UNCLASSIFIED

AD NUMBER
ADA800390
CLASSIFICATION CHANGES
TO: **unclassified**
FROM: **confidential**
LIMITATION CHANGES
TO: **Approved for public release; distribution is unlimited.**
FROM: **Distribution authorized to DoD only; Administrative/Operational Use; MAY 1951. Other requests shall be referred to Aeronautical Systems Div., Wright-Patterson AFB, OH 45433. Pre-dates formal DoD distribution statements. Treat as DoD only.**
AUTHORITY
ASD/ENF ltr dtd 9 Mar 1992; ASD/ENF ltr dtd 9 Mar 1992

THIS PAGE IS UNCLASSIFIED

THIS REPORT HAS BEEN DECLASSIFIED
AND CLEARED FOR PUBLIC RELEASE.

DISTRIBUTION A
APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED.

(Unpublished Card) CONFIDENTIAL

ATI 162 183 (Copies obtainable from ASTIA-DSC)

Republic Aviation Corp., Farmingdale, L. I., N. Y. (Report No. EDR-C 905-104)

Analog Computer Investigation of Stability of F-84 - B-29 Wing Tip Coupling

Helfman, S. 11 May'51 137pp tables, diagrs, graphs

Airplanes - Stability
Airplanes - Control
Airplanes - Wing-tip coupling
Project MX-1016

Aerodynamics (2)
Stability and Control (1)

CO' DENTIAL

ATI No. 162183
ASTIA FILE COPY

REPUBLIC AVIATION CORPORATION
FARMINGDALE, LONG ISLAND
NEW YORK

ANALOG COMPUTER INVESTIGATION

OF

STABILITY OF F-84 - B-29 WING TIP COUPLING

PROJECT MX-1016

R/C REPORT NDR-C905-104

6-1-9

CONFIDENTIAL

CONFIDENTIAL

This report cancelled

Analog Computer Investigation of

Stability of F-84 - B-29 Wing Tip Coupling

Project MX-1016

RAC Report No. EDR-C905-104

Prepared by: S. Hoffman

Approved by: H. R. Lu

C. E. Pappas
Chief of Aerodynamics

May 11, 1951

CONFIDENTIAL

CONFIDENTIAL

TABLE OF CONTENTS

		Page
I.	Introduction	2
II.	Summary	3
III.	List of Tables	4
IV.	List of Figures	5
V.	Coefficients & Symbols	6
VI.	Discussion	
	A. Equations of Motion	8
	B. Gust Disturbances	9
	C. Results of Analog Computer Investigation	11

CONFIDENTIAL

CONFIDENTIAL

I. Introduction

The incorporation of the adjustable rear latch and the single aileron method of control into the design of the wing tip coupling mechanism has necessitated the extension of the analysis of the stability of the combination to include the effect of altitude, speed, weight ratios, and control ratios.

This report presents the results of an analog-computer investigation of the level-flight stability of the F-84 - B-29 coupling scheme undertaken at the Office of Air Research, Wright-Patterson Air Forces Base, Dayton, Ohio, during the week of November 27, 1950.

Subsequent analysis of the two-point method of control using an increased number of degrees of freedom has indicated unstable motion; hence the results given in this report should be reviewed with this fact in mind. An alternative method of control, using auto-pilot components and a single-point method of attachment, is now in the process of investigation and will eventually supersede the two-point method of control analyzed in this report.

CONFIDENTIAL

CONFIDENTIAL

II. Summary

The motions resulting from symmetrical disturbances and also from anti-symmetrical disturbances were obtained for 270 possible flight conditions in accordance with the schedule of runs given in Table I. The results of the analysis are tabulated in Table III, for the four-degree of freedom systems investigated. In all of the 540 conditions analyzed, the resultant motions of the flexible combinations with single aileron control were stable and amply-damped, confirming the advisability, at least theoretically, of using single aileron control. Figure II(a) and II(b) are representative of the records obtained from the computer.

Subsequently, the addition of a fifth degree of freedom to the equations of motion for a symmetric disturbance, namely, ability of the B-29 airplane to translate vertically, has resulted in unstable motion (See Fig. III(a) and (b)), and has necessitated an analytical study of the one-point method of attachment previously mentioned.

CONFIDENTIAL

CONFIDENTIAL

III. List of Tables

Page No.

Table I Schedule of Runs Done at Office of Air Research December 4, 1951 - Symmetrical and Anti-Symmetrical Motion (6 sheets) - 12

Table II

A. Symmetrical Motion Equations - - - - - - - - - - - - - - - - - 18

B. Anti-Symmetrical Motion Equations - - - - - - - - - - - - - - 19

C. Mass and Inertia Characteristics - - - - - - - - - - - - - - 20

D. Coefficients of Equations of Motion - - - - - - - - - - - - 21
Runs #1-270 (90 sheets)

Table III

A. Maximum Amplitudes of Oscillations Symmetrical Motion (10 sheets) - - - - - - - - - - - - - - - 111

B. Maximum Amplitudes of Oscillations Anti-Symmetrical Motion (10 sheets) - - - - - - - - - - - 122

CONFIDENTIAL

CONFIDENTIAL

IV. List of Figures

Page No.

Fig. I. Modes of Motion Considered in Flexible Wing Analysis of Wing Tip Coupling - - - - - - - 133

Fig. II.

A. Typical Computer Record - Symmetrical Motion Runs #121, 122, and 123 - - - - - - - - - - - - 134

B. Typical Computer Record - Anti-Symmetrical Motion Runs #121, 122, and 123 - - - - - - - - - - - - - 135

Fig. III.

A. Run #86 - Symmetrical Motion - ω Term Absent - 136

B. Run #86 - Symmetrical Motion - ω Term Present - 137

CONFIDENTIAL

CONFIDENTIAL

V. Coefficients & Symbols

M	Mass of B-29 Airplane, slugs
m	Mass of F-84 Airplane, slugs
q	Dynamic Pressure = $\frac{1}{2} \rho V^2$, lbs. per sq. ft.
V	Velocity, ft. per sec.
I_{x-x}	Roll Moment of Inertia of B-29 Airplane, slugs-ft.^{2}
I_{y-y}	Pitch Moment of Inertia of B-29 Airplane, slugs-ft.^{2}
k_x	Radius of Gyration of F-84 Airplane in Roll, ft.
k_y	Radius of Gyration of F-84 airplane in Pitch, ft.
a	Distance from elastic axis of B-29 wing tip to F-84 center of gravity (Fig. I), ft.
c	Distance from B-29 center of gravity to B-29 wing elastic axis measured at wing tip, ft. = 3.25 ft. for .26 MAC B-29 center of gravity.
$l_{t_{29}}$	Distance from B-29 center of gravity to center of pressure of horizontal tail, ft.
$l_{t_{84}}$	Distance from F-84 center of gravity to center of pressure of horizontal tail, ft.
R	Semi-span of B-29 airplane, ft.
r	Semi-span of F-84 airplane, ft.
C.G.	Center of gravity position of F-84 airplane, fraction of MAC.
x	Maximum value of pitch distrubance over B-29 airplane, ft/sec.
y	Maximum value of pitch disturbance over F-84 airplane, ft/sec.
z	Maximum value of rolling disturbance, ft./sec.
K	Automatic Aileron drive ratio = $\frac{\text{aileron deflection}}{\text{flapping deflection}}$
X	$e^{-4.75t}\left[1 - e^{-.5t}\right]$

CONFIDENTIAL

CONFIDENTIAL

w	Vertical displacement of B-29 center of gravity, ft.
ϕ	Roll displacement of B-29 wing, radians
θ	Pitch displacement of B-29 airplane, radians
y	Bending displacement of B-29 wing tip relative to fuselage, ft.
δ	Slope of B-29 wing tip in bending, radians
β	Flapping deflection of F-84 airplane, radians
α	Torsional deflection of B-29 wing tip relative to fuselage, radians
$\dot{\theta}$, $\ddot{\theta}$, etc.	$\frac{d\theta}{d_t}$, $\frac{d^2\theta}{d_t^2}$, etc.

S-1-72
REV. 2/49

CONFIDENTIAL

VI. Discussion

A. Equations of Motion

The general form of the equations of motion given in Tables II-A and II-B is used to compute the system of differential equations (Tables II-D) that are solved on the analog computer. The possible degrees of freedom are shown in Figure I, from which the equations of motion are derived through an application of Newton's Law; namely:

$$\sum m_i \; a_i = \sum \text{External Forces} \quad \text{------} \quad (1)$$

$$\sum m_i a_i x_i = \sum \text{External Moments} \quad \text{-----} \quad (2)$$

where:

m_i is the mass of a particle

a_i is the absolute acceleration of the particle considered

x_i is an arm of the particle from an axis under consideration.

Replacing the acceleration, a_i, by its equivalent in terms of the mode variables, and neglecting products of the variables and their derivatives (small perturbations), leads to the set of equations of Table II-A and II-B.

Symmetric motion is caused by a symmetrical vertical gust disturbance and implies that no roll (ϕ) occurs. Similarly, anti-symmetric motion implies no pitch of the B-29 airplane (θ), and no vertical translation of the B-29 center of gravity (w).

CONFIDENTIAL

CONFIDENTIAL

The results shown in Table III-A for symmetric motion were obtained for a four degree of freedom system containing θ, y, β, and α variables [since $\delta = f(y)$], assuming that the influence of w upon the resultant motion was negligible. Subsequent analysis indicated otherwise.

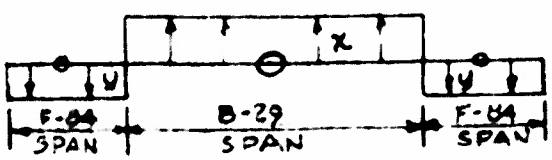
The results shown in Table III-B for anti-symmetric motion were obtained for a four degree of freedom system consisting of ϕ, y, β, and α variables.

B. Gust Disturbances

The design gust distributions considered in this report consist of vertical gusts having symmetrical and anti-symmetrical components. The motion resulting from a horizontal gust has not been treated here, but is amenable to analytic solution and had been previously computed. Since the equations of motion are linear, the total motion in any variable is the vectorial sum of that caused by the symmetrical gust (Table III-A) and that caused by the anti-symmetrical gust (Table III-B).

The symmetrical gust distribution is:

Spanwise:



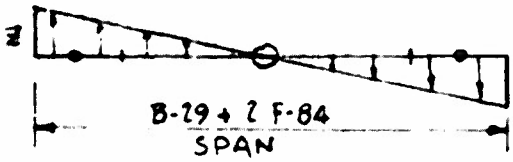
CONFIDENTIAL

[CONFIDENTIAL]

where the maximum values of x and y are obtained from the table below:

Altitude	$X_{max.}$	$Y_{max.}$
Sea Level	14.0 ft/sec	7.3 ft/sec
20,000 ft.	17.1 ft/sec	8.9 ft/sec
35,000 ft.	21.0 ft/sec	10.8 ft/sec

The anti-symmetrical gust distribution is:



where the maximum value of Z is obtained from the table below:

Altitude	$Z_{max.}$
Sea Level	6.8 ft/sec
20,000 ft.	9.2 ft/sec
35,000 ft.	12.0 ft/sec

The variation of the gust magnitude, both symmetrical and anti-symmetrical, with time is given by:

$$\left.\begin{matrix} x \\ y \\ z \end{matrix}\right\} = \left.\begin{matrix} x_{max.} \\ y_{max.} \\ z_{max.} \end{matrix}\right\} e^{-4.75t}\left[1 - e^{-5t}\right]$$

[CONFIDENTIAL]

where $e^{-4.75t}\left[1 - e^{-.5t}\right] = K$, and corresponds to a gust gradient distance of approximately ten B-29 mean aerodynamic chord lengths.

C. Results of Analog Computer Investigation

The maximum values of the resultant oscillations are given in Table III-A for symmetrical motion, and in Table III-B for the anti-symmetrical motion. These values were obtained from the computer records of the 540 runs, a typical one being shown in Figure II-A and Figure II-B for Runs #121, 122, and 123.

The results indicate that single-aileron operation would provide satisfactory and stable motion, and that the effect of increasing K, which is the ratio of $\frac{\text{aileron deflection}}{\text{flapping deflection}}$, is to reduce the maximum magnitude of the flapping deflection, β.

The resultant motion produces tip loads and moments on the B-29 wing tip which are given by:

Δ Vertical Reaction Load at Neutral Axis of B-29 Wing = 2910 y (lbs.)

where y is obtained from Tables III-A and III-B.

Δ Torsional Moment about N.A. of B-29 Wing = $665 \times 10^3 \alpha$ (ft.-lbs.)

where α is obtained from Table III-A and III-B.

When the vertical translation of the B-29 airplane is included in the equations of symmetrical motion, the transient response is not appreciably changed but a slow divergence is indicated. This effect is shown in Figure III-A and III-B. The presence of this divergence implies that hands-off flight is theoretically not feasible with a mechanically actuated single-aileron control and has led to an investigation of a single-point method of attachment employing an automatic pilot type of control.

CONFIDENTIAL

Table I

Schedule of Runs #1 - #270

Symmetrical and Anti - Symmetrical Motion

CONFIDENTIAL

TABLE I

WING TIP COUPLING PROJECT NX-1016
SCHEDULE OF RUNS DONE AT O.A.R. DEC. 4, 1950
ANTI-SYMMETRICAL & SYMMETRICAL MOTION

Run #	Altitude	Speed (ft/sec)	W_{84}(#)	W_{29}(#)	K	CG_{84} Position
1	Sea Level	259	14500	90000	0	.280 MAC
2					1.5	
3					3.0	
4				105000	0	
5					1.5	
6					3.0	
7				120000	0	
8					1.5	
9					3	
10		344		90000	0	
11					1.5	
12					3	
13				105000	0	
14					1.5	
15					3	
16				120000	0	
17					1.5	
18					3	
19		410		90000	0	
20					1.5	
21					3	
22				105000	0	
23					1.5	
24					3	
25				120000	0	
26					1.5	
27					3	
28		259	13000	90000	0	
29					1.5	
30					3	
31				105000	0	
32					1.5	
33					3	
34				120000	0	
35					1.5	
36					3	
37		344		90000	0	
38					1.5	
39					3	
40				105000	0	
41					1.5	
42					3	
43				120000	0	
44					1.5	
45					3	
46		410		90000	0	
47					1.5	
48					3	
49				105000	0	

Schedule of Runs (continued)

Run #	Altitude	Speed (ft/sec)	W_{84}(#)	W_{29}(#)	K	CG_{84} Position
50	Sea Level	410	13000	105000	1.5	.280 MAC
51					3	
52				120000	0	
53					1.5	
54					3	
55		259	11500	90000	0	
56					1.5	
57					3	
58				105000	0	
59					1.5	
60					3	
61				120000	0	
62					1.5	
63					3	
64		344		90000	0	
65					1.5	
66					3	
67				105000	0	
68					1.5	
69					3	
70				120000	0	
71					1.5	
72					3	
73		410		90000	0	
74					1.5	
75					3	
76				105000	0	
77					1.5	
78					3	
79				120000	0	
80					1.5	
81					3	
82	20000	354	14500	90000	0	
83					1.5	
84					3	
85				105000	0	
86					1.5	
87					3	
88				120000	0	
89					1.5	
90					3	
91		434		90000	0	
92					1.5	
93					3	
94				105000	0	
95					1.5	
96					3	
97				120000	0	
98					1.5	
99					3	

CONFIDENTIAL

The results shown in Table III-A for symmetric motion were obtained for a four degree of freedom system containing θ, y, β, and α variables [since $\delta = f(y)$], assuming that the influence of w upon the resultant motion was negligible. Subsequent analysis indicated otherwise.

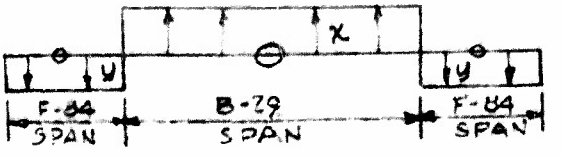
The results shown in Table III-B for anti-symmetric motion were obtained for a four degree of freedom system consisting of ϕ, y, β, and α variables.

B. Gust Disturbances

The design gust distributions considered in this report consist of vertical gusts having symmetrical and anti-symmetrical components. The motion resulting from a horizontal gust has not been treated here, but is amenable to analytic solution and had been previously computed. Since the equations of motion are linear, the total motion in any variable is the vectorial sum of that caused by the symmetrical gust (Table III-A) and that caused by the anti-symmetrical gust (Table III-B).

The symmetrical gust distribution is:

Spanwise:



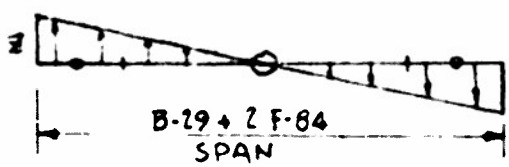
CONFIDENTIAL

[CONFIDENTIAL]

where the maximum values of x and y are obtained from the table below:

Altitude	$X_{max.}$	$Y_{max.}$
Sea Level	14.0 ft/sec	7.3 ft/sec
20,000 ft.	17.1 ft/sec	8.9 ft/sec
35,000 ft.	21.0 ft/sec	10.8 ft/sec

The anti-symmetrical gust distribution is:



where the maximum value of Z is obtained from the table below:

Altitude	$Z_{max.}$
Sea Level	6.8 ft/sec
20,000 ft.	9.2 ft/sec
35,000 ft.	12.0 ft/sec

The variation of the gust magnitude, both symmetrical and anti-symmetrical, with time is given by:

$$\left.\begin{matrix} x \\ y \\ z \end{matrix}\right\} = \left.\begin{matrix} x_{max.} \\ y_{max.} \\ z_{max.} \end{matrix}\right\} e^{-4.75t}\left[1 - e^{-5t}\right]$$

[CONFIDENTIAL]

where $e^{-4.75t}\left[1 - e^{-.5t}\right] = X$, and corresponds to a gust gradient distance of approximately ten B-29 mean aerodynamic chord lengths.

C. Results of Analog Computer Investigation

The maximum values of the resultant oscillations are given in Table III-A for symmetrical motion, and in Table III-B for the anti-symmetrical motion. These values were obtained from the computer records of the 540 runs, a typical one being shown in Figure II-A and Figure II-B for Runs #121, 122, and 123.

The results indicate that single-aileron operation would provide satisfactory and stable motion, and that the effect of increasing K, which is the ratio of $\frac{\text{aileron deflection}}{\text{flapping deflection}}$, is to reduce the maximum magnitude of the flapping deflection, β.

The resultant motion produces tip loads and moments on the B-29 wing tip which are given by:

Δ Vertical Reaction Load at Neutral Axis of B-29 Wing = 2910 y (lbs.)

where y is obtained from Tables III-A and III-B.

Δ Torsional Moment about N.A. of B-29 Wing = $665 \times 10^3 \alpha$ (ft.-lbs.)

where α is obtained from Table III-A and III-B.

When the vertical translation of the B-29 airplane is included in the equations of symmetrical motion, the transient response is not appreciably changed but a slow divergence is indicated. This effect is shown in Figure III-A and III-B. The presence of this divergence implies that hands-off flight is theoretically not feasible with a mechanically actuated single-aileron control and has led to an investigation of a single-point method of attachment employing an automatic pilot type of control.

CONFIDENTIAL

Table I

Schedule of Runs #1 - #270

Symmetrical and Anti - Symmetrical Motion

CONFIDENTIAL

TABLE I

WING TIP COUPLING PROJECT NX-1016
SCHEDULE OF RUNS DONE AT O.A.R. DEC. 4, 1950
ANTI-SYMMETRICAL & SYMMETRICAL MOTION

Run #	Altitude	Speed (ft/sec)	W_{84}(#)	W_{29}(#)	K	CG_{84} Position
1	Sea Level	259	14500	90000	0	.280 MAC
2					1.5	
3					3.0	
4				105000	0	
5					1.5	
6					3.0	
7				120000	0	
8					1.5	
9					3	
10		344		90000	0	
11					1.5	
12					3	
13				105000	0	
14					1.5	
15					3	
16				120000	0	
17					1.5	
18					3	
19		410		90000	0	
20					1.5	
21					3	
22				105000	0	
23					1.5	
24					3	
25				120000	0	
26					1.5	
27					3	
28		259	13000	90000	0	
29					1.5	
30					3	
31				105000	0	
32					1.5	
33					3	
34				120000	0	
35					1.5	
36					3	
37		344		90000	0	
38					1.5	
39					3	
40				105000	0	
41					1.5	
42					3	
43				120000	0	
44					1.5	
45					3	
46		410		90000	0	
47					1.5	
48					3	
49				105000	0	

Schedule of Runs (continued)

Run #	Altitude	Speed (ft/sec)	W_{84}(#)	W_{29}(#)	K	CG_{84} Position
50	Sea Level	410	13000	105000	1.5	.280 MAC
51					3	
52				120000	0	
53					1.5	
54					3	
55		259	11500	90000	0	
56					1.5	
57					3	
58				105000	0	
59					1.5	
60					3	
61				120000	0	
62					1.5	
63					3	
64		344		90000	0	
65					1.5	
66					3	
67				105000	0	
68					1.5	
69					3	
70				120000	0	
71					1.5	
72					3	
73		410		90000	0	
74					1.5	
75					3	
76				105000	0	
77					1.5	
78					3	
79				120000	0	
80					1.5	
81					3	
82	20000	354	14500	90000	0	
83					1.5	
84					3	
85				105000	0	
86					1.5	
87					3	
88				120000	0	
89					1.5	
90					3	
91		434		90000	0	
92					1.5	
93					3	
94				105000	0	
95					1.5	
96					3	
97				120000	0	
98					1.5	
99					3	

Schedule of Runs (continued)

Run #	Altitude	Speed (ft/sec)	W_{84}(#)	W_{29}(#)	K	CG_{84} Position
100	20000	501	14500	90000	0	.280 MAC
101					1.5	
102					3	
103				105000	0	
104					1.5	
105					3	
106				120000	0	
107					1.5	
108					3	
109		354	13000	90000	0	
110					1.5	
111					3	
112				105000	0	
113					1.5	
114					3	
115				120000	0	
116					1.5	
117					3	
118		434		90000	0	
119					1.5	
120					3	
121				105000	0	
122					1.5	
123					3	
124				120000	0	
125					1.5	
126					3	
127		501		90000	0	
128					1.5	
129					3	
130				105000	0	
131					1.5	
132					3	
133				120000	0	
134					1.5	
135					3	
136	20000	354	11500	90000	0	
137					1.5	
138					3	
139				105000	0	
140					1.5	
141					3	
142				120000	0	
143					1.5	
144					3	
145		434		90000	0	
146					1.5	
147					3	
148				105000	0	
149					1.5	

Schedule of Runs (continued)

Run #	Altitude	Speed (ft/sec)	W_{84}(#)	W_{29}(#)	K	CG_{84} Position
150	20000	434	11500	105000	3	.280 MAC
151				120000	0	
152					1.5	
153					3	
154		501		90000	0	
155					1.5	
156					3	
157				105000	0	
158					1.5	
159					3	
160				120000	0	
161					1.5	
162					3	
163	35000	465	14500	90000	0	
164					1.5	
165					3	
166				105000	0	
167					1.5	
168					3	
169				120000	0	
170					1.5	
171					3	
172		520		90000	0	
173					1.5	
174					3	
175				105000	0	
176					1.5	
177					3	
178				120000	0	
179					1.5	
180					3	
181		570		90000	0	
182					1.5	
183					3	
184				105000	0	
185					1.5	
186					3	
187				120000	0	
188					1.5	
189					3	
190		465	13000	90000	0	
191					1.5	
192					3	
193				105000	0	
194					1.5	
195					3	
196				120000	0	
197					1.5	
198					3	
199		520		90000	0	

Schedule of Runs (continued)

Run #	Altitude	Speed (ft/sec)	W_{84}(#)	W_{29}(#)	K	CG_{84} Position
200	35000	520	13000	90000	1.5	.280 MAC
201					3	
202				105000	0	
203					1.5	
204					3	
205				120000	0	
206					1.5	
207					3	
208		570		90000	0	
209					1.5	
210					3	
211				105000	0	
212					1.5	
213					3	
214				120000	0	
215					1.5	
216					3	
217		465	11500	90000	0	
218					1.5	
219					3	
220				105000	0	
221					1.5	
222					3	
223				120000	0	
224					1.5	
225					3	
226		520		90000	0	
227					1.5	
228					3	
229				105000	0	
230					1.5	
231					3	
232				120000	0	
233					1.5	
234					3	
235		570		90000	0	
236					1.5	
237					3	
238				105000	0	
239					1.5	
240					3	
241				12000	0	
242					1.5	
243					3	
244	Sea Level	259	13000	105000	0	.233 MAC
245					1.5	
246					3	
247		344			0	
248					1.5	
249					3	

CONFIDENTIAL

TABLE II A—SYMMETRICAL MOTION EQUATIONS

	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'
EQUATION 1	$\frac{M+2m}{q\times10^3}$	$\frac{12.22}{V}$	—	$\frac{3.696m}{q\times10^3}$	$\frac{5.201}{V}$	—	$\frac{-2m(3.23+a)}{q\times10^3}$	$-\frac{70.52}{V}$	-12.217	$-\frac{2ma}{q\times10^3}$	$-\frac{988}{V}$	-2.998	$\frac{36.6m}{q\times10^3}$	$\frac{47.52}{V}$
EQUATION 2	$-\frac{2m(3.23+a)}{q\times10^3}$	$-\frac{22.02}{V}$	—	$\frac{3.696m(3.23+a)}{-q\times10^3}$	$-\frac{20.14}{V}$	—	$\frac{I_{y-y}+2m[k_y^2+(3.23+a)^2]}{q\times10^3}$	$\frac{3275}{V}$	18.64	$\frac{2m[k_y^2+a(3.23+a)]}{q\times10^3}$	$\frac{213}{V}$	9.38	$-\frac{36.6m(3.23+a)}{q\times10^3}$	$-\frac{198.36}{V}$
EQUATION 3	$\frac{18.3m}{q\times10^3}$	$\frac{24.41}{V}$	—	$\frac{m[33.8+.0463q]}{q\times10^3}$	$\frac{44.30}{V}$	—	$-\frac{18.3m(3.23+a)}{q\times10^3}$	$-\frac{100}{V}$	-24.36	$-\frac{18.3ma}{q\times10^3}$	$-\frac{90.5}{V}$	-22.25	$\frac{m[335+k_x^2]}{q\times10^3}$	$\frac{475.4}{V}$
EQUATION 4	$\frac{m}{q\times10^3}$	$\frac{1.461}{V}$	—	$\frac{1.848m}{q\times10^3}$	$\frac{2.269}{V}$	$\frac{2.91}{q}$	$-\frac{m(3.23+a)}{q\times10^3}$	$-\frac{5.46}{V}$	-1.457	$-\frac{ma}{q\times10^3}$	$-\frac{4.94}{V}$	-1.237	$\frac{18.3m}{q\times10^3}$	$\frac{22.26}{V}$
EQUATION 5	—	$\frac{10.17Cg-4.09}{V}$	—	—	$\frac{15.62Cg-6.787}{V}$	$\frac{2.91a}{q}$	$\frac{m k_y^2}{q\times10^3}$	$\frac{99.0}{V}$	$3.303-10.15Cg$	$\frac{m k_y^2}{q\times10^3}$	$\frac{89.7}{V}$	$\frac{66.5}{q}+2.896-8.52Cg$	—	$\frac{183Cg-66.38}{V}$

	β	FORCING FUNCTION
EQUATION 1	$.1888+.1682K$	$\frac{[251.1x-76.9y]}{V}$ X
EQUATION 2	$[.686+.536K]$	$\frac{[239.7y-284.5x]}{V}$ X
EQUATION 3	$1.402+2.63K$	$\frac{[68.5x-562.5y]}{V}$ X
EQUATION 4	$.0779+.0841K$	$\frac{[6.05x-31.35y]}{V}$ X
EQUATION 5	$[.586+.622K]q$ $-[.230+.155K]$	$\frac{[1.342x+13.90y]}{V}$ X

m = MASS OF F-84, SLUGS.
q = DYNAMIC PRESSURE, LB./SQ.FT.
V = VELOCITY, FT./SEC.
k_x = RADIUS OF GYRATION IN ROLL OF F-84, FT.
a = DISTANCE FROM E.A. OF B-29 WING TO C.G. OF F-84, FT.
Cg = CENTER OF GRAVITY POSITION OF F-84, FRACTION OF M.A.C.
K = AUTOMATIC AILERON DRIVE RATIO.
k_y = RADIUS OF GYRATION IN PITCH OF F-84, FT.
M = MASS OF B-29 AIRPLANE, SLUGS.
X = MAX. VALUE OF PITCH DISTURBANCE OVER B-29, FT./SEC.
y = MAX. VALUE OF PITCH DISTURBANCE OVER F-84, FT./SEC.
I_{y-y} = PITCH MOMENT OF INERTIA OF B-29, SLUGS-(FT)^2

CONFIDENTIAL

CONFIDENTIAL

Schedule of Runs (continued)

Run #	Altitude	Speed (ft/sec)	W_{84}(#)	W_{29}(#)	K	CG_{84} Position
250	Sea Level	410	13000	105000	0	.233 MAC
251					1.5	
252					3	
253	20000	354			0	
254					1.5	
255					3	
256		434			0	
257					1.5	
258					3	
259		501			0	
260					1.5	
261					3	
262	35000	465			0	
263					1.5	
264					3	
265		520			0	
266					1.5	
267					3	
268		570			0	
269					1.5	
270					3	

CONFIDENTIAL

CONFIDENTIAL

TABLE II B — ANTI-SYMMETRICAL MOTION EQUATIONS

	$\ddot{\Phi}$	$\dot{\Phi}$	Φ	$\ddot{y}$	$\dot{y}$	y	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$
EQUATION 1	$\frac{I_{x-x}+2m[8000+k_x^2]}{q\times10^3}$	$\frac{49440}{V}$	—	$\frac{2m[1657+.0463k_x^2]}{q\times10^3}$	$\frac{598.6}{V}$	—	$-\frac{179.2ma}{q\times10^3}$	$-\frac{885}{V}$	-221.0	$\frac{2m[1641+k_x^2]}{q\times10^3}$	$\frac{8149}{V}$
EQUATION 2	$\frac{m[1640+k_x^2]}{q\times10^3}$	$\frac{1779}{V}$	—	$\frac{m[338+.0463k_x^2]}{q\times10^3}$	$\frac{44.30}{V}$	—	$\frac{-18.3ma}{q\times10^3}$	$-\frac{90.5}{V}$	-22.25	$\frac{m[335+k_x^2]}{q\times10^3}$	$\frac{475.4}{V}$
EQUATION 3	$\frac{89.6m}{q\times10^3}$	$\frac{100.50}{V}$	—	$\frac{1.848m}{q\times10^3}$	$\frac{2.269}{V}$	$\frac{2.91}{q}$	$\frac{-ma}{q\times10^3}$	$-\frac{4.94}{V}$	-1.237	$\frac{18.3m}{q\times10^3}$	$\frac{22.26}{V}$
EQUATION 4	—	$\frac{687C_g-309.6}{V}$	—	—	$\frac{15.62C_g-6.757}{V}$	$\frac{2.91}{q}a$	$\frac{mk_y^2}{q\times10^3}$	$\frac{89.7}{V}$	$\frac{665}{q}+2.896-8.52C_g$	—	$\frac{153C_g-66.35}{V}$

	β	Forcing Function
EQUATION 1	$13.91+17.25K$	$\frac{8635Z}{V}\Sigma$
EQUATION 2	$1.402+2.63K$	$\frac{483Z}{V}\Sigma$
EQUATION 3	$.0779+.0841K$	$\frac{27.28Z}{V}\Sigma$
EQUATION 4	$[.536+.622K]C_g-[.230+.155K]$	$\frac{12.16Z}{V}\Sigma$

I_{x-x} = Roll Moment Of Inertia Of B-29, Slugs-(FT)^2
m = Mass Of F-84, Slugs.
q = Dynamic Pressure, LB/SQ.FT.
V = Velocity, FT/SEC.
k_x = Radius Of Gyration In Roll Of F-84, FT.
a = Distance From E.A. Of B-29 Wing To C.G. Of F-84, FT.
C.G. = Center Of Gravity Position Of F-84, Fraction Of M.A.C.
K = Automatic Aileron Drive Ratio.
k_y = Radius Of Gyration In Pitch Of F-84, FT
Z = Max. Value Of Roll Disturbance Velocity, FT./SEC.

CONFIDENTIAL

CONFIDENTIAL

TABLE II-C.

MASS AND INERTIA CHARACTERISTICS.

	F-84 AIRPLANE.			B-29 AIRPLANE.		
WEIGHT. (LBS.)	14500	13000	11500	120000	105000	90000
MASS. (SLUGS)	450	404	357	3728	3260	2795
k_x ~ FT.	5.88	5.85	5.48			
k_y ~ FT.	6.11	6.16	6.50			
I_{x-x} (SLUGS-FT^2)				1712×10^3	1500×10^3	1285×10^3
I_{y-y} (SLUGS-FT^2)				1000×10^3	875×10^3	750×10^3

CONFIDENTIAL

CONFIDENTIAL

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION

SYMMETRICAL AND ANTI-SYMMETRICAL MOTION

CONFIDENTIAL

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 1,2,3

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.04619	.04718	-	.02079	.02008	-	.03831	.2723	12.217	.001969	.03815	2.998	.2059	.1935	.1888	.4411	.6934	-11.41X			
2	-.03831	-.08502	-	-.07079	-.07776	-	9.925	12.64	18.64	.4267	.8224	9.38	-.7011	-.7659	-.6860	-1.490	-2.294	-8.622 X			
3	.1029	.09425	-	.1991	.1710	-	-.3505	-.3861	-24.36	-.01801	-.3494	-22.25	2.079	1.836	1.402	5.347	9.292	12.69X			
4	.005625	.005641	-	.01039	.008761	.03637	-.01915	-.02108	-1.457	-.0009844	-.01907	-1.237	.1029	.08595	.0779	.2041	.3302	.5566 X			
5	-	-.004797	-	-	-.009202	.006366	.2100	.3822	.4610	.2100	.3463	8.823	-	-.09077	-.07992	-.05118	-.02244	-.4643 X			

ANTI-SYMMETRICAL MOTION

												K = 0	K = 1.5	K = 3.0	
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.
Eq. 1	106.5	190.9	-	1.882	2.311	-	-.1764	-3.417	-221.0	18.85	31.46	13.91	39.79	65.66	226.7X
2	9.419	6.869	-	.1991	.1710	-	-.01801	-.3494	-22.25	2.079	1.836	1.402	5.347	9.292	12.68X
3	.5040	.3880	-	.01039	.008761	.03637	-.0009844	-.01907	-1.237	.1029	.08595	.0779	.2041	.3302	.7162X
4	-	-.4527	-	-	-.009202	.006366	.2100	.3463	8.823	-	-.09077	-.07992	-.05118	-.02244	-.3193X

CONFIDENTIAL

PREPARED
CHECKED
REVISED

Alt. = Sea Level
W_{84} = 14500#
W_{29} = 105000#
$V_{Ft/Sec}$ = 259
q = 80, a = .175 Ft. C.G.84 = .280

TABLE II – D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 4, 5, 6

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K=0	K=1.5	K=3.0				
	ω''	ω'	ω	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq.1	.05200	.04718	-	.02079	.02008	-	-.03831	-.2723	12.217	-.001969	-.03815	2.998	.2059	.1835	.1888	.4411	.6934	-11.41 X			
2	-.03831	-.08502	-	-.07079	-.07776	-	11.49	12.64	18.64	.4267	.8244	9.38	-.7011	-.7659	-.6860	-1.490	-2.294	8.622X			
3	.1029	.09425	-	.1991	.1710	-	-.3505	-.3861	-24.36	-.01801	-.3494	-22.25	2.079	1.836	1.402	5.347	9.292	12.69X			
4	.005625	.005641	-	.01039	.008761	.03637	-.01915	-.02108	-1.457	-.0009844	-.01907	-1.237	.1029	.08595	.0779	.2041	.3302	.5566X			
5	-	-.004797	-	-	-.009292	.006366	.2100	.3822	.4610	.2100	.3463	8.823	-	-.09077	-.07992	-.05118	-.02244	-.4643X			

ANTI-SYM. MOTION

												K=0	K=1.5	K=3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq.1	109.1	190.9	-	1.882	2.311	-	-.1764	-3.417	-221.0	18.85	31.46	13.91	39.79	65.66	226.7 X						
2	9.419	6.869	-	.1991	.1710	-	-.01801	-.3494	-22.25	2.079	1.836	1.402	5.347	9.292	12.68X						
3	.5040	.3880	-	.01039	.008761	.03637	-.0009844	-.01907	-1.237	.1029	.08595	.0779	.2041	.3302	.7162 X						
4	-	-.4527	-	-	-.009292	.006366	.2100	.3463	8.823	-	-.09077	-.07992	-.05118	-.02244	-.3193 X						

CONFIDENTIAL

TABLE II - D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 7, 8, 9

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K=0	K=1.5	K=3.0				
	ω''	ω'	ω	ψ''	ψ'	ψ	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.05785	.04718	-	.02079	.02008	-	-.03831	.2723	12.217	-.001969	-.03815	2.998	.2059	.1835	.1888	.4411	.6934	-11.41X			
2	-.03831	-.08502	-	-.07079	-.07776	-	13.05	12.64	18.64	.4267	.8224	9.38	-.7011	-.7659	-.6860	-1.490	-2.294	8.622X			
3	.1029	.09425	-	.1991	.1710	-	-.3505	-.3861	-24.36	-.01801	-.3494	-22.25	2.079	1.836	1.402	5.347	9.292	12.69X			
4	.005625	.005641	-	.01039	.008761	.03637	-.01915	-.02108	-1.457	-.0009844	-.01907	-1.237	.1029	.08595	.0779	.2041	.3302	.5566X			
5	-	-.004797	-	-	-.009209	.006366	.2100	.3822	.4610	.2100	.3463	8.823	-	-.09077	-07992	-.05118	-.02244	-.4643X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	ψ''	ψ'	ψ	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	111.8	190.9	-	1.882	2.311	-	-.1764	-3.417	-221.0	18.85	31.46	13.91	39.79	65.66	226.7 X						
2	9.419	6.869	-	.1991	.1710	-	-.01801	-.3494	-22.25	2.079	1.836	1.402	5.347	9.292	12.68 X						
3	.5040	.3880	-	.01039	.008761	.03637	-.0009844	-.01907	-1.237	.1029	.08595	.0779	.2041	.3302	.7162 X						
4	-	-.4527	-	-	-.009202	.006366	.2100	.3463	8.823	-	-.09077	-.07992	-.05118	-.02244	-.3193 X						

CONFIDENTIAL

Alt. = Sea Level
W_{84} = 14500#
W_{29} = 90000#
q = 140, a = .175 Ft.
$V_{ft/sec}$ = 344
$C.G._{84}$ = .280

[CONFIDENTIAL]

TABLE II - D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS #10,11,12

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K=0	K=1.5	K=3.0				
	w''	w'	w	ψ''	ψ'	ψ	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.02639	.03552	-	.01108	.01512	-	-.02109	-.2050	-12.217	-.001125	-.02872	-2.998	.1176	.1381	.1888	.4111	.6924	8.587 X			
2	-.02189	-.06401	-	-.04045	-.05855	-	5.671	9.520	10.64	.2438	.6192	9.380	-.4004	-.5766	-.6860	-1.490	-2.294	6.492 X			
3	.05882	.07096	-	.1138	.1288	-	-.2003	-.2907	-24.36	-.01029	-.2631	-22.25	1.108	1.382	1.402	5.347	9.292	9.554 X			
4	.003214	.004247	-	.005940	.006596	.02079	-.01094	-.01587	-1.457	-.0005625	-.01436	-1.237	.05882	.06471	.0779	.2041	.3302	.4191 X			
5	-	-.003612	-	-	-.006928	.003637	.1200	.2678	.4610	.1200	.2608	5.260	-	-.06834	-.07992	-.05118	-.02244	-.3496 X			

ANTI-SYM. MOTION

	ϕ''	ϕ'	ϕ	ψ''	ψ'	ψ	α''	α'	α	β''	β'	β	β	β	F.F.
												K = 0	K = 1.5	K = 3.0	
Eq. 1	60.66	143.7	-	1.075	1.740	-	-.1008	-2.573	-221.0	10.77	23.69	13.91	39.79	65.66	170.7 X
2	5.383	5.172	-	.1138	.1288	-	-.01029	-.2631	-22.25	1.188	1.382	1.402	5.347	9.292	9.547 X
3	.2880	.2922	-	.005940	.006596	.02079	-.0005625	-.01436	-1.237	.05882	.06471	.0779	.2041	.3302	.5392 X
4	-	-.3408	-	-	-.006928	.003637	.1200	.2608	5.260	-	-.06834	-.07992	-.05118	-.02244	-.2404 X

[CONFIDENTIAL]

TABLE II - D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS #13, 14, 15

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K=0	K=1.6	K=3.0				
	ω''	ω'	ω	ψ''	ψ'	ψ	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.02971	.03552	-	.01188	.01512	-	-.02139	-.2050	-.12-217	-.001125	-.02872	-2.998	.1176	.1381	.1888	.4411	.6934	8.587 X			
2	-.02189	-.06401	-	-.04045	-.05855	-	6.566	9.520	18.64	.2438	.6192	9.380	-.4004	-.5766	-.6860	-1.490	-2.294	6.492 X			
3	.05882	.07096	-	.1138	.1288	-	-.2003	-.2907	-24.36	-.01029	-.2631	-22.25	1.188	1.382	1.402	5.347	9.292	9.554 X			
4	.003214	.004247	-	.005940	.006596	.02079	-.01094	-.01587	-1.457	-.0005625	-.01436	-1.237	.05882	.06471	.0779	.2041	.3302	.4191 X			
5	-	-.003612	-	-	-.006928	.003637	.1200	.2878	.4610	.1200	.2608	5.260	-	-.06834	-.07992	-.05118	-.02244	-.3496X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	ψ''	ψ'	ψ	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	62.34	143.7	-	1.075	1.740	-	-.1008	-2.573	-221.0	10.77	23.69	13.01	39.79	65.66	170.7 X						
2	5.383	5.172	-	.1138	.1288	-	-.01029	-.2631	-22.25	1.188	1.382	1.402	5.347	9.292	9.547 X						
3	.2880	.2922	-	.005940	.006596	.02079	-.0005625	-.01436	-1.237	.05882	.06471	.0779	.2041	.3302	.5392 X						
4	-	-.3408	-	-	-.006928	.003637	.1200	.2608	5.260	-	-.06834	-.07992	-.05118	-.02244	-.2404 X						

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 16, 17, 18

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.03306	.03552	-	.01188	.01512	-	-.02189	-.2050	-12.217	-.001125	-.02872	-2.998	.1176	.1381	.1888	.4411	.6934	-8.587X			
2	-.02189	-.06401	-	-.04045	-.05855	-	7.457	9.520	18.64	.2438	.6192	9.380	-.4004	-.5766	-.6860	-1.490	-2.294	6.492X			
3	.05882	.07096	-	.1138	.1288	-	-.2003	-.2907	-24.26	-.01029	-.2631	-22.25	1.188	1.382	1.402	5.347	9.292	9.554X			
4	.003214	.004247	-	.005940	.006596	.02079	-.01094	-.01587	-1.457	-.0005625	-.01436	-1.237	.05882	.06471	.0779	.2041	.3302	.4191X			
5	-	-.003612	-	-	-.006928	.003637	.1200	.2878	.4610	.1200	.2608	5.260	-	-.06834	-.07992	-.05118	-.02244	-.3496 X			

ANTI-SYM. MOTION

												K = 0	K = 1.5	K = 3							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	63.88	143.7	-	1.075	1.740	-	-.1008	-2.573	-221.0	10.77	23.69	13.91	39.79	65.66	170.7 X						
2	5.383	5.172	-	.1138	.1288	-	-.01029	-.2631	-22.25	1.188	1.382	1.402	5.347	9.292	9.547 X						
3	.2880	.2922	-	.005940	.006596	.02079	-.0005625	-.01436	-1.237	.05882	.06471	.0779	.2041	.3302	.5392 X						
4	-	-.3408	-	-	.006928	.003637	.1200	.2608	5.260	-	-.06834	-.07992	-.05118	-.02244	-.2404X						

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 19, 28-21

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.01848	.02980		.008316	.01269		-.01532	-.1720	-12.217	.0007876	.02410	-2.998	.08236	.1159	.1888	.4411	.0934	-7.208X			
2	-.01532	-.05371		-.02832	-.04912		3.970	7.988	18.64	.1707	.1595	9.38	-.2804	-.4838	-.6860	-1.490	-2.294	5.447X			
3	.04116	.05954		.07964	.1080		-.1402	-.2439	-24.36	.007204	-.2207	-22.25	.8316	1.160	1.402	5.347	9.292	8.016X			
4	.002250	.003563		.004156	.005534	.01455	-.007660	-.01332	-1.457	.0003938	-.01205	-1.237	.04116	.05429	.0779	.2041	.3302	.3516X			
5		-.003030			-.005813	.002546	.08400	.2415	.4610	.08400	.2188	3.835		-.05734	-.07992	-.05118	-.02244	-.2933X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	42.60	120.6		.7528	1.460		-.07056	-2.159	-221.0	7.540	19.88	13.91	39.79	65.66	143.2X						
2	3.768	4.339		.07964	.1080		-.007204	-.2207	-22.25	.8316	1.160	1.402	5.347	9.292	8.010X						
3	.2016	.2451		.004156	.005534	.01455	-.0003938	-.01205	-1.237	.04116	.05429	.0779	.2041	.3302	.4524X						
4		-.2860			-.005813	.002546	.08400	.2188	3.835		-.05734	-.07992	-.05118	-.02244	-.2017X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 22, 23, 24.

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	ω''	ω'	ω	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.02080	.02980		.008316	.01269		-.01532	-.1720	-12.217	-.0007876	-.02410	-2.998	.08236	.1159	.1888	.4411	.6934	-7.208X			
2	-.01532	-.05371		-.02832	-.04912		4.596	7.988	18.64	.1707	.5195	9.38	-.2804	-.4438	-.6860	-1.490	-2.294	5.447X			
3	.04116	.05954		.07964	.1080		-.1402	-.2439	-24.36	.007204	-.2207	-22.25	.8316	1.160	1.402	5.347	9.292	8.016X			
4	.002250	.003563		.004156	.005534	.01455	-.007660	-.01332	-1.457	-.0003938	-.01205	-1.237	.04116	.05429	.0779	.2041	.3302	.3516X			
5		-.003030			-.005813	.002546	.08400	.2415	.4610	.08400	.2188	3.835		-.05734	-.07992	-.05118	-.02244	-.2933X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	43.64	120.6		.7528	1.460		-.07056	-2.159	-221.0	7.540	19.88	13.91	39.79	65.66	143.2X						
2	3.768	4.339		.07964	.1080		-.007204	-.2207	-22.25	.8316	1.160	1.402	5.347	9.292	8.010X						
3	.2016	.2451		.004156	.005534	.01455	-.0003938	-.01205	-1.237	.04116	.05429	.0779	.2041	.3302	.4524X						
4		-.2860			-.005813	.002546	.08400	.2188	3.835		-.05734	-.07992	-.05118	-.02244	-.2017X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS #25, 26, 27

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.02314	.02980		.008316	.01269		-.01532	-.1720	-12.217	-.0007876	-.02410	-2.998	.08236	.1159	.1888	.4411	.6934	-7.208X			
2	-.01532	-.05371		-.02832	-.04912		5.220	7.988	18.64	.1707	.5195	9.38	-.2804	-.4838	-.6860	-1.490	-2.294	5.447X			
3	.04116	.05954		.07964	.1080		-.1402	-.2439	-24.36	-.007204	-.2207	-22.25	.8316	1.160	1.402	5.347	9.292	8.016X			
4	.002250	.003563		.004156	.005534	.01455	-.007660	-.01332	-1.457	-.0003938	-.01205	-1.237	.04116	.05429	.0779	.2041	.3302	.3516X			
5		-.003030			-.005813	.002546	.08400	.2415	.4610	.08400	.2188	3.835		-.05734	-.07992	-.05118	-.02244	-.2933X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	44.72	120.6		.7528	1.460		-.07056	-2.159	-221.0	7.540	19.88	13.91	39.79	65.66	143.2X						
2	3.768	4.339		.07964	.1080		-.007204	-.2207	-22.25	.8316	1.160	1.402	5.347	9.292	8.010X						
3	.2016	.2451		.004156	.005534	.01455	-.0003938	-.01205	-1.237	.04116	.05429	.0779	.2041	.3302	.4524X						
4		-.2860			-.005813	.002546	.08400	.2188	3.835		-.05734	-.07992	-.05118	-.02244	-.2017X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 28, 29, 30

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0			K = 1.5		K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.04504	.04718		.01866	.02008		-.03439	-.2723	-12.217	-.001767	-.03815	-2.998	.1848	.1835	.1888	.4411	.6934	-11.41X			
2	-.03439	-.08502		-.06354	-.07776		9.875	12.64	18.64	.3893	.8224	9.38	-.6292	-.7659	-.6860	-1.490	-2.294	8.622X			
3	.09241	.09425		.1787	.1710		.3148	-.3861	-24.36	-.01617	-.3494	-22.25	1.865	1.836	1.402	5.347	9.292	12.69X			
4	.005050	.005641		.009332	.008761	.03637	-.01720	-.02108	-1.457	-.0008837	-.01907	-1.237	.09241	.08595	.0779	.2041	.3302	.5566X			
5		-.004797			-.009202	.006366	.1916	.3822	.4610	.1916	.3463	8.823		-.09077	-.07992	-.05118	-.02244	-.4643X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F						
Eq. 1	97.21	190.9		1.690	2.311		-.1584	-3.417	-221.0	16.92	31.46	13.91	39.79	65.66	226.7X						
2	8.455	6.869		.1787	.1710		-.01617	-.3494	-22.25	1.865	1.836	1.402	5.347	9.292	12.68X						
3	.4525	.3880		.009332	.008761	.03637	-.0008837	-.01907	-1.237	.09241	.08595	.0779	.2041	.3302	.7162X						
4		-.4527			-.009202	.006366	.1916	.3463	8.823		-.09077	-.07992	-.05118	-.02244	-.3193X						

PREPARED G. M. 9-1-50
CHECKED
REVISED

Alt. = Sea Level
W_{84} = 13000 #
W_{29} = 105000 #
q = 80 a = .175 ft.

Vft/sec = 259
$C.G._{84}$ = .280

PAGE 32
REPORT NO. EDR-C905-104
MODEL

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION

SYMMETRIC MOTION

RUNS # 31, 32, 33

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq 1	.05085	.04718	--	.01866	.02008	--	-.03439	-.2723	-12.217	-.001767	-.03815	-2.998	.1848	.1835	.1888	.4411	.6934	11.41 X			
2	-.03439	-.08502	--	.06354	-.07776	--	11.44	12.64	18.64	.3833	.8224	9.38	-.6292	-.7659	-.6860	-1.490	-2.296	8.622 X			
3	.09241	.09425	--	.1787	.1710	--	-.3148	-.3861	-24.36	-.01617	-.3494	-22.25	1.865	1.836	1.402	5.347	9.292	12.69 X			
4	.005050	.005641	--	.009332	.008761	.03637	-.01720	-.02108	-1.457	-.0008837	-.01907	-1.237	.09241	.08595	.0279	.2041	.3302	.5566 X			
5	--	-.04787	--	--	-.009202	.006366	.1916	.3822	.4610	.1916	.3463	8.823	--	-.09077	-.07992	-.05118	-.02244	-.4643 X			

ANTISYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ø"	ø'	ø	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq 1	99.90	190.9	--	1.690	2.311	--	-.1584	-3.417	-221.0	16.92	31.46	13.31	39.79	65.66	226.7 X						
2	8.455	6.263	--	.1787	.1710	--	-.01617	-.3494	-22.25	1.865	1.836	1.402	5.347	9.292	12.68 X						
3	.4525	.3830	--	.009332	.008761	.03637	-.0008837	-.01907	-1.237	.09241	.08595	.0279	.2041	.3302	.7162 X						
4	--	-.4527	--	--	-.009202	.006366	.1916	.3463	8.323	--	-.09077	-.07992	-.05118	-.02244	-.3133 X						

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
							COEFFICIENTS		TABLE II-D OF EQUATIONS OF MOTION. RUNS # 34, 35, 36												
								SYMMETRIC MOTION							K = 0	K = 1.5	K = 3				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq. 1	.05670	.04718	--	.01866	.02008	--	-.03439	-.2723	-12.217	-.001767	-.03215	-2.998	.1848	.1835	.1888	.4611	.6934	-11.41 X			
2	-.03439	-.08502	--	-.06354	-.07776	--	13.00	12.64	18.64	.3693	.8224	3.38	-.6232	-.7659	-.1860	-1.430	-2.294	9.632 X			
3	.09241	.09425	--	.1737	.1710	--	-.3148	-.3861	-24.36	-.01617	-.3494	22.25	1.865	1.836	1.402	5.347	9.292	12.69 X			
4	.005050	.005641	--	.003332	.006761	.03637	-.01720	-.02108	-1.457	-.0008837	-.01907	-1.237	.09241	.08595	.0779	.2041	.3302	.5566 X			
5	--	-.004777	--	--	-.009202	.006366	.1916	.3822	.4610	.1916	.3463	8.823	--	-.09007	-.07392	-.05118	-.02244	-.4643 X			
								ANTI-SYMMETRIC MOTION													
												K = 0	K = 15	K = 30							
	Ø"	Ø'	Ø	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
1	102.5	190.9	--	1.600	2.311	--	-.1584	-3.417	-221.0	16.92	31.46	13.91	33.79	65.66	226.7						
2	8.455	6.869	--	.1737	.1710	--	-.01617	-.3494	-22.25	1.865	1.836	1.402	5.347	9.292	12.68 X						
3	.4525	.3880	--	.003332	.006761	.03637	-.0008837	-.01907	-1.237	.09241	.08595	.0779	.2041	.3302	.7162 X						
4	--	-.4527	--	--	-.009202	.006366	.1916	.3463	8.823	--	-.09077	-.07392	-.05118	-.02244	-.3193 X						

Alt. = Sea Level
W_{84} = 13000 #
W_{84} = 90000 #
q^{29} = 140, a = .175 ft.
Vft/sec = 344
C.G.$_{84}$ = 280

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
SYMMETRIC MOTION

RUNS # 37, 38, 39

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	z''	z'	z	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq.1	.02574	.03552	--	.01066	.01512	--	.01965	-.2050	12.217	-.001010	-.02872	-2.998	.1056	.1381	.1888	.4411	.6934	-8.587 X			
2	-.01965	-.06401	--	-.03631	-.05855	--	5.643	9.520	18.64	.2225	.6192	9.380	-.3595	-.5766	-.6860	-1.490	-2.294	6.492 X			
3	.05281	.07036	--	.1021	.1288	--	-.1739	-.2307	-24.36	-.009240	-.2631	-22.25	1.066	1.382	1.402	5.347	9.292	9.554 X			
4	.002886	.004247	--	.005333	.006596	.02079	-.009229	-.01587	-1.457	-.0005050	-.01436	-1.237	.05281	.06471	.0779	.2041	.3302	.4191 X			
5	--	-.003612	--	--	-.006928	.003637	.1095	.2878	.4610	.1095	.2608	5.260	--	-.06834	-.07992	-.05118	-.02244	-.3496 X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 15	K = 30							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq.1	55.55	143.7	--	.9657	1.740	--	-.02051	-2.573	-221.0	9.669	23.69	13.91	39.79	65.66	170.7 X						
2	4.831	5.172	--	.1021	.1288	--	-.009240	-.2631	-22.25	1.006	1.382	1.402	5.347	9.292	9.567 X						
3	.2586	.2982	--	.005333	.006596	.02079	-.0005050	-.01436	-1.237	.05281	.06471	.0779	.2041	.3302	.5392 X						
4	--	-.3608	--	--	-.006928	.003637	.1095	.2608	5.260	--	-.06834	-.07992	-.05118	-.02244	-.2604 X						

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS 40, 41, 42

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
															K = 0	K = 1.5	K = 3.0	
	W"	W'	W	v"	v'	v	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.
Eq. 1	.02906	.03552	--	.01066	.01512	--	-.01965	-.2050	-12.217	-.001010	-.02872	-2.998	.1056	.1381	.1888	.4411	.6934	8.587 X
2	.01965	-.06401	--	-.03631	-.05855	--	6.537	9.520	18.64	.2225	.6192	9.380	-.3595	-.5766	-.6860	-1.490	-2.294	6.492 X
3	.05281	.07096	--	.1021	.1288	--	-.1799	-.2907	-24.36	-.009240	-.2631	-22.25	1.066	1.382	1.402	5.347	9.292	9.554 X
4	.002886	.004247	--	.005333	.006596	.02079	-.009829	-.01587	-1.457	-.0005050	-.01436	-1.237	.05281	.06471	.0779	.2041	.3302	.4191 X
5	--	-.003612	--	--	-.006928	.003637	.1095	.2878	.4610	.1095	.2608	5.260	--	-.06834	-.07992	-.05118	-.02244	-.3496 X

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
												K = 0	K = 1.5	K = 3.0	
	φ"	φ'	φ	v"	v'	v	α"	α'	α	β"	β'	β	β	β	F.F.
1	57.09	143.7	--	.9657	1.740	--	-.09051	-2.573	-221.0	9.669	23.69	13.91	39.79	65.66	170.7 X
2	4.831	5.172	--	.1021	.1288	--	-.009240	-.2631	-22.25	1.066	1.382	1.402	5.347	9.292	9.547 X
3	.2586	.2902	--	.005333	.006596	.02079	-.0005050	-.01436	-1.237	.05281	.06471	.0779	.2041	.3302	.5392 X
4	--	-.3608	--	--	-.006928	.003637	.1095	.2608	5.260	--	-.06834	-.07992	-.05118	-.02244	-.2404 X

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 43, 44, 45

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															X = 0	X = 1.5	X = 3.0				
	W''	W'	W	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.03240	.03552	--	.01066	.01512	--	-.01965	-.2050	-12.217	-.001010	-.02872	-2.998	.1056	.1381	.11888	.4411	.6934	-8.587 X			
2	-.01965	-.06401	--	-.03631	-.05855	--	7.429	9.520	18.64	.2225	.6192	9.380	-.3595	-.5766	-.6860	-1.490	-2.294	6.492 X			
3	.05281	.07096	--	.1021	.1288	--	-.1799	-.2907	-24.36	-.009240	-.2631	-22.25	1.066	1.382	1.402	5.347	9.292	9.554 X			
4	.002886	.004247	--	.005333	.006596	.02079	-.009829	-.01587	-1.457	-.0005050	-.01436	-1.237	.05281	.06471	.0779	.2041	.3302	.4191 X			
5	--	-.003612	--	--	-.006928	.003637	.1095	.2878	.4610	.1095	.2608	5.260	--	-.06834	-.07992	-.05118	-.02244	-.3496 X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												X = 0	X = 1.5	X = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	58.57	143.7	--	.9657	1.740	--	-.09051	-2.573	-221.0	9.669	23.69	13.91	39.79	65.66	170.7 X						
2	4.831	5.172	--	.1021	.1288	--	-.009240	-.2631	222.25	1.066	1.382	1.402	5.347	9.292	9.547 X						
3	.2586	.2922	--	.005333	.006596	.02079	-.0005050	-.01436	-1.237	.05281	.06471	.0779	.2041	.3302	.5392 X						
4	--	.33408	--	--	-.006928	.003637	.1095	.2608	5.260	--	-.06834	-.07992	-.05118	-.02244	-2.404 X						

PREPARED G. M. 9-1-50
CHECKED
REVISED

Alt. = Sea Level
W_{84} = 13000 #
W_{29} = 90000 #
q = 200, a = .175 ft.

Vft/sec = 410
$C.G._{84}$ = .280

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
SYMMETRIC MOTION
RUNS # 46, 47, 48

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq. 1	.01802	.02980	--	.00[illegible]64	.01269	--	-.01376	-.1720	-12.217	-.0007068	-.02410	2.998	.07392	.1159	.1888	.4411	.6934	7.208 X			
2	-.01376	-.05371	--	-.02542	-.04912	--	3.950	7.988	18.64	.1557	.5195	9.38	-.2517	-.4838	-.6860	-1.490	-2.294	5.447 X			
3	.03686	.05954	--	.07148	.1080	--	-.1259	-.2439	-24.36	-.006468	-.2207	22.25	.7460	1.160	1.402	5.347	9.292	8.016 X			
4	.002020	.003563	--	.003733	.005534	.01455	-.006880	-.01332	-1.457	-.0003535	-.01205	-1.237	.03696	.05429	.0779	.2041	.3302	.3516 X			
5	--	-.003030	--	--	-.005813	.002546	.07664	.2415	.4610	.07664	.2188	3.835	--	-.05734	-.07922	-.05118	-.02244	-.2933 X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ø"	ø'	ø	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq. 1	38.88	120.6	--	.6760	1.460	--	-.06336	-2.159	-221.0	6.768	19.88	13.91	39.79	65.66	143.2 X						
2	3.382	4.339	--	.07148	.1080	--	-.006468	-.2207	-22.25	.7460	1.160	1.402	5.347	9.292	8.010 X						
3	.1810	.2451	--	.003733	.005534	.01455	-.0003535	-.01205	-1.237	.03696	.05429	.0779	.2041	.3302	.4524 X						
4	--	-.2860	--	--	-.005813	.002546	.07664	.2188	3.835	--	-.05734	-.07992	-.05118	-.02244	-.2017 X						

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 49, 50, 51

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq. 1	.02034	.02380	—	.007464	.01269	--	-.01376	-.1720	-12.217	-.0007068	-.02410	-2.998	.07392	.1159	.1888	.4411	.6934	7.208 X			
2	-.01376	-.05371	—	-.02542	-.04912	—	4.576	7.988	18.64	.1557	.5195	9.38	-.2517	-.4838	-.6860	-1.490	-2.294	5.447 X			
3	.03696	.05954	—	.07148	.1080	—	-.1259	-.2439	-22.36	-.006468	-.2207	-22.25	.7640	1.160	1.402	5.347	9.292	8.016 X			
4	.002020	.003563	--	.003733	.005534	.01455	-.006880	-.01332	-1.457	-.0003535	-.01205	-1.237	.03696	.05429	.0779	.2041	.3302	.3516 X			
5	—	-.003030	—	--	-.005813	.002546	.07664	.2415	.4610	.07664	.2188	3.835	--	-.05734	-.07992	-.05118	-.02244	-.2933 X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	φ"	φ'	φ	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq. 1	39.96	120.6	—	.6760	1.460	—	-.06336	-2.159	221.0	6.768	19.88	13.91	39.79	65.66	143.2 X						
2	3.382	8.332	—	.07148	.1080	—	-.006468	-.2207	-22.25	17460	1.160	1.402	5.347	9.292	8.010 X						
3	.1810	.2451	—	.003733	.005534	.01455	-.0003535	-.01205	-1.237	.03696	.05429	.0779	.2041	.3302	.4524 X						
4	—	-.2360	—	--	-.005813	.002546	.07664	.2188	3.835	--	-.05734	-.07992	-05118	-.02244	-.2017 X						

PREPARED G. M. 9-1-50
CHECKED
REVISED

Alt. = Sea Level
W_{84} = 13000 #
W_{29} = 120000 #
q = 200, a = .175 ft.

Wft/sec = 410
$C.G._{84}$ = .280

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
SYMMETRIC MOTION

RUNS # 52, 53, 54

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq.1	.02268	.02980	--	.007464	.01269	--	.01376	.1720	-12.217	.0007068	-.02410	-2.998	.07392	.1159	.1888	.4411	.6934	-7.208 X			
2	-.01376	-.05371	--	-.02542	-.04912	--	5.200	7.988	18.64	.1557	.5195	9.38	-.2517	-.4838	-.6860	-1.490	-2.294	5.447 X			
3	.03696	.05954	--	.07148	.1080	--	-.1259	-.2439	-24.36	-.006468	-.2207	22.25	.7460	1.160	1.402	5.347	9.292	8.016 X			
4	.002020	.003563	--	.003733	.005534	.01455	-.006880	-.01332	-1.457	-.0003535	-.01205	-1.237	.03696	.05429	.0779	.2041	.3302	.3516 X			
5	--	-.003030	--	--	-.005813	.002546	.07664	.2415	.4610	.07664	.2188	3.835	--	-.05734	-.07992	-.05118	-.02244	-.2933 X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	φ"	φ'	φ	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq.1	41.00	120.6	--	.6760	1.460	--	-.06336	-2.159	-221.0	6.768	19.88	13.91	39.79	65.66	143.2 X						
2	3.382	4.339	--	.07148	.1080	--	-.006468	-.2207	-22.25	.7640	1.160	1.402	5.347	9.292	8.010 X						
3	.1810	.2451	--	.003733	.005534	.01455	-.0003535	-.01205	-1.237	.03696	.05429	.0779	.2041	.3302	.4524 X						
4	--	-.2860	--	--	-.005813	.002546	.07664	.2188	3.835	--	-.05734	-.07992	-.05118	-.-2244	-.2017 X						

CONFIDENTIAL

Alt. = Sea Level
W_{84} = 11500 #
W_{29} = 90000 #
q = 80, a = .175 ft.

Vft/sec = 259
$C.G._{84}$ = .280

CONFIDENTIAL

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION.

SYMMETRIC MOTION

RUNS # 55, 56, 57

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W''	W'	W	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq.1	.0438	.0472	--	.0165	.0201	--	-.0304	-.2723	-12.217	-.0016	-.0382	2.998	.1633	.1835	.1888	.4411	.6934	-11.41 X			
2	-.0304	-.0850	--	-.0562	-.0778	--	9.81	12.64	18.64	.3824	.8224	9.38	-.5560	-.7659	-.6860	-1.490	-2.296	8.622 X			
3	.0817	.0943	--	.1570	.1710	--	-.2781	-.3861	-24.36	-.0143	-.3494	-22.25	1.629	1.836	1.402	5.347	9.292	12.69 X			
4	.0045	.0056	--	.0082	.0088	.0062	-.0252	-.0217	-1.237	-.0008	-.0297	-1.237	.0817	.0860	.0779	.2041	.3302	.557 X			
5	--	-.0048	--	--	-.0092	.0064	.1885	.3822	.4610	.1885	.3463	8.823	--	-.0908	-.0799	-.0512	-.0224	-.464 X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq.1	87.73	190.9	--	1.491	2.311	--	-.1399	-3.417	-221.0	14.91	31.46	13.91	39.79	65.66	226.7 X						
2	7.453	6.869	--	.1570	.1710	--	-.0143	-.3494	-22.25	1.629	1.836	1.402	5.347	9.292	12.68 X						
3	.3998	.3880	--	.0082	.0088	.0364	-.0008	-.0191	-1.237	.0817	.0860	.0779	.2041	.3302	.716 X						
4	--	-.4527	--	--	-.0092	.0064	.1885	.3463	8.823	--	-.0908	.0799	-.0512	-.0224	-.319 X						

CONFIDENTIAL

Alt. = Sea Level
W_{84} = 11500 #
W_{29} = 105000 #
q = 80, a = .175 ft.

Vft/sec = 259
$C.G._{84}$ = .280

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
SYMMETRIC MOTION
RUNS # 58, 59, 60

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq. 1	.04967	.04718	--	.01649	.02008	--	-.03039	-.2723	-12.217	.001562	.03815	-2.998	.1633	.1835	.1888	.4411	.6934	11.41 X			
2	-.03029	-.08502	--	-.05615	-.07776	--	11.42	12.64	18.64	.3824	.8224	9.38	-.5560	-.7659	-.6860	-1.490	-2.294	8.622 X			
3	.08166	.09425	--	.1570	.1710	--	-.2781	-.3861	-24.36	-.01429	-.3494	-22.25	1.629	1.836	1.402	5.347	9.232	12.69 X			
4	.004463	.005641	--	.008247	.008761	.03637	-.01519	-.02108	-1.457	-.0007809	-.01907	-1.237	.08166	.08595	.0779	.2041	.3302	.5566 X			
5	--	-.004797	--	--	-.009202	.006366	.1885	.3822	.4610	.1885	.3463	8.823	--	-.09077	-.07992	-.05118	-.02244	-.4643 X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	φ"	φ'	φ	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq. 1	90.42	190.9	--	1.491	2.311	--	-.1399	-3.417	-221.0	14.91	31.46	13.91	39.79	65.66	266.7 X						
2	7.453	6.869	--	.1526	.1710	--	-.01429	-.3494	-22.25	1.629	1.836	1.402	5.347	9.232	12.68 X						
3	.3998	.3880	--	.008247	.008761	.03637	-.0007809	-.01907	-1.237	.08166	.08595	.0779	.2041	.3302	.7162 X						
4	.3998	-.4527	--	--	-.009202	.006366	.1885	.3463	8.823	--	-.09077	-.07992	-.05118	-.02244	-.3193 X						

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION.

SYMMETRIC MOTION

RUNS # 61, 62, 63

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq. 1	.05553	.04718	--	.01649	.02008	--	.03039	-.2723	-12.217	-.001562	-.03815	-2.998	.1633	.1838	.1888	.4411	.6934	11.41 X			
2	-.03039	-.08502	--	-.05615	-.07776	--	12.94	12.64	18.64	.3824	.8224	9.38	-.5560	-.7659	-.6860	-1.490	-2.294	8.622 X			
3	.08166	.09425	--	.1570	.1710	--	-.2781	-.3861	-24.36	-.01429	-.3494	-22.25	1.629	1.836	1.402	5.347	9.292	12.69 X			
4	.004463	.005641	--	.008247	.008761	.03637	-.10519	-.02108	-1.457	-.0007809	-.01907	-1.237	.08166	.08595	.0779	.2041	.3302	.5566 X			
5	--	-.004797	--	--	-.009202	.006366	.1885	.3822	.4610	.1885	.3463	8.823	--	-.09077	-.07392	-.05118	-.02244	-.4643X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	φ"	φ'	φ	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
1	93.07	190.9	--	1.491	2.311	--	-.1399	-3.417	-221.0	14.91	31.46	13.91	33.79	65.66	226.7 X						
2	7.453	6.869	--	.1526	.1710	--	-.01429	-.3494	-22.25	1.629	1.836	1.402	5.347	9.292	12.68 X						
3	.3998	.3880	--	.008247	.008761	.03637	-.0007809	-.01907	-1.237	.08166	.08595	.0779	.2041	.3302	.7162X						
4	--	-.4527	--	--	-.009202	.006366	.1885	.3463	8.823	--	.09077	-.07392	-.05118	-.02244	-.3193X						

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION
SYMMETRIC MOTION

RUNS # 64, 65, 66

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	θ''	θ'	θ	y''	y'	y	α''	α'	α	β''	β'	β	β''	β'	β	β	β	F.F.			
Eq. 1	.0250	.0355	--	.0094	.0151	--	-.0174	-.2050	-12.217	-.0009	-.0287	-2.998	.0933	.1381	.1888	.4411	.6934	-8.587X			
2	-.0174	-.0640	--	-.0321	-.0586	--	5.608	9.520	18.64	.2185	.6192	9.380	-.3177	-.5766	-.6860	-1.490	-2.294	6.492X			
3	.0467	.0710	--	.0872	.1288	--	-.1589	-.2907	-24.36	-.0082	-.2631	-22.25	.9309	1.382	1.402	5.347	9.292	9.554X			
4	.0026	.0042	--	.0047	.0066	.0208	-.0087	-.0159	-1.457	-.0004	-.0144	-1.237	.0467	.0647	.0779	.2[illegible]	.3302	.419X			
5	--	-.0036	--	--	-.0069	.0036	.1077	.2878	.4610	.1077	.2608	5.260	--	-.0683	.0799	-.0512	-.0224	-.350 X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.0	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	50.13	143.7	--	.8520	1.740	--	-.0799	-7.573	-221.0	8.570	23.69	13.91	39.79	65.66	170.7 X						
2	4.259	5.172	--	.0872	.1288	--	-.0082	-.2631	-22.25	.9309	1.382	1.402	5.347	9.292	9.547 X						
3	.2285	.2922	--	.0047	.0066	.0208	-.0004	-.0144	-1.237	.0467	.0647	.0779	.7041	.3302	.539 X						
4	--	-.3408	--	--	-.0069	.0036	.1077	.2608	5.260	--	-.0683	-.0799	-.0512	-.0224	-1240 X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
SYMMETRIC MOTION
RUNS #67, 68, 69

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq. 1	.02838	.03552	--	.009423	.01512	--	-.01737	-.2050	-12.217	-.0008926	-.02872	-2.998	.09331	.1381	.1888	.4411	.6934	-8.587 X			
2	-.01737	-.06401	--	-.03209	-.05855	--	6.526	9.520	18.64	.2185	.6192	9.380	-.3177	-.5766	-.6860	-1.490	-2.294	6.492 X			
3	.04666	.07096	--	.08720	.1288	--	-.1589	-.2907	-24.36	-.008166	-.2631	-22.25	.9309	1.382	1.402	5.347	9.292	9.554 X			
4	.002550	.004247	--	.004713	.006596	.02079	-.008680	-.01587	-1.457	-.0004462	-.01436	-1.237	.04666	.06471	.0779	.2041	.3302	.4191 X			
5	--	-.003612	--	--	-.006928	.003637	.1077	.2878	.4610	.1077	.2608	5.260	--	-.06834	-.07992	-.05118	-.02244	-.3496 X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ø"	ø'	ø	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq. 1	51.67	143.7	--	.8520	1.740	--	-.07394	-2.573	-221.0	8.520	23.69	13.91	39.79	65.66	170.7 X						
2	4.259	5.172	--	.08720	.1288	--	-.008166	-.2631	-22.25	.9309	1.382	1.402	5.347	9.292	9.547 X						
3	.2285	.2922	--	.004713	.006596	.02079	-.0004462	-.01436	-1.237	.04666	.06471	.0779	.2041	.3302	.5392 X						
4	--	-.3408	--	--	-.006928	.003637	.1077	.2608	5.260	--	-.06834	-.07992	-.05118	-.02244	-.2404 X						

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 70, 71, 72

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq. 1	.03173	.03552	--	.002423	.01312	--	-.01737	-.2050	-12.217	-.0008926	-.02872	2.998	.09331	.1381	.1888	.4411	.6934	-8.587 X			
2	.01737	-.06421	--	-.03209	-.05855	--	7.394	9.520	18.64	.2185	.6192	9.380	-.3177	-.5766	-.6860	-1.490	-2.294	6.432 X			
3	.04666	.07096	--	.08720	.1283	--	-.1589	-.2907	-24.36	-.008166	-.2631	-22.25	.9309	1.382	1.402	5.347	9.292	9.554 X			
4	.002550	.004247	--	.004713	.006596	.02079	-.008630	-.01587	-1.457	-.0004462	-.01436	-1.237	.04666	.06471	.0779	.2041	.3302	.4191 X			
5	--	-.003612	--	--	-.006328	.003637	.1077	.2878	.4610	.1077	.2608	5.260	--	-.06834	-.07392	-.05118	-.02844	-.3406X			

ANTI-SYMMETRIC MOTION

												L = 0	K = 1.5	K = 3.0							
	Ø"	Ø'	Ø	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq. 1	53.18	143.7	--	.2520	1.740	--	-.07394	-2.573	-221.0	8.520	23.69	13.21	39.79	65.66	175.7 X						
2	4.259	5.172	--	.08720	.1283	--	-.008166	-.2631	-22.25	.9309	1.382	1.402	5.347	9.292	9.547						
3	.2285	.2922	--	.006713	.006596	.02079	-.0004462	-.01436	-1.237	.04666	.06471	.0779	.2041	.3302	.5332X						
4	--	-.3408	--	--	-.006328	.003637	.1077	.2608	5.260	--	-.06834	-.07392	-.05118	-.02844	-.2404 X						

TABLE "II-D
OF EQUATIONS OF MOTION
RUNS # 73, 74, 75

COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
								SYMMETRIC MOTION							K = 0	K = 1.5	K = 3.0				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq. 1	.0175	.0298	--	.0066	.0127	--	-.0122	-.1720	-12.217	-.0006	-.0241	-2.998	.0653	.1159	.1888	.4411	.6934	-7.208X			
2	-.0122	-.0537	--	-.0225	-.0491	--	3.926	7.988	18.64	.1530	.5195	9.38	-.2224	-.4838	-.6860	-1.490	-2.294	5.45 X			
3	.0327	.0596	--	.0610	.1080	--	-.1112	-.2439	-24.36	-.0057	-.2207	-22.25	.6516	1.160	1.402	5.347	9.292	8.02 X			
4	.0018	.0036	--	.0033	.0055	.0146	-.0061	-.0133	-1.457	-.0003	-.0121	-1.237	.0327	.0543	.0779	.2041	.3302	.352 X			
5	--	-.0030	--	--	-.0058	.00255	.0754	.2415	.4610	.0754	.2188	3.835	--	-.0573	-.0799	-.0512	-.0224	-.293 X			
								ANTI-SYMMETRIC MOTION													
												K = 0	K = 1.5	K = 3.0							
	ø"	ø'	ø	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq. 1	35.09	120.6	--	.5964	1.460	--	-.0560	-2.159	-221.0	5.964	19.88	13.91	33.79	65.66	143.2 X						
2	2.981	4.339	--	.0610	.1080	--	-.0057	-.2207	-22.25	.6516	1.160	1.402	5.347	9.292	8.01 X						
3	.1599	.2451	--	.0033	.0055	.01455	-.0003	-.0121	-1.237	.0327	.0543	.0779	.2041	.3302	.452 X						
4	--	-.2860	--	--	-.0058	.00255	.0754	.2188	3.835	--	-.0573	-.0799	-.0512	-.0224	-.202 X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 76,77,78

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	y''	y'	y	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.01987	.02980	—	.006596	.01269	[illegible]	-.01216	-.1720	-12.217	-.0006248	-.02410	-2.998	.06532	.1159	.1688	.4411	.6934	-7.208 X			
2	-.01216	-.05371	—	-.02246	-.04912	—	4.568	7.988	18.64	.1530	.5195	9.38	-.2224	-.4838	-.6860	-1.490	-2.294	5.447 X			
3	-.03266	.05356	--	.06104	.1080	—	-.1112	-.2439	-24.36	-.005716	-.2207	-22.25	.6516	1.160	1.402	5.347	9.292	8.016 X			
4	.001785	.003563	—	.003299	.005534	.01455	-.006076	-.01332	-1.457	-.0003124	-.01205	-1.237	.03266	.05429	.0779	.2041	.3302	.3516 X			
5	--	-.003030	--	--	-.005813	.002546	.07540	.2415	.4610	.07540	.2188	3.835	--	-.05734	-.07392	-.05118	-.02244	-.2933 X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	36.17	120.6	--	.5364	1.460	--	-.05596	-2.159	-221.0	5.964	19.88	13.91	39.79	65.66	143.2 X						
2	2.981	4.339	--	.06104	.1080	--	-.005716	-.2207	-22.25	.6516	1.160	1.402	5.347	9.292	8.010 X						
3	.1599	.2451	--	.003299	.005534	.01455	-.0003124	-.01205	-1.237	.03266	.05429	.0779	.2041	.3302	.4524 X						
4	--	-.2860	--	--	-.005813	.002546	.07540	.2188	3.835	--	-.05734	-.07392	-.05118	-.02244	-.2017X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 79, 80, 81

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0			K = 1.5		K = 3.0				
	[illegible]	W'	W	Y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq. 1	.02221	.02980	--	.006536	.01269	--	.01216	-.1720	-12.217	-.0006248	-.02410	-2.998	.06532	.1159	.1888	.4411	.6934	-7.208X			
2	-.01216	-.05371	--	-.02246	-.04912	--	5.176	7.988	18.64	.1530	.5195	9.38	-.2224	-.4838	-.6860	-1.490	-2.294	5.447 X			
3	.03266	.05954	--	.06104	.1080	--	-.1112	-.2439	-24.36	-.005716	-.2207	-22.25	.6516	1.160	1.402	5.347	9.292	8.016 X			
4	.001785	.003563	--	.003299	.005534	.01455	-.006076	-.01332	-1.457	-.0003124	-.01205	-1.237	.03266	.05429	.0779	.2041	.3302	.3516 X			
5	--	-.003030	--	--	-.005813	.002546	.07540	.2415	.4610	.07540	.2188	3.835	--	-.05734	-.07992	-.05118	-.02244	-.2933 X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ø"	ø'	ø	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq. 1	37.23	120.6	--	.5964	1.460	--	-.05536	-2.159	-221.0	5.364	19.88	13.91	39.79	65.66	143.2 X						
2	2.981	4.339	--	.06104	.1080	--	-.005716	-.2207	-22.25	.6516	1.160	1.402	5.347	9.292	8.016X						
3	.1599	.2451	--	.003299	.005534	.01455	-.0003124	-.01205	-1.237	.03266	.05429	.0779	.2041	.3302	.4524 X						
4	--	-.2860	--	--	-.005813	.002546	.07540	.2188	3.835	--	-.05734	-.07992	-.05118	-.02244	-.2017 X						

Alt. = 20000 ft. V = 354 ft/sec.
W_{84} = 14500 # CG = .280
W_{29} = 90000 #
q^{29} = 80, a = .175 ft.

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
SYMMETRIC MOTION

RUNS # 82, 83, 84

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq. 1	.0462	.0346	--	.0210	.0147	--	-.0384	-.1995	-12.217	-.0020	-.02[illegible]	-2.998	.2068	.1342	.1888	.4411	.6934	-10.20X		W	X10
2	-.0384	-.0622	--	-.0712	-.0570	--	9.93	9.27	18.64	.4340	.602	9.38	-.7045	-.561	-.686	-1.490	-2.294	7.73X		θ	X5
3	.1032	.06896	--	.1990	.1256	--	-.3515	-.2825	-24.36	-.0181	-.2557	-22.25	2.082	1.342	1.402	5.347	9.292	11.32 X		B	X4
4	.0057	.0042	--	.0104	.0064	.0363	-.0192	-.0155	-1.457	-.0010	-.0140	-1.237	.1032	.0628	.0779	.2040	.3302	.436 X		y	X100
5	--	-.0035	--	--	-.0067	.0063	.2135	.280	.458	.2135	.2540	8.829	--	-.0666	-.0800	-.0512	-.0221	-.414X		L	X100

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	Ø"	Ø'	Ø	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq. 1	106.5	139.7	--	1.885	1.695	--	-.1765	-2.505	-221.0	18.68	23.05	13.91	39.78	65.66	225.0X		Ø	X1			
2	9.43	5.02	--	.1991	.1254	--	-.0181	-.2557	-22.25	2.082	1.342	1.402	5.347	9.292	12.58X		B	X5			
3	.505	.2840	--	.0104	.0064	.0363	-.0010	-.0140	-1.237	.1032	.0628	.0779	.2040	.3302	.7090 X		y	X100			
4	--	-.3315	--	--	-.0067	.0063	.2135	.2540	8.829	--	-.0666	-.0800	-.0512	-.0221	-.316 X		L	X100			

Alt. = 20000 Ft.
W_{84} = 14500 #
W_{29} = 105000#
q = 80, a = .175 ft.

Vft/sec = 354
$C.G._{84}$ = .280

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 86, 86, 87

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K=0	K = 1.5	K = 3.0				
	Π''	Π'	Π	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0520	.0346	--	.0210	.0147	--	-.0384	-.1995	-12.217	-.0020	-.0280	-2.998	.2068	.1342	.1888	.4411	.6934	-10.20X			
2	-.0384	-.0622	--	-.0712	-.0570	--	11.49	9.27	18.64	.4340	.602	9.38	-.7045	-.561	-.686	-1.490	-2.294	7.73 X			
3	.1032	.06896	--	.1990	.1254	--	-.3515	-.2825	-24.36	-.0181	-.2557	-22.25	2.082	1.342	1.402	5.347	9.292	11.32 X			
4	.0057	.0042	--	.0104	.0064	.0363	-.10192	-.0155	-1.457	-.0010	-.0140	-1.237	.1032	.0628	.0779	.2040	.3302	.496 X			
5	--	-.0035	--	--	-.0067	.0063	.2135	.280	.458	.2135	.2540	8.829	--	-.0666	-.0800	-.0512	-.0221	-.414 X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	109.19	139.7	--	1.885	1.605	--	-.1765	-2.505	-221.0	18.88	23.05	13.91	39.78	65.66	225.0X						
2	9.43	5.02	--	.1991	.1254	--	-.0181	-.2557	-22.25	2.082	1.342	1.402	5.347	9.292	12.58 X						
3	.505	.2840	--	.0104	.0064	.0363	-.0010	-.0140	-1.237	.1032	.0628	.0779	.2040	.3302	.7090 X						
4	--	-.3315	--	--	-.0067	.0063	.2135	.2540	8.829	--	-.0666	-.0800	-.0512	-.0221	-.316 X						

CONFIDENTIAL

TABLE II D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 88, 89 90

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq.1	.0578	.0346	--	.0210	.0147	--	-.0384	-.1995	-12.217	-.0020	-.0280	-2.998	.2068	.1342	.1888	.4411	.6934	-10.20X			
2	-.0384	-.0622	--	-.0712	-.0570	--	13.05	9.27	18.64	.4340	.602	9.38	-.7045	-.561	-.686	-1.490	-2.294	7.73 X			
3	.1032	.06896	--	.1990	.1254	--	-.3515	-.2825	-24.36	-.0181	-.2557	-22.25	2.082	1.342	1.402	5.347	9.292	11.32 X			
4	.0057	.0042	--	.0104	.0064	.0363	-.0192	-.0155	-1.457	-.0010	-.0140	-1.237	.1032	.0628	.0779	.2040	.3302	.496 X			
5	--	-.0035	--	--	-.0067	.0063	.2135	.280	.458	.2135	.2540	8.829	--	-.0666	-.0800	-.0512	-.0221	-.414 X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ø"	ø'	ø	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq.1	111.84	139.7	--	1.885	1.695	--	-.1765	-2.505	-221.0	18.88	23.05	13.91	39.78	65.66	225.0 X						
2	9.43	5.02	--	.1991	.1254	--	-.0181	-.2557	-22.25	2.082	1.342	1.402	5.347	9.292	12.58X						
3	.505	.2840	--	.0104	.0064	.0363	-.0010	-.0140	-1.237	.1032	.0628	.0779	.2040	.3302	.7090 X						
4	--	-.3315	--	--	-.0067	.0063	.2135	.2540	8.829	--	-.0666	-.0800	-.0512	-.0221	-.316X						

TABLE II C
COEFFICIENT OF EQUATIONS OF MOTION
RUNS 91, 92, 93

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
															K = 0	K = 1.5	K = 3.0	
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.
Eq. 1	.0308	.0282	--	.0140	.0120	--	-.0256	-.1625	-12.217	-.0013	-.0028	-2.298	.1378	.1095	.1800	.4411	.6934	-8.31 X
2	-.0256	-.0507	--	-.0474	-.0464	--	6.61	7.55	18.64	.2992	.491	9.38	-.470	-.457	-.686	-1.490	-2.294	6.30 X
3	.0688	.05624	--	.1327	.1021	--	-.2345	-.230	-24.36	-.0121	-.2185	-22.25	1.388	1.095	1.402	5.347	9.292	9.23 X
4	.0037	.0034	--	.0069	.0052	.0242	-.0128	-.0126	-1.457	-.0007	-.0014	-1.237	.0689	.0512	.0779	.2040	.3302	.404 X
5	--	-.0029	--	--	-.0055	.0042	.1425	.228	.458	.1425	.2067	6.049	--	-.0543	-.0800	-.0512	-.0221	-.338 X

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
												K = 0	K = 1.5	K = 3.0	
	φ"	φ'	φ	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.
Eq. 1	71.0	113.8	--	1.257	1.380	--	-.1178	-2.040	-221.0	12.58	18.77	13.91	39.78	65.66	183.1 X
2	6.29	4.09	--	.1328	.1021	--	-.0120	-.2185	-22.25	1.388	1.095	1.402	5.347	9.292	10.24 X
3	.3365	.2315	--	.0069	.0052	.0242	-.0007	-.0014	-1.237	.0688	.0512	.0779	.2040	.3302	.5[illegible]2 X
4	--	-.270	--	--	-.0005	.0042	.1425	.2067	6.049	--	-.0543	-.0800	-.0512	-.0221	-.257 X

Alt. = 20000 Ft. V = 434 ft/sec
W_{84} = 14500 # C.G.$_{84}$ = .280
W_{29} = 105000
q_{29} @ 120 a = .175 ft.

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION

RUNS # 94, 95, 96

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W"	W'	W	v"	v'	v	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.			
Eq.1	.0347	.0282	--	.0140	.0120	--	-.0256	-.1625	-12.217	-.0013	-.0628	-2.[illegible]8	.1378	.1095	.1888	.4411	.6934	-8.31 X			
2	-.0256	-.0507	--	-.0474	-.0464	--	7.65	7.55	18.64	.28[illegible]	.491	9.38	-.470	-.457	-.686	-1.490	-2.294	6.30 X			
3	.0688	.05624	--	.1327	.1021	--	-.2345	-.230	-24.36	-.0121	-.2185	-22.25	1.388	1.095	1.402	5.347	9.292	9.23 X			
4	.0037	.0034	--	.0069	.0052	.0242	-.0128	-.0126	-1.457	-.0007	-.0114	-1.237	.0689	.0512	.0779	.2040	.3302	.404 X			
5	--	-.0029	--	--	-.0005	.0042	.1425	.228	.458	.1425	.2067	6.049	--	-.0543	-.0800	-.0512	-.0221	-.338X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	φ"	φ'	φ	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.						
Eq.1	72.79	113.8	--	1.257	1.380	--	-.1178	-2.040	-[illegible]1.0	12.58	18.77	13.91	39.78	65.66	183.1 X						
2	6.29	4.09	--	.1328	.1021	--	-.0120	-.2185	-22.25	1.388	1.095	1.402	5.347	9.292	10.24 X						
3	.3365	.2315	--	.0069	.0052	.0242	-.0007	-.0014	-1.237	.0683	.0512	.0779	.2040	.3302	.5782 X						
4	--	-.270	--	--	-.0055	.0042	.1425	.2067	6.049	--	-.0543	-.0800	-.0512	-.0221	-.257 X						

CONFIDENTIAL

Alt = 20000 ft. V = 434 ft/sec
W_{84} = 14500 # C. G. = .280
W_{29} = 120000
q^{29} = 120 a, = .175 ft.

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 97, 98, 99

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
															K = 0	K = 1.5	K = 3.0	
	W"	W'	W	y"	y'	y	θ"	θ'	θ	α"	α'	α	β"	β'	β	β	β	F.F.
Eq.1	.0386	.0282	--	.0140	.0120	--	-.0256	-.1625	-12.217	-.0013	-.0228	-2.998	.1378	.1095	.1888	.4411	6.934	-8.31 X
2	-.0256	-.0507	--	-.0474	-.0464	--	8.59	7.55	18.64	.2892	.491	9.38	-.470	-.457	-.686	-1.490	-2.294	6.30 X
3	.0688	.05624	--	.1327	.1021	--	-.2345	-.230	-24.36	-.0121	-.2185	-22.25	1.388	1.095	1.402	5.347	9.292	9.23 X
4	.0037	.0034	--	.0069	.0052	.0242	.0128	-.0126	-1.457	-.0007	-.0114	-1.237	.0689	.0512	.0779	.2040	.3302	.404 X
5	--	-.0029	--	--	-.0055	.0042	.1425	.228	.458	.1425	.2067	6.049	--	-.0543	-.0800	-.0512	-.0821	-.338 X

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
												K = 0	K = 1.5	K = 3.0	
	ø"	ø'	ø	y"	y'	y	α"	α'	α	β"	β'	β	β	β	F.F.
Eq1	74.56	113.8	--	1.257	1.380	--	-11.78	-2.040	-221.0	12.58	18.77	13.91	39.78	65.66	183.1 X
2	6.29	4.09	--	.1328	.1021	--	-.0220	-.2185	-22.25	1.383	1.095	1.402	5.347	9.292	10.24 X
3	.3365	.2315	--	.0069	.0052	.0242	-.0007	-.0014	-1.237	.0688	.0512	.0779	.2040	.3302	.5782 X
4	--	-.270	--	--	-.0055	.0042	.1425	.2067	6.049	--	-.0543	-.0800	-.0512	-.0821	-.257 X

CONFIDENTIAL

CONFIDENTIAL

Altitude = 20,000 ft. V = 501 ft/sec.
W_{S4} = 14,500 lbs.
W_{29} = 90,000 lbs.
q = 160 a = .175 ft. cg_{S4} = .280

TABLE II – D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS #100, 101, 102

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	K = 0 β	K = 1.5 β	K = 3.0 β	FF			
											SYMMETRIC MOTION										
Eq. 1	.0231	.0245	-	.0105	.0104	-	- .0192	-.1411	-12.217	-.0010	-.01972	-2.998	.1033	.0950	.1888	.4411	.6934	7.21X			
2	-.0192	-.0440	-	-.0355	-.0403	-	-- 4.96	6.55	18.64	.2168	.426	9.38	-.3520	-.3965	-.686	-1.490	-2.294	5.47X			
3	.0516	.05872	-	.0995	.0887	-	- .1758	-.1998	-24.36	-.0090	-.1806	-22.25	1.040	.950	1.402	5.347	9.292	8.01X			
4	.0028	.0030	-	.00521	.0045	.0182	- .0096	-.0110	- 1.457	-.0006	-.0099	- 1.237	.0517	.0444	.0779	.2040	.3302	.351X			
5	—	-.0025	-	-	-.0047	.0032	.1048	.1980	.458	.1048	.1797	4.669	—	-.0471	-.0800	-.0512	- .0221	- .293X			
											ANTI-SYMMETRIC MOTION										
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	FF						
Eq. 1	53.25	98.75	-	.9425	1.198	-	-.0882	-1.770	-221.0	9.44	16.32	13.91	39.78	65.66	159.0X						
2	4.72	3.55	-	.0995	.0887	-	-.0090	- .1895	- 22.25	1.042	.950	1.402	5.347	9.292	8.90X						
3	.2525	.2010	-	.0052	.0045	.0182	-.0006	- .0099	- 1.237	.0515	.0444	.0779	.2040	.3302	.5009X						
4	-	.2345	-	-	.0047	.0032	.1048	.1797	4.669	-	-.0471	-.0800	-.0512	-.0221	-.224 X						

CONFIDENTIAL

Altitude = 20,000 ft.
W_{84} = 14,500 lbs.
W_{29} = 10,500 lbs.
q = 160

V = 501 ft/sec
a = .175 ft
CG_{84} = .280

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 103, 104, 105

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	z''	z'	z	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F			
Eq. 1	.0260	.0245	-	.0105	.0104	-	-.0192	-.1411	-12.217	-.0010	-.01972	2.998	.1033	.0950	.1808	.4411	.6934	7.21X			
2	-.0192	-.0440	-	-.0355	-.0403	-	5.74	6.55	18.64	.2168	.426	9.30	-.3320	-.3965	-.686	-1.490	-2.294	5.47 X			
3	.0516	.04872	-	.0995	.0887	-	-.1758	-.1998	-24.36	-.0090	-.1806	-22.25	1.040	.950	1.402	5.347	9.292	8.01 X			
4	.0028	.0030	-	.0052	.0045	.0182	-.0096	-.0110	-1.457	-.0006	-.0099	-1.237	.0517	.0444	.0779	.2040	.3302	.251X			
5	-	-.0025	-	-	-.0047	.0032	.1048	.1980	.458	.1048	.1797	4.669	-	-.0471	-.0800	-.0512	-.0221	-.293X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	54.59	98.75	-	.9425	1.198	-	-.0882	-1.770	-221.0	9.44	16.30	13.01	39.18	65.66	159.0X						
2	4.72	3.55	-	.0995	.0887	-	-.0090	-.1895	-22.25	1.042	.950	1.402	5.347	9.292	8.00X						
3	.2525	.2010	-	.0052	.0045	.0182	-.0096	-.0099	-1.237	.0515	.0444	.0779	.2040	.3302	.5000 X						
4	-	-.2345	-	-	-.0047	.0032	.1048	.1797	4.669	-	-.0471	-.0800	-.0512	-.0221	-.224 X						

Altitude = 20,000 ft. V = 501 ft/sec
W_{84} = 14,500 lbs. a = .175 ft.
W_{29} = 120,000 lbs. CG_{84} = .280
q = 160

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 106, 107, 108

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
										SYMMETRIC MOTION					K = 0	K = 15	K = 3.0				
	w''	w'	w	η''	η'	η	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0289	.0245	-	.0105	.0104	-	-.0192	-.1411	-12.217	.0010	-.01972	-2.998	.2033	.0950	.1888	.4411	.6934	- 7.21X			
2	-.0192	-.0440	-	-.0355	-.0403	-	6.52	6.55	18.64	.2168	.426	9.38	.2520	-.3965	-.686	-1.490	- 2.294	5.47X			
3	.0516	.04872	-	.0995	.0887	-	-.1758	-.1998	-24.36	-.0090	-.1806	22.25	1.040	.950	1.402	5.347	9.292	8.01X			
4	.0028	.0030	-	.0052	.0045	.0182	-.0096	-.0110	- 1.457	-.0006	-.0099	-1.237	.0517	.0444	.0779	.2040	.3302	.351X			
5	-	-.0025	-		-.0047	.0032	.1048	.1980	.458	.1048	.1797	4.669	-	-.0471	-.0800	-.0512	- .0221	- .293X			
										ANTI-SYMMETRIC MOTION											
												K = 0	K = 1.5	K=3.0							
	ϕ''	ϕ'	ϕ	ξ''	ξ'	ξ	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	55.92	98.75	-	.9435	1.190	-	-.0082	-1.770	221.0	9.44	16.30	13.91	39.78	65.66	159.0X						
2	4.72	3.55	-	.0995	.0887	-	-.0090	-.1995	22.25	1.042	.950	1.402	5.347	9.292	8.90X						
3	.2525	.2010	-	.0052	.0045	.0182	-.0006	-.0099	1.237	.0515	.0444	.0779	.2040	.3302	.5009X						
4	-	-.2345	-	-	-.0047	.0032	.1048	.1797	4.669	--	-.0471	-.0800	-.0512	-.0221	- .224 X						

CONFIDENTIAL

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
								COEFFICIENTS		TABLE II — D OF EQUATIONS OF MOTION. RUNS # 109, 110, 111											
										SYMMETRIC MOTION											
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	η''	η'	η	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0450	.0346	-	.0188	.0147	-	.0344	-.1995	12.217	.0018	.0280	2.998	.1852	.1342	.1888	.4411	.6034	- 10.20X			
2	-.0344	.0622	-	-.0638	-.0570	-	9.88	9.27	18.64	.3090	.602	9.38	-.631	- .561	-.636	-1.490	-2.294	7.73X			
3	.0926	.06896	-	.1787	.1254	-	- .315	.2825	-24.36	.0162	-.2557	-22.25	1.867	1.342	1.402	5.347	9.292	11.32X			
4	.0051	.0042	-	.00936	.0064	.0363	- .0172	- .0155	- 1.457	.0009	-.0140	-1.237	.0925	.0628	.0779	.2040	.3302	.496X			
5	-	-.0035	-	-	-.0067	.0063	.1915	.200	.458	.1916	.2540	8.829	-	-.0666	-.0800	-.0512	- .0221	- .414X			
										ANTI-SYMMETRIC MOTION											
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	ζ''	ζ'	ζ	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	97.26	139.7	-	1.690	1.695	--	-.1583	-2.505	-221.0	16.92	23.05	13.91	39.78	65.66	225.0X						
2	8.46	5.02	-	.1787	.1254	--	-.0162	-.2557	- 22.25	1.867	1.342	1.402	5.347	9.292	12.58X						
3	.453	.2840	-	.00936	.00 4	.0363	-.0009	-.0140	- 1.237	.0925	.0628	.0779	.2040	.3302	.7090 X						
4	--	- .3315	-	--	-.0067	.0063	.1916	.2540	8.829	--	- .0666	-.0800	-.0512	-.0221	-.316 X						

CONFIDENTIAL

Altitude = 20,000 ft. V = 354 ft/sec.
W_{84} = 13,000# a = .175 ft.
W_{29} = 105,000# CG_{84} = .280
q = 80

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 112, 113, 114

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
																K = 0	K = 1.5	K = 3.0			
	$w^{\cdot\cdot}$	$w^{\cdot}$	w	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\theta^{\cdot\cdot}$	$\theta^{\cdot}$	θ	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F.F.			
1	.0509	.0346	-	.0188	.0147	-	.0344	.1995	12.217	.0018	-.0280	2.998	.1852	.1342	.1888	.4411	.6934	10.20X			
2	-.0344	-.0622	-	-.0638	-.0570	-	11.43	9.27	18.64	.3890	.602	9.38	-.631	-.561	-.686	-1.490	-2.294	7.73X			
3	.0926	.06896	-	.1787	.1254	-	-.315	-.2825	-24.36	-.0162	-.2557	-22.25	1.867	1.342	1.402	5.347	9.292	11.32X			
4	.0051	.0042	-	.00936	.0064	.0363	-.0172	-.0155	-1.457	-.0009	-.0140	-1.237	.0925	.0628	.0779	.2040	.3302	.496 X			
5	-	-.0035	-	-	-.0067	.0063	.1915	.280	.458	.1916	.2540	8.829	-	.0666	.0800	-.0512	-.0221	-.414 X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	$\phi^{\cdot\cdot}$	$\phi^{\cdot}$	ϕ	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F. F.						
1	100.0	139.7	-	1.690	1.695	-	-1583	-2.505	-221.0	16.92	23.05	13.91	39.78	65.66	225.0X						
2	8.46	5.02	-	.1787	.1254	-	-.0162	-.2557	-22.25	1.867	1.342	1.402	5.347	9.292	12.58X						
3	.453	.2640	-	.00936	.0064	.0363	-.0009	-.0140	-1.237	.0925	.0628	.0779	.2040	.3302	.7090X						
4	-	-.3315	-	-	-.0067	.0063	.1916	.2540	8.829	-	-.0666	-.0800	-.0512	-.0221	-.316 X						

CONFIDENTIAL

CONFIDENTIAL

Altitude = 20,000 Ft. V = 354 ft/sec.
W_{84} = 13,000# a = .175 ft.
W_{29} = 120,000# CG_{84} = .280
q_{80} =

TABLE II - D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS #115, 116, 117

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	$\omega^{\cdot\cdot}$	$\omega^{\cdot}$	ω	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\theta^{\cdot\cdot}$	$\theta^{\cdot}$	θ	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F.F.			
1	.0567	.0346	-	.0188	.0147	-	.0344	-.1995	-12.217	.0018	.0280	-2.998	.1852	.1842	.1888	.4411	.6934	-10.20X			
2	-.0344	.0622	-	.0638	-.0570	-	13.00	9.27	18.64	.3890	.602	9.38	-.631	-.561	-.586	-1.490	-7.294	7.73X			
3	.0926	.06896	-	.1787	.1254	-	.315	.2825	-24.36	-.0162	-.2557	-22.25	1.867	1.342	1.402	5.947	9.292	11.32X			
4	.0051	.0042	-	.00936	.0064	.0363	.0172	.0155	-1.457	-.0009	-.0140	-1.237	.0925	.0628	.0779	.2040	.3302	.496X			
5	-	-.0035	-	-	-.0067	.0063	.1915	.280	.458	.1916	.2540	8.829	-	-.0666	-.0800	-.0512	-.0221	-.414X			

ANTI-SYMMETRICAL

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	$\phi^{\cdot\cdot}$	$\phi^{\cdot}$	ϕ	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F.F.						
1	102.6	139.7	-	1.690	1.695	-	-.1583	-2.505	-221.0	16.92	23.05	13.91	39.78	65.66	225.0 X						
2	8.46	5.02	-	.1787	.1254	--	-.0162	-.2557	-22.25	1.867	1.342	1.402	5.347	9.292	12.5X						
3	.453	.2840	-	.00936	.0064	.0363	-.0009	-.0140	-1.236	.0925	.0628	.0779	.2040	.3302	.7090 X						
4	-	.3315	-	-	-.0067	.0063	.1916	.2540	8.829	-	-.0666	-.0800	-.0512	-.0221	-.316 X						

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 118, 119, 120

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0300	.0282		.0125	.0120		-.0229	-.1625	-12.217	-.0012	-.0228	-2.998	.1234	.1095	.1888	.4411	.6934	-8.31X			
2	-.0229	-.0507		-.0425	-.0464		6.58	7.55	18.64	.2502	.491	9.38	-.421	-.457	-.686	-1.490	-2.294	6.30X			
3	.0617	.05624		.1190	.1021		-.210	-.230	-24.36	-.0108	-.2185	-22.25	1.244	1.095	1.402	5.347	9.292	9.23X			
4	.0034	.0034		.00623	.0052	.0242	-.0115	-.0126	-1.457	-.0006	-.0114	-1.237	.0617	.0512	.0779	.2040	.3302	.404X			
5		-.0029			-.0055	.0042	.1273	.228	.458	.1278	.2067	6.049		-.0543	-.0800	-.0512	-.0221	-.338X			

ANTI-SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	K = 0	K = 1.5	K = 3.0	F.F.						
Eq. 1	64.81	113.8		1.127	1.380		-.1056	-2.040	-221.0	11.28	18.77	13.91	39.78	65.66	183.1X						
2	5.64	4.09		.1190	.1021		-.0108	-.2185	-22.25	1.244	1.095	1.402	5.347	9.292	10.24X						
3	.302	.2315		.00623	.0052	.0242	-.0006	-.0114	-1.237	.0617	.0512	.0779	.2040	.3302	.5782X						
4		-.270			-.0055	.0042	.1278	.2067	6.049		-.0543	-.0800	-.0512	-.0221	-.257X						

TABLE II-D
COEFFICIENT OF EQUATIONS OF MOTION
RUNS #121, 122, 123

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	$\ddot{w}$	$\dot{w}$	w	$\ddot{y}$	$\dot{y}$	y	$\ddot{\theta}$	$\dot{\theta}$	θ	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	F.F.			
Eq. 1	.0339	.0282		.0125	.0120		-.0229	-.1625	-12.217	-.0012	-.0228	-2.998	.1234	.1095	.1888	.4411	.6934	-8.31X			
2	-.0229	-.0507		-.0425	-.0464		7.62	7.55	18.64	.2592	.491	9.38	-.421	-.457	-.686	-1.490	-2.294	6.30X			
3	.0617	.05624		.1190	.1021		-.210	-.230	-24.36	-.0108	-.2185	-22.25	1.244	1.095	1.402	5.347	9.292	9.23X			
4	.0034	.0034		.00623	.0052	.0242	-.0115	-.0126	-1.457	-.0006	-.0114	-1.237	.0617	.0512	.0779	.2040	.3302	.404X			
5		-.0029			-.0055	.0042	.1278	.228	.458	.1278	.2067	6.049		-.0543	-.080	-.0512	-.0221	-.338X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	$\ddot{\phi}$	$\dot{\phi}$	ϕ	$\ddot{y}$	$\dot{y}$	y	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	F.F.						
Eq. 1	66.6	113.8		1.127	1.380		-.1056	-2.040	-221.0	11.28	18.77	13.91	39.78	65.66	183.1X						
2	5.64	4.09		.1190	.1021		-.0108	-.2185	-22.25	1.244	1.095	1.402	5.347	9.292	10.24X						
3	.302	.2315		.00623	.0052	.0242	-.0006	-.0114	-1.237	.0617	.0512	.0779	.2040	.3302	.5782X						
4		-.270			-.0055	.0042	.1278	.2067	6.049		-.0543	-.0800	-.0512	-.0221	-.257X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 124, 125, 126

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β				
Eq. 1	.0378	.0282		.0125	.0120		-.0229	-.1625	-12.217	-.0012	-.0228	-2.998	.1234	.1095	.1888	.4411	.6934				
2	-.0229	-.0507		-.0425	-.0464		8.66	7.55	18.64	.2592	.491	9.38	-.421	-.457	-.686	-1.490	-2.294				
3	.0617	.05624		.1190	.1021		-.210	-.230	-24.36	-.0108	-.2185	-22.25	1.244	1.095	1.402	5.347					
4	.0034	.0034		.00623	.0052	.0242	-.0115	-.0126	-1.457	-.0006	-.0114	-1.237	.0617	.0512	.0779	.2040					
5		-.0029			-.0055	.0242	.1278	.228	.458	.1278	.2067	6.049		-.0543	-.0800	-.0512					

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	z''	z'	z	α''	α'	α	β''	β'	β	β	β	F. F.						
Eq. 1	68.36	113.8		1.127	1.380		-.1056	-2.040	-221.0	11.28	18.77	13.91	39.78	65.66	183.1X						
2	5.64	4.09		.1190	.1021		-.0108	-.2185	-22.25	-1.244	1.095	1.402	5.347	9.292	10.24X						
3	.302	.2315		.00623	.0052	.0242	-.0006	-.0114	-1.237	.0617	.0512	.0779	.2040	.3302	.5782X						
4		-.270			-.0055	.0042	-.1278	.2067	6.049		-.0543	-.0800	-.0512	-.0221	-.257X						

PREPARED
CHECKED
REVISED

Alt. = 20,000 ft. V = 501 ft/sec
W84 = 13,000 # a =- .175 ft.
W29 = 90,000 # cg84 = .280
q = 160

TABLE-II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 127, 128, 129

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0225	.0245		.0094	.0104		-.0172	-.1411	-12.217	-.0001	-.0197	-2.998	.0926	.0950	.1888	.4411	.6934	-7.21X			
2	-.0172	-.0440		-.0319	-.0403		4.93	6.55	18.64	.1345	.426	9.38	-.3155	-.3965	-.686	-1.490	-2.294	5.47X			
3	.0463	.04872		.0893	.0887		-.1575	-.1998	-24.36	-.0081	-.1806	-22.25	.9335	.950	1.402	5.347	9.292	8.01X			
4	.0025	.0030		.00468	.0045	.0182	-.0086	-.0110	-1.457	-.0005	-.0099	-1.237	.0463	.0444	.0779	.2040	.3302	.351X			
5		-.0025			-.0047	.0032	.0957	.1980	.458	.0958	.1797	4.669		-.0471	-.0800	-.0512	-.0221	-.293X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	48.66	98.75		.845	1.198		-.0791	-1.770	-221.0	8.46	16.30	13.91	39.78	65.66	159.0X						
2	4.23	3.55		.0893	.0887		-.0081	-.1895	-22.25	.934	.950	1.402	5.347	9.292	8.90X						
3	.2265	.2010		.00468	.0045	.0182	-.0005	-.0099	-1.237	.0462	.0444	.0779	.2040	.3302	.5009X						
4		-.2345			-.0047	.0032	.0958	.1797	4.669		-.0471	-.0800	-.0512	-.0221	-.224X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 130, 131, 132

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F. F.			
Eq. 1	.0254	.0245		.0094	.0104		-.0172	-.1411	-12.217	-.0009	-.01972	-2.998	.0926	.0950	.1888	.4411	.6934	-7.21X			
2	-.0172	-.0440		-.0319	-.0403		5.715	6.55	18.64	.1945	.426	9.38	-.3155	-.3965	-.686	-1.490	-2.294	5.47X			
3	.0463	.04872		.0893	.0887		-.1575	-.1998	-24.36	-.0081	-.1806	-22.25	.9335	.950	1.402	5.347	9.292	8.01X			
4	.0025	.0030		.10468	.0045	.0182	-.0086	-.0110	-1.457	-.0005	-.0099	-1.237	.0463	.0444	.0779	.2040	.3302	.351X			
5		-.0025			-.0047	.0032	.0957	.1980	.458	.0958	.1797	4.669		-.0471	-.0800	-.0512	-.0221	-.293X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F. F.						
Eq. 1	50.0	98.75		.845	1.198		-.0791	-1.770	-221.0	8.46	16.30	13.91	39.78	65.66	159.0X						
2	4.23	3.55		.0893	.0887		-.0081	-.1895	-22.25	.934	.950	1.402	5.347	9.292	8.90X						
3	.2265	.2010		.00468	.0045	.0182	-.0005	-.0099	-1.237	.0462	.0444	.0779	.2040	.3302	.5009X						
4		-.2345			-.0047	.0032	.0958	.1797	4.669		-.0471	-.0800	-.0512	-.0221	-.224X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 133, 134, 135

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	$w^{\cdot\cdot}$	$w^{\cdot}$	w	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\theta^{\cdot\cdot}$	$\theta^{\cdot}$	θ	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F.F.			
Eq. 1	.0283	.0245		.0094	.0104		-.0172	-.1411	-12.217	-.0009	-.01972	-2.998	.0326	.0950	.1888	.4411	.6934	-7.21X			
2	-.0172	-.0440		-.0319	-.0403		6.49	6.55	18.64	.1945	.426	9.38	-.3155	-.3965	-.686	-1.490	-2.294	5.47X			
3	.0463	.04872		.0893	.0887		-.1575	-.1998	-24.36	-.0081	-.1806	-22.25	.9335	.950	1.402	5.347	9.292	8.01X			
4	.0025	.0030		.00468	.0045	.0182	-.0086	-.0110	-1.457	-.0005	-.0099	-1.237	.0463	.0444	.0779	.2040	.3302	.351X			
5		-.0025			-.0047	.0032	.0957	.1980	.458	.0958	.1797	4.669		.0471	-.0800	-.0512	-.0221	-.293X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	$\phi^{\cdot\cdot}$	$\phi^{\cdot}$	ϕ	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F.F.						
Eq. 1	51.33	98.75		.845	1.198		-.0791	-1.770	-221.0	8.46	16.30	13.91	39.78	65.66	159.0X						
2	4.23	3.55		.0893	.0887		-.0081	-.1895	-22.25	.934	.950	1.402	5.347	9.292	8.90X						
3	.2265	.2010		.00468	.0045	.0182	-.0005	-.0099	-1.237	.0462	.0444	.0779	.2040	.3302	.5009X						
4		-.2345			-.0047	.0032	.0958	.1797	4.669		-.0471	-.0800	-.0512	-.0221	-.224X						

PREPARED
CHECKED
REVISED

Alt. = 20,000 Ft. V = 354 ft/sec
W84 = 11,500 # a = .175 ft.
W29 = 90,000 # cg84 = .280
q = 80

TABLE II-D
COEFFICIENT OF EQUATIONS OF MOTION
RUNS # 136, 137, 138

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	$\ddot{w}$	$\dot{w}$	w	$\ddot{y}$	$\dot{y}$	y	$\ddot{\theta}$	$\dot{\theta}$	θ	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	7.7.			
Eq. 1	.0438	.03452		.0165	.01469		-.0304	-.1992	-12.217	-.0016	-.02791	-2.998	.1633	.1342	.1888	.4411	.6934	-10.20X			
2	.0304	-.06220		-.0562	-.05689		9.81	9.252	18.64	.3824	.6017	9.38	-.5561	-.5603	-.686	-1.490	-2.294	7.716X			
3	.0817	.06896		.1570	.1251		-.278	-.2825	-24.36	-.0143	-.2557	-22.25	1.629	1.343	1.402	5.347	9.292	11.32X			
4	.0045	.004127		.0082	.006410	.0364	-.0152	-.01542	-1.457	-.0008	-.01396	-1.237	.0817	.06288	.0779	.2041	.3302	.4959X			
5		.003503			-.006732	.0064	.1885	.2797	.461	.1885	.2534	8.823		-.06641	-.0800	-.0512	-.0224	-.4143X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	$\ddot{\phi}$	$\dot{\phi}$	ϕ	$\ddot{y}$	$\dot{y}$	y	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	7.7.						
Eq. 1	87.73	139.7		1.491	1.691		-.1399	-2.500	-221.0	14.91	23.02	13.91	39.785	65.66	224.4X						
2	7.45	5.025		.1570	.1251		-.0143	-.2557	-22.25	1.629	1.343	1.402	5.347	9.292	12.55X						
3	.400	.2839		.0082	.006410	.0364	-.0008	-.01396	-1.237	.0817	.06288	.0779	.2041	.3302	.7090X						
4		.3311			.006732	.0064	.1885	.2534	8.823		-.06641	-.0800	-.0512	-.0224	-.316X						

TABLE II-D
COEFFICIENT OF EQUATIONS OF MOTION
RUNS # 136, 137, 138

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	$\ddot{w}$	$\dot{w}$	w	$\ddot{y}$	$\dot{y}$	y	$\ddot{\theta}$	$\dot{\theta}$	θ	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	7.7.			
															K = 0	K = 1.5	K = 3.0				
Eq. 1	.0438	.03452		.0165	.01469		-.0304	-.1992	-12.217	-.0016	-.02791	-2.998	.1633	.1342	.1888	.4411	.6934	-10.20X			
2	.0304	-.06220		-.0562	-.05689		9.81	9.252	18.64	.3824	.6017	9.38	-.5561	-.5603	-.686	-1.490	-2.294	7.716X			
3	.0817	.06896		.1570	.1251		-.278	-.2825	-24.36	-.0143	-.2557	-22.25	1.629	1.343	1.402	5.347	9.292	11.32X			
4	.0045	.004127		.0082	.006410	.0364	-.0152	-.01542	-1.457	-.0008	-.01396	-1.237	.0817	.06288	.0779	.2041	.3302	.4959X			
5		.003503			-.006732	.0064	.1885	.2797	.461	.1885	.2534	8.823		-.06641	-.0800	-.0512	-.0224	-.4143X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	$\ddot{\phi}$	$\dot{\phi}$	ϕ	$\ddot{y}$	$\dot{y}$	y	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	7.7.						
Eq. 1	87.73	139.7		1.491	1.691		-.1399	-2.500	-221.0	14.91	23.02	13.91	39.785	65.66	224.4X						
2	7.45	5.025		.1570	.1251		-.0143	-.2557	-22.25	1.629	1.343	1.402	5.347	9.292	12.55X						
3	.400	.2839		.0082	.006410	.0364	-.0008	-.01396	-1.237	.0817	.06288	.0779	.2041	.3302	.7090X						
4		.3311			.006732	.0064	.1885	.2534	8.823		-.06641	-.0800	-.0512	-.0224	-.316X						

TABLE II — D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 139, 140, 141

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	$\ddot{w}$	$\dot{w}$	w	$\ddot{y}$	$\dot{y}$	y	$\ddot{\theta}$	$\dot{\theta}$	θ	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	F.F.			
Eq. 1	.0497	.0346		.0165	.0147		-.0304	-.1995	-12.217	-.0016	-.0280	-2.[illegible]98	.1633	.1342	.1888	.4411	.6934	-10.20X			
2	-.0304	-.0622		-.0562	-.0570		11.42	9.27	18.64	.3824	.602	9.38	-.5560	-.561	-.686	-1.490	-2.294	7.73X			
3	.0817	.06896		.1570	.1254		-.2781	-.2825	-24.36	-.0143	-.2557	-22.25	1.629	1.342	1.402	5.347	9.292	11.32X			
4	.0045	.0042		.0082	.0064	.0364	-.0152	-.0155	-1.457	-.0008	-.0140	-1.237	.0817	.0628	.0779	.2040	.3302	.496X			
5		-.0035			-.0067	.0064	.1885	.280	.4610	.1885	.2540	8.823		-.0666	-.0800	-.0512	-.0224	-.414X			

ANTI-SYMMETRIC MOTION

												K 0	K 1.5	K 3.0							
	$\ddot{\psi}$	$\dot{\psi}$	ψ	$\ddot{y}$	$\dot{y}$	y	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	F.F.						
Eq. 1	22.42	139.7		1.491	1.695		-.1399	-2.505	-221.0	14.91	23.05	13.91	39.78	65.66	225.0X						
2	7.453	5.02		.1570	.1254		-.0143	-.2557	-22.25	1.629	1.342	1.402	5.347	9.292	12.58X						
3	.3998	.2840		.0082	.0064	.0364	-.0008	-.0140	-1.237	.0817	.0628	.0779	.2040	.3302	.7090X						
4		-.3315			-.0067	.0064	.1885	.2540	8.823		-.0666	-.0800	-.0512	-.0224	-.316X						

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION.

RUNS # 142, 143, 144

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
										SYMMETRIC MOTION					K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ'	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0555	.0346		.01649	.0147		-.0304	-.1995	-12.217	-.0016	-.0280	-2.998	.1633	.1342	.1888	.4411	.6934	-10.20%			
2	-.0304	-.0622		-.0562	-.0570		12.94	9.27	18.64	.3824	.602	9.38	-.5560	-.561	-.686	-1.490	-2.294	7.73%			
3	.0817	.06896		.1570	.1254		-.2781	-.2825	-24.36	-.0143	-.2557	-22.25	1.629	1.342	1.402	5.347	9.292	11.32%			
4	.0045	.0042		.0082	.0064	.0364	-.0152	-.0155	-1.457	-.0008	-.0140	-1.237	.0817	.0628	.0779	.2040	.3302	.496%			
5		-.0035			-.0067	.0064	.1885	.280	.4610	.1885	.2540	8.823		-.0666	-.0800	-.0512	-.0224	-.414%			
										ANTI-SYMMETRIC MOTION											
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	93.07	139.7		1.491	1.695		-.1399	-2.505	-221.0	14.91	23.05	13.91	39.78	65.66	225.0%						
2	7.453	5.02		.1570	.1254		-.0143	-.2557	-22.25	1.629	1.342	1.402	5.347	9.292	17.58%						
3	.3998	.2840		.0082	.0064	.0364	-.0008	-.0140	-1.237	.0817	.0628	.0779	.2040	.3302	.7090%						
4		-.3315			-.0067	.0064	.1885	.2540	8.823		-.0666	-.0800	-.0512	-.0224	-.316%						

TABLE II-D

COEFFICIENT OF EQUATIONS OF MOTION.

SYMMETRIC MOTION

RUNS # 145, 146, 147

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	F.F.						
Eq. 1	.0292	.02815		.0110	.01198		.0203	-.1625	12.217	.0010	-.02276	-2.998	.1088	.1095	-8.317%						
2	.02026	-.05073		-.0374	-.04640		6.568	7.546	18.64	.2549	.4908	9.38	-.3706	-.4570	6.295%						
3	.0544	.05624		.1047	.1021		-.1853	-.2304	-24.36	-.0095	-.2085	-22.25	1.085	1.095	9.230%						
4	.0030	.003366		.0055	.005228	.02425	-.0101	-.01258	-1.457	-.0005	-.01138	-1.237	.0544	.05129	.4055%						
5		-.002857			-.005490	.004244	.1256	.2281	.461	.1256	.2067	6.052		-.05417	-.3387%						

ANTI-SYMMETRIC MOTION

	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	F.F.
Eq. 1	58.46	113.9		.994	1.379		-.0933	-2.039	-221.0	9.938	18.78	183.0%
2	4.97	4.099		.1047	.1021		-.0095	-.2085	-22.25	1.085	1.095	10.24%
3	.266	.2316		.0055	.005228	.02425	-.0005	-.01138	-1.237	.0544	.05129	.5782%
4		-.2700			-.005490	.004244	.1256	.2067	6.052		-.05417	-.2577%

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS #148, 149, 150

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	F. F.
Eq. 1	.03312	.02815		.0110	.01198		-.0203	-.1625	12.217	.0010	-.02276	-2.998	.1088	.1095	-8.317X
2	.02026	-.05073		-.0374	-.04640		7.612	7.546	18.64	.2549	.4908	9.38	-.3706	-.4570	6.295X
3	.0544	.05624		.1047	.1021		-.1853	-.2304	-24.36	-.0095	-.2085	-22.25	1.085	1.095	9.230X
4	.0030	.003366		.0055	.005228	.02425	-.0101	-.01258	-1.457	-.0005	-.01138	-1.237	.0544	.05129	.4055X
5		-.002857				.004244	.1256	.2281	.461	.1256	.2067	6.052		-.05417	-.3387X

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	F. F.
Eq. 1	60.28	113.9		.994	1.379		-.0933	-2.039	-221.0	9.938	18.78	183.0X
2	4.97	4.099		.1047	.1021		-.0095	-.2085	-22.25	1.085	1.095	10.24X
3	.266	.2316		.0055	.005228	.02425	-.0005	-.01138	-1.237	.0544	.05129	.5782X
4		-.2700			-.005490	.004244	.1256	.2067	6.052		-.05417	-.2577X

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 151, 152, 153

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	F.F.
Eq. 1	.03702	.02815		.0110	.01198		-.0203	-.1625	-12.217	-.0010	-.02276	-2.998	.1088	.1096	-8.317X
2	.02026	-.05073		-.0374	-.04640		8.654	7.546	18.64	.2549	.4908	9.38	-.3706	-.4570	6.295X
3	.0544	.05624		.1047	.1021		-.1853	-.2304	-24.36	-.0095	-.2085	-22.25	1.085	1.095	9.230X
4	.0030	.003366		.0055	.005228	.02425	-.0101	-.01258	-1.457	-.0005	-.01138	-1.237	.0544	.05129	.4055X
5		-.002857			-.005490	.004244	.1256	.2281	.461	.1256	.2067	6.052		-.05417	-.3387X

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	F.F.
Eq. 1	62.05	113.9		.994	1.379		-.0933	-2.039	-221.0	9.938	18.78	183.0X
2	4.97	4.099		.1047	.1021		-.0095	-.2085	-22.25	1.085	1.095	10.24X
3	.266	.2316		.0055	.005228	.02425	-.0005	-.01138	-1.237	.0544	.05129	.5782X
4		-.2700			-.005490	.004244	.1256	.2067	6.052		-.05417	-.2577X

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS #154, 155, 156

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	F.F
Eq. 1	.02193	.02439		.008244	.01038		.01519	.1408	-12.217	-.0008	-.01972	-2.998	.08165	.09485	-7.206X
2	-.01519	-.04395		-.02807	-.04020		4.928	6.537	18.64	.1912	.4251	9.38	-.2781	-.3959	5.453X
3	.04083	.04872		.07854	.08842		-.1390	-.1996	-24.36	-.00715	-.1806	-22.25	.8145	.9489	7.996X
4	.002231	.002916		.004123	.004529	.01819	-.00760	-.01090	-1.457	-.0004	-.009860	-1.237	.04085	.04443	.3513X
5		-.002475			-.004756	.003183	.09427	.1976	.461	.09425	.1790	4.669		-.04693	-.2934X

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12
	ϕ	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	F.F.
Eq. 1	43.87	98.68		.746	1.195		-.0700	-1.7666	-221.0	7.46	16.27	158.6X
2	3.725	3.551		.07854	.08842		-.0072	-.1806	-22.25	.815	.9489	8.870X
3	.200	.2006		.004123	.004529	.01819	-.0004	-.009860	-1.237	.0409	.04443	.5009X
4		-.2339			-.004756	.003183	.0943	.1790	4.669		-.04693	-.2236X

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 157, 158, 159

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	F.F.
Eq. 1	.02484	.02439		.008244	.01038		.01519	-.1408	-12.217	.0008	.01972	-2.998	.08165	.09485	-7.206X
2	-.01519	-.04395		-.02807	-.04020		5.709	6.537	18.64	.1912	.4251	9.38	-.2781	-.3959	5.453X
3	.04083	.04872		.07854	.08842		-.1390	-.1996	-24.36	-.00715	-.1806	-22.25	.8145	.9489	7.996X
4	.002231	.002916		.004123	.004529	.01819	-.00760	-.01090	-1.457	-.0004	-.009860	-1.237	.04085	.04443	.3513X
5		-.002475			-.004756	.003183	.09427	.1976	.461	.09425	.1790	4.669		-.04693	-.2934X

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	F.F.
Eq. 1	45.21	98.68		.746	1.195		-.0700	-1.7666	-221.0	7.46	16.27	158.6X
2	3.725	3.551		.07854	.08842		-.0072	-.1806	-22.25	.815	.9489	8.870X
3	.200	.2006		.004123	.004529	.01819	-.0004	-.009860	-1.237	.0409	.04443	.5009X
4		-.2339			-.004756	.003183	.0943	.1790	4.669		-.04693	.2236X

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS #160, 161, 162

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	F.F.						
Eq. 1	.02777	.02439		.008244	.01038		.01519	-.1408	-12.219	-.0008	-.01972	-2.998	.08165	.09485	-7.206X						
2	-.01519	-.04395		-.02807	-.04020		6.490	6.537	18.64	.1912	.4251	9.38	-.2781	-.3959	5.453X						
3	.04083	.04872		.07854	.08842		-.1390	-.1996	-24.36	-.00715	-.1806	-22.25	.8145	.9489	7.996X						
4	.002231	.002916		.004123	.004529	.01819	-.00760	-.01090	-1.457	-.0004	-.009860	-1.237	.04085	.04443	.3513X						
5		-.002475			-.004756	.003183	.09427	.1976	.461	.09425	.1790	4.669		-.04693	-.2934X						

ANTI-SYMMETRIC MOTION

	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	F.F.
Eq. 1	46.53	98.68		.746	1.195		-.0700	-1.7666	-221.0	7.46	16.27	158.6X
2	3.725	3.551		.07854	.08842		-.0072	-.1806	-22.25	.815	.9489	8.870X
3	.200	.2006		.004123	.004529	.01819	-.0004	-.009860	-1.237	.0409	.04443	.5009X
4		-.2339			-.004756	.003183	.0943	.1790	4.669		-.04693	-.2236X

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.

SYMMETRICAL MOTION

RUNS # 163, 164, 165

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.04619	.0263		.02079	.0112		.03831	-.1517	-12.217	-.00197	.0212	2.998	.2059	.1022	.1888	.4411	.6934	-9.55X			
2	-.03831	-.0474		-.07079	-.0433		9.825	7.04	18.64	.4267	.458	9.38	-.7010	-.427	-.686	-1.490	-2.294	7.28X			
3	.1029	.0525		.1991	.0953		-.3505	.215	-24.36	-.01801	-.1946	-22.25	2.079	1.022	1.402	5.347	9.292	10.42X			
4	.00563	.0031		.0104	.0049	.0364	-.01915	-.0117	-1.457	-.000984	-.0106	-1.237	.1029	.0479	.0779	.2041	.3302	.455X			
5		-.0027			-.0051	.0064	.2100	.2129	.461	.2100	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.383X			

ANTI-SYMMETRICAL MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	10.65	106.3		1.882	1.287		-.1764	-1.903	-221.0	18.85	17.52	13.91	39.785	65.66	222.9X						
2	9.419	3.83		.1991	.0953		-.01801	-.1946	-22.25	2.079	1.022	1.402	5.347	9.292	12.47X						
3	.5040	.2161		.0104	.0049	.0364	-.000984	-.0106	-1.237	.1029	.0479	.0779	.2041	.3302	.704X						
4		-.252			-.0051	.0064	.2100	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.314X						

Alt. = 35,000 ft. V = 465 ft/sec
W84 = 14,500 a = .175 ft.
W29 = 105,000 cg84 = .280
q = 80

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 166, 167, 168

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0520	.0263		.02079	.0112		.03831	-.1517	-12.217	.00197	.0212	-2.998	.2059	.1022	.1888	.4411	.6934	9.55%			
2	-.03831	-.0474		-.07079	-.0433		11.488	7.04	18.64	.4267	.458	9.38	-.7010	-.427	-.686	-1.490	-2.234	7.28%			
3	.1029	.0525		.1991	.0953		-.3505	-.215	-24.36	-.01801	-.1946	-22.25	2.079	1.022	1.402	5.347	9.292	10.42%			
4	.00563	.0031		.0104	.0049	.0364	-.01915	-.0117	-1.457	-.000984	-.0106	-1.237	.1029	.0479	.0779	.2041	.3302	.45%			
5		-.0027			-.0051	.0064	.2100	.2129	.461	.2100	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.383%			

ANTI-SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	109.14	106.3		1.882	1.287		-.1764	-1.903	-221.0	18.85	17.52	13.91	39.785	65.66	222.9%						
2	9.419	3.83		.1991	.0953		-.01801	-.1946	-22.25	2.079	1.022	1.402	5.347	9.292	12.47%						
3	.5040	.2161		.0104	.0049	.0364	.000984	-.0106	-1.237	.1029	.0479	.0779	.2041	.3302	.70%						
4		-.252			-.0051	.0064	.2100	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.31%						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 169, 170, 171

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.05785	.0263		.02079	.0112		-.03831	-.1517	-12.217	-.00197	-.0212	-2.998	.2059	.1022	.1888	.4411	.6934	9.55%			
2	-.03831	-.0474		-.07079	-.0433		13.05	7.04	18.64	.4267	.458	9.38	-.7010	-.427	-.686	-1.490	-2.294	7.28%			
3	.1029	.0525		.1991	.0953		-.3505	-.215	-24.36	-.01801	-.1946	-22.25	2.079	1.022	1.402	5.347	9.292	10.42%			
4	.00563	.0031		.0104	.0049	.0364	-.01915	-.0117	-1.457	-.000984	-.0106	-1.237	.1029	.0479	.0779	.2041	.3302	.455%			
5		-.0027			-.0051	.0064	.2100	.2129	.461	.2100	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.383%			

ANTI-SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	111.79	106.3		1.882	1.287		-.1764	-1.903	-221.0	18.85	17.52	13.91	39.785	65.66	222.9%						
2	9.419	3.83		.1991	.0953		-.01801	-.1946	-22.25	2.079	1.022	1.402	5.347	9.292	12.47%						
3	.5040	.2161		.0104	.0049	.0364	-.000984	-.0106	-1.237	.1029	.0479	.0779	.2041	.3302	.70%						
4		-.252			-.0051	.0064	.2100	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.31%						

PREPARED
CHECKED
REVISED

Alt. = 35,000 ft. V = 520 ft/sec
W84 = 14,500 # a = .175 ft
W29 = 90,000 # cg84 = .280
q = 100

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 172, 173, 174

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.03695	.0235		.01663	.0100		-.03065	-.1356	-12.217	-.00158	-.0190	-2.998	.1647	.0914	.1888	.4411	.6934	-8.54X			
2	-.03065	-.0423		-.05663	-.0387		7.940	6.298	18.64	.3414	.4096	9.38	-.5608	-.3814	-.686	-1.490	-2.294	6.511X			
3	.08235	.0469		.1593	.0852		-.2804	-.1923	-24.36	-.01441	-.1740	-22.25	1.663	.9142	1.402	5.347	9.292	9.319X			
4	.00450	.0028		.00832	.0044	.0291	-.01532	-.0105	-1.457	-.000788	-.0095	-1.237	.08235	.0428	.0779	.2041	.3302	.408X			
5		-.0024			-.0046	.0051	.1680	.1904	.461	.1680	.1725	7.160		.0452	-.0800	-.0512	-.0224	-.343X			

ANTI-SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = -1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	85.16	95.07		1.506	1.151		-.1411	-1.702	-221.0	15.08	15.67	13.91	39.785	65.66	199.3X						
2	7.536	3.42		.1593	.0852		-.01441	-.1740	-22.25	1.663	.9142	1.402	5.347	9.292	11.15X						
3	.4032	.1933		.00832	.0044	.0291	-.000788	-.0095	-1.237	.08235	.0428	.0779	.2041	.3302	.630X						
4		-.2254			-.0046	.0051	.1680	.1725	7.160		-.0452	-.0800	-.0512	-.0224	-.281X						

CONFIDENTIAL

Alt. = 35,000 ft. V = 520 ft/sec
W84 = 14,500 # a = .175 ft.
W29 = 105,000 # cg84 = .280
q = 100

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS# 175, 176, 177

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	$w^{\cdot\cdot}$	$w^{\cdot}$	w	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\theta^{\cdot\cdot}$	$\theta^{\cdot}$	θ	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F.F.			
Eq. 1	.0416	.0235		.01663	.0100		.03065	-.1356	-12.217	-.00138	-.0190	-2.998	-.1647	.0914	.1888	.4411	.6934	-8.54X			
2	-.03065	-.0423		-.05663	-.0387		9.190	6.298	18.64	.3414	.4096	9.38	-.5608	-.3814	-.686	-1.490	-2.294	6.511X			
3	.08235	.0469		.1593	.0852		-.2804	-.1923	-24.36	-.01441	-.1740	-22.25	1.663	.9142	1.402	5.347	9.292	9.319X			
4	.00450	.0028		.00832	.0044	.0291	-.01532	-.0105	-1.457	-.000788	-.0095	-1.237	.08235	.0428	.0779	.2041	.3302	.408X			
5		-.0024			-.0046	.0051	.1680	.1904	.461	.1680	.1725	7.160		.0452	-.0800	-.0512	-.0224	-.343X			

ANTI-SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = -1.5	K = 3.0							
	$\phi^{\cdot\cdot}$	$\phi^{\cdot}$	ϕ	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F.F.						
Eq. 1	87.31	95.07		1.506	1.151		-.1411	-1.702	-221.0	15.08	15.67	13.91	39.785	65.66	199.3X						
2	7.536	3.42		.1593	.0852		-.01441	-.1740	-22.25	1.663	.9142	1.402	5.347	9.292	11.15X						
3	.4032	.1933		.00832	.0044	.0291	-.000788	-.0095	-1.237	.08235	.0428	.0779	.2041	.3302	.630X						
4		-.2254			-.0046	.0051	.1680	.1725	7.160		-.0452	-.0800	-.0512	-.0224	-.281X						

CONFIDENTIAL

PREPARED
CHECKED
REVISED

Alt. = 35,000 ft. V = 520 ft/sec
W84 = 14,500 # a = .175 ft.
W29 = 120,000 # cg84 = .280
q = 100

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 178, 179, 180

SYMMETRICAL MOTION

	1.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	η''	η'	η	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.04628	.0235		.01663	.0100		-.03065	-.1356	-12.217	-.00158	-.0190	-2.998	-.1647	.0914	.1888	.4411	.6934	-8.54X			
2	-.03065	-.0423		-.05063	-.0387		10.44	6.298	18.64	.3414	.4096	9.38	-.5608	-.3814	-.686	-1.490	-2.294	6.511X			
3	.08235	.0469		.1593	.0852		-.2804	-.1923	-24.36	-.01441	-.1740	-22.25	1.663	.9142	1.402	5.347	9.292	9.319X			
4	.00450	.0028		.00832	.0044	.0291	-.01532	-.0105	-1.457	-.000788	-.0095	-1.237	.08235	.0428	.0779	.2041	.3302	.408X			
5		-.0024			-.0046	.0051	.1680	.1904	.461	.1680	.1725	7.160		-.0452	-.0800	-.0512	-.0224	-.340X			

ANTI-SYMMETRICAL MOTION

												K = 0	K = 1.5	K = 3.0							
	α''	α'	α	η''	η'	η	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	89.43	95.07		1.506	1.151		-.1411	-1.702	-221.0	15.08	15.67	13.91	39.785	65.66	199.3X						
2	7.536	3.42		.1593	.0852		-.01441	-.1740	-22.25	1.663	.9142	1.402	5.347	9.292	11.15X						
3	.4032	.1933		.00832	.0044	.0291	-.000788	-.0095	-1.237	.08235	.0428	.0779	.2041	.3302	.630X						
4		-.2254			-.0046	.0051	.1680	.1725	7.160		-.0452	-.0800	-.0512	-.0224	-.281X						

CONFIDENTIAL

E-1-189
REV. 8/49

TABLE II-D
COEFFICIENTS, OF EQUATIONS OF MOTION
RUNS # 181, 182, 183

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F. F.			
Eq. 1	.03079	.0214		.01386	.0091		-.02554	-.1237	-12.217	-.00131	-.0173	-2.998	.1373	.0834	.1888	.4411	.6934	-7.792%			
2	-.02554	-.0386		-.04719	-.0353		6.617	5.744	18.64	.2845	.3736	9.38	-.4673	-.3479	-.686	-1.490	-2.294	5.939%			
3	.06863	.0428		.1328	.0777		-.2337	-.1754	-24.36	-.01201	-.1587	-22.25	1.386	.8339	1.402	5.347	9.292	8.501%			
4	.00375	.0026		.00693	.0040	.0243	-.01277	-.0096	-1.457	-.000656	-.0087	-1.237	.06863	.0390	.0779	.2041	.3302	.371%			
5		-.0022			-.0042	.0043	.1400	.1736	.461	.1400	.1573	6.052		-.0412	-.0800	-.0512	-.0224	-.313%			

ANTI-SYMMETRICAL MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F. F.						
Eq. 1	70.97	86.72		1.255	1.050		-.1176	-1.552	-221.0	12.57	14.29	13.91	39.785	65.66	181.7%						
2	6.280	3.12		.1328	.0777		-.01201	-.1587	-22.25	1.386	.8339	1.402	5.347	9.292	10.17%						
3	.3360	.1762		.00693	.0040	.0243	-.000656	-.0087	-1.237	.06863	.0390	.0779	.2041	.3302	.574%						
4		-.206			-.0042	.0043	.1400	.1573	6.052		-.0412	-.0800	-.0512	-.0224	-.256%						

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION
RUNS* 184, 185, 186

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K' = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.03467	.0214		.01386	.0091		-.02554	-.1237	-12.217	-.00131	-.0173	-2.998	.1371	.0834	.1888	.4411	.6934	-7.792X			
2	-.02554	-.0386		-.04719	-.0353		7.659	5.744	18.64	.2845	.3736	9.38	-.4673	-.3479	-.686	-1.490	-2.294	5.939X			
3	.06863	.0428		.1328	.0777		-.2337	-.1754	-24.36	-.01201	-.1587	-22.25	1.386	.8339	1.402	5.347	9.292	8.501X			
4	.00375	.0026		.00693	.0040	.0243	-.01277	-.0096	-1.457	-.000656	-.0087	-1.237	.06863	.0390	.0779	.2041	.3302	.371X			
5		-.0022			-.0042	.0043	.1400	.1736	.461	.1400	.1573	6.052		-.0412	-.0800	-.0512	-.0224	-.313X			

ANTI-SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	72.76	86.72		1.255	1.050		-.1176	-1.552	-221.0	12.57	14.29	13.91	39.785	65.66	181.7X						
2	6.280	3.12		.1328	.0777		-.01201	-.1587	-22.25	1.386	.8339	1.402	5.347	9.292	10.17X						
3	.3360	.1762		.00693	.0040	.0243	-.000656	-.0087	-1.237	.06863	.0390	.0779	.2041	.3302	.574X						
4		-.206			-.0042	.0043	.1400	.1573	6.052		-.0412	-.0800	-.0512	-.0224	-.256X						

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 187, 188, 189

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.03857	.0214		.01386	.0091		-.02554	-.1237	-12.217	-.00131	-.0173	-2.998	.1373	.0834	.1888	.4411	.6934	-7.792%			
2	-.02554	-.0386		-.04719	-.0353		8.700	5.744	18.64	.2845	.3736	9.38	-.4673	-.3479	-.686	-1.490	-2.294	5.939%			
3	.06863	.0428		.1328	.0777		-.2337	-.1754	-24.36	-.01201	-.1587	-22.25	1.386	.8339	1.402	5.347	9.292	8.501%			
4	.00375	.0026		.00693	.0040	.0243	-.01277	-.0096	-1.457	-.000656	-.0087	-1.237	.06863	.0390	.0779	.2041	.3302	.371%			
5		-.0022			-.0042	.0043	.1400	.1736	.461	.1400	.1573	6.052		-.0412	-.0800	-.0512	-.0224	-.313%			

ANTI-SYMMETRICAL MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	74.53	86.72		1.255	1.050		-.1176	-1.552	-221.0	12.57	14.29	13.91	39.785	65.66	181.7%						
2	6.280	3.12		.1328	.0777		-.01201	-.1587	-22.25	1.386	.8339	1.402	5.347	9.292	10.17%						
3	.3360	.1762		.00693	.0040	.0243	-.000656	-.0087	-1.237	.06863	.0390	.0779	.2041	.3302	.574%						
4		-.206			-.0042	.0043	.1400	.1573	6.052		-.0412	-.0800	-.0512	-.0224	-.256%						

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION
RUNS #190, 191, 192

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.04504	.02628		.01866	.01118		-.03439	-.1516	-12.217	-.001768	-.02125	-2.998	.1848	.1022				-9.554			
2	-.03439	-.04735		-.06354	-.04331		9.88	7.043	18.64	.3892	.4580	9.38	-.6293	-.4266				7.281			
3	.09241	.05249		.1787	.09527		-.3147	-.2150	-24.36	-.01617	-.1946	-22.25	1.865	1.022				10.42			
4	.005050	.003142		.009332	.004880	.03638	-.01720	-.01175	-1.457	-.0008838	-.01062	-1.237	.09242	.04787				.4549			
5		-.002672			-.005125	.006366	.1916	.2129	.4610	.1916	.1929	8.823		-.05056				-.3834			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	97.26	106.3		1.690	1.287		-.1534	-1.903	-221.0	16.92	17.52				222.8						
2	8.455	3.826		.1787	.04527		-.01617	-.1946	-22.25	1.865	1.022				12.46						
3	.4525	.2161		.009332	.004879	.03638	-.0008837	-.01062	-1.237	.09241	.04787				.7038						
4		-.2521			-.005126	.006366	.1916	.1929	8.823		-.05056				-.3137						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 193, 194, 195

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β (K = 0)	β (K = 1.5)	β (K = 3.0)	F.F.			
Eq. 1	.05085	.02628		.01866	.01118		-.03439	-.1516	-12.217	-.001768	-.02125	-2.998	.1848	.1022				-9.554X			
2	-.03439	-.04735		-.06354	-.04331		11.44	7.043	18.64	.3892	.4580	9.38	-.6293	-.4266				7.281X			
3	.09241	.05249		.1787	.09527		-.3147	-.2150	-24.36	-.01617	-.1946	-22.25	1.865	1.022				10.42X			
4	.005050	.003142		.009332	.004880	.03638	-.01720	-.01175	-1.457	-.0008838	-.01062	-1.237	.09242	.04787				.4549X			
5		-.002672			-.005125	.006366	.1916	.2129	.4610	.1916	.1929	8.823		-.05056				-.3834X			

ANTI-SYMMETRIC MOTION

	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.
Eq. 1	99.90	106.3		1.690	1.287		-.1584	-1.903	-221.0	16.92	17.52				222.8
2	8.455	3.826		.1787	.09527		-.01617	-.1946	-22.25	1.865	1.072				12.46
3	.4525	.2161		.009332	.004879	.03638	-.0008837	-.01062	-1.237	.09241	.04787				.7038
4		-.2521			-.005126	.006366	.1916	.1926	8.823		-.05056				-.3137

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION

RUNS # 196, 197, 198

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0			K = 1.5		K = 3.0				
	w''	w'	w	y''	y'	y	β''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.05670	.02628		.01866	.01118		-.03439	-.1516	-12.217	-.001768	-.02125	-2.998	.1848	.1022	.1888	.4411	.6934	-9.554X			
2	-.03439	-.04735		-.06354	-.04331		13.00	7.043	18.64	.3892	.4580	9.38	-.6293	-.4266	-.6860	-1.490	-2.294	7.281X			
3	.03241	.05249		.1787	.09527		-.3147	-.2150	-24.36	-.01617	-.1946	-22.25	1.865	1.022	1.402	5.347	9.292	10.42X			
4	.005050	.003142		.009332	.004880	.03638	-.01720	-.01175	-1.457	.0008838	-.01062	-1.237	.09242	.04787	.0779	.2041	.3302	.4549X			
5		-.002672			-.005125	.006366	.1916	.2129	.4610	.1916	.1939	8.823		-.05056	-.07992	-.05118	-.07244	-.3834X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	102.5	106.3		1.090	1.287		-.1584	-1.903	-221.0	16.92	17.52	13.91	39.79	65.66	222.8						
2	8.455	3.826		.1787	.09527		-.01617	-.1946	-22.25	1.865	1.022	1.402	5.347	9.292	12.46						
3	.4525	.2161		.009332	.004870	.03638	-.0008837	-.01062	-1.237	.09241	.04787	.0779	.2041	.3302	.7038						
4		-.2521			-.005126	.006366	.1916	.1929	8.823		-.05056	-.07992	-.05118	-.02244	-.3137						

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.

SYMMETRIC MOTION

RUNS # 199, 200, 201

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	z''	z'	z	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.03603	.02350		.01493	.01000		-.02751	-.1356	-12.217	-.001414	-.01900	-2.998	.1478	.09139				-8.543			
2	-.02751	-.04234		-.05084	-.03873		7.90	6.298	18.64	.3114	.4096	9.38	-.5034	-.3815				6.511			
3	-.07393	.04694		.1430	.08519		-.2518	-.1922	-24.36	-.01294	-.1740	-22.25	1.4970	.9139				9.318			
4	.004040	.002810		.007466	.004363	.02910	.01376	-.01051	-1.457	-.0007070	-.009498	-1.237	.07394	.04281				.4068			
5		.002388			.004583	.005092	.1533	.1904	.4610	.1533	.1725	7.160		.04521				-.3428			

ANTI-SYMMETRIC MOTION

	ϕ''	ϕ'	ϕ	z''	z'	z	α''	α'	α	β''	β'	K = 0	K = 1.5	K = 3.0	F.F.						
Eq. 1	77.70	95.06		1.352	1.151		-.1267	-1.702	-221.0	13.54	15.67				199.2						
2	6.764	3.421		.1430	.08519		-.01294	-.1740	-22.25	1.442	.9140				11.14						
3	.3620	.1932		.007466	.004363	.02910	-.0007070	-.009497	-1.237	.0739	.04281				.6294						
4		.2254			.004584	.005092	.1533	.1724	7.160		-.04522				-.2805						

CONFIDENTIAL

Alt 35000 Ft.
W84 = 13000#
W29 = 105.000#
q = 100

V = 520
a = .175 Ft
C.G. = .280

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION

RUNS 202, 203, 204

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O			P			
															K = 0	K= 1.5	K= 3.0				
	$w^{\cdot\cdot}$	$w^{\cdot}$	w	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\theta^{\cdot\cdot}$	$\theta^{\cdot}$	θ	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F.F.			
Eq. 1	.04068	.02350	-	.01493	.01000	-	-.02751	.1356	-12.217	-.001414	-.0190	-2.998	.1478	.09139				8.543			
2	-.02751	-.04234	-	-.05084	-.03873	-	9.14	6.298	18.64	.3114	.4096	9.38	-.5034	-.3815				6.511			
3	.07393	.04694	-	.1430	.08519	-	-.2518	-.1922	-24.36	-.01294	-.1740	-22.25	1.4920	.9139				9.318			
4	.004040	.002810	-	.007466	.004363	.02910	-.01376	-.01051	-1.457	-.000707	0-.009998	-1.237	-.07394	.04281				.4068			
5	-	-.002388	-	-	-.004583	.005092	.1533	.1904	.4610	.1533	.1725	7.160	-	-.04521				-.3428			

ANTI-SYMMETRIC MOTION

	$\phi^{\cdot\cdot}$	$\phi^{\cdot}$	ϕ	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	K = 0	K =1.5	K= 3.0	F.F.
Eq. 1	79.88	95.06	-	1.352	1.151	-	-.1267	-1.702	-221.0	13.54	15.67				199.2
2	6.764	3.421	-	.1430	.08519	-	-.01294	-.1740	-22.25	1.492	.9140				11.14
3	.3620	.1932	-	.007466	.004363	.02910	-.000707	0-.009497	-1.237	.0739	.04281				.6294
4	-	.2254	-	-	-.004584	.005092	.1533	.1725	7.160	-	-.04522				-.2805

PREPARED
CHECKED
REVISED

Alt. = 35,000 Ft. V ft/sec = 520
W84 = 13,000 # a = .175 Ft.
W29 = 120,000 # C.G. = .280
g = 100

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.

SYMMETRIC MOTION

RUNS # 205, 206, 207

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	ω''	ω'	ω	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.04536	.02350		.01493	.01000		-.02751	-.1356	-12.217	-.001414	-.01900	-2.998	.1478	.09139	.1888	.4411	.6934	-8.543			
2	-.02751	-.04234		-.05084	-.03873		10.40	6.298	18.64	.3114	.4096	9.38	-.5034	-.3815	-.6860	-1.490	-2.294	6.511			
3	.07393	.04694		.1430	.08519		-.2518	-.1922	-24.36	-.01294	-.1740	-22.25	1.4920	.9139	1.402	5.347	9.292	9.318			
4	.004040	.002810		.007466	.004363	.02910	-.01376	-.01051	-1.457	-.0007070	-.009498	-1.237	.07394	.04281	.0779	.2041	.3302	.4068			
5		-.002388			-.004583	.005092	.1533	.1904	.4610	.1533	.1725	7.160		-.04521	-.07992	-.05118	-.02244	-.3428			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	82.00	95.06		1.352	1.151		-.1267	-1.702	-221.0	13.54	15.67	13.91	39.79	65.66	199.2						
2	6.764	3.421		.1430	.08519		-.01294	-.1740	-22.25	1.492	.9140	1.402	5.347	9.292	11.14						
3	.3620	.1932		.007466	.004363	.02910	-.0007070	-.009497	-1.237	.0739	.04281	.0779	.2041	.3302	.6294						
4		-.2254			-.004584	.005092	.1533	.1725	7.160		.04522	-.07992	-.05118	-.02244	-.2805						

CONFIDENTIAL

E-1-129
REV. 4/49

TABLE II—D

COEFFICIENTS OF EQUATIONS OF MOTION

SYMMETRIC MOTION

RUNS # 208, 209, 210

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	z''	z'	z	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F. F.			
Eq. 1	.03002	.02144		.01244	.009120		-.02293	-.1237	-12.217	-.001179	.01734	-2.998	.1232	.08337				-7.794			
2	-.02293	-.03863		-.04236	.03537		6.584	5.746	18.64	.2595	.3736	9.38	-.4195	-.3480				5.940			
3	.06161	.04282		.1191	.07772		-.2098	-.1754	-24.36	-.01078	-.1588	-77.75	1.243	.8337				8.500			
4	.003367	.002563		.006221	.003981	.02426	-.01147	-.009585	-1.457	-.000589	-.008661	-1.237	.06161	.03905				.3711			
5		-.002180			-.004181	.004244	.1277	.1737	.4610	.1277	.1574	6.052		-.04124				-.3128			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F. F.						
Eq. 1	57.36	86.72		1.127	1.050		-.1056	-1.552	-221.0	11.28	14.29				181.8						
2	5.637	3.121		.1191	.07772		-.01078	-.1588	-22.25	1.243	.8337				10.16						
3	.3017	.1763		.006221	.003980	.02425	-.000589	-.008664	-1.237	.06161	.03905				.5741						
4		-.2056			-.004182	.004244	.1271	.1574	6.052		-.04124				-.2559						

TABLE II-D.
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 211, 212, 213.

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	$w^{\cdot\cdot}$	$w^{\cdot}$	w	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\theta^{\cdot\cdot}$	$\theta^{\cdot}$	θ	$\alpha^{\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F.F.			
Eq. 1	.03390	.02144		.01244	.009120		-.02293	-.1237	-12.217	-.001179	-.01734	-2.998	.1232	.08337				-7.794			
2	-.02293	-.03863		-.04236	-.03533		7.625	5.746	18.64	.2595	.3736	9.38	-.4195	-.3480				5.940			
3	.06161	.04282		.1191	.07772		-.2098	-.1754	-24.36	-.01078	-.1588	-22.25	1.243	.8337				8.500			
4	.003367	.002563		.006221	.003981	.02425	-.01147	-.009585	-1.457	-.0005892	-.008664	-1.237	.06161	.03905				.3711			
5		-.002180			-.004181	.004244	.1277	.1737	.4610	.1277	.1574	6.052		-.04124				-.3128			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	$\phi^{\cdot\cdot}$	$\phi^{\cdot}$	ϕ	$y^{\cdot\cdot}$	$y^{\cdot}$	y	$\alpha^{\cdot\cdot}$	$\alpha^{\cdot}$	α	$\beta^{\cdot\cdot}$	$\beta^{\cdot}$	β	β	β	F.F.						
Eq. 1	66.56	86.72		1.127	1.050		-.1056	-1.552	-221.0	11.28	14.29				181.8						
2	5.637	3.121		.1191	.07772		-.01078	-.1588	-22.25	1.243	.8337				10.16						
3	.3017	.1763		.006221	.993980	.02425	-.0005891	-.008664	-1.237	.06161	.03905				.5741						
4		-.2056			-.004182	.004244	.1277	.1574	6.052		-.04124				-.2559						

Alt. = 35,000 ft. V = 570
W84 = 13,000 # a = .175 ft.
W29 = 120,000 # C.G. = .280
g = 120 #/ft 2

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS* 214, 215, 216

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.03780	.02144		.01244	.009120		-.02293	-.1237	12.217	-.001179	-.01934	-2.998	-.1232	.08337	.1888	.4411	.6934	-9.994			
2	-.02293	-.03863		-.04236	.03533		8.667	5.746	18.64	.2595	.3736	9.38	-.4195	-.3480	-.6860	-1.490	-2.294	5.840			
3	.06161	.04282		.1191	.07772		-.2098	-.1754	-24.36	-.01078	-.1588	-22.25	1.243	.8337	1.402	5.347	9.292	8.500			
4	.003367	.002563		.006221	.003981	.02425	-.01147	-.009585	-1.457	-.0005892	-.008664	-1.237	.06161	.03905	.0779	.2091	.3302	.3711			
5		-.002180			-.004181	.004244	.1277	.1737	.4610	.1277	.1574	6.052		-.04124	-.07992	-.05118	-.02244	-.3128			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	68.33	86.72		1.127	1.050		-.1056	-1.552	-221.0	11.28	14.29	13.91	39.39	65.66	181.8						
2	5.637	3.121		.1191	.07772		-.01078	-.1588	-22.25	1.243	.8337	1.002	5.347	9.292	10.16						
3	.3017	.1763		.006221	.003980	.02425	-.0005891	-.008664	-1.237	.06161	.03905	.0779	.2041	.3302	.5741						
4		-.2056			-.004182	.004244	.1277	.1574	6.052		-.04124	-.07992	-.05118	-.02244	-.2559						

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 217, 218, 219

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	W''	W'	W	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0439	.0263		.0165	.0112		-.0804	.1517	-12.217	-.0016	-.2212	2.998	.1633	.1020	.1888	.4411	.6934	9.55X			
2	-.0304	-.0474		-.0562	-.0433		9.856	7.04	18.64	.3824	.458	9.38	-.5561	-.427	-.686	-1.490	-2.294	7.28X			
3	.0817	.0525		.1570	.0953		-.278	-.215	-24.36	-.0143	-.1946	-22.25	1.629	1.022	1.402	5.347	9.292	10.42X			
4	.0045	.0031		.0082	.0049	.0364	-.0152	-.0117	-1.457	-.0008	-.0106	-1.237	.0817	.0479	.0779	.2041	.3302	.455X			
5		-.0027			-.0051	.0064	.1885	.2129	.461	.1885	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.383X			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	87.73	106.3		1.491	1.287		-.1399	-1.903	-221.0	14.91	17.52	13.91	39.785	65.66	222.9X						
2	7.45	3.83		.1570	.0953		-.0143	-.1946	-22.25	1.629	1.022	1.402	5.347	9.292	12.47X						
3	.400	.2161		.0082	.0049	.0364	-.0008	-.0106	-1.237	.0817	.0479	.0779	.2041	.3302	.704X						
4		-.252			-.0051	.0064	.1885	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.314X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 220, 221, 222

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	$\dot{w}$	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0497	.0263		.0765	.0112		-.0304	-.1517	12.217	.0016	.0212	2.998	.1633	.1022	.1888	.4411	.6934	9.55%			
2	-.0304	-.0474		-.0562	-.0433		11.418	7.04	18.64	.3824	.458	9.38	-.5561	-.427	-.686	-1.490	-2.294	7.28%			
3	.0817	.0525		.1570	.0953		-.278	-.215	-24.36	-.0143	-.1946	-22.25	1.629	1.022	1.402	5.347	9.292	10.42%			
4	.0045	.0031		.0082	.0049	.0364	-.0152	-.0117	-1.457	-.0008	-.0106	-1.237	.0817	.0479	.0779	.2041	.3302	.455%			
5		-.0027			-.0051	.0064	.1885	.2129	.461	.1885	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.383%			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	90.42	106.3		1.491	1.287		-.1399	-1.903	-221.0	14.91	17.52	13.91	39.785	65.66	222.9%						
2	7.45	3.83		.1570	.0953		-.0143	-.1946	-22.25	1.629	1.022	1.402	5.347	9.292	12.47%						
3	.400	.2161		.0082	.0049	.0364	-.0008	-.0106	-1.237	.0817	.0479	.0779	.2041	.3302	.704%						
4		-.252			-.0051	.0064	.1885	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.314%						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 223, 224, 225

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.05553	.0263		.0165	.0112		-.0304	-.1517	-12.217	-.0016	-.0212	-2.998	.1633	.1022	.1888	.4411	.6934	-9.55X			
2	-.0304	-.0474		-.0562	-.0433		12.98	7.04	18.64	.3824	.458	9.38	-.5561	-.427	-.686	-1.490	-2.294	-7.28X			
3	.0817	.0525		.1570	.0953		-.278	-.215	-24.36	-.0143	-.1946	-22.25	1.629	1.022	1.402	5.347	9.292	10.42X			
4	.0045	.0031		.0082	.0049	.0364	-.0152	-.0117	-1.457	-.0008	-.0106	-1.237	.0817	.0479	.0779	.2041	.3302	.45X			
5		-.0027			-.0051	.0064	.1885	.2129	.461	.1885	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.383X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	93.07	106.3		1.431	1.287		-.1399	-1.903	-221.0	14.91	17.52	13.91	39.785	65.66	222.9X						
2	7.45	3.83		.1570	.0953		-.0143	-.1946	-22.25	1.629	1.022	1.402	5.347	9.292	12.47X						
3	.400	.2161		.0082	.0049	.0364	-.0008	-.0106	-1.237	.0817	.0479	.0779	.2041	.3302	.70X						
4		-.252			-.0051	.0064	.1885	.1929	8.823		-.0506	-.0800	-.0512	-.0224	-.31X						

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 226, 227, 228

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0351	.0235		.0132	.0100		-.0243	-.1356	-12.217	-.0013	-.0190	-2.998	.1307	.0914	.1888	.4411	.6934	8.541X			
2	-.0243	-.0423		-.0449	-.0387		7.884	6.298	18.64	.3060	.4096	9.38	-.4449	-.3814	-.686	-1.490	-2.294	6.511X			
3	.0653	.0469		.1257	.0852		-.2225	-.1923	-24.36	-.0114	-.174	-22.25	1.303	.9142	1.402	5.347	9.292	9.319X			
4	.0036	.0028		.0066	.0044	.0291	-.0122	-.0105	-1.457	-.0006	-.0095	-1.237	.0653	.0428	.0779	.2041	.3302	.408X			
5		-.0024			-.0046	.0051	.1508	.1904	.461	.1508	.1725	7.160		-.0452	-.0800	-.0512	-.0224	-.343X			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	70.18	35.07		1.193	1.151		-.1120	-1.702	-221.0	11.193	15.67	13.91	39.785	65.66	199.3X						
2	5.96	3.42		.1257	.0852		-.0114	-.1740	-22.25	1.303	.9142	1.402	5.347	9.292	11.15X						
3	.3199	.1933		.0066	.0044	.0291	-.0006	-.0095	-1.237	.0653	.0428	.0779	.2041	.3302	.630X						
4		-.2254			-.0046	.0051	.1508	.1725	7.160		-.0452	-.0800	-.0512	-.0224	-.281X						

PREPARED
CHECKED
REVISED

Alt = 35,000 ft. V = 520 ft/sec
W_{84} = 11500# a = 175 ft.
W_{29} = 105,000# C_{q84} = .280
q = 100

CONFIDENTIAL

PAGE 98
REPORT NO. EDR-C905-104
MODEL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.

RUNS # 229, 230, 231

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O			P			
															K=0	K=1.5	K=3.0				
	ω''	ω'	ω	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F			
Eq. 1	.0397	.0235	-	.0122	.0100	-	.0243	.1356	12.217	-.0013	.0190	2.998	.1307	.0914	.1888	.4411	.6934	8.541 X			
2	-.0243	-.0423	-	-.0449	-.0387	-	9.134	6.298	18.64	.3060	.4096	9.38	-.4449	-.3814	-.686	-1.490	-2.294	6.511 X			
3	.0653	.0469	-	.1257	.0852	-	-.2225	-.1923	-.24.36	-.0114	-.174	-22.25	1.303	.9142	1.402	5.347	9.292	9.319 X			
4	.0036	.0028	-	.0066	.0044	.0291	-.0122	-.0105	-1.457	-.0006	-.0095	-1.237	.0653	.0428	.0779	.2041	.3302	.408 X			
5	-	-.0024	-	-	-.0046	.0051	.1508	.1904	.461	.1508	.1725	7.160	-	-.0452	-.0800	-.0512	-.0224	-.343X			

ANTI-SYMMETRIC MOTION

	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	K = 0	K = 1.5	K = 3.0	F.F.
1	72.33	95.07	-	1.193	1.152	-	-.1120	-1.702	-221.0	11.93	15.67	13.91	39.785	65.66	199.3 X
2	5.96	3.42	-	.1257	.0852	-	-.0114	-.1740	-22.25	1.303	.9142	1.402	5.347	9.292	11.15X
3	.3199	.1933	-	.0066	.0044	.0291	-.0006	-.0095	-1.237	.0653	.0428	.0779	.2041	.3302	.630 X
4	-	-.2254	-	-	-.0046	.0051	.1508	.1725	7.160	-	-.0452	-.0800	-.0512	-.0224	-.281X
5															

Alt = 35,000 ft.
W_{84} = 11500#
W_{29} = 120,000#
q = 100

V = 520 Ft/Sec
a = .175 ft.
$C.G._{84}$ = .280

[CONFIDENTIAL]

TABLE II-D

COEFFICIENTS OF EQUATIONS OF MOTION

RUNS 232, 233, 234

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O			P			
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.04442	.0235	-	.0432	.0100	-	.0243	.1356	12.217	-.0013	.0190	2.998	.1307	.0914	.1868	.4411	.6934	8.541X			
2	-.0243	-.0423	-	-.0449	-.0387	-	10.38	6.298	18.64	.3060	.4096	9.38	-.4449	-.3814	-.686	-1.490	-2.294	6.511X			
3	.0653	.0469	-	.1257	.0852	-	-.2225	-.1923	-24.36	-.0114	.1740	-22.25	1.303	.9142	1.402	5.347	9.292	9.319 X			
4	.0036	.0028	-	.0066	.0044	.0291	-.0122	-.0105	-1.457	-.0006	.0095	-1.237	.0653	.0428	.0779	.2041	.3302	.408 X			
5	-	-.0024	-	-	-.0046	.0051	.1508	.1904	.461	.1508	.1725	7.160	-	-.0452	-.0800	-.0512	-.0224	-.343X			

ANTI-SYMMETRICAL MOTION

													K = 0	K = 1.5	K = 3.0						
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	74.45	95.07	-	1.193	1.151	-	-.1120	-1.702	-221.0	11.93	15.67	13.91	39.785	65.66	199.3 X						
2	5.96	3.42	-	.1257	.0852	-	-.0114	-.1740	-22.25	1.303	.9142	1.402	5.347	9.292	11.15 X						
3	.3199	.1933	-	.0066	.0044	.0291	-.0006	-.0095	-1.237	.0653	.0428	.0779	.2041	.3302	.630 X						
4	-	-.2254	-	-	-.0046	.0051	-.1508	.1725	7.160	-	-.0452	-.0800	-.0512	-.0224	-.281 X						

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
									TABLE II-D COEFFICIENTS OF EQUATIONS OF MOTION												
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O			P			
										RUNS 235, 236, 237											
										SYMMETRICAL MOTION					K = 0	K = 1.5	K= 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β'	β	F.F.			
Eq. 1	.0292	.0214	-	.0110	.0091	-	-.0203	-.1237	-12.217	-.0010	-.0173	-2.998	.1088	.0834	.1888	.4411	.6934	-7.792X			
2	-.0203	-.0386	-	-.0374	-.0353	-	6.568	5.744	18.64	.2549	.3736	9.38	-.3706	-.3479	-.686	-1.490	-2.894	5.939 X			
3	.0544	.0428	-	.1047	.0777	-	-.1353	-.1754	-24.36	-.0095	-.1587	-22.25	1.085	.8339	1.402	5.347	9.292	8.501 X			
4	.0030	.0026	-	.0055	.0040	.0243	-.0101	-.0096	-1.457	-.0005	.0087	-1.237	.0544	.0390	.0779	.2041	.3302	.371 X			
5	-	-.0022	-	-	-.0042	.0043	.1256	.1736	.461	.1256	.1573	6.052	-	-.0412	-.0800	-.0512	-.0224	-.313 X			
6																					
									ANTI-SYMMETRICAL MOTION												
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	K= 0	K= 1.5	K =3.0	F.F.						
1	58.46	86.72	-	.994	1.050	-	-.0933	-1.552	-221.0	9.938	14.29	13.91	39.785	65.66	181.7X						
2	4.97	3.12	-	.1047	.0777	-	-.0095	-.1587	-22.25	1.085	.8339	1.402	5.347	9.292	10.17X						
3	.266	.1762	-	.0055	.0040	.0243	-.0005	-.0087	-1.237	.0544	.0390	.0779	.2041	.3302	574 X						
4	-	-.206	-	-	-.0042	.0043	.1256	.1573	6.052	-	-.0412	-.0800	-.0512	-.0224	-.256 X						

CONFIDENTIAL

Altitude = 35,000 ft.
W_{84} = 11,500 lbs.
W_{29} = 105,000 lbs.

q = 120
V = 570 ft/sec.
a = .175 ft.
CG_{84} = .280

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS #238, 239, 240

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	$\ddot{w}$	$\dot{w}$	w	$\ddot{y}$	$\dot{y}$	y	$\ddot{\theta}$	$\dot{\theta}$	θ	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	F. F.			
Eq. 1	.0331	.0214	-	.0110	.0091	-	.0203	.1237	12.217	.0010	.0173	2.998	.1088	.0834	.1888	.4411	.6934	7.792X			
2	-.0203	-.0386	-	-.0374	-.0353	-	7.612	5.744	18.64	.2549	.3736	9.38	-.3706	-.3479	-.686	-1.490	-2.294	5.939X			
3	.0544	.0428	-	.1047	.0777	-	-.1853	-.1754	24.36	-.0095	-.1587	-22.25	1.085	.8339	1.402	5.347	9.292	8.501X			
4	.0030	.0026	-	.0055	.0040	.0243	-.0101	-.0096	1.457	-.0005	-.0087	-1.237	.0544	.0390	.0779	.2041	.3302	.371X			
5	-	-.0022	-	-	-.0042	.0043	.1256	.1736	.461	.1256	.1573	6.052	-	-.0412	-.0800	-.0512	-.0224	.313X			

ANTI-SYMMETRICAL MOTION

	$\ddot{\phi}$	$\dot{\phi}$	ϕ	$\ddot{y}$	$\dot{y}$	y	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	F. F.						
Eq. 1	60.28	86.72	-	.994	1.050	-	-.0933	-1.552	221.0	9.938	14.29	13.91	39.79	65.66	181.7X						
2	4.97	3.12	-	.1047	.0777	-	-.0095	-.1587	22.25	1.085	.8339	1.402	5.347	9.290	10.17X						
3	.266	.1762	-	.0055	.0040	.0243	-.0005	-.0087	1.237	.0544	.0390	.0779	.2041	.3302	.574X						
4	-	.206	-	-	.0042	.0043	.1256	.1573	6.052	-	-.0412	-.0800	.0512	-.0224	-.256X						

CONFIDENTIAL

PREPARED
CHECKED
REVISED

Alt. = 35,000 ft.
W_{84} = 11,500#
W_{29} = 120,000#
a = 120

V = 570 ft/sec.
a = .175 ft.
CG_{84} = .280

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 241, 242, 243

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F			
Eq. 1	.03702	.0214	-	.0110	.0091	-	-.0203	.1237	12.217	.0010	.0173	2.998	.1088	.0834	.1888	.4411	.6934	-7.792X			
2	-.0203	-.0386	-	-.0374	-.0353	-	8.654	5.744	18.64	.2549	.3736	9.38	-.3706	-.3479	-.686	-1.490	-2.294	5.939X			
3	.0544	.0428	-	.1047	.0777	-	-.1853	-.1754	-24.36	-.0095	-.1587	-22.25	1.085	.8339	1.402	5.347	9.292	8.501X			
4	.0030	.0026	-	.0055	.0040	.0243	-.0101	-.0096	-1.457	-.0005	-.0087	-1.237	.0544	.0390	.0779	.2041	.3302	.371X			
5	-	-.0022	-	-	-.0042	.0043	.1256	.1736	.461	.1256	.1573	6.052	-	-.0412	-.0800	-.0512	-.0224	-.313X			

ANTI-SYMMETRICAL MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	62.05	86.72	-	.994	1.050	-	-.0933	-1.552	-221.0	9.938	14.29	13.91	39.785	65.66	181.7X						
2	4.97	3.12	-	.1047	.0777	-	-.0095	-.1587	-22.25	1.085	.8339	1.402	5.347	9.292	10.17X						
3	.266	.1762	-	.0055	.0040	.0243	-.0005	-.0087	-1.237	.0544	.0390	.0779	.2041	.3302	.574 X						
4	-	-.206	-	-	-.0042	.0043	.1256	.1573	6.052	-	-.0412	-.0800	-.0512	-.0224	-.256 X						

PREPARED _____ _____
CHECKED _____ _____
REVISED _____ _____

Alt = S.L.
W84 = 13000#
W29 = 105000
q = 80

$V_{Ft/Sec}$ = 259
a = -175
C.G. 84 = .233

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS NO. 244, 245, 246

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
																		P			
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β K = 0	β K = 1.5	β K = 3.0	F F			
Eq. 1	.05085	.04718	-	.01366	.02[illegible]8	-	.[illegible]3086	-.2723	1[illegible].[illegible]17	.[illegible]17[illegible]	-.[illegible]	-2.998	.1[illegible]48	,1835	.1883	.44[illegible]1	.6934	11.4054 X			
2	-.[illegible]3086	-.08502	-	-.05701	-.07776	-	11.4159	12.6448	18.64	.3779	.8[illegible]4	9.38	-.5646	-.7659	-.686	-1.490	-2.294	8.62.16 X			
3	.09242	.09425	-	.1787	.1710	-	-.2823	-.3861	-24.36	.[illegible]1613	-.[illegible]494	-22.25	1.8635	1.8355	1.402	5.347	9.292	12.6911 X			
4	.[illegible]05[illegible]50	.[illegible]05641	-	.[illegible]9332	.[illegible]761	.03638	-.01543	-.02108	-1.[illegible]7	.[illegible]0[illegible]4	-.[illegible]1907	-1.237	.09241	.0[illegible]595	.[illegible]779	.2041	.3302	.5568 X			
5	-	-.[illegible]42	-	-	-.[illegible]1204	-.006367	.1917	.3822	.9[illegible]	.1916	.3463	9.2233	-	-.1185	-.1051	-.1[illegible]2	-.1353	-.4643 X			

ANTI-SYMMETRIC MOTION

												K= 0	K=1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F F.						
Eq. 1	9[illegible].8934	190.[illegible]	-	1.6897	2.3112	-	.1584	-3.4170	-221.[illegible]	16.[illegible]17[illegible]	314633	13.91[illegible]	39.785	65.660	226.7104 X						
2	8.4537	6.3687	-	.17[illegible]	.1710	-	.01617	-.3494	-2[illegible].25	1.[illegible]35	1.8355	1.402	5.347	9.292	12.6[illegible]11 X						
3	.[illegible]	.3[illegible]0	-	.0[illegible]32	.0[illegible]761	.03638	.[illegible]38	-.[illegible]907	-1.[illegible]7	.[illegible]9242	.03595	.[illegible]779	.2041	.3[illegible]2	.7162 X						
4	-	-.5773	-	-	-.[illegible]1204	-.006367	.1916	.3463	9.[illegible]734	-	-.1185	-.1051	-.1202	-.1353	-.3193 X						
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P						

CONFIDENTIAL

E-1-129
REV. 4/49

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 247, 248, 249

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β K = 0	β K = 1.5	β K = 3.0	F.F.			
Eq. 1	.02906	.03552	-	.01066	.01512	-	.01763	.2050	12.217	.001010	.202872	2.998	.1056	.1382	.1888	.4411	.6934	8.5871			
2	-.01763	.06401	-	.03257	.05855	-	6.5230	9.5203	18.64	.2159	.6192	9.38	.3226	-.5766	-.686	-1.490	-2.294	6.4912			
3	.05281	.07096	-	.1021	.1287	-	-.1613	-.2907	24.36	.009245	.2631	22.25	1.0648	1.3819	1.402	5.347	9.292	9.5551			
4	.002886	.004217	-	.005332	.006596	.02079	-.008817	-.01587	1.457	.0005051	.01436	1.237	.05280	.06471	.0779	2.041	.3302	.4192			
5	-	.005001	-	-	.009065	.003638	.1095	.2878	.9380	.1095	.2607	5.661	-	-.08922	-.1051	-.1202	-.1353	-.3496			

ANTI-SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	w''	w'	w	y''	y'	y	α''	α'	α	β''	β'	K = 0	K = 1.5	K = 3.0	F.F.						
Eq. 1	57.0791	143.7196	-	.9655	1.7401	-	.09051	-2.5727	-221.0	9.6667	23.6887	13.910	39.785	65.660	170.6903						
2	4.8304	5.1714	-	.1022	.1287	-	.009240	-.2631	-22.25	1.0648	1.3819	1.402	5.347	9.292	9.5476						
3	.2586	.2921	-	.005332	.006596	.02079	.0005050	-.01436	-1.237	.05281	.06471	.0779	.2041	.3302	.5392						
4	-	.4346	-	-	.009065	-.003638	.1095	.1881	5.661	-	-.08922	-.1051	-.1202	-.1353	-.2404						

TABLE II – D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 250, 251, 252

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	ω''	ω'	ω	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.P.			
Eq. 1	.02034	.02980	-	.007464	.01268	-	-.01234	.1720	-12.217	.0007092	.02410	-2.998	.07392	.1159	.1888	.4411	.6934	-7.2048X			
2	-.01234	-.05371	-	-.02280	.04912	-	4.5664	7.9877	18.64	.1512	.5195	9.38	-.2258	-.4838	-.686	-1.490	-2.294	5.4463X			
3	.03697	.05954	-	.07148	.1080	-	.1129	.2439	-24.36	.006472	-.2207	-22.25	.7454	1.1595	1.402	5.347	9.292	8.0170X			
4	.00202	.003563	-	.003733	.005534	.01455	-.006172	-.01332	-1.457	.0003536	-.01205	1.237	.03696	.05429	.0779	.2041	.3302	.3517X			
5	-	-.004196	-	-	-.007606	-.002547	.07668	.2414	.9380	.07664	.2188	4.2360	-	-.07486	-.1051	-.1202	-.1353	-.2933X			

ANTI-SYMMETRICAL MOTION

												K = 0	K = 1.5	K = 3.0							
	ω''	ω'	ω	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.E.						
Eq. 1	39.9574	120.5839	-	.6759	1.4600	-	.06336	-2.1585	-221.0	6.7670	19.2754	13.910	39.785	65.660	143.2130X						
2	3.3815	4.3390	-	.07152	.1080	-	.006468	-.2207	-22.25	.7454	1.1595	1.402	5.347	9.292	8.0107X						
3	.1810	.2451	-	.003733	.005534	.01455	.0003535	-.01205	-1.237	.03696	.05429	.0779	.2041	.3302	.4524X						
4	-	-.3647	-	-	-.007606	-.002547	.07664	.1579	4.2360	-	-.07486	-.1051	.1202	-.1353	-.2017X						

CONFIDENTIAL

Altitude = 20,000 ft. V = 354 ft/sec.
W_{84} = 13,000 lbs. a = .175 ft.
W_{29} = 105,000 lbs. CG_{84} = .233
q = 80

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS # 253, 254, 255

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0			K = 1.5		K = 3.0				
	$\ddot{w}$	$\dot{w}$	w	$\ddot{y}$	$\dot{y}$	y	$\ddot{\theta}$	$\dot{\theta}$	θ	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	F.E.			
Eq. 1	.0509	.0346	-	.0186	.01469	-	.03086	.1992	12.217	.001767	.02990	2.998	.1848	.1342				10.197			
2	-.0309	-.06216	-	-.0569	-.05689	-	11.42	9.251	18.64	.3779	.6017	9.38	-.5646	-.5604				7.716			
3	.0924	.06890	-	.1787	.1252	-	-.2823	-.2825	-24.36	.01617	-.2556	-22.25	1.865	1.342				11.316			
4	.0051	.00417	-	.0093	.006410	.03638	-.01543	-.01542	-1.457	.0008838	-.01395	-1.237	.09242	.06288				.4959			
5	—	-.0049	-	-	.008806	.006366	.1916	.2797	.9381	.1916	.2534	9.223	-	-.08673				-.4143			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	$\ddot{\theta}$	$\dot{\theta}$	θ	$\ddot{y}$	$\dot{y}$	y	$\ddot{\alpha}$	$\dot{\alpha}$	α	$\ddot{\beta}$	$\dot{\beta}$	β	β	β	F.E.						
Eq. 1	99.90	139.6	-	1.689	1.691	-	.1584	-2.500	-221.0	16.92	23.13				224.4						
2	8.456	5.025	-	.1787	.1252	-	.01617	-.2556	-22.25	1.865	1.342				12.55						
3	.4526	.2839	-	.009333	.006410	.03638	.0008838	-.01395	-1.237	.09242	.06288				.7090						
4	-	.4224	-	-	.008806	.006366	.1916	.2534	9.223	-	-.08684				-.3161						

CONFIDENTIAL

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS # 256, 257, 258

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0339	.0282		.0124	.01198		-.02057	-.1625	-12.217	-.001178	.02276	-2.998	.1232	.1095	.1888	.4411	.6934	-8.317			
2	-.0206	-.0507		-.0379	-.04640		7.610	7.546	18.64	.2519	.4908	9.38	-.3764	-.4571	-.686	-1.490	-2.294	6.294			
3	.0616	.0562		.1191	.1021		-.1882	-.2304	-24.36	.01078	-.2085	-22.25	1.243	1.095	1.402	5.347	9.292	9.230			
4	.0034	.0034		.0062	.005228	.02425	-.01029	-.01258	-1.457	.005892	-.01138	-1.237	.06161	.05129	.0779	.2041	.3302	.4045			
5		-.0040			-.007183	-.004244	.1277	.2281	.9381	.1277	.2067	6.4525		-.07074	-.1051	-.12022	-.1353	-.3379			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ψ''	ψ'	ψ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	66.60	113.9		1.126	1.372		.1056	-2.039	-221.0	11.28	18.78	13.91	39.79	65.66	183.0						
2	5.637	4.099		.1191	.1021		.01078	-.2085	-22.25	1.243	1.095	1.402	5.347	9.292	10.24						
3	.3017	.2316		.006222	.005228	.02425	.0005228	-.01138	-1.237	.06161	.05129	.0779	.2041	.3302	.5783						
4		-.3445			-.007183	.004244	.1277	.2067	6.4525		-.07083	-.1051	-.1202	-.1353	-.2578						

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION
RUNS 259, 260, 261

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	z''	z'	z	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.0254	.02443		.0093	.01038		-.01543	-.1408	-12.217	-.008835	-.01972	-2.998	.0924	.09485				-7.205			
2	-.01545	-.04392		-.0284	-.04819		5.7075	6.537	18.64	.1880	.4252	9.38	-.2823	-.3960				5.452			
3	.0462	.04868		.0893	.08344		-.1412	-.1996	-24.36	.008085	-.1806	-22.25	.9323	.9485				7.995			
4	.00255	.00295		.00465	.004529	.01819	-.00772	-.01090	-1.457	.0004419	-.009858	-1.237	.04621	.04443				.3504			
5		-.00347			-.006222	-.03183	.09578	.1976	.9381	.09578	.1791	5.067		-.06128				-.2927			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	49.95	98.67		.8445	1.195		.0792	-1.766	-221.0	8.46	16.27				158.5						
2	4.228	3.551		.08933	.08844		.008085	-.1806	-22.25	.9323	.9485				8.870						
3	.2263	.2006		.004667	.004529	.01819	.0004419	-.009858	-1.237	.04621	.04443				.5010						
4		-.2984			-.006222	-.03183	.09578	.1791	5.067		-.06136				-.2233						

TABLE II – D

COEFFICIENTS OF EQUATIONS OF MOTION

RUNS # 262, 263, 264

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0			K = 1.5		K = 3.0				
	w''	w'	w	η''	η'	η	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.05085	.02628		.01866	.01118		-.03086	-.1516	-12.219	-.001767	-.02125	-2.998	.1848	.1022	.1888	.4411	.6934	-9.554			
2	-.03086	-.04735		.05702	-.04331		11.42	7.043	18.64	.3779	.4580	9.38	-.5646	-.4266	-.6860	-1.490	-2.294	7.281			
3	.09241	.05249		.1787	.09527		-.2823	-.2150	-24.36	.01617	-.1946	-22.25	1.865	1.022	1.402	5.347	9.292	10.42			
4	.005050	.003142		.003337	.004880	.03638	-.01543	-.01175	-1.457	.0008838	-.01062	-1.237	.09242	.04787	.0779	.2041	.3302	.4549			
5		.003700			-.005125	.006366	.1916	.2129	.4610	.1916	.1329	9.223		-.06602	-.1051	-.12022	-.1353	-.3834			

ANTI-SYMMETRIC MOTION

												K = 0	K = 1.5	K = 3.0							
	q''	q'	q	ζ''	ζ'	ζ	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	82.00	95.06		1.352	1.151		.1584	-1.704	-221.0	13.54	15.67	13.91	39.79	65.66	199.2						
2	6.764	3.421		.1430	.08519		.1617	-.1740	-22.25	1.492	.9140	1.402	5.347	9.292	11.14						
3	.3620	.1932		.007466	.004363	.02910	.0008838	-.009497	-1.237	.0739	.04281	.0779	.2041	.3302	.6294						
4		-.3216			-.006704	.005092	.1916	.1725	9.223		-.06610	-.1051	-.1202	-.1353	-.2805						

CONFIDENTIAL

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTIONS.
RUNS # 255, 266, 267

SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
															K = 0	K = 1.5	K = 3.0				
	w''	w'	w	y''	y'	y	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F.			
Eq. 1	.04068	.02350		.01493	.009997		-.02469	-.1356	-12.217	.001414	-.01900	-2.998	.1478	.0914				-8.543			
2	-.02469	-.04434		.04562	-.03873		9.136	6.298	18.64	.3023	.4096	9.38	-.4517	-.3815				6.511			
3	.07393	.04694		.1430	.08519		-.2258	-.1923	-24.36	.01204	-.1740	-22.25	1.492	.9139				9.318			
4	.004040	.002810		.007470	.004364	.02910	-.01234	-.0105	-1.457	.0007070	-.009497	-1.237	.07394	.04281				.4068			
5		.003309			-.004583	.005093	.1533	.1904	.4610	.1533	.1725	7.5608		-.05904				-.3428			

ANTI-SYMMETRIC MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	ϕ''	ϕ'	ϕ	y''	y'	y	α''	α'	α	β''	β'	β	β	β	F.F.						
Eq. 1	65.60	85.00		1.082	1.029		.1267	-1.522	-221.0	10.83	14.01				178.1						
2	5.411	3.059		.1144	.07618		.1294	-.1536	-22.25	1.1036	.8173				9.962						
3	.2896	.1728		.005973	.003901	.2328	.0007070	-.008492	-1.237	.05912	.03828				.5628						
4		-.2876			-.005895	.004074	.1533	.1543	7.5608		-.05911				-.2508						

CONFIDENTIAL

CONFIDENTIAL

Alt. = 35,000 ft. V = 570 ft/sec
W84 = 13,000 # a = -.175
W29 = 105,000 # cg = .233
q = 120

TABLE II-D
COEFFICIENTS OF EQUATIONS OF MOTION.
RUNS #268, 269, 270

SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	w''	w'	w	z''	z'	z	θ''	θ'	θ	α''	α'	α	β''	β'	β	β	β	F.F			
1	.03390	.02144		.01244	.009121		-.02057	.1237	-12.217	.001178	.01734	2.998	.1232	.08337				-7.794			
2	-.02057	-.02863		-.02801	-.02533		7.013	5.746	18.64	.2510	.3736	0.38	.3764	-.3480				5.940			
3	.06161	.04282		.1191	.07772		-.1882	-.1754	-24.36	.01078	-.1588	-22.25	1.243	.8337				8.501			
4	.003367	.002563		.006225	.003981	.02425	-.01029	-.009586	-1.457	.0005892	-.008664	-1.237	.06161	.03905				.3711			
5		.003018			-.04181	.004244	.1277	.1737		.1277	.1874			-.05386				-.3128			

ANTI-SYMMETRICAL MOTION

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
												K = 0	K = 1.5	K = 3.0							
	v''	v'	ϕ	y''	y'	y	x''	x'	x	β''	β'	β	β	β	F.F.						
1	54.67	17.25		.2013	.9330		.1056	-1.388	-221.0	9.026	12.78				162.5						
2	4.509	2.791		.09533	.06050		.1078	-.1419	-22.25	.1946	.7456				9.088						
3	.2013	.1576		.004077	.003553	.01940	.0005892	-.007748	-1.237	.04027	.03492				.5135						
4		-.2624			-.005469	.003395	.1277	.1407	6.45		-.05392				-.4288						

CONFIDENTIAL

CONFIDENTIAL

TABLE III-A

MAXIMUM AMPLITUDES OF OSCILLATION

SYMMETRICAL MOTION

CONFIDENTIAL

TABLE III-A

SYMMETRICAL MOTION

MAX. AMPLITUDES OF OSCILLATIONS

RUN	θ (RAD)	β (RAD.)	y (FT)	α (RAD.)
1	+.0125	-.245	±.110	+.0040
2	+.0119	-.080	-.220	+.0040
3	+.0112	-.046	-.250	+.0040
4	+.0125	-.250	+.1025	+.00375
5	+.0114	-.0735	-.2175	+.00375
6	+.01125	-.0440	-.245	+.00375
7	+.0125	-.240	+.1025	+.00352
8	+.01125	-.070	-.205	+.00352
9	+.01075	-.0405	-.2275	+.00352
10	+.01273	-.278	-.2820	-.0048
11	+.0119	-.080	-.3700	+.0048
12	+.0114	-.0450	-.4100	+.0049
13	+.0125	-.278	-.252	-.0049
14	+.0119	-.0747	-.352	+.0045
15	+.0113	-.0430	-.400	+.0046
16	+.0124	-.270	-.180	-.0042
17	+.0113	-.0705	-.350	+.0043
18	+.0113	-.0400	-.337	+.0044
19	+.0125	-.298	-.330	-.0065
20	+.0115	-.0775	-.492	+.0051
21	+.0113	-.0450	-.0570	+.0055
22	+.0125	-.2820	-.2750	-.0060
23	+.0113	-.0750	-.490	+.0050
24	+.0113	-.0435	-.0550	+.0052
25	+.0123	-.2920	-.310	-.0065
26	+.0113	-.0750	-.450	+.0048
27	+.0109	-.0435	-.530	+.0050
28	+.0128	-.248	+.1026	+.0038

TABLE III-A (CONT'D)

SYMMETRICAL MOTION

CONFIDENTIAL

RUN	θ (RAD.)	β (RAD.)	y (FT.)	α (RAD.)
29	+ .0119	-.0750	-.220	+ .0038
30	+ .0113	-.0450	-.248	+ .0038
31	+ .0125	-.2450	+.1025	+ .0035
32	+ .0114	-.0710	-.2125	+ .0035
33	+ .0113	-.0440	-.2200	+ .0038
34	+ .0125	-.2400	±.1025	+ .0035
35	+ .0113	-.0685	-.2000	+ .0035
36	+ .0112	-.0410	-.2050	+ .0035
37	+ .0126	-.2800	-.2350	-.0046
38	+ .01189	-.078	-.372	+ .0045
39	+ .01189	-.046	-.390	+ .0048
40	+ .0125	-.284	-.1925	-.0044
41	+ .0113	-.0755	-.3525	+ .0044
42	+ .0113	-.0425	-.4000	+ .0044
43	+ .0125	-.2820	-.1750	-.0044
44	+ .0113	-.0725	-.3280	+ .0041
45	+ .0113	-.0410	-.3750	+ .0043
46	+ .0125	-.3000	-.3050	-.0065
47	+ .0113	-.0300	-.4900	+ .0050
48	+ .0113	-.045	-.5500	+ .0053
49	+ .0125	-.2930	-.2550	-.0063
50	+ .0113	-.0748	-.4800	+ .0045
51	+ .0108	-.0450	-.550	+ .0048
52	+ .0124	-.2940	-.255	-.0063
53	+ .0113	-.0705	-.450	+ .0045
54	+ .0106	-.0400	-.530	+ .0046
55	+ .0131	-.2520	-.1075	+ .00367
56	+ .0119	-.0795	-.2250	+ .0038

CONFIDENTIAL

TABLE III-A (CONT'D)
SYMMETRICAL MOTION

CONFIDENTIAL

RUN	θ (RAD.)	β (RAD.)	y (FT.)	α (RAD.)
57	+.0114	-.0450	-.2500	+.0038
58	+.0127	-.2500	-.1250	+.0035
59	+.0113	-.0675	-.205	+.0035
60	+.0113	-.0400	-.225	+.0037
61	+.0125	-.2450	-.1175	+.0034
62	+.0113	-.0655	-.2000	+.0035
63	+.0106	-.0400	-.2250	+.0035
64	+.0130	-.2800	-.2000	-.0045
65	+.0124	-.079	-.3500	+.0044
66	+.0119	-.0470	-.4050	+.0045
67	+.0125	-.2800	-.1525	-.0041
68	+.0114	-.0740	-.3500	+.0041
69	+.0113	-.0400	-.3075	+.0043
70	+.0125	-.2700	-.1650	-.0043
71	+.0113	-.0655	-.3620	+.0039
72	+.0111	-.0350	-.3745	+.0040
73	+.0125	-.3000	-.3000	-.0066
74	+.0115	-.0750	-.4750	+.0050
75	+.0111	-.045	-.5550	+.0050
76	+.0125	-.3000	-.250	-.0062
77	+.0111	-.075	-.485	+.0045
78	+.0111	-.0425	-.550	+.0046
79	+.0124	-.290	-.225	-.0060
80	+.0110	-.0695	-.450	+.0043
81	+.0106	-.0400	-.500	+.0045
82	+.0137	-.2900	-.115	+.0036
83	+.0125	-.085	-.2380	+.0037
84	+.0125	-.0500	-.2750	+.0038

CONFIDENTIAL

CONFIDENTIAL

RUN	θ (RAD)	β (RAD.)	y (FT.)	α (RAD)
85	+ .0138	-.3000	±.1000	+ .0035
86	+ .0125	-.0805	-.2370	+ .0035
87	+ .0119	-.0450	-.2600	+ .0035
88	+ .0138	-.2940	±.1000	+ .0033
89	+ .0124	-.0770	-.2250	+ .0033
90	+ .0113	-.0425	-.250	+ .0034
91	+ .0138	-.3000	-.1825	±.0041
92	+ .0124	-.0875	-.3500	+ .0043
93	+ .0120	-.0495	-.3950	+ .0043
94	+ .0136	-.3000	-.1675	±.0040
95	+ .0123	-.0795	-.3250	+ .0040
96	+ .0113	-.045	-.3750	+ .0040
97	+ .0125	-.3000	-.1500	-.0040
98	+ .0116	-.0750	-.3250	+ .0038
99	+ .0113	-.0425	-.3500	+ .0040
100	+ .0136	-.3200	-.2500	-.0054
101	+ .0125	-.0850	-.4250	+ .0046
102	+ .0119	-.0475	-.5000	+ .0048
103	+ .0130	-.3200	-.2280	-.0053
104	+ .0119	-.0800	-.4150	+ .0043
105	+ .0113	-.0450	-.4850	+ .0045
106	+ .0128	-.3200	-.2250	-.0053
107	+ .0121	-.0750	-.4150	+ .0041
108	+ .0113	-.0405	-.4600	+ .0043
109	+ .0139	-.2980	-.1025	+ .0035
110	+ .0125	-.0850	-.2480	+ .0035
111	+ .0125	-.0475	-.2750	+ .0037
112	+ .0138	-.2900	-.1025	+ .0034

SYMMETRICAL MOTION

RUN	θ (RAD.)	β (RAD.)	y (FT.)	α (RAD.)
113	+.0125	-.0800	-.2350	+.0034
114	+.0116	-.04500	-.252	+.0035
115	+.0138	-.2900	+.1000	+.0031
116	+.0119	-.07500	-.1125	+.0032
117	+.0113	-.043	-.250	+.0033
118	+.0138	-.3000	-.1875	-.0041
119	+.0125	-.0900	-.3620	+.0023
120	+.0119	-.0495	-.375	+.0025
121	+.0135	-.3100	-.165	-.0040
122	+.0119	-.0800	-.3400	+.0021
123	+.0113	-.0450	-.3750	+.0022
124	+.0129	-.3000	-.1525	-.0039
125	+.0118	-.0745	-.3250	+.0036
126	+.0113	-.0400	-.3500	+.0039
127	+.0134	-.3200	-.225	-.0053
128	+.0125	-.0825	-.4250	+.0044
129	+.0119	-.04500	-.4975	+.0045
130	+.0126	-.3200	-.2125	-.0054
131	+.0119	-.0770	-.4220	+.0041
132	+.0114	-.0435	-.4750	+.0043
133	+.0126	-.3300	-.2250	-.0054
134	+.0119	-.0750	-.3750	+.0040
135	+.0113	-.0400	-.450	+.0042
136	+.0140	-.3000	-.1250	+.0034
137	+.0126	-.0805	-.2400	+.0035
138	+.0125	-.0450	-.2500	+.0036
139	+.0138	-.2820	+.1000	+.0033
140	+.0125	-.0755	-.2325	+.0033

CONFIDENTIAL

TABLE III-A (CONT'D) CONFIDENTIAL

SYMMETRICAL MOTION

RUN	θ (RAD)	β (RAD)	y (FT.)	α (RAD)
141	+.0119	-.0425	-.2500	+.0034
142	+.0138	-.2800	+.1000	+.0031
143	+.0113	-.0725	-.2250	+.0031
144	+.0111	-.0400	-.2320	+.0033
145	+.0138	-.3000	-.1525	-.0043
146	+.0125	-.0300	-.350	+.0040
147	+.0119	-.045	-.387	+.0040
148	+.0136	-.3000	-.150	-.0041
149	+.0124	-.0750	-.328	+.0040
150	+.0113	-.0400	-.367	+.0039
151	+.0131	-.3000	-.150	-.0040
152	+.0115	-.0715	-.325	+.0035
153	+.0113	-.0376	-.3500	+.0038
154	+.0138	-.3300	-.2150	-.0054
155	+.0125	-.0300	-.427	+.0043
156	+.0113	-.0450	-.495	+.0044
157	+.0136	-.3100	-.1775	-.0053
158	+.0123	-.0750	-.405	+.0040
159	+.0113	-.0425	-.463	+.0043
160	+.0131	-.3100	-.1750	-.0051
161	+.0118	-.0705	-.4000	+.0039
162	+.0113	-.0400	-.4400	+.0040
163	+.01440	-.3260	-.1275	+.0035
164	+.0131	-.0895	-.2650	+.0036
165	+.0125	-.0500	-.2900	+.0036
166	+.0138	-.3200	-.1250	±.0033
167	+.0125	-.0855	-.2500	+.0033
168	+.0124	-.0455	-.2770	+.0035

CONFIDENTIAL

TABLE III-A (CONT'D)
SYMMETRICAL MOTION

RUN	θ (RAD.)	β (RAD.)	y (FT.)	α (RAD.)
169	+.0138	-.3100	-.1125	+.0033
170	+.0125	-.0815	-.2500	+.0032
171	+.0113	-.0445	-.2650	+.0033
172	+.0144	-.3300	-.1525	-.0040
173	+.0130	±.0900	-.3000	+.0039
174	+.0125	-.0500	-.3500	+.0040
175	+.0138	-.326	-.1375	-.0039
176	+.0125	-.0850	-.3050	+.0036
177	+.0119	-.0455	-.3300	+.0037
178	+.0138	-.3200	-.1275	-.0037
179	+.0125	-.0800	-.2980	+.0035
180	+.0113	-.0440	-.3250	+.0035
181	+.0150	-.3600	-.1750	-.0050
182	+.0136	+.1000	-.3750	+.0044
183	+.0125	+.0600	+.4000	+.0045
184	+.0148	-.344	-.175	-.0048
185	+.0131	-.0890	-.352	+.0041
186	+.0125	±.0500	-.4070	+.0042
187	+.0138	-.3500	-.1525	-.0048
188	+.0125	-.0875	+.332	+.0039
189	+.0119	-.0460	-.3750	+.0040
190	+.0144	-.3200	-.125	+.0034
191	+.0131	-.0900	-.258	+.0035
192	+.0125	-.0500	-.2880	+.0035
193	+.0138	-.3200	-.125	+.0033
194	+.0125	-.0845	-.2500	+.0033
195	+.0119	-.0450	-.2750	+.0033
196	+.0138	-.3200	-.125	+.0030

CONFIDENTIAL

TABLE III-A (CONT'D)
SYMMETRICAL MOTION

RUN	θ (RAD.)	β (RAD.)	y (FT.)	α (RAD.)
197	+.0124	-.0800	-.245	+.0031
198	+.0113	-.0430	-.260	+.0030
199	+.0144	-.3400	-.130	-.0040
200	+.0128	-.0875	-.297	+.0038
201	+.0125	-.0495	-.350	+.0038
202	+.0140	-.334	-.125	-.0039
203	+.0125	-.0845	-.300	+.0035
204	+.0119	-.0450	-.325	+.0035
205	+.0138	-.3300	-.125	-.0038
206	+.0125	-.061	-.3000	+.0033
207	+.0113	-.042	-.312	+.0035
208	+.0141	-.3600	-.175	-.0050
209	+.0129	-.0905	-.352	+.0043
210	+.0125	+.0545	-.415	+.0043
211	+.0138	-.3500	-.175	-.0049
212	+.0125	+.0875	-.338	+.0040
213	+.0119	-.0495	-.4000	+.0040
214	+.0138	-.3400	-.1500	-.0045
215	+.0125	-.0805	-.3250	+.0037
216	+.0115	-.0450	-.3750	+.0038
217	+.0150	-.3300	-.1125	±.0033
218	+.0131	-.0880	-.2630	+.0035
219	+.0125	-.0475	-.2780	+.0035
220	+.0139	-.3200	-.1023	-.0033
221	+.0125	-.0825	-.2500	+.0033
222	+.0119	-.0450	-.2650	+.0033
223	+.0138	-.3180	-.1025	±.0030
224	+.0121	-.0825	-.2480	+.0030

CONFIDENTIAL

TABLE III-A (CONT'D)
SYMMETRICAL MOTION

RUN	θ (RAD.)	β (RAD.)	y (FT.)	α (RAD.)
225	+.0113	-.0405	-.2500	+.0030
226	+.0149	-.3400	-.1250	-.0042
227	+.0128	-.0855	-.3000	+.0037
228	+.0125	-.0455	-.3400	+.0038
229	+.0138	-.3400	-.1500	-.0039
230	+.0125	-.0850	-.3000	+.0035
231	+.0118	-.0440	-.323	+.0035
232	+.0137	-.3300	+.1275	-.0038
233	+.0119	-.0755	-.2800	+.0033
234	+.0113	-.0400	-.3000	+.0033
235	+.0144	-.3600	-.1500	-.0050
236	+.0128	-.0890	-.3750	+.0040
237	+.0125	-.5000	-.4100	+.0041
238	+.0138	-.3540	-.1375	-.0050
239	+.0125	-.0850	-.3520	+.0038
240	+.0119	-.0450	-.3770	+.0039
241	+.0138	-.3400	+.1250	-.0048
242	+.0124	-.0795	-.3250	+.0037
243	+.0114	-.0450	-.3750	+.0038
244	+.0125	-.2500	+.1150	+.0033
245	+.0119	-.0725	-.2125	+.0032
246	+.0113	-.0435	-.2450	+.0032
247	+.0125	-.2780	-.2750	-.0048
248	+.0114	-.0785	-.3720	+.0037
249	+.0113	-.0405	-.3875	+.0037
250	+.0125	-.2800	-.3745	-.0066
251	+.0113	-.0750	-.4900	+.0039
252	+.0113	-.0400	-.563	+.0040

CONFIDENTIAL

CONFIDENTIAL

TABLE III-A (CONCLUDED)

SYMMETRICAL MOTION

RUN	θ (RAD.)	β (RAD.)	y (FT.)	α (RAD.)
253	+.0131	-.2800	±.1125	+.0032
254	+.0119	-.0775	-.2275	+.0031
255	+.0113	-.0450	-.2620	+.0030
256	+.0127	-.3000	-.2300	-.0048
257	+.0124	-.0750	-.3250	+.0035
258	+.0113	-.0405	-.3750	+.0035
259	+.0125	-.3100	-.3245	-.0068
260	+.0123	-.0875	-.4370	+.0038
261	+.0119	-.0455	-.4750	+.0037
262	+.0138	-.3100	-.1125	-.0033
263	+.0125	-.0825	-.2480	+.0030
264	+.0119	-.0445	-.2750	+.0030
265	+.0138	-.3220	-.1750	-.0045
266	+.0125	-.0950	-.3220	+.0031
267	+.0125	±.0500	-.3175	+.0031
268	+.0137	-.3400	-.2250	-.0054
269	+.0125	-.0825	-.3375	+.0034
270	+.0124	-.0475	-.4000	+.0035

CONFIDENTIAL

CONFIDENTIAL

TABLE III-B

MAXIMUM AMPLITUDES OF OSCILLATIONS

ANTI-SYMMETRICAL MOTION

CONFIDENTIAL

TABLE III-B
ANTI - SYMMETRICAL CASE

MAXIMUM AMPLITUDES OF OSCILLATIONS

RUN	φ (RAD./SEC)	β (RAD)	y (FT.)	α (RAD)
1	-.03	-.1093	-.105	±.001125
2	-.03	-.0687	-.095	-.00162
3	-.0285	-.05	-.11	-.00200
4	-.03	-.1125	-.075	-.00125
5	-.0275	-.0655	-.095	-.00175
6	-.0275	-.0500	-.155	-.00200
7	-.0250	-.1095	-.085	-.00125
8	-.0250	-.0625	-.090	-.001625
9	-.0250	-.047	-.145	-.00200
10	-.0275	-.100	-.080	-.001625
11	-.0275	-.050	-.130	-.00200
12	-.0262	-.033	-.200	-.00233
13	-.0325	-.1125	-.090	-.00175
14	-.0300	-.0607	-.160	-.00212
15	-.0300	-.0438	-.125	-.00275
16	-.0287	-.1125	-.095	-.00175
17	-.0287	-.0594	-.150	-.00212
18	-.0287	-.0407	-.240	-.00262
19	-.0288	-.122	-.11	-.00338
20	-.0288	-.050	-.21	-.00325
21	-.0275	-.0313	-.26	-.00350
22	-.0325	-.1375	-.14	-.00375
23	-.0312	-.0563	-.12	-.00362
24	-.0300	-.0344	-.32	-.00387
25	-.030	-.1375	-.15	-.00487
26	-.030	-.0563	-.115	-.00325
27	-.0288	-.0344	-.310	-.00363
28	-.030	-.1125	-.080	-.00125

CONFIDENTIAL

TABLE III-B (CONT'D)
ANTI - SYMMETRICAL CASE

RUN	φ (RAD/SEC)	β (RAD)	y (FT)	α (RAD)
29	-.0288	-.0688	-.100	-.00175
30	-.02875	-.050	-.155	-.00200
31	-.0275	-.1095	-.075	-.00125
32	-.0275	-.0625	-.0912	-.00175
33	-.0275	-.0375	-.145	-.001875
34	-.0250	-.1062	-.070	-.00125
35	-.0262	-.0594	-.090	-.00175
36	-.0250	-.0438	-.140	-.001875
37	-.0325	-.122	-.125	-.00200
38	-.0325	-.0625	-.170	-.00237
39	-.0312	-.0408	-.250	-.00275
40	-.0312	-.122	-.1125	-.00200
41	-.030	-.0625	-.165	-.00235
42	-.030	-.0375	-.120	-.00272
43	-.030	-.118	-.100	-.001875
44	-.0294	-.0563	-.160	-.00225
45	-.0275	-.0375	-.115	-.00263
46	-.0325	-.1435	-.15	-.00369
47	-.0313	-.0563	-.250	-.00363
48	-.0312	-.0344	-.320	-.00375
49	-.0313	-.1375	-.140	-.00350
50	-.030	-.0563	-.240	-.00350
51	-.0313	-.141	-.140	-.00363
52	-.0313	-.134	-.120	-.0035
53	-.0287	-.0532	-.230	-.0035
54	-.0287	-.0312	-.300	-.00363
55	-.0287	-.1125	-.085	-.001375
56	-.0287	-.0657	-.105	-.001875

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

TABLE III-B (CONT'D)
ANTI - SYMMETRICAL CASE

RUN	φ (RAD/SEC)	β (RAD.)	y (FT.)	α (RAD)
57	-.0275	-.097	-.155	-.00213
58	-.0275	-.1095	-.075	-.001375
59	-.0275	-.0625	-.095	-.001875
60	-.0275	-.0437	-.150	-.00223
61	-.0263	-.1062	-.060	-.0015
62	-.0263	-.0563	-.0901	-.00175
63	-.025	-.0407	-.140	-.0020
64	-.0325	-.118	-.130	-.001875
65	-.0315	-.0625	-.170	-.0025
66	-.030	-.0407	-.140	-.00287
67	-.030	-.1188	-.110	-.0020
68	-.030	-.0594	-.165	-.0025
69	-.02875	-.060	-.230	-.00275
70	-.030	-.1155	-.095	-.001875
71	-.0288	-.0563	-.155	-.0025
72	-.0275	-.0375	-.110	-.00263
73	-.0313	-.1405	-.170	-.00375
74	-.0313	-.0563	-.240	-.00363
75	-.030	-.0344	-.300	-.0035
76	-.030	-.1405	-.150	-.00375
77	-.030	-.0563	-.115	-.0035
78	-.030	-.0312	-.300	-.0035
79	-.030	-.1375	-.130	-.0035
80	-.030	-.050	-.220	-.00337
81	-.0288	-.0312	-.28	-.003375
82	-.035	-.150	-.100	-.001375
83	-.035	-.0845	-.125	-.00275
84	-.035	-.0625	-.195	-.00200

CONFIDENTIAL

CONFIDENTIAL

TABLE III-B (CONT'D.)
ANTI - SYMMETRICAL CASE

RUN	$\dot{\varphi}$ (RAD/SEC)	β (RAD)	y (FT)	α (RAD)
85	-.035	-.1405	-.100	-.00150
86	-.0337	-.0814	-.120	-.00150
87	-.0325	-.0563	-.185	-.001875
88	-.0325	-.1405	±.080	±.00125
89	-.0312	-.075	-.110	-.00150
90	-.0312	-.0563	-.175	-.001875
91	-.040	-.1565	-.120	-.0020
92	-.0375	-.1095	-.160	-.001875
93	-.0363	-.0531	-.260	-.0025
94	-.0375	-.150	-.115	-.0020
95	-.0363	-.075	-.200	-.001875
96	-.0337	-.050	-.240	-.00225
97	-.0350	-.144	±.100	-.001815
98	-.0350	-.0688	-.140	-.001875
99	-.0325	-.050	-.230	-.00237
100	-.0413	-.1625	-.135	-.00262
101	-.0500	-.075	-.215	-.00237
102	-.0375	-.047	-.310	-.00262
103	-.0370	-.1565	-.130	-.00263
104	-.0375	-.072	-.200	-.00225
105	-.0363	-.0469	-.300	-.00287
106	-.0375	-.150	-.120	-.00237
107	-.0350	-.0788	-.180	-.00212
108	-.0350	-.0438	-.290	-.00275
109	-.0363	-.1405	±.075	-.001375
110	-.0375	-.0813	-.120	-.001625
111	-.035	-.0594	-.190	-.00200
112	-.035	-.1405	±.070	±.00125

TABLE III-B (CONT'D)
ANTI - SYMMETRICAL CASE

CONFIDENTIAL

RUN	$\dot{\gamma}$ (RAD/SEC)	β (RAD)	y (FT)	α (RAD)
113	-.035	-.0751	-.115	-.00150
114	-.0325	-.0563	-.175	-.001875
115	-.0377	-.134	-.060	±.00125
116	-.0312	-.0719	-.105	-.00150
117	-.0312	-.050	-.170	-.001875
118	-.0380	-.150	±.100	-.001875
119	-.0375	-.075	-.160	-.0020
120	-.0375	-.050	-.240	-.0025
121	-.0375	-.1435	-.100	-.001875
122	-.0363	-.0687	-.150	-.0020
123	-.0337	-.115	-.230	-.00237
124	-.0363	-.1375	-.075	-.001875
125	-.035	-.0658	-.140	-.00213
126	-.0347	-.0437	-.220	-.00225
127	-.0413	-.1565	-.130	-.00263
128	-.0387	-.072	-.220	-.00237
129	-.0388	-.0464	-.300	-.00287
130	-.0387	-.150	-.115	-.00250
131	-.0375	-.0673	-.200	-.00237
132	-.0363	-.0453	-.280	-.00275
133	-.0363	-.1453	-.1525	-.0025
134	-.0357	-.0625	-.180	-.00231
135	-.0350	-.0407	-.270	-.00269
136	-.0363	-.1375	-.0951	-.001375
137	-.0350	-.1375	-.110	-.001625
138	-.0350	-.0563	-.180	-.00200
139	-.0350	-.1375	±.070	-.001375

CONFIDENTIAL

CONFIDENTIAL

TABLE III-B (CONT'D)

ANTI - SYMMETRICAL CASE

RUN	φ (RAD/sec)	β (RAD.)	y (FT.)	α (RAD.)
140	-.0337	-.0750	-.110	-.001625
141	-.0337	-.0532	-.170	-.0020
142	-.0337	-.134	±.055	-.001375
143	-.0313	-.0605	-.105	-.00175
144	-.0313	-.0470	-.160	-.0020
145	-.0387	-.1435	-.1075	-.00213
146	-.0363	-.0720	-.155	-.0020
147	-.0363	-.050	-.225	-.0025
148	-.0375	-.1435	-.095	-.0020
149	-.0363	-.0688	-.150	-.0020
150	-.0337	-.0469	-.225	-.0025
151	-.035	-.1345	-.075	-.001875
152	-.0337	-.0625	-.140	-.00213
153	-.0337	-.0407	-.210	-.00237
154	-.0416	-.1575	-.130	-.00275
155	-.0275	-.0688	-.210	-.00250
156	-.0387	-.0438	-.300	-.00294
157	-.0387	-.150	-.120	-.00263
158	-.0375	-.0658	-.200	-.00250
159	-.0363	-.0438	-.280	-.00387
160	-.0375	-.1435	±.105	-.00250
161	-.0350	-.0625	-.190	-.00238
162	-.0350	-.0375	-.270	-.00275
163	-.0425	-.0938	-.120	-.00312
164	-.0400	-.100	-.150	±.001375
165	-.0400	-.0688	-.220	-.001875
166	-.0400	-.175	-.100	-.00175

CONFIDENTIAL

CONFIDENTIAL

TABLE III-B (CONT'D.)
ANTI - SYMMETRICAL CASE

RUN	$\dot{\varphi}$ (RAD./SEC.)	β (RAD.)	y (FT.)	α (RAD.)
167	-.0375	-.0871	-.140	±.001375
168	-.0375	-.0625	-.210	-.001875
169	-.0375	-.1675	-.100	-.001625
170	-.0350	-.0845	-.130	±.001375
171	-.0350	-.0595	-.200	-.00175
172	-.0450	-.1935	-.135	-.00244
173	-.0425	-.0968	-.170	-.001625
174	-.0400	-.0688	-.260	-.00225
175	-.0412	-.1845	-.120	-.00225
176	-.0400	-.0375	-.160	-.001625
177	-.0375	-.0625	-.240	-.00225
178	-.0375	-.169	-.120	-.00212
179	-.0362	-.0813	-.150	-.001625
180	-.0363	-.0564	-.225	-.00212
181	-.0463	-.200	-.170	-.00269
182	-.0437	-.0985	-.180	-.00175
183	-.0425	-.0653	-.280	-.0025
184	-.0437	-.1875	-.150	-.0025
185	-.0413	-.0877	-.160	±.00313
186	-.0400	-.0610	-.260	-.00225
187	-.0400	-.1785	-.140	-.002375
188	-.0387	-.0876	-.160	-.00175
189	-.0375	-.0563	-.260	-.00243
190	-.04375	-.1815	-.100	-.001875
191	-.0400	-.09375	-.140	±.001375
192	-.0400	-.0658	-.215	-.001875
193	-.0400	-.1685	-.0900	-.00175
194	-.0375	-.140	-.0876	-.001375
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CONFIDENTIAL

CONFIDENTIAL

TABLE III-B (CONT'D.)
ANTI - SYMMETRICAL CASE

CONFIDENTIAL

RUN	φ (RAD/SEC)	β (RAD.)	y (FT.)	α (RAD.)
195	-.0375	-.0625	-.200	-.001875
196	-.0375	-.1625	-.070	-.001625
197	-.0363	-.0815	-.130	-.00150
198	-.035	-.0564	-.185	-.001935
199	-.045	-.100	-.130	-.00237
200	-.0425	-.0875	-.165	-.00175
201	-.0412	-.0642	-.250	-.00225
202	-.0413	-.175	-.110	-.00213
203	-.0400	-.0845	-.150	±.001565
204	-.0388	-.0563	-.230	-.00213
205	-.0400	-.175	-.0951	-.00200
206	-.0375	-.0783	-.145	-.00175
207	-.0363	-.0532	-.220	-.00215
208	-.0463	-.1935	-.165	-.00387
209	-.0437	-.0970	-.180	-.00175
210	-.0425	-.0658	-.280	-.00250
211	-.0450	-.1875	-.130	-.00250
212	-.0425	-.077	-.165	-.001815
213	-.0400	-.061	-.270	-.00250
214	-.0425	-.1815	-.115	-.002375
215	-.0400	-.0813	-.160	-.001875
216	-.0380	-.086	-.250	-.00237
217	-.0425	-.175	±.1265	-.001875
218	-.0413	-.0923	-.125	-.00150
219	-.0400	-.0658	-.205	-.0020
220	-.0413	-.1625	-.0826	-.001625
221	-.0387	-.0845	-.125	-.00150
222	-.0375	-.0595	-.190	-.001875.

CONFIDENTIAL

TABLE III-B (CONT'D.)
ANTI - SYMMETRICAL CASE

RUN	$\dot{\varphi}$ (RAD/SEC)	β (RAD)	y (FT)	α (RAD)
223	-.0375	-.1565	+.065	-.001565
224	-.0363	-.0782	-.120	-.001565
225	-.0350	-.0532	-.142	-.001875
226	-.0444	-.175	-.0650	-.00206
227	-.0425	-.0876	-.1475	-.00175
228	-.0413	-.0595	-.230	-.00225
229	-.0413	-.1687	-.1475	-.00200
230	-.040	-.0813	-.145	-.00175
231	-.0388	-.0532	-.220	-.00225
232	-.0387	-.1625	±.075	-.00206
233	-.0375	-.0735	-.135	-.00175
234	-.0350	-.050	-.205	-.00225
235	-.0463	-.1935	-.160	-.00225
236	-.0443	-.0939	-.1725	-.001815
237	-.0431	-.0625	-.270	-.00244
238	-.0437	-.1845	-.135	-.00231
239	-.0418	-.0845	-.160	-.001875
240	-.0406	-.0595	-.250	-.00237
241	-.0425	-.1685	-.110	-.002125
242	-.0400	-.0782	-.1525	-.001935
243	-.0387	-.0532	-.240	-.00237
244	-.0287	-.1158	-.0951	-.01562
245	-.0275	-.0688	-.0975	-.001875
246	-.0281	-.0500	-.155	-.00213
247	-.0313	-.1375	-.145	-.0025
248	-.0300	-.0640	-.170	-.00275
249	-.0300	-.0422	-.250	-.00300
250	-.0313	-.144	-.185	-.0035
251	-.0312	-.0595	-.240	-.00325

CONFIDENTIAL

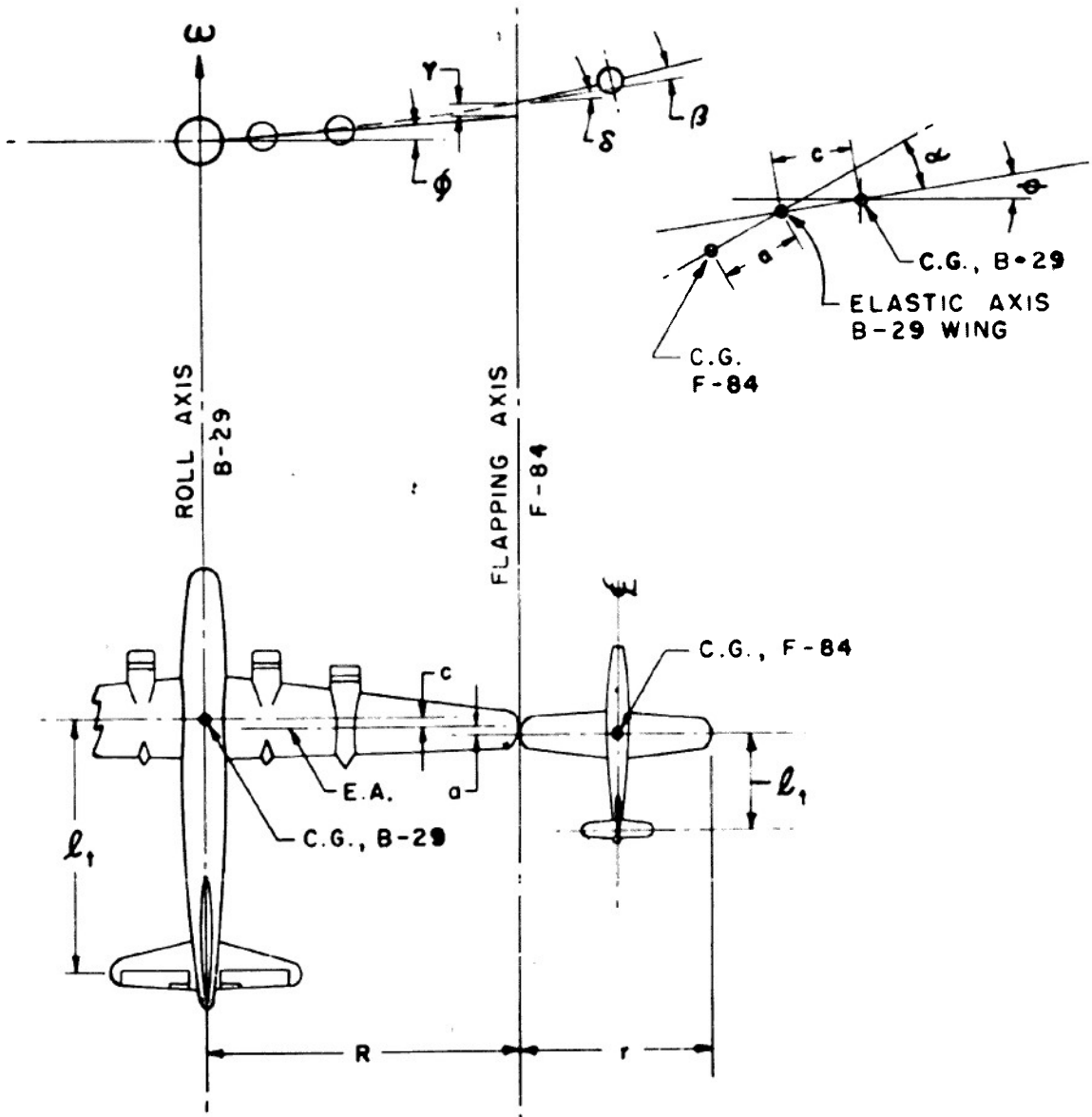
CONFIDENTIAL

TABLE III-B (CONCLUDED)
ANTI - SYMMETRICAL CASE

RUN	φ (RAD./SEC.)	β (RAD)	y (FT.)	α (RAD.)
252	-.0300	-.0344	-.220	-.00363
253	-.0350	-.075	-.100	-.00175
254	-.0337	-.0814	-.105	-.00312
255	-.0325	-.0562	-.170	-.001875
256	-.0375	-.1565	-.130	-.00244
257	-.0350	-.1375	-.160	-.00213
258	-.0350	-.0532	-.240	-.00250
259	-.0400	-.1935	-.165	-.00375
260	-.0387	-.0751	-.240	-.00287
261	-.0375	-.0475	-.330	-.00337
262	-.0406	-.1875	-.100	-.00212
263	-.0381	-.0906	-.135	-.00212
264	-.0375	-.0625	-.200	-.001875
265	-.0413	-.100	-.120	-.00263
266	-.0400	-.0877	-.160	-.00225
267	-.0387	-.0564	-.240	-.00181
268	-.0375	-.131	-.150	-.00225
269	-.0387	-.0641	-.160	-.00212
270	-.0381	-.0438	-.220	-.00225

FIGURE I

POSSIBLE MODES OF MOTION CONSIDERED IN FLEXIBLE WING ANALYSIS OF WING TIP COUPLING



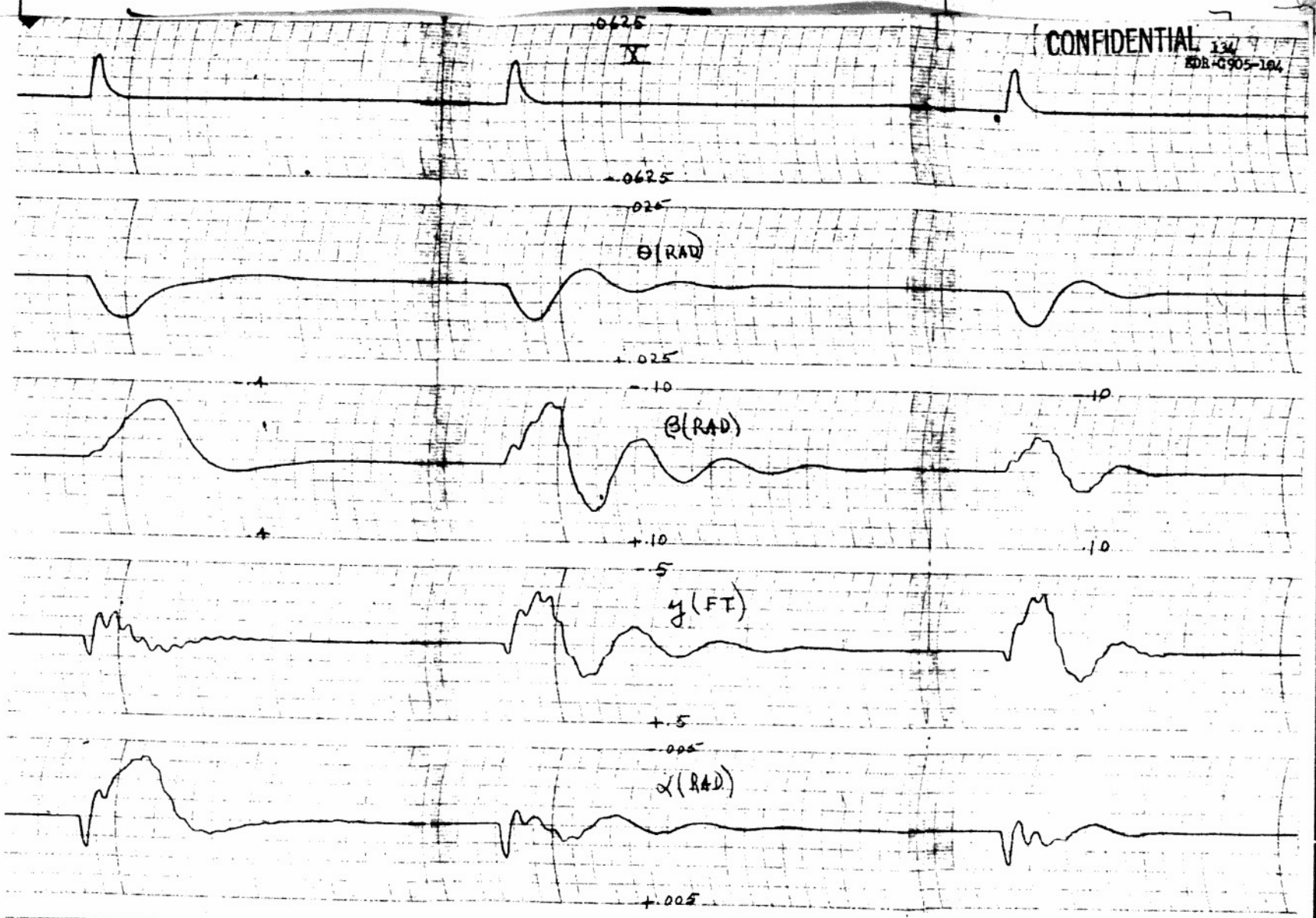
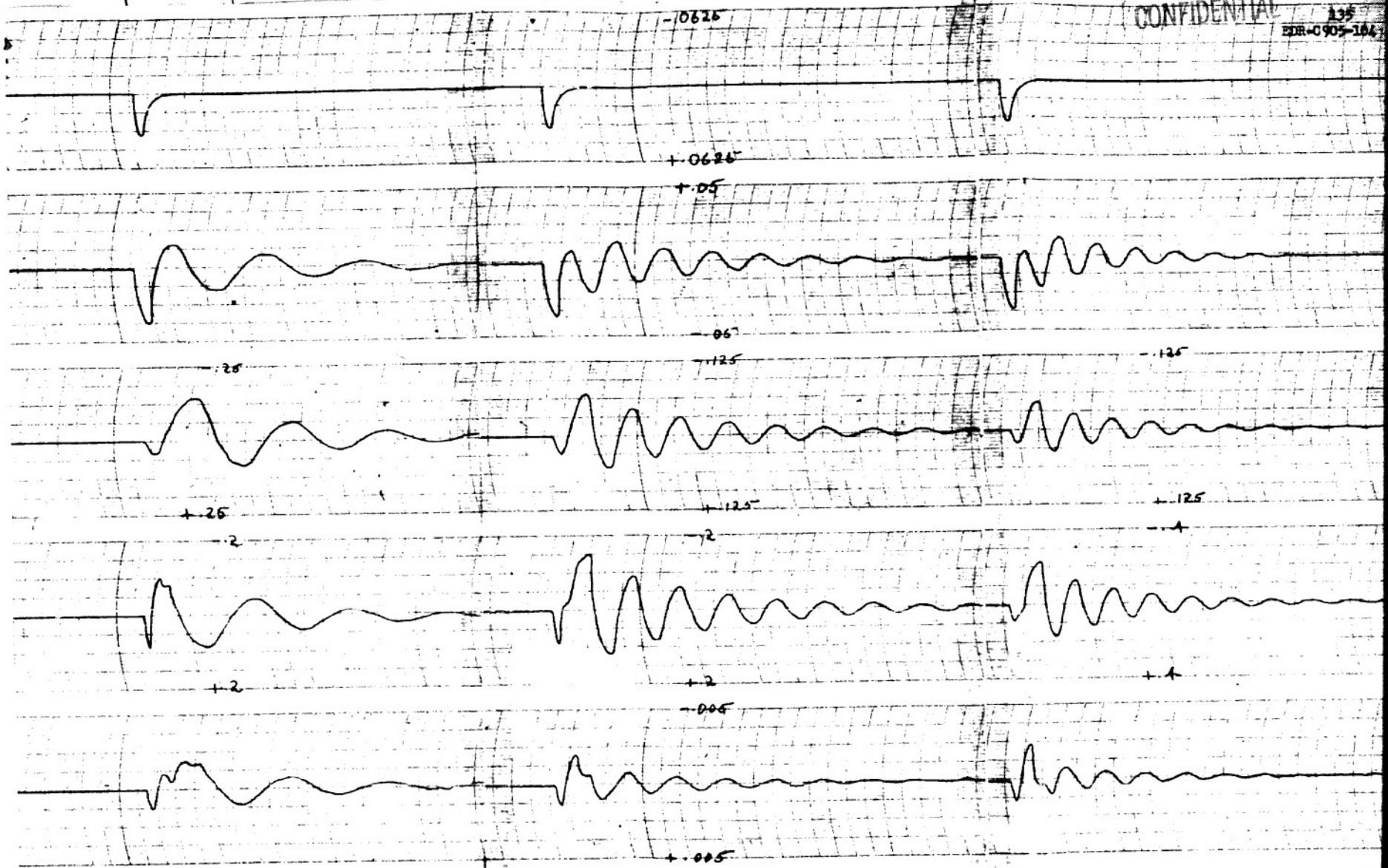
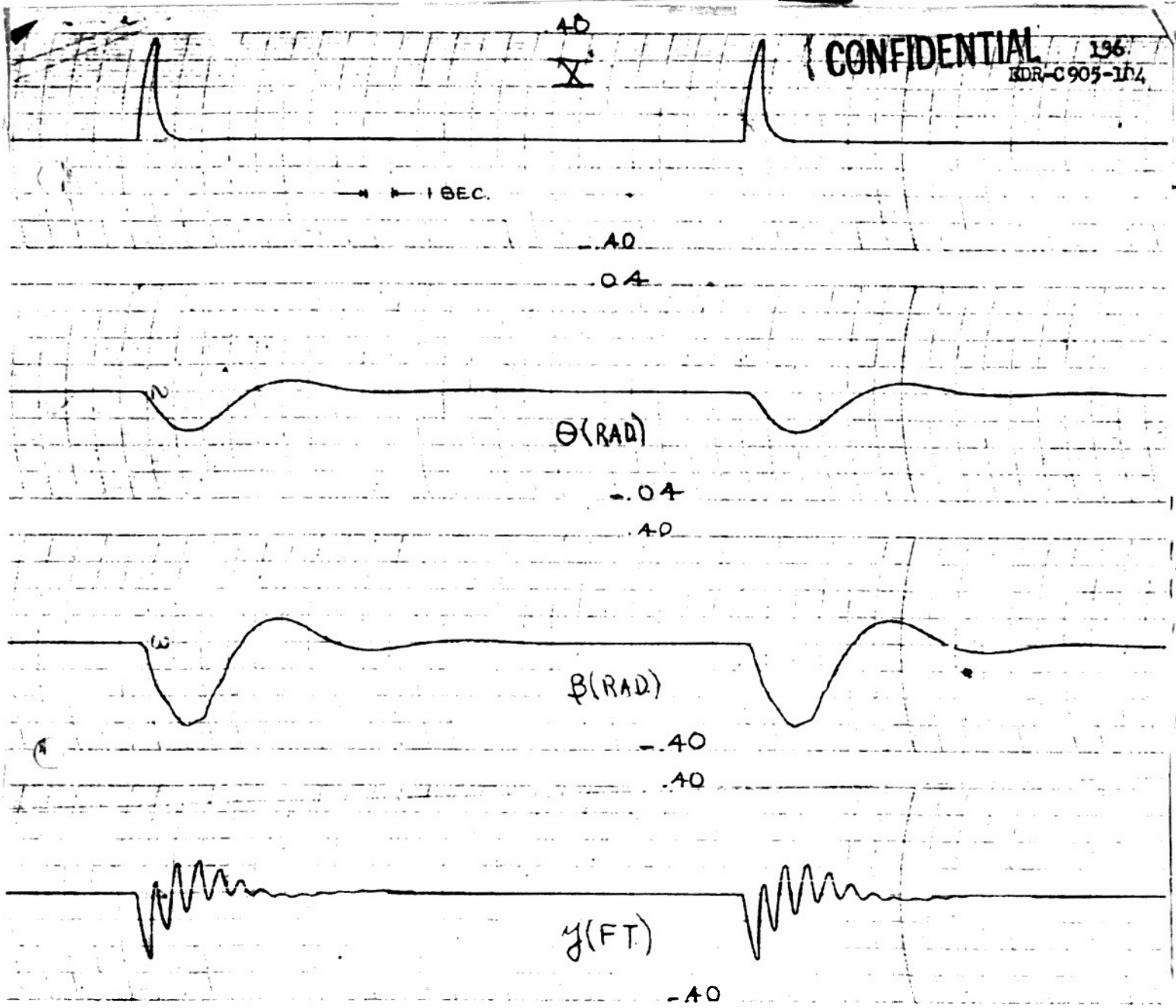


FIGURE II-A
SYMMETRICAL MOTION

RUN # 121 RUN # 122 RUN # 123



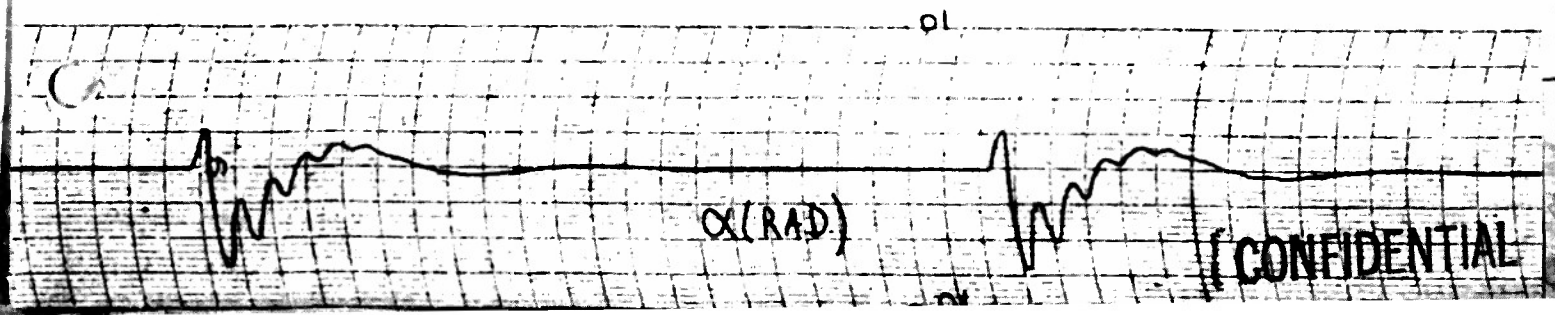
ANTI-SYMMETRICAL MOTION
FIGURE II-B

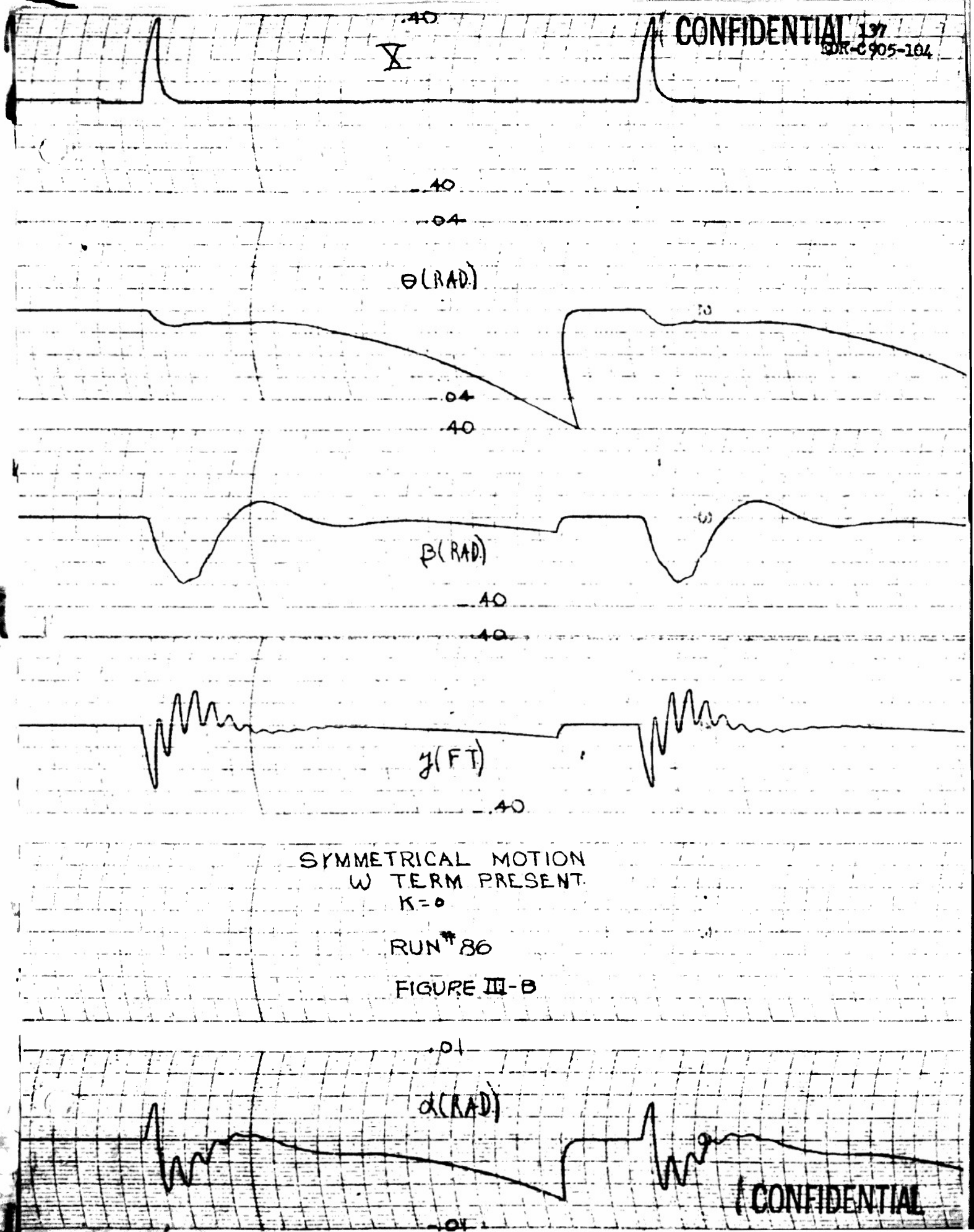


SYMMETRICAL MOTION
W TERM ABSENT
K=0

RUN #86

FIGURE III-A





SYMMETRICAL MOTION
W TERM PRESENT
K=0

RUN # 86

FIGURE III-B