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WIND-TUNNEL INVESTIGATION
OF HELICOPTER-ROTOR WAKE EFFECTS
ON THREE HELICOPTER FUSELAGE MODELS

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SUMMARY

An investigation was conducted in the Langley V/STOL tunnel to study the effects of rotor wake on helicopter fuselage aerodynamic characteristics. A rotor model for generating the wake was mounted close to two of three fuselage models. Force, moment, and pressure data were determined for various combinations of windspeed, sideslip angles, and pitch angles. The data show that the influence of rotor wake on helicopter fuselage yawing moment imposes a significant additional thrust requirement on the tail rotor of single-rotor helicopters for high positive sideslip angles. The influence of the low Reynolds number characteristic of this investigation can make the results conservative if utilized in the specification for design of a tail rotor.

INTRODUCTION

Single-rotor helicopters have experienced degradation of directional control while flying at low speed. (See ref. 1.) The degradation varies with airspeed and yaw angle. It is attributed partially to mutual aerodynamic interference between the tail rotor, main rotor, and vertical tail and partially to the unstable yawing-moment characteristics of the fuselage. An investigation of a tail-rotor interference problem for rearward flight in ground effect is reported in reference 2. The results of the wind-tunnel investigations, reported therein, identified significant adverse effects of the main-rotor wake on the vertical-tail force and on the tail-rotor thrust.

The main-rotor wake has appreciable influence on the fuselage at low airspeeds. Little published information is available to provide an understanding of such effects. What does exist is directed toward the evaluation of conditions in hovering flight only without treatment of conditions at low-flight speeds near hover. Obtaining such information with full-scale flight investigations is difficult because of problems in controlling test conditions and in measuring all relevant parameters.

The purpose of this investigation was to obtain force, moment, and pressure data experimentally for several different fuselage shapes in the presence of a rotor wake. Three fuselage models representative of current helicopter designs were tested in the

Langley V/STOL tunnel at windspeeds of up to 102 knots through ±180° sideslip. (When the rotor was mounted, the maximum windspeed was 45 knots.) Forces and moments of the fuselage and the rotor were measured. In addition, pressure distributions were measured for selected test conditions. Comprehensive tables of the pressure data are available in a supplement to this report. A request form for the supplement is found in the back of this report.

SYMBOLS

The longitudinal and lateral data in this report are referred to the body axes (fig. 1). Moment centers are indicated for each of the three models in figure 2. The units used for physical quantities defined in this paper are given in both the U.S. Customary Units and the International System of Units (SI). Measurements and calculations were made in U.S. Customary Units. Factors relating these two systems of units are presented in reference 3. The symbols used are defined as follows; the symbols enclosed in parentheses are used in the data listing of the appendix and supplement.

A rotor disk area, 0.8107 m^2 (8.728 ft^2)

b number of rotor blades

C_A (CAF)   axial-force coefficient, $F_A/q_\infty S_p$

C_H/σ (CHSSIG)   in-plane rotor drag coefficient, $H/\rho A V_T^2 \sigma$

C_l (CRM)   rolling-moment coefficient, $M_X/q_\infty S_s \ell_F$

C_m (CPM)   pitching-moment coefficient, $M_Y/q_\infty S_p \ell_F$

C_N (CNF)   normal-force coefficient, $F_N/q_\infty S_p$

C_n (CYM)   yawing-moment coefficient, $M_Z/q_\infty S_s \ell_F$

$C_{n,s}$ (CYMS)   yawing-moment slipstream coefficient, $M_Z/q_s S_s \ell_F$

C_p pressure coefficient, $\dfrac{p - p_\infty}{q_\infty}$

C_{PR} yaw center of pressure, C_n/C_Y

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C_T/σ (CTSSIG)   thrust coefficient, $T/\rho A V_T^2 \sigma$

C_Y (CSF)   side-force coefficient, $F_Y/q_\infty S_S$

$C_{Y,s}$ (CSFS)   side-force slipstream coefficient, $F_Y/q_s S_S$

c   blade chord, 8.9 cm (3.5 in.)

F_A axial force, N (lbf)

F_N normal force, N (lbf)

F_Y side force, N (lbf)

H   rotor and hub drag force normal to thrust, N (lbf)

ℓ characteristic length (for Reynolds number), m (ft)

ℓ_F fuselage length, 91.4 cm (36 in.)

M_X rolling moment, cm-N (in-lbf)

M_Y pitching moment, cm-N (in-lbf)

M_Z yawing moment, cm-N (in-lbf)

N_{Re} Reynolds number, $V\ell/\nu$

p   local pressure, N/m^2 (lbf/ft^2)

p_∞ free-stream static pressure, N/m^2 (lbf/ft^2)

q_s (QS)   slipstream dynamic pressure, $q_\infty + \dfrac{T}{A}$, N/m^2 (lbf/ft^2)

q_∞ (Q)   free-stream dynamic pressure, $\rho V^2/2$, N/m^2 (lbf/ft^2)

R   radius of rotor disk, 50.8 cm (20 in.)

S_p planform projected area of fuselage, m^2 (ft^2)

| S_s | side projected area of fuselage, m^2 (ft^2) |

T   rotor thrust, shaft axis, N (lbf)

V   free-stream or slipstream windspeed, m/sec (ft/sec)

V_K free-stream windspeed, knots

V_T (VT)   rotor tip speed, ΩR, m/sec (ft/sec)

x (X)   fuselage station, cm (in.)

α (ALPHA)   angle of attack, deg

β (BETA)   angle of sideslip, deg

ν air kinematic viscosity, m^2/sec (ft^2/sec)

ρ air density, kg/m^3 (slugs/ft^3)

σ rotor disk solidity, bc/πR, 0.1114

ϕ flow angle, deg

χ (CHI)   wake skew angle (from the vertical), deg

Ω rotor rotational speed, rad/sec

MODEL DESCRIPTION AND INSTALLATION

The three fuselage models used in this investigation (fig. 2) are representative of a current gunship configuration (model 1), a utility configuration (model 2), and a light observation configuration (model 3). The models differed slightly from scaled versions of these configurations in that the tail-boom segments were slightly oversized. The fuselage assemblies were made of molded fiberglass, and each had static-pressure taps located on the model surface to obtain pressure distribution data. The pressure tap locations are given in table I. Each fuselage could be tested with or without a standard vertical tail, although the gunship configuration was tested with a cambered vertical tail and a "V" tail as well. The nomenclature of these configurations is given in table II.

A teetering hub tail rotor from a light observation helicopter simulated the main rotor of each configuration in this investigation. The rotor served to generate the rotor wake that a helicopter fuselage experiences at low-flight speeds. The direction of rotor rotation was conventional, that is, counterclockwise when viewed from above the fuselage. (See fig. 1.) The two blades of the rotor (fig. 3) had a chord of 8.9 cm (3.5 in.), an NACA 0012 airfoil section, and no twist. The rotor diameter was 101.6 cm (40 in.). The blade root cutout was 40.2 percent of the rotor radius. Collective pitch was set by adjustment of pitch links at the rotor hub and measurement of the rotor blade angle. The rotor had no cyclic pitch control and was free to flap. The rotor hub was attached through a five-component strain-gage balance to an air motor which drove the rotor at speeds of 3350 or 3600 rpm. The balance measured the orthogonal rotor shaft forces of thrust, drag, and side force as well as pitching moment and rolling moment. The balance was not capable of measuring yawing moment, that is, torque.

The fuselage models and the rotor were inverted for the tunnel installation as shown in figure 4. The fuselage assembly was mounted on a six-component strain-gage balance attached to a sting. The rotor was mounted through the five-component balance and an air motor to a section of the sting-support structure, the air motor exhaust being ducted through the support structure. The rotor was placed at the appropriate scaled location near the fuselage, although not connected with it. The distance from the rotor flapping axis to the top of the fuselage pylon was 4.9 cm (1.93 in.) for model 1 and 9.4 cm (3.70 in.) for model 2. Model 3 was not tested with the rotor. The whole assembly could be pitched through an angle-of-attack range of $\pm 15^O$. The fuselage models were mounted with either the nose upstream or the tail upstream; thus, sideslip angles of $\pm 180^O$ were possible. When sideslip angles were greater than $\pm 90^O$, the sting was mounted through the nose of the fuselage and a rounded plug was inserted in the tail of the model.

TESTING AND CORRECTIONS

The investigation was conducted in the Langley V/STOL tunnel. The test section has a width of 6.63 m (21.75 ft) and a height of 4.42 m (14.5 ft). The fuselage and rotor were located approximately in the center of the test section. This test program utilized a free-stream windspeed range of 15 to 102 knots (1 knot = 0.5144 m/s). Since errors due to blockage, slipstream contraction, flow misalinement, and tunnel wall effects have been found to be small for models of this size in this tunnel, no corrections for these types of error have been applied to the data. The maximum tunnel wall effect was calculated (ref. 4) to be a flow angle-of-attack change of 1.0^O; this effect occurred at the lowest free-stream velocity and at the lowest downwash angle (which therefore was the most extreme wake angle effected).

Since yawing moment and side force were the components of primary interest in this program, the force and moment measuring balance was chosen with the range most suitable for these components. The maximum forces and moments that the fuselage balance was capable of measuring (the associated accuracy was ±0.5 percent of the maximum force or moment) are given in the following table:

F_A, N (lbf) . . . . ±66.7 (±15)

F_Y, N (lbf) . . . . ±222.4 (±50)

F_N, N (lbf) . . . . ±222.4 (±50)

M_X, cm-N (in-lbf) . . . . ±226 (±20)

M_Y, cm-N (in-lbf) . . . . ±1130 (±100)

M_Z, cm-N (in-lbf) . . . . ±1130 (±100)

The accuracy of data presented in coefficient form is, of course, inversely proportional to the dynamic pressure and nondimensionalizing areas and lengths, as indicated in "Symbols." The data repeatability was good because of the manner of acquiring data. A data point is normally 10 samples. When pressure data are obtained, the balance measurements are sampled 48 times. Thus, there is a statistical improvement in accuracy of 3.3 when 10 samples are taken and 6.9 when 48 samples are obtained. (See ref. 5.)

The rotor balance measured five components, although only two of these, thrust and drag, were of interest. The thrust range capability was 0 to 623 N (0 to 140 lbf) with an accuracy of ±2.2 N (±0.5 lbf). The drag range was ±133 N (±30 lbf) with an accuracy of ±2.7 N (±0.6 lbf). The statistical improvement in data repeatability, as a result of the data compiling procedure, is true for these data as well.

The accuracy of attitude angles and windspeed also influenced data accuracy. Angle of attack α and angle of sideslip β were within 0.1° of the nominal value. Windspeed measurements were within 0.5 knot. Collective pitch settings were accurate within ±0.1°. For most of the test program, the rotor collective pitch setting was 8.0° with a rotor speed of 3600 rpm; for early test runs, the pitch setting was 9.0° with a rotor speed of 3350 rpm.

PRESENTATION OF DATA

The results of the wind-tunnel investigation are presented in terms of conventional aerodynamic force, moment, and pressure coefficients. As an aid to the evaluation and analyses of the results, figures 5 and 6 are presented. Figure 5 shows the variation of rotor thrust, rotor drag, and calculated wake angles as a function of windspeed for the rotor used in this test program when tested alone. Figure 6 shows typical main-rotor power for a helicopter as the equivalent yawing-moment coefficient required of a tail rotor for antitorque. Yawing-moment (body axis) and side-force coefficient data are

presented in figures 7 to 48. The appendix has a complete listing of the six components of fuselage forces and moments (in coefficient form) measured as well as the thrust coefficient. Selected portions of the pressure coefficient data are presented in figures 51 to 70. Comprehensive tables of the pressure data are available in a supplement to this report which is available on request. Inclusion of the test run number in figures and data listings provide a means of correlating test conditions and data.

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DISCUSSION OF RESULTS

The rotor wake at low-flight speeds immerses a helicopter fuselage in a swirling, relatively strong flow that can be expected to strongly affect fuselage aerodynamics. The flow is complex and self-distorting. (See ref. 6.) Axial swirl is induced by the profile drag of the rotor blade; there are strong vortices generated by the rotor blade tips; the lateral extremities of the wake roll up as does any wake trailed by a finite-span lifting surface. Wake skew angle is an adequate general indicator of the strength of the momentum flux through the rotor relative to the free-stream flow; the angle is determined as a function of rotor thrust and drag according to the derivation in reference 4. High thrust and low windspeed results in a small angle from the vertical. As windspeed increases or thrust decreases, the angle approaches a value of 90°. Figure 5 indicates that this angle varies significantly with windspeed in the range of 0 to 60 knots.

The performance characteristics of the rotor alone are indicated in figures 5(a) and 5(b). Because a fixed collective was used throughout the test program, disk loading increased moderately as the free-stream windspeed was increased. The resulting variation of wake skew angle for the investigation is shown in figure 5(c). The data may be

read for different values of lift if the appropriate values of wake skew angle and then the corresponding airspeed are determined.

Yawing Moment and Side Force

Since yawing-moment characteristics, supplemented by side-force characteristics, were of the greatest interest, only these data are presented in figures 7 to 48. The configurations consisted of combinations of the three fuselage shapes, with and without vertical- and horizontal-tail surfaces, and with and without rotor. Configuration nomenclature used in the figure keys and illustrations of each configuration are given in table II.

Model 1 was tested with four vertical-tail configurations. Figure 7 shows the comparison of yawing moment for the four configurations. It is evident that the fuselage without a vertical tail is moderately unstable in the range of sideslip -20° to 20° (at an angle of attack of 0°). The three tails provide a moderate stabilizing effect in that range. Also, they are nearly identical in yawing-moment characteristics throughout the sideslip range. Figures 8 to 11 show the results of varying windspeed for the four tail configurations. No significant anomalous aerodynamic characteristics attributable to Reynolds number effects are evident. Qualitative consideration of possible Reynolds number effect is presented in the section "Reynolds Number." In general, the data for model 1 configurations without the influence of rotor wake show reasonable, symmetric variations about a sideslip of 0°.

The strong influence of the rotor wake on model 1 is shown in figures 12 to 16. Maximum yawing-moment peaks for rotors-off configurations occur at angles of sideslip of 120° to 130°. With the rotor wake, these peaks occur at sideslip angles as low as 70°. The data show discontinuities at low windspeeds (15 to 25 knots) at sidewind conditions (sideslip angles near ±90°). This characteristic is attributable to the configuration change from nose to tail mounting on the sting. The usual symmetry of yawing-moment data about a sideslip of 0° for rotor off is altered appreciably with the addition of a rotor wake. In general, the rotor wake has a much stronger effect on C_n at lower airspeeds and causes the fuselage to stabilize in yaw about a sideslip angle of approximately 20°.

The directional characteristics of model 2 are similar to those of model 1; that is, the same pattern of yawing-moment variation influence is evident in figures 17 to 21. The maximum moment occurs at 120° to 130° with the rotor off. With the rotor on (figs. 22 to 25), the peak occurs at a sideslip angle as low as 60°. As with data for model 1, data for the model with the rotor wake effect show discontinuities at sideslip angles of 90° and -90°. (See figs. 22(g) and 23(g).)

Model 3 was investigated without the rotor only. A comparison of its directional characteristics with models 1 and 2 is shown in figure 26. In the sideslip range of -20° to 20°, it is slightly less stable than models 1 and 2. Otherwise, the variation of yawing-

moment and side-force characteristics of model 3 with sideslip is very similar to those of models 1 and 2.

To determine how well the rotor-on data could be condensed to a single curve representative of all windspeeds, the yawing-moment and side-force data were nondimensionalized with slipstream dynamic pressure rather than with windstream dynamic pressure. The results are shown in figures 27 to 34. For models 1 and 2 with vertical tails, the data do condense reasonably well, especially for the sideslip range of 20° to 90°. This range is the most significant range in that it is burdening the tail rotor. However, the scatter in the data and variation in trends reflect the complexity of the variation in the total flow field with changes in windspeed (and wake skew angle).

All three models were subjected to angle-of-attack excursions at various sideslip angles. The results are shown in figures 35 to 48. The effect of angle of attack on yawing moment of the various configurations is moderate. This result appears to disagree with the conclusions of reference 7. (The shape of model 2 of this investigation is similar to that of model D of ref. 7.) Reference 7 dealt with helicopter fuselage models which have a rotating hub. However, two aspects explain the disagreement. First, the hub of reference 7 incurred a Magnus effect contributing to side force at zero sideslip. This condition effected sidewash at the vertical tail and contributed yawing moment at zero sideslip. Secondly, reference 7 explored a limited sideslip range of $\pm8^O$; whereas, this investigation explored the whole sideslip range of $\pm180^O$ but did not acquire data at sideslip between 0° and $+10^O$ or 0° and -10°. The moderate effect of angle of attack on yawing moment and side force at various sideslip angles makes the results for the sideslip excursions of $\pm180^O$ conducted at an angle of attack of 0° generally applicable for moderate angles of attack.

The application of the results of this investigation is useful in the determination of the required yaw control capability of the tail rotor on a single main-rotor helicopter. The results indicate that for the sideslip range of approximately 25° to 170°, the yawing moment due to rotor wake is additive to the basic main-rotor antitorque requirement of a tail rotor. For the rest of the sideslip range, of course, the yawing moment due to rotor wake reduces the yaw control required of the tail rotor. Figure 49 shows the variation with windspeed of this additional requirement for selected sideslip angles; this figure has data for models 1 and 2 and with and without vertical tails.

Figure 50 shows comparisons of the envelopes (maximum and minimum yawing moment for the sideslip range of $\pm180^O$) of wake-affected yawing-moment coefficient with a typical envelope (see fig. 6) of equivalent yawing-moment coefficient required of a tail rotor for antitorque. Both forms of yawing-moment coefficients are shown for model 2 with the tail mounted. The slipstream dynamic-pressure coefficient (fig. 50(b)) provides a clearer measure of the relative magnitude of the burden of fuselage yawing moment than

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that provided by the yawing-moment coefficient based on windstream dynamic pressure. It is evident that at extreme sideslip and windspeed a tail rotor may be required to provide a total yaw capability of nearly twice the main-rotor antitorque requirement.

Pressure Distribution

Pressures were measured for selected test conditions and configurations. Of these data, the pressure coefficients measured on the sides of the fuselages are presented in figures 51 to 62 to show sideslip effects. The pressure coefficients for the top and bottom center line of the fuselage are presented in figures 63 to 70 to show the effects of angle of attack. These data serve to describe the load distributions and the resultant yawing moment of the fuselages as shown previously in figures 7 to 48.

The influence of rotor wake on pressure distributions on the model 1 fuselage is shown in figures 54 to 56. Without the rotor, coefficients range from -2.0 to 1.0 (figs. 51 to 53). With the rotor, rotor wake effect results in coefficients greater than 1.0 and less than -3.0. This greater range is because the dynamic pressure of the regions of the rotor wake that impinge on the fuselage is greater than the slipstream dynamic pressure. A comparison of figure 51 with figure 54 illustrates this amplification caused by rotor wake. Also evident in figure 54, is the diminishing influence of rotor wake on fuselage pressures as the windspeed increases to 45 knots. The presence of the vertical tail, as expected, affects the pressures only to a minor degree. The data obtained for the portion of the sideslip range near a rearward flight condition are presented in figures 53, 55, and 56. The trends of pressure patterns for model 1 are in agreement with the yawing-moment variations with sideslip and windspeed shown in figures 12, 13, and 14.

Pressure patterns obtained for model 2 at various sideslip angles and windspeeds (figs. 57 to 61) differ from those of model 1. There is, of course, a distinctive difference in fuselage shape of the models which accounts for the pressure difference. Model 2 has a bulbous forward fuselage, fairing into a slender "tail boom," which supports the vertical tail whereas model 1 is relatively slender overall. Neither model had pressure taps close enough to the end of the fuselage to provide for an evaluation of the discontinuity in yawing-moment variation at $\beta = 90^{\circ}$ and $\beta = -90^{\circ}$, as mentioned previously.

Some of the pressure patterns obtained for model 3, which was tested without the rotor, are shown in figure 62 for various sideslip angles. The patterns are similar to those of models 1 and 2 (figs. 51 and 57) and apparent differences reasonably reflect the difference in fuselage shape.

The effect of angle of attack on pressure distributions along the center line of the fuselages is moderate as shown in figures 63 to 70. A comparison of figures 65, 66, and 69 (rotor on for models 1 and 2) with figures 63, 64, 67, and 68 indicates that this effect is primarily attributable to the variation of rotor thrust with angle of attack.

The center of pressure for these pressure distributions can be evaluated from the force and moment data; for pitch center of pressure, pitching moment divided by normal force; and for yaw center of pressure, yawing moment divided by side force. Figures 71, 72, and 73 show this for (1) comparisons of the three models, (2) rotor wake effect on model 1, and (3) rotor wake effect on model 2. In an ideal fluid, a slender streamlined fuselage shape can have the center of pressure at infinity where the resulting pressure distribution yields only a pure couple with no resultant force. For real fluids and moderate angles of attack or sideslip, the center of pressure moves usually to a position moderately ahead of the nose of the fuselage. For the models of this investigation, this is essentially true for the sideslip range of $\pm10^{\circ}$. For the extreme angles of sideslip, beyond this range, the center of pressure moved behind the moment resolving center, close to the center of the fuselage. (See fig. 71.) The influence of the rotor wake served to make the flow conditions affecting the model pressure distributions even less ideal (figs. 72 and 73) and thus the center-of-pressure variations are very erratic.

Reynolds Number

The significance of Reynolds number that affected the model characteristics is not readily evaluated. Only qualitative considerations are possible for several reasons. First, the wake of a rotor is a complex turbulent flow which impinges on sections of the fuselage. Second, even without the rotor wake, the extreme sideslip angles that these models were subjected to introduces the uncertainty of defining an appropriate characteristic length for Reynolds number. The length could be the total axial dimension of the fuselage as in references 7 and 8. However, the cross-flow velocity component, that is, the velocity perpendicular to the fuselage longitudinal axis, becomes important as the sideslip angle increases. The characteristic length for the cross-flow Reynolds number is typically the depth of the fuselage, as shown in sketch (a), which varies over the length of the fuselage:
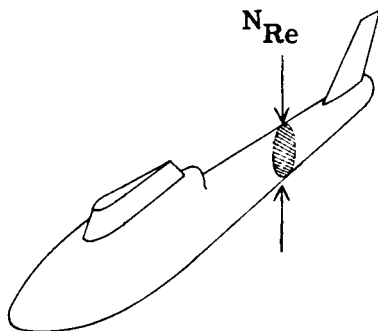
Sketch (a)

Consideration of Reynolds number effects can be based on the difference in characteristics between subcritical and supercritical flow regimes. The Reynolds number that

the models experienced ranged from 5394/cm (13 700/in.) to 23 622/cm (60 000/in.) for windspeeds of 15 to 60 knots and depending on rotor on or off. The turbulence created by the rotor would tend to increase the Reynolds number. In general, the models experienced less than the "critical" Reynolds number, that is, where force coefficients decrease as Reynolds number increases. Full-scale Reynolds number would be in the supercritical range, that is, greater than 400 000.

The significance of Reynolds number effects is shown by references 9 to 13. In these, the variation of aerodynamic forces of various cylindrical shapes is defined. Reference 12 presents extensive data regarding a variety of noncircular two-dimensional cylinders and includes the elliptical shape which is most pertinent to the three fuselage models in this test program. Data from reference 9 (shown in fig. 74) indicate that the yawing moment shown for the fuselages tested without the vertical tails should be reduced by 50 percent to be representative of full-scale values.

The vertical-tail fins mounted on the fuselages provided a significant contribution to the side force and yawing moment. The influence of extremely low Reynolds number on airfoils is dealt with in reference 13. Therein, the Reynolds number influence is indicated to be predominantly near the maximum lift of an airfoil, that is, near or at stall angles of attack. Since for the wide range of sideslip angles in this program, the maximum lift (effectively side force) that the tails experience occurs in only two small regions of sideslip angles (10^0 to 20^0 and -10^0 to -20^0), the significance of low Reynolds number for the tail surfaces appears to be minimal.

The other forces and moments (lift, drag, pitching moment, and rolling moment) are also affected by low Reynolds number. Reference 8 describes a wind-tunnel investigation of a full-scale helicopter fuselage similar in shape to model 2 of this investigation. Longitudinal data therein were obtained at a Reynolds number, based on fuselage length, of 42×10^6. A comparison of these data with data for model 2 obtained at a Reynolds number of 1.8×10^6 is shown in figure 75. The correlation is rather poor and may be explained by the large difference in test Reynolds number. Differences in body shape and minor differences in configuration may contribute to a lesser degree to the poor correlation. Definition or evaluation of the influence of Reynolds number is evidently very uncertain for longitudinal data; however, these components are of less significance regarding the objectives of this investigation.

SUMMARY OF RESULTS

The results of a wind-tunnel investigation of influence of rotor wake on helicopter fuselage models indicate the following conclusions:

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1. The rotor wake significantly increases fuselage yawing moment that the tail rotor must counteract for sideslip angles greater than 20°.

2. The influence on the fuselage yawing moment of the low Reynolds number characteristics of this investigation is significant and makes the results of this investigation conservative if utilized for the design specification of a tail rotor.

Langley Research Center,
     National Aeronautics and Space Administration,
          Hampton, Va., January 7, 1975.

APPENDIX

FORCE AND MOMENT DATA

The force and moment data, presented graphically in figures 7 to 48, are presented in tabular form in this appendix. Each block of data represents one run or parameter sweep. The configuration numbers are described in table II and the table column headings are described in the "Symbols" section. The angles α and β are in degrees; Q and QS, are in N/m^2; velocity is in knots; and tip speed, VT, is in m/sec.

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RUN 5   CONFIGURATION 11

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
135	58.6	.0	-.1	.0003	.0340	-.0007	.0001	.0015	.0033	90.0	.0000	.00000	0.0	584.7	584.7	.0015	.0033
136	58.7	10.2	-.1	.0356	.0441	.0052	-.0001	.0012	.0044	90.0	.0000	.00000	0.0	585.5	585.5	.0012	.0044
137	58.5	5.1	-.1	.0197	.0399	.0014	.0000	.0017	.0067	90.0	.0000	.00000	0.0	582.3	582.3	.0017	.0067
138	58.5	.0	-.1	-.0011	.0331	-.0008	.0001	.0017	.0040	90.0	.0000	.00000	0.0	581.1	581.1	.0017	.0040
139	58.6	-5.0	-.1	-.0097	.0307	-.0046	.0002	.0014	.0049	90.0	.0000	.00000	0.0	583.9	583.9	.0014	.0049
140	58.6	-10.0	-.1	-.0271	.0306	-.0082	.0004	.0009	.0082	90.0	.0000	.00000	0.0	584.3	584.3	.0009	.0082
141	58.6	.1	-.1	.0005	.0326	-.0008	.0001	.0018	.0040	90.0	.0000	.00000	0.0	583.9	583.9	.0018	.0040

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 583.7 583.7

RUN 6   CONFIGURATION 11

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
144	58.6	.0	-10.0	-.0268	.0246	.0085	.0037	.0171	.1125	90.0	.0000	.00000	0.0	584.3	584.3	.0171	.1125
145	58.6	10.2	-10.0	-.0118	.0417	.0239	-.0013	-.0002	.1670	90.0	.0000	.00000	0.0	584.3	584.3	-.0002	.1670
146	58.6	5.1	-10.0	-.0303	.0303	.0199	.0015	.0113	.1347	90.0	.0000	.00000	0.0	583.9	583.9	.0113	.1347
147	58.6	-.0	-10.0	-.0267	.0236	.0087	.0038	.0171	.1147	90.0	.0000	.00000	0.0	583.9	583.9	.0171	.1147
148	58.6	-5.1	-10.0	-.0252	.0206	-.0004	.0060	.0169	.1081	90.0	.0000	.00000	0.0	583.1	583.1	.0169	.1081
149	58.6	-10.0	-10.0	-.0309	.0194	-.0072	.0079	.0134	.1183	90.0	.0000	.00000	0.0	583.5	583.5	.0134	.1183
150	58.5	-.0	-10.0	-.0255	.0245	.0085	.0036	.0170	.1106	90.0	.0000	.00000	0.0	582.7	582.7	.0170	.1106

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 583.7 583.7

RUN 7   CONFIGURATION 11

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
153	58.6	.0	-20.0	-.0523	-.0021	.0074	.0087	.0178	.3045	90.0	.0000	.00000	0.0	583.9	583.9	.0178	.3045
154	58.6	10.2	-20.0	-.0151	.0057	.0113	.0009	-.0043	.4032	90.0	.0000	.00000	0.0	584.7	584.7	-.0043	.4032
155	58.6	5.1	-20.0	-.0504	-.0003	.0159	.0051	.0104	.3392	90.0	.0000	.00000	0.0	583.1	583.1	.0104	.3392
156	58.6	.1	-20.0	-.0522	-.0035	.0076	.0087	.0176	.3068	90.0	.0000	.00000	0.0	583.9	583.9	.0176	.3068
157	58.6	-5.1	-20.0	-.0530	-.0058	-.0023	.0123	.0195	.2898	90.0	.0000	.00000	0.0	583.1	583.1	.0195	.2898
158	58.5	-10.1	-20.0	-.0549	-.0052	-.0107	.0157	.0156	.2973	90.0	.0000	.00000	0.0	581.9	581.9	.0156	.2973
159	58.5	.1	-20.0	-.0526	-.0029	.0076	.0087	.0177	.3025	90.0	.0000	.00000	0.0	582.3	582.3	.0177	.3025

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 583.3 583.3

RUN 8   CONFIGURATION 11

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
162	58.6	.0	-30.0	-.0518	-.0709	-.0223	.0158	.0081	.5818	90.0	.0000	.00000	0.0	583.9	583.9	.0081	.5818
163	58.6	10.1	-30.0	-.0032	-.0669	-.0173	.0058	-.0092	.6789	90.0	.0000	.00000	0.0	584.3	584.3	-.0092	.6789
164	58.7	5.1	-30.0	-.0332	-.0717	-.0178	.0117	.0016	.6305	90.0	.0000	.00000	0.0	585.1	585.1	.0016	.6305
165	58.6	-.1	-30.0	-.0516	-.0723	-.0226	.0158	.0079	.5800	90.0	.0000	.00000	0.0	583.5	583.5	.0079	.5800
166	58.5	-5.1	-30.0	-.0851	-.0716	-.0186	.0195	.0124	.5470	90.0	.0000	.00000	0.0	582.7	582.7	.0124	.5470
167	58.5	-10.1	-30.0	-.1067	-.0681	-.0153	.0226	.0126	.5371	90.0	.0000	.00000	0.0	581.9	581.9	.0126	.5371
168	58.5	.0	-30.0	-.0521	-.0725	-.0220	.0157	.0077	.5816	90.0	.0000	.00000	0.0	582.7	582.7	.0077	.5816

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 583.4 583.4

RUN 9   CONFIGURATION 11

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
172	58.6	.0	.0	.0077	.0344	-.0004	.0001	.0009	.0026	90.0	.0000	.00000	0.0	583.1	583.1	.0009	.0026
173	58.6	-.0	10.1	-.0213	.0293	.0076	-.0035	-.0165	-.0994	90.0	.0000	.00000	0.0	584.3	584.3	-.0165	-.0994
174	58.6	-.0	20.1	-.0618	.0026	.0114	-.0085	-.0164	-.2928	90.0	.0000	.00000	0.0	584.3	584.3	-.0164	-.2928
175	58.7	.0	30.0	-.0279	-.0639	-.0226	-.0154	-.0074	-.5641	90.0	.0000	.00000	0.0	585.1	585.1	-.0074	-.5641
176	58.6	.0	70.5	.0564	-.0698	-.0324	-.0119	.1051	-1.1593	90.0	.0000	.00000	0.0	583.5	583.5	.1051	-1.1593
177	58.5	.0	80.0	.0635	-.0725	-.0268	-.0108	.1173	-1.1470	90.0	.0000	.00000	0.0	582.3	582.3	.1173	-1.1470
178	58.7	.0	89.8	.0366	-.0867	-.0016	-.0097	.1285	-1.1244	90.0	.0000	.00000	0.0	585.1	585.1	.1285	-1.1244
179	58.5	-.1	39.9	-.1269	-.1471	-.0427	-.0193	.0200	-.8435	90.0	.0000	.00000	0.0	581.9	581.9	.0200	-.8435
180	58.6	-.0	.1	.0091	.0317	-.0004	.0000	.0007	.0005	90.0	.0000	.00000	0.0	583.9	583.9	.0007	.0005
181	58.7	.0	-9.9	-.0253	.0237	.0082	.0036	.0168	.1102	90.0	.0000	.00000	0.0	585.1	585.1	.0168	.1102
182	58.7	.1	-20.0	-.0505	-.0032	.0075	.0088	.0176	.3090	90.0	.0000	.00000	0.0	585.1	585.1	.0176	.3090
183	58.6	.1	-30.0	-.0484	-.0709	-.0235	.0157	.0090	.5765	90.0	.0000	.00000	0.0	584.7	584.7	.0090	.5765
184	58.5	.0	-40.0	-.2024	-.1514	-.0335	.0184	-.0133	.8832	90.0	.0000	.00000	0.0	581.9	581.9	-.0133	.8832
185	58.6	-.0	-50.0	-.3379	-.2504	-.0530	.0160	-.0646	1.2047	90.0	.0000	.00000	0.0	583.5	583.5	-.0646	1.2047
186	58.7	.0	-60.0	.0572	-.3350	-.0608	.0155	-.0558	1.3130	90.0	.0000	.00000	0.0	585.1	585.1	-.0558	1.3130
187	58.5	.2	-69.9	.0609	-.0671	-.0269	.0114	-.1018	1.1440	90.0	.0000	.00000	0.0	582.3	582.3	-.1018	1.1440
188	58.6	.2	-80.0	.0397	-.0913	-.0243	.0101	-.1203	1.1338	90.0	.0000	.00000	0.0	583.9	583.9	-.1203	1.1338
189	58.6	.2	-90.0	.0081	-.0888	.0024	.0090	-.1291	1.0911	90.0	.0000	.00000	0.0	584.3	584.3	-.1291	1.0911
190	58.5	.0	.0	.0092	.0308	-.0003	.0001	.0009	.0011	90.0	.0000	.00000	0.0	582.7	582.7	.0009	.0011

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 583.8 583.8

RUN 10   CONFIGURATION 11

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
193	29.4	0.0	.0	.0001	.0362	.0003	.0001	.0008	.0056	90.0	.0000	.00000	0.0	146.9	146.9	.0008	.0056
194	29.2	-.0	10.0	-.0198	.0317	.0064	-.0034	-.0159	-.0921	90.0	.0000	.00000	0.0	145.3	145.3	-.0159	-.0921
195	29.5	-.0	20.0	-.0526	.0092	.0091	-.0078	-.0143	-.2935	90.0	.0000	.00000	0.0	148.1	148.1	-.0143	-.2935
196	29.3	-.0	30.1	-.0685	-.0516	-.0213	-.0146	.0014	-.6063	90.0	.0000	.00000	0.0	145.7	145.7	.0014	-.6063
197	29.3	-.1	40.0	-.0992	-.1440	-.0519	-.0187	.0211	-.9372	90.0	.0000	.00000	0.0	145.7	145.7	.0211	-.9372
198	29.4	-.1	50.0	-.2307	-.2289	-.0648	-.0174	.0573	-1.2083	90.0	.0000	.00000	0.0	146.5	146.5	.0573	-1.2083
199	29.3	-.0	60.0	.0173	-.3206	-.0603	-.0170	.0522	-1.3573	90.0	.0000	.00000	0.0	146.1	146.1	.0522	-1.3573
200	29.3	-.0	70.1	.0492	-.0484	-.0376	-.0123	.0993	-1.1535	90.0	.0000	.00000	0.0	145.7	145.7	.0993	-1.1535
201	29.2	-.0	80.1	.0509	-.0529	-.0291	-.0111	.1133	-1.1279	90.0	.0000	.00000	0.0	145.3	145.3	.1133	-1.1279
202	29.5	-.0	90.0	.0183	-.0642	-.0041	-.0102	.1256	-1.1220	90.0	.0000	.00000	0.0	148.1	148.1	.1256	-1.1220
203	29.3	-.0	10.1	-.0199	.0348	.0064	-.0033	-.0160	-.0977	90.0	.0000	.00000	0.0	145.7	145.7	-.0160	-.0977
204	29.5	0.0	.0	.0064	.0373	-.0006	.0002	.0022	.0081	90.0	.0000	.00000	0.0	147.7	147.7	.0022	.0081
205	29.5	.0	-10.0	-.0228	.0291	.0077	.0034	.0165	.1137	90.0	.0000	.00000	0.0	147.7	147.7	.0165	.1137
206	29.5	.0	-19.9	-.0422	.0053	.0361	.0079	.0147	.3152	90.0	.0000	.00000	0.0	147.7	147.7	.0147	.3152
207	29.4	.1	-33.0	-.0363	-.0592	-.0267	.0148	-.0009	.6318	90.0	.0000	.00000	0.0	146.5	146.5	-.0009	.6318
208	29.3	.1	-40.0	-.0869	-.1350	-.0433	.0175	-.0172	.9129	90.0	.0000	.00000	0.0	146.1	146.1	-.0172	.9129
209	29.3	.1	-50.0	-.2055	-.2275	-.0599	.0161	-.0545	1.2030	90.0	.0000	.00000	0.0	145.7	145.7	-.0545	1.2030
210	29.3	.1	-60.0	-.0041	-.3118	-.0528	.0161	-.0488	1.3642	90.0	.0000	.00000	0.0	145.7	145.7	-.0488	1.3642
211	29.2	.1	-69.8	.0253	-.0401	-.0286	.0118	-.1018	1.1525	90.0	.0000	.00000	0.0	145.3	145.3	-.1018	1.1525
212	29.4	.1	-80.0	.0330	-.0492	-.0169	.0108	-.1180	1.1524	90.0	.0000	.00000	0.0	147.3	147.3	-.1180	1.1524
213	29.5	.1	-89.9	-.0151	-.0525	.0113	.0095	-.1279	1.1112	90.0	.0000	.00000	0.0	148.1	148.1	-.1279	1.1112
214	29.5	0.0	.0	.0062	.0385	.0000	.0001	.0013	.0054	90.0	.0000	.00000	0.0	147.7	147.7	.0013	.0054

AVERAGE TIP SPEED RATIO = .030   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   146.6   146.6

RUN 11   CONFIGURATION 11

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
229	14.5	.0	.0	-.0975	.0569	-.0031	-.0004	.0025	.0127	90.0	.0000	.00000	0.0	35.8	35.8	.0025	.0127
230	14.6	-.0	10.0	-.1283	.0674	.0020	-.0041	-.0171	-.0879	90.0	.0000	.00000	0.0	36.2	36.2	-.0171	-.0879
231	14.5	-.0	20.0	-.1394	.0371	-.0004	-.0093	-.0116	-.3798	90.0	.0000	.00000	0.0	36.2	36.2	-.0116	-.3798
232	14.4	-.0	30.0	-.1493	-.0247	-.0346	-.0157	.0027	-.7011	90.0	.0000	.00000	0.0	35.8	35.8	.0027	-.7011
233	14.4	-.0	40.0	-.2101	-.1350	-.0597	-.0223	.0171	-1.1187	90.0	.0000	.00000	0.0	35.8	35.8	.0171	-1.1187
234	14.4	-.0	50.0	-.3547	-.2463	-.0875	-.0198	.0593	-1.5164	90.0	.0000	.00000	0.0	35.8	35.8	.0593	-1.5164
235	14.4	-.0	60.1	-.1151	-.3561	-.0922	-.0207	.0543	-1.7196	90.0	.0000	.00000	0.0	35.8	35.8	.0543	-1.7196
236	14.4	-.0	70.0	-.0603	-.0441	-.0458	-.0156	.0952	-1.4290	90.0	.0000	.00000	0.0	35.8	35.8	.0952	-1.4290
237	14.4	-.0	80.0	-.0332	-.0414	-.0439	-.0142	.1134	-1.3905	90.0	.0000	.00000	0.0	35.8	35.8	.1134	-1.3905
238	14.4	-.0	90.0	-.0839	-.0492	-.0166	-.0131	.1264	-1.3651	90.0	.0000	.00000	0.0	35.5	35.5	.1264	-1.3651
239	14.7	-.0	-.0	-.0700	.0696	-.0060	-.0009	.0081	-.0119	90.0	.0000	.00000	0.0	37.4	37.4	.0081	-.0119
240	14.4	0.0	-10.0	-.0911	.0592	-.0011	.0023	.0194	.1275	90.0	.0000	.00000	0.0	35.8	35.8	.0194	.1275
241	14.4	.0	-20.0	-.0813	.0298	-.0124	.0068	.0144	.3340	90.0	.0000	.00000	0.0	35.5	35.5	.0144	.3340
242	14.4	.0	-30.0	-.1106	-.0436	-.0478	.0136	.0012	.6859	90.0	.0000	.00000	0.0	35.5	35.5	.0012	.6859
243	14.4	.0	-40.0	-.1979	-.1390	-.0686	.0166	-.0183	.9688	90.0	.0000	.00000	0.0	35.5	35.5	-.0183	.9688
244	14.4	.1	-50.0	-.3165	-.2605	-.0936	.0150	-.0643	1.2718	90.0	.0000	.00000	0.0	35.5	35.5	-.0643	1.2718
245	14.4	.1	-60.0	-.0675	-.3447	-.0780	.0160	-.0523	1.3747	90.0	.0000	.00000	0.0	35.5	35.5	-.0523	1.3747
246	14.3	.1	-70.0	-.1633	-.0386	-.0087	.0127	-.0924	1.1666	90.0	.0000	.00000	0.0	35.1	35.1	-.0924	1.1666
247	14.3	.1	-80.0	-.0152	-.0288	-.0386	.0101	-.1411	1.1525	90.0	.0000	.00000	0.0	35.1	35.1	-.1411	1.1525
248	14.5	.1	-90.0	-.0679	-.0348	-.0107	.0090	-.1506	1.1184	90.0	.0000	.00000	0.0	36.2	36.2	-.1506	1.1184

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   35.8   35.8

RUN 12   CONFIGURATION 11

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
251	43.6	.0	0.0	.0054	.0425	-.0012	.0000	.0010	-.0003	90.0	.0000	.00000	0.0	326.8	326.8	.0010	-.0003
252	43.6	-.0	10.0	-.0250	.0396	.0074	-.0042	-.0193	-.1208	90.0	.0000	.00000	0.0	326.8	326.8	-.0193	-.1208
253	43.7	-.0	20.0	-.0523	.0076	.0089	-.0106	-.0207	-.3541	90.0	.0000	.00000	0.0	328.8	328.8	-.0207	-.3541
254	43.6	-.1	30.0	-.0503	-.0725	-.0281	-.0187	-.0036	-.7048	90.0	.0000	.00000	0.0	327.6	327.6	-.0036	-.7048
255	43.9	-.1	40.0	-.1282	-.1717	-.0565	-.0226	.0213	-1.0905	90.0	.0000	.00000	0.0	332.3	332.3	.0213	-1.0905
256	43.7	-.1	50.0	-.3151	-.2901	-.0759	-.0203	.0676	-1.4657	90.0	.0000	.00000	0.0	328.0	328.0	.0676	-1.4657
257	43.6	-.0	60.0	-.0013	-.4022	-.0799	-.0197	.0641	-1.6437	90.0	.0000	.00000	0.0	326.5	326.5	.0641	-1.6437
258	43.6	-.0	70.0	.0453	-.0678	-.0436	-.0148	.1017	-1.4016	90.0	.0000	.00000	0.0	326.5	326.5	.1017	-1.4016
259	43.6	-.0	80.0	.0434	-.0759	-.0335	-.0133	.1159	-1.3797	90.0	.0000	.00000	0.0	326.5	326.5	.1159	-1.3797
260	43.7	-.0	90.0	.0095	-.0932	-.0036	-.0120	.1263	-1.3502	90.0	.0000	.00000	0.0	328.8	328.8	.1263	-1.3502
261	43.7	-.0	0.0	.0106	.0416	-.0015	-.0001	.0004	-.0041	90.0	.0000	.00000	0.0	329.2	329.2	.0004	-.0041
262	43.6	.0	-10.0	-.0256	.0318	.0080	.0035	.0170	.1064	90.0	.0000	.00000	0.0	327.2	327.2	.0170	.1064
263	43.8	.0	-20.0	-.0534	.0012	.0070	.0086	.0176	.3067	90.0	.0000	.00000	0.0	330.8	330.8	.0176	.3067
264	43.6	.0	-30.0	-.0595	-.0777	-.0285	.0155	.0027	.6095	90.0	.0000	.00000	0.0	327.2	327.2	.0027	.6095
265	43.7	.0	-40.0	-.1488	-.1757	-.0553	.0178	-.0217	.9094	90.0	.0000	.00000	0.0	328.4	328.4	-.0217	.9094
266	43.7	.0	-50.0	-.2232	-.2877	-.0781	.0162	-.0666	1.1997	90.0	.0000	.00000	0.0	328.8	328.8	-.0666	1.1997
267	43.7	.1	-60.0	.0505	-.3967	-.0772	.0156	-.0653	1.3416	90.0	.0000	.00000	0.0	328.4	328.4	-.0653	1.3416
268	43.8	.1	-70.0	.0482	-.0560	-.0399	.0113	-.1226	1.1558	90.0	.0000	.00000	0.0	330.0	330.0	-.1226	1.1558
269	43.6	.1	-80.0	.0617	-.0658	-.0252	.0100	-.1419	1.1398	90.0	.0000	.00000	0.0	327.8	327.8	-.1419	1.1398
270	43.6	.1	-90.0	.0259	-.0772	-.0054	.0089	-.1546	1.1108	90.0	.0000	.00000	0.0	327.0	327.0	-.1546	1.1108

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   328.2   328.2

RUN 13 CONFIGURATION 13

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
282	14.8	.0	0.0	.0053	.0485	-.0005	.0025	-.0160	.0588	90.0	.0000	.00000	0.0	37.8	37.8	-.0160	.0588
283	14.4	-.0	10.0	-.0310	.0439	.0072	-.0036	-.0099	-.1292	90.0	.0000	.00000	0.0	35.5	35.5	-.0099	-.1292
284	14.2	-.0	20.0	-.0185	.0177	-.0057	-.0126	.0297	-.3835	90.0	.0000	.00000	0.0	34.7	34.7	.0297	-.3835
285	14.3	-.0	30.0	-.0539	-.0497	-.0334	-.0197	.0647	-.7492	90.0	.0000	.00000	0.0	35.1	35.1	.0647	-.7492
286	14.3	-.0	40.0	-.0582	-.1458	-.0710	-.0240	.1014	-1.0598	90.0	.0000	.00000	0.0	35.1	35.1	.1014	-1.0598
287	14.3	-.0	50.0	-.2330	-.2171	-.0806	-.0224	.1419	-1.3849	90.0	.0000	.00000	0.0	35.1	35.1	.1419	-1.3849
288	14.4	-.0	60.0	-.0403	-.3157	-.0622	-.0235	.1463	-1.5662	90.0	.0000	.00000	0.0	35.5	35.5	.1463	-1.5662
289	14.4	-.0	70.0	-.0381	-.0694	-.0123	-.0207	.1665	-1.3070	90.0	.0000	.00000	0.0	35.5	35.5	.1665	-1.3070
290	14.4	-.0	80.0	-.0087	-.0641	-.0169	-.0190	.1889	-1.2523	90.0	.0000	.00000	0.0	35.5	35.5	.1889	-1.2523
291	14.4	-.0	90.0	-.0111	-.0747	-.0029	-.0199	.2106	-1.2567	90.0	.0000	.00000	0.0	35.5	35.5	.2106	-1.2567
292	14.4	-.0	-.0	.0049	.0675	-.0033	.0020	-.0189	.0389	90.0	.0000	.00000	0.0	35.8	35.8	-.0189	.0389
293	14.5	0.0	-10.0	-.0085	.0539	-.0033	.0086	-.0232	.1904	90.0	.0000	.00000	0.0	36.2	36.2	-.0232	.1904
294	14.5	.0	-20.0	-.0450	.0255	-.0046	.0160	-.0638	.4682	90.0	.0000	.00000	0.0	36.2	36.2	-.0638	.4682
295	14.6	.0	-30.0	-.0790	-.0382	-.0246	.0213	-.0918	.7838	90.0	.0000	.00000	0.0	36.6	36.6	-.0918	.7838
296	14.6	.0	-40.0	-.1148	-.1278	-.0571	.0250	-.1274	1.1073	90.0	.0000	.00000	0.0	36.6	36.6	-.1274	1.1073
297	14.6	.0	-50.0	-.3533	-.2013	-.0527	.0230	-.1613	1.4225	90.0	.0000	.00000	0.0	36.6	36.6	-.1613	1.4225
298	14.5	.1	-60.0	-.1177	-.2820	-.0159	.0238	-.1482	1.5374	90.0	.0000	.00000	0.0	36.2	36.2	-.1482	1.5374
299	14.5	.1	-70.0	-.1343	-.0383	.0306	.0206	-.1624	1.2918	90.0	.0000	.00000	0.0	36.2	36.2	-.1624	1.2918
300	14.5	.1	-80.0	-.0419	-.0271	.0153	.0187	-.1938	1.2396	90.0	.0000	.00000	0.0	36.2	36.2	-.1938	1.2396
301	14.4	.1	-90.0	-.0954	-.0307	.0355	.0190	-.2116	1.2206	90.0	.0000	.00000	0.0	35.8	35.8	-.2116	1.2206

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   35.9   35.9

RUN 14 CONFIGURATION 13

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
304	29.2	0.0	0.0	.0089	.0412	.0019	.0027	-.0210	.0410	90.0	.0000	.00000	0.0	146.5	146.5	-.0210	.0410
305	29.2	-.0	10.0	-.0198	.0325	.0070	-.0037	-.0143	-.1006	90.0	.0000	.00000	0.0	146.5	146.5	-.0143	-.1006
306	28.9	-.0	20.0	-.0334	-.0055	-.0007	-.0122	.0251	-.3691	90.0	.0000	.00000	0.0	143.7	143.7	.0251	-.3691
307	29.1	-.0	30.0	-.0650	-.0741	-.0236	-.0202	.0644	-.7154	90.0	.0000	.00000	0.0	145.7	145.7	.0644	-.7154
308	29.1	-.1	40.0	-.0594	-.1651	-.0721	-.0249	.1017	-1.0447	90.0	.0000	.00000	0.0	145.7	145.7	.1017	-1.0447
309	29.0	-.1	50.0	-.2057	-.2401	-.0726	-.0226	.1390	-1.3185	90.0	.0000	.00000	0.0	144.5	144.5	.1390	-1.3185
310	29.0	0.0	60.0	.0081	-.3376	-.0405	-.0235	.1481	-1.5321	90.0	.0000	.00000	0.0	144.9	144.9	.1481	-1.5321
311	29.1	-.0	70.0	.0207	-.0686	-.0157	-.0196	.1752	-1.2848	90.0	.0000	.00000	0.0	145.7	145.7	.1752	-1.2848
312	29.1	-.0	80.0	.0283	-.0793	-.0121	-.0188	.1938	-1.2631	90.0	.0000	.00000	0.0	145.3	145.3	.1938	-1.2631
313	29.1	-.0	90.0	-.0004	-.0930	.0080	-.0197	.2156	-1.2550	90.0	.0000	.00000	0.0	145.7	145.7	.2156	-1.2550
314	29.5	-.0	.0	.0090	.0406	.0013	.0027	-.0213	.0404	90.0	.0000	.00000	0.0	149.2	149.2	-.0213	.0404
315	29.2	0.0	-10.0	-.0116	.0291	.0026	.0083	-.0235	.1768	90.0	.0000	.00000	0.0	146.5	146.5	-.0235	.1768
316	29.1	.0	-20.0	-.0367	-.0050	.0032	.0165	-.0594	.4408	90.0	.0000	.00000	0.0	145.7	145.7	-.0594	.4408
317	29.1	.0	-30.0	-.0610	-.0635	-.0125	.0229	-.0910	.7752	90.0	.0000	.00000	0.0	145.7	145.7	-.0910	.7752
318	29.1	.0	-40.0	-.0688	-.1479	-.0488	.0262	-.1209	1.0881	90.0	.0000	.00000	0.0	145.7	145.7	-.1209	1.0881
319	29.1	.0	-50.0	-.2470	-.2137	-.0395	.0232	-.1595	1.3643	90.0	.0000	.00000	0.0	145.7	145.7	-.1595	1.3643
320	29.1	.1	-60.0	-.0661	-.3060	-.0160	.0240	-.1577	1.5412	90.0	.0000	.00000	0.0	145.3	145.3	-.1577	1.5412
321	28.9	.1	-70.0	-.0345	-.0437	.0153	.0200	-.1795	1.2908	90.0	.0000	.00000	0.0	143.7	143.7	-.1795	1.2908
322	29.0	.1	-80.0	-.0204	-.0491	.0217	.0192	-.1994	1.2817	90.0	.0000	.00000	0.0	144.9	144.9	-.1994	1.2817
323	29.1	.1	-90.0	-.0557	-.0531	.0435	.0189	-.2097	1.2300	90.0	.0000	.00000	0.0	145.3	145.3	-.2097	1.2300

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   145.6   145.6

RUN 15 CONFIGURATION 13

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
326	58.2	.0	0.0	.0112	.0408	-.0003	.0028	-.0232	.0379	90.0	.0000	.00000	0.0	583.5	583.5	-.0232	.0379
327	58.3	-.0	10.0	-.0211	.0323	.0069	-.0036	-.0175	-.0971	90.0	.0000	.00000	0.0	585.1	585.1	-.0175	-.0971
328	58.2	-.0	20.0	-.0441	-.0089	.0017	-.0129	.0212	-.3480	90.0	.0000	.00000	0.0	581.9	581.9	.0212	-.3480
329	58.2	-.0	30.0	-.0297	-.0843	-.0235	-.0213	.0584	-.6675	90.0	.0000	.00000	0.0	582.7	582.7	.0584	-.6675
330	58.2	-.1	40.0	-.0851	-.1662	-.0608	-.0258	.1018	-.9820	90.0	.0000	.00000	0.0	582.7	582.7	.1018	-.9820
331	58.3	-.2	50.0	-.3743	-.2303	-.0400	-.0226	.1556	-1.3079	90.0	.0000	.00000	0.0	583.9	583.9	.1556	-1.3079
332	58.0	-.0	60.0	-.0732	-.3502	-.0423	-.0227	.1753	-1.5165	90.0	.0000	.00000	0.0	579.6	579.6	.1753	-1.5165
333	58.3	-.0	70.0	.0056	-.0876	-.0062	-.0197	.1770	-1.2914	90.0	.0000	.00000	0.0	583.9	583.9	.1770	-1.2914
334	58.4	0.0	80.0	.0278	-.0941	-.0046	-.0188	.1962	-1.2738	90.0	.0000	.00000	0.0	587.4	587.4	.1962	-1.2738
335	58.2	.0	90.0	.0059	-.1119	.0137	-.0187	.2131	-1.2579	90.0	.0000	.00000	0.0	582.7	582.7	.2131	-1.2579
336	58.0	.0	0.0	.0113	.0395	-.0002	.0028	-.0231	.0382	90.0	.0000	.00000	0.0	579.6	579.6	-.0231	.0382
337	58.0	.0	-10.0	-.0155	.0250	.0025	.0084	-.0233	.1693	90.0	.0000	.00000	0.0	578.4	578.4	-.0233	.1693
338	58.2	.0	-20.0	-.0389	-.0068	.0037	.0168	-.0565	.4135	90.0	.0000	.00000	0.0	582.7	582.7	-.0565	.4135
339	58.1	.0	-30.0	-.0562	-.0708	-.0097	.0240	-.0833	.7188	90.0	.0000	.00000	0.0	581.1	581.1	-.0833	.7188
340	58.0	0.0	-40.0	-.1726	-.1484	-.0351	.0267	-.1169	1.0475	90.0	.0000	.00000	0.0	578.8	578.8	-.1169	1.0475
341	58.1	-.0	-50.0	-.3280	-.2262	-.0451	.0232	-.1696	1.3675	90.0	.0000	.00000	0.0	580.4	580.4	-.1696	1.3675
342	58.2	.1	-60.0	.0266	-.3189	-.0182	.0232	-.1603	1.4847	90.0	.0000	.00000	0.0	583.1	583.1	-.1603	1.4847
343	58.2	.1	-70.0	.0439	-.0570	.0068	.0194	-.1778	1.2677	90.0	.0000	.00000	0.0	582.3	582.3	-.1778	1.2677
344	58.3	.2	-80.0	.0574	-.0630	.0108	.0183	-.1943	1.2506	90.0	.0000	.00000	0.0	585.8	585.8	-.1943	1.2506
345	58.3	.2	-90.0	.0348	-.0794	.0217	.0174	-.2054	1.2084	90.0	.0000	.00000	0.0	583.9	583.9	-.2054	1.2084

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   582.5   582.5

RUN 16   CONFIGURATION 13

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
348	58.3	0.0	0.0	.0082	.0403	.0000	.0029	-.0231	.0386	90.0	.0000	.00000	0.0	584.7	584.7	-.0231	.0386
349	58.3	10.3	0.0	.0428	.0487	.0057	.0020	-.0182	.0308	90.0	.0000	.00000	0.0	584.3	584.3	-.0182	.0308
350	58.4	5.2	0.0	.0269	.0466	.0020	.0023	-.0206	.0343	90.0	.0000	.00000	0.0	586.2	586.2	-.0206	.0343
351	58.3	.1	0.0	.0081	.0411	-.0002	.0028	-.0231	.0379	90.0	.0000	.00000	0.0	584.3	584.3	-.0231	.0379
352	58.3	-4.9	0.0	-.0079	.0406	-.0022	.0034	-.0273	.0454	90.0	.0000	.00000	0.0	584.3	584.3	-.0273	.0454
353	58.3	-9.9	0.0	-.0257	.0417	-.0037	.0034	-.0280	.0457	90.0	.0000	.00000	0.0	585.1	585.1	-.0280	.0457

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000   .0 584.8 584.8

RUN 17   CONFIGURATION 13

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
354	58.2	.1	-10.0	-.0170	.0270	.0028	.0082	-.0226	.1689	90.0	.0000	.0000C	0.0	582.3	582.3	-.0226	.1689
355	58.2	10.3	-10.0	-.0099	.0452	.0223	.0012	-.0220	.1978	90.0	.0000	.00000	0.0	583.1	583.1	-.0220	.1978
356	58.3	5.2	-10.0	-.0229	.0345	.0149	.0047	-.0171	.1744	90.0	.0000	.00030	0.0	583.9	583.9	-.0171	.1744
357	58.2	.2	-10.0	-.0183	.0261	.0025	.0084	-.0231	.1708	90.0	.0000	.00000	0.0	583.5	583.5	-.0231	.1708
358	58.2	-4.9	-10.0	-.0203	.0215	-.0056	.0117	-.0343	.1839	90.0	.0000	.00000	0.0	583.1	583.1	-.0343	.1839
359	58.2	-9.9	-10.0	-.0253	.0175	-.0128	.0146	-.0468	.2054	90.0	.0000	.00000	0.0	583.5	583.5	-.0468	.2054

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000   .0 583.2 583.2

RUN 18   CONFIGURATION 13

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
360	58.4	.2	-20.0	-.0418	-.0049	.0043	.0165	-.0566	.4169	90.0	.0000	.00000	0.0	587.4	587.4	-.0566	.4169
361	58.2	10.3	-20.0	-.0078	-.0013	.0092	.0073	-.0713	.5032	90.0	.0000	.00000	0.0	582.7	582.7	-.0713	.5032
362	58.2	5.2	-20.0	-.0370	-.0056	.0110	.0122	-.0598	.4456	90.0	.0000	.00000	0.0	583.5	583.5	-.0598	.4456
363	58.3	.2	-20.0	-.0419	-.0071	.0041	.0168	-.0572	.4189	90.0	.0000	.00000	0.0	584.7	584.7	-.0572	.4189
364	58.3	-4.9	-20.0	-.0518	-.0044	-.0009	.0202	-.0589	.4070	90.0	.0000	.00000	0.0	584.7	584.7	-.0589	.4070
365	58.3	-9.9	-20.0	-.0569	.0001	-.0066	.0236	-.0653	.4187	90.0	.0000	.00000	0.0	583.9	583.9	-.0653	.4187

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000   .0 584.5 584.5

RUN 19   CONFIGURATION 13

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
366	58.2	.2	-30.0	-.0605	-.0710	-.0095	.0239	-.0836	.7227	90.0	.0000	.00000	0.0	583.5	583.5	-.0836	.7227
367	58.2	10.3	-30.0	.0033	-.0748	-.0125	.0130	-.1032	.8283	90.0	.0000	.00000	0.0	583.5	583.5	-.1032	.8283
368	58.3	5.3	-30.0	-.0370	-.0742	-.0071	.0193	-.0914	.7757	90.0	.0000	.00000	0.0	584.3	584.3	-.0914	.7757
369	58.3	.2	-30.0	-.0605	-.0736	-.0093	.0239	-.0836	.7239	90.0	.0000	.C000	0.0	584.3	584.3	-.0836	.7239
370	58.3	-4.9	-30.0	-.0860	-.0699	-.0136	.0282	-.0841	.6992	90.0	.0000	.00000	0.0	584.3	584.3	-.0841	.6992
371	58.3	-9.9	-30.0	-.0985	-.0653	-.0142	.0318	-.0881	.6916	90.0	.0000	.00000	0.0	583.9	583.9	-.0881	.6916

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000   .0 584.0 584.0

RUN 20   CONFIGURATION 14

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
383	14.7	.0	0.0	-.3312	.0776	.2088	.0025	-.0182	-.0448	90.0	.0000	.00000	0.0	37.0	37.0	-.0182	-.0448
384	14.1	.0	10.0	-.3657	.0807	.2167	-.0034	-.0183	-.1618	90.0	.0000	.00000	0.0	34.3	34.3	-.0183	-.1618
385	14.4	-.0	20.1	-.3874	.0464	.2044	-.0122	.0253	-.3834	90.0	.0000	.00000	0.0	35.5	35.5	.0253	-.3834
386	14.5	-.0	30.0	-.3870	-.0218	.1816	-.0204	.0732	-.6706	90.0	.0000	.00300	0.0	36.2	36.2	.0732	-.6706
387	14.5	-.0	40.0	-.4131	-.0971	.1444	-.0238	.0994	-.9640	90.0	.0000	.00000	0.0	36.2	36.2	.0994	-.9640
388	14.4	-.0	50.0	-.5607	-.1787	.1192	-.0226	.1243	-1.2385	90.0	.0000	.00300	0.0	35.8	35.8	.1243	-1.2385
389	14.4	-.0	60.0	-.3450	-.2738	.1216	-.0221	.1147	-1.4229	90.0	.0000	.00000	0.0	35.8	35.8	.1147	-1.4229
390	14.2	-.0	70.0	-.2448	-.0127	.1306	-.0188	.1485	-1.2278	90.0	.0000	.00000	0.0	34.7	34.7	.1485	-1.2278
391	14.4	-.0	80.0	-.2100	-.0176	.1266	-.0180	.1683	-1.1944	90.0	.0000	.00030	0.0	35.8	35.8	.1683	-1.1944
392	14.4	.0	90.0	-.2875	-.0276	.1624	-.0200	.1996	-1.1751	90.0	.0000	.00000	0.0	35.8	35.8	.1996	-1.1751
393	14.7	.0	0.0	-.3283	.0863	.2019	.0021	-.0192	-.0633	90.0	.0000	.00000	0.0	37.4	37.4	-.0192	-.0633
394	14.8	.0	-10.0	-.3391	.0828	.1915	.0076	-.0220	.0414	90.0	.0000	.30000	0.0	37.8	37.8	-.0220	.0414
395	14.8	.1	-20.0	-.3761	.0455	.1847	.0162	-.0672	.2668	90.0	.0000	.00000	0.0	37.8	37.8	-.0672	.2668
396	14.8	.1	-30.0	-.3870	-.0387	.1614	.0252	-.1186	.5713	90.0	.0000	.00000	0.0	37.8	37.8	-.1186	.5713
397	14.7	.1	-40.0	-.4772	-.0966	.1433	.0272	-.1331	.8327	90.0	.0000	.00000	0.0	37.4	37.4	-.1331	.8327
398	14.7	.1	-50.0	-.6627	-.1816	.1227	.0245	-.1628	1.1402	90.0	.0000	.00300	0.0	37.4	37.4	-.1628	1.1402
399	14.7	.1	-60.0	-.3560	-.2627	.1299	.0238	-.1401	1.2518	90.0	.0000	.00030	0.0	37.4	37.4	-.1401	1.2518
400	14.7	.1	-70.0	-.3742	-.0268	.1608	.0216	-.1590	1.0302	90.0	.0000	.00000	0.0	37.0	37.0	-.1590	1.0302
401	14.4	.1	-80.0	-.2936	-.0163	.1446	.0209	-.2023	1.0370	90.0	.0000	.00000	0.0	35.8	35.8	-.2023	1.0370
402	14.4	.2	-90.0	-.3235	-.0173	.1694	.0217	-.2266	1.0218	90.0	.0000	.00000	0.0	35.8	35.8	-.2266	1.0218

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000   .0 36.5 36.5

RUN 21   CONFIGURATION 14

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
404	29.0	-.0	10.0	-.0798	-.0018	.0455	-.0056	.0012	-.0976	90.0	.0000	.00000	0.0	144.9	144.9	.0012	-.0976
405	29.1	-.0	20.0	-.1014	-.0317	.0377	-.0138	.0384	-.3047	90.0	.0000	.00000	0.0	145.3	145.3	.0384	-.3047
406	29.1	-.0	30.0	-.1464	-.1079	.0261	-.0242	.0929	-.5971	90.0	.0000	.00000	0.3	145.3	145.3	.0929	-.5971
407	29.1	-.0	40.0	-.1446	-.1879	-.0174	-.0283	.1196	-.8940	90.0	.0000	.00000	0.0	145.7	145.7	.1196	-.8940
408	29.0	-.1	50.0	-.2739	-.2609	-.0329	-.0248	.1417	-1.1553	90.0	.0000	.00000	0.0	144.9	144.9	.1417	-1.1553
409	28.9	-.0	60.0	-.0171	-.3532	-.0239	-.0237	.1327	-1.3296	90.0	.0000	.00000	0.3	143.3	143.3	.1327	-1.3296
410	29.2	-.0	70.0	.0653	-.0884	-.0398	-.0204	.1706	-1.1440	90.0	.0000	.00000	0.0	146.9	146.9	.1706	-1.1440
411	29.2	-.0	80.0	.0612	-.0963	-.0328	-.0194	.1842	-1.1173	90.0	.0000	.00000	0.0	146.9	146.9	.1842	-1.1173
412	29.1	-.0	90.0	.0067	-.1060	.0045	-.0215	.2133	-1.0949	90.0	.0000	.00000	0.0	146.1	146.1	.2133	-1.0949
413	29.1	.0	0.0	-.0899	.0056	.0512	.0004	-.0033	-.0099	90.0	.0000	.00000	0.0	145.7	145.7	-.0033	-.0099
415	29.1	.0	-10.0	-.0989	-.0063	.0430	.0062	-.0071	.0870	90.0	.0000	.00000	0.0	145.3	145.3	-.0071	.0870
416	29.0	.0	-20.0	-.1087	-.0417	.0334	.0144	-.0441	.2831	90.0	.0000	.00000	0.0	144.5	144.5	-.0441	.2831
417	28.9	.1	-30.0	-.1298	-.1222	.0110	.0251	-.1015	.5884	90.0	.0000	.00000	0.0	144.1	144.1	-.1015	.5884
418	29.1	.1	-40.0	-.1630	-.1852	-.0136	.0264	-.1124	.8584	90.0	.0000	.00000	0.0	145.3	145.3	-.1124	.8584
420	29.1	.1	-50.0	-.3026	-.2570	-.0235	.0232	-.1402	1.1374	90.0	.0000	.00000	0.0	145.3	145.3	-.1402	1.1374
421	29.0	.2	-60.0	-.0745	-.3561	-.0236	.0231	-.1284	1.3289	90.0	.0000	.00000	0.0	144.9	144.9	-.1284	1.3289
422	29.0	.1	-70.0	-.0170	-.0905	-.0232	.0194	-.1655	1.1171	90.0	.0000	.00000	0.0	144.9	144.9	-.1655	1.1171
425	29.4	.1	-90.0	-.0471	-.0942	.0109	.0199	-.2085	1.0686	90.0	.0000	.00000	0.0	149.2	149.2	-.2085	1.0686

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000   .0 145.5 145.5

RUN 22   CONFIGURATION 14

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
428	58.2	0.3	0.0	-.0232	.0400	.0202	.0012	-.0088	.0038	90.0	.0000	.00000	0.0	582.7	582.7	-.0088	.0038
429	58.1	-.0	10.0	-.0322	.0341	.0141	-.0052	-.0041	-.0819	90.0	.0000	.00000	0.0	580.7	580.7	-.0041	-.0819
430	58.3	-.3	20.0	-.0476	.0011	.0071	-.0139	.0322	-.2635	90.0	.0000	.00000	0.0	583.9	583.9	.0322	-.2635
431	59.1	-.0	30.0	-.0489	-.0800	-.0054	-.0247	.0818	-.5221	90.0	.0000	.00000	0.0	580.4	580.4	.0818	-.5221
432	59.5	-.1	40.0	-.1038	-.1522	-.0412	-.0281	.1102	-.7796	90.0	.0000	.00000	0.0	587.8	587.8	.1102	-.7796
433	59.1	-.1	50.0	-.3599	-.2192	-.0366	-.0241	.1591	-1.1380	90.0	.0000	.00000	0.0	580.0	580.0	.1591	-1.1380
434	59.2	-.0	60.0	-.0048	-.3339	-.0630	-.0228	.1760	-1.3364	90.0	.0000	.00000	0.0	582.3	582.3	.1760	-1.3364
435	59.4	-.0	70.0	.1105	-.0692	-.0618	-.0196	.1661	-1.1243	90.0	.0000	.00000	0.0	584.7	584.7	.1661	-1.1243
436	59.5	-.0	80.0	.1326	-.0734	-.0613	-.0186	.1820	-1.1035	90.0	.0000	.00000	0.0	588.2	588.2	.1820	-1.1035
437	59.4	.0	90.0	.0916	-.0871	-.0297	-.0196	.2045	-1.0871	90.0	.0000	.00000	0.0	585.5	585.5	.2045	-1.0871
438	59.3	.0	-.0	-.0217	.0393	.0200	.0012	-.0088	.0026	90.0	.0000	.00000	0.0	582.7	582.7	-.0088	.0026
439	59.1	.0	-10.0	-.0309	.0261	.0106	.0070	-.0111	.0926	90.0	.0000	.00000	0.0	578.8	578.8	-.0111	.0926
440	59.4	.0	-20.0	-.0398	-.0105	-.0025	.0158	-.0468	.2753	90.0	.0000	.00000	0.0	586.2	586.2	-.0468	.2753
441	59.1	.0	-30.0	-.0544	-.0961	-.0213	.0267	-.0972	.5363	90.0	.0000	.00000	0.0	578.8	578.8	-.0972	.5363
442	59.4	-.0	-40.0	-.2016	-.1567	-.0355	.0278	-.1157	.8303	90.0	.0000	.00000	0.0	585.5	585.5	-.1157	.8303
443	59.2	-.0	-50.0	-.3406	-.2379	-.0582	.0239	-.1548	1.1677	90.0	.0000	.00000	0.0	581.9	581.9	-.1548	1.1677
444	59.4	.1	-60.0	.0350	-.3223	-.0524	.0223	-.1344	1.2792	90.0	.0000	.00000	0.0	584.7	584.7	-.1344	1.2792
445	59.3	.1	-70.0	.0925	-.0698	-.0556	.0193	-.1679	1.1143	90.0	.0000	.00000	0.0	584.3	584.3	-.1679	1.1143
446	59.3	.1	-80.0	.1080	-.0768	-.0534	.0186	-.1872	1.1069	90.0	.0000	.00000	0.0	583.1	583.1	-.1872	1.1069
447	59.3	.1	-90.0	.0669	-.0913	-.0335	.0189	-.2063	1.0706	90.0	.0000	.00000	0.0	583.9	583.9	-.2063	1.0706

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000   .0 583.3 583.3

RUN 23   CONFIGURATION 14

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
453	59.3	.1	-.0	-.0249	.0400	.0202	.0011	-.0087	.0030	90.0	.0000	.00000	0.0	583.5	583.5	-.0087	.0030
454	59.3	10.2	-.0	.0411	.0457	.0047	.0006	-.0057	.0047	90.0	.0000	.00000	0.0	583.5	583.5	-.0057	.0047
455	59.3	5.1	-.0	.0151	.0452	.0103	.0009	-.0076	.0023	90.0	.0000	.00000	0.0	583.5	583.5	-.0076	.0023
456	59.3	.1	-.0	-.0249	.0405	.0201	.0011	-.0087	.0027	90.0	.0000	.00000	0.0	583.9	583.9	-.0087	.0027
457	59.3	-4.9	-.0	-.0589	.0384	.0306	.0017	-.0113	.0042	90.0	.0000	.00000	0.0	583.9	583.9	-.0113	.0042
458	59.3	-10.0	-.0	-.0992	.0320	.0418	.0016	-.0115	.0052	90.0	.0000	.00000	0.0	584.3	584.3	-.0115	.0052

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000   .0 583.7 583.7

RUN 24   CONFIGURATION 14

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
459	59.1	.2	-10.0	-.0342	.0281	.0112	.0068	-.0105	.0960	90.0	.3300	.00000	0.0	579.6	579.6	-.0105	.0960
460	59.2	10.2	-10.0	-.0078	.0428	.0180	.0002	-.0115	.1793	90.0	.0000	.00000	0.0	582.3	582.3	-.0115	.1793
461	59.3	5.2	-10.0	-.0265	.0342	.0166	.0037	-.0067	.1256	90.0	.0000	.00030	0.0	583.1	583.1	-.0067	.1256
462	59.4	.1	-10.0	-.0335	.0272	.0108	.0071	-.0113	.0951	90.0	.0000	.00000	0.0	585.8	585.8	-.0113	.0951
463	59.4	-4.9	-10.0	-.0510	.0222	.0117	.01C7	-.0241	.0822	90.0	.0000	.00000	0.3	586.2	586.2	-.0241	.0822
464	59.3	-10.0	-10.0	-.0817	.0131	.0195	.0136	-.0378	.0856	90.0	.0000	.00000	0.3	584.3	584.3	-.0378	.0856

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000   .0 583.6 583.6

RUN   25   CONFIGURATION 14

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
465	59.4	.2	-20.0	-.0444	-.0096	-.0022	.0158	-.0468	.2772	90.0	.0000	.00000	0.0	585.8	585.8	-.0468	.2772
466	59.4	10.2	-20.0	.0020	-.0035	-.0033	.0082	-.0705	.4428	90.0	.0000	.00000	0.0	585.8	585.8	-.0705	.4428
467	59.2	5.2	-20.0	-.0298	-.0053	.0002	.0117	-.0506	.3352	90.0	.0000	.00000	0.0	582.3	582.3	-.0506	.3352
468	59.2	.1	-20.0	-.0464	-.0112	-.0017	.0160	-.0473	.2761	90.0	.0000	.00000	0.0	581.9	581.9	-.0473	.2761
469	59.2	-4.9	-20.0	-.0623	-.0167	-.0004	.0203	-.0552	.2411	90.0	.0000	.00000	0.0	581.5	581.5	-.0552	.2411
470	59.3	-10.0	-20.0	-.0906	-.0195	.0071	.0250	-.0691	.2312	90.0	.0000	.00000	0.0	582.7	582.7	-.0691	.2312

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000   .0 583.4 583.4

RUN   26   CONFIGURATION 14

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
471	59.2	.2	-30.0	-.0606	-.0055	-.0195	.0265	-.0971	.5357	90.0	.0000	.00000	0.0	582.3	582.3	-.0971	.5357
472	59.3	10.3	-30.0	-.0022	-.0867	-.0216	.0156	-.1108	.7223	90.0	.0000	.00000	0.0	583.1	583.1	-.1108	.7223
473	59.3	5.2	-30.0	-.0317	-.0933	-.0198	.0214	-.1036	.6281	90.0	.0000	.00000	0.0	583.5	583.5	-.1036	.6281
474	59.3	.1	-30.0	-.0607	-.0982	-.0200	.0266	-.0981	.5399	90.0	.0000	.00000	0.0	583.9	583.9	-.0981	.5399
475	59.3	-5.0	-30.0	-.0949	-.0920	-.0157	.0308	-.0976	.4770	90.0	.0000	.00000	0.0	583.9	583.9	-.0976	.4770
476	59.3	-10.0	-30.0	-.1285	-.0854	-.0045	.0343	-.0977	.4410	90.0	.0000	.00000	0.0	583.5	583.5	-.0977	.4410

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000   .0 583.4 583.4

RUN   27   CONFIGURATION 12

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
491	14.8	-.1	-.0	-.0165	.1117	-.0127	.0001	.0039	.0102	90.0	.0000	.00000	0.0	36.2	36.2	.0039	.0102
492	14.5	-.1	-10.0	-.0335	.0953	-.0071	.0059	-.0097	.1574	90.0	.0000	.00000	0.0	34.7	34.7	-.0097	.1574
493	14.9	-.1	-20.0	-.0660	.0671	-.0141	.0134	-.0396	.4349	90.0	.0000	.00000	0.0	36.6	36.6	-.0396	.4349
494	15.2	-.1	-30.0	-.0700	.0100	-.0041	.0195	-.0709	.7584	90.0	.0000	.00000	0.0	38.2	38.2	-.0709	.7584
495	14.8	-.1	-40.0	-.1397	-.0619	-.0574	.0227	-.0992	1.0297	90.0	.0000	.00000	0.0	36.2	36.2	-.0992	1.0297
496	14.7	-.1	-50.0	-.3314	-.1461	-.0738	.0231	-.1576	1.4386	90.0	.0000	.00000	0.0	35.8	35.8	-.1576	1.4386
497	14.6	-.0	-60.0	-.0651	-.2332	-.0461	.0231	-.1323	1.5058	90.0	.0000	.00000	0.0	35.5	35.5	-.1323	1.5058
498	14.9	-.0	-70.0	-.1216	-.0147	.0090	.0220	-.1583	1.3549	90.0	.0000	.00000	0.0	37.0	37.0	-.1583	1.3549
499	14.8	-.0	-80.0	.0133	.0214	-.0152	.0182	-.1905	1.2378	90.0	.0000	.00000	0.0	36.2	36.2	-.1905	1.2378
500	14.9	-.0	-90.0	-.0373	-.0043	.0070	.0192	-.2153	1.2647	90.0	.0000	.00000	0.0	36.6	36.6	-.2153	1.2647
501	14.8	-.2	0.0	.0080	.0994	-.0166	.0000	-.0014	-.0014	90.0	.0000	.00000	0.0	36.2	36.2	-.0020	-.0014
502	14.5	-.2	10.0	-.0273	.0946	-.0118	-.0060	.0061	-.1336	90.0	.0000	.00000	0.0	35.1	35.1	.0061	-.1336
503	14.5	-.2	20.0	-.0395	.0680	-.0103	-.0130	.0394	-.3941	90.0	.0000	.00000	0.0	35.1	35.1	.0394	-.3941
504	14.5	-.2	30.0	-.0751	.0013	-.0383	-.0204	.0760	-.7643	90.0	.0000	.00000	0.0	35.1	35.1	.0760	-.7643
505	14.7	-.2	40.0	-.1070	-.0851	-.0618	-.0255	.1135	-1.1232	90.0	.0000	.00000	0.0	35.8	35.8	.1135	-1.1232
506	14.7	-.2	50.0	-.3036	-.1571	-.0677	-.0249	.1537	-1.4049	90.0	.0000	.00000	0.0	35.8	35.8	.1537	-1.4049
507	14.7	-.2	60.0	-.0907	-.2630	-.0578	-.0260	.1525	-1.6101	90.0	.0000	.00000	0.0	35.8	35.8	.1525	-1.6101
508	14.7	-.2	70.0	-.0101	-.0051	-.0231	-.0211	.1804	-1.3449	90.0	.0000	.00000	0.0	35.8	35.8	.1804	-1.3449
509	14.7	-.2	80.0	-.0080	-.0062	-.0202	-.0202	.2012	-1.3139	90.0	.0000	.00000	0.0	35.8	35.8	.2012	-1.3139
510	14.7	-.2	90.0	-.0339	-.0219	-.0025	-.0201	.2147	-1.2929	90.0	.0000	.00000	0.0	35.8	35.8	.2147	-1.2929
511	14.8	-.2	0.0	.0075	.0924	-.0156	-.0004	.0013	-.0130	90.0	.0000	.00000	0.0	36.2	36.2	.0013	-.0130

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000   .0 36.0 36.0

RUN   28   CONFIGURATION 12

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
514	29.8	0.0	0.0	.0070	.0494	-.0020	.0001	.0013	.0082	90.0	.0000	.00000	0.0	147.3	147.3	.0013	.0082
515	29.8	.0	-10.0	-.0134	.0384	.0042	.0061	-.0061	.1520	90.0	.0000	.00000	0.0	147.7	147.7	-.0061	.1520
516	29.6	.0	-20.0	-.0383	.0129	.0014	.0138	-.0391	.4130	90.0	.0000	.00000	0.0	144.9	144.9	-.0391	.4130
517	29.6	.1	-30.0	-.0418	-.0452	-.0266	.0204	-.0724	.7483	90.0	.0000	.00000	0.0	145.7	145.7	-.0724	.7483
518	29.6	.0	-40.0	-.0749	-.1267	-.0504	.0242	-.1044	1.0519	90.0	.0000	.00000	0.0	145.3	145.3	-.1044	1.0519
519	29.8	.1	-50.0	-.2169	-.2105	-.0530	.0230	-.1499	1.3558	90.0	.0000	.00000	0.0	147.3	147.3	-.1499	1.3558
520	29.6	.1	-60.0	-.0257	-.3055	-.0323	.0239	-.1446	1.5357	90.0	.0000	.00000	0.0	144.9	144.9	-.1446	1.5357
521	29.6	.1	-70.0	.0062	-.0380	-.0110	.0195	-.1781	1.2968	90.0	.0000	.00000	0.0	145.7	145.7	-.1781	1.2968
522	29.6	.1	-80.0	.0253	-.0406	-.0027	.0182	-.1965	1.2625	90.0	.0000	.00000	0.0	145.7	145.7	-.1965	1.2625
523	29.6	.1	-90.0	-.0032	-.0516	.0159	.0183	-.2098	1.2355	90.0	.0000	.00000	0.0	145.7	145.7	-.2098	1.2355
524	29.8	-.0	0.0	.0248	.0499	-.0035	.0001	.0010	-.0006	90.0	.0000	.00000	0.0	147.7	147.7	.0013	-.0006
525	29.8	-.0	10.0	-.0035	.0436	.0021	-.0058	.0053	-.1298	90.0	.0000	.00000	0.0	146.9	146.9	.0053	-.1298
526	29.6	-.0	20.0	-.0294	.0161	.0029	-.0134	.0392	-.3883	90.0	.0000	.00000	0.0	145.3	145.3	.0392	-.3883
527	29.6	-.1	30.0	-.0480	-.0437	-.0221	-.0204	.0779	-.7280	90.0	.0000	.00000	0.0	145.3	145.3	.0779	-.7280
528	29.6	-.1	40.0	-.0766	-.1318	-.0588	-.0262	.1141	-1.0820	90.0	.0000	.00000	0.0	145.7	145.7	.1141	-1.0820
529	29.8	-.1	50.0	-.2330	-.2105	-.0553	-.0243	.1529	-1.3627	90.0	.0000	.00000	0.0	147.7	147.7	.1529	-1.3627
530	29.7	-.0	60.0	-.0136	-.3044	-.0352	-.0246	.1498	-1.5215	90.0	.0000	.00000	0.0	146.5	146.5	.1498	-1.5215
531	29.6	-.0	70.0	.0184	-.0461	-.0148	-.0203	.1798	-1.3038	90.0	.0000	.00000	0.0	145.3	145.3	.1798	-1.3038
532	29.6	-.1	80.0	.0201	-.0521	-.0090	-.0192	.1987	-1.2822	90.0	.0000	.00000	0.0	144.9	144.9	.1987	-1.2822
533	29.7	-.0	90.0	-.0025	-.0630	.0166	-.0195	.2160	-1.2697	90.0	.0000	.00000	0.0	146.1	146.1	.2160	-1.2697
534	29.6	-.0	0.0	.0249	.0495	-.0033	-.0000	.0005	-.0034	90.0	.0000	.00000	0.0	145.7	145.7	.0005	-.0034

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000   .0 146.1 146.1

RUN 29   CONFIGURATION 12

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
537	58.8	.0	-.0	.0079	.0401	-.0018	.0001	.0005	.0019	90.0	.0000	.00000	0.0	583.9	583.9	.0005	.0019
538	58.8	.0	-10.0	-.0233	.0303	.0057	.0064	-.0062	.1451	90.0	.0000	.00000	0.0	583.1	583.1	-.0062	.1451
539	58.9	.0	-20.0	-.0471	.0031	.0058	.0139	-.0362	.3844	90.0	.0000	.00000	0.0	584.7	584.7	-.0362	.3844
540	58.8	.0	-30.0	-.0423	-.0605	-.0207	.0212	-.0640	.6959	90.0	.0000	.00000	0.0	583.5	583.5	-.0640	.6959
541	58.9	.0	-40.0	-.1413	-.1407	-.0392	.0251	-.1021	1.0173	90.0	.0000	.00000	0.0	584.3	584.3	-.1021	1.0173
542	58.9	-.0	-50.0	-.3402	-.2312	-.0537	.0223	-.1610	1.3561	90.0	.0000	.00000	0.0	584.3	584.3	-.1610	1.3561
543	58.8	.1	-60.0	.0613	-.3211	-.0269	.0225	-.1428	1.4512	90.0	.0000	.00000	0.0	583.1	583.1	-.1428	1.4512
544	58.7	.1	-70.0	.0681	-.0739	.0234	.0187	-.1756	1.2683	90.0	.0000	.00000	0.0	581.5	581.5	-.1756	1.2683
545	58.8	.1	-80.0	.0767	-.0827	-.0200	.0175	-.1948	1.2470	90.0	.0000	.00000	0.0	583.0	583.0	-.1948	1.2470
546	58.8	.2	-90.0	.0679	-.0923	-.0036	.0170	-.2065	1.2075	90.0	.0000	.00000	0.0	582.7	582.7	-.2065	1.2075
547	58.8	0.0	0.0	.0109	.0387	-.0020	.0001	.0005	.0012	90.0	.0000	.00000	0.0	582.9	582.9	.0005	.0012
548	58.8	-.0	10.0	-.0199	.0324	.0048	-.0061	.0047	-.1304	90.0	.0000	.00000	0.0	582.7	582.7	.0047	-.1304
549	58.8	-.0	20.0	-.0551	.0023	.0089	-.0139	.0378	-.3776	90.0	.0000	.00000	0.0	582.3	582.3	.0378	-.3776
550	58.8	-.1	30.0	-.0544	-.0594	-.0146	-.0209	.0644	-.6815	90.0	.0000	.00000	0.0	583.9	583.9	.0644	-.6815
551	58.9	-.1	40.0	-.1330	-.1447	-.0474	-.0260	.1133	-1.0009	90.0	.0000	.00000	0.0	584.7	584.7	.1133	-1.0009
552	58.8	-.2	50.0	-.4205	-.2197	-.0251	-.0237	.1695	-1.3441	90.0	.0000	.00000	0.0	583.1	583.1	.1695	-1.3441
553	58.7	.0	60.0	-.0858	-.3340	-.0296	-.0237	.1731	-1.5033	90.0	.0000	.00000	0.0	581.5	581.5	.1731	-1.5033
554	58.7	-.0	70.0	.0081	-.0758	-.0079	-.0199	.1826	-1.3021	90.0	.0000	.00000	0.0	581.5	581.5	.1826	-1.3021
555	58.9	0.0	80.0	.0230	-.0769	-.0045	-.0187	.2022	-1.2850	90.0	.0000	.00000	0.0	585.8	585.8	.2022	-1.2850
556	58.9	.0	90.0	.0002	-.0914	.0189	-.0182	.2165	-1.2618	90.0	.0000	.00000	0.0	585.1	585.1	.2165	-1.2618
557	58.8	0.0	0.0	.0110	.0361	-.0015	.0001	.0003	.0026	90.0	.0000	.00000	0.0	583.9	583.9	.0003	.0026

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   583.5   583.5

RUN 30   CONFIGURATION 12

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
560	58.8	0.0	0.0	.0081	.0378	-.0012	.0002	.0005	.0041	90.0	.0000	.00000	0.0	582.3	582.3	.0005	.0041
561	58.8	10.3	0.0	.0415	.0471	.0055	.0001	-.0000	.0015	90.0	.0000	.00000	0.0	583.9	583.9	-.0000	.0015
562	58.8	5.2	0.0	.0300	.0451	.0015	.0000	.0004	.0024	90.0	.0000	.00000	0.0	583.9	583.9	.0004	.0024
563	58.9	.2	0.0	.0093	.0384	-.0010	.0001	.0002	.0013	90.0	.0000	.00000	0.0	584.3	584.3	.0002	.0013
564	58.8	-4.9	0.0	-.0035	.0366	-.0047	.0003	-.0006	.0045	90.0	.0000	.00000	0.0	583.5	583.5	-.0006	.0045
565	58.8	-9.9	0.0	-.0198	.0366	-.0082	.0003	-.0009	.0034	90.0	.0000	.00000	0.0	583.1	583.1	-.0009	.0034
566	58.8	.2	0.0	.0094	.0389	-.0009	.0001	.0003	.0013	90.0	.0000	.00000	0.0	582.7	582.7	.0003	.0013

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   583.4   583.4

RUN 31   CONFIGURATION 12

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
567	58.9	.3	-10.0	-.0262	.0279	.0070	.0064	-.0063	.1470	90.0	.0000	.00000	0.0	584.7	584.7	-.0063	.1470
568	58.7	10.3	-10.0	-.0142	.0437	.0233	-.0005	-.0053	.1693	90.0	.0000	.00000	0.0	580.7	580.7	-.0053	.1693
569	58.7	5.3	-10.0	-.0256	.0353	.0178	.0029	-.0011	.1473	90.0	.0000	.00000	0.0	581.9	581.9	-.0011	.1473
570	58.8	.2	-10.0	-.0251	.0281	.0070	.0062	-.0061	.1436	90.0	.0000	.00000	0.0	583.5	583.5	-.0061	.1436
571	58.8	-4.8	-10.0	-.0264	.0251	-.0008	.0092	-.0149	.1530	90.0	.0000	.00000	0.0	583.9	583.9	-.0149	.1530
572	58.8	-9.9	-10.0	-.0351	.0253	-.0062	.0111	-.0215	.1649	90.0	.0000	.00000	0.0	583.9	583.9	-.0215	.1649
573	58.8	.2	-10.0	-.0250	.0288	.0070	.0062	-.0059	.1428	90.0	.0000	.00000	0.0	583.9	583.9	-.0059	.1428

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   583.2   583.2

RUN 32   CONFIGURATION 12

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
574	58.8	.3	-20.0	-.0555	.0002	.0090	.0136	-.0369	.3827	90.0	.0000	.00000	0.0	583.1	583.1	-.0369	.3827
576	58.8	10.4	-20.0	-.0161	.0035	.0125	.0057	-.0581	.4839	90.0	.0000	.00000	0.0	582.7	582.7	-.0581	.4839
577	58.8	5.3	-20.0	-.0468	.0013	.0159	.0098	-.0432	.4143	90.0	.0000	.00000	0.0	583.1	583.1	-.0432	.4143
578	58.8	.2	-20.0	-.0583	-.0011	.0086	.0139	-.0369	.3807	90.0	.0000	.00000	0.0	582.7	582.7	-.0369	.3807
579	58.8	-4.8	-20.0	-.0622	-.0007	.0005	.0172	-.0370	.3692	90.0	.0000	.00000	0.0	582.7	582.7	-.0370	.3692
580	58.8	-9.9	-20.0	-.0611	.0039	-.0075	.0204	-.0413	.3752	90.0	.0000	.00000	0.0	582.3	582.3	-.0413	.3752
581	58.8	.2	-20.0	-.0570	-.0001	.0087	.0137	-.0373	.3838	90.0	.0000	.00000	0.0	582.7	582.7	-.0373	.3838

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   582.8   582.8

RUN 33   CONFIGURATION 12

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
582	58.9	.3	-30.0	-.0547	-.0647	-.0172	.0210	-.0647	.6868	90.0	.0000	.00000	0.0	584.7	584.7	-.0647	.6868
583	58.8	10.4	-30.0	.0026	-.0626	-.0162	.0110	-.0846	.7881	90.0	.0000	.00000	0.0	583.5	583.5	-.0846	.7881
584	58.9	5.3	-30.0	-.0306	-.0654	-.0129	.0167	-.0726	.7388	90.0	.0000	.00000	0.0	584.3	584.3	-.0726	.7388
585	58.9	.2	-30.0	-.0547	-.0660	-.0175	.0211	-.0651	.6878	90.0	.0000	.00000	0.0	585.0	585.0	-.0651	.6878
586	58.9	-4.9	-30.0	-.0915	-.0638	-.0170	.0253	-.0639	.6593	90.0	.0000	.00000	0.0	584.7	584.7	-.0639	.6593
587	58.8	-9.9	-30.0	-.1118	-.0579	-.0136	.0288	-.0650	.6439	90.0	.0000	.00000	0.0	583.1	583.1	-.0650	.6439
588	58.9	.3	-30.0	-.0579	-.0654	-.0166	.0210	-.0649	.6873	90.0	.0000	.00000	0.0	584.3	584.3	-.0649	.6873

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   584.2   584.2

RUN 34 CONFIGURATION 32

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	CS	CYMS	CSFS
617	15.0	.0	.0	-.2789	.1096	.0407	-.0182	-.2623	-.0507	40.9	.0556	.00203	177.9	36.2	273.9	-.0347	-.0067
618	14.7	.0	10.0	-.5097	.0554	.0828	-.0438	-.1728	-.6401	39.9	.0556	.00212	177.9	34.7	272.4	-.0220	-.0815
619	15.0	.0	20.0	-.8945	-.0304	.1337	-.0634	.0414	-1.2667	40.7	.0556	.00208	177.9	36.2	273.7	.0055	-.1677
620	15.0	-.0	30.0	-.8763	-.0829	.1011	-.0781	.2133	-2.0045	40.8	.0555	.00200	177.8	36.2	272.9	.0283	-.2662
621	14.9	-.0	40.0	-.7972	-.1616	.1408	-.0860	.3822	-2.8242	40.7	.0553	.00191	177.8	35.8	271.9	.0504	-.3723
622	14.9	-.0	50.0	-.8041	-.2285	.0996	-.0846	.5331	-3.4545	40.9	.0552	.00180	177.9	35.8	271.7	.0723	-.4557
623	14.9	-.0	60.0	-.7281	.0253	.0878	-.0864	.7017	-3.9875	40.8	.0552	.00171	177.8	35.5	270.8	.0919	-.5220
624	14.9	-.0	70.0	-.5234	.2122	.0650	-.0910	.8309	-4.3774	41.1	.0548	.00150	178.2	35.5	270.1	.1091	-.5746
625	14.5	.0	80.0	-.2943	.1688	.0503	-.0946	.9572	-4.8557	40.5	.0547	.00128	178.2	33.9	268.2	.1209	-.6133
626	14.9	.0	90.0	.1239	.0517	-.0280	-.0875	.9710	-4.8027	41.5	.0559	.00119	178.3	35.5	271.2	.1269	-.6278
627	15.7	.0	-.0	-.2807	.1149	.0433	-.0171	-.2159	-.1061	42.2	.0561	.00215	178.1	39.4	279.4	-.0305	-.0150
628	15.6	.0	-10.0	-.3506	.1633	.0350	.0156	-.3277	.5907	42.2	.0559	.00215	178.0	39.0	277.8	-.0460	.0815
629	15.4	.0	-20.0	-.4748	.1293	-.0003	.3472	-.4151	1.2124	42.1	.0557	.00208	177.8	38.2	275.7	-.0575	.1680
630	15.4	.1	-30.0	-.6708	.0505	-.0103	.0719	-.4672	1.8189	42.2	.0556	.00216	177.8	38.2	275.3	-.0649	.2525
631	15.0	.1	-40.0	-.8296	-.0578	.0381	.0965	-.5316	2.6008	41.5	.0553	.00231	177.8	36.2	272.0	-.0708	.3466
632	14.8	.1	-50.0	-.6101	-.2105	.0943	.1139	-.5370	3.4438	41.1	.0551	.00248	177.8	35.1	270.2	-.0697	.4460
633	14.6	.1	-60.0	-.4389	-.2888	.1457	.1259	-.6242	4.2550	40.9	.0551	.00272	177.4	34.3	268.2	-.0797	.5437
634	14.7	.1	-70.0	-.4539	-.3914	.1237	.1304	-.7244	4.8211	41.3	.0553	.00291	177.3	34.7	269.2	-.0933	.6208
635	14.9	.2	-80.0	-.0040	-.4450	.1334	.1272	-.7199	5.0738	42.0	.0551	.00307	177.3	35.5	269.0	-.0949	.6697

AVERAGE TIP SPEED RATIO = .043   AVERAGE OF ABOVE VALUES 41.2 .0553 .00209 177.9 36.1 272.3

RUN 35 CONFIGURATION 32

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	CS	CYMS	CSFS
638	25.2	.0	.0	.0812	.1151	.0404	-.0032	-.1178	.0375	58.2	.0633	.00480	179.3	101.6	374.7	-.0319	.0102
639	25.1	0.0	10.0	.0587	.0771	.0562	-.0248	-.0484	-.3079	58.1	.0630	.00485	179.1	101.2	373.9	-.0131	-.0934
640	25.1	-.0	20.0	-.1495	.0817	.0745	-.0422	.0611	-.7070	58.1	.0630	.00487	178.6	100.8	372.3	.0166	-.1915
641	24.9	-.0	30.0	-.3850	.0506	.0923	-.0556	.2114	-1.1803	57.8	.0630	.00483	178.6	99.3	370.2	.0567	-.3162
642	25.3	-.0	40.0	-.5344	.0058	.0852	-.0673	.3288	-1.5774	58.5	.0635	.00486	178.4	102.8	375.4	.0902	-.4319
643	25.4	-.0	50.0	-.5914	-.0776	.0571	-.0690	.2973	-1.7797	58.8	.0633	.00460	178.5	103.2	375.6	.0817	-.4889
644	25.3	-.0	60.0	-.6231	-.2525	.0463	-.0701	.3506	-2.2055	59.0	.0629	.00432	178.5	102.8	373.7	.0965	-.6067
645	25.2	-.0	70.0	-.6290	-.4164	.0681	-.0704	.4362	-2.5266	59.1	.0626	.00401	178.7	101.6	371.3	.1194	-.6915
646	25.2	-.0	80.0	-.3655	-.0251	.1030	-.0576	.5269	-2.4843	59.4	.0621	.00371	178.9	101.6	369.9	.1448	-.6825
647	25.0	.0	90.0	-.5470	-.0080	.1297	-.0553	.4422	-2.3573	59.3	.0624	.00343	178.7	100.4	369.6	.1202	-.6405
648	25.7	.0	0.0	.0793	.1059	.0407	-.0013	-.1216	-.0448	58.8	.0636	.00500	179.4	105.9	381.9	-.0337	.0124
649	25.7	.0	-10.0	.0602	.1126	.0264	.0159	-.1602	.3463	59.1	.0633	.00486	179.3	106.3	380.7	-.0448	.0967
650	25.7	.0	-20.0	-.0378	.1180	.0308	.0363	-.2178	.6981	59.3	.0631	.00473	179.1	106.3	379.4	-.0610	.1957
651	25.6	.1	-30.0	.0132	.0971	.0393	.0530	-.2421	1.0604	59.4	.0628	.00462	179.1	105.5	377.1	-.0678	.2968
652	25.6	.1	-40.0	-.0974	.0444	.0727	.0690	-.2535	1.4366	59.6	.0624	.00453	178.9	105.2	374.5	-.0712	.4033
653	25.5	.1	-50.0	-.5952	.0118	.1267	.0749	-.2941	1.8246	59.7	.0625	.00447	178.4	104.4	373.0	-.0823	.5105
654	25.4	.1	-60.0	-.9408	-.0983	.1621	.0789	-.4249	2.3415	59.9	.0625	.00439	178.3	103.6	371.4	-.1185	.6530
655	25.2	.1	-70.0	-.6971	-.3158	.0141	.0803	-.4747	2.7508	59.9	.0623	.00441	178.2	102.0	368.8	-.1313	.7608

AVERAGE TIP SPEED RATIO = .073   AVERAGE OF ABOVE VALUES 59.0 .0629 .00452 178.9 103.0 374.1

RUN 36 CONFIGURATION 32

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	CS	CYMS	CSFS
658	35.1	.0	.0	.0925	.0756	.0201	-.0000	-.0400	-.0279	69.2	.0694	.00578	180.1	197.3	500.7	-.0159	-.0110
659	35.2	.0	10.0	.0858	.0464	.0239	-.0129	-.0183	-.2318	69.3	.0696	.00586	180.3	198.8	503.0	-.0072	-.0917
660	35.2	-.0	20.0	.0319	-.0023	.0323	-.0299	.0468	-.5177	69.3	.0696	.00591	180.0	198.8	503.1	.0185	-.2046
661	35.3	-.0	30.0	-.0972	-.0662	.0349	-.0446	.1368	-.8941	69.5	.0695	.00587	179.8	199.6	502.8	.0543	-.3552
662	35.3	-.0	40.0	-.2723	-.0825	.0148	-.0492	.2055	-1.1754	69.6	.0697	.00579	179.4	199.6	502.1	.0817	-.4471
663	35.2	-.0	50.0	-.2942	-.1728	.0126	-.0488	.2142	-1.4002	69.8	.0692	.00560	179.4	198.4	499.8	.0852	-.5570
664	35.0	.4	60.0	-.2940	-.2369	.3584	-.0547	.3469	-1.6841	69.6	.0691	.00554	179.3	196.1	495.6	.1372	-.6462
665	35.1	.1	70.0	-.3408	-.2467	.0737	-.0487	.3149	-1.5858	69.9	.0691	.00531	179.4	197.3	497.3	.1240	-.6290
666	35.1	.0	80.0	-.3028	-.0622	.0571	-.0395	.3017	-1.4137	70.1	.0687	.00511	179.5	197.3	495.8	.1200	-.5625
667	34.9	.0	90.0	-.4239	-.1043	.0418	-.0365	.3025	-1.4279	70.1	.0686	.00466	179.3	195.7	495.3	.1195	-.5642
668	36.1	.0	0.0	.0911	.0716	.0172	-.0005	-.0325	-.0354	73.0	.0701	.00593	180.2	209.1	516.5	-.0132	-.0143
669	35.4	.0	-10.0	.0817	.0732	.0064	.0155	-.1063	.2384	69.6	.0695	.00577	180.1	201.6	505.6	-.0424	.0950
670	35.1	.1	-20.0	.0579	.0610	-.0038	.0276	-.1521	.5716	69.5	.0689	.00559	179.9	197.3	497.9	-.0602	.1997
671	34.9	.1	-30.0	.0292	.0369	-.0096	.0373	-.1873	.7933	69.7	.0682	.00548	179.7	195.7	493.3	-.0744	.3148
672	34.8	.1	-40.0	-.0245	-.0276	-.0020	.0485	-.2164	1.0762	69.9	.0579	.00545	179.2	194.9	489.2	-.0862	.4287
673	34.7	.1	-50.0	-.2405	-.0676	.0177	.0581	-.2855	1.3375	69.9	.0681	.00543	179.0	192.9	487.3	-.1130	.5205
674	34.5	.3	-60.0	-.4942	-.0576	.0322	.3626	-.3303	1.5577	69.8	.0684	.00563	178.7	191.0	485.6	-.1299	.6125
675	34.6	.1	-70.0	-.3620	-.1627	.0138	.0549	-.2828	1.6572	70.1	.0681	.00576	178.6	191.7	485.9	-.1119	.6552
676	34.8	.1	-80.0	-.2913	-.2881	.0035	.0481	-.2332	1.6407	70.6	.0678	.00593	178.5	194.5	486.0	-.0933	.6566

AVERAGE TIP SPEED RATIO = .100   AVERAGE OF ABOVE VALUES 69.8 .0689 .00560 179.5 197.2 496.9

RUN 37   CONFIGURATION 32

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
679	45.2	.0	0.0	.0857	.0596	.0015	-.0006	-.0187	-.0269	75.7	.0745	.00871	180.3	327.8	654.7	-.0094	-.0135
680	45.4	-.0	10.0	.0456	.0353	.0161	-.0115	-.0072	-.1975	75.8	.0750	.00892	180.4	331.0	660.0	-.0336	-.0990
681	45.4	-.0	20.0	-.0041	-.0181	.0173	-.0241	.0421	-.4572	75.8	.0750	.00901	180.2	330.6	659.2	.0211	-.2202
682	45.1	-.0	30.0	-.1122	-.0800	.0153	-.0344	.1091	-.7652	75.8	.0747	.00895	179.9	326.6	653.0	-.0546	-.3827
683	45.1	-.1	40.0	-.3662	-.1009	.0165	-.0366	.1679	-1.0045	75.8	.0752	.00891	179.5	325.8	652.9	.0838	-.5012
684	44.9	-.1	50.0	-.2840	-.2058	.0123	-.0370	.1966	-1.2626	75.8	.0750	.00876	179.2	323.1	647.9	.0981	-.6296
685	44.7	-.0	60.0	-.1158	-.2340	.0208	-.0377	.2226	-1.3828	75.9	.0745	.00846	179.3	320.3	643.4	.1139	-.6884
686	44.6	-.0	70.0	-.1031	-.0334	.0125	-.0270	.2359	-1.2739	75.9	.0743	.00812	179.5	318.8	641.7	.1172	-.6328
687	44.6	-.0	80.0	-.0391	-.0276	.0216	-.0246	.2447	-1.2938	76.0	.0740	.00780	179.9	318.8	641.7	.1216	-.6427
688	44.6	3.0	90.0	-.1585	-.0255	.0414	-.0243	.2571	-1.2769	75.6	.0742	.00710	180.2	318.8	644.2	.1273	-.6321
689	45.8	.0	-.0	.0806	.0574	.0014	-.0008	-.0175	-.0313	76.0	.0747	.00879	180.6	336.1	665.7	-.0089	-.0158
690	45.1	.1	-10.0	.0631	.0559	-.0031	.0118	-.0538	.1517	75.7	.0744	.00858	180.4	327.0	654.3	-.0269	.0850
691	44.9	.1	-20.0	.0086	.0323	-.0017	.0228	-.0953	.4042	75.7	.0740	.00837	180.4	323.5	649.5	-.0475	.2016
692	44.8	.1	-30.0	-.0313	-.0140	-.0123	.0303	-.1304	.6753	75.8	.0735	.00817	180.1	321.5	643.0	-.0652	.3377
693	44.9	.1	-40.0	-.1072	-.0869	-.0115	.0381	-.1633	.9484	76.1	.0732	.00809	179.6	323.9	642.7	-.0923	.4779
694	44.8	.1	-50.0	-.1415	-.1777	-.0335	.0470	-.1960	1.1681	76.3	.0728	.00796	179.1	322.7	637.8	-.0992	.5912
695	44.8	.1	-60.0	-.0347	-.2459	-.0609	.0409	-.2039	1.3996	76.5	.0724	.00805	178.7	321.9	634.0	-.1035	.7154
696	45.0	.2	-70.0	-.1026	-.2606	.0069	.0300	-.1902	1.4456	76.8	.0724	.00805	178.5	325.1	636.1	-.0972	.7388

AVERAGE TIP SPEED RATIO = .129   AVERAGE OF ABOVE VALUES 75.9 .0741 .00838 179.9 324.6 647.7

RUN 38   CONFIGURATION 32

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
738	20.1	0.0	-.0	.1083	.1314	.0430	-.0128	-.1229	-.0430	51.5	.0579	.00296	177.2	64.2	307.3	-.0257	-.0090
739	20.1	-.0	10.0	.0589	.0856	.0782	-.0335	-.0543	-.4935	51.2	.0575	.00323	178.6	64.2	309.7	-.0112	-.1923
740	20.0	-.0	20.0	-.1352	.0898	.0731	-.0501	.0769	-.9968	51.1	.0575	.00347	178.3	63.8	308.2	.0159	-.2064
741	19.8	-.0	30.0	-.2573	.0312	.0785	-.0639	.2668	-1.6631	50.8	.0573	.00358	178.3	62.6	306.2	.0546	-.3402
742	20.3	-.0	40.0	-.4123	-.0588	.0703	-.0716	.4040	-2.1547	51.8	.0574	.00373	178.3	65.8	310.0	.0857	-.4572
743	20.3	-.0	50.0	-.6814	-.1969	.0860	-.0802	.4470	-2.5620	51.8	.0575	.00370	178.4	65.4	310.3	.0942	-.5399
744	20.2	-.0	60.0	-.7570	-.3715	.0438	-.0825	.4688	-2.9295	51.9	.0574	.00365	178.6	65.0	309.7	.0984	-.6147
745	20.0	-.0	70.0	-.2284	.1400	.0625	-.0710	.6547	-3.1624	51.9	.0569	.00360	178.9	63.8	307.5	.1359	-.6562
746	20.0	-.0	80.0	-.2539	.1445	.1289	-.0656	.6508	-3.2449	52.1	.0568	.00348	179.2	63.8	307.2	.1352	-.6741
747	20.0	.0	90.0	-.2376	.0486	.1239	-.0606	.5951	-3.1084	52.4	.0569	.00329	178.8	63.8	307.0	.1237	-.6462
748	20.5	0.0	3.0	.1455	.1211	.0444	-.0105	-.1238	-.0354	51.9	.0575	.00317	178.3	66.6	312.5	-.0264	-.0075
749	20.3	.0	-10.0	.0735	.1446	.0367	.0135	-.1957	.4258	51.8	.0571	.00292	178.6	65.4	309.1	-.0414	.0931
750	20.0	.0	-20.0	.0488	.1606	.0424	.0396	-.2771	.9494	51.4	.0571	.00281	178.3	63.8	306.4	-.0577	.1978
751	19.8	.1	-30.0	-.0117	.1326	.0541	.0590	-.3093	1.4425	51.3	.0567	.00267	178.3	62.6	303.7	-.0638	.2975
752	20.2	.1	-40.0	-.0441	.0535	.0746	.0813	-.3653	1.9841	52.2	.0567	.00264	178.7	65.0	307.2	-.0773	.4198
753	20.1	.1	-50.0	-.2908	-.0665	.1179	.0945	-.3851	2.5332	52.3	.0567	.00255	178.9	64.2	305.6	-.0839	.5322
754	20.0	.1	-60.0	-.4463	-.2231	.1289	.0937	-.4558	3.1433	52.4	.0567	.00261	178.7	63.8	304.2	-.0956	.6593
755	19.9	.1	-70.0	-.3344	-.4047	.0684	.0959	-.5240	3.6260	52.5	.0565	.00267	178.1	63.0	303.0	-.1090	.7543

AVERAGE TIP SPEED RATIO = .058   AVERAGE OF ABOVE VALUES 51.8 .0571 .00315 178.4 64.3 307.5

RUN 39   CONFIGURATION 32

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
763	30.0	-.0	.0	.1072	.0872	.0336	-.0003	-.0751	-.0041	65.2	.0635	.00568	178.3	142.9	413.2	-.0260	-.0016
764	30.3	-.0	13.0	.1006	.0539	.0415	-.0162	-.0347	-.7477	65.5	.0638	.00590	178.3	145.7	415.9	-.0121	-.0866
765	30.2	-.0	20.0	.0610	.0118	.0526	-.0352	.0405	-.5807	65.6	.0637	.00601	177.9	145.3	414.9	.0142	-.2033
766	30.1	-.0	30.0	-.2153	-.0210	.0691	-.0496	.1564	-.9731	65.5	.0637	.00605	177.5	143.7	412.5	.0545	-.3391
767	30.1	.0	40.0	-.3378	-.0399	.0364	-.0572	.2483	-1.2882	65.6	.0639	.00601	177.4	144.1	413.5	.0866	-.4405
768	30.2	-.0	50.0	-.3618	-.1045	-.0740	-.0518	.1922	-1.4054	65.5	.0638	.00587	177.7	144.9	414.2	.0672	-.4918
769	30.1	-.0	60.0	-.3117	-.2117	.0766	-.0595	.3616	-1.8723	66.0	.0634	.00569	177.7	144.1	412.0	.1245	-.6550
771	30.1	-.0	70.0	-.2817	-.2665	.0872	-.0587	.3999	-1.9725	66.0	.0633	.00540	178.2	143.7	412.3	.1394	-.6874
772	30.2	0.0	.0	.1292	.0814	.0337	-.0011	-.0652	-.0146	55.3	.0636	.00577	178.9	144.9	417.2	-.0227	-.0051
773	30.1	.0	-10.0	.1313	.0855	.0190	.0161	-.1350	.2796	65.5	.0634	.00562	178.6	144.1	414.6	-.0460	.0972
774	30.3	.0	-20.0	.1255	.0747	.0077	.0304	-.1787	.5615	65.8	.0635	.00551	178.0	145.7	414.9	-.0628	.1972
775	30.4	.1	-30.0	.0866	.0577	.0073	.0419	-.2061	.8499	66.2	.0633	.00524	177.7	147.3	414.6	-.0732	.3016
776	30.1	.1	-40.0	.0011	.0314	.0348	.0549	-.2155	1.1421	66.3	.0628	.00493	178.1	143.7	413.0	-.0756	.4024
777	30.3	.1	-50.0	-.3711	-.0090	.0647	.0598	-.2949	1.5053	66.5	.0630	.00492	177.6	145.7	411.7	-.1044	.5329

AVERAGE TIP SPEED RATIO = .087   AVERAGE OF ABOVE VALUES 65.7 .0635 .00561 178.0 144.7 413.8

RUN 40   CONFIGURATION 32

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
806	30.3	.0	.0	.1109	.0404	.0329	-.0008	-.0644	-.0174	65.7	.0642	.00578	177.2	146.1	415.1	-.0227	-.0061
807	30.3	5.0	.0	.1418	.0646	.0185	.0029	-.0558	.0110	62.6	.0667	.00599	180.9	146.1	437.9	-.0185	.0037
808	30.3	10.0	.0	.1308	.0584	.0152	.0025	-.0478	.0039	59.6	.0716	.00641	178.9	145.7	452.4	-.0154	.0013
809	30.3	-.0	.0	.1170	.0797	.0329	-.0006	-.0673	-.0171	65.7	.0644	.00578	176.9	145.7	415.2	-.0236	-.0060
810	30.5	-5.1	.0	-.0059	.0749	.0395	-.0015	-.0770	-.0448	68.4	.0604	.00544	175.9	147.7	397.7	-.0794	-.0165
811	30.6	-10.1	.0	-.0348	.0715	.0238	-.0028	-.0821	-.0387	71.1	.0558	.00500	176.3	149.2	380.4	-.0822	-.0152

AVERAGE TIP SPEED RATIO = .088   AVERAGE OF ABOVE VALUES 65.5 .0638 .00573 177.6 146.8 415.4

RUN 41 CONFIGURATION 32

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
814	30.3	.1	-20.0	.0416	.0875	.0091	.0310	-.1806	.5497	65.3	.0566	.00494	191.6	146.5	424.5	-.0623	.1897
815	30.4	5.1	-20.0	.0584	.0597	.0057	.0287	-.1682	.4847	67.4	.0591	.00504	194.5	147.3	446.5	-.0555	.1599
816	30.5	.0	-20.0	.0409	.0846	.0099	.0307	-.1779	.5465	65.6	.0565	.00487	191.6	148.1	425.4	-.0613	.1902
817	30.5	-5.0	-20.0	-.0402	.0907	.0180	.0306	-.1705	.6508	68.2	.0530	.00459	190.8	148.5	406.4	-.0623	.2378
818	30.7	-10.0	-20.0	-.1256	.0950	.0153	.0306	-.1591	.6472	70.7	.0492	.00426	190.9	149.6	389.6	-.0611	.2486

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES 66.4 .0549 .00474 191.9 148.0 418.5

RUN 42 CONFIGURATION 32

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
821	30.1	-.0	20.0	.0227	.0257	.0616	-.0366	.0299	-.5912	64.5	.0569	.00449	193.6	144.5	429.9	.0100	-.1988
822	30.2	5.0	20.0	.0466	.0117	.0514	-.0291	.0376	-.5179	62.2	.0591	.00466	194.5	145.3	443.4	.0123	-.1592
823	30.2	-.0	20.0	.0236	.0277	.0597	-.0360	.0257	-.5816	65.0	.0567	.00451	192.5	145.3	426.5	.0088	-.1982
824	30.3	-5.0	20.0	-.1838	.0423	.0643	-.0360	.0372	-.6858	67.6	.0535	.00421	191.8	145.7	408.9	.0132	-.2444
825	30.3	-9.9	20.0	-.2628	.0211	.0538	-.0396	.0439	-.7191	69.9	.0498	.00393	192.3	145.7	392.1	.0163	-.2672

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES 65.8 .0552 .00436 193.0 145.3 420.3

RUN 43 CONFIGURATION 31

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
859	15.2	.0	.0	-.1470	.1373	.0263	-.0264	-.2416	-.1719	40.0	.0495	.00242	192.4	35.8	274.6	-.0315	-.0224
860	15.3	-.0	10.0	-.4355	.0895	.0600	-.0375	-.2257	-.6014	40.3	.0495	.00245	197.0	36.2	274.1	-.0294	-.0795
861	15.3	-.0	20.0	-.8154	-.0063	.1056	-.0429	-.1194	-1.0785	40.3	.0494	.00243	191.9	36.2	273.2	-.0158	-.1431
862	15.4	-.0	30.0	-.6744	-.0574	.0317	-.0518	.0235	-1.7359	40.6	.0492	.00237	191.9	36.6	272.9	.0032	-.2331
863	15.4	-.0	40.0	-.6492	-.1081	.0645	-.0578	.1457	-2.3676	40.7	.0492	.00225	191.7	36.6	272.3	.0196	-.3185
864	15.4	-.0	50.0	-.5308	-.1672	-.0253	-.0600	.2867	-2.9583	40.8	.0490	.00211	191.9	36.6	272.0	.0386	-.3985
865	15.3	-.0	60.0	-.4120	.0538	-.0811	-.0579	.4226	-3.4473	40.8	.0490	.00192	191.8	36.2	271.0	.0565	-.4610
866	15.3	-.0	70.0	-.1486	.2544	-.1236	-.0584	.5374	-3.8053	41.0	.0488	.00169	191.9	36.2	270.5	.0720	-.5098
867	15.2	-.0	80.0	.1907	.1857	-.1404	-.0580	.6295	-4.0948	41.0	.0496	.00139	191.9	35.8	269.1	.0839	-.5459
868	15.0	.0	90.0	.2634	.0790	-.0229	-.0567	.6863	-4.2356	40.5	.0486	.00110	191.8	34.7	267.4	.0890	-.5491
869	15.6	.0	-.0	-.0662	.1316	.0229	-.0230	-.2432	-.0825	41.0	.0497	.00262	191.5	37.8	275.2	-.0334	-.0113
870	15.6	.0	-10.0	-.1700	.1996	.0003	-.0023	-.2772	.4814	41.0	.0496	.00262	191.5	37.8	275.1	-.0381	.0662
871	15.6	.0	-20.0	-.2675	.1719	-.0478	.0202	-.2836	1.0281	41.1	.0496	.00261	191.5	37.8	274.9	-.0390	.1415
872	15.6	.1	-30.0	-.4629	.1251	-.0521	.0422	-.2734	1.5491	41.2	.0495	.00262	191.5	37.8	274.4	-.0377	.2135
873	15.6	.1	-40.0	-.6386	.0163	-.0294	.0628	-.2683	2.1390	41.5	.0494	.00261	191.1	37.8	272.9	-.0372	.2944
874	15.6	.1	-50.0	-.2547	-.1371	-.0885	.0772	-.2809	2.8688	41.7	.0493	.00260	191.0	37.8	271.9	-.0391	.3900
875	15.5	.1	-60.0	-.0606	-.2263	-.0684	.0844	-.3343	3.4877	41.6	.0494	.00267	190.7	37.4	271.3	-.0461	.4817
876	15.3	.1	-70.0	-.1365	-.2550	-.0700	.0865	-.4101	3.9596	41.5	.0494	.00259	190.5	36.2	269.8	-.0551	.5320
877	15.2	.1	-80.0	.2225	-.2437	-.0073	.0883	-.4561	4.3756	41.3	.0490	.00251	190.7	35.8	267.9	-.0510	.5856
878	15.1	.2	-90.0	.2576	-.2722	.0151	.0809	-.4789	4.2380	41.4	.0491	.00231	190.5	35.5	267.5	-.0635	.5617

AVERAGE TIP SPEED RATIO = .041   AVERAGE OF ABOVE VALUES 41.0 .0492 .00229 191.5 36.7 271.9

RUN 44 CONFIGURATION 31

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
881	20.7	.0	0.0	.0936	.1417	.0322	-.0119	-.1344	-.0184	51.4	.0530	.00263	191.2	66.2	318.6	-.0279	-.0038
882	20.7	0.0	10.0	.0298	.1049	.0552	-.0250	-.1416	-.3370	51.6	.0528	.00271	190.9	66.6	317.2	-.0297	-.0707
883	20.7	-.0	20.0	-.2097	.1256	.0809	-.0311	-.0760	-.7122	51.6	.0528	.00274	190.7	66.6	316.7	-.0160	-.1497
884	20.7	-.0	30.0	-.2629	.0810	.0462	-.0387	.0596	-1.2508	51.7	.0527	.00269	190.5	66.6	315.8	.0126	-.2637
885	20.7	-.0	40.0	-.2562	-.0115	-.0469	-.0452	.1850	-1.7432	51.9	.0526	.00262	190.4	66.6	314.9	.0391	-.3685
886	20.7	-.0	50.0	-.3838	-.1201	-.0886	-.0486	.2369	-2.1821	51.9	.0527	.00248	190.3	66.2	315.2	.0497	-.4582
887	20.6	-.0	60.0	-.3796	-.2886	-.2051	-.0512	.2457	-2.5209	52.0	.0523	.00233	193.7	65.8	313.6	.0516	-.5298
888	20.5	-.0	70.0	.1024	.2007	-.1617	-.0426	.3993	-2.7263	52.0	.0520	.00222	190.8	65.0	311.9	.0832	-.5681
889	20.4	-.0	80.0	-.0676	.1677	-.0011	-.0423	.3891	-2.8499	52.1	.0518	.00203	190.8	64.7	310.1	.0806	-.5901
890	20.1	0.0	90.0	-.1465	.0752	.0770	-.0423	.3941	-2.8867	51.9	.0516	.00184	190.7	62.6	307.2	.0804	-.5885
891	20.7	.0	-.0	.0949	.1390	.0303	-.0112	-.1333	-.0061	51.5	.0529	.00272	191.4	66.2	314.7	-.0270	-.0013
892	20.7	.0	-10.0	.0260	.1799	.0276	.0032	-.1191	.3204	51.5	.0530	.00271	190.4	66.2	316.6	-.0249	.0670
893	20.7	.1	-20.0	-.0123	.1771	.0141	.0186	-.1167	.7396	51.7	.0528	.00272	190.3	66.2	315.1	-.0245	.1553
894	20.7	.1	-30.0	-.0192	.1169	-.0092	.0365	-.1193	1.2040	51.7	.0527	.00276	191.0	66.2	316.8	-.0249	.2515
895	20.7	.1	-40.0	-.1122	.0419	.0061	.0535	-.1281	1.6439	51.9	.0525	.00280	191.5	66.2	315.8	-.0268	.3434
896	20.6	.1	-50.0	-.1811	-.0610	-.0070	.0650	-.1385	2.2312	51.9	.0525	.00293	191.5	65.8	316.5	-.0288	.4637
897	20.6	.1	-60.0	-.3837	-.1882	-.0249	.0696	-.1836	2.6785	52.3	.0522	.00301	191.4	65.8	315.0	-.0383	.5593
898	20.4	.1	-70.0	-.3600	-.3586	-.0416	.0713	-.2258	3.0615	52.1	.0521	.00309	191.4	64.6	313.4	-.0466	.6311
899	20.4	.1	-80.0	-.5365	-.5365	-.0185	.0677	-.2198	3.0359	52.0	.0520	.00312	191.5	64.6	312.9	-.0454	.6768
900	20.1	.1	-90.0	-.2140	-.5548	.0474	.0608	-.2059	2.9960	52.0	.0522	.00310	191.2	62.6	311.5	-.0414	.6024

AVERAGE TIP SPEED RATIO = .055   AVERAGE OF ABOVE VALUES 51.9 .0525 .00266 190.9 65.5 314.6

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RUN 45 CONFIGURATION 31

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
903	25.5	.0	.0	.1108	.1242	.0361	-.0084	-.0891	-.0124	58.5	.0559	.00385	191.9	100.8	369.1	-.0243	-.0034
904	25.6	.0	10.0	.0813	.0880	.0542	-.0206	-.0862	-.7427	58.7	.0558	.00398	191.5	101.2	368.1	-.0237	-.0667
905	25.6	-.0	20.0	-.1496	.1020	.0786	-.0271	-.0594	-.5070	58.9	.0558	.00402	191.2	101.6	367.0	-.0165	-.1404
906	25.6	-.0	30.0	-.3632	.0857	.0777	-.0337	.0380	-.8884	58.9	.0560	.00405	190.9	101.6	367.7	.0105	-.2455
907	25.6	-.0	40.0	-.3734	.0358	.0151	-.0400	-.1144	-1.2556	59.0	.0558	.00396	190.9	101.2	366.2	-.0316	-.3470
908	25.5	-.0	50.0	-.3896	-.0257	-.0422	-.0454	.1180	-1.5277	59.1	.0555	.00374	190.9	100.4	363.9	.0326	-.4217
909	25.3	-.0	60.0	-.3611	-.2033	-.0865	-.0472	.1334	-1.8899	59.1	.0552	.00358	191.3	99.3	361.8	.0366	-.5184
910	25.2	-.0	70.0	-.2100	-.0136	-.0226	-.0409	.2687	-2.0218	59.2	.0547	.00333	191.2	98.5	359.1	.0727	-.5543
911	25.8	-.0	80.0	-.2554	.0046	.0650	-.0417	.2883	-2.1168	60.4	.0548	.00321	191.1	103.2	364.0	.0817	-.6033
912	26.1	.0	90.0	-.4080	-.0008	.0879	-.0415	.2520	-2.0047	61.0	.0553	.00307	190.9	105.9	368.7	.0724	-.5762
913	26.0	.0	0.0	.0979	.1161	.0391	-.0079	-.0798	-.0215	59.4	.0561	.00395	191.5	104.8	372.5	-.0224	-.0060
914	26.0	.0	-10.0	.0751	.1205	.0279	.0031	-.0599	.1928	59.6	.0558	.00389	191.4	105.2	371.4	-.0160	.0546
915	26.0	.0	-20.0	.0288	.1121	.0271	.0154	-.0558	.4626	59.7	.0556	.00378	191.4	105.2	370.8	-.0158	.1312
916	25.7	.1	-30.0	.0026	.0929	.0163	.0294	-.0572	.7976	59.5	.0552	.00362	191.2	102.0	365.0	-.0160	.2229
917	25.2	.1	-40.0	-.0620	.0328	.0399	.0466	-.0601	1.2269	59.0	.0548	.00356	190.9	98.1	358.2	-.0164	.3350
918	25.2	.1	-50.0	-.4767	-.0077	.0753	.0543	-.0627	1.5565	59.2	.0551	.00358	190.7	98.5	359.4	-.0172	.4265
919	25.6	.1	-60.0	-.8417	-.1233	.0844	.0595	-.1626	2.0150	60.0	.0553	.00363	190.4	101.6	363.1	-.0455	.5639
920	25.6	.1	-70.0	-.6212	-.3308	.0231	.0598	-.1717	2.3556	60.2	.0550	.00365	190.9	101.6	362.8	-.0481	.6597
921	25.6	.1	-80.0	-.5529	-.5084	-.0570	.0553	-.1750	2.4639	60.4	.0551	.00358	191.2	101.6	363.6	-.0489	.6886
922	25.6	.1	-90.0	-.4118	-.5004	-.0189	.0480	-.1552	2.2279	60.7	.0549	.00353	191.3	101.6	362.6	-.0435	.6244

AVERAGE TIP SPEED RATIO = .069   AVERAGE OF ABOVE VALUES 59.5 .0554 .00368 191.1 101.7 365.3

RUN 46 CONFIGURATION 31

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
938	30.9	.0	-.0	.0969	.0832	.0340	-.0061	-.0307	-.0698	65.1	.0589	.00504	192.2	148.5	432.2	-.0106	-.0240
939	31.0	-.0	10.0	.0849	.0556	.0454	-.0165	-.0372	-.2455	65.3	.0590	.00505	191.5	149.2	431.9	-.0129	-.0849
940	30.7	-.0	20.0	.0201	.0145	.0633	-.0272	-.0330	-.4740	65.2	.0586	.00497	190.9	146.9	425.7	-.0114	-.1635
941	30.7	-.0	30.0	-.2850	.0220	.0710	-.0312	.0188	-.7342	65.1	.0587	.00494	191.3	146.1	426.8	.0044	-.2513
942	30.5	.2	40.0	-.3078	.0005	.0213	-.0346	.0574	-.9739	64.9	.0588	.00475	191.2	144.9	425.8	.0195	-.3315
943	30.4	.2	50.0	-.3578	-.0534	.0036	-.0376	.0632	-1.1601	64.9	.0585	.00441	191.4	143.7	423.9	.0214	-.3933
944	30.6	.0	60.0	-.3293	-.1647	.0349	-.0398	.1183	-1.4875	65.4	.0585	.00422	191.5	145.7	426.0	.0405	-.5087
945	30.6	-.0	70.0	-.2376	-.2393	.0319	-.0400	.1503	-1.6070	65.6	.0582	.00392	191.4	145.7	425.9	.0514	-.5498
946	30.6	-.0	80.0	-.2829	-.0358	.0379	-.0369	.2026	-1.4753	65.9	.0575	.00363	192.4	145.7	423.8	.0696	-.5072
947	30.5	-.0	90.0	-.4595	-.0293	.0474	-.0359	.2161	-1.4965	65.9	.0577	.00328	191.4	145.7	423.9	.0739	-.5116
948	30.8	.0	-.0	.1033	.0817	.0361	-.0062	-.0329	-.0700	64.9	.0587	.00493	192.4	147.3	431.4	-.0112	-.0239
949	30.7	.0	-10.0	.0729	.0767	.0230	.0030	-.0266	.1108	65.0	.0582	.00486	192.5	146.5	429.2	-.0091	.0379
950	30.5	.1	-20.0	.0182	.0605	.0191	.0128	-.0256	.3256	65.0	.0579	.00476	192.3	146.9	424.6	-.0087	.1111
951	30.5	.1	-30.0	-.0246	.0327	.0202	.0246	-.0442	.5998	65.2	.0576	.00465	192.1	146.5	422.3	-.0151	.2053
952	30.4	.1	-40.0	-.1102	-.0065	.0457	.0371	-.0374	.8829	65.3	.0575	.00456	191.9	143.3	419.9	-.0128	.3016
953	30.5	.1	-50.0	-.4662	-.0184	.0855	.0406	-.0777	1.1981	65.8	.0576	.00459	191.2	144.9	419.8	-.0268	.4135
954	30.4	.1	-60.0	-.5878	-.0737	.0509	.0464	-.1576	1.6335	65.8	.0576	.00467	191.9	143.7	418.4	-.0541	.5612
955	30.5	.1	-70.0	-.5859	-.2221	.0349	.0507	-.1249	1.7007	66.1	.0576	.00460	191.6	144.9	420.9	-.0430	.5856
956	30.6	.1	-80.0	-.2851	-.3794	-.0261	.0483	-.1196	1.8069	66.4	.0574	.00454	191.6	145.7	420.8	-.0414	.6256

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES 65.4 .0581 .00454 191.8 145.6 424.9

RUN 47 CONFIGURATION 31

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
959	30.7	.0	0.0	.1106	.0850	.0348	-.0061	-.0327	-.0620	64.6	.0586	.00503	193.1	146.1	431.4	-.0111	-.0210
960	30.6	5.0	0.0	.1342	.0758	.0260	-.0035	-.0132	-.0504	61.8	.0606	.00531	195.1	145.7	447.2	-.0043	-.0164
961	30.6	-.0	0.0	.1051	.0840	.0352	-.0060	-.0311	-.0655	64.9	.0587	.00516	191.4	145.7	426.3	-.0126	-.0224
962	30.7	-5.1	0.0	-.0156	.0781	.0359	-.0060	-.0490	-.0895	67.7	.0549	.00480	190.6	146.1	406.7	-.0176	-.0322
963	30.7	-10.1	0.0	-.0573	.0786	.0270	-.0074	-.0605	-.0881	70.0	.0510	.00432	192.1	146.5	392.2	-.0226	-.0320

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES 65.8 .0568 .00492 192.5 146.0 420.8

RUN 48 CONFIGURATION 31

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
966	30.5	.0	-20.0	.0364	.0628	.0191	.0128	-.0242	.3289	65.2	.0581	.00461	191.2	144.5	421.8	-.0083	.1127
967	30.5	5.0	-20.0	.0576	.0424	.0169	.0102	-.0032	.2511	62.6	.0604	.00484	192.8	146.5	438.3	-.0010	.0832
968	30.7	-.0	-20.0	.0421	.0613	.0173	.0126	-.0200	.3178	65.8	.0581	.00467	189.9	146.5	419.8	-.0070	.1119
969	30.8	-5.1	-20.0	-.0442	.0657	.0270	.0137	-.0268	.4443	68.0	.0544	.00429	192.3	147.7	410.3	-.0096	.1599
970	31.0	-10.1	-20.0	-.1062	.0670	.0210	.0150	-.0310	.4705	70.3	.0507	.00403	193.1	148.8	395.6	-.0117	.1771

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES 66.4 .0563 .00449 191.9 146.5 417.2

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RUN 49   CONFIGURATION 31

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
973	30.5	-.0	20.0	-.0039	.0092	.0680	-.0274	-.0310	-.4792	64.7	.0580	.00492	193.0	144.5	426.7	-.0105	-.1623
974	30.5	5.0	20.0	-.0120	.0043	.0593	-.3204	-.0152	-.4235	62.2	.0602	.00514	194.0	144.9	440.8	-.0350	-.1392
975	30.6	-.0	20.0	-.0029	.0097	.0644	-.0268	-.0297	-.4772	65.3	.0581	.00503	190.3	145.3	420.3	-.0103	-.1650
976	30.7	-5.1	20.0	-.2045	.0398	.0714	-.0245	-.0397	-.5449	68.0	.0546	.00464	190.0	146.1	403.6	-.0144	-.1972
977	30.7	-10.0	20.0	-.2545	.0213	.0623	-.0268	-.0399	-.5792	70.2	.0511	.00436	190.4	146.5	388.3	-.0150	-.2185

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES   66.1   .0564   .00482   191.6   145.5   415.9

RUN 50   CONFIGURATION 31

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
980	35.7	.0	0.0	.0996	.0639	.0220	-.0046	-.0017	-.0874	69.9	.0610	.00561	191.4	198.0	490.1	-.0007	-.0353
981	35.7	0.0	10.0	.0928	.0384	.0279	-.0138	-.0127	-.2414	69.9	.0611	.00561	191.4	198.4	490.7	-.0051	-.0976
982	35.7	-.0	20.0	.0289	-.0074	.0394	-.3225	-.0126	-.4394	70.0	.0609	.00553	191.1	198.0	488.4	-.0055	-.1782
983	35.5	-.0	30.0	-.0866	-.0606	.0358	-.0293	.0110	-.7015	69.9	.0608	.00542	191.0	196.1	485.7	.0044	-.2832
984	35.6	-.0	40.0	-.2176	-.0788	.0078	-.0300	.0339	-.9220	70.0	.0609	.00537	190.9	196.9	486.8	.0137	-.3728
985	35.6	.0	50.0	-.2617	-.1611	-.0001	-.0327	.0630	-1.1418	70.2	.0607	.00512	191.0	196.9	485.3	.0255	-.4672
986	35.6	.6	60.0	-.1521	-.1873	.0399	-.0313	.0929	-1.2654	70.1	.0607	.00502	191.1	196.5	485.9	.0376	-.5116
987	35.6	.1	70.0	-.2380	-.1952	.0229	-.0300	.1043	-1.2087	70.3	.0606	.00463	191.6	196.9	487.4	.0421	-.4882
988	35.6	.1	80.0	-.1430	-.0354	-.0012	-.0261	.1654	-1.1860	70.5	.0602	.00442	191.8	196.9	486.0	.0670	-.4804
989	35.6	.1	90.0	-.2614	-.0758	-.0065	-.0247	.1849	-1.2245	70.6	.0602	.00397	191.9	196.9	486.4	.0749	-.4956
990	35.9	.0	-.0	.1026	.0621	.0219	-.0046	-.0012	-.0886	70.0	.0610	.00550	191.9	200.4	493.6	-.0005	-.0360
991	35.9	.0	-10.0	.0779	.0596	.0147	.0034	-.0007	.0761	70.1	.0606	.00547	191.9	200.4	492.0	-.0003	.0312
992	35.7	.1	-20.0	.0324	.0332	.0040	.0115	-.0088	.2842	70.1	.0604	.00541	191.8	198.4	488.9	-.0036	.1154
993	35.5	.1	-30.0	-.0057	-.0015	-.0094	.0208	-.0386	.5653	70.2	.0599	.00528	191.5	196.1	482.8	-.0157	.2296
994	35.6	.1	-40.0	-.0681	-.0580	-.0061	.0296	-.0538	.8407	70.4	.0597	.00524	191.2	196.9	482.1	-.0220	.3433
995	35.8	.1	-50.0	-.2453	-.1067	.0160	.0355	-.0642	1.0606	70.8	.0598	.00523	190.8	198.8	483.1	-.0264	.4365
996	35.6	.1	-60.0	-.5073	-.1032	.0291	.0369	-.0721	1.1811	70.7	.0600	.00528	190.6	197.3	482.2	-.0795	.4832
997	35.5	.2	-70.0	-.4174	-.1803	.0041	.0388	-.0895	1.3290	70.9	.0598	.00523	190.7	196.1	482.2	-.0365	.5427
998	35.8	.1	-80.0	-.2657	-.2971	-.0308	.0364	-.1091	1.4087	71.3	.0597	.00528	190.6	199.2	482.7	-.0450	.5814
999	35.8	.1	-90.0	-.2176	-.3671	-.0223	.0352	-.1204	1.3978	71.4	.0596	.00524	191.0	199.2	482.9	-.0497	.5766

AVERAGE TIP SPEED RATIO = .096   AVERAGE OF ABOVE VALUES   70.4   .0604   .00519   191.3   197.7   486.2

RUN 51   CONFIGURATION 31

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1003	45.8	.0	.0	.0910	.0508	.0037	-.0028	.0019	-.0497	76.3	.0659	.00810	190.3	327.4	640.5	.0010	-.0254
1004	45.8	0.0	10.0	.0498	.0282	.0184	-.0107	-.0109	-.1860	76.1	.0663	.00818	191.0	327.4	644.6	-.0055	-.0945
1005	45.8	-.0	20.0	-.0019	-.0210	.0210	-.0176	-.0097	-.3732	76.1	.0660	.00808	191.2	327.0	643.7	-.0049	-.1896
1006	45.9	-.0	30.0	-.0893	-.0856	.0109	-.0230	.0047	-.6037	76.3	.0661	.00799	191.1	329.4	644.0	.0024	-.3078
1007	45.9	-.0	40.0	-.3058	-.1038	.0087	-.0215	.0153	-.7590	76.3	.0664	.00796	190.6	329.0	645.2	.0078	-.3873
1008	45.9	-.0	50.0	-.2097	-.1898	-.0249	-.0206	.0291	-1.0063	76.3	.0663	.00770	191.0	328.6	646.2	.0148	-.5117
1009	45.8	-.0	60.0	-.0197	-.2165	-.0346	-.0195	.0353	-1.0874	76.4	.0660	.00737	191.2	327.4	644.2	.0179	-.5527
1010	46.1	-.0	70.0	.0252	-.0350	-.0417	-.0156	.0959	-1.0551	76.6	.0660	.00713	191.5	331.0	648.6	.0489	-.5384
1011	45.8	-.0	80.0	.0565	-.0227	-.0191	-.0149	.1280	-1.1039	76.5	.0656	.00678	191.8	326.6	643.4	.0650	-.5604
1012	45.9	.1	90.0	-.0440	.0024	.0103	-.0145	.1468	-1.1043	76.7	.0655	.00644	191.9	329.4	645.8	.0749	-.5632
1013	45.9	.0	.0	.1013	.0475	.0041	-.0029	.0019	-.0497	76.1	.0658	.00789	192.2	328.2	647.3	.0003	-.0252
1014	45.9	.0	-10.0	.0627	.0410	.0050	.0039	.0131	.0763	76.1	.0655	.00785	192.3	328.6	646.4	.0067	.0388
1015	45.9	.0	-20.0	-.0090	.0113	.0067	.0110	.0116	.2653	76.3	.0650	.00771	192.0	328.2	642.8	.0059	.1355
1016	45.9	.0	-30.0	-.0563	-.0417	-.0069	.0178	-.0028	.5121	76.5	.0648	.00748	191.7	328.6	641.1	-.0014	.2625
1017	45.8	.0	-40.0	-.1508	-.1081	-.0062	.0233	-.0137	.7601	76.6	.0645	.00736	191.4	327.0	637.0	-.0072	.3903
1018	45.9	.0	-50.0	-.2096	-.1821	-.0110	.0255	-.0155	.9510	76.9	.0640	.00723	190.9	328.2	634.1	-.0080	.4922
1019	45.8	.1	-60.0	-.0619	-.2385	-.0235	.0212	-.0266	1.1863	76.9	.0640	.00730	190.9	327.4	633.4	-.0138	.6132
1020	45.9	.4	-70.0	-.0199	-.2557	-.0323	.0201	-.0711	1.2718	77.1	.0637	.00743	190.6	328.6	632.4	-.0370	.6608

AVERAGE TIP SPEED RATIO = .123   AVERAGE OF ABOVE VALUES   76.4   .0654   .00755   191.3   328.2   642.4

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RUN 52   CONFIGURATION 34

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1033	14.7	.0	.0	-.6077	-.0246	.2471	-.0225	-.3221	-.0720	39.1	.0487	.00273	190.9	33.9	266.8	-.0402	-.3391
1034	15.5	-.0	10.0	-.9690	-.0259	.3406	-.0394	-.2019	-.5434	40.8	.0492	.00286	190.8	37.4	277.4	-.0277	-.0747
1035	15.5	-.0	20.0	-1.3504	-.0805	.4581	-.0590	.0131	-1.1965	40.8	.0491	.00281	191.1	37.4	272.8	.0318	-.1642
1036	15.1	-.0	30.0	-1.1990	-.1415	.3493	-.0774	.1763	-1.9835	40.0	.0487	.00268	190.9	35.5	268.5	.0233	-.2619
1037	15.5	-.0	40.0	-.7633	-.1555	.2019	-.0858	.3621	-2.7343	41.0	.0490	.00270	190.8	37.4	271.3	.0499	-.3771
1038	16.1	-.0	50.0	-.5051	-.2275	-.0831	-.0855	.5125	-3.1742	42.5	.0491	.00257	191.1	40.6	275.9	.0754	-.4669
1039	15.2	-.0	60.0	-.2666	.1527	-.0904	-.0852	.6642	-3.7017	40.6	.0485	.00220	191.2	35.8	264.2	.0888	-.4948
1040	15.4	-.0	70.0	.2708	.2854	-.2011	-.0878	.8246	-4.1367	41.3	.0486	.00206	191.2	37.0	271.4	.1129	-.5665
1041	15.9	-.0	80.0	.5375	.2154	-.2099	-.0818	.8613	-4.1933	42.8	.0488	.00184	191.0	39.4	273.0	.1243	-.6352
1042	15.1	.0	90.0	.6626	.0758	-.1802	-.0835	.9028	-4.3476	41.2	.0482	.30144	191.0	35.5	265.9	.1204	-.5796
1043	15.6	.0	0.0	-.4310	-.0053	.2368	-.0205	-.2762	-.0571	40.9	.0492	.00290	191.1	37.8	273.7	-.0382	-.0079
1044	15.6	.0	-10.0	-.9514	.0998	.5223	.0170	-.3645	.5725	40.9	.0492	.00285	191.0	37.8	273.6	-.0504	.0701
1045	15.5	.0	-20.0	-1.1808	.1358	.5671	.0494	-.3589	1.0459	40.8	.0494	.00288	190.6	37.4	277.7	-.0493	.1435
1046	15.5	.1	-30.0	-1.1204	.0643	.3860	.0744	-.3734	1.6389	41.0	.0491	.00272	191.0	37.4	272.2	-.0512	.2252
1047	15.5	.1	-40.0	-.8774	-.1035	.1565	.0913	-.4119	2.2413	41.3	.0488	.00261	191.0	37.4	271.1	-.0560	.3004
1048	15.2	.1	-50.0	-.4753	-.2722	.0433	.1128	-.4852	3.1840	40.9	.0487	.00254	190.9	36.2	268.9	-.0654	.4292
1049	15.2	.1	-60.0	-.1495	-.3523	-.0058	.1228	-.6207	3.9717	40.9	.0488	.00262	190.4	35.8	267.9	-.0831	.5316
1050	15.1	.1	-70.0	-.2805	-.4095	.0085	.1241	-.7374	4.4999	41.1	.0486	.00256	190.4	35.5	266.6	-.0982	.5984
1051	15.0	.1	-80.0	.0812	-.4174	.1160	.1277	-.7842	4.9778	41.2	.0483	.00246	190.6	35.1	265.1	-.1037	.6593
1052	14.9	.2	-90.0	.1128	-.3535	.1509	.1130	-.7696	4.7735	41.2	.0484	.00225	190.5	34.7	265.6	-.1005	.6237

AVERAGE TIP SPEED RATIO = .041   AVERAGE OF ABOVE VALUES   41.0 .0488 .00251 190.9 36.8 270.1

RUN 53   CONFIGURATION 34

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1056	20.4	.0	-.0	-.3496	.0175	.3031	-.0088	-.1455	-.0185	51.1	.0514	.00307	191.6	65.0	312.3	-.0303	-.0039
1057	20.5	.0	10.0	-.4508	-.0146	.3591	-.0281	-.1027	-.3922	51.2	.0514	.00330	191.1	65.4	311.4	-.0216	-.0824
1058	20.5	-.0	20.0	-.8071	.0730	.4250	-.0483	.0642	-.9133	51.2	.0513	.00336	191.1	65.4	311.2	.0135	-.1919
1059	20.5	-.0	30.0	-.7537	.1040	.3841	-.0650	.2375	-1.5272	51.4	.0510	.00333	191.0	65.4	309.6	.0502	-.3225
1060	20.3	-.0	40.0	-.5145	.0144	.2051	-.0761	.3462	-1.9936	51.4	.0510	.00318	190.8	64.6	308.1	.0726	-.4179
1061	20.2	-.0	50.0	-.2521	-.0905	-.0331	-.0833	.4135	-2.4389	51.3	.0510	.00305	191.0	63.8	307.9	.0857	-.5355
1062	20.2	-.0	60.0	-.1933	-.2837	-.1372	-.0852	.4248	-2.7925	51.4	.0510	.00292	191.1	63.8	308.2	.0874	-.5782
1063	20.6	-.0	70.0	.1172	.1533	-.1092	-.0711	.5671	-2.8624	52.4	.0509	.00285	191.3	66.2	310.8	.1228	-.6095
1064	20.7	-.0	80.0	.0676	.1798	-.0167	-.0667	.5957	-3.0259	52.8	.0507	.00264	191.4	66.6	310.1	.1279	-.6495
1065	20.3	.0	90.0	.0492	.0859	-.0127	-.0624	.5695	-2.9818	52.4	.0506	.00240	191.2	64.2	307.1	.1191	-.6234
1066	20.8	.0	-.0	-.3248	.0293	.3187	-.0073	-.1397	-.0124	51.9	.0516	.00321	191.0	67.7	314.8	-.0301	-.0027
1067	20.2	.0	-10.0	-.5734	.0941	.4312	.0143	-.1737	.3598	50.9	.0512	.00306	191.0	63.8	309.0	-.0350	.0743
1068	20.8	.1	-20.0	-.6749	.1870	.4746	.0395	-.2159	.8105	52.1	.0513	.00306	191.0	67.4	312.8	-.0465	.1745
1069	20.2	.1	-30.0	-.5795	.1503	.3932	.0653	-.3061	1.4161	51.2	.0508	.00290	191.2	63.4	305.5	-.0633	.2930
1070	20.1	.1	-40.0	-.4160	.0312	.2512	.0878	-.3682	1.9768	51.4	.0504	.00280	191.1	63.0	304.4	-.0762	.4092
1071	20.3	.1	-50.0	-.2307	-.0960	.0726	.1031	-.4178	2.5936	51.9	.0507	.00281	190.9	64.2	306.5	-.0875	.5432
1072	20.5	.1	-60.0	-.1980	-.3266	-.0703	.1107	-.5534	3.1987	52.7	.0508	.00296	190.4	65.4	307.3	-.1185	.6847
1073	20.5	.1	-70.0	-.1149	-.4567	-.1190	.1028	-.5811	3.5749	52.8	.0508	.00295	190.4	65.4	307.0	-.1234	.7615
1074	20.4	.1	-80.0	-.3641	-.6201	-.0937	.0872	-.5261	3.4652	53.0	.0508	.00289	190.4	65.0	306.6	-.1115	.7346
1075	20.3	.1	-90.0	-.3519	-.6552	-.0231	.0730	-.4077	3.1354	52.8	.0512	.00286	190.5	64.2	307.8	-.0850	.6541

AVERAGE TIP SPEED RATIO = .055   AVERAGE OF ABOVE VALUES   51.9 .0510 .00298 191.0 65.0 309.0

RUN 54   CONFIGURATION 34

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1078	25.7	.0	.0	-.3074	.0455	.2979	-.0018	-.1227	.0344	59.2	.0547	.00467	190.4	102.8	363.2	-.0347	.0097
1079	25.5	.0	10.0	-.2773	-.0371	.2701	-.0181	-.0889	-.2310	58.6	.0549	.00470	191.5	101.6	365.5	-.0247	-.0642
1080	25.5	-.0	20.0	-.5984	.0352	.3385	-.0372	.0501	-.6573	58.7	.0547	.00463	191.5	101.6	364.9	.0140	-.1820
1081	25.4	.0	30.0	-.6720	.1112	.3373	-.0534	.1973	-1.0849	58.7	.0548	.00450	191.1	100.9	363.6	.0547	-.3000
1082	25.4	.0	40.0	-.4901	.1681	.2371	-.0644	.3094	-1.4533	58.6	.0548	.00432	191.1	100.4	363.2	.0856	-.4019
1083	25.2	-.0	50.0	-.4346	.0537	.1177	-.0690	.2823	-1.7058	58.6	.0546	.00399	191.0	98.9	360.0	.0775	-.4684
1084	25.6	-.0	60.0	-.1556	-.1440	-.0473	-.0728	.3060	-2.0565	59.5	.0548	.00381	191.1	102.4	364.8	.0850	-.5773
1085	25.7	-.0	70.0	-.0275	-.3138	-.1124	-.0720	.3999	-2.3137	59.8	.0545	.00347	191.8	103.2	366.1	.1127	-.6522
1086	25.6	-.0	80.0	.0367	-.0023	-.0673	-.0594	.4806	-2.3055	59.9	.0541	.00316	191.8	102.0	363.4	.1349	-.6472
1087	25.5	-.0	90.0	-.2056	.0073	-.0079	-.0541	.3988	-2.1804	59.9	.0544	.00283	191.9	101.2	363.8	.1110	-.6066
1088	25.5	.0	-.0	-.3109	.0432	.2982	-.0022	-.1230	.0305	58.6	.0547	.00450	192.3	131.6	365.9	-.0341	.0085
1089	25.5	.0	-10.0	-.3429	.0601	.3008	.0147	-.1625	.3363	58.8	.0544	.00440	192.1	101.2	364.6	-.0451	.0934
1090	25.3	.0	-20.0	-.4066	.1098	.3232	.0346	-.2064	.6698	58.7	.0542	.00437	192.1	100.0	362.5	-.0570	.1849
1091	25.3	.1	-30.0	-.3790	.1057	.3131	.0540	-.2486	1.0465	58.8	.0540	.00420	191.9	99.6	360.8	-.0687	.2892
1092	25.9	.1	-40.0	-.3569	.0228	.2893	.0747	-.2783	1.4410	59.9	.0544	.00425	191.5	104.4	366.1	-.0794	.4102
1093	25.5	.1	-50.0	-.4976	-.0411	.1437	.0828	-.3195	1.8567	59.7	.0540	.00437	191.1	101.2	360.1	-.0898	.5229
1094	25.3	.1	-60.0	-.5284	-.1985	-.0031	.0981	-.5364	2.5416	59.7	.0540	.00402	191.0	100.0	358.4	-.1497	.7094
1095	25.5	.1	-70.0	-.3672	-.4218	-.1119	.0905	-.5523	2.8859	60.2	.0542	.00407	191.0	101.6	360.8	-.1554	.8129
1096	25.6	.1	-80.0	-.4392	-.5372	-.1399	.0681	-.3791	2.7523	60.5	.0543	.00396	191.0	102.4	362.3	-.1171	.7780
1097	25.6	.1	-90.0	-.2898	-.5020	-.0873	.0579	-.2732	2.3513	60.8	.0540	.00384	191.0	102.4	360.9	-.0775	.6671

AVERAGE TIP SPEED RATIO = .069   AVERAGE OF ABOVE VALUES   59.4 .0544 .00409 191.4 101.5 363.1

RUN 55   CONFIGURATION 34

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1109	30.6	.0	.0	-.1646	-.0041	.2065	.0031	-.1151	.0592	64.9	.0579	.00478	193.1	146.1	428.5	-.0392	.0202
1110	30.7	.0	10.0	-.1409	-.0293	.1874	-.0134	-.0689	-.2143	65.0	.0583	.00477	192.6	146.5	428.0	-.0236	-.0733
1111	30.7	-.0	20.0	-.2848	-.0565	.2536	-.0332	.0191	-.5630	65.1	.0580	.00472	192.2	146.5	426.9	.0066	-.1932
1112	30.6	.0	30.0	-.4630	.0877	.2589	-.0465	.1472	-.9164	65.2	.0578	.00459	191.9	145.7	424.4	.0505	-.3146
1113	30.5	.2	40.0	-.3862	.1013	.2060	-.0533	.2145	-1.1827	65.0	.0581	.00452	191.5	144.5	423.3	.0732	-.4038
1114	30.3	.1	50.0	-.3707	.0212	.1044	-.0536	.1973	-1.3572	65.1	.0577	.00416	191.4	142.6	419.0	.0671	-.4618
1115	30.7	.0	-.0	-.1526	-.0106	.2009	.0018	-.1049	.0400	65.1	.0580	.00489	192.0	146.5	426.5	-.0360	.0137
1116	30.7	.0	-10.0	-.1715	.0056	.2035	.0193	-.1599	.3119	65.1	.0579	.00487	192.1	146.5	426.4	-.0549	.1071
1117	30.7	.1	-20.0	-.2074	.0161	.2074	.0343	-.1998	.5908	65.4	.0575	.00486	191.8	146.5	423.3	-.0691	.2044
1118	30.6	.1	-30.0	-.2440	.0152	.2212	.0498	-.2453	.8976	65.5	.0573	.00473	191.6	145.3	423.7	-.0847	.3100
1119	30.5	.1	-40.0	-.3247	-.0197	.2402	.0612	-.2436	1.1954	65.7	.0570	.00469	191.4	144.5	418.1	-.0842	.4177
1120	30.3	.1	-50.0	-.4011	-.0424	.0982	.0742	-.3566	1.6449	65.7	.0571	.00470	190.8	142.9	415.2	-.1228	.5663
1121	30.1	.1	-60.0	-.5223	-.1698	.0568	.0847	-.4823	2.1720	65.7	.0569	.00466	190.9	141.0	412.4	-.1649	.7424
1122	30.0	.1	-70.0	-.4275	-.3172	-.0376	.0744	-.3994	2.2039	65.8	.0569	.00472	190.5	139.7	410.1	-.1361	.7513
1123	30.0	.1	-80.0	-.1977	-.4163	-.0850	.0599	-.2704	2.1114	66.0	.0567	.00468	190.3	139.8	409.1	-.0924	.7214
1124	30.5	.1	-90.0	-.1645	-.4389	-.1072	.0517	-.2367	1.9163	66.7	.0570	.00472	190.9	144.9	415.7	-.0823	.6664

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES 65.4 .0575 .00469 191.6 144.3 420.5

RUN 56   CONFIGURATION 34

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1125	30.6	.0	0.0	-.1653	-.0176	.2035	.0021	-.1080	.0496	64.8	.0582	.00486	192.7	145.7	428.5	-.0367	.0169
1126	30.6	5.0	0.0	-.1413	-.0346	.1853	.0031	-.0798	.0549	62.3	.0607	.00520	193.0	146.1	442.2	-.0264	.0181
1127	30.6	10.1	0.0	-.1337	-.0418	.1709	.0035	-.0729	.0478	59.2	.0652	.00561	191.0	145.3	456.8	-.0232	.0152
1128	30.6	-.0	.0	-.1649	-.0153	.2026	-.0002	-.1074	.0493	65.1	.0582	.00499	191.2	146.1	424.9	-.0369	.0170
1129	30.7	-5.0	.0	-.2983	-.0101	.1901	-.0006	-.0957	-.0262	67.4	.0546	.00455	193.0	146.5	412.8	-.0340	-.0093
1130	30.7	-10.0	.0	-.3525	.0077	.1893	-.0020	-.1004	-.0150	69.9	.0504	.00427	193.9	146.9	394.7	-.0374	-.0056

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES 64.8 .0579 .00491 192.5 146.1 426.7

RUN 57   CONFIGURATION 34

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1131	30.6	.1	-20.0	-.2152	.0065	.2061	.0355	-.2104	.6031	65.1	.0578	.00478	192.3	145.3	425.1	-.0719	.2061
1132	30.5	5.1	-20.0	-.2418	-.0175	.2201	.0326	-.1917	.5327	62.0	.0601	.00495	195.2	144.5	444.0	-.0624	.1734
1133	30.4	10.1	-20.0	-.2171	-.0380	.2024	.0314	-.1838	.4964	59.0	.0635	.00533	194.5	143.7	458.0	-.0577	.1558
1134	30.4	.0	-20.0	-.2425	.0083	.2188	.0351	-.2073	.6131	65.1	.0576	.00487	192.0	144.1	421.8	-.0708	.2095
1135	30.5	-5.0	-20.0	-.3386	.0243	.2250	.0345	-.1996	.6672	67.7	.0542	.00465	191.2	144.5	404.1	-.0714	.2386
1136	30.6	-10.0	-20.0	-.4167	.0384	.2148	.0335	-.1751	.7044	70.1	.0504	.00441	191.8	145.3	388.2	-.0655	.2636

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES 64.8 .0573 .00483 192.8 144.6 423.5

RUN 58   CONFIGURATION 34

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1137	30.6	.0	20.0	-.3135	-.0605	.2571	-.0317	.0144	-.5421	64.9	.0583	.00484	192.0	145.7	427.3	.0049	-.1848
1138	30.6	5.0	20.0	-.3255	-.0732	.2643	-.0233	.0053	-.4626	61.9	.0604	.00498	195.2	145.7	445.9	.0017	-.1508
1139	30.4	10.0	20.0	-.3700	-.0702	.2877	-.0162	.0052	-.4329	58.7	.0638	.00547	194.2	144.1	459.1	.0016	-.1359
1140	30.5	.0	20.0	-.3119	-.0630	.2622	-.0327	.0164	-.5613	64.7	.0583	.00486	192.0	144.5	425.8	.0056	-.1905
1141	30.5	-5.1	20.0	-.5081	-.0181	.2579	-.0329	.0331	-.6575	67.4	.0550	.00457	190.9	144.5	407.0	.0118	-.2335
1142	30.6	-10.0	20.0	-.5526	-.0317	.2455	-.0372	.0452	-.6956	69.9	.0513	.00419	191.1	145.7	391.2	.0169	-.2591

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES 64.6 .0579 .00482 192.6 145.0 426.2

RUN 59   CONFIGURATION 34

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1146	35.5	.0	-.0	-.1021	.0037	.1371	.0012	-.0560	.0014	70.2	.0584	.00616	191.9	198.8	484.0	-.0230	.0009
1147	35.5	.0	10.0	-.0829	-.0203	.1287	-.0112	-.0406	-.2022	70.4	.0583	.00621	191.7	199.2	481.9	-.0168	-.0836
1148	35.5	-.0	20.0	-.2439	-.0612	.1977	-.0255	.0138	-.4688	70.5	.0582	.00622	190.9	199.2	483.7	.0057	-.1943
1149	35.5	-.0	30.0	-.2487	-.0456	.1969	-.0409	.1062	-.8185	70.5	.0581	.00610	190.7	198.4	477.2	.0440	-.3389
1150	35.3	-.0	40.0	-.3395	.0264	.1801	-.0421	.1466	-1.0635	70.6	.0580	.00593	190.2	196.9	475.5	.0607	-.4403
1151	35.5	-.0	50.0	-.0585	-.0967	.0309	-.0486	.2052	-1.3174	70.5	.0581	.00568	192.7	199.2	483.9	.0845	-.5424
1152	35.4	.0	-.0	-.1106	-.0024	.1412	.0024	-.0674	.0161	70.2	.0578	.00599	192.4	198.0	482.1	-.0277	.0006
1153	35.1	.0	-10.0	-.1282	-.0009	.1373	.0183	-.1242	.2514	70.0	.0575	.00590	192.3	194.9	477.1	-.0507	.1027
1154	35.2	.1	-20.0	-.1631	-.0232	.1330	.0315	-.1673	.5033	70.1	.0576	.00586	192.7	195.7	478.2	-.0684	.2060
1155	35.5	.1	-30.0	-.2175	-.0565	.1434	.0422	-.2184	.8111	70.6	.0574	.00573	191.3	198.4	478.7	-.0905	.3362
1156	35.5	.1	-40.0	-.2917	-.0889	.1588	.0498	-.2480	1.1094	70.9	.0571	.00549	191.4	198.8	476.3	-.1035	.4633
1157	35.3	.1	-50.0	-.2381	-.1632	.0167	.0693	-.3139	1.4383	71.1	.0567	.00530	193.2	197.3	471.5	-.1313	.6017
1158	35.1	.1	-60.0	-.4708	-.1871	.0075	.0730	-.3454	1.6039	71.3	.0571	.00516	190.6	194.5	469.7	-.1431	.6642
1159	35.4	.1	-70.0	-.3507	-.2473	-.0420	.0544	-.2978	1.6457	71.4	.0571	.00513	190.5	197.6	472.7	-.1245	.6801
1160	35.4	.1	-80.0	-.2236	-.3042	-.0766	.0439	-.2105	1.5438	71.7	.0566	.00495	190.4	198.0	472.5	-.0886	.6607
1161	35.4	.1	-90.0	-.1852	-.3708	-.0763	.0424	-.2084	1.5073	71.7	.0567	.00477	191.2	197.6	472.9	-.0871	.6230
1162	35.6	.0	.0	-.1193	-.0024	.1360	.0008	-.0535	-.0029	70.3	.0580	.00607	192.6	200.0	485.7	-.0220	-.0012

AVERAGE TIP SPEED RATIO = .055   AVERAGE OF ABOVE VALUES 70.7 .0576 .00568 191.4 197.8 477.7

RUN 60   CONFIGURATION 33

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1174	15.2	.0	.0	-.1943	.1708	.1037	-.0187	-.3146	.0403	40.6	.0469	.00281	191.5	36.2	264.5	-.0431	.0055
1175	15.4	0.0	10.0	-.5264	.1390	.1444	-.0379	-.1928	-.5216	41.4	.0467	.00284	191.4	37.4	264.5	-.0273	-.0738
1176	15.4	-.0	20.0	-.8400	.0540	.1750	-.0553	.0088	-1.1480	41.4	.0467	.00295	191.1	37.4	264.1	.0012	-.1627
1177	15.4	-.0	30.0	-.6339	.0258	.0965	-.0731	.2019	-1.9148	41.4	.0466	.00297	191.8	37.4	264.9	.0295	-.2705
1178	15.4	-.0	40.0	-.2791	-.0644	.0263	-.0830	.3726	-2.5683	41.6	.0465	.00291	191.6	37.4	263.9	.0528	-.3643
1179	15.2	-.0	50.0	-.3046	-.1368	-.0759	-.0840	.5121	-3.1192	41.3	.0464	.00279	191.8	36.6	263.1	.0713	-.4344
1180	15.2	-.0	60.0	-.0011	.2054	-.0624	-.0812	.6396	-3.5145	41.6	.0462	.00265	191.5	36.6	261.7	.0896	-.4920
1181	15.2	-.0	70.0	.3319	.3229	-.1256	-.0843	.7804	-3.9266	41.6	.0462	.00241	191.7	36.2	251.5	.1382	-.5443
1182	15.1	-.0	80.0	.5814	.2841	-.1451	-.0837	.8445	-4.1164	41.7	.0459	.00214	191.7	35.8	259.7	.1166	-.5682
1183	14.7	.0	89.9	.8793	.2008	-.1845	-.0818	.8992	-4.2768	41.1	.0459	.00190	191.3	34.3	258.5	.1192	-.5671
1184	15.3	.0	0.0	-.2103	.1594	.0921	-.0165	-.3186	.0760	41.1	.0468	.00279	191.3	37.0	264.6	-.0446	.0106
1185	15.4	.0	-10.0	-.2405	.1916	.0776	.0130	-.4244	.7147	41.4	.0469	.00263	191.5	37.4	265.4	-.0508	.1008
1186	15.4	.0	-20.0	-.4350	.2388	.0944	.0504	-.5077	1.3458	41.4	.0470	.00254	191.3	37.4	264.9	-.0717	.1901
1187	15.3	.1	-30.0	-.6674	.1636	.0994	.0727	-.4939	1.8691	41.4	.0466	.00239	191.1	37.0	263.0	-.0695	.2632
1188	15.3	.1	-40.0	-.8486	.0225	.1204	.0948	-.4786	2.4007	41.7	.0464	.00223	191.0	37.0	261.8	-.0677	.3395
1189	15.3	.1	-50.0	-.7385	-.1401	.1717	.1048	-.4801	3.0415	41.9	.0466	.00213	190.7	37.0	261.7	-.0679	.4303
1190	15.3	.1	-60.0	-.4768	-.1915	.2073	.1131	-.5907	3.7860	42.1	.0464	.00202	191.0	37.0	261.8	-.0836	.5356
1191	15.2	.1	-70.0	-.4358	-.2260	.1708	.1142	-.7068	4.2964	42.1	.0462	.00188	191.3	36.6	262.5	-.0987	.5907
1192	15.1	.1	-80.0	-.1849	-.2106	.2416	.1161	-.7457	4.6533	41.8	.0460	.00170	192.7	35.9	262.6	-.1018	.6353
1193	14.9	.2	-90.0	-.1473	-.2143	.2363	.1059	-.7265	4.5246	41.5	.0463	.00153	192.6	35.1	263.0	-.0968	.6032
1194	15.3	.0	-.0	-.3059	.1395	.1093	-.0147	-.3301	.0551	40.7	.0468	.00284	193.3	37.0	269.1	-.0454	.0076

AVERAGE TIP SPEED RATIO = .041   AVERAGE OF ABOVE VALUES 41.5 .0465 .00243 191.6 36.7 263.2

RUN 61   CONFIGURATION 33

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1195	20.3	.0	-.0	-.0684	.1474	.0951	-.0069	-.1573	.0156	51.0	.0492	.00346	193.4	65.0	309.2	-.0331	.0033
1196	20.0	.0	10.0	-.1583	.1382	.1212	-.0275	-.0941	-.4226	50.4	.0491	.00355	193.3	63.0	306.5	-.0194	-.0860
1197	20.0	.0	20.0	-.3861	.1756	.1526	-.0447	.0371	-.9018	50.4	.0492	.00367	193.2	63.0	306.8	.0076	-.1852
1198	20.1	.0	30.0	-.2706	.1306	.0856	-.0601	.1847	-1.4119	50.7	.0490	.00371	193.3	63.8	307.0	.0384	-.2934
1199	20.1	.0	40.0	-.0136	.0646	-.0532	-.0724	.3408	-1.9458	50.9	.0490	.00365	193.1	63.8	306.5	.0710	-.4051
1200	20.0	-.0	50.0	-.0157	-.0725	-.1156	-.0789	.4337	-2.4411	50.9	.0490	.00346	193.3	63.4	305.6	.0897	-.5049
1201	20.0	.0	60.0	-.1581	-.2724	-.1411	-.0808	.4370	-2.7437	51.1	.0490	.00328	193.4	63.4	306.4	.0904	-.5678
1202	20.1	-.0	70.0	.2536	.2016	-.0962	-.0699	.5951	-2.9722	51.6	.0487	.00311	193.4	63.8	305.4	.1243	-.6200
1203	20.1	-.0	80.0	.2197	.2067	-.0194	-.0659	.6332	-3.1363	51.8	.0488	.00290	193.3	63.8	305.6	.1322	-.6548
1204	20.1	.0	90.0	.2150	.1435	.0109	-.0610	.6067	-3.0725	52.1	.0488	.00267	193.4	63.8	306.0	.1265	-.6407
1205	20.2	.0	0.0	-.0845	.1638	.0990	-.0078	-.1552	-.0113	50.7	.0493	.00339	193.5	64.2	309.1	-.0322	-.0023
1206	19.7	.0	-10.0	-.1803	.1880	.1038	.0207	-.2163	.4325	49.9	.0491	.00322	193.4	61.4	305.1	-.0436	.0871
1207	20.2	.1	-20.0	-.1999	.2138	.1157	.0431	-.2547	.8875	50.9	.0494	.00319	193.4	64.6	309.9	-.0531	.1850
1208	20.4	.1	-30.0	-.2922	.1898	.1485	.0636	-.2615	1.3319	51.4	.0495	.00310	193.3	65.8	311.0	-.0553	.2812
1209	20.4	.1	-40.0	-.3645	.0903	.1532	.0858	-.3276	1.8760	51.8	.0490	.00291	193.2	65.8	308.4	-.0699	.4001
1210	20.4	.1	-50.0	-.5032	-.0052	.1726	.0990	-.4047	2.5186	52.0	.0492	.00282	192.6	65.8	308.0	-.0864	.5380
1211	20.4	.1	-60.0	-.7089	-.1878	.1604	.0999	-.5020	3.0312	52.4	.0490	.00270	192.5	65.8	306.8	-.1076	.6499
1212	20.4	.1	-70.0	-.6658	-.3355	.1188	.0966	-.5952	3.4533	52.5	.0490	.00256	192.3	65.4	305.9	-.1272	.7381
1213	20.0	.1	-80.0	-.6223	-.5532	.0538	.0882	-.5803	3.5497	52.2	.0490	.00242	192.1	63.4	303.5	-.1213	.7417
1214	20.0	.2	-90.0	-.5579	-.5441	.1350	.0731	-.4377	3.1702	52.4	.0491	.00225	192.3	63.4	303.9	-.0914	.6617
1215	20.6	.0	0.0	-.0805	.1611	.1018	-.0060	-.1603	.0099	51.4	.0497	.00359	193.4	67.0	313.9	-.0342	.0021

AVERAGE TIP SPEED RATIO = .054   AVERAGE OF ABOVE VALUES 51.4 .0491 .00312 193.1 64.3 307.2

RUN 62 CONFIGURATION 33

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1227	30.5	.0	-.0	.1274	.0886	.0343	.0082	-.1259	.0805	65.8	.0554	.00469	192.4	148.8	423.8	-.0442	.0283
1228	30.3	.0	10.0	.0805	.0668	.0605	-.0111	-.0672	-.1993	65.5	.0551	.00466	192.0	146.1	419.0	-.0234	-.0695
1229	30.1	0.0	20.0	.0018	.0438	.0859	-.0295	-.0061	-.5093	65.6	.0549	.00460	191.5	144.5	414.8	-.0021	-.1775
1230	30.0	.0	30.0	-.0576	.1134	.0458	-.0442	.1078	-.8562	65.6	.0548	.00451	191.0	143.7	412.2	.0376	-.2986
1231	30.5	.2	40.0	.0710	.0420	-.0440	-.0531	.1624	-1.1076	66.0	.0553	.00452	191.4	148.1	420.0	.0573	-.3905
1232	30.4	.3	50.0	-.0383	-.0255	-.0672	-.0524	.1608	-1.2637	66.2	.0553	.00427	190.9	147.7	416.6	.0570	-.4479
1233	30.2	.0	60.0	.0723	-.2251	-.0685	-.0618	.3080	-1.7092	66.2	.0546	.00397	191.7	145.7	415.0	.1081	-.6001
1234	30.1	-.0	70.0	.1082	-.3409	-.0578	-.0635	.3871	-1.9051	66.2	.0544	.00366	192.0	144.5	413.5	.1353	-.6659
1235	29.6	0.0	80.0	-.0292	-.0934	-.0225	-.0511	.3940	-1.7366	65.8	.0542	.00344	192.1	139.8	408.4	.1349	-.5944
1236	30.1	.0	90.0	-.2202	-.0205	.0182	-.0454	.3539	-1.6572	66.7	.0541	.00317	192.0	144.9	412.7	.1243	-.5819
1237	30.2	.0	.0	.1180	.0918	.0344	.0076	-.1275	.0739	65.5	.0548	.00461	192.5	145.3	417.9	-.0444	.0257
1238	30.4	.1	-10.0	.1211	.0820	.0099	.0230	-.1702	.3160	65.8	.0546	.00464	192.4	147.7	419.8	-.0599	.1112
1239	30.3	.1	-20.0	.0715	.0766	.0143	.0360	-.2060	.5714	65.9	.0545	.00449	192.5	146.5	417.3	-.0723	.2006
1240	30.2	.1	-33.0	.0024	.0830	.0336	.0456	-.2114	.8316	66.0	.0541	.00440	192.1	145.3	413.4	-.0743	.2923
1241	30.5	.1	-40.0	-.0595	.0472	.0434	.0579	-.2325	1.1360	66.6	.0542	.00444	191.9	148.5	416.3	-.0829	.4051
1242	30.5	.1	-50.0	-.3617	.0099	.0589	.0650	-.3039	1.4897	66.9	.0541	.00444	191.4	148.8	415.0	-.1390	.5343
1243	30.4	.1	-60.0	-.4465	-.1075	.0270	.0767	-.3601	1.8733	66.8	.0543	.00444	191.4	147.3	414.4	-.1780	.6658
1244	30.3	.1	-73.0	-.4082	-.2783	-.0233	.0770	-.3771	2.0188	67.0	.0540	.00440	191.1	146.5	411.2	-.1343	.7192
1245	30.1	.1	-80.0	-.2732	-.3767	.0025	.0604	-.3254	2.0695	67.1	.0538	.00432	191.1	144.9	408.6	-.1154	.7339
1246	30.1	.1	-90.0	-.2973	-.4096	.0044	.0519	-.2628	1.8773	67.3	.0538	.00426	191.1	144.9	408.7	-.0932	.6657

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   66.2   .0545   .00430   191.7   146.0   414.9

RUN 63 CONFIGURATION 33

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1250	30.1	.0	0.0	.1057	.0842	.0385	.0071	-.1255	.0800	65.6	.0543	.00428	192.5	144.5	414.8	-.0437	.0279
1251	30.1	5.0	0.0	.123C	.0751	.0307	.0103	-.1184	.1125	63.1	.0568	.00459	193.2	144.5	429.1	-.0399	.0379
1252	30.0	-.0	.0	.1065	.0843	.0375	.0081	-.1359	.0909	65.4	.0543	.00431	193.1	143.7	415.5	-.0470	.0315
1253	30.2	-5.1	.0	-.0178	.0751	.0420	.0068	-.1375	.0363	68.1	.0511	.00398	193.2	145.7	401.4	-.0499	.0132
1254	30.3	-10.1	.0	-.0977	.0721	.0367	.0027	-.1214	.0127	70.6	.0472	.00373	192.8	146.1	381.6	-.0465	.0048

AVERAGE TIP SPEED RATIO = .080   AVERAGE OF ABOVE VALUES   66.6   .0527   .00418   193.0   144.9   408.5

RUN 64 CONFIGURATION 33

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1258	30.4	.0	-20.0	.0532	.0663	.0157	.0361	-.2064	.5875	66.1	.0546	.00489	191.2	147.7	415.5	-.0734	.2088
1259	30.4	5.0	-20.0	.0667	.0438	.0116	.0359	-.1992	.5458	63.3	.0569	.00508	193.9	147.7	434.9	-.0676	.1853
1260	30.5	.0	-20.0	.0530	.0671	.0182	.0364	-.2066	.5959	65.9	.0543	.00488	193.3	148.5	420.9	-.0729	.2101
1261	30.5	-5.1	-20.0	-.0350	.0746	.0388	.0351	-.1882	.6762	68.6	.0507	.00470	192.0	148.5	399.3	-.0700	.2514
1262	30.5	-10.0	-20.0	-.1393	.0905	.0425	.0348	-.1733	.6826	70.9	.0473	.00447	191.5	148.5	381.3	-.0675	.3658

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   67.0   .0528   .00481   192.4   148.1   410.4

RUN 65 CONFIGURATION 33

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1265	30.3	-.0	20.0	-.0057	.0313	.0861	-.0298	-.0035	-.5172	65.9	.0546	.00463	191.7	146.5	416.1	-.0012	-.1821
1266	30.4	5.0	20.0	-.0230	.0267	.0813	-.0216	-.0016	-.4378	63.6	.0570	.00498	192.1	147.3	429.5	-.0006	-.1501
1267	30.4	-.0	20.0	-.0107	.0294	.0839	-.0292	-.0033	-.5118	66.2	.0547	.00480	190.5	147.3	414.0	-.0012	-.1821
1268	30.4	-5.1	20.0	-.2109	.0636	.0931	-.0298	.0095	-.6195	68.3	.0513	.00445	192.1	147.3	401.7	.0035	-.2271
1269	30.5	-9.9	20.0	-.2622	.0492	.0810	-.0330	.0156	-.6524	70.5	.0477	.00409	193.9	148.1	388.6	.0060	-.2486

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   66.9   .0531   .00459   192.1   147.3   410.0

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RUN 66   CONFIGURATION 33

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1272	25.3	.0	0.0	.0921	.1158	.0602	.0033	-.1545	.0873	60.2	.0512	.00330	191.7	102.0	354.5	-.0445	.0251
1273	25.0	.0	10.0	.0004	.1033	.1032	-.0187	-.0808	-.2418	59.6	.0512	.00329	192.0	99.6	353.7	-.3228	-.0682
1274	25.0	-.0	20.0	-.2299	.1510	.1178	-.0342	-.0256	-.6063	59.5	.0513	.00330	192.4	99.6	354.7	-.0072	-.1703
1275	25.0	-.0	30.0	-.2260	.1533	.0829	-.0501	.1549	-1.0170	59.7	.0515	.00329	191.9	100.0	354.4	.0437	-.2871
1276	25.1	-.0	40.0	-.0381	.1198	-.0156	-.0630	.2442	-1.3657	59.9	.0514	.00322	192.1	100.4	355.2	.0492	-.3861
1277	25.1	-.0	50.0	-.0364	-.0009	-.0693	-.0707	.2865	-1.6622	60.0	.0513	.00301	192.1	100.4	354.5	.0912	-.4739
1278	25.0	-.0	60.0	.0624	-.2098	-.1160	-.0707	.2782	-1.9988	60.2	.0510	.00283	192.3	100.0	353.3	.0789	-.5665
1279	25.0	-.0	70.0	.0523	-.3723	-.0882	-.0700	.3978	-2.3028	60.4	.0507	.00268	192.4	99.6	351.7	.1127	-.6524
1280	25.2	-.0	80.0	.1829	-.0571	-.0436	-.0588	.5149	-2.3499	61.0	.0506	.00262	192.3	101.2	352.2	.1490	-.6743
1281	25.2	-.0	90.0	-.0734	.0409	.0322	-.0537	.4282	-2.1992	61.1	.0509	.00243	192.3	101.2	353.5	.1226	-.6297
1282	25.3	.0	0.0	.0931	.1166	.0590	.0039	-.1554	.1040	60.0	.0513	.00338	192.5	102.3	356.9	-.0446	.0207
1284	25.1	.0	-10.0	.0906	.1256	.0435	.0221	-.1874	.3833	59.7	.0512	.00345	192.5	100.8	355.7	-.0531	.1087
1285	25.2	.0	-20.0	.0361	.1429	.0596	.0377	-.2115	.6668	60.0	.0510	.00346	192.4	101.2	354.6	-.0424	.1924
1286	25.2	.1	-30.0	-.0254	.1604	.0884	.0529	-.2097	.9839	60.2	.0509	.00348	192.3	101.2	353.6	-.0622	.2816
1287	25.1	.1	-40.0	-.0846	.1054	.1054	.0701	-.2201	1.3588	60.5	.0506	.00348	191.7	100.8	351.0	-.0632	.3903
1288	25.5	.1	-50.0	-.4342	.0502	.1194	.0779	-.2683	1.7211	61.1	.0509	.00361	191.5	103.6	354.3	-.0784	.5031
1289	25.4	.1	-60.0	-.7201	-.0757	.1563	.0876	-.4521	2.3106	61.2	.0510	.00370	191.5	103.2	354.2	-.1317	.6732
1290	25.2	.1	-70.0	-.4591	-.3939	-.0026	.0900	-.5284	2.7827	61.3	.0505	.00371	191.8	101.6	351.1	-.1520	.8053
1291	25.1	.1	-80.0	-.5158	-.5070	-.0347	.0703	-.4511	2.8214	61.2	.0536	.00369	192.3	100.8	352.1	-.1292	.8375
1292	25.1	.1	-90.0	-.4546	-.4872	.0326	.0586	-.3180	2.4210	61.5	.0506	.00373	191.8	103.4	352.2	-.0912	.6043

AVERAGE TIP SPEED RATIO = .067   AVERAGE OF ABOVE VALUES   60.4   .0510   .00328   192.1   131.0   353.5

RUN 67   CONFIGURATION 33

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1305	45.9	.0	.0	.0912	.0646	.0022	.0036	-.0464	.0146	76.9	.0618	.00689	192.9	329.8	632.5	-.0242	.0074
1306	45.8	-.0	10.0	.0512	.0406	.0192	-.0077	-.0343	-.1463	76.7	.0616	.00700	193.7	328.6	633.2	-.0179	-.0759
1307	45.7	-.0	20.0	.0040	-.0080	.0183	-.0189	-.0034	-.3787	76.8	.0615	.00701	193.2	327.4	629.5	-.0218	-.1960
1308	45.6	-.0	30.0	.0825	-.0424	-.0313	-.0312	.0598	-.6614	76.9	.0614	.00701	192.7	326.2	626.6	.0111	-.3444
1309	45.9	-.1	40.0	-.1234	-.0746	-.0313	-.0316	.0883	-.8398	77.1	.0617	.00707	192.3	329.4	628.6	.0443	-.4430
1310	45.6	-.1	50.0	-.0448	-.2056	-.0664	-.0350	.1465	-1.1660	77.0	.0616	.00700	192.6	325.5	626.1	.0752	-.6041
1311	45.6	-.0	60.0	.1252	-.2677	-.0724	-.0363	.1959	-1.3211	77.1	.0615	.00686	192.6	326.2	626.7	.1120	-.6877
1312	45.6	-.0	70.0	.1193	-.0665	-.0373	-.0259	.2248	-1.2450	77.2	.0611	.00663	192.7	326.2	625.1	.1173	-.6407
1313	45.6	-.0	80.0	.1414	-.0302	-.0110	-.0233	.2287	-1.2470	77.3	.0608	.00645	193.4	325.8	625.5	.1191	-.6494
1314	45.8	.0	90.0	.0586	-.0008	.0096	-.0224	.2382	-1.2277	77.5	.0610	.00630	192.6	328.2	626.3	.1268	-.6414
1315	45.9	.0	0.0	.0888	.0646	.0016	.0037	-.0463	.0185	77.0	.0612	.00672	193.0	329.4	629.7	-.0242	.0097
1316	45.8	.0	-10.0	.0890	.0519	-.0153	.0170	-.0811	.2952	77.0	.0611	.00665	192.6	329.0	627.3	-.0425	.1076
1317	45.6	.0	-20.0	.0498	.0079	-.0243	.0283	-.1071	.4313	77.0	.0605	.00647	192.6	325.5	671.0	-.0541	.2260
1318	46.0	.0	-30.0	-.0131	-.0440	-.0229	.0353	-.1255	.6795	77.4	.0604	.00636	192.4	331.7	675.1	-.0665	.3600
1319	45.9	.0	-40.0	-.1299	-.1017	-.0064	.0425	-.1310	.9105	77.5	.0600	.00629	191.8	330.6	621.3	-.0697	.4844
1320	45.8	.0	-50.0	-.2228	-.1925	-.0140	.0477	-.1343	1.0924	77.7	.0594	.00624	191.2	328.2	614.2	-.0718	.5837
1321	45.7	.1	-60.0	-.0505	-.2923	-.0700	.0431	-.1597	1.3608	77.8	.0589	.00631	191.7	326.6	611.5	-.0853	.7260
1322	45.7	.2	-70.0	-.0633	-.2530	-.0187	.0307	-.1910	1.4347	77.8	.0590	.00635	191.9	327.4	613.6	-.1019	.7656

AVERAGE TIP SPEED RATIO = .122   AVERAGE OF ABOVE VALUES   77.2   .0608   .00644   192.5   327.9   624.7

RUN 69   CONFIGURATION 39

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1363	15.5	.0	.0	-1.9127	.1812	.8084	-.0301	-.1470	-.2518	42.6	.0451	.00244	191.7	37.8	255.8	-.0217	-.0372
1364	15.2	-.0	10.0	-2.4945	.1781	.9791	-.0441	-.1006	-.7587	41.8	.0451	.00235	191.5	36.2	253.9	-.0144	-.1082
1365	15.3	-.0	20.0	-2.7145	.0828	.9898	-.0436	-.0425	-1.1465	42.2	.0450	.00220	191.2	36.6	253.2	-.0061	-.1550
1366	15.2	-.0	30.0	-2.8295	.0305	1.0010	-.0473	.0966	-1.8243	42.0	.0449	.00206	191.4	36.2	252.8	.0139	-.2616
1367	15.1	-.0	40.0	-2.8612	-.0495	1.0724	-.0544	.1587	-2.3679	41.9	.0448	.00190	191.5	35.8	251.7	.0226	-.3373
1368	15.1	.0	.0	-2.0190	.1960	.8667	-.0314	-.1583	-.2535	41.7	.0449	.00246	191.4	35.8	252.6	-.0225	-.0360
1369	15.2	.0	-10.0	-1.7957	.2184	.7308	-.0059	-.1397	.2377	41.9	.0450	.00256	191.3	36.2	252.4	-.0201	.0341
1370	15.2	.0	-20.0	-1.8501	.2121	.6803	.0150	-.1379	.7580	41.9	.0451	.00265	191.1	36.2	253.3	-.0197	.1085
1371	15.2	.0	-30.0	-2.2597	.1743	.7506	.0343	-.1302	1.2551	42.2	.0450	.00264	191.3	36.2	252.0	-.0187	.1809
1372	15.2	.1	-40.0	-2.5750	.0943	.8316	.0525	-.1412	1.8498	42.3	.0448	.00271	191.3	36.2	251.3	-.0204	.2647
1373	15.2	.1	-50.0	-2.4309	-.0517	.8509	.0636	-.1387	2.4668	42.4	.0448	.00274	191.3	36.2	251.6	-.0200	.3554
1374	15.0	.1	-60.0	-2.1426	-.1537	.8700	.0759	-.2028	3.2853	42.1	.0449	.00283	191.2	35.5	251.5	-.0286	.4631

AVERAGE TIP SPEED RATIO = .041   AVERAGE OF ABOVE VALUES   42.1   .0449   .00246   191.3   36.3   252.7

RUN 70   CONFIGURATION 39

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1378	30.6	.0	.0	-.1799	.0642	.1542	-.0063	-.0191	-.0840	66.6	.0539	.00442	191.5	146.9	407.0	-.0069	-.0303
1379	30.5	-.0	10.0	-.2039	.0479	.1697	-.0159	-.0333	-.2432	66.5	.0539	.00446	191.2	145.7	405.1	-.0120	-.0975
1380	30.5	-.0	20.0	-.2390	.0028	.1721	-.0261	-.0272	-.4800	66.5	.0540	.00441	191.3	145.7	404.6	-.0098	-.1774
1381	30.3	-.0	30.0	-.4968	.0035	.1857	-.0307	.0066	-.7166	66.3	.0541	.00430	191.1	143.7	403.7	.0123	-.2551
1382	30.3	.0	0.0	-.1894	.0656	.1551	-.0063	-.0193	-.0859	66.2	.0539	.00439	191.5	143.7	403.8	-.0069	-.0306
1383	30.4	.0	-10.0	-.2156	.0572	.1490	.0022	-.0093	.0855	66.4	.0538	.00439	191.6	144.5	404.3	-.0033	.0336
1384	30.4	.0	-20.0	-.2798	.0350	.1524	.0102	.0012	.2717	66.5	.0536	.00431	191.5	144.5	403.2	.0004	.0974
1385	30.4	.0	-30.0	-.3820	.0125	.1730	.0221	-.0020	.5218	66.8	.0533	.00424	191.4	144.9	401.7	-.0007	.1802
1386	30.4	.1	-40.0	-.5308	-.0296	.2156	.0341	-.0027	.7910	67.0	.0532	.00414	191.1	144.5	400.2	-.0010	.2857
1387	30.5	.1	-50.0	-.9605	-.0218	.2769	.0365	-.0434	1.0935	67.2	.0533	.00473	191.0	145.3	401.2	-.0157	.3910

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES   66.6   .0537   .00433   191.3   144.9   403.5

RUN 71   CONFIGURATION 39

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1391	30.4	.0	0.0	-.1751	.0664	.1542	-.0059	-.0177	-.0770	66.4	.0540	.00456	190.9	144.9	404.1	-.0064	-.0276
1392	30.6	2.4	0.0	-.0916	.0640	.1202	-.3037	-.0096	-.0649	65.3	.0556	.00472	191.6	146.5	415.1	-.0034	-.0229
1393	30.6	5.0	0.0	-.0459	.0575	.0919	-.0022	-.0089	-.0395	64.2	.0567	.00482	191.5	146.5	423.0	-.0031	-.013P
1394	30.6	-.0	0.0	-.1795	.0668	.1531	-.0060	-.0182	-.0788	66.6	.0542	.00457	190.8	146.5	406.3	-.0065	-.0284
1395	30.6	-2.5	0.0	-.2322	.0600	.1599	-.0064	-.0273	-.0908	67.7	.0521	.00438	191.8	146.5	398.8	-.0120	-.0333
1396	30.6	-5.1	.0	-.3000	.0606	.1547	-.0066	-.0336	-.0940	68.9	.0503	.00427	192.1	146.9	391.2	-.0126	-.0353
1397	30.8	-7.5	.0	-.3121	.0644	.1404	-.0072	-.0370	-.0988	70.3	.0484	.00417	191.7	148.1	382.1	-.0143	-.03R3
1398	30.8	-10.0	.0	-.3011	.0650	.1224	-.0078	-.0394	-.0934	71.5	.0461	.00408	191.8	148.1	371.6	-.0157	-.0372
1399	30.8	-12.5	.0	-.3011	.0613	.1030	-.0091	-.0382	-.0914	72.7	.0442	.00391	191.9	148.5	362.5	-.0156	-.0374

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES   68.2   .0513   .00439   191.6   146.9   394.6

RUN 72   CONFIGURATION 19

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1411	30.7	.0	.0	-.0693	.0460	.0308	-.0002	.0022	.0056	90.0	.0000	.00000	0.0	147.3	147.3	.0022	.0056
1412	30.4	.0	10.0	-.1018	.0445	.0393	-.0031	-.0141	-.0926	90.0	.0000	.00000	0.0	144.9	144.9	-.0141	-.0926
1413	30.4	0.0	20.0	-.1620	.0215	.0529	-.0086	-.0153	-.2811	90.0	.0000	.00000	0.0	144.9	144.9	-.0153	-.2811
1414	30.4	-.0	30.0	-.2320	-.0398	.0556	-.0162	-.0029	-.5821	90.0	.0000	.00000	0.0	144.5	144.5	-.0029	-.5821
1415	30.4	-.0	40.2	-.7078	-.1241	.0256	-.0200	.0103	-.8796	90.0	.0000	.00000	0.0	144.5	144.5	.0103	-.8796
1416	30.5	-.0	50.0	-.4142	-.2155	.0270	-.0191	.0358	-1.1320	90.0	.0000	.00000	0.0	145.7	145.7	.0358	-1.1320
1417	30.5	.0	0.0	-.0695	.0431	.0298	-.0001	.0029	.0085	90.0	.0000	.00000	0.0	146.1	146.1	.0029	.0085
1418	30.4	.0	-10.0	-.1002	.0320	.0382	.0032	.0178	.1193	90.0	.0000	.00000	0.0	144.9	144.9	.0178	.1193
1419	30.4	.1	-20.0	-.1694	.0036	.0570	.0091	.0154	.3339	90.0	.0000	.00000	0.0	144.5	144.5	.0154	.3339
1420	30.3	.1	-30.0	-.2349	-.0622	.0580	.0160	.0021	.6293	90.0	.0000	.00000	0.0	144.1	144.1	.0021	.6293
1421	30.6	.1	-40.0	-.2416	-.1515	.0199	.0188	-.0132	.9180	90.0	.0000	.00000	0.0	146.5	146.5	-.0132	.9180
1422	30.6	.1	-50.0	-.3523	-.2470	.0146	.0177	-.0395	1.1598	90.0	.0000	.00000	0.0	146.9	146.9	-.0395	1.1598

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   145.4   145.4

RUN 73   CONFIGURATION 19

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1423	30.3	.0	-.0	-.0644	.0398	.0299	-.0002	.0026	.0056	90.0	.0000	.00000	0.0	144.1	144.1	.0026	.0056
1424	30.4	10.0	-.0	.0672	.0409	-.0059	-.0004	.0010	.0141	90.0	.0000	.00000	0.0	144.9	144.9	.0010	.0141
1425	30.5	7.5	-.0	.0453	.0409	.0025	-.0003	.0015	.0126	90.0	.0000	.00000	0.0	145.3	145.3	.0015	.0126
1426	30.5	5.0	-.0	.0166	.0384	.0110	-.0002	.0022	.0140	90.0	.0000	.00000	0.0	145.7	145.7	.0022	.0140
1427	30.5	2.4	-.0	-.0210	.0387	.0211	-.0002	.0027	.0096	90.0	.0000	.00000	0.0	145.7	145.7	.0027	.0096
1428	30.5	-.0	-.0	-.0578	.0393	.0298	-.0000	.0029	.0083	90.0	.0000	.00000	0.0	145.7	145.7	.0029	.0083
1429	30.5	-2.5	-.0	-.0710	.0356	.0377	.0000	.0029	.0083	90.0	.0000	.00000	0.0	145.7	145.7	.0029	.0083
1430	30.5	-5.1	-.0	-.1138	.0334	.0459	.0001	.0028	.0056	90.0	.0000	.00000	0.0	145.7	145.7	.0028	.0056
1431	30.5	-7.6	-.0	-.1199	.0283	.0510	.0006	.0034	.0096	90.0	.0000	.00000	0.0	145.7	145.7	.0034	.0096
1432	30.5	-10.0	-.0	-.1365	.0304	.0470	.0012	.0033	.0081	90.0	.0000	.00000	0.0	145.7	145.7	.0033	.0081
1433	30.5	-12.5	-.0	-.1673	.0382	.0458	.0006	.0031	.0073	90.0	.0000	.00000	0.0	145.7	145.7	.0031	.0073

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   145.4   145.4

RUN 74   CONFIGURATION 19

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1434	61.0	.0	-.0	-.0659	.0378	.0338	.0000	.0026	.0039	90.0	.0000	.00000	0.0	582.7	582.7	.0026	.0039
1435	61.1	10.0	-.0	.0660	.0425	-.0027	-.0003	.0014	.0057	90.0	.0000	.00000	0.0	584.2	584.2	.0014	.0057
1436	61.2	7.5	-.0	.0324	.0430	.0076	-.0003	.0012	.0063	90.0	.0000	.00000	0.0	586.2	586.2	.0012	.0063
1437	61.1	5.0	-.0	-.0025	.0438	.0167	-.0002	.0016	.0053	90.0	.0000	.00000	0.0	584.2	584.2	.0016	.0053
1438	61.1	2.5	-.0	-.0348	.0397	.0257	-.0001	.0022	.0057	90.0	.0000	.00000	0.0	584.6	584.6	.0022	.0057
1439	61.0	-.0	-.0	-.0674	.0375	.0341	.0000	.0029	.0046	90.0	.0000	.00000	0.0	582.7	582.7	.0029	.0046
1440	61.0	-2.5	-.0	-.0939	.0345	.0413	.0001	.0028	.0033	90.0	.0000	.00000	0.0	582.3	582.3	.0028	.0033
1441	61.0	-5.1	-.0	-.1262	.0311	.0494	.0002	.0026	.0027	90.0	.0000	.00000	0.0	582.7	582.7	.0026	.0027
1442	61.0	-7.6	-.0	-.1541	.0273	.0554	.0002	.0027	.0039	90.0	.0000	.00000	0.0	582.3	582.3	.0027	.0039
1443	61.0	-10.1	-.0	-.1573	.0320	.0524	.0008	.0019	.0049	90.0	.0000	.00000	0.0	582.7	582.7	.0019	.0049
1444	61.0	-12.5	-.0	-.1783	.0378	.0542	.0009	.0027	.0067	90.0	.0000	.00000	0.0	582.7	582.7	.0027	.0067

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   583.4   583.4

RUN 76   CONFIGURATION 21

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1519	30.0	-.0	-180.0	-.0116	-.1118	-.0056	-.0004	.0020	-.0078	90.0	.0000	.00000	0.0	147.7	147.7	.0020	-.0078
1520	30.1	-.0	-170.0	-.0264	-.0985	-.0050	.0032	-.0246	.0991	90.0	.0000	.00000	0.0	148.5	148.5	-.0246	.0991
1521	30.1	.0	-160.0	-.0407	-.0846	-.0113	.0087	-.0642	.3116	90.0	.0000	.00000	0.0	148.5	148.5	-.0642	.3116
1522	29.9	0.0	-150.0	.0275	-.0715	-.0154	.0147	-.1109	.6168	90.0	.0000	.00000	0.0	146.9	146.9	-.1109	.6168
1523	29.8	.0	-140.0	-.3305	-.0630	.0126	.0148	-.1545	.8933	90.0	.0000	.00000	0.0	145.3	145.3	-.1545	.8933
1524	29.7	.0	-130.0	-.4163	-.0417	.0621	.0142	-.1992	1.1041	90.0	.0000	.00000	0.0	144.5	144.5	-.1992	1.1041
1525	29.6	.0	-120.0	-.1006	-.0445	-.0192	.0104	-.2109	1.2009	90.0	.0000	.00000	0.0	143.3	143.3	-.2109	1.2009
1526	29.7	.0	-110.0	-.1299	-.0393	-.0266	.0103	-.1953	1.1820	90.0	.0000	.00000	0.0	144.5	144.5	-.1953	1.1820
1527	29.8	-.0	-100.0	-.1839	-.0265	-.0081	.0104	-.1691	1.1263	90.0	.0000	.00000	0.0	145.7	145.7	-.1691	1.1263
1528	29.8	-.0	-90.0	-.1014	-.0898	-.0041	.0095	-.1308	1.0918	90.0	.0000	.00000	0.0	145.7	145.7	-.1308	1.0918
1529	29.6	-.0	180.0	-.0368	-.0799	-.0095	-.0005	-.0057	-.0367	90.0	.0000	.00000	0.0	143.3	143.3	-.0057	-.0367
1530	30.0	-.0	170.0	-.0553	-.0805	-.0079	-.0042	.0217	-.1584	90.0	.0000	.00000	0.0	147.3	147.3	.0217	-.1584
1531	29.8	-.0	160.0	-.1479	-.0650	.0016	-.0087	.0607	-.3866	90.0	.0000	.00000	0.0	145.3	145.3	.0607	-.3866
1532	30.0	-.1	150.0	-.2972	-.0481	.0157	-.0126	.1059	-.6955	90.0	.0000	.00000	0.0	147.7	147.7	.1059	-.6955
1533	30.0	-.1	140.0	.0994	-.0574	-.0855	-.0159	.1625	-.9999	90.0	.0000	.00000	0.0	147.3	147.3	.1625	-.9999
1534	29.9	-.1	130.0	-.2972	-.0826	-.0209	-.0107	.1763	-1.0791	90.0	.0000	.00000	0.0	146.9	146.9	.1763	-1.0791
1535	29.8	-.1	120.0	-.2078	-.0654	-.0229	-.0100	.1938	-1.2053	90.0	.0000	.00000	0.0	145.3	145.3	.1938	-1.2053
1536	29.8	-.1	110.0	-.1454	-.0707	-.0448	-.0105	.1814	-1.1762	90.0	.0000	.00000	0.0	145.3	145.3	.1814	-1.1762
1537	29.7	-.1	100.0	-.2195	-.0609	-.0217	-.0105	.1576	-1.1364	90.0	.0000	.00000	0.0	144.5	144.5	.1576	-1.1364
1538	29.6	-.1	90.0	-.1289	-.1168	-.0145	-.0097	.1217	-1.1114	90.0	.0000	.00000	0.0	143.7	143.7	.1217	-1.1114

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 145.9 145.9

RUN 78   CONFIGURATION 21

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1573	59.6	-.0	-180.0	.0111	-.0674	.0017	-.0002	.0016	-.0046	90.0	.0000	.00000	0.0	582.7	582.7	.0016	-.0046
1574	59.5	-.0	-170.0	.0001	-.0593	.0027	.0034	-.0262	.1009	90.0	.0000	.00000	0.0	581.5	581.5	-.0262	.1009
1575	59.6	-.0	-160.0	.0215	-.0338	-.0059	.0097	-.0640	.3041	90.0	.0000	.00000	0.0	583.1	583.1	-.0640	.3041
1576	59.7	-.1	-150.0	.1087	-.0096	-.0659	.0148	-.1204	.6234	90.0	.0000	.00000	0.0	584.3	584.3	-.1204	.6234
1577	59.6	.1	-140.0	-.6984	-.0434	-.0847	.0088	-.1770	1.0881	90.0	.0000	.00000	0.0	581.9	581.9	-.1770	1.0881
1578	59.6	-.1	-130.0	-.3965	.0281	.0123	.0096	-.2136	1.1505	90.0	.0000	.00000	0.0	583.5	583.5	-.2136	1.1505
1579	59.7	-.1	-120.0	.0254	.0022	-.0298	.0086	-.2043	1.1473	90.0	.0000	.00000	0.0	583.9	583.9	-.2043	1.1473
1580	59.5	-.0	-110.0	-.0417	.0143	-.0217	.0104	-.1923	1.1573	90.0	.0000	.00000	0.0	581.5	581.5	-.1923	1.1573
1581	59.5	-.0	-100.0	-.0967	.0375	.0133	.0108	-.1722	1.1407	90.0	.0000	.00000	0.0	580.7	580.7	-.1722	1.1407
1582	59.7	-.1	-90.0	.0162	-.0581	.0205	.0102	-.1254	1.1327	90.0	.0000	.00000	0.0	584.7	584.7	-.1254	1.1327
1583	59.5	-.0	180.0	.0126	-.0617	.0018	-.0001	.0006	-.0071	90.0	.0000	.00000	0.0	581.1	581.1	-.0006	-.0071
1584	59.6	-.0	170.0	-.0108	-.0589	.0032	-.0038	.0284	-.1236	90.0	.0000	.00000	0.0	583.5	583.5	.0284	-.1236
1585	59.7	-.0	160.0	-.0912	-.0335	.0097	-.0092	.0655	-.3244	90.0	.0000	.00000	0.0	583.9	583.9	.0655	-.3244
1586	59.5	-.1	150.0	-.0928	-.0141	-.0140	-.0145	.1194	-.6002	90.0	.0000	.00000	0.0	580.7	580.7	.1194	-.6002
1587	59.8	.1	140.0	-.9681	-.0339	-.0067	-.0078	.1797	-1.0903	90.0	.0000	.00000	0.0	586.2	586.2	.1797	-1.0903
1588	59.5	-.1	120.0	-.1479	.0032	.0417	-.0071	.2128	-1.1533	90.0	.0000	.00000	0.0	581.1	581.1	.2128	-1.1533
1589	59.5	-.1	110.0	-.0923	.0060	-.0007	-.0095	.1866	-1.1455	90.0	.0000	.00000	0.0	581.5	581.5	.1866	-1.1455
1590	59.7	-.1	100.0	-.0644	.0031	.0083	-.0090	.1618	-1.1099	90.0	.0000	.00000	0.0	584.7	584.7	.1618	-1.1099
1591	59.7	-.1	90.0	.0099	-.0579	.0106	-.0095	.1234	-1.1213	90.0	.0000	.00000	0.0	583.9	583.9	.1234	-1.1213

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 582.9 582.9

RUN 79   CONFIGURATION 21

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1599	44.8	-.0	180.0	.0058	-.0910	.0008	-.0001	.0012	-.0086	90.0	.0000	.00000	0.0	329.0	329.0	.0012	-.0086
1600	44.7	-.0	-170.0	-.0054	-.0807	.0015	.0034	-.0259	.0991	90.0	.0000	.00000	0.0	327.4	327.4	-.0259	.0991
1601	44.6	-.0	-160.0	.0066	-.0476	-.0018	.0095	-.0643	.3041	90.0	.0000	.00000	0.0	327.0	327.0	-.0643	.3041
1602	44.6	-.0	-150.0	.2044	-.0111	-.0285	.0152	-.1214	.6266	90.0	.0000	.00000	0.0	326.6	326.6	-.1214	.6266
1603	44.6	-.0	-140.0	-.0301	-.0098	-.0975	.0150	-.1762	.9550	90.0	.0000	.00000	0.0	327.0	327.0	-.1762	.9550
1604	44.5	.0	-130.0	-.4180	-.0079	-.0045	.0095	-.2176	1.2504	90.0	.0000	.00000	0.0	324.7	324.7	-.2176	1.2504
1605	44.7	-.0	-120.0	-.0646	.0064	.0026	.0100	-.2087	1.1724	90.0	.0000	.00000	0.0	327.8	327.8	-.2087	1.1724
1606	44.7	-.0	-110.0	-.0325	.0059	-.0234	.0103	-.1950	1.1653	90.0	.0000	.00000	0.0	328.2	328.2	-.1950	1.1653
1607	44.6	-.0	-100.0	-.0798	.0159	.0130	.0107	-.1726	1.1362	90.0	.0000	.00000	0.0	327.0	327.0	-.1726	1.1362
1608	44.5	-.0	-90.0	.0259	-.0690	.0288	.0100	-.1285	1.1303	90.0	.0000	.00000	0.0	325.5	325.5	-.1285	1.1303
1609	44.8	-.0	180.0	-.0027	-.1139	-.0008	.0001	-.0014	-.0159	90.0	.0000	.00000	0.0	329.0	329.0	-.0014	-.0159
1610	44.6	-.0	170.0	-.0246	-.1204	-.0002	-.0036	.0256	-.1323	90.0	.0000	.00000	0.0	327.0	327.0	.0256	-.1323
1611	44.5	-.1	160.0	-.1108	-.1071	.0065	-.0091	.0647	-.3485	90.0	.0000	.00000	0.0	324.3	324.3	.0647	-.3485
1612	44.8	-.1	150.0	-.0319	-.0834	-.0095	-.0145	.1178	-.6517	90.0	.0000	.00000	0.0	329.8	329.8	.1178	-.6517
1613	44.8	-.0	140.0	-.7777	-.0793	-.0330	-.0082	.1668	-1.1140	90.0	.0000	.00000	0.0	329.0	329.0	.1668	-1.1140
1614	44.6	-.1	130.0	-.3860	-.0518	.0603	-.0088	.2180	-1.2309	90.0	.0000	.00000	0.0	326.6	326.6	.2180	-1.2309
1615	45.0	-.1	120.0	-.2276	-.0495	.0358	-.0089	.2066	-1.1907	90.0	.0000	.00000	0.0	332.5	332.5	.2066	-1.1907
1616	44.9	-.1	110.0	-.1094	-.0387	-.0119	-.0096	.1875	-1.1676	90.0	.0000	.00000	0.0	331.0	331.0	.1875	-1.1676
1617	44.8	-.1	100.0	-.1108	-.0307	.0013	-.0096	.1626	-1.1222	90.0	.0000	.00000	0.0	328.6	328.6	.1626	-1.1222
1618	44.7	-.2	90.0	.0257	-.1013	.0174	-.0091	.1244	-1.1287	90.0	.0000	.00000	0.0	327.4	327.4	.1244	-1.1287

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 327.8 327.8

RUN 80   CONFIGURATION 21

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1626	29.9	-.0	180.0	-.0116	-.1082	-.0037	-.0003	.0021	-.0139	90.0	.0000	.00000	0.0	146.5	146.5	.0021	-.0139
1627	29.9	-9.9	180.0	.0224	-.0879	-.0116	.0002	.0009	-.0109	90.0	.0000	.00000	0.0	146.5	146.5	.0009	-.0109
1628	29.9	-4.9	180.0	.0047	-.0994	-.0079	-.0000	.0009	-.0140	90.0	.0000	.00000	0.0	146.5	146.5	.0009	-.0140
1629	29.9	.3	180.0	-.0057	-.0991	-.0013	-.0002	.0016	-.0141	90.0	.0000	.00000	0.0	146.5	146.5	.0016	-.0141
1630	29.9	5.1	180.0	-.0342	-.1089	.0039	-.0005	.0019	-.0143	90.0	.0000	.00000	0.0	146.5	146.5	.0019	-.0143
1631	29.9	10.1	180.0	-.0388	-.1128	.0103	-.0007	.0022	-.0202	90.0	.0000	.00000	0.0	146.5	146.5	.0022	-.0202
1632	29.9	.0	180.0	-.0060	-.1209	-.0022	-.0002	.0008	-.0171	90.0	.0000	.00000	0.0	146.5	146.5	.0008	-.0171

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 146.5 146.5

RUN 81   CONFIGURATION 21

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1633	29.9	.0	170.0	-.0377	-.1360	-.0024	-.0038	.0286	-.1431	90.0	.0000	.00000	0.0	146.9	146.9	.0286	-.1431
1634	29.9	-10.0	170.0	-.0005	-.1155	-.0106	-.0003	.0286	-.1955	90.0	.0000	.00000	0.0	146.5	146.5	.0286	-.1955
1635	29.9	-4.9	170.0	-.0169	-.1227	-.0069	-.0021	.0286	-.1591	90.0	.0000	.00000	0.0	146.5	146.5	.0286	-.1591
1636	29.9	.0	170.0	-.0319	-.1241	-.0015	-.0037	.0284	-.1348	90.0	.0000	.00000	0.0	146.5	146.5	.0284	-.1348
1637	29.9	5.0	170.0	-.0411	-.1338	.0035	-.0051	.0305	-.1364	90.0	.0000	.00000	0.0	146.5	146.5	.0305	-.1364
1638	29.9	10.0	170.0	-.0134	-.1368	.0078	-.0062	.0354	-.1841	90.0	.0000	.00000	0.0	146.5	146.5	.0354	-.1841
1639	29.9	0.0	170.0	-.0379	-.1418	-.0030	-.0037	.0284	-.1377	90.0	.0000	.00000	0.0	146.5	146.5	.0284	-.1377

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 146.5 146.5

RUN 82   CONFIGURATION 21

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1640	29.7	-.0	160.0	-.1241	-.1337	.0076	-.0082	.0687	-.3626	90.0	.0000	.00000	0.0	144.9	144.9	.0687	-.3626
1641	29.7	-10.0	160.0	-.0900	-.1181	-.0068	-.0026	.0747	-.4421	90.0	.0000	.00000	0.0	144.9	144.9	.0747	-.4421
1642	29.7	-5.0	160.0	-.1225	-.1248	.0013	-.0054	.0708	-.3880	90.0	.0000	.00000	0.0	144.9	144.9	.0708	-.3880
1643	29.7	.0	160.0	-.1176	-.1218	.0094	-.0084	.0693	-.3683	90.0	.0000	.00000	0.0	144.9	144.9	.0693	-.3683
1644	29.7	5.0	160.0	-.1078	-.1349	.0130	-.0107	.0690	-.3635	90.0	.0000	.00000	0.0	144.9	144.9	.0690	-.3635
1645	29.7	10.0	160.0	.0049	-.1370	.0128	-.0119	.0763	-.4397	90.0	.0000	.00000	0.0	144.9	144.9	.0763	-.4397
1646	29.8	-.0	160.0	-.1177	-.1366	.0076	-.0082	.0690	-.3614	90.0	.0000	.00000	0.0	145.3	145.3	.0690	-.3614

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 145.0 145.0

RUN 83   CONFIGURATION 21

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1647	29.6	-.0	150.0	-.2697	-.1278	.0237	-.0119	.1121	-.6648	90.0	.0000	.00000	0.0	144.1	144.1	.1121	-.6648
1648	29.6	-10.0	150.0	-.3701	-.1229	.0175	-.0046	.1259	-.7761	90.0	.0000	.00000	0.0	144.1	144.1	.1259	-.7761
1649	29.6	-5.0	150.0	-.3661	-.1254	.0245	-.0075	.1175	-.7251	90.0	.0000	.00000	0.0	144.1	144.1	.1175	-.7251
1650	29.6	.0	150.0	-.2699	-.1165	.0247	-.0119	.1123	-.6649	90.0	.0000	.00000	0.0	144.1	144.1	.1123	-.6649
1651	29.6	5.0	150.0	-.0516	-.1288	.0069	-.0159	.1187	-.7105	90.0	.0000	.00000	0.0	144.1	144.1	.1187	-.7105
1652	29.6	10.0	150.0	.1022	-.1271	-.0282	-.0171	.1384	-.8479	90.0	.0000	.00000	0.0	144.1	144.1	.1384	-.8479
1653	29.9	-.0	150.0	-.2929	-.1346	.0244	-.0119	.1145	-.6780	90.0	.0000	.00000	0.0	146.9	146.9	.1145	-.6780

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 144.5 144.5

RUN 84   CONFIGURATION 23

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1677	29.8	-.0	180.0	-.0297	-.1227	-.0126	-.0008	.0140	-.0107	90.0	.0000	.00000	0.0	145.7	145.7	.0140	-.0107
1678	29.9	.0	-170.0	-.0687	-.0980	.0075	.0051	-.0467	.1294	90.0	.0000	.00000	0.0	146.9	146.9	-.0467	.1294
1679	29.9	.0	-160.0	-.1255	-.0439	.0457	.0133	-.1193	.3760	90.0	.0000	.00000	0.0	146.5	146.5	-.1193	.3760
1680	29.8	.1	-150.0	.0213	.0109	.0209	.0211	-.1867	.6906	90.0	.0000	.00000	0.0	146.1	146.1	-.1867	.6906
1681	29.8	.1	-140.0	-.1125	.0439	-.0013	.0228	-.2331	.9770	90.0	.0000	.00000	0.0	145.7	145.7	-.2331	.9770
1682	29.7	.1	-130.0	-.1009	.0231	.0395	.0201	-.2722	1.1618	90.0	.0000	.00000	0.0	144.5	144.5	-.2722	1.1618
1683	29.6	.1	-120.0	-.0170	.0536	.0220	.0211	-.2871	1.2942	90.0	.0000	.00000	0.0	143.3	143.3	-.2871	1.2942
1684	29.5	.1	-110.0	-.1366	.0426	.0443	.0223	-.2603	1.2558	90.0	.0000	.00000	0.0	142.9	142.9	-.2603	1.2558
1685	29.4	.1	-100.0	-.1596	.0490	.0593	.0215	-.2403	1.2528	90.0	.0000	.00000	0.0	142.2	142.2	-.2403	1.2528
1686	29.4	.0	-90.0	-.0185	-.0164	.0541	.0195	-.2048	1.2627	90.0	.0000	.00000	0.0	141.4	141.4	-.2048	1.2627
1687	30.1	.0	-180.0	.0073	-.0833	-.0008	-.0007	.0115	-.0139	90.0	.0000	.00000	0.0	148.5	148.5	.0115	-.0139
1688	30.2	.0	170.0	-.0413	-.1071	.0054	-.0073	.0665	-.1763	90.0	.0000	.00000	0.0	149.2	149.2	.0665	-.1763
1689	30.0	-.0	160.0	-.0091	-.1182	-.0052	-.0155	.1272	-.4284	90.0	.0000	.00000	0.0	147.7	147.7	.1272	-.4284
1690	29.9	-.0	150.0	.0446	-.1195	-.0254	-.0206	.1911	-.7519	90.0	.0000	.00000	0.0	146.9	146.9	.1911	-.7519
1691	29.8	-.0	140.0	-.1074	-.1361	-.0661	-.0231	.2454	-1.0297	90.0	.0000	.00000	0.0	145.7	145.7	.2454	-1.0297
1692	29.7	-.1	130.0	-.1042	-.1700	-.0751	-.0208	.2649	-1.1584	90.0	.0000	.00000	0.0	144.9	144.9	.2649	-1.1584
1693	29.6	-.1	120.0	-.0830	-.1669	-.0526	-.0201	.2771	-1.2602	90.0	.0000	.00000	0.0	143.7	143.7	.2771	-1.2602
1694	29.4	-.1	110.0	-.2194	-.1558	-.0026	-.0213	.2593	-1.2576	90.0	.0000	.00000	0.0	141.8	141.8	.2593	-1.2576
1695	29.6	-.1	100.0	-.2341	-.1398	.0204	-.0200	.2365	-1.2551	90.0	.0000	.00000	0.0	144.1	144.1	.2365	-1.2551
1696	29.7	-.1	90.0	-.1011	-.1677	.0104	-.0185	.2002	-1.2643	90.0	.0000	.00000	0.0	144.9	144.9	.2002	-1.2643

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 145.1 145.1

RUN 85   CONFIGURATION 23

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1697	44.7	.0	-180.0	.0039	-.0662	-.0037	-.0009	.0139	-.0076	90.0	.0000	.00000	0.0	327.4	327.4	.0139	-.0075
1698	44.5	.1	-170.0	-.0530	-.0429	.0173	.0053	-.0511	.1365	90.0	.0000	.00000	0.0	325.5	325.5	-.0511	.1365
1699	44.6	.1	-160.0	-.1156	.0086	.0550	.0144	-.1225	.3790	90.0	.0000	.00000	0.0	326.6	325.6	-.1225	.3790
1700	44.8	.1	-150.0	.0339	.0561	.0269	.0219	-.1897	.6844	90.0	.0000	.00000	0.0	329.8	329.8	-.1897	.6844
1701	44.8	.1	-140.0	-.0605	.0549	-.0090	.0225	-.2395	.9473	90.0	.0000	.00000	0.0	329.0	329.0	-.2395	.9473
1702	44.6	.1	-130.0	-.0820	.0346	.0096	.0199	-.2723	1.1481	90.0	.0000	.00000	0.0	326.6	326.6	-.2723	1.1481
1703	44.4	.1	-120.0	-.0474	.0603	.0388	.0204	-.2812	1.2667	90.0	.0000	.00000	0.0	323.9	323.9	-.2812	1.2667
1704	44.7	.1	-110.0	-.1315	.0482	.0469	.0221	-.2615	1.2706	90.0	.0000	.00000	0.0	327.4	327.4	-.2615	1.2706
1705	44.9	.1	-100.0	-.1498	.0432	.0683	.0214	-.2415	1.2558	90.0	.0000	.00000	0.0	331.4	331.4	-.2415	1.2558
1706	44.9	.1	-90.0	.0111	-.0198	.0613	.0191	-.2048	1.2820	90.0	.0000	.00000	0.0	331.4	331.4	-.2048	1.2820
1707	44.9	.0	180.0	.0091	-.0741	-.0017	-.0007	.0107	-.0149	90.0	.0000	.00000	0.0	330.2	330.2	.0107	-.0149
1708	44.9	.0	170.0	-.0357	-.0897	.0061	-.0076	.0675	-.1743	90.0	.0000	.00000	0.0	331.4	331.4	.0675	-.1743
1709	44.7	.0	160.0	-.0177	-.0904	-.0052	-.0162	.1270	-.4101	90.0	.0000	.00000	0.0	327.4	327.4	.1270	-.4101
1710	44.5	-.0	150.0	.0638	-.0926	-.0311	-.0211	.1972	-.7354	90.0	.0000	.00000	0.0	324.3	324.3	.1972	-.7354
1711	44.7	-.0	140.0	-.1059	-.1125	-.0666	-.0225	.2510	-1.0053	90.0	.0000	.00000	0.0	328.2	328.2	.2510	-1.0053
1712	44.8	-.0	130.0	-.1051	-.1489	-.0740	-.0205	.2660	-1.1465	90.0	.0000	.00000	0.0	328.6	328.6	.2660	-1.1465
1713	44.8	-.0	120.0	-.0462	-.1214	-.0399	-.0201	.2819	-1.2659	90.0	.0000	.00000	0.0	329.4	329.4	.2819	-1.2659
1714	44.9	-.0	110.0	-.1892	-.1109	-.0017	-.0211	.2598	-1.2572	90.0	.0000	.00000	0.0	330.2	330.2	.2598	-1.2572
1715	44.8	-.0	100.0	-.1943	-.1095	.0282	-.0192	.2336	-1.2366	90.0	.0000	.00000	0.0	328.6	328.6	.2336	-1.2366
1716	44.6	-.1	90.0	-.0557	-.1375	.0162	-.0181	.1996	-1.2624	90.0	.0000	.00000	0.0	326.6	326.6	.1996	-1.2624

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   328.2   328.2

RUN 86   CONFIGURATION 23

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1755	44.3	-.0	180.0	.0149	-.0733	-.0039	-.0008	.0125	-.0147	90.0	.0000	.00000	0.0	326.6	326.6	.0125	-.0147
1756	44.4	-10.0	180.0	.0365	-.0566	-.0190	-.0015	.0229	-.0452	90.0	.0000	.00000	0.0	327.4	327.4	.0229	-.0452
1757	44.4	-5.0	180.0	.0309	-.0624	-.0111	-.0011	.0181	-.0273	90.0	.0000	.00000	0.0	327.4	327.4	.0181	-.0273
1758	44.4	.0	180.0	.0201	-.0641	-.0032	-.0008	.0122	-.0134	90.0	.0000	.00000	0.0	327.4	327.4	.0122	-.0134
1759	44.4	5.1	180.0	-.0028	-.0647	.0058	-.0010	.0081	-.0106	90.0	.0000	.00000	0.0	327.0	327.0	.0081	-.0106
1760	44.4	10.0	180.0	-.0202	-.0618	.0145	-.0011	.0066	-.0151	90.0	.0000	.00000	0.0	327.4	327.4	.0066	-.0151

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   327.2   327.2

RUN 87   CONFIGURATION 23

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1763	44.5	-.0	170.0	-.0275	-.0861	.0041	-.0075	.0693	-.1833	90.0	.0000	.00000	0.0	329.4	329.4	.0693	-.1833
1764	44.6	-10.0	170.0	.0147	-.0704	-.0151	-.0049	.0774	-.2309	90.0	.0000	.00000	0.0	329.8	329.8	.0774	-.2309
1765	44.6	-4.9	170.0	-.0040	-.0770	-.0042	-.0060	.0737	-.2012	90.0	.0000	.00000	0.0	329.8	329.8	.0737	-.2012
1766	44.5	.0	170.0	-.0245	-.0765	.0056	-.0076	.0698	-.1818	90.0	.0000	.00000	0.0	329.4	329.4	.0698	-.1818
1767	44.6	5.1	170.0	-.0351	-.0753	.0153	-.0087	.0651	-.1729	90.0	.0000	.00000	0.0	329.8	329.8	.0651	-.1729
1768	44.6	10.0	170.0	-.0431	-.0745	.0201	-.0099	.0626	-.1818	90.0	.0000	.00000	0.0	329.8	329.8	.0626	-.1818

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   329.7   329.7

RUN 88   CONFIGURATION 23

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1772	44.5	-.0	160.0	-.0133	-.1028	-.0058	-.0162	.1283	-.4218	90.0	.0000	.00000	0.0	328.2	328.2	.1283	-.4218
1773	44.5	-10.0	160.0	.0590	-.0824	-.0240	-.0107	.1343	-.4706	90.0	.0000	.00000	0.0	328.6	328.6	.1343	-.4706
1774	44.5	-5.0	160.0	-.0057	-.0954	-.0071	-.0135	.1293	-.4334	90.0	.0000	.00000	0.0	329.0	329.0	.1293	-.4334
1775	44.5	.0	160.0	-.0106	-.0986	-.0058	-.0162	.1288	-.4223	90.0	.0000	.00000	0.0	328.6	328.6	.1288	-.4223
1776	44.5	5.1	160.0	-.0114	-.0991	.0014	-.0187	.1318	-.4314	90.0	.0000	.00000	0.0	328.6	328.6	.1318	-.4314
1777	44.4	10.0	160.0	-.0089	-.0997	.0120	-.0204	.1310	-.4560	90.0	.0000	.00000	0.0	327.4	327.4	.1310	-.4560

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   328.4   328.4

RUN 89   CONFIGURATION 23

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1780	44.4	.0	-160.0	-.1139	-.0030	.0522	.0141	-.1232	.3768	90.0	.0000	.00000	0.0	327.0	327.0	-.1232	.3768
1781	44.4	-9.9	-160.0	.0144	.0396	.0277	.0103	-.1444	.4671	90.0	.0000	.00000	0.0	327.4	327.4	-.1444	.4671
1782	44.4	-4.9	-160.0	-.0664	.0187	.0435	.0122	-.1321	.4120	90.0	.0000	.00000	0.0	327.4	327.4	-.1321	.4120
1783	44.4	.1	-160.0	-.1056	.0076	.0548	.0142	-.1223	.3730	90.0	.0000	.00000	0.0	327.0	327.0	-.1223	.3730
1784	44.4	5.1	-160.0	-.0954	-.0010	.0586	.0161	-.1136	.3603	90.0	.0000	.00000	0.0	327.0	327.0	-.1136	.3603
1785	44.3	10.1	-160.0	-.0459	-.0007	.0577	.0171	-.1076	.3701	90.0	.0000	.00000	0.0	326.2	326.2	-.1076	.3701

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   327.0   327.0

RUN   90   CONFIGURATION 24

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1796	29.6	-.0	180.0	-.0107	-.0928	.0020	-.0004	.0034	.0010	90.0	.0000	.00000	0.0	145.7	145.7	.0034	.0010
1797	29.6	.0	-170.0	-.0825	-.0703	.0229	.0058	-.0598	.1480	90.0	.0000	.00000	0.0	145.3	145.3	-.0598	.1480
1798	29.6	.0	-160.0	-.1079	-.0235	.0523	.0152	-.1357	.4153	90.0	.0000	.00000	0.3	145.7	145.7	-.1357	.4153
1799	29.6	.0	-150.0	.1236	.0255	-.0046	.0235	-.2055	.7451	90.0	.0000	.00000	0.0	145.3	145.3	-.2055	.7451
1800	29.4	.0	-140.0	-.0914	.0467	.0264	.0264	-.2483	1.0263	90.0	.0000	.00000	0.0	143.3	143.3	-.2483	1.0263
1801	29.4	.0	-130.0	-.1996	.0401	.0022	.0241	-.2836	1.2436	90.0	.0000	.00000	0.0	143.7	143.7	-.2836	1.2436
1802	29.5	.0	-120.0	.1028	.0485	-.0408	.0254	-.2859	1.2830	90.0	.0000	.00000	0.0	144.5	144.5	-.2859	1.2830
1803	29.5	.0	-110.0	-.0273	.0430	-.0153	.0265	-.2721	1.2889	90.0	.0000	.00000	0.0	144.5	144.5	-.2721	1.2889
1804	29.5	-.0	-100.0	-.0424	.0619	-.0076	.0238	-.2470	1.2671	90.0	.0000	.00000	0.0	144.5	144.5	-.2470	1.2671
1805	29.6	-.0	-90.0	.1034	.0065	-.0196	.0198	-.2019	1.2695	90.0	.0000	.00000	0.0	145.3	145.3	-.2019	1.2695
1806	30.0	-.0	180.0	.0024	-.0647	.0088	-.0004	.0014	-.0053	90.0	.0000	.00000	0.0	149.2	149.2	.0014	-.0053
1807	29.7	-.0	170.0	-.0742	-.0780	.0292	-.0063	.0634	-.1635	93.0	.0000	.00000	0.0	146.5	146.5	.0634	-.1635
1808	29.7	-.1	160.0	-.0191	-.0768	.0198	-.0155	.1290	-.4305	90.0	.0000	.00000	0.0	146.1	146.1	.1290	-.4305
1809	29.5	-.1	150.0	.0738	-.0807	-.0241	-.0228	.1909	-.7510	90.0	.0000	.00000	0.0	144.9	144.9	.1909	-.7510
1810	29.3	-.1	140.0	-.2761	-.0933	-.0463	-.0240	.2335	-1.0431	90.0	.0000	.00000	0.0	142.9	142.9	.2335	-1.0431
1811	29.9	-.1	130.0	-.2173	-.1063	-.0137	-.0228	.2693	-1.2160	90.0	.0000	.00000	0.0	148.5	148.5	.2693	-1.2160
1812	29.9	-.1	120.0	.0099	-.1078	-.0585	-.0239	.2708	-1.2413	90.0	.0000	.00000	0.0	148.5	148.5	.2708	-1.2413
1813	29.9	-.1	110.0	-.1365	-.1053	-.0184	-.0253	.2595	-1.2403	90.0	.0000	.00000	0.0	148.5	148.5	.2595	-1.2403
1814	29.8	-.1	100.0	-.1289	-.0712	-.0169	-.0226	.2370	-1.2440	90.0	.0000	.00000	0.0	147.3	147.3	.2370	-1.2440
1815	29.7	-.2	90.0	.0152	-.1035	-.0342	-.0188	.1918	-1.2300	90.0	.0000	.00000	0.0	146.5	146.5	.1918	-1.2300

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   145.8   145.8

RUN   91   CONFIGURATION 24

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1818	44.7	-.0	180.0	.0039	-.0655	.0035	-.0003	.0035	-.0080	81.0	.0131	-.01054	0.0	332.1	501.7	.0023	-.0053
1819	44.2	.0	-170.0	-.0707	-.0470	.0262	.0058	-.0608	.1409	81.4	.0122	-.01084	0.0	324.7	482.9	-.0409	.0947
1820	44.4	.0	-160.0	-.1038	.0004	.0575	.0161	-.1382	.4019	81.8	.0118	-.01111	0.0	327.4	480.6	-.0942	.2738
1822	44.7	.0	-150.0	.1169	.0396	-.0019	.0239	-.2078	.7119	82.7	.0109	-.01059	0.0	331.7	473.6	-.1456	.4987
1823	44.4	.0	-140.0	-.1173	.0401	-.0280	.0263	-.2539	.9940	83.7	.0094	-.00919	0.0	327.8	449.8	-.1851	.7245
1824	44.2	.0	-130.0	-.1800	.0185	-.0013	.0241	-.2839	1.2160	84.3	.0085	-.00808	0.0	324.3	434.9	-.2117	.9066
1825	44.1	-.0	-120.0	.1219	.0226	-.0491	.0251	-.2875	1.2727	84.6	.0000	.00000	0.0	322.3	322.3	-.2875	1.2727
1826	44.4	0.0	-110.0	-.0081	.0275	-.0258	.0264	-.2721	1.2885	85.0	.0000	.00000	0.0	327.8	327.8	-.2721	1.2885
1827	44.2	-.0	-100.0	-.0323	.0367	-.0034	.0239	-.2482	1.2649	85.5	.0000	.00000	0.0	324.3	324.3	-.2482	1.2649
1828	44.7	-.0	-90.0	.1184	-.0206	-.0136	.0199	-.2017	1.2605	85.9	.0000	.00000	0.0	332.1	332.1	-.2017	1.2605
1829	45.3	-.0	180.0	.0113	-.0721	.0355	-.0000	.0000	-.0100	87.2	.0000	.00000	0.0	341.2	341.2	.0000	-.0100
1830	44.4	0.0	170.0	-.0861	-.0863	.0281	-.0068	.0670	-.1751	90.0	.0000	.00000	0.0	327.0	327.0	.0670	-.1751
1831	44.3	-.0	160.0	-.0407	-.0720	.0180	-.0164	.1326	-.4285	72.9	.0234	-.00956	0.0	326.2	629.8	.0687	-.2220
1832	44.6	-.1	150.0	.0960	-.0714	-.0330	-.0237	.2029	-.7731	73.8	.0226	-.00680	0.0	329.8	623.5	.1073	-.4089
1833	44.5	-.1	140.0	-.1384	-.0863	-.0481	-.0247	.2472	-1.0154	74.3	.0220	-.00401	0.0	329.0	614.2	.1324	-.5439
1834	44.3	-.1	130.0	-.2229	-.1084	-.0149	-.0225	.2726	-1.2148	74.8	.0212	-.00125	0.0	325.8	600.4	.1479	-.6593
1835	44.5	-.1	120.0	.0252	-.1021	-.0635	-.0238	.2770	-1.2665	75.5	.0206	.00135	0.0	329.0	596.2	.1528	-.6989
1837	44.4	-.1	110.0	-.1359	-.0914	-.0194	-.0252	.2624	-1.2664	76.2	.0197	.00371	0.0	327.8	583.7	.1474	-.7112
1838	44.5	-.1	100.0	-.1310	-.0637	.0122	-.0222	.2356	-1.2517	76.9	.0189	.00576	0.0	328.6	574.0	.1349	-.7166
1839	44.3	-.2	90.0	.0442	-.1025	-.0345	-.0186	.1931	-1.2571	77.8	.0178	.00728	0.0	326.6	557.6	.1131	-.7365

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   80.8   .0116 -.00319   .0   328.3   478.9

RUN   92   CONFIGURATION 24

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1844	44.4	.0	180.0	.0012	-.0642	.0043	-.0003	.0030	-.0057	90.0	.0000	.00000	0.0	327.4	327.4	.0030	-.0057
1845	44.4	-9.9	180.0	.0808	-.0364	-.0387	-.0000	.0044	-.0099	90.0	.0000	.00000	0.0	327.4	327.4	.0044	-.0099
1846	44.4	-4.9	180.0	.0464	-.0511	-.0177	-.0001	.0047	-.0070	90.0	.0000	.00000	0.0	327.4	327.4	.0047	-.0070
1847	44.4	.0	180.0	.0038	-.0600	.0044	-.0003	.0032	-.0043	90.0	.0000	.00000	0.0	327.0	327.0	.0032	-.0043
1848	44.7	5.1	180.0	-.0354	-.0645	.0241	-.0005	.0032	-.0064	90.0	.0000	.00000	0.0	332.1	332.1	.0032	-.0064
1849	44.6	10.0	180.0	-.0736	-.0632	.0399	-.0004	.0020	-.0064	90.0	.0000	.00000	0.0	330.2	330.2	.0020	-.0064

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   328.6   328.6

RUN   93   CONFIGURATION 24

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1852	44.6	0.0	170.0	-.0905	-.0817	.0274	-.0068	.0677	-.1655	90.0	.0000	.00000	0.0	329.8	329.8	.0677	-.1655
1853	44.4	-10.0	170.0	-.0413	-.0694	.0001	-.0046	.0905	-.2505	90.0	.0000	.00000	0.0	327.4	327.4	.0905	-.2505
1854	44.3	-5.0	170.0	-.0794	-.0746	.0178	-.0055	.0799	-.2089	90.0	.0000	.00000	0.0	326.6	326.6	.0799	-.2089
1855	44.4	-.0	170.0	-.0935	-.0775	.0286	-.0070	.0686	-.1694	90.0	.0000	.00000	0.0	327.0	327.0	.0686	-.1694
1856	44.4	5.0	170.0	-.0966	-.0815	.0394	-.0082	.0604	-.1557	90.0	.0000	.00000	0.0	327.4	327.4	.0604	-.1557
1857	44.4	10.0	170.0	-.1249	-.0861	.0572	-.0094	.0577	-.1631	90.0	.0000	.00000	0.0	327.0	327.0	.0577	-.1631

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   327.6   327.6

RUN 94 CONFIGURATION 24

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1858	44.3	-.0	160.0	-.0441	-.0795	.0170	-.0163	.1320	-.4147	90.0	.0000	.00000	0.0	325.8	325.8	.1320	-.4147
1859	44.4	-10.0	160.0	.0693	-.0508	-.0078	-.0125	.1521	-.4863	90.0	.0000	.00000	0.0	327.0	327.0	.1521	-.4863
1860	44.4	-5.0	160.0	-.0088	-.0642	.0057	-.0146	.1419	-.4466	90.0	.0000	.00000	0.0	327.4	327.4	.1419	-.4466
1861	44.3	-.0	160.0	-.0402	-.0704	.0173	-.0166	.1334	-.4196	90.0	.0000	.00000	0.0	326.6	326.6	.1334	-.4196
1862	44.5	5.0	160.0	-.0777	-.0798	.0334	-.0183	.1280	-.4208	90.0	.0000	.00000	0.0	328.2	328.2	.1280	-.4208
1863	44.5	10.0	160.0	-.0680	-.0859	.0477	-.0194	.1273	-.4469	90.0	.0000	.00000	0.0	328.2	328.2	.1273	-.4469

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 327.2 327.2

RUN 95 CONFIGURATION 24

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1864	44.5	-.0	-160.0	-.1169	-.0106	.0562	.0159	-.1385	.4060	90.0	.0000	.00000	0.0	328.2	328.2	-.1385	.4060
1865	44.6	-10.0	-160.0	.0019	.0330	.0302	.0124	-.1677	.5043	90.0	.0000	.00000	0.0	329.8	329.8	-.1677	.5043
1866	44.6	-5.0	-160.0	-.0849	.0111	.0482	.0140	-.1522	.4443	90.0	.0000	.00000	0.0	330.2	330.2	-.1522	.4443
1867	44.6	.0	-160.0	-.1083	-.0000	.0573	.0161	-.1398	.4081	90.0	.0000	.00000	0.0	330.2	330.2	-.1398	.4081
1868	44.5	5.1	-160.0	-.1159	-.0117	.0678	.0178	-.1285	.3831	90.0	.0000	.00000	0.0	329.0	329.0	-.1285	.3831
1869	44.5	10.0	-160.0	-.1178	-.0231	.0815	.0188	-.1207	.3852	90.0	.0000	.00000	0.0	329.0	329.0	-.1207	.3852

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 329.4 329.4

RUN 96 CONFIGURATION 22

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1893	45.3	-.0	180.0	.0031	-.0636	.0001	-.0001	.0026	-.0070	90.0	.0000	.00000	0.0	329.8	329.8	.0026	-.0070
1894	45.2	0.0	-170.0	-.0580	-.0450	.0212	.0059	-.0590	.1389	90.0	.0000	.00000	0.0	328.2	328.2	-.0590	.1389
1895	45.0	.0	-160.0	-.0466	-.0052	.0320	.0147	-.1294	.3866	90.0	.0000	.00000	0.0	325.8	325.8	-.1294	.3866
1896	45.3	.0	-160.0	-.0461	-.0028	.0323	.0149	-.1298	.3862	90.0	.0000	.00000	0.0	329.0	329.0	-.1298	.3862
1897	45.2	.0	-150.0	.1195	.0456	.0041	.0212	-.2015	.7083	90.0	.0000	.00000	0.0	327.4	327.8	-.2015	.7083
1898	45.0	0.0	-140.0	-.0041	.0366	-.0415	.0209	-.2548	.9834	90.0	.0000	.00000	0.0	325.8	325.8	-.2548	.9834
1899	45.1	.0	-130.0	-.2094	.0202	.0295	.0183	-.2834	1.2086	90.0	.0000	.00000	0.0	326.6	326.6	-.2834	1.2086
1900	45.2	.0	-120.0	-.0530	.0362	.0110	.0203	-.2851	1.2772	90.0	.0000	.00000	0.0	328.6	328.6	-.2851	1.2772
1901	45.3	.0	-110.0	-.0942	.0271	.0280	.0209	-.2594	1.2538	90.0	.0000	.00000	0.0	329.4	329.4	-.2594	1.2538
1902	45.2	.0	-100.0	-.0835	.0121	.0475	.0197	-.2359	1.2377	90.0	.0000	.00000	0.0	328.2	328.2	-.2359	1.2377
1903	45.3	-.0	-90.0	.0537	-.0283	.0411	.0183	-.2060	1.2737	90.0	.0000	.00000	0.0	329.0	329.0	-.2060	1.2737
1904	45.2	-.0	180.0	.0195	-.0628	.0031	-.0000	.0004	-.0154	90.0	.0000	.00000	0.0	328.6	328.6	.0004	-.0154
1905	45.1	-.0	170.0	-.0684	-.0686	.0249	-.0063	.0636	-.1764	90.0	.0000	.00000	0.0	326.2	326.2	.0636	-.1764
1906	45.2	-.0	160.0	-.0695	-.0591	.0289	-.0152	.1320	-.4212	90.0	.0000	.00000	0.0	328.6	328.6	.1320	-.4212
1907	45.1	-.1	150.0	.0514	-.0536	-.0055	-.0212	.2056	-.7582	90.0	.0000	.00000	0.0	327.0	327.0	.2056	-.7582
1908	45.2	-.1	140.0	-.1164	-.0743	-.0521	-.0205	.2564	-1.0295	90.0	.0000	.00000	0.0	328.2	328.2	.2564	-1.0295
1909	45.3	-.1	130.0	-.2464	-.0917	-.0014	-.0181	.2827	-1.2327	90.0	.0000	.00000	0.0	329.8	329.8	.2827	-1.2327
1910	45.2	-.1	120.0	-.1942	-.0586	.0258	-.0192	.2834	-1.2776	90.0	.0000	.00000	0.0	328.6	328.6	.2834	-1.2776
1911	45.2	-.1	110.0	-.1970	-.0480	.0294	-.0199	.2562	-1.2511	90.0	.0000	.00000	0.0	327.4	327.4	.2562	-1.2511
1912	45.2	-.1	100.0	-.0951	-.0794	.0387	-.0183	.2329	-1.2372	90.0	.0000	.00000	0.0	327.4	327.4	.2329	-1.2372
1913	45.2	-.2	90.0	-.0166	-.0866	.0161	-.0179	.2055	-1.2734	90.0	.0000	.00000	0.0	328.2	328.2	.2055	-1.2734

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 328.0 328.0

RUN 97 CONFIGURATION 22

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1947	45.1	-.0	180.0	.0004	-.0638	-.0003	-.0001	.0027	-.0045	90.0	.0000	.00000	0.0	327.0	327.0	.0027	-.0045
1948	45.2	-9.9	180.0	.0333	-.0411	-.0138	.0000	.0045	-.0088	90.0	.0000	.00000	0.0	327.4	327.4	.0045	-.0088
1949	45.2	-5.0	180.0	.0130	-.0521	-.0073	-.0001	.0035	-.0067	90.0	.0000	.00000	0.0	327.8	327.8	.0035	-.0067
1950	45.2	.0	180.0	.0031	-.0578	.0005	-.0001	.0026	-.0045	90.0	.0000	.00000	0.0	327.8	327.8	.0026	-.0045
1951	45.2	5.0	180.0	-.0144	-.0584	.0076	-.0003	.0024	-.0061	90.0	.0000	.00000	0.0	327.4	327.4	.0024	-.0061
1952	45.2	10.1	180.0	-.0294	-.0621	.0141	-.0003	.0016	-.0118	90.0	.0000	.00000	0.0	327.8	327.8	.0016	-.0118
1953	45.1	-.0	180.0	.0004	-.0638	-.0002	-.0001	.0023	-.0046	90.0	.0000	.00000	0.0	327.0	327.0	.0023	-.0046

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 327.5 327.5

RUN 98 CONFIGURATION 22

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1954	45.0	-.0	170.0	-.0840	-.0730	.0212	-.0063	.0652	-.1681	90.0	.0000	.00000	0.0	325.8	325.8	.0652	-.1681
1955	45.2	-10.0	170.0	-.0447	-.0584	.0084	-.0033	.0828	-.2589	90.0	.0000	.00000	0.0	328.2	328.2	.0828	-.2589
1956	45.2	-5.0	170.0	-.0747	-.0663	.0161	-.0048	.0746	-.2043	90.0	.0000	.00000	0.0	327.4	327.4	.0746	-.2043
1957	45.2	.0	170.0	-.0833	-.0666	.0223	-.0064	.0655	-.1671	90.0	.0000	.00000	0.0	327.4	327.4	.0655	-.1671
1958	45.2	5.1	170.0	-.0756	-.0676	.0273	-.0079	.0588	-.1517	90.0	.0000	.00000	0.0	327.4	327.4	.0588	-.1517
1959	45.2	10.0	170.0	-.0621	-.0700	.0311	-.0094	.0556	-.1695	90.0	.0000	.00000	0.0	327.4	327.4	.0556	-.1695
1960	45.1	-.0	170.0	-.0860	-.0737	.0216	-.0064	.0663	-.1698	90.0	.0000	.00000	0.0	327.0	327.0	.0663	-.1698

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 327.3 327.3

RUN 99   CONFIGURATION 22

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1968	45.2	-.0	160.0	-.0862	-.0806	.0248	-.0153	.1336	-.4184	90.0	.0000	.00000	0.0	328.2	328.2	.1336	-.4184
1969	45.3	-10.0	160.0	.0139	-.0531	.0072	-.0101	.1441	-.4750	90.0	.0000	.00000	0.0	329.0	329.0	.1441	-.4750
1970	45.3	-5.0	160.0	-.0514	-.0671	.0174	-.0129	.1376	-.4399	90.0	.0000	.00000	0.0	329.0	329.0	.1376	-.4399
1971	45.3	.0	160.0	-.0824	-.0728	.0258	-.0155	.1343	-.4203	90.0	.0000	.00000	0.0	329.4	329.4	.1343	-.4203
1972	45.3	5.0	160.0	-.0621	-.0732	.0262	-.0176	.1314	-.4280	90.0	.0000	.00000	0.0	329.4	329.4	.1314	-.4280
1973	45.3	10.0	160.0	-.0155	-.0770	.0291	-.0191	.1321	-.4569	90.0	.0000	.00000	0.0	329.0	329.0	.1321	-.4569
1974	45.3	-.0	160.0	-.0858	-.0790	.0251	-.0153	.1335	-.4160	90.0	.0000	.00000	0.0	329.0	329.0	.1335	-.4160

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 329.0 329.0

RUN 100   CONFIGURATION 22

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
1975	45.2	-.1	150.0	.0372	-.0776	-.0082	-.0214	.2073	-.7632	90.0	.0000	.00000	0.0	328.6	328.6	.2073	-.7632
1976	45.3	-10.0	150.0	.0840	-.0401	-.0214	-.0163	.1990	-.7528	90.0	.0000	.00000	0.0	330.2	330.2	.1990	-.7528
1977	45.3	-5.0	150.0	.0613	-.0593	-.0134	-.0189	.2025	-.7490	90.0	.0000	.00000	0.0	330.2	330.2	.2025	-.7490
1978	45.3	-.0	150.0	.0319	-.0715	-.0073	-.0213	.2066	-.7596	90.0	.0000	.00000	0.0	330.2	330.2	.2066	-.7596
1979	45.3	5.0	150.0	.0139	-.0801	-.0018	-.0237	.2101	-.7963	90.0	.0000	.00000	0.0	330.7	330.7	.2101	-.7963
1980	45.3	10.0	150.0	.0411	-.0855	.0079	-.0258	.2135	-.8604	90.0	.0000	.00000	0.0	330.2	330.2	.2135	-.8604
1981	45.3	-.1	150.0	.0345	-.0773	-.0084	-.0213	.2069	-.7608	90.0	.0000	.00000	0.0	330.2	330.2	.2069	-.7608

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 329.9 329.9

RUN 101   CONFIGURATION 21

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2015	45.2	-.0	180.0	.0109	-.0681	.0005	-.0001	.0014	-.0007	90.0	.0000	.00000	0.0	328.6	328.6	.0014	-.0007
2016	45.3	-10.0	180.0	.0251	-.0479	-.0130	.0000	.0010	-.0031	90.0	.0000	.00000	0.0	330.2	330.2	.0010	-.0031
2017	45.4	-5.0	180.0	.0206	-.0539	-.0063	-.0000	.0016	-.0031	90.0	.0000	.00000	0.0	330.6	330.6	.0016	-.0031
2018	45.3	.0	180.0	.0109	-.0603	.0015	-.0001	.0018	-.0019	90.0	.0000	.00000	0.0	330.2	330.2	.0018	-.0019
2019	45.4	5.0	180.0	-.0776	-.0641	.0084	-.0003	.0021	-.0068	90.0	.0000	.00000	0.0	330.6	330.6	.0021	-.0068
2020	45.4	10.0	180.0	-.0260	-.0652	.0153	-.0004	.0016	-.0051	90.0	.0000	.00000	0.0	331.0	331.0	.0016	-.0051
2021	45.4	-.0	180.0	.0109	-.0671	.0006	-.0001	.0014	-.0007	90.0	.0000	.00000	0.0	330.6	330.6	.0014	-.0007

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 330.2 330.2

RUN 102   CONFIGURATION 21

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2022	45.2	-.0	170.0	-.0170	-.0704	.0014	-.0038	.0289	-.1199	90.0	.0000	.00000	0.0	328.6	328.6	.0289	-.1199
2023	45.2	-10.0	170.0	-.0194	-.0596	-.0080	-.0003	.0313	-.1851	90.0	.0000	.00000	0.0	328.6	328.6	.0313	-.1851
2024	45.2	-5.0	170.0	-.0141	-.0623	-.0029	-.0022	.0297	-.1472	90.0	.0000	.00000	0.0	328.6	328.6	.0297	-.1472
2025	45.2	.0	170.0	-.0172	-.0650	.0019	-.0038	.0290	-.1199	90.0	.0000	.00000	0.0	328.6	328.6	.0290	-.1199
2026	45.2	5.1	170.0	-.0833	-.0696	.0083	-.0051	.0303	-.1206	90.0	.0000	.00000	0.0	328.6	328.6	.0303	-.1206
2027	45.3	10.0	170.0	.0029	-.0739	.0126	-.0065	.0347	-.1556	90.0	.0000	.00000	0.0	329.0	329.0	.0347	-.1556
2028	45.2	-.0	170.0	-.0197	-.0733	.0012	-.0038	.0290	-.1199	90.0	.0000	.00000	0.0	328.6	328.6	.0290	-.1199

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 328.7 328.7

RUN 103   CONFIGURATION 21

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2029	45.0	-.0	160.0	-.0732	-.0654	.0038	-.0092	.0667	-.3319	90.0	.0000	.00000	0.0	325.5	325.5	.0667	-.3319
2030	45.1	-10.0	160.0	-.0669	-.0502	-.0094	-.0032	.0746	-.4173	90.0	.0000	.00000	0.0	326.2	326.2	.0746	-.4173
2031	45.1	-5.0	160.0	-.0965	-.0563	.0005	-.0061	.0690	-.3704	90.0	.0000	.00000	0.0	326.2	326.2	.0690	-.3704
2032	45.1	.0	160.0	-.0699	-.0575	.0047	-.0094	.0673	-.3334	90.0	.0000	.00000	0.0	326.2	326.2	.0673	-.3334
2033	45.0	5.0	160.0	-.1315	-.0633	.0121	-.0115	.0692	-.3513	90.0	.0000	.00000	0.0	325.5	325.5	.0692	-.3513
2034	45.0	10.0	160.0	.0010	-.0711	.0114	-.0125	.0782	-.4151	90.0	.0000	.00000	0.0	325.8	325.8	.0782	-.4151
2035	45.0	-.0	160.0	-.0729	-.0662	.0036	-.0093	.0674	-.3313	90.0	.0000	.00000	0.0	325.8	325.8	.0674	-.3313

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 325.9 325.9

RUN 104   CONFIGURATION 41

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2069	15.0	-.0	-180.0	.0144	-.1920	.0744	.0249	-.0930	.5791	44.4	.0458	.00158	192.7	36.6	268.2	-.0127	.0791
2070	14.9	.0	-170.0	-.1242	-.1200	.0889	.0327	-.1548	1.0501	43.9	.0457	.00154	193.6	35.8	268.8	-.0206	.1400
2071	15.0	.0	-160.0	-.3900	-.1411	.1265	.0328	-.2066	1.3551	44.1	.0458	.00169	193.2	36.2	269.0	-.0278	.1826
2072	15.0	.0	-150.0	-.5324	-.1417	.1302	.0320	-.2496	1.5640	44.4	.0458	.00175	193.0	36.6	269.0	-.0340	.2130
2073	15.0	.0	-140.0	-.5020	-.1911	.0885	.0368	-.2974	1.9024	44.5	.0455	.00176	193.0	36.6	267.4	-.0407	.2606
2074	15.0	.0	-130.0	-.2159	-.2441	.0499	.3450	-.3544	2.4614	44.5	.0453	.00178	192.9	36.6	266.4	-.0488	.3386
2075	15.0	.0	-120.0	.0940	-.2322	.0029	.0542	-.4333	3.1204	44.3	.0453	.00174	192.7	36.2	265.3	-.0592	.4263
2076	14.9	0.0	-110.0	.2460	-.1790	-.0037	.0656	-.4879	3.7114	44.0	.0453	.00166	192.7	35.8	265.1	-.0660	.5020
2077	14.7	-.0	-100.0	.4077	-.0909	-.0042	.0790	-.5478	4.3391	43.4	.0452	.00149	192.9	35.1	263.9	-.0728	.5764
2078	14.6	-.0	-90.0	.6510	.0402	-.0142	.0882	-.6043	4.7571	43.0	.0451	.00133	192.9	34.7	263.0	-.0796	.6270
2079	15.3	-.0	-180.0	.0615	-.0643	.0828	.0243	-.0925	.5833	45.0	.0459	.00159	192.6	37.8	269.4	-.0130	.0819
2080	15.3	-.0	170.0	-.0200	-.1243	.0911	.0065	-.0206	.0904	45.1	.0458	.00160	192.5	37.8	268.9	-.0029	.0127
2081	15.3	-.0	160.0	-.2145	-.1721	.1053	-.0103	.0604	-.4143	45.0	.0459	.00165	192.5	37.8	269.2	.0085	-.0582
2082	15.2	-.1	150.0	-.3212	-.1819	.1214	-.0240	.1449	-.9874	44.9	.0458	.00173	192.4	37.4	268.0	.0202	-.1379
2083	15.0	-.1	140.0	-.2923	-.2066	.1251	-.0354	.2478	-1.7514	44.4	.0456	.00172	192.3	36.6	266.0	.0341	-.2412
2084	15.0	-.1	130.0	-.0987	-.2216	.1013	-.0420	.3560	-2.4230	44.3	.0455	.00178	192.3	36.6	265.7	.0491	-.3341

AVERAGE TIP SPEED RATIO = .040   AVERAGE OF ABOVE VALUES 44.3 .0456 .00165 192.8 36.5 267.1

RUN 105   CONFIGURATION 41

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2092	20.1	.0	180.0	.1635	-.1454	.0076	.0146	-.0389	.2831	54.8	.0485	.00261	192.7	65.4	310.7	-.0082	.0596
2093	20.2	.0	-170.0	.1403	-.0967	.0107	.0272	-.0819	.5965	54.9	.0486	.00280	193.4	66.2	313.9	-.0173	.1257
2094	20.1	.0	-160.0	-.1506	-.0611	.0317	.0365	-.1282	.8652	54.8	.0486	.00299	193.2	65.4	312.4	-.0268	.1811
2095	20.0	.1	-150.0	-.8374	-.0586	.0596	.0374	-.1628	1.0662	54.6	.0486	.00301	193.2	65.0	312.0	-.0339	.2221
2096	20.0	.0	-140.0	-.4555	-.2612	.0937	.0316	-.1560	1.3475	54.8	.0481	.00304	193.1	65.0	309.4	-.0328	.2831
2097	19.9	.0	-130.0	-.2557	-.3790	.0693	.0347	-.1679	1.6402	54.5	.0480	.00308	192.9	63.8	307.3	-.0349	.3405
2098	19.8	.0	-120.0	-.1881	-.3853	.0594	.0403	-.1943	2.0408	54.3	.0479	.00299	192.9	63.4	306.0	-.0403	.4229
2099	19.7	.0	-110.0	-.1578	-.357C	.0666	.0450	-.2208	2.4558	53.9	.0478	.00284	192.9	62.6	304.7	-.0454	.5048
2100	19.6	.0	-100.0	-.1131	-.2915	.0570	.0495	-.2386	2.8167	53.7	.0477	.00263	192.9	62.2	303.6	-.0499	.5773
2101	19.4	-.0	-90.0	-.0809	-.2354	.0820	.0576	-.2492	3.2088	53.1	.0476	.00243	192.9	61.1	302.1	-.0504	.6484
2102	20.2	-.0	180.0	.1498	-.1209	.0108	.0138	-.0367	.2804	55.2	.0485	.00279	192.9	66.2	311.9	-.0078	.0595
2103	20.2	-.0	170.0	.0971	-.1699	.0140	-.0003	.0153	-.0798	55.2	.0484	.00270	192.8	66.2	311.4	.0032	-.0170
2104	20.2	-.0	160.0	.0067	-.2006	.0201	-.0136	.0749	-.4396	55.1	.0485	.00266	192.8	66.2	311.6	.0159	-.0934
2105	20.1	-.0	150.0	-.1900	-.2130	.0356	-.0256	.1329	-.8653	54.9	.0485	.00249	192.9	65.4	310.C	.0280	-.1825
2106	20.0	-.0	140.0	-.5138	-.2041	.0357	-.0351	.1926	-1.2897	54.7	.0482	.00240	192.8	65.0	308.7	.0405	-.2716
2107	19.9	-.1	130.0	-.7914	-.2027	.0356	-.0414	.2441	-1.6448	54.1	.0485	.00236	192.6	63.8	308.8	.0504	-.3399

AVERAGE TIP SPEED RATIO = .053   AVERAGE OF ABOVE VALUES 54.5 .0482 .00274 193.0 64.6 309.0

RUN 106   CONFIGURATION 41

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2115	25.2	0.0	180.0	.1812	-.0969	.0053	.0095	-.0210	.1356	62.8	.0518	.00348	190.9	102.8	360.0	-.0060	.0387
2116	25.2	.0	-170.0	.2111	-.0557	.0033	.0218	-.0574	.4082	62.9	.0519	.00349	190.6	103.2	359.7	-.0165	.1171
2117	25.1	.0	-160.0	.1545	-.0004	.0080	.0325	-.1021	.7192	62.8	.0518	.00349	190.6	102.4	358.5	-.0292	.2054
2118	25.1	.0	-150.0	-.2233	-.0023	.0272	.0345	-.1431	.9520	62.8	.0519	.00335	190.5	102.4	358.8	-.0408	.2717
2119	25.0	.1	-140.0	-.5776	-.0174	.0652	.0354	-.1654	1.1367	62.5	.0518	.00313	190.6	131.2	357.5	-.0468	.3219
2120	24.9	.0	-130.0	-.3819	-.1258	.0492	.0299	-.1678	1.3107	62.4	.0515	.00305	190.6	100.4	354.8	-.0475	.3711
2121	24.8	.0	-120.0	-.0940	-.2427	.0473	.0334	-.1499	1.5111	62.3	.0512	.00284	190.4	99.6	352.3	-.0424	.4274
2122	24.6	.0	-110.0	-.0783	-.2668	.0433	.0384	-.1480	1.7999	61.9	.0510	.00261	190.4	98.1	350.0	-.0415	.5043
2123	25.0	.0	-100.0	-.1474	-.2186	.0279	.0430	-.1550	2.0156	62.3	.0512	.00246	190.4	101.2	353.8	-.0443	.5766
2124	25.2	0.0	-90.0	-.3150	-.1910	.0144	.0472	-.1692	2.1798	62.3	.0514	.00220	190.4	102.8	356.5	-.0488	.6285
2125	26.0	-.0	180.C	.1875	-.0722	.0091	.0090	-.0192	.1280	63.8	.0523	.00381	190.0	109.1	368.6	-.0057	.0370
2126	25.5	-.0	170.0	.1560	-.0978	.0089	-.0021	.0171	-.1148	63.4	.0517	.00384	190.9	105.5	362.2	.0050	-.0335
2127	25.5	-.0	160.0	.0889	-.1215	.0117	-.0132	.0664	-.3983	63.3	.0515	.00398	191.0	105.2	361.5	.0193	-.1150
2128	25.4	-.0	150.0	-.0506	-.1266	.0137	-.0245	.1205	-.7110	63.0	.0516	.00395	191.1	104.4	360.8	.0349	-.2057
2129	25.2	-.0	140.0	-.2146	-.1253	.0062	-.0340	.1620	-1.0455	62.7	.0515	.00391	190.9	102.8	359.2	.0465	-.3030
2130	25.0	-.1	130.C	-.6375	-.1453	-.0093	-.0386	.1899	-1.3074	62.7	.0517	.00396	190.8	101.2	357.2	.0538	-.3705
2131	25.0	-.1	120.0	-.8590	-.1322	.0426	-.0378	.2177	-1.6699	62.0	.0516	.00401	190.6	100.8	356.2	.0616	-.4727

AVERAGE TIP SPEED RATIO = .068   AVERAGE OF ABOVE VALUES 62.7 .0516 .00338 190.7 102.5 358.0

RUN 107   CONFIGURATION 41

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2165	30.5	-.0	-180.0	.1680	-.0993	.0046	.C067	-.0141	.0886	68.7	.0547	.00432	190.9	147.7	413.6	-.0050	.0316
2166	30.0	.0	-170.0	.2047	-.0629	.0003	.0177	-.0484	.3142	68.2	.0545	.00449	191.2	143.3	409.1	-.0169	.1101
2167	30.4	0.0	-160.0	.2150	-.0040	-.0048	.0275	-.0924	.6255	68.6	.0545	.00466	191.0	146.5	411.8	-.0329	.2225
2168	30.3	.0	-150.0	.0331	.0192	.0132	.0317	-.1334	.8739	68.5	.0546	.00472	190.8	145.7	411.0	-.0473	.3098
2169	30.3	.1	-140.0	-.4033	-.0063	.0388	.0318	-.1656	1.0332	68.2	.0547	.00464	191.2	145.3	417.3	-.0583	.3641
2170	30.3	.0	-130.0	-.1809	-.0150	.0496	.0319	-.1847	1.2319	68.3	.0545	.00468	190.7	145.7	410.1	-.0656	.4376
2171	30.3	.0	-120.0	-.2002	-.0754	.0362	.0298	-.1703	1.2683	68.2	.0545	.00458	191.4	146.1	417.8	-.0603	.4489
2172	30.4	.0	-110.0	-.1341	-.1876	.0351	.0320	-.1341	1.3591	68.2	.0541	.00449	191.5	146.5	411.3	-.0478	.4841
2173	30.3	.0	-100.0	-.1932	-.1933	.0046	.0364	-.1418	1.5665	68.1	.0541	.00428	191.2	145.7	409.6	-.0504	.5572
2174	30.4	.0	-89.9	-.2880	-.1862	-.0149	.0402	-.1484	1.6423	67.9	.0543	.00401	191.5	146.5	412.2	-.0528	.5837
2175	30.2	0.0	180.0	.1584	-.1161	.0023	.0071	-.0162	.0926	68.3	.0543	.00430	192.1	144.9	412.4	-.0057	.0325
2176	30.4	-.0	170.0	.1315	-.1294	.0034	-.0027	.0159	-.1038	68.4	.0544	.00422	192.2	146.9	415.1	.0056	-.0367
2177	30.3	-.0	160.0	.0982	-.1352	.0064	-.0116	.0604	-.3637	68.4	.0540	.00401	192.3	146.1	412.7	.0214	-.1287
2178	30.3	-.0	150.0	.0636	-.1147	.0152	-.0206	.1153	-.6659	68.2	.0538	.00389	192.3	145.3	411.1	.0407	-.2353
2179	30.3	-.0	140.0	-.2841	-.1117	.0074	-.0278	.1517	-.8421	68.2	.0539	.00376	192.3	145.7	411.6	.0537	-.2981
2180	30.4	-.0	130.0	-.2577	-.1056	-.0086	-.0334	.1893	-1.1515	68.2	.0539	.00375	192.0	146.5	411.9	.0673	-.4095
2181	30.4	-.0	120.0	-.5398	-.1241	.0043	-.0353	.1975	-1.3541	67.9	.0544	.00364	192.0	146.5	414.2	.0699	-.4789
2182	30.3	-.1	110.0	-.5046	-.1242	.0254	-.0325	.2127	-1.5413	67.9	.0538	.00365	191.7	145.7	409.4	.0757	-.5486
2183	30.4	-.1	100.0	-.5021	-.1028	.0307	-.0337	.2135	-1.5450	67.9	.0538	.00367	191.5	146.9	410.2	.0764	-.5532
2184	30.5	-.1	90.0	-.5596	-.0939	.0674	-.0345	.2028	-1.4938	67.9	.0536	.00370	191.8	147.7	410.9	.0729	-.5369

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES 68.2 .0542 .00417 191.6 146.1 411.7

RUN 108   CONFIGURATION 41

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2193	30.4	.0	-180.0	.1758	-.0510	.0101	.0067	-.0145	.0744	68.6	.0546	.00416	191.0	146.9	412.6	-.0052	.0265
2194	30.4	-10.0	-180.0	.1585	.0230	.0051	.0033	-.0087	.0380	69.3	.0620	.00481	190.9	146.5	448.1	-.0029	.0124
2195	30.3	-4.9	-180.0	.1751	-.0130	.0092	.0049	-.0113	.0334	68.8	.0569	.00413	192.3	145.7	425.9	-.0039	.0114
2196	30.6	-.0	-180.0	.1686	-.0388	.0112	.0066	-.0137	.0736	68.9	.0547	.00380	189.4	148.5	410.4	-.0050	.0266
2197	30.5	5.0	-180.0	.0836	-.0720	.0078	.0076	-.0185	.0887	68.6	.0507	.00323	191.0	148.1	394.9	-.0069	.0332
2198	30.5	10.0	-180.0	.0284	-.0961	.0123	.0085	-.0218	.1303	68.7	.0467	.00249	191.6	147.7	376.4	-.0085	.0511

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES 68.8 .0543 .00377 191.0 147.2 411.4

RUN 109   CONFIGURATION 41

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2206	30.3	-.0	160.0	.1122	-.0766	.0116	-.0119	.0633	-.3620	68.3	.0540	.00463	192.6	145.3	412.4	.0223	-.1275
2207	30.3	-9.8	160.0	.1427	.0080	.0019	-.0072	.0679	-.2939	69.4	.0605	.00526	191.1	145.3	440.4	.0224	-.0970
2208	30.4	-5.0	160.0	.1301	-.0190	.0059	-.0089	.0636	-.3229	69.1	.0569	.00491	191.3	146.5	424.3	.0220	-.1115
2209	30.4	.0	160.0	.1106	-.0597	.0128	-.0117	.0628	-.3552	68.9	.0541	.00484	190.1	146.9	408.0	.0226	-.1279
2210	30.4	5.1	160.0	.0239	-.0965	.0166	-.0127	.0664	-.3954	68.3	.0506	.00428	192.2	146.9	396.4	.0246	-.1465
2211	30.5	10.0	160.0	-.0212	-.1349	.0207	-.0138	.0721	-.3934	68.6	.0470	.00343	191.7	148.1	378.6	.0282	-.1539

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES 68.8 .0538 .00456 191.5 146.5 410.0

RUN 110   CONFIGURATION 41

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2219	30.4	.0	-160.0	.1915	.0296	-.0021	.0272	-.0907	.6124	68.8	.0542	.00491	191.6	146.9	412.3	-.0323	.2182
2220	30.4	-9.9	-160.0	.1358	.0855	.0017	.0158	-.0838	.4294	69.9	.0604	.00582	191.4	146.5	441.8	-.0278	.1424
2221	30.3	-4.9	-160.0	.1586	.0593	.0000	.0220	-.0839	.4765	69.1	.0569	.00518	192.1	145.7	426.2	-.0287	.1629
2272	30.4	.0	-160.0	.1979	.0340	-.0018	.0272	-.0908	.6172	68.9	.0546	.00532	190.2	146.5	410.1	-.0324	.2205
2223	30.5	5.1	-160.0	.1298	-.0075	.0022	.0286	-.1028	.6793	68.7	.0506	.00553	192.4	147.3	397.1	-.0381	.2486
2224	30.5	10.1	-160.0	.0722	-.0429	.0130	.0279	-.1133	.7187	69.2	.0468	.00549	191.7	147.7	377.3	-.0443	.2813

AVERAGE TIP SPEED RATIO = .082   AVERAGE OF ABOVE VALUES 69.1 .0539 .00538 191.6 146.8 410.8

RUN 111   CONFIGURATION 41

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2233	45.6	-.0	180.0	.0945	-.0551	.0091	.0031	-.0056	.0424	77.7	.0618	.00476	193.1	329.8	637.3	-.0029	.0220
2234	45.6	.0	-170.0	.0858	-.0341	.0052	.0106	-.0344	.1894	77.3	.0609	-.00351	191.5	330.2	628.5	-.0181	.0995
2235	45.5	0.0	-160.0	.1225	.0115	-.0070	.0178	-.0779	.4321	76.6	.0612	-.00885	191.9	328.6	629.6	-.0407	.2255
2236	45.2	-.0	-150.0	.0593	.0361	-.0030	.0196	-.1235	.6786	76.3	.0615	-.00919	191.0	325.1	624.2	-.0643	.3533
2237	45.4	.0	-139.9	-.2547	.0125	-.0014	.0184	-.1596	.8155	76.7	.0621	-.00338	191.2	327.4	630.5	-.0829	.4235
2238	45.2	.0	-130.0	-.1641	-.0162	.0297	.0170	-.1876	.9809	76.7	.0616	-.00150	191.0	325.1	624.8	-.0976	.5103
2239	45.6	.0	-120.0	-.1168	-.0537	.0117	.0141	-.1835	.9934	77.2	.0614	.00140	190.6	330.6	628.2	-.0965	.5227
2240	45.6	.0	-110.0	-.0691	-.0768	.0252	.0141	-.1616	1.0115	77.4	.0612	.00422	191.3	329.8	628.7	-.0848	.5306
2241	45.4	-.0	-100.0	-.0334	-.1327	.0255	.0160	-.1298	1.1019	78.0	.0574	.00578	191.4	327.4	608.1	-.0699	.5934
2242	45.4	-.1	-89.9	-.0387	-.1158	.0234	.0174	-.1216	1.1902	78.2	.0566	.00668	191.1	327.4	603.2	-.0660	.6460
2243	45.4	-.0	180.0	.0814	-.0824	.0064	.0033	-.0068	.0410	76.9	.0650	.00105	191.6	327.0	645.3	-.0034	.0208
2244	45.4	-.0	170.0	.0619	-.0886	.0070	-.0036	.0223	-.0976	77.0	.0644	.00071	191.6	327.8	543.2	.0114	-.0497
2245	45.4	-.1	160.0	.0090	-.0833	.0064	-.0097	.0621	-.3100	76.7	.0653	.00028	191.6	327.4	647.4	.0314	-.1568
2246	45.7	-.1	150.0	-.0052	-.0568	.0060	-.0146	.1113	-.5840	76.9	.0645	.00025	191.5	332.1	647.5	.0571	-.2995
2247	45.4	-.0	140.0	-.2203	-.0431	.0178	-.0172	.1473	-.7722	77.2	.0628	.00700	191.3	327.4	633.5	.0761	-.3991
2248	45.4	-.3	130.0	-.2428	-.0405	.0167	-.0161	.1850	-.9756	77.3	.0627	.00352	191.2	327.8	633.6	.0957	-.5043

AVERAGE TIP SPEED RATIO = .122   AVERAGE OF ABOVE VALUES   77.1   .0619   .00026   191.4   328.2   630.9

RUN 112   CONFIGURATION 43

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2314	15.5	-.0	180.0	.0838	-.1803	.0452	.0233	-.0677	.4126	46.2	.0457	.00217	191.2	38.2	262.5	-.0099	.0602
2315	15.2	.0	-170.0	-.0040	-.0800	.0697	.0354	-.1585	.9393	45.7	.0456	.00208	190.9	37.0	260.3	-.0225	.1336
2316	15.1	.0	-160.0	-.2694	-.1087	.1160	.0365	-.2404	1.3064	45.4	.0456	.00207	190.7	36.2	258.8	-.0337	.1829
2317	15.1	.0	-150.0	-.4690	-.1076	.1167	.0378	-.3216	1.6173	45.5	.0455	.00200	190.6	36.2	258.1	-.0452	.2271
2318	15.1	.0	-140.0	-.4123	-.1778	.0910	.0443	-.3768	1.9556	45.5	.0454	.00189	190.6	36.2	257.6	-.0530	.2752
2319	15.1	.0	-130.0	-.2623	-.2130	.0844	.0542	-.4530	2.5120	45.5	.0453	.00176	190.4	36.2	256.9	-.0639	.3544
2320	15.0	.0	-120.0	.0075	-.1978	.0763	.0655	-.5513	3.1949	45.3	.0452	.00155	190.4	35.8	255.9	-.0772	.4475
2321	14.9	0.0	-110.0	.1388	-.1589	.0925	.0802	-.6385	3.8186	45.0	.0452	.00130	190.3	35.5	255.4	-.0887	.5302
2322	14.7	0.0	-100.0	.0158	-.0659	.2205	.0980	-.7937	4.5272	44.3	.0451	.00105	190.4	34.7	255.6	-.1076	.6143
2323	14.6	-.0	-90.0	.1193	.0370	.3373	.1181	-.9092	5.1541	43.7	.0450	.00077	191.1	33.9	254.7	-.1209	.6856
2324	15.1	-.0	180.0	.2357	-.0783	.0524	.0241	-.0674	.4142	45.5	.0457	.00235	190.7	36.2	259.8	-.0094	.0578
2325	15.1	-.0	170.0	.2706	-.1435	.0458	.0037	.0210	-.0676	45.6	.0456	.00244	190.7	36.2	259.1	.0029	-.0095
2326	15.1	-.1	160.0	.1166	-.1681	.0618	-.0133	.1230	-.6830	45.6	.0456	.00256	190.7	36.2	258.8	.0172	-.0956
2327	15.1	-.1	150.0	-.0549	-.2061	.0925	-.0310	.2410	-1.3305	45.6	.0454	.00260	190.6	36.2	257.7	.0339	-.1871
2328	15.1	-.1	140.0	-.1357	-.2333	.1041	-.0434	.3772	-2.0253	45.6	.0453	.00264	190.4	36.2	257.2	.0532	-.2854
2329	14.9	-.1	130.0	.0142	-.2812	.0879	-.0516	.5217	-2.7829	45.0	.0455	.00268	190.4	35.5	257.0	.0720	-.3839
2330	14.8	-.1	120.0	.1618	-.3084	.0331	-.0595	.6438	-3.3790	44.7	.0454	.00270	190.5	35.1	256.5	.0880	-.4619

AVERAGE TIP SPEED RATIO = .040   AVERAGE OF ABOVE VALUES   45.3   .0454   .00204   190.7   36.0   257.8

RUN 113   CONFIGURATION 43

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2331	19.9	-.0	180.0	.3538	-.0610	.0072	.0130	-.0238	.1960	55.2	.0484	.00299	190.6	63.4	299.4	-.0050	.0415
2332	20.0	-.0	-170.0	.3252	.0156	.0244	.0291	-.1063	.6141	55.5	.0485	.00298	190.6	64.2	300.6	-.0227	.1312
2333	20.3	-.0	-160.0	.0492	.0540	.0310	.0405	-.1761	.9019	55.8	.0487	.00295	190.5	65.8	303.4	-.0382	.1956
2334	20.3	.0	-150.0	-.4943	.0492	.0658	.0406	-.2206	1.1537	55.7	.0487	.00287	190.6	65.8	303.7	-.0478	.2409
2335	20.2	.0	-140.0	-.2916	-.1494	.1080	.0368	-.2317	1.4077	55.8	.0484	.00278	190.5	65.4	301.6	-.0502	.3052
2336	20.2	.0	-130.0	-.1001	-.2620	.1060	.0409	-.2605	1.7194	55.6	.0484	.00260	190.4	65.0	303.6	-.0563	.3717
2337	20.0	.0	-120.0	-.0436	-.2614	.1163	.0483	-.3082	2.1597	55.3	.0480	.00242	190.4	64.2	299.8	-.0660	.4625
2338	19.9	0.0	-110.0	-.0105	-.2272	.1301	.0545	-.3905	2.5628	55.1	.0478	.00209	190.5	63.8	298.9	-.0748	.5471
2339	19.8	-.0	-100.0	-.0320	-.1686	.1458	.0626	-.4128	3.0051	54.8	.0479	.00177	190.5	63.4	299.1	-.0875	.6372
2340	19.9	-.0	-90.0	-.0348	-.0898	.1785	.0751	-.5506	3.5235	54.6	.0480	.00152	190.5	63.8	299.6	-.1172	.7504
2341	20.6	-.0	180.0	.3796	-.0426	.0072	.0115	-.0202	.1640	56.5	.0484	.00322	190.7	68.5	306.7	-.0045	.0366
2342	20.5	-.0	170.0	.3453	-.0884	.0104	-.0025	.0419	-.1621	56.4	.0482	.00317	190.8	67.7	305.3	.0093	-.0363
2343	20.5	-.1	160.0	.2861	-.1203	.0071	-.0176	.1184	-.5753	56.5	.0480	.00324	190.7	67.7	304.3	.0263	-.1281
2344	20.4	-.1	150.0	.1286	-.1432	.0162	-.0315	.2016	-1.0406	56.2	.0479	.00333	190.8	67.0	303.1	.0445	-.2299
2345	20.4	-.1	140.0	-.3624	-.1456	.0229	-.0428	.2735	-1.3985	56.0	.0481	.00332	190.7	67.0	303.9	.0603	-.3082
2346	20.2	-.1	130.0	-.5832	-.1605	.0491	-.0486	.3467	-1.8122	55.5	.0481	.00331	190.9	65.8	302.7	.0753	-.3938
2347	20.0	-.1	120.0	-.2748	-.1743	.0697	-.0519	.4332	-2.4034	55.0	.0480	.00335	190.7	64.2	300.3	.0926	-.5138

AVERAGE TIP SPEED RATIO = .054   AVERAGE OF ABOVE VALUES   55.6   .0482   .00282   190.6   65.5   301.9

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APPENDIX

RUN 114   CONFIGURATION 43

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2355	25.1	-.0	180.0	.2100	-.1188	-.0068	.0088	-.0112	.1315	62.8	.0509	.00372	192.4	101.2	356.5	-.0032	.0373
2356	25.1	0.0	-170.0	.1975	-.0709	.0069	.0243	-.0801	.4448	62.9	.0510	.00377	191.8	101.2	355.4	-.0228	.1267
2357	25.0	.0	-160.0	.1989	.0011	.0086	.0375	-.1544	.8265	62.7	.0512	.00369	191.5	100.8	355.0	-.0439	.2348
2358	25.1	.0	-150.0	-.3910	-.0117	.0122	.0396	-.194	.9749	62.8	.0514	.00365	191.2	101.2	355.9	-.0564	.2773
2359	25.2	.0	-140.0	-.5138	-.0141	.0624	.0407	-.2331	1.2642	62.8	.0514	.00355	191.1	102.0	356.4	-.0667	.3618
2360	25.1	.0	-130.0	-.3951	-.1363	.0743	.0372	-.2461	1.4549	62.7	.0513	.00342	190.9	101.2	354.3	-.0703	.4157
2361	25.0	.0	-120.0	-.1154	-.2285	.0855	.0414	-.2586	1.6960	62.7	.0511	.00327	190.9	100.8	352.8	-.0739	.4847
2362	24.9	.0	-110.0	-.0806	-.2289	.0839	.0477	-.2777	1.9919	62.4	.0508	.00303	190.9	99.6	350.3	-.0790	.5667
2363	24.7	.0	-100.0	-.1930	-.1811	.0900	.0539	-.3049	2.2658	62.1	.0507	.00271	190.8	98.5	348.6	-.0861	.6400
2364	24.7	0.0	-90.0	-.3369	-.1154	.0869	.0610	-.3875	2.5888	61.8	.0508	.00243	190.7	98.5	348.9	-.1093	.7305
2365	25.5	-.0	180.0	.2113	-.1045	-.0058	-.0090	-.0090	.1150	63.5	.0515	.00387	191.1	105.2	359.4	-.0026	.0336
2366	25.5	-.0	170.0	.1756	-.1377	-.0027	-.0040	.0411	-.1607	63.5	.0513	.00376	191.1	105.2	358.9	.0123	-.0471
2367	25.5	-.0	160.0	.1686	-.1550	-.0114	-.0162	.1078	-.4956	63.5	.0511	.00369	191.2	104.8	357.6	.0316	-.1452
2368	25.4	-.1	150.0	.0586	-.1702	-.0078	-.0292	.1704	-.8334	63.2	.0509	.00368	191.2	103.6	355.4	.0497	-.2429
2369	25.3	-.1	140.0	-.2568	-.1793	-.0039	-.0406	.2299	-1.1496	63.0	.0508	.00364	191.4	103.2	355.3	.0668	-.3339
2370	25.3	-.1	130.0	-.6441	-.1985	.0008	-.0458	.2860	-1.4803	62.7	.0512	.00365	191.1	102.8	356.0	.0826	-.4275
2371	25.0	-.1	120.0	-.9352	-.1827	.0539	-.0471	.3398	-1.8951	62.1	.0513	.00364	191.2	100.4	354.0	.0964	-.5376

AVERAGE TIP SPEED RATIO = .068   AVERAGE OF ABOVE VALUES 62.8 .0511 .00348 191.2 101.8 354.8

RUN 115   CONFIGURATION 43

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2379	30.2	.0	180.0	.1574	-.1213	-.0048	.0058	-.0022	.0808	68.5	.0545	.00505	191.2	146.5	416.2	-.0008	.0284
2380	30.2	.0	-170.0	.1453	-.0694	.0092	.0193	-.0678	.3180	68.6	.0548	.00519	190.7	147.3	417.0	-.0239	.1123
2381	30.2	.0	-160.0	.1738	.0013	.0128	.0326	-.1392	.6612	68.5	.0546	.00523	190.7	146.5	415.6	-.0491	.2330
2382	30.1	.0	-150.0	-.0529	.0157	-.0094	.0365	-.1996	.9491	68.4	.0547	.00507	190.7	145.7	415.3	-.0700	.3330
2383	30.0	.1	-140.0	-.3742	-.0151	.0489	.0390	-.2244	1.1074	68.2	.0547	.00480	190.4	144.5	413.3	-.0785	.3872
2384	30.0	.1	-130.0	-.3663	-.0604	.0656	.0369	-.2411	1.2904	68.1	.0548	.00472	190.2	144.5	413.1	-.0844	.4515
2385	30.0	.1	-120.0	-.2825	-.1302	.0816	.0381	-.2391	1.4097	68.1	.0545	.00445	190.2	144.5	411.7	-.0839	.4949
2386	29.9	.0	-110.0	-.1496	-.1838	.0699	.0419	-.2505	1.5955	68.1	.0541	.00423	190.2	143.7	408.8	-.0881	.5609
2387	29.7	.0	-103.0	-.2618	-.1759	.0523	.0474	-.2736	1.8230	67.6	.0541	.00388	190.9	142.2	409.2	-.0951	.6334
2388	29.7	.0	-89.7	-.3885	-.1173	.0610	.0530	-.3111	1.9718	67.3	.0542	.00342	191.5	142.6	411.7	-.1377	.6828
2389	30.4	0.0	180.0	.1615	-.1095	-.0035	.0058	-.0017	.0740	68.5	.0545	.00503	192.1	148.5	421.2	-.0006	.0261
2390	30.2	-.0	170.0	.1363	-.1409	-.0046	-.0054	.0446	-.1593	68.4	.0543	.00503	192.1	146.5	418.1	.0156	-.0558
2391	30.2	-.0	160.0	.1284	-.1424	-.0141	-.0152	.1017	-.4509	68.4	.0540	.00491	192.1	146.5	416.4	.0358	-.1586
2392	30.0	-.1	150.0	-.0254	-.1657	-.0206	-.0252	.1644	-.7099	68.2	.0538	.00482	192.1	144.9	413.4	.0576	-.2486
2393	29.9	-.1	140.0	-.0775	-.1721	-.0087	-.0353	.2223	-1.0444	68.1	.0537	.00475	192.2	144.1	412.6	.0776	-.3648
2394	29.7	-.1	130.0	-.4649	-.1941	.0050	-.0422	.2714	-1.3047	67.6	.0540	.00463	192.1	142.2	412.1	.0936	-.4500
2395	29.6	-.1	120.0	-.7090	-.2045	.0313	-.0440	.3103	-1.6345	67.2	.0544	.00451	192.2	141.4	413.5	.1061	-.5589

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES 68.1 .0543 .00469 191.3 144.8 414.1

RUN 116   CONFIGURATION 43

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2403	44.7	-.0	-180.0	.1032	-.0844	.0003	.0020	.0075	.0309	77.6	.0626	.00715	190.8	329.0	644.1	.0038	.0158
2404	44.6	.0	-170.0	.0501	-.0485	.0165	.0125	-.0574	.2101	77.2	.0625	.00701	193.1	326.6	649.0	-.0289	.1057
2405	44.8	.0	-160.0	.0448	.0157	.0329	.0233	-.1294	.4793	77.3	.0626	.00699	193.4	329.8	653.8	-.0653	.2418
2406	44.7	.0	-150.0	.0397	.0487	.0019	.0273	-.1941	.7602	77.2	.0630	.00700	192.8	328.2	652.4	-.0976	.3825
2407	44.5	.0	-140.0	-.2928	.0246	.0073	.0270	-.2288	.9217	77.0	.0637	.00669	192.5	325.5	651.7	-.1143	.4603
2408	44.8	.0	-130.0	-.1518	-.0255	.0444	.0243	-.2403	1.0206	77.2	.0634	.00675	191.7	330.6	652.9	-.1216	.5167
2409	44.7	-.0	-120.0	-.2184	-.0556	.0545	.0243	-.2355	1.0564	77.2	.0633	.00650	191.7	329.4	651.0	-.1191	.5345
2410	44.5	-1.6	-110.0	-.2013	-.1109	.0754	.0247	-.2322	1.1574	77.2	.0631	.00627	192.0	325.5	647.3	-.1167	.5879
2411	44.9	-.0	180.0	.1101	-.0991	.0006	.0023	.0052	.0301	77.5	.0623	.00708	192.2	331.0	649.5	.0326	.0153
2412	44.8	-.0	170.0	.0825	-.1110	.0024	-.0072	.0560	-.1569	77.5	.0620	.00704	192.2	330.2	646.7	.0286	-.0801
2413	44.7	-.0	160.0	.0595	-.1121	-.0102	-.0157	.1151	-.4062	77.5	.0618	.00701	192.1	328.2	643.6	.0587	-.2072
2414	44.5	-.0	150.0	.0664	-.0982	-.0300	-.0202	.1701	-.6811	77.4	.0615	.00689	192.5	325.1	638.4	.0866	-.3468
2415	44.7	-.1	140.0	-.2242	-.1014	-.0249	-.0223	.2192	-.8995	77.4	.0621	.00676	192.0	328.6	645.3	.1116	-.4581
2416	44.7	-.1	130.0	-.1178	-.0918	-.0012	-.0239	.2575	-1.1052	77.4	.0617	.00691	191.6	329.4	642.8	.1320	-.5663
2417	44.7	-.1	120.0	-.1571	-.1305	-.0068	-.0232	.2624	-1.1720	77.4	.0616	.00695	191.5	328.2	640.4	.1345	-.6007
2418	44.5	-.4	110.0	-.2527	-.1070	.0388	-.0243	.2593	-1.2202	77.3	.0613	.00702	191.5	325.5	636.3	.1326	-.6241

AVERAGE TIP SPEED RATIO = .120   AVERAGE OF ABOVE VALUES 77.3 .0624 .00688 192.1 328.2 646.6

RUN 117   CONFIGURATION 43

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2426	29.8	0.0	180.0	.1451	-.1663	-.0097	.0058	-.0011	.0842	67.5	.0554	.00453	192.3	146.1	429.1	-.0004	.0287
2427	29.8	-5.0	180.0	.1585	-.1353	-.0124	.0042	.0059	.0608	68.2	.0578	.00483	192.6	146.5	442.8	.0019	.0201
2428	30.0	.0	180.0	.1428	-.1635	-.0095	.0060	-.0025	.0914	67.9	.0552	.00454	191.0	147.7	426.3	-.0009	.0317
2429	30.0	5.1	180.0	.0650	-.1682	-.0072	.0065	-.0085	.0971	67.8	.0518	.00410	190.6	148.1	408.2	-.0031	.0352
2430	30.0	10.1	180.0	.0052	-.1799	.0015	.0078	-.0153	.1310	68.1	.0476	.00372	191.1	148.5	389.0	-.0058	.0500

AVERAGE TIP SPEED RATIO = .080   AVERAGE OF ABOVE VALUES 67.9 .0536 .00434 191.5 147.4 419.1

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RUN 118   CONFIGURATION 43

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2431	29.8	-.0	160.0	.1037	-.1915	-.0196	-.0152	.1021	-.4404	67.7	.0548	.00437	191.4	146.1	423.8	.0352	-.1519
2432	29.8	-5.0	160.0	.1378	-.1531	-.0266	-.0115	.1029	-.3877	68.0	.0572	.00453	194.0	145.3	443.7	.0339	-.1277
2433	29.8	.0	160.0	.1101	-.1866	-.0196	-.0154	.1042	-.4455	67.7	.0547	.00438	191.3	146.1	423.1	.0360	-.1538
2434	29.8	5.0	160.0	.0377	-.2103	-.0090	-.0174	.1134	-.4869	67.6	.0514	.00400	190.5	146.1	404.3	.0410	-.1759
2435	29.8	10.1	160.0	-.0524	-.2354	.0019	-.0193	.1197	-.4938	67.7	.0479	.00388	190.8	146.1	387.0	.0452	-.1864

AVERAGE TIP SPEED RATIO = .080   AVERAGE OF ABOVE VALUES   67.8   .0532   .00423   191.6   146.1   416.4

RUN 119   CONFIGURATION 43

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2436	29.8	.0	-160.0	.1793	-.0313	.0095	.0332	-.1405	.6741	67.7	.0555	.00462	191.1	146.1	425.2	-.0482	.2311
2437	29.7	-5.0	-160.0	.1832	-.0186	-.0060	.0282	-.1336	.5841	67.9	.0575	.00467	193.7	145.3	443.9	-.0437	.1912
2438	29.6	.1	-160.0	.1752	-.0300	.0091	.0337	-.1426	.6891	67.6	.0551	.00458	191.0	144.1	422.3	-.0487	.2352
2439	29.6	5.1	-160.0	.1101	-.0574	.0279	.0346	-.1456	.7487	67.3	.0519	.00420	190.3	143.7	403.8	-.0518	.2665
2440	29.6	10.1	-160.0	.0270	-.0820	.0418	.0342	-.1525	.7865	67.3	.0484	.00388	190.8	144.1	387.6	-.0567	.2925

AVERAGE TIP SPEED RATIO = .080   AVERAGE OF ABOVE VALUES   67.6   .0537   .00439   191.4   144.7   416.7

RUN 120   CONFIGURATION 44

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2452	15.2	-.0	180.0	.1487	-.0842	.0569	.0253	-.0797	.4331	46.0	.0462	.00290	191.5	38.6	275.8	-.0112	.0606
2453	15.0	.0	-170.0	.0828	-.0023	.0786	.0401	-.1724	.9673	45.5	.0460	.00299	191.1	37.4	273.0	-.0236	.1326
2454	15.0	.1	-160.0	-.1502	-.0383	.1084	.0374	-.2609	1.3832	45.6	.0460	.00300	190.9	37.4	272.7	-.0359	.1902
2455	15.0	.1	-150.0	-.2953	-.0474	.1187	.0400	-.3201	1.6194	45.5	.0460	.00293	190.7	37.4	272.1	-.0440	.2227
2456	15.0	.1	-140.0	-.3187	-.1008	.0499	.0483	-.3880	1.9894	45.4	.0459	.00282	190.8	37.4	271.4	-.0535	.2743
2457	14.9	.1	-130.0	-.0388	-.1586	.0066	.0589	-.4700	2.5466	45.3	.0457	.00275	190.7	37.0	269.8	-.0645	.3495
2458	14.7	.1	-120.0	.2477	-.1400	-.0501	.0712	-.5822	3.2745	44.9	.0457	.00256	190.7	36.2	268.5	-.0796	.4420
2459	14.7	.1	-110.0	.2847	-.0920	-.0062	.0881	-.7039	3.9810	44.6	.0455	.00231	190.7	35.8	268.1	-.0941	.5323
2460	14.5	.1	-100.0	.0949	-.0142	.1467	.1085	-.8648	4.7226	44.1	.0455	.00194	190.6	35.1	266.5	-.1138	.6214
2461	14.3	.0	-90.0	.2730	.0920	.2220	.1347	-.9791	5.2874	43.2	.0453	.00161	190.9	33.9	265.1	-.1251	.6757
2462	14.7	.0	180.0	.2051	-.0390	.0546	.0271	-.0753	.4402	44.9	.0461	.00277	190.4	36.2	270.7	-.0101	.0589
2463	14.7	.0	170.0	.1486	-.1046	.0662	.0047	.0158	-.0466	45.0	.0461	.00269	190.3	36.2	270.0	.0021	-.0063
2464	14.8	.0	160.0	-.0015	-.1742	.0746	-.0152	.1279	-.6666	45.1	.0461	.00253	190.2	36.6	270.3	.0173	-.0903
2465	14.8	0.0	150.0	-.1273	-.2016	.0770	-.0321	.2422	-1.3235	45.2	.0459	.00244	190.1	36.6	269.3	.0329	-.1800
2466	14.8	-.0	140.0	-.1402	-.2437	.0569	-.0444	.3622	-2.0040	45.1	.0459	.00230	189.9	36.6	268.5	.0494	-.2734
2467	14.7	-.0	130.0	-.0159	-.3072	.0117	-.0636	.5146	-2.7317	44.9	.0460	.00228	189.9	36.2	268.9	.0694	-.3682
2468	14.4	-.0	120.0	.1349	-.3435	-.0430	-.0636	.6825	-3.4483	43.7	.0460	.00207	190.5	34.7	268.7	.0881	-.4449

AVERAGE TIP SPEED RATIO = .040   AVERAGE OF ABOVE VALUES   44.9   .0459   .00252   190.6   36.5   269.9

RUN 121   CONFIGURATION 44

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2471	20.3	-.0	180.0	.3080	-.0550	.0016	.0154	-.0407	.2469	55.5	.0493	.00296	190.4	68.5	319.1	-.0087	.0530
2472	20.3	0.0	-170.0	.2620	-.0072	.0142	.0295	-.1055	.5731	55.6	.0490	.00299	190.5	68.5	317.7	-.0228	.1236
2473	20.0	0.0	-160.0	.0711	.0503	.0270	.0418	-.1769	.9327	55.1	.0490	.00300	190.4	66.6	315.5	-.0373	.1968
2474	20.0	.0	-150.0	-.4840	.0318	.0391	.0445	-.2332	1.1771	55.1	.0488	.00297	190.4	66.6	314.8	-.0493	.2489
2475	19.9	.0	-140.0	-.2611	-.1669	.0620	.0410	-.2432	1.4234	55.1	.0484	.00297	190.5	65.8	311.6	-.0514	.3005
2476	19.7	.0	-130.0	-.0598	-.2896	.0464	.0455	-.2643	1.7335	54.8	.0484	.00287	190.3	65.0	310.8	-.0553	.3625
2477	19.6	.0	-120.0	.0226	-.3000	.0327	.0518	-.3038	2.1450	54.2	.0485	.00270	191.0	64.2	312.1	-.0625	.4413
2478	19.5	.0	-110.0	.0678	-.2914	.0308	.0587	-.3468	2.5722	53.8	.0485	.00245	191.1	63.4	311.8	-.0705	.5232
2479	19.3	.0	-100.0	.0625	-.2432	.0532	.0675	-.4173	3.1191	53.2	.0481	.00217	191.3	61.8	308.9	-.0835	.6245
2480	19.2	.0	-90.0	-.0176	-.1627	.1597	.0815	-.5458	3.7038	52.9	.0482	.00197	191.2	61.4	308.3	-.1088	.7382
2481	19.7	-.0	180.0	.3019	-.0513	.0088	.0142	-.0333	.2239	54.6	.0490	.00309	191.0	65.0	315.6	-.0069	.0461
2482	19.9	-.0	170.0	.2358	-.0919	.0252	-.0020	.0374	-.1319	54.8	.0488	.00300	191.2	65.8	315.9	.0078	-.0275
2483	19.9	-.0	160.0	.1882	-.1462	.0046	-.0190	.1155	-.5670	54.9	.0485	.00298	191.2	65.8	314.6	.0241	-.1186
2484	19.8	-.0	150.0	-.0031	-.1866	.0070	-.0333	.1971	-1.0379	54.7	.0483	.00290	191.5	65.4	313.7	.0411	-.2163
2485	19.8	-.1	140.0	-.4422	-.1808	-.0259	-.0443	.2871	-1.4812	54.6	.0484	.00282	191.2	65.4	313.8	.0598	-.3087
2486	19.7	-.1	130.0	-.5951	-.1896	-.0035	-.0513	.3386	-1.7944	54.2	.0488	.00278	191.1	65.0	314.8	.0690	-.3705
2487	19.4	-.1	120.0	-.1492	-.2225	.0091	-.0547	.4143	-2.3686	53.6	.0484	.00272	191.3	63.0	311.1	.0839	-.4798

AVERAGE TIP SPEED RATIO = .053   AVERAGE OF ABOVE VALUES   54.5   .0486   .00279   190.9   65.1   313.5

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APPENDIX

RUN 122   CONFIGURATION 44

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2500	24.4	-.0	180.0	.2783	-.2097	-.0296	.0103	-.0209	.1636	64.9	.0432	.00338	191.7	99.3	322.4	-.0064	.0503
2501	24.3	0.0	-170.0	.2384	-.1604	-.0211	.0266	-.0897	.4621	61.9	.0503	.00347	191.1	98.5	357.0	-.0247	.1275
2502	24.4	0.0	-160.0	.2258	-.0981	-.0269	.0397	-.1579	.8125	62.0	.0506	.00355	190.9	99.3	358.5	-.0437	.2250
2503	24.5	.0	-150.0	-.2522	-.0923	-.0257	.0431	-.2102	1.0008	62.1	.0508	.00360	190.9	100.4	360.7	-.0585	.2787
2504	24.5	.0	-140.0	-.3322	-.0999	.0044	.0442	-.2474	1.2829	61.8	.0507	.00356	191.6	100.0	362.0	-.0684	.3545
2505	24.5	.0	-140.0	-.3234	-.0990	.0053	.0442	-.2450	1.2878	61.8	.0506	.00358	191.5	100.0	361.1	-.0679	.3567
2506	24.5	.0	-130.0	-.2186	-.2360	.0055	.0405	-.2433	1.4473	61.9	.0503	.00357	191.5	100.0	359.6	-.0677	.4027
2507	24.3	0.0	-120.0	.0985	-.3355	-.0048	.0440	-.2406	1.6752	61.7	.0501	.00352	191.5	98.9	357.3	-.0666	.4635
2508	24.4	-.0	-110.0	.1381	-.3401	-.0289	.0495	-.2510	1.9692	61.8	.0500	.00341	191.3	99.6	355.9	-.0701	.5498
2509	24.4	-.0	-100.0	.0940	-.2855	-.0478	.0544	-.2700	2.2274	61.5	.0500	.00313	192.0	99.6	359.0	-.0749	.6182
2510	24.4	-.0	-90.0	-.0779	-.2412	-.0502	.0607	-.3236	2.4755	61.2	.0503	.00284	191.9	99.6	360.1	-.0896	.6851
2511	24.6	-.0	180.0	.2740	-.1860	-.0261	.0097	-.0186	.1652	62.3	.0502	.00344	192.5	101.2	362.6	-.0052	.0461
2512	24.4	-.0	170.0	.2307	-.2141	-.0112	-.0053	.0480	-.1588	62.0	.0499	.00324	192.3	99.6	359.3	.0133	-.0440
2513	24.2	-.1	160.0	.2345	-.2334	-.0352	-.0186	.1111	-.4771	61.6	.0501	.00309	192.3	98.1	358.5	.0304	-.1305
2514	24.5	-.1	150.0	.1257	-.2357	-.0426	-.0318	.1863	-.8448	62.0	.0500	.00300	192.6	100.8	367.0	.0519	-.2353
2515	24.9	-.1	140.0	-.1261	-.2332	-.0522	-.0419	.2327	-1.1107	62.2	.0503	.00282	192.7	103.6	366.0	.0659	-.3143
2516	24.9	-.1	130.0	-.4821	-.2596	-.0655	-.0484	.2792	-1.4549	62.1	.0504	.00273	192.5	103.6	366.4	.0789	-.4113
2517	24.6	-.1	120.0	-.7511	-.2229	-.0233	-.0485	.3178	-1.8244	61.6	.0505	.00265	192.4	101.6	364.5	.0886	-.5086
2518	24.2	-.1	110.0	-.3664	-.2410	-.0064	-.0501	.3549	-2.1394	61.0	.0500	.00262	192.2	98.1	357.9	.0972	-.5863
2519	24.3	-.1	100.0	-.3206	-.2368	-.0090	-.0508	.3807	-2.2981	61.0	.0497	.00264	191.9	98.5	355.9	.1053	-.6358
2520	24.4	-.1	90.0	-.3944	-.2207	.0211	-.0549	.4459	-2.4140	60.9	.0502	.00256	191.9	99.6	359.5	.1236	-.6690

AVERAGE TIP SPEED RATIO = .066   AVERAGE OF ABOVE VALUES   61.9   .0499   .00316   191.9   100.0   358.4

RUN 123   CONFIGURATION 44

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2523	29.4	-.0	180.0	.2226	-.1336	-.0154	.0068	-.0107	.1106	68.0	.0529	.00412	190.9	144.5	415.5	-.0037	.0385
2525	29.7	.0	-170.0	.1990	-.0868	-.0008	.0206	-.0778	.3555	68.1	.0534	.00436	191.1	147.3	421.4	-.0272	.1242
2526	29.7	.0	-160.0	.2222	-.0208	-.0170	.0338	-.1490	.6962	68.1	.0534	.00445	191.2	147.3	421.7	-.0521	.2432
2527	29.6	.0	-150.0	-.1340	-.0217	-.0188	.0394	-.1960	.9071	68.0	.0533	.00438	191.1	146.5	423.2	-.0683	.3162
2528	29.5	.0	-140.0	-.2437	-.0450	-.0048	.0410	-.2304	1.1211	67.8	.0532	.00435	191.0	145.3	418.5	-.0900	.3893
2529	29.5	.0	-130.0	-.1839	-.0849	.0017	.0401	-.2533	1.3296	67.5	.0535	.00434	192.2	145.7	423.7	-.0871	.4572
2530	29.5	.1	-120.0	-.1148	-.1518	-.0002	.0404	-.2324	1.3965	67.4	.0533	.00421	192.5	145.7	423.3	-.0803	.4806
2531	29.4	.0	-110.0	-.0023	-.2228	-.0250	.0425	-.2239	1.5538	67.5	.0526	.00411	192.5	144.9	418.8	-.0775	.5377
2532	29.5	0.0	-100.0	-.0602	-.2242	-.0643	.0464	-.2367	1.7607	67.3	.0530	.00390	192.1	145.3	420.5	-.0818	.6084
2533	29.6	-.0	-90.0	-.1827	-.2047	-.0740	.0503	-.2505	1.8309	67.1	.0533	.00355	192.1	146.1	423.1	-.0865	.6322
2534	29.6	-.0	-180.0	.2067	-.1554	-.0185	.0070	-.0114	.1115	67.9	.0531	.00420	192.7	146.5	423.5	-.0039	.0386
2535	29.6	-.0	170.0	.1571	-.1750	-.0055	-.0062	.0543	-.1538	67.9	.0528	.00399	192.6	146.5	421.9	.0189	-.0534
2536	29.5	-.0	160.0	.1518	-.1748	-.0279	-.0171	.1079	-.4201	67.8	.0526	.00376	192.5	145.3	419.9	.0373	-.1454
2537	29.4	-.1	150.0	.0284	-.1841	-.0451	-.0266	.1750	-.6976	67.7	.0524	.00362	192.3	144.5	417.1	.0606	-.2417
2538	30.0	-.1	140.0	-.0365	-.1501	-.0384	-.0361	.2262	-.9662	68.3	.0526	.00352	191.9	150.4	423.2	.0804	-.3434
2539	29.5	-.1	130.0	-.2577	-.1874	-.0467	-.0434	.2608	-1.2336	67.6	.0527	.00333	191.9	145.3	418.5	.0906	-.4283
2540	29.3	-.1	120.0	-.5250	-.2022	-.0369	-.0458	.2856	-1.5341	67.2	.0528	.00317	191.9	143.7	417.2	.0984	-.5286
2541	29.3	-.1	110.0	-.3840	-.2147	-.0433	-.0443	.3057	-1.7074	67.2	.0524	.00322	191.8	143.3	414.6	.1057	-.5903
2542	29.8	-.1	100.0	-.3411	-.1842	-.0486	-.0448	.3034	-1.6934	67.7	.0524	.00326	191.5	148.5	418.5	.1076	-.6006
2543	29.8	-.1	90.0	-.4185	-.1662	-.0055	-.0457	.3118	-1.6810	67.6	.0524	.00315	191.5	148.9	419.1	.1107	-.5970

AVERAGE TIP SPEED RATIO = .079   AVERAGE OF ABOVE VALUES   67.7   .0529   .00385   191.9   146.1   420.0

RUN 124   CONFIGURATION 44

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2546	44.4	-.0	180.0	.1246	-.0957	-.0016	.0032	-.0039	.0474	77.6	.0607	.00697	192.1	329.4	644.4	-.0020	.0243
2547	44.4	0.0	-170.0	.0630	-.0614	.0181	.0135	-.0680	.2273	77.6	.0606	.00695	192.1	329.4	644.2	-.0347	.1163
2548	44.4	-.0	-160.0	.0876	-.0074	.0226	.0248	-.1410	.5051	77.5	.0608	.00697	192.1	327.8	643.6	-.0718	.2573
2549	44.1	-.0	-150.0	.0347	.0105	-.0128	.0283	-.2016	.7858	77.4	.0608	.00695	191.6	325.1	638.9	-.1026	.3998
2550	44.6	.0	-140.0	-.2461	-.0124	-.0185	.0282	-.2404	.9490	77.4	.0618	.00690	191.9	332.1	651.8	-.1225	.4836
2551	44.3	-.0	-130.0	.0239	-.0696	-.0386	.0262	-.2518	1.0457	77.4	.0615	.00689	191.5	328.6	645.7	-.1781	.5322
2552	44.1	-.0	-120.0	-.0529	-.1001	-.0266	.0271	-.2483	1.0785	77.2	.0613	.00657	191.5	325.1	641.3	-.1258	.5467
2553	44.3	-.0	-110.0	.0333	-.1290	-.0120	.0253	-.2229	1.1334	77.1	.0614	.00637	192.4	327.8	647.3	-.1129	.5740
2554	44.3	-.0	-100.0	.0910	-.1489	-.0283	.0245	-.2019	1.2406	77.2	.0609	.00599	192.0	328.6	644.6	-.1029	.6324
2555	44.4	-.1	-90.0	.0759	-.1280	-.0302	.0255	-.1969	1.3247	77.2	.0610	.00565	191.6	329.4	644.4	-.1006	.6771
2556	44.3	-.1	180.0	.1110	-.1211	-.0051	.0032	-.0046	.0447	77.6	.0606	.00681	192.1	329.0	643.8	-.0023	.0228
2557	44.3	-.0	170.0	.0578	-.1311	.0120	-.0076	.0614	-.1616	77.6	.0602	.00661	191.9	328.6	640.5	.0315	-.0829
2558	44.2	-.1	160.0	.0787	-.1212	-.0112	-.0166	.1170	-.3994	77.6	.0601	.00645	191.9	326.6	638.3	.0599	-.2044
2559	44.6	-.1	150.0	-.0121	-.1096	-.0353	-.0213	.1721	-.6623	77.8	.0598	.00637	191.6	332.9	641.7	.0893	-.3436
2560	44.3	-.1	140.0	-.2098	-.1025	-.0440	-.0251	.2172	-.8760	77.6	.0601	.00618	191.7	328.6	639.4	.1116	-.4502
2561	44.1	-.1	130.0	-.0416	-.1013	-.0462	-.0264	.2548	-1.0915	77.5	.0598	.00620	191.5	325.5	633.7	.1308	-.5605
2562	44.2	-.2	120.0	-.0288	-.1354	-.0588	-.0259	.2674	-1.1970	77.4	.0604	.00628	191.4	326.6	637.8	.1370	-.6130
2563	44.3	-.2	110.0	-.0970	-.1361	-.0403	-.0258	.2537	-1.2047	77.5	.0596	.00616	191.4	329.0	635.2	.1312	-.6229
2564	44.3	-.2	100.0	-.1002	-.1224	-.0388	-.0245	.2309	-1.2288	77.4	.0592	.00597	191.4	327.4	632.6	.1195	-.6360

AVERAGE TIP SPEED RATIO = .119   AVERAGE OF ABOVE VALUES   77.5   .0606   .00649   191.8   328.3   641.6

RUN 125   CONFIGURATION 42

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2583	19.5	-.0	180.0	.2772	-.2989	.0049	.0146	-.0364	.2646	53.6	.0484	.00218	192.4	63.8	315.7	-.0074	.0535
2584	19.8	.0	-170.0	.2433	-.2204	.0178	.0308	-.1180	.6648	53.9	.0485	.00219	193.1	65.4	319.8	-.0241	.1369
2585	19.8	.0	-160.0	.0262	-.1801	.0206	.0411	-.1885	.9793	53.9	.0486	.00222	192.6	65.4	319.7	-.0387	.2009
2586	19.8	.0	-150.0	-.5072	-.1906	.0631	.0413	-.2291	1.2069	54.0	.0485	.00226	192.1	65.4	317.1	-.0472	.2498
2587	19.8	.0	-140.0	-.4108	-.3182	.0962	.0384	-.2485	1.4425	54.0	.0484	.00224	191.9	65.4	315.8	-.0515	.2987
2588	19.8	.0	-130.0	-.1654	-.4978	.1024	.0422	-.2604	1.7611	54.2	.0481	.00227	191.5	65.3	313.7	-.0543	.3571
2589	19.7	.0	-120.0	-.1104	-.4972	.1119	.0487	-.3117	2.1729	53.8	.0482	.00225	191.5	64.6	313.0	-.0643	.4484
2590	19.5	.0	-110.0	-.0805	-.4764	.1234	.0550	-.3538	2.6140	53.4	.0480	.00209	191.8	63.4	311.7	-.0720	.5319
2591	19.4	.0	-100.0	-.0901	-.4224	.1369	.0624	-.3980	3.0100	53.2	.0479	.00192	191.5	63.0	309.9	-.0809	.6171
2592	19.3	-.0	-90.0	-.0686	-.3243	.1986	.0753	-.4978	3.5762	52.7	.0481	.00179	191.6	62.2	310.7	-.0997	.7163
2593	20.1	-.0	180.0	.3166	-.2370	.0098	.0135	-.0289	.2335	54.8	.0488	.00233	191.6	67.4	319.2	-.0061	.0403
2594	20.1	-.0	170.0	.2476	-.2721	.0215	-.0035	.0528	-.1681	54.7	.0487	.00223	191.5	67.4	318.7	.0112	-.0355
2595	20.1	-.1	160.0	.2279	-.3010	.0169	-.0180	.1345	-.5801	54.9	.0485	.00219	191.6	67.8	318.1	.0286	-.1236
2596	20.1	-.1	150.0	.0575	-.3095	.0192	-.0312	.2147	-1.0158	54.7	.0486	.00212	191.6	67.8	318.5	.0457	-.2161
2597	20.1	-.1	140.0	-.4843	-.3066	.0310	-.0405	.2801	-1.3253	54.4	.0485	.00203	191.7	67.4	317.8	.0594	-.2809
2598	19.9	-.1	130.0	-.6545	-.2845	.0700	-.0476	.3527	-1.7689	54.0	.0486	.00205	191.5	66.6	317.3	.0740	-.3712
2599	19.9	-.1	120.0	-.2990	-.2741	.0980	-.0499	.4322	-2.2953	54.0	.0484	.00216	191.4	66.6	316.1	.0913	-.4834
2600	19.8	-.1	110.0	-.2172	-.3190	.0814	-.0475	.5167	-2.7484	53.6	.0483	.00230	191.4	65.4	314.1	.1076	-.5721
2601	19.7	-.1	100.0	-.1883	-.2803	.0900	-.0500	.5769	-3.0087	53.3	.0484	.00242	191.2	65.0	313.9	.1194	-.6229
2602	19.5	-.2	90.0	-.2836	-.1730	.1199	-.0578	.6588	-3.2812	52.8	.0483	.00244	191.2	63.8	312.3	.1346	-.6705

AVERAGE TIP SPEED RATIO = .053   AVERAGE OF ABOVE VALUES   53.9   .0484   .00219   191.7   65.4   315.6

RUN 126   CONFIGURATION 42

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2605	29.4	-.0	180.0	.1624	-.1960	-.0040	.0065	-.0095	.0881	67.6	.0540	.00461	191.9	146.1	427.8	-.0032	.0301
2606	29.6	-.0	-170.0	.1526	-.1497	.0080	.0204	-.0772	.3416	67.8	.0542	.00473	191.7	147.7	430.0	-.0265	.1173
2607	29.6	0.0	-160.0	.2013	-.0894	.0026	.0329	-.1449	.6855	67.9	.0541	.00481	191.1	147.7	427.9	-.0500	.2366
2608	29.5	.0	-149.9	-.1320	-.1005	-.0213	.0356	-.2020	.9515	67.6	.0543	.00475	191.4	146.5	428.2	-.0691	.3255
2609	29.4	.1	-140.0	-.4095	-.1283	.0495	.0379	-.2267	1.1239	67.4	.0543	.00469	191.5	145.3	426.0	-.0773	.3834
2610	29.4	.0	-130.0	-.3725	-.1882	.0525	.0366	-.2457	1.3090	67.5	.0544	.00463	190.7	146.1	425.2	-.0842	.4487
2611	29.4	.0	-120.0	-.2833	-.2701	.0692	.0376	-.2416	1.4188	67.5	.0542	.00438	190.8	146.1	425.6	-.0829	.4871
2612	29.3	.0	-110.0	-.1779	-.3346	.0509	.0417	-.2488	1.5930	67.4	.0536	.00421	190.9	144.9	422.0	-.0854	.5471
2613	29.2	.0	-100.0	-.2766	-.3384	.0327	.0466	-.2635	1.7959	67.3	.0536	.00386	190.7	144.1	420.3	-.0903	.6158
2614	29.1	.0	-89.9	-.3913	-.3078	.0324	.0524	-.2895	1.9468	67.0	.0536	.00346	190.7	142.9	419.0	-.0988	.6642
2615	29.3	-.0	180.0	.1565	-.2276	-.0079	.0073	-.0124	.1027	67.6	.0540	.00460	191.4	144.5	424.5	-.0042	.0350
2616	29.5	-.0	170.0	.0908	-.2345	.0079	-.0049	.0502	-.1392	67.8	.0537	.00438	191.4	146.5	425.1	.0173	-.0489
2617	29.5	-.0	160.0	.1221	-.2219	-.0038	-.0152	.1127	-.4558	67.8	.0536	.00426	191.5	146.5	424.8	.0389	-.1572
2618	29.4	-.1	150.0	-.0804	-.2331	-.0072	-.0242	.1661	-.6621	67.6	.0533	.00405	191.7	145.7	423.4	.0572	-.2278
2619	29.3	-.1	140.0	-.1355	-.2236	.0143	-.0348	.2208	-.9960	67.5	.0532	.00386	191.5	144.5	420.9	.0758	-.3420
2620	29.2	-.1	130.0	-.4430	-.2397	.0148	-.0417	.2677	-1.2545	67.2	.0535	.00370	191.5	144.1	421.8	.0915	-.4287
2621	29.2	-.1	120.0	-.6500	-.1941	.0506	-.0437	.3129	-1.5843	67.0	.0537	.00355	191.6	144.1	423.2	.1066	-.5395
2622	29.2	-.1	110.0	-.5071	-.1998	.0603	-.0428	.3391	-1.7643	67.0	.0532	.00349	191.1	143.3	418.9	.1160	-.6037
2623	29.2	-.1	100.0	-.5434	-.1715	.0823	-.0454	.3428	-1.7938	67.1	.0530	.00337	190.9	143.7	417.2	.1181	-.6180
2624	29.3	-.1	90.0	-.5450	-.1506	.1137	-.0479	.3546	-1.7898	67.0	.0528	.00318	191.0	144.5	417.7	.1227	-.6193

AVERAGE TIP SPEED RATIO = .079   AVERAGE OF ABOVE VALUES   67.4   .0537   .00413   191.2   145.2   423.5

RUN 127   CONFIGURATION 42

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2627	29.2	.0	180.0	.1764	-.1338	-.0021	.0070	-.0117	.0945	67.6	.0541	.00453	190.5	144.1	422.6	-.0040	.0322
2628	29.6	-5.0	180.0	.1693	-.1100	-.0033	.0052	-.0058	.0659	68.1	.0566	.00462	193.9	147.7	448.8	-.0019	.0217
2629	29.7	.0	180.0	.1710	-.1315	-.0017	.0069	-.0109	.0947	67.8	.0542	.00447	191.7	148.5	430.9	-.0038	.0326
2630	29.8	5.0	180.0	.0975	-.1572	-.0017	.0082	-.0165	.1111	67.6	.0506	.00417	192.5	149.2	415.1	-.0059	.0399
2631	29.6	10.1	180.0	.0148	-.1675	.0048	.0092	-.0198	.1529	67.8	.0464	.00380	192.9	148.1	392.6	-.0075	.0576

AVERAGE TIP SPEED RATIO = .079   AVERAGE OF ABOVE VALUES   67.8   .0524   .00432   192.3   147.5   427.0

RUN 128   CONFIGURATION 42

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2632	29.4	-.0	160.0	.1410	-.1690	-.0017	-.0152	.1149	-.4624	67.3	.0538	.00422	193.1	146.1	430.4	.0390	-.1570
2633	29.6	-5.0	160.0	.1693	-.1310	-.0096	-.0119	.1153	-.4159	68.2	.0561	.00448	193.4	147.7	444.8	.0383	-.1381
2634	29.6	.0	160.0	.1290	-.1619	.0010	-.0156	.1154	-.4626	68.0	.0536	.00431	190.7	147.7	423.8	.0407	-.1612
2635	29.6	5.0	160.0	.0565	-.1954	.0085	-.0172	.1209	-.4945	67.6	.0504	.00402	191.9	148.1	410.7	.0436	-.1783
2636	29.7	10.0	160.0	-.0209	-.2024	.0190	-.0187	.1285	-.5203	67.7	.0470	.00379	192.3	148.5	394.5	.0484	-.1958

AVERAGE TIP SPEED RATIO = .079   AVERAGE OF ABOVE VALUES   67.8   .0522   .00416   192.2   147.6   420.8

RUN   129   CONFIGURATION 15

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	O	QS	CYMS	CSFS
2672	15.1	-.0	0.0	-.0120	.0709	-.0018	-.0001	.0030	.0110	90.0	.0000	.00000	0.0	37.8	37.8	.0030	.0110
2673	15.1	-.0	10.0	-.0143	.0692	-.0019	.0012	-.0067	-.0774	90.0	.0000	.00000	0.0	37.4	37.4	-.0062	-.0774
2674	15.1	-.0	20.0	-.0730	.0684	.0085	.0032	-.0020	-.2249	90.0	.0000	.00000	0.0	37.4	37.4	-.0020	-.2249
2675	15.0	-.0	30.0	-.1305	.0673	-.0043	.0061	.0223	-.4593	90.0	.0000	.00000	0.0	37.0	37.0	.0223	-.4593
2676	14.9	-.1	40.0	-.1760	.0613	-.0123	.0094	.0464	-.6875	90.0	.0000	.00000	0.0	36.6	36.6	.0464	-.6875
2677	14.9	-.1	50.0	-.1334	.0462	-.0715	.0099	.0906	-.9410	90.0	.0000	.00000	0.0	36.6	36.6	.0906	-.9410
2678	14.9	-.1	60.0	-.1905	.0047	-.0193	.0114	.1314	-1.1572	90.0	.0000	.00000	0.0	36.6	36.6	.1314	-1.1572
2679	14.8	-.1	70.0	-.3364	-.0476	-.0168	.0136	.1333	-1.2254	90.0	.0000	.00000	0.0	36.2	36.2	.1333	-1.2254
2680	14.7	-.1	80.0	-.4120	-.1238	-.0142	.0145	.1340	-1.1782	90.0	.0000	.00000	0.0	35.8	35.8	.1340	-1.1782
2681	14.6	-.0	90.0	-.2748	-.1743	.0027	.0138	.1496	-1.0540	90.0	.0000	.00000	0.0	35.1	35.1	.1496	-1.0540
2682	14.9	-.0	0.0	-.0124	.0732	-.0012	-.0001	.0038	.0227	90.0	.0000	.00000	0.0	36.6	36.6	.0038	.0227
2683	15.0	0.0	-10.0	-.0238	.0700	-.0018	-.0015	.0105	.1128	90.0	.0000	.00000	0.0	37.0	37.0	.0105	.1128
2684	14.9	.0	-20.0	-.0930	.0650	.009C	-.0033	.0055	.2545	90.0	.0000	.00000	0.0	36.6	36.6	.0055	.2545
2685	14.9	.0	-30.0	-.1301	.0535	-.0037	-.0062	-.0203	.4926	90.0	.0000	.00000	0.0	36.6	36.6	-.0203	.4926
2686	14.9	.0	-40.0	-.1816	.0420	-.0122	-.0089	-.0481	.7196	90.0	.0000	.00000	0.0	36.6	36.6	-.0481	.7196
2687	14.8	.0	-50.0	-.1391	.0273	-.0243	-.0091	-.1026	.9964	90.0	.0000	.00000	0.0	36.2	36.2	-.1026	.9964
2688	14.8	.1	-60.0	-.2359	-.0181	-.0214	-.0112	-.1320	1.1913	90.0	.0000	.00000	0.0	36.2	36.2	-.1320	1.1913
2689	14.7	.1	-70.0	-.3943	-.0799	-.0171	-.0129	-.1298	1.2298	90.0	.0000	.00000	0.0	35.8	35.8	-.1298	1.2298
2690	14.7	.1	-80.0	-.4378	-.1441	.0134	-.0139	-.1331	1.1479	90.0	.0000	.00000	0.0	35.8	35.8	-.1331	1.1479
2691	14.7	.1	-90.0	-.3320	-.1923	.0002	-.0129	-.1494	1.0175	90.0	.0000	.00000	0.0	35.5	35.5	-.1494	1.0175

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000   .0 36.5 36.5

RUN   130   CONFIGURATION 15

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	O	QS	CYMS	CSFS
2699	44.7	-.0	0.0	.0001	.0380	-.0092	-.0001	.0014	.0080	90.0	.0000	.00000	0.0	329.8	329.8	.0014	.0080
2700	44.6	-.0	10.0	-.0022	.0411	-.0104	.0011	-.0080	-.0765	90.0	.0000	.00000	0.0	327.4	327.4	-.0080	-.0765
2701	44.5	-.0	20.0	-.0225	.0381	-.0093	.0031	-.0072	-.2014	90.0	.0000	.00000	0.0	325.9	325.9	-.0072	-.2014
2702	44.6	-.1	30.0	-.0984	.0349	-.0076	.0055	.0142	-.3860	90.0	.0000	.00000	0.0	327.4	327.4	.0142	-.3860
2703	44.7	-.1	40.0	-.1105	.0250	-.0208	.0071	.0512	-.6136	90.0	.0000	.00000	0.0	329.8	329.8	.0512	-.6136
2704	44.5	-.1	50.0	-.1113	.0193	-.0313	.0091	.0989	-.8869	90.0	.0000	.00000	0.0	326.6	326.6	.0989	-.8869
2705	44.4	-.1	60.0	-.1855	-.0154	-.0273	.0106	.1379	-1.1095	90.0	.0000	.00000	0.0	325.1	325.1	.1379	-1.1095
2706	44.5	-.1	70.0	-.3544	-.0787	-.0210	.0125	.1427	-1.1893	90.0	.0000	.00000	0.0	326.2	326.2	.1427	-1.1893
2707	44.7	-.1	80.0	-.4240	-.1579	-.0190	.0132	.1402	-1.1569	90.0	.0000	.00000	0.0	329.8	329.8	.1402	-1.1569
2708	44.9	-.1	90.0	-.4331	-.2085	-.0220	.0124	.1537	-1.0505	90.0	.0000	.00000	0.0	332.1	332.1	.1537	-1.0505
2709	44.8	-.0	0.0	-.0045	.0352	-.0092	-.0001	.0016	.0105	90.0	.0000	.00000	0.0	331.4	331.4	.0016	.0105
2710	44.7	-.0	-10.0	-.0020	.0342	-.0109	-.0013	.0088	.1029	90.0	.0000	.00000	0.0	329.4	329.4	.0088	.1029
2711	44.6	0.0	-20.0	-.0358	.0288	-.0077	-.0033	.0079	.2257	90.0	.0000	.00000	0.0	327.4	327.4	.0079	.2257
2712	44.5	-.0	-30.0	-.1032	.0189	-.0110	-.0058	-.0183	.4260	90.0	.0000	.00000	0.0	325.9	325.9	-.0183	.4260
2713	44.6	.0	-40.0	-.0889	.0112	-.0183	-.0076	-.0681	.6819	90.0	.0000	.00000	0.0	328.6	328.6	-.0681	.6819
2714	44.4	.0	-50.0	-.0797	-.0066	-.0278	-.0084	-.1123	.9298	90.0	.0000	.00000	0.0	325.5	325.5	-.1123	.9298
2715	44.8	.0	-60.0	-.1727	-.0494	-.0292	-.0103	-.1404	1.1259	90.0	.0000	.00000	0.0	331.0	331.0	-.1404	1.1259
2716	44.7	-.0	-70.0	-.3643	-.1075	-.0190	-.0122	-.1428	1.1833	90.0	.0000	.00000	0.0	329.8	329.8	-.1428	1.1833
2717	44.7	-.0	-80.0	-.4543	-.1819	-.0182	-.0128	-.1387	1.1349	90.0	.0000	.00000	0.0	329.8	329.8	-.1387	1.1349
2718	44.8	-.0	-90.0	-.4082	-.2281	-.0216	-.0122	-.1579	1.0213	90.0	.0000	.00000	0.0	330.6	330.6	-.1579	1.0213

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000   .0 328.5 328.5

RUN   131   CONFIGURATION 15

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	O	QS	CYMS	CSFS
2726	59.5	-.0	.0	-.0011	.0351	-.0090	-.0001	.0010	.0062	90.0	.0000	.00000	0.0	584.3	584.3	.0010	.0062
2727	59.4	-.0	10.0	-.0017	.0366	-.0100	.0012	-.0081	-.0784	90.0	.0000	.00000	0.0	581.9	581.9	-.0081	-.0784
2728	59.5	-.0	20.0	-.0115	.0334	-.0109	.0031	-.0076	-.1997	90.0	.0000	.00000	0.0	583.9	583.9	-.0076	-.1997
2729	59.5	-.1	30.0	-.0478	.0236	-.0099	.0055	.0022	-.3526	90.0	.0000	.00000	0.0	583.9	583.9	.0022	-.3526
2730	59.7	-.1	40.0	-.0971	.0162	-.0135	.0066	.0371	-.5655	90.0	.0000	.00000	0.0	587.8	587.8	.0371	-.5655
2731	59.5	-.1	50.0	-.1006	.0160	-.0359	.0087	.0985	-.8701	90.0	.0000	.00000	0.0	583.5	583.5	.0985	-.8701
2732	59.4	-.1	60.0	-.1691	-.0129	-.0296	.0107	.1389	-1.1029	90.0	.0000	.00000	0.0	582.3	582.3	.1389	-1.1029
2733	59.6	-.2	70.0	-.3298	-.0823	-.0165	.0127	.1443	-1.1743	90.0	.0000	.00000	0.0	585.1	585.1	.1443	-1.1743
2734	59.5	-.2	80.0	-.3957	-.1610	-.0189	.0134	.1408	-1.1357	90.0	.0000	.00000	0.0	583.1	583.1	.1408	-1.1357
2735	59.6	-.2	90.0	-.4135	-.2088	-.0209	.0127	.1543	-1.0336	90.0	.0000	.00000	0.0	585.1	585.1	.1543	-1.0336
2736	59.5	-.0	-.0	-.0046	.0343	-.0090	-.0001	.0011	.0069	90.0	.0000	.00000	0.0	583.5	583.5	.0011	.0069
2737	59.3	-.0	-10.0	-.0030	.0332	-.0112	-.0014	.0085	.0989	90.0	.0000	.00000	0.0	580.0	580.0	.0085	.0989
2738	59.4	-.0	-20.0	-.0223	.0264	-.0109	-.0034	.0080	.2200	90.0	.0000	.00000	0.0	582.7	582.7	.0080	.2200
2739	59.5	-.0	-30.0	-.0762	.0163	-.0100	-.0056	-.0070	.3913	90.0	.0000	.00000	0.0	584.7	584.7	-.0070	.3913
2740	59.4	0.0	-40.0	-.0501	.0051	-.0163	-.0071	-.0610	.6373	90.0	.0000	.00000	0.0	581.9	581.9	-.0610	.6373
2741	59.5	.0	-50.0	-.0505	-.0068	-.0340	-.0084	-.1124	.9184	90.0	.0000	.00000	0.0	583.1	583.1	-.1124	.9184
2742	59.5	.0	-60.0	-.1411	-.0492	-.0308	-.0104	-.1413	1.1228	90.0	.0000	.00000	0.0	584.3	584.3	-.1413	1.1229
2743	59.5	-.1	-70.0	-.3462	-.1123	-.0173	-.0123	-.1437	1.1671	90.0	.0000	.00000	0.0	583.9	583.9	-.1437	1.1671
2744	59.4	-.1	-80.0	-.4368	-.1831	-.0180	-.0127	-.1406	1.1242	90.0	.0000	.00000	0.0	582.3	582.3	-.1406	1.1242
2745	59.5	-.1	-90.0	-.3996	-.2356	-.0205	-.0119	-.1594	1.0169	90.0	.0000	.00000	0.0	583.1	583.1	-.1594	1.0169

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000   .0 583.5 583.5

RUN 132   CONFIGURATION 15

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	OS	CYMS	CSFS
2753	58.9	-.0	0.0	.0015	.0368	-.0093	-.0001	.0011	.0061	90.0	.0000	.00000	0.0	586.2	585.2	.0011	.0061
2754	58.9	9.9	0.0	.0335	.0357	.0176	-.0001	-.0002	.0115	90.0	.0000	.00000	0.0	586.6	586.6	-.0002	.0115
2755	58.8	4.9	0.0	.0153	.0372	-.0052	-.0002	.0011	.0101	90.0	.0000	.00000	0.0	584.7	584.7	.0011	.0101
2756	58.7	-.1	0.0	.0008	.0371	-.0096	-.0001	.0013	.0068	90.0	.0000	.00000	0.0	583.9	583.9	.0013	.0068
2757	58.8	-5.1	0.0	-.0143	.0366	-.0225	-.0001	.0012	.0064	90.0	.0000	.00000	0.0	584.3	583.3	.0012	.0064
2758	58.7	-10.0	0.0	-.0384	.0370	-.0333	-.0000	.0025	.0014	90.0	.0000	.00000	0.0	583.9	583.9	.0025	.0014

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 584.9 584.0

RUN 133   CONFIGURATION 15

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	OS	CYMS	CSFS
2759	58.5	-.0	-10.0	.0041	.0374	-.0112	-.0014	.0086	.0958	90.0	.0000	.00000	0.0	580.0	580.0	.0086	.0958
2760	58.7	9.9	-10.0	.0391	.0339	.0156	-.0016	.0065	.1098	90.0	.0000	.00000	0.0	583.1	583.1	.0065	.1098
2761	58.7	4.9	-10.0	.0280	.0371	.0006	-.0014	.0095	.0991	90.0	.0000	.00000	0.0	583.1	583.1	.0095	.0991
2762	58.7	-.1	-10.0	.0025	.0368	-.0118	-.0014	.0085	.0976	90.0	.0000	.00000	0.0	582.7	582.7	.0085	.0976
2763	58.7	-5.0	-10.0	-.0154	.0381	-.0241	-.0015	.0044	.1036	90.0	.0000	.00000	0.0	583.5	583.5	.0044	.1036
2764	58.7	-10.0	-10.0	-.0467	.0383	-.0334	-.0016	.0012	.1046	90.0	.0000	.00000	0.0	583.5	583.5	.0012	.1046

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 582.6 582.6

RUN 134   CONFIGURATION 15

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	OS	CYMS	CSFS
2765	58.8	-.0	-20.0	-.0168	.0297	-.0114	-.0034	.0079	.2201	90.0	.0000	.00000	0.0	584.3	584.3	.0079	.2201
2766	58.9	9.9	-20.0	.0035	.0295	.0177	-.0032	.0021	.2502	90.0	.0000	.00000	0.0	586.6	586.6	.0021	.2502
2767	58.8	5.0	-20.0	.0006	.0289	.0020	-.0034	.0094	.2227	90.0	.0000	.00000	0.0	585.9	585.9	.0094	.2227
2768	58.8	-.0	-20.0	-.0176	.0291	-.0114	-.0035	.0078	.2212	90.0	.0000	.00000	0.0	585.1	585.1	.0078	.2212
2769	58.8	-5.0	-20.0	-.0399	.0308	-.0235	-.0033	.0019	.2315	90.0	.0000	.00000	0.0	584.7	584.7	.0019	.2315
2770	58.7	-10.0	-20.0	-.0832	.0316	-.0304	-.0034	-.0018	.2268	90.0	.0000	.00000	0.0	582.7	582.7	-.0018	.2268

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 584.9 584.9

RUN 135   CONFIGURATION 15

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	OS	CYMS	CSFS
2771	58.8	-.0	-30.0	-.0699	.0193	-.0105	-.0056	-.0067	.3885	90.0	.0000	.00000	0.0	585.5	585.5	-.0067	.3885
2772	58.8	9.9	-30.0	.0158	.0179	.0037	-.0047	-.0054	.4046	90.0	.0000	.00000	0.0	585.5	585.5	-.0054	.4046
2773	58.9	4.9	-30.0	-.0364	.0199	-.0015	-.0052	-.0065	.3985	90.0	.0000	.00000	0.0	586.6	586.6	-.0065	.3985
2774	58.9	-.1	-30.0	-.0705	.0188	-.0106	-.0056	-.0072	.3910	90.0	.0000	.00000	0.0	586.2	586.2	-.0072	.3910
2775	58.8	-5.0	-30.0	-.1142	.0183	-.0196	-.0057	-.0130	.3886	90.0	.0000	.00000	0.0	585.5	585.5	-.0130	.3886
2776	58.7	-10.0	-30.0	-.1805	.0181	-.0256	-.0056	-.0219	.3944	90.0	.0000	.00000	0.0	583.9	583.9	-.0219	.3944

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 585.5 585.5

RUN 136   CONFIGURATION 16

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	OS	CYMS	CSFS
2788	44.1	0.0	0.0	.0043	.0375	-.0091	.0002	-.0008	.0136	90.0	.0000	.00000	0.0	329.8	329.8	-.0008	.0136
2789	43.9	-.0	10.0	.0050	.0379	-.0102	-.0030	.0232	-.1208	90.0	.0000	.00000	0.0	326.6	326.6	.0232	-.1208
2790	43.9	-.0	20.0	-.0104	.0317	-.0114	-.0041	.0521	-.2897	90.0	.0000	.00000	0.0	326.2	326.2	.0521	-.2897
2791	43.9	-.0	30.0	-.0912	.0309	-.0039	-.0025	.0889	-.5003	90.0	.0000	.00000	0.0	326.2	326.2	.0889	-.5003
2792	43.9	-.1	40.0	-.0981	.0213	-.0172	-.0035	.1516	-.7698	90.0	.0000	.00000	0.0	326.6	326.6	.1516	-.7698
2793	43.9	-.1	50.0	-.1169	.0203	-.0133	-.0003	.1901	-1.0382	90.0	.0000	.00000	0.0	326.6	326.6	.1901	-1.0382
2794	43.9	-.1	60.0	-.1951	-.0173	-.0141	.0012	.2241	-1.2489	90.0	.0000	.00000	0.0	326.6	326.6	.2241	-1.2489
2795	44.0	-.1	70.0	-.3575	-.0838	-.0079	.0032	.2175	-1.2997	90.0	.0000	.00000	0.0	327.4	327.4	.2175	-1.2997
2796	43.8	-.1	80.0	-.4270	-.1592	-.0079	.0035	.2199	-1.2824	90.0	.0000	.00000	0.0	324.3	324.3	.2199	-1.2824
2797	44.2	-.1	90.0	-.4559	-.2073	-.0089	.0013	.2380	-1.2023	90.0	.0000	.00000	0.0	330.2	330.2	.2380	-1.2023
2798	44.2	.0	0.0	.0044	.0374	-.0089	.0001	.0002	.0082	90.0	.0000	.00000	0.0	330.6	330.6	.0002	.0082
2799	44.1	.0	-10.0	.0068	.0351	-.0113	.0033	-.0277	.1596	90.0	.0000	.00000	0.0	329.0	329.0	-.0277	.1596
2800	43.9	.0	-20.0	-.0272	.0264	-.0089	.0040	-.0534	.3148	90.0	.0000	.00000	0.0	325.5	325.5	-.0534	.3148
2801	44.3	.0	-30.0	-.0935	.0191	-.0090	.0027	-.0971	.5414	90.0	.0000	.00000	0.0	332.1	332.1	-.0971	.5414
2802	44.4	.0	-40.0	-.0894	.0157	-.0098	.0027	-.1661	.8255	90.0	.0000	.00000	0.0	333.3	333.3	-.1661	.8255
2803	44.1	.1	-50.0	-.0936	-.0021	-.0089	.0012	-.2001	1.0570	90.0	.0000	.00000	0.0	329.8	329.8	-.2001	1.0570
2804	43.9	.1	-60.0	-.1876	-.0466	-.0121	-.0008	-.2237	1.2542	90.0	.0000	.00000	0.0	325.9	325.9	-.2237	1.2542
2805	44.0	.0	-70.0	-.3775	-.1074	-.0051	-.0027	-.2193	1.2941	90.0	.0000	.00000	0.0	327.8	327.8	-.2193	1.2941
2806	43.9	.0	-80.0	-.4698	-.1801	-.0055	-.0029	-.2200	1.2704	90.0	.0000	.00000	0.0	326.6	326.6	-.2200	1.2704
2807	44.3	.0	-90.0	-.4383	-.2243	-.0081	-.0008	-.2407	1.1614	90.0	.0000	.00000	0.0	331.8	331.8	-.2407	1.1614

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 328.2 328.2

RUN 137   CONFIGURATION 16

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2810	58.7	-.0	0.0	.0004	.0362	-.0094	.0001	-.0003	.0080	90.0	.0000	.00000	0.0	583.5	583.5	-.0003	.0080
2811	58.7	-.0	10.0	.0016	.0369	-.0108	-.0030	.0242	-.1263	90.0	.0000	.00000	0.0	582.7	582.7	.0242	-.1263
2812	58.9	-.0	20.0	-.0062	.0302	-.0136	-.0041	.0522	-.2905	90.0	.0000	.00000	0.0	587.0	587.0	.0522	-.2905
2813	58.7	-.1	30.0	-.0411	.0217	-.0104	-.0036	.0832	-.4770	90.0	.0000	.00000	0.0	582.7	582.7	.0832	-.4770
2814	58.6	-.1	40.0	-.0973	.0179	-.0076	-.0041	.1391	-.7255	90.0	.0000	.00000	0.0	581.5	581.5	.1391	-.7255
2815	58.8	-.1	50.0	-.1293	.0210	-.0126	-.0006	.1901	-1.0197	90.0	.0000	.00000	0.0	584.7	584.7	.1901	-1.0197
2816	58.7	-.0	0.0	.0003	.0378	-.0087	.0001	-.0002	.0065	90.0	.0000	.00000	0.0	583.5	583.5	-.0002	.0065
2817	58.7	-.0	-10.0	.0022	.0354	-.0116	.0033	-.0275	.1515	90.0	.0000	.00000	0.0	583.5	583.5	-.0275	.1515
2818	58.8	-.0	-20.0	-.0179	.0249	-.0126	.0039	-.0544	.3146	90.0	.0000	.00000	0.0	584.3	584.3	-.0544	.3146
2819	58.5	-.0	-30.0	-.0751	.0181	-.0085	.0030	-.0883	.5146	90.0	.0000	.00000	0.0	579.6	579.6	-.0883	.5146
2820	58.7	-.0	-40.0	-.0620	.0131	-.0057	.0031	-.1610	.7863	90.0	.0000	.00000	0.0	582.7	582.7	-.1610	.7863
2821	58.7	.0	-50.0	-.0766	.0000	-.0131	.0012	-.2014	1.0523	90.0	.0000	.00000	0.0	582.3	582.3	-.2014	1.0523

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   583.2   583.2

RUN 138   CONFIGURATION 16

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2824	58.7	-.0	0.0	.0012	.0356	-.0092	.0002	-.0006	.0088	90.0	.0000	.00000	0.0	582.3	582.3	-.0006	.0088
2825	58.7	9.9	0.0	.0304	.0342	.0180	-.0001	.0006	.0093	90.0	.0000	.00000	0.0	583.5	583.5	.0006	.0093
2826	58.8	4.9	0.0	.0117	.0350	.0058	-.0001	.0007	.0052	90.0	.0000	.00000	0.0	584.3	584.3	.0007	.0052
2827	58.7	-.1	0.0	.0004	.0354	-.0093	.0001	-.0003	.0065	90.0	.0000	.00000	0.0	583.1	583.1	-.0003	.0065
2828	58.7	-5.0	0.0	-.0161	.0354	-.0225	.0001	-.0002	.0061	90.0	.0000	.00000	0.0	583.5	583.5	-.0002	.0061
2829	58.8	-10.0	0.0	-.0391	.0332	-.0332	.0001	.0013	.0003	90.0	.0000	.00000	0.0	585.1	585.1	.0013	.0003

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   583.6   583.6

RUN 139   CONFIGURATION 16

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2830	58.6	-.0	-10.0	.0032	.0350	-.0117	.0032	-.0266	.1462	90.0	.0000	.00000	0.0	580.4	580.4	-.0266	.1462
2831	58.6	9.9	-10.0	.0389	.0312	.0146	.0015	-.0160	.1394	90.0	.0000	.00000	0.0	581.1	581.1	-.0160	.1394
2832	58.7	4.9	-10.0	.0271	.0344	-.0000	.0026	-.0205	.1414	90.0	.0000	.00000	0.0	582.7	582.7	-.0205	.1414
2833	58.6	-.1	-10.0	.0032	.0340	-.0123	.0032	-.0280	.1522	90.0	.0000	.00000	0.0	581.1	581.1	-.0280	.1522
2834	58.6	-5.0	-10.0	-.0175	.0356	-.0235	.0032	-.0332	.1567	90.0	.0000	.00000	0.0	581.1	581.1	-.0332	.1567
2835	58.6	-10.0	-10.0	-.0514	.0350	-.0321	.0028	-.0351	.1570	90.0	.0000	.00000	0.0	580.7	580.7	-.0351	.1570

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   581.2   581.2

RUN 140   CONFIGURATION 16

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2836	58.7	-.0	-20.0	-.0161	.0250	-.0136	.0039	-.0549	.3142	90.0	.0000	.00000	0.0	583.9	583.9	-.0549	.3142
2837	58.8	9.9	-20.0	.0046	.0230	.0168	.0039	-.0562	.3355	90.0	.0000	.00000	0.0	584.3	584.3	-.0562	.3355
2838	58.8	4.9	-20.0	.0024	.0231	-.0003	.0040	-.0513	.3109	90.0	.0000	.00000	0.0	584.7	584.7	-.0513	.3109
2839	58.8	-.0	-20.0	-.0153	.0242	-.0133	.0040	-.0545	.3117	90.0	.0000	.00000	0.0	584.3	584.3	-.0545	.3117
2840	58.7	-5.0	-20.0	-.0406	.0275	-.0237	.0040	-.0608	.3225	90.0	.0000	.00000	0.0	582.7	582.7	-.0608	.3225
2841	58.7	-10.0	-20.0	-.0859	.0296	-.0285	.0034	-.0629	.3204	90.0	.0000	.00000	0.0	582.7	582.7	-.0629	.3204

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   583.8   583.8

RUN 141   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2877	15.3	0.0	-.0	-.2731	.0932	-.0987	.0205	-.3149	.4983	42.7	.0453	.00151	191.7	37.8	264.3	-.0450	.0713
2878	15.0	-.0	10.0	-.3024	.0840	-.0911	.0109	-.2059	.1629	42.1	.0450	.00141	191.7	36.2	261.7	-.0285	.0226
2879	14.8	-.0	20.0	-.5887	.0551	-.0380	-.0035	-.0259	-.3047	41.7	.0451	.00139	191.8	35.5	261.6	-.0035	-.0413
2880	15.0	-.1	30.0	-1.3920	.0327	-.0104	-.0028	.2424	-.9141	42.2	.0453	.00140	191.9	36.2	263.2	.0334	-.1259
2881	15.0	-.1	40.0	-1.9469	-.0921	.0308	.0010	.4265	-1.4941	42.3	.0453	.00136	191.9	36.2	263.3	.0587	-.2056
2882	15.0	-.1	50.0	-2.3261	-.2113	-.0111	.0092	.5890	-2.2547	42.5	.0453	.00127	191.9	36.2	263.3	.0811	-.3103
2883	14.9	-.1	60.0	-1.7920	-.3393	-.1821	-.0055	.8262	-3.3284	42.3	.0454	.00134	191.8	35.8	263.3	.1125	-.4532
2884	15.2	-.1	70.0	-1.6911	-.2913	-.2589	-.0163	1.0551	-3.5611	43.0	.0458	.00141	191.9	37.4	266.9	.1479	-.4992
2885	15.4	-.0	80.0	-.6762	-.0392	-.2100	-.0380	1.1667	-3.8874	43.5	.0457	.00131	192.1	38.2	268.1	.1663	-.5541
2886	15.4	-.0	90.0	-.1049	-.0410	-.1881	-.0354	1.1226	-3.9726	43.9	.0455	.00119	192.2	38.6	257.7	.1619	-.5730
2887	15.0	0.0	-.0	-.2806	.0961	-.1062	.0209	-.3250	.5608	42.1	.0453	.00151	191.9	36.6	263.8	-.0451	.0779
2888	14.7	.0	-10.0	-.4929	.0777	-.1274	.0309	-.4515	.8833	41.4	.0451	.00140	191.9	35.1	261.4	-.0606	.1185
2889	14.8	.0	-20.0	-.5897	.0924	-.1385	.0436	-.5869	1.3046	41.5	.0454	.00145	191.8	35.5	262.9	-.0792	.1760
2890	15.3	.0	-30.0	-.7170	.0966	-.1415	.0401	-.6895	1.6939	42.7	.0456	.00154	191.7	37.8	266.2	-.0980	.2407
2891	15.3	.0	-40.0	-.9706	.0650	-.1597	.0362	-.8069	2.0941	42.9	.0456	.00154	191.5	37.8	265.3	-.1150	.2985
2892	15.3	.0	-50.0	-1.1759	.0124	-.1800	.0292	-.8559	2.4219	43.1	.0457	.00159	191.5	37.8	265.9	-.1217	.3445
2893	15.3	.0	-60.0	-1.1844	-.1193	-.2438	.0284	-1.0124	2.8852	43.2	.0456	.00171	191.5	37.8	265.6	-.1441	.4108

AVERAGE TIP SPEED RATIO = .040   AVERAGE OF ABOVE VALUES   42.5   .0454   .00163   191.8   36.9   264.4

RUN 142   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2901	20.3	.0	-.0	.1445	.1977	-.0402	.0088	-.1614	.1822	52.4	.0477	.00271	192.6	67.0	307.9	-.0351	.0396
2902	20.3	.0	10.0	.1709	.1941	-.0238	.0034	-.1119	-.0916	52.5	.0475	.00258	192.4	66.6	306.1	-.0243	-.0199
2903	20.0	.0	20.0	.0494	.1836	.0125	-.0078	.0731	-.5896	52.1	.0472	.30254	192.3	64.6	322.4	.0156	-.1260
2904	19.9	-.0	30.0	-.3406	.1564	.0577	-.0137	.2278	-1.0051	52.0	.0473	.00248	192.2	64.2	302.3	.0484	-.2134
2905	19.8	-.0	40.0	-1.0020	.1466	.0700	-.0164	.5020	-1.6655	51.8	.0476	.00236	191.9	63.4	302.1	.1054	-.3497
2906	20.2	-.0	50.0	-1.1792	.0957	.0306	-.0175	.6144	-2.2280	52.5	.0483	.00229	191.7	65.8	307.5	.1314	-.4766
2907	20.2	-.1	60.0	-1.0776	-.0268	-.1023	-.0198	.6550	-2.4906	52.6	.0485	.00223	191.8	66.2	309.2	.1402	-.5331
2908	20.2	-.1	70.0	-1.2155	-.1358	-.1709	-.0155	.7147	-2.6439	52.7	.0485	.00205	191.8	66.2	309.3	.1529	-.5656
2909	20.2	-.1	80.0	-1.1427	-.2718	-.1736	-.0117	.7579	-2.4993	52.9	.0486	.00181	191.7	66.2	309.4	.1621	-.5346
2910	20.2	-.0	90.0	-.9648	-.3770	-.1576	-.0111	.7126	-2.2113	52.9	.0487	.00159	191.6	65.8	309.2	.1516	-.4705
2911	19.8	.0	.0	.1212	.1981	-.0437	.0089	-.1686	.2126	51.6	.0472	.00273	191.9	63.4	300.3	-.0356	.0449
2912	19.5	.3	-10.0	.0561	.2078	-.0484	.0189	-.2598	.5492	51.1	.0472	.00269	191.7	61.8	298.0	-.0539	.1140
2913	19.7	-.0	-20.0	-.0263	.2018	-.0478	.0311	-.3782	.9536	51.6	.0472	.00261	191.7	63.0	299.3	-.0797	.2008
2914	19.7	.1	-30.0	-.0576	.1883	-.0565	.0302	-.4463	1.3056	51.8	.0472	.30256	191.7	63.0	299.1	-.094C	.2751
2915	19.7	.1	-40.0	-.2240	.1698	-.0423	.0348	-.5867	1.7696	51.9	.0473	.00258	191.4	63.0	298.7	-.1238	.3734
2916	20.0	.1	-50.0	-.5810	.1290	-.0226	.0316	-.6533	2.1047	52.6	.0476	.00260	191.3	65.0	302.3	-.1405	.4526
2917	20.0	.1	-60.0	-.9281	.0578	-.0725	.0214	-.8021	2.5419	52.8	.0479	.00259	191.3	65.0	30?.7	-.1716	.5439

AVERAGE TIP SPEED RATIO = .054   AVERAGE OF ABOVE VALUES   52.2 .0477 .00241 191.8 64.7 308.9

RUN 143   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2925	25.2	.0	-.0	.1757	.1601	-.0211	.0080	-.1075	.0931	60.0	.0501	.00409	192.2	102.8	355.0	-.0311	.0270
2926	25.2	.0	10.0	.2011	.1664	-.0087	.0009	-.0351	-.1934	60.0	.0502	.00418	192.0	102.8	354.8	-.0102	-.0560
2927	25.1	.0	20.0	.1773	.1660	.0061	-.0068	.0598	-.5333	59.9	.0501	.00413	191.9	102.0	353.4	.0172	-.1530
2928	25.1	-.0	30.0	-.0323	.1563	.0523	-.0159	.2254	-.9924	60.0	.0503	.00400	192.0	102.0	354.4	.0649	-.2856
2929	24.9	-.0	40.0	-.4463	.1668	.0537	-.0185	.4205	-1.4834	59.8	.0505	.00378	192.0	100.8	353.5	.1196	-.4220
2930	25.0	-.0	50.0	-.3333	.0939	-.0097	-.0160	.4134	-1.7023	59.9	.0509	.30366	191.9	101.2	356.2	.1175	-.4837
2931	25.1	-.1	60.0	-.4429	.0380	-.0595	-.0174	.4732	-1.9662	60.2	.0510	.00340	192.0	102.4	359.4	.1352	-.5617
2932	25.1	-.1	70.0	-.6568	-.036C	-.0972	-.0153	.5502	-2.1381	60.2	.0512	.00309	192.2	102.4	359.8	.1566	-.6084
2933	25.0	-.1	80.0	-.7637	-.1635	-.0650	-.0073	.5058	-1.9744	60.2	.0514	.00274	192.1	101.6	359.8	.1429	-.5577
2934	24.9	-.0	90.1	-.7959	-.2838	-.0177	-.0085	.4335	-1.5762	60.3	.0514	.00239	191.9	100.8	358.3	.1220	-.4435
2935	25.0	.0	-.0	.1789	.1670	-.0227	.0079	-.1087	.0986	59.7	.0500	.00405	192.1	101.2	352.7	-.0312	.0243
2936	25.0	.0	-10.0	.1472	.1693	-.0300	.0144	-.1818	.4019	59.8	.0501	.00393	192.0	101.2	357.8	-.0522	.1153
2937	25.0	.0	-20.0	.1196	.1724	-.0254	.0231	-.2691	.7204	59.9	.0499	.00380	192.0	101.2	351.8	-.0774	.2073
2938	25.0	.0	-30.0	.1012	.1798	-.0166	.0210	-.2995	.9860	60.1	.0498	.00366	192.0	101.2	351.1	-.0863	.2842
2939	25.0	.1	-40.0	-.0366	.1829	.0112	.0253	-.3902	1.3548	60.3	.0497	.00353	191.9	101.2	350.5	-.1127	.3912
2940	24.9	.1	-50.0	-.2785	.1576	-.0066	.0210	-.5245	1.8358	60.2	.0499	.00335	191.8	100.0	350.3	-.1498	.5243
2941	25.0	.1	-60.0	-.4941	.1137	-.0058	.0118	-.6934	2.3817	60.4	.0504	.00323	191.8	101.2	353.6	-.1985	.6818

AVERAGE TIP SPEED RATIO = .067   AVERAGE OF ABOVE VALUES   60.1 .0504 .00359 192.0 101.5 354.6

RUN 144   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2949	30.2	.0	0.0	.1016	.1028	-.0125	.0084	-.0767	.0602	66.5	.0528	.00355	193.0	148.1	415.8	-.0273	.0215
2950	30.1	-.0	10.0	.0736	.1030	-.0037	.0018	-.0156	-.1565	66.4	.0530	.30372	191.6	146.5	411.6	-.0056	-.0557
2951	30.0	-.0	20.0	-.0322	.1121	.0236	-.0058	.0542	-.4178	66.3	.0532	.00382	191.6	145.7	411.4	.0192	-.1480
2952	30.1	-.0	30.0	-.1532	.1014	.0330	-.0137	.2028	-.8355	66.4	.0535	.00381	192.0	146.9	415.3	.C717	-.2955
2953	30.1	-.0	40.0	-.2226	.0902	.0090	-.0178	.3327	-1.2115	66.4	.0535	.00379	192.0	146.5	415.3	.1174	-.4274
2954	29.9	-.1	50.0	-.3035	.0726	-.0217	-.0049	.3138	-1.3488	66.3	.0535	.00371	191.9	144.9	413.4	.1100	-.4729
2955	30.2	-.1	60.0	-.1366	-.0108	-.0370	-.0161	.4321	-1.6429	66.8	.0536	.00371	191.9	147.7	416.5	.1532	-.5826
2956	30.2	-.1	70.1	-.4021	-.0439	-.0025	-.0110	.4152	-1.6486	66.8	.0536	.00353	192.3	147.7	417.7	.1468	-.5828
2957	30.2	-.1	80.0	-.6309	-.1107	.0289	-.0047	.3505	-1.4014	66.9	.0540	.00334	192.1	147.3	418.7	.1233	-.4929
2958	30.1	-.1	90.0	-.6270	-.1555	.0209	-.0080	.3326	-1.0953	67.0	.0540	.00314	191.9	146.5	417.4	.1167	-.3844
2960	30.2	.0	0.0	.1019	.1027	-.0119	.0082	-.0740	.0625	66.5	.0531	.00371	191.9	148.1	414.2	-.0265	.0223
2961	30.2	.0	-10.0	.0891	.1017	-.0204	.0159	-.1524	.2996	66.7	.0528	.00354	191.8	148.1	412.4	-.0547	.1076
2962	30.1	.0	-20.0	.0598	.1132	-.0215	.0197	-.2131	.5370	66.6	.0526	.00340	191.9	146.5	410.0	-.0761	.1919
2963	30.0	.0	-30.0	.0577	.1203	-.0161	.0155	-.2438	.7807	66.7	.0523	.00328	191.8	145.7	407.7	-.0871	.2790
2964	29.9	.1	-40.0	.0696	.1217	-.0055	.0138	-.2946	1.0837	66.8	.0520	.00317	191.7	144.5	405.0	-.1051	.3867
2965	29.7	.1	-50.0	.0491	.0980	-.0176	.0167	-.4982	1.6344	66.8	.0521	.00314	191.7	143.3	403.9	-.1769	.5800
2966	30.1	.1	-60.0	-.2684	.0806	-.0097	.0110	-.6231	2.0154	67.1	.0528	.00313	191.9	146.9	411.7	-.2223	.7191

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   66.7 .0531 .00350 192.0 146.5 412.8

RUN 145   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
2974	35.2	.0	.0	.0734	.0829	-.0153	.0049	-.0336	.0037	70.9	.0558	.00456	191.7	199.2	477.2	-.0140	.0016
2975	35.2	-.0	10.0	.0360	.0846	-.0054	.0016	-.0125	-.1334	70.9	.0559	.00474	191.6	199.2	477.2	-.0052	-.0557
2976	35.1	-.0	20.0	-.0966	.0919	.0249	-.0051	.0495	-.3470	70.7	.0561	.00484	192.0	198.0	478.4	.0205	-.1437
2977	35.0	-.0	30.0	-.2286	.0881	.0261	-.0116	.1725	-.7036	70.7	.0564	.00482	191.8	196.9	477.7	.0711	-.2900
2978	35.2	-.1	40.0	-.2468	.0781	-.0227	-.0146	.2947	-1.0657	70.9	.0568	.00493	191.6	199.6	481.8	.1221	-.4415
2979	35.2	-.1	50.0	-.2791	.0427	-.0315	-.0069	.2798	-1.1509	71.0	.0567	.00491	191.6	199.2	480.9	.1159	-.4768
2980	35.0	-.1	60.1	-.2565	-.0080	-.0217	-.0162	.3722	-1.3870	71.0	.0563	.00483	191.9	197.3	478.2	.1535	-.5721
2981	35.1	-.1	70.0	-.4508	-.0405	.0136	-.0095	.3180	-1.2652	71.0	.0566	.00470	192.2	198.4	481.7	.1310	-.5212
2982	35.2	-.1	80.0	-.5492	-.0819	.0214	-.0058	.2766	-1.0621	71.3	.0568	.00445	192.0	199.6	483.3	.1142	-.4387
2983	35.2	-.1	90.0	-.4881	-.1093	-.0003	-.0031	.3000	-.9775	71.4	.0567	.00428	191.9	199.6	482.6	.1241	-.4043
2984	35.2	0.0	0.0	.0724	.0845	-.0151	.0055	-.0376	.0111	70.9	.0560	.00457	191.8	200.0	479.0	-.0157	.0046
2985	35.1	.0	-10.0	.0589	.0831	-.0191	.0144	-.1181	.2423	71.1	.0554	.00420	191.7	198.8	474.5	-.0495	.1015
2986	35.0	.0	-20.0	-.0196	.0868	-.0137	.0175	-.1705	.4412	71.1	.0553	.00400	191.7	197.6	472.7	-.0713	.1845
2987	34.8	.0	-30.0	-.0945	.0969	-.0142	.0148	-.2317	.6892	71.0	.0550	.00383	191.7	194.9	468.8	-.0963	.2865
2988	34.9	.0	-40.0	-.0995	.0914	-.0440	.0133	-.3316	1.0153	71.2	.0551	.00365	191.5	196.1	469.7	-.1384	.4322
2989	35.0	.0	-50.0	-.0905	.0530	-.0569	.0166	-.4641	1.4140	71.5	.0550	.00362	191.5	197.6	470.8	-.1948	.5936
2990	35.0	.1	-60.0	-.2005	.0026	.0051	.0170	-.4326	1.4258	71.6	.0550	.00354	191.4	197.6	470.7	-.1816	.5987

AVERAGE TIP SPEED RATIO = .094   AVERAGE OF ABOVE VALUES   71.1 .0559 .00438 191.7 198.2 476.8

RUN 146   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3041	44.8	.0	-.0	.0429	.0623	-.0202	.0037	-.0191	.0042	76.6	.0609	.00695	191.7	325.5	630.1	-.0099	.0022
3042	45.1	-.0	10.0	.0176	.0621	-.0118	.0016	-.0055	-.1100	76.7	.0612	.00690	191.8	329.4	635.8	-.0029	-.0572
3043	45.0	-.0	20.0	-.0803	.0636	.0086	-.0049	.0512	-.3088	76.6	.0616	.00683	191.4	327.4	634.2	.0264	-.1594
3044	45.1	-.1	30.0	-.1685	.0598	.0015	-.0087	.1449	-.6081	76.7	.0618	.00667	191.4	328.6	636.5	.0748	-.3139
3045	45.0	-.1	40.0	-.1697	.0469	-.0472	-.0107	.2560	-.9431	76.6	.0621	.00638	191.8	327.8	638.9	.1314	-.4839
3046	45.0	-.1	50.0	-.3206	.0094	-.0267	-.0082	.2622	-1.0678	76.6	.0623	.00608	191.7	327.0	638.8	.1342	-.5467
3047	45.0	-.1	60.0	-.2653	-.0499	-.0110	-.0105	.2620	-1.1414	76.7	.0620	.00589	191.9	328.2	638.9	.1346	-.5863
3048	45.1	-.1	70.0	-.3715	-.0734	-.0270	-.0023	.2481	-1.1641	76.7	.0626	.00555	192.5	329.4	645.1	.1267	-.5944
3049	45.1	-.1	80.0	-.4392	-.1101	-.0081	.0003	.2676	-1.1683	76.9	.0622	.00513	192.4	329.4	642.9	.1371	-.5986
3050	45.2	-.1	90.0	-.4411	-.1489	-.0031	.0022	.2698	-1.1427	77.0	.0623	.00488	191.9	330.2	642.2	.1387	-.5875
3051	45.0	.0	0.0	.0381	.0612	-.0201	.0034	-.0178	.0040	76.7	.0611	.00679	191.5	327.8	632.9	-.0092	.0021
3052	45.0	.0	-10.0	.0127	.0593	-.0196	.0099	-.0730	.1875	76.8	.0608	.00681	191.5	328.2	631.5	-.0380	.0975
3053	45.1	.0	-20.0	-.0600	.0568	-.0137	.0124	-.1197	.3702	76.9	.0605	.00672	191.5	379.0	630.6	-.0625	.1931
3054	44.9	.0	-30.0	-.1555	.0623	-.0134	.0103	-.1781	.6097	76.9	.0602	.00657	191.5	326.6	627.1	-.0927	.3175
3055	45.0	.0	-40.0	-.1735	.0476	-.0443	.0118	-.2837	.9430	77.1	.0601	.00648	191.2	328.2	627.2	-.1484	.4935
3056	45.1	.0	-50.0	-.2793	.0026	-.0118	.0173	-.3203	1.1096	77.2	.0601	.00641	191.4	329.8	629.2	-.1679	.5816
3057	45.2	.0	-60.0	-.2271	-.0387	-.0572	.0117	-.3071	1.1993	77.2	.0604	.00641	191.5	330.2	631.7	-.1605	.6268
3058	45.0	.0	-70.0	-.3093	-.0402	-.0361	-.0000	-.2643	1.2374	77.2	.0605	.00629	191.5	328.2	630.2	-.1376	.6445
3059	45.1	.0	-80.0	-.4812	-.0646	-.0190	-.0015	-.2623	1.2207	77.2	.0610	.00615	191.5	329.0	633.4	-.1362	.6340
3060	45.1	.0	-90.0	-.4829	-.1259	-.0119	-.0034	-.2632	1.1812	77.3	.0612	.00612	191.5	328.6	634.0	-.1364	.6122

AVERAGE TIP SPEED RATIO = .121   AVERAGE OF ABOVE VALUES   76.9 .0613 .00630 191.7 328.4 634.6

RUN 147   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3068	30.3	.0	0.0	.1092	.1110	-.0130	.0079	-.0735	.0622	66.4	.0540	.00392	191.2	148.5	417.1	-.0262	.0221
3069	29.8	9.9	0.0	.0507	.0616	.0045	.0066	-.0502	.0460	60.0	.0605	.00439	192.0	144.1	447.8	-.0161	.0148
3070	30.2	4.9	0.0	.0675	.0790	-.0045	.0055	-.0352	.0137	63.7	.0567	.00407	192.0	147.7	432.4	-.0120	.0047
3071	30.3	-.0	0.0	.1093	.1122	-.0139	.0079	-.0743	.0624	66.4	.0539	.00386	191.3	148.5	416.7	-.0265	.0222
3072	30.1	-5.0	0.0	.0389	.1359	-.0325	.0084	-.0794	-.0293	68.7	.0503	.00357	191.1	146.5	396.8	-.0293	.0108
3073	30.2	-10.0	0.0	-.0228	.1410	-.0553	.0069	-.0786	.0255	71.1	.0462	.00328	191.7	147.3	378.4	-.0306	.0099

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   66.1 .0536 .00385 191.6 147.1 414.9

RUN 148   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3074	30.1	.0	-20.0	.0673	.1274	-.0243	.0198	-.2178	.5604	66.4	.0535	.00365	191.7	146.9	414.6	-.0772	.1985
3075	30.1	5.0	-20.0	.0268	.0873	-.0133	.0211	-.2014	.4704	63.9	.0562	.00383	192.0	146.9	429.1	-.0689	.1610
3076	30.0	-.0	-20.0	.0648	.1252	-.0228	.0195	-.2175	.5672	66.4	.0534	.00363	191.2	145.7	411.5	-.0770	.2008
3077	30.0	-5.0	-20.0	.0077	.1405	-.0423	.0170	-.2186	.6452	68.8	.0500	.00341	191.1	145.7	394.0	-.0808	.2386
3078	30.0	-9.9	-20.0	-.0511	.1460	-.0626	.0158	-.2165	.6588	71.0	.0464	.00319	191.6	145.7	377.4	-.0836	.2543

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   67.3 .0519 .00354 191.5 146.2 405.3

RUN 149   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3079	30.1	-.0	20.0	-.0247	.1260	.0217	-.0060	.0546	-.4091	66.0	.0544	.00389	191.7	146.9	418.9	.0191	-.1434
3080	30.2	4.9	20.0	-.0799	.0957	.0267	-.0059	.0595	-.3382	63.7	.0569	.00408	192.3	147.7	433.8	.0202	-.1151
3081	30.2	-.1	20.0	-.0314	.1249	.0225	-.0060	.0549	-.4041	66.2	.0543	.00389	191.5	147.7	418.4	.0194	-.1426
3082	30.2	-5.0	20.0	.1625	.1354	-.0156	-.0046	.0784	-.6106	68.7	.0507	.00372	191.1	147.3	399.2	.0289	-.2253
3083	30.0	-10.0	20.0	.0218	.1459	-.0271	-.0042	.0585	-.5382	70.8	.0469	.00333	192.0	146.1	381.3	.0224	-.2062

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES 67.1 .0526 .00378 191.7 147.1 410.3

RUN 150   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3097	35.2	0.0	0.0	.0771	.0813	-.0148	.0057	-.0394	.0199	70.7	.0567	.00512	191.4	200.8	483.4	-.0164	.0083
3098	35.1	.1	-60.0	-.1974	.0002	.0075	.0181	-.4262	1.4036	71.4	.0559	.00441	190.9	199.2	476.5	-.1782	.5868
3099	35.1	.1	-70.0	-.1768	-.0307	-.0113	.0093	-.3077	1.2280	71.5	.0558	.00432	190.8	199.2	475.7	-.1289	.5143
3100	35.0	.1	-80.0	-.3878	-.0459	-.0046	.0036	-.2705	1.1990	71.4	.0563	.00404	191.4	198.4	479.1	-.1120	.4965
3101	34.9	.1	-90.0	-.4382	-.1011	-.0147	-.0001	-.2810	1.1503	71.3	.0568	.00398	191.5	197.6	480.9	-.1155	.4727

AVERAGE TIP SPEED RATIO = .094   AVERAGE OF ABOVE VALUES 71.2 .0563 .00437 191.2 199.1 479.1

RUN 151   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3102	30.0	.1	-59.9	-.2788	.0883	-.0068	.0105	-.6254	2.0447	66.5	.0537	.00361	191.8	145.3	413.9	-.2196	.7178
3103	30.1	.1	-70.0	-.2184	.0004	-.0265	.0178	-.4162	1.6861	66.8	.0538	.00354	191.4	146.5	415.0	-.1469	.5952
3104	30.1	.1	-80.0	-.5788	-.0506	-.0070	.0094	-.3087	1.4754	66.8	.0542	.00332	191.7	146.5	417.4	-.1083	.5177
3105	30.0	.1	-90.0	-.6958	-.1695	-.0126	.0050	-.2874	1.3194	66.7	.0544	.00315	191.8	145.7	417.9	-.1002	.4600

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES 66.7 .0540 .00340 191.7 146.0 416.1

RUN 152   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3106	24.8	.1	-60.0	-.5246	.0967	-.0131	.0123	-.6853	2.3733	60.0	.0511	.00294	192.0	99.6	356.0	-.1918	.6643
3107	25.1	.1	-70.0	-.4693	.0224	-.0689	.0168	-.6104	2.4520	60.4	.0515	.00289	192.0	101.6	359.9	-.1723	.6923
3108	25.1	.1	-80.0	-.8977	-.0657	-.0475	.0095	-.4695	2.1142	60.4	.0520	.00270	192.3	102.0	363.6	-.1317	.5931
3109	25.1	.1	-90.0	-1.0648	-.2221	-.0327	.0053	-.3818	1.7596	60.6	.0521	.00249	192.1	102.0	363.8	-.1070	.4934

AVERAGE TIP SPEED RATIO = .067   AVERAGE OF ABOVE VALUES 60.3 .0517 .00275 192.1 101.3 360.8

RUN 153   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3110	19.7	.0	-60.0	-.8953	.0304	-.0991	.0224	-.8133	2.5376	51.5	.0485	.00246	192.1	63.0	306.4	-.1673	.5220
3111	20.2	.1	-70.0	-1.0092	.0099	-.1672	.0155	-.8683	3.0360	52.4	.0489	.00242	192.0	65.8	311.4	-.1834	.6413
3112	20.2	.1	-80.0	-1.2764	-.1250	-.1574	.0069	-.7775	2.8632	52.4	.0493	.00231	192.0	65.8	313.0	-.1634	.6017
3113	20.2	.1	-90.0	-1.3923	-.2997	-.0995	.0012	-.6189	2.3298	52.6	.0494	.00211	191.9	65.8	313.2	-.1300	.4893

AVERAGE TIP SPEED RATIO = .054   AVERAGE OF ABOVE VALUES 52.2 .0490 .00232 192.0 65.1 311.0

RUN 154   CONFIGURATION 36

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3114	15.4	.0	-60.0	-1.1967	-.1155	-.2530	.0292	-1.0361	2.9523	42.3	.0464	.00217	191.5	38.2	269.6	-.1468	.4184
3115	15.2	.1	-70.0	-1.1225	-.2566	-.2947	.0304	-1.1377	3.3830	42.2	.0461	.00195	191.7	37.4	267.7	-.1591	.4730
3116	14.7	.1	-80.0	-.3825	-.3238	-.2205	.0262	-1.0986	4.5668	41.3	.0458	.00178	191.9	35.1	264.5	-.1457	.6054
3117	14.8	.1	-90.0	-.3745	-.3836	-.1945	.0209	-1.0437	4.3722	41.6	.0461	.00173	191.8	35.5	266.1	-.1391	.5825

AVERAGE TIP SPEED RATIO = .040   AVERAGE OF ABOVE VALUES 41.8 .0461 .00191 191.7 36.5 267.0

APPENDIX

RUN 155   CONFIGURATION 35

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3130	14.7	-.0	0.0	-.2603	.0690	-.1151	.0180	-.3231	.4959	40.4	.0458	.00231	191.5	35.1	263.3	-.0430	.0660
3131	15.0	-.0	10.0	-.1987	.0739	-.0987	.0201	-.2809	.2241	41.3	.0458	.00231	191.5	36.6	265.2	-.0388	.0310
3132	15.1	-.0	20.0	-.4517	.0530	-.0535	.0223	-.1906	-.1035	41.6	.0456	.00225	191.7	37.0	265.0	-.0266	-.0145
3133	15.1	-.1	30.0	-1.1786	.0281	-.0416	.0241	.0506	-.6681	41.7	.0458	.00216	191.7	37.0	266.0	.0070	-.0930
3134	15.1	-.1	40.0	-1.7151	-.0836	-.0324	.0274	.2261	-1.1986	41.8	.0459	.00206	191.6	37.0	266.5	.0314	-.1665
3135	15.0	-.1	50.0	-2.0199	-.2265	-.0860	.0335	.4046	-2.0028	41.8	.0458	.00190	191.7	36.6	265.6	.0558	-.2763
3136	15.0	-.1	60.0	-1.5545	-.3439	-.2712	.0257	.6255	-3.1022	41.9	.0459	.00183	191.5	36.6	255.6	.0863	-.4279
3137	15.0	-.1	70.0	-1.0322	-.1692	-.3501	.0084	.8804	-3.5737	41.9	.0456	.00165	191.7	36.2	264.3	.1207	-.4900
3138	14.9	-.1	80.0	-.3144	.0463	-.3386	.0031	.9660	-4.0238	41.9	.0453	.00140	191.8	35.8	262.9	.1317	-.5486
3139	14.6	-.0	90.0	-.1169	-.0039	-.2566	.0015	.9655	-4.1636	41.3	.0453	.00115	191.9	34.7	261.8	.1279	-.5514
3140	15.4	-.0	-.0	-.1311	.1142	-.1019	.0160	-.2698	.3802	41.8	.0461	.00248	191.5	38.2	258.0	-.0385	.0542
3141	15.2	-.0	-10.0	-.2682	.0988	-.1367	.0158	-.3685	.6733	41.6	.0459	.00232	191.4	37.4	266.2	-.0518	.0947
3142	15.1	-.0	-20.0	-.5006	.0697	-.1730	.0137	-.4498	.9893	41.6	.0459	.00221	191.2	37.0	265.1	-.0628	.1382
3143	15.0	-.0	-30.0	-.7171	.0552	-.2311	.0079	-.5396	1.3714	41.6	.0456	.00208	191.4	36.6	263.8	-.0749	.1905
3144	14.9	0.0	-40.0	-1.0210	-.0007	-.2507	-.0007	-.5782	1.6126	41.2	.0459	.00208	191.1	35.8	263.9	-.0785	.2191
3145	14.8	0.0	-50.0	-1.1303	-.0688	-.3510	-.0062	-.6903	2.0175	41.1	.0458	.00195	191.5	35.5	264.1	-.0927	.2729
3146	14.8	.0	-60.0	-1.0303	-.2170	-.4268	-.0099	-.8135	2.4873	41.4	.0457	.00191	191.4	35.5	262.9	-.1097	.3354
3147	14.7	.0	-70.0	-.7893	-.3148	-.4638	-.0086	-.9129	3.0158	41.4	.0456	.00186	191.5	35.1	262.4	-.1220	.4030
3148	14.5	.1	-80.0	-.0356	-.3490	-.3618	-.0170	-.8614	4.2574	40.9	.0455	.00182	191.7	33.9	261.4	-.1116	.5517
3149	15.0	.1	-90.0	-.1517	-.4082	-.2815	-.0165	-.7863	3.8414	42.3	.0460	.00181	191.7	36.6	266.6	-.1080	.5278

AVERAGE TIP SPEED RATIO = .040   AVERAGE OF ABOVE VALUES   41.5   .0457   .00198   191.5   36.2   264.5

RUN 156   CONFIGURATION 35

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3163	20.0	0.0	0.0	.1248	.2004	-.0461	.0092	-.1654	.2051	52.6	.0461	.00278	191.6	65.8	298.9	-.0364	.0451
3164	20.0	-.0	10.0	.1394	.2037	-.0249	.0130	-.1672	-.0210	52.5	.0460	.00282	192.4	65.8	300.3	-.0366	-.0046
3165	20.0	-.0	20.0	.0471	.1982	.0054	.0119	-.0412	-.4311	52.5	.0458	.00286	192.6	65.4	299.7	-.0090	-.0941
3166	19.9	-.0	30.0	-.2651	.1807	.0249	.0109	.0840	-.7950	52.4	.0460	.00281	192.5	65.0	300.0	.0182	-.1722
3167	19.9	-.1	40.1	-.8786	.1772	-.0107	.0120	.3258	-1.3683	52.5	.0462	.00276	192.1	64.6	299.6	.0702	-.2951
3168	19.7	-.1	50.0	-1.1915	.1229	-.0498	.0168	.3957	-1.8352	52.4	.0463	.00259	192.2	63.8	299.5	.0843	-.3910
3169	19.6	-.1	60.0	-1.0267	-.0050	-.2576	.0132	.5023	-2.2752	52.1	.0465	.00254	192.1	62.6	299.0	.1052	-.4766
3170	20.1	-.1	70.0	-.9468	-.1100	-.3143	.0151	.5273	-2.3901	53.1	.0471	.00253	192.3	66.2	306.0	.1140	-.5169
3171	20.2	-.1	80.0	-1.0600	-.2491	-.2434	.0189	.5110	-2.1960	53.6	.0470	.00237	192.0	67.0	305.8	.1119	-.4809
3172	20.2	-.1	90.0	-1.0070	-.3574	-.1706	.0155	.4701	-1.8589	53.9	.0469	.00219	191.9	67.0	304.9	.1032	-.4082
3173	20.0	.0	-.0	.1025	.2145	-.0500	.0092	-.1664	.2070	52.4	.0461	.00277	192.2	65.4	299.9	-.0363	.0451
3174	20.0	.0	-10.0	.0380	.2273	-.0549	.0056	-.1644	.4062	52.6	.0460	.00263	192.1	65.8	299.8	-.0361	.0891
3175	20.0	.0	-20.0	-.0202	.2277	-.0721	.0040	-.2145	.7153	52.7	.0459	.00244	192.0	65.8	299.2	-.0472	.1573
3176	20.0	.0	-30.0	-.0278	.2065	-.1129	.0013	-.2803	1.0663	52.9	.0457	.00225	192.2	65.8	298.5	-.0618	.2350
3177	20.0	.0	-40.0	-.1643	.2011	-.1236	-.0014	-.3365	1.3982	53.0	.0458	.00215	191.8	65.4	297.5	-.0739	.3073
3178	19.9	.0	-50.0	-.3936	.1777	-.1627	-.0048	-.4256	1.7504	53.0	.0460	.00200	191.8	65.0	298.2	-.0928	.3815
3179	19.9	.0	-60.0	-.6633	.0889	-.2618	-.0109	-.5807	2.1954	53.1	.0461	.00186	191.7	64.6	298.0	-.1259	.4759
3180	19.8	.0	-70.0	-.9657	.0300	-.2265	-.0157	-.5596	2.5099	53.0	.0461	.00173	191.9	64.2	298.2	-.1205	.5404
3181	19.7	.1	-80.0	-1.2123	-.0985	-.2140	-.0176	-.5313	2.4487	53.1	.0462	.00166	191.8	63.8	298.0	-.1138	.5243
3182	19.6	.1	-90.0	-1.3327	-.2909	-.1609	-.0192	-.4389	2.0449	52.9	.0462	.00155	191.9	62.6	296.8	-.0926	.4315

AVERAGE TIP SPEED RATIO = .053   AVERAGE OF ABOVE VALUES   52.8   .0462   .00236   192.1   65.1   299.9

RUN 157   CONFIGURATION 35

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3185	25.1	.0	0.0	.1596	.1550	-.0249	.0050	-.0895	.0884	60.7	.0487	.00354	191.9	103.2	349.9	-.0264	.0261
3186	24.8	0.0	10.0	.1833	.1607	-.0108	.0075	-.0804	-.1062	60.2	.0486	.00348	192.3	100.8	348.2	-.0233	-.0207
3187	24.7	-.0	20.0	.1668	.1639	.0076	.0085	-.0371	-.3771	60.2	.0484	.00337	191.7	99.6	344.6	-.0107	-.1089
3188	24.5	-.0	30.0	-.0236	.1596	.0414	.0075	.0820	-.7704	59.9	.0487	.00319	191.5	98.1	343.9	.0234	-.2197
3189	24.7	-.0	40.0	-.3498	.1701	-.0009	.0091	.2428	-1.1915	60.2	.0492	.00303	191.5	100.0	348.6	.0697	-.3419
3190	24.7	-.1	50.1	-.1937	.1280	-.0893	.0119	.2368	-1.3989	60.4	.0493	.00282	191.4	100.0	348.6	.0680	-.4015
3191	24.7	-.1	60.0	-.3670	.0636	-.1199	.0100	.2881	-1.6594	60.6	.0492	.00252	191.5	100.0	348.6	.0827	-.4762
3192	24.6	-.1	70.0	-.6671	-.0218	-.1130	.0111	.3235	-1.8008	60.6	.0494	.00226	191.6	98.9	348.3	.0918	-.5111
3193	24.8	-.1	80.0	-.7823	-.1592	-.0657	.0136	.2872	-1.6393	60.8	.0495	.00202	191.6	100.4	350.9	.0822	-.4692
3194	24.8	-.1	90.0	-.7856	-.2798	-.0275	.0081	.2527	-1.2680	61.1	.0497	.00181	191.5	100.8	351.9	.0724	-.3634
3195	24.9	0.0	-.0	.1571	.1604	-.0261	.0052	-.0922	.0986	60.3	.0485	.00357	192.5	101.6	349.0	-.0269	.0287
3196	24.4	.0	-10.0	.1272	.1702	-.0352	.0022	-.1035	.3087	59.8	.0481	.00354	192.3	97.7	342.7	-.0295	.0880
3197	24.9	.0	-20.0	.1063	.1670	-.0282	-.0010	-.1045	.4994	60.4	.0485	.00360	192.2	101.2	348.2	-.0304	.1452
3198	25.0	.0	-30.0	.0934	.1658	-.0224	-.0040	-.1257	.7379	60.8	.0484	.00358	192.2	102.4	348.8	-.0369	.2167
3199	25.0	.0	-40.0	-.0353	.1868	-.0015	-.0064	-.1541	1.0224	61.1	.0483	.00352	191.9	102.4	347.4	-.0454	.3013
3200	25.0	.0	-50.0	-.1751	.1775	-.0586	-.0099	-.2931	1.4790	61.2	.0484	.00341	191.9	102.4	348.0	-.0862	.4352
3201	24.9	.1	-60.0	-.4067	.1160	-.0651	-.0147	-.4543	2.0076	61.1	.0486	.00333	192.1	101.6	349.0	-.1323	.5845
3202	24.8	.1	-70.0	-.4795	.0452	-.0733	-.0094	-.3347	2.0205	61.1	.0486	.00326	191.9	100.4	346.6	-.0970	.5854
3203	24.8	.1	-80.0	-.8382	-.0595	-.0694	-.0083	-.2660	1.7847	61.0	.0491	.00312	192.0	100.4	350.0	-.0763	.5122
3204	24.6	.0	-90.0	-1.0356	-.2146	-.0606	-.0095	-.2292	1.5308	60.9	.0491	.00291	192.2	99.3	349.2	-.0652	.4351

AVERAGE TIP SPEED RATIO = .066   AVERAGE OF ABOVE VALUES   60.6   .0488   .00309   191.9   100.6   348.1

RUN 158   CONFIGURATION 35

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3207	30.0	.0	0.0	.0956	.1045	-.0125	.0025	-.0334	.0037	66.7	.0515	.00451	191.1	147.7	406.8	-.0121	.0013
3208	29.8	-.0	10.0	.0542	.1037	-.0034	.0045	-.0337	-.1095	66.6	.0516	.00456	190.2	145.3	402.5	-.0122	-.0395
3209	29.7	-.0	20.0	-.0764	.1137	.0285	.0062	-.0296	-.2656	66.3	.0514	.00445	191.8	144.5	405.1	-.0105	-.0968
3210	29.6	-.0	30.0	-.1990	.1115	.0340	.0058	.0695	-.6137	66.1	.0518	.00436	191.7	143.7	405.7	.0246	-.2174
3211	29.8	-.1	40.0	-.1977	.0977	-.0163	.0065	.1621	-.9363	66.4	.0520	.00429	191.6	145.7	408.7	.0578	-.3338
3212	29.7	-.1	50.0	-.2627	.0874	-.0474	.0133	.1693	-1.0928	66.5	.0518	.00410	191.5	144.9	406.5	.0604	-.3895
3213	29.9	-.0	60.0	-.1465	.0130	-.0395	.0091	.2104	-1.2798	66.8	.0516	.00394	191.7	146.1	407.5	.0754	-.4588
3214	29.9	-.1	70.0	-.4039	-.0154	.0004	.0099	.2062	-1.2905	66.9	.0518	.00364	192.1	146.5	410.0	.0737	-.4611
3215	29.9	-.1	80.0	-.5851	-.0995	.0113	.0106	.1871	-1.1041	67.0	.0520	.00337	192.1	146.1	410.7	.0666	-.3928
3216	29.8	-.1	90.0	-.5720	-.1439	-.0038	.0061	.1980	-.8564	67.2	.0519	.00311	191.8	145.7	408.9	.0705	-.3051
3217	29.9	-.0	.0	.0963	.1107	-.0139	.0026	-.0355	.0071	66.5	.0512	.00445	191.9	146.5	406.3	-.0128	.0026
3218	29.9	.0	-10.0	.0861	.1103	-.0210	.0007	-.0429	.1395	66.7	.0509	.00428	191.8	146.1	403.8	-.0155	.0505
3219	29.7	.0	-20.0	.0405	.1113	-.0174	-.0020	-.0509	.2991	66.5	.0507	.00410	191.7	144.1	401.1	-.0183	.1075
3220	29.8	.0	-30.0	.0148	.1151	-.0152	-.0047	-.0891	.5411	66.8	.0506	.00400	191.7	145.3	431.4	-.0323	.1959
3221	29.8	.1	-40.0	.0397	.1163	-.0148	-.0075	-.1328	.8266	67.2	.0504	.00379	191.6	145.3	402.3	-.0482	.3031
3222	29.9	.1	-50.0	.0551	.0927	-.0361	-.0096	-.2655	1.2511	67.3	.0504	.00364	191.5	146.1	400.6	-.0968	.4563
3223	29.8	.1	-60.0	-.2199	.0881	-.0454	-.0151	-.3583	1.5781	67.2	.0509	.00343	191.8	145.7	403.9	-.1293	.5693
3224	29.8	.1	-70.0	-.2292	.0296	-.0244	-.0056	-.1734	1.2849	67.4	.0507	.00328	191.5	145.3	401.5	-.0628	.4651
3225	29.7	.1	-80.0	-.5261	-.0378	-.0292	-.0054	-.1606	1.2041	67.2	.0512	.00309	191.6	144.1	403.1	-.0574	.4305
3226	29.7	.1	-90.0	-.6128	-.1431	-.0312	-.0086	-.1600	1.0840	67.2	.0516	.00291	191.6	144.1	404.9	-.0573	.3859

AVERAGE TIP SPEED RATIO = .080   AVERAGE OF ABOVE VALUES   66.9   .0513   .00386   191.6   145.4   405.0

RUN 159   CONFIGURATION 35

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3229	34.9	0.0	0.0	.0680	.0813	-.0160	.0010	-.0040	-.0354	71.3	.0537	.00512	190.9	199.6	469.1	-.0017	-.0151
3230	34.9	-.0	10.0	.0271	.0811	-.0057	.0031	-.0216	-.1052	71.3	.0538	.00518	191.2	200.3	471.0	-.0092	-.0447
3231	34.9	-.0	20.0	-.1099	.0859	.0259	.0045	-.0146	-.2398	71.2	.0541	.00512	191.4	199.6	472.4	-.0062	-.1013
3232	34.7	-.0	30.0	-.2313	.0864	.0245	.0051	.0527	-.5093	71.0	.0541	.00498	192.1	197.6	472.7	.0220	-.2129
3233	34.7	-.1	40.0	-.2504	.0765	-.0314	.0059	.1459	-.8306	70.9	.0545	.00491	192.1	196.9	473.8	.0606	-.3451
3234	34.8	-.1	50.0	-.3059	.0438	-.0312	.0098	.1388	-.9126	71.1	.0543	.00480	192.3	198.4	474.3	.0581	-.3817
3235	34.8	-.1	60.0	-.2936	.0004	-.0188	.0076	.1528	-.9985	71.2	.0543	.00459	192.2	198.4	474.9	.0639	-.4173
3236	34.6	-.1	70.0	-.4614	-.0258	.0082	.0075	.1400	-.9540	71.1	.0541	.00434	192.5	195.7	471.8	.0581	-.3957
3237	34.8	-.1	80.0	-.5100	-.0803	-.0067	.0083	.1498	-.8539	71.4	.0545	.00414	192.2	198.8	476.3	.0625	-.3564
3238	34.9	-.1	90.0	-.4478	-.1101	-.0209	.0103	.1866	-.8150	71.7	.0542	.00388	192.3	199.2	475.4	.0782	-.3416
3239	34.9	0.0	0.0	.0653	.0818	-.0157	.0010	-.0042	-.0311	71.2	.0535	.00506	192.1	199.6	471.6	-.0018	-.0131
3240	34.7	.0	-10.0	.0476	.0807	-.0172	-.0003	-.0097	.0818	71.1	.0532	.00486	191.9	196.9	466.7	-.0041	.0345
3241	34.5	.0	-20.0	-.0238	.0817	-.0113	-.0023	-.0207	.2223	71.1	.0528	.00469	192.0	195.3	463.4	-.0087	.0937
3242	34.9	.0	-30.1	-.1084	.0831	-.0131	-.0045	-.0748	.4542	71.5	.0530	.00458	191.8	199.2	468.0	-.0318	.1934
3243	34.9	.0	-40.0	-.1195	.0760	-.0452	-.0068	-.1591	.7592	71.6	.0530	.00438	191.9	199.6	468.6	-.0678	.3234
3244	34.8	.0	-50.0	-.1223	.0531	-.0585	-.0092	-.2264	1.0258	71.7	.0528	.00416	191.9	198.8	465.5	-.0965	.4372
3245	34.6	.1	-60.0	-.2234	.0123	-.0052	-.0096	-.1516	.9523	71.7	.0528	.00402	191.7	196.5	463.7	-.0642	.4035
3246	34.9	.1	-70.0	-.1707	-.0313	-.0259	-.0112	-.1187	.9305	72.1	.0530	.00402	191.6	200.0	467.8	-.0508	.3979
3247	35.0	.1	-80.0	-.3105	-.0449	-.0412	-.0114	-.1540	1.0031	72.1	.0533	.00376	191.9	200.8	471.2	-.0656	.4274
3248	35.0	.1	-90.0	-.3731	-.0907	-.0352	-.0143	-.1734	.9922	72.1	.0537	.00367	191.9	200.4	472.6	-.0735	.4208

AVERAGE TIP SPEED RATIO = .093   AVERAGE OF ABOVE VALUES   71.4   .0536   .00451   191.9   198.6   470.6

RUN 160   CONFIGURATION 35

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3251	44.9	0.0	0.0	.0323	.0587	-.0194	.0001	.0070	-.0330	77.1	.0576	.00671	193.2	331.0	627.3	.0037	-.0174
3252	44.8	.0	10.0	.0078	.0602	-.0107	.0021	-.0072	-.1072	77.2	.0581	.00688	191.2	328.6	621.1	-.0038	-.0567
3253	44.6	-.0	20.0	-.0937	.0613	.0106	.0040	-.0092	-.2176	77.1	.0582	.00684	191.5	325.5	619.2	-.0048	-.1144
3254	44.6	-.1	30.0	-.1845	.0559	.0024	.0053	.0446	-.4625	76.9	.0584	.00673	191.9	326.7	626.0	.0233	-.2410
3255	44.8	-.1	40.1	-.1893	.0388	-.0437	.0069	.1125	-.7273	77.1	.0587	.00664	191.9	328.2	625.8	.0590	-.3814
3256	44.8	-.1	50.0	-.3293	.0147	-.0214	.0106	.1050	-.8313	77.2	.0588	.00653	191.7	328.6	626.2	.0551	-.4362
3257	44.7	-.1	60.0	-.2668	-.0400	-.0177	.0098	.0847	-.8831	77.2	.0586	.00638	191.9	326.6	623.9	.0443	-.4623
3258	44.9	-.1	70.0	-.3666	-.0762	-.0388	.0110	.1213	-.9791	77.3	.0591	.00600	192.5	331.0	632.6	.0635	-.5123
3259	44.7	-.1	80.0	-.4232	-.1145	-.0258	.0120	.1570	-1.0061	77.3	.0589	.00565	192.6	327.8	628.9	.0819	-.5244
3260	45.0	-.1	90.0	-.4115	-.1651	-.0705	.0134	.1684	-.9985	77.5	.0589	.00543	192.4	331.7	631.9	.0884	-.5242
3261	44.7	.0	-.1	.0342	.0608	-.0202	.0001	.0069	-.0332	77.3	.0574	.00670	191.6	327.8	617.9	.0037	-.0176
3262	44.7	.0	-10.0	.0143	.0599	-.0183	-.0015	.0088	.0609	77.3	.0572	.00652	191.5	326.6	615.6	.0047	.0323
3263	44.8	.0	-20.0	-.0542	.0586	-.0125	-.0033	.0012	.1839	77.4	.0571	.00635	191.9	329.0	618.4	.0007	.0978
3264	44.8	.0	-30.0	-.1563	.0571	-.0109	-.0055	-.0402	.4007	77.4	.0569	.00610	192.3	328.6	618.1	-.0214	.2131
3265	44.7	.0	-40.0	-.1721	.0427	-.0361	-.0077	-.1028	.6655	77.5	.0567	.00587	192.2	327.0	615.2	-.0547	.3538
3266	45.0	.0	-50.0	-.2589	.0120	-.0190	-.0105	-.0883	.7606	77.7	.0568	.00575	191.9	331.3	619.4	-.0472	.4069
3267	44.8	.0	-60.0	-.2405	-.0152	-.0490	-.0122	-.0998	.8901	77.7	.0570	.00561	191.9	328.2	617.1	-.0531	.4734
3268	44.6	.0	-70.0	-.3144	-.0443	-.0423	-.0122	-.1426	1.0511	77.6	.0571	.00545	192.2	325.5	616.1	-.0753	.5553
3269	44.7	.0	-80.0	-.4778	-.0711	-.0358	-.0127	-.1572	1.0611	77.6	.0576	.00535	192.1	326.6	619.6	-.0829	.5594
3270	44.8	.0	-90.0	-.4730	-.1357	-.0279	-.0142	-.1617	1.0166	77.7	.0580	.00529	192.1	329.4	624.1	-.0853	.5365

AVERAGE TIP SPEED RATIO = .120   AVERAGE OF ABOVE VALUES   77.4   .0579   .00614   192.1   328.3   622.2

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RUN 161   CONFIGURATION 35

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3273	29.9	.0	0.0	.0860	.1123	-.0155	.0026	-.0323	.0096	66.9	.0497	.00455	192.5	146.9	400.8	-.0118	.0035
3274	29.9	9.8	0.0	.0345	.0773	.0009	.0019	-.0170	-.0026	61.5	.0571	.00509	191.0	146.5	433.4	-.0057	-.0009
3275	29.9	4.8	0.0	.0442	.0837	-.0066	.0016	-.0069	-.0219	64.6	.0522	.00465	192.9	146.1	413.8	-.0024	-.0077
3276	29.9	-.3	0.0	.0797	.1062	-.0154	.0024	-.0287	.0089	67.5	.0501	.00459	189.3	146.9	394.1	-.0107	.0033
3277	30.0	-5.0	0.0	.0420	.1325	-.0340	.0038	-.0422	-.0060	69.8	.0464	.00427	190.7	147.7	380.1	-.0164	-.0023

AVERAGE TIP SPEED RATIO = .080   AVERAGE OF ABOVE VALUES 66.1 .0511 .00463 191.3 146.8 404.4

RUN 162   CONFIGURATION 35

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3278	29.9	-.0	-20.0	.0301	.1119	-.0183	-.0019	-.0469	.2916	67.2	.0494	.00403	192.1	146.1	397.0	-.0173	.1073
3279	29.7	9.8	-20.0	-.0084	.0669	.0001	-.0019	-.0004	.1525	61.9	.0553	.00456	191.9	144.5	425.3	-.0001	.0518
3280	29.7	4.9	-20.0	.0002	.0812	-.0096	-.0020	-.0228	.2046	64.8	.0520	.00428	191.6	144.5	407.3	-.0081	.0726
3281	29.7	-.0	-20.0	.0196	.1091	-.0180	-.0019	-.0470	.2890	67.4	.0494	.00416	191.9	144.5	390.0	-.0174	.1071
3282	29.7	-5.0	-20.0	.0053	.1295	-.0398	-.0026	-.0673	.3935	69.4	.0462	.00395	191.7	144.9	378.5	-.0258	.1507
3283	29.8	-9.8	-20.0	-.0622	.1414	-.0599	-.0025	-.0744	.4197	71.7	.0427	.00370	191.8	145.3	361.9	-.0299	.1685

AVERAGE TIP SPEED RATIO = .080   AVERAGE OF ABOVE VALUES 67.1 .0492 .00411 191.5 145.0 393.3

RUN 163   CONFIGURATION 35

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3284	29.8	-.0	20.0	-.1043	.1189	.0293	.0064	-.0292	-.2688	66.7	.0502	.00456	192.4	145.7	401.6	-.0106	-.0975
3285	29.7	9.8	20.0	-.0940	.0872	.0240	.0036	.0268	-.2754	61.3	.0561	.00508	192.2	144.1	429.7	.0090	-.0924
3286	29.7	4.8	20.0	-.1176	.0891	.0290	.0050	-.0057	-.2444	64.3	.0524	.00468	192.5	144.1	411.7	-.0020	-.0856
3287	29.5	-.1	20.0	-.0917	.1156	.0276	.0065	-.0291	-.2759	66.7	.0500	.00454	190.4	142.2	392.0	-.0106	-.1000
3288	30.0	-5.0	20.0	.1389	.1333	-.0106	.0090	-.0080	-.4692	69.3	.0468	.00432	192.8	147.7	387.3	-.0031	-.1789
3289	30.1	-9.9	20.0	.0045	.1417	-.0179	.0087	-.0244	-.4144	71.8	.0433	.00408	191.6	148.5	367.5	-.0099	-.1674

AVERAGE TIP SPEED RATIO = .080   AVERAGE OF ABOVE VALUES 66.7 .0498 .00454 192.0 145.4 398.3

RUN 164   CONFIGURATION 25

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3316	45.5	-.0	180.0	.0372	-.0817	.0060	.0001	-.0001	-.0218	90.0	.0000	.00000	0.0	328.6	328.6	-.0001	-.0218
3317	45.4	-.0	-170.0	.0287	-.0835	.0060	-.0006	-.0252	.0752	90.0	.0000	.00000	0.0	326.6	326.6	-.0252	.0752
3318	45.4	-.0	-160.0	.0508	-.0800	-.0013	-.0020	-.0651	.2100	90.0	.0000	.00000	0.0	327.4	327.4	-.0651	.2100
3319	45.5	-.0	-150.0	.2078	-.0506	-.0243	-.0039	-.1345	.5142	90.0	.0000	.00000	0.0	329.0	329.0	-.1345	.5142
3320	45.5	-.1	-140.0	.4559	-.0118	-.0885	-.0065	-.2227	.9127	90.0	.0000	.00000	0.0	327.8	327.8	-.2227	.9127
3321	45.5	.0	-130.0	-.4061	-.0235	-.0933	-.0111	-.2824	1.0649	90.0	.0000	.00000	0.0	328.6	328.6	-.2824	1.0649
3322	45.4	.0	-120.0	-.2937	-.0658	-.0459	-.0099	-.3035	.9473	90.0	.0000	.00000	0.0	326.6	326.6	-.3035	.9473
3323	45.5	.1	-110.0	-.3259	-.1084	-.0220	-.0117	-.2812	.9646	90.0	.0000	.00000	0.0	329.0	329.0	-.2812	.9646
3324	45.6	.1	-100.0	-.3274	-.1685	-.0191	-.0136	-.2036	.9406	90.0	.0000	.00000	0.0	329.8	329.8	-.2036	.9406
3325	45.5	.0	-90.0	-.2963	-.1548	-.0226	-.0143	-.1695	.9484	90.0	.0000	.00000	0.0	327.8	327.8	-.1695	.9484
3326	45.5	-.0	180.0	.0066	-.0647	-.0001	.0001	-.0026	-.0341	90.0	.0000	.00000	0.0	327.8	327.8	-.0026	-.0341
3327	45.6	-.0	170.0	.0014	-.0675	.0010	.0006	.0270	-.1088	90.0	.0000	.00000	0.0	329.8	329.8	.0270	-.1088
3328	45.4	-.1	160.0	.0423	-.0602	-.0075	.0021	.0682	-.2516	90.0	.0000	.00000	0.0	326.6	326.6	.0682	-.2516
3329	45.5	-.1	150.0	.0727	-.0230	-.0121	.0049	.1361	-.5166	90.0	.0000	.00000	0.0	329.0	329.0	.1361	-.5166
3330	45.5	-1.0	140.0	.0168	.0168	-.0174	.0079	.2032	-.7473	90.0	.0000	.00000	0.0	327.8	327.8	.2032	-.7473
3331	45.4	-.1	90.0	-.3937	-.1043	-.0197	.0140	.1594	-.9336	90.0	.0000	.00000	0.0	327.0	327.0	.1594	-.9336
3332	45.5	-.1	100.0	-.4037	-.1347	-.0114	.0135	.1876	-.9094	90.0	.0000	.00000	0.0	328.6	328.6	.1876	-.9094
3333	45.6	-.0	110.0	-.4367	-.0799	.0010	.0119	.2691	-.9362	90.0	.0000	.00000	0.0	329.4	329.4	.2691	-.9362
3334	45.5	-.0	120.0	-.4898	-.0119	-.0097	.0107	.2936	-.9531	90.0	.0000	.00000	0.0	327.8	327.8	.2936	-.9531
3335	45.6	-.1	130.0	-.2439	-.0252	-.0223	.0074	.2597	-.8139	90.0	.0000	.00000	0.0	329.8	329.8	.2597	-.8139

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 328.2 328.2

RUN 165   CONFIGURATION 25

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3343	30.4	0.0	180.0	.0328	-.1001	.0061	.0000	.0004	-.0229	90.0	.0000	.00000	0.0	146.9	146.9	.0004	-.0229
3344	30.3	-9.9	180.0	.0826	-.0402	-.0172	.0004	.0057	-.0045	90.0	.0000	.00000	0.0	145.7	145.7	.0057	-.0045
3345	30.4	-4.9	180.0	.0590	-.0644	-.0051	.0001	.0017	-.0012	90.0	.0000	.00000	0.0	146.5	146.5	.0017	-.0012
3346	30.4	.1	180.0	.0328	-.0907	.0064	-.0004	-.0007	-.0263	90.0	.0000	.00000	0.0	146.5	146.5	-.0007	-.0263
3347	30.4	5.1	180.0	.0207	-.1232	.0197	-.0004	-.0016	-.0307	90.0	.0000	.00000	0.0	146.5	146.5	-.0016	-.0307
3348	30.4	10.1	180.0	-.0413	-.1433	.0248	-.0002	-.0055	-.0448	90.0	.0000	.00000	0.0	146.5	146.5	-.0055	-.0448

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 146.4 146.4

RUN 166   CONFIGURATION 25

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3349	30.4	.0	170.0	.0297	-.1271	.0054	.0006	.0271	-.1187	90.0	.0000	.00000	0.0	146.5	145.5	.0271	-.1187
3350	30.4	-10.0	170.0	.0614	-.0519	-.0137	.0030	.0395	-.1486	90.0	.0000	.00000	0.0	146.5	146.5	.0395	-.1486
3351	30.4	-4.9	170.0	.0467	-.0774	-.0042	.0018	.0314	-.1081	90.0	.0000	.00000	0.0	146.5	146.5	.0314	-.1081
3352	30.4	.1	170.0	.0263	-.1020	.0062	.0005	.0276	-.1159	90.0	.0000	.00000	0.0	146.5	146.5	.0276	-.1159
3353	30.4	5.1	170.0	.0166	-.1294	.0174	-.0007	.0268	-.1203	90.0	.0000	.00000	0.0	146.5	146.5	.0268	-.1203
3354	30.4	10.0	170.0	-.0030	-.1448	.0254	-.0013	.0291	-.1557	90.0	.0000	.00000	0.0	146.5	146.5	.0291	-.1557

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 146.5 146.5

RUN 167   CONFIGURATION 25

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3355	30.3	.0	160.0	.0470	-.1264	.0020	.0022	.0722	-.2847	90.0	.0000	.00000	0.0	145.3	145.3	.0722	-.2847
3356	30.3	-10.0	160.0	.0466	-.0396	-.0126	.0064	.0905	-.3787	90.0	.0000	.00000	0.0	145.3	145.3	.0905	-.3787
3357	30.3	-4.9	160.0	.0800	-.0664	-.0051	.0050	.0799	-.2935	90.0	.0000	.00000	0.0	145.3	145.3	.0799	-.2935
3358	30.3	.0	160.0	.0435	-.0987	.0029	.0021	.0736	-.2816	90.0	.0000	.00000	0.0	145.3	145.3	.0736	-.2816
3359	30.3	5.0	160.0	.0202	-.1276	.0155	.0004	.0764	-.3119	90.0	.0000	.00000	0.0	145.3	145.3	.0764	-.3119
3360	30.3	10.0	160.0	.0220	-.1437	.0227	-.0000	.0820	-.3610	90.0	.0000	.00000	0.0	145.3	145.3	.0820	-.3610

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 145.3 145.3

RUN 168   CONFIGURATION 26

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3395	30.4	-.0	180.0	.0360	-.0863	.0041	-.0001	.0037	-.0191	90.0	.0000	.00000	0.0	146.9	146.9	.0037	-.0191
3396	30.4	0.0	-170.0	-.0033	-.0825	.0152	.0036	-.0621	.1275	90.0	.0000	.00000	0.0	146.9	146.9	-.0621	.1275
3397	30.4	.0	-160.0	.0042	-.0820	.0211	.0056	-.1329	.3119	90.0	.0000	.00000	0.0	146.9	146.9	-.1329	.3119
3398	30.3	.0	-150.0	.1451	-.0744	.0127	.0069	-.2207	.5964	90.0	.0000	.00000	0.0	145.7	145.7	-.2207	.5964
3399	30.4	-.0	-140.0	.2709	-.0531	-.0179	.0088	-.3148	.9307	90.0	.0000	.00000	0.0	146.9	146.9	-.3148	.9307
3400	30.5	.0	-130.0	.1236	-.0755	-.0360	.0114	-.4101	1.1219	90.0	.0000	.00000	0.0	147.3	147.3	-.4101	1.1219
3401	30.2	.0	-120.0	-.1618	-.1494	-.0087	.0066	-.3692	1.0613	90.0	.0000	.00000	0.0	144.9	144.9	-.3692	1.0613
3402	30.4	.0	-110.0	-.1017	-.1875	.0136	.0052	-.3266	1.1012	90.0	.0000	.00000	0.0	146.9	146.9	-.3266	1.1012
3403	30.4	.0	-100.0	-.1901	-.2152	.0089	.0004	-.2764	1.1101	90.0	.0000	.00000	0.0	146.9	146.9	-.2764	1.1101
3404	30.4	.0	-90.0	-.3032	-.1720	-.0038	-.0031	-.2434	1.1071	90.0	.0000	.00000	0.0	146.5	146.5	-.2434	1.1071
3405	30.6	-.0	180.0	..0388	-.0905	.0029	-.0002	-.0007	-.0340	90.0	.0000	.00000	0.0	148.5	148.5	-.0007	-.0340
3406	30.5	-.0	170.0	-.0108	-.0907	.0181	-.0040	.0722	-.1702	90.0	.0000	.00000	0.0	147.7	147.7	.0722	-.1702
3407	30.4	-.0	160.0	.0240	-.0924	.0212	-.0056	.1417	-.3681	90.0	.0300	.00000	0.0	146.5	146.5	.1417	-.3681
3408	30.3	-.1	150.0	.1545	-.0719	.0110	-.0068	.2264	-.6268	90.0	.0000	.00000	0.0	146.1	146.1	.2264	-.6268
3409	30.6	-.1	140.0	.2816	-.0440	-.0207	-.0090	.3272	-.9758	90.0	.0000	.00000	0.0	148.1	148.1	.3272	-.9758
3410	30.3	-.1	130.0	.0827	-.0844	-.0359	-.0106	.3874	-1.1021	90.0	.0000	.00000	0.0	146.1	146.1	.3874	-1.1021
3411	30.3	-.1	120.0	-.3062	-.1164	.0168	-.0057	.3679	-1.1094	90.0	.0300	.00000	0.0	145.3	145.3	.3679	-1.1094
3412	30.4	-.1	109.9	-.0764	-.1806	.0184	-.0043	.3124	-1.1159	90.0	.0000	.00000	0.0	146.5	146.5	.3124	-1.1159
3413	30.4	-.1	100.0	-.2793	-.1850	.0029	.0014	.2677	-1.0846	90.0	.0000	.00000	0.0	146.9	146.9	.2677	-1.0846
3414	30.4	-.1	89.9	-.3100	-.1360	-.0045	.0042	.2372	-1.1144	90.0	.0000	.00000	0.0	146.5	146.5	.2372	-1.1144

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 146.7 146.7

RUN 169   CONFIGURATION 26

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3422	30.4	-.0	-180.0	.0290	-.0756	.0041	-.0003	.0046	-.0220	90.0	.0000	.00000	0.0	146.9	146.9	.0046	-.0220
3423	30.4	-10.1	-180.0	.0941	-.0528	-.0158	-.3000	.0067	-.0133	90.0	.0000	.00000	0.0	146.9	146.9	.0067	-.0133
3424	30.4	-5.1	-180.0	.0601	-.0682	-.0060	-.0002	.0054	-.0177	90.0	.0000	.00000	0.0	146.9	146.9	.0054	-.0177
3425	30.3	-.0	-180.0	.0293	-.0667	.0042	-.0002	.0038	-.0222	90.0	.0000	.00000	0.0	146.1	146.1	.0038	-.0222
3426	30.3	5.0	-180.0	.0091	-.0633	.0161	-.0003	.0026	-.0092	90.0	.0000	.00000	0.0	146.1	146.1	.0026	-.0092
3427	30.3	9.9	-180.0	-.0545	-.0541	.0214	-.0007	.0045	-.0016	90.0	.0000	.00000	0.0	146.1	146.1	.0045	-.0016

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 146.5 146.5

RUN 170   CONFIGURATION 26

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3428	30.4	-.0	160.0	.0137	-.0959	.0222	-.0057	.1438	-.3668	90.0	.0000	.00000	0.0	146.9	146.9	.1438	-.3668
3429	30.5	-10.1	160.0	.0999	-.0437	.0098	-.0032	.1595	-.4030	90.0	.0000	.00000	0.0	147.3	147.3	.1595	-.4030
3430	30.3	-5.0	160.0	.0637	-.0655	.0137	-.0043	.1526	-.3753	90.0	.0000	.00000	0.0	145.7	145.7	.1526	-.3753
3431	30.3	-.1	160.0	.0173	-.0696	.0221	-.0056	.1442	-.3582	90.0	.0000	.00000	0.0	145.7	145.7	.1442	-.3582
3432	30.3	4.9	160.0	.0025	-.0683	.0289	-.0067	.1394	-.3574	90.0	.0000	.00000	0.0	145.7	145.7	.1394	-.3574
3433	30.3	9.9	160.0	-.0123	-.0618	.0328	-.0082	.1447	-.3784	90.0	.0000	.00000	0.0	145.3	145.3	.1447	-.3784

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES 90.0 .0000 .00000 .0 146.1 146.1

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RUN 171   CONFIGURATION 46

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3467	14.6	0.0	180.0	-.4555	-.0727	.0800	.0097	-.0804	.2124	42.8	.0484	.00194	191.7	35.1	280.2	-.0101	.0246
3468	14.7	.0	-169.9	-.4277	.0181	.0660	.0187	-.1961	.7264	42.9	.0486	-.00951	191.7	35.5	281.8	-.0247	.0914
3469	14.9	.0	-160.0	-.3100	.1614	.0801	.0261	-.3138	1.4017	43.3	.0487	-.02050	191.6	36.2	283.0	-.0402	.1795
3470	14.9	.0	-150.0	-.0235	.2553	.0231	.0369	-.4558	2.0485	43.2	.0486	-.03105	191.6	36.2	282.3	-.0585	.2630
3471	14.9	.0	-140.0	.1900	.2071	-.0100	.0401	-.6022	2.6089	43.1	.0485	-.04046	191.6	36.2	281.9	-.0774	.3354
3472	14.7	-.0	-130.0	.2154	.0291	-.0691	.0368	-.7617	3.1293	42.6	.0485	-.04867	191.6	35.5	280.8	-.0962	.3951
3473	14.8	.0	-120.0	-.2434	-.2087	-.1224	.0231	-.8365	3.2952	42.6	.0487	-.05543	191.6	35.8	282.2	-.1063	.4186
3474	14.7	-.0	-110.0	-.3099	-.2794	-.1480	.0200	-.9918	3.9951	42.3	.0488	-.06045	191.5	35.5	282.3	-.1245	.5017
3475	14.7	-.0	-100.0	-.3333	-.2497	-.1755	.0253	-1.1451	4.5145	42.1	.0487	-.06345	191.8	35.5	282.5	-.1437	.5665
3476	14.5	-.0	-90.0	-.3803	-.1991	-.1789	.0274	-1.3391	5.1197	41.4	.0487	-.06453	191.8	34.7	281.9	-.1647	.6295
3478	15.3	-.0	180.0	-.4592	-.0364	.0681	.0080	-.0733	.1611	44.0	.0486	.00166	192.0	38.2	285.6	-.0098	.0216
3483	14.9	-.0	170.0	-.4528	.0313	.0739	-.0029	.0717	-.0918	43.4	.0485	.01339	191.1	36.2	280.7	.0093	-.0118
3484	14.8	-.0	160.0	-.5800	.0389	.0692	-.0095	.1663	-.6203	43.1	.0485	.02441	191.4	35.8	280.9	.0212	-.0792
3485	14.7	-.0	150.0	-.7194	.0420	.0718	-.0178	.3130	-1.2345	42.9	.0484	.03486	191.4	35.5	279.7	.0397	-.1565
3486	14.6	-.1	140.0	-.6699	.0003	.0820	-.0260	.4547	-1.8853	42.6	.0483	.04425	191.5	35.1	279.0	.0571	-.2369
3487	14.6	-.1	130.0	-.7283	-.0143	.0503	-.0288	.6240	-2.5391	42.5	.0482	.05237	191.6	35.1	279.1	.0784	-.3190
3488	14.5	-.1	120.0	-.7861	-.0249	.0015	-.0284	.8564	-3.3168	41.9	.0482	.05887	191.7	34.3	278.5	.1254	-.4082
3489	14.5	-.1	110.0	-.2299	-.0752	-.0810	-.0362	1.1127	-4.2748	41.8	.0483	.06373	191.8	34.3	279.4	.1365	-.5244
3490	14.5	-.1	100.0	-.3781	-.0664	-.1625	-.0374	1.3126	-4.7054	41.7	.0485	.06660	191.9	34.7	280.7	.1621	-.5812
3491	14.6	-.1	90.0	-.5176	.0551	-.1964	-.0417	1.3703	-4.8069	41.7	.0485	.06771	191.7	35.1	281.1	.1709	-.5996

AVERAGE TIP SPEED RATIO = .039   AVERAGE OF ABOVE VALUES   42.6   .0485   .00179   191.6   35.5   281.2

RUN 172   CONFIGURATION 46

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3499	19.8	-.0	180.0	.0926	-.1263	.0350	.0034	-.0303	.1124	53.7	.0508	.00308	192.3	64.2	323.1	-.0060	.0223
3500	19.9	.0	-170.0	.0199	-.0848	.0396	.0116	-.1212	.4045	54.0	.0508	-.00841	191.5	65.0	322.2	-.0245	.0816
3501	19.9	.0	-160.0	.0016	-.0571	.0222	.0184	-.2115	.6216	54.1	.0507	-.01949	191.4	65.0	321.1	-.0428	.1258
3502	19.9	.0	-150.0	-.1237	-.0267	-.0163	.0226	-.2925	.8784	53.9	.0508	-.02996	191.7	65.0	322.1	-.0590	.1772
3503	19.8	.0	-140.0	-.4458	.0126	-.0063	.0250	-.3773	1.0771	53.5	.0509	-.03955	191.7	64.2	322.2	-.0752	.2146
3504	19.6	.0	-129.9	-.4895	.0021	.0347	.0238	-.4454	1.5063	53.0	.0509	-.04798	191.6	63.0	320.8	-.0875	.2959
3505	19.7	.0	-120.0	-.7191	-.2249	.0125	.3162	-.4768	1.6994	52.9	.0513	-.05468	191.5	63.4	323.0	-.0936	.3337
3506	20.0	.0	-110.0	-1.0288	-.4065	-.0623	.0071	-.5275	1.9491	53.3	.0514	-.05971	191.6	65.4	325.6	-.1059	.3914
3507	20.0	.1	-100.0	-1.3644	-.3741	-.1147	.0012	-.6344	2.1954	53.1	.0516	-.06313	191.5	65.4	326.2	-.1272	.4401
3508	19.9	.1	-90.0	-1.5071	-.2227	-.1269	.0058	-.8148	2.6334	52.7	.0516	-.06443	191.5	65.0	327.0	-.1619	.5234
3509	20.1	-.0	-180.0	.1121	-.1336	.0325	.0035	-.0344	.1142	54.5	.0510	.00328	191.8	66.6	325.2	-.0070	.0234
3510	20.1	-.0	170.0	.0548	-.1436	.0436	-.0040	.0630	-.1226	54.5	.0507	.01460	192.0	66.6	324.2	.0129	-.0252
3511	20.0	-.0	160.0	-.0795	-.1349	.0488	-.0113	.1639	-.3710	54.3	.0506	.02557	192.0	65.8	323.1	.0334	-.0755
3512	19.9	-.0	150.0	-.1094	-.1625	.0156	-.0197	.2731	-.7111	54.1	.0504	.03594	191.8	65.0	320.4	.0554	-.1442
3513	19.9	-.1	139.9	-.2123	-.2171	.0037	-.0261	.3782	-1.0041	54.0	.0503	.04538	191.5	65.0	319.3	.0770	-.2044
3514	19.8	-.1	130.1	-.4847	-.2265	.0049	-.0296	.4522	-1.1388	53.6	.0506	.05322	191.5	64.6	320.5	.0911	-.2295
3515	19.7	-.1	120.0	-.4543	-.2426	-.0057	-.0282	.5393	-1.6529	53.1	.0507	.05981	191.5	63.8	320.3	.1075	-.3293
3516	19.6	-.1	109.7	-.4000	-.3200	-.0566	-.0189	.6521	-2.2053	52.8	.0507	.06475	191.5	63.0	319.4	.1287	-.4352
3517	19.8	-.1	100.0	-.8722	-.4155	-.1233	-.0139	.7422	-2.2592	52.8	.0515	.06760	191.4	64.6	324.4	.1478	-.4499
3518	20.0	-.1	90.0	-1.1088	-.3446	-.1883	-.0142	.8573	-2.5342	52.9	.0519	.06860	191.2	65.8	327.4	.1723	-.5092

AVERAGE TIP SPEED RATIO = .053   AVERAGE OF ABOVE VALUES   53.5   .0510   .00272   191.6   64.8   322.9

RUN 173   CONFIGURATION 46

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3526	25.2	-.0	-180.0	.1757	-.1251	.0312	.0028	-.0209	.0513	61.4	.0543	.00371	193.5	102.0	377.4	-.0056	.0139
3527	25.0	0.0	-170.0	.1378	-.1064	.0359	.0096	-.0955	.2644	61.5	.0544	-.00792	191.5	100.4	370.6	-.0259	.0716
3528	25.4	0.0	-160.0	.2226	-.0858	.0258	.0128	-.1741	.5141	62.1	.0547	-.01916	191.3	104.0	375.1	-.0482	.1425
3529	25.4	.0	-150.0	.1420	-.0781	-.0105	.0156	-.2623	.6630	61.8	.0547	-.02958	192.4	104.0	378.1	-.0721	.1824
3530	25.4	.0	-140.0	-.0933	-.0617	-.0243	.0171	-.3156	.7940	61.5	.0550	-.03942	192.1	103.6	378.5	-.0864	.2173
3531	25.3	.0	-130.0	-.5406	-.0813	-.0212	.0150	-.3759	.9155	61.2	.0554	-.04791	192.1	103.2	380.0	-.1021	.2496
3532	25.2	.1	-120.0	-.9701	-.1644	-.0086	.0128	-.3927	.9438	60.7	.0555	-.05488	192.1	102.0	379.7	-.1055	.2535
3533	25.1	.1	-110.0	-1.0867	-.2749	-.0375	.0078	-.3846	1.2458	60.5	.0555	-.05985	192.1	101.2	378.6	-.1028	.3331
3534	75.2	.1	-100.0	-1.1864	-.2751	-.0418	.0052	-.3958	1.5268	60.4	.0554	-.06303	192.3	102.0	379.6	-.1064	.4103
3535	25.2	.1	-89.9	-1.1624	-.1236	-.0342	.0081	-.4610	1.8048	60.2	.0556	-.06425	192.5	102.0	381.0	-.1234	.4832
3536	25.8	-.0	180.0	.1723	-.1135	.0305	.0026	-.0210	.0289	62.4	.0549	.00391	192.4	107.1	382.7	-.0059	.0081
3537	25.1	-.0	170.0	.1289	-.1211	.0411	-.0042	.0548	-.1518	61.5	.0544	.01515	192.4	101.6	374.4	.0149	-.0412
3539	75.2	-.0	160.0	.1547	-.1170	.0442	-.0079	.1375	-.4149	61.5	.0542	.02614	192.6	102.4	374.9	.0376	-.1133
3541	25.1	-.1	150.0	.1940	-.1357	.0275	-.0150	.2183	-.5822	61.3	.0539	.03639	193.1	101.2	373.3	.0592	-.1579
3542	25.1	-.1	140.0	.1134	-.1542	.0171	-.0202	.2978	-.7637	61.2	.0537	.04573	192.9	101.2	372.3	.0810	-.2077
3543	25.0	-.1	130.0	-.0826	-.1729	.0079	-.0215	.3709	-.9652	60.8	.0541	.05391	192.8	100.4	373.3	.0998	-.2597
3544	25.1	-.1	120.0	-.5306	-.1803	.0073	-.0203	.4255	-1.0718	60.6	.0547	.06045	192.9	101.2	377.1	.1142	-.2877
3545	25.1	-.1	110.0	-.7831	-.2453	.0178	-.0155	.4423	-1.2163	60.4	.0548	.06534	192.8	101.2	377.4	.1186	-.3262
3546	25.0	-.1	100.0	-.9020	-.2984	-.0158	-.0099	.4661	-1.4477	60.2	.0550	.06832	192.6	100.8	377.3	.1246	-.3869
3547	24.9	-.1	90.0	-.9449	-.2557	-.0576	-.0081	.5511	-1.8217	59.8	.0551	.06913	192.6	100.0	377.2	.1462	-.4832

AVERAGE TIP SPEED RATIO = .067   AVERAGE OF ABOVE VALUES   61.1   .0548   .00311   192.5   102.1   376.9

RUN 174   CONFIGURATION 46

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3555	30.0	0.0	180.0	.1666	-.0534	.0293	.0017	-.0098	.0405	67.2	.0570	.00439	192.2	145.3	430.7	-.0033	.0137
3556	30.1	.0	-170.0	.1320	-.0377	.0349	.0082	-.0842	.1905	67.2	.0571	-.00719	192.3	145.7	431.7	-.0284	.0643
3557	29.9	.0	-160.0	.2286	-.0284	.0313	.0105	-.1545	.4440	67.1	.0570	-.01848	192.3	144.5	429.0	-.0520	.1496
3558	29.9	.0	-150.0	.2459	-.0221	-.0022	.0122	-.2432	.6964	67.1	.0570	-.02913	191.8	144.1	428.2	-.0818	.2344
3559	30.1	.0	-140.0	-.1049	-.0750	.0040	.0115	-.2805	.6549	67.1	.0576	-.03896	191.6	146.5	433.0	-.0949	.2216
3560	30.0	.1	-130.0	-.2867	-.1041	.0003	.0101	-.3137	.7846	66.7	.0579	-.04754	191.5	145.3	433.0	-.1053	.2633
3561	29.9	.1	-120.0	-.5455	-.1169	-.0064	.0083	-.3416	.9284	66.4	.0580	-.05430	191.9	144.5	433.6	-.1139	.3094
3562	30.1	.1	-110.0	-.7293	-.1382	-.0187	.0068	-.3259	.9904	66.5	.0579	-.05931	192.1	146.1	435.5	-.1093	.3322
3563	30.0	.1	-100.0	-.7740	-.1501	-.0328	.0050	-.3166	1.1352	66.2	.0580	-.06246	192.1	145.3	435.3	-.1057	.3789
3564	30.1	.1	-90.0	-.7505	-.0630	-.0232	.0055	-.3234	1.2501	66.0	.0579	-.06353	192.5	145.7	436.4	-.1080	.4173
3565	30.1	0.0	180.0	.1656	-.0592	.0287	.0016	-.0113	.0254	67.3	.0570	.00436	192.1	146.1	430.9	-.0038	.0086
3566	29.9	-.0	170.0	.1247	-.0665	.0382	-.0039	.0559	-.1529	67.2	.0567	.01582	191.9	144.5	427.5	.0189	-.0517
3567	29.9	-.0	160.0	.1605	-.0590	.0376	-.0056	.1279	-.3920	67.1	.0565	.02694	191.9	143.7	425.7	.0432	-.1323
3568	30.0	-.0	150.0	.1385	-.0715	.0219	-.0093	.2104	-.5276	67.2	.0565	.03733	192.3	145.3	427.9	.0715	-.1792
3569	30.1	-.0	140.0	.1230	-.0755	.0261	-.0120	.2643	-.6912	67.1	.0564	.04657	192.3	146.1	428.9	.0900	-.2354
3570	30.0	-.1	130.0	.0530	-.0915	.0191	-.0126	.3264	-.9107	66.8	.0566	.05462	192.4	144.9	428.6	.1103	-.3079
3571	29.8	-.1	120.0	-.1086	-.0997	.0141	-.0125	.3814	-1.0666	66.4	.0568	.06113	192.6	143.3	428.7	.1275	-.3566
3572	29.9	-.1	110.0	-.6346	-.1191	.0208	-.0119	.3871	-1.0170	66.3	.0572	.06603	192.5	144.6	431.8	.1295	-.3404
3573	30.0	-.1	100.0	-.7498	-.1450	.0127	-.0098	.3625	-1.0705	66.3	.0573	.06904	192.2	145.3	431.9	.1219	-.3601
3574	30.0	-.1	90.0	-.6790	-.1637	-.0007	-.0069	.3786	-1.2845	66.1	.0575	.07017	191.9	144.9	431.8	.1271	-.4311

AVERAGE TIP SPEED RATIO = .080   AVERAGE OF ABOVE VALUES   66.8 .0572 .00378 192.1 145.1 431.0

RUN 175   CONFIGURATION 46

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3582	35.1	-.0	-180.0	.1429	-.0326	.0262	.0011	-.0071	.0297	71.7	.0591	.00534	192.4	198.8	495.5	-.0029	.0119
3583	35.1	.0	-170.0	.1004	-.0199	.0329	.0068	-.0786	.1622	71.6	.0592	-.00605	192.7	198.0	496.1	-.0314	.0647
3584	34.9	.0	-160.0	.1500	-.0116	.0278	.0088	-.1472	.3731	71.6	.0593	-.01730	191.9	196.5	492.1	-.0588	.1490
3585	35.1	.0	-149.9	.1999	-.0111	.0031	.0093	-.2266	.6268	71.7	.0594	-.02797	191.6	198.8	494.4	-.0911	.2521
3586	35.0	.0	-140.0	-.1353	-.0480	.0080	.0085	-.2751	.6503	71.5	.0599	-.03777	191.5	197.6	494.9	-.1099	.2597
3587	35.0	.0	-130.0	-.0876	-.1006	.0102	.0072	-.2932	.8426	71.4	.0599	-.04629	191.2	197.6	494.4	-.1172	.3368
3588	34.9	.1	-120.0	-.2922	-.1058	.0035	.0029	-.3049	.9151	70.9	.0598	-.05229	193.1	196.5	498.2	-.1202	.3608
3589	34.9	.1	-110.0	-.4227	-.1203	-.0084	-.0004	-.2990	.9920	70.8	.0598	-.05759	192.8	196.1	497.2	-.1179	.3912
3590	35.2	.1	-100.0	-.5220	-.1000	-.0199	-.0019	-.2986	1.0675	71.0	.0599	-.06100	192.6	200.0	501.0	-.1192	.4262
3592	35.3	.1	-90.0	-.5144	-.0554	-.0363	-.3013	-.3020	1.1057	70.9	.0599	-.06224	192.7	200.8	502.3	-.1207	.4420
3593	35.1	-.0	-180.0	.1486	-.0402	.0265	.0010	-.0082	.0168	71.7	.0591	.00537	192.2	198.0	494.0	-.0333	.0068
3594	35.1	-.0	169.9	.1058	-.0477	.0362	-.0043	.0593	-.1445	71.7	.0590	.01679	192.1	198.0	493.2	.0238	-.0580
3595	34.9	-.0	160.0	.1391	-.0405	.0350	-.0058	.1265	-.3557	71.6	.0588	.02779	192.0	196.5	490.0	.0507	-.1426
3596	35.0	-.1	150.0	.1311	-.0289	.0130	-.0070	.2072	-.5489	71.6	.0587	.03818	192.1	197.3	490.5	.0833	-.2207
3597	34.8	-.0	139.9	-.0240	-.0355	.0257	-.0076	.2533	-.6239	71.4	.0586	.04738	192.3	195.7	489.4	.1013	-.2495
3598	34.8	-.1	130.0	-.0678	-.0526	.0237	-.0068	.3033	-.8193	71.2	.0589	.05528	192.4	194.9	490.3	.1205	-.3256
3599	35.0	-.1	120.0	-.2002	-.0614	.0221	-.0046	.3347	-.9166	71.1	.0594	.06181	192.5	197.6	495.9	.1334	-.3653
3600	35.0	-.1	110.0	-.3429	-.0714	.0141	-.0038	.3413	-.9604	71.1	.0590	.06656	192.4	197.6	493.2	.1368	-.3848
3601	35.0	-.0	100.0	-.5148	-.0775	.0075	-.0042	.3251	-.9473	71.0	.0592	.06953	192.0	197.3	493.1	.1301	-.3790
3602	34.9	-.1	90.0	-.5523	-.1081	.0089	-.0041	.3112	-1.0048	70.7	.0594	.07066	191.7	196.1	491.9	.1241	-.4005

AVERAGE TIP SPEED RATIO = .094   AVERAGE OF ABOVE VALUES   71.3 .0593 .00481 192.2 197.5 494.4

RUN 176   CONFIGURATION 46

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3653	45.3	-.0	180.0	.0944	-.0340	.0205	-.0002	-.0003	.0185	77.9	.0616	.00712	192.3	329.0	635.8	-.0002	.0096
3654	45.2	-.0	-170.0	.0377	-.0243	.0292	.0051	-.0702	.1530	77.8	.0617	.00704	192.2	327.4	635.4	-.0362	.0789
3655	45.2	-.0	-160.0	.0704	-.0204	.0266	.0077	-.1439	.3376	77.7	.0620	.00712	192.3	327.8	637.6	-.0740	.1736
3656	45.3	-.0	-150.0	.1648	-.0092	.0057	.0082	-.2283	.6114	77.7	.0623	.00706	192.1	329.0	639.4	-.1174	.3146
3657	45.2	0.0	-140.0	-.1249	-.0195	-.0095	.0060	-.2841	.7536	77.6	.0629	.00665	191.1	327.8	638.1	-.1460	.3872
3658	45.1	.0	-130.0	-.2292	-.0847	.0100	.0048	-.2962	.8084	77.5	.0629	.00647	191.0	327.0	636.9	-.1521	.4151
3659	45.1	.1	-120.0	-.3397	-.1285	.0031	.0012	-.2843	.9115	77.5	.0628	.00624	191.2	327.0	636.9	-.1460	.4680
3660	45.1	.1	-110.0	-.4178	-.1552	-.0039	-.0023	-.2861	1.0293	77.5	.0623	.00587	191.1	327.0	634.5	-.1475	.5305
3661	45.3	.1	-100.0	-.4856	-.1493	-.0068	-.0041	-.2848	1.1045	77.5	.0622	.00548	191.0	329.0	635.3	-.1475	.5720
3662	45.2	.1	-90.0	-.6195	-.1004	.0062	-.0050	-.2687	1.1316	77.4	.0624	.00510	191.1	328.6	636.3	-.1388	.5844
3663	45.3	-.0	180.0	.0895	-.0336	.0202	-.0002	-.0018	.0130	78.0	.0618	.00706	191.3	329.4	633.9	-.0009	.0067
3664	45.2	-.0	170.0	.0484	-.0361	.0319	-.0050	.0649	-.1289	77.9	.0616	.00693	191.1	327.8	631.3	.0337	-.0669
3665	45.3	-.1	160.0	.0746	-.0365	.0293	-.0070	.1329	-.3122	77.9	.0613	.00676	191.9	329.0	633.6	.0690	-.1621
3666	45.1	-.1	150.0	.0899	-.0228	.0130	-.0074	.2120	-.5316	77.8	.0613	.00665	191.3	326.6	631.2	.1097	-.2751
3667	45.2	-.0	140.0	-.2689	-.0182	.0184	-.0057	.2594	-.6359	77.7	.0619	.00644	191.8	328.7	635.9	.1339	-.3282
3668	45.1	-.1	130.0	-.2491	-.0474	.0305	-.0054	.2895	-.7378	77.6	.0618	.00641	191.5	326.6	637.5	.1495	-.3810
3669	45.3	-.1	120.0	-.3077	-.0790	.0181	-.0030	.3050	-.8490	77.6	.0621	.00651	191.4	329.0	634.2	.1577	-.4390

AVERAGE TIP SPEED RATIO = .121   AVERAGE OF ABOVE VALUES   77.7 .0620 .00653 191.5 328.0 635.4

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APPENDIX

RUN 177   CONFIGURATION 46

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3677	30.1	-.0	180.0	.1556	-.0847	.0298	.0014	-.0092	.0342	68.0	.0547	.00374	191.4	145.7	416.4	-.0032	.0120
3678	30.1	-10.0	180.0	.1167	-.0038	.0020	-.0002	.0032	.0203	69.0	.0614	.00433	191.3	145.3	448.7	.0910	.0066
3679	30.1	-5.0	180.0	.1325	-.0276	.0155	.0002	.0004	.0280	68.6	.0573	.00399	191.4	145.3	428.6	.0301	.0095
3680	30.1	.0	180.0	.1556	-.0712	.0298	.0014	-.0076	.0374	68.0	.0547	.00374	191.7	145.7	417.1	-.0027	.0131
3681	30.2	5.1	180.0	.0009	-.0792	.0303	.0017	-.0134	.0446	67.9	.0512	.00340	191.9	146.5	400.9	-.0049	.0163
3682	30.3	10.0	180.0	-.1160	-.0728	.0348	.0018	-.0150	.0445	68.5	.0472	.00322	190.9	147.3	379.7	-.0058	.0173

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   68.3   .0544   .00374   191.4   146.0   415.2

RUN 178   CONFIGURATION 46

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3683	30.1	-.0	160.0	.1527	-.0848	.0378	-.0060	.1336	-.3882	68.0	.0543	.00355	191.7	145.7	415.4	.0469	-.1361
3684	30.0	-5.0	160.0	.1319	-.0573	.0260	-.0043	.1368	-.3688	68.4	.0569	.00375	192.3	144.9	429.0	.0462	-.1246
3685	30.0	.0	160.0	.1498	-.074.	.0378	-.0060	.1345	-.3873	67.9	.0544	.00346	191.1	144.9	413.1	.0472	-.1359
3686	30.0	5.0	160.0	.0434	-.1003	.0433	-.0087	.1349	-.4222	67.7	.0511	.00312	191.2	144.9	397.5	.0492	-.1539
3687	30.1	10.0	160.0	-.0980	-.0895	.0424	-.0113	.1440	-.3928	67.8	.0476	.00293	191.6	145.3	381.1	.0549	-.1497

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   68.0   .0529   .00336   191.6   145.1   407.2

RUN 179   CONFIGURATION 46

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3688	30.1	0.0	-159.9	.2155	-.0610	.0319	.0105	-.1534	.4421	68.0	.0549	.00358	190.9	145.7	415.6	-.0538	.1550
3689	30.0	-5.0	-159.9	.1635	-.0349	.0206	.0078	-.1519	.3829	68.1	.0571	.00366	193.8	144.9	434.5	-.0507	.1277
3690	30.0	.0	-159.9	.2203	-.0580	.0324	.0108	-.1561	.4529	67.8	.0546	.00352	191.7	144.9	415.7	-.0544	.1579
3691	30.1	5.1	-159.9	.1085	-.0673	.0355	.0125	-.1632	.5153	67.6	.0514	.00320	191.8	145.3	400.8	-.0591	.1868
3692	30.1	10.1	-159.9	.0010	-.0671	.0367	.0141	-.1744	.5563	67.8	.0478	.00301	191.8	145.7	383.4	-.0663	.2114

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   67.9   .0532   .00339   192.0   145.3   410.0

RUN 180   CONFIGURATION 45

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3704	45.4	-.0	180.0	.0941	-.0245	.0222	-.0000	-.0017	.0181	77.4	.0637	.00734	193.0	330.6	651.1	-.0209	.0092
3705	45.1	-.0	-170.0	.0802	-.0199	.0189	.0010	-.0303	.1369	77.4	.0638	.00738	192.4	327.0	645.8	-.0154	.0541
3706	45.3	-.0	-160.0	.1239	-.0080	.0062	.0002	-.0758	.2602	77.4	.0640	.00752	192.3	329.8	649.4	-.0385	.1321
3707	45.3	-.1	-150.0	.3052	.0282	-.0346	-.0031	-.1517	.6257	77.5	.0636	.00744	192.0	330.2	646.9	-.0774	.3194
3708	45.1	.0	-140.0	-.1287	-.0099	-.0602	-.0049	-.2146	.6515	77.3	.0644	.00691	190.9	326.2	643.4	-.1088	.3304
3709	45.0	.0	-130.0	-.2630	.0005	-.0373	-.0047	-.2406	.6799	77.0	.0648	.00670	192.5	325.5	649.5	-.1206	.3407
3710	45.0	.1	-120.0	-.3188	-.0919	-.0094	-.0085	-.2406	.7748	77.1	.0651	.00657	190.8	325.5	645.2	-.1214	.3908
3711	45.0	.1	-110.0	-.3803	-.1365	-.0217	-.0128	-.1924	.8558	77.0	.0640	.00612	192.5	325.8	646.1	-.0971	.4316
3712	45.2	.1	-100.0	-.4674	-.1376	-.0263	-.0153	-.1815	.9370	77.0	.0643	.00576	191.5	327.4	646.0	-.0920	.4750
3713	45.2	.1	-90.0	-.5791	-.0894	-.0171	-.0161	-.1672	.9593	77.0	.0646	.00531	190.7	328.2	645.2	-.0850	.4879
3714	45.3	-.0	180.0	.0894	-.0261	.0217	-.0001	-.0032	.0113	77.6	.0637	.00737	191.5	330.2	645.5	-.0016	.0058
3715	45.2	-.1	170.0	.0752	-.0285	.0220	-.0007	.0241	-.0826	77.6	.0635	.00729	191.5	328.6	643.2	.0123	-.0422
3716	45.0	-.1	160.0	.1180	-.0209	.0119	.0003	.0713	-.2622	77.6	.0630	.00705	191.2	325.8	636.7	.0365	-.1342
3717	45.2	-.1	150.0	.0815	-.0087	.0101	.0020	.1319	-.4428	77.6	.0630	.00690	191.6	328.6	641.1	.0676	-.2269
3718	45.1	-.1	140.0	-.0122	-.0065	.0210	.0027	.1871	-.5592	77.4	.0631	.00669	192.1	326.7	640.7	.0953	-.2847
3719	45.2	-.0	129.9	-.3334	.0004	.0215	.0043	.2252	-.6009	77.3	.0637	.00649	191.7	328.6	644.5	.1148	-.3064
3720	45.2	-.0	120.0	-.3404	-.0514	.0187	.0069	.2351	-.6777	77.1	.0643	.00653	191.5	327.4	645.5	.1193	-.3438
3721	45.1	-.1	110.0	-.3742	-.0969	.0025	.0107	.2123	-.7701	77.2	.0635	.00646	191.0	326.2	639.4	.1083	-.3929
3722	45.3	-.1	100.0	-.4343	-.0967	-.0080	.0140	.1969	-.8748	77.2	.0636	.00623	191.0	329.0	642.4	.1008	-.4480

AVERAGE TIP SPEED RATIO = .121   AVERAGE OF ABOVE VALUES   77.3   .0639   .00674   191.7   327.7   644.6

RUN 181   CONFIGURATION 45

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3725	35.1	-.0	180.0	.1384	-.0448	.0283	.0011	-.0064	.0339	71.7	.0593	.00549	192.1	198.0	493.4	-.0026	.0136
3726	35.1	.0	-170.0	.1368	-.0394	.0255	.0026	-.0375	.1177	72.0	.0591	.00554	190.8	197.6	488.3	-.0152	.0476
3727	35.1	0.0	-160.0	.1711	-.0214	.0112	.0024	-.0873	.3084	71.8	.0592	.00539	191.4	197.6	490.1	-.0352	.1244
3728	35.3	-.0	-150.0	.2775	-.0003	-.0126	-.0002	-.1473	.5853	71.9	.0593	.00535	191.5	199.6	493.1	-.0596	.2369
3729	35.3	.0	-140.0	-.0779	-.0561	-.0354	.0009	-.1996	.5396	71.8	.0596	.00495	191.6	200.0	495.2	-.0806	.2179
3730	35.2	.0	-130.0	-.0969	-.0962	-.0231	-.0010	-.2217	.6514	71.7	.0594	.00470	191.5	199.2	493.4	-.0895	.2630
3731	35.1	.1	-120.0	-.2705	-.1263	-.0126	-.0065	-.2251	.7493	71.5	.0593	.00434	191.5	197.6	491.1	-.0906	.3015
3732	35.0	.1	-110.0	-.4312	-.1278	-.0290	-.0105	-.1909	.8137	71.2	.0594	.00392	191.6	196.5	490.7	-.0764	.3258
3733	35.1	.1	-100.0	-.5299	-.1188	-.0413	-.0130	-.1851	.8950	71.1	.0597	.00360	191.6	197.6	493.4	-.0741	.3585
3734	35.3	.1	-89.9	-.5233	-.0689	-.0527	-.0131	-.1801	.9180	71.1	.0599	.00319	191.6	200.0	496.9	-.0725	.3695
3735	35.3	0.0	180.0	.1350	-.0513	.0296	.0012	-.0081	.0288	72.1	.0589	.00561	191.2	199.6	490.6	-.0033	.0117
3736	35.3	-.0	170.0	.1222	-.0539	.0304	.0002	.0220	-.0884	72.1	.0587	.00549	191.5	199.6	490.5	.0090	-.0360
3737	35.1	-.0	160.0	.1539	-.0501	.0246	.0002	.0709	-.2778	71.9	.0585	.00534	191.5	197.6	487.6	.0287	-.1126
3738	35.1	-.0	150.0	.1418	-.0435	.0242	.0005	.1309	-.4414	71.9	.0583	.00525	191.5	197.6	485.1	.0532	-.1795
3739	35.0	-.1	140.0	.0584	-.0514	.0113	.0009	.1934	-.5876	71.7	.0583	.00513	191.6	196.5	485.2	.0783	-.2379
3740	35.2	-.0	130.0	-.1705	-.0666	.0209	.0021	.2205	-.5880	71.6	.0590	.00507	191.8	198.8	491.9	.0891	-.2376
3741	35.2	-.1	120.0	-.1893	-.0881	.0132	.0039	.2352	-.7195	71.6	.0588	.00505	191.7	198.8	490.6	.0953	-.2915
3742	35.1	-.1	110.0	-.3605	-.0939	-.0002	.0067	.2369	-.7898	71.4	.0589	.00492	191.6	198.8	490.7	.0958	-.3194

AVERAGE TIP SPEED RATIO = .094   AVERAGE OF ABOVE VALUES   71.7   .0591   .00491   191.5   198.4   491.1

RUN 182   CONFIGURATION 45

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3745	30.4	-.0	180.0	.1634	-.0623	.0370	.0017	-.0085	.0422	68.0	.0568	.00503	191.2	148.5	429.1	-.0029	.0146
3746	30.2	-.0	-170.0	.1606	-.0586	.0281	.0041	-.0447	.1487	67.6	.0565	.00482	192.4	146.1	428.5	-.0152	.0507
3747	30.3	0.0	-160.0	.1984	-.0417	.0169	.0049	-.0931	.3422	67.9	.0568	.00486	191.3	147.7	428.4	-.0321	.1187
3748	30.5	-.2	-150.0	.2321	-.0283	.0006	.0033	-.1476	.5645	67.9	.0567	.00475	192.4	149.2	432.9	-.0509	.1946
3749	30.2	.0	-140.0	.0052	-.0829	-.0243	.0050	-.2004	.5454	67.7	.0568	.00447	190.6	146.1	424.4	-.0690	.1878
3750	30.1	.0	-130.0	-.1664	-.0965	-.0275	.0031	-.2398	.6716	67.2	.0567	.00407	191.9	145.3	427.4	-.0815	.2283
3751	30.2	.1	-120.0	-.5433	-.1401	-.0259	-.0017	-.2394	.7334	67.0	.0572	.00369	192.0	146.1	430.8	-.0812	.2487
3752	30.2	.1	-110.0	-.7812	-.1569	-.0365	-.0045	-.2096	.8097	67.0	.0574	.00327	191.6	146.9	431.1	-.0714	.2759
3753	30.2	.1	-100.0	-.8076	-.1714	-.0533	-.0070	-.1925	.9587	66.9	.0572	.00293	191.7	146.9	430.6	-.0657	.3270
3754	30.2	.1	-90.0	-.7575	-.0895	-.0555	-.0074	-.1911	1.0701	66.7	.0575	.00249	191.8	146.9	432.4	-.0649	.3635
3755	30.2	-.0	160.0	.1585	-.0674	.0316	.0017	-.0097	.0338	67.8	.0566	.00498	191.4	146.5	426.3	-.0033	.0114
3756	30.3	-.0	170.0	.1430	-.0712	.0336	.0002	.0224	-.1012	67.9	.0567	.00495	191.1	147.3	426.6	.0077	-.0349
3757	30.4	-.0	160.0	.1671	-.0768	.0299	-.0015	.0763	-.2806	68.1	.0562	.00482	191.0	148.1	425.2	.0266	-.0977
3758	30.2	-.1	150.0	.2096	-.0710	.0231	-.0026	.1422	-.4641	67.8	.0560	.00475	191.1	146.1	422.5	.0492	-.1605
3759	30.2	-.1	140.0	.0837	-.0962	.0168	-.0037	.1996	-.5525	67.8	.0562	.00467	191.1	146.9	423.8	.0692	-.1915
3760	30.3	-.1	130.0	.0484	-.1140	.0120	-.0045	.2318	-.6924	67.7	.0562	.00451	191.1	147.7	424.7	.0806	-.2408
3761	30.2	-.1	120.0	-.1514	-.1221	-.0069	-.0020	.2614	-.8318	67.3	.0566	.00445	191.4	146.9	425.6	.0900	-.2864
3762	30.2	-.1	110.0	-.6557	-.1397	.0026	-.0004	.2615	-.8268	67.0	.0570	.00425	191.2	146.1	427.4	.0894	-.2826
3763	30.1	-.1	100.0	-.7298	-.1812	-.0144	.0030	.2372	-.9137	66.9	.0570	.00407	190.9	145.7	426.2	.0811	-.3124

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   67.5   .0567   .00431   191.4   146.9   427.6

RUN 183   CONFIGURATION 45

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3766	25.2	-.0	180.0	.1566	-.1147	.0354	.0026	-.0160	.0474	61.5	.0538	.00321	192.7	101.6	371.6	-.0044	.0130
3767	25.3	0.0	-170.0	.1383	-.0999	.0293	.0057	-.0547	.1921	61.9	.0536	.00307	191.7	102.4	368.5	-.0152	.0534
3768	25.1	.0	-160.0	.1399	-.0944	.0177	.0076	-.1091	.3849	61.7	.0536	.00300	191.3	101.2	366.3	-.0302	.1064
3769	25.1	.0	-150.0	.1129	-.0781	-.0045	.0086	-.1679	.5492	61.7	.0535	.00294	191.3	101.2	365.6	-.0465	.1521
3770	25.1	-.0	-140.0	-.1171	-.0659	-.0336	.0095	-.2310	.6277	61.4	.0535	.00282	191.7	100.8	366.0	-.0636	.1729
3771	24.7	.0	-129.9	-.6349	-.0870	-.0415	.0060	-.2805	.6961	60.7	.0541	.00261	191.0	98.1	364.5	-.0755	.1873
3772	25.1	.1	-120.0	-1.0022	-.1597	-.0285	.0018	-.2798	.7519	60.8	.0545	.00249	191.5	100.8	370.4	-.0762	.2047
3773	25.1	.1	-110.0	-1.0679	-.2890	-.0613	-.0051	-.2582	1.0521	60.9	.0542	.00238	191.0	101.2	368.5	-.0709	.2890
3774	25.1	.1	-100.0	-1.1773	-.2918	-.0677	-.0090	-.2588	1.3232	60.7	.0544	.00218	191.0	101.2	369.1	-.0710	.3629
3775	25.0	.1	-90.0	-1.1685	-.1551	-.0805	-.0094	-.2938	1.5774	60.4	.0545	.00194	191.1	100.4	369.0	-.0800	.4293
3776	25.0	-.0	180.0	.1481	-.1253	.0345	.0025	-.0167	.0351	61.7	.0536	.00326	191.1	100.4	365.0	-.0046	.0096
3777	25.3	-.0	170.0	.1367	-.1241	.0366	-.0004	.0213	-.1227	62.1	.0536	.00315	191.4	103.2	368.4	.0060	-.0344
3778	25.3	-.0	160.0	.1402	-.1301	.0322	-.0041	.0857	-.3185	62.1	.0535	.00307	191.4	103.2	367.6	.0241	-.0894
3779	25.3	-.0	150.0	.1487	-.1393	.0253	-.0086	.1538	-.4925	62.1	.0533	.00304	191.1	103.2	365.9	.0434	-.1389
3780	25.3	-.1	140.0	.0988	-.1588	.0144	-.0111	.2165	-.6410	61.9	.0531	.00298	191.0	102.4	363.8	.0609	-.1804
3781	25.2	-.1	130.0	-.0996	-.1938	-.0068	-.0116	.2621	-.7447	61.5	.0535	.00295	191.0	102.0	365.7	.0731	-.2077
3782	24.9	-.1	110.0	-.8135	-.2873	-.0082	-.0017	.3207	-1.0602	60.5	.0540	.00311	190.9	99.3	365.3	.0871	-.2880
3783	25.2	-.1	90.0	-.9245	-.2700	-.0895	.0121	.3372	-1.5523	60.5	.0544	.00327	190.5	101.6	368.4	.0930	-.4281

AVERAGE TIP SPEED RATIO = .068   AVERAGE OF ABOVE VALUES   61.3   .0538   .00286   191.3   101.4   367.2

APPENDIX

RUN 184   CONFIGURATION 45

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3786	20.1	0.0	-180.0	.0283	-.0965	.0388	.0030	-.0250	.1429	54.6	.0510	.00345	191.4	65.0	317.5	-.0051	.0293
3787	20.3	.0	-170.0	.0182	-.0770	.0326	.0077	-.0734	.3289	54.8	.0509	.00338	192.1	66.2	319.8	-.0152	.0680
3788	20.3	.0	-160.0	-.0319	-.0512	.0173	.0121	-.1359	.5077	54.9	.0508	.00345	191.7	66.2	318.4	-.0282	.1055
3789	20.2	.0	-150.0	-.1932	-.0300	-.0047	.0153	-.2037	.6816	54.4	.0508	.00326	192.7	65.8	320.8	-.0418	.1398
3790	20.2	.0	-140.0	-.5376	.0136	-.0191	.0158	-.2693	.8415	54.7	.0508	.00312	190.5	65.4	314.5	-.0560	.1750
3791	20.1	.1	-130.0	-.8129	.0404	.0085	.0138	-.3261	1.1223	54.1	.0509	.00285	191.9	65.0	317.9	-.0667	.2295
3792	20.1	.0	-120.0	-.6444	-.1789	-.0024	.0040	-.3415	1.5246	53.9	.0509	.00265	191.9	64.6	317.7	-.0694	.3100
3793	19.7	.1	-110.0	-.9227	-.3772	-.0936	-.0059	-.4075	1.8600	52.9	.0509	.00240	193.1	62.6	318.8	-.0801	.3654
3794	20.5	.1	-100.0	-1.3762	-.3501	-.1423	-.0159	-.4288	1.8713	54.3	.0517	.00212	191.0	67.4	322.0	-.0897	.3914
3795	19.7	.0	-90.0	-1.2985	-.2520	-.2087	-.0198	-.5835	2.3217	52.5	.0509	.00162	192.8	62.2	317.9	-.1142	.4545
3796	20.3	.0	180.0	.0202	-.1121	.0385	.0030	-.0289	.1202	55.2	.0507	.00355	191.0	66.2	316.0	-.0059	.0252
3797	20.2	-.0	170.0	.0000	-.1193	.0402	-.0010	.0265	-.1066	55.0	.0507	.00340	190.7	65.8	314.8	.0055	-.0223
3798	20.2	-.0	160.0	-.0917	-.1186	.0299	-.0066	.1072	-.2989	54.9	.0507	.00330	190.9	65.4	314.7	.0223	-.0621
3799	20.2	-.0	150.0	-.2378	-.1314	.0215	-.0134	.1825	-.5122	54.5	.0507	.00304	192.3	65.4	317.7	.0376	-.1054
3800	19.9	-.1	130.0	-.4968	-.1858	-.0049	-.0177	.3364	-.9819	53.8	.0507	.00275	191.8	63.8	315.5	.0680	-.1986
3801	19.8	-.1	110.0	-.3775	-.2736	-.0932	-.0019	.5040	-2.0107	53.3	.0505	.00256	191.8	63.0	314.1	.1011	-.4034
3802	20.3	-.1	90.0	-1.1483	-.3195	-.2187	.0156	.6283	-2.1836	53.4	.0519	.00231	192.0	66.2	324.6	.1281	-.4451

AVERAGE TIP SPEED RATIO = .054   AVERAGE OF ABOVE VALUES 54.2 .0509 .00289 191.7 65.1 317.8

RUN 185   CONFIGURATION 45

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3805	15.1	0.0	180.0	-.4934	-.0306	.0779	.0089	-.0883	.2100	44.3	.0480	.00197	190.8	36.6	272.5	-.0119	.0282
3806	14.7	.0	-170.0	-.4411	.0700	.0859	.0124	-.1578	.9078	42.9	.0481	.00202	192.8	34.7	276.0	-.0198	.1140
3807	15.3	.0	-160.0	-.3600	.1268	.0568	.0176	-.2307	1.1654	44.6	.0481	.00227	190.9	37.4	275.1	-.0314	.1585
3808	15.4	.0	-150.0	-.1683	.1855	.0405	.0264	-.3157	1.5930	44.9	.0481	.00229	191.6	38.2	275.6	-.0436	.2201
3809	14.9	.0	-140.0	.1471	.2234	.0161	.0288	-.4741	2.4506	43.5	.0477	.00213	191.5	35.5	271.4	-.0619	.3202
3810	14.7	.0	-130.0	.3121	.0482	-.0686	.0242	-.6435	3.0434	42.9	.0477	.00209	191.5	34.7	271.1	-.0823	.3892
3811	15.0	.0	-120.0	-.2670	-.2006	-.1138	.0066	-.6832	3.0066	43.5	.0482	.00206	191.1	36.2	274.1	-.0904	.3976
3812	15.0	.0	-110.0	-.2991	-.3443	-.1366	-.0051	-.8196	3.7055	43.5	.0482	.00200	191.0	36.2	273.5	-.1086	.4910
3813	15.0	.0	-100.0	-.3032	-.3132	-.1764	-.0112	-1.0083	4.3948	43.3	.0483	.00182	191.0	36.2	273.5	-.1336	.5823
3814	15.0	-.0	-90.0	-.1892	-.2796	-.2773	-.0151	-1.0876	4.6914	43.2	.0480	.00162	191.1	36.2	273.0	-.1444	.6227
3815	15.5	.0	180.0	-.3627	-.0756	.0665	.0078	-.0820	.1472	45.1	.0485	.00216	191.2	38.6	278.2	-.0114	.0204
3816	15.0	.0	170.0	-.5237	-.0353	.0957	-.0003	.0291	.0260	44.0	.0480	.00189	191.5	36.2	273.7	.0038	.0034
3817	14.4	0.0	160.0	-.7445	-.0372	.0805	-.0056	.1310	-.4098	42.5	.0480	.00168	191.0	33.5	270.1	.0162	-.0508
3818	15.2	-.0	150.0	-.7653	-.0735	.0570	-.0135	.2279	-.8180	44.2	.0484	.00164	191.1	37.0	275.4	.0306	-.1100
3819	15.3	-.1	130.0	-.4877	-.1024	.0296	-.0136	.5323	-2.3370	44.1	.0483	.00146	191.1	37.4	275.8	.0722	-.3172
3820	15.3	-.1	110.0	-.3051	-.1651	-.0262	-.0037	.8117	-3.5875	43.8	.0482	.00147	191.0	37.4	275.0	.1105	-.4882
3821	15.0	-.1	90.0	-.7029	-.0225	-.0950	.0049	1.1289	-4.3617	43.0	.0484	.00134	190.8	36.2	274.0	.1493	-.5764

AVERAGE TIP SPEED RATIO = .040   AVERAGE OF ABOVE VALUES 43.7 .0481 .00188 191.2 36.4 274.1

RUN 186   CONFIGURATION 45

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3824	30.4	-.0	-180.0	.1631	-.0651	.0333	.0018	-.0096	.0447	67.7	.0565	.00406	192.3	148.8	431.1	-.0033	.0154
3825	30.5	-5.0	-180.0	.1423	-.0266	.0180	.0005	-.0028	.0380	68.4	.0593	.00425	192.4	149.6	446.1	-.0009	.0127
3826	30.0	.1	-180.0	.1647	-.0628	.0324	.0019	-.0097	.0433	67.5	.0563	.00397	190.6	144.5	420.7	-.0033	.0149
3827	30.4	5.1	-180.0	-.0081	-.0430	.0318	.0021	-.0121	.0554	67.6	.0530	.00373	191.6	148.5	411.0	-.0044	.0200
3828	30.5	10.1	-180.0	-.1170	-.0324	.0366	.0021	-.0148	.0522	67.8	.0492	.00351	191.7	149.2	393.5	-.0056	.0198

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES 67.8 .0549 .00391 191.7 148.1 420.5

RUN 187   CONFIGURATION 45

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3829	30.0	0.0	160.0	.1749	-.0768	.0303	-.0015	.0767	-.2738	67.5	.0561	.00406	190.8	144.1	420.1	.0263	-.0939
3830	30.0	-5.0	160.0	.1729	-.0284	.0140	.0004	.0757	-.2605	68.1	.0586	.00432	191.3	144.5	434.0	.0252	-.0867
3831	30.0	.1	160.0	.1747	-.0737	.0303	-.0018	.0788	-.2754	67.4	.0560	.00394	191.3	144.5	421.2	.0270	-.0945
3832	30.0	5.0	160.0	.0577	-.0731	.0340	-.0041	.0832	-.2976	67.1	.0527	.00372	191.6	144.5	405.8	.0296	-.1060
3833	30.5	10.0	160.0	-.0737	-.0592	.0367	-.0056	.0925	-.2650	67.7	.0495	.00357	192.0	149.6	395.9	.0350	-.1002

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES 67.6 .0546 .00392 191.4 145.5 415.4

RUN 188   CONFIGURATION 45

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3834	30.2	.0	-160.0	.2047	-.0472	.0177	.0053	-.0941	.3431	67.5	.0565	.00391	191.3	146.1	425.5	-.0323	.1178
3835	30.5	-4.9	-160.0	.1648	-.0149	.0077	.0010	-.0835	.2752	68.3	.0593	.00416	192.5	149.2	445.9	-.0283	.3921
3836	30.0	.1	-160.0	.1961	-.0465	.0179	.0055	-.0946	.3399	67.5	.0563	.00381	190.9	144.9	421.7	-.0325	.1168
3837	30.2	5.1	-160.0	.1256	-.0398	.0223	.0068	-.1055	.4086	67.2	.0531	.00356	191.7	146.1	409.6	-.0376	.1457
3838	30.0	10.1	-160.0	.0452	-.0340	.0266	.0069	-.1168	.4870	67.2	.0494	.00329	190.8	144.1	387.2	-.0435	.1813

AVERAGE TIP SPEED RATIO = .081   AVERAGE OF ABOVE VALUES   67.5 .0549 .00375 191.4 146.1 418.0

RUN 189   CONFIGURATION 17

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3874	45.8	.0	0.0	-.0112	.0520	-.0190	-.0004	.0020	.0045	90.0	.0000	.00000	0.0	327.8	327.8	.0020	.0045
3875	45.9	-.0	10.0	.0039	.0479	-.0162	.0027	-.0162	-.0628	90.0	.0000	.00000	0.0	329.8	329.8	-.0162	-.0628
3876	45.9	-.0	20.0	.0291	.0373	-.0291	.0058	-.0249	-.1604	90.0	.0000	.00000	0.0	329.8	329.8	-.0249	-.1604
3877	45.9	-.0	30.0	.0406	.0195	-.0211	.0101	-.0176	-.2991	90.0	.0000	.00000	0.0	330.2	330.2	-.0176	-.2991
3878	46.1	-.0	40.0	.0938	-.0129	-.0131	.0150	.0095	-.4905	90.0	.0000	.00000	0.0	332.9	332.9	.0095	-.4905
3879	45.7	.0	50.0	.2405	-.0750	-.0247	.0244	.0831	-.8481	90.0	.0000	.00000	0.0	326.2	326.2	.0831	-.8481
3880	46.0	.1	60.0	.3623	-.1738	-.0225	.0294	.1054	-.9898	90.0	.0000	.00000	0.0	330.9	330.9	.1054	-.9898
3881	45.9	.1	70.0	.2757	-.2412	.0208	.0315	.1126	-1.0267	90.0	.0000	.00000	0.0	329.0	329.0	.1126	-1.0267
3882	46.0	.1	80.0	.2001	-.2923	.0186	.0345	.1166	-1.0437	90.0	.0000	.00000	0.0	331.3	331.3	.1166	-1.0437
3883	46.1	.1	90.0	.2119	-.3171	.0229	.0311	.1269	-.9678	90.0	.0000	.00000	0.0	331.7	331.7	.1269	-.9678
3884	45.8	-.0	-.0	-.0087	.0452	-.0171	-.0003	.0015	-.0015	90.0	.0000	.00000	0.0	327.8	327.8	.0015	-.0015
3885	45.7	.0	-10.0	.0085	.0459	-.0233	-.0033	.0170	.0727	90.0	.0000	.00000	0.0	326.2	326.2	.0170	.0727
3886	46.0	.0	-20.0	.0260	.0392	-.0242	-.0067	.0242	.1711	90.0	.0000	.00000	0.0	331.3	331.3	.0242	.1711
3887	45.8	.0	-30.0	.0396	.0244	-.0130	-.0108	.0135	.3175	90.0	.0000	.00000	0.0	327.4	327.4	.0135	.3175
3888	46.0	.1	-40.0	.0592	-.0023	.0027	-.0163	-.0202	.5262	90.0	.0000	.00000	0.0	330.6	330.6	-.0202	.5262
3890	45.8	.1	-50.0	.2566	-.0753	-.0234	-.0251	-.0857	.8827	90.0	.0000	.00000	0.0	327.4	327.4	-.0857	.8827
3891	45.7	.2	-60.0	.3626	-.1766	-.0204	-.0298	-.1040	1.0035	90.0	.0000	.00000	0.0	326.2	326.2	-.1040	1.0035

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000 .0 329.2 329.2

RUN 190   CONFIGURATION 17

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3892	45.8	-.0	.0	-.0114	.0279	-.0179	-.0003	.0015	-.0015	90.0	.0000	.00000	0.0	328.6	328.6	.0015	-.0015
3893	45.9	10.0	.0	.0195	.0213	.0035	-.0003	.0005	-.0006	90.0	.0000	.00000	0.0	329.0	329.0	.0005	-.0006
3894	45.9	5.0	.0	.0001	.0228	-.0050	-.0003	.0018	-.0045	90.0	.0000	.00000	0.0	329.8	329.8	.0018	-.0045
3895	45.9	.0	.0	-.0141	.0248	-.0172	-.0003	.0015	-.0035	90.0	.0000	.00000	0.0	329.8	329.8	.0015	-.0035
3896	45.9	-5.0	.0	-.0387	.0268	-.0191	-.0002	.0008	-.0039	90.0	.0000	.00000	0.0	329.4	329.4	.0008	-.0039
3897	45.9	-10.1	.0	-.0576	.0279	-.0265	-.0002	-.0020	.0020	90.0	.0000	.00000	0.0	329.8	329.8	-.0020	.0020

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000 .0 329.4 329.4

RUN 191   CONFIGURATION 17

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3898	45.9	.1	-20.0	.0262	.0222	-.0247	-.0068	.0252	.1702	90.0	.0000	.00000	0.0	329.0	329.0	.0252	.1702
3899	46.0	10.0	-20.0	.0518	.0097	-.0030	-.0101	.0235	.1659	90.0	.0000	.00000	0.0	330.6	330.6	.0235	.1659
3900	45.9	5.0	-20.0	.0350	.0123	-.0106	-.0083	.0277	.1572	90.0	.0000	.00000	0.0	330.2	330.2	.0277	.1572
3901	46.0	.0	-20.0	.0260	.0172	-.0252	-.0067	.0245	.1715	90.0	.0000	.00000	0.0	330.6	330.6	.0245	.1715
3902	45.9	-5.0	-20.0	.0129	.0225	-.0310	-.0053	.0109	.2174	90.0	.0000	.00000	0.0	330.2	330.2	.0109	.2174
3903	45.9	-10.0	-20.0	.0024	.0302	-.0376	-.0039	-.0119	.2830	90.0	.0000	.00000	0.0	330.2	330.2	-.0119	.2830

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000 .0 330.1 330.1

RUN 192   CONFIGURATION 17

POINT	V,KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3911	101.7	-.0	0.0	-.0145	.0310	-.0146	-.0002	.0015	.0045	90.0	.0000	.00000	0.0	1618.0	1618.0	.0015	.0045
3913	101.6	10.0	0.0	.0186	.0279	.0019	-.0003	.0008	.0046	90.0	.0000	.00000	0.0	1615.6	1615.6	.0008	.0046
3914	101.6	5.0	0.0	.0039	.0287	-.0069	-.0003	.0017	.0028	90.0	.0000	.00000	0.0	1613.7	1613.7	.0017	.0028
3915	101.5	-.1	0.0	-.0152	.0304	-.0148	-.0002	.0013	.0037	90.0	.0000	.00000	0.0	1611.7	1611.7	.0013	.0037
3916	101.6	-5.1	0.0	-.0390	.0314	-.0199	-.0002	.0007	.0056	90.0	.0000	.00000	0.0	1613.7	1613.7	.0007	.0056
3917	101.6	-10.2	0.0	-.0618	.0322	-.0272	-.0001	-.0013	.0089	90.0	.0000	.00000	0.0	1613.7	1613.7	-.0013	.0089

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0 .0000 .00000 .0 1614.4 1614.4

RUN 195   CONFIGURATION 17

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3965	20.5	.0	0.0	.0676	.1204	-.0112	-.0010	.0028	.0303	90.0	.0000	.00000	0.0	67.0	67.0	.0028	.0303
3966	40.2	0.0	0.0	.0105	.0582	-.0134	-.0004	.0022	.0121	90.0	.0000	.00000	0.0	256.6	256.6	.0022	.0121
3967	60.5	-.0	0.0	-.0047	.0415	-.0135	-.0003	.0017	.0069	90.0	.0000	.00000	0.0	583.1	583.1	.0017	.0069
3968	80.8	-.0	0.0	-.0088	.0357	-.0137	-.0002	.0014	.0046	90.0	.0000	.00000	0.0	1037.8	1037.8	.0014	.0046

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   486.1   486.1

RUN 196   CONFIGURATION 17

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3969	80.7	-.0	0.0	-.0089	.0357	-.0136	-.0002	.0013	.0040	90.0	.0000	.00000	0.0	1036.6	1036.6	.0013	.0040
3970	80.7	10.0	0.0	.0236	.0306	.0019	-.0004	.0010	.0051	90.0	.0000	.00000	0.0	1037.4	1037.4	.0010	.0051
3971	80.7	5.0	0.0	.0086	.0320	-.0068	-.0003	.0018	.0034	90.0	.0000	.00000	0.0	1036.3	1036.3	.0018	.0034
3972	80.6	-.0	0.0	-.0106	.0333	-.0136	-.0002	.0015	.0046	90.0	.0000	.00000	0.0	1034.7	1034.7	.0015	.0045
3973	80.7	-5.1	0.0	-.0321	.0341	-.0197	-.0002	.0008	.0059	90.0	.0000	.00000	0.0	1037.0	1037.0	.0008	.0059
3974	80.7	-10.1	0.0	-.0556	.0365	-.0275	-.0002	-.0015	.0100	90.0	.0000	.00000	0.0	1036.6	1036.6	-.0015	.0100

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   1036.4   1036.4

RUN 197   CONFIGURATION 17

POINT	V.KT	ALPHA	BETA	CNF	CAF	CPM	CRM	CYM	CSF	CHI	CTSSIG	CHSSIG	VT	Q	QS	CYMS	CSFS
3975	80.8	-.0	0.0	-.0088	.0370	-.0137	-.0003	.0015	.0046	90.0	.0000	.00000	0.0	1037.8	1037.8	.0015	.0046
3976	80.7	-.0	5.0	-.0105	.0364	-.0124	.0012	-.0118	-.0218	90.0	.0000	.00000	0.0	1037.0	1037.0	-.0118	-.0218
3977	80.7	-.0	10.0	.0037	.0345	-.0176	.0028	-.0167	-.0650	90.0	.0000	.00000	0.0	1036.3	1036.3	-.0167	-.0650
3978	80.9	0.0	-.0	-.0088	.0367	-.0138	-.0003	.0015	.0053	90.0	.0000	.00000	0.0	1040.6	1040.6	.0015	.0053
3979	80.6	.0	-5.0	-.0097	.0370	-.0116	-.0017	.0144	.0315	90.0	.0000	.00000	0.0	1033.1	1033.1	.0144	.0315
3980	80.7	.0	-10.0	.0100	.0354	-.0189	-.0032	.0176	.0789	90.0	.0000	.00000	0.0	1036.3	1036.3	.0176	.0789
3981	80.7	0.0	.0	-.0089	.0361	-.0137	-.0002	.0013	.0040	90.0	.0000	.00000	0.0	1036.3	1036.3	.0013	.0040

AVERAGE TIP SPEED RATIO = .000   AVERAGE OF ABOVE VALUES   90.0   .0000   .00000   .0   1036.8   1036.8

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TABLE I.- PRESSURE TAP LOCATIONS

(a) Model 1

cm	in.	Percent	Body center line Left side	Body center line Right side	Top	Bottom	Pylon Left side	Pylon Right side
0	0	0	x	x	x	x		
1.8	.72	2.0	x	x	x	x		
4.6	1.80	5.0				x		
5.6	2.20	6.1	x	x				
9.1	3.60	10.0	x	x	x	x		
13.7	5.40	16.0	x	x	x	x		
18.3	7.20	20.0	x	x	x	x		
21.9	8.64	24.0			x			
22.9	9.00	25.0	x	x		x		
23.4	9.25	25.7			x			
24.4	9.60	26.7					x	x
25.4	10.00	27.7			x			
26.2	10.30	28.7					x	x
27.4	10.80	30.3	x	x	x	x	x	x
32.0	12.60	35.0	x	x	x	x	x	x
36.6	14.40	40.0	x	x	x	x	x	x
41.1	16.20	45.0	x	x		x	x	x
44.7	17.60	49.0	x	x	x	x		
47.0	18.50	51.5	x	x	x	x		
50.3	19.80	55.0	x	x	x	x		
54.9	21.60	60.0	x	x	x	x		
64.0	25.20	70.0	x	x	x	x		
76.8	30.25	84.0	x	x	x			
77.7	30.60	85.0				x		

65

TABLE I.- PRESSURE TAP LOCATIONS – Continued

(b) Model 2

x cm	x in.	Percent	Body center line Left side	Body center line Right side	Body center line Top	Body center line Bottom	Pylon Left side	Pylon Right side	Upper body flank Left side	Upper body flank Right side
0	0	0	x	x	x	x				
1.8	.72	2.0	x	x	x	x				
4.6	1.80	5.0	x	x	x	x				
9.1	3.60	10.0	x	x	x	x				
13.7	5.40	15.0	x	x	x					
15.5	6.12	17.0	x	x						
18.3	7.20	20.0	x	x	x	x				
20.1	7.92	22.0	x	x						
22.9	9.00	25.0	x	x	x					
24.3	9.55	26.5					x	x		
24.7	9.72	27.0	x	x			x	x	x	x
27.4	10.80	30.3	x	x	x	x	x	x	x	x
32.0	12.60	35.0	x	x	x	x	x	x	x	x
36.6	14.40	40.0	x	x	x	x	x	x	x	x
41.1	16.20	45.0	x	x	x		x	x		
43.4	17.10	47.5	x	x						
45.7	18.00	50.0	x	x	x	x	x	x		
47.0	18.50	51.5					x	x		
50.3	19.80	55.0			x					
54.9	21.60	60.0	x	x	x	x				
64.0	25.20	70.0	x	x	x	x				
77.7	30.60	85.0	x	x	x	x				
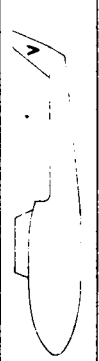
TABLE I.- PRESSURE TAP LOCATIONS – Concluded

(c) Model 3

x cm	x in.	Percent	Body center line Left side	Body center line Right side	Body center line Top	Body center line Bottom	Pylon Left side	Pylon Right side
0.1	0.04	0.1	x	x				
1.8	.72	2.0	x	x	x	x		
4.6	1.80	5.0	x	x		x		
9.1	3.60	10.0	x	x	x	x		
11.4	4.50	12.5			x			
13.4	5.27	14.7			x		x	x
13.7	5.40	16.0	x	x		x		
16.0	6.30	17.5			x		x	x
18.3	7.20	20.0	x	x	x	x	x	x
22.9	9.00	25.0	x	x	x	x	x	x
27.4	10.80	30.3	x	x	x	x	x	x
32.0	12.60	35.0	x	x	x	x	x	x
36.6	14.40	40.0	x	x	x	x	x	x
45.7	18.00	50.0	x	x	x	x	x	x
50.3	19.80	55.0	x	x	x	x		
52.6	20.70	57.5			x	x		
54.9	21.60	60.0	x	x	x	x		
64.0	25.20	70.0	x	x	x	x		
77.7	30.60	85.0	x	x	x	x		

TABLE II.- CONFIGURATION NOMENCLATURE

Model		No rotor; nose forward	No rotor; nose aft	With rotor; nose forward	With rotor; nose aft
Number	Tail configuration				
1	None	11	21	31	41
1	Standard	12	22	32	42
1	Cambered	13	23	33	43
1	"V"	14	24	34	44
2	None	15	25	35	45
2	Standard	16	26	36	46
3	None	17			
1	Horizontal tail	19		39	
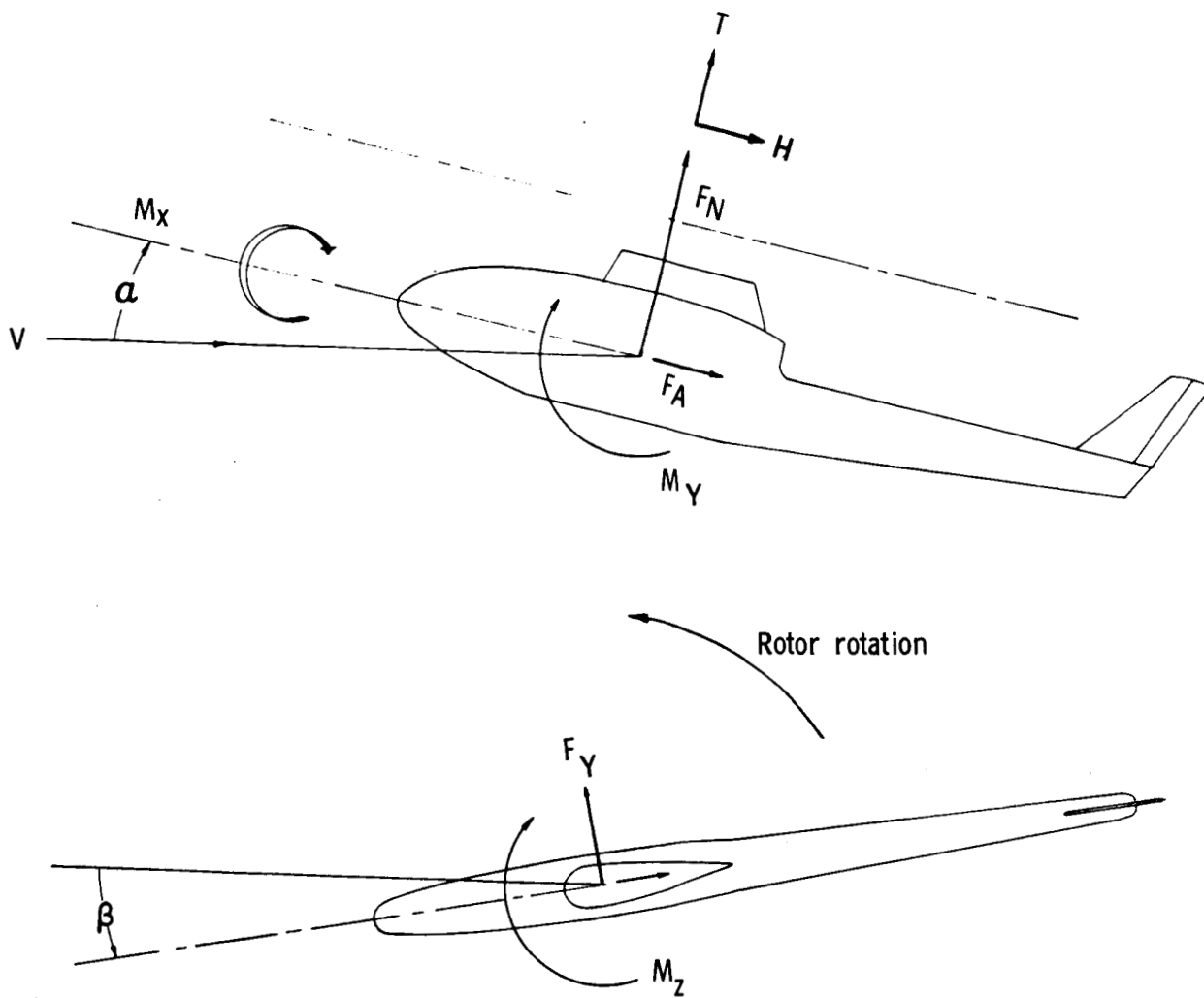
Figure 1.- Axes and force notation showing positive directions of forces and moments.

Frontal area 122 cm² (0.1314 ft²)

| Fuselage station | 2.5 (1.0) | 5.1 (2.0) | 15.2 (6.0) | 20.3 (8.0) | 25.4 (10.0) | 35.6 (14.0) | 45.7 (18.0) | 61.0 (24.0) | 72.7 (28.6) |

91.4 (36.0)

27.4 (10.8)

12.3 (4.84)

Pressure tap locations (see table 1)

Moment resolving center
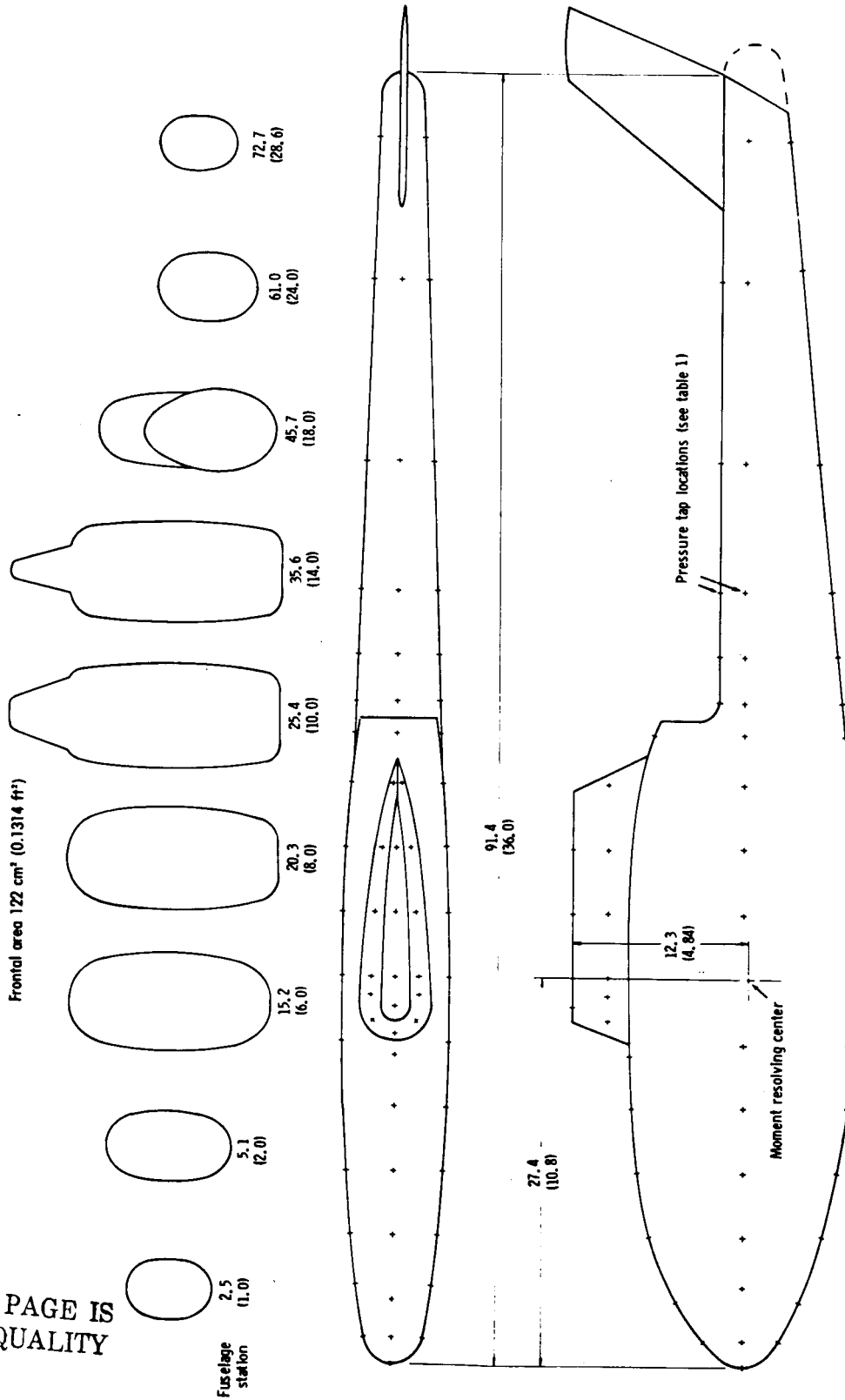
(a) Model 1; S_S = 985 cm² (1.06 ft²); S_p = 502 cm² (0.54 ft²). All dimensions are in centimeters (inches) unless otherwise noted.

Figure 2.- Fuselage models tested.

Frontal area 250.5 cm² (0.2697 ft²)

78.7
(31.0)

49.5
(19.5)

44.1
(17.4)

39.6
(15.6)

33.0
(13.0)

27.4
(10.8)

17.0
(6.7)

10.2
(4.0)

5.1
(2.0)

2.5
(1.0)

Fuselage
station

Pressure tap locations (see table 2)

91.4
(36.0)

Moment resolving center

27.4
(10.8)

7.4
(2.9)
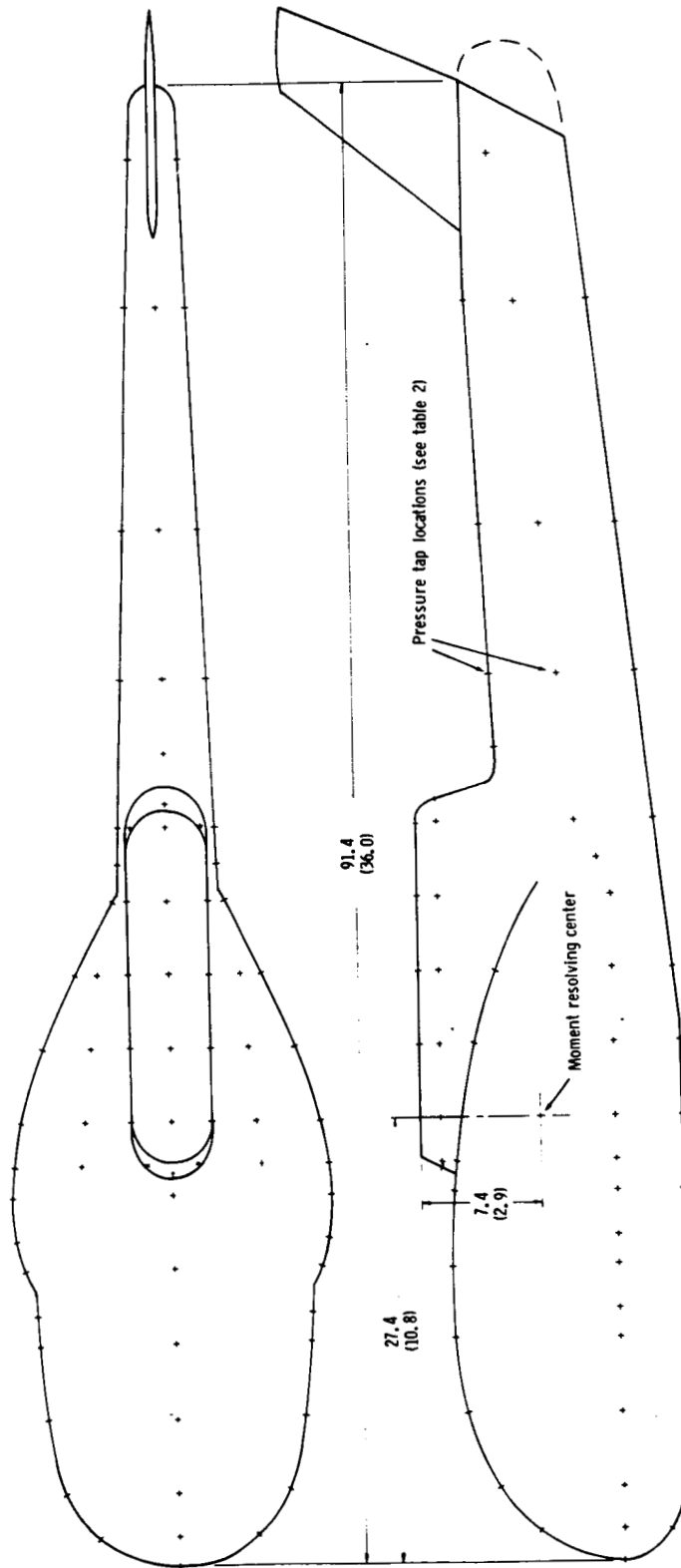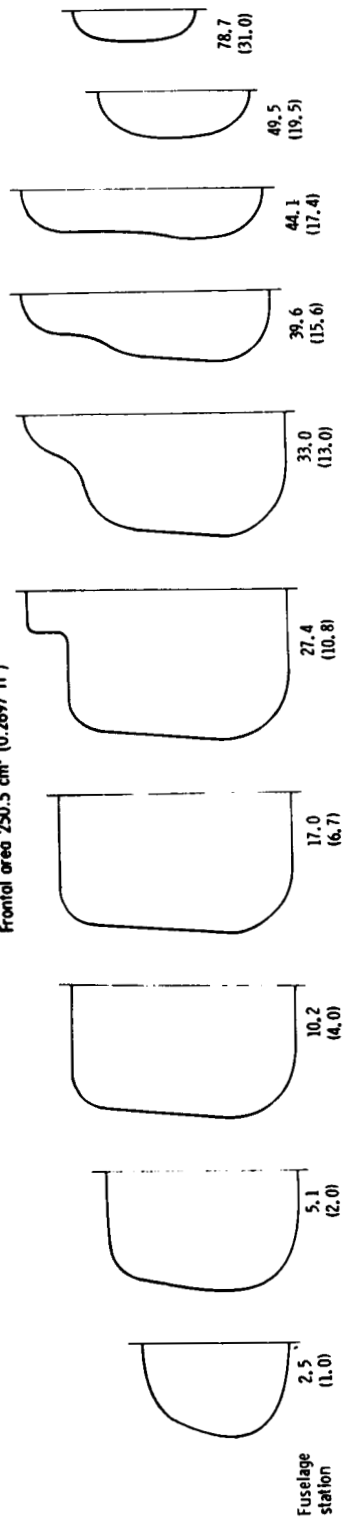
(b) Model 2; S_s = 1013 cm² (1.09 ft²); S_p = 864 cm² (0.93 ft²).

Figure 2.- Continued.

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Frontal area 261.9 cm² (0.2819 ft²)

Fuselage station

2.5 (1.0)
7.6 (3.0)
12.7 (6.0)
17.8 (9.0)
38.1 (15.0)
44.5 (17.5)
46.7 (18.4)
49.5 (19.5)
50.8 (20.0)
76.5 (30.1)

36.0 (91.4)

27.4 (10.8)

7.4 (2.9)

Moment resolving center

Pressure tap locations (see table 3)
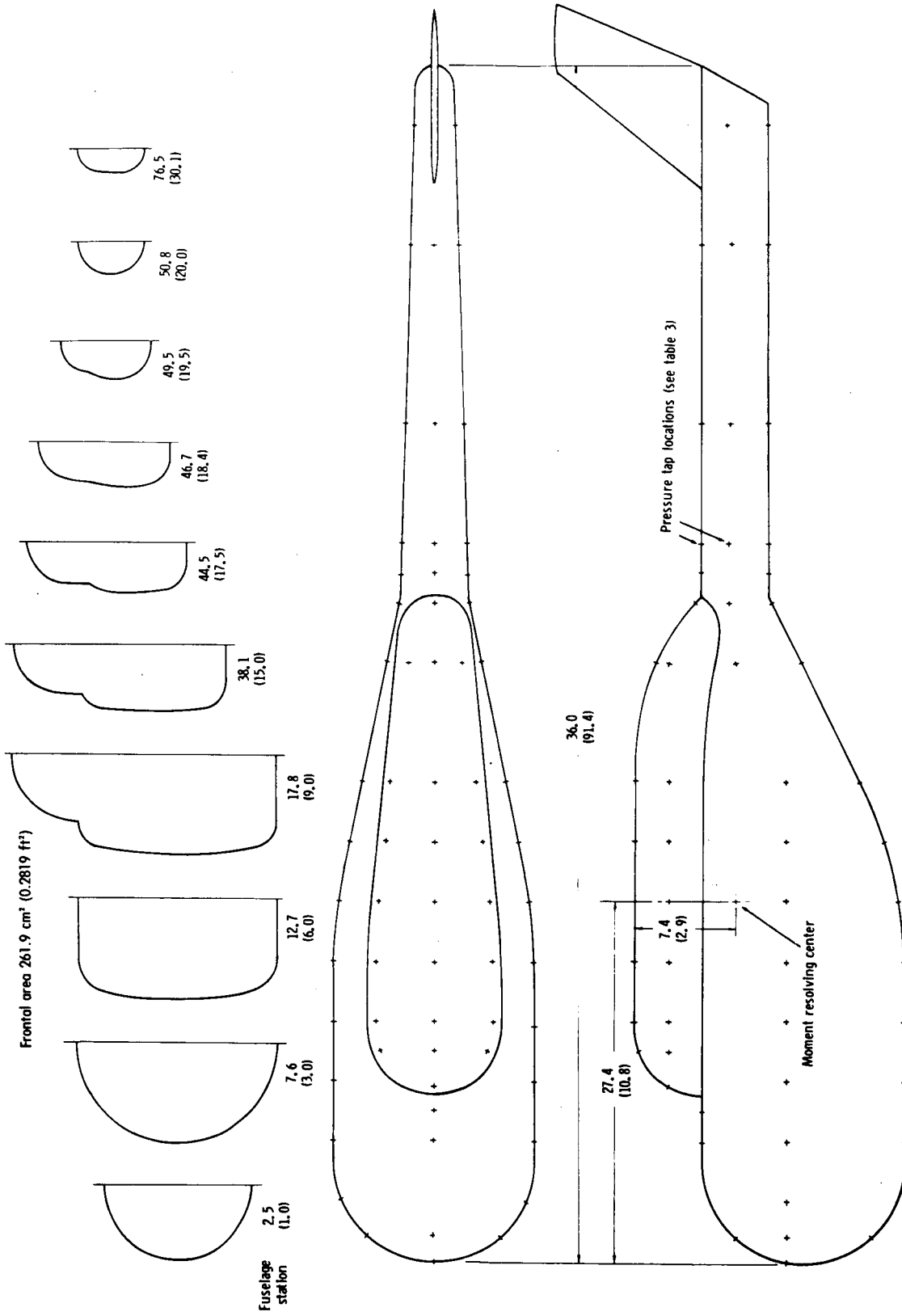
(c) Model 3; $S_s = 1022$ cm² (1.10 ft²); $S_p = 790$ cm² (0.85 ft²).

Figure 2.- Continued.

NACA 23012 airfoil

5.9
(2.3)

11.5
(4.5)

3.68
(1.44)

36°

10.6
(4.2)

50°

Cambered Vertical tail

Sta. 64.0
(25.2)

6.5
(2.6)

5.7
(2.2)

20°

4.1
(1.6)

NACA 23012 airfoil

-3° incidence

Horizontal tail

2.54
(1.0)

11.1
(4.4)

5.9
(2.3)

24°

2.54
(1.0)

.46
(.2)

9.4
(3.7)

40°
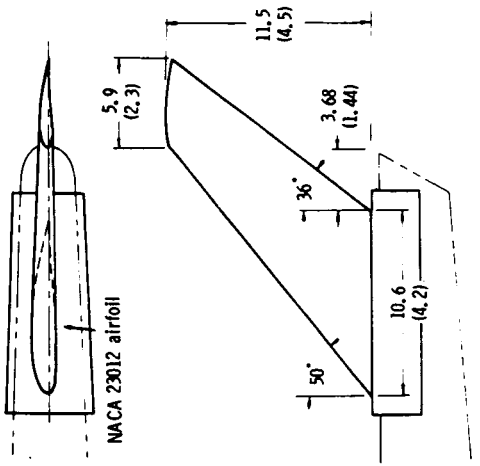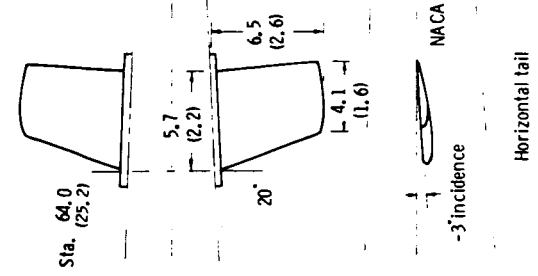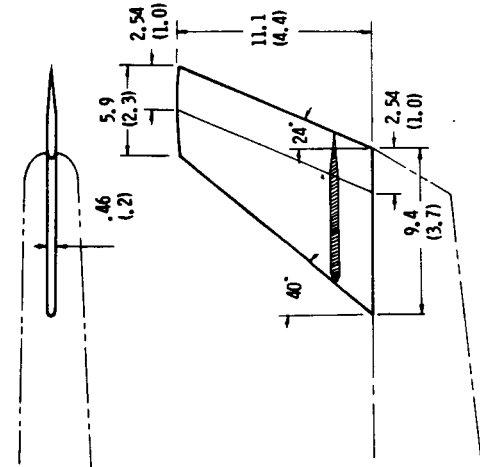
Standard vertical tail
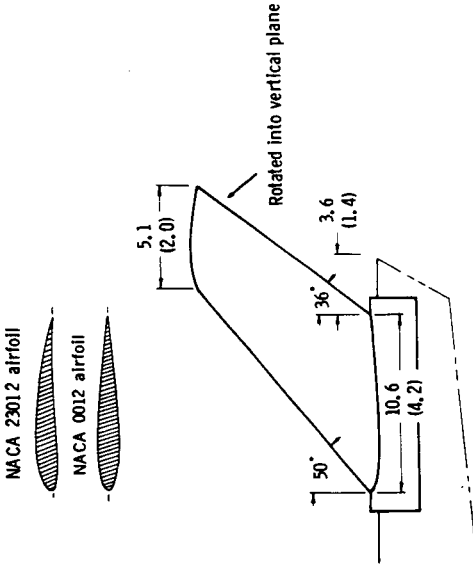
NACA 23012 airfoil

NACA 0012 airfoil

Rotated into vertical plane

5.1
(2.0)

3.6
(1.4)

36°

10.6
(4.2)

50°

Uncambered

26.4°

9.9
(3.9)

Looking aft

26.4°

Cambered
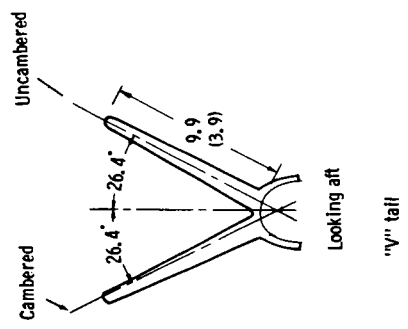
"V" tail

(d) Tail components.

Figure 2. – Concluded.

NACA 0012 airfoil

8.9
(3.5)

30.4
(12.0)

50.8
(20.0)

30°

Flapping axis
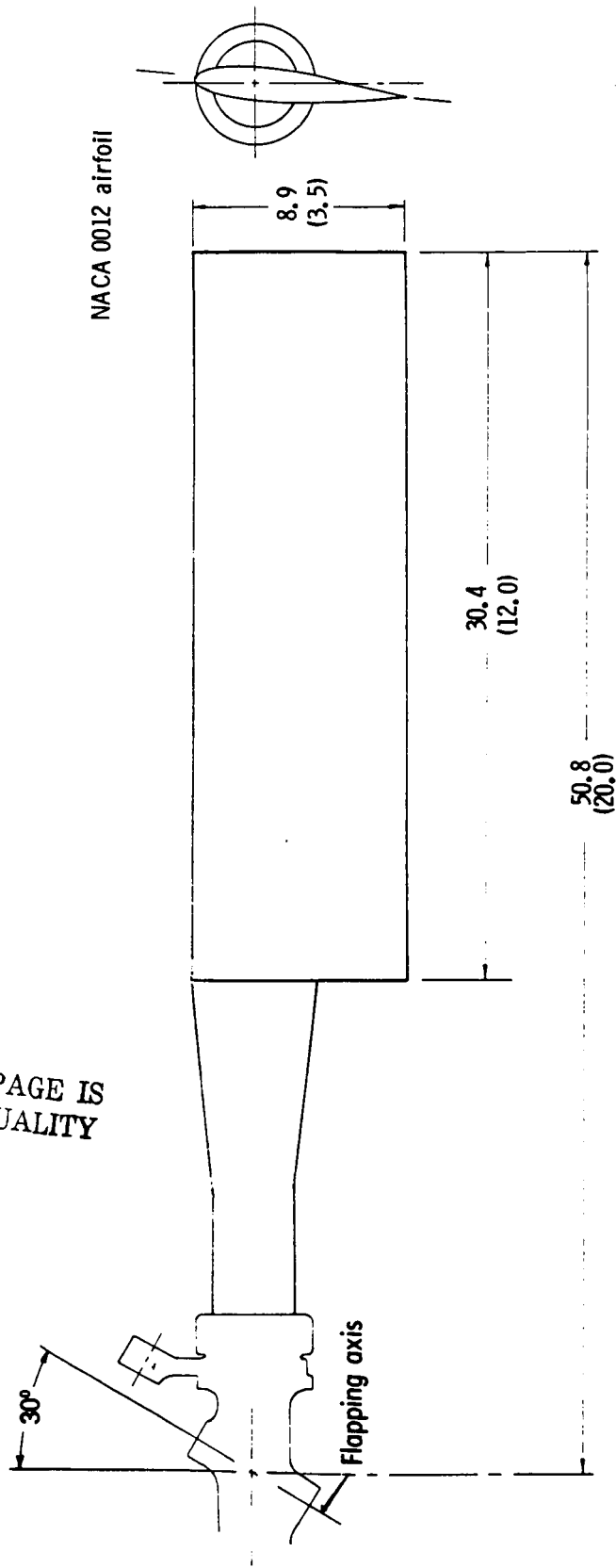
Figure 3.- Rotor blade planform. (Dimensions are in centimeters (inches).)

L-72-1507

Figure 4.- Photograph of model installation in V/STOL wind tunnel.
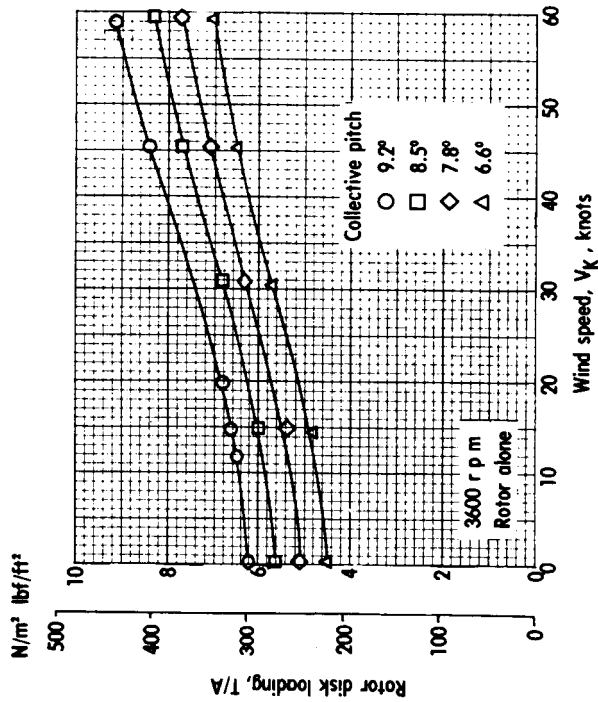
(c) Rotor wake angle, χ.

(a) Rotor disk loading (thrust/area).
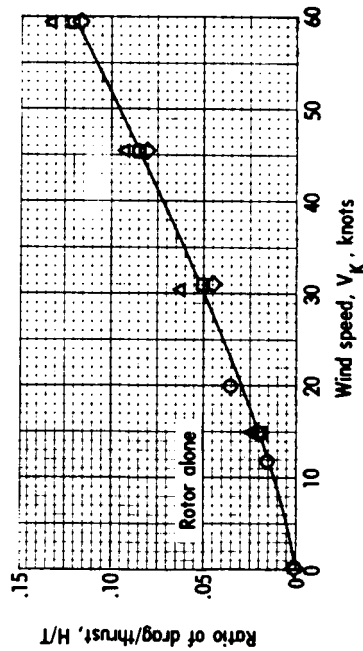
(b) Rotor drag ratio, H/T.
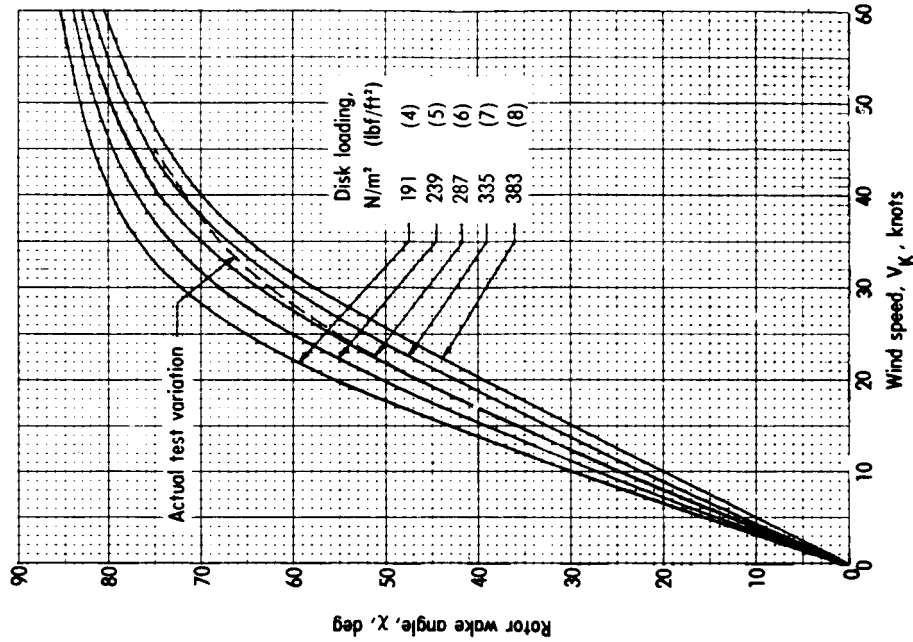
Figure 5.- Rotor thrust, drag, and wake angle as a function of windspeed.
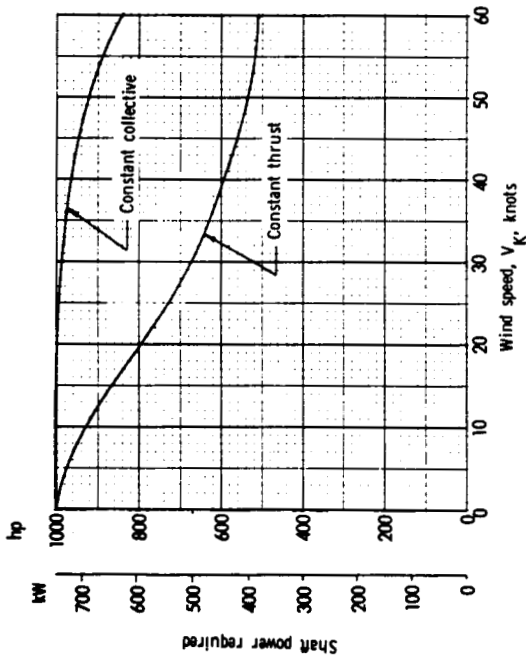
(a) Main rotor power required.
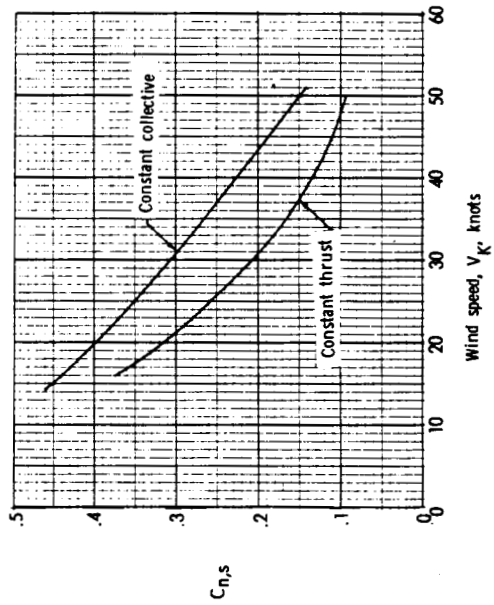
(b) Slipstream yaw coefficient, $C_{n,s}$.
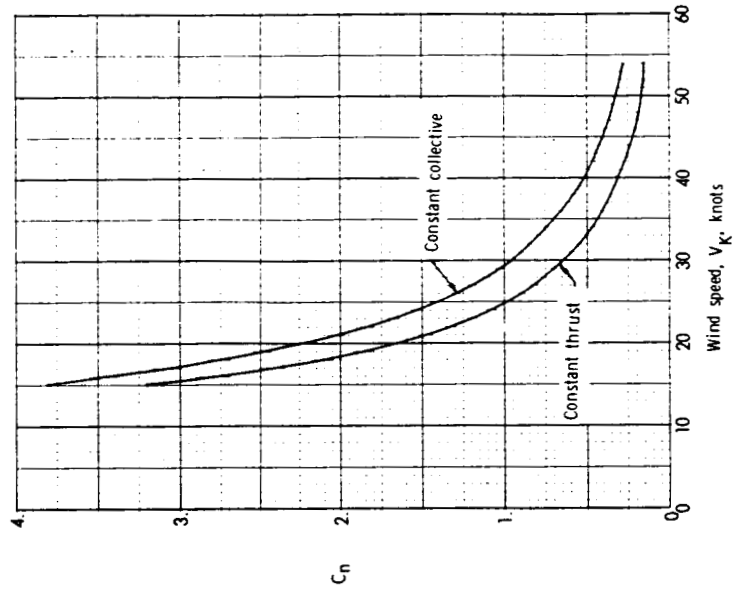
(c) Yaw coefficient, C_n.

Figure 6.- Power variation of a typical helicopter and corresponding antitorque yaw coefficient required of tail rotor.
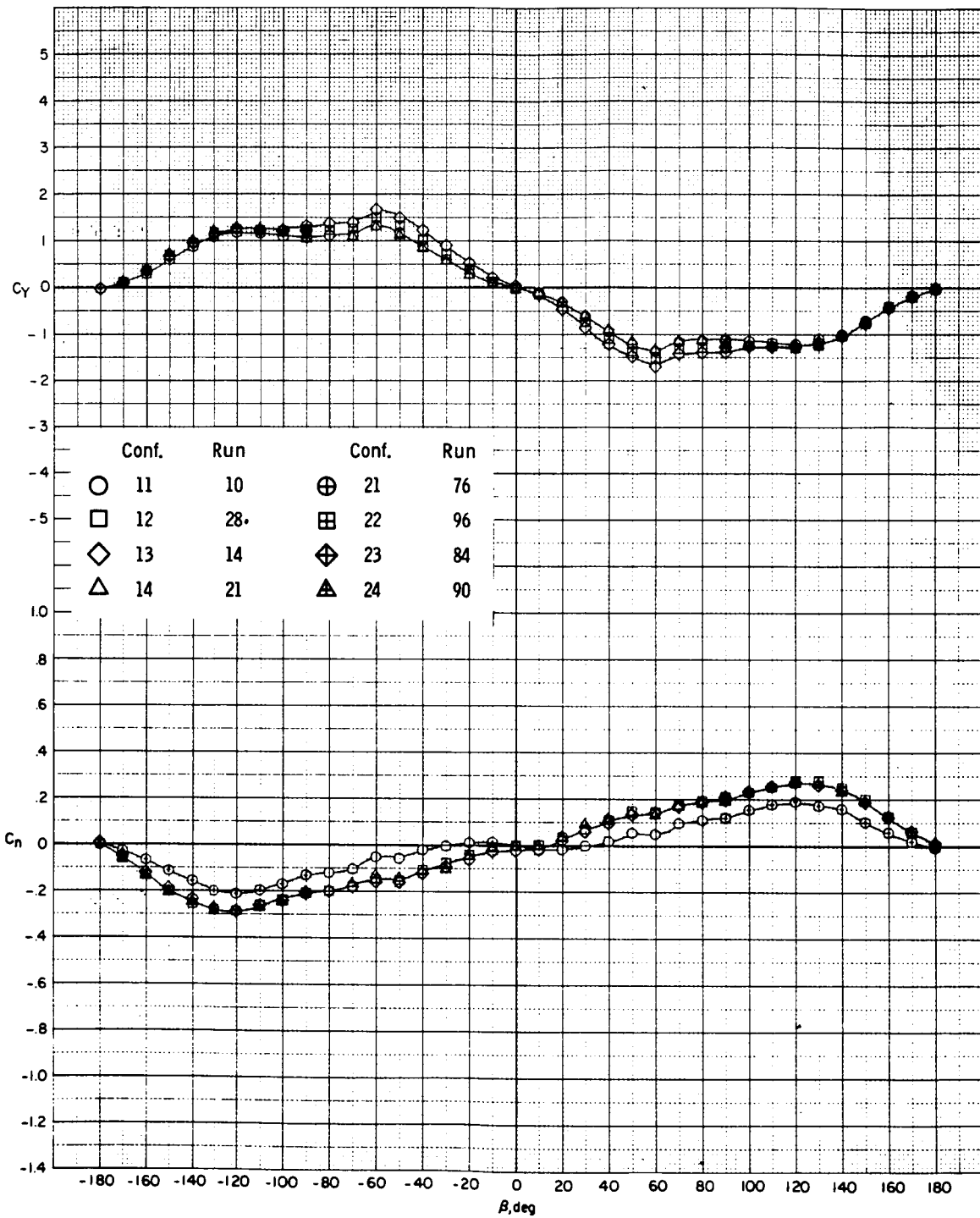
Figure 7.- Comparison of directional characteristics of model 1 without rotor with four vertical-tail configurations.

Figure 8.- Effect of windspeed on directional characteristics of model 1
without rotor or tail.
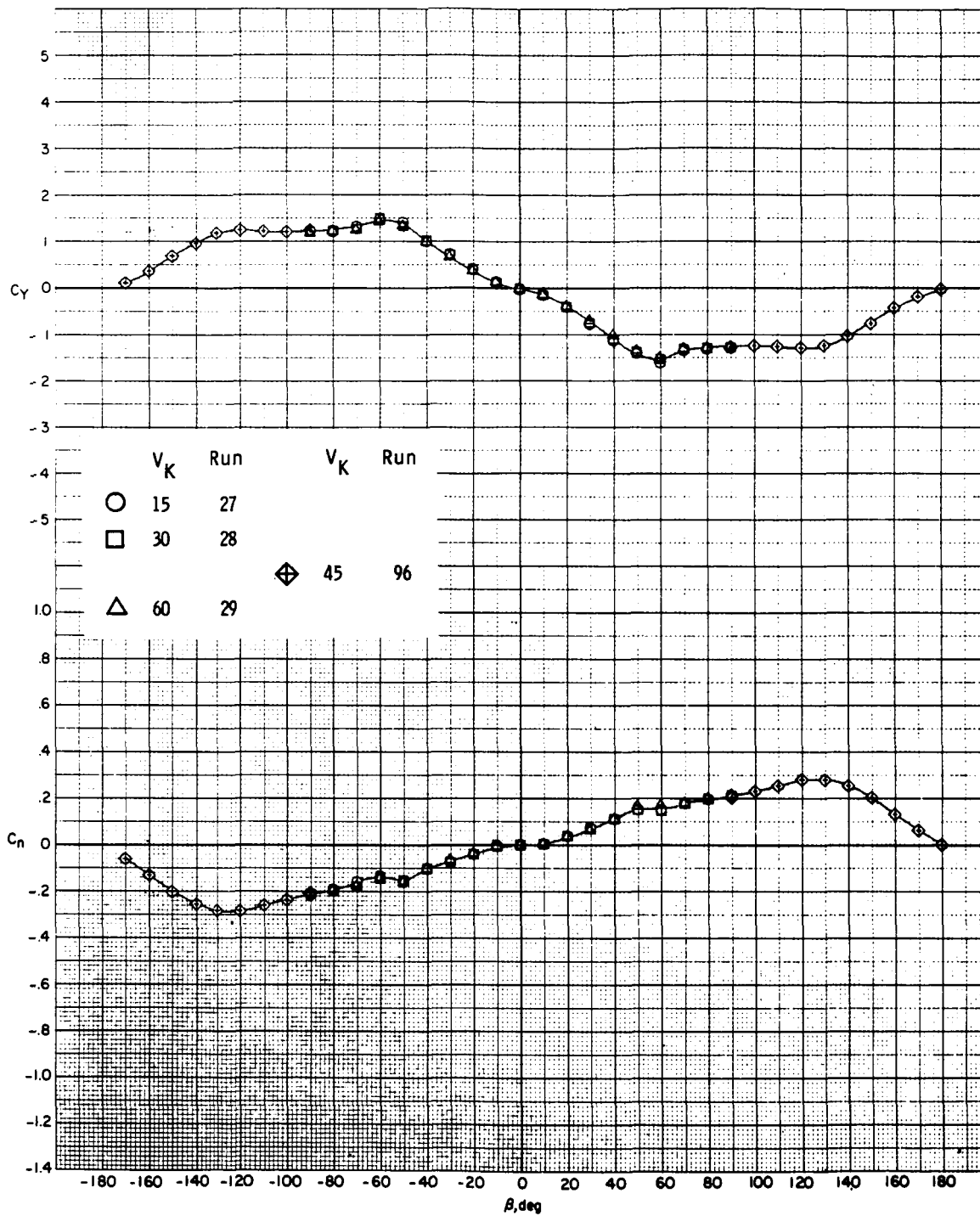
Figure 9.- Effect of windspeed on directional characteristics of model 1 without rotor and with standard vertical tail (configuration 12).
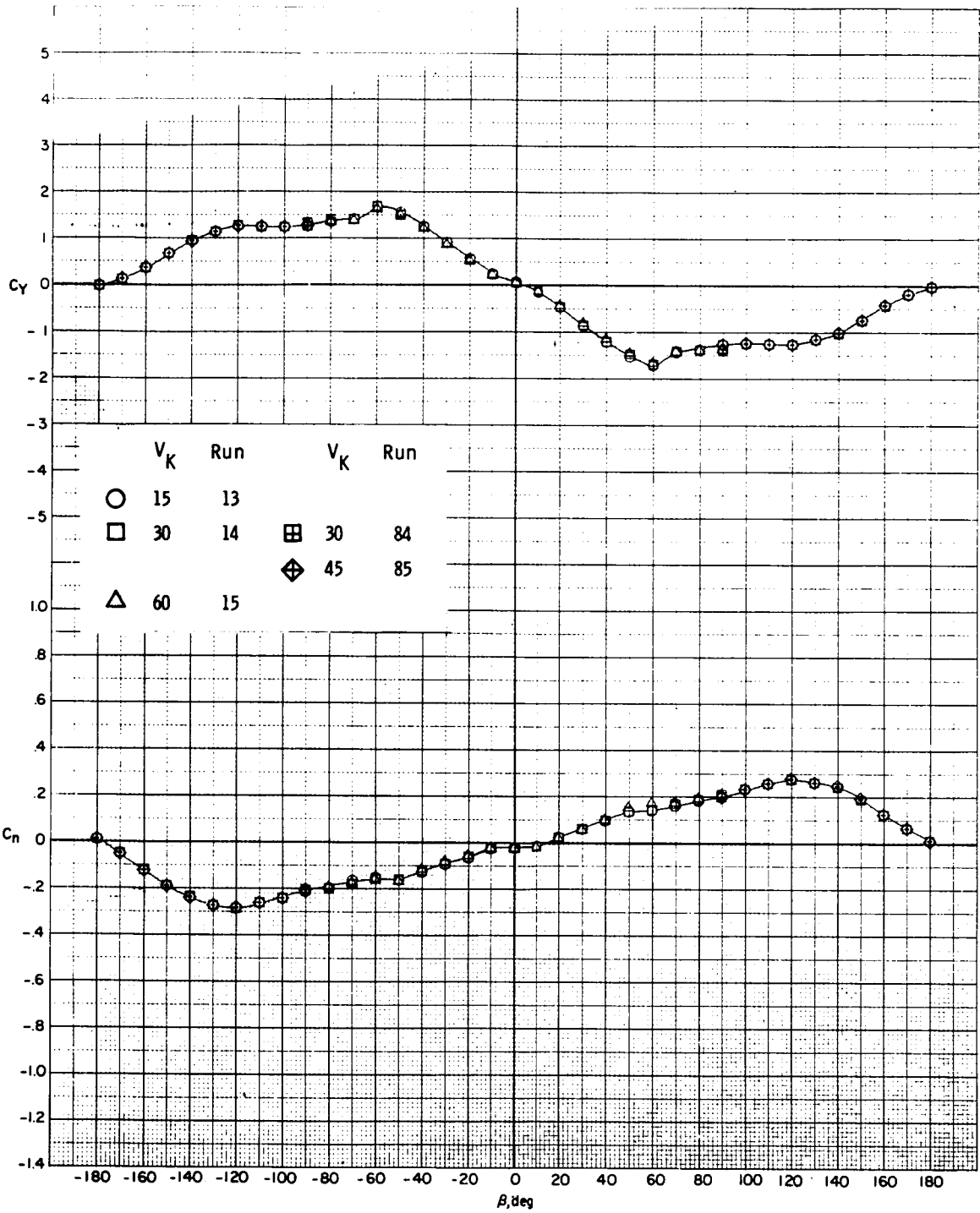
Figure 10.- Effect of windspeed on directional characteristics of model 1
without rotor and with cambered vertical tail (configuration 13).
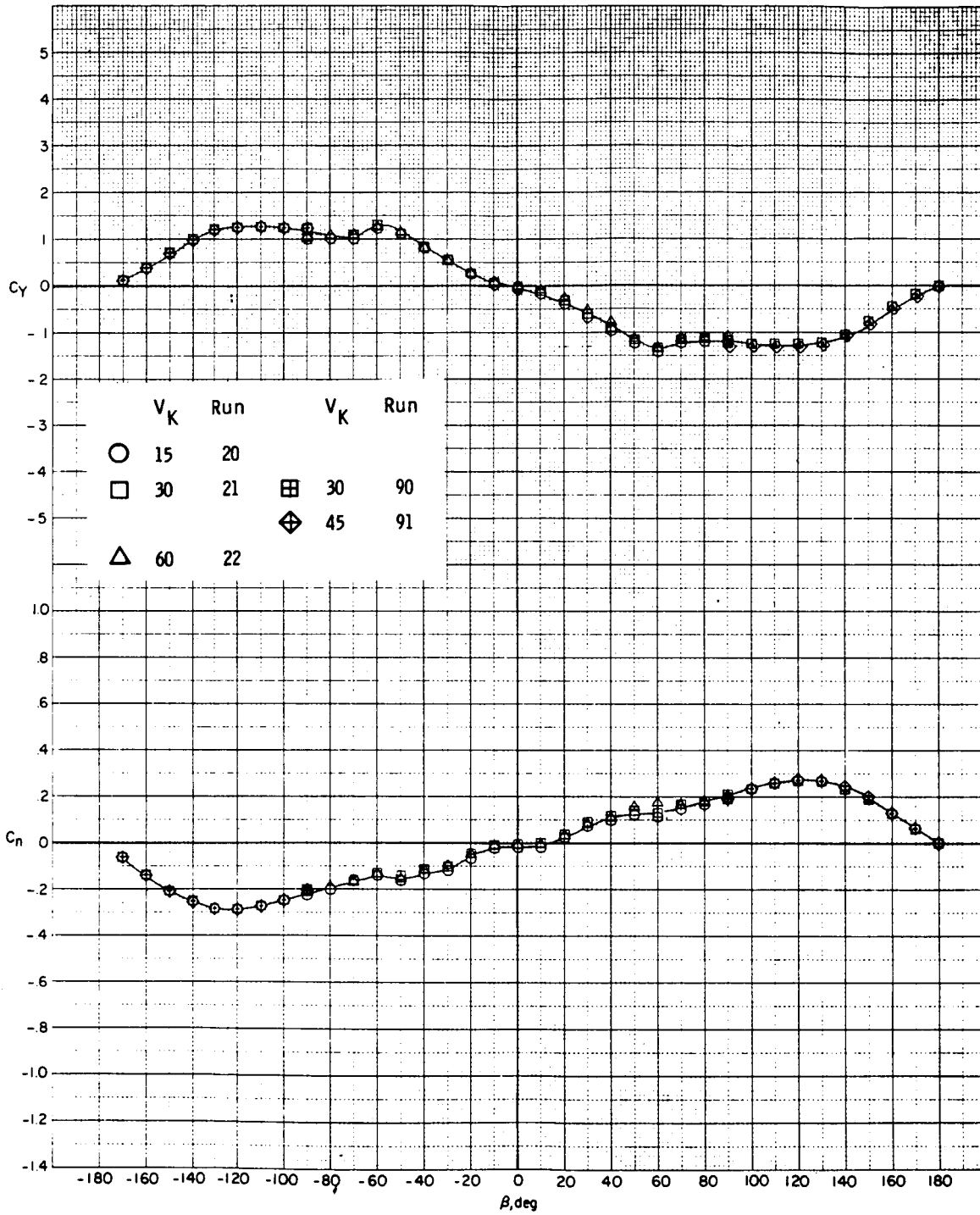
Figure 11.- Effect of windspeed on directional characteristics of model 1
without rotor and with V vertical tail (configuration 14).
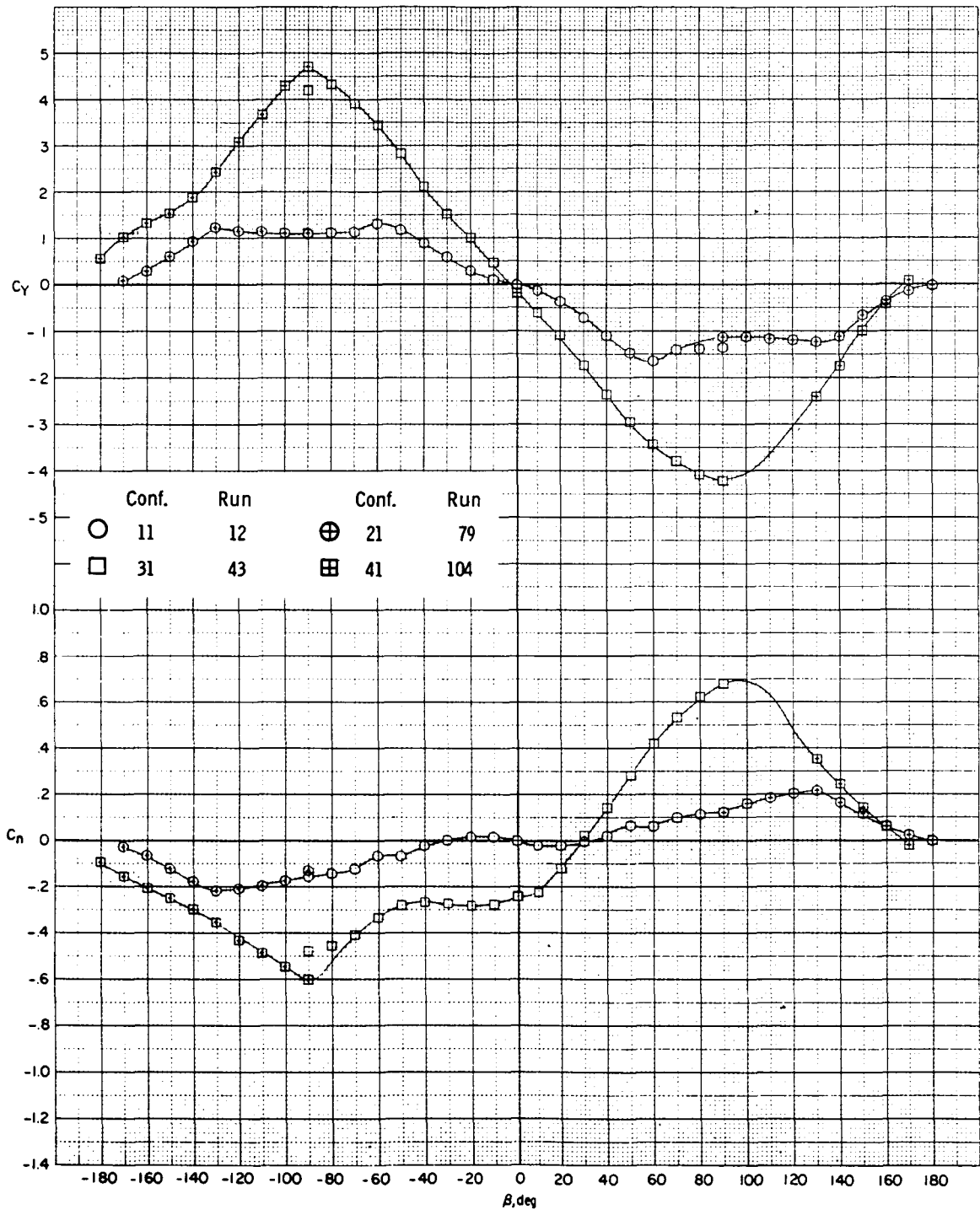
(a) Windspeed, 15 knots.

Figure 12.- Effect of rotor wake on directional characteristics of model 1 without tail.

	Conf.	Run		Conf.	Run
○	11	12	⊕	21	79
□	31	44	⊞	41	105
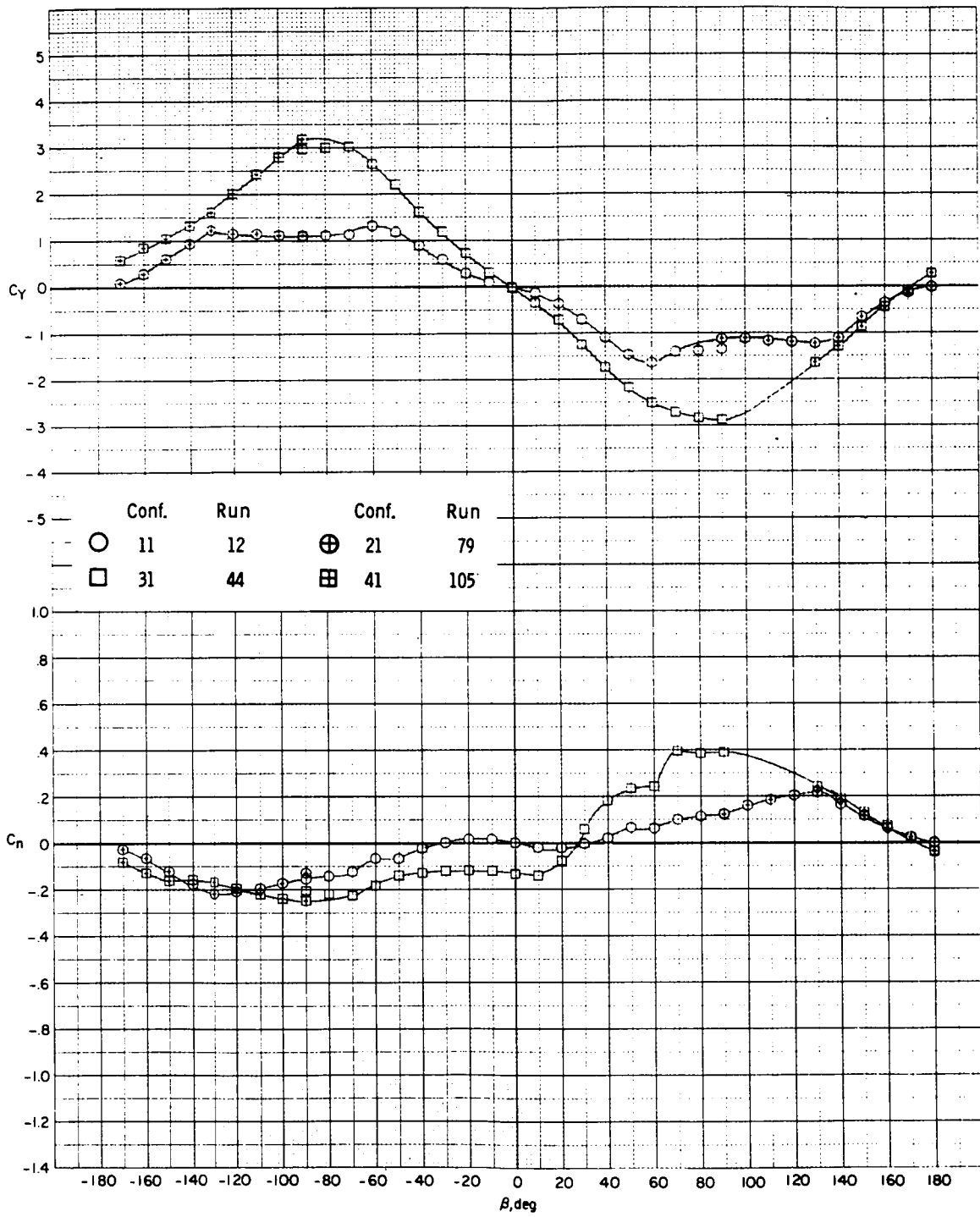
(b) Windspeed, 20 knots.

Figure 12.- Continued.
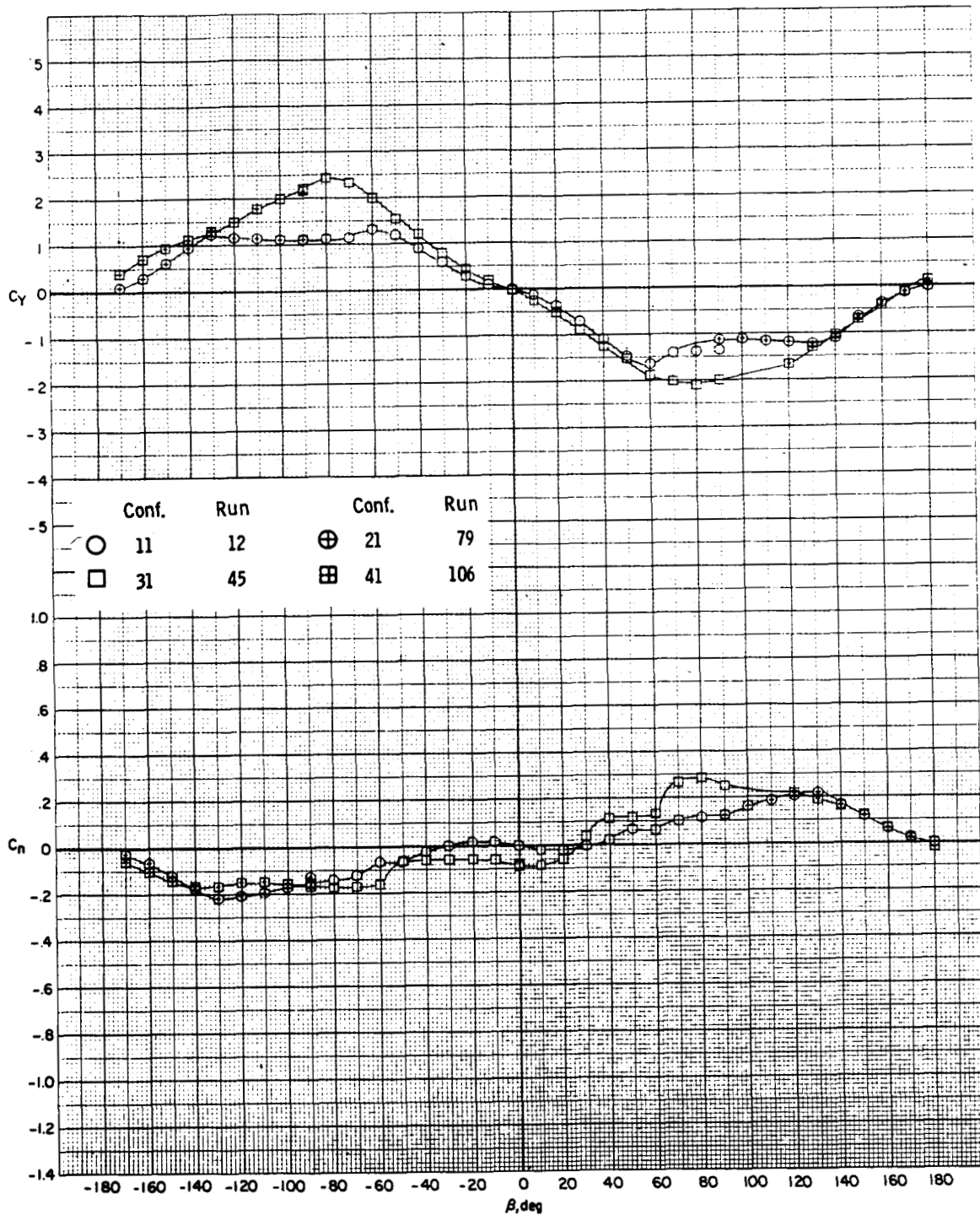
(c) Windspeed, 25 knots.

Figure 12.- Continued.

Legend:

	Conf.	Run		Conf.	Run
○	11	12	⊕	21	79
□	31	46	⊞	41	107
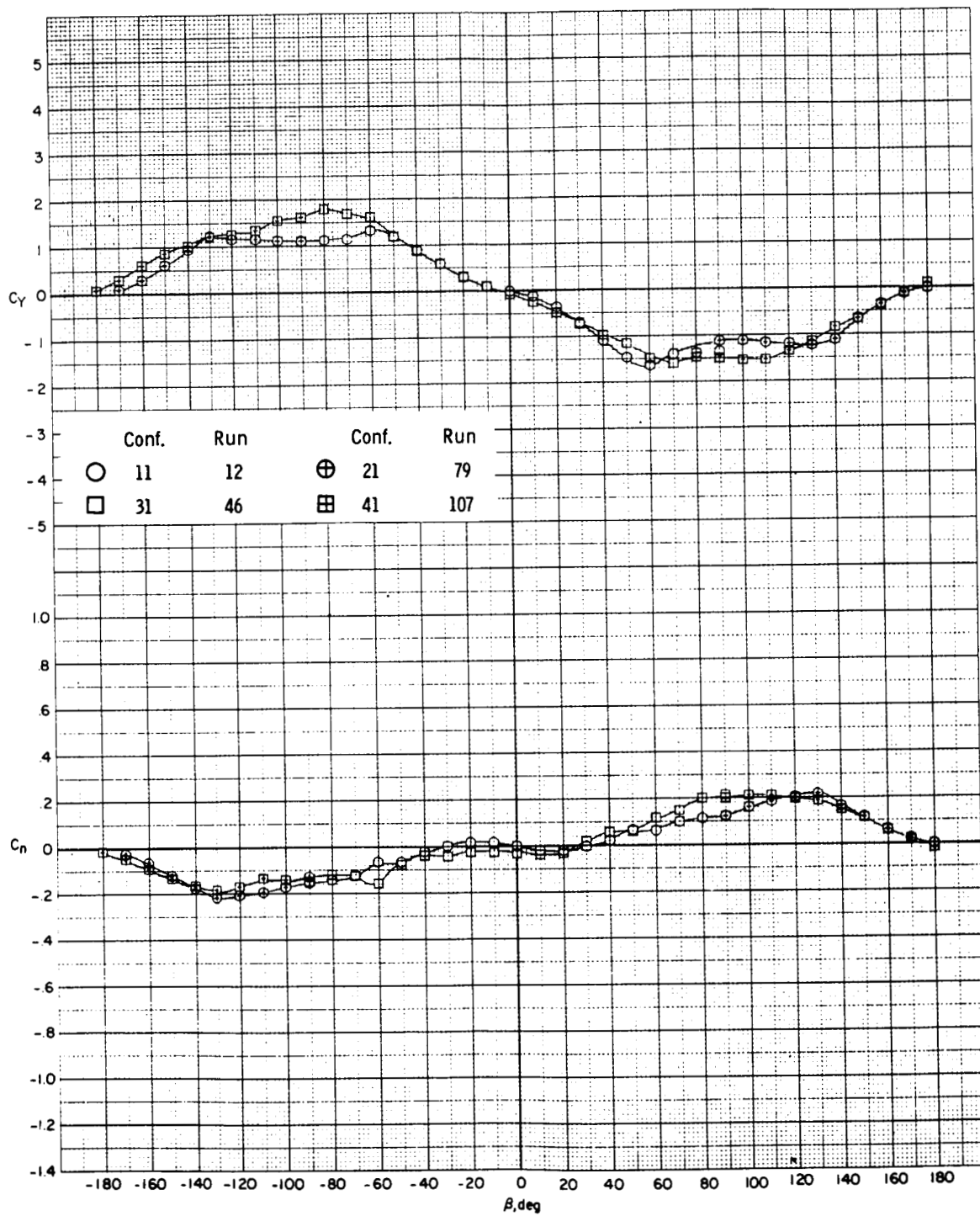
(d) Windspeed, 30 knots.

Figure 12.- Continued.
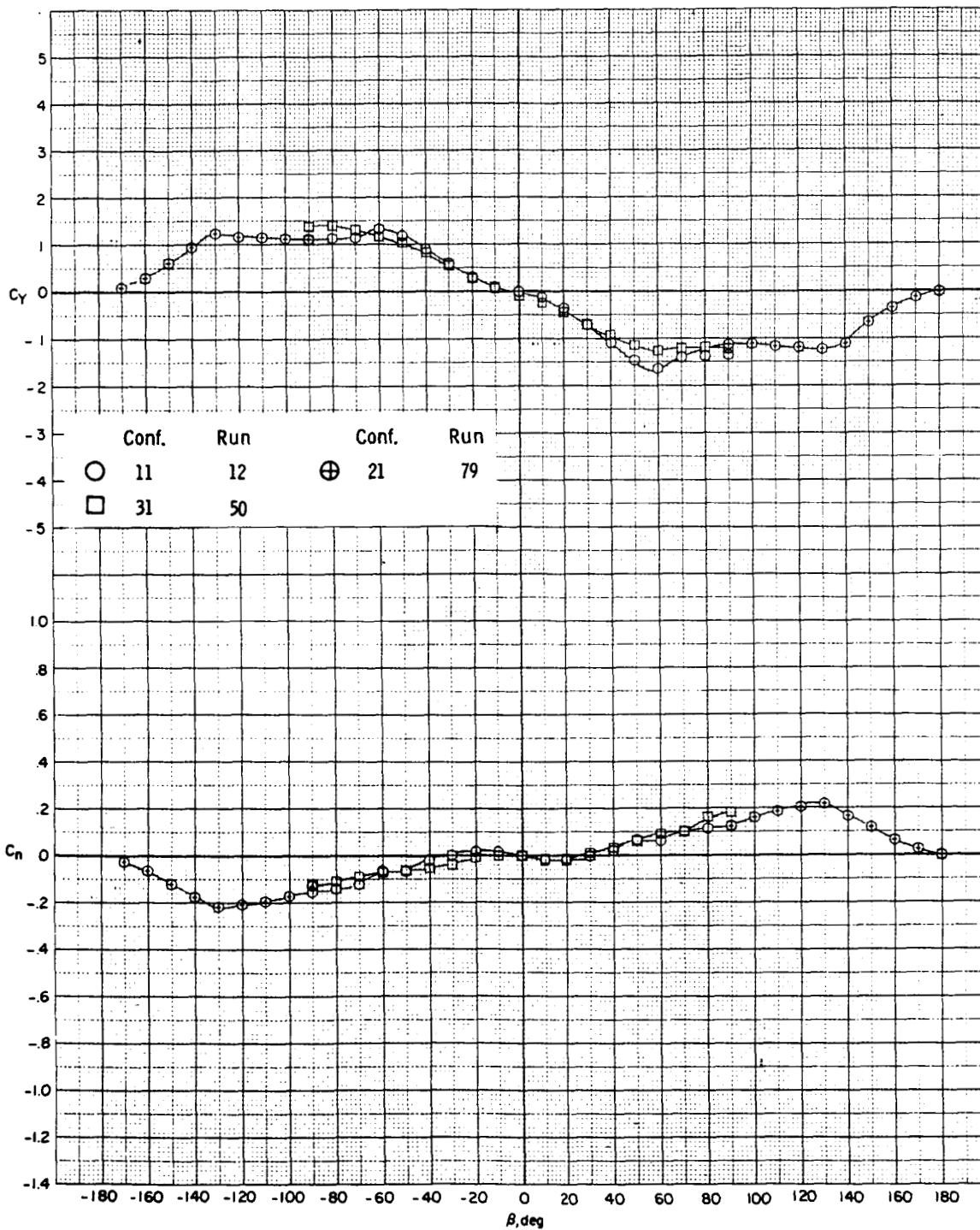
(e) Windspeed, 35 knots.

Figure 12.- Continued.

(f) Windspeed, 45 knots.

Figure 12.- Continued.

Conf.	V_K	Run		Conf.	V_K	Run
◯ 31	15	43	⊕ 41	15	104
◻ 31	20	44	⊞ 41	20	105
◇ 31	25	45	◈ 41	25	106
△ 31	30	46	▲ 41	30	107
◹ 31	35	50			
◿ 31	45	51	⊿ 41	45	111
◖ 11	–	12	⊕ 21	–	79

β, deg
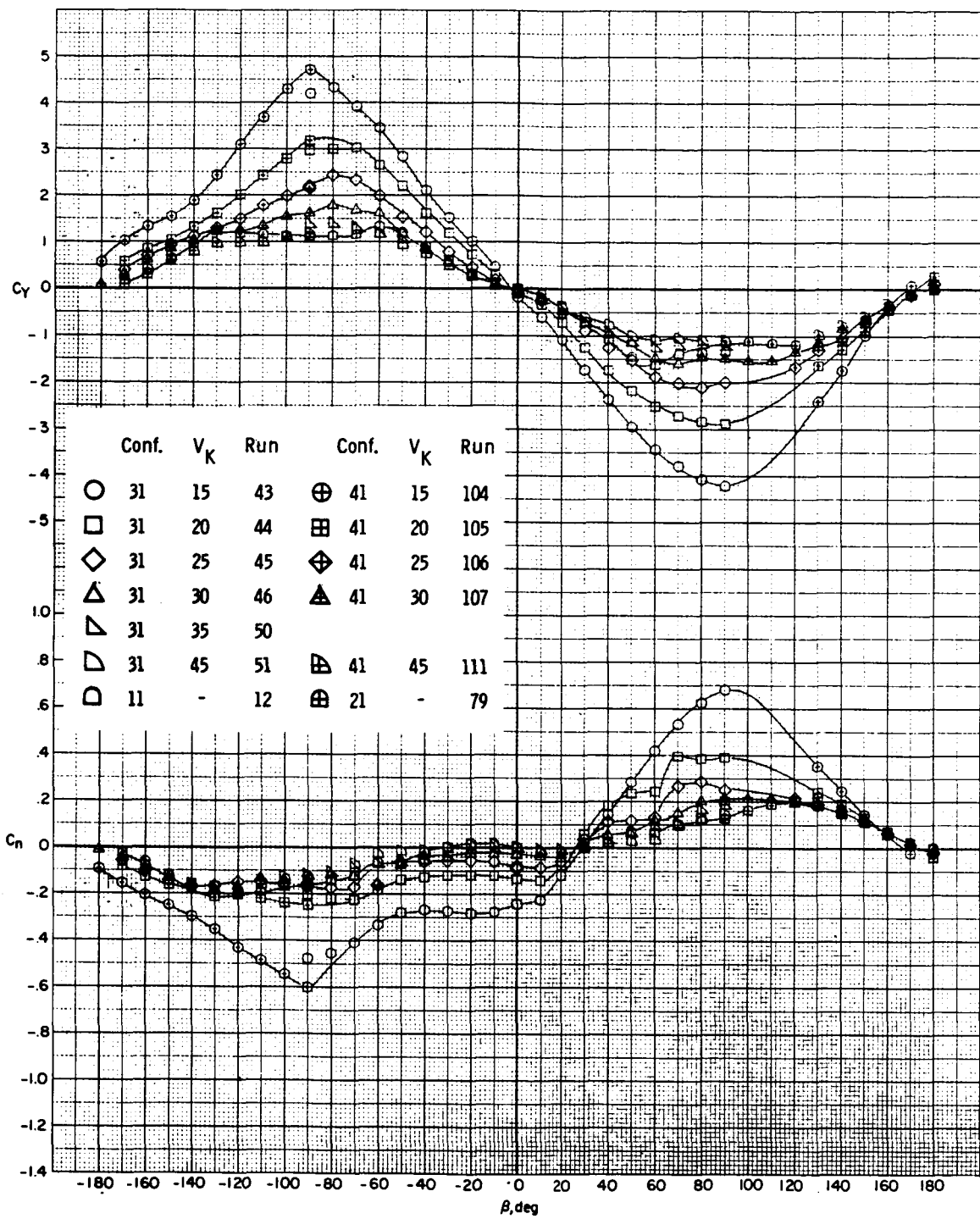
(g) Windspeed, 15 to 45 knots.

Figure 12.- Concluded.
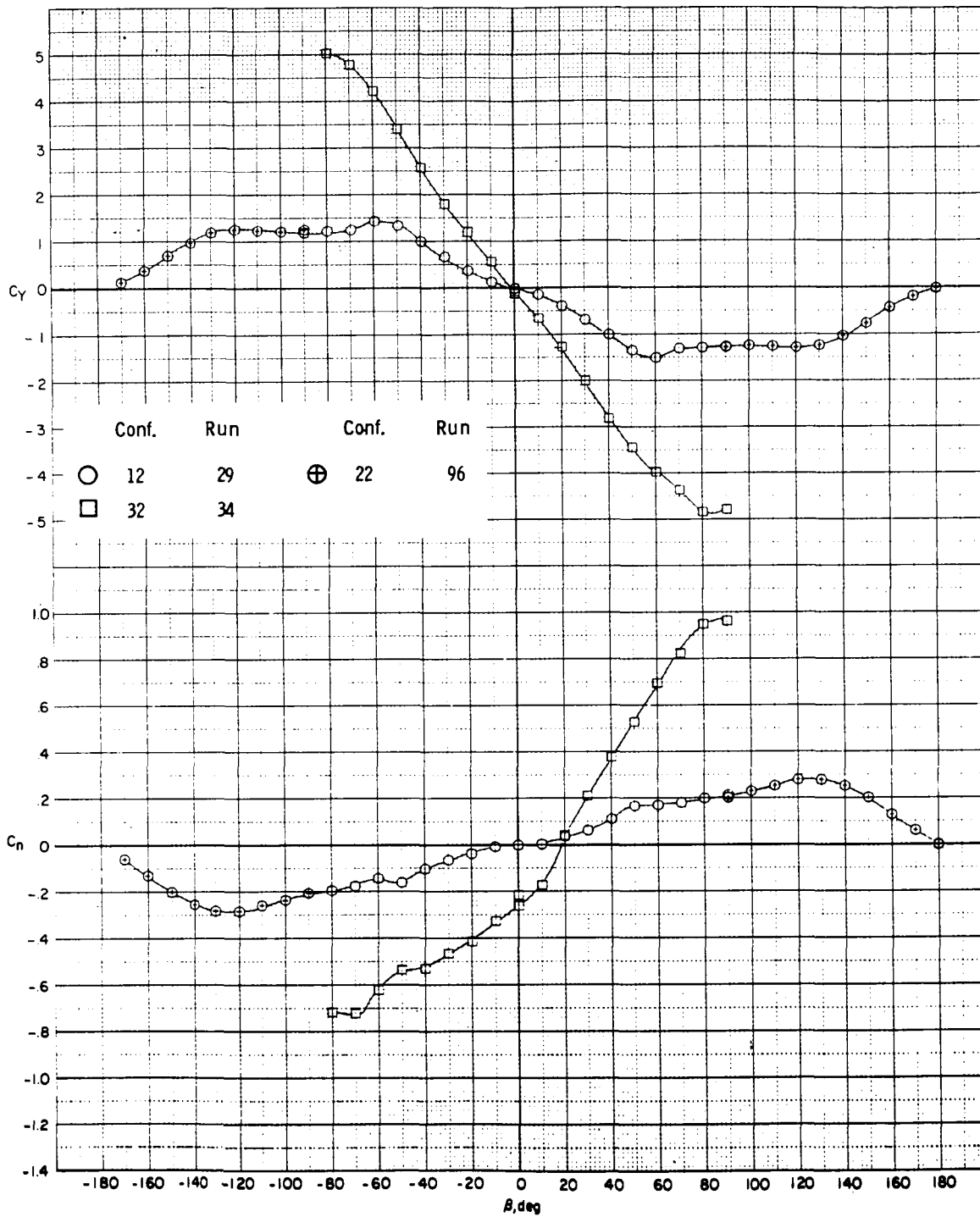
(a) Windspeed, 15 knots.

Figure 13.- Effect of rotor wake on directional characteristics of model 1 with
standard vertical tail (configuration 12).
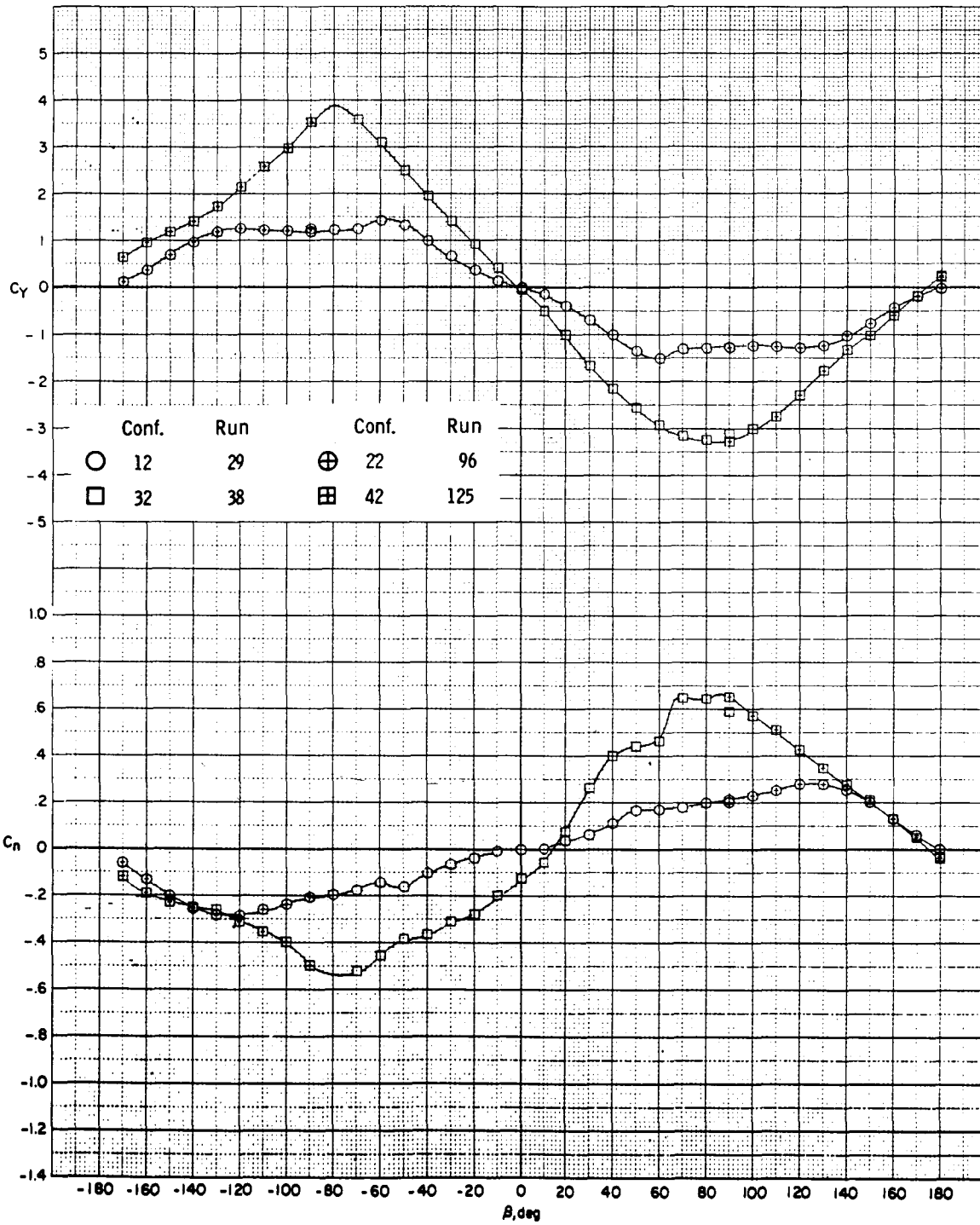
(b) Windspeed, 20 knots.

Figure 13.- Continued.
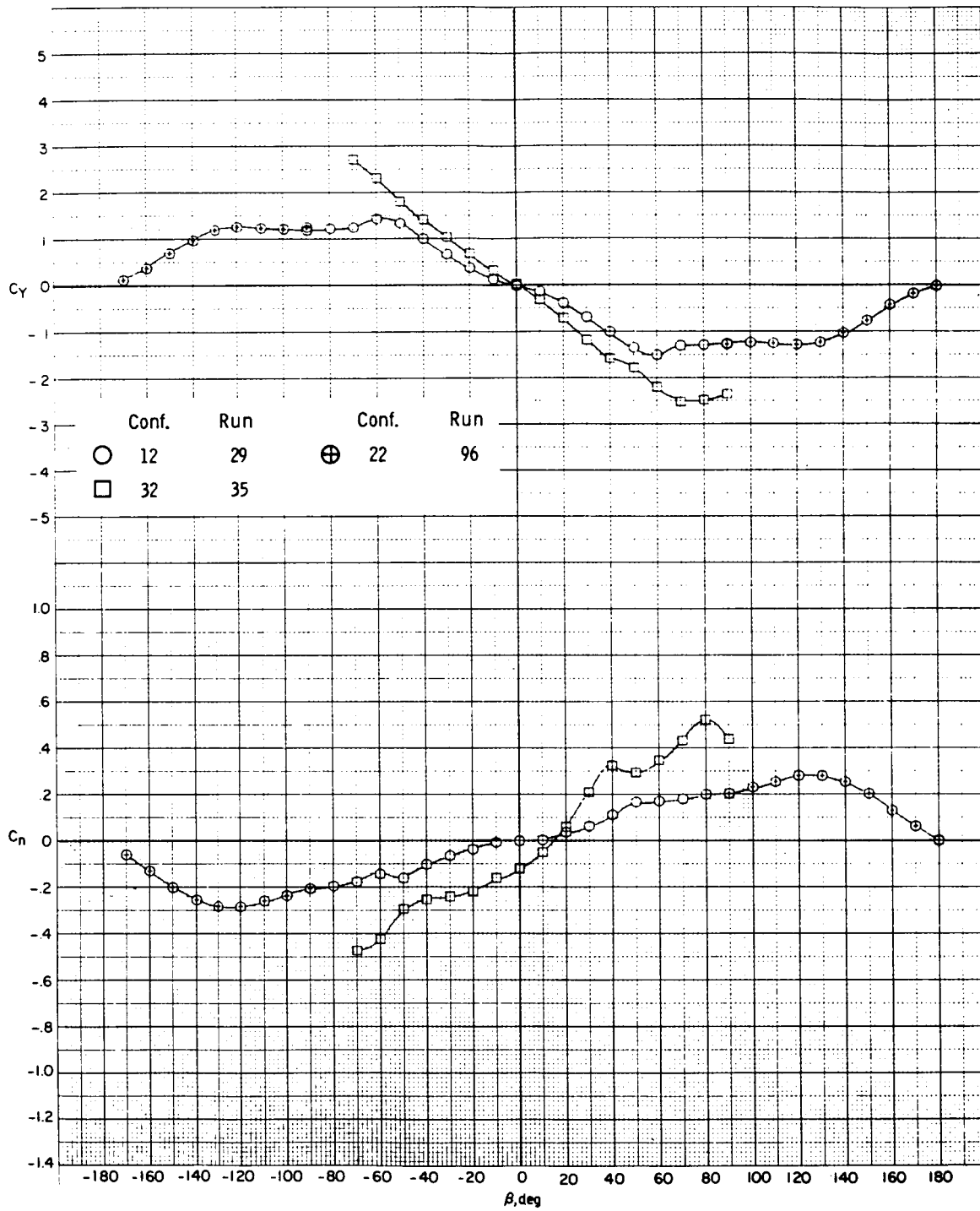
(c) Windspeed, 25 knots.

Figure 13.- Continued.
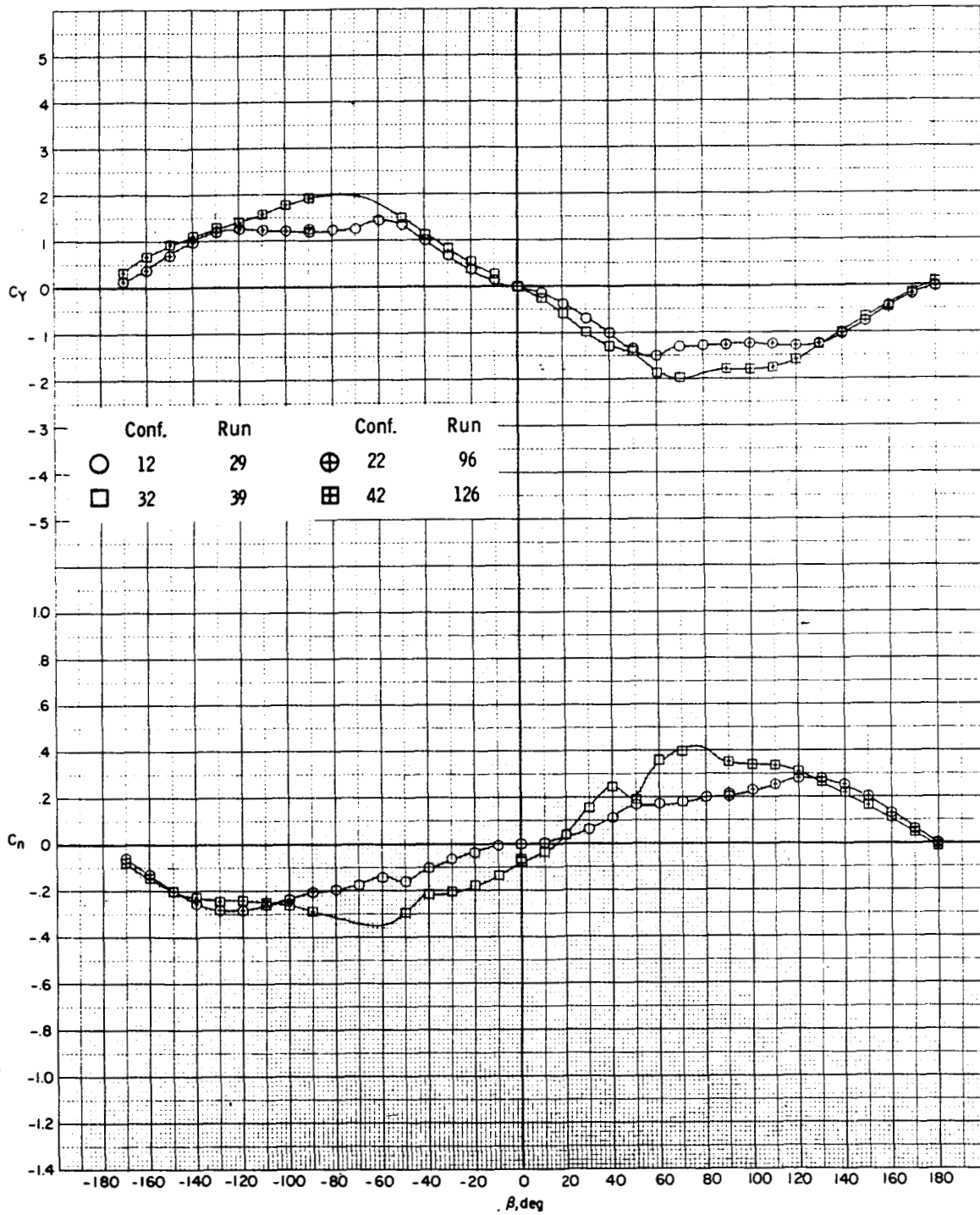
(d) Windspeed, 30 knots.

Figure 13.- Continued.
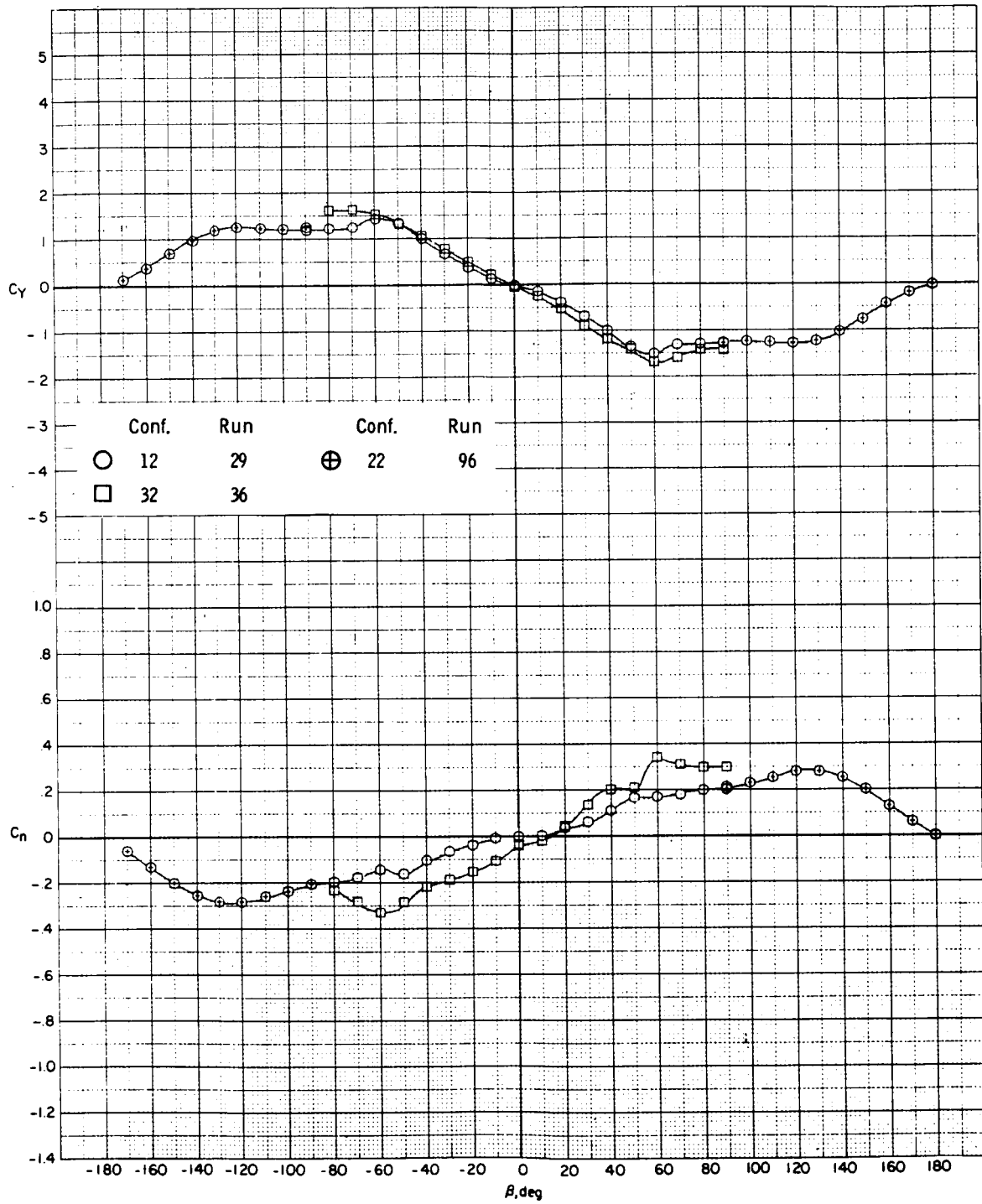
(e) Windspeed, 35 knots.

Figure 13.- Continued.
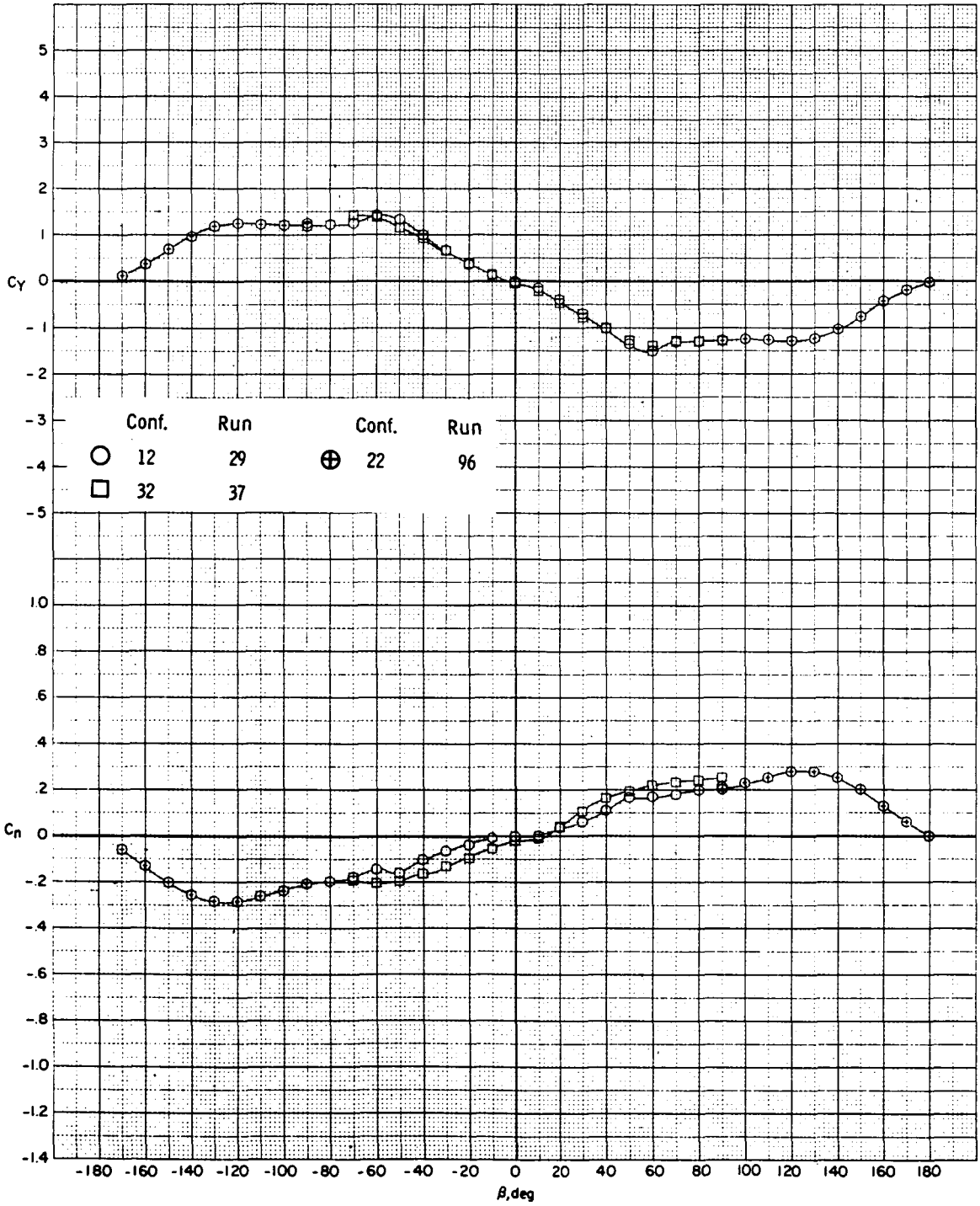
(f) Windspeed, 45 knots.

Figure 13.- Continued.
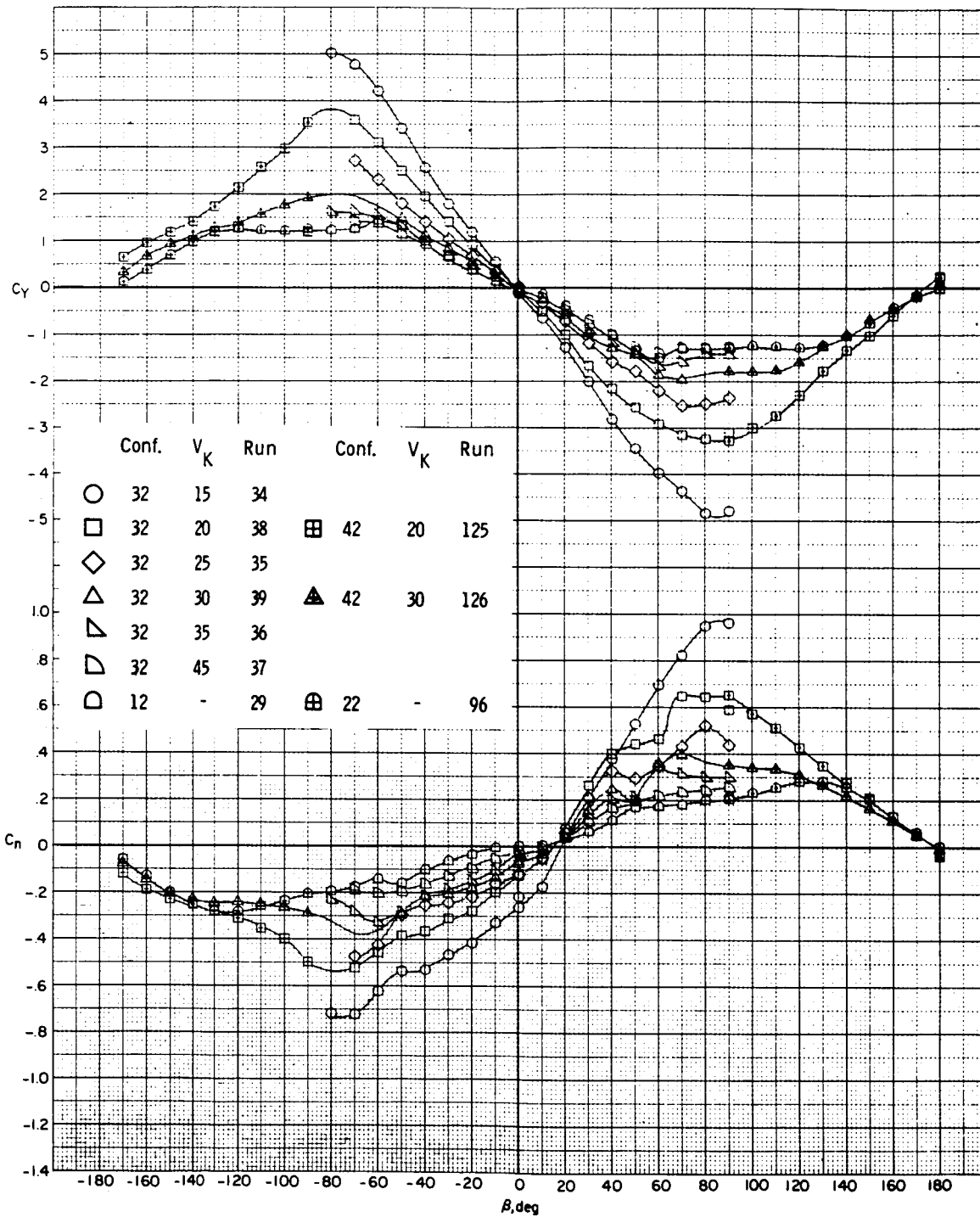
(g) Windspeed, 15 to 45 knots.

Figure 13.- Concluded.
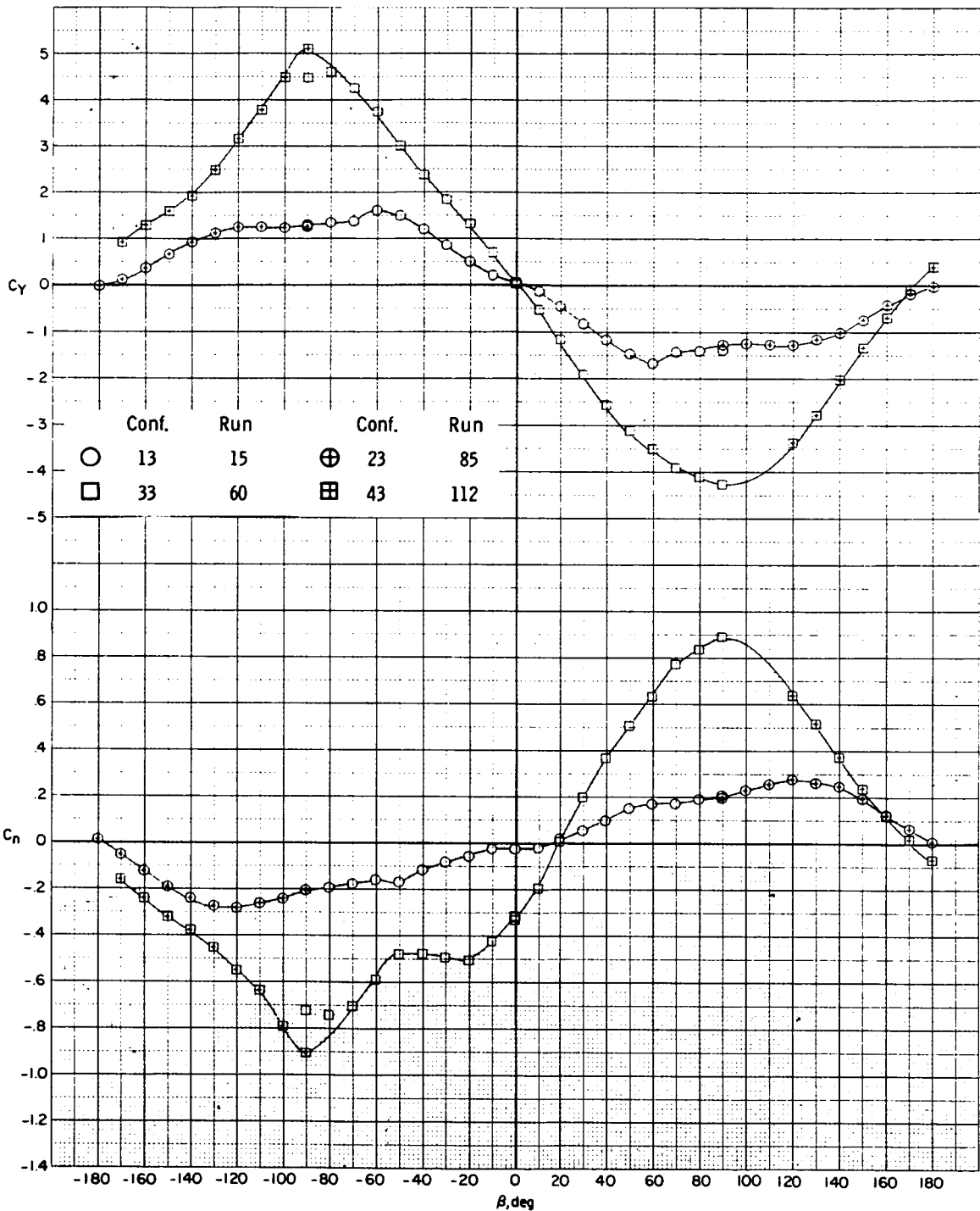
(a) Windspeed, 15 knots.

Figure 14.- Effect of rotor wake on directional characteristics of model 1 with cambered vertical tail (configuration 13).

Legend:

	Conf.	Run		Conf.	Run
○	13	15	⊕	23	85
□	33	61	⊞	43	113
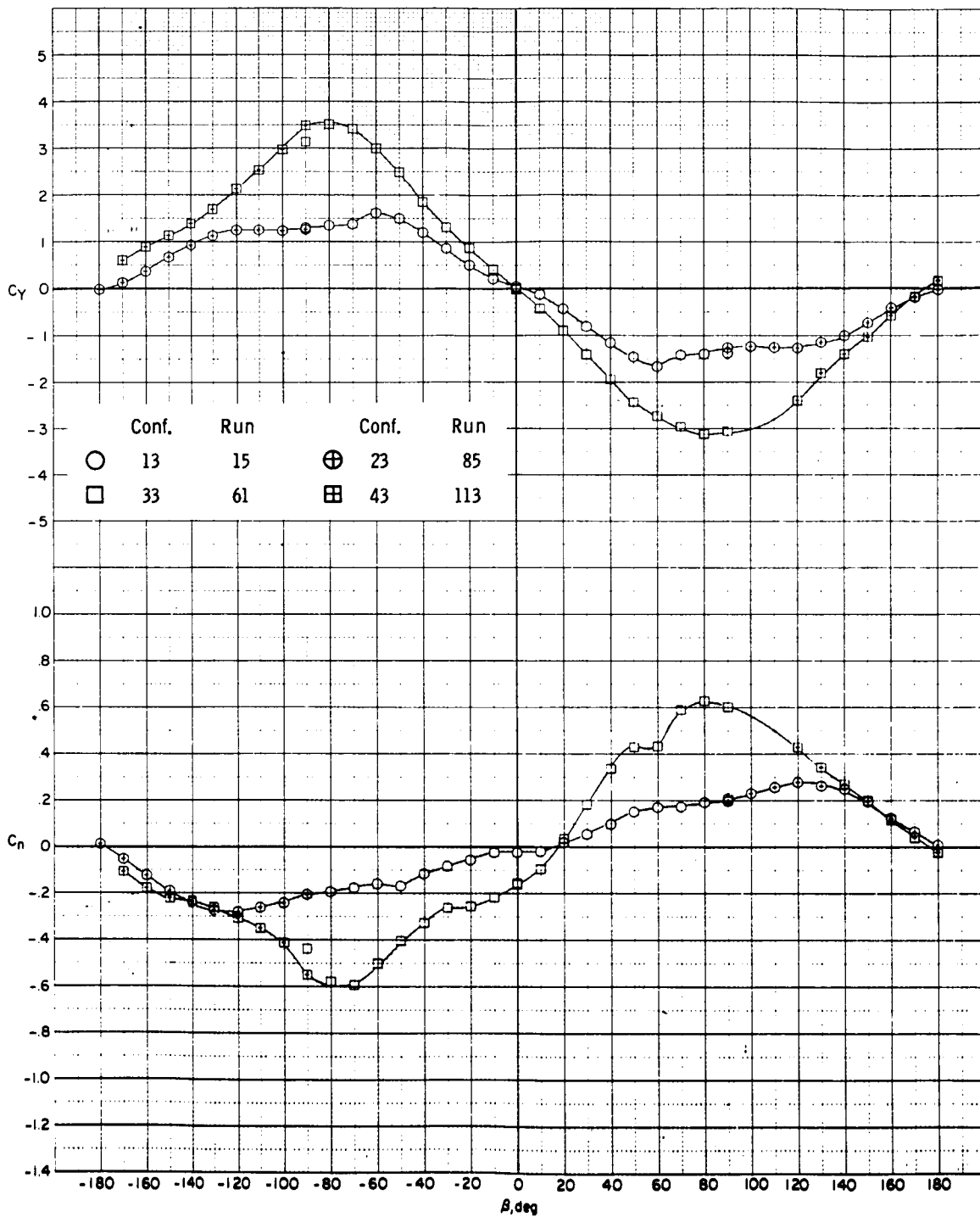
(b) Windspeed, 20 knots.

Figure 14.- Continued.
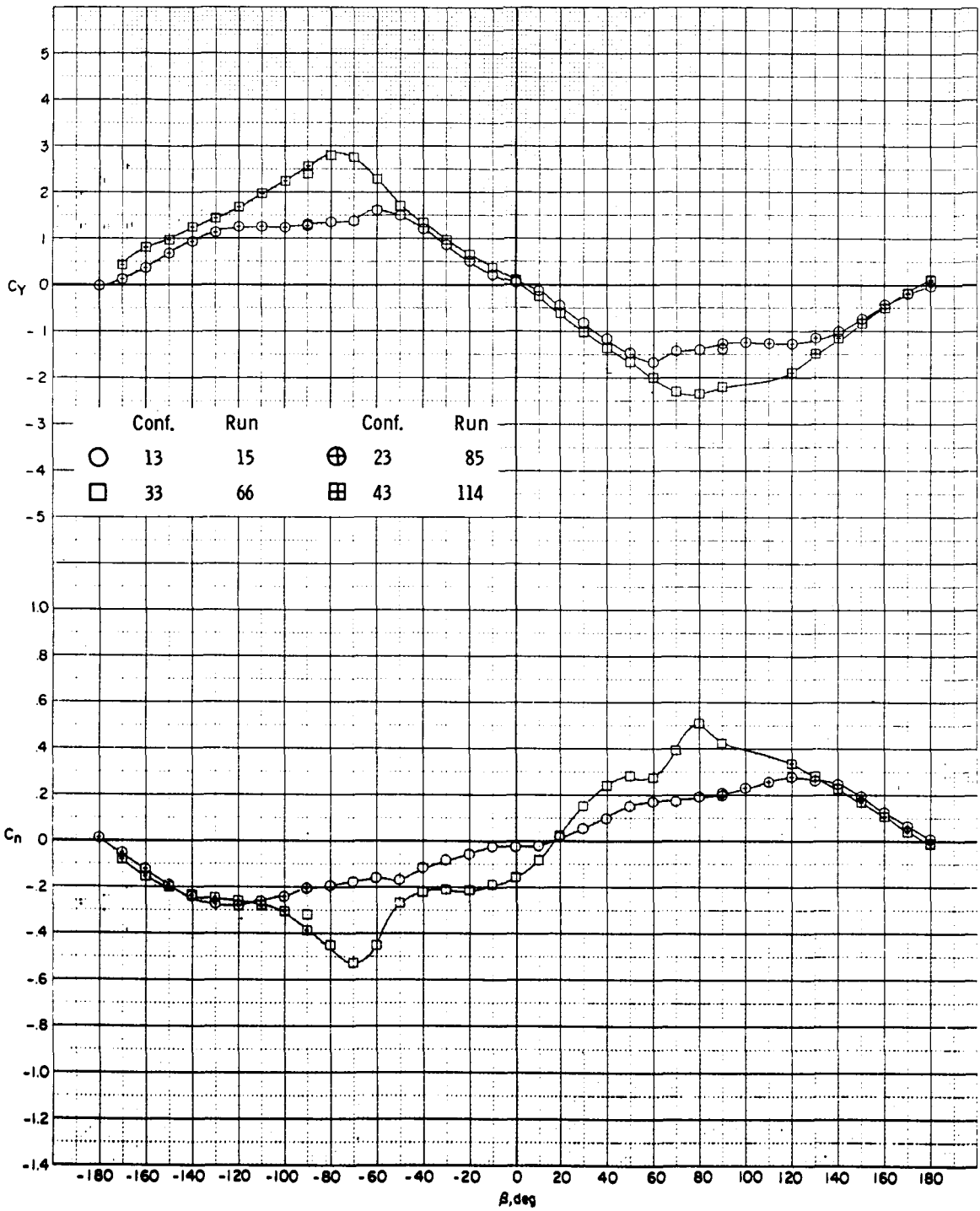
(c) Windspeed, 25 knots.

Figure 14.- Continued.
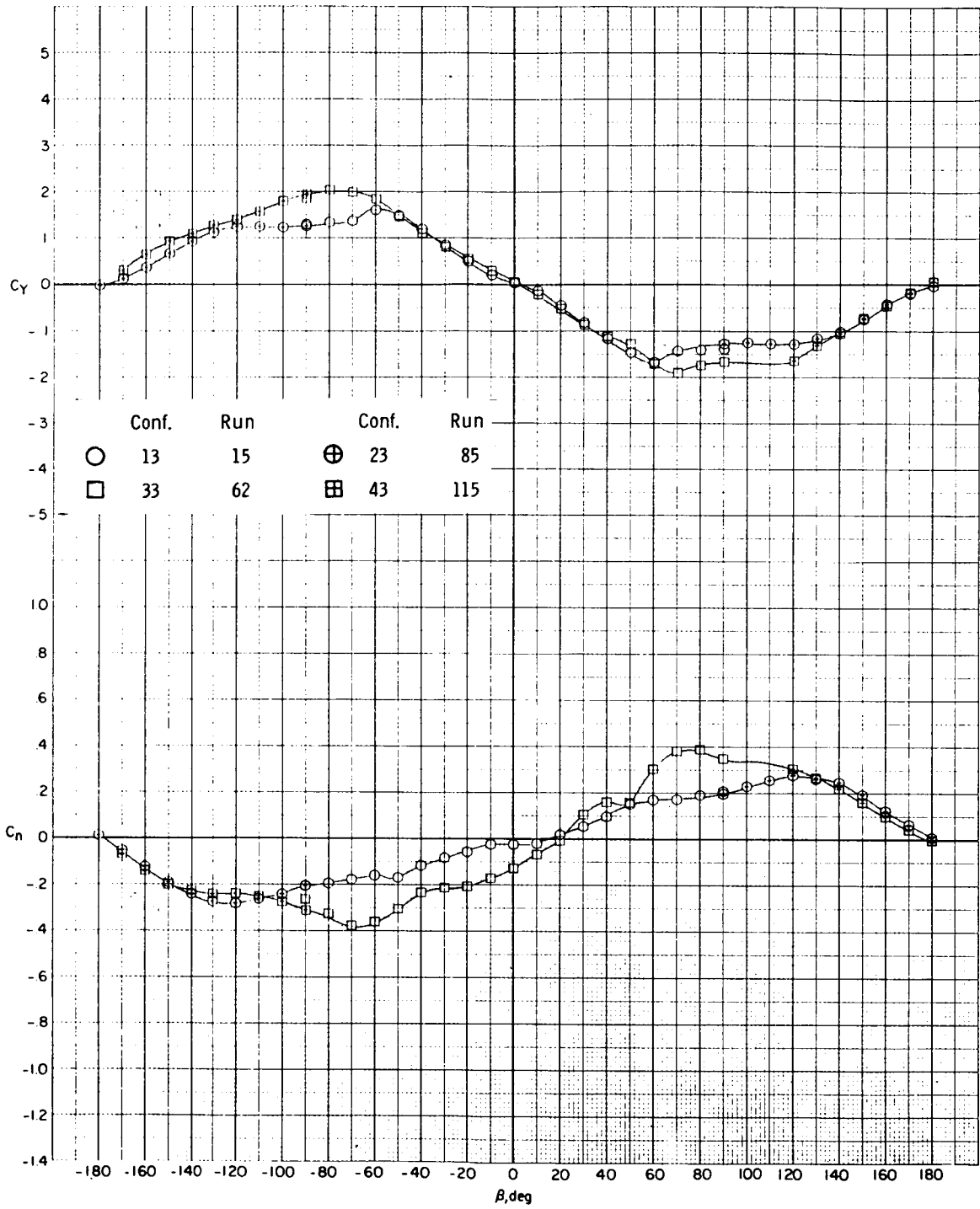
(d) Windspeed, 30 knots.

Figure 14.- Continued.

Conf.	Run	Conf.	Run
◯ 13	15	⊕ 23	85
□ 33	67	⊞ 43	116
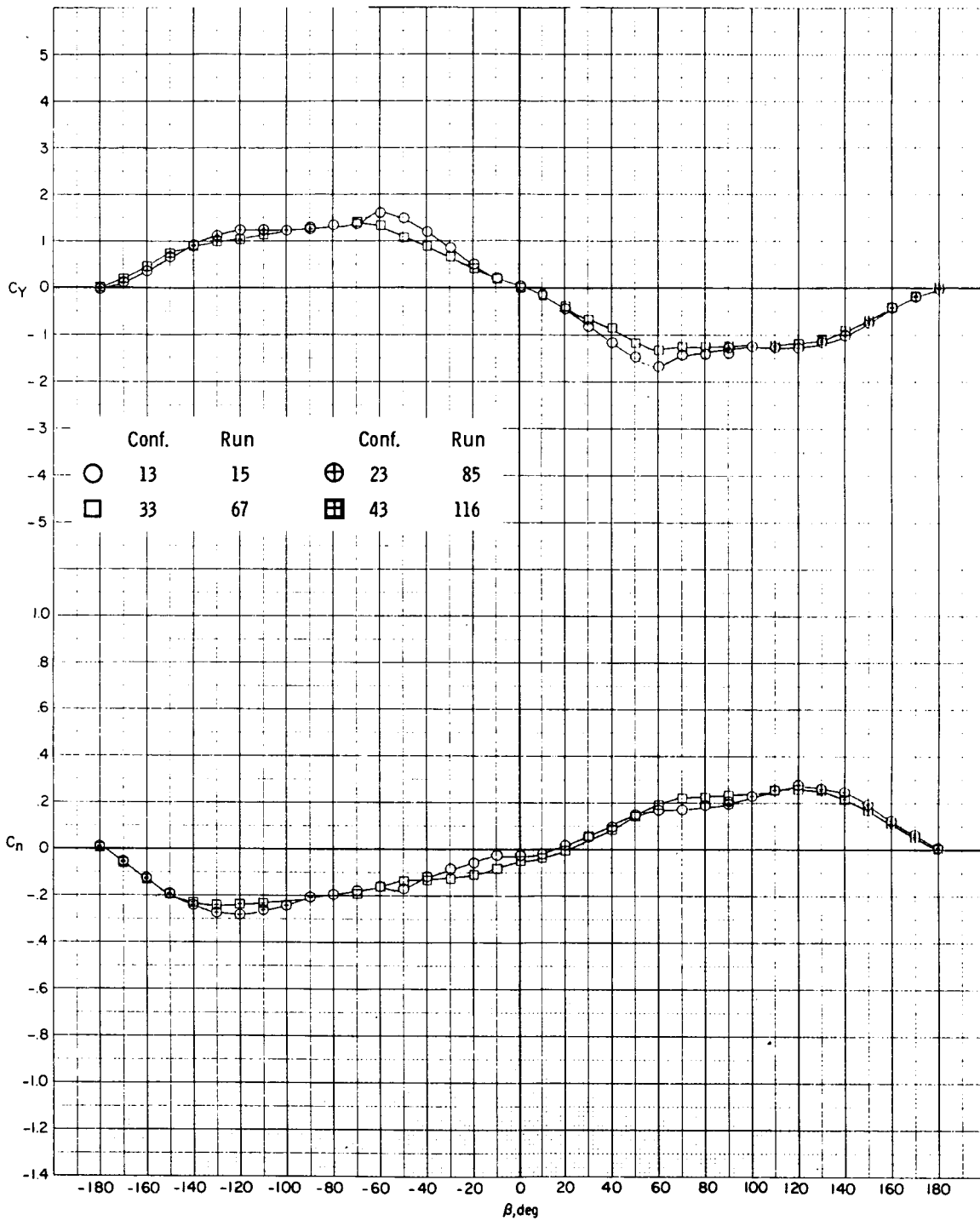
(e) Windspeed, 45 knots.

Figure 14.- Continued.
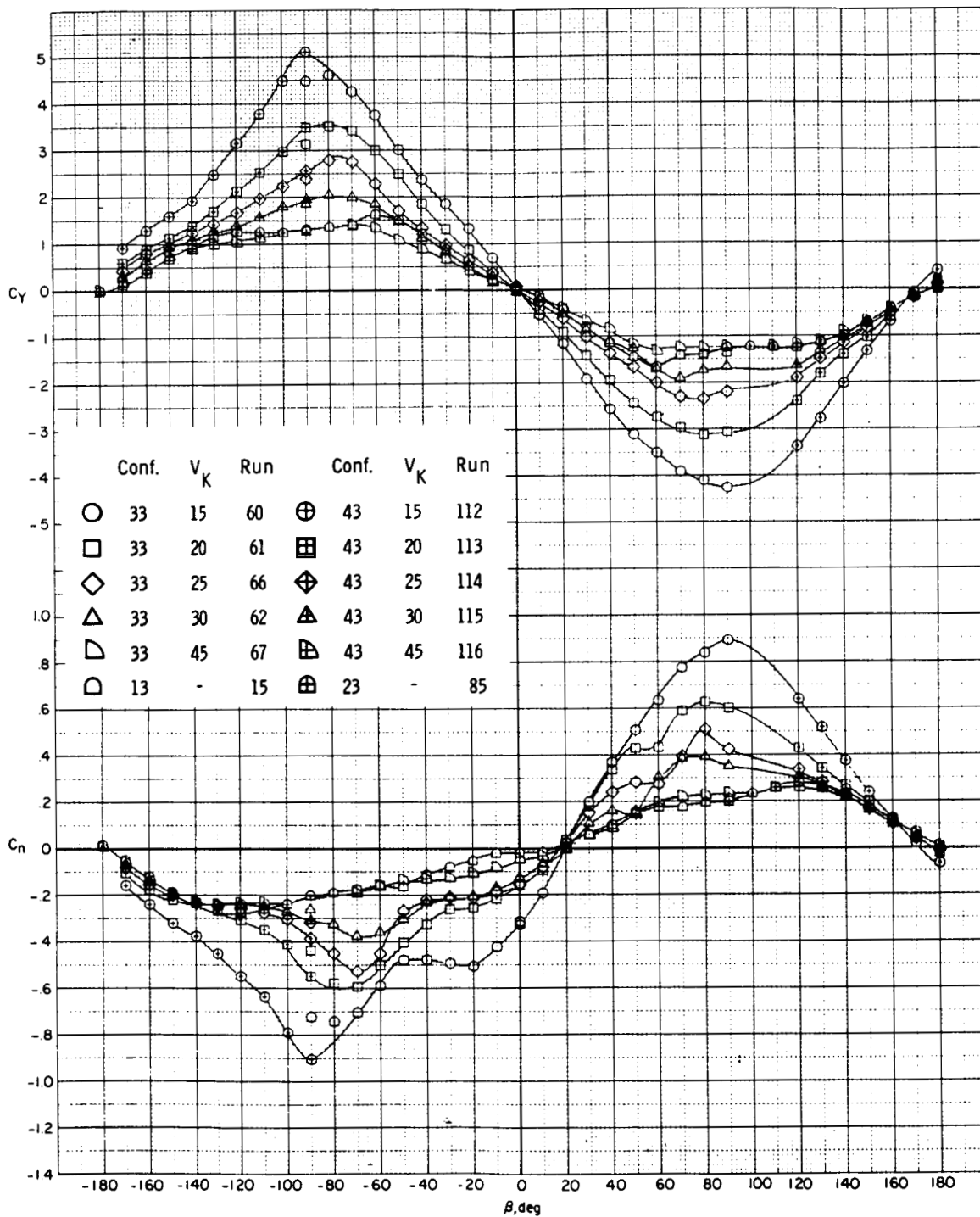
(f) Windspeed, 15 to 45 knots.

Figure 14.- Concluded.
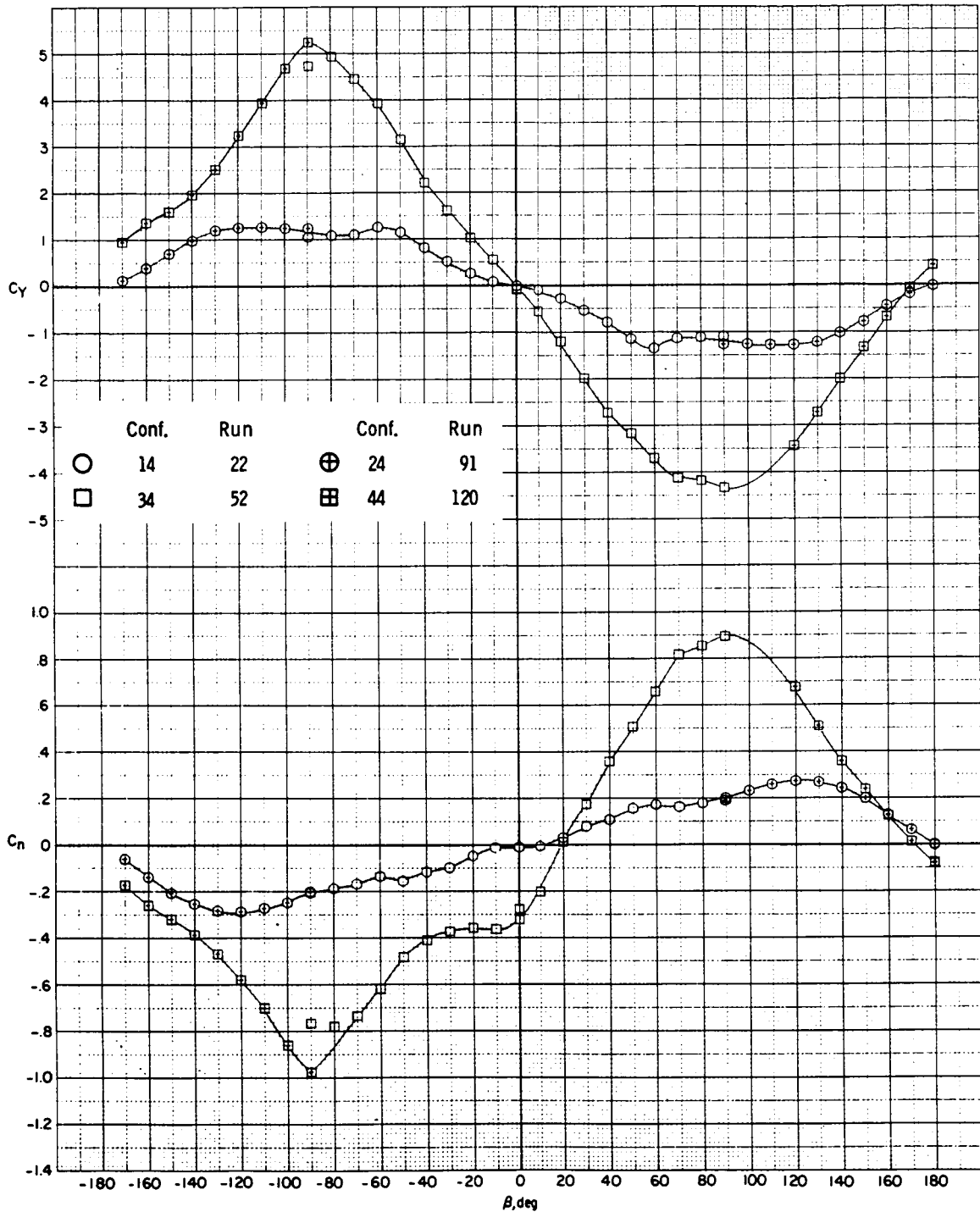
(a) Windspeed, 15 knots.

Figure 15.- Effect of rotor wake on directional characteristics of model 1 with V vertical tail (configuration 14).

	Conf.	Run		Conf.	Run
◯	14	22	⊕	24	91
☐	34	53	⊞	44	121
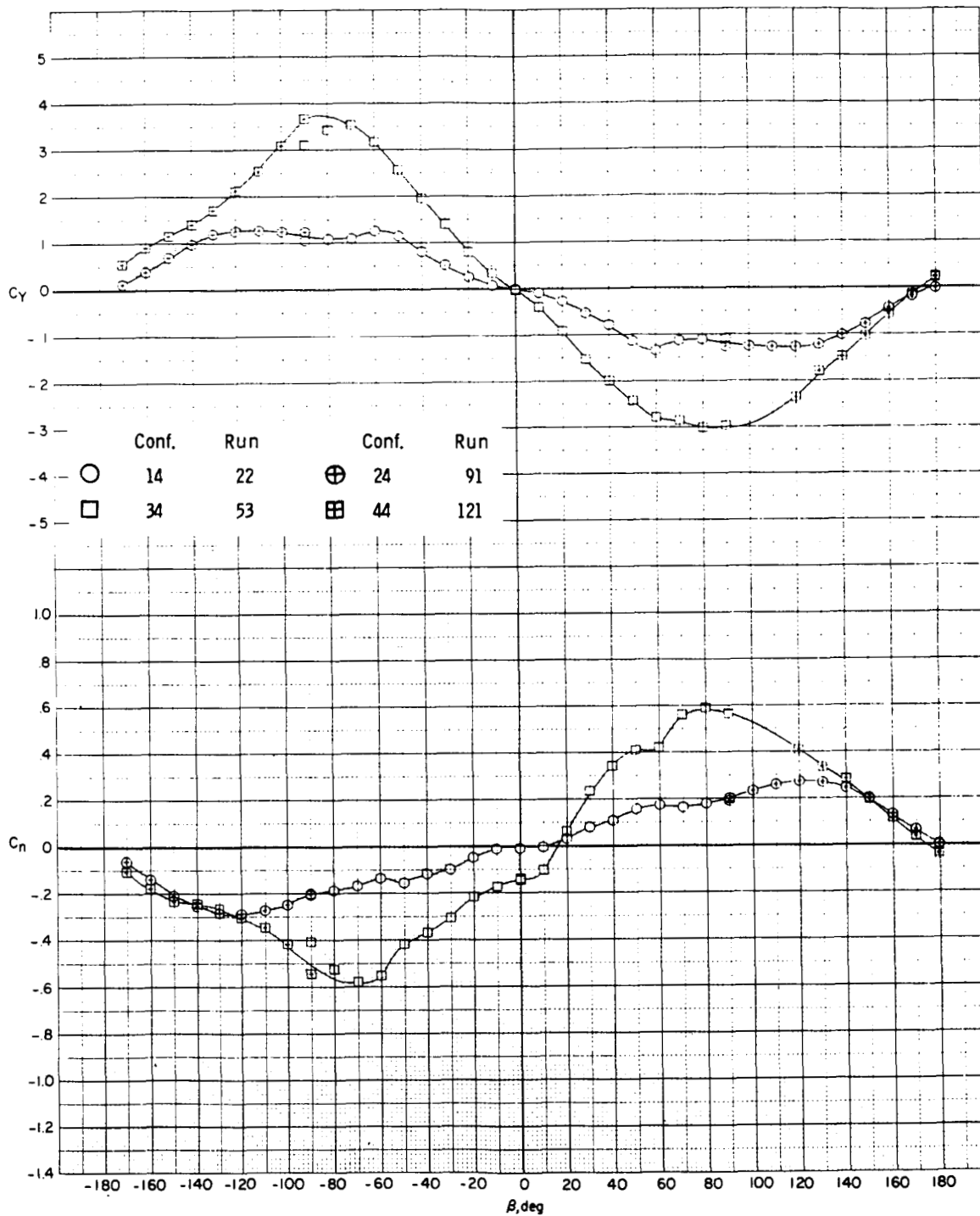
(b) Windspeed, 20 knots.

Figure 15.- Continued.

	Conf.	Run		Conf.	Run
○	14	22	⊕	24	91
□	34	54	⊞	44	122
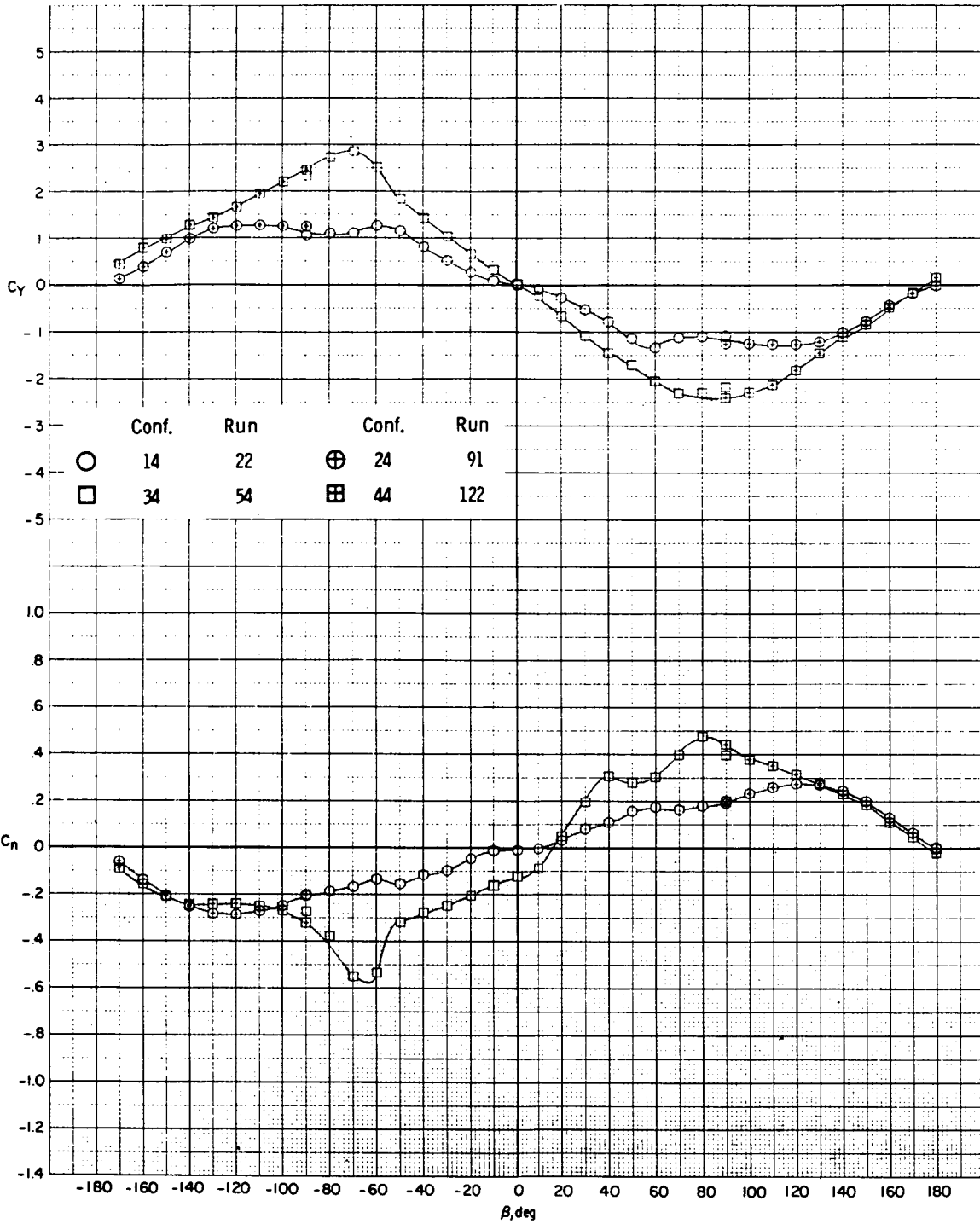
(c) Windspeed, 25 knots.

Figure 15.- Continued.

	Conf.	Run		Conf.	Run
○	14	22	⊕	24	91
□	34	55	⊞	44	123
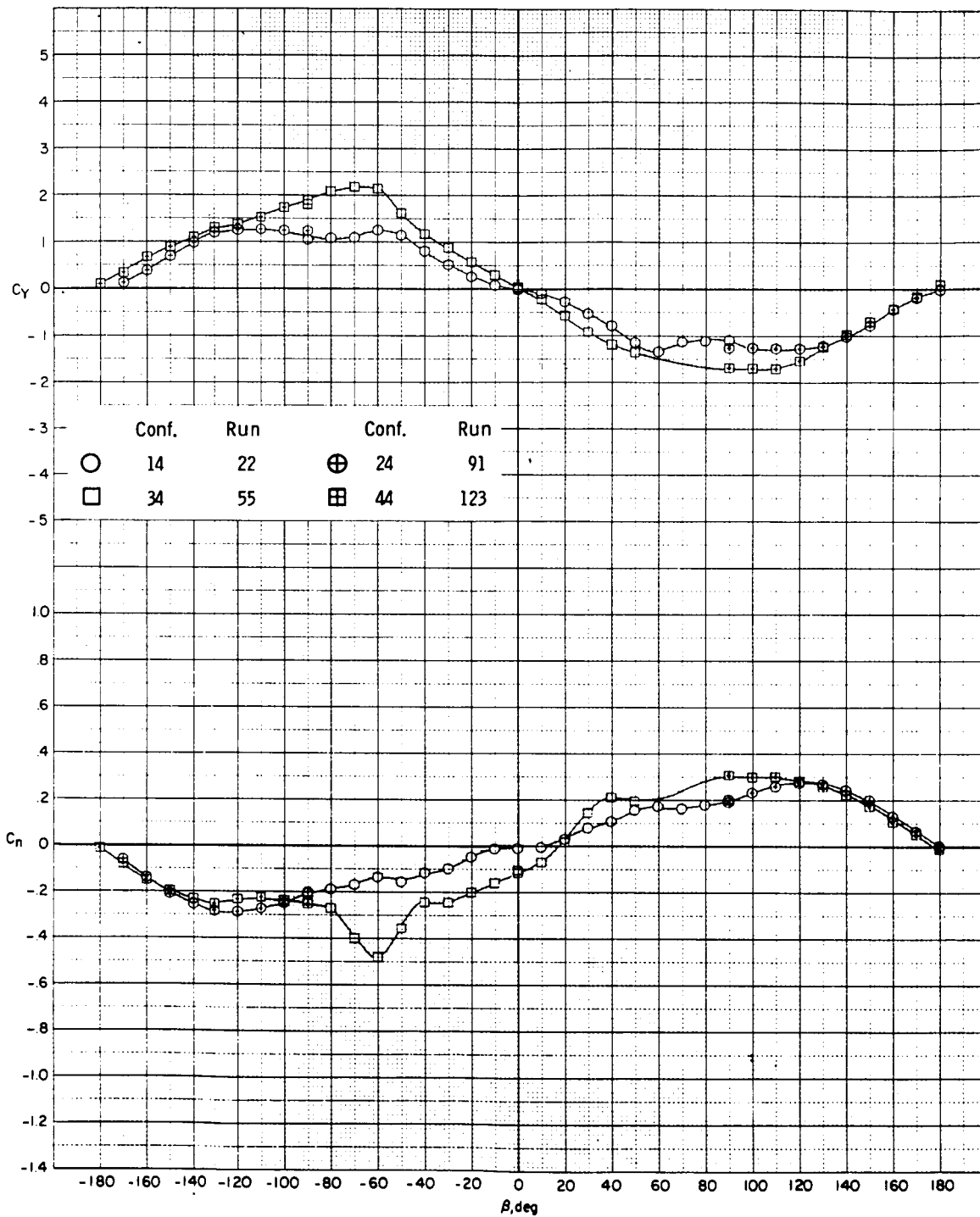
(d) Windspeed, 30 knots.

Figure 15.- Continued.
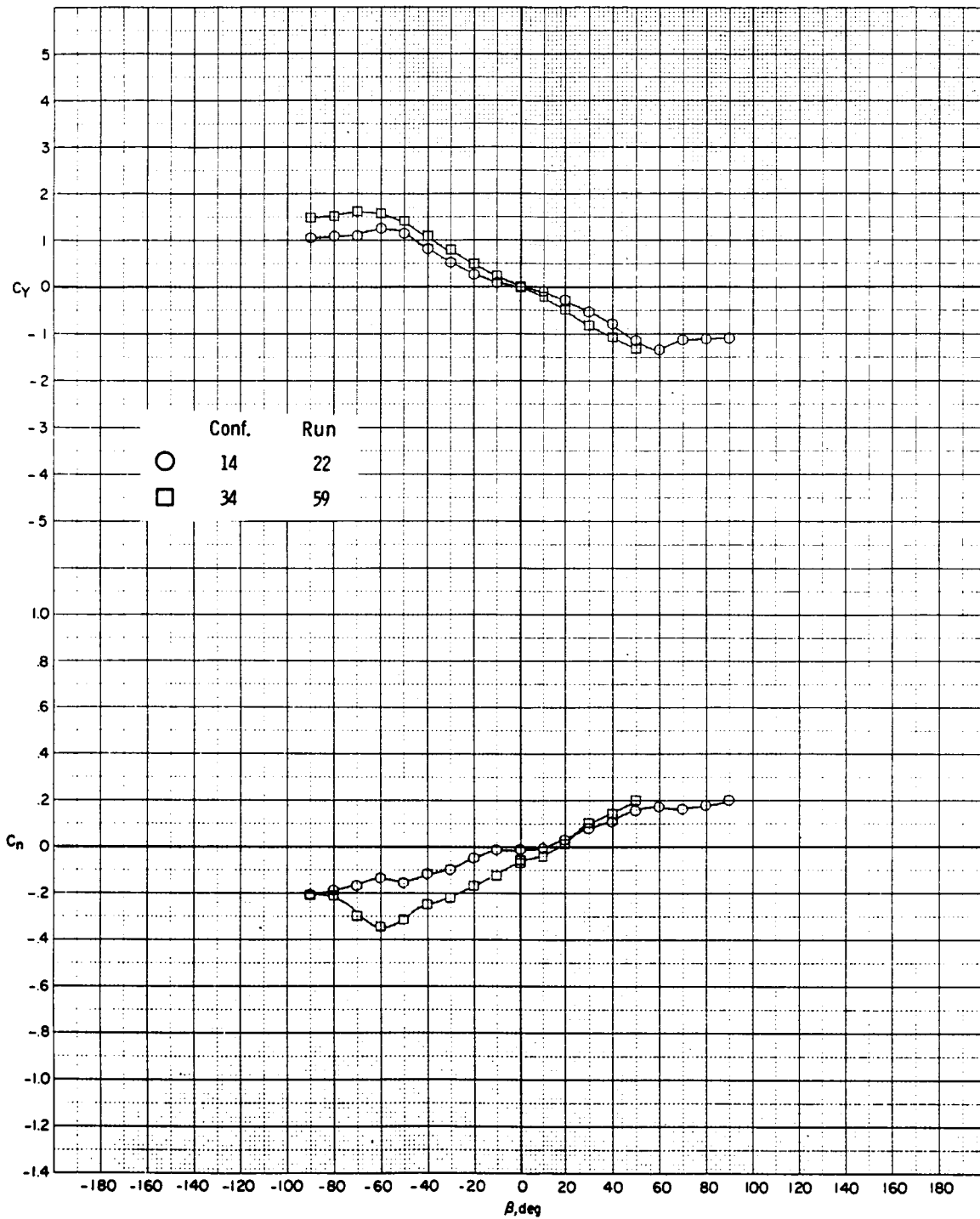
(e) Windspeed, 35 knots.

Figure 15.- Continued.
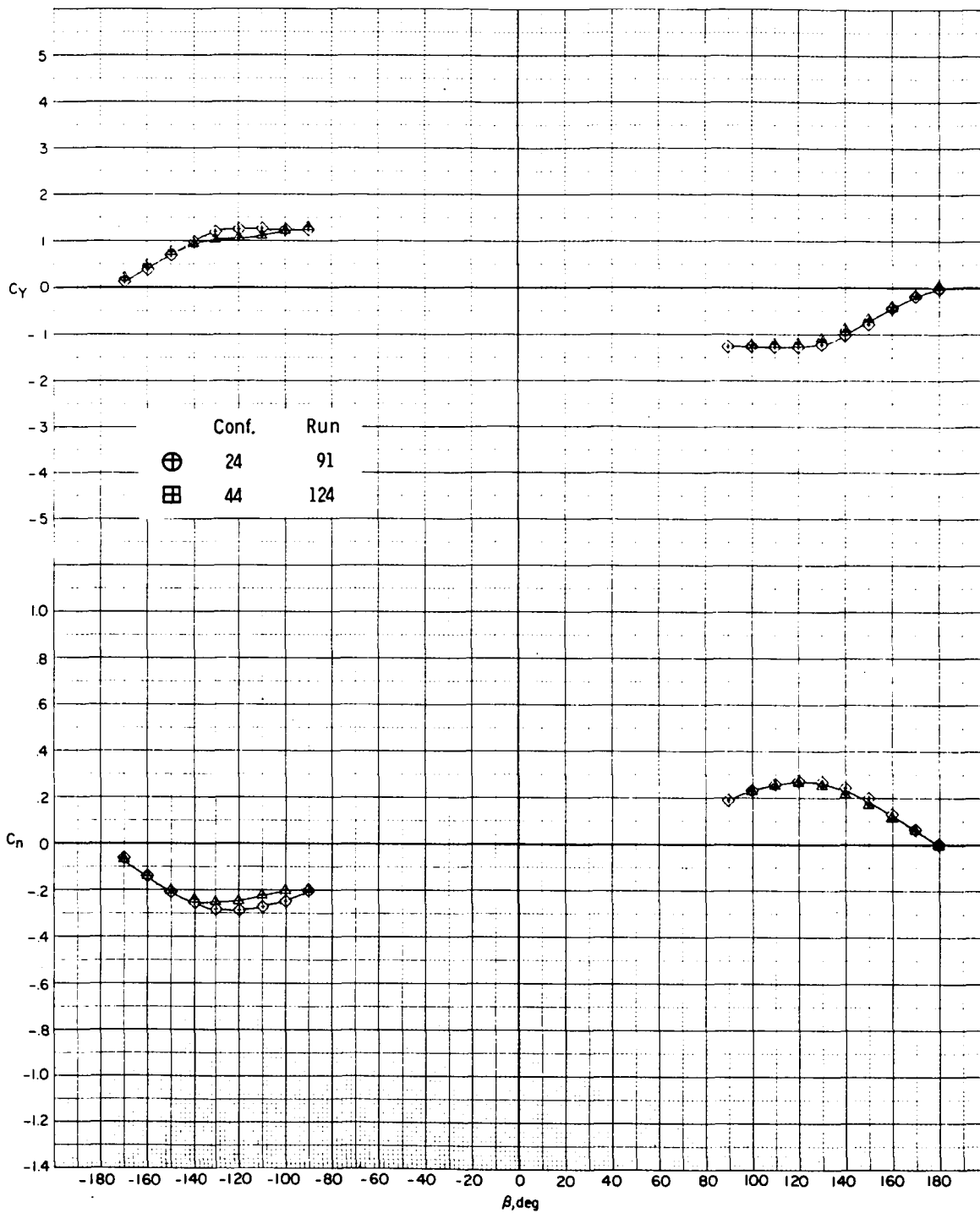
(f) Windspeed, 45 knots.

Figure 15.- Continued.
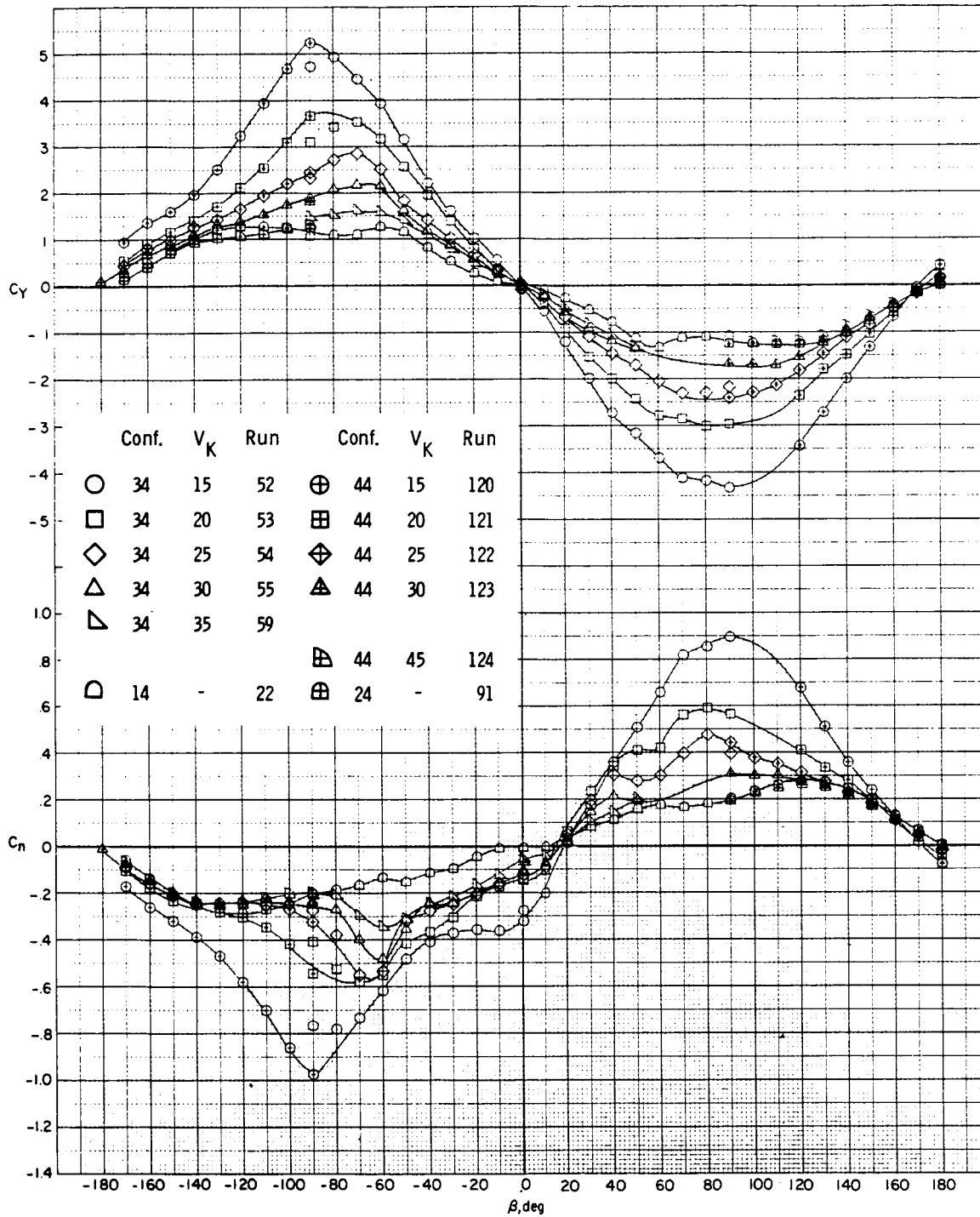
(g) Windspeed, 15 to 45 knots.

Figure 15.- Concluded.
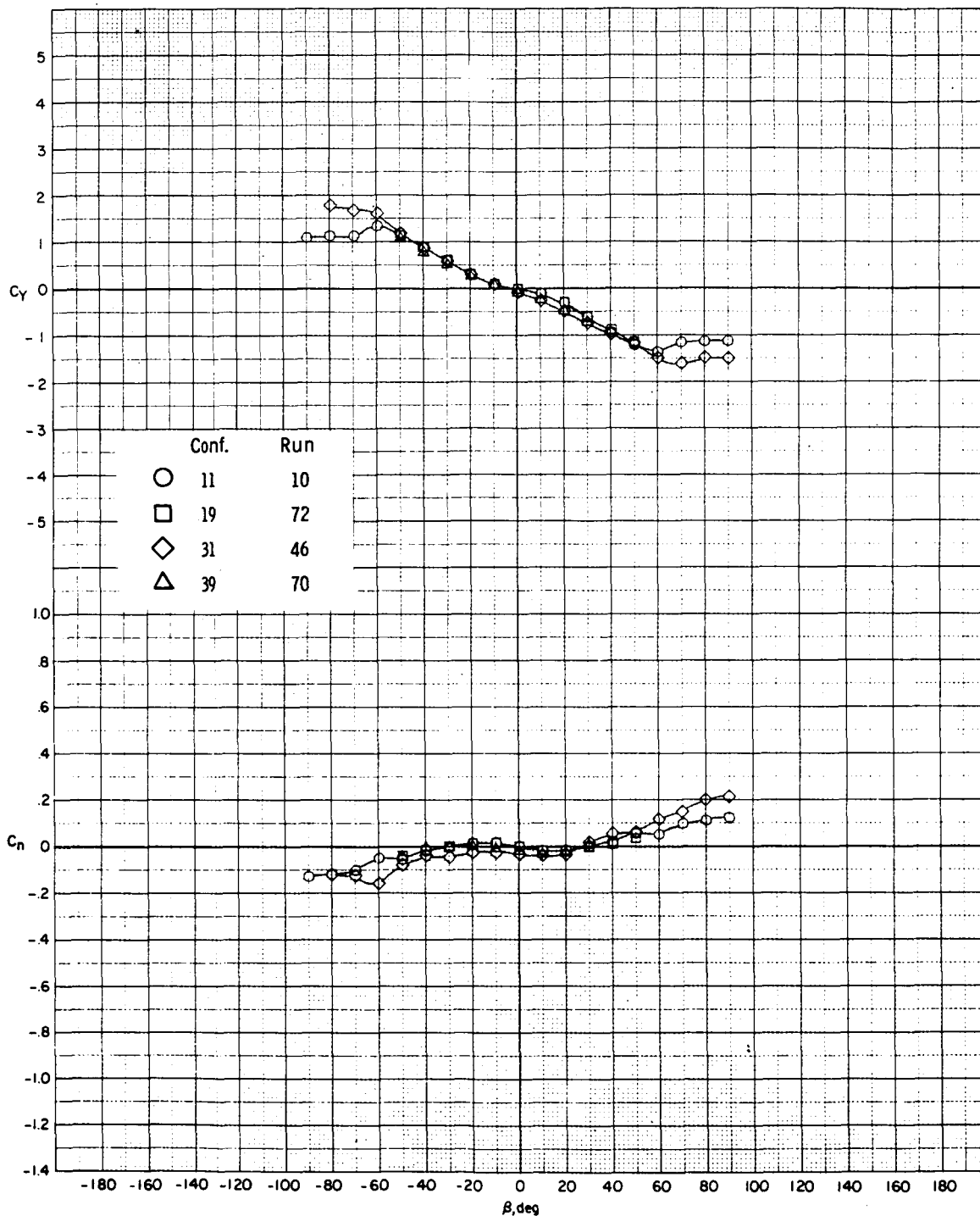
Figure 16.- Effect of rotor wake on directional characteristics of model 1 with
and without horizontal tail for windspeed of 30 knots.
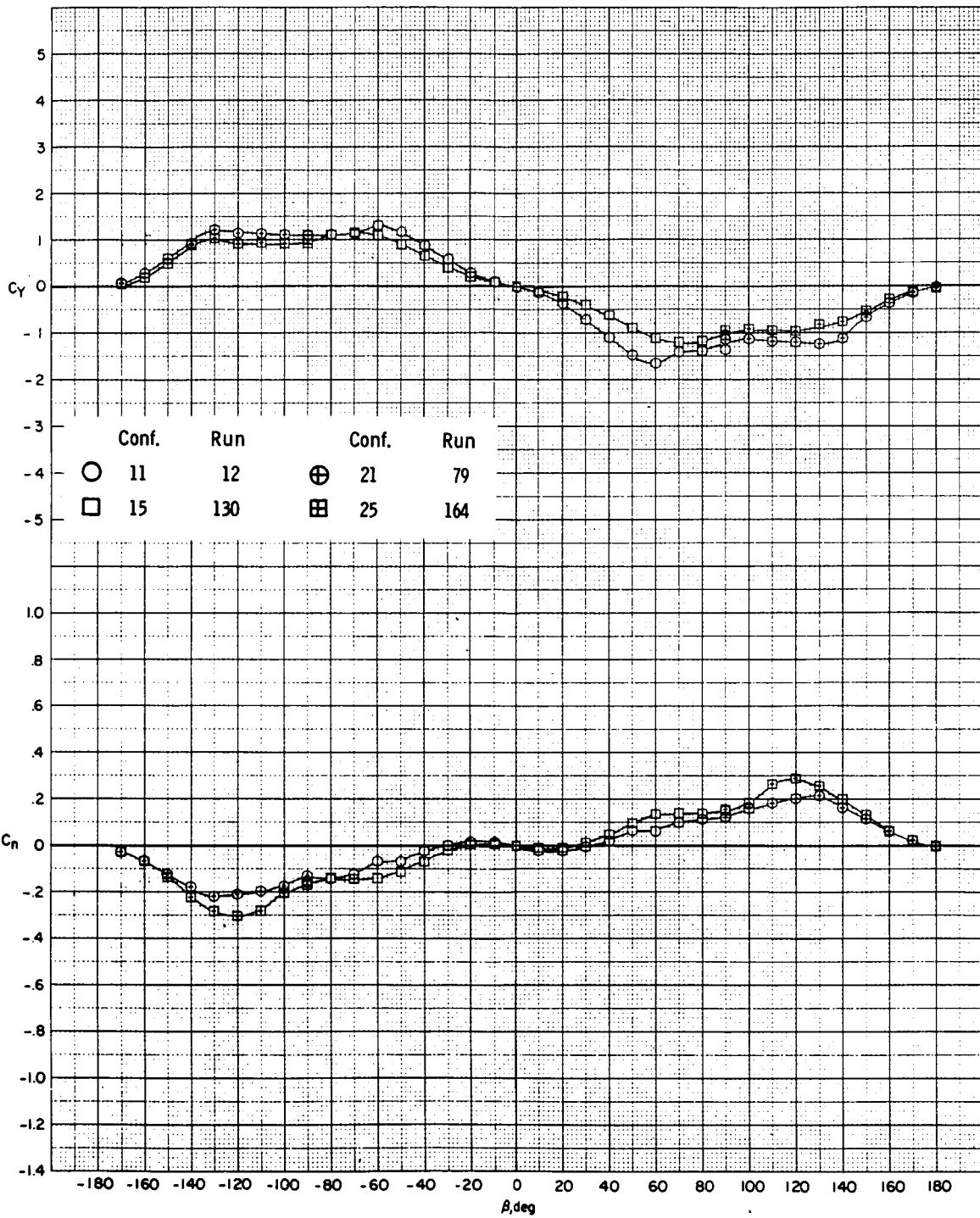
Figure 17.- Comparison of directional characteristics of models 1 and 2 without
vertical tails and without rotor (configurations 11 and 15).
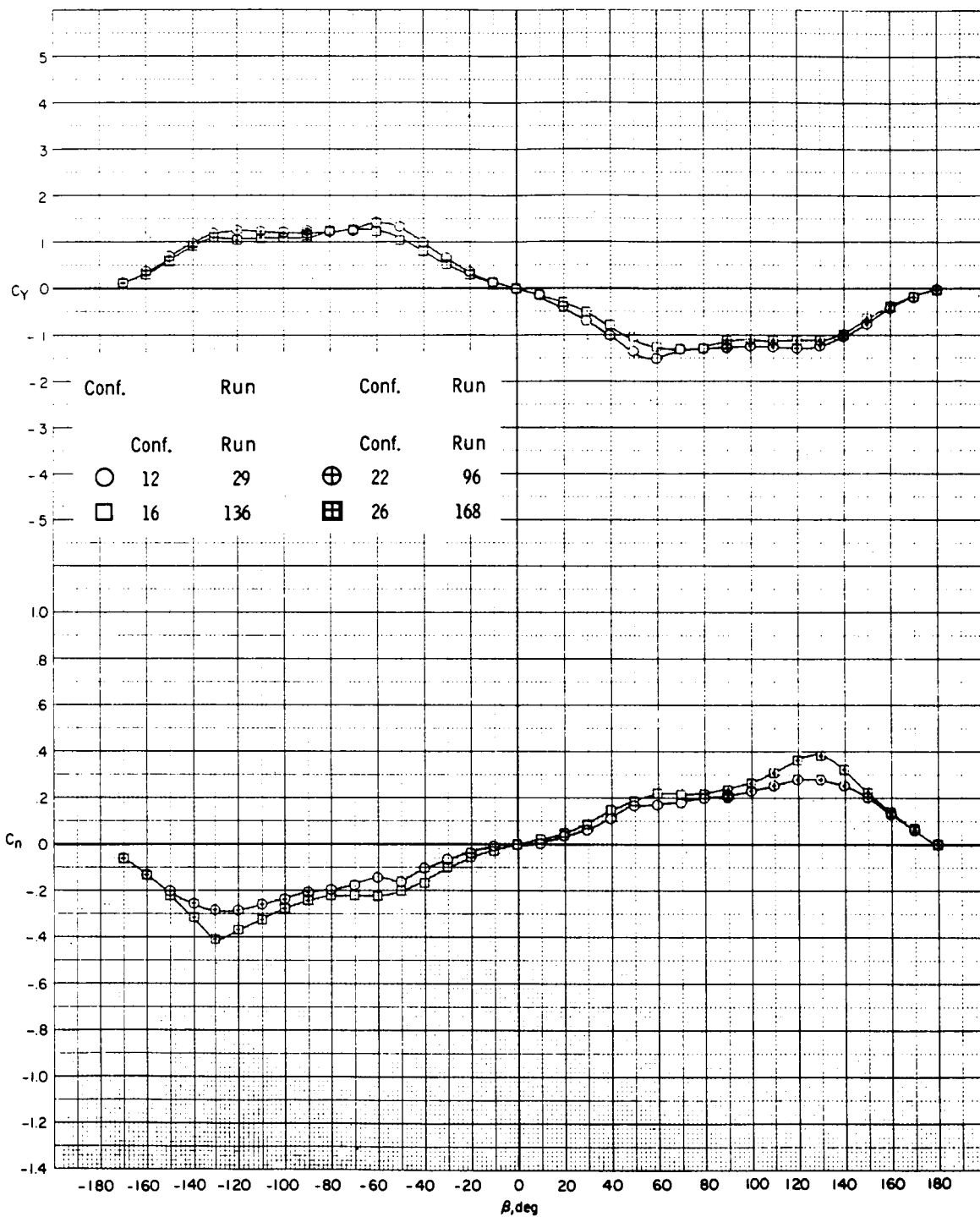
Figure 18.- Comparison of directional characteristics of models 1 and 2 with vertical tails and without rotor (configurations 12 and 16).
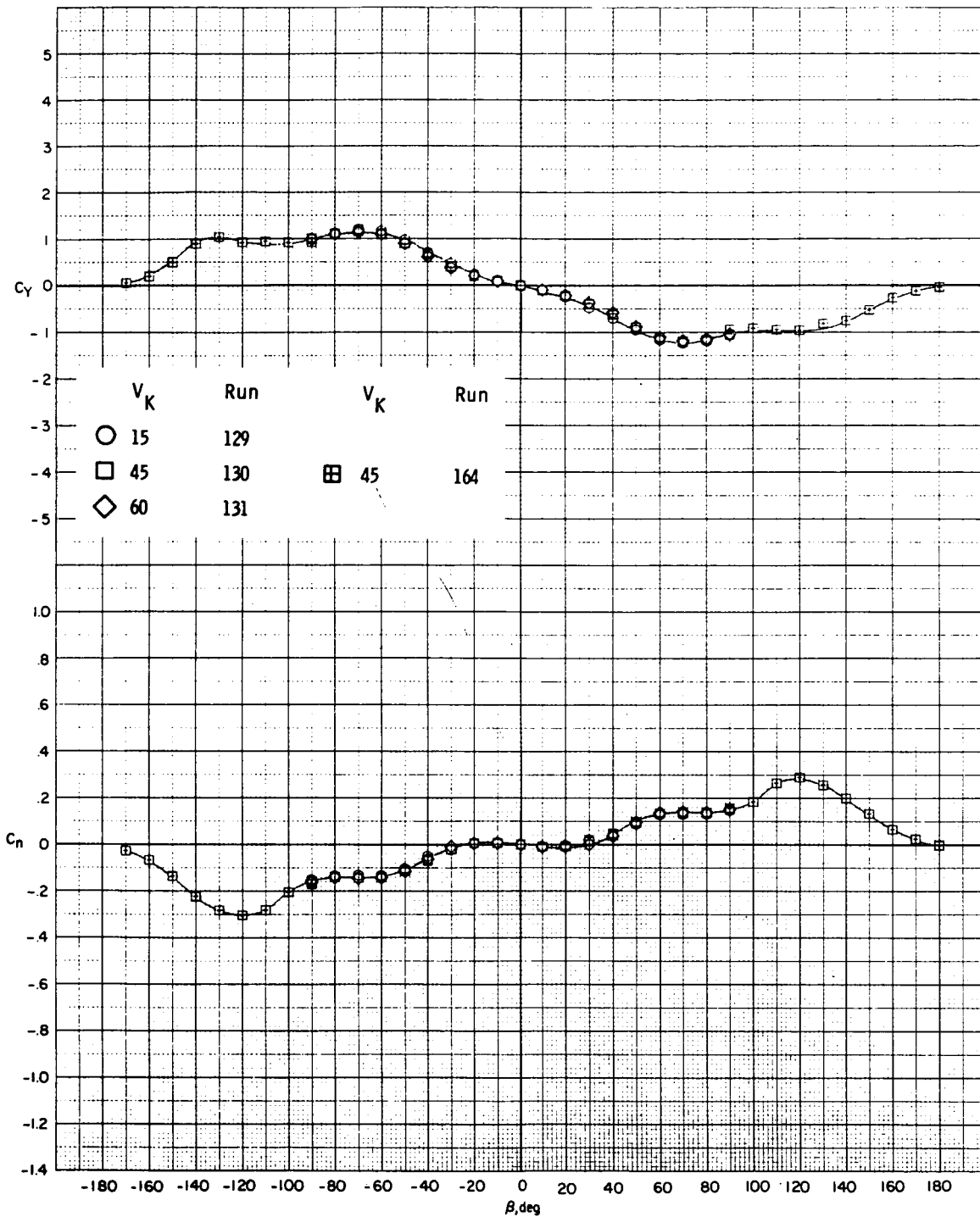
Figure 19.- Effect of windspeed on directional characteristics of model 2 without rotor and without vertical tail.

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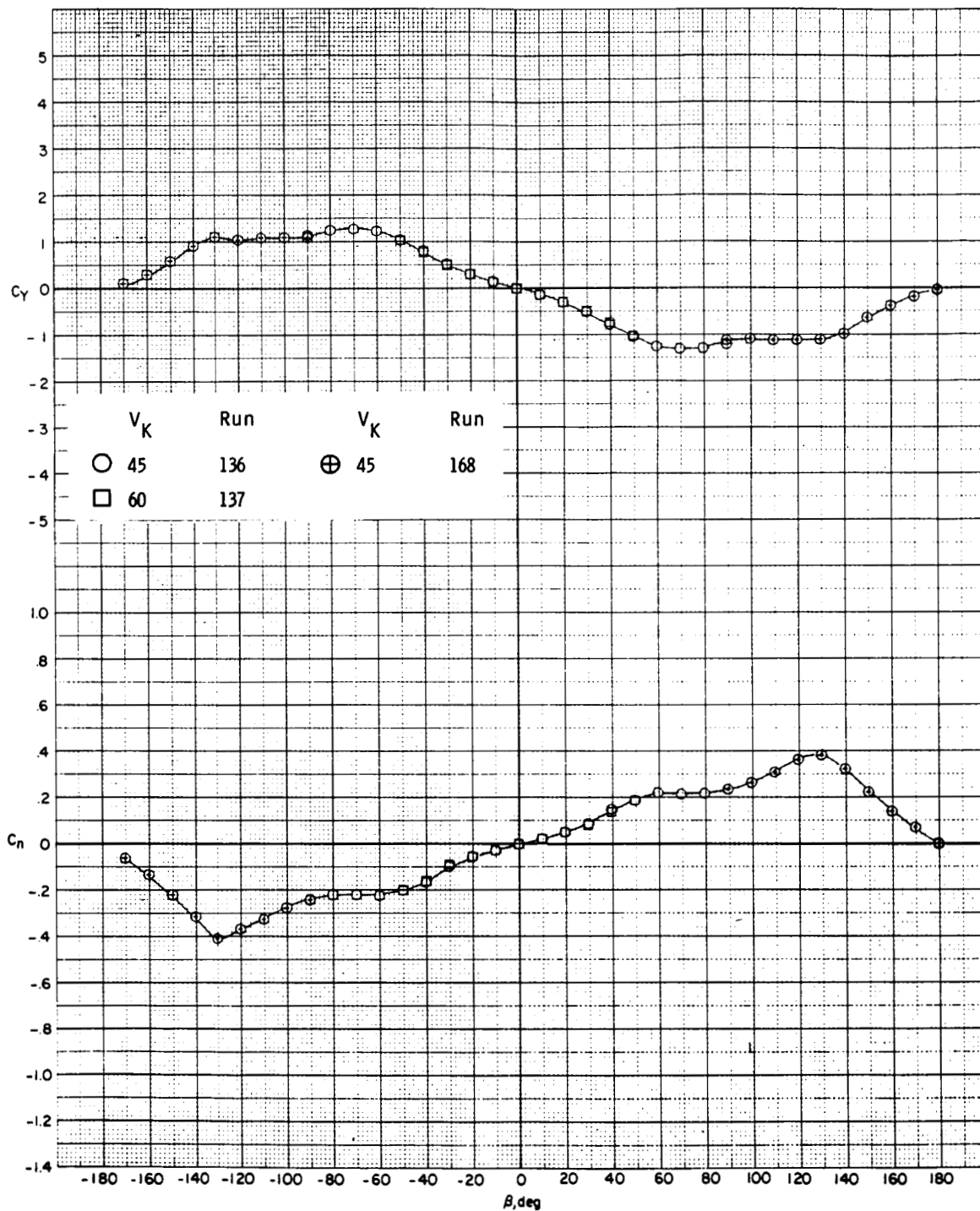
Figure 20.- Effect of windspeed on directional characteristics of model 2 without rotor and with vertical tail.
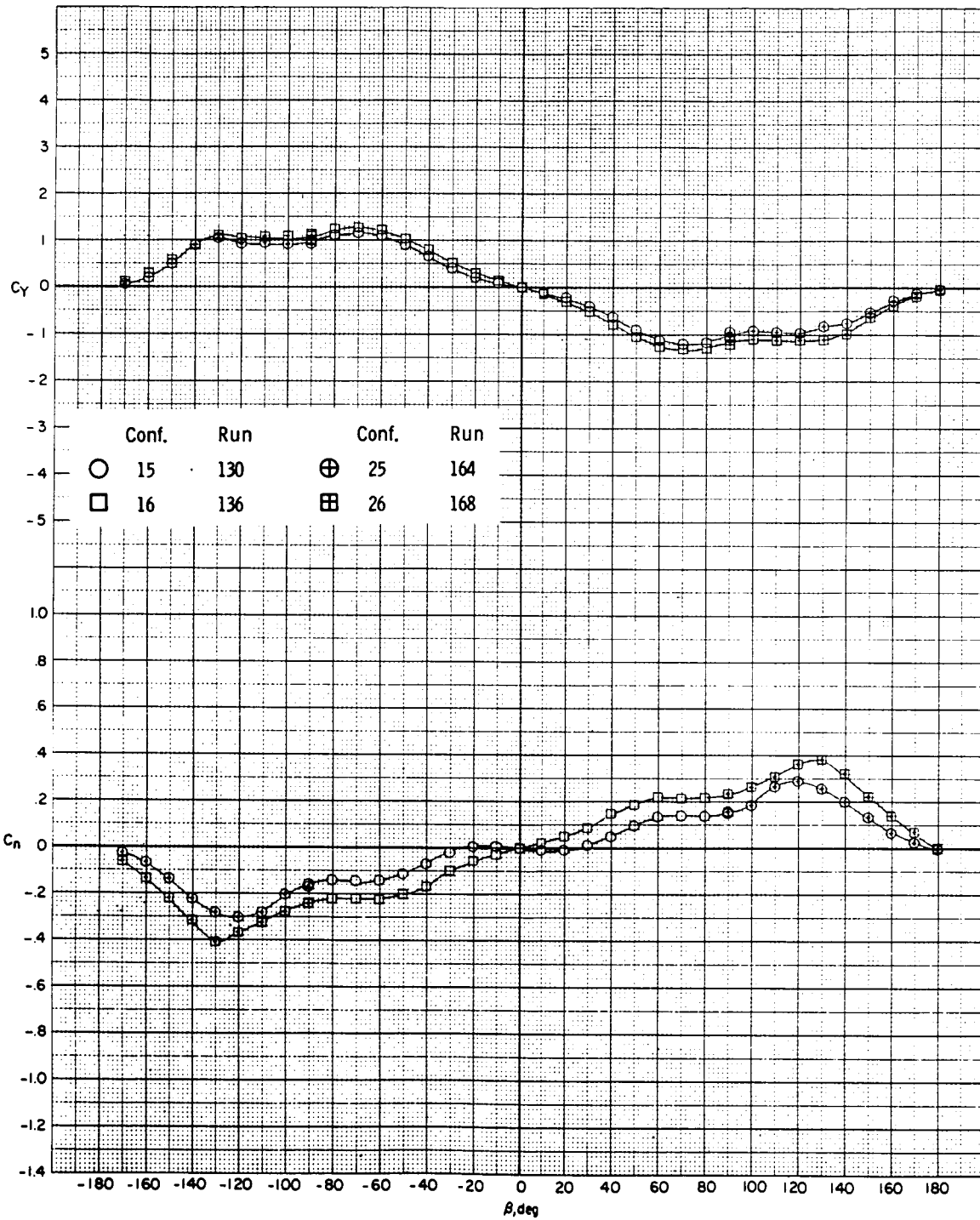
Figure 21.- Comparison of directional characteristics of model 2 without rotor and with and without vertical tail.
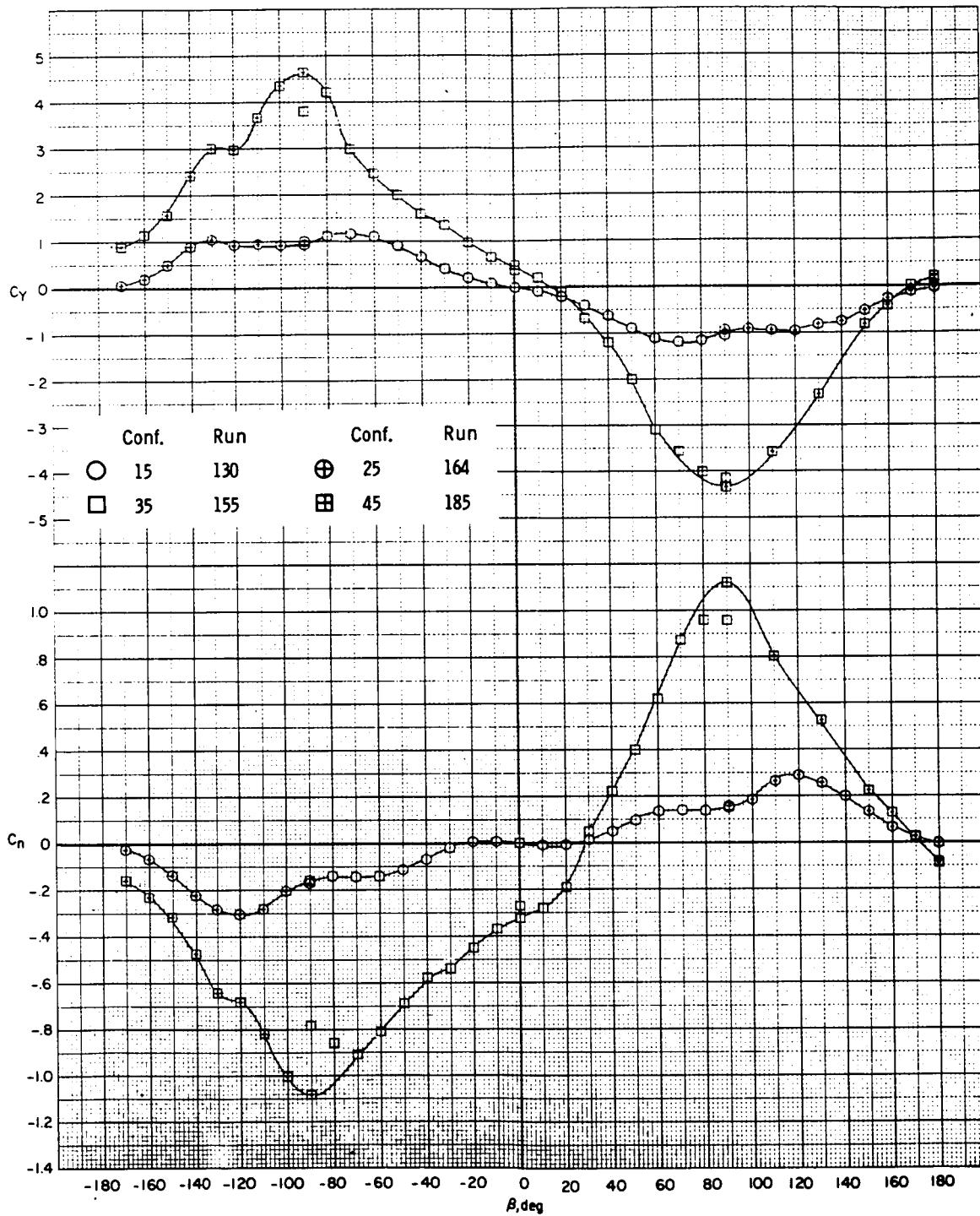
(a) Windspeed, 15 knots.

Figure 22.- Effect of rotor wake on directional characteristics of model 2 without tail.
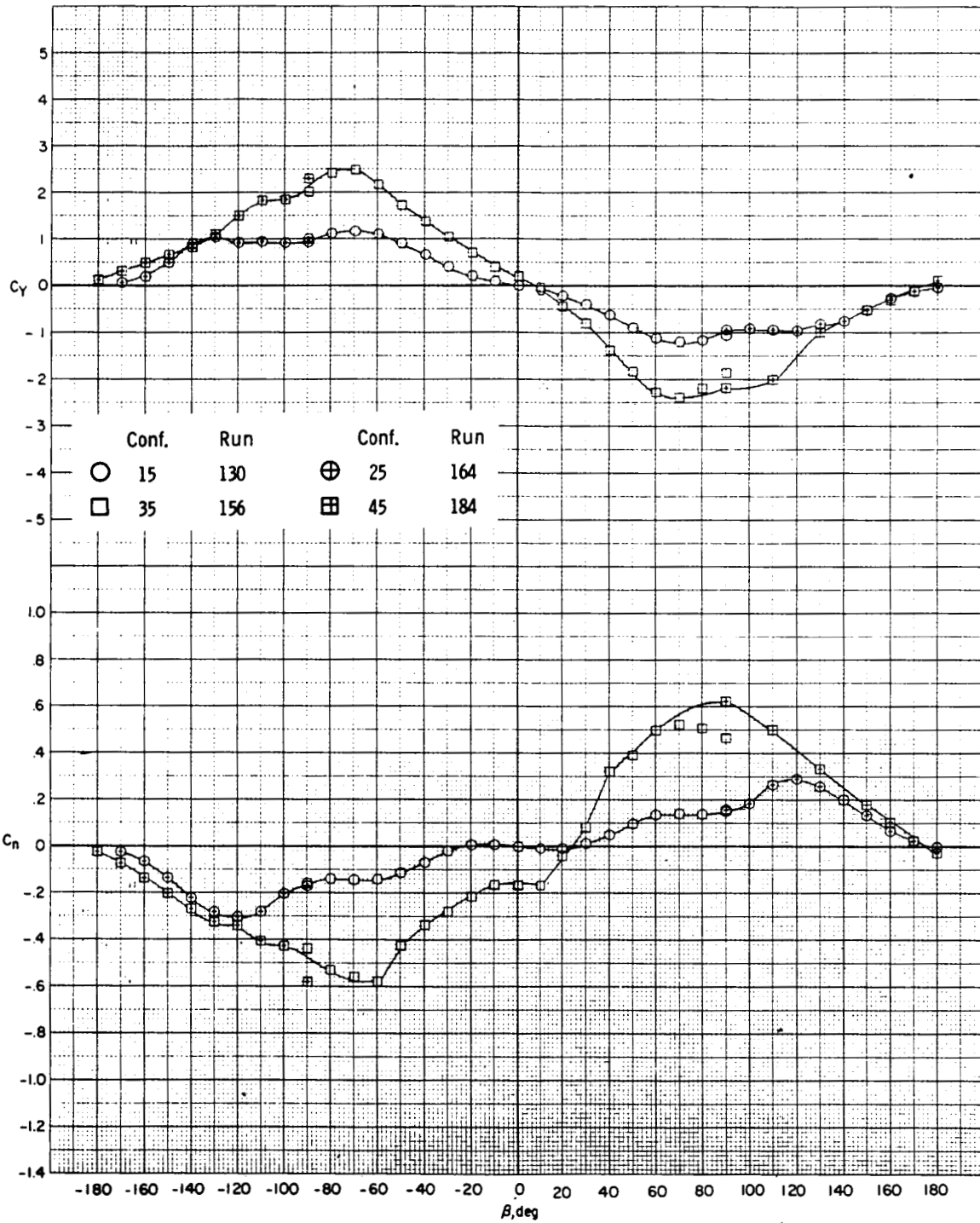
(b) Windspeed, 20 knots.

Figure 22.- Continued.

	Conf.	Run		Conf.	Run
$\bigcirc$	15	130	$\oplus$	25	164
$\square$	35	157	$\boxplus$	45	183
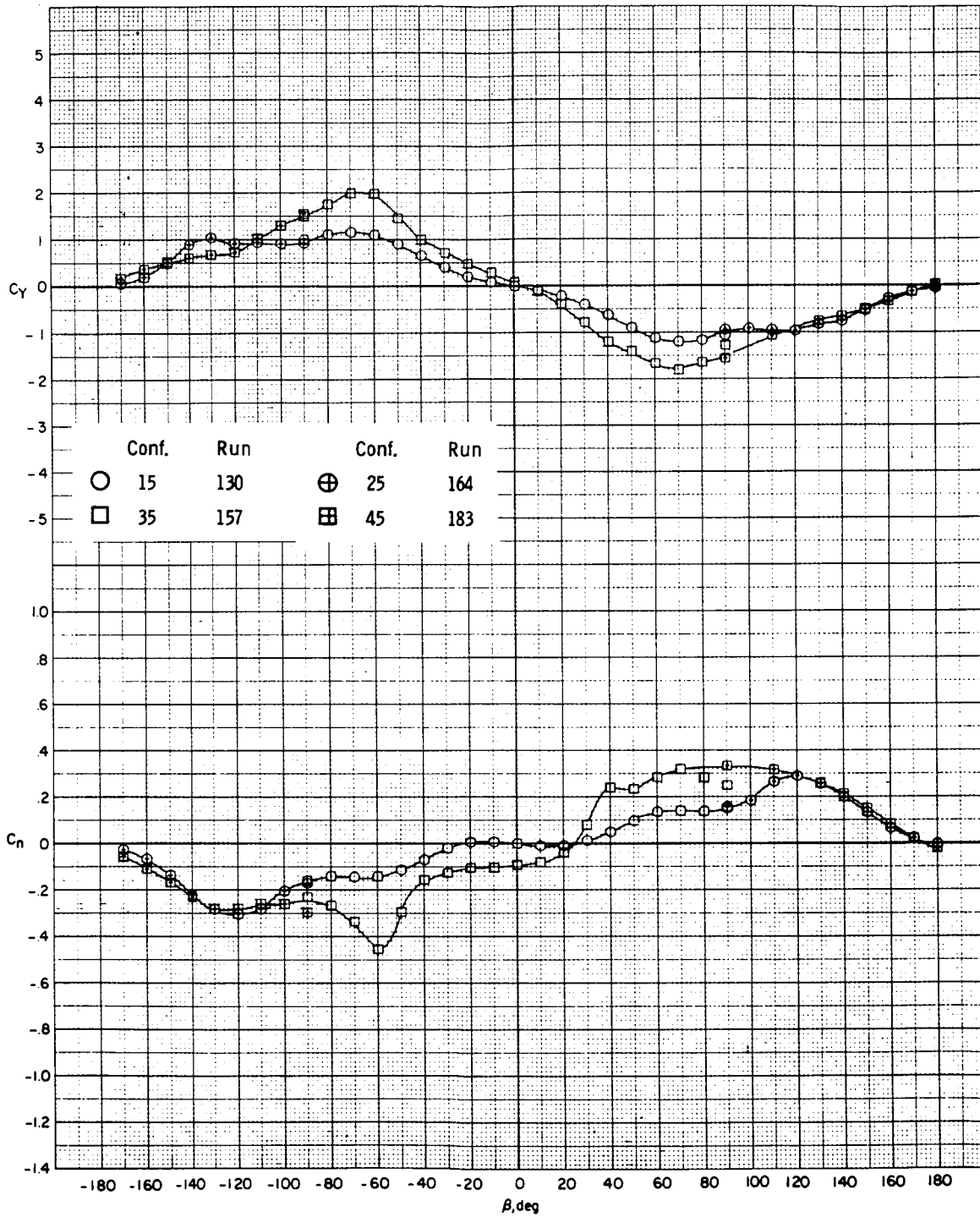
(c) Windspeed, 25 knots.

Figure 22.- Continued.

(d) Windspeed, 30 knots.

Figure 22.- Continued.

	Conf.	Run		Conf.	Run
○	15	130	⊕	25	164
□	35	159	⊞	45	181
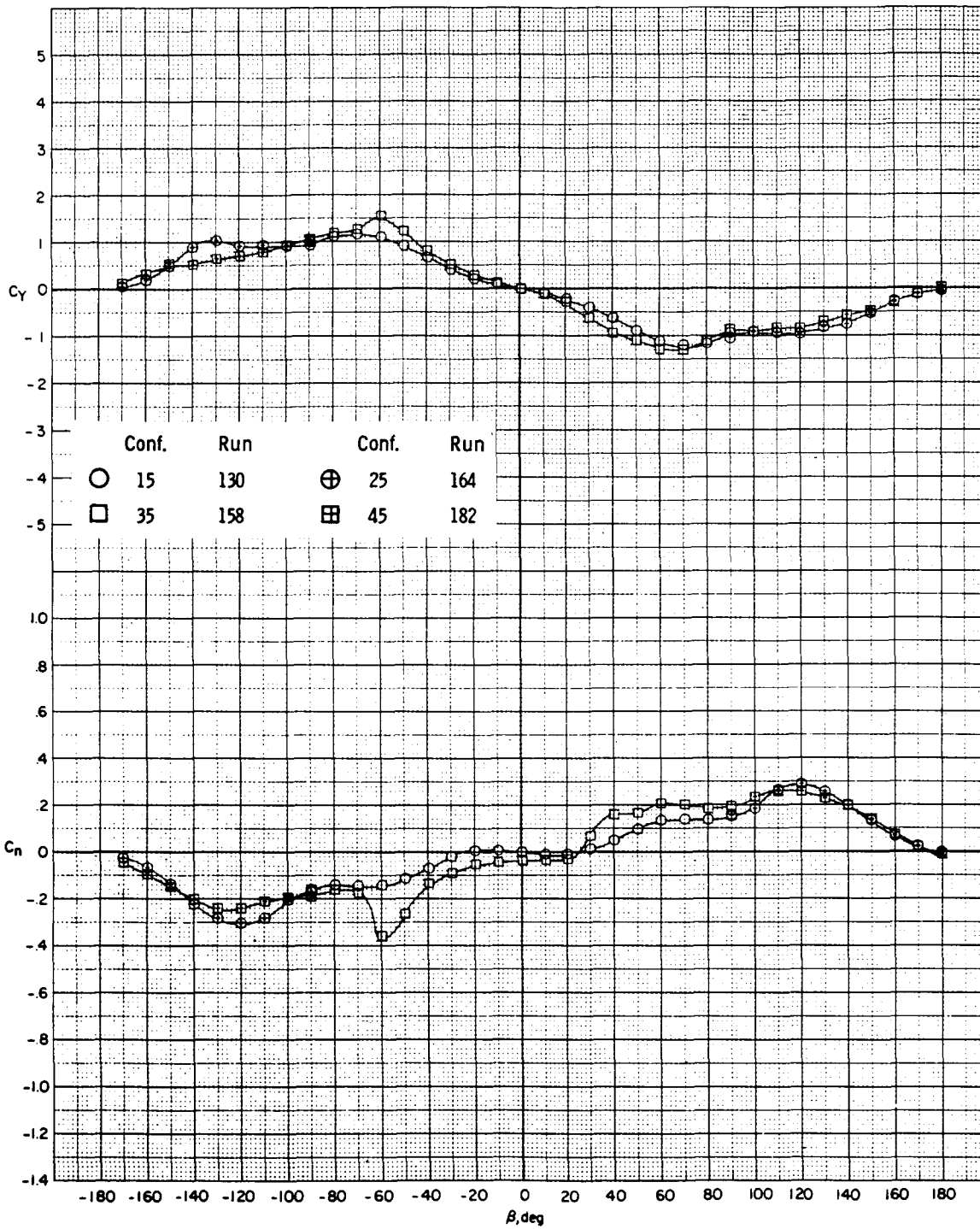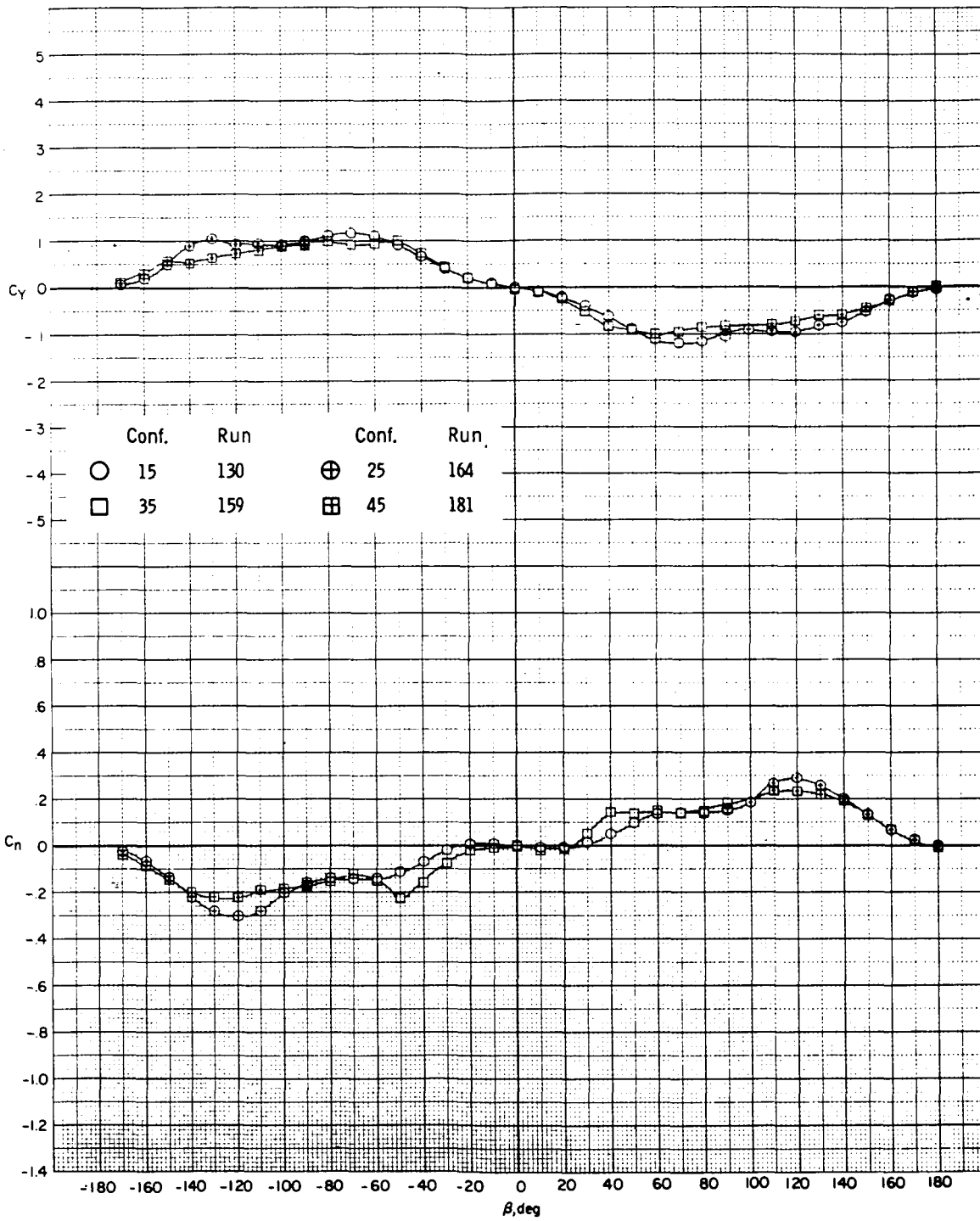
(e) Windspeed, 35 knots.

Figure 22.- Continued.
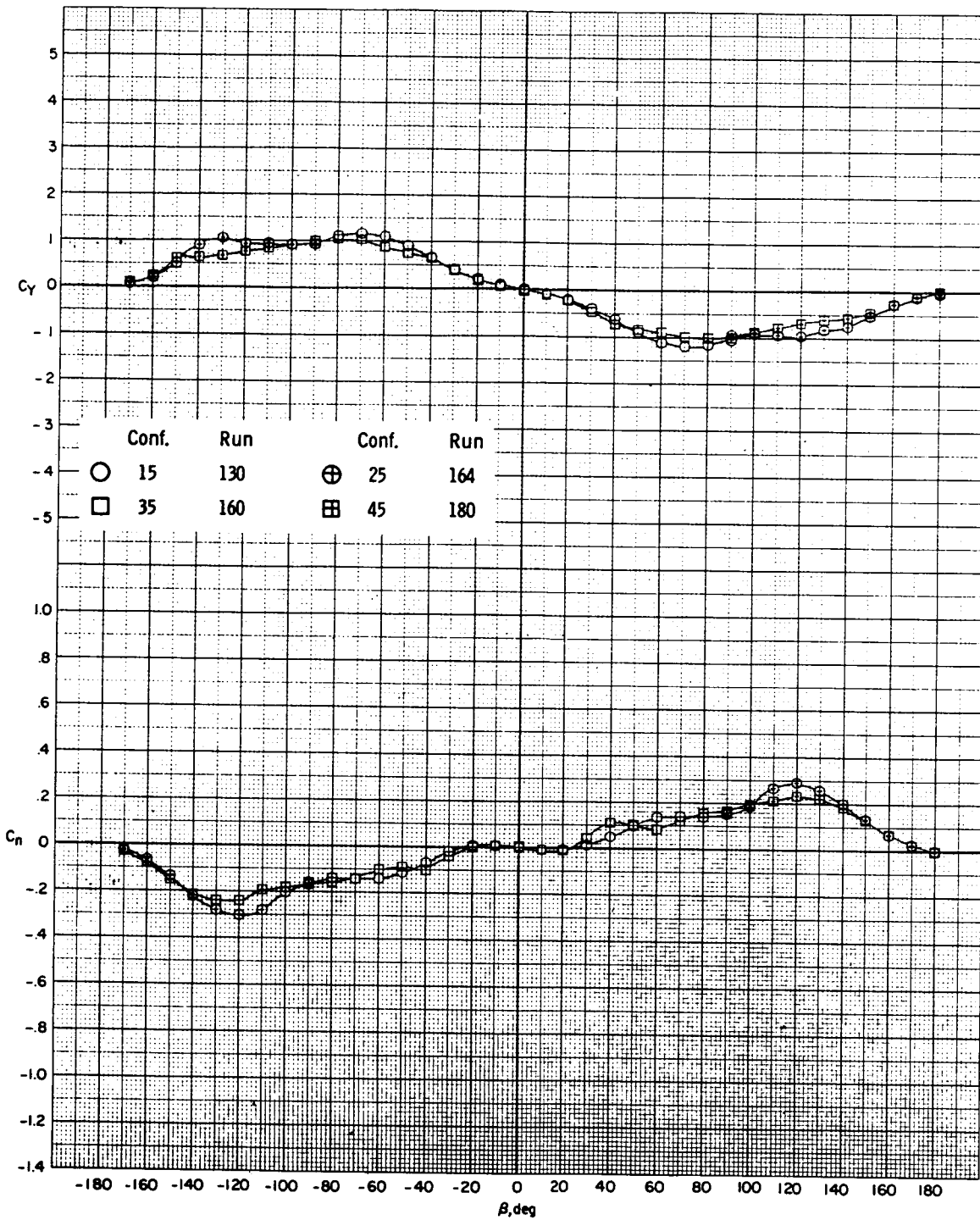
(f) Windspeed, 45 knots.

Figure 22.- Continued.
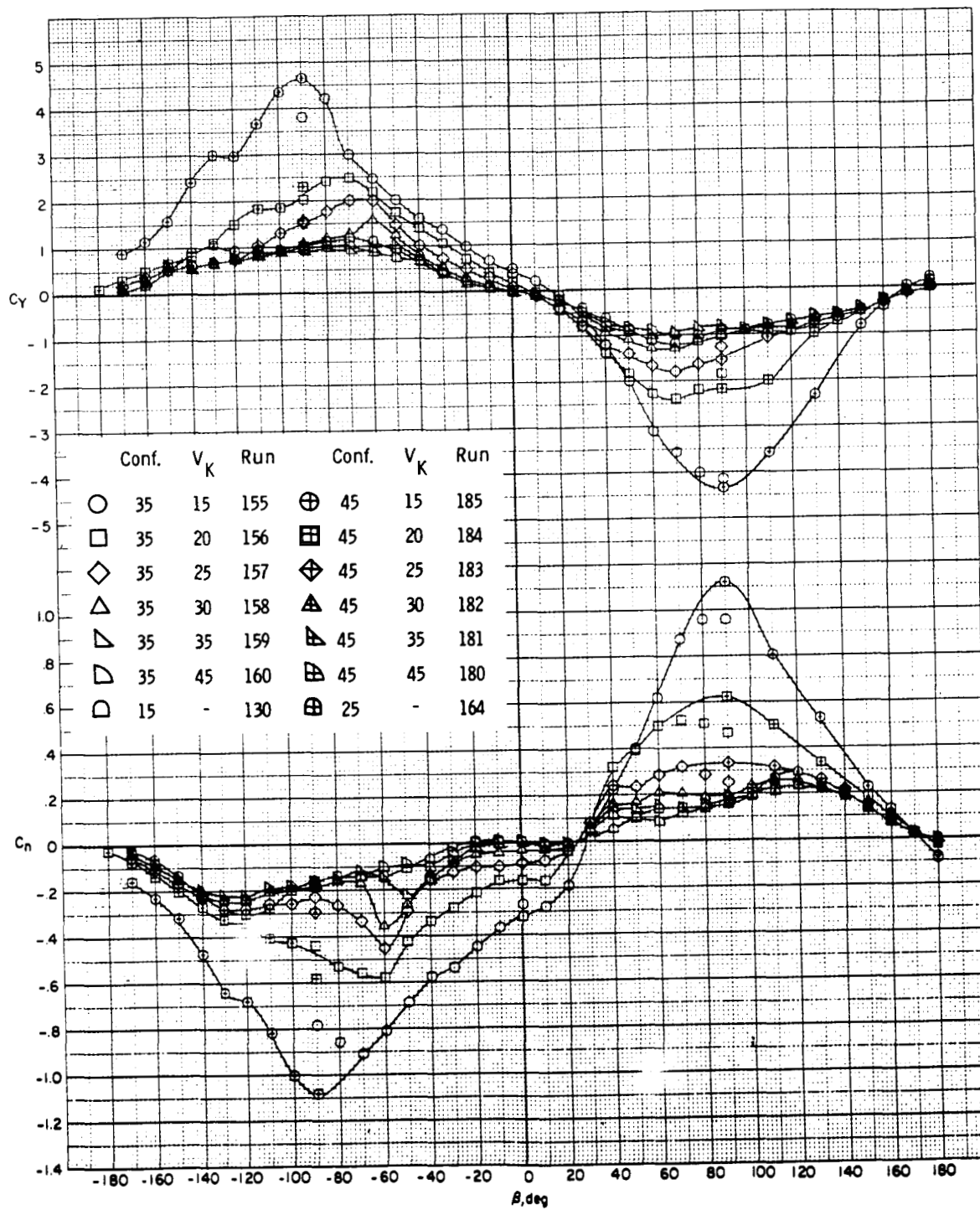
(g) Windspeed, 15 to 45 knots.

Figure 22.- Concluded.
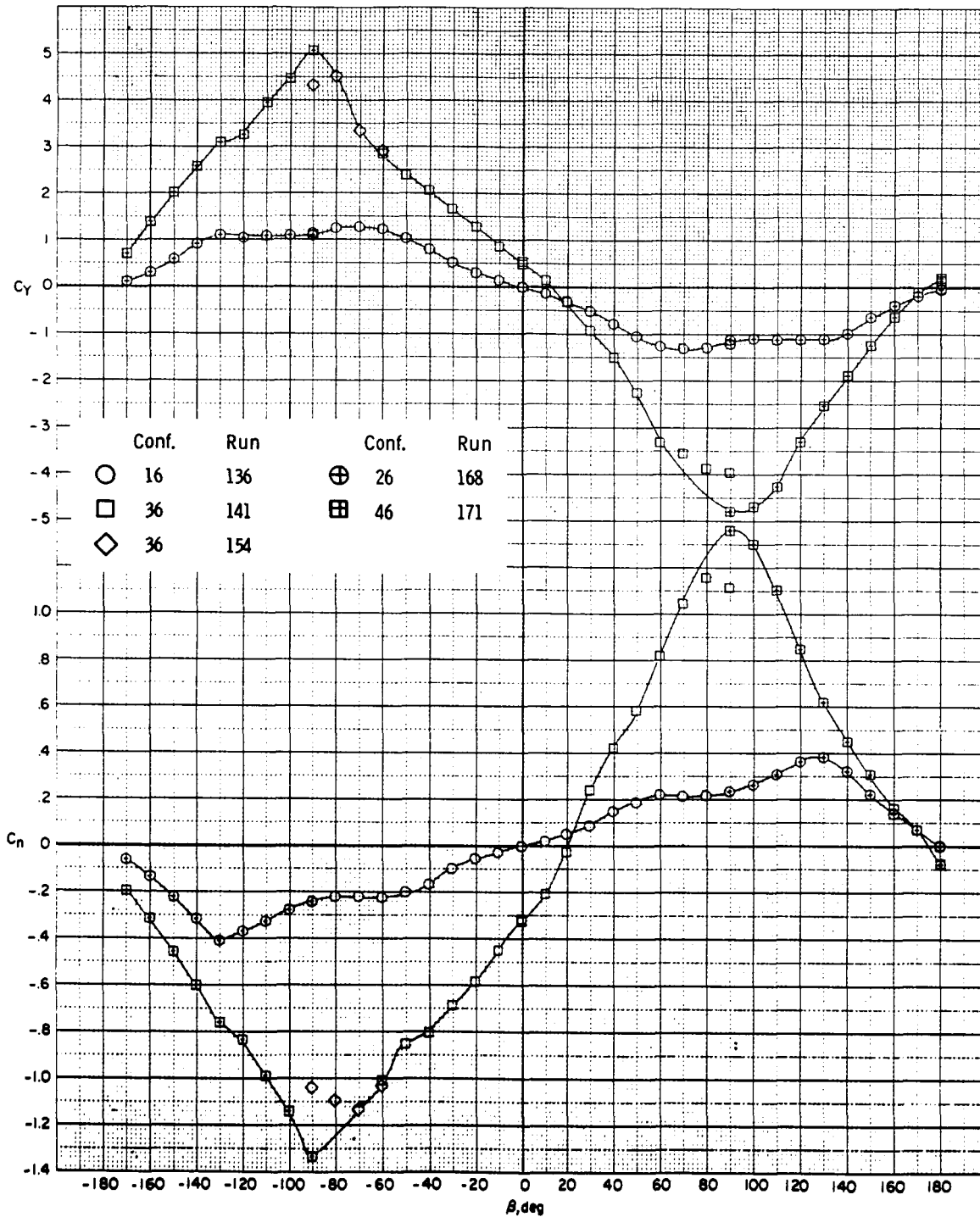
(a) Windspeed, 15 knots.

Figure 23.- Effect of rotor wake on directional characteristics of model 2 with tail.

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Conf.	Run		Conf.	Run
◯ 16	136		⊕ 26	168
☐ 36	142		⊞ 46	172
◇ 36	153			
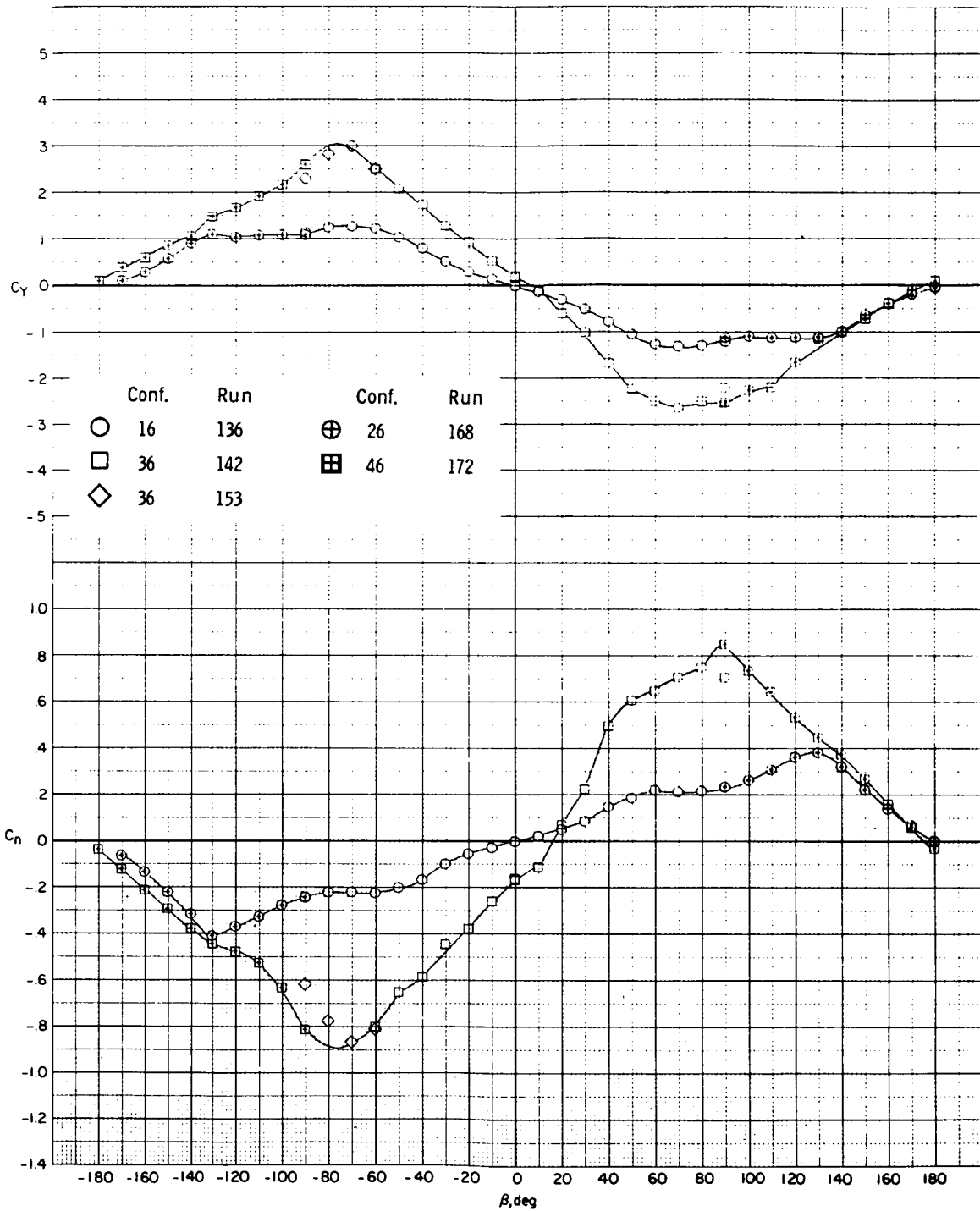
(b) Windspeed, 20 knots.

Figure 23.- Continued.
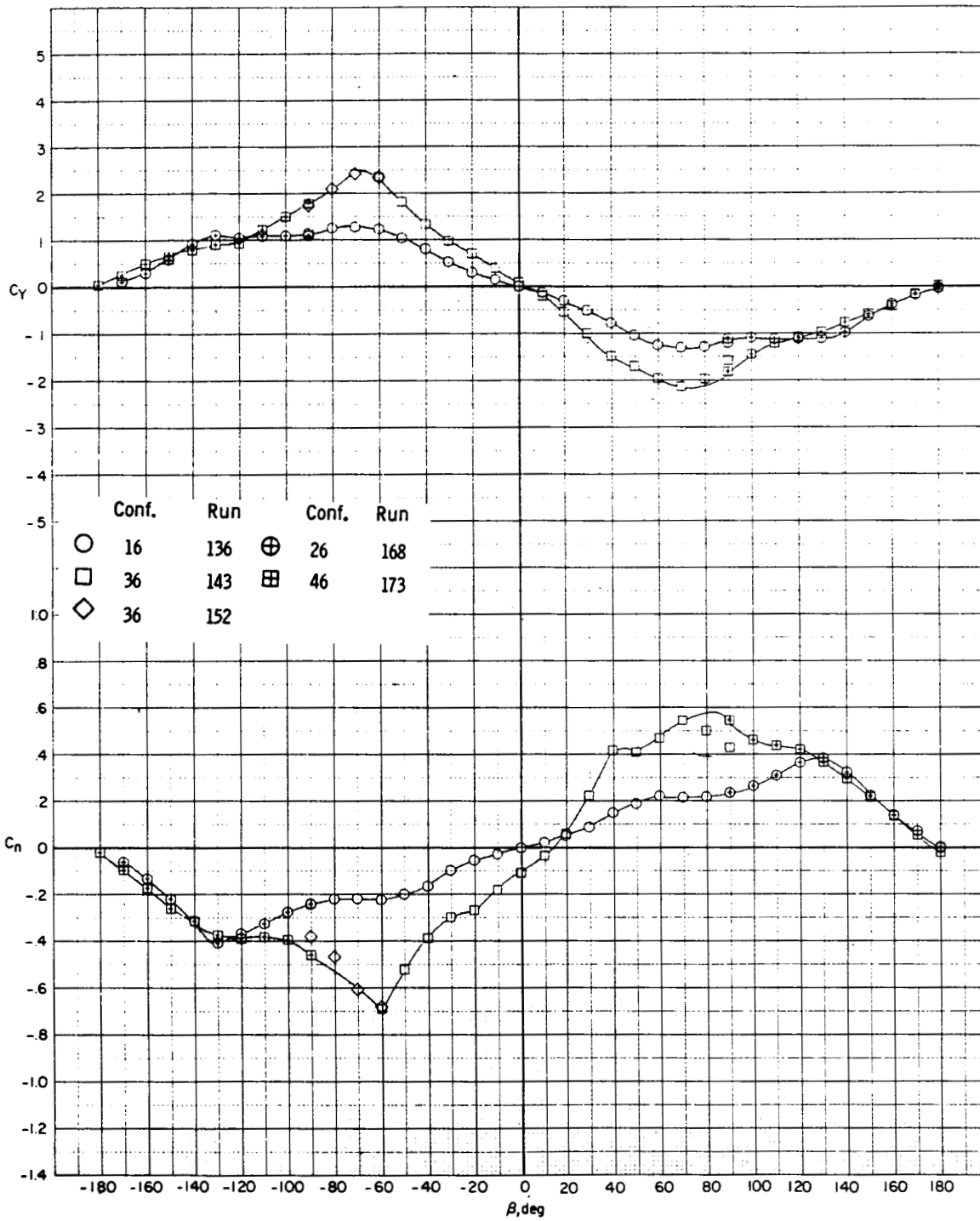
(c) Windspeed, 25 knots.

Figure 23.- Continued.
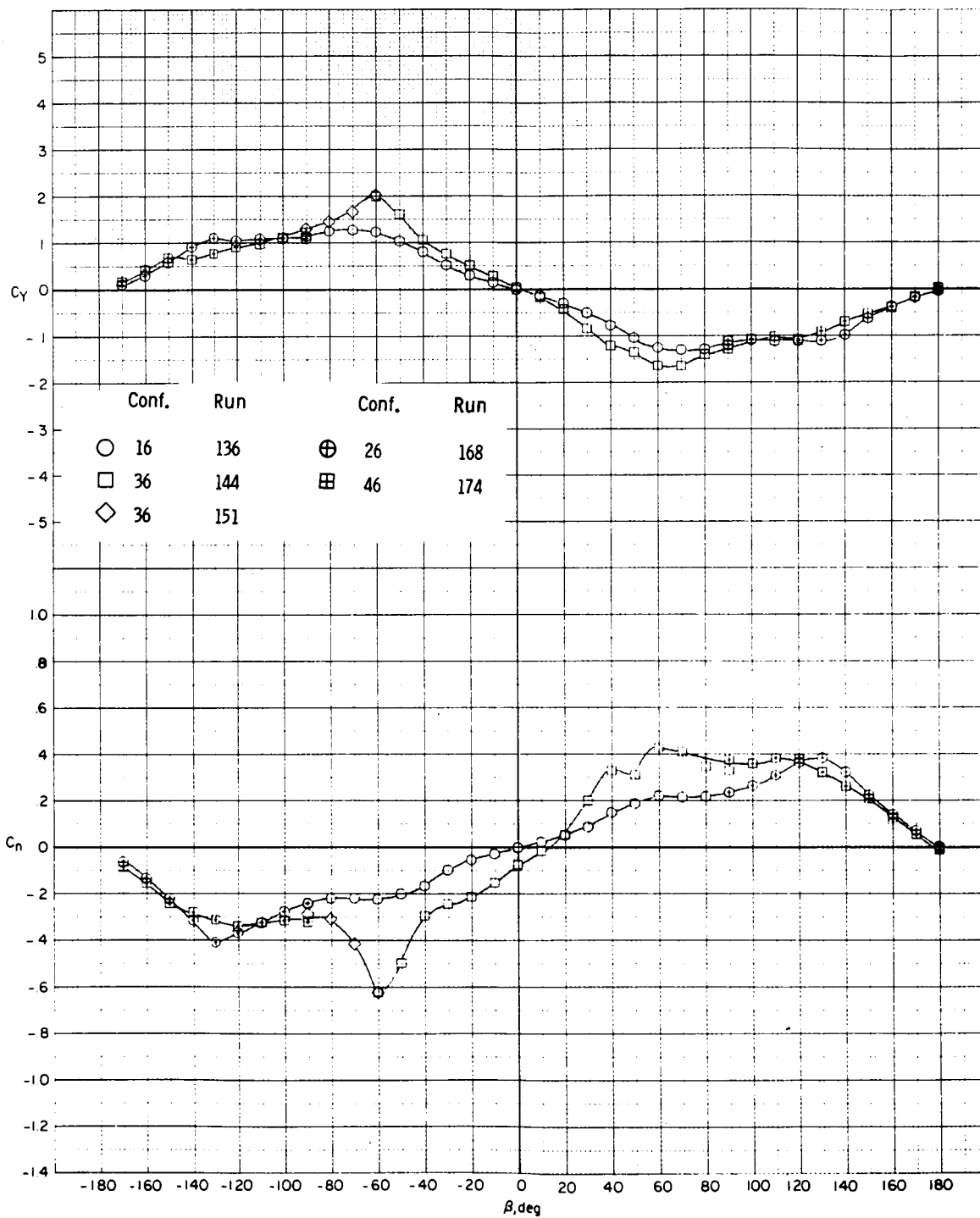
(d) Windspeed, 30 knots.

Figure 23.- Continued.

(e) Windspeed, 35 knots.

Figure 23.- Continued.

	Conf.	Run		Conf.	Run
○	16	136	⊕	26	168
□	36	146	⊞	46	176
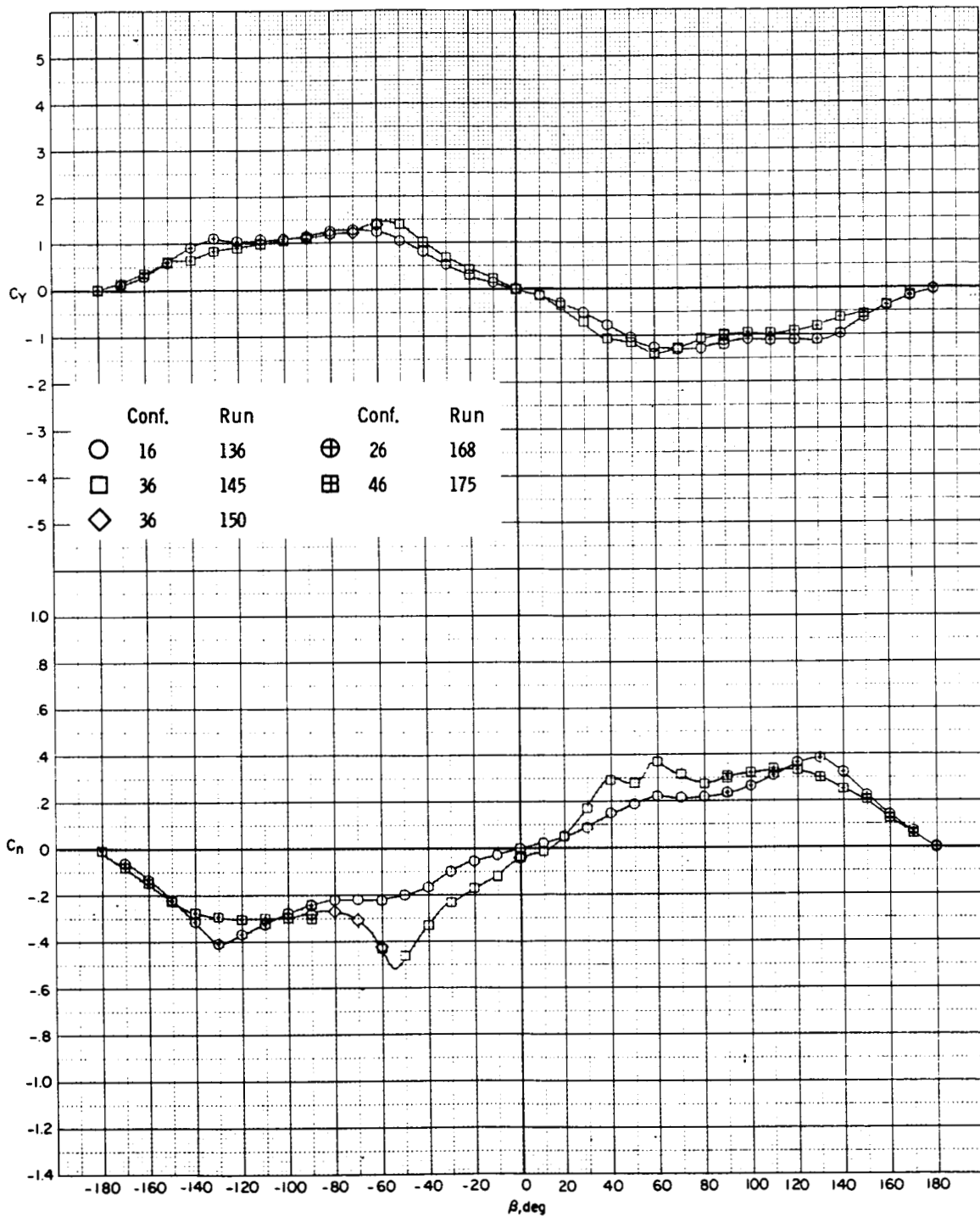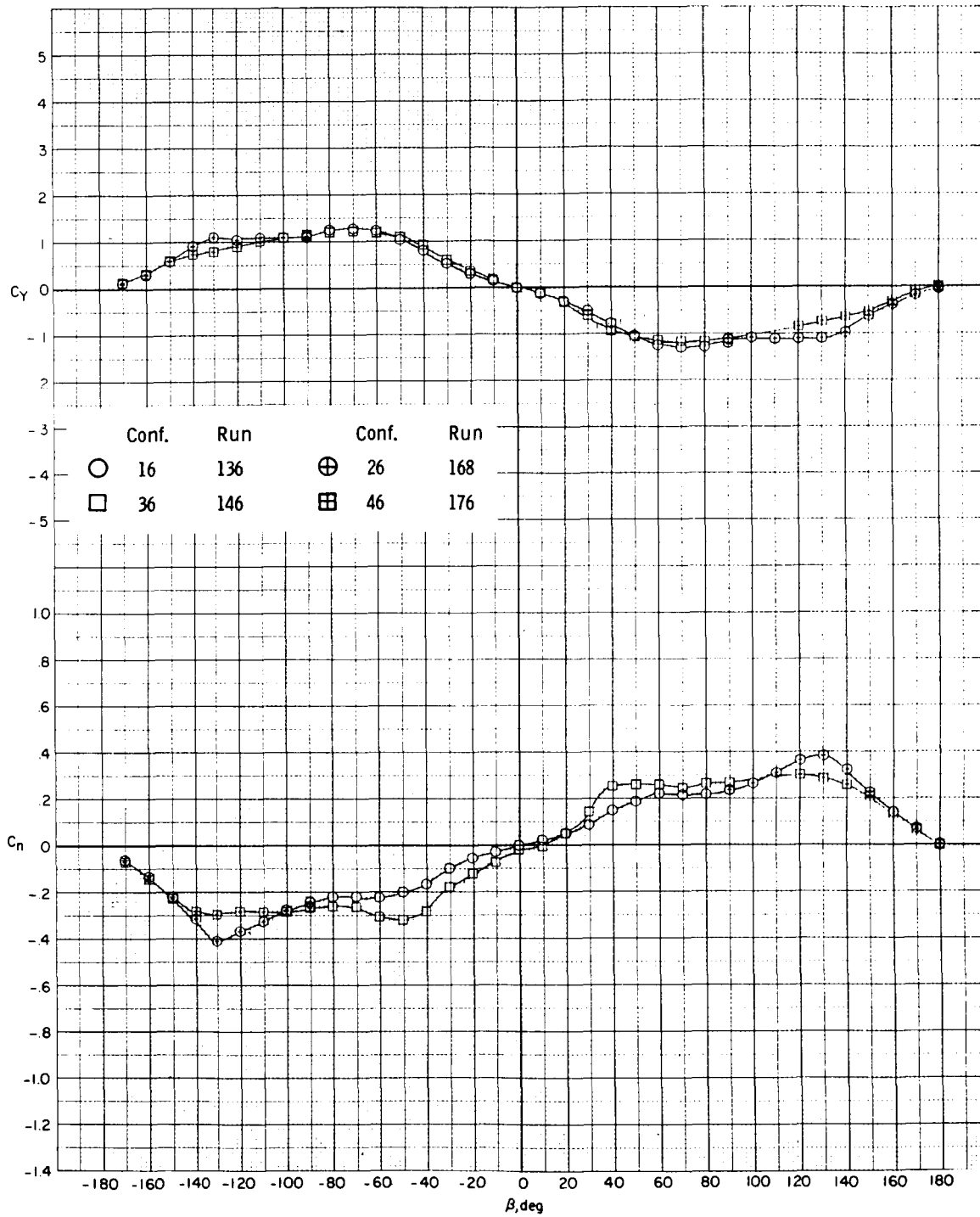
(f) Windspeed, 45 knots.

Figure 23.- Continued.
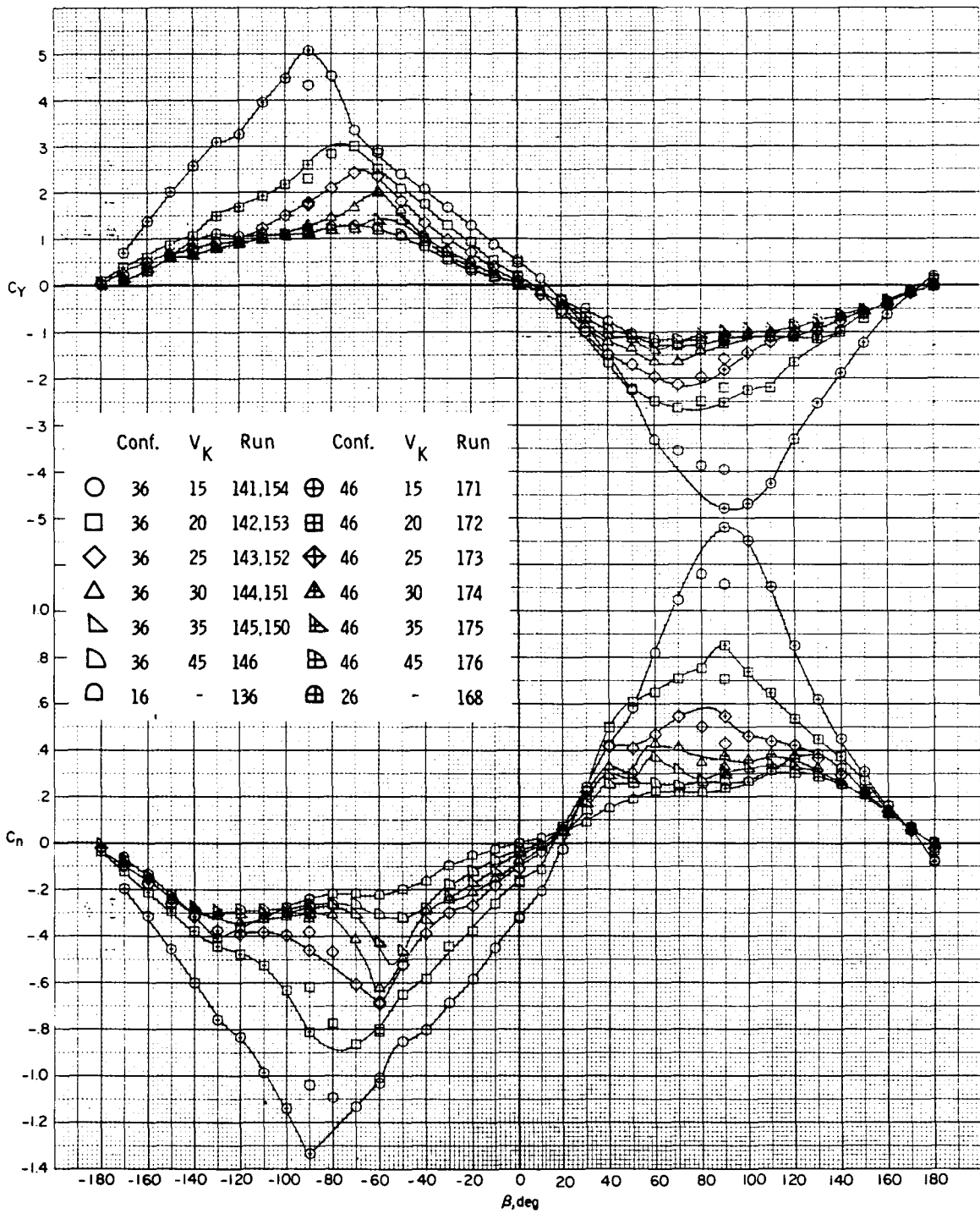
(g) Windspeed, 15 to 45 knots.

Figure 23.- Concluded.
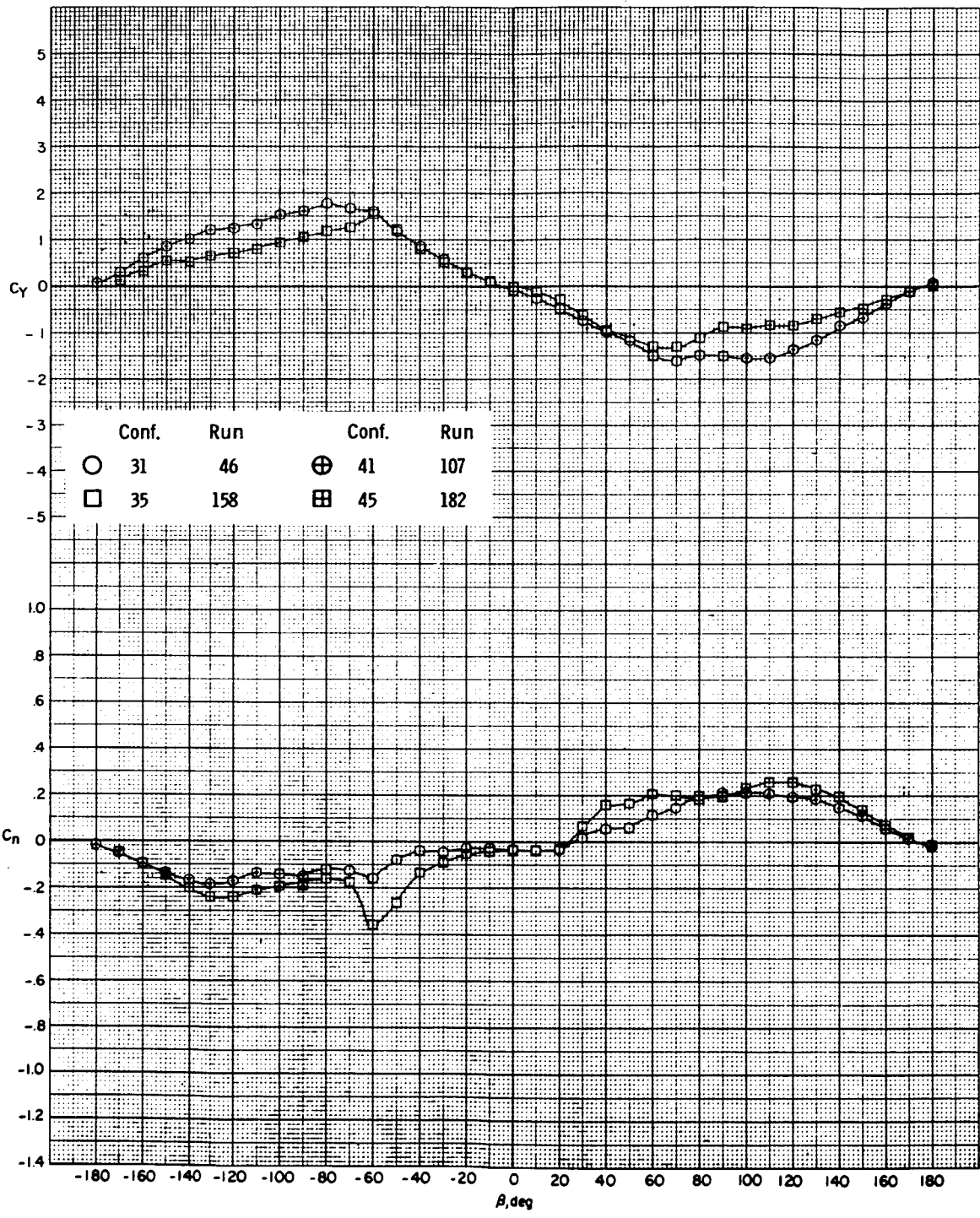
Figure 24.- Comparison of directional characteristics of models 1 and 2 with rotor and without tails. $V_K = 30$.
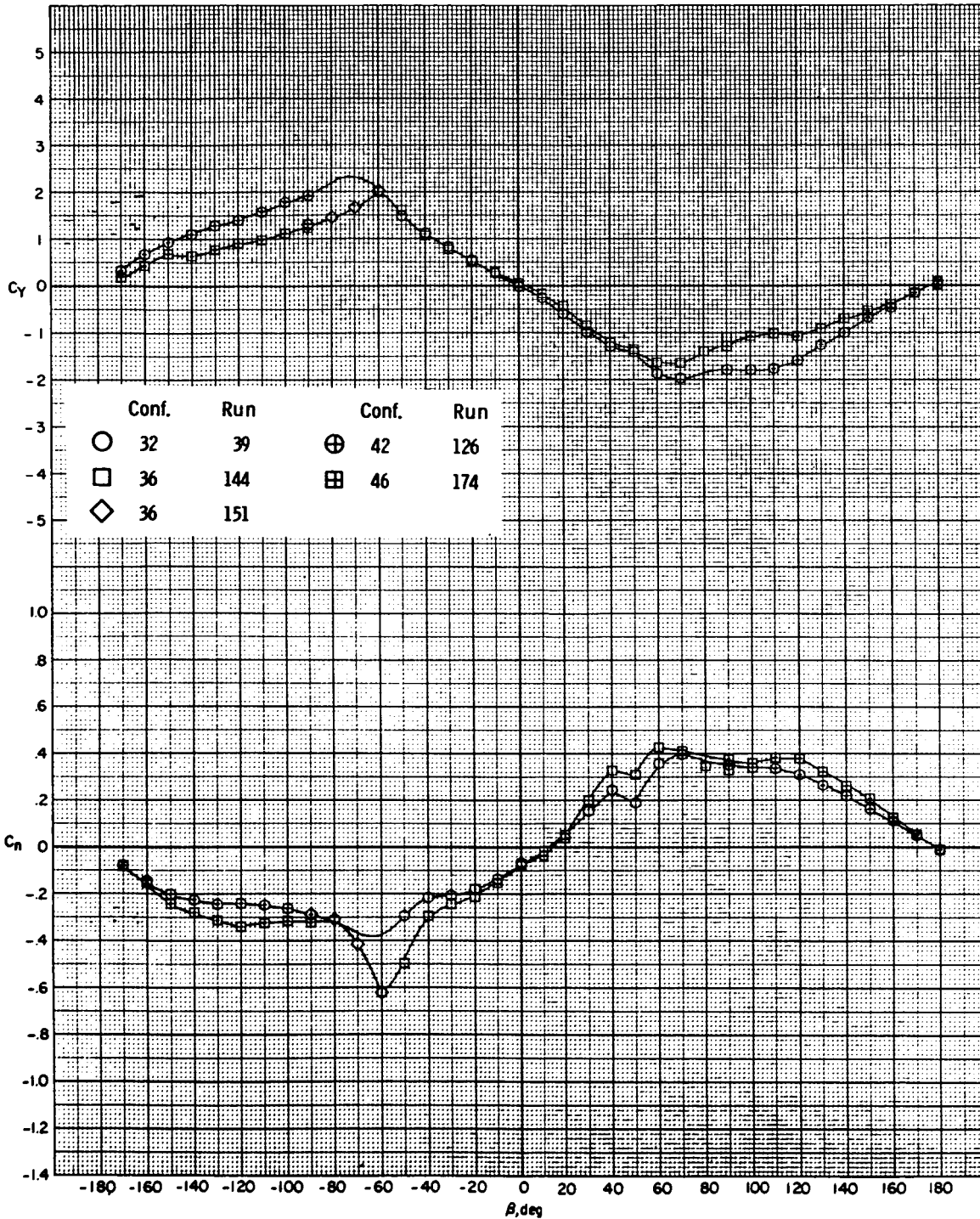
Figure 25.- Comparison of directional characteristics of models 1 and 2 with rotor and with vertical tails. $V_K = 30$.
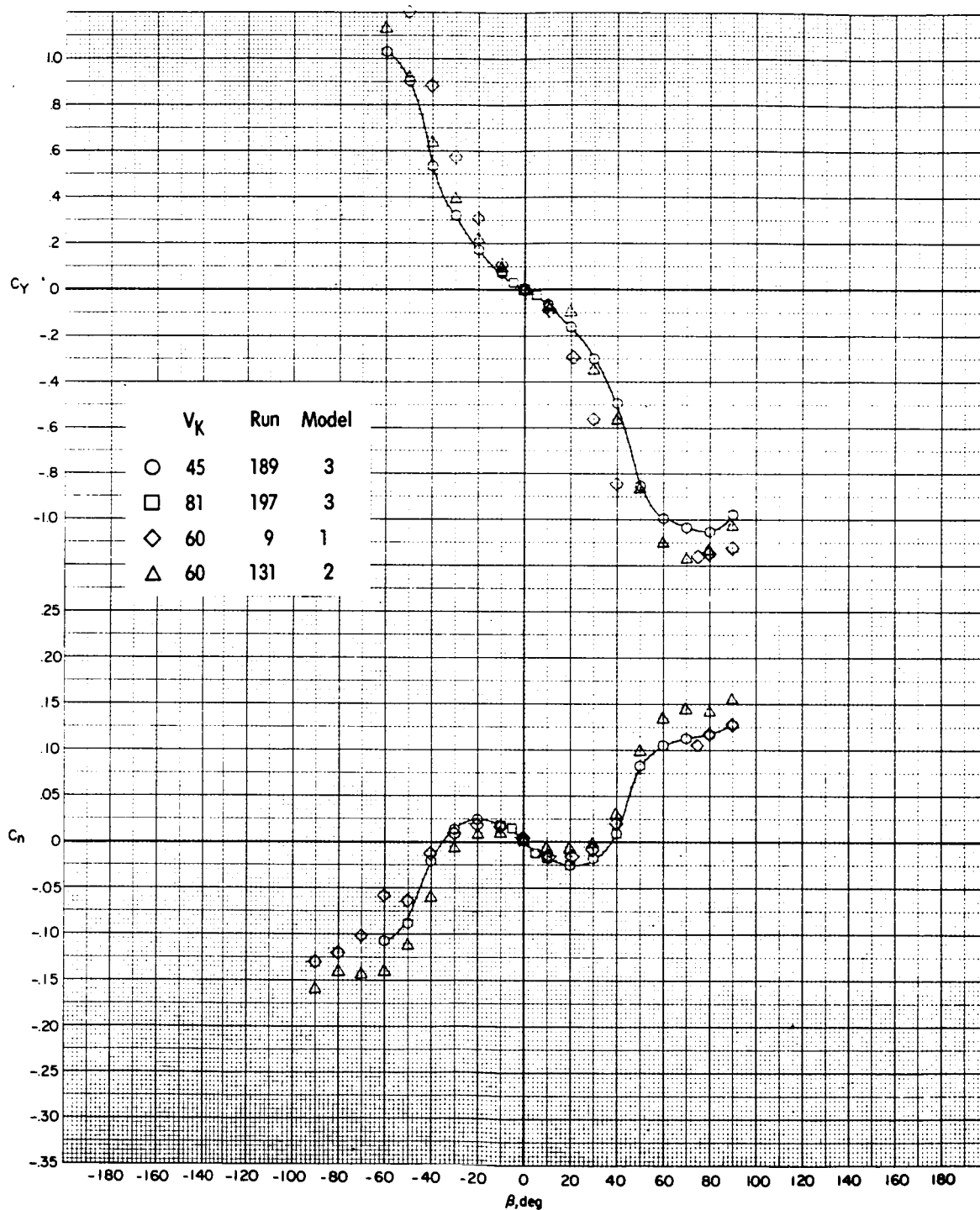
Figure 26.- Comparison of directional characteristics of models 1, 2, and 3.
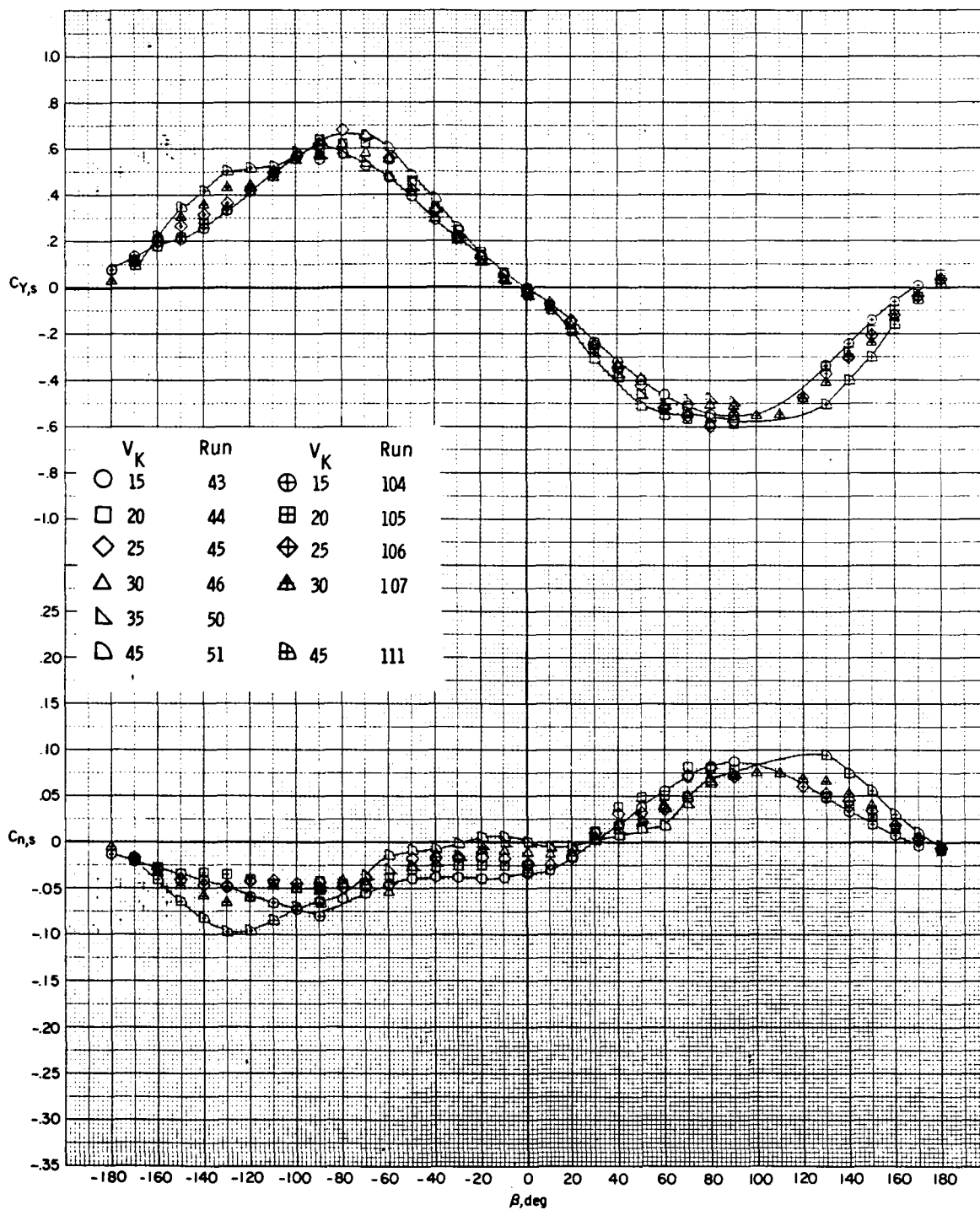
Figure 27.- Effect of rotor wake on directional characteristics (slipstream) on
model 1 without tail for windspeeds of 15 to 45 knots.
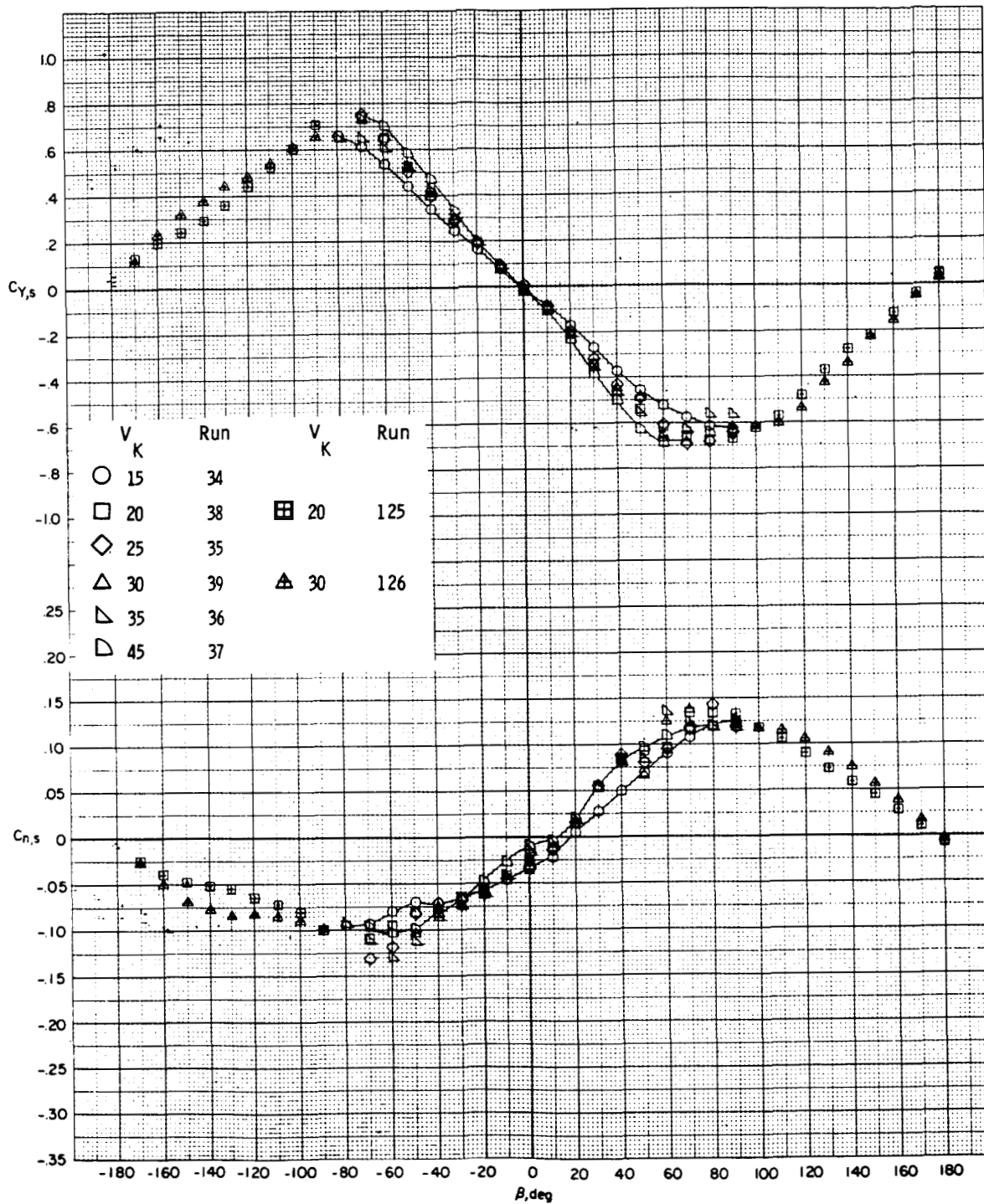
Figure 28.- Effect of rotor wake on directional characteristics (slipstream) on model 1 with standard vertical tail for windspeeds of 15 to 45 knots (configuration 32).
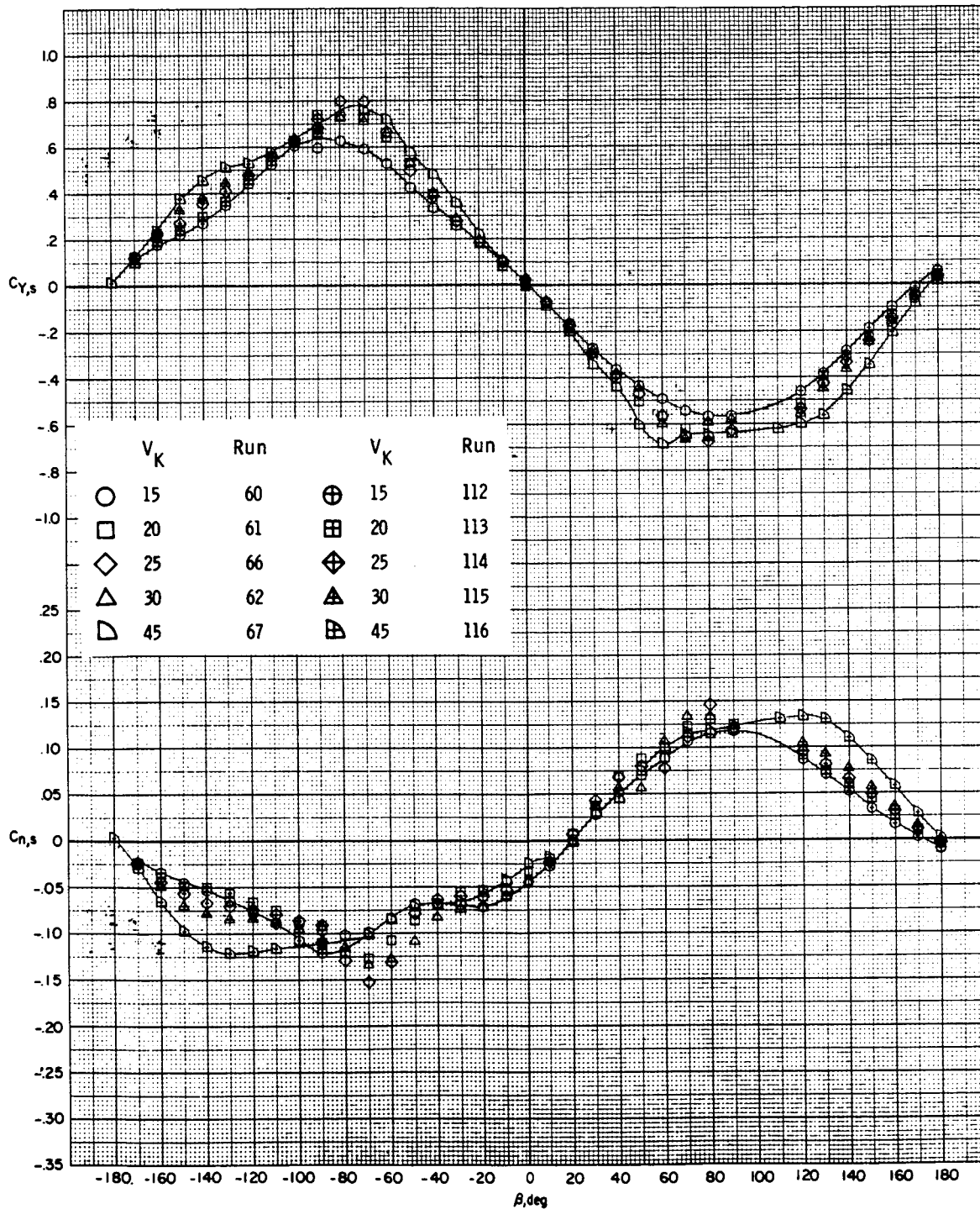
Figure 29.- Effect of rotor wake on directional characteristics (slipstream) on model 1 with cambered vertical tail for windspeeds of 15 to 45 knots (configuration 33).
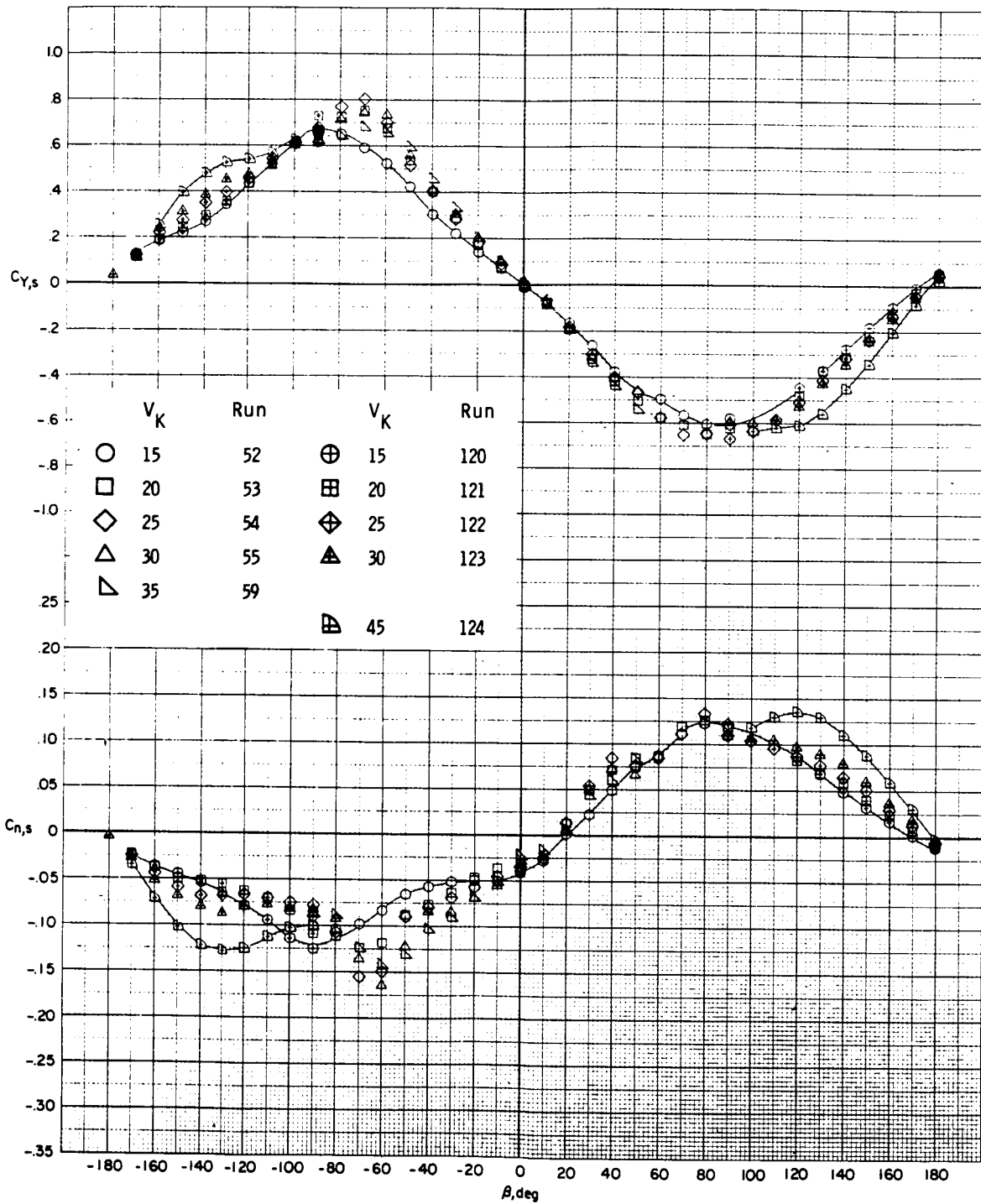
Figure 30.- Effect of rotor wake on directional characteristics (slipstream) on model 1 with V vertical tail for windspeeds of 15 to 45 knots (configuration 34).
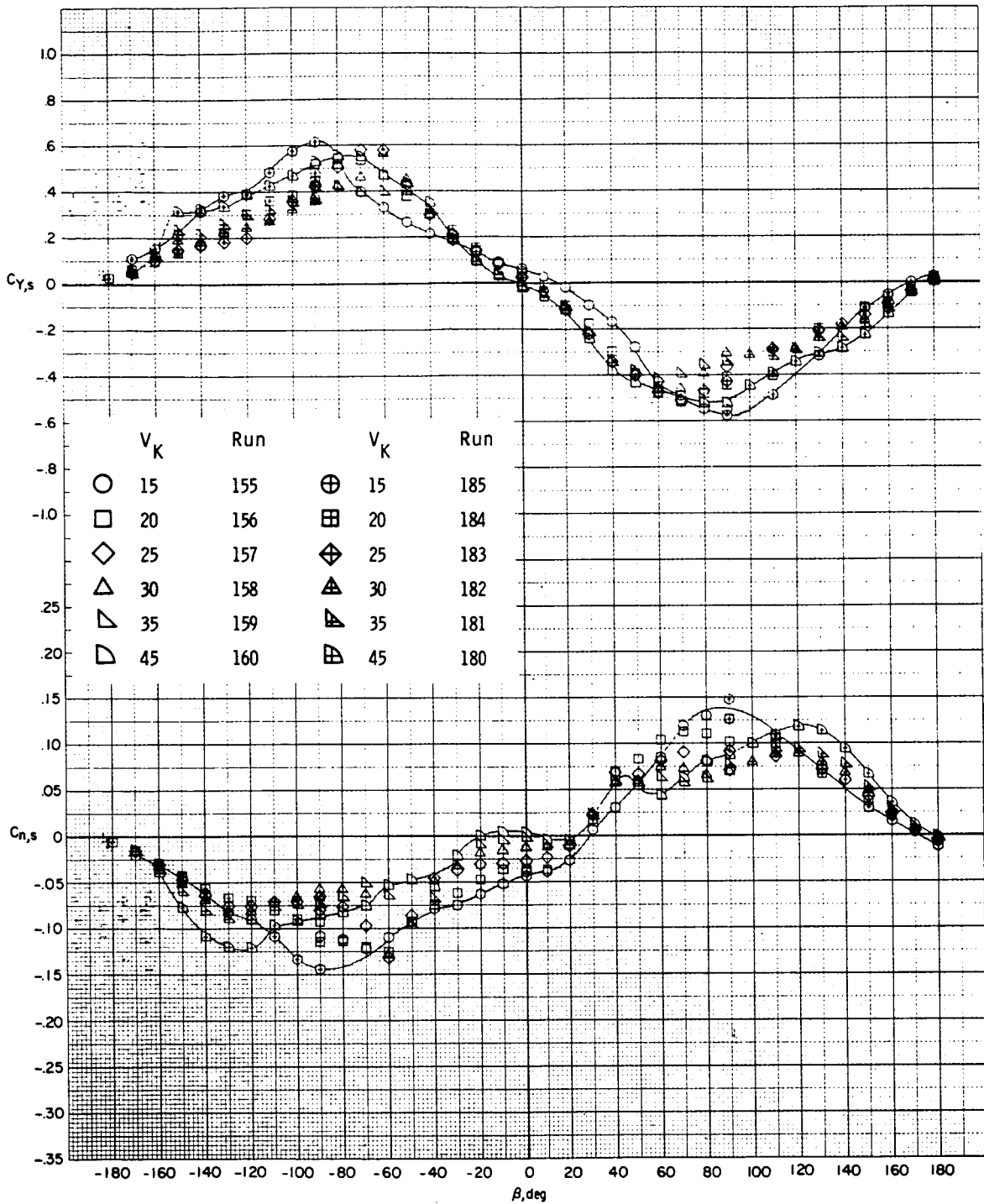
Figure 31.- Effect of rotor wake on directional characteristics (slipstream) on model 2 without tail for windspeeds of 15 to 45 knots.
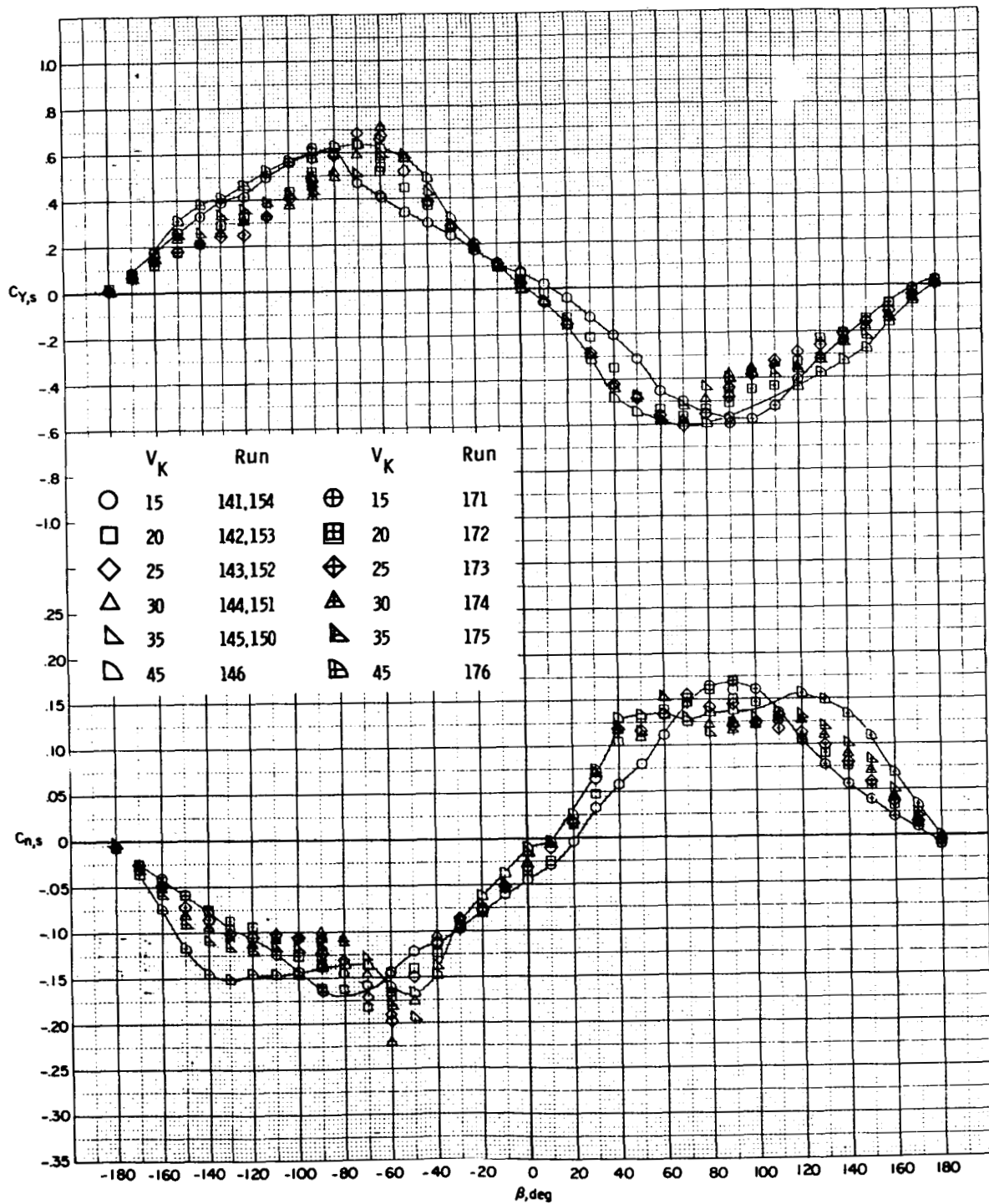
Figure 32.- Effect of rotor wake on directional characteristics (slipstream) on
model 2 with tail for windspeeds of 15 to 45 knots.

Conf. Run   Conf. Run

○ 31   46   ⊕ 41   107

□ 35   158   ⊞ 45   182

$C_{Y,s}$

$C_{n,s}$

β, deg
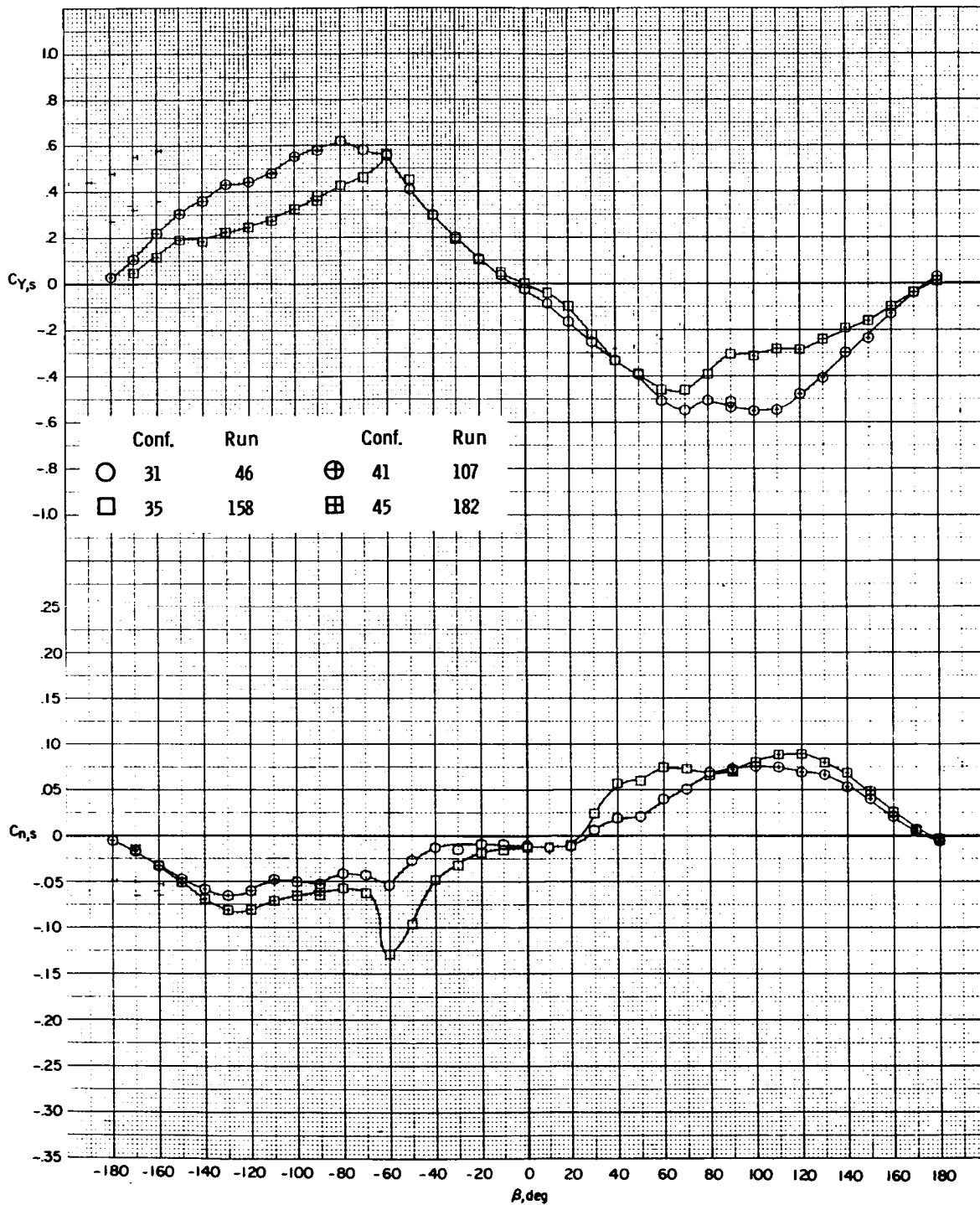
Figure 33.- Comparison of directional characteristics (slipstream) of
models 1 and 2 without tail. $V_K = 30$.
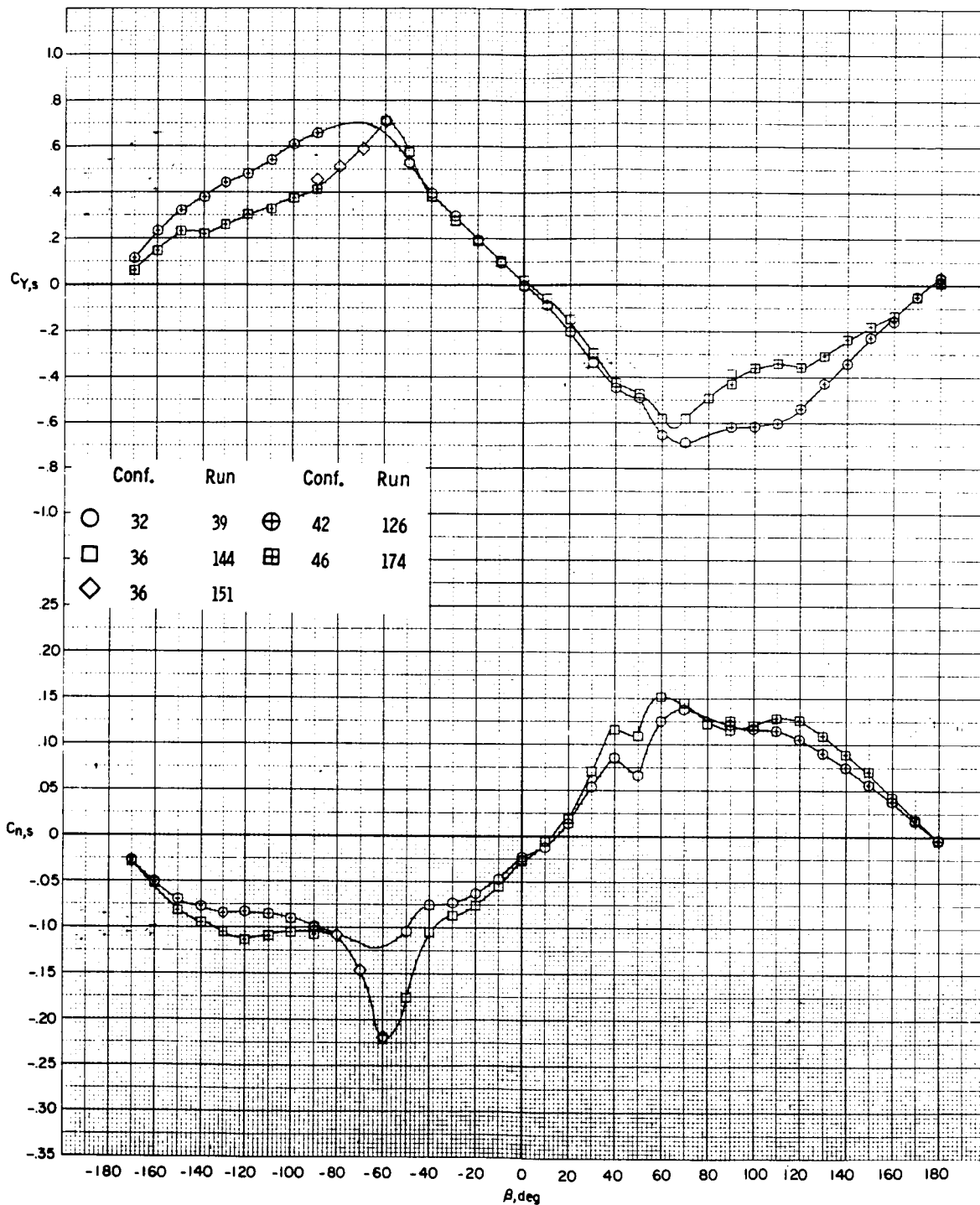
Figure 34.- Comparison of directional characteristics (slipstream) of
models 1 and 2 with standard vertical tail. $V_K = 30$.
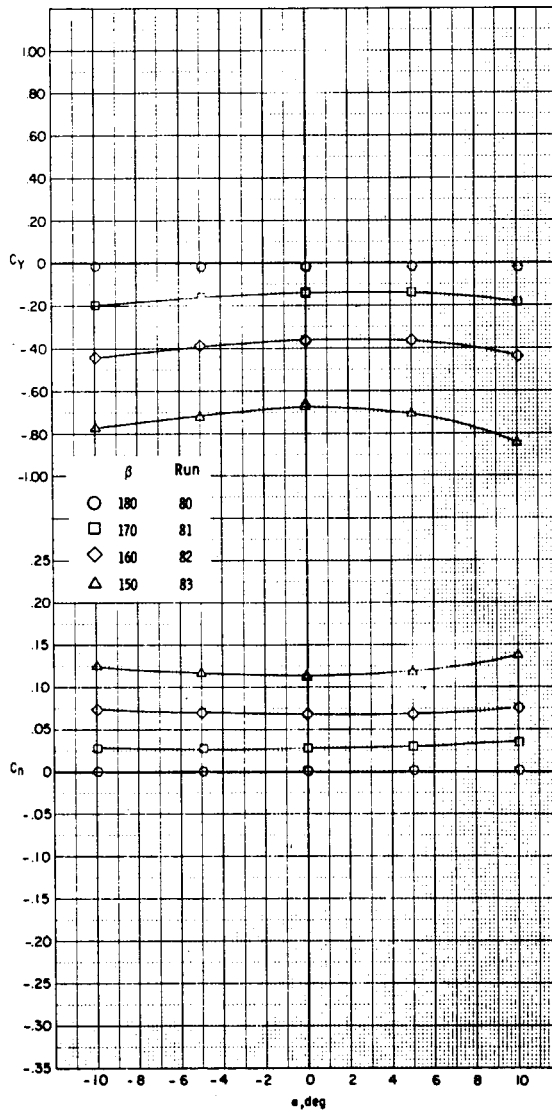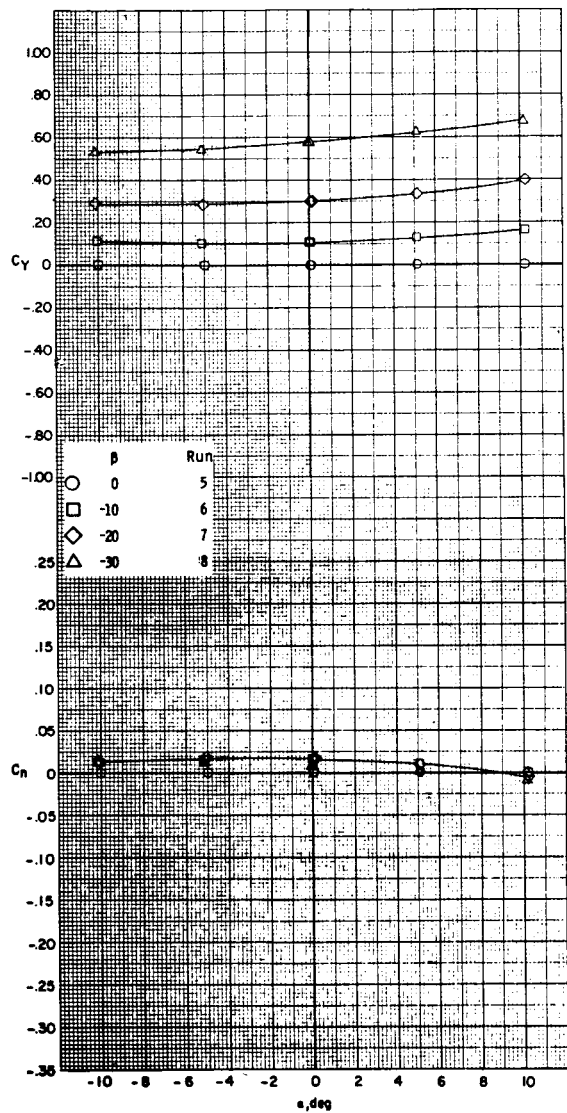
Figure 35.- Effect of angle of attack on directional characteristics on
model 1 without rotor or tail.
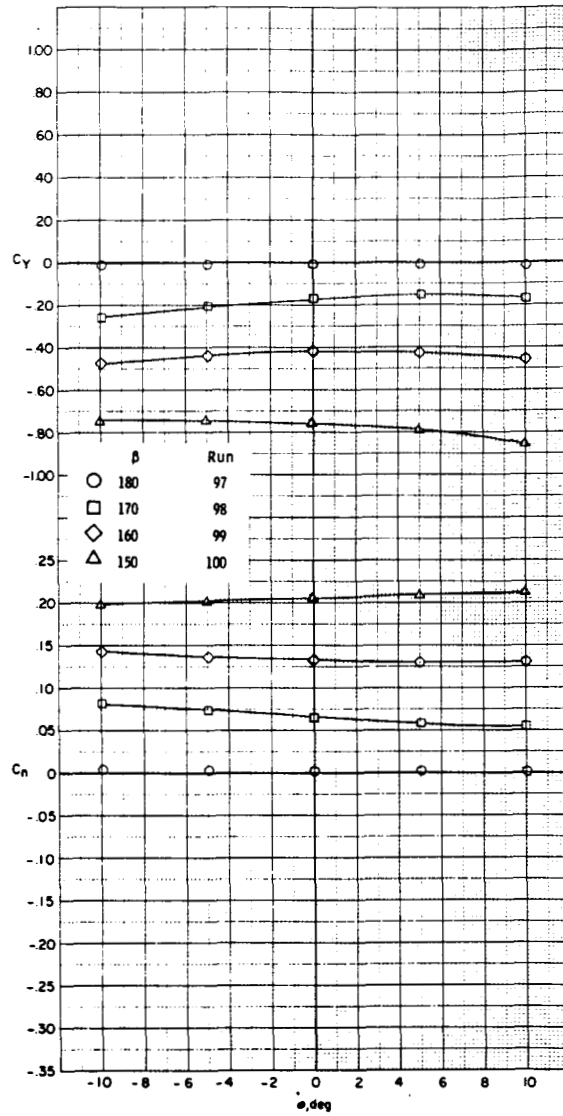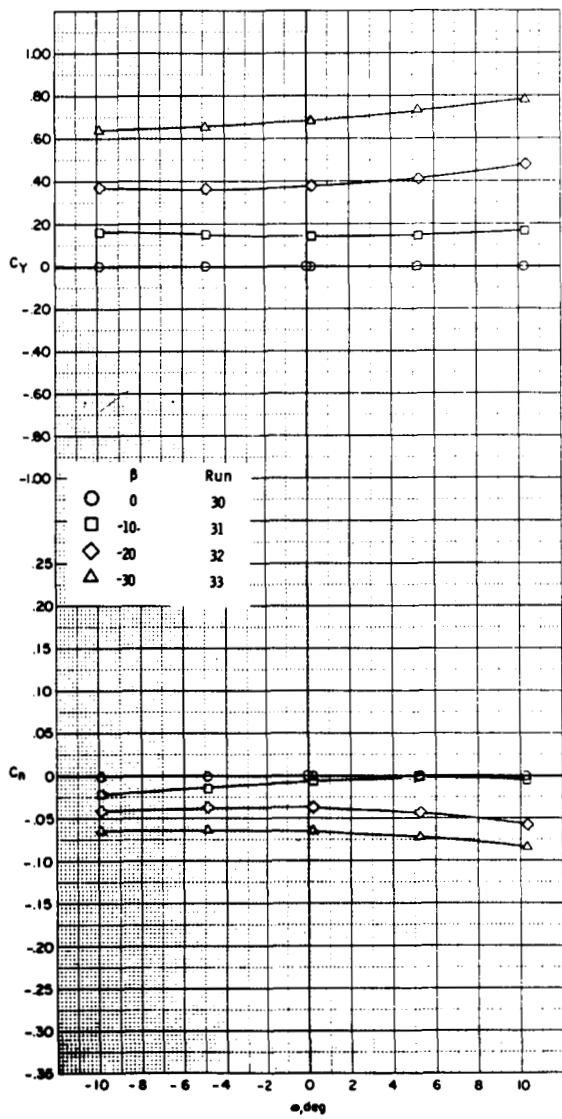
Figure 36.- Effect of angle of attack on directional characteristics on model 1
without rotor and with standard vertical tail (configuration 12).
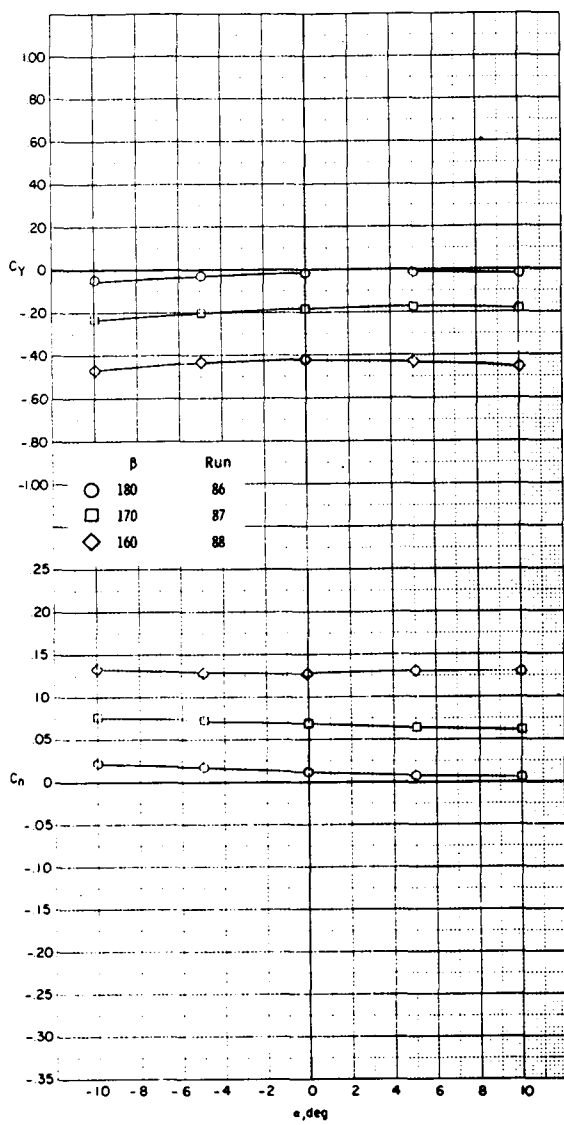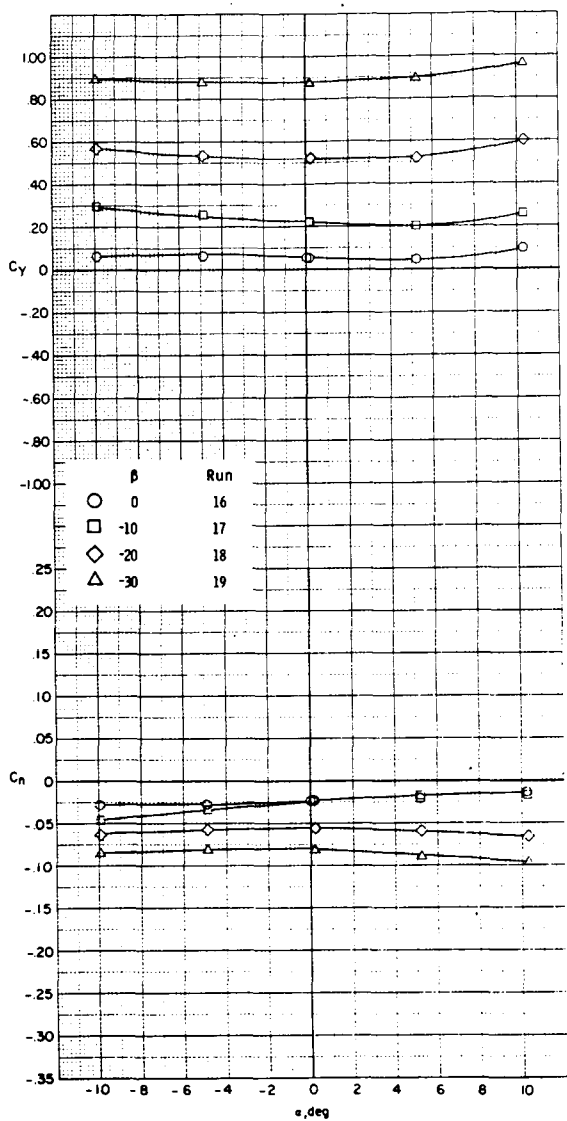
Figure 37.- Effect of angle of attack on directional characteristics on model 1 without rotor and with cambered vertical tail (configuration 13).
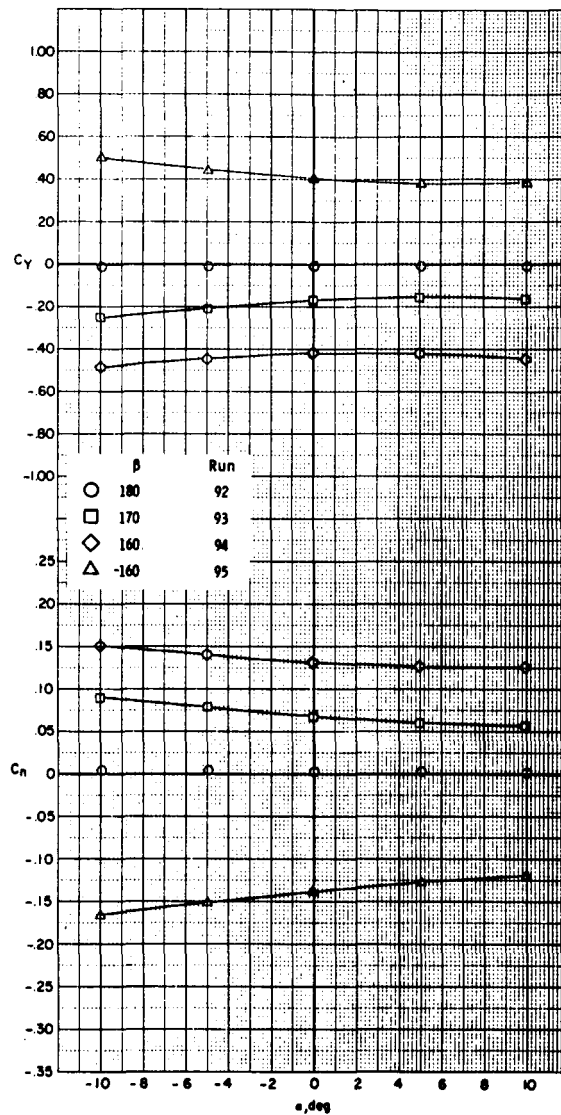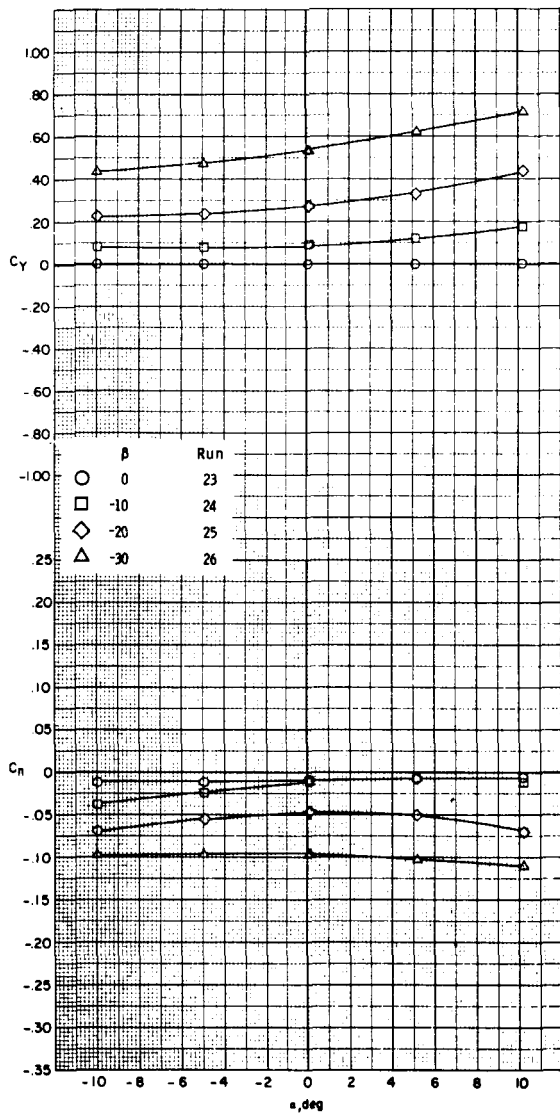
Figure 38.- Effect of angle of attack on directional characteristics on model 1 without rotor and with V vertical tail (configuration 14).

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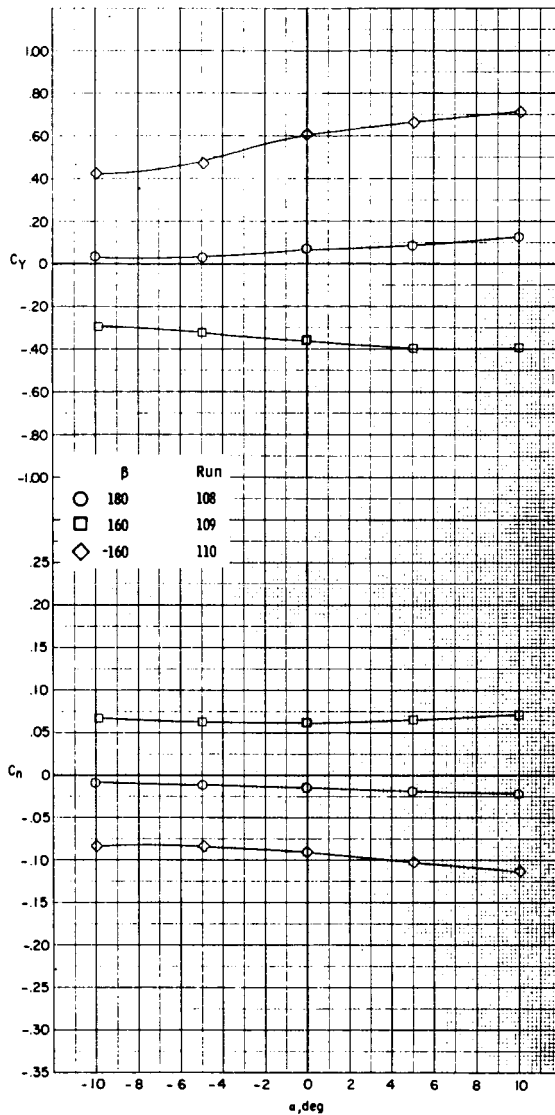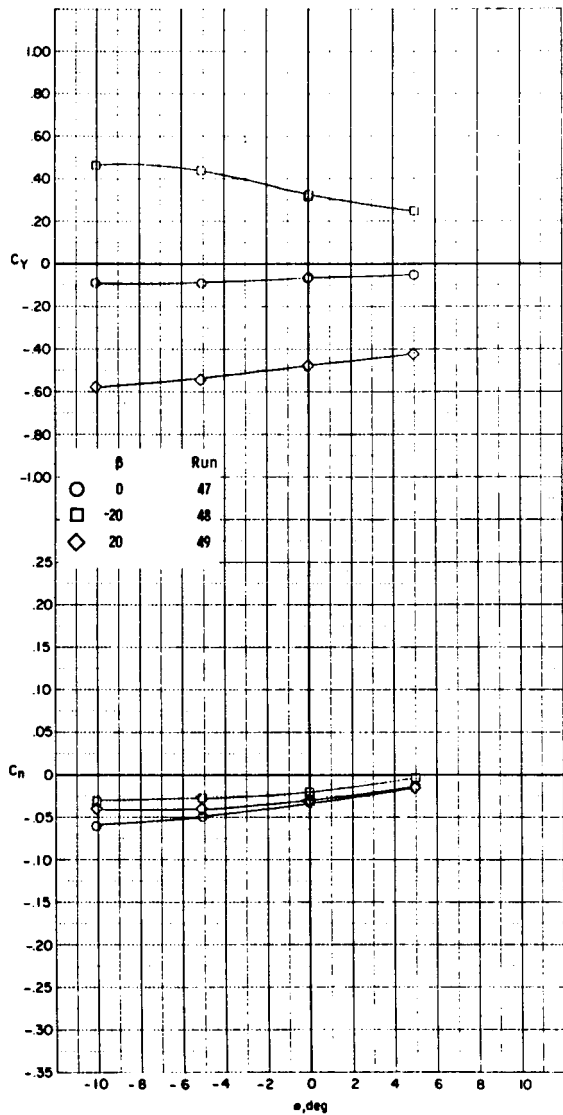
Figure 39.- Effect of angle of attack on directional characteristics on model 1 with rotor and without tail. $V_K = 30$.
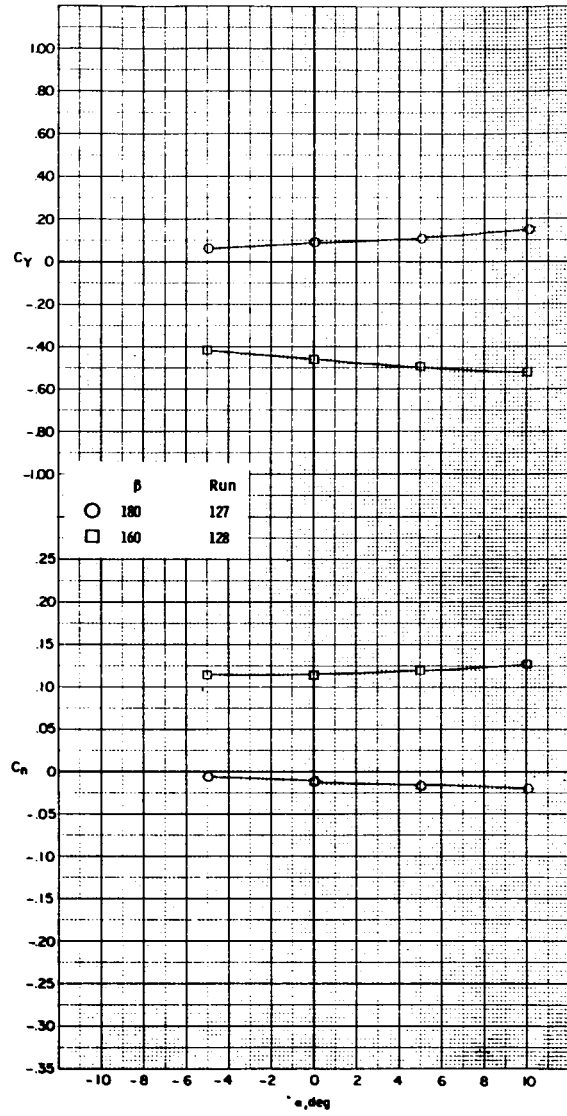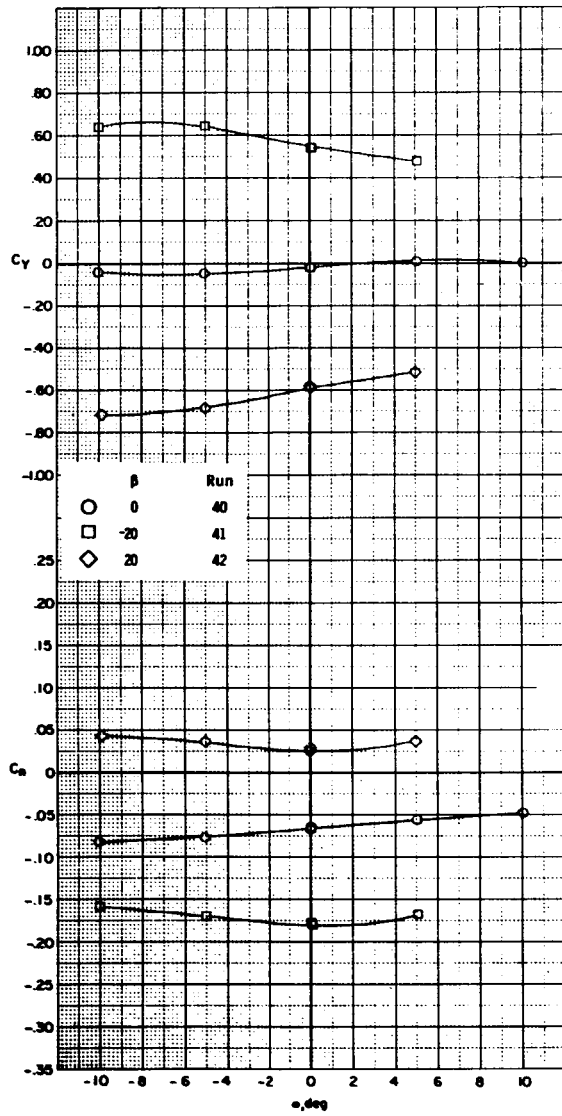
Figure 40.- Effect of angle of attack on directional characteristics on model 1 with rotor and with standard vertical tail (configuration 32). $V_K = 30$.
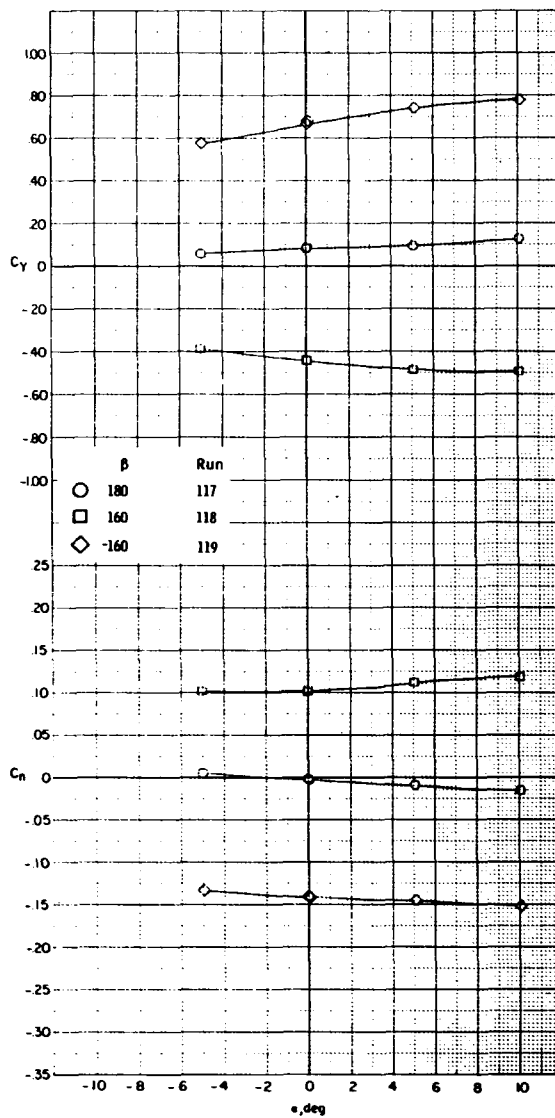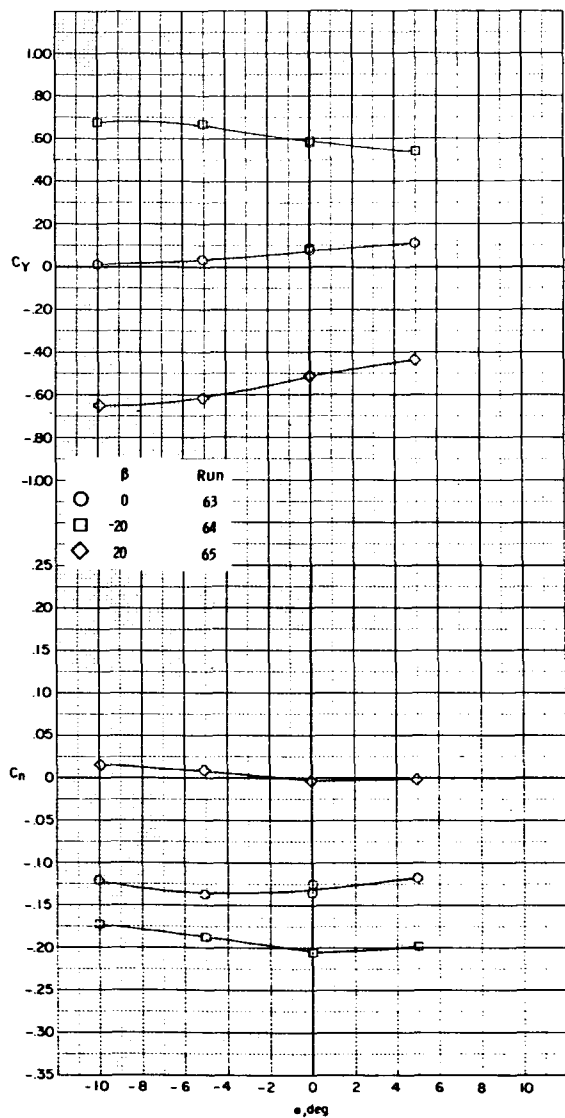
Figure 41.- Effect of angle of attack on directional characteristics on model 1 with rotor and with cambered vertical tail (configuration 33). $V_K = 30$.
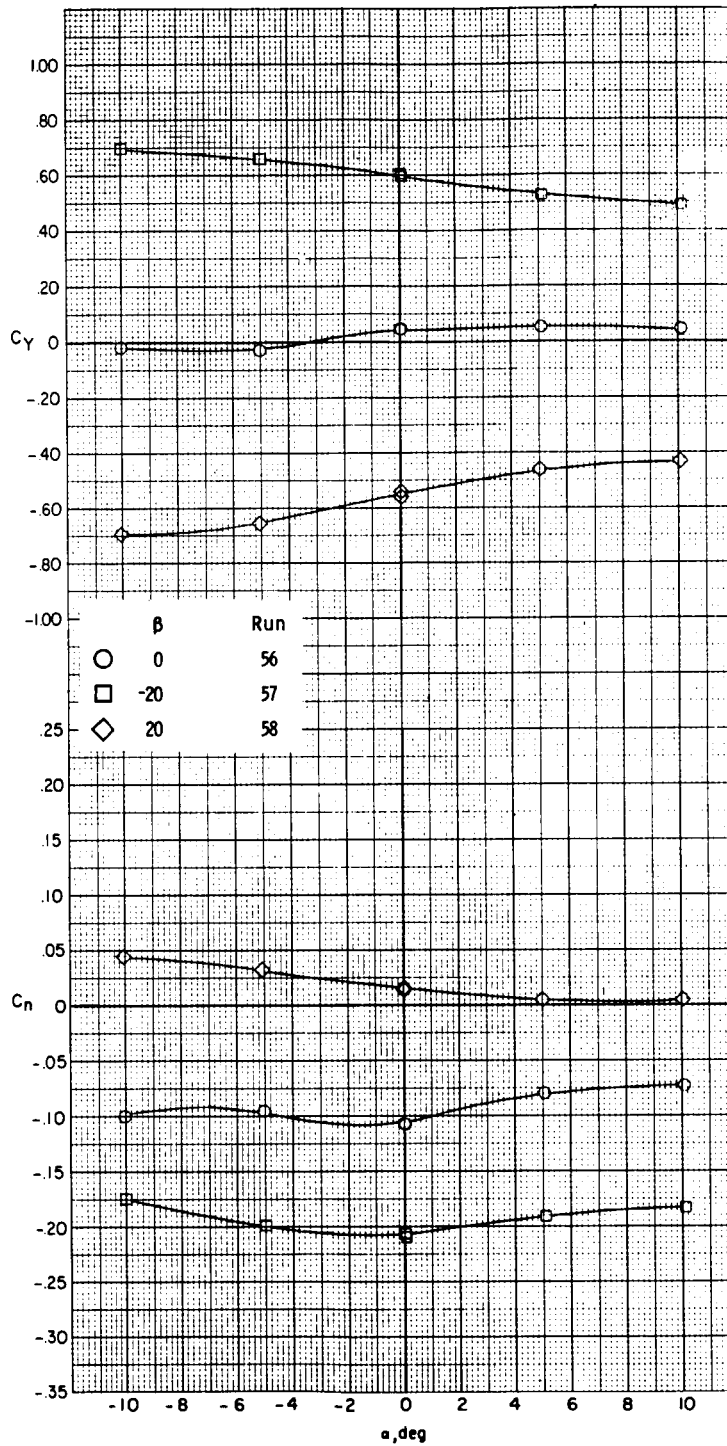
Figure 42.- Effect of angle of attack on directional characteristics on model 1 with rotor and V vertical tail (configuration 34). $V_K = 30$.

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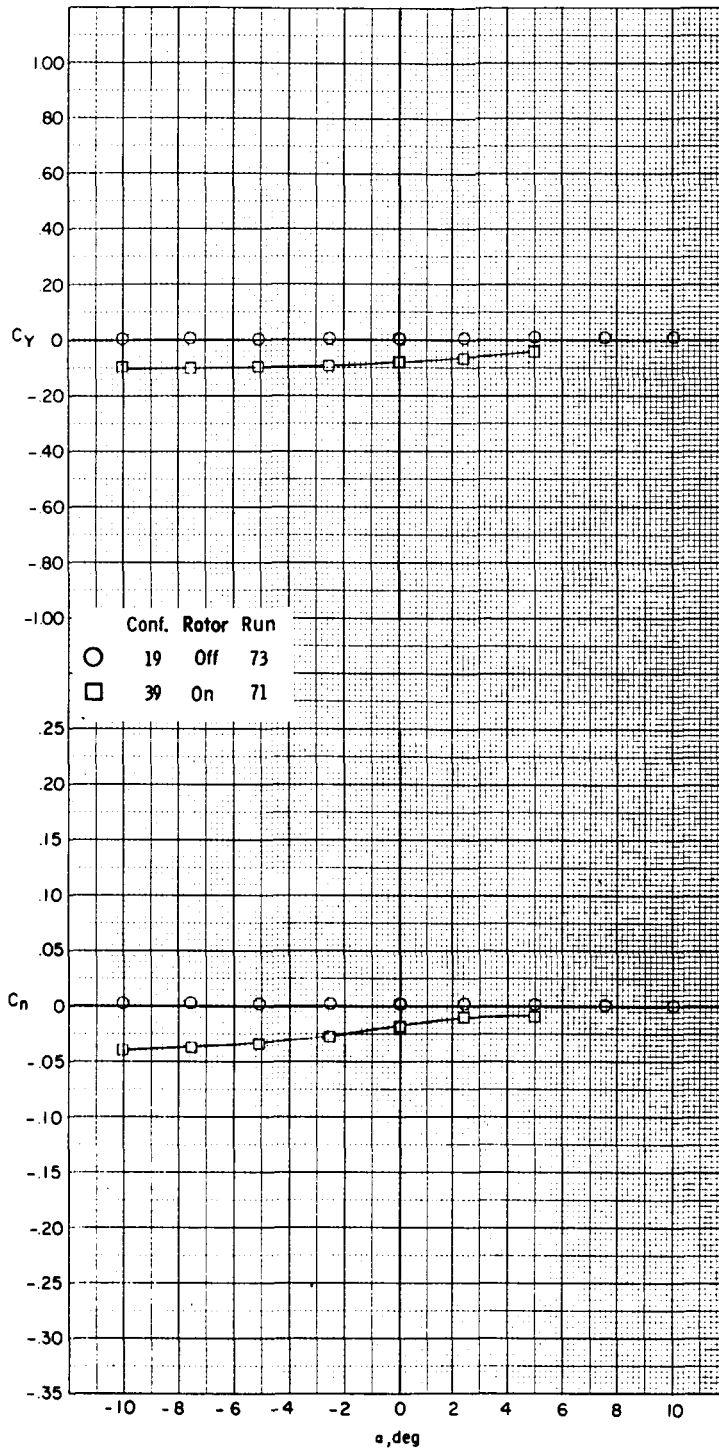
Figure 43.- Effect of angle of attack on directional characteristics on model 1 with horizontal tail with and without rotor.
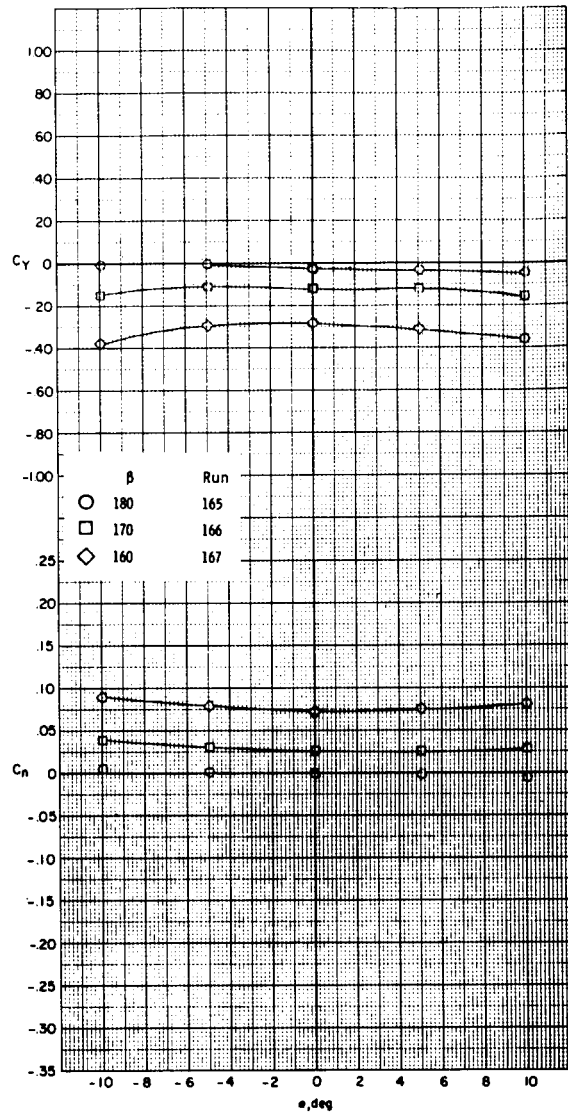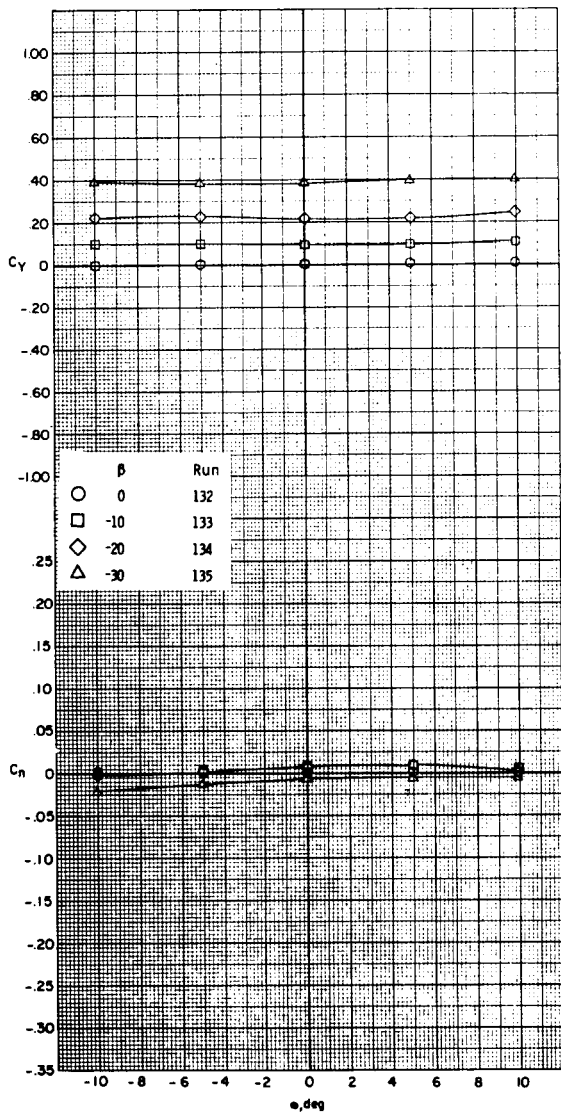
Figure 44.- Effect of angle of attack on directional characteristics on
model 2 without rotor or tail.
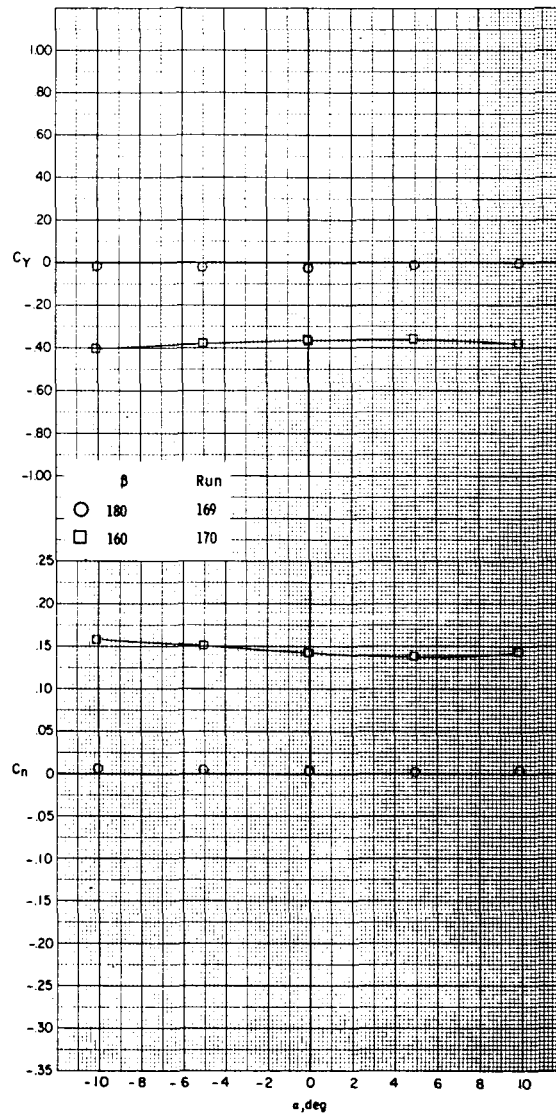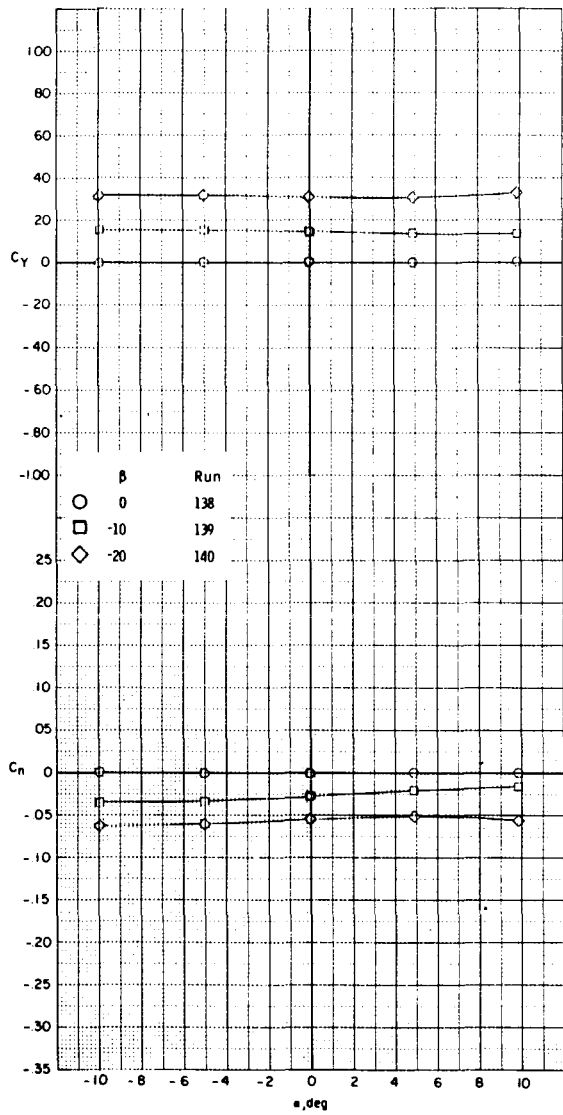
Figure 45.- Effect of angle of attack on directional characteristics on
model 2 without rotor but with tail.
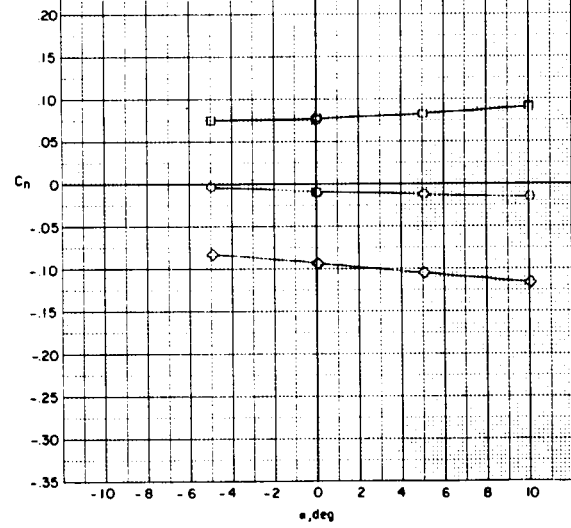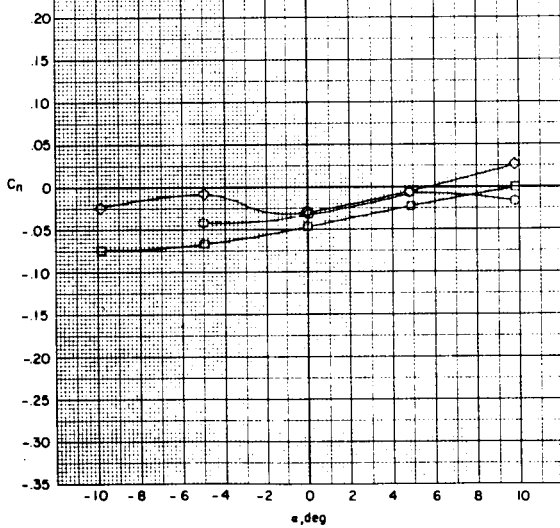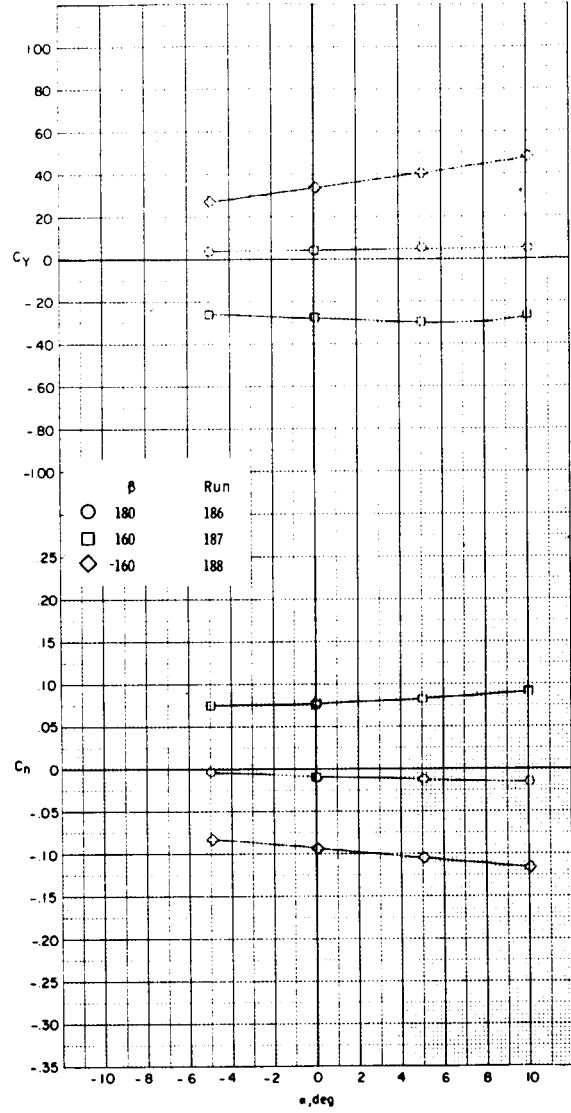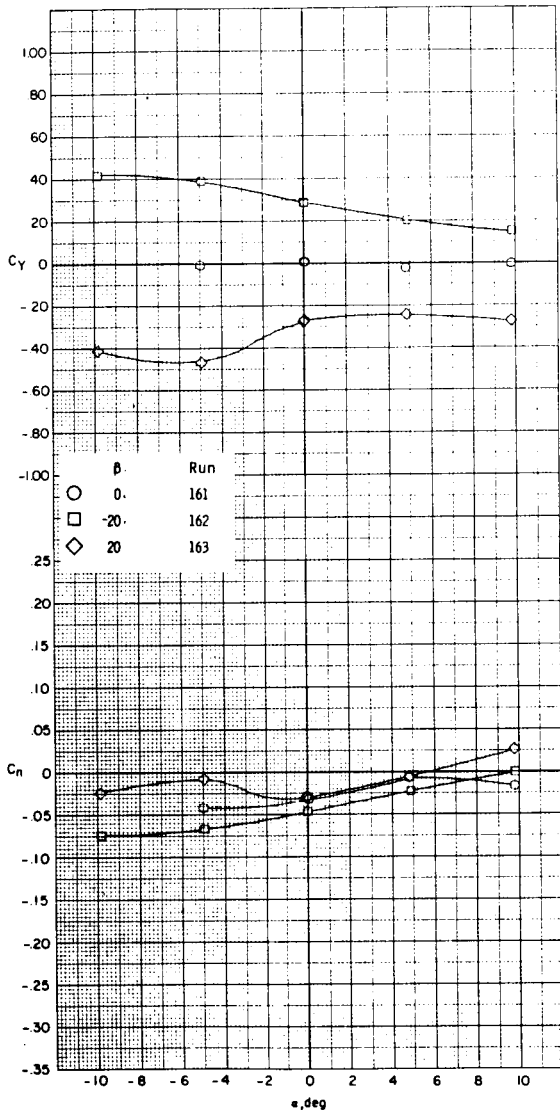
Figure 46.- Effect of angle of attack on directional characteristics on model 2 with rotor but without tail. $V_K = 30$.
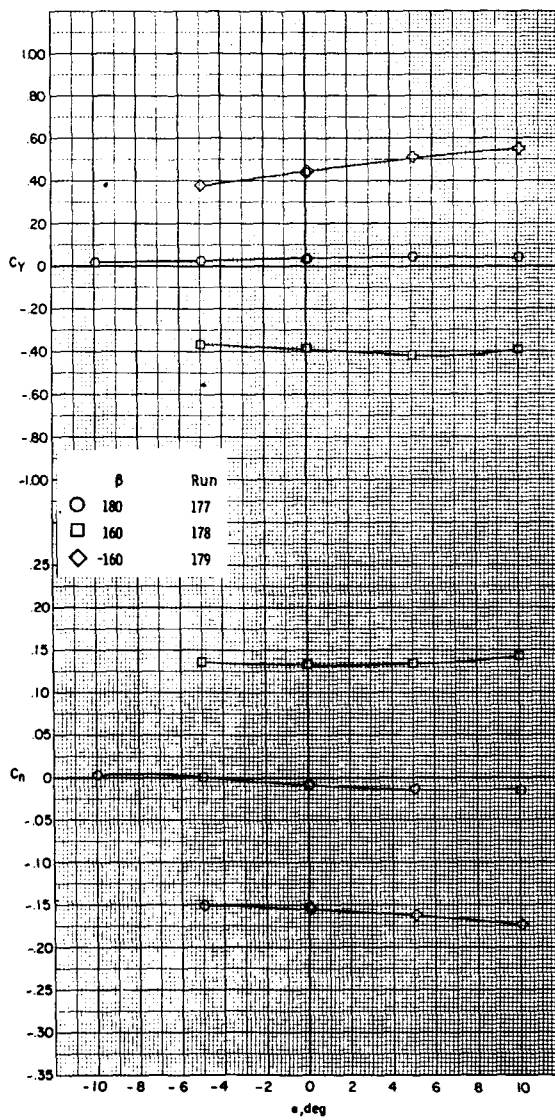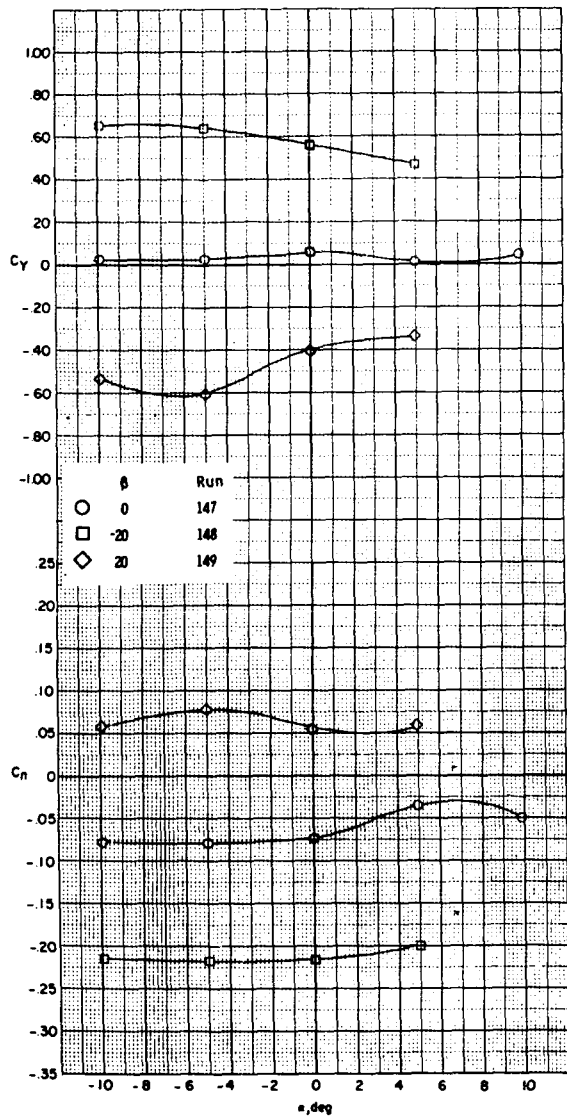
Figure 47.- Effect of angle of attack on directional characteristics on model 2 with rotor and tail.

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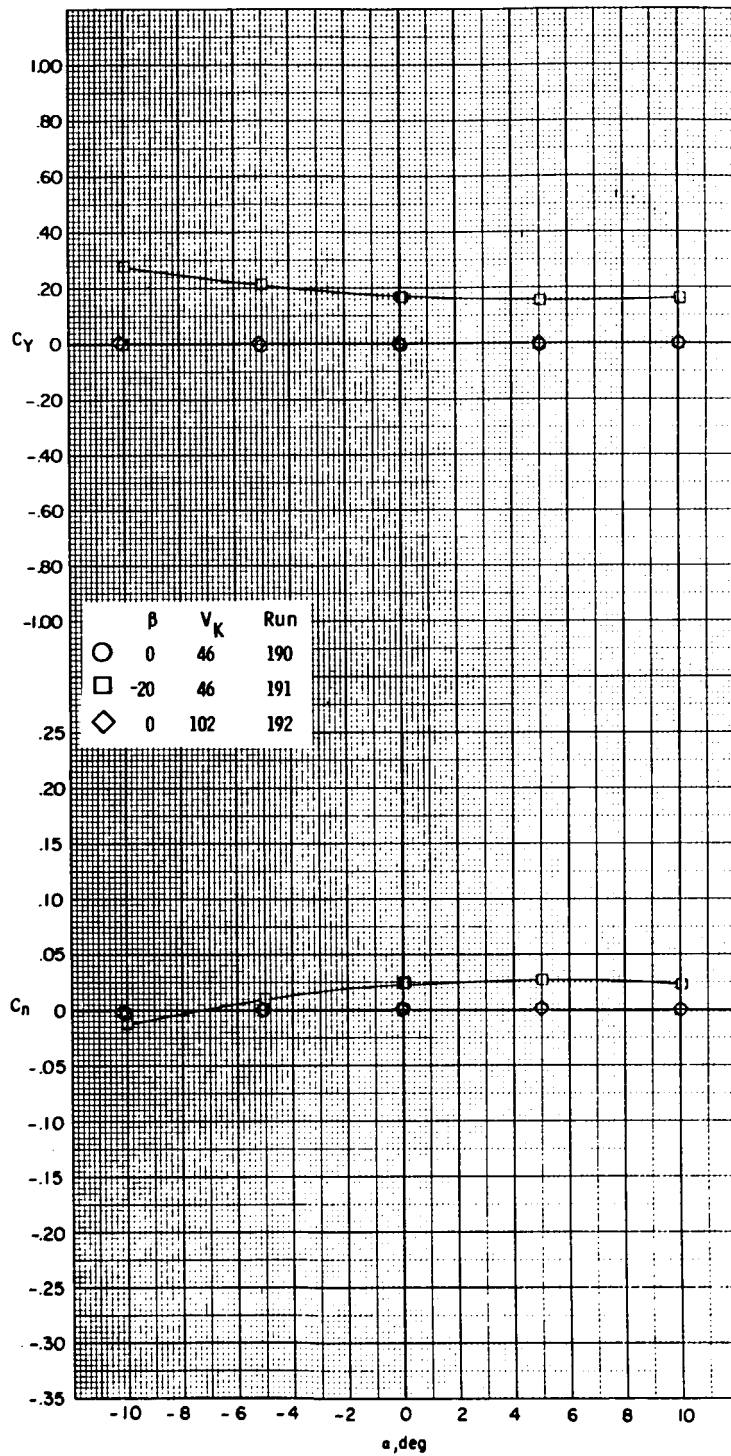
Figure 48.- Effect of angle of attack on directional characteristics on model 3.

(a) Model 1 without tail.

(b) Model 1 with configuration 12 tail.
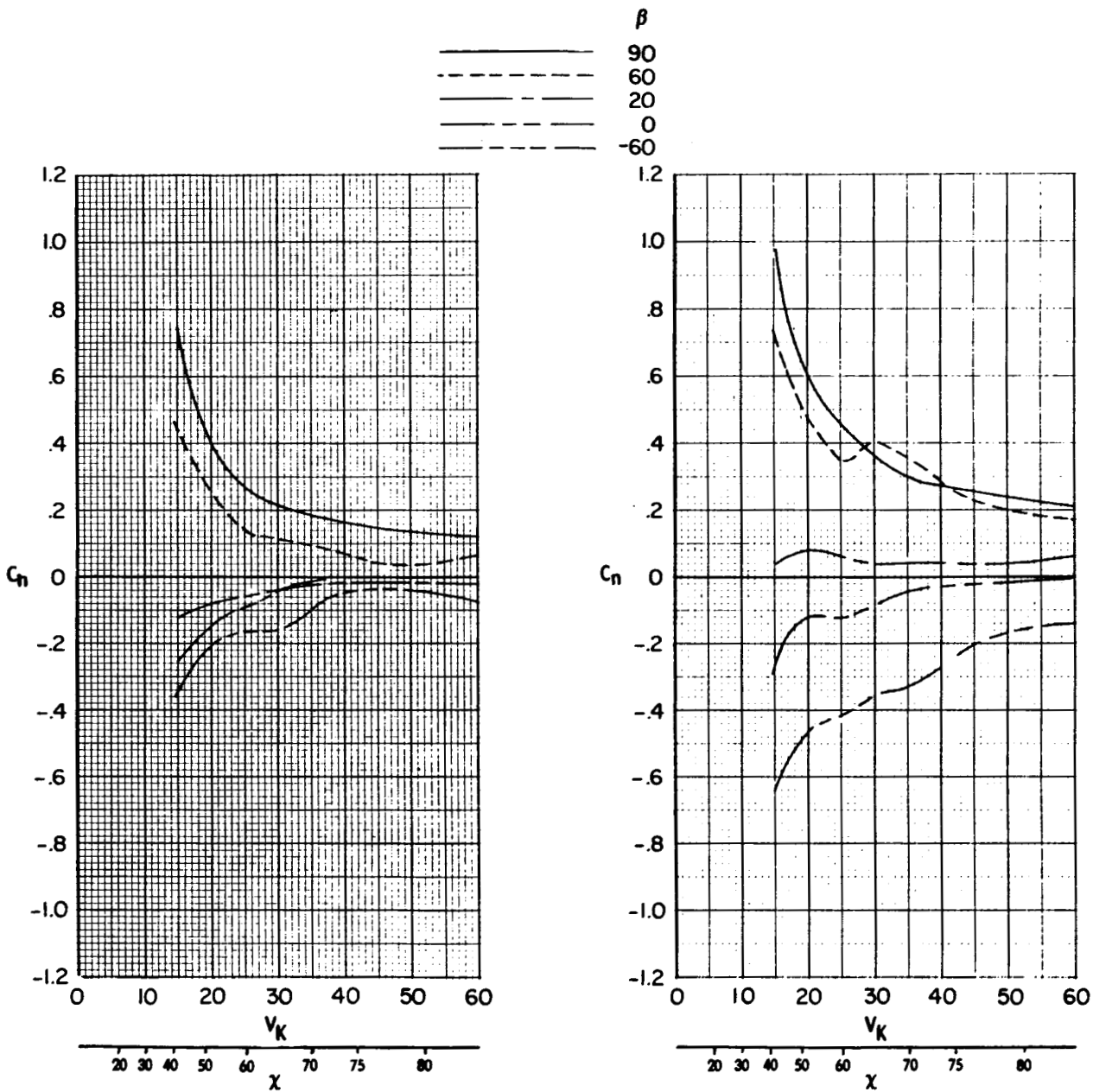
Figure 49.- Variation of yawing moment with windspeed at several angles of sideslip.
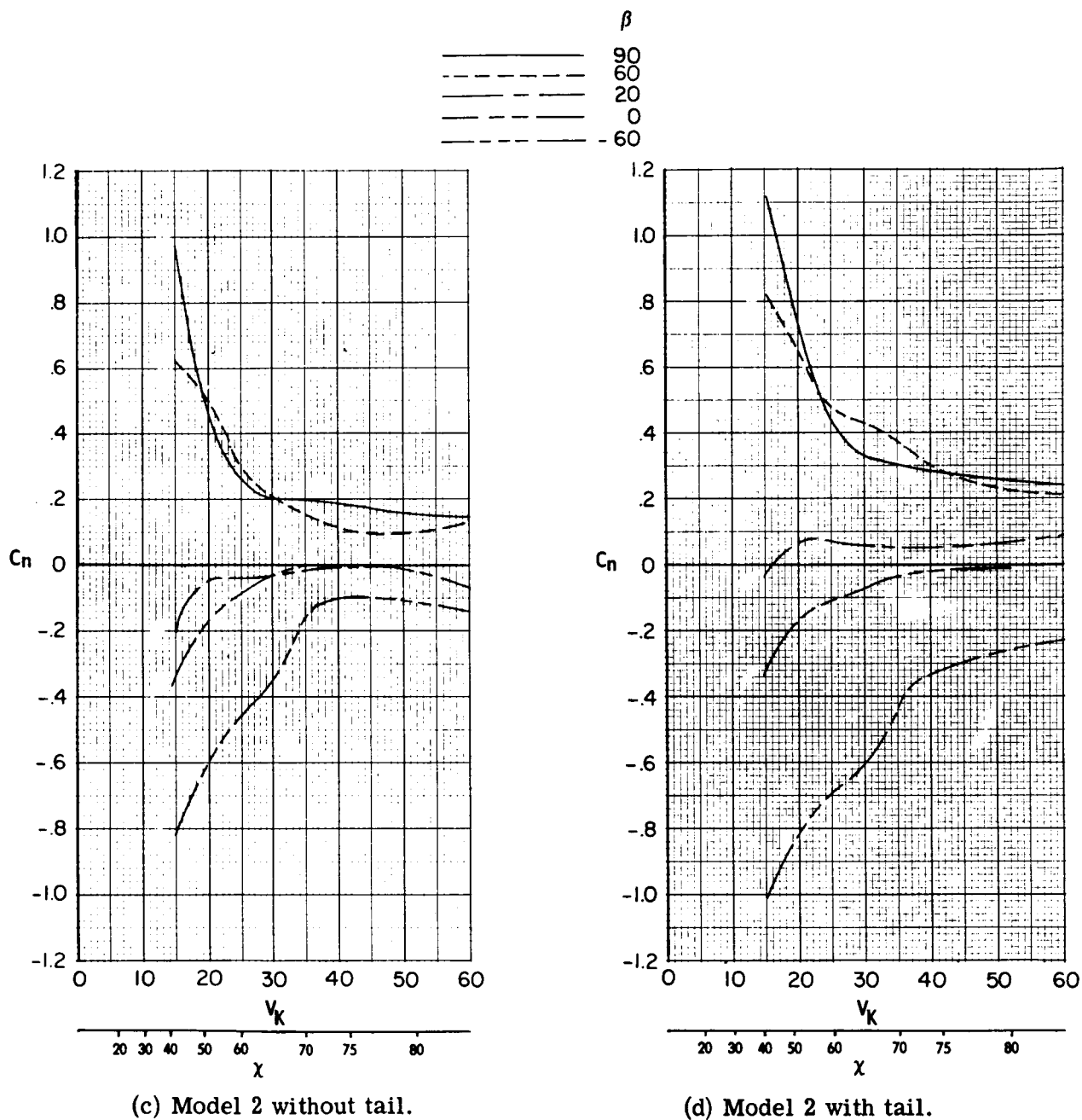
(c) Model 2 without tail. (d) Model 2 with tail.

Figure 49.- Concluded.
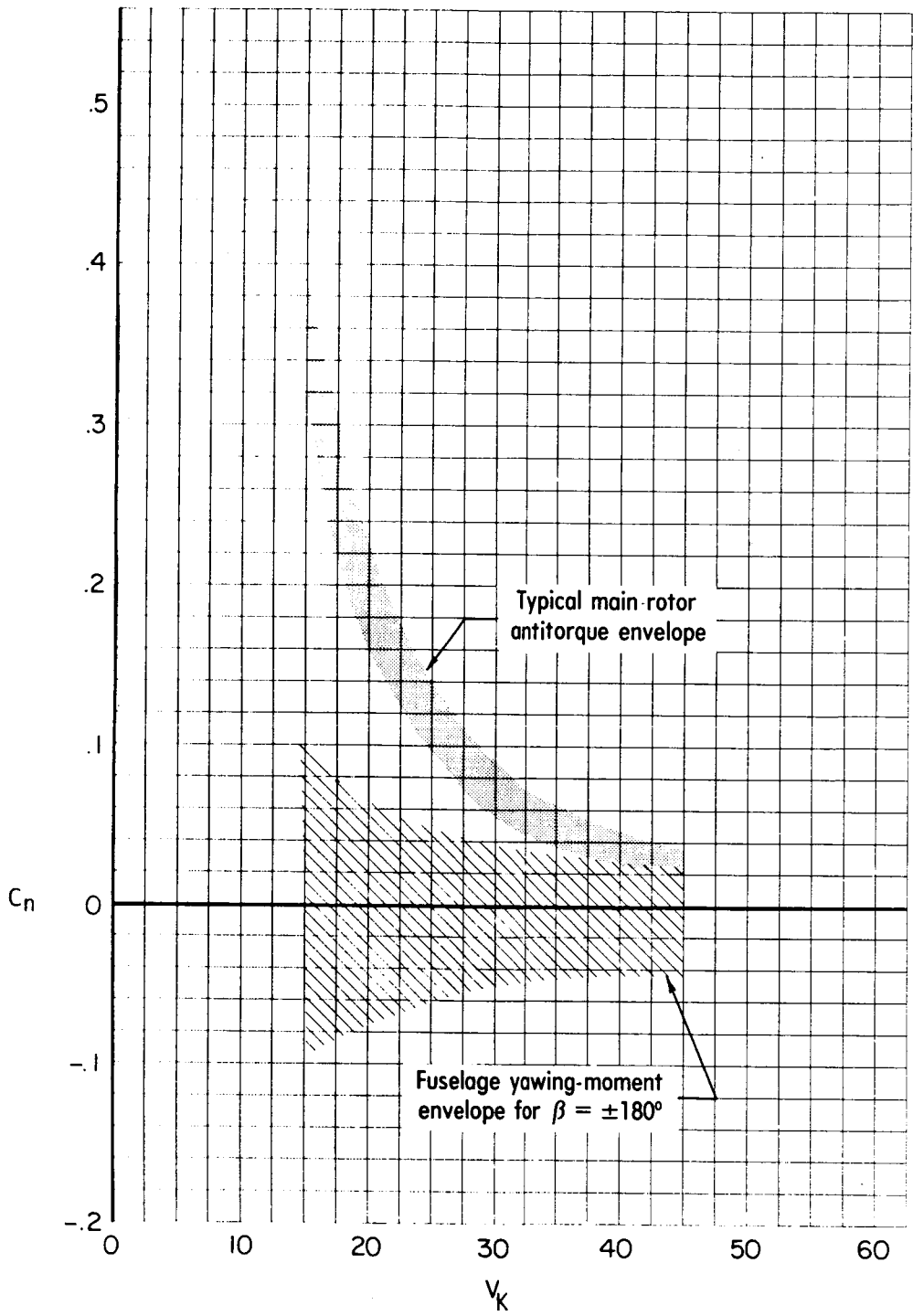
(a) Yawing-moment coefficient.

Figure 50.- Comparison of fuselage yawing-moment envelope (model 2 with tail) with main rotor antitorque required of tail rotor.
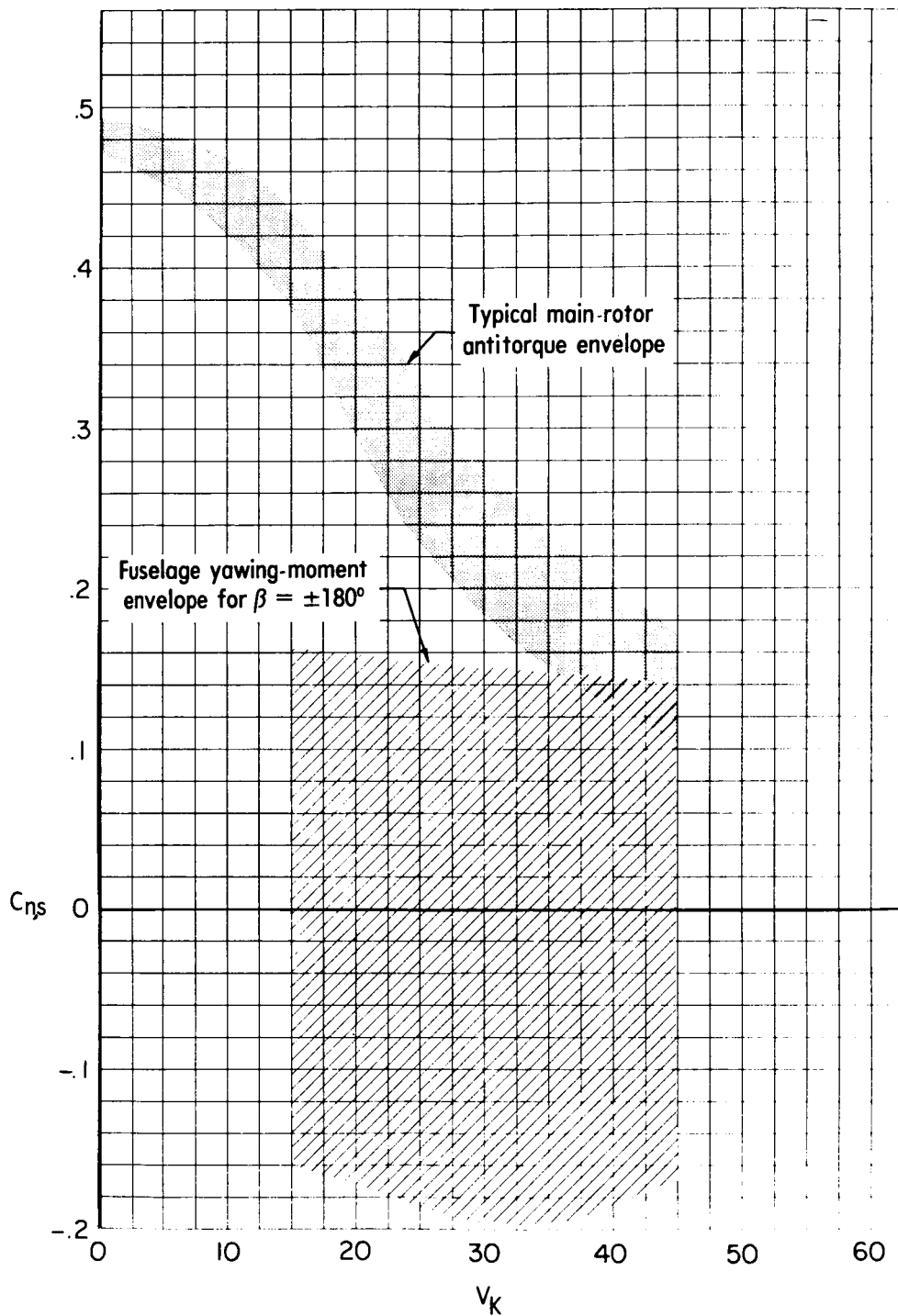
(b) Slipstream yawing-moment coefficient.

Figure 50.- Concluded.
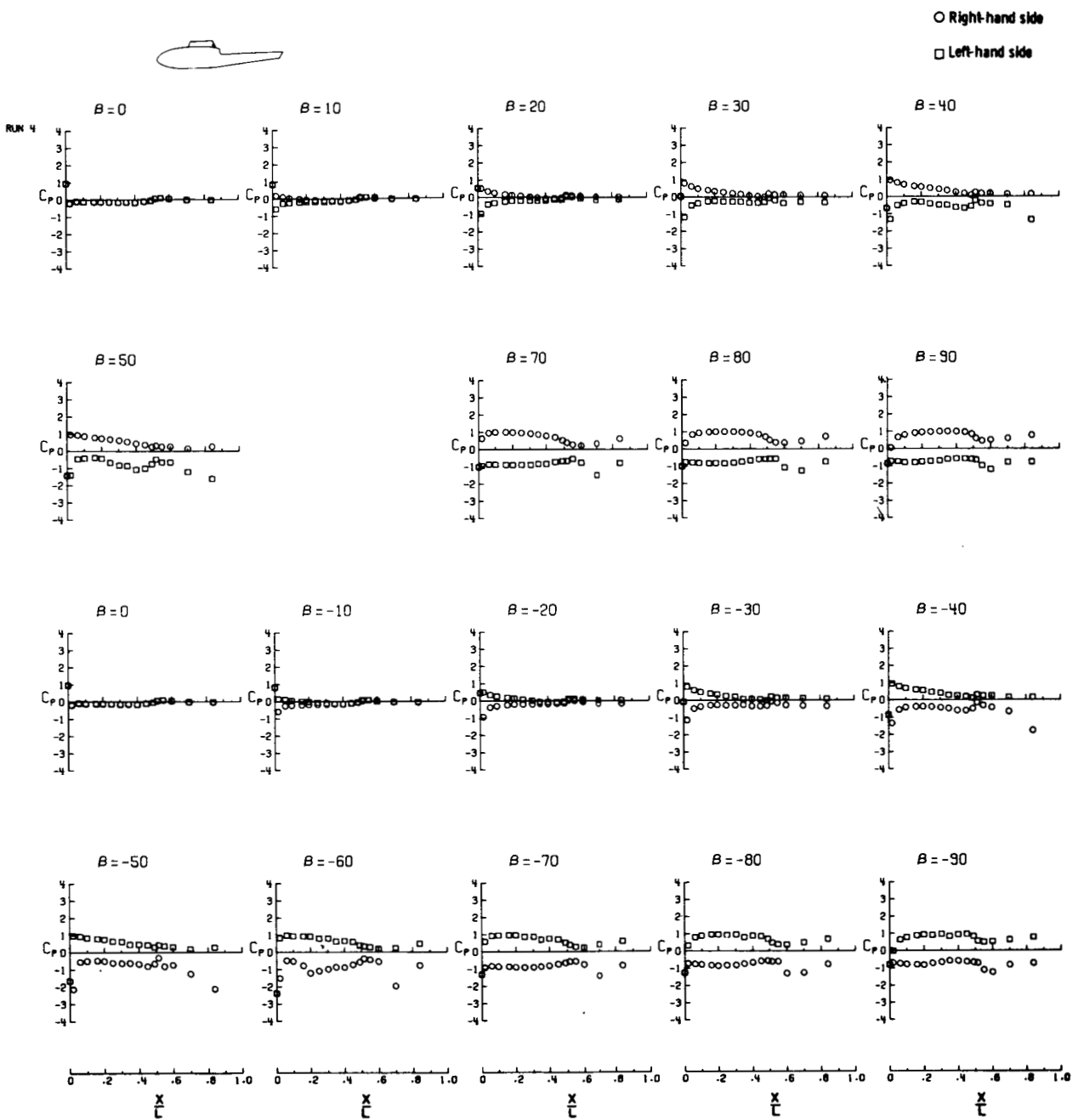
Figure 51.- Effect of sideslip angles on pressure distribution on model 1
without rotor or tail. Forward flight.
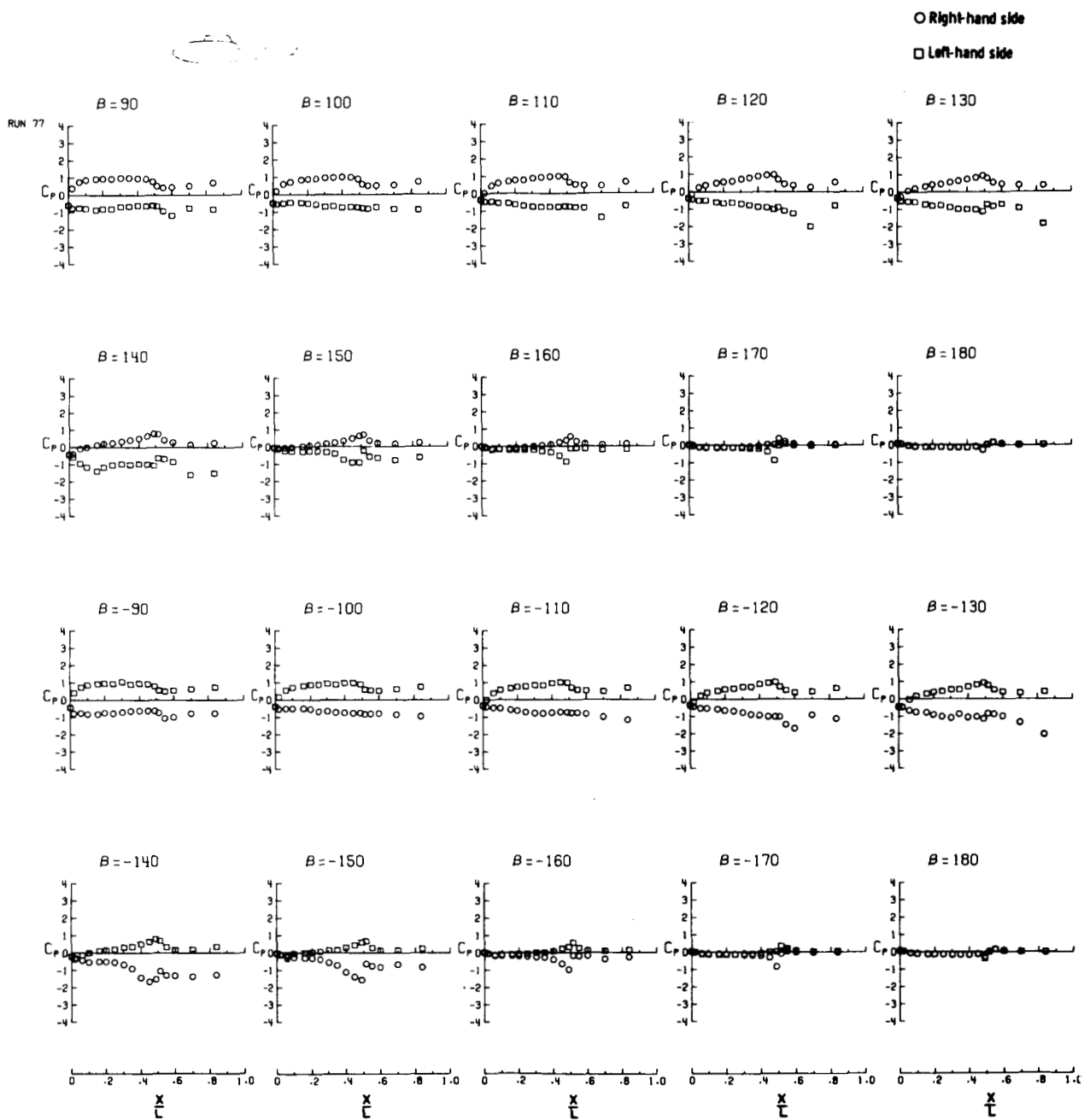
Figure 52.- Effect of sideslip angles on pressure distribution on model 1 without rotor or tail. Rearward flight.
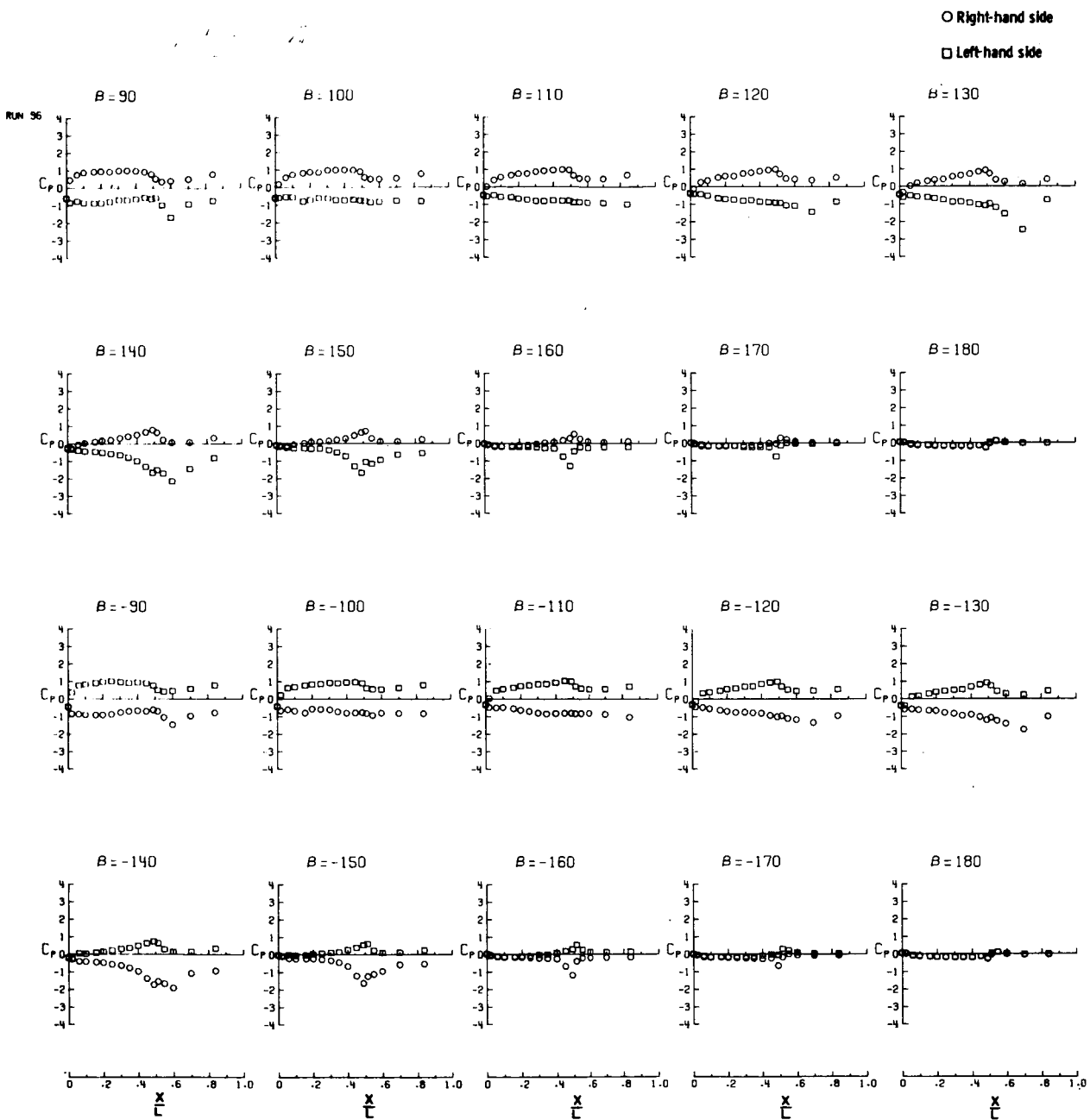
Figure 53.- Effect of sideslip angles on pressure distribution on model 1
without rotor and with standard tail. Configuration 12, rearward
flight.
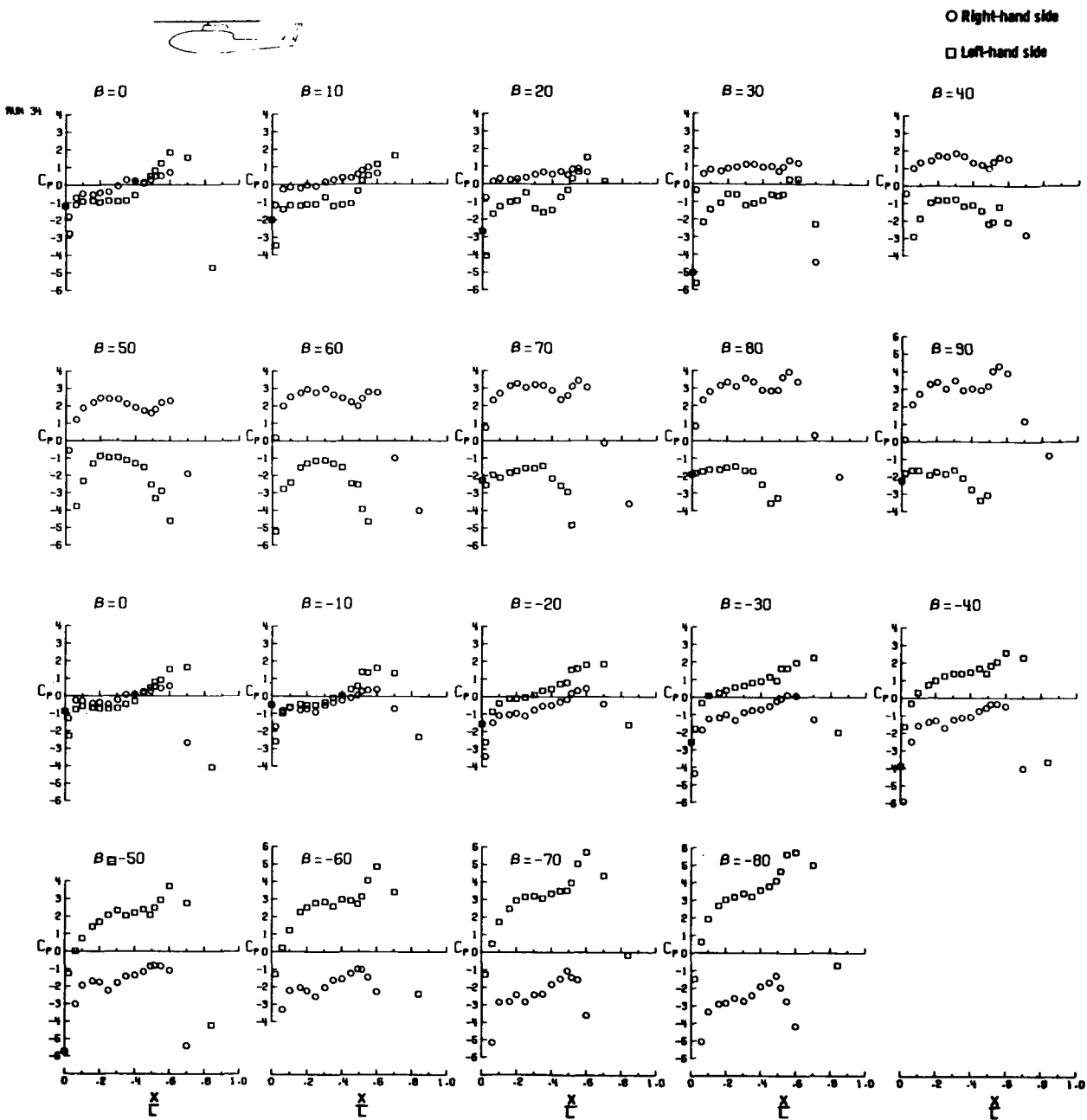
(a) $V_K = 15$.

Figure 54.- Effect of sideslip angles on pressure distribution on model 1
with rotor and configuration 12 tail. Forward flight.
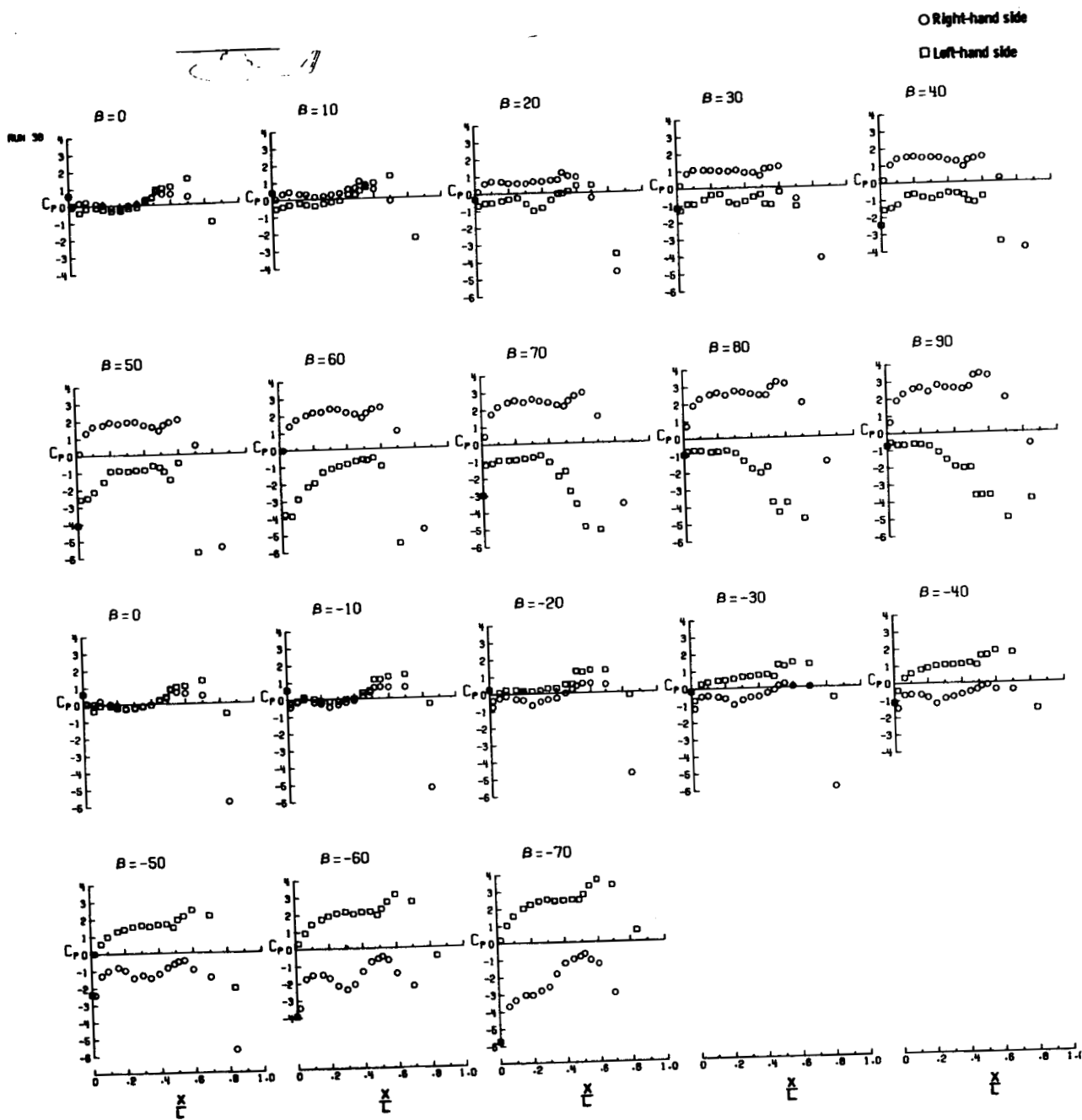
(b) $V_K = 20.$

Figure 54.- Continued.

O Right-hand side
□ Left-hand side
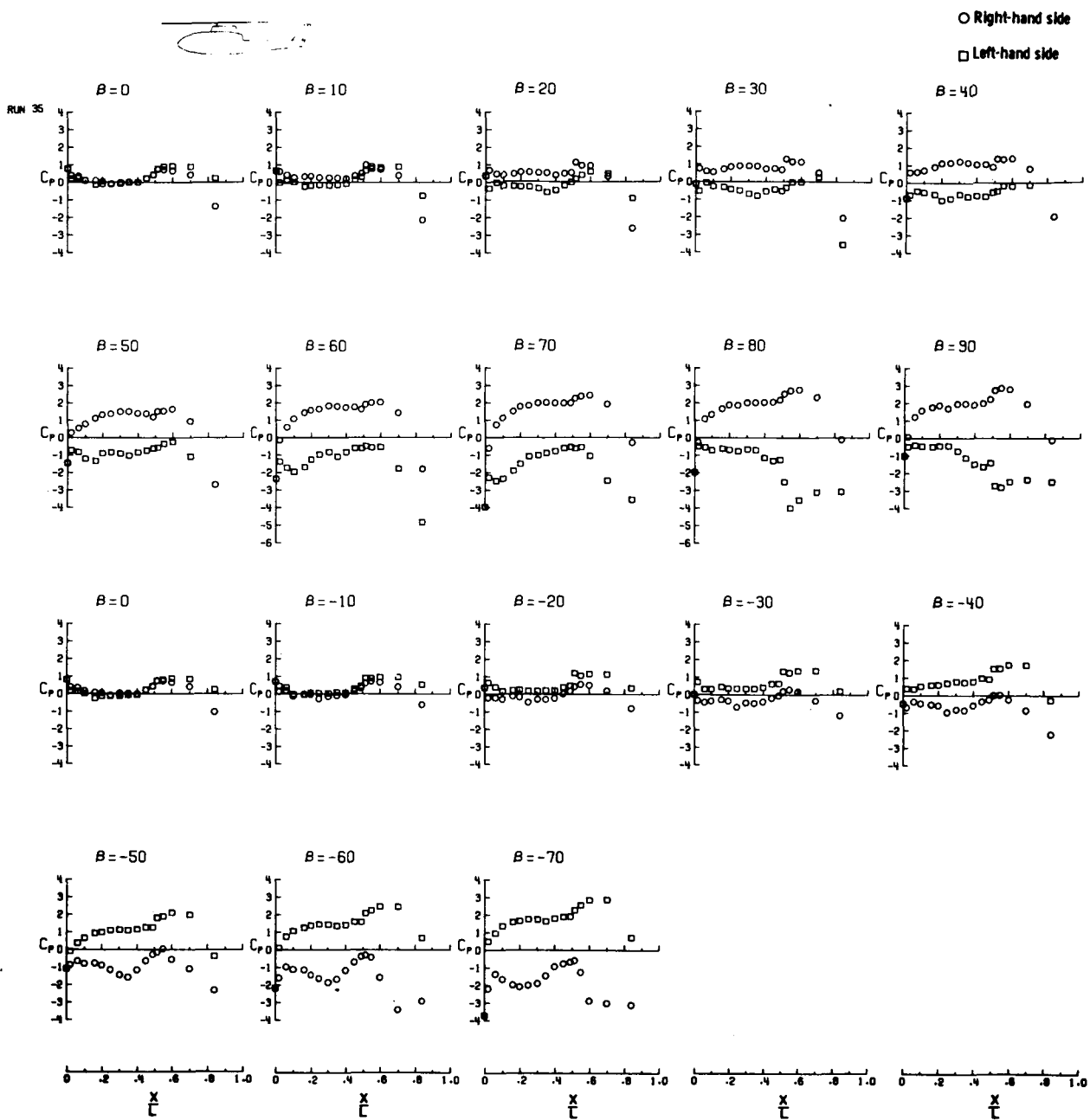
(c) $V_K = 25$.

Figure 54.- Continued.

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O Right-hand side
□ Left-hand side
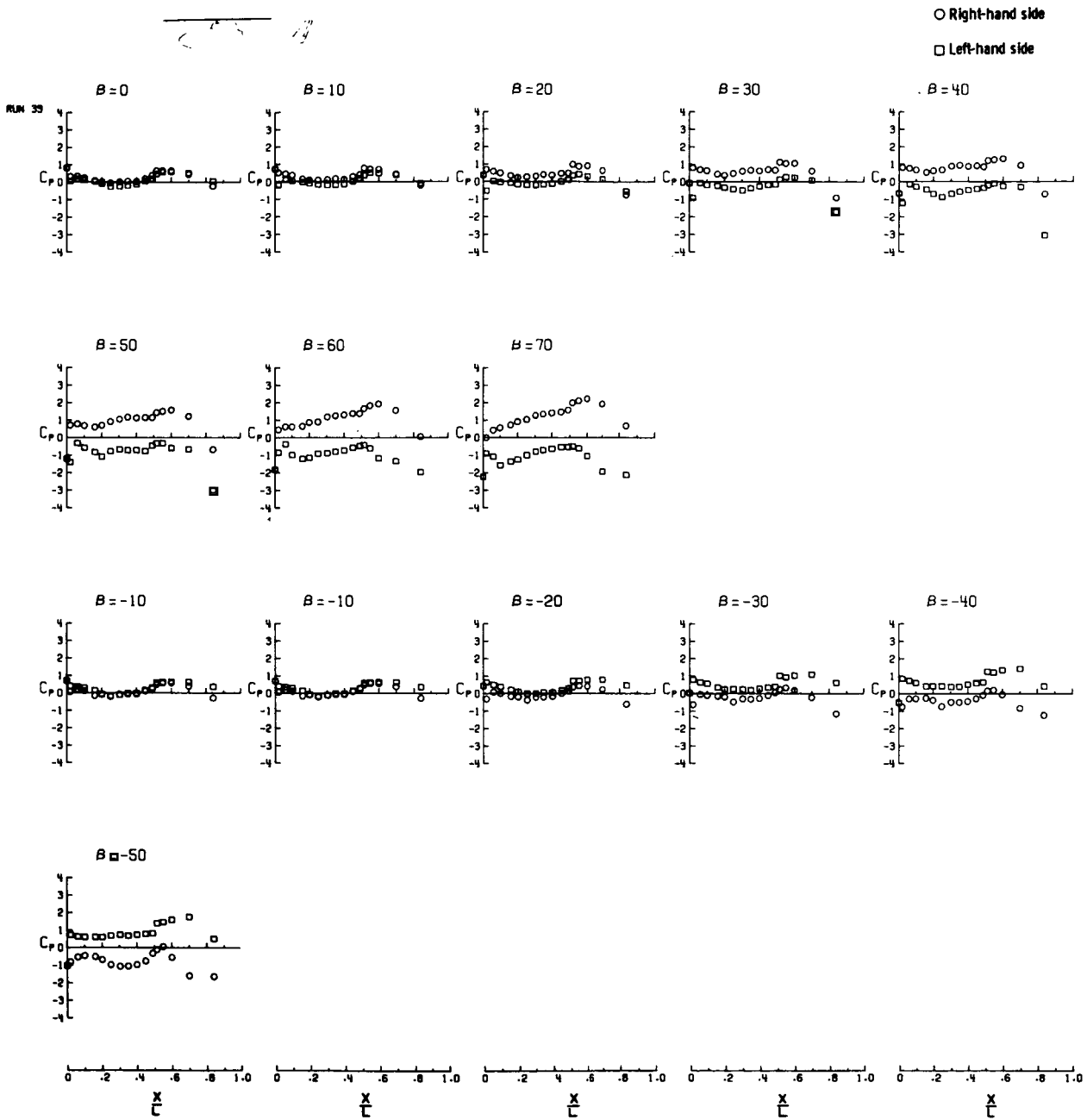
(d) $V_K = 30$.

Figure 54.- Continued.

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RUN 36

$B = 0$ $B = 10$ $B = 20$ $B = 30$ $B = 40$

$B = 50$ $B = 60$ $B = 70$ $B = 80$ $B = 90$

$B = 0$ $B = -10$ $B = -20$ $B = -30$ $B = -40$

$B = -50$ $B = -60$ $B = -70$ $B = -80$

$\frac{x}{c}$ $\frac{x}{c}$ $\frac{x}{c}$ $\frac{x}{c}$ $\frac{x}{c}$

(e) $V_K = 35$.
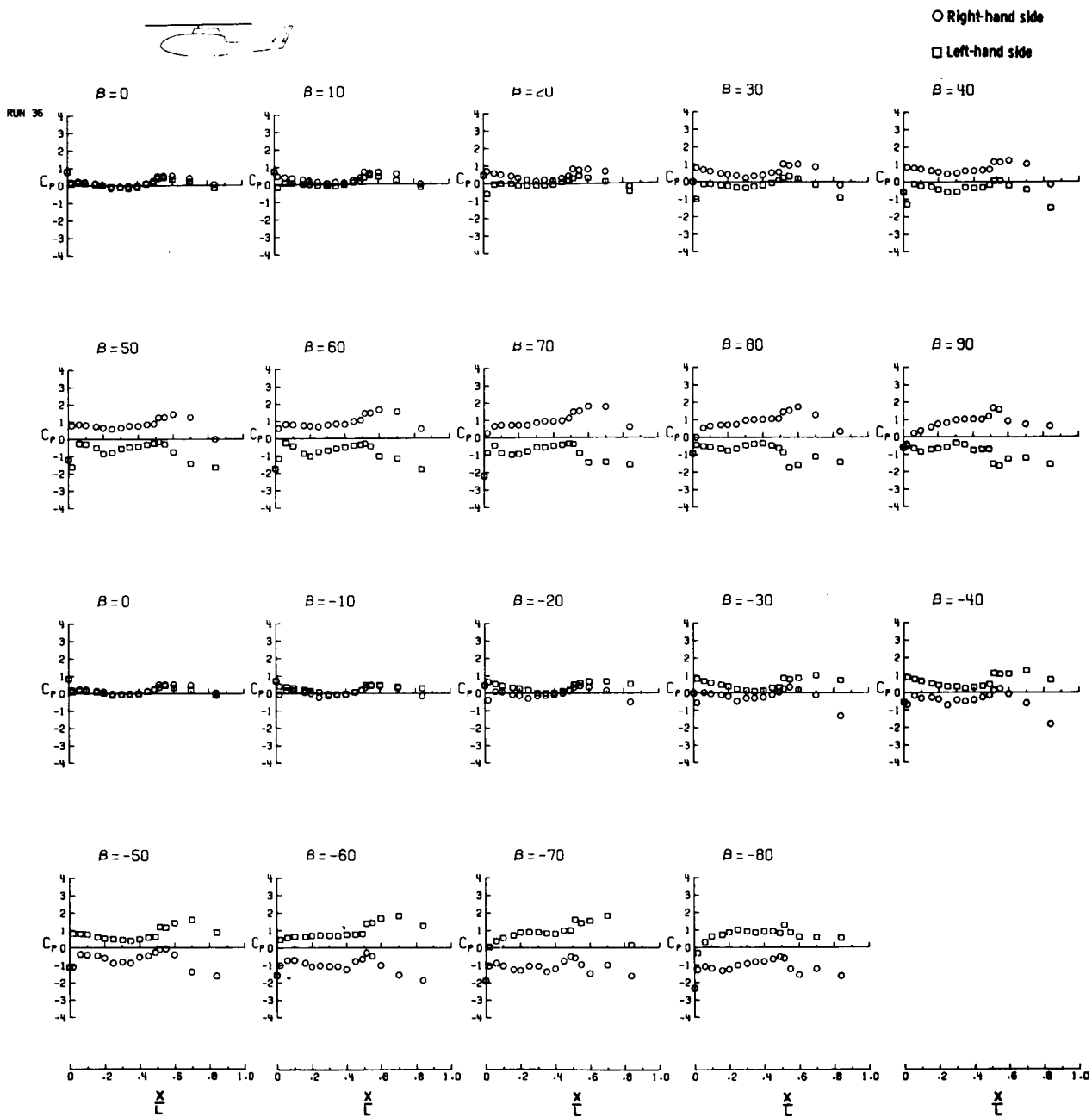
Figure 54.- Continued.
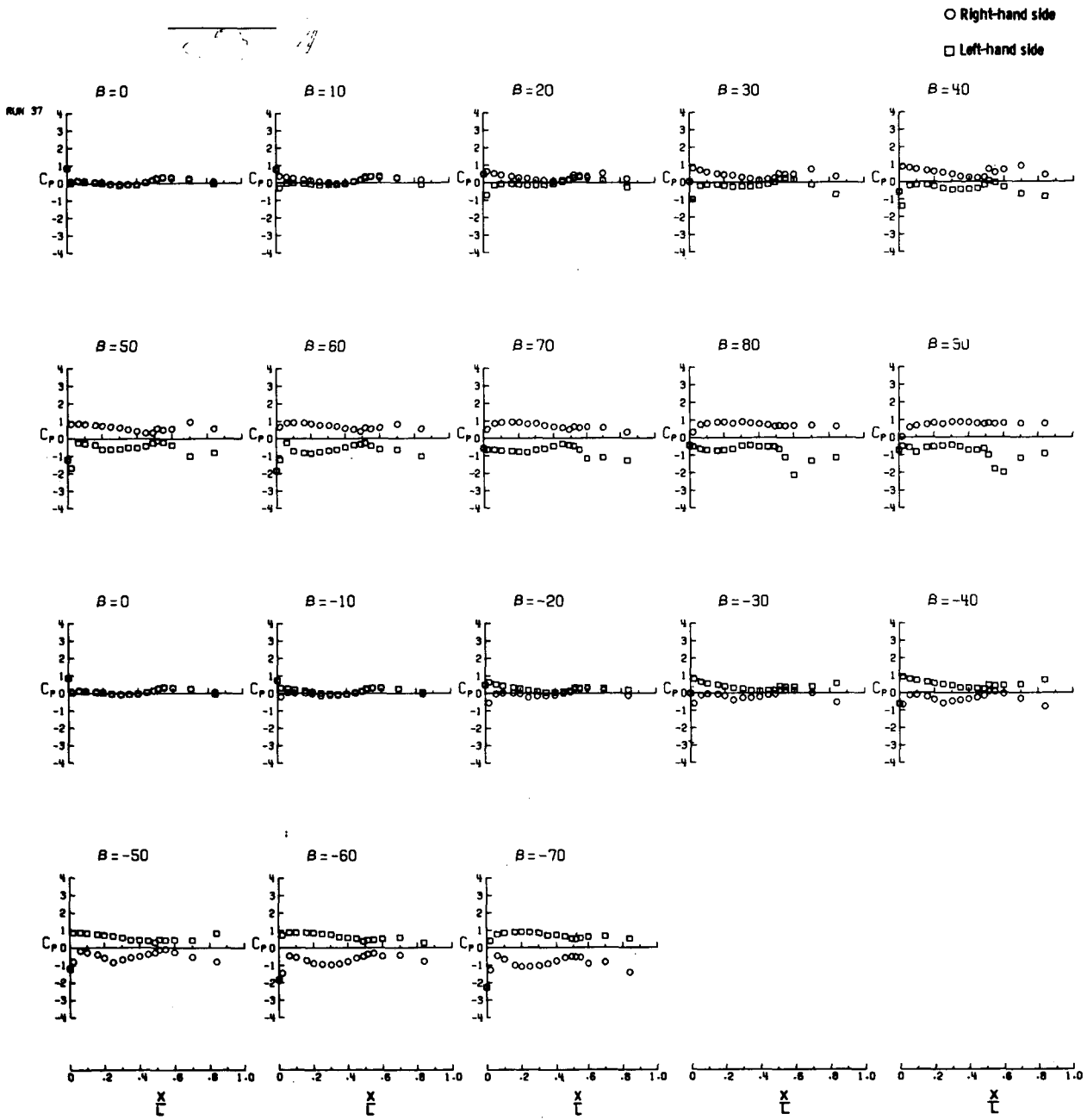
(f) $V_K = 45$.

Figure 54.- Concluded.
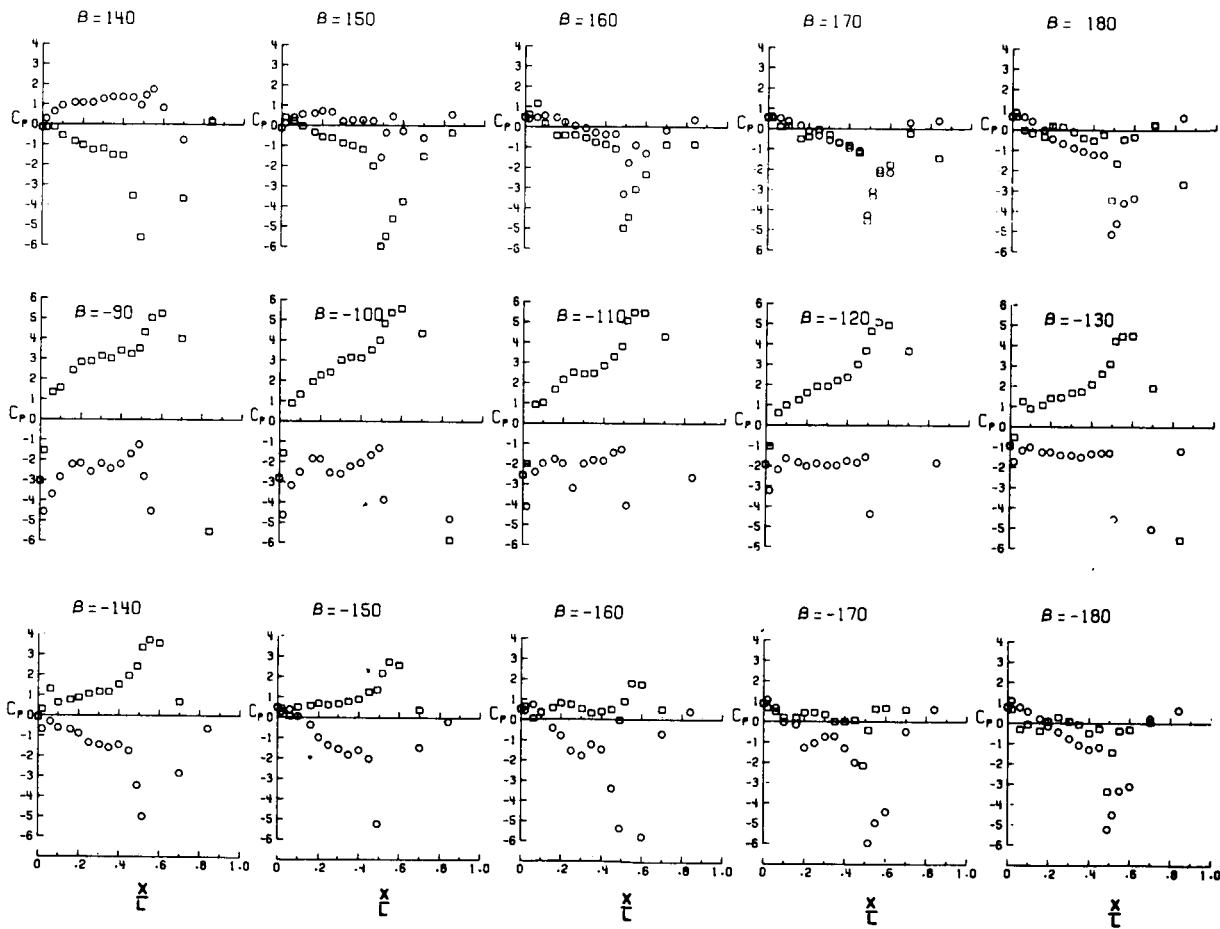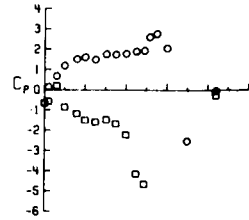
(a) $V_K = 15$.

Figure 55.- Effect of sideslip angles on pressure distribution on model 1
with rotor and without tail.   Rearward flight.

O Right-hand side
□ Left-hand side

$B = 120$ $B = 130$

$B = 140$ $B = 150$ $B = 160$ $B = 170$ $B = 180$

$B = -90$ $B = -100$ $B = -110$ $B = -120$ $B = -130$

$B = -140$ $B = -150$ $B = -160$ $B = -170$ $B = 180$
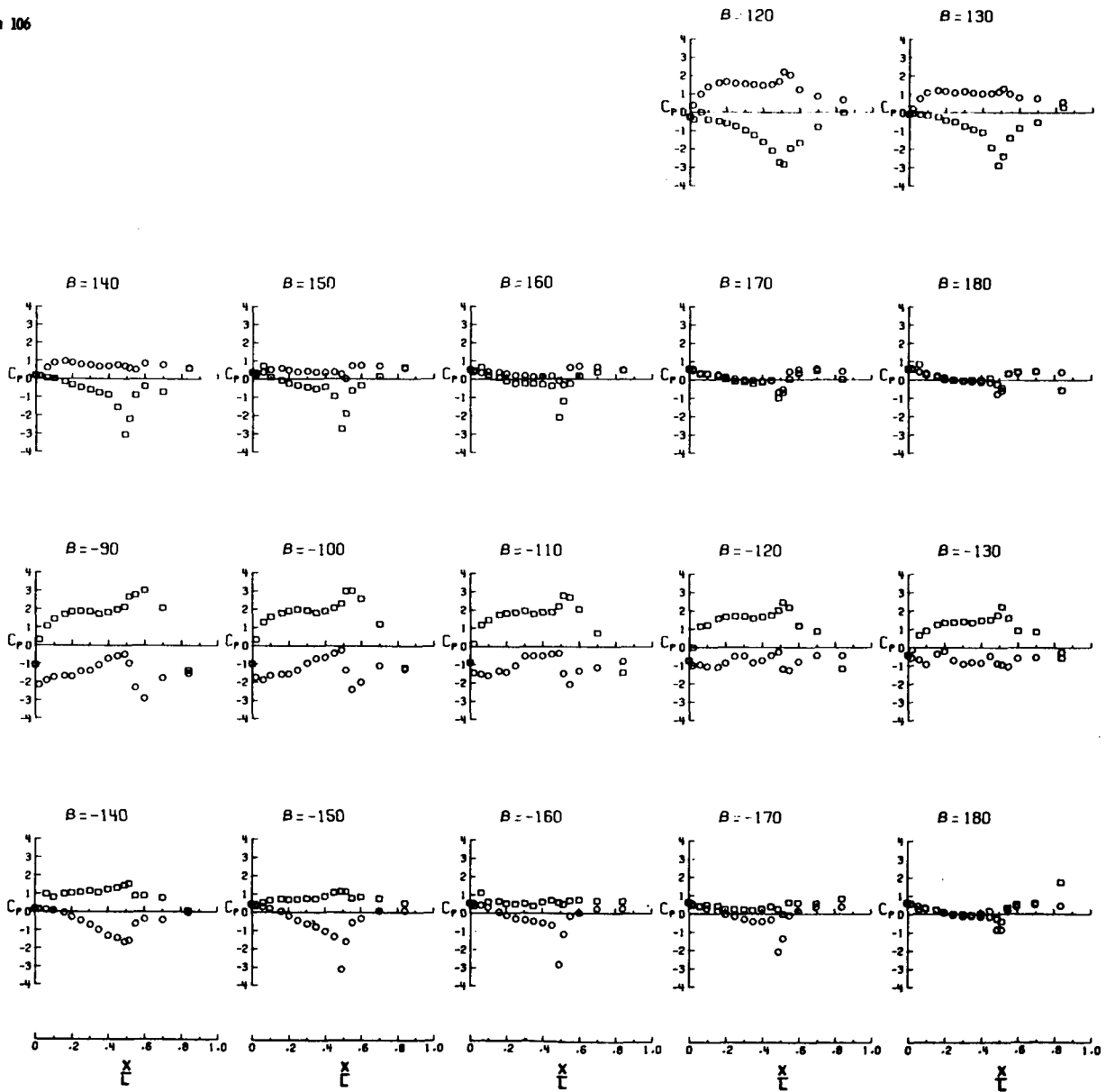
(c) $V_K = 25$.

Figure 55.- Continued.

(d) $V_K = 30$.

Figure 55.- Continued.

RUN III

$B = 130$

$B = 140$ $B = 150$ $B = 160$ $B = 170$ $B = 180$

$B = -90$ $B = -100$ $B = -110$ $B = -120$ $B = -130$

$B = -140$ $B = -150$ $B = -160$ $B = -170$ $B = 180$

$\frac{x}{c}$ $\frac{x}{c}$ $\frac{x}{c}$ $\frac{x}{c}$ $\frac{x}{c}$
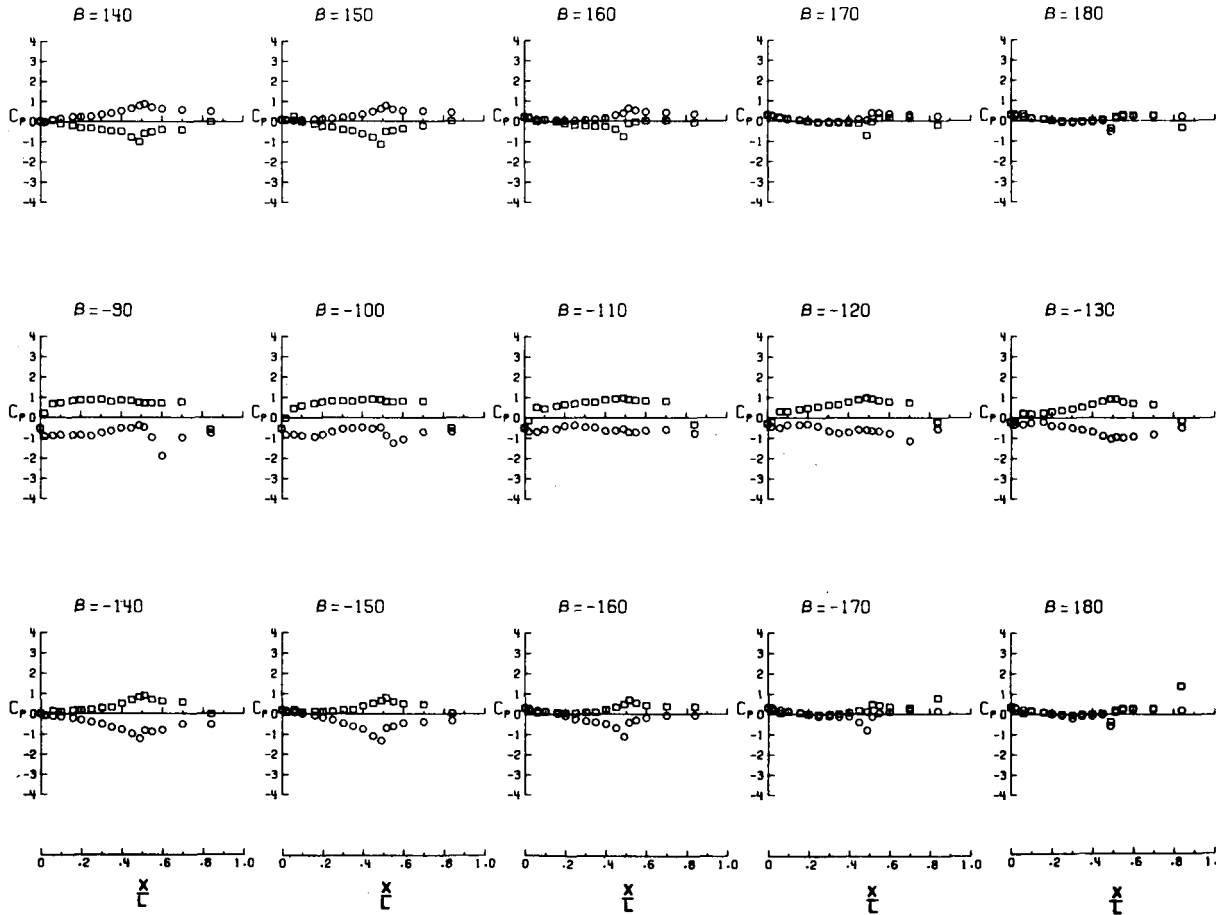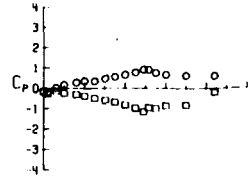
(e) $V_K = 45$.

Figure 55.- Concluded.

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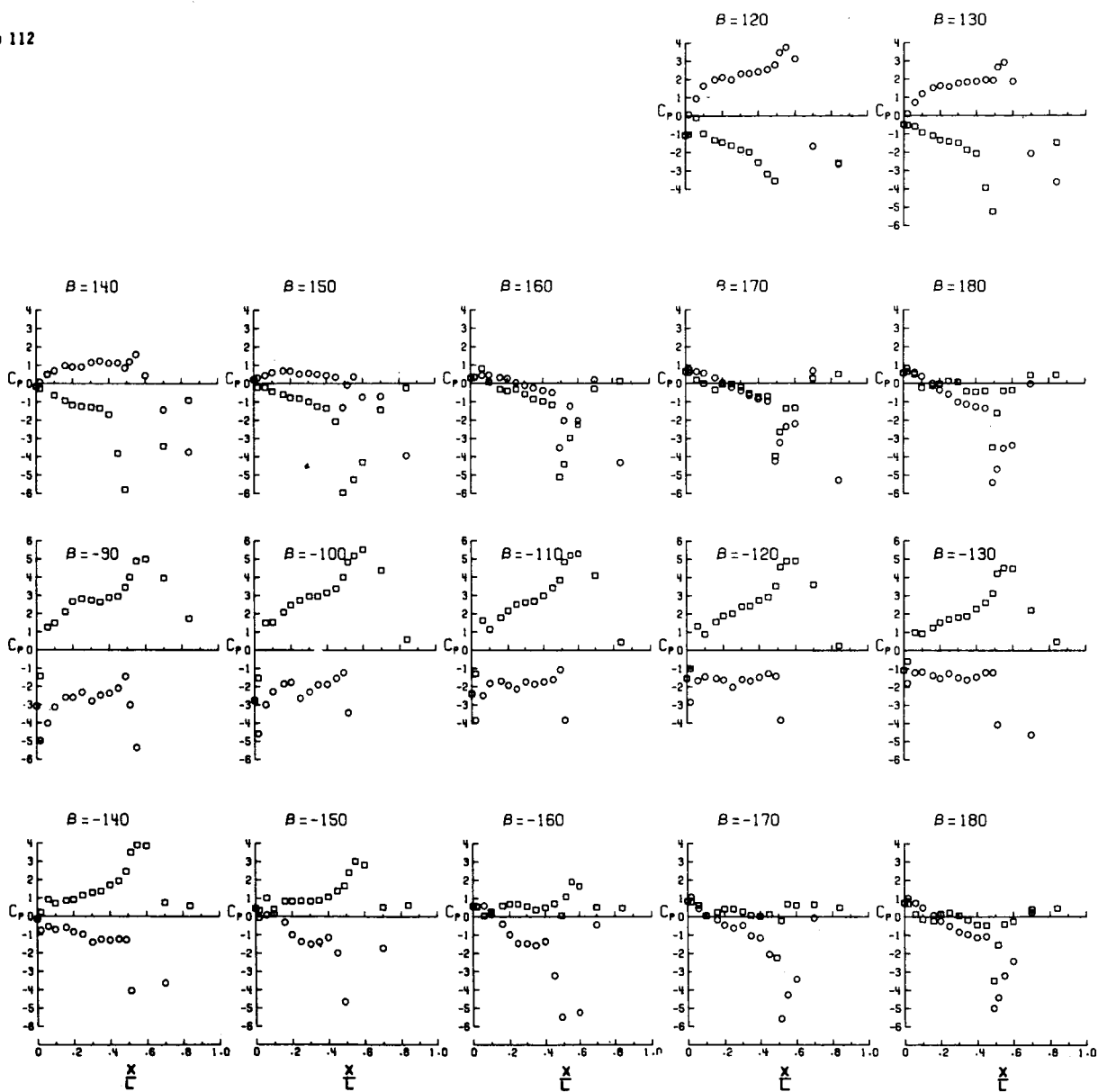
(a) $V_K = 15$.

Figure 56.- Effect of sideslip angles on pressure distribution on model 1 with rotor and with cambered vertical tail. Configuration 13, rearward flight.
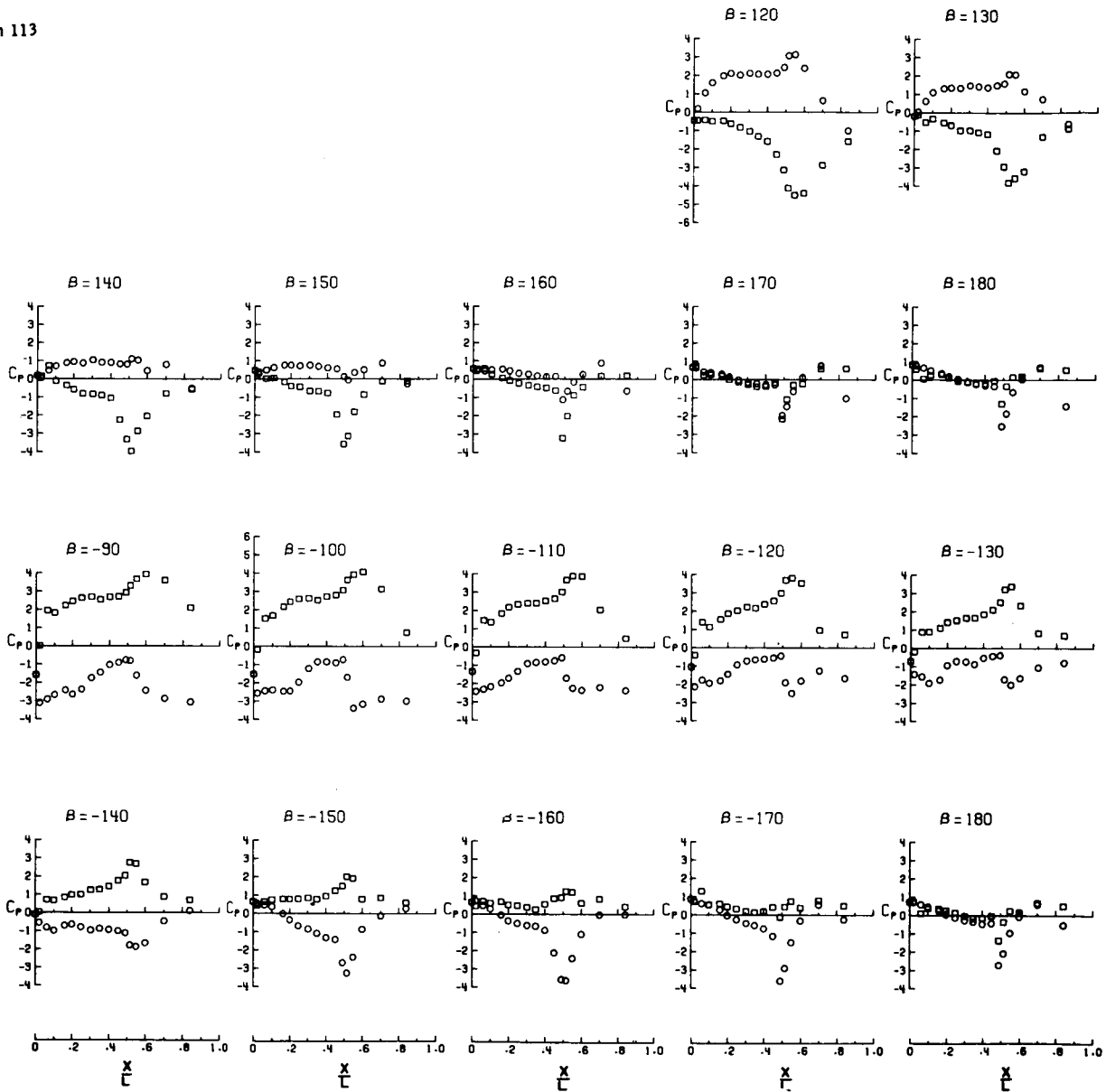
(b) $V_K = 20$.

Figure 56.- Continued.

174
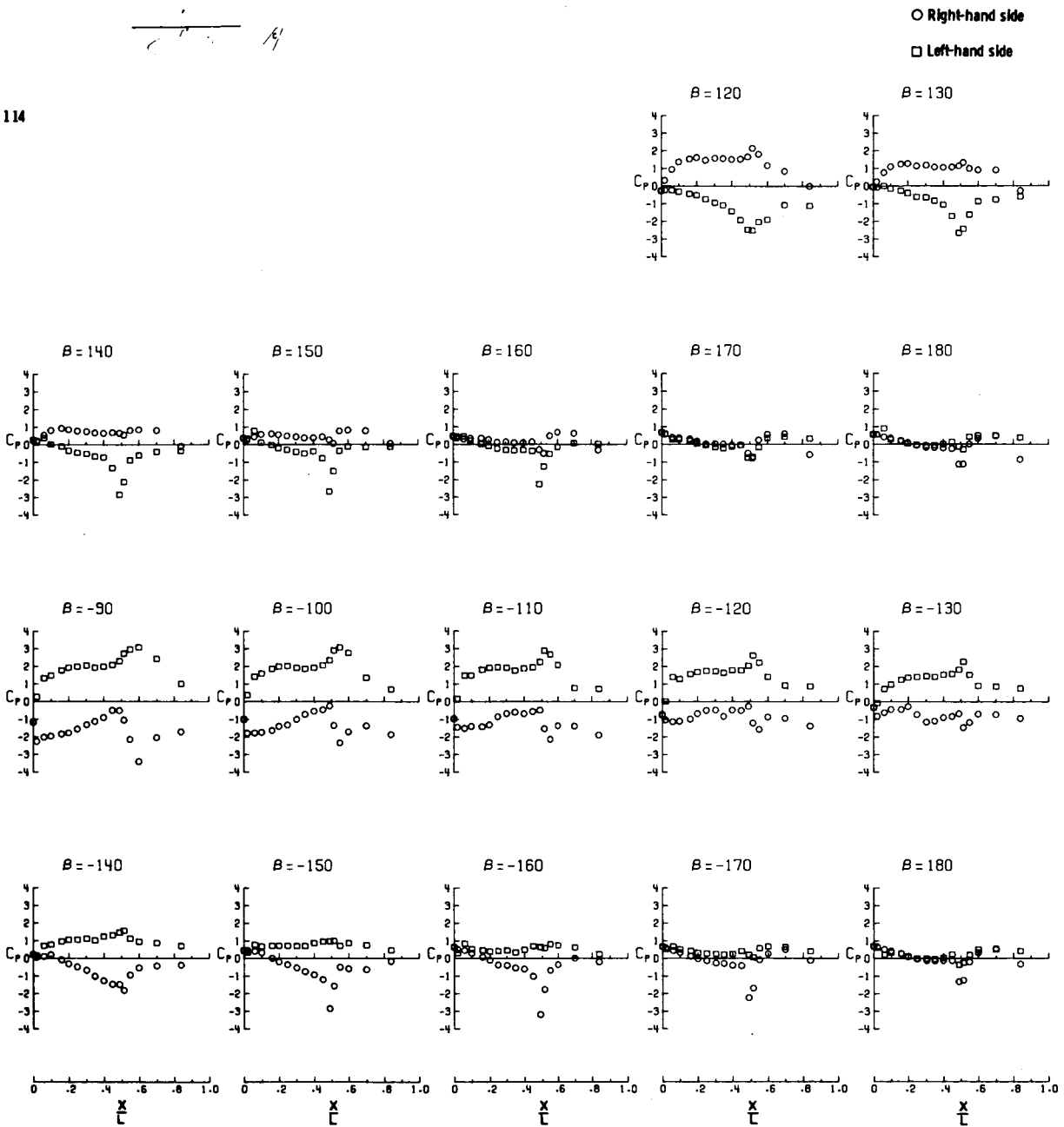
Run 114

(c) $V_K = 25$.

Figure 56.- Continued.

Run 115
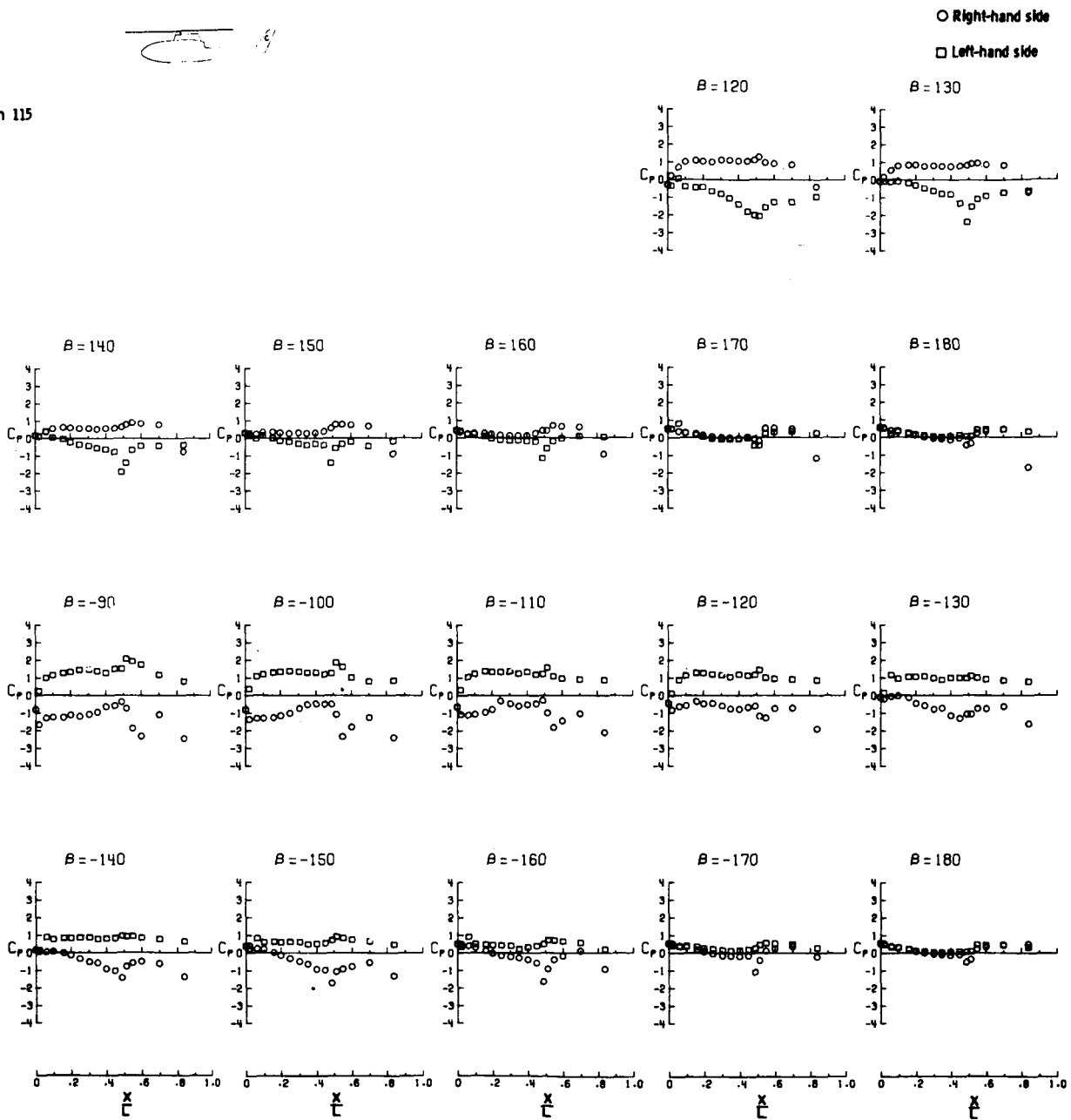
(d) $V_K = 30$.

Figure 56.- Continued.

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Run 116

$B = 110$ $B = 120$ $B = 130$

$B = 140$ $B = 150$ $B = 160$ $B = 170$ $B = 180$

$B = -110$ $B = -120$ $B = -130$

$B = -140$ $B = -150$ $B = -160$ $B = -170$ $B = -180$
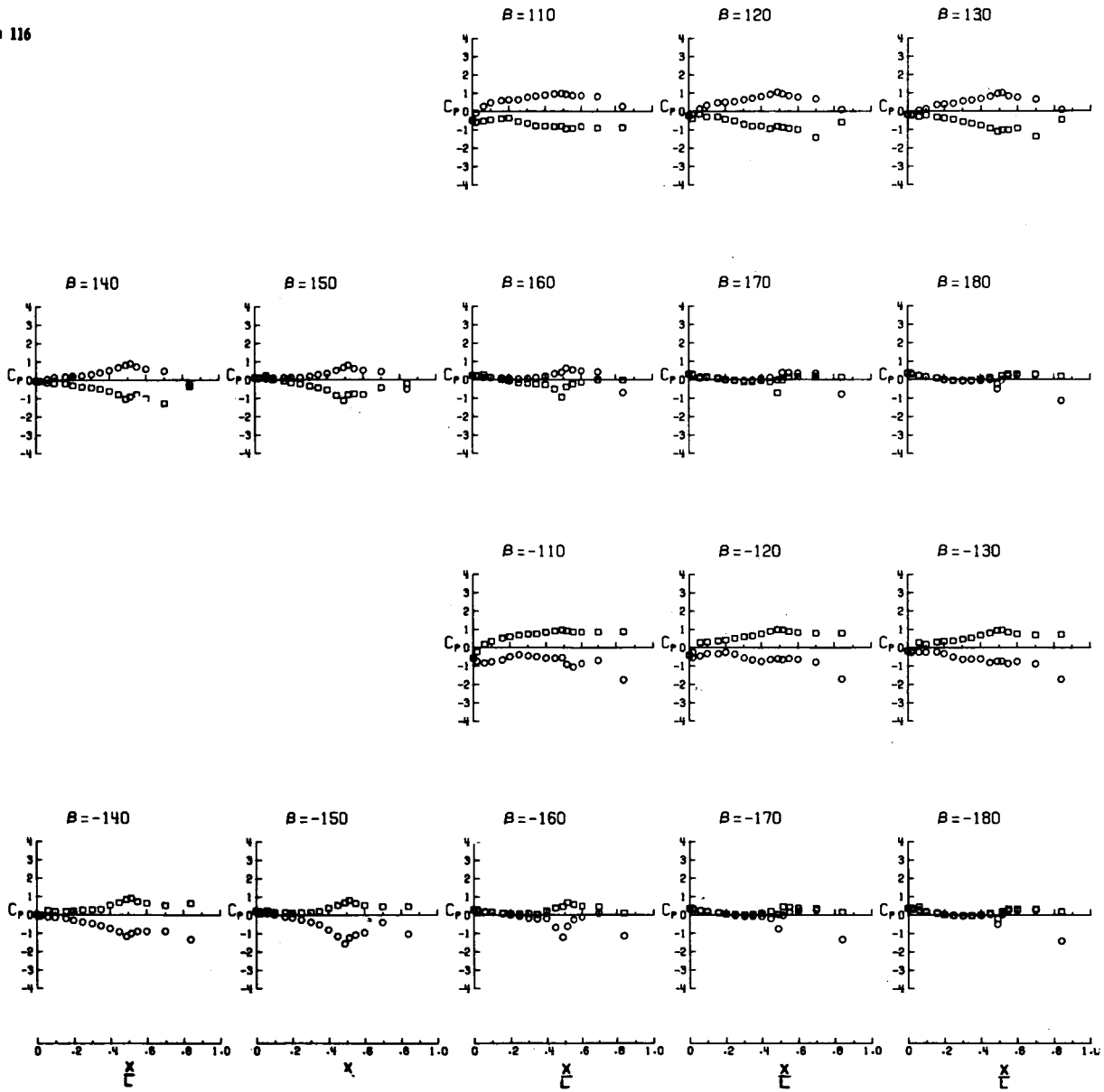
(e) $V_K = 45$.

Figure 56.- Concluded.
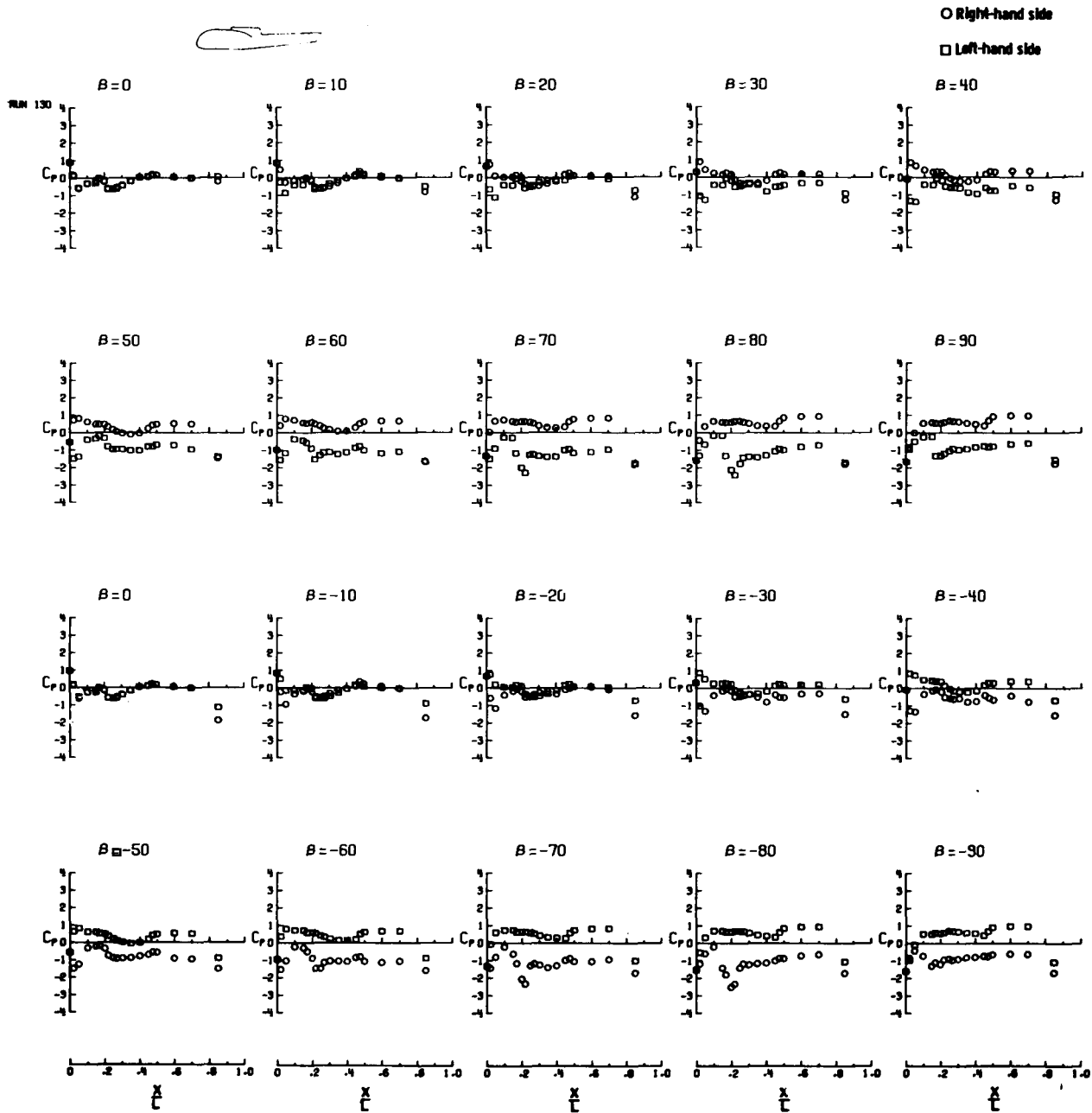
Figure 57.- Effect of sideslip angles on pressure distribution on model 2
without rotor and without tail.   Forward flight.

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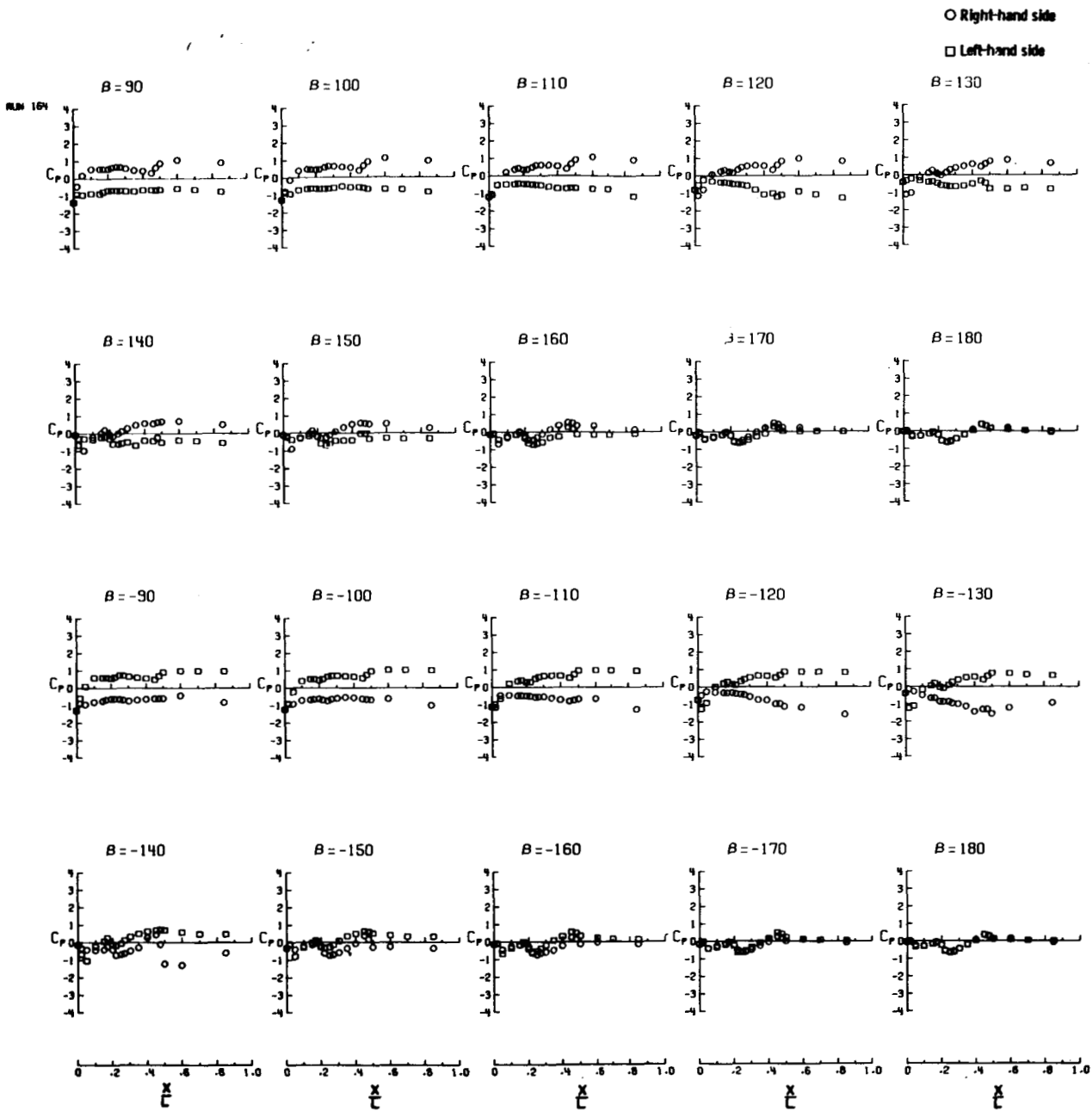
Figure 58.- Effect of sideslip angles on pressure distribution on model 2 without rotor and without tail. Rearward flight.
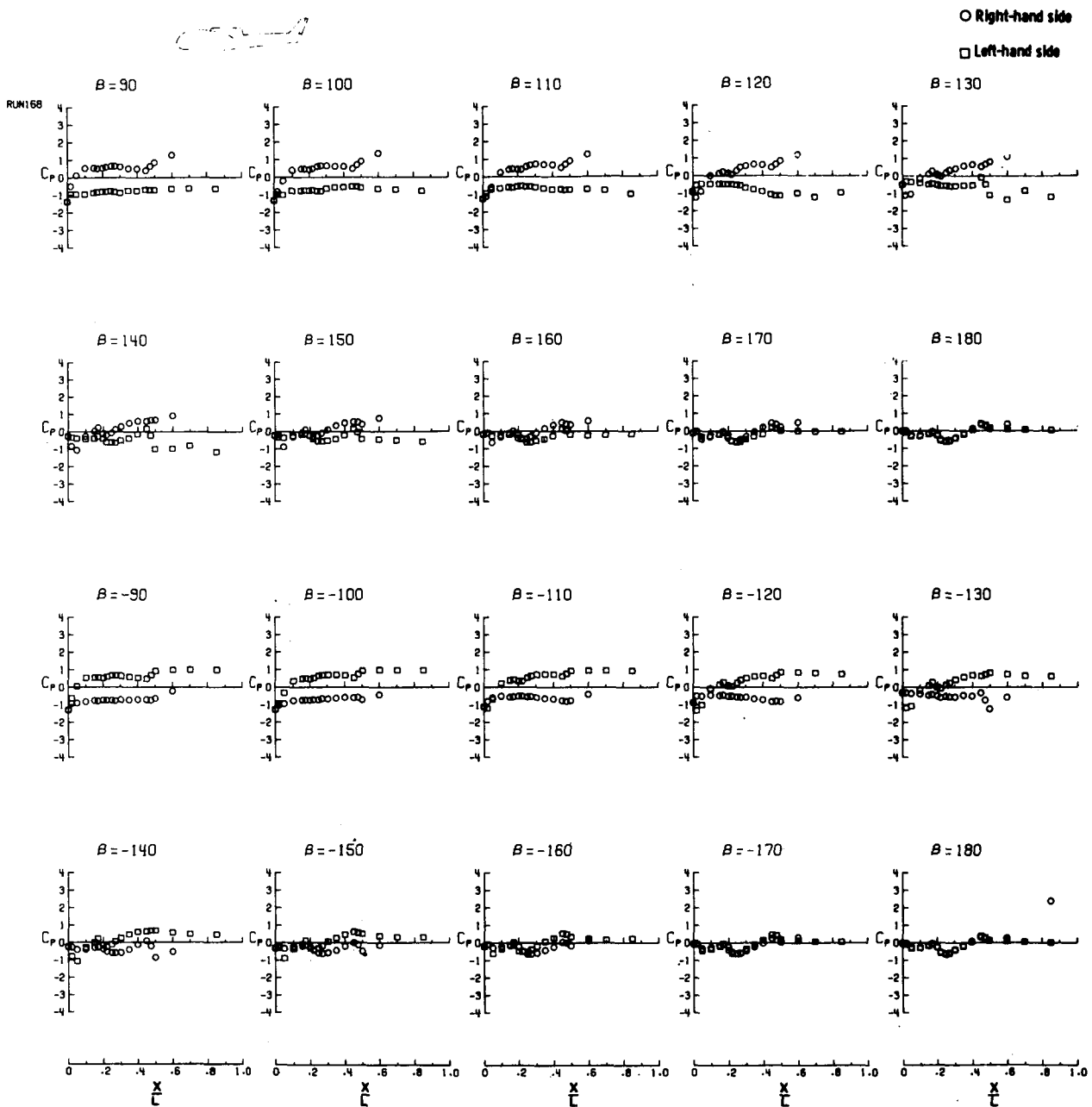
Figure 59.- Effect of sideslip angles on pressure distribution on model 2
without rotor and with tail.   Rearward flight.
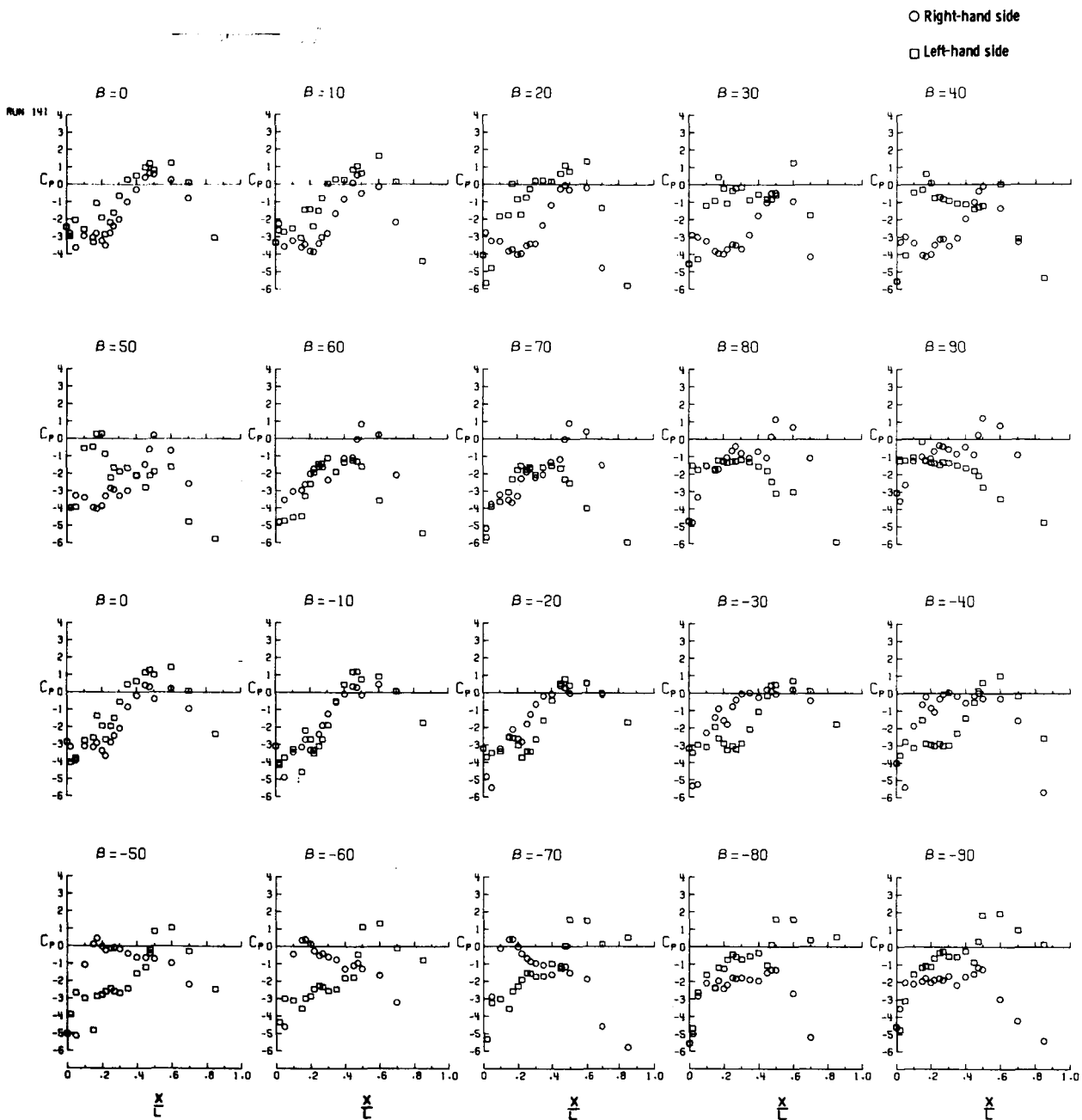
(a) $V_K = 15$.

Figure 60.- Effect of sideslip angles on pressure distribution on model 2
with rotor and with tail. Forward flight.

RUN 142

Legend:
- ◯ Right-hand side
- □ Left-hand side

Row 1: $B = 0$, $B = 10$, $B = 20$, $B = 30$, $B = 40$

Row 2: $B = 50$, $B = 60$, $B = 70$, $B = 80$, $B = 90$

Row 3: $B = 0$, $B = -10$, $B = -20$, $B = -30$, $B = -40$

Row 4: $B = -50$, $B = -60$, $B = -70$, $B = -80$, $B = -90$

$\dfrac{x}{L}$
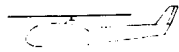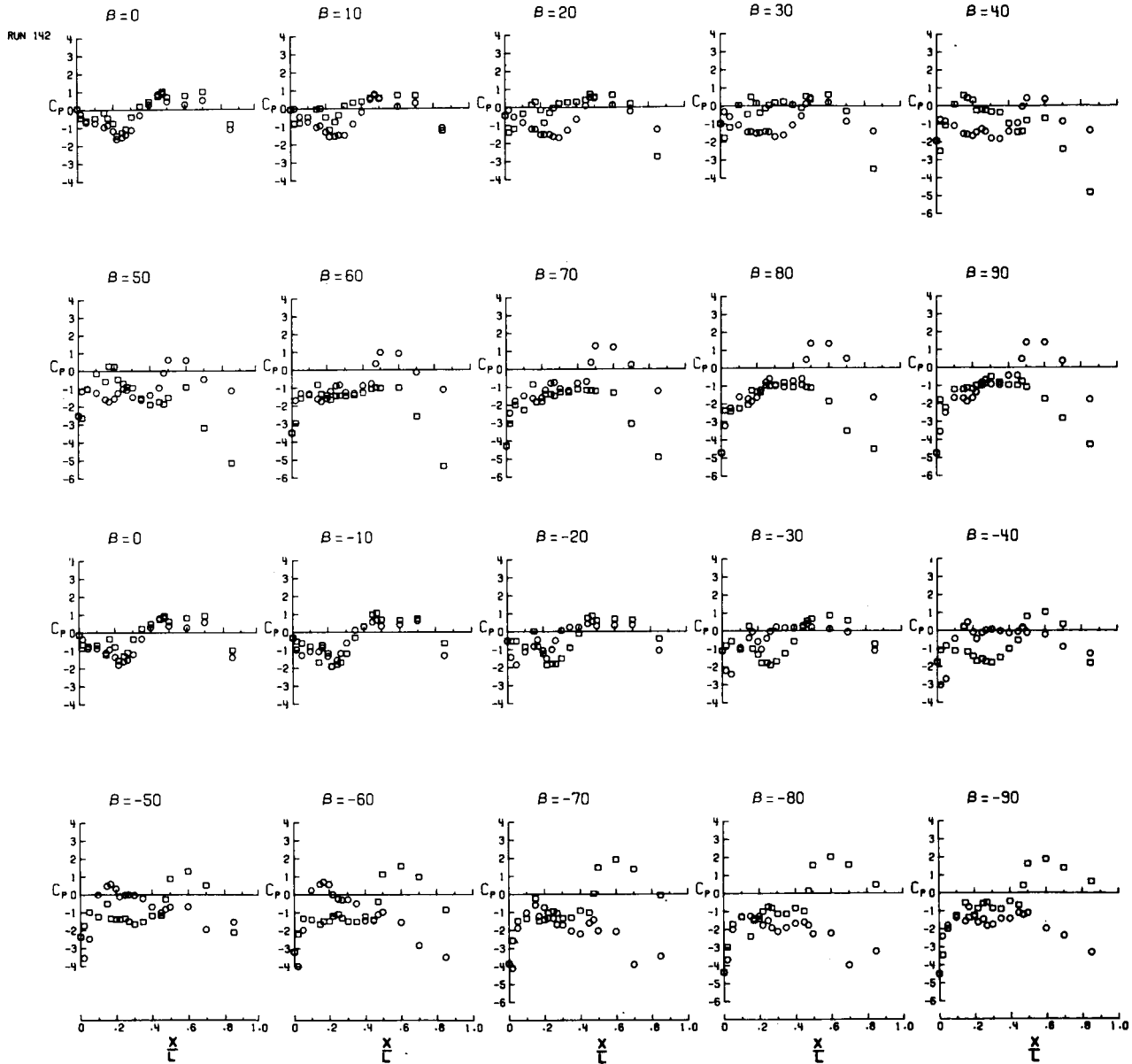
(b) $V_K = 20$.

Figure 60.- Continued.

(c) $V_K = 25.$

Figure 60.- Continued.

RUN 144

$B = 0$ $B = 10$ $B = 20$ $B = 30$ $B = 40$

$B = 50$ $B = 60$ $B = 70$ $B = 80$ $B = 90$

$B = 0$ $B = -10$ $B = -20$ $B = -30$ $B = -40$

$B = -50$ $B = -60$ $B = -70$ $B = -80$ $B = -90$

$\frac{x}{L}$ $\frac{x}{L}$ $\frac{x}{L}$ $\frac{x}{L}$ $\frac{x}{L}$

(d) $V_K = 30$.

Figure 60.- Continued.

(e) $V_K = 35$.
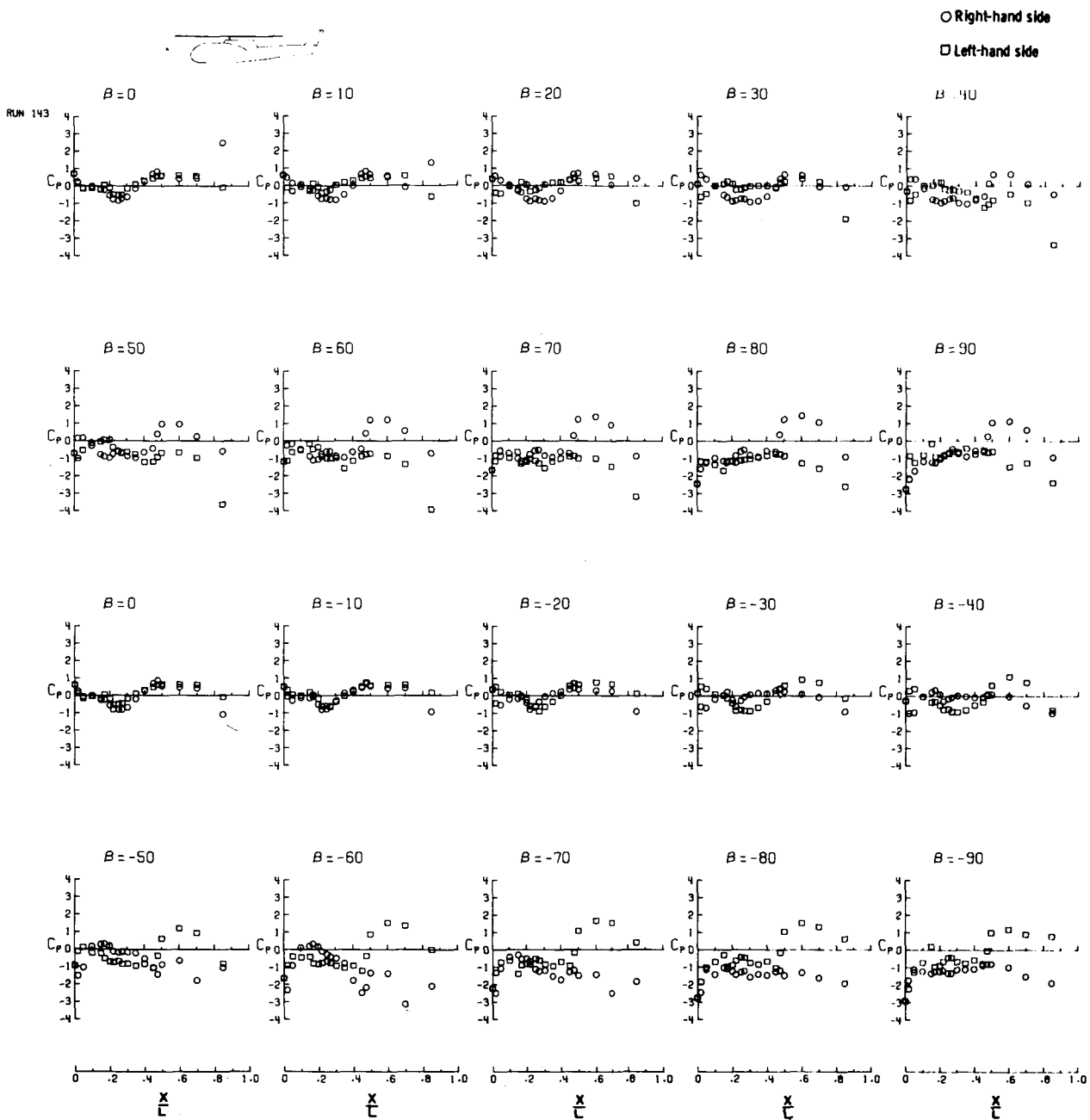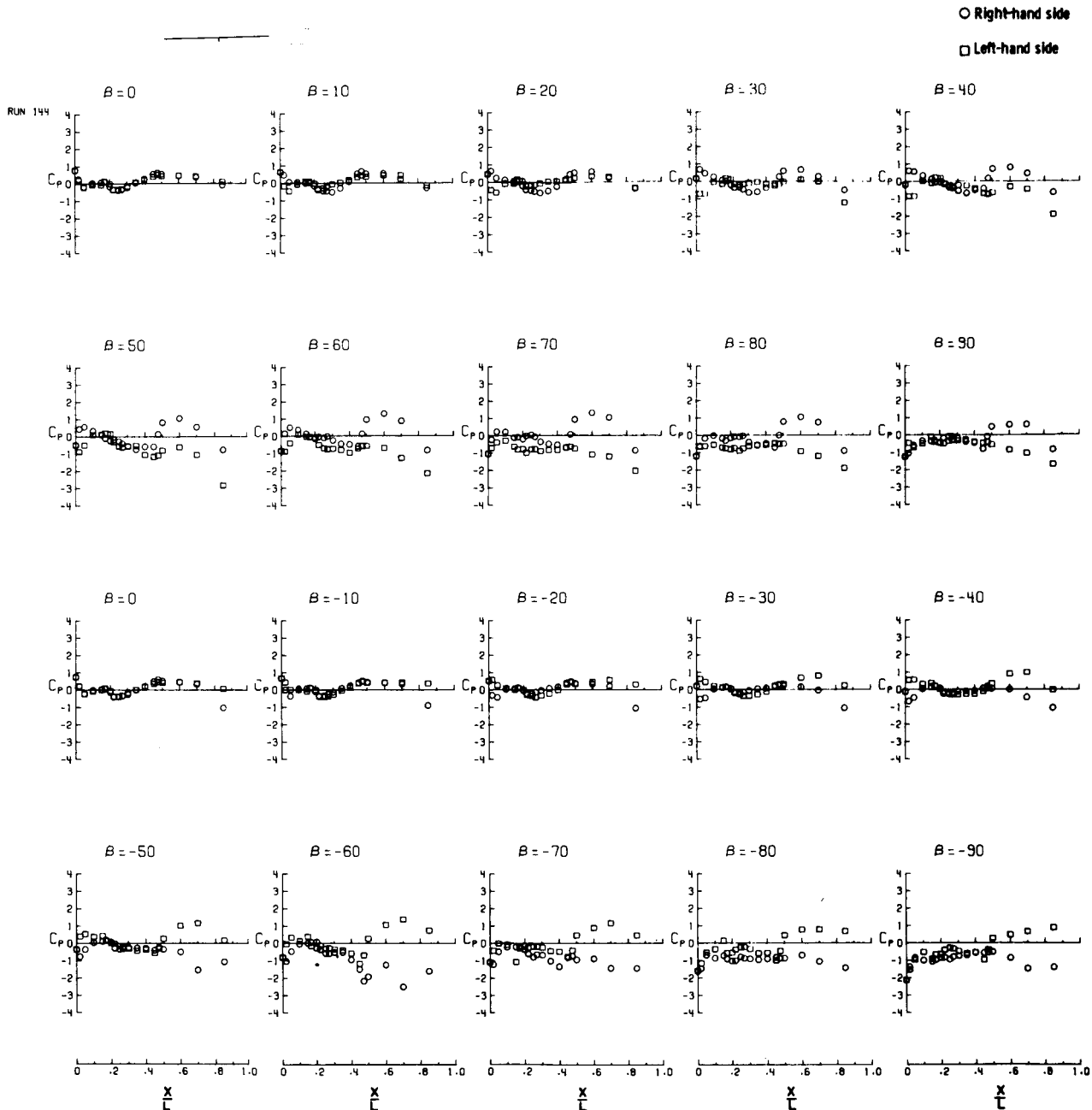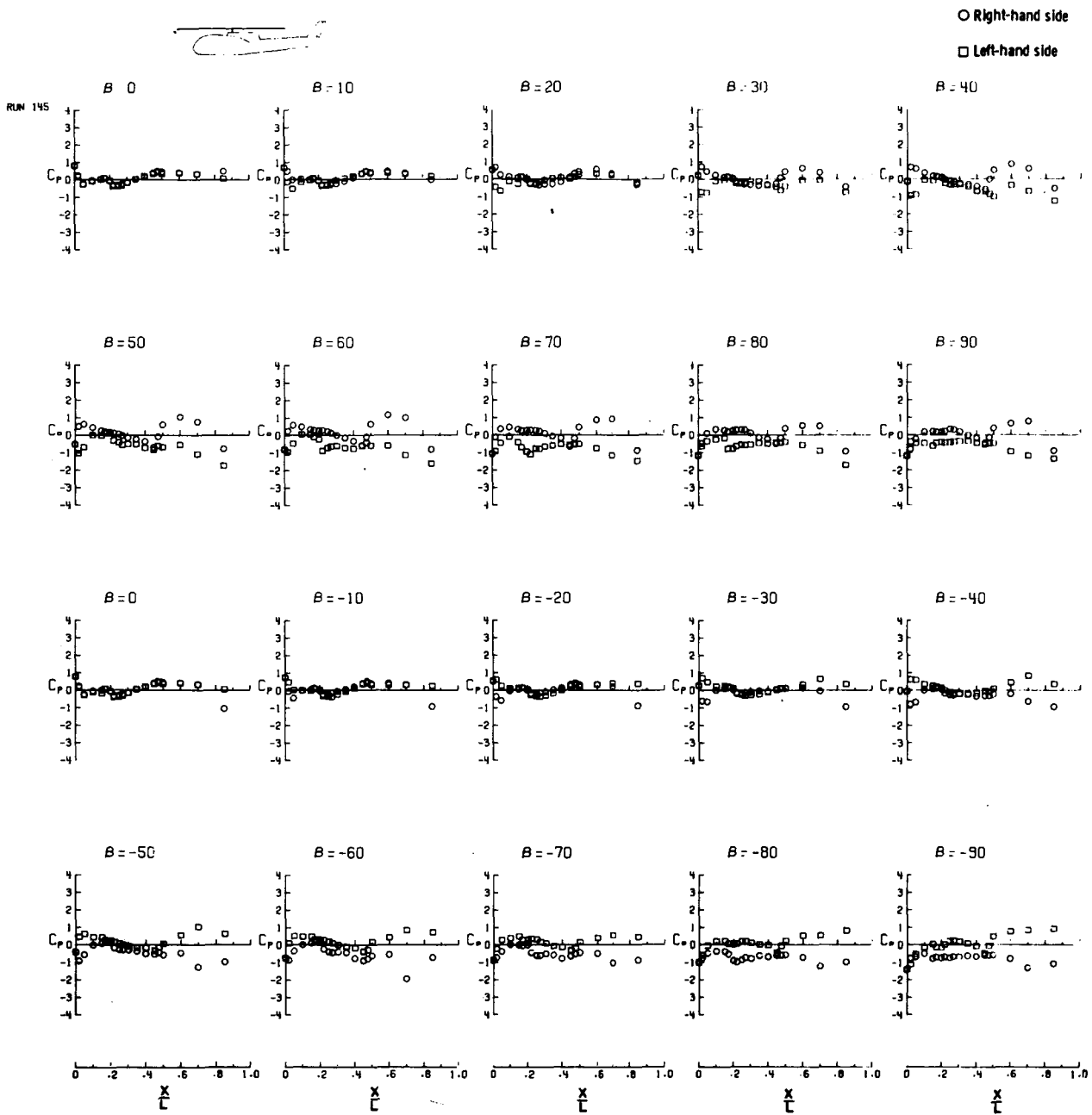
Figure 60.- Continued.
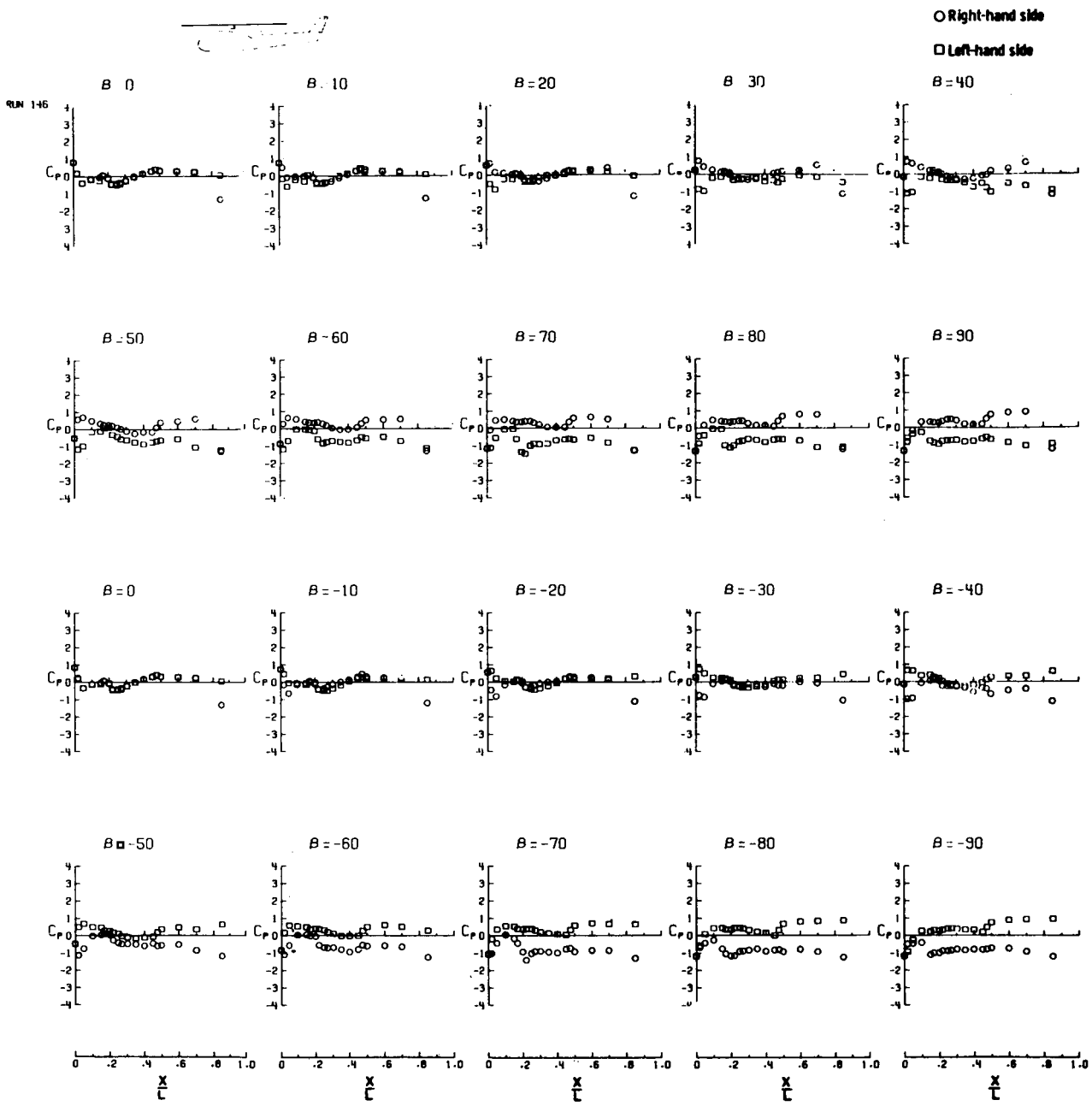
(f) $V_K = 45$.

Figure 60.- Concluded.

(a) $V_K = 15$.
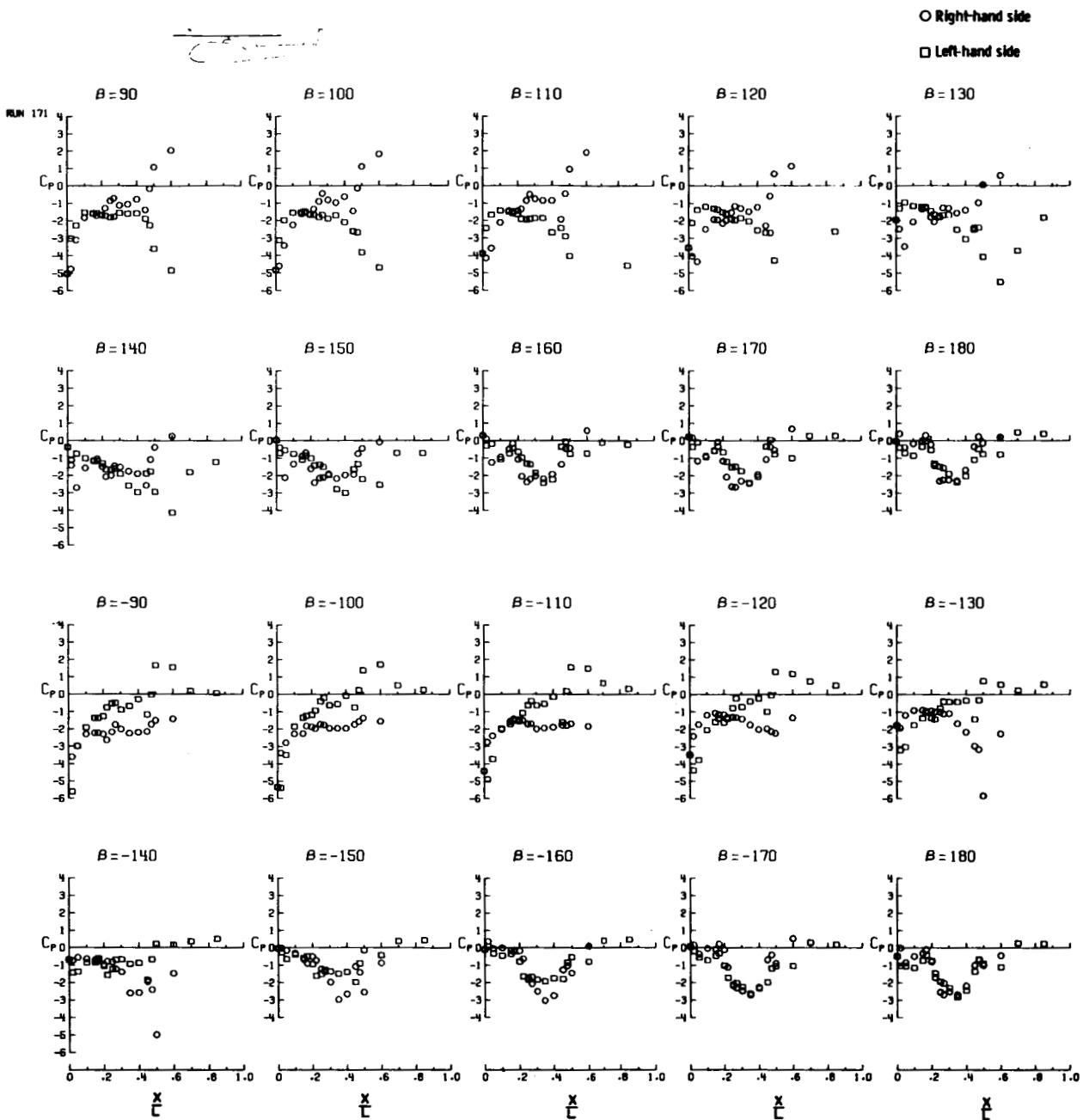
Figure 61.- Effect of sideslip angles on pressure distribution on model 2
with rotor and with tail. Rearward flight.
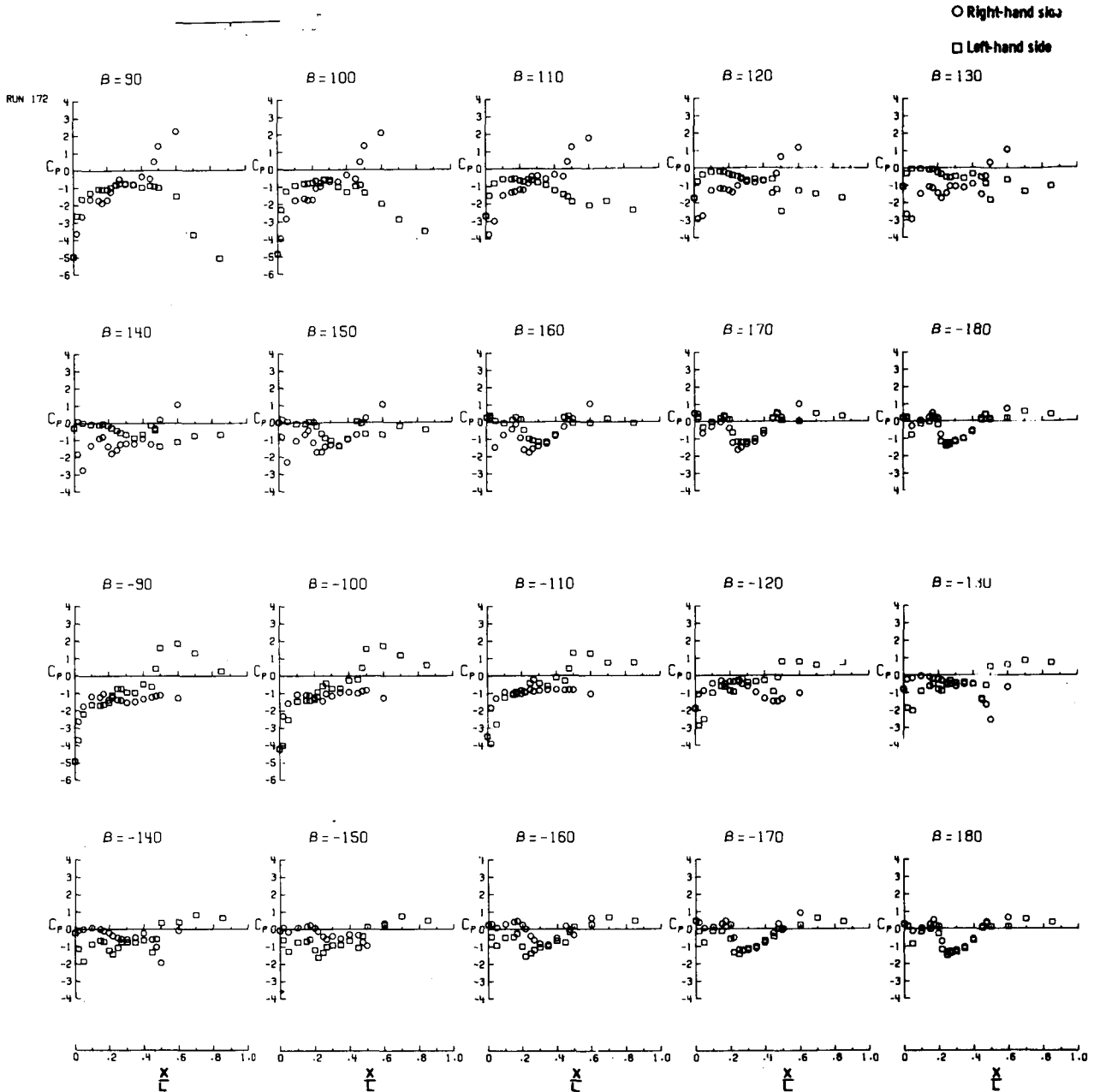
(b) $V_K = 20$.

Figure 61.- Continued.
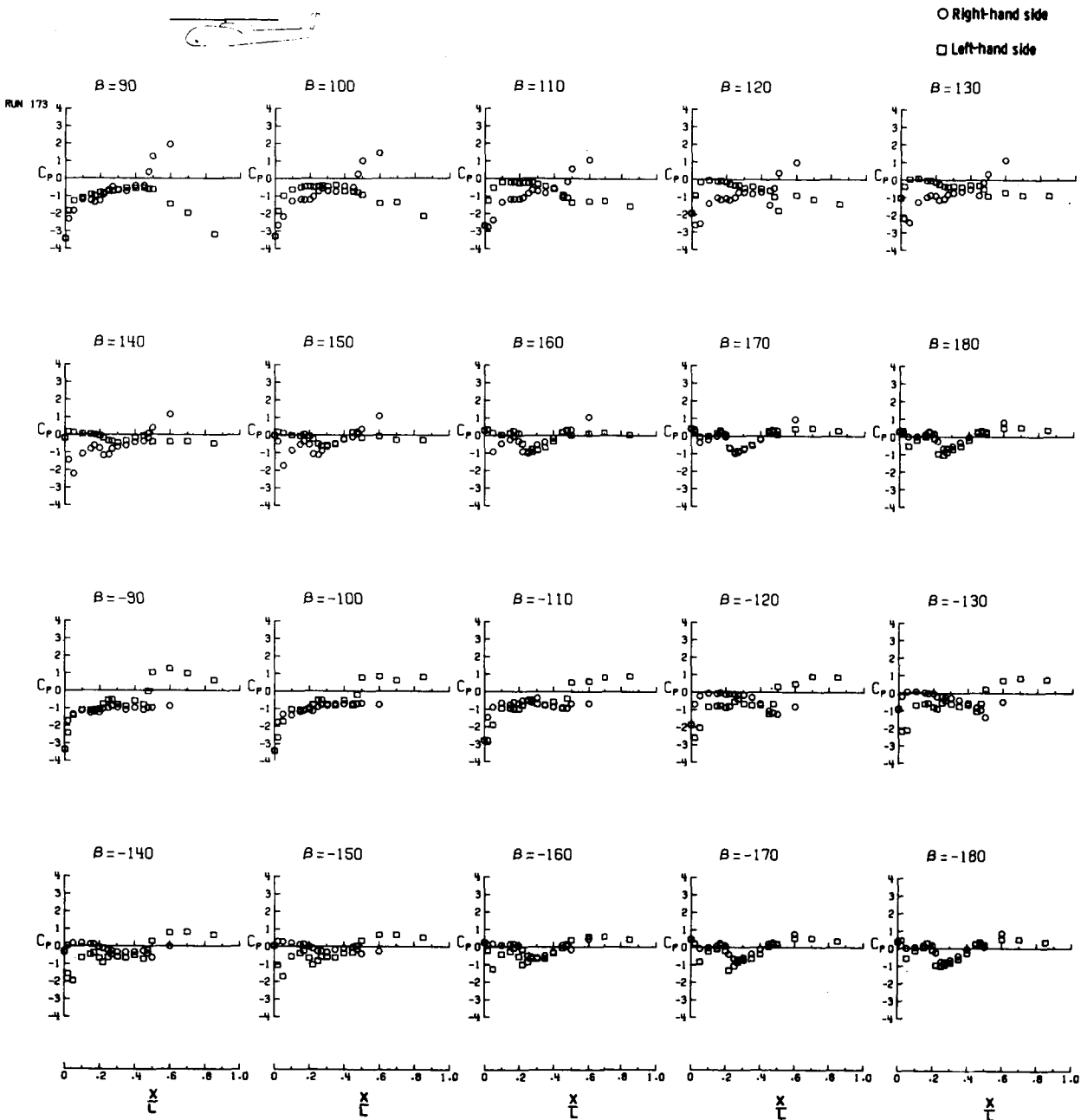
(c) $V_K = 25.$

Figure 61.- Continued.
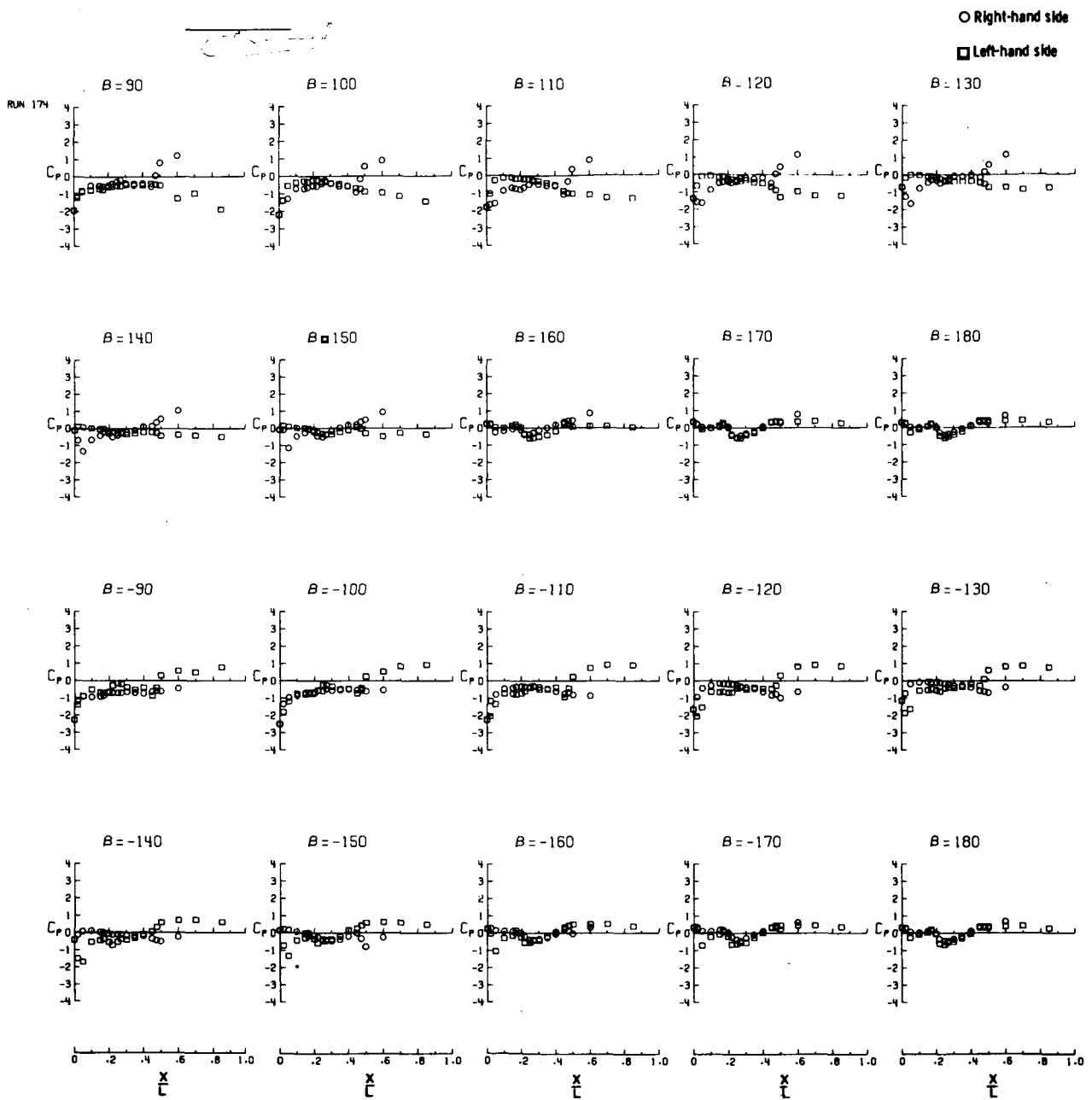
(d) $V_K = 30.$

Figure 61.- Continued.
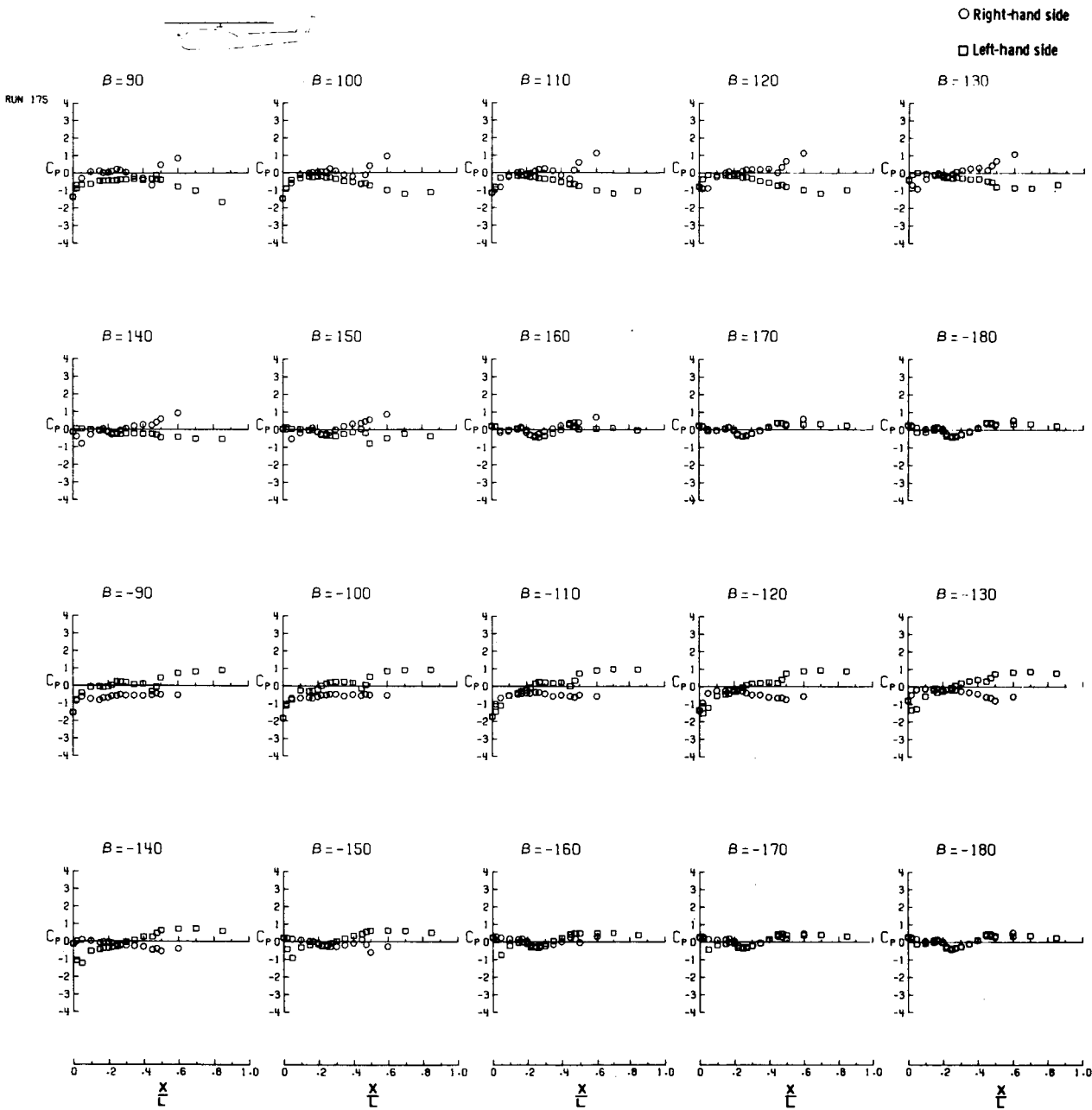
(e) $V_K = 35$.

Figure 61.- Concluded.
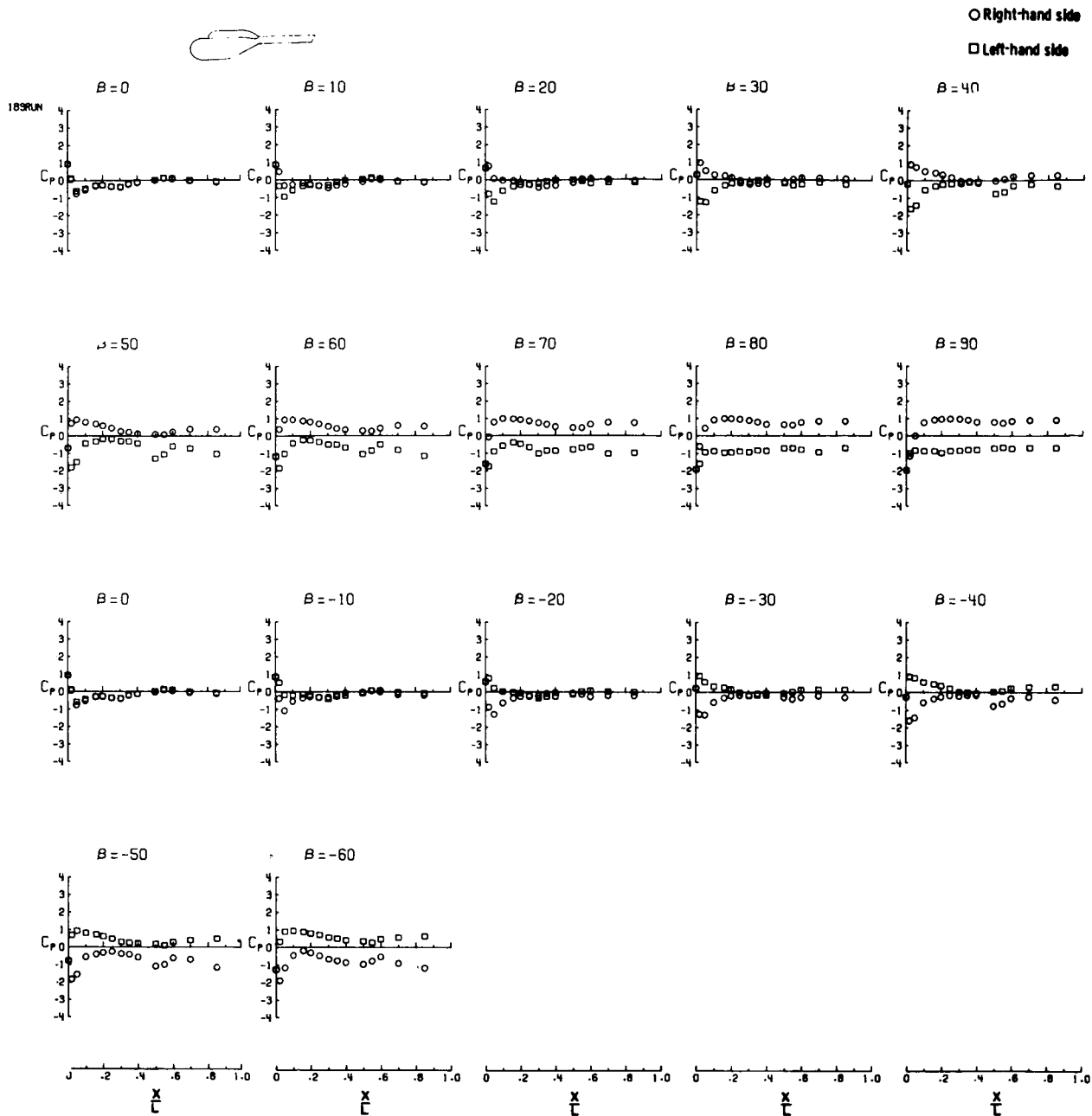
Figure 62.- Effect of sideslip angles on pressure distribution on model 3.
Forward flight.
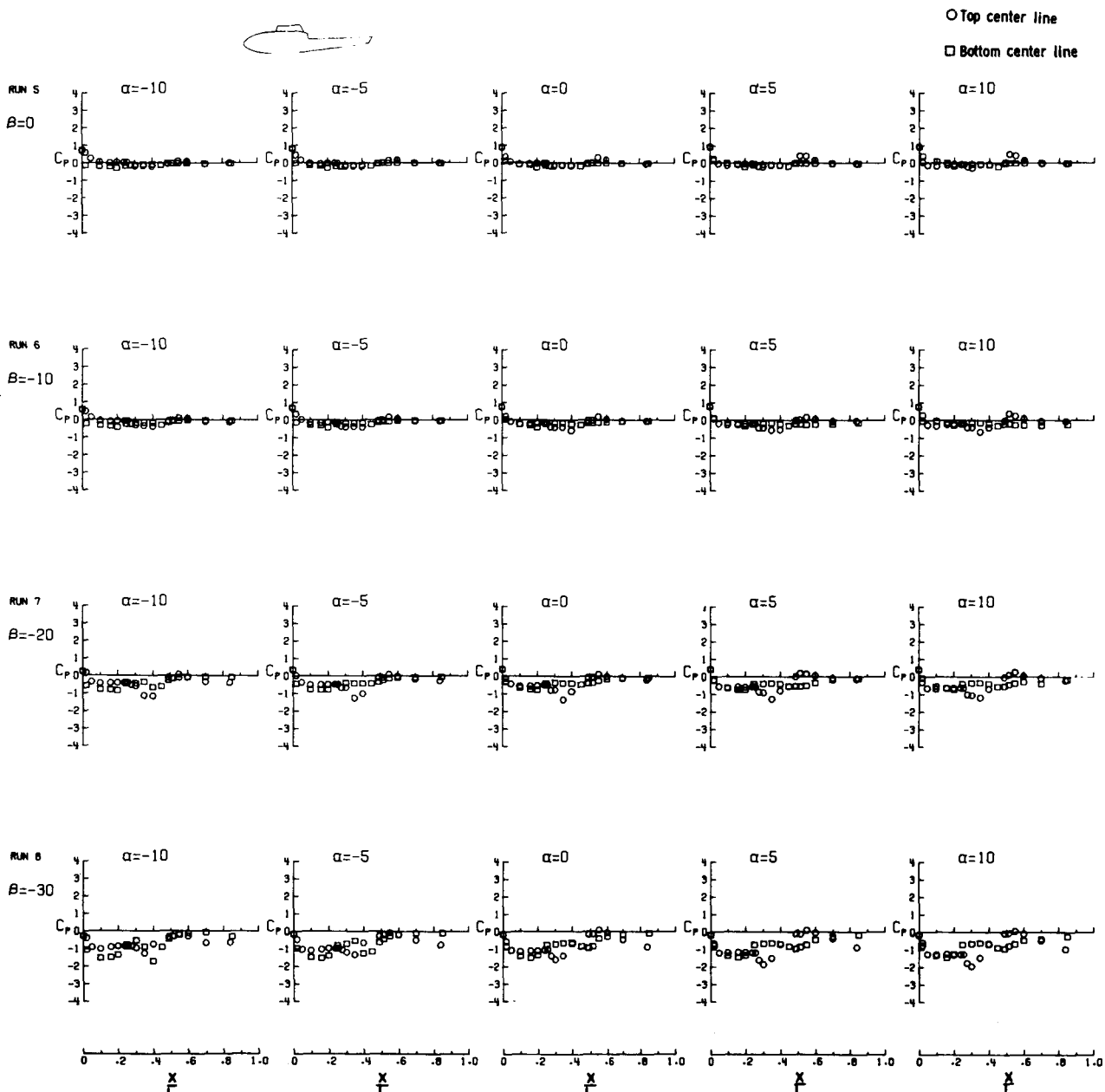
Figure 63.- Effect of angles of attack on pressure distribution on model 1 without rotor and without tail. Forward flight.
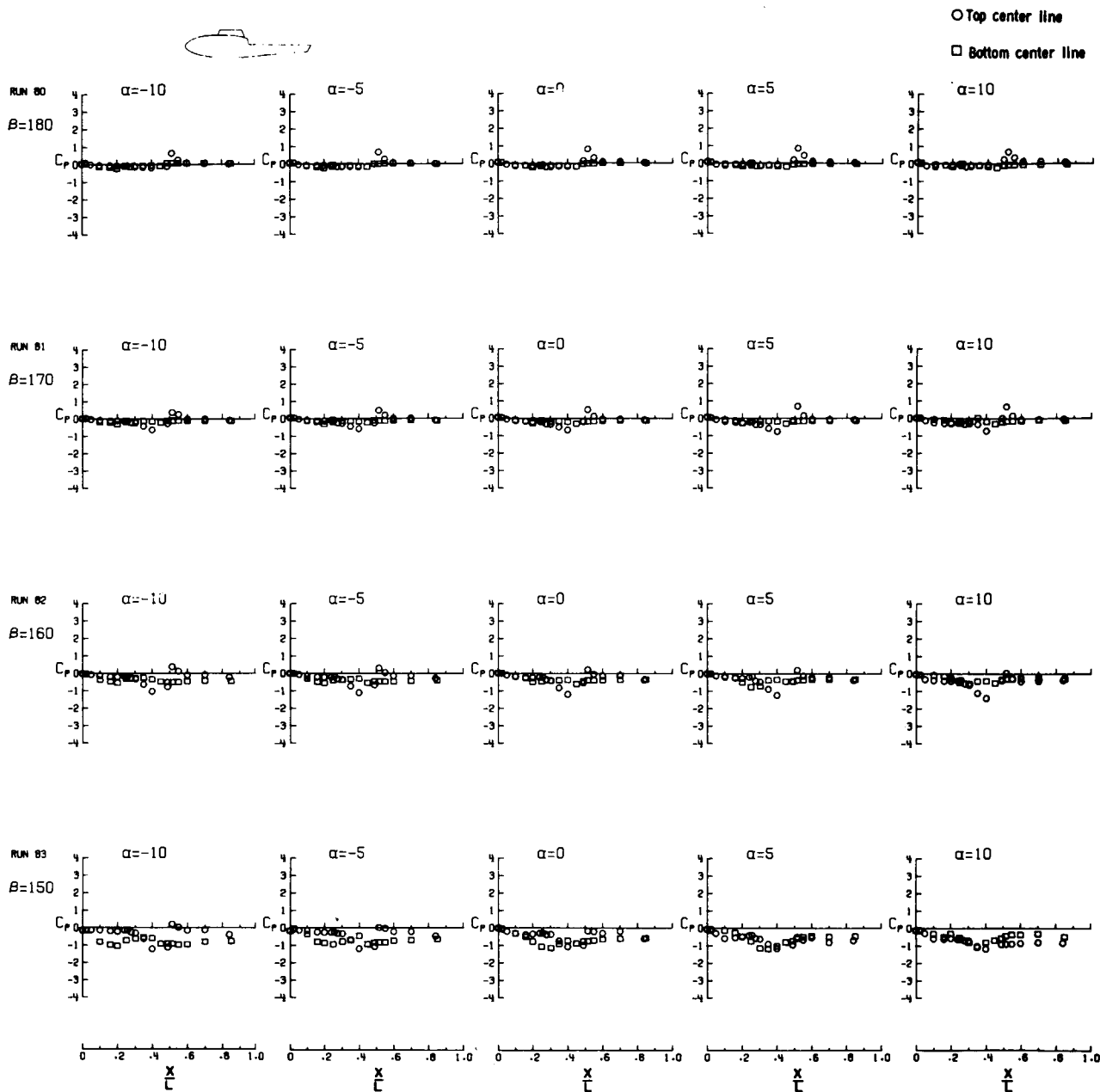
Figure 64.- Effect of angles of attack and sideslip on pressure distribution on model 1 without rotor and without tail. Rearward flight.
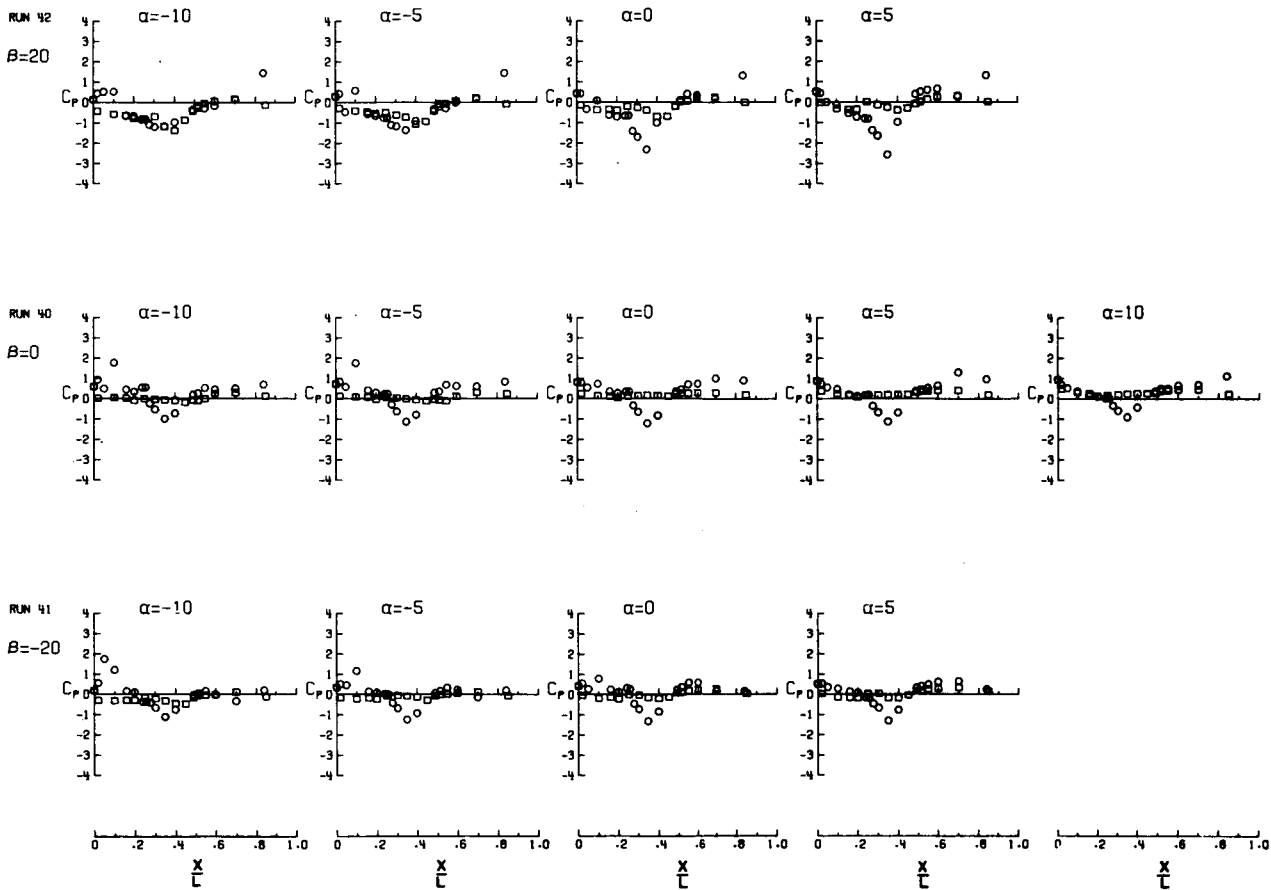
Figure 65.- Effect of angles of attack and sideslip on pressure distribution on model 1
with rotor and without tail. Forward flight at V_K = 30.
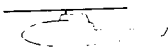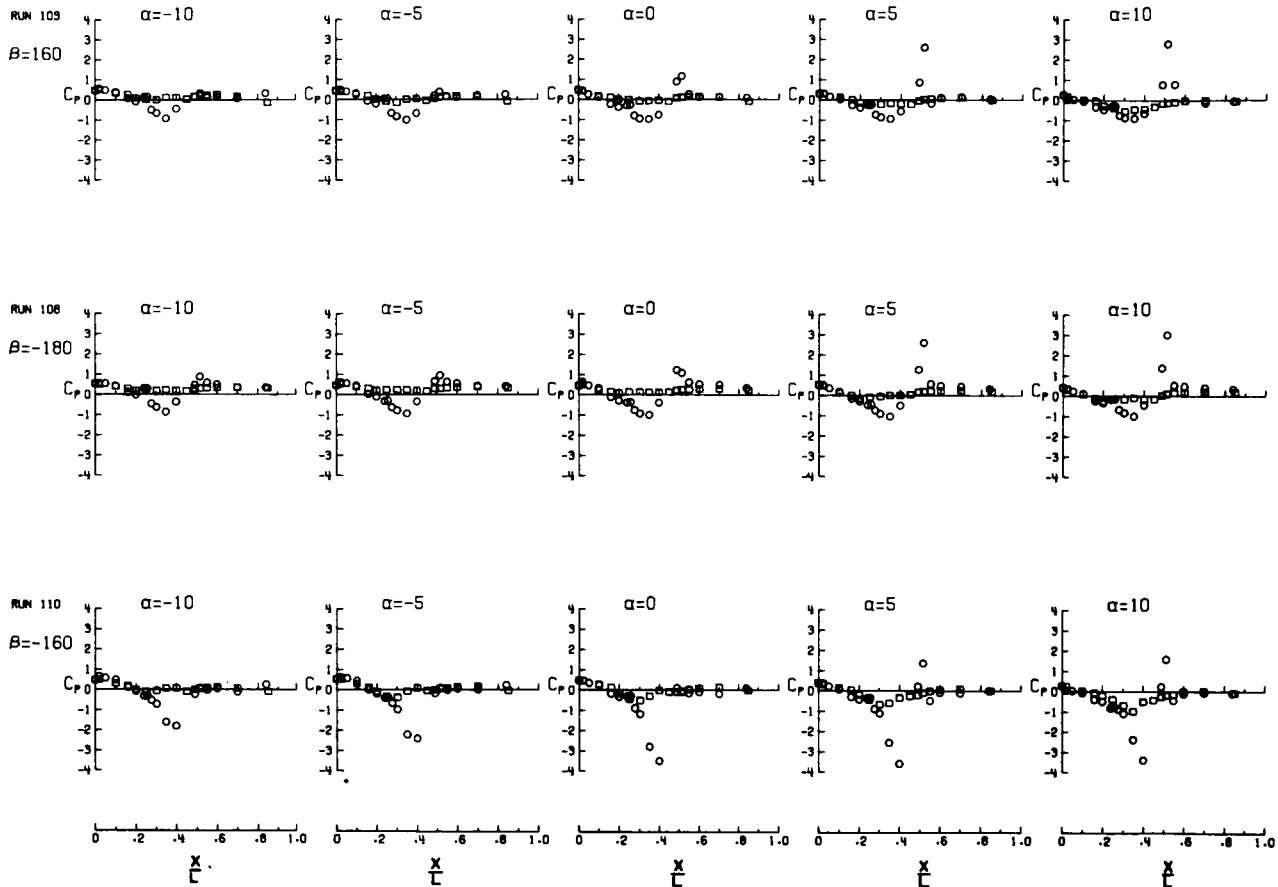
Figure 66.- Effect of angles of attack and sideslip on pressure distribution on model 1
with rotor and without tail.   Rearward flight at V_K = 30.
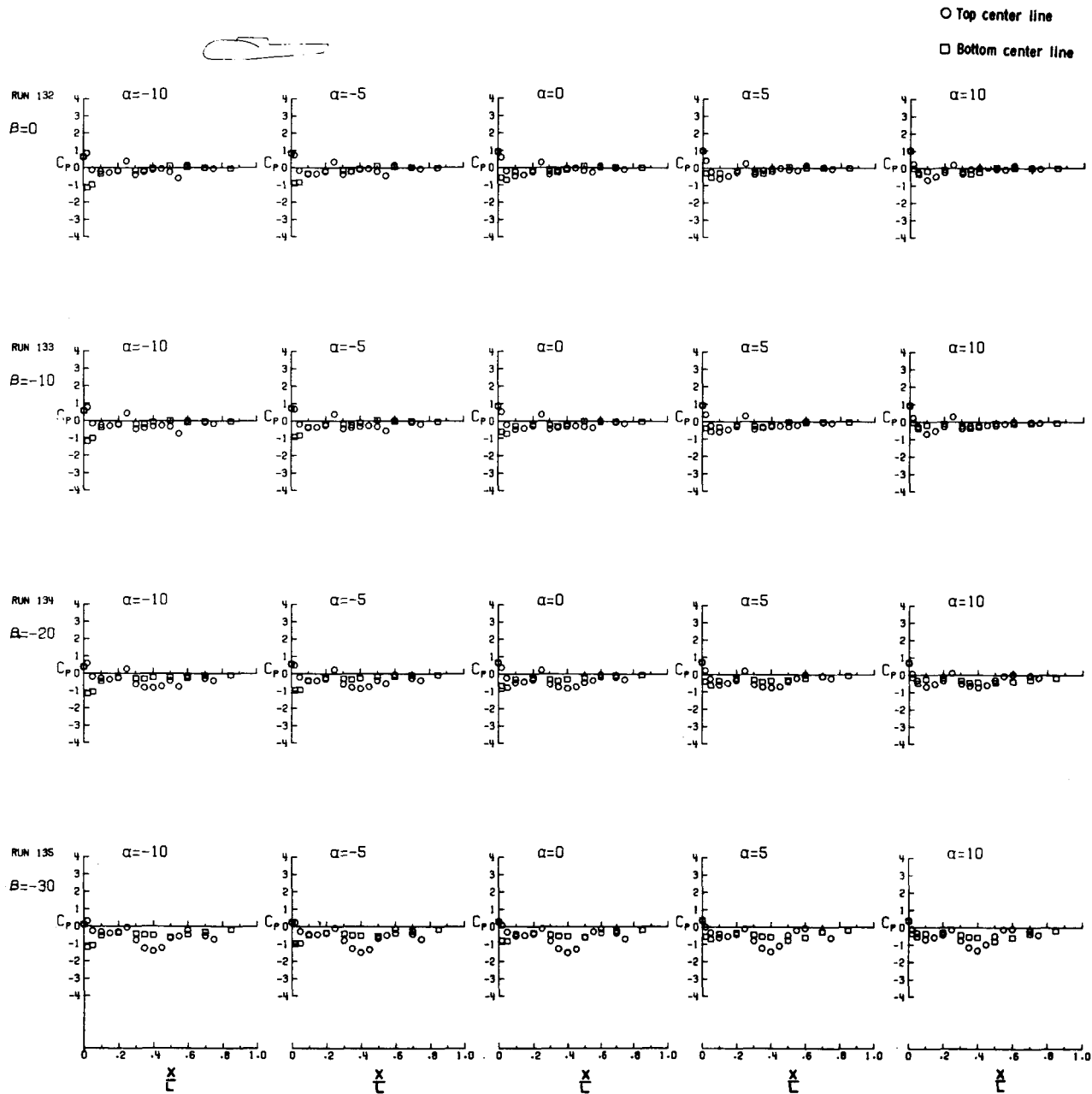
Figure 67.- Effect of angles of attack and sideslip on pressure distribution on model 2 without rotor and without tail. Forward flight.
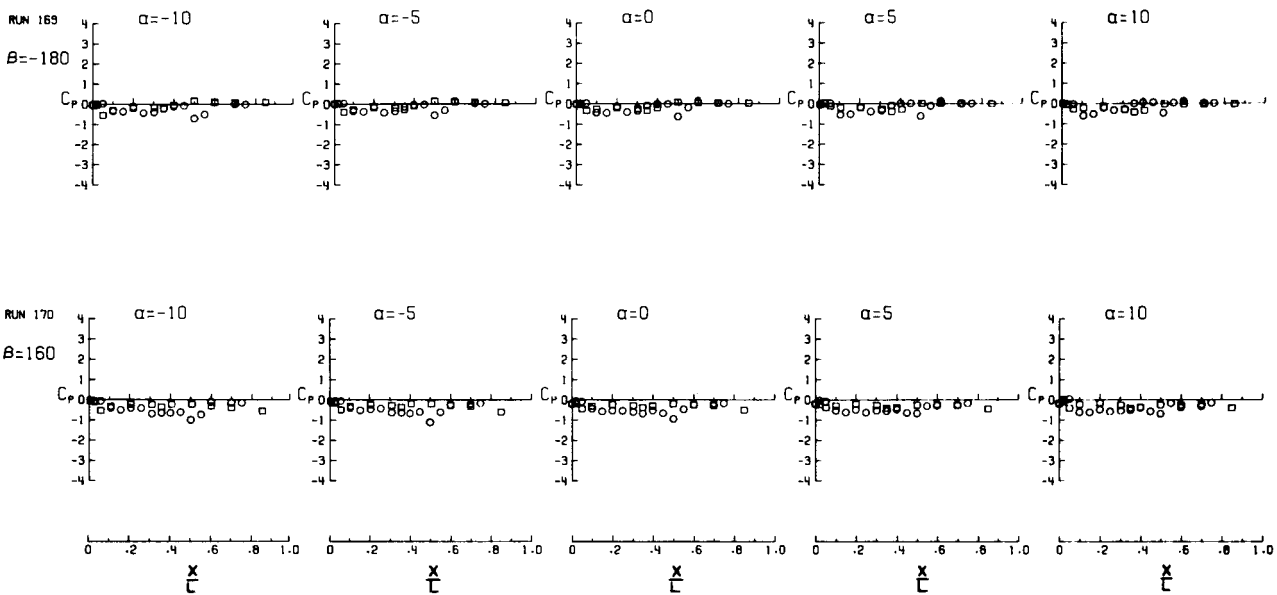
Figure 68.- Effect of angles of attack on pressure distribution on model 2
without rotor and with tail.   Rearward flight.
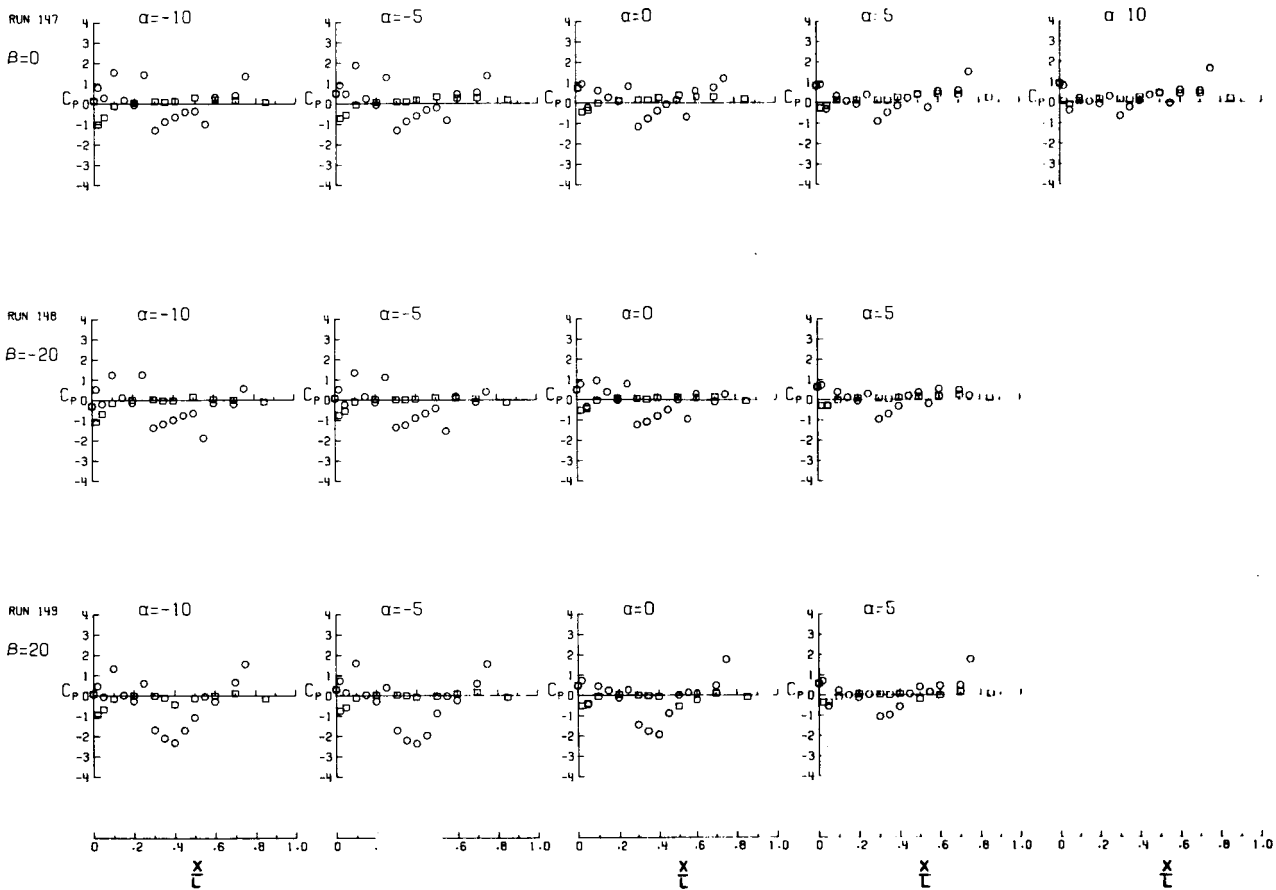
Figure 69.- Effect of angles of attack and sideslip on pressure distribution on model 2 with rotor and with tail.   Forward flight at V_K = 30.
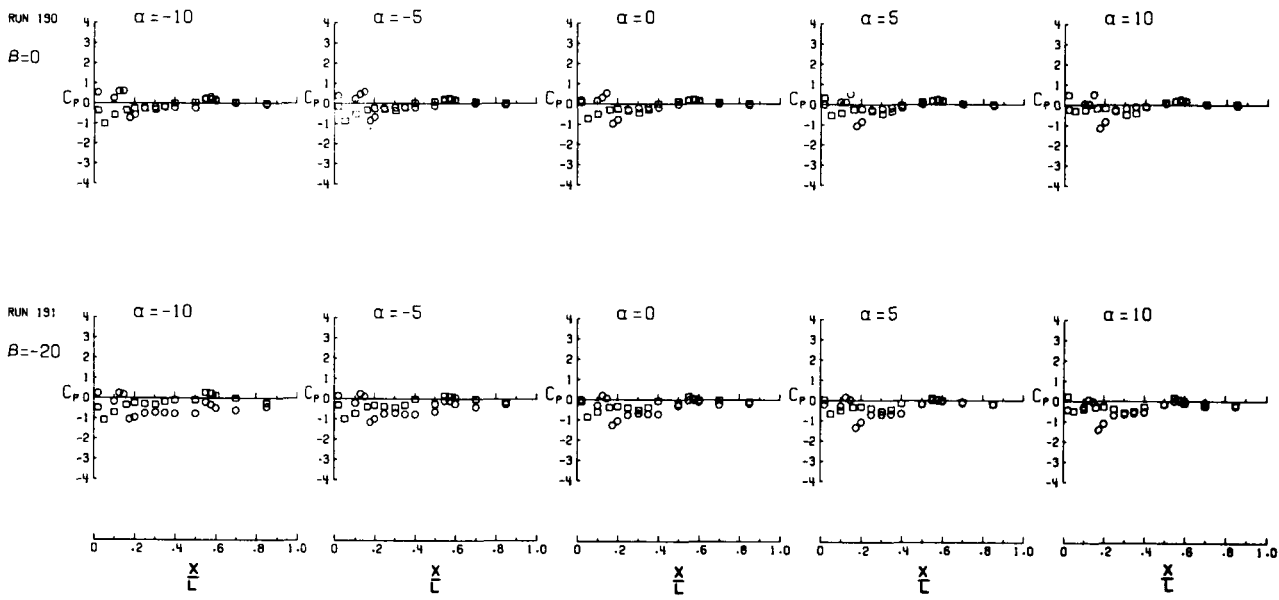
Figure 70.- Effect of angles of attack on pressure distribution on model 3. Forward flight.
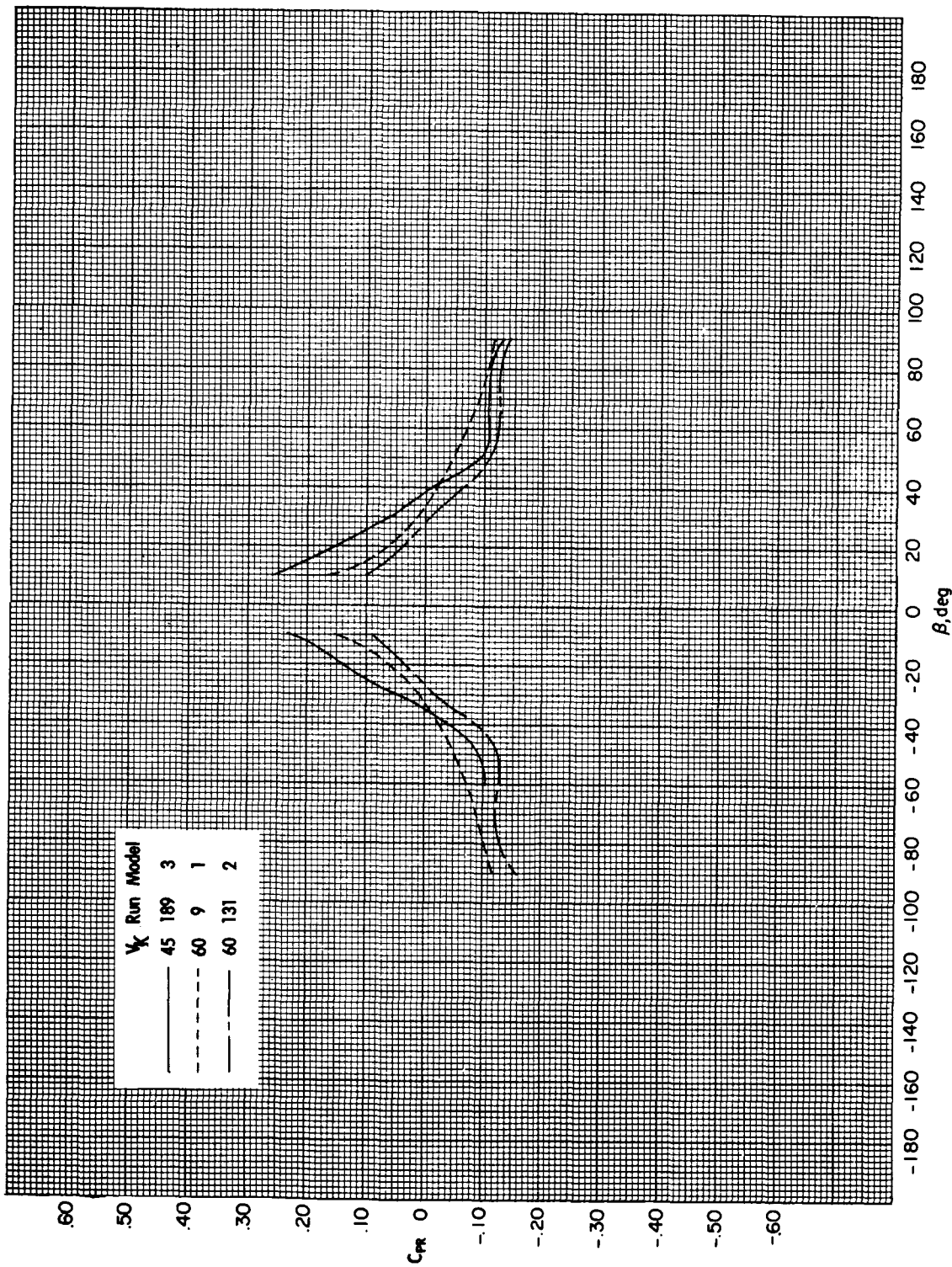
Figure 71.- Comparison of center-of-pressure variation with sideslip of models 1, 2, and 3.
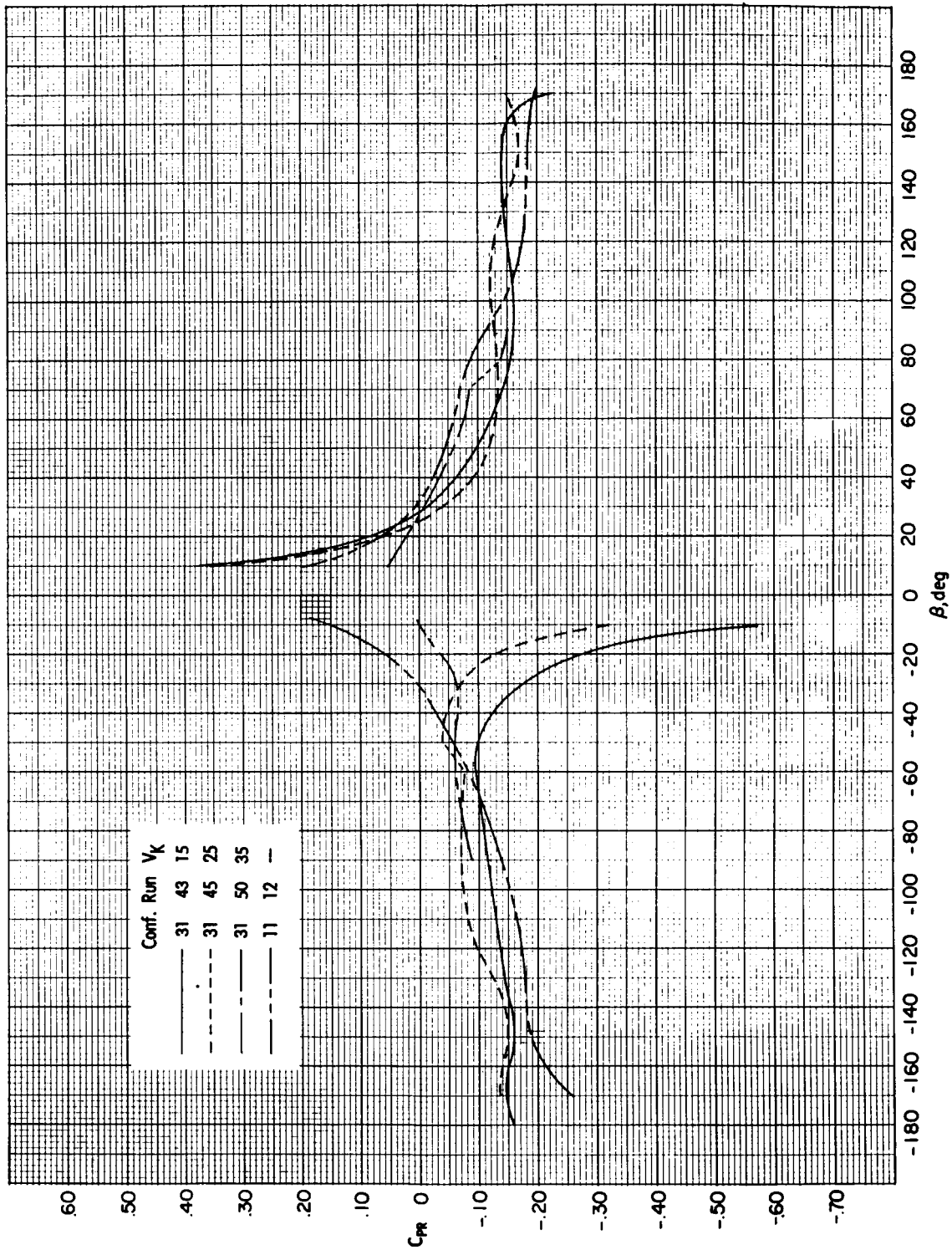
Figure 72.- Effect of rotor wake on center-of-pressure variation with sideslip on model 1 without tail.
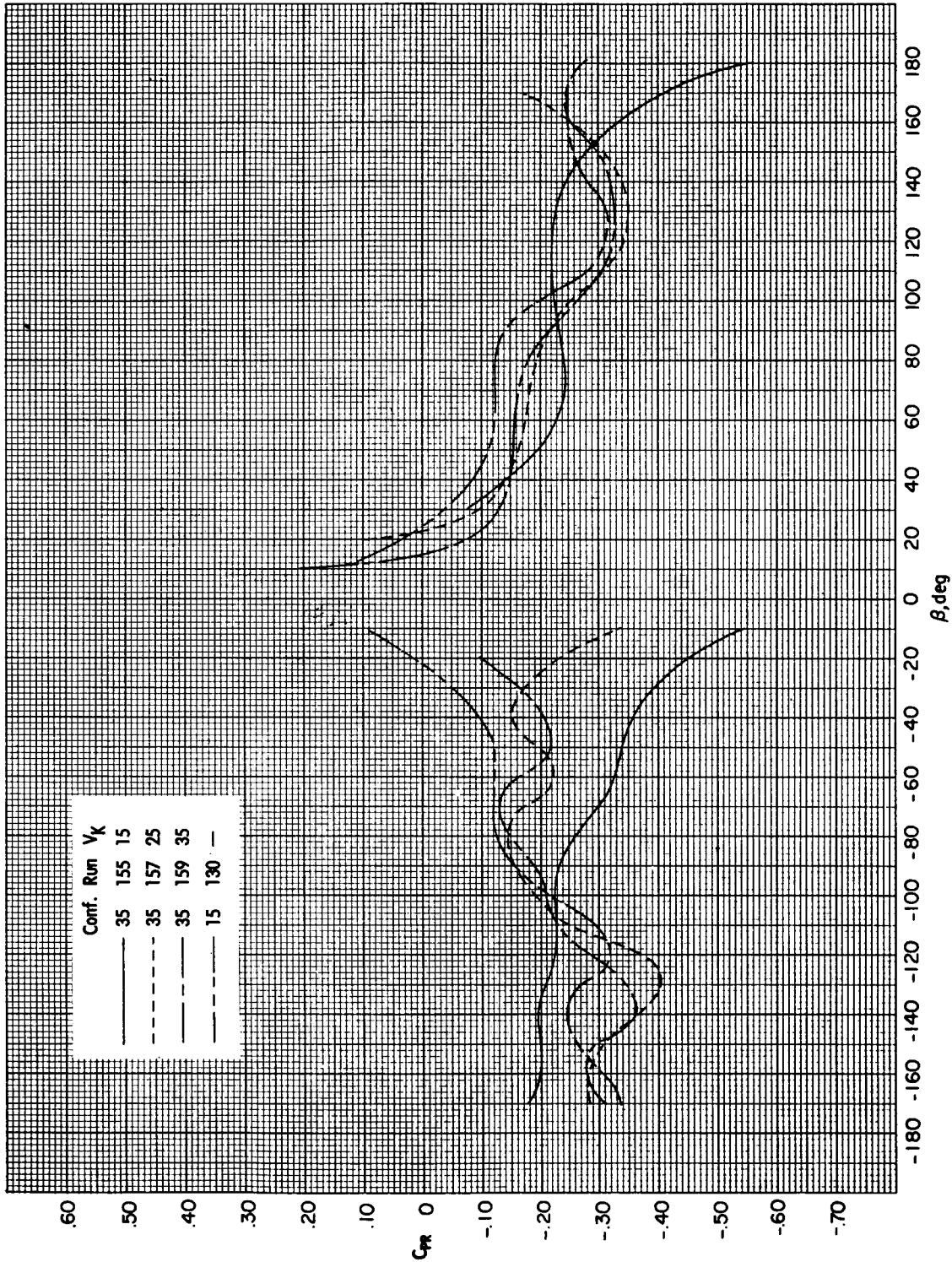
Figure 73.- Effect of center-of-pressure variation with sideslip on model 2 without tail.

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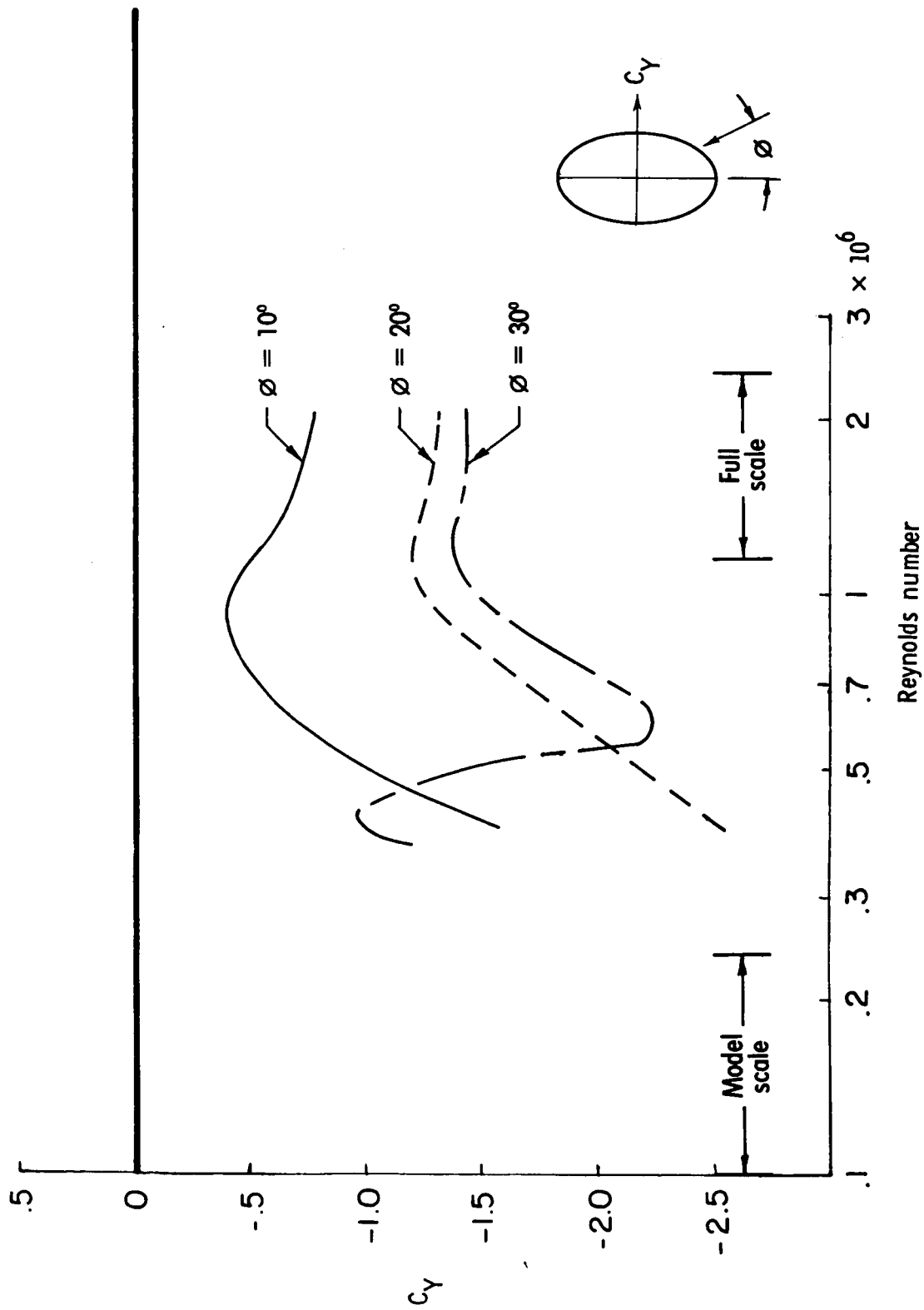
Figure 74.- Effect of Reynolds number and flow incidence on side force of an elliptic cylinder. Major axis over minor axis = 2.0 and C_Y based on minor axis.
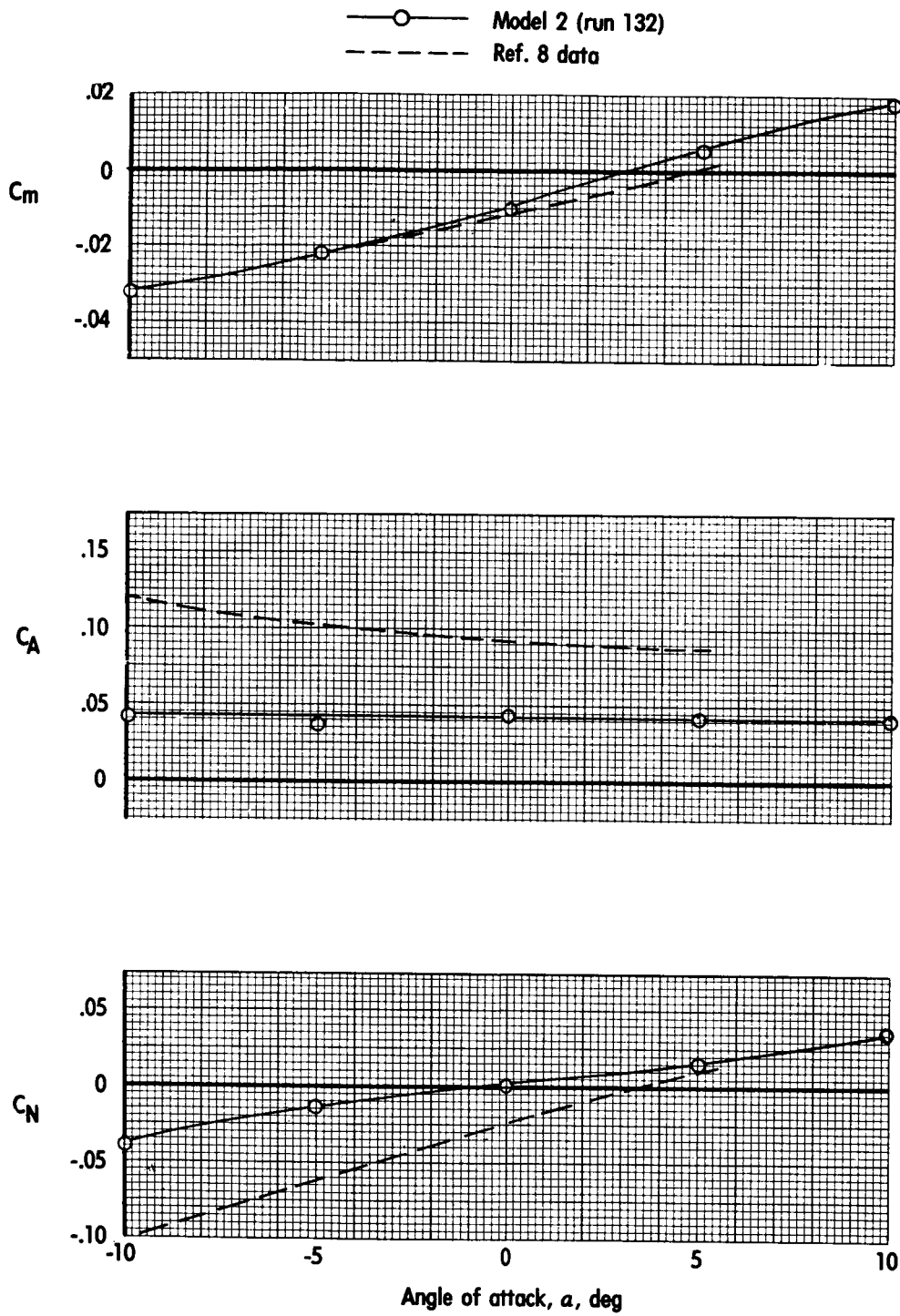
Figure 75.- Comparison of longitudinal characteristics of model 2 with those of full-scale configuration ("MUH") in reference 8.

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15. Supplementary Notes

16. Abstract

The effects of rotor wake on helicopter fuselage aerodynamic characteristics were investigated in the Langley V/STOL tunnel. Force, moment, and pressure data were obtained on three fuselage models at various combinations of windspeed, sideslip angle, and pitch angle. The data show that the influence of rotor wake on the helicopter fuselage yawing moment imposes a significant additional thrust requirement on the tail rotor of a single-rotor helicopter at high sideslip angles. Influence of the low Reynolds number characteristic of this investigation can make the results conservative if utilized in the specification for design of a tail rotor.

17. Key Words (Suggested by Author(s)) Rotor wake Yawing moment Helicopter	18. Distribution Statement Unclassified — Unlimited Subject Category 02 Aerodynamics

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