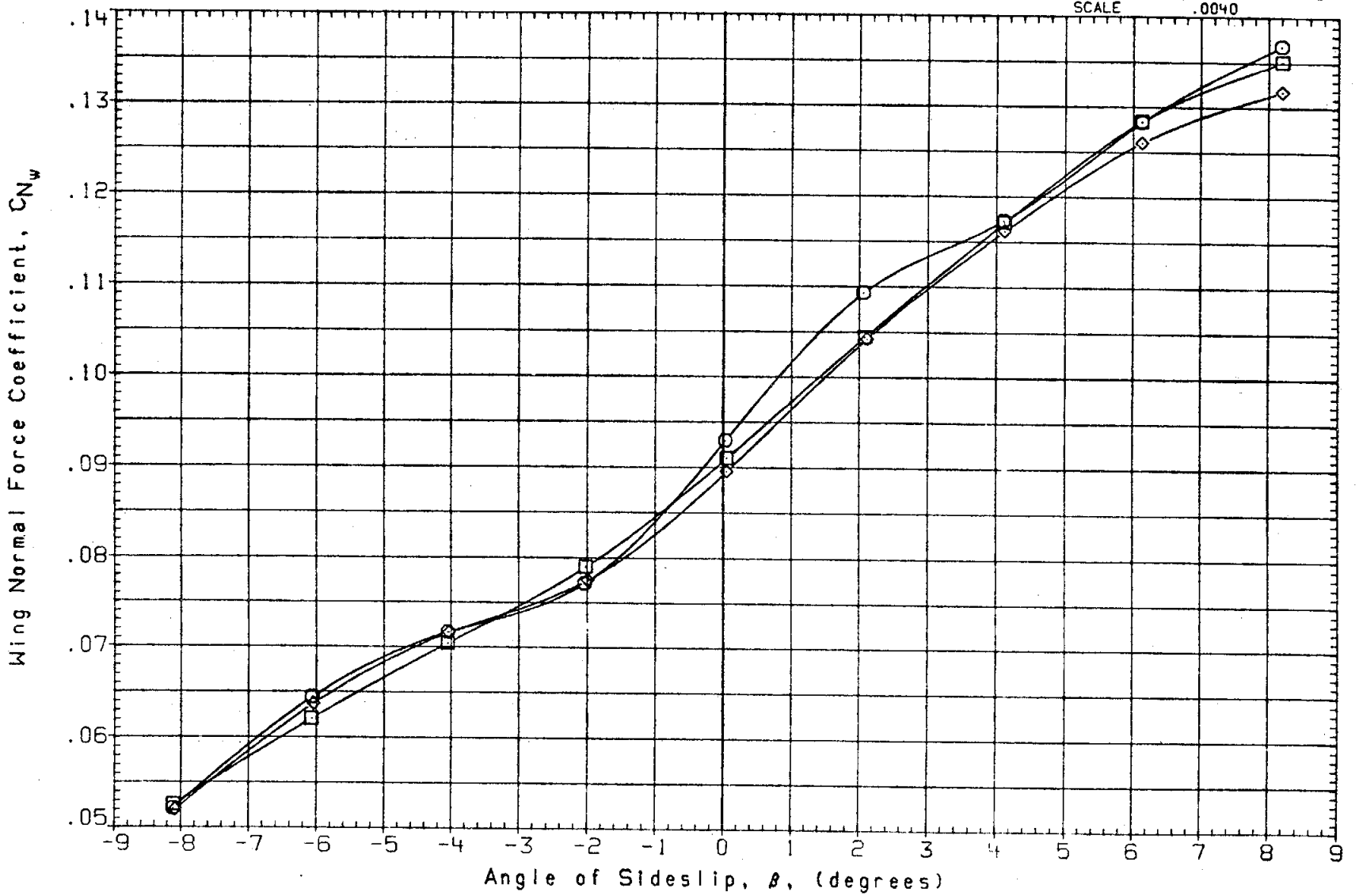

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

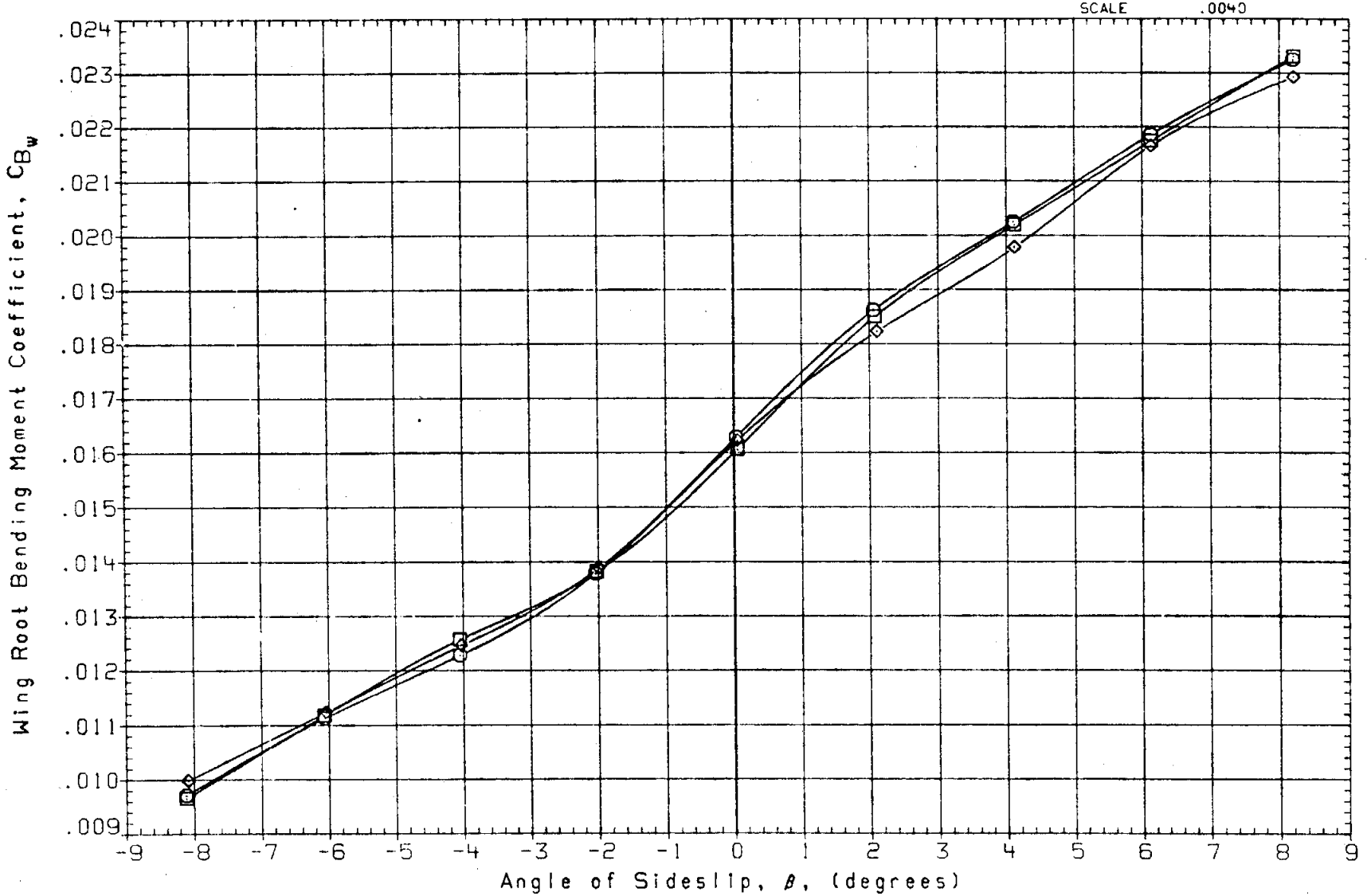

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

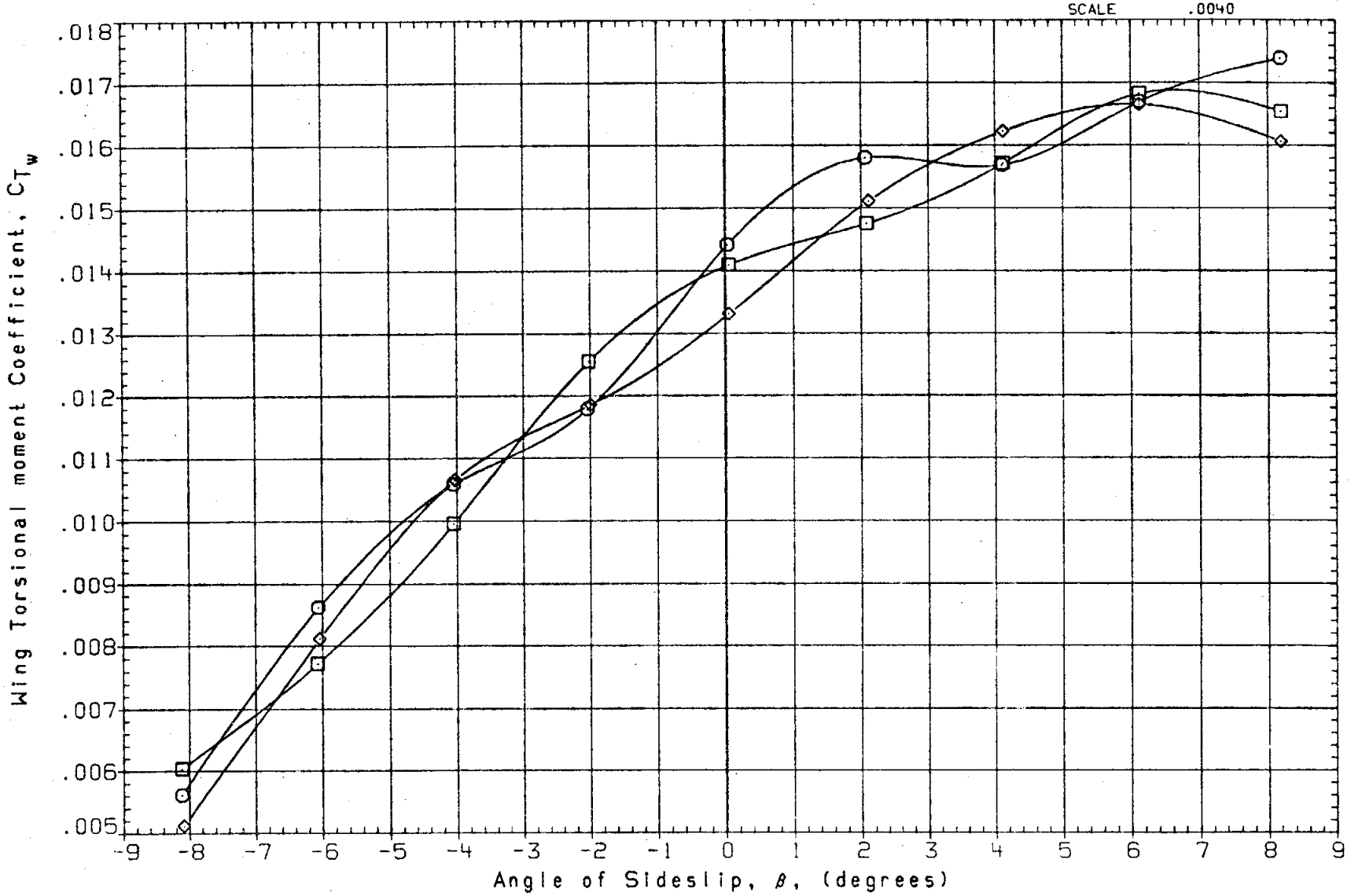

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

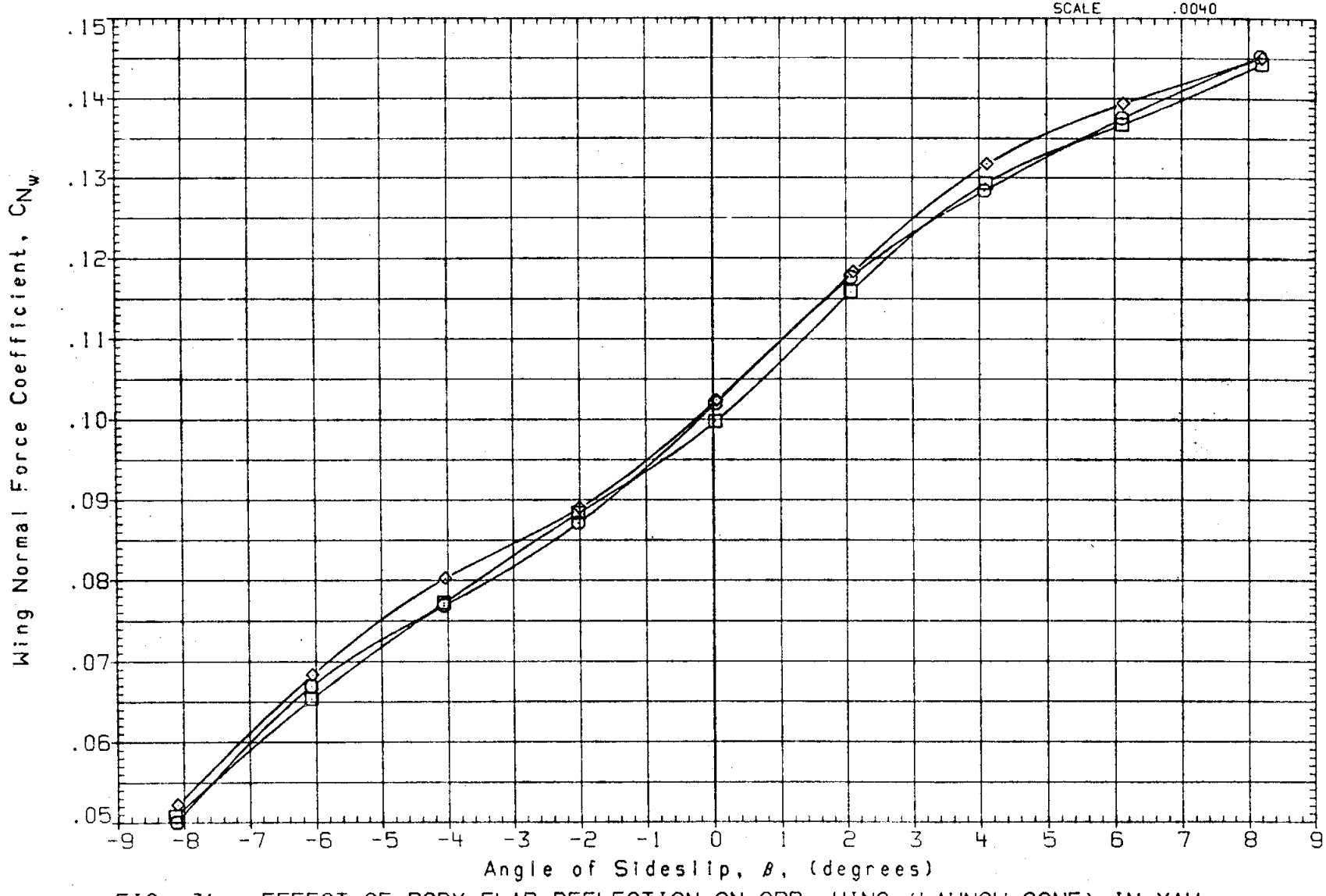

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA29 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

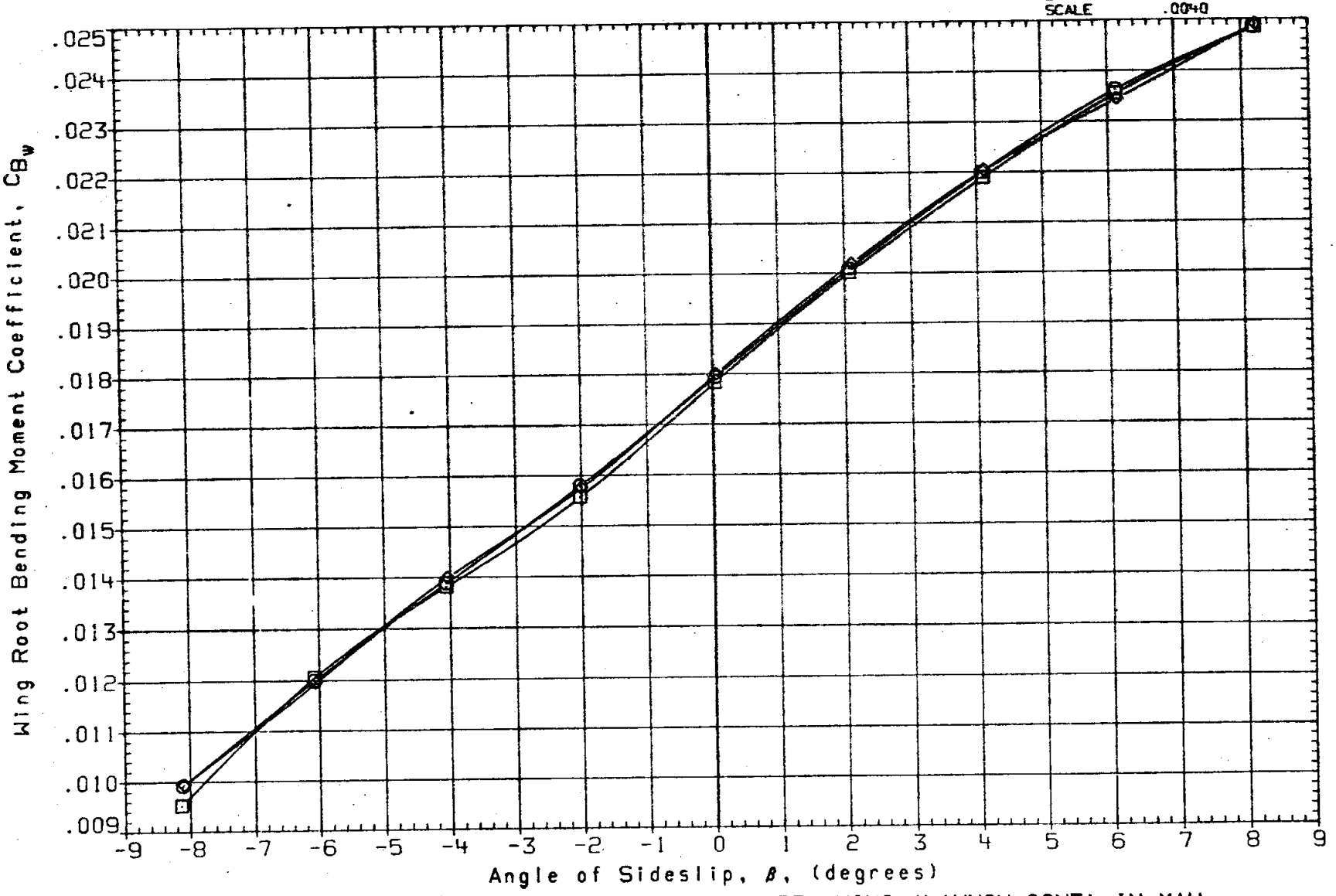

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

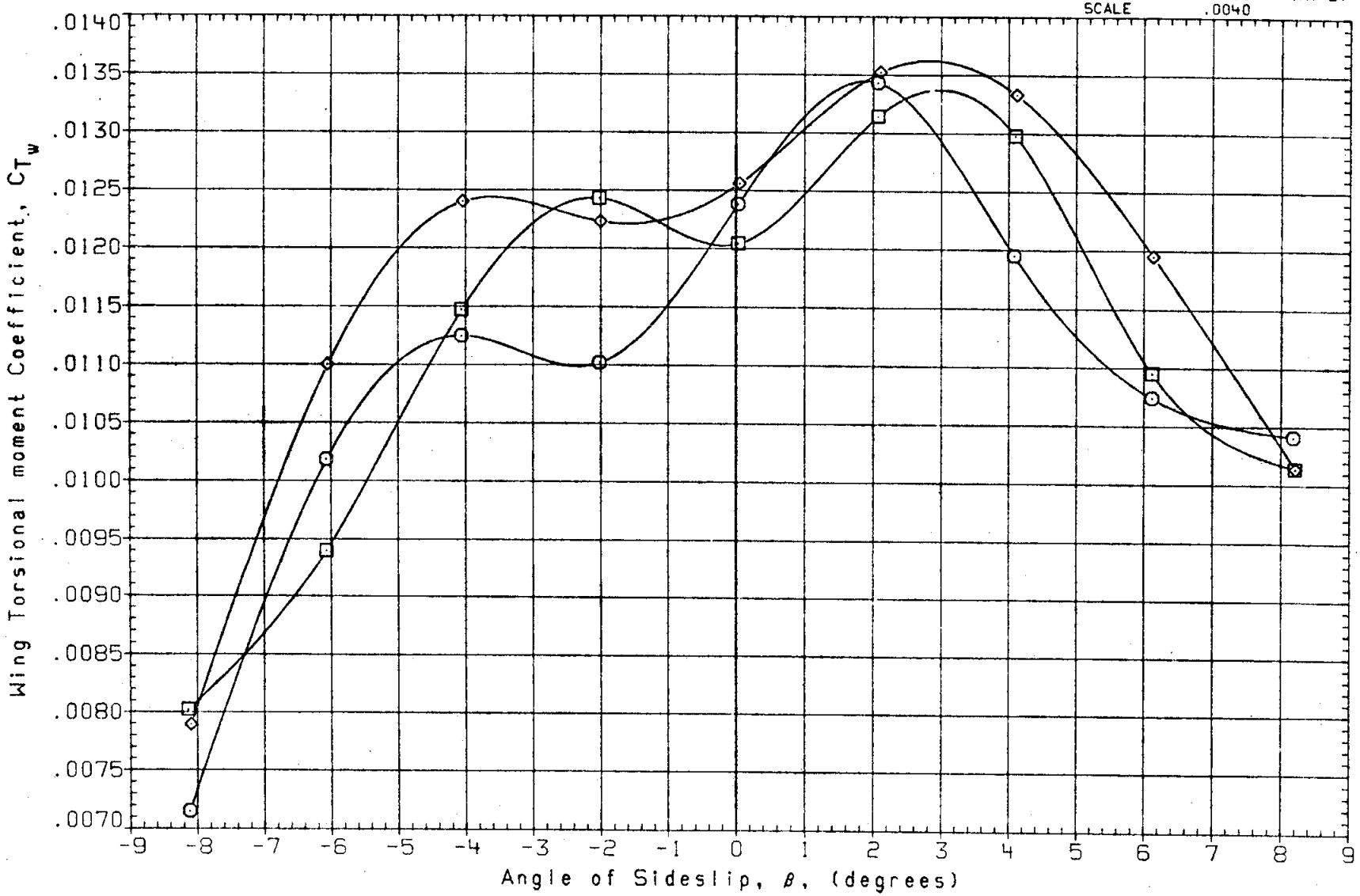

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2590.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

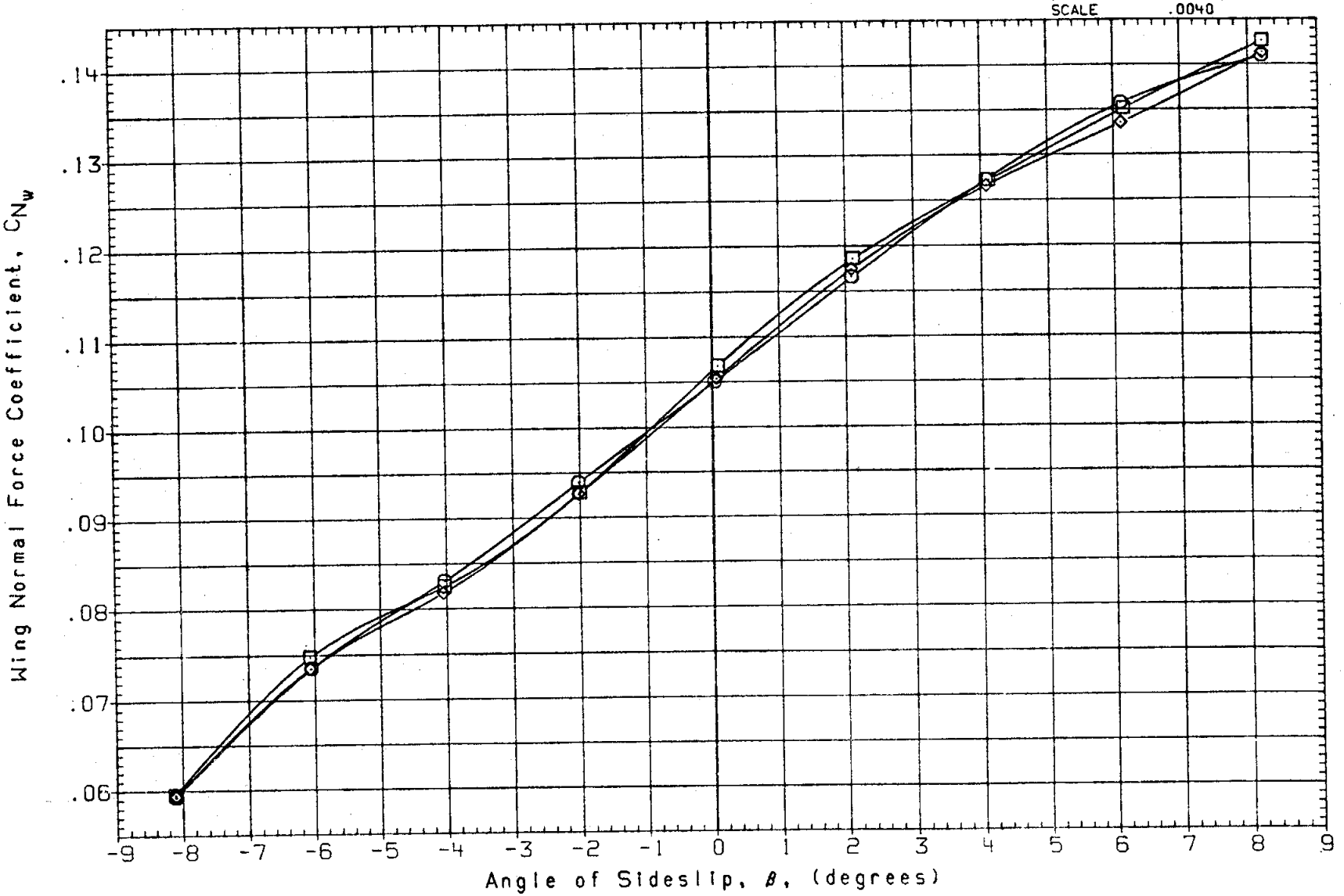

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

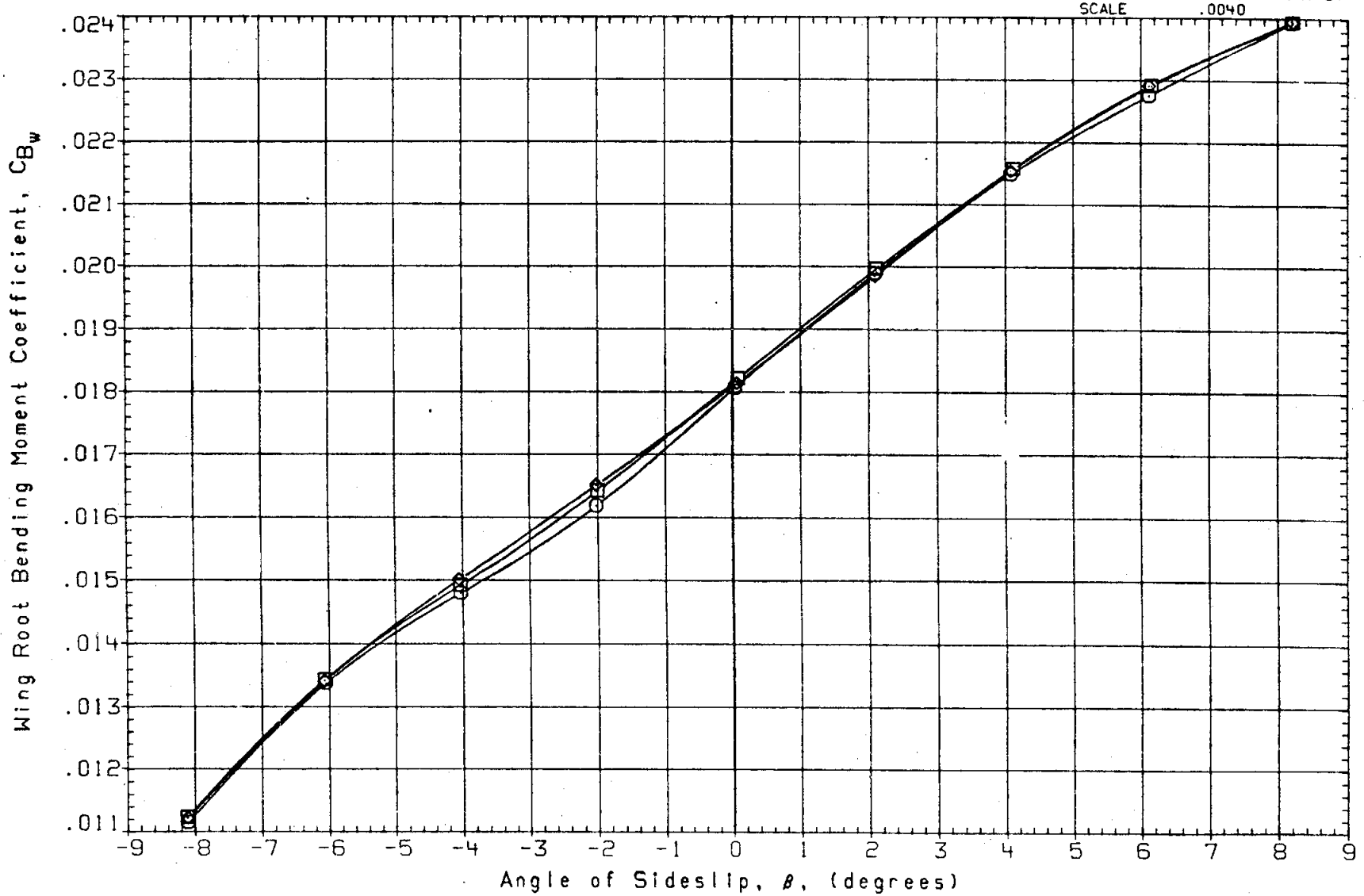

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

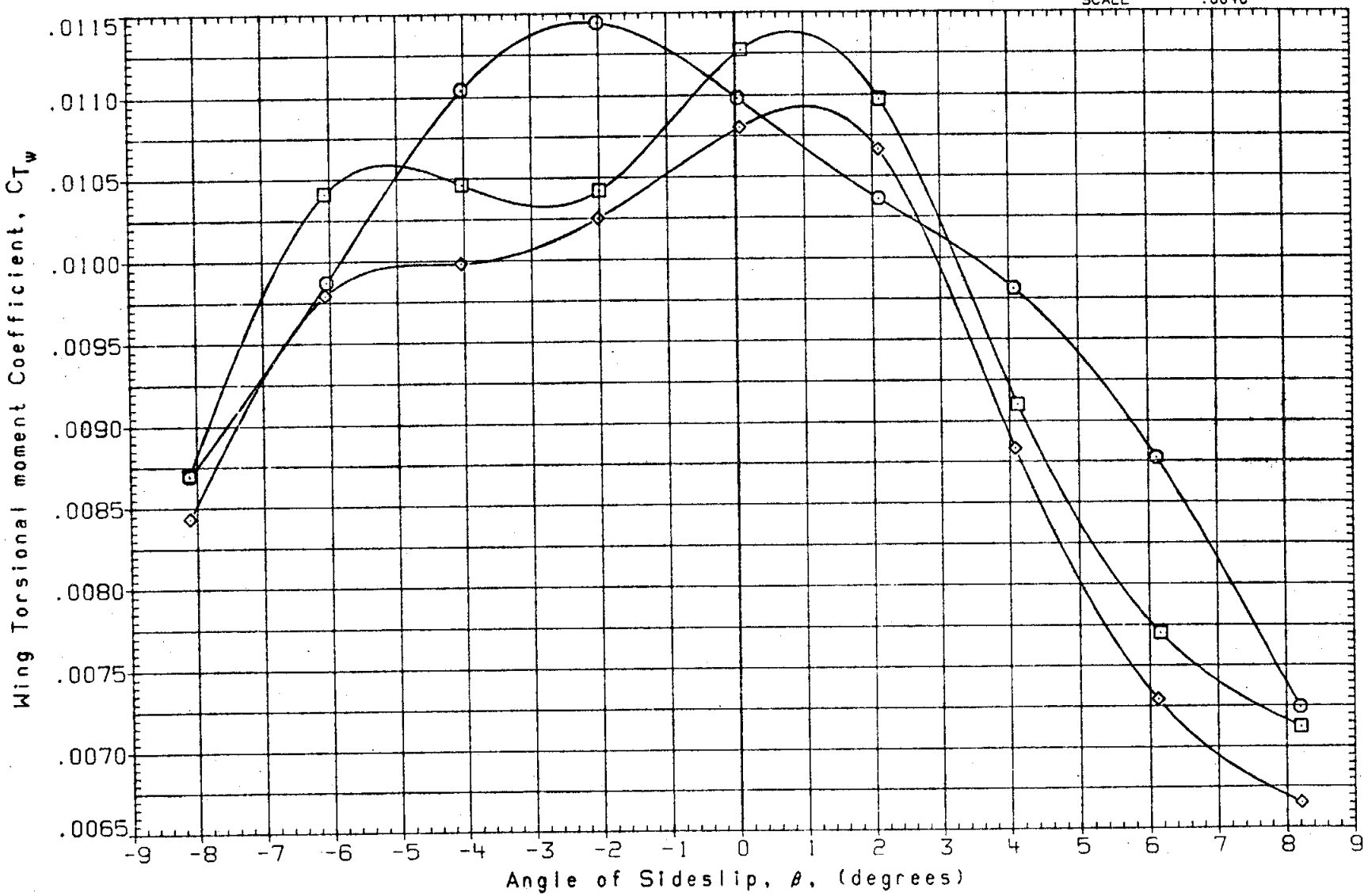

FIG. 31 EFFECT OF BODY FLAP DEFLECTION ON ORB. WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

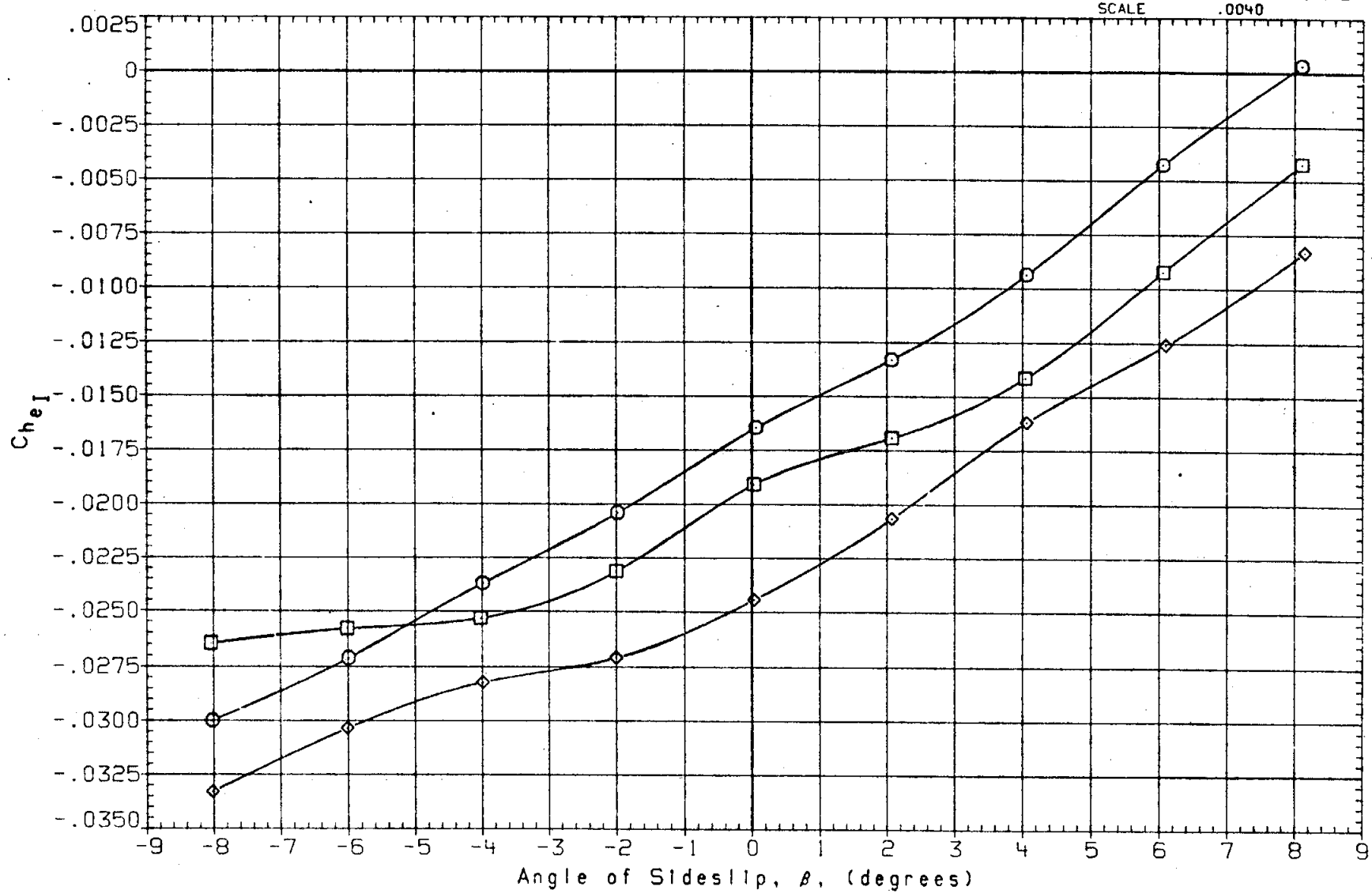

FIG. 32 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

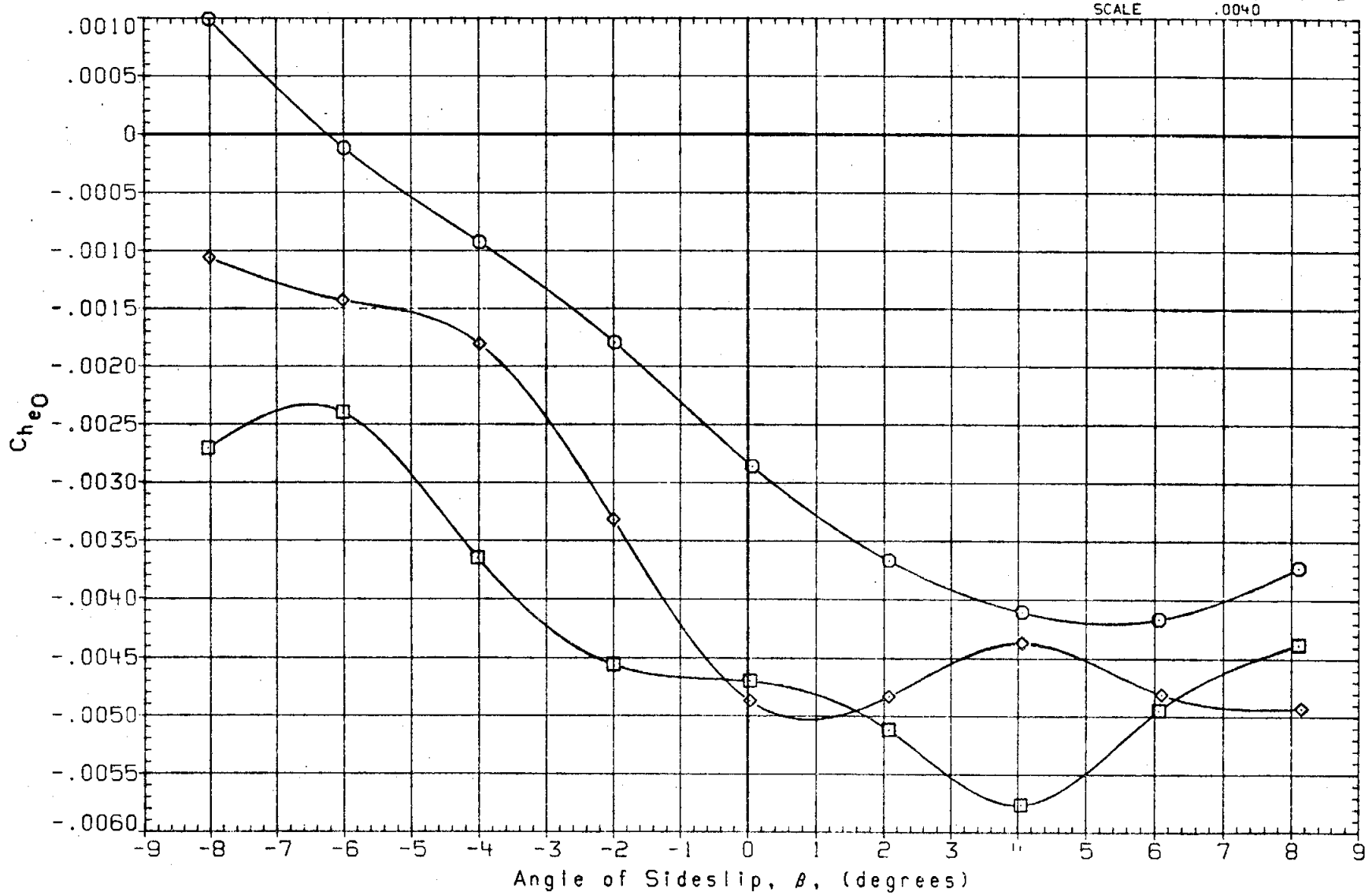

FIG. 32 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

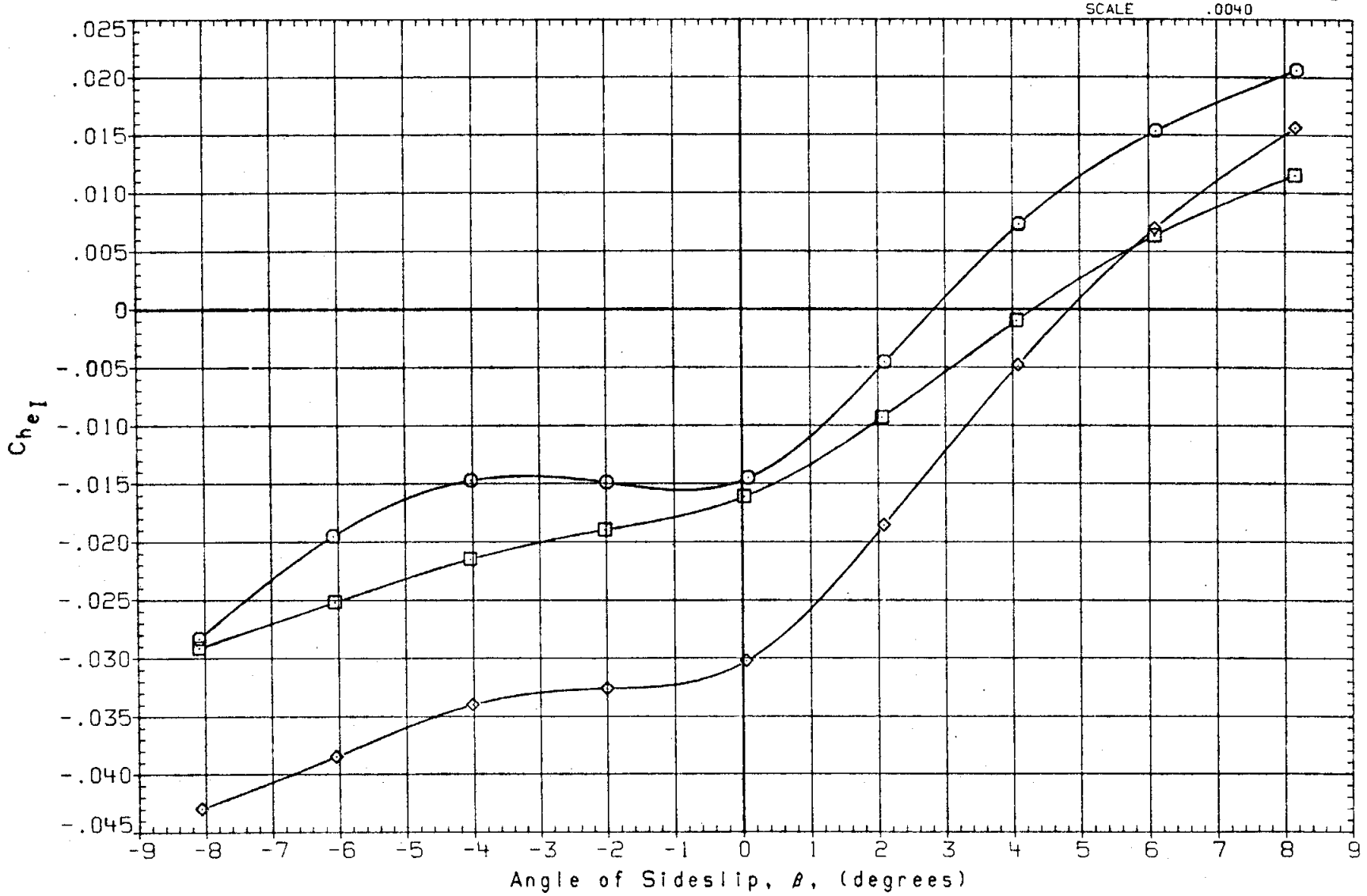

FIG. 32 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

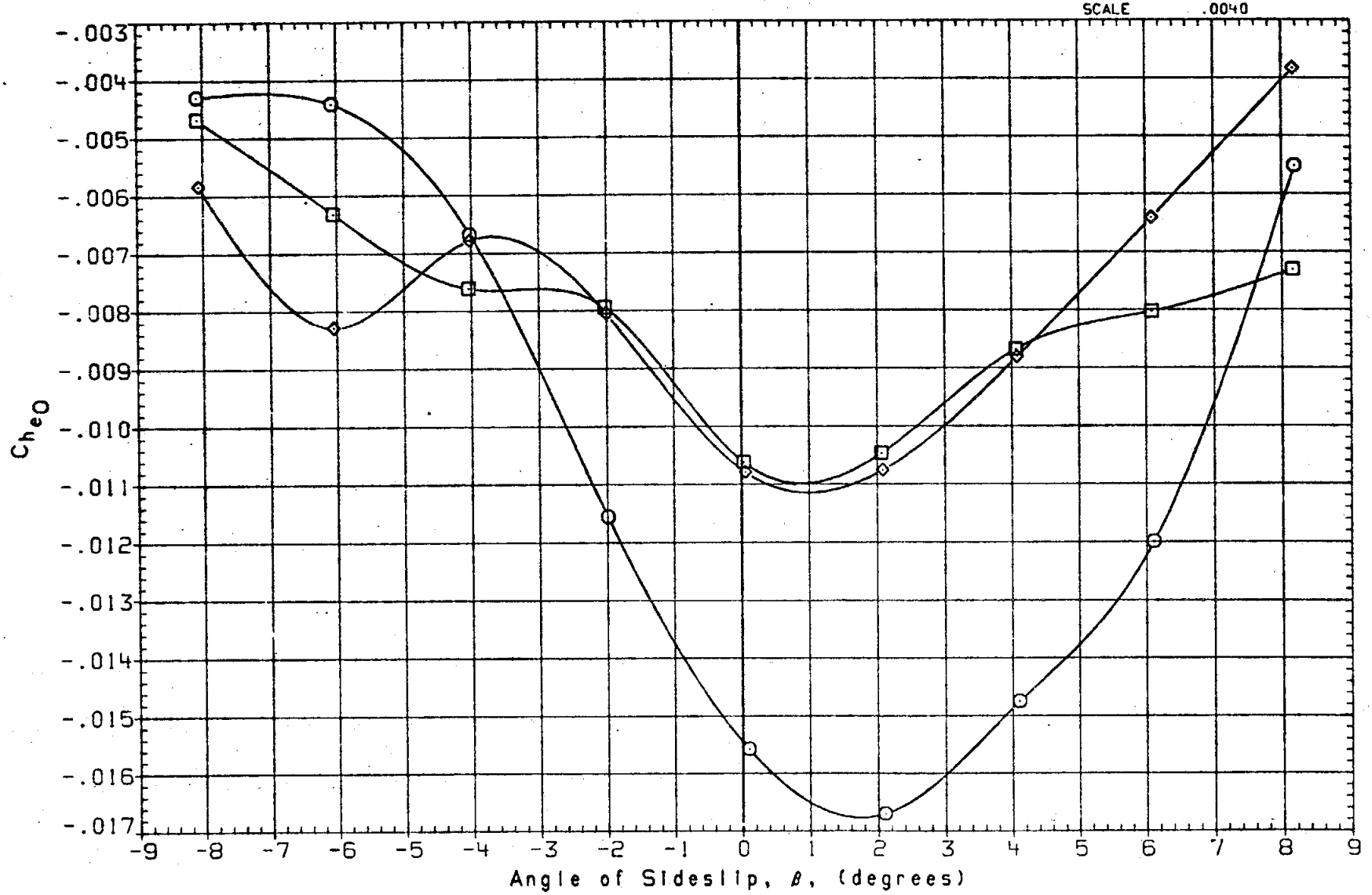

FIG. 32 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

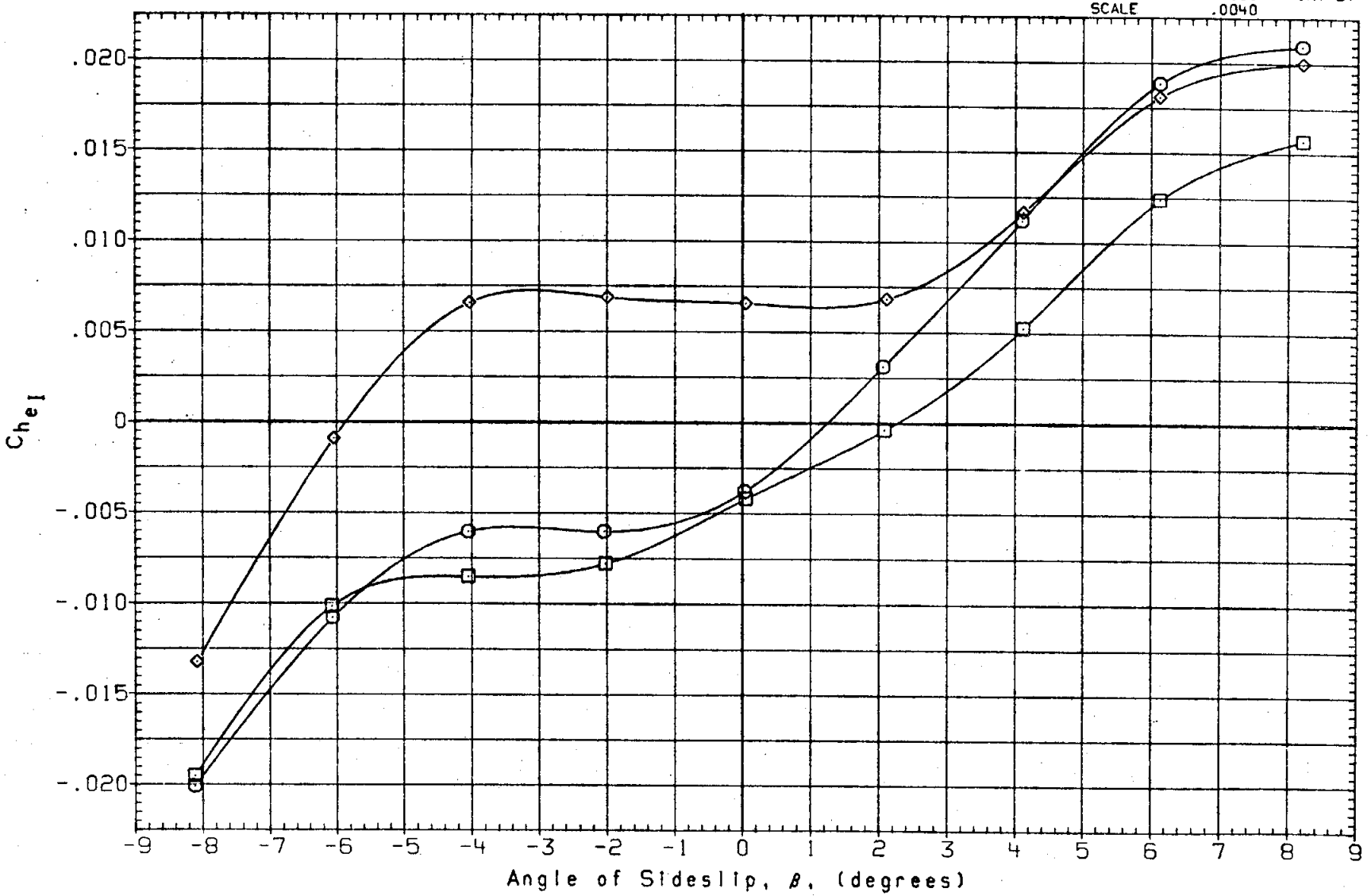

FIG. 32 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

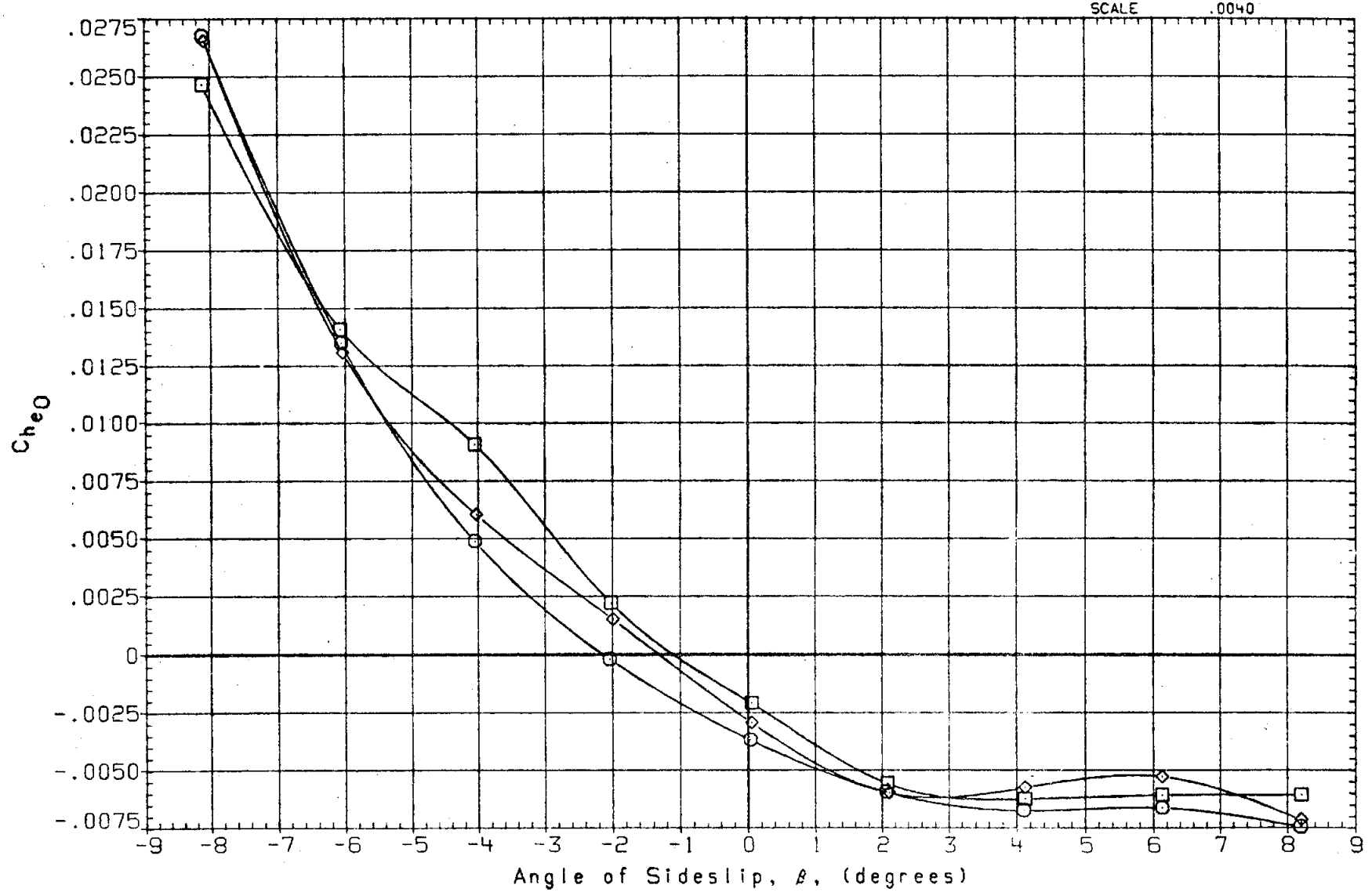

FIG. 32 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

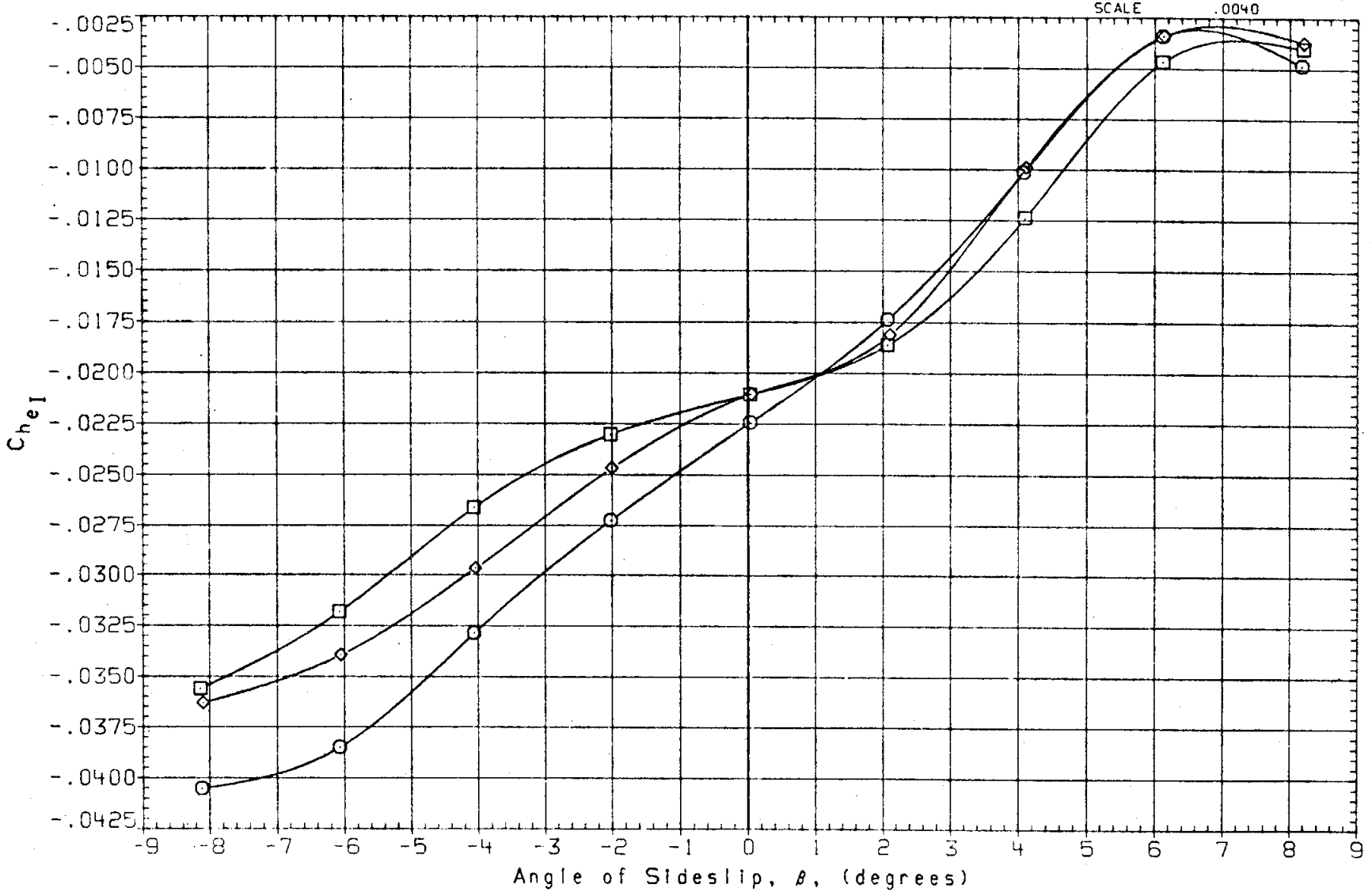

FIG. 32 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

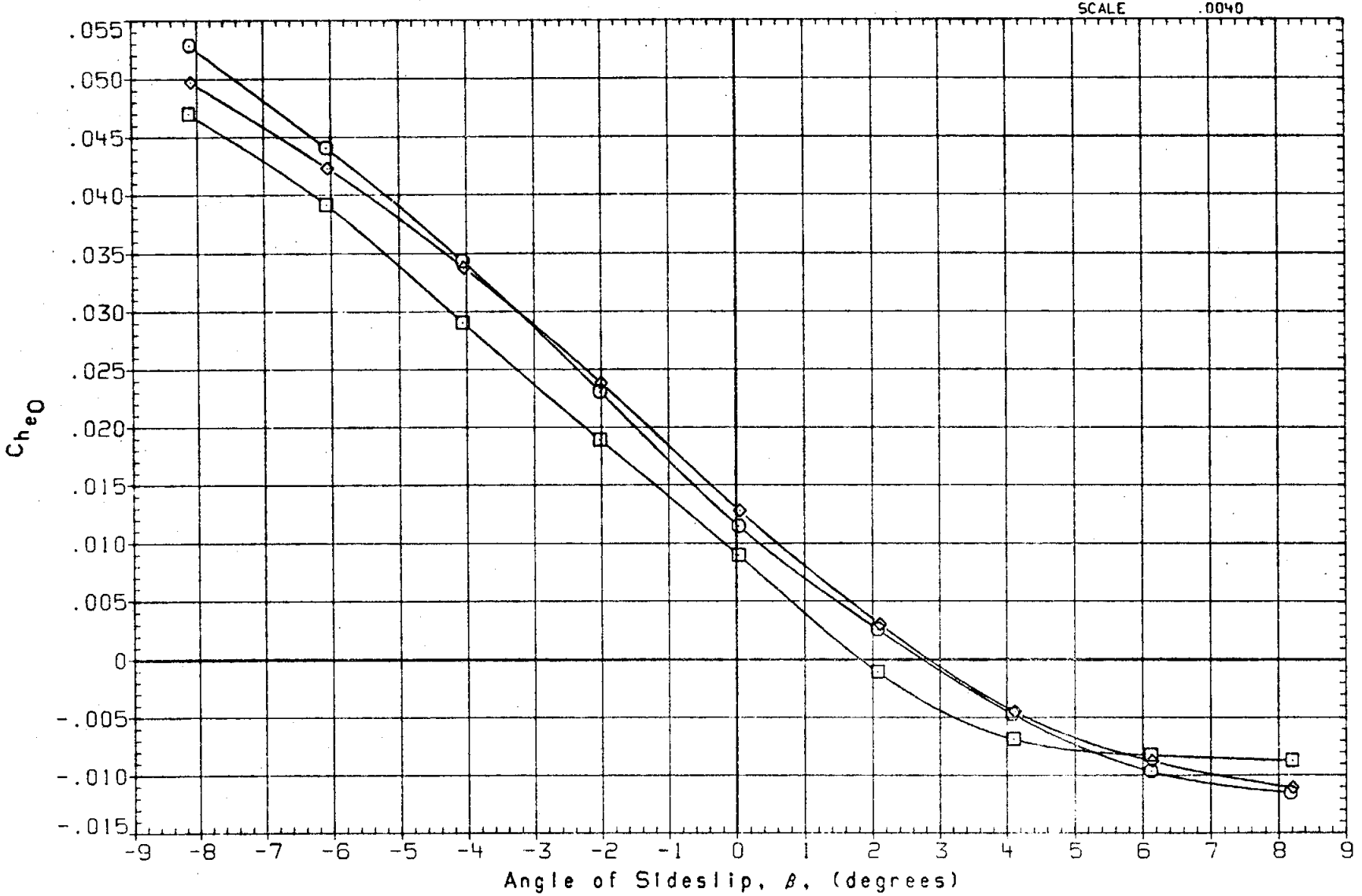

FIG. 32 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

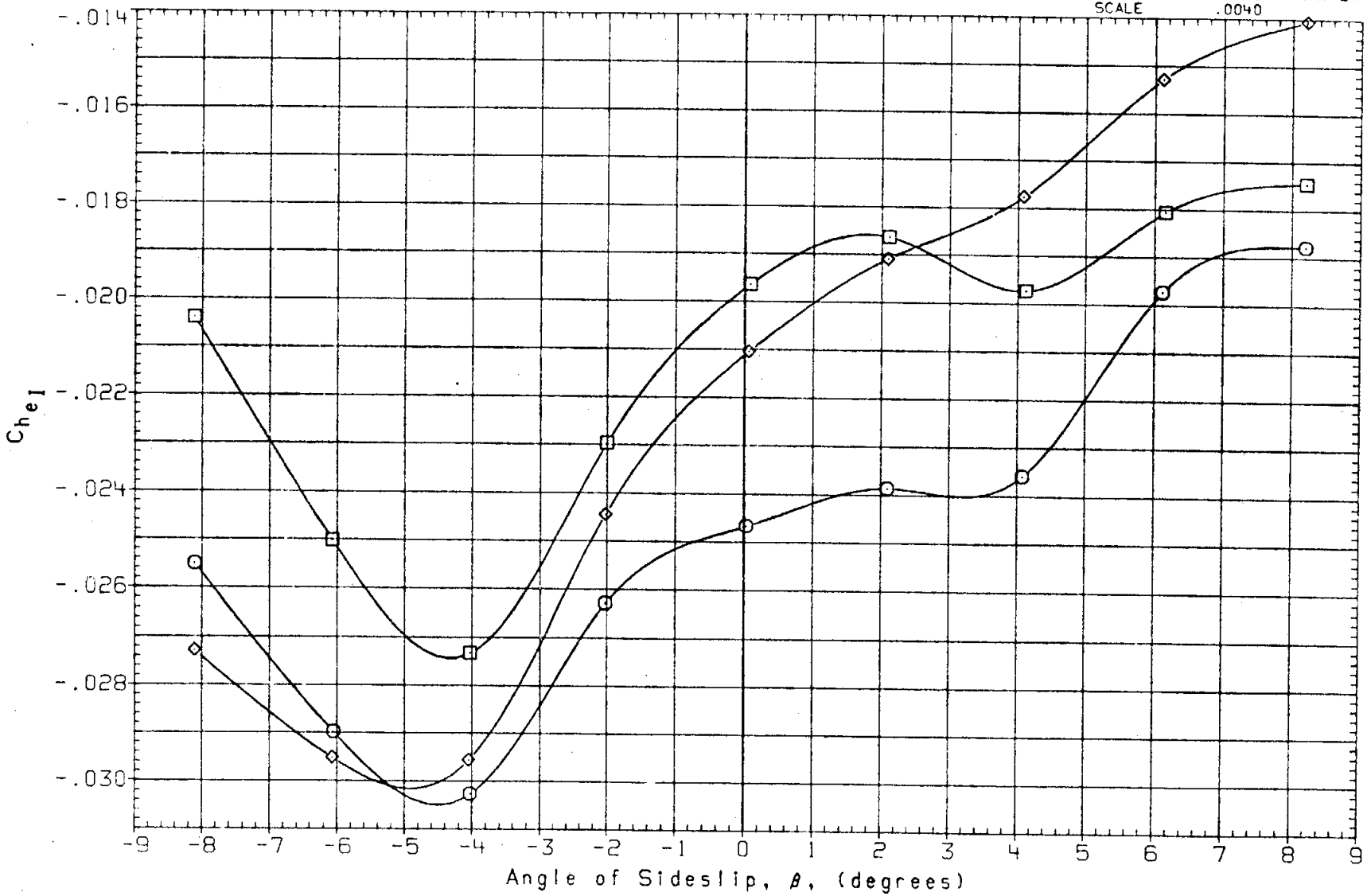

FIG. 32 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(E) MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BDFLAP	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 556)	O2W2E2PNPAATT3S3	.000	.000	90.000
S1Z011	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	8.000	.000	90.000
S1Z012	◇	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	16.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

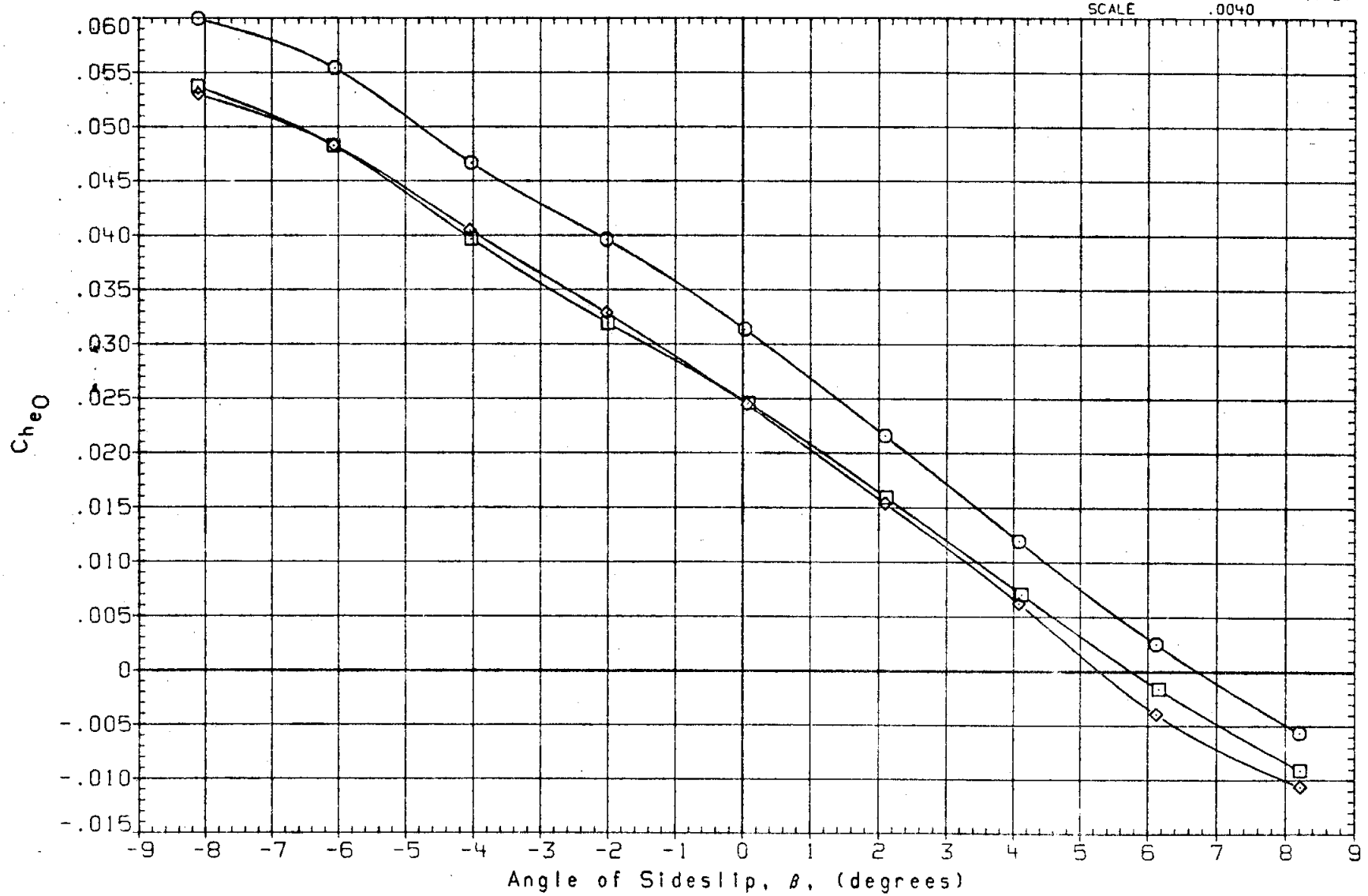

FIG. 32 EFFECT OF BODY FLAP DEFLECTION ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

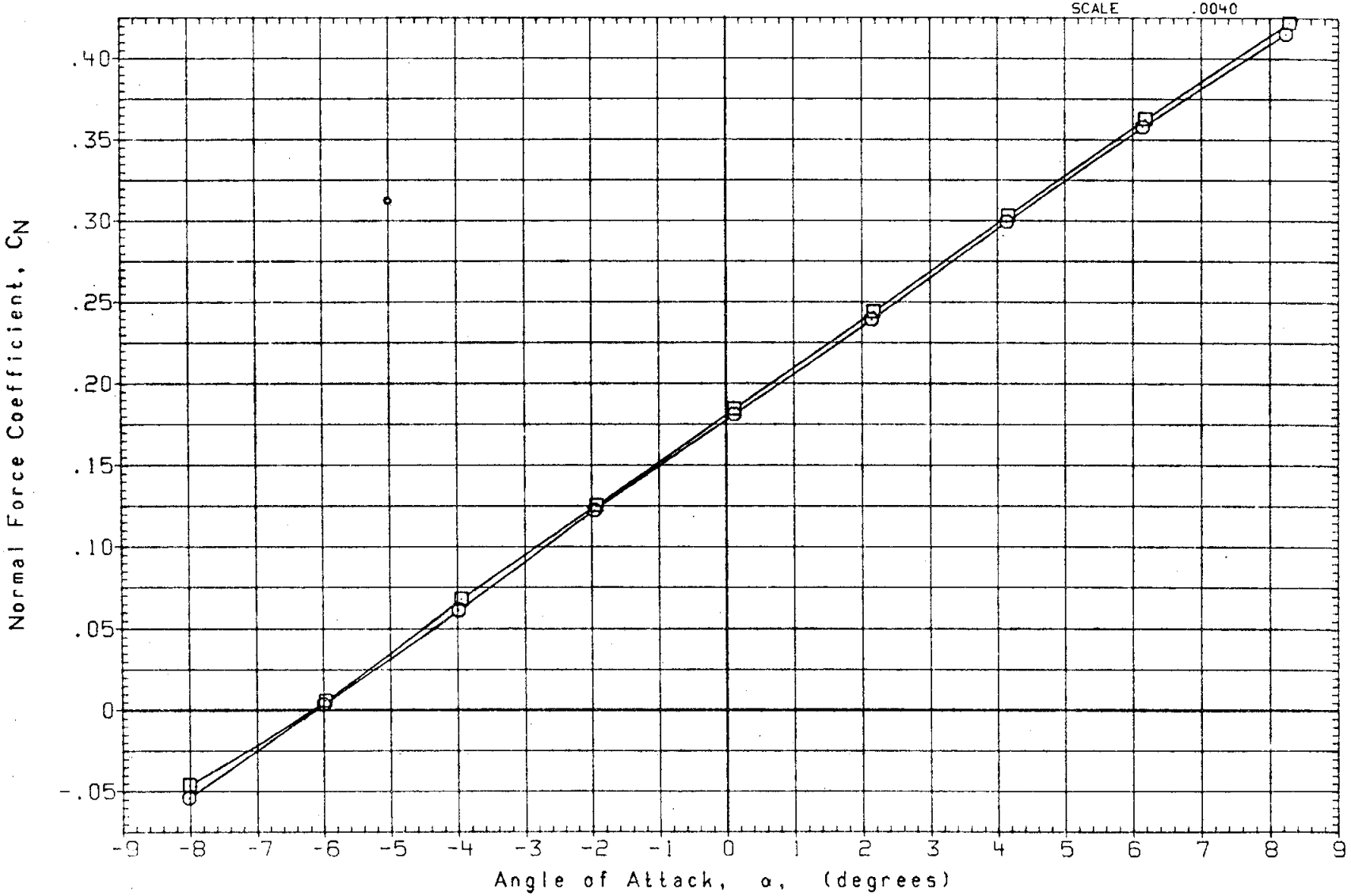

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

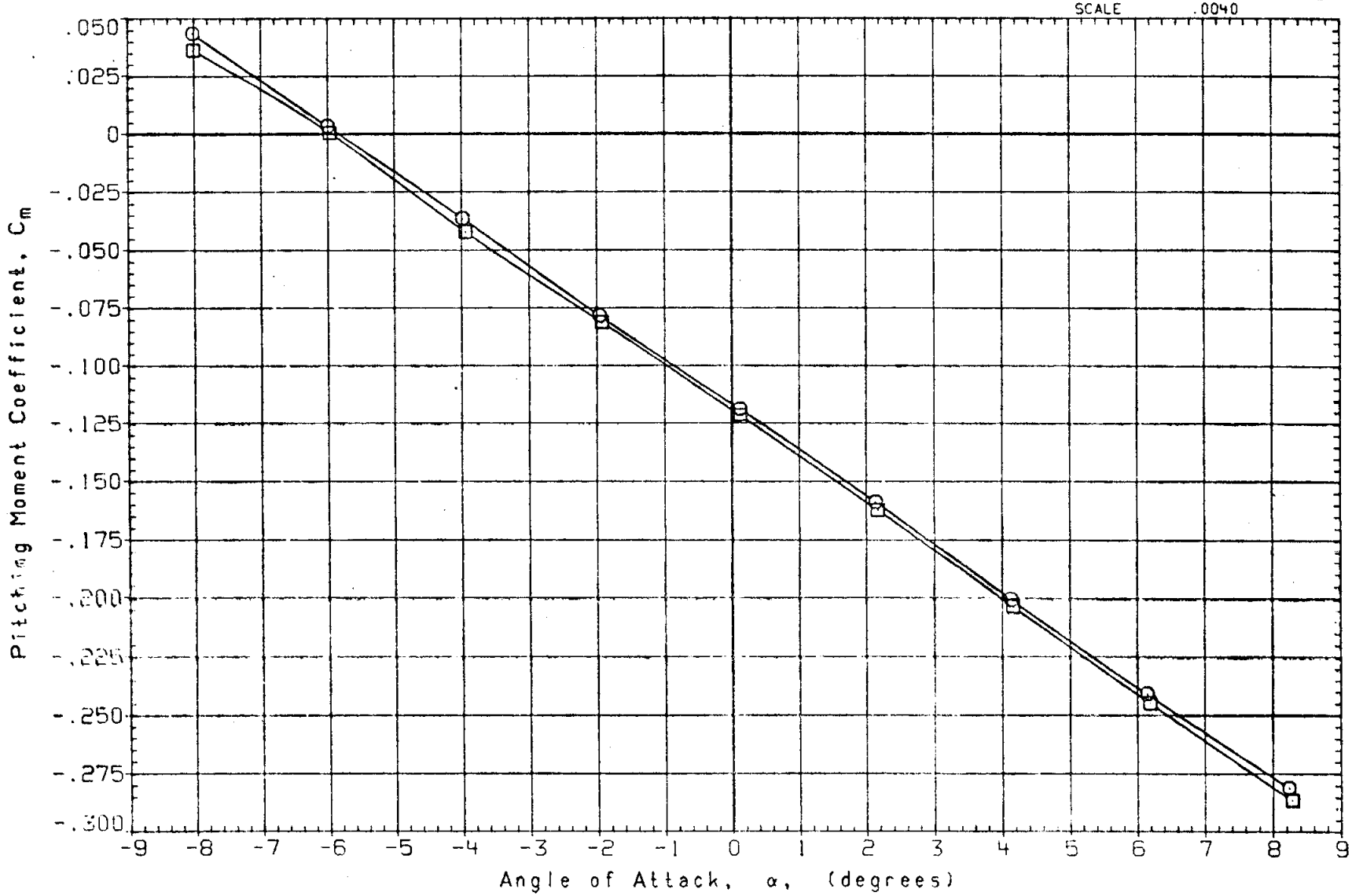

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

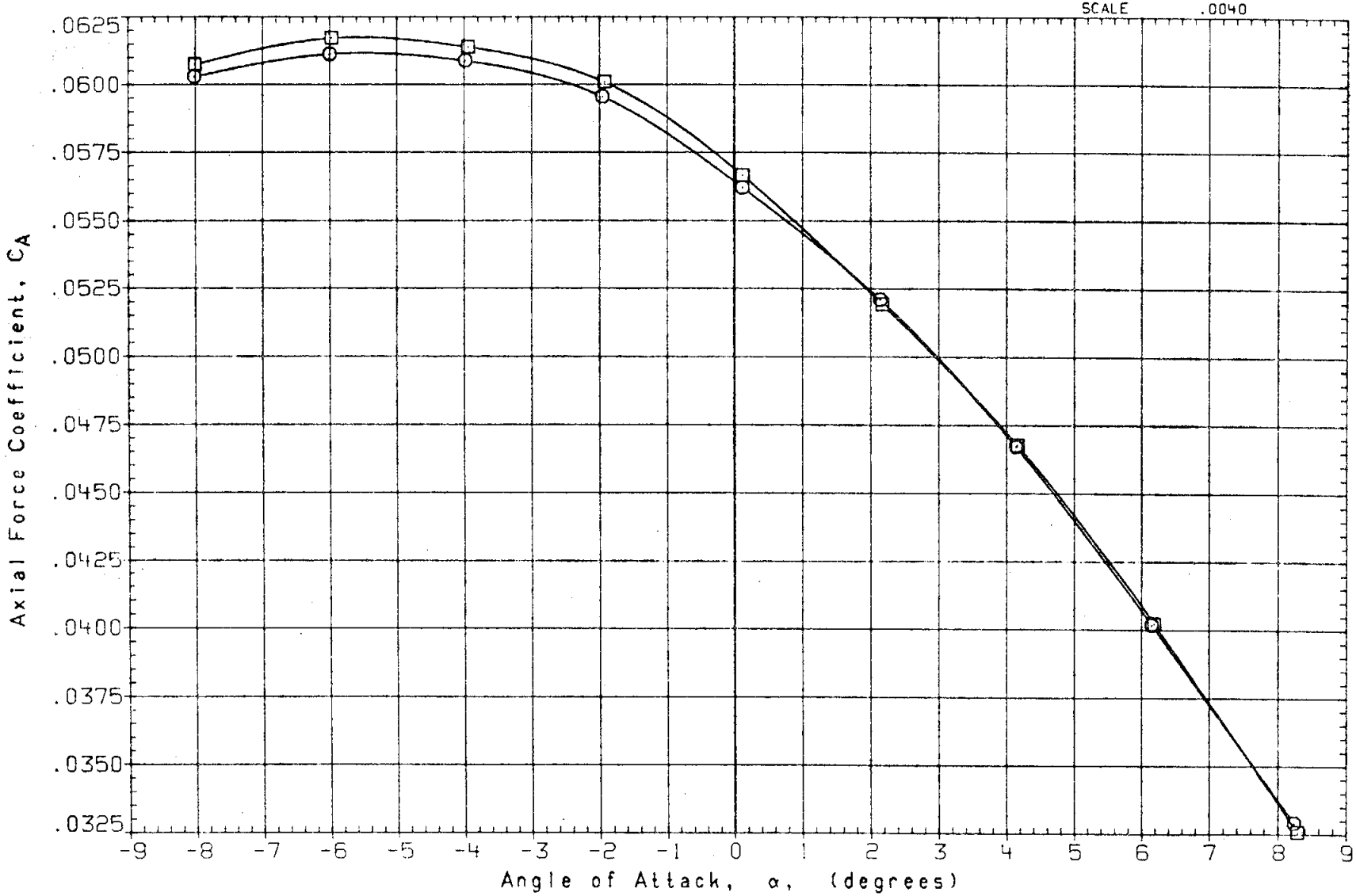

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

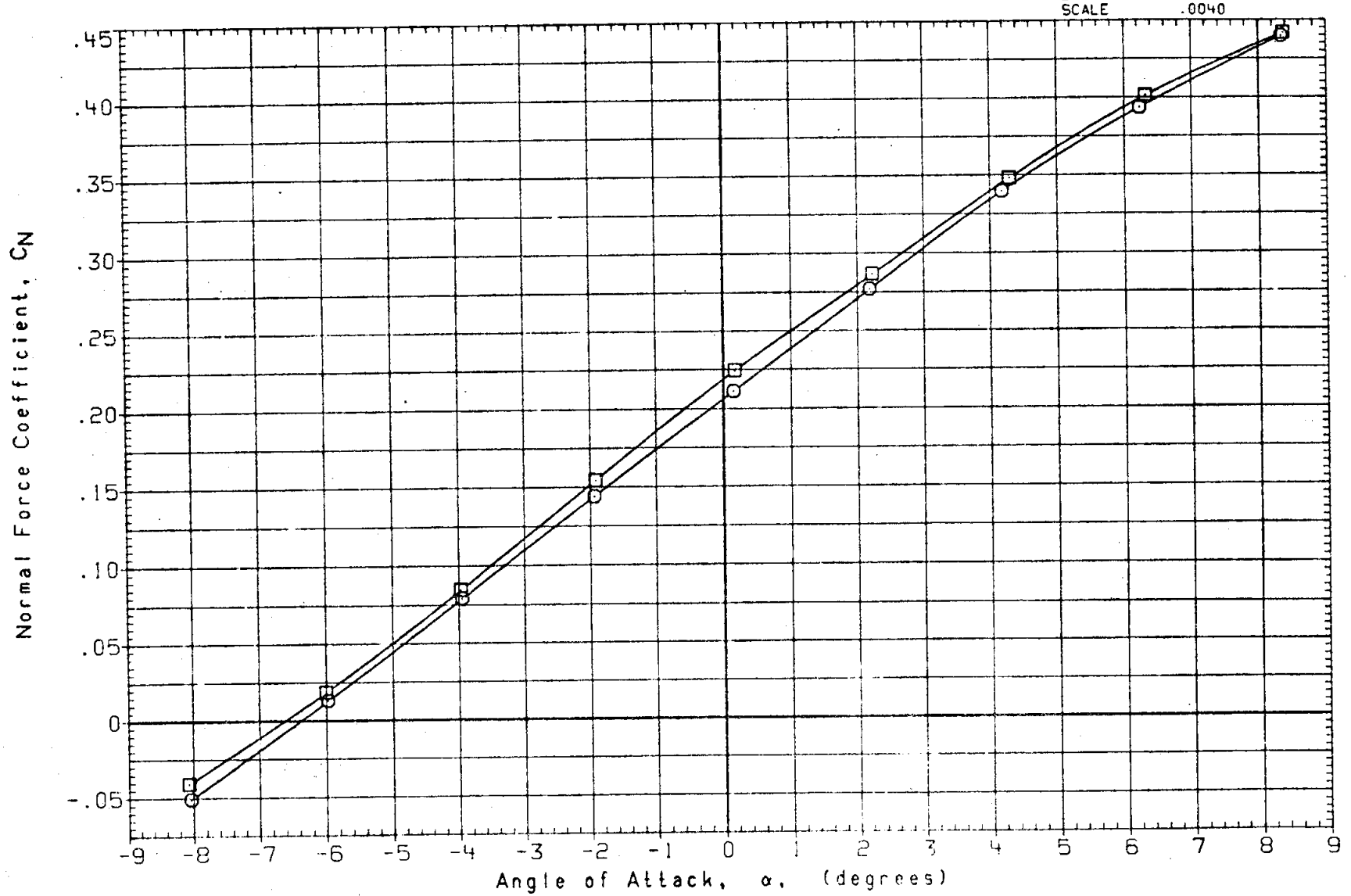

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC WT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

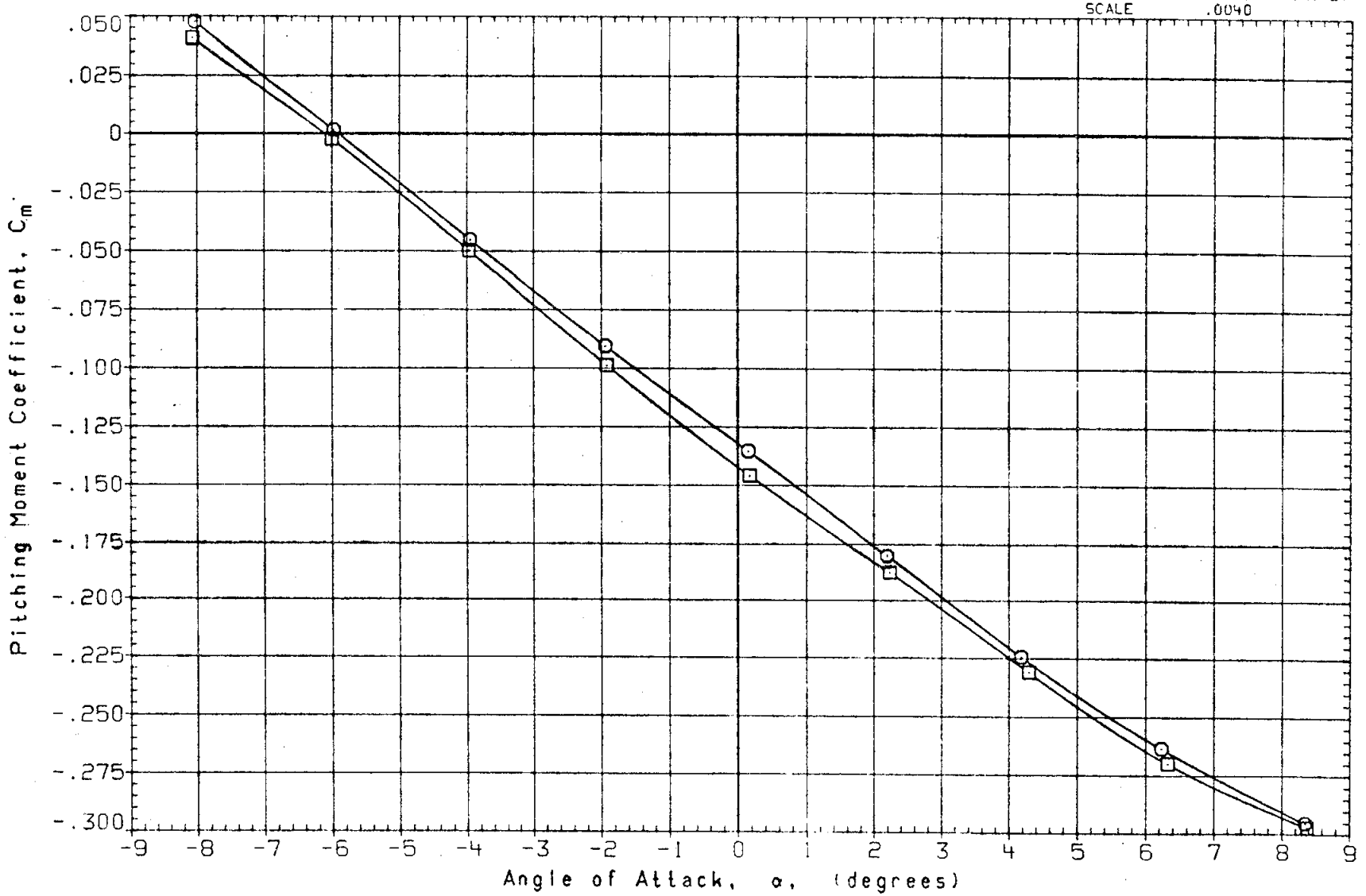

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	PT	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

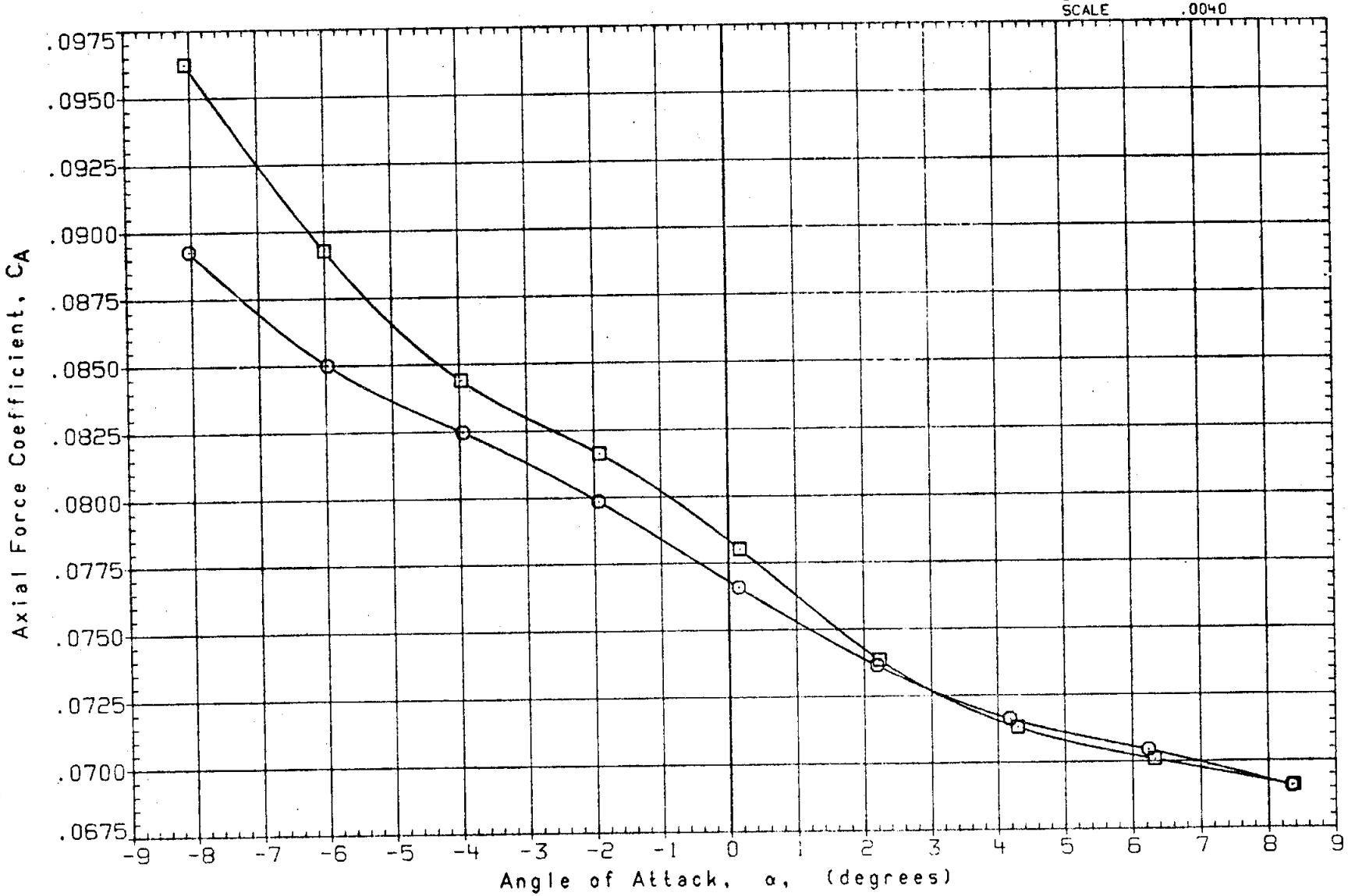

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

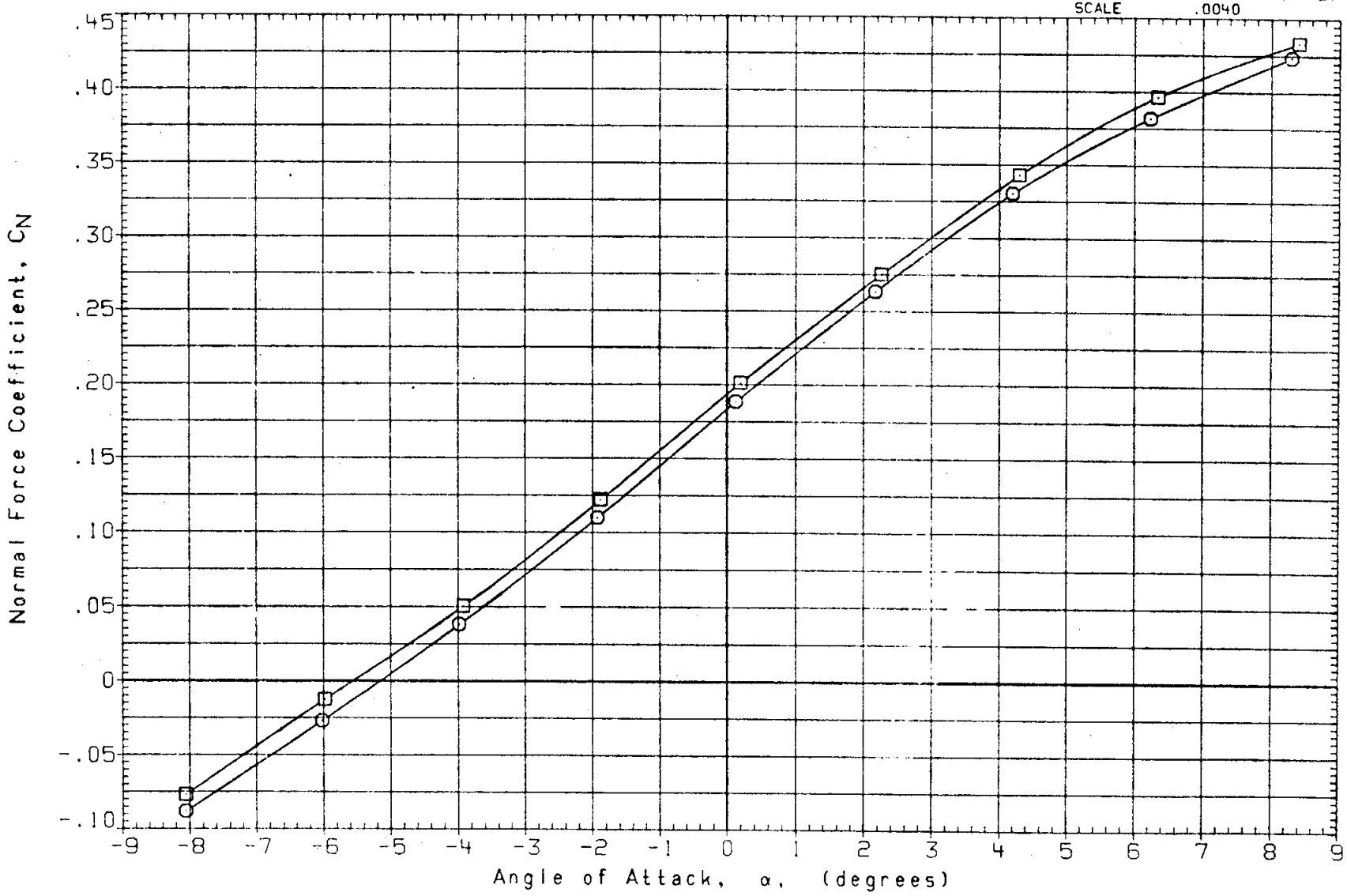

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

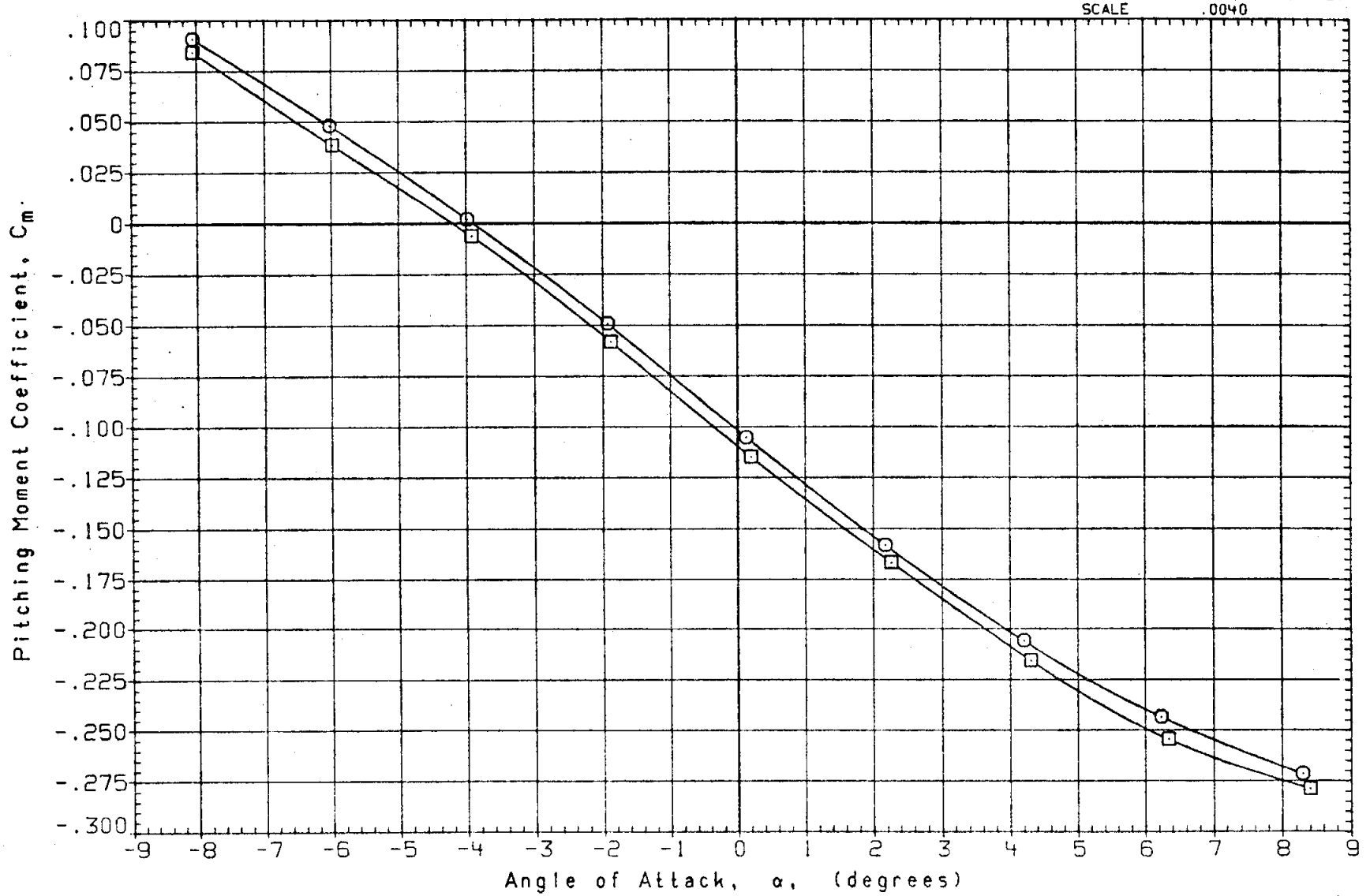

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

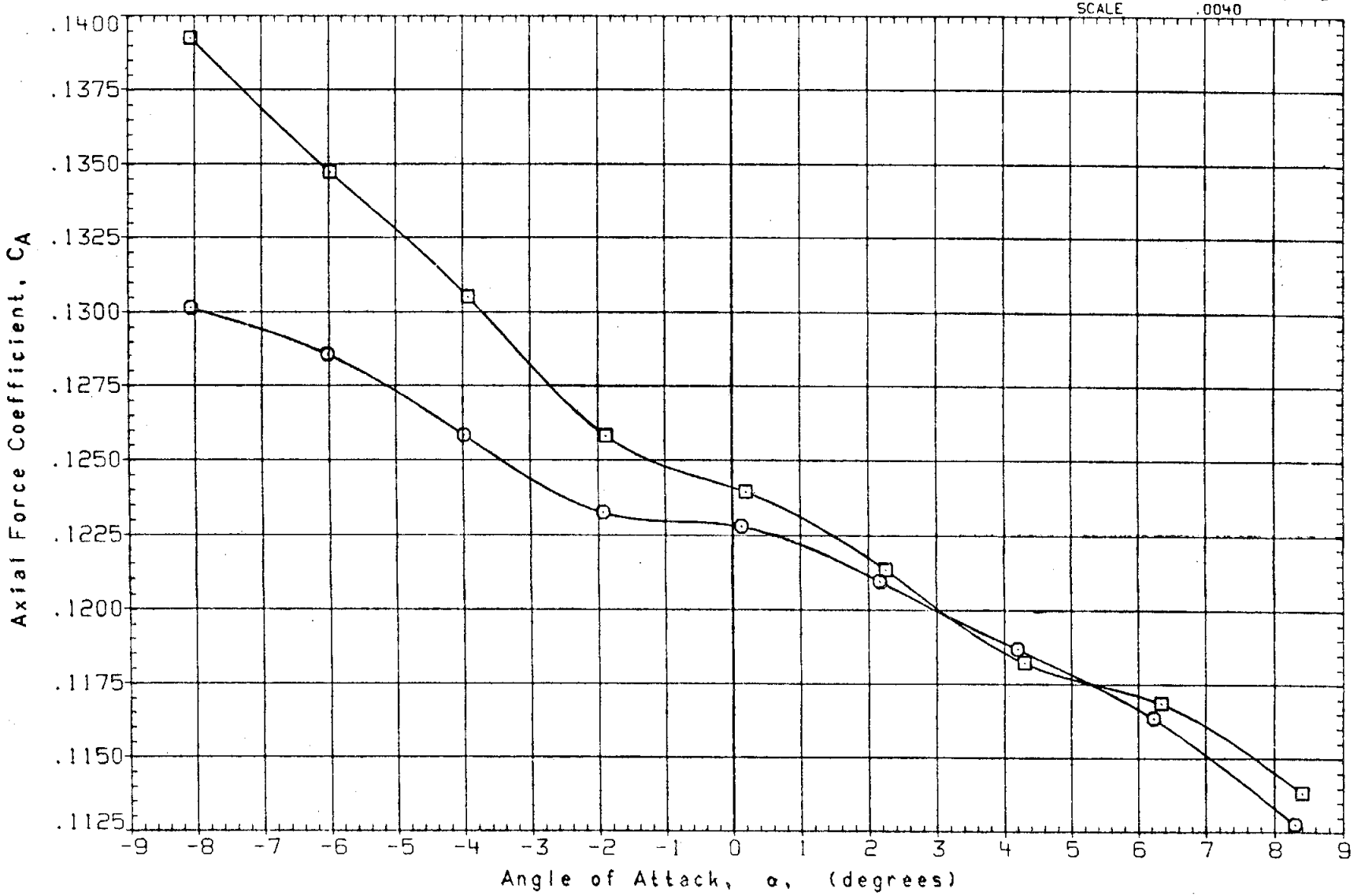

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

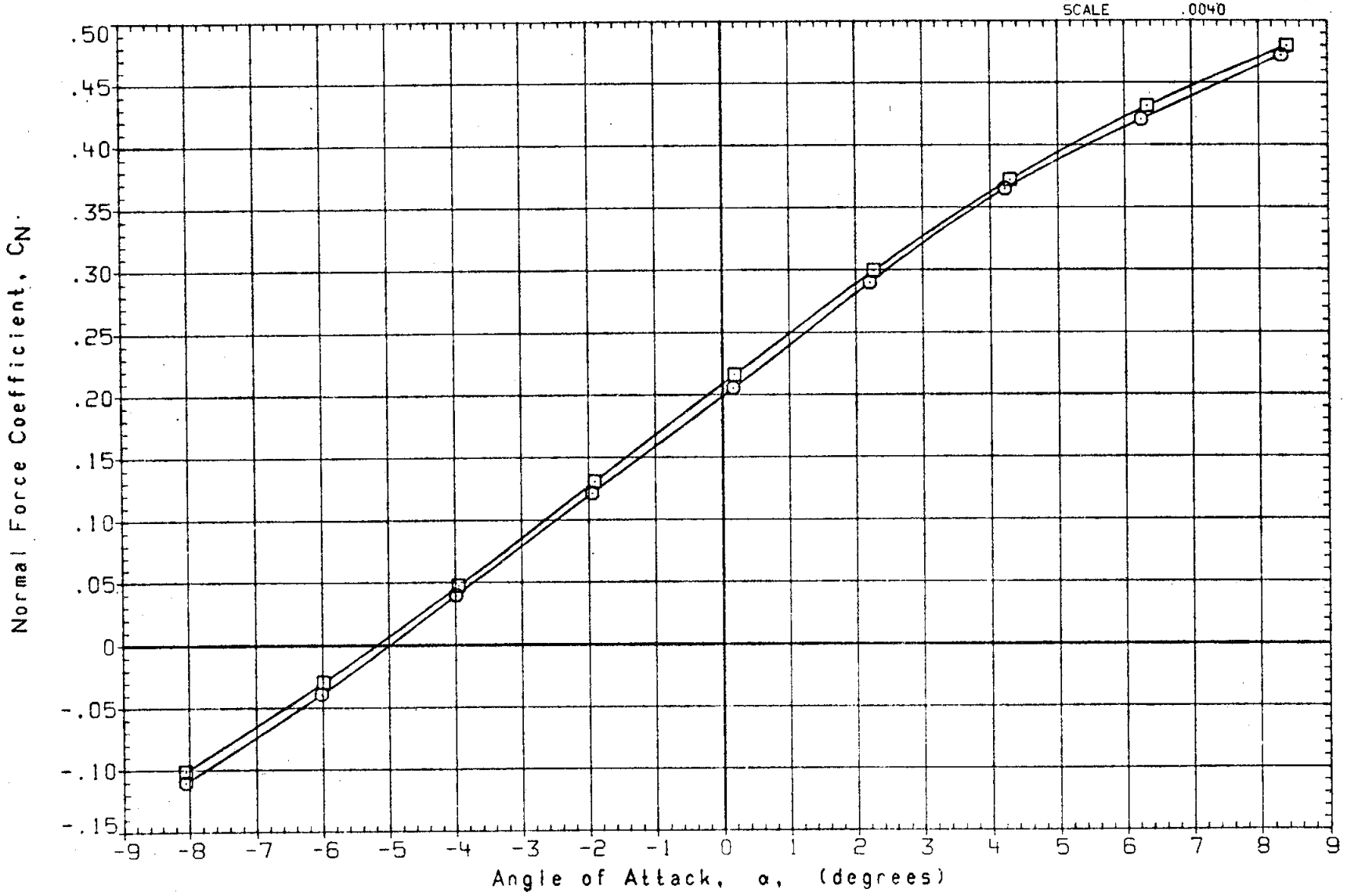

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

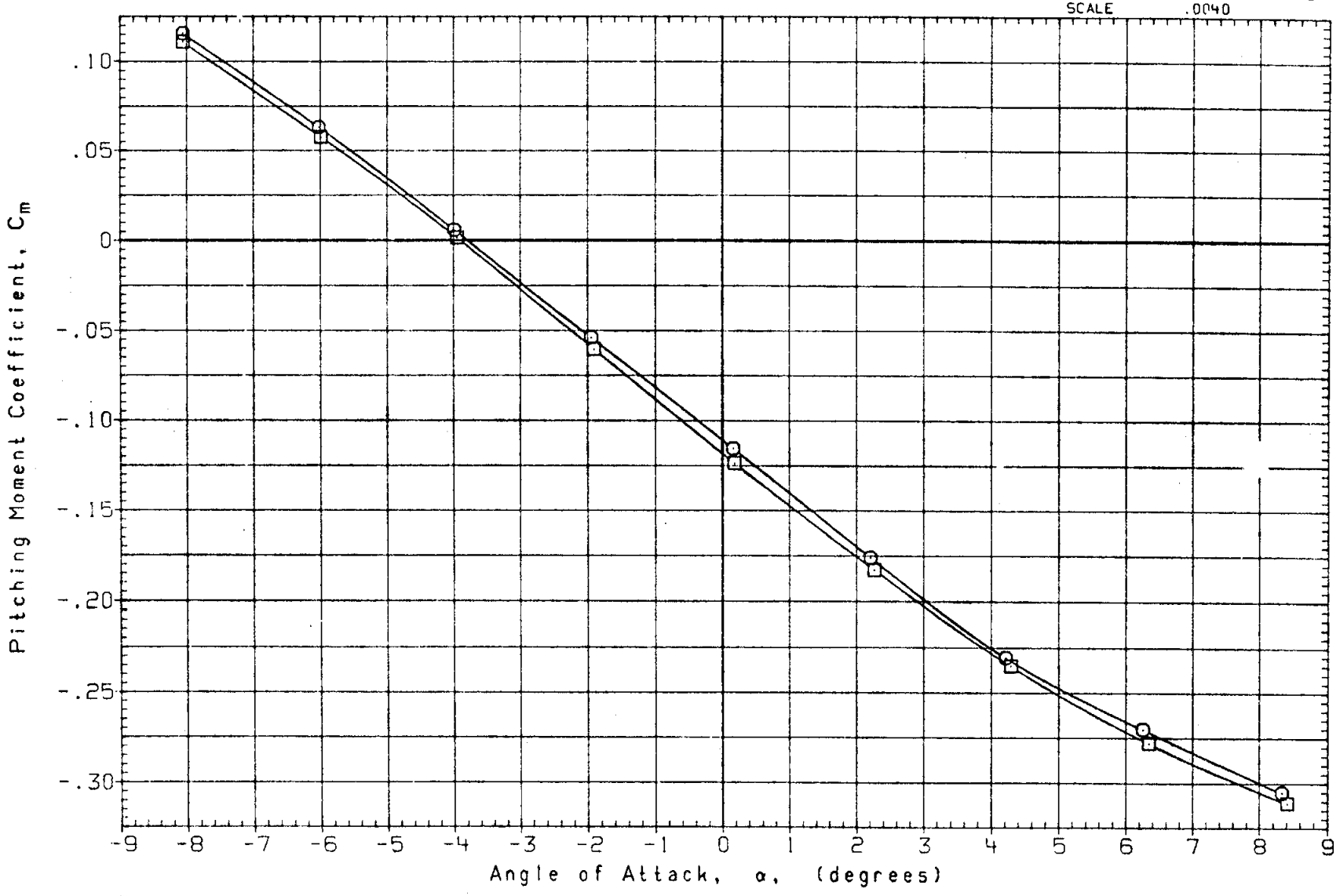

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	PT	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

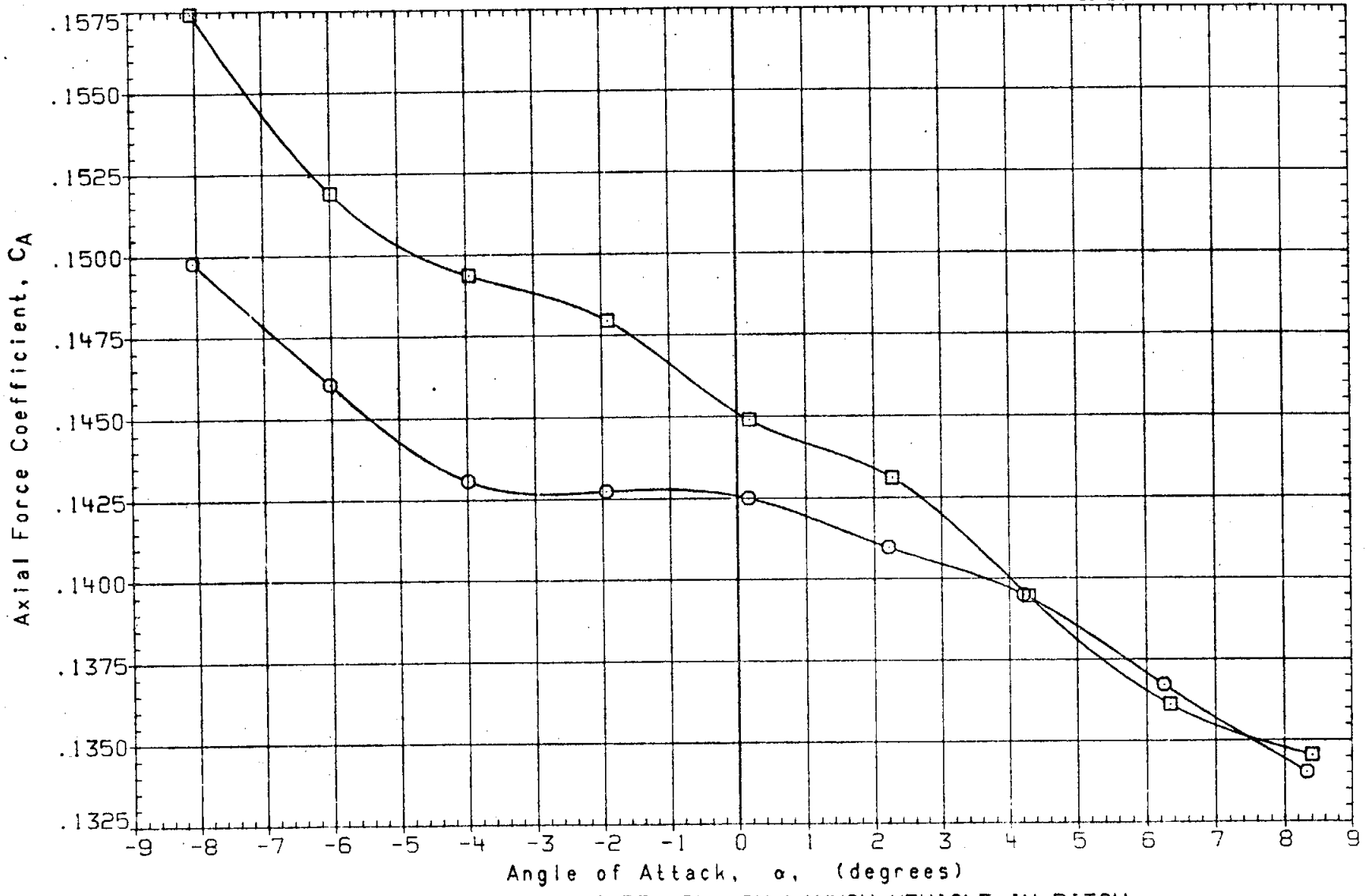

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

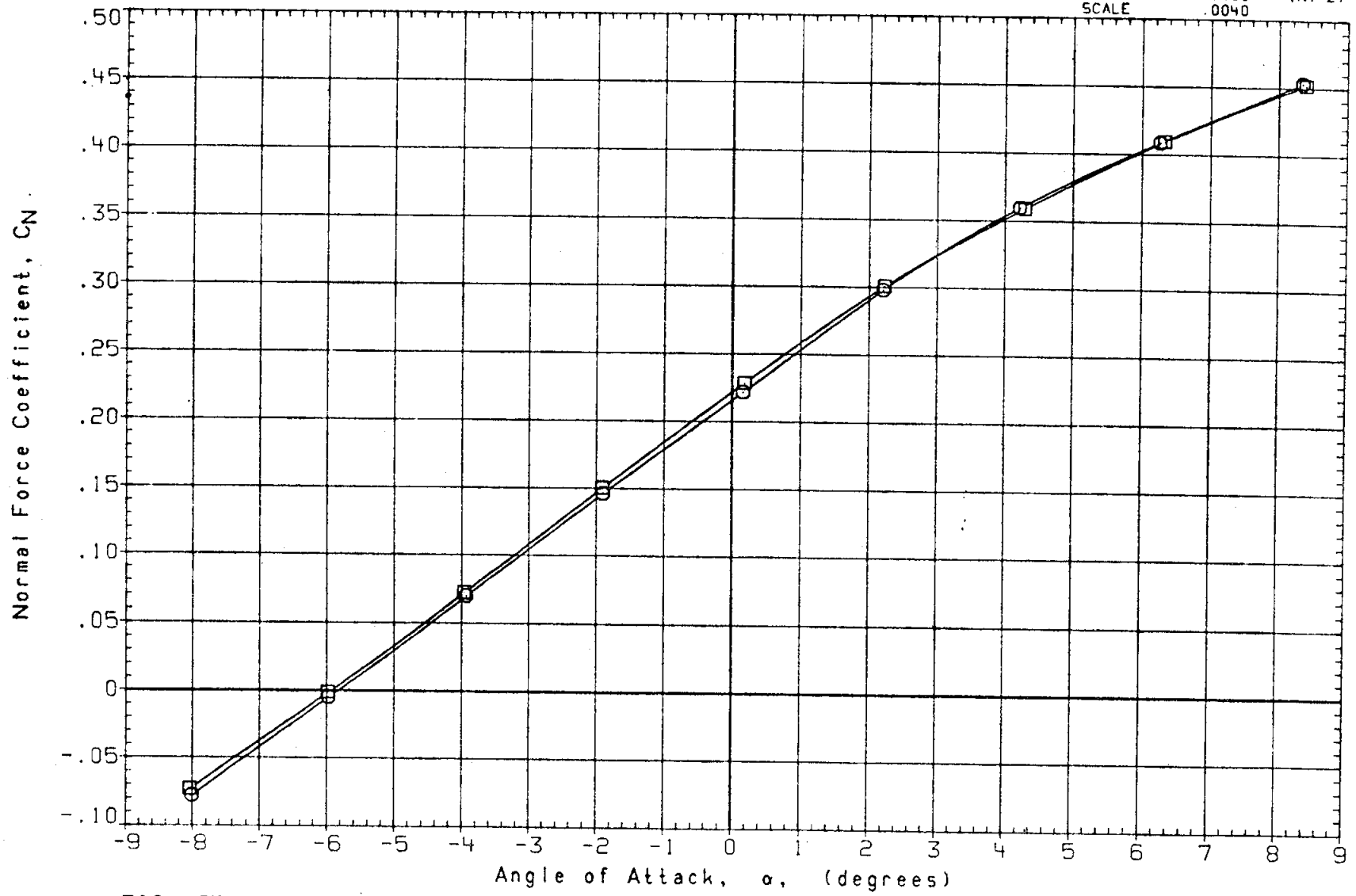

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(E) MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

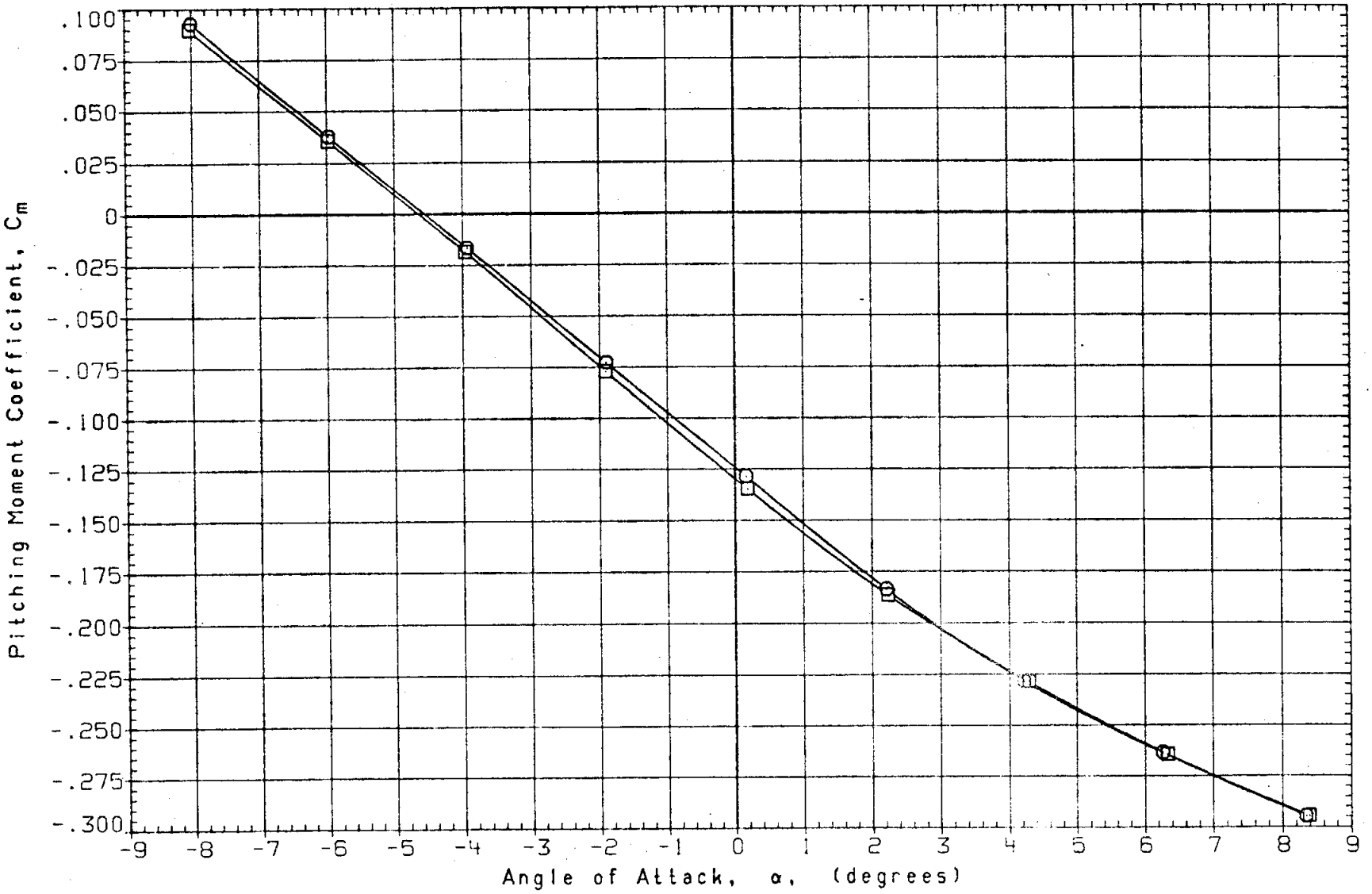

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
R1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000
R1Z014	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

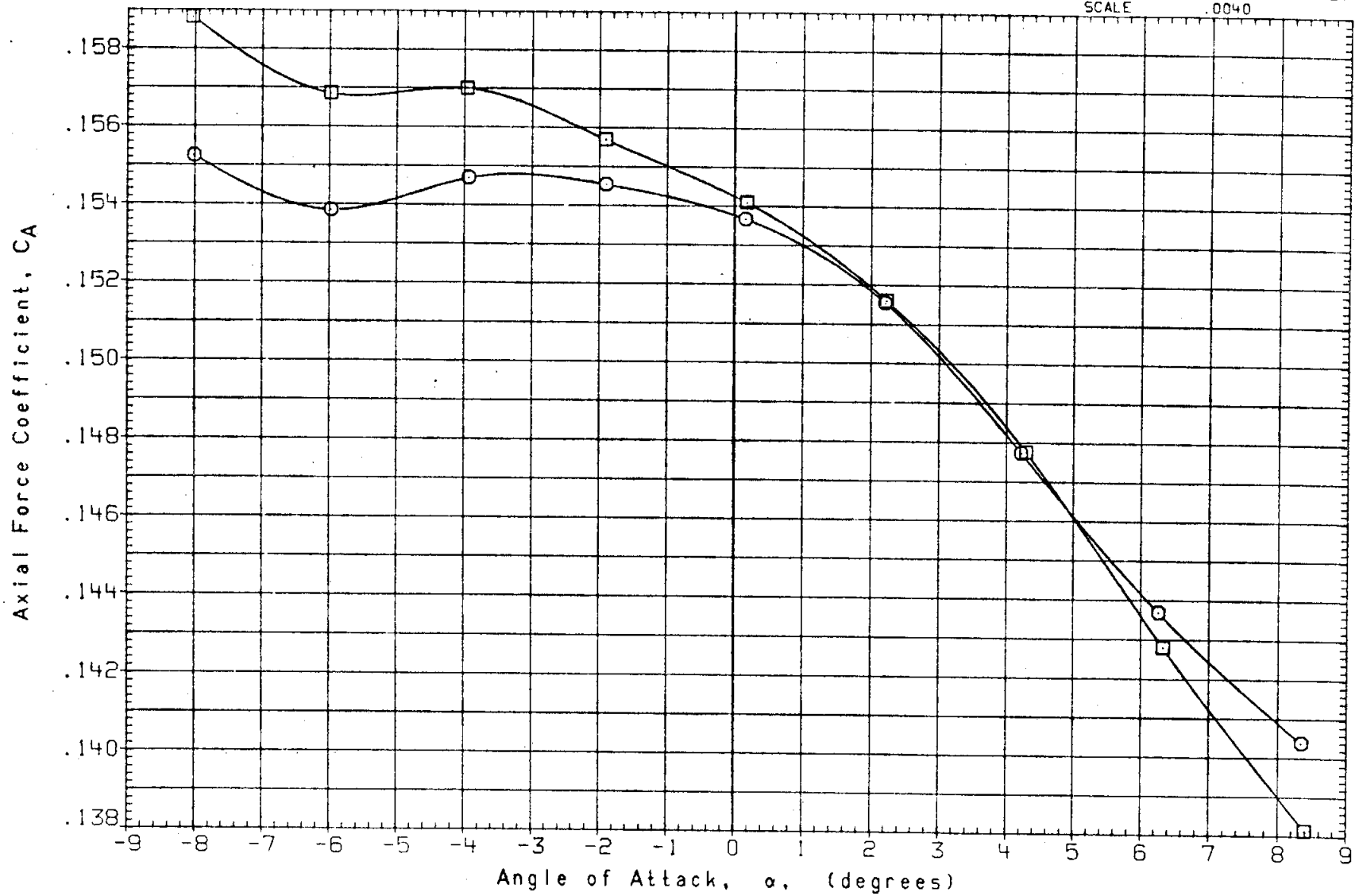

FIG. 33 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

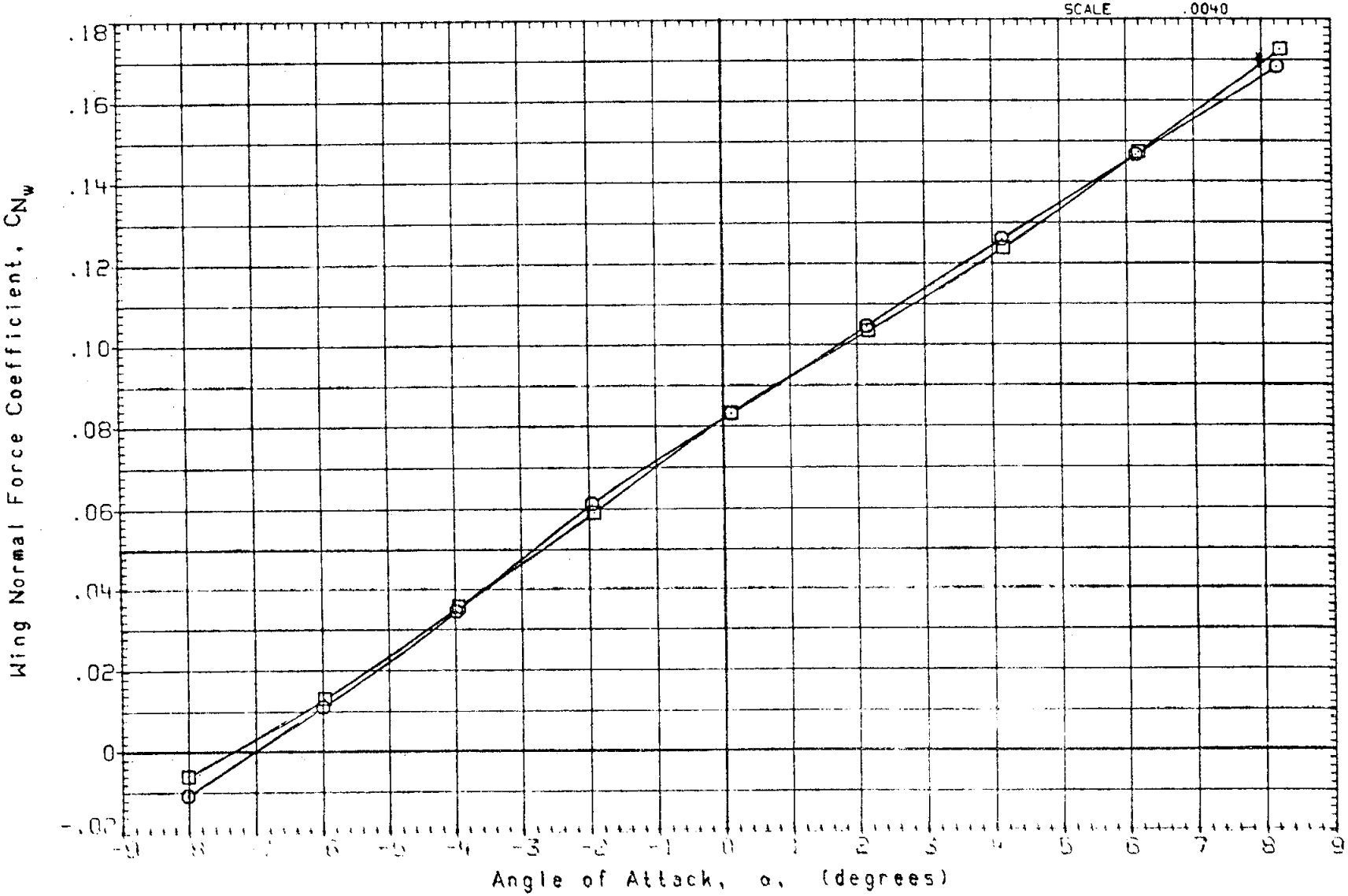

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

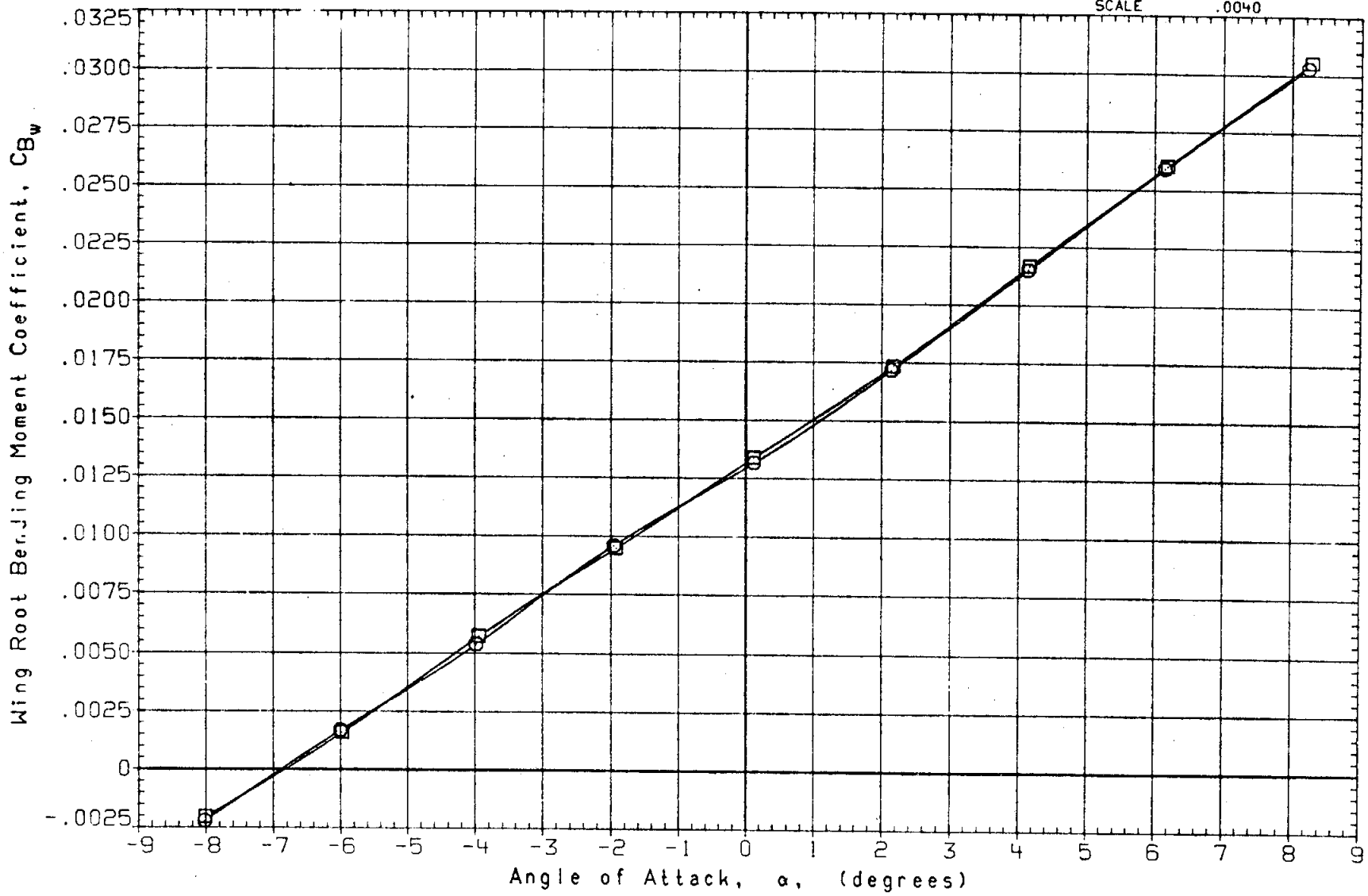

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

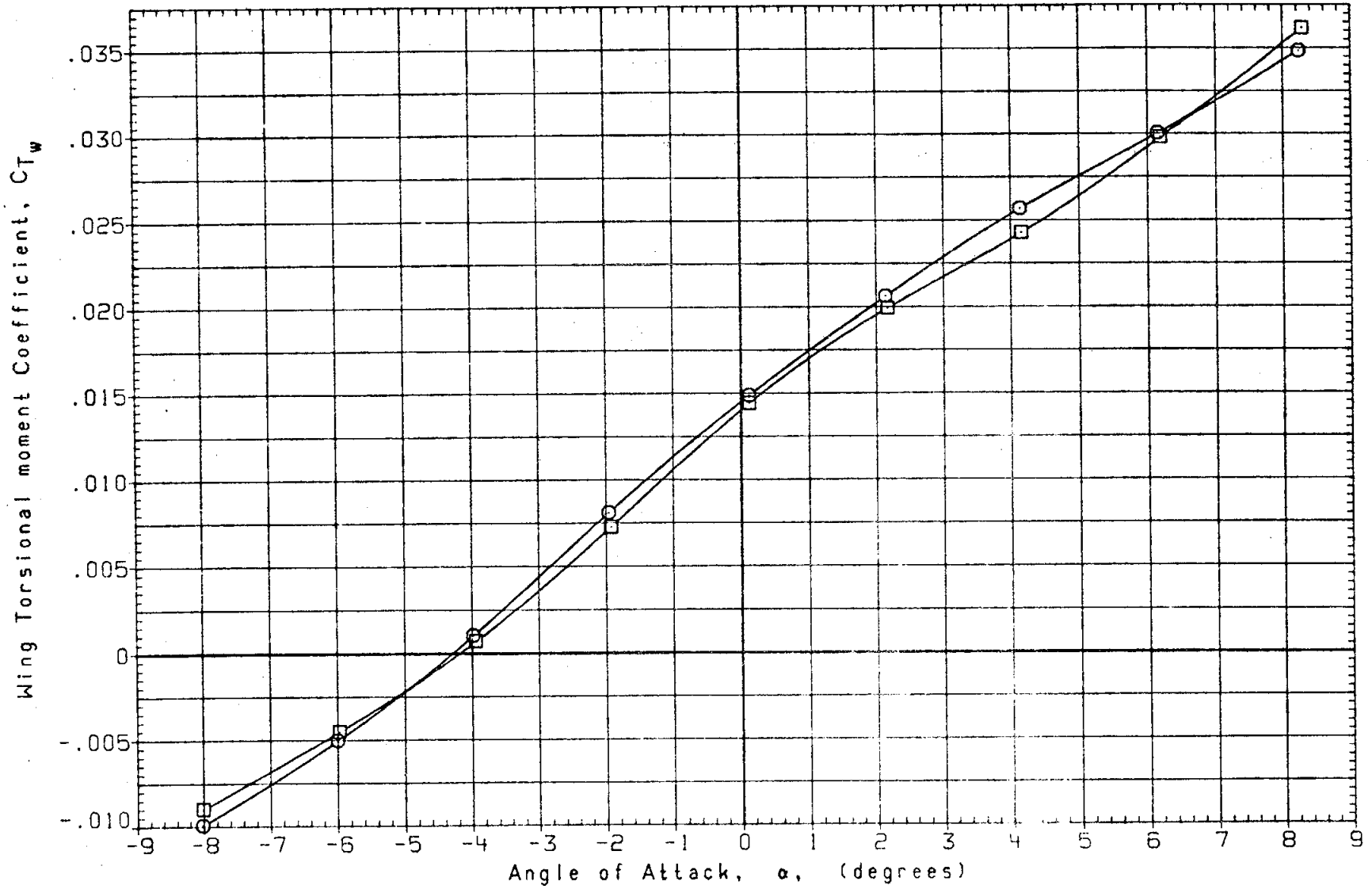

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S12008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S12014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

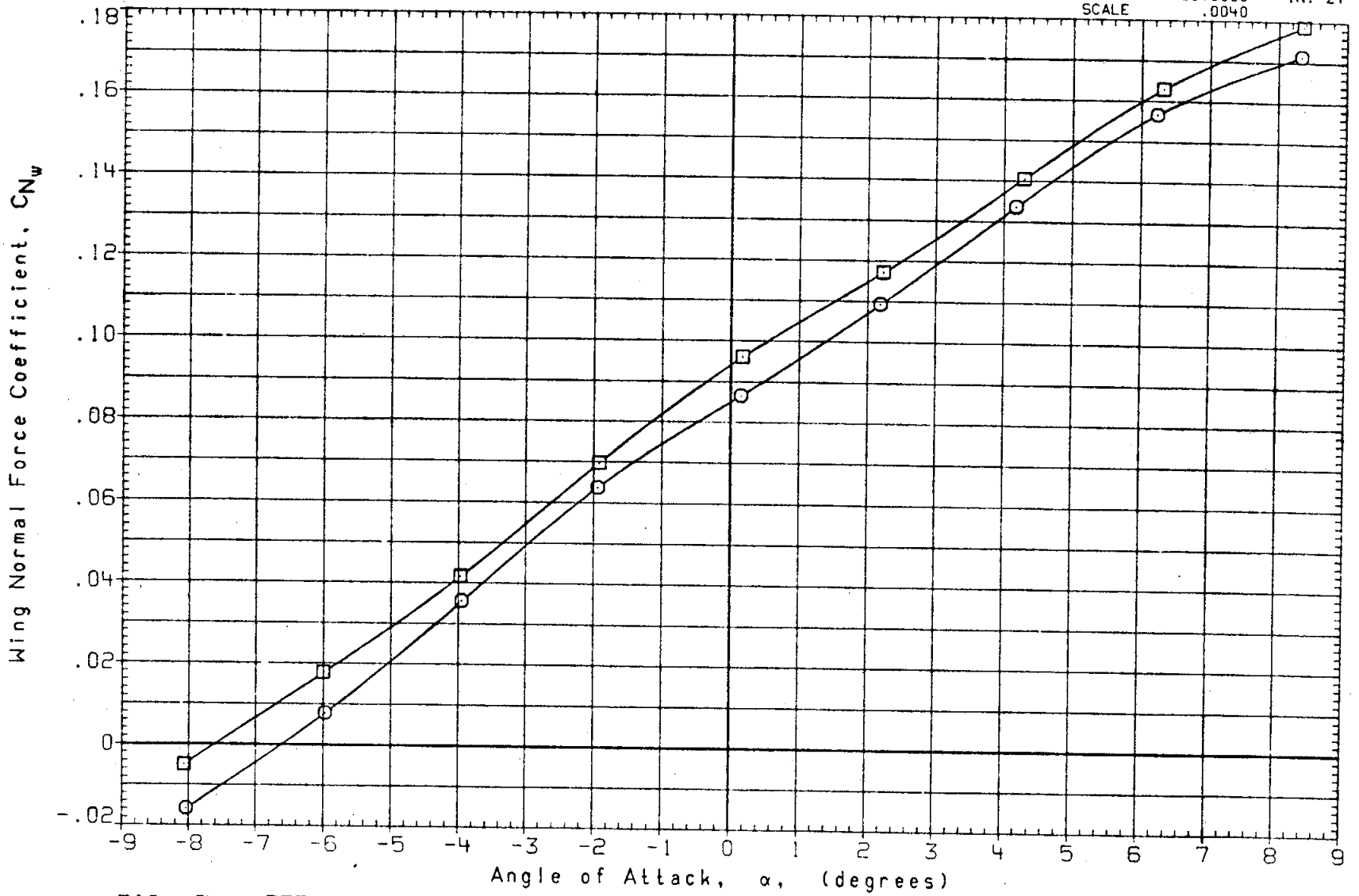

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

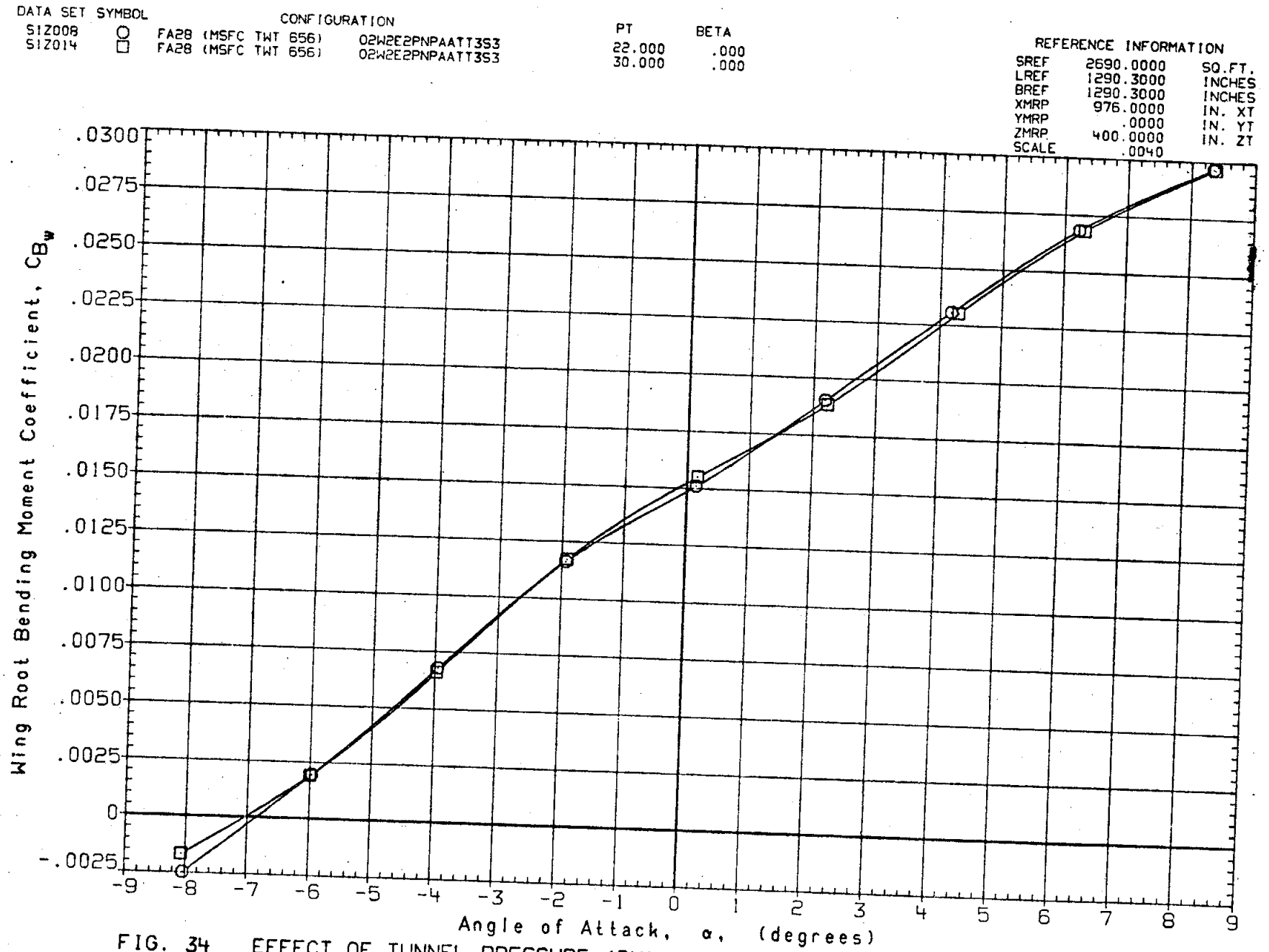

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(B)MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

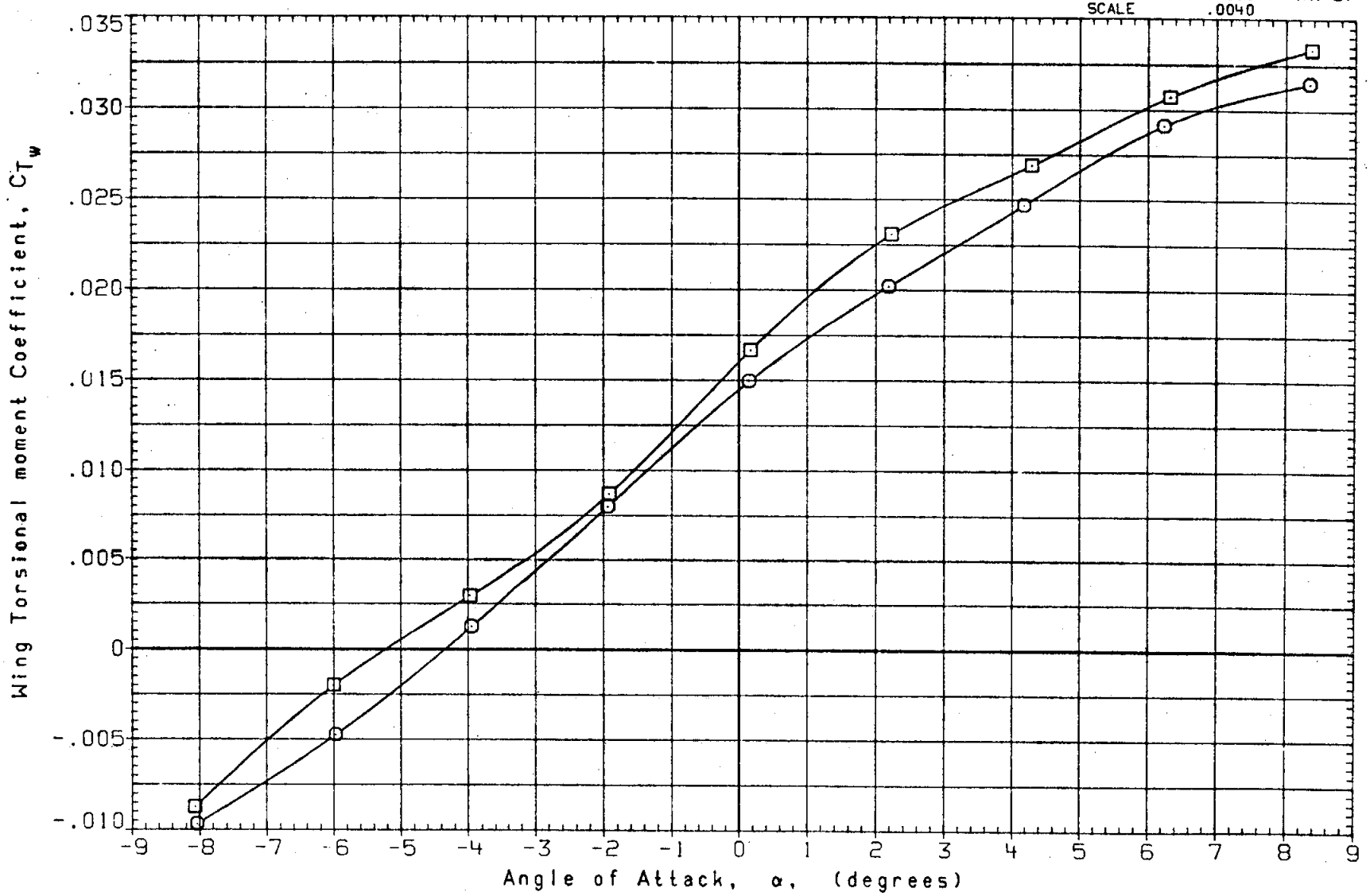

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(B) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

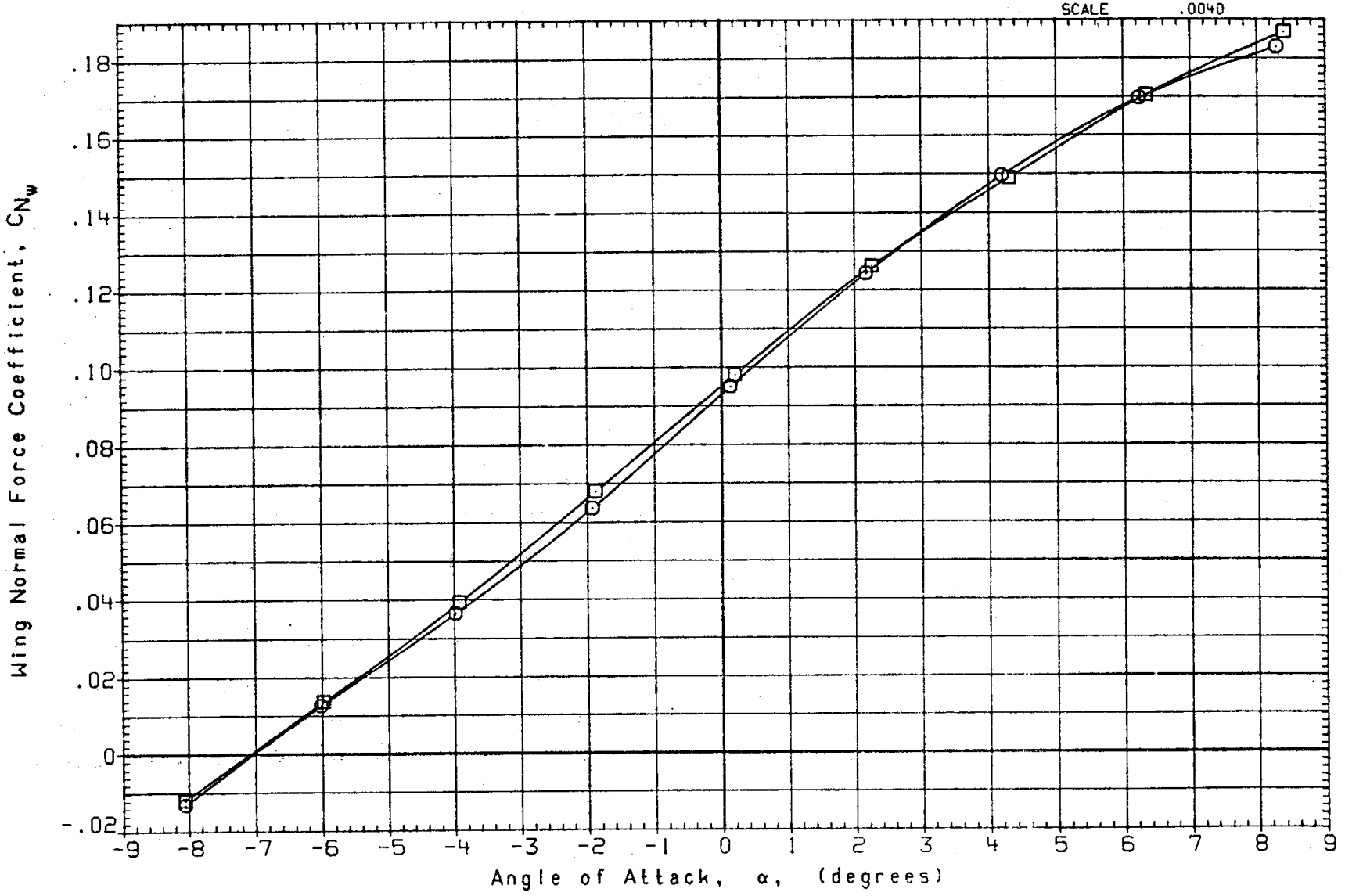

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

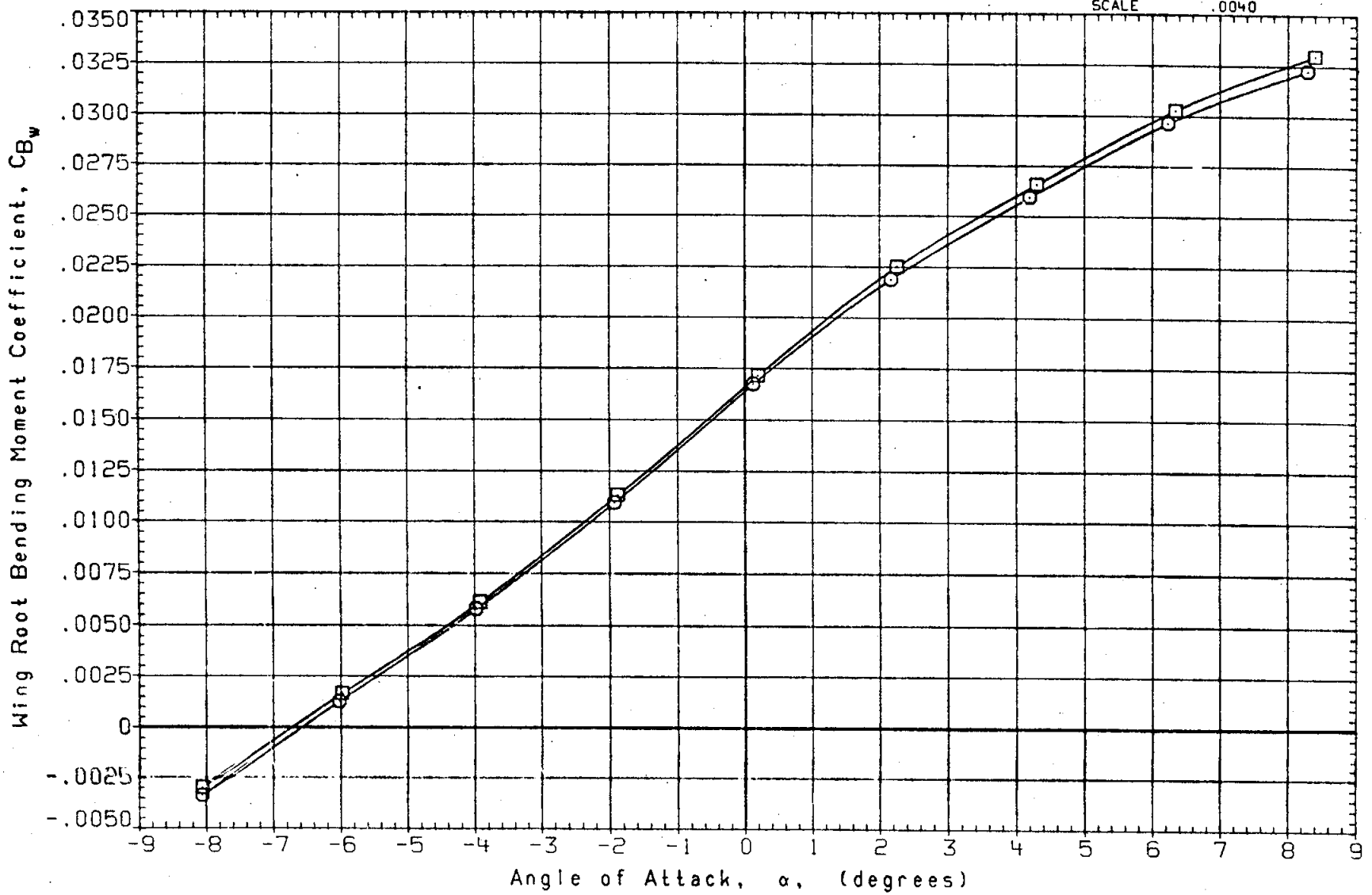

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(C) MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

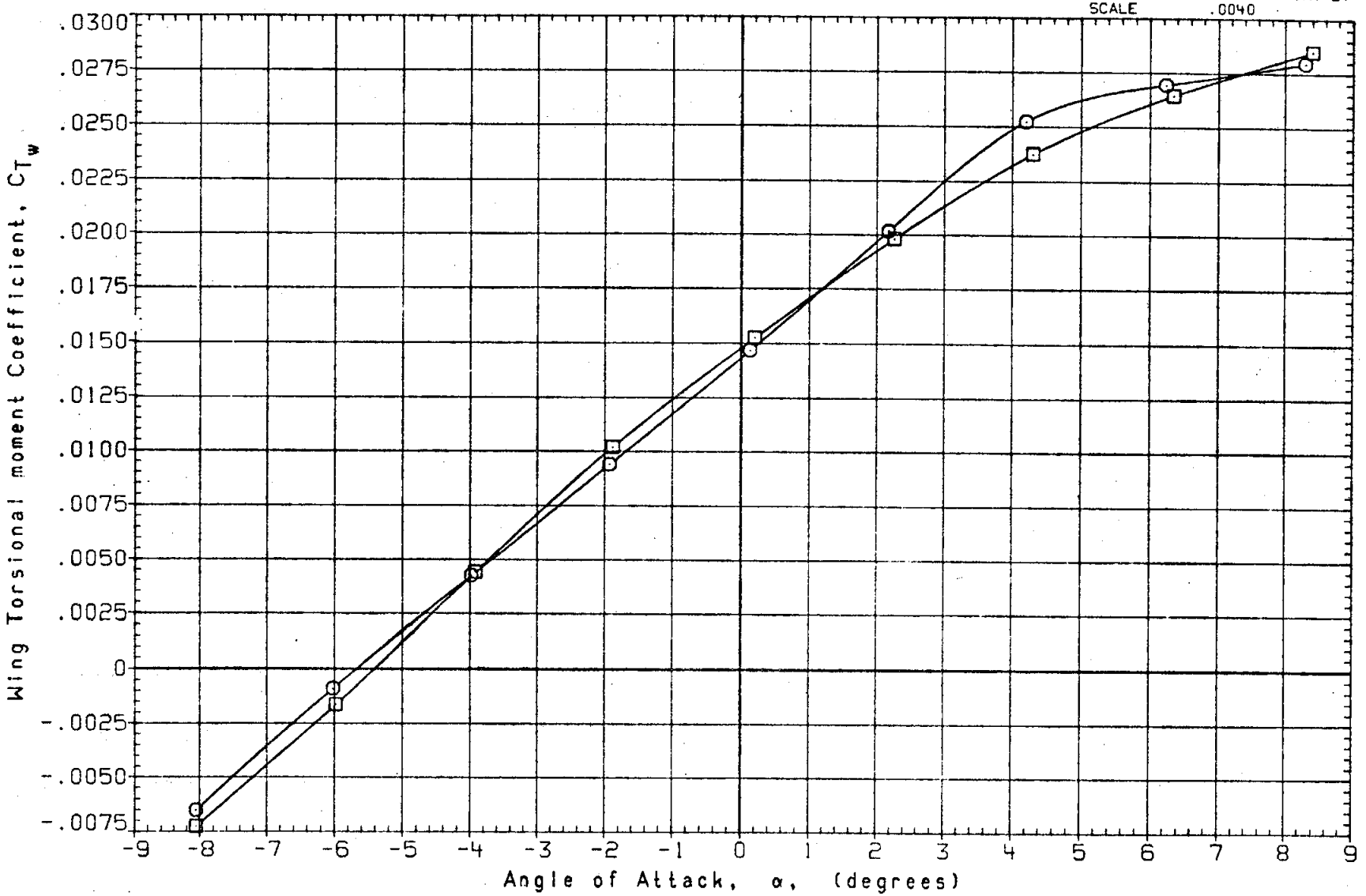

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

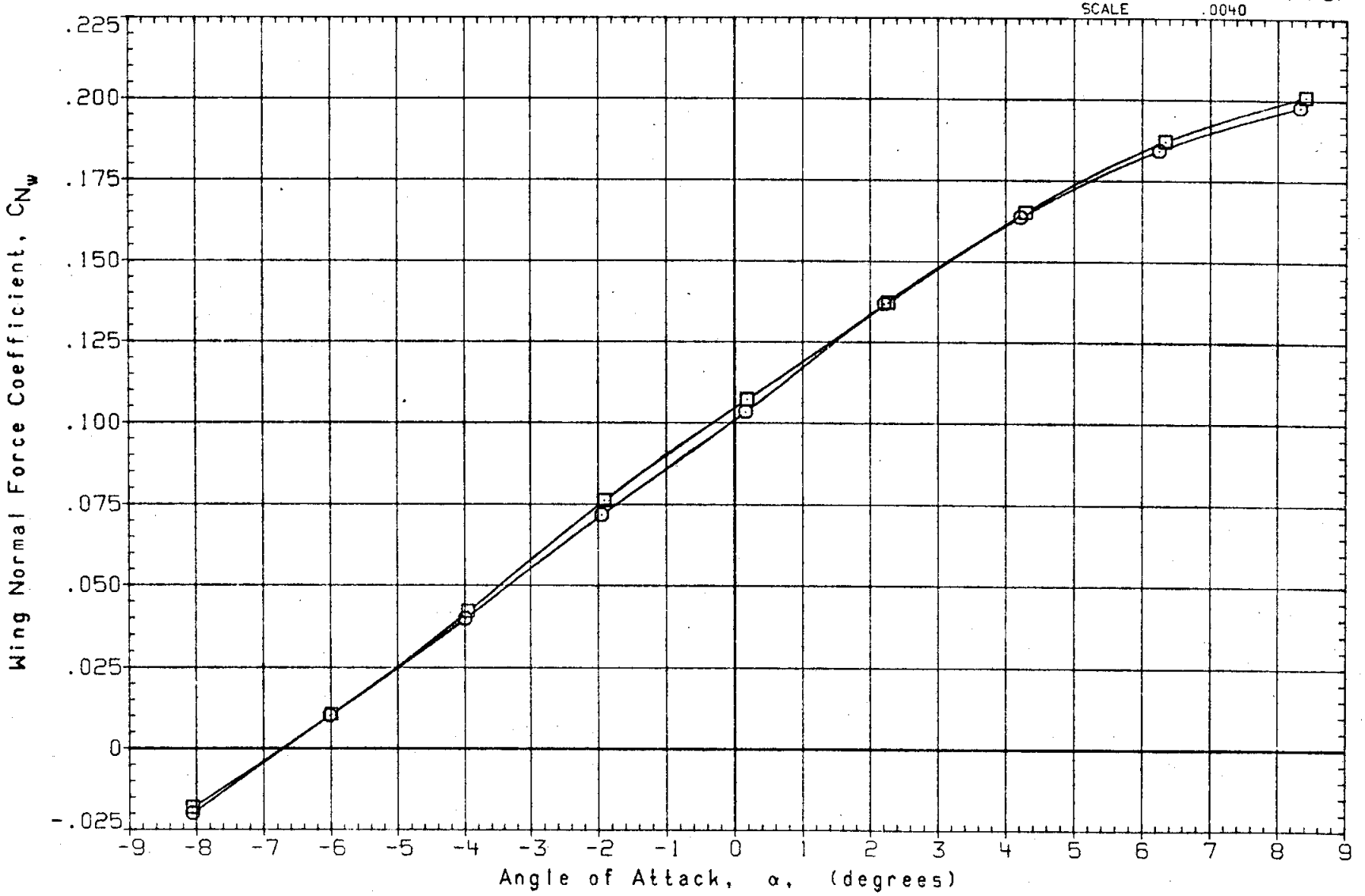

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

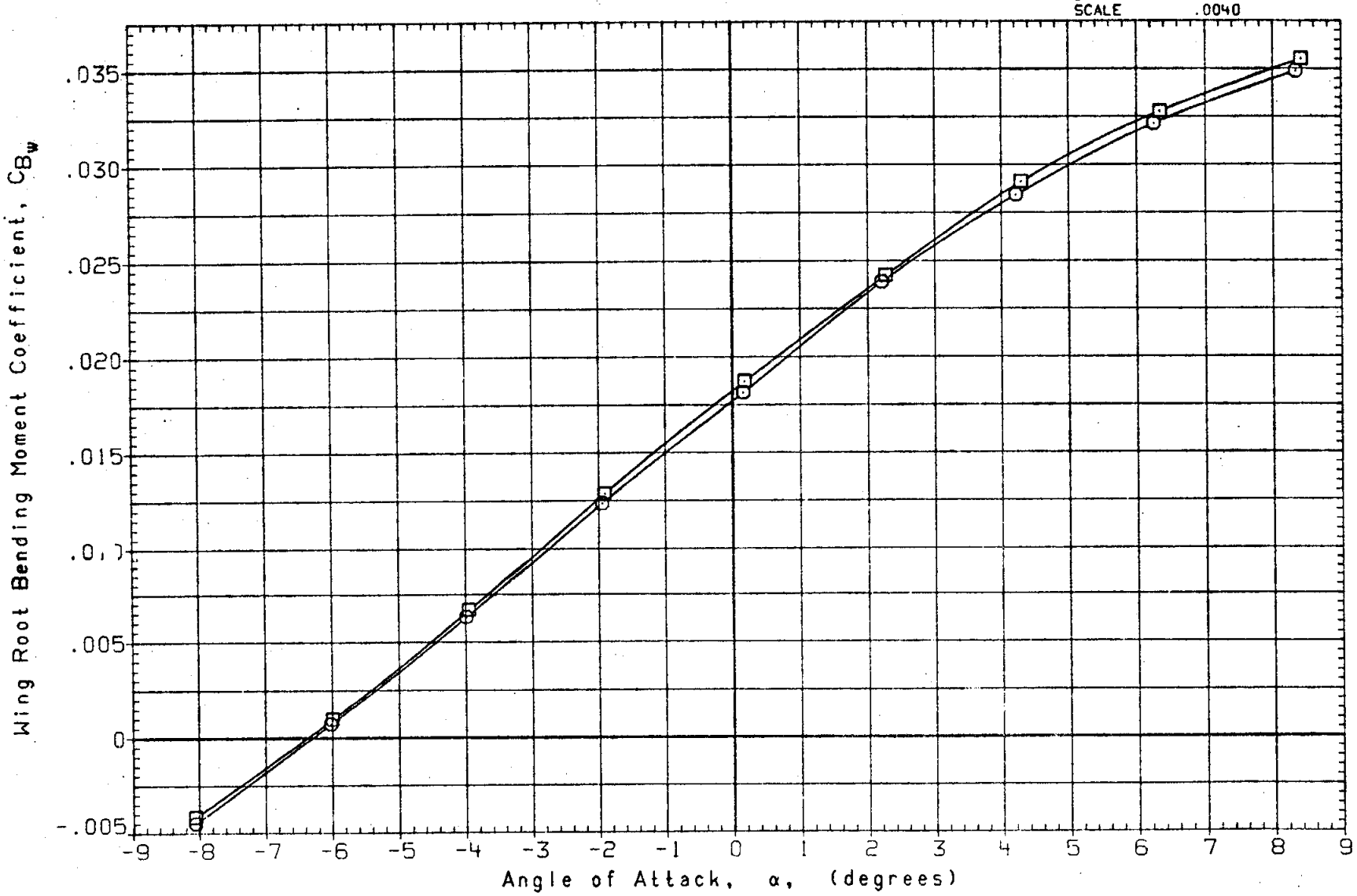

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	- .000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

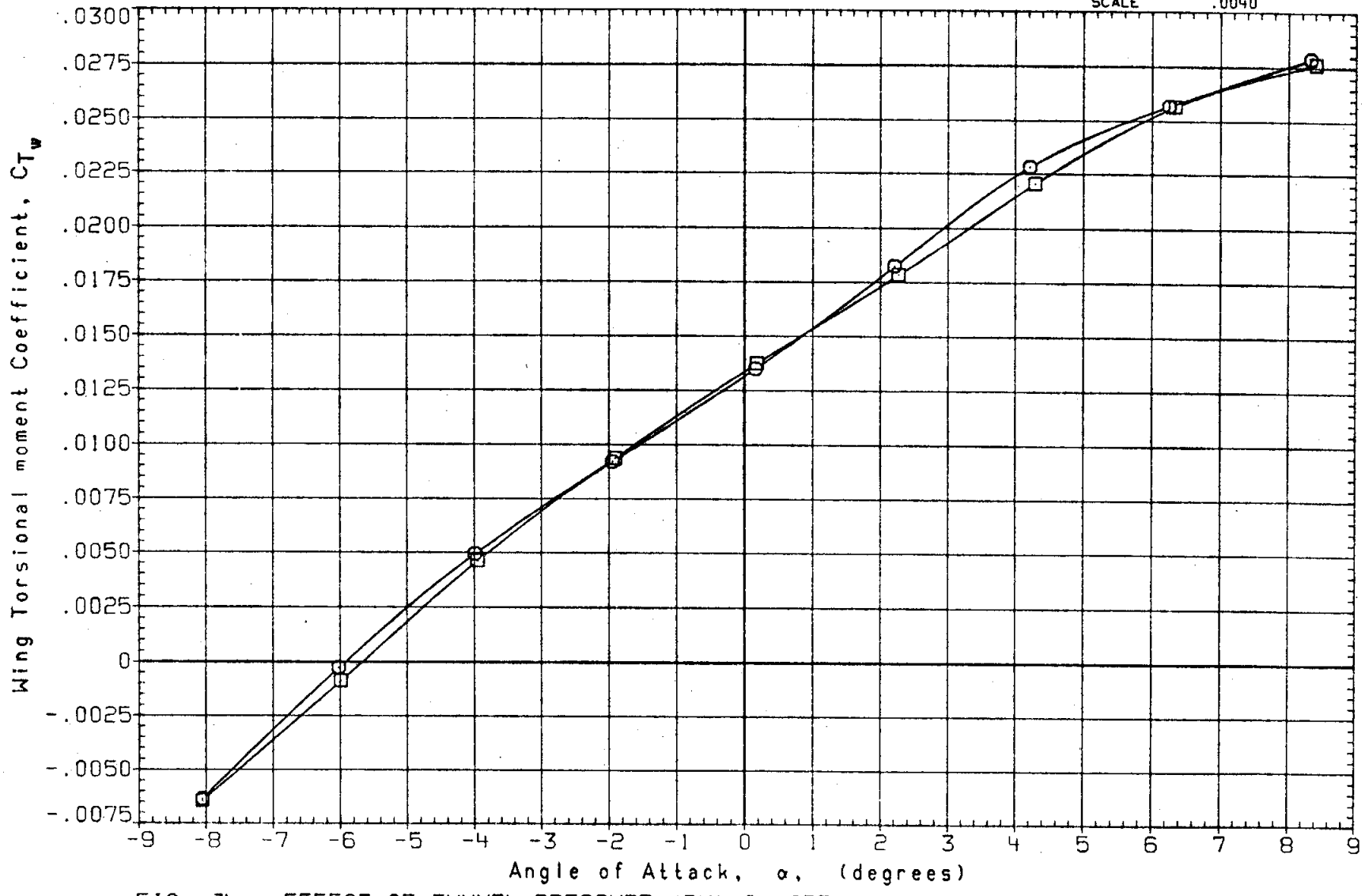

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

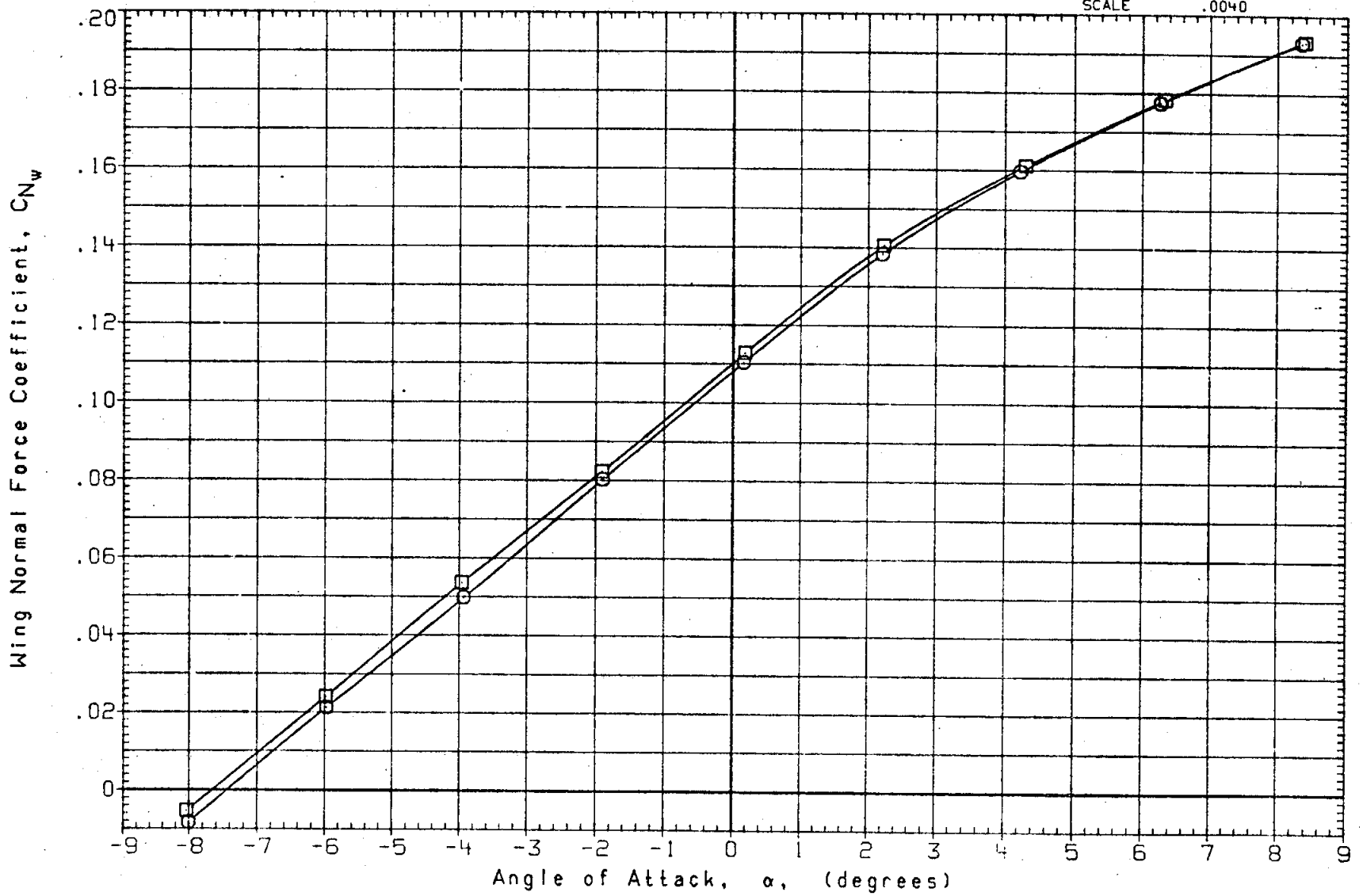

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

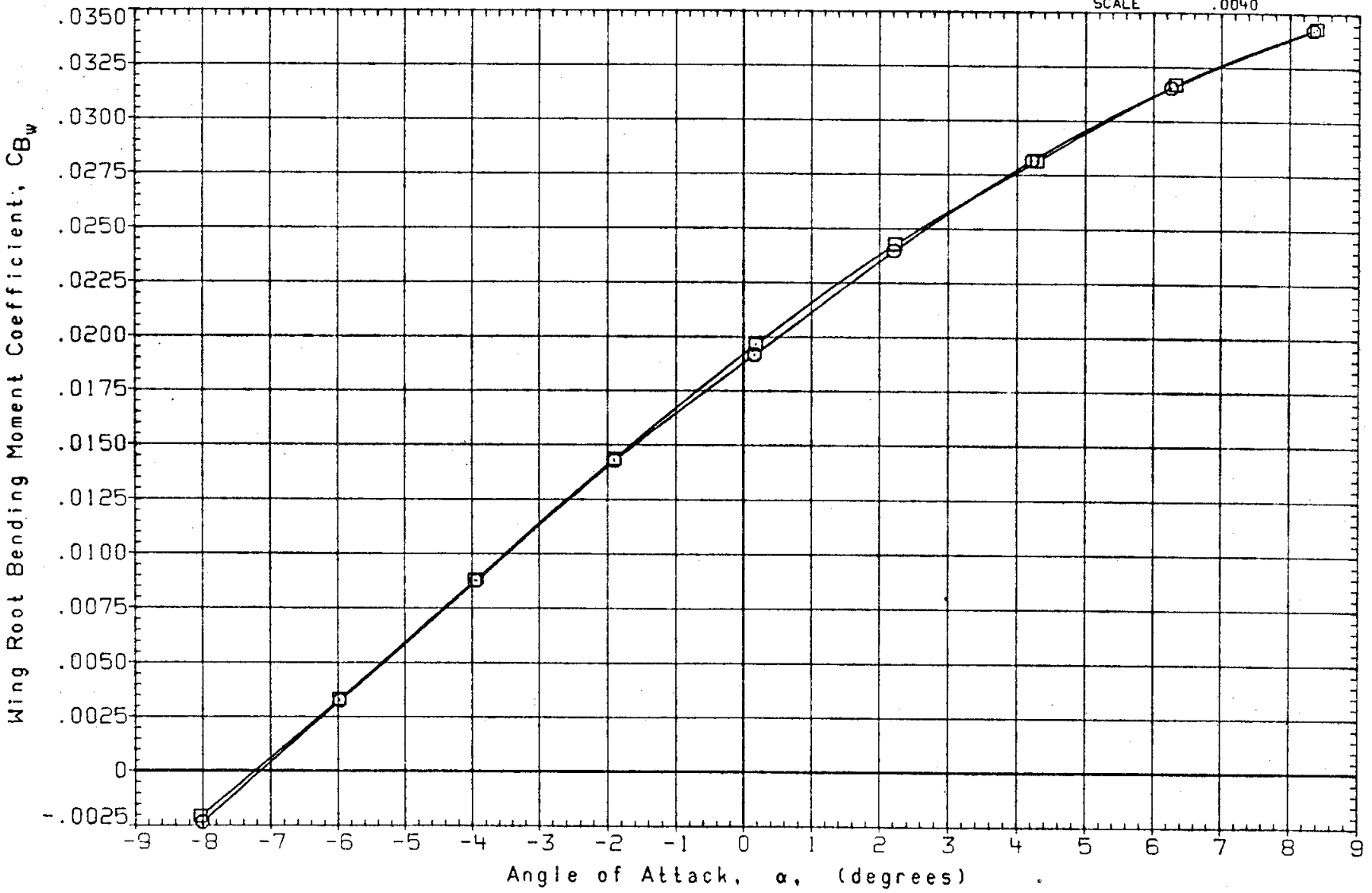

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

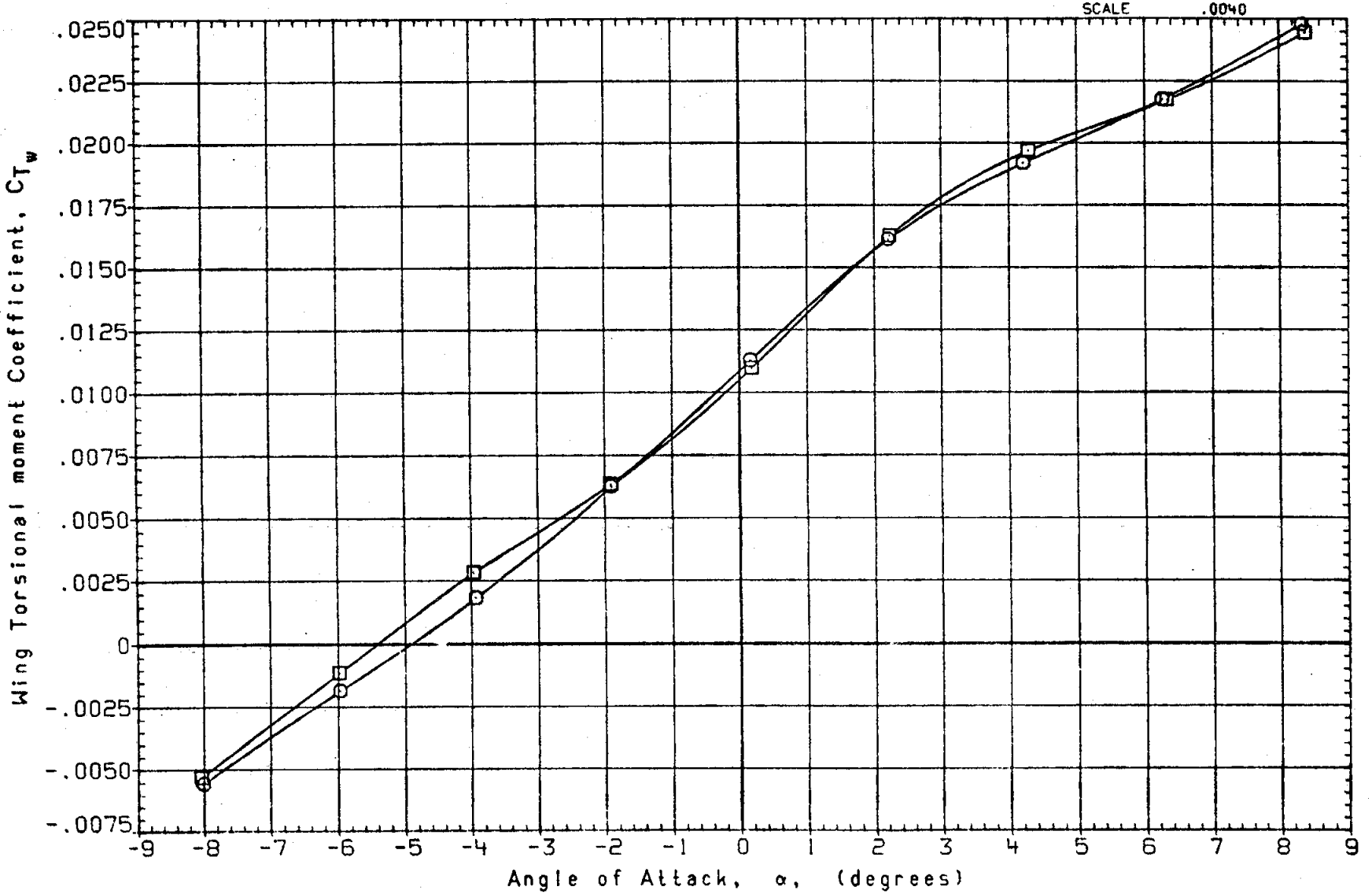

FIG. 34 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

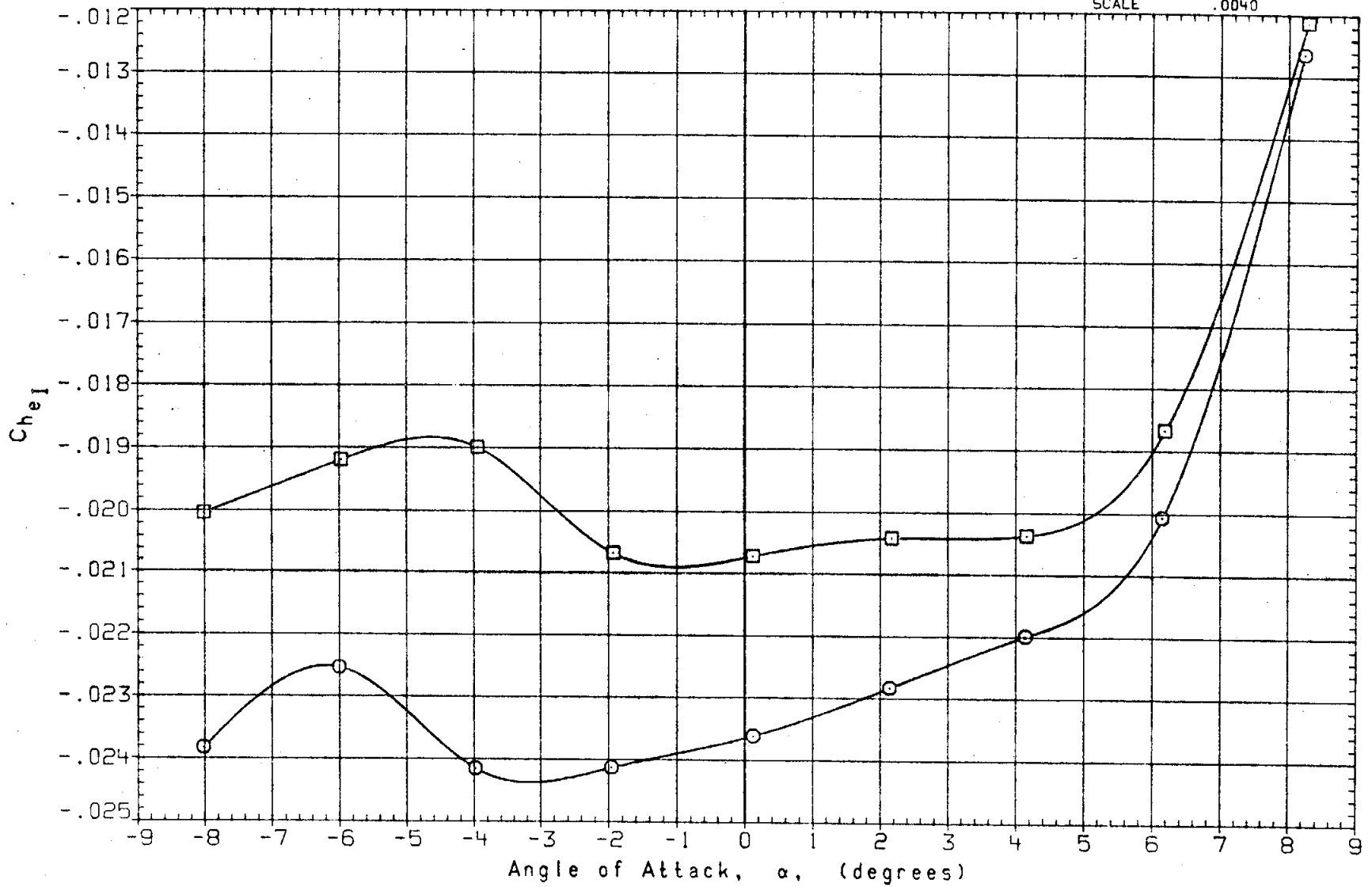

FIG. 35 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

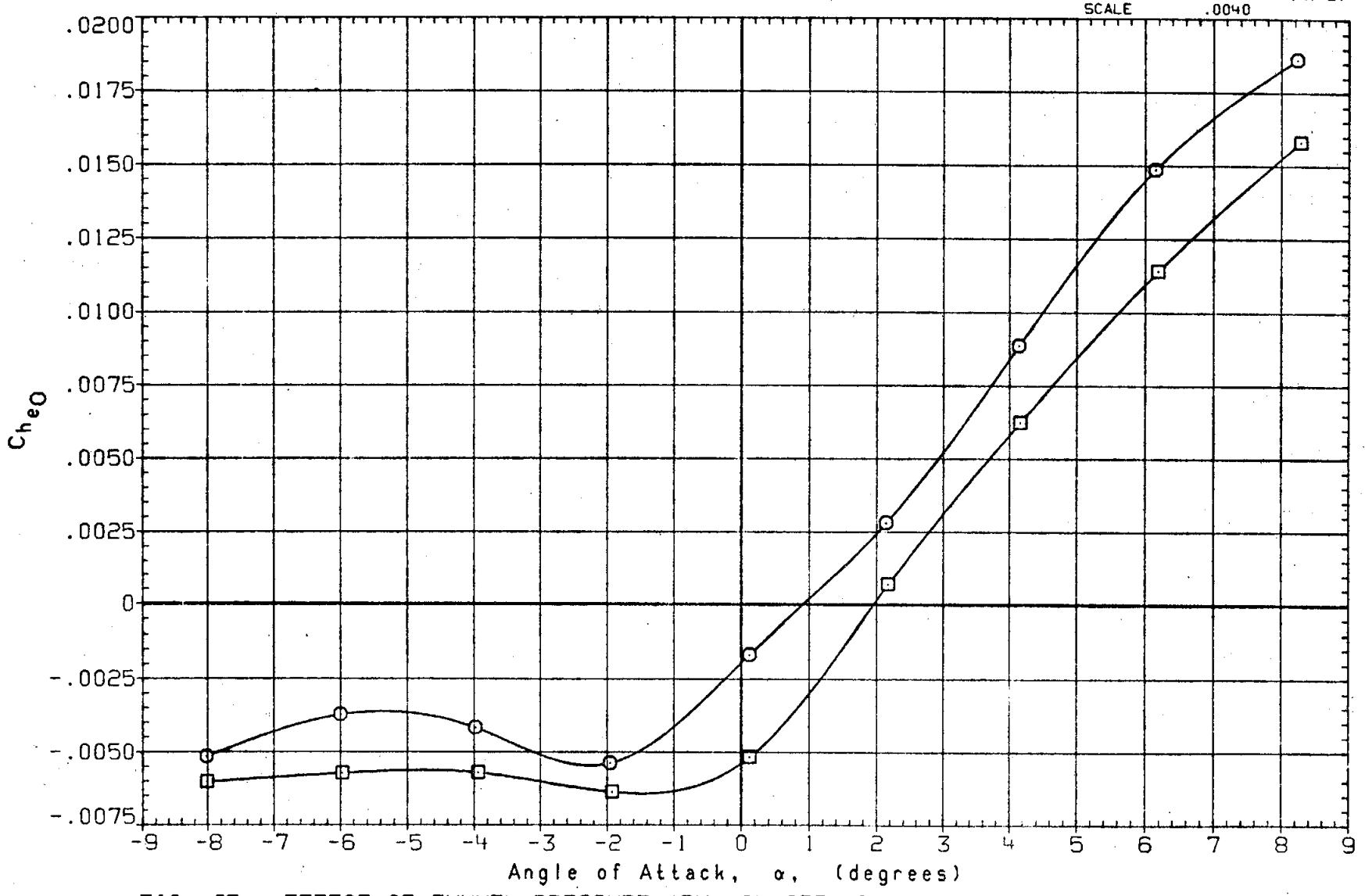

FIG. 35 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

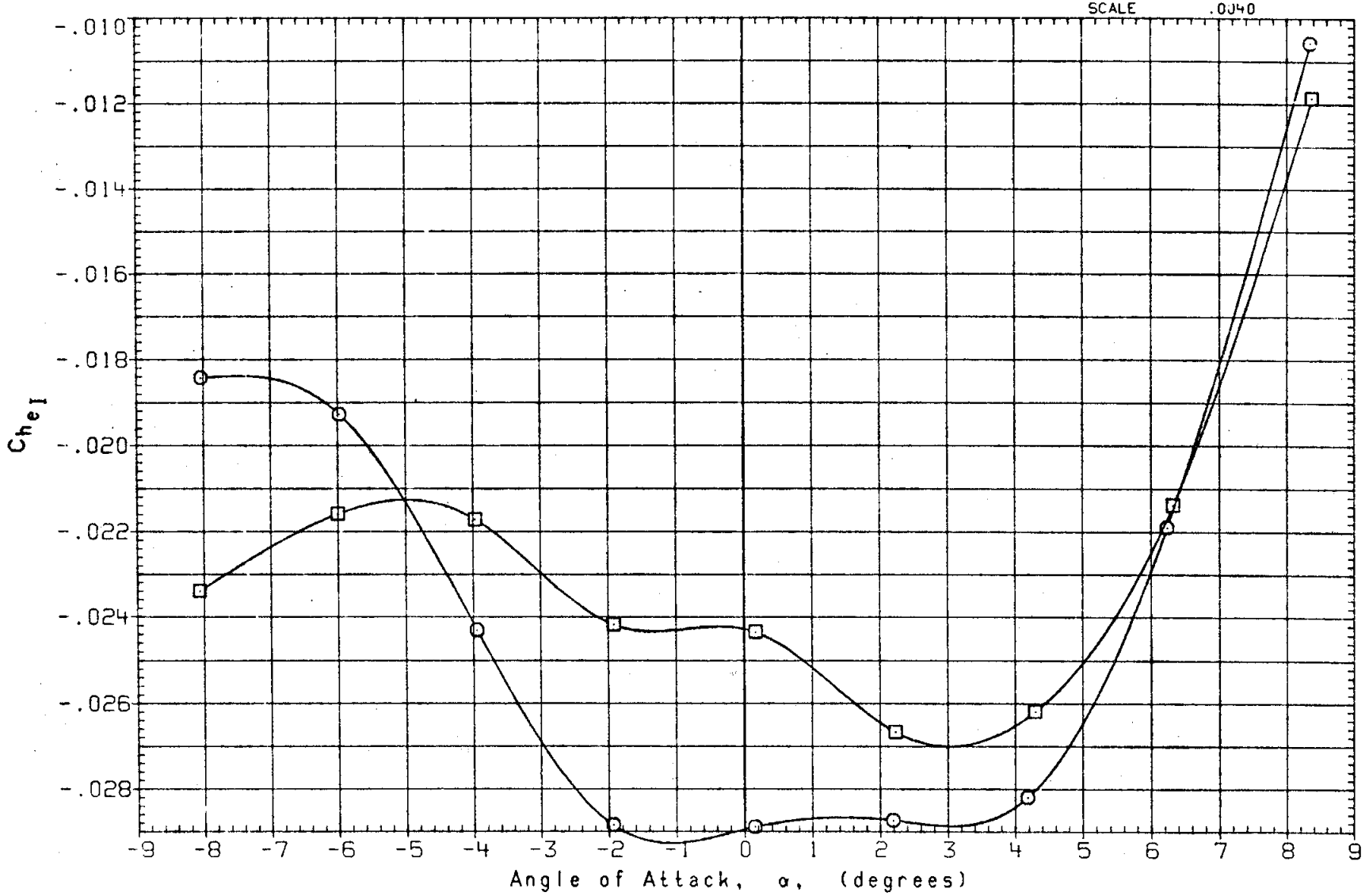

FIG. 35 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	PT	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

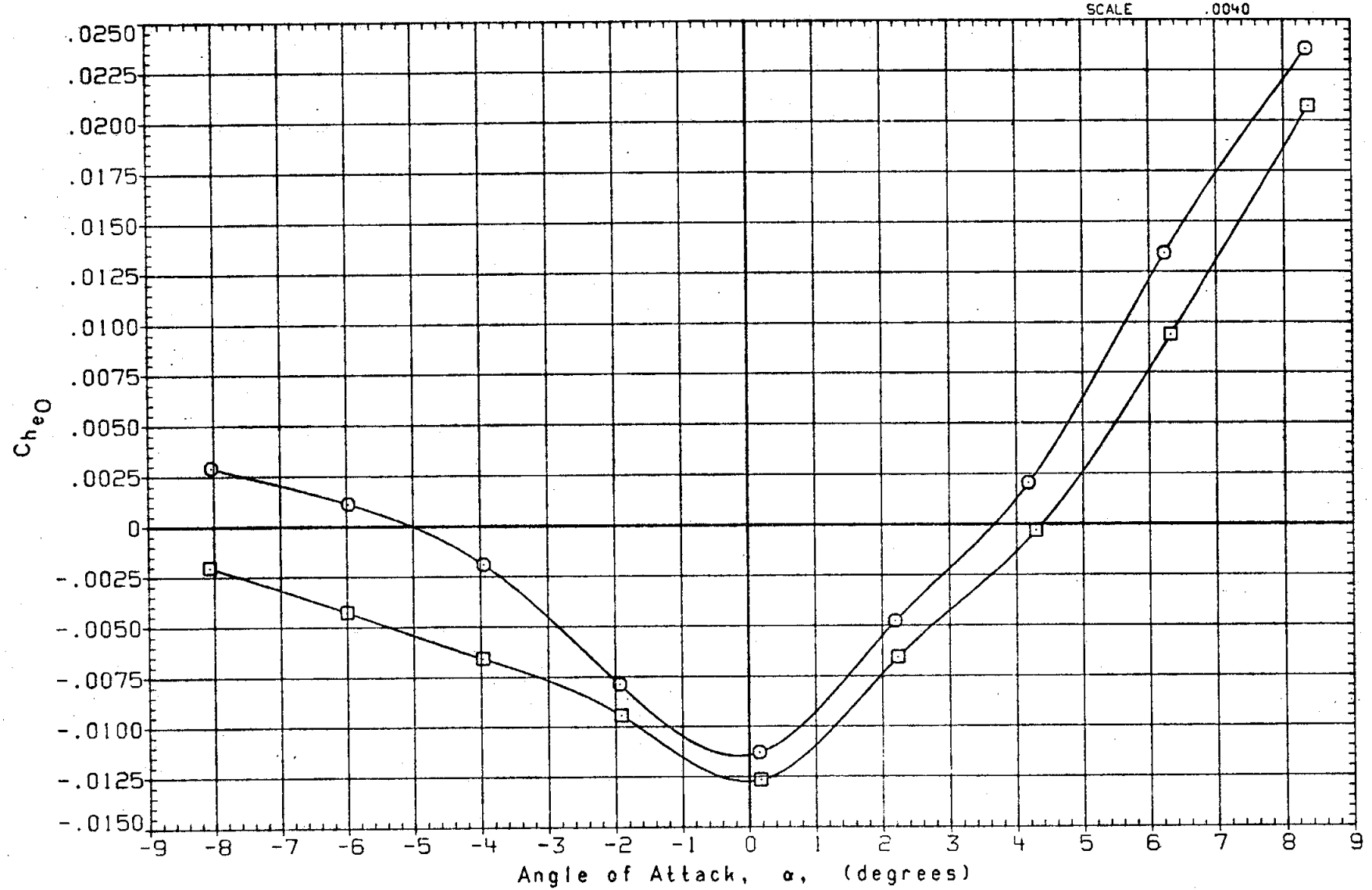

FIG. 35 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT353	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT353	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

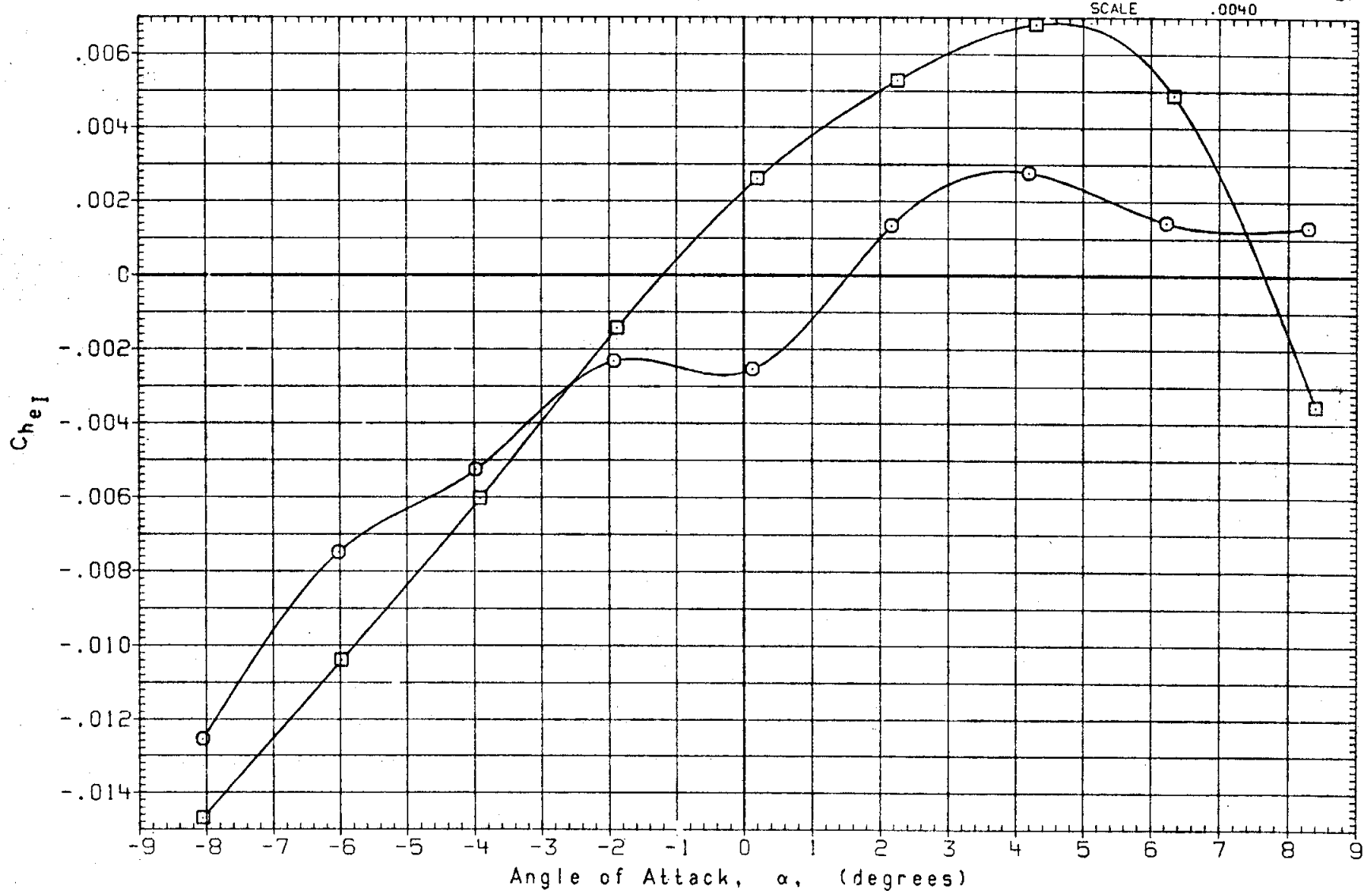

FIG. 35 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

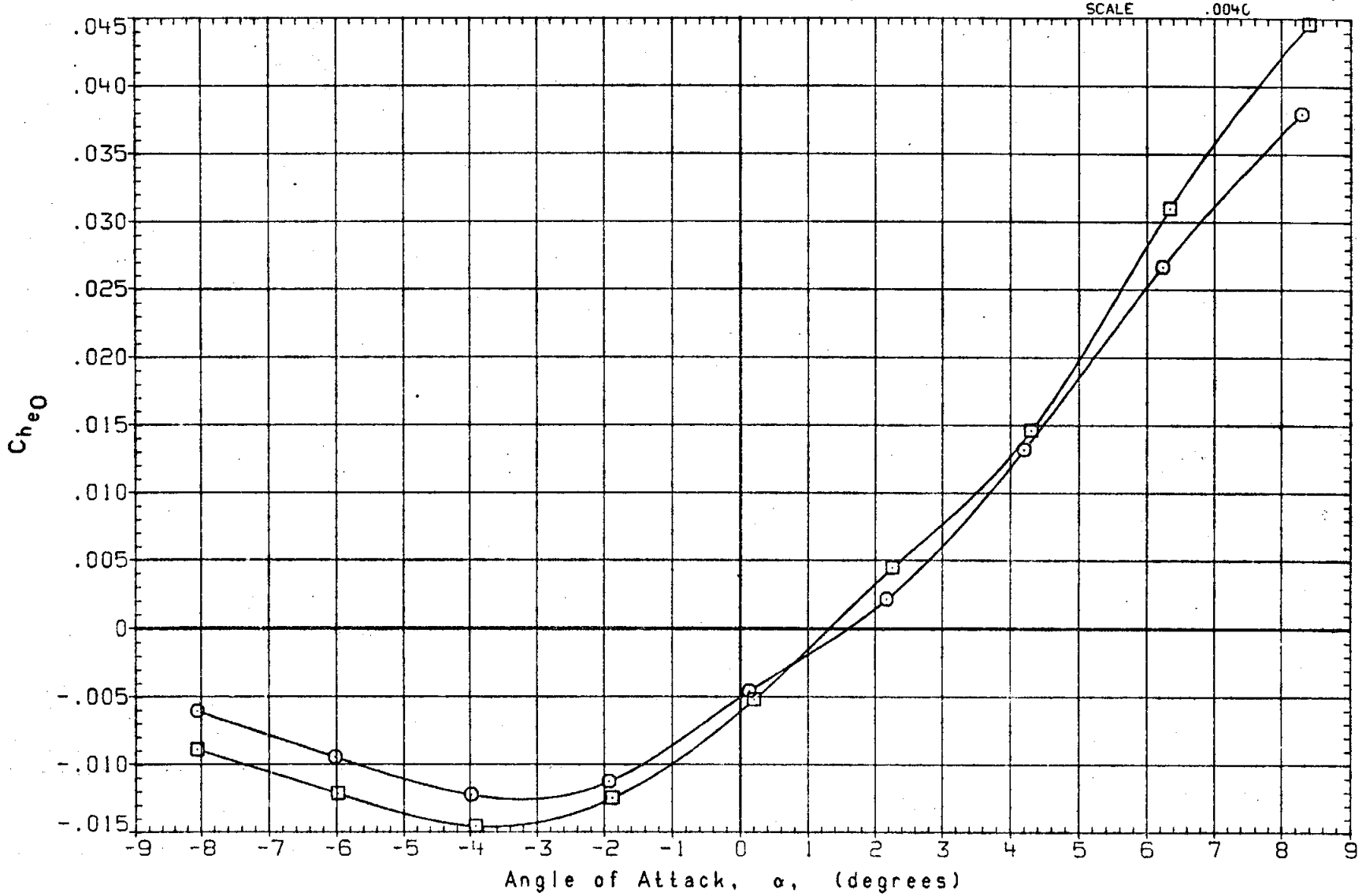

FIG. 35 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

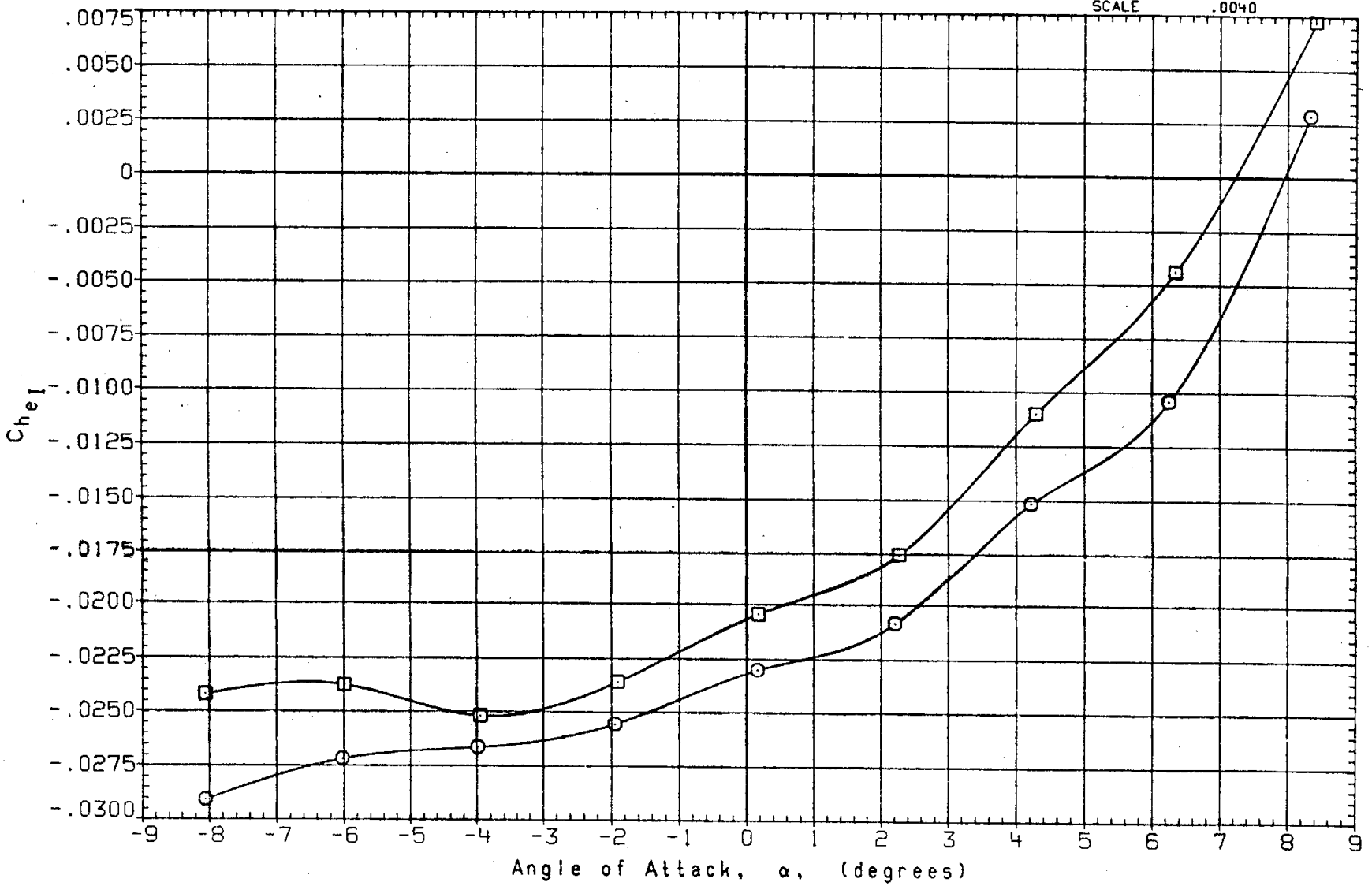

FIG. 35 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

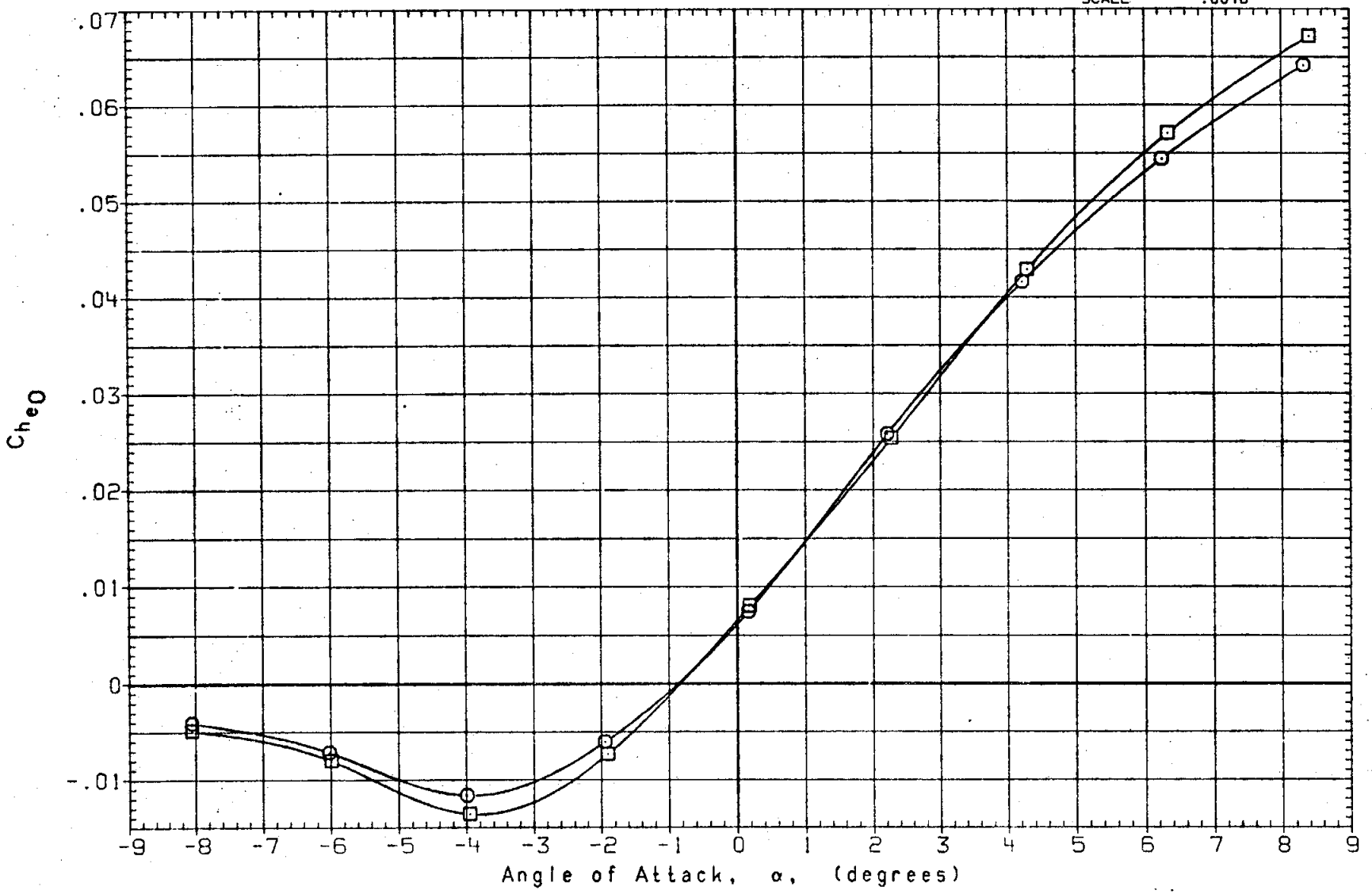

FIG. 35 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80 PAGE 289

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	⊙	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

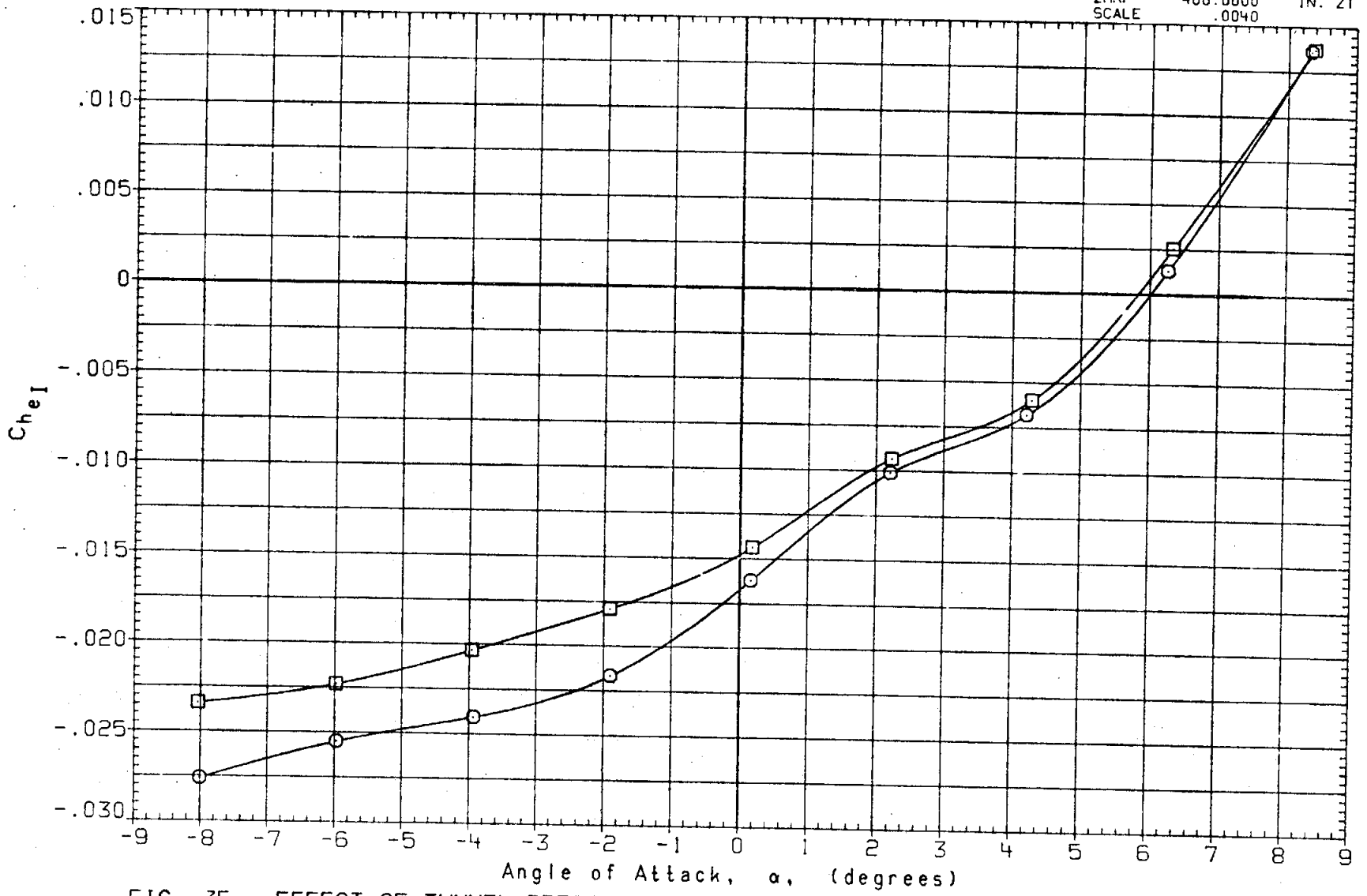

FIG. 35 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(E)MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000
S1Z014	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

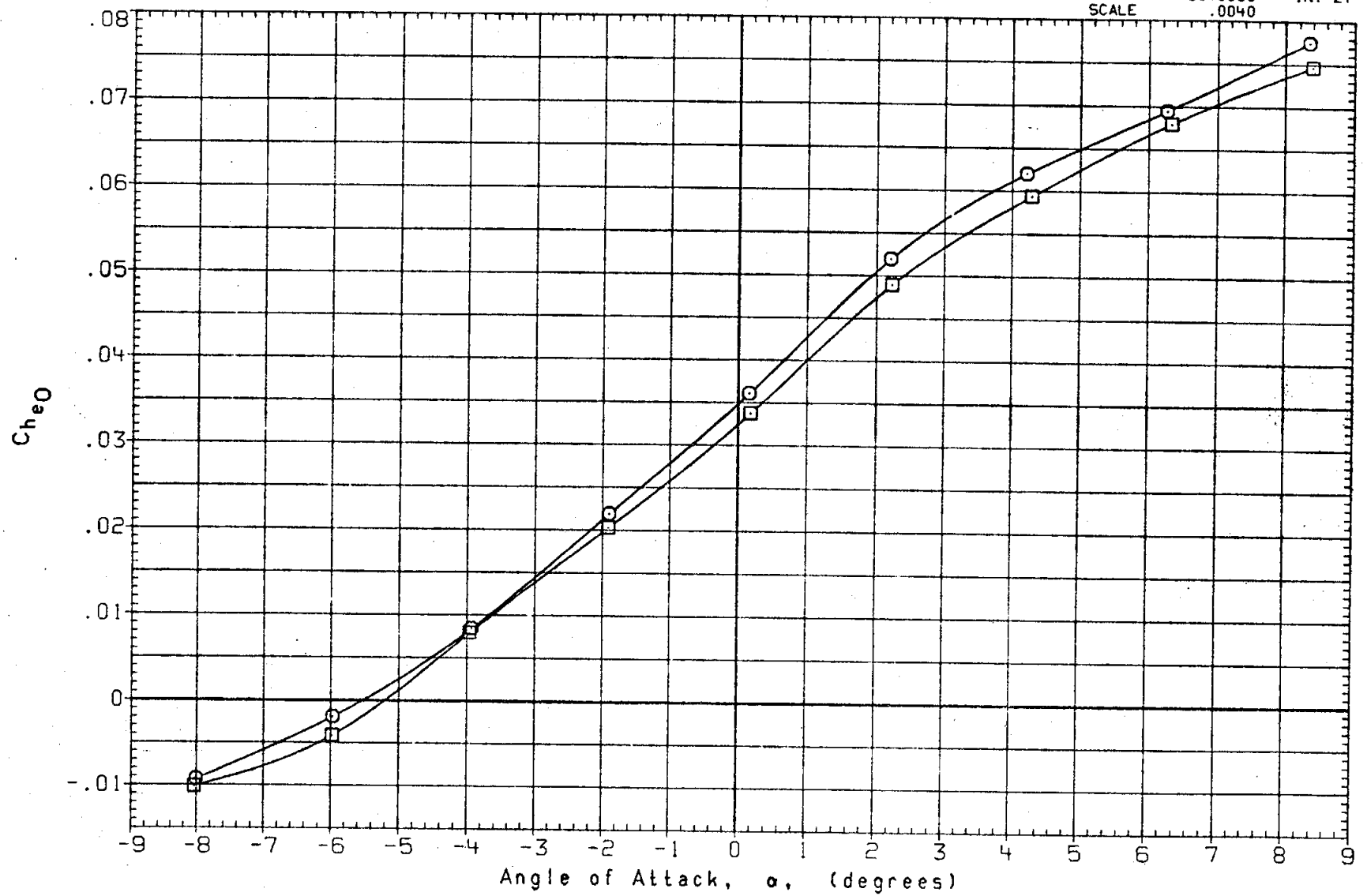

FIG. 35 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

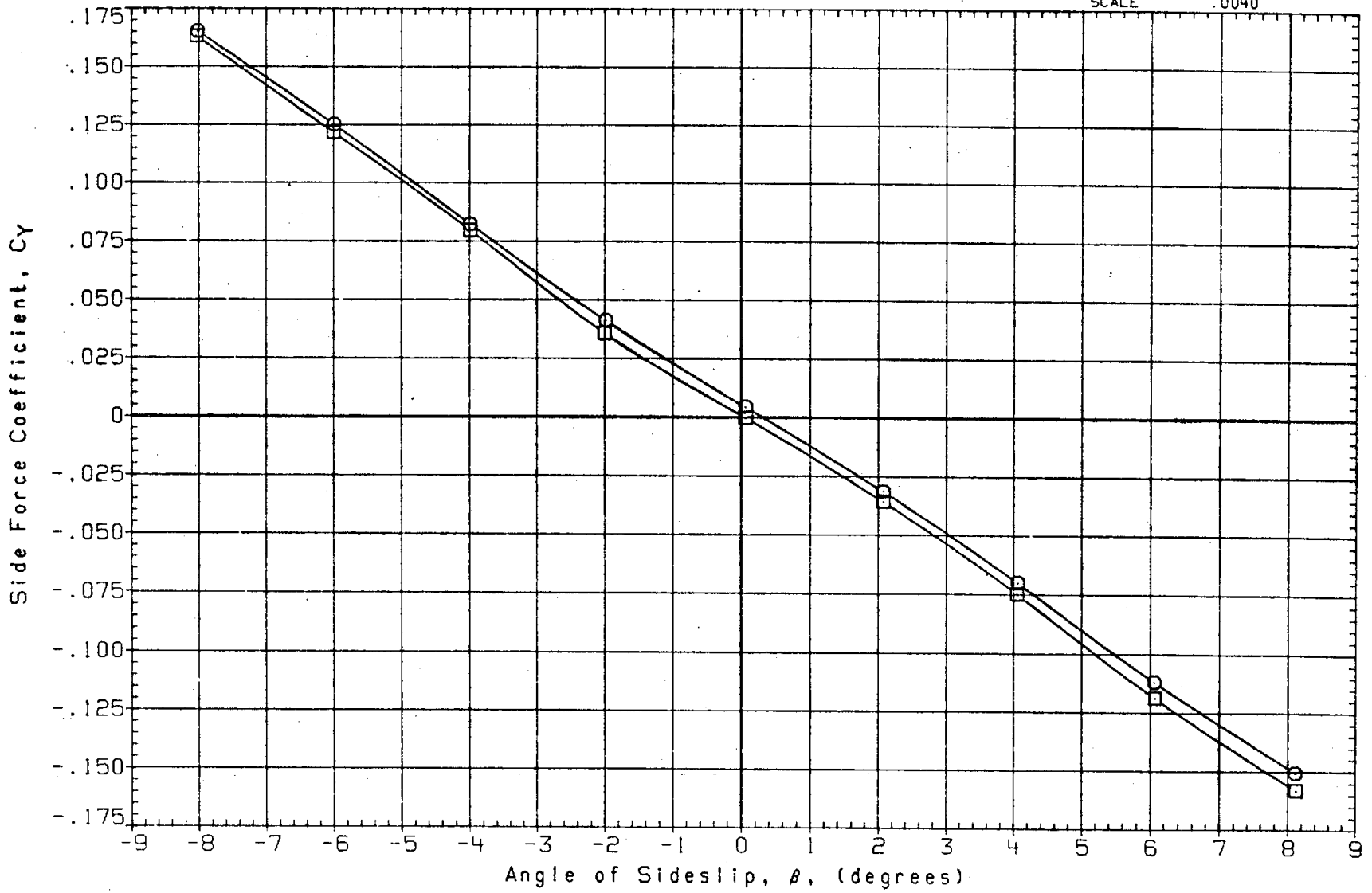

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

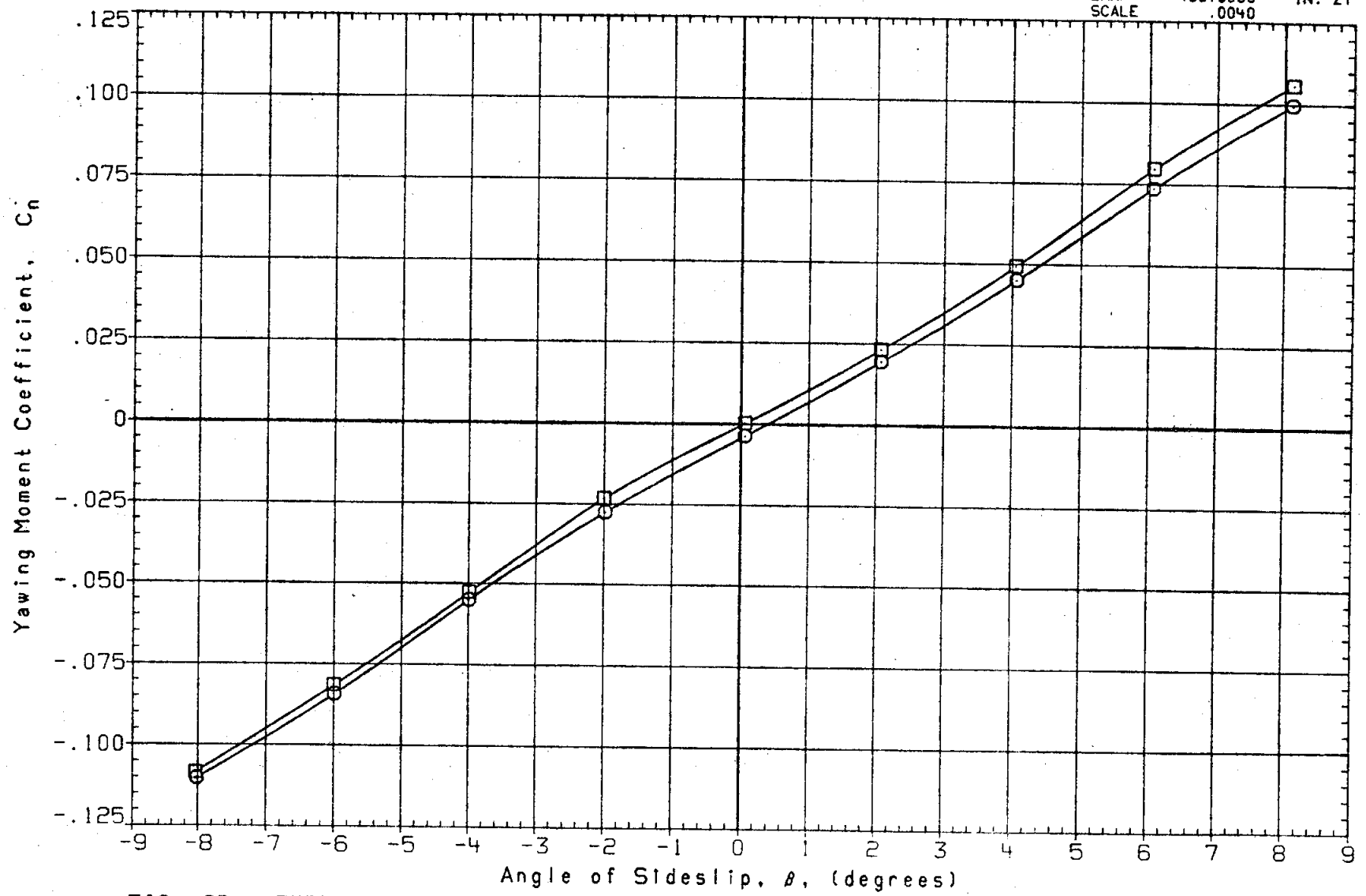

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

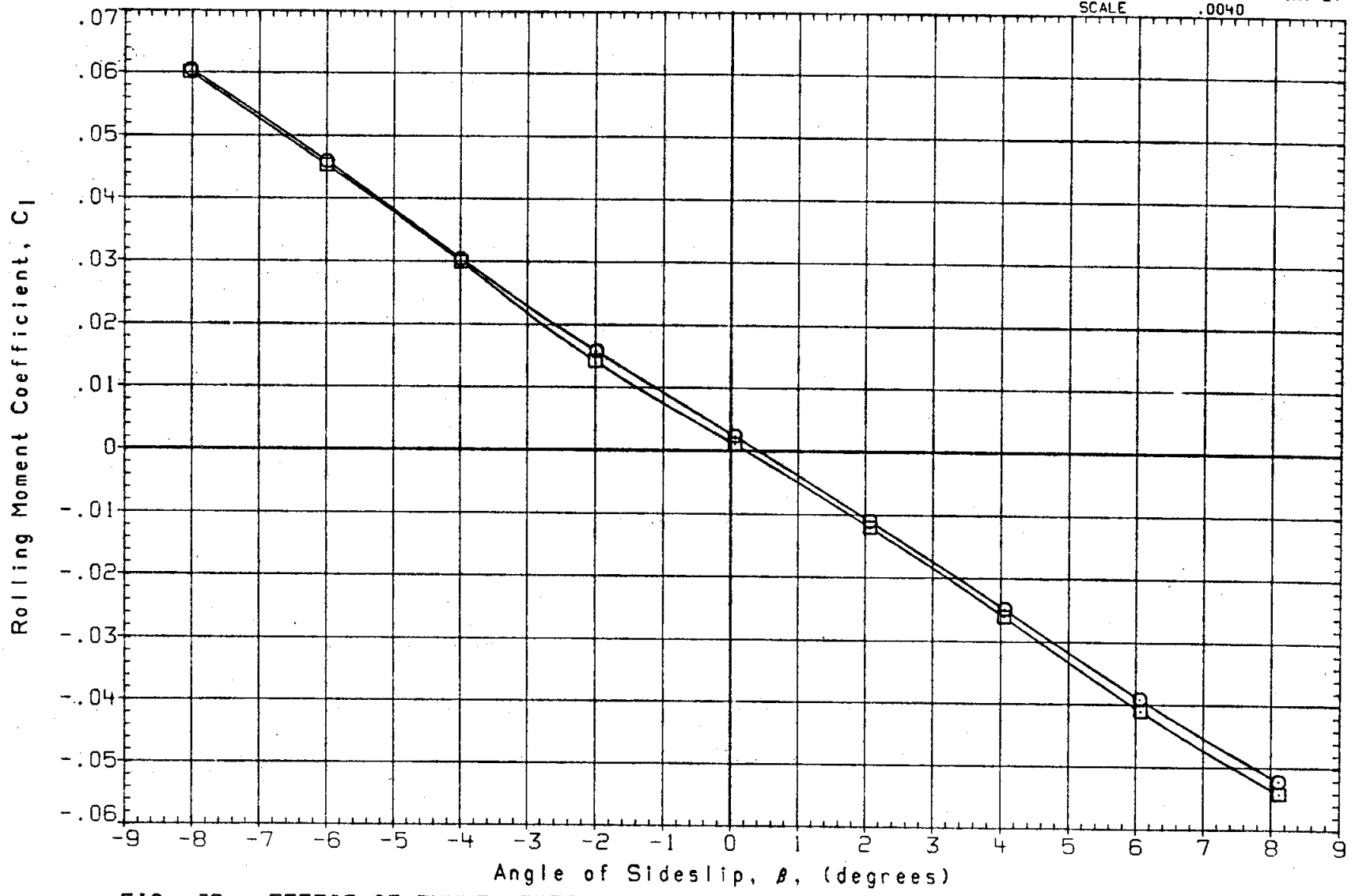

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

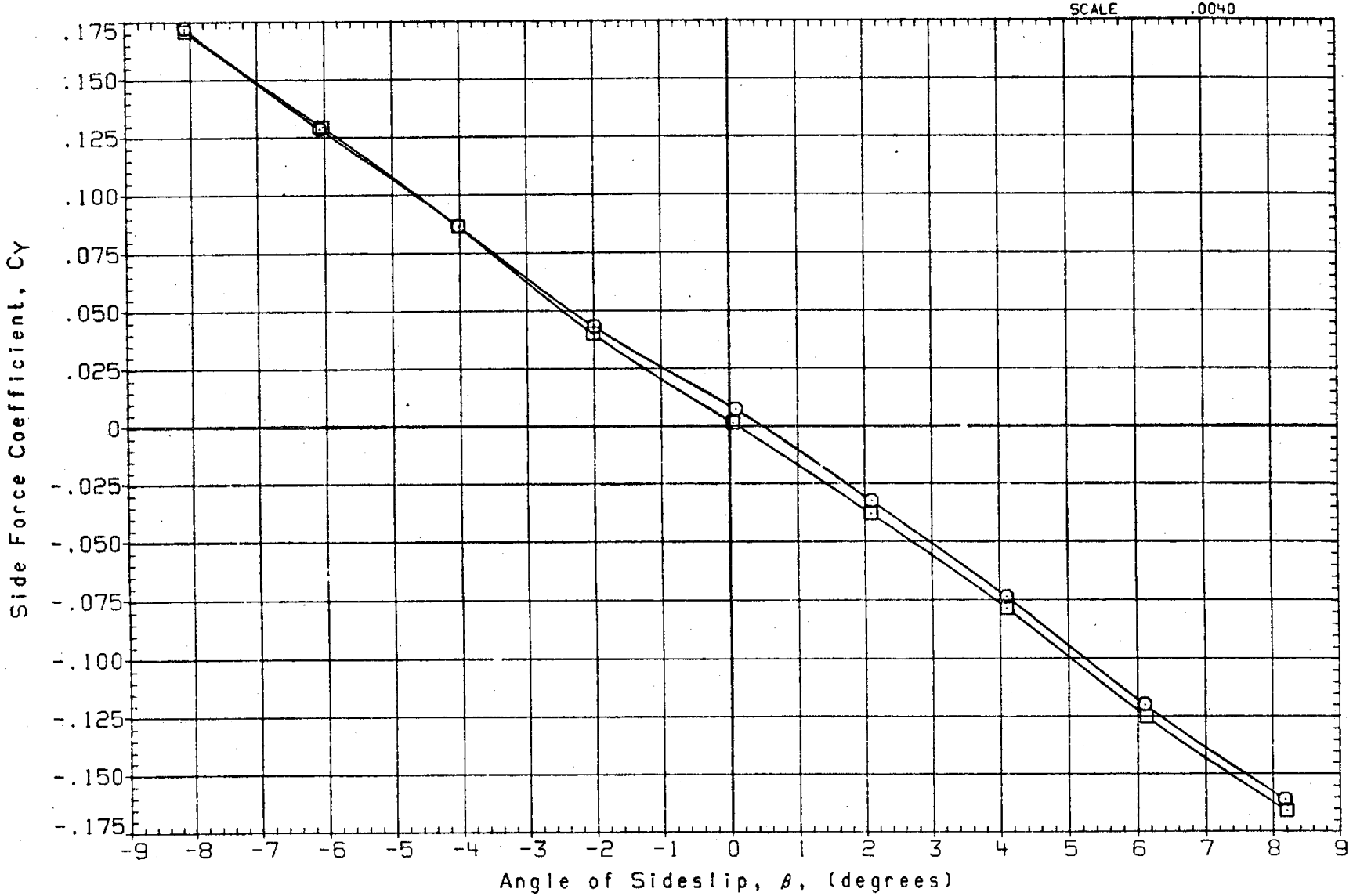

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(B) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

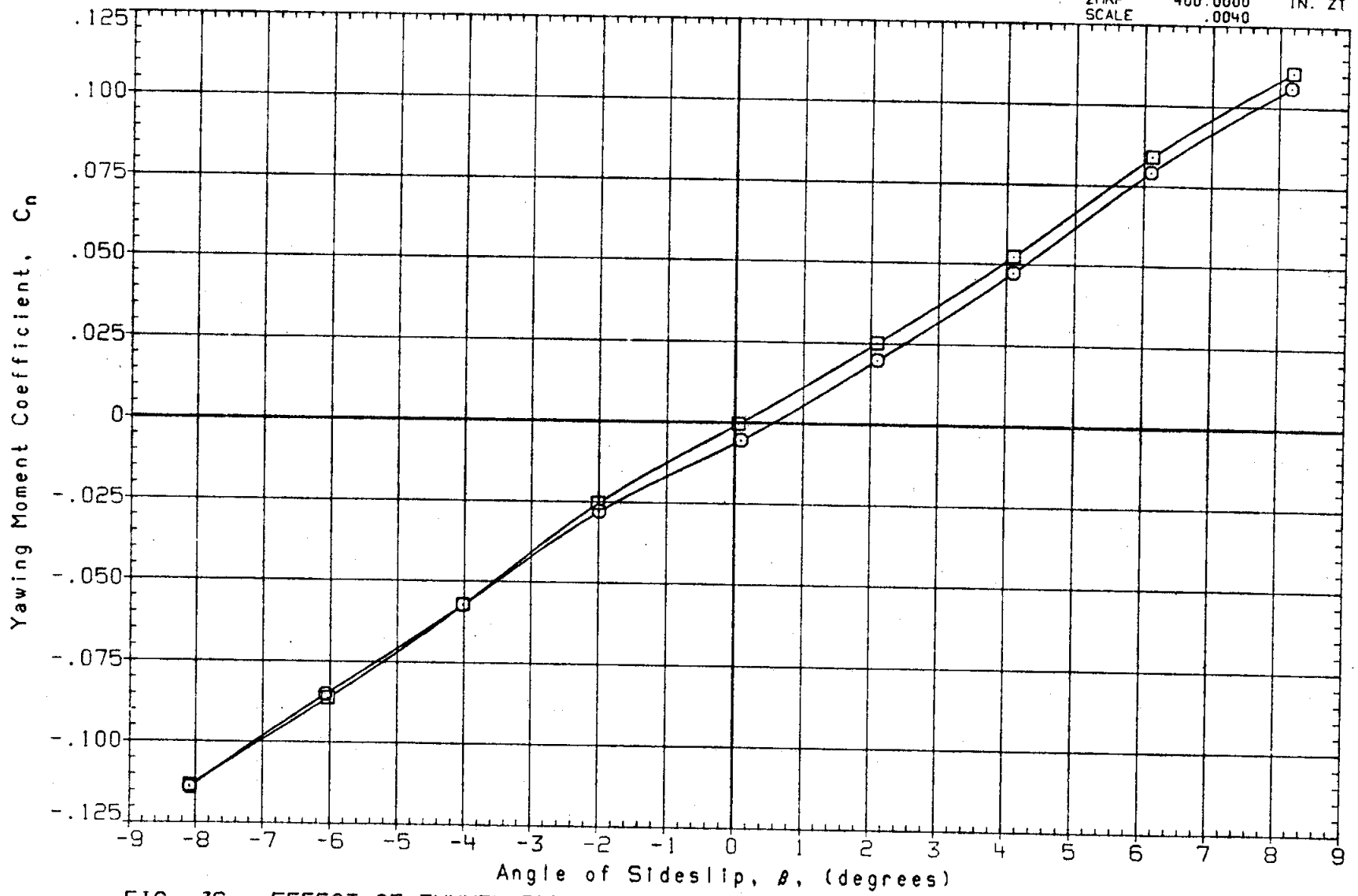

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(B) MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

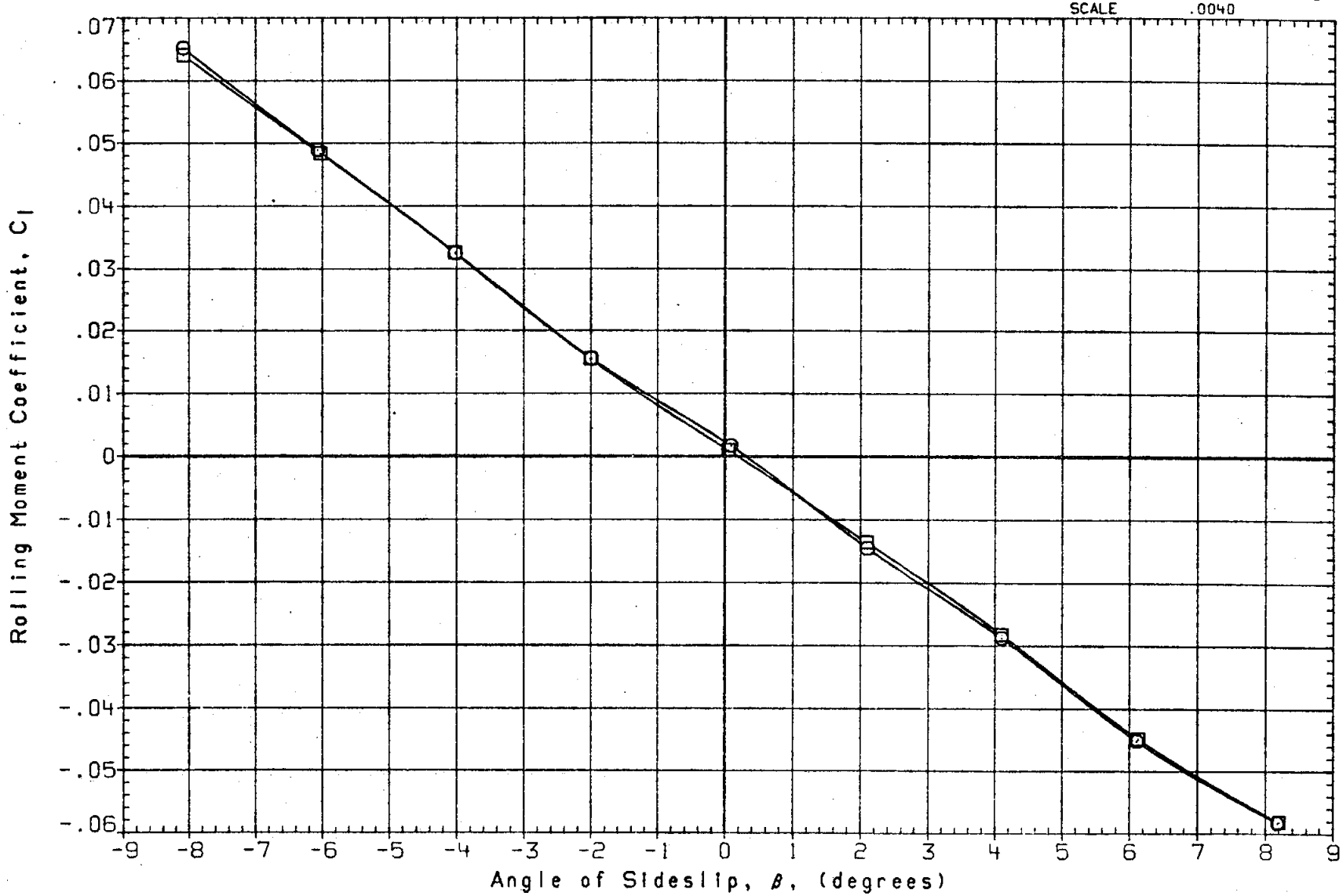

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	⊙	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

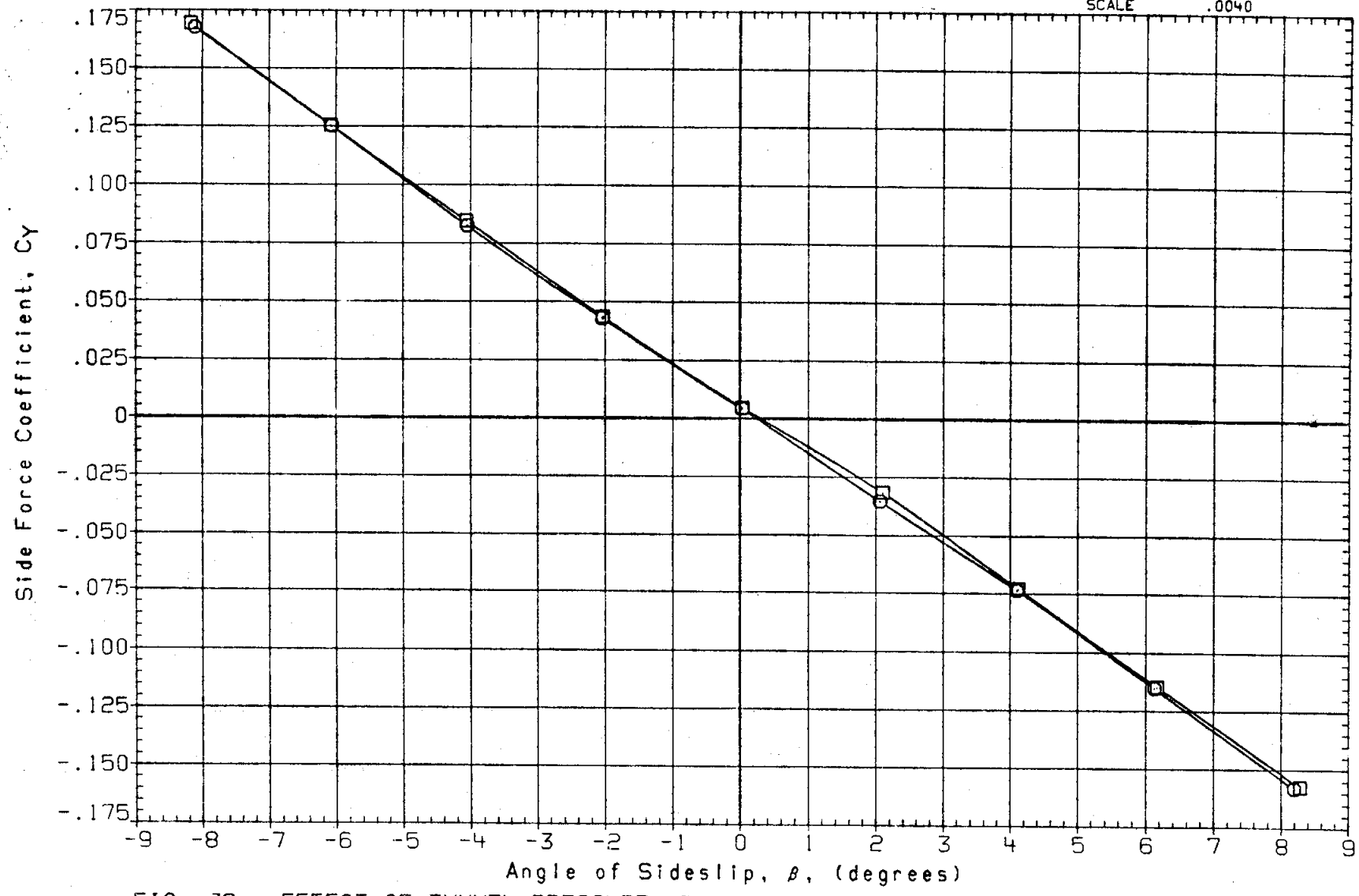

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

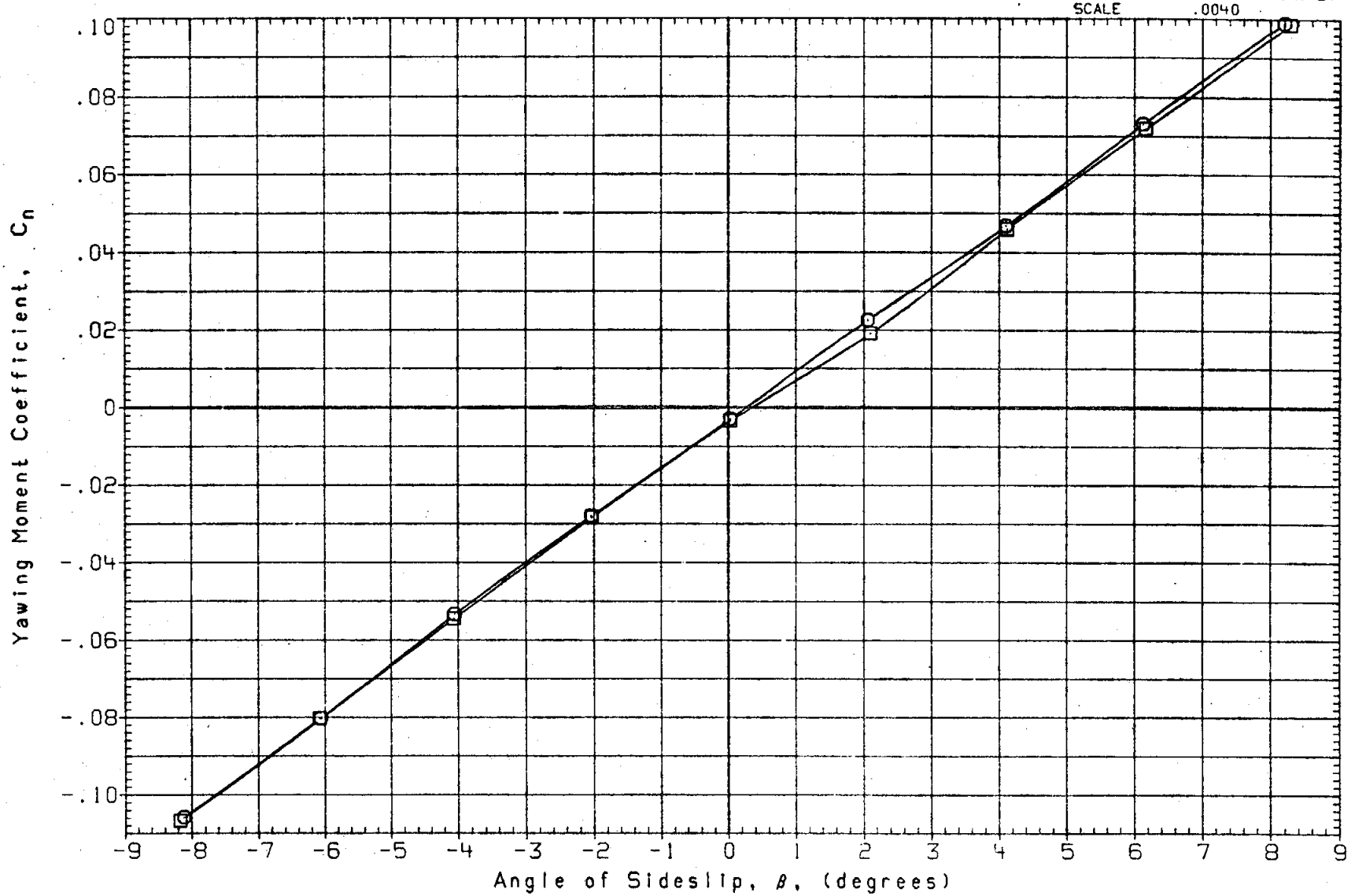

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

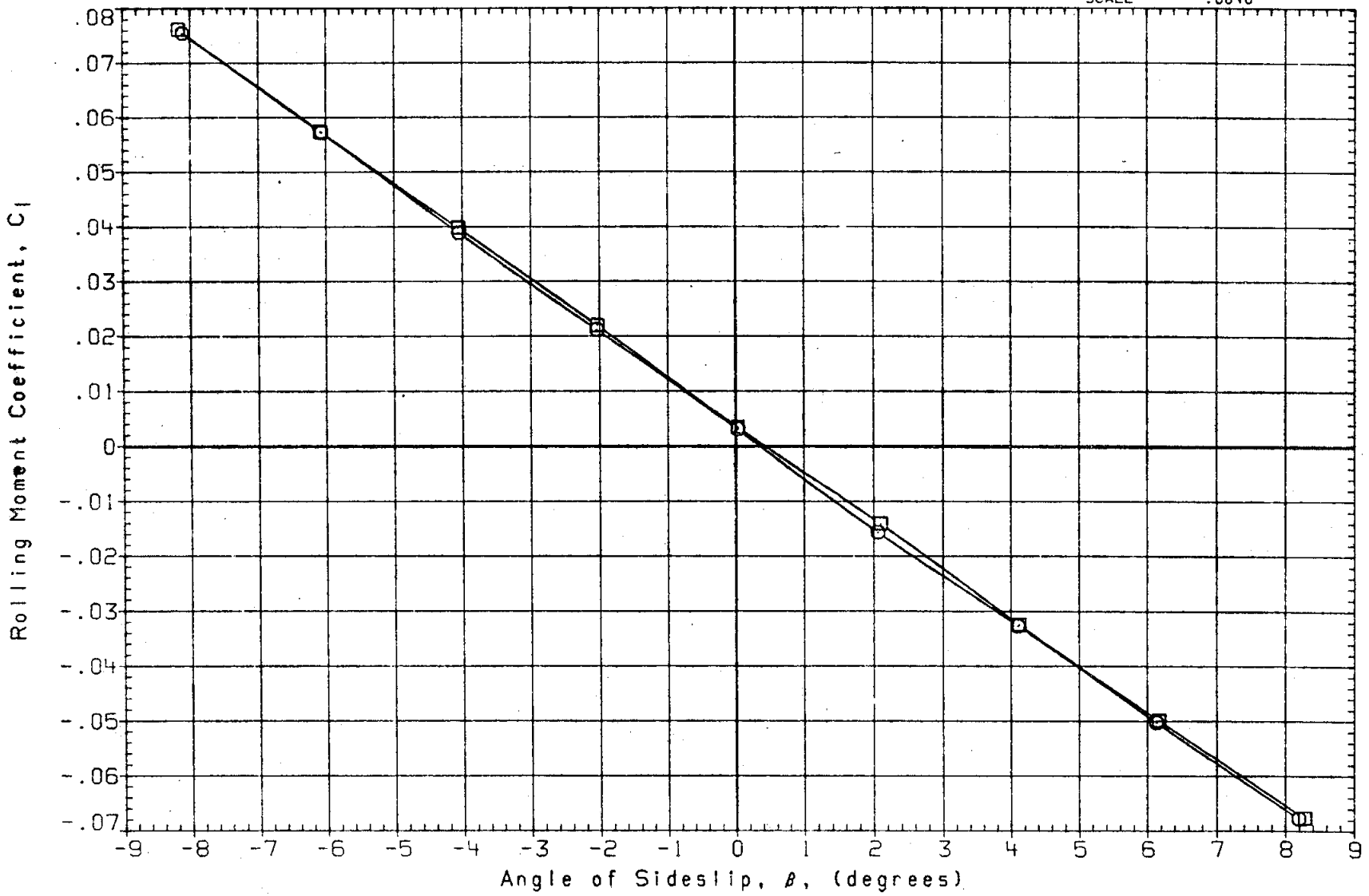

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

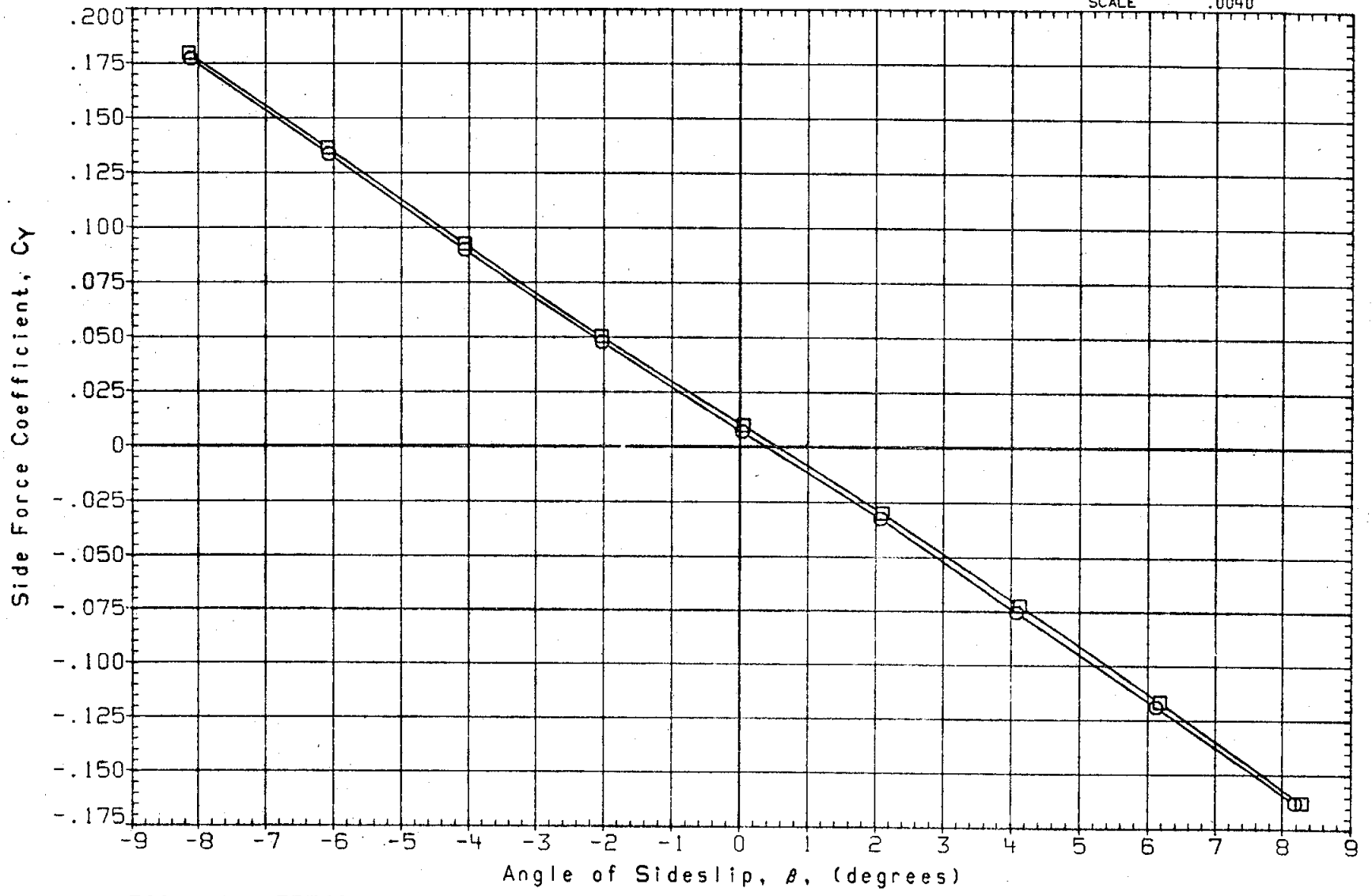

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

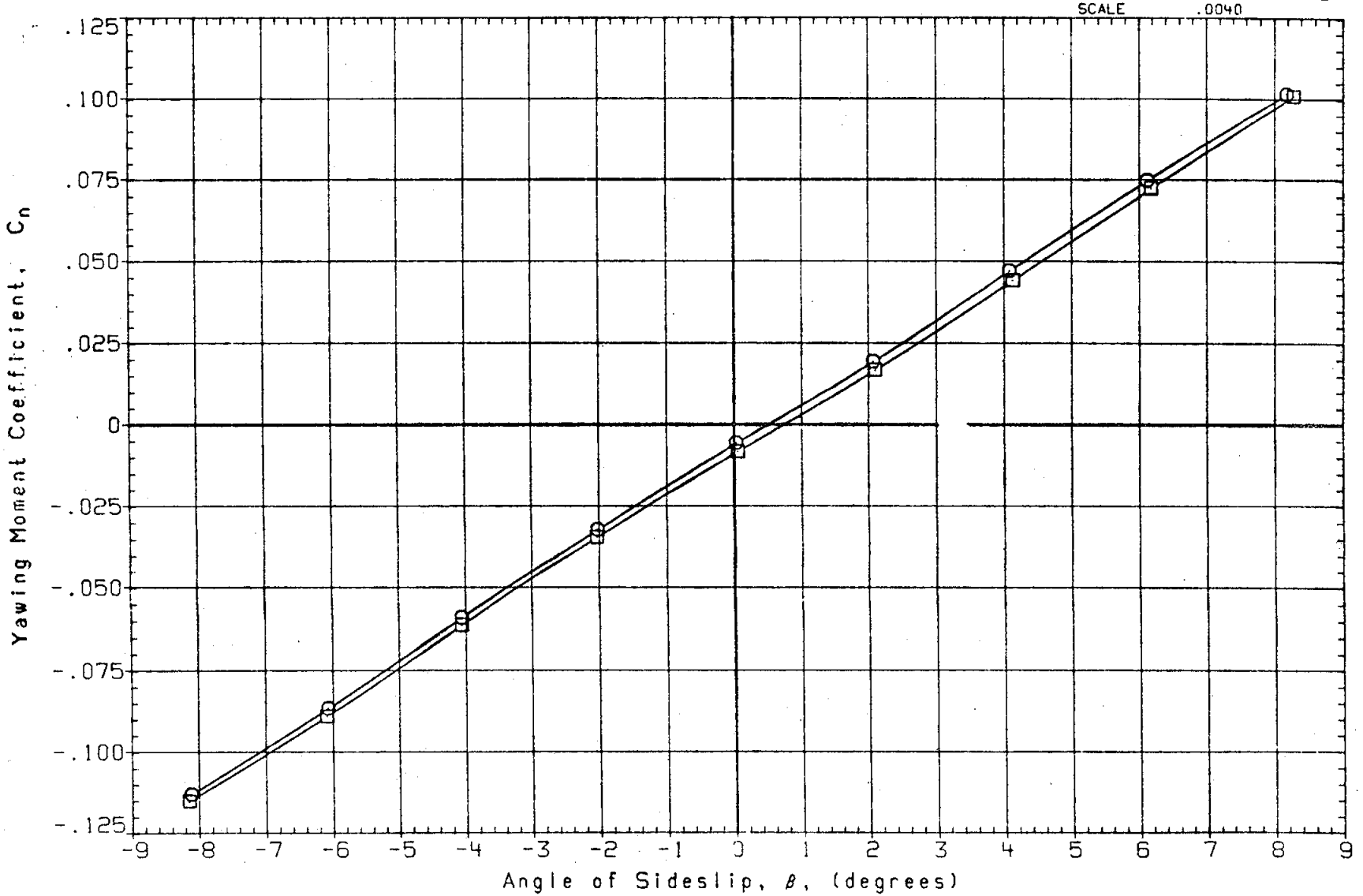

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

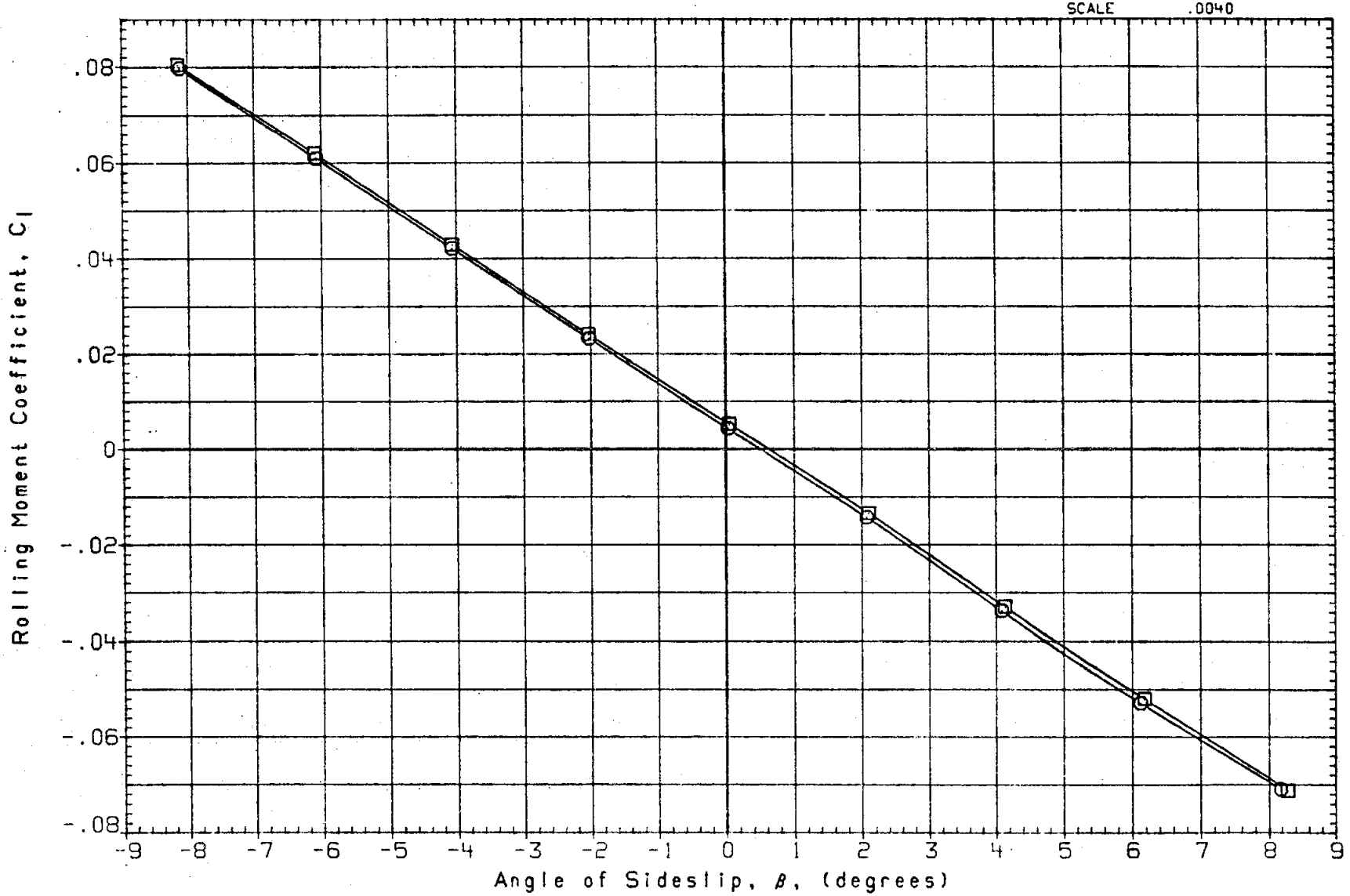

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

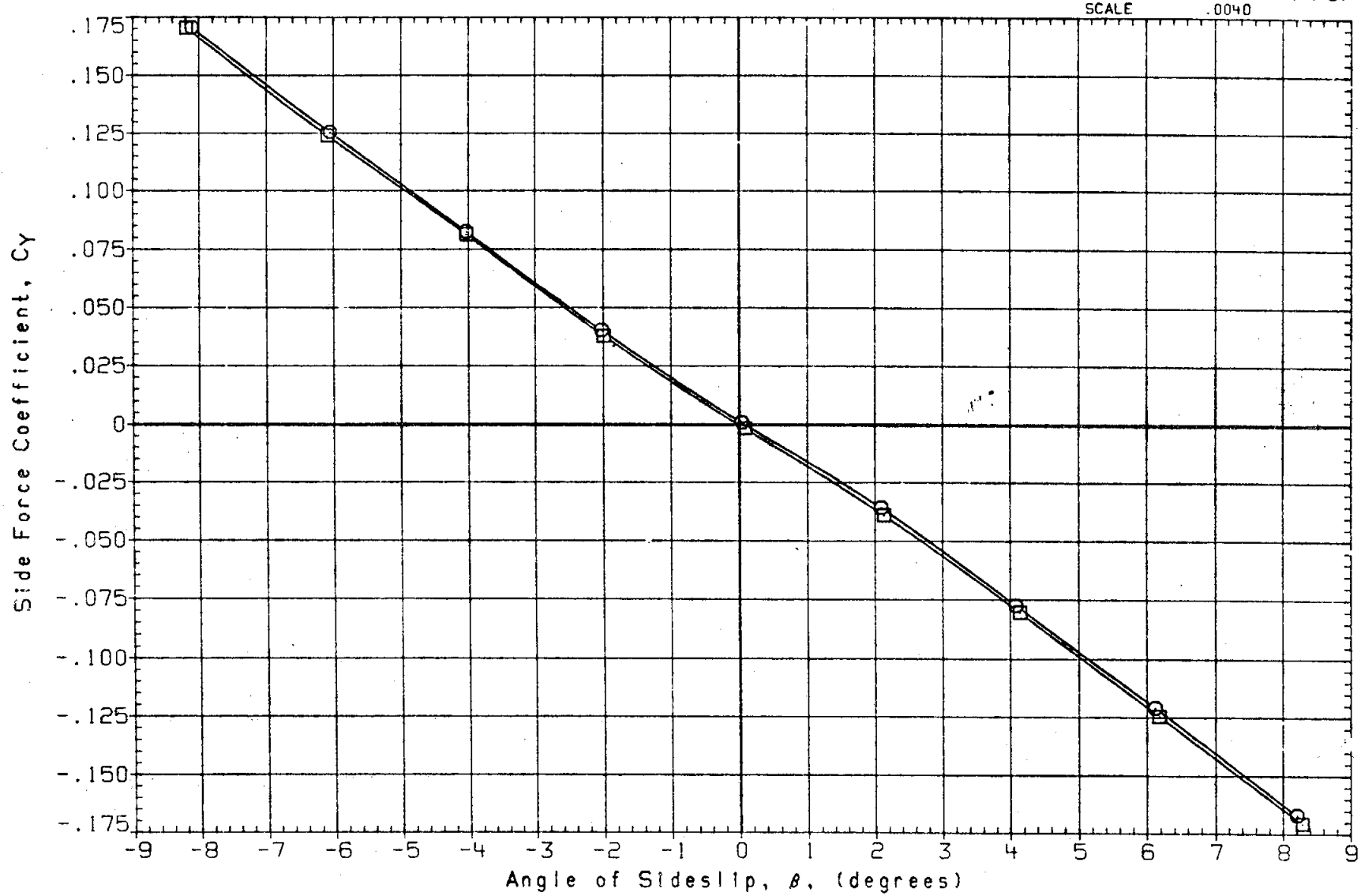

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

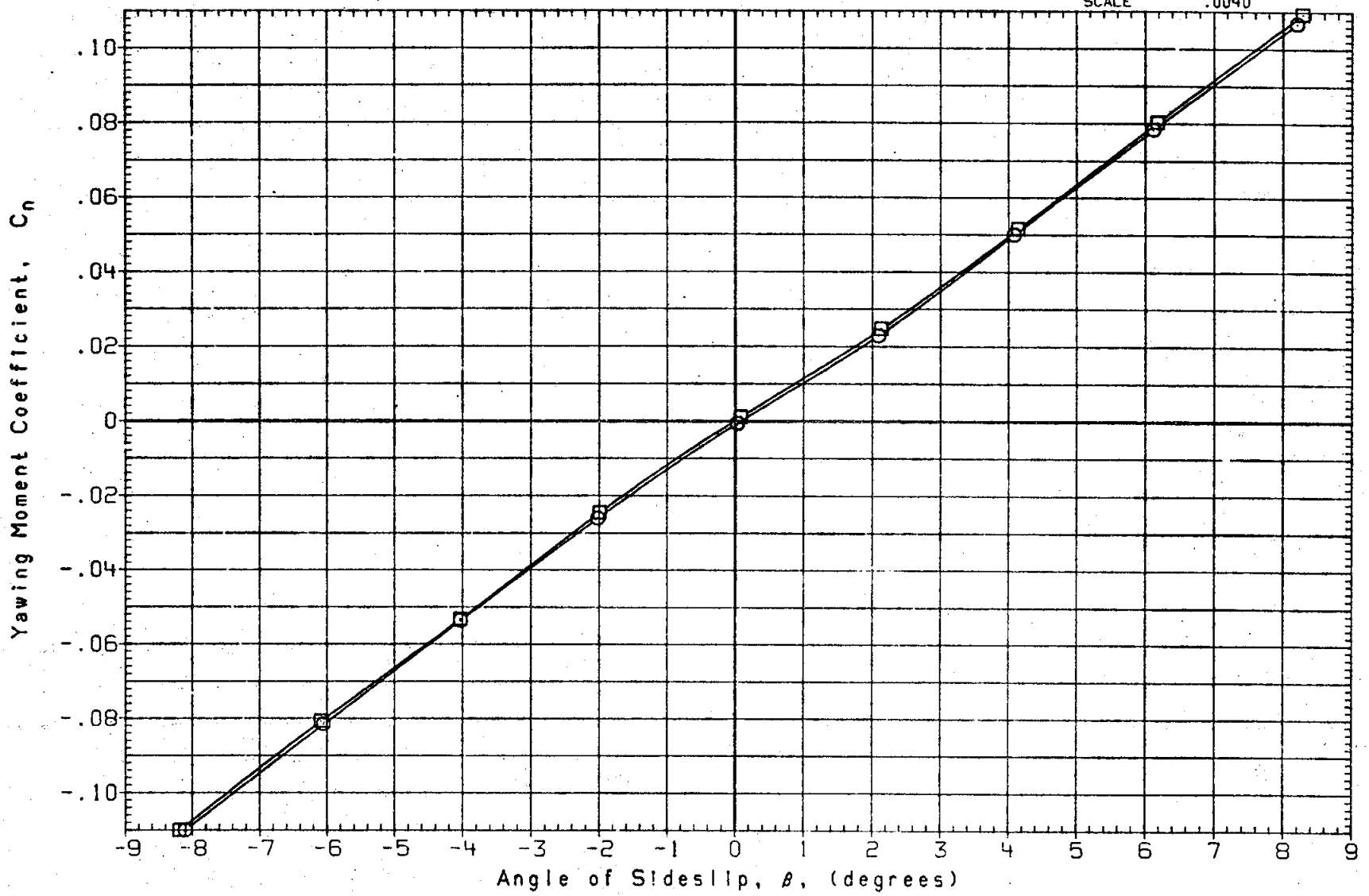

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
R1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

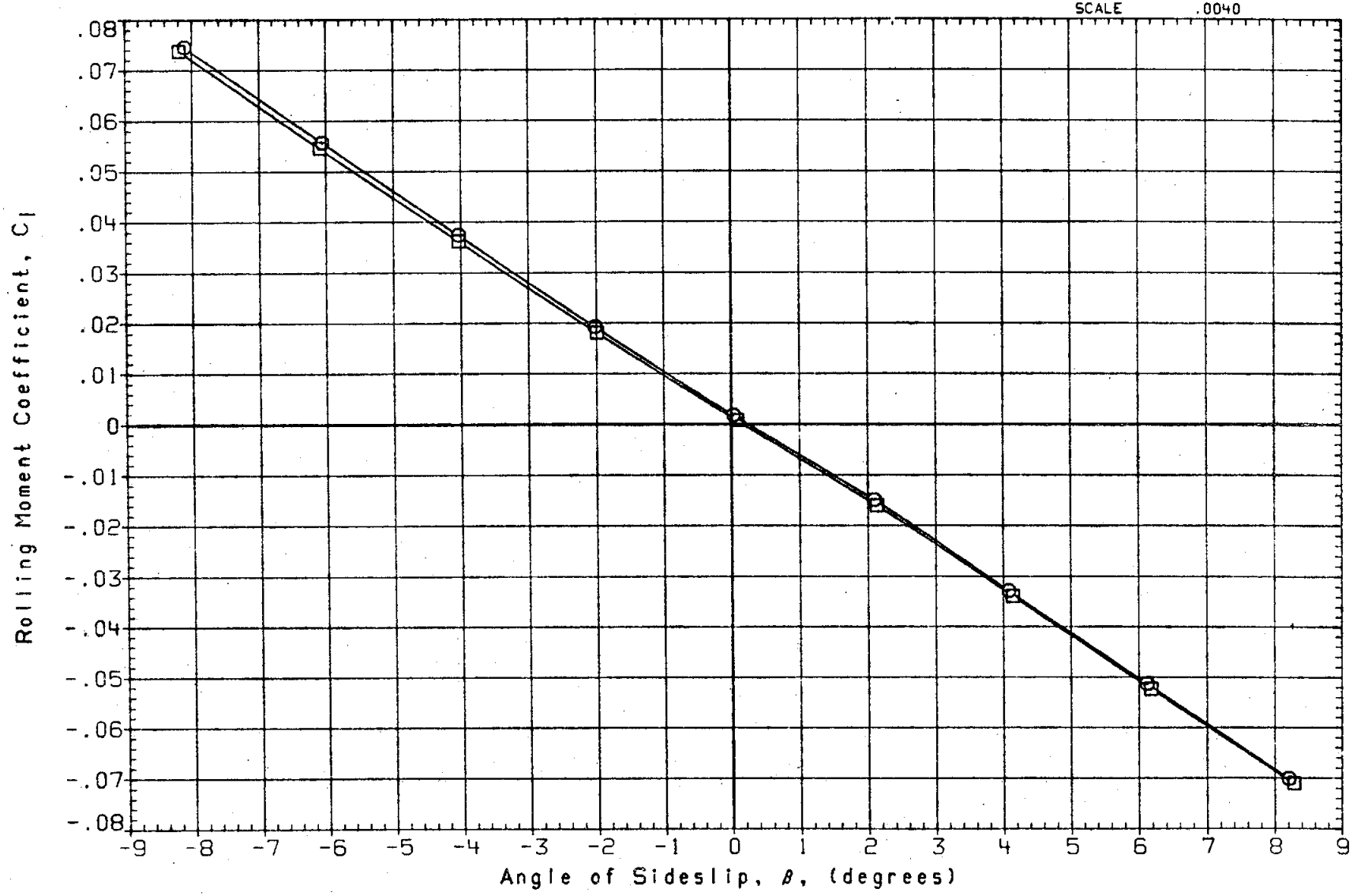

FIG. 36 EFFECT OF TUNNEL PRESSURE (RN) ON LAUNCH VEHICLE IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

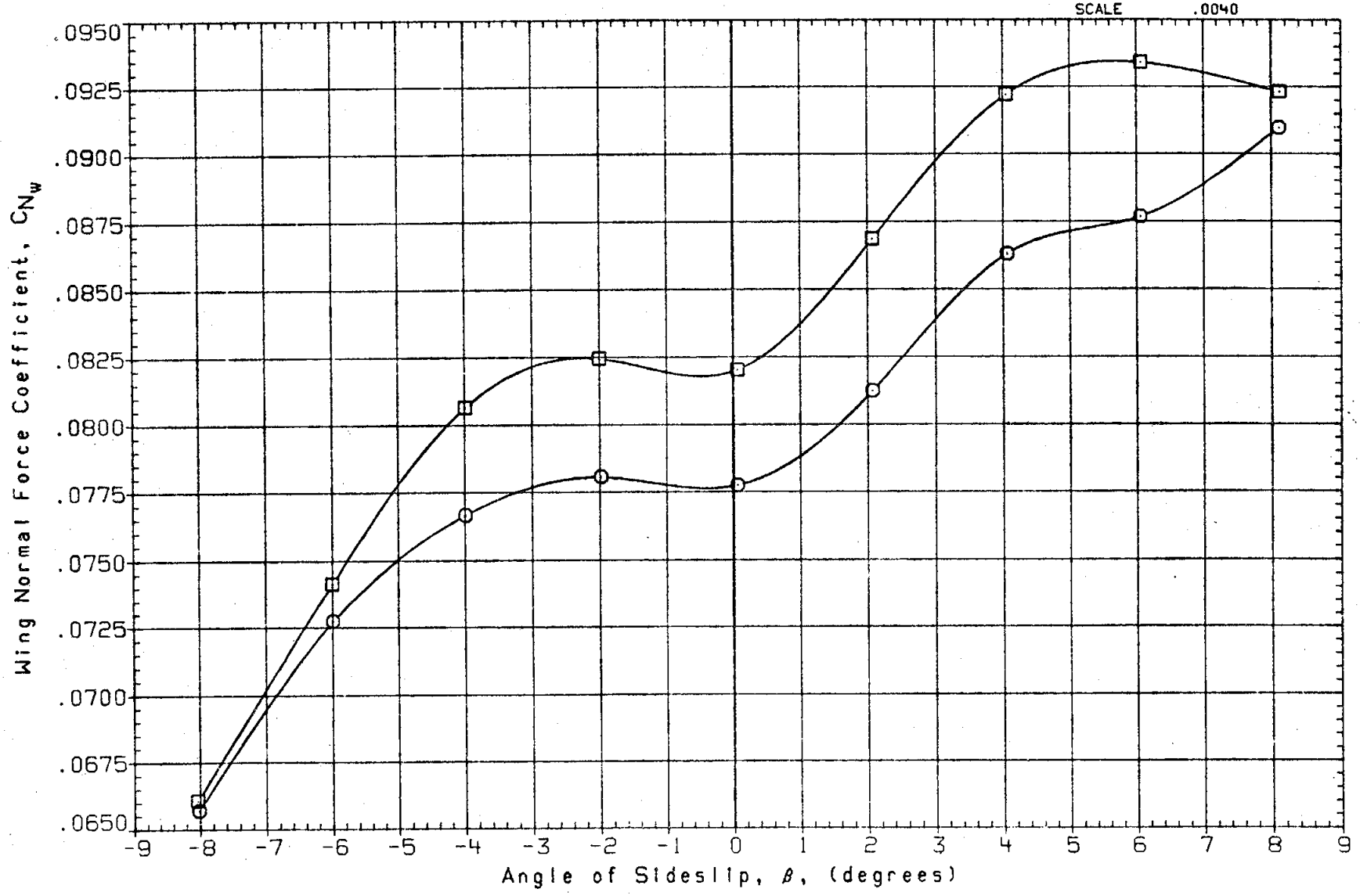

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

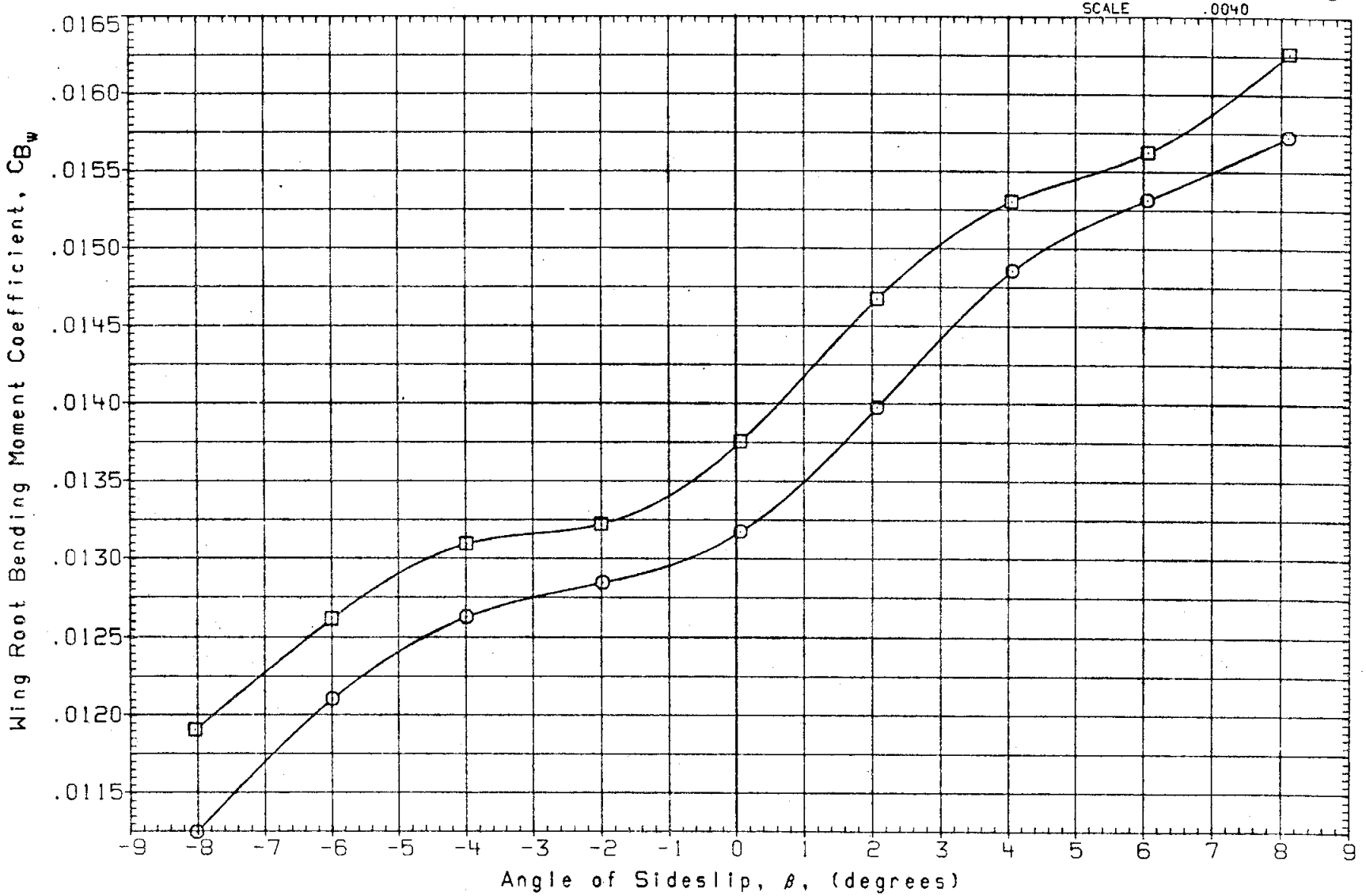

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

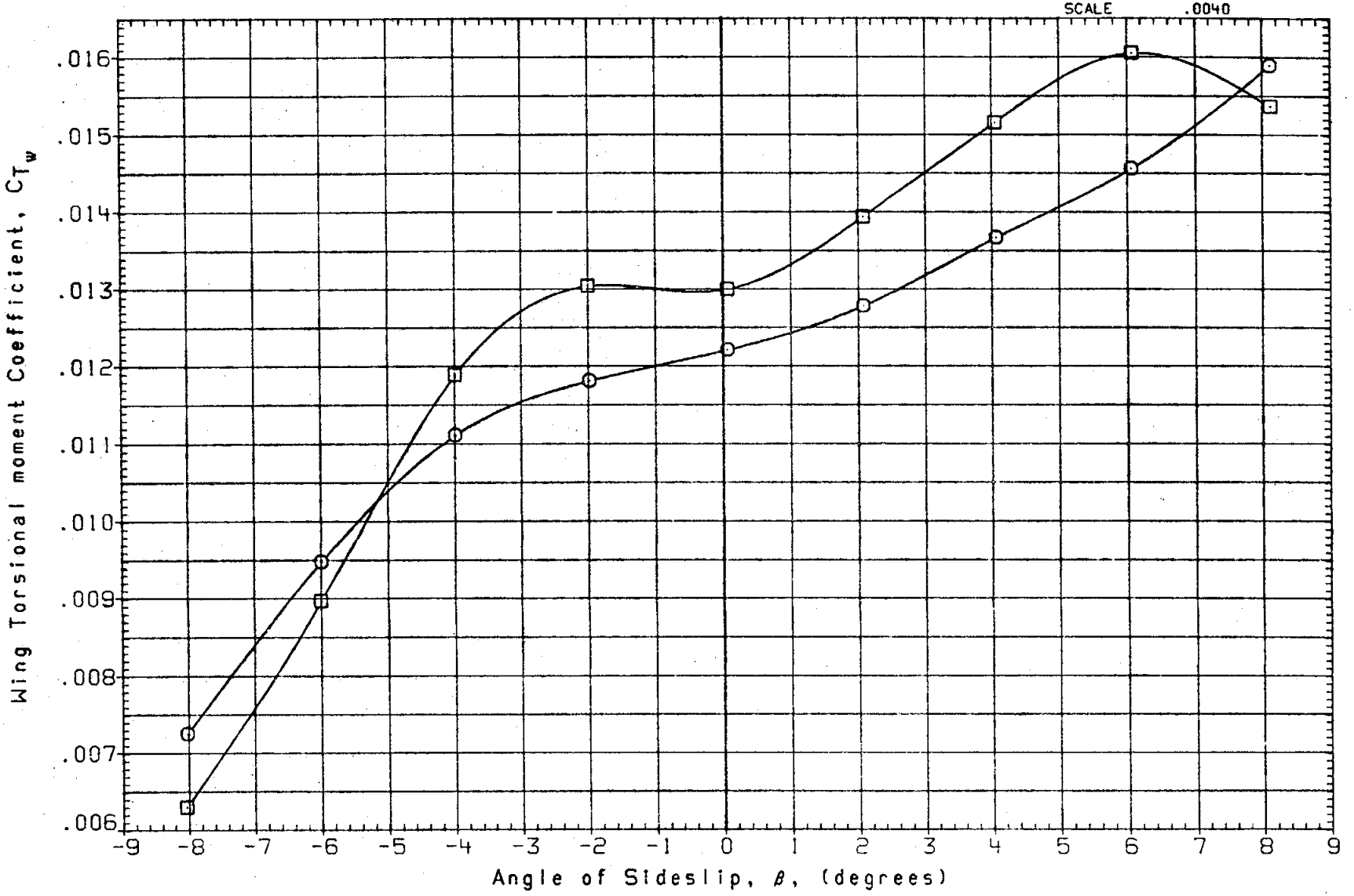

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

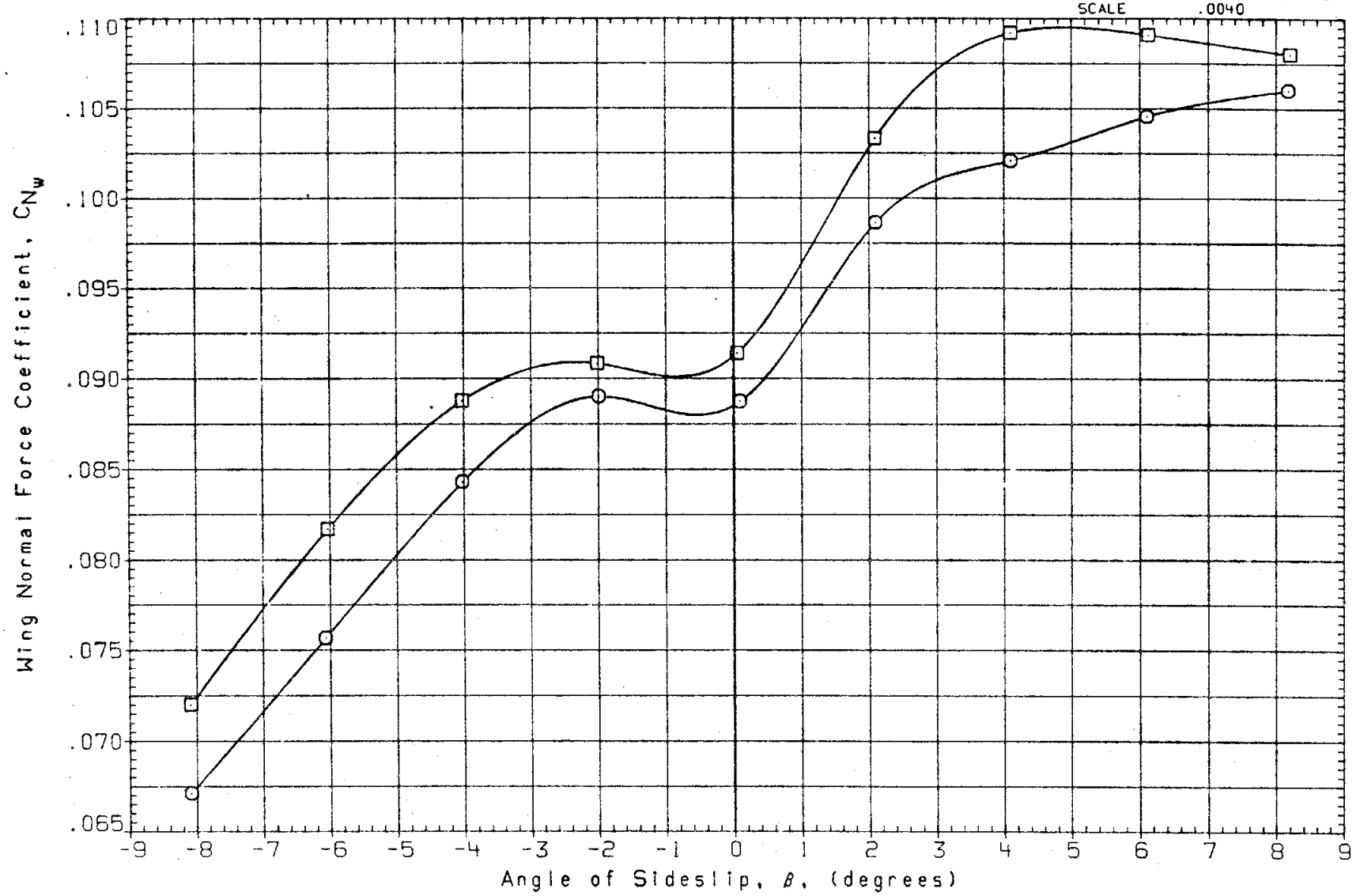

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S12009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT353	22.000	.000	90.000
S12015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT353	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2890.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

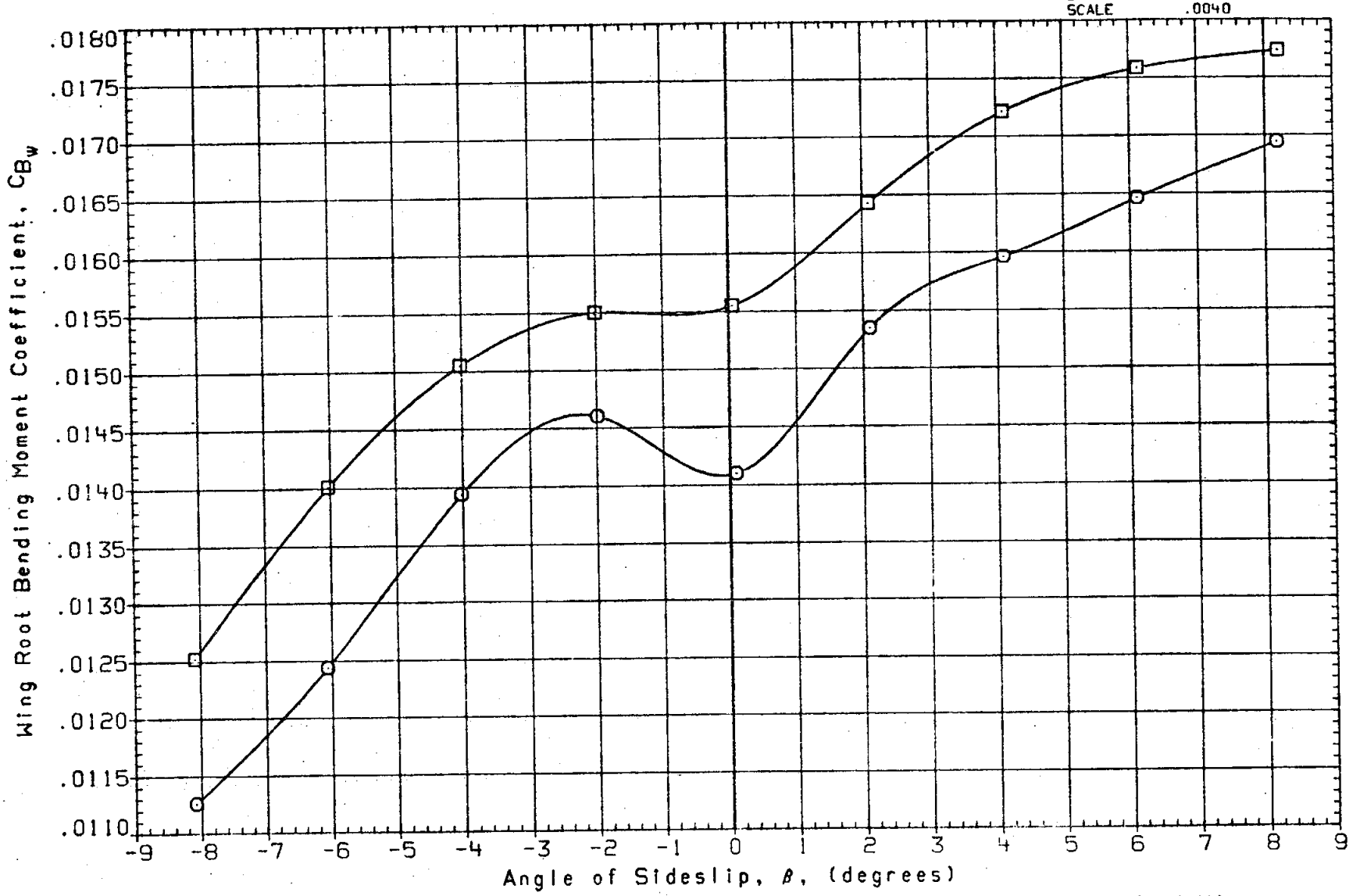

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

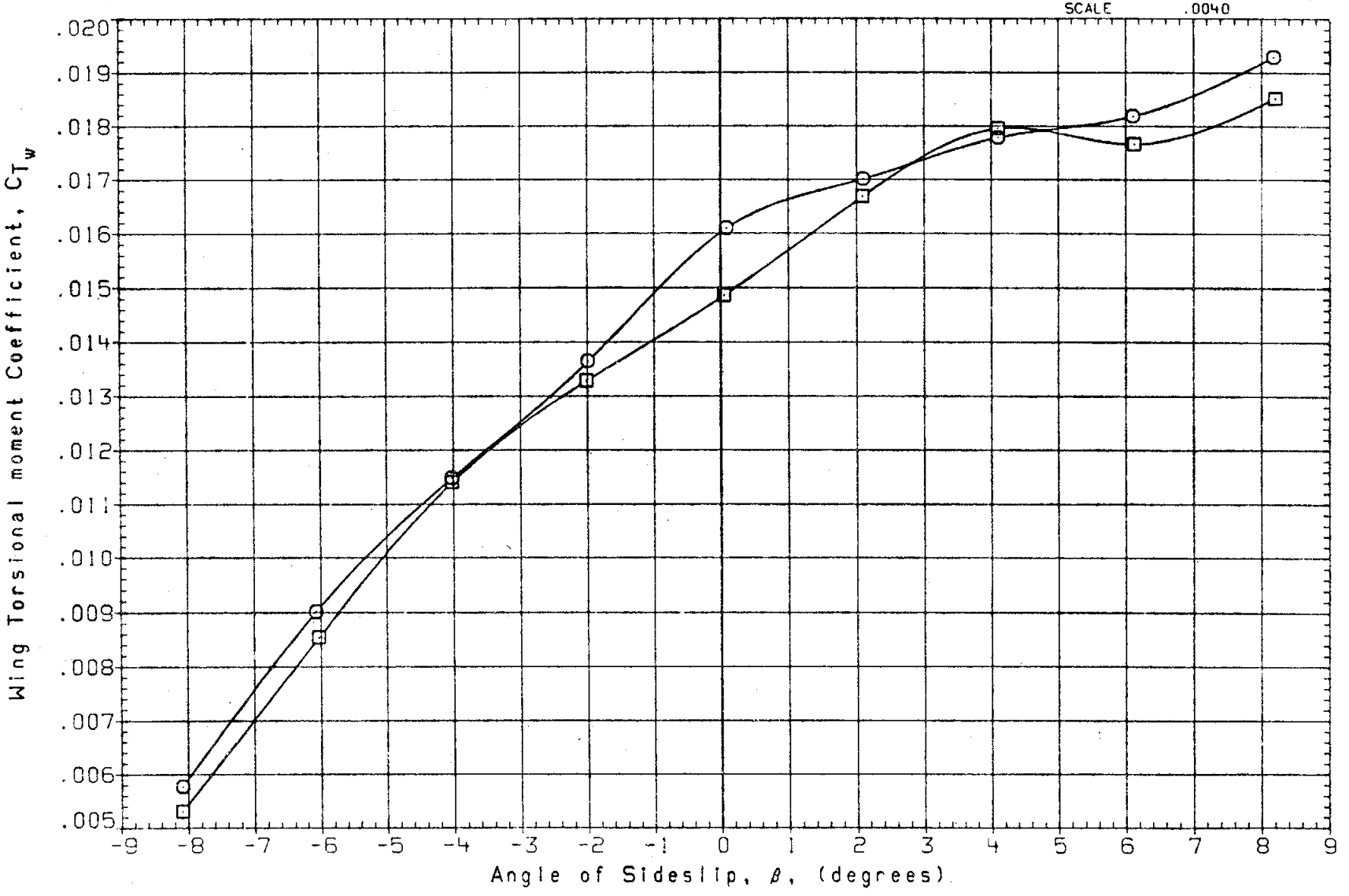

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

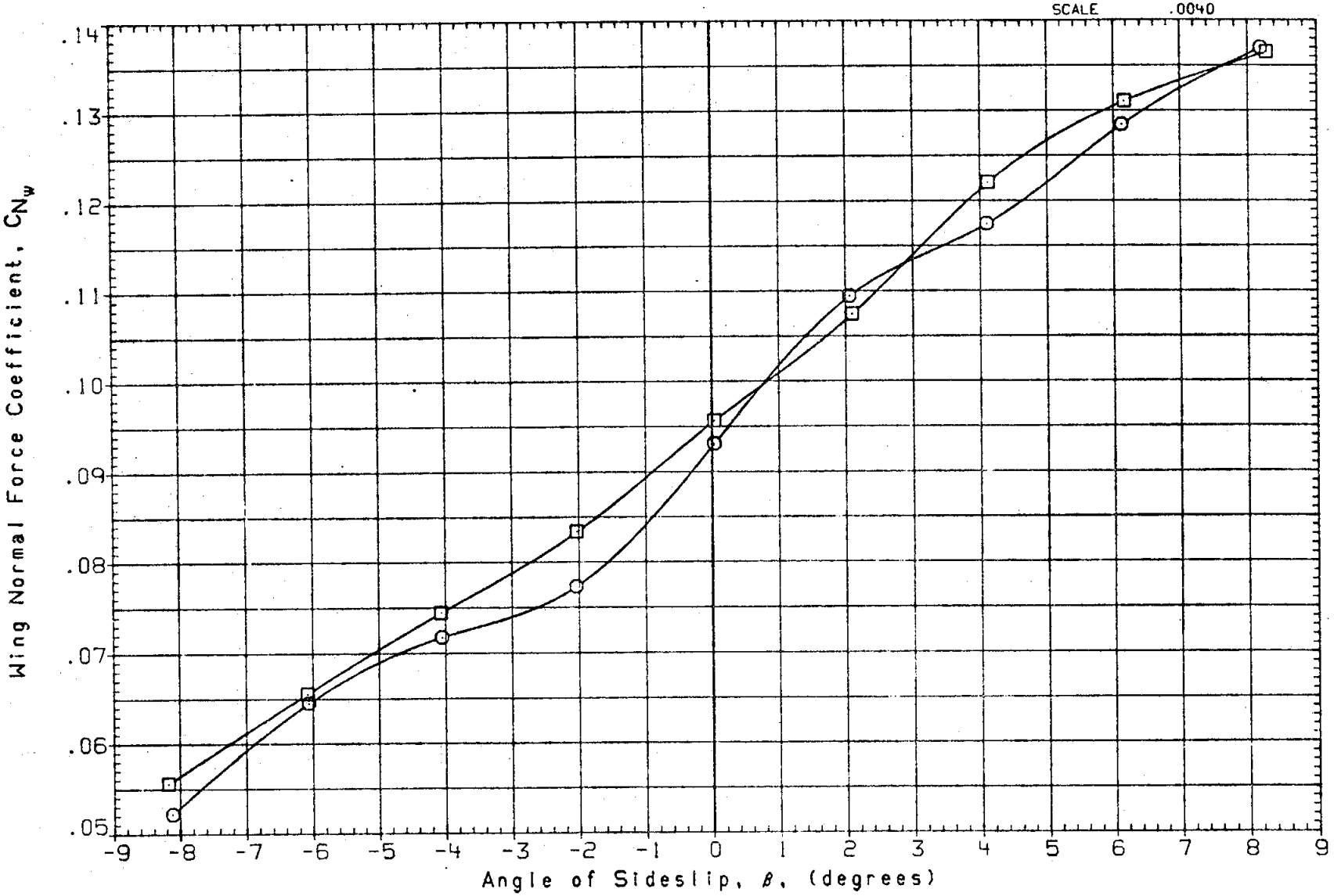

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA26 (MSFC TWT 656) 02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

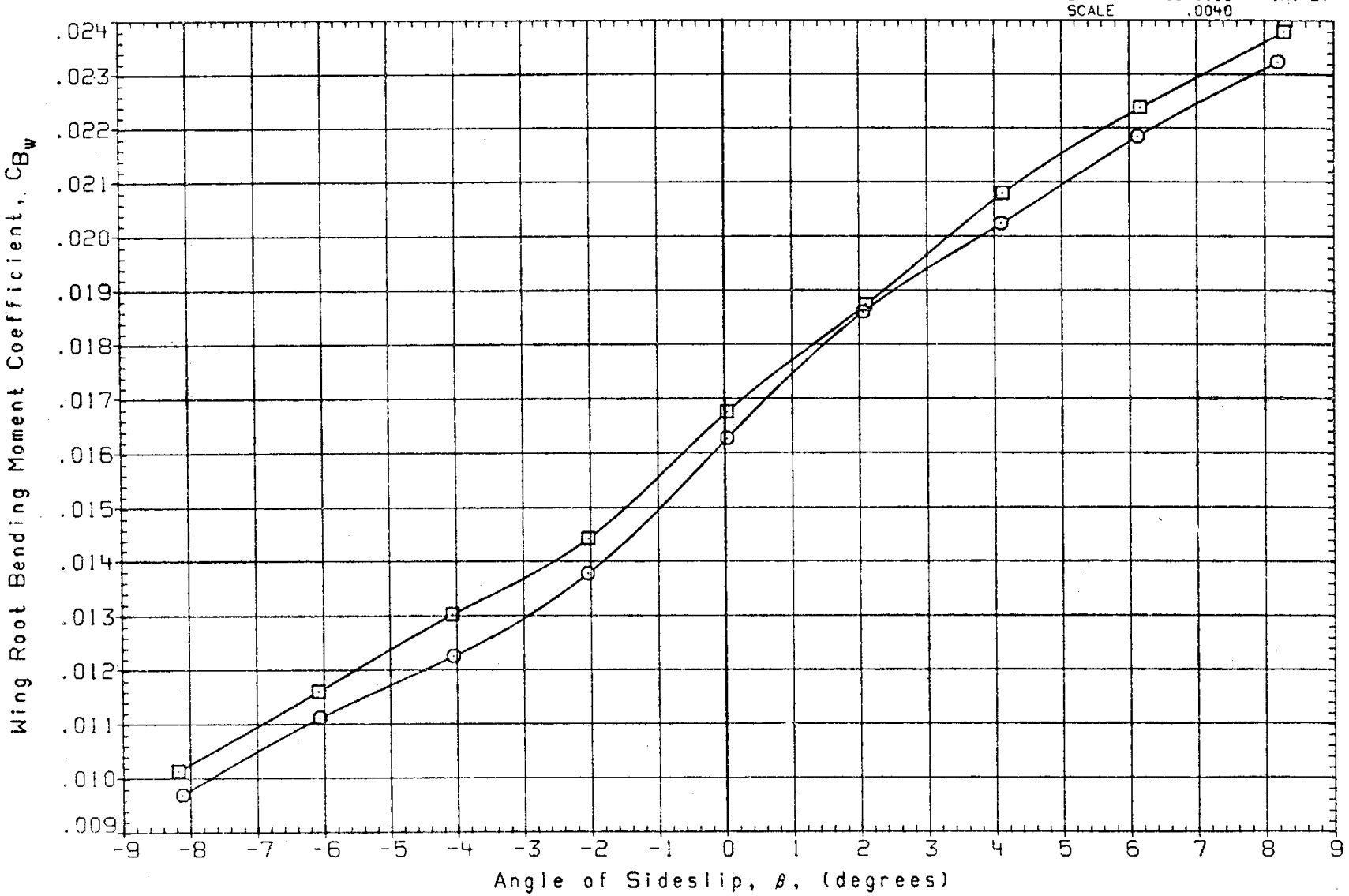

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

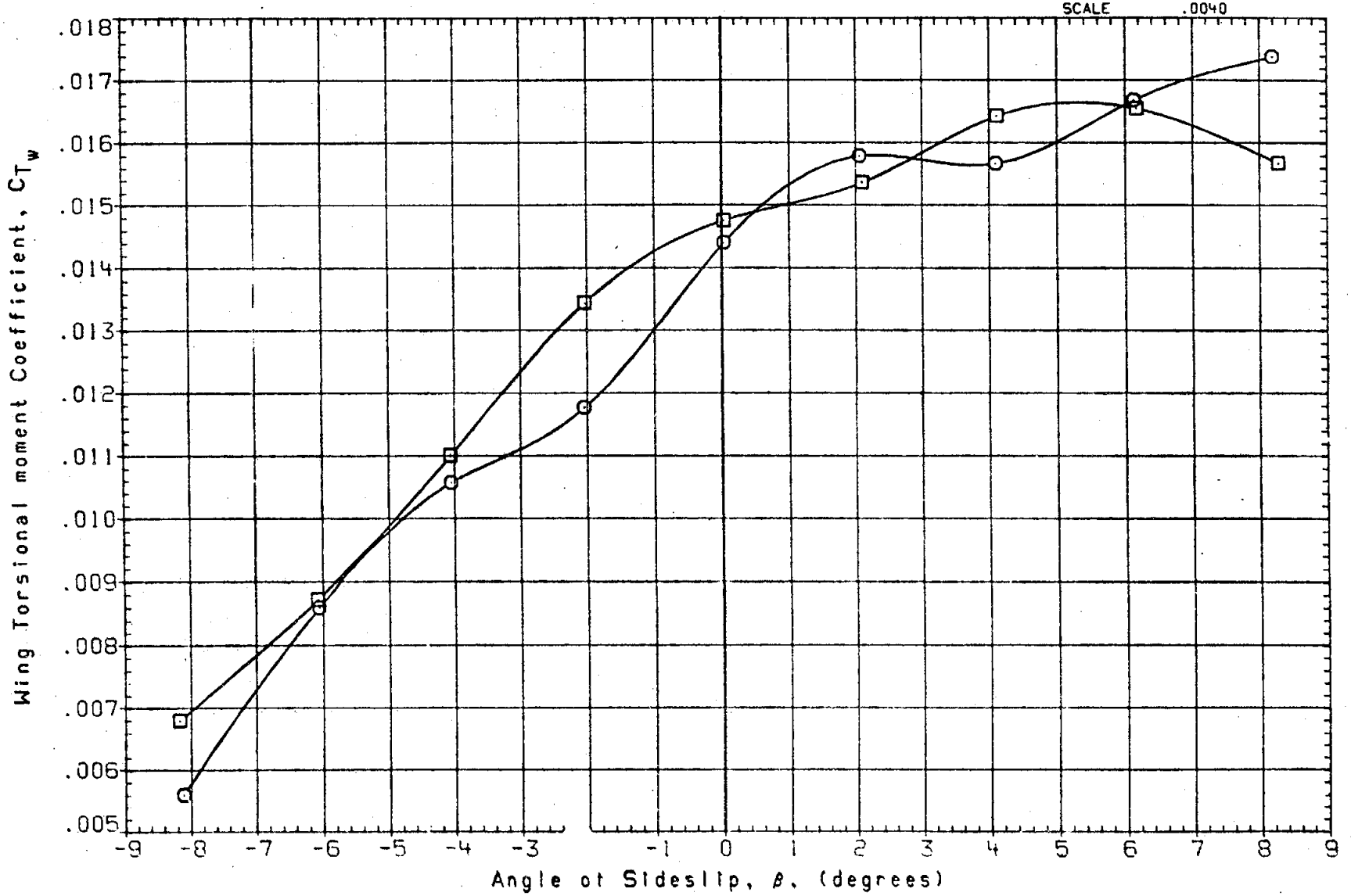

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

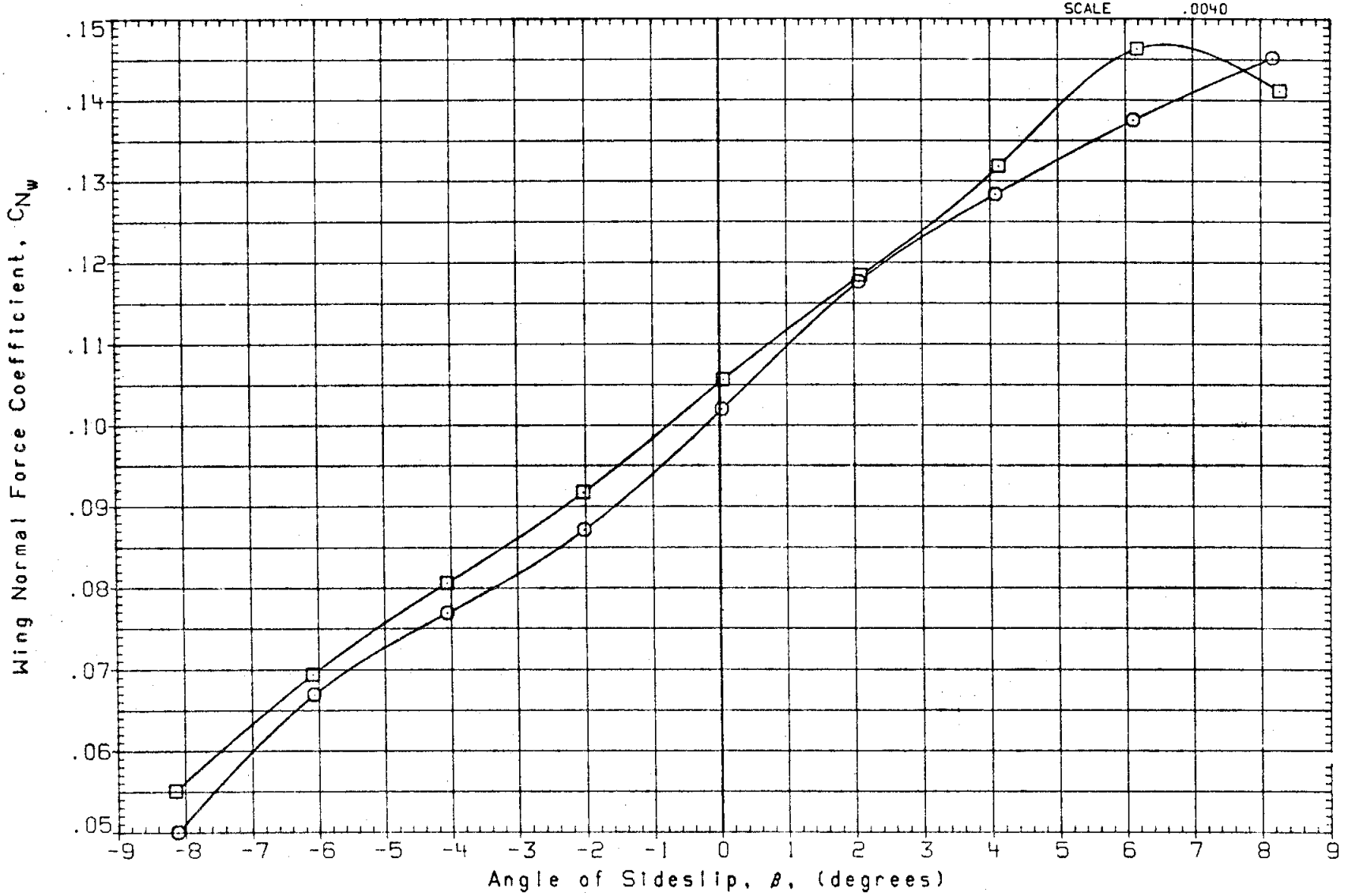

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

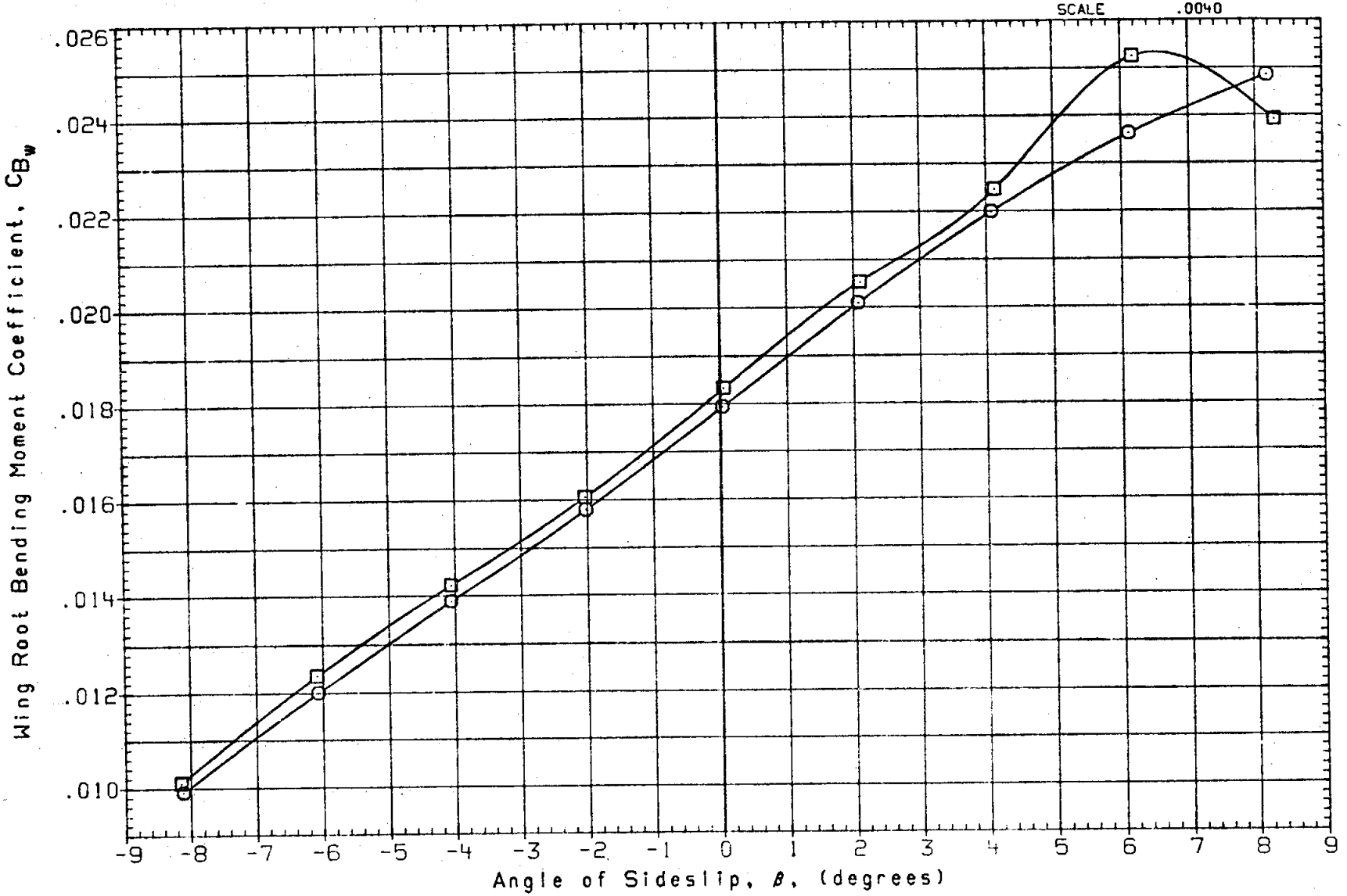

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

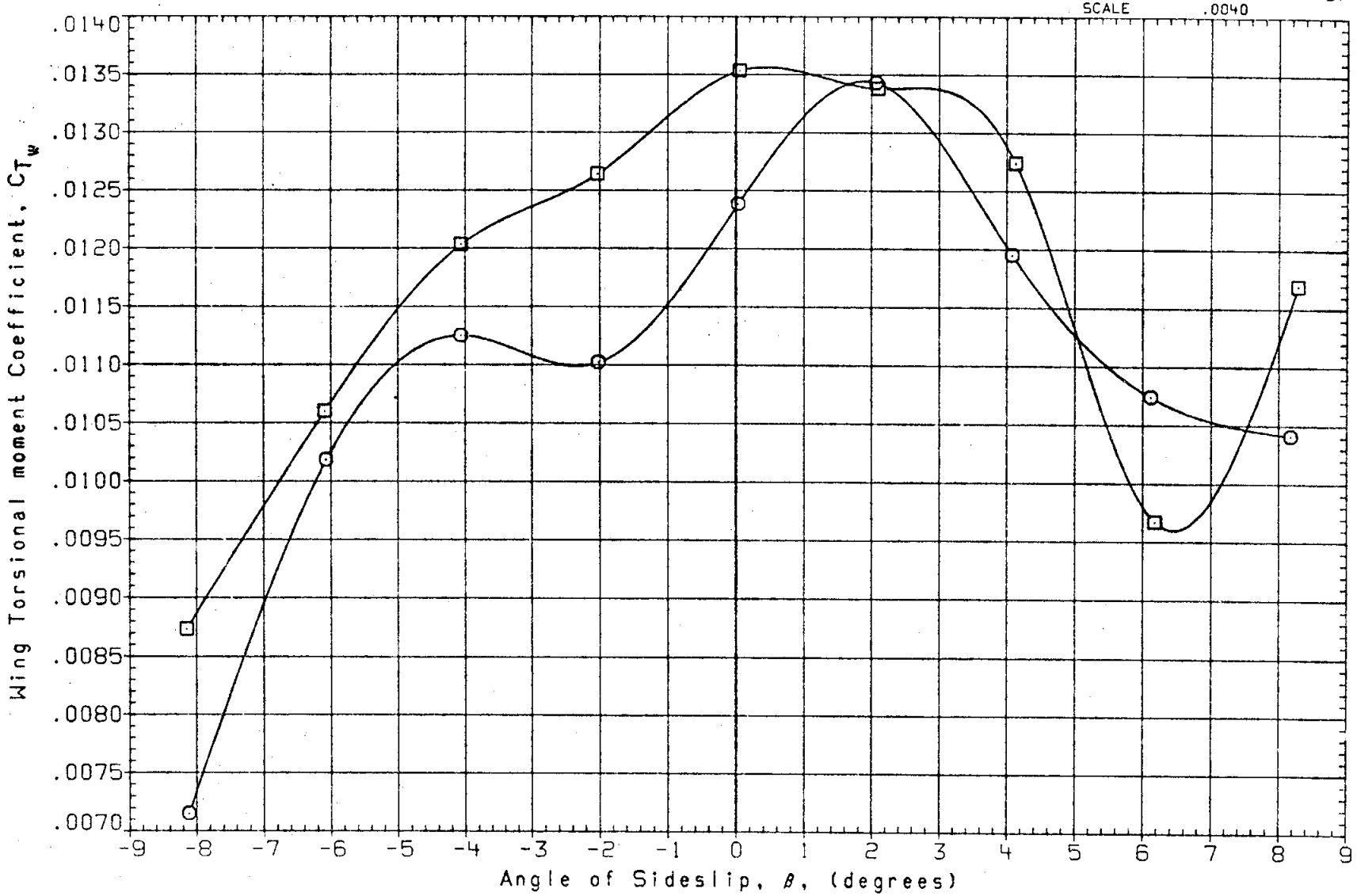

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

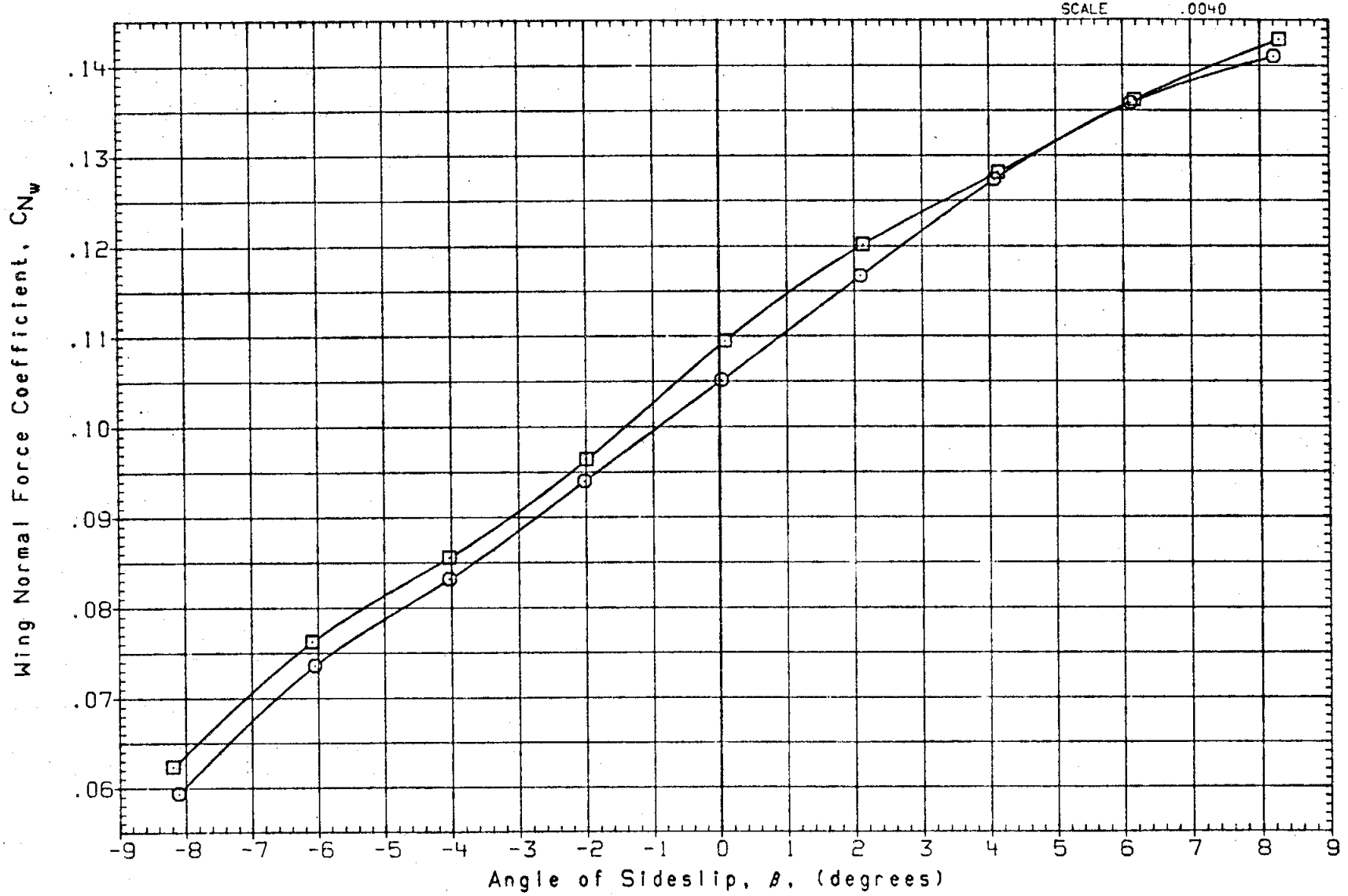

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

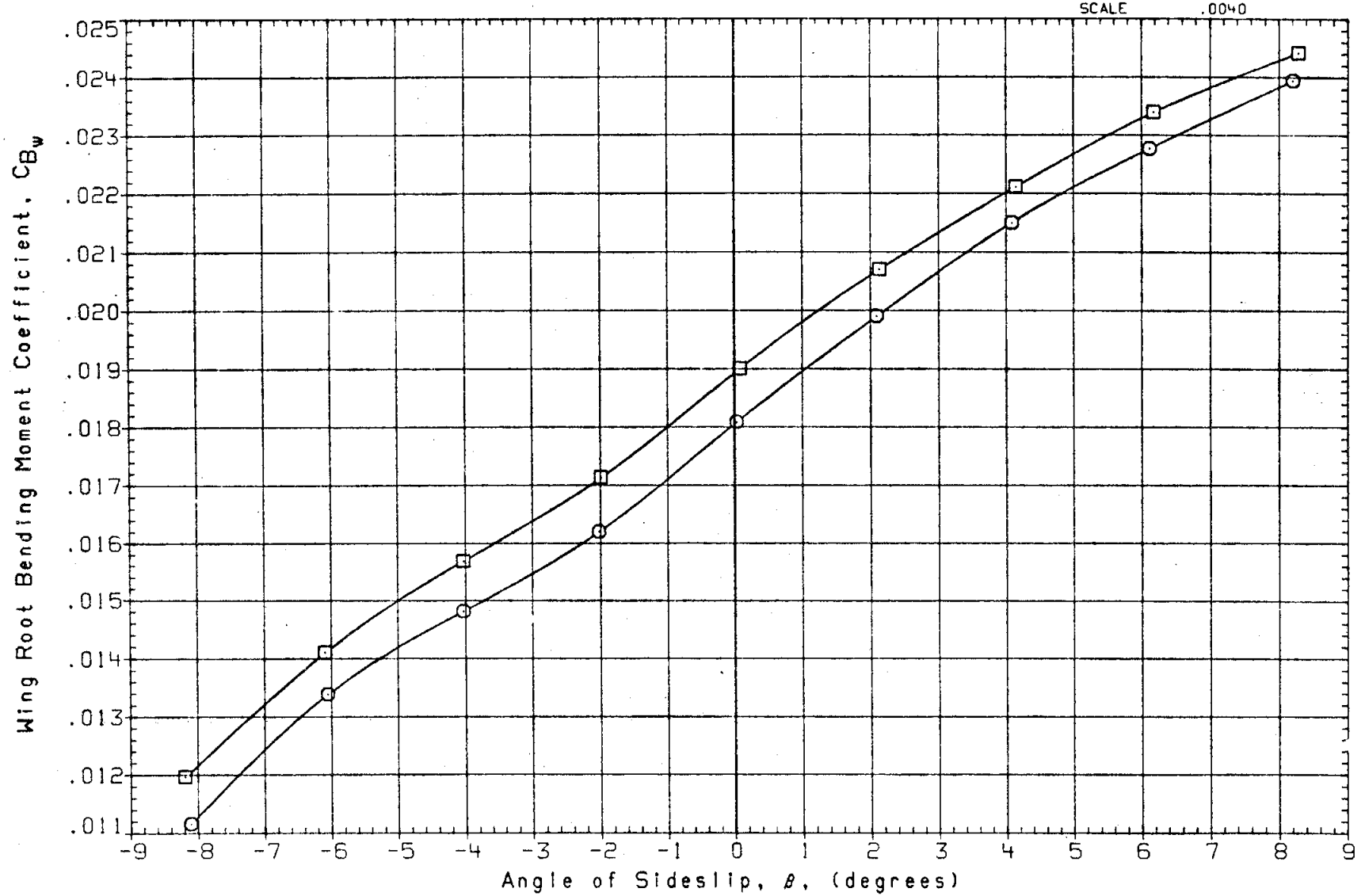

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

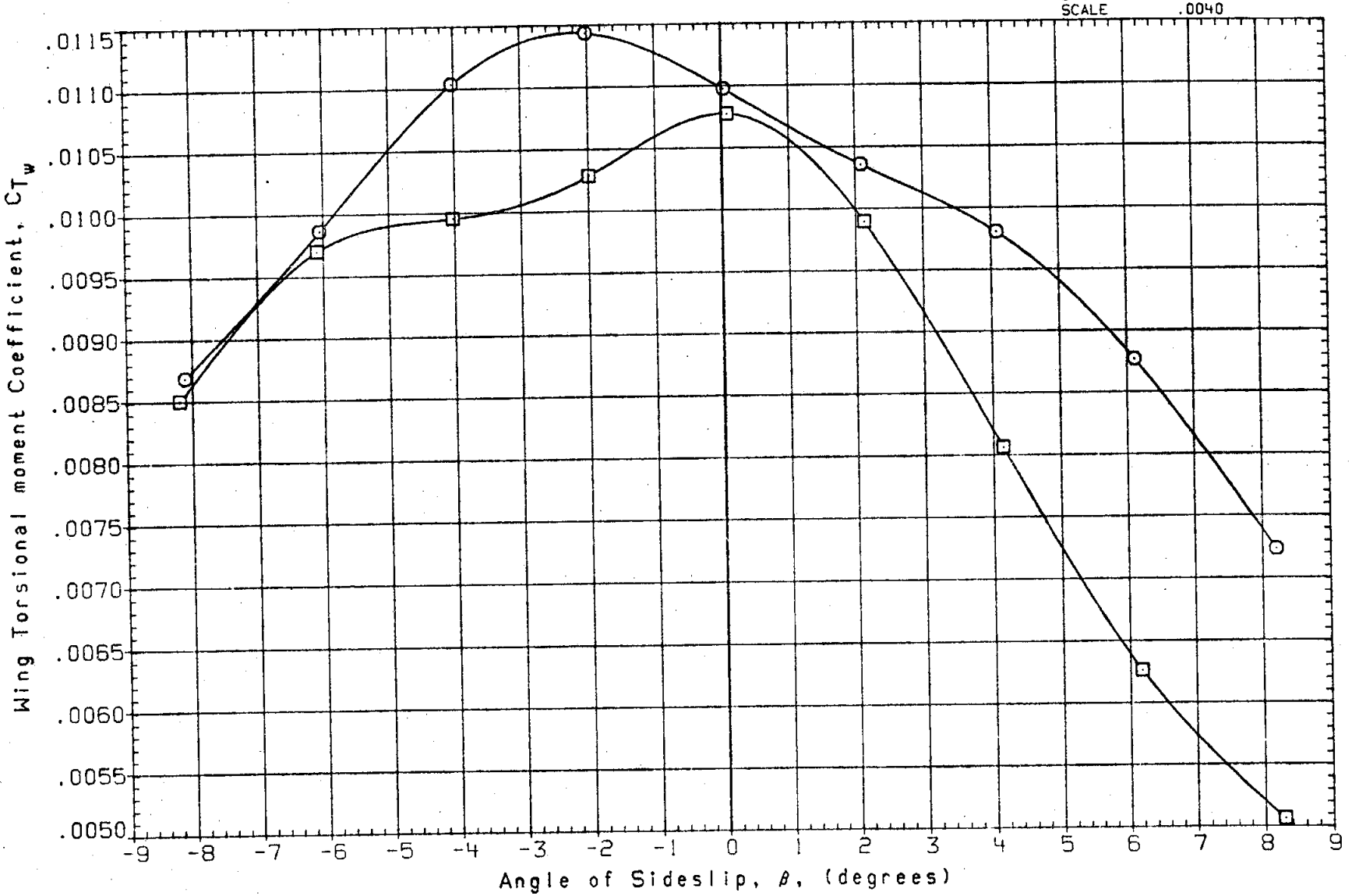

FIG. 37 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

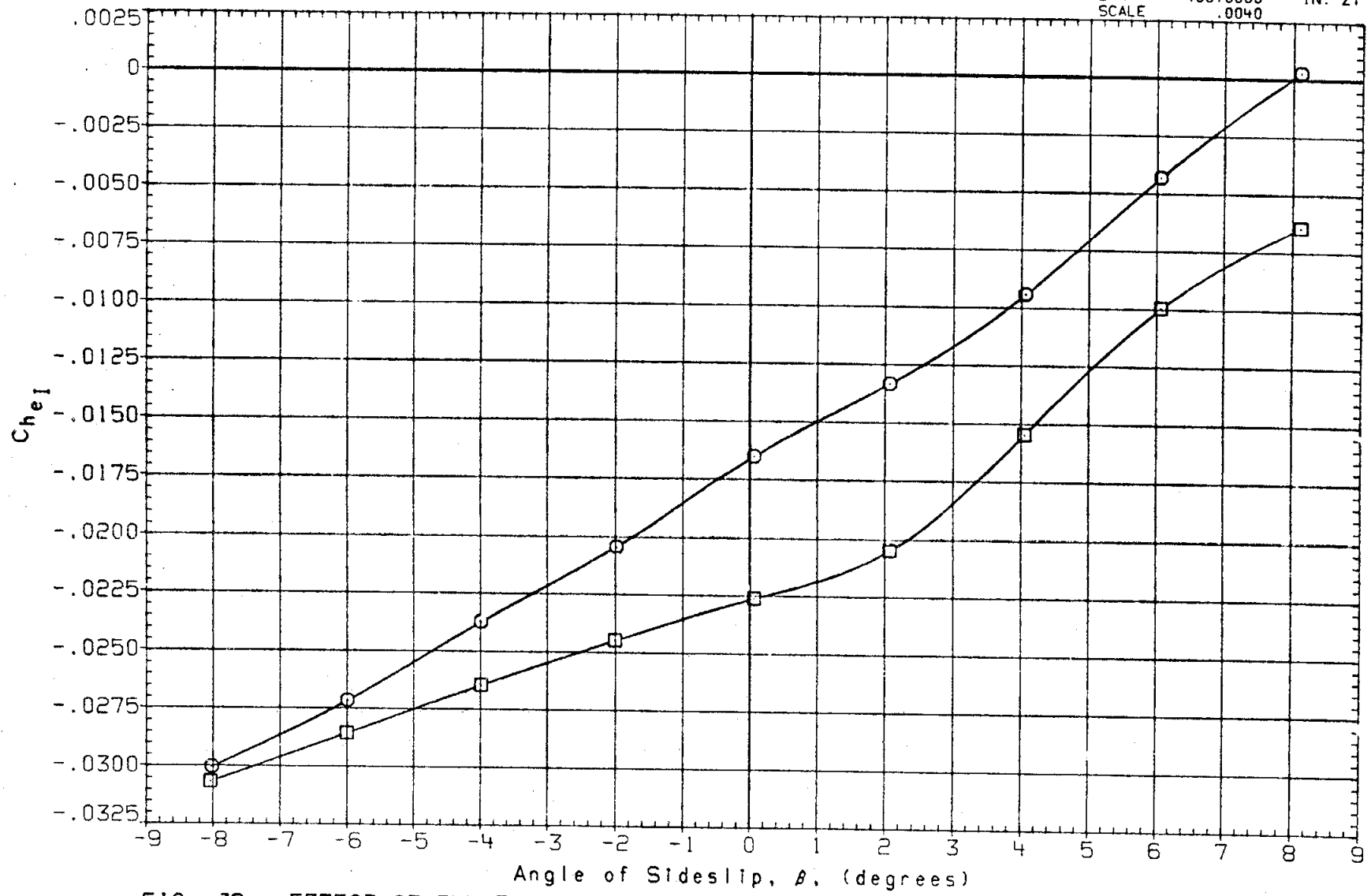

FIG. 38 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

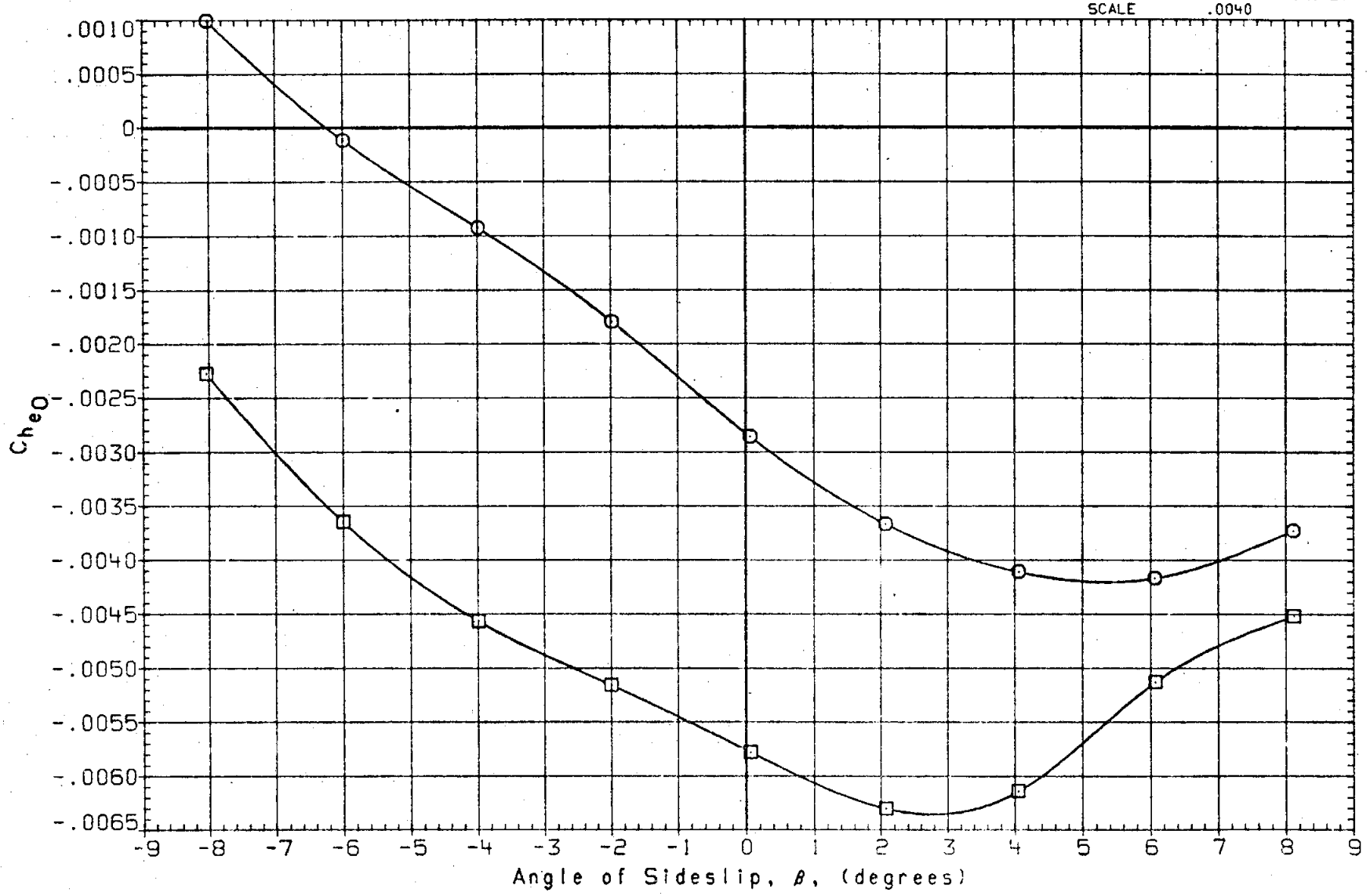

FIG. 38 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

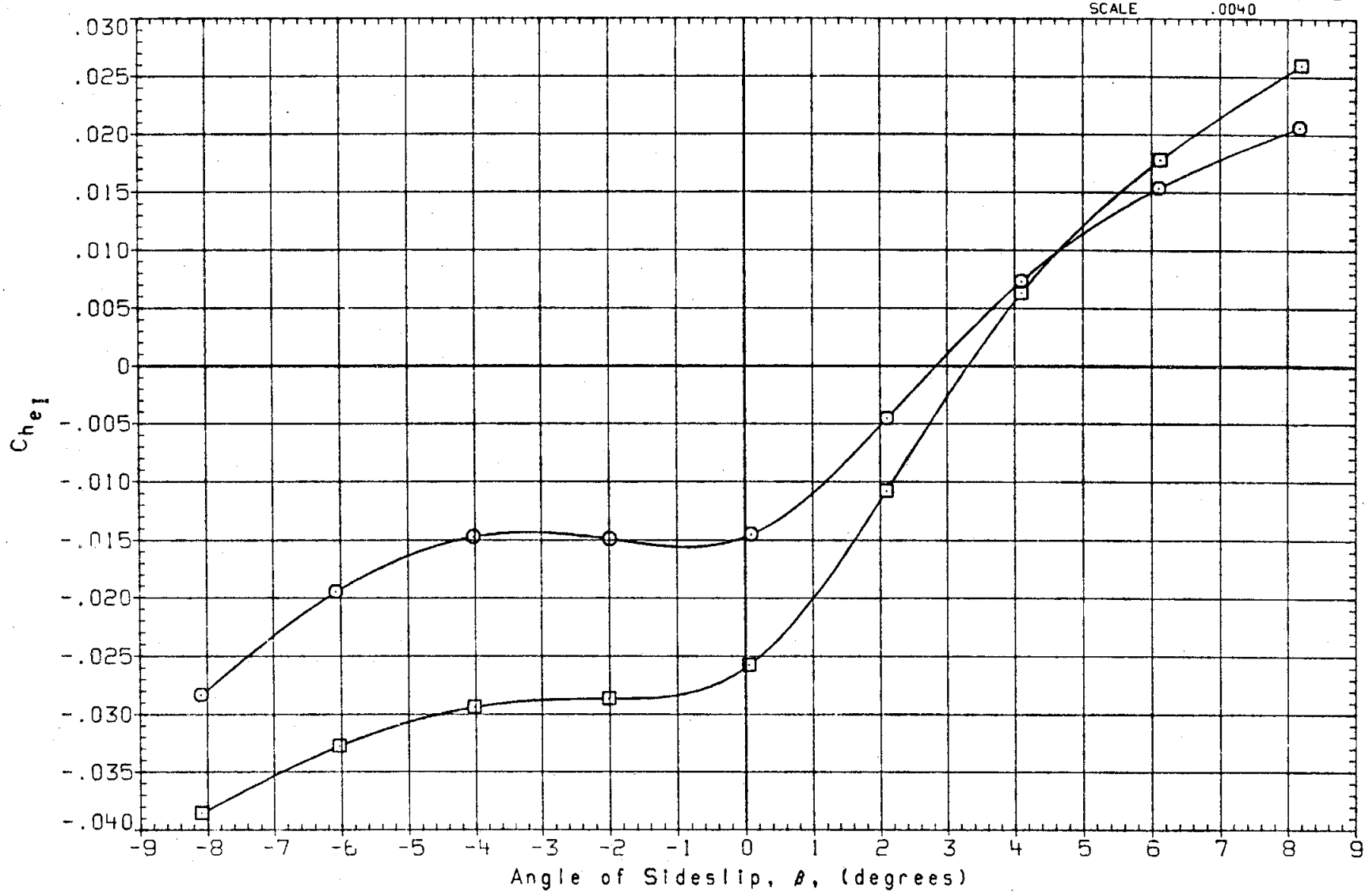

FIG. 38 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

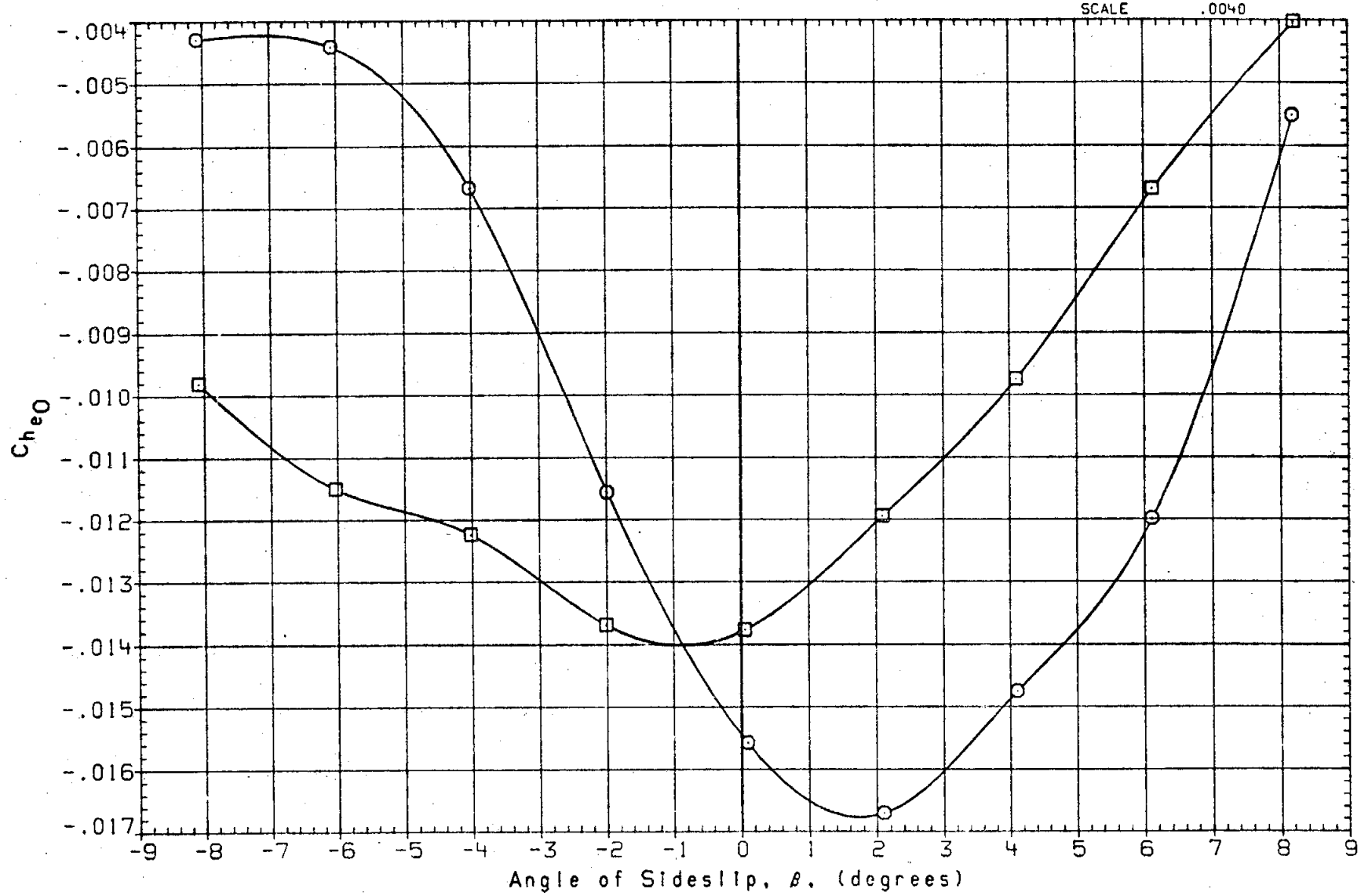

FIG. 38 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

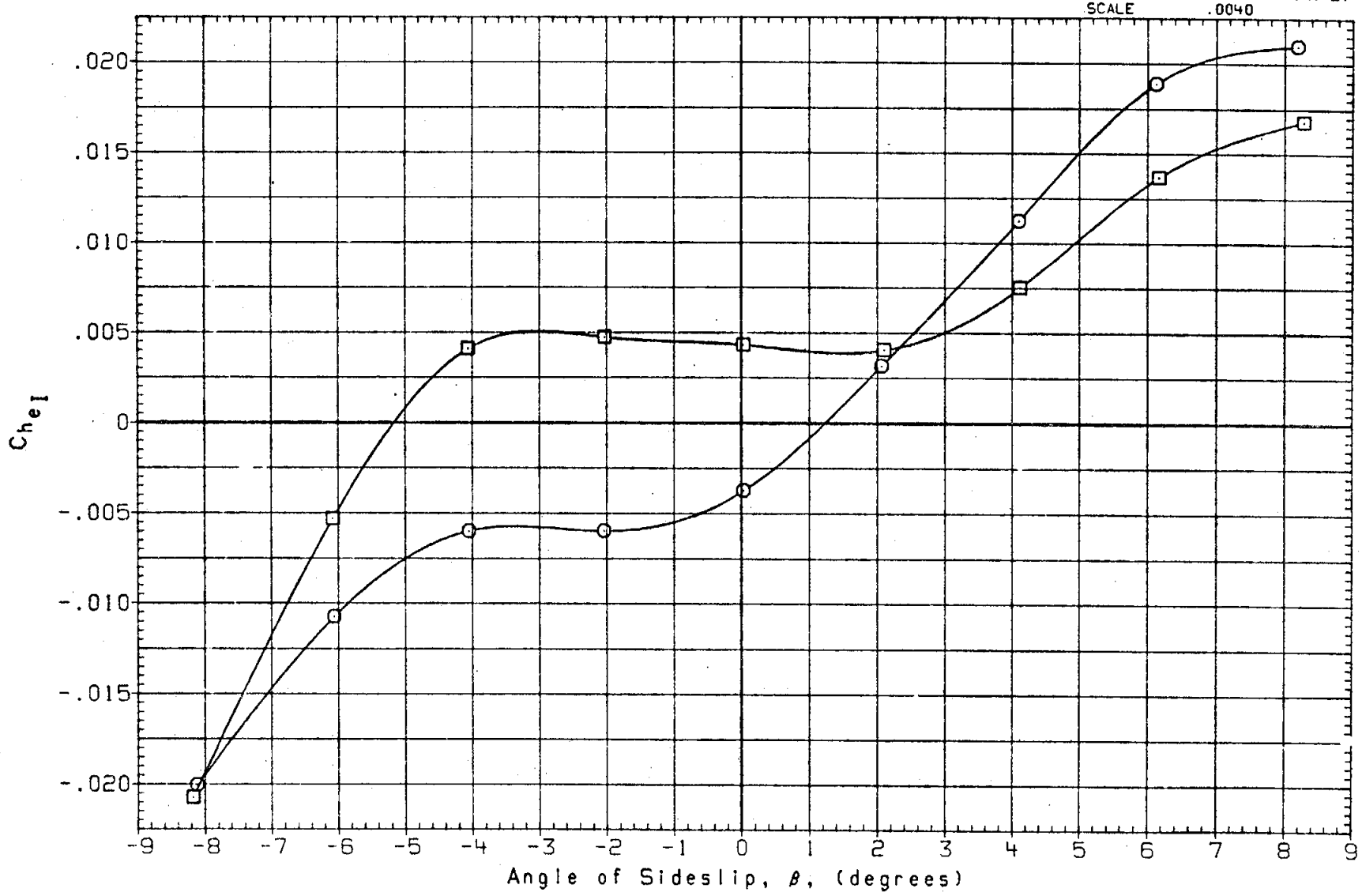

FIG. 38 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

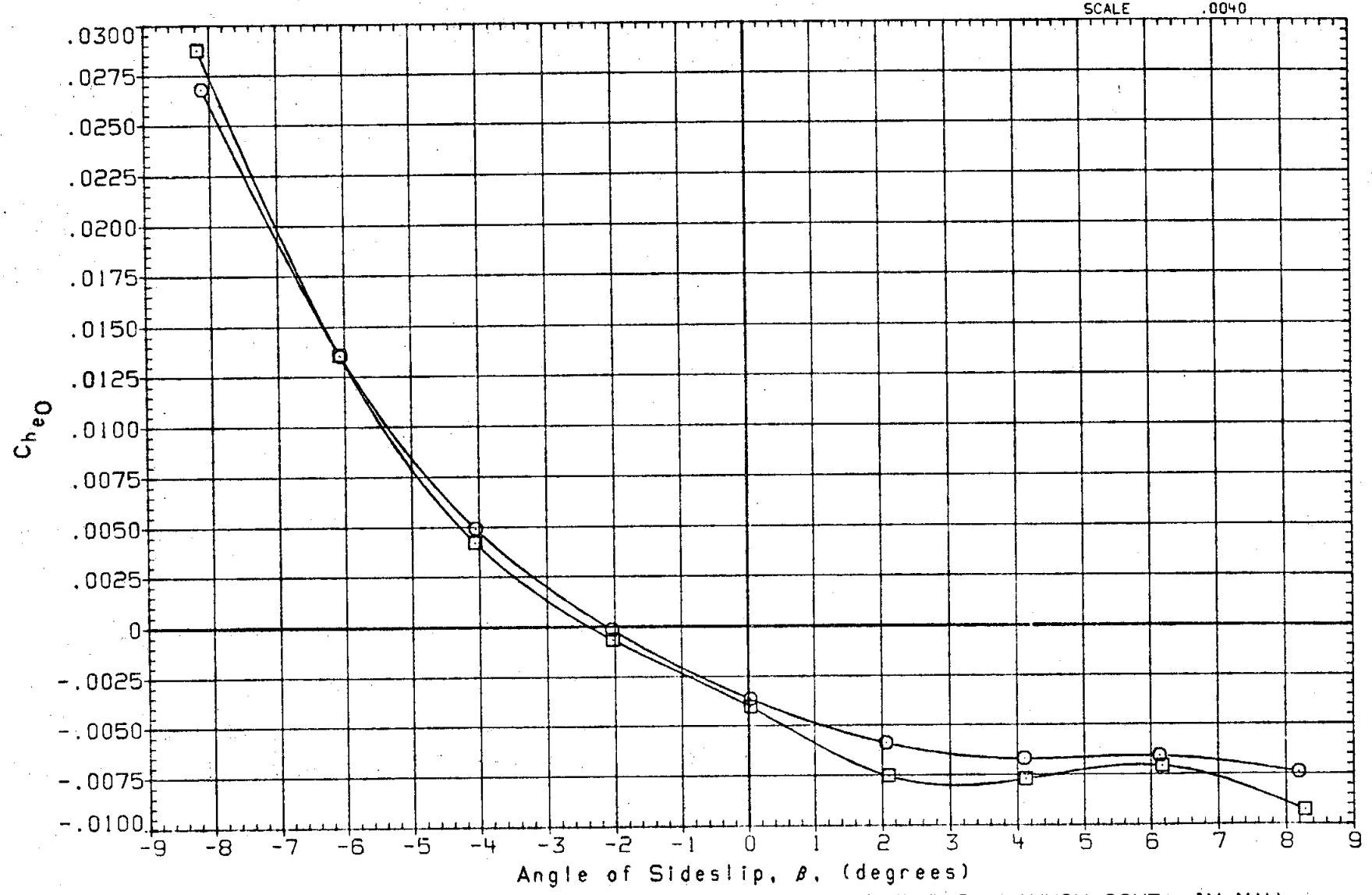

FIG. 38 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

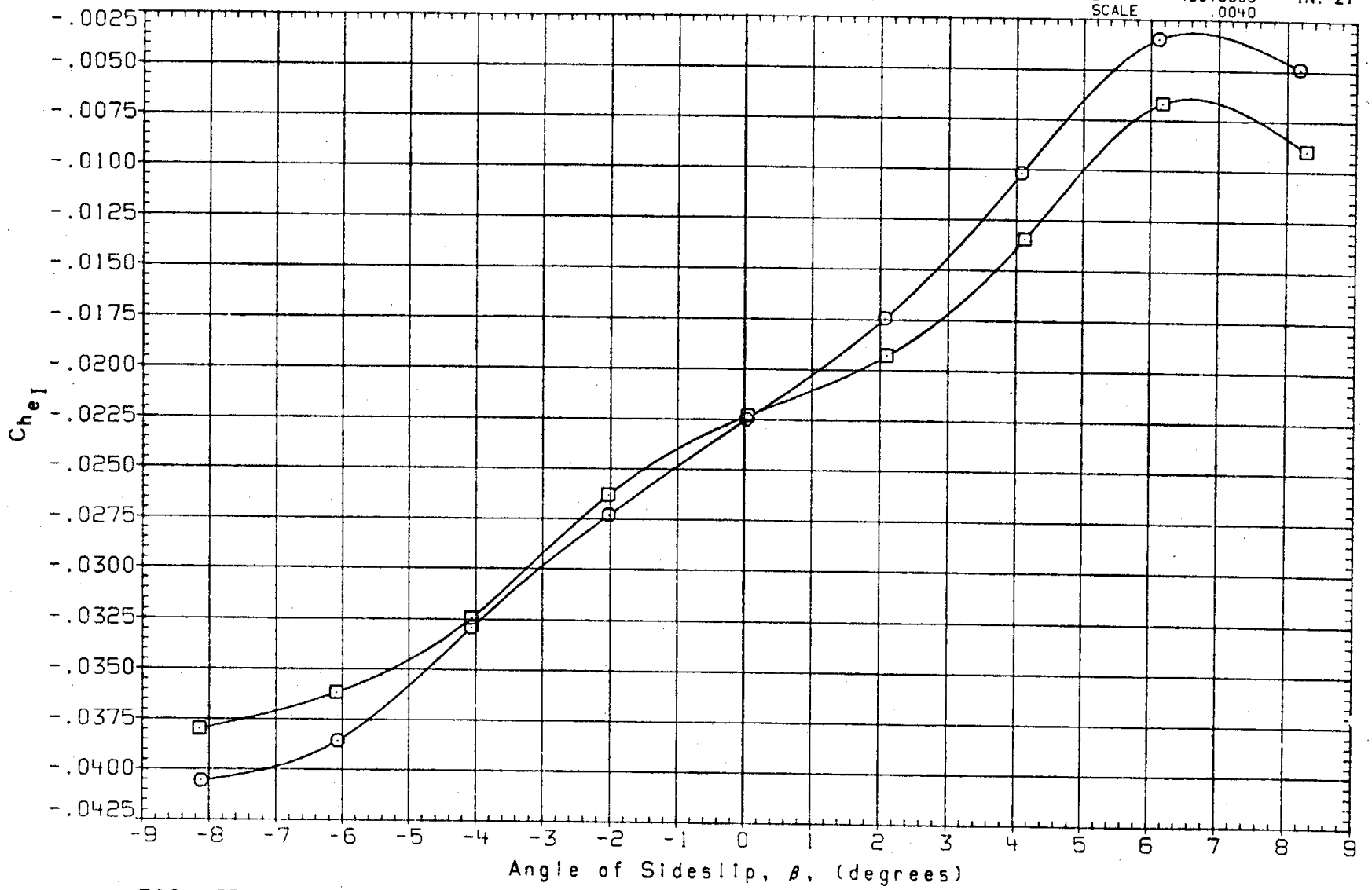

FIG. 38 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

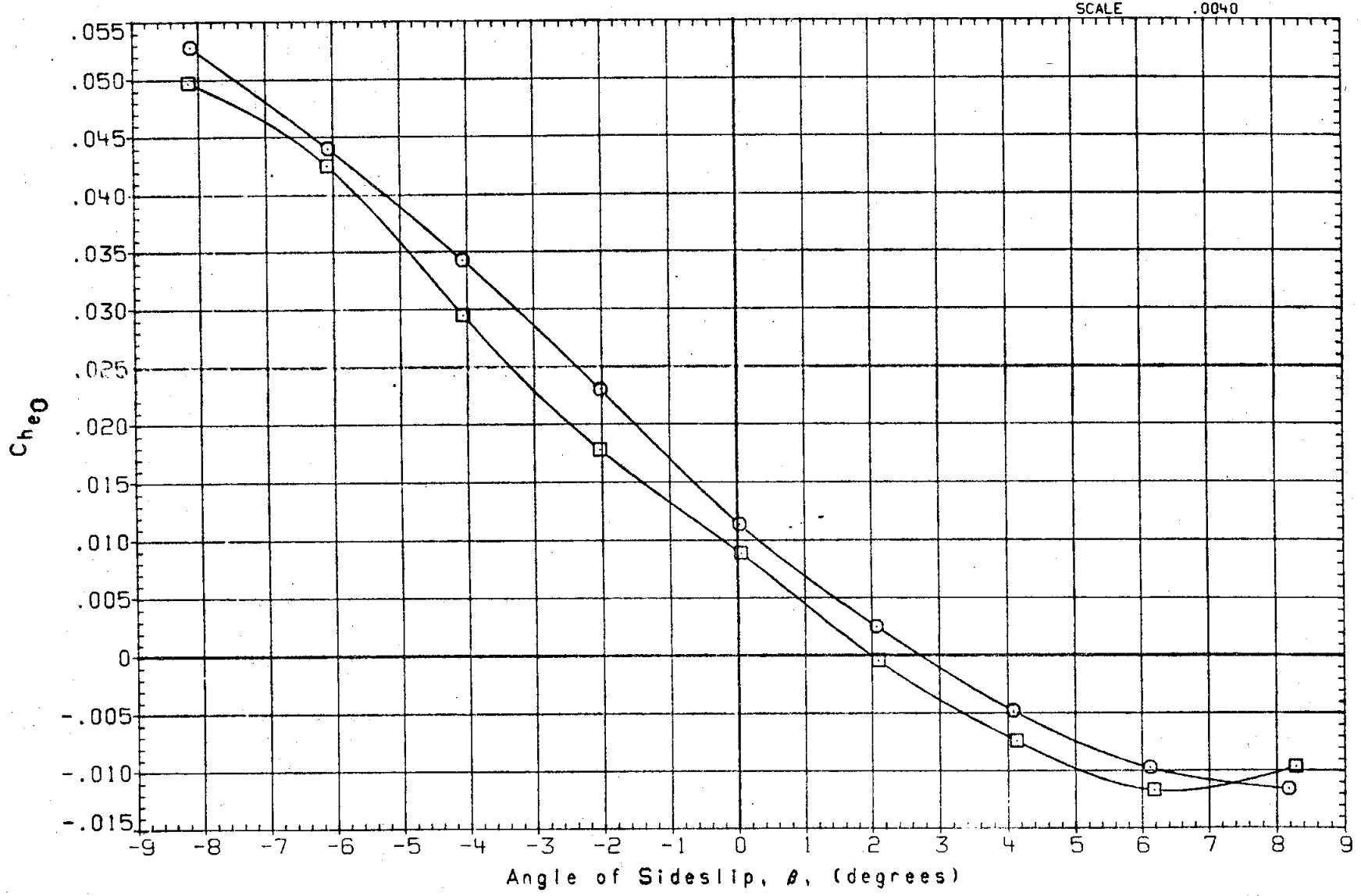

FIG. 38 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
S1Z015	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

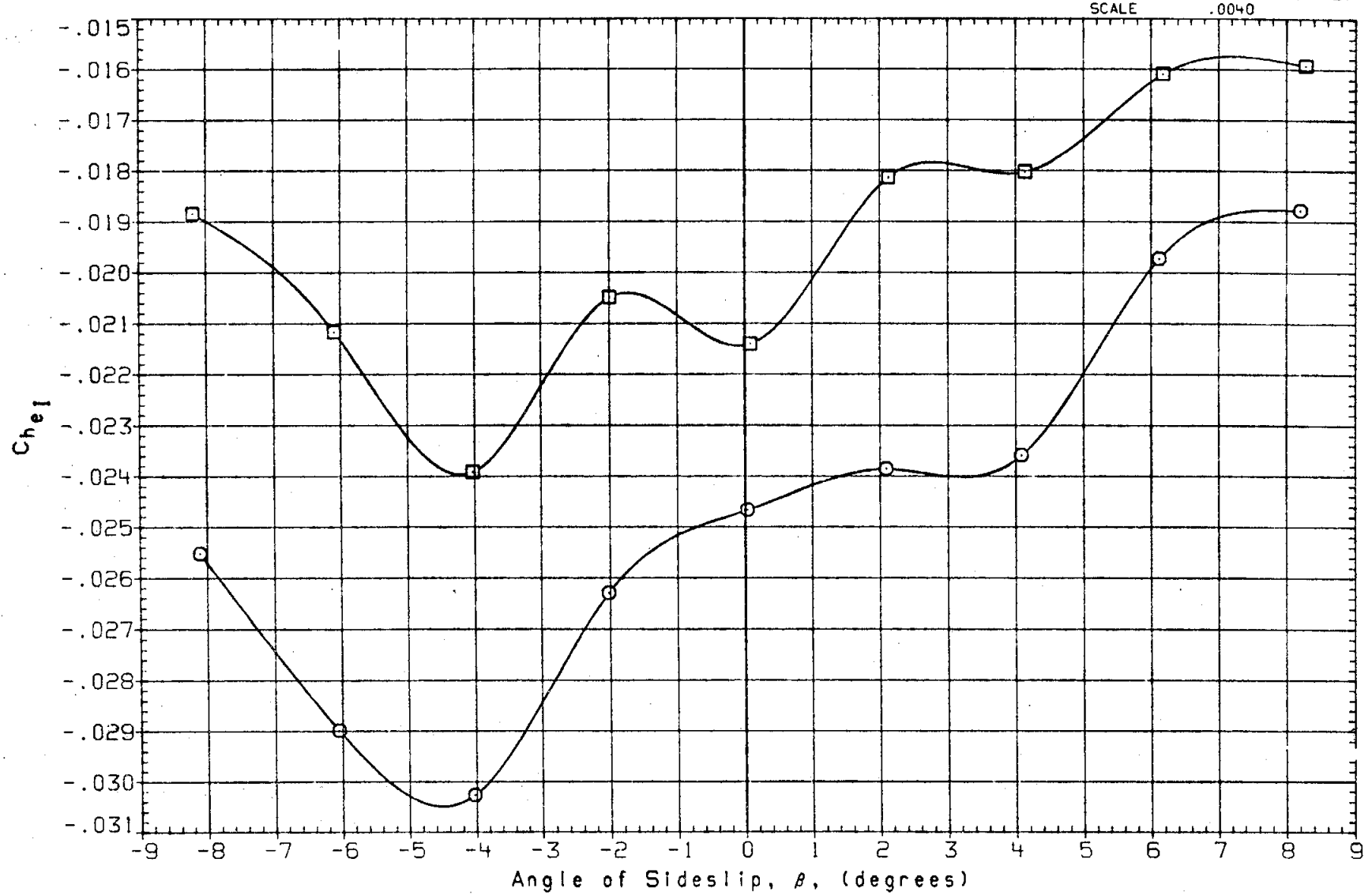

FIG. 38 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		PT	ALPHA	PHI
09	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	22.000	.000	90.000
15	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	30.000	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

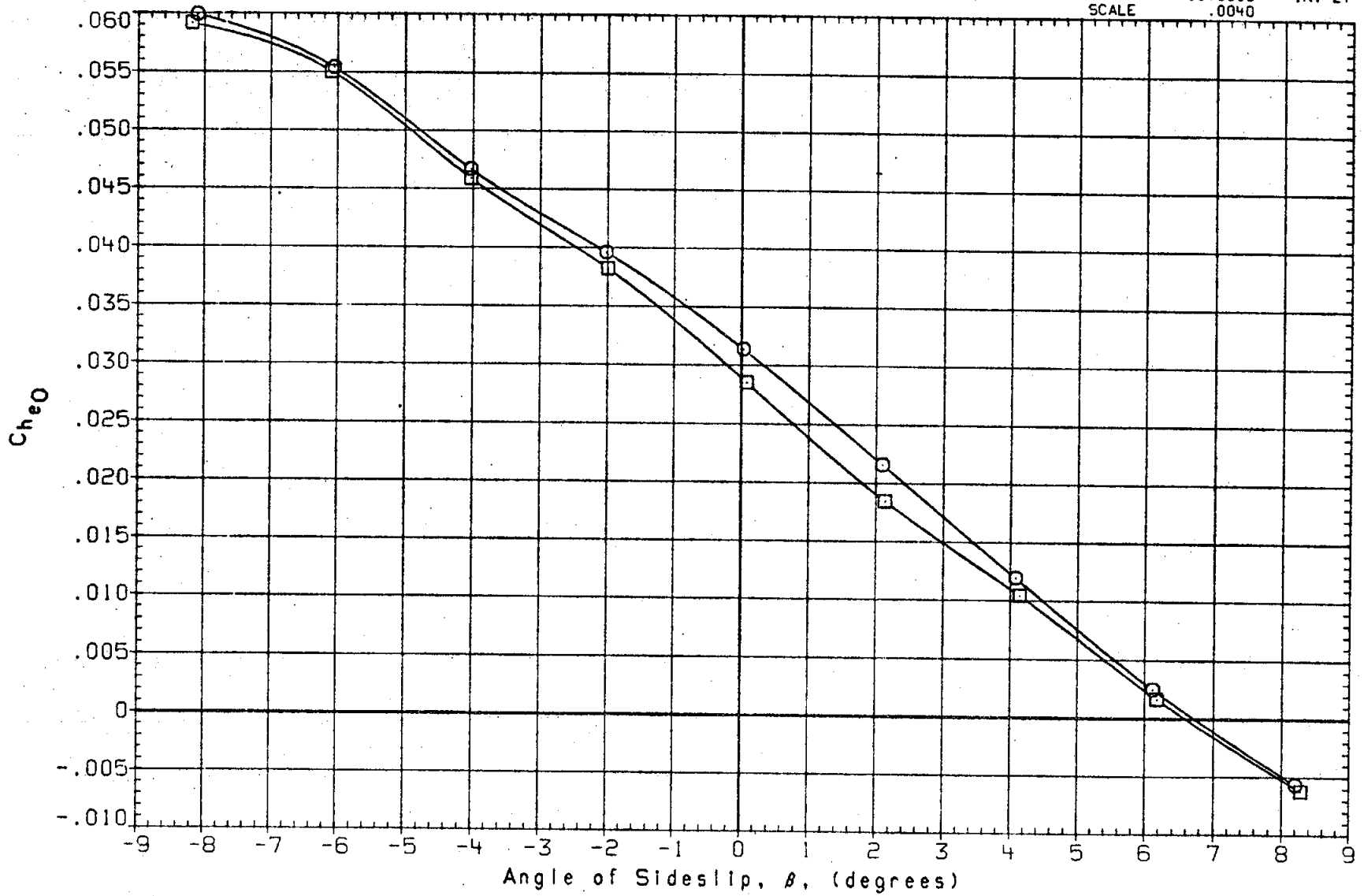

FIG. 38 EFFECT OF TUNNEL PRESSURE (RN) ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

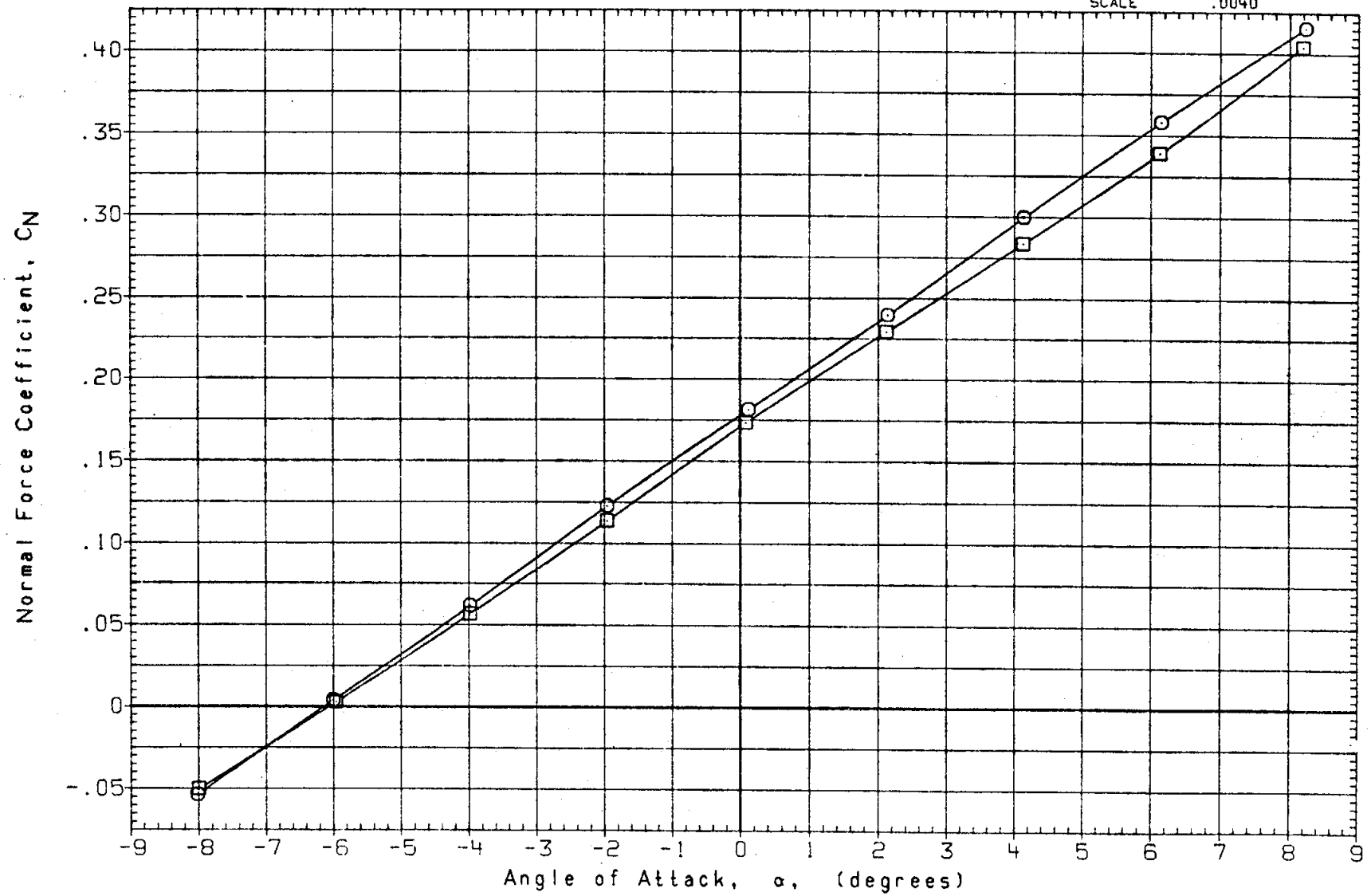

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

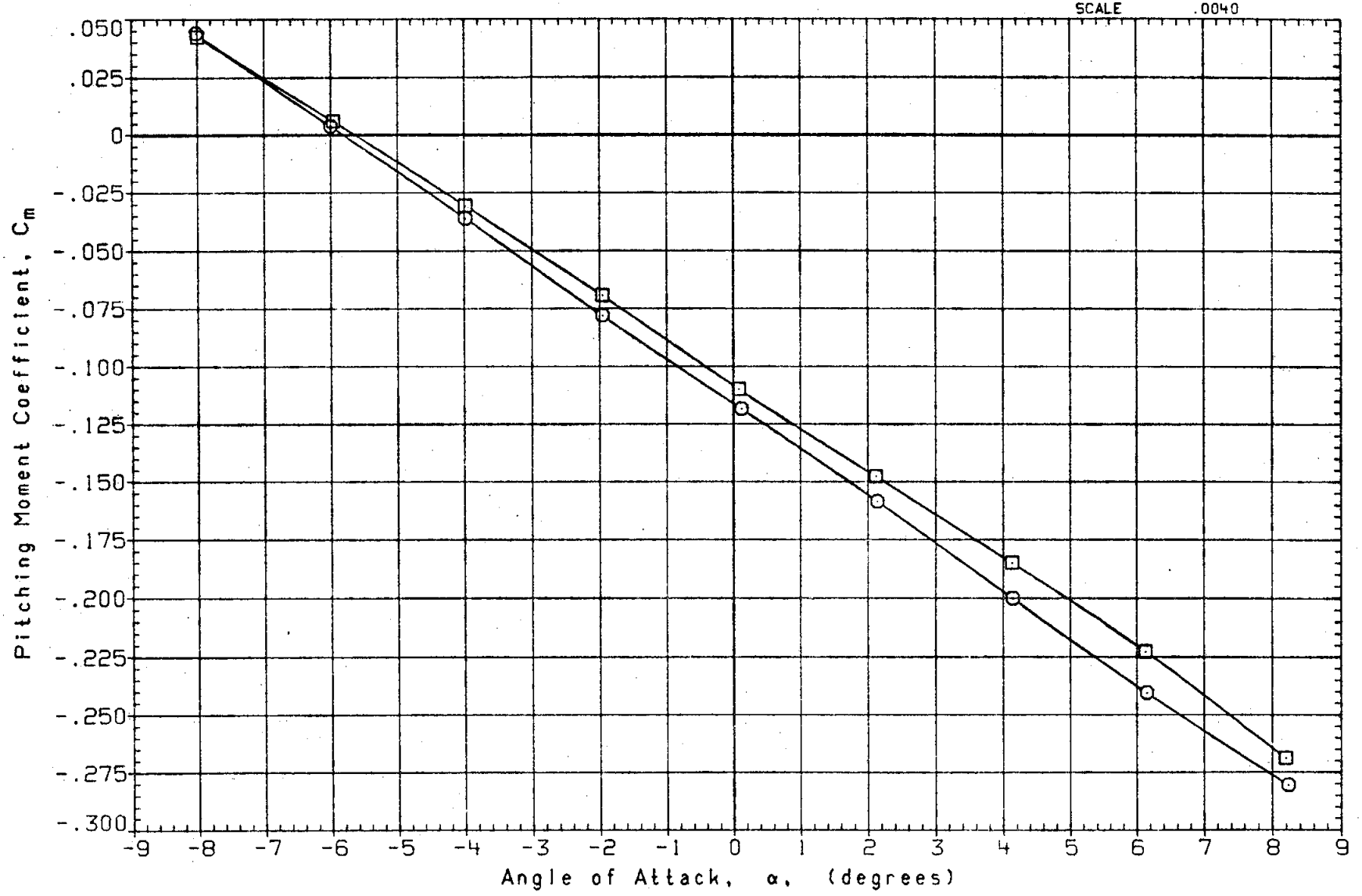

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

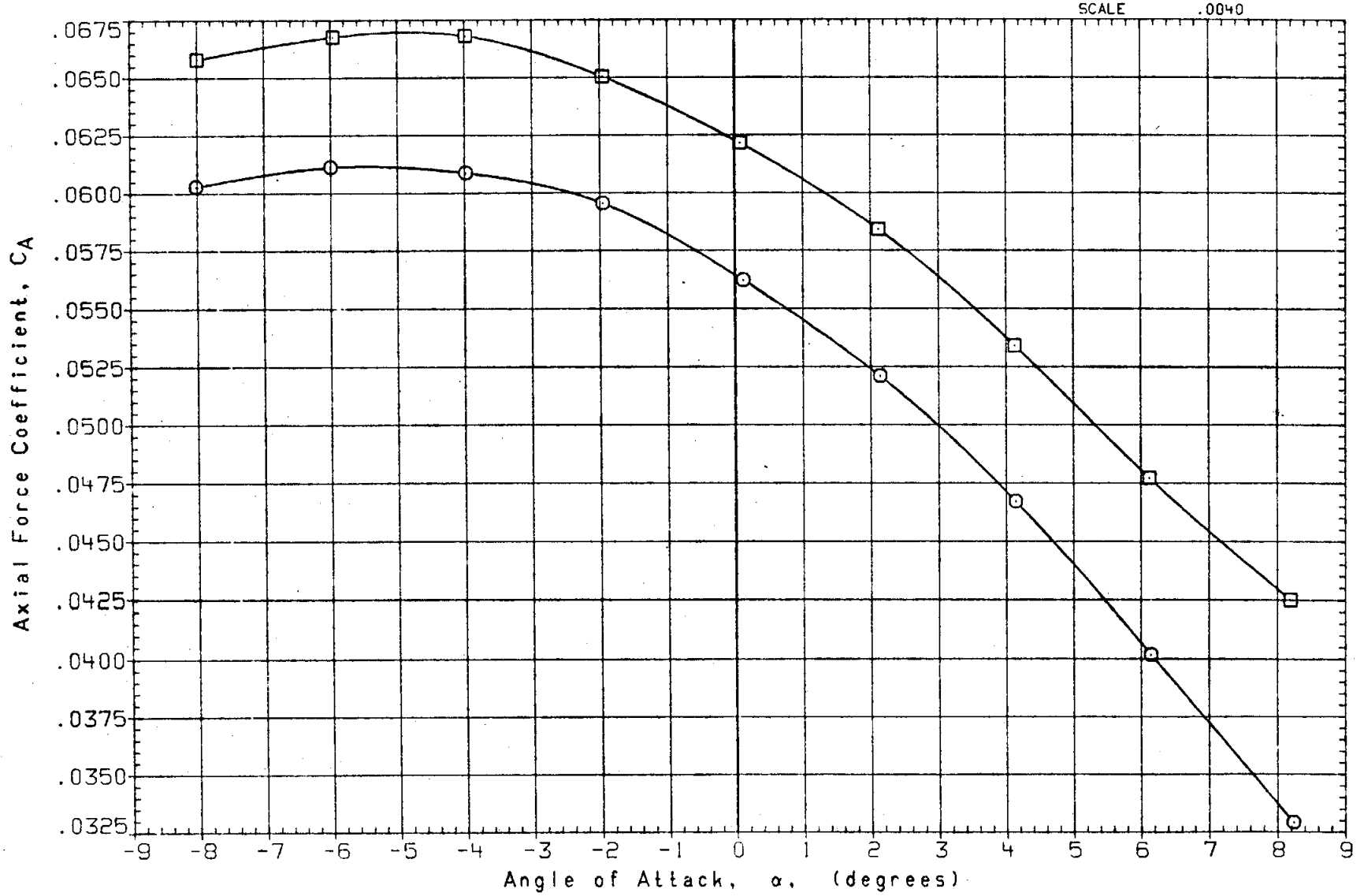

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

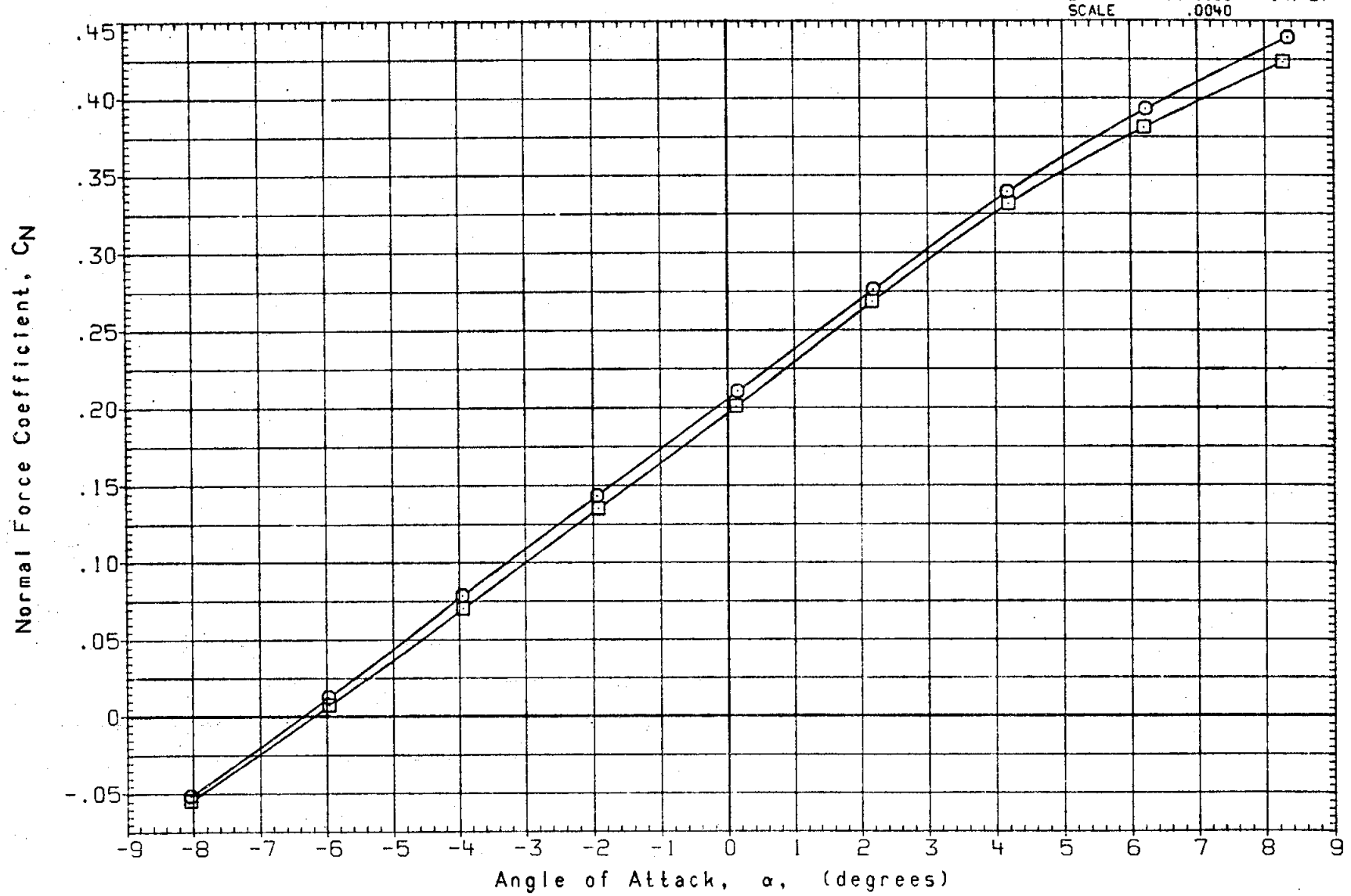

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

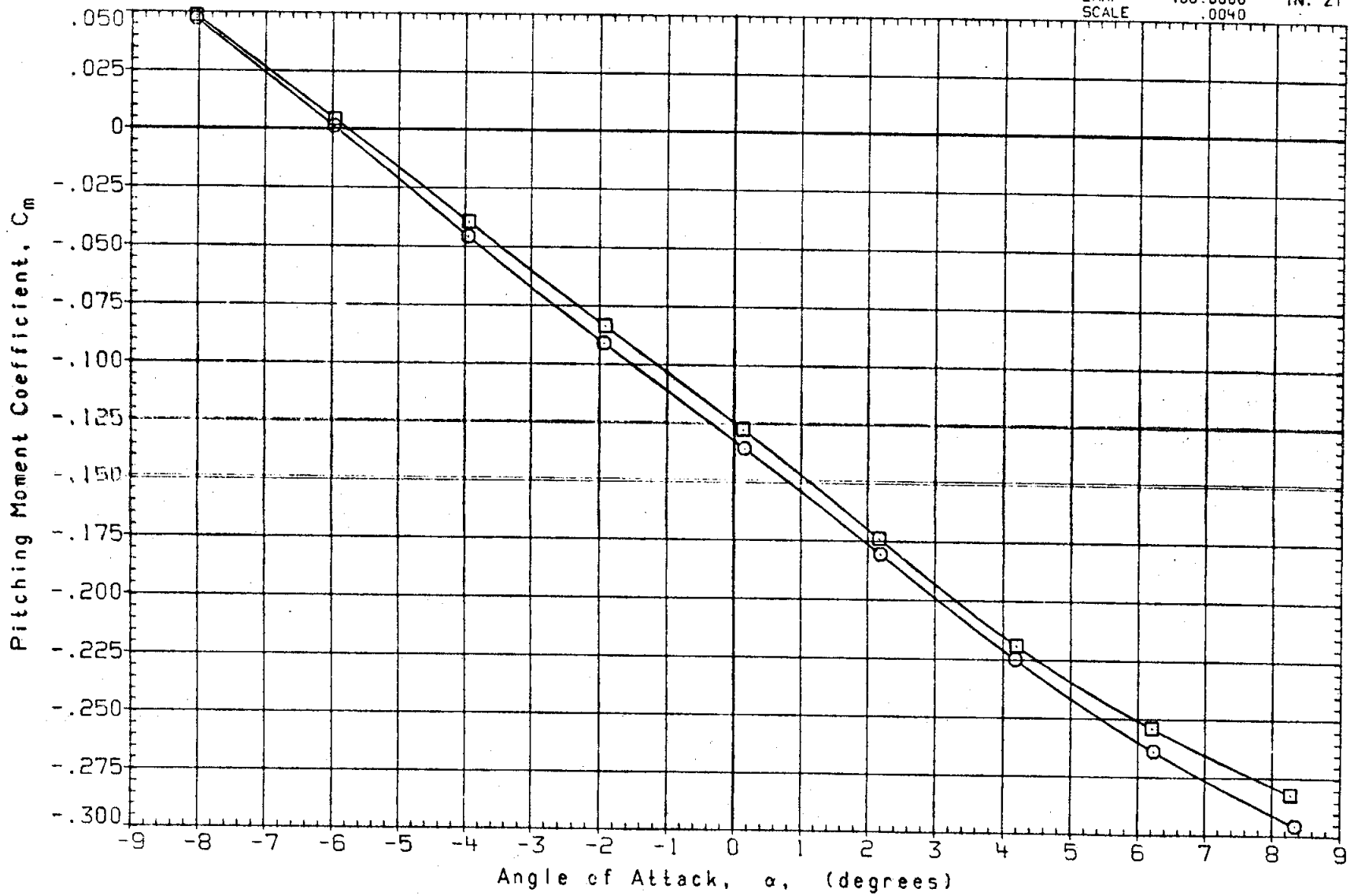

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z008	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3 W/GRIT	- .000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

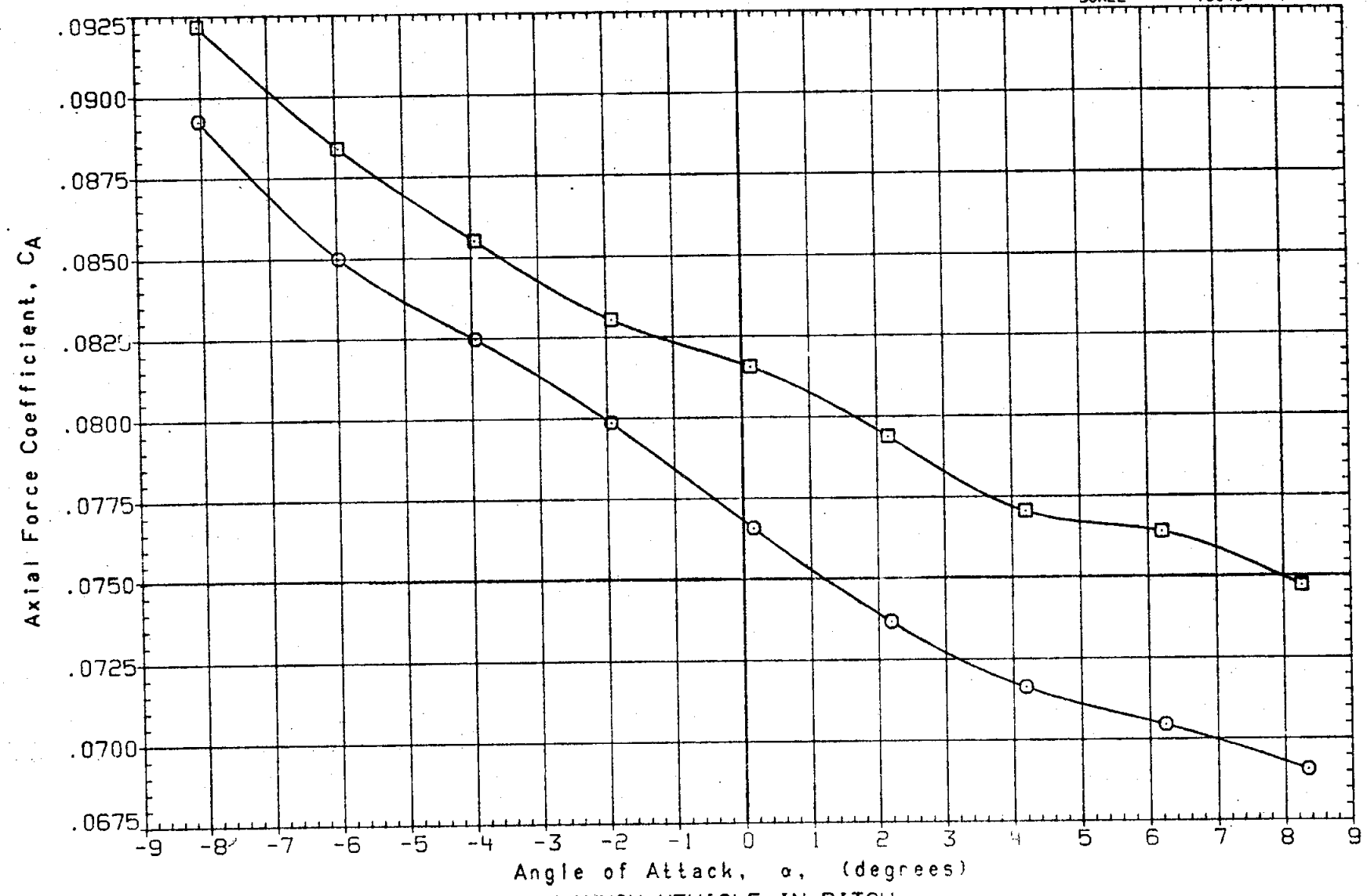

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(B)MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

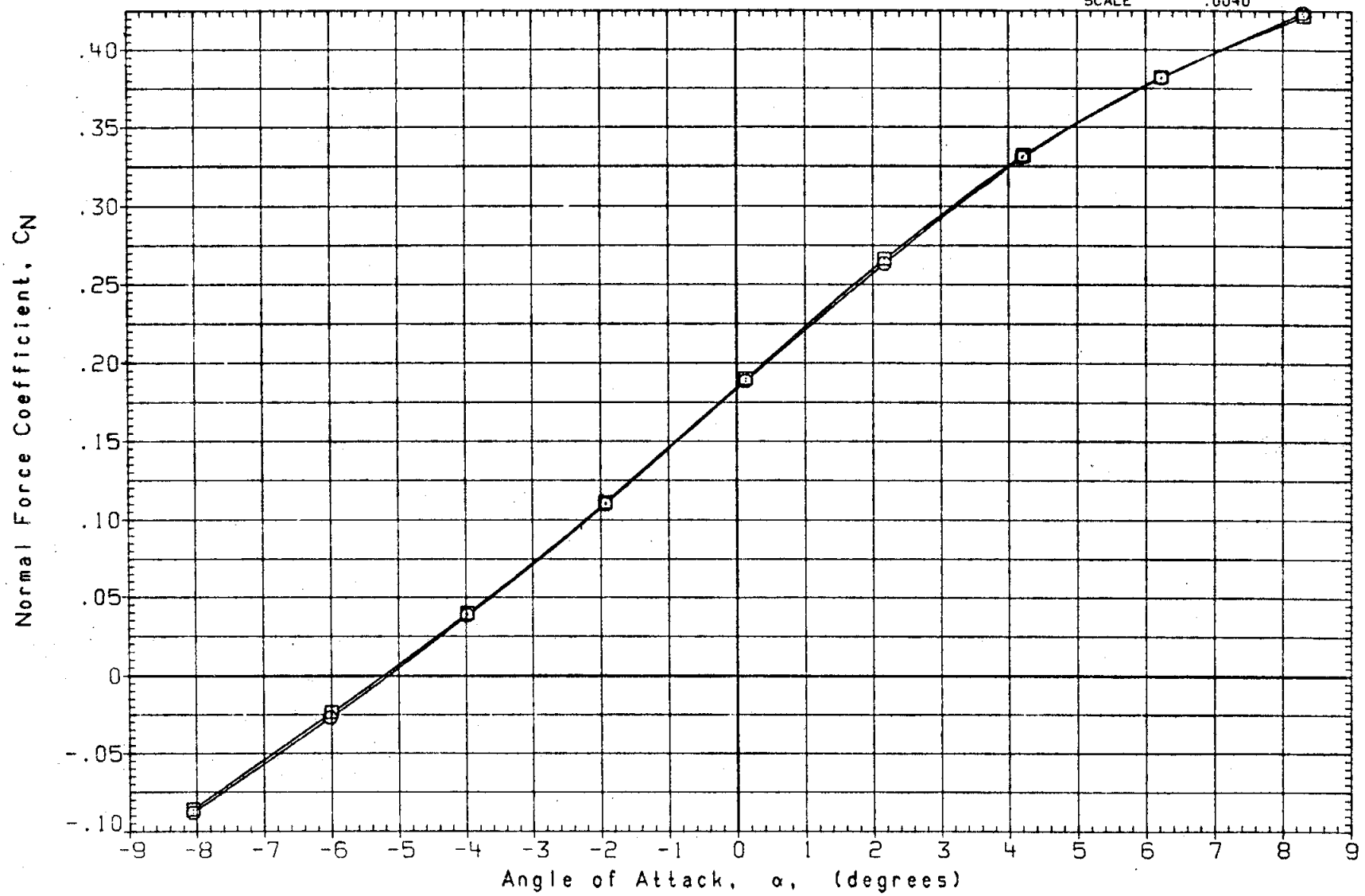

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

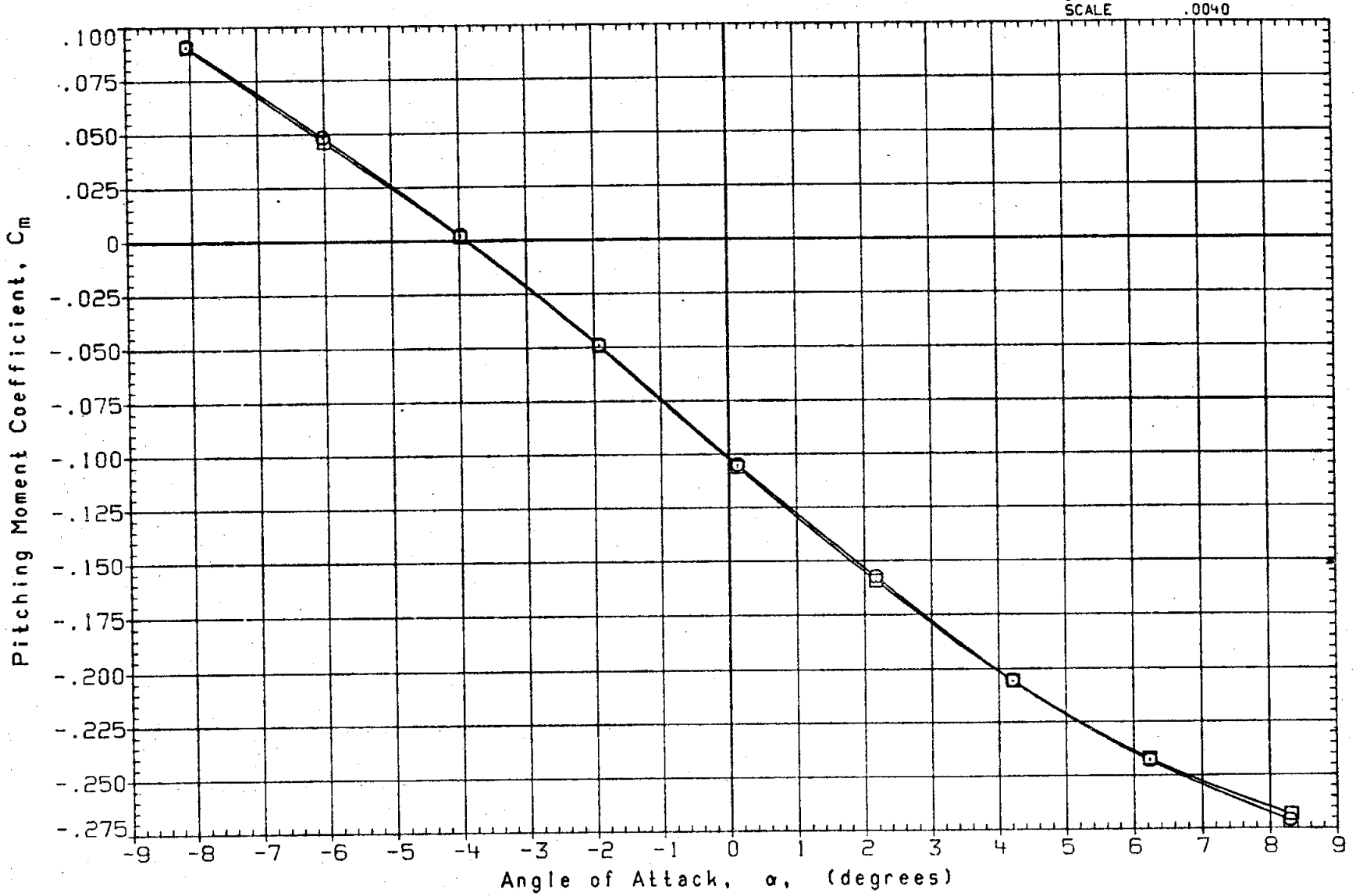

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

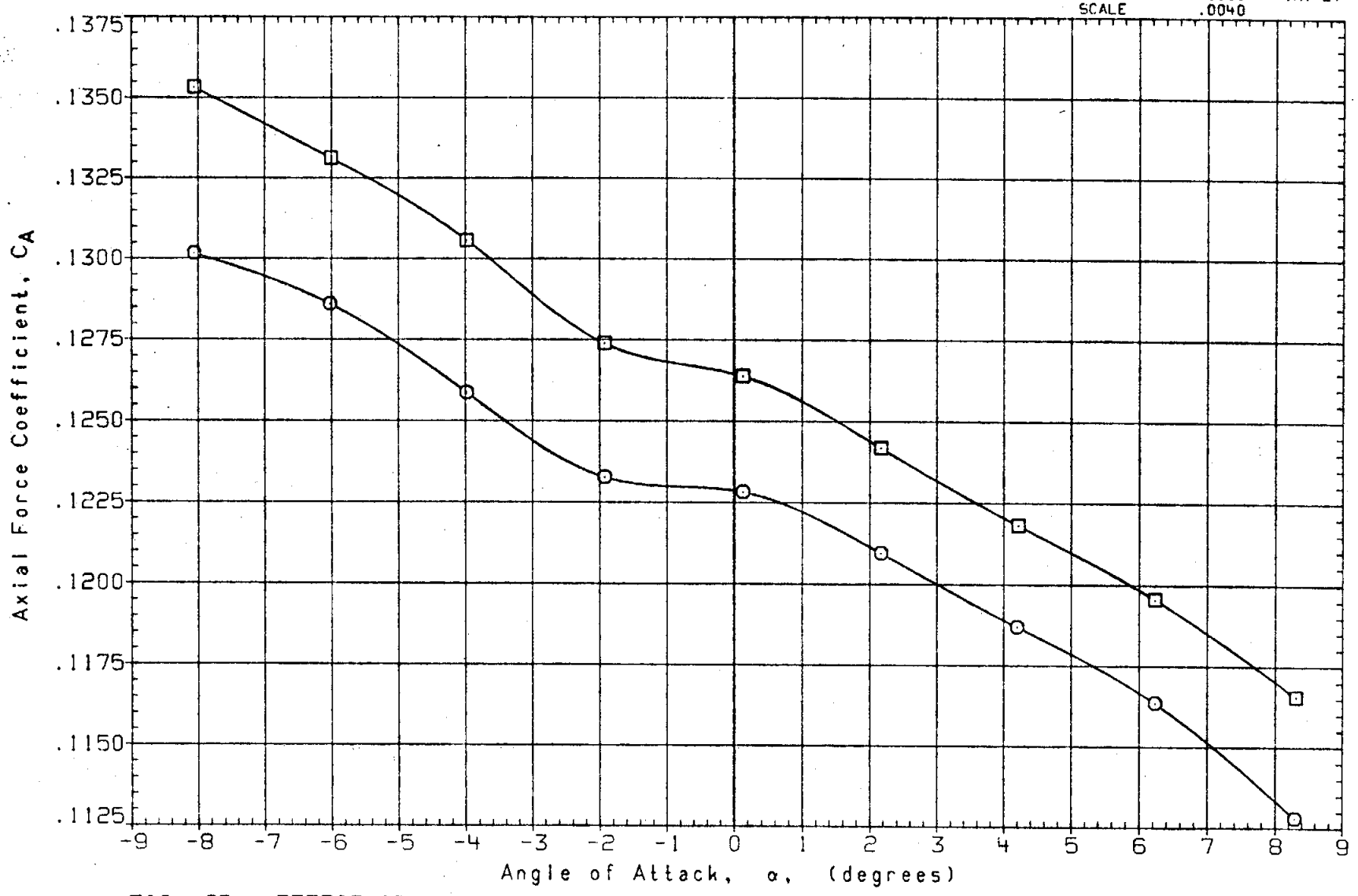

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

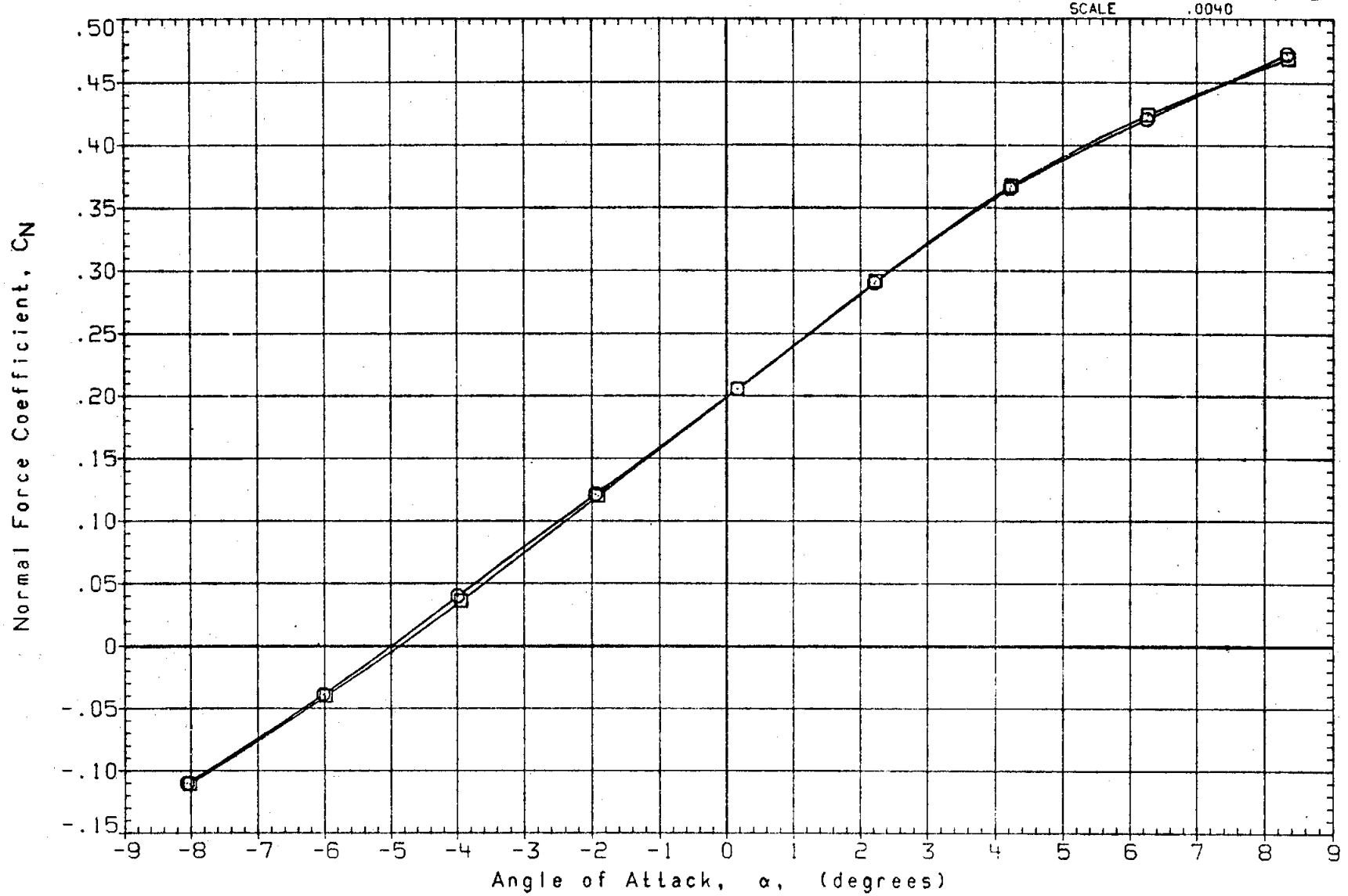

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

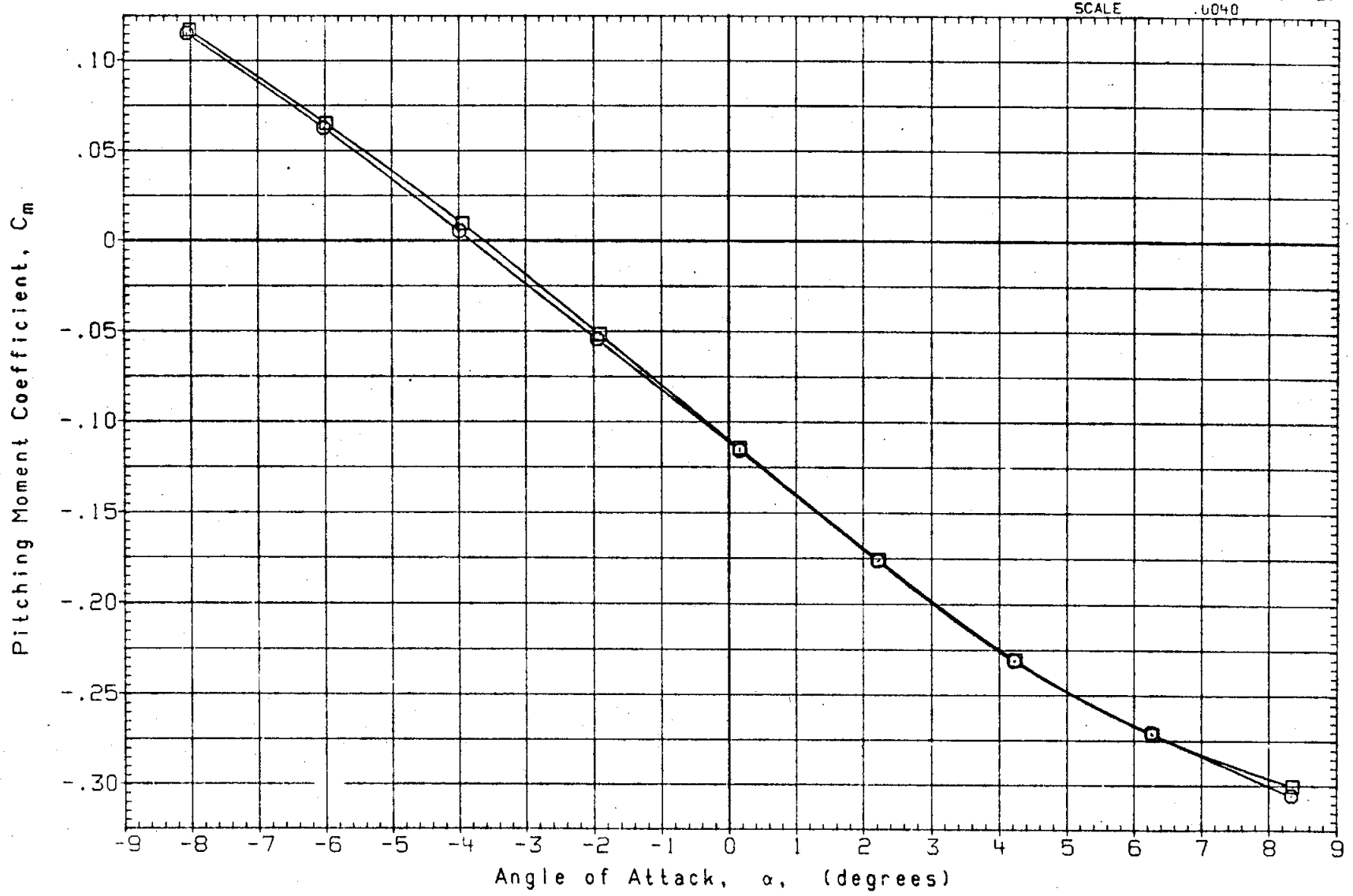

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

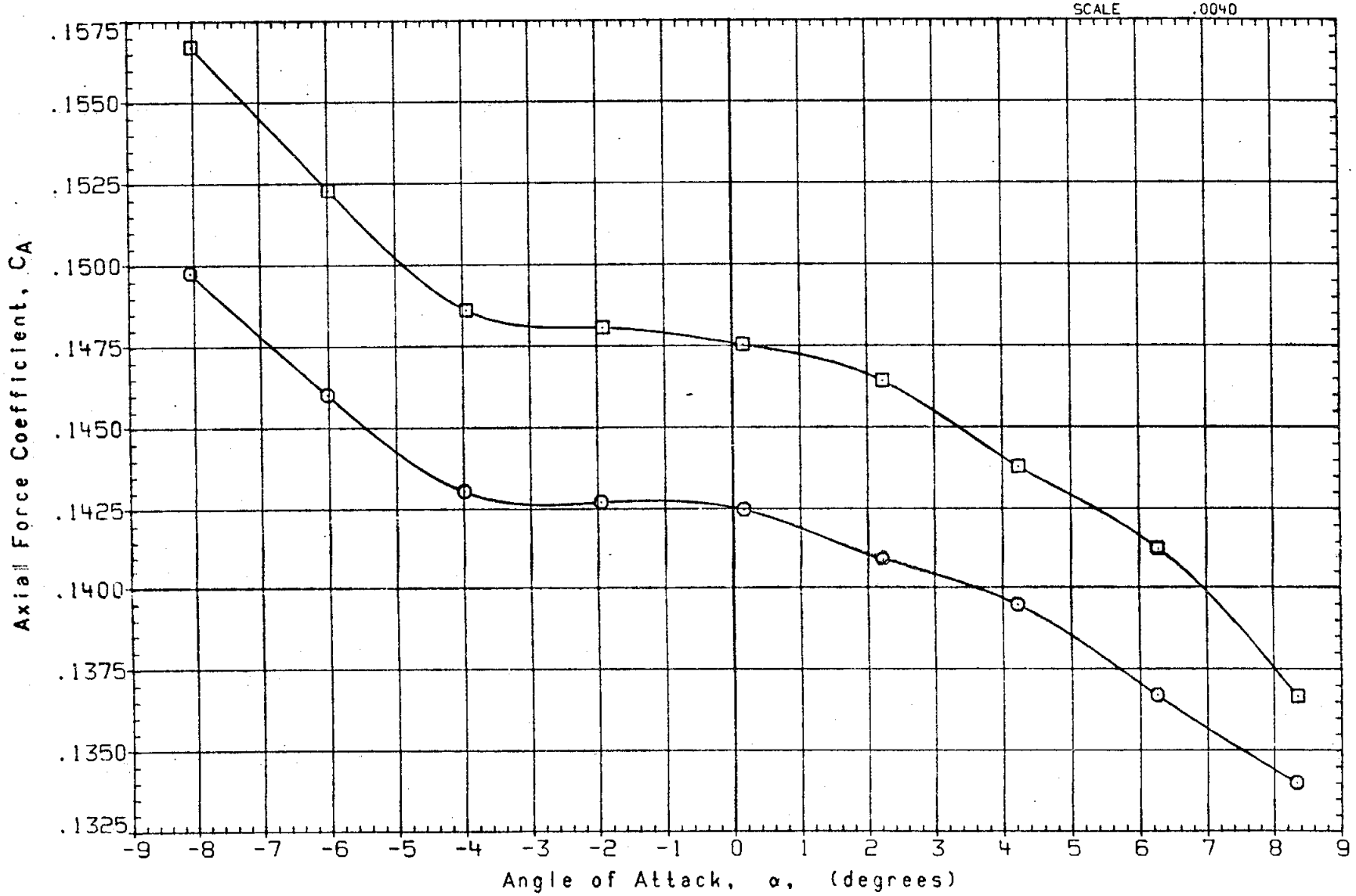

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

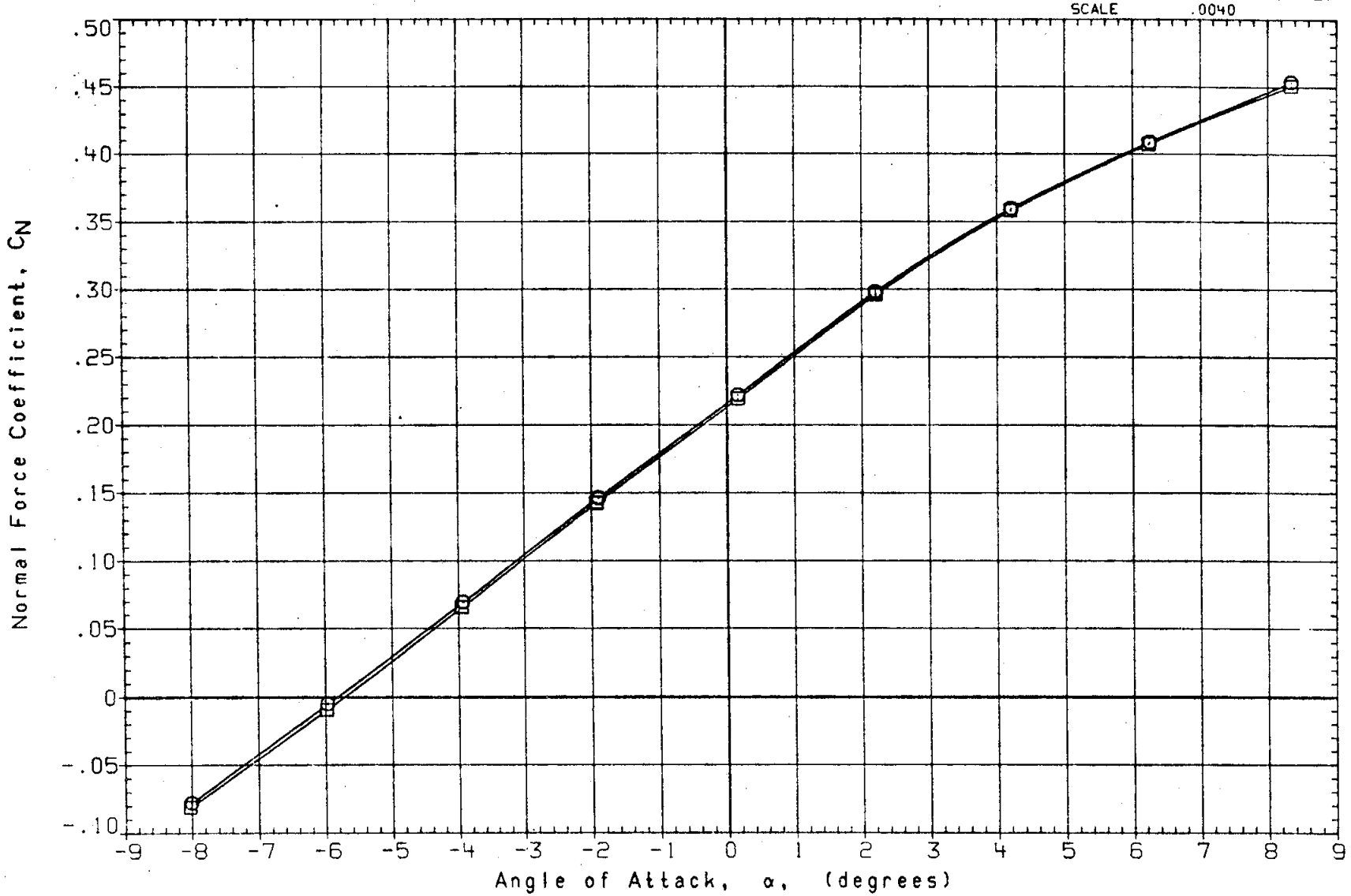

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
R1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

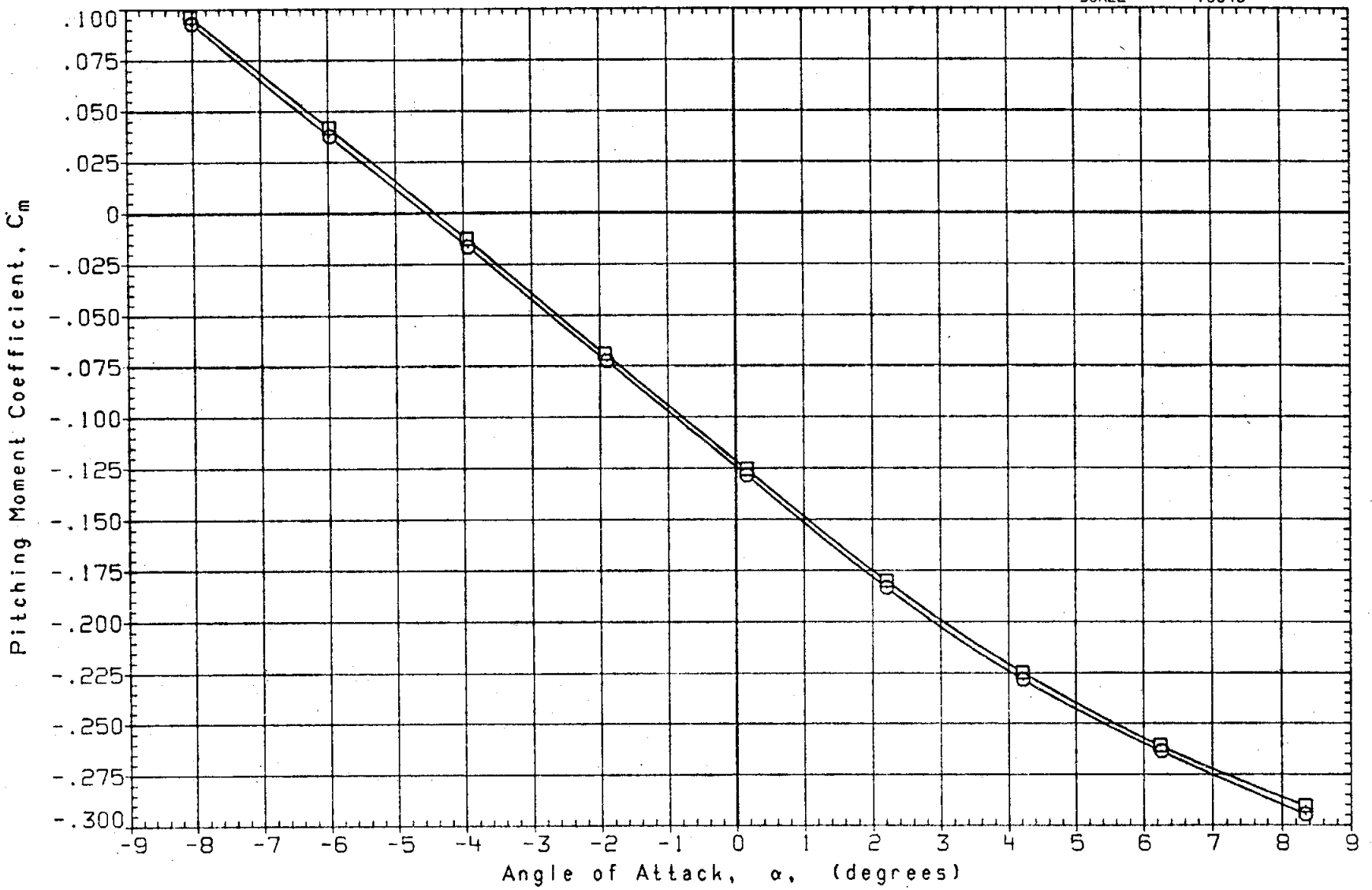

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
R1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000
A1Z017	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

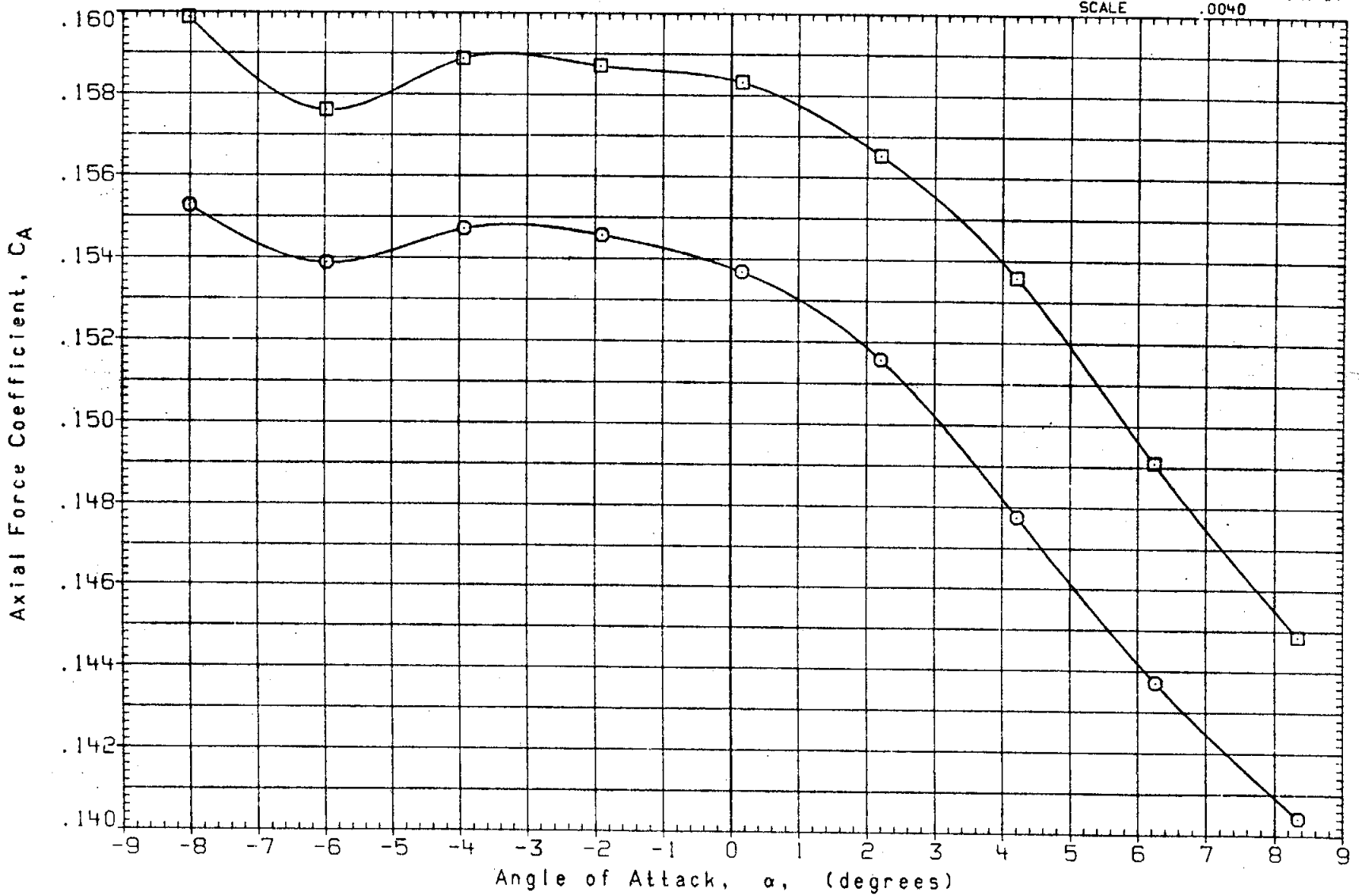

FIG. 39 EFFECT OF GRIT ON LAUNCH VEHICLE IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S12008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B12017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

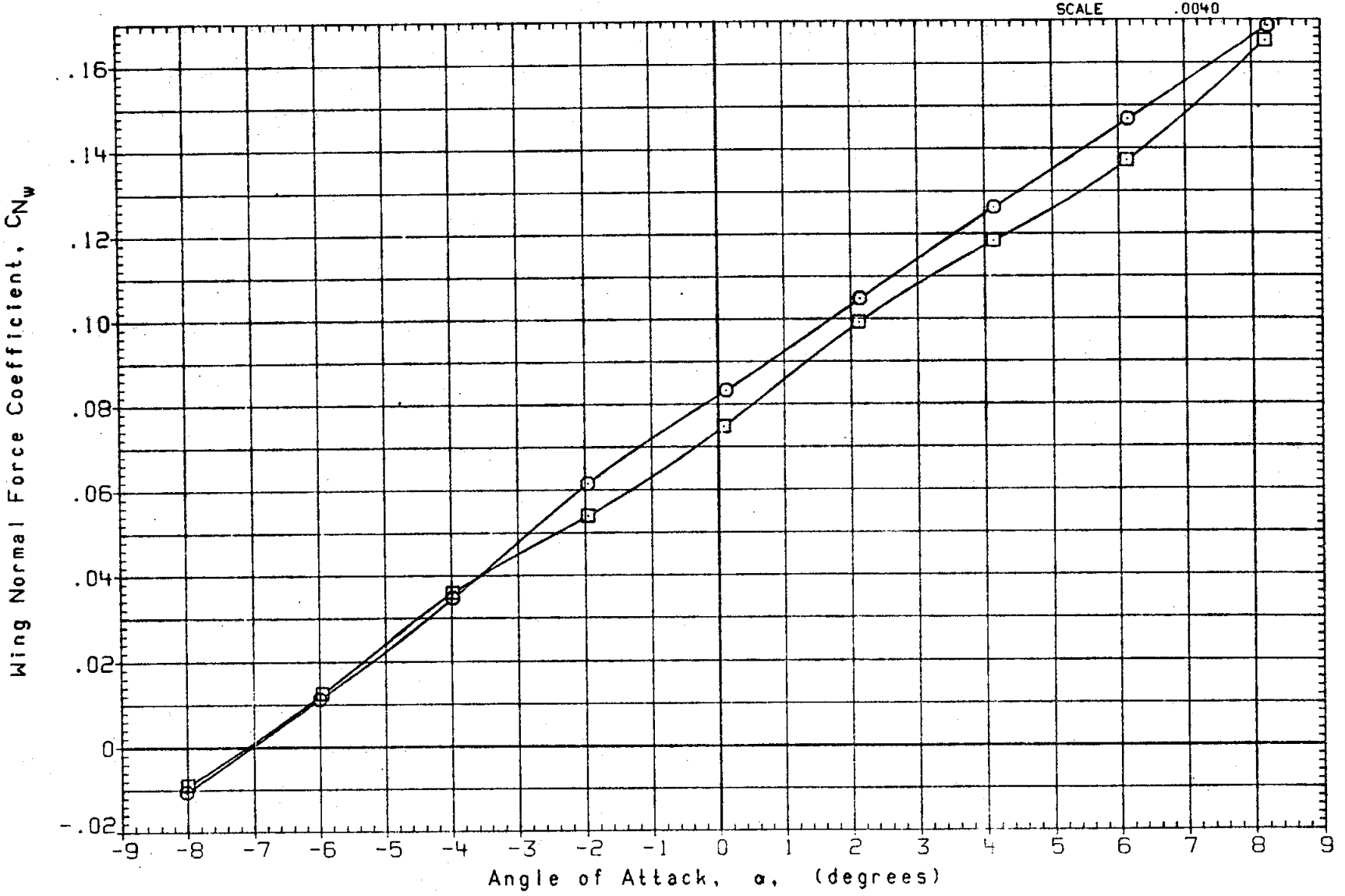

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S12008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B12017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

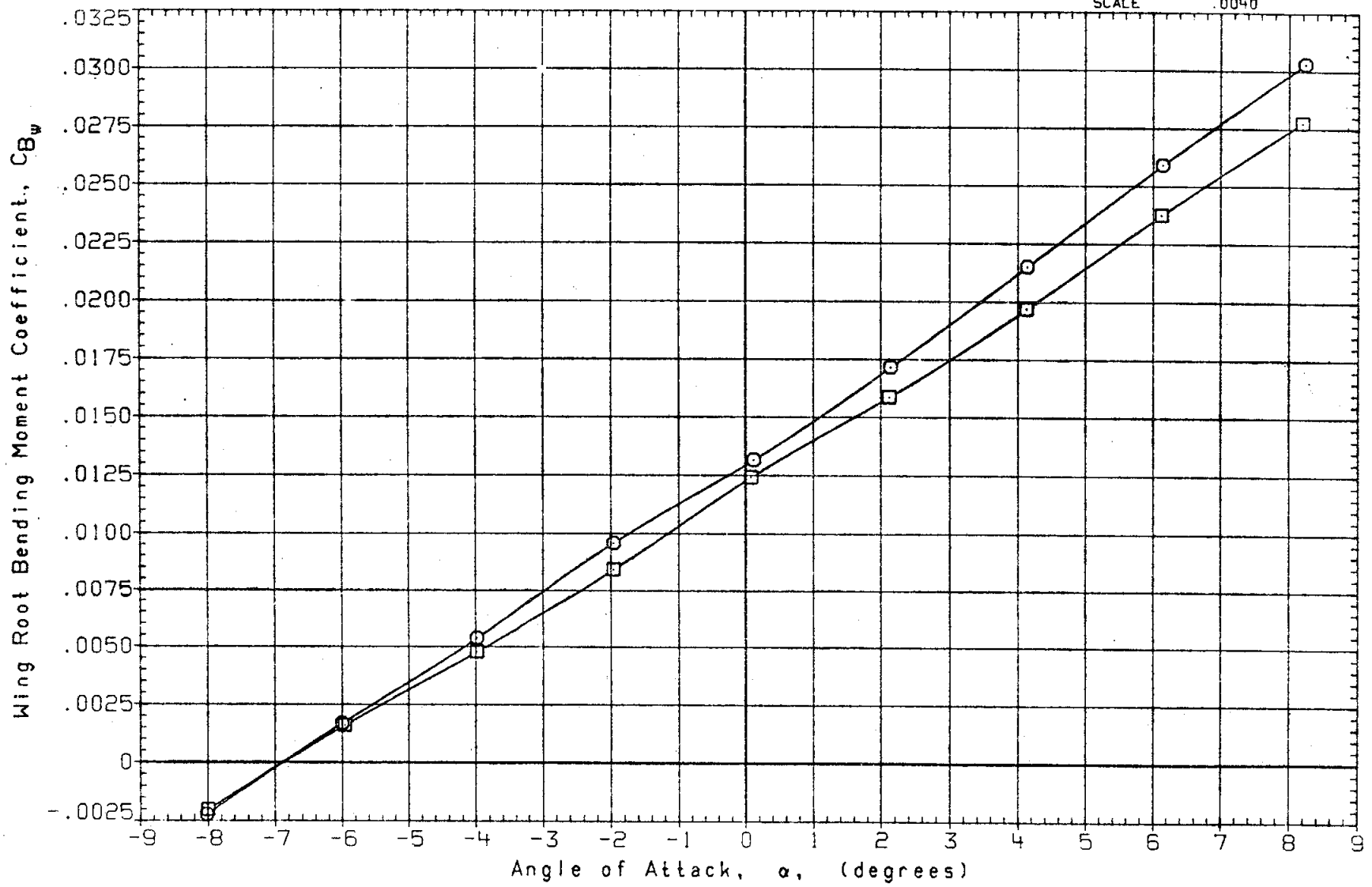

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	0040	

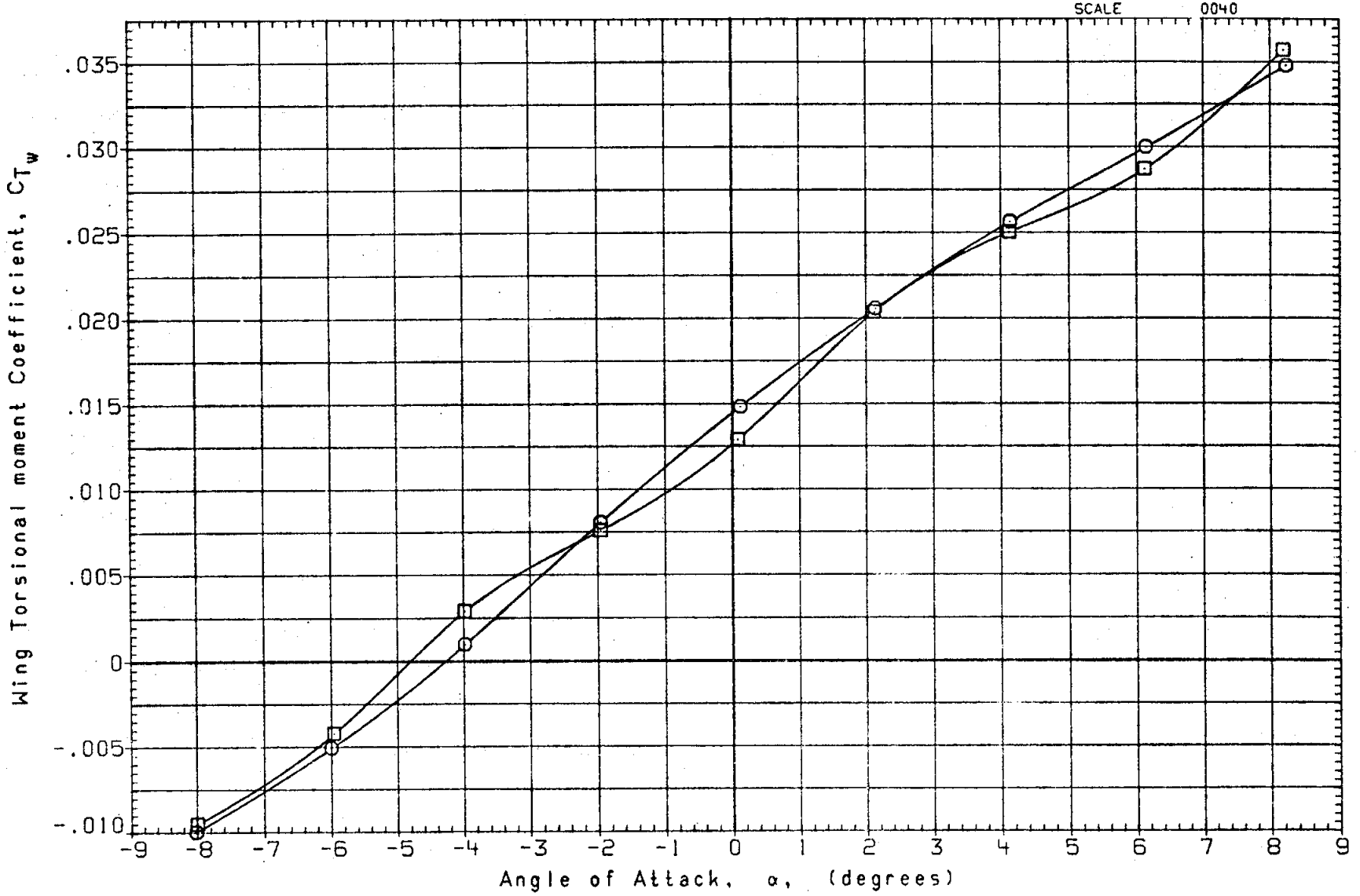

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

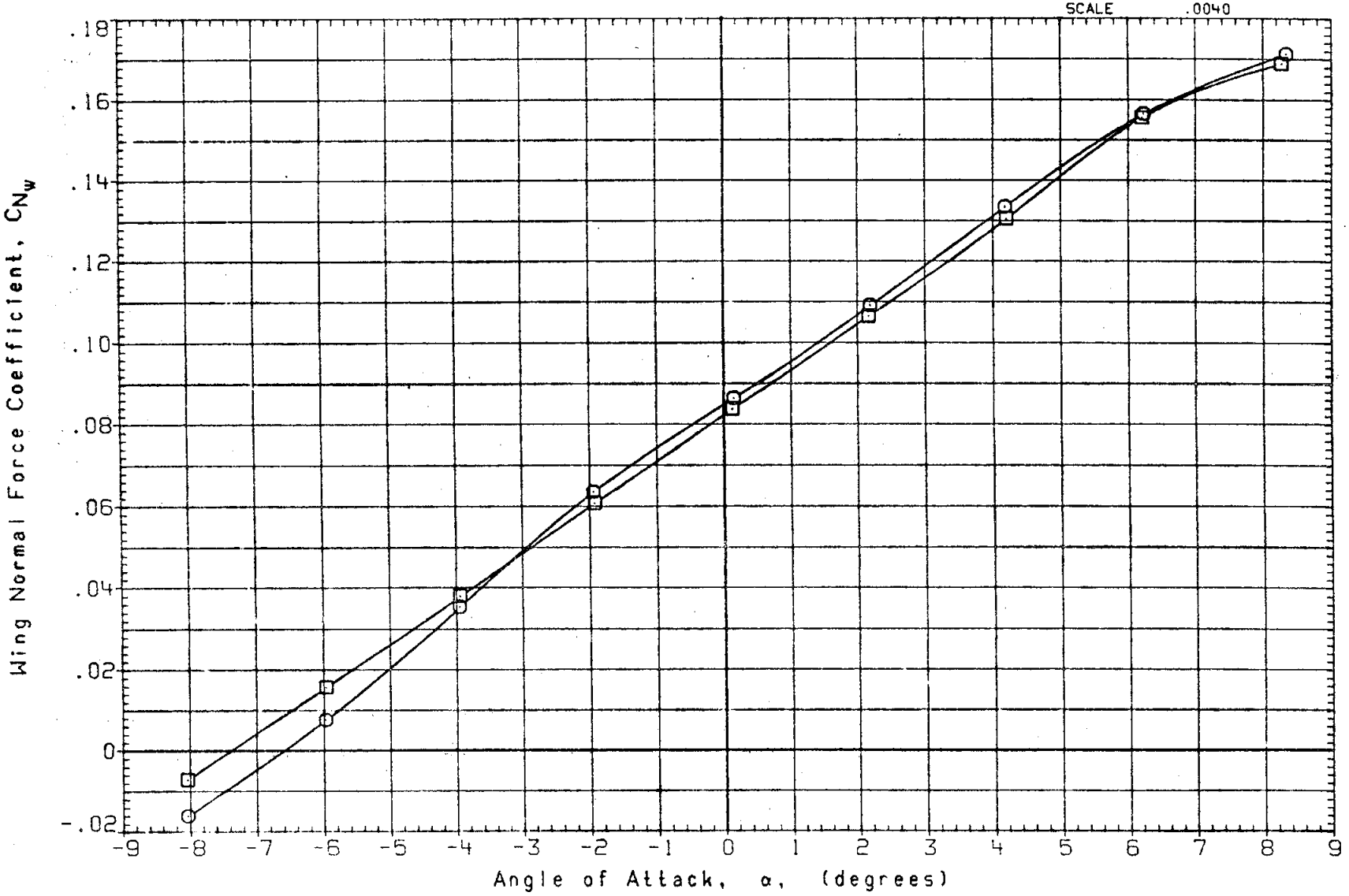

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

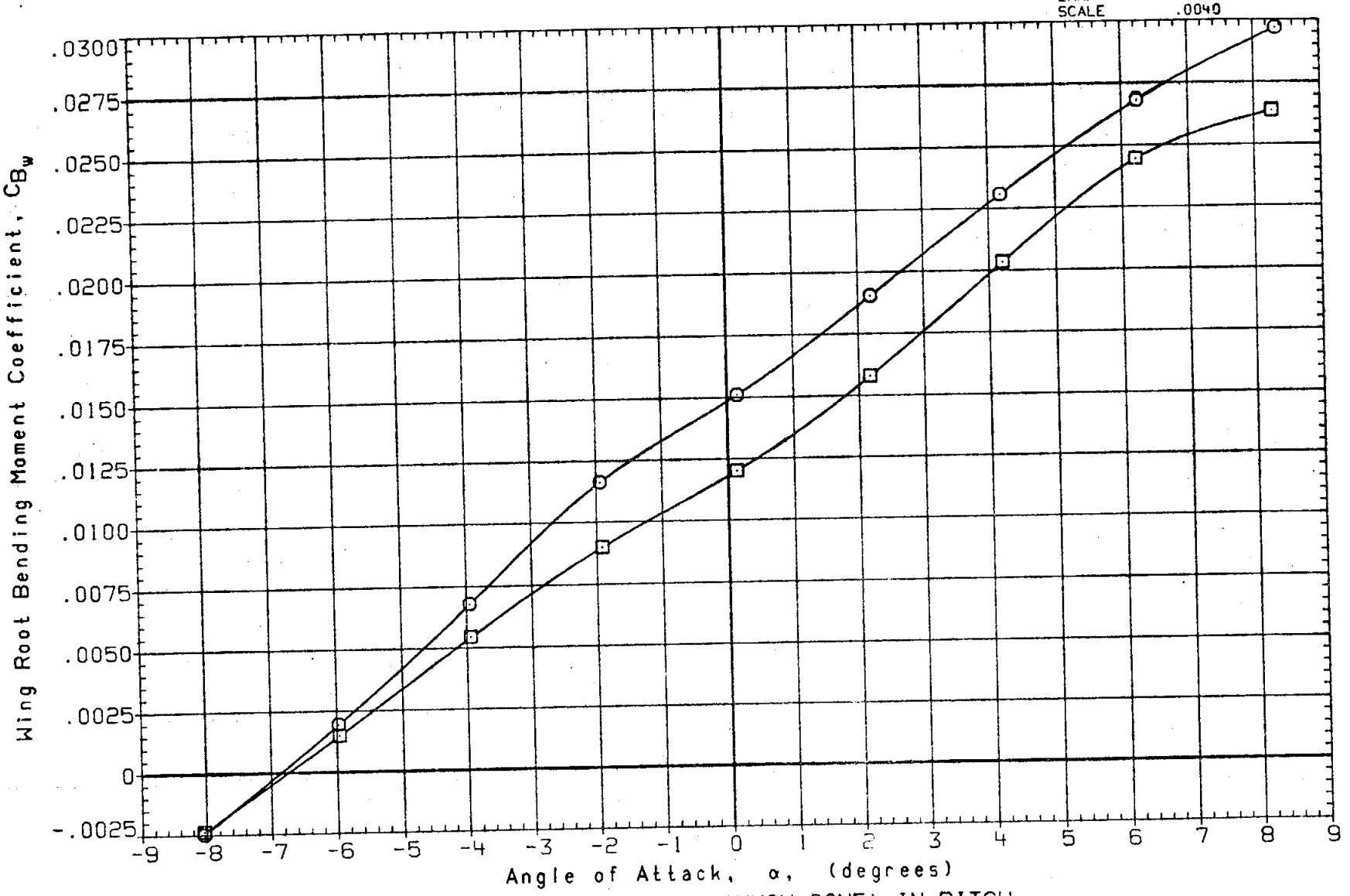

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(B)MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

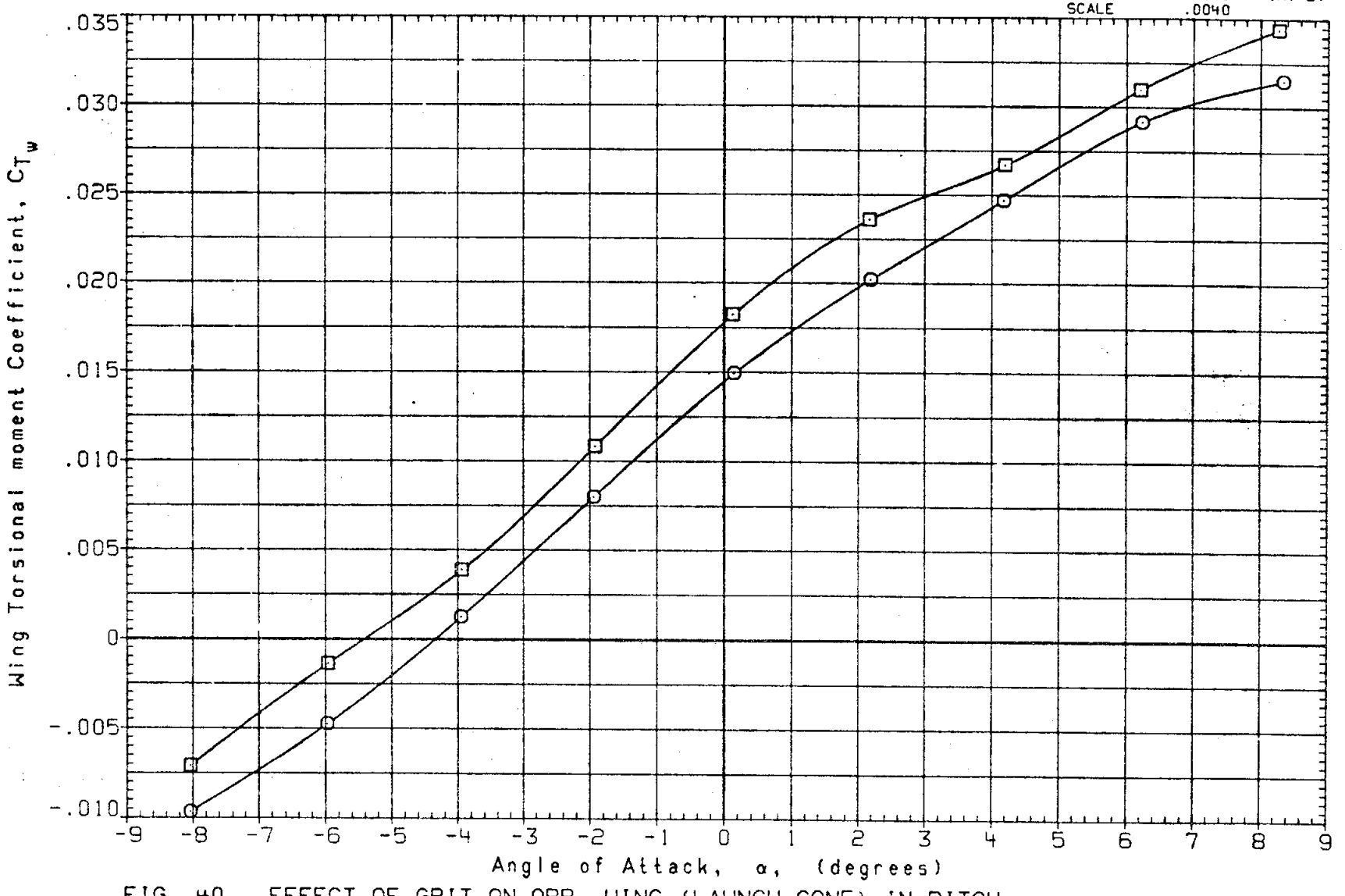

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/ORIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

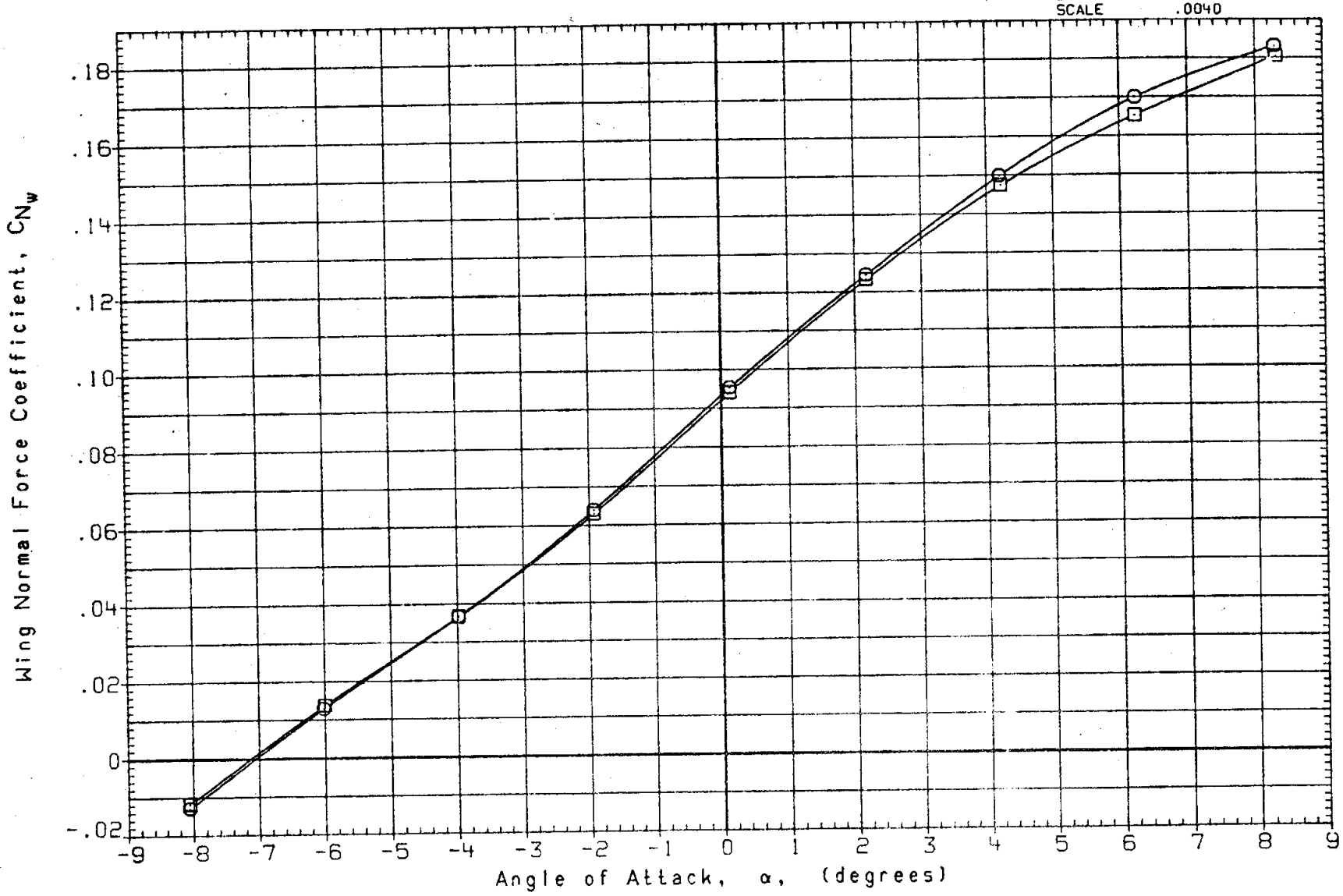

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

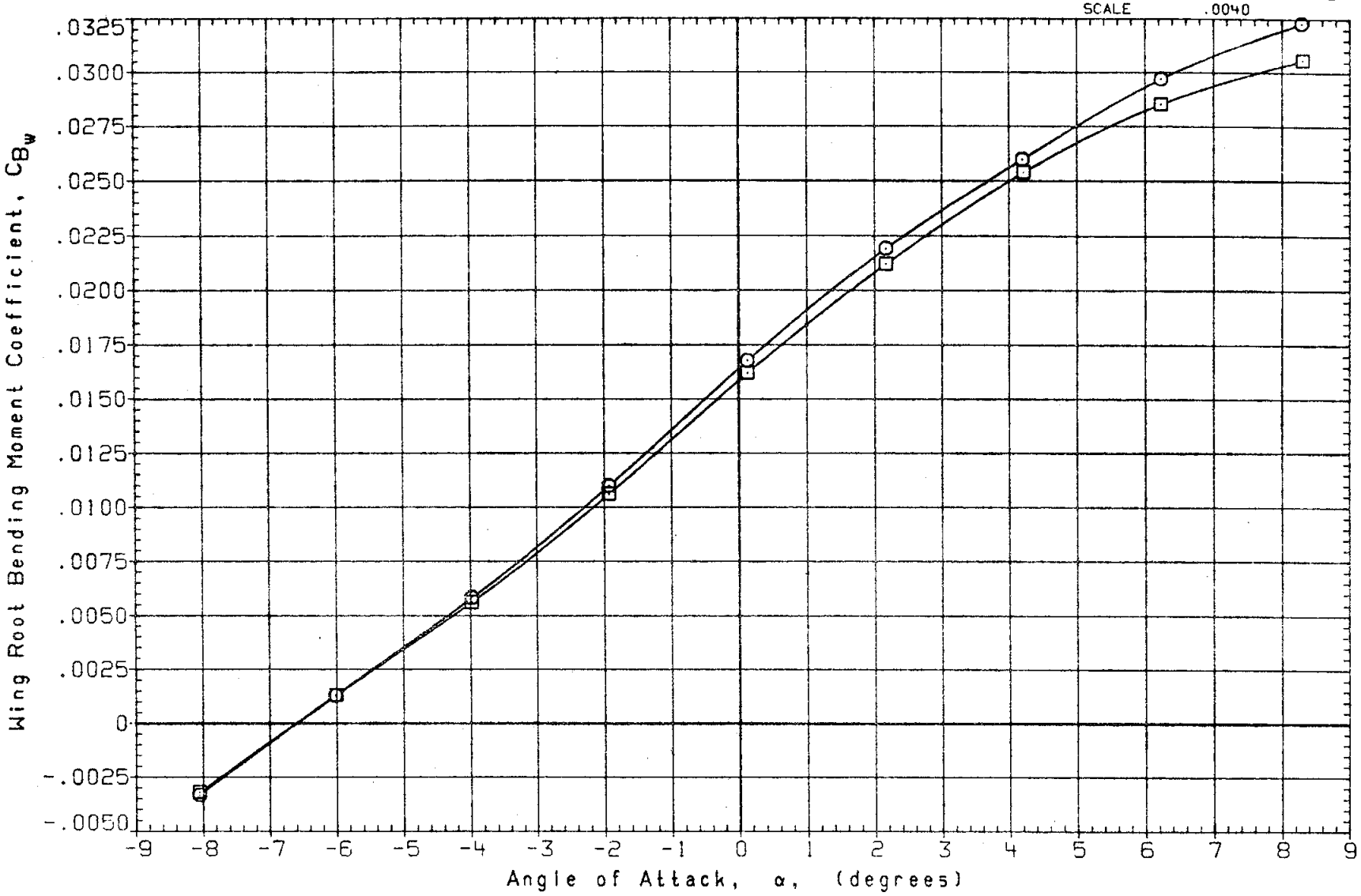

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

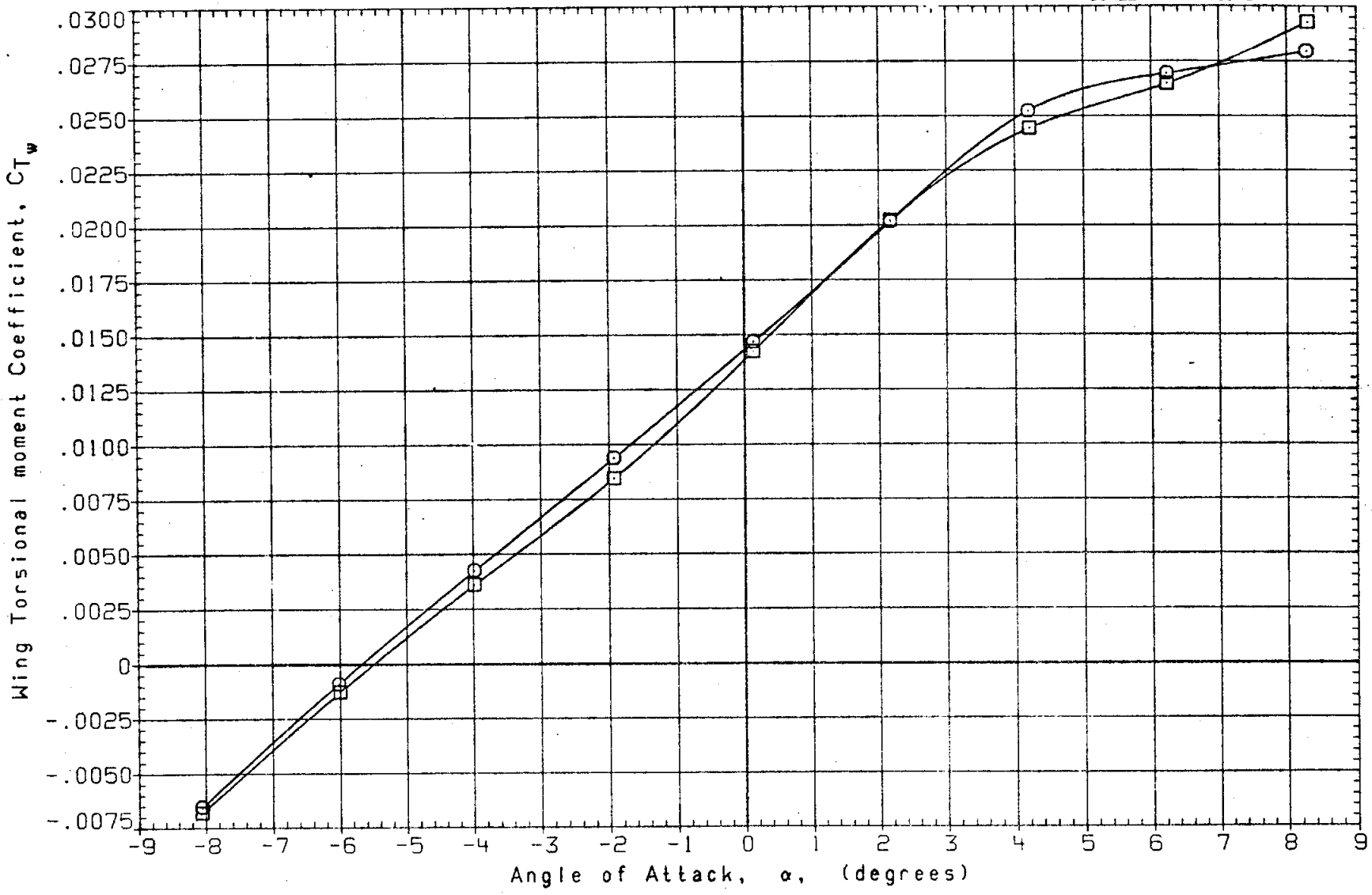

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

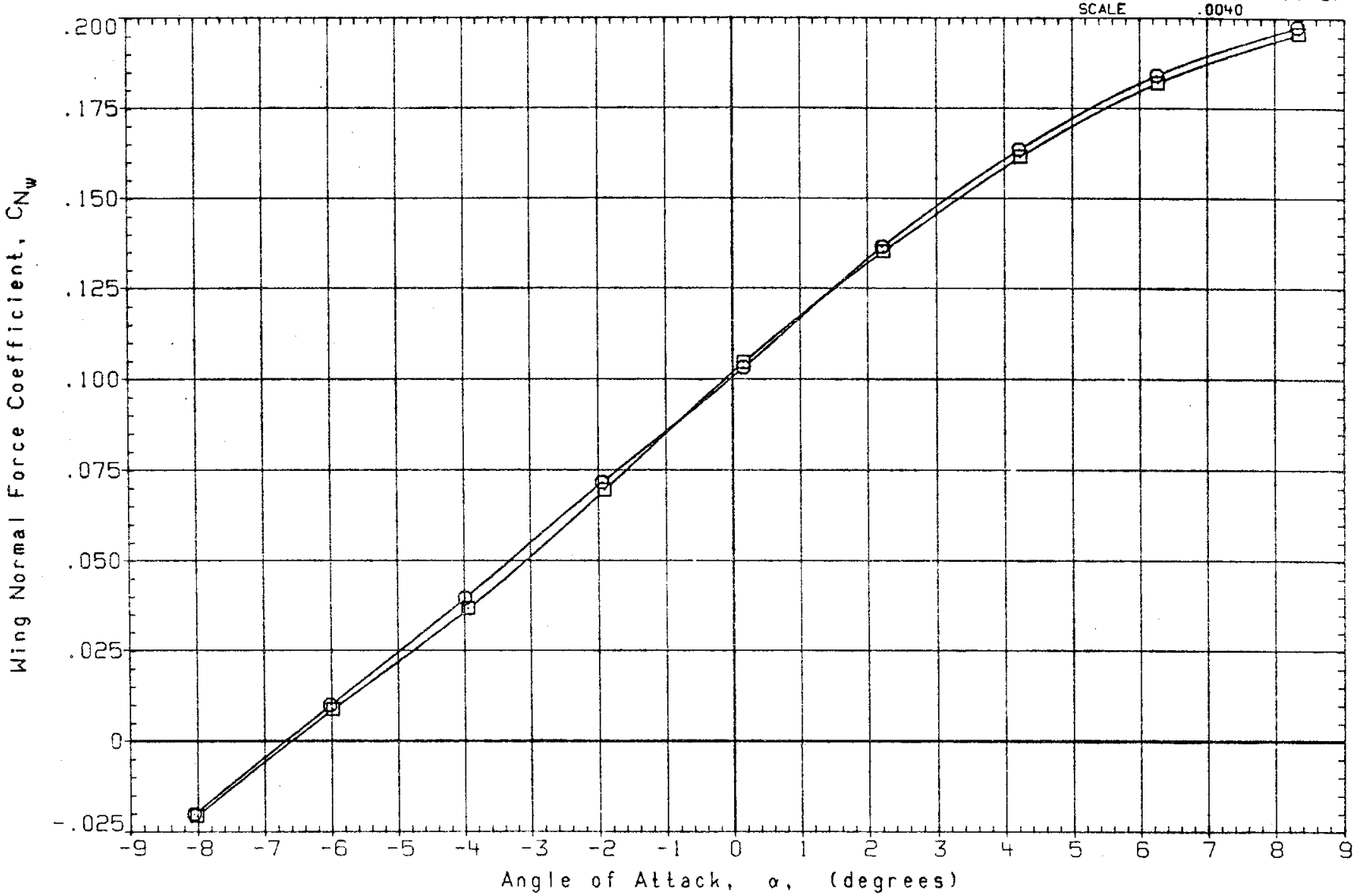

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

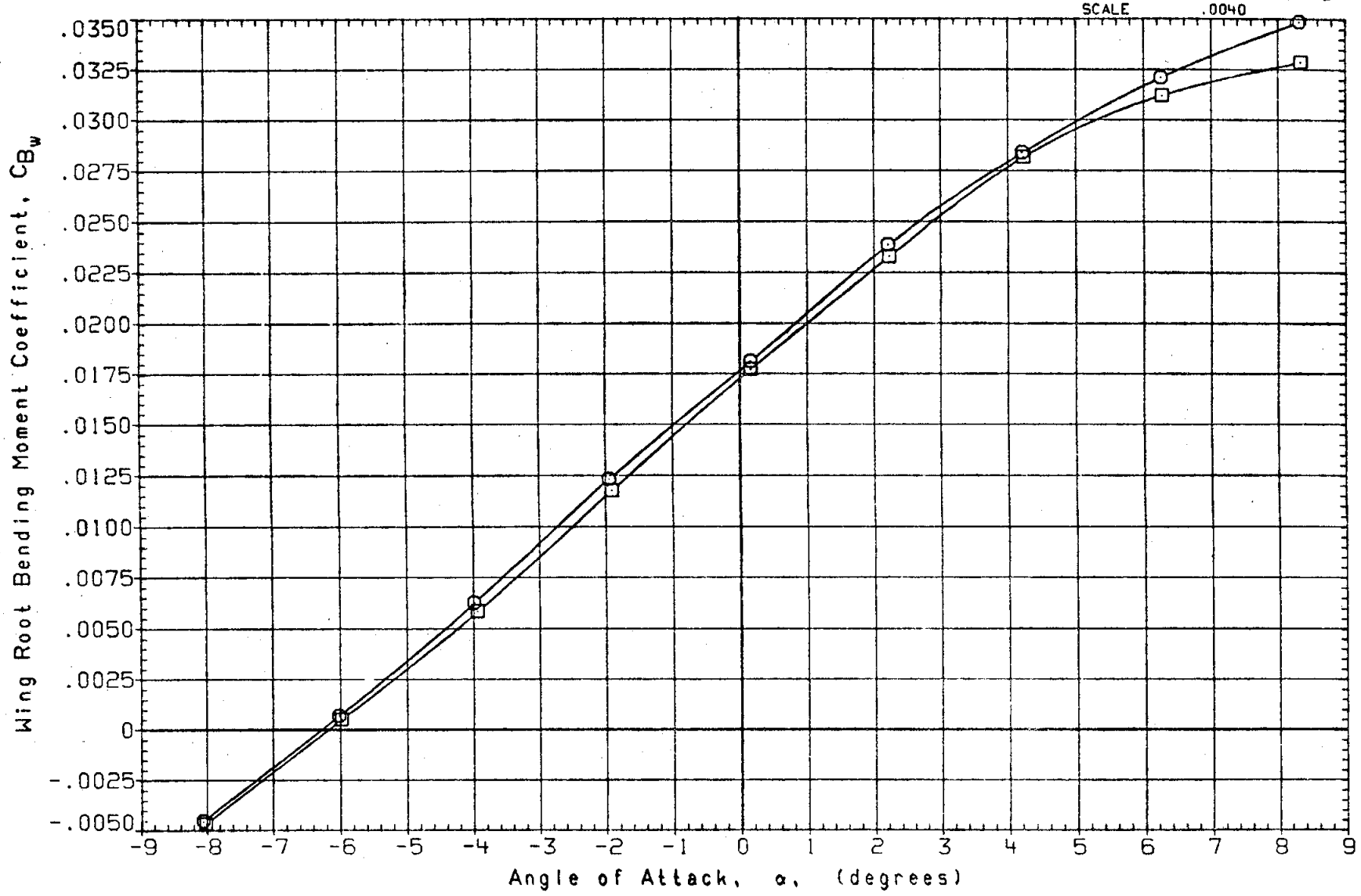

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

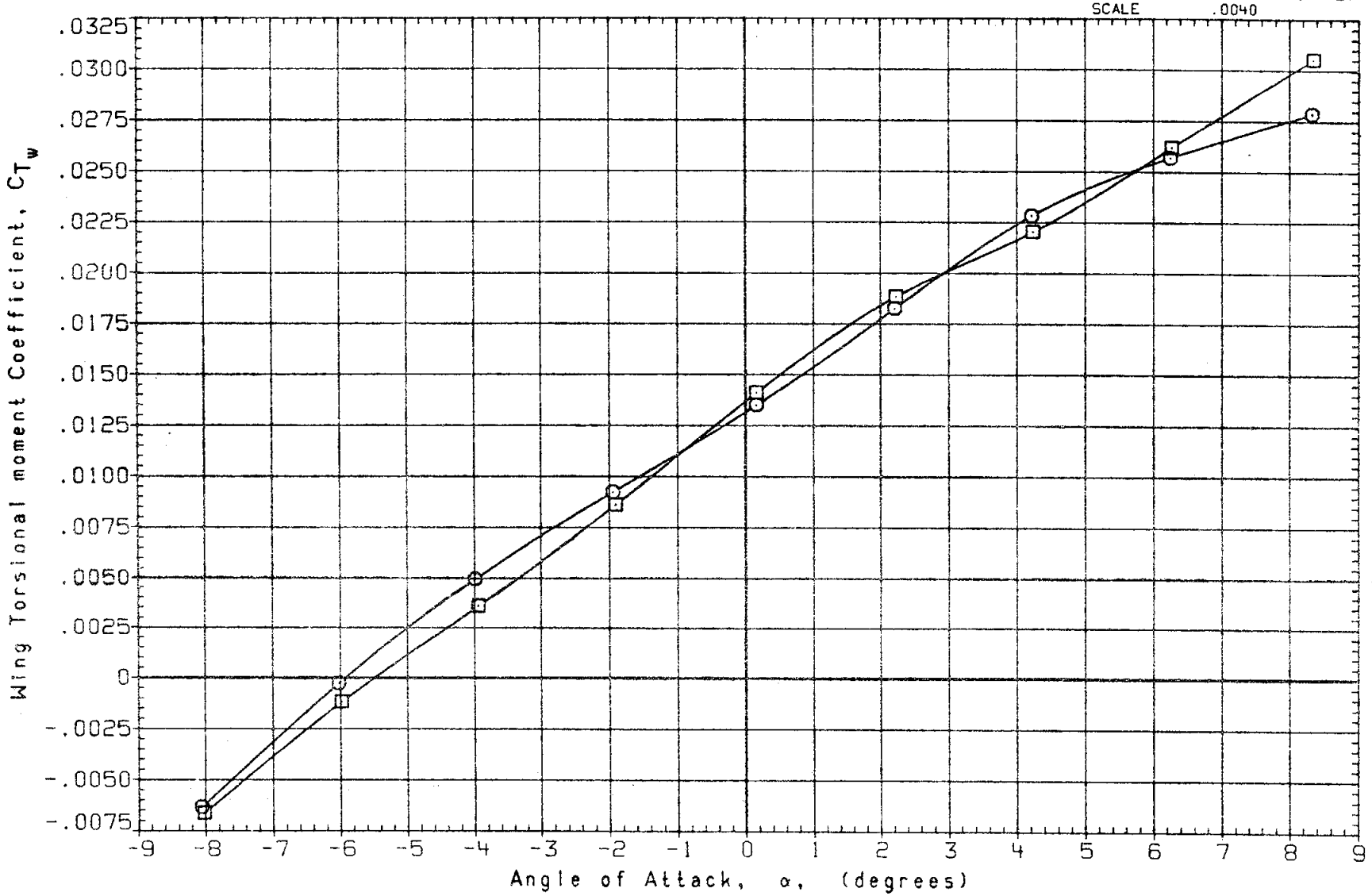

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

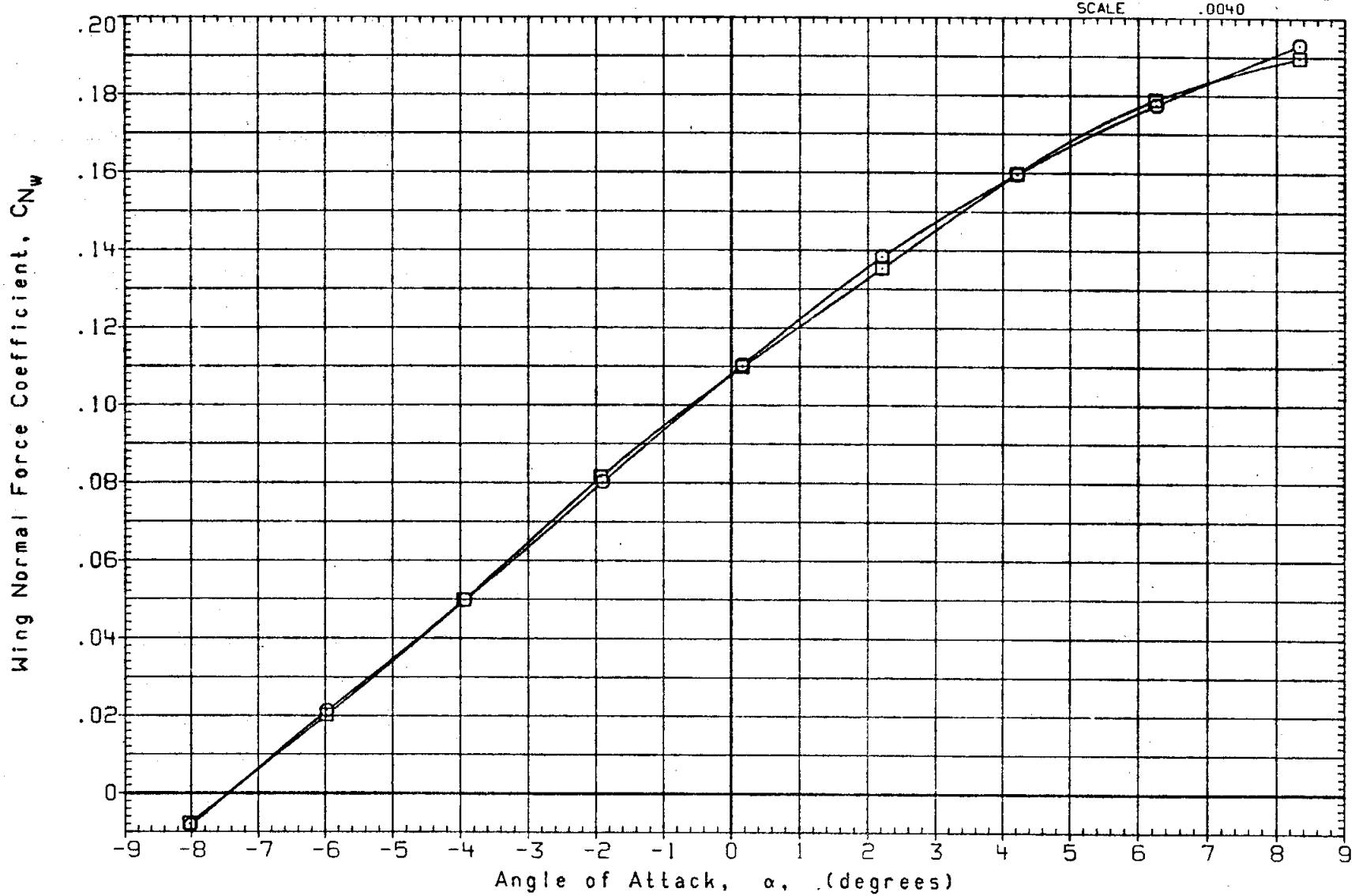

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

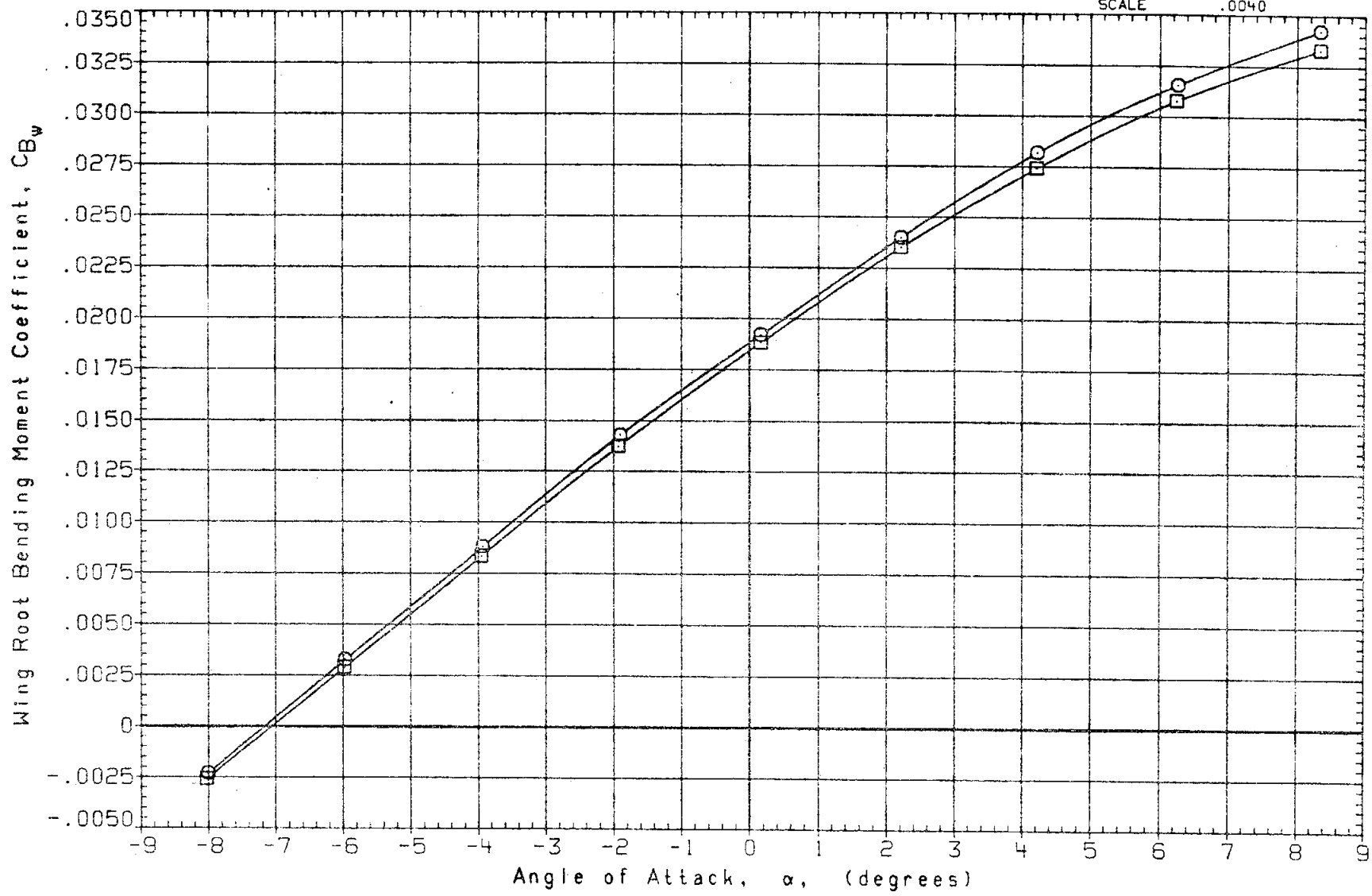

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

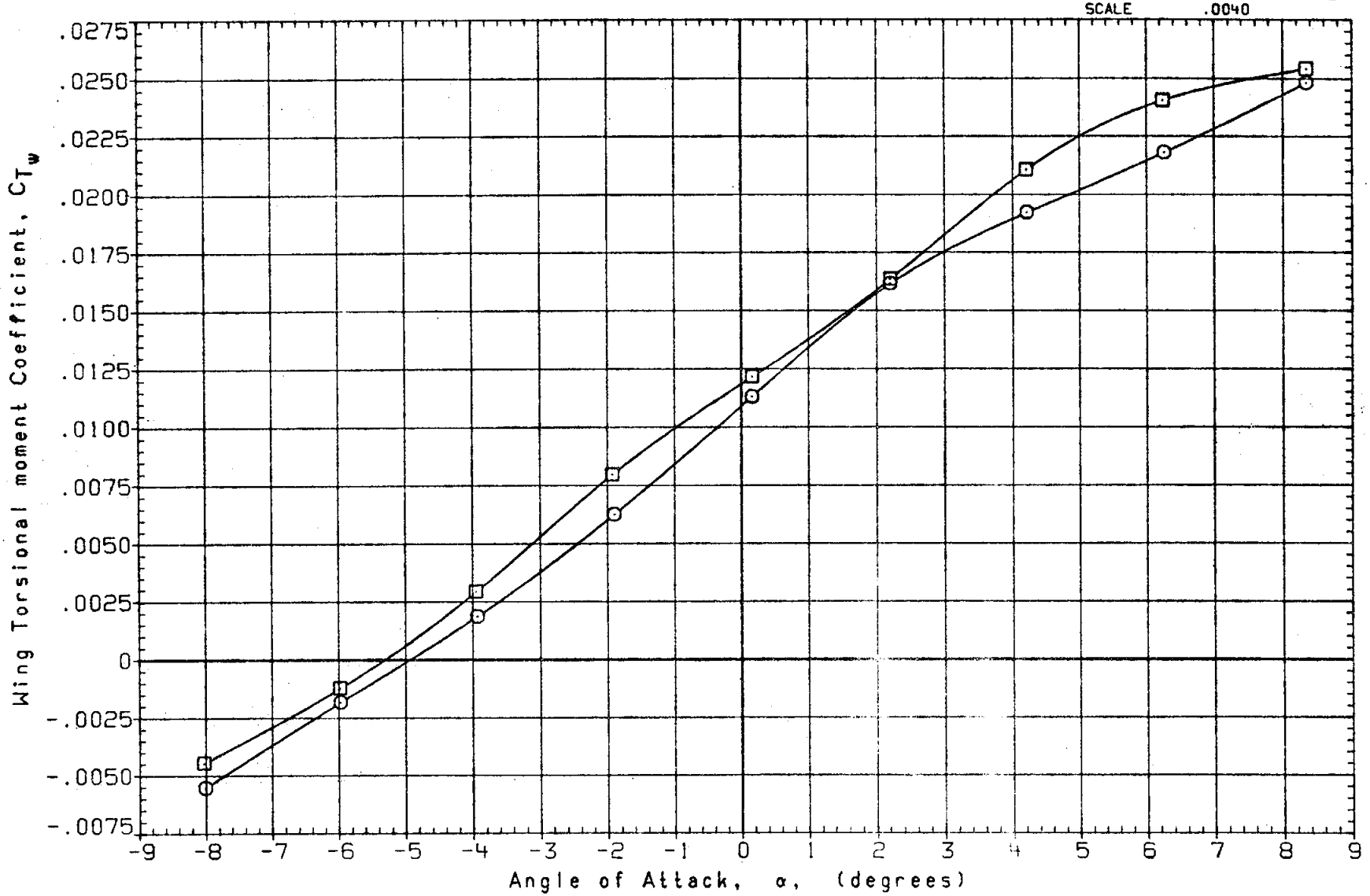

FIG. 40 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

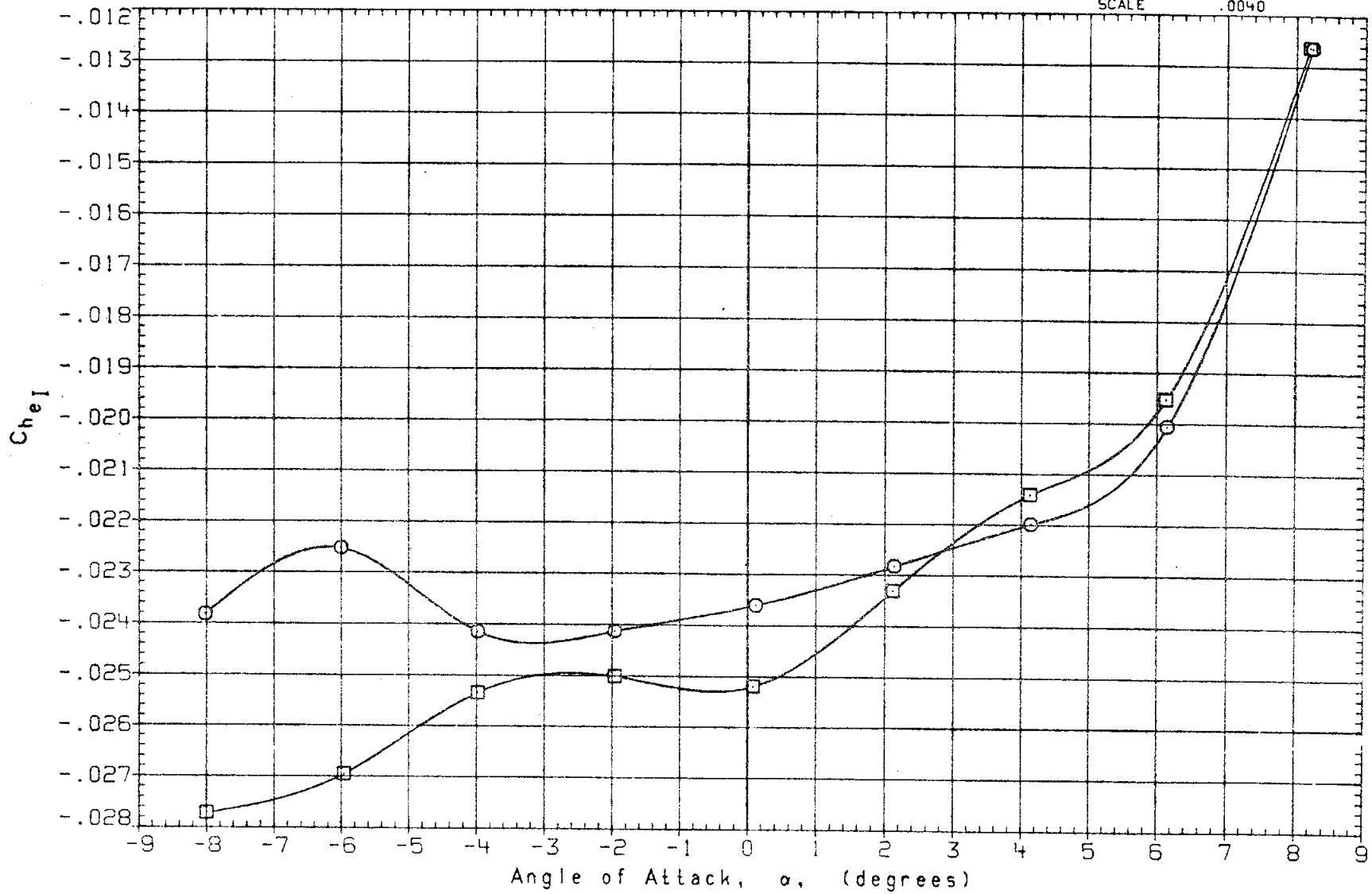

FIG. 41 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(A)MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

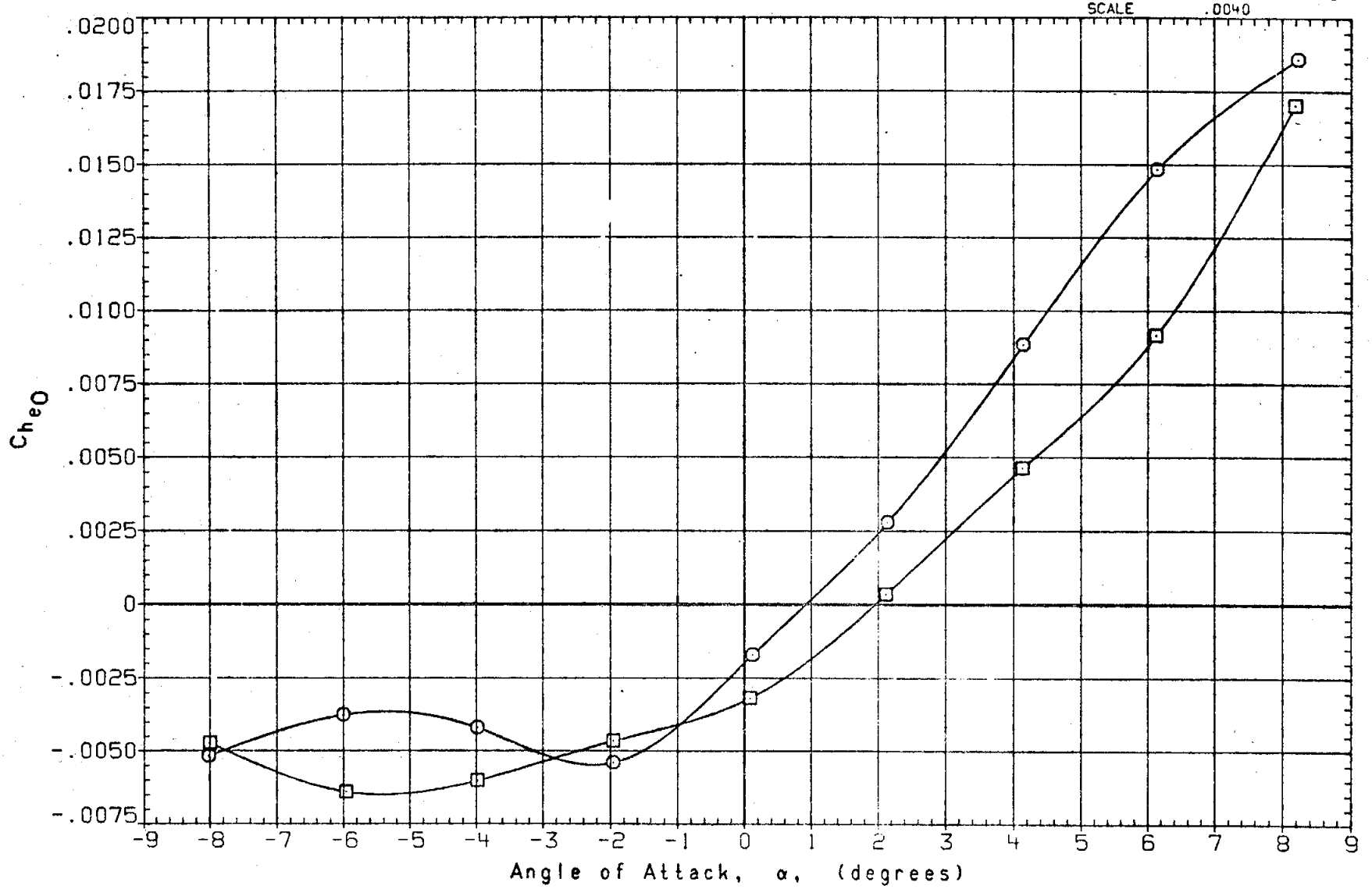

FIG. 41 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(A)MACH = .60 DATE 12 MAR 80

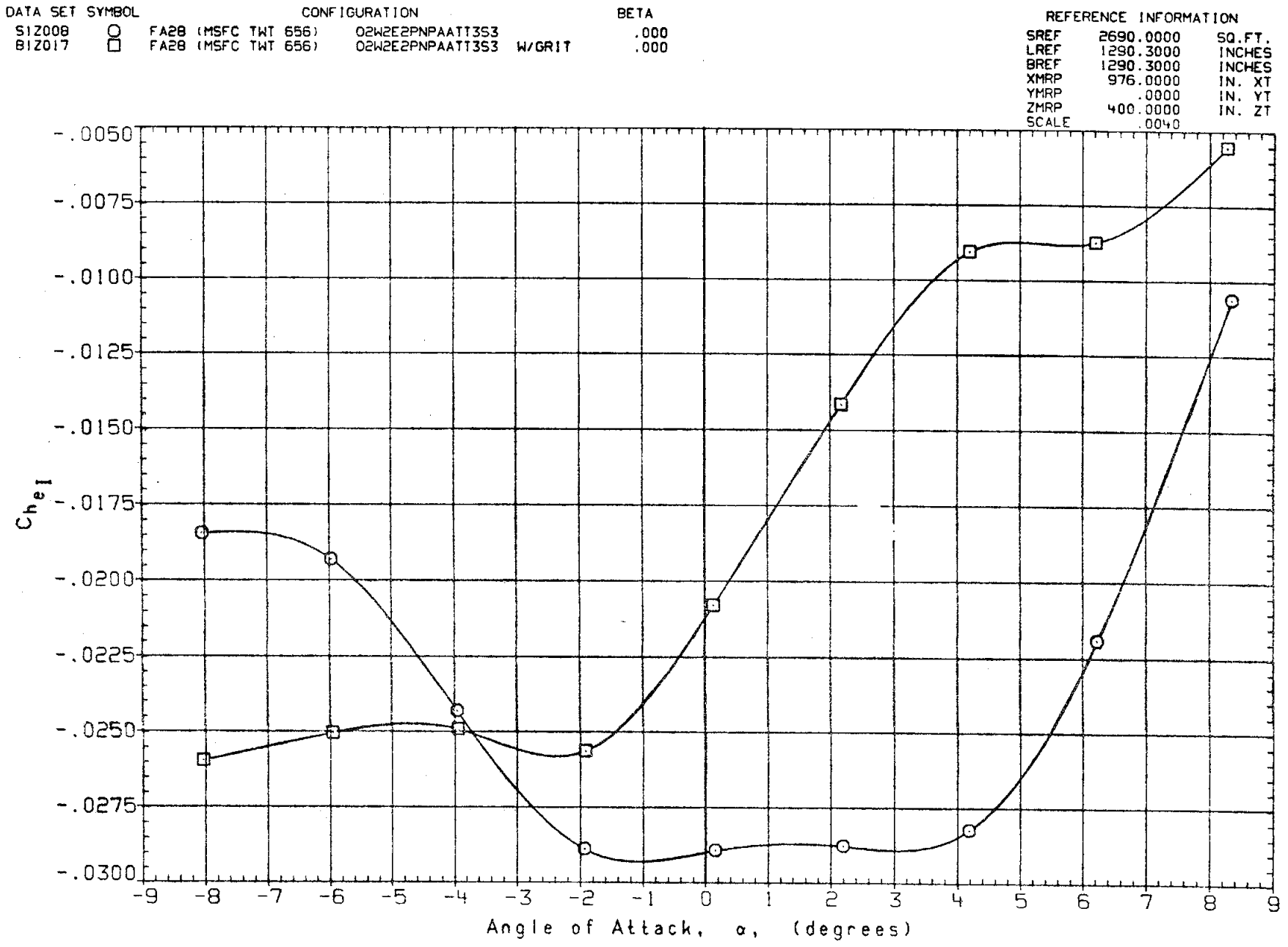

FIG. 41 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

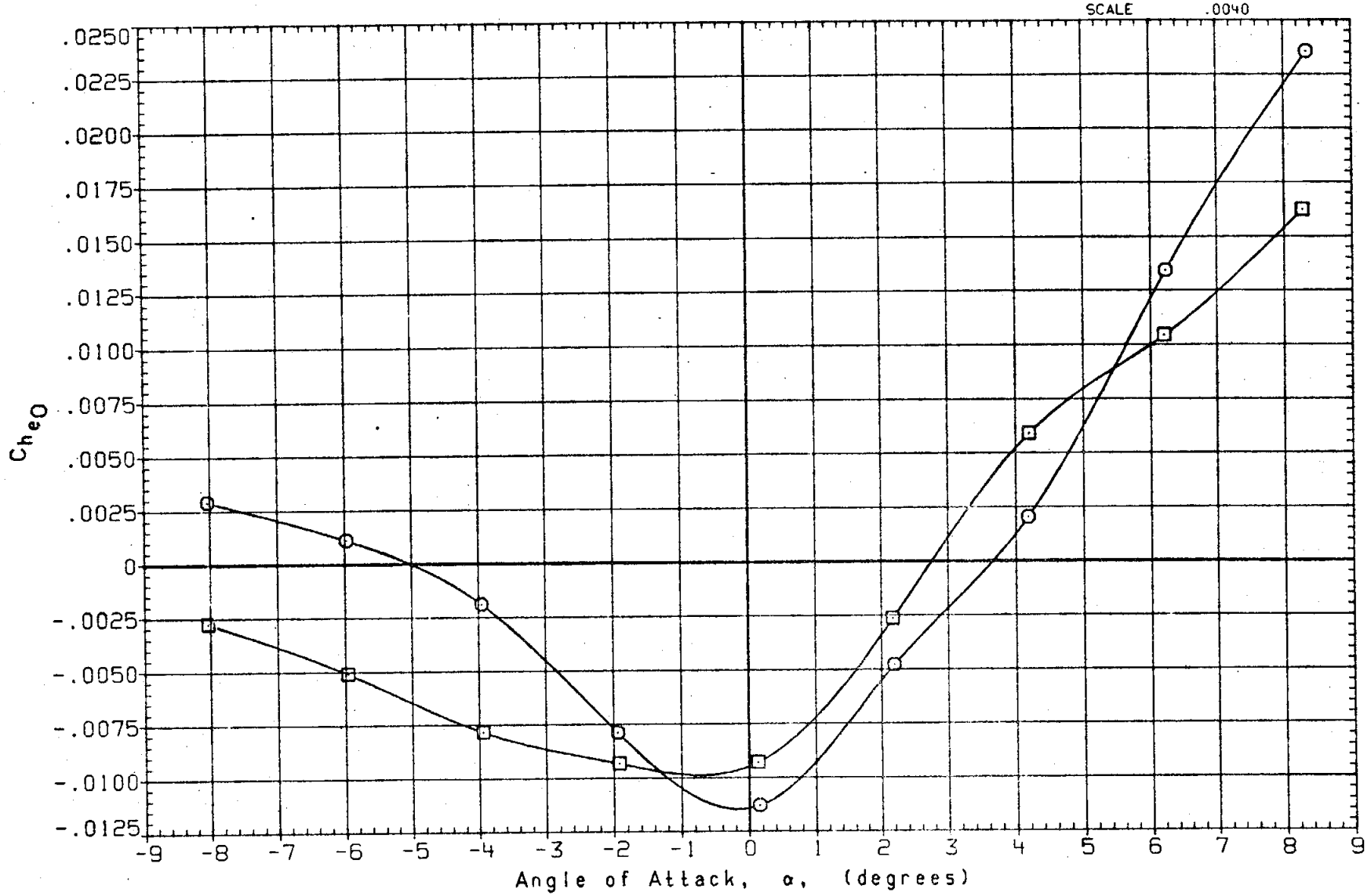

FIG. 41 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

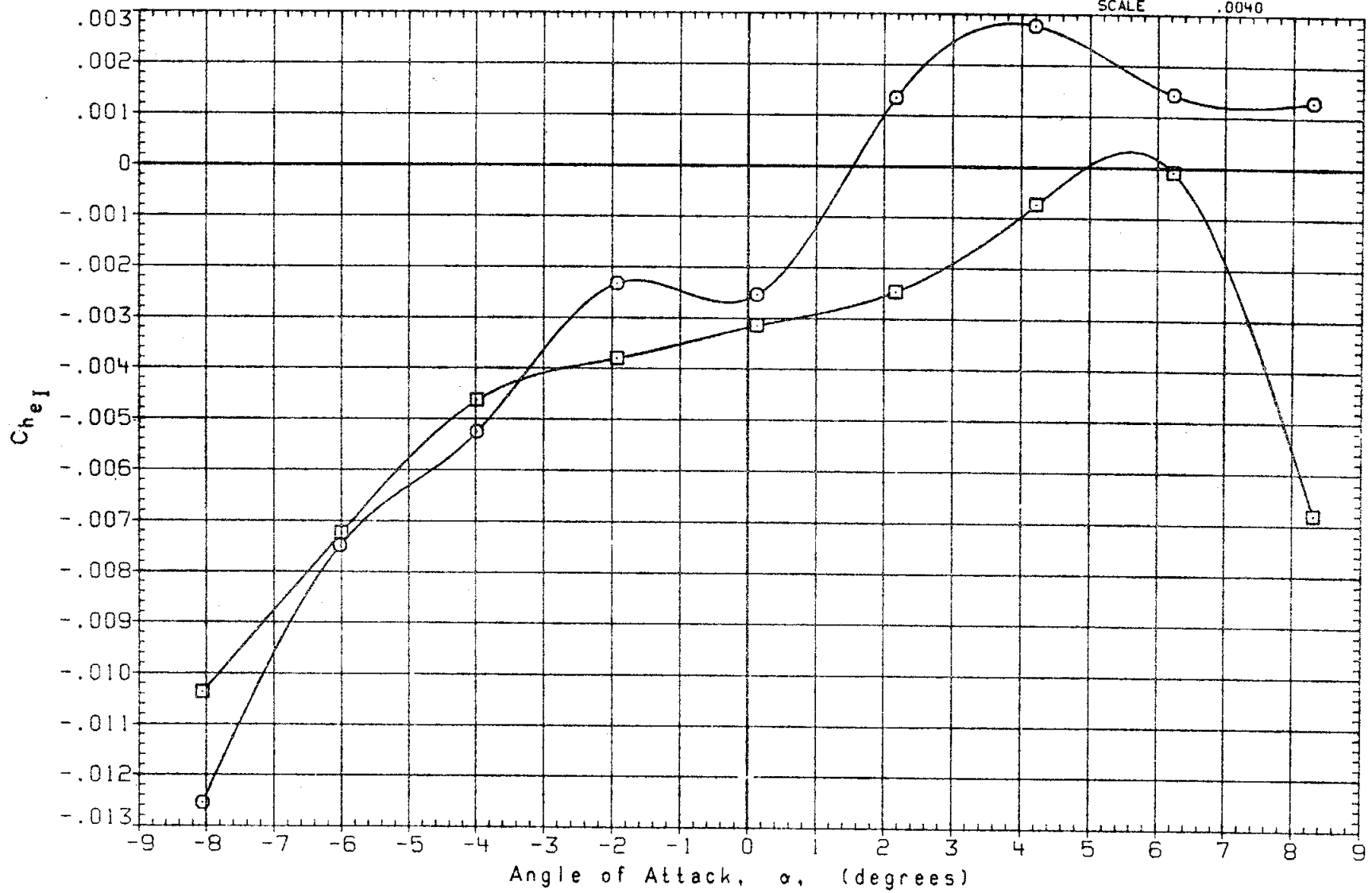

FIG. 41 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		BETA
S1Z008	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

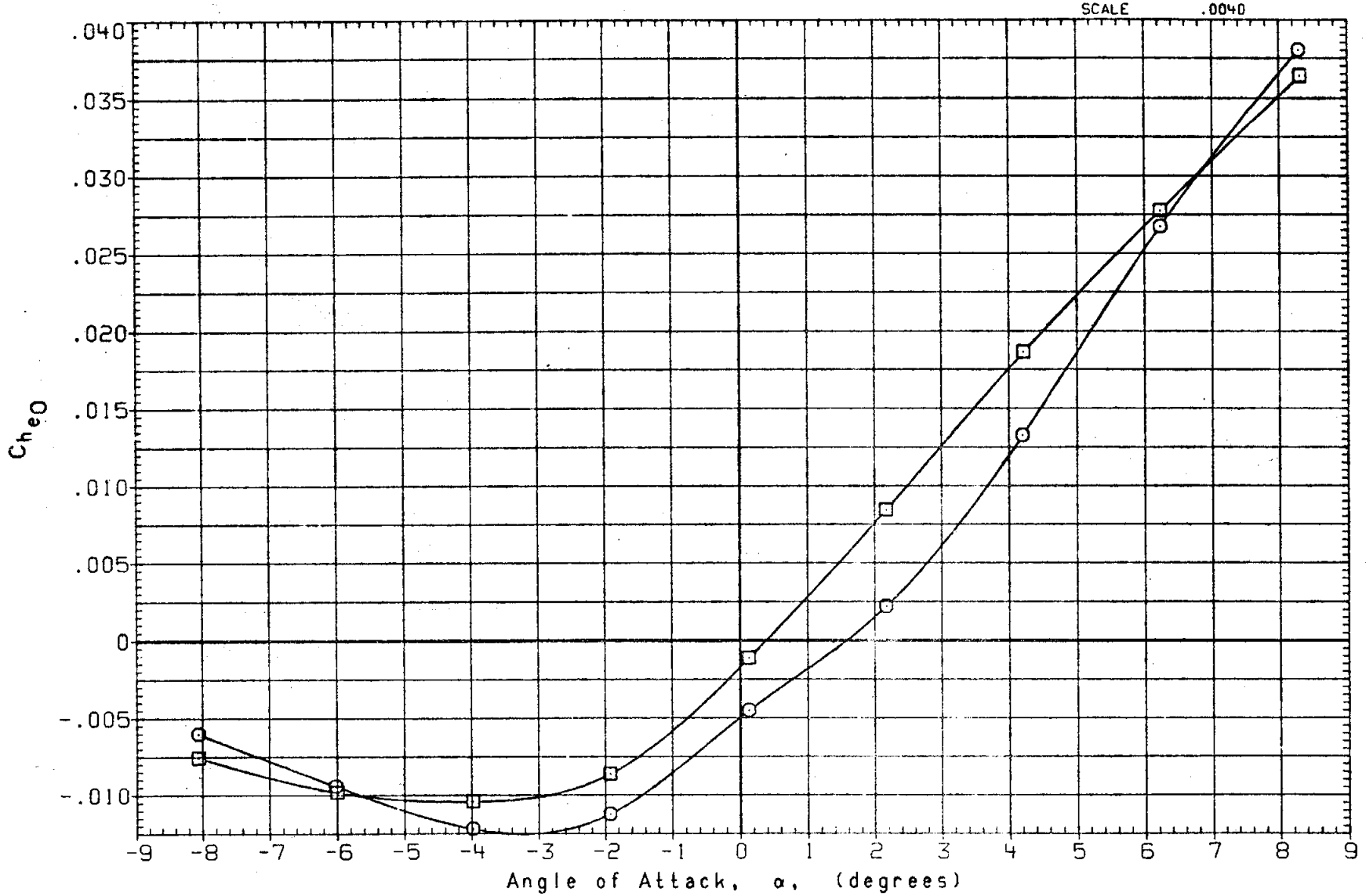

FIG. 41 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

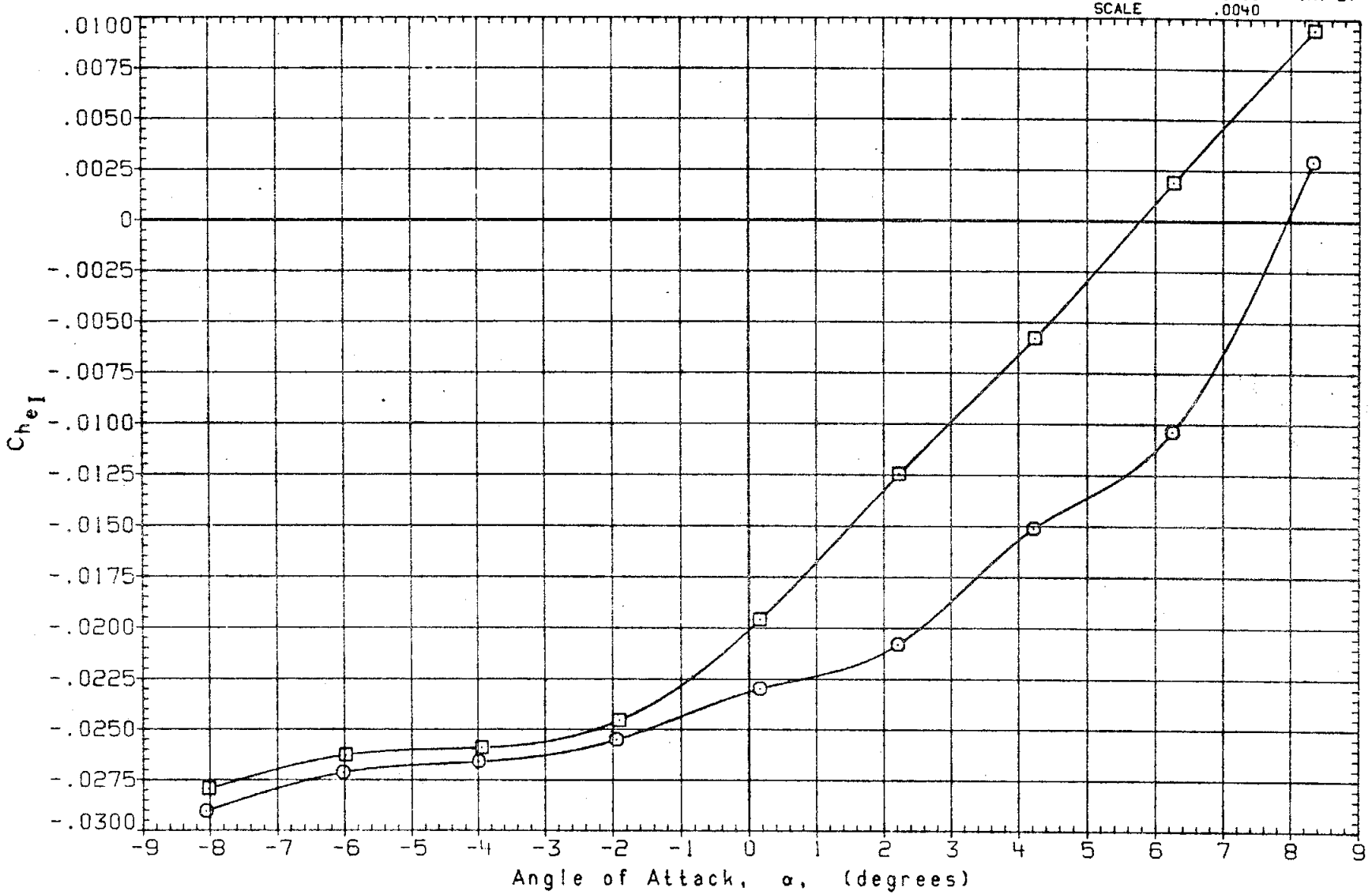

FIG. 41 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

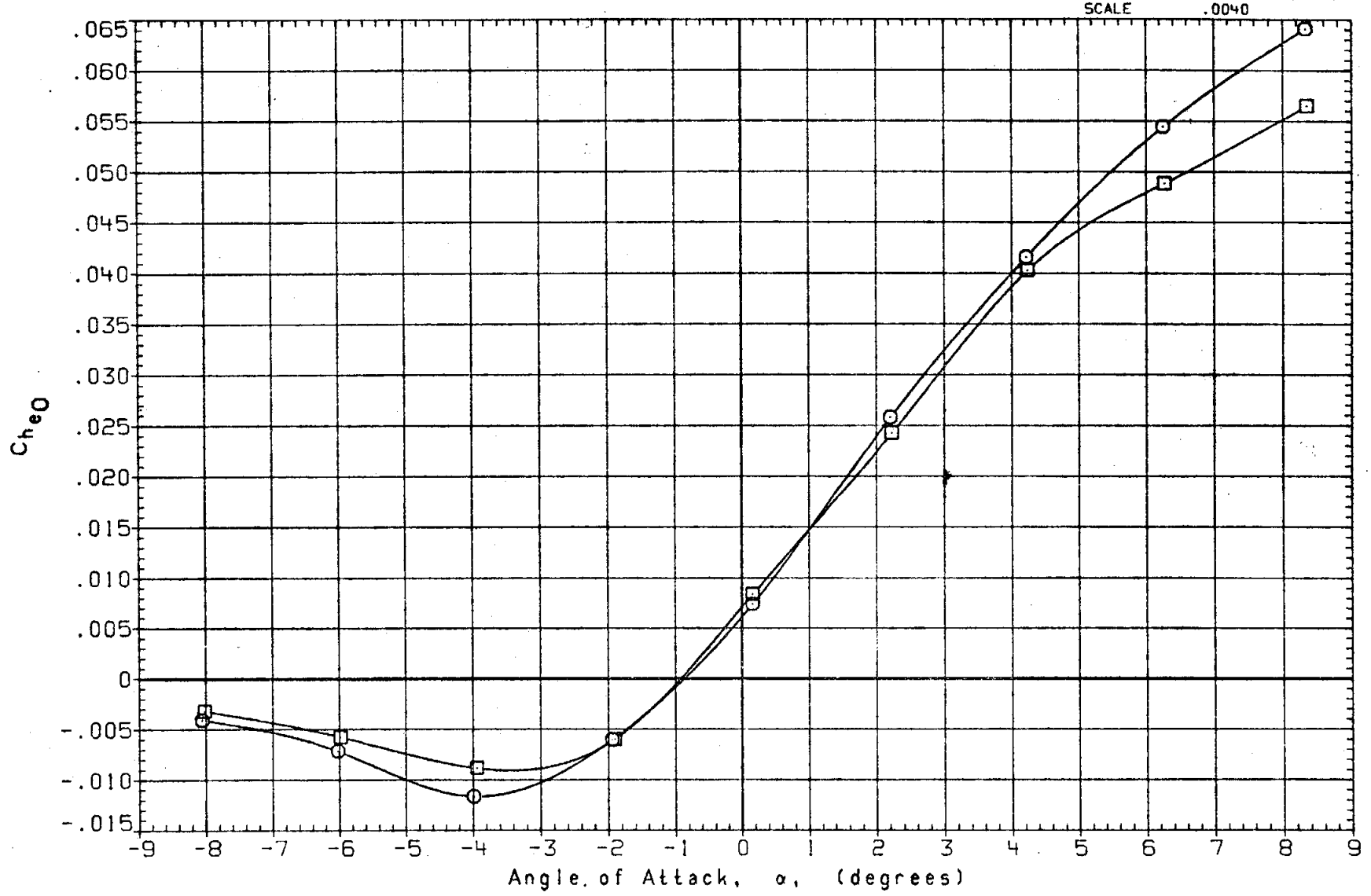

FIG. 41 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.00 0	IN. ZT
SCALE	.3040	

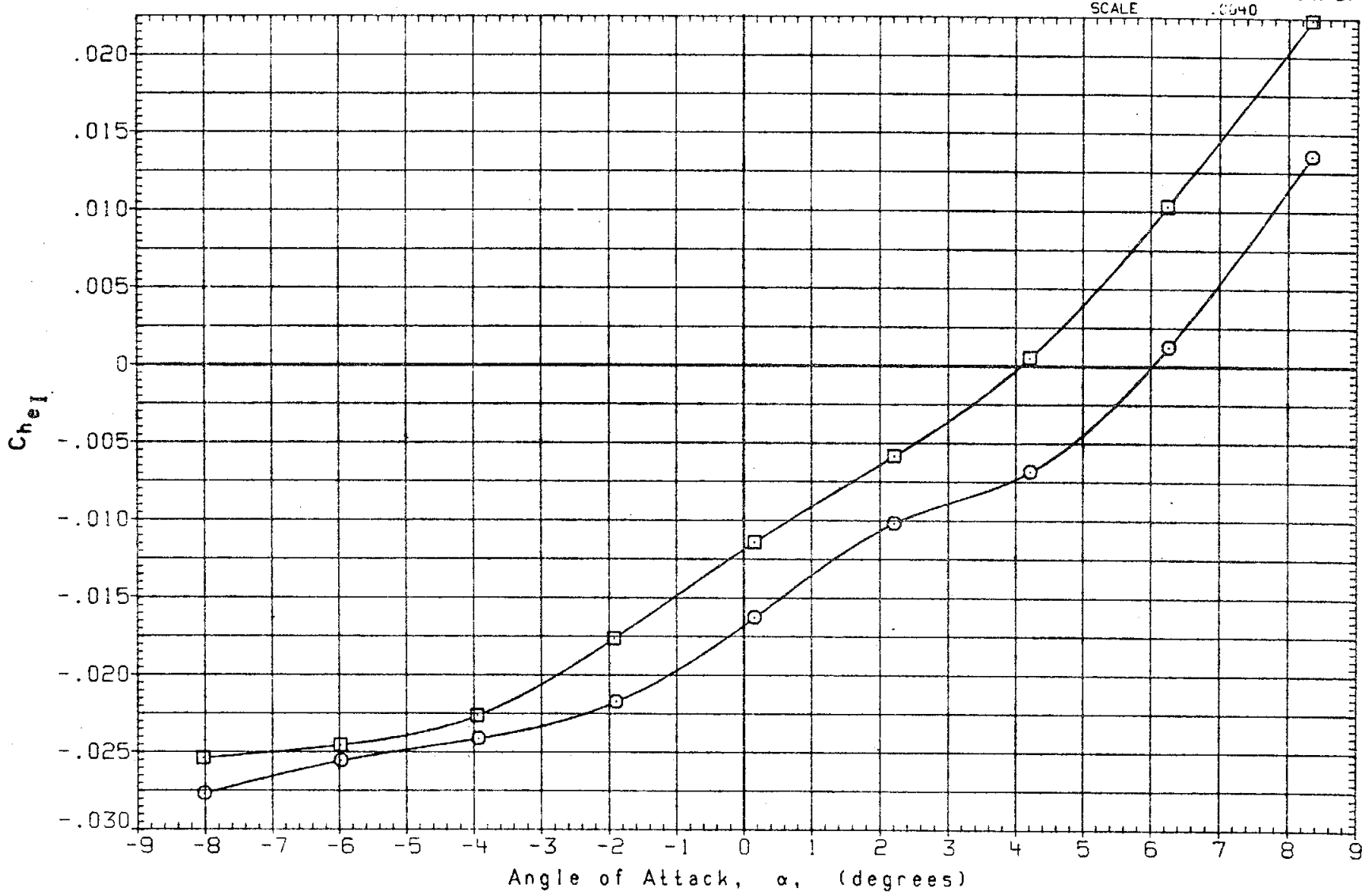

FIG. 41 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	BETA
S1Z008	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000
B1Z017	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

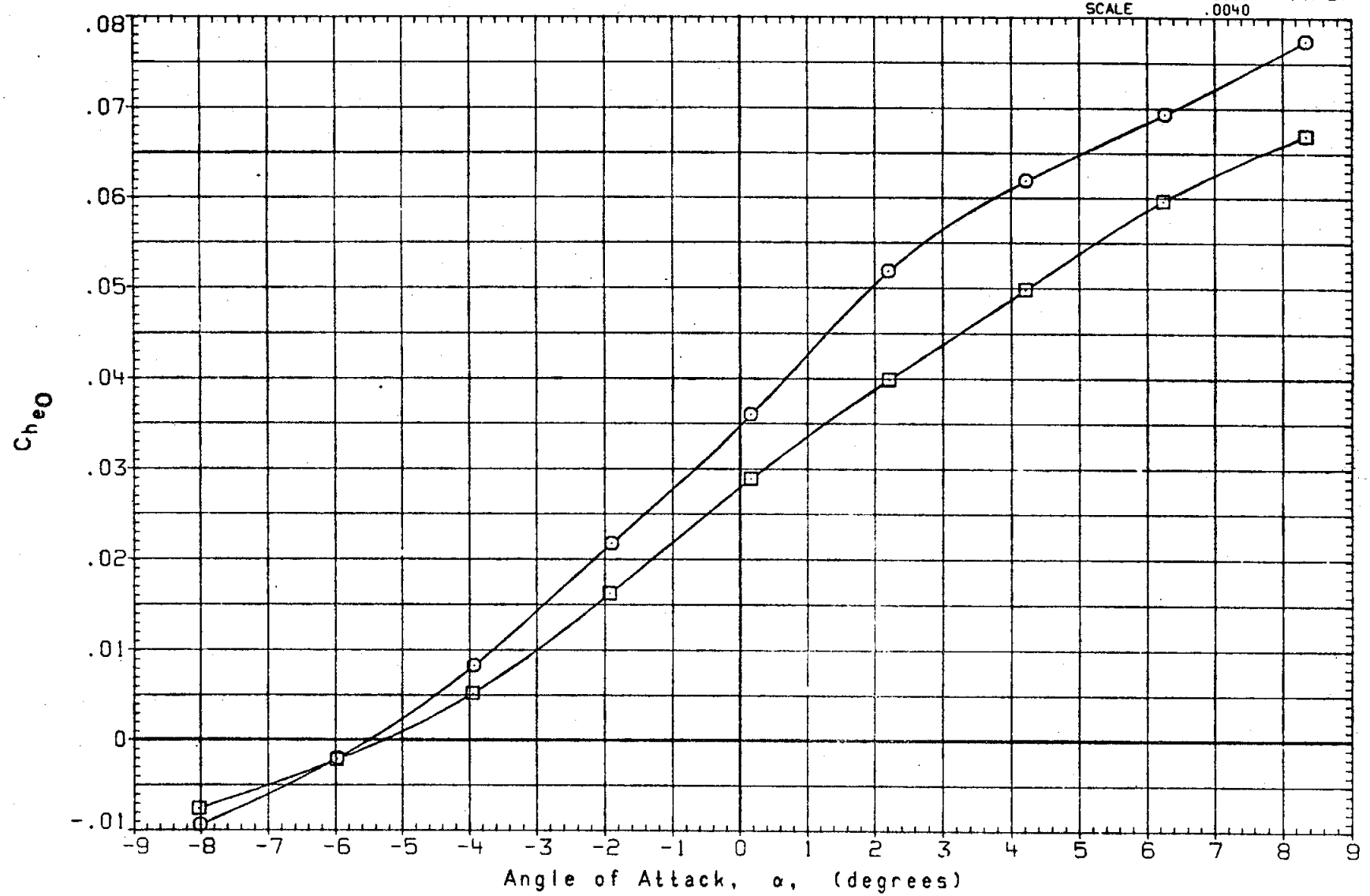

FIG. 41 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN PITCH

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R12009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	970.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

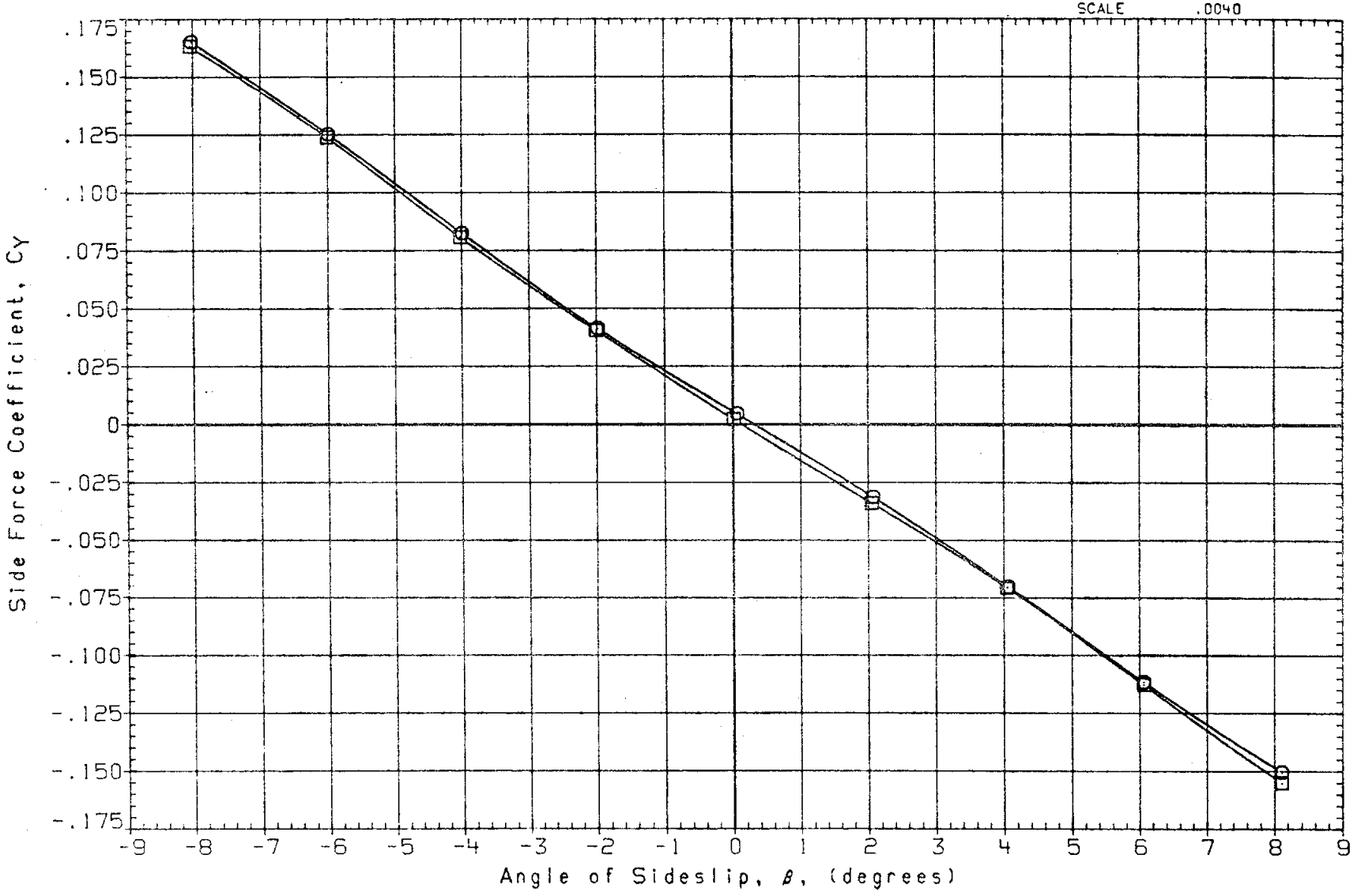

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

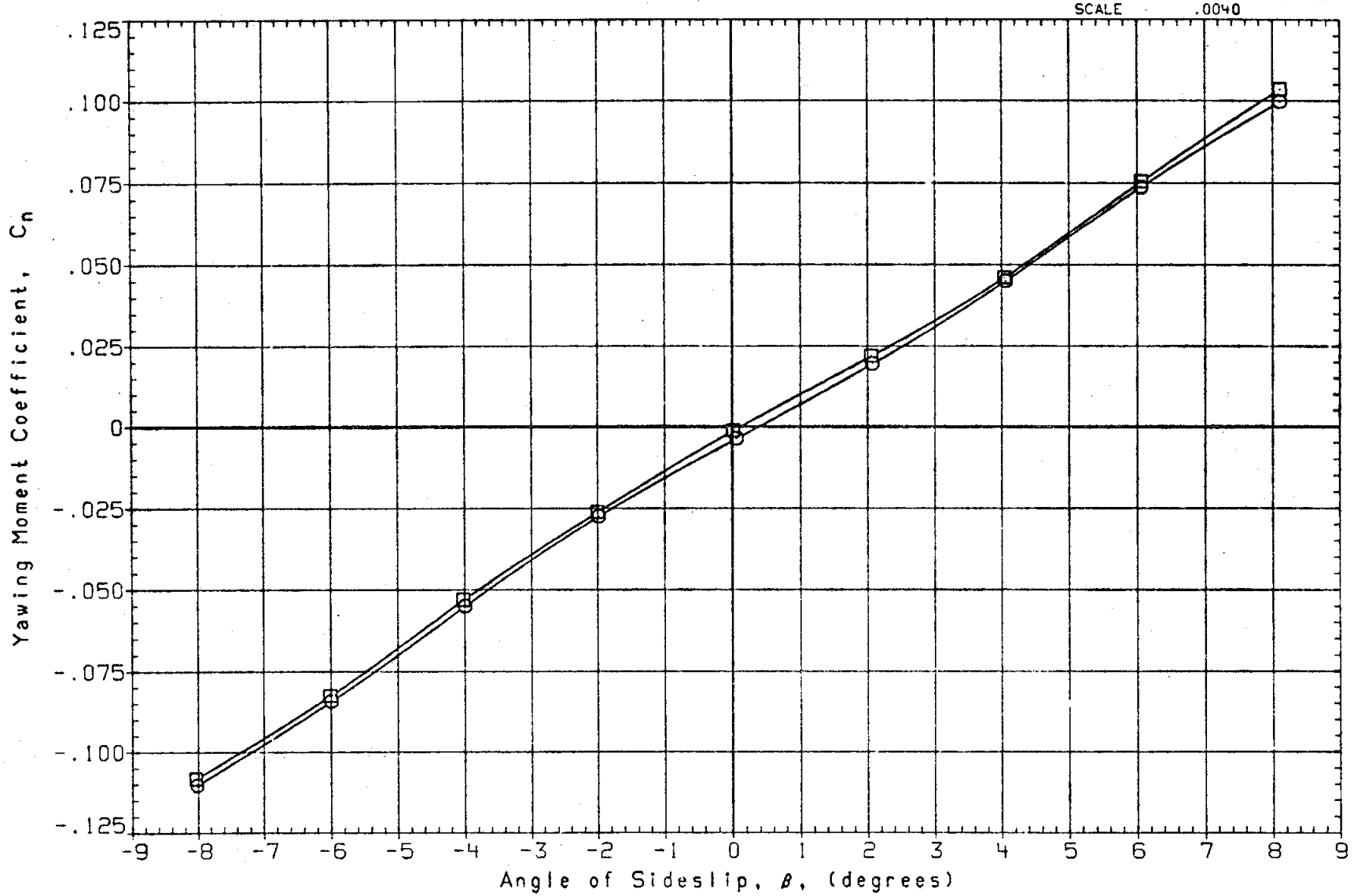

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

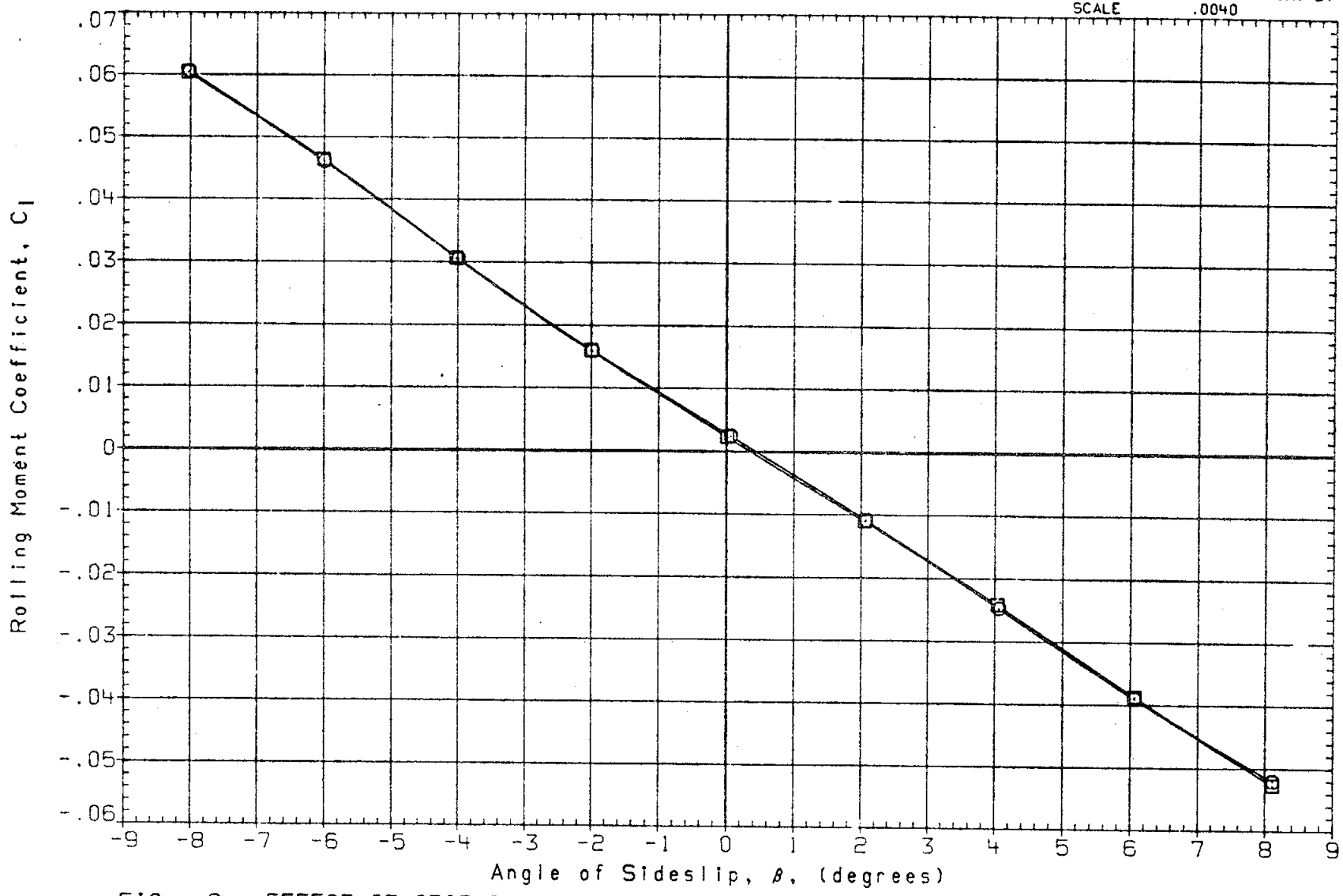

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(A) MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

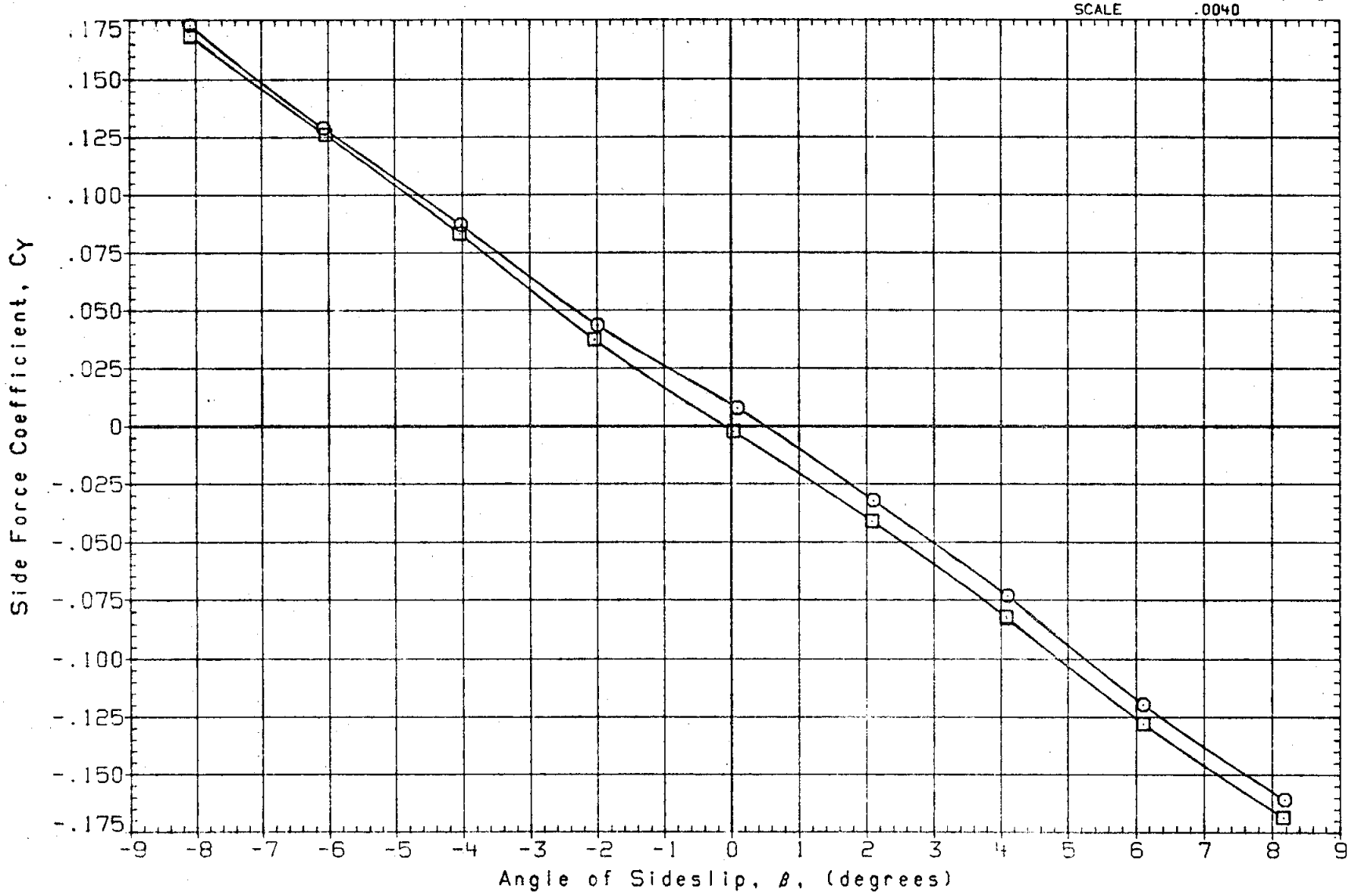

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

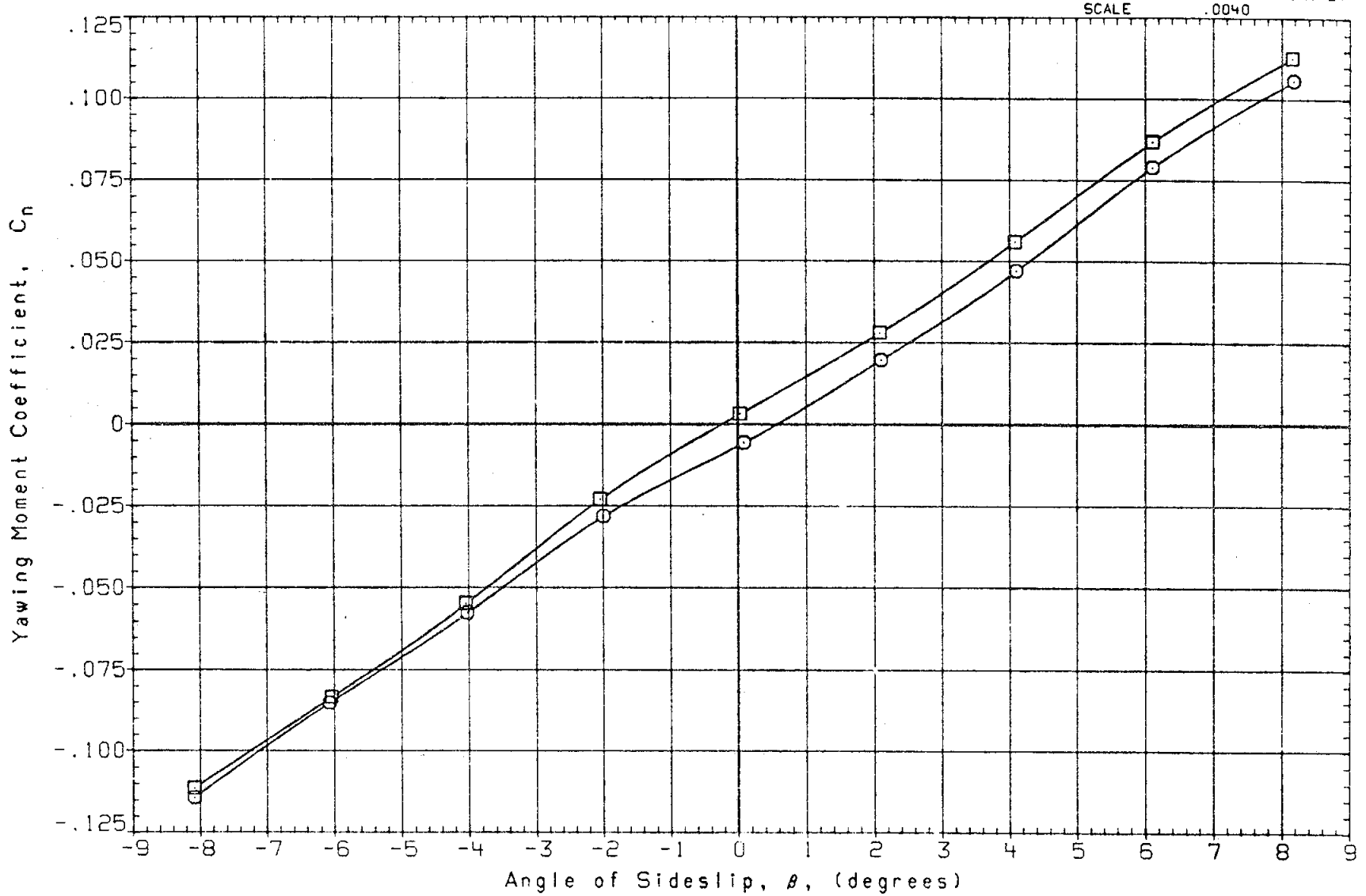

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(B) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

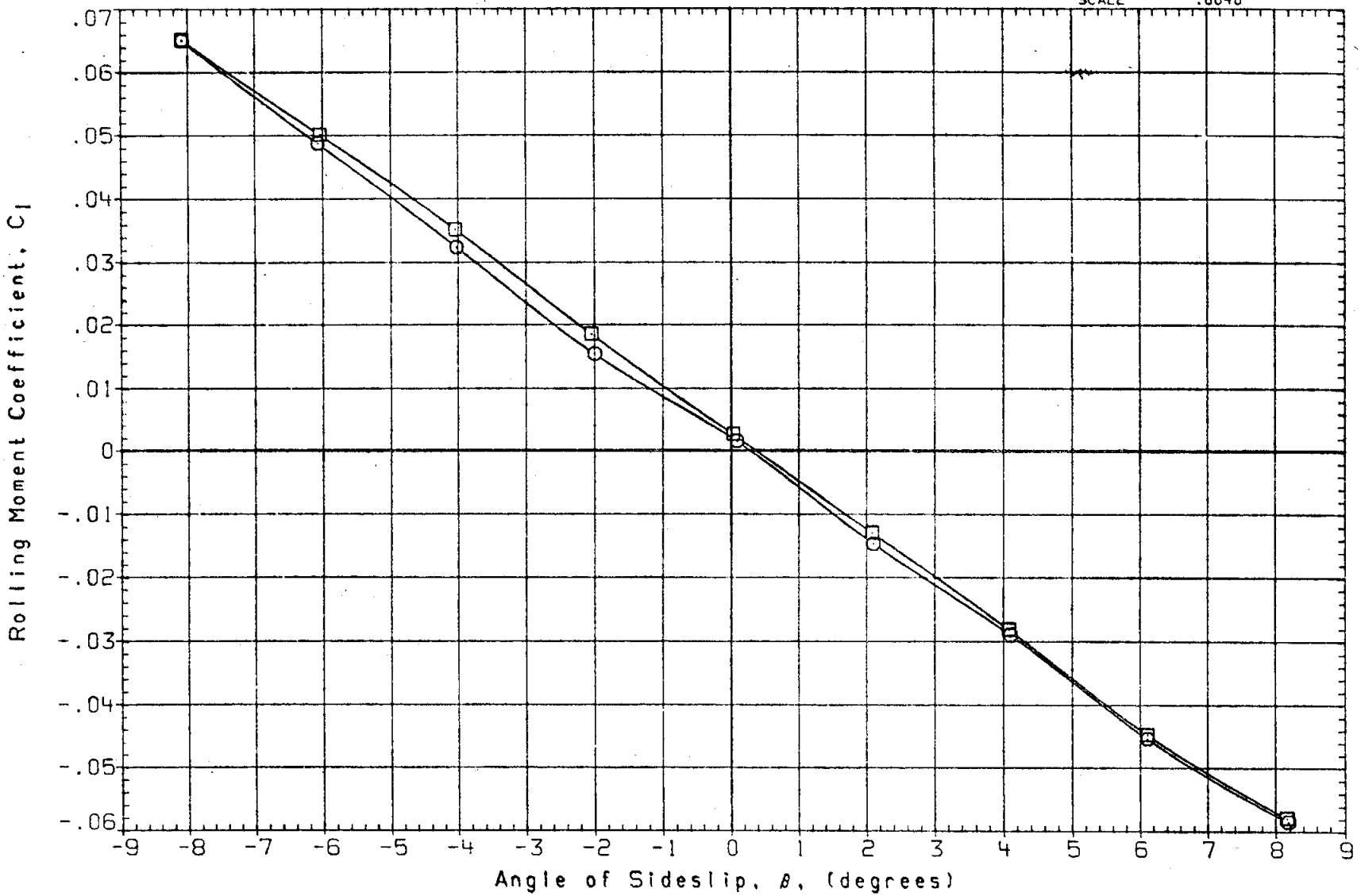

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

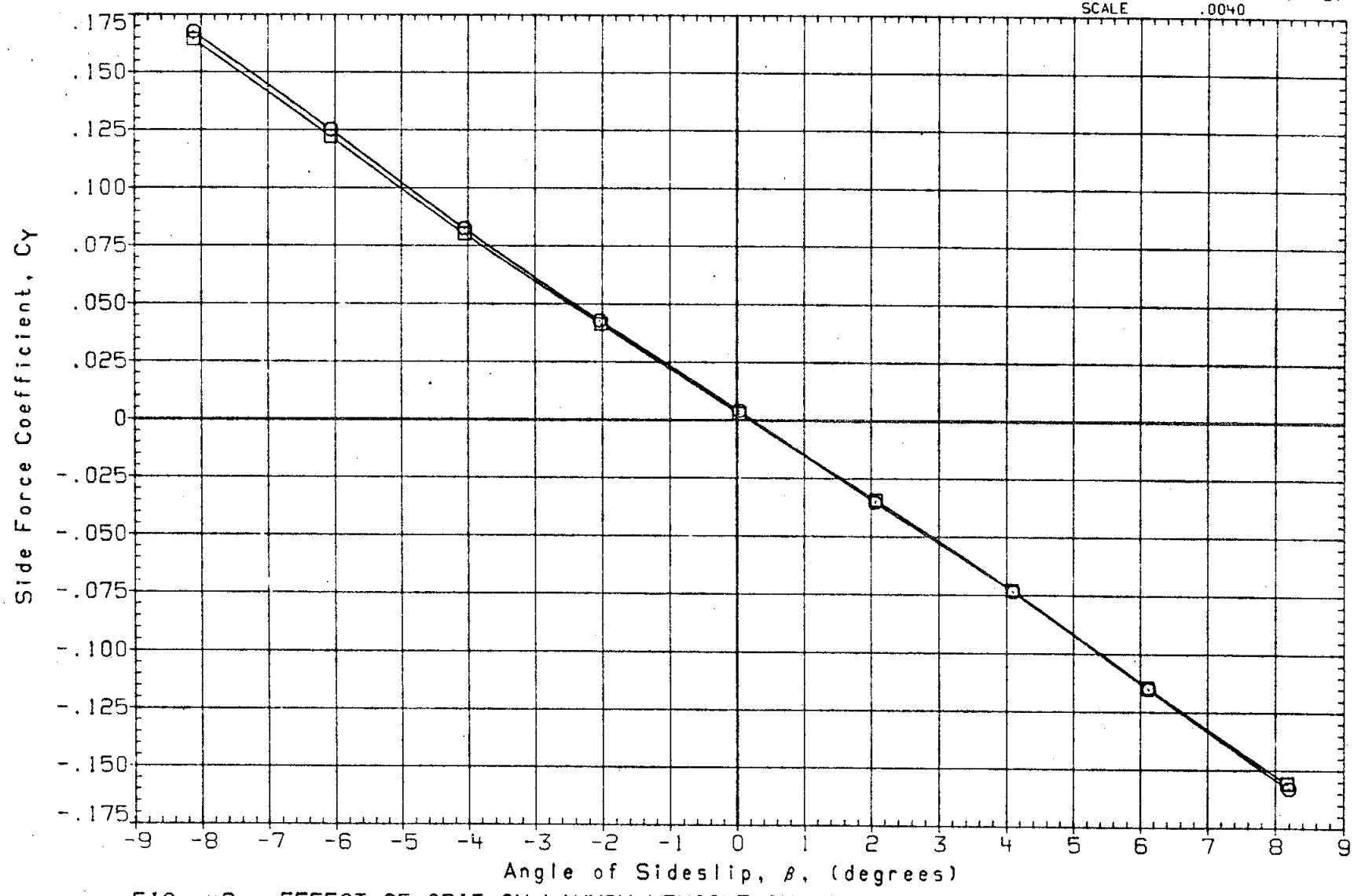

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

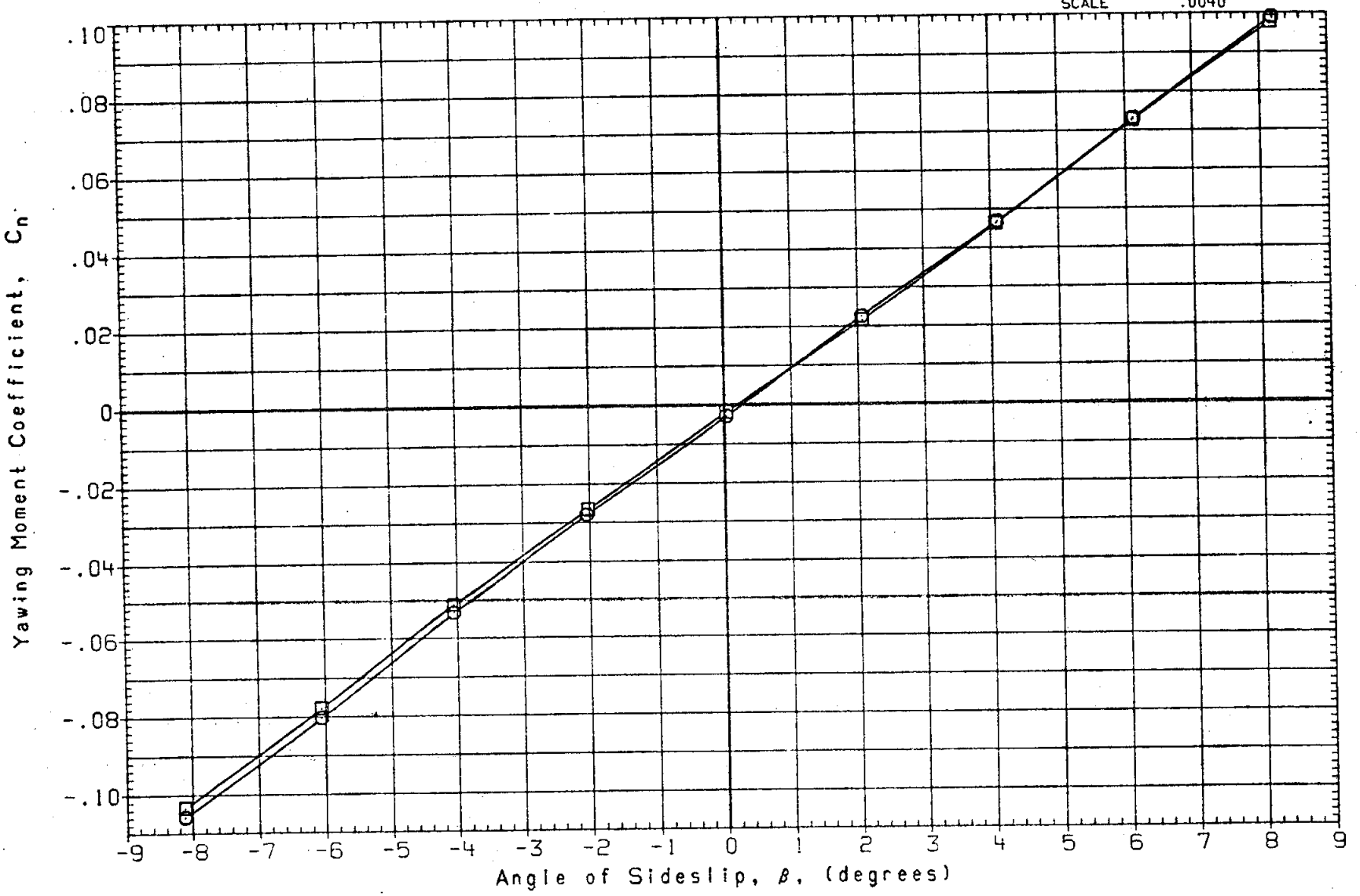

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

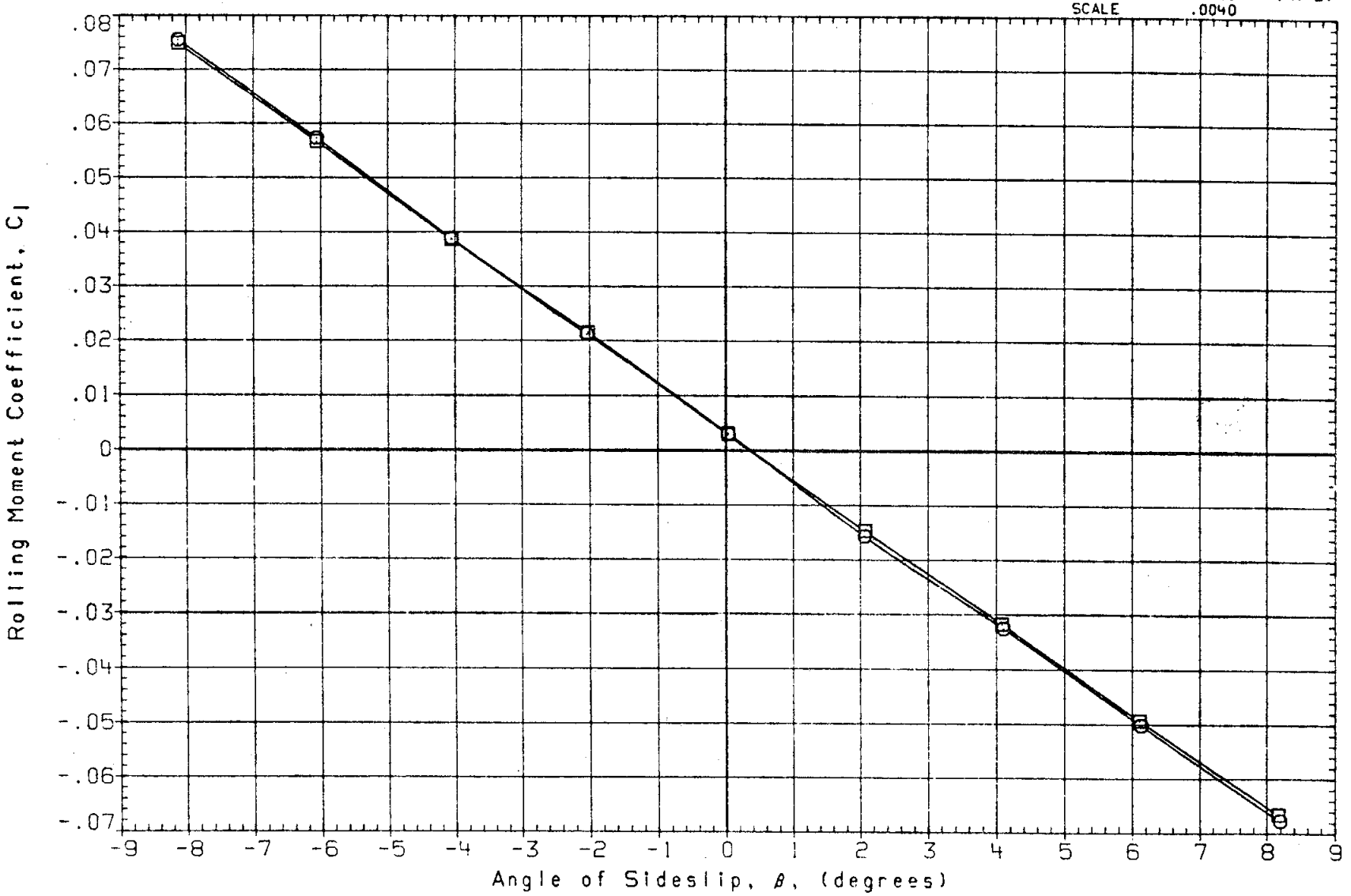

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

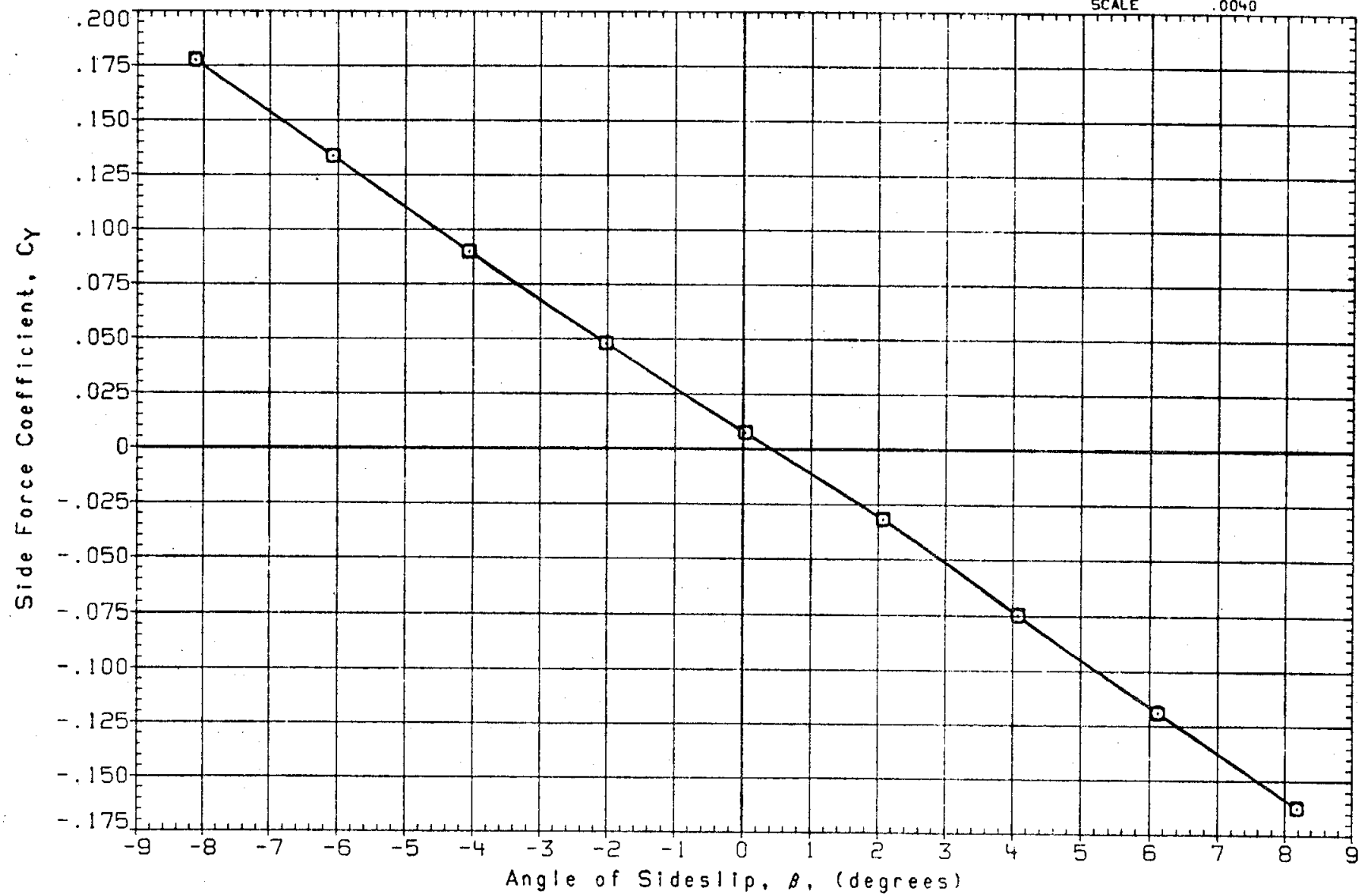

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

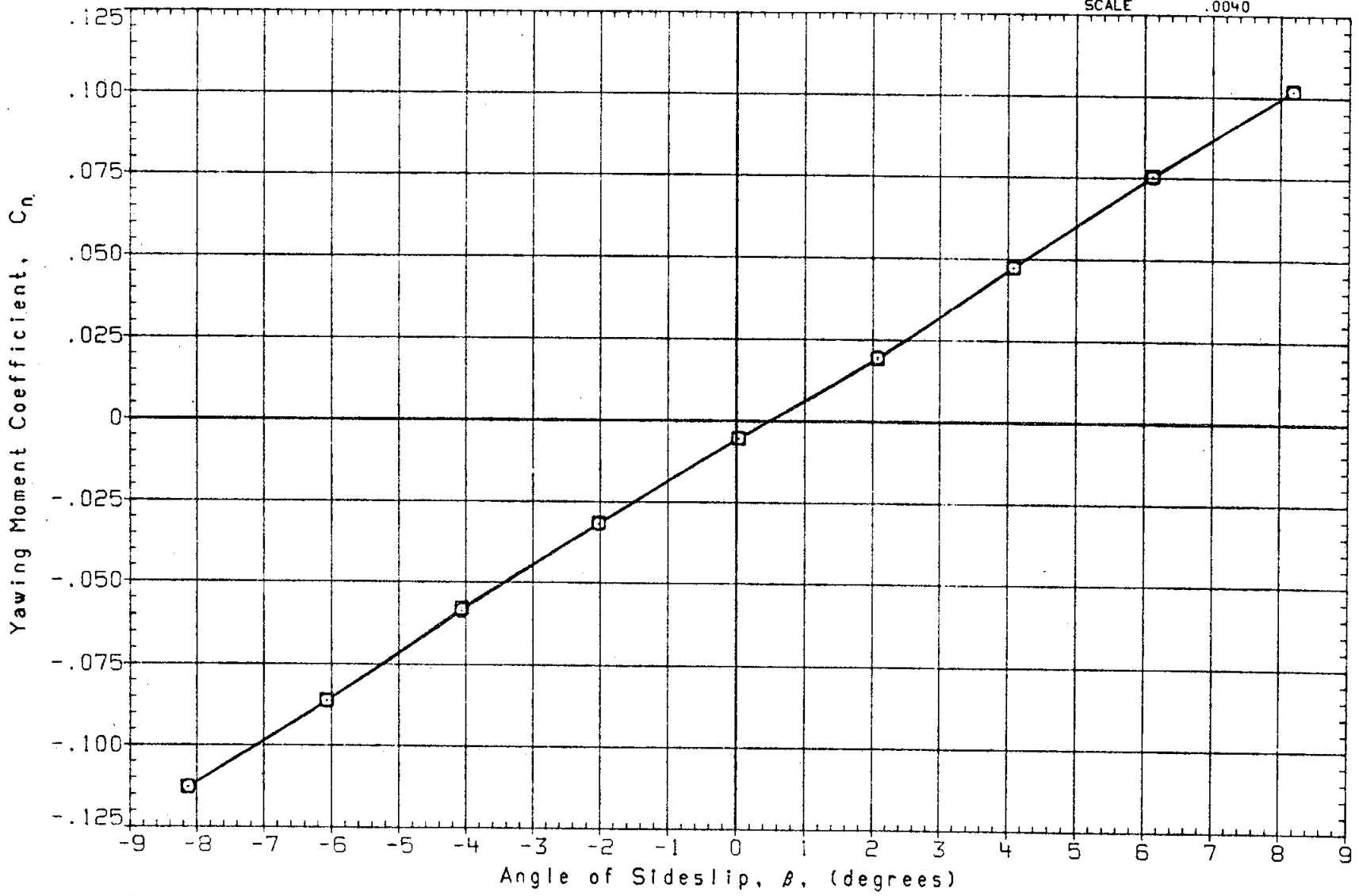

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(D) MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

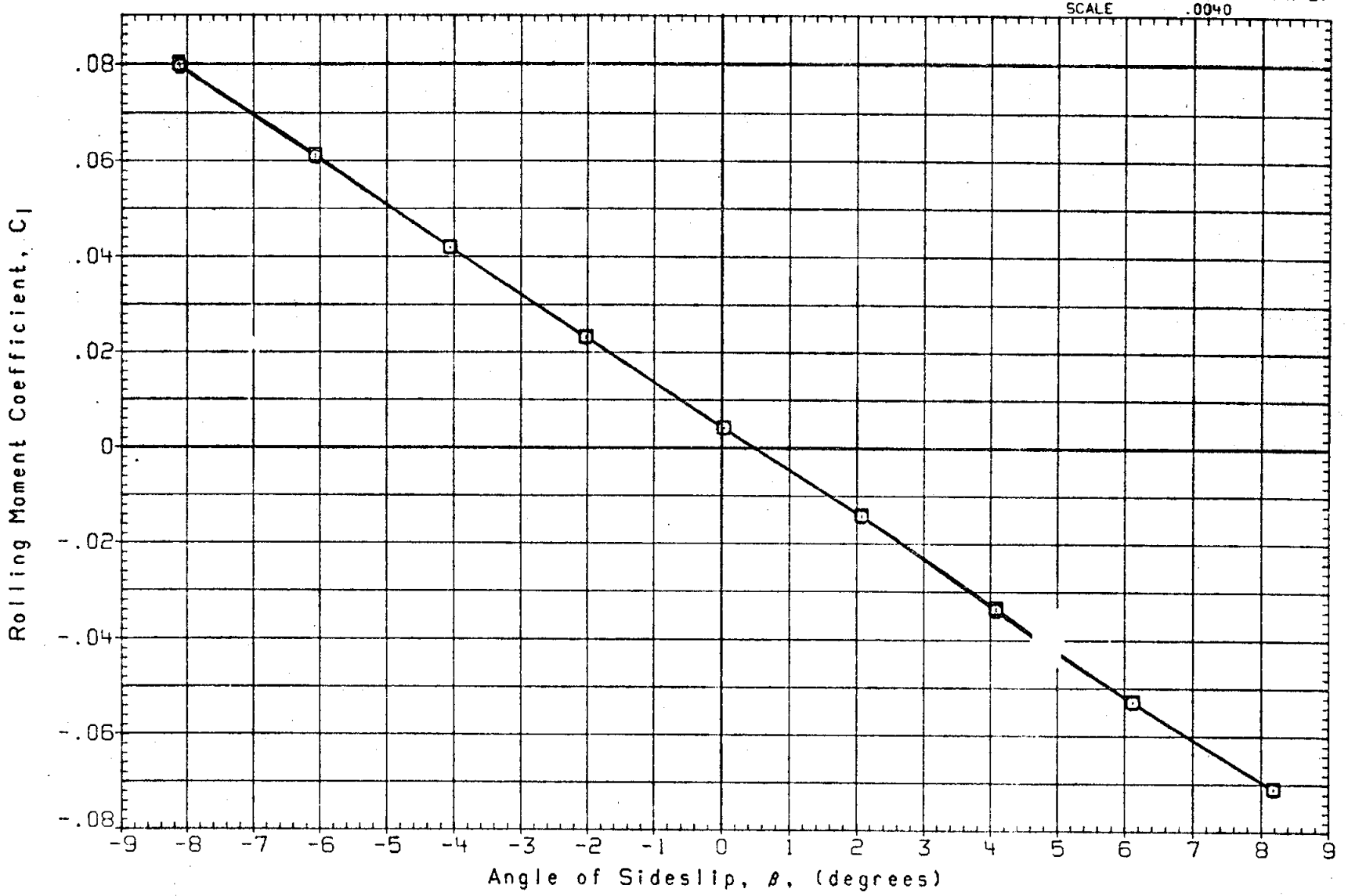

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
R:Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
A:Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

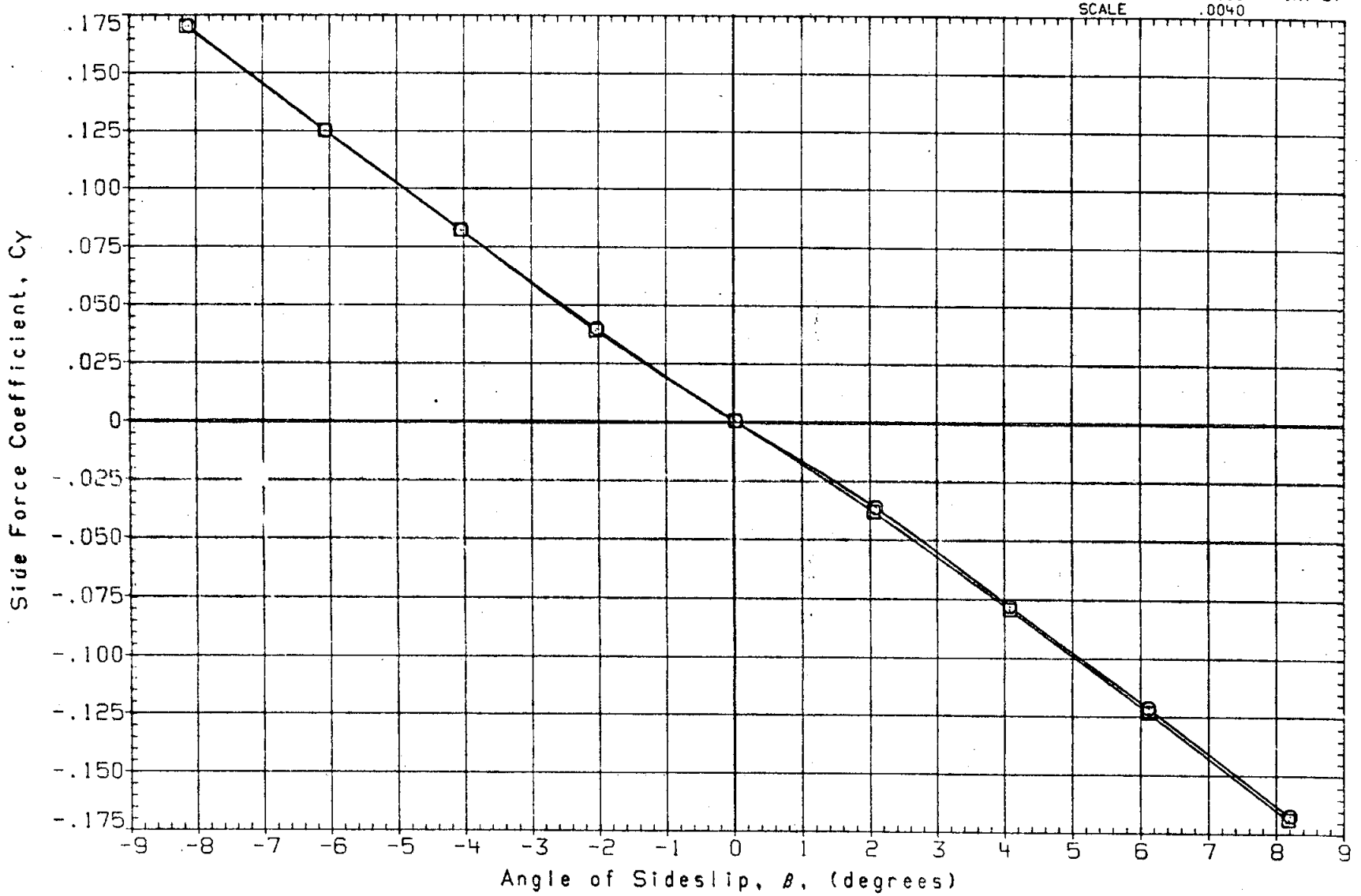

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT
LREF	1290.3000	INCHL
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

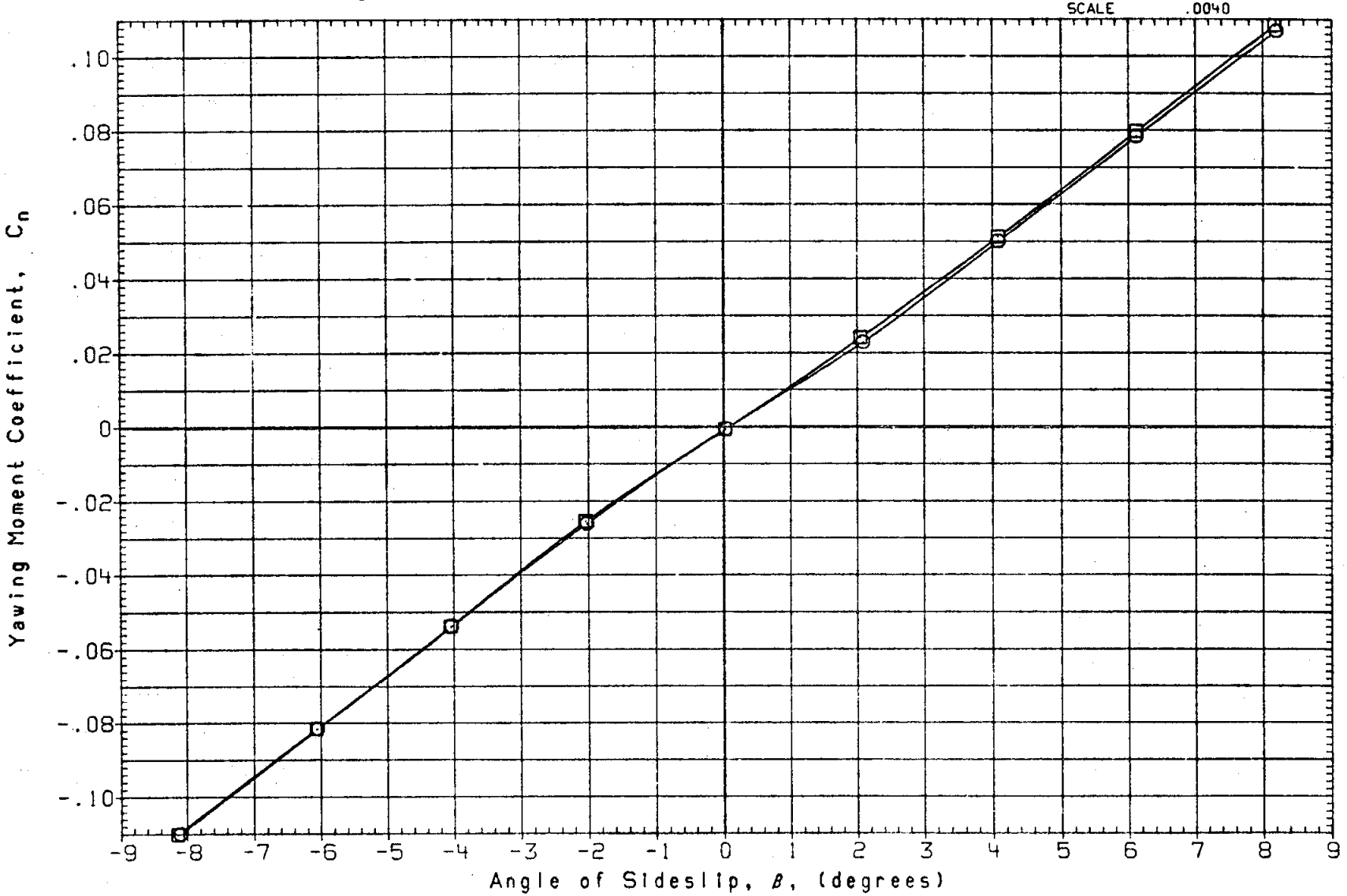

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
R1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
A1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

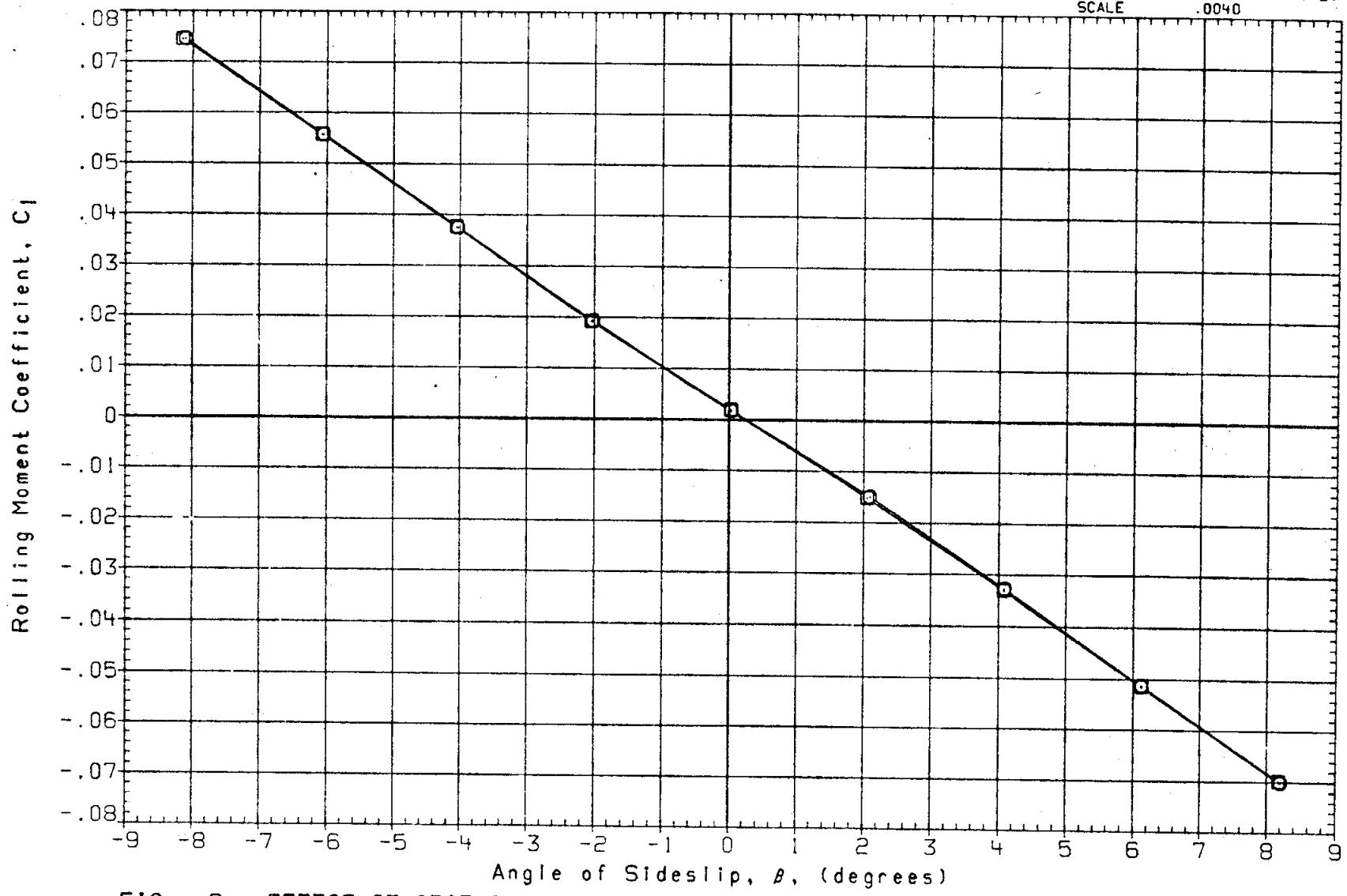

FIG. 42 EFFECT OF GRIT ON LAUNCH VEHICLE IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT353	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT353 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

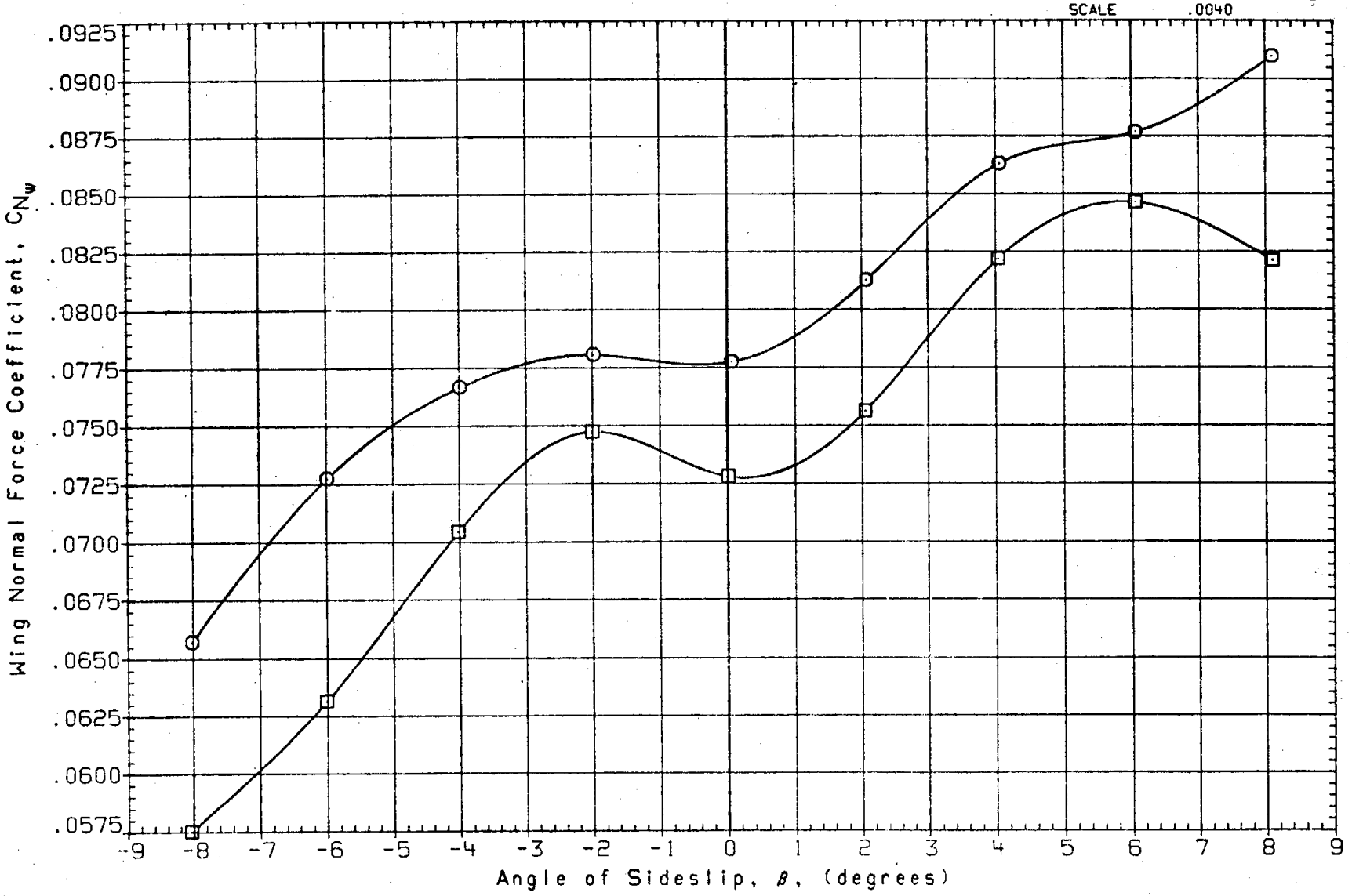

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(A) MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

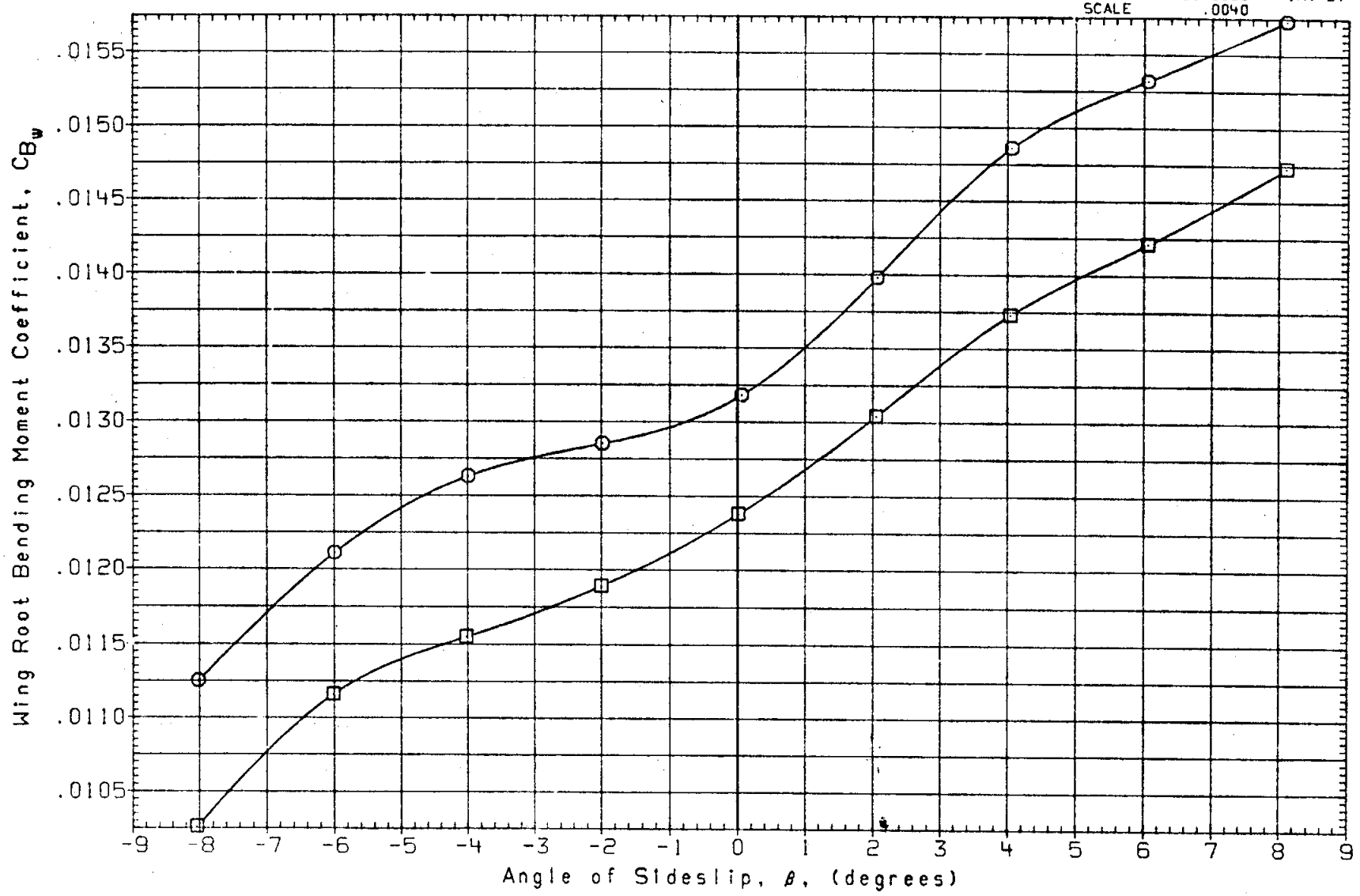

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT353	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT353 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

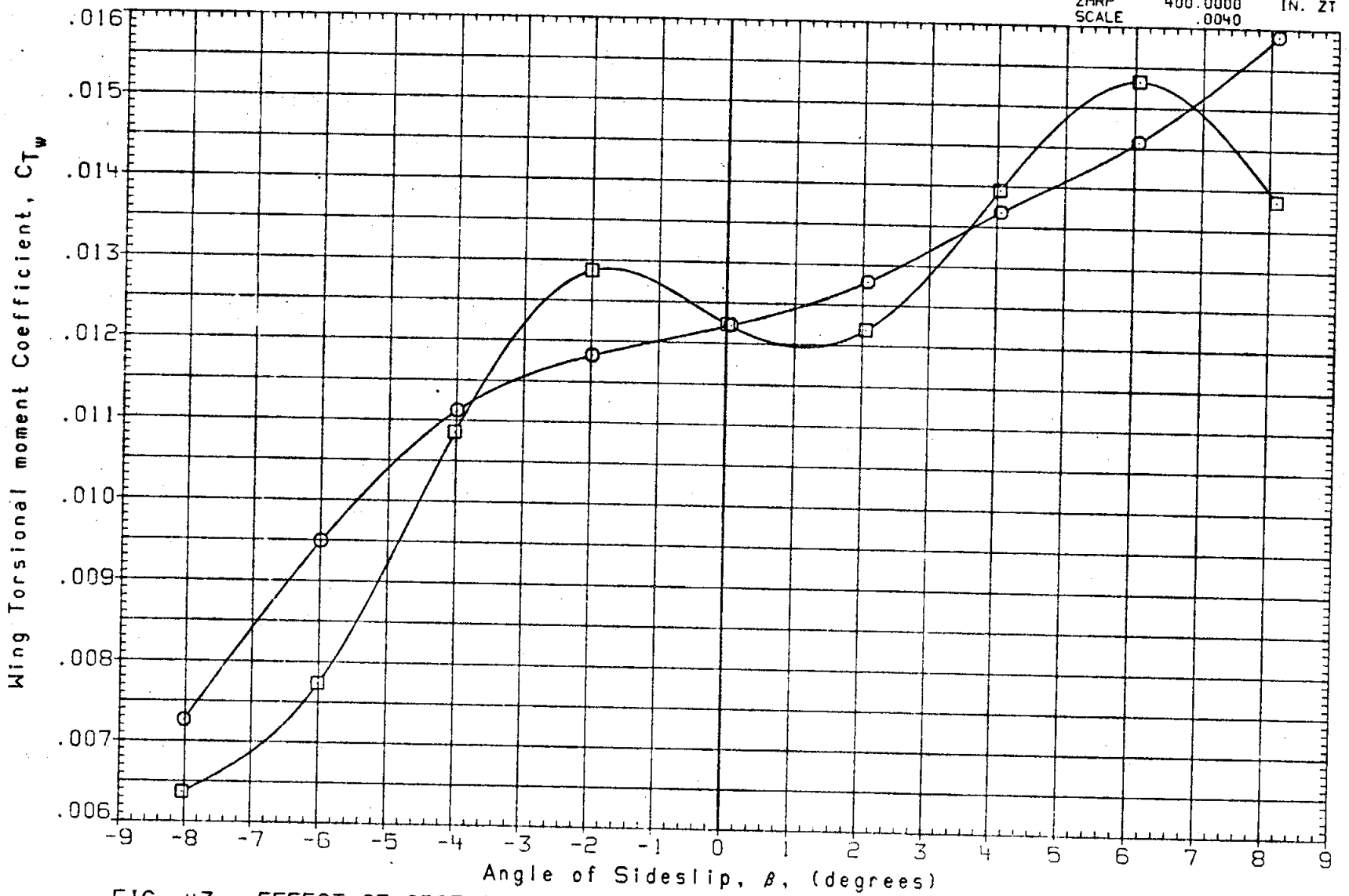

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(A)MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

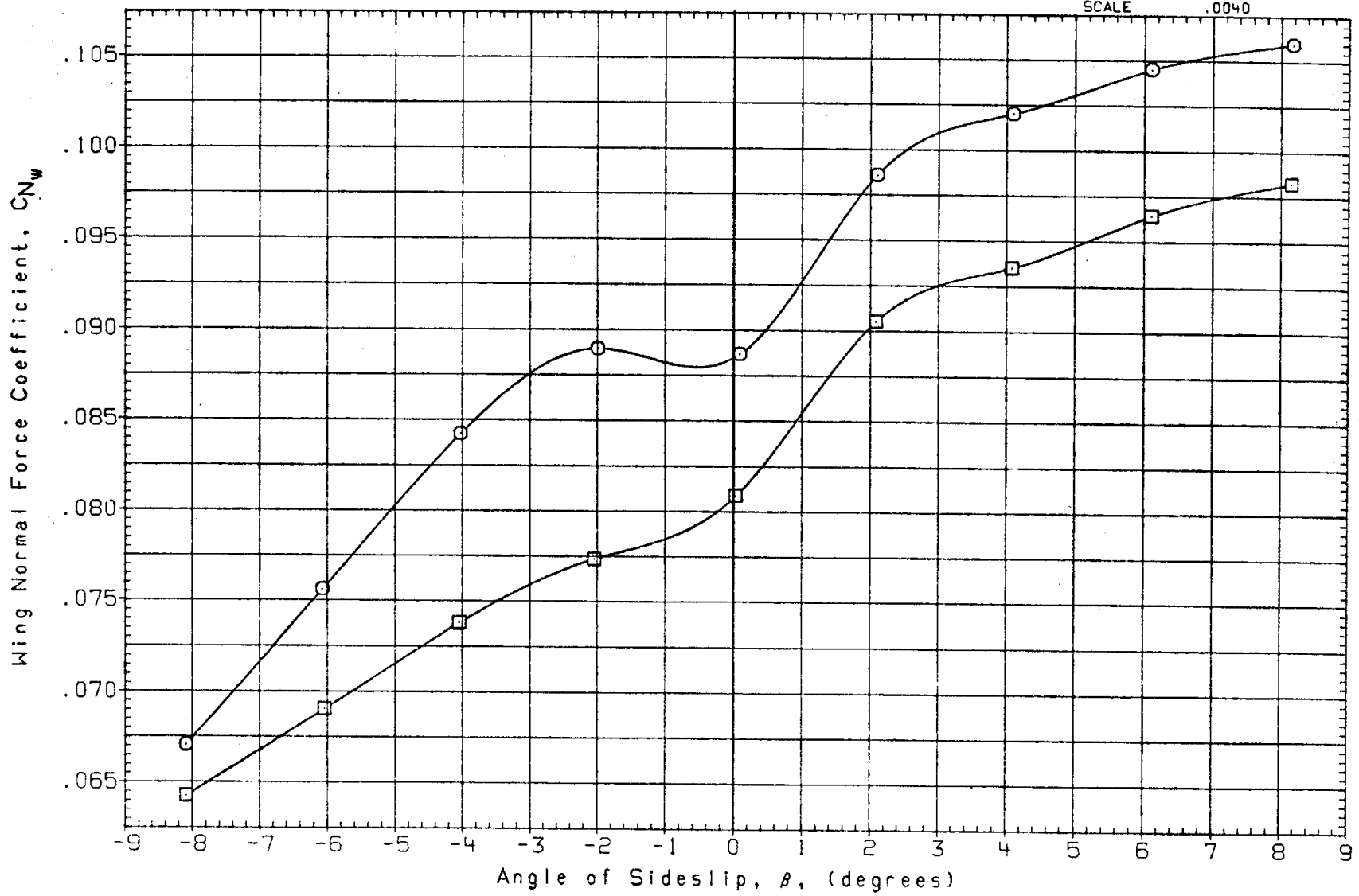

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(B) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

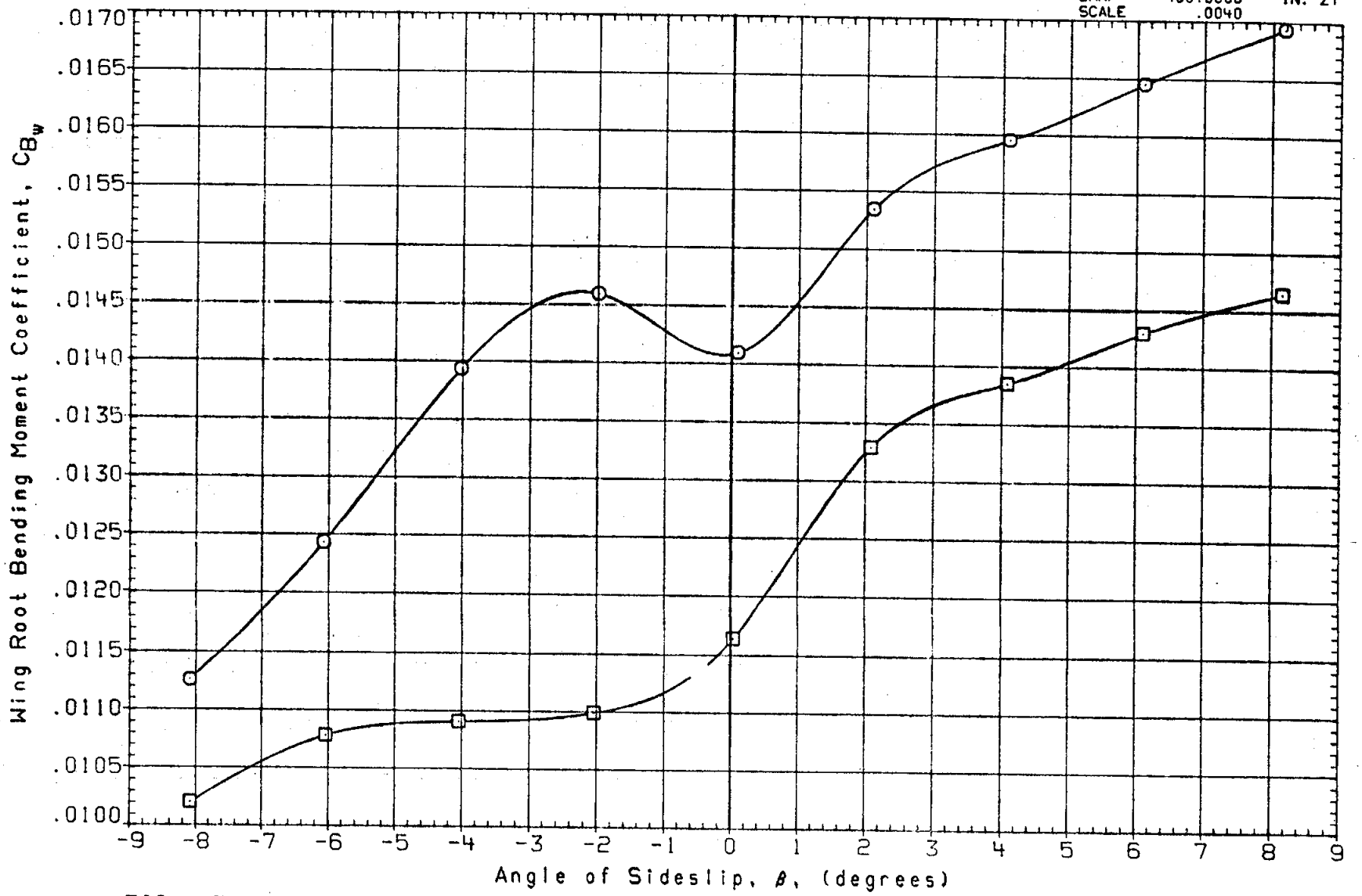

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(B)MACH = .90

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

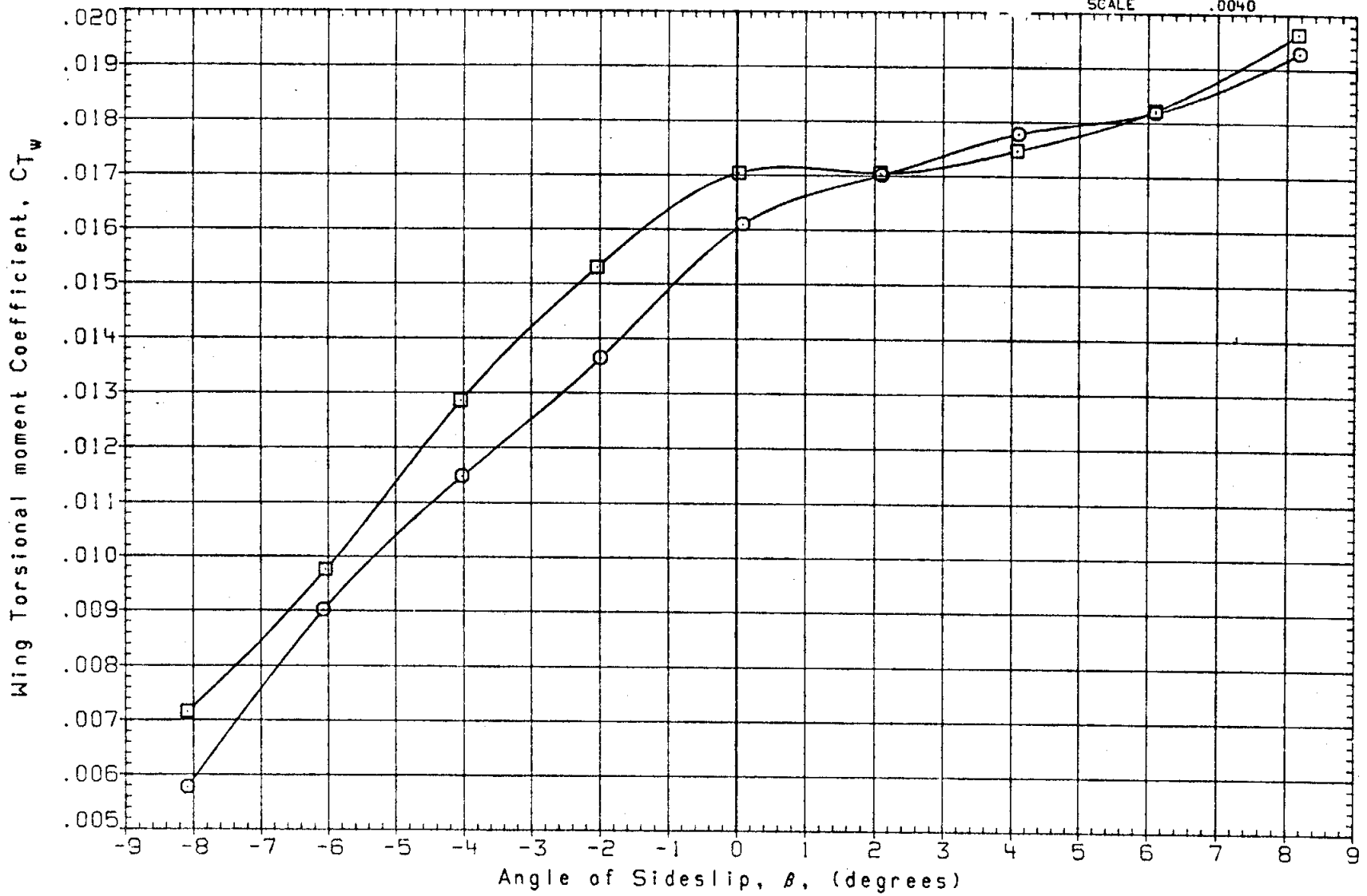

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(B) MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

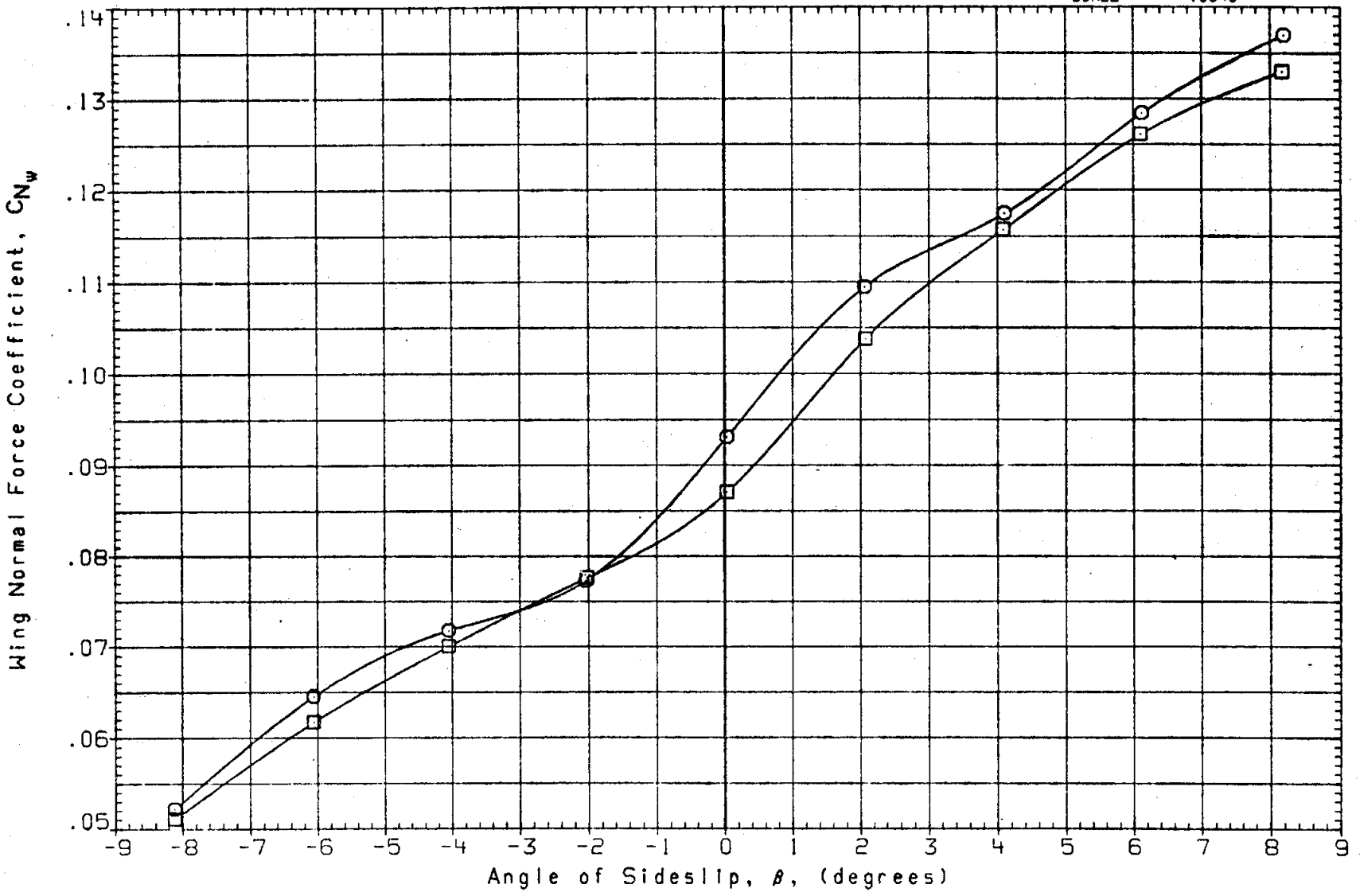

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

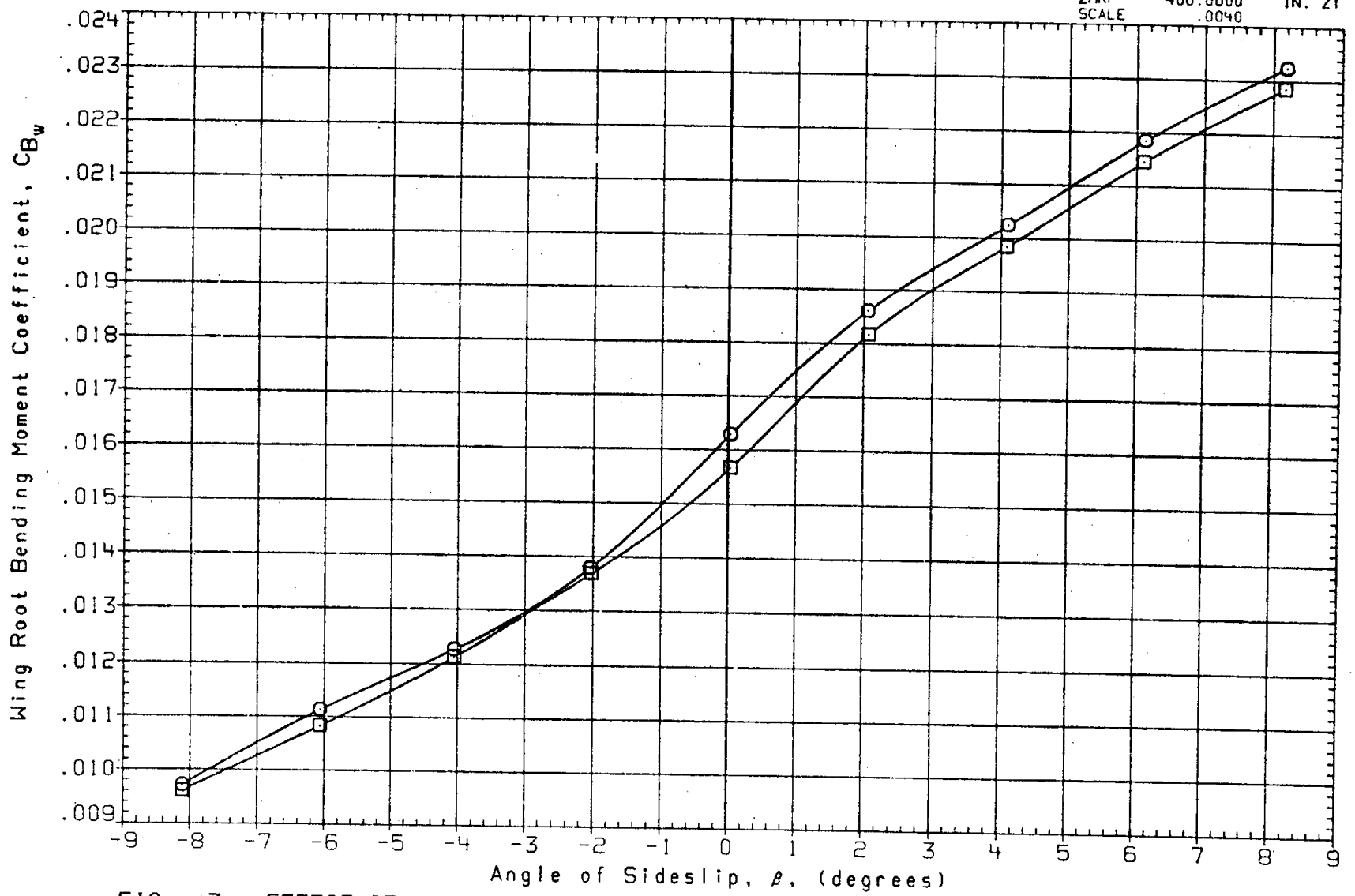

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

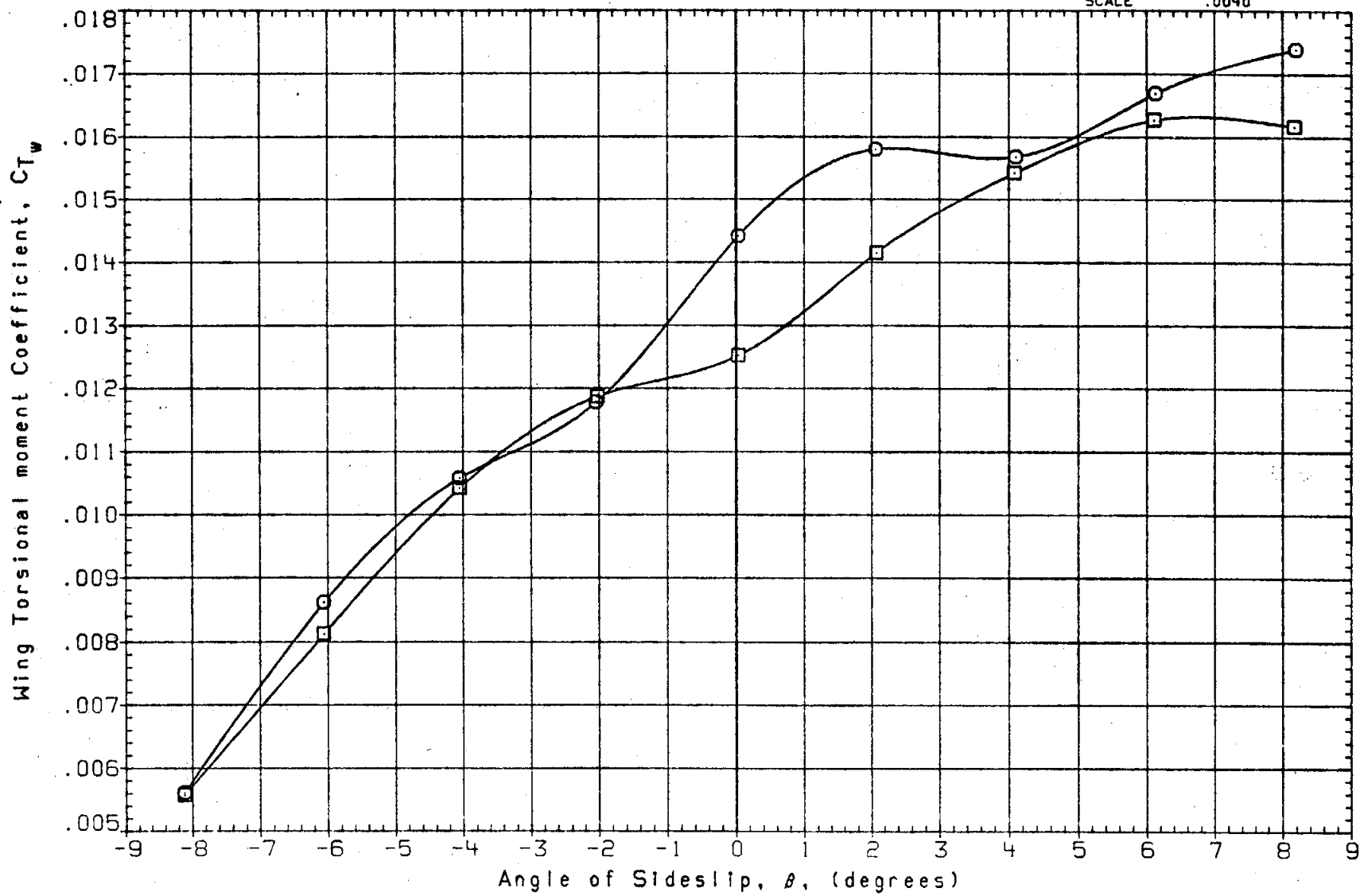

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

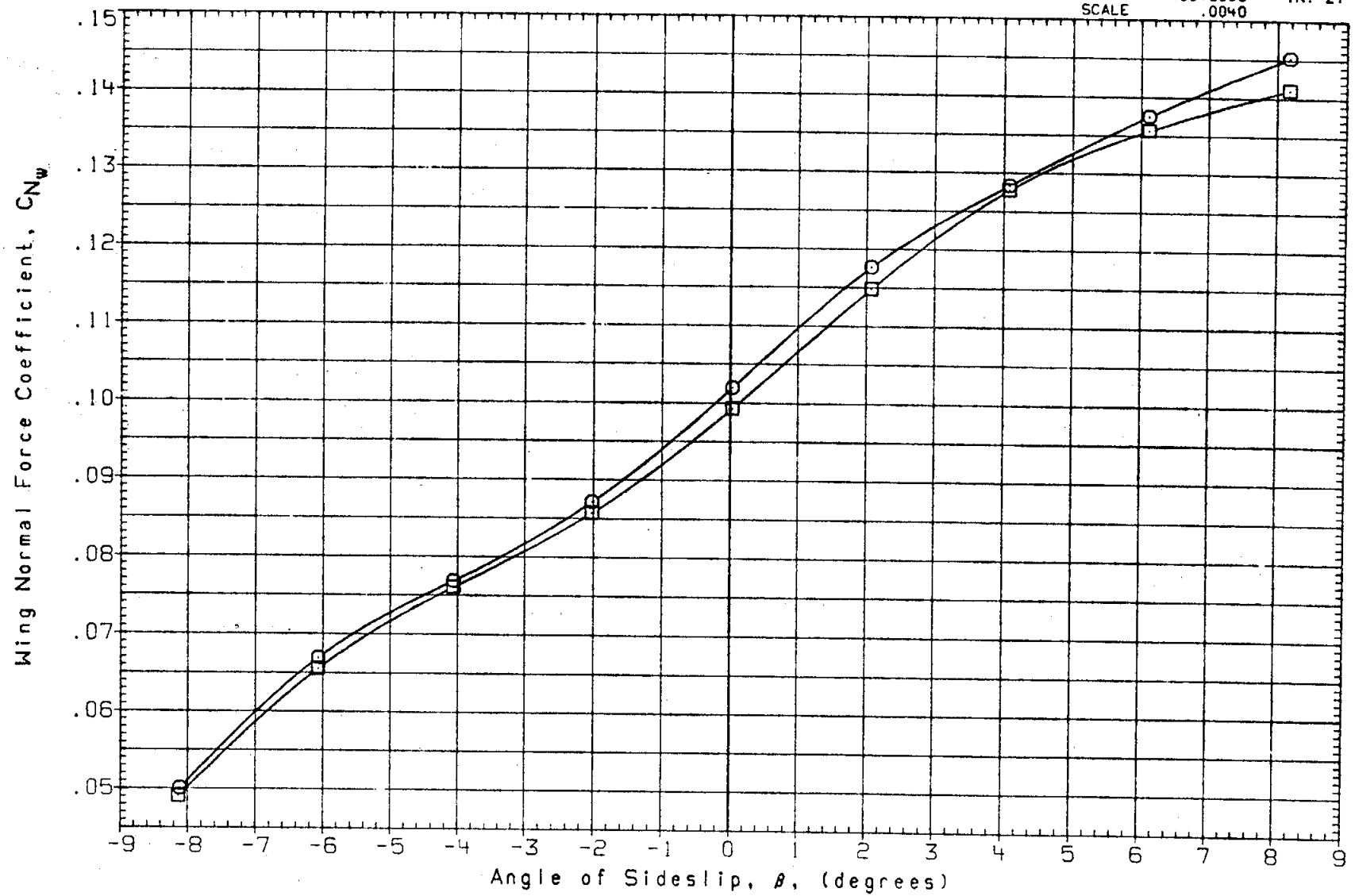

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

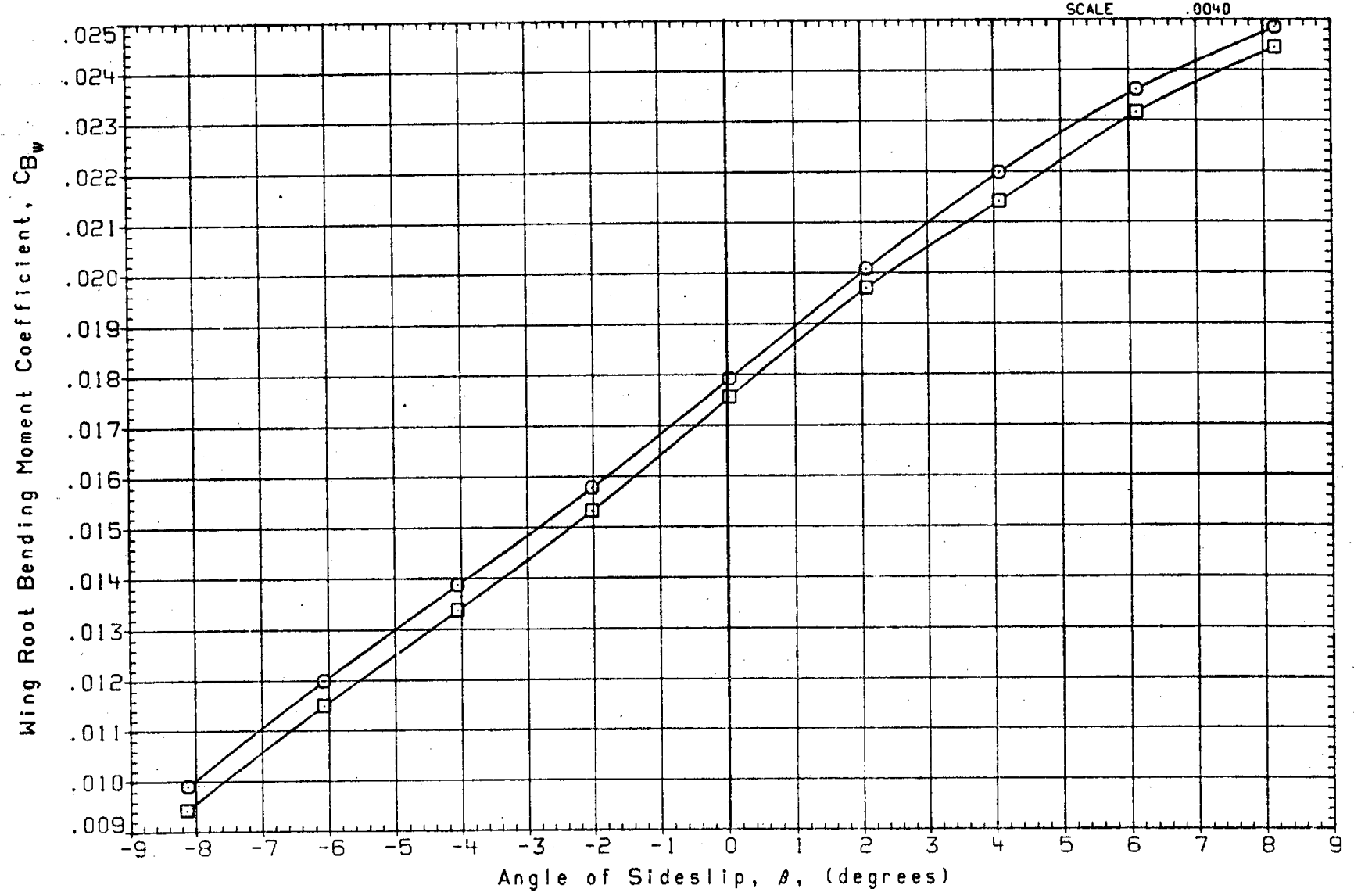

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

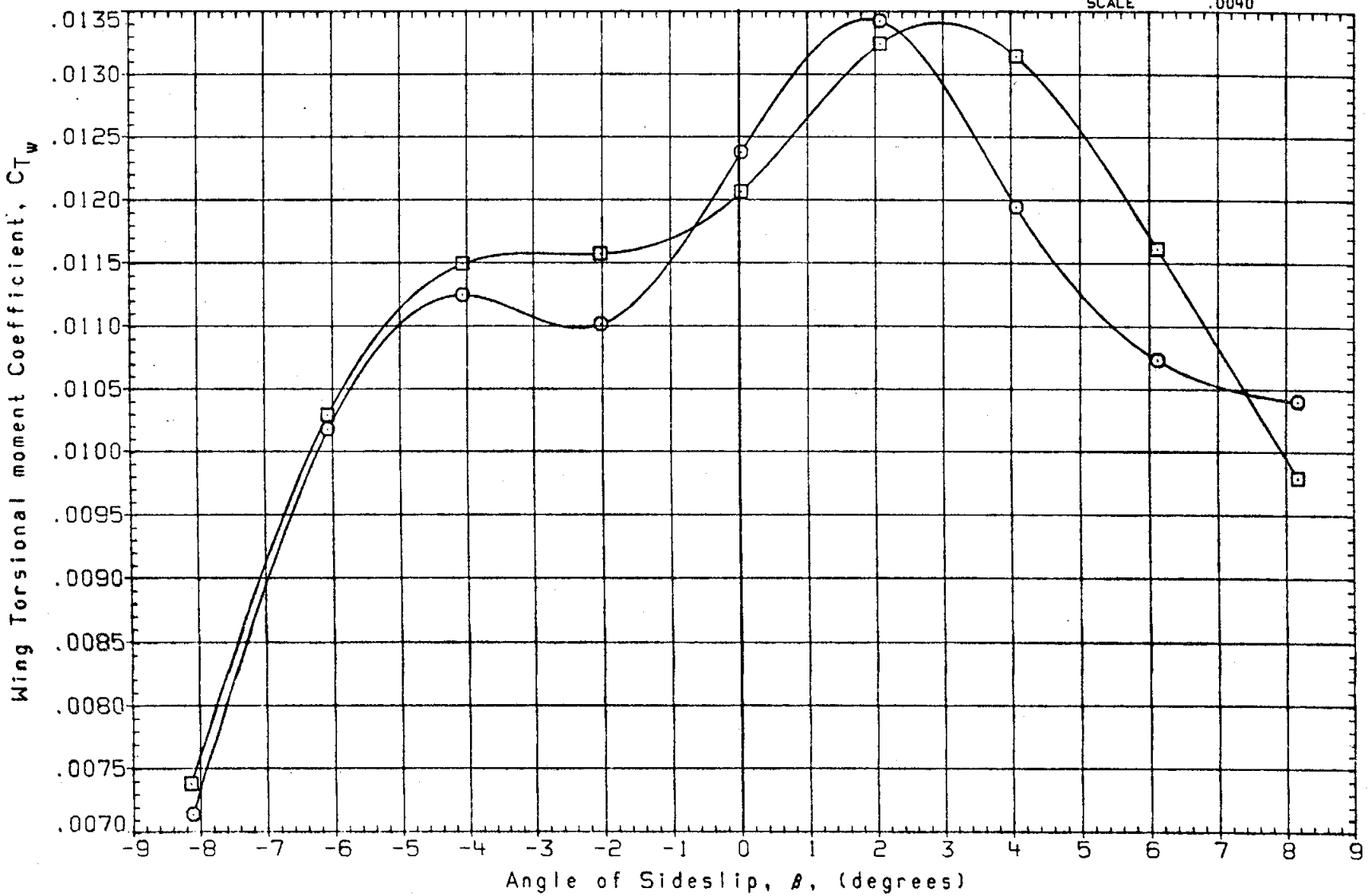

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

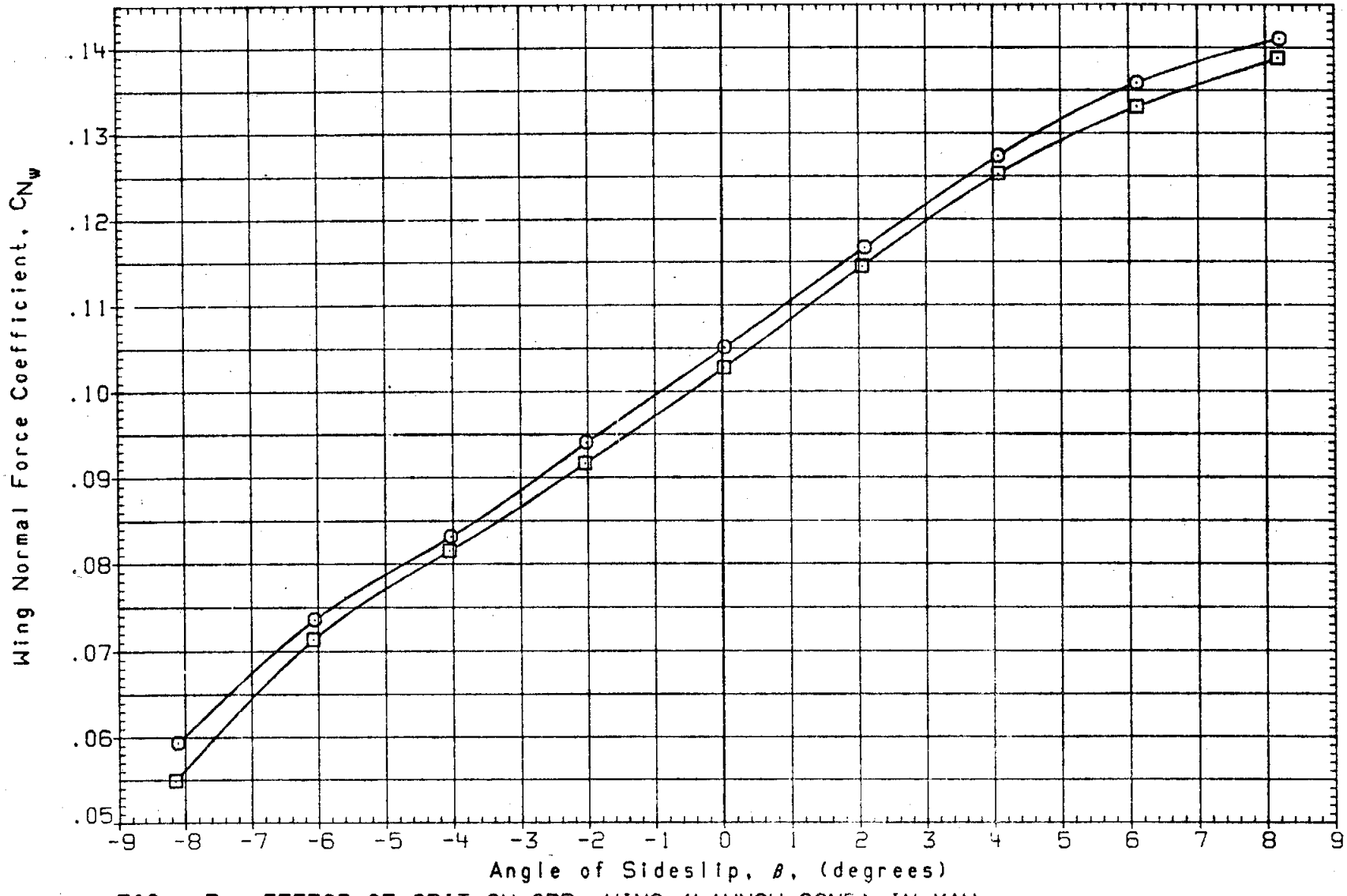

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

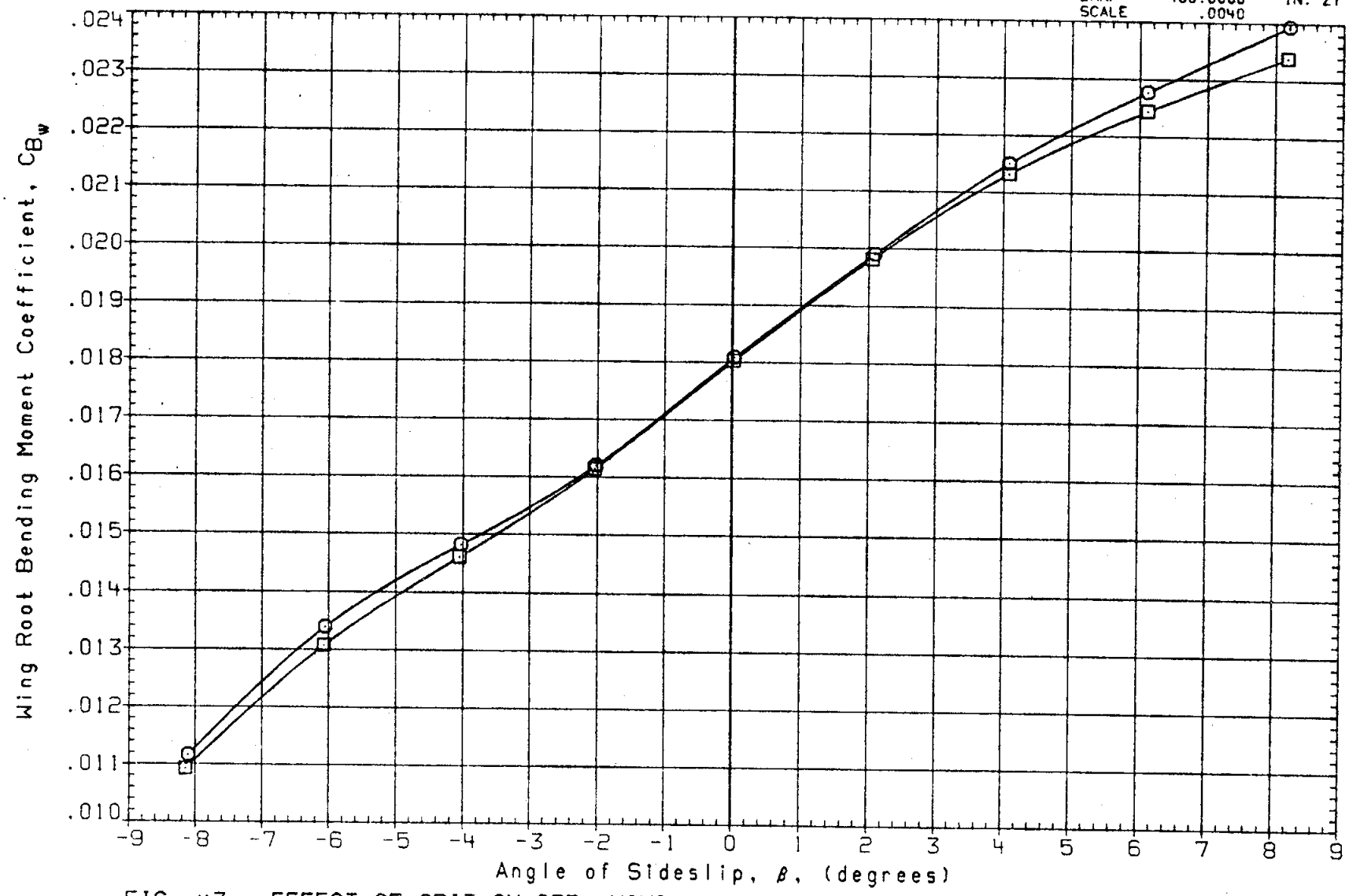

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

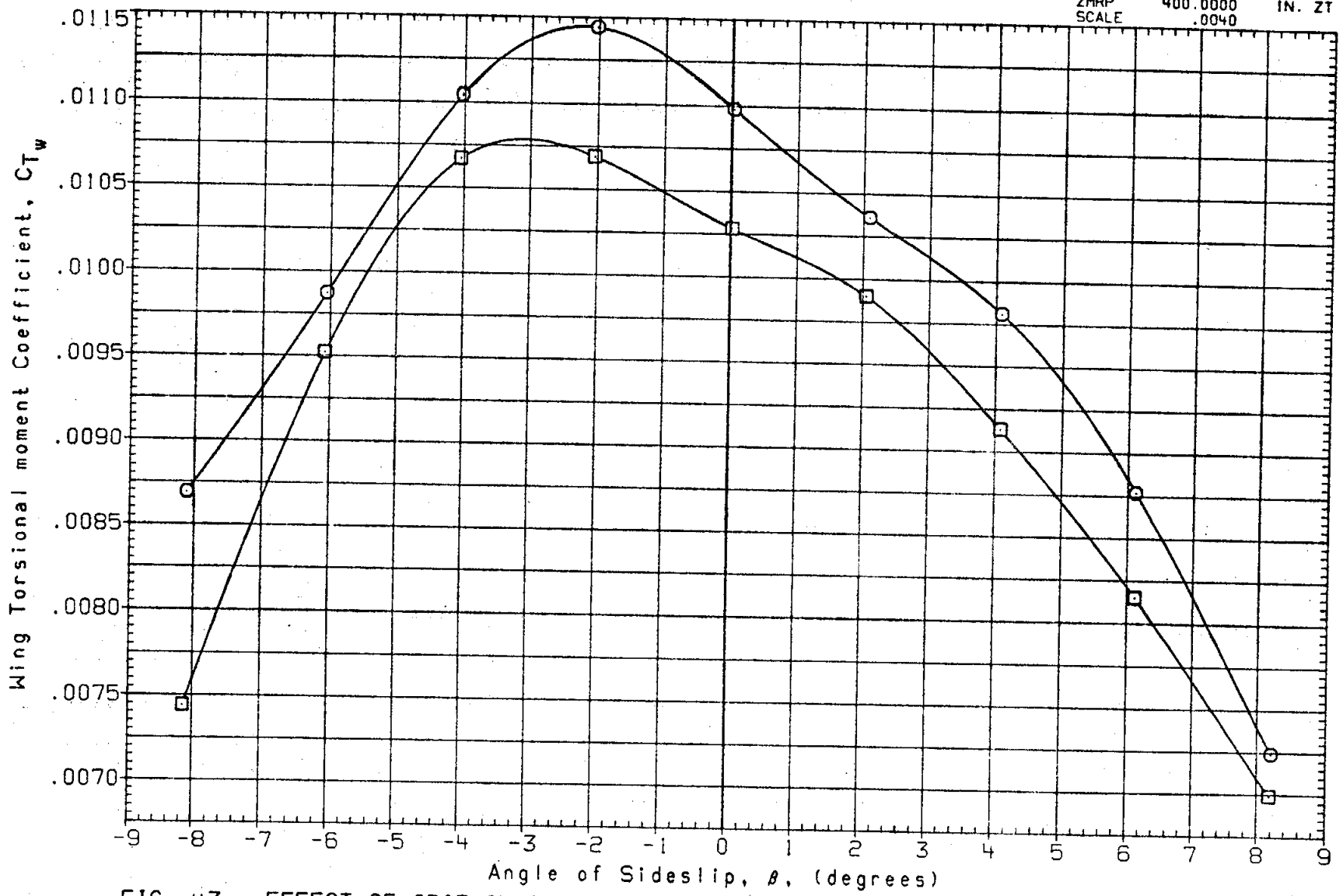

FIG. 43 EFFECT OF GRIT ON ORB. WING (LAUNCH CONF) IN YAW

(E)MACH = 1.25

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

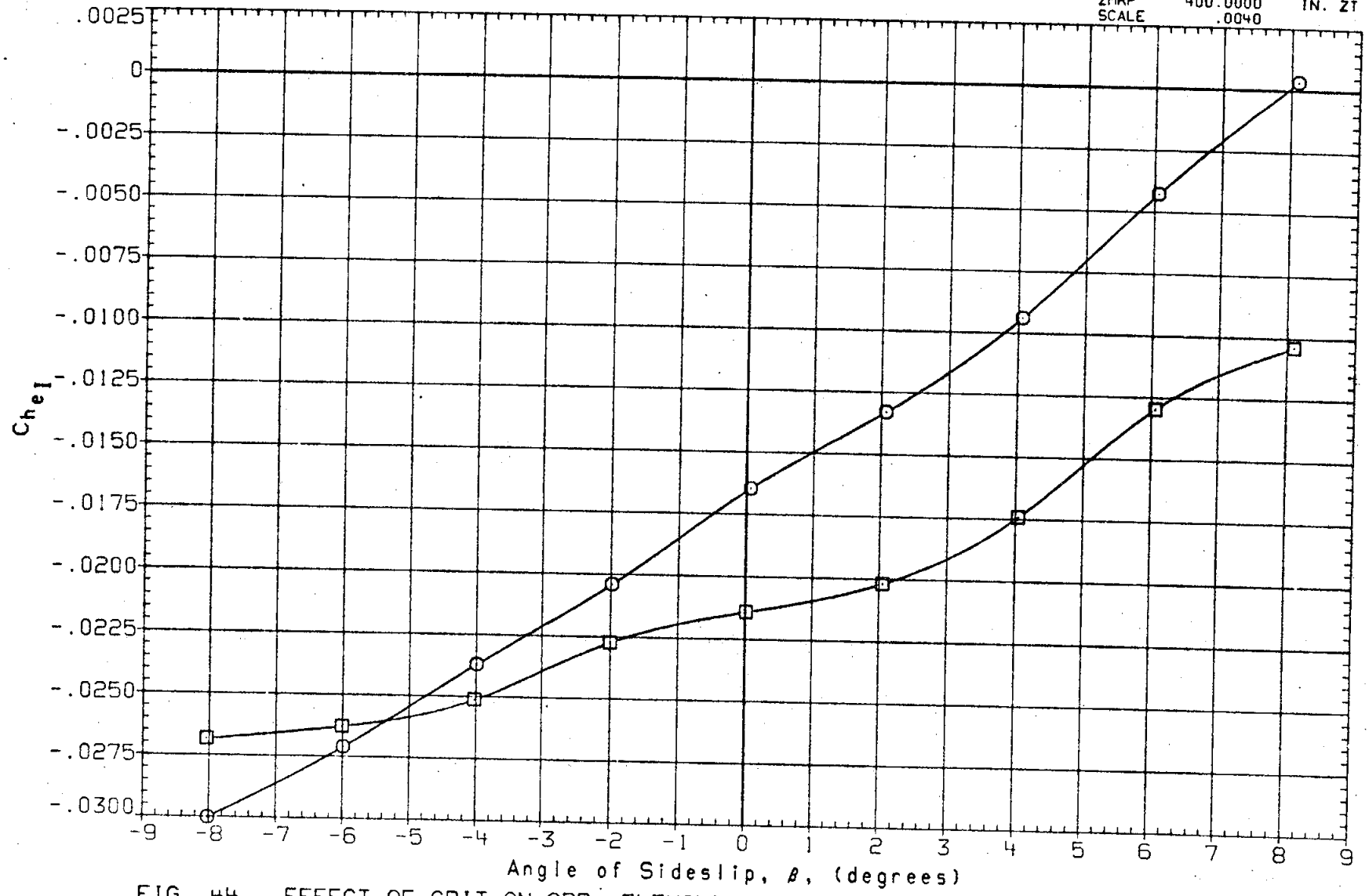

FIG. 44 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(A)MACH = .60

DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	⊙	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

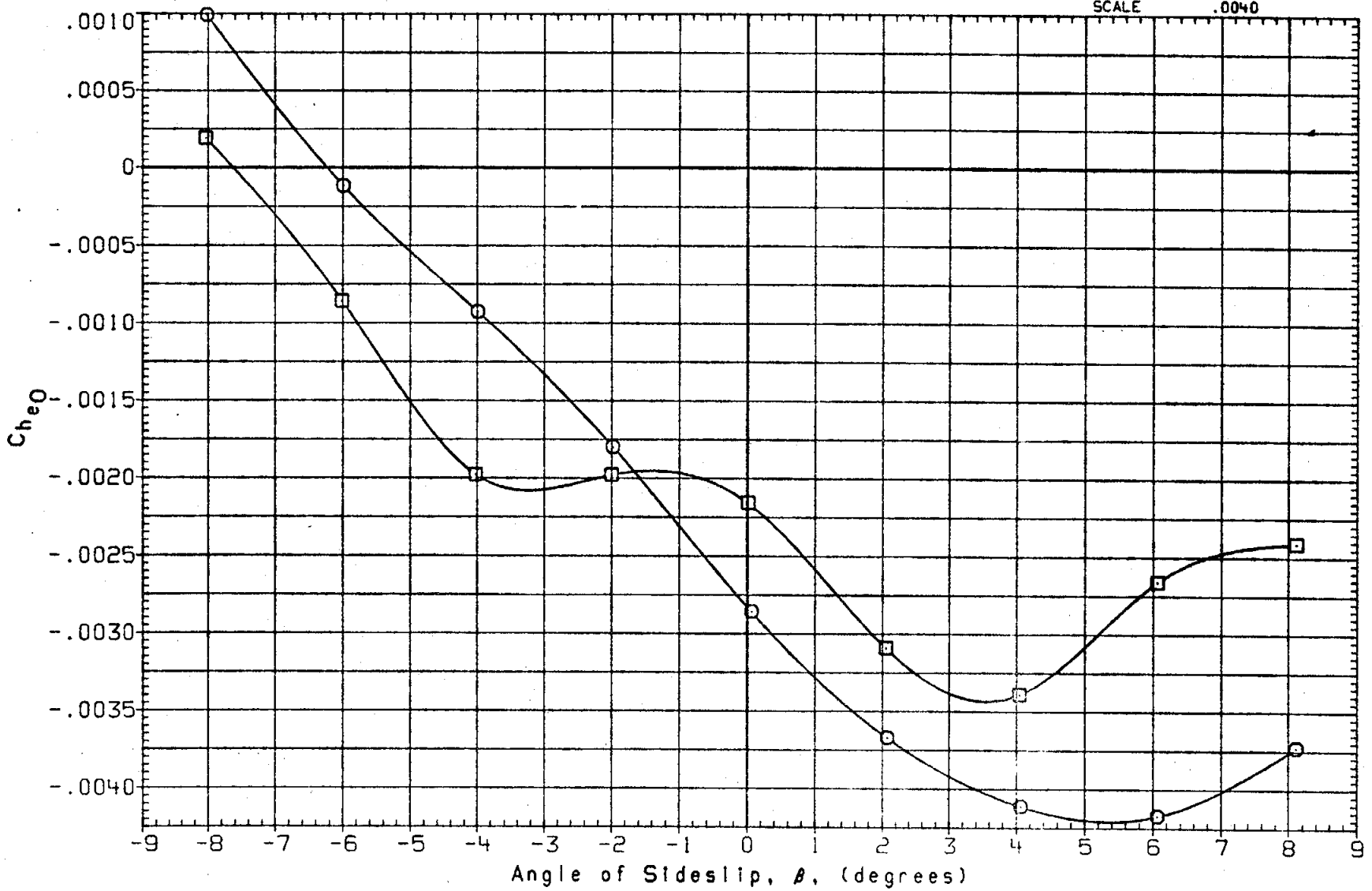

FIG. 44 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(A)MACH = .60 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

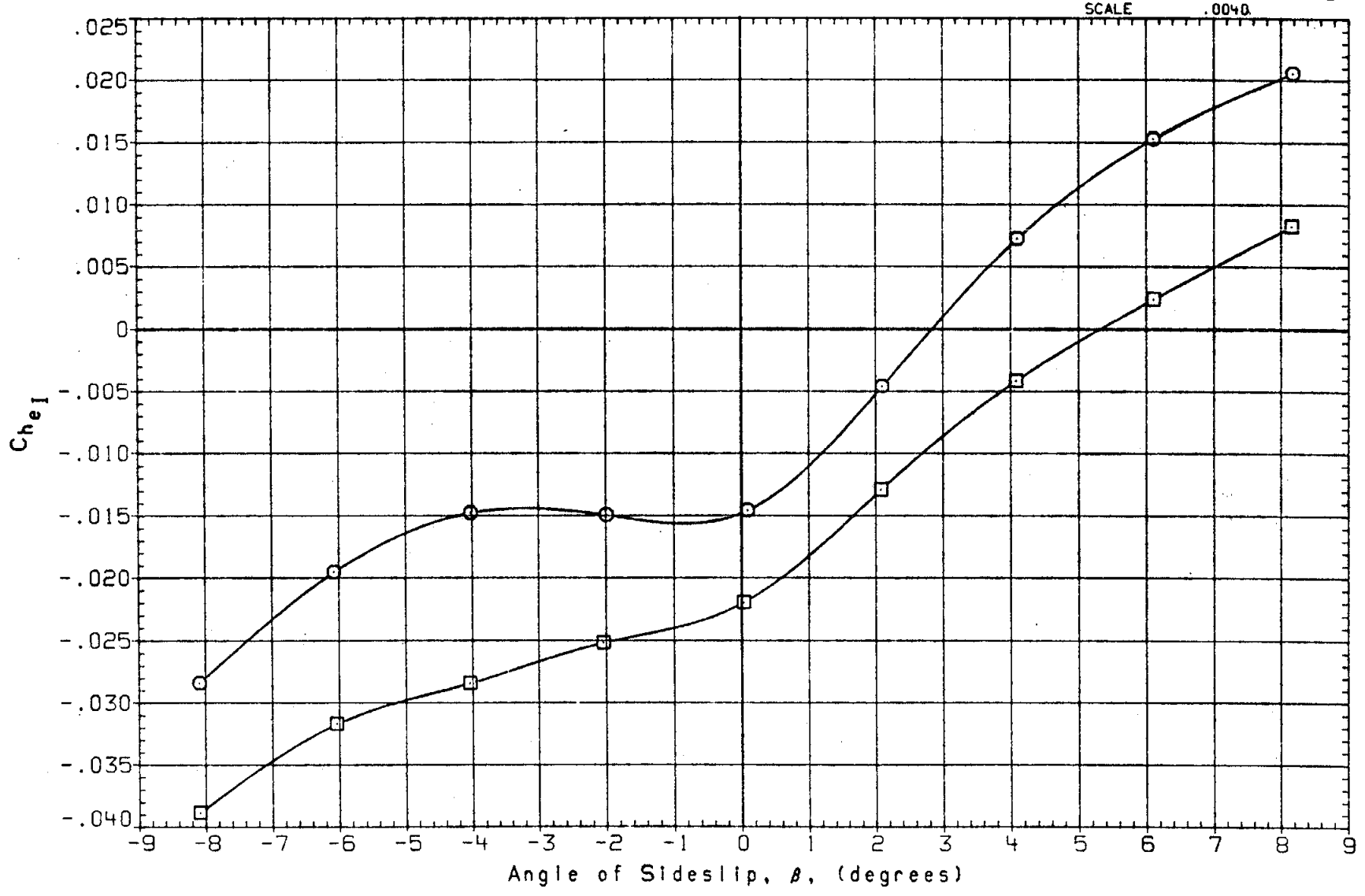

FIG. 44 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(B)MACH = .90 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	O2W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

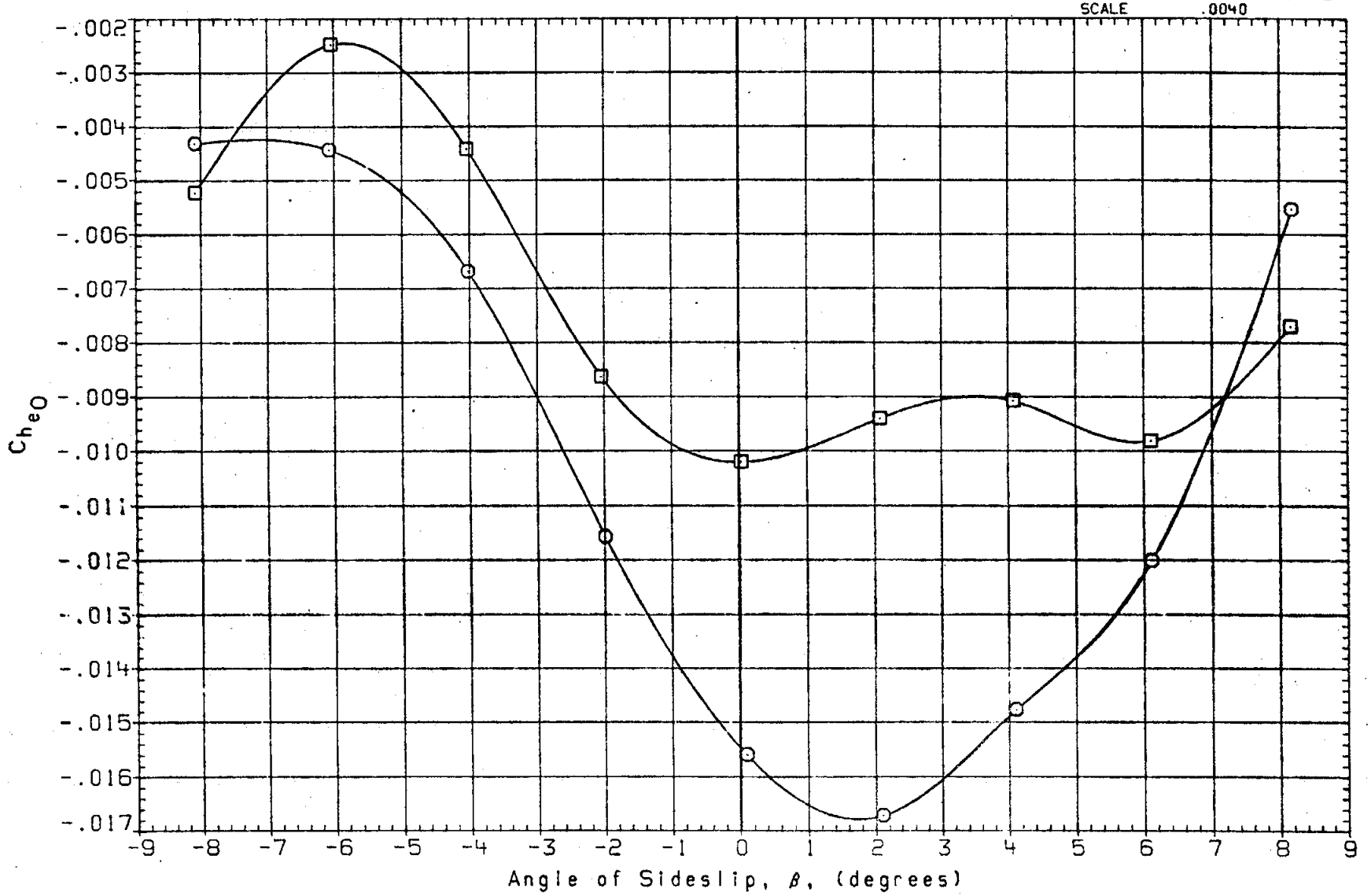

FIG. 44 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN YAW

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

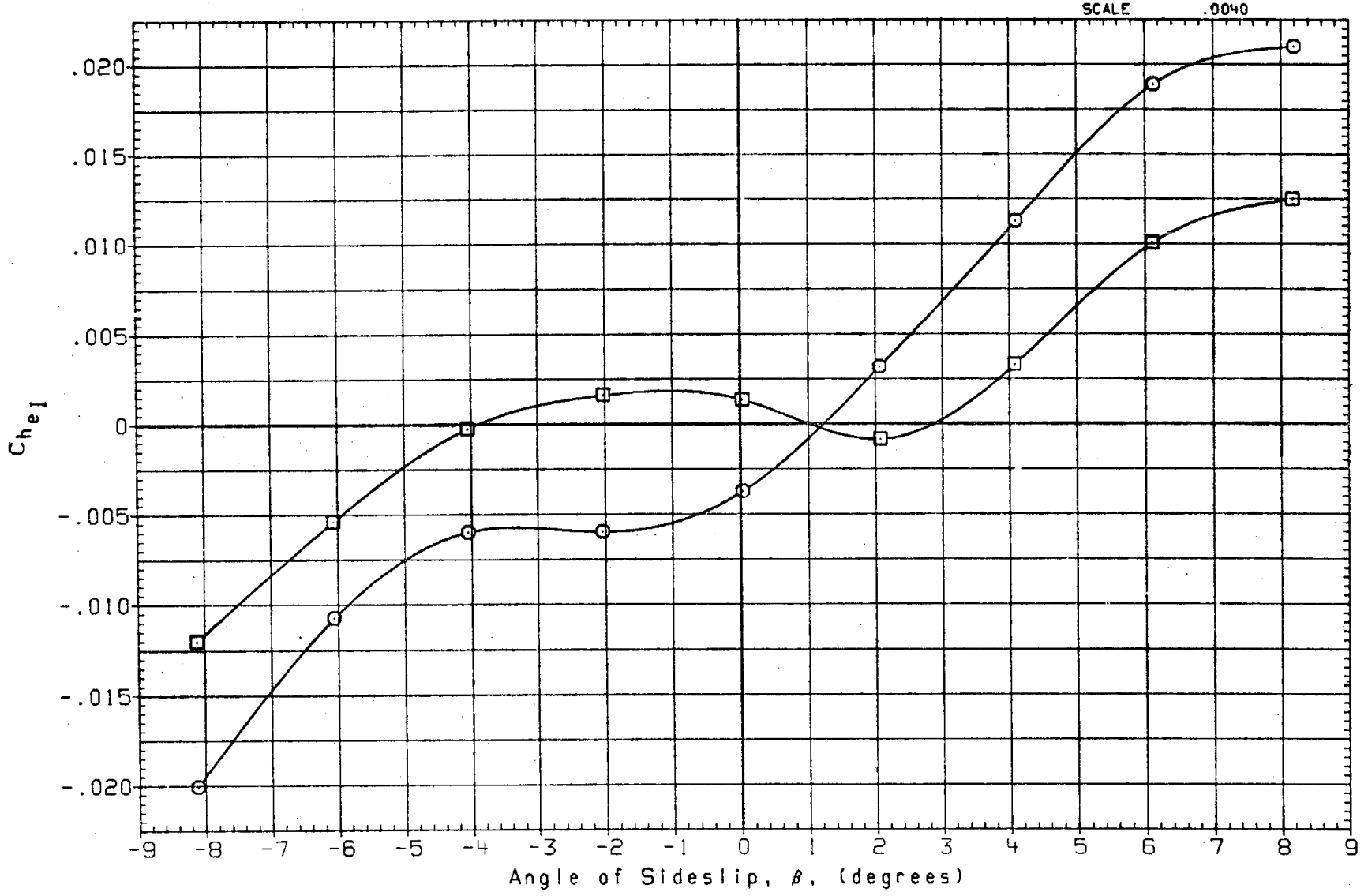

FIG. 44 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

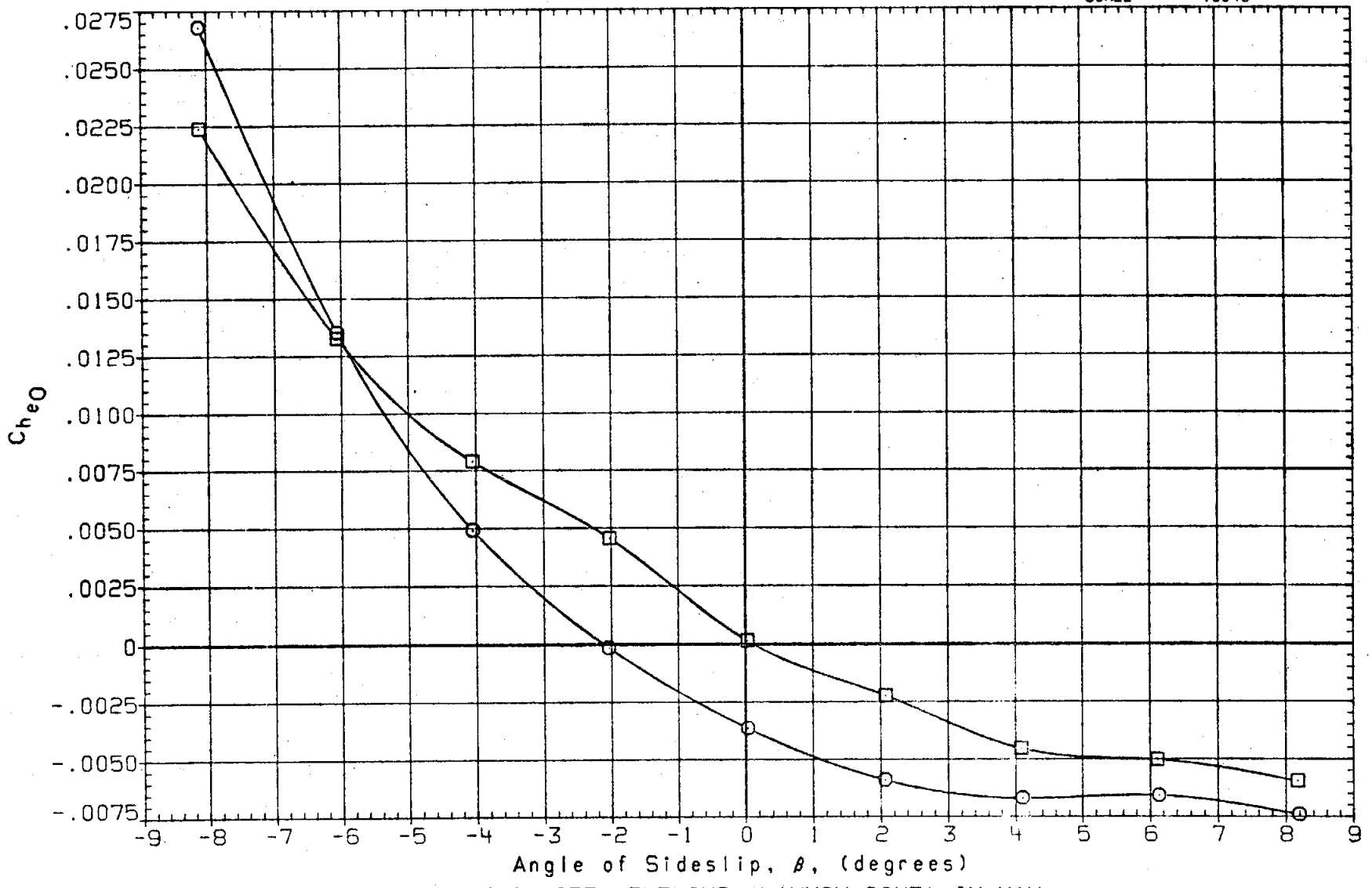

FIG. 44 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(C)MACH = 1.05 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION	ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

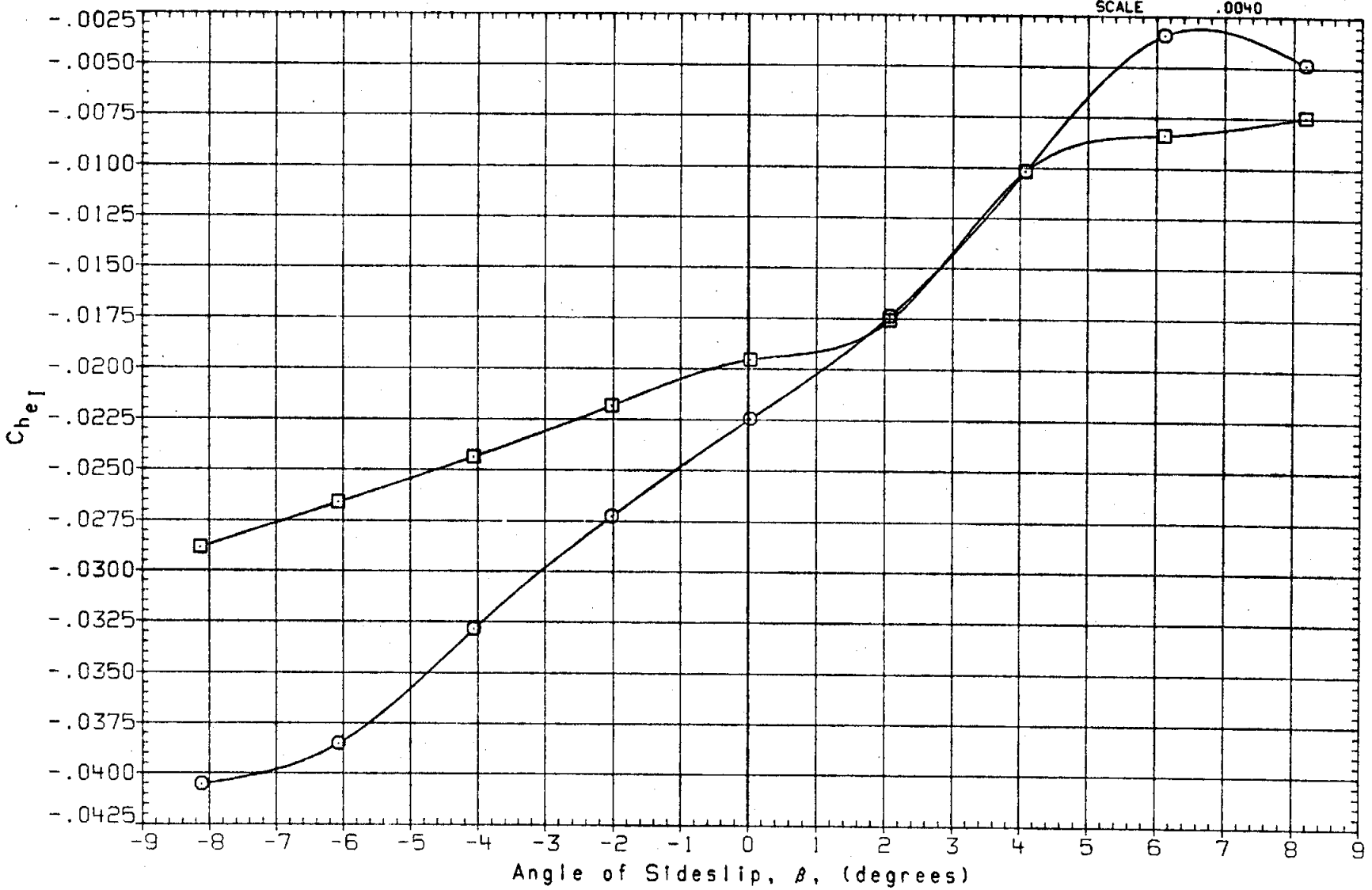

FIG. 44 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

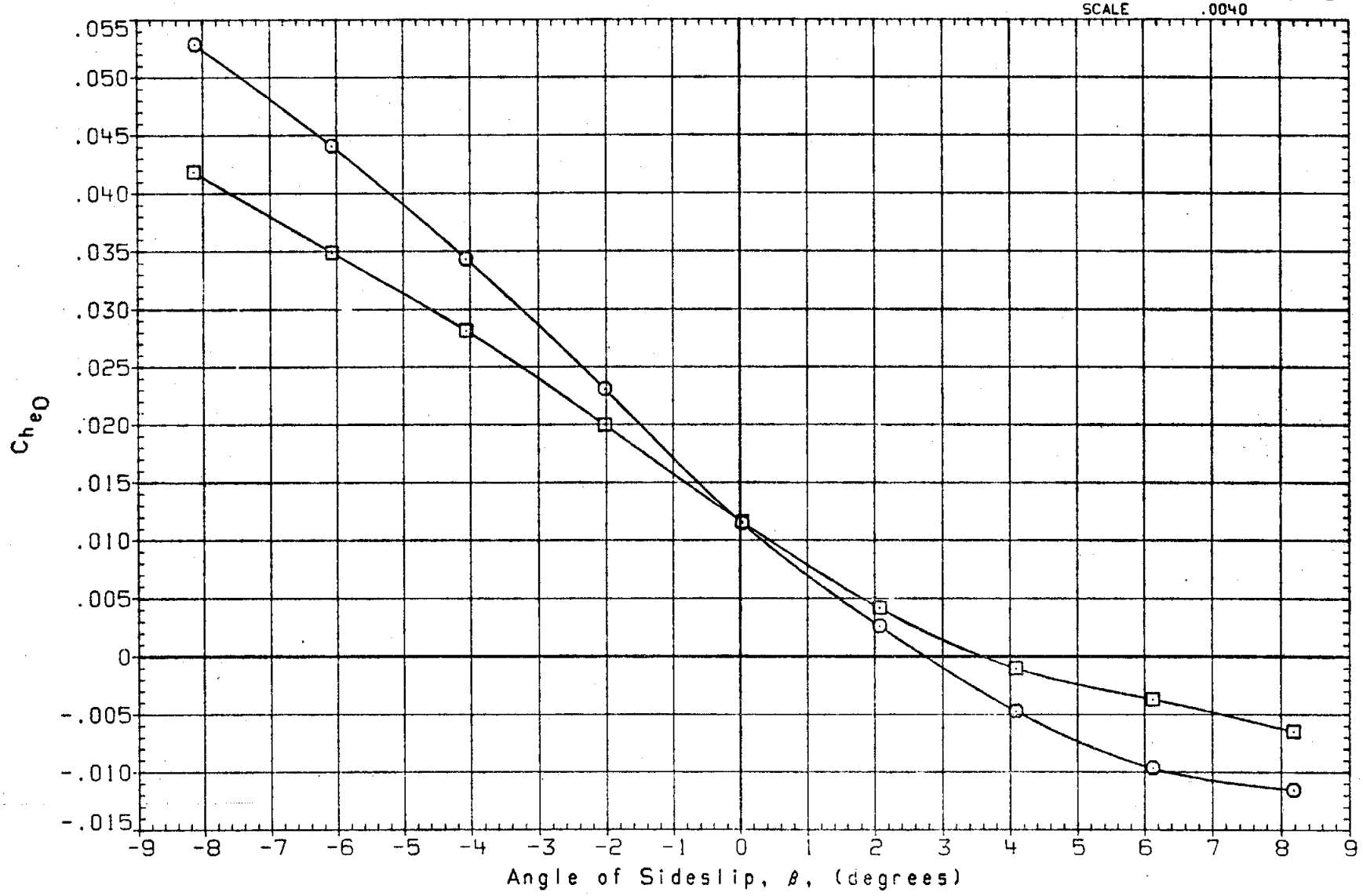

FIG. 44 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(D)MACH = 1.10 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

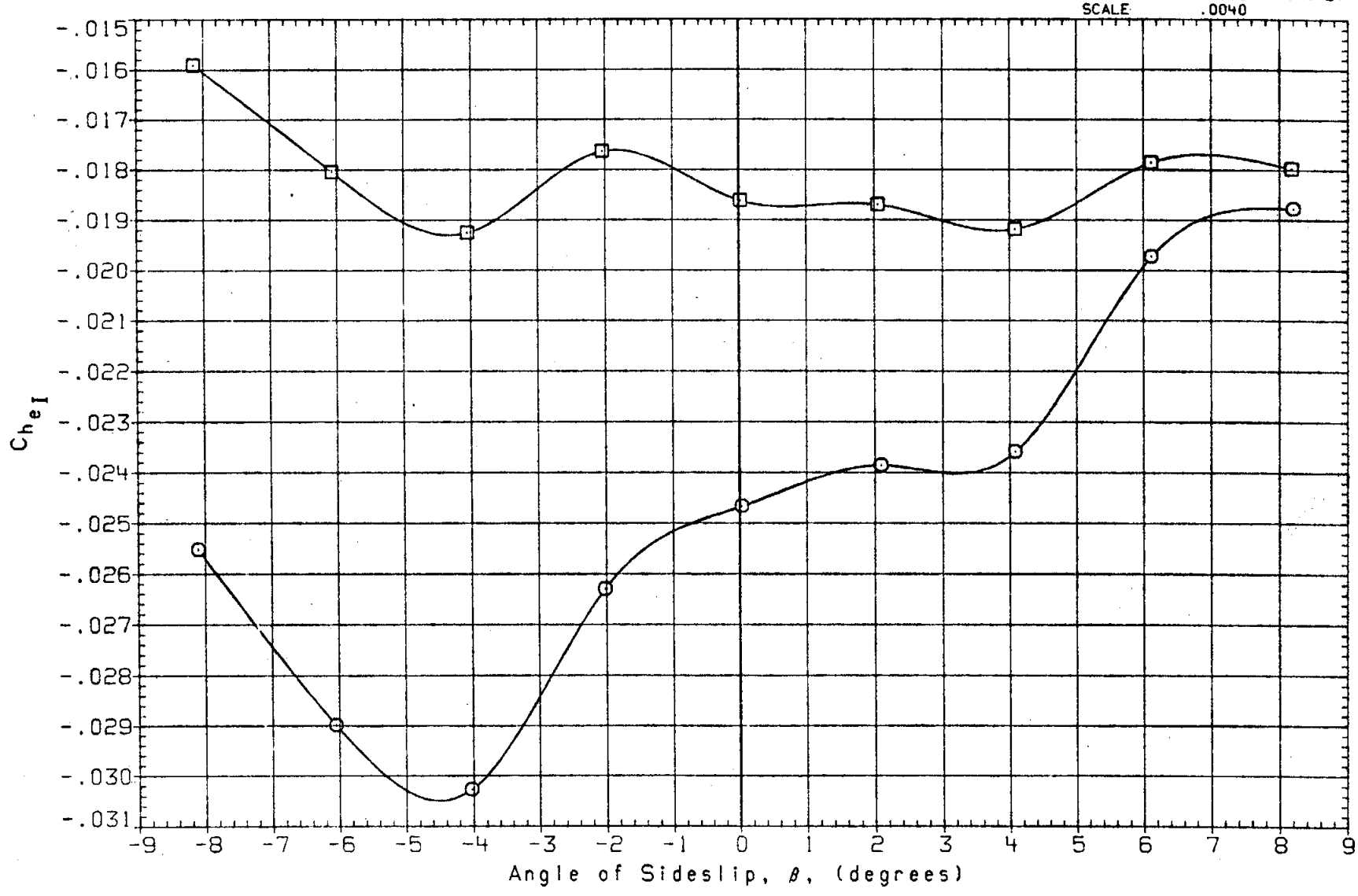

FIG. 44 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

DATA SET	SYMBOL	CONFIGURATION		ALPHA	PHI
S1Z009	○	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3	.000	90.000
B1Z016	□	FA28 (MSFC TWT 656)	02W2E2PNPAATT3S3 W/GRIT	.000	90.000

REFERENCE INFORMATION

SREF	2690.0000	SQ.FT.
LREF	1290.3000	INCHES
BREF	1290.3000	INCHES
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

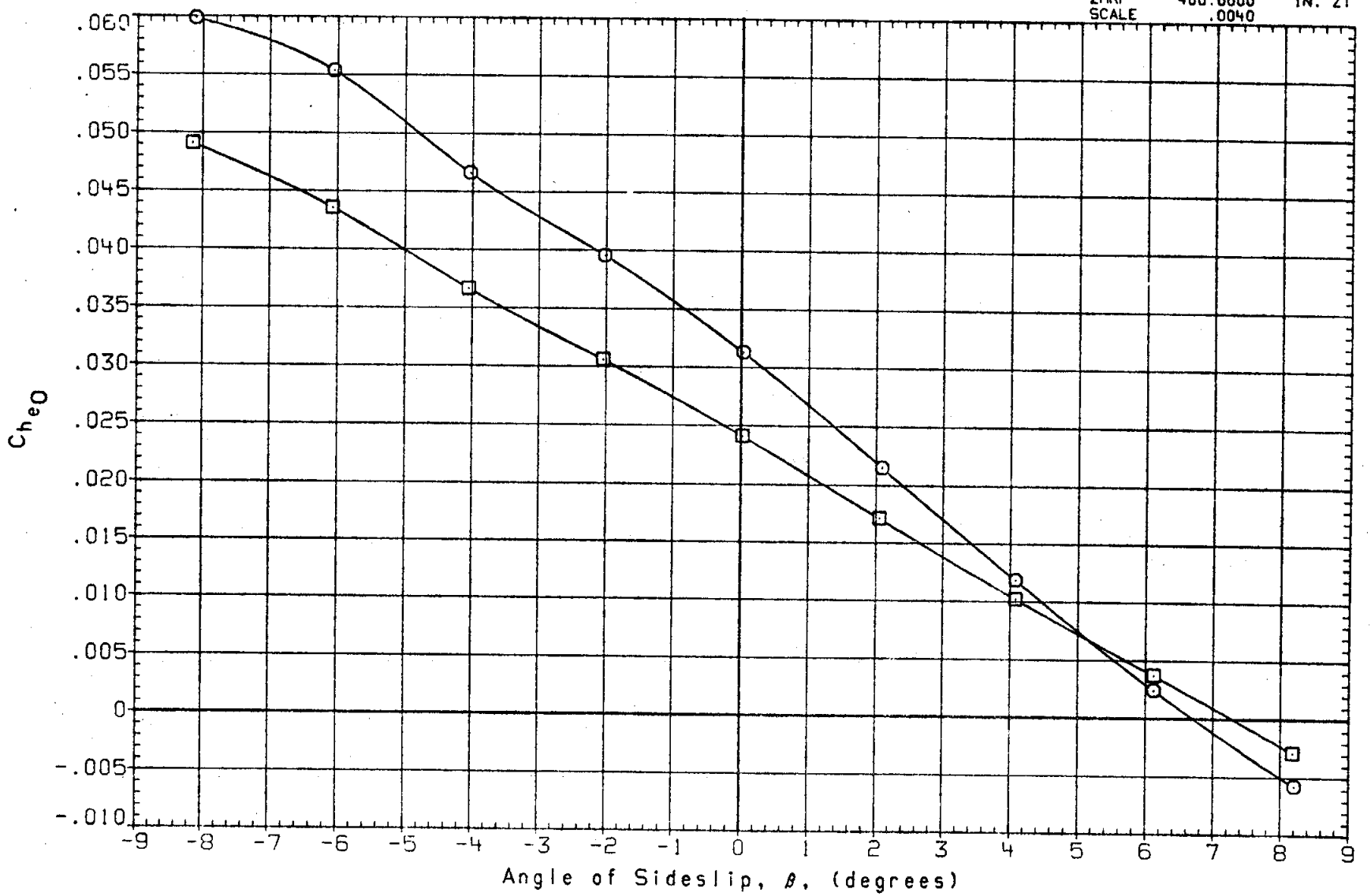

FIG. 44 EFFECT OF GRIT ON ORB. ELEVONS (LAUNCH CONF) IN YAW

(E)MACH = 1.25 DATE 12 MAR 80

APPENDIX

Tabulated Source Data

FA28 (MSFC TWT 656) 02W:T2 (R1Z001) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 160/ 0 RN/L = 4.97 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.604	-8.170	.00000	-.29052	.18071	.00150	-.00034	.00123	.04763	-.19200
.604	-6.120	.00000	-.18677	.11252	.00240	-.00138	.00105	.05303	-.18200
.604	-4.000	.00000	-.08569	.04820	.00050	-.00017	.00067	.05920	-.17700
.604	-2.020	.00000	-.00076	-.00592	.00096	.00100	.00062	.06233	-.17200
.604	.030	.00000	.09127	-.06582	.00244	.00170	-.00008	.06276	-.16600
.604	2.070	.00000	.18430	-.12610	-.00264	.00155	.00045	.06092	-.16600
.604	4.100	.00000	.27622	-.18729	.00365	.00191	.00016	.05606	-.16600
.604	6.150	.00000	.37251	-.25184	.00559	.00311	-.00075	.04780	-.17300
.604	8.250	.00000	.46876	-.31741	.00652	.00375	-.00109	.03838	-.17200
	GRADIENT	.00000	.04480	-.02914	.00049	00023	-.00006	-.00038	.00138

RUN NO. 150/ 0 RN/L = 6.16 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.901	-8.290	.00000	-.40785	.28248	.00059	.00168	-.00126	.08325	-.26400
.901	-6.230	.00000	-.30431	.21153	.00072	.00171	-.00094	.08027	-.24100
.901	-4.080	.00000	-.19335	.13660	.00123	.00186	-.00007	.07765	-.22600
.901	-2.070	.00000	-.07298	.05553	.00157	.00205	-.00051	.08066	-.21800
.901	.040	.00000	.04306	-.02189	.00257	.00242	-.00145	.08271	-.21000
.901	2.090	.00000	.14907	-.09125	.00433	.00313	-.00169	.08314	-.21200
.901	4.160	.00000	.25793	-.16369	.00504	.00332	-.00182	.08556	-.20800
.901	6.230	.00000	.38013	-.24787	.00721	.00448	-.00232	.08497	-.21700
.901	8.360	.00000	.49177	-.32375	.01000	.00611	-.00292	.08014	-.22600
	GRADIENT	.00000	.05448	-.03621	.00050	.00019	-.00023	.00089	.00203

RUN NO. 140/ 0 RN/L = 6.48 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.056	-8.290	.00000	-.47352	.36338	.00581	.00568	-.00094	.14699	-.42600
1.056	-6.250	.00000	-.36385	.28757	.00645	.00601	-.00101	.14551	-.38300
1.056	-4.120	.00000	-.22835	.18845	.00628	.00573	-.00106	.14243	-.37200
1.056	-2.100	.00000	-.10380	.10004	.00517	.00447	-.00092	.13977	-.35200
1.056	.000	.00000	.03305	.00246	-.00515	.00414	-.00049	.13751	-.34100
1.056	2.100	.00000	.17137	-.09585	.00654	.00500	-.00098	.14054	-.32600
1.056	4.160	.00000	.29856	-.18522	.00840	.00608	-.00190	.14417	-.34500
1.056	6.240	.00000	.42961	-.27768	.01096	.00769	-.00293	.14469	-.35400
1.056	8.370	.00000	.56310	-.37116	.01406	.00963	-.00421	.14266	-.36200
	GRADIENT	.00000	.06402	-.04544	.00027	.00006	-.00008	.00021	.00385

FA28 (MSFC TWT 656) 02W2 2 (R1Z001) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 130/ 0 RN/L = 6.77 GRAD ENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.099	-8.290	.00000	-.45727	.35803	-.00521	.00456	.00000	.16445	-.49900
1.099	-6.250	.00000	-.35480	.28958	.00527	.00467	-.00065	.17084	-.51600
1.099	-4.130	.00000	-.22193	.19528	.00489	.00430	-.00066	.17323	-.50000
1.099	-2.090	.00000	-.08849	.09894	.00516	.00429	-.00082	.17129	-.47400
1.099	-.010	.00000	.04062	.00685	-.00556	.00425	-.00062	.17096	-.46500
1.099	2.090	.00000	.16934	-.08495	.00640	.00461	-.00066	.17242	-.46200
1.099	4.160	.00000	.30013	-.18048	.00846	.00556	-.00200	.16712	-.44100
1.099	6.250	.00000	.42695	-.27131	.00987	.00627	-.00255	.16514	-.44200
1.099	8.390	.00000	.55614	-.36058	-.01318	.00861	-.00359	.16546	-.47500
	GRADIENT	.00000	.06271	-.04506	-.00040	00014	-.00013	-.00053	.00625

RUN NO. 120/ 0 RN/L = 6.71 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.250	-8.310	.00000	-.43734	.34543	-.00407	.00430	.00006	.15455	-.38600
1.250	-6.260	.00000	-.32127	.26339	-.00422	.00441	-.00049	.15565	-.37600
1.250	-4.140	.00000	-.19018	.16813	.00472	.00481	-.00029	.15883	-.36500
1.250	-2.110	.00000	-.07420	.08368	.00540	.00492	-.00047	.15824	-.34600
1.250	-.020	.00000	.04248	-.00137	.00649	.00554	-.00054	.15759	-.33700
1.250	2.070	.00000	.16343	-.08959	.00815	.00662	-.00121	.15698	-.32900
1.250	4.120	.00000	.28069	-.17438	.00909	.00704	-.00181	.15564	-.32700
1.250	6.230	.00000	.40634	-.26415	.00947	.00699	-.00247	.15357	-.32900
1.250	8.350	.00000	.52195	-.34670	-.01247	.00911	-.00314	.14733	-.32500
	GRADIENT	.00000	.05697	-.04146	.00056	.00030	-.00018	-.00037	.00449

FA28 (MSFC TWT 656) 02WE52 WING GAP WAXED (R1Z002) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 170/ 0 RN/L = 6.28 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.902	-8.290	.00000	-.41093	.28331	-.00245	.00302	-.00131	.08068	-.26600
.902	-6.260	.00000	-.30659	.21112	-.00367	.00355	-.00092	.07695	-.24700
.902	-4.130	.00000	-.19198	.13401	-.00330	.00333	-.00076	.07657	-.22900
.902	-2.120	.00000	-.08342	.06335	-.00461	.00402	-.00105	.08086	-.21800
.902	-.020	.00000	.03536	-.01556	-.00425	.00363	-.00174	.08354	-.20900
.902	2.070	.00000	.14539	-.08778	-.00541	.00408	-.00195	.08406	-.20600
.902	4.140	.00000	.25393	-.16059	-.00565	.00399	-.00184	.08391	-.20800
.902	6.210	.00000	.37256	-.24218	-.00628	.00396	-.00166	.08334	-.21400
.902	8.340	.00000	.49137	-.32289	-.00724	.00430	-.00251	.08227	-.22600
	GRADIENT	.00000	.05406	-.03571	-.00026	00007	-.00015	.00086	.00260

RUN NO. 180/ 0 RN/L = 6.70 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.253	-8.290	.00000	-.44784	.35392	.00439	-.00311	.00177	.15605	-.37700
1.253	-6.260	.00000	-.33016	.27119	.00375	-.00271	.00132	.15686	-.36700
1.253	-4.120	.00000	-.19950	.17656	.00282	-.00185	.00123	.15950	-.35600
1.253	-2.110	.00000	-.07813	.08828	.00077	-.00027	.00061	.16089	-.34500
1.253	.000	.00000	.04210	.00099	-.00074	.00079	.00051	.16015	-.33500
1.253	2.080	.00000	.16462	-.08795	-.00239	.00218	-.00028	.15939	-.32800
1.253	4.140	.00000	.28072	-.17093	-.00337	.00276	-.00103	.15930	-.32800
1.253	6.230	.00000	.40341	-.25933	-.00435	.00316	-.00160	.15546	-.32300
1.253	8.370	.00000	.53027	-.34901	-.00698	.00481	-.00229	.15187	-.33000
	GRADIENT	.00000	.05809	-.04206	-.00075	.00056	-.00026	-.00009	.00352

FA28 (MSFC TWT 656) 02W2E2 WING GAP WAXED (RIZ003) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 230/ 0 RN/L = 4.93 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.600	-6.000	.00000	.11232	-.08264	.11115	-.07870	.03146	.05799	-.17500
.600	-3.970	.00000	.10880	-.07917	.07360	-.05184	.02084	.06150	-.19300
.600	-1.940	.00000	.10118	-.07162	.03642	-.02508	.01064	.06275	-.19800
.600	.050	.00000	.10073	-.07160	.00438	-.00308	.00183	.06290	-.19400
.600	2.100	.00000	.10109	-.07217	-.03251	.02290	-.00845	.06282	-.17800
.600	4.100	.00000	.10089	-.07298	-.06588	.04615	-.01735	.06233	-.17100
.600	6.160	.00000	.10018	-.07442	-.10501	.07428	-.02823	.06117	-.18000
	GRADIENT	.00000	-.00079	.00059	-.01724	.01209	-.00473	.00009	.00317

RUN NO. 220/ 0 RN/L = 6.18 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.902	-6.000	.00000	.05798	-.03422	.11551	-.08101	.03189	.08198	-.24800
.902	-3.960	.00000	.05665	-.03338	.07599	-.05316	.02084	.08194	-.24700
.902	-1.950	.00000	.05109	-.02688	.03610	-.02424	.00897	.08331	-.23700
.902	.050	.00000	.05408	-.02997	.00209	-.00055	-.00025	.08066	-.21500
.902	2.110	.00000	.05284	-.02913	-.03470	.02509	-.01035	.08163	-.21300
.902	4.100	.00000	.05040	-.02768	-.06920	.04916	-.01969	.08205	-.22500
.902	6.160	.00000	.05043	-.02876	-.10956	.07811	-.03110	.08135	-.24100
	GRADIENT	.00000	-.00053	.00045	-.01790	.01258	-.00497	-.00007	.00337

RUN NO. 210/ 0 RN/L = 6.45 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.049	-5.990	.00000	.04779	-.01161	.10481	-.07209	.03139	.13782	-.37600
1.049	-3.970	.00000	.04616	-.00846	.06923	-.04732	.02097	.14021	-.36600
1.049	-1.930	.00000	.04020	-.00230	.03495	-.02345	.01079	.14076	-.35200
1.049	.060	.00000	.03437	.00214	.00174	-.00011	.00124	.14004	-.33700
1.049	2.110	.00000	.03025	.00511	-.03333	.02368	-.00901	.13858	-.32300
1.049	4.130	.00000	.02722	.00697	-.06725	.04683	-.01890	.13837	-.31100
1.049	6.170	.00000	.02595	.00610	-.10558	.07363	-.03009	.13838	-.33800
	GRADIENT	.00000	-.00236	.00189	-.01686	.01163	-.00492	-.00029	.00687

FA28 (MSFC TWT 656) 02W2E2 WING GAP WAXED (R1Z003) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 200/ 0 RN/L = 6.43 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.114	-5.990	.00000	.03886	.00241	.10752	-.07464	.03256	.16149	-.44500
1.114	-3.950	.00000	.04310	.00053	.07220	-.05011	.02219	.16563	-.47000
1.114	-1.930	.00000	.04202	.00210	.03557	-.02436	.01121	.16553	-.46700
1.114	.060	.00000	.03643	.00605	.00097	-.00022	.00118	.16351	-.42500
1.114	2.140	.00000	.03511	.00806	-.03339	.02321	-.00887	.16779	-.44700
1.114	4.140	.00000	.03152	.00985	-.06823	.04741	-.01912	.16598	-.45800
1.114	6.180	.00000	.02586	.01291	-.10572	.07381	-.03032	.16388	-.44000
	GRADIENT	.00000	-.00148	.00121	-.01727	.01198	-.00507	.00015	.00215

RUN NO. 190/ 0 RN/L = 6.50 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.255	-6.020	.00000	.05479	-.00952	.10370	-.07094	.03038	.15810	-.36300
1.255	-3.970	.00000	.05552	-.00927	.06708	-.04530	.01946	.15991	-.36500
1.255	-1.950	.00000	.05146	-.00579	.03139	-.02039	.00908	.16010	-.35300
1.255	.050	.00000	.05097	-.00559	-.00289	.00316	-.00038	.15969	-.34100
1.255	2.100	.00000	.04976	-.00469	-.03704	.02650	-.00973	.16037	-.34000
1.255	4.120	.00000	.04773	-.00335	-.07142	.05037	-.01949	.16086	-.34500
1.255	6.160	.00000	.04492	-.00202	-.10803	.07578	-.03019	.16025	-.34700
	GRADIENT	.00000	-.00085	.00064	-.01707	.01178	-.00478	.00011	.00262

FA28 (MSFC TWT 656) 02:42 WING WAX CUT (RIZ004) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 240/ 0 RN/L = 6.23 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.905	-6.220	.00000	-.31841	.22322	-.00306	.00318	-.00119	.08144	-.25700
.905	-4.170	.00000	-.21405	.15279	-.00332	.00318	-.00056	.07850	-.23700
.905	-2.100	.00000	-.08537	.06552	-.00440	.00396	-.00082	.08128	-.22200
.905	.000	.00000	.03457	-.01475	-.00533	.00458	-.00194	.08332	-.21400
.905	2.090	.00000	.14513	-.08759	-.00566	.00464	-.00186	.08362	-.21200
.905	4.140	.00000	.25205	-.15961	-.00722	.00543	-.00203	.08346	-.21300
.905	6.210	.00000	.37611	-.24536	-.00974	.00677	-.00237	.08120	-.22300
.905	8.340	.00000	.49250	-.32448	-.01061	.00689	-.00315	.08095	-.22600
	GRADIENT	.00000	.05587	-.03738	-.00044	.00025	-.00019	.00059	.00279

RUN NO. 250/ 0 RN/L = 6.60 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.254	-8.290	.00000	-.43853	.34675	-.00126	.00142	.00049	.15439	-.38800
1.254	-6.220	.00000	-.32213	.26486	-.00182	.00189	-.00025	.15743	-.38500
1.254	-4.140	.00000	-.19437	.17242	-.00296	.00293	-.00039	.16160	-.37600
1.254	-2.090	.00000	-.07062	.08264	-.00378	.00349	-.00057	.16253	-.35900
1.254	.010	.00000	.05294	-.00754	-.00502	.00434	-.00075	.16147	-.34400
1.254	2.100	.00000	.17177	-.09405	-.00609	.00504	-.00123	.15928	-.32900
1.254	4.140	.00000	.29275	-.18110	-.00788	.00621	-.00204	.15820	-.32900
1.254	6.230	.00000	.41240	-.26664	-.00913	.00691	-.00247	.15509	-.32500
1.254	8.370	.00000	.54076	-.35737	-.01133	.00823	-.00329	.15149	-.34100
	GRADIENT	.00000	.05863	-.04259	-.00059	.00039	-.00019	-.00048	.00598

FA28 (MSFC TWT 656) 02W:E2WNWAATT3S3 (R1Z005) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 300/ 0 RN/L = 4.95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.603	-8.020	.00000	-.04296	.03408	-.00303	.00139	-.00055	.06163	-.17400
.603	-6.000	.00000	.01340	-.00515	-.00374	.00200	-.00071	.06266	-.16500
.603	-3.960	.00000	.07493	-.04729	-.00452	.00264	-.00059	.06282	-.15900
.603	-1.960	.00000	.13473	-.08832	-.00580	.00349	.00071	.06097	-.15500
.603	.080	.00000	.19169	-.12734	-.00615	.00384	-.00109	.05697	-.15400
.603	2.130	.00000	.25276	-.16918	-.00614	.00392	-.00047	.05246	-.14600
.603	4.100	.00000	.30975	-.20866	-.00651	.00437	-.00064	.04722	-.13700
.603	6.130	.00000	.36569	-.24767	-.00826	.00571	-.00106	.04106	-.12900
.603	8.200	.00000	.41807	-.28392	-.00690	.00474	-.00123	.03418	-.12800
	GRADIENT	.00000	.02908	-.01997	-.00021	00019	-.00006	-.00196	.00262

RUN NO. 290/ 0 RN/L = 6.26 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.904	-8.040	.00000	-.04178	.03947	-.00624	.00462	-.00151	.08933	-.28300
.904	-6.010	.00000	.02013	-.00394	-.00644	.00492	-.00214	.08942	-.26700
.904	-3.970	.00000	.08722	-.05177	-.00551	.00390	-.00139	.08594	-.23600
.904	-1.930	.00000	.15820	-.10051	-.00590	.00419	-.00232	.08268	-.22100
.904	.130	.00000	.22204	-.14432	-.00616	.00409	-.00174	.07893	-.21400
.904	2.170	.00000	.28740	-.18879	-.00666	.00440	-.00229	.07593	-.20900
.904	4.160	.00000	.34633	-.22997	-.00680	.00454	-.00225	.07346	-.20800
.904	6.210	.00000	.40016	-.26847	-.00904	.00579	-.00343	.07245	-.20400
.904	8.290	.00000	.44159	-.29700	-.01035	.00672	-.00394	.07122	-.21000
	GRADIENT	.00000	.03174	-.02190	-.00016	.00007	-.00008	-.00155	.00334

RUN NO. 280/ 0 RN/L = 6.57 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.054	-8.040	.00000	-.06387	.07330	-.00466	.00325	-.00071	.13783	-.34000
1.054	-6.010	.00000	-.00249	.02892	-.00488	.00327	-.00098	.13317	-.31100
1.054	-3.990	.00000	.06143	-.01634	-.00444	.00288	-.00103	.12928	-.28600
1.054	-1.950	.00000	.13262	-.06721	-.00421	.00249	-.00113	.12568	-.26500
1.054	.150	.00000	.21506	-.12578	-.00460	.00276	-.00148	.12353	-.26000
1.054	2.190	.00000	.28857	-.17891	-.00476	.00268	-.00167	.12111	-.25300
1.054	4.210	.00000	.35107	-.22326	-.00529	.00303	-.00148	.11867	-.26000
1.054	6.240	.00000	.39628	-.25484	-.00659	.00398	-.00274	.11683	-.26800
1.054	8.310	.00000	.43774	-.28336	-.00938	.00604	-.00380	.11333	-.27200
	GRADIENT	.00000	.03580	-.02559	-.00011	.00002	-.00007	-.00126	.00312

FA28 (MSFC TWT 656) 02W2E2WNWAATT3S3 (R1Z005) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 270/ 0 RN/L = 6.64 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.106	-8.060	.00000	-.08684	.09735	-.00304	.00206	-.00038	.15542	-.38600
1.106	-6.010	.00000	-.01314	.04276	-.00310	.00202	-.00054	.15077	-.37100
1.106	-3.970	.00000	.06253	-.01224	-.00340	.00223	-.00090	.14862	-.36900
1.106	-1.940	.00000	.14657	-.07398	-.00360	.00221	-.00089	.14797	-.35400
1.106	.150	.00000	.22909	-.13310	-.00477	.00329	-.00093	.14802	-.34800
1.106	2.190	.00000	.31055	-.19334	-.00505	.00322	-.00105	.14383	-.33600
1.106	4.210	.00000	.38160	-.24522	-.00640	.00441	-.00149	.14315	-.33000
1.106	6.250	.00000	.44192	-.28885	-.00687	.00458	-.00202	.13938	-.33000
1.106	8.310	.00000	.49043	-.32208	-.00508	.00629	-.00265	.13674	-.33900
	GRADIENT	.00000	.03915	-.02857	-.00036	00026	-.00007	-.00074	.00468

RUN NO. 260/ 0 RN/L = 6.55 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.250	-8.070	.00000	-.06851	.08579	-.00493	.00380	-.00087	.15996	-.32000
1.250	-6.010	.00000	.00678	.02932	-.00609	.00463	-.00104	.15947	-.31700
1.250	-3.990	.00000	.07979	-.02415	-.00690	.00538	-.00116	.16035	-.31500
1.250	-1.940	.00000	.15911	-.08325	-.00657	.00498	-.00125	.15948	-.30200
1.250	.120	.00000	.23430	-.13816	-.00868	.00683	-.00177	.15801	-.29100
1.250	2.170	.00000	.30652	-.19054	-.01136	.00872	-.00257	.15442	-.28000
1.250	4.210	.00000	.36877	-.23523	-.01111	.00841	-.00322	.15083	-.27200
1.250	6.250	.00000	.42646	-.27749	-.01192	.00892	-.00394	.14710	-.26900
1.250	8.320	.00000	.46708	-.30583	-.01182	.00922	-.00421	.14184	-.26500
	GRADIENT	.00000	.03537	-.02582	-.00064	.00048	-.00027	-.00117	.00527

FA28 (MSFC TWT 656) 02W:E2WNWAATT3S3 (R1Z006) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 310/ 0 RN/L = 4.91 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.601	-8.040	.00000	.20502	-.14500	.16006	-.10784	.05537	.05135	-.17500
.601	-6.010	.00000	.20871	-.14508	.12027	-.08147	.04251	.05354	-.16900
.601	-3.990	.00000	.20704	-.14167	.07759	-.05199	.02790	.05568	-.16200
.601	-2.000	.00000	.20328	-.13694	.03797	-.02525	.01426	.05641	-.15100
.601	.030	.00000	.19422	-.12943	.00341	-.00279	.00205	.05712	-.14800
.601	2.070	.00000	.19512	-.13100	-.03328	.02133	-.01100	.05761	-.15200
.601	4.040	.00000	.19820	-.13572	-.07214	.04721	-.02426	.05724	-.16000
.601	6.060	.00000	.19698	-.13909	-.11669	.07802	-.03956	.05613	-.17700
.601	8.110	.00000	.19569	-.13962	-.15657	.10494	-.05275	.05321	-.18300
	GRADIENT	.00000	-.00129	.00089	-.01841	01217	-.00644	.00021	.00015

RUN NO. 320/ 0 RN/L = 6.20 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.900	-8.060	.00000	.23777	-.16118	.16539	-.11066	.05963	.08678	-.28100
.900	-6.040	.00000	.24277	-.16477	.12632	-.08518	.04602	.08368	-.25100
.900	-4.040	.00000	.24589	-.16623	.08407	-.05624	.03041	.08261	-.23400
.900	-2.010	.00000	.23944	-.15995	.03962	-.02533	.01444	.08194	-.21500
.900	.050	.00000	.22138	-.14565	.00183	-.00075	.00142	.07900	-.19900
.900	2.080	.00000	.22748	-.15071	-.03855	.02536	-.01381	.08175	-.22600
.900	4.080	.00000	.23310	-.15619	-.07959	.05291	-.02816	.08517	-.25500
.900	6.090	.00000	.22713	-.15277	-.12310	.08260	-.04388	.08779	-.27200
.900	8.180	.00000	.21875	-.14713	-.16539	.11035	-.05783	.09002	-.29000
	GRADIENT	.00000	-.00186	.00145	-.01994	.01323	-.00715	.00024	-.00258

RUN NO. 330/ 0 RN/L = 6.49 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.051	-8.120	.00000	.22669	-.14139	.16069	-.10271	.06882	.12285	-.29200
1.051	-6.080	.00000	.22406	-.13698	.11926	-.07741	.05234	.12480	-.29000
1.051	-4.050	.00000	.22504	-.13511	.07979	-.05188	.03622	.12675	-.28500
1.051	-2.020	.00000	.21571	-.12627	.03965	-.02584	.01867	.12525	-.27100
1.051	.030	.00000	.21222	-.12371	.00154	-.00082	.00144	.12369	-.25600
1.051	2.060	.00000	.21386	-.12621	-.03541	.02279	-.01562	.12617	-.28100
1.051	4.070	.00000	.21227	-.12570	-.07613	.04940	-.03292	.13007	-.31100
1.051	6.130	.00000	.21278	-.12820	-.11707	.07566	-.04992	.13081	-.31900
1.051	8.200	.00000	.20564	-.12477	-.16160	.10326	-.06738	.13093	-.33300
	GRADIENT	.00000	-.00135	.00093	-.01904	.01236	-.00849	.00037	-.00304

FA28 (MSFC TWT 656) O2W2E2WNWAATT3S3 (R1Z006) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 340/ 0 RN/L = 6.53 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.100	-8.110	.00000	.23636	-.14442	.17194	-.11029	.07428	.14549	-.36700
1.100	-6.050	.00000	.24179	-.14705	.13059	-.08522	.05755	.14567	-.36100
1.100	-4.030	.00000	.24471	-.14718	.08895	-.05877	.04001	.14576	-.35200
1.100	-2.020	.00000	.23777	-.14025	.04739	-.03160	.02148	.14571	-.34000
1.100	.050	.00000	.23142	-.13472	.00719	-.00533	.00333	.14477	-.33200
1.100	2.090	.00000	.23355	-.13806	-.03277	.02027	-.01489	.14533	-.34400
1.100	4.100	.00000	.23239	-.13812	-.07447	.04724	-.03335	.14784	-.37000
1.100	6.120	.00000	.22747	-.13627	-.11846	.07561	-.05205	.14865	-.37600
1.100	8.210	.00000	.21767	-.13027	-.16351	.10358	-.07057	.15015	-.38500
	GRADIENT	.00000	-.00142	.00100	-.01998	01295	-.00899	.00018	-.00196

RUN NO. 350/ 0 RN/L = 6.58 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.251	-8.110	.00000	.23510	-.14863	.16149	-.10411	.06839	.14541	-.27500
1.251	-6.050	.00000	.24017	-.15017	.11850	-.07707	.05132	.14852	-.27500
1.251	-4.030	.00000	.23846	-.14543	.07806	-.05101	.03439	.15146	-.27900
1.251	-2.000	.00000	.22999	-.13731	.03705	-.02404	.01672	.15238	-.27400
1.251	.050	.00000	.22516	-.13274	-.00106	.00108	.00029	.15400	-.28000
1.251	2.090	.00000	.22478	-.13376	-.03928	.02582	-.01645	.15508	-.29500
1.251	4.100	.00000	.22820	-.13809	-.07845	.05117	-.03328	.15544	-.30200
1.251	6.140	.00000	.22138	-.13449	-.12226	.07963	-.05161	.15391	-.30300
1.251	8.240	.00000	.21151	-.12749	-.16760	.10817	-.06979	.15361	-.31000
	GRADIENT	.00000	-.00127	.00090	-.01913	.01249	-.00828	.00052	-.00329

FA28 (MSFC TWT 656) 02W2E2WNWAATT3S3 (R1Z007) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = -90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 360/ 0 RN/L = 6.56 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.249	-8.210	.00000	.24715	-.15531	.16092	-.10476	.06828	.14930	-.29400
1.249	-6.140	.00000	.25288	-.15734	.11686	-.07709	.05057	.15225	-.29900
1.249	-4.100	.00000	.25158	-.15383	.07490	-.04972	.03297	.15382	-.29900
1.249	-2.090	.00000	.24235	-.14632	.03488	-.02325	.01550	.15321	-.28700
1.249	-.060	.00000	.24151	-.14493	-.00384	.00214	-.00116	.15471	-.29100
1.249	1.990	.00000	.24188	-.14640	-.04102	.02615	-.01774	.15494	-.29900
1.249	4.010	.00000	.24277	-.14837	-.08070	.05193	-.03445	.15621	-.30900
1.249	6.040	.00000	.23645	-.14863	-.12189	.07840	-.05173	.15146	-.29000
1.249	8.100	.00000	.23202	-.14498	-.16597	.10618	-.06918	.14939	-.29000
	GRADIENT	.00000	-.00092	.00053	-.01907	01245	-.00828	.00032	-.00158

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 (R1Z008) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 431/ 0 RN/L = 4.85 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.600	-8.020	.00000	-.05374	.04374	-.00336	.00119	-.00048	.06028	-.17100
.600	-6.000	.00000	.00388	.00358	-.00635	.00340	-.00132	.06112	-.16700
.600	-3.980	.00000	.06148	-.03622	-.00620	.00347	-.00084	.06087	-.16100
.600	-1.960	.00000	.12263	-.07818	-.00699	.00423	-.00132	.05954	-.15500
.600	.120	.00000	.18135	-.11847	-.00735	.00458	-.00099	.05620	-.14700
.600	2.140	.00000	.23950	-.15861	-.00776	.00496	-.00078	.05208	-.14600
.600	4.140	.00000	.29957	-.20026	-.00909	.00569	-.00154	.04670	-.14500
.600	6.150	.00000	.35798	-.24060	-.01001	.00645	-.00186	.04017	-.14300
.600	8.230	.00000	.41565	-.28061	-.00904	.00583	-.00222	.03291	-.13900
	GRADIENT	.00000	.02916	-.02008	-.00032	.00025	-.00004	-.00176	.00202

FA28 (MSFC TWT 656) 02W3E2PNPAATT3S3 (R1Z008) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 402/ 0 RN/L = 6.14 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.898	-8.040	.00000	-.05096	.04735	-.00608	.00487	.00024	.08926	-.20400
.898	-5.970	.00000	.01289	.00134	-.00650	.00463	-.00008	.08499	-.19500
.898	-3.950	.00000	.07896	-.04544	-.00680	.00487	-.00087	.08246	-.18500
.898	-1.940	.00000	.14387	-.09061	-.00632	.00476	-.00151	.07985	-.17600
.898	.150	.00000	.21100	-.13541	-.00608	.00447	-.00140	.07658	-.17400
.898	2.190	.00000	.27682	-.18022	-.00555	.00370	-.00148	.07364	-.17200
.898	4.180	.00000	.33949	-.22448	-.00513	.00311	-.00150	.07162	-.17300
.898	6.230	.00000	.39328	-.26345	-.00649	.00403	-.00213	.07044	-.17600
.898	8.340	.00000	.43952	-.29542	-.00775	.00501	-.00237	.06906	-.18000
	GRADIENT	.00000	.03208	-.02196	.00020	- 00022	-.00006	-.00137	.00137

RUN NO. 410/ 0 RN/L = 6.34 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.949	-8.040	.00000	-.06830	.06639	-.00376	.00226	-.00009	.11171	-.25800
.949	-6.000	.00000	-.00422	.01920	-.00370	.00223	-.00029	.10769	-.24400
.949	-3.990	.00000	.05758	-.02527	-.00348	.00195	-.00052	.10432	-.23300
.949	-1.950	.00000	.12794	-.07508	-.00302	.00134	-.00048	.10205	-.23000
.949	.120	.00000	.19929	-.12475	-.00213	.00052	-.00060	.09805	-.22800
.949	2.170	.00000	.26780	-.17246	-.00207	.00028	-.00066	.09224	-.22400
.949	4.180	.00000	.33077	-.21611	-.00244	.00070	-.00148	.08821	-.22500
.949	6.210	.00000	.38271	-.25357	-.00273	.00075	-.00223	.08627	-.22300
.949	8.280	.00000	.42415	-.28222	-.00529	.00245	-.00277	.08344	-.21900
	GRADIENT	.00000	.03354	-.02342	.00015	-.00017	-.00010	-.00205	.00108

RUN NO. 390/ 0 RN/L = 6.47 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.050	-8.060	.00000	-.08833	.09104	-.00336	.00184	.00055	.13016	-.27200
1.050	-6.020	.00000	-.02710	.04819	-.00320	.00165	.00017	.12859	-.26900
1.050	-3.980	.00000	.03800	.00224	-.00277	.00122	-.00004	.12586	-.25600
1.050	-1.930	.00000	.10982	-.04898	-.00277	.00100	-.00031	.12327	-.25000
1.050	.130	.00000	.18836	-.10516	-.00289	.00103	-.00043	.12282	-.25300
1.050	2.170	.00000	.26322	-.15765	-.00317	.00112	-.00060	.12095	-.25700
1.050	4.200	.00000	.33030	-.20563	-.00437	.00167	-.00065	.11870	-.26000
1.050	6.230	.00000	.38160	-.24310	-.00616	.00323	-.00211	.11636	-.27000
1.050	8.290	.00000	.42335	-.27130	-.00712	.00416	-.00227	.11280	-.27400
	GRADIENT	.00000	.03607	-.02563	-.00018	.00005	-.00007	-.00081	-.00073

FA28 (MSFC TWT 656) 02N2E2PNPAATT3S3 (R1Z008) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 380/ 0 RN/L = 6.53 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.099	-8.060	.00000	-.11041	.11521	-.00254	.00120	.00045	.14978	-.35100
1.099	-6.020	.00000	-.03903	.06293	-.00223	.00073	.00026	.14604	-.33900
1.099	-3.990	.00000	.03976	.00548	-.00250	.00092	-.00020	.14307	-.33100
1.099	-1.950	.00000	.12123	-.05412	-.00248	.00085	-.00032	.14273	-.32500
1.099	.160	.00000	.20533	-.11561	-.00249	.00069	-.00001	.14250	-.32300
1.099	2.210	.00000	.28980	-.17611	-.00350	.00137	-.00024	.14097	-.32200
1.099	4.220	.00000	.36493	-.23076	-.00469	.00227	-.00056	.13949	-.31900
1.099	6.250	.00000	.42024	-.27031	-.00604	.00339	-.00122	.13672	-.32200
1.099	8.330	.00000	.47182	-.30537	-.00672	.00388	-.00077	.13402	-.33300
	GRADIENT	.00000	.03979	-.02889	-.00026	00016	-.00003	-.00043	.00131

RUN NO. 421/ 0 RN/L = 6.54 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.149	-8.060	.00000	-.09012	.10132	-.00204	.00101	-.00047	.15702	-.37700
1.149	-6.000	.00000	-.01008	.03991	-.00296	.00172	-.00052	.15281	-.35500
1.149	-3.970	.00000	.07409	-.02354	-.00371	.00217	-.00033	.15072	-.33700
1.149	-1.930	.00000	.15365	-.08185	-.00520	.00339	-.00052	.15053	-.32900
1.149	.130	.00000	.23281	-.14043	-.00544	.00329	-.00048	.14792	-.32200
1.149	2.170	.00000	.31058	-.19605	-.00651	.00379	-.00125	.14494	-.31700
1.149	4.210	.00000	.37829	-.24439	-.00693	.00405	-.00189	.14149	-.31000
1.149	6.250	.00000	.43355	-.28379	-.00782	.00469	-.00249	.13883	-.31100
1.149	8.330	.00000	.48686	-.31975	-.00877	.00527	-.00213	.13580	-.32200
	GRADIENT	.00000	.03741	-.02717	-.00038	.00020	-.00019	-.00118	.00323

RUN NO. 371/ 0 RN/L = 6.57 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.246	-8.010	.00000	-.07810	.09266	-.00510	.00370	-.00028	.15525	-.28700
1.246	-5.970	.00000	-.00512	.03736	-.00503	.00343	.00008	.15387	-.28100
1.246	-3.930	.00000	.06931	-.01688	-.00584	.00418	-.00027	.15471	-.28400
1.246	-1.900	.00000	.14609	-.07301	-.00583	.00409	-.00040	.15456	-.28100
1.246	.160	.00000	.22154	-.12878	-.00687	.00479	-.00054	.15368	-.28100
1.246	2.210	.00000	.29798	-.18370	-.00822	.00585	-.00118	.15156	-.28400
1.246	4.220	.00000	.35969	-.22859	-.00857	.00604	-.00203	.14775	-.28100
1.246	6.260	.00000	.40854	-.26376	-.00919	.00681	-.00276	.14371	-.27500
1.246	8.340	.00000	.45322	-.29486	-.00984	.00708	-.00240	.14041	-.27600
	GRADIENT	.00000	.03590	-.02617	-.00038	.00027	-.00021	-.00083	.00015

FA28 (MSFC TWT 656) 02'2E2PNPAATT3S3 (R1Z009) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 441/ 0 RN/L = 4.91 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.602	-8.020	.00000	.22093	-.15103	.16506	-.11036	.06052	.05121	-.18100
.602	-5.990	.00000	.20999	-.14369	.12495	-.08428	.04595	.05393	-.17700
.602	-3.990	.00000	.20262	-.13758	.08216	-.05501	.03046	.05633	-.17100
.602	-1.980	.00000	.19134	-.12833	.04104	-.02750	.01583	.05802	-.16500
.602	.060	.00000	.18089	-.12037	.00424	-.00378	.00242	.05837	-.15900
.602	2.070	.00000	.18201	-.12260	-.03138	.01938	-.01088	.05931	-.16300
.602	4.060	.00000	.18595	-.12181	-.07025	.04501	-.02479	.05732	-.17100
.602	6.060	.00000	.18317	-.12854	-.11189	.07372	-.03903	.05756	-.17600
.602	8.110	.00000	.18279	-.13136	-.15050	.09960	-.05209	.05581	-.18700
	GRADIENT	.00000	-.00212	.00185	-.01872	01225	-.00681	.00016	.00010

RUN NO. 450/ 0 RN/L = 6.18 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.900	-8.090	.00000	.24697	-.16125	.17244	-.11412	.06516	.08168	-.24900
.900	-6.070	.00000	.23661	-.15606	.12882	-.08510	.04879	.08017	-.22700
.900	-4.020	.00000	.22798	-.15110	.08685	-.05739	.03244	.07986	-.21900
.900	-1.990	.00000	.21210	-.13854	.04328	-.02797	.01544	.07968	-.20800
.900	.090	.00000	.19002	-.12121	.00766	-.00548	.00161	.07885	-.19700
.900	2.100	.00000	.19769	-.12737	-.03221	.01985	-.01452	.08275	-.23300
.900	4.100	.00000	.20436	-.13472	-.07339	.04722	-.02884	.08407	-.25000
.900	6.110	.00000	.20296	-.13545	-.11966	.07927	-.04523	.08532	-.26200
.900	8.180	.00000	.19682	-.13149	-.16081	.10591	-.05832	.08898	-.27900
	GRADIENT	.00000	-.00305	.00218	-.01947	.01264	-.00750	.00056	-.00425

RUN NO. 462/ 0 RN/L = 6.59 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.050	-8.120	.00000	.25215	-.15239	.16735	-.10591	.07545	.12553	-.30200
1.050	-6.060	.00000	.23431	-.13980	.12494	-.08034	.05719	.12551	-.28700
1.050	-4.050	.00000	.21341	-.12426	.08225	-.05346	.03878	.12478	-.28100
1.050	-2.040	.00000	.19368	-.10922	.04264	-.02803	.02109	.12308	-.27000
1.050	.030	.00000	.18876	-.10637	.00384	-.00297	.00296	.12307	-.26200
1.050	2.060	.00000	.19704	-.11478	-.03543	.02253	-.01570	.12568	-.27700
1.050	4.100	.00000	.19439	-.11426	-.07365	.04668	-.03264	.12463	-.28400
1.050	6.130	.00000	.19727	-.11925	-.11535	.07310	-.05025	.12504	-.28400
1.050	8.190	.00000	.18993	-.11559	-.15816	.09891	-.06775	.12962	-.32000
	GRADIENT	.00000	-.00170	.00070	-.01911	.01230	-.00881	.00011	-.00064

FA28 (MSFC TWT 656) 0243E2PNPAATT3S3 (R1Z009) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 471/ 0 RN/L = 6.58 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.100	-8.120	.00000	.25749	-.15249	.17723	-.11283	.07964	.14822	-.37100
1.100	-6.070	.00000	.24708	-.14596	.13365	-.08639	.06089	.14687	-.36600
1.100	-4.060	.00000	.23316	-.13631	.08998	-.05882	.04198	.14438	-.34900
1.100	-2.020	.00000	.21979	-.12701	.04798	-.03190	.02318	.14204	-.33200
1.100	.030	.00000	.20803	-.11818	.00695	-.00548	.00419	.14219	-.32800
1.100	2.070	.00000	.21193	-.12310	-.03228	.01959	-.01430	.14301	-.34100
1.100	4.080	.00000	.20836	-.12128	-.07514	.04734	-.03383	.14385	-.34400
1.100	6.120	.00000	.20700	-.12260	-.11870	.07507	-.05291	.14538	-.35800
1.100	8.180	.00000	.19483	-.11461	-.16271	.10186	-.07102	.15117	-.38800
	GRADIENT	.00000	-.00282	.00167	-.02015	01295	-.00928	-.00001	.00005

RUN NO. 480/ 0 RN/L = 6.71 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.248	-8.110	.00000	.25228	-.15282	.17035	-.11011	.07445	.14953	-.29200
1.248	-6.050	.00000	.24302	-.14675	.12531	-.08160	.05561	.15134	-.28900
1.248	-4.030	.00000	.22834	-.13544	.08213	-.05373	.03726	.15019	-.27700
1.248	-2.020	.00000	.21401	-.12487	.04011	-.02612	.01919	.14915	-.26600
1.248	.030	.00000	.20447	-.11736	.00078	-.00063	.00166	.15053	-.27200
1.248	2.090	.00000	.20530	-.12007	-.03592	.02287	-.01501	.15320	-.29400
1.248	4.080	.00000	.20107	-.11684	-.07756	.04992	-.03288	.15650	-.30500
1.248	6.120	.00000	.19588	-.11534	-.12108	.07825	-.05137	.15589	-.31000
1.248	8.200	.00000	.18508	-.10775	-.16705	.10673	-.07015	.15570	-.32200
	GRADIENT	.00000	-.00311	.00206	-.01945	.01260	-.00858	.00082	-.00414

FA28 (MSFC TWT 656) 02W2E2PNP/ATT3S3 (R1Z010) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 8.000 PT = 22.000

RUN NO. 530/ 0 RN/L = 4.97 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.602	-8.020	.00000	-.05177	.04073	-.00706	.00526	-.00076	.06292	-.16600
.602	-5.980	.00000	.00404	.00210	-.00780	.00582	-.00113	.06417	-.15600
.602	-3.980	.00000	.06041	-.03660	-.00851	.00643	-.00140	.06457	-.15300
.602	-1.960	.00000	.12161	-.07876	-.00882	.00669	-.00177	.06313	-.15400
.602	.080	.00000	.17859	-.11745	-.00833	.00644	-.00143	.05963	-.15100
.602	2.100	.00000	.23908	-.15926	-.01098	.00856	-.00166	.05551	-.13900
.602	4.100	.00000	.30039	-.20189	-.01134	.00884	-.00175	.05080	-.13500
.602	6.130	.00000	.35973	-.24339	-.01221	.00940	-.00217	.04411	-.13800
.602	8.170	.00000	.41498	-.28138	-.01076	.00846	-.00271	.03700	-.12800
	GRADIENT	.00000	.02955	-.02033	-.00039	00033	-.00003	-.00174	.00252

RUN NO. 520/ 0 RN/L = 6.24 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.899	-8.040	.00000	-.05113	.04623	-.01133	.00921	-.00041	.08905	-.23300
.899	-6.020	.00000	.01139	.00077	-.01158	.00941	-.00117	.08596	-.22200
.899	-3.980	.00000	.07879	-.04728	-.01206	.00990	-.00151	.08436	-.20900
.899	-1.960	.00000	.14775	-.09549	-.01365	.01125	-.00309	.08258	-.20000
.899	.100	.00000	.21187	-.13849	-.01345	.01100	-.00311	.07946	-.19700
.899	2.160	.00000	.27495	-.18094	-.01324	.01056	-.00338	.07621	-.19500
.899	4.180	.00000	.33828	-.22596	-.01281	.01009	-.00267	.07303	-.18800
.899	6.200	.00000	.39014	-.26292	-.01269	.00973	-.00301	.07098	-.18700
.899	8.250	.00000	.43538	-.29370	-.01375	.01050	-.00370	.06879	-.19100
	GRADIENT	.00000	.03161	-.02166	-.00005	-.00002	-.00013	-.00142	.00230

RUN NO. 510/ 0 RN/L = 6.51 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.049	-8.060	.00000	-.09002	.09246	-.00534	.00412	.00109	.13333	-.28000
1.049	-6.000	.00000	-.02596	.04713	-.00514	.00395	.00083	.13124	-.27300
1.049	-3.960	.00000	.03938	.00110	-.00519	.00393	.00072	.12892	-.26200
1.049	-1.940	.00000	.10955	-.04928	-.00493	.00357	.00078	.12641	-.25600
1.049	.150	.00000	.18705	-.10494	-.00529	.00360	.00037	.12514	-.25700
1.049	2.170	.00000	.26499	-.15967	-.00606	.00399	.00002	.12224	-.25800
1.049	4.200	.00000	.32964	-.20538	-.00609	.00383	-.00015	.12012	-.25800
1.049	6.230	.00000	.38425	-.24547	-.00739	.00497	-.00085	.11894	-.26800
1.049	8.290	.00000	.42880	-.27588	-.00876	.00619	-.00106	.11579	-.27600
	GRADIENT	.00000	.03603	-.02562	-.00014	.00001	-.00012	-.00107	.00029

REFERENCE DATA

SREF =	2690.0000 SQ.FT.	XMRP =	976.0000 IN. XT		
LREF =	1290.3000 INCHES	YMRP =	.0000 IN. YT		
BREF =	1290.3000 INCHES	ZMRP =	400.0000 IN. ZT		
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	PHI =	.000
ELV-IB =	10.000	ELV-OB =	5.000
BDFLAP =	8.000	PT =	22.000

RUN NO. 500/ 0 RN/L = 6.53 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.096	-8.070	.00000	-.11713	.11640	-.00464	.00357	.00047	.15104	-.35000
1.096	-6.000	.00000	-.04333	.06615	-.00460	.00336	.00043	.14850	-.34100
1.096	-3.980	.00000	.03457	.00994	-.00379	.00246	.00015	.14753	-.34000
1.096	-1.930	.00000	.11563	-.04956	-.00446	.00305	-.00039	.14489	-.33400
1.096	.130	.00000	.19904	-.11050	-.00493	.00334	-.00017	.14406	-.32600
1.096	2.190	.00000	.28434	-.17132	-.00573	.00388	-.00035	.14300	-.33000
1.096	4.210	.00000	.36025	-.22666	-.00650	.00424	-.00069	.14097	-.32600
1.096	6.250	.00000	.41979	-.26908	-.00721	.00475	-.00132	.13836	-.33600
1.096	8.350	.00000	.47250	-.30534	-.00734	.00484	-.00077	.13637	-.34000
	GRADIENT	.00000	.04001	-.02902	-.00033	.00021	-.00008	-.00073	.00156

RUN NO. 491/ 0 RN/L = 6.58 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.248	-8.010	.00000	-.07819	.09163	-.00753	.00595	-.00078	.15477	-.28200
1.248	-5.980	.00000	-.00645	.03763	-.00726	.00557	-.00018	.15370	-.27700
1.248	-3.930	.00000	.06992	-.01803	-.00722	.00556	-.00019	.15532	-.28000
1.248	-1.900	.00000	.14384	-.07075	-.00858	.00671	-.00093	.15524	-.27800
1.248	.150	.00000	.22105	-.12939	-.00862	.00661	-.00092	.15455	-.27200
1.248	2.190	.00000	.29606	-.18337	-.00997	.00764	-.00195	.15279	-.27400
1.248	4.220	.00000	.35605	-.22607	-.01020	.00765	-.00253	.14978	-.27400
1.248	6.260	.00000	.40549	-.26156	-.01083	.00840	-.00328	.14558	-.27100
1.248	8.330	.00000	.45079	-.29279	-.01106	.00849	-.00276	.14203	-.27500
	GRADIENT	.00000	.03553	-.02693	-.00036	.00025	-.00028	-.00066	.00079

FA28 (MSFC TWT 656) 02H2E2PNPAATT3S3 (R1Z011) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 8.000 PT = 22.000

RUN NO. 540/ 0 RN/L = 4.97 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.604	-8.040	.00000	.22532	-.15346	.15824	-.10382	.05909	.05253	-.17100
.604	-6.010	.00000	.21536	-.14666	.11736	-.07746	.04437	.05503	-.16900
.604	-4.020	.00000	.20626	-.13921	.07515	-.04864	.02868	.05699	-.16100
.604	-2.000	.00000	.19343	-.12911	.03550	-.02192	.01465	.05878	-.15100
.604	.030	.00000	.18200	-.12045	-.00279	.00287	.00080	.05936	-.15200
.604	2.070	.00000	.18610	-.12518	-.03951	.02639	-.01287	.05968	-.16100
.604	4.040	.00000	.18774	-.12861	-.07636	.05075	-.02653	.05870	-.16900
.604	6.060	.00000	.18682	-.13106	-.11873	.08012	-.04115	.05769	-.18000
.604	8.110	.00000	.18615	-.13374	-.15774	.10604	-.05428	.05600	-.19700
	GRADIENT	.00000	-.00220	.00125	-.01872	.01224	-.00683	.00021	-.00128

RUN NO. 550/ 0 RN/L = 6.22 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.901	-8.090	.00000	.25338	-.16717	.16719	-.10950	.06404	.08188	-.24900
.901	-6.050	.00000	.24399	-.16256	.12410	-.08084	.04792	.08120	-.23200
.901	-4.040	.00000	.23999	-.16127	.08522	-.05492	.03305	.08121	-.21900
.901	-2.020	.00000	.22660	-.15097	.03472	-.02017	.01508	.08139	-.20900
.901	.030	.00000	.20855	-.13717	-.00354	.00475	.00095	.08002	-.19700
.901	2.060	.00000	.21917	-.14577	-.04339	.03048	-.01484	.08509	-.22900
.901	4.060	.00000	.22145	-.14933	-.08385	.05710	-.02914	.08692	-.25000
.901	6.090	.00000	.21876	-.14895	-.12034	.08742	-.04535	.08948	-.27300
.901	8.150	.00000	.21265	-.14480	-.16613	.11413	-.05891	.09371	-.30100
	GRADIENT	.00000	-.00220	.00144	-.02052	.01354	-.00761	.00074	-.00403

RUN NO. 560/ 0 RN/L = 6.54 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.051	-8.120	.00000	.25297	-.15379	.16336	-.10233	.07423	.12688	-.30100
1.051	-6.070	.00000	.23650	-.14242	.12105	-.07688	.05637	.12676	-.28900
1.051	-4.050	.00000	.21828	-.12894	.07980	-.05070	.03882	.12625	-.27800
1.051	-2.020	.00000	.19720	-.11297	.03948	-.02498	.02067	.12416	-.25800
1.051	.050	.00000	.18656	-.10546	.00050	.00022	.00231	.12384	-.25600
1.051	2.080	.00000	.19265	-.11142	-.03778	.02451	-.01605	.12578	-.27500
1.051	4.120	.00000	.19016	-.11119	-.07690	.04966	-.03318	.12531	-.27000
1.051	6.130	.00000	.19593	-.11873	-.11894	.07622	-.05084	.12646	-.28200
1.051	8.200	.00000	.19122	-.11766	-.16217	.10248	-.06830	.13127	-.31700
	GRADIENT	.00000	-.00298	.00181	-.01911	.01224	-.00884	-.00001	-.00005

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 (R1Z011) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 8.000 PT = 22.000

RUN NO. 570/ 0 RN/L = 6.57 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.099	-8.140	.00000	.25893	-.15409	.17612	-.11166	.07956	.14714	-.36900
1.099	-6.070	.00000	.24916	-.14774	.13299	-.08574	.06098	.14838	-.36800
1.099	-4.060	.00000	.23480	-.13759	.08983	-.05851	.04217	.14648	-.34700
1.099	-2.020	.00000	.21951	-.12694	.04740	-.03125	.02317	.14393	-.32500
1.099	.030	.00000	.20804	-.11821	.00614	-.00458	.00397	.14444	-.32400
1.099	2.070	.00000	.20837	-.12009	-.03222	.01977	-.01446	.14472	-.33500
1.099	4.100	.00000	.20671	-.11995	-.07545	.04781	-.03417	.14585	-.34400
1.099	6.120	.00000	.20503	-.12134	-.11979	.07601	-.05332	.14707	-.35600
1.099	8.200	.00000	.19527	-.11557	-.16380	.10290	-.07143	.15438	-.39500
	GRADIENT	.00000	-.00330	.00207	-.02010	01292	-.00932	-.00002	-.00019

RUN NO. 580/ 0 RN/L = 6.60 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.250	-8.120	.00000	.25571	-.15516	.16951	-.10941	.07424	.15215	-.29200
1.250	-6.070	.00000	.24435	-.14817	.12294	-.07968	.05474	.15313	-.28700
1.250	-4.030	.00000	.22908	-.13613	.07914	-.05140	.03637	.15253	-.27700
1.250	-2.000	.00000	.21569	-.12613	.03753	-.02420	.01839	.15143	-.26300
1.250	.080	.00000	.20769	-.12023	-.00293	.00232	.00072	.15212	-.26400
1.250	2.110	.00000	.20705	-.12154	-.04023	.02616	-.01619	.15463	-.29000
1.250	4.120	.00000	.20347	-.11930	-.08149	.05297	-.03428	.15665	-.30200
1.250	6.160	.00000	.19870	-.11813	-.12484	.08117	-.05271	.15685	-.30900
1.250	8.210	.00000	.18741	-.11115	-.17072	.10991	-.07159	.15646	-.31100
	GRADIENT	.00000	-.00294	.00188	-.01955	.01269	-.00862	.00056	-.00376

FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3 (R1Z012) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 16.000 PT = 22.000

RUN NO. 630/ 0 RN/L = 4.87 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.600	-8.020	.00000	.22306	-.15248	.15846	-.10489	.05916	.04955	-.16800
.600	-6.010	.00000	.21333	-.14593	.11931	-.07925	.04511	.05241	-.15900
.600	-3.990	.00000	.20522	-.13937	.07681	-.05027	.02946	.05459	-.16100
.600	-2.000	.00000	.19391	-.12999	.03590	-.02290	.01477	.05608	-.15800
.600	.030	.00000	.18234	-.12121	-.00159	.00144	.00137	.05600	-.14300
.600	2.070	.00000	.18482	-.12482	-.03749	.02460	-.01163	.05710	-.14900
.600	4.060	.00000	.19074	-.13171	-.07472	.04904	-.02530	.05687	-.16400
.600	6.100	.00000	.19076	-.13473	-.11751	.07862	-.04017	.05565	-.18200
.600	8.150	.00000	.18987	-.13730	-.15732	.10533	-.05346	.05418	-.18600
	GRADIENT	.00000	-.00189	.00102	-.01866	.01220	-.00674	.00028	.00015

RUN NO. 620/ 0 RN/L = 6.14 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.900	-8.070	.00000	.25303	-.16593	.16840	-.11082	.06441	.07967	-.24300
.900	-6.050	.00000	.24297	-.16088	.12526	-.08188	.04804	.07779	-.22700
.900	-4.020	.00000	.23802	-.15906	.08123	-.05271	.03169	.07695	-.21700
.900	-2.000	.00000	.22472	-.14883	.03804	-.02344	.01547	.07643	-.20200
.900	.050	.00000	.20765	-.13538	.00013	.00106	.00164	.07585	-.19300
.900	2.080	.00000	.21627	-.14261	-.04169	.02845	-.01458	.08030	-.22700
.900	4.080	.00000	.22033	-.14794	-.08163	.05484	-.02856	.08074	-.24400
.900	6.090	.00000	.21533	-.14603	-.12660	.08534	-.04447	.08218	-.26100
.900	8.160	.00000	.20680	-.14053	-.16765	.11197	-.05808	.08479	-.27300
	GRADIENT	.00000	-.00217	.00141	-.01999	.01316	-.00742	.00056	-.00389

RUN NO. 610/ 0 RN/L = 6.42 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.048	-8.090	.00000	.25947	-.15926	.16464	-.10406	.07425	.12384	-.28900
1.048	-6.040	.00000	.23920	-.14470	.12227	-.07844	.05638	.12458	-.28200
1.048	-4.030	.00000	.21781	-.12882	.08130	-.05256	.03891	.12349	-.27300
1.048	-1.990	.00000	.19771	-.11328	.03988	-.02610	.02040	.12135	-.25800
1.048	.050	.00000	.18664	-.10521	.00128	-.00100	.00213	.12144	-.25500
1.048	2.110	.00000	.19069	-.10952	-.03668	.02318	-.01591	.12340	-.27200
1.048	4.120	.00000	.18929	-.11053	-.07562	.04821	-.03312	.12196	-.27000
1.048	6.130	.00000	.19445	-.11734	-.11770	.07492	-.05070	.12453	-.28900
1.048	8.200	.00000	.18977	-.11618	-.15986	.10030	-.06791	.12703	-.31700
	GRADIENT	.00000	-.00314	.00198	-.01914	.01229	-.00884	-.00005	-.00039

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 (R1Z012) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 16.000 PT = 22.000

RUN NO. 600/ 0 RN/L = 6.48 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.101	-8.100	.00000	.26410	-.15903	.17648	-.11232	.07950	.14552	-.36100
1.101	-6.050	.00000	.25215	-.15100	.13330	-.08613	.06121	.14563	-.35600
1.101	-4.040	.00000	.23832	-.14112	.08980	-.05866	.04214	.14459	-.33900
1.101	-2.000	.00000	.22059	-.12834	.04701	-.03136	.02311	.14242	-.32200
1.101	.050	.00000	.21211	-.12198	.00614	-.00495	.00394	.14286	-.32200
1.101	2.110	.00000	.21384	-.12455	-.03358	.02047	-.01473	.14366	-.33700
1.101	4.120	.00000	.21123	-.12401	-.07609	.04804	-.03408	.14404	-.34300
1.101	6.140	.00000	.20735	-.12374	-.12009	.07615	-.05313	.14499	-.35600
1.101	8.210	.00000	.19940	-.11934	-.16457	.10310	-.07179	.15131	-.39500
	GRADIENT	.00000	-.00298	.00186	-.02018	01298	-.00931	.00001	-.00112

RUN NO. 590/ 0 RN/L = 6.52 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.250	-8.110	.00000	.25812	-.15740	.17047	-.11064	.07484	.15508	-.29000
1.250	-6.070	.00000	.24717	-.15041	.12474	-.08141	.05555	.15622	-.28600
1.250	-4.050	.00000	.23284	-.13970	.08060	-.05264	.03694	.15388	-.27200
1.250	-2.020	.00000	.22035	-.13061	.03824	-.02471	.01876	.15174	-.25800
1.250	.060	.00000	.21087	-.12251	-.00098	.00075	.00148	.15421	-.26000
1.250	2.090	.00000	.20871	-.12230	-.03796	.02428	-.01537	.15722	-.29300
1.250	4.080	.00000	.20473	-.11964	-.07844	.05062	-.03326	.15872	-.30300
1.250	6.120	.00000	.19980	-.11811	-.12183	.07884	-.05185	.15940	-.31200
1.250	8.210	.00000	.18859	-.11198	-.16740	.10746	-.07060	.15848	-.31400
	GRADIENT	.00000	-.00334	.00238	-.01935	.01254	-.00857	.00074	-.00475

FA28 (MSFC TWT 656) 02'(2E2PNPAATT3S3 (R1Z013) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 16.000 PT = 22.000

RUN NO. 640/ 0 RN/L = 4.88 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.600	-7.960	.00000	-.05038	.04071	-.00502	.00316	-.00041	.06013	-.16700
.600	-5.940	.00000	.00388	.00306	-.00576	.00372	-.00069	.06099	-.15600
.600	-3.920	.00000	.06179	-.03683	-.00745	.00509	-.00088	.06131	-.15700
.600	-1.920	.00000	.12413	-.07985	-.00911	.00629	-.00170	.05949	-.15400
.600	.120	.00000	.18242	-.11928	-.00816	.00581	-.00104	.05607	-.14900
.600	2.150	.00000	.23995	-.15885	-.00810	.00594	-.00049	.05184	-.13600
.600	4.140	.00000	.29975	-.20045	-.00853	.00610	-.00060	.04653	-.13200
.600	6.170	.00000	.35600	-.24083	-.00986	.00709	-.00144	.03999	-.13500
.600	8.230	.00000	.41829	-.28267	-.00687	.00652	-.00159	.03270	-.12600
	GRADIENT	.00000	.02931	-.02012	-.00006	00008	.00009	-.00184	.00337

RUN NO. 650/ 0 RN/L = 6.16 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.899	-8.040	.00000	-.05636	.05055	-.00345	.00268	.00116	.08770	-.23100
.899	-6.000	.00000	.00727	.00430	-.00366	.00305	.00073	.08462	-.22100
.899	-3.960	.00000	.07582	-.04464	-.00583	.00454	-.00059	.08194	-.21200
.899	-1.920	.00000	.14789	-.09507	-.00612	.00483	-.00167	.07962	-.20600
.899	.190	.00000	.21477	-.13983	-.00562	.00428	-.00090	.07756	-.20000
.899	2.230	.00000	.27805	-.18246	-.00646	.00448	-.00150	.07445	-.19300
.899	4.240	.00000	.34021	-.22622	-.00772	.00515	-.00164	.07216	-.19700
.899	6.250	.00000	.39168	-.26310	-.00812	.00526	-.00217	.06983	-.20100
.899	8.320	.00000	.43820	-.29492	-.00801	.00502	-.00300	.06925	-.19800
	GRADIENT	.00000	.03207	-.02192	-.00020	.00004	-.00009	-.00120	.00210

RUN NO. 660/ 0 RN/L = 6.48 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.048	-8.000	.00000	-.08411	.08756	-.00282	.00160	.00054	.12965	-.26500
1.048	-5.960	.00000	-.02075	.04295	-.00309	.00174	.00017	.12841	-.26100
1.048	-3.910	.00000	.04320	-.00216	-.00290	.00152	.00016	.12617	-.25500
1.048	-1.910	.00000	.11478	-.05358	-.00288	.00124	-.00011	.12310	-.25000
1.048	.160	.00000	.19453	-.11073	-.00230	.00077	.00000	.12192	-.25100
1.048	2.210	.00000	.27200	-.16555	-.00301	.00104	-.00044	.11969	-.24900
1.048	4.220	.00000	.33493	-.20996	-.00403	.00162	-.00080	.11723	-.25800
1.048	6.250	.00000	.38701	-.24788	-.00584	.00310	-.00212	.11529	-.26100
1.048	8.330	.00000	.42993	-.27715	-.00632	.00350	-.00191	.11181	-.26500
	GRADIENT	.00000	.03635	-.02589	-.00012	-.00000	-.00011	-.00104	-.00024

FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3 (R1Z013) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 16.000 PT = 22.000

RUN NO. 670/ 0 RN/L = 6.59 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.097	-8.060	.00000	-.11104	.11505	-.00317	.00185	.00041	.14902	-.34500
1.097	-6.020	.00000	-.03861	.06297	-.00219	.00095	.00040	.14731	-.33800
1.097	-3.980	.00000	.03929	.00622	-.00269	.00121	-.00007	.14576	-.33100
1.097	-1.950	.00000	.12685	-.05861	-.00302	.00138	-.00008	.14595	-.33000
1.097	.120	.00000	.21227	-.12135	-.00347	.00153	.00002	.14443	-.32700
1.097	2.190	.00000	.29519	-.18019	-.00388	.00183	-.00016	.14180	-.32500
1.097	4.220	.00000	.36860	-.23282	-.00496	.00263	-.00076	.13871	-.32100
1.097	6.250	.00000	.42335	-.27225	-.00610	.00348	-.00149	.13556	-.32100
1.097	8.310	.00000	.47515	-.30728	-.00703	.00414	-.00100	.13290	-.33400
	GRADIENT	.00000	.04026	-.02920	-.00026	00016	-.00007	-.00089	.00122

RUN NO. 680/ 0 RN/L = 6.68 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.248	-8.040	.00000	-.07741	.09087	-.00458	.00342	-.00009	.15378	-.27500
1.248	-6.010	.00000	-.00516	.03694	-.00431	.00312	.00047	.15405	-.27300
1.248	-3.970	.00000	.07046	-.01816	-.00513	.00374	.00049	.15610	-.27700
1.248	-1.950	.00000	.14724	-.07456	-.00677	.00500	-.00022	.15607	-.27700
1.248	.120	.00000	.22504	-.13247	-.00711	.00519	-.00057	.15482	-.27600
1.248	2.190	.00000	.29854	-.18467	-.00830	.00622	-.00122	.15314	-.27500
1.248	4.200	.00000	.35881	-.22809	-.00929	.00709	-.00215	.15041	-.27500
1.248	6.240	.00000	.40814	-.26406	-.01055	.00816	-.00306	.14632	-.27000
1.248	8.310	.00000	.45219	-.29435	-.01055	.00806	-.00292	.14178	-.26800
	GRADIENT	.00000	.03555	-.02588	-.00048	.00039	-.00031	-.00070	.00029

FA28 (MSFC TWT 656) C2K: E2PNPAATT3S3 (R1Z014) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 30.000

RUN NO. 730/ 0 RN/L = 6.65 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.600	-8.010	.00000	-.04552	.03647	-.00078	.00011	.00051	.06073	-.16900
.600	-5.970	.00000	.00629	.00089	-.00232	.00121	.00005	.06171	-.17100
.600	-3.940	.00000	.06823	-.04186	-.00282	.00168	.00010	.06138	-.16700
.600	-1.930	.00000	.12571	-.08086	-.00206	.00139	.00032	.06008	-.15800
.600	.120	.00000	.18470	-.12107	-.00335	.00231	-.00001	.05665	-.15100
.600	2.170	.00000	.24450	-.16193	-.00369	.00247	.00028	.05191	-.14900
.600	4.160	.00000	.30362	-.20300	-.00533	.00356	-.00013	.04675	-.14800
.600	6.190	.00000	.36301	-.24432	-.00525	.00359	-.00048	.04021	-.14200
.600	8.280	.00000	.42262	-.28597	-.00519	.00357	-.00083	.03257	-.13400
	GRADIENT	.00000	.02904	-.01987	-.00033	00024	-.00002	-.00184	.00232

RUN NO. 720/ 0 RN/L = 8.42 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.897	-8.070	.00000	-.04100	.04056	-.00526	.00441	-.00067	.09624	-.28000
.897	-6.000	.00000	.01836	-.00247	-.00532	.00446	-.00028	.08926	-.25200
.897	-3.970	.00000	.09448	-.04996	-.00628	.00515	-.00113	.08438	-.23300
.897	-1.920	.00000	.15410	-.09876	-.00586	.00494	-.00185	.08163	-.22200
.897	.170	.00000	.22423	-.14600	-.00666	.00546	-.00201	.07801	-.21600
.897	2.230	.00000	.28638	-.18783	-.00655	.00508	-.00129	.07385	-.20400
.897	4.290	.00000	.34789	-.23105	-.00606	.00429	-.00142	.07130	-.20900
.897	6.320	.00000	.40101	-.26994	-.00583	.00357	-.00202	.07009	-.20400
.897	8.370	.00000	.44134	-.29717	-.00565	.00313	-.00244	.06909	-.20600
	GRADIENT	.00000	.03189	-.02183	-.00001	-.00008	-.00000	-.00164	.00319

RUN NO. 710/ 0 RN/L = 8.75 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.048	-8.060	.00000	-.07697	.08457	-.00327	.00202	.00036	.13928	-.32200
1.048	-5.980	.00000	-.01271	.03859	-.00189	.00087	.00058	.13476	-.30500
1.048	-3.920	.00000	.05020	-.00592	-.00244	.00106	.00020	.13054	-.28800
1.048	-1.880	.00000	.12201	-.05780	-.00184	.00040	.00022	.12585	-.26700
1.048	.200	.00000	.20103	-.11477	-.00203	.00031	.00022	.12397	-.26500
1.048	2.260	.00000	.27499	-.16616	-.00226	.00025	.00000	.12134	-.27300
1.048	4.300	.00000	.34266	-.21521	-.00217	-.00006	.00006	.11825	-.27100
1.048	6.340	.00000	.39644	-.25414	-.00361	.00104	-.00035	.11688	-.27300
1.048	8.400	.00000	.43325	-.27842	-.00452	.00180	-.00091	.11387	-.28300
	GRADIENT	.00000	.03586	-.02561	.00001	-.00012	-.00002	-.00141	.00136

FA28 (MSFC TWT 656) 02W E2PNPAATT3S3 (R1Z014) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 30.000

RUN NO. 700/ 0 RN/L = 8.98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.097	-8.060	.00000	-.10148	.11053	-.00331	.00206	.00042	.15742	-.40000
1.097	-5.990	.00000	-.02945	.05745	-.00183	.00071	.00059	.15190	-.38200
1.097	-3.950	.00000	.04749	.00118	-.00143	.00030	.00032	.14935	-.36300
1.097	-1.910	.00000	.13050	-.06046	-.00190	.00051	.00014	.14794	-.35400
1.097	.180	.00000	.21620	-.12373	-.00328	.00131	.00004	.14489	-.34300
1.097	2.270	.00000	.29924	-.18294	-.00397	.00181	-.00004	.14310	-.34200
1.097	4.290	.00000	.37191	-.23529	-.00486	.00244	-.00057	.13944	-.33900
1.097	6.340	.00000	.43084	-.27802	-.00674	.00393	-.00112	.13611	-.33500
1.097	8.410	.00000	.47926	-.31125	-.00701	.00402	-.00059	.13454	-.34600
	GRADIENT	.00000	.03958	-.02882	-.00043	00027	-.00009	-.00119	.00291

RUN NO. 691/ 0 RN/L = 9.17 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.249	-8.040	.00000	-.07330	.08968	-.00348	.00270	.00075	.15883	-.31000
1.249	-5.980	.00000	-.00160	.03524	-.00420	.00315	.00093	.15687	-.30000
1.249	-3.960	.00000	.07180	-.01874	-.00470	.00338	.00089	.15701	-.30000
1.249	-1.910	.00000	.15021	-.07712	-.00511	.00359	.00053	.15571	-.29400
1.249	.180	.00000	.22841	-.13480	-.00666	.00482	-.00045	.15411	-.28800
1.249	2.230	.00000	.30079	-.18653	-.00748	.00540	-.00098	.15162	-.28700
1.249	4.290	.00000	.35887	-.22874	-.00815	.00580	-.00184	.14778	-.28400
1.249	6.330	.00000	.40938	-.26456	-.00893	.00666	-.00232	.14282	-.28000
1.249	8.390	.00000	.45179	-.29472	-.00982	.00706	-.00230	.13817	-.27500
	GRADIENT	.00000	.03511	-.02565	-.00045	.00032	-.00034	-.00109	.00189

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 (R1Z015) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 30.000

RUN NO. 740/ 0 RN/L = 6.61 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.600	-8.040	.00000	.22519	-.15272	.16309	-.10861	.06020	.04968	-.18500
.600	-6.000	.00000	.21718	-.14714	.12160	-.08157	.04543	.05180	-.17400
.600	-3.990	.00000	.20913	-.14049	.07951	-.05274	.03001	.05380	-.17100
.600	-2.000	.00000	.19678	-.13052	.03576	-.02338	.01425	.05531	-.16400
.600	.060	.00000	.18647	-.12292	-.00032	.00017	.00114	.05563	-.16800
.600	2.070	.00000	.18941	-.12601	-.03581	.02317	-.01187	.05575	-.16200
.600	4.050	.00000	.19359	-.13140	-.07490	.04932	-.02592	.05591	-.17500
.600	6.070	.00000	.19309	-.13427	-.11886	.07972	-.04095	.05478	-.18600
.600	8.120	.00000	.19280	-.13721	-.15611	.10576	-.05407	.05323	-.20100
	GRADIENT	.00000	-.00191	.00113	-.01888	01244	-.00685	.00023	-.00029

RUN NO. 750/ 0 RN/L = 8.47 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.900	-8.090	.00000	.26102	-.17126	.17116	-.11357	.06401	.08505	-.27800
.900	-6.030	.00000	.25568	-.17026	.12977	-.08626	.04831	.08243	-.26600
.900	-4.020	.00000	.24965	-.16704	.08666	-.05739	.03246	.08191	-.24800
.900	-2.010	.00000	.23553	-.15587	.04035	-.02549	.01545	.08080	-.23300
.900	.050	.00000	.21714	-.14186	.00171	-.00049	.00093	.07847	-.21400
.900	2.090	.00000	.23255	-.15441	-.03758	.02509	-.01362	.08645	-.25900
.900	4.100	.00000	.23999	-.16226	-.07817	.05226	-.02830	.08852	-.27900
.900	6.130	.00000	.23261	-.15882	-.12471	.08409	-.04487	.08959	-.29700
.900	8.200	.00000	.22245	-.15202	-.16551	.11055	-.05818	.09192	-.31400
	GRADIENT	.00000	-.00110	.00054	-.02004	.01327	-.00740	.00093	-.00432

RUN NO. 760/ 0 RN/L = 8.86 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.047	-8.180	.00000	.25559	-.15533	.16928	-.10677	.07607	.12790	-.32000
1.047	-6.080	.00000	.23855	-.14380	.12532	-.08036	.05732	.12605	-.30700
1.047	-4.060	.00000	.22258	-.13236	.08437	-.05455	.03969	.12465	-.29600
1.047	-2.030	.00000	.20604	-.11974	.04334	-.02835	.02187	.12238	-.27300
1.047	.030	.00000	.19852	-.11379	.00447	-.00353	.00335	.12271	-.26800
1.047	2.100	.00000	.20120	-.11760	-.03167	.01911	-.01413	.12387	-.28400
1.047	4.120	.00000	.20242	-.12030	-.07312	.04591	-.03250	.12561	-.29700
1.047	6.170	.00000	.20501	-.12497	-.11468	.07191	-.04995	.12623	-.30600
1.047	8.280	.00000	.19773	-.12100	-.15759	.09850	-.06774	.13119	-.33800
	GRADIENT	.00000	-.00220	.00128	-.01903	.01212	-.00880	.00017	-.00064

FA28 (MSFC TWT 656) 02:/ E2PNPAATT3S3 (RIZ015) (07 FEB 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 30.000

RUN NO. 770/ 0 RN/L = 8.92 GR:[IENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.098	-8.150	.00000	.26037	-.15501	.17977	-.11483	.08038	.14928	-.38900
1.098	-6.090	.00000	.25137	-.14935	.13661	-.08878	.06194	.14929	-.38700
1.098	-4.060	.00000	.23772	-.13967	.09269	-.06096	.04279	.14615	-.36900
1.098	-2.030	.00000	.22412	-.12982	.05054	-.03406	.02405	.14514	-.35300
1.098	.050	.00000	.21440	-.12214	.00987	-.00799	.00513	.14569	-.34900
1.098	2.100	.00000	.21843	-.12701	-.02968	.01708	-.01344	.14565	-.35900
1.098	4.130	.00000	.21637	-.12677	-.07193	.04449	-.03297	.14655	-.37100
1.098	6.180	.00000	.20973	-.12335	-.11647	.07270	-.05203	.15061	-.41500
1.098	8.280	.00000	.20090	-.11829	-.16251	.10126	-.07127	.15471	-.39400
	GRADIENT	.00000	-.00236	.00140	-.01996	01278	-.00922	.00006	-.00049

RUN NO. 780/ 0 RN/L = 9.04 GR/[IENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.248	-8.190	.00000	.25663	-.15656	.17021	-.11011	.07373	.15098	-.31400
1.248	-6.090	.00000	.24726	-.15049	.12388	-.08079	.05447	.15214	-.30900
1.248	-4.030	.00000	.23128	-.13774	.08104	-.05330	.03604	.15194	-.30100
1.248	-1.990	.00000	.22567	-.13451	.03779	-.02456	.01802	.14922	-.27800
1.248	.080	.00000	.21580	-.12648	-.00176	.00103	.00067	.15008	-.28000
1.248	2.130	.00000	.21658	-.12821	-.03913	.02468	-.01612	.15374	-.31200
1.248	4.140	.00000	.20747	-.12132	-.08061	.05149	-.03390	.15706	-.33000
1.248	6.180	.00000	.20230	-.11971	-.12468	.08021	-.05240	.15684	-.33600
1.248	8.280	.00000	.19531	-.11645	-.17071	.10925	-.07110	.15510	-.33400
	GRADIENT	.00000	-.00277	.00191	-.01956	.01265	-.00851	.00072	-.00449

FA28 (MSFC TWT 656) 02W:E2PNPAATT353 W/GRIT (AIZ016) (10 MAR 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 830/ 0 RN/L = 4.92 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.603	-8.040	.00000	.21073	-.14058	.16308	-.10843	.06032	.05533	-.17800
.603	-6.010	.00000	.20080	-.13357	.12361	-.08265	.04629	.05819	-.17400
.603	-4.020	.00000	.19332	-.12735	.08040	-.05323	.03054	.06084	-.16300
.603	-2.000	.00000	.18266	-.11912	.04017	-.02626	.01593	.06238	-.15500
.603	.010	.00000	.17506	-.11304	.00185	-.00139	.00227	.06269	-.15700
.603	2.050	.00000	.17455	-.11428	-.03401	.02178	-.01107	.06297	-.16200
.603	4.040	.00000	.17947	-.11986	-.07056	.04600	-.02421	.06232	-.16500
.603	6.060	.00000	.17651	-.12059	-.11309	.07531	-.03879	.06129	-.18300
.603	8.110	.00000	.17491	-.12282	-.15515	.10344	-.05272	.05973	-.19600
	GRADIENT	.00000	-.00178	.00098	-.01865	01222	-.00677	.00018	-.00055

RUN NO. 820/ 0 RN/L = 6.19 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
.903	-8.090	.00000	.24839	-.15927	.16823	-.11125	.06524	.08621	-.25600
.903	-6.040	.00000	.23920	-.15487	.12594	-.08327	.05021	.08416	-.24300
.903	-4.040	.00000	.22945	-.14860	.08309	-.05453	.03530	.08374	-.22800
.903	-2.040	.00000	.21461	-.13736	.03718	-.02278	.01863	.08408	-.21300
.903	.030	.00000	.19903	-.12593	-.00245	.00336	.00277	.08206	-.20300
.903	2.080	.00000	.20894	-.13434	-.04105	.02822	-.01275	.08827	-.24600
.903	4.080	.00000	.21132	-.13803	-.08239	.05614	-.02798	.08963	-.26500
.903	6.110	.00000	.20291	-.13337	-.12795	.08707	-.04456	.09113	-.27800
.903	8.160	.00000	.19408	-.12771	-.16847	.11298	-.05770	.09386	-.29900
	GRADIENT	.00000	-.00206	.00119	-.02009	.01337	-.00776	.00078	-.00526

RUN NO. 810/ 0 RN/L = 6.48 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.052	-8.120	.00000	.25430	-.15288	.16417	-.10346	.07475	.12999	-.29700
1.052	-6.060	.00000	.23229	-.13739	.12185	-.07785	.05660	.12959	-.28700
1.052	-4.050	.00000	.21282	-.12303	.08002	-.05121	.03856	.12898	-.27900
1.052	-2.020	.00000	.19825	-.11221	.04109	-.02661	.02142	.12692	-.26300
1.052	.030	.00000	.18866	-.10547	.00269	-.00193	.00295	.12674	-.25900
1.052	2.070	.00000	.19439	-.11107	-.03454	.02162	-.01475	.12962	-.28500
1.052	4.080	.00000	.19637	-.11375	-.07323	.04623	-.03186	.13219	-.30100
1.052	6.110	.00000	.19646	-.11652	-.11467	.07261	-.04940	.13279	-.30900
1.052	8.170	.00000	.18885	-.11329	-.15593	.09765	-.06660	.13302	-.32400
	GRADIENT	.00000	-.00181	.00097	-.01878	.01195	-.00870	.00045	-.00324

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT (AIZ016) (10 MAR 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 800/ 0 RN/L = 6.54 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.101	-8.140	.00000	.25521	-.14954	.17770	-.11298	.08019	.15161	-.37100
1.101	-6.070	.00000	.24449	-.14271	.13349	-.08614	.06150	.15143	-.36400
1.101	-4.060	.00000	.22835	-.13122	.08943	-.05817	.04211	.14973	-.35000
1.101	-2.020	.00000	.21700	-.12324	.04785	-.03171	.02345	.14747	-.33600
1.101	.030	.00000	.20648	-.11539	.00737	-.00557	.00436	.14740	-.32600
1.101	2.070	.00000	.20887	-.11877	-.03153	.01911	-.01388	.14798	-.34200
1.101	4.080	.00000	.20531	-.11778	-.07474	.04723	-.03318	.14969	-.35000
1.101	6.120	.00000	.20145	-.11575	-.11925	.07546	-.05260	.15476	-.38700
1.101	8.180	.00000	.19303	-.11139	-.16231	.10185	-.07074	.15713	-.39900
	GRADIENT	.00000	-.00266	.00154	-.02001	01284	-.00922	.00002	-.00029

RUN NO. 790/ 0 RN/L = 6.58 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CLM	CY	CYN	CBL	CA	CPB
1.250	-8.150	.00000	.24785	-.14717	.17048	-.11016	.07442	.15500	-.29600
1.250	-6.070	.00000	.23843	-.14105	.12548	-.08172	.05564	.15650	-.29300
1.250	-4.050	.00000	.22366	-.12971	.08260	-.05401	.03756	.15638	-.28500
1.250	-2.040	.00000	.21408	-.12348	.03947	-.02554	.01919	.15428	-.26800
1.250	.020	.00000	.20456	-.11564	.00092	-.00085	.00182	.15535	-.27200
1.250	2.050	.00000	.20506	-.11720	-.03756	.02401	-.01525	.15743	-.29700
1.250	4.080	.00000	.20140	-.11515	-.07896	.05106	-.03320	.15967	-.30600
1.250	6.120	.00000	.19472	-.11219	-.12290	.07958	-.05143	.15955	-.31500
1.250	8.180	.00000	.18409	-.10599	-.16846	.10819	-.06994	.15910	-.32100
	GRADIENT	.00000	-.00263	.00174	-.01966	.01276	-.00865	.00048	-.00349

FA28 (MSFC TWT 656) 02[illegible]E2PNPAATT3S3 W/GRIT (A1Z017) (10 MAR 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 840/ 0 RN/L = 4.90 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.602	-8.000	.00000	-.05035	.04211	-.00183	.00077	.00037	.06579	-.16200
.602	-5.960	.00000	.00263	.00586	-.00122	.00055	.00045	.06676	-.15800
.602	-3.980	.00000	.05654	-.03083	-.00291	.00192	.00015	.06680	-.15200
.602	-1.960	.00000	.11367	-.06950	-.00377	.00255	.00004	.06503	-.15500
.602	.080	.00000	.17328	-.10989	-.00463	.00326	-.00027	.06214	-.15300
.602	2.120	.00000	.22910	-.14787	-.00465	.00328	.00014	.05840	-.14700
.602	4.130	.00000	.28355	-.18506	-.00602	.00413	-.00062	.05340	-.14600
.602	6.130	.00000	.33900	-.22281	-.00281	.00193	-.00032	.04771	-.14200
.602	8.190	.00000	.40422	-.26892	-.00676	.00487	-.00098	.04249	-.13600
	GRADIENT	.00000	.02805	-.01906	-.00035	00025	-.00007	-.00165	.00099

RUN NO. 850/ 0 RN/L = 6.16 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
.896	-8.040	.00000	-.05405	.04893	-.00381	.00339	-.00008	.09217	-.20100
.896	-5.960	.00000	.00780	.00465	-.00453	.00329	-.00012	.08839	-.19100
.896	-3.940	.00000	.07062	-.03913	-.00306	.00211	.00024	.08550	-.18700
.896	-1.920	.00000	.13573	-.08324	-.00405	.00321	.00046	.08304	-.17700
.896	.130	.00000	.20142	-.12717	-.00539	.00422	.00122	.08155	-.17400
.896	2.170	.00000	.26893	-.17350	-.00672	.00483	.00129	.07937	-.17400
.896	4.200	.00000	.33198	-.21867	-.00572	.00363	.00043	.07705	-.17900
.896	6.210	.00000	.38156	-.25343	-.00338	.00154	-.00090	.07640	-.17800
.896	8.270	.00000	.42381	-.28167	-.00532	.00298	-.00089	.07469	-.18500
	GRADIENT	.00000	.03220	-.02206	-.00039	.00023	.00006	-.00101	.00093

RUN NO. 860/ 0 RN/L = 6.46 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.048	-8.060	.00000	-.08630	.09026	-.00307	.00172	.00059	.13532	-.27400
1.048	-6.000	.00000	-.02380	.04599	-.00288	.00142	.00016	.13311	-.26200
1.048	-3.980	.00000	.03946	.00151	-.00224	.00089	.00016	.13056	-.25300
1.048	-1.930	.00000	.11074	-.04966	-.00174	.00040	.00028	.12738	-.24600
1.048	.130	.00000	.18969	-.10632	-.00236	.00055	.00023	.12638	-.24900
1.048	2.170	.00000	.26601	-.15950	-.00360	.00139	-.00002	.12418	-.25100
1.048	4.220	.00000	.33134	-.20586	-.00411	.00161	-.00041	.12181	-.25900
1.048	6.230	.00000	.38194	-.24218	-.00530	.00258	-.00100	.11957	-.26600
1.048	8.310	.00000	.42149	-.26853	-.00697	.00404	-.00112	.11655	-.26800
	GRADIENT	.00000	.03605	-.02559	-.00027	.00012	-.00007	-.00101	-.00083

FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3 W/GRIT (A1Z017) (10 MAR 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 870/ 0 RN/L = 6.41 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.097	-8.020	.00000	-.11094	.11719	-.00210	.00088	.00077	.15674	-.36300
1.097	-5.980	.00000	-.04029	.06531	-.00199	.00068	.00039	.15232	-.34500
1.097	-3.940	.00000	.03603	.00977	-.00207	.00074	.00008	.14864	-.33300
1.097	-1.910	.00000	.11991	-.05142	-.00228	.00094	.00016	.14810	-.33100
1.097	.160	.00000	.20525	-.11414	-.00225	.00076	.00033	.14757	-.32700
1.097	2.230	.00000	.29112	-.17535	-.00307	.00114	.00003	.14646	-.33300
1.097	4.240	.00000	.36701	-.23009	-.00409	.00188	-.00035	.14383	-.33000
1.097	6.270	.00000	.42381	-.27100	-.00497	.00270	-.00039	.14131	-.33100
1.097	8.350	.00000	.46838	-.29993	-.00566	.00291	.00039	.13670	-.34000
	GRADIENT	.00000	.04065	-.02945	-.00024	00012	-.00005	-.00055	.00019

RUN NO. 880/ 0 RN/L = 6.58 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CLM	CY	CYN	CBL	CA	CPB
1.246	-8.030	.00000	-.08148	.09593	-.00468	.00361	.00048	.15987	-.28300
1.246	-5.980	.00000	-.00941	.04147	-.00375	.00279	.00091	.15761	-.27700
1.246	-3.950	.00000	.06540	-.01292	-.00375	.00273	.00107	.15887	-.27700
1.246	-1.930	.00000	.14227	-.06927	-.00540	.00403	.00045	.15870	-.27600
1.246	.160	.00000	.21891	-.12580	-.00518	.00359	.00032	.15831	-.27900
1.246	2.210	.00000	.29563	-.18041	-.00700	.00501	-.00053	.15652	-.28200
1.246	4.210	.00000	.35780	-.22493	-.00826	.00598	-.00121	.15357	-.27900
1.246	6.240	.00000	.40694	-.26098	-.00823	.00595	-.00187	.14909	-.27800
1.246	8.340	.00000	.45040	-.29072	-.00869	.00614	-.00160	.14485	-.27900
	GRADIENT	.00000	.03608	-.02616	-.00052	.00036	-.00027	-.00062	-.00049

FA28 (MSFC TWT 656) 02:22 (S1Z001) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 160/ 0 RN/L = 4.97 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.604	-8.170	.00000	-.08335	-.01277	-.03943	-.00945	-.00798
.604	-6.120	.00000	-.04350	-.00636	-.02874	.00129	-.00168
.604	-4.000	.00000	-.00964	-.00090	-.01911	.00100	-.00304
.604	-2.020	.00000	.02490	.00406	-.00754	-.00495	-.00374
.604	.030	.00000	.05379	.00996	-.00008	-.00815	-.00281
.604	2.070	.00000	.08901	.01523	.01081	-.00992	.00131
.604	4.100	.00000	.12167	.02112	.01985	-.00546	.00787
.604	6.150	.00000	.15389	.02698	.02776	.00438	.01359
.604	8.250	.00000	.19203	.03249	.03925	.01516	.02117
	GRADIENT	.00000	.01610	.00272	00474	-.00088	.00133

RUN NO. 150/ 0 RN/L = 6.16 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.901	-8.290	.00000	-.11867	-.01663	-.04542	.00218	.00501
.901	-6.230	.00000	-.08025	-.01151	-.03525	-.00188	.00964
.901	-4.080	.00000	-.04650	-.00660	-.02497	-.00416	.00891
.901	-2.070	.00000	-.00178	.00085	-.01404	-.01059	.00173
.901	.040	.00000	.04384	.00822	-.00172	-.01796	-.00302
.901	2.090	.00000	.07799	.01382	.00862	-.02352	.00000
.901	4.160	.00000	.11675	.01973	.01701	-.02745	.01050
.901	6.230	.00000	.16199	.02664	.02659	-.00894	.02371
.901	8.360	.00000	.19670	.03216	.03487	.01483	.03441
	GRADIENT	.00000	.01968	.00318	.00517	-.00288	.00007

RUN NO. 140/ 0 RN/L = 6.48 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.056	-8.290	.00000	-.13755	-.02308	-.03759	.01914	-.00529
1.056	-6.250	.00000	-.09803	-.01677	-.03022	.02963	.00546
1.056	-4.120	.00000	-.05479	-.00889	-.02279	.03816	.01070
1.056	-2.100	.00000	-.00632	-.00058	-.01395	.04265	.00913
1.056	.000	.00000	.04391	.00761	-.00409	.04102	.00736
1.056	2.100	.00000	.09282	.01566	.00481	.03888	.01529
1.056	4.160	.00000	.14029	.02353	.01122	.04833	.03741
1.056	6.240	.00000	.18603	.03122	.01852	.05462	.05711
1.056	8.370	.00000	.23203	.03890	.02657	.06981	.07207
	GRADIENT	.00000	.02357	.00391	.00418	.00079	.00287

FA28 (MSFC TWT 656) 02W: E2 (S1Z001) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 130/ 0 RN/L = 6.77 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.099	-8.290	.00000	-.13798	-.02348	-.03575	.01547	-.01216
1.099	-6.250	.00000	-.09899	-.01720	-.02783	.02400	-.00471
1.099	-4.130	.00000	-.05320	-.00891	-.01970	.03550	.00337
1.099	-2.090	.00000	-.00301	-.00012	-.01137	.04468	.00594
1.099	-.010	.00000	.04303	.00770	-.00325	.05118	.00805
1.099	2.090	.00000	.08913	.01533	.00394	.05752	.02125
1.099	4.160	.00000	.13489	.02333	.01043	.05834	.03830
1.099	6.250	.00000	.17925	.03056	.01798	.06547	.05800
1.099	8.390	.00000	.22156	.03762	.02417	.08177	.07256
	GRADIENT	.00000	.02256	.00385	00364	.00282	.00411

RUN NO. 120/ 0 RN/L = 6.71 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.250	-8.310	.00000	-.13029	-.02260	-.02801	.00594	-.02372
1.250	-6.260	.00000	-.08771	-.01526	-.02099	.01512	-.02049
1.250	-4.140	.00000	-.04318	-.00707	-.01564	.02840	-.00599
1.250	-2.110	.00000	-.00085	.00014	-.01034	.03893	.01004
1.250	-.020	.00000	.04016	.00703	-.00498	.04669	.02459
1.250	2.070	.00000	.08276	.01430	.00041	.05540	.04359
1.250	4.120	.00000	.12458	.02139	.00575	.06669	.05954
1.250	6.230	.00000	.16888	.02877	.01209	.08849	.07149
1.250	8.350	.00000	.20787	.03497	.01859	.11016	.08321
	GRADIENT	.00000	.02025	.00343	.00259	.00449	.00795

FA28 (MSFC TWT 656) 02W2E2 WING GAP WAXED (S1Z002) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 170/ 0 RN/L = 6.28 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.902	-8.290	.00000	-.11065	-.01619	-.03689	.00223	.00210
.902	-6.260	.00000	-.08154	-.01179	-.03259	-.00139	.00682
.902	-4.130	.00000	-.04425	-.00652	-.02366	-.01005	.00600
.902	-2.120	.00000	-.00727	.00009	-.01560	-.01915	.00033
.902	-.020	.00000	.03639	.00729	-.00520	-.02899	-.00537
.902	2.070	.00000	.07204	.01288	.00397	-.03515	-.00333
.902	4.140	.00000	.10968	.01856	.01280	-.02744	.00756
.902	6.210	.00000	.15226	.02520	.02170	-.00799	.02068
.902	8.340	.00000	.19417	.03152	.02987	.00786	.03173
	GRADIENT	.00000	.01868	.00304	00446	-.00245	-.00002

RUN NO. 180/ 0 RN/L = 6.70 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.253	-8.290	.00000	-.13054	-.02248	-.02708	-.00987	-.02561
1.253	-6.260	.00000	-.09105	-.01561	-.02101	-.00165	-.02267
1.253	-4.120	.00000	-.04215	-.00709	-.01392	.00990	-.00751
1.253	-2.110	.00000	.00175	.00015	-.00757	.02238	.00961
1.253	.000	.00000	.04284	.00706	-.00220	.03155	.02455
1.253	2.080	.00000	.08892	.01437	.00468	.04460	.04118
1.253	4.140	.00000	.12774	.02123	.00919	.06040	.05649
1.253	6.230	.00000	.17226	.02823	.01608	.08361	.07087
1.253	8.370	.00000	.21238	.03486	.02182	.10729	.08170
	GRADIENT	.00000	.02061	.00342	.00282	.00595	.00770

FA28 (MSFC TWT 656) 02.,E2 WING GAP WAXED (SIZ003) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 230/ 0 RN/L = 4.93 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.600	-6.000	.00000	.07966	.01227	.01006	-.01319	-.00425
.600	-3.970	.00000	.07230	.01186	.00745	-.01301	-.00456
.600	-1.940	.00000	.07103	.01111	.00829	-.01132	-.00430
.600	.050	.00000	.06309	.01051	.00588	-.00981	-.00337
.600	2.100	.00000	.05858	.01014	.00438	-.00844	-.00367
.600	4.100	.00000	.05455	.00923	.00401	-.00469	-.00268
.600	6.160	.00000	.04173	.00827	-.00075	-.00252	-.00306
	GRADIENT	.00000	-.00238	-.00031	-.00053	.00097	.00022

RUN NO. 220/ 0 RN/L = 6.18 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.902	-6.000	.00000	.05655	.01006	.00288	-.01756	-.00443
.902	-3.960	.00000	.05495	.00986	.00285	-.01823	-.00454
.902	-1.950	.00000	.04950	.00950	.00109	-.02044	-.00508
.902	.050	.00000	.04807	.00902	.00109	-.01880	-.00428
.902	2.110	.00000	.04231	.00825	-.00041	-.02103	-.00332
.902	4.100	.00000	.03464	.00730	-.00298	-.02431	-.00383
.902	6.160	.00000	.02899	.00624	-.00445	-.02110	-.00321
	GRADIENT	.00000	-.00237	-.00032	-.00065	-.00063	.00016

RUN NO. 210/ 0 RN/L = 6.45 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.049	-5.990	.00000	.05558	.00929	-.00040	.02543	.00796
1.049	-3.970	.00000	.05432	.00905	-.00030	.02991	.00591
1.049	-1.930	.00000	.05055	.00883	- 00143	.03405	.00468
1.049	.060	.00000	.04841	.00812	-.00104	.04148	.00607
1.049	2.110	.00000	.03996	.00723	-.00310	.04945	.00883
1.049	4.130	.00000	.03220	.00590	-.00479	.05863	.01095
1.049	6.170	.00000	.02437	.00445	-.00675	.06898	.01385
	GRADIENT	.00000	-.00271	-.00039	-.00053	.00360	.00070

FA28 (MSFC TWT 656) 02W E2 WING GAP WAXED (S1Z003) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 200/ 0 RN/L = 6.43 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.114	-5.990	.00000	.04932	.00863	-.00128	.03170	.01719
1.114	-3.950	.00000	.04943	.00848	-.00084	.03776	.01646
1.114	-1.930	.00000	.04560	.00811	-.00224	.04408	.01128
1.114	.060	.00000	.04336	.00754	-.00245	.05054	.00900
1.114	2.140	.00000	.03742	.00672	-.00439	.05742	.00897
1.114	4.140	.00000	.03029	.00562	-.00716	.06285	.01029
1.114	6.180	.00000	.02365	.00451	-.00903	.06821	.01246
	GRADIENT	.00000	-.00230	-.00035	-.00073	.00314	-.00072

RUN NO. 190/ 0 RN/L = 6.50 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.255	-6.020	.00000	.05512	.00955	.00071	.02934	.02866
1.255	-3.970	.00000	.05227	.00929	-.00047	.03265	.02834
1.255	-1.950	.00000	.05022	.00848	-.00049	.03767	.02641
1.255	.050	.00000	.04729	.00781	-.00125	.04286	.02575
1.255	2.100	.00000	.04085	.00712	-.00360	.04787	.02378
1.255	4.120	.00000	.03671	.00625	-.00481	.05273	.01907
1.255	6.160	.00000	.02766	.00508	-.00752	.05630	.01827
	GRADIENT	.00000	-.00200	-.00037	-.00058	.00249	-.00105

FA28 (MSFC TWT 656) 02W2E2 WING WAX CUT (SIZ004) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 240/ 0 RN/L = 6.23 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.905	-6.220	.00000	-.08800	-.01236	-.03648	-.00406	.01194
.905	-4.170	.00000	-.05359	-.00779	-.02591	-.00958	.00760
.905	-2.100	.00000	-.00494	.00026	-.01370	-.01547	.00099
.905	.000	.00000	.04146	.00785	-.00155	-.02432	-.00450
.905	2.090	.00000	.07965	.01353	.01018	-.03047	-.00246
.905	4.140	.00000	.11696	.01926	.01919	-.02452	.00904
.905	6.210	.00000	.15812	.02590	.02755	-.00441	.02166
.905	8.340	.00000	.20252	.03279	.03524	.01411	.03515
	GRADIENT	.00000	.02046	.00324	.00548	-.00216	-.00003

RUN NO. 250/ 0 RN/L = 6.60 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.254	-8.290	.00000	-.13245	-.02236	-.02893	.00474	-.02489
1.254	-6.220	.00000	-.08896	-.01507	-.02195	.01150	-.02160
1.254	-4.140	.00000	-.04315	-.00698	-.01620	.02344	-.00570
1.254	-2.090	.00000	.00115	.00063	-.01043	.03428	.01127
1.254	.010	.00000	.04559	.00783	-.00391	.04229	.02565
1.254	2.100	.00000	.08922	.01499	.00228	.05419	.04329
1.254	4.140	.00000	.13218	.02213	.00847	.07299	.06019
1.254	6.230	.00000	.17274	.02893	.01459	.09682	.07497
1.254	8.370	.00000	.21955	.03553	.02306	.11931	.08543
	GRADIENT	.00000	.02114	.00350	.00299	.00573	.00789

FA28 (MSFC TWT 656) 02WE52WNWAATT3S3 (S1Z005) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 300/ 0 RN/L = 4.95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.603	-8.020	.00000	-.00160	-.00153	-.00824	-.02388	-.00730
.603	-6.000	.00000	.02237	.00214	-.00197	-.02134	-.00620
.603	-3.960	.00000	.04503	.00592	.00421	-.02305	-.00590
.603	-1.960	.00000	.06742	.01011	.00949	-.02211	-.00597
.603	.080	.00000	.08630	.01381	.01447	-.02290	-.00333
.603	2.130	.00000	.10758	.01787	.01983	-.02330	.00050
.603	4.100	.00000	.13045	.02199	.02559	-.02313	.00526
.603	6.130	.00000	.15306	.02605	.03146	-.02148	.01152
.603	8.200	.00000	.17517	.03030	.03696	-.01561	.01677
	GRADIENT	.00000	.01044	.00197	00263	-.00007	.00142

RUN NO. 290/ 0 RN/L = 6.26 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.904	-8.040	.00000	-.00343	-.00185	-.00760	-.01616	-.00007
.904	-6.010	.00000	.02066	.00266	-.00260	-.02020	-.00569
.904	-3.970	.00000	.04491	.00690	.00319	-.02130	-.00611
.904	-1.930	.00000	.07353	.01183	.01011	-.01979	-.00891
.904	.130	.00000	.09506	.01495	.01714	-.02045	-.00970
.904	2.170	.00000	.11741	.01894	.02201	-.02101	-.00596
.904	4.180	.00000	.14137	.02281	.02679	-.01996	.00011
.904	6.210	.00000	.16463	.02675	.03089	-.01633	.01068
.904	8.290	.00000	.18048	.02978	.03266	-.00921	.02144
	GRADIENT	.00000	.01161	.00191	.00290	.00007	.00075

RUN NO. 280/ 0 RN/L = 6.57 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.054	-8.040	.00000	-.00503	-.00217	-.00661	-.00657	-.00721
1.054	-6.010	.00000	.02053	.00233	-.00065	-.00173	-.01008
1.054	-3.990	.00000	.04292	.00652	.00458	.00155	-.01252
1.054	-1.950	.00000	.06958	.01154	.00984	.00304	-.01137
1.054	.150	.00000	.09807	.01700	.01471	.00510	-.00465
1.054	2.190	.00000	.12657	.02218	.01921	.00536	.00201
1.054	4.210	.00000	.15213	.02623	.02401	.00585	.01193
1.054	6.240	.00000	.17601	.03037	.02714	.00199	.02779
1.054	8.310	.00000	.19281	.03342	.02959	.00108	.04177
	GRADIENT	.00000	.01341	.00244	.00235	.00053	.00303

FA28 (MSFC TWT 656) 02WIE2WNWAATT3S3 (SIZ005) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 270/ 0 RN/L = 6.64 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.106	-8.060	.00000	-.01025	-.00335	-.00546	-.02461	-.00544
1.106	-6.010	.00000	.01978	.00187	.00097	-.02286	-.00901
1.106	-3.970	.00000	.04911	.00747	.00574	-.02293	-.01295
1.106	-1.940	.00000	.08090	.01356	.00967	-.02176	-.00499
1.106	.150	.00000	.11227	.01922	.01423	-.01807	.01062
1.106	2.190	.00000	.14338	.02455	.01882	-.01571	.02527
1.106	4.210	.00000	.17112	.02932	.02256	-.01171	.04367
1.106	6.250	.00000	.19347	.03331	.02593	-.00868	.05597
1.106	8.310	.00000	.20946	.03661	.02809	.00393	.06559
	GRADIENT	.00000	.01496	.00267	00209	.00139	.00700

RUN NO. 260/ 0 RN/L = 6.55 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.250	-8.070	.00000	-.00316	-.00187	-.00446	-.02530	-.01138
1.250	-6.010	.00000	.02685	.00390	-.00079	-.02387	-.00313
1.250	-3.990	.00000	.05540	.00915	.00321	-.02170	.00668
1.250	-1.940	.00000	.08827	.01479	.00804	-.02018	.02035
1.250	.120	.00000	.11700	.01968	.01278	-.01671	.03284
1.250	2.170	.00000	.14195	.02404	.01704	-.01301	.04640
1.250	4.210	.00000	.16443	.02833	.02030	-.00903	.05625
1.250	6.250	.00000	.18619	.03243	.02302	-.00201	.06424
1.250	8.320	.00000	.20282	.03557	.02567	.01034	.07270
	GRADIENT	.00000	.01325	.00232	.00211	.00158	.00610

FA28 (MSFC TWT 656) 02W:E2WNWAATT3S3 (S1Z006) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 310/ 0 RN/L = 4.91 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.601	-8.040	.00000	.08368	.01332	.01074	-.03731	-.00049
.601	-6.010	.00000	.08572	.01343	.01221	-.03325	-.00037
.601	-3.990	.00000	.08441	.01358	.01224	-.03011	-.00069
.601	-2.000	.00000	.08429	.01383	.01244	-.02814	-.00168
.601	.030	.00000	.08559	.01410	.01326	-.02504	-.00294
.601	2.070	.00000	.09068	.01461	.01471	-.02199	-.00343
.601	4.040	.00000	.09469	.01518	.01614	-.01663	-.00281
.601	6.060	.00000	.09359	.01552	.01567	-.01217	-.00212
.601	8.110	.00000	.09010	.01586	.01407	-.00983	-.00200
	GRADIENT	.00000	.00134	.00020	00050	.00164	-.00030

RUN NO. 320/ 0 RN/L = 6.20 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.900	-8.060	.00000	.08160	.01308	.00958	-.02622	-.00232
.900	-6.040	.00000	.08750	.01417	.01112	-.02439	-.00364
.900	-4.040	.00000	.09549	.01535	.01319	-.02311	-.00490
.900	-2.010	.00000	.09860	.01575	.01509	-.02132	-.00693
.900	.050	.00000	.09665	.01490	.01756	-.01871	-.00864
.900	2.080	.00000	.10259	.01583	.01821	-.01235	-.00827
.900	4.080	.00000	.10516	.01654	.01826	-.00055	-.00842
.900	6.090	.00000	.10708	.01692	.01821	.00642	-.00842
.900	8.180	.00000	.10935	.01723	.01916	.01218	-.00460
	GRADIENT	.00000	.00115	.00012	.00065	.00266	-.00041

RUN NO. 330/ 0 RN/L = 6.49 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.051	-8.120	.00000	.06650	.01138	.00948	-.01916	.01916
1.051	-6.080	.00000	.07225	.01232	.01063	-.00528	.00860
1.051	-4.050	.00000	.08056	.01376	.01243	.00069	.00334
1.051	-2.020	.00000	.09076	.01528	.01426	-.00143	.00010
1.051	.030	.00000	.10135	.01723	.01615	.00331	-.00336
1.051	2.060	.00000	.11253	.01889	.01714	.01149	-.00633
1.051	4.070	.00000	.12200	.02056	.01704	.01714	-.00584
1.051	6.130	.00000	.12869	.02201	.01626	.02218	-.00563
1.051	8.200	.00000	.13261	.02278	.01583	.02322	-.00671
	GRADIENT	.00000	.00515	.00085	.00060	.00225	-.00122

FA28 (MSFC TWT 656) 02W E2WNWAATT3S3 (S1Z006) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 340/ 0 RN/L = 6.53 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.100	-8.110	.00000	.06478	.01143	.01034	-.03848	.04769
1.100	-6.050	.00000	.07584	.01315	.01239	-.03240	.03896
1.100	-4.030	.00000	.08720	.01508	.01382	-.02441	.03210
1.100	-2.020	.00000	.09933	.01693	.01435	-.02368	.02163
1.100	.050	.00000	.11228	.01891	.01492	-.01959	.01126
1.100	2.090	.00000	.12476	.02080	.01478	-.01278	.00252
1.100	4.100	.00000	.13445	.02267	.01314	-.00898	-.00393
1.100	6.120	.00000	.14017	.02389	.01100	-.00636	-.00897
1.100	8.210	.00000	.14626	.02506	.00934	-.00419	-.01169
	GRADIENT	.00000	.00589	.00094	- 00005	.00205	-.00448

RUN NO. 350/ 0 RN/L = 6.58 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.251	-8.110	.00000	.07088	.01271	.01046	-.01904	.05782
1.251	-6.050	.00000	.08135	.01447	.01149	-.02007	.05376
1.251	-4.030	.00000	.09021	.01609	.01187	-.02260	.04564
1.251	-2.000	.00000	.10093	.01767	.01134	-.02414	.03842
1.251	.050	.00000	.11204	.01946	.01091	-.02206	.03082
1.251	2.090	.00000	.12442	.02079	.01092	-.02114	.02184
1.251	4.100	.00000	.13319	.02216	.00952	-.01931	.01284
1.251	6.140	.00000	.13763	.02335	.00653	-.01941	.00337
1.251	8.240	.00000	.14087	.02430	.00450	-.01713	-.00439
	GRADIENT	.00000	.00538	.00075	-.00025	.00047	-.00404

FA28 (MSFC TWT 656) O2W2E2WNWAATT3S3 (S1Z007) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = -90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 360/ 0 RN/L = 6.56 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.249	-8.210	.00000	.07425	.01345	.01094	-.01997	.05844
1.249	-6.140	.00000	.08560	.01518	.01220	-.02099	.05333
1.249	-4.100	.00000	.09644	.01688	.01307	-.02080	.04577
1.249	-2.090	.00000	.10629	.01857	.01279	-.02136	.03885
1.249	-.060	.00000	.12103	.02046	.01223	-.01894	.03131
1.249	1.990	.00000	.13214	.02205	.01102	-.01937	.02284
1.249	4.010	.00000	.13865	.02342	.00897	-.01719	.01296
1.249	6.040	.00000	.14407	.02452	.00591	-.01794	.00587
1.249	8.100	.00000	.14677	.02546	.00434	-.01689	-.00190
	GRADIENT	.00000	.00533	.00082	- 00049	.00045	-.00402

FA28 (MSFC TWT 656) O2W2E2PNPAATT3S3 (S1Z008) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 431/ 0 RN/L = 4.85 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.600	-8.020	.00000	-.01062	-.00223	-.00994	-.02383	-.00516
.600	-6.000	.00000	.01123	.00168	-.00505	-.02253	-.00374
.600	-3.980	.00000	.03461	.00537	.00102	-.02415	-.00418
.600	-1.960	.00000	.06139	.00959	.00809	-.02413	-.00538
.600	.120	.00000	.08321	.01315	.01487	-.02361	-.00168
.600	2.140	.00000	.10471	.01715	.02060	-.02283	.00281
.600	4.140	.00000	.12621	.02150	.02566	-.02199	.00886
.600	6.150	.00000	.14678	.02591	.03000	-.02006	.01486
.600	8.230	.00000	.16848	.03029	.03483	-.01264	.01862
	GRADIENT	.00000	.01114	.00196	.00304	.00028	.00168

FA28 (MSFC TWT 656) 021:E2PNPAATT3S3 (S1Z008) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 402/ 0 RN/L = 6.14 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.898	-8.040	.00000	-.01591	-.00249	-.00967	-.01843	.00290
.898	-5.970	.00000	.00781	.00194	-.00475	-.01928	.00111
.898	-3.950	.00000	.03552	.00678	.00126	-.02431	-.00192
.898	-1.940	.00000	.06369	.01162	.00800	-.02885	-.00789
.898	.150	.00000	.08657	.01510	.01494	-.02889	-.01130
.898	2.190	.00000	.10924	.01903	.02021	-.02873	-.00479
.898	4.180	.00000	.13359	.02306	.02471	-.02819	.00203
.898	6.230	.00000	.15660	.02683	.02914	-.02190	.01341
.898	8.340	.00000	.17142	.02967	.03149	-.01058	.02354
	GRADIENT	.00000	.01185	.00196	00290	-.00037	.00053

RUN NO. 410/ 0 RN/L = 6.34 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.949	-8.040	.00000	-.00860	-.00211	-.00966	.01744	.00257
.949	-6.000	.00000	.01645	.00221	-.00416	.01405	-.00028
.949	-3.990	.00000	.04144	.00646	.00205	.00777	-.00249
.949	-1.950	.00000	.06803	.01103	.00867	.00785	-.00465
.949	.120	.00000	.09411	.01602	.01446	.00221	-.00262
.949	2.170	.00000	.11753	.01989	.02015	-.00338	-.00353
.949	4.180	.00000	.14035	.02347	.02431	-.01026	-.00175
.949	6.210	.00000	.16368	.02743	.02749	-.01430	.00812
.949	8.280	.00000	.17905	.02980	.03033	-.01048	.01970
	GRADIENT	.00000	.01209	.00210	.00274	-.00231	.00013

RUN NO. 390/ 0 RN/L = 6.47 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.050	-8.060	.00000	-.01294	-.00335	-.00654	-.01255	-.00604
1.050	-6.020	.00000	.01277	.00130	-.00090	-.00749	-.00943
1.050	-3.980	.00000	.03667	.00582	.00424	-.00526	-.01219
1.050	-1.930	.00000	.06388	.01097	.00937	-.00233	-.01123
1.050	.130	.00000	.09523	.01677	.01466	-.00254	-.00462
1.050	2.170	.00000	.12444	.02192	.02016	.00134	.00219
1.050	4.200	.00000	.14977	.02597	.02522	.00277	.01325
1.050	6.230	.00000	.16984	.02968	.02693	.00143	.02673
1.050	8.290	.00000	.18301	.03229	.02794	.00130	.03802
	GRADIENT	.00000	.01402	.00251	.00258	.00096	.00314

FA28 (MSFC TWT 656) 02W: E2PNPAATT3S3 (S1Z008) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 380/ 0 RN/L = 6.53 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.099	-8.060	.00000	-.02002	-.00450	-.00635	-.02905	-.00410
1.099	-6.020	.00000	.01004	.00072	-.00027	-.02714	-.00717
1.099	-3.990	.00000	.03978	.00629	.00494	-.02660	-.01165
1.099	-1.950	.00000	.07171	.01235	.00921	-.02551	-.00607
1.099	.160	.00000	.10337	.01814	.01349	-.02297	.00742
1.099	2.210	.00000	.13665	.02388	.01824	-.02080	.02579
1.099	4.220	.00000	.16362	.02841	.02282	-.01511	.04157
1.099	6.250	.00000	.18429	.03212	.02568	-.01037	.05442
1.099	8.330	.00000	.19771	.03488	.02786	.00293	.06408
	GRADIENT	.00000	.01519	.00271	00218	.00134	.00672

RUN NO. 421/ 0 RN/L = 6.54 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.149	-8.060	.00000	-.01194	-.00331	-.00607	-.02700	-.00692
1.149	-6.000	.00000	.02076	.00284	-.00248	-.02287	-.00803
1.149	-3.970	.00000	.05315	.00878	.00175	-.02068	.00216
1.149	-1.930	.00000	.08340	.01435	.00627	-.02194	.01614
1.149	.130	.00000	.11433	.01960	.01096	-.02117	.02961
1.149	2.170	.00000	.14330	.02459	.01600	-.01716	.04410
1.149	4.210	.00000	.16869	.02904	.02048	-.01351	.05502
1.149	6.250	.00000	.18952	.03287	.02369	-.00489	.06471
1.149	8.330	.00000	.20580	.03611	.02660	.01075	.07465
	GRADIENT	.00000	.01422	.00248	.00231	.00093	.00653

RUN NO. 371/ 0 RN/L = 6.57 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.246	-8.010	.00000	-.00836	-.00232	-.00553	-.02763	-.00933
1.246	-5.970	.00000	.02128	.00327	-.00182	-.02552	-.00196
1.246	-3.930	.00000	.04971	.00879	.00186	-.02407	.00840
1.246	-1.900	.00000	.08018	.01429	.00626	-.02168	.02187
1.246	.160	.00000	.11032	.01920	.01130	-.01622	.03606
1.246	2.210	.00000	.13829	.02399	.01615	-.01012	.05192
1.246	4.220	.00000	.15963	.02818	.01922	-.00680	.06199
1.246	6.260	.00000	.17744	.03156	.02179	.00130	.06944
1.246	8.340	.00000	.19304	.03423	.02481	.01360	.07750
	GRADIENT	.00000	.01362	.00238	.00219	.00226	.00673

FA28 (MSFC TWT 656) 02[illegible]52PNPAATT3S3 (S1Z009) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 441/ 0 RN/L = 4.91 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.602	-8.020	.00000	.06570	.01125	.00726	-.03002	.00099
.602	-5.990	.00000	.07274	.01211	.00949	-.02712	-.00012
.602	-3.990	.00000	.07666	.01263	.01112	-.02371	-.00093
.602	-1.980	.00000	.07805	.01285	.01182	-.02041	-.00180
.602	.060	.00000	.07774	.01318	.01222	-.01647	-.00286
.602	2.070	.00000	.08124	.01398	.01279	-.01330	-.00367
.602	4.060	.00000	.08631	.01486	.01368	-.00938	-.00411
.602	6.060	.00000	.08767	.01532	.01457	-.00427	-.00417
.602	8.110	.00000	.09097	.01573	.01590	.00033	-.00373
	GRADIENT	.00000	.00111	.00028	00030	.00178	-.00041

RUN NO. 450/ 0 RN/L = 6.18 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.900	-8.090	.00000	.06709	.01126	.00577	-.02835	-.00430
.900	-6.070	.00000	.07565	.01244	.00901	-.01950	-.00442
.900	-4.020	.00000	.08429	.01394	.01148	-.01473	-.00668
.900	-1.990	.00000	.08901	.01460	.01364	-.01490	-.01156
.900	.090	.00000	.08873	.01410	.01609	-.01452	-.01558
.900	2.100	.00000	.09863	.01535	.01701	-.00457	-.01670
.900	4.100	.00000	.10207	.01596	.01778	.00729	-.01475
.900	6.110	.00000	.10455	.01646	.01818	.01533	-.01199
.900	8.180	.00000	.10600	.01694	.01929	.02060	-.00552
	GRADIENT	.00000	.00222	.00023	.00079	.00267	-.00105

RUN NO. 462/ 0 RN/L = 6.59 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.050	-8.120	.00000	.05218	.00971	.00561	-.02006	.02679
1.050	-6.060	.00000	.06452	.01113	.00861	-.01074	.01350
1.050	-4.050	.00000	.07176	.01227	.01058	-.00598	.00490
1.050	-2.040	.00000	.07729	.01379	.01178	-.00597	-.00016
1.050	.030	.00000	.09307	.01628	.01441	-.00375	-.00365
1.050	2.060	.00000	.10942	.01861	.01580	.00315	-.00590
1.050	4.100	.00000	.11741	.02024	.01568	.01125	-.00670
1.050	6.130	.00000	.12842	.02185	.01669	.01889	-.00658
1.050	8.190	.00000	.13689	.02324	.01739	.02096	-.00741
	GRADIENT	.00000	.00605	.00102	.00070	.00214	-.00142

FA28 (MSFC TWT 656) 02W:E2PNPAATT3S3 (S1Z009) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 471/ 0 RN/L = 6.58 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.100	-8.120	.00000	.05000	.00991	.00715	-.04054	.05283
1.100	-6.070	.00000	.06693	.01200	.01018	-.03851	.04403
1.100	-4.060	.00000	.07684	.01388	.01125	-.03287	.03430
1.100	-2.020	.00000	.08712	.01579	.01102	-.02726	.02304
1.100	.030	.00000	.10193	.01793	.01238	-.02246	.01145
1.100	2.070	.00000	.11761	.02008	.01343	-.01739	.00259
1.100	4.080	.00000	.12834	.02199	.01195	-.01016	-.00473
1.100	6.120	.00000	.13750	.02362	.01074	-.00343	-.00966
1.100	8.180	.00000	.14519	.02485	.01041	-.00486	-.01153
	GRADIENT	.00000	.00655	.00101	00019	.00271	-.00484

RUN NO. 480/ 0 RN/L = 6.71 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.248	-8.110	.00000	.05935	.01116	.00869	-.02552	.05990
1.248	-6.050	.00000	.07360	.01339	.00987	-.02899	.05535
1.248	-4.030	.00000	.08317	.01481	.01104	-.03027	.04664
1.248	-2.020	.00000	.09400	.01620	.01144	-.02629	.03958
1.248	.030	.00000	.10512	.01808	.01098	-.02467	.03134
1.248	2.090	.00000	.11666	.01990	.01036	-.02386	.02156
1.248	4.080	.00000	.12733	.02150	.00981	-.02359	.01191
1.248	6.120	.00000	.13582	.02277	.00877	-.01973	.00249
1.248	8.200	.00000	.14099	.02394	.00724	-.01878	-.00568
	GRADIENT	.00000	.00546	.00084	-.00017	.00078	-.00430

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 (S1Z010) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 8.000 PT = 22.000

RUN NO. 530/ 0 RN/L = 4.97 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.602	-8.020	.00000	-.00845	-.00235	-.00907	-.01489	-.00672
.602	-5.980	.00000	.01503	.00161	-.00339	-.01508	-.00636
.602	-3.980	.00000	.04005	.00533	.00380	-.01582	-.00650
.602	-1.960	.00000	.06246	.00944	.00928	-.01657	-.00619
.602	.080	.00000	.08014	.01319	.01379	-.01705	-.00520
.602	2.100	.00000	.10468	.01730	.02055	-.01410	-.00031
.602	4.100	.00000	.13008	.02141	.02767	-.01109	.00527
.602	6.130	.00000	.14954	.02587	.03166	-.00676	.01230
.602	8.170	.00000	.16966	.03027	.03579	-.00549	.01490
	GRADIENT	.00000	.01099	.00198	00292	.00059	.00145

RUN NO. 520/ 0 RN/L = 6.24 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.899	-8.040	.00000	-.01137	-.00340	-.00774	-.01386	.00052
.899	-6.020	.00000	.01390	.00129	-.00271	-.00888	-.00192
.899	-3.980	.00000	.03818	.00601	.00220	-.01029	-.00515
.899	-1.960	.00000	.06743	.01105	.00880	-.01495	-.00958
.899	.100	.00000	.09099	.01447	.01603	-.01625	-.01164
.899	2.160	.00000	.11248	.01838	.02138	-.02039	-.00480
.899	4.180	.00000	.13660	.02211	.02631	-.02089	.00247
.899	6.200	.00000	.15838	.02585	.03046	-.02114	.01028
.899	8.250	.00000	.17253	.02894	.03225	-.01589	.02035
	GRADIENT	.00000	.01183	.00193	.00297	-.00130	.00098

RUN NO. 510/ 0 RN/L = 6.51 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.049	-8.060	.00000	-.01400	-.00365	-.00717	-.01293	-.00898
1.049	-6.000	.00000	.00996	.00097	-.00229	-.00861	-.01188
1.049	-3.960	.00000	.03521	.00547	.00341	-.00541	-.01494
1.049	-1.940	.00000	.06530	.01061	.00990	-.00316	-.01196
1.049	.150	.00000	.09343	.01595	.01494	-.00030	-.00321
1.049	2.170	.00000	.12078	.02150	.01912	.00243	.00725
1.049	4.200	.00000	.14692	.02574	.02388	.00190	.01585
1.049	6.230	.00000	.17004	.02936	.02708	-.00095	.02716
1.049	8.290	.00000	.18359	.03201	.02843	-.00481	.03981
	GRADIENT	.00000	.01365	.00252	.00246	.00099	.00395

FA28 (MSFC TWT 656) 02[illegible]E2PNPAATT3S3 (SIZ010) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 8.000 PT = 22.000

RUN NO. 500/ 0 RN/L = 6.53 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.096	-8.070	.00000	-.02203	-.00493	-.00664	-.02737	-.00402
1.096	-6.000	.00000	.00613	.00014	-.00114	-.02345	-.00874
1.096	-3.980	.00000	.03618	.00578	.00419	-.02305	-.00943
1.096	-1.930	.00000	.06651	.01143	.00892	-.02063	-.00839
1.096	.130	.00000	.10043	.01733	.01400	-.01852	.00406
1.096	2.190	.00000	.13501	.02325	.01895	-.01317	.02321
1.096	4.210	.00000	.16100	.02786	.02325	-.00538	.03906
1.096	6.250	.00000	.18260	.03200	.02554	.00114	.05282
1.096	8.350	.00000	.19723	.03471	.02804	.01183	.06284
	GRADIENT	.00000	.01552	.00273	00235	.00209	.00627

RUN NO. 491/ 0 RN/L = 6.58 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.248	-8.010	.00000	-.00902	-.00237	-.00573	-.02824	-.00799
1.248	-5.980	.00000	.01930	.00314	-.00235	-.02564	-.00117
1.248	-3.930	.00000	.04873	.00869	.00170	-.02216	.00770
1.248	-1.900	.00000	.07909	.01410	.00627	-.01773	.01899
1.248	.150	.00000	.10968	.01918	.01108	-.01052	.03288
1.248	2.190	.00000	.13779	.02397	.01602	-.00434	.04679
1.248	4.220	.00000	.15884	.02797	.01958	.00032	.05639
1.248	6.260	.00000	.17531	.03144	.02144	.00855	.06572
1.248	8.330	.00000	.19011	.03420	.02380	.02237	.07246
	GRADIENT	.00000	.01368	.00238	.00223	.00286	.00614

FA28 (MSFC TWT 656) 02W E2PNPAATT3S3 (SIZ011) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 8.000 PT = 22.000

RUN NO. 540/ 0 RN/L = 4.97 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.604	-8.040	.00000	.06681	.01150	.00739	-.02648	-.00271
.604	-6.010	.00000	.07182	.01236	.00862	-.02582	-.00240
.604	-4.020	.00000	.07514	.01296	.00961	-.02533	-.00365
.604	-2.000	.00000	.08029	.01312	.01235	-.02313	-.00456
.604	.030	.00000	.08169	.01332	.01368	-.01910	-.00470
.604	2.070	.00000	.08166	.01419	.01257	-.01693	-.00512
.604	4.040	.00000	.08871	.01509	.01418	-.01415	-.00576
.604	6.060	.00000	.09162	.01534	.01607	-.00924	-.00495
.604	8.110	.00000	.09054	.01600	.01517	-.00423	-.00438
	GRADIENT	.00000	.00141	.00026	00046	.00141	-.00024

RUN NO. 550/ 0 RN/L = 6.22 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.901	-8.090	.00000	.06728	.01148	.00538	-.02915	-.00468
.901	-6.050	.00000	.07437	.01274	.00783	-.02520	-.00632
.901	-4.040	.00000	.08442	.01411	.01107	-.02149	-.00762
.901	-2.020	.00000	.08738	.01469	.01291	-.01897	-.00795
.901	.030	.00000	.08618	.01436	.01456	-.01615	-.01062
.901	2.060	.00000	.09928	.01553	.01665	-.00933	-.01047
.901	4.060	.00000	.10344	.01594	.01822	-.00099	-.00868
.901	6.090	.00000	.10412	.01660	.01765	.00631	-.00803
.901	8.150	.00000	.10665	.01704	.01933	.01150	-.00731
	GRADIENT	.00000	.00246	.00022	.00089	.00250	-.00023

RUN NO. 560/ 0 RN/L = 6.54 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.051	-8.120	.00000	.05264	.00965	.00603	-.01949	.02470
1.051	-6.070	.00000	.06218	.01118	.00772	-.01010	.01413
1.051	-4.050	.00000	.07057	.01256	.00996	-.00847	.00911
1.051	-2.020	.00000	.07915	.01382	.01255	-.00773	.00225
1.051	.050	.00000	.09116	.01606	.01409	-.00414	-.00205
1.051	2.080	.00000	.10456	.01849	.01475	-.00034	-.00552
1.051	4.120	.00000	.11725	.02019	.01571	.00531	-.00619
1.051	6.130	.00000	.12850	.02173	.01682	.01244	-.00602
1.051	8.200	.00000	.13518	.02330	.01654	.01574	-.00603
	GRADIENT	.00000	.00581	.00098	.00067	.00171	-.00188

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 (S1Z011) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 8.000 PT = 22.000

RUN NO. 570/ 0 RN/L = 6.57 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.099	-8.140	.00000	.05075	.00952	.00802	-.03563	.04698
1.099	-6.070	.00000	.06533	.01206	.00940	-.03183	.03911
1.099	-4.060	.00000	.07716	.01381	.01147	-.02663	.02901
1.099	-2.020	.00000	.08833	.01557	.01243	-.02305	.01888
1.099	.030	.00000	.09974	.01783	.01204	-.02108	.00893
1.099	2.070	.00000	.11582	.02001	.01314	-.01862	-.00109
1.099	4.100	.00000	.12930	.02189	.01298	-.01240	-.00689
1.099	6.120	.00000	.13673	.02354	.01095	-.00469	-.00826
1.099	8.200	.00000	.14424	.02484	.01014	-.00403	-.00874
	GRADIENT	.00000	.00546	.00101	00018	.00161	-.00450

RUN NO. 580/ 0 RN/L = 6.60 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.250	-8.120	.00000	.05962	.01125	.00870	-.02040	.05371
1.250	-6.070	.00000	.07486	.01345	.01041	-.02502	.04824
1.250	-4.030	.00000	.08259	.01494	.01046	-.02733	.03966
1.250	-2.000	.00000	.09289	.01644	.01042	-.02297	.03192
1.250	.080	.00000	.10688	.01823	.01127	-.01965	.02456
1.250	2.110	.00000	.11869	.01998	.01097	-.01864	.01589
1.250	4.120	.00000	.12728	.02159	.00910	-.01974	.00705
1.250	6.160	.00000	.13524	.02293	.00770	-.01806	-.00164
250	8.210	.00000	.14268	.02395	.00712	-.01745	-.00914
	GRADIENT	.00000	.00565	.00083	-.00011	.00096	-.00398

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 (S1Z012) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 16.000 PT = 22.000

RUN NO. 6307 0 RN/L = 4.87 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.600	-8.020	.00000	.06545	.01160	.00628	-.03331	-.00106
.600	-6.010	.00000	.07519	.01222	.01015	-.03036	-.00143
.600	-3.990	.00000	.07713	.01271	.01113	-.02822	-.00181
.600	-2.000	.00000	.07678	.01306	.01103	-.02710	-.00332
.600	.030	.00000	.07942	.01331	.01276	-.02444	-.00487
.600	2.070	.00000	.08633	.01391	.01502	-.02065	-.00483
.600	4.060	.00000	.08872	.01489	.01495	-.01619	-.00437
.600	6.100	.00000	.08649	.01545	.01392	-.01259	-.00481
.600	8.150	.00000	.09014	.01590	.01518	-.00831	-.00493
	GRADIENT	.00000	.00162	.00026	00058	.00151	-.00033

RUN NO. 620/ 0 RN/L = 6.14 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.900	-8.070	.00000	.06634	.01141	.00503	-.04299	-.00584
.900	-6.050	.00000	.07665	.01268	.00883	-.03848	-.00829
.900	-4.020	.00000	.08319	.01421	.01053	-.03399	-.00678
.900	-2.000	.00000	.08640	.01496	.01182	-.03260	-.00806
.900	.050	.00000	.08809	.01430	.01515	-.03025	-.01079
.900	2.080	.00000	.09856	.01538	.01676	-.01858	-.01076
.900	4.080	.00000	.10109	.01596	.01720	-.00481	-.00881
.900	6.090	.00000	.10265	.01644	.01732	.00693	-.00641
.900	8.160	.00000	.10522	.01661	.01960	.01563	-.00384
	GRADIENT	.00000	.00236	.00019	.00090	.00357	-.00033

RUN NO. 610/ 0 RN/L = 6.42 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.048	-8.090	.00000	.05208	.00998	.00512	-.01318	.02659
1.048	-6.040	.00000	.06384	.01124	.00811	-.00086	.01312
1.048	-4.030	.00000	.07174	.01245	.01065	.00662	.00608
1.048	-1.990	.00000	.07770	.01389	.01185	.00692	.00155
1.048	.050	.00000	.08971	.01622	.01331	.00661	-.00289
1.048	2.110	.00000	.10437	.01822	.01511	.00688	-.00592
1.048	4.120	.00000	.11632	.01978	.01622	.01172	-.00569
1.048	6.130	.00000	.12617	.02164	.01665	.01815	-.00522
1.048	8.200	.00000	.13190	.02292	.01606	.02002	-.00709
	GRADIENT	.00000	.00568	.00093	.00071	.00050	-.00152

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 (SIZ012) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 16.000 PT = 22.000

RUN NO. 600/ 0 RN/L = 6.48 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.101	-8.100	.00000	.05221	.00994	.00789	-.03634	.04971
1.101	-6.050	.00000	.06835	.01196	.01100	-.03394	.04228
1.101	-4.040	.00000	.08023	.01399	.01240	-.02966	.03372
1.101	-2.000	.00000	.08399	.01575	.01223	-.02469	.02379
1.101	.050	.00000	.10237	.01800	.01256	-.02107	.01275
1.101	2.110	.00000	.11829	.02019	.01352	-.01812	.00302
1.101	4.120	.00000	.13172	.02203	.01333	-.00992	-.00452
1.101	6.140	.00000	.13936	.02344	.01195	-.00342	-.00879
1.101	8.210	.00000	.14503	.02490	.01014	-.00373	-.01109
	GRADIENT	.00000	.00647	.00100	00015	.00225	-.00476

RUN NO. 590/ 0 RN/L = 6.52 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.250	-8.110	.00000	.05945	.01124	.00843	-.02729	.05300
1.250	-6.070	.00000	.07359	.01343	.00979	-.02952	.04830
1.250	-4.050	.00000	.08186	.01503	.00998	-.02956	.04047
1.250	-2.020	.00000	.09274	.01653	.01025	-.02444	.03284
1.250	.060	.00000	.10550	.01816	.01080	-.02105	.02442
1.250	2.090	.00000	.11758	.01986	.01066	-.01910	.01535
1.250	4.080	.00000	.12670	.02156	.00883	-.01777	.00621
1.250	6.120	.00000	.13364	.02293	.00729	-.01528	-.00395
1.250	8.210	.00000	.14140	.02396	.00665	-.01406	-.01063
	GRADIENT	.00000	.00562	.00080	-.00009	.00142	-.00422

FA28 (MSFC TWT 656) 0:/2E2PNPAATT3S3 (S1Z013) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 16.000 PT = 22.000

RUN NO. 640/ 0 RN/L = 4.88 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.600	-7.960	.00000	-.00838	-.00210	-.00924	-.02153	-.00660
.600	-5.940	.00000	.01508	.00173	-.00343	-.02181	-.00655
.600	-3.920	.00000	347	.00534	.00364	-.02313	-.00619
.600	-1.920	.00000	.. 072	.00960	.00837	-.02272	-.00574
.600	.120	.00000	.06039	.01341	.01372	-.02472	-.00405
.600	2.150	.00000	.10449	.01720	.02066	-.02396	.00050
.600	4.140	.00000	.12810	.02137	.02701	-.02258	.00662
.600	6.170	.00000	.14747	.02601	.03066	-.02203	.01226
.600	8.230	.00000	.17110	.03041	.03630	-.01663	.01612
	GRADIENT	.00000	.01095	.00196	00292	-.00001	.00158

RUN NO. 650/ 0 RN/L = 6.16 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.899	-8.040	.00000	-.01223	-.00338	-.00782	-.02164	-.00219
.899	-6.000	.00000	.01532	.00121	-.00162	-.02069	-.00290
.899	-3.960	.00000	.04030	.00591	.00368	-.02456	-.00490
.899	-1.920	.00000	.06778	.01134	.00873	-.02701	-.00953
.899	.190	.00000	.09145	.01456	.01643	-.02705	-.01037
.899	2.230	.00000	.11677	.01821	.02343	-.02816	-.00430
.899	4.240	.00000	.13843	.02218	.02735	-.02802	.00015
.899	6.250	.00000	.15720	.02604	.03004	-.02406	.01125
.899	8.320	.00000	.17829	.02932	.03407	-.01607	.02014
	GRADIENT	.00000	.01194	.00192	.00302	-.00039	.00074

RUN NO. 660/ 0 RN/L = 6.48 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.048	-8.000	.00000	-.01371	-.00316	-.00789	-.00940	-.00885
1.048	-5.960	.00000	.01264	.00145	-.00183	-.00363	-.01180
1.048	-3.910	.00000	.03868	.00586	.00449	.00035	-.01353
1.048	-1.910	.00000	.06428	.01097	.00924	.00320	-.01132
1.048	.160	.00000	.09499	.01691	.01420	.00427	-.00385
1.048	2.210	.00000	.12571	.02214	.02010	.00738	.00424
1.048	4.220	.00000	.14737	.02604	.02404	.00671	.01362
1.048	6.250	.00000	.16859	.02986	.02561	.00282	.02846
1.048	8.330	.00000	.18432	.03218	.02850	-.00260	.04033
	GRADIENT	.00000	.01368	.00253	.00245	.00083	.00343

FA28 (MSFC TWT 656) 02L2E2PNPAATT3S3 (SIZ013) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = 16.000 PT = 22.000

RUN NO. 670/ 0 RN/L = 6.59 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.097	-8.060	.00000	-.02211	-.00455	-.00776	-.02682	-.00604
1.097	-6.020	.00000	.00877	.00062	-.00119	-.02509	-.00963
1.097	-3.980	.00000	.03993	.00619	.00439	-.02440	-.01349
1.097	-1.950	.00000	.07296	.01251	.00846	-.02225	-.00702
1.097	.120	.00000	.10339	.01830	.01257	-.01810	.00849
1.097	2.190	.00000	.13426	.02377	.01750	-.01272	.02420
1.097	4.220	.00000	.16255	.02851	.02164	-.00635	.04019
1.097	6.250	.00000	.18336	.03195	.02591	-.00261	.05156
1.097	8.310	.00000	.19918	.03483	.02847	.00741	.06191
	GRADIENT	.00000	.01492	.00272	00212	.00222	.00675

RUN NO. 680/ 0 RN/L = 6.68 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.248	-8.040	.00000	-.00904	-.00244	-.00591	-.02705	-.01029
1.248	-6.010	.00000	.01941	.00312	-.00246	-.02542	-.00368
1.248	-3.970	.00000	.05019	.00854	.00234	-.02316	.00629
1.248	-1.950	.00000	.08072	.01398	.00697	-.01923	.01974
1.248	.120	.00000	.10820	.01920	.01039	-.01423	.03354
1.248	2.190	.00000	.13518	.02386	.01523	-.01015	.04799
1.248	4.200	.00000	.15960	.02790	.01982	-.00602	.05858
1.248	6.240	.00000	.17775	.03155	.02200	.00248	.06682
1.248	8.310	.00000	.18993	.03430	.02341	.01413	.07417
	GRADIENT	.00000	.01334	.00237	.00211	.00212	.00649

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 (S1Z014) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 30.000

RUN NO. 730/ 0 RN/L = 6.65 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.600	-8.010	.00000	-.00583	-.00205	-.00899	-.02004	-.00602
.600	-5.970	.00000	.01338	.00159	-.00452	-.01920	-.00572
.600	-3.940	.00000	.03579	.00571	.00069	-.01900	-.00570
.600	-1.930	.00000	.05936	.00947	.00726	-.02067	-.00636
.600	.120	.00000	.08344	.01338	.01441	-.02071	-.00516
.600	2.170	.00000	.10362	.01733	.01992	-.02041	.00069
.600	4.160	.00000	.12405	.02166	.02427	-.02036	.00624
.600	6.190	.00000	.14749	.02602	.02977	-.01867	.01141
.600	8.280	.00000	.17274	.03053	.03614	-.01213	.01581
	GRADIENT	.00000	.01088	.00196	00295	-.00012	.00152

RUN NO. 720/ 0 RN/L = 8.42 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.897	-8.070	.00000	-.00504	-.00169	-.00874	-.02340	-.00204
.897	-6.000	.00000	.01764	.00189	-.00200	-.02159	-.00427
.897	-3.970	.00000	.04161	.00659	.00294	-.02172	-.00659
.897	-1.920	.00000	.06971	.01172	.00870	-.02418	-.00944
.897	.170	.00000	.09598	.01550	.01666	-.02435	-.01266
.897	2.230	.00000	.11712	.01884	.02307	-.02667	-.00657
.897	4.290	.00000	.14045	.02302	.02690	-.02619	-.00033
.897	6.320	.00000	.16296	.02681	.03073	-.02138	.00938
.897	8.370	.00000	.17871	.02963	.03331	-.01186	.02072
	GRADIENT	.00000	.01186	.00193	.00301	-.00055	.00074

RUN NO. 710/ 0 RN/L = 8.75 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.048	-8.060	.00000	-.01170	-.00294	-.00728	-.01469	-.00886
1.048	-5.980	.00000	.01388	.00169	-.00164	-.01040	-.01208
1.048	-3.920	.00000	.03952	.00616	.00441	-.00604	-.01448
1.048	-1.880	.00000	.06822	.01136	.01018	-.00143	-.01241
1.048	.200	.00000	.09829	.01719	.01523	.00260	-.00514
1.048	2.260	.00000	.12639	.02255	.01980	.00529	.00453
1.048	4.300	.00000	.14913	.02661	.02373	.00681	.01467
1.048	6.340	.00000	.17065	.03033	.02643	.00488	.03106
1.048	8.400	.00000	.18686	.03302	.02848	-.00353	.04466
	GRADIENT	.00000	.01348	.00253	.00235	.00158	.00366

FA28 (MSFC TWT 656) 021 2E2PNPAATT3S3 (S1Z014) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 30.000

RUN NO. 700/ 0 RN/L = 8.98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.097	-8.060	.00000	-.01822	-.00416	-.00645	-.02416	-.00491
1.097	-5.990	.00000	.01036	.00098	-.00088	-.02370	-.00805
1.097	-3.950	.00000	.04192	.00667	.00462	-.02513	-.01360
1.097	-1.910	.00000	.07613	.01286	.00936	-.02353	-.00735
1.097	.180	.00000	.10718	.01871	.01373	-.02039	.00800
1.097	2.270	.00000	.13708	.02423	.01784	-.01749	.02535
1.097	4.290	.00000	.16512	.02909	.02203	-.01095	.04284
1.097	6.340	.00000	.18704	.03276	.02566	-.00434	.05706
1.097	8.410	.00000	.20095	.03551	.02762	.00730	.06718
	GRADIENT	.00000	.01488	.00272	00210	.00166	.00705

RUN NO. 691/ 0 RN/L = 9.17 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.249	-8.040	.00000	-.00540	-.00205	-.00527	-.02344	-.01016
1.249	-5.980	.00000	.02410	.00334	-.00110	-.02233	-.00417
1.249	-3.960	.00000	.05357	.00882	.00286	-.02035	.00792
1.249	-1.910	.00000	.08224	.01437	.00636	-.01790	.02028
1.249	.180	.00000	.11275	.01969	.01100	-.01438	.03374
1.249	2.230	.00000	.14044	.02431	.01631	-.00935	.04893
1.249	4.290	.00000	.16107	.02816	.01971	-.00599	.05935
1.249	6.330	.00000	.17821	.03170	.02179	.00254	.06796
1.249	8.390	.00000	.19323	.03433	.02448	.01371	.07465
	GRADIENT	.00000	.01324	.00236	.00211	.00181	.00637

FA28 (MSFC TWT 656) 02L2E2PNPAATT3S3 (S1Z015) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 30.000

RUN NO. 740/ 0 RN/L = 6.61 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.600	-8.040	.00000	.08606	.01191	.00631	-.03063	-.00228
.600	-6.000	.00000	.07415	.01262	.00898	-.02852	-.00365
.600	-3.990	.00000	.08065	.01310	.01190	-.02641	-.00457
.600	-2.000	.00000	.08244	.01323	.01305	-.02444	-.00516
.600	.060	.00000	.08202	.01376	.01301	-.02258	-.00578
.600	2.070	.00000	.08686	.01468	.01395	-.02046	-.00630
.600	4.050	.00000	.09221	.01531	.01517	-.01541	-.00614
.600	6.070	.00000	.09339	.01563	.01606	-.00991	-.00513
.600	8.120	.00000	.09231	.01627	.01538	-.00639	-.00452
	GRADIENT	.00000	.00136	.00029	00037	.00129	-.00021

RUN NO. 750/ 0 RN/L = 8.47 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.900	-8.090	.00000	.07199	.01252	.00531	-.03857	-.00981
.900	-6.030	.00000	.08170	.01401	.00854	-.03278	-.01150
.900	-4.020	.00000	.08876	.01505	.01140	-.02939	-.01224
.900	-2.010	.00000	.09082	.01550	.01328	-.02865	-.01369
.900	.050	.00000	.09138	.01555	.01486	-.02578	-.01377
.900	2.090	.00000	.10330	.01643	.01668	-.01080	-.01195
.900	4.100	.00000	.10917	.01721	.01795	.00628	-.00975
.900	6.130	.00000	.10906	.01758	.01766	.01778	-.00670
.900	8.200	.00000	.10799	.01773	.01852	.02597	-.00403
	GRADIENT	.00000	.00262	.00026	.00081	.00438	.00033

RUN NO. 760/ 0 RN/L = 8.86 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.047	-8.180	.00000	.05556	.01015	.00681	-.02075	.02875
1.047	-6.080	.00000	.06555	.01162	.00874	-.00530	.01356
1.047	-4.060	.00000	.07444	.01304	.01102	.00407	.00421
1.047	-2.030	.00000	.08334	.01445	.01346	.00473	-.00066
1.047	.030	.00000	.09559	.01677	.01477	.00431	-.00406
1.047	2.100	.00000	.10743	.01875	.01538	.00403	-.00755
1.047	4.120	.00000	.12201	.02080	.01644	.00753	-.00771
1.047	6.170	.00000	.13100	.02233	.01656	.01369	-.00707
1.047	8.280	.00000	.13642	.02380	.01569	.01680	-.00929
	GRADIENT	.00000	.00582	.00097	.00062	.00030	-.00150

FA28 (MSFC TWT 656) 02W2E; PNPAATT3S3 (S1Z015) (29 JAN 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 30.000

RUN NO. 770/ 0 RN/L = 8.92 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.098	-8.150	.00000	.05507	01010	.00873	-.03795	.04980
1.098	-6.090	.00000	.06938	01235	.01060	-.03612	.04258
1.098	-4.060	.00000	.08061	01422	.01203	-.03238	.02955
1.098	-2.030	.00000	.09166	01605	.01264	-.02626	.01787
1.098	.050	.00000	.10562	01832	.01353	-.02226	.00893
1.098	2.100	.00000	.11836	02053	.01338	-.01924	-.00037
1.098	4.130	.00000	.13182	.02246	.01274	-.01340	-.00733
1.098	6.180	.00000	.14627	.02524	.00967	-.00662	-.01159
1.098	8.280	.00000	.14113	.02391	.01169	-.00896	-.00957
	GRADIENT	.00000	.00630	.00102	00011	.00219	-.00449

RUN NO. 780/ 0 RN/L = 9.04 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.248	-8.190	.00000	.06232	01196	.00851	-.01885	.05912
1.248	-6.090	.00000	.07623	.01410	.00971	-.02117	.05501
1.248	-4.030	.00000	.08558	.01569	.00996	-.02392	.04586
1.248	-1.990	.00000	.09639	.01713	.01029	-.02049	.03817
1.248	.080	.00000	.10945	01900	.01078	-.02141	.02849
1.248	2.130	.00000	.12018	.02070	.00990	-.01814	.01845
1.248	4.140	.00000	.12813	02211	.00807	-.01803	.01040
1.248	6.180	.00000	.13619	02339	.00627	-.01610	.00166
1.248	8.280	.00000	.14283	02441	.00507	-.01593	-.00624
	GRADIENT	.00000	.00532	00080	-.00020	.00069	-.00443

FA28 (MSFC TWT 656) O2W2E:PNPAATT3S3 W/GRIT (B1Z016) (10 MAR 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 830/ 0 RN/L = 4.92 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.603	-8.040	.00000	.05751	.01026	.00636	-.02686	.00019
.603	-6.010	.00000	.06315	.01116	.00773	-.02629	-.00086
.603	-4.020	.00000	.07044	.01155	.01085	-.02514	-.00198
.603	-2.000	.00000	.07473	.01189	.01287	-.02274	-.00198
.603	.010	.00000	.07280	.01238	.01223	-.02142	-.00216
.603	2.050	.00000	.07561	.01304	.01219	-.02019	-.00309
.603	4.040	.00000	.08219	.01373	.01395	-.01742	-.00339
.603	6.060	.00000	.08464	.01421	.01532	-.01297	-.00266
.603	8.110	.00000	.08211	.01473	.01386	-.01039	-.00241
	GRADIENT	.00000	.00121	.00027	00027	.00089	-.00019

RUN NO. 820/ 0 RN/L = 6.19 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
.903	-8.090	.00000	.06431	01021	.00715	-.03880	-.00521
.903	-6.040	.00000	.06909	01079	.00975	-.03166	-.00246
.903	-4.040	.00000	.07385	01092	.01285	-.02836	-.00440
.903	-2.040	.00000	.07741	01100	.01530	-.02510	-.00862
.903	.030	.00000	.08094	01165	.01704	-.02191	-.01019
.903	2.080	.00000	.09057	.01330	.01705	-.01285	-.00938
.903	4.080	.00000	.09358	.01386	.01747	-.00409	-.00906
.903	6.110	.00000	.09648	01431	.01822	.00246	-.00979
.903	8.160	.00000	.09831	.01466	.01964	.00830	-.00768
	GRADIENT	.00000	.00259	.00040	.00054	.00298	-.00049

RUN NO. 810/ 0 RN/L = 6.48 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.052	-8.120	.00000	.05107	.00961	.00557	-.01202	.02238
1.052	-6.060	.00000	.06170	.01083	.00812	-.00539	.01325
1.052	-4.050	.00000	.07000	.01213	.01042	-.00026	.00788
1.052	-2.020	.00000	.07763	.01369	.01187	.00159	.00454
1.052	.030	.00000	.08702	.01566	.01252	.00133	.00013
1.052	2.070	.00000	.10373	.01817	.01415	-.00086	-.00224
1.052	4.080	.00000	.11568	01984	.01542	.00327	-.00454
1.052	6.110	.00000	.12608	.02145	.01627	.01003	-.00503
1.052	8.170	.00000	.13297	.02285	.01617	.01245	-.00596
	GRADIENT	.00000	.00577	.00098	.00060	.00023	-.00155

FA28 (MSFC TWT 656) 02W2E2PNPAATT3S3 W/GRIT (B1Z016) (10 MAR 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 PHI = 90.000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 800/ 0 RN/L = 6.54 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.101	-8.140	.00000	.04899	.00944	.00739	-.02883	.04184
1.101	-6.070	.00000	.06553	.01151	.01030	-.02661	.03486
1.101	-4.060	.00000	.07601	.01339	.01150	-.02438	.02811
1.101	-2.020	.00000	.08570	.01534	.01158	-.02183	.01993
1.101	.030	.00000	.09927	.01757	.01207	-.01955	.01157
1.101	2.070	.00000	.11480	.01971	.01325	-.01760	.00416
1.101	4.080	.00000	.12773	.02142	.01315	-.01019	-.00102
1.101	6.120	.00000	.13562	.02317	.01162	-.00839	-.00369
1.101	8.180	.00000	.14108	.02446	.00980	-.00746	-.00648
	GRADIENT	.00000	.00651	.00100	00024	.00160	-.00364

RUN NO. 790/ 0 RN/L = 6.58 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CNW	CBW	CTW	CHEI	CHEO
1.250	-8.150	.00000	.05487	.01092	.00744	-.01591	.04916
1.250	-6.070	.00000	.07131	.01307	.00952	-.01805	.04362
1.250	-4.050	.00000	.08151	.01460	.01067	-.01926	.03670
1.250	-2.040	.00000	.09159	.01614	.01069	-.01764	.03065
1.250	.020	.00000	.10275	.01802	.01028	-.01862	.02417
1.250	2.050	.00000	.11447	.01981	.00990	-.01870	.01720
1.250	4.080	.00000	.12525	.02132	.00913	-.01919	.01028
1.250	6.120	.00000	.13302	.02244	.00815	-.01786	.00379
1.250	8.180	.00000	.13869	.02338	.00699	-.01798	-.00277
	GRADIENT	.00000	.00542	.00084	-.00019	-.00005	-.00326

FA28 (MSFC TWT 656) 02W2[illegible]2PNPAATT3S3 W/GRIT (BIZ017) (10 MAR 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 840/ 0 RN/L = 4.90 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.602	-8.000	.00000	-.00905	.00202	-.00947	-.02772	-.00471
.602	-5.960	.00000	.01252	.00159	-.00418	-.02695	-.00637
.602	-3.980	.00000	.03585	.00478	.00295	-.02534	-.00599
.602	-1.960	.00000	.05391	.00841	.00763	-.02501	-.00463
.602	.080	.00000	.07471	.01241	.01294	-.02519	-.00315
.602	2.120	.00000	.09914	.01586	.02041	-.02331	.00037
.602	4.130	.00000	.11829	.01968	.02507	-.02141	.00467
.602	6.130	.00000	.13713	.02374	.02875	-.01953	.00919
.602	8.190	.00000	.16507	.02775	.03573	-.01263	.01705
	GRADIENT	.00000	.01035	.00183	00281	.00047	.00130

RUN NO. 850/ 0 RN/L = 6.16 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
.896	-8.040	.00000	-.00694	.00238	-.00711	-.02593	-.00277
.896	-5.960	.00000	.01599	.00148	-.00136	-.02502	-.00511
.896	-3.940	.00000	.03818	.00543	.00386	-.02489	-.00785
.896	-1.920	.00000	.06101	.00898	.01082	-.02559	-.00933
.896	.130	.00000	.08392	.01200	.01821	-.02076	-.00929
.896	2.170	.00000	.10672	.01578	.02358	-.01411	-.00266
.896	4.200	.00000	.13071	.02032	.02670	-.00902	.00589
.896	6.210	.00000	.15575	.02444	.03098	-.00869	.01042
.896	8.270	.00000	.16913	.02637	.03439	-.00549	.01622
	GRADIENT	.00000	.01133	.00180	.00287	.00212	.00168

RUN NO. 860/ 0 RN/L = 6.46 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.048	-8.060	.00000	-.01185	.00321	-.00680	-.01037	-.00758
1.048	-6.000	.00000	.01365	.00131	-.00128	-.00724	-.00983
1.048	-3.980	.00000	.03662	.00562	.00360	-.00464	-.01042
1.048	-1.930	.00000	.06294	.01059	.00844	-.00381	-.00864
1.048	.130	.00000	.09401	.01620	.01423	-.00315	-.00115
1.048	2.170	.00000	.12319	.02121	.02022	-.00247	.00843
1.048	4.220	.00000	.14734	.02538	.02443	-.00074	.01863
1.048	6.230	.00000	.16523	.02851	.02646	-.00009	.02774
1.048	8.310	.00000	.18039	.03057	.02926	-.00681	.03638
	GRADIENT	.00000	.01374	.00245	.00261	.00045	.00367

FA28 (MSFC TWT 656) 02W[illegible]2PNPAATT3S3 W/GRIT (B1Z017) (10 MAR 80)

REFERENCE DATA

SREF = 2690.0000 SQ.FT. XMRP = 976.0000 IN. XT
LREF = 1290.3000 INCHES YMRP = .0000 IN. YT
BREF = 1290.3000 INCHES ZMRP = 400.0000 IN. ZT
SCALE = .0040

PARAMETRIC DATA

BETA = .000 PHI = .000
ELV-IB = 10.000 ELV-OB = 5.000
BDFLAP = .000 PT = 22.000

RUN NO. 870/ 0 RN/L = 6.41 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.097	-8.020	.00000	-.02048	-.00463	-.00664	-.02795	-.00323
1.097	-5.980	.00000	.00897	.00056	-.00119	-.02627	-.00577
1.097	-3.940	.00000	.03693	.00588	.00357	-.02591	-.00884
1.097	-1.910	.00000	.06971	.01180	.00859	-.02456	-.00602
1.097	.160	.00000	.10482	.01775	.01409	-.01960	.00838
1.097	2.230	.00000	.13540	.02333	.01883	-.01246	.02424
1.097	4.240	.00000	.16167	.02821	.02203	-.00578	.04028
1.097	6.270	.00000	.18223	.03125	.02618	.00189	.04882
1.097	8.350	.00000	.19594	.03289	.03051	.00946	.05648
	GRADIENT	.00000	.01538	.00274	00230	.00255	.00627

RUN NO. 880/ 0 RN/L = 6.58 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CNW	CBW	CTW	CHEI	CHEO
1.246	-8.030	.00000	-.00790	.00259	-.00447	-.02534	-.00746
1.246	-5.980	.00000	.02016	.00288	-.00122	-.02449	-.00210
1.246	-3.950	.00000	.04972	.00833	.00292	-.02258	.00533
1.246	-1.930	.00000	.08140	.01372	.00796	-.01759	.01633
1.246	.160	.00000	.10979	.01881	.01215	-.01135	.02902
1.246	2.210	.00000	.13535	.02350	.01635	-.00580	.04000
1.246	4.210	.00000	.15964	.02740	.02107	.00059	.04995
1.246	6.240	.00000	.17866	.03077	.02404	.01033	.05974
1.246	8.340	.00000	.18956	.03330	.02541	.02240	.06708
	GRADIENT	.00000	.01338	.00234	.00218	.00284	.00552