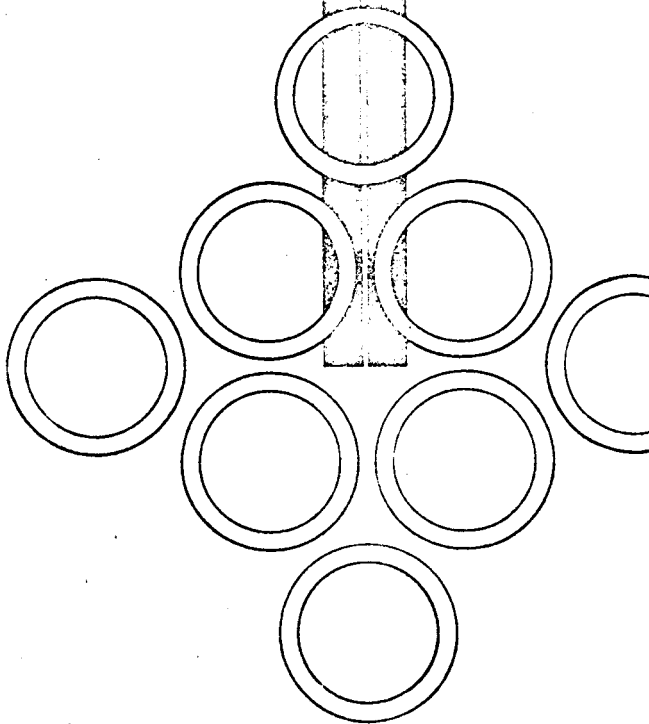


DB

ENGINEERING DEPARTMENT
TECHNICAL NOTE

TN-AE-64-16
(ADDENDUM)



FACILITY FORM 602

N66-23648

(ACCESSION NUMBER)

(PAGES)

134
CR-74415

(NASA CR OR TMX OR AD NUMBER)

(THRU)

(CODE)

01
(CATEGORY)

**RESULTS OF AN EXPERIMENTAL
INVESTIGATION TO DETERMINE
THE AERODYNAMIC LOADINGS
ON THREE SATURN PAYLOAD
SHAPES**

SATURN S-IB STAGE AND SATURN IB PROGRAM

GPO PRICE \$ _____

CFSTI PRICE(S) \$ _____

Hard copy (HC) *4.00*

Microfiche (MF) *1.00*

SPACE DIVISION



**CHRYSLER
CORPORATION**

547-37575R-A

RESULTS OF AN EXPERIMENTAL
INVESTIGATION TO DETERMINE THE
AERODYNAMIC LOADINGS ON THREE
SATURN PAYLOAD SHAPES

November 10, 1964

Prepared by:

H. B. Reese

H. B. Reese, Project Engineer
Aerospace Physics Section

Approved by:

R. H. Ross

R. H. Ross, Manager
Aerospace Physics Section

Approved by:

D. N. Buell

D. N. Buell, Chief Engineer
Advance Engineering Branch

CHRYSLER CORPORATION SPACE DIVISION - NEW ORLEANS, LOUISIANA

23648

SUMMARY

Wind tunnel tests were conducted by Chrysler Corporation Space Division (CCSD) under National Aeronautics and Space Administration (NASA) contract NAS 8-4016, Item III b, on two payload shapes for Saturn vehicles. This investigation was initiated to experimentally determine the local static pressure, local axial force, and local normal force distributions on two payload shapes with cylindrical afterbodies.

The test program consisted of 115 runs at Mach numbers from 0.60 to 1.46, and at angles of attack from zero to 10 degrees. The tests were performed during March 1964, in the Marshall Space Flight Center (MSFC) 14- by 14-inch Trisonic Wind Tunnel at Huntsville, Alabama.

Results of these tests indicate that there are extreme peak values of negative pressure coefficient associated with the cone-cylinder and frustum-cylinder junctures. These loadings may cause critical local load conditions at the junctures to occur in the transonic Mach number ranges rather than at the higher Mach numbers corresponding to the maximum flight dynamic pressures. In addition, the abrupt broadening of these peaks with increasing Mach numbers results in rapid increases in the local loads downstream of the junctures.

Author

TABLE OF CONTENTS

Paragraph		Page
	Section 1 - INTRODUCTION	1-1
	Section 2 - DISCUSSION	2-1
2.1	Test Facility and Model Configuration	2-1
2.2	Test Scope and Procedure	2-1
2.3	Data Reduction	2-1
2.4	Test Results and Analysis	2-3
2.5	Conclusions	2-4
2.6	Symbols and Nomenclature	2-5
2.7	References	2-6
	Section 3 - GRAPHICAL ANALYSIS	3-1
	Section 4 - TABULATED PRESSURE AND NORMAL FORCE COEFFICIENT	4-1

LIST OF ILLUSTRATIONS

Figure		
1	Dimensions of Test Model Configurations	2-8
2	Payload Shape Models	2-9
3	Model Orifice Locations - Configuration A	2-10
4	Model Orifice Locations - Configuration B	2-11
5	Distribution of Local Pressure Coefficients - Configuration A	3-1
6	Distribution of Local Pressure Coefficients - Configuration B	3-12
7	Distribution of Local Axial Force Coefficients - Configuration A	3-24
8	Distribution of Local Axial Force Coefficients - Configuration B	3-35
9	Variation of Axial Force Coefficient with Mach Number - Configuration A	3-47
10	Variation of Axial Force Coefficient with Mach Number - Configuration B	3-48

LIST OF ILLUSTRATIONS (continued)

Figure		Page
11	Distribution of Local Normal Force Coefficient - Configuration B	3-49
11a	Comparison of Local Normal Force Coefficient Distributions - Configuration B	3-61
11b	Comparison of Local Normal Force Coefficient Distributions - Configuration B	3-62
12	Variation of Bursting Pressure Differential for Typical Saturn IB Trajectory	3-63
13	Variation of Bursting Pressure Differential for Typical Saturn IB Trajectory - Configuration B	3-64

LIST OF TABLES

Table		
1	Summary Run Schedule - Configuration B	2-7
2	Tabulated Pressure Coefficients	4-1

Section 1 - INTRODUCTION

Chrysler Corporation Space Division (CCSD) performed a wind tunnel investigation on three Saturn payload shapes during November 1963. These tests were conducted in the Marshall Space Flight Center (MSFC) 14 - by 14-inch Trisonic Wind Tunnel at Huntsville, Alabama. Test results were reported in reference 1, and indicated that data taken at Mach numbers 1.20 and 1.43 were very erratic. These difficulties were thought to have been caused by impingement of reflected shock waves on the models.

Following the completion of this test and the publication of reference 1, modifications were made to the MSFC facility. These modifications were designed to correct the transonic Mach range shock reflection problems.

A second test was accordingly initiated to accomplish the following objectives:

- a. Obtain new data for Mach numbers 1.20 and 1.43.
- b. Obtain more extensive subsonic Mach number coverage.

This test was performed at MSFC in March 1964, but due to the time allowed for the test only two payload shapes were used. A 15-degree cone-cylinder model and a generalized payload shape consisting of a cone-frustum-cylinder model were tested.

Section 2 - DISCUSSION

2.1 TEST FACILITY AND MODEL CONFIGURATION

The experimental program was conducted in the MSFC 14- by 14-inch Trisonic Wind Tunnel at Huntsville, Alabama. The facility is of the blowdown type and employs two test sections to provide a Mach number range from 0.50 to 4.96. A complete description of the wind tunnel is contained in reference 2.

The two model configurations utilized in this investigation (figures 1 and 2) are as follows:

Configuration A: A comparison model consisting of a cone-cylinder with a 15-degree semi-vertex angle.

Configuration B: A Model of the generalized payload shape with afterbody.

The model configurations A and B contained one longitudinal row of 41 and 42 orifices, respectively, located as shown in figures 3 and 4. A complete description of the models is contained in reference 1.

2.2 TEST SCOPE AND PROCEDURE

A complete leak check of each installed model was performed to verify proper operation of the system before testing. All orifices were operating satisfactorily throughout the test program except as follows:

<u>Orifice Number</u>	<u>Test Numbers</u>	<u>Condition</u>
8	133, 134, 135	Tubing to orifice severed
10	110	Orifice partially restricted
14	133, 134, 135	Tubing to orifice severed
27	211, 212	Tubing to orifice severed
41	190, 191, 192	Orifice partially restricted

The test program consisted of 115 runs as shown in table 1. In runs 97 through 192, configuration B was tested at Mach numbers of 1.20 and 1.43 and angles of attack from zero to 10 degrees. To facilitate numerical integration, the local static pressures were measured at eight selected roll angles, as follows: 0° (orifices vertical), 18°54', 31°59', 62°07', 117°53', 148°01', 161°06' and 180°.

For runs 193 through 212, configurations A and B were tested in the Mach number range of 0.60 to 1.10, with the angle of attack maintained at zero degrees. No Schlieren photographs or shadowgraphs were taken, due to tunnel limitations.

2.3 DATA REDUCTION

The local static pressures were measured and recorded by the MSFC scanivalve and digital data acquisition system. These raw data were first reduced to pressure

coefficients and were then numerically integrated to obtain local normal force coefficients. All pressure coefficients and local normal force coefficients were calculated by the MSFC G-15 computer (reference 3). The following formulas define the procedure used to reduce the raw data to coefficient form:

a. Pressure Coefficients

All pressure coefficients were determined by

$$C_p = \frac{P_1 - P_s}{q}$$

b. Local Normal Force Coefficients

The local normal force coefficients were determined by the Tchebycheff method of integration (reference 4). The differential pressure coefficients were first determined through the following relationships:

$$\Delta C_{p_1} = C_{p_{(180^\circ - \phi_1)}} - C_{p_{\phi_1}} = C_{p_{180^\circ}} - C_{p_{0^\circ}}$$

$$\Delta C_{p_2} = C_{p_{(180^\circ - \phi_2)}} - C_{p_{\phi_2}} = C_{p_{161^\circ 06'}} - C_{p_{18^\circ 54'}}$$

$$\Delta C_{p_3} = C_{p_{(180^\circ - \phi_3)}} - C_{p_{\phi_3}} = C_{p_{148^\circ 01'}} - C_{p_{31^\circ 59'}}$$

$$\Delta C_{p_4} = C_{p_{(180^\circ - \phi_4)}} - C_{p_{\phi_4}} = C_{p_{117^\circ 53'}} - C_{p_{62^\circ 07'}}$$

The local normal force was then determined as follows:

$$C'_N = \frac{dC_N}{d\left(\frac{X}{D}\right)} = \frac{4D'}{\pi D} \left[K_1 \Delta C_{p_1} + K_2 \Delta C_{p_2} + K_3 \Delta C_{p_3} + K_4 \Delta C_{p_4} \right]$$

where

$$K_1 = 0.14285$$

$$K_2 = K_3 = K_4 = 0.28571$$

c. Axial Force

The local axial force was computed from the equation

$$C'_x = \frac{dC_x}{d\left(\frac{X}{D}\right)} = \frac{2\pi D^2}{S} \int_0^{r/D} C_p \tan \theta d\left(\frac{r}{D}\right)$$

At zero degrees angle of attack for an axisymmetric body,

$$C_{p_{0^\circ}} = C_{p_{18^\circ 54'}} = C_{p_{31^\circ 59'}} = C_{p_{62^\circ 07'}} = \text{etc.},$$

and the equation reduces to

$$C'_x = 8 C_p \frac{r}{D} \tan \theta$$

The total axial force at zero angle of attack was then determined by

$$C_x = \int_{\left(\frac{X}{D}\right)_1}^{\left(\frac{X}{D}\right)_2} C'_x d\left(\frac{X}{D}\right) = \int_{\left(\frac{X}{D}\right)_1}^{\left(\frac{X}{D}\right)_2} 8 C_p \frac{r}{D} \tan \theta d\left(\frac{X}{D}\right)$$

2.4 TEST RESULTS AND ANALYSIS

This test program was undertaken to clarify local normal force distributions at Mach numbers of 1.20 and 1.43, and to determine the magnitude and location of maximum loads on the generalized nose shape and afterbody. The data contained in reference 1 indicated that maximum loads for the regions aft of the corners occurred in the transonic Mach number range but did not necessarily occur at the point of maximum dynamic pressure. Reference 1 also indicated that the local normal force distributions on the cylindrical afterbodies at Mach numbers of 1.20 and 1.43 were adversely affected by shock reflections, making it necessary to extrapolate the fairing at these points. Since the wind tunnel modifications were designed to alleviate some of the transonic shock reflection problems, it was necessary to acquire new data for the Mach 1.20 and 1.43 cases.

The results of this investigation are presented in graphical and tabular form. A complete tabulation of the pressure coefficients is contained in table 2. Figures 5 and 6 present the local pressure coefficient distribution for zero angle of attack. These figures indicate that minimum pressure conditions occur in the transonic Mach number

range and that an increase in Mach number results in a reduction, but broadening, of the peak negative pressure coefficient.

In the high subsonic and transonic Mach number range the flow expands along the cone to a point at which it becomes supersonic, followed by a rapid recompression behind the corners. For configuration B, the flow returns to subsonic in the front portion of the frustum but is then re-expanded to supersonic at the aft corner. The points at which the flow reaches Mach 1.00 are indicated on the applicable graphs.

The local axial force coefficients are presented in figures 7 and 8. In the subsonic and transonic Mach number range a negative pressure coefficient is shown for certain areas on the aft sections of the cones and at leading and trailing edges of the frustum. This negative coefficient should not be misinterpreted; the only conclusion that can be drawn is that the local static pressure is below freestream pressure. The negative pressure coefficient results from subsonic flow expanding along the cone up to the corner where the flow temporarily becomes supersonic. Figures 9 and 10 present the total axial force as a function of Mach number for the two configurations. Of special interest is the transonic Mach number range of figure 10, where supersonic flow is first sustained on the frustum but remains subsonic on the cone. The loadings obtained with these conditions result in a dip in the axial force distribution. Also indicated is a negative axial force coefficient at $M = 0.65$. Some doubt should therefore be assigned to the pressure coefficients at this Mach number.

Figure 11 presents the local normal force distributions for configuration B at Mach numbers of 1.20 and 1.43. As seen for these particular Mach numbers, and by comparison with data from reference 1 (figures 11a and 11b), there is improvement in the data. There is, however, still considerable scatter in the data obtained near the base. This can only be attributed to shock reflections and/or tunnel flow phenomena.

Figures 12 and 13 have been included to illustrate possible magnitudes of peak panel loading on a launch vehicle structure in flight. In figure 12, peak pressure coefficients measured at the juncture of the payload configuration and the cylindrical afterbodies were combined with typical values of flight dynamic pressure. These results, in effect, may be interpreted as the bursting pressure differential ($-C_{pq}$) acting at the point in question, provided the internal pressure of the vehicle is assumed to be equal to the ambient external pressure. Figure 12 compares the maximum bursting pressure differential of the generalized payload shape (Configuration B) with the loads on a 15-degree cone cylinder (Configuration A). Figure 13 presents the variation of bursting pressure differential for several X/D locations on Configuration B as a function of Mach number.

2.5 CONCLUSIONS

This test program was conducted primarily for the purpose of investigating the effects of certain tunnel modifications on previously acquired data. Such data had shown considerable scatter which was believed to be attributable to tunnel shock reflections. The results of this reinvestigation at Mach numbers of 1.20 and 1.43 indicated some improvement; however, scatter was still evident in the base region of the models.

The following conclusions may be drawn:

- a. There are extreme peak values of negative pressure coefficient associated with the cone-cylinder and frustum-cylinder junctures. As a result, critical loads may exist over those regions under transonic speed conditions rather than at the higher Mach numbers corresponding to maximum flight dynamic pressures.
- b. The region of negative pressure coefficient behind cone-cylinder and frustum-cylinder junctures broadens rapidly with increasing Mach number in the transonic region.

2.6 SYMBOLS AND NOMENCLATURE

α	Angle of attack, degrees
ϕ	Roll angle, degrees
θ	Cone semi-vertex angle, degrees
C'_N	Local normal force coefficient
C'_{N_α}	Gradient of local normal force coefficient
C_p	Pressure coefficient
$-C_{p,q}$	Bursting pressure coefficient
C'_x	Local axial force coefficient
C_x	Total axial force coefficient
D	Reference diameter, 2 inches model scale
D'	Local diameter, inches
hg	Mercury
K_1, K_2, K_3, K_4	Assigned constants (Tchebycheff's constants of integration)
M	Freestream Mach number
M_c	Surface Mach number
mm	Millimeters
q	Freestream dynamic pressure, units as assigned
Q	Freestream dynamic pressure, mm hg
P_a	Atmospheric pressure, mm hg
P_1	Local surface pressure, mm hg

P_S	Freestream static pressure, mm hg
r	Local radius, inches
R_N	Reynolds number per foot
S	Reference area, 3.140 square inches
X	Longitudinal distance from base of model, inches
X/D	Model station, calibers from base

2.7 REFERENCES

1. Reese, H. B., Results of an Experimental Investigation to Determine the Aerodynamic Loadings of Three Saturn Payload Shapes, CCSD, TN-AE-64-16, March 1, 1964
2. Simon, E., The George C. Marshall Space Flight Center 14 - by 14-Inch Trisomic Wind Tunnel Technical Handbook, June 1964
3. Romero, Fred, Automatic Data Reduction Procedures for ABMA Wind Tunnel Facilities, Aeroballistics, WTO-60-6, June 28, 1960
4. Romero, Fred, Duration of Local Normal Force Coefficients at the ABMA Wind Tunnel Facilities, ORDAB-DAE-3-60, March 2, 1960

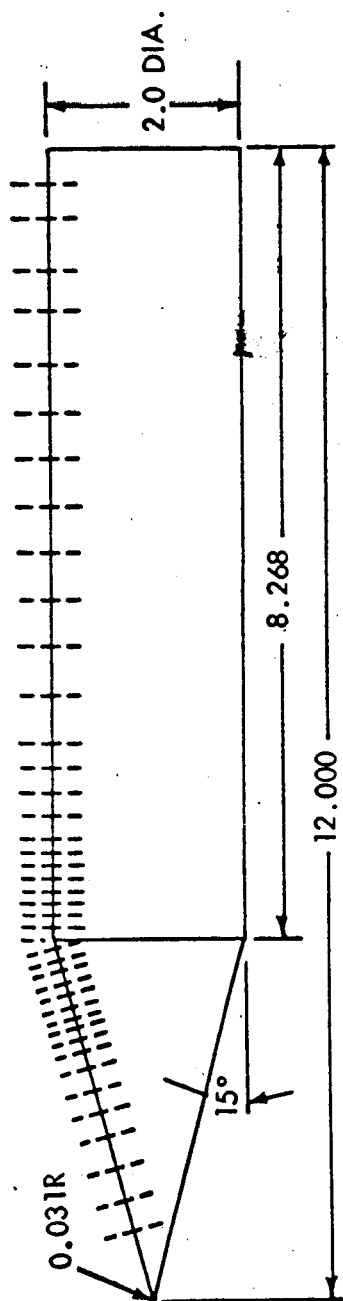
Table 1. Summary Run Schedule

CONFIGURATION B

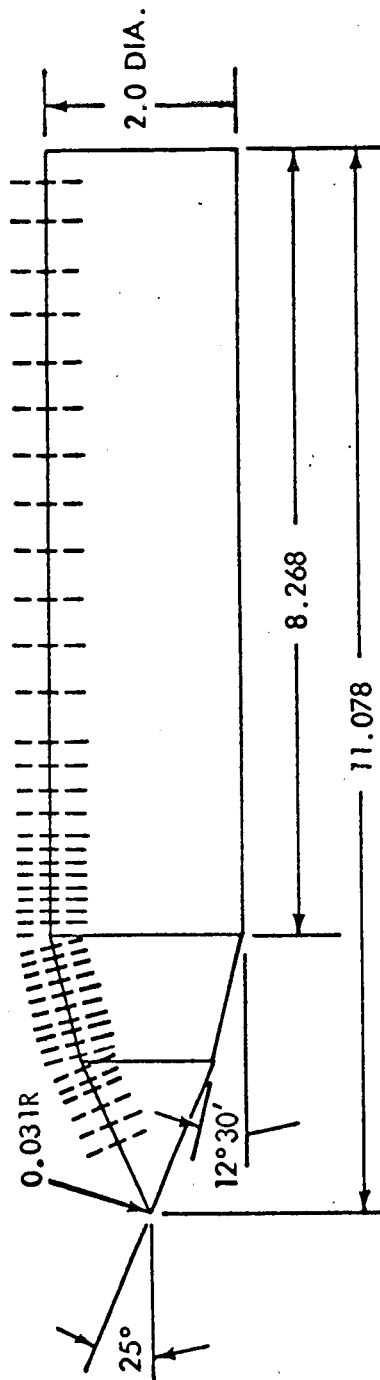
Mach Number	α	Roll Angle/Run Number								R_N/ft 10^{-6}
		0°	18°54'	31°59'	62°07'	117°53'	148°01'	161°06'	180°	
1.20 ↓	0	97*	103	109	115	121	127	133	139	4.96 ↓
	2	98	104	110	116	122	128	134	140	
	4	99	105	111	117	123	129	135	141	
	6	100	106	112	118	124	130	136	142	
	8	101	107	113	119	125	131	137	143	
	10	102	108	114	120	126	132	138	144	
1.46 ↓	0	145	151	157	163	169	175	181	187	4.22 ↓
	2	146	152	158	164	170	176	182	188	
	4	147	153	159	165	171	177	183	189	
	6	148	154	160	166	172	178	184	190	
	8	149	155	161	167	173	179	185	191	
	10	150	156	162	168	174	180	186	192	

*Note: Runs 1-96 were cancelled because of tunnel scheduling problems.

Mach Number	α	ϕ	Configuration/Run No.		R_N/ft 10^{-6}
			A	B	
0.60	0° ↓	0°	193	203	3.61
0.65			194	204	3.90
0.70			195	205	4.03
0.75			196	206	4.17
0.80			197	207	4.33
0.85			198	208	4.50
0.90			199	209	4.63
0.95			200	210	4.75
1.00			201	211	4.82
1.10			202	212	4.90



CONFIGURATION A = 15 DEGREE CONE-CYLINDER MODEL

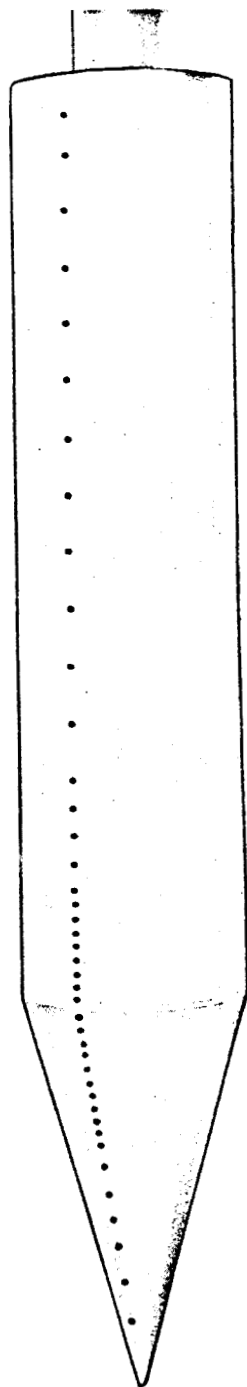


CONFIGURATION B = GENERALIZED PAYLOAD SHAPE

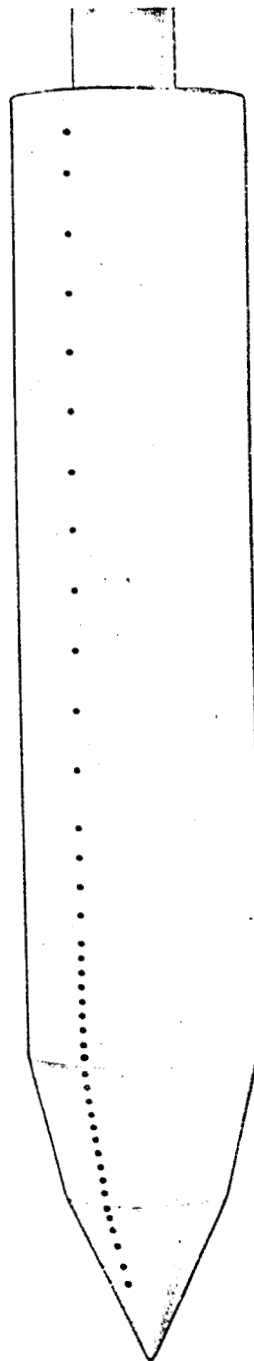
Figure 1. Dimensions of Test Model Configurations

NOTE:
ALL DIMENSIONS IN INCHES

E10092



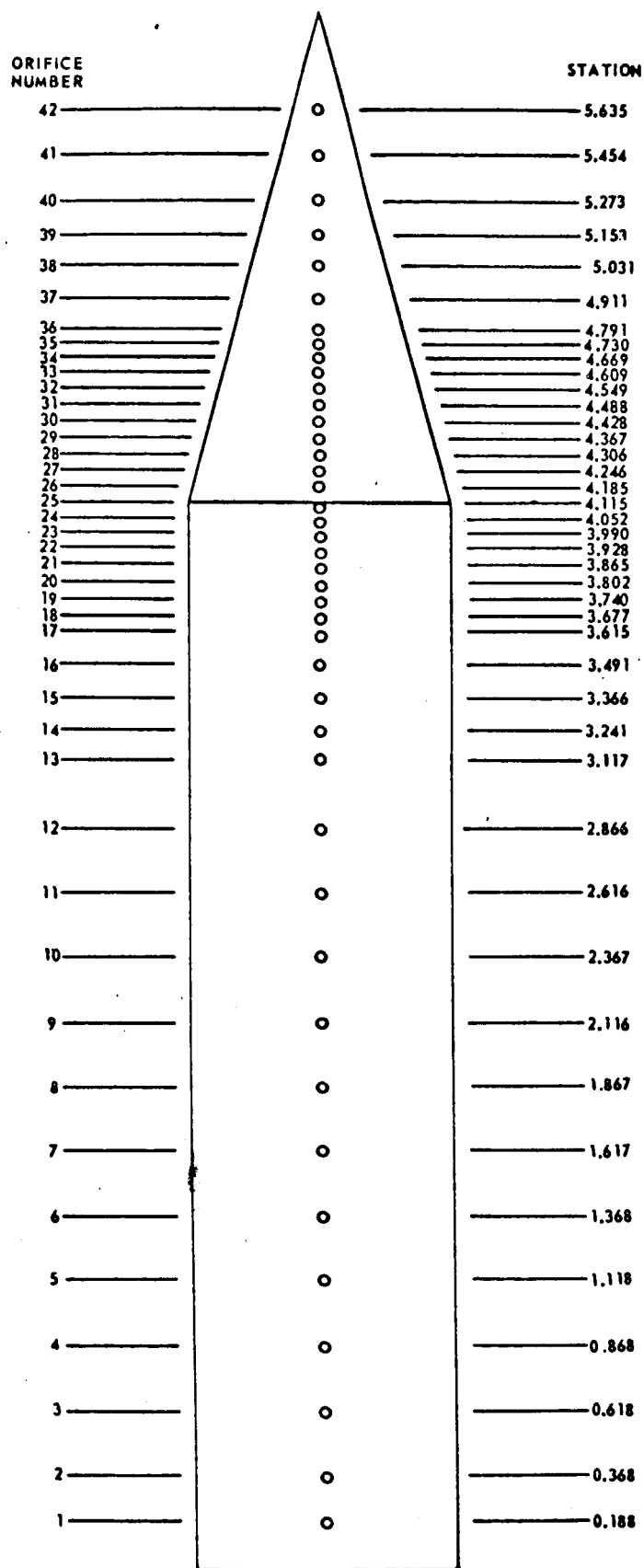
CONFIGURATION A



CONFIGURATION B

E10093

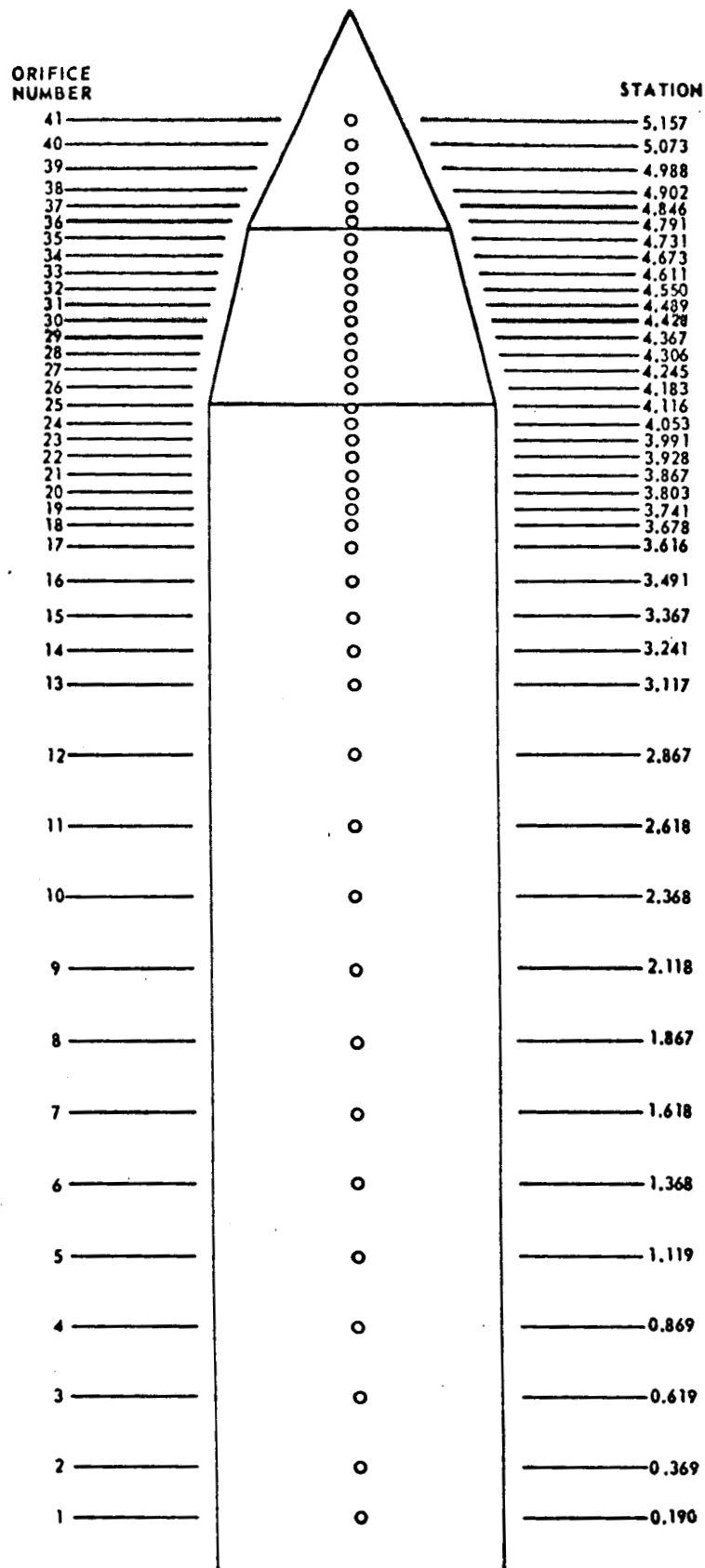
Figure 2. Payload Shape Models.



NOTE: ALL STATION NUMBERS
IN CALIBERS

E10094

Figure 3. Model Orifice Locations - Configuration A



NOTE: ALL STATION NUMBERS
IN CALIBERS

E10095

Figure 4. Model Orifice Locations - Configuration B

Section 3

GRAPHICAL ANALYSIS

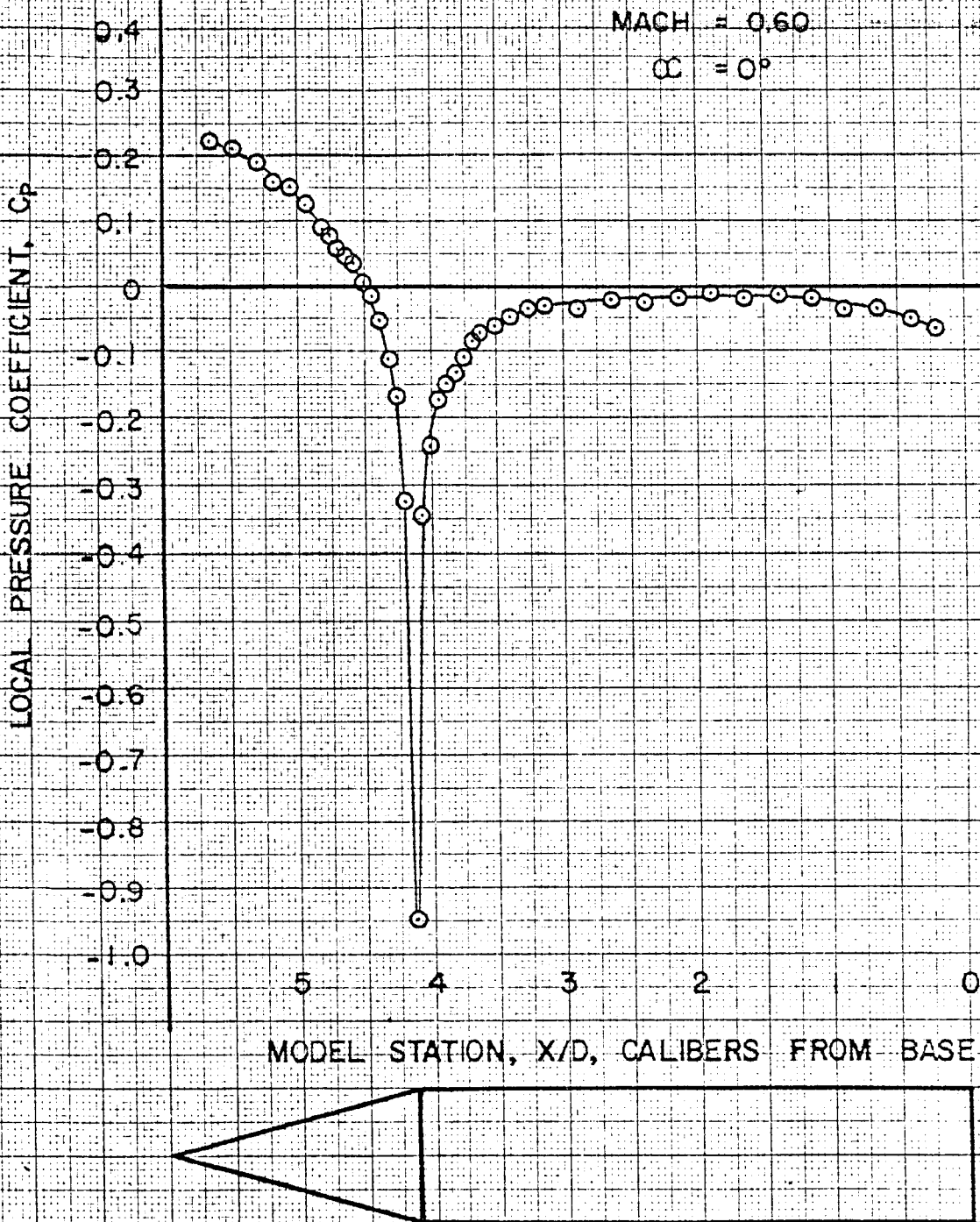


FIGURE 5 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS

- CONFIGURATION A -

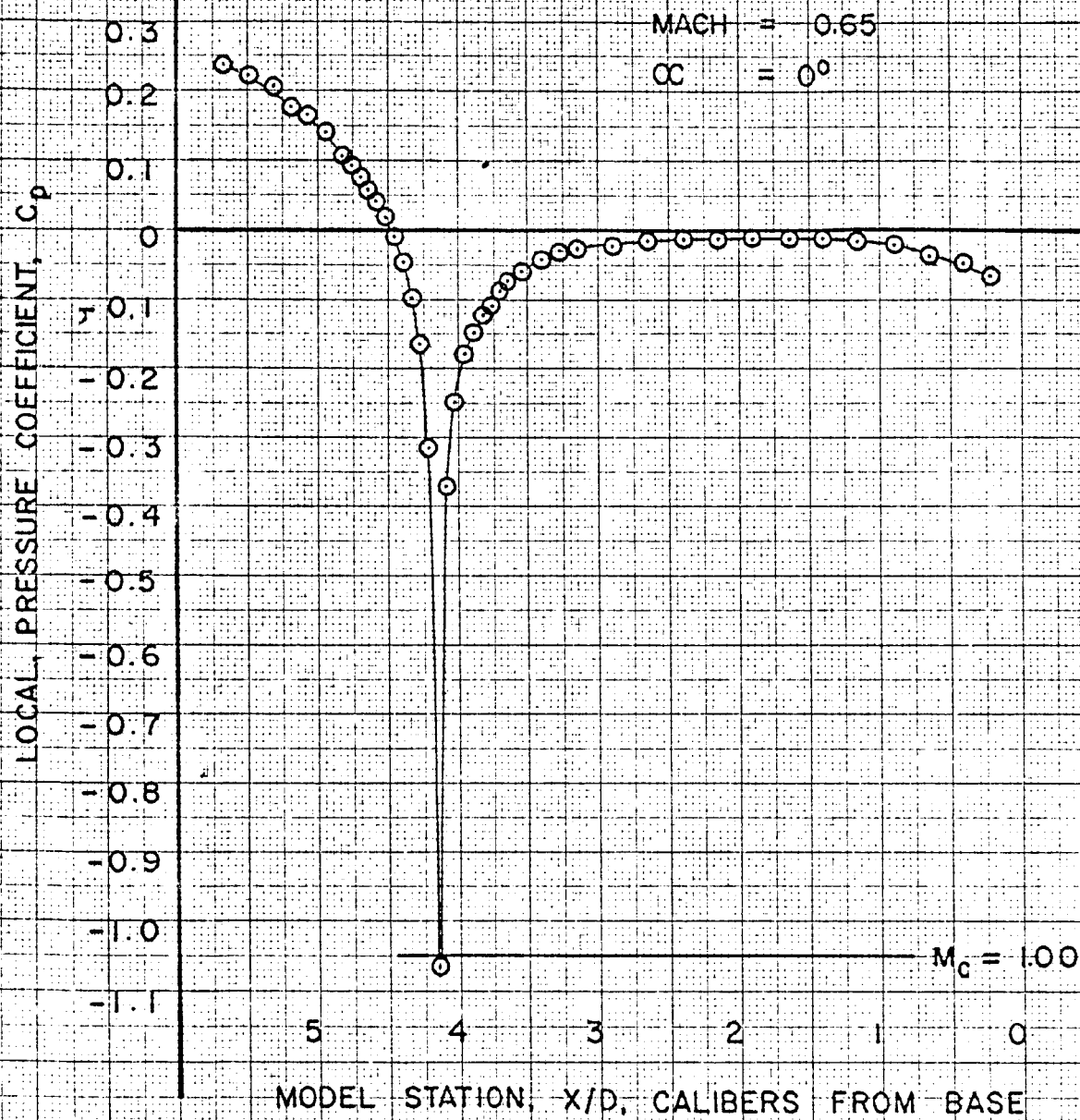
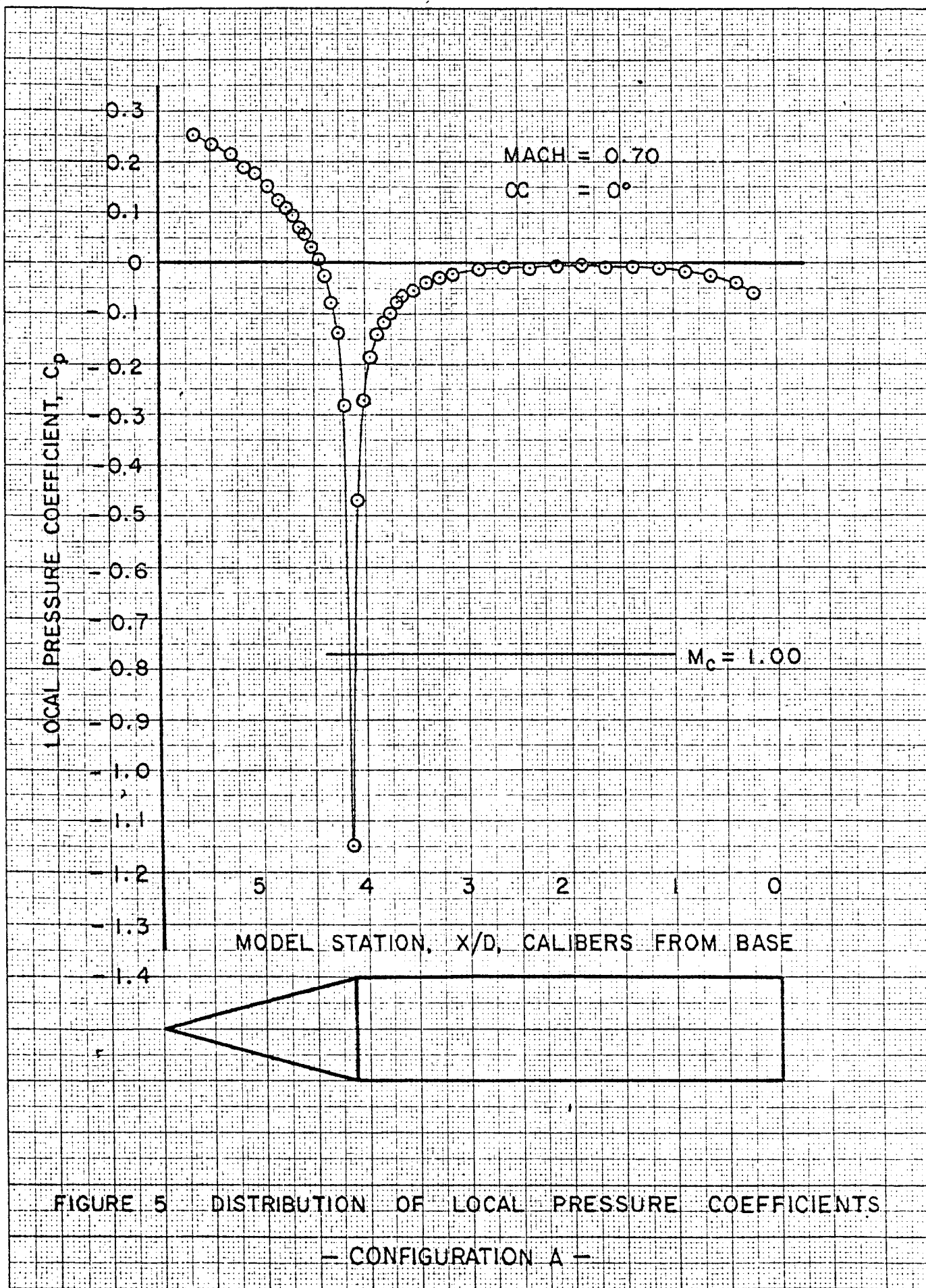


FIGURE 5 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS
- CONFIGURATION A -

KODAK SAFETY FILM
 16mm
 10 X 10 TO THE CENTIMETER
 8121 8A
 KODAK SAFETY FILM CO.
 16mm



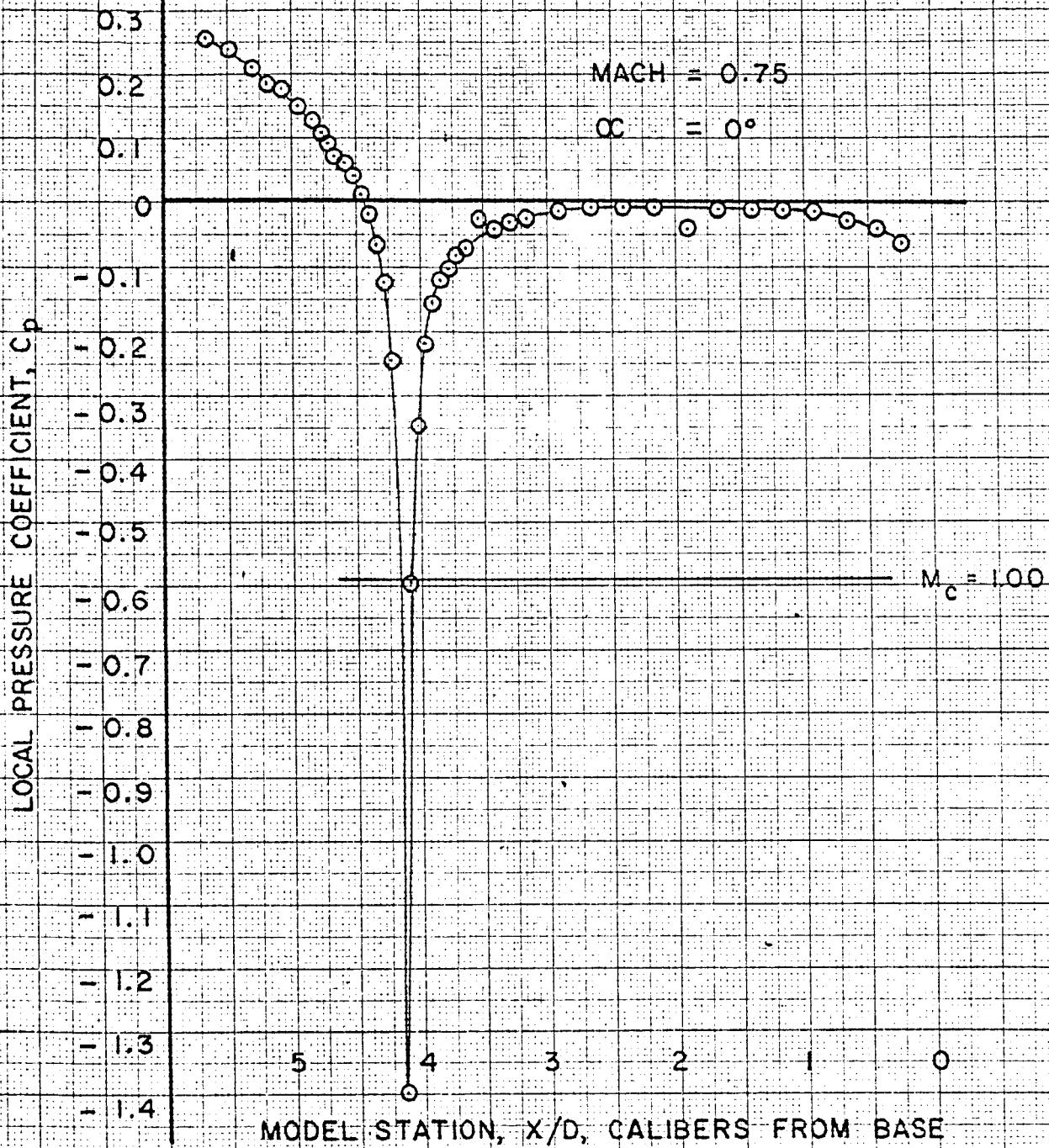


FIGURE 5 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS
 — CONFIGURATION A —

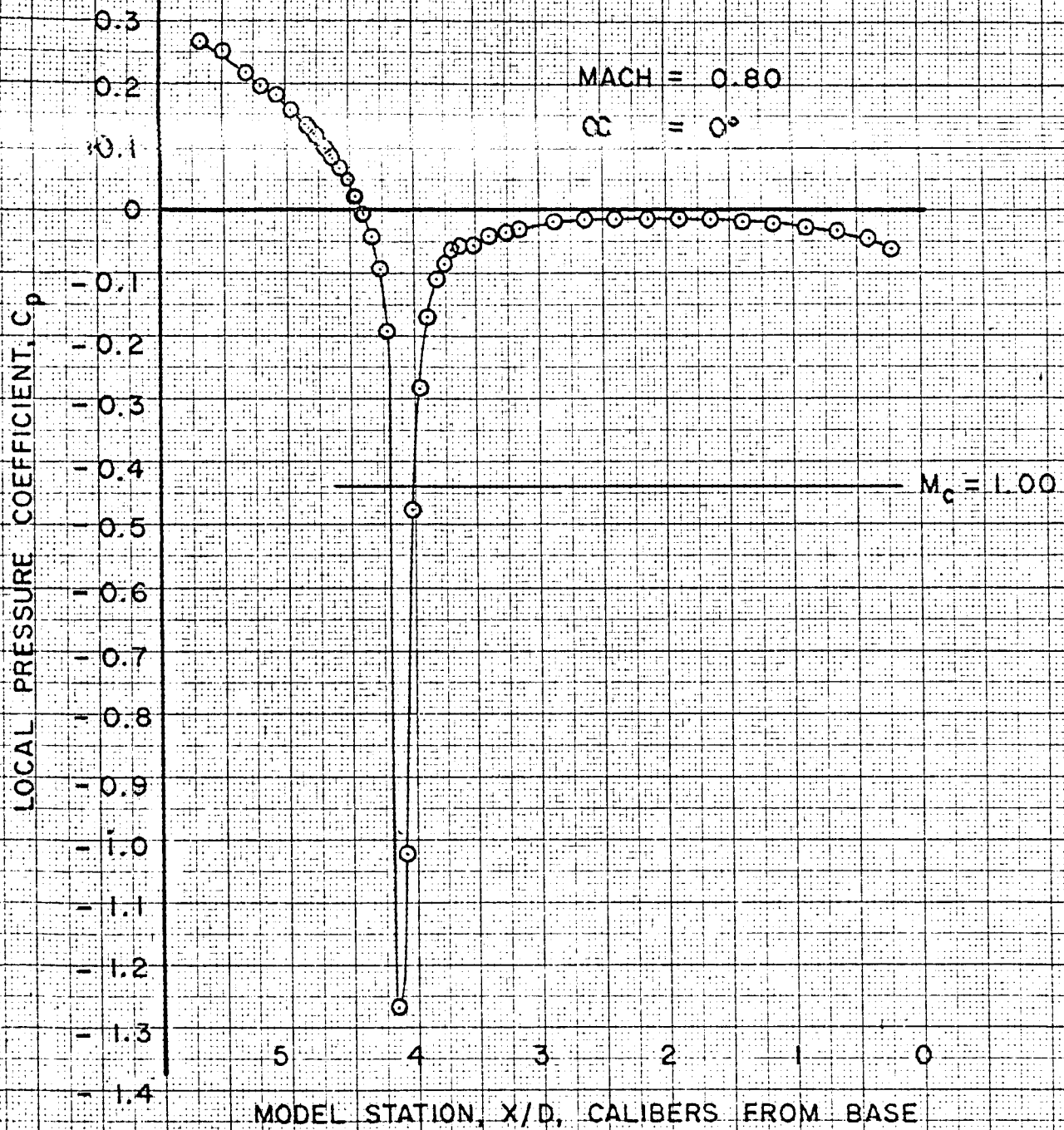


FIGURE 5 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS
 - CONFIGURATION A -

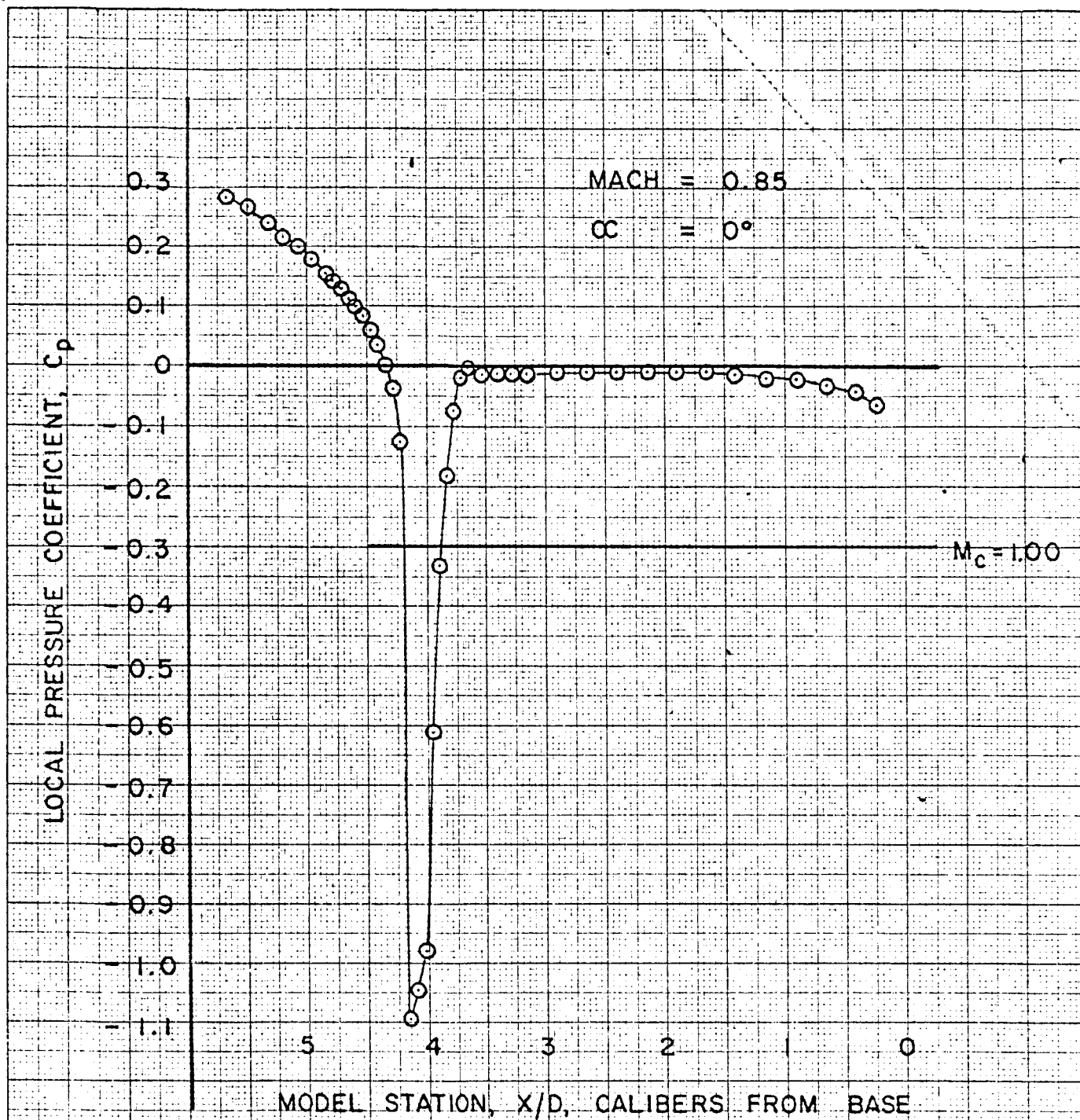
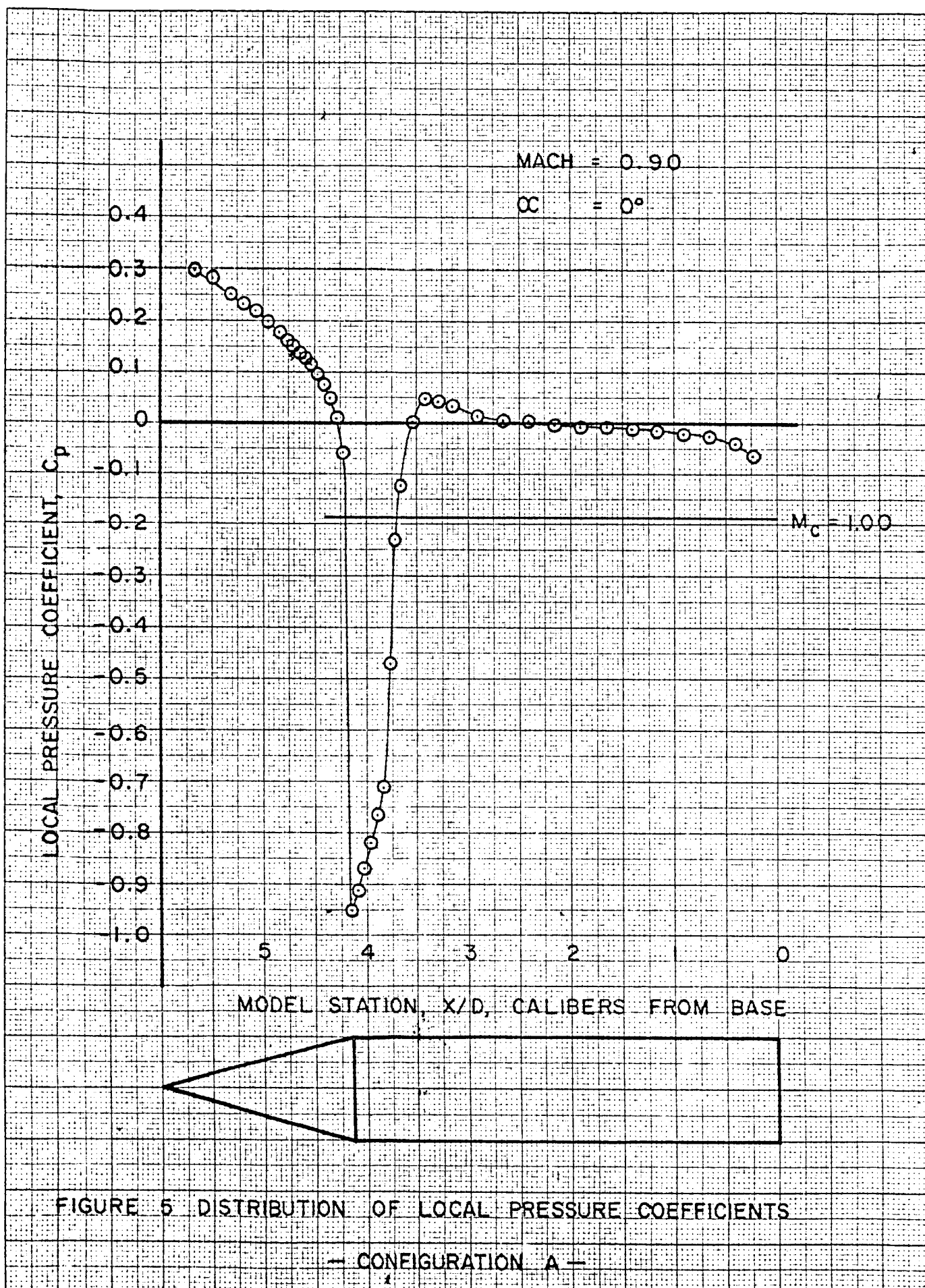
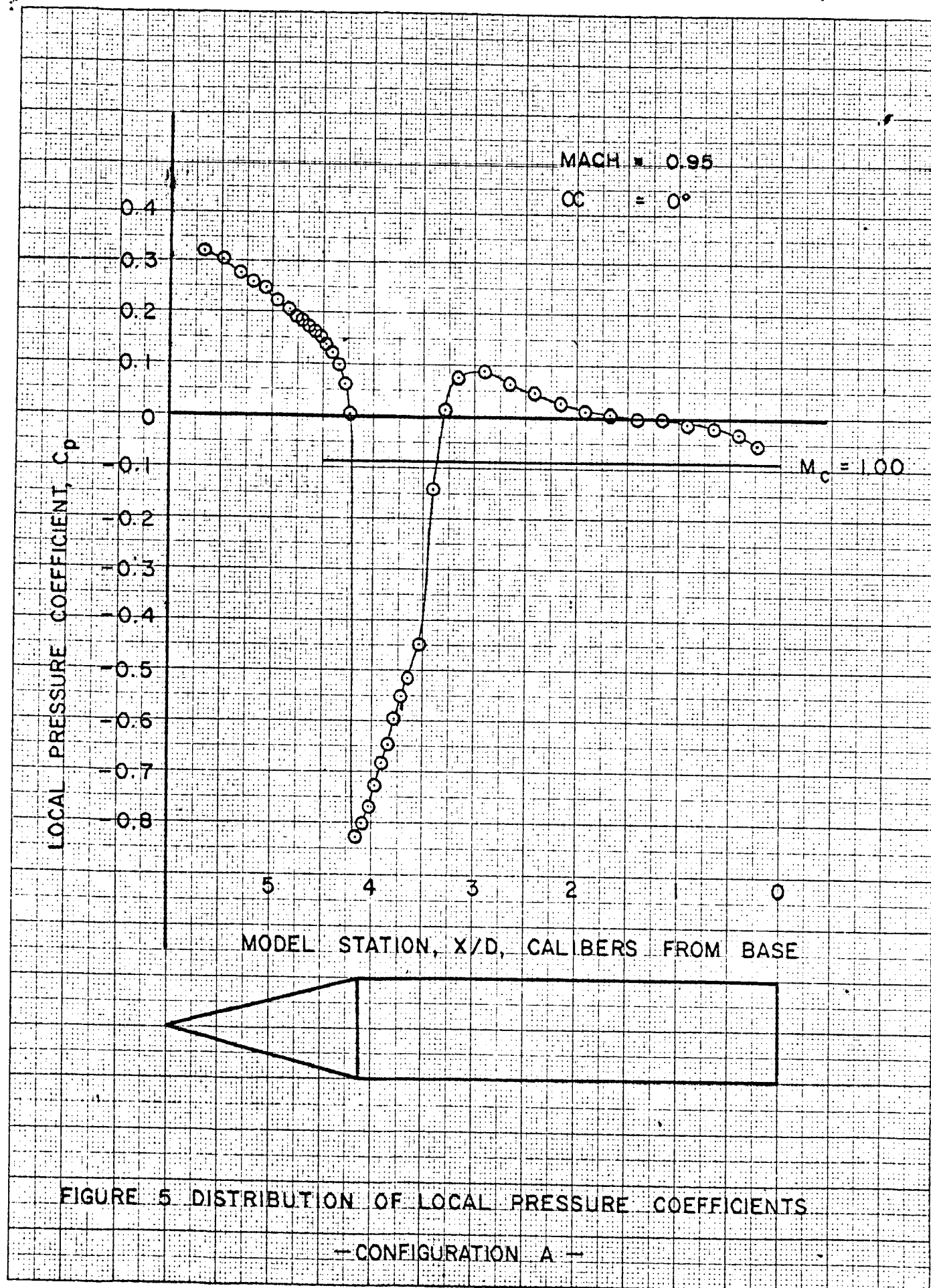


FIGURE 5 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS

— CONFIGURATION A —

KENNEDY & LEECH CO.
 10 X 10 TO THE CENTIMETER
 10 X 10 TO THE CENTIMETER
 10 X 10 TO THE CENTIMETER





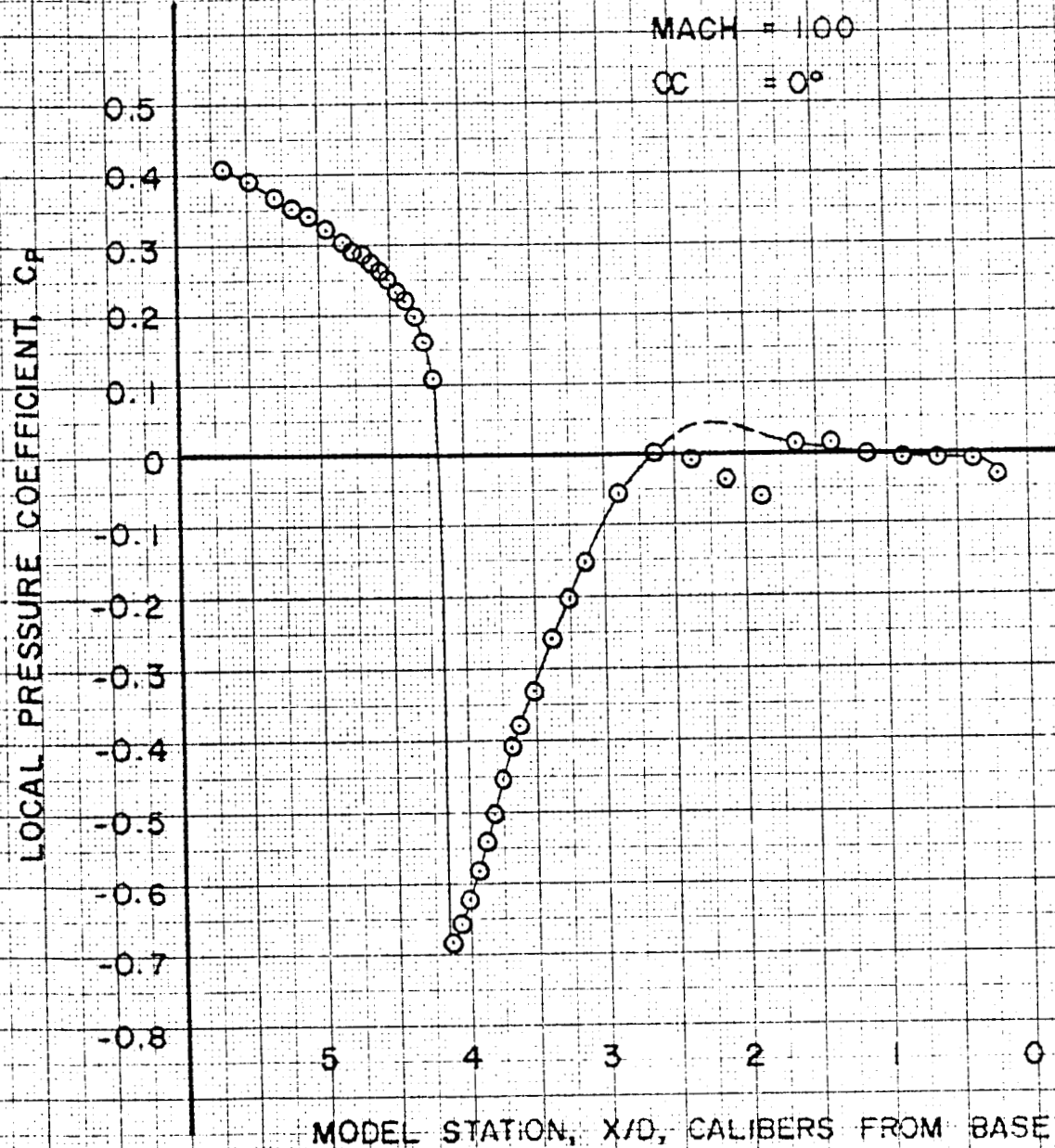
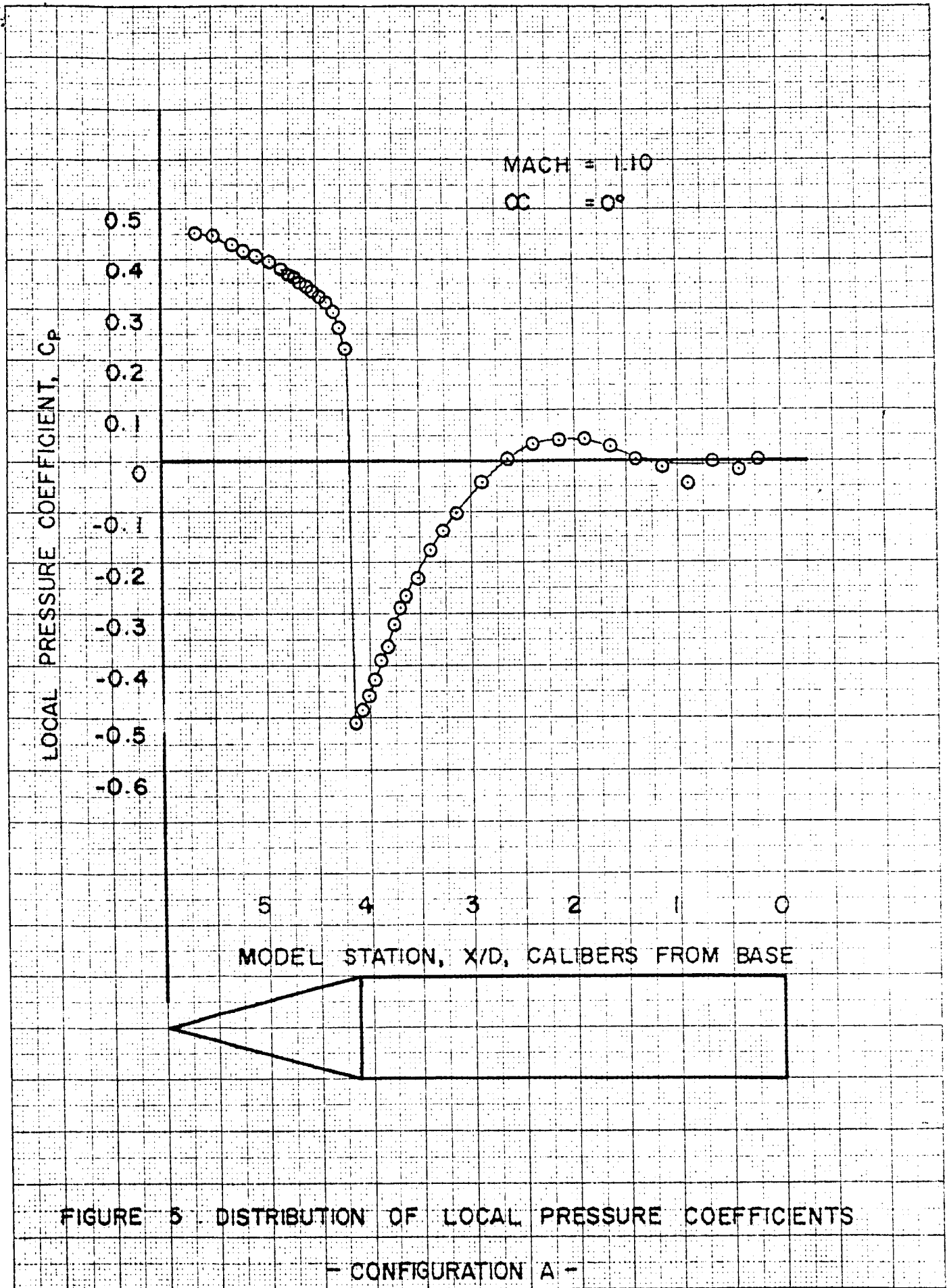


FIGURE 5 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS

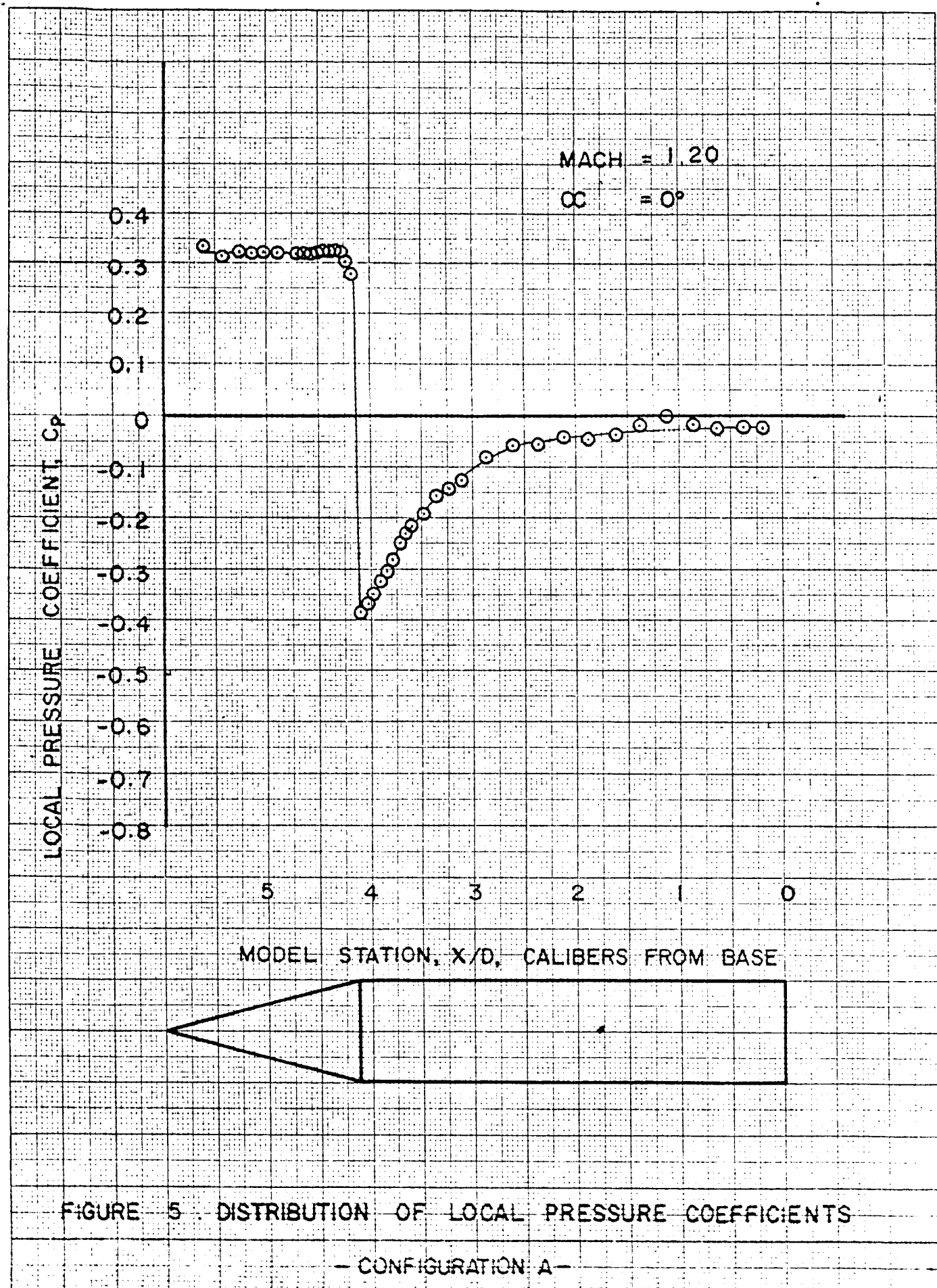
— CONFIGURATION A —

3-10

REPRODUCED FROM
NATIONAL BUREAU OF STANDARDS
GPO : 1964 O - 350-000



REF ID: A61010 THE CENTIMETER 42 1213



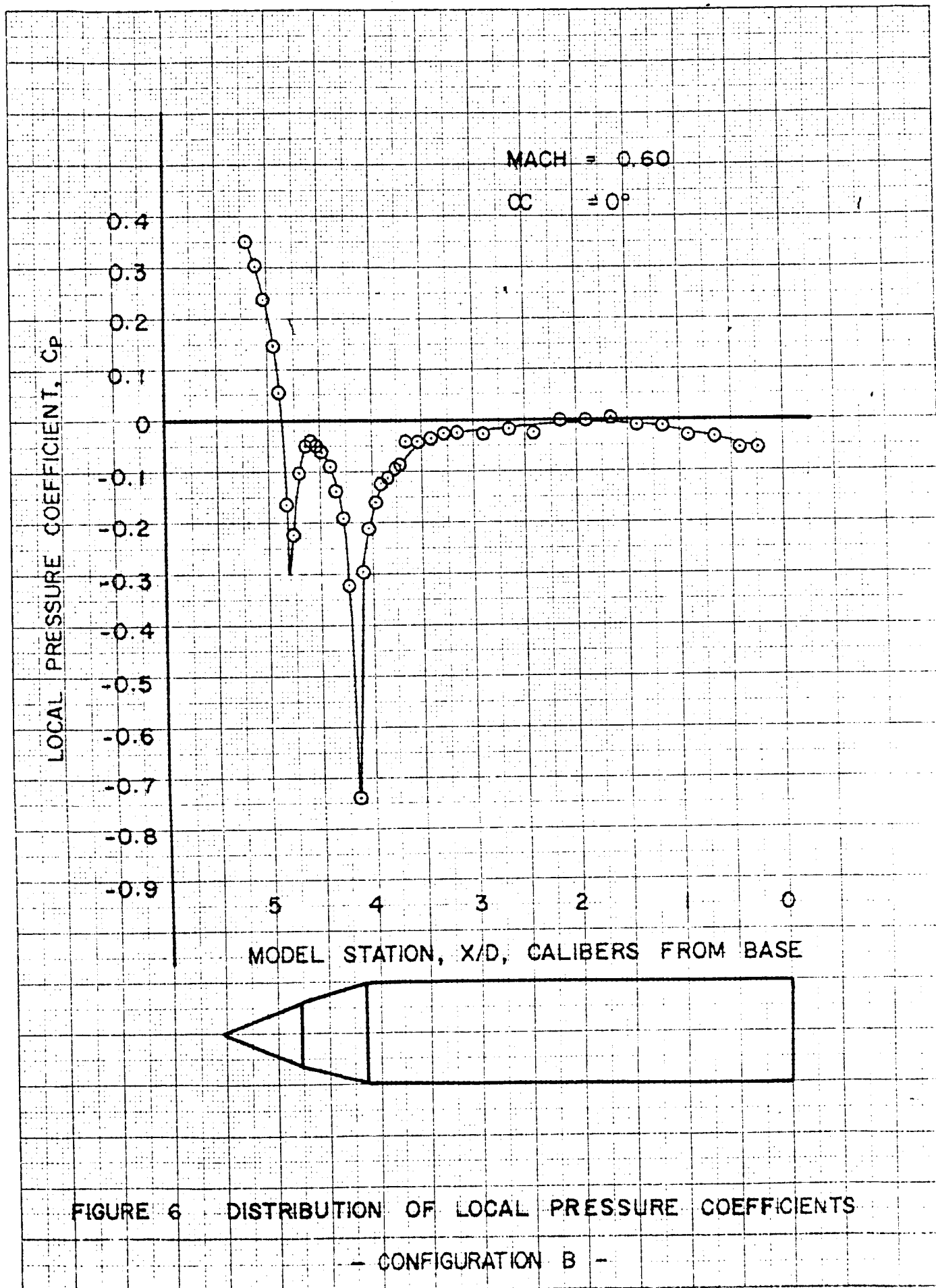
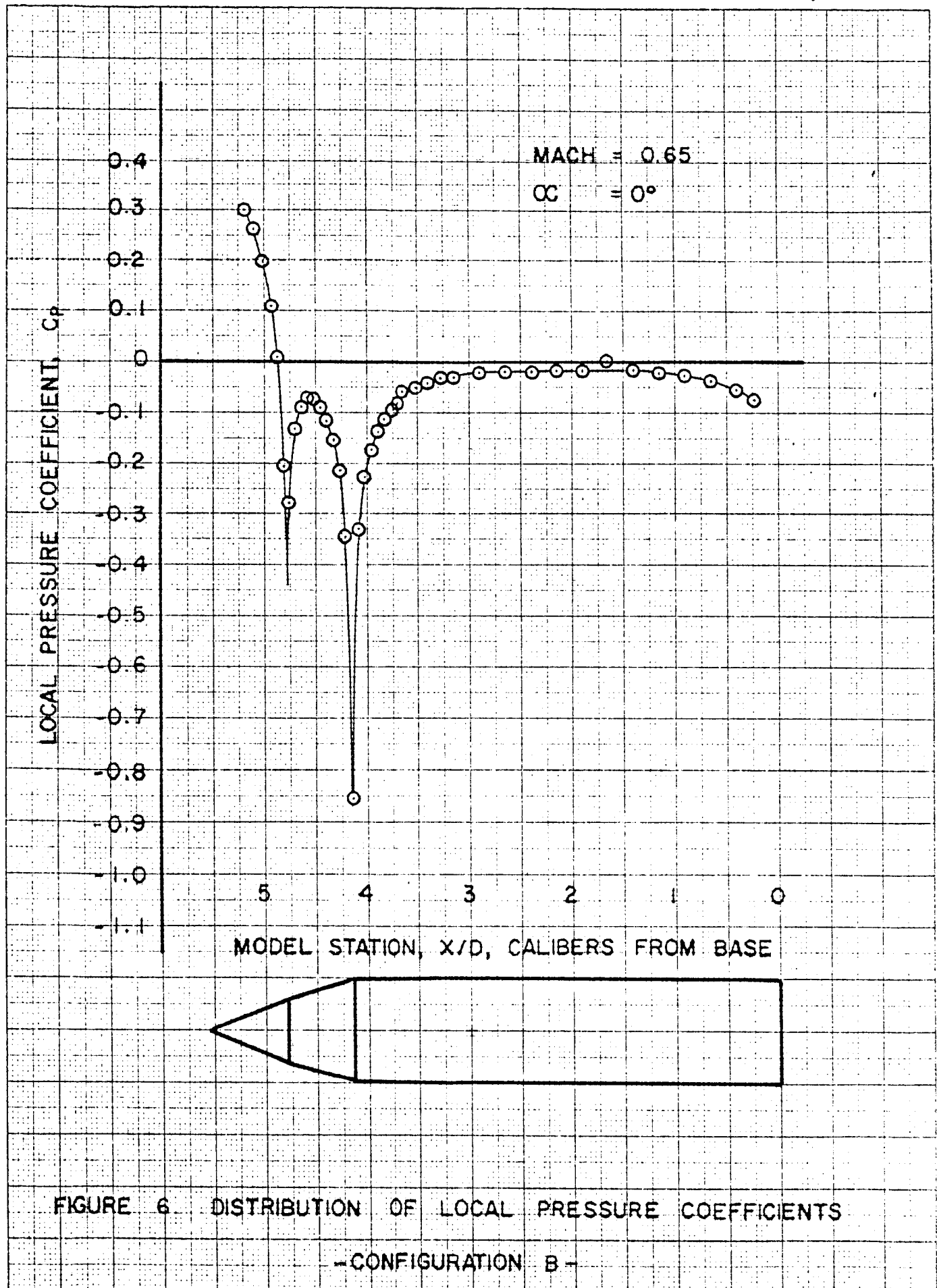


FIGURE 6 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS
- CONFIGURATION B -



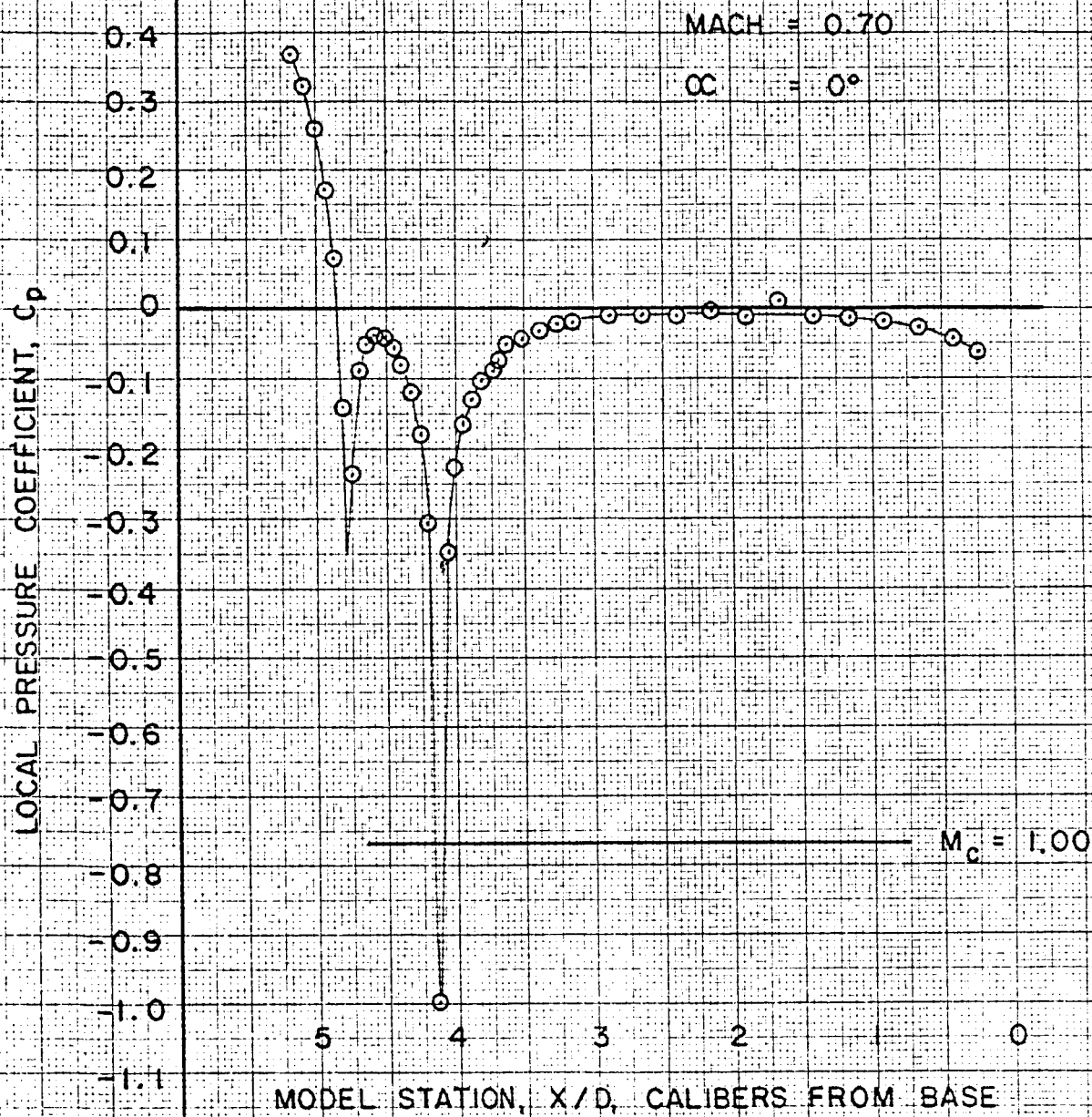


FIGURE 6 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS

— CONFIGURATION B —

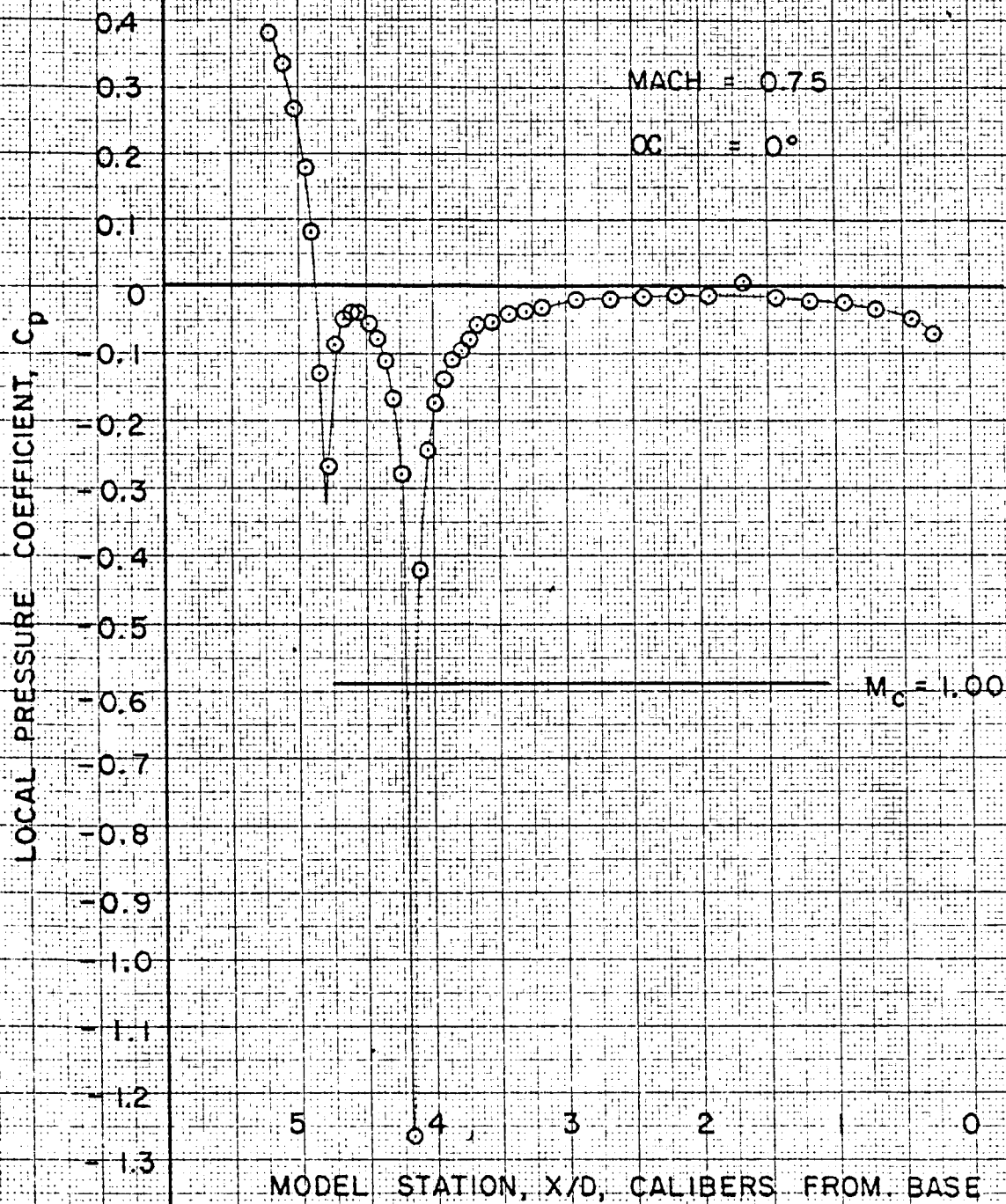


FIGURE 6 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS

— CONFIGURATION B —

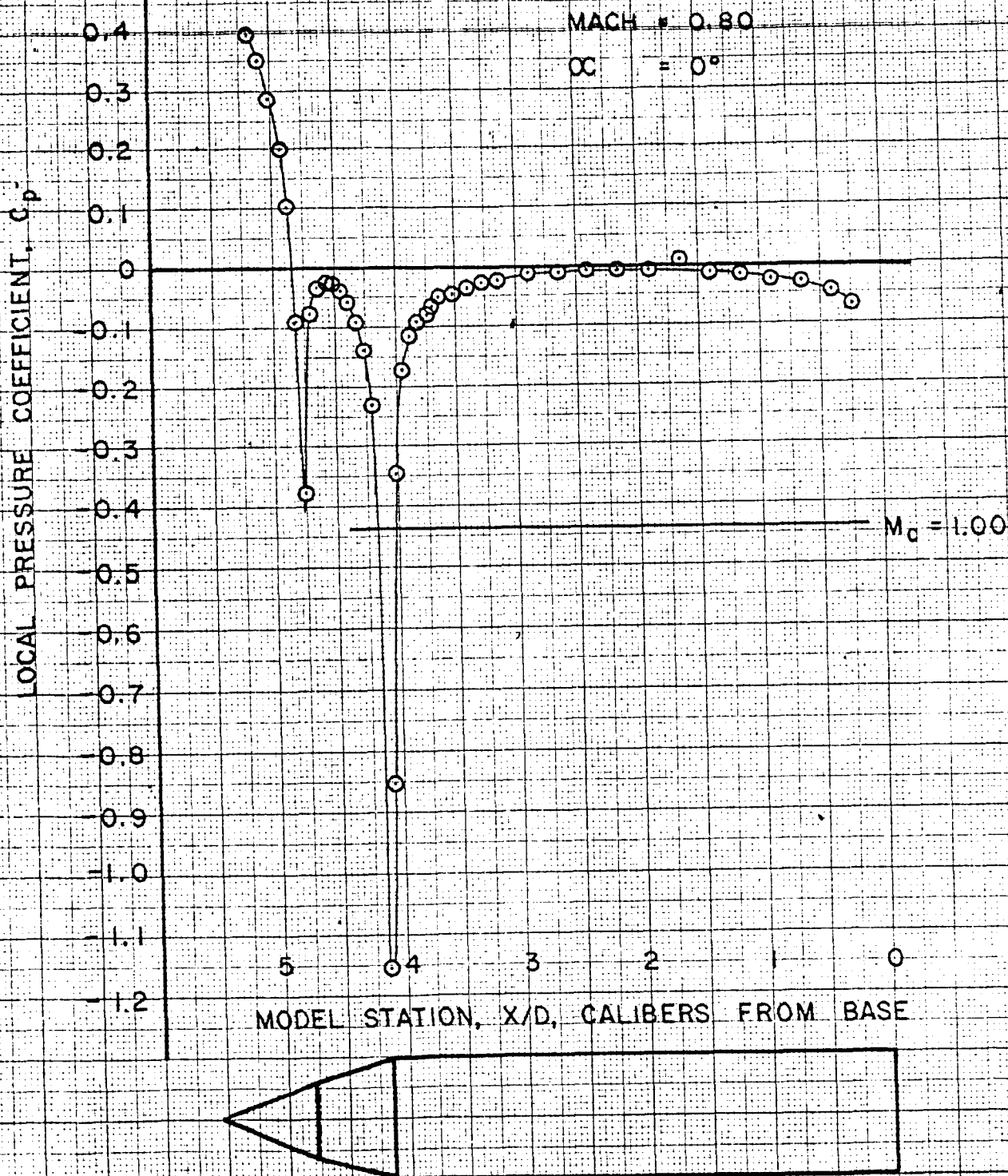
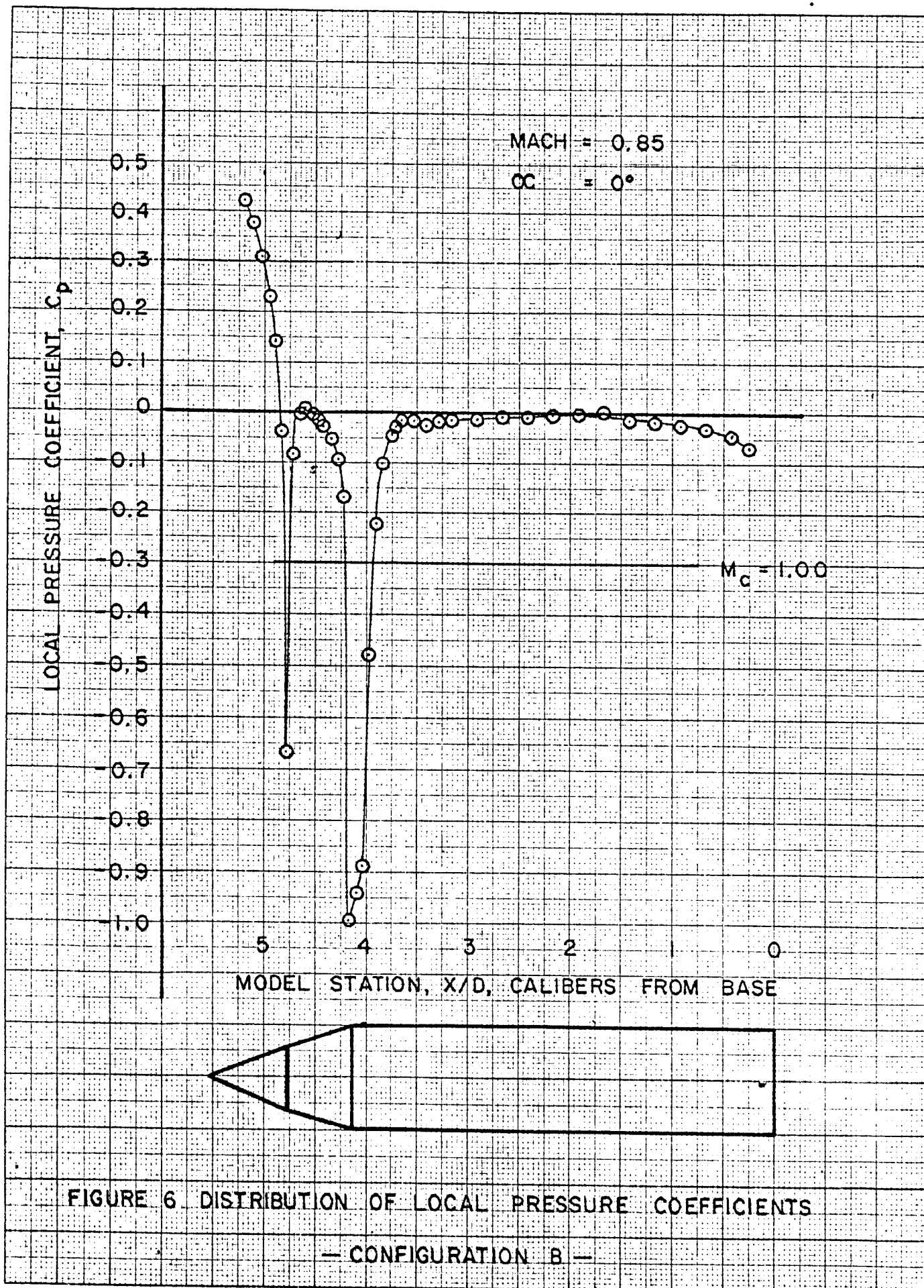


FIGURE 6 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS

— CONFIGURATION 8 —



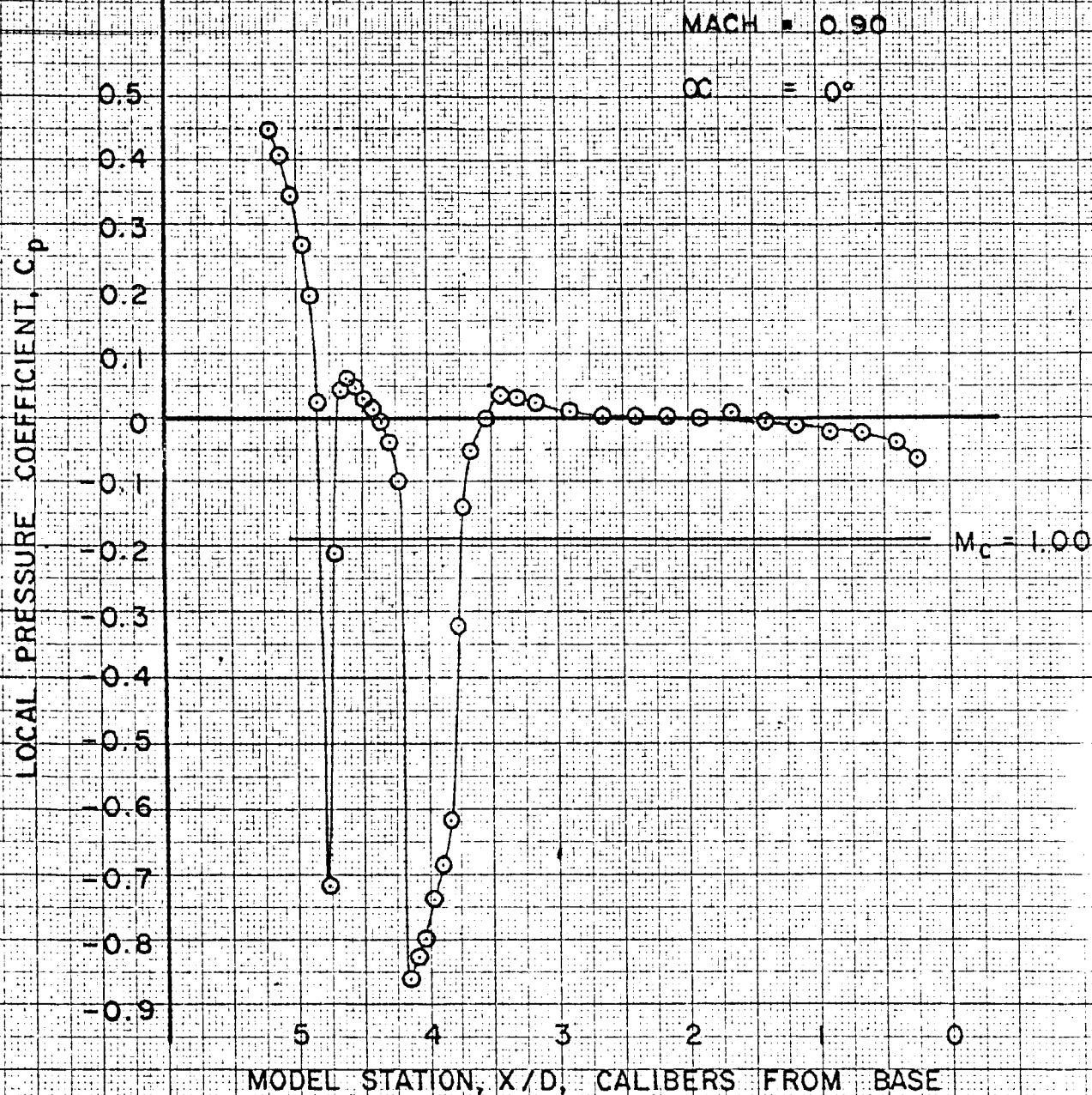
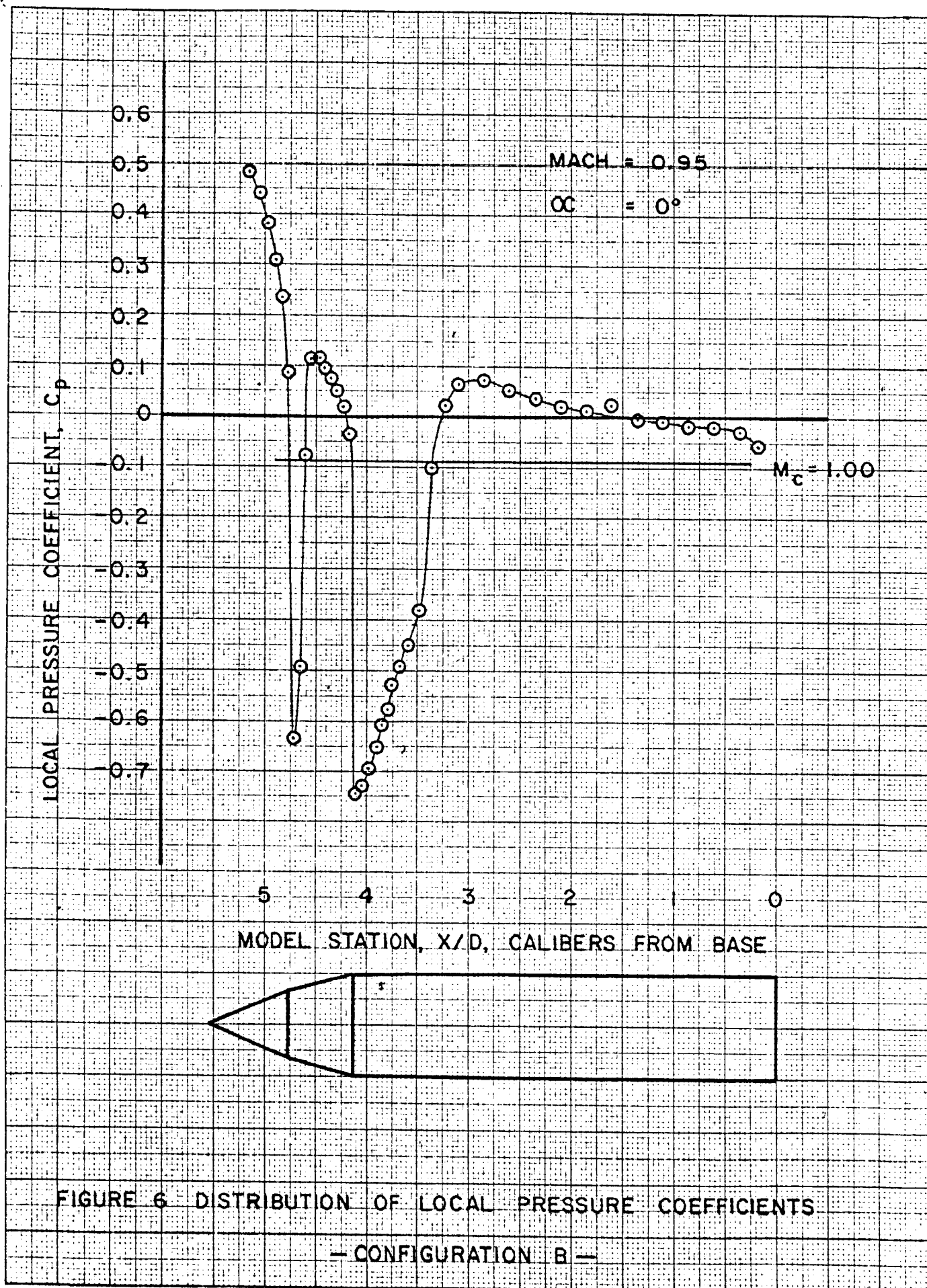


FIGURE 6 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS
 — CONFIGURATION B —

RECEIVED
JAN 10 1964
AERONAUTICAL
RESEARCH
AND
DEVELOPMENT
ADMINISTRATION
WASHINGTON, D.C.

RECEIVED
JAN 10 1964
AERONAUTICAL
RESEARCH
AND
DEVELOPMENT
ADMINISTRATION
WASHINGTON, D.C.



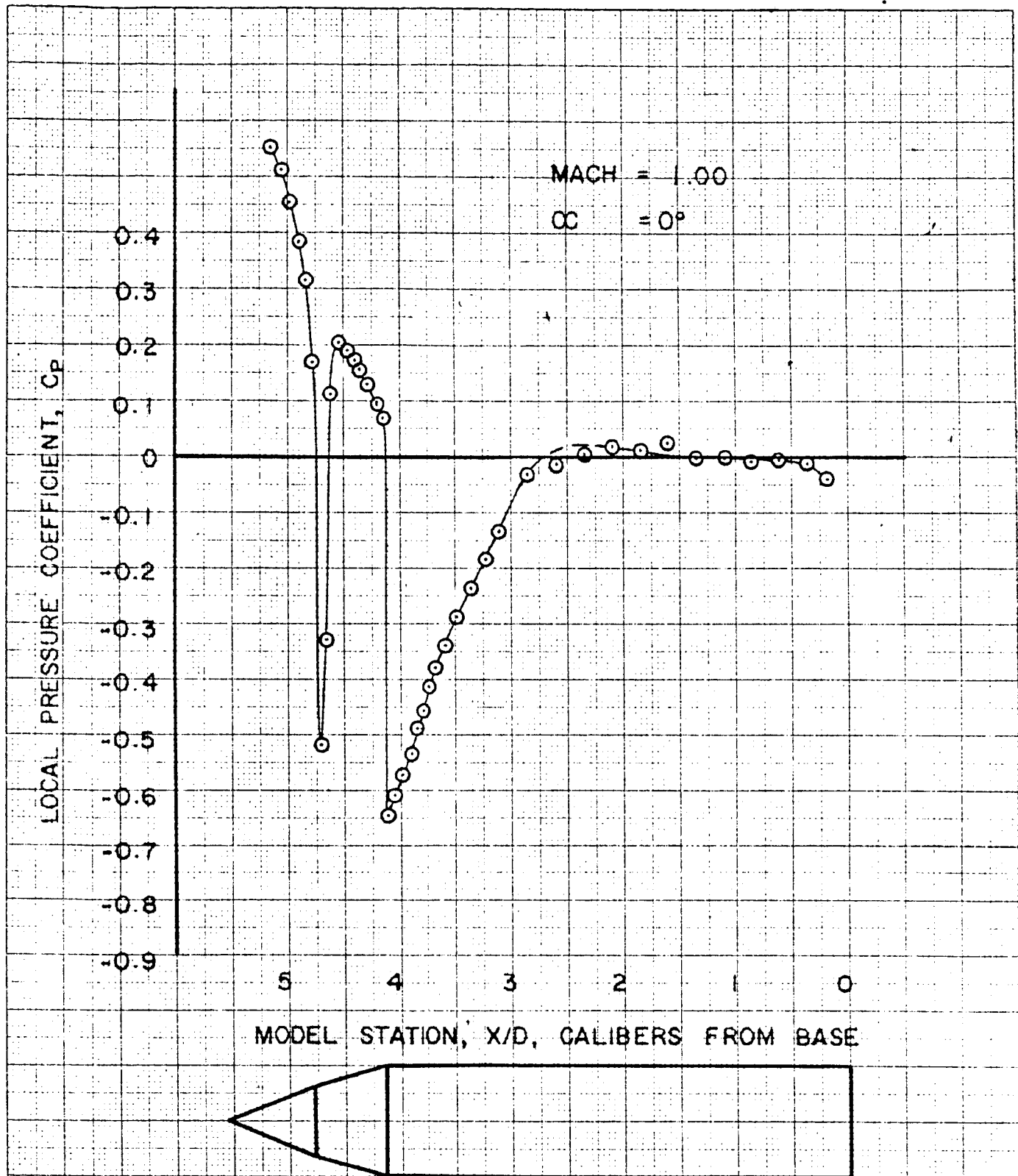


FIGURE 6 DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS
 - CONFIGURATION B -

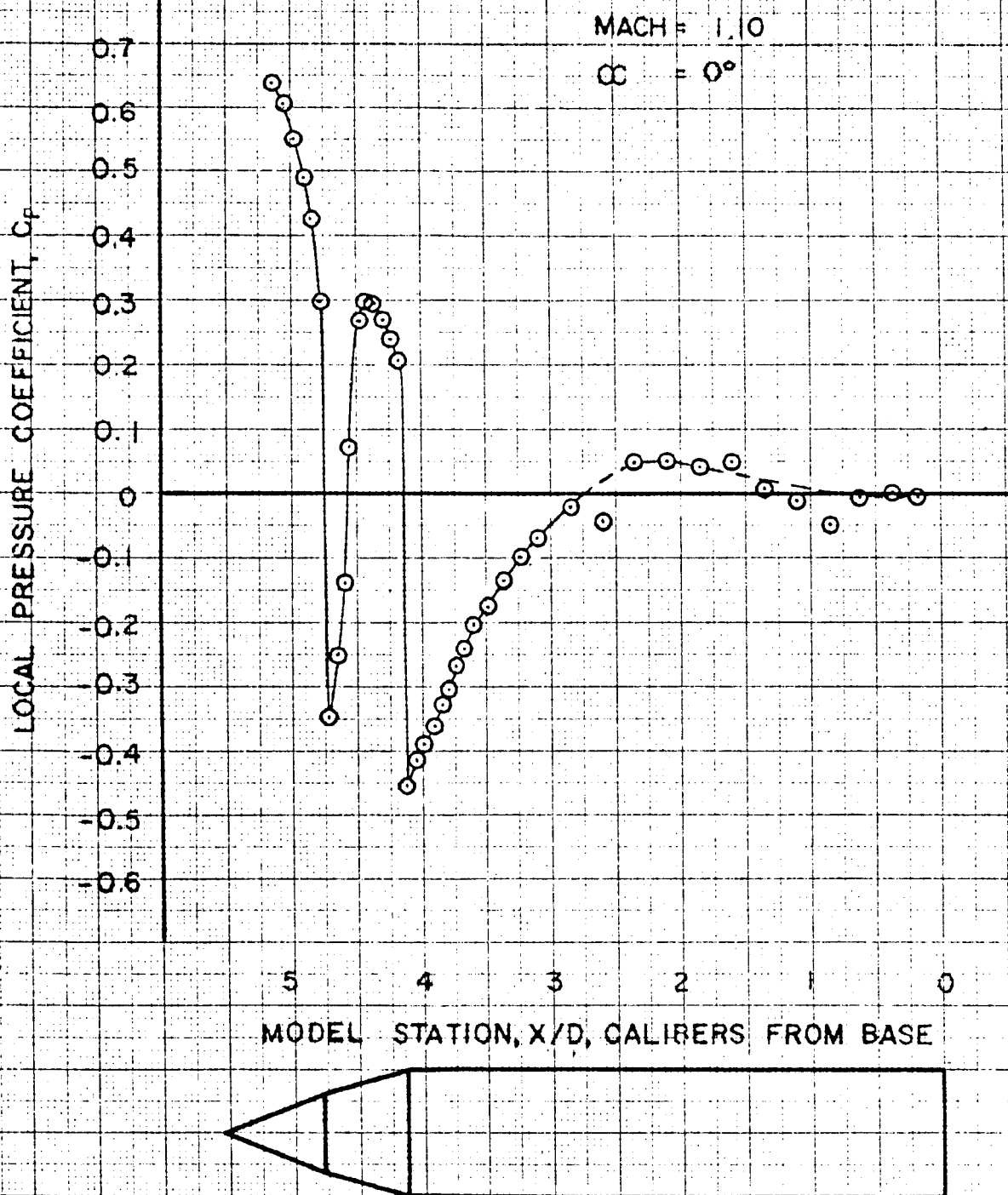
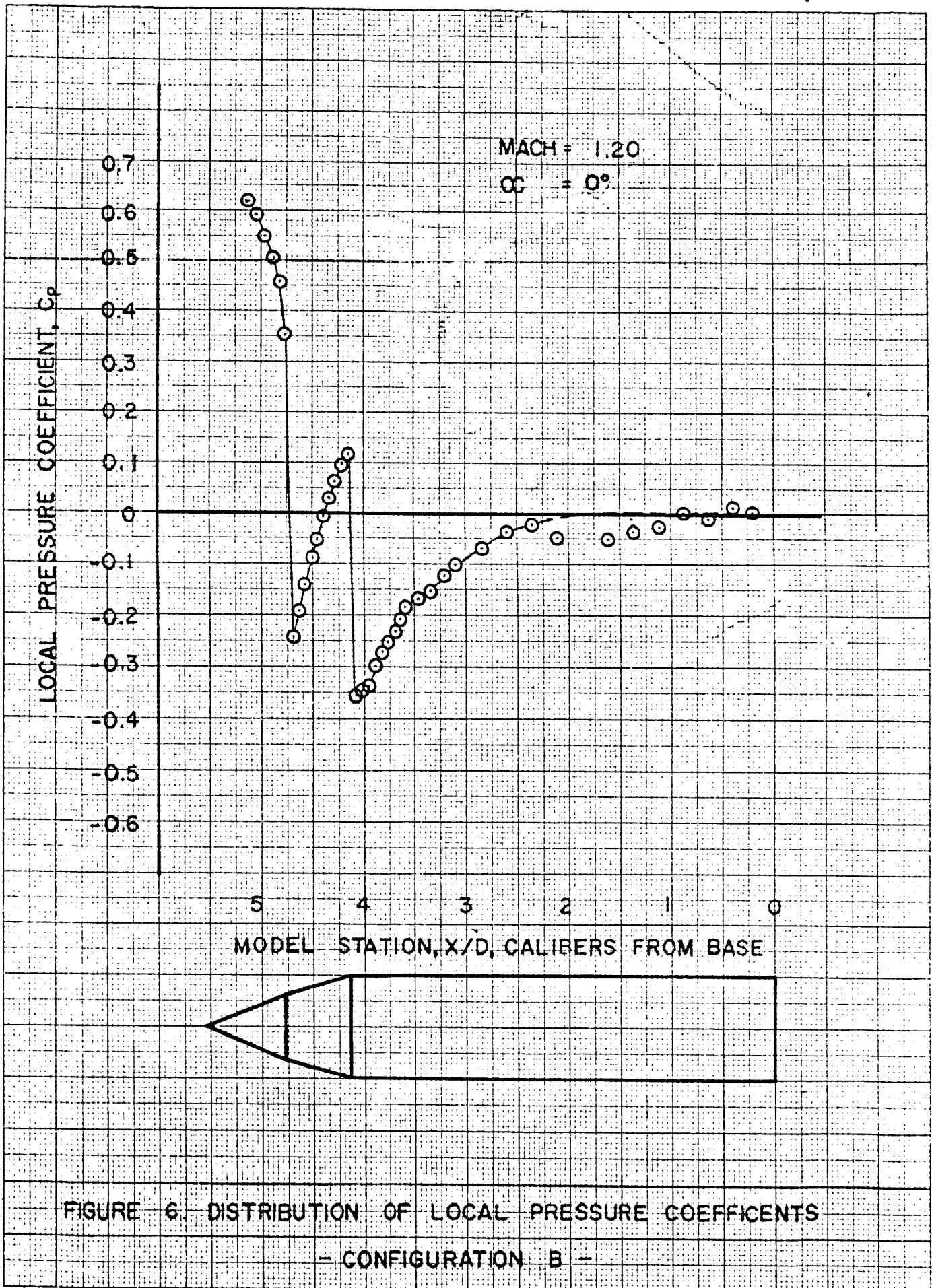


FIGURE 6. DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS
- CONFIGURATION B -

REF ID: A61243



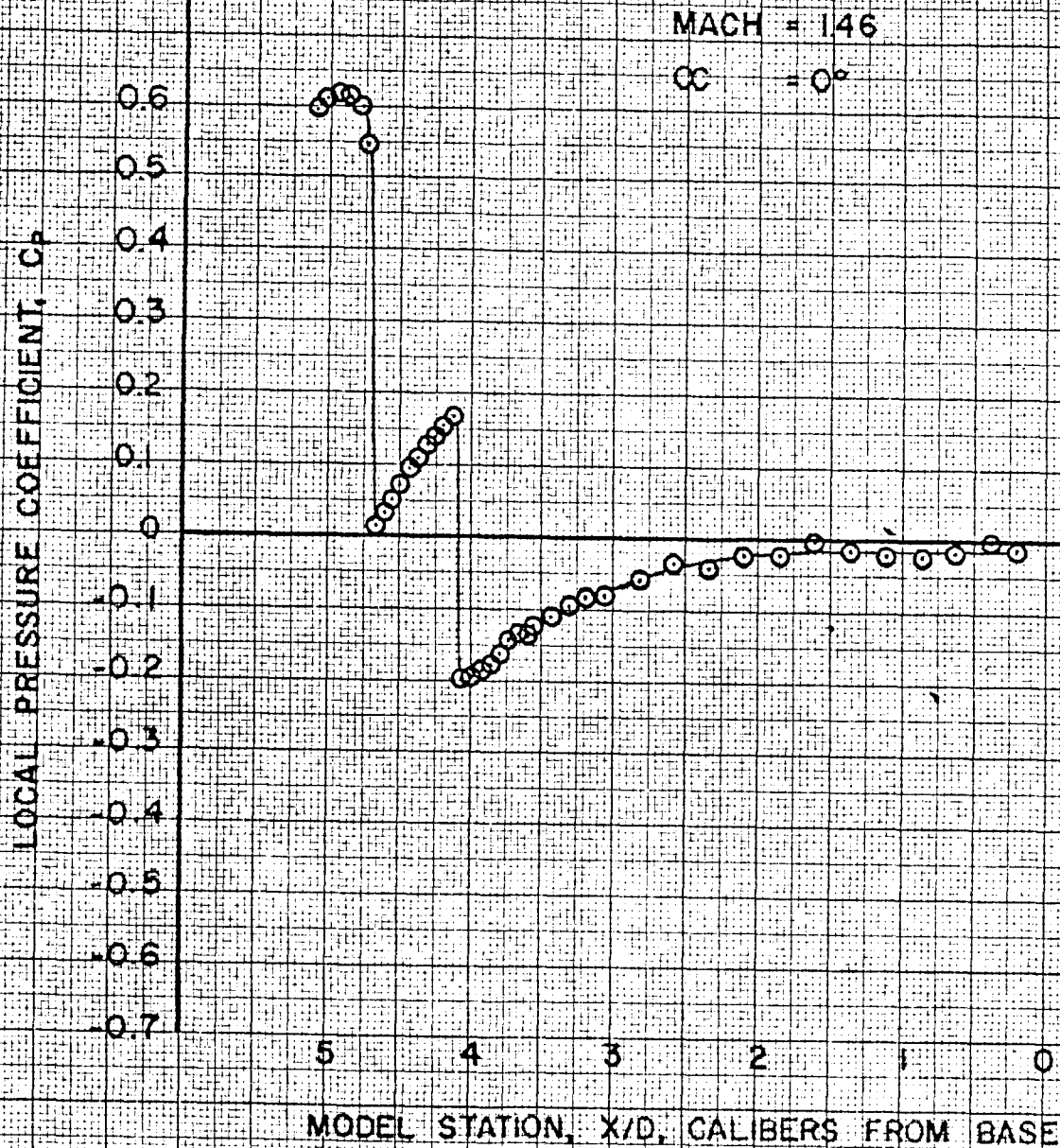
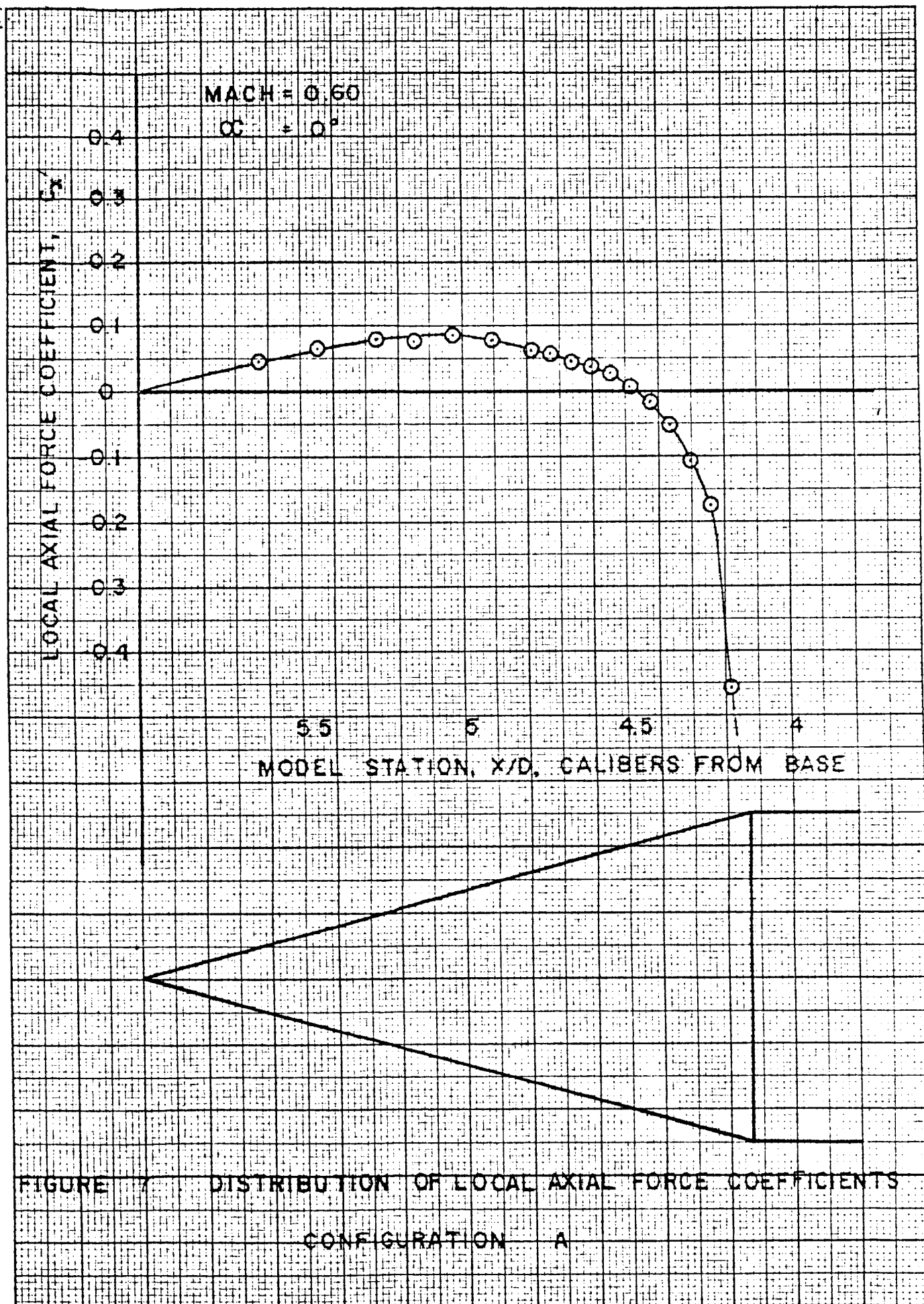
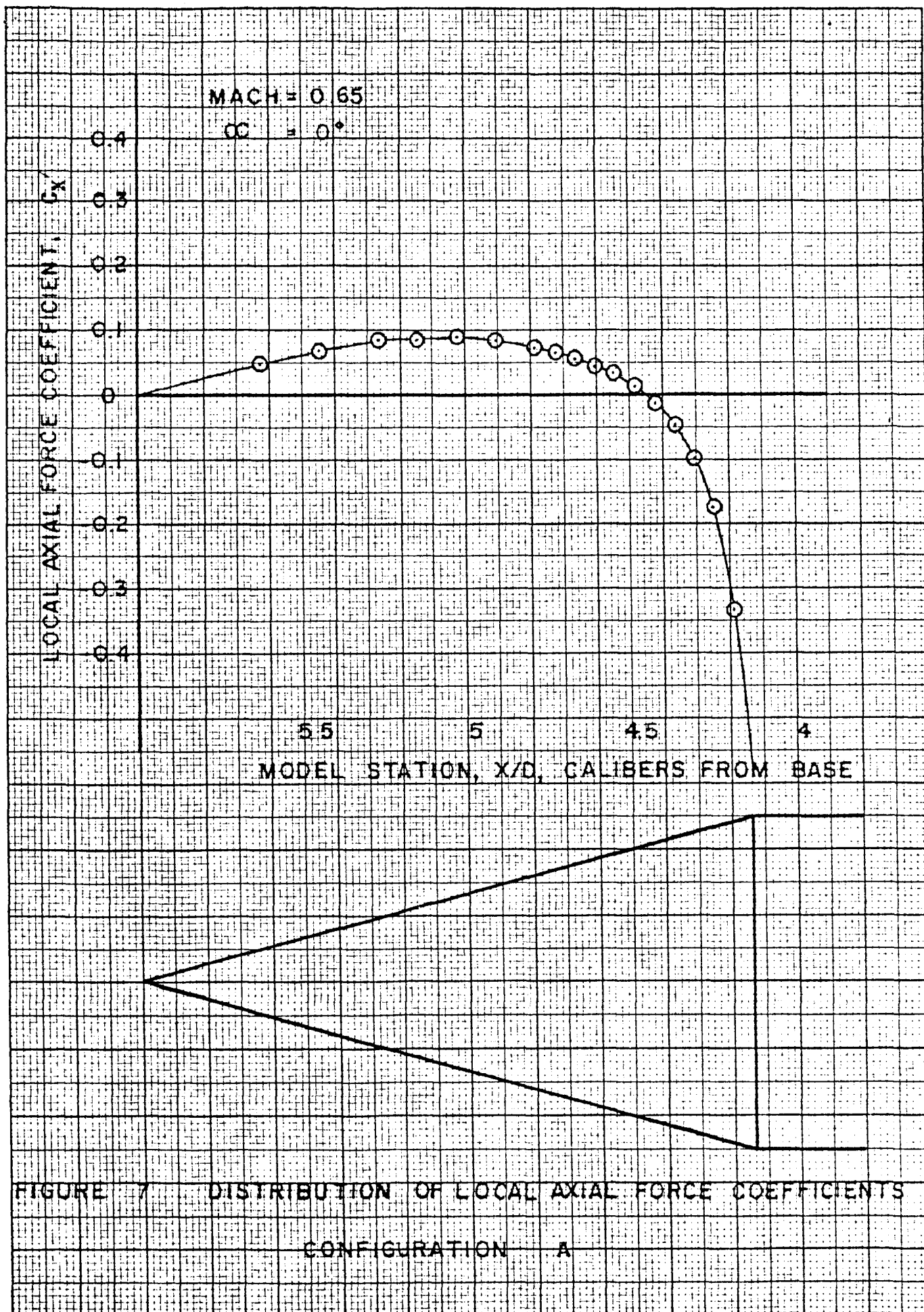
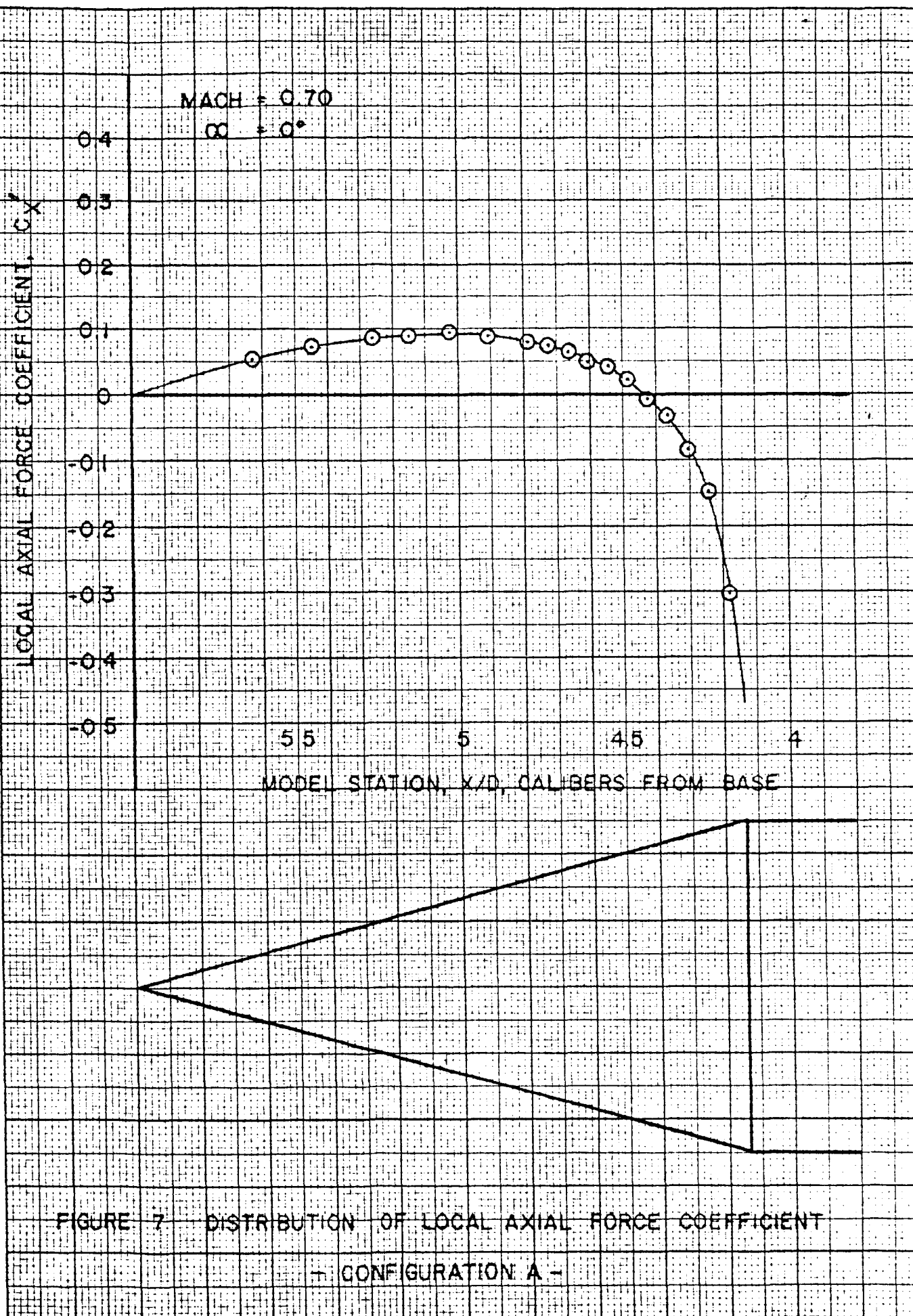


FIGURE 5. DISTRIBUTION OF LOCAL PRESSURE COEFFICIENTS
- CONFIGURATION B -







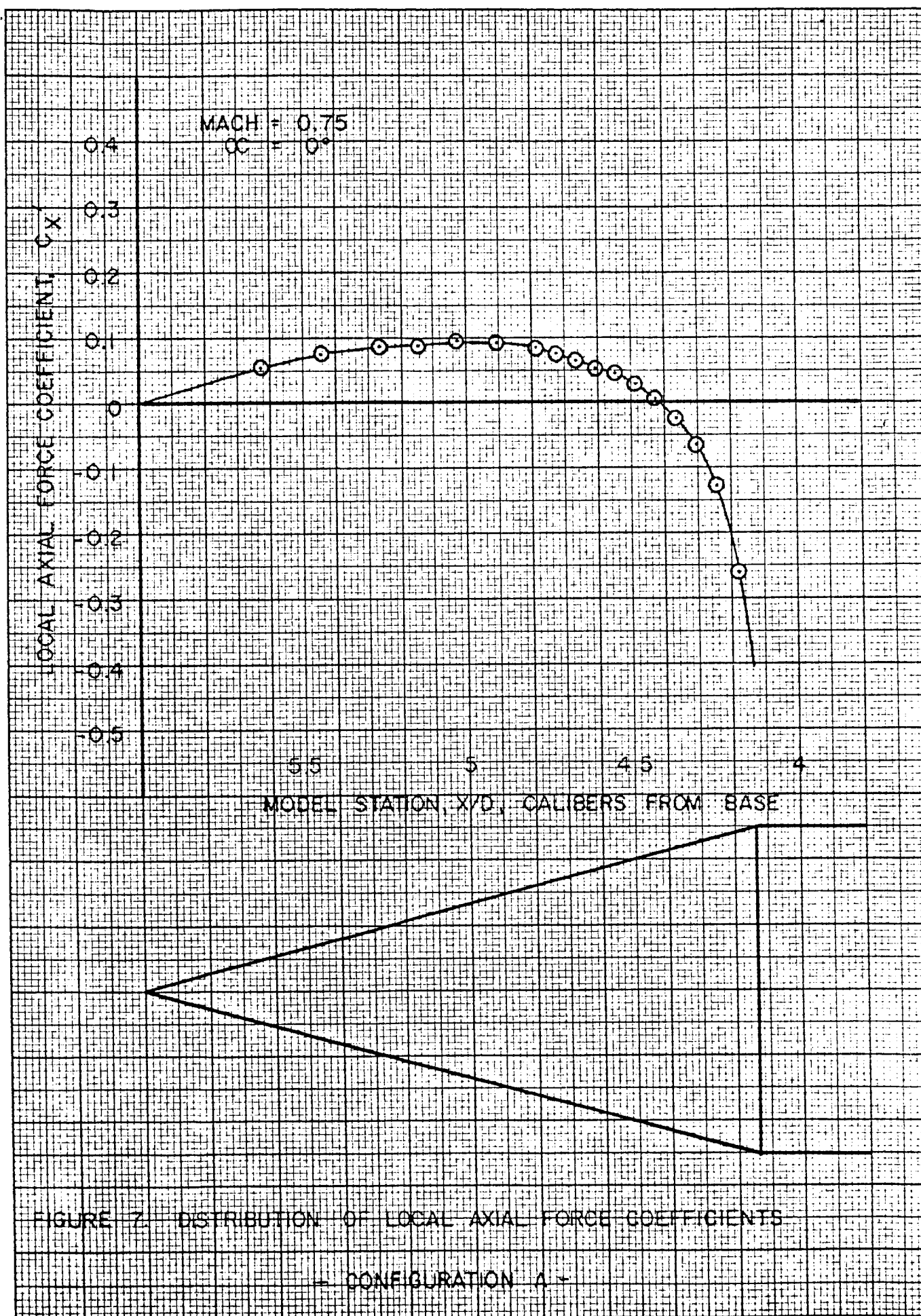
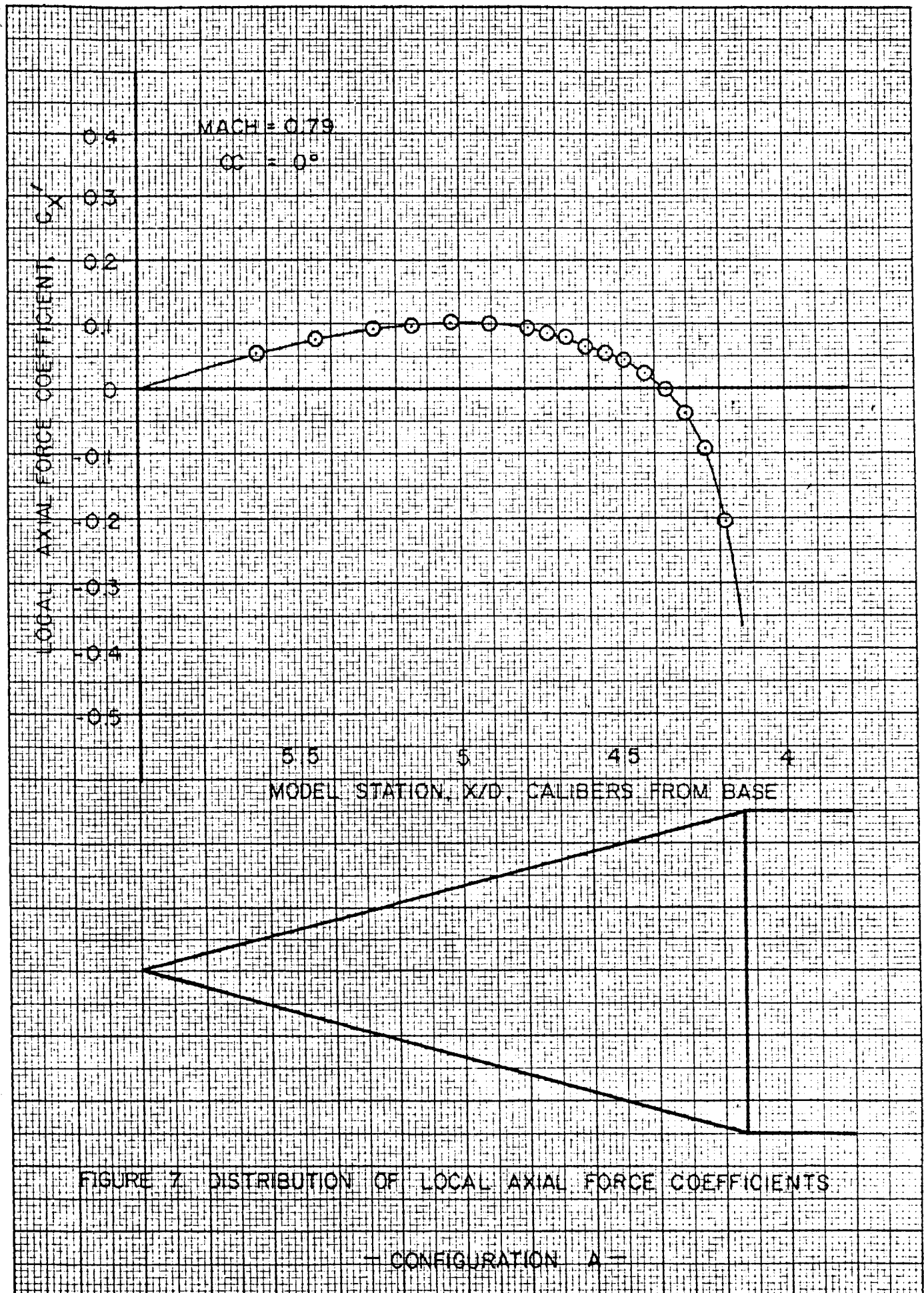
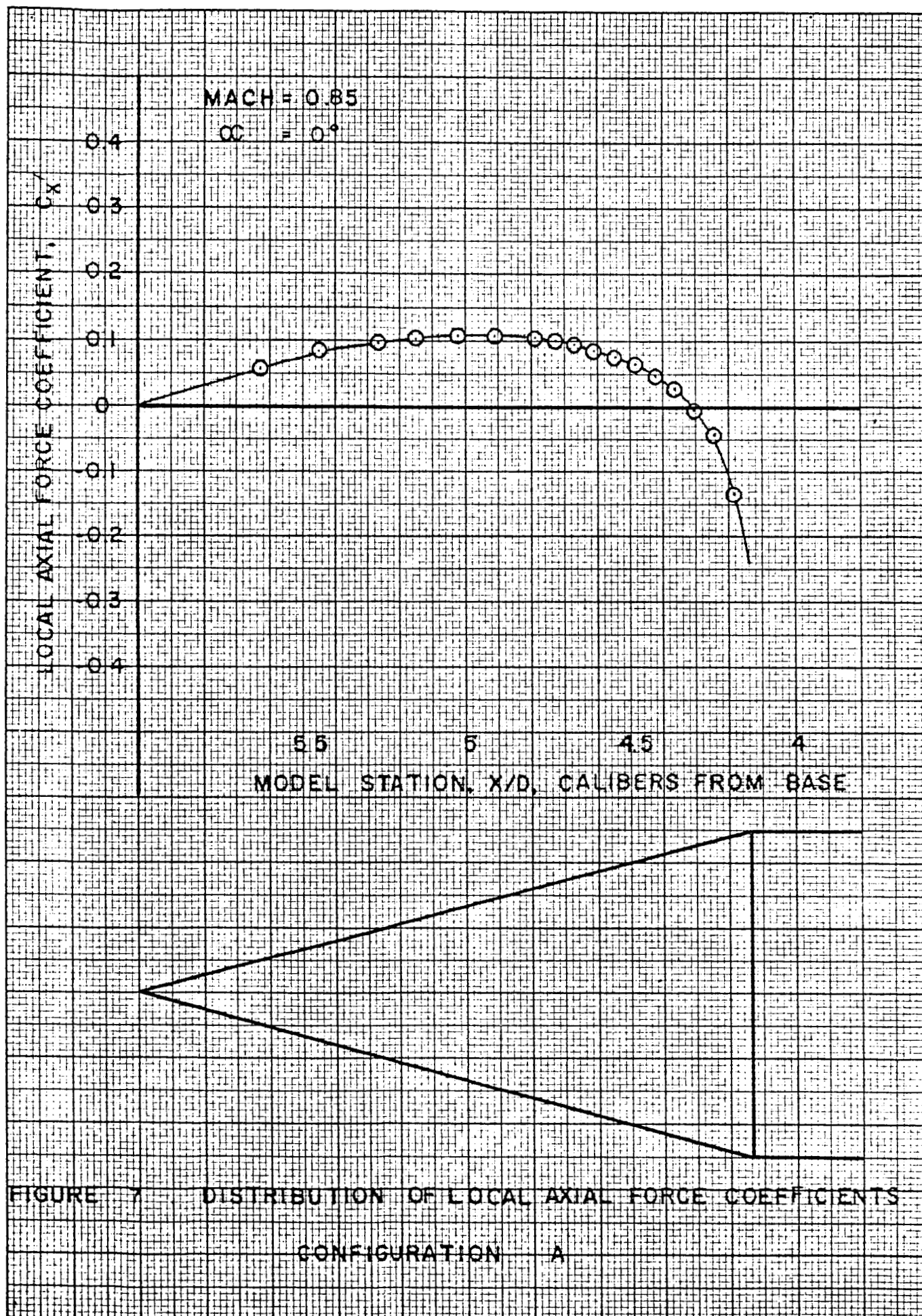
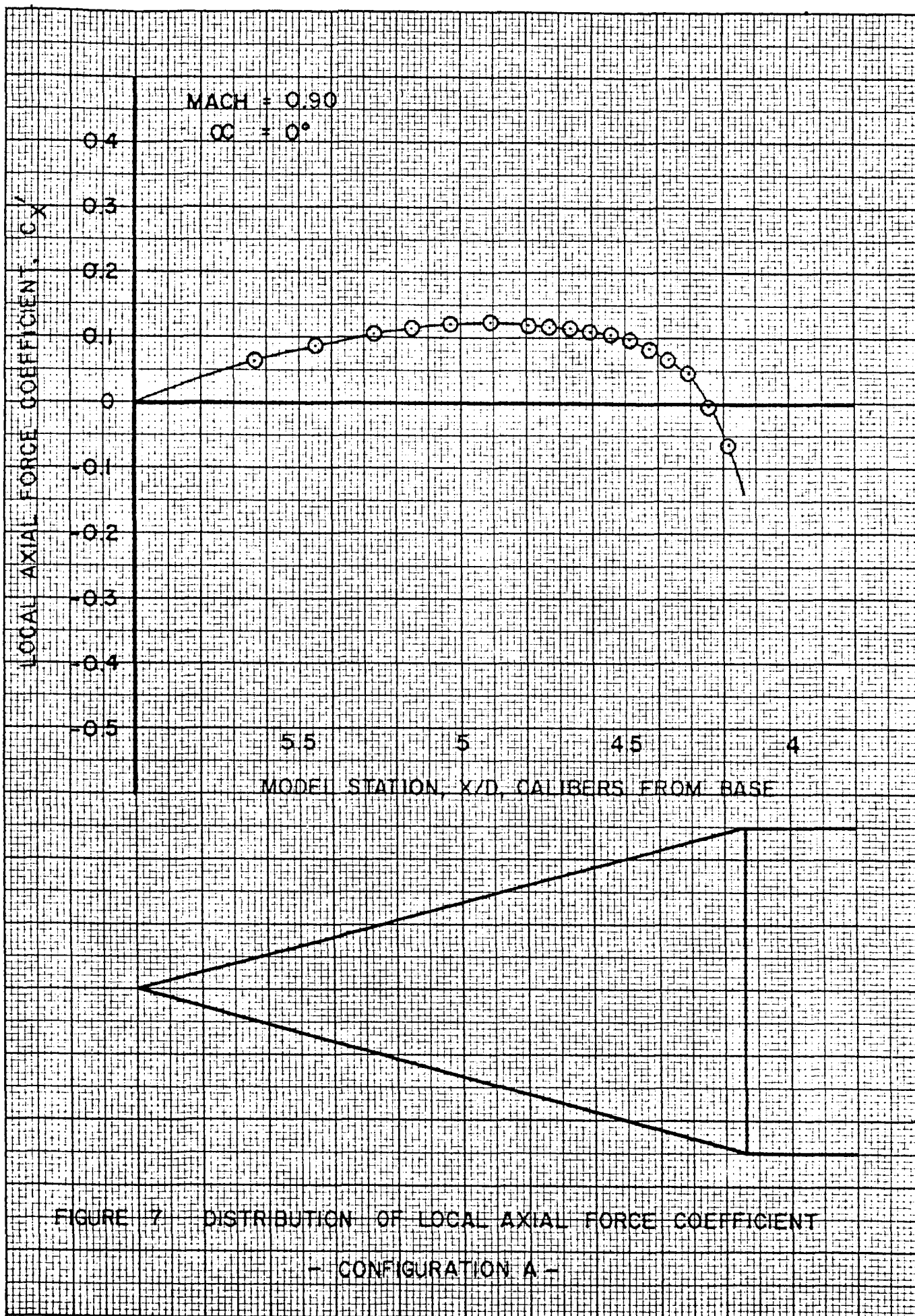
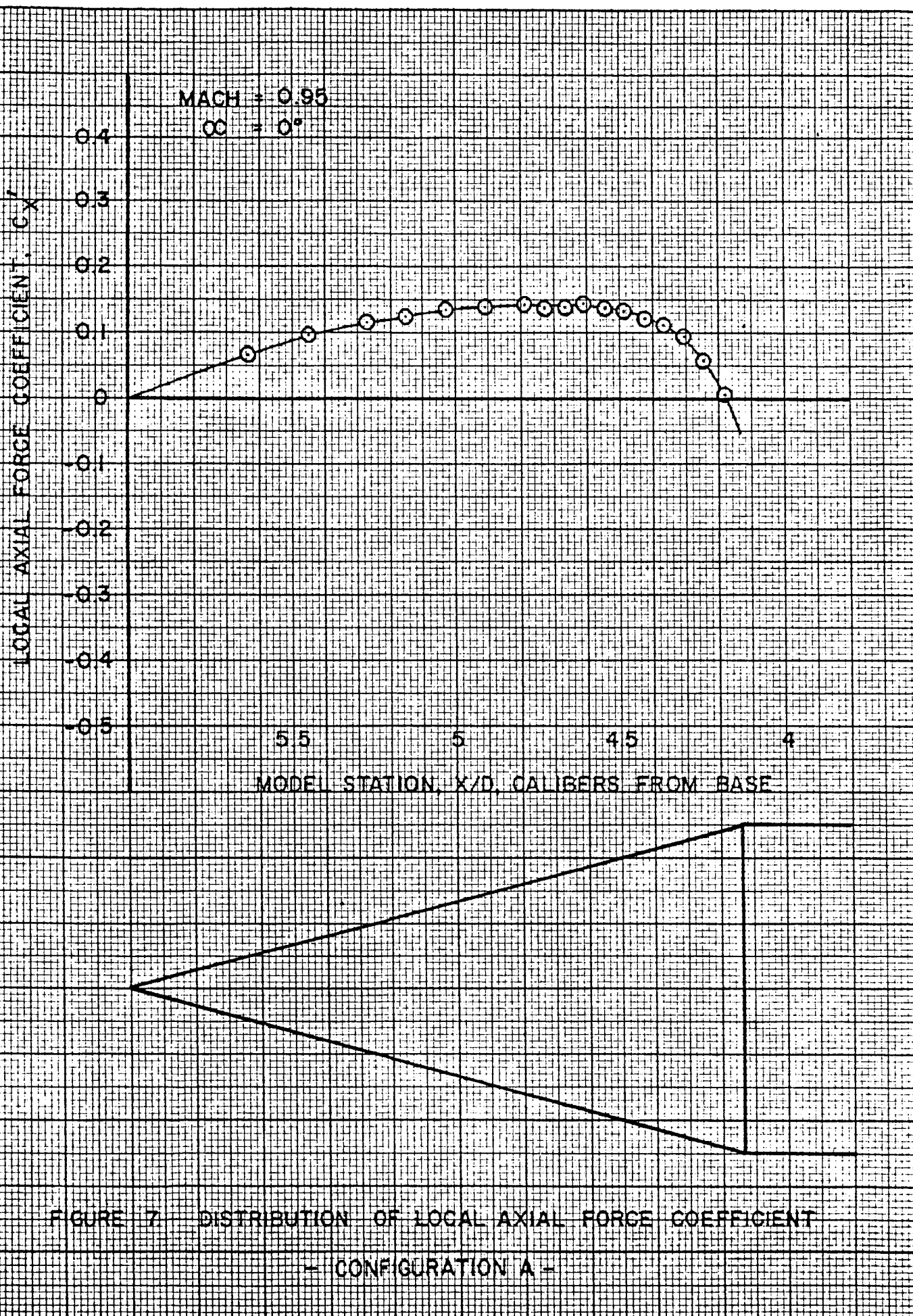


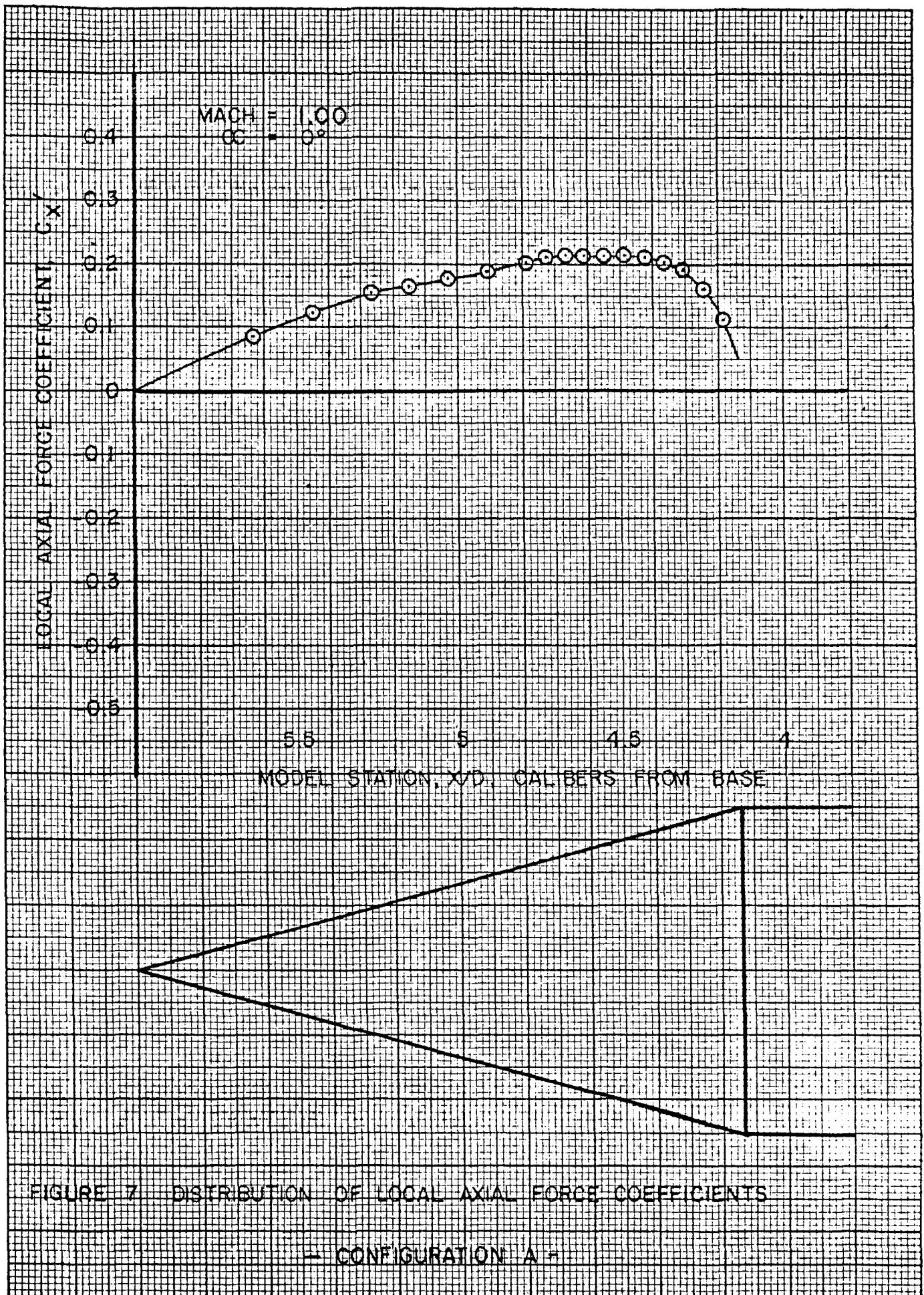
FIGURE 7. DISTRIBUTION OF LOCAL AXIAL FORCE COEFFICIENTS
- CONFIGURATION A -











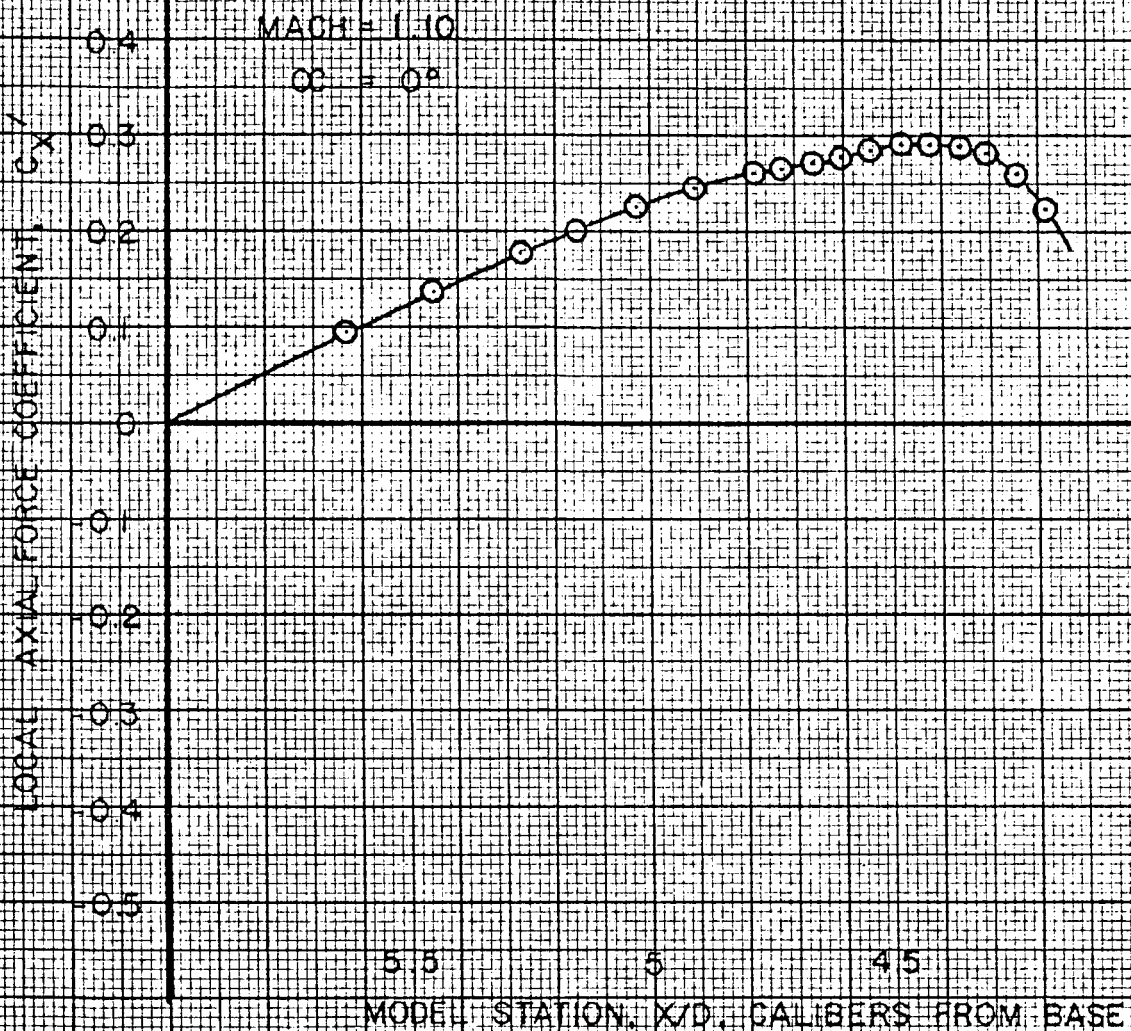


FIGURE 7 DISTRIBUTION OF LOCAL AXIAL FORCE COEFFICIENTS

— CONFIGURATION A —

K-E
KENNEL & KASEN CO.
10 X 10 TO THE 1/4 INCH
328-11

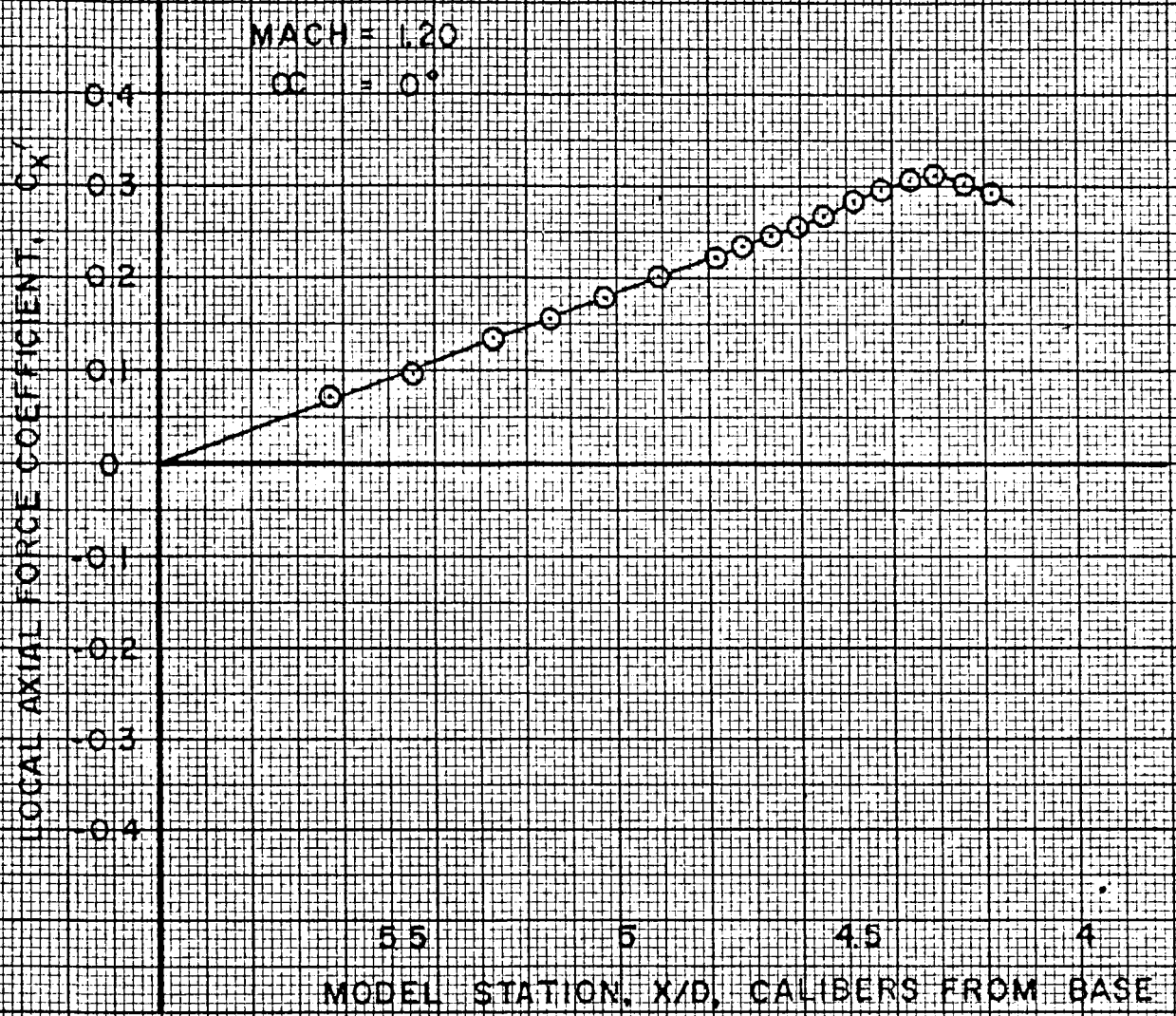


FIGURE 7 DISTRIBUTION OF LOCAL AXIAL FORCE COEFFICIENTS
CONFIGURATION A

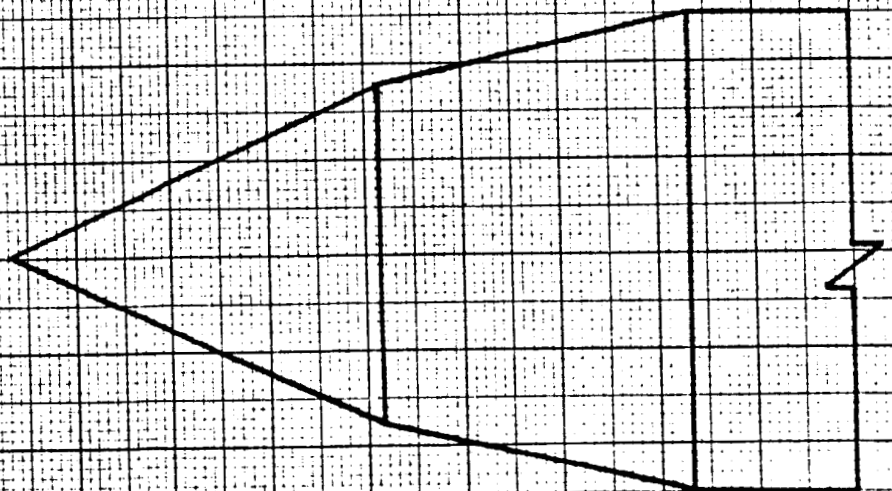
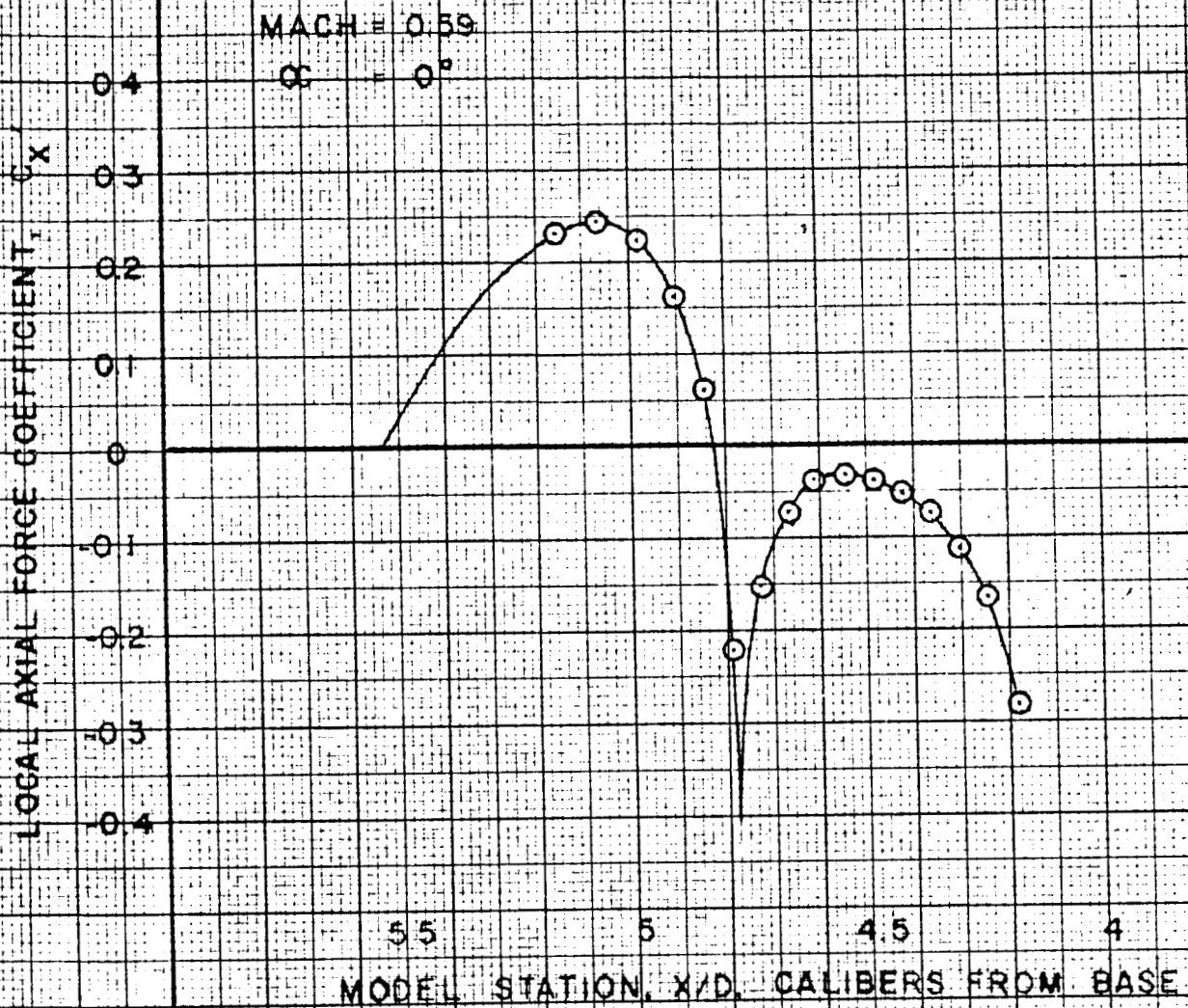
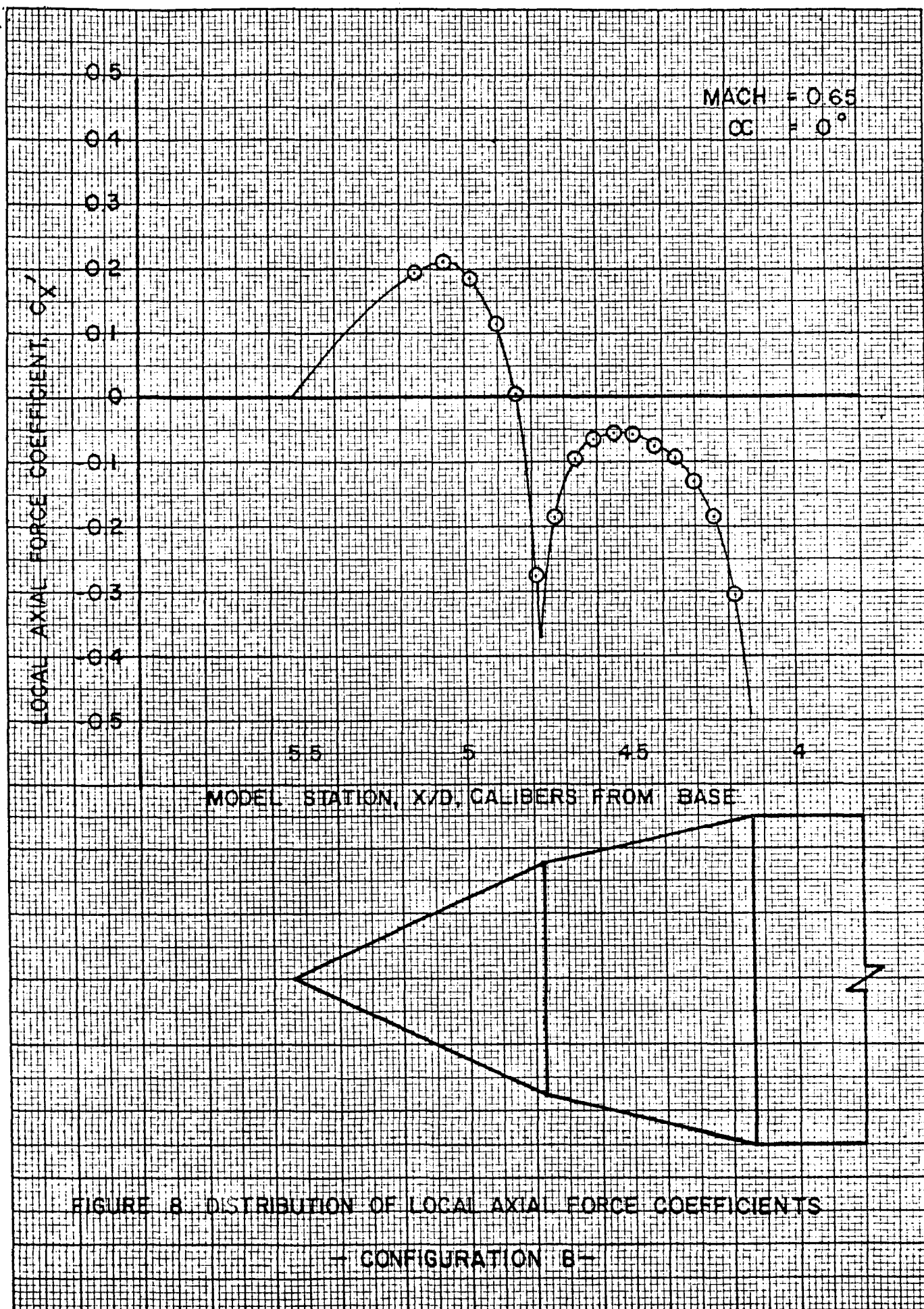


FIGURE B DISTRIBUTION OF LOCAL AXIAL FORCE COEFFICIENTS
CONFIGURATION B



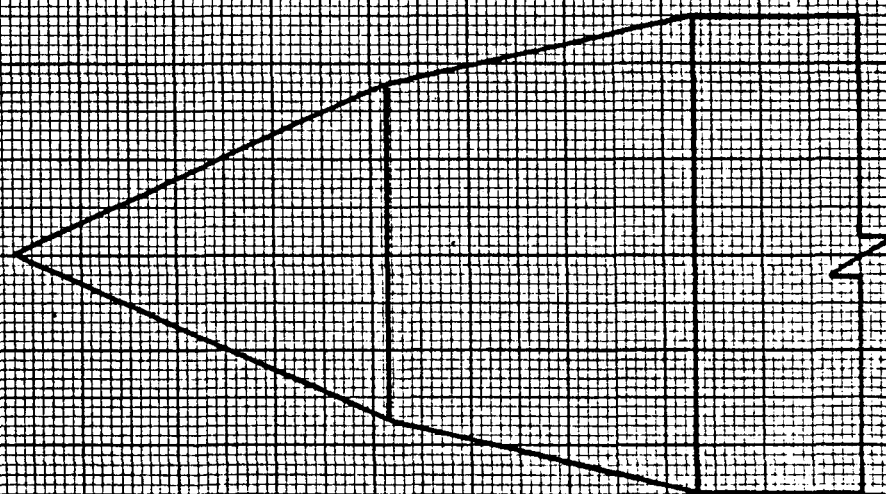
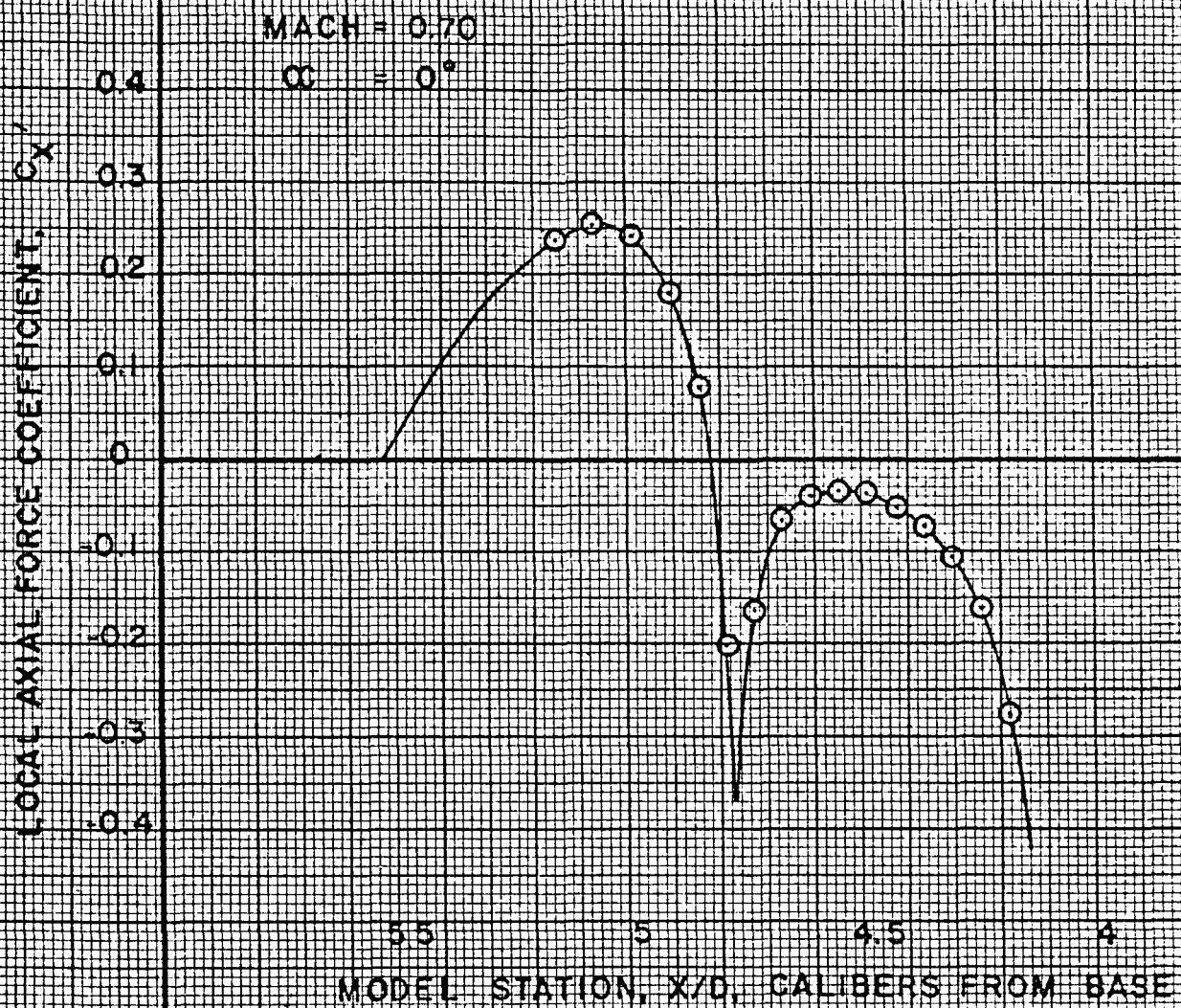
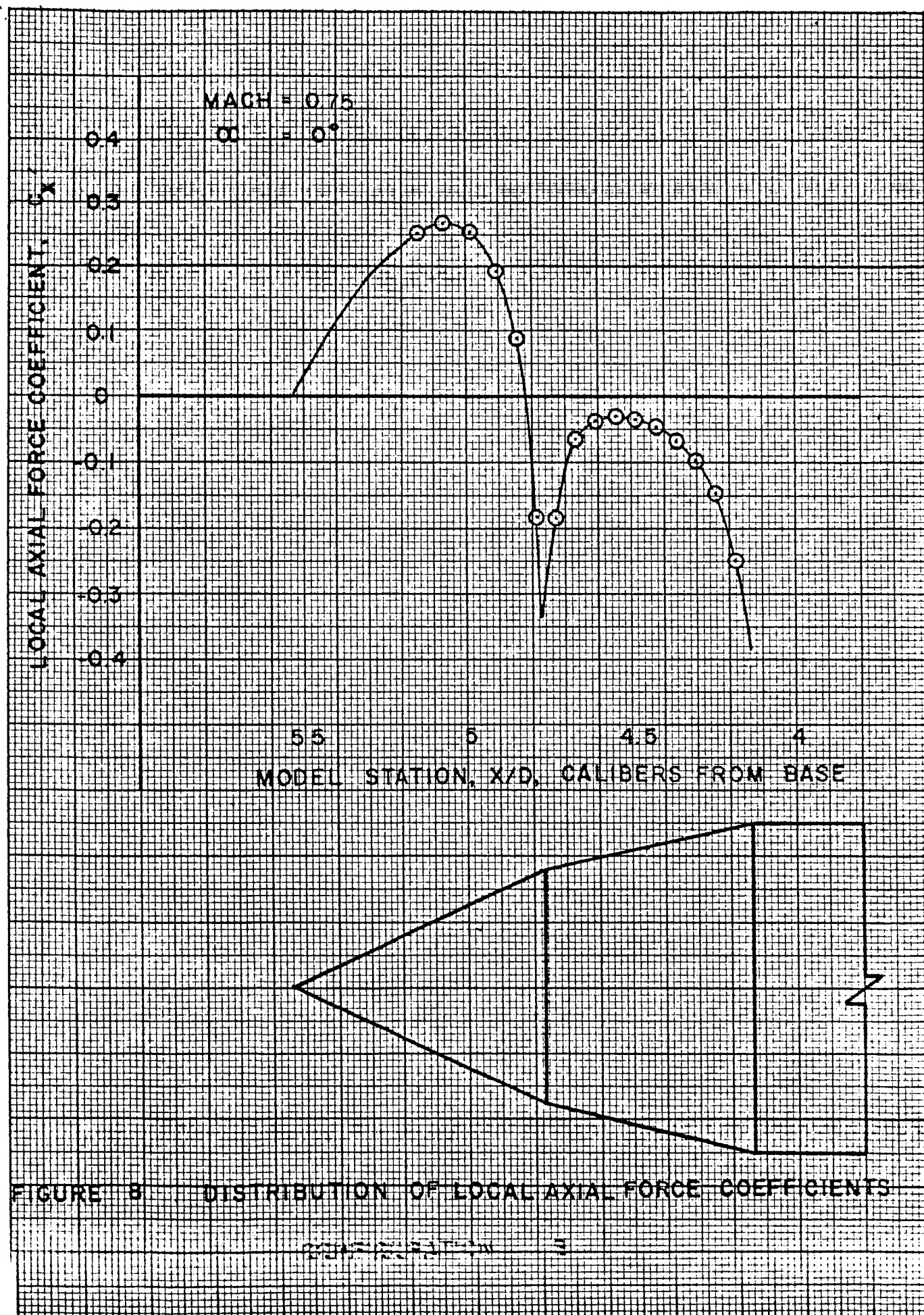
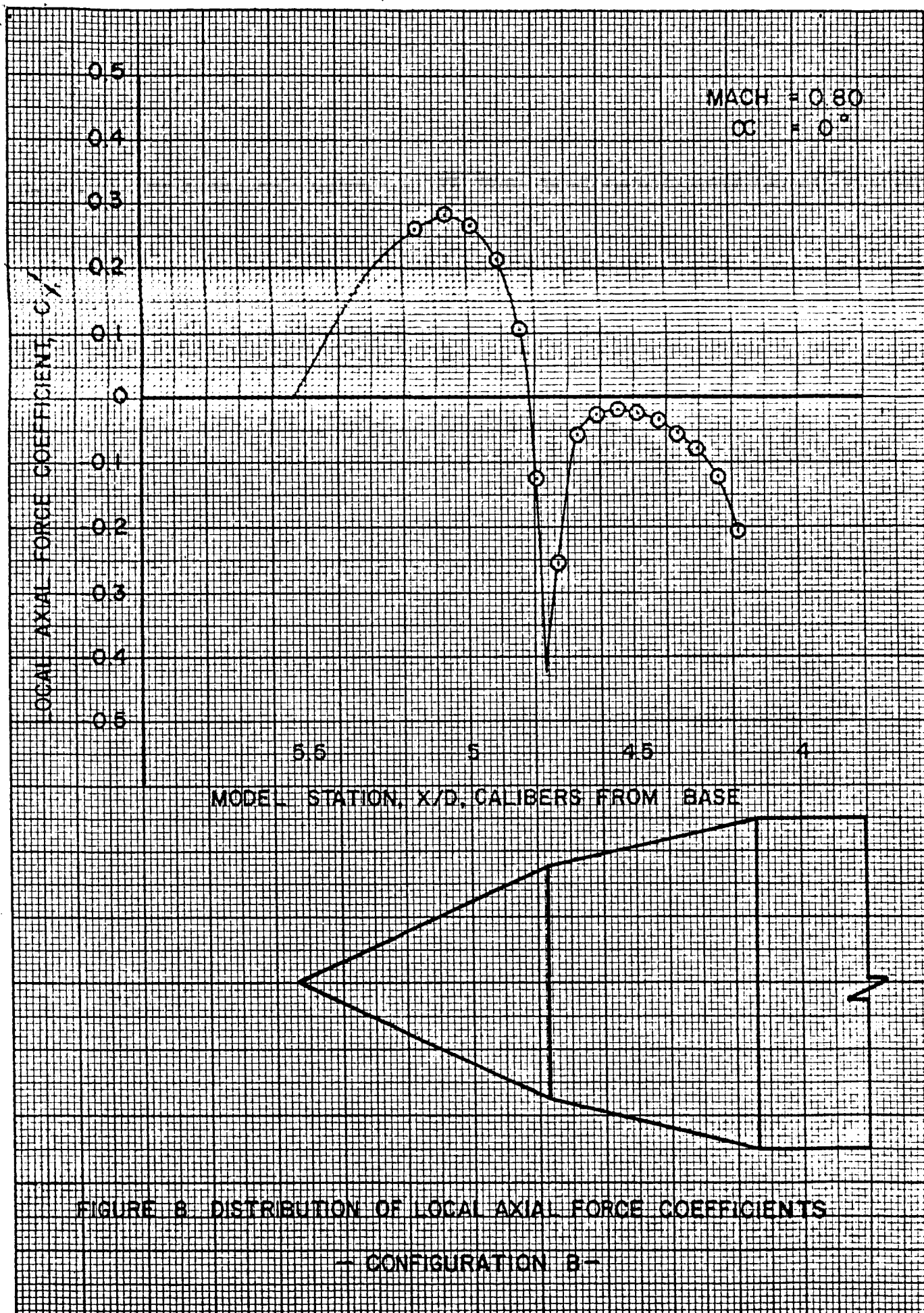
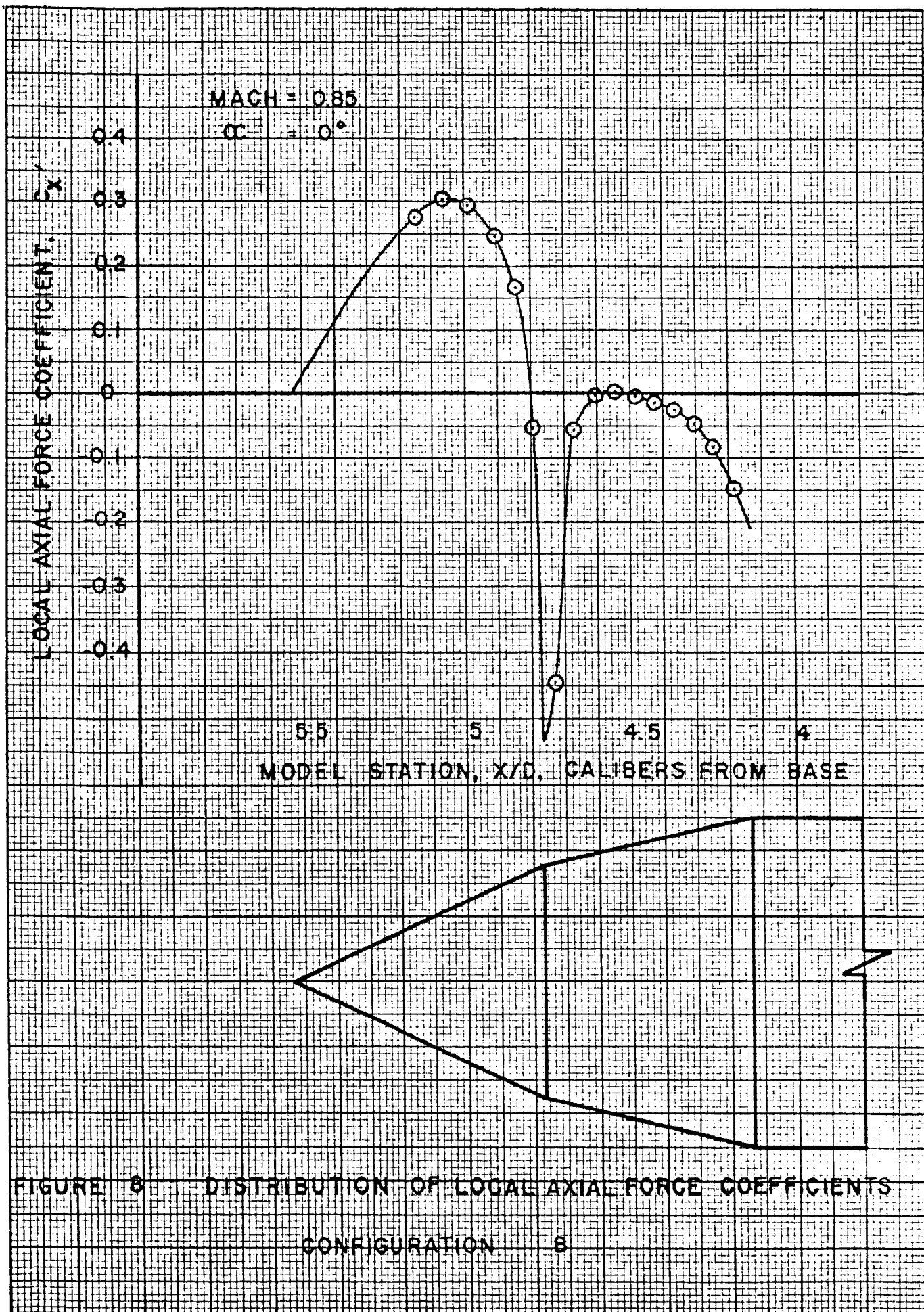


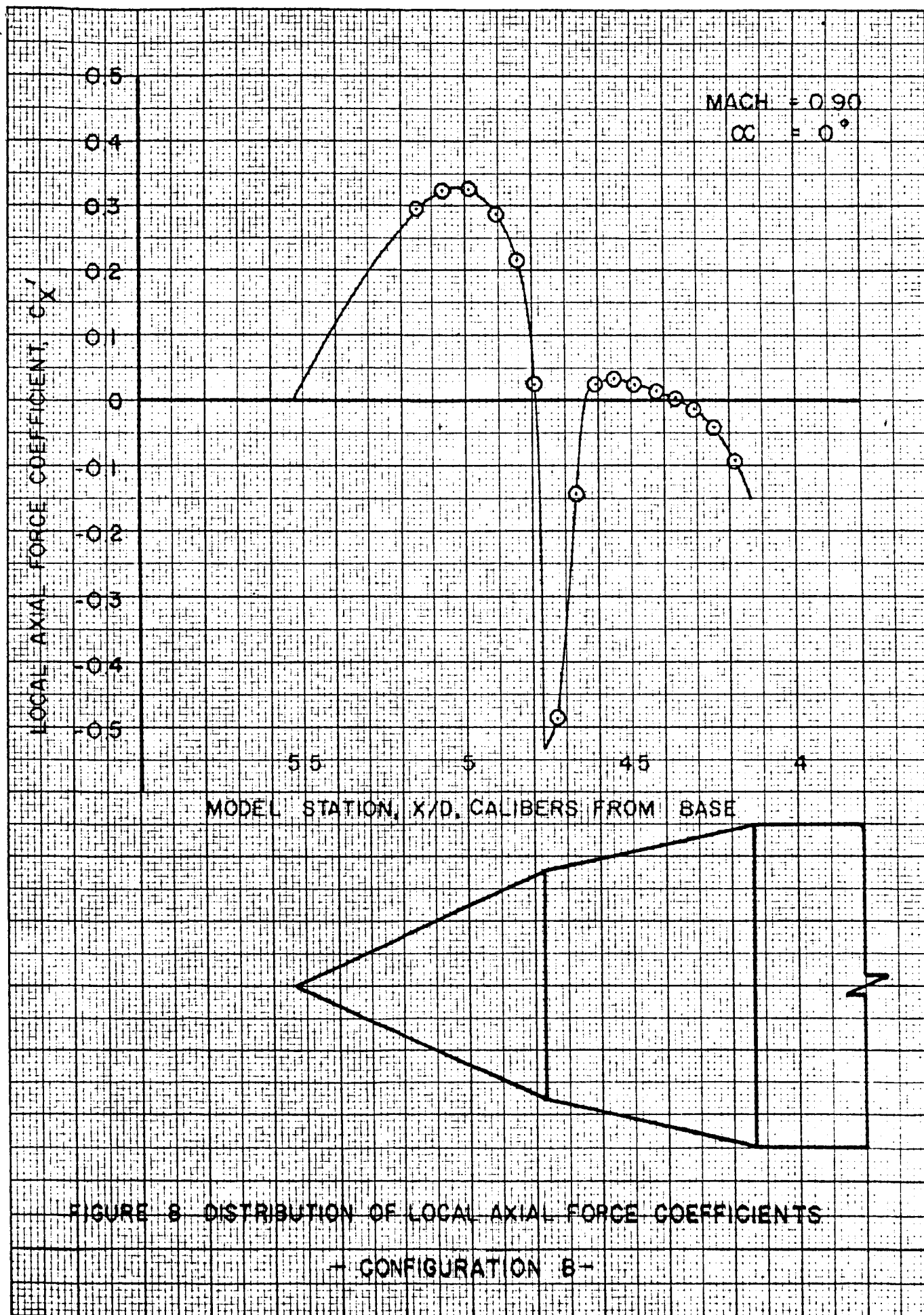
FIGURE 8 - DISTRIBUTION OF LOCAL AXIAL FORCE COEFFICIENTS

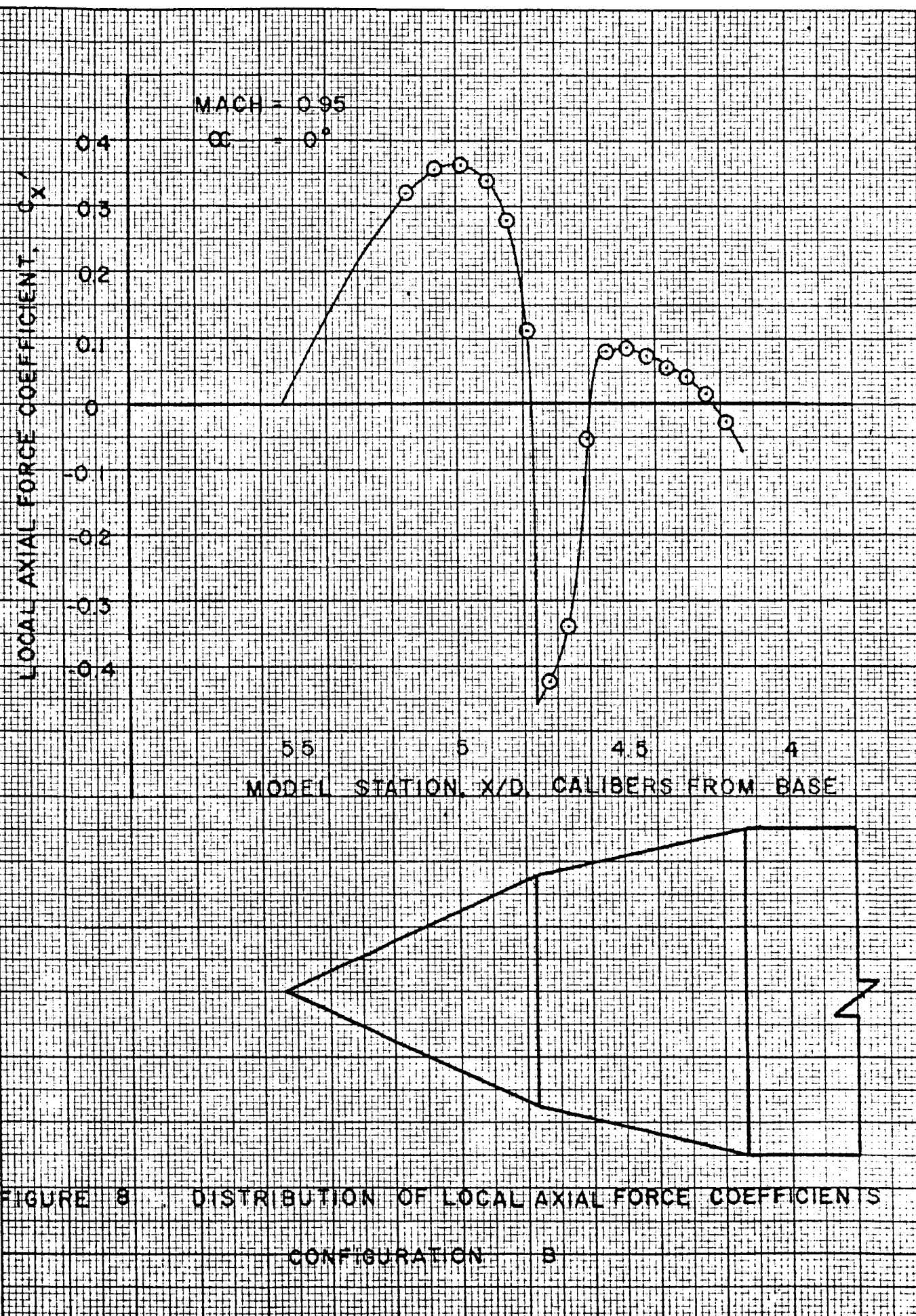
CONFIGURATION B

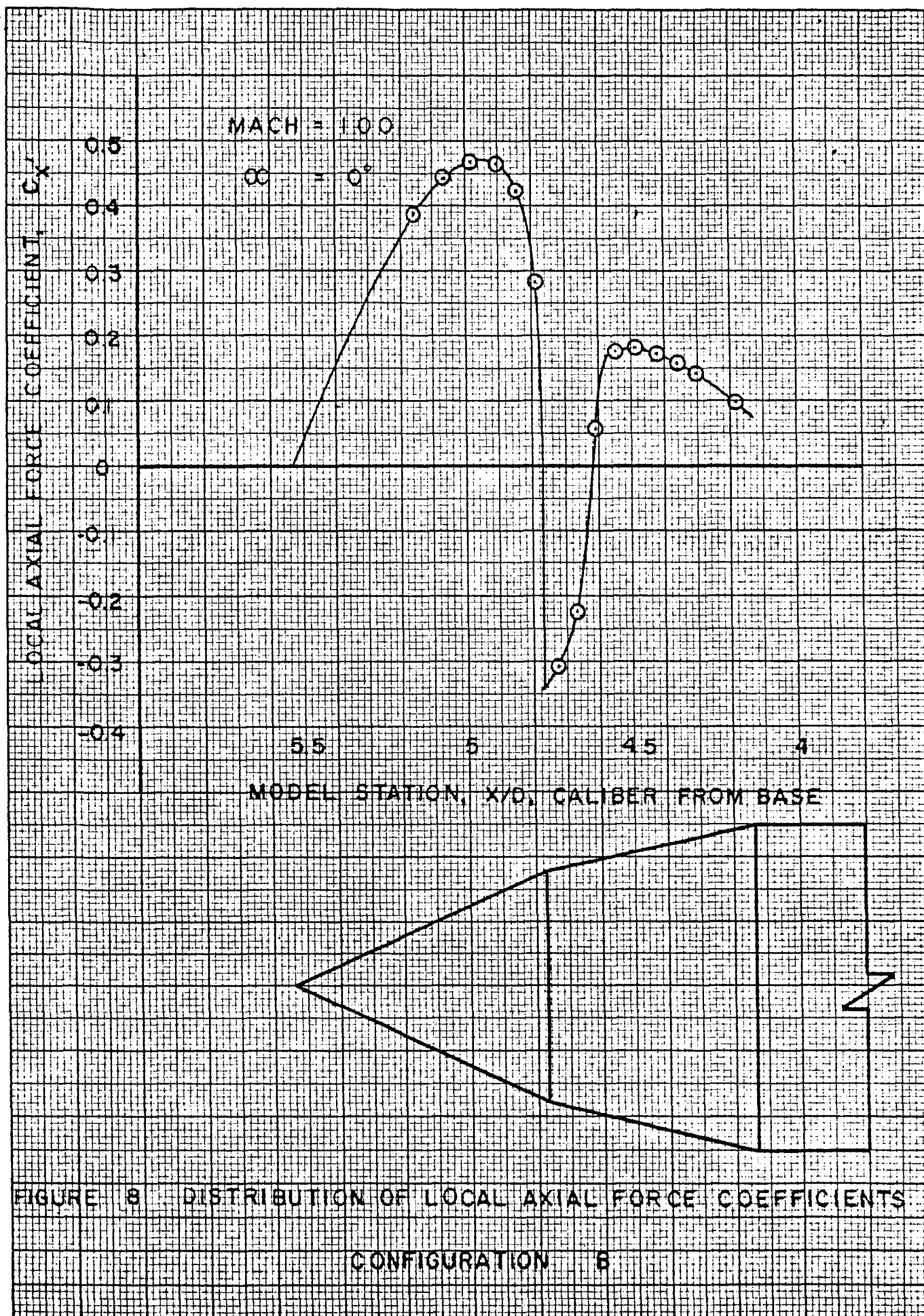


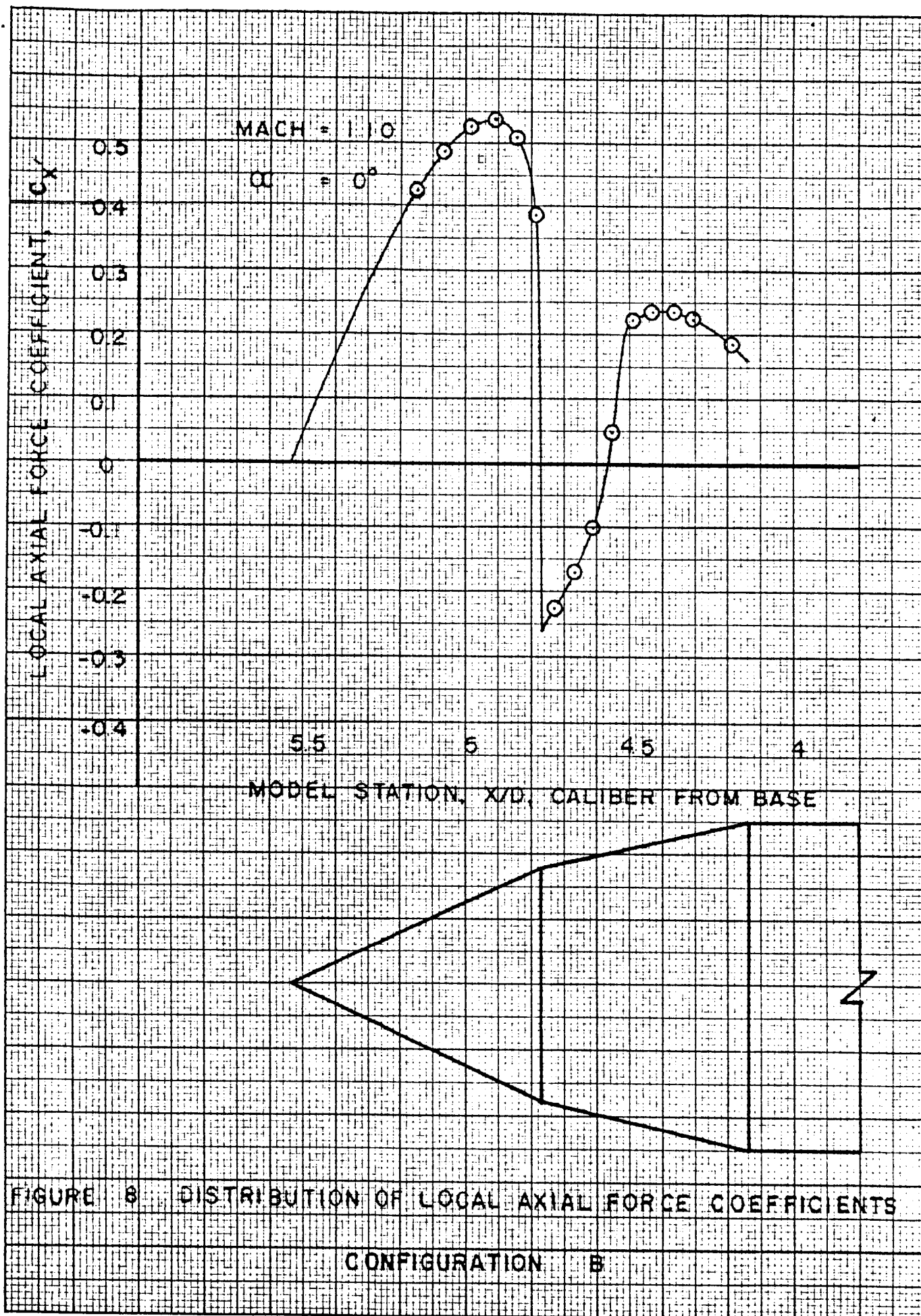


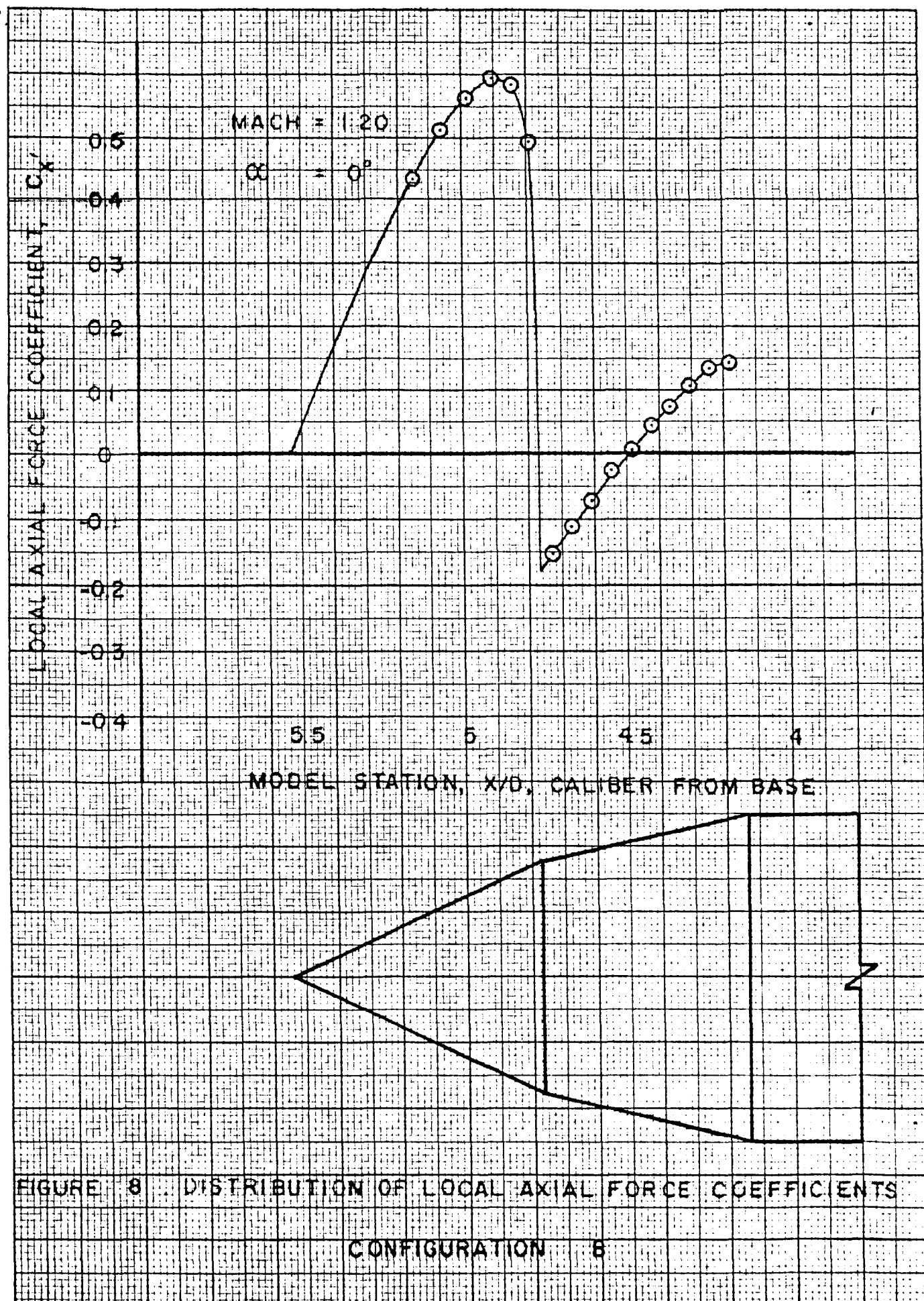












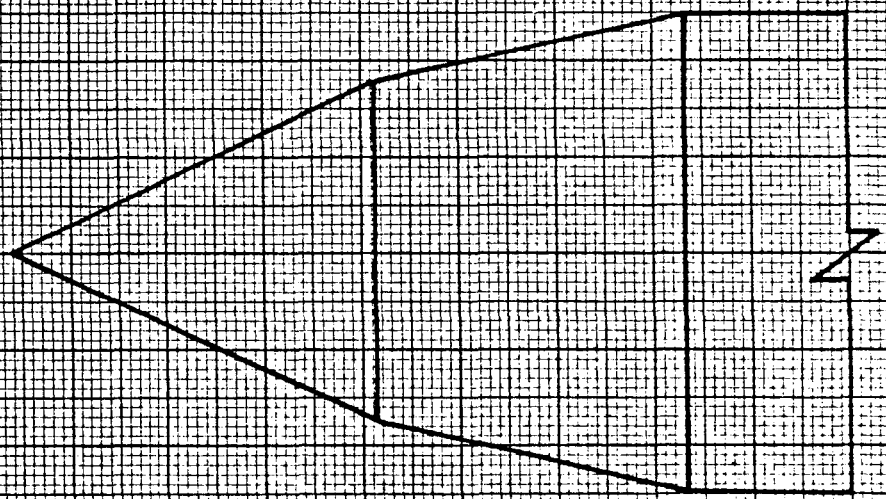
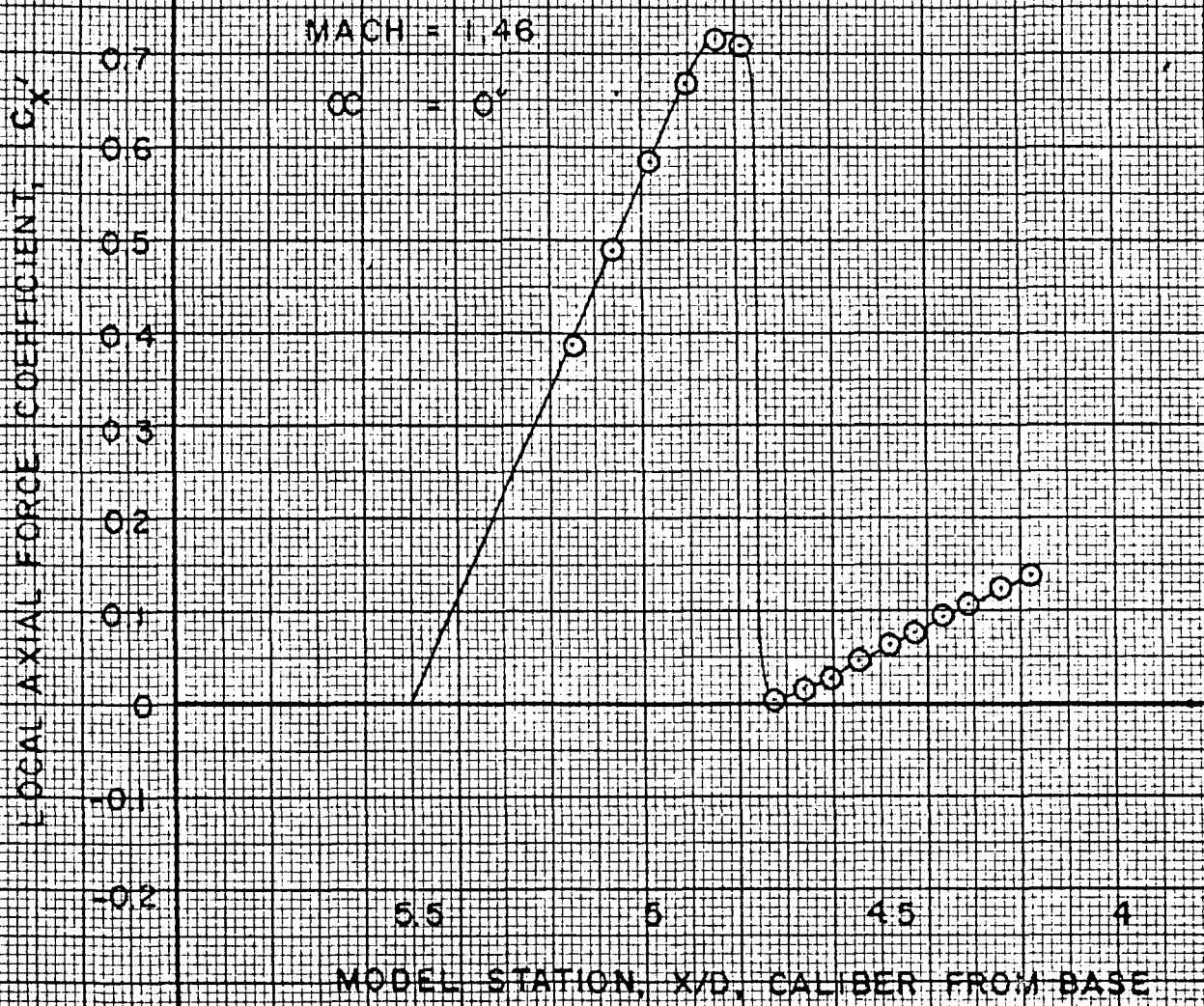
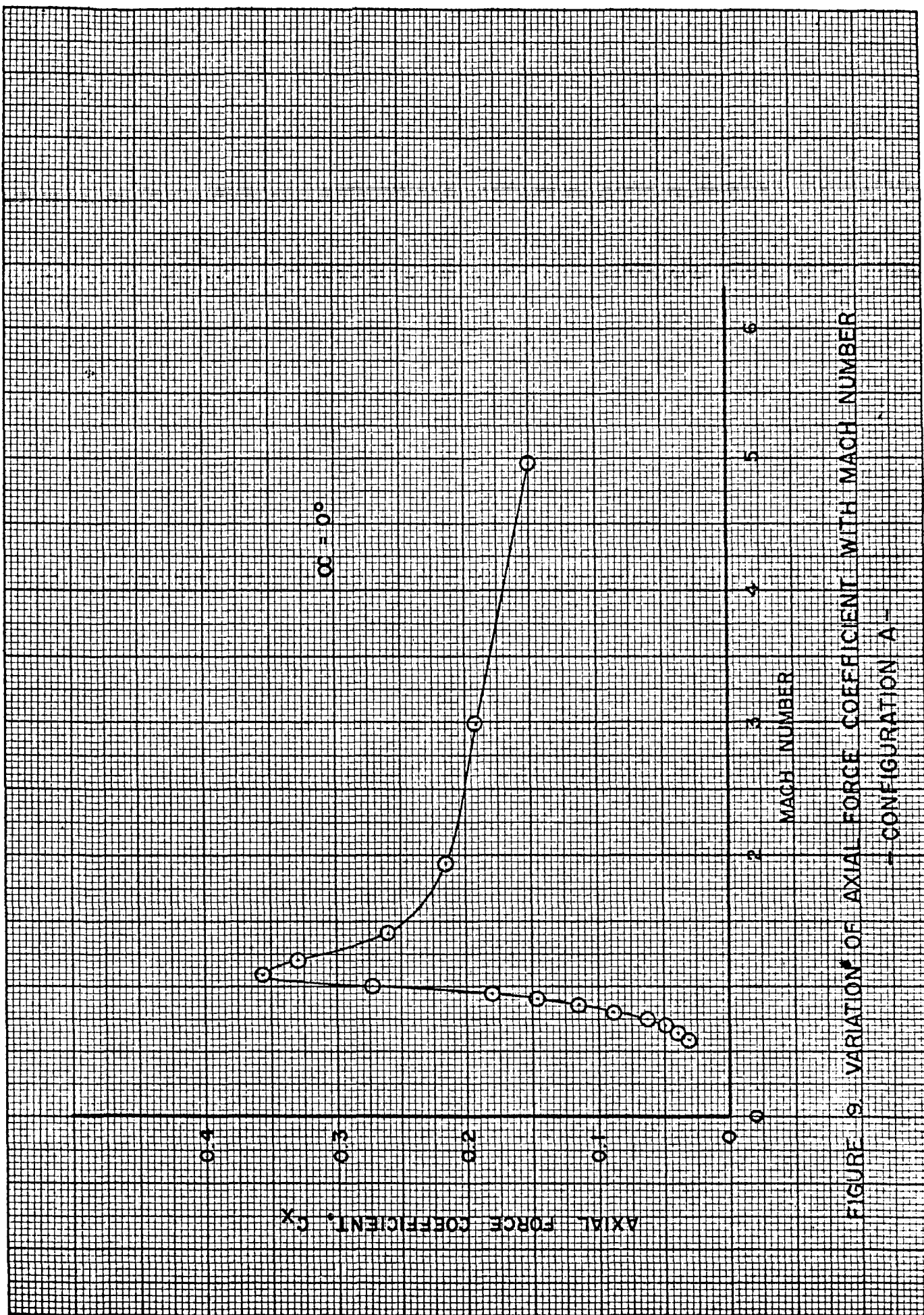


FIGURE 8 DISTRIBUTION OF LOCAL AXIAL FORCE COEFFICIENTS
CONFIGURATION B



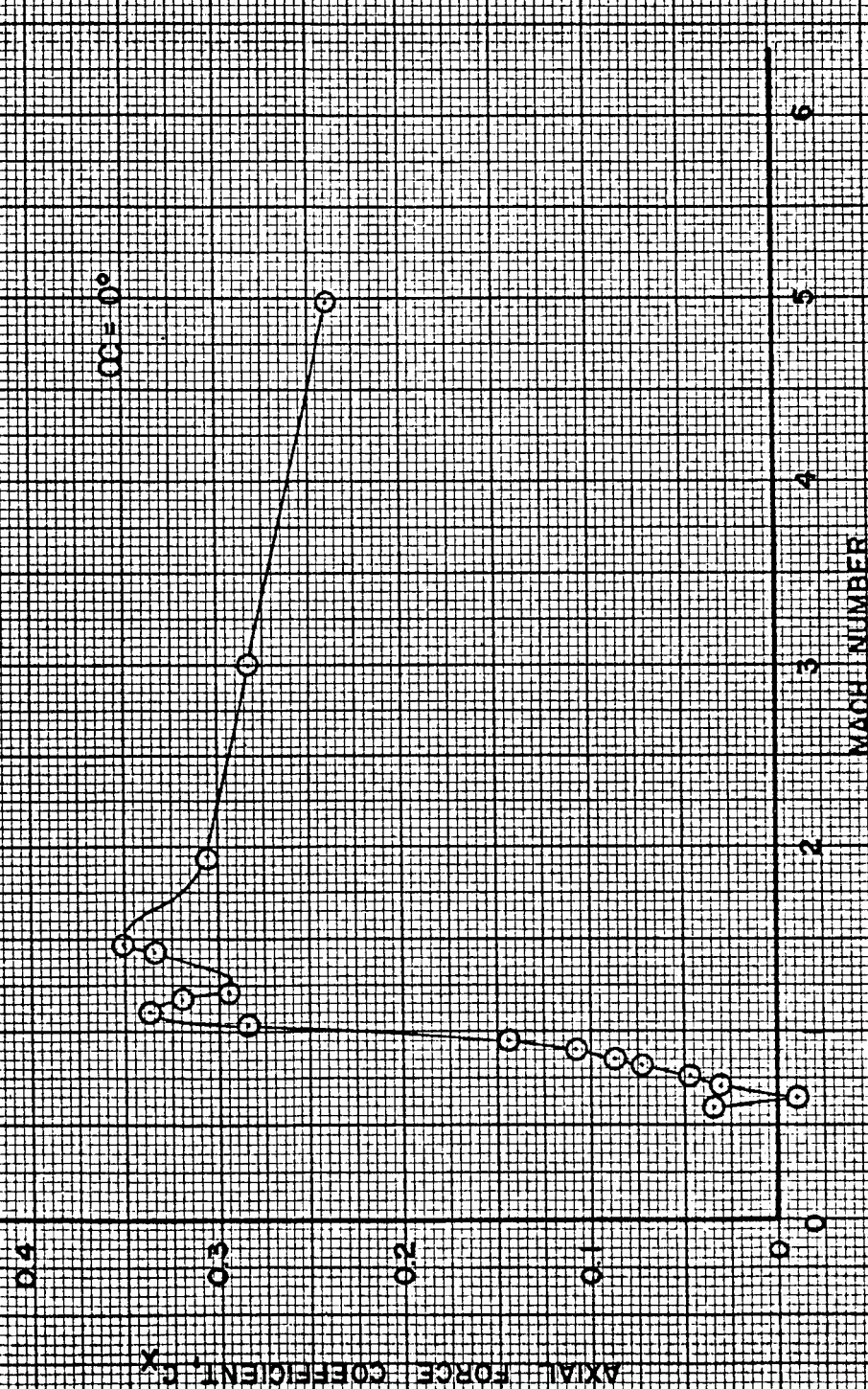


FIGURE 10. VARIATION OF AXIAL FORCE COEFFICIENT WITH MACH NUMBER
— CONFIGURATION B —

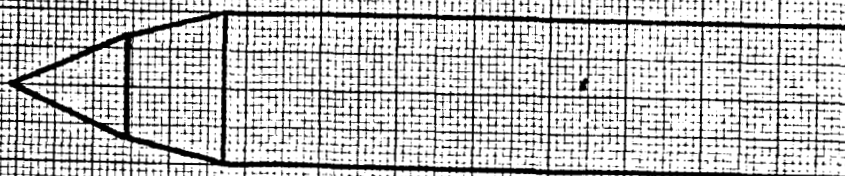
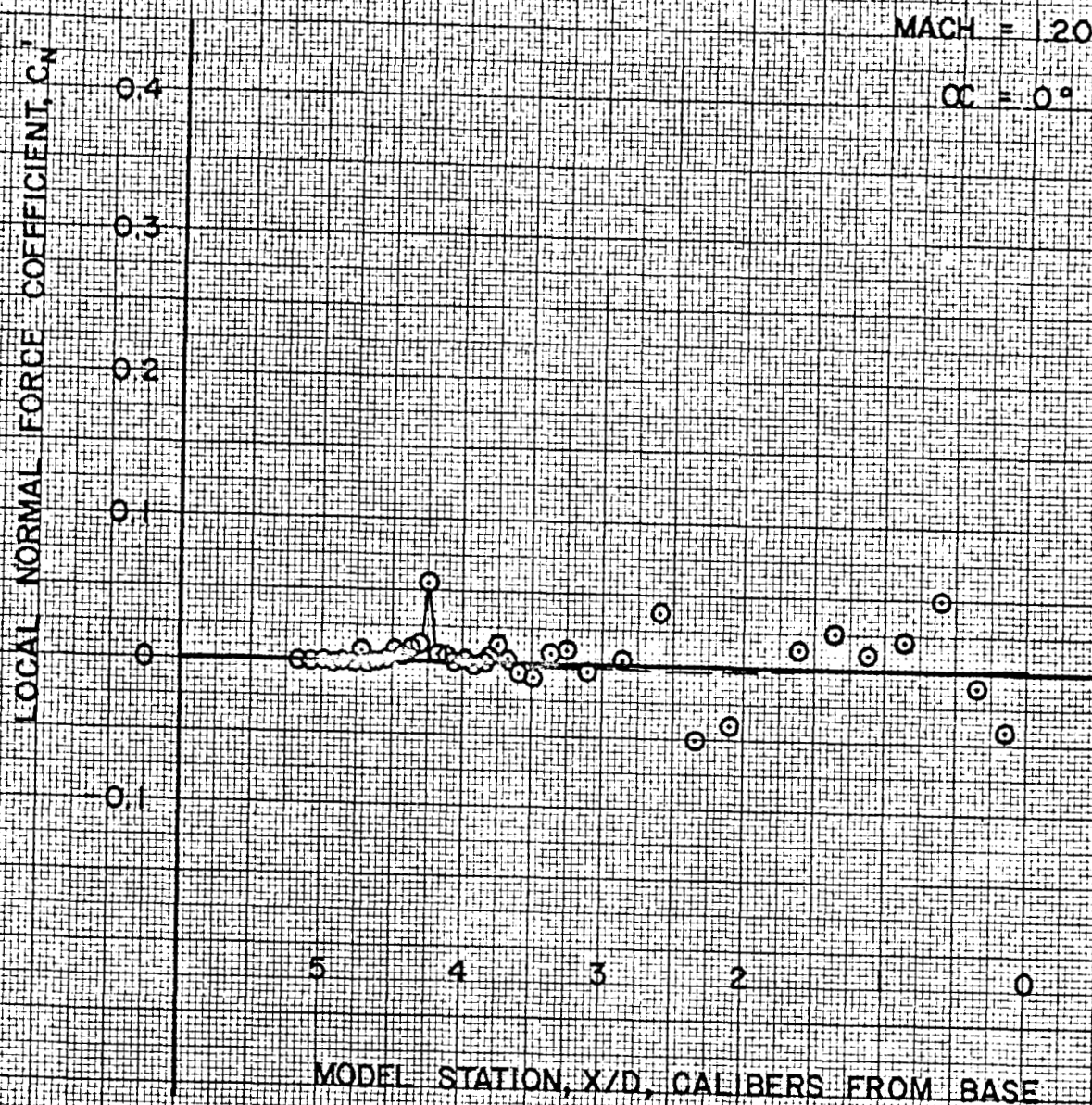


FIGURE 11. DISTRIBUTION OF LOCAL NORMAL FORCE COEFFICIENTS
— CONFIGURATION B —

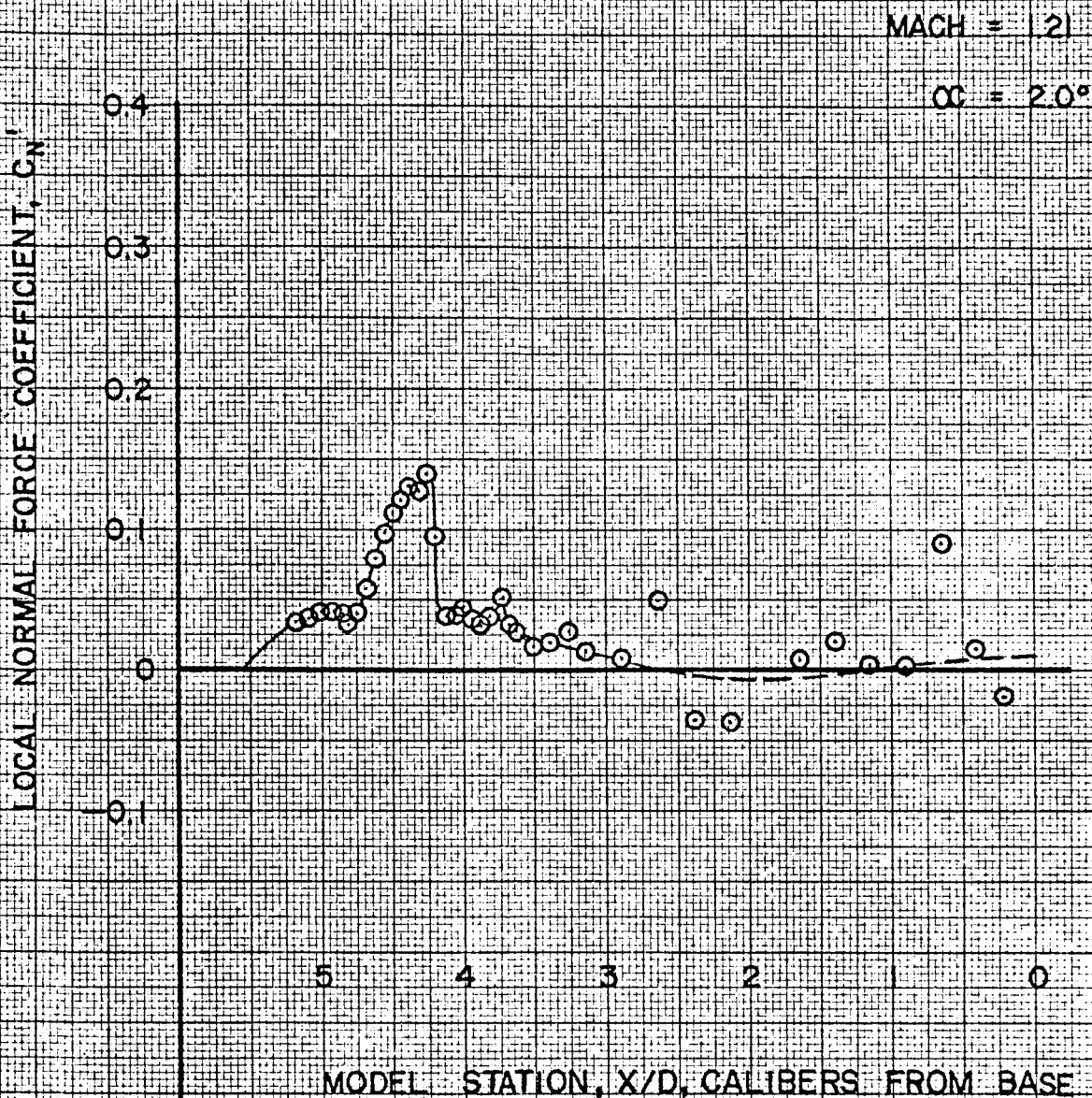


FIGURE 11 DISTRIBUTION OF LOCAL NORMAL FORCE COEFFICIENTS

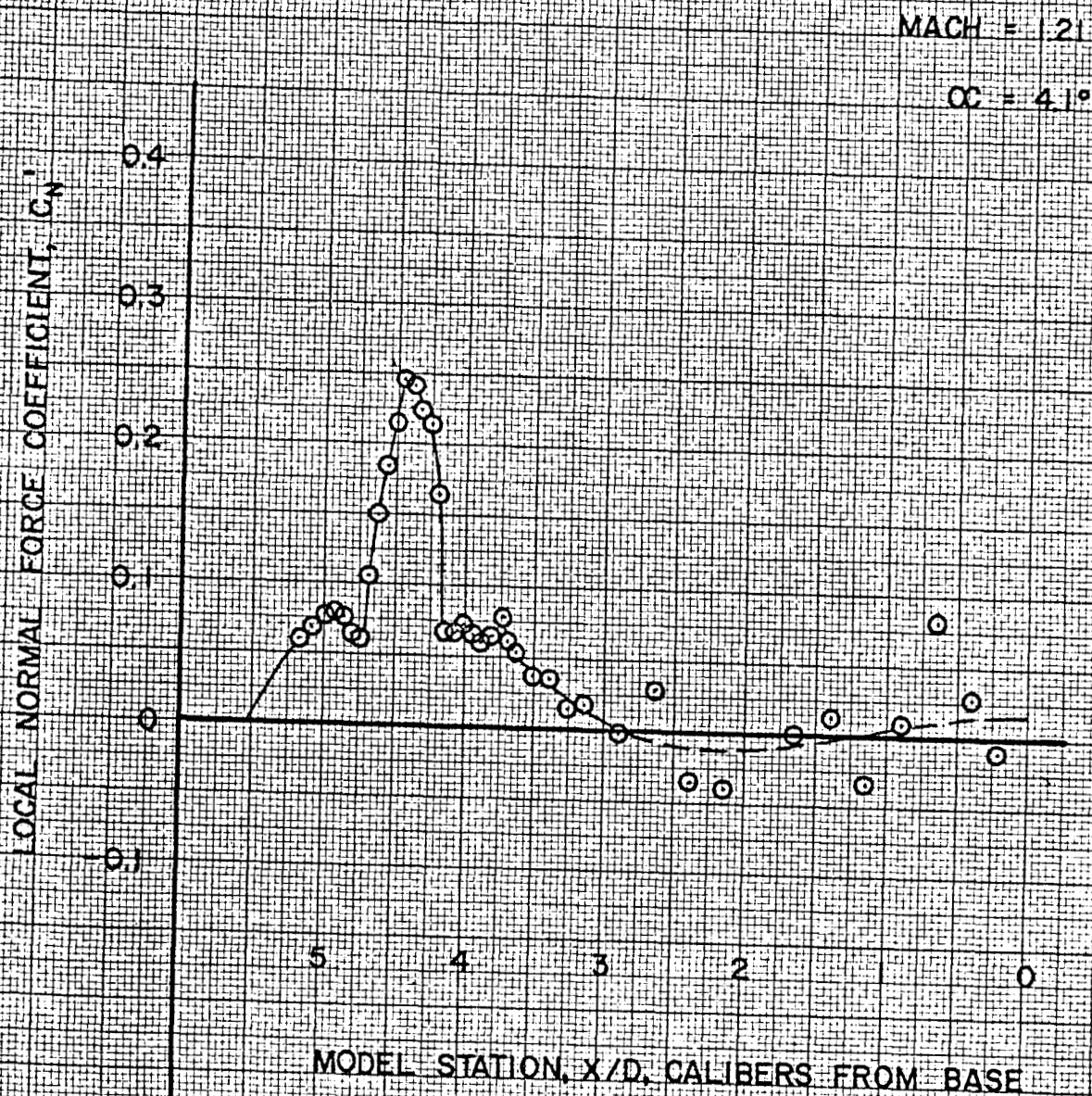


FIGURE II. DISTRIBUTION OF LOCAL NORMAL FORCE COEFFICIENTS
— CONFIGURATION B —

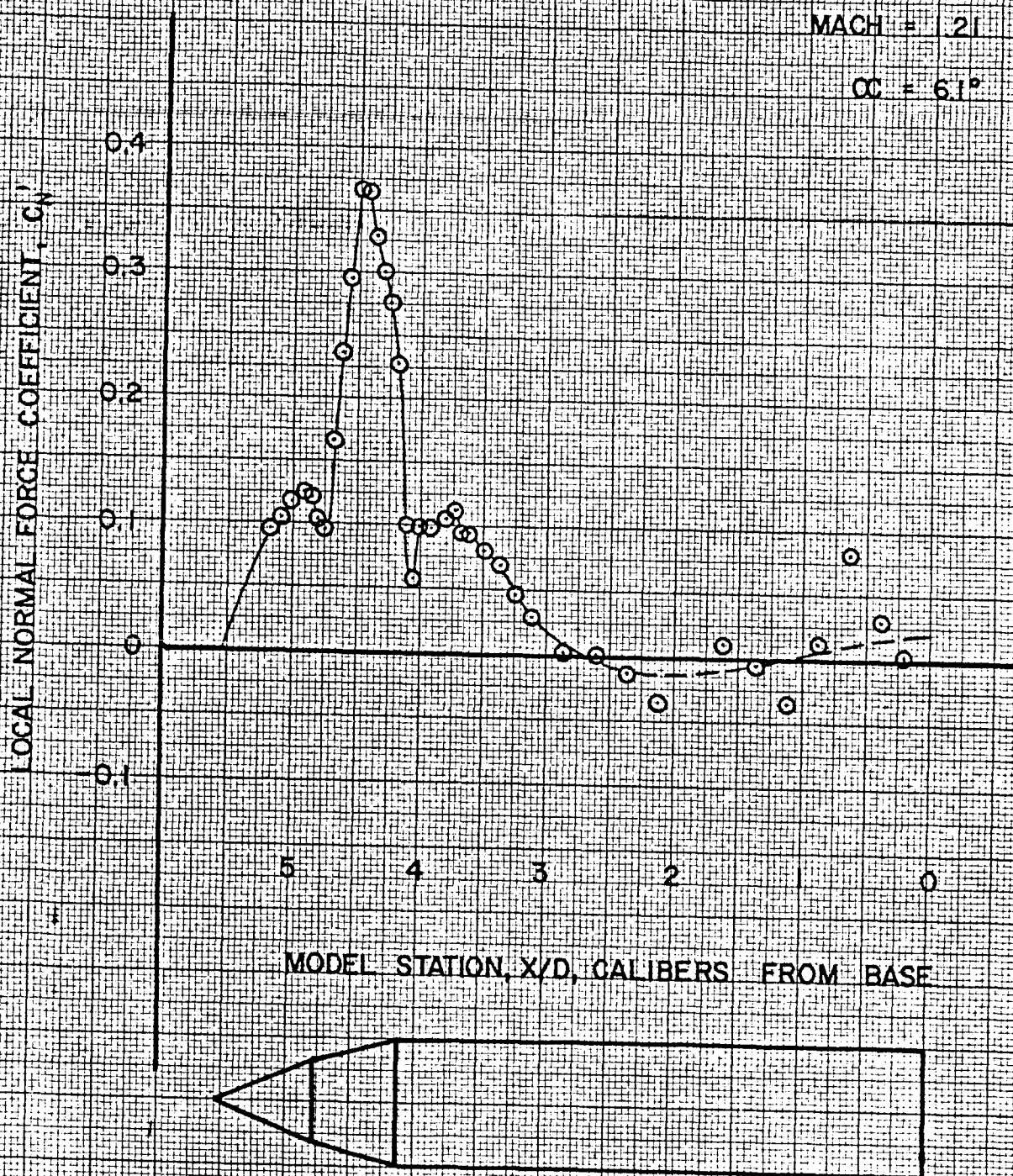


FIGURE 11 DISTRIBUTION OF LOCAL NORMAL FORCE COEFFICIENTS
— CONFIGURATION B —

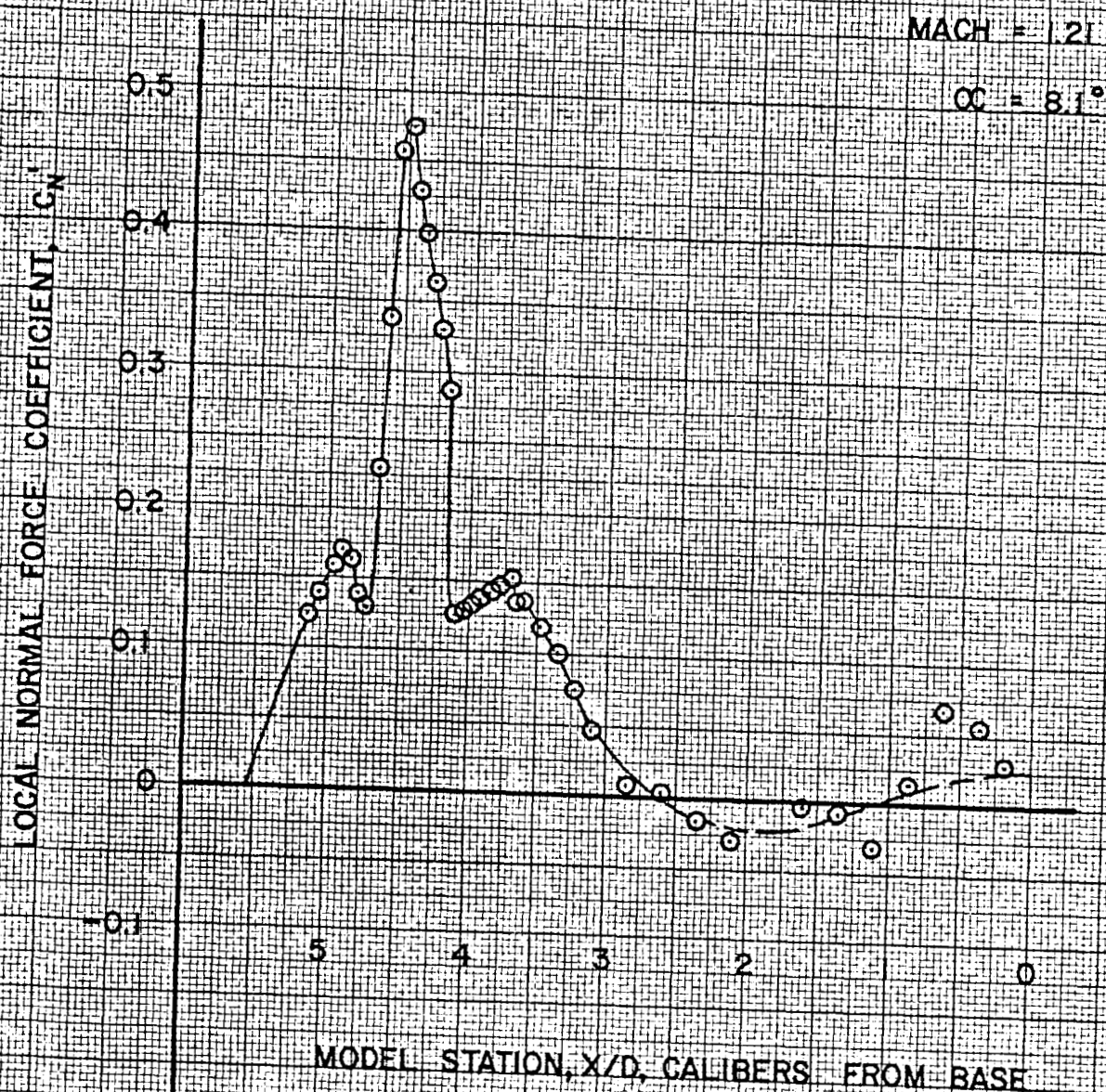


FIGURE II DISTRIBUTION OF LOCAL NORMAL FORCE COEFFICIENTS
— CONFIGURATION B —

K-E

16 X 32 CM

KENNEL & ESPER CO.

MADE IN U.S.A.
48 1243

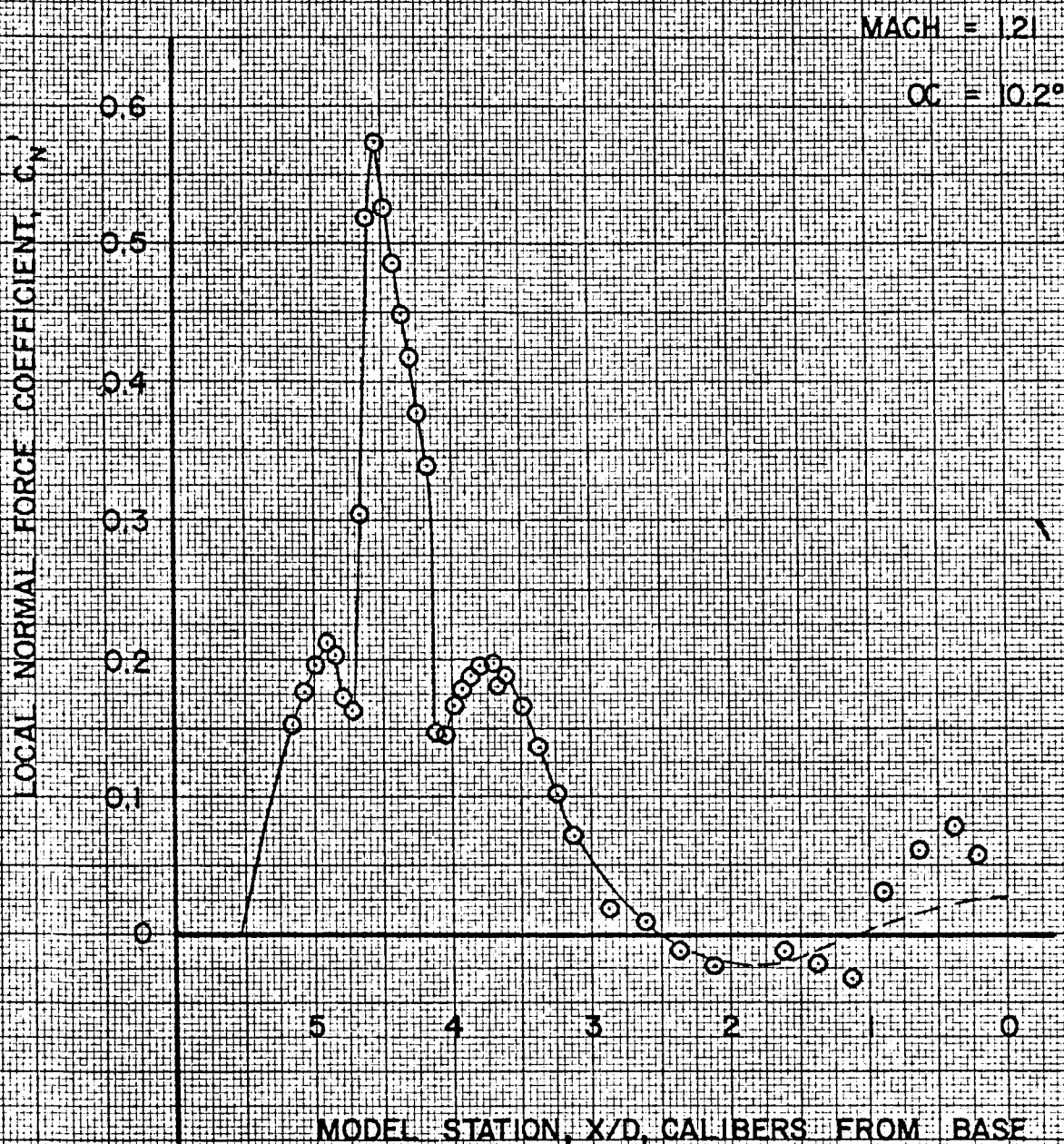


FIGURE II DISTRIBUTION OF LOCAL NORMAL FORCE COEFFICIENTS
— CONFIGURATION B —

K-E
10 X 10 TO THE CENTIMETER
VE 1213

LOCAL NORMAL FORCE COEFFICIENT, C_n

MACH = 1.46

$\alpha = -0.2^\circ$

MODEL STATION, X/D , CALIBERS FROM BASE

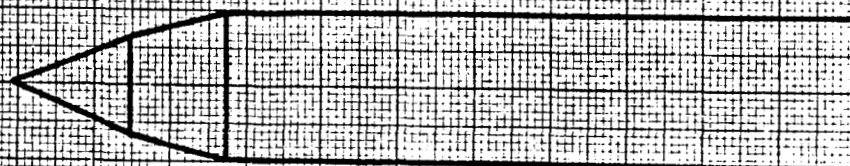


FIGURE II DISTRIBUTION OF LOCAL NORMAL FORCE COEFFICIENTS
- CONFIGURATION B -

This page intentionally left blank

K&E 18 X 52 CM
KENTLE & EBER CO.
10 X 10 TO THE CENTIMETER
NOT IN R.A.V.
AP 12/73

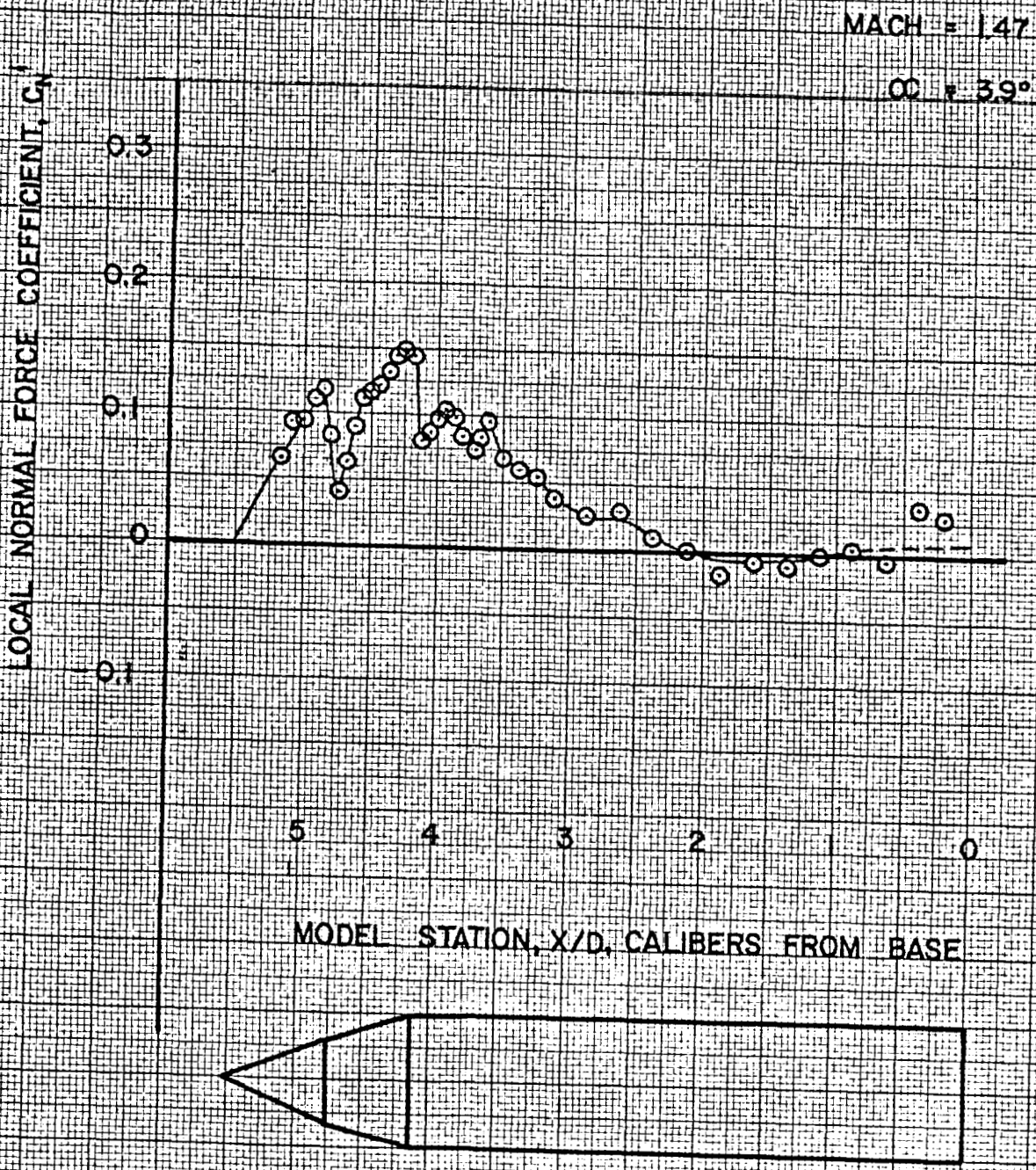


FIGURE II. DISTRIBUTION OF LOCAL NORMAL FORCE COEFFICIENTS
— CONFIGURATION B —

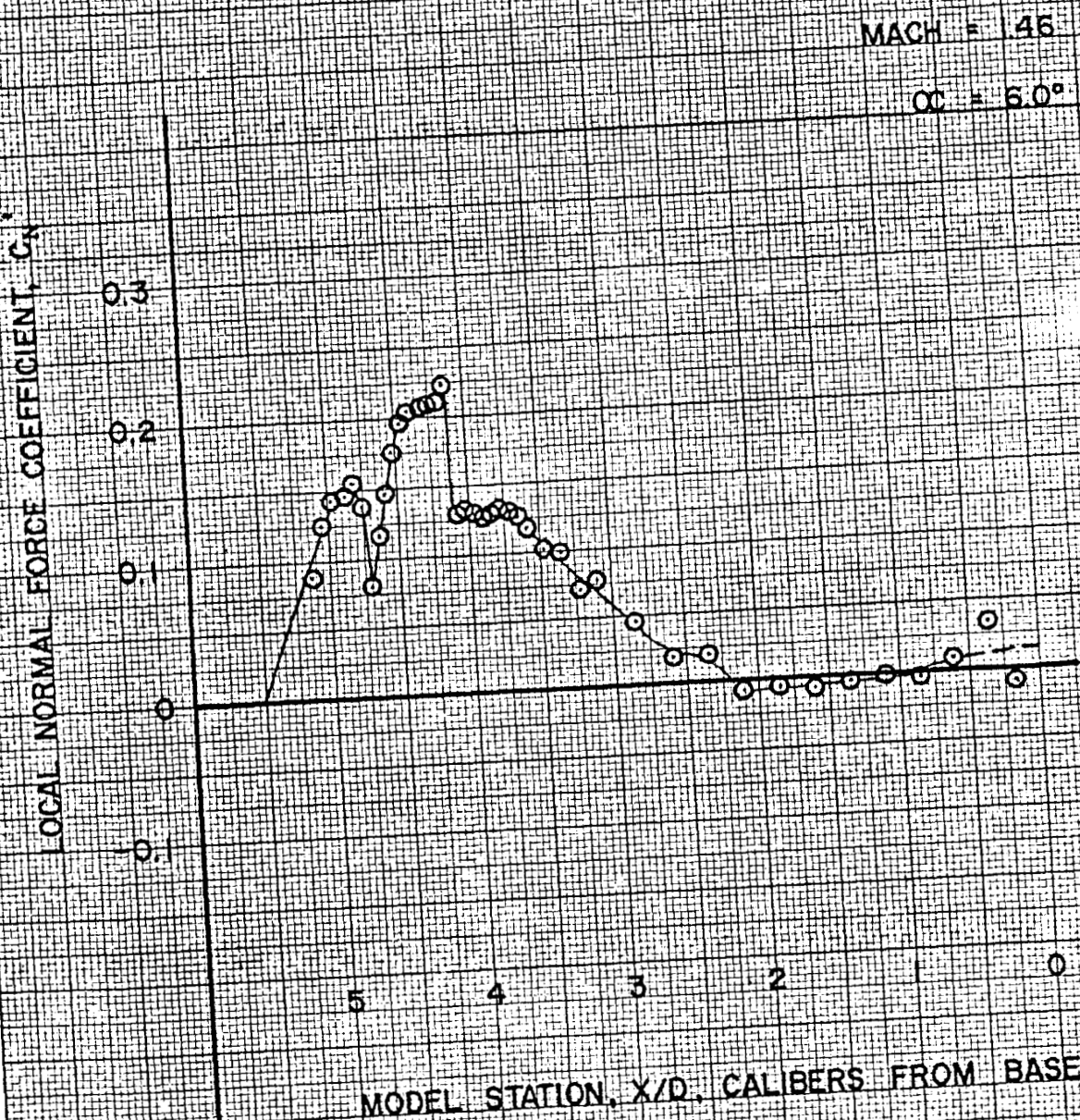


FIGURE II DISTRIBUTION OF LOCAL NORMAL FORCE COEFFICIENTS
— CONFIGURATION B —

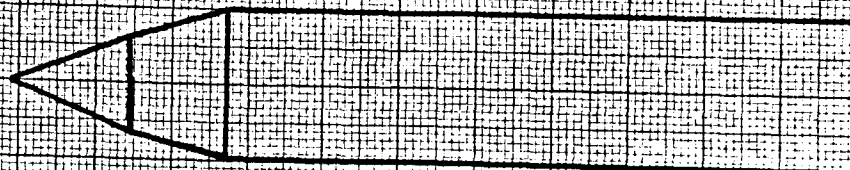
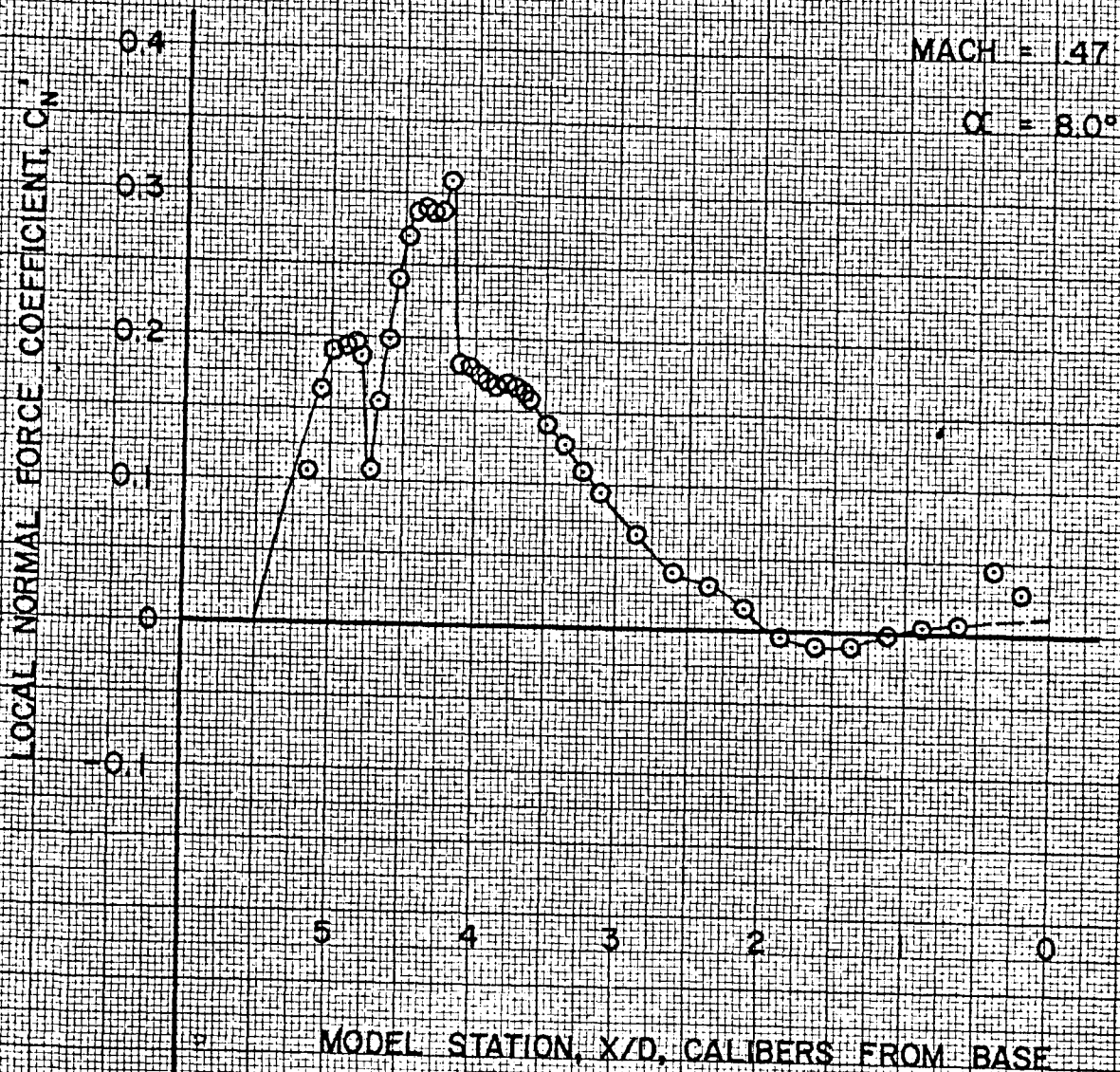
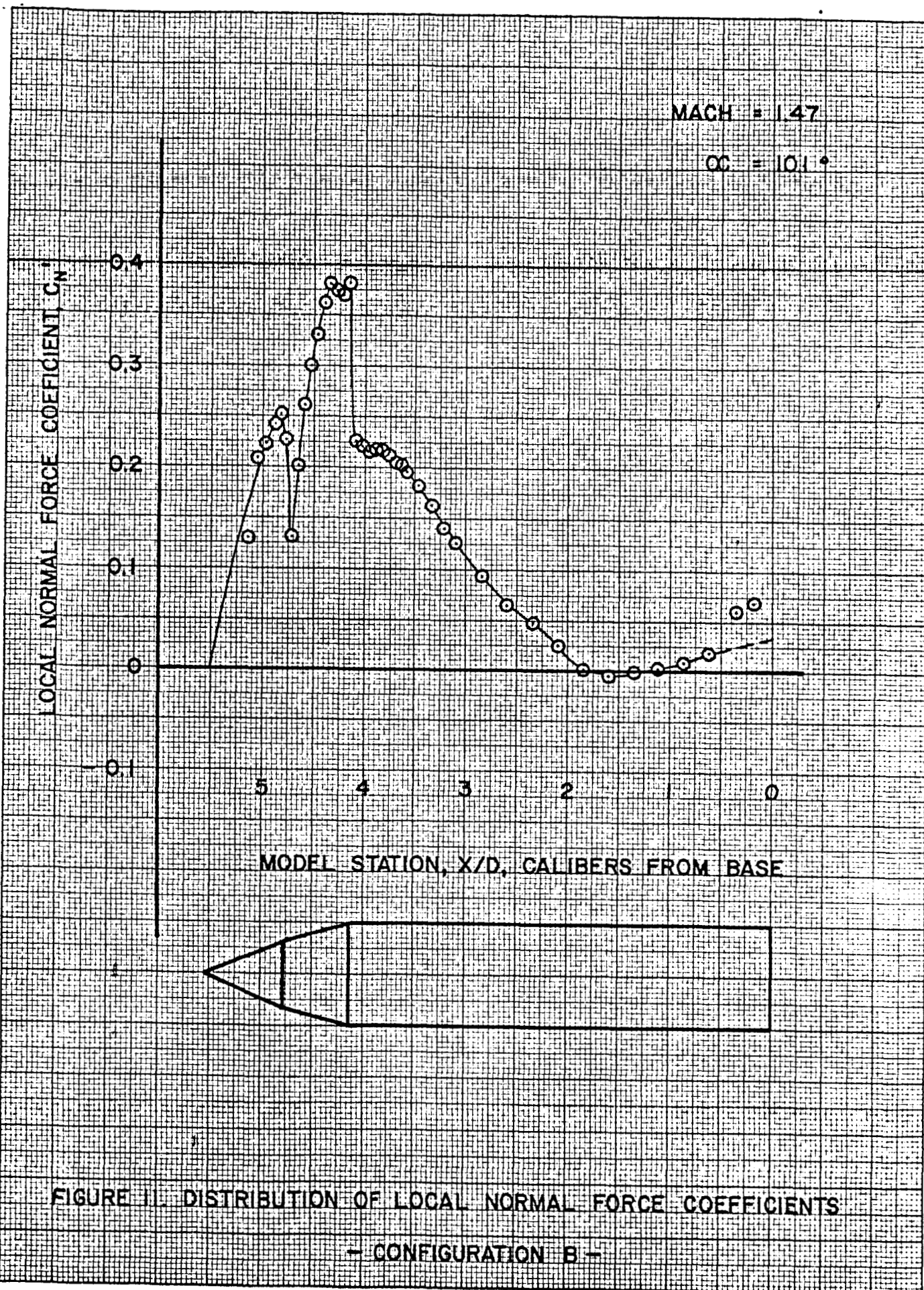


FIGURE 11. DISTRIBUTION OF LOCAL NORMAL FORCE COEFFICIENTS
— CONFIGURATION B —



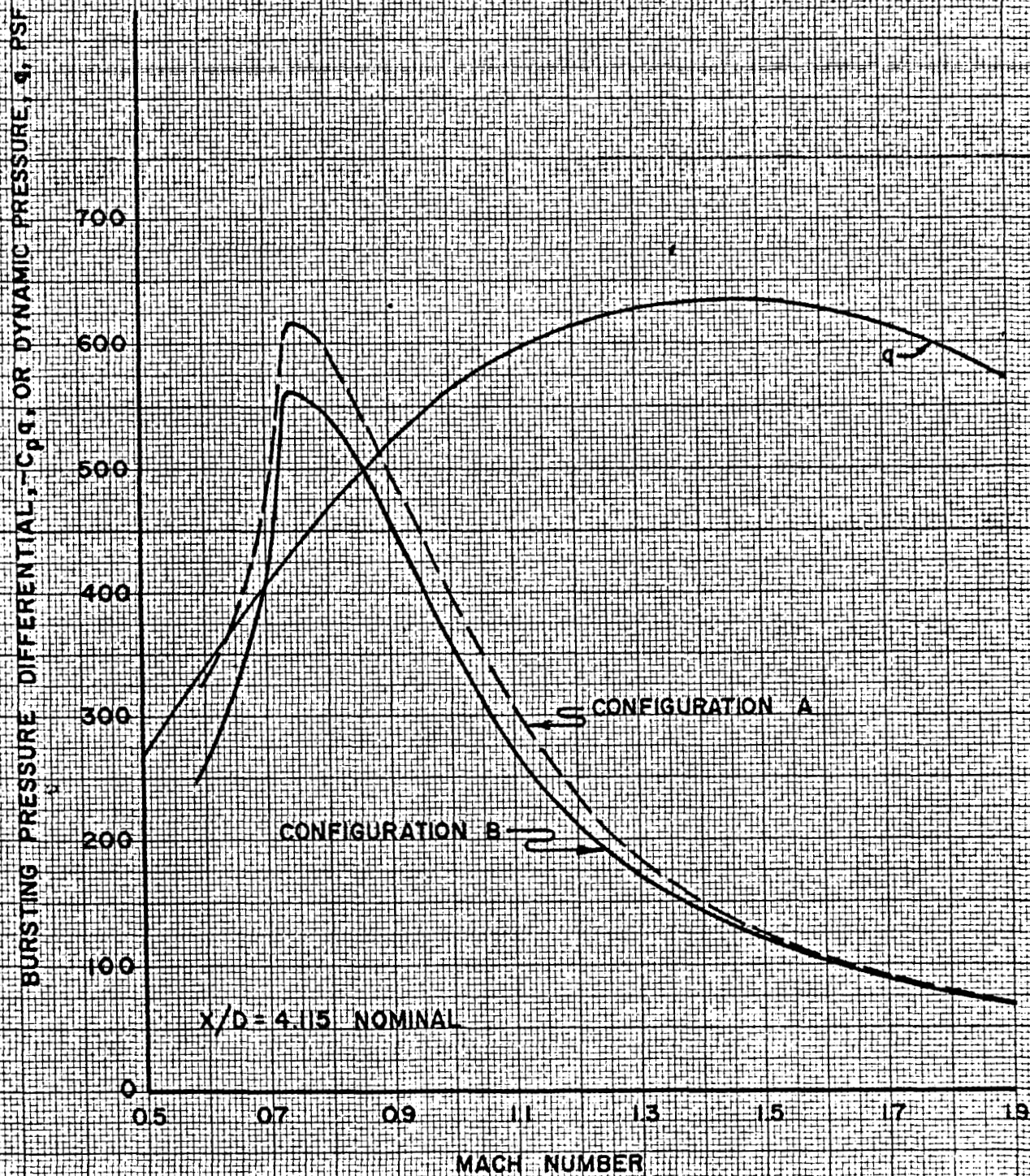


FIGURE 12. VARIATION OF BURSTING PRESSURE DIFFERENTIAL FOR TYPICAL SATURN IB TRAJECTORY

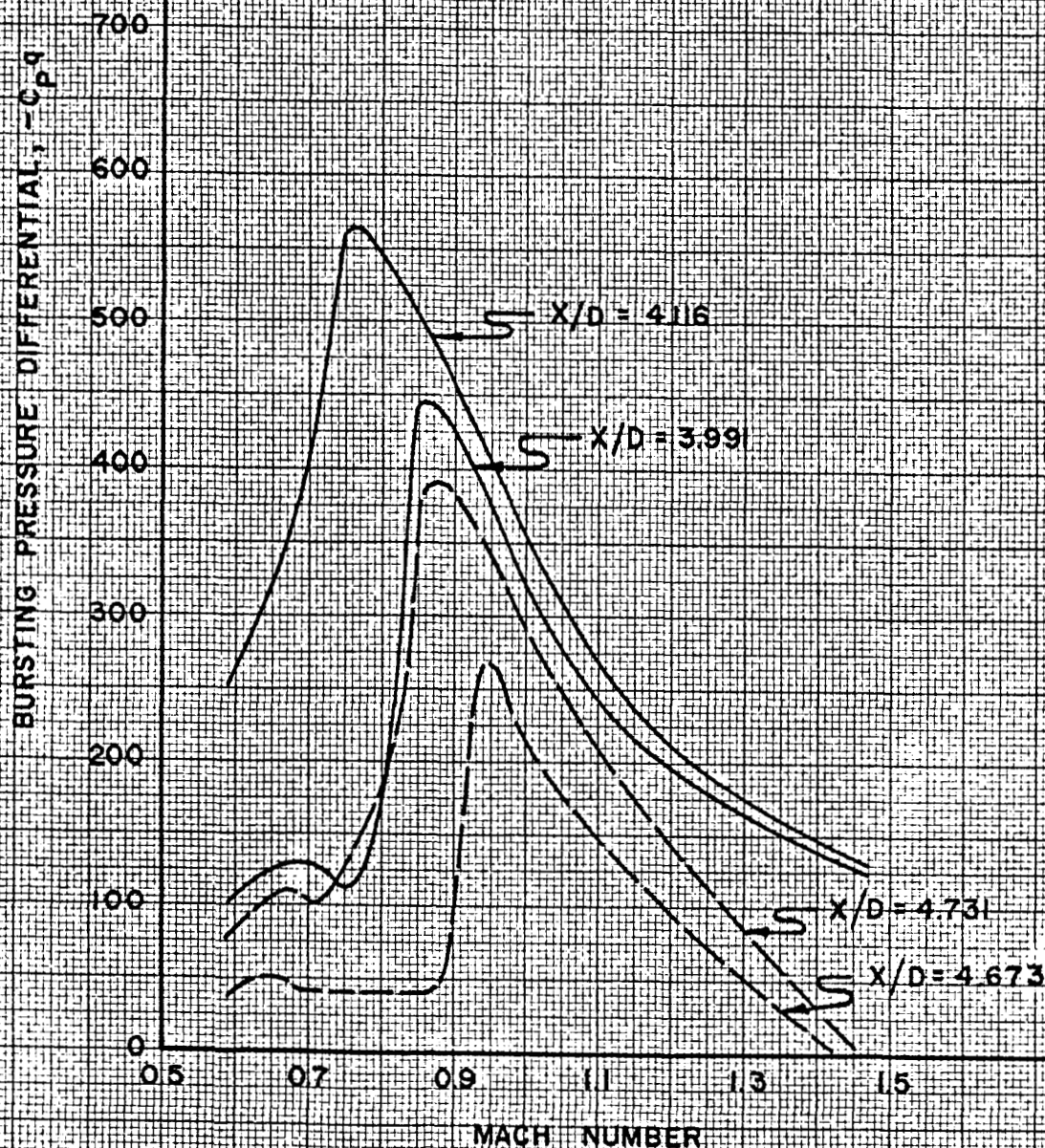


FIGURE 13. VARIATION OF BURSTING PRESSURE DIFFERENTIAL
FOR TYPICAL SATURN IB TRAJECTORY
— CONFIGURATION B —

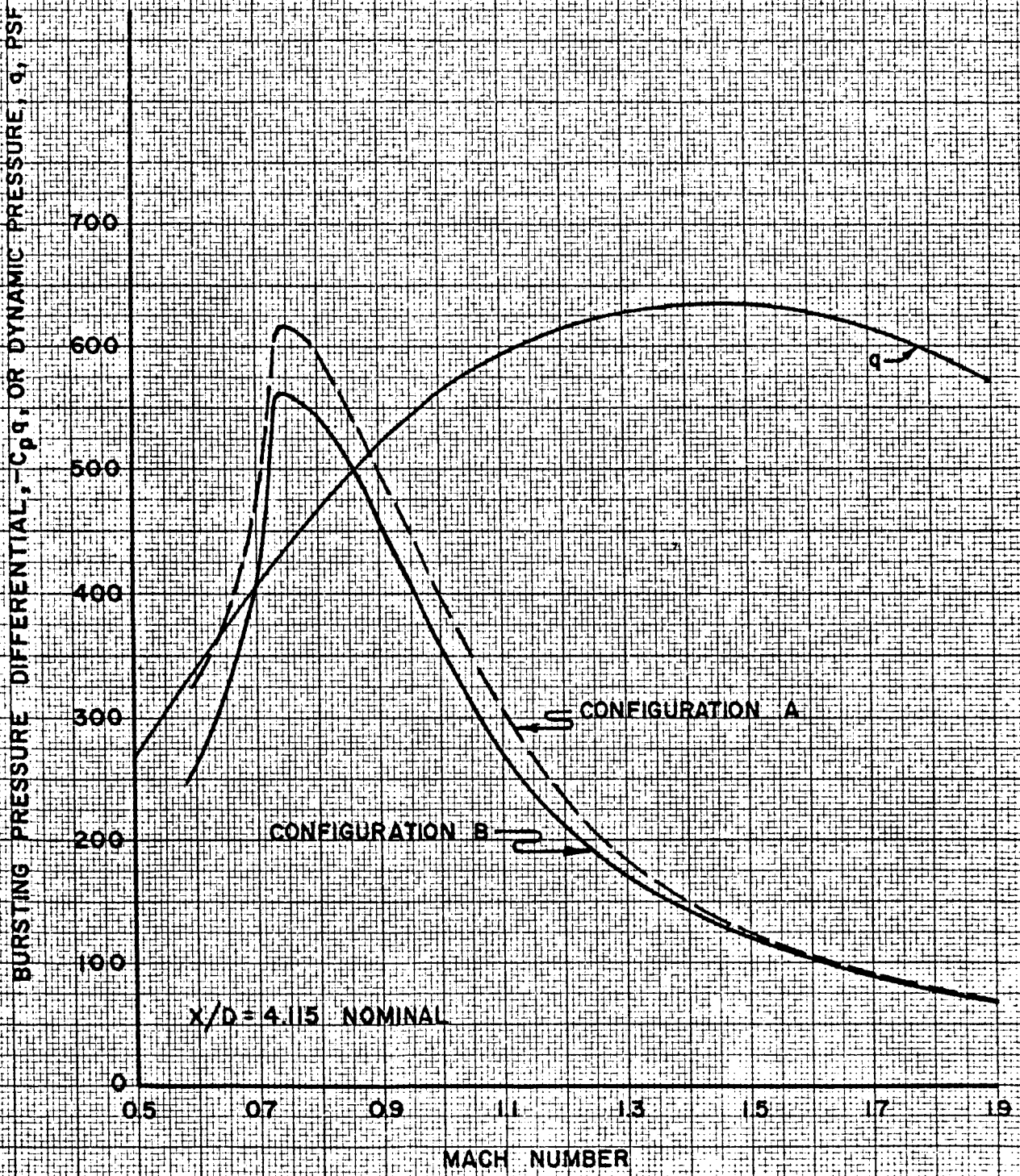


FIGURE 12. VARIATION OF BURSTING PRESSURE DIFFERENTIAL
FOR TYPICAL SATURN IB TRAJECTORY

K&E

18 X 53 CM.

KENNEL & EBER CO.

PRINTED IN U.S.A.
NO 1213

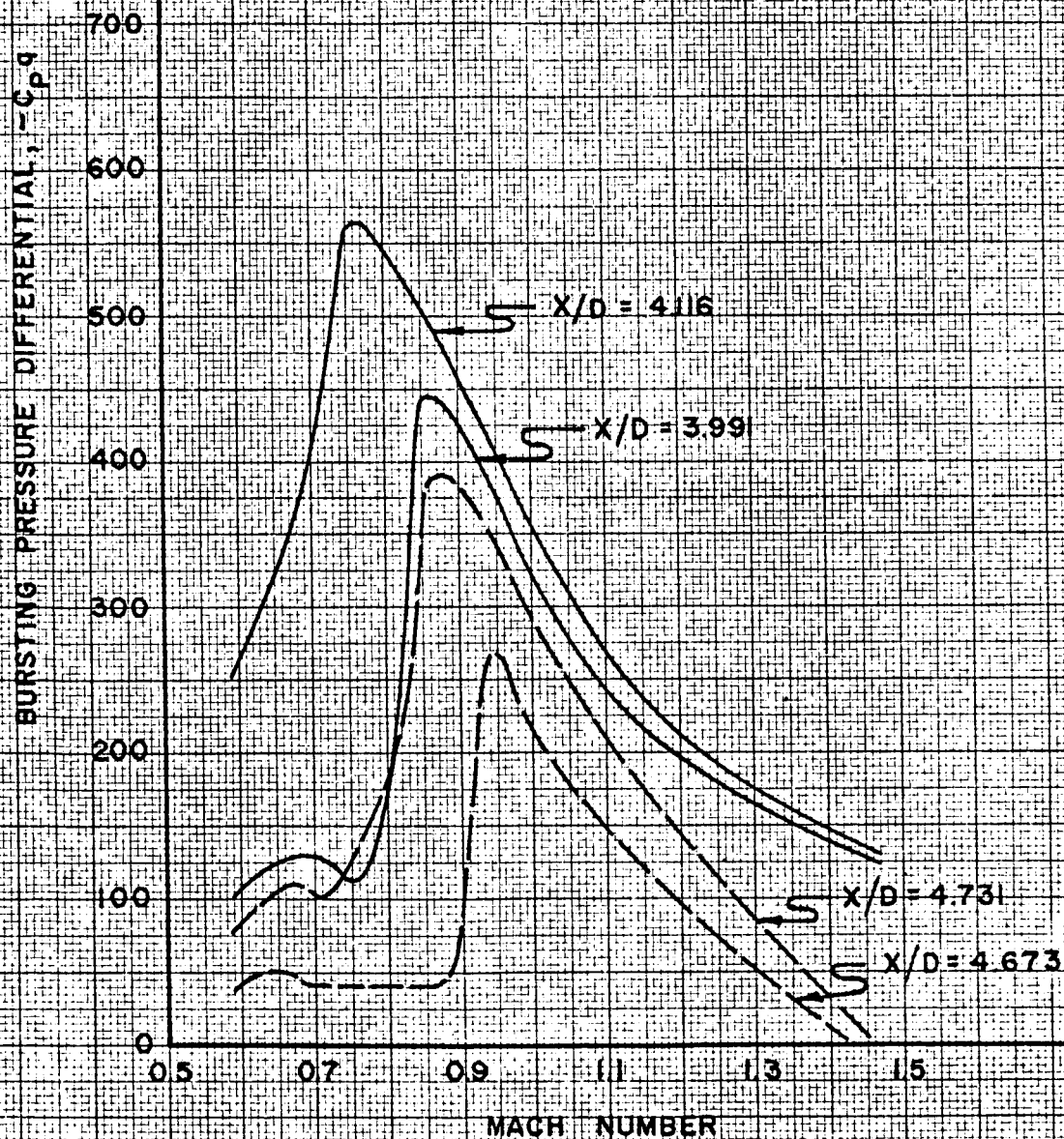


FIGURE 13. VARIATION OF BURSTING PRESSURE DIFFERENTIAL
FOR TYPICAL SATURN IB TRAJECTORY
— CONFIGURATION B —

Section 4

TABULATED PRESSURE AND NORMAL FORCE COEFFICIENTS

TABLE 2

TABULATED PRESSURE COEFFICIENTS

MACH NO. = 1.200 ATTACK ANGLE = -0.072									
RUN NOS =									
ROLL ANGLES = 0.									
Q VALUES =									
	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8	
X/D	CN LOCAL								
0.1900	-0.0411	0.0052	0.0192	0.0179	-0.0187	-0.0248	-0.0248	-0.0213	139
0.3690	-0.0064	0.0235	0.0287	0.0044	0.0096	0.0087	0.0035	0.0091	133
0.6190	0.0500	-0.0195	0.0057	0.0110	0.0200	0.0431	0.0317	0.0091	180.0
0.8690	0.0163	-0.0156	-0.0035	0.0215	0.0009	0.0022	0.0352	0.0074	
1.1190	0.0135	-0.0252	0.0070	0.0144	0.0318	0.0200	0.0113	-0.0077	
1.3680	0.0239	-0.0404	-0.0374	-0.0505	-0.0294	-0.0235	0.0017	0.0096	
1.6180	0.0173	-0.0678	-0.0396	-0.0491	-0.0462	-0.0209	-0.0230	0.0195	
1.8670	-0.0892	0.3223	-0.0775	-0.0711	-0.0732	-0.0718	-0.0999	-0.1034	
2.1180	-0.0422	-0.0605	-0.0618	-0.0675	-0.1003	-0.1059	-0.0910	-0.0915	
2.3680	-0.0484	-0.0339	-0.0318	-0.0320	-0.0497	-0.0558	-0.0627	-0.0772	
2.6180	0.0397	-0.0557	-0.1170	-0.0667	-0.0476	-0.0432	-0.0531	-0.0629	
2.8670	0.0045	-0.0748	-0.0739	-0.0719	-0.0772	-0.0698	-0.0727	-0.0590	
3.1170	-0.0036	-0.1031	-0.0983	-0.1030	-0.1117	-0.1116	-0.1010	-0.0932	
3.3670	0.0137	-0.1326	-0.1335	-0.1221	-0.1173	-0.1155	-0.1245	-0.1127	
3.6160	0.0067	-0.1627	-0.1509	-0.1438	-0.1370	-0.1360	-0.1498	-0.1496	
3.8670	-0.0142	-0.1531	-0.1566	-0.1608	-0.1679	-0.1631	-0.1759	-0.1726	
4.1160	-0.0084	-0.1818	-0.1763	-0.1841	-0.1927	-0.1852	-0.1881	-0.1790	
4.3670	0.0039	-0.2066	-0.2064	-0.2112	-0.2026	-0.2053	-0.2076	-0.2038	
4.6170	0.0132	-0.2266	-0.2221	-0.2203	-0.2163	-0.2197	-0.1937	-0.2172	
4.8680	0.0039	-0.2493	-0.2500	-0.2517	-0.2494	-0.2525	-0.2450	-0.2459	
5.1180	-0.0020	-0.2640	-0.2583	-0.2652	-0.2618	-0.2647	-0.2637	-0.2611	
5.3680	0.0002	-0.2910	-0.2840	-0.2892	-0.2817	-0.2827	-0.2897	-0.2854	
5.6180	0.0073	-0.3337	-0.3076	-0.3097	-0.2945	-0.3018	-0.3067	-0.2954	
5.8680	-0.0011	-0.3250	-0.3233	-0.3228	-0.3121	-0.3197	-0.3228	-0.3149	
6.1180	0.0059	-0.3434	-0.3526	-0.3389	-0.3321	-0.3333	-0.3347	-0.3388	
6.3680	0.0065	0.1610	0.1726	0.1655	0.1682	0.1703	0.1774	0.1727	
6.6180	0.0532	0.1550	-0.0092	0.1467	0.1544	0.1542	0.1556	0.1535	
6.8680	0.0116	0.1219	0.1207	0.1236	0.1316	0.1342	0.1359	0.1315	
7.1180	0.0102	0.0866	0.0894	0.0913	0.0958	0.0971	0.1045	0.0970	
7.3680	0.0078	0.0487	0.0523	0.0555	0.0600	0.0579	0.0602	0.0613	
7.6180	0.0092	-0.0013	0.0153	0.0188	0.0265	0.0261	0.0261	0.0243	
7.8680	0.0015	-0.0361	-0.0323	-0.0271	-0.0242	-0.0279	-0.0270	-0.0248	
8.1180	-0.0004	-0.1030	-0.1013	-0.0963	-0.0872	-0.0947	-0.0986	-0.0943	
8.3680	0.0009	-0.1660	-0.1658	-0.1590	-0.1590	-0.1596	-0.1655	-0.1636	
8.6180	0.0077	-0.2316	-0.2278	-0.2183	-0.2198	-0.2136	-0.2046	-0.2221	
8.8680	-0.0030	0.3754	0.3780	0.3835					

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. 1.200	ATTACK ANGLE = 1.972												
RUN NOS	98	104	110	116	122	128	134	140					
ROLL ANGLES	0.	18.9	32.0	62.1	117.9	148.0	161.1	180.0					
Q VALUES	461.3994	459.4908	459.7781	458.7830	459.2422	459.7429	461.4873	460.3918					
X/D	CM LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8				
0.1900	-0.0195	-0.0043	0.0109	0.0022	-0.0044	-0.0157	-0.0100	-0.0134	-0.0161				
0.3690	0.0140	0.0061	0.0052	-0.0087	-0.0061	-0.0048	0.0122	0.0173	0.0148				
0.6190	0.0867	-0.0104	-0.0157	-0.0169	-0.0092	0.0379	0.0447	0.0785	0.0603				
0.8690	-0.0025	0.0108	0.0026	0.0091	0.0113	-0.0074	0.0252	0.0091	-0.0109				
1.1190	-0.0000	-0.0230	0.0039	0.	0.0188	0.0209	-0.0030	-0.0013	0.0035				
1.3680	0.0162	-0.0277	-0.0418	-0.0511	-0.0349	-0.0649	-0.0339	0.	-0.0299				
1.6180	0.0054	-0.0533	-0.0353	-0.0368	-0.0537	-0.0327	-0.0382	-0.0516	-0.1107				
1.8670	-0.01506	0.4945	-0.0758	-0.0624	-0.0737	-0.0919	-0.0995	-0.1318	-0.0926				
2.1180	-0.0442	-0.0273	-0.0587	-0.0628	-0.0683	-0.0926	-0.0861	-0.0999	-0.0926				
2.3680	-0.0409	-0.0134	-0.0231	-0.0105	-0.0352	-0.0439	-0.0435	-0.0606	-0.0800				
2.6180	0.0498	-0.0534	-0.1048	-0.0659	-0.0444	-0.0243	-0.0274	-0.0229	-0.0605				
2.8670	0.0056	-0.0742	-0.0779	-0.0798	-0.0761	-0.0617	-0.0796	-0.0684	-0.0518				
3.1170	0.0109	-0.1071	-0.1109	-0.1126	-0.1057	-0.1104	-0.0979	-0.0999	-0.0892				
3.2410	0.0232	-0.1163	-0.1397	-0.1348	-0.1257	-0.1213	-0.1048	-0.1164	-0.1040				
3.3670	0.0156	-0.1510	-0.1531	-0.1544	-0.1462	-0.1395	-0.1366	-0.1384	-0.1435				
3.4910	0.0122	-0.1618	-0.1658	-0.1693	-0.1683	-0.1712	-0.1488	-0.1510	-0.1596				
3.6160	0.0299	-0.2015	-0.1933	-0.2004	-0.1913	-0.1767	-0.1821	-0.1634	-0.1624				
3.6780	0.0317	-0.2197	-0.2207	-0.2199	-0.2223	-0.2047	-0.2021	-0.1850	-0.1876				
3.7410	0.0491	-0.2396	-0.2342	-0.2299	-0.2336	-0.2147	-0.2003	-0.1678	-0.1993				
3.8030	0.0374	-0.2686	-0.2642	-0.2677	-0.2606	-0.2470	-0.2316	-0.2309	-0.2288				
3.8670	0.0316	-0.2873	-0.2764	-0.2811	-0.2698	-0.2627	-0.2516	-0.2473	-0.2449				
3.9280	0.0360	-0.3098	-0.3047	-0.3071	-0.2872	-0.2786	-0.2734	-0.2685	-0.2688				
3.9910	0.0432	-0.3453	-0.3243	-0.3249	-0.3081	-0.2963	-0.2890	-0.2841	-0.2840				
4.0530	0.0334	-0.3328	-0.3374	-0.3366	-0.3330	-0.3172	-0.3055	-0.3061	-0.3053				
4.1160	0.0346	-0.3524	-0.3579	-0.3489	-0.3327	-0.3172	-0.3172	-0.3252	-0.3223				
4.1830	0.0930	0.1151	0.1271	0.1195	0.1455	0.1910	0.2061	0.2054	0.2172				
4.2450	0.1408	0.0883	-0.0253	0.0968	0.1324	0.1806	0.1943	0.1750	0.2094				
4.3060	0.1295	0.0463	0.0631	0.0687	0.1063	0.1675	0.1856	0.1919	0.2011				
4.3670	0.1309	0.0199	0.0318	0.0377	0.0740	0.1401	0.1621	0.1654	0.1716				
4.4280	0.1194	-0.0117	-0.0035	-0.0026	0.0348	0.0957	0.1207	0.1220	0.1303				
4.4890	0.1112	-0.0002	-0.0387	-0.0324	0.	0.0535	0.0767	0.0829	0.0921				
4.5500	0.0947	-0.0870	-0.0805	-0.0744	-0.0492	0.0004	0.0227	0.0287	0.0343				
4.6110	0.0765	-0.1430	-0.1372	-0.1346	-0.1110	-0.0682	-0.0522	-0.0476	-0.0443				
4.6730	0.0532	-0.1911	-0.1890	-0.1858	-0.1761	-0.1402	-0.1253	-0.1268	-0.1282				
4.7310	0.0362	-0.2401	-0.2365	-0.2335	-0.2307	-0.2114	-0.1941	-0.1775	-0.2085				
4.7910	0.0294	0.3575	0.3636	0.3646	0.3775	0.3954	0.4052	0.3996	0.3997				
4.8460	0.0367	0.4559	0.4612	0.4619	0.4788	0.5015	0.5140	0.5130	0.5148				
4.9020	0.0387	0.5022	0.5087	0.5105	0.5286	0.5557	0.5688	0.5680	0.5713				
4.9880	0.0376	0.5482	0.5544	0.5561	0.5762	0.6064	0.6202	0.6212	0.6278				
5.0730	0.0328	0.5893	0.5984	0.5991	0.6199	0.6509	0.6658	0.6667	0.6721				
5.1570	0.0306	0.6133	0.6186	0.6232	0.6439	0.6769	0.6990	0.7023	0.7012				

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. =	1.200	ATTACK ANGLE =	6.089										
RUN NOS =	100	106	112	118	124	130	136	142					
ROLL ANGLES =	0.	18.9	32.0	62.1	117.9	146.0	161.1	180.0					
0 VALUES =	462.4211	459.4891	458.6109	461.1158	460.2073	458.8393	460.3291	460.8911					
X/D	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8				
0.1900	0.0025	0.0048	-0.0035	-0.0166	-0.0392	-0.0570	0.0022	0.0022	0.0056				
0.3690	0.0072	0.0004	0.0022	-0.0105	0.0026	-0.0004	0.0118	0.0256	0.0646				
0.6190	0.0032	0.0065	-0.0065	-0.0078	-0.0344	0.0200	0.0614	0.0721	0.0590				
0.8690	0.0078	-0.0048	-0.0044	-0.0113	-0.0017	0.0135	-0.0035	-0.0061	-0.0048				
1.1190	-0.0368	-0.0082	-0.0070	-0.0074	0.0039	-0.0483	-0.0257	-0.0330	-0.0174				
1.3690	-0.0055	-0.0346	-0.0235	-0.0257	-0.0469	-0.0740	-0.0213	-0.0226	-0.0213				
1.6190	0.0090	-0.0389	-0.0370	-0.0488	-0.0719	-0.0487	-0.0279	-0.0513	-0.0490				
1.8670	-0.0249	1.3115	-0.0584	-0.0658	-0.0921	-0.1288	-0.1054	-0.0917	-0.0907				
2.1190	-0.0331	-0.0389	-0.0693	-0.0776	-0.0907	-0.1005	-0.1038	-0.1051	-0.0773				
2.3690	-0.0350	-0.0156	-0.0449	-0.0493	-0.0504	-0.0535	-0.0436	-0.0595	-0.0738				
2.6190	-0.0020	-0.0186	-0.0649	-0.0349	-0.0697	-0.0935	-0.0366	-0.0300	-0.0482				
2.8670	0.0024	-0.0666	-0.0758	-0.0881	-0.1039	-0.1122	-0.0881	-0.0816	-0.0495				
3.1170	0.0260	-0.1051	-0.1107	-0.1164	-0.1328	-0.1283	-0.0964	-0.0816	-0.0695				
3.2410	0.0443	-0.1259	-0.1364	-0.1439	-0.1604	-0.1366	-0.1034	-0.0968	-0.0903				
3.3670	0.0682	-0.1635	-0.1765	-0.1770	-0.1828	-0.1501	-0.1117	-0.1164	-0.1051				
3.4910	0.0773	-0.1808	-0.1905	-0.1992	-0.2104	-0.1696	-0.1313	-0.1211	-0.1116				
3.6160	0.0931	-0.1979	-0.2027	-0.2198	-0.2370	-0.1746	-0.1359	-0.1348	-0.1145				
3.6780	0.0935	-0.2260	-0.2310	-0.2443	-0.2521	-0.2031	-0.1573	-0.1534	-0.1388				
3.7410	0.1124	-0.2520	-0.2519	-0.2621	-0.2810	-0.2178	-0.1725	-0.1439	-0.1557				
3.8030	0.1046	-0.2749	-0.2845	-0.2970	-0.3103	-0.2450	-0.2049	-0.1987	-0.1865				
3.8670	0.0986	-0.2883	-0.2932	-0.3092	-0.3198	-0.2584	-0.2215	-0.2139	-0.2034				
3.9280	0.0960	-0.3100	-0.3167	-0.3385	-0.3349	-0.2766	-0.2455	-0.2443	-0.2295				
3.9910	0.0976	-0.3498	-0.3415	-0.3638	-0.3535	-0.2969	-0.2713	-0.2699	-0.2542				
4.0530	0.0575	-0.1489	-0.3706	-0.3856	-0.3768	-0.3181	-0.2988	-0.2921	-0.2807				
4.1160	0.1003	-0.3882	-0.3906	-0.4023	-0.3821	-0.3329	-0.3094	-0.3018	-0.2989				
4.1830	0.2310	0.0305	0.0505	0.0628	0.1010	0.2121	0.2601	0.2675	0.2772				
4.2450	0.2805	-0.0052	-0.0592	0.0405	0.0893	0.2151	0.2680	0.2497	0.2894				
4.3060	0.3054	-0.0406	-0.0375	-0.0813	0.0884	0.2208	0.2758	0.2884	0.3011				
4.3670	0.3348	-0.0692	-0.0662	-0.0484	0.0589	0.2164	0.2741	0.2914	0.3011				
4.4280	0.3700	-0.1046	-0.0989	-0.0867	-0.0139	0.2095	0.2688	0.2853	0.2954				
4.4890	0.3702	-0.1500	-0.1280	-0.1159	-0.0607	0.1638	0.2510	0.2667	0.2743				
4.5500	0.2980	-0.1755	-0.1642	-0.1526	-0.1053	0.0561	0.1534	0.1798	0.1939				
4.6110	0.2370	-0.2131	-0.2122	-0.2047	-0.1499	-0.0213	0.0501	0.0699	0.0916				
4.6730	0.1667	-0.2429	-0.2462	-0.2422	-0.2023	-0.1067	-0.0545	-0.0404	-0.0317				
4.7310	0.0942	-0.2679	-0.2792	-0.2811	-0.2613	-0.2086	-0.1762	-0.1433	-0.1606				
4.7910	0.1008	0.3116	0.3088	0.3160	0.3403	0.4106	0.4391	0.4420	0.4504				
4.8460	0.1195	0.3954	0.3945	0.4002	0.4317	0.5181	0.5577	0.5680	0.5743				
4.9020	0.1246	0.4347	0.4353	0.4404	0.4688	0.5682	0.6183	0.6314	0.6409				
4.9880	0.1168	0.4736	0.4762	0.4814	0.5125	0.6183	0.6741	0.6896	0.6991				
5.0730	0.1036	0.5130	0.5167	0.5207	0.5527	0.6636	0.7229	0.7399	0.7498				
5.1570	0.0937	0.5262	0.5292	0.5387	0.5782	0.7048	0.7609	0.7762	0.7815				

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. =	1.200	ATTACK ANGLE =	8.141										
RUN NOS =	101	107	113	119	125	131	137	143					
ROLL ANGLES =	0.	18.9	32.0	62.1	117.9	148.0	161.1	180.0					
Q VALUES =	462.4289	459.3670	459.3740	459.5124	459.6327	459.4537	460.4834	460.6333					
X/D	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8				
0.1900	0.0281	0.0022	-0.0148	-0.0394	-0.0531	-0.0617	0.0048	0.0126	0.0308				
0.3690	0.0547	-0.0052	-0.0108	-0.0262	-0.0091	0.0074	0.0153	0.0378	0.0824				
0.6190	0.0674	0.0138	-0.0108	-0.0188	-0.0339	-0.0061	0.0562	0.0595	0.0378				
0.8690	0.0132	0.0056	-0.0069	-0.0192	-0.0287	-0.0117	-0.0157	0.0091	0.0048				
1.1190	-0.0329	-0.0004	-0.0087	-0.0188	-0.0074	-0.0756	-0.0187	-0.0300	-0.0022				
1.3680	-0.0106	-0.0242	-0.0191	-0.0315	-0.0539	-0.0739	-0.0205	-0.0304	-0.0421				
1.6180	-0.0049	-0.0307	-0.0382	-0.0582	-0.0809	-0.0726	-0.0558	-0.0591	-0.0373				
1.8670	-0.02849	1.3063	-0.0542	-0.0682	-0.1057	-0.1604	-0.0868	-0.0799	-0.0621				
2.1180	-0.0280	-0.0407	-0.0624	-0.0798	-0.1029	-0.1176	-0.0950	-0.0952	-0.0690				
2.3680	-0.0157	-0.0147	-0.0428	-0.0564	-0.0649	-0.0723	-0.0540	-0.0587	-0.0594				
2.6180	0.0030	-0.0121	-0.0511	-0.0412	-0.0907	-0.1159	-0.0305	-0.0196	-0.0295				
2.8670	0.0077	-0.0536	-0.0694	-0.0915	-0.1251	-0.1337	-0.0793	-0.0600	-0.0373				
3.1170	0.0480	-0.0982	-0.1091	-0.1245	-0.1639	-0.1424	-0.0841	-0.0639	-0.0492				
3.2410	0.0749	-0.1293	-0.1405	-0.1531	-0.1874	-0.1455	-0.0867	-0.0761	-0.0629				
3.3670	0.0996	-0.1670	-0.1776	-0.1830	-0.2110	-0.1564	-0.0932	-0.0921	-0.0790				
3.4910	0.1191	-0.1864	-0.1964	-0.2116	-0.2445	-0.1725	-0.1085	-0.0952	-0.0842				
3.6160	0.1382	-0.2040	-0.2157	-0.2342	-0.2729	-0.1817	-0.1167	-0.1034	-0.0844				
3.6780	0.1345	-0.2295	-0.2423	-0.2539	-0.2899	-0.2100	-0.1403	-0.1256	-0.1103				
3.7410	0.1545	-0.2550	-0.2597	-0.2709	-0.3107	-0.2200	-0.1495	-0.1121	-0.1251				
3.8030	0.1470	-0.2814	-0.2934	-0.3133	-0.3407	-0.2510	-0.1849	-0.1699	-0.1564				
3.8670	0.1421	-0.2939	-0.3051	-0.3304	-0.3525	-0.2645	-0.2055	-0.1860	-0.1748				
3.9280	0.1377	-0.3138	-0.3305	-0.3627	-0.3664	-0.2836	-0.2317	-0.2190	-0.2072				
3.9910	0.1322	-0.3475	-0.3584	-0.3863	-0.3772	-0.3063	-0.2597	-0.2485	-0.2359				
4.0530	0.1276	-0.3691	-0.3907	-0.4060	-0.3981	-0.3294	-0.2907	-0.2750	-0.2667				
4.1160	0.1256	-0.3924	-0.4123	-0.4243	-0.3997	-0.3385	-0.3057	-0.2982	-0.2898				
4.1830	0.2883	0.0087	0.0239	0.0297	0.0735	0.2116	0.2609	0.2947	0.3081				
4.2450	0.3315	-0.0450	-0.0552	0.0148	0.0631	0.2181	0.2944	0.2817	0.3255				
4.3060	0.3660	-0.0861	-0.0634	-0.0070	0.0674	0.2307	0.3110	0.3260	0.3442				
4.3670	0.3992	-0.1116	-0.1021	-0.0755	0.0661	0.2325	0.3136	0.3325	0.3472				
4.4280	0.4326	-0.1467	-0.1369	-0.1253	0.0322	0.2325	0.3162	0.3338	0.3485				
4.4890	0.4785	-0.1908	-0.1638	-0.1541	-0.0809	0.2342	0.3149	0.3329	0.3481				
4.5500	0.4603	-0.2107	-0.1951	-0.1664	-0.1331	0.1447	0.2931	0.3182	0.3250				
4.6110	0.3406	-0.2422	-0.2382	-0.2333	-0.1811	0.0004	0.1327	0.1669	0.2037				
4.6730	0.2302	-0.2655	-0.2670	-0.2659	-0.2251	-0.0874	-0.0100	0.0152	0.0256				
4.7310	0.1277	-0.2641	-0.2913	-0.2971	-0.2826	-0.2025	-0.1549	-0.1169	-0.1355				
4.7910	0.1379	0.2858	0.2861	0.2919	0.3104	0.4098	0.4604	0.4659	0.4735				
4.8460	0.1633	0.3633	0.3654	0.3675	0.3910	0.5167	0.5844	0.5972	0.6060				
4.9020	0.1693	0.3996	0.4015	0.3992	0.4314	0.5719	0.6446	0.6624	0.6729				
4.9680	0.1578	0.4337	0.4377	0.4375	0.4745	0.6193	0.7018	0.7219	0.7346				
5.0730	0.1399	0.4740	0.4786	0.4735	0.5133	0.6658	0.7520	0.7754	0.7848				
5.1570	0.1233	0.4632	0.4496	0.4987	0.5383	0.7076	0.7925	0.8093	0.8219				

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. =	1.200	ATTACK ANGLE =	10.183										
RUN NOS =	102	108	114	120	126	132	138	144					
ROLL ANGLES =	0.	18.9	32.0	62.1	117.9	148.0	161.1	180.0					
Q VALUES =	462.3577	459.3949	459.1477	459.8749	458.9625	458.1764	460.3367	461.1118					
X/D	GN	LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CPA			
0.1900	0.0583	0.0125	-0.0231	-0.0631	-0.0591	-0.0583	-0.0583	0.0113	0.0355	0.0691			
0.3690	0.0802	0.0030	-0.0256	-0.0523	-0.0256	-0.0148	-0.0148	0.0404	0.0499	0.0798			
0.6190	0.0626	0.0194	-0.0192	-0.0444	-0.0439	-0.0030	-0.0030	0.0078	0.0546	0.0299			
0.8690	0.0311	0.0091	-0.0166	-0.0422	-0.0409	-0.0579	-0.0579	0.0052	0.0260	0.0338			
1.1190	-0.0335	0.0004	-0.0201	-0.0366	-0.0213	-0.0927	-0.0927	-0.0404	-0.0342	-0.0048			
1.3680	-0.0225	-0.0048	-0.0279	-0.0509	-0.0695	-0.1032	-0.1032	-0.0526	-0.0334	-0.0469			
1.6180	-0.0130	-0.0108	-0.0379	-0.0658	-0.0930	-0.1153	-0.1153	-0.0630	-0.0473	-0.0243			
1.8670	-0.0298	1.2937	-0.0567	-0.0745	-0.1113	-0.1645	-0.1645	-0.1004	-0.0798	-0.0603			
2.1180	-0.0226	-0.0347	-0.0623	-0.0867	-0.1223	-0.1421	-0.1421	-0.0953	-0.0518	-0.0559			
2.3680	-0.0123	-0.0082	-0.0462	-0.0662	-0.0853	-0.1076	-0.1076	-0.0572	-0.0518	-0.0382			
2.6180	0.0084	-0.0139	-0.0427	-0.0501	-0.1088	-0.1404	-0.1404	-0.0319	-0.0096	-0.0074			
2.8670	0.0178	-0.0420	-0.0645	-0.0962	-0.1550	-0.1600	-0.1600	-0.0730	-0.0448	-0.0199			
3.1170	0.0715	-0.0910	-0.1089	-0.1319	-0.1941	-0.1587	-0.1587	-0.0721	-0.0413	-0.0234			
3.2410	0.1026	-0.1273	-0.1398	-0.1598	-0.2133	-0.1530	-0.1530	-0.0725	-0.0513	-0.0351			
3.3670	0.1373	-0.1733	-0.1807	-0.1955	-0.2451	-0.1613	-0.1613	-0.0778	-0.0678	-0.0473			
3.4910	0.1668	-0.1923	-0.2117	-0.2238	-0.2834	-0.1727	-0.1727	-0.0883	-0.0705	-0.0503			
3.6160	0.1903	-0.2085	-0.2287	-0.2554	-0.3118	-0.1820	-0.1820	-0.0941	-0.0753	-0.0512			
3.6780	0.1826	-0.2310	-0.2513	-0.2737	-0.3257	-0.2090	-0.2090	-0.1198	-0.0975	-0.0760			
3.7410	0.1996	-0.2544	-0.2692	-0.2898	-0.3458	-0.2190	-0.2190	-0.1294	-0.0888	-0.0920			
3.8030	0.1961	-0.2864	-0.3045	-0.3304	-0.3762	-0.2486	-0.2486	-0.1621	-0.1432	-0.1228			
3.8670	0.1895	-0.3037	-0.3171	-0.3509	-0.3841	-0.2651	-0.2651	-0.1835	-0.1615	-0.1458			
3.9280	0.1812	-0.3219	-0.3410	-0.3870	-0.3937	-0.2860	-0.2860	-0.2122	-0.1963	-0.1801			
3.9910	0.1685	-0.3509	-0.3654	-0.4114	-0.4054	-0.3117	-0.3117	-0.2445	-0.2316	-0.2136			
4.0530	0.1476	-0.3249	-0.3968	-0.4293	-0.4250	-0.3387	-0.3387	-0.2811	-0.2629	-0.2505			
4.1160	0.1488	-0.3839	-0.4359	-0.4379	-0.4229	-0.3435	-0.3435	-0.3024	-0.2954	-0.2767			
4.1830	0.3443	0.0160	-0.0031	-0.0096	-0.0265	-0.0257	-0.0257	-0.2984	0.3180	0.3348			
4.2450	0.3822	-0.0570	-0.0711	-0.0231	0.0243	0.2187	0.2187	0.3164	0.3141	0.3574			
4.3060	0.4220	-0.1192	-0.0711	-0.0322	0.0338	0.2335	0.2335	0.3373	0.3627	0.3791			
4.3670	0.4538	-0.1503	-0.1330	-0.0658	0.0347	0.2404	0.2404	0.3430	0.3701	0.3869			
4.4280	0.4905	-0.1640	-0.1765	-0.1473	0.0390	0.2457	0.2457	0.3491	0.3745	0.3917			
4.4890	0.5320	-0.2245	-0.2036	-0.1878	-0.0325	0.2531	0.2531	0.3557	0.3801	0.3973			
4.5500	0.5791	-0.2392	-0.2310	-0.2201	-0.1670	0.2574	0.2574	0.3566	0.3849	0.3977			
4.6110	0.5243	-0.2674	-0.2672	-0.2589	-0.2081	0.2681	0.2681	0.3250	0.3633	0.3703			
4.6730	0.3065	-0.2842	-0.2890	-0.2881	-0.2495	-0.0734	-0.0734	0.0507	0.0802	0.1344			
4.7310	0.1628	-0.2990	-0.3086	-0.3129	-0.2996	-0.2205	-0.2205	-0.1365	-0.0819	-0.1028			
4.7910	0.1727	0.2613	0.2594	0.2658	0.2778	0.4045	0.4045	0.4711	0.4664	0.4995			
4.8460	0.2043	0.3323	0.3312	0.3360	0.3540	0.5124	0.5124	0.6010	0.6234	0.6370			
4.9020	0.2122	0.3665	0.3630	0.3595	0.3923	0.5700	0.5700	0.6644	0.6914	0.7081			
4.9880	0.1970	0.3963	0.3969	0.3944	0.4345	0.6177	0.6177	0.7221	0.7521	0.7710			
5.0730	0.1764	0.4348	0.4339	0.4288	0.4707	0.6709	0.6709	0.7755	0.8067	0.8252			
5.1570	0.1535	0.4417	0.4432	0.4535	0.4974	0.7056	0.7056	0.8190	0.8447	0.8625			

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. =	1.470	ATTACK ANGLE =	-0.205										
RUN NOS =	145	151	157	163	169	175	181	187					
ROLL ANGLES =	0.	18.9	32.0	62.1	117.9	148.0	161.1	180.0					
Q VALUES =	478.0790	479.1791	477.5823	477.8532	477.4260	477.5106	477.6097	476.9876					
X/D	CN	LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8			
0.1900	0.0208	-0.0163	-0.0150	-0.0096	0.0347	0.0536	0.0126	-0.0038	-0.0047				
0.3690	0.0387	-0.0067	-0.0109	-0.0088	-0.0134	0.0013	0.0251	0.0306	0.0260				
0.6190	0.0106	-0.0209	-0.0142	-0.0176	-0.0180	-0.0038	-0.0096	-0.0113	-0.0126				
0.8690	0.0013	-0.0305	-0.0200	-0.0226	-0.0301	-0.0168	-0.0314	-0.0255	-0.0214				
1.1190	0.0074	-0.0255	-0.0250	-0.0276	-0.0218	-0.0193	-0.0201	-0.0163	-0.0180				
1.3680	0.0021	-0.0217	-0.0342	-0.0301	-0.0113	-0.0323	-0.0192	-0.0126	-0.0256				
1.6180	-0.0073	-0.0046	-0.0092	-0.0021	-0.0113	-0.0130	-0.0130	-0.0117	-0.0117				
1.8670	-0.0070	-0.0272	-0.0121	-0.0176	-0.0310	-0.0239	-0.0214	-0.0319	-0.0222				
2.1180	0.0046	-0.0297	-0.0338	-0.0406	-0.0251	-0.0310	-0.0285	-0.0377	-0.0373				
2.3680	0.0020	-0.0477	-0.0413	-0.0377	-0.0486	-0.0398	-0.0423	-0.0482	-0.0528				
2.6180	-0.0054	-0.0435	-0.0522	-0.0439	-0.0599	-0.0616	-0.0624	-0.0570	-0.0687				
2.8670	0.0017	-0.0644	-0.0609	-0.0761	-0.0912	-0.0729	-0.0800	-0.0754	-0.0754				
3.1170	0.0079	-0.0853	-0.0776	-0.0966	-0.0862	-0.0963	-0.0850	-0.0896	-0.0947				
3.3670	0.0003	-0.1021	-0.1048	-0.1104	-0.0975	-0.0955	-0.1127	-0.1026	-0.1043				
3.6160	-0.0044	-0.1163	-0.1081	-0.1172	-0.1147	-0.1223	-0.1076	-0.1139	-0.1161				
3.8670	0.0013	-0.1301	-0.1231	-0.1172	-0.1255	-0.1282	-0.1085	-0.1240	-0.1334				
4.1160	0.0008	-0.1427	-0.1369	-0.1322	-0.1448	-0.1340	-0.1391	-0.1361	-0.1477				
4.3670	0.0072	-0.1380	-0.1381	-0.1410	-0.1477	-0.1294	-0.1412	-0.1349	-0.1409				
4.6180	0.0037	-0.1510	-0.1682	-0.1661	-0.1590	-0.1575	-0.1617	-0.1583	-0.1623				
4.8670	0.0049	-0.1690	-0.1828	-0.1753	-0.1573	-0.1923	-0.1659	-0.1659	-0.1581				
5.1160	0.0015	-0.1857	-0.1903	-0.1912	-0.1808	-0.1952	-0.1873	-0.1839	-0.1753				
5.3670	-0.0036	-0.1962	-0.1894	-0.1950	-0.1938	-0.1952	-0.1998	-0.1969	-0.1893				
5.6180	-0.0064	-0.2041	-0.1911	-0.1983	-0.2021	-0.1994	-0.2065	-0.2031	-0.2043				
5.8670	-0.0090	-0.2067	-0.1916	-0.1971	-0.2102	-0.1994	-0.2023	-0.2085	-0.2165				
6.1160	-0.0203	0.1607	0.1623	0.1489	0.1461	0.1349	0.1420	0.1378	0.1317				
6.3670	-0.0128	0.1460	0.1248	0.1263	0.1298	0.1177	0.1236	0.1185	0.1141				
6.6180	-0.0119	0.1293	0.1244	0.1309	0.1214	0.1177	0.1131	0.1152	0.1200				
6.8670	-0.0131	0.1205	0.1294	0.1289	0.1114	0.1148	0.1081	0.1080	0.1179				
7.1160	-0.0080	0.0983	0.1131	0.1084	0.1009	0.1018	0.0947	0.0984	0.1028				
7.3670	-0.0038	0.0845	0.0876	0.0887	0.0917	0.0842	0.0821	0.0879	0.0877				
7.6180	-0.0048	0.0657	0.0647	0.0690	0.0733	0.0624	0.0637	0.0666	0.0625				
7.8670	-0.0024	0.0418	0.0384	0.0423	0.0448	0.0385	0.0436	0.0381	0.0361				
8.1160	-0.0050	0.0238	0.0213	0.0222	0.0226	0.0184	0.0163	0.0167	0.0172				
8.3670	-0.0037	0.0038	0.0017	0.0013	-0.0004	-0.0017	-0.0038	-0.0029	-0.0017				
8.6180	-0.0044	0.5422	0.5421	0.5432	0.5408	0.5403	0.5357	0.5359	0.5363				
8.8670	-0.0055	0.5925	0.5939	0.5967	0.5943	0.5919	0.5860	0.5865	0.5846				
9.1160	-0.0017	0.6033	0.6022	0.6051	0.6056	0.6028	0.6006	0.6012	0.6046				
9.3670	-0.0005	0.6100	0.6093	0.6160	0.6056	0.6095	0.6140	0.6129	0.6109				
9.6180	0.0021	0.6042	0.6035	0.6155	0.6182	0.6153	0.6153	0.6154	0.6134				
9.8670	0.0028	0.5853	0.5875	0.5931	0.5931	0.5962	0.5971	0.5985	0.5925				

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. =	1.470 ATTACK ANGLE = 1.853									
RUN NOS =	146	152	158	164	170	176	182	188		
ROLL ANGLES =	0.	18.9	32.0	62.1	117.9	148.0	161.1	180.0		
Q VALUES =	477.9507	478.8825	477.8672	477.5243	477.4157	476.9384	477.4187	477.0727		
X/D	GN	LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8
0.1900	0.0238		-0.0063	-0.0092	-0.0176	-0.0021	0.0297	0.0096	0.0008	-0.0134
0.3690	0.0356		-0.0071	-0.0146	-0.0054	-0.0155	-0.0176	0.0281	0.0360	0.0247
0.6190	0.0019		-0.0092	-0.0154	-0.0192	-0.0147	-0.0109	-0.0159	-0.0138	-0.0163
0.8690	0.0034		-0.0230	-0.0188	-0.0289	-0.0297	-0.0251	-0.0214	-0.0201	-0.0256
1.1190	0.0044		-0.0234	-0.0238	-0.0234	-0.0281	-0.0201	-0.0205	-0.0218	-0.0247
1.3680	-0.0100		-0.0142	-0.0263	-0.0226	-0.0126	-0.0327	-0.0231	-0.0256	-0.0293
1.6180	-0.0144		-0.0025	-0.0071	0.0029	-0.0080	-0.0084	-0.0218	-0.0151	-0.0155
1.8670	-0.0081		-0.0134	-0.0100	-0.0276	-0.0285	-0.0402	-0.0147	-0.0218	-0.0369
2.1180	0.0139		-0.0234	-0.0272	-0.0276	-0.0318	-0.0272	0.0092	-0.0306	-0.0231
2.3680	0.0378		-0.0439	-0.0434	-0.0452	-0.0456	-0.0285	0.0243	-0.0314	-0.0335
2.6180	0.0112		-0.0414	-0.0556	-0.0473	-0.0469	-0.0511	-0.0143	-0.0478	-0.0528
2.8670	0.0272		-0.0682	-0.0735	-0.0716	-0.0649	-0.0603	-0.0260	-0.0536	-0.0587
3.1170	0.0411		-0.0683	-0.0844	-0.0862	-0.0963	-0.0767	-0.0205	-0.0658	-0.0700
3.2410	0.0475		-0.1034	-0.1165	-0.1017	-0.0896	-0.0909	-0.0214	-0.0775	-0.0784
3.3670	0.0632		-0.1197	-0.1140	-0.1285	-0.1085	-0.0918	-0.0180	-0.0834	-0.0876
3.4910	0.0574		-0.1285	-0.1266	-0.1189	-0.1286	-0.1198	-0.0143	-0.0968	-0.0994
3.6160	0.0733		-0.1469	-0.1420	-0.1373	-0.1361	-0.1093	-0.0235	-0.0972	-0.1149
3.6780	0.0854		-0.1611	-0.1571	-0.1562	-0.1554	-0.1156	-0.0268	-0.1093	-0.1253
3.7410	0.0679		-0.1540	-0.1541	-0.1549	-0.1516	-0.1240	-0.0503	-0.1152	-0.1228
3.8030	0.0635		-0.1703	-0.1784	-0.1838	-0.1650	-0.1596	-0.0637	-0.1454	-0.1379
3.8670	0.0765		-0.1845	-0.2005	-0.1938	-0.1713	-0.1621	-0.0616	-0.1533	-0.1409
3.9280	0.0761		-0.2046	-0.2130	-0.2051	-0.1931	-0.1743	-0.0902	-0.1634	-0.1530
3.9910	0.0846		-0.2188	-0.2143	-0.2114	-0.2119	-0.1793	-0.0834	-0.1688	-0.1660
4.0530	0.0778		-0.2255	-0.2122	-0.2110	-0.2215	-0.1681	-0.0885	-0.1759	-0.1824
4.1160	0.0565		-0.2264	-0.2064	-0.2030	-0.2094	-0.1456	-0.1010	-0.1835	-0.1928
4.1830	-0.0526		0.1239	0.1278	0.1243	0.1369	0.1512	-0.1187	0.1843	0.1727
4.2450	-0.0340		0.1151	0.0948	0.0963	0.1181	0.1470	-0.1195	0.1625	0.1572
4.3060	-0.0254		0.0912	0.0848	0.0933	0.1093	0.1504	-0.1442	0.1684	0.1640
4.3670	-0.0332		0.0757	0.0890	0.0950	0.1068	0.1453	-0.1539	0.1567	0.1585
4.4280	-0.0456		0.0636	0.0873	0.0883	0.0917	0.1231	-0.1727	0.1357	0.1396
4.4890	-0.0396		0.0494	0.0677	0.0645	0.0817	0.1051	-0.1786	0.1236	0.1199
4.5500	-0.0305		0.0414	0.0393	0.0393	0.0649	0.0896	-0.1794	0.1043	0.0956
4.6110	-0.0246		0.0188	0.0171	0.0184	0.0369	0.0628	-0.1715	0.0725	0.0642
4.6730	0.0725		0.0050	0.0054	0.0042	0.0147	0.0348	-0.1858	0.0448	0.0403
4.7310	0.0602		-0.0088	-0.0092	-0.0109	-0.0059	0.0054	0.1627	0.0176	0.0117
4.7910	-0.0664		0.5110	0.5174	0.5194	0.5286	0.5508	0.1581	0.5680	0.5641
4.8460	-0.0660		0.5536	0.5570	0.5663	0.5713	0.6019	0.1497	0.6258	0.6273
4.9020	-0.0533		0.5520	0.5516	0.5605	0.5734	0.6153	0.1325	0.6434	0.6474
4.9880	-0.0548		0.5612	0.5700	0.5768	0.5927	0.6270	0.1220	0.6505	0.6550
5.0730	-0.0410		0.5503	0.5545	0.5672	0.5809	0.6283	0.1028	0.6572	0.6608
5.1570	-0.0333		0.5239	0.5357	0.5454	0.5655	0.6154	0.0751	0.6386	0.6447

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 1.470 ATTACK ANGLE = 5.970									
RUN NOS = 148 154									
ROLL ANGLES = 0. 18.9									
Q VALUES = 478.3385 478.9275 478.0875 477.9210 477.3920 477.8666 477.3911 161.1 180.0									
X/D	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8
0.1900	-0.0097	0.0096	-0.0004	0.0071	-0.0042	-0.0184	-0.0004	-0.0004	0.
0.3690	0.0330	-0.0038	-0.0134	-0.0151	-0.0239	-0.0243	0.0163	0.0252	0.0390
0.6190	0.0070	-0.0105	-0.0179	-0.0251	-0.0368	-0.0314	-0.0155	-0.0130	-0.0117
0.8690	-0.0052	-0.0251	-0.0255	-0.0351	-0.0452	-0.0587	-0.0305	-0.0293	-0.0281
1.1190	-0.0013	-0.0109	-0.0221	-0.0259	-0.0460	-0.0549	-0.0205	-0.0155	-0.0243
1.3680	-0.0064	-0.0142	-0.0271	-0.0217	-0.0435	-0.0562	-0.0335	-0.0218	-0.0113
1.6180	-0.0102	-0.0029	0.	-0.0134	-0.0301	-0.0407	-0.0239	-0.0067	-0.0038
1.8670	-0.0078	-0.0050	-0.0188	-0.0272	-0.0573	-0.0658	-0.0289	-0.0163	-0.0323
2.1180	-0.0098	-0.0159	-0.0259	-0.0372	-0.0507	-0.0670	-0.0448	-0.0276	-0.0184
2.3680	0.0171	-0.0205	-0.0418	-0.0423	-0.0754	-0.0649	-0.0255	-0.0239	-0.0163
2.6180	0.0172	-0.0460	-0.0598	-0.0598	-0.0875	-0.0721	-0.0477	-0.0364	-0.0289
2.8670	0.0427	-0.0689	-0.0677	-0.0616	-0.1013	-0.0805	-0.0460	-0.0293	-0.0239
3.1170	0.0765	-0.0932	-0.0991	-0.1088	-0.1306	-0.0851	-0.0347	-0.0390	-0.0319
3.2410	0.0702	-0.1162	-0.1154	-0.1234	-0.1315	-0.0951	-0.0699	-0.0511	-0.0386
3.3670	0.0975	-0.1245	-0.1438	-0.1468	-0.1315	-0.0807	-0.0611	-0.0461	-0.0449
3.4910	0.1000	-0.1508	-0.1513	-0.1606	-0.1553	-0.1106	-0.0636	-0.0626	-0.0616
3.6190	0.1176	-0.1709	-0.1686	-0.1627	-0.1632	-0.0980	-0.0678	-0.0616	-0.0583
3.6780	0.1270	-0.1922	-0.1849	-0.1827	-0.1799	-0.1135	-0.0816	-0.0662	-0.0647
3.7410	0.1398	-0.1993	-0.1970	-0.1932	-0.1870	-0.1207	-0.0875	-0.0745	-0.0750
3.8030	0.1320	-0.2211	-0.2195	-0.2179	-0.2092	-0.1387	-0.1097	-0.1009	-0.0901
3.8670	0.1276	-0.2253	-0.2212	-0.2254	-0.2050	-0.1500	-0.1130	-0.1055	-0.0901
3.9280	0.1246	-0.2349	-0.2350	-0.2454	-0.2126	-0.1609	-0.1314	-0.1210	-0.1094
3.9910	0.1289	-0.2449	-0.2538	-0.2605	-0.2163	-0.1638	-0.1423	-0.1311	-0.1228
4.0530	0.1328	-0.2620	-0.2675	-0.2676	-0.2347	-0.1776	-0.1511	-0.1386	-0.1371
4.1160	0.1287	-0.2705	-0.2593	-0.2578	-0.2525	-0.1923	-0.1536	-0.1371	-0.1343
4.1830	0.2332	0.0217	0.0480	0.0619	0.0749	0.1885	0.2373	0.2607	0.2725
4.2450	0.2101	0.0155	0.0392	0.0590	0.0695	0.1692	0.2319	0.2507	0.2599
4.3060	0.2085	0.0176	0.0342	0.0485	0.0729	0.1684	0.2382	0.2452	0.2624
4.3670	0.2066	0.0255	0.0276	0.0163	0.0649	0.1680	0.2235	0.2373	0.2478
4.4280	0.2042	0.0197	0.0029	0.0038	0.0498	0.1567	0.2072	0.2264	0.2360
4.4890	0.1951	-0.0071	-0.0054	0.	0.0322	0.1391	0.1934	0.2121	0.2214
4.5500	0.1740	-0.0247	-0.0079	-0.0059	0.0092	0.1152	0.1687	0.1857	0.1903
4.6110	0.1452	-0.0343	-0.0255	-0.0239	-0.0146	0.0767	0.1281	0.1416	0.1476
4.6730	0.1147	-0.0468	-0.0435	-0.0440	-0.0334	0.0385	0.0824	0.0947	0.0990
4.7310	0.0793	-0.0560	-0.0593	-0.0636	-0.0539	-0.0080	0.0272	0.0390	0.0583
4.7910	0.1364	0.4158	0.4312	0.4379	0.4728	0.5584	0.6022	0.6144	0.6206
4.8460	0.1331	0.4555	0.4684	0.4739	0.5171	0.6199	0.6750	0.6928	0.6994
4.9020	0.1432	0.4789	0.4916	0.4961	0.5321	0.6342	0.7018	0.7225	0.7275
4.9880	0.1402	0.4935	0.4772	0.4969	0.5221	0.6518	0.7219	0.7439	0.7506
5.0730	0.1224	0.4697	0.4868	0.4973	0.5334	0.6589	0.7336	0.7535	0.7594
5.1570	0.0857	0.4572	0.4466	0.4522	0.5040	0.6551	0.7321	0.7518	0.7587

MACH NO. = 1.470 ATTACK ANGLE = 8.023		155	161	167	173	179	185	191	
RUN NOS =		149	155	161	167	173	179	185	
ROLL ANGLES = 0.		18.9	32.0	62.1	117.9	148.0	161.1	180.0	
Q VALUES =		477.9946	478.6232	477.7967	477.5679	477.2393	477.0331	476.8078	
CN LOCAL	CN	C21	C22	C23	C24	C25	C26	C27	C28
0.1900	0.0265	0.0063	-0.0184	-0.0289	-0.0193	-0.0142	0.0059	0.0038	0.0281
0.3690	0.0438	-0.0088	-0.0246	-0.0322	-0.0360	-0.0570	0.0117	0.0453	0.0461
0.6190	0.0040	0.	-0.0255	-0.0331	-0.0448	-0.0632	-0.0276	-0.0013	-0.0104
0.8690	0.0020	-0.0138	-0.0276	-0.0406	-0.0519	-0.0720	-0.0285	-0.0180	-0.0059
1.1190	-0.0035	-0.0075	-0.0234	-0.0352	-0.0540	-0.0754	-0.0289	-0.0185	-0.0063
1.3680	-0.0125	-0.0042	-0.0230	-0.0289	-0.0578	-0.0846	-0.0423	-0.0205	0.0029
1.6180	-0.0130	0.0075	-0.0042	-0.0163	-0.0469	-0.0746	-0.0168	-0.0092	0.0025
1.8670	-0.0038	0.0017	-0.0159	-0.0331	-0.0624	-0.0787	-0.0297	-0.0151	-0.0088
2.1180	0.0125	-0.0134	-0.0259	-0.0360	-0.0800	-0.0885	-0.0230	0.	-0.0214
2.3680	0.0287	-0.0218	-0.0439	-0.0485	-0.0963	-0.0918	-0.0218	-0.0008	-0.0126
2.6180	0.0387	-0.0327	-0.0489	-0.0552	-0.1034	-0.0725	-0.0268	-0.0164	-0.0038
2.8670	0.0641	-0.0678	-0.0660	-0.0649	-0.1218	-0.0885	-0.0373	-0.0105	-0.0042
3.1170	0.0928	-0.0908	-0.1028	-0.1163	-0.1608	-0.0969	-0.0456	-0.0239	-0.0075
3.3670	0.1067	-0.1139	-0.1195	-0.1335	-0.1537	-0.0931	-0.0440	-0.0243	-0.0176
3.6160	0.1258	-0.1273	-0.1504	-0.1569	-0.1524	-0.1006	-0.0360	-0.0264	-0.0222
3.8670	0.1393	-0.1583	-0.1562	-0.1699	-0.1759	-0.1090	-0.0440	-0.0340	-0.0294
4.1160	0.1579	-0.1702	-0.1776	-0.1711	-0.1854	-0.0927	-0.0490	-0.0294	-0.0281
4.3660	0.1637	-0.1915	-0.2043	-0.1929	-0.2018	-0.1090	-0.0674	-0.0470	-0.0428
4.6150	0.1658	-0.2024	-0.2097	-0.2054	-0.2043	-0.1157	-0.0716	-0.0562	-0.0428
4.8640	0.1694	-0.2030	-0.2315	-0.2306	-0.2227	-0.1417	-0.0884	-0.0755	-0.0570
5.1130	0.1699	-0.2371	-0.2315	-0.2368	-0.2189	-0.1392	-0.0959	-0.0805	-0.0625
5.3620	0.1695	-0.2522	-0.2457	-0.2536	-0.2235	-0.1459	-0.1064	-0.0914	-0.0784
5.6110	0.1745	-0.2635	-0.2615	-0.2686	-0.2398	-0.1636	-0.1135	-0.1006	-0.0885
5.8600	0.1794	-0.2756	-0.2808	-0.2774	-0.2578	-0.1774	-0.1244	-0.1090	-0.0998
6.1090	0.1812	-0.2842	-0.2794	-0.2744	-0.2635	-0.1785	-0.1260	-0.1052	-0.0932
6.3580	0.3084	0.0013	0.0159	0.0339	0.0612	0.2020	0.2951	0.3172	0.3272
6.6070	0.2875	-0.0134	0.0050	0.0272	0.0607	0.1953	0.2776	0.2916	0.3028
6.8560	0.2869	-0.0080	-0.0025	0.0142	0.0670	0.2662	0.2750	0.2912	0.3070
7.1050	0.2910	0.0004	-0.0063	-					

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 1.470 ATTACK ANGLE = 10.063											
RUN NOS =	150	156	162	168	174	180	186	192			
ROLL ANGLES =	0.	18.9	32.0	62.1	117.9	148.0	161.1	180.0			
Q VALUES =	477.7958	478.5336	477.6798	477.5252	476.9854	477.6057	474.9020	476.6297			
X/D	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8		
0.1900	0.0691	0.0075	-0.0384	-0.0636	-0.0478	-0.0390	0.0197	0.0403	0.0458		
0.3690	0.0604	0.0067	-0.0384	-0.0540	-0.0494	-0.0683	-0.0033	0.0616	0.0751		
0.6190	0.0185	0.0092	-0.0430	-0.0620	-0.0486	-0.0889	-0.0218	0.0067	0.0118		
0.8690	0.0076	-0.0054	-0.0380	-0.0615	-0.0607	-0.1002	-0.0351	-0.0063	-0.0008		
1.1190	0.0026	0.0050	-0.0343	-0.0565	-0.0637	-0.1103	-0.0310	-0.0092	0.0113		
1.3680	-0.0006	0.0038	-0.0376	-0.0469	-0.0687	-0.1166	-0.0314	-0.0130	0.0160		
1.6180	-0.0061	0.0134	-0.0184	-0.0339	-0.0637	-0.1082	-0.0285	-0.0017	0.0243		
1.8670	-0.0001	0.0059	-0.0251	-0.0465	-0.0762	-0.1145	-0.0393	0.0013	0.0147		
2.1180	0.0242	-0.0117	-0.0359	-0.0469	-0.1014	-0.1098	-0.0180	0.0038	0.0013		
2.3680	0.0477	-0.0172	-0.0476	-0.0603	-0.1269	-0.0981	-0.0205	0.0050	0.0025		
2.6180	0.0654	-0.0339	-0.0559	-0.0666	-0.1428	-0.1036	-0.0121	0.0067	0.0130		
2.8670	0.0940	-0.0636	-0.0693	-0.0921	-0.1579	-0.0964	-0.0130	0.0096	0.0143		
3.1170	0.1262	-0.0850	-0.1081	-0.1290	-0.1947	-0.1052	-0.0322	0.0008	0.0145		
3.3670	0.1412	-0.1143	-0.1198	-0.1407	-0.1834	-0.0935	-0.0247	0.0008	0.0076		
3.6160	0.1636	-0.1281	-0.1545	-0.1691	-0.1914	-0.1145	-0.0142	-0.0025	0.0017		
3.8670	0.1836	-0.1566	-0.1641	-0.1901	-0.2027	-0.1010	-0.0272	-0.0029	-0.0013		
4.1160	0.1975	-0.1754	-0.1897	-0.1926	-0.2090	-0.0989	-0.0314	-0.0050	-0.0113		
4.3670	0.2051	-0.1697	-0.2152	-0.2118	-0.2232	-0.1069	-0.0478	-0.0210	-0.0122		
4.6170	0.2145	-0.2407	-0.2428	-0.2210	-0.2262	-0.1207	-0.0662	-0.0474	-0.0273		
4.8670	0.2197	-0.2554	-0.2466	-0.2440	-0.2463	-0.1367	-0.0662	-0.0474	-0.0281		
5.1170	0.2179	-0.2738	-0.2629	-0.2499	-0.2468	-0.1304	-0.0692	-0.0591	-0.0457		
5.3670	0.2162	-0.2834	-0.2771	-0.2625	-0.2454	-0.1434	-0.0834	-0.0730	-0.0579		
5.6170	0.2223	-0.2893	-0.2884	-0.2771	-0.2559	-0.1618	-0.0939	-0.0792	-0.0701		
5.8670	0.2265	-0.2933	-0.2954	-0.2940	-0.2668	-0.1673	-0.1002	-0.0755	-0.0726		
6.1170	0.3857	-0.0176	-0.0218	-0.0038	-0.0398	-0.1694	0.3326	0.3564	0.3692		
6.3670	0.3714	-0.0439	-0.0305	-0.0075	0.0377	0.2139	0.3213	0.3384	0.3520		
6.6170	0.3764	-0.0398	-0.0314	-0.0067	0.0389	0.2403	0.3242	0.3510	0.3646		
6.8670	0.3816	-0.0343	-0.0314	-0.0281	0.0121	0.2336	0.3284	0.3564	0.3654		
7.1170	0.3636	-0.0356	-0.0331	-0.0540	-0.0021	0.1975	0.3179	0.3426	0.3542		
7.3670	0.3314	-0.0423	-0.0477	-0.0569	-0.0088	0.1602	0.2886	0.3220	0.3345		
7.6170	0.3015	-0.0670	-0.0711	-0.0624	-0.0239	0.1250	0.2513	0.2889	0.3029		
7.8670	0.2625	-0.0870	-0.0840	-0.0733	-0.0603	0.0843	0.2027	0.2353	0.2450		
8.1170	0.2018	-0.0833	-0.0848	-0.0796	-0.0850	0.0403	0.1361	0.1653	0.1745		
8.3670	0.1304	-0.0774	-0.0852	-0.0921	-0.0992	-0.0088	0.0526	0.0755	0.0923		
8.6170	0.2273	0.3507	0.3638	0.3547	0.3859	0.5465	0.4357	0.6595	0.4679		
8.8670	0.2523	0.3682	0.3785	0.3857	0.4421	0.6098	0.7203	0.7505	0.7636		
9.1170	0.2423	0.3820	0.3856	0.4087	0.4710	0.6345	0.7521	0.7908	0.8005		
9.3670	0.2230	0.4164	0.4186	0.4275	0.4283	0.6610	0.7776	0.8201	0.8332		
9.6170	0.2085	0.3733	0.3831	0.3982	0.4555	0.6777	0.7981	0.8386	0.8529		
9.8670	0.1275	0.3926	0.3826	0.3986	0.4333	0.6739	0.8097	0.8483	0.8671		

4-13

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 0.650 ATTACK ANGLE = 0.005

RUN NOS	194	0	14.9	32.0	62.1	117.9	148.0	161.1	180.0
ROLL ANGLES =	0.	247.1302	CP2	CP3	CP4	CP5	CP6	CP7	CP8
0 VALUES =	CP1								
X/D	CN LOCAL								
0.1800	-0.0671	0.	0.	0.	0.	0.	0.	0.	0.
0.3600	-0.0493	0.	0.	0.	0.	0.	0.	0.	0.
0.5400	-0.0396	0.	0.	0.	0.	0.	0.	0.	0.
0.7200	-0.0234	0.	0.	0.	0.	0.	0.	0.	0.
0.9000	-0.0194	0.	0.	0.	0.	0.	0.	0.	0.
1.0800	-0.0154	0.	0.	0.	0.	0.	0.	0.	0.
1.2600	-0.0178	0.	0.	0.	0.	0.	0.	0.	0.
1.4400	-0.0129	0.	0.	0.	0.	0.	0.	0.	0.
1.6200	-0.0162	0.	0.	0.	0.	0.	0.	0.	0.
1.8000	-0.0186	0.	0.	0.	0.	0.	0.	0.	0.
1.9800	-0.0194	0.	0.	0.	0.	0.	0.	0.	0.
2.1600	-0.0247	0.	0.	0.	0.	0.	0.	0.	0.
2.3400	-0.0291	0.	0.	0.	0.	0.	0.	0.	0.
2.5200	-0.0347	0.	0.	0.	0.	0.	0.	0.	0.
2.7000	-0.0477	0.	0.	0.	0.	0.	0.	0.	0.
2.8800	-0.0655	0.	0.	0.	0.	0.	0.	0.	0.
3.0600	-0.0702	0.	0.	0.	0.	0.	0.	0.	0.
3.2400	-0.0922	0.	0.	0.	0.	0.	0.	0.	0.
3.4200	-0.1148	0.	0.	0.	0.	0.	0.	0.	0.
3.6000	-0.1302	0.	0.	0.	0.	0.	0.	0.	0.
3.7800	-0.1552	0.	0.	0.	0.	0.	0.	0.	0.
3.9600	-0.1868	0.	0.	0.	0.	0.	0.	0.	0.
4.1400	-0.2555	0.	0.	0.	0.	0.	0.	0.	0.
4.3200	-0.3702	0.	0.	0.	0.	0.	0.	0.	0.
4.5000	-1.0810	0.	0.	0.	0.	0.	0.	0.	0.
4.6800	-0.3212	0.	0.	0.	0.	0.	0.	0.	0.
4.8600	-0.1715	0.	0.	0.	0.	0.	0.	0.	0.
5.0400	-0.1020	0.	0.	0.	0.	0.	0.	0.	0.
5.2200	-0.0404	0.	0.	0.	0.	0.	0.	0.	0.
5.4000	-0.0138	0.	0.	0.	0.	0.	0.	0.	0.
5.5800	0.0380	0.	0.	0.	0.	0.	0.	0.	0.
5.7600	0.0525	0.	0.	0.	0.	0.	0.	0.	0.
5.9400	0.0711	0.	0.	0.	0.	0.	0.	0.	0.
6.1200	0.0881	0.	0.	0.	0.	0.	0.	0.	0.
6.3000	0.1018	0.	0.	0.	0.	0.	0.	0.	0.
6.4800	0.1349	0.	0.	0.	0.	0.	0.	0.	0.
6.6600	0.1616	0.	0.	0.	0.	0.	0.	0.	0.
6.8400	0.1713	0.	0.	0.	0.	0.	0.	0.	0.
7.0200	0.1906	0.	0.	0.	0.	0.	0.	0.	0.
7.2000	0.2166	0.	0.	0.	0.	0.	0.	0.	0.
7.3800	0.2319	0.	0.	0.	0.	0.	0.	0.	0.

[illegible]

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 0.750 ATTACK ANGLE = 0.014

RUN NOS = 106 0 1P.9 32.0 62.1 117.9 148.0 141.1 0 0

ROLL ANGLES = 0. 301.8942

Q VALUES =

X/D	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CPA	CP7	CPA
0.1880		-0.0650	0.	0.	0.	0.	0.	0.	0.
0.3680		-0.0451	0.	0.	0.	0.	0.	0.	0.
0.6180		-0.0325	0.	0.	0.	0.	0.	0.	0.
0.8680		-0.0219	0.	0.	0.	0.	0.	0.	0.
1.1180		-0.0186	0.	0.	0.	0.	0.	0.	0.
1.3680		-0.0159	0.	0.	0.	0.	0.	0.	0.
1.6170		-0.0146	0.	0.	0.	0.	0.	0.	0.
1.8670		-0.0471	0.	0.	0.	0.	0.	0.	0.
2.1180		-0.0133	0.	0.	0.	0.	0.	0.	0.
2.3670		-0.0146	0.	0.	0.	0.	0.	0.	0.
2.6160		-0.0159	0.	0.	0.	0.	0.	0.	0.
2.8660		-0.0102	0.	0.	0.	0.	0.	0.	0.
3.1170		-0.0209	0.	0.	0.	0.	0.	0.	0.
3.2410		-0.0372	0.	0.	0.	0.	0.	0.	0.
3.3660		-0.0471	0.	0.	0.	0.	0.	0.	0.
3.4910		-0.0209	0.	0.	0.	0.	0.	0.	0.
3.6150		-0.0739	0.	0.	0.	0.	0.	0.	0.
3.6770		-0.0853	0.	0.	0.	0.	0.	0.	0.
3.7400		-0.1086	0.	0.	0.	0.	0.	0.	0.
3.8020		-0.1246	0.	0.	0.	0.	0.	0.	0.
3.8650		-0.1619	0.	0.	0.	0.	0.	0.	0.
3.9280		-0.2238	0.	0.	0.	0.	0.	0.	0.
3.9900		-0.3511	0.	0.	0.	0.	0.	0.	0.
4.0520		-0.6055	0.	0.	0.	0.	0.	0.	0.
4.1150		-1.4158	0.	0.	0.	0.	0.	0.	0.
4.1850		-0.2502	0.	0.	0.	0.	0.	0.	0.
4.2460		-0.1284	0.	0.	0.	0.	0.	0.	0.
4.3060		-0.0679	0.	0.	0.	0.	0.	0.	0.
4.3670		-0.0246	0.	0.	0.	0.	0.	0.	0.
4.4280		0.0080	0.	0.	0.	0.	0.	0.	0.
4.4880		0.0346	0.	0.	0.	0.	0.	0.	0.
4.5490		0.0546	0.	0.	0.	0.	0.	0.	0.
4.6090		0.0644	0.	0.	0.	0.	0.	0.	0.
4.6690		0.0863	0.	0.	0.	0.	0.	0.	0.
4.7300		0.1029	0.	0.	0.	0.	0.	0.	0.
4.7910		0.1215	0.	0.	0.	0.	0.	0.	0.
4.9110		0.1454	0.	0.	0.	0.	0.	0.	0.
5.0310		0.1700	0.	0.	0.	0.	0.	0.	0.
5.1530		0.1819	0.	0.	0.	0.	0.	0.	0.
5.2730		0.2072	0.	0.	0.	0.	0.	0.	0.
5.4540		0.2336	0.	0.	0.	0.	0.	0.	0.
5.6350		0.2522	0.	0.	0.	0.	0.	0.	0.

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 0.800 ATTACK ANGLE = 0.016

RUN NOS = 197

ROLL ANGLES = 0.

O VALUES = 124.5327

	0	18.9	32.0	42.1	117.9	148.0	141.1	0	0
	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8	CP9
X/R									
0.1880	-0.0624	0.	0.	0.	0.	0.	0.	0.	0.
0.3680	-0.0441	0.	0.	0.	0.	0.	0.	0.	0.
0.5480	-0.0312	0.	0.	0.	0.	0.	0.	0.	0.
0.7280	-0.0257	0.	0.	0.	0.	0.	0.	0.	0.
0.9080	-0.0196	0.	0.	0.	0.	0.	0.	0.	0.
1.0880	-0.0147	0.	0.	0.	0.	0.	0.	0.	0.
1.2680	-0.0129	0.	0.	0.	0.	0.	0.	0.	0.
1.4480	-0.0122	0.	0.	0.	0.	0.	0.	0.	0.
1.6280	-0.0128	0.	0.	0.	0.	0.	0.	0.	0.
1.8080	-0.0147	0.	0.	0.	0.	0.	0.	0.	0.
1.9880	-0.0171	0.	0.	0.	0.	0.	0.	0.	0.
2.1680	-0.0208	0.	0.	0.	0.	0.	0.	0.	0.
2.3480	-0.0306	0.	0.	0.	0.	0.	0.	0.	0.
2.5280	-0.0373	0.	0.	0.	0.	0.	0.	0.	0.
2.7080	-0.0428	0.	0.	0.	0.	0.	0.	0.	0.
2.8880	-0.0600	0.	0.	0.	0.	0.	0.	0.	0.
3.0680	-0.0601	0.	0.	0.	0.	0.	0.	0.	0.
3.2480	-0.0668	0.	0.	0.	0.	0.	0.	0.	0.
3.4280	-0.0877	0.	0.	0.	0.	0.	0.	0.	0.
3.6080	-0.1122	0.	0.	0.	0.	0.	0.	0.	0.
3.7880	-0.1710	0.	0.	0.	0.	0.	0.	0.	0.
3.9680	-0.2887	0.	0.	0.	0.	0.	0.	0.	0.
4.1480	-0.4824	0.	0.	0.	0.	0.	0.	0.	0.
4.3280	-1.0353	0.	0.	0.	0.	0.	0.	0.	0.
4.5080	-1.2818	0.	0.	0.	0.	0.	0.	0.	0.
4.6880	-0.1960	0.	0.	0.	0.	0.	0.	0.	0.
4.8680	-0.0943	0.	0.	0.	0.	0.	0.	0.	0.
5.0480	-0.0441	0.	0.	0.	0.	0.	0.	0.	0.
5.2280	-0.0086	0.	0.	0.	0.	0.	0.	0.	0.
5.4080	0.0472	0.	0.	0.	0.	0.	0.	0.	0.
5.5880	0.0649	0.	0.	0.	0.	0.	0.	0.	0.
5.7680	0.0820	0.	0.	0.	0.	0.	0.	0.	0.
5.9480	0.0991	0.	0.	0.	0.	0.	0.	0.	0.
6.1280	0.1156	0.	0.	0.	0.	0.	0.	0.	0.
6.3080	0.1303	0.	0.	0.	0.	0.	0.	0.	0.
6.4880	0.1530	0.	0.	0.	0.	0.	0.	0.	0.
6.6680	0.1787	0.	0.	0.	0.	0.	0.	0.	0.
6.8480	0.1921	0.	0.	0.	0.	0.	0.	0.	0.
7.0280	0.2148	0.	0.	0.	0.	0.	0.	0.	0.
7.2080	0.2472	0.	0.	0.	0.	0.	0.	0.	0.
7.3880	0.2613	0.	0.	0.	0.	0.	0.	0.	0.

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 0.850 ATTACK ANGLE = 0.016

RUN NOS = 100

ROLL ANGLES = 0.

Q VALUES = 350.1902

Y/D	CM LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8
0.1800	-0.0655	0.	0.	0.	0.	0.	0.	0.	0.
0.3600	-0.0422	0.	0.	0.	0.	0.	0.	0.	0.
0.5400	-0.0313	0.	0.	0.	0.	0.	0.	0.	0.
0.6600	-0.0245	0.	0.	0.	0.	0.	0.	0.	0.
1.1100	0.1652	0.	0.	0.	0.	0.	0.	0.	0.
1.3600	-0.0148	0.	0.	0.	0.	0.	0.	0.	0.
1.6170	-0.0114	0.	0.	0.	0.	0.	0.	0.	0.
1.8670	-0.0125	0.	0.	0.	0.	0.	0.	0.	0.
2.1160	-0.0108	0.	0.	0.	0.	0.	0.	0.	0.
2.3670	-0.0114	0.	0.	0.	0.	0.	0.	0.	0.
2.6160	-0.0120	0.	0.	0.	0.	0.	0.	0.	0.
2.8660	-0.0165	0.	0.	0.	0.	0.	0.	0.	0.
3.1170	0.1647	0.	0.	0.	0.	0.	0.	0.	0.
3.2410	-0.0194	0.	0.	0.	0.	0.	0.	0.	0.
3.3640	-0.0165	0.	0.	0.	0.	0.	0.	0.	0.
3.4910	-0.0188	0.	0.	0.	0.	0.	0.	0.	0.
3.6150	-0.0048	0.	0.	0.	0.	0.	0.	0.	0.
3.6770	-0.0217	0.	0.	0.	0.	0.	0.	0.	0.
3.7400	-0.0775	0.	0.	0.	0.	0.	0.	0.	0.
3.8020	-0.1903	0.	0.	0.	0.	0.	0.	0.	0.
3.8850	0.1652	0.	0.	0.	0.	0.	0.	0.	0.
3.9200	-0.6205	0.	0.	0.	0.	0.	0.	0.	0.
3.9900	-0.0932	0.	0.	0.	0.	0.	0.	0.	0.
4.0520	-1.0547	0.	0.	0.	0.	0.	0.	0.	0.
4.1150	-1.1046	0.	0.	0.	0.	0.	0.	0.	0.
4.1850	-0.1278	0.	0.	0.	0.	0.	0.	0.	0.
4.2460	-0.0416	0.	0.	0.	0.	0.	0.	0.	0.
4.3060	-0.0029	0.	0.	0.	0.	0.	0.	0.	0.
4.3670	0.1637	0.	0.	0.	0.	0.	0.	0.	0.
4.4280	0.0548	0.	0.	0.	0.	0.	0.	0.	0.
4.4890	0.0770	0.	0.	0.	0.	0.	0.	0.	0.
4.5400	0.0924	0.	0.	0.	0.	0.	0.	0.	0.
4.6000	0.1041	0.	0.	0.	0.	0.	0.	0.	0.
4.6600	0.1226	0.	0.	0.	0.	0.	0.	0.	0.
4.7300	0.1374	0.	0.	0.	0.	0.	0.	0.	0.
4.7910	0.1404	0.	0.	0.	0.	0.	0.	0.	0.
4.9110	0.1642	0.	0.	0.	0.	0.	0.	0.	0.
5.0310	0.1942	0.	0.	0.	0.	0.	0.	0.	0.
5.1510	0.2110	0.	0.	0.	0.	0.	0.	0.	0.
5.2710	0.2327	0.	0.	0.	0.	0.	0.	0.	0.
5.4510	0.2632	0.	0.	0.	0.	0.	0.	0.	0.
5.6350	0.2745	0.	0.	0.	0.	0.	0.	0.	0.

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 0.950 ATTACK ANGLE = 0.027

RUIN NOS = 200

ROLL ANGLES = 0.

Q VALUES = 395.6834

Y/D	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8
0.1800	-0.0555	0.	0.	0.	0.	0.	0.	0.	0.
0.3600	-0.0305	0.	0.	0.	0.	0.	0.	0.	0.
0.5400	-0.0183	0.	0.	0.	0.	0.	0.	0.	0.
0.7200	-0.0137	0.	0.	0.	0.	0.	0.	0.	0.
0.9000	-0.0056	0.	0.	0.	0.	0.	0.	0.	0.
1.1800	-0.0015	0.	0.	0.	0.	0.	0.	0.	0.
1.3600	0.0041	0.	0.	0.	0.	0.	0.	0.	0.
1.5400	0.0127	0.	0.	0.	0.	0.	0.	0.	0.
1.7200	0.0249	0.	0.	0.	0.	0.	0.	0.	0.
1.9000	0.0433	0.	0.	0.	0.	0.	0.	0.	0.
2.0800	0.0626	0.	0.	0.	0.	0.	0.	0.	0.
2.2600	0.0876	0.	0.	0.	0.	0.	0.	0.	0.
2.4400	0.1170	0.	0.	0.	0.	0.	0.	0.	0.
2.6200	0.1517	0.	0.	0.	0.	0.	0.	0.	0.
2.8000	-0.1451	0.	0.	0.	0.	0.	0.	0.	0.
2.9800	-0.4541	0.	0.	0.	0.	0.	0.	0.	0.
3.1600	-0.5229	0.	0.	0.	0.	0.	0.	0.	0.
3.3400	-0.5570	0.	0.	0.	0.	0.	0.	0.	0.
3.5200	-0.6014	0.	0.	0.	0.	0.	0.	0.	0.
3.7000	-0.6534	0.	0.	0.	0.	0.	0.	0.	0.
3.8800	-0.6926	0.	0.	0.	0.	0.	0.	0.	0.
4.0600	-0.7339	0.	0.	0.	0.	0.	0.	0.	0.
4.2400	-0.7752	0.	0.	0.	0.	0.	0.	0.	0.
4.4200	-0.8008	0.	0.	0.	0.	0.	0.	0.	0.
4.6000	-0.8372	0.	0.	0.	0.	0.	0.	0.	0.
4.7800	0.0046	0.	0.	0.	0.	0.	0.	0.	0.
4.9600	0.0575	0.	0.	0.	0.	0.	0.	0.	0.
5.1400	0.0957	0.	0.	0.	0.	0.	0.	0.	0.
5.3200	0.1141	0.	0.	0.	0.	0.	0.	0.	0.
5.5000	0.1339	0.	0.	0.	0.	0.	0.	0.	0.
5.6800	0.1512	0.	0.	0.	0.	0.	0.	0.	0.
5.8600	0.1613	0.	0.	0.	0.	0.	0.	0.	0.
6.0400	0.1694	0.	0.	0.	0.	0.	0.	0.	0.
6.2200	0.1826	0.	0.	0.	0.	0.	0.	0.	0.
6.4000	0.1887	0.	0.	0.	0.	0.	0.	0.	0.
6.5800	0.2030	0.	0.	0.	0.	0.	0.	0.	0.
6.7600	0.2219	0.	0.	0.	0.	0.	0.	0.	0.
6.9400	0.2423	0.	0.	0.	0.	0.	0.	0.	0.
7.1200	0.2540	0.	0.	0.	0.	0.	0.	0.	0.
7.3000	0.2729	0.	0.	0.	0.	0.	0.	0.	0.
7.4800	0.3010	0.	0.	0.	0.	0.	0.	0.	0.
7.6600	0.3173	0.	0.	0.	0.	0.	0.	0.	0.

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 1.100 ATTACK ANGLE = 0.014

RUIN NOS = 202

ROLL ANGLES = 0.

0 VALUES = 441.6087

X/D	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8
0.180	0.0005	0.	0.	0.	0.	0.	0.	0.	0.
0.360	-0.0100	0.	0.	0.	0.	0.	0.	0.	0.
0.540	-0.0009	0.	0.	0.	0.	0.	0.	0.	0.
0.720	-0.0453	0.	0.	0.	0.	0.	0.	0.	0.
1.110	-0.0159	0.	0.	0.	0.	0.	0.	0.	0.
1.360	0.0027	0.	0.	0.	0.	0.	0.	0.	0.
1.610	0.0272	0.	0.	0.	0.	0.	0.	0.	0.
1.860	0.0304	0.	0.	0.	0.	0.	0.	0.	0.
2.110	0.0380	0.	0.	0.	0.	0.	0.	0.	0.
2.360	0.0313	0.	0.	0.	0.	0.	0.	0.	0.
2.610	0.0012	0.	0.	0.	0.	0.	0.	0.	0.
2.860	-0.0457	0.	0.	0.	0.	0.	0.	0.	0.
3.110	-0.1037	0.	0.	0.	0.	0.	0.	0.	0.
3.240	-0.1436	0.	0.	0.	0.	0.	0.	0.	0.
3.360	-0.1704	0.	0.	0.	0.	0.	0.	0.	0.
3.490	-0.2360	0.	0.	0.	0.	0.	0.	0.	0.
3.610	-0.2718	0.	0.	0.	0.	0.	0.	0.	0.
3.670	-0.2954	0.	0.	0.	0.	0.	0.	0.	0.
3.740	-0.3280	0.	0.	0.	0.	0.	0.	0.	0.
3.800	-0.3701	0.	0.	0.	0.	0.	0.	0.	0.
3.860	-0.3986	0.	0.	0.	0.	0.	0.	0.	0.
3.920	-0.4331	0.	0.	0.	0.	0.	0.	0.	0.
3.990	-0.4652	0.	0.	0.	0.	0.	0.	0.	0.
4.050	-0.4920	0.	0.	0.	0.	0.	0.	0.	0.
4.110	-0.5185	0.	0.	0.	0.	0.	0.	0.	0.
4.180	0.2175	0.	0.	0.	0.	0.	0.	0.	0.
4.240	0.2583	0.	0.	0.	0.	0.	0.	0.	0.
4.300	0.2910	0.	0.	0.	0.	0.	0.	0.	0.
4.360	0.3082	0.	0.	0.	0.	0.	0.	0.	0.
4.420	0.3204	0.	0.	0.	0.	0.	0.	0.	0.
4.480	0.3336	0.	0.	0.	0.	0.	0.	0.	0.
4.540	0.3413	0.	0.	0.	0.	0.	0.	0.	0.
4.600	0.3478	0.	0.	0.	0.	0.	0.	0.	0.
4.660	0.3501	0.	0.	0.	0.	0.	0.	0.	0.
4.730	0.3623	0.	0.	0.	0.	0.	0.	0.	0.
4.790	0.3745	0.	0.	0.	0.	0.	0.	0.	0.
4.910	0.3904	0.	0.	0.	0.	0.	0.	0.	0.
5.030	0.4049	0.	0.	0.	0.	0.	0.	0.	0.
5.150	0.4170	0.	0.	0.	0.	0.	0.	0.	0.
5.270	0.4262	0.	0.	0.	0.	0.	0.	0.	0.
5.450	0.4424	0.	0.	0.	0.	0.	0.	0.	0.
5.630	0.4406	0.	0.	0.	0.	0.	0.	0.	0.

MACH NO. = 0.600		ATTACK ANGLE = 0.013							
RUN NOS =	203	0	0						
ROLL ANGLES =	0.	18.9	32.0						
0 VALUES =	211.9642	0.	0.						
X/D	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8
0.1900		-0.0527	0.	0.	0.	0.	0.	0.	0.
0.3690		-0.0537	0.	0.	0.	0.	0.	0.	0.
0.6190		-0.0320	0.	0.	0.	0.	0.	0.	0.
0.8690		-0.0311	0.	0.	0.	0.	0.	0.	0.
1.1190		-0.0122	0.	0.	0.	0.	0.	0.	0.
1.3680		-0.0094	0.	0.	0.	0.	0.	0.	0.
1.6180		0.0094	0.	0.	0.	0.	0.	0.	0.
1.8670		-0.0028	0.	0.	0.	0.	0.	0.	0.
2.1180		-0.0009	0.	0.	0.	0.	0.	0.	0.
2.3680		-0.0245	0.	0.	0.	0.	0.	0.	0.
2.6180		-0.0179	0.	0.	0.	0.	0.	0.	0.
2.8670		-0.0282	0.	0.	0.	0.	0.	0.	0.
3.1170		-0.0235	0.	0.	0.	0.	0.	0.	0.
3.3670		-0.0292	0.	0.	0.	0.	0.	0.	0.
3.6170		-0.0376	0.	0.	0.	0.	0.	0.	0.
3.8670		-0.0433	0.	0.	0.	0.	0.	0.	0.
4.1170		-0.0455	0.	0.	0.	0.	0.	0.	0.
4.3670		-0.0882	0.	0.	0.	0.	0.	0.	0.
4.6170		-0.0949	0.	0.	0.	0.	0.	0.	0.
4.8670		-0.1176	0.	0.	0.	0.	0.	0.	0.
5.1170		-0.1271	0.	0.	0.	0.	0.	0.	0.
5.3670		-0.1613	0.	0.	0.	0.	0.	0.	0.
5.6170		-0.2144	0.	0.	0.	0.	0.	0.	0.
5.8670		-0.2998	0.	0.	0.	0.	0.	0.	0.
6.1170		-0.7490	0.	0.	0.	0.	0.	0.	0.
6.3670		-0.3246	0.	0.	0.	0.	0.	0.	0.
6.6170		-0.1976	0.	0.	0.	0.	0.	0.	0.
6.8670		-0.1421	0.	0.	0.	0.	0.	0.	0.
7.1170		-0.0922	0.	0.	0.	0.	0.	0.	0.
7.3670		-0.0678	0.	0.	0.	0.	0.	0.	0.
7.6170		-0.0527	0.	0.	0.	0.	0.	0.	0.
7.8670		-0.0433	0.	0.	0.	0.	0.	0.	0.
8.1170		-0.0529	0.	0.	0.	0.	0.	0.	0.
8.3670		-0.1067	0.	0.	0.	0.	0.	0.	0.
8.6170		-0.2275	0.	0.	0.	0.	0.	0.	0.
8.8670		-0.1699	0.	0.	0.	0.	0.	0.	0.
9.1170		0.0510	0.	0.	0.	0.	0.	0.	0.
9.3670		0.1444	0.	0.	0.	0.	0.	0.	0.
9.6170		0.2332	0.	0.	0.	0.	0.	0.	0.
9.8670		0.3012	0.	0.	0.	0.	0.	0.	0.
10.1170		0.3467	0.	0.	0.	0.	0.	0.	0.

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 0.650 ATTACK ANGLE = 0.

RUN NOS = 204

ROLL ANGLES = 0.

Q VALUES = 247.7004

	18.9	32.0	42.1	117.9	148.0	141.1	180.0
	CP2	CP3	CP4	CP5	CP6	CP7	CP8
X/D							
0.1900	0.	0.	0.	0.	0.	0.	0.
0.3600	-0.0741	0.	0.	0.	0.	0.	0.
0.5300	-0.0539	0.	0.	0.	0.	0.	0.
0.7000	-0.0354	0.	0.	0.	0.	0.	0.
0.8690	-0.0274	0.	0.	0.	0.	0.	0.
1.1190	-0.0217	0.	0.	0.	0.	0.	0.
1.3680	-0.0153	0.	0.	0.	0.	0.	0.
1.6180	0.0040	0.	0.	0.	0.	0.	0.
1.8670	-0.0245	0.	0.	0.	0.	0.	0.
2.1170	-0.0170	0.	0.	0.	0.	0.	0.
2.3680	-0.0227	0.	0.	0.	0.	0.	0.
2.6180	-0.0219	0.	0.	0.	0.	0.	0.
2.8670	-0.0268	0.	0.	0.	0.	0.	0.
3.1170	-0.0349	0.	0.	0.	0.	0.	0.
3.3670	-0.0373	0.	0.	0.	0.	0.	0.
3.6170	-0.0454	0.	0.	0.	0.	0.	0.
3.8670	-0.0568	0.	0.	0.	0.	0.	0.
4.1170	-0.0623	0.	0.	0.	0.	0.	0.
4.3670	-0.0874	0.	0.	0.	0.	0.	0.
4.6170	-0.0996	0.	0.	0.	0.	0.	0.
4.8670	-0.1182	0.	0.	0.	0.	0.	0.
5.1170	-0.1433	0.	0.	0.	0.	0.	0.
5.3670	-0.1764	0.	0.	0.	0.	0.	0.
5.6170	-0.2331	0.	0.	0.	0.	0.	0.
5.8670	-0.3359	0.	0.	0.	0.	0.	0.
6.1170	-0.4606	0.	0.	0.	0.	0.	0.
6.3670	-0.3510	0.	0.	0.	0.	0.	0.
6.6170	-0.2198	0.	0.	0.	0.	0.	0.
6.8670	-0.1504	0.	0.	0.	0.	0.	0.
7.1170	-0.1208	0.	0.	0.	0.	0.	0.
7.3670	-0.0950	0.	0.	0.	0.	0.	0.
7.6170	-0.0781	0.	0.	0.	0.	0.	0.
7.8670	-0.0757	0.	0.	0.	0.	0.	0.
8.1170	-0.0924	0.	0.	0.	0.	0.	0.
8.3670	-0.1366	0.	0.	0.	0.	0.	0.
8.6170	-0.2844	0.	0.	0.	0.	0.	0.
8.8670	-0.2113	0.	0.	0.	0.	0.	0.
9.1170	0.0040	0.	0.	0.	0.	0.	0.
9.3670	0.1036	0.	0.	0.	0.	0.	0.
9.6170	0.1944	0.	0.	0.	0.	0.	0.
9.8670	0.2505	0.	0.	0.	0.	0.	0.
10.1170	0.2983	0.	0.	0.	0.	0.	0.

4-25

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 0.750 ATTACK ANGLE = 0.012

RUN NOS = 206

ROLL ANGLES = 0.

0 VALUES = 303.7896

X/Y	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8
0.1900	1.0562	0.	0.	0.	0.	0.	0.	0.	0.
0.3690	0.9724	0.	0.	0.	0.	0.	0.	0.	0.
0.5480	0.8886	0.	0.	0.	0.	0.	0.	0.	0.
0.7270	0.8048	0.	0.	0.	0.	0.	0.	0.	0.
0.9060	0.7210	0.	0.	0.	0.	0.	0.	0.	0.
1.0850	0.6372	0.	0.	0.	0.	0.	0.	0.	0.
1.2640	0.5534	0.	0.	0.	0.	0.	0.	0.	0.
1.4430	0.4696	0.	0.	0.	0.	0.	0.	0.	0.
1.6220	0.3858	0.	0.	0.	0.	0.	0.	0.	0.
1.8010	0.3020	0.	0.	0.	0.	0.	0.	0.	0.
1.9800	0.2182	0.	0.	0.	0.	0.	0.	0.	0.
2.1590	0.1344	0.	0.	0.	0.	0.	0.	0.	0.
2.3380	0.0506	0.	0.	0.	0.	0.	0.	0.	0.
2.5170	0.0668	0.	0.	0.	0.	0.	0.	0.	0.
2.6960	-0.0170	0.	0.	0.	0.	0.	0.	0.	0.
2.8750	-0.0332	0.	0.	0.	0.	0.	0.	0.	0.
3.0540	-0.0494	0.	0.	0.	0.	0.	0.	0.	0.
3.2330	-0.0656	0.	0.	0.	0.	0.	0.	0.	0.
3.4120	-0.0818	0.	0.	0.	0.	0.	0.	0.	0.
3.5910	-0.0980	0.	0.	0.	0.	0.	0.	0.	0.
3.7700	-0.1142	0.	0.	0.	0.	0.	0.	0.	0.
3.9490	-0.1304	0.	0.	0.	0.	0.	0.	0.	0.
4.1280	-0.1466	0.	0.	0.	0.	0.	0.	0.	0.
4.3070	-0.1628	0.	0.	0.	0.	0.	0.	0.	0.
4.4860	-0.1790	0.	0.	0.	0.	0.	0.	0.	0.
4.6650	-0.1952	0.	0.	0.	0.	0.	0.	0.	0.
4.8440	-0.2114	0.	0.	0.	0.	0.	0.	0.	0.
5.0230	-0.2276	0.	0.	0.	0.	0.	0.	0.	0.
5.2020	-0.2438	0.	0.	0.	0.	0.	0.	0.	0.
5.3810	-0.2600	0.	0.	0.	0.	0.	0.	0.	0.
5.5600	-0.2762	0.	0.	0.	0.	0.	0.	0.	0.
5.7390	-0.2924	0.	0.	0.	0.	0.	0.	0.	0.
5.9180	-0.3086	0.	0.	0.	0.	0.	0.	0.	0.
6.0970	-0.3248	0.	0.	0.	0.	0.	0.	0.	0.
6.2760	-0.3410	0.	0.	0.	0.	0.	0.	0.	0.
6.4550	-0.3572	0.	0.	0.	0.	0.	0.	0.	0.
6.6340	-0.3734	0.	0.	0.	0.	0.	0.	0.	0.
6.8130	-0.3896	0.	0.	0.	0.	0.	0.	0.	0.
6.9920	-0.4058	0.	0.	0.	0.	0.	0.	0.	0.
7.1710	-0.4220	0.	0.	0.	0.	0.	0.	0.	0.
7.3500	-0.4382	0.	0.	0.	0.	0.	0.	0.	0.
7.5290	-0.4544	0.	0.	0.	0.	0.	0.	0.	0.
7.7080	-0.4706	0.	0.	0.	0.	0.	0.	0.	0.
7.8870	-0.4868	0.	0.	0.	0.	0.	0.	0.	0.
8.0660	-0.5030	0.	0.	0.	0.	0.	0.	0.	0.
8.2450	-0.5192	0.	0.	0.	0.	0.	0.	0.	0.
8.4240	-0.5354	0.	0.	0.	0.	0.	0.	0.	0.
8.6030	-0.5516	0.	0.	0.	0.	0.	0.	0.	0.
8.7820	-0.5678	0.	0.	0.	0.	0.	0.	0.	0.
8.9610	-0.5840	0.	0.	0.	0.	0.	0.	0.	0.
9.1400	-0.6002	0.	0.	0.	0.	0.	0.	0.	0.
9.3190	-0.6164	0.	0.	0.	0.	0.	0.	0.	0.
9.4980	-0.6326	0.	0.	0.	0.	0.	0.	0.	0.
9.6770	-0.6488	0.	0.	0.	0.	0.	0.	0.	0.
9.8560	-0.6650	0.	0.	0.	0.	0.	0.	0.	0.
10.0350	-0.6812	0.	0.	0.	0.	0.	0.	0.	0.

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO.= 0.800		ATTACK ANGLE = 0.011											
RUN NOS =		207											
ROLL ANGLES =		0.		18.9	32.0	62.1	117.9	168.0	181.1	190.0			
U VALUES =		325.9119		0.	0.	0.	0.	0.	0.	0.			
CN LOCAL													
X/D	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8					
0.1900	-0.0692	0.	0.	0.	0.	0.	0.	0.					
0.3690	-0.0470	0.	0.	0.	0.	0.	0.	0.					
0.6190	-0.0327	0.	0.	0.	0.	0.	0.	0.					
0.8690	-0.0272	0.	0.	0.	0.	0.	0.	0.					
1.1190	-0.0204	0.	0.	0.	0.	0.	0.	0.					
1.3690	-0.0173	0.	0.	0.	0.	0.	0.	0.					
1.6190	0.0049	0.	0.	0.	0.	0.	0.	0.					
1.8670	0.0542	0.	0.	0.	0.	0.	0.	0.					
2.1180	-0.0173	0.	0.	0.	0.	0.	0.	0.					
2.3690	-0.0135	0.	0.	0.	0.	0.	0.	0.					
2.6190	-0.0153	0.	0.	0.	0.	0.	0.	0.					
2.8670	-0.0106	0.	0.	0.	0.	0.	0.	0.					
3.1170	-0.0282	0.	0.	0.	0.	0.	0.	0.					
3.2410	-0.0325	0.	0.	0.	0.	0.	0.	0.					
3.3670	-0.0411	0.	0.	0.	0.	0.	0.	0.					
3.4910	-0.0509	0.	0.	0.	0.	0.	0.	0.					
3.6160	-0.0546	0.	0.	0.	0.	0.	0.	0.					
3.6780	-0.0705	0.	0.	0.	0.	0.	0.	0.					
3.7410	-0.0840	0.	0.	0.	0.	0.	0.	0.					
3.8030	-0.0969	0.	0.	0.	0.	0.	0.	0.					
3.8670	-0.1106	0.	0.	0.	0.	0.	0.	0.					
3.9290	-0.1779	0.	0.	0.	0.	0.	0.	0.					
3.9910	-0.3515	0.	0.	0.	0.	0.	0.	0.					
4.0530	-0.8649	0.	0.	0.	0.	0.	0.	0.					
4.1160	-1.1690	0.	0.	0.	0.	0.	0.	0.					
4.1830	-0.2332	0.	0.	0.	0.	0.	0.	0.					
4.2490	-0.1424	0.	0.	0.	0.	0.	0.	0.					
4.3060	-0.0957	0.	0.	0.	0.	0.	0.	0.					
4.3670	-0.0651	0.	0.	0.	0.	0.	0.	0.					
4.4280	-0.0436	0.	0.	0.	0.	0.	0.	0.					
4.4890	-0.0307	0.	0.	0.	0.	0.	0.	0.					
4.5500	-0.0270	0.	0.	0.	0.	0.	0.	0.					
4.6110	-0.0402	0.	0.	0.	0.	0.	0.	0.					
4.6730	-0.0834	0.	0.	0.	0.	0.	0.	0.					
4.7310	-0.3871	0.	0.	0.	0.	0.	0.	0.					
4.7910	-0.0943	0.	0.	0.	0.	0.	0.	0.					
4.8460	0.1010	0.	0.	0.	0.	0.	0.	0.					
4.9020	0.1935	0.	0.	0.	0.	0.	0.	0.					
4.9890	0.2806	0.	0.	0.	0.	0.	0.	0.					
5.0730	0.3469	0.	0.	0.	0.	0.	0.	0.					
5.1570	0.3923	0.	0.	0.	0.	0.	0.	0.					

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 0.850 ATTACK ANGLE = 0.011

RUN NOS = 208

ROLL ANGLES = 0.

Q VALUES = 150.0649

	0.	18.9	32.0	62.1	117.9	148.0	141.1	0	180.0
	CP2	CP3	CP4	CP5	CP6	CP7	CP8		
X/N	CP1								
0.1900	-0.0684								
0.3690	-0.0450								
0.6190	-0.0206								
0.8690	-0.0239								
1.1190	-0.0171								
1.3690	-0.0131								
1.6190	0.0063								
1.8670	0.1635								
2.1180	-0.0057								
2.3690	-0.0086								
2.6190	-0.0097								
2.8670	-0.0131								
3.1170	-0.0160								
3.2410	-0.0200								
3.3670	-0.0263								
3.4910	-0.0166								
3.6160	-0.0171								
3.6780	-0.0273								
3.7410	-0.0472								
3.8030	-0.1047								
3.8670	-0.2282								
3.9280	-0.4870								
3.9910	-0.9007								
4.0530	-0.1889								
4.1160	-1.0078								
4.1830	-0.1713								
4.2450	-0.0959								
4.3060	-0.0577								
4.3670	-0.0320								
4.4280	-0.0166								
4.4890	-0.0063								
4.5500	0.0011								
4.6110	-0.0063								
4.6730	-0.0050								
4.7310	-0.0670								
4.7910	-0.0382								
4.8460	0.1387								
4.9020	0.2249								
4.9880	0.3077								
5.0730	0.3750								
5.1570	0.4185								

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 0.900		ATTACK ANGLE = 0.013											
RUN NOS =		209											
ROLL ANGLES =		0.		18.9	32.0	42.1	117.9	148.0	161.1	180.0			
Q VALUES =		371.6833		0.	CP3	CP4	CP5	CP6	CP7	CP8			
X/D	CN LOCAL	CP1	CP2										
0.1900		-0.0671	0.		0.	0.	0.	0.	0.	0.			
0.3690		-0.0424	0.		0.	0.	0.	0.	0.	0.			
0.6190		-0.0279	0.		0.	0.	0.	0.	0.	0.			
0.8690		-0.0236	0.		0.	0.	0.	0.	0.	0.			
1.1190		-0.0150	0.		0.	0.	0.	0.	0.	0.			
1.3680		-0.0113	0.		0.	0.	0.	0.	0.	0.			
1.6180		0.0086	0.		0.	0.	0.	0.	0.	0.			
1.8670		0.2469	0.		0.	0.	0.	0.	0.	0.			
2.1170		-0.0032	0.		0.	0.	0.	0.	0.	0.			
2.3660		-0.0011	0.		0.	0.	0.	0.	0.	0.			
2.6160		0.	0.		0.	0.	0.	0.	0.	0.			
2.8670		0.0043	0.		0.	0.	0.	0.	0.	0.			
3.1170		0.0161	0.		0.	0.	0.	0.	0.	0.			
3.3670		0.0252	0.		0.	0.	0.	0.	0.	0.			
3.6170		0.0290	0.		0.	0.	0.	0.	0.	0.			
3.8670		-0.0075	0.		0.	0.	0.	0.	0.	0.			
4.1160		-0.0606	0.		0.	0.	0.	0.	0.	0.			
4.3670		-0.1499	0.		0.	0.	0.	0.	0.	0.			
4.6170		-0.3311	0.		0.	0.	0.	0.	0.	0.			
4.8670		-0.6297	0.		0.	0.	0.	0.	0.	0.			
5.1170		-0.6946	0.		0.	0.	0.	0.	0.	0.			
5.3670		-0.7476	0.		0.	0.	0.	0.	0.	0.			
5.6170		-0.8009	0.		0.	0.	0.	0.	0.	0.			
5.8670		0.0270	0.		0.	0.	0.	0.	0.	0.			
6.1170		-0.8784	0.		0.	0.	0.	0.	0.	0.			
6.3670		-0.1066	0.		0.	0.	0.	0.	0.	0.			
6.6170		-0.7443	0.		0.	0.	0.	0.	0.	0.			
6.8670		-0.0156	0.		0.	0.	0.	0.	0.	0.			
7.1170		0.0045	0.		0.	0.	0.	0.	0.	0.			
7.3670		0.0231	0.		0.	0.	0.	0.	0.	0.			
7.6170		0.0355	0.		0.	0.	0.	0.	0.	0.			
7.8670		0.0511	0.		0.	0.	0.	0.	0.	0.			
8.1170		0.0355	0.		0.	0.	0.	0.	0.	0.			
8.3670		-0.2226	0.		0.	0.	0.	0.	0.	0.			
8.6170		-0.7334	0.		0.	0.	0.	0.	0.	0.			
8.8670		0.0210	0.		0.	0.	0.	0.	0.	0.			
9.1170		0.1801	0.		0.	0.	0.	0.	0.	0.			
9.3670		0.2597	0.		0.	0.	0.	0.	0.	0.			
9.6170		0.3377	0.		0.	0.	0.	0.	0.	0.			
9.8670		0.4011	0.		0.	0.	0.	0.	0.	0.			
10.1170		0.4436	0.		0.	0.	0.	0.	0.	0.			

LOCAL NORMAL FORCE COEFFICIENTS

MACH NO. = 0.950 ATTACK ANGLE = 0.022

RUN NOS = 210

ROLL ANGLES = 0.

O VALUES = 395.6235

X/Y	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CP6	CP7	CP8
0.1980	-0.0636	0.	0.	0.	0.	0.	0.	0.	0.
0.3690	-0.0369	0.	0.	0.	0.	0.	0.	0.	0.
0.6190	-0.0241	0.	0.	0.	0.	0.	0.	0.	0.
0.8690	-0.0100	0.	0.	0.	0.	0.	0.	0.	0.
1.1190	-0.0113	0.	0.	0.	0.	0.	0.	0.	0.
1.3680	-0.0056	0.	0.	0.	0.	0.	0.	0.	0.
1.6180	0.0185	0.	0.	0.	0.	0.	0.	0.	0.
1.8670	0.0051	0.	0.	0.	0.	0.	0.	0.	0.
2.1170	0.0180	0.	0.	0.	0.	0.	0.	0.	0.
2.3680	0.0208	0.	0.	0.	0.	0.	0.	0.	0.
2.6180	0.0452	0.	0.	0.	0.	0.	0.	0.	0.
2.8670	0.0662	0.	0.	0.	0.	0.	0.	0.	0.
3.1170	0.0657	0.	0.	0.	0.	0.	0.	0.	0.
3.3670	0.0313	0.	0.	0.	0.	0.	0.	0.	0.
3.6160	-0.0796	0.	0.	0.	0.	0.	0.	0.	0.
3.8670	-0.3702	0.	0.	0.	0.	0.	0.	0.	0.
4.1160	-0.4585	0.	0.	0.	0.	0.	0.	0.	0.
4.3670	-0.5021	0.	0.	0.	0.	0.	0.	0.	0.
4.6170	-0.5369	0.	0.	0.	0.	0.	0.	0.	0.
4.8670	-0.5804	0.	0.	0.	0.	0.	0.	0.	0.
5.1170	-0.6143	0.	0.	0.	0.	0.	0.	0.	0.
5.3670	-0.6578	0.	0.	0.	0.	0.	0.	0.	0.
5.6170	-0.7014	0.	0.	0.	0.	0.	0.	0.	0.
5.8670	-0.7347	0.	0.	0.	0.	0.	0.	0.	0.
6.1170	-0.7554	0.	0.	0.	0.	0.	0.	0.	0.
6.3670	-0.8369	0.	0.	0.	0.	0.	0.	0.	0.
6.6170	0.0133	0.	0.	0.	0.	0.	0.	0.	0.
6.8670	0.0441	0.	0.	0.	0.	0.	0.	0.	0.
7.1170	0.0667	0.	0.	0.	0.	0.	0.	0.	0.
7.3670	0.0892	0.	0.	0.	0.	0.	0.	0.	0.
7.6170	0.1108	0.	0.	0.	0.	0.	0.	0.	0.
7.8670	0.1123	0.	0.	0.	0.	0.	0.	0.	0.
8.1170	-0.0676	0.	0.	0.	0.	0.	0.	0.	0.
8.3670	-0.4976	0.	0.	0.	0.	0.	0.	0.	0.
8.6170	-0.6430	0.	0.	0.	0.	0.	0.	0.	0.
8.8670	0.0850	0.	0.	0.	0.	0.	0.	0.	0.
9.1170	0.2208	0.	0.	0.	0.	0.	0.	0.	0.
9.3670	0.3036	0.	0.	0.	0.	0.	0.	0.	0.
9.6170	0.3757	0.	0.	0.	0.	0.	0.	0.	0.
9.8670	0.4372	0.	0.	0.	0.	0.	0.	0.	0.
10.1170	0.4826	0.	0.	0.	0.	0.	0.	0.	0.

MACH NO. 3 1.000 ATTACK ANGLE = 0.032

SUN NIS 3

211

ROLL ANGLES :

3.

१५.७

Q VALUES =

417.6223

7001 LOCAL

2

८३३

८५३१

45.

565

29x

CP7

உ

LOCAL NORMAL FORCE COEFFICIENTS

PACH NO. 1.100 ATTACK ANGLE = 0.013

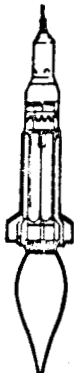
RUN NOS = 212

ROLL ANGLES = 0.

Q VALUES = 437.9100

Y/N	CN LOCAL	CP1	CP2	CP3	CP4	CP5	CPA	CP7	CPA
0.1900	-0.0069	0.	0.	0.	0.	0.	0.	0.	0.
0.3690	0.0037	0.	0.	0.	0.	0.	0.	0.	0.
0.5480	-0.0059	0.	0.	0.	0.	0.	0.	0.	0.
0.7270	-0.0049	0.	0.	0.	0.	0.	0.	0.	0.
0.9060	-0.0156	0.	0.	0.	0.	0.	0.	0.	0.
1.1190	0.0078	0.	0.	0.	0.	0.	0.	0.	0.
1.3680	0.0495	0.	0.	0.	0.	0.	0.	0.	0.
1.6180	0.0393	0.	0.	0.	0.	0.	0.	0.	0.
1.8670	0.0484	0.	0.	0.	0.	0.	0.	0.	0.
2.1180	0.0479	0.	0.	0.	0.	0.	0.	0.	0.
2.3680	-0.0474	0.	0.	0.	0.	0.	0.	0.	0.
2.6180	-0.0219	0.	0.	0.	0.	0.	0.	0.	0.
2.8670	-0.0698	0.	0.	0.	0.	0.	0.	0.	0.
3.1170	-0.1004	0.	0.	0.	0.	0.	0.	0.	0.
3.2410	-0.1369	0.	0.	0.	0.	0.	0.	0.	0.
3.3670	-0.1743	0.	0.	0.	0.	0.	0.	0.	0.
3.4910	-0.2087	0.	0.	0.	0.	0.	0.	0.	0.
3.6160	-0.2430	0.	0.	0.	0.	0.	0.	0.	0.
3.7410	-0.2667	0.	0.	0.	0.	0.	0.	0.	0.
3.8670	-0.3040	0.	0.	0.	0.	0.	0.	0.	0.
3.9910	-0.3288	0.	0.	0.	0.	0.	0.	0.	0.
4.1160	-0.3626	0.	0.	0.	0.	0.	0.	0.	0.
4.2410	-0.3932	0.	0.	0.	0.	0.	0.	0.	0.
4.3670	-0.4152	0.	0.	0.	0.	0.	0.	0.	0.
4.4910	-0.4543	0.	0.	0.	0.	0.	0.	0.	0.
4.6160	0.2103	0.	0.	0.	0.	0.	0.	0.	0.
4.7410	0.0383	0.	0.	0.	0.	0.	0.	0.	0.
4.8670	0.2687	0.	0.	0.	0.	0.	0.	0.	0.
4.9910	0.2919	0.	0.	0.	0.	0.	0.	0.	0.
5.1160	0.3011	0.	0.	0.	0.	0.	0.	0.	0.
5.2410	0.2710	0.	0.	0.	0.	0.	0.	0.	0.
5.3670	0.0766	0.	0.	0.	0.	0.	0.	0.	0.
5.4910	-0.1412	0.	0.	0.	0.	0.	0.	0.	0.
5.6160	-0.2522	0.	0.	0.	0.	0.	0.	0.	0.
5.7410	-0.3459	0.	0.	0.	0.	0.	0.	0.	0.
5.8670	0.2970	0.	0.	0.	0.	0.	0.	0.	0.
5.9910	0.4249	0.	0.	0.	0.	0.	0.	0.	0.
6.1160	0.4875	0.	0.	0.	0.	0.	0.	0.	0.
6.2410	0.5501	0.	0.	0.	0.	0.	0.	0.	0.
6.3670	0.6036	0.	0.	0.	0.	0.	0.	0.	0.
6.4910	0.6373	0.	0.	0.	0.	0.	0.	0.	0.

DATE: 1-12-65



PUBLICATION CHANGE

THE FOLLOWING CHANGES APPLY TO PUBLICATION: TECHNICAL NOTE

TITLE: Results of an Experimental Investigation to Determine the Aerodynamic Loading on Three Saturn Payload Shapes

TN-AE-64-16

NUMBER: (ADDENDUM) DATE: 11-10-64 BRANCH: Advance Engineering

Section 3, Pages 3-61 and 3-62:

Remove pages (figures 12 and 13) and insert attached pages (figures 11A and 11B).

H. B. Reese, Project Engineer
Aerospace Physics Section

PAGE 1 OF 3

1314B-1-12-65

DISTRIBUTION SAME AS FOR
ABOVE PUBLICATION

SPACE DIVISION



CHRYSLER
CORPORATION

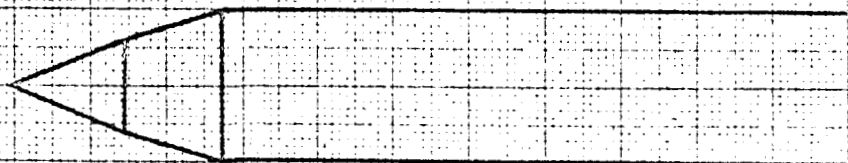


FIGURE 11A. COMPARISON OF LOCAL NORMAL FORCE COEFFICIENT DISTRIBUTIONS

