

**LOW SPEED WIND TUNNEL TEST
OF GROUND PROXIMITY
AND DECK EDGE EFFECTS
ON A
LIFT CRUISE FAN V/STOL CONFIGURATION**

(NASA-CR-152248) LOW SPEED WIND TUNNEL TEST OF GROUND PROXIMITY AND DECK EDGE EFFECTS ON A LIFT CRUISE FAN V/STOL CONFIGURATION, VOLUME 2 Contractor Report, Mar. 1978 - (Rockwell International Corp., Columbus,	N79-28142 Unclas 31003
---	----------------------------------

Distribution of this report is provided in the interest
of information exchange. Responsibility for the
contents resides in the author or organization that
prepared it.

VOLUME II TO NASA CONTRACTOR REPORT 152247

MAY 1979

Prepared under contract NAS2-9882 by

ROCKWELL INTERNATIONAL CORPORATION

Columbus, Ohio

for



AMES RESEARCH CENTER
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE.		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CR 152248	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Low Speed Wind Tunnel Test of Ground Proximity and Deck Edge Effects on a Lift Cruise Fan V/STOL Configuration, Volume II		5. TYPE OF REPORT & PERIOD COVERED Contractor Report March 1978 - February 1979
		6. PERFORMING ORG. REPORT NUMBER NR79H-12
7. AUTHOR(s) V. R. Stewart		8. CONTRACT OR GRANT NUMBER(s) NAS2-9882
9. PERFORMING ORGANIZATION NAME AND ADDRESS Rockwell International Corporation 4300 E. Fifth Avenue, P.O. Box 1259 Columbus, OH 43216		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS NASA, Ames Research Center Moffett Field, CA 94035		12. REPORT DATE February 1979
		13. NUMBER OF PAGES 480
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) None
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES A. Summary of Test Results appears in CR 152247		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) V/STOL Lift Cruise Fans Ground Effects Deck Edge Wind Tunnel Test		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report is Volume II to CR 152247 and contains a compilation of test results. Data are presented without comment for a lift-cruise-fan V/STOL configuration in near proximity to the edge of a small flat surface representation of a ship deck. The model tested was a four-fan configuration with modifications to represent a three-fan configuration. Model scale was approximately 0.12.		

**LOW SPEED WIND TUNNEL TEST
OF GROUND PROXIMITY
AND DECK EDGE EFFECTS
ON A
LIFT CRUISE FAN V/STOL CONFIGURATION**

BY V. R. STEWART

Distribution of this report is provided in the interest of information exchange. Responsibility for the contents resides in the author or organization that prepared it.

VOLUME II TO NASA CONTRACTOR REPORT 152247

MAY 1979

Prepared under contract NAS2-9882 by

ROCKWELL INTERNATIONAL CORPORATION
Columbus, Ohio
for



**AMES RESEARCH CENTER
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

CONTENTS

	Page
APPENDIX A WIND TUNNEL DATA	1
APPENDIX B STATIC THRUST STAND DATA*	3 76
APPENDIX C FAN CALIBRATION DATA	447

PAGE INTENTIONALLY BLANK

LOW SPEED WIND TUNNEL TEST
OF GROUND PROXIMITY AND DECK EDGE
EFFECTS ON A LIFT-CRUISE-FAN V/STOL
CONFIGURATION

Vearyl R. Stewart
Rockwell International
Columbus Aircraft Division

APPENDIX A - WIND TUNNEL DATA

VOLUME II

TO SUMMARY REPORT CR-152247

SYMBOLS

Total Forces

L	lift, newtons (pounds)
D	drag, newtons (pounds)
M	pitching moment, newton meters (foot pounds)
RM	rolling moment, newton meters (foot pounds)
T	thrust, newtons (pounds)
TL	thrust, left hand side, newtons (pounds)
TR	thrust, right hand side, newtons (pounds)

Thrust Induced Aerodynamic Forces (Power ON - Power OFF)

ΔL	lift, newtons (pounds)
ΔD	drag, newtons (pounds)
ΔM	pitching moment, newton meters (foot pounds)
ΔRM	rolling moment, newton meters (foot pounds)

Total Coefficients (Stability Axis)

CL	lift coefficient, L/qS
CD	drag coefficient, D/qS
CM	pitching moment coefficient, $M/qS\bar{c}$
C_{RM}	rolling moment coefficient RM/qS

Thrust Coefficients

C_T	thrust coefficient, T/qS
ΔC_{LT}	lift coefficient due to thrust
ΔC_{DT}	drag coefficient due to thrust
ΔC_{MT}	pitching moment coefficient due to thrust
ΔC_{RMT}	rolling moment coefficient due to thrust
ΔC_{YMT}	yawing moment coefficient due to thrust
ΔC_{MD}	pitching moment coefficient due to ram drag
C_{DR}	ram drag coefficient $\sim \frac{M_1 V}{qS}$

Aerodynamic Coefficients (Thrust Effects Removed)

C_{LA}	lift coefficient
C_{DA}	drag coefficient
C_{MA}	pitching moment coefficient
C_{RMA}	rolling moment coefficient

Angles

α , Alfa	angle of attack, degrees
ϕ	bank angle, degrees
θ_T	thrust angle, degrees
δ_N	nozzle angle - geometric angle, degrees
δ_{NFwd}	nacelle forward nozzle angle, degrees
δ_{NAft}	nacelle aft nozzle angle, degrees
δ_{NNose}	nose nozzle angle, degrees
β	sideslip angle, degrees

Dimensions

S	wing area - 0.7767 m ²
b	wing span - 2.502 m
\bar{c}	wing mean aerodynamic chord - 0.3231 m
y	lateral dimension, meters (feet)
x	fuselage dimension, meters (feet)
z	vertical dimension, meters (feet)
H/D, h/D	non-dimensional ground height height of fuselage/diameter of one fan
D	equivalent diameter of one fan - (0.13 m) model (1.083 m) full scale airplane
l_1	horizontal ram drag arm, see Figure 17, meters (feet)
l_2	vertical thrust arm, see Figure 17, meters (feet)
l_3	vertical ram drag arm, see Figure 17, meters (feet)
l_4	horizontal thrust arm, see Figure 17, meters (feet)
l_5	lateral thrust arm, see Figure 17, meters (feet)

Miscellaneous

V	wind velocity, meters/sec (feet/sec)
V_j	nozzle exit velocity, meters/sec (feet/sec)
P_R	pressure ratio, P_T/P_a
P_T	total pressure behind fan, pascals (pounds/in ²)
P_a	ambient pressure, pascals (pounds/in ²)
q	dynamic pressure $\sim 1/2\rho V^2$, newtons/meter ² (pounds/foot ²)
ρ	air density, kg/meter ³ (pounds/foot ³)
M_i	inlet mass flow, kg/sec (pounds/sec)

LIST OF ILLUSTRATIONS

Figure	Title	Page
A-1	Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_{NFwd} = 30^\circ, \delta_{NAft} = 60^\circ$	11
A-2	Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 90^\circ$	15
A-3	Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 90^\circ$, Lateral Control In; $T_R/T_L = .8$	19
A-4	Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 105^\circ$	23
A-5	Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 80^\circ, 90^\circ, 90^\circ$	27
A-6	Effect of Thrust on the Aerodynamic Coefficients, Free Air $\sim \delta_{NFwd} = 30^\circ, \delta_{NAft} = 60^\circ$	31
A-7	Effect of Thrust on the Aerodynamic Coefficients, Free Air $\sim \delta_N = 90^\circ$	35
A-8	Effect of Thrust on the Aerodynamic Coefficients, Free Air $\sim \delta_N = 90^\circ$, Lateral Control In; $T_R/T_L = .8$	39
A-9	Effect of Thrust on the Aerodynamic Coefficients, Free Air $\sim \delta_N = 105^\circ$	43
A-10	Effect of Thrust on the Aerodynamic Coefficients, Free Air $\sim \delta_N = 80^\circ, 90^\circ, 90^\circ$	47
A-11	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{NFwd} = 30^\circ, \delta_{NAft} = 60^\circ; \alpha = 0^\circ; \phi = 0^\circ$	51
A-12	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{NFwd} = 30^\circ, \delta_{NAft} = 60^\circ; \alpha = 8^\circ; \phi = 0^\circ$	55
A-13	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_{NFwd} = 30^\circ, \delta_{NAft} = 60^\circ; \alpha = 0^\circ; \phi = 0^\circ$	59
A-14	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ, \delta_{NAft} = 60^\circ; \alpha = 8^\circ; \phi = 0^\circ$	63
A-15	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ, \delta_{NAft} = 60^\circ; \alpha = 0^\circ; \phi = 10^\circ$	67
A-16	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ, \delta_{NAft} = 60^\circ; \alpha = 0^\circ; \phi = 10^\circ$	71
A-17	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ, \delta_{NAft} = 60^\circ; \alpha = 0^\circ; \phi = 0^\circ$	75
A-18	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ, \delta_{NAft} = 60^\circ; \alpha = 8^\circ; \phi = 0^\circ$	79

LIST OF ILLUSTRATIONS (Continued)

Figure	Title	Page
A-19	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	83
A-20	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	87
A-21	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	91
A-22	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	95
A-23	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	99
A-24	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	103
A-25	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	107
A-26	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$	111
A-27	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	115
A-28	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$	119
A-29	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	123
A-30	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	127
A-31	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	131
A-32	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$	135

LIST OF ILLUSTRATIONS (Continued)

Figure	Title	Page
A-33	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	139
A-34	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	143
A-35	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	147
A-36	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	151
A-37	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	155
A-38	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	159
A-39	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	163
A-40	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$ Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	167
A-41	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	171
A-42	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	175
A-43	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	179
A-44	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	183
A-45	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	187
A-46	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	191

LIST OF ILLUSTRATIONS (Continued)

Figure	Title	Page
A-47	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	195
A-48	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	199
A-49	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	203
A-50	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	207
A-51	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	211
A-52	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	215
A-53	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	219
A-54	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	223
A-55	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$	227
A-56	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	231
A-57	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$	235
A-58	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	239
A-59	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	243
A-60	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	247

LIST OF ILLUSTRATIONS (Continued)

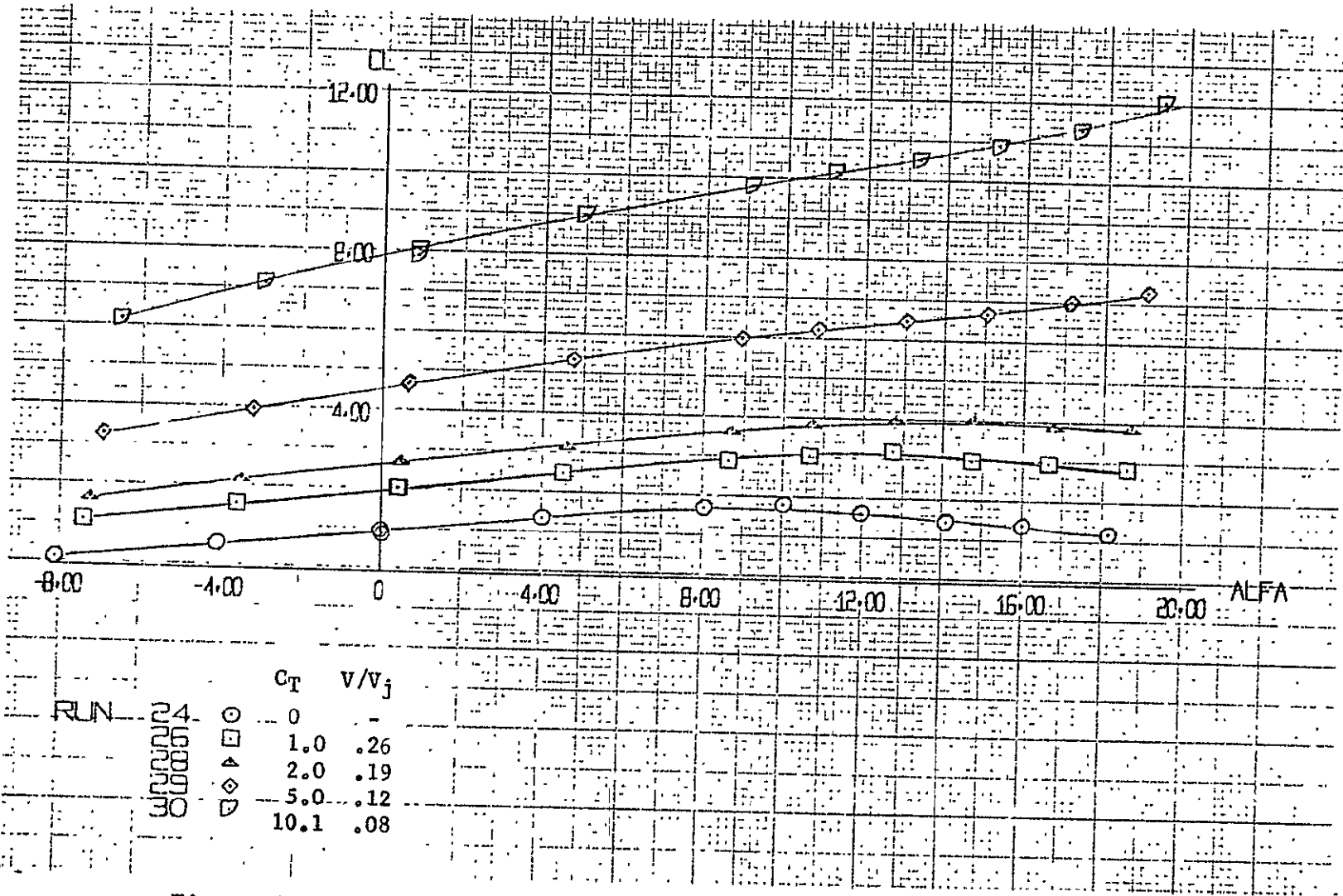
Figure	Title	Page
A-61	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$	251
A-62	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -1^\circ$	255
A-63	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	259
A-64	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	263
A-65	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -1^\circ$	267
A-66	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = -1^\circ$	271
A-67	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	275
A-68	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	279
A-69	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	283
A-70	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$	287
A-71	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	291
A-72	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	295
A-73	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	299
A-74	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$	303

LIST OF ILLUSTRATIONS (Continued)

Figure	Title	Page
A-75	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	307
A-76	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	311
A-77	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$	315
A-78	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	319
A-79	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$	323
A-80	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	327
A-81	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$	331
A-82	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$	335
A-83	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$	339
A-84	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	343
A-85	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$	347
A-86	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$	351
A-87	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$	355
A-88	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{NNose} = 80^\circ$, $\delta_{NAft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$	359

LIST OF ILLUSTRATIONS (Concluded)

Figure	Title	Page
A-89	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{NNose} = 80^\circ, \delta_{NAft} = 90^\circ; \alpha = 0^\circ; \phi = 0^\circ$	363
A-90	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{NNose} = 80^\circ, \delta_{NAft} = 90^\circ; \alpha = 0^\circ; \phi = -10^\circ$	367
A-91	Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{NNose} = 80^\circ, \delta_{NAft} = 90^\circ; \alpha = 0^\circ; \phi = +10^\circ$	371
A-92	Ground Board Configurations	375



RUN	C _T	V/V _j
4	0	-
10	1.0	.26
11	2.0	.19
12	5.0	.12
13	10.1	.08

Figure A-1. Effect of Thrust on the Basic Aerodynamic Characteristics,
 Free Air ~ $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$

-1- ACCURACY OF THE ORIGINAL PAGE IS POOR

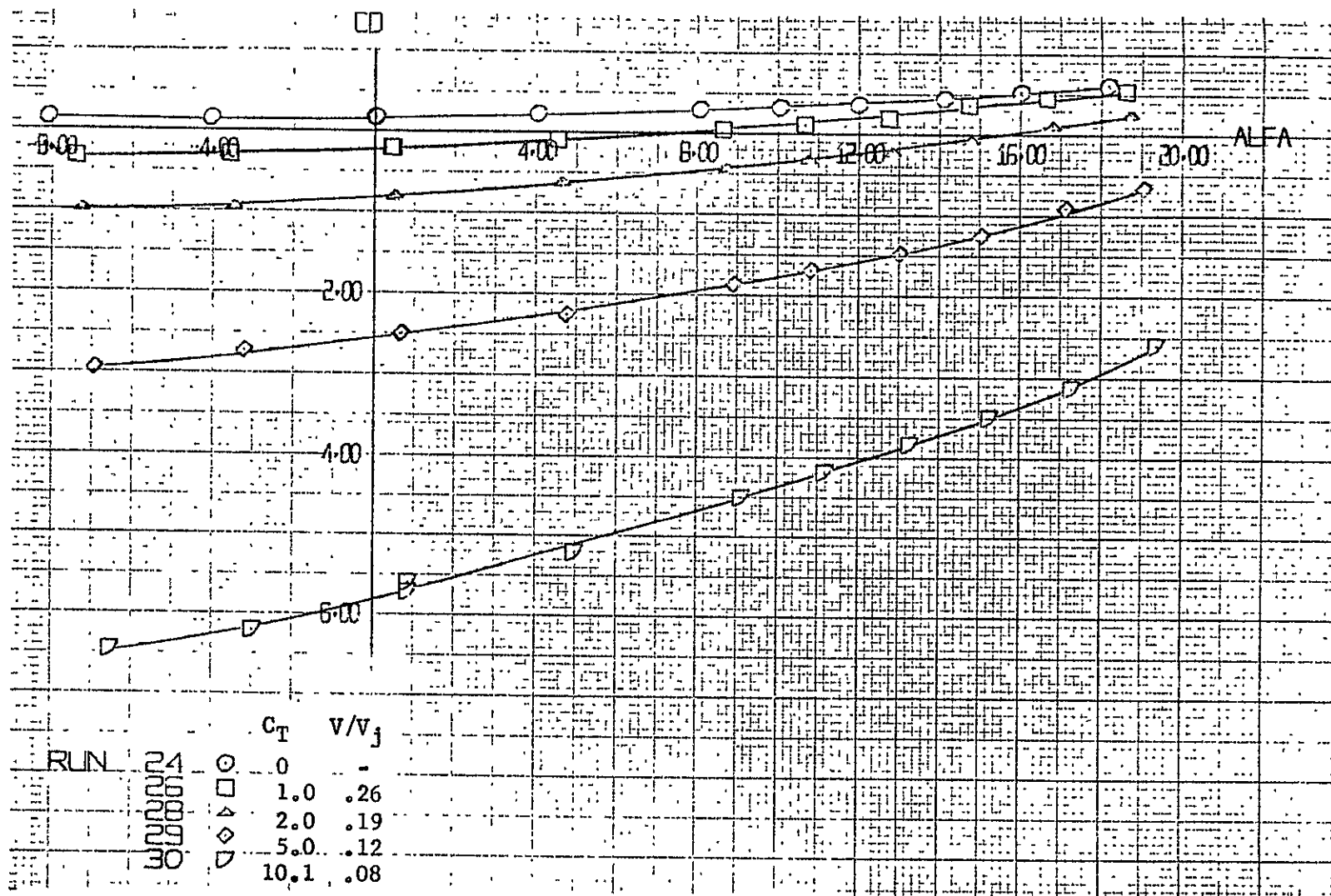


Figure A-1. Effect of Thrust on the Basic Aerodynamic Characteristics,
Free Air $\sim \delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$ (Continued)

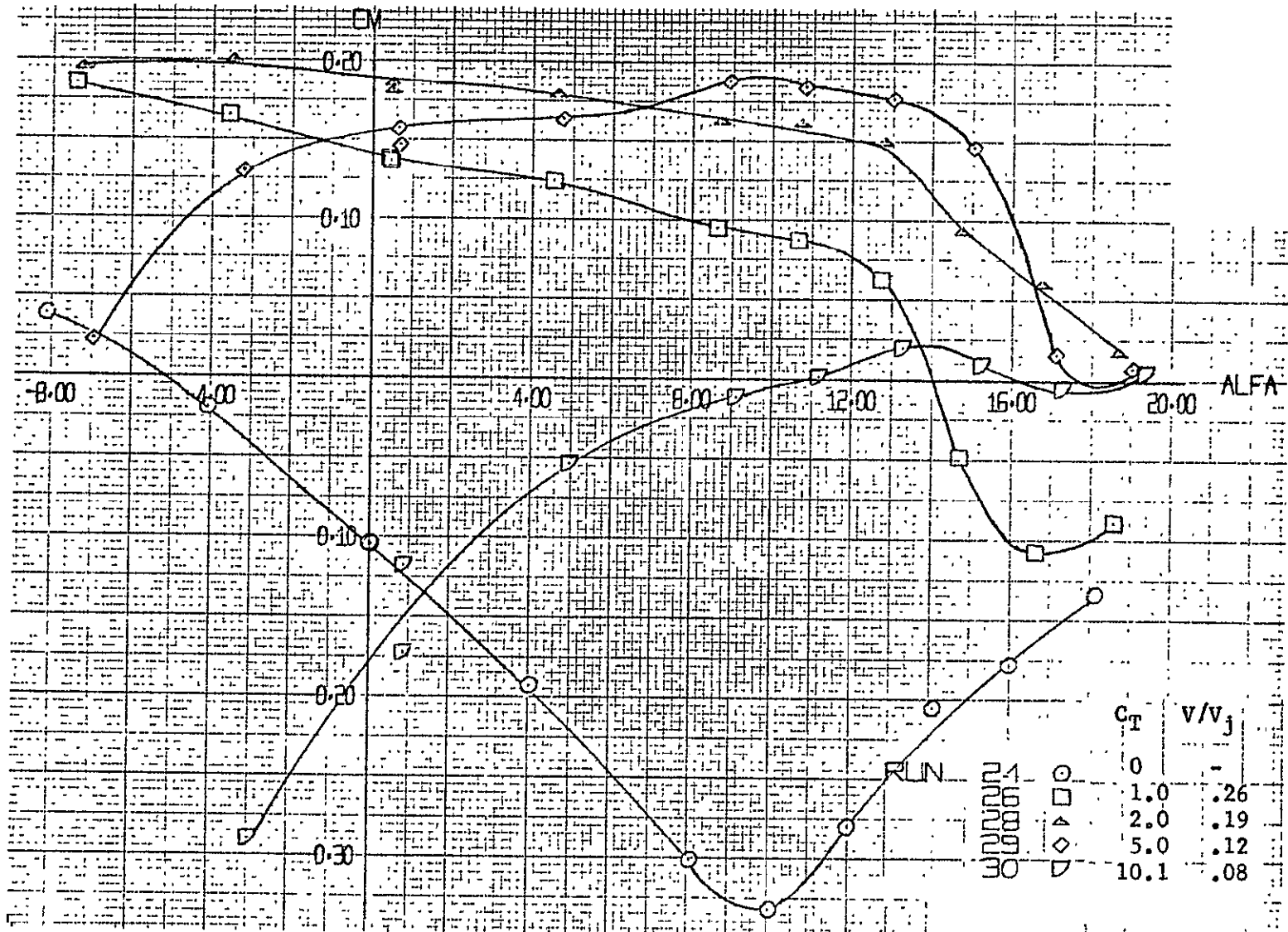


Figure A-1. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_{N_{Fwd}} = 30^\circ, \delta_{N_{Aft}} = 60^\circ$ (Continued)

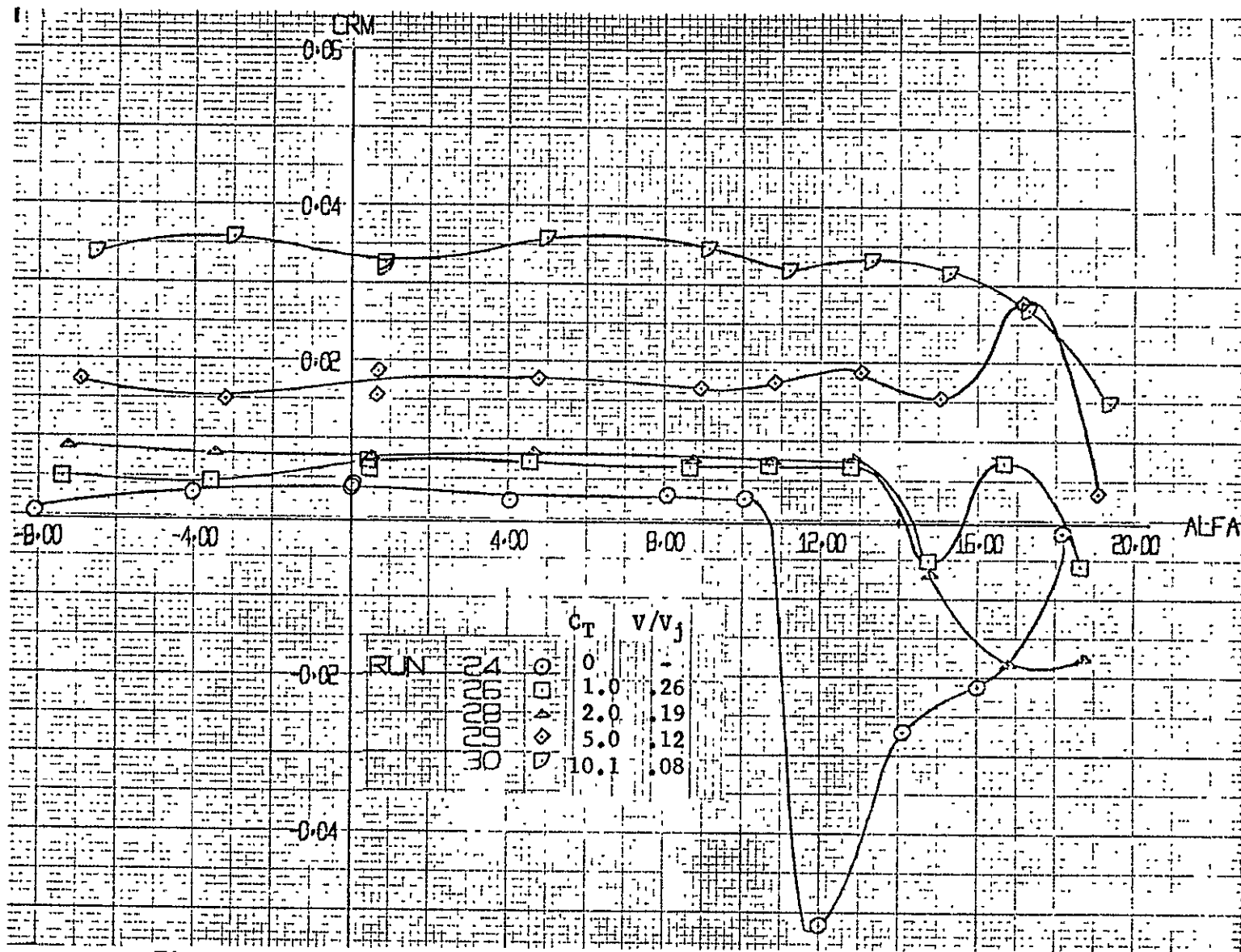


Figure A-1. Effect of Thrust on the Basic Aerodynamic Characteristics,
 Free Air $\sim \delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$ (Concluded)

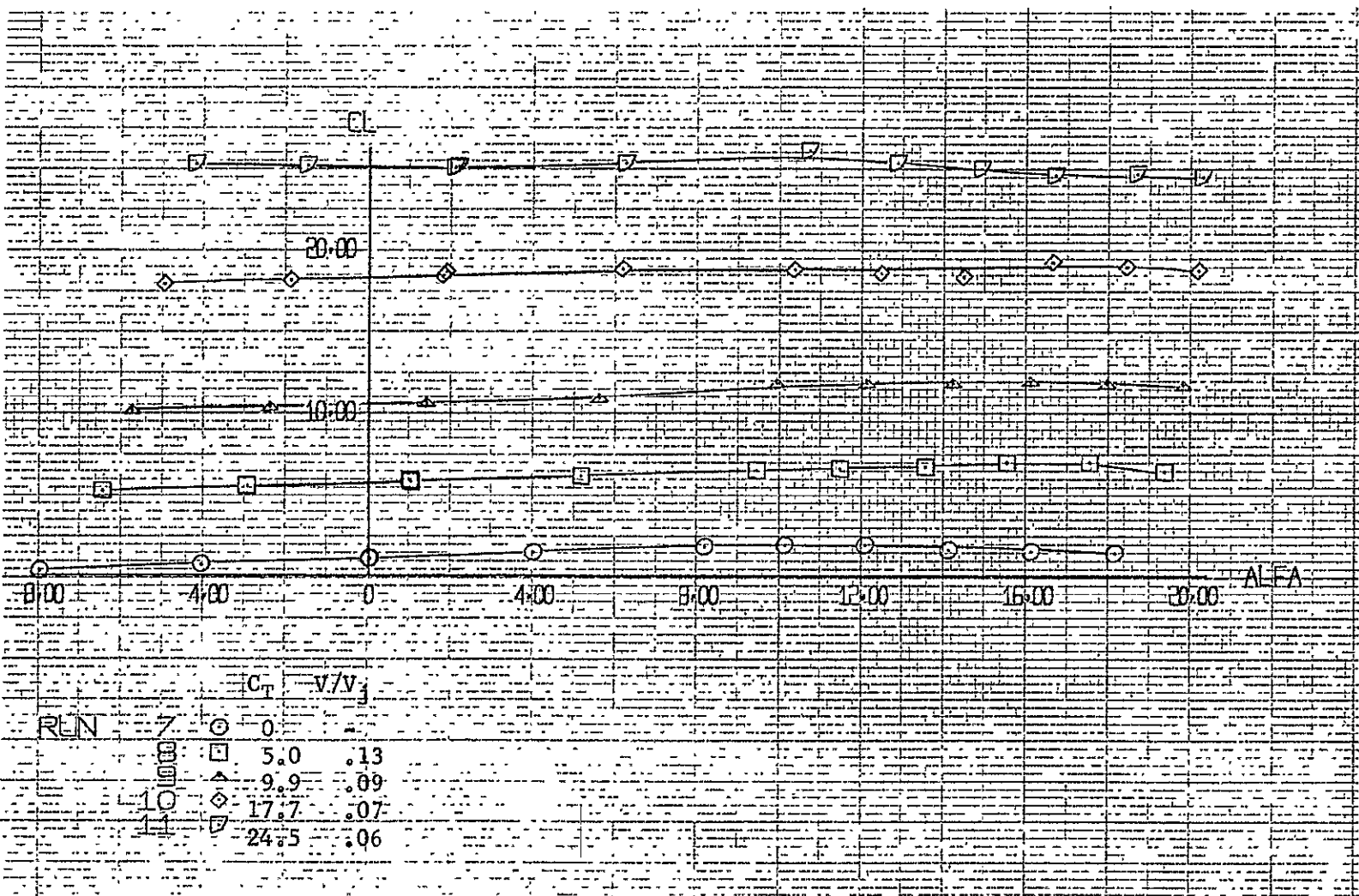


Figure A-2. Effect of Thrust on the Basic Aerodynamic Characteristics,
Free Air $\sim \delta_N = 90^\circ$

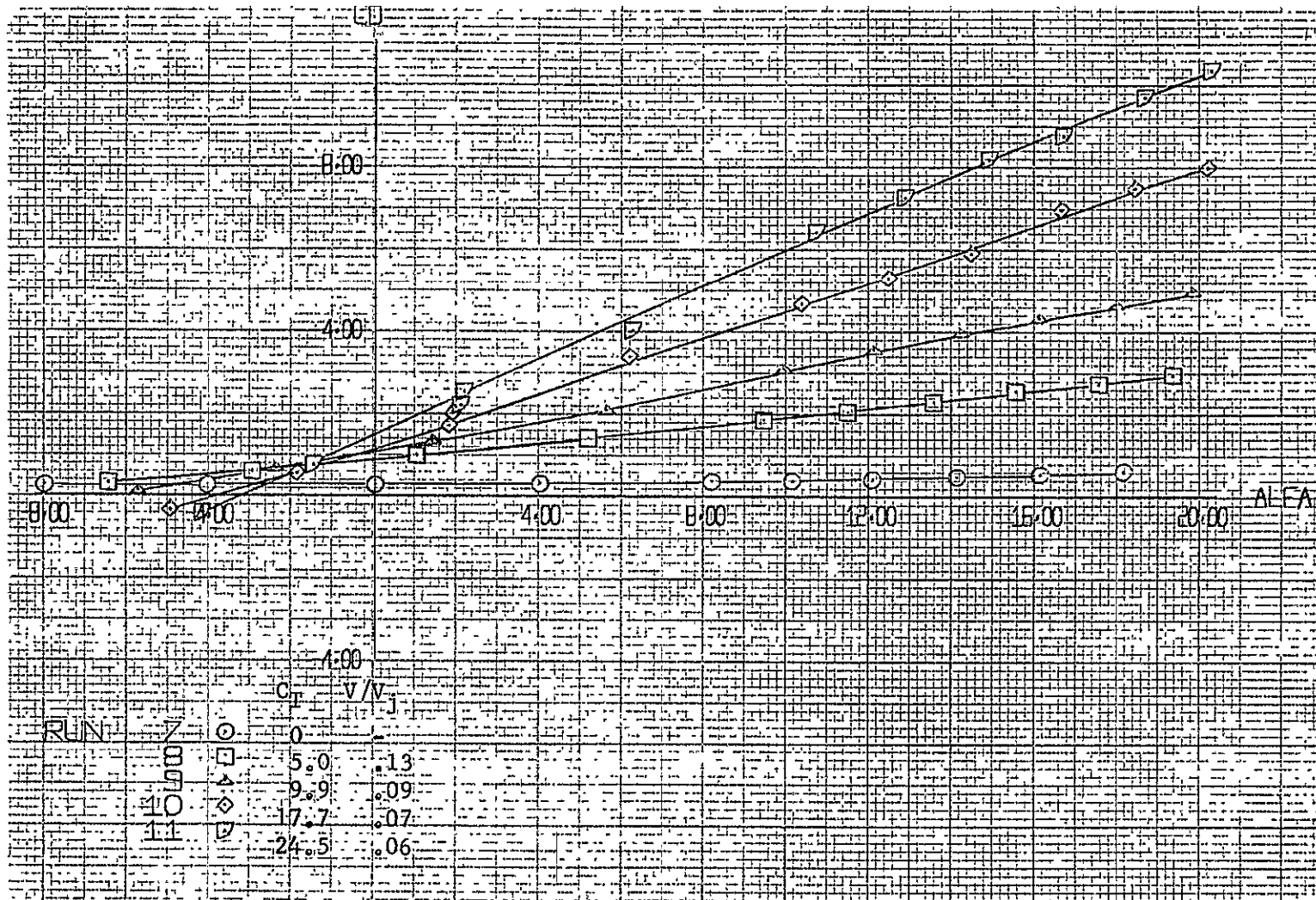


Figure A-2. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 90^\circ$ (Continued)

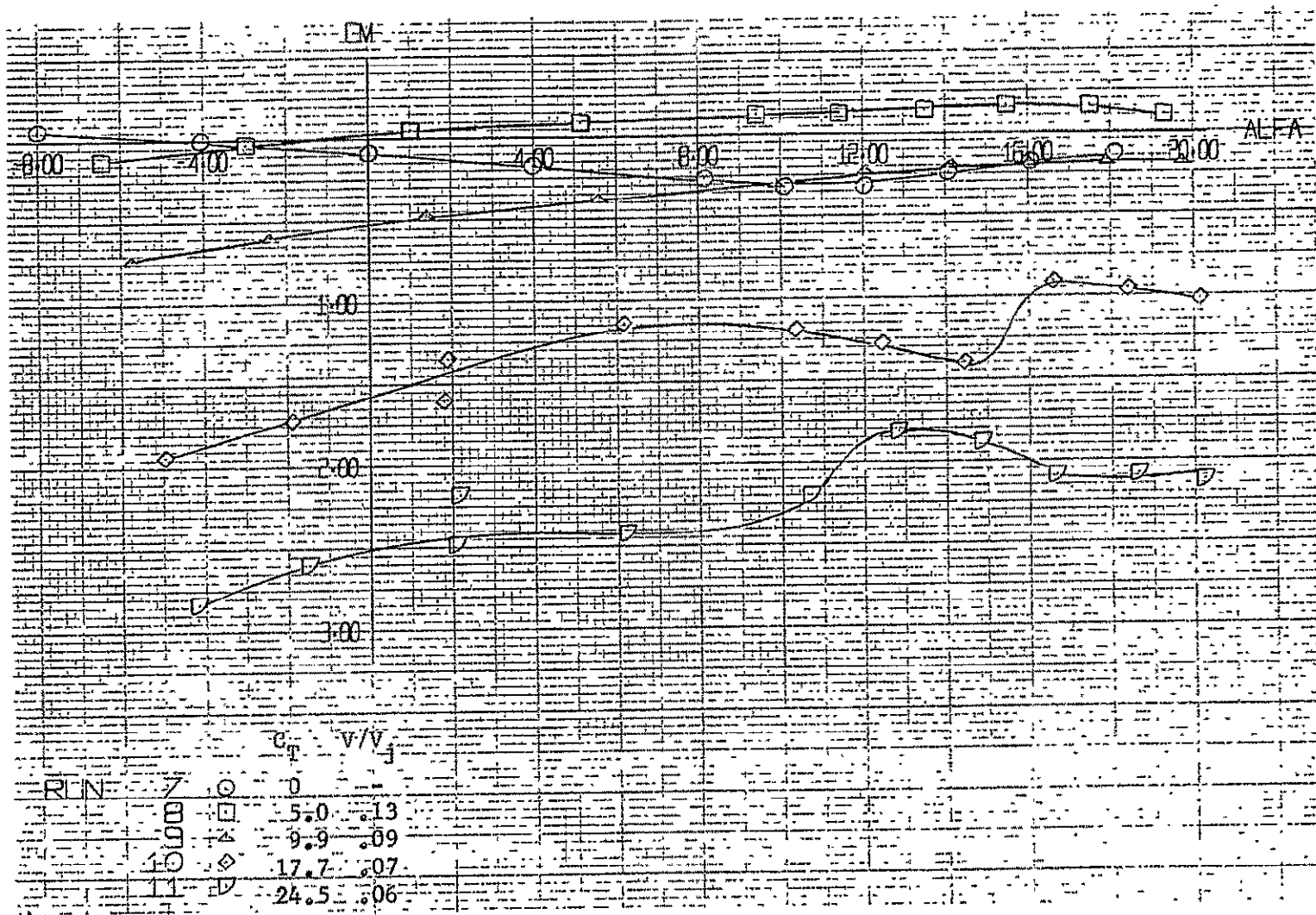


Figure A-2. Effect of Thrust on the Basic Aerodynamic Characteristics,
Free Air $\sim \delta_N = 90^\circ$ (Continued)

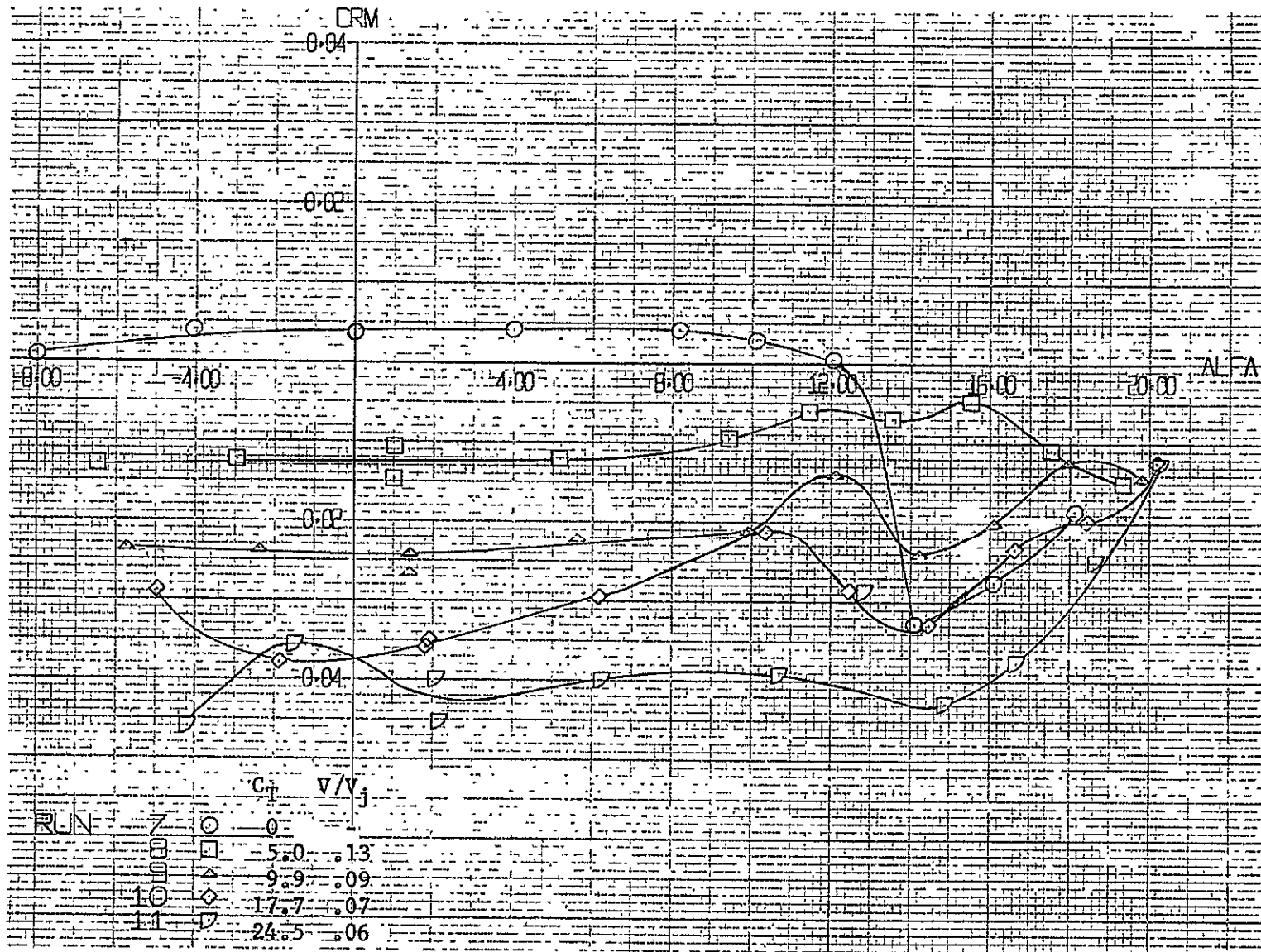


Figure A-2. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 90^\circ$ (Concluded)

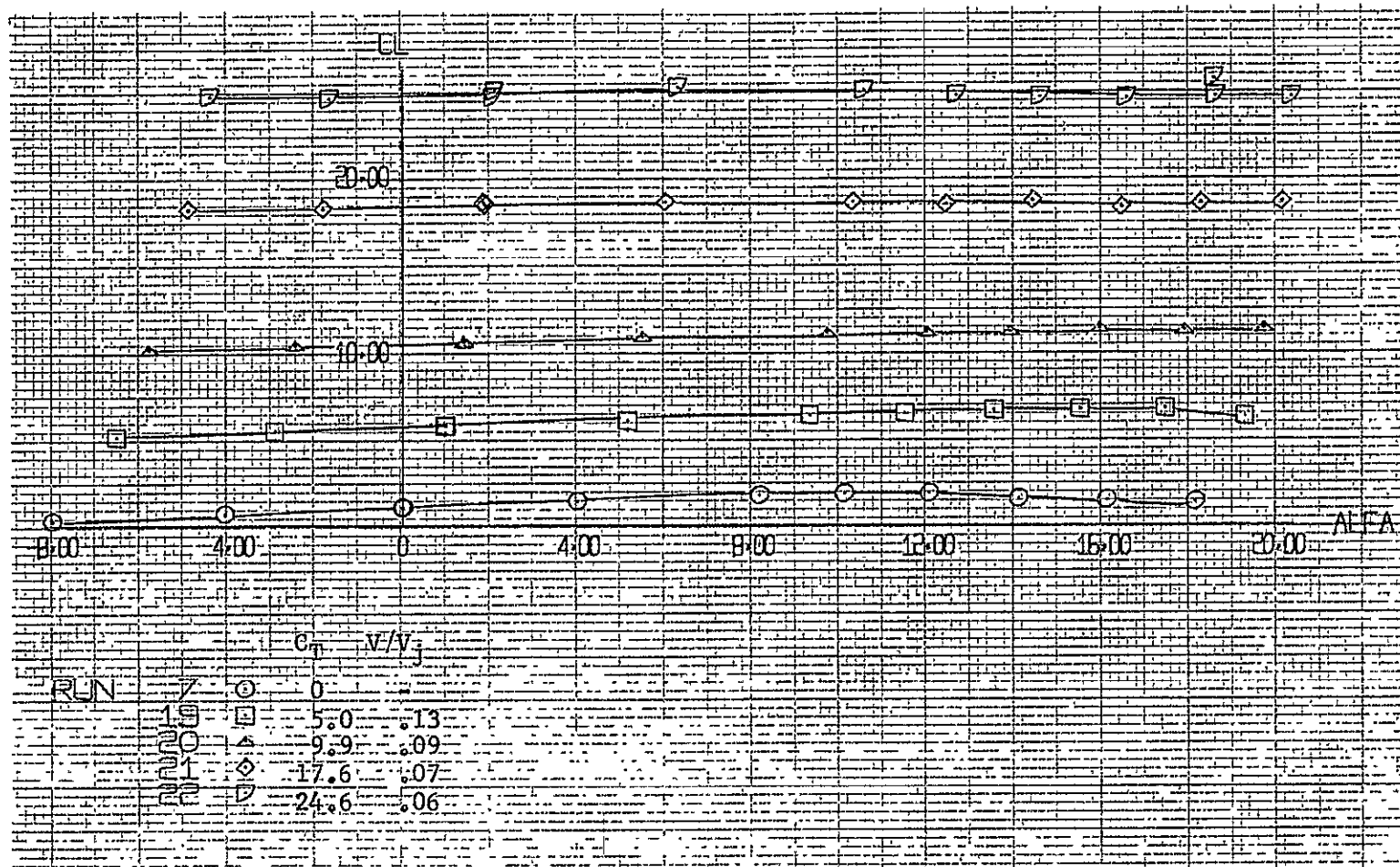


Figure A-3. Effect of Thrust on the Basic Aerodynamic Characteristics,
Free Air $\sim \delta_N = 90^\circ$, Lateral Control In; $T_R/T_L = .8$

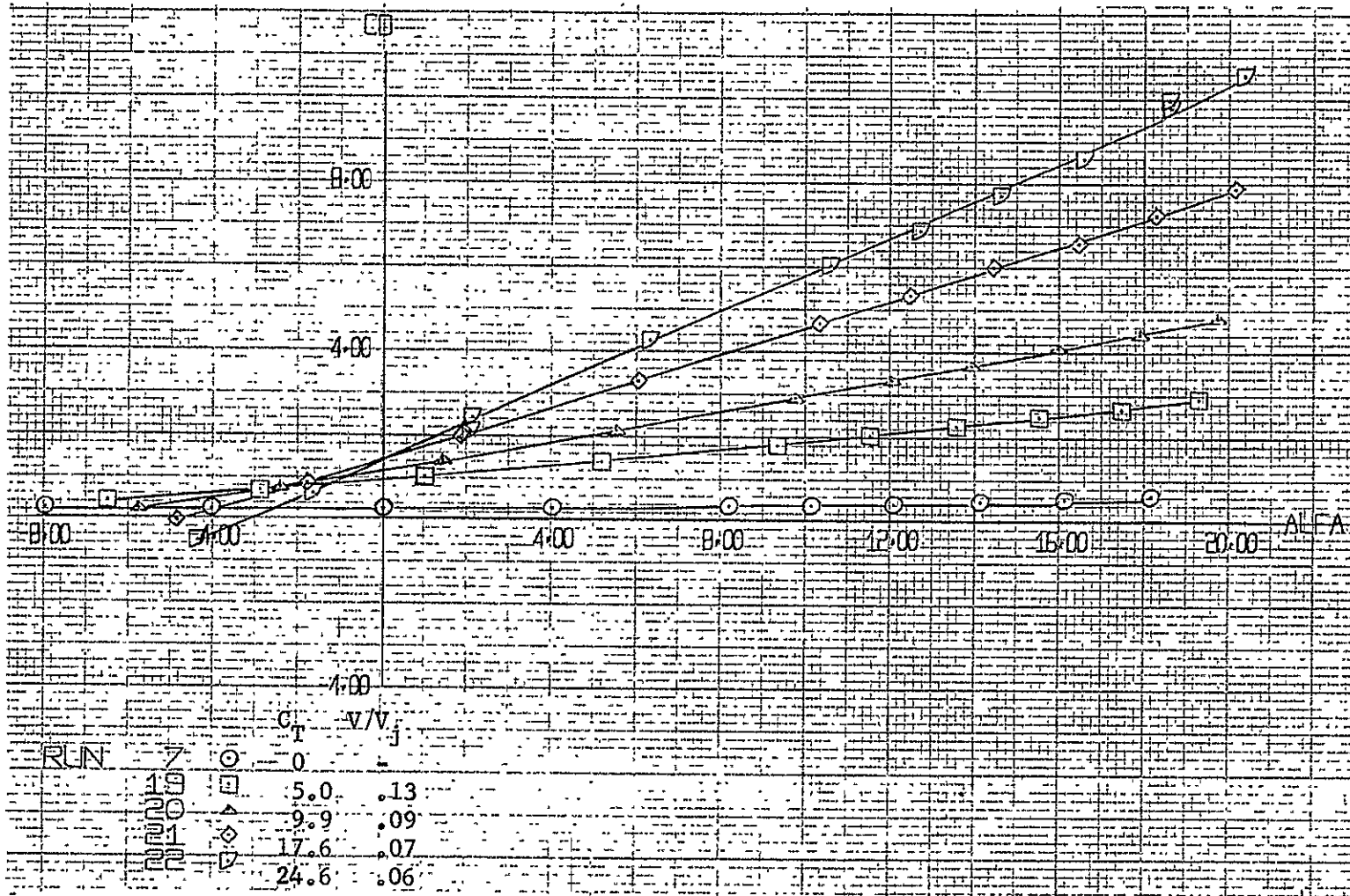


Figure A-3., Effect of Thrust on the Basic Aerodynamic Characteristics,
Free Air $\sim \delta_N = 90^\circ$, Lateral Control In; $T_R/T_L = .8$ (Continued)

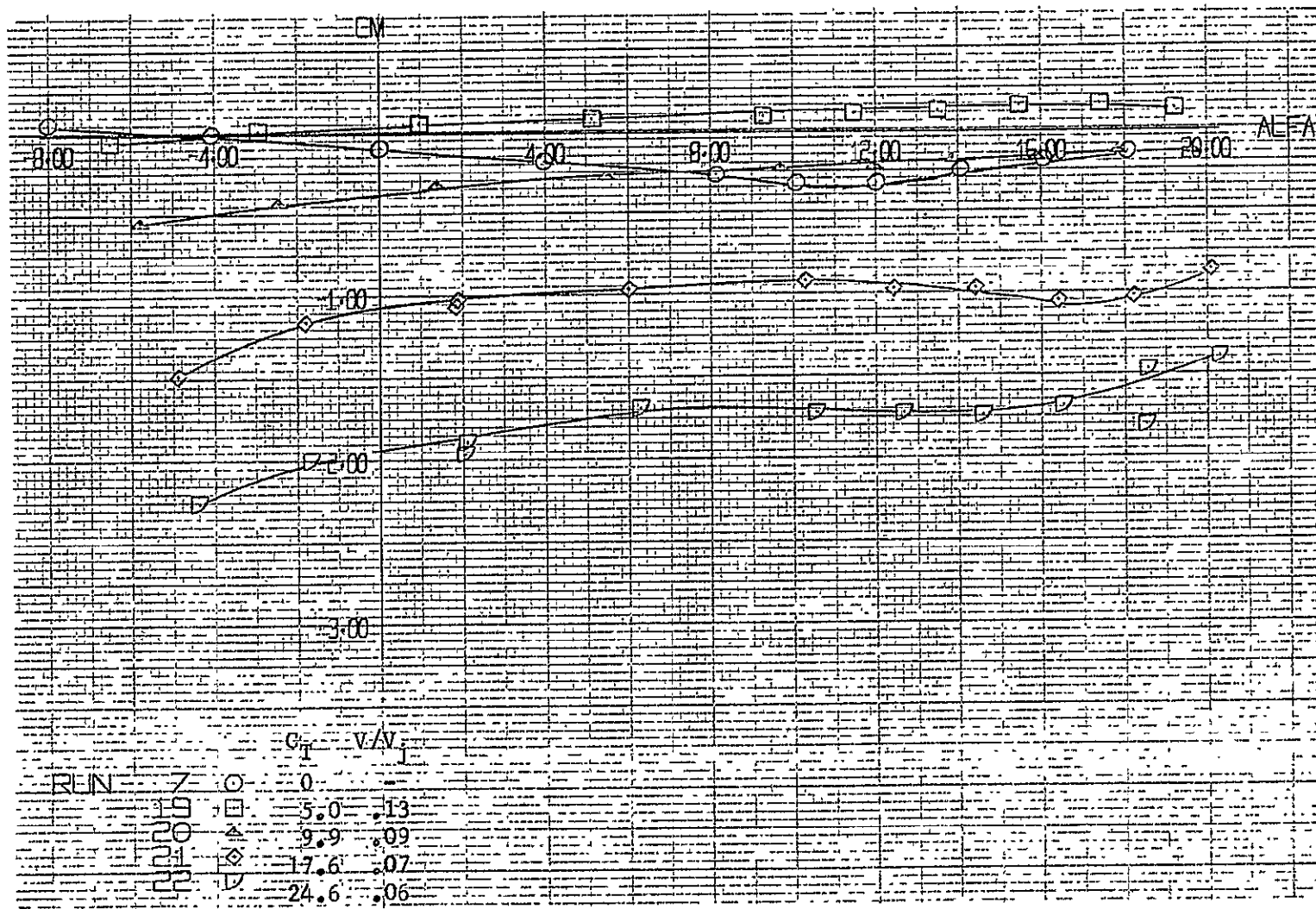


Figure A-3. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 90^\circ$, Lateral Control In; $T_R/T_L = .8$ (Continued)

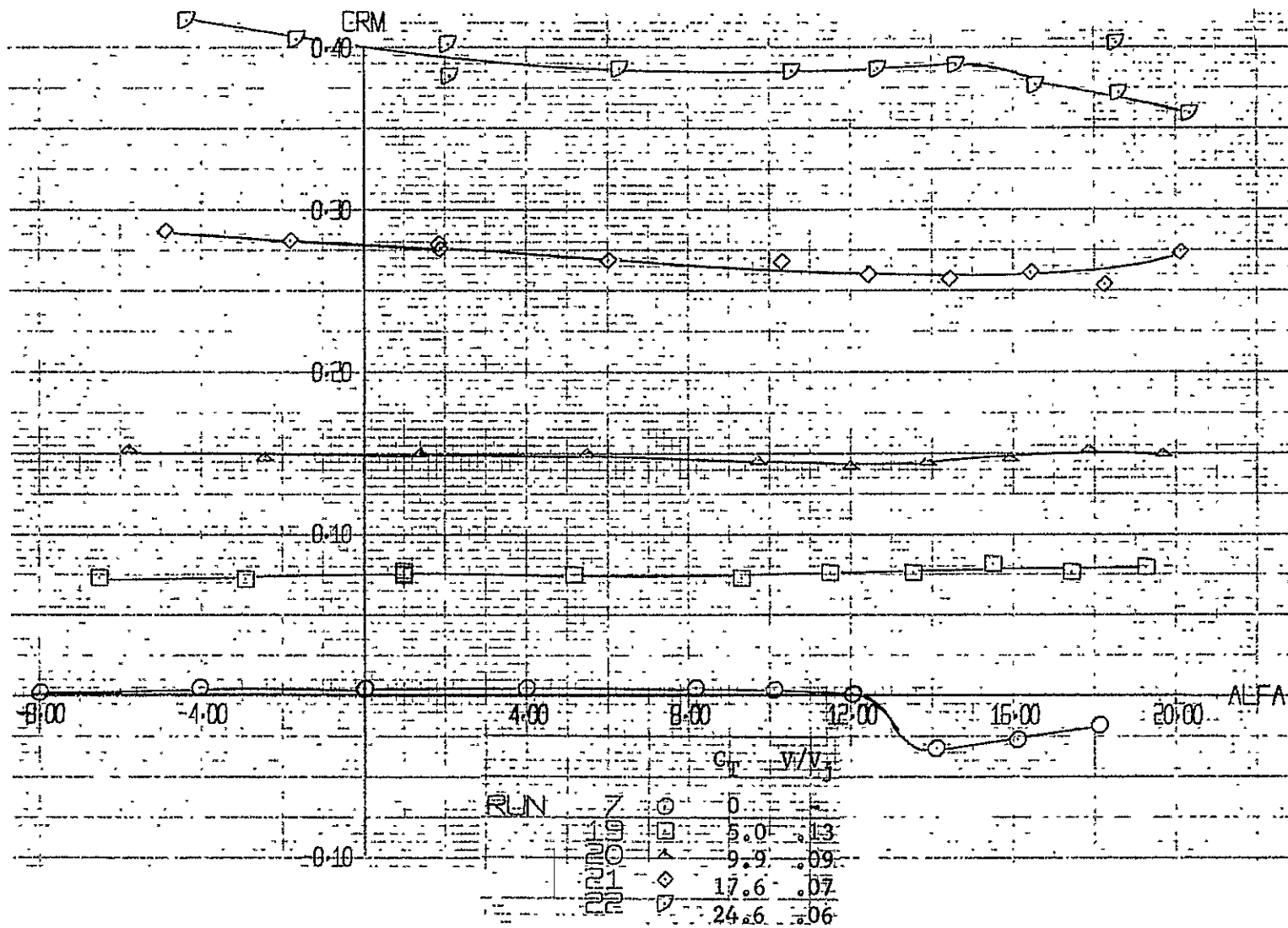


Figure A-3. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 90^\circ$, Lateral Control In; $T_R/T_L = .8$ (Concluded)

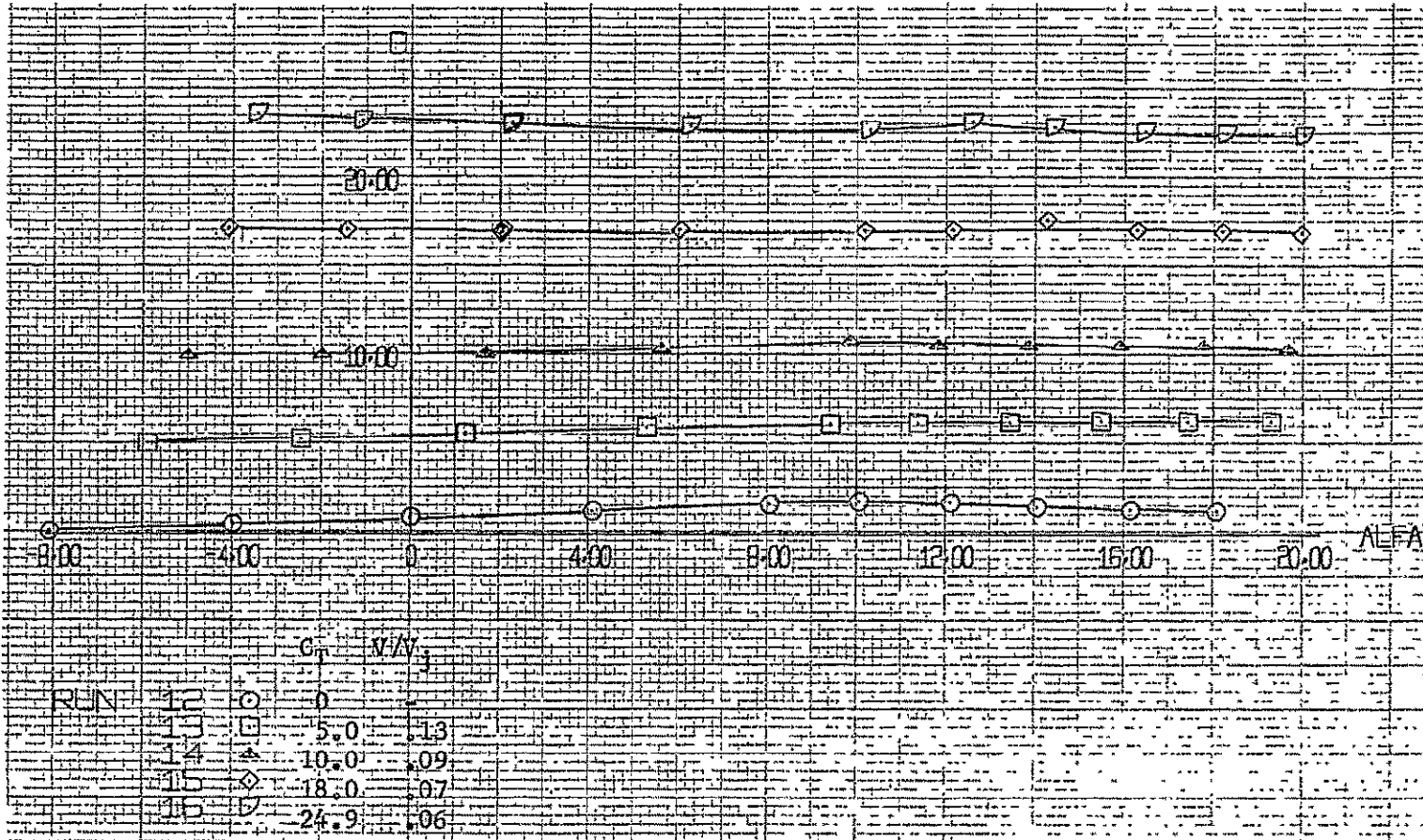


Figure A-4. Effect of Thrust on the Basic Aerodynamic Characteristics,
Free Air $\sim \delta_N = 105^\circ$

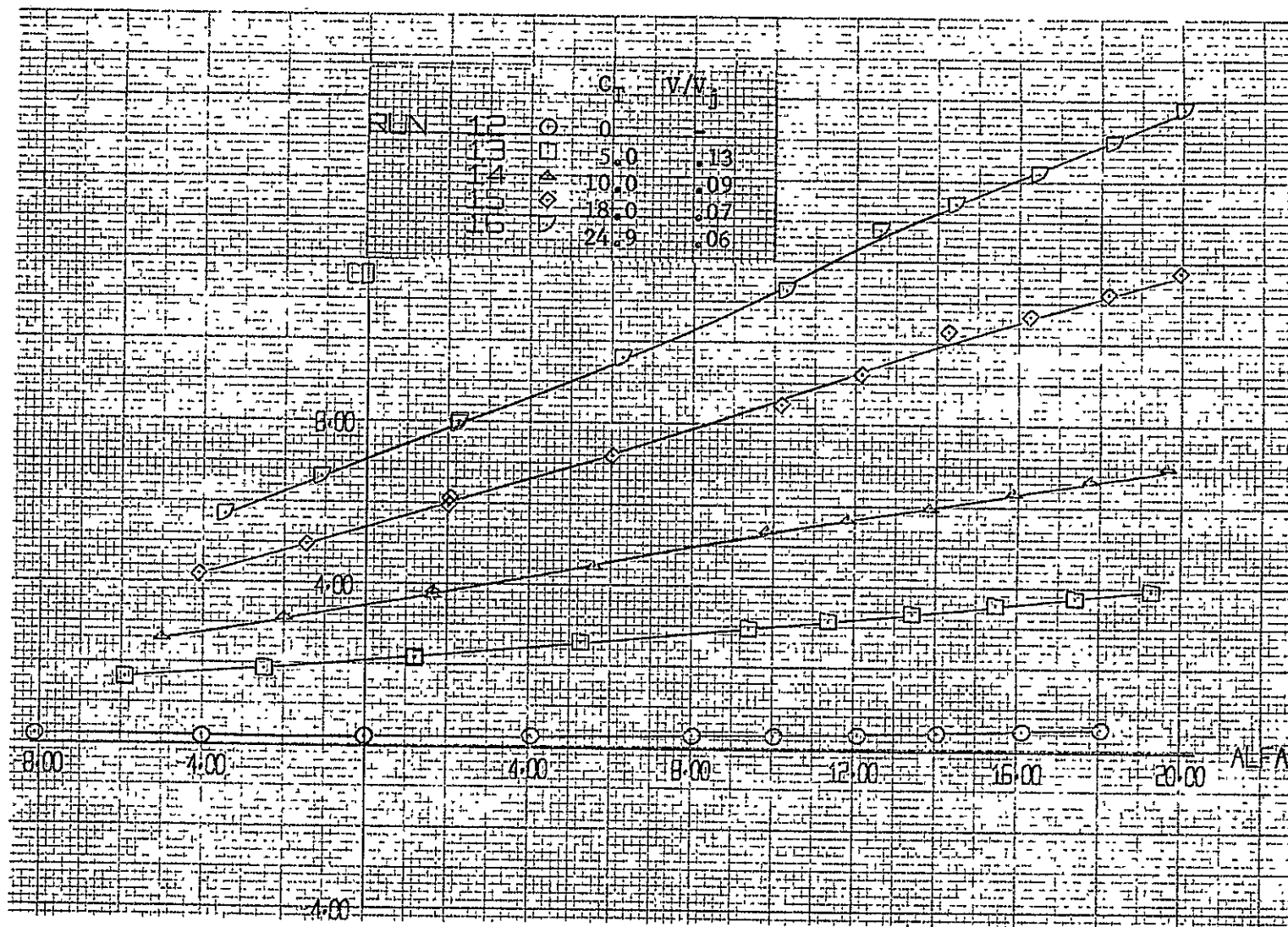


Figure A-4. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 105^\circ$ (Continued)

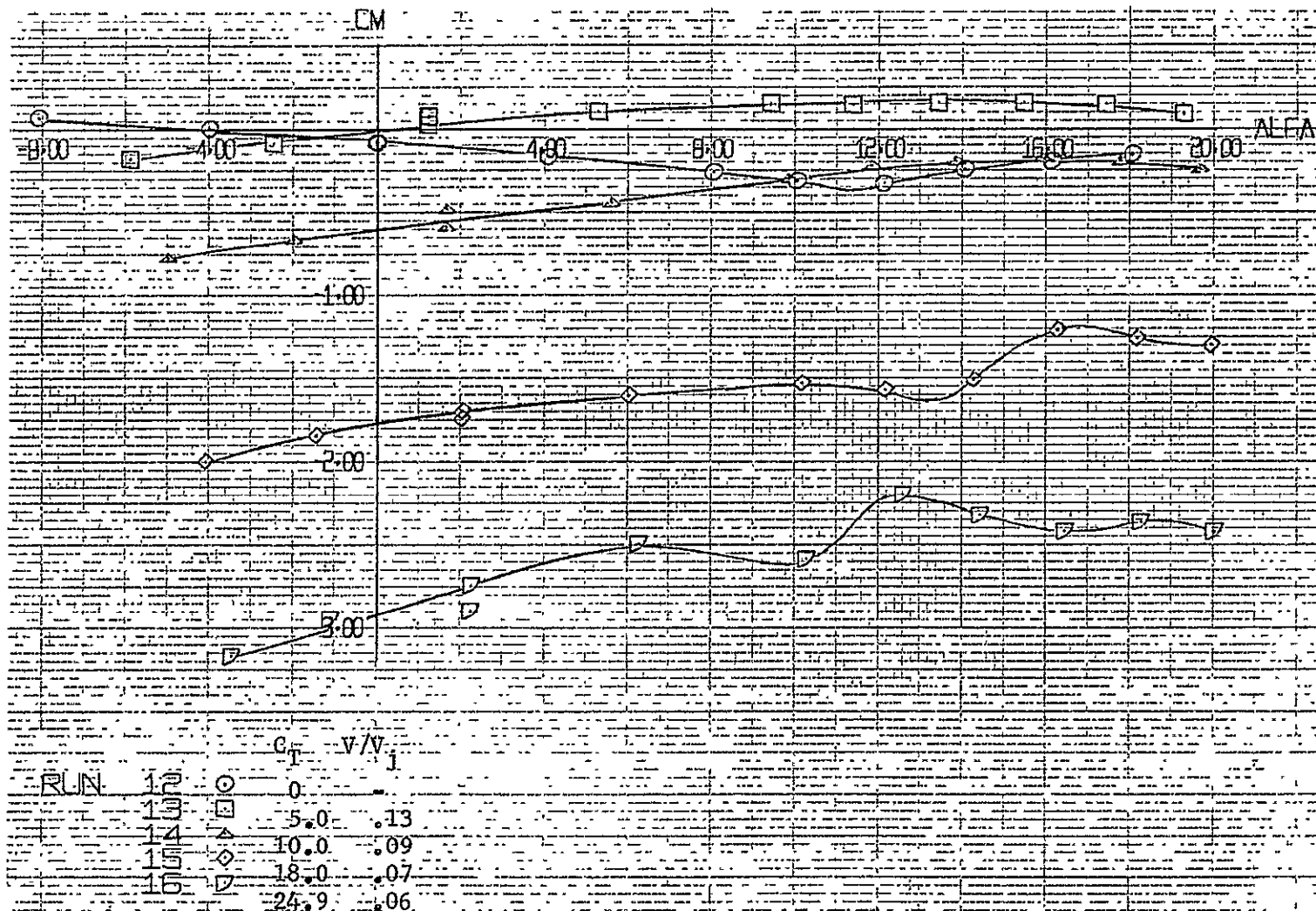


Figure A-4. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 105^\circ$ (Continued)

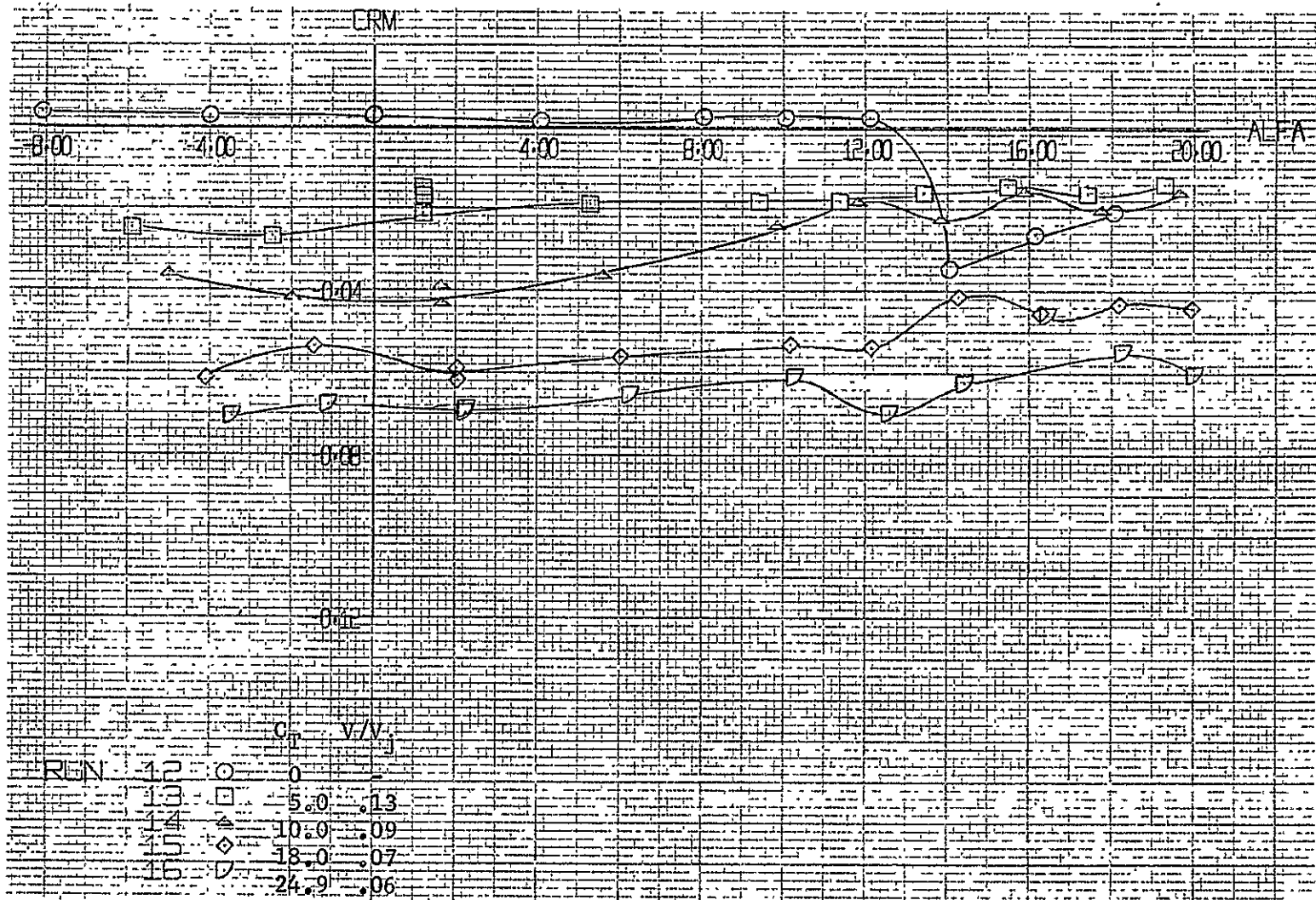


Figure A-4. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air $\sim \delta_N = 105^\circ$ (Concluded)

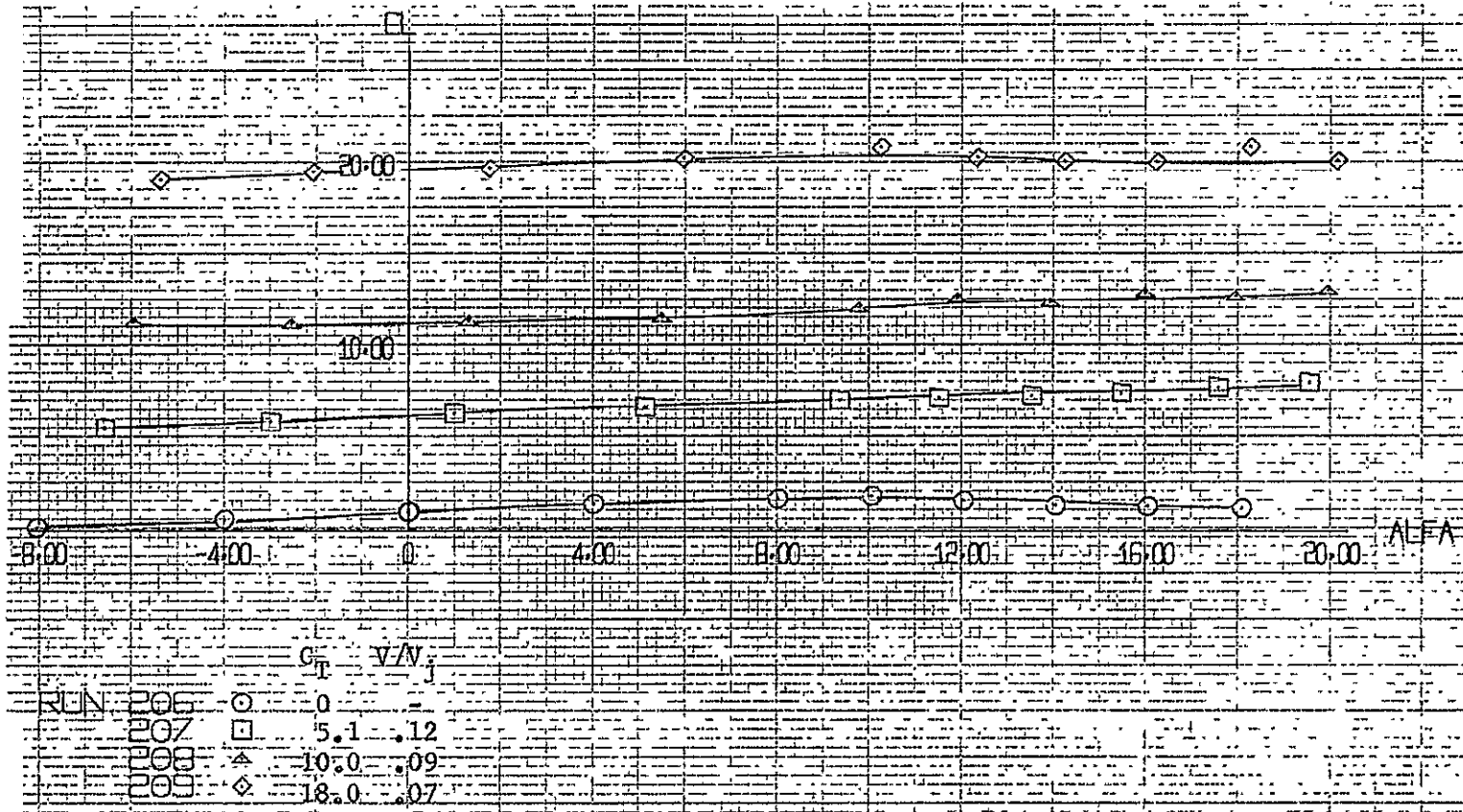


Figure A-5. Effect of Thrust on the Basic Aerodynamic Characteristics,
Free Air $\sim \delta_N = 80^\circ, 90^\circ, 90^\circ$

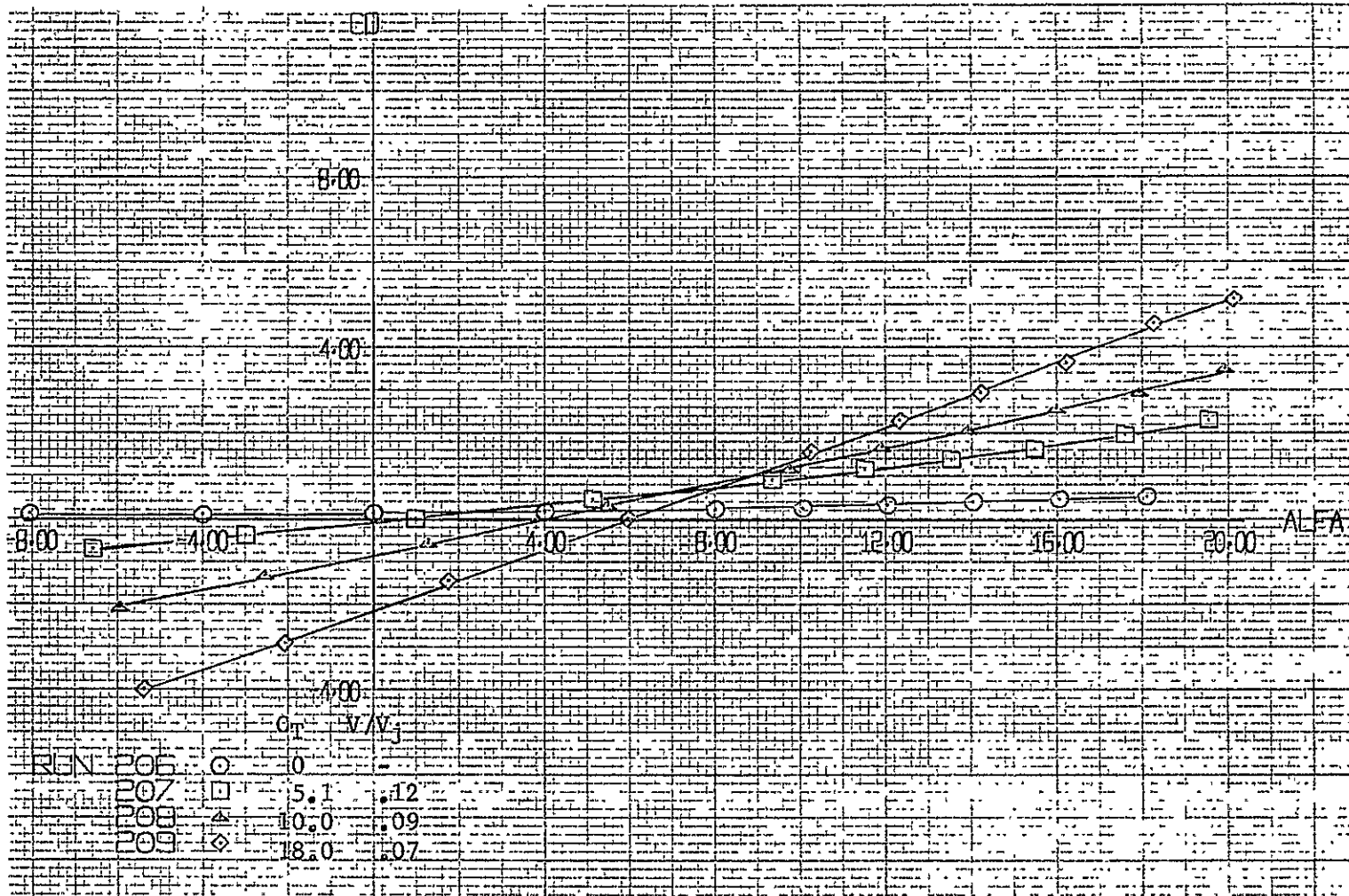


Figure A-5. Effect of Thrust on the Basic Aerodynamic Characteristics,
Free Air ~ $\delta_N = 80^\circ, 90^\circ, 90^\circ$ (Continued)

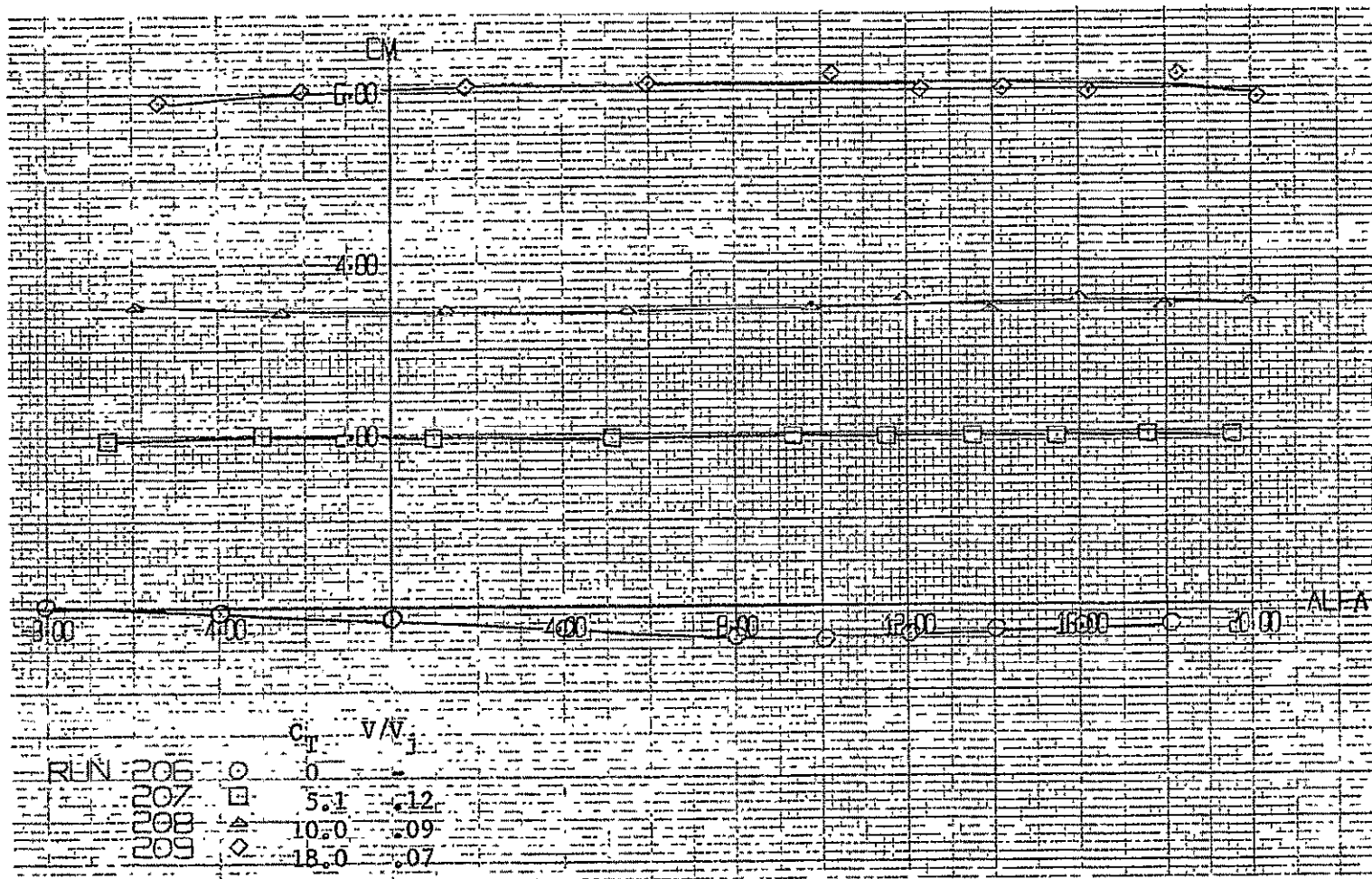


Figure A-5. Effect of Thrust on the Basic Aerodynamic Characteristics,
Free Air $\sim \delta_N = 80^\circ, 90^\circ, 90^\circ$ (Continued)

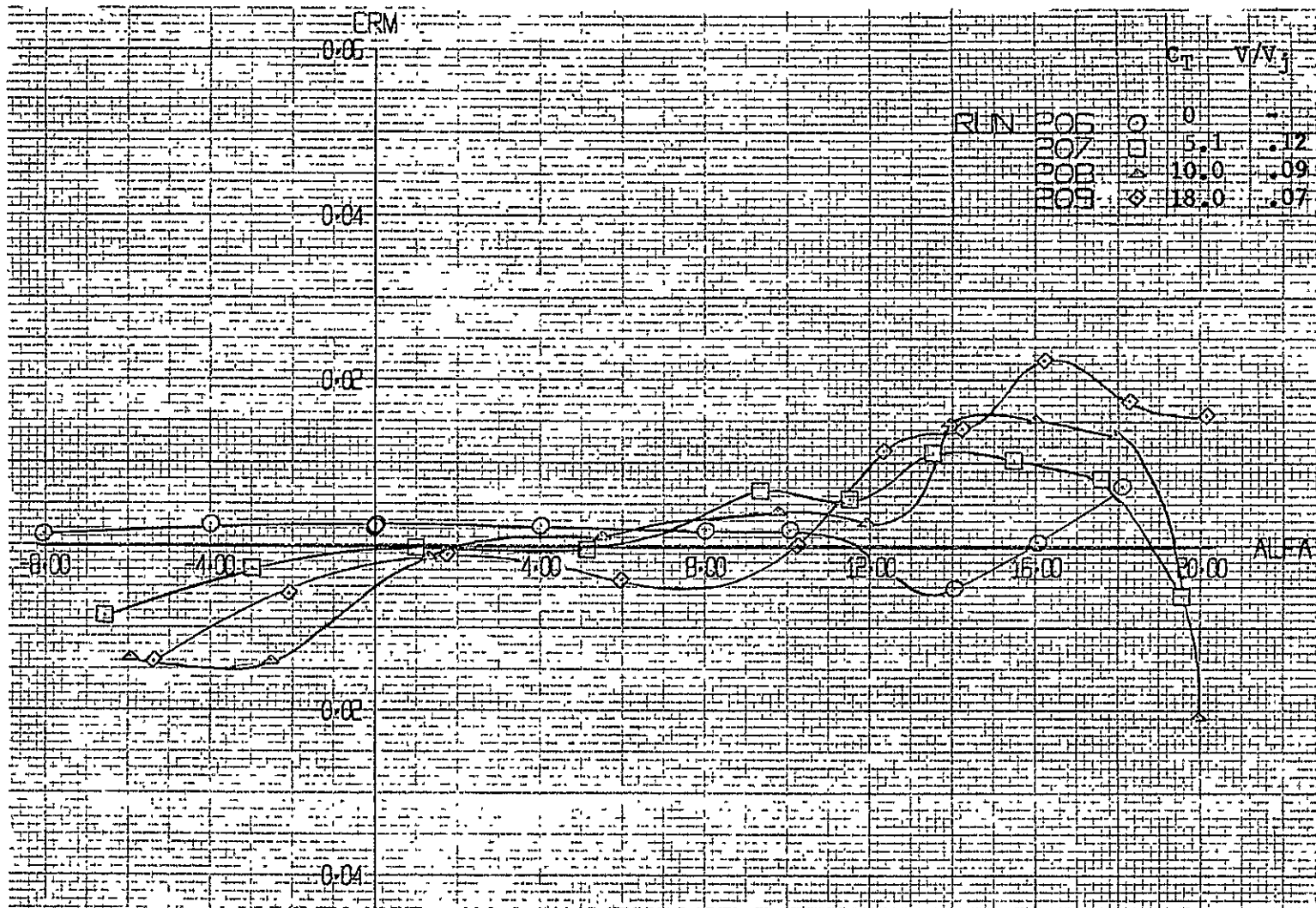


Figure A-5. Effect of Thrust on the Basic Aerodynamic Characteristics,
Free Air $\sim \delta_N = 80^\circ, 90^\circ, 90^\circ$ (Concluded)

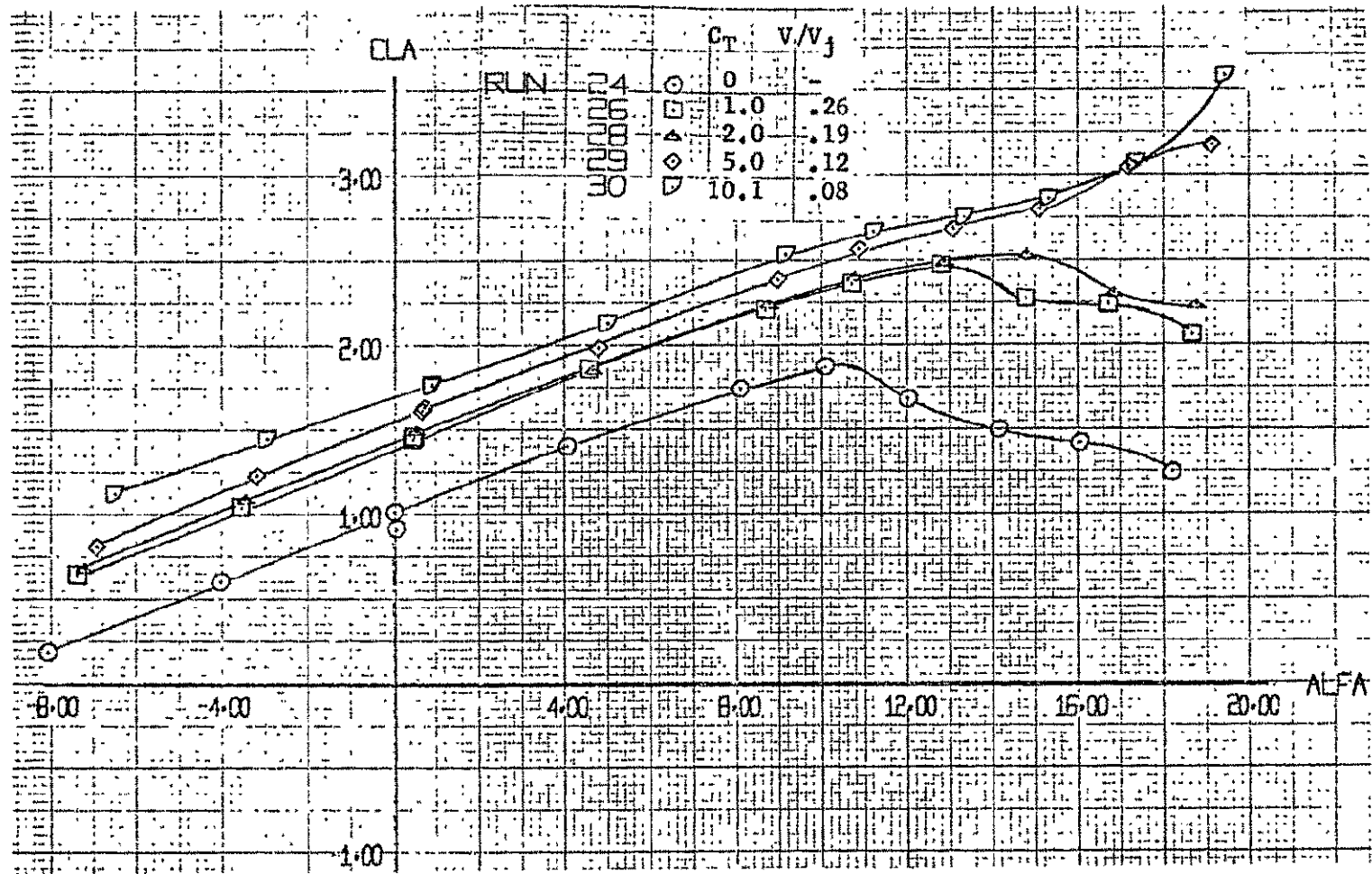


Figure A-6. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$

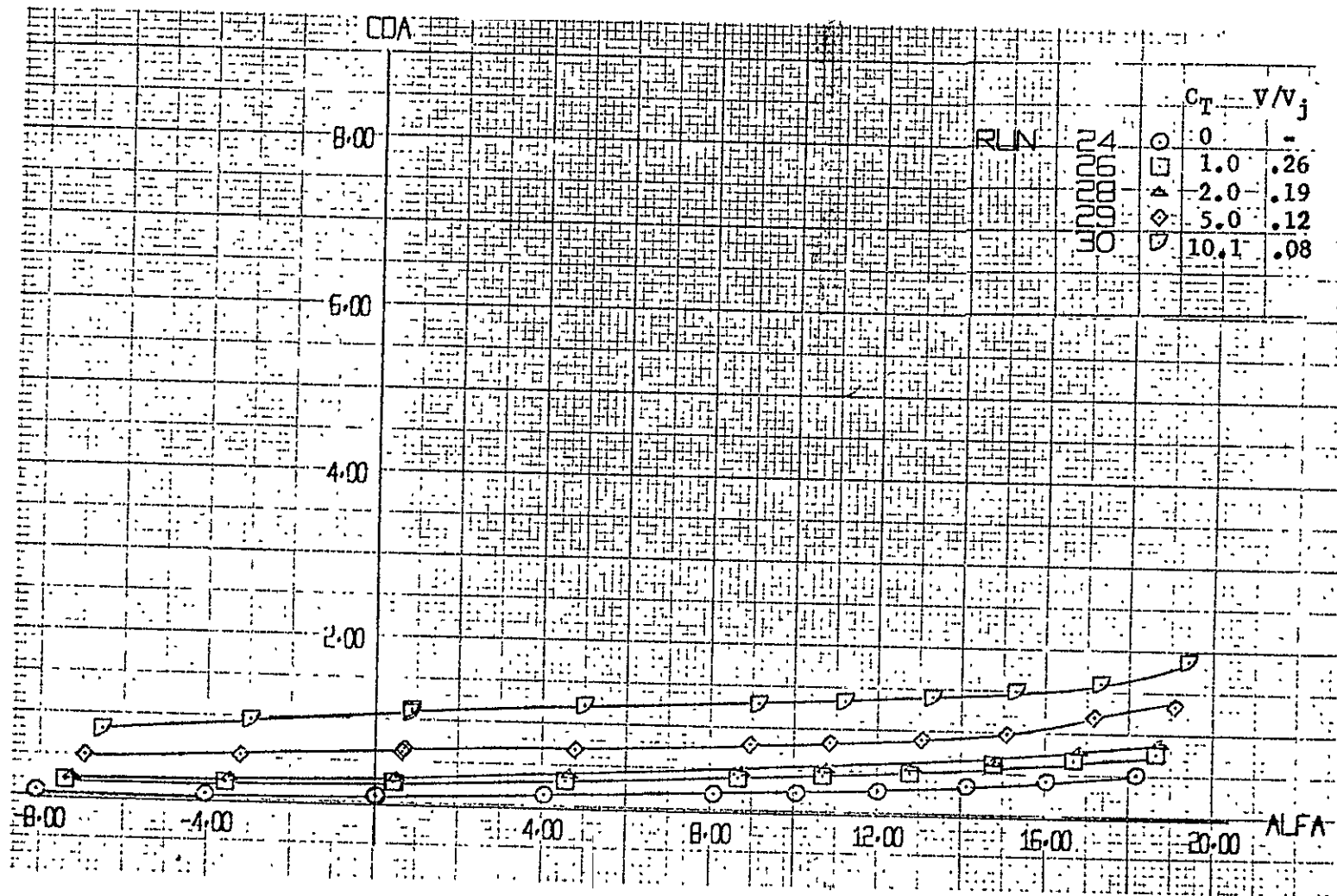


Figure A-6. Effect of Thrust on the Aerodynamic Coefficients,
 Free Air $\sim \delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$ (Continued)

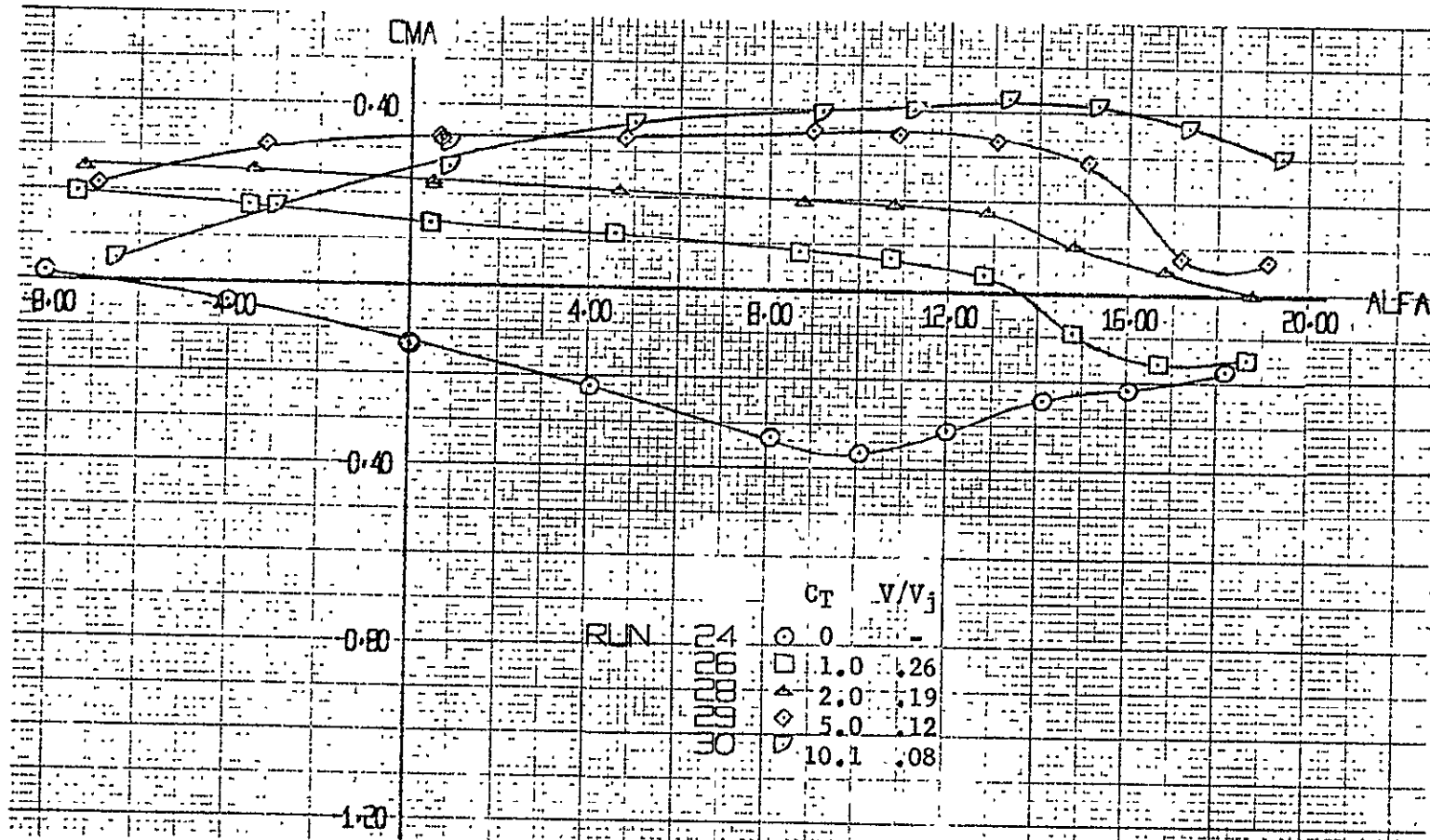


Figure A-6. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$ (Continued)

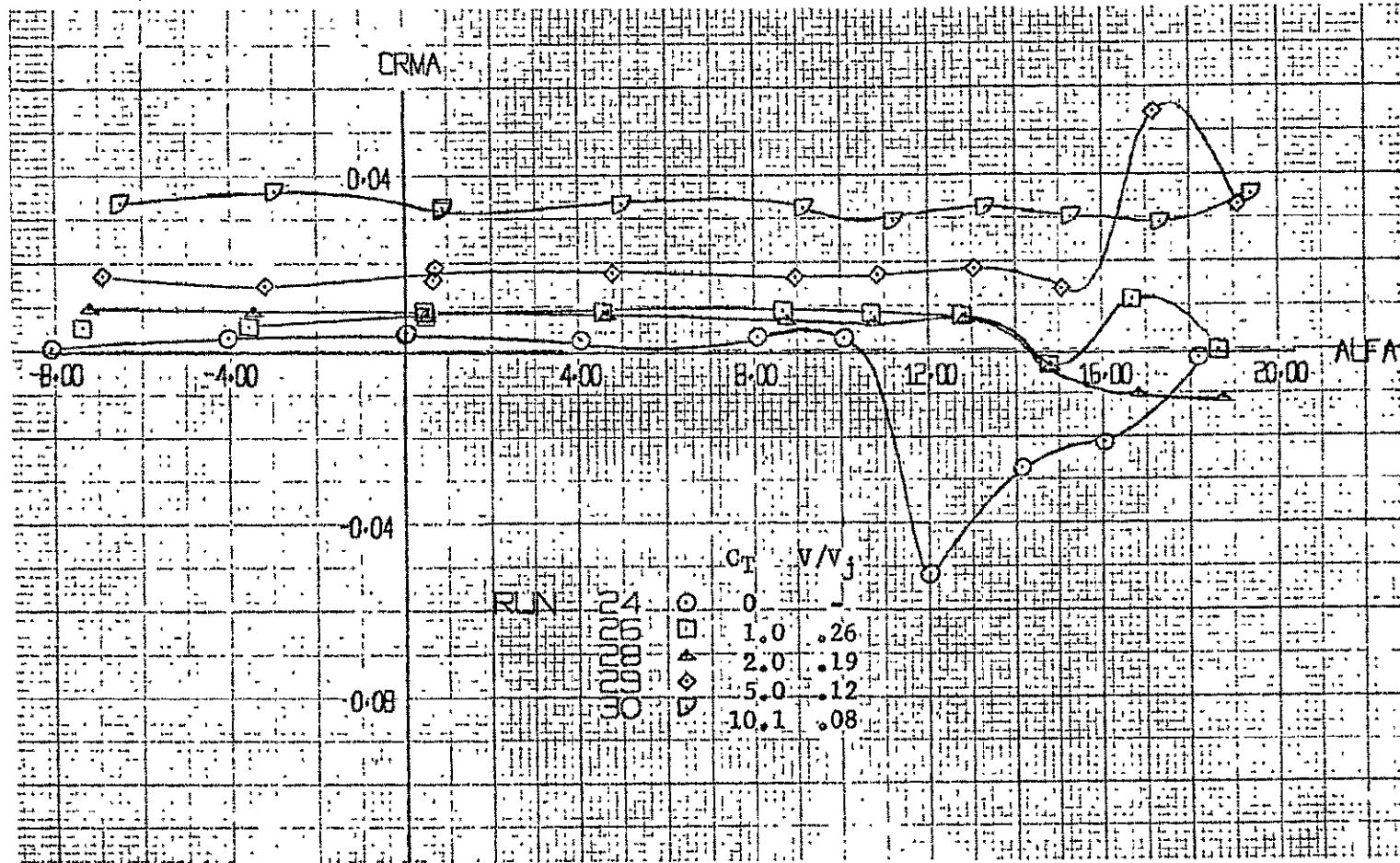


Figure A-6. Effect of Thrust on the Aerodynamic Coefficients,
 Free Air ~ $\delta_{N_{Fwd}} = 30^\circ$; $\delta_{N_{Aft}} = 60^\circ$ (Concluded)

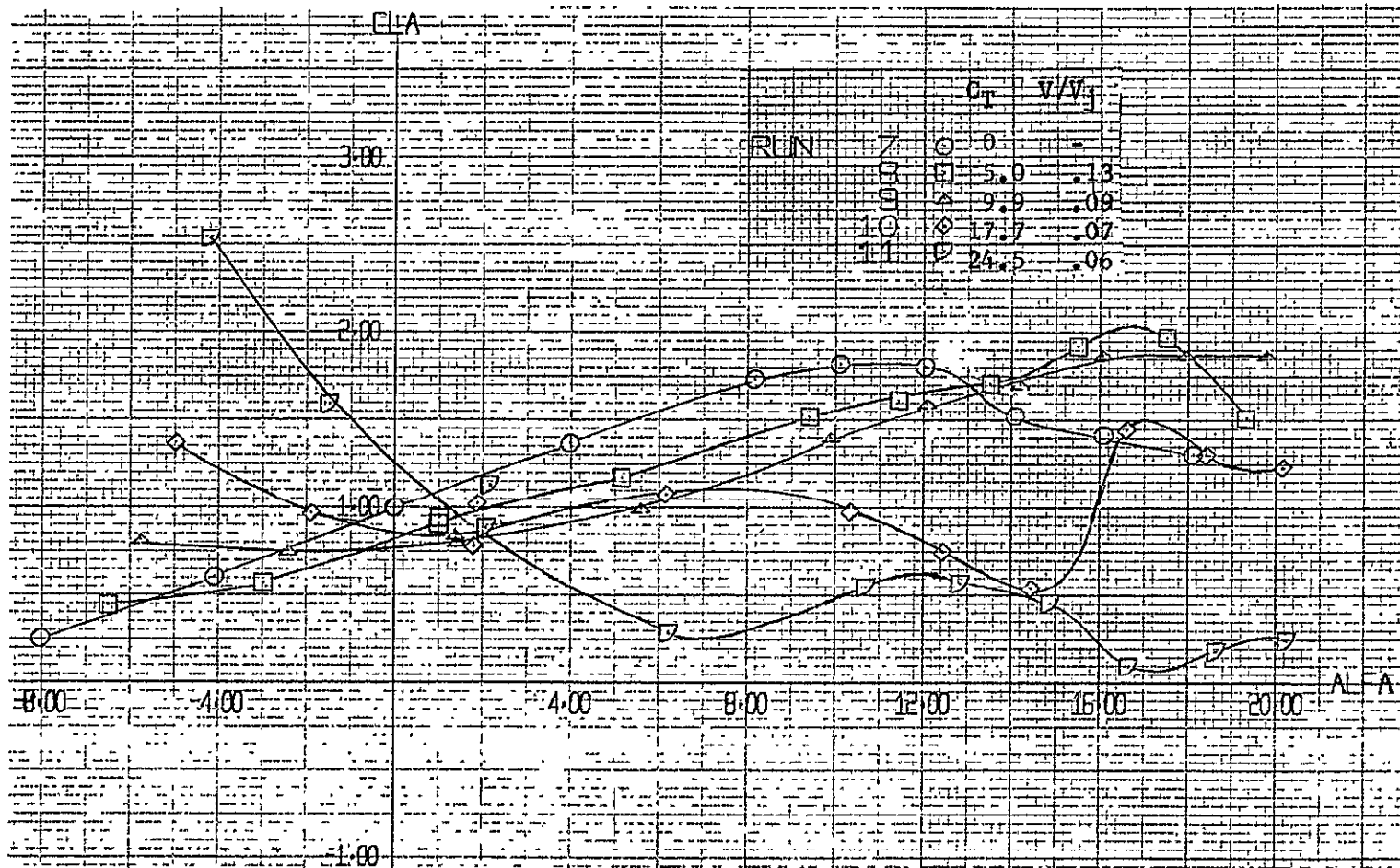


Figure A-7. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_N = 90^\circ$

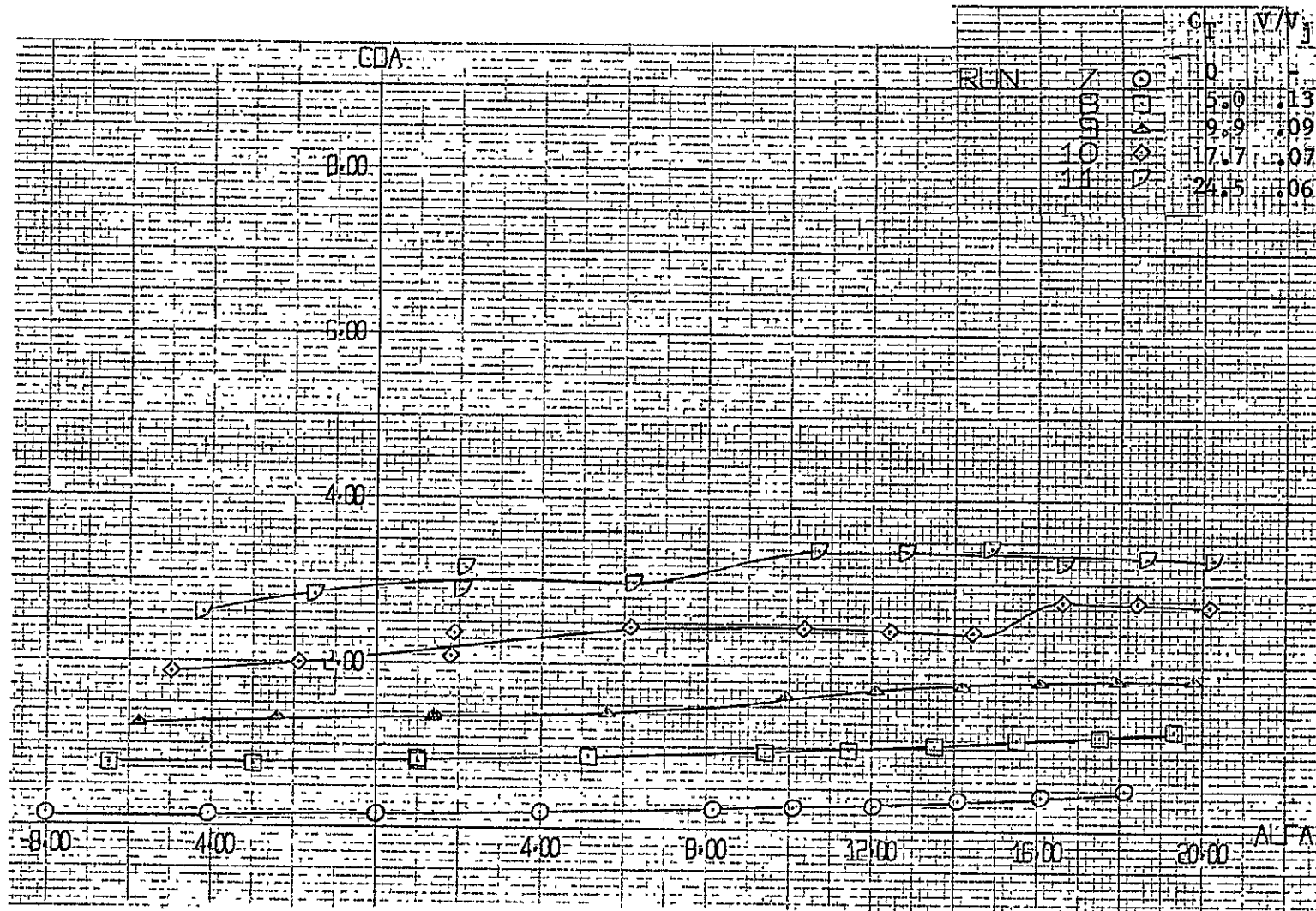
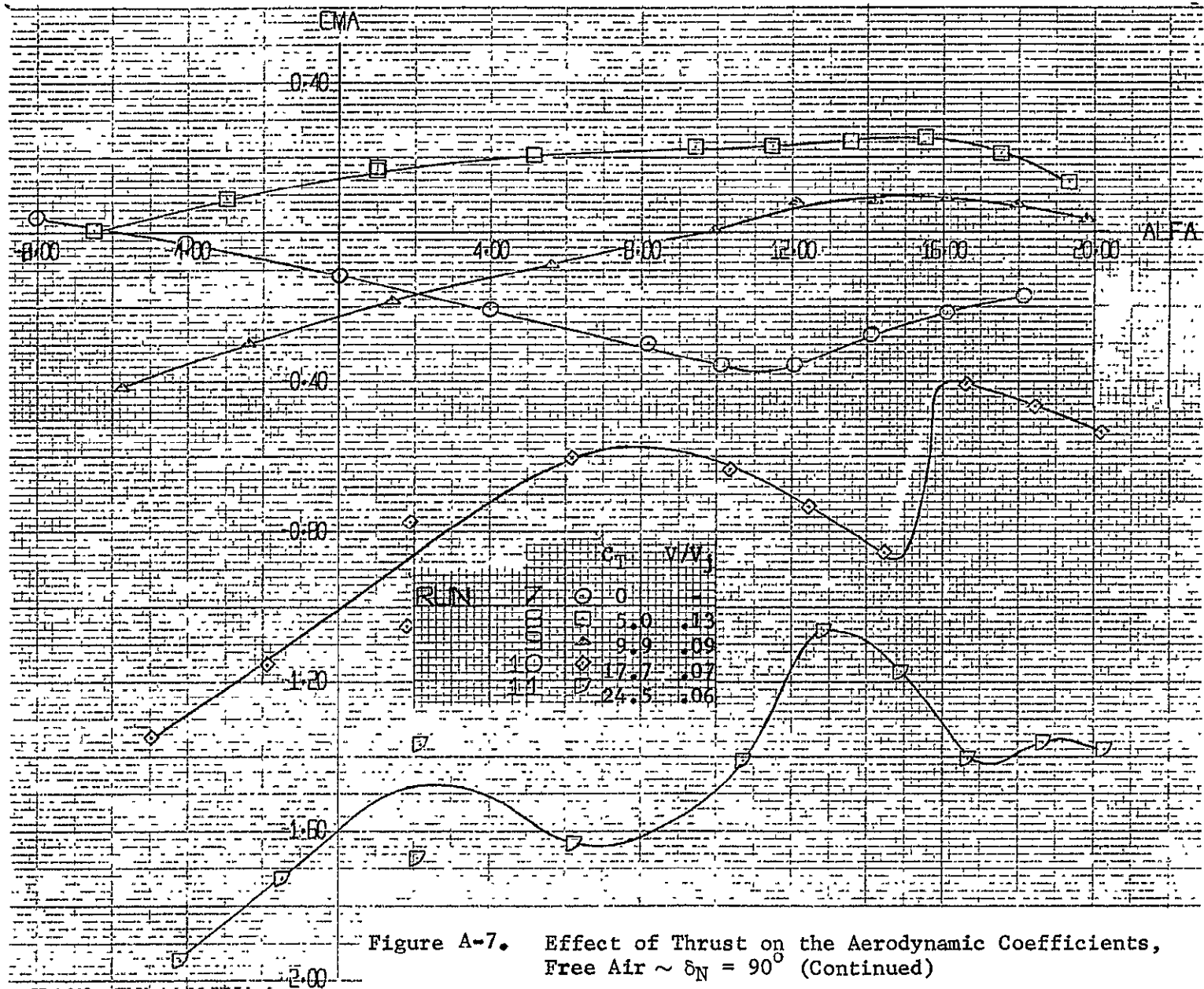


Figure A-7. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_N = 90^\circ$ (Continued)



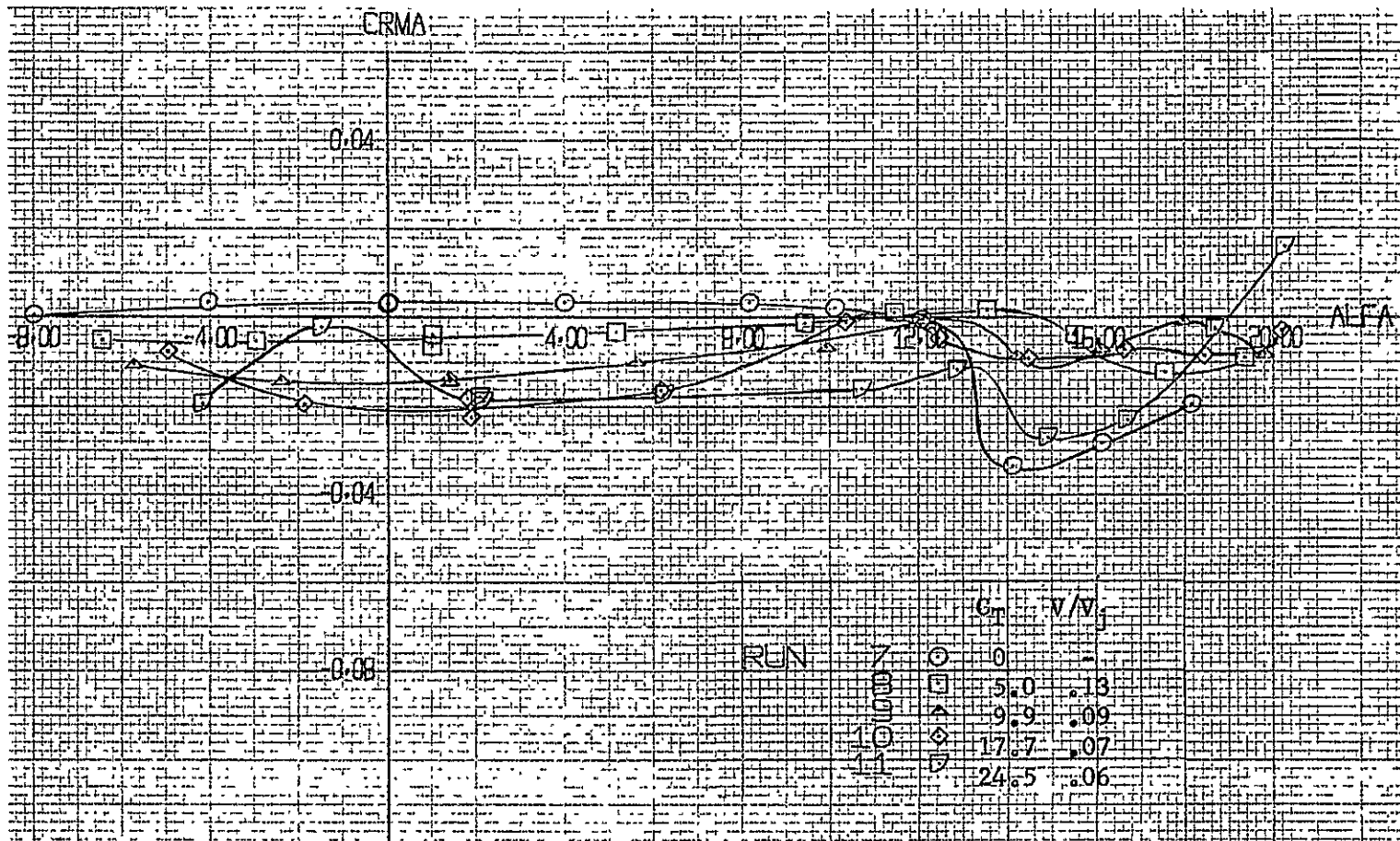


Figure A-7. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_N = 90^\circ$ (Concluded)

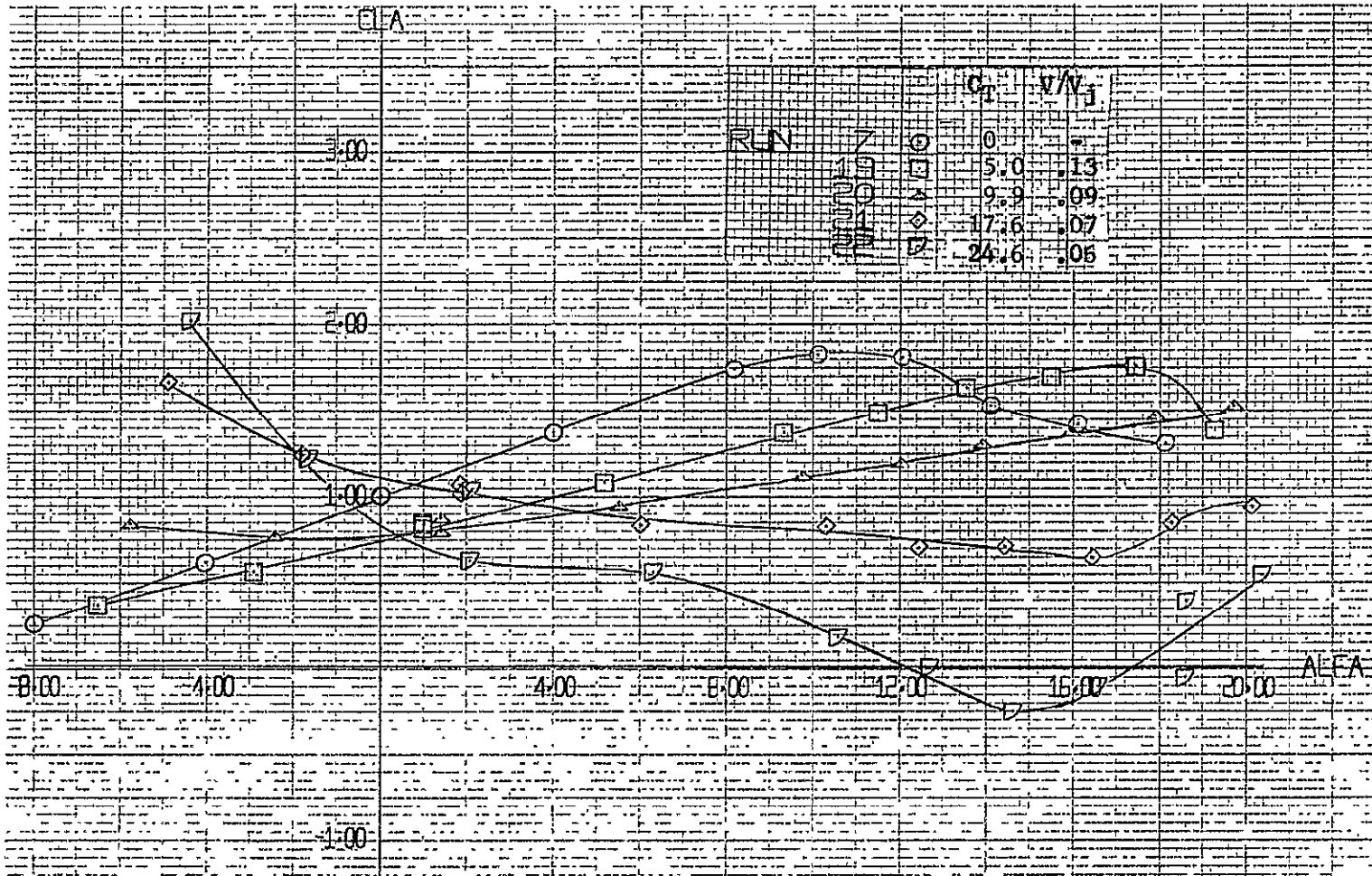


Figure A-8. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_N = 90^\circ$, Lateral Control In; $T_R/T_L = .8$

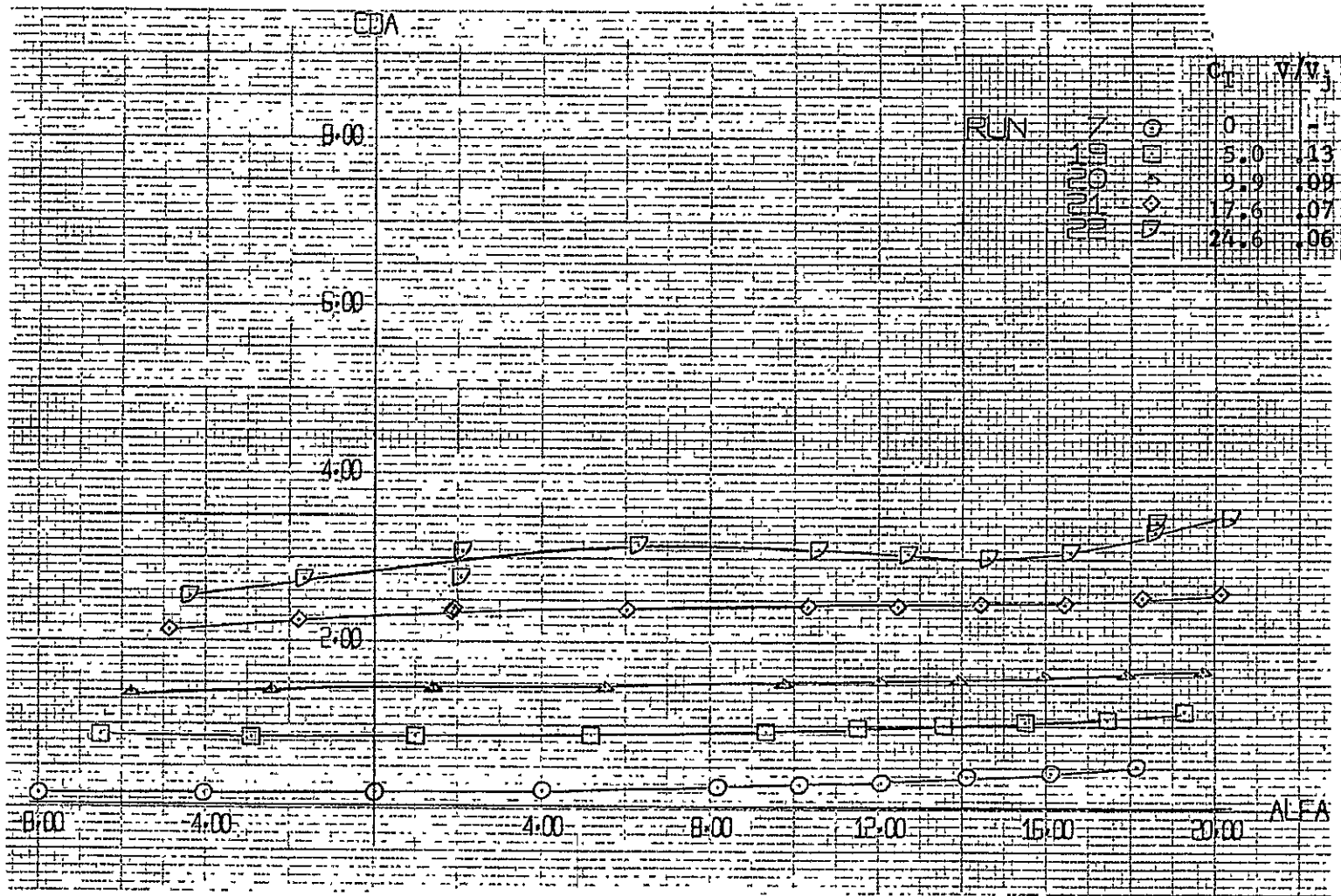


Figure A-8. Effect of Thrust on the Aerodynamic Coefficients,
 Free Air ~ $\delta_N = 90^\circ$, Lateral Control In; $T_R/T_L = .8$ (Continued)

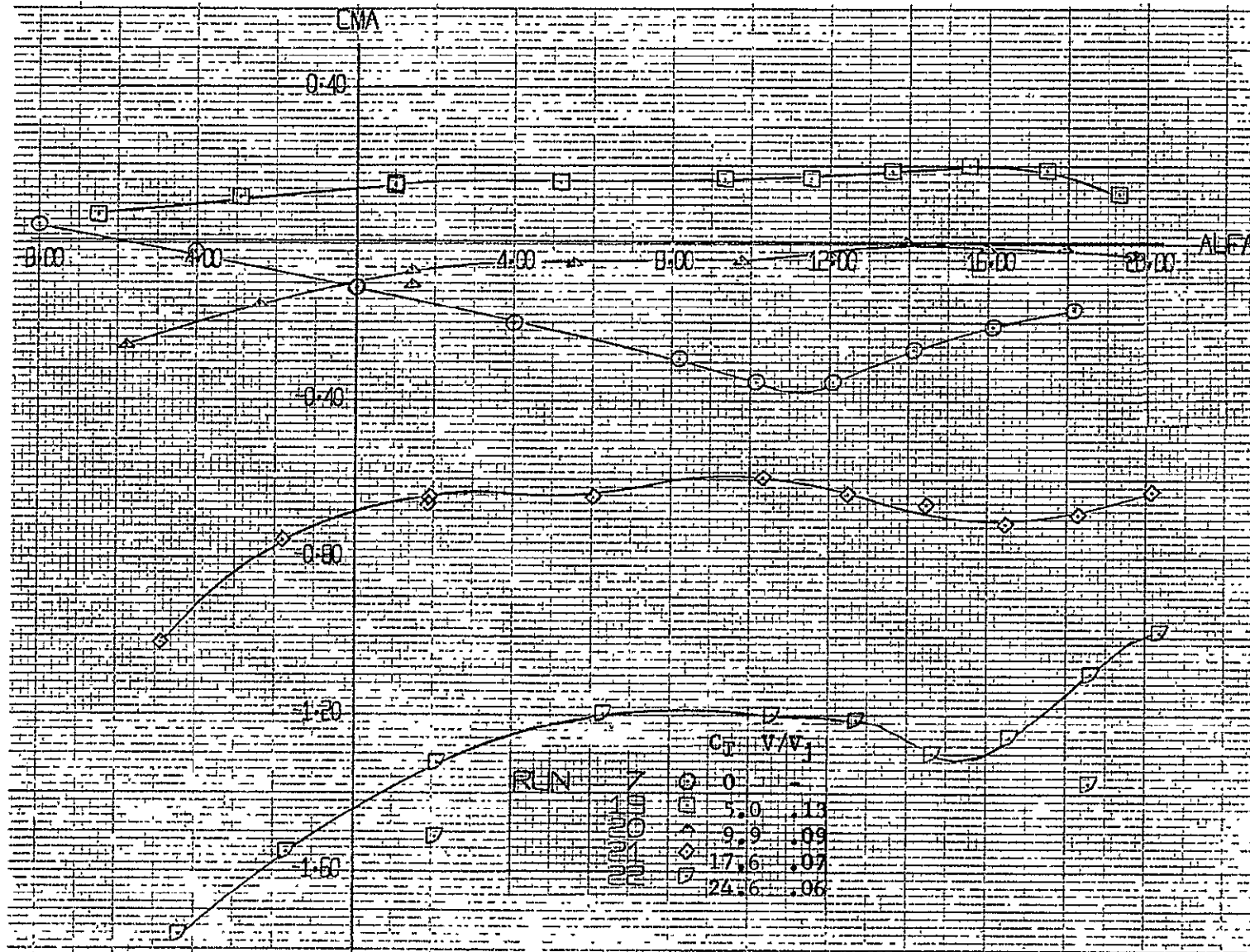


Figure A-8. Effect of Thrust on the Aerodynamic Coefficients, Free Air $\sim \delta_N = 90^\circ$, Lateral Control In; $T_R/T_L = .8$ (Continued)

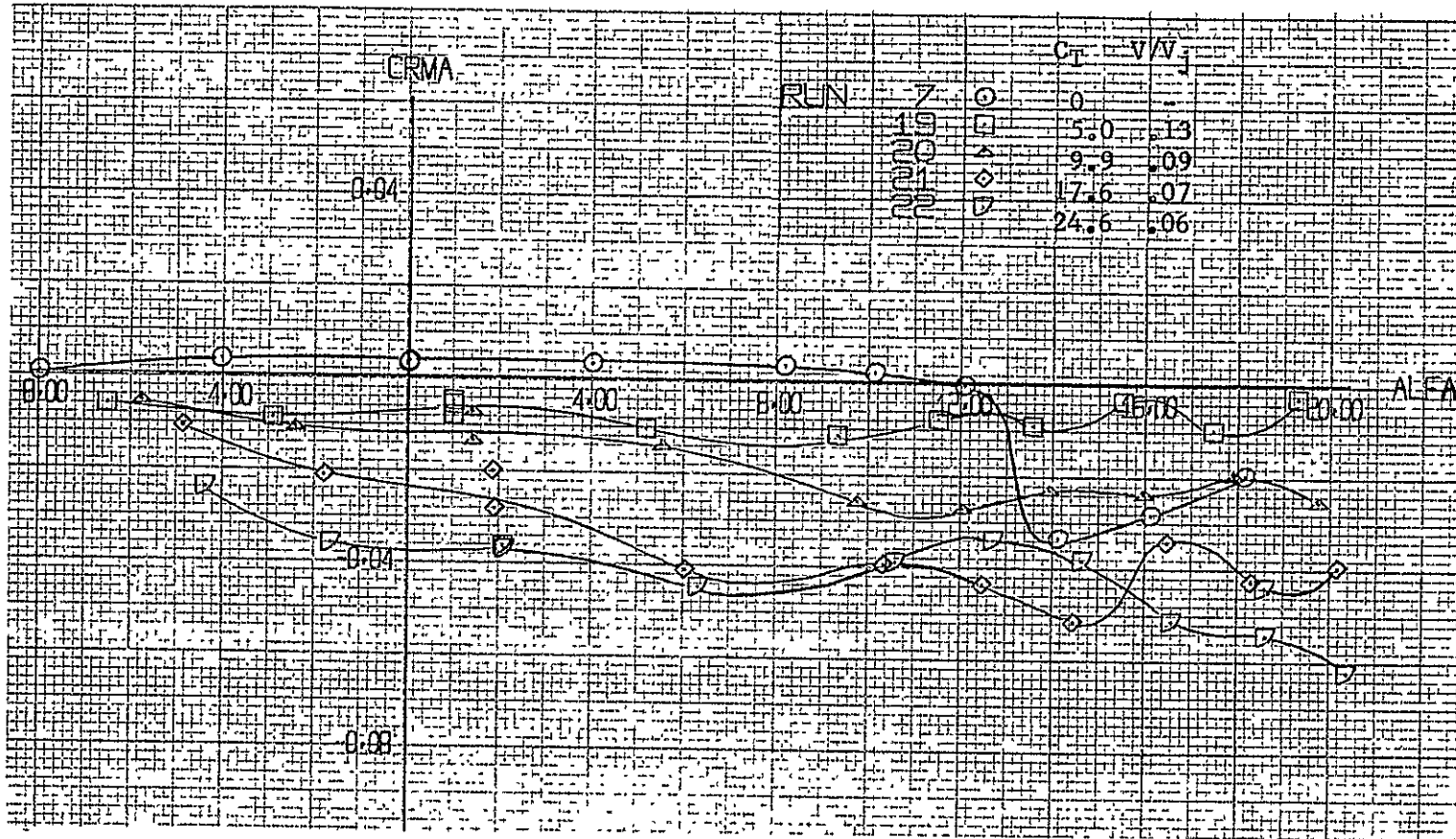


Figure A-8. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_N = 90^\circ$, Lateral Control In; $T_R/T_L = .8$ (Concluded)

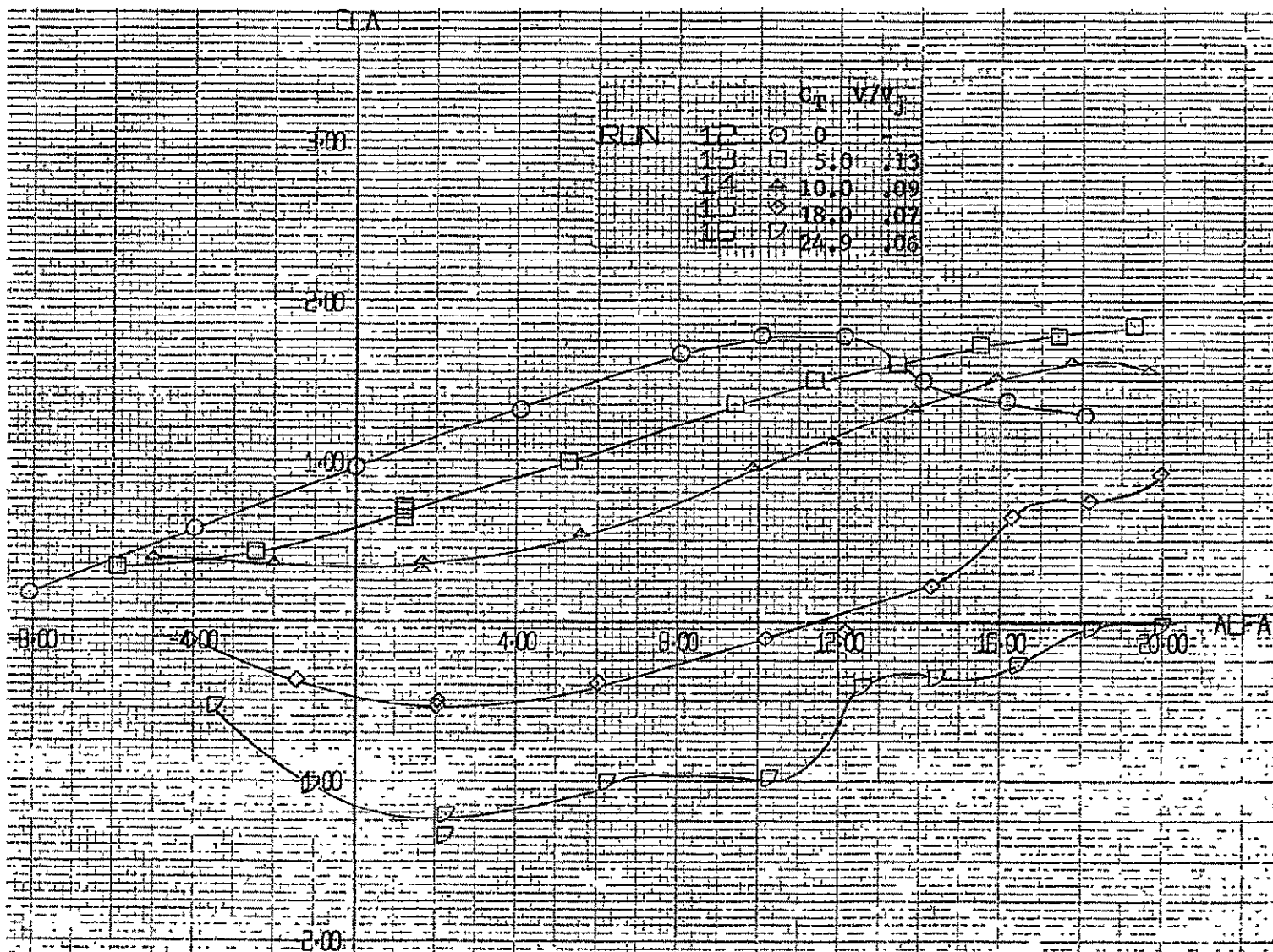


Figure A-9. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_N = 105^\circ$

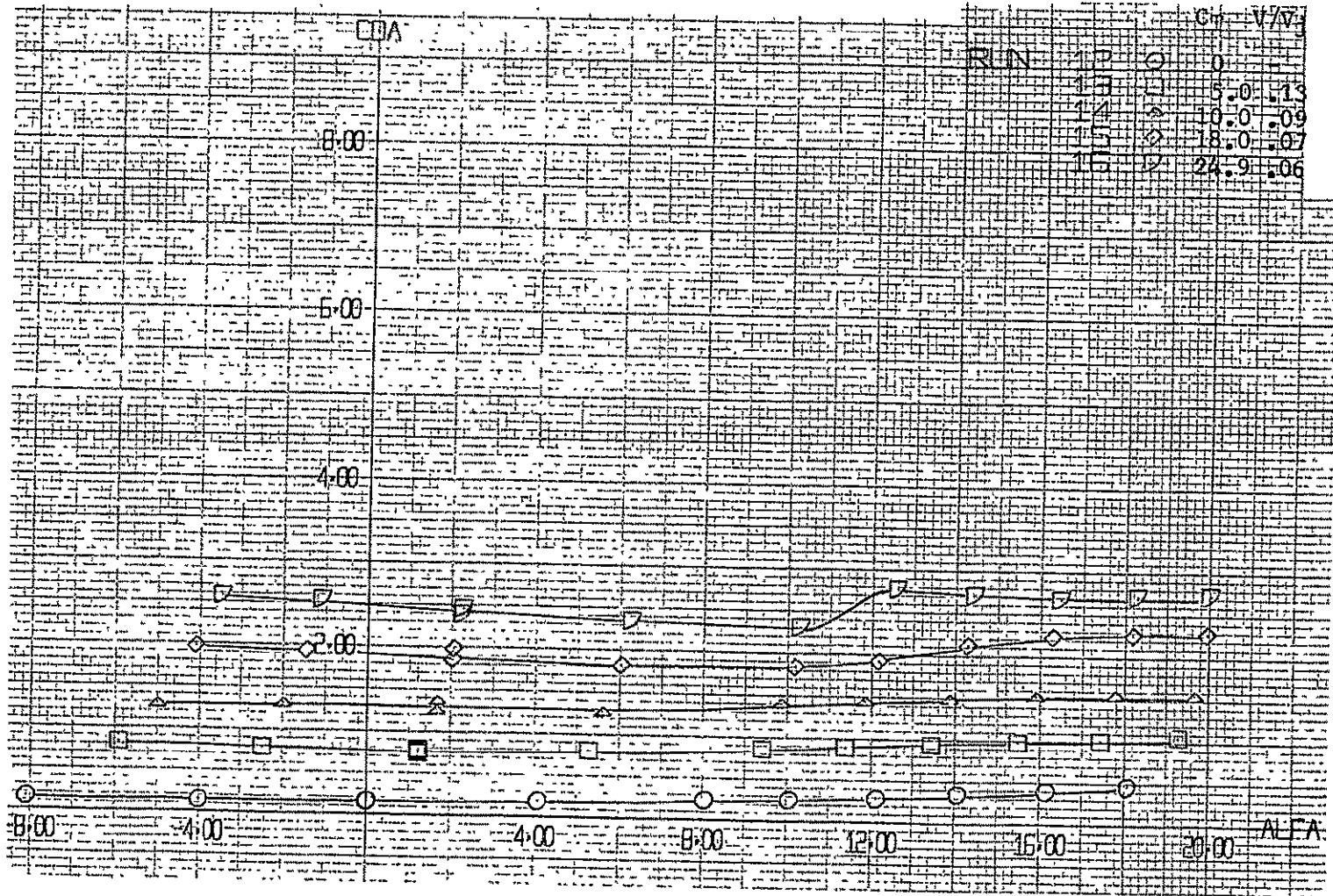


Figure A-9. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_N = 105^\circ$ (Continued)

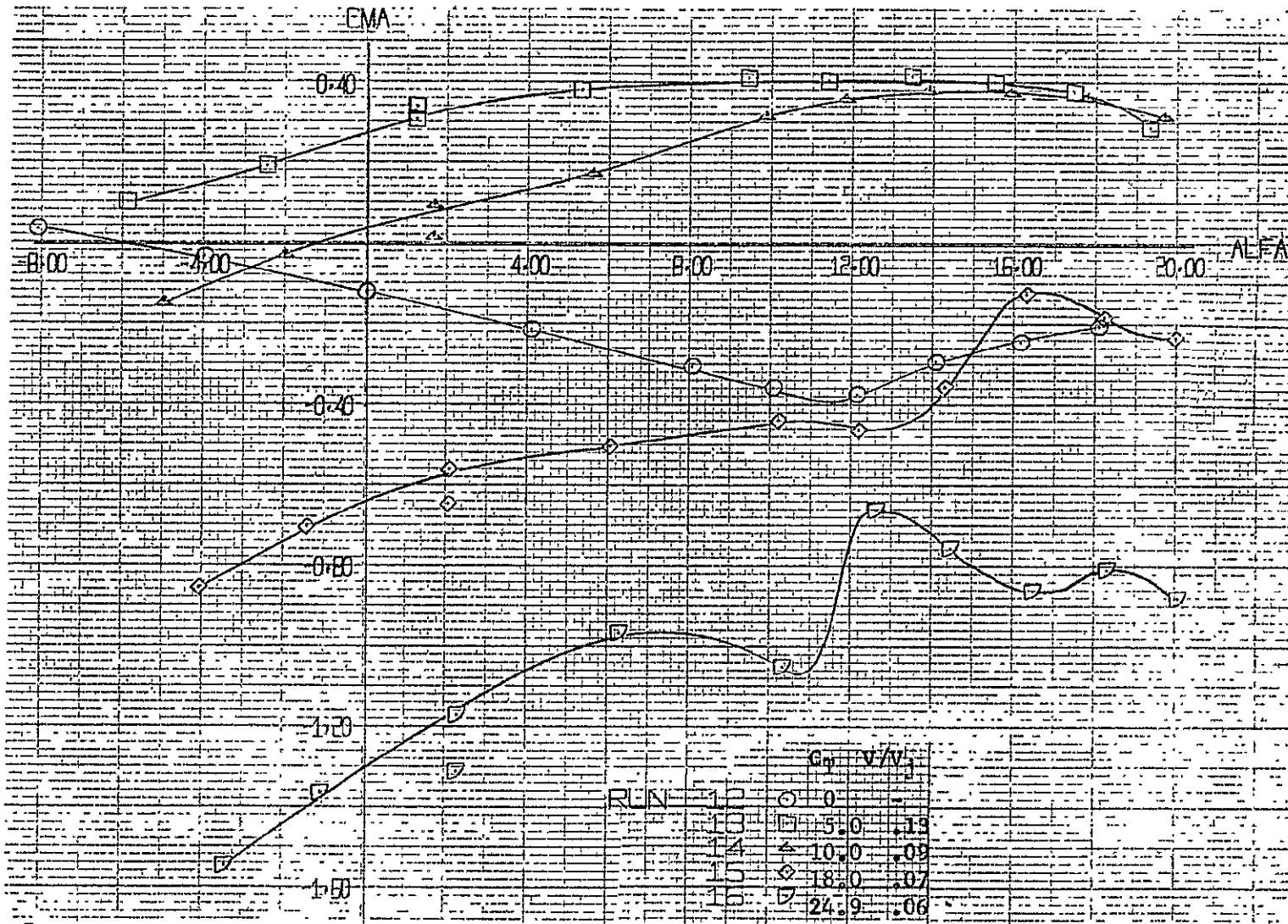


Figure A-9. Effect of Thrust on the Aerodynamic Coefficients, Free Air $\sim \delta_N = 105^\circ$ (Continued)

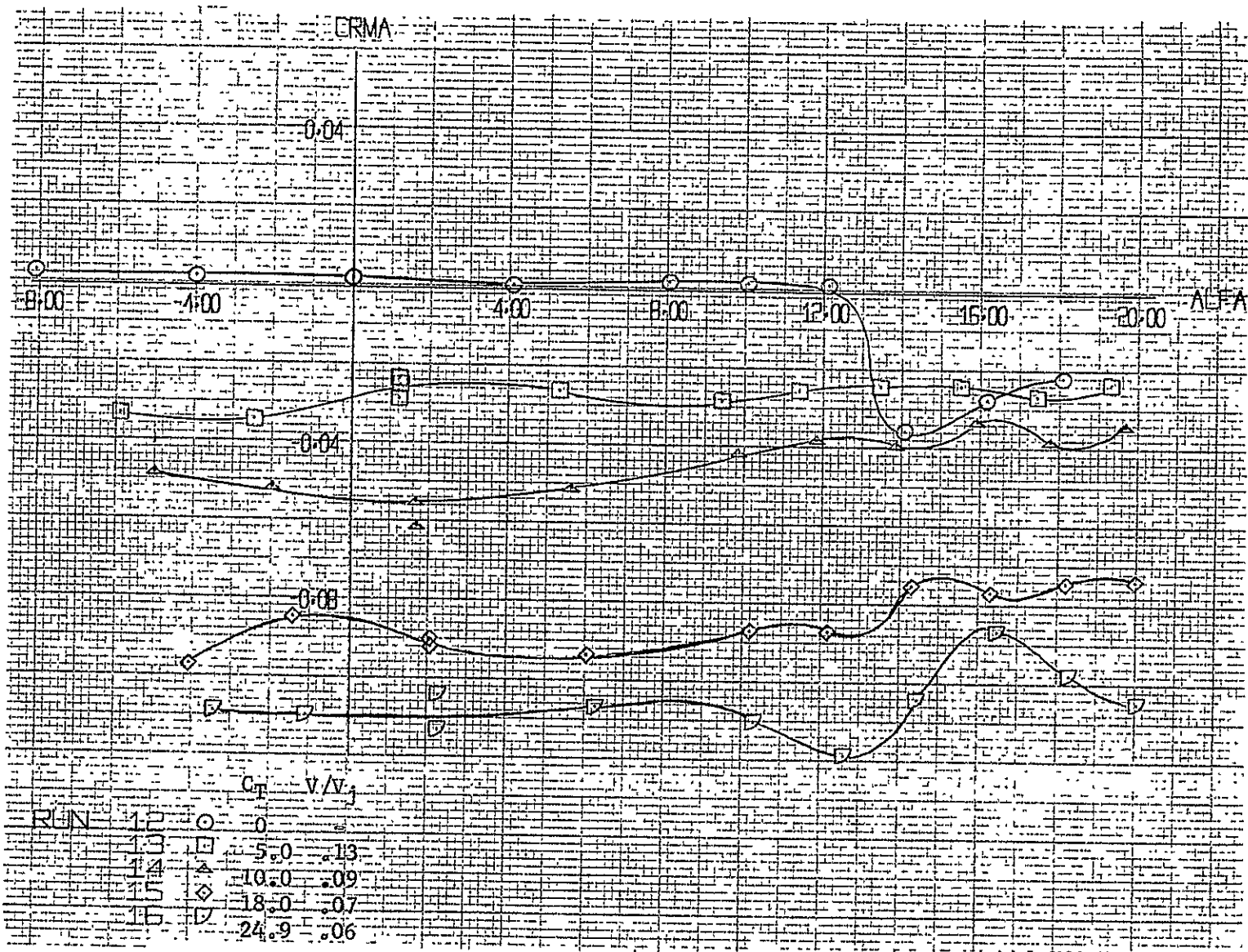


Figure A-9. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_N = 105^\circ$ (Concluded)

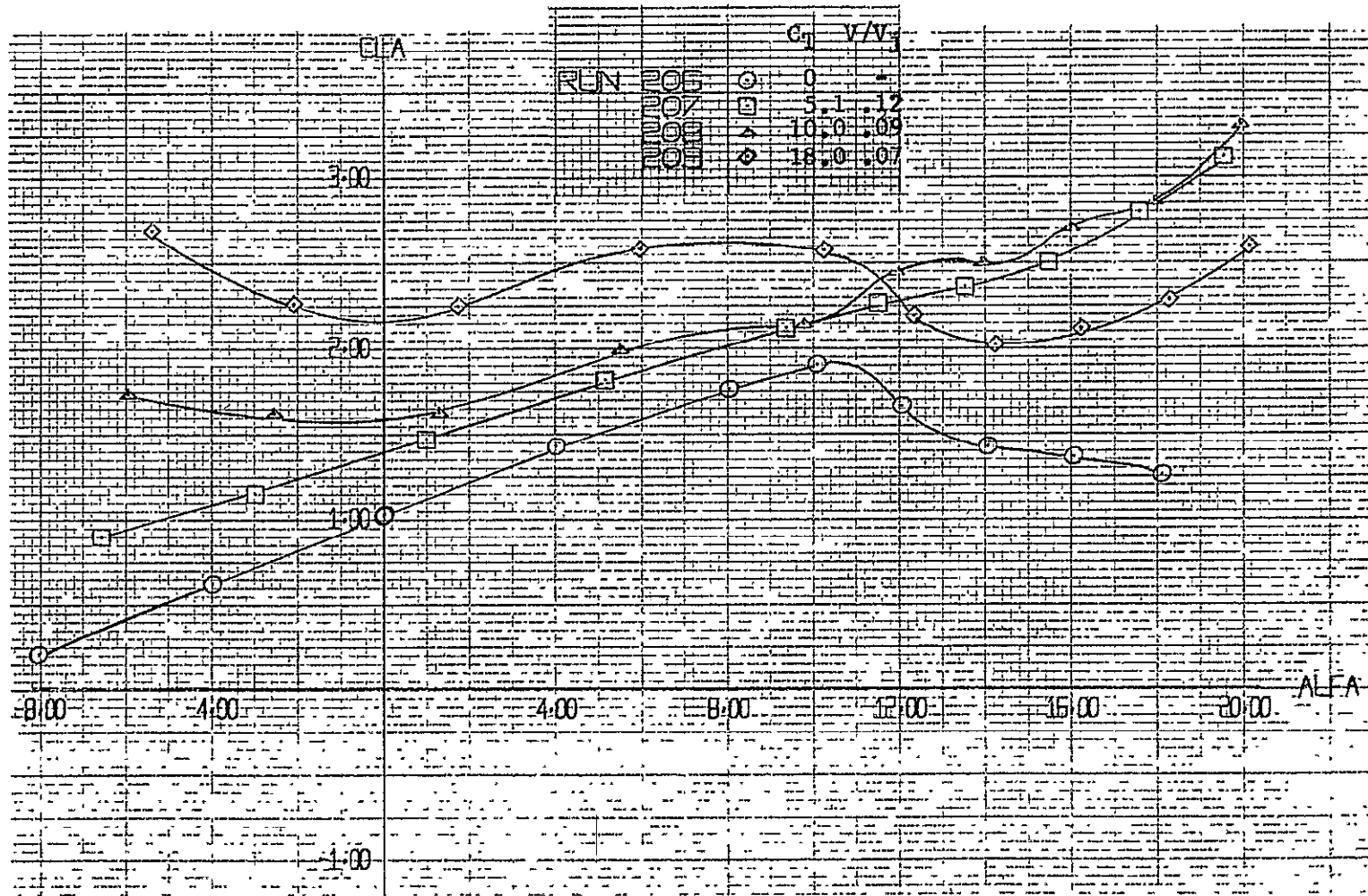


Figure A-10. Effect of Thrust on the Aerodynamic Coefficients,
Free Air ~ $\delta_N = 80^\circ, 90^\circ, 90^\circ$

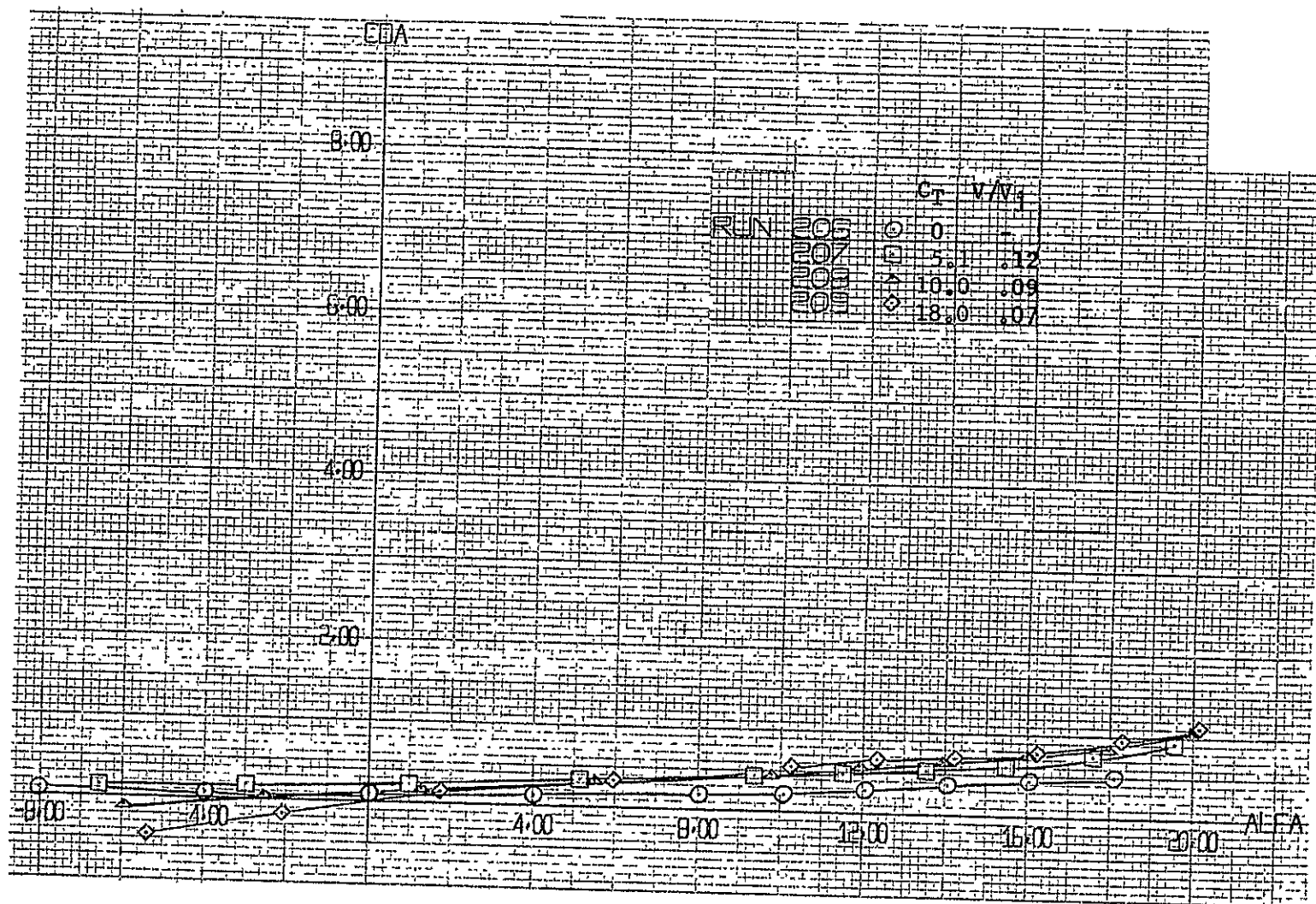


Figure A-10. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_N = 80^\circ, 90^\circ, 90^\circ$ (Continued)

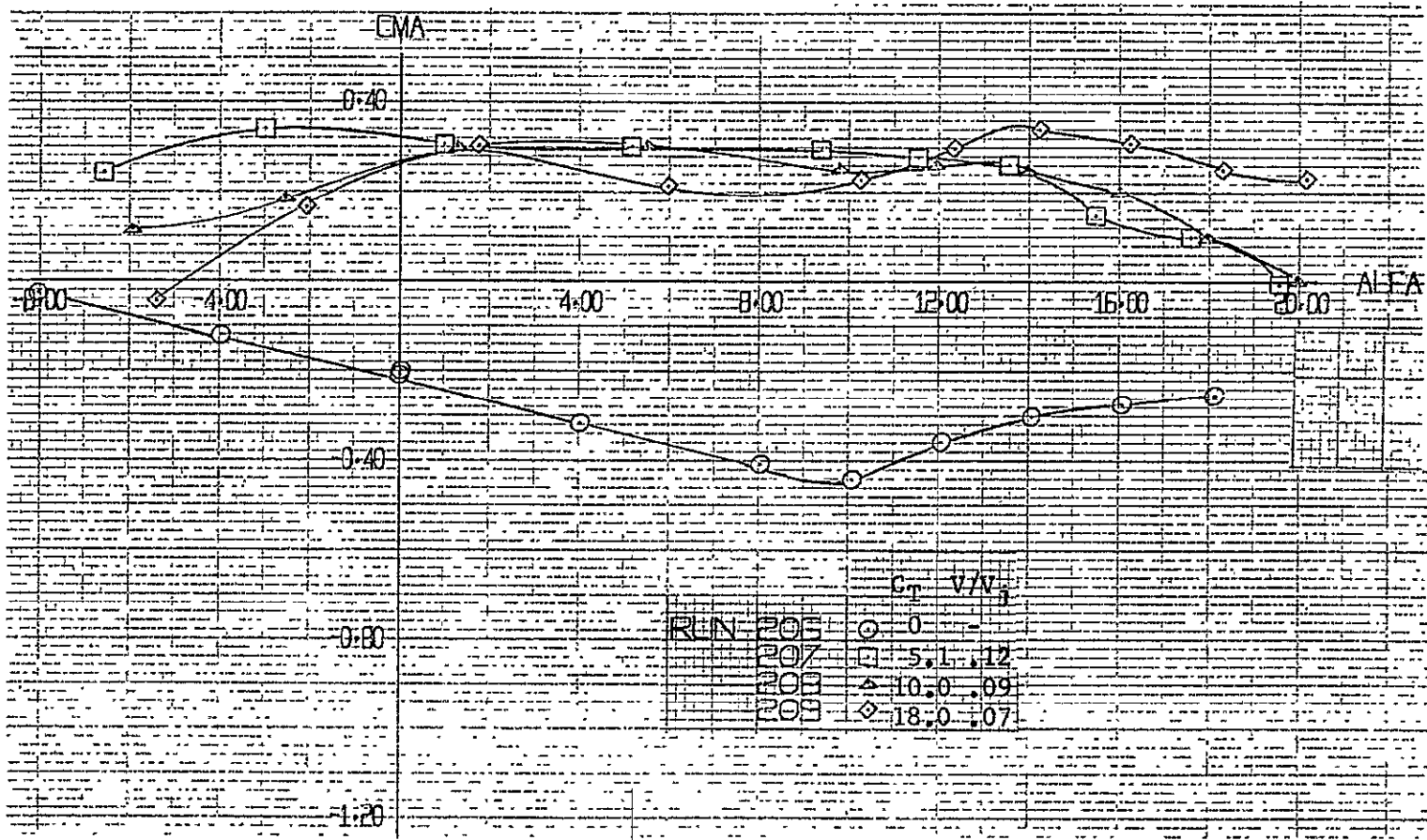


Figure A-10. Effect of Thrust on Aerodynamic Coefficients,
Free Air $\sim \delta_N = 80^\circ, 90^\circ, 90^\circ$ (Continued)

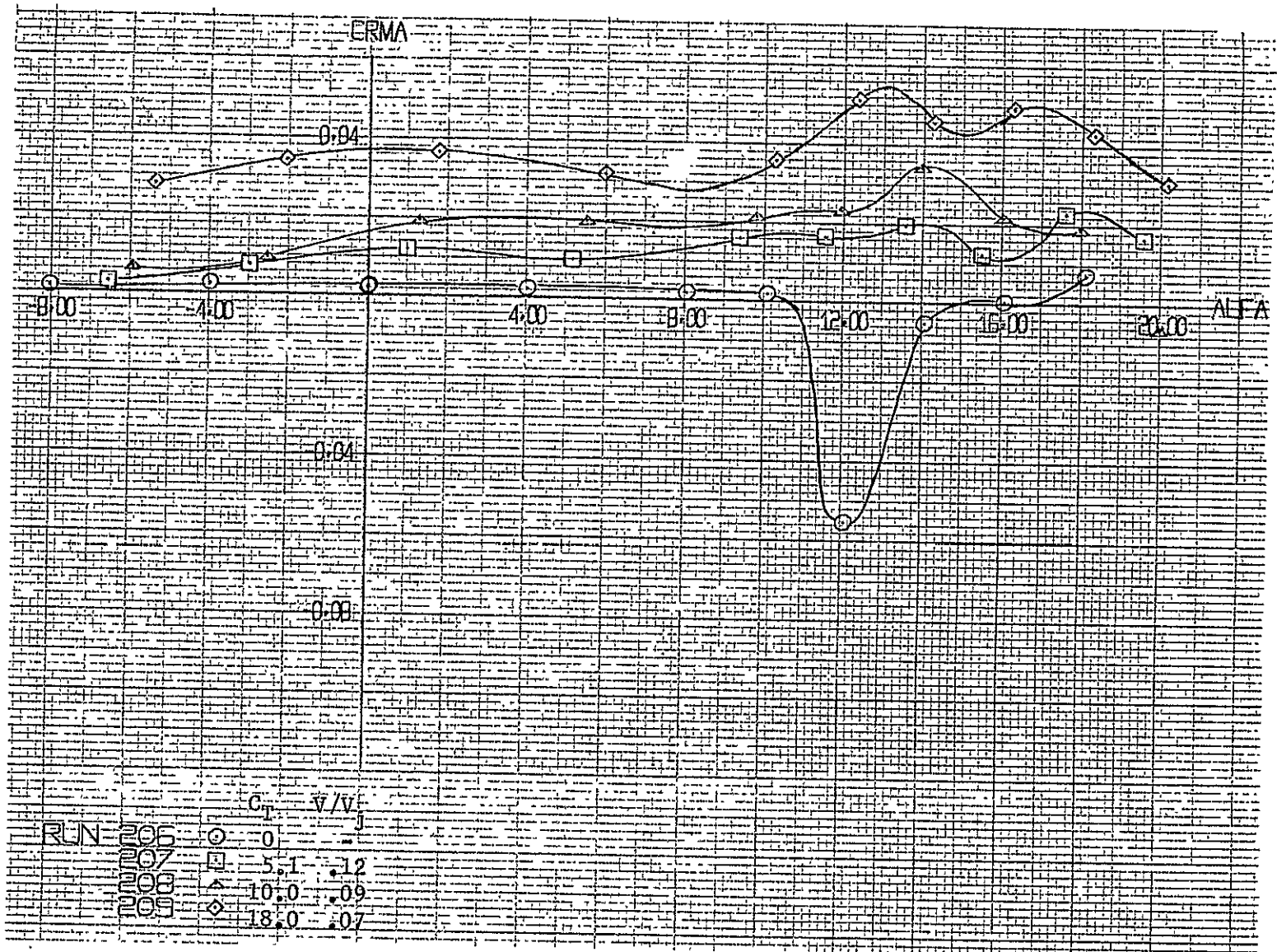


Figure A-10. Effect of Thrust on the Aerodynamic Coefficients,
Free Air $\sim \delta_N = 80^\circ, 90^\circ, 90^\circ$ (Concluded)

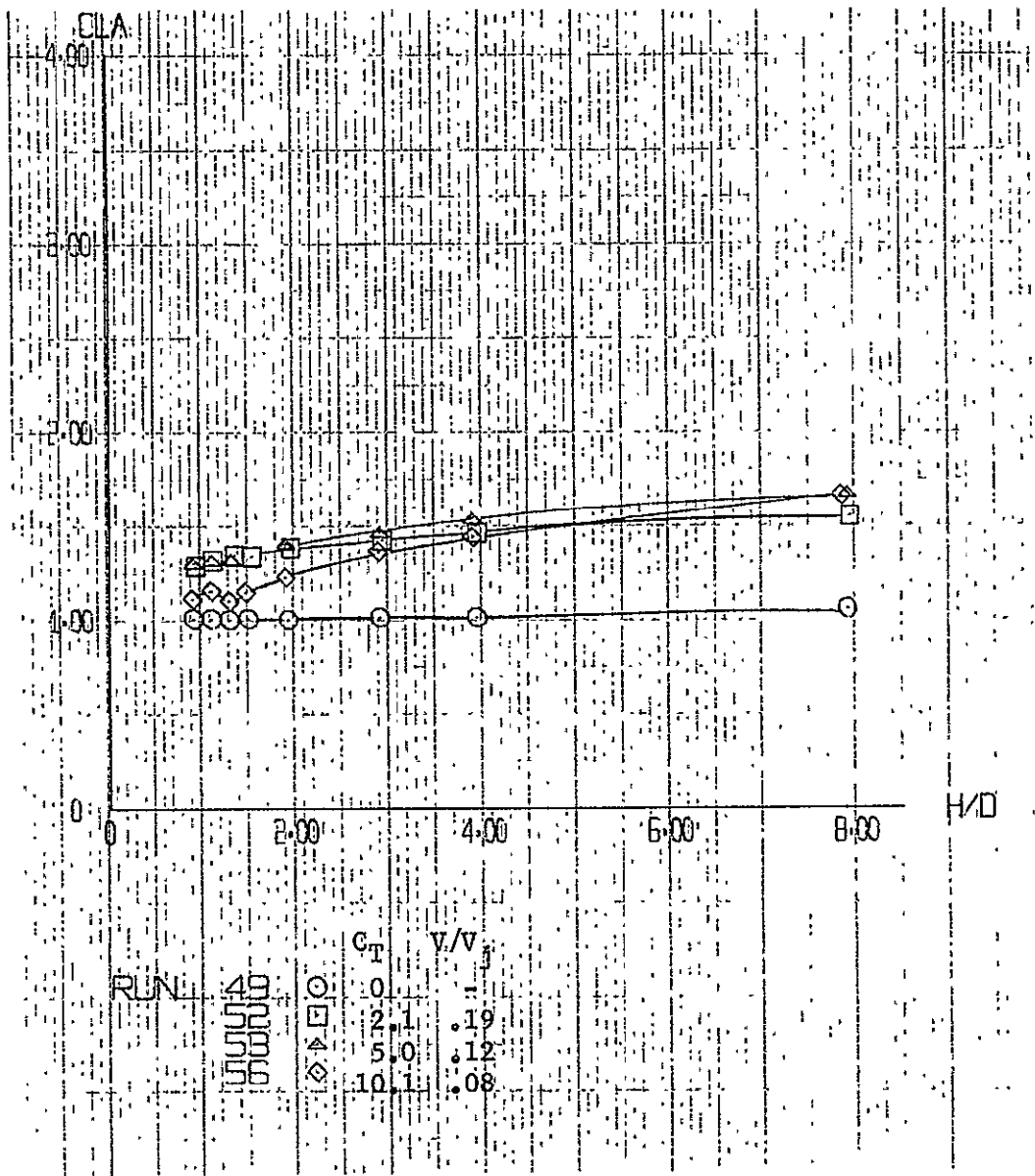


Figure A-11. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

~~ORIGINAL~~ PAGE IS
OF POOR QUALITY

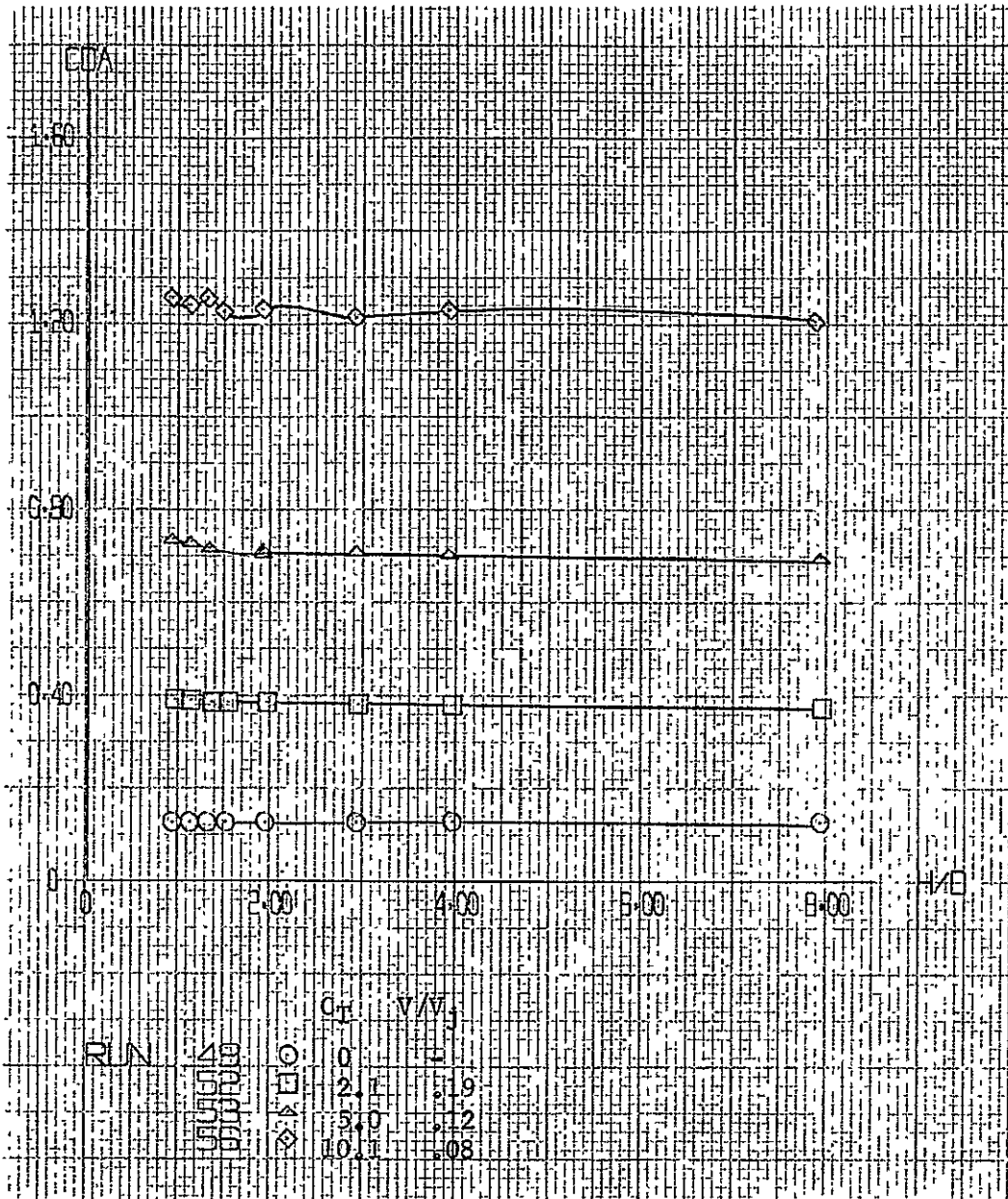


Figure A-11. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

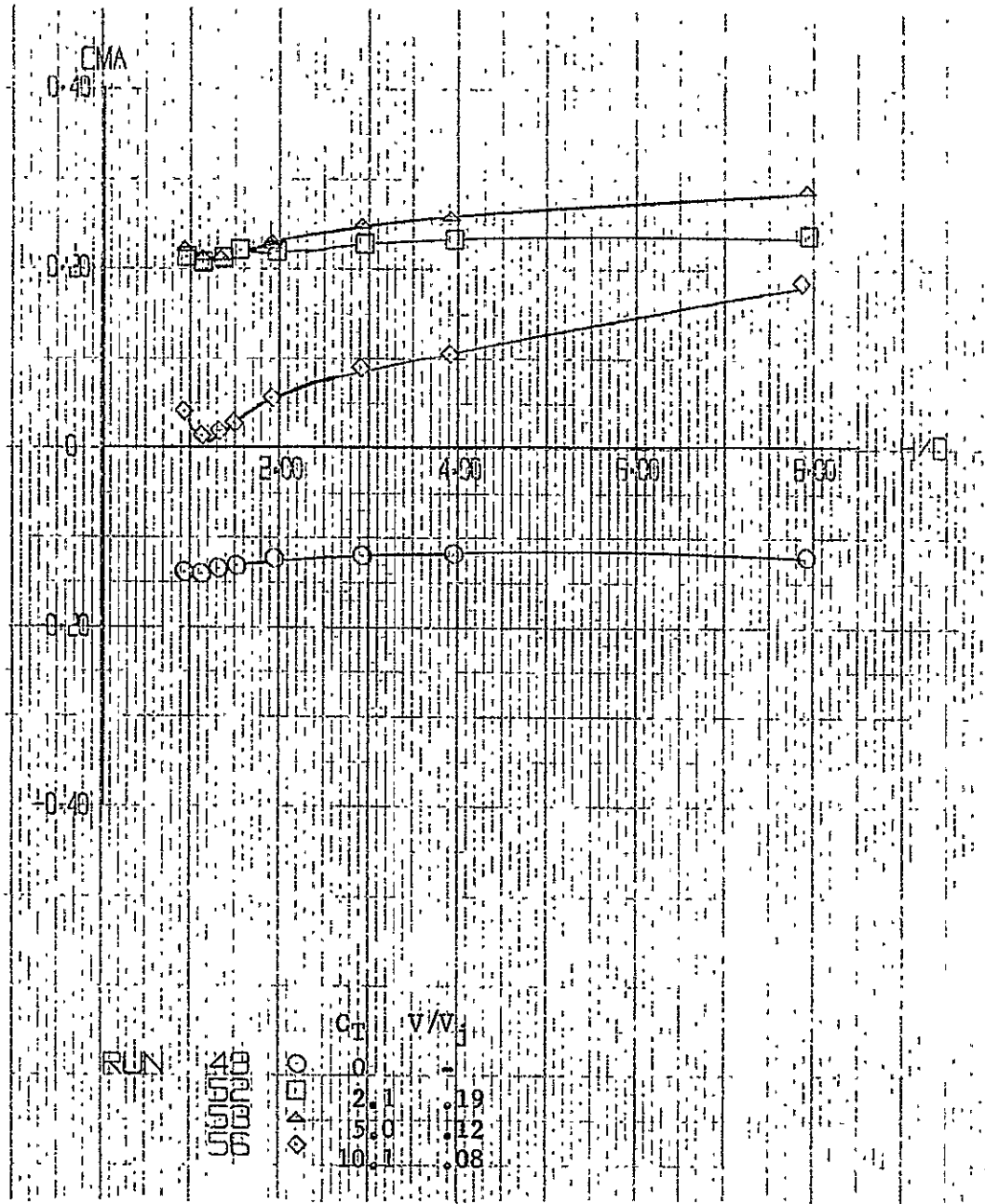


Figure A-11. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

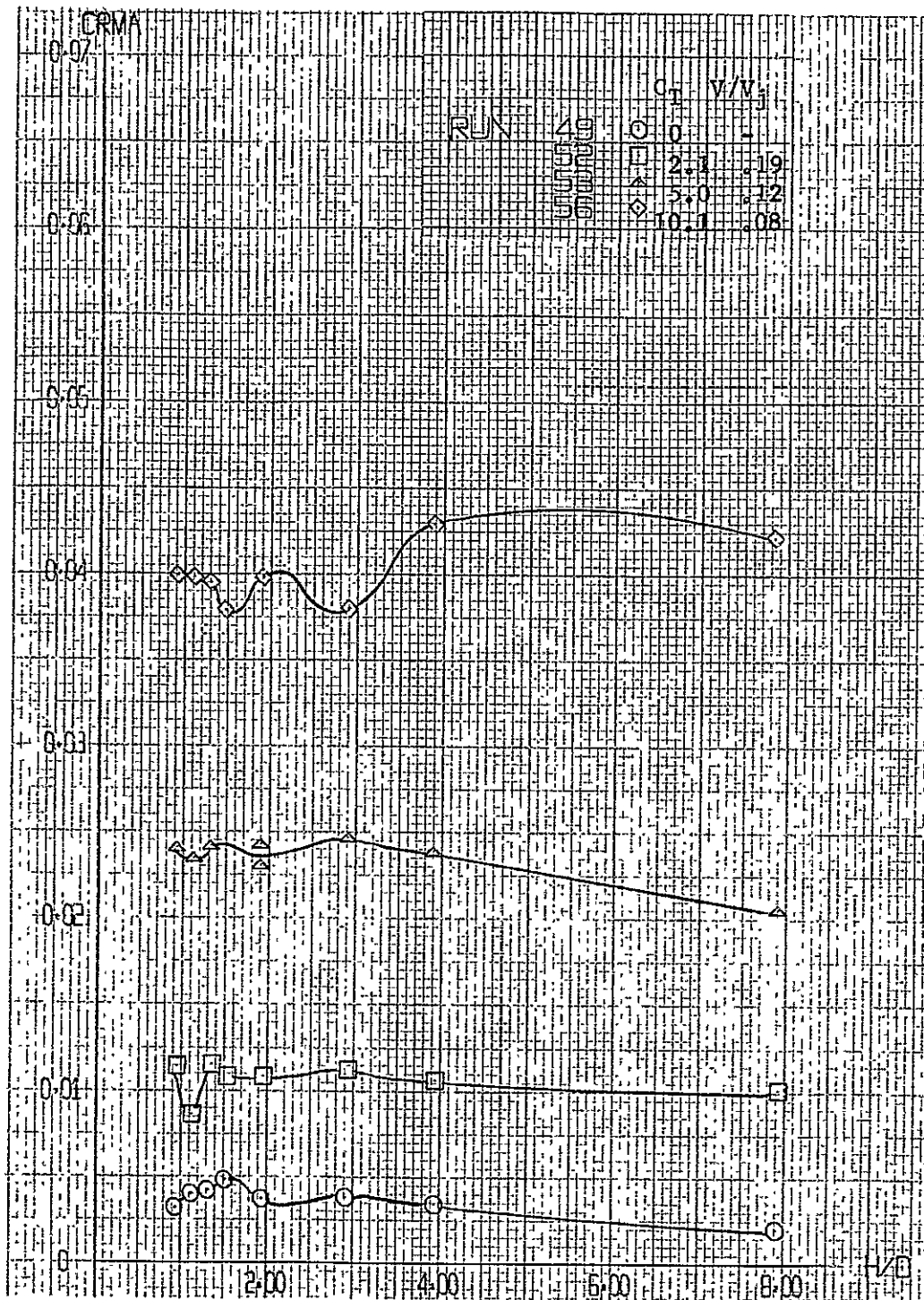


Figure A-11. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

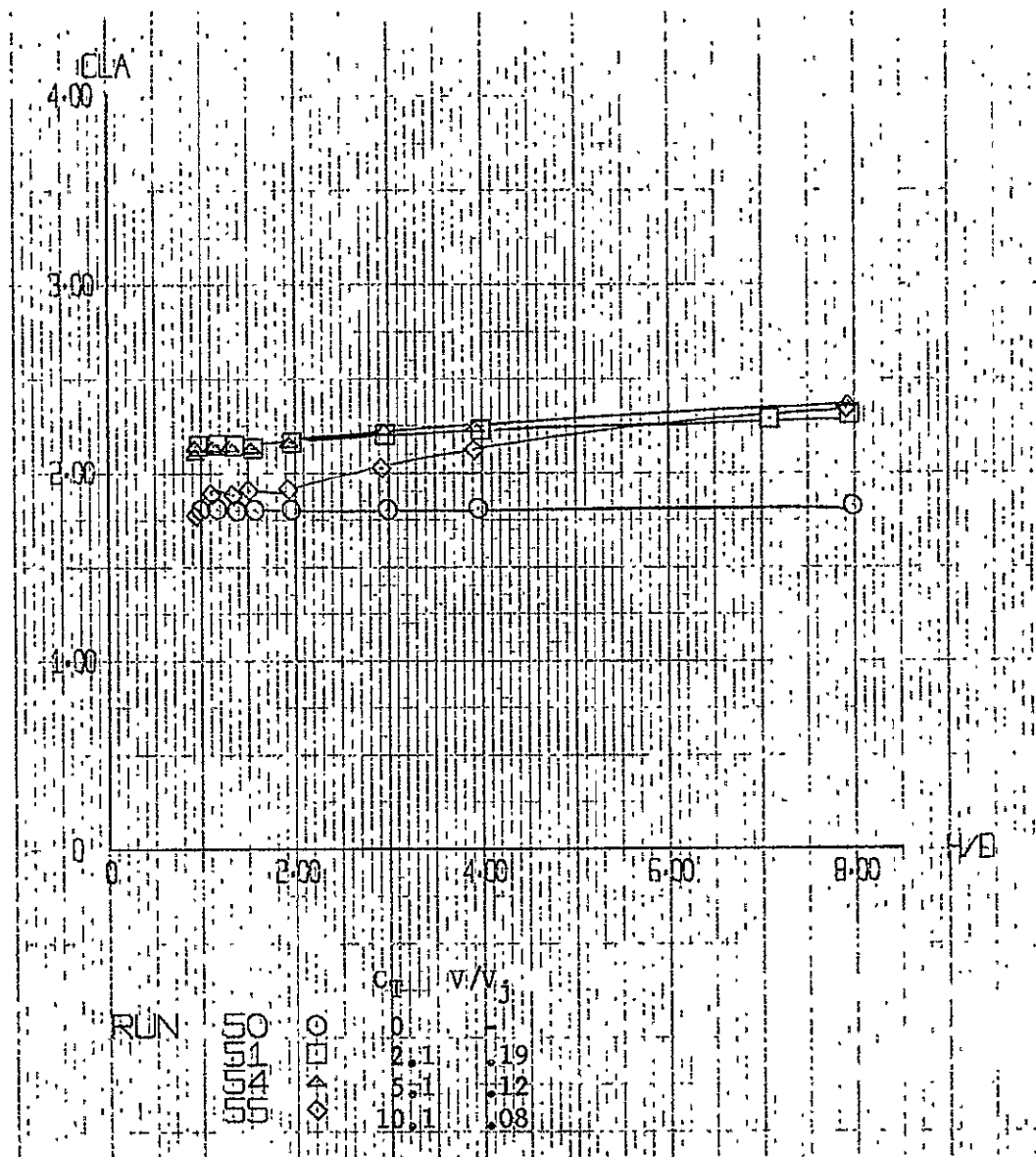


Figure A-12. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 8^\circ$, $\phi = 0^\circ$

ORIGINAL PAGE IS
 OF POOR QUALITY

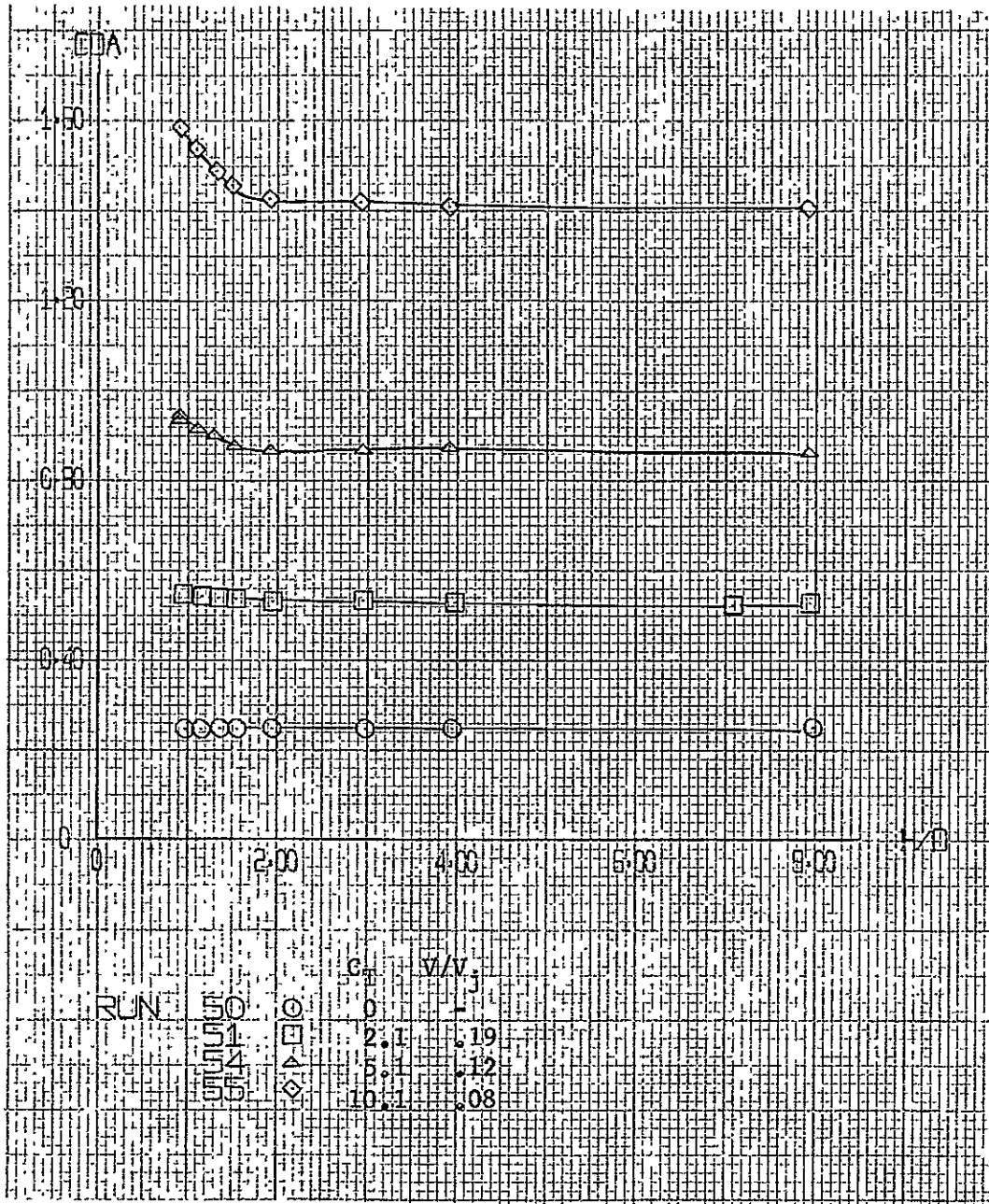


Figure A-12. Effect of Height on the Aerodynamic Coefficients
 at Various Thrust Levels, Ground Board Configuration
 2; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

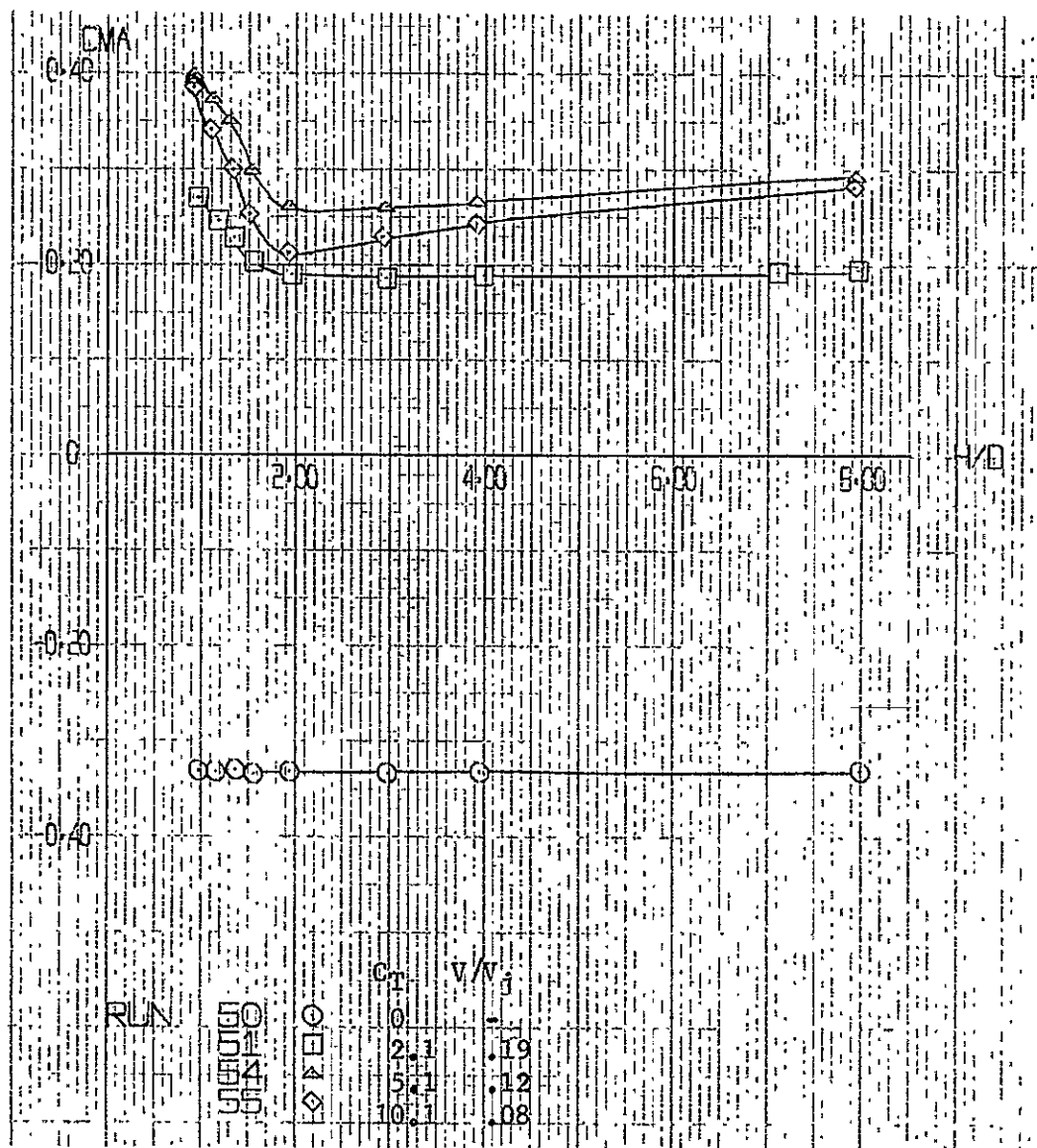


Figure A-12. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

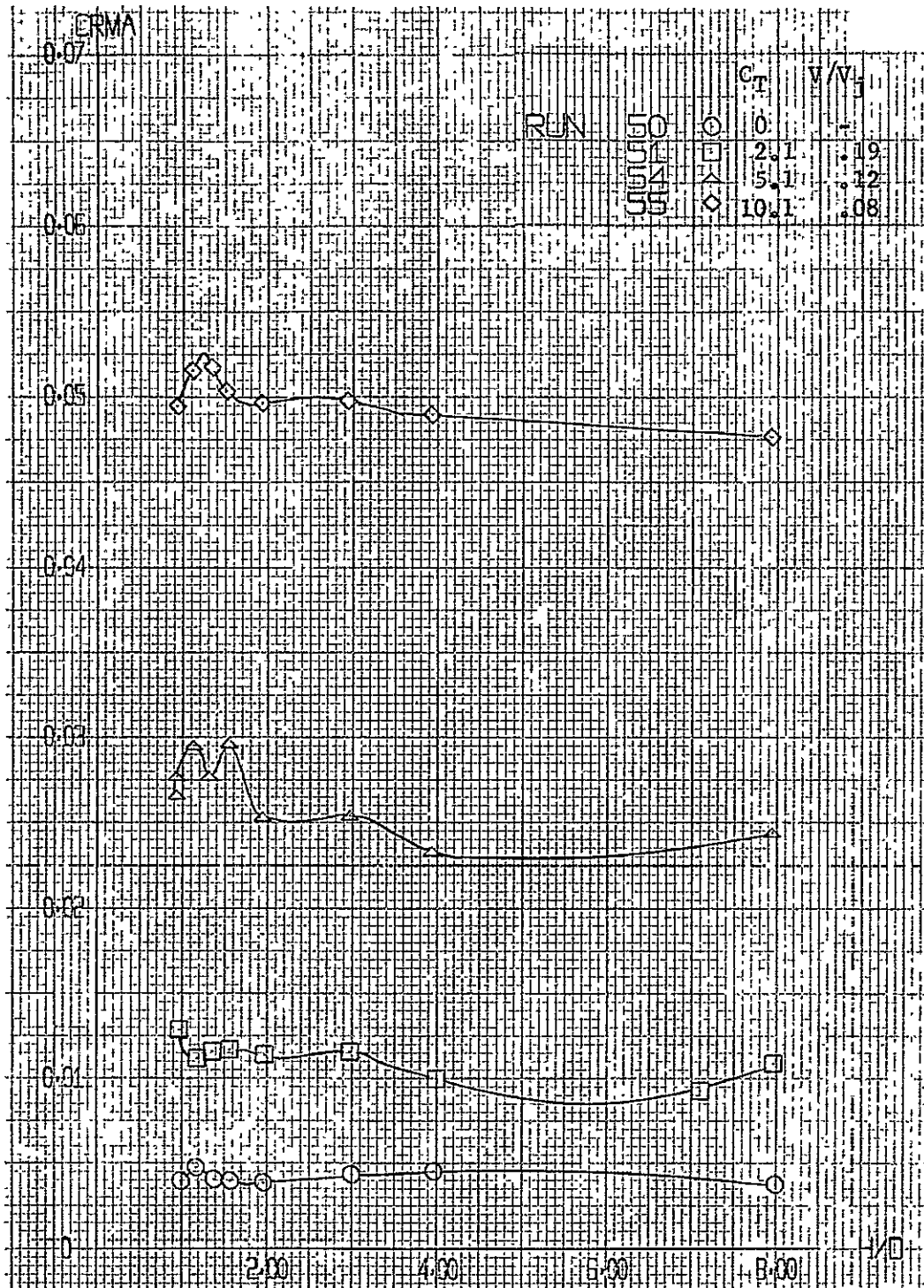


Figure A-12. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Concluded)

ORIGINAL PAGE IS
OF POOR QUALITY

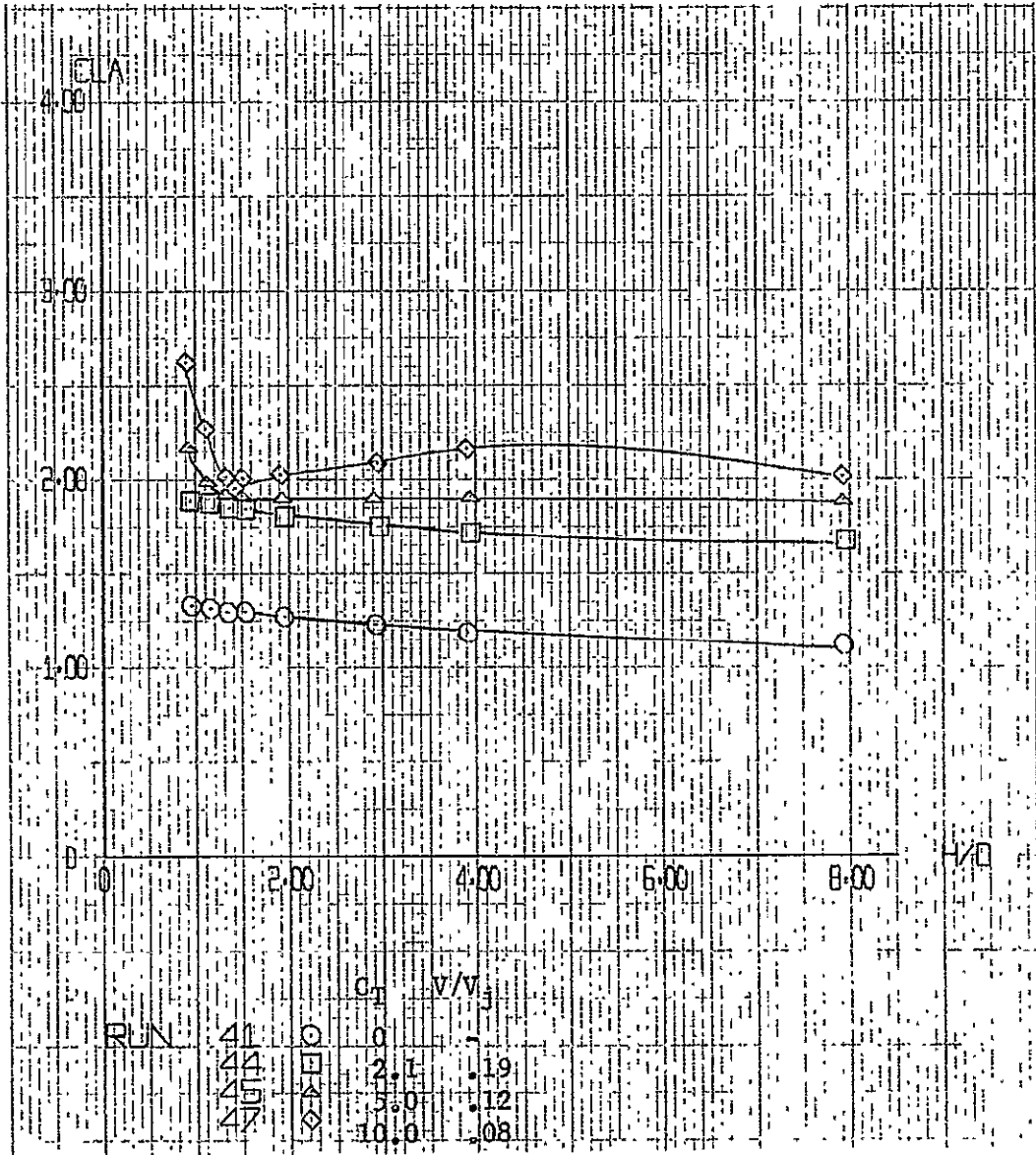


Figure A-13. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

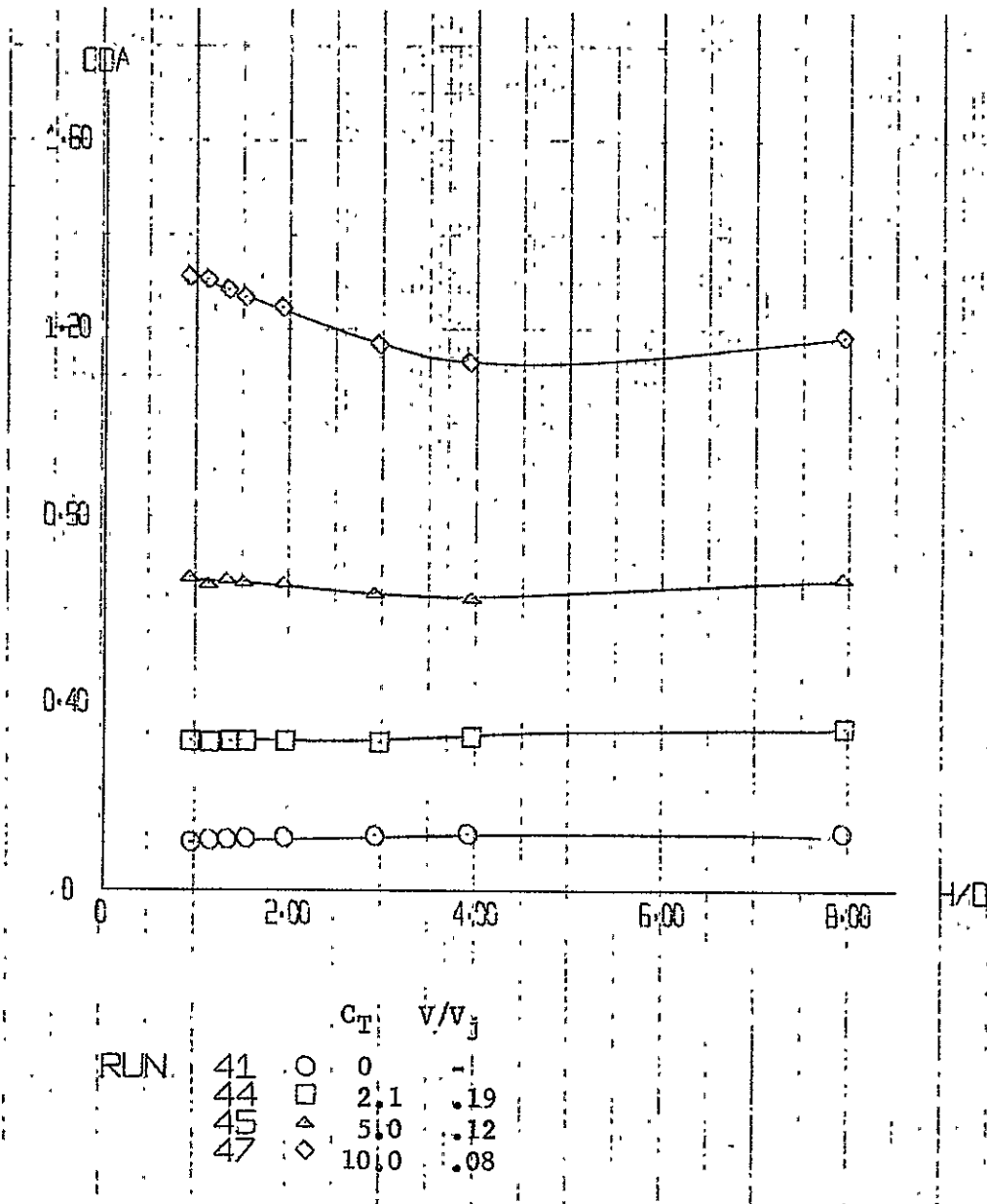


Figure A-13. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

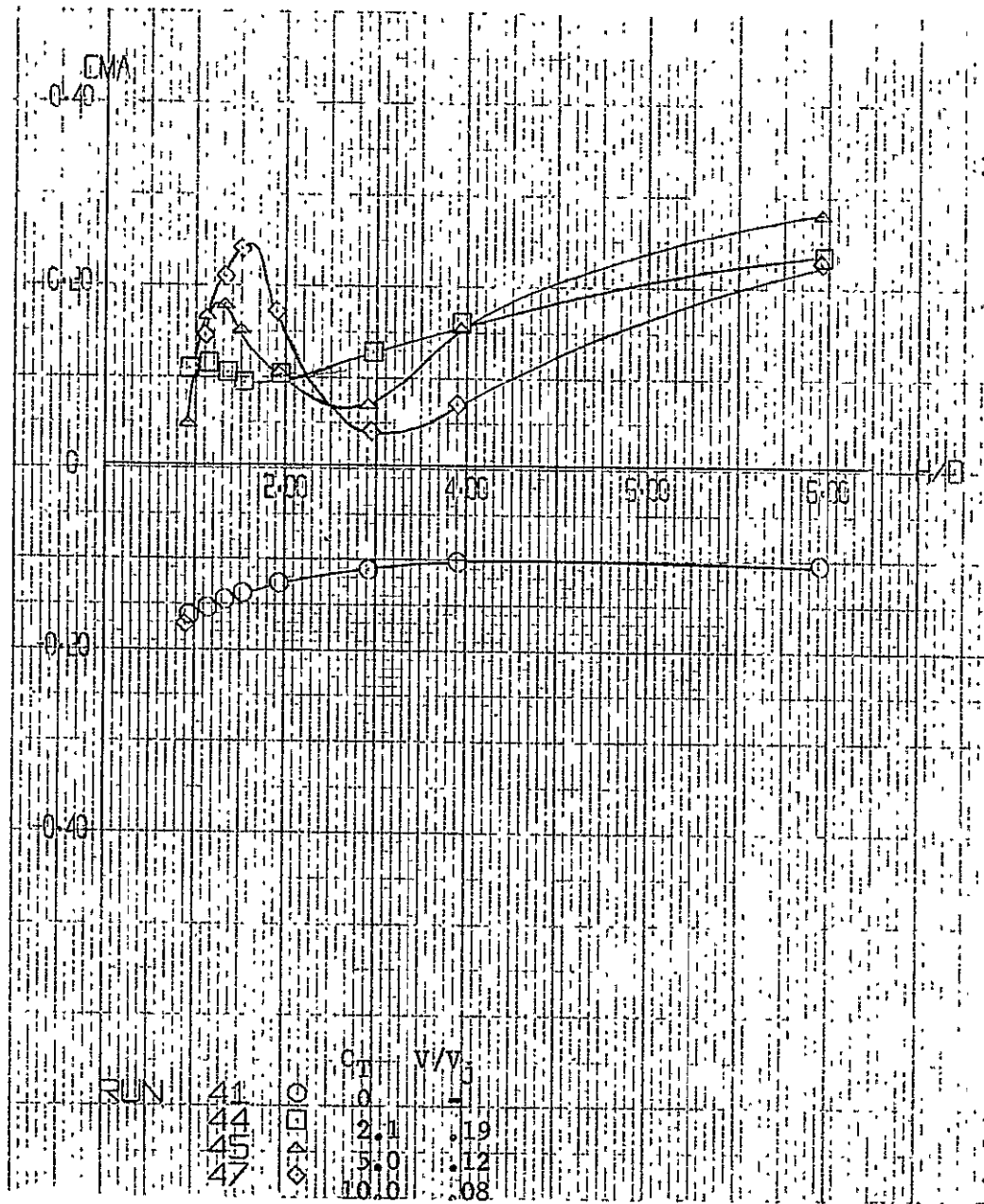


Figure A-13. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

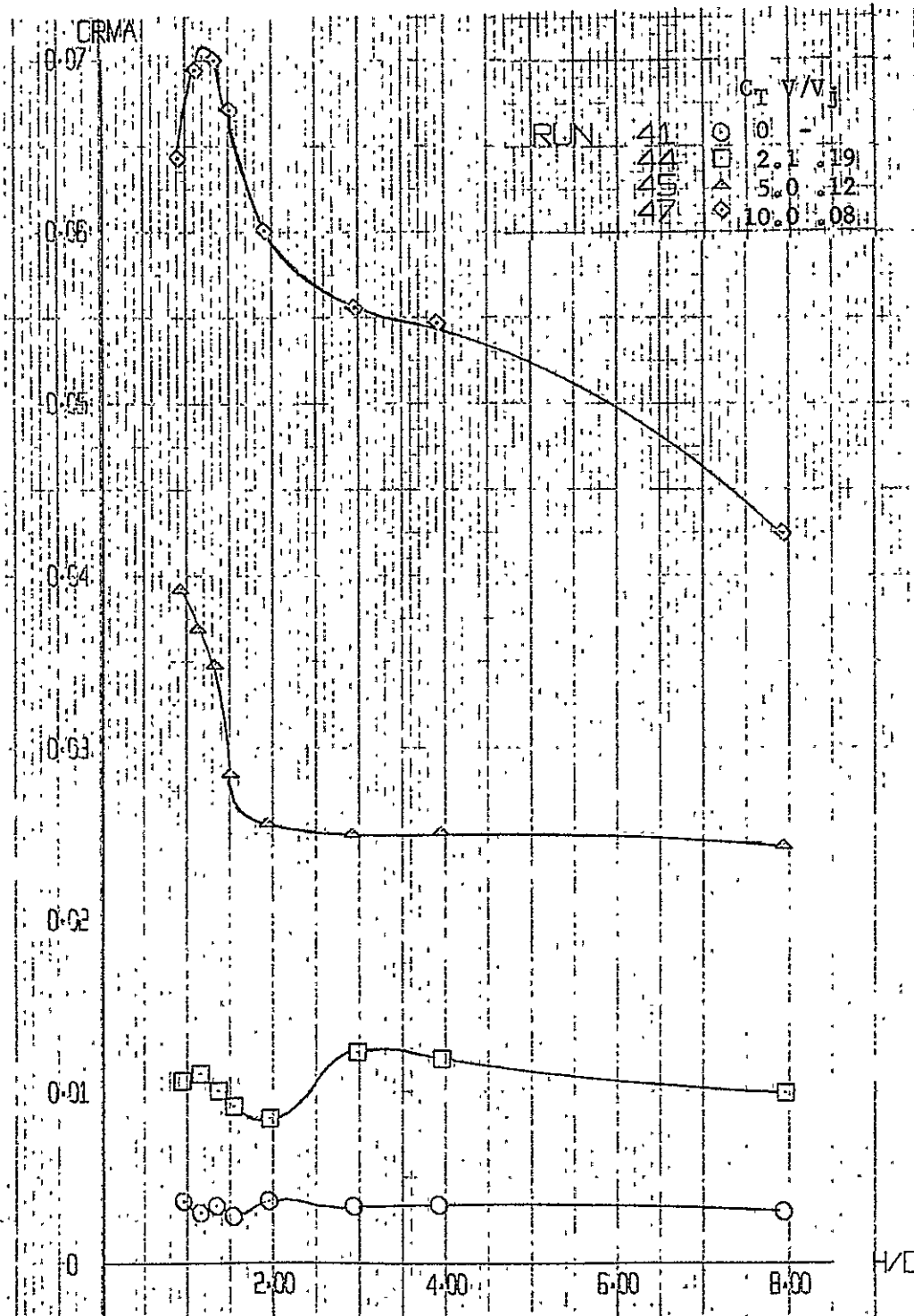


Figure A-13. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

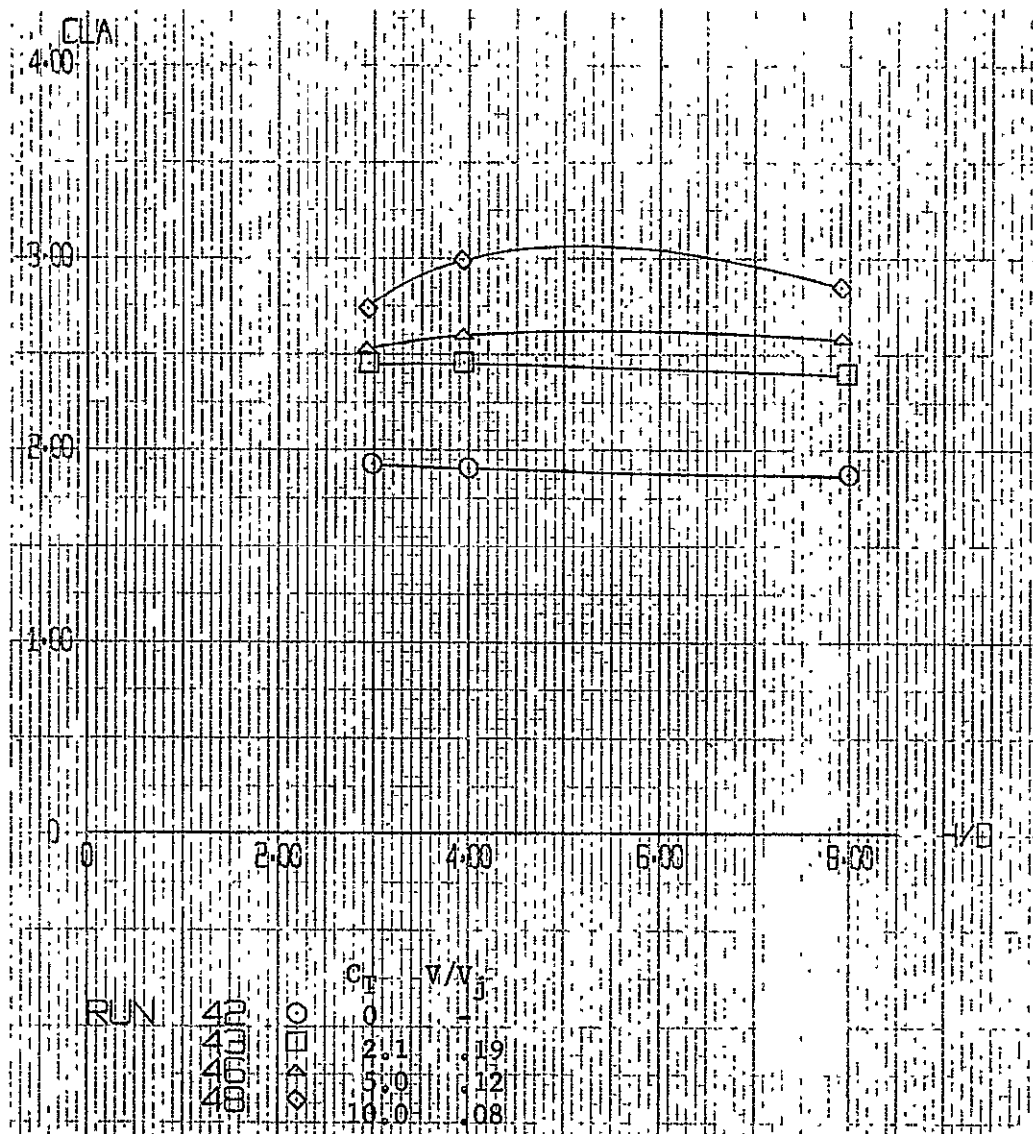


Figure A-14. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$

ORIGINAL PAGE IS
OF POOR QUALITY

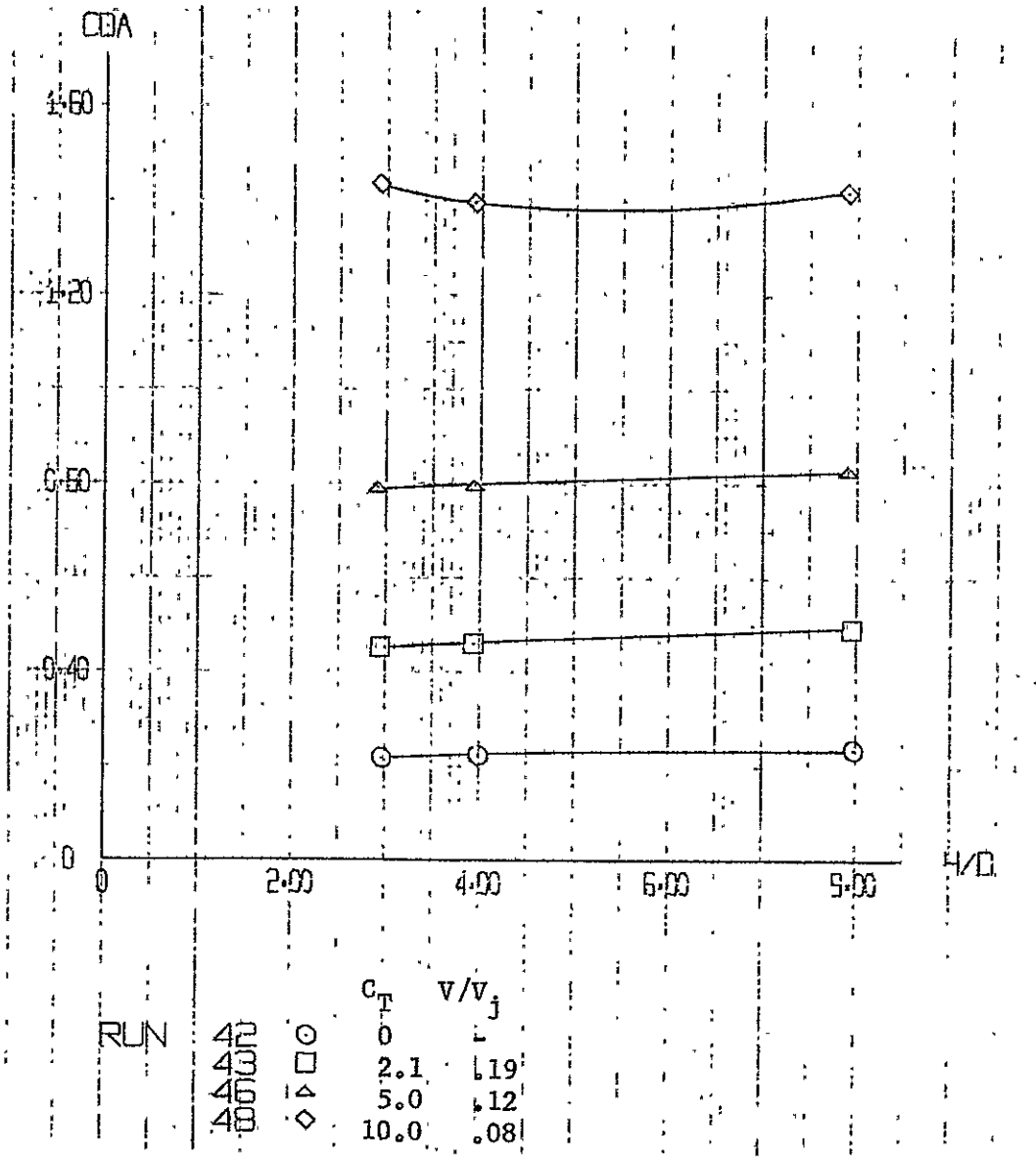


Figure A-14. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

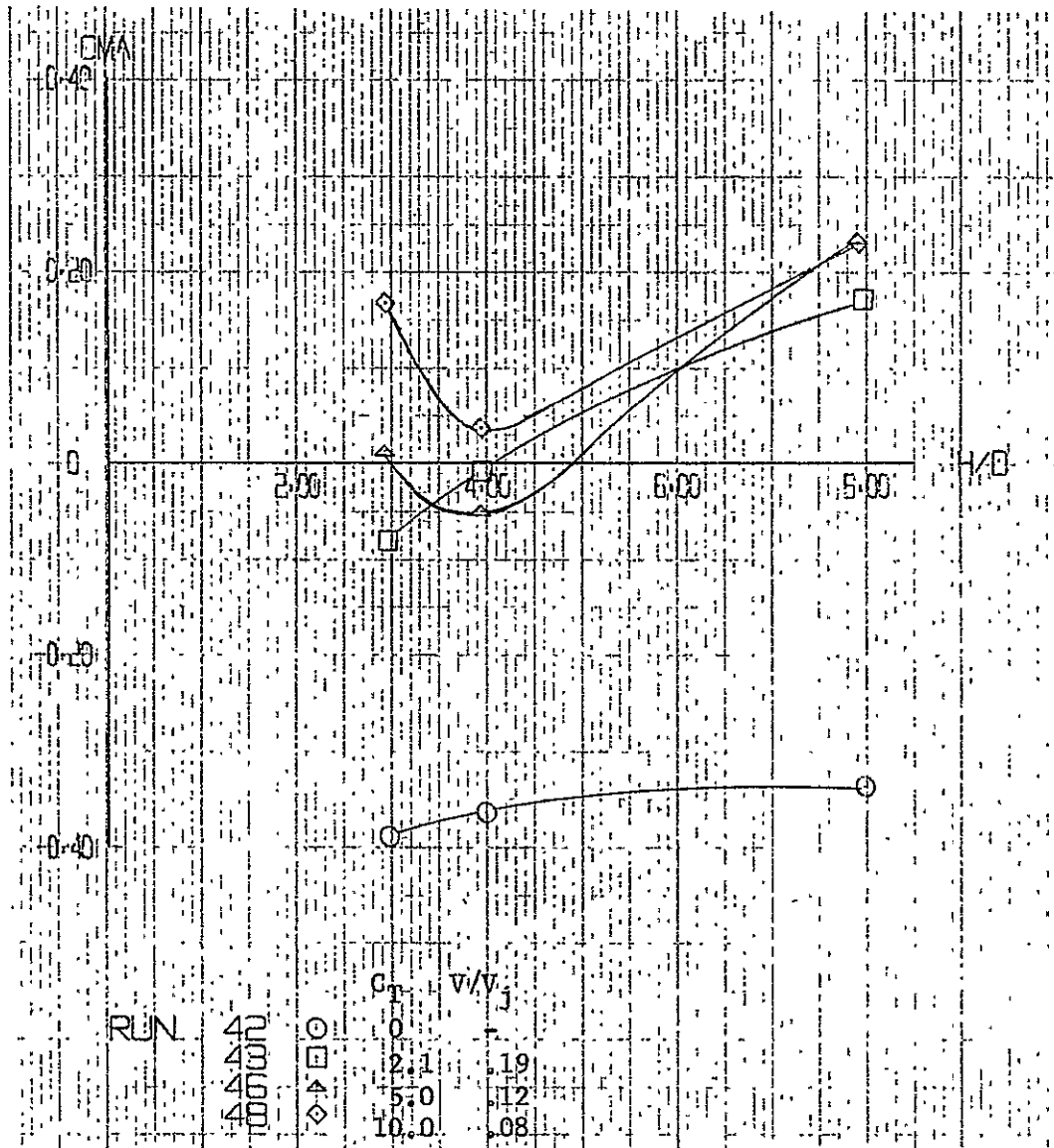


Figure A-14. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

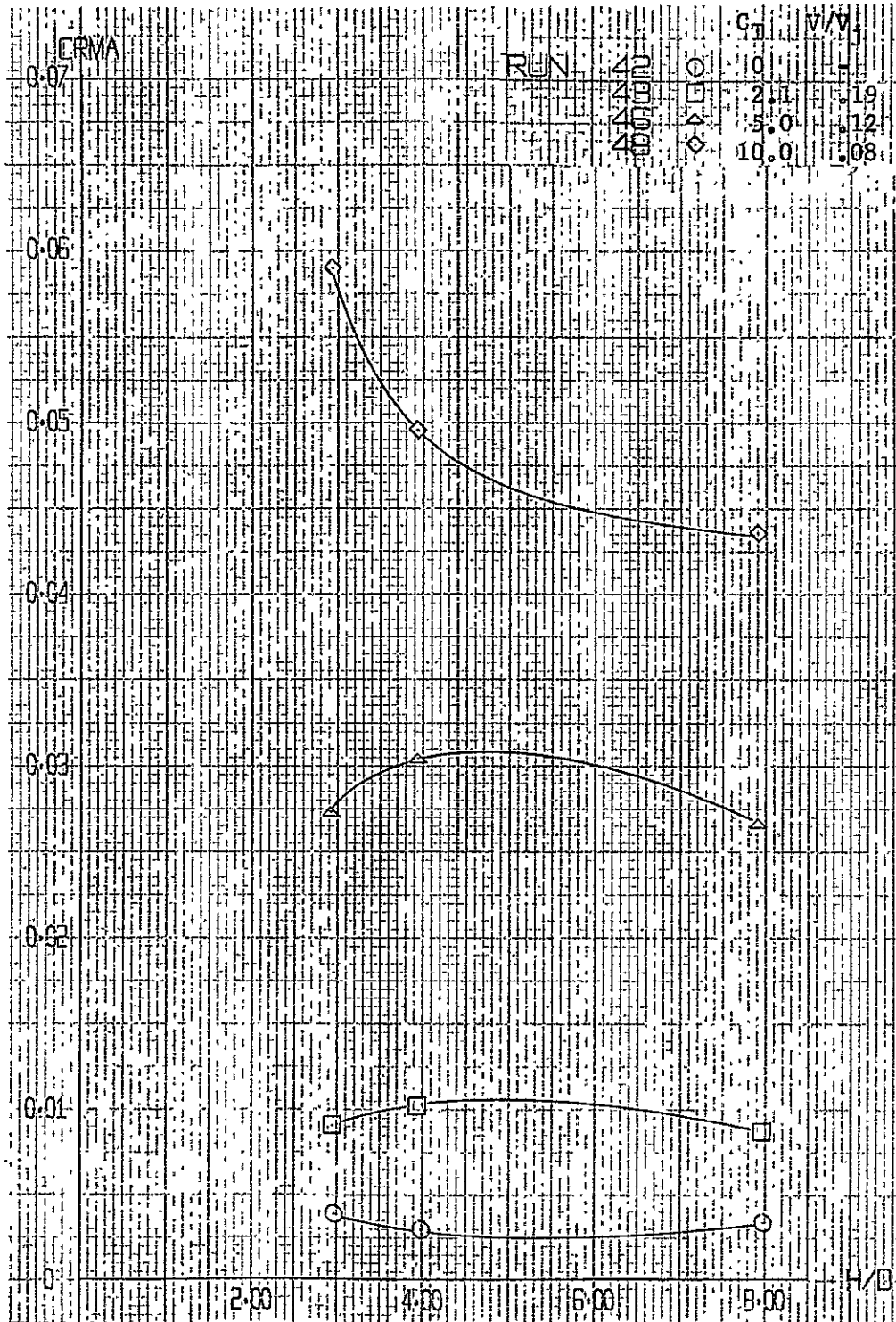


Figure A-14. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Concluded)

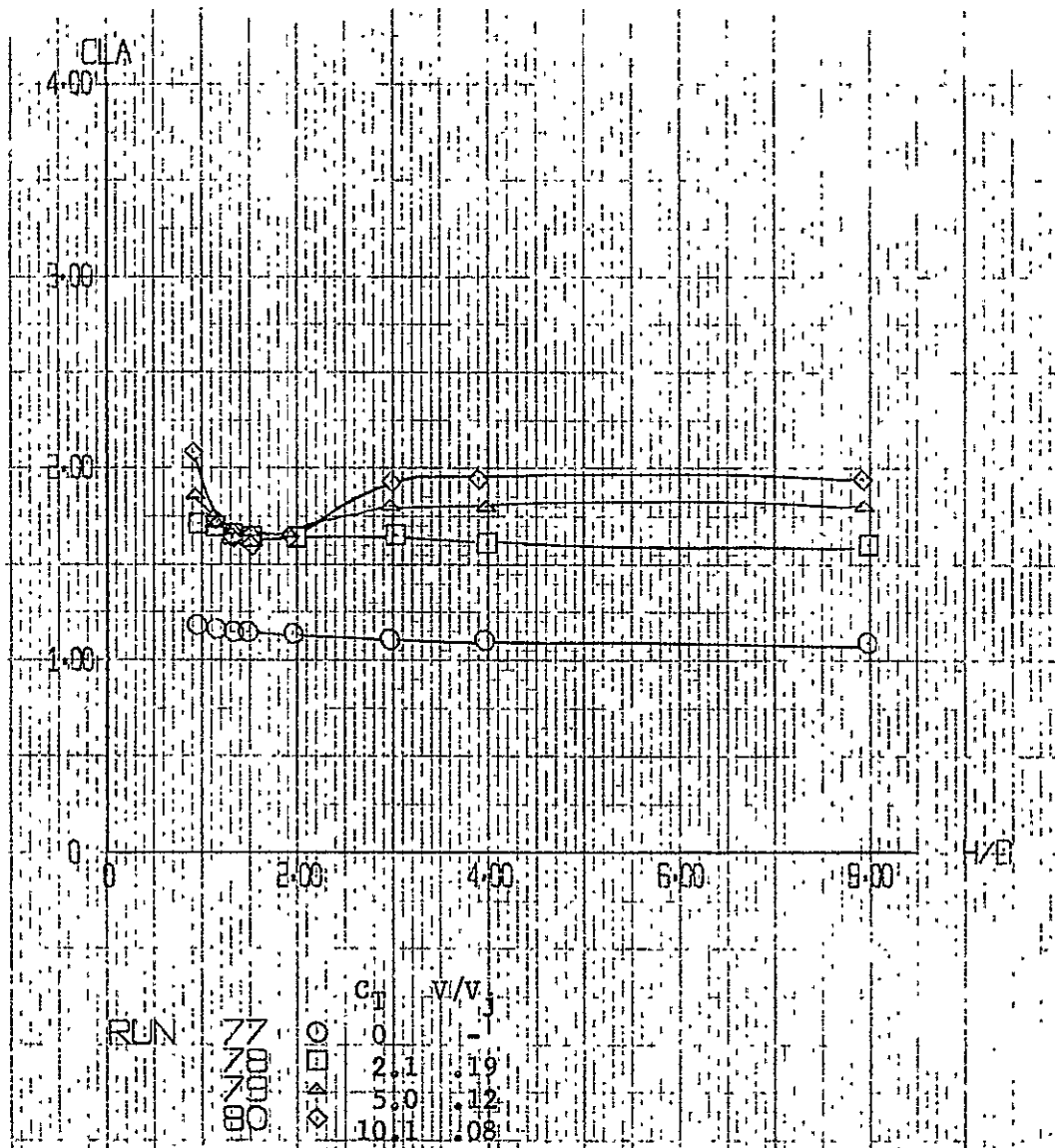


Figure A-15. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\beta = 0^\circ$

ORIGINAL PAGE IS
OF POOR QUALITY

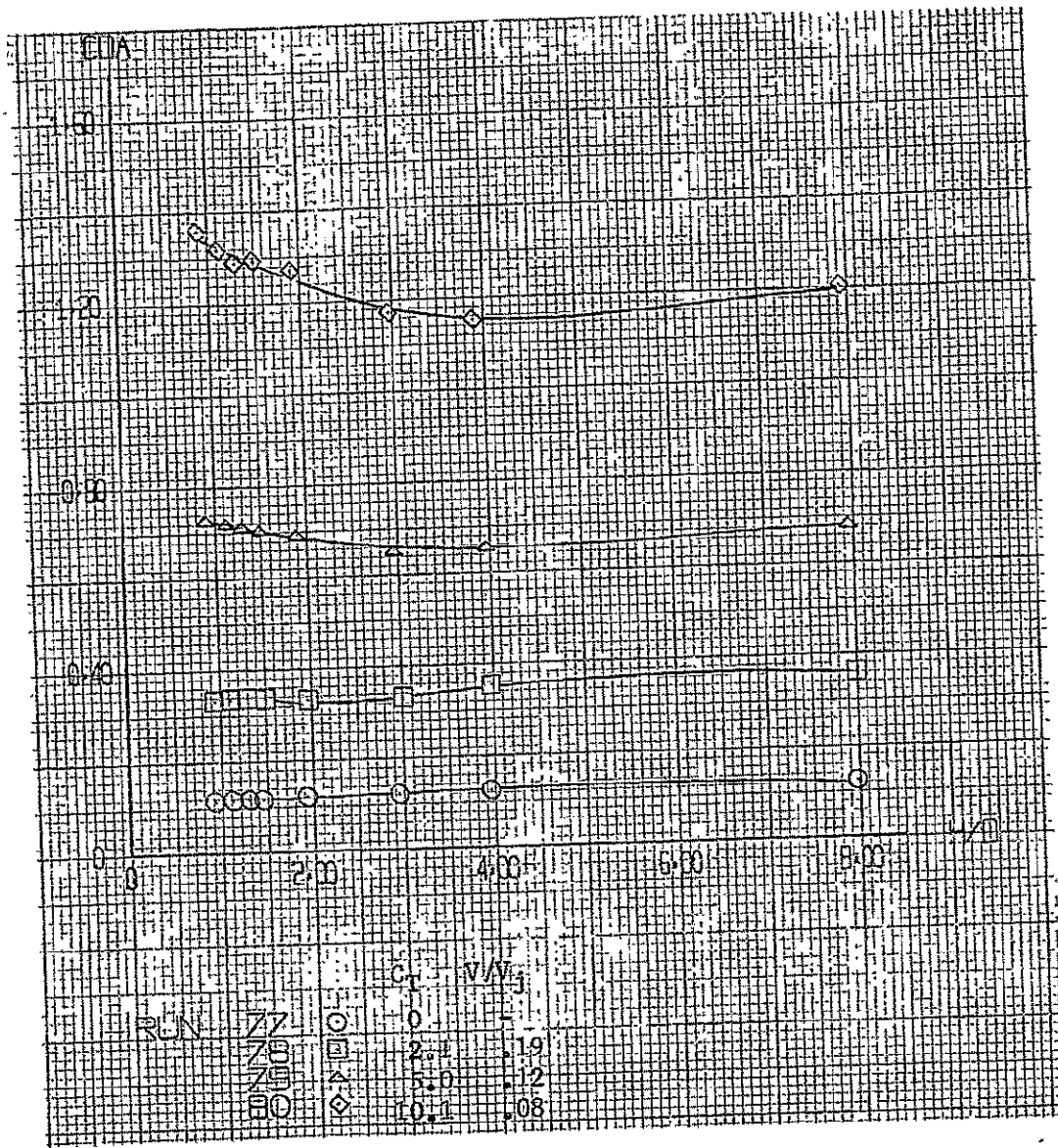


Figure A-15. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

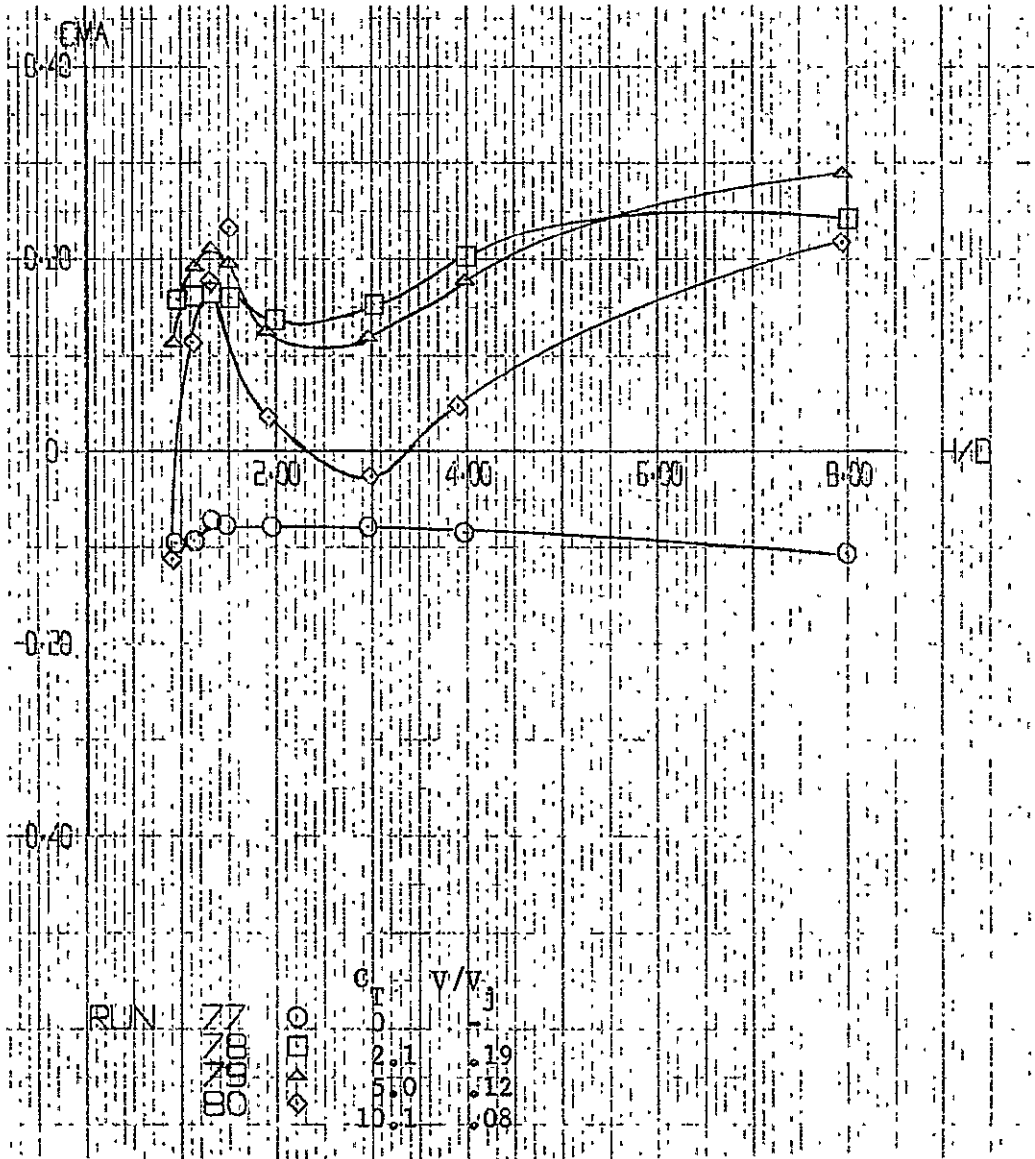


Figure A-15. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

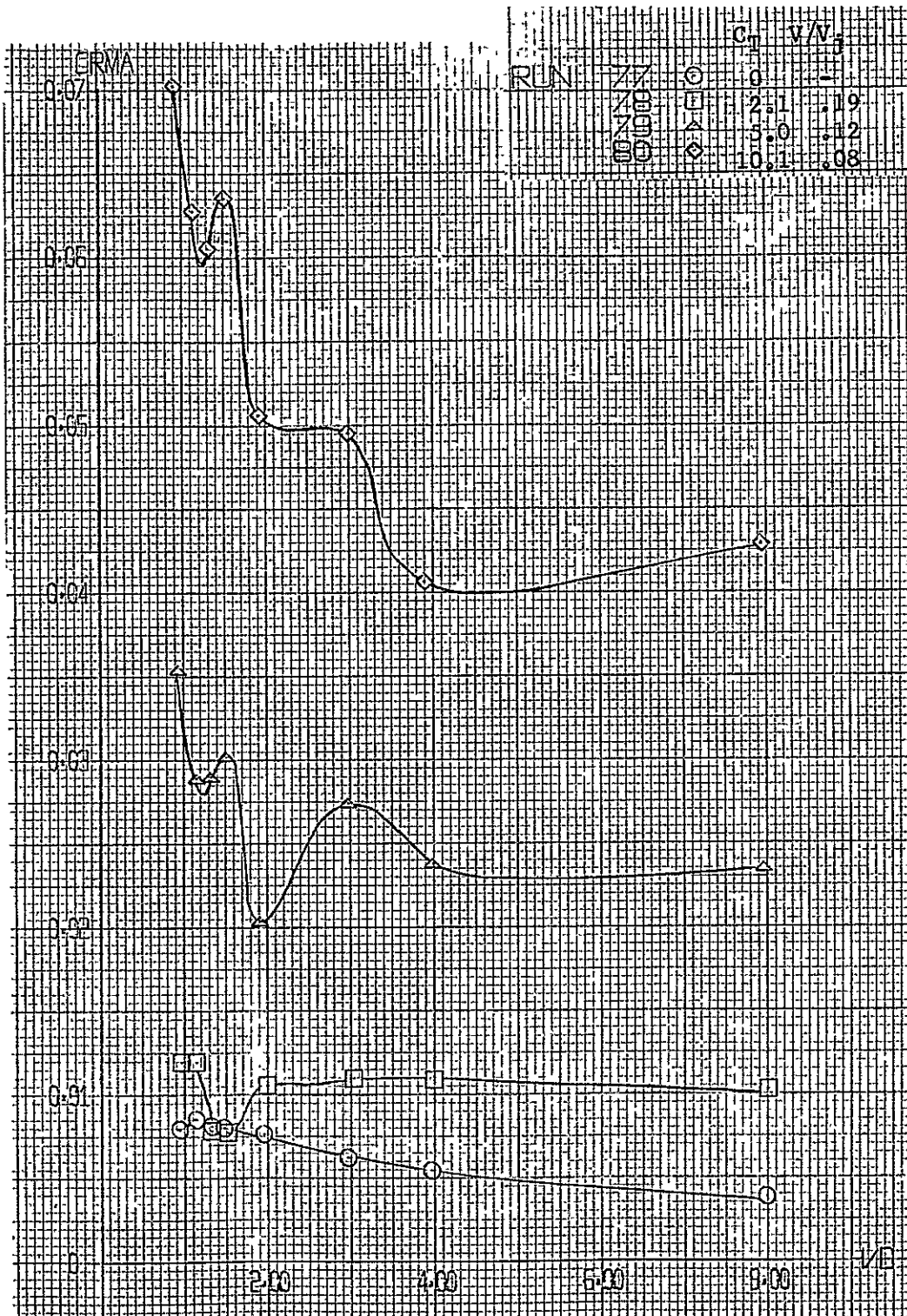


Figure A-15. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

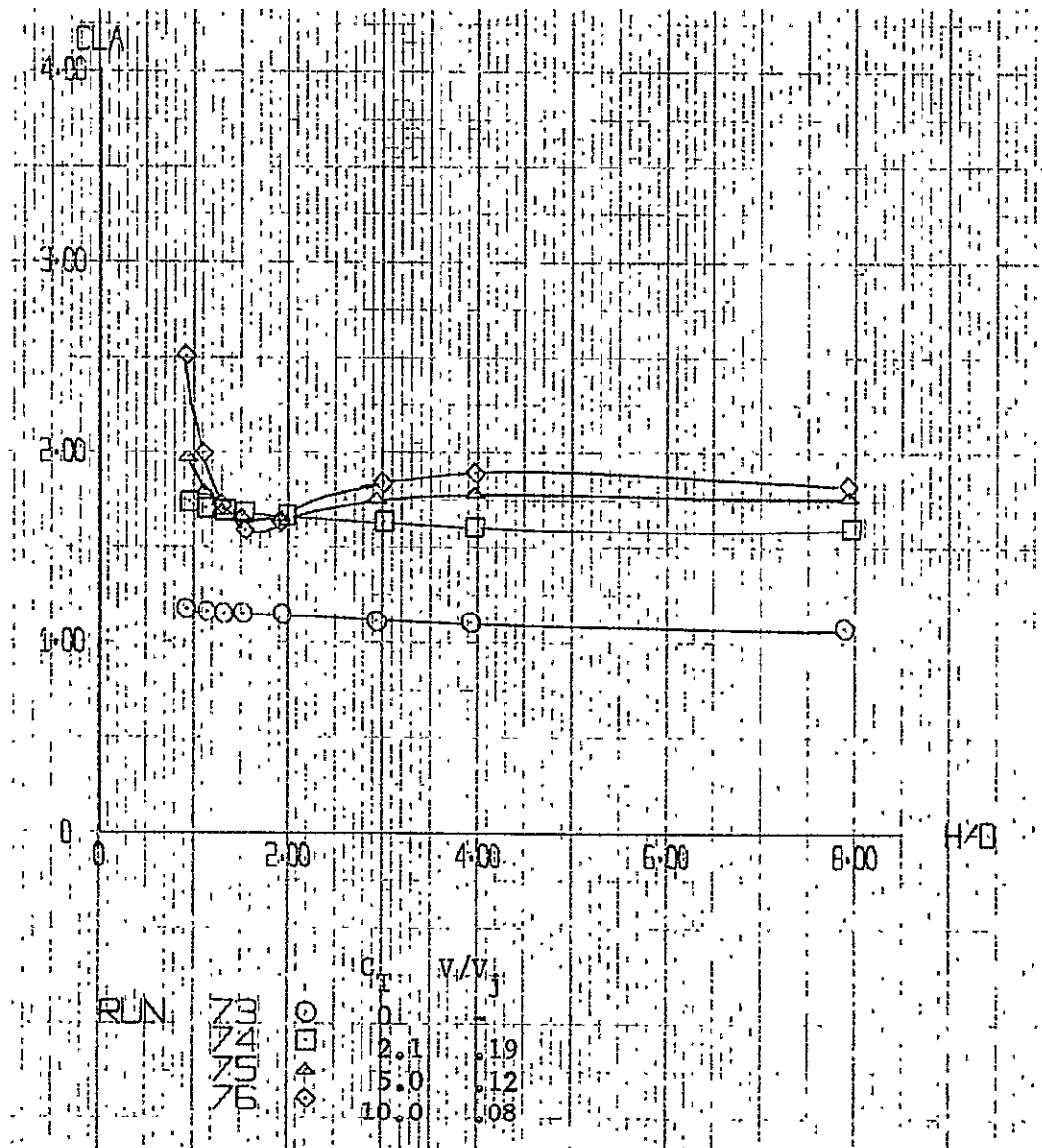


Figure A-16. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$

ORIGINAL PAGE IS
OF ~~FOUR~~ NUMBER

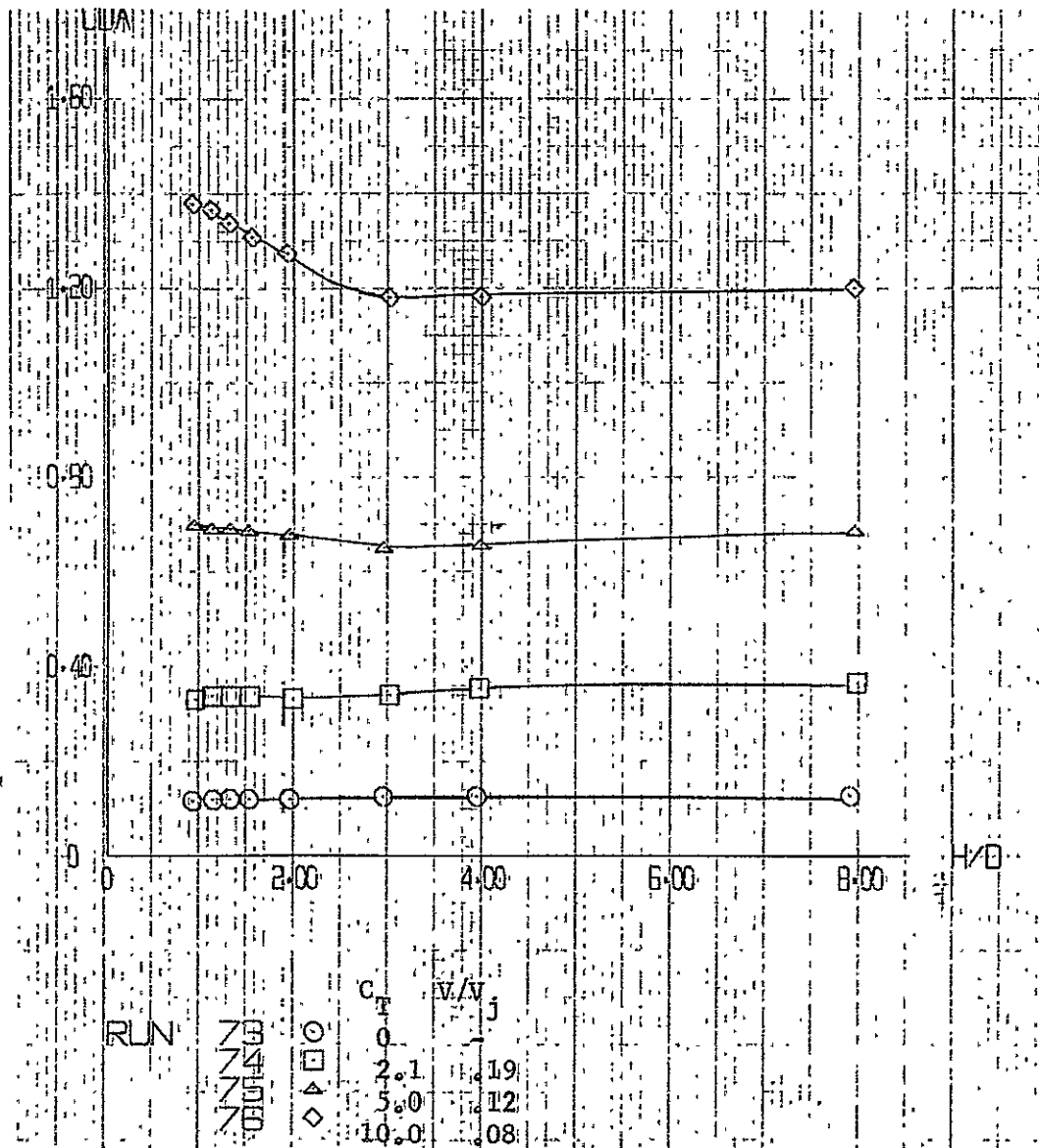


Figure A-16. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Continued)

ORIGINAL PAGE IS
OF POOR QUALITY

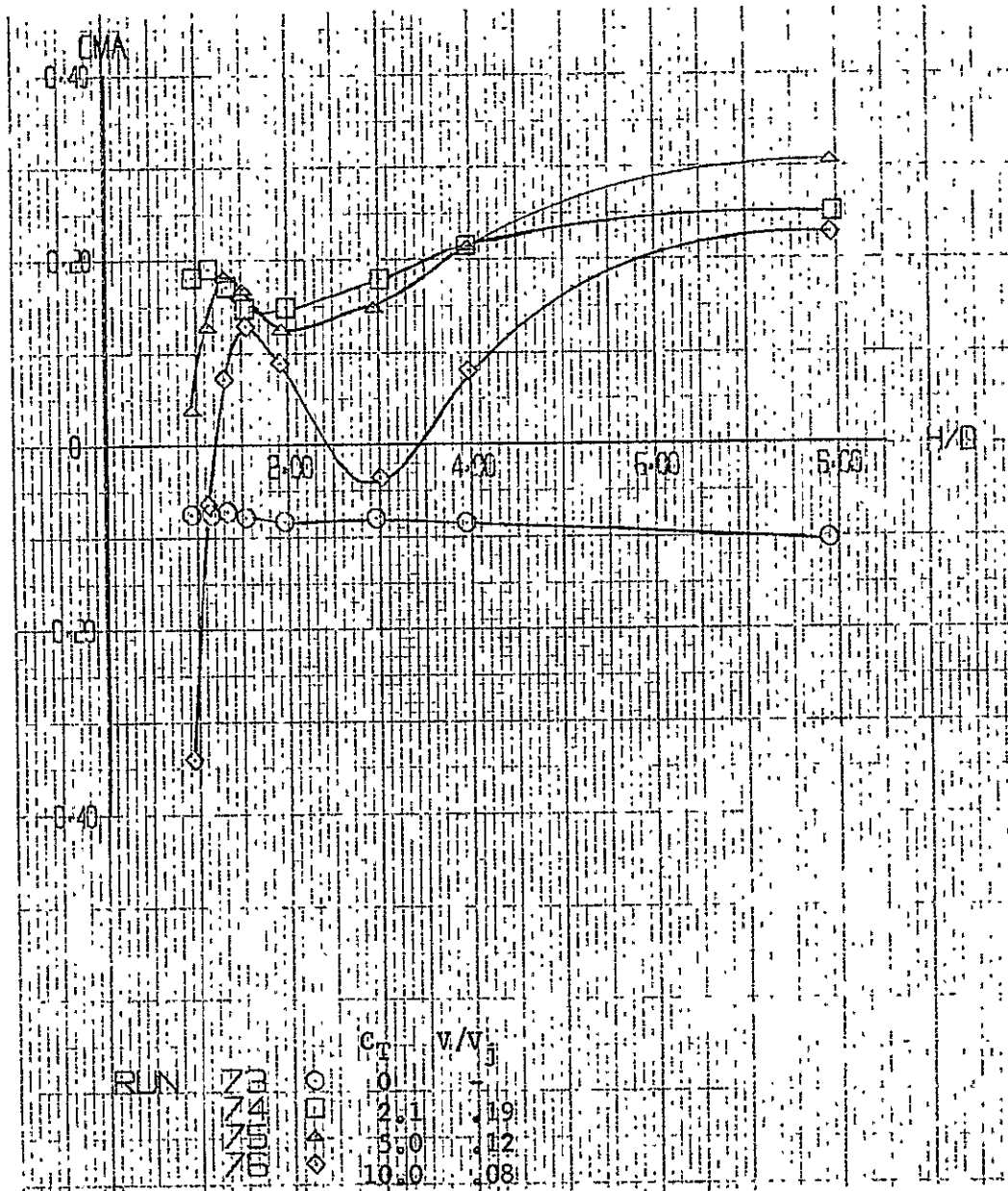


Figure A-16. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

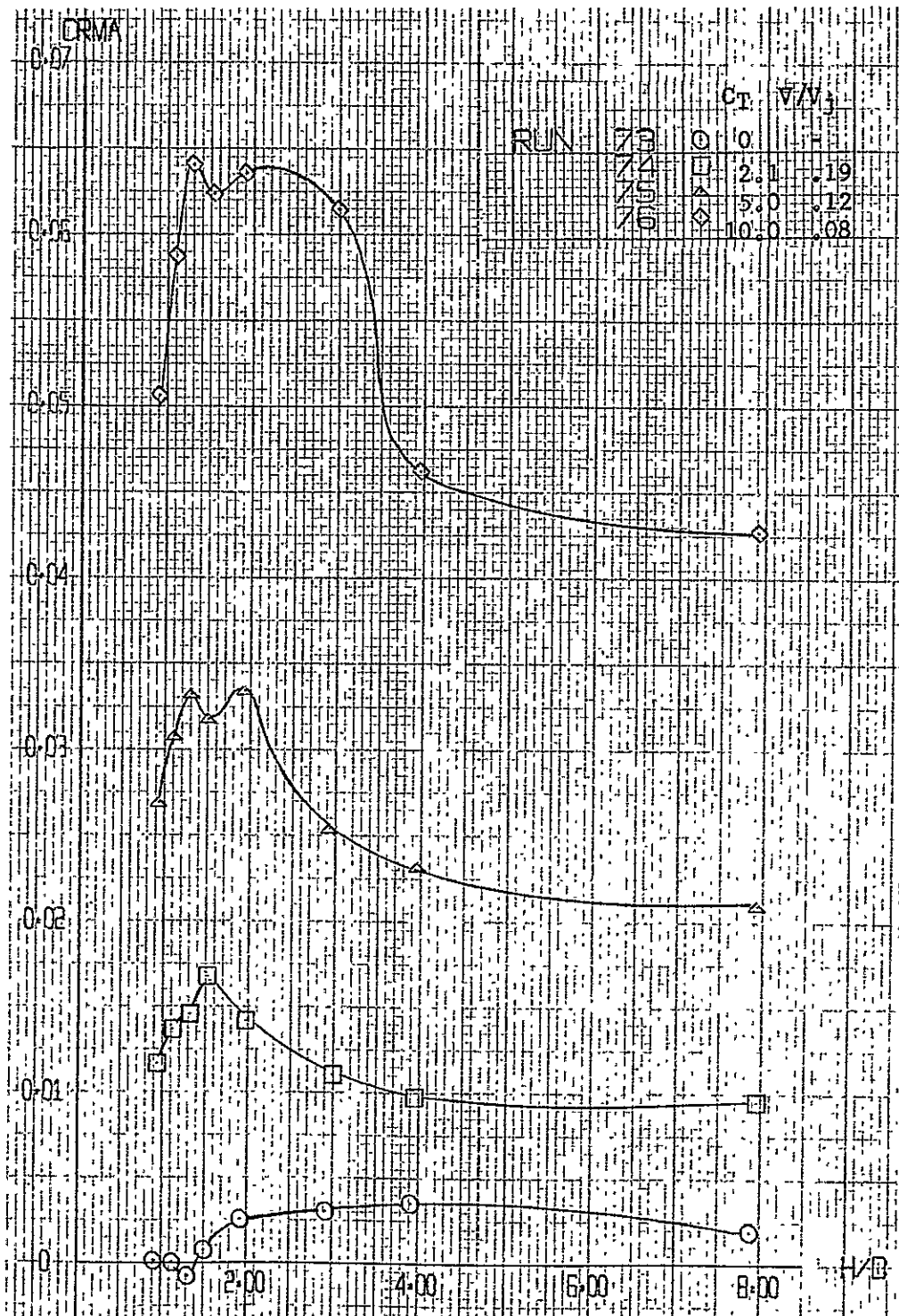


Figure A-16. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Concluded)

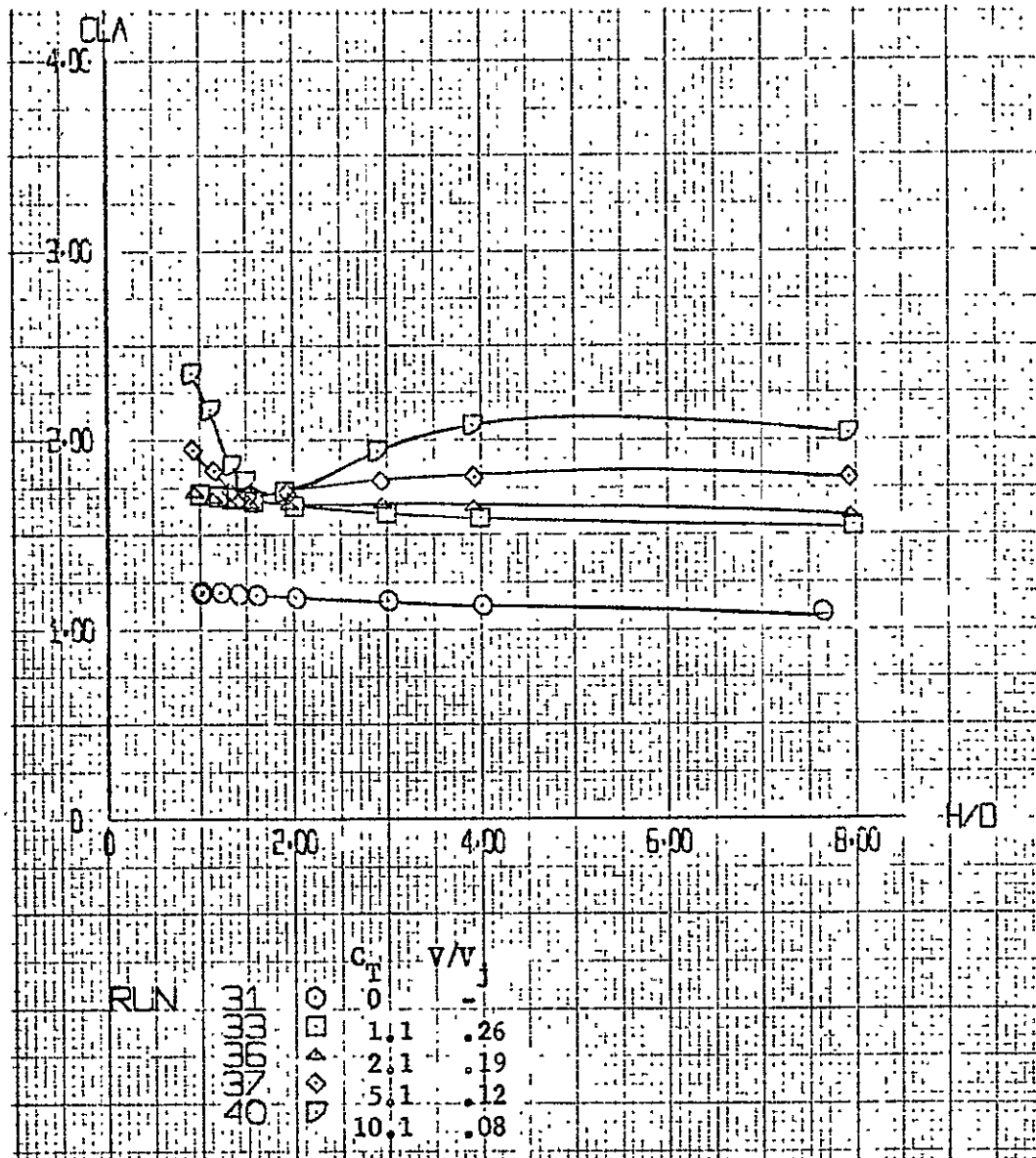


Figure A-17. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\beta = 0^\circ$

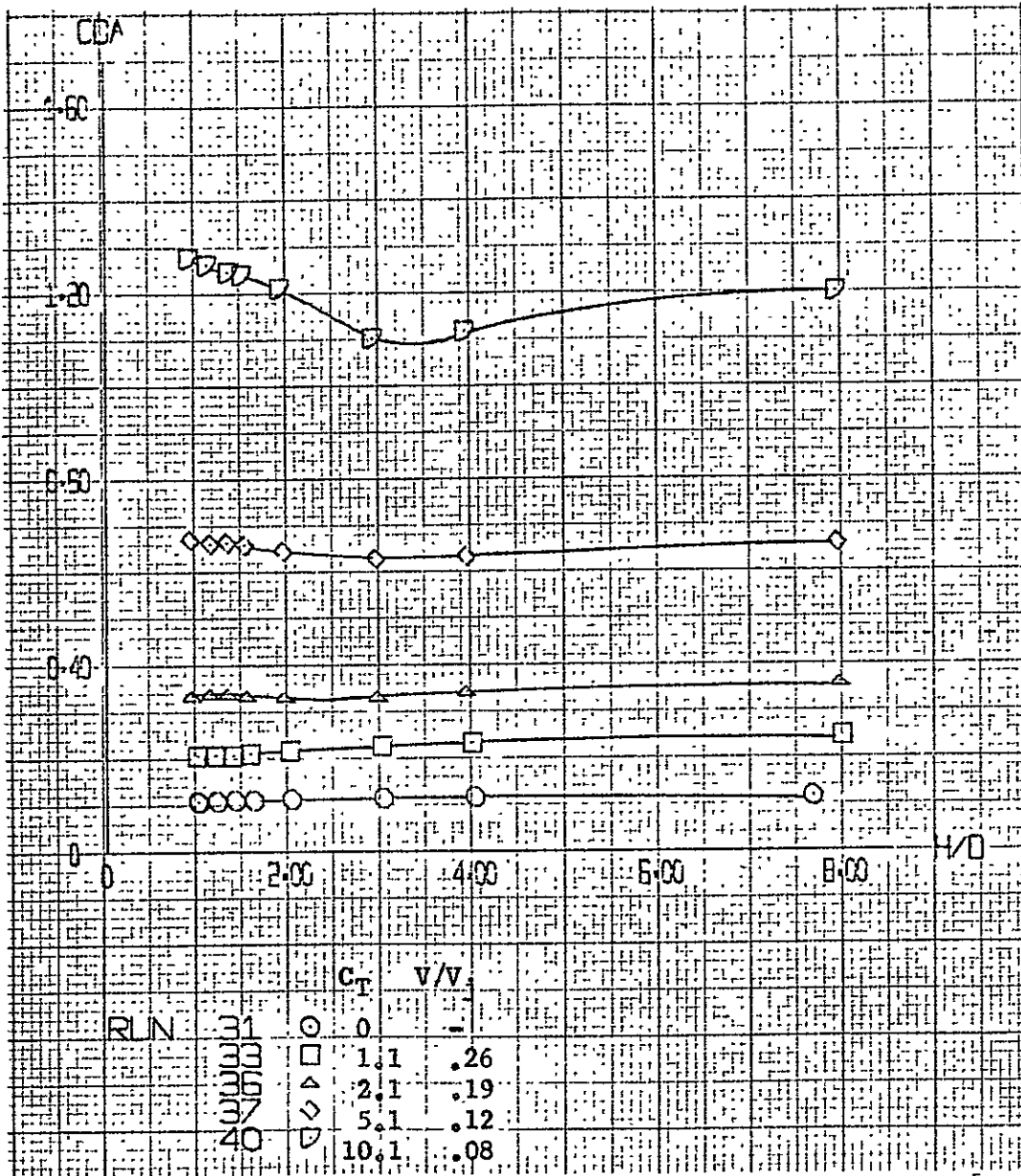


Figure A-17. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

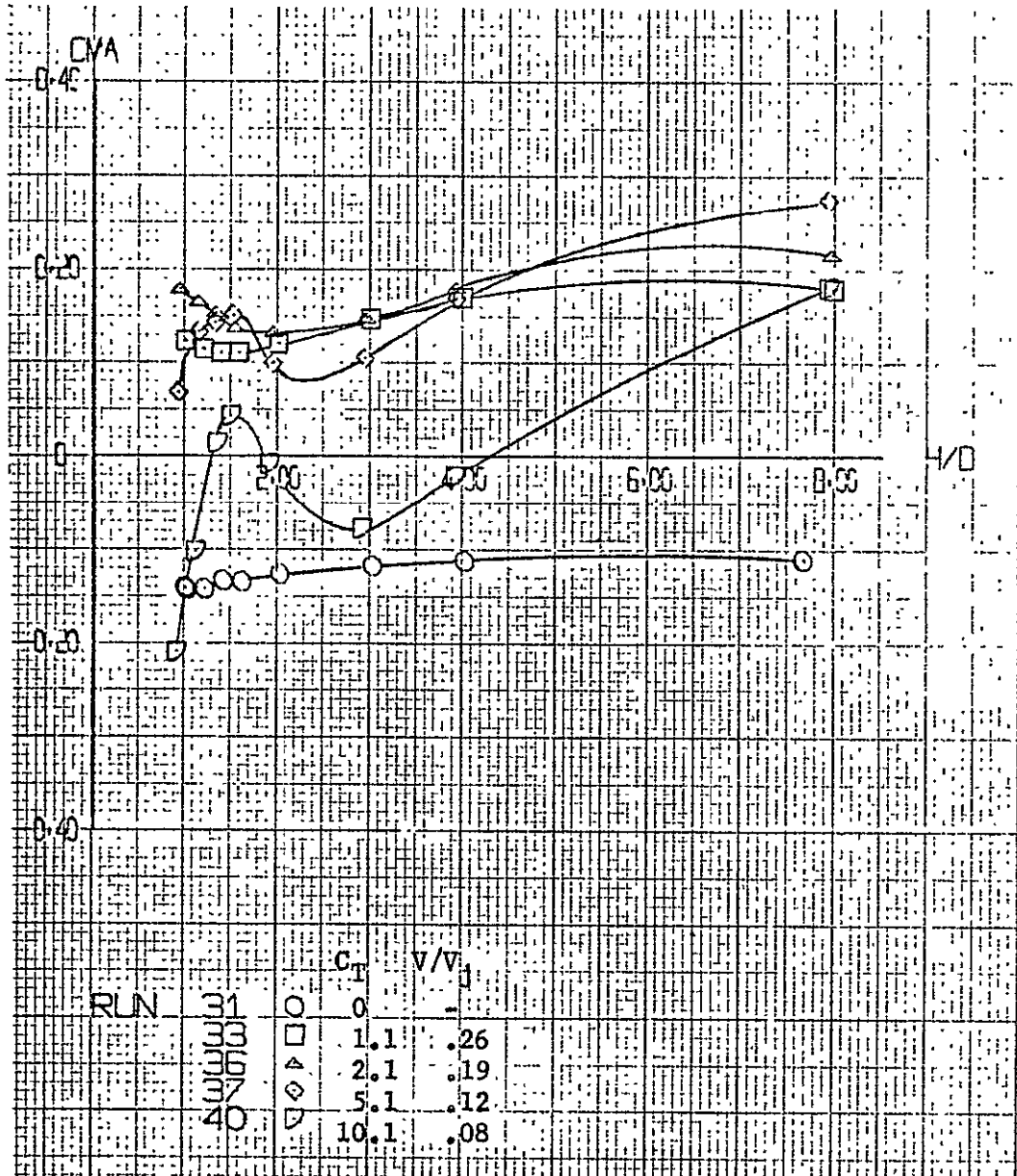


Figure A-17. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\beta = 0^\circ$ (Continued)

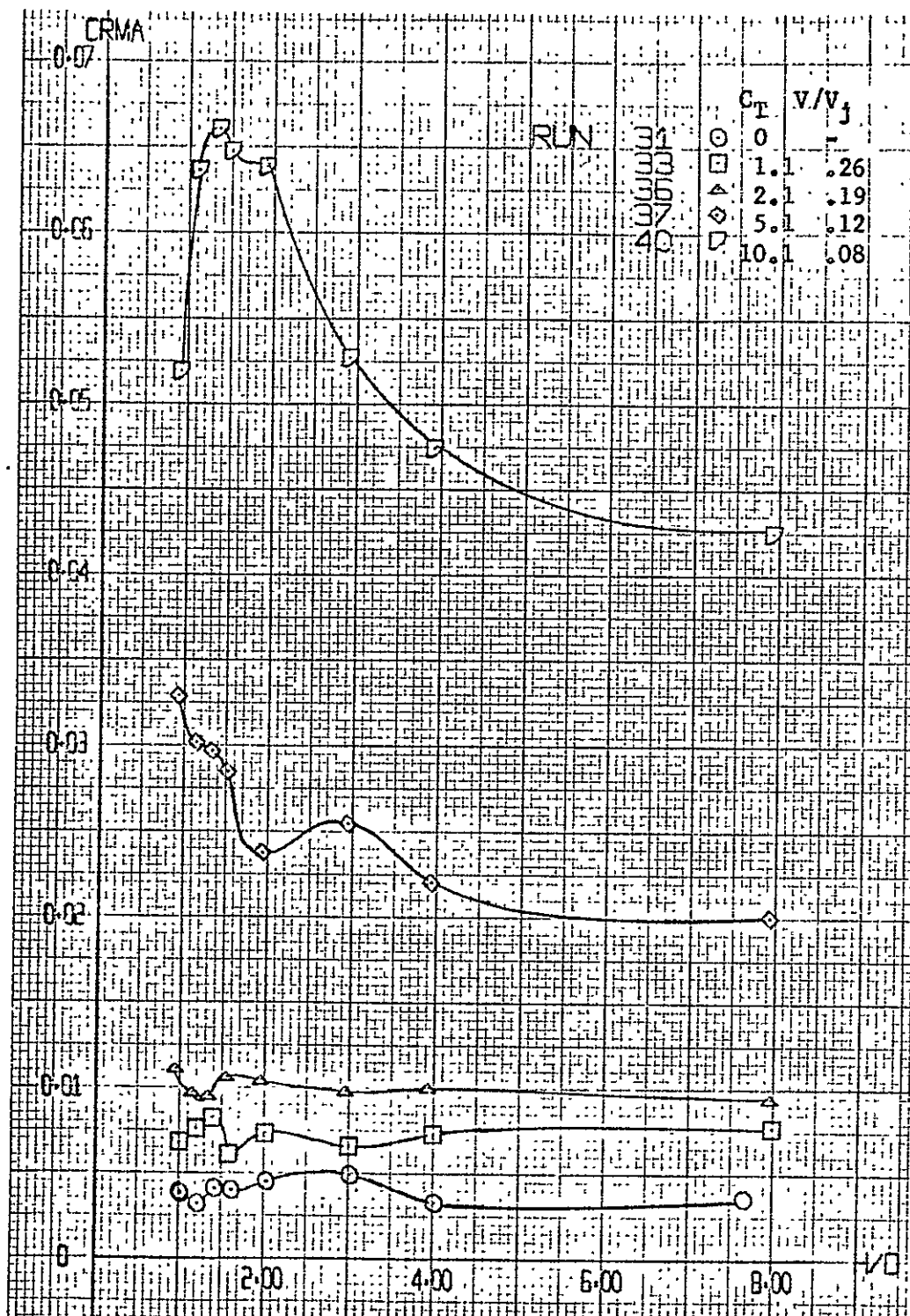


Figure A-17. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

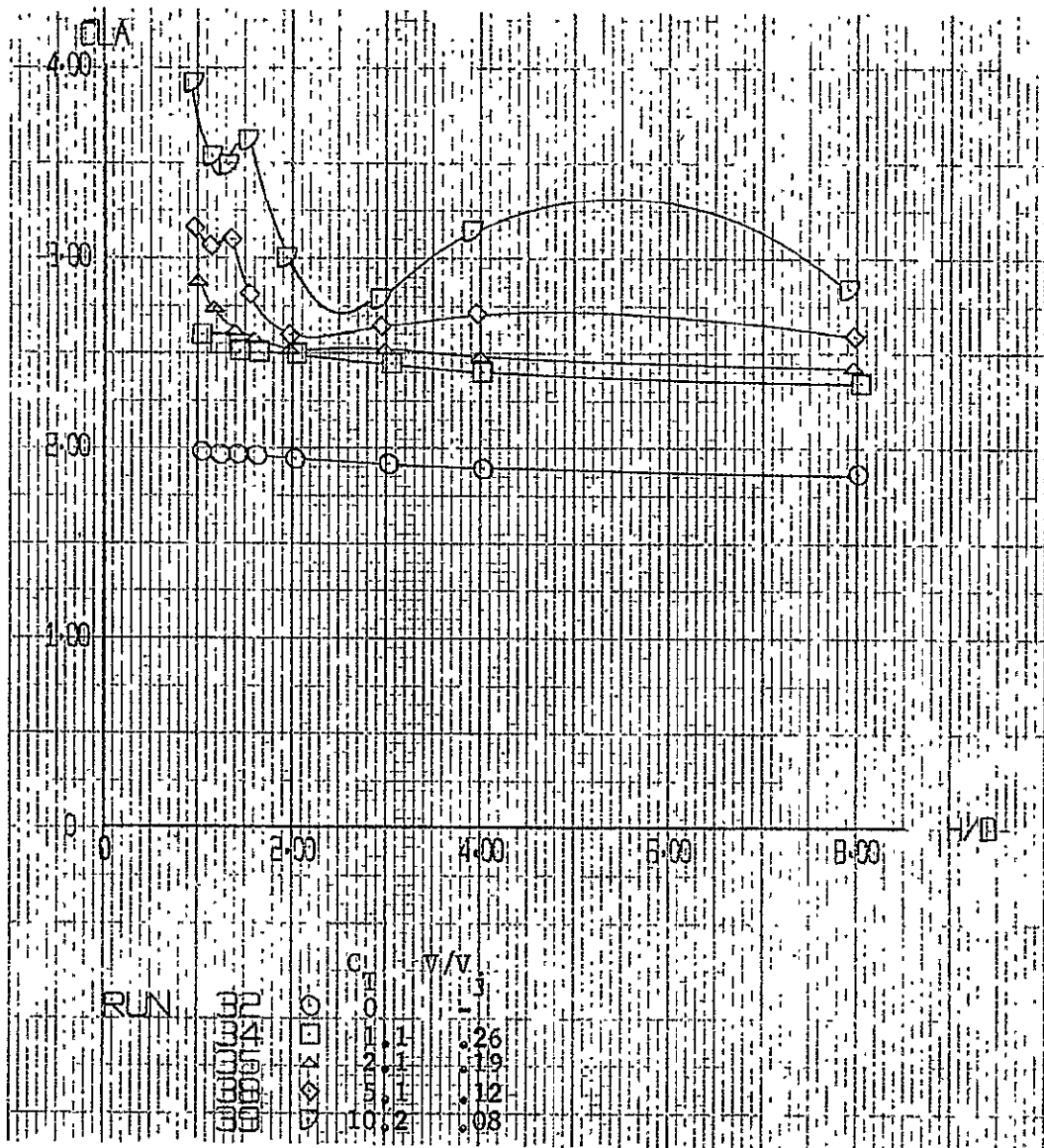


Figure A-18. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 8^\circ$, $\phi = 0^\circ$

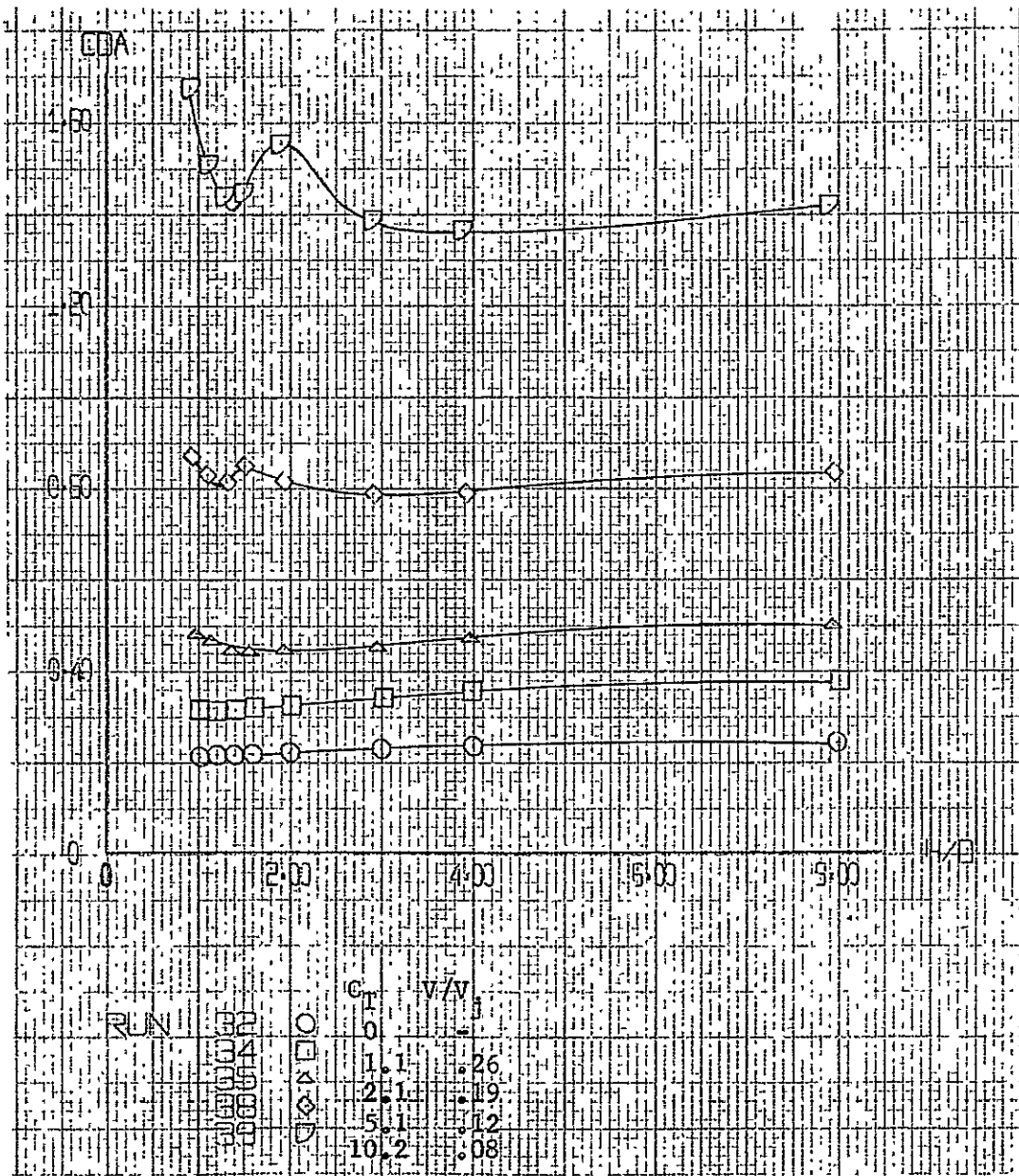


Figure A-18. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 8^\circ$, $\phi = 0^\circ$ (Continued)

ORIGINAL PAGE IS
OF POOR QUALITY

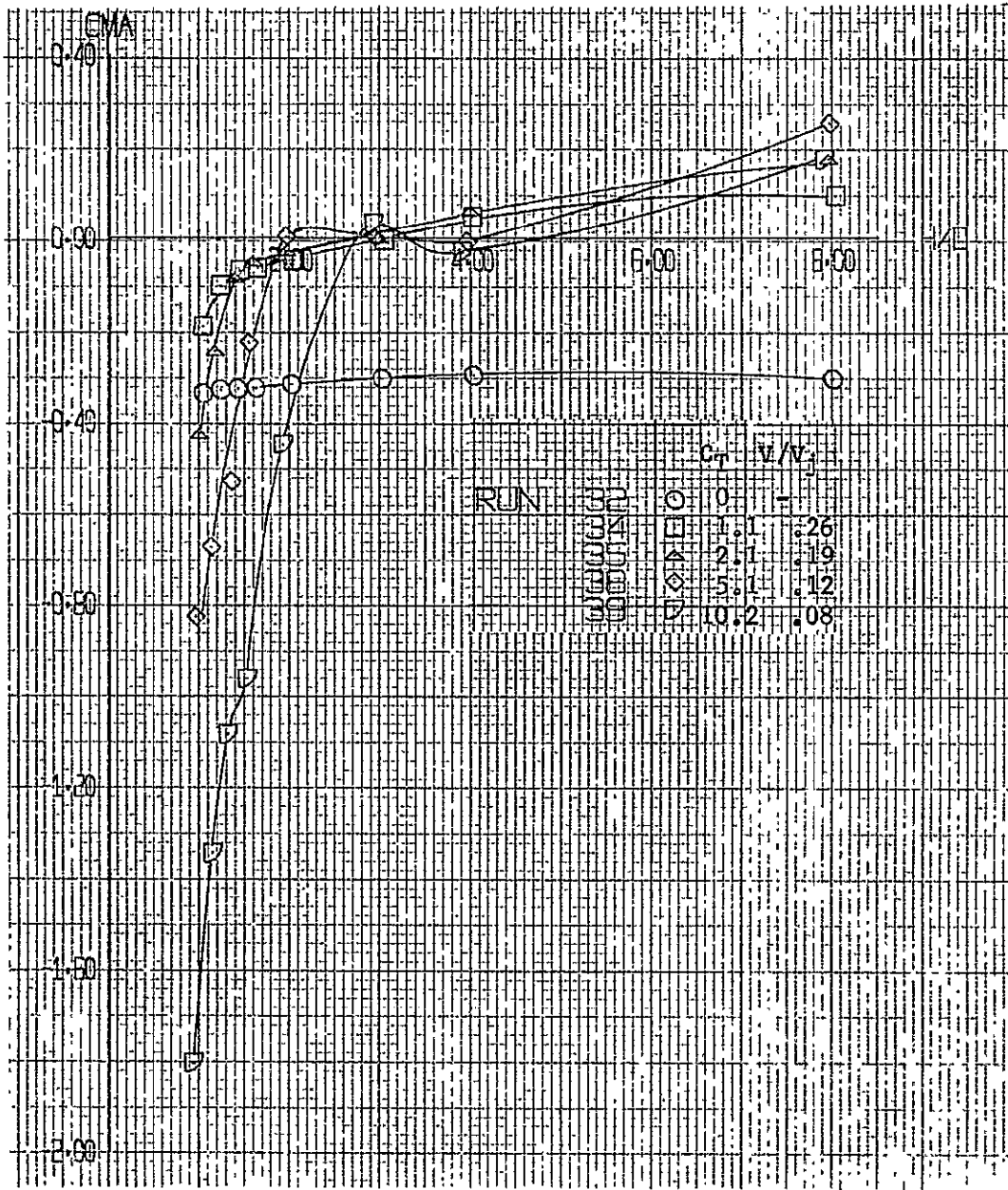


Figure A-18. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta N_{Fwd} = 30^\circ$, $\delta N_{Aft} = 60^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

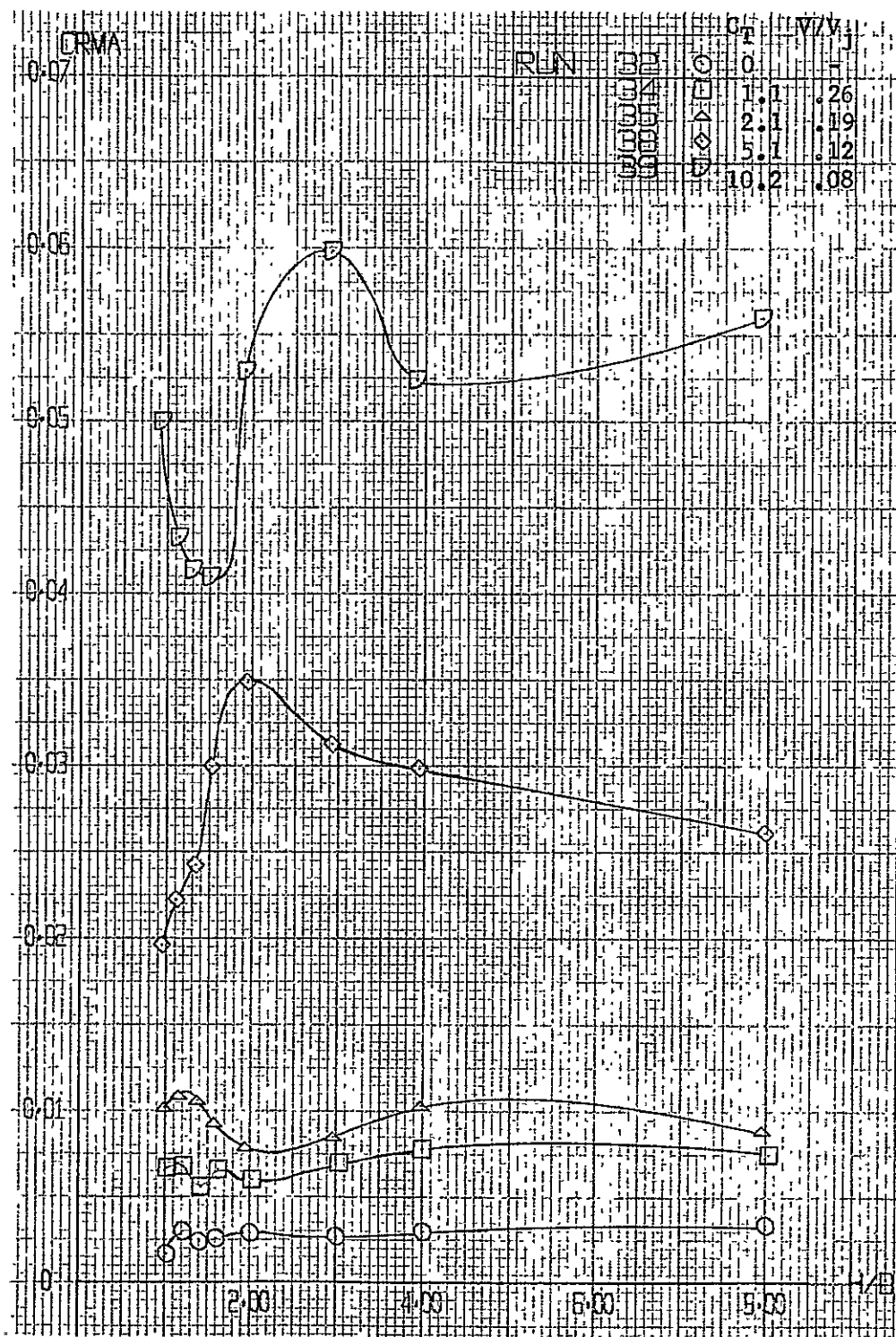


Figure A-18. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 8^\circ$, $\phi = 0^\circ$ (Concluded)

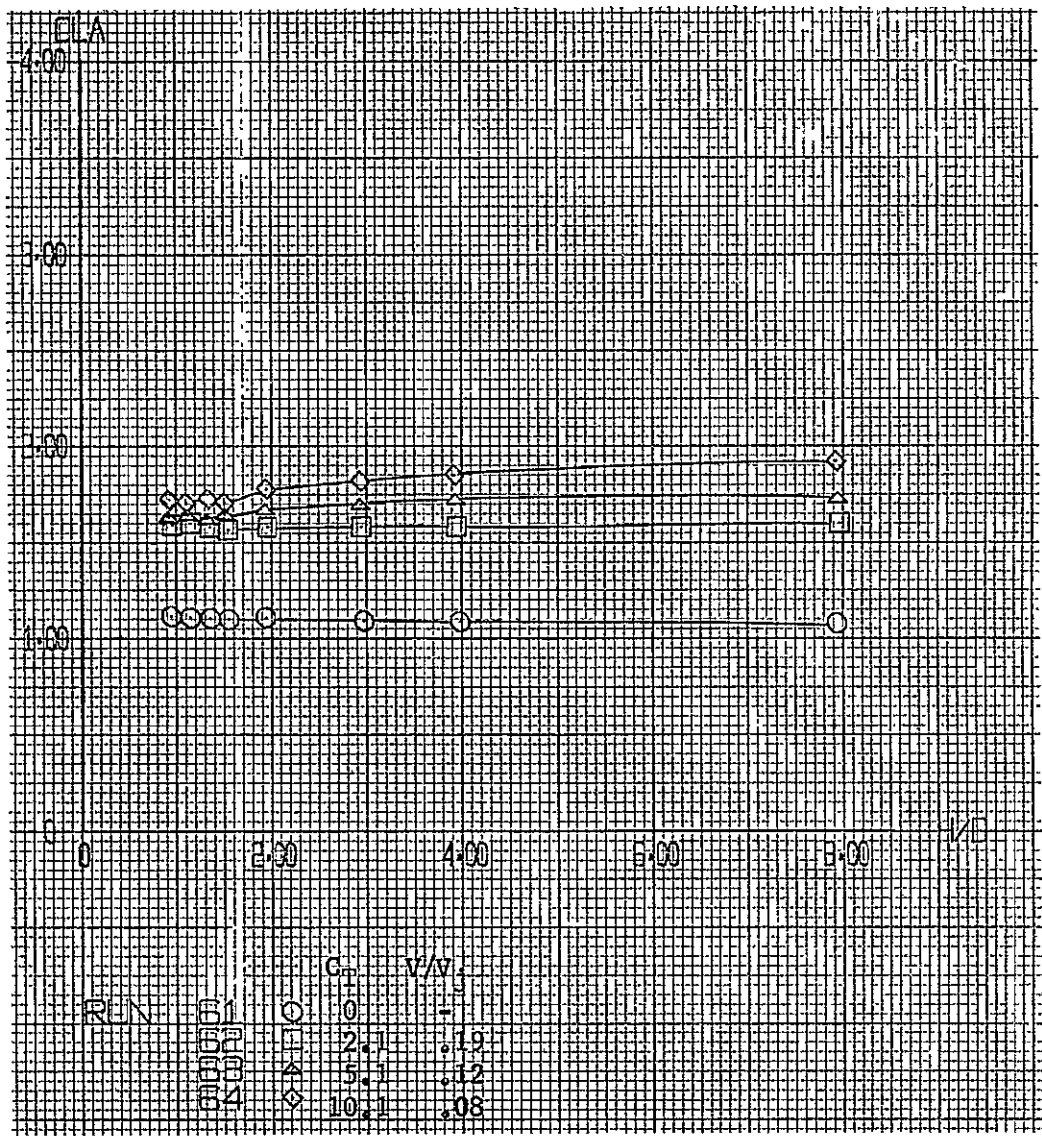


Figure A-19. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

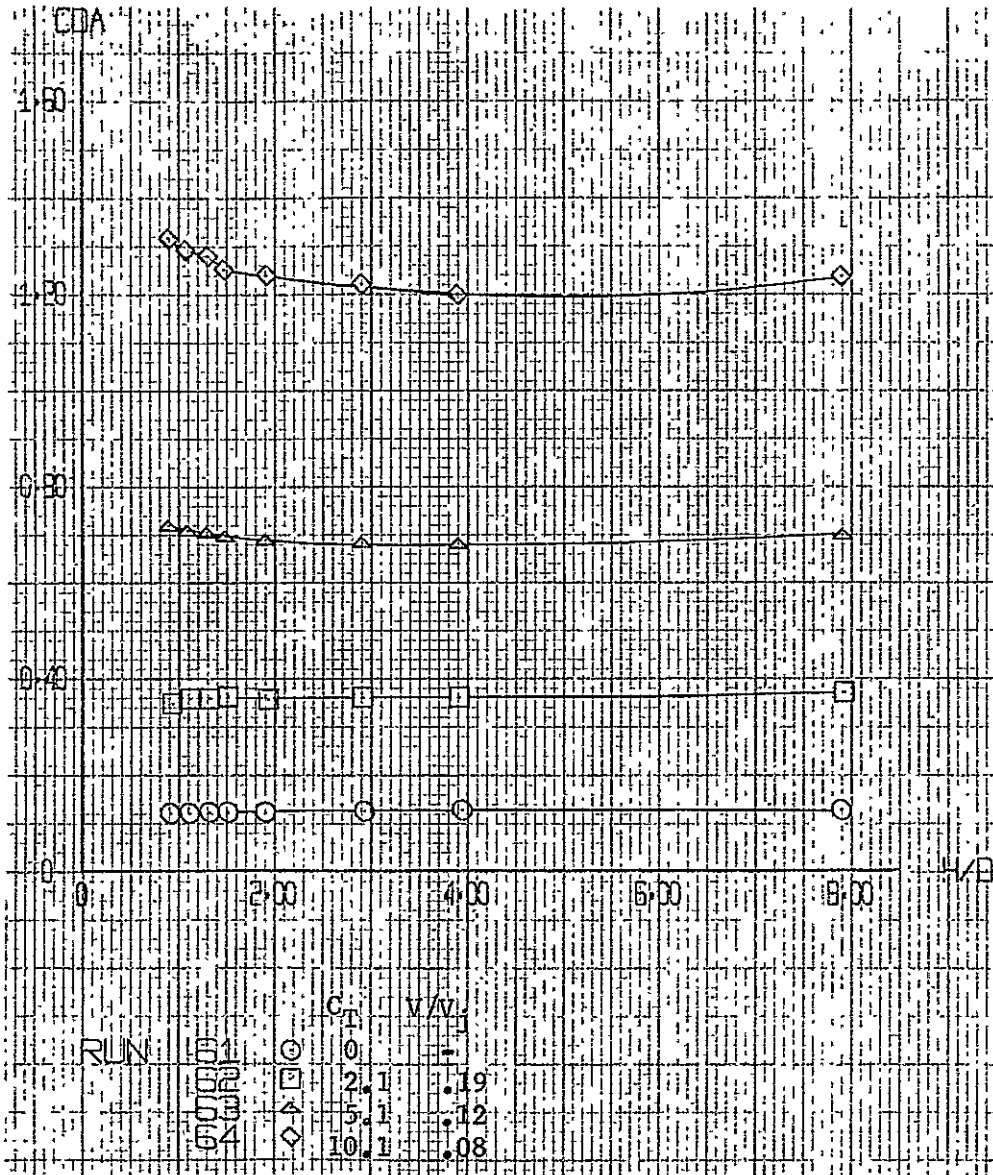


Figure A-19. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

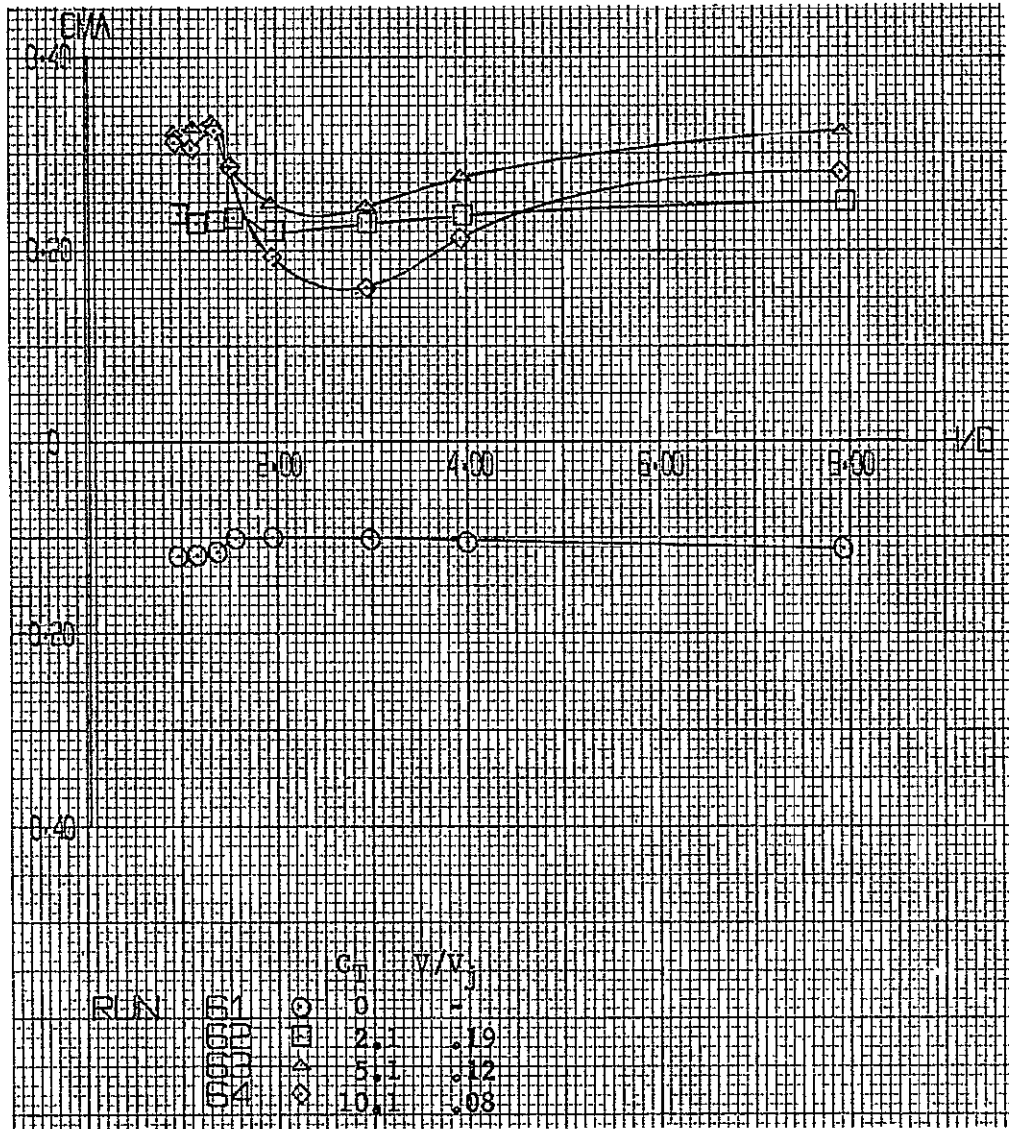


Figure A-19. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 5; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

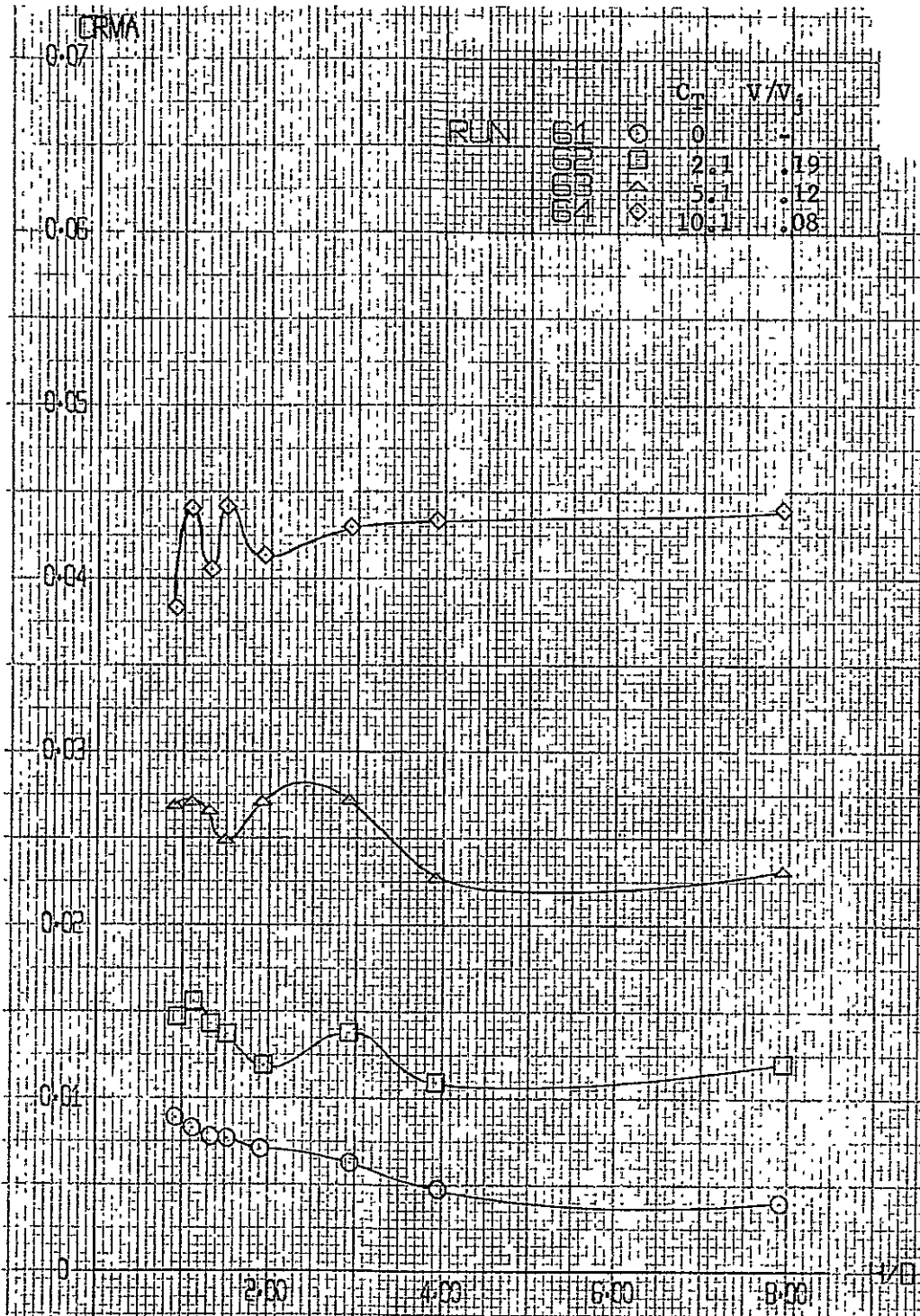


Figure A-19. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

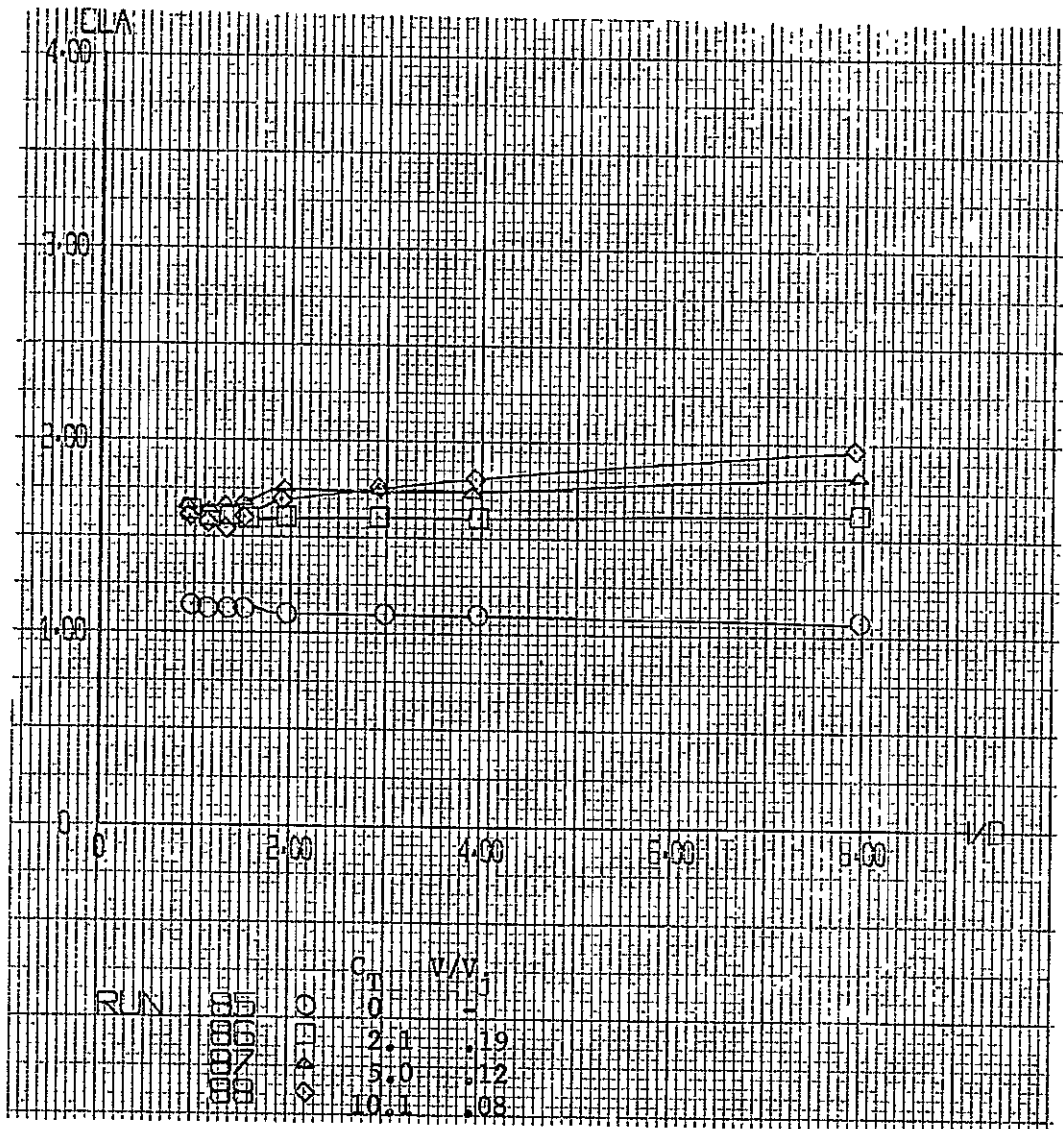


Figure A-20. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

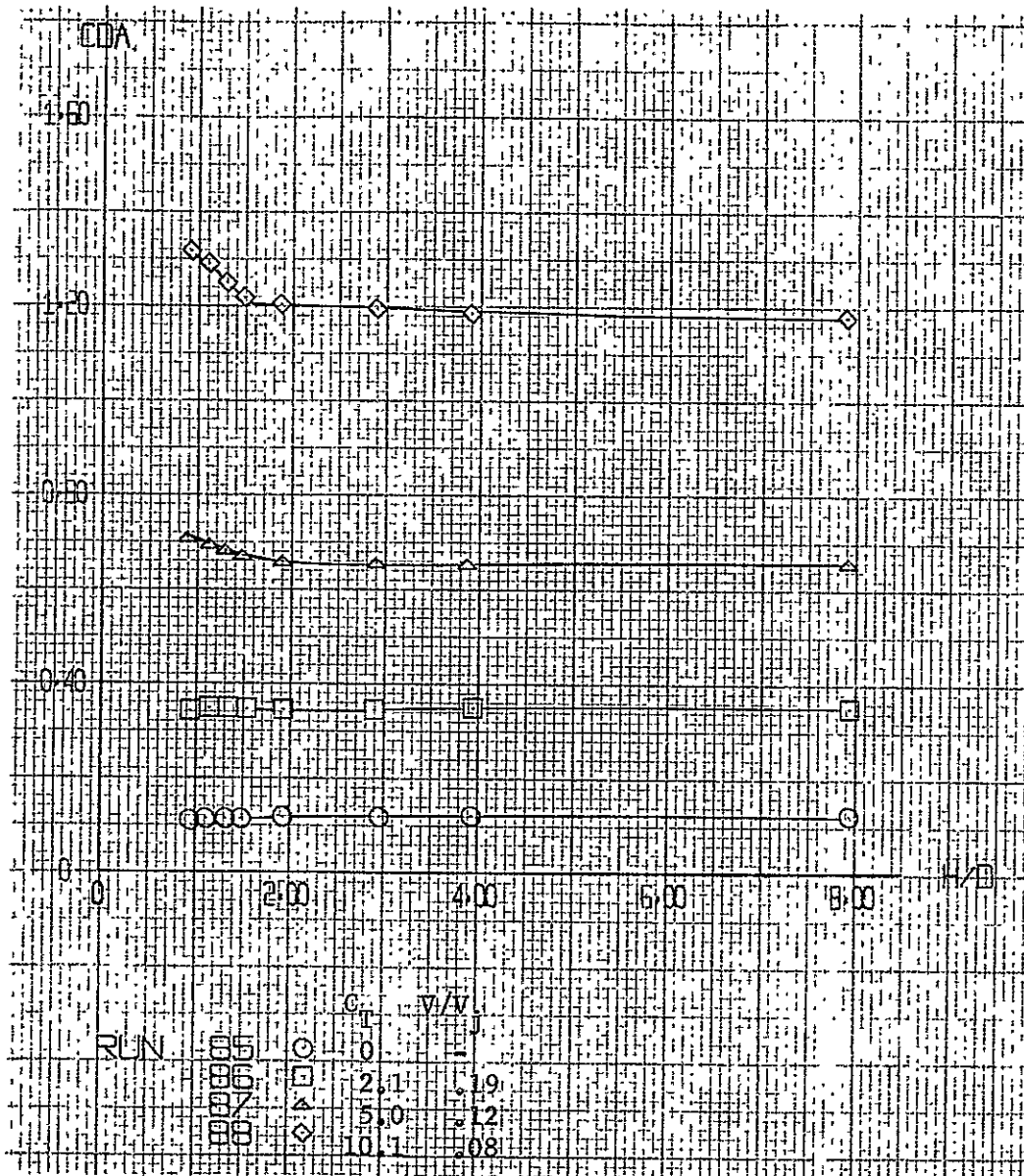


Figure A-20. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

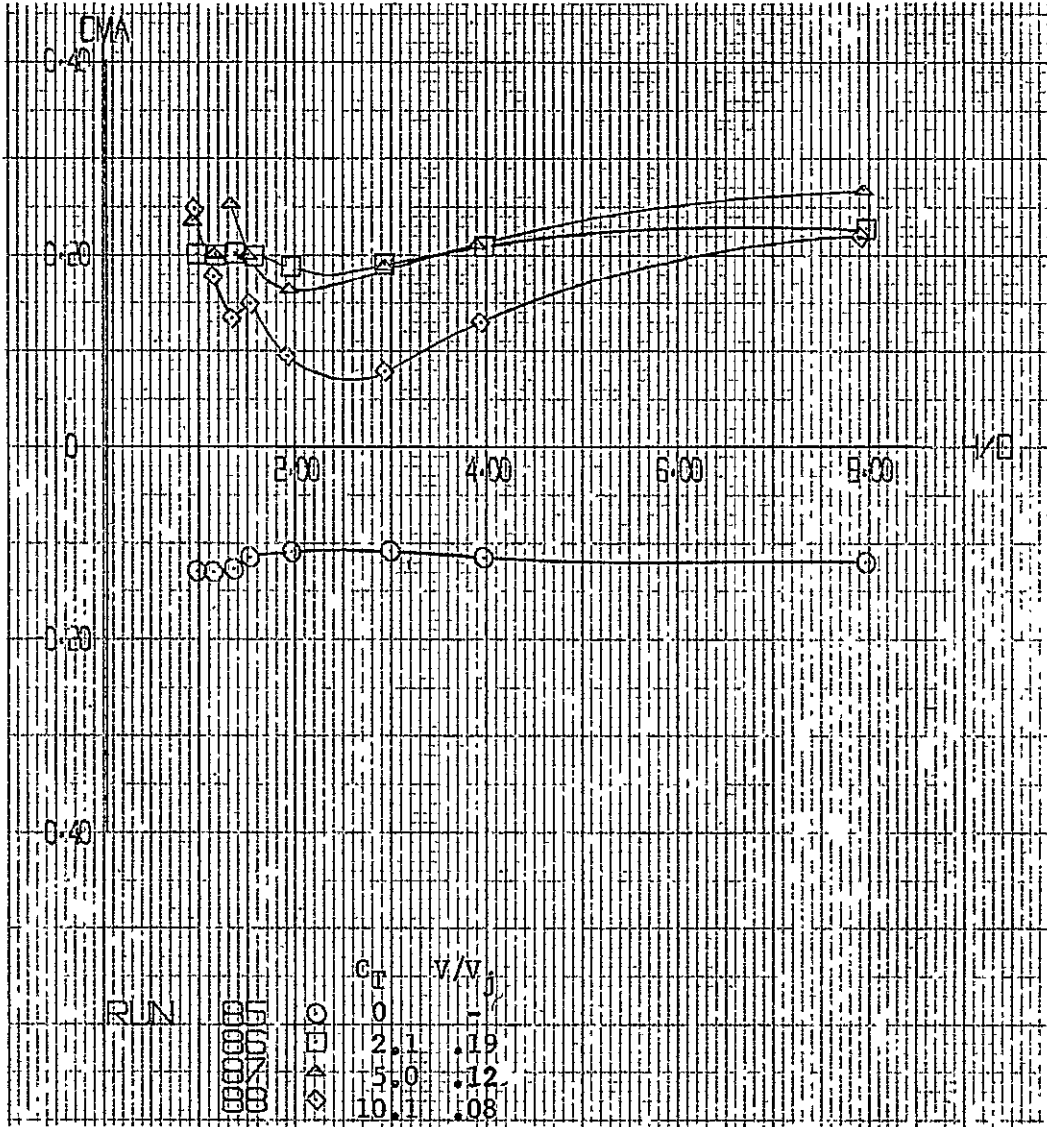


Figure A-20. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

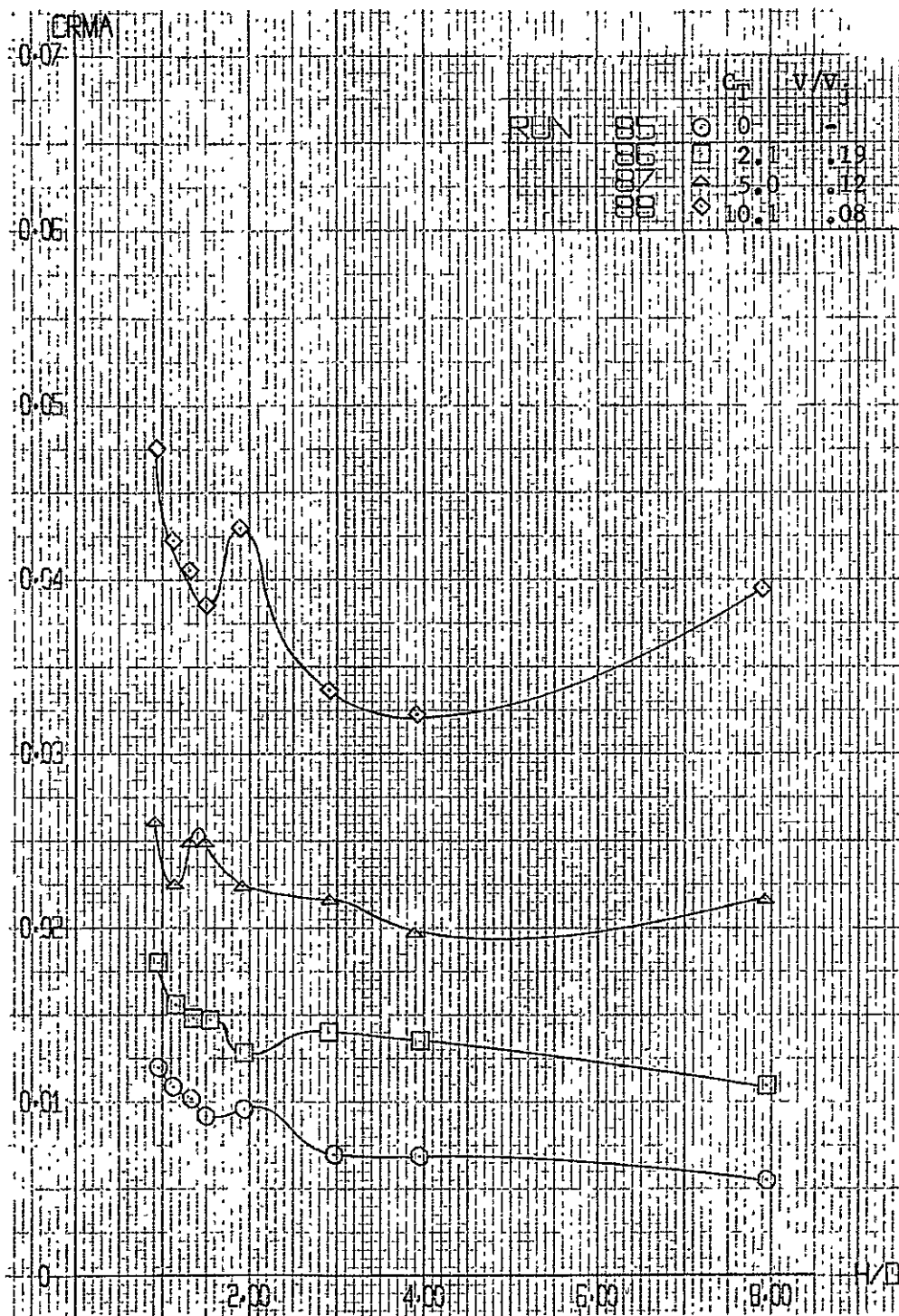


Figure A-20. Effect of Height on the Aerodynamic Coefficients
 at Various Thrust Levels, Ground Board Configuration
 5; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Concluded)

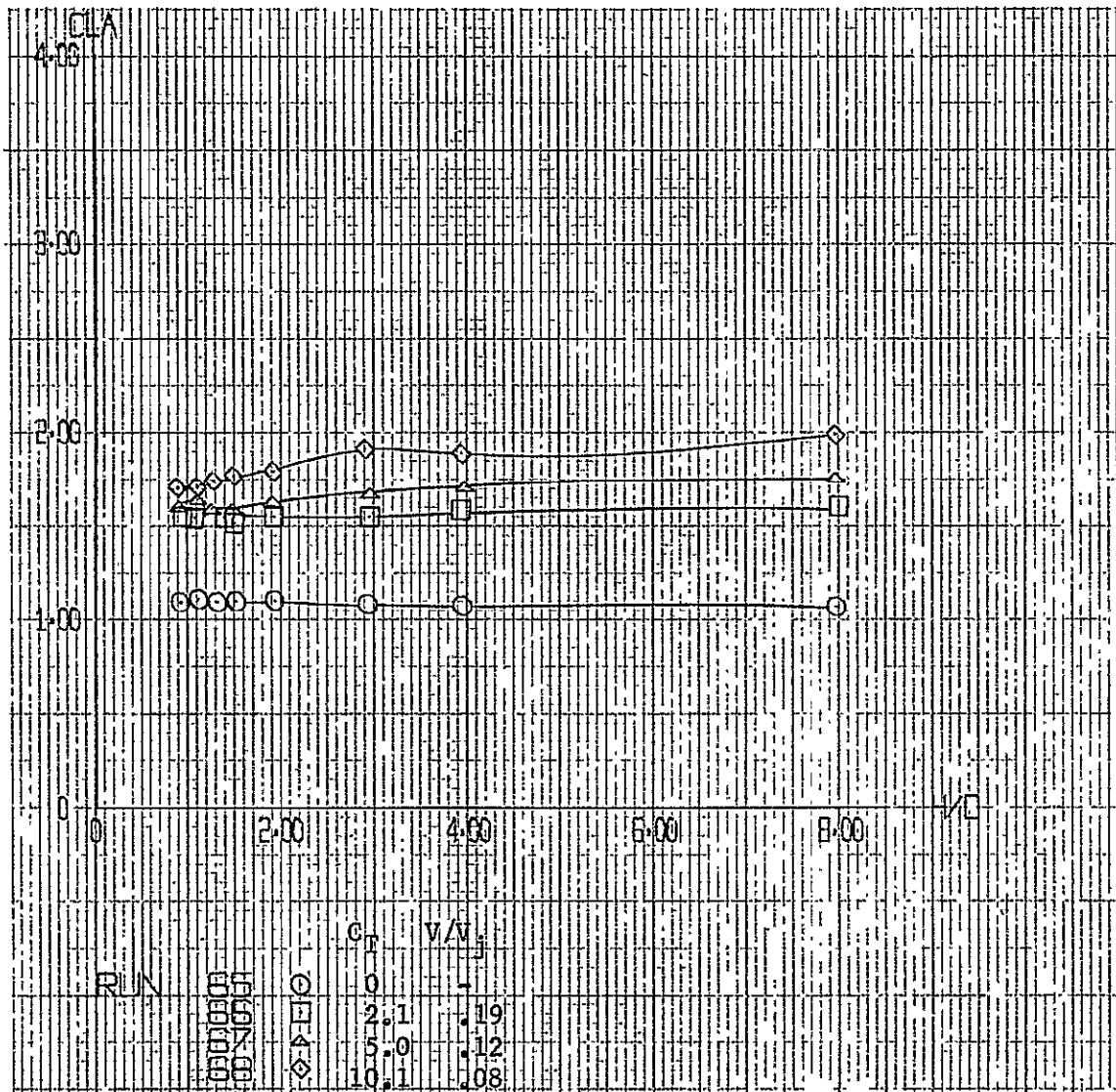


Figure A-21. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$

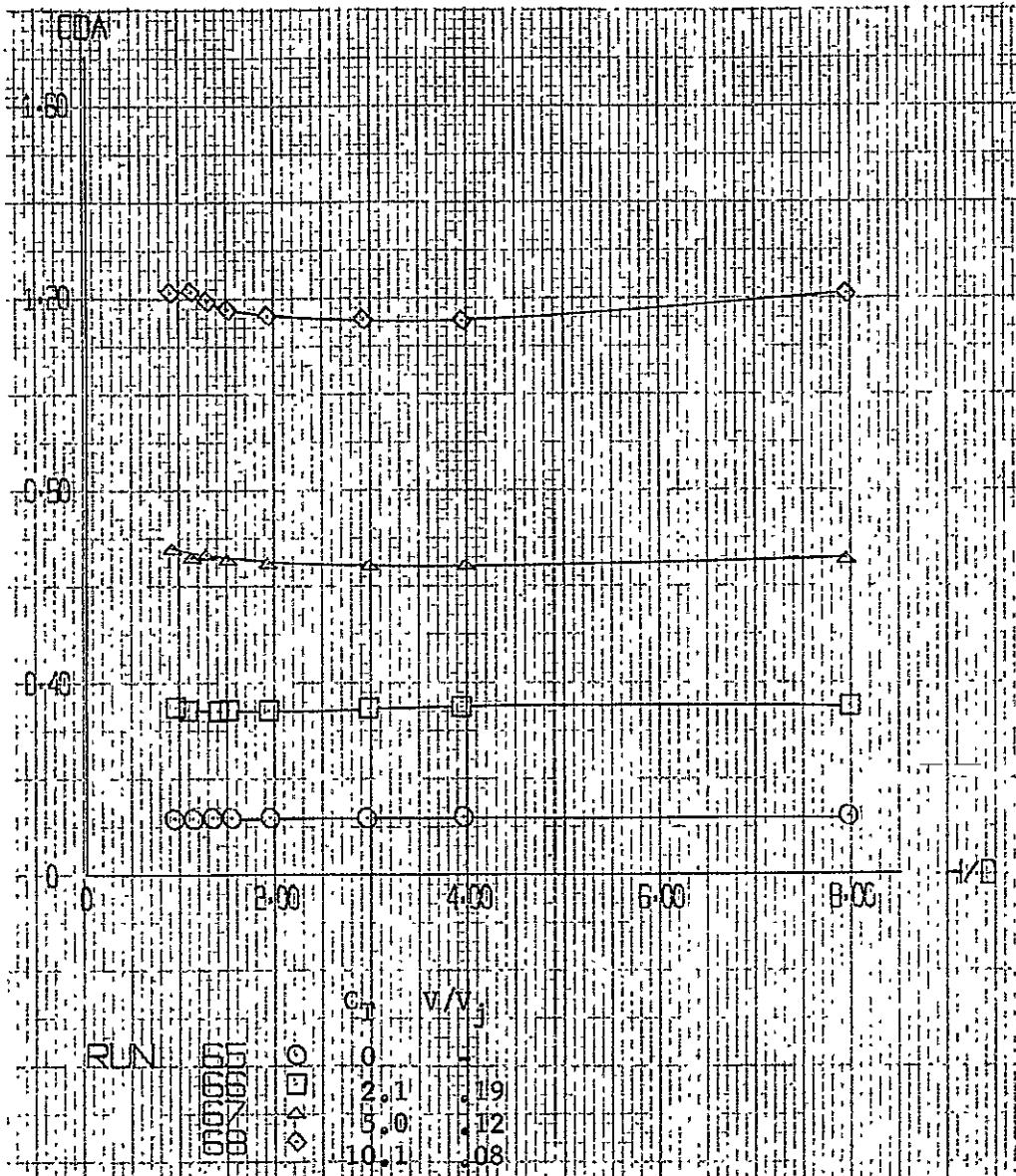


Figure A-21. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

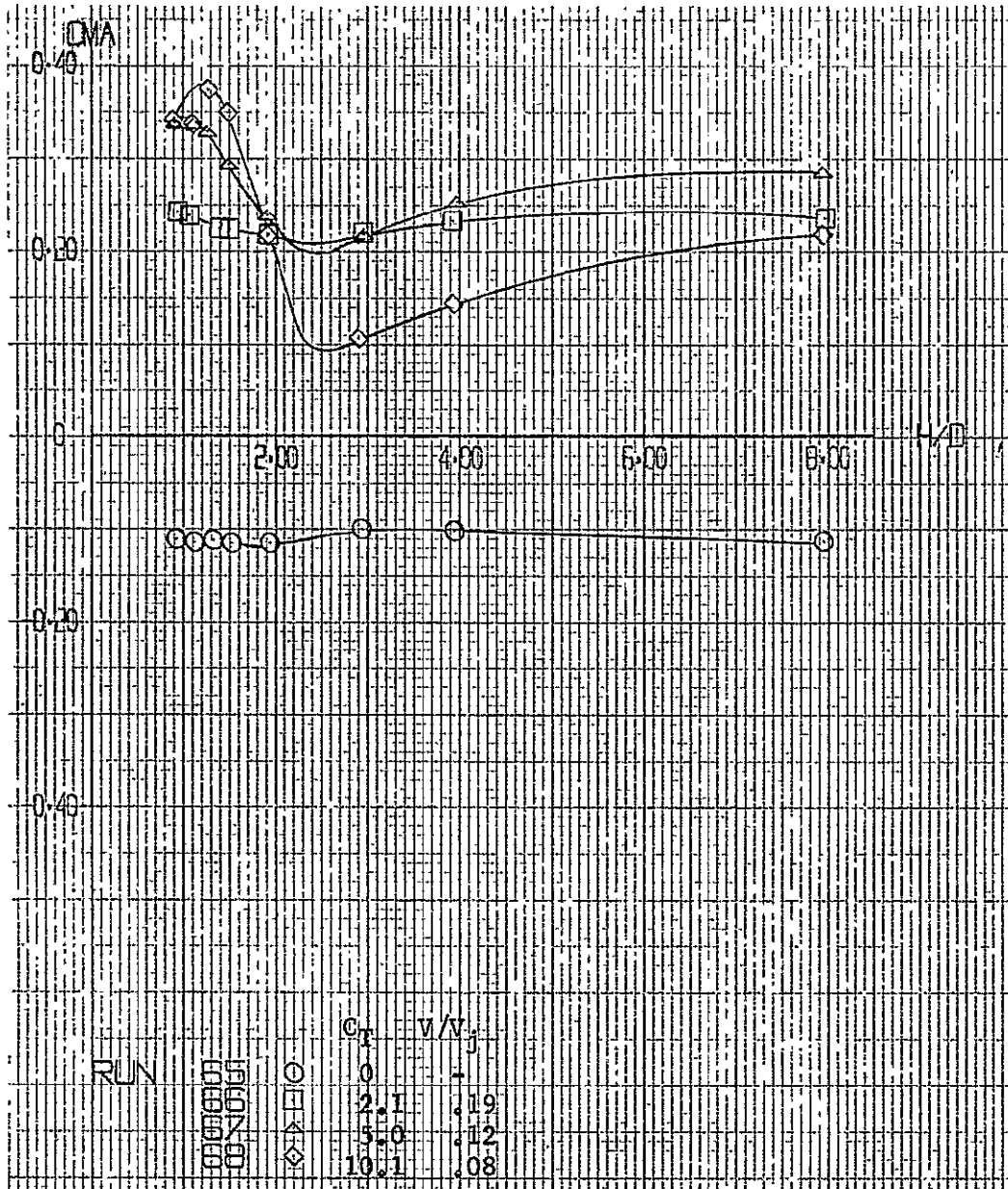


Figure A-21. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 5; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

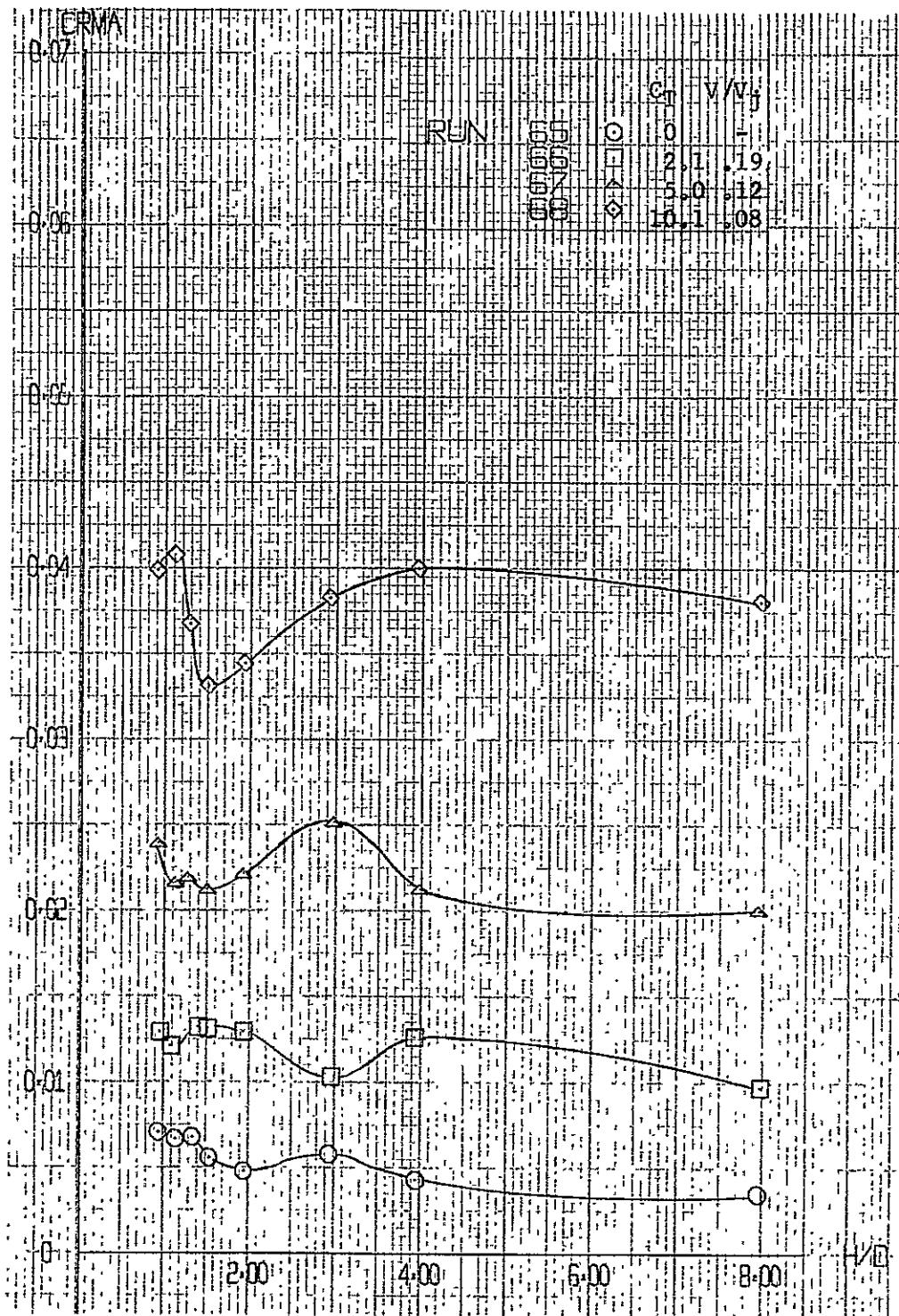


Figure A-21. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\beta = 10^\circ$ (Concluded)

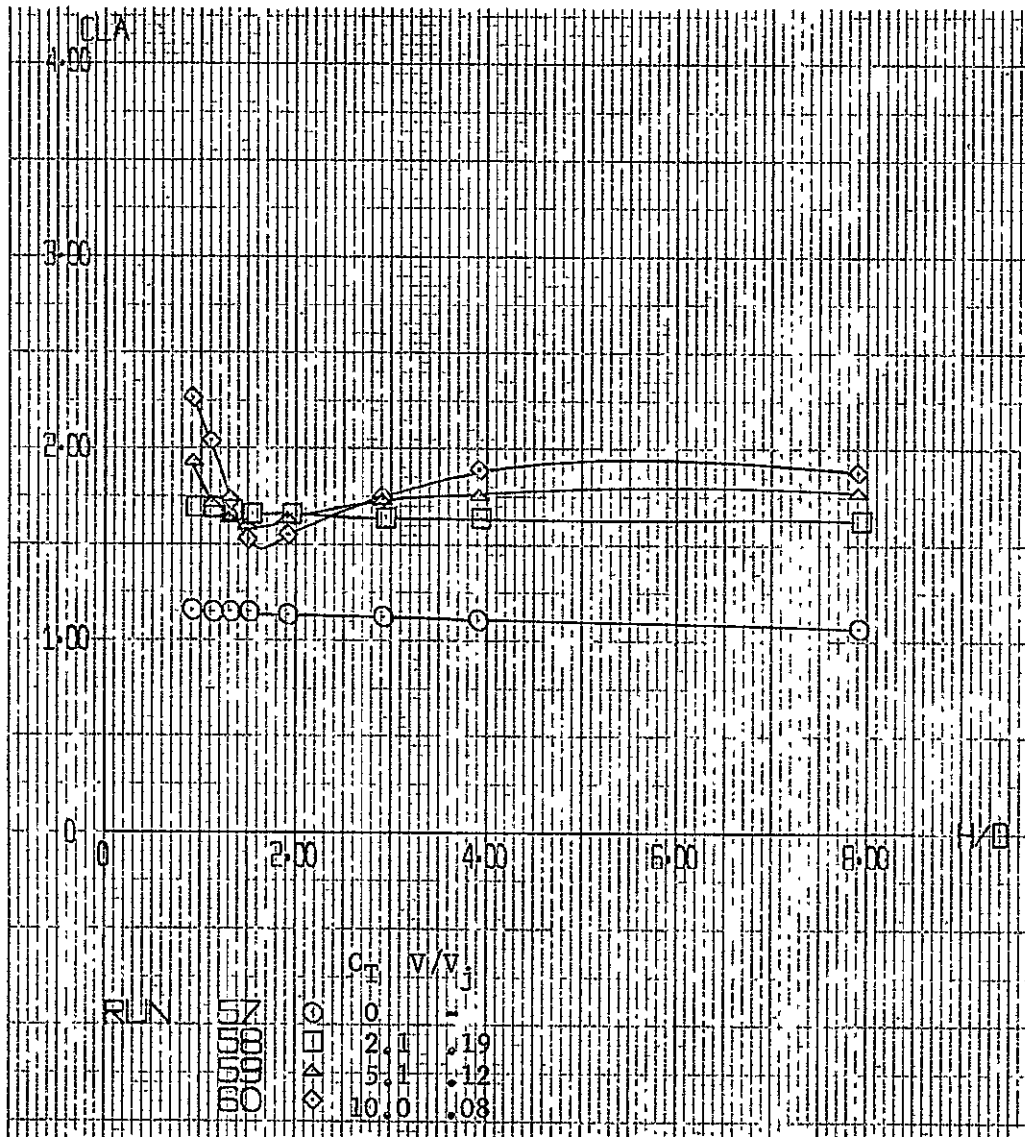


Figure A-22. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

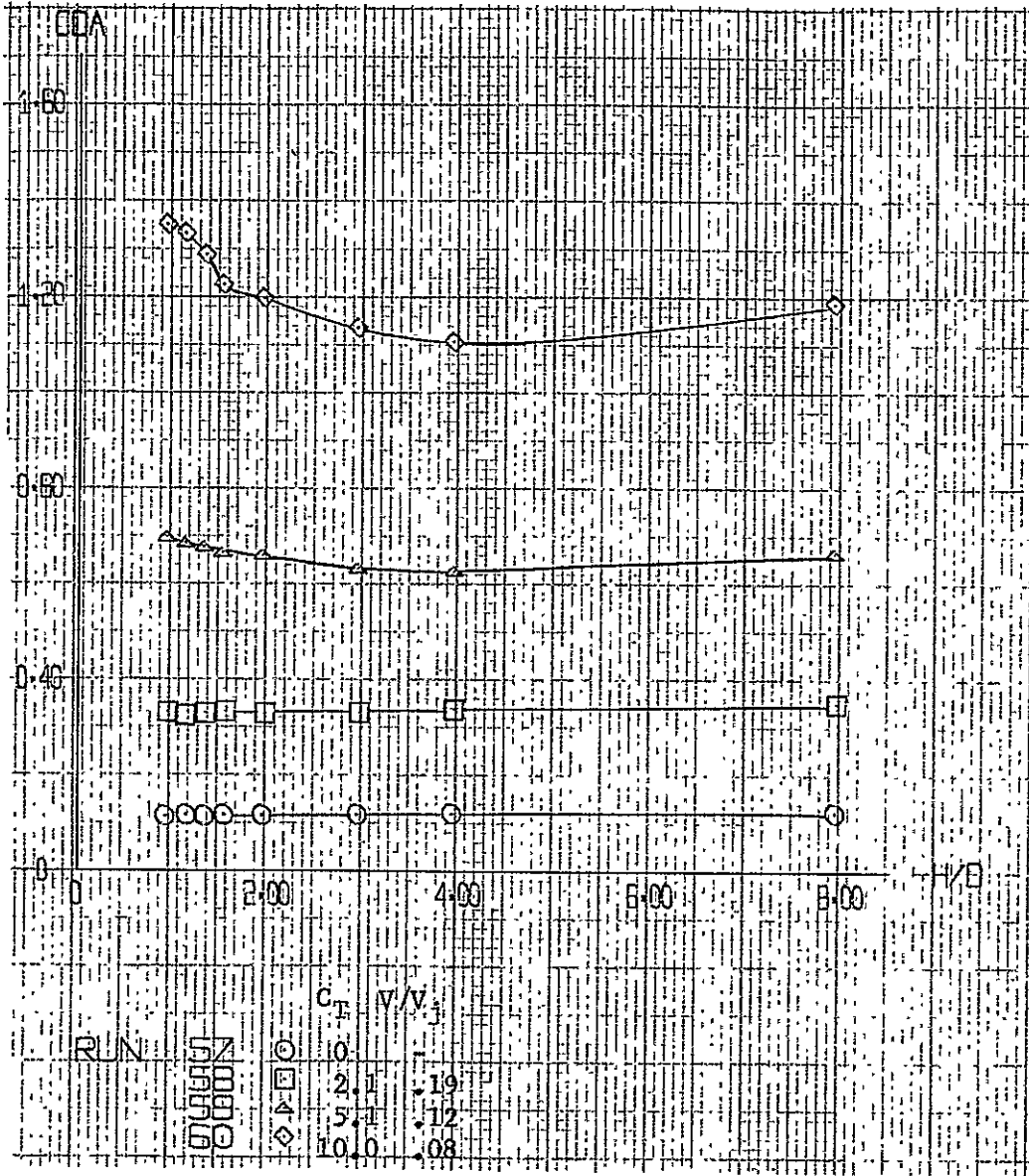


Figure A-22. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

C-2

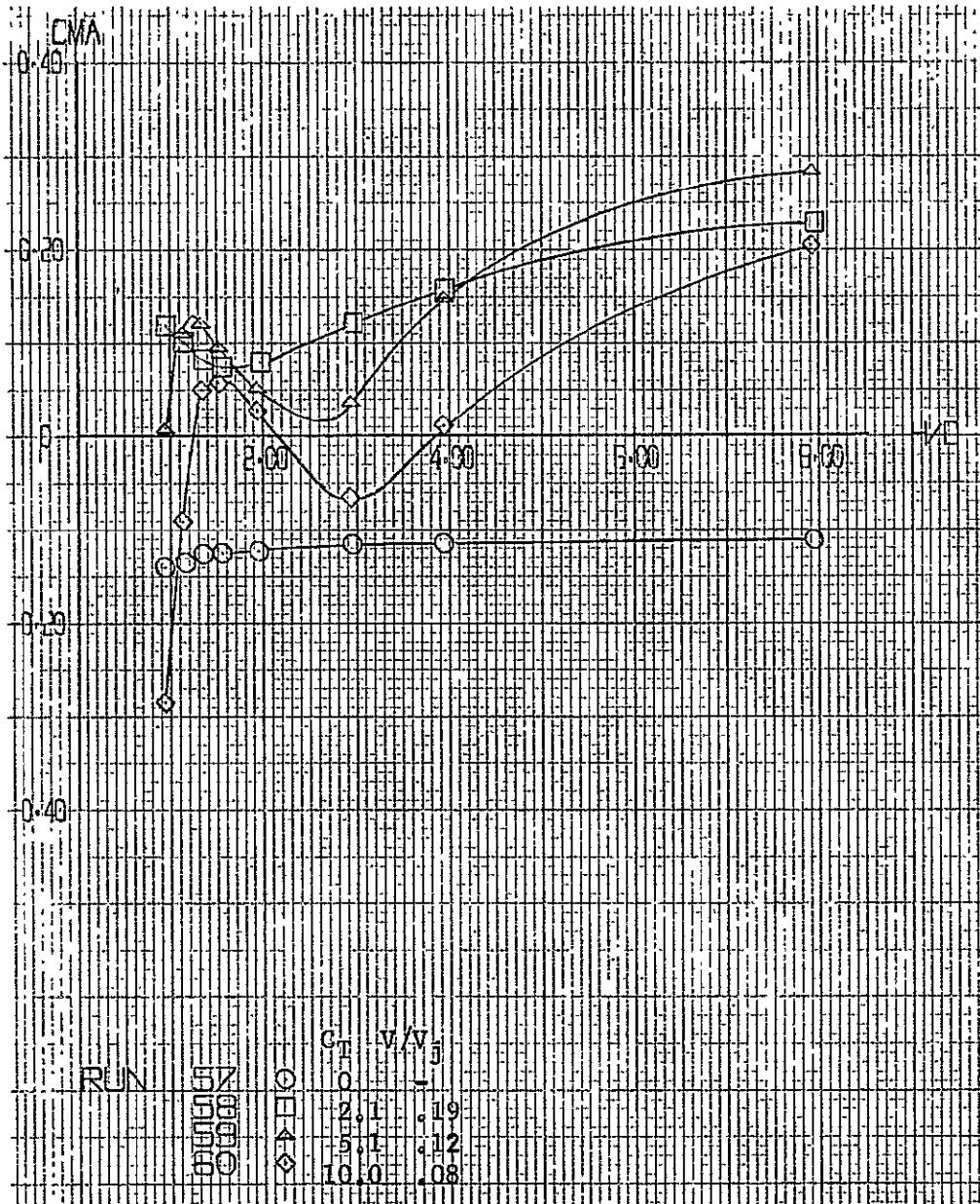


Figure A-22. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

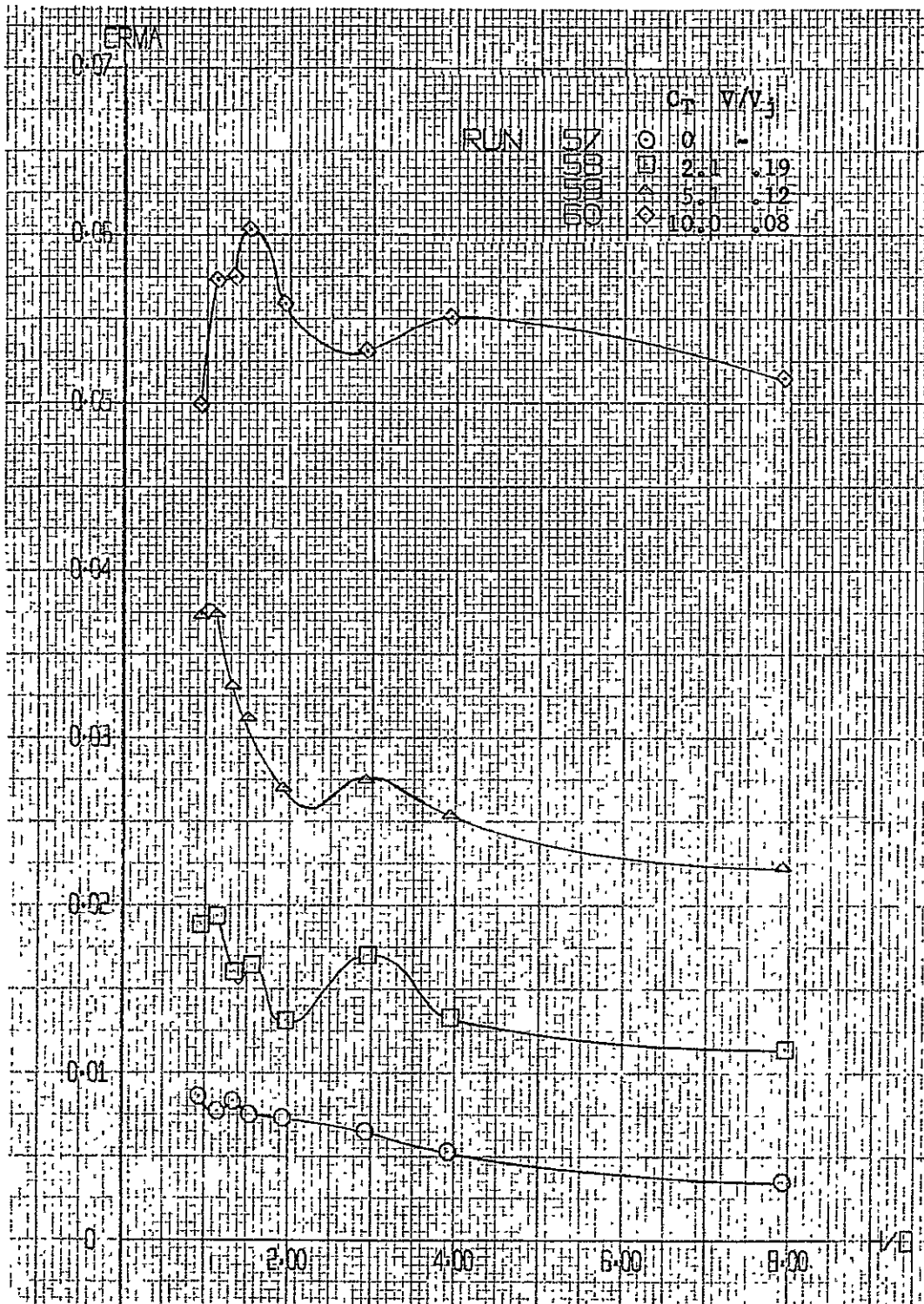


Figure A-22. Effect of Height on the Aerodynamic Coefficients
 at Various Thrust Levels, Ground Board Configuration
 4; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

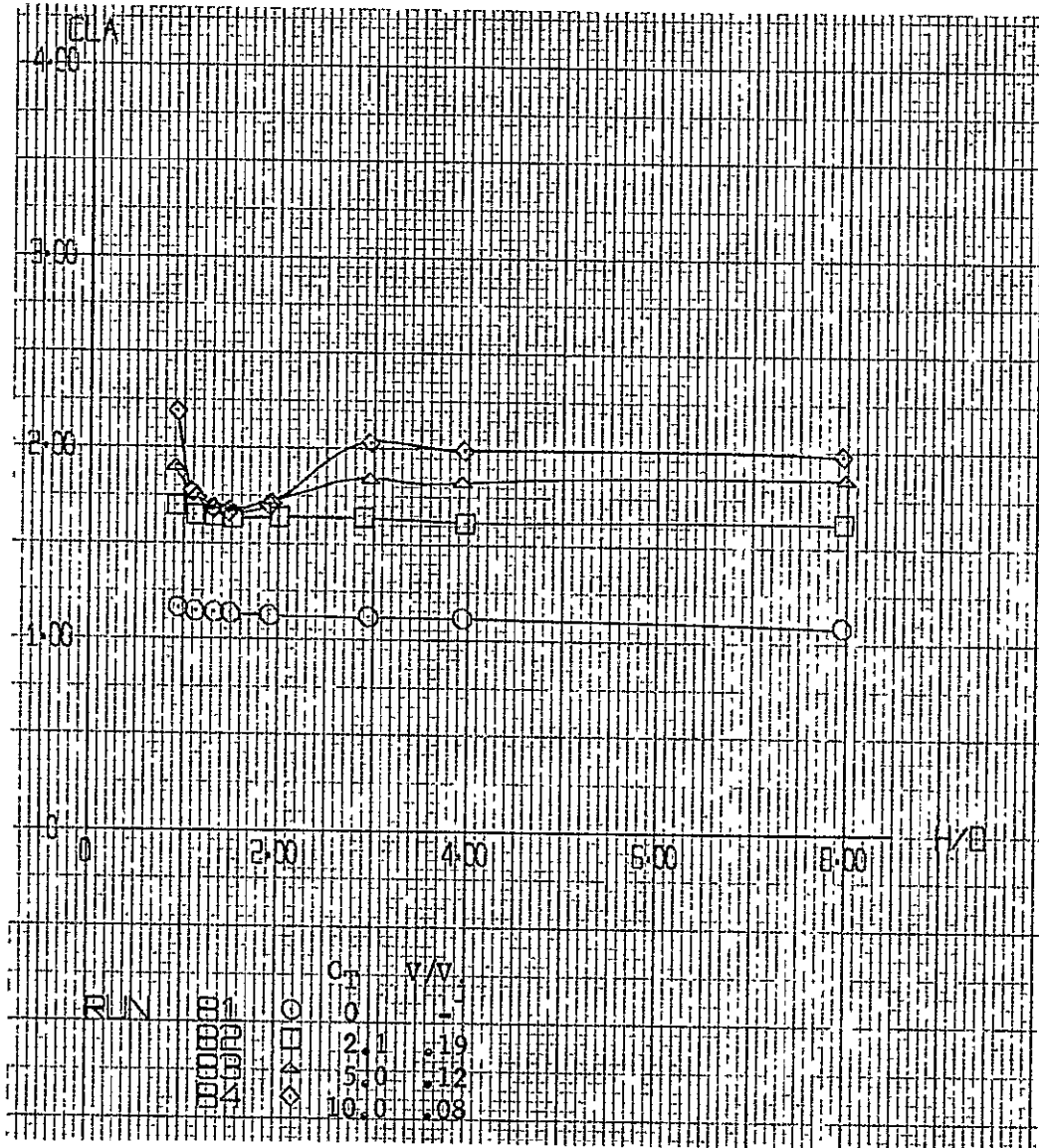


Figure A-23. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

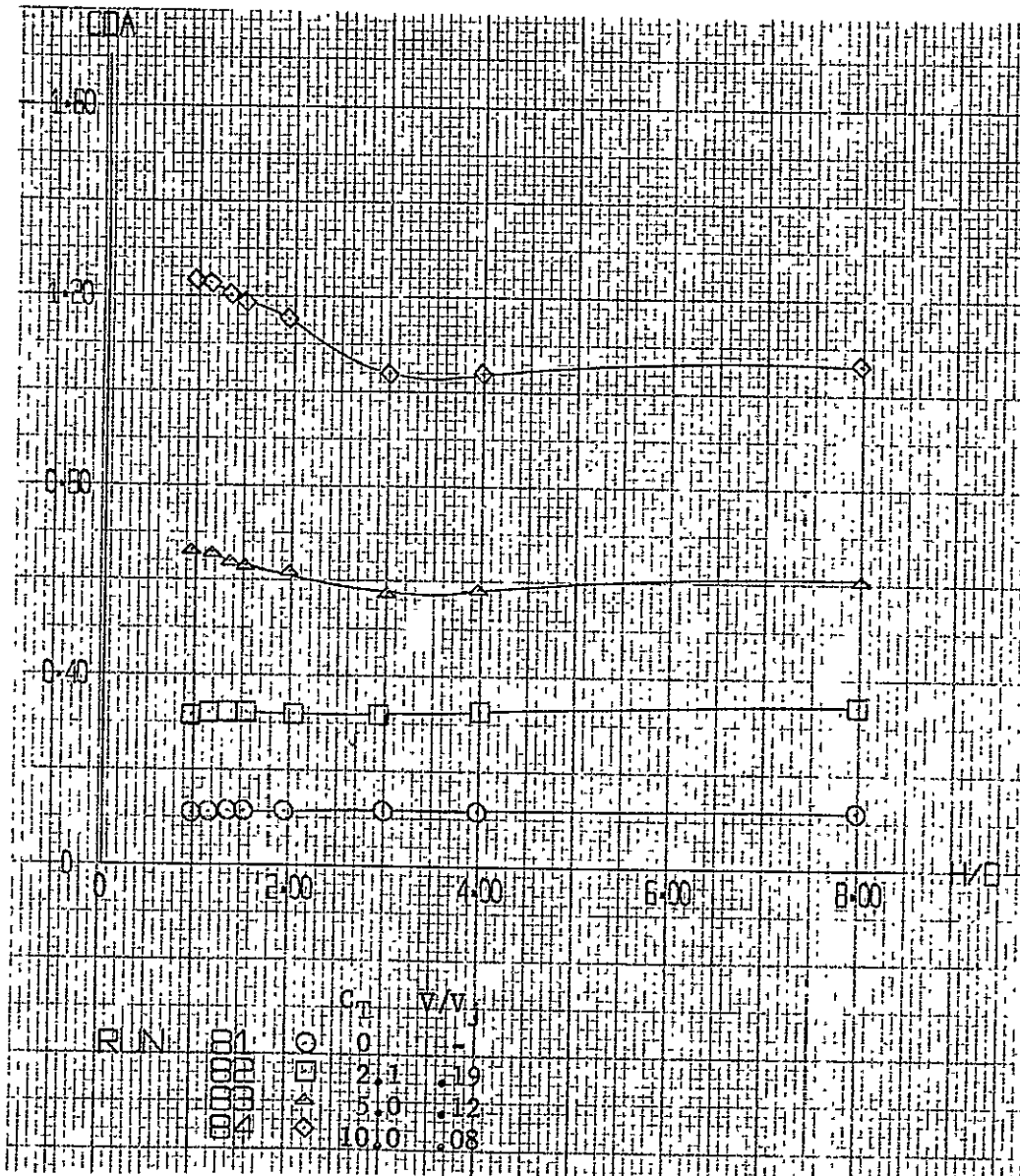


Figure A-23. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Continued)

ORIGINAL PAGE IS
OF POOR QUALITY

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR.

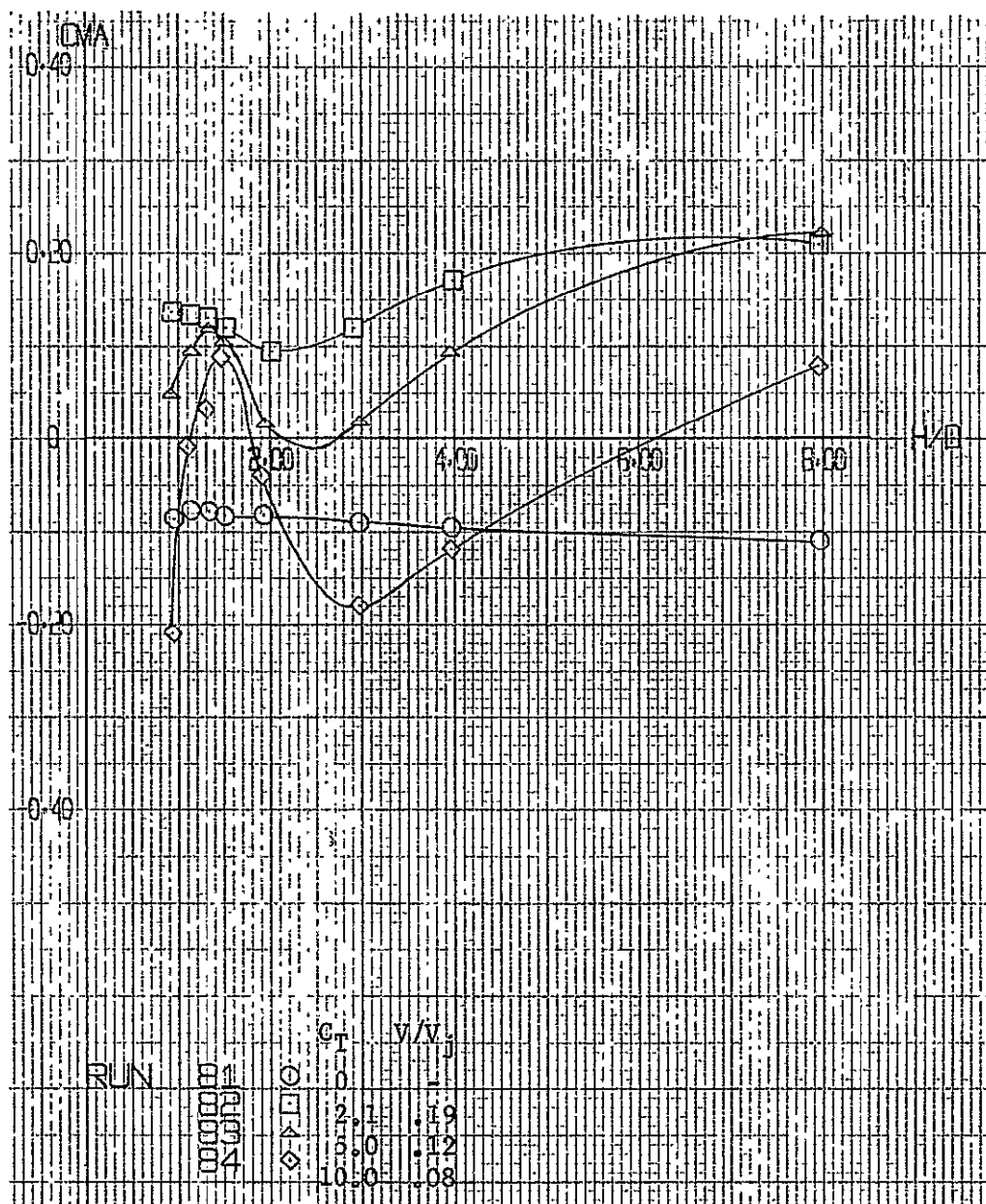


Figure A-23. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

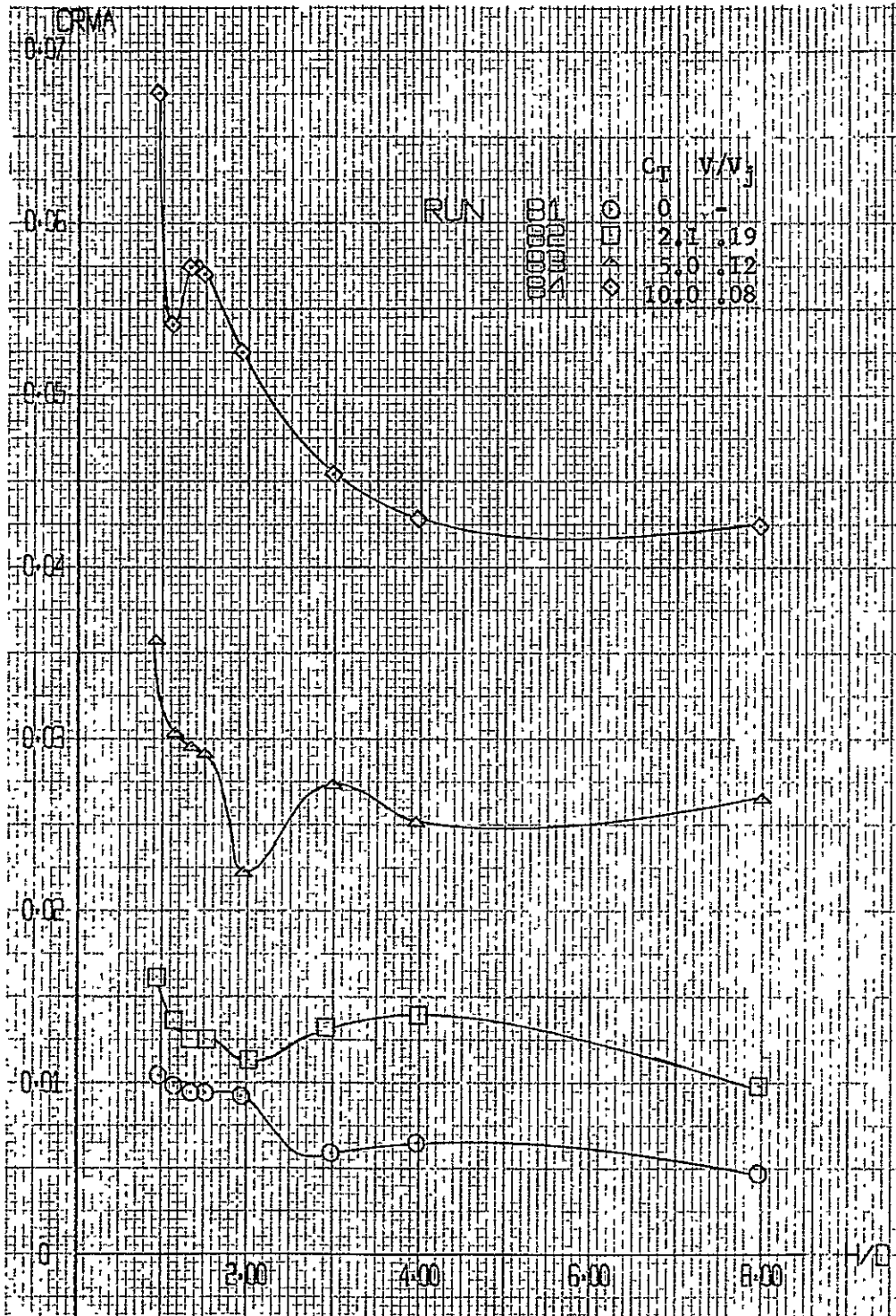


Figure A-23. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{NFwd} = 30^\circ$, $\delta_{NAft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Concluded)

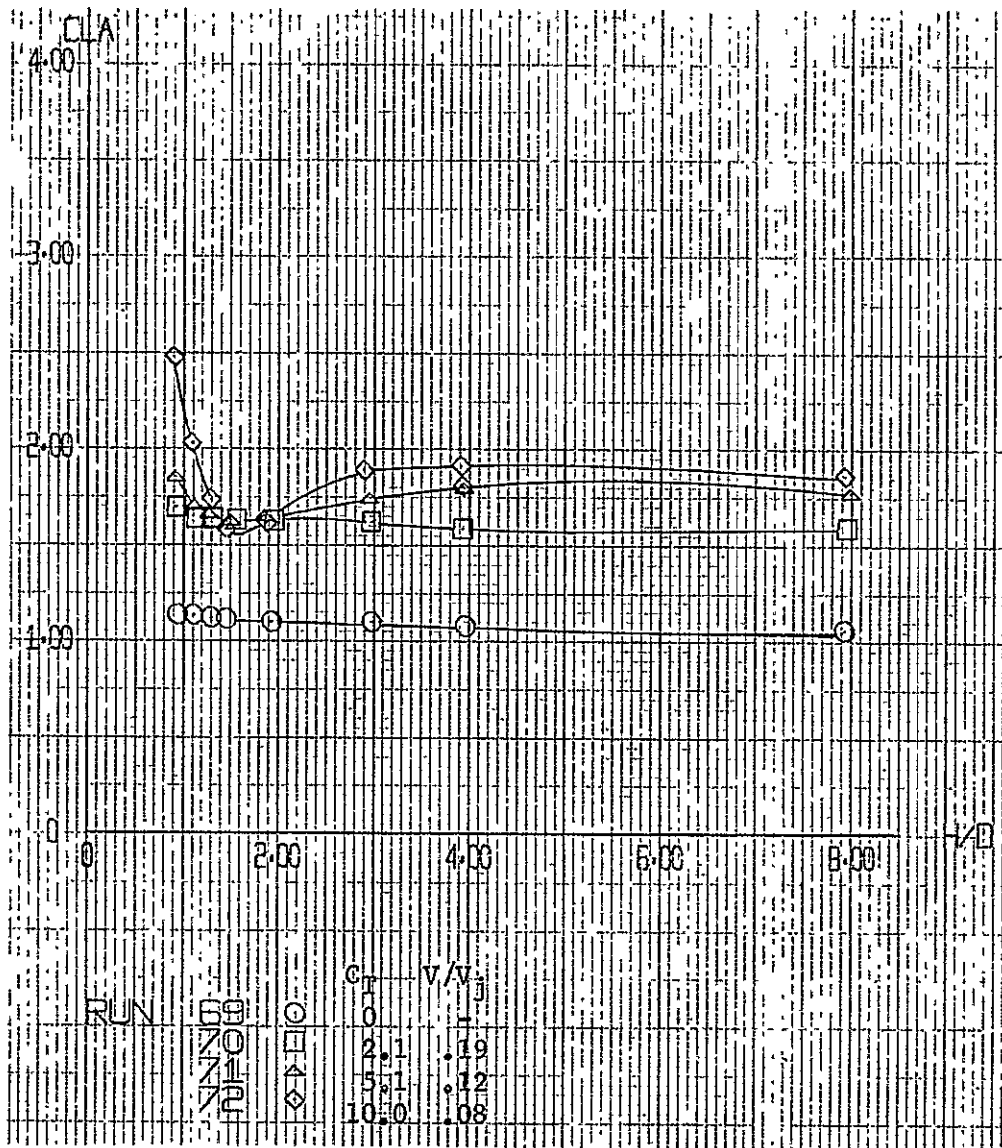


Figure A-24. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$

ORIGINAL PAGES
OF POOR QUALITY

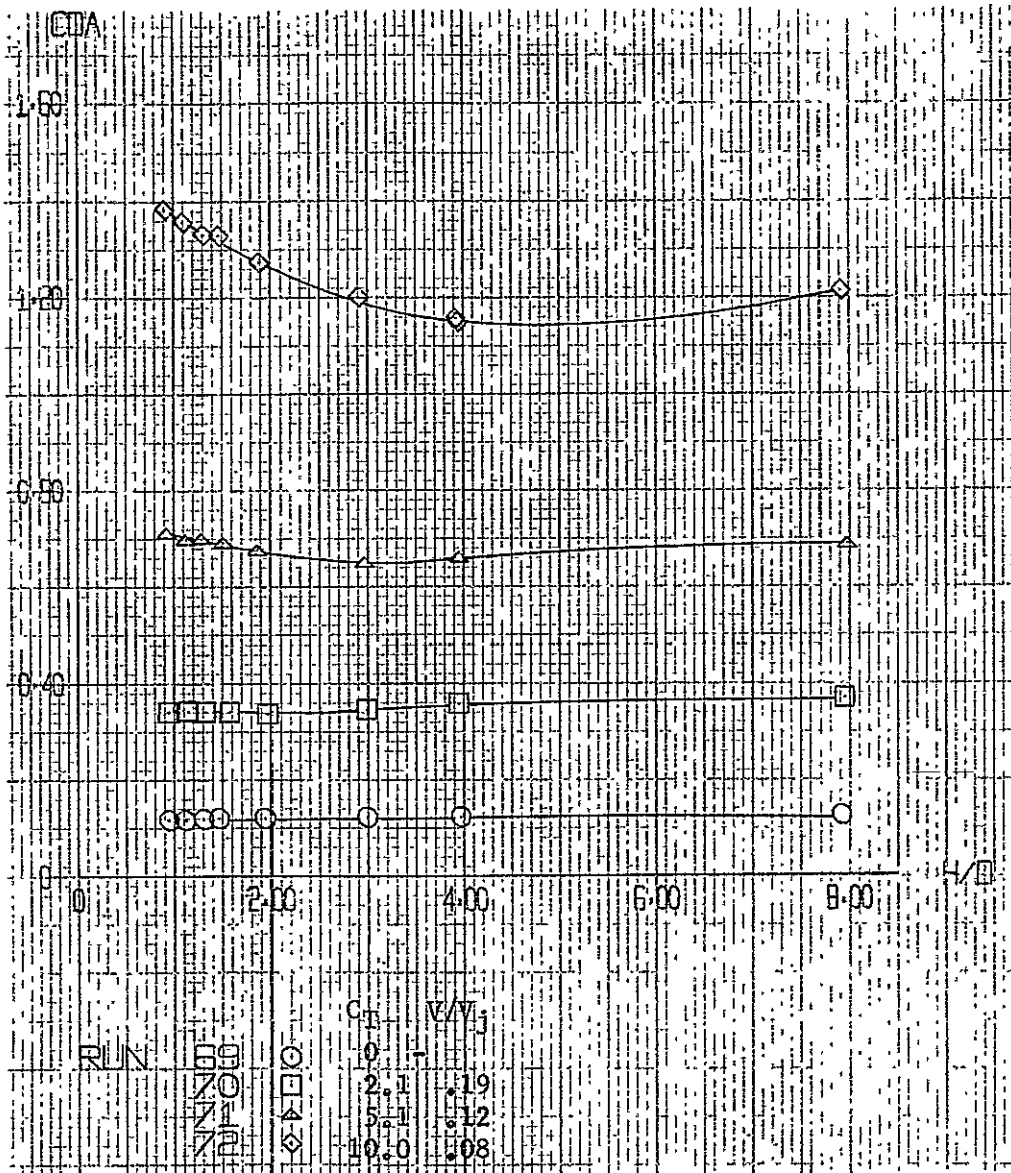


Figure A-24. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta N_{Fwd} = 30^\circ$, $\delta N_{Aft} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

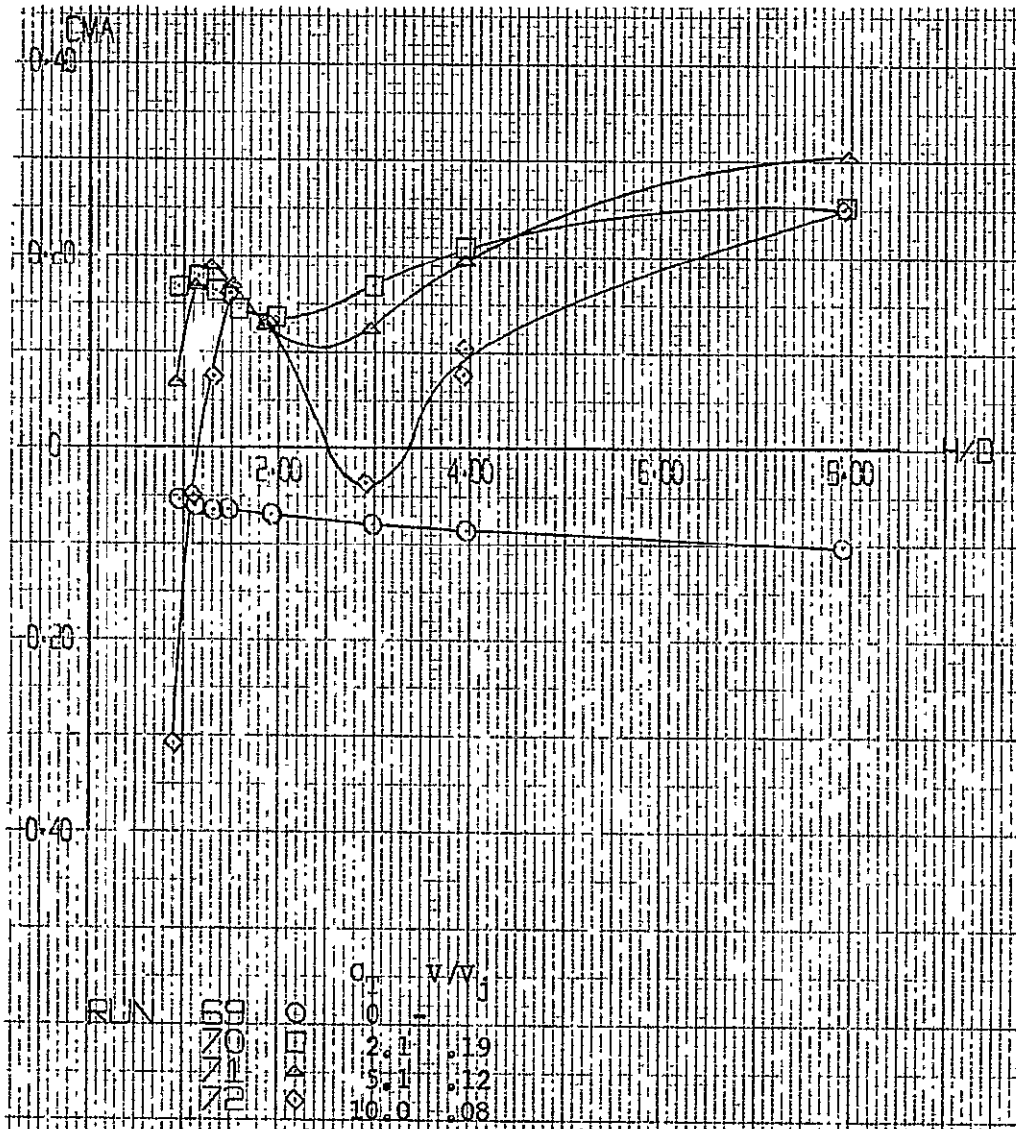


Figure A-24. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

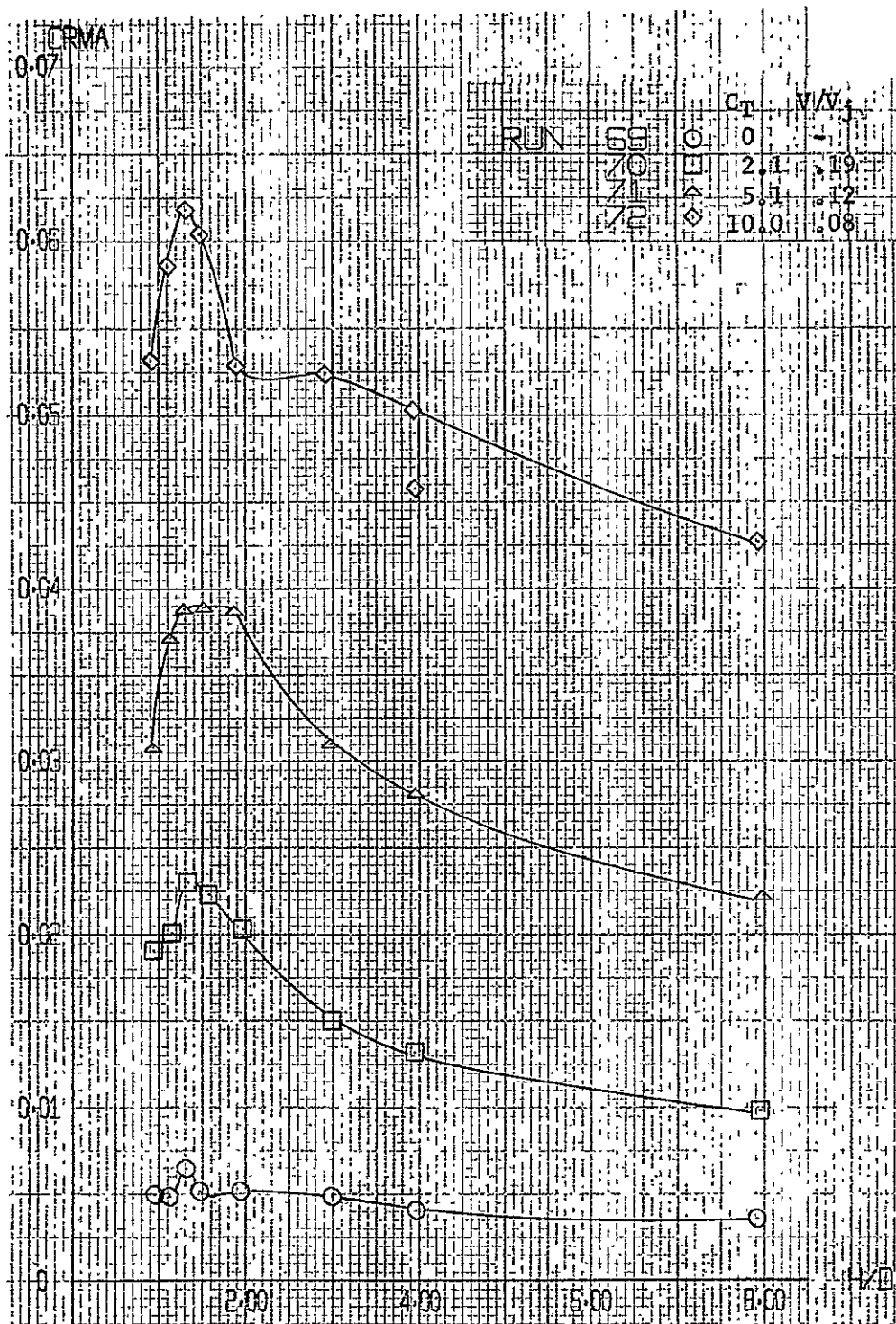


Figure A-24. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{N_{Fwd}} = 30^\circ$, $\delta_{N_{Aft}} = 60^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Concluded)

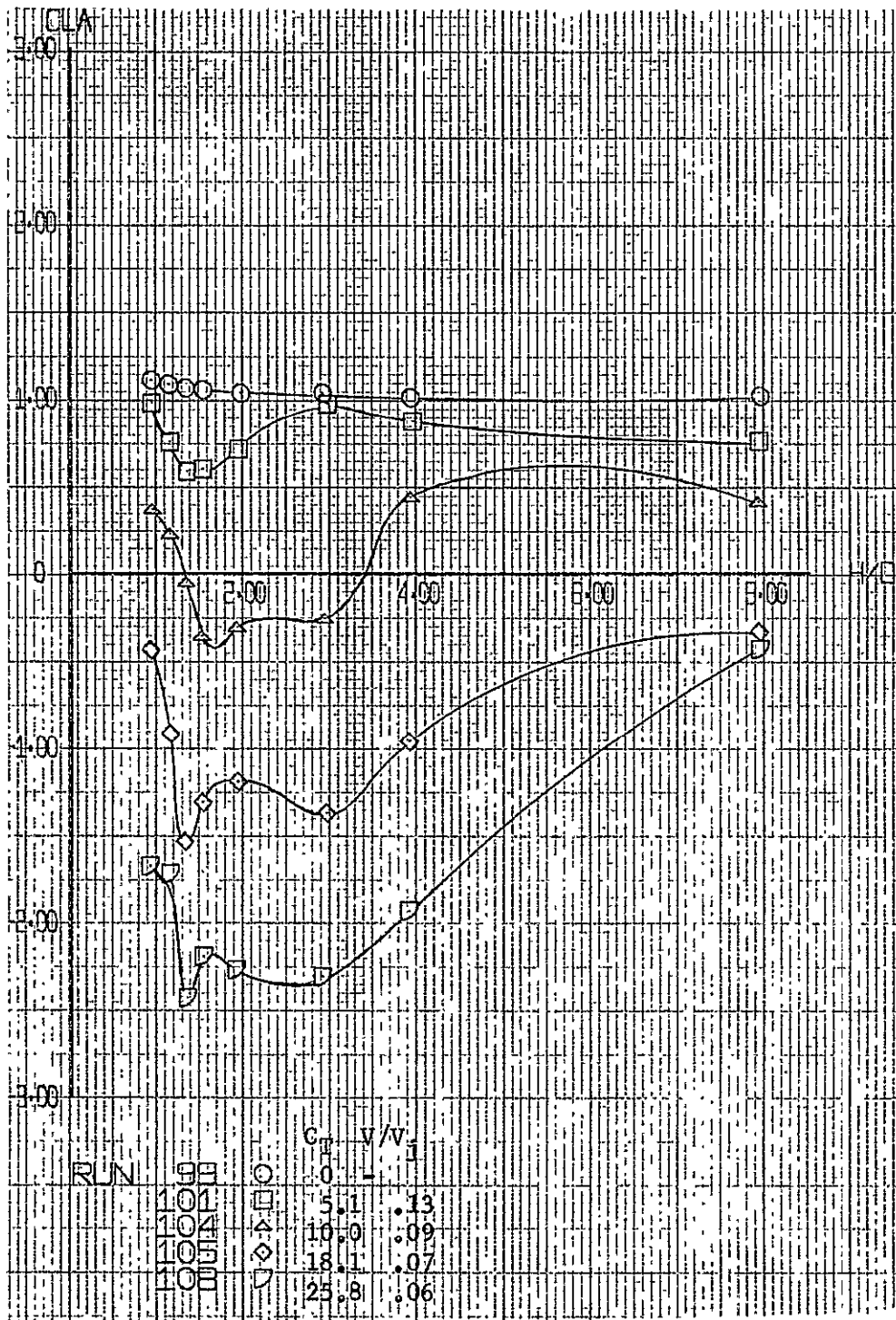


Figure A-25. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$

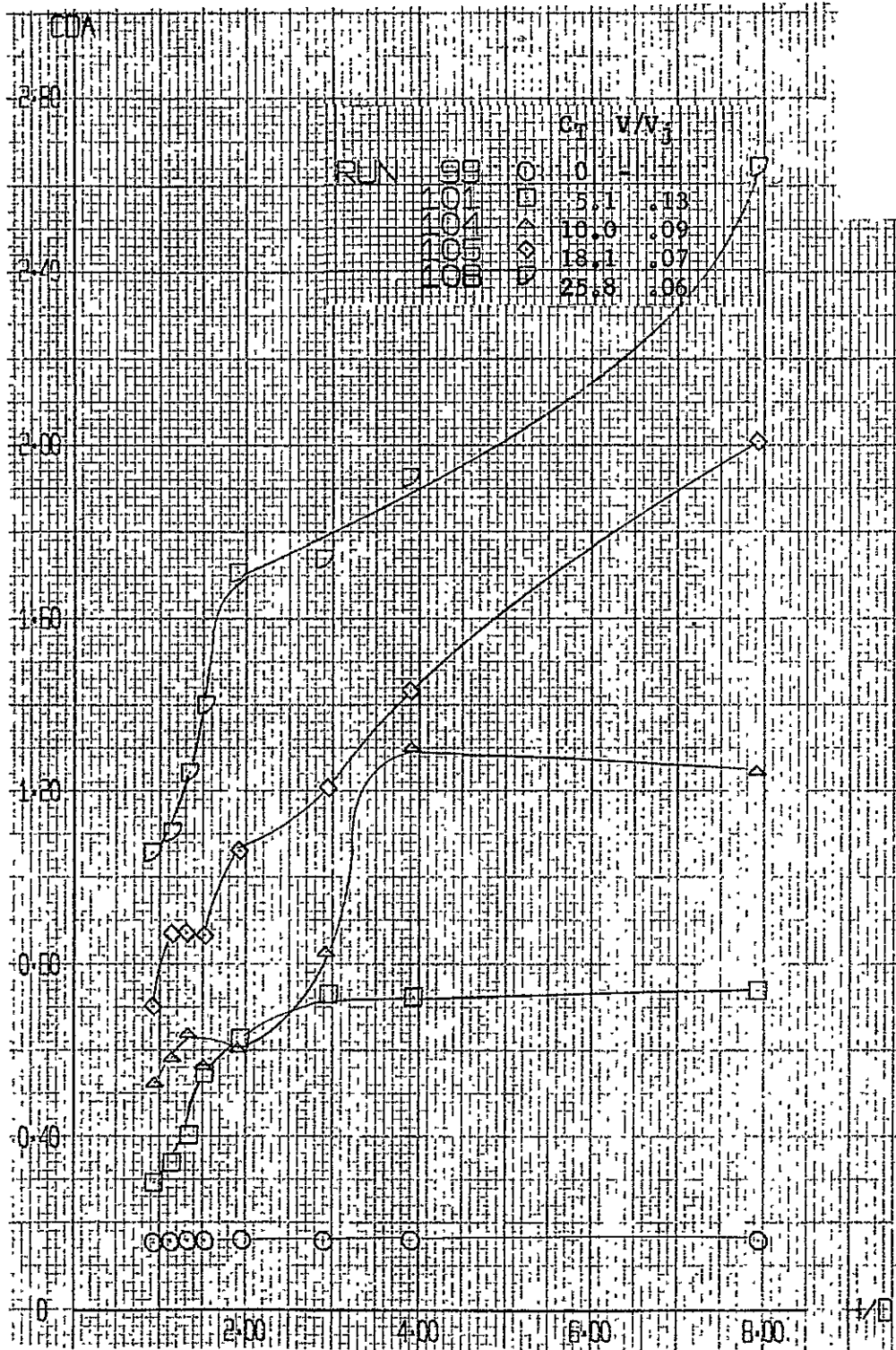


Figure A-25. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$ (Continued)

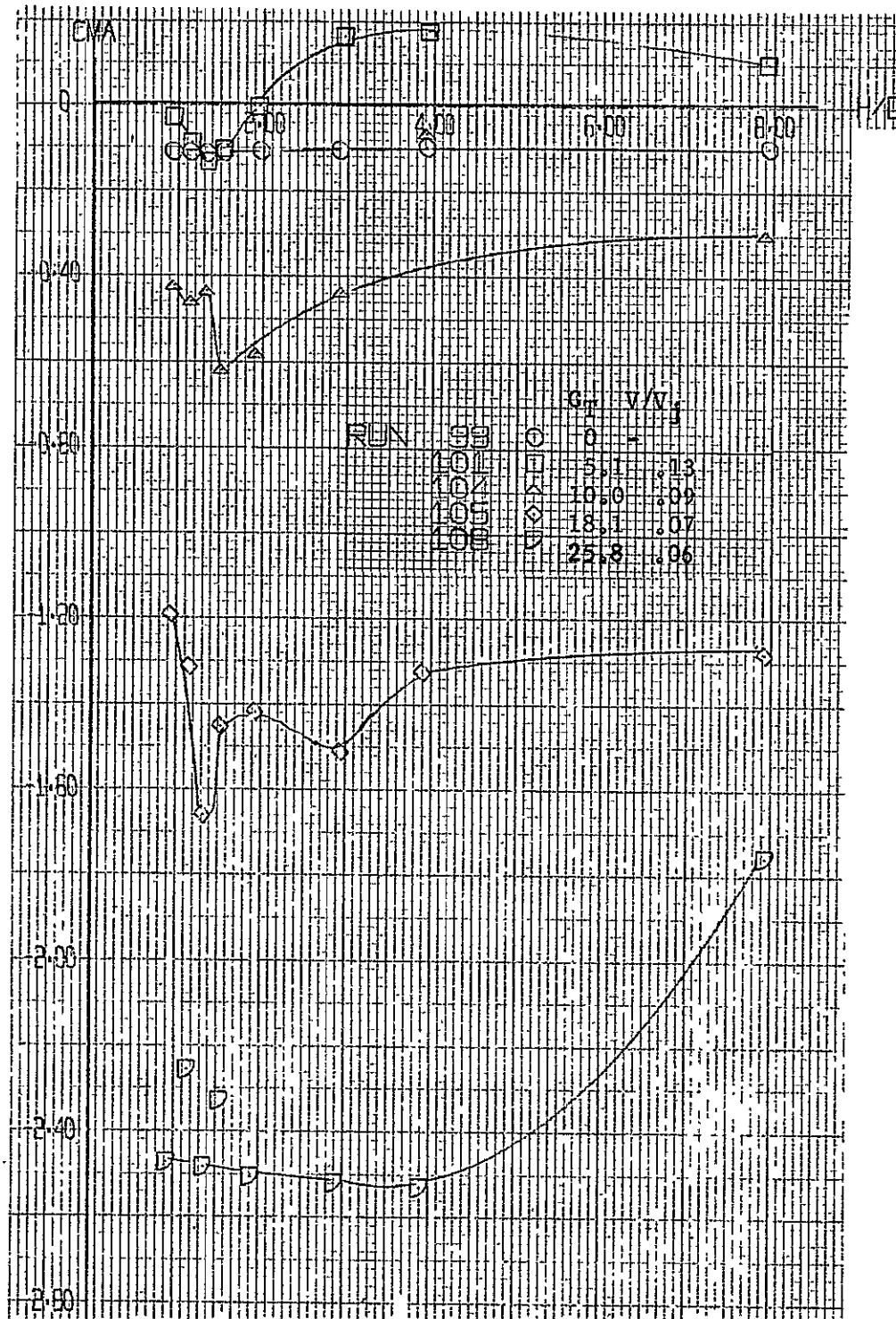


Figure A-25. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$ (Continued)

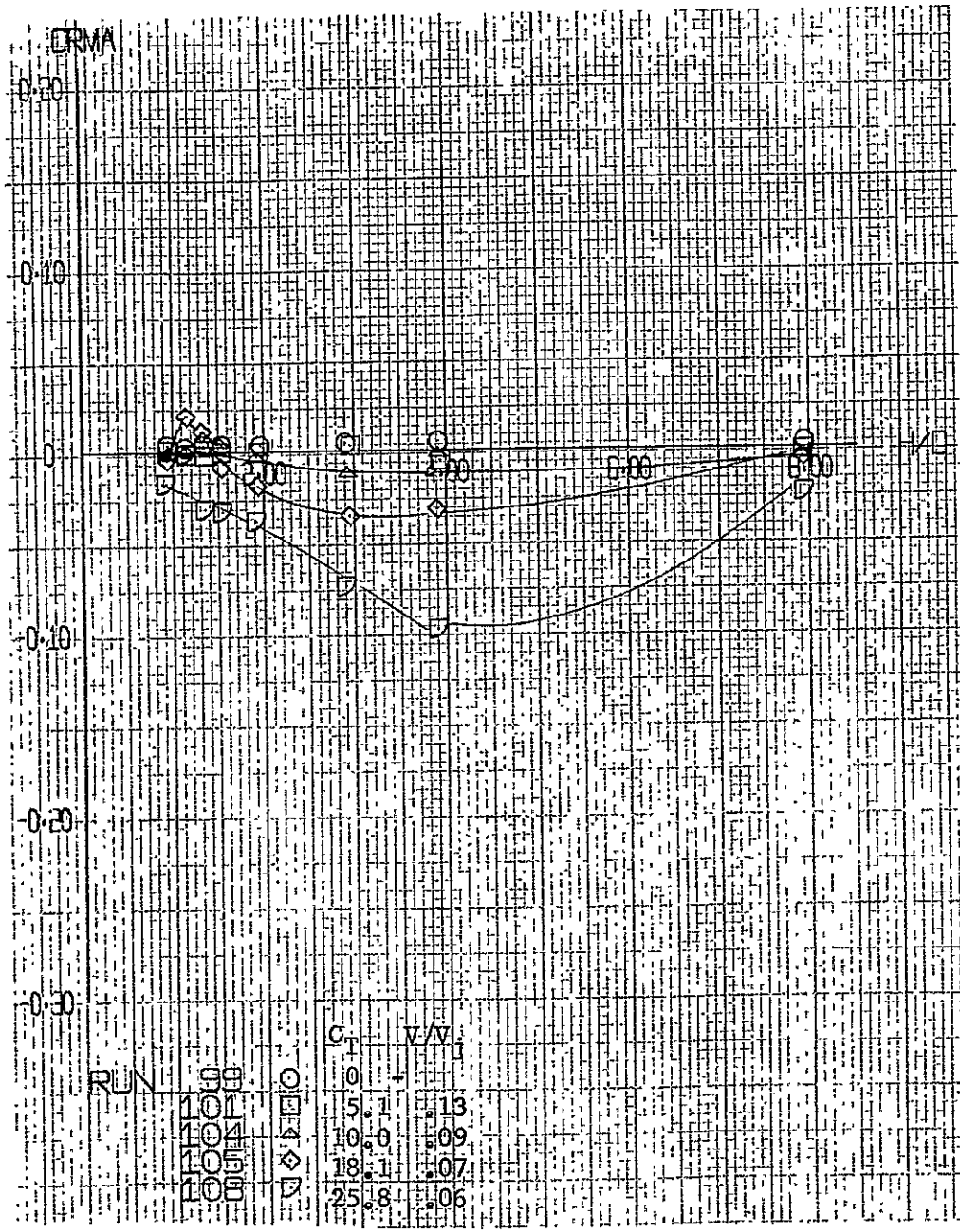


Figure A-25. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$ (Concluded)

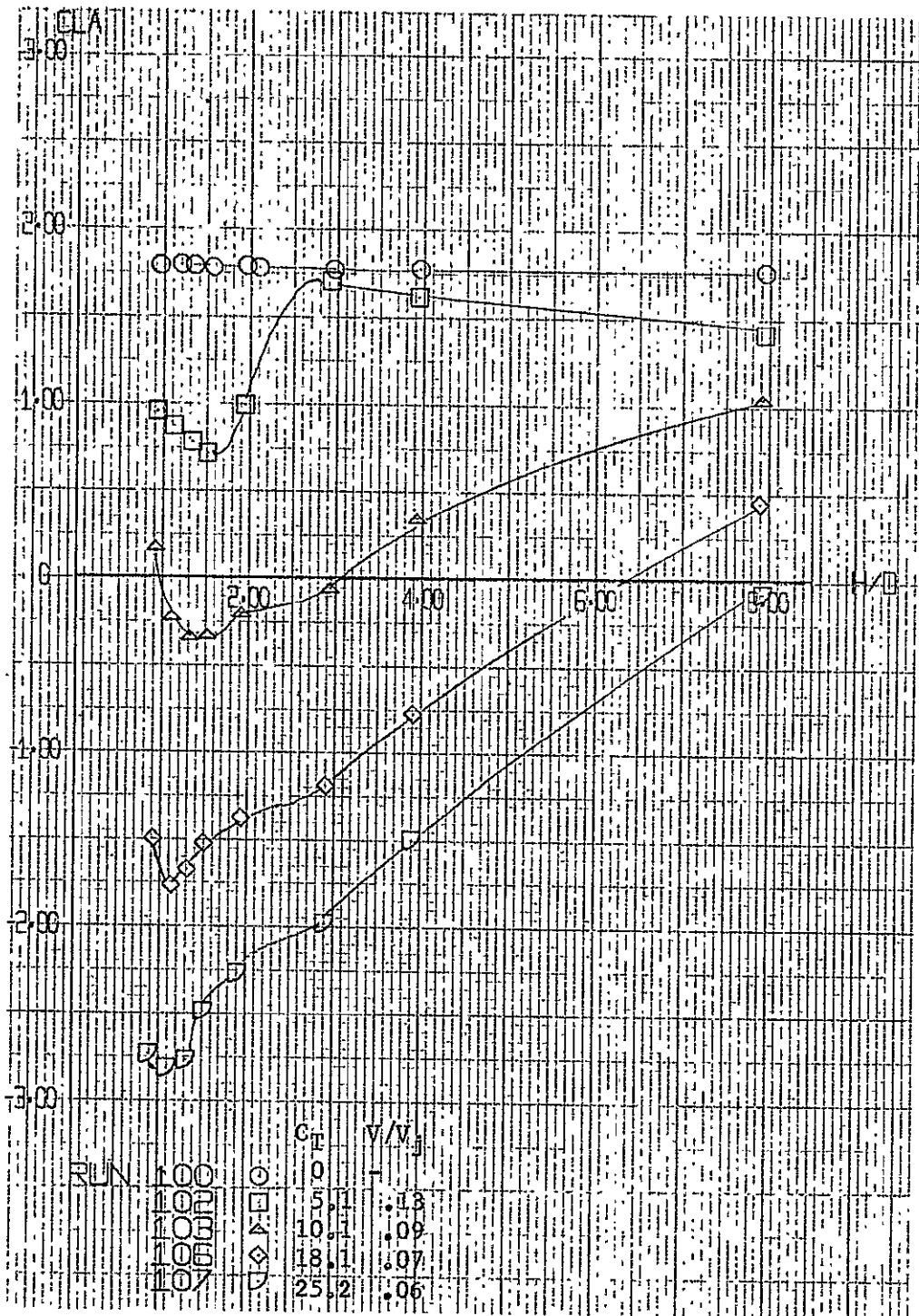


Figure A-26. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$

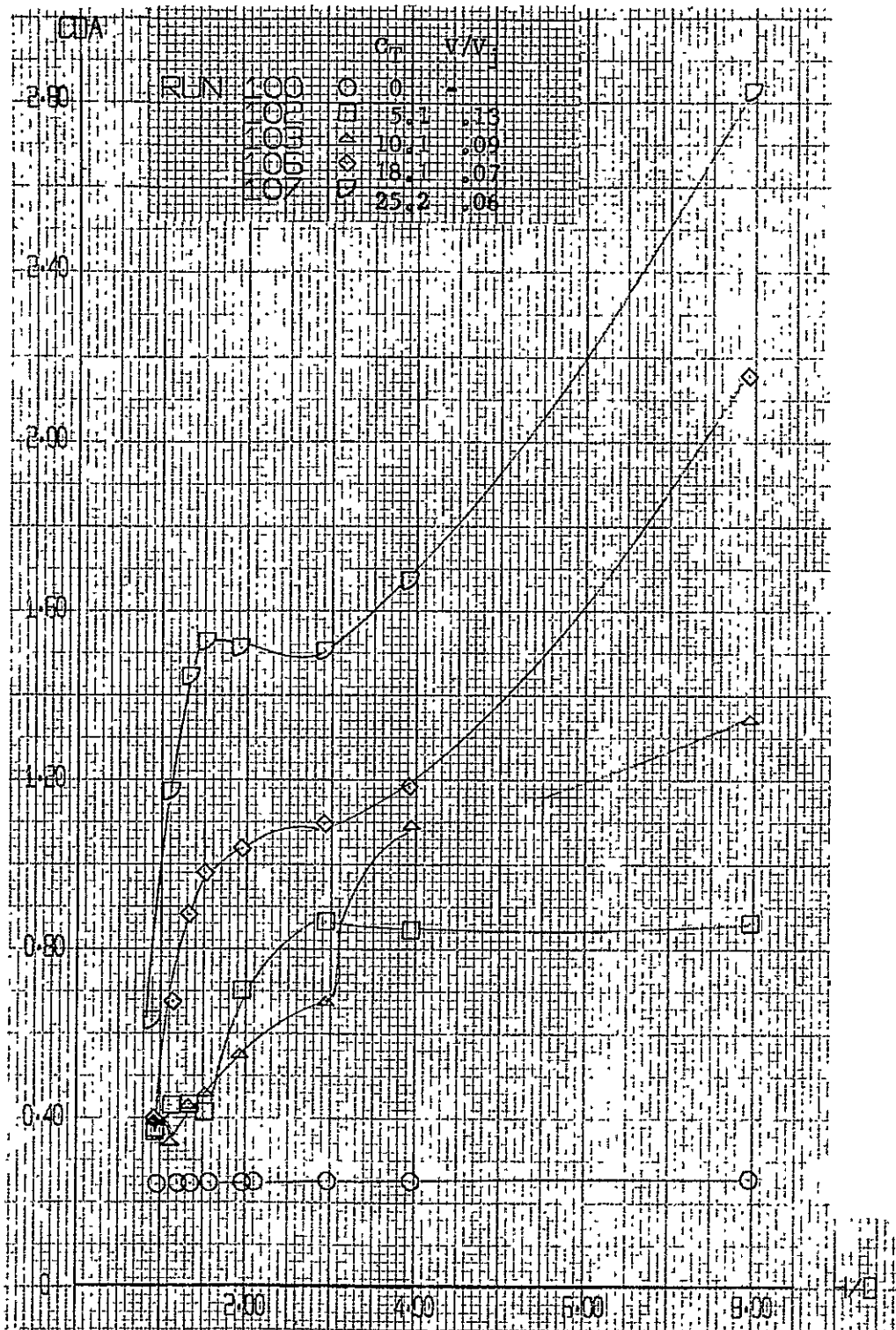


Figure A-26. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

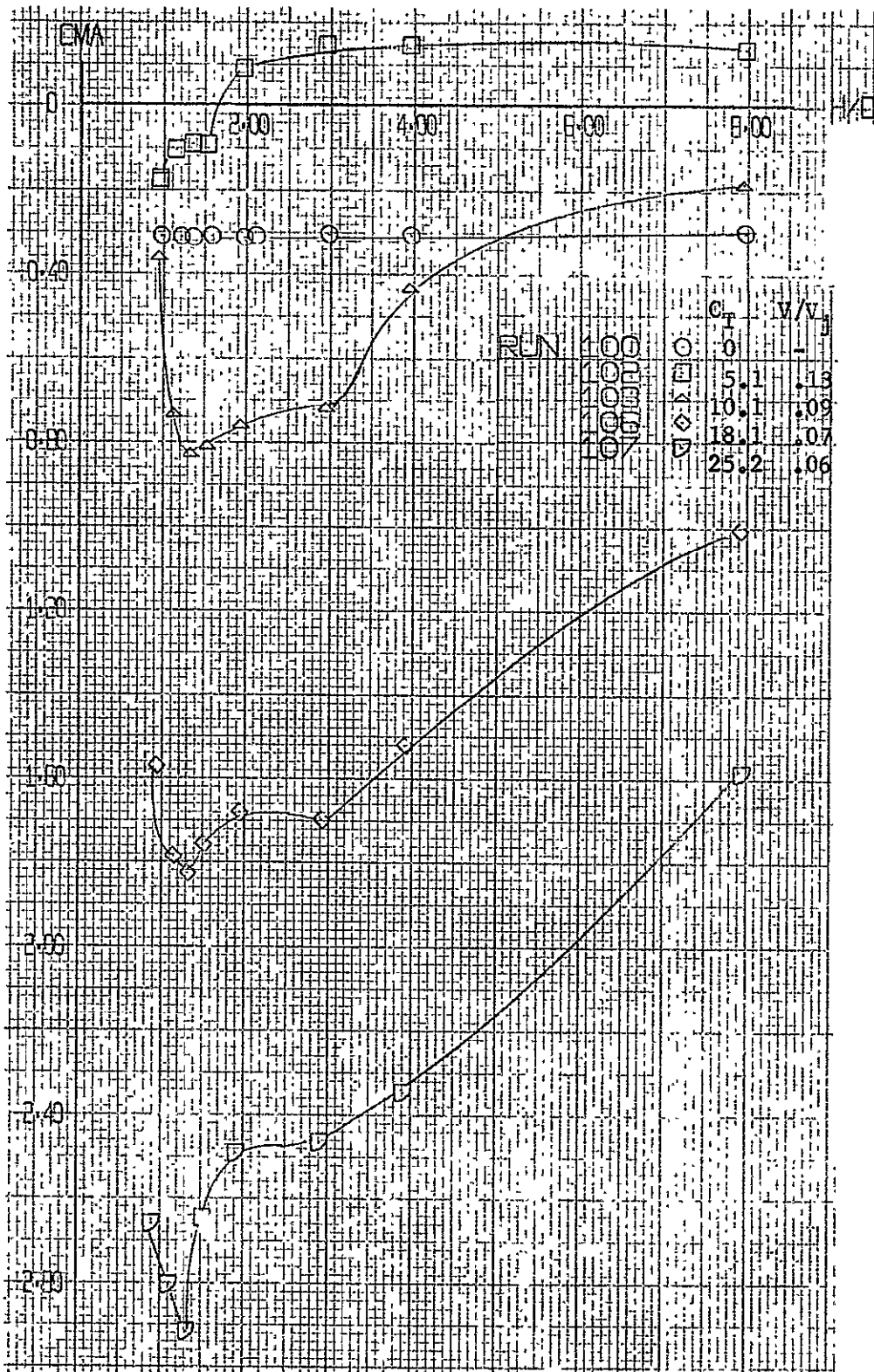


Figure A-26. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\theta = 0^\circ$ (Continued)

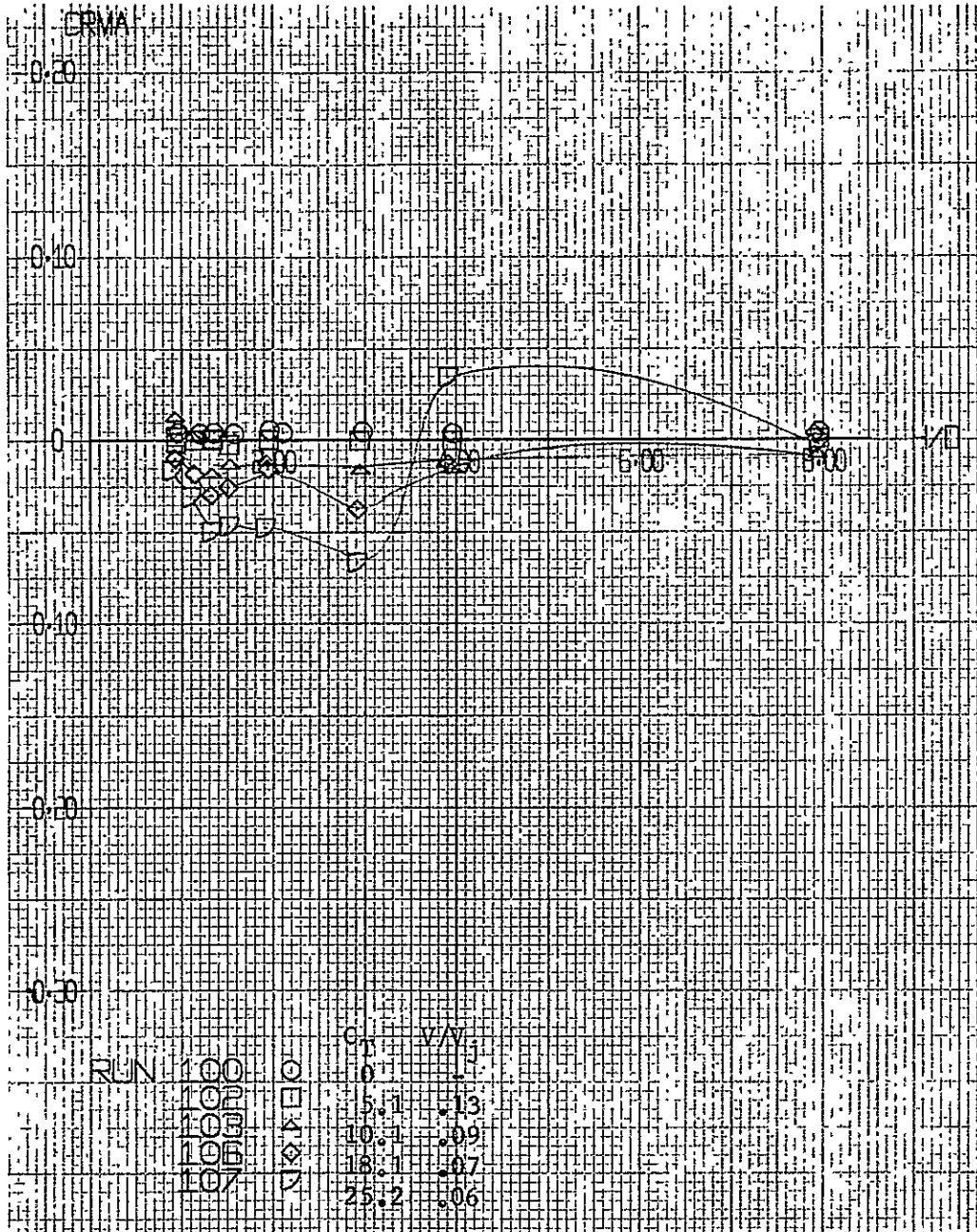


Figure A-26. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\theta = 0^\circ$ (Concluded)

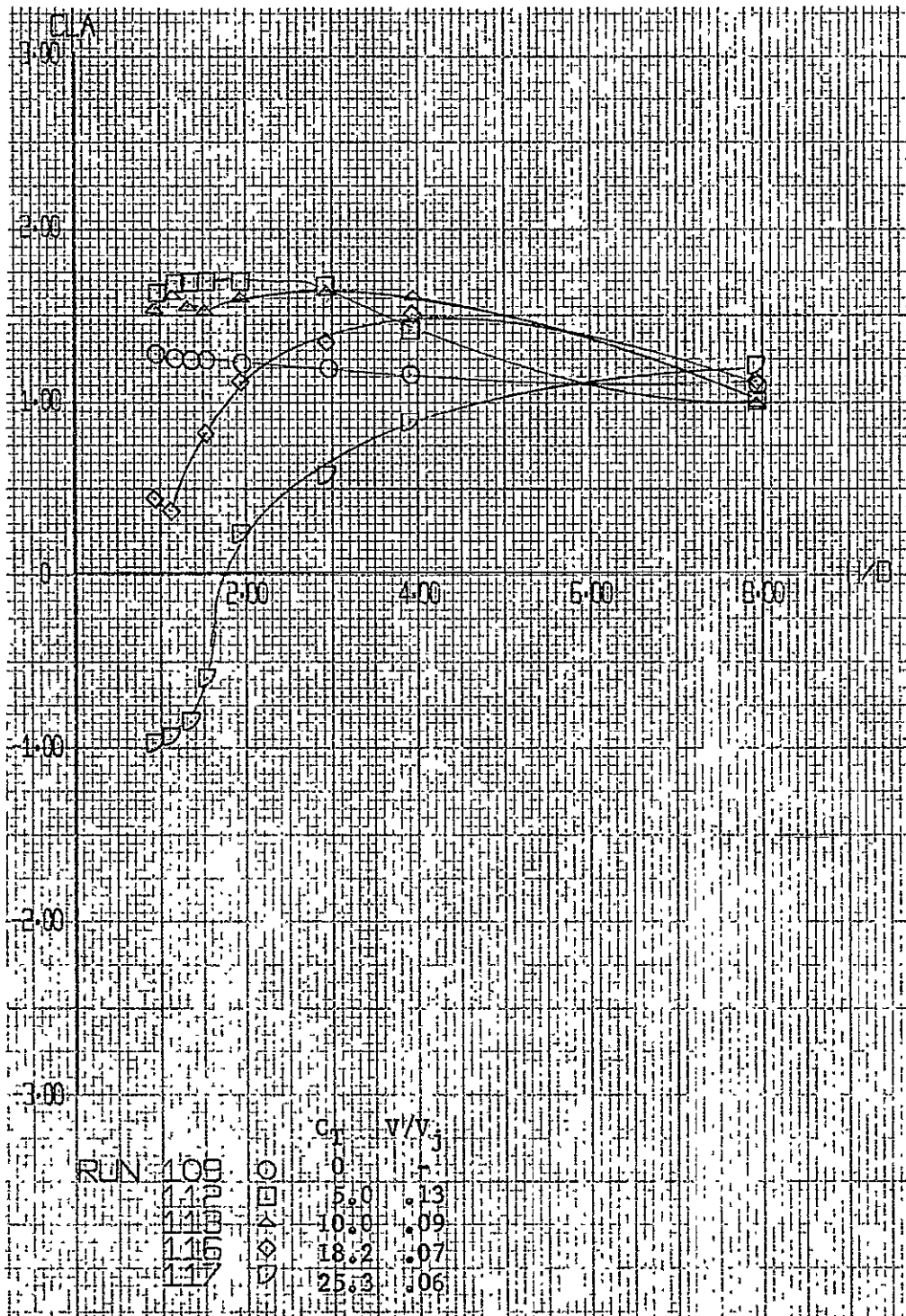


Figure A-27. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

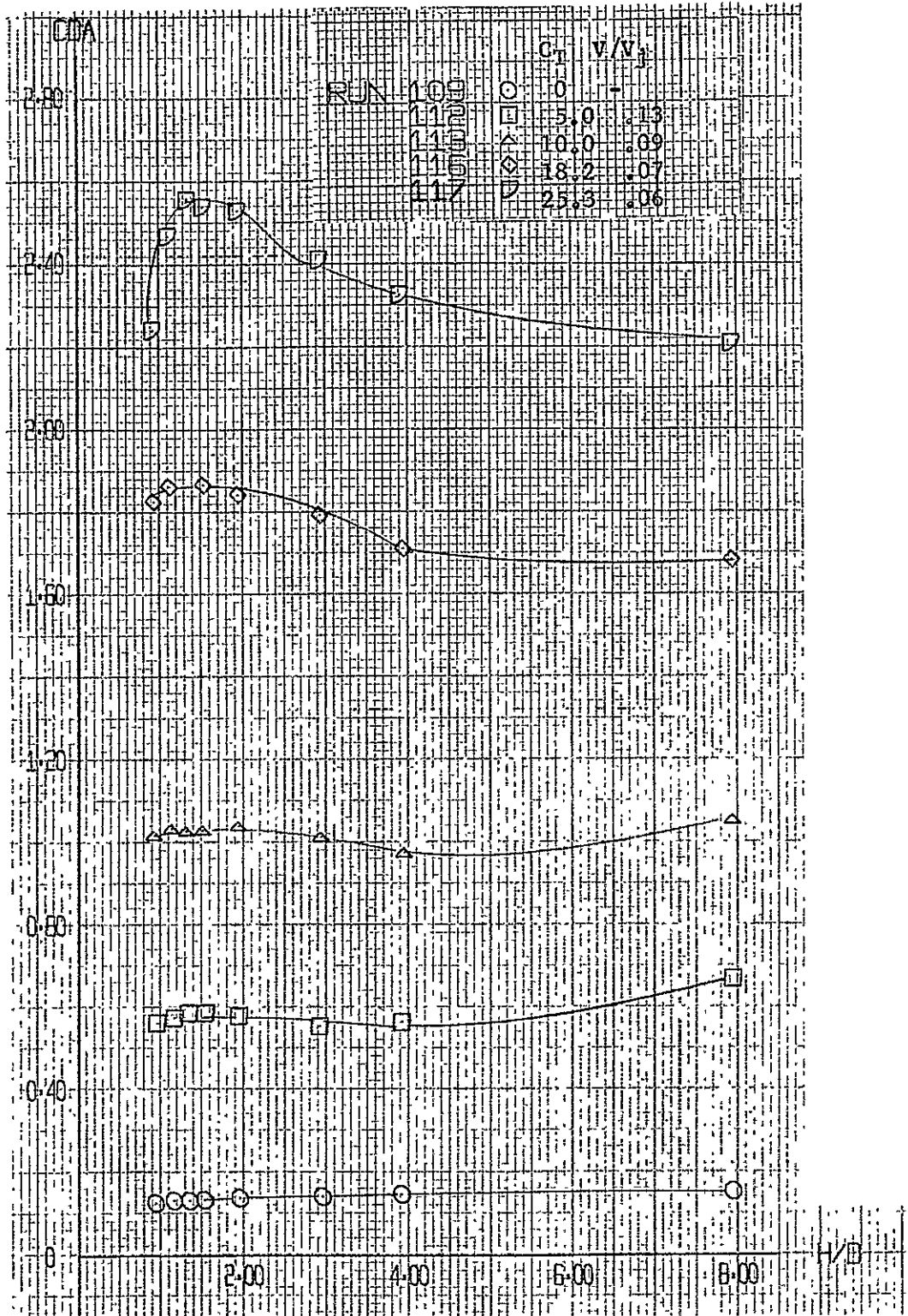


Figure A-27. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$ (Continued)

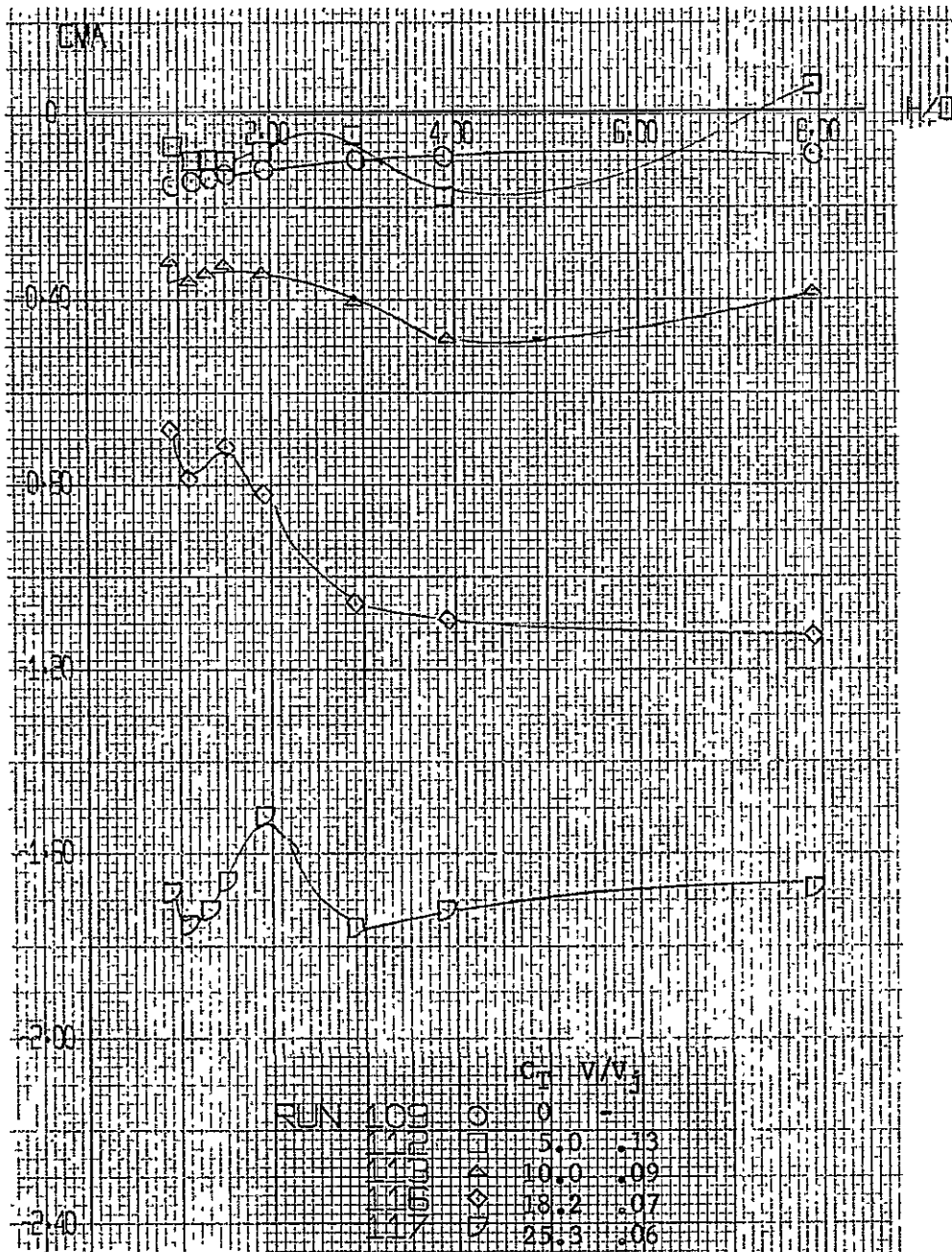


Figure A-27. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

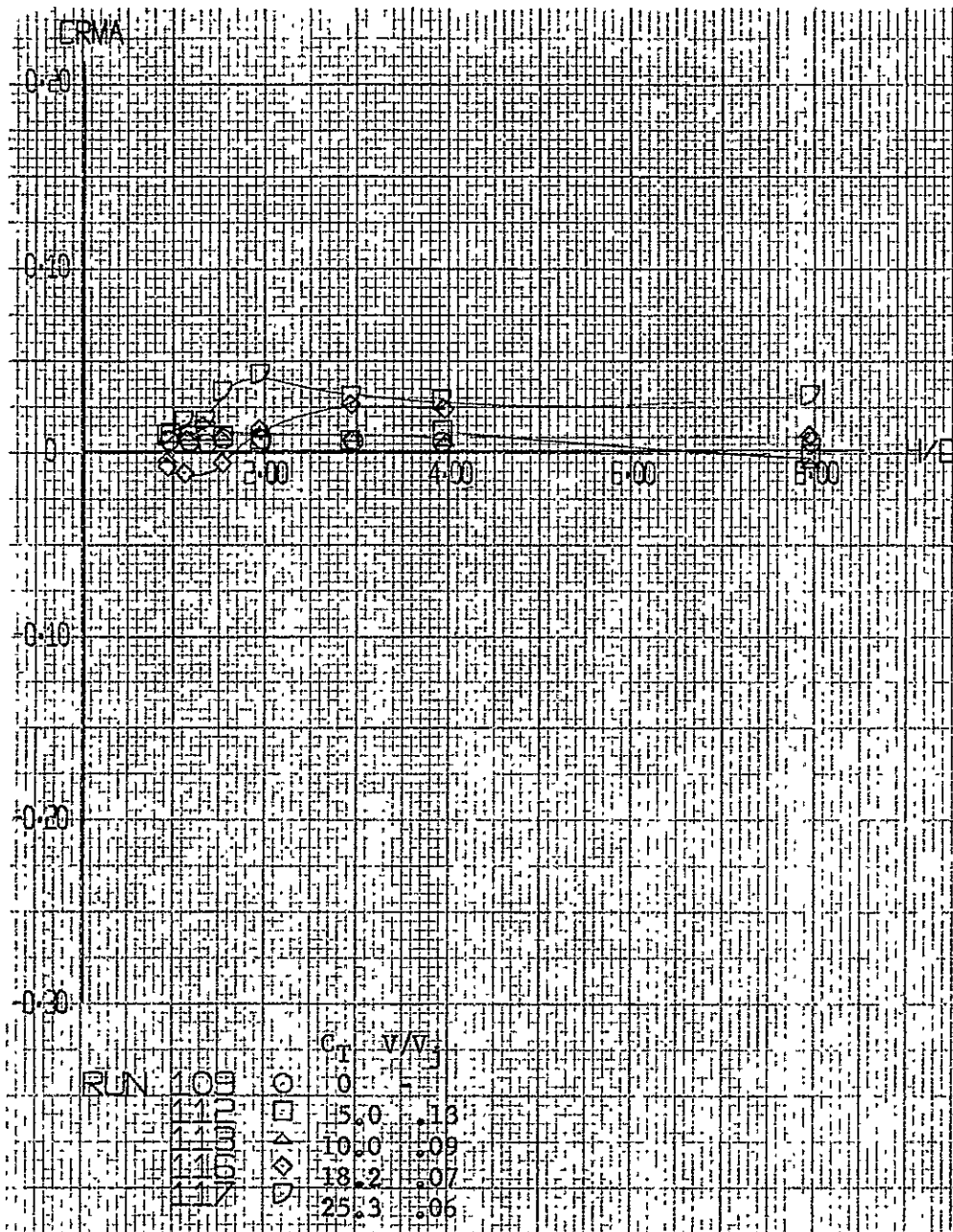


Figure A-27. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

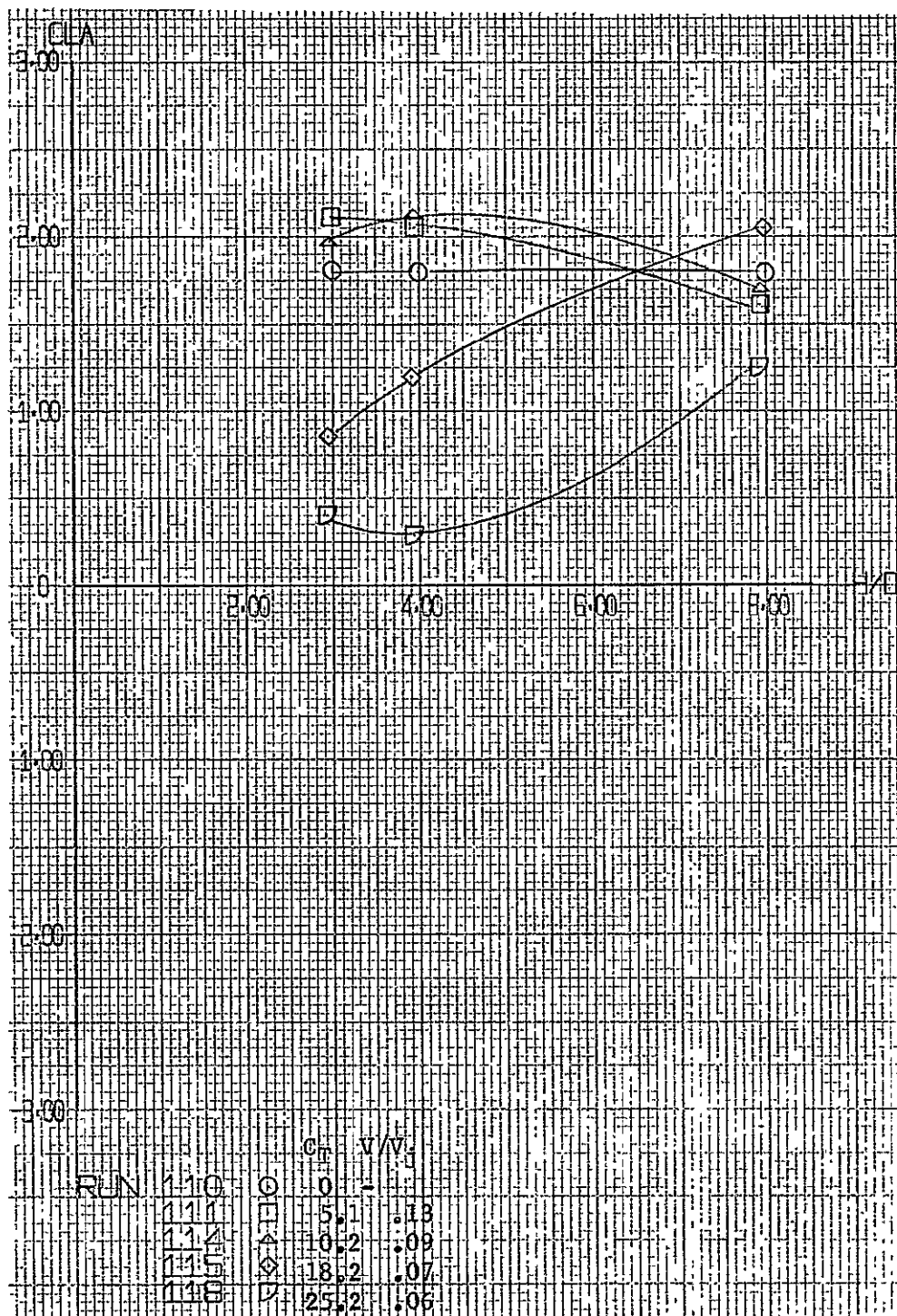


Figure A-28. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\theta = 0^\circ$

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

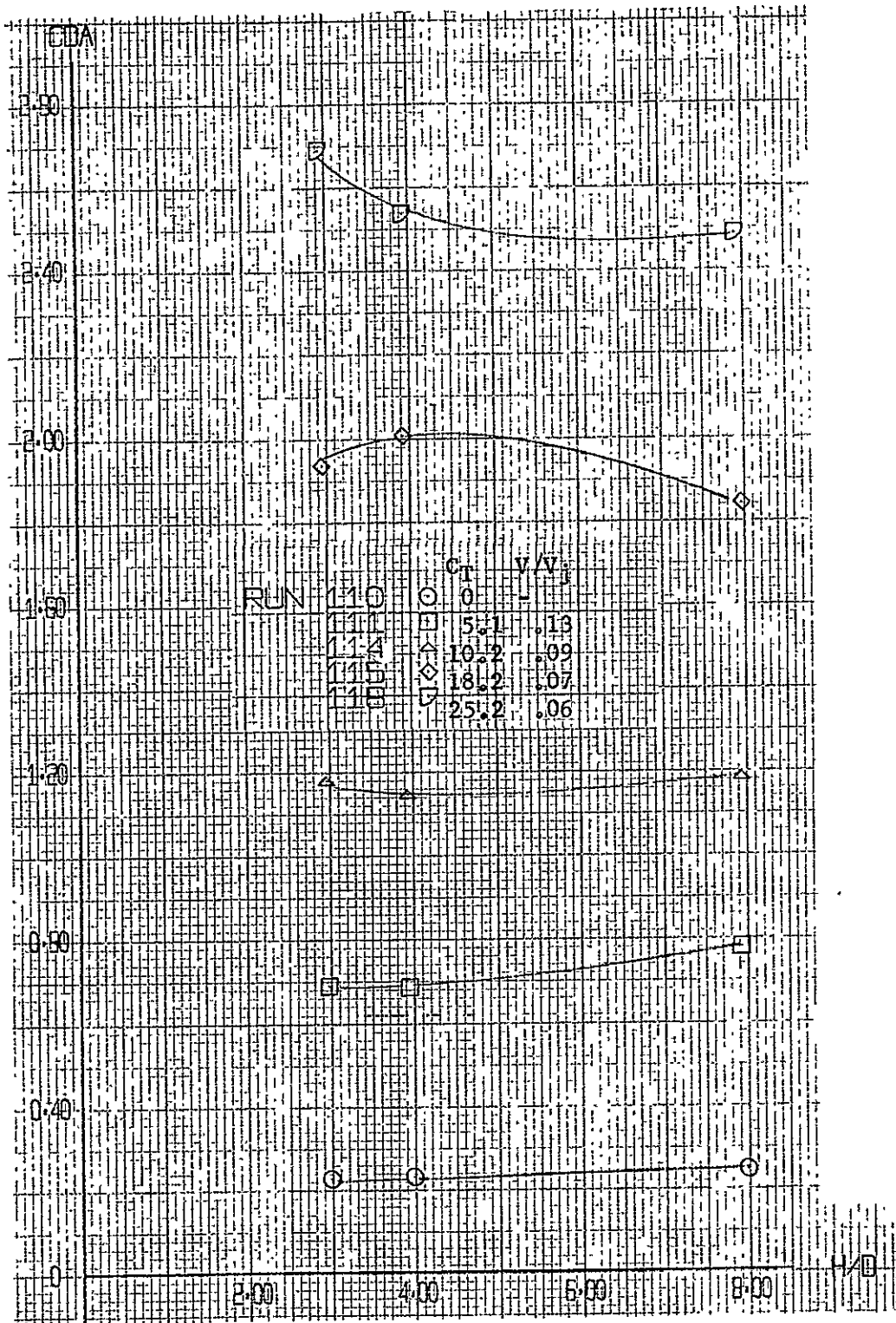


Figure A-28. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\theta = 0^\circ$ (Continued)

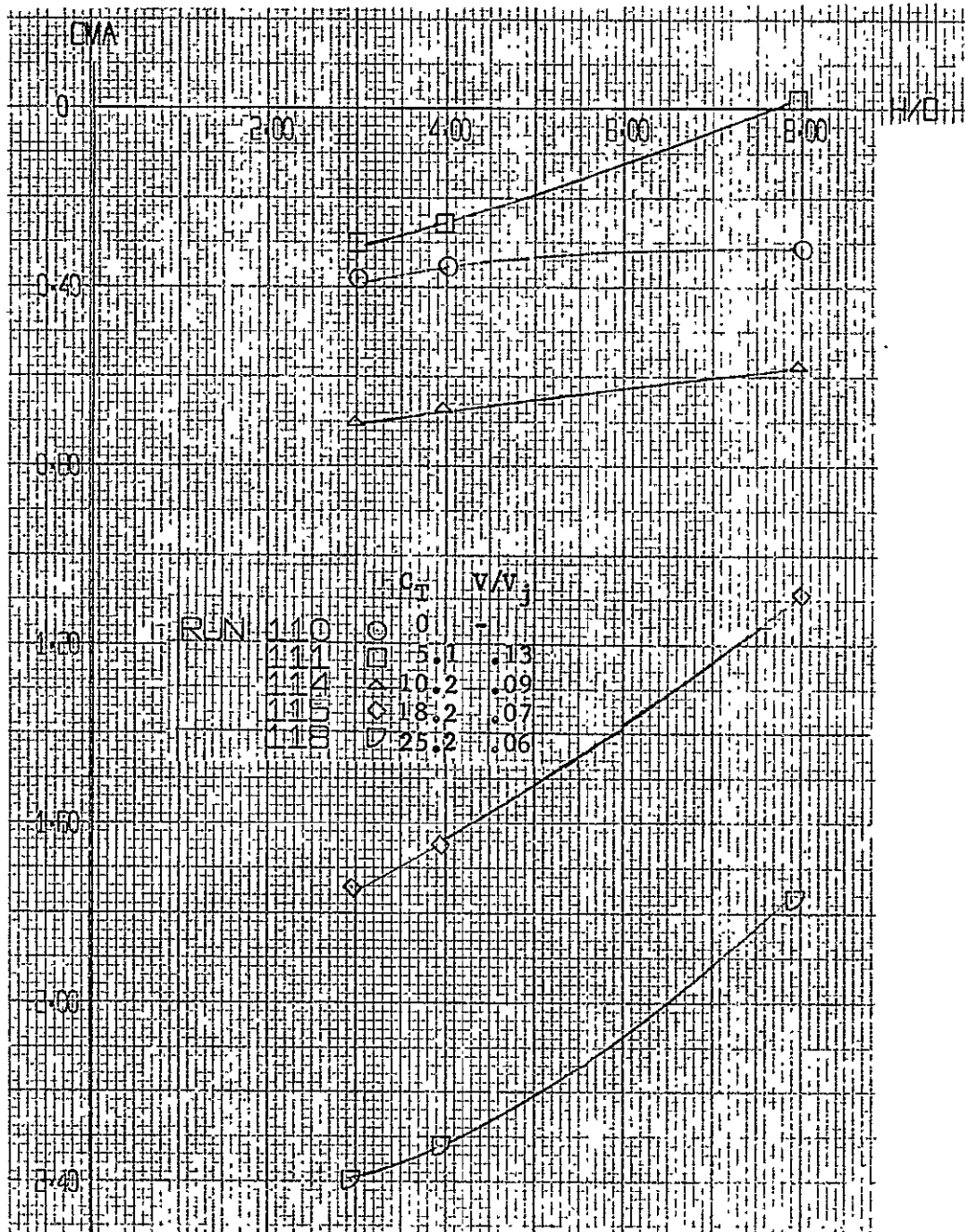


Figure A-28. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

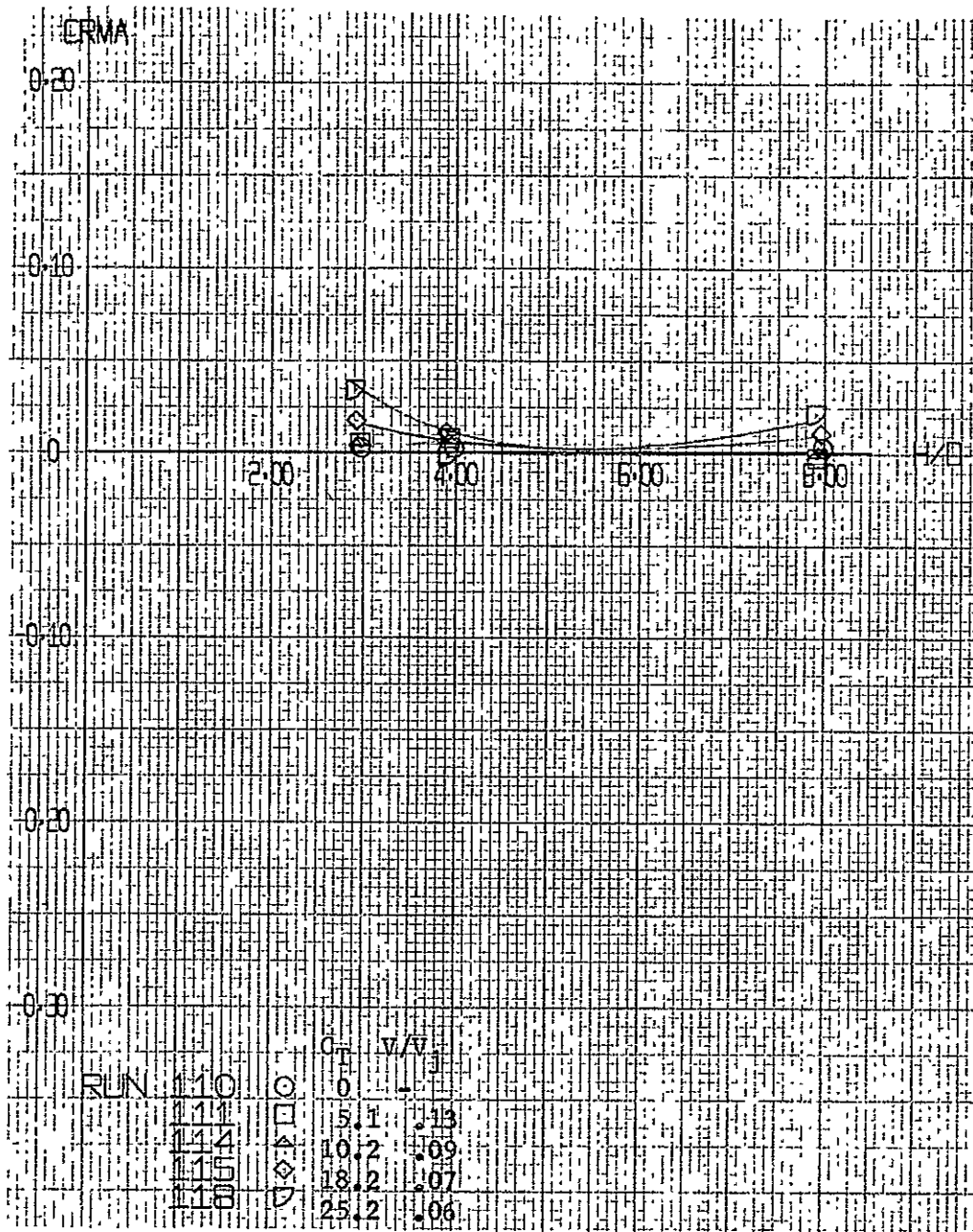
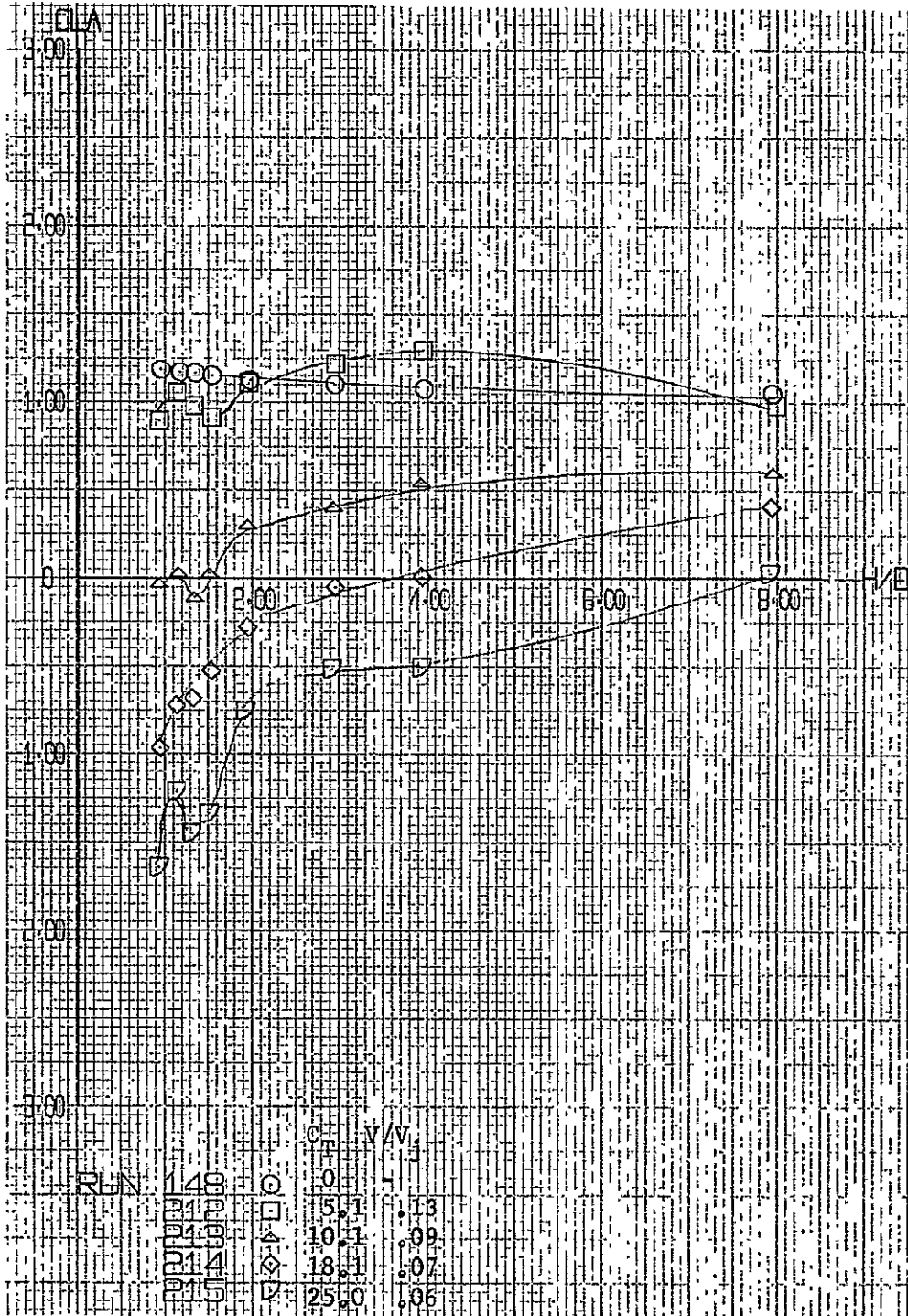


Figure A-28. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Concluded)



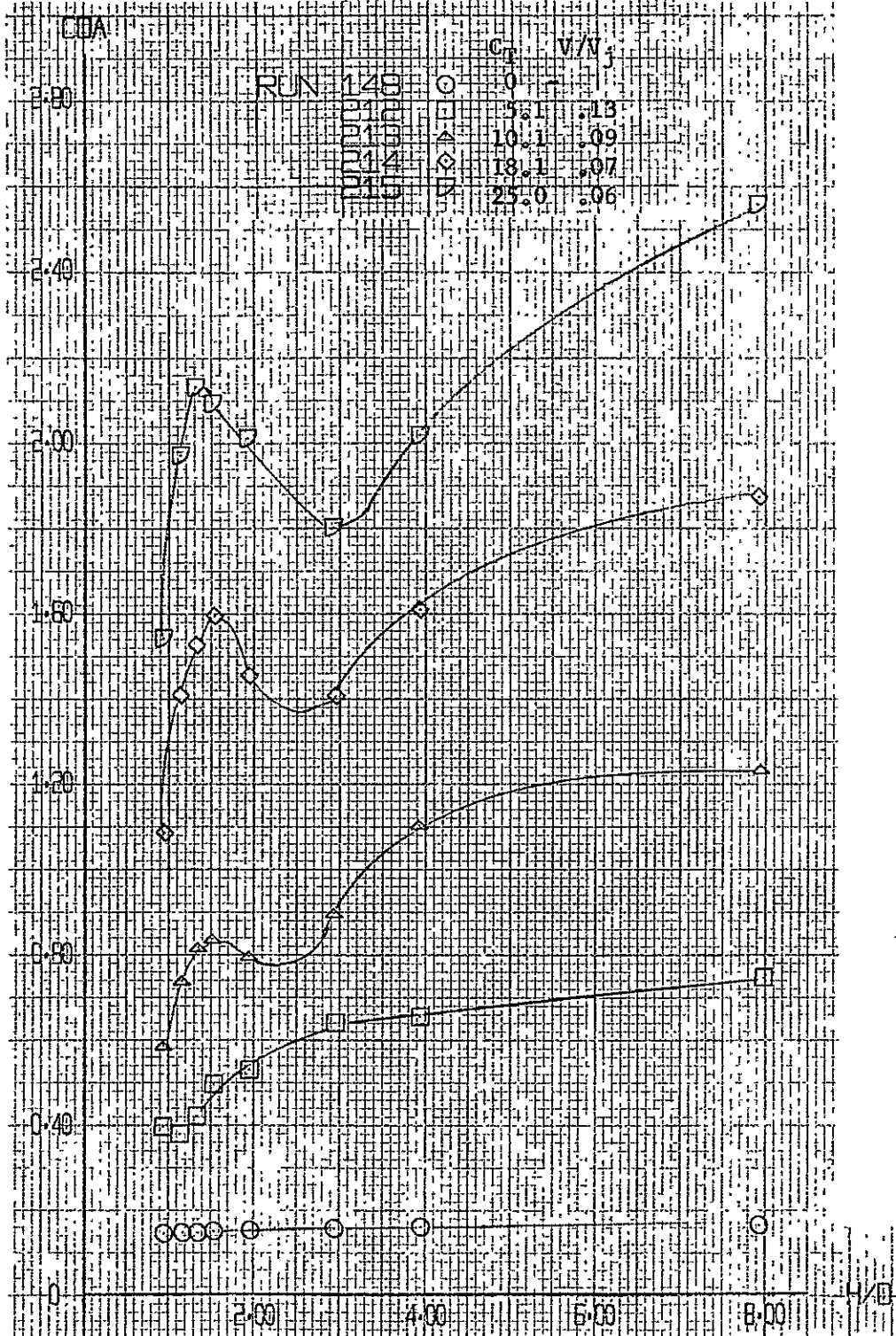


Figure A-29. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

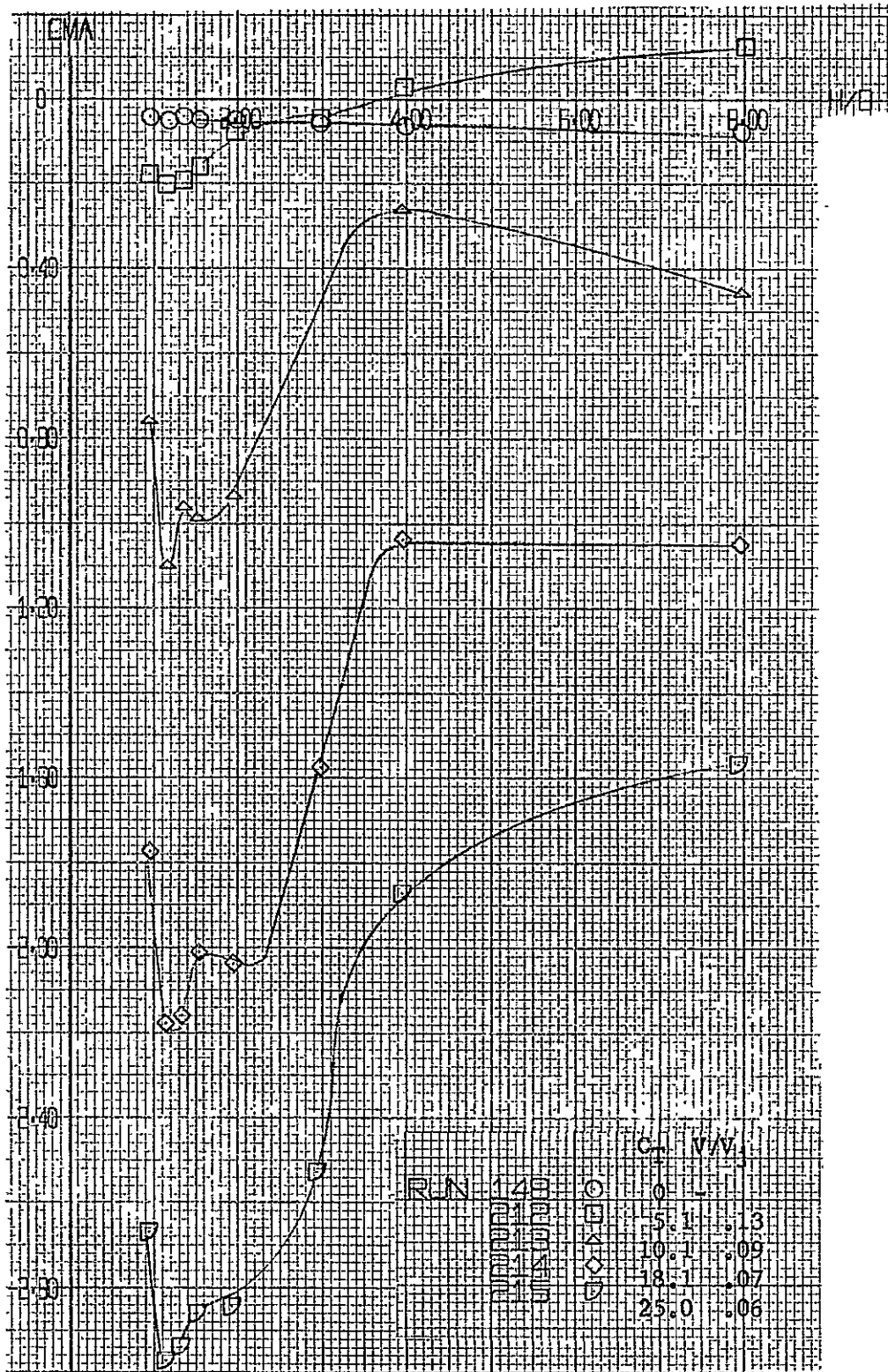


Figure A-29. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

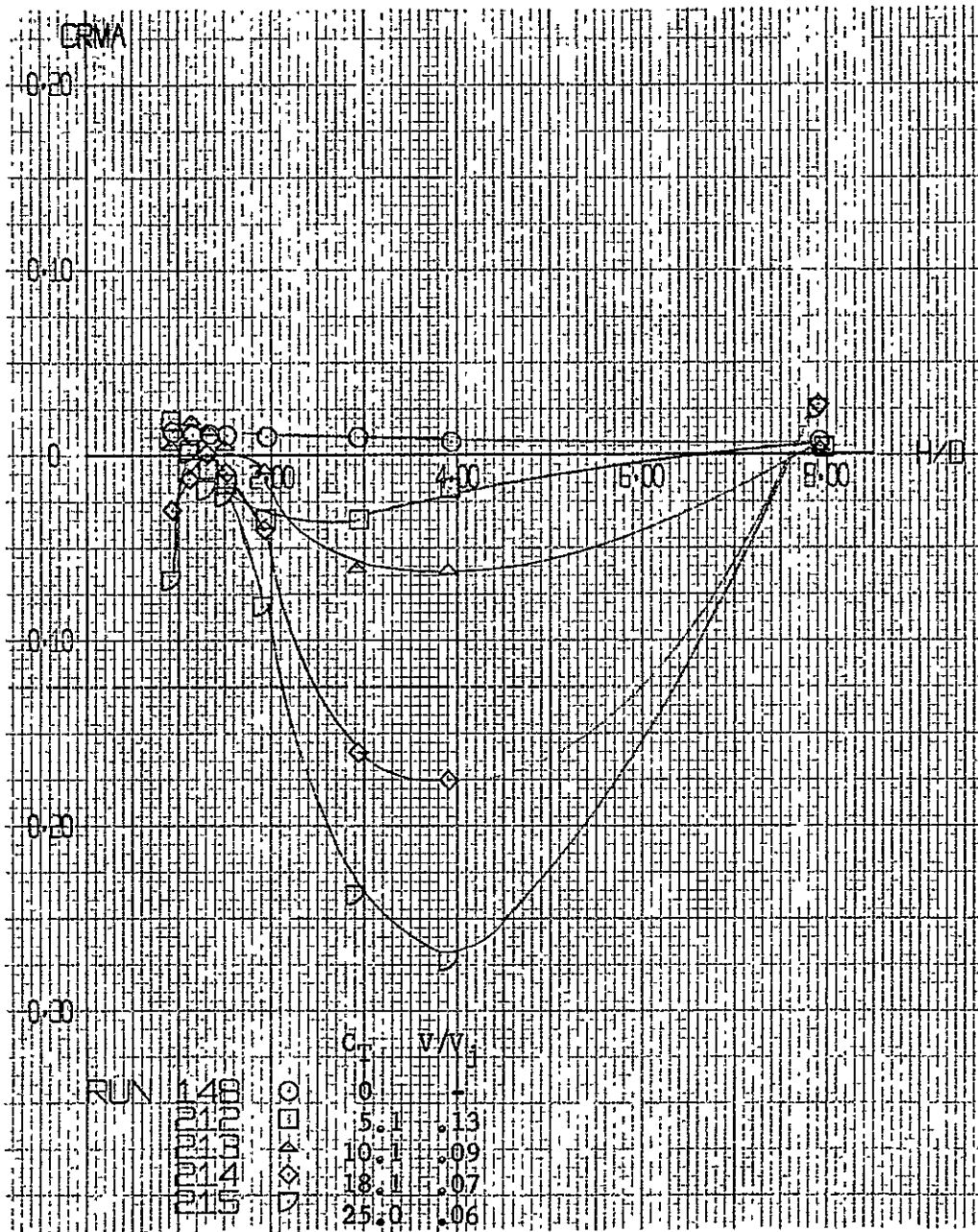


Figure A-29. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Concluded)

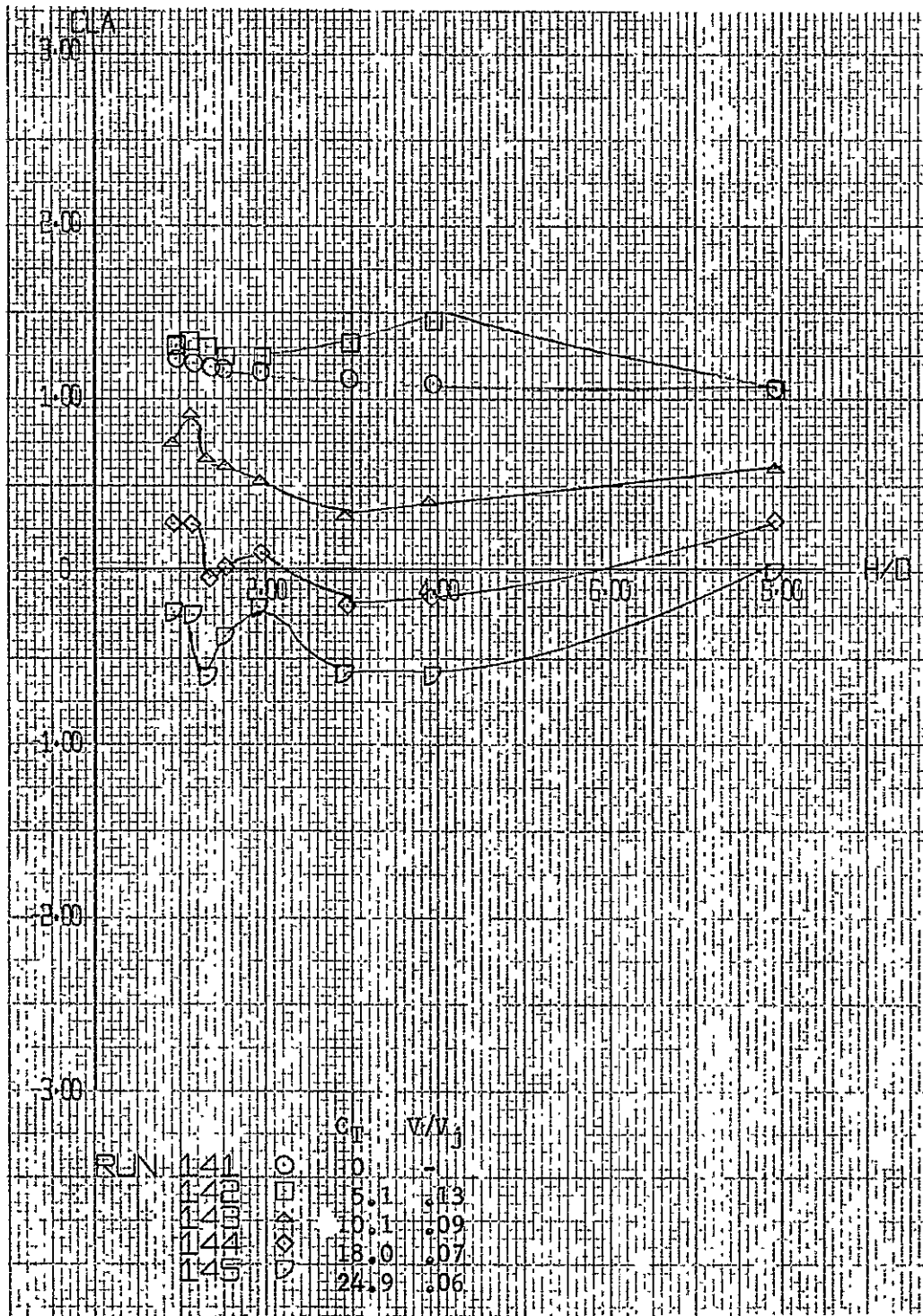


Figure A-30. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$

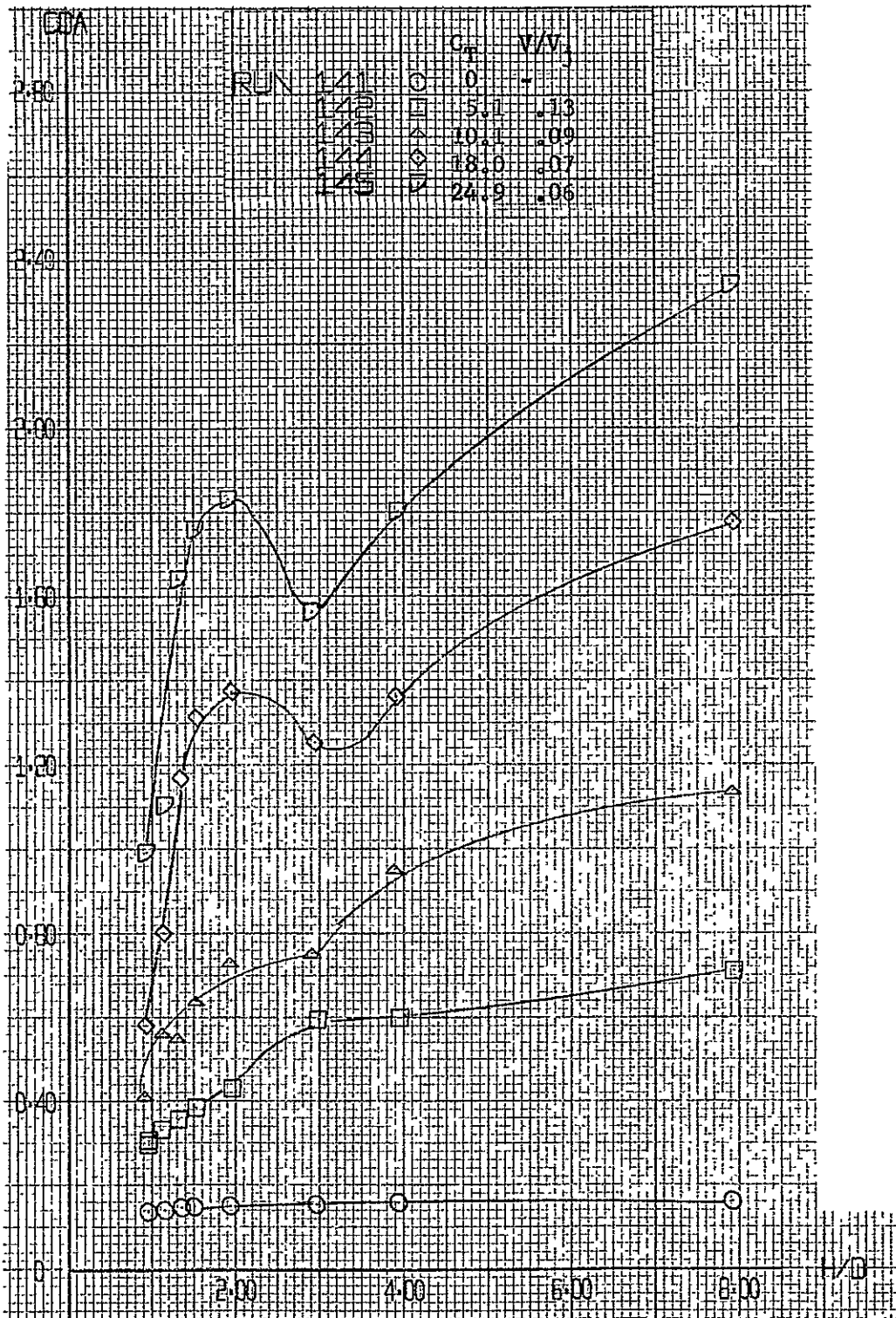


Figure A-30. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

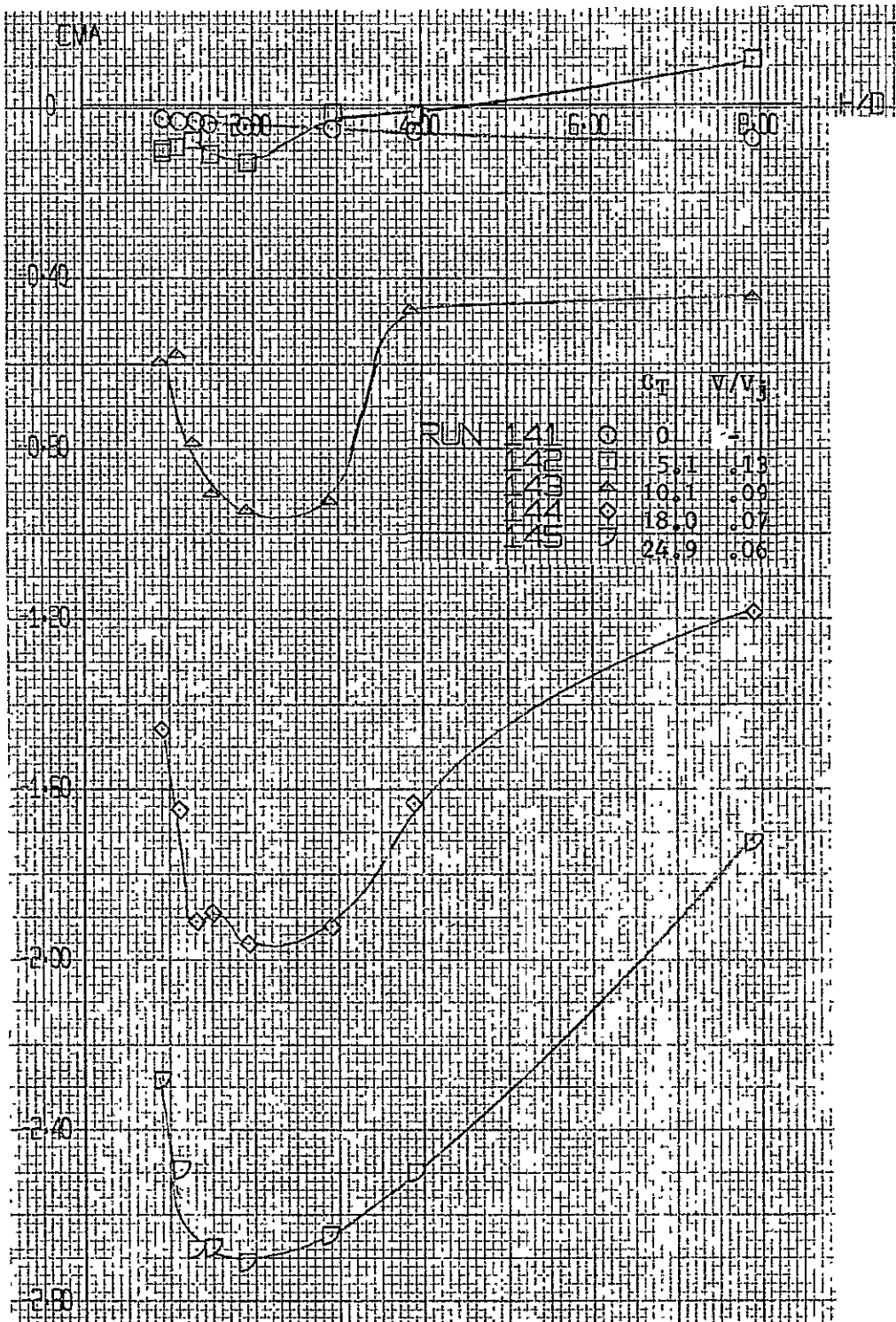


Figure A-30. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Continued)

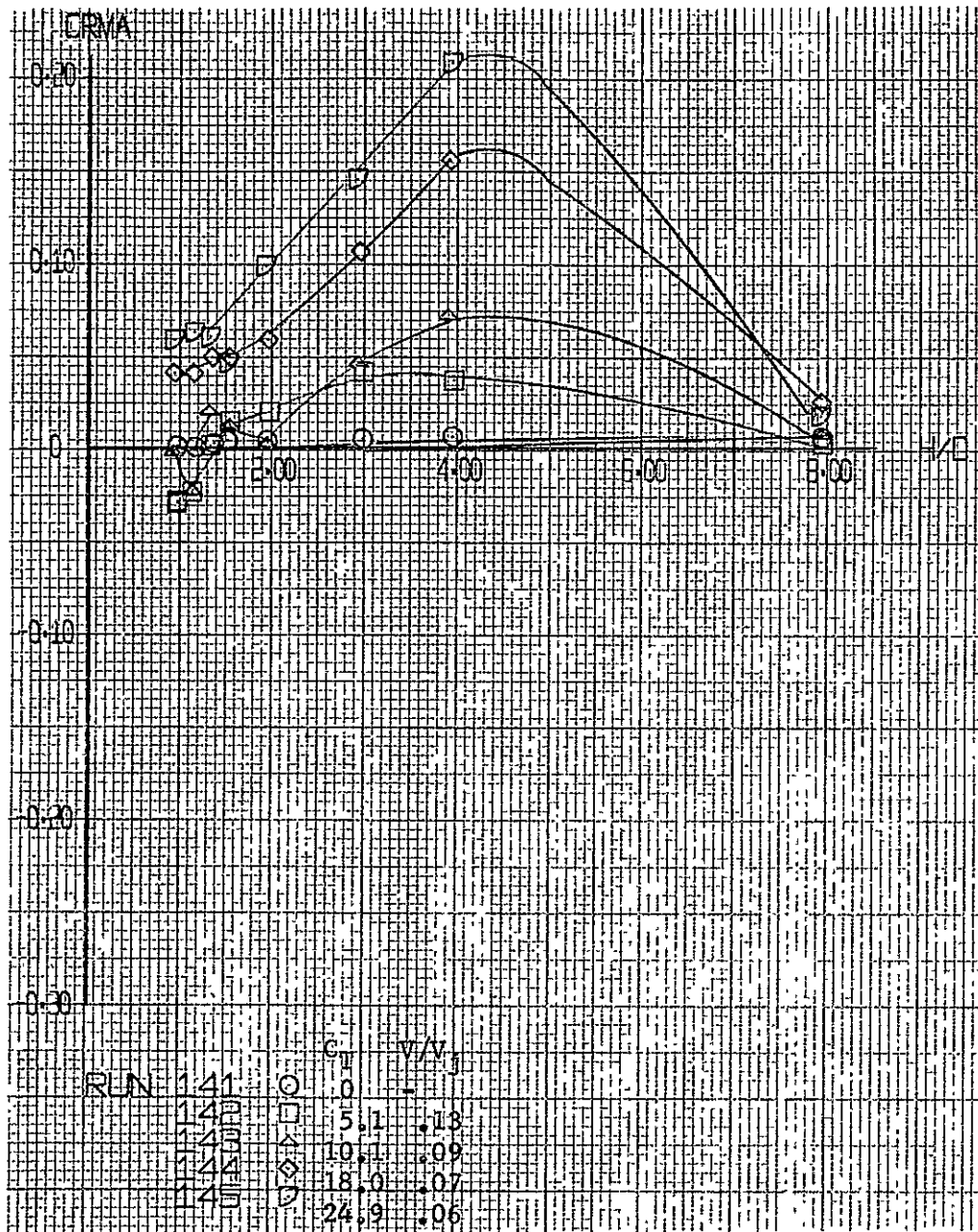


Figure A-30. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Concluded)

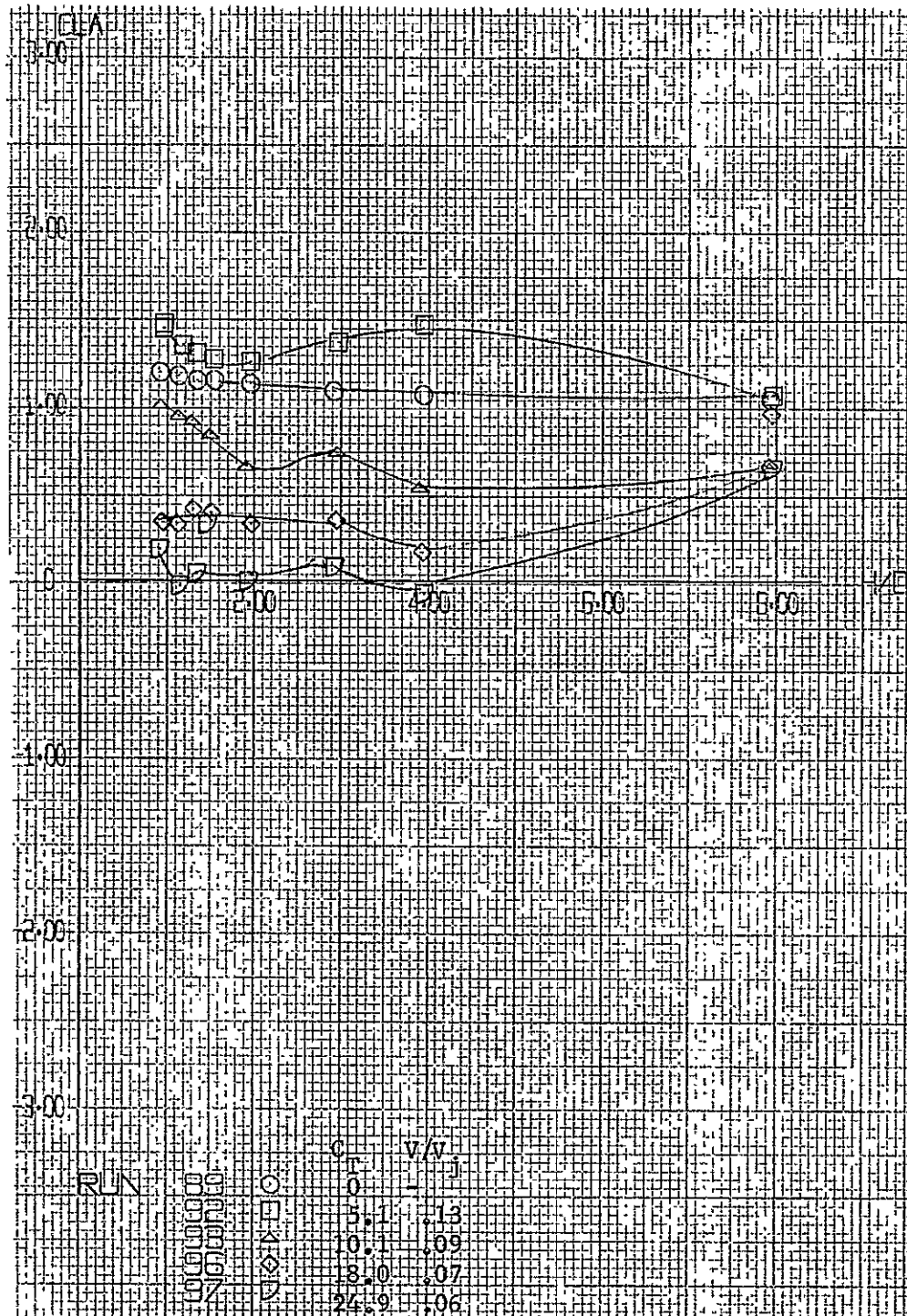


Figure A-31. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

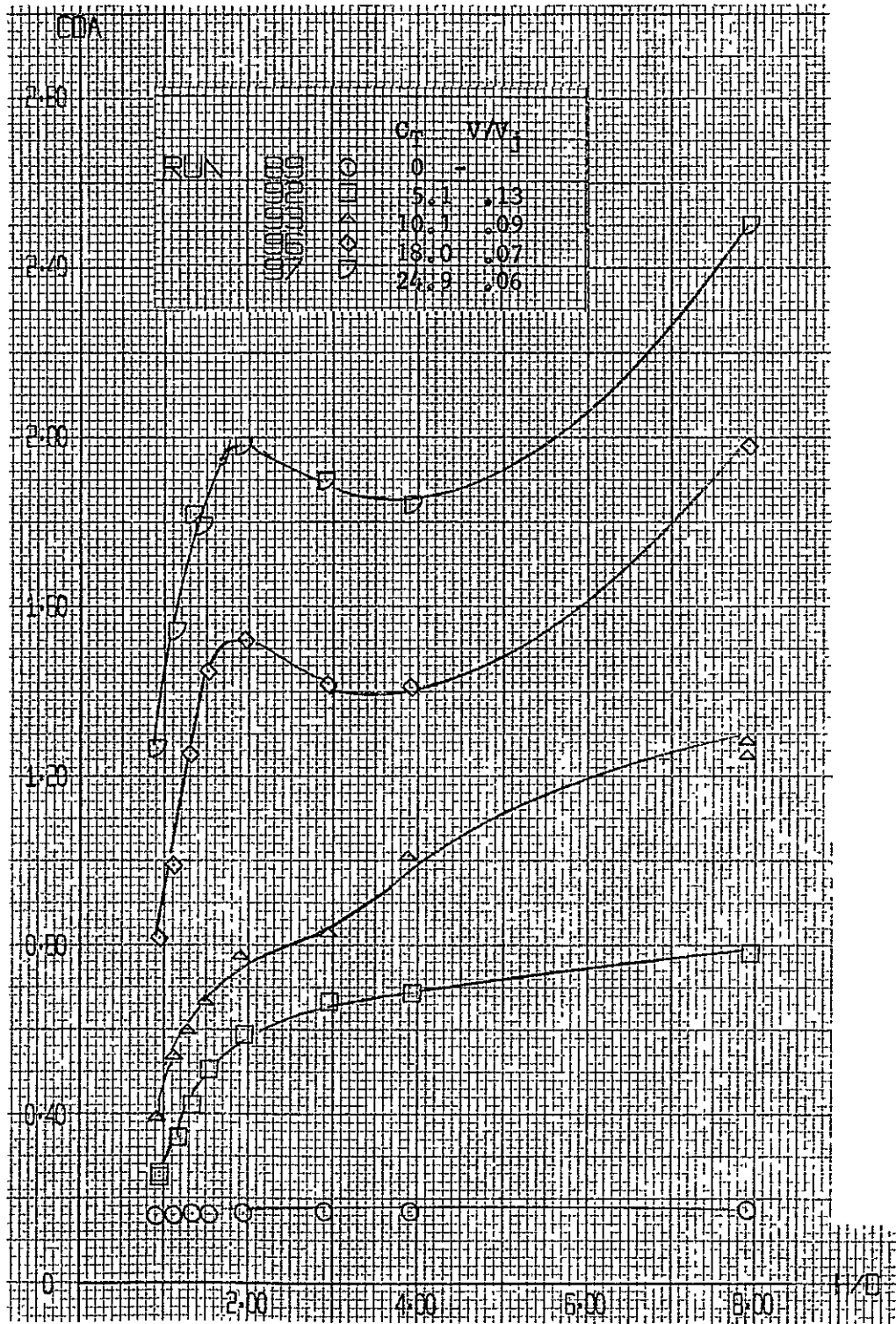


Figure A-31. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

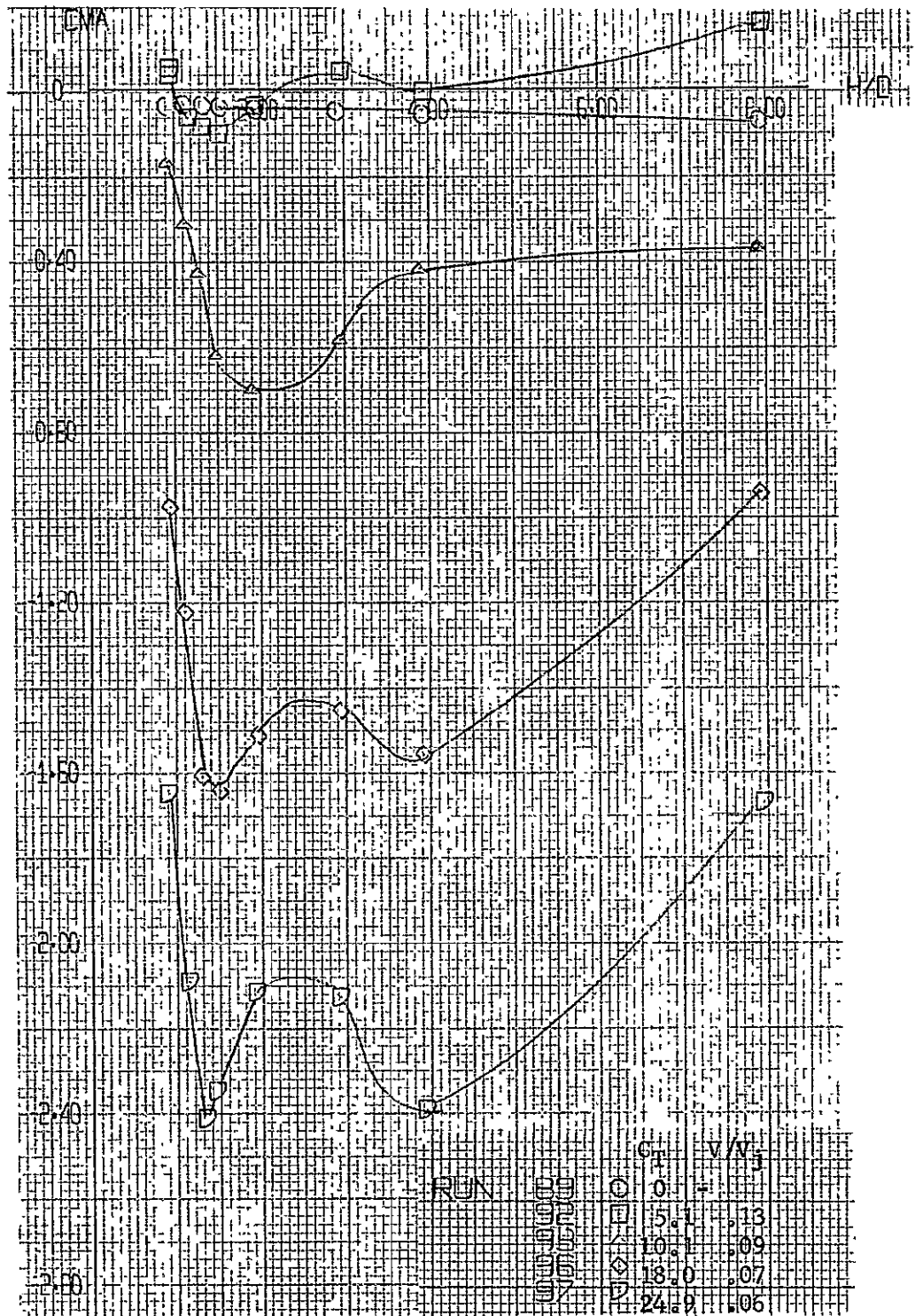


Figure A-31. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

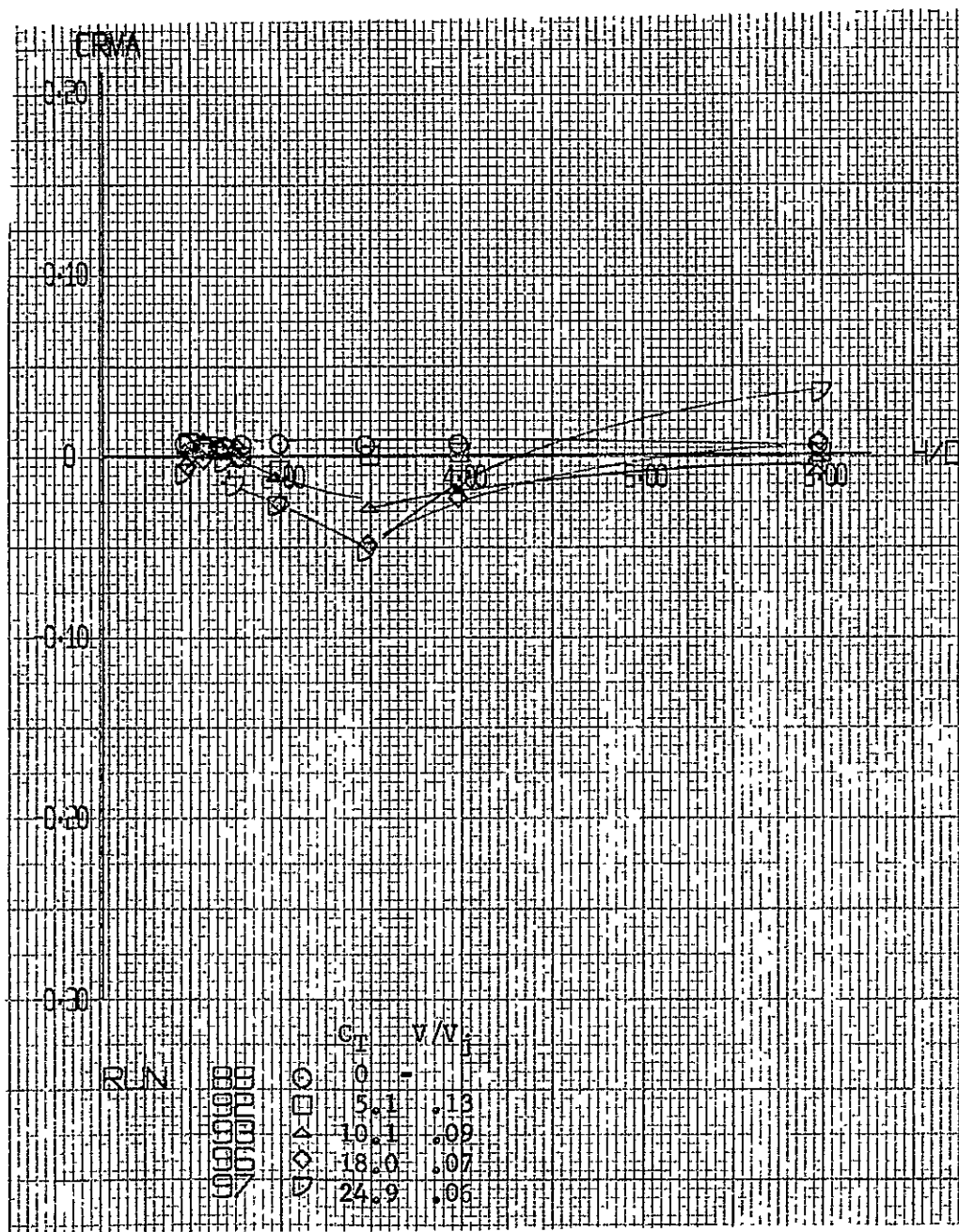


Figure A-31. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$ (Concluded)

ORIGINAL PAGE IS
OF POOR QUALITY

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

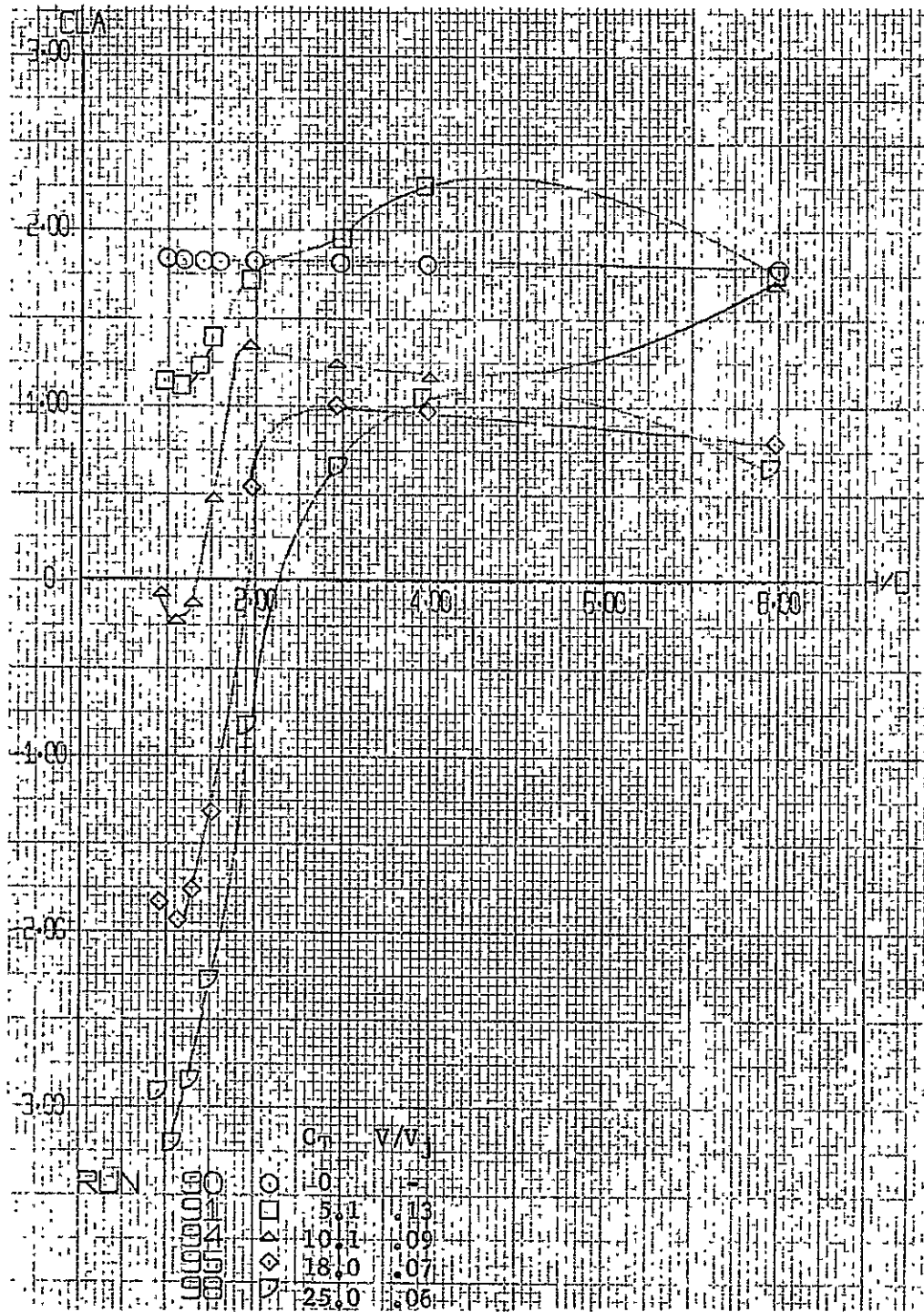


Figure A-32. Effect of Height on the Aerodynamic Coefficients
at Various Thrust Levels, Ground Board Configuration
1; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$

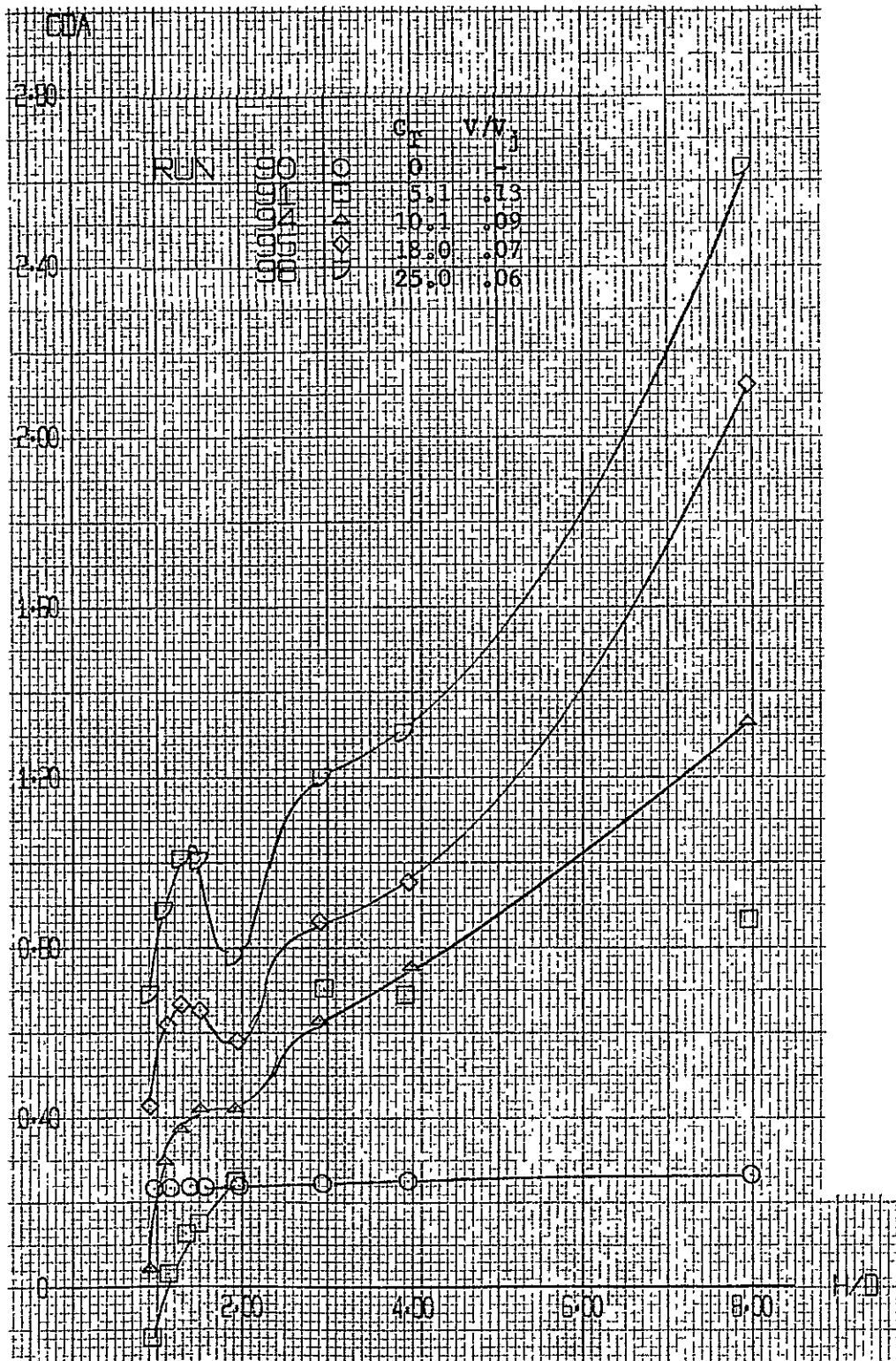


Figure A-32. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\theta = 0^\circ$ (Continued)

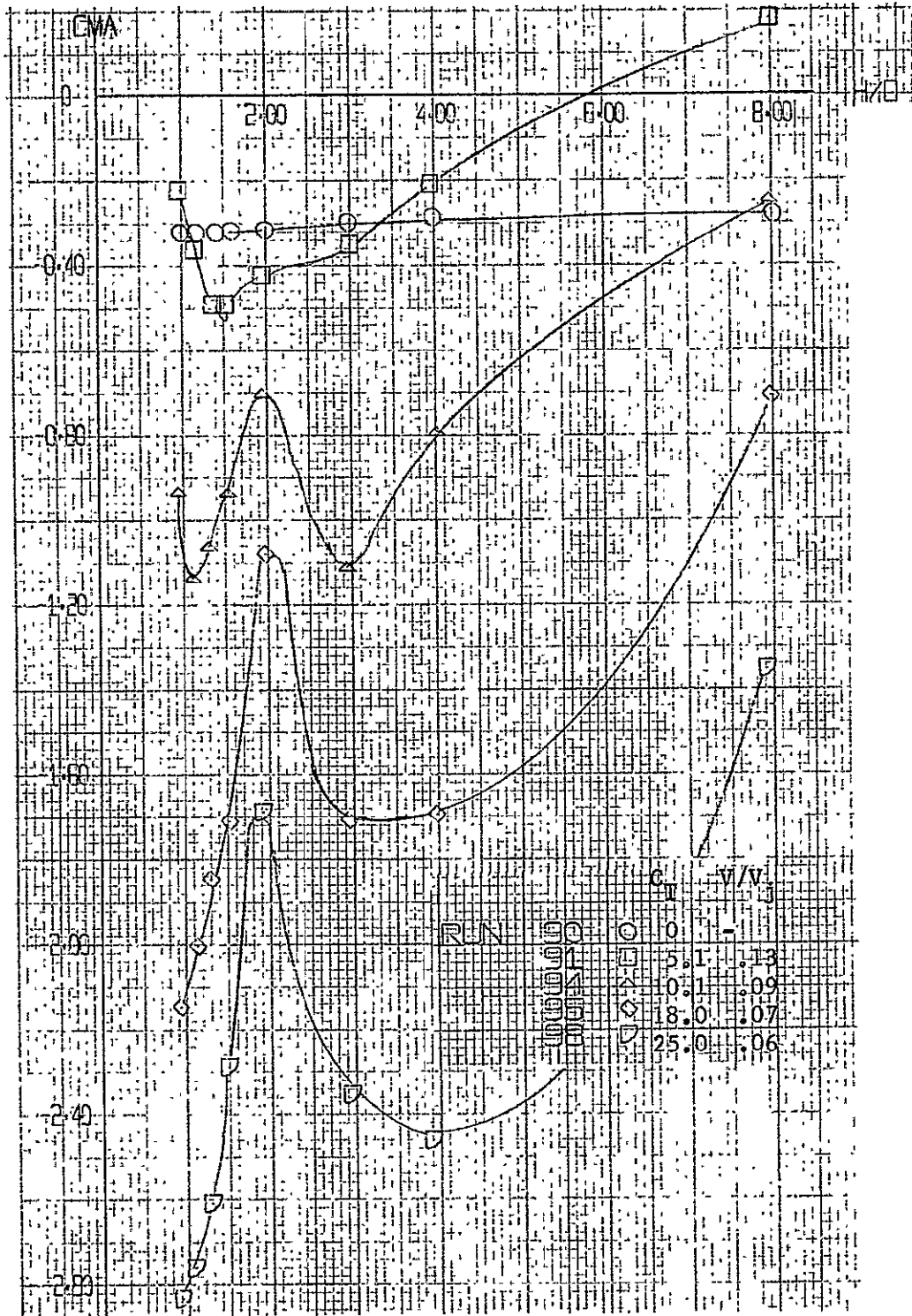


Figure A-32. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

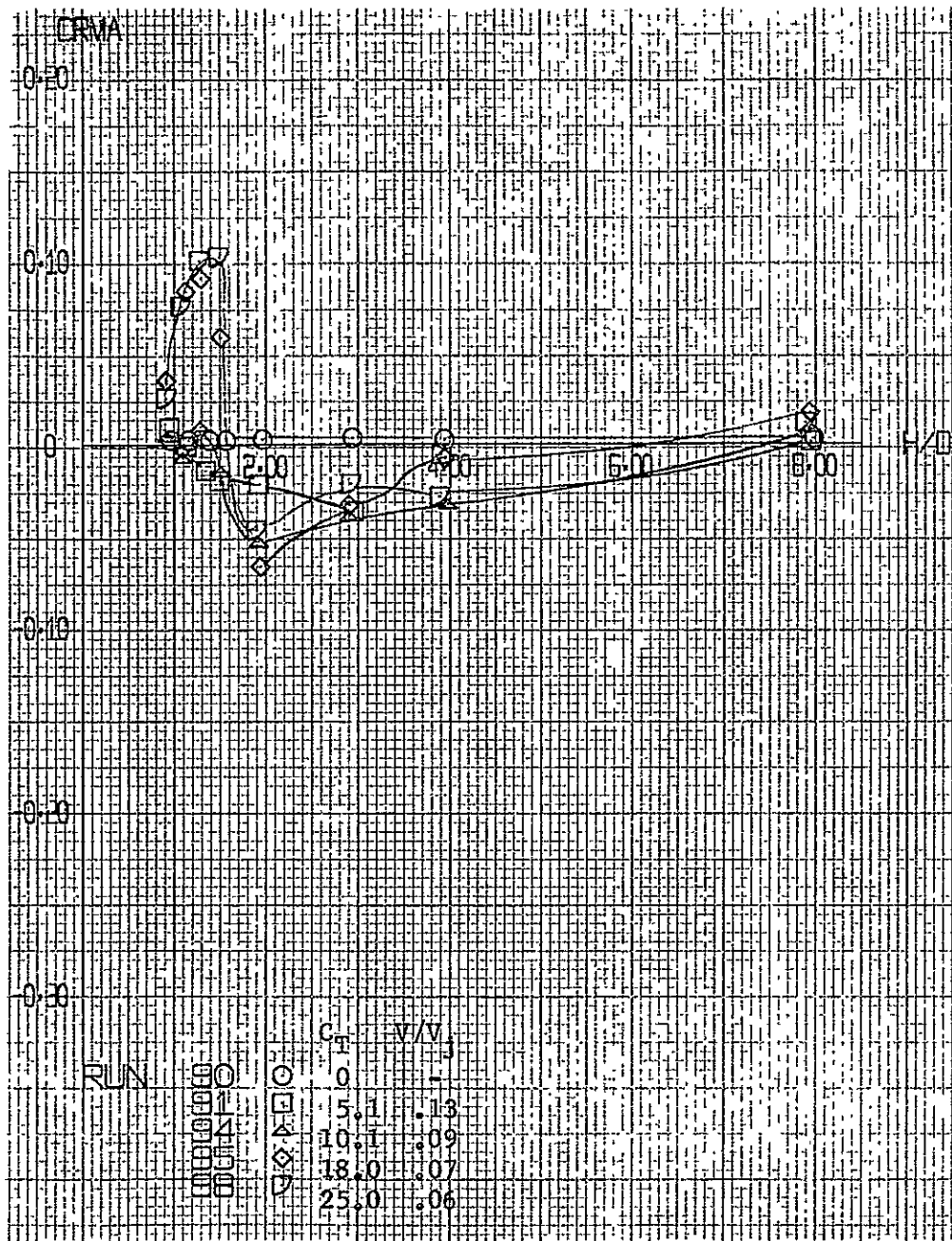


Figure A-32. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 8^\circ$; $\theta = 0^\circ$ (Concluded)

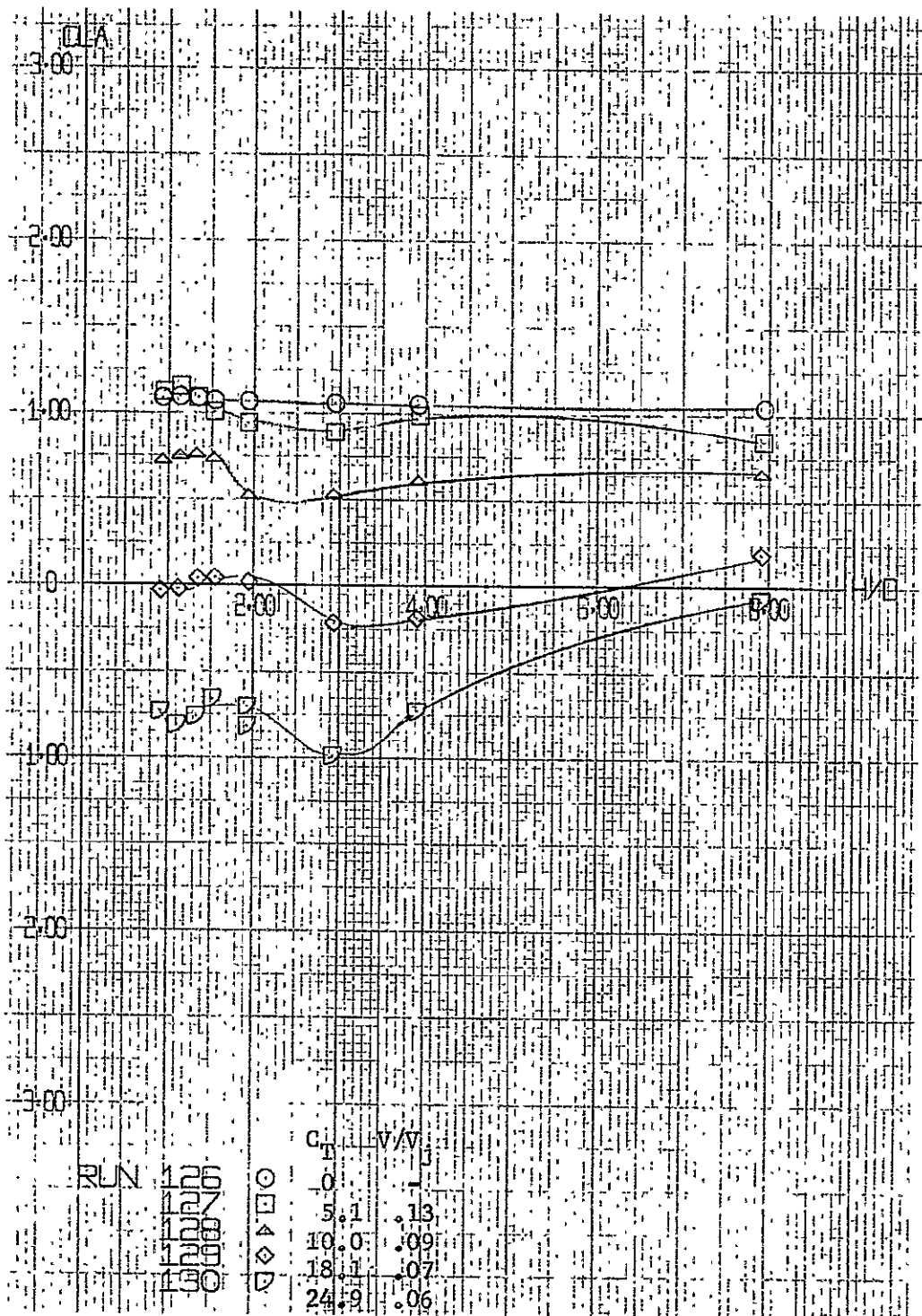


Figure A-33. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$

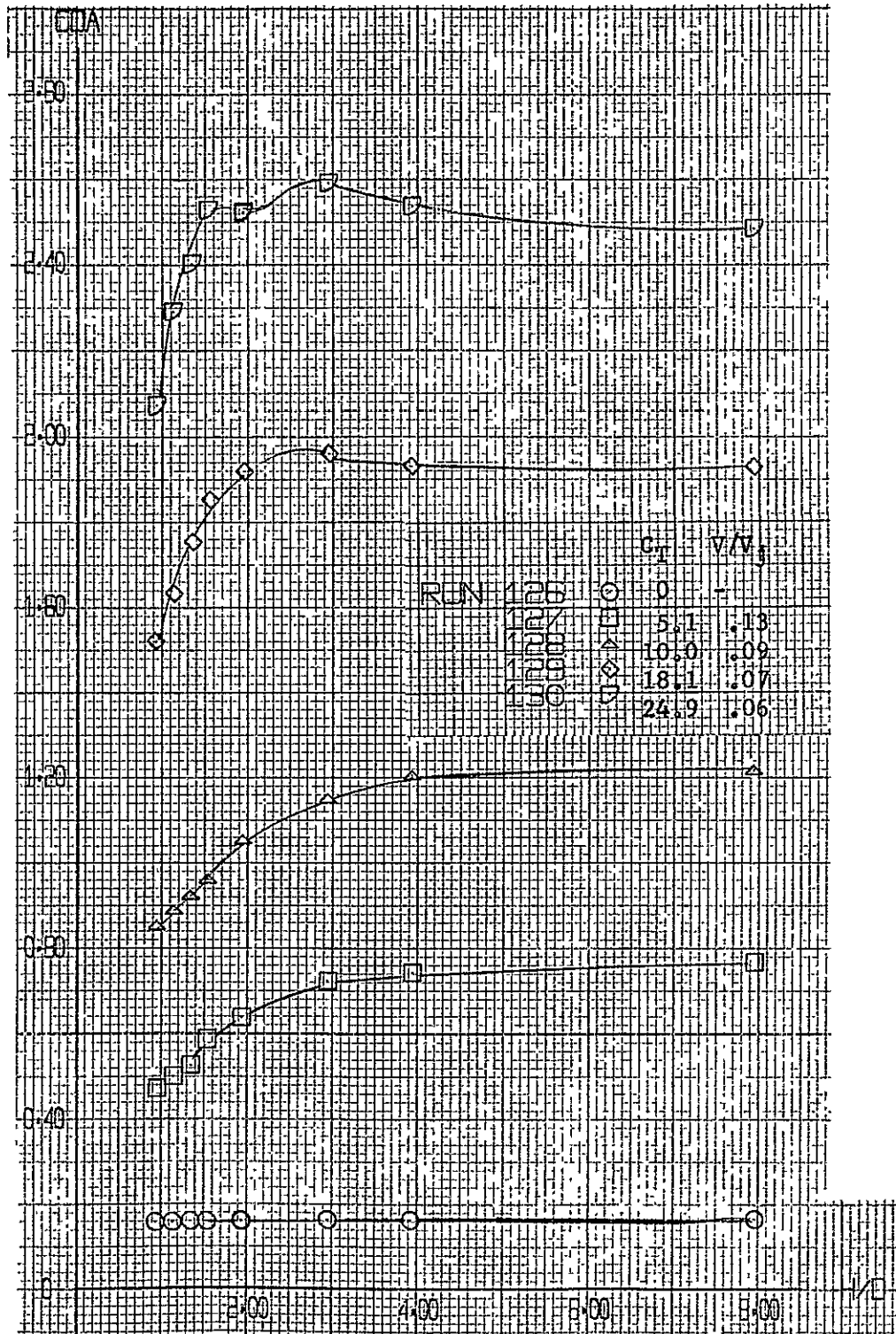


Figure A-33. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$ (Continued)

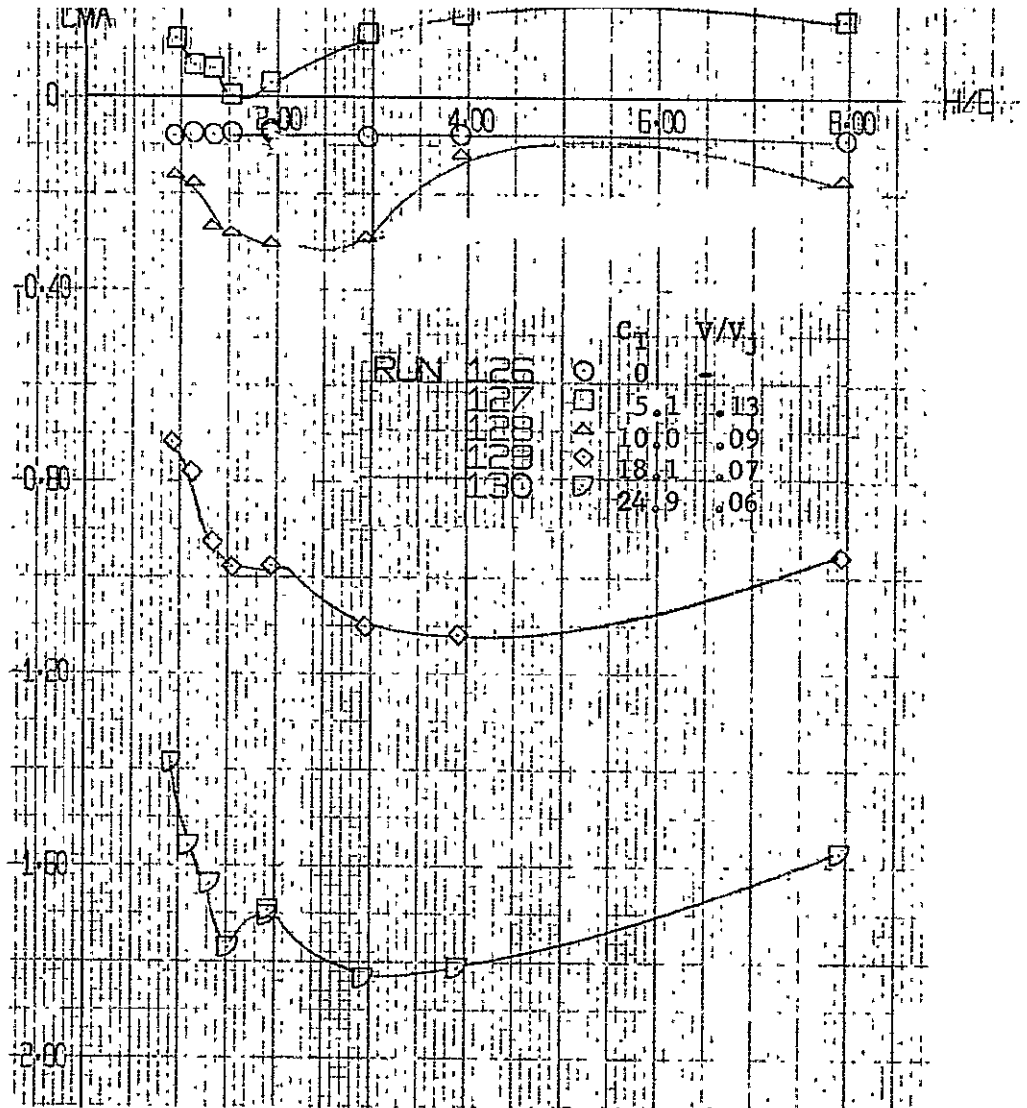


Figure A-33. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$ (Continued)

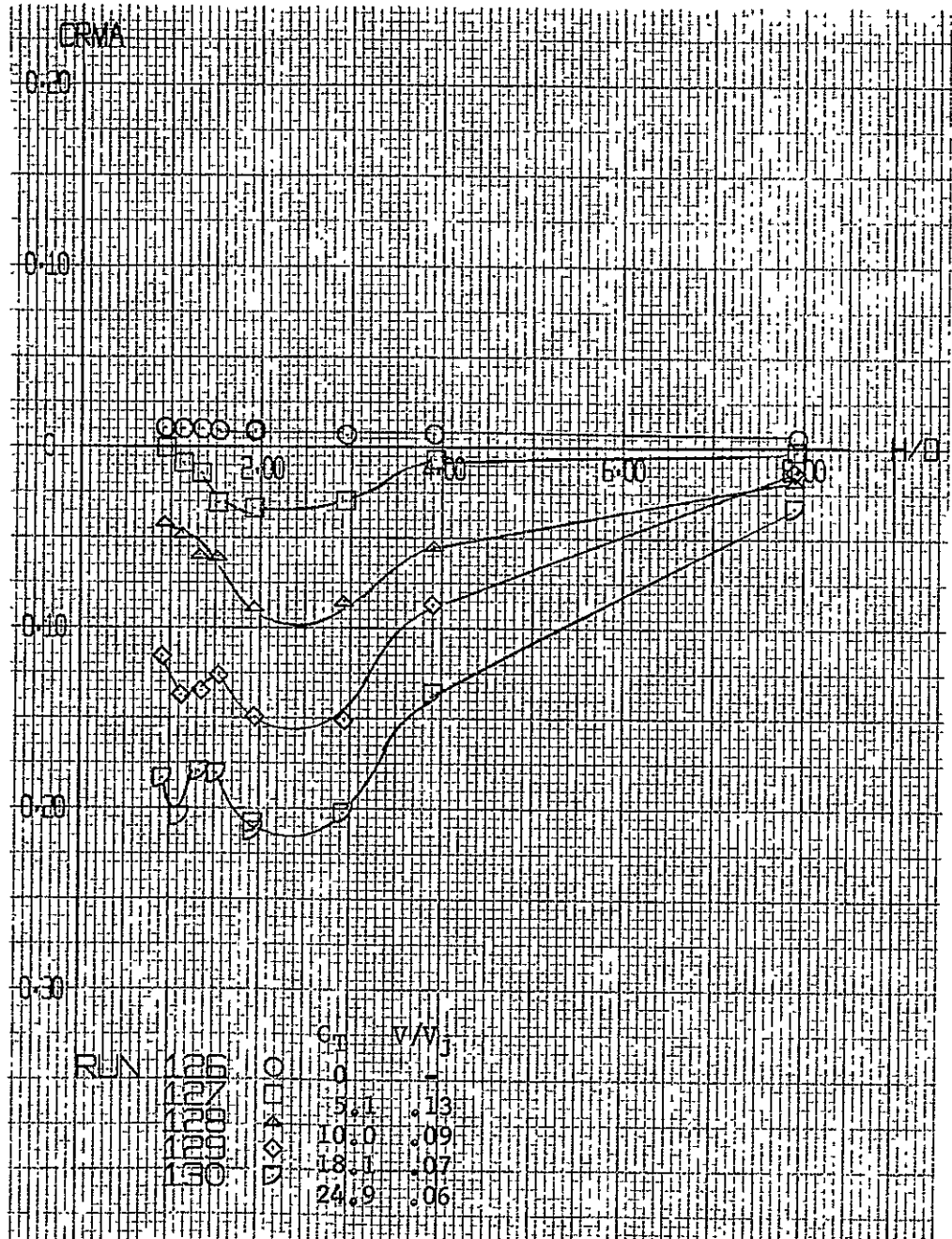


Figure A-33.. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

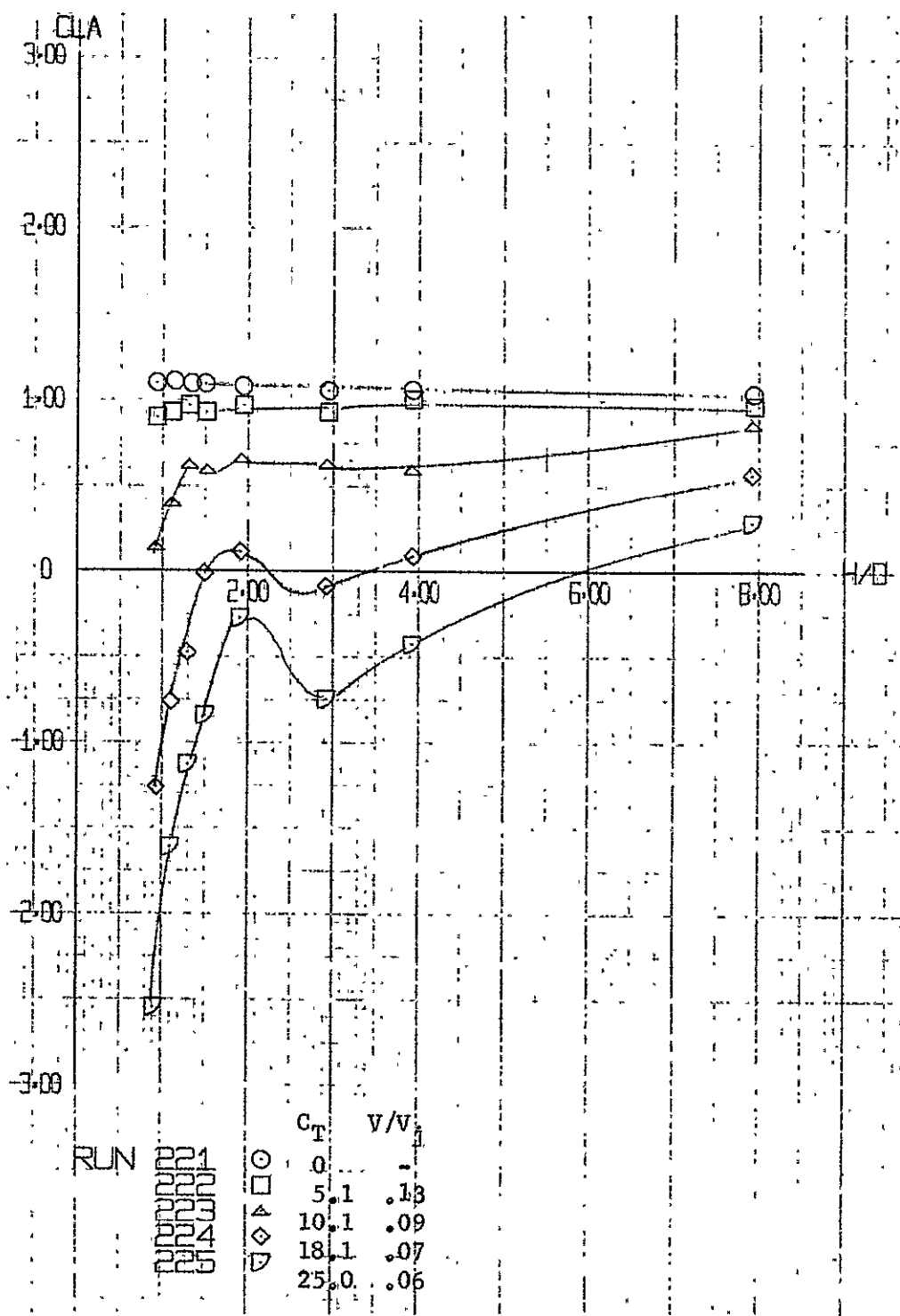


Figure A-34. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

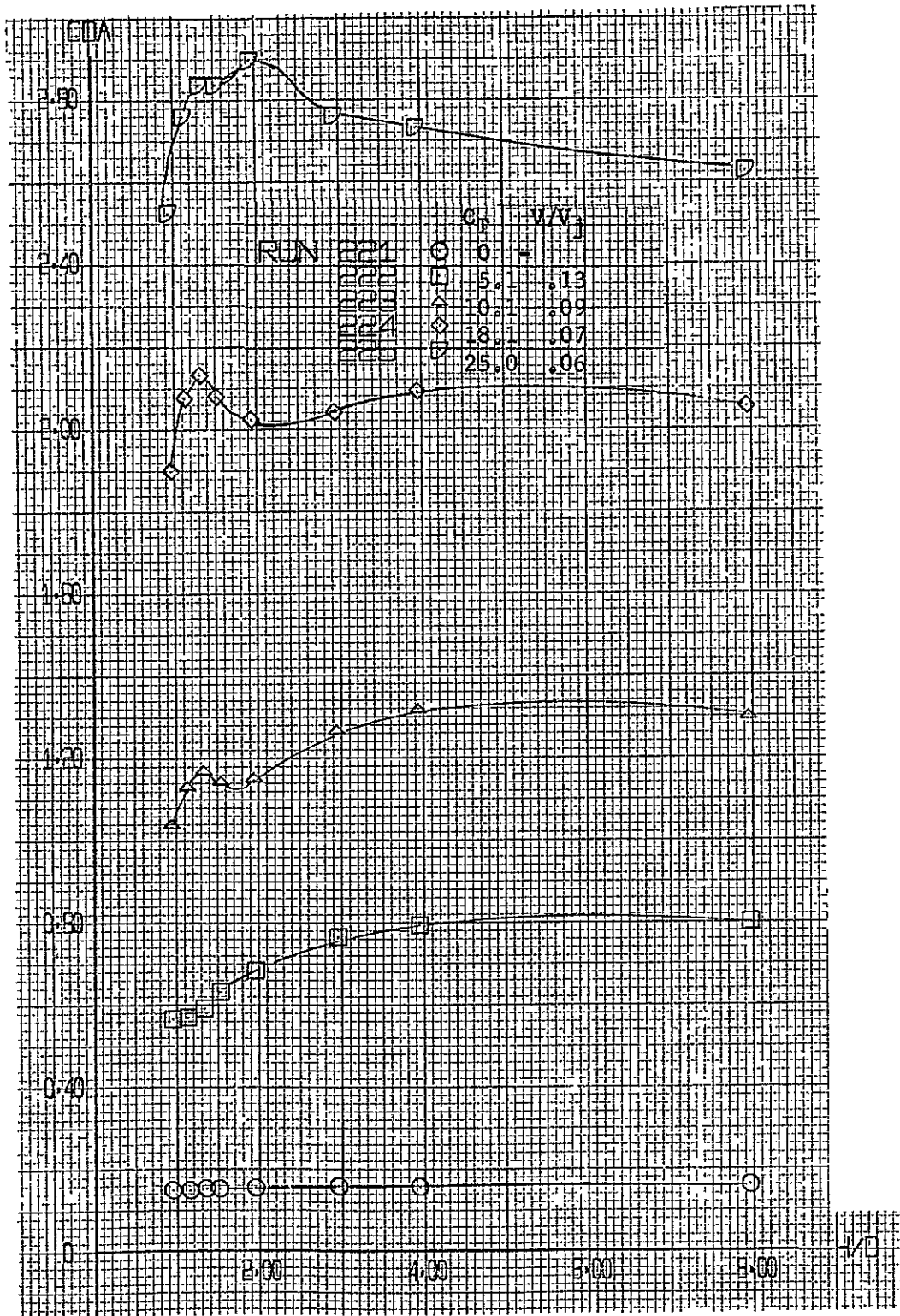


Figure A-34. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

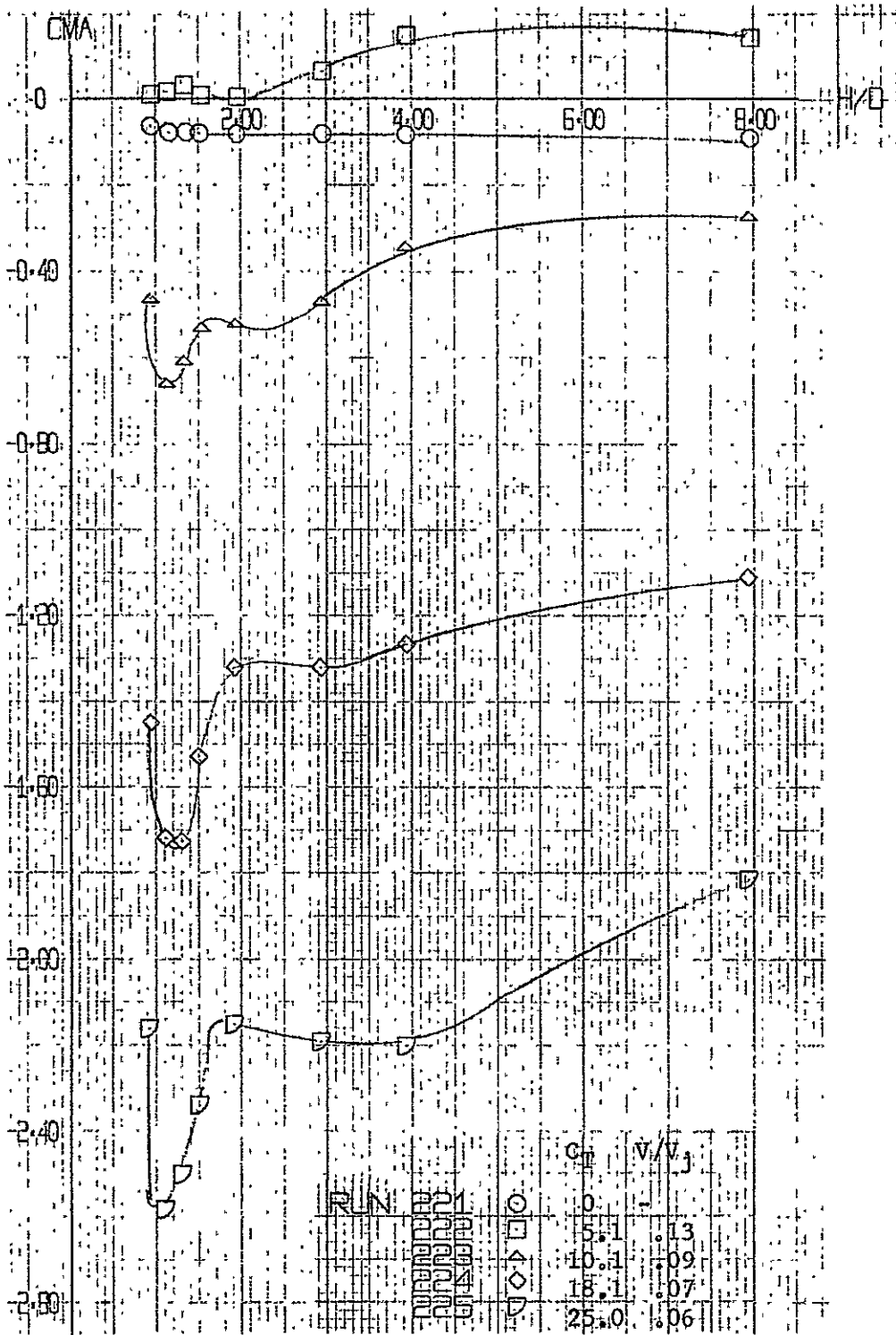


Figure A-34. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Continued)

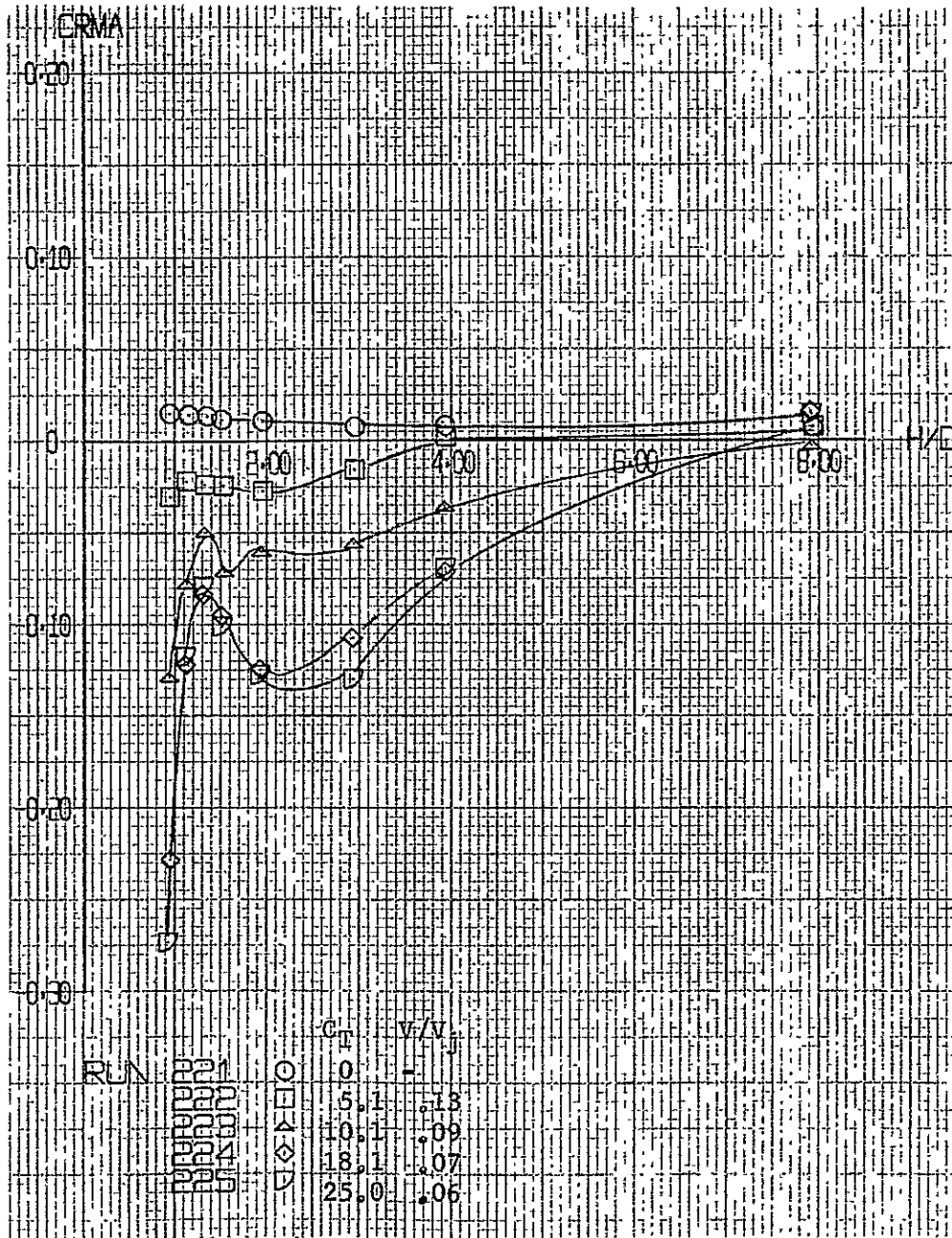


Figure A-34. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Concluded)

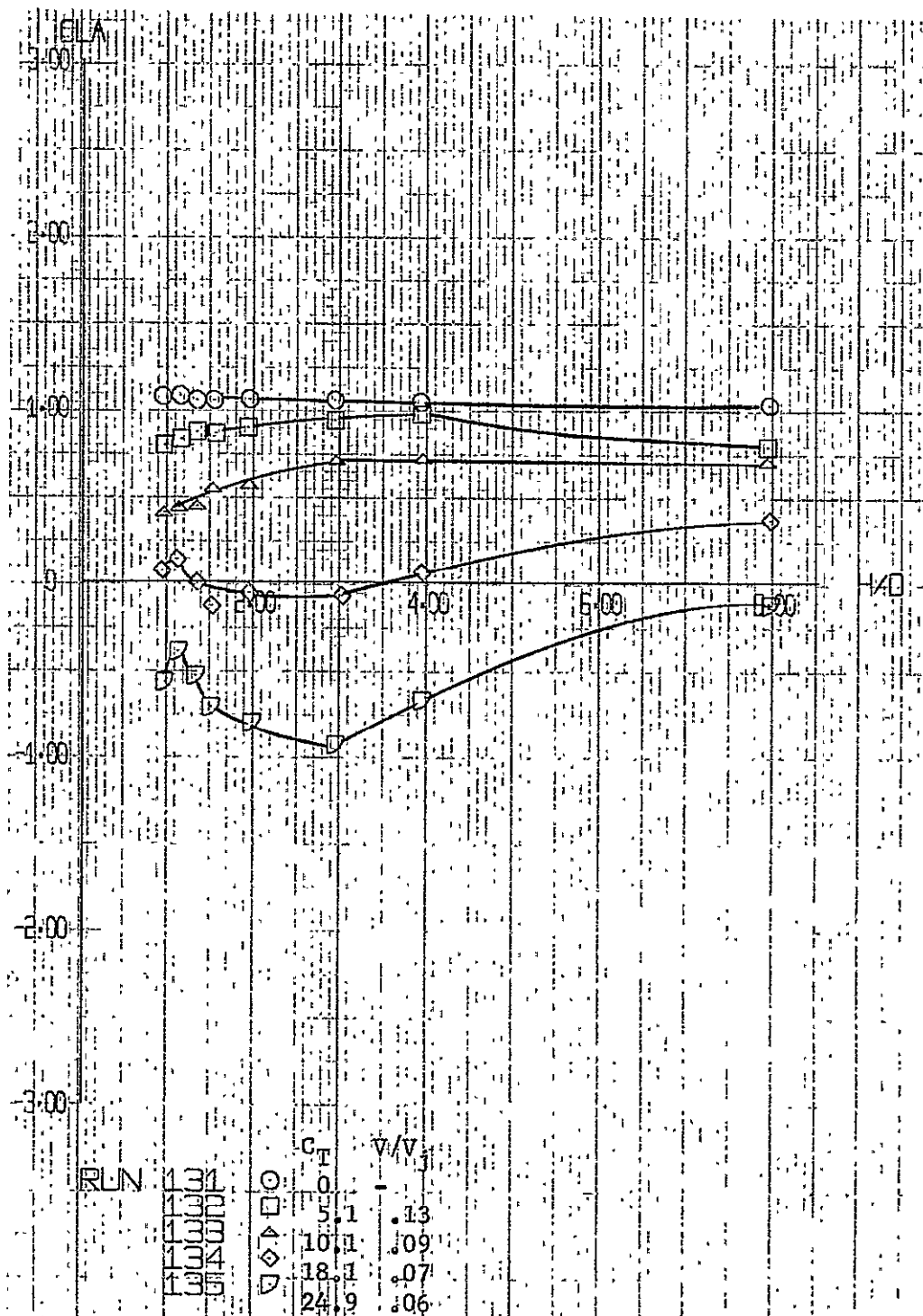


Figure A-35. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$

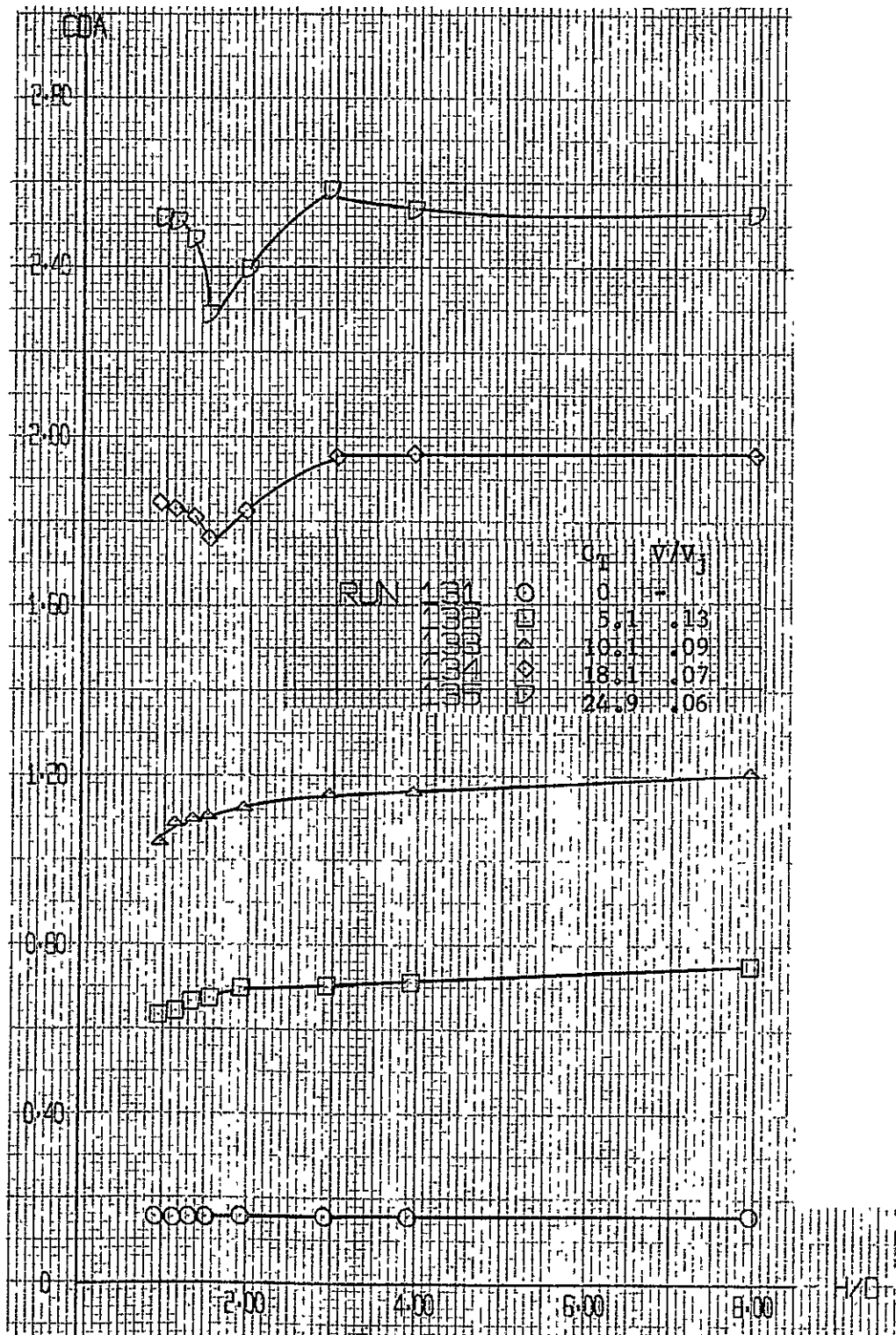


Figure A-35. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

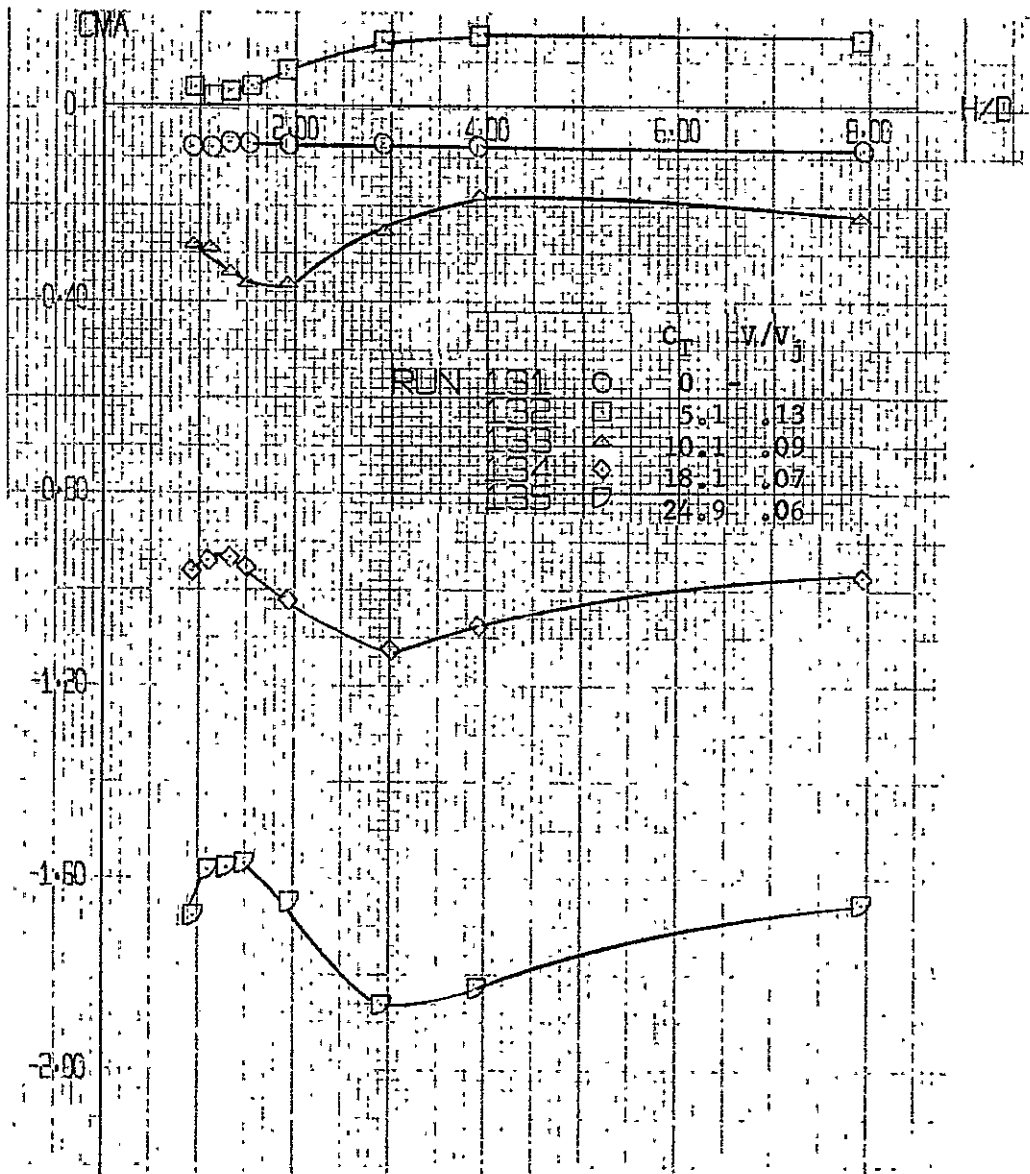


Figure A-35. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

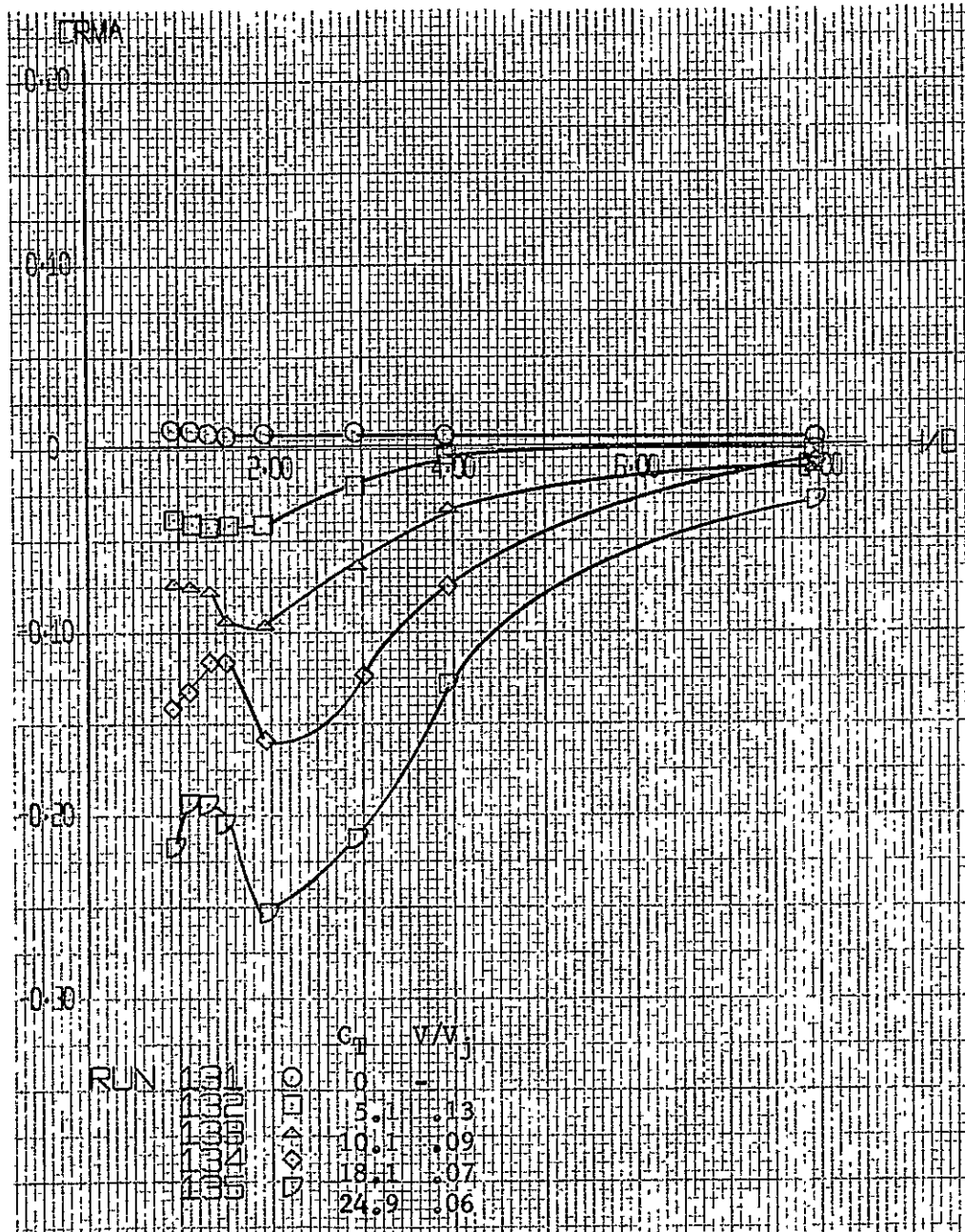


Figure A-35. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Concluded)

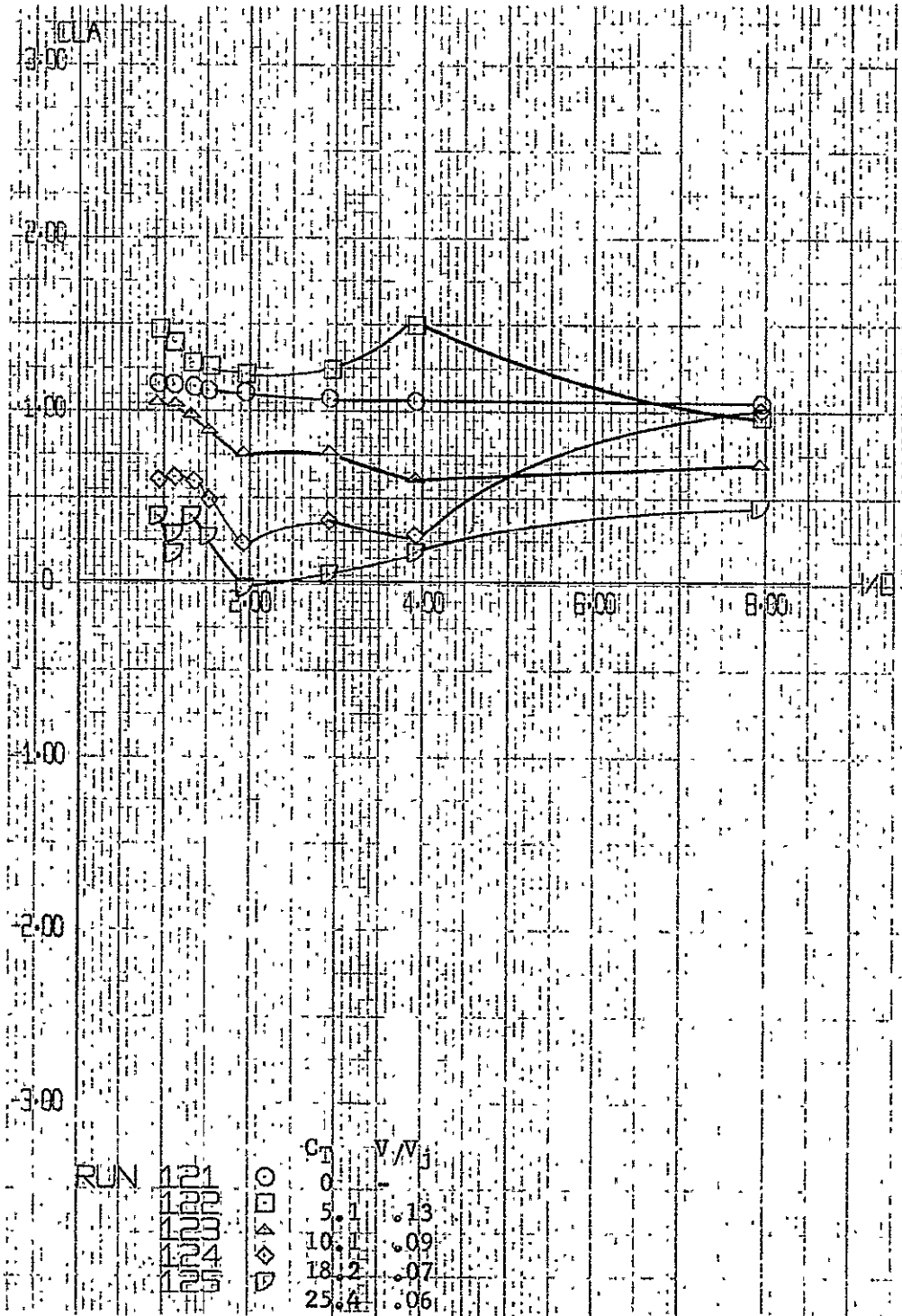


Figure A-36. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

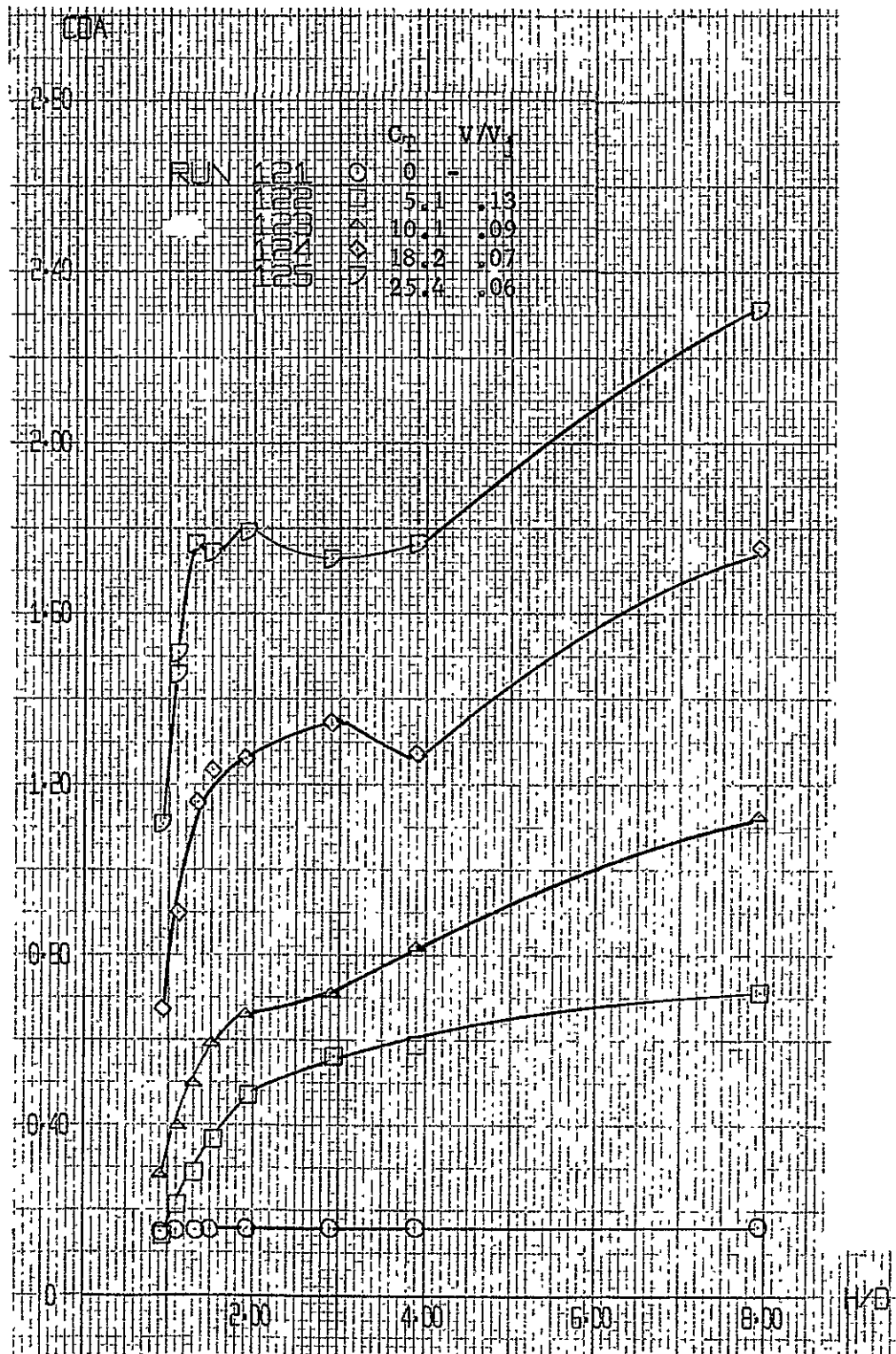


Figure A-36. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

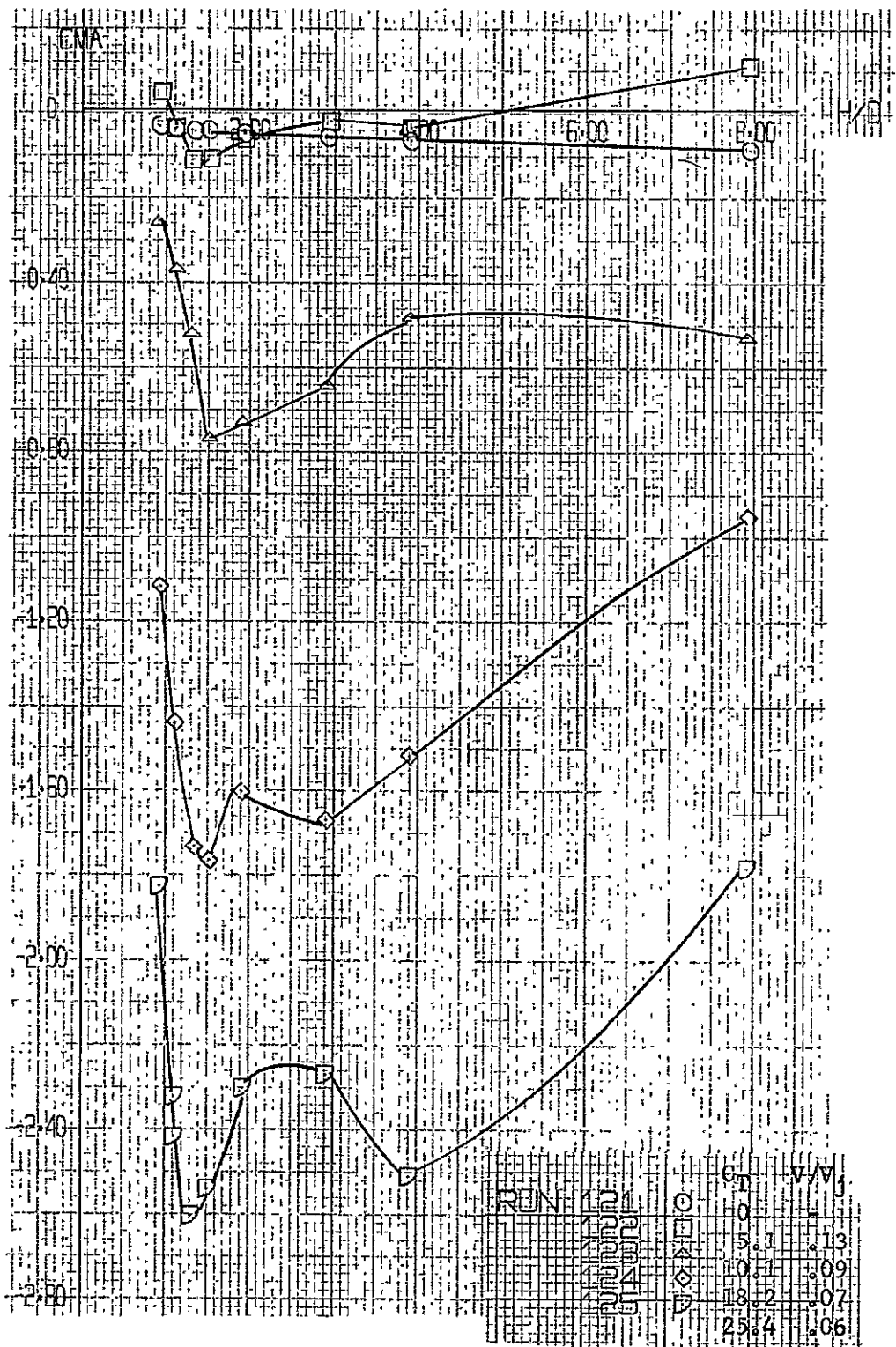


Figure A-36. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$ (Continued)

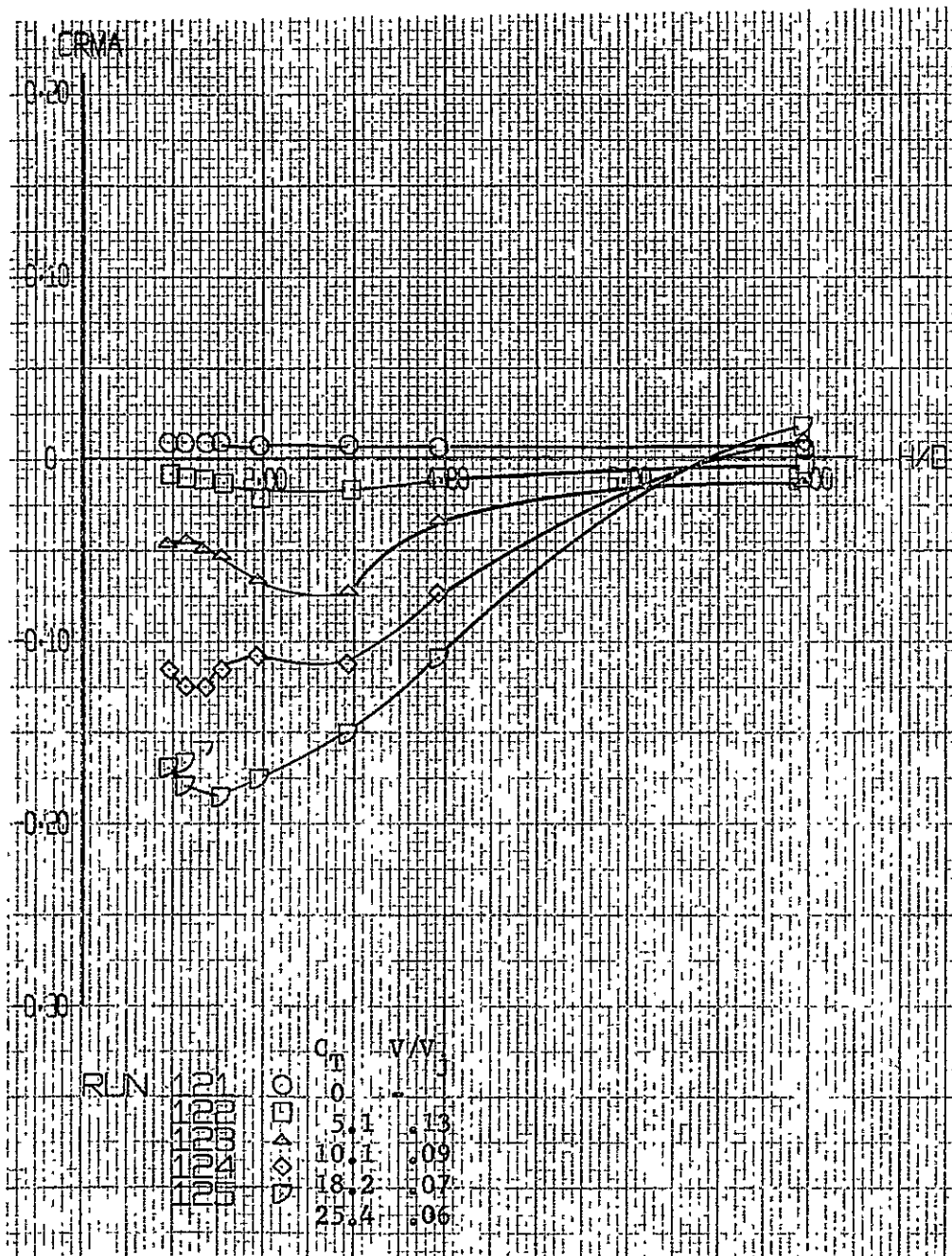


Figure A-36. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$ (Concluded)

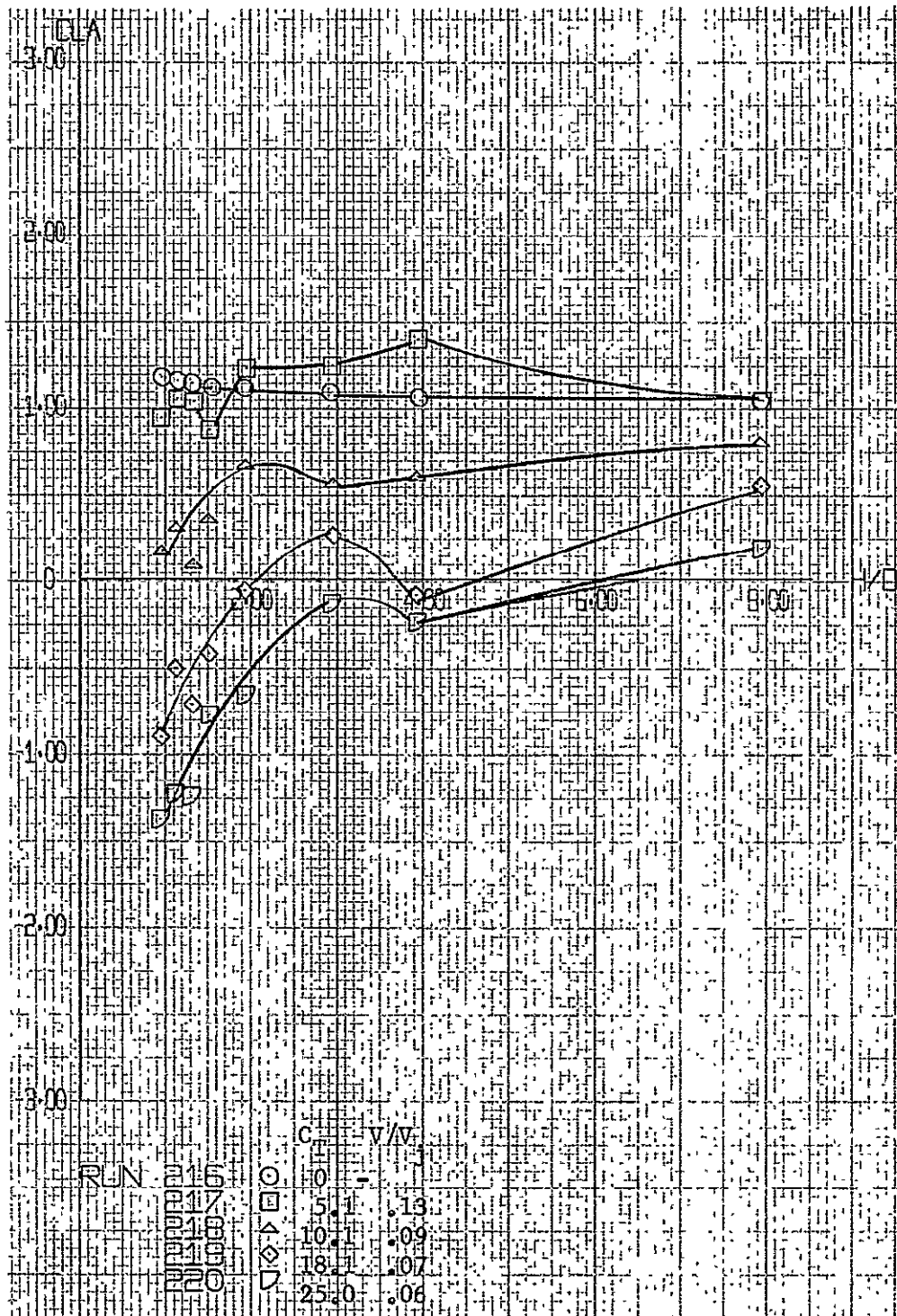


Figure A-37. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$

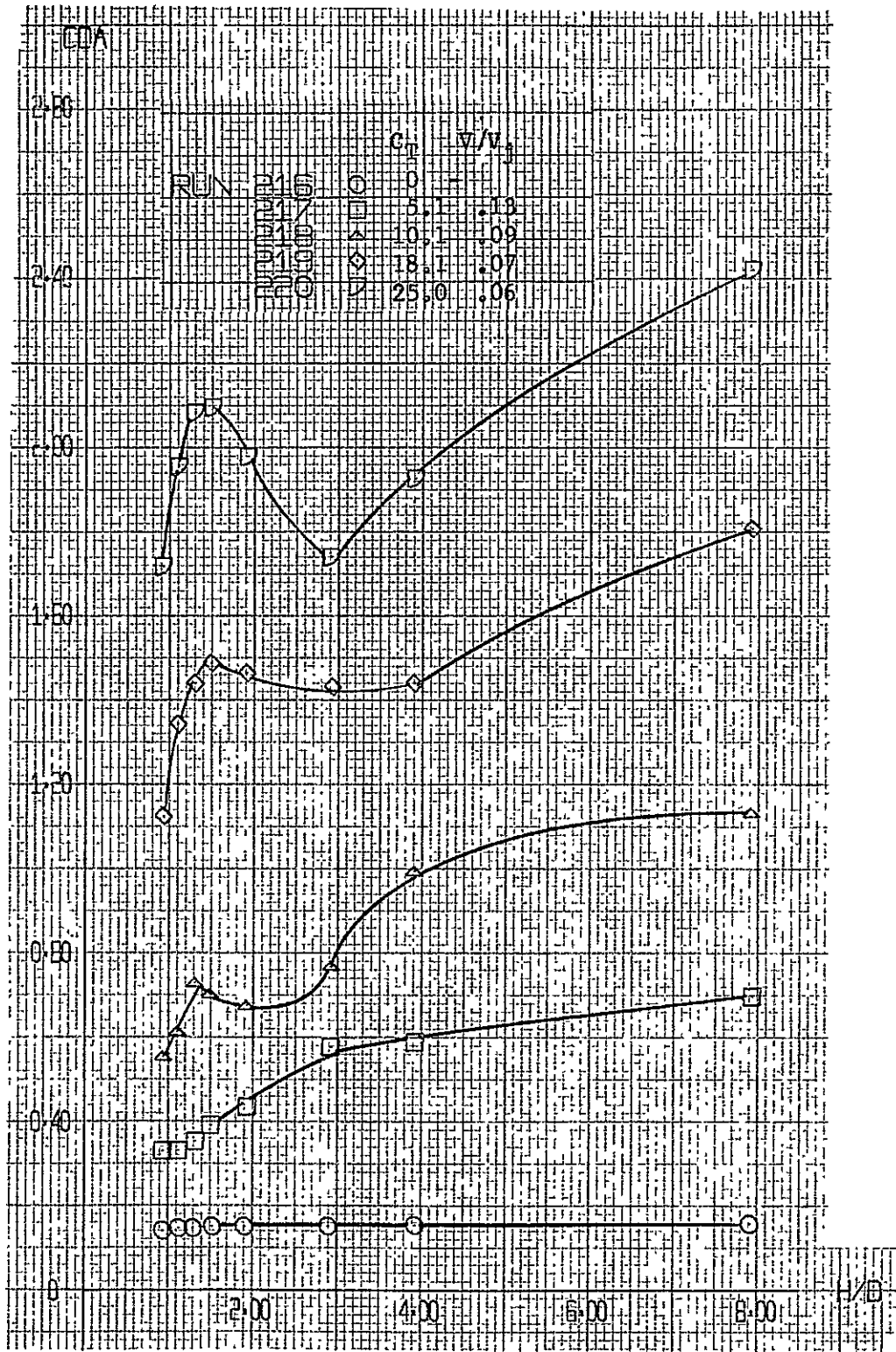


Figure A-37. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

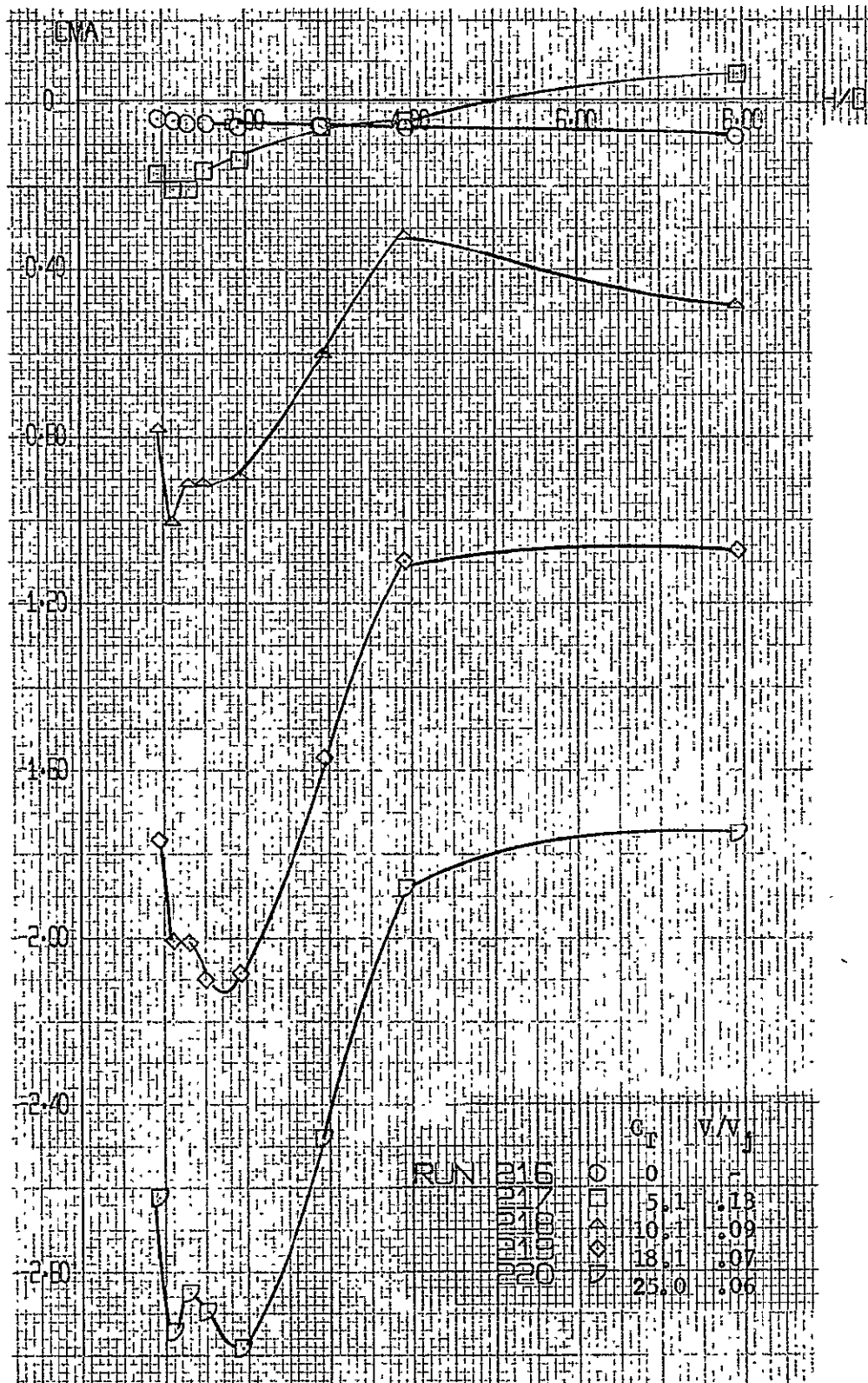


Figure A-37. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

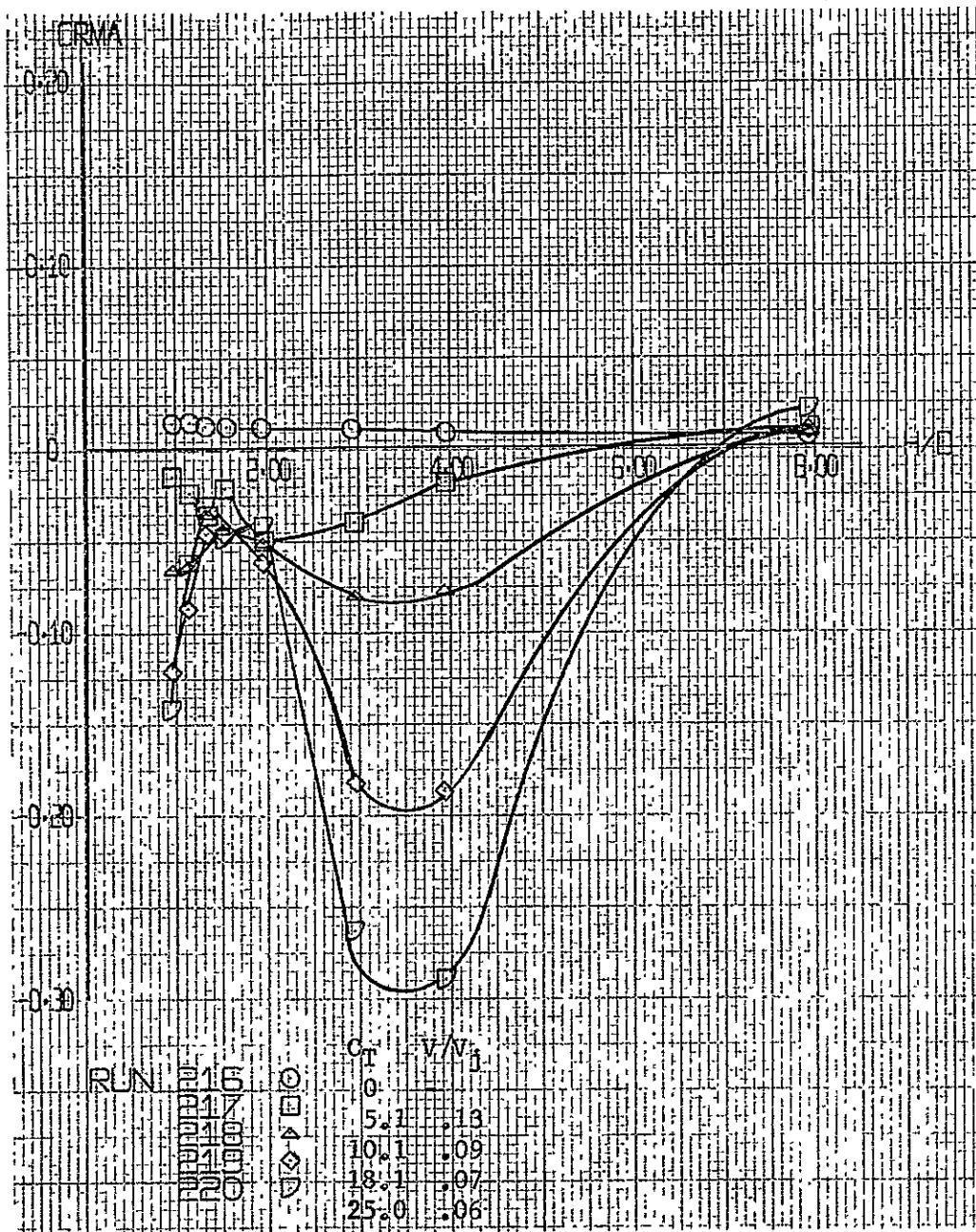


Figure A-37. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Concluded)

ORIGINAL PAGE IS
OF POOR QUALITY

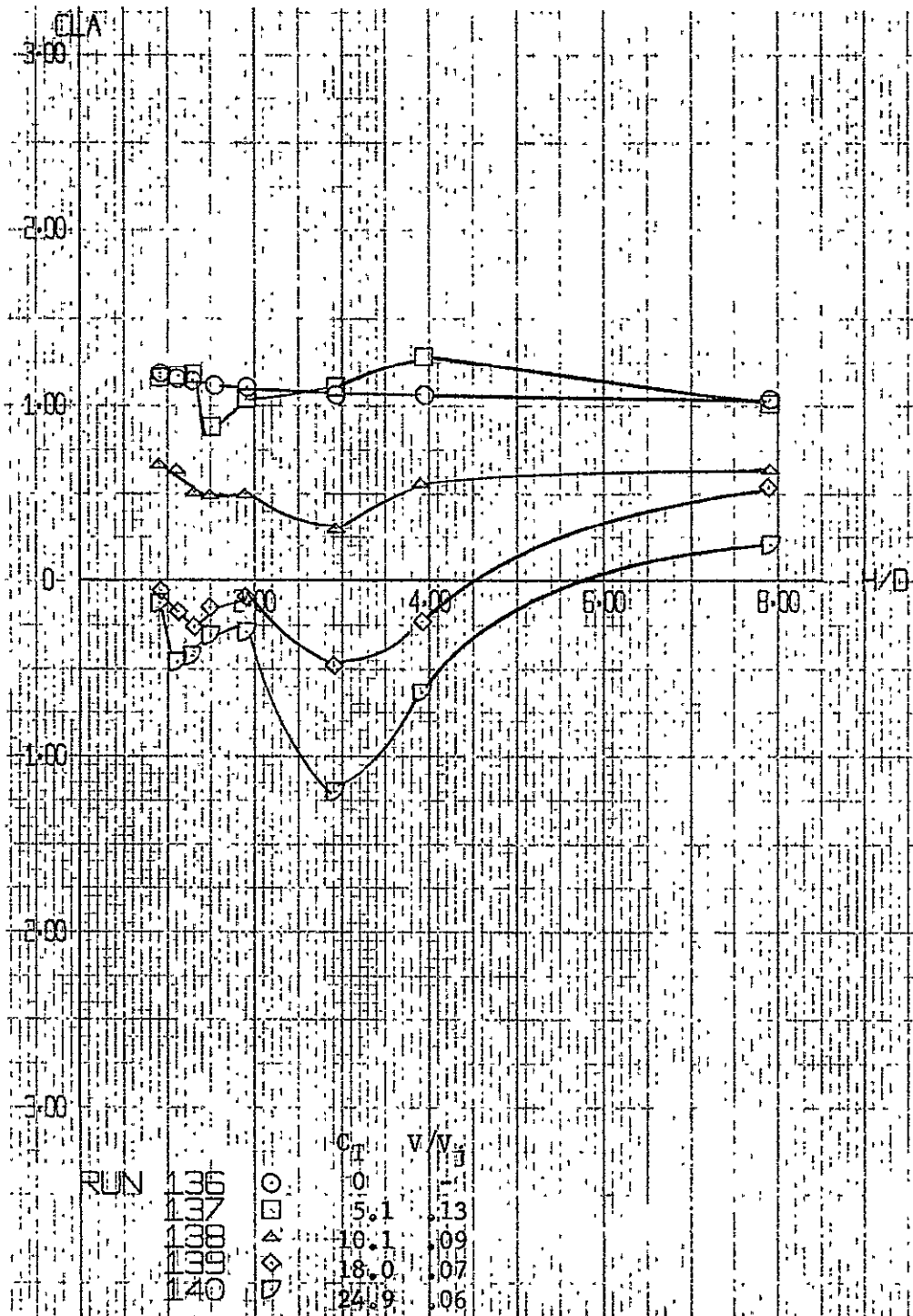


Figure A-38. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$

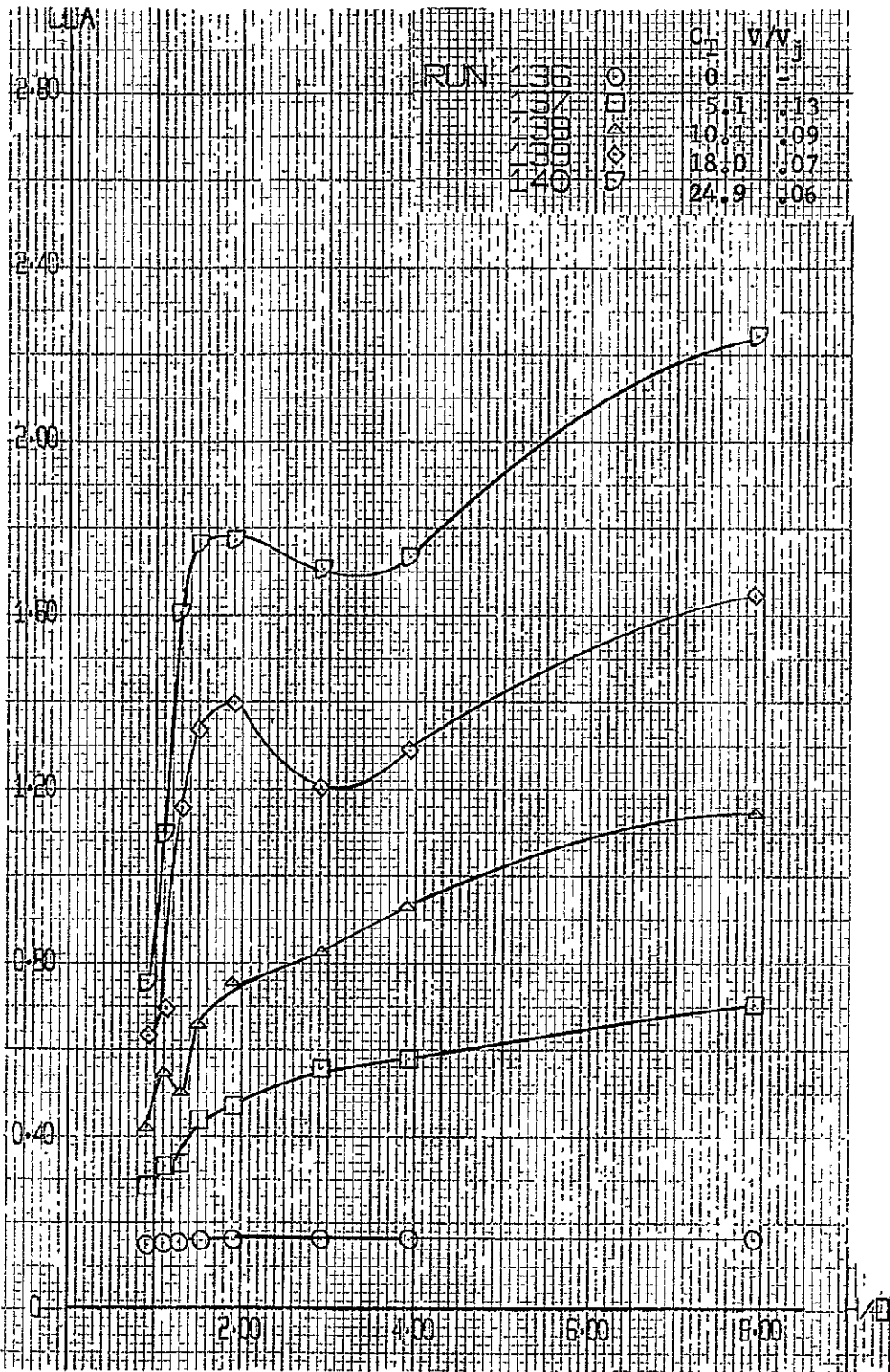


Figure A-38. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

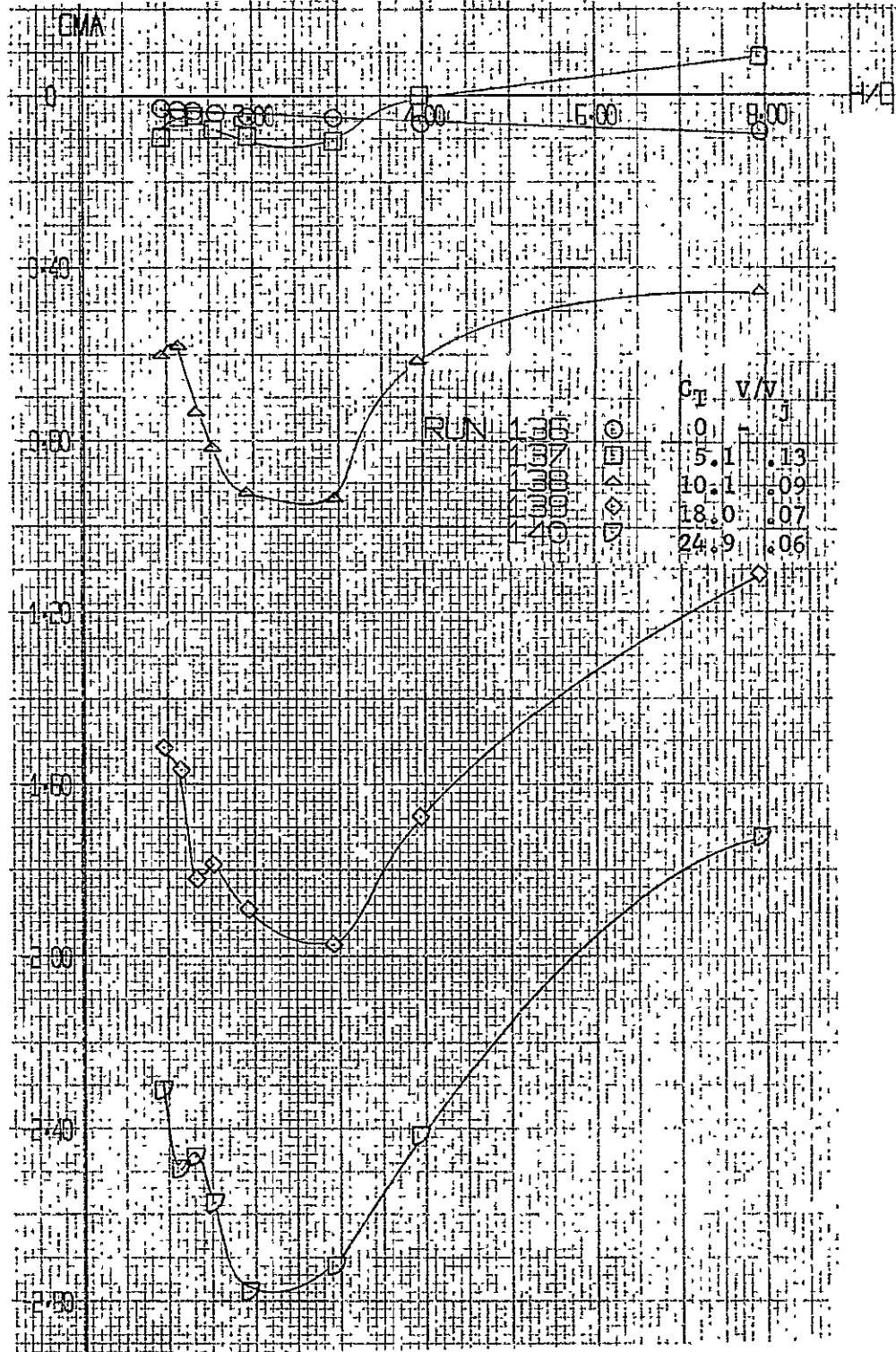


Figure A-38. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

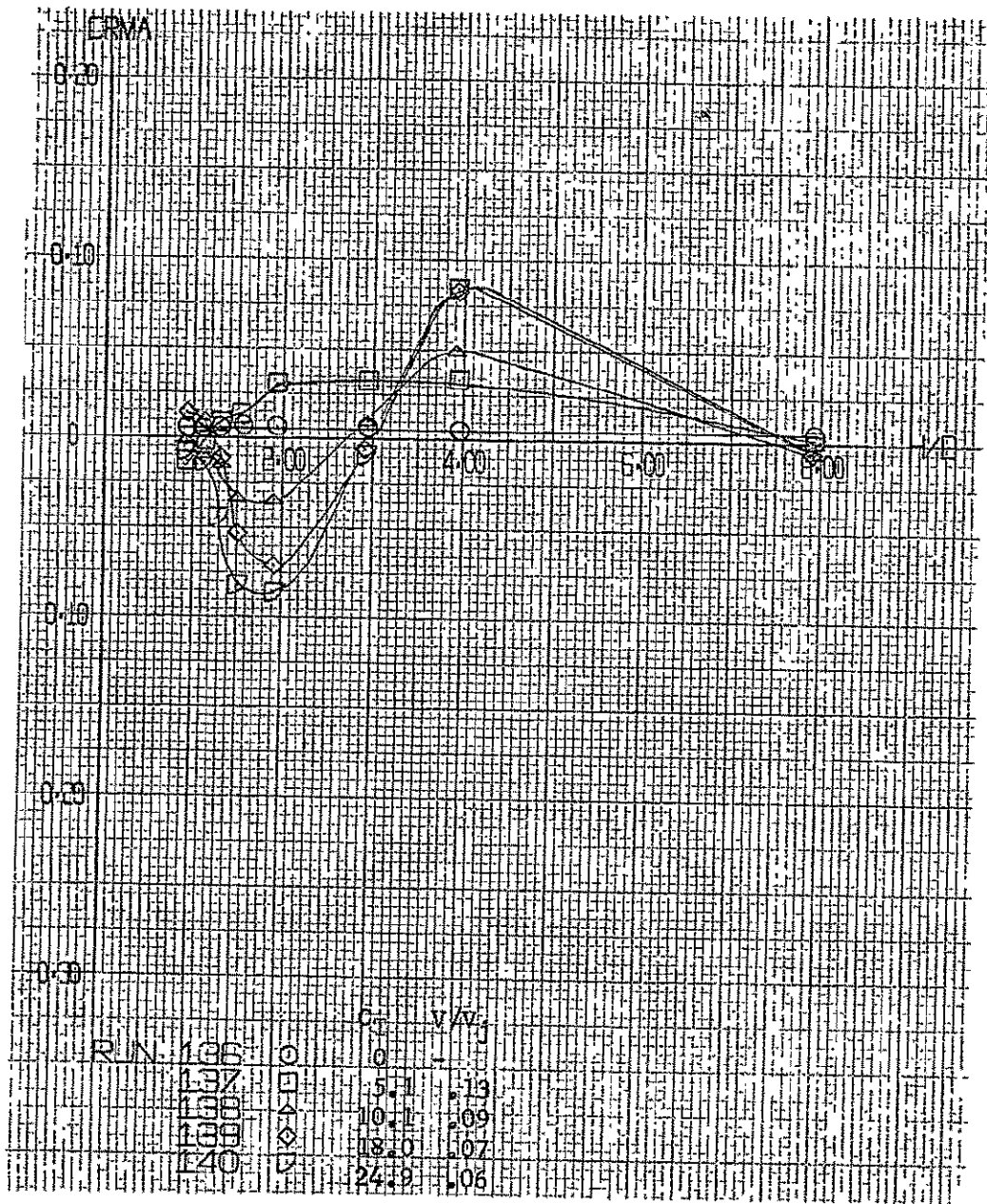


Figure A-38. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Concluded)

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

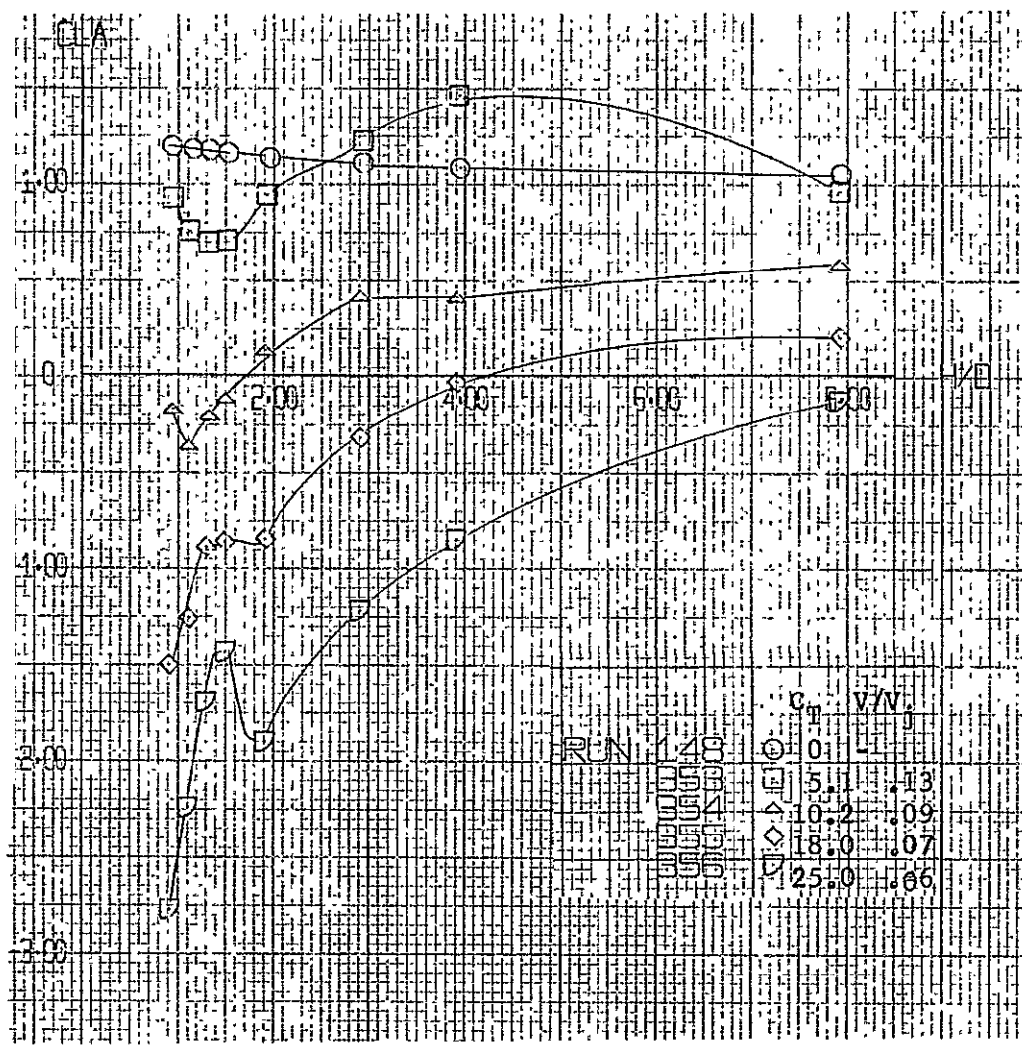


Figure A-39. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

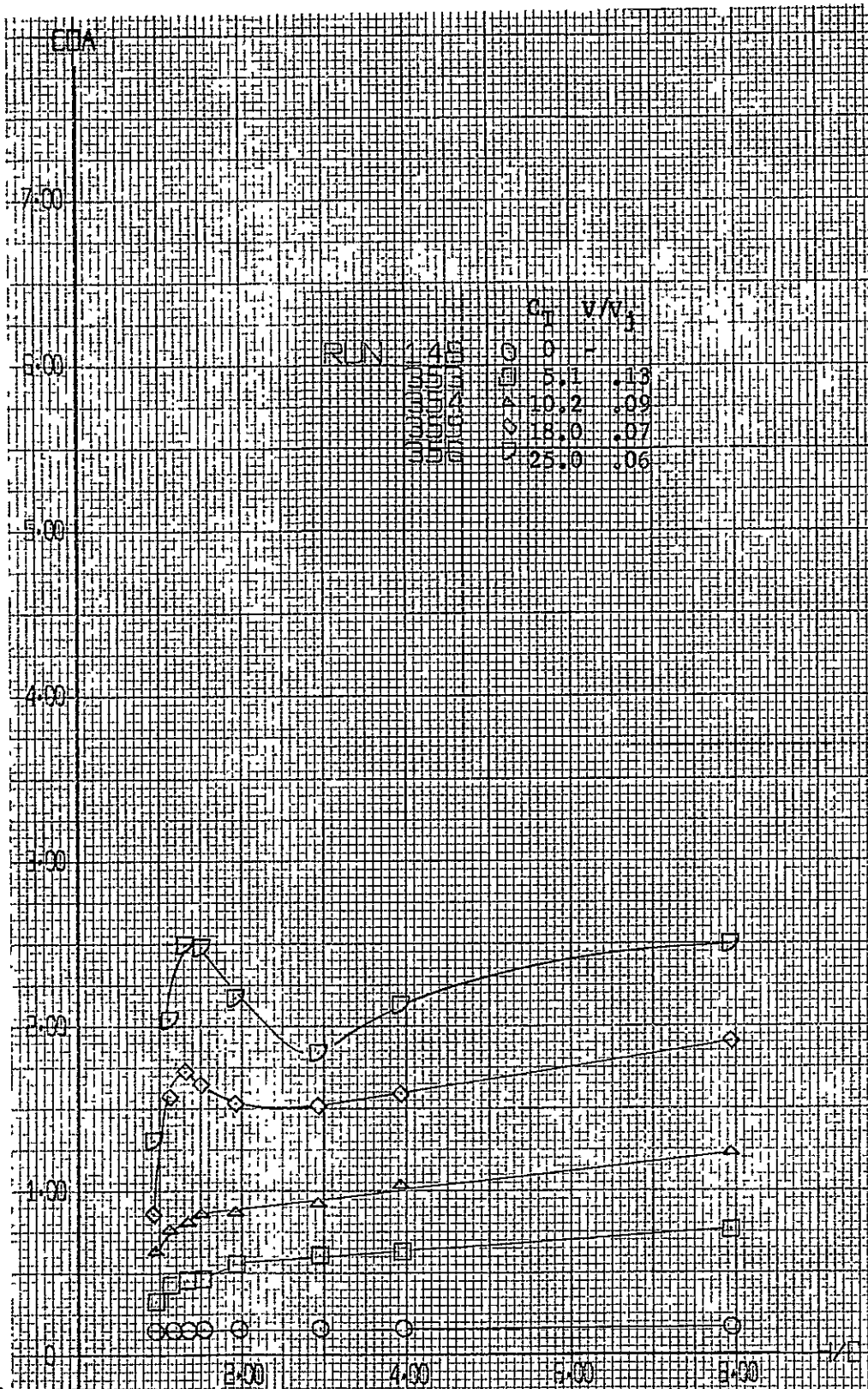


Figure A-39. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

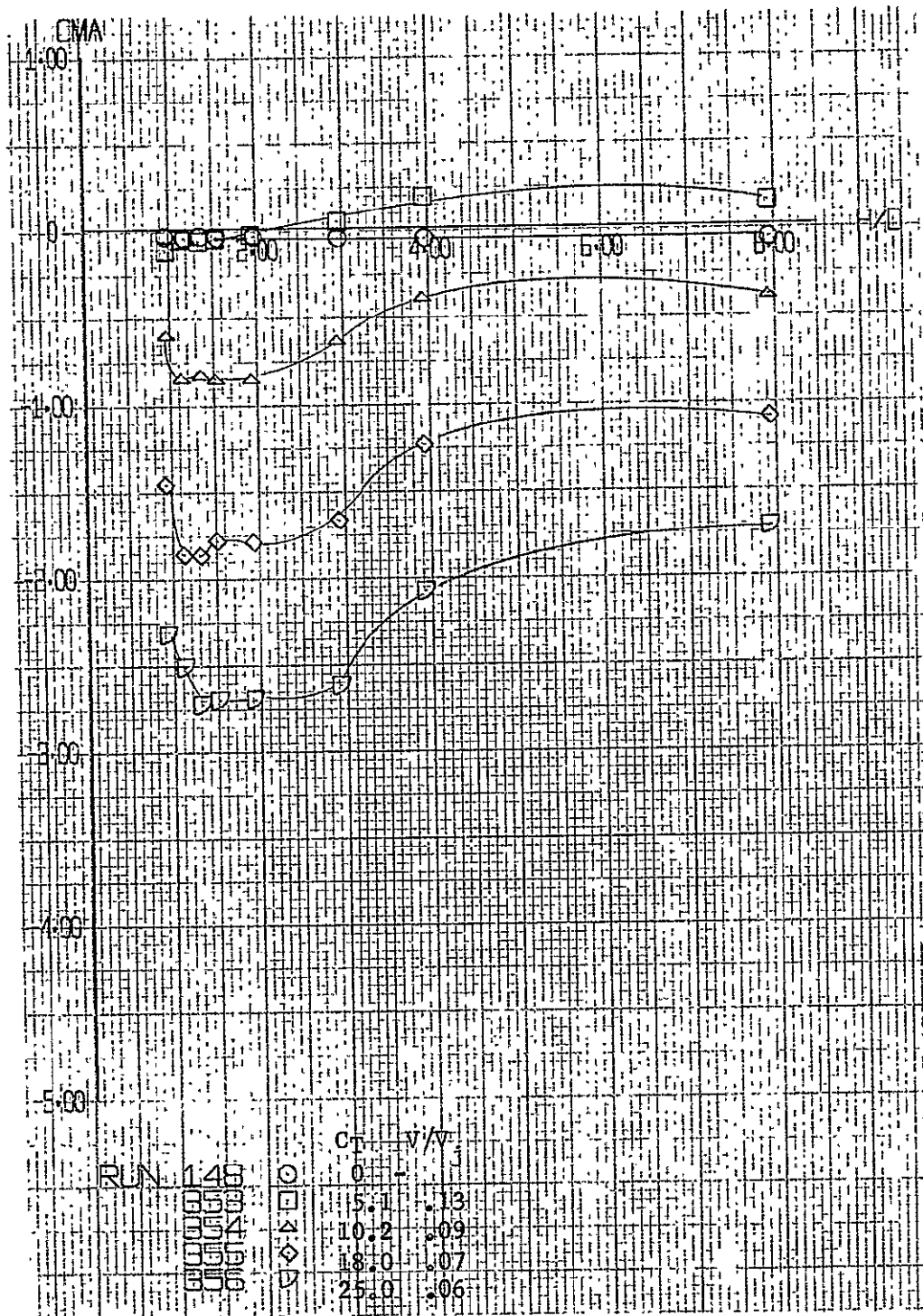


Figure A-39. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

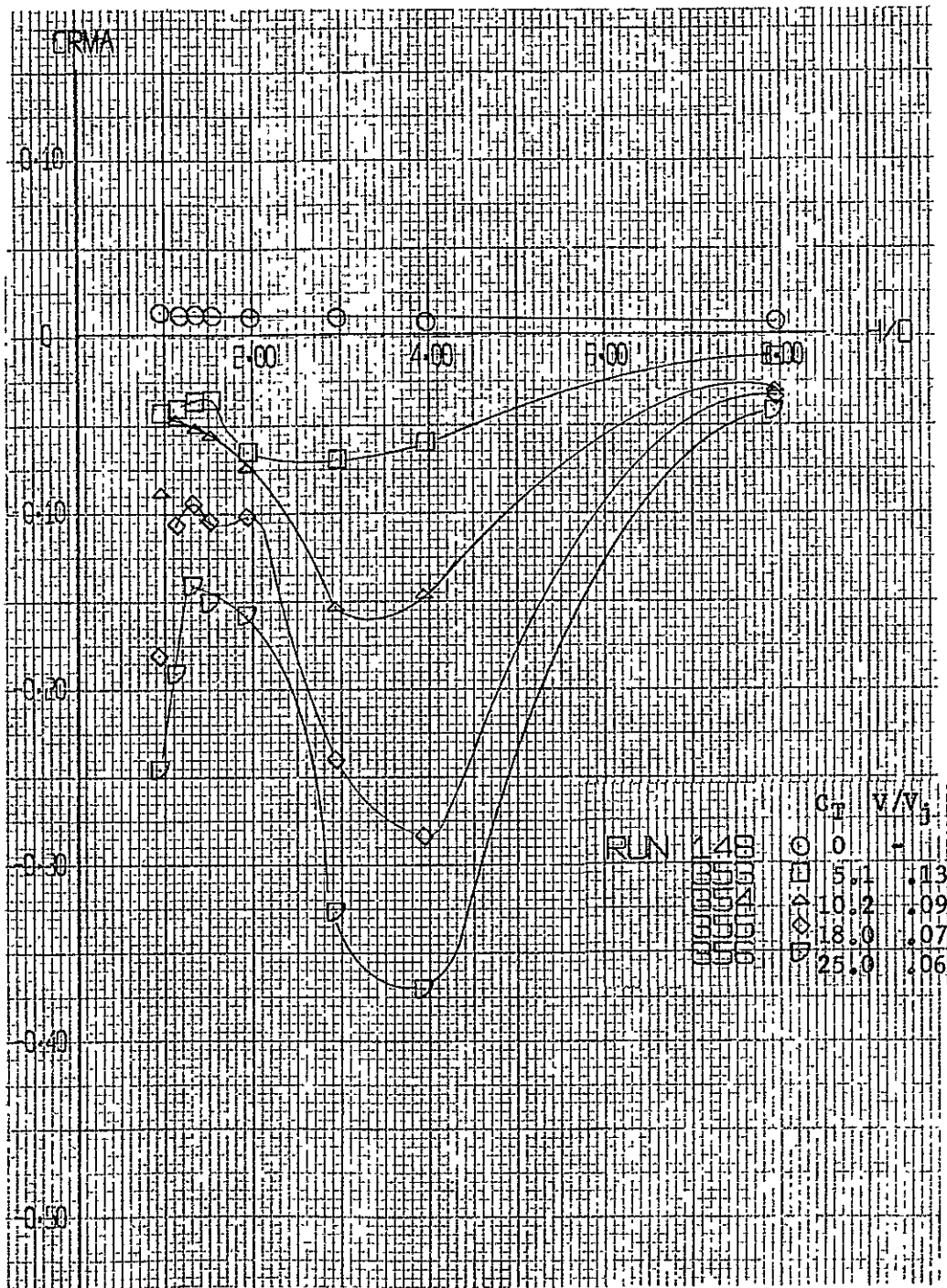


Figure A-39. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Concluded)

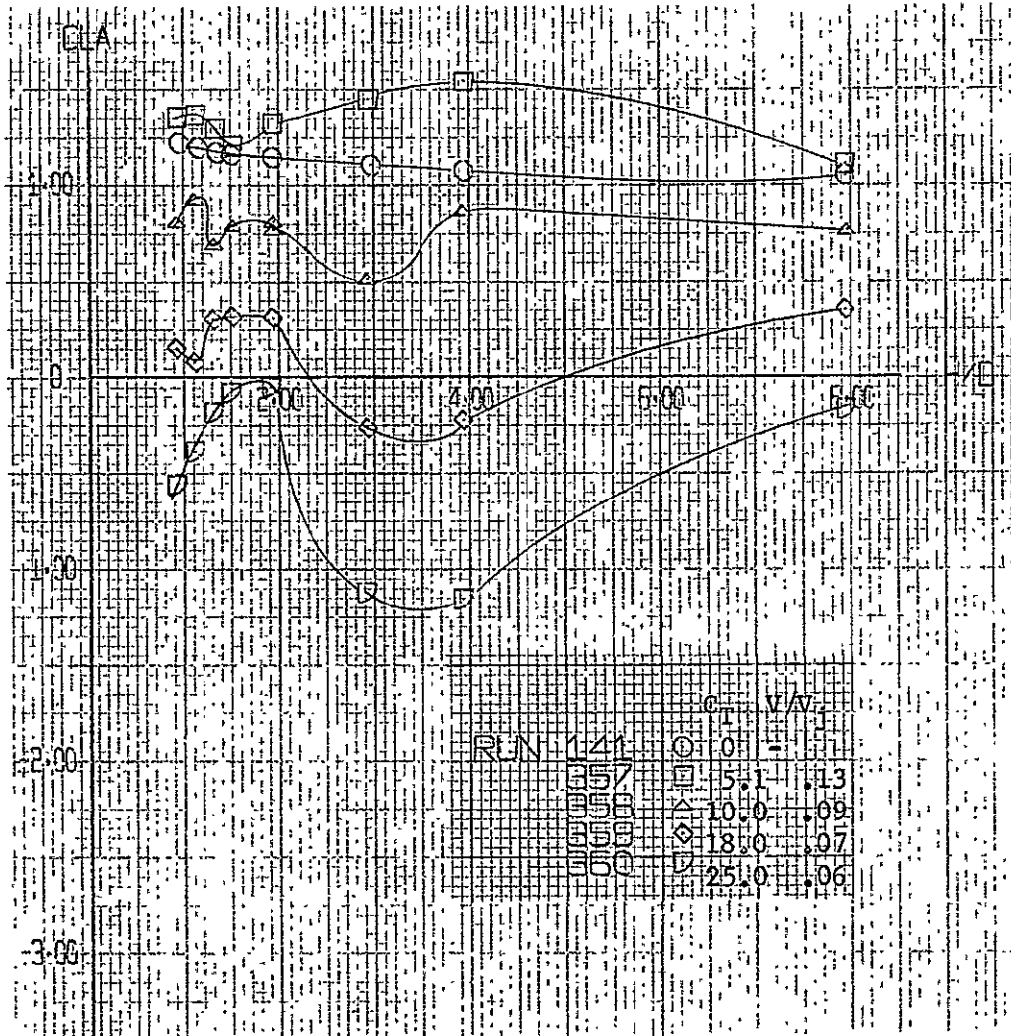


Figure A-40. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_{L0} = .8$, Ground Board Configuration 1, $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$

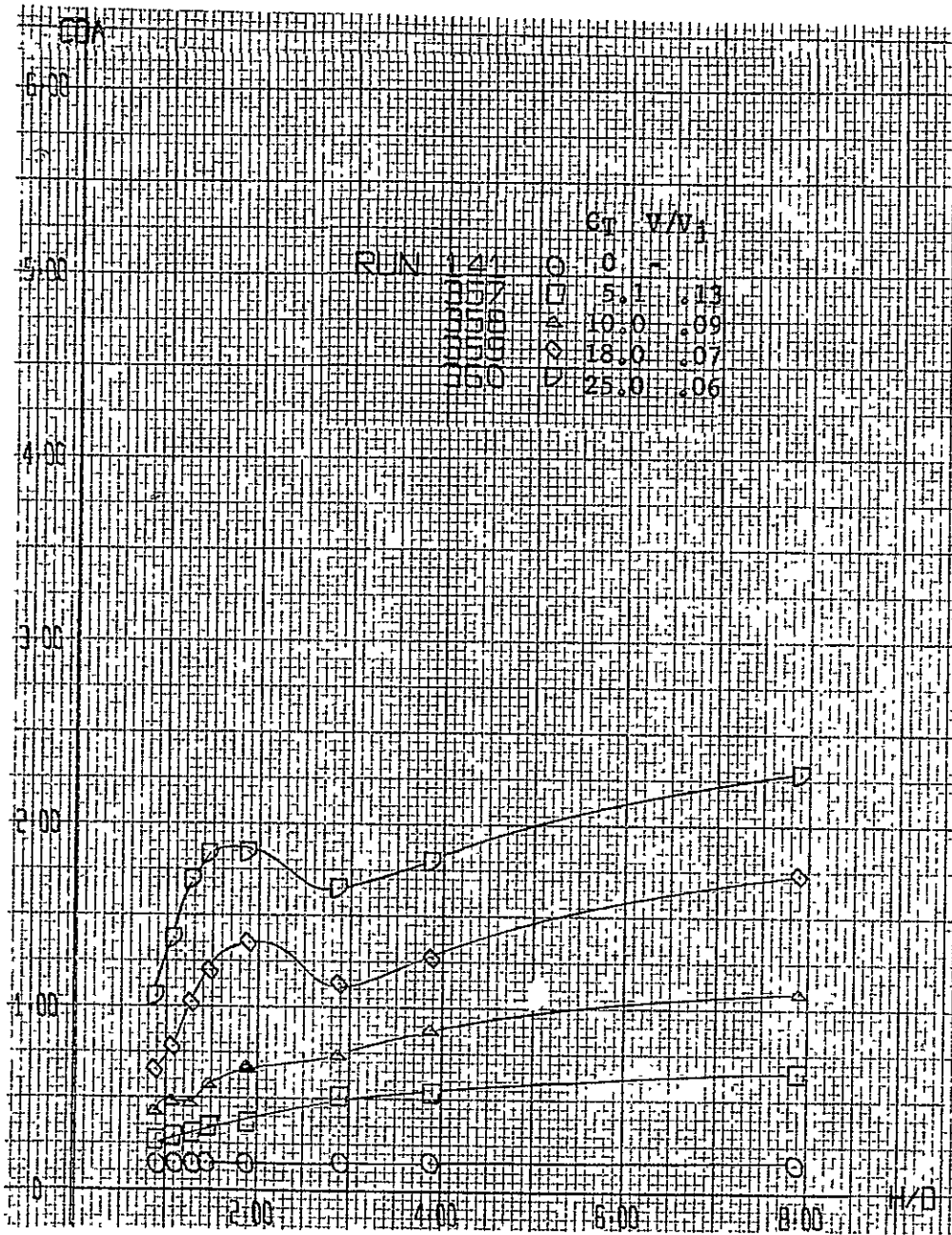


Figure A-40. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1, $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Continued)

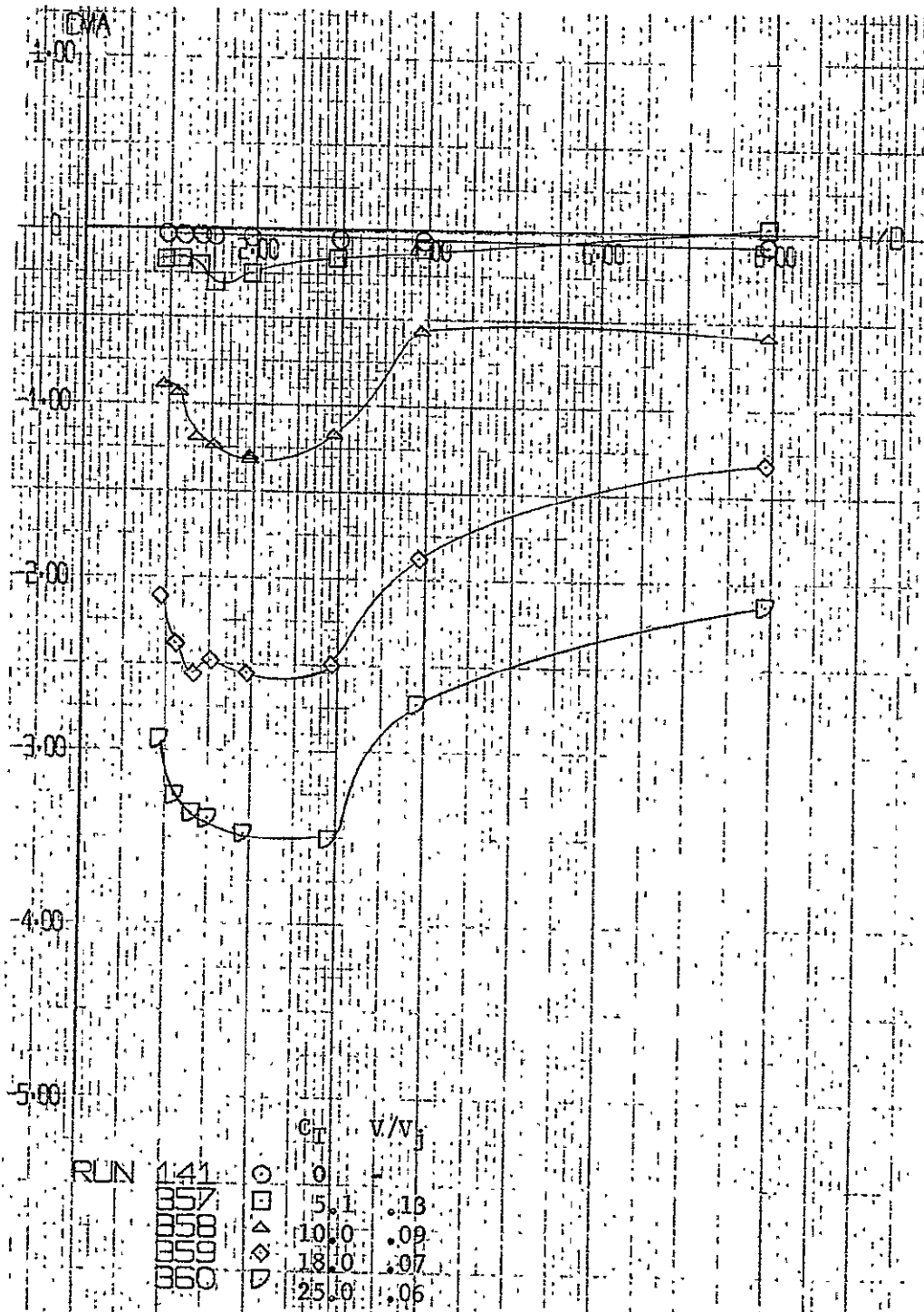


Figure A-40. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1, $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

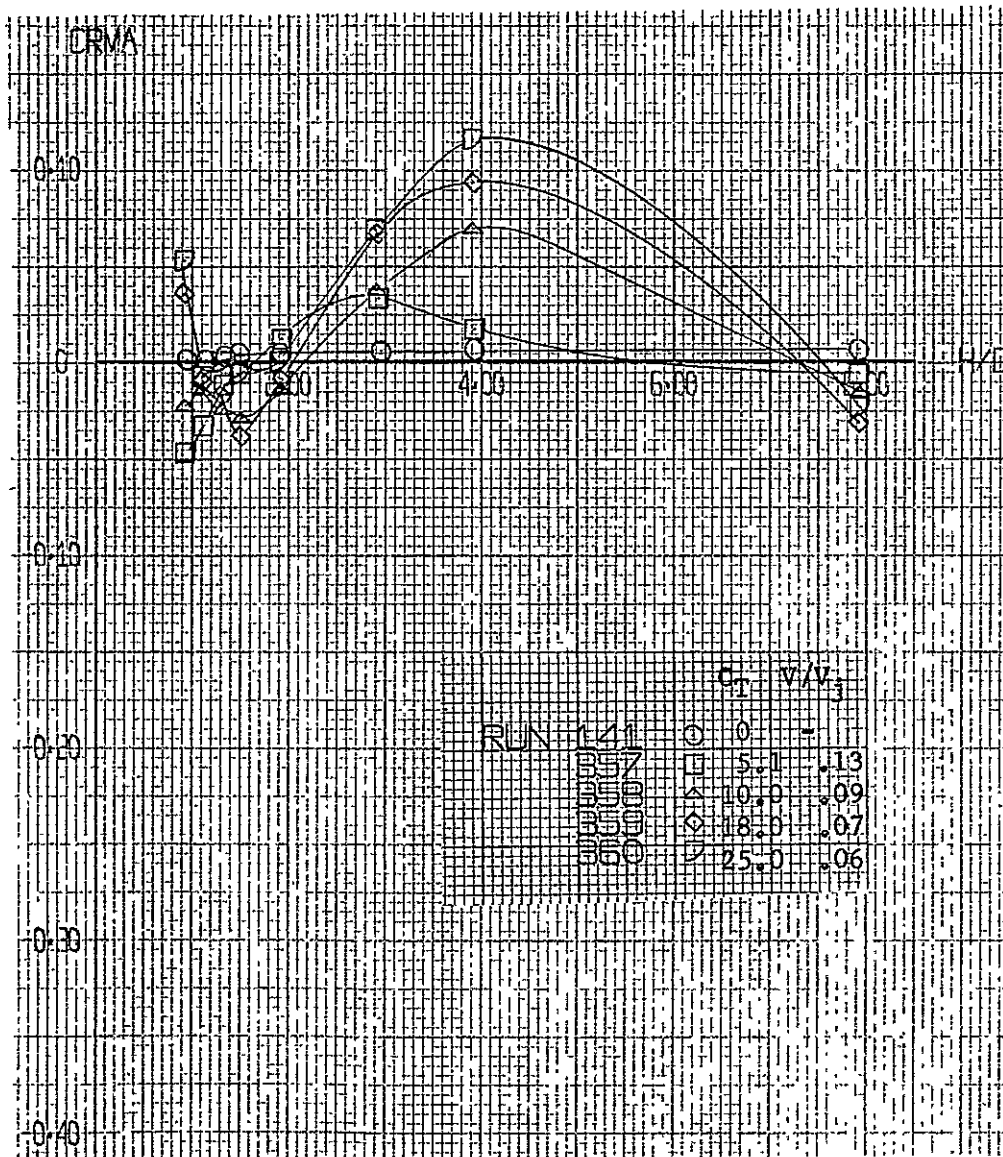


Figure A-40. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1, $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Concluded)

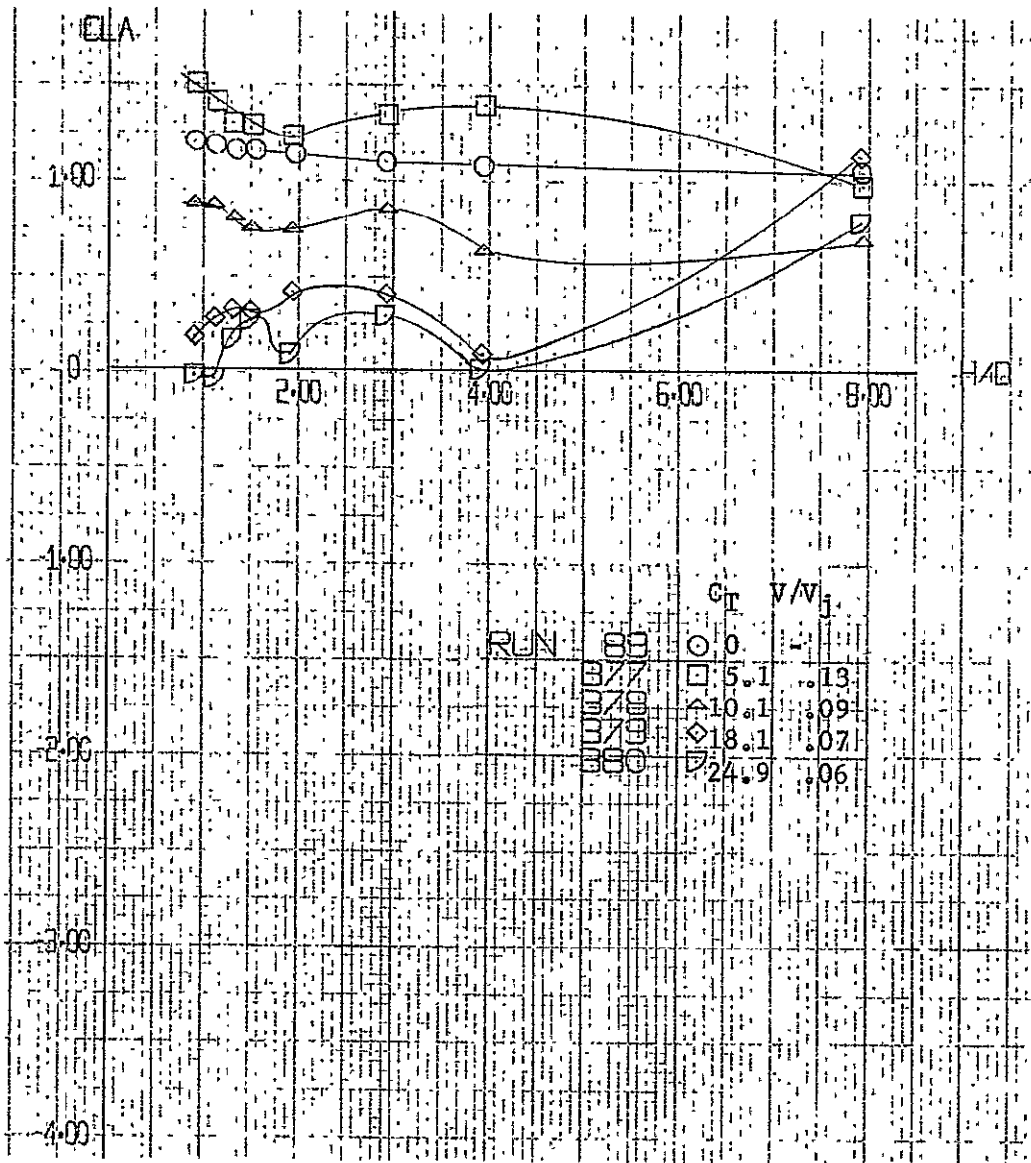


Figure A-41. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

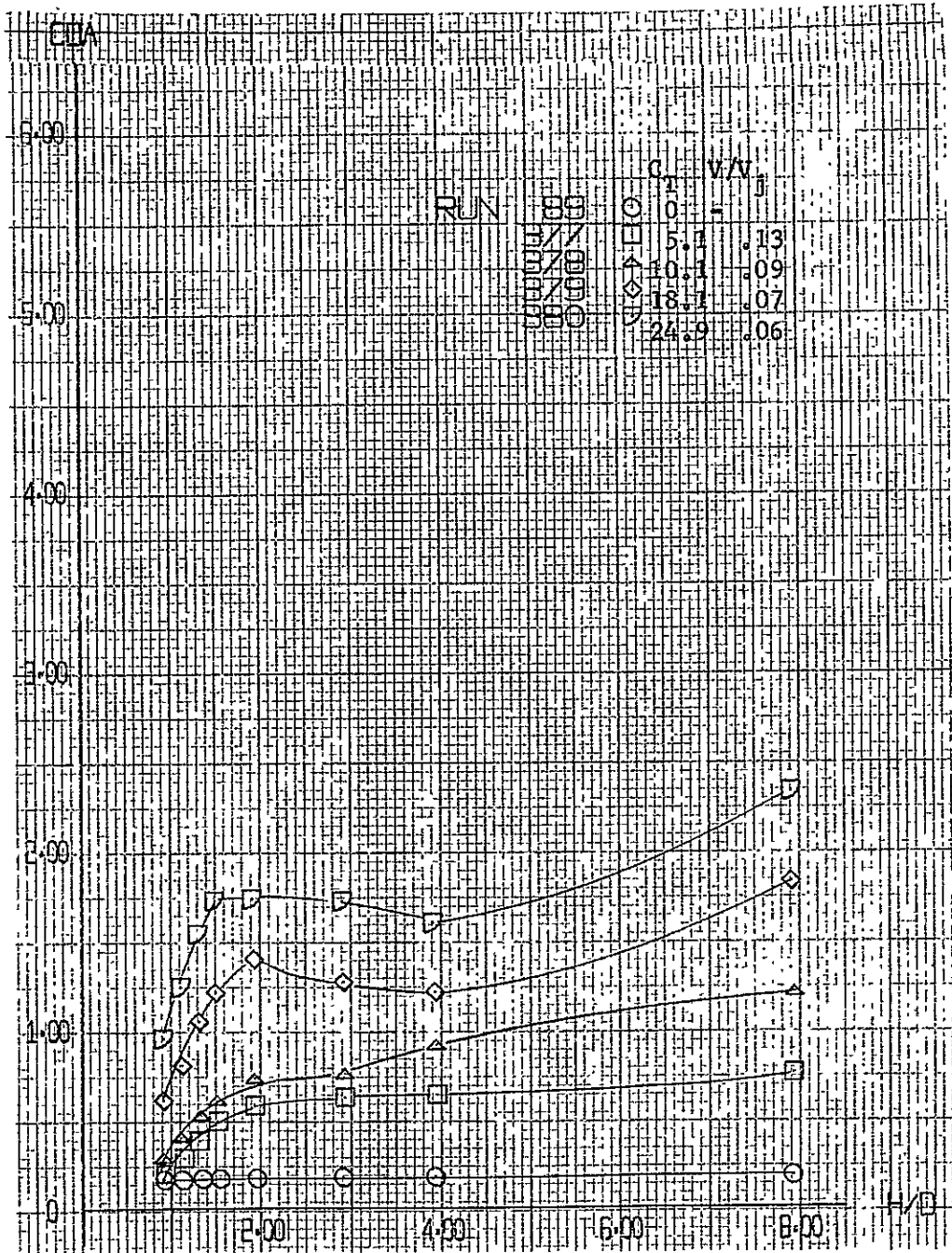


Figure A-41. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

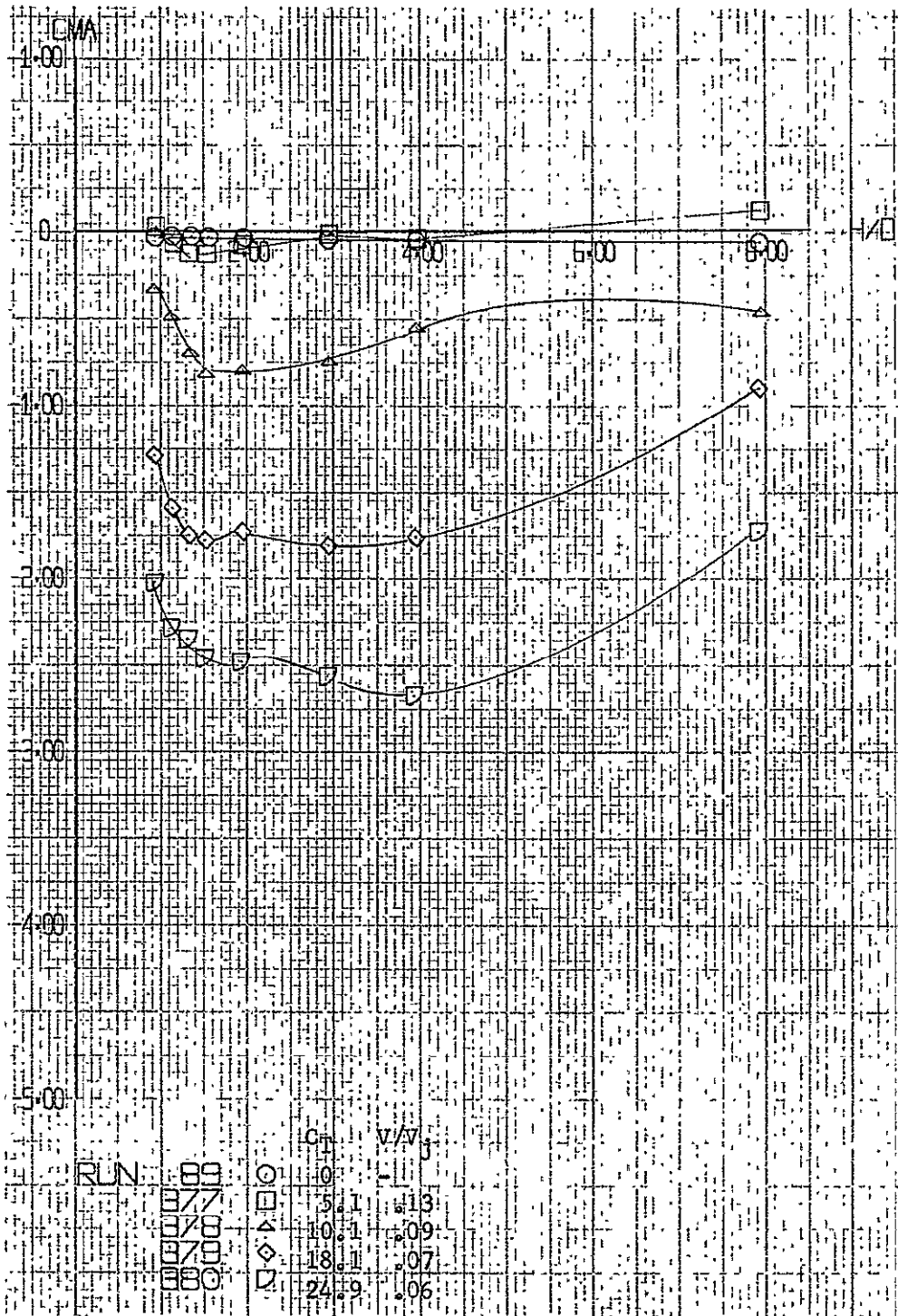


Figure A-41. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_{L0} = .8$, Ground Board Configuration 1, $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

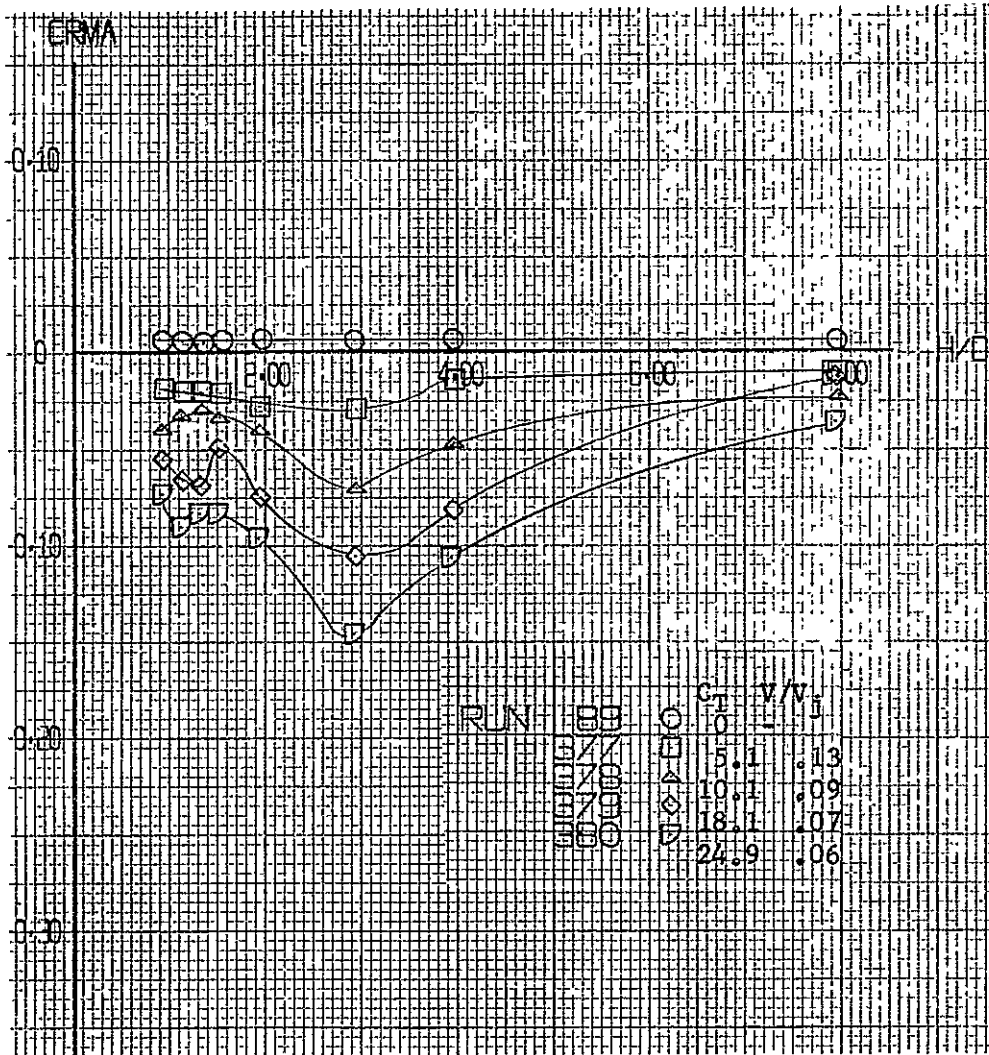


Figure A-41. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1, $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

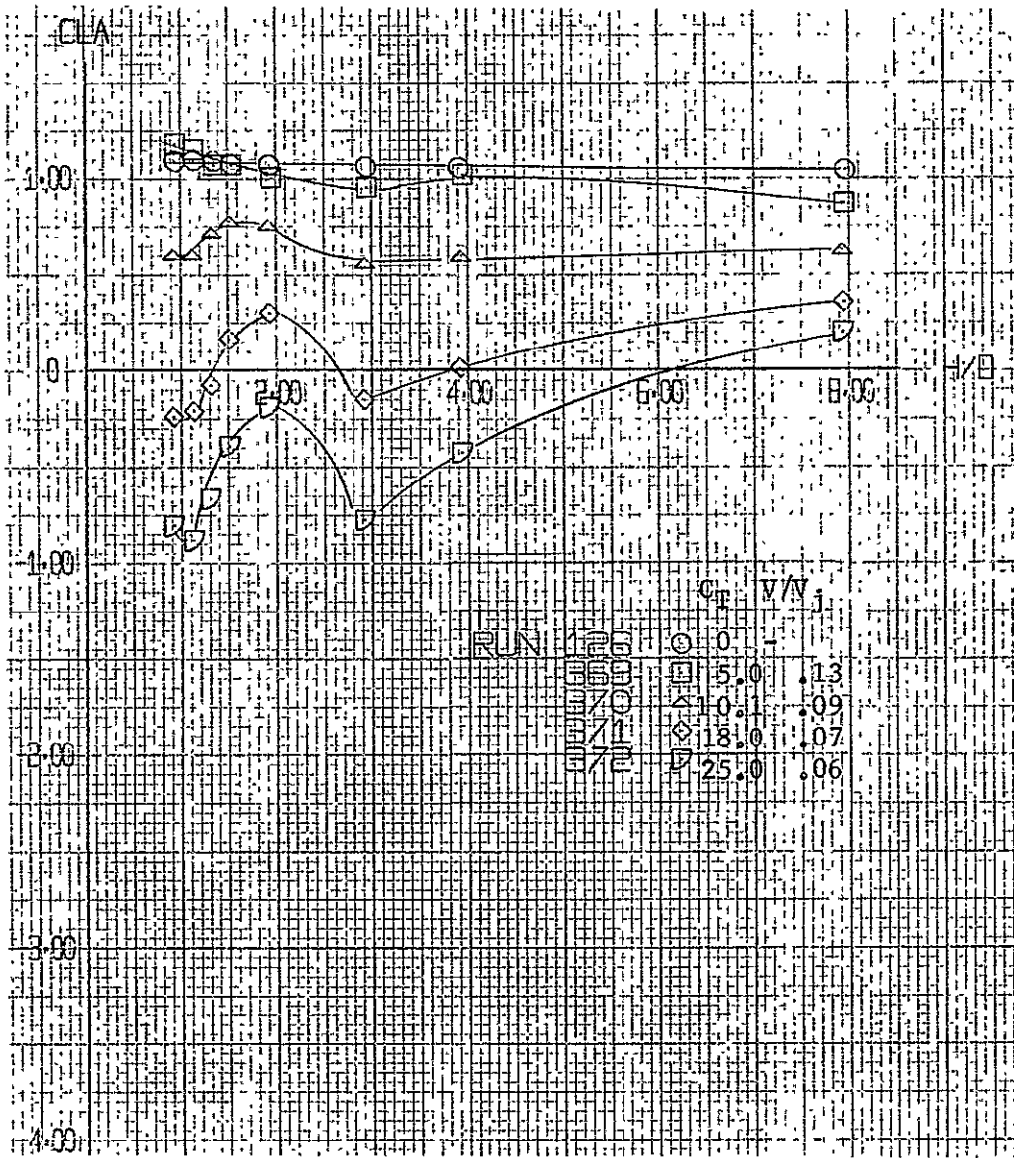


Figure A-42. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

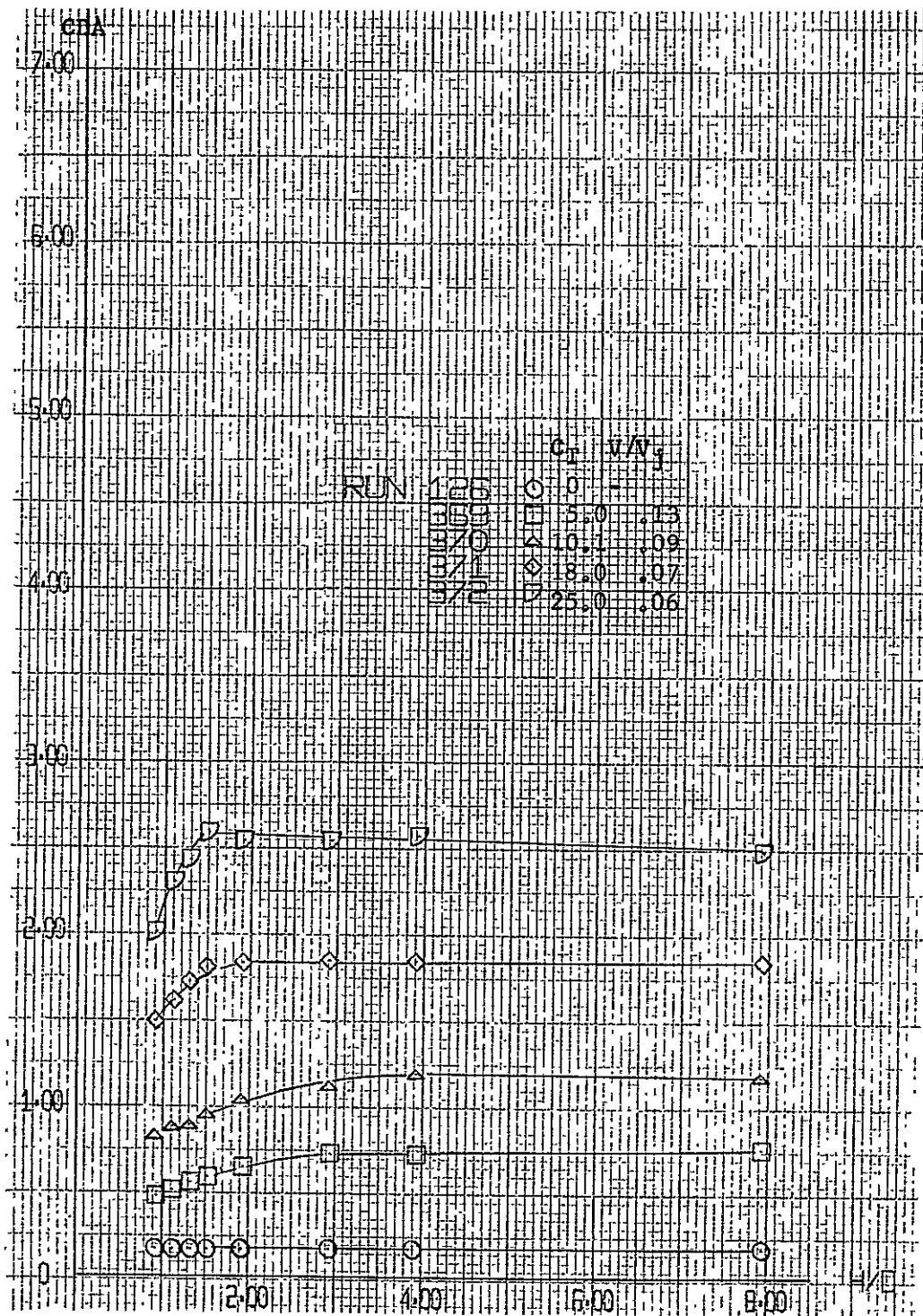


Figure A-42. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_{L0} = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

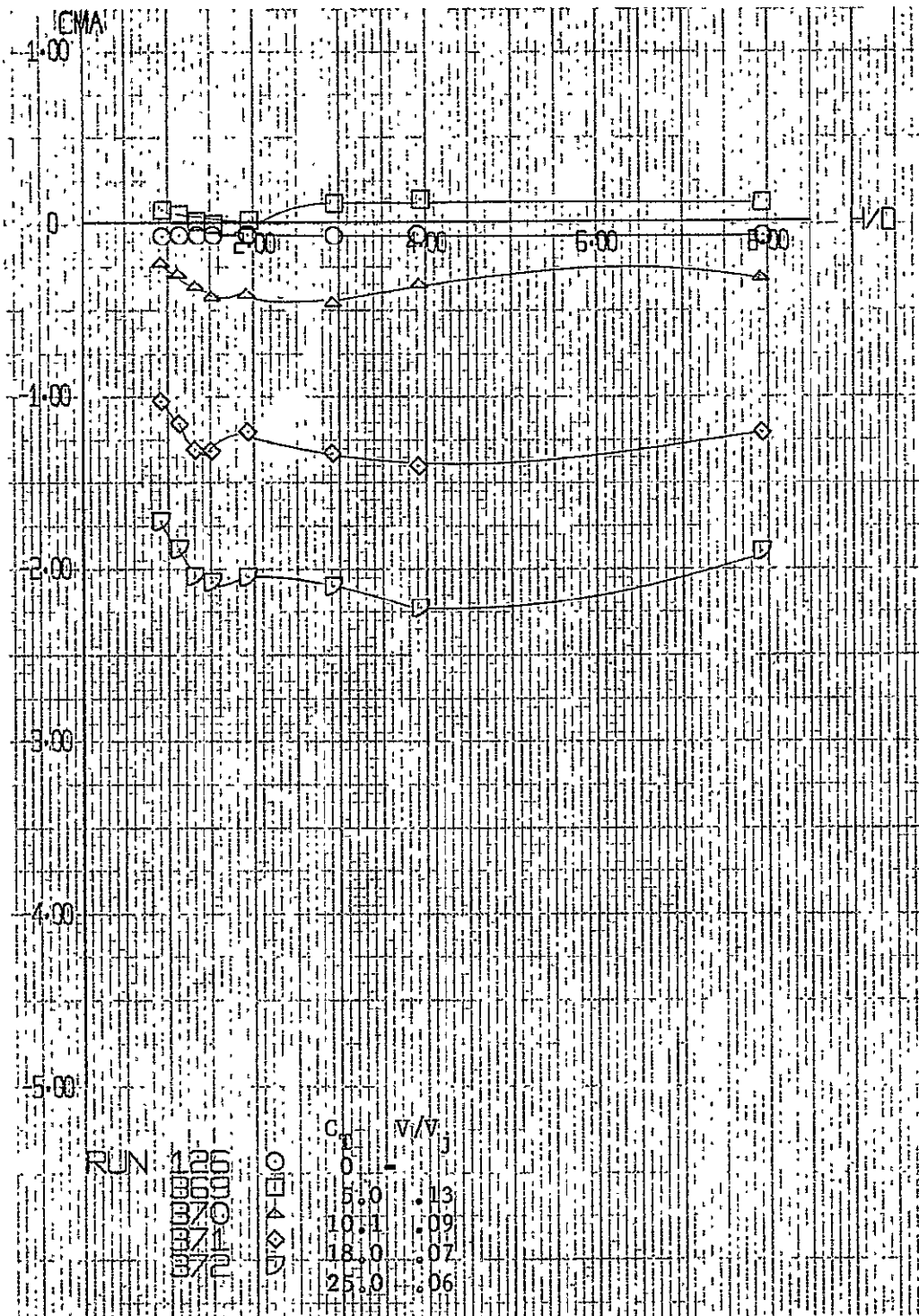


Figure A-42. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

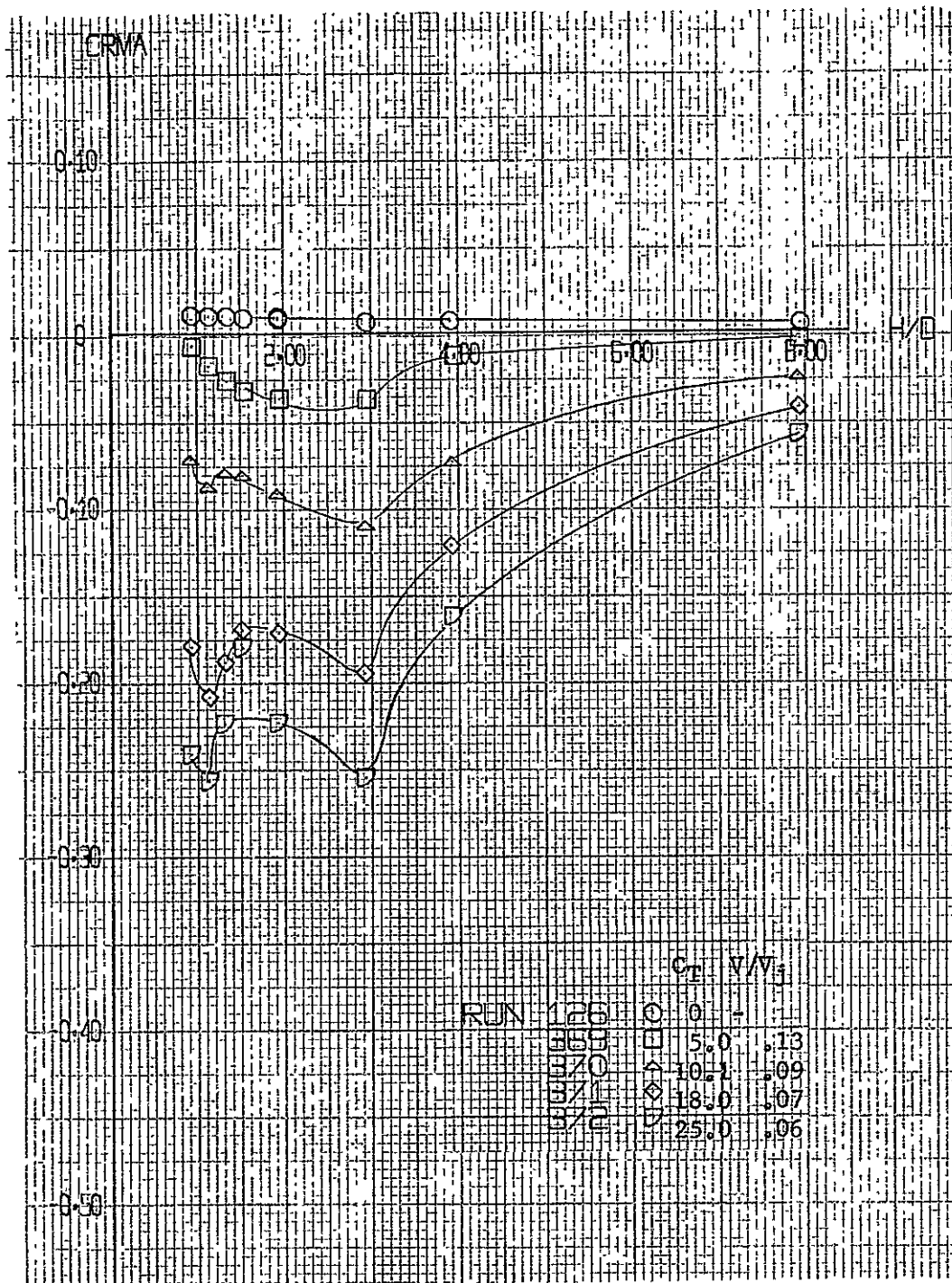


Figure A-42. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

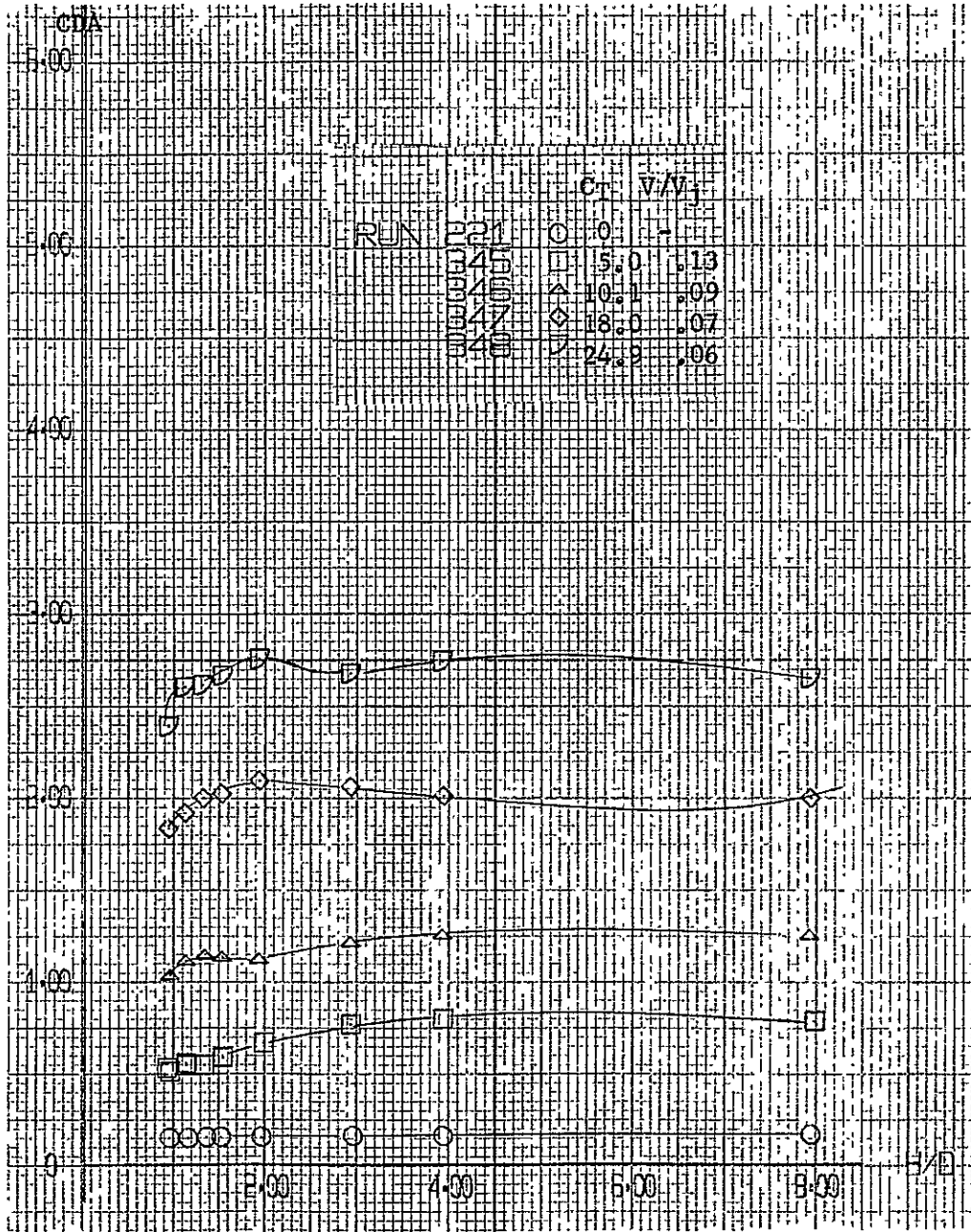


Figure A-43. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

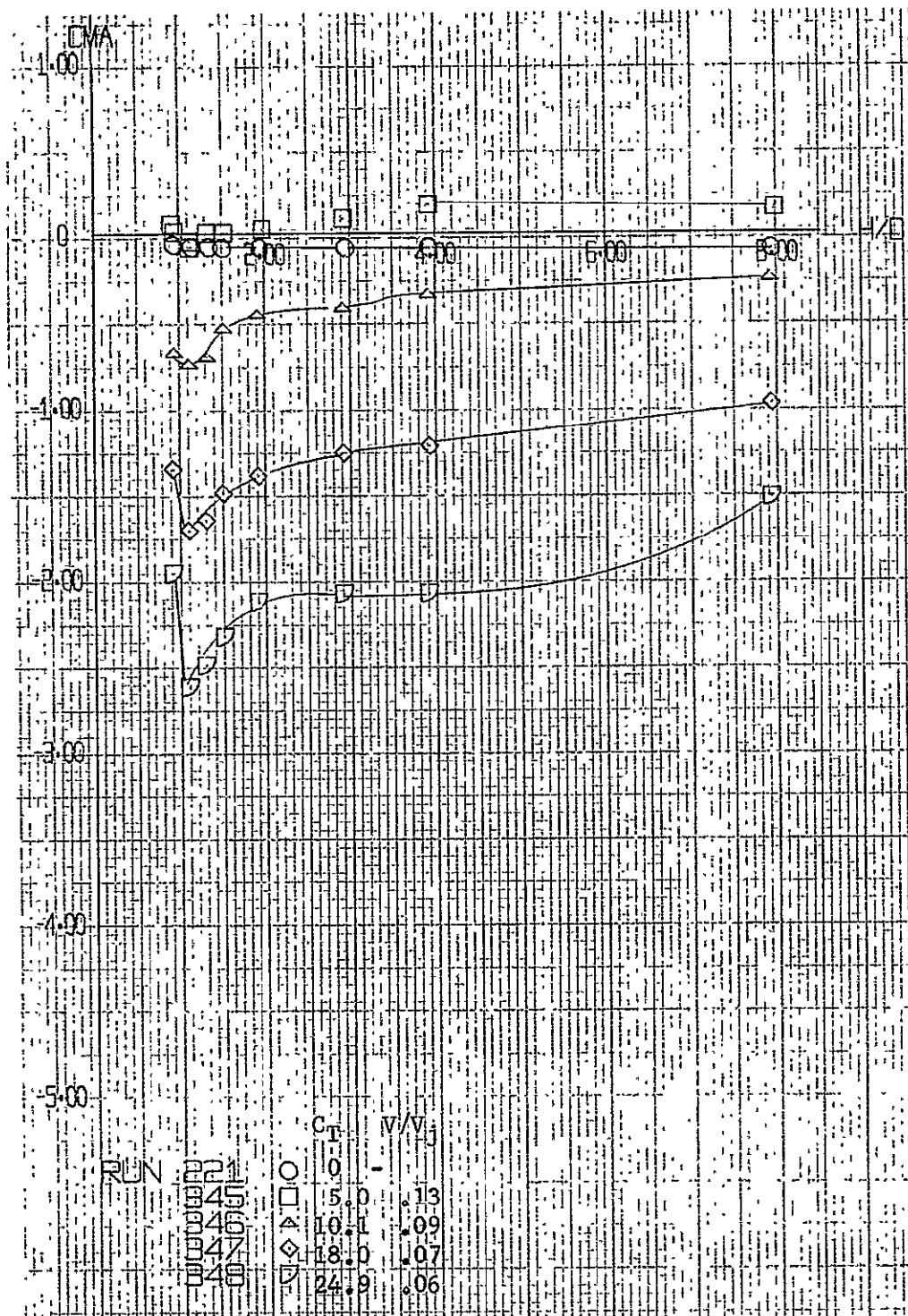


Figure A-43. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

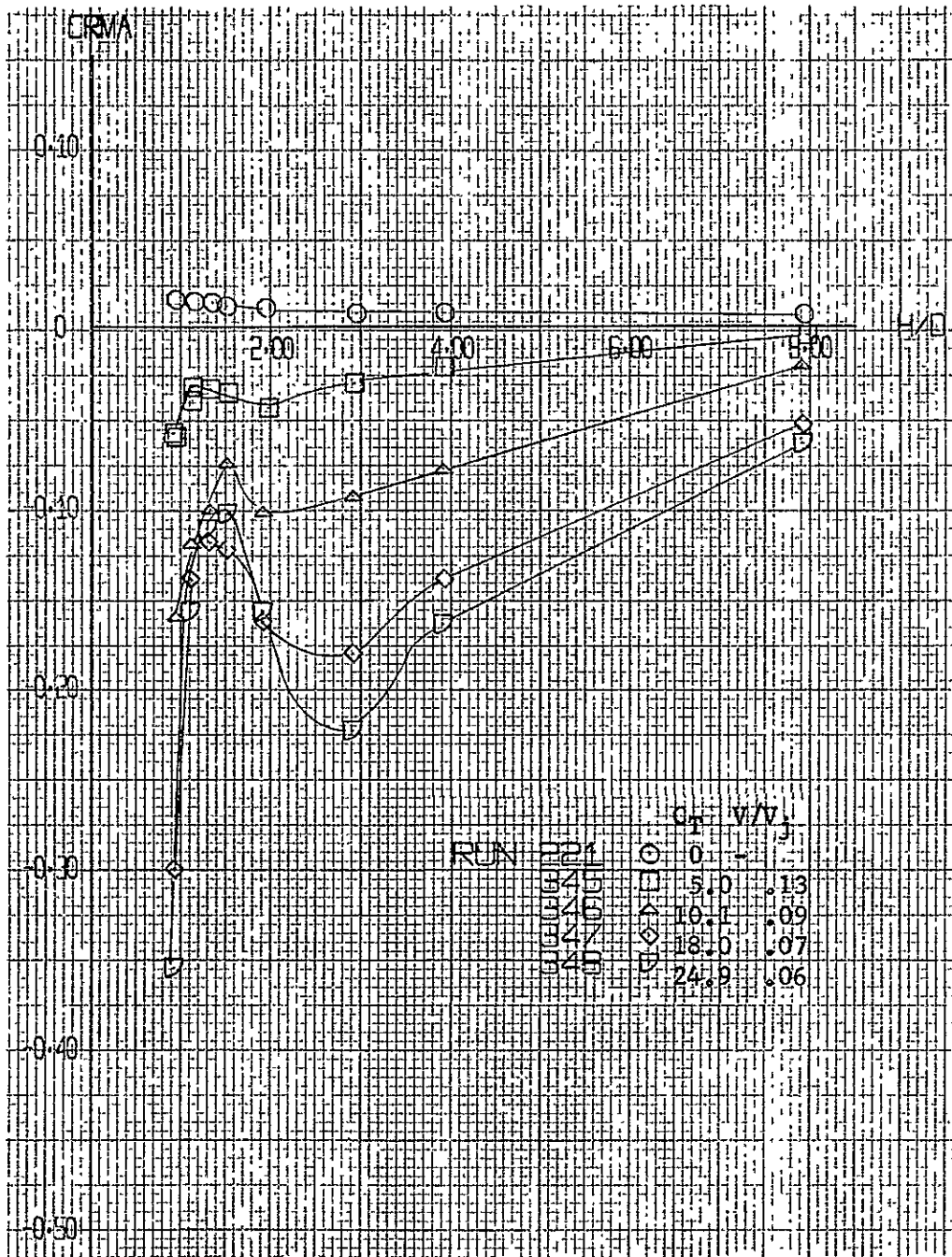


Figure A-43. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_{I_0} = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Concluded)

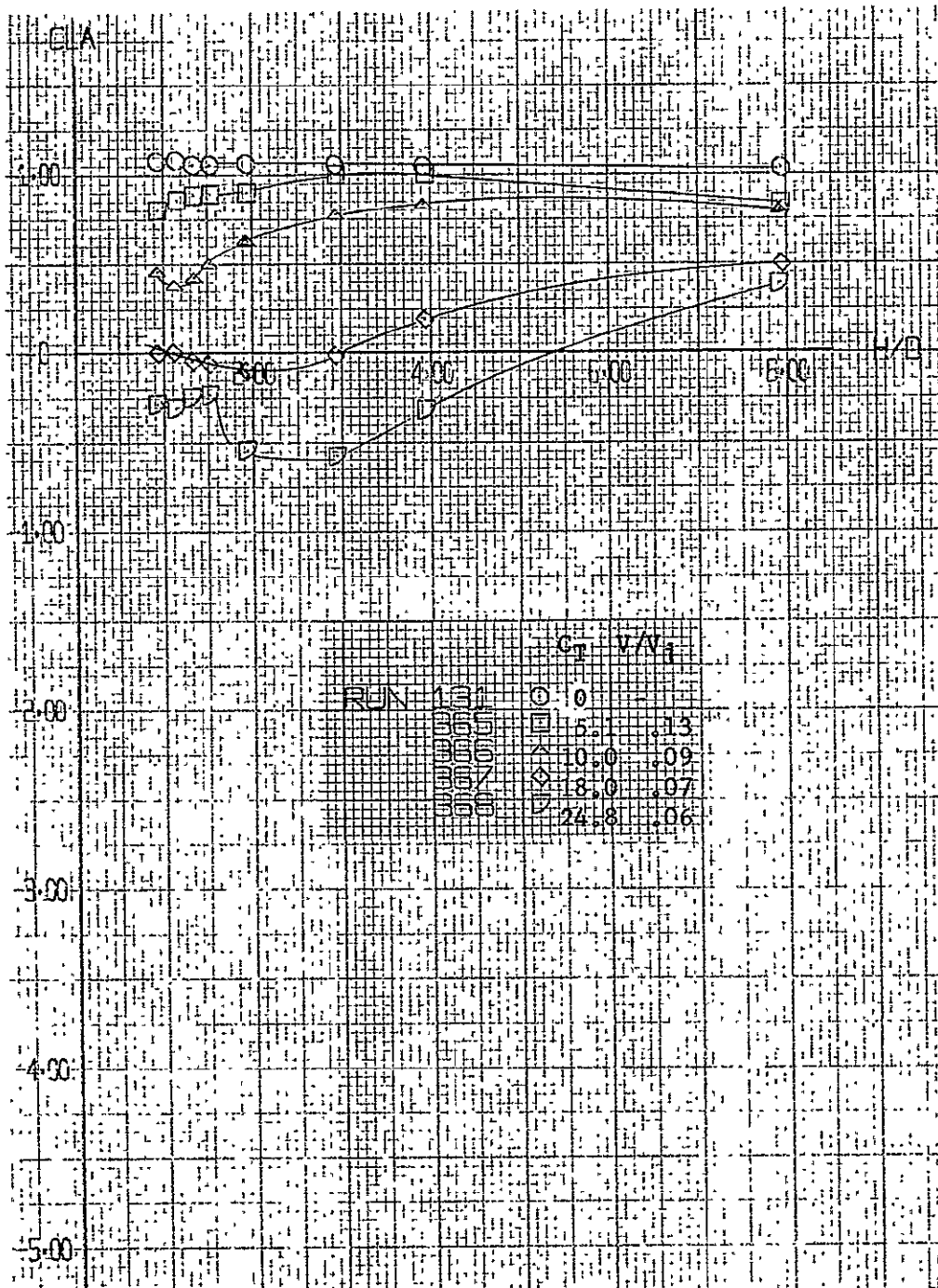


Figure A-44. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$

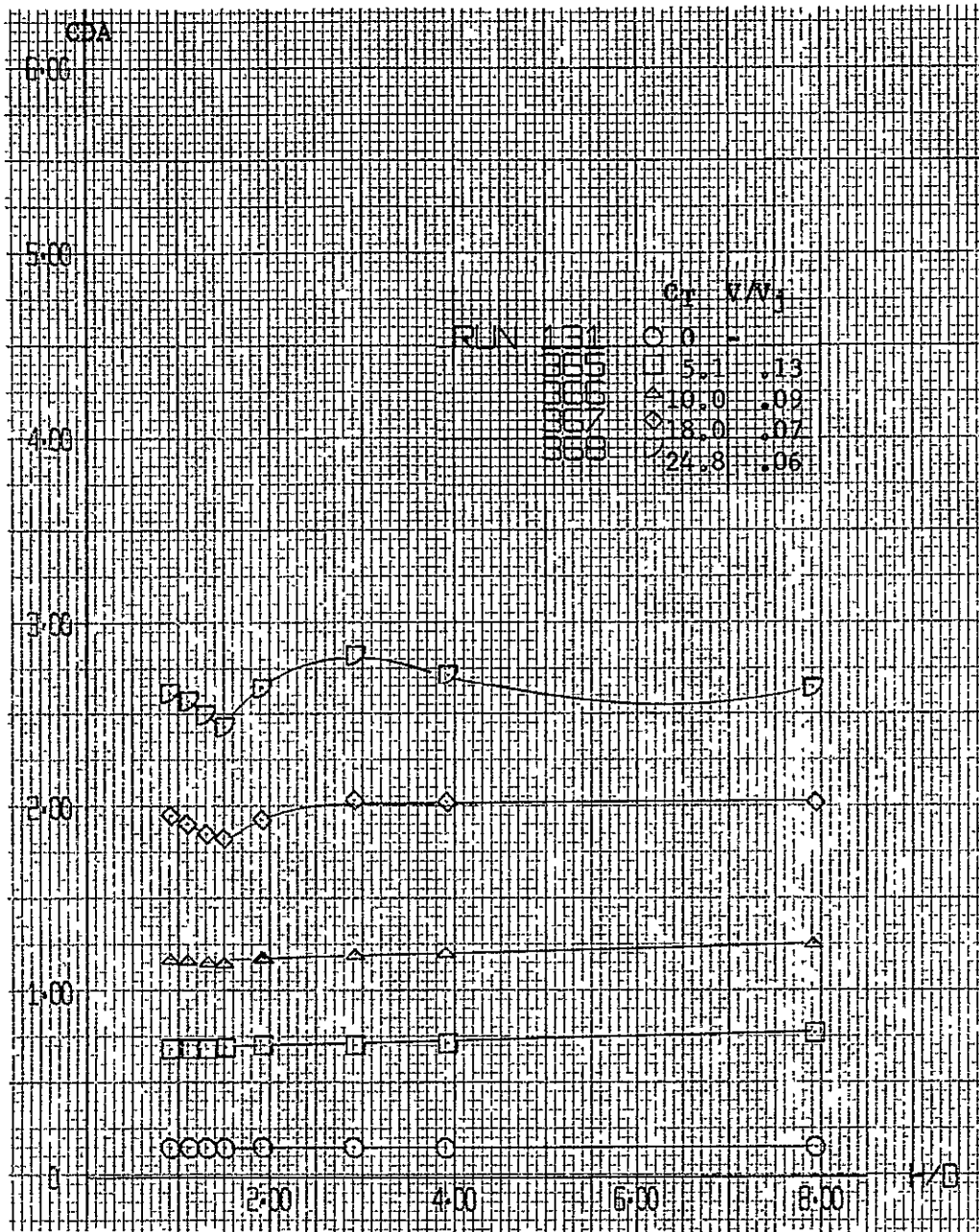


Figure A-44. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Continued)

ORIGINAL PAGE IS
OF POOR QUALITY

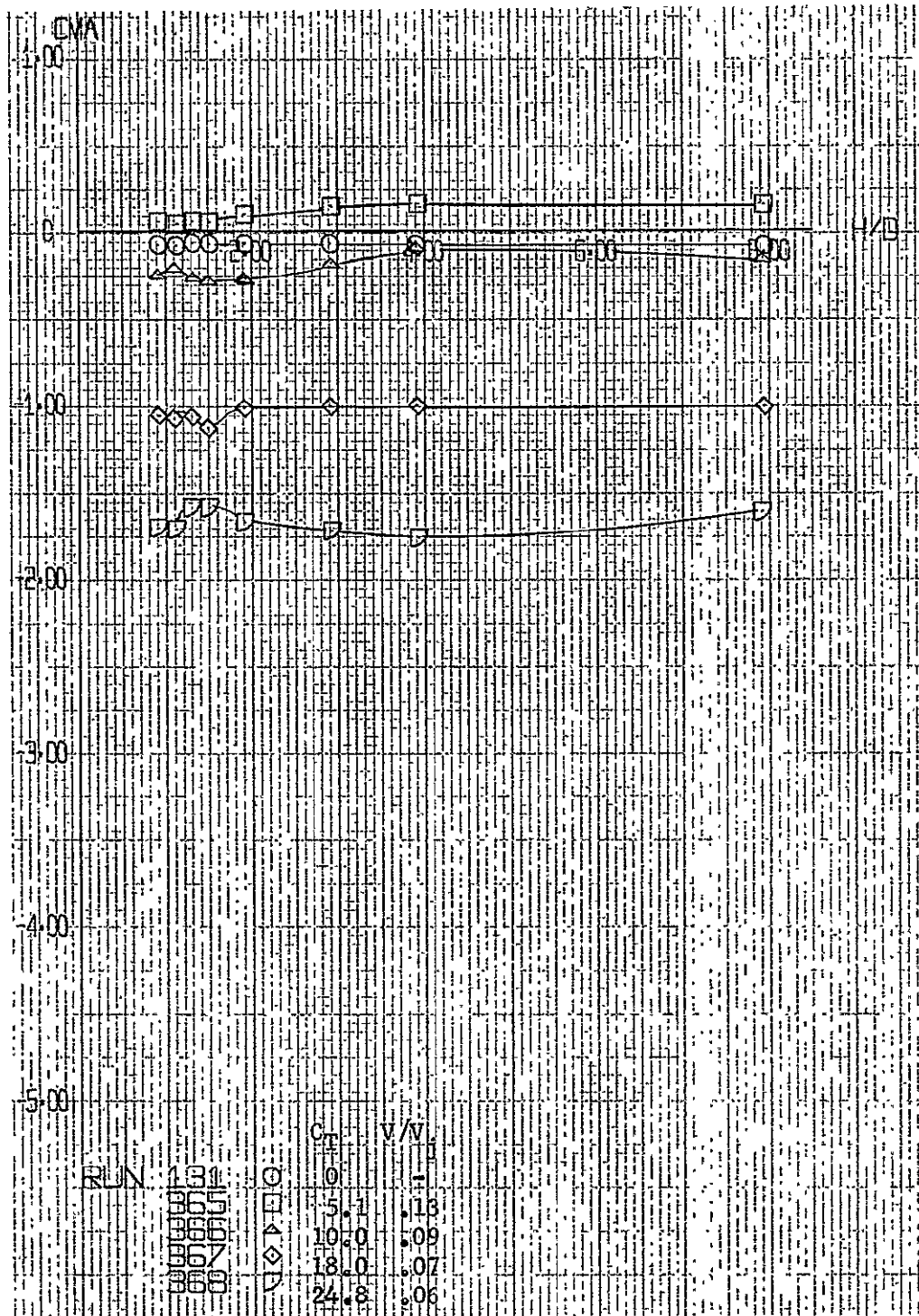


Figure A-44. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

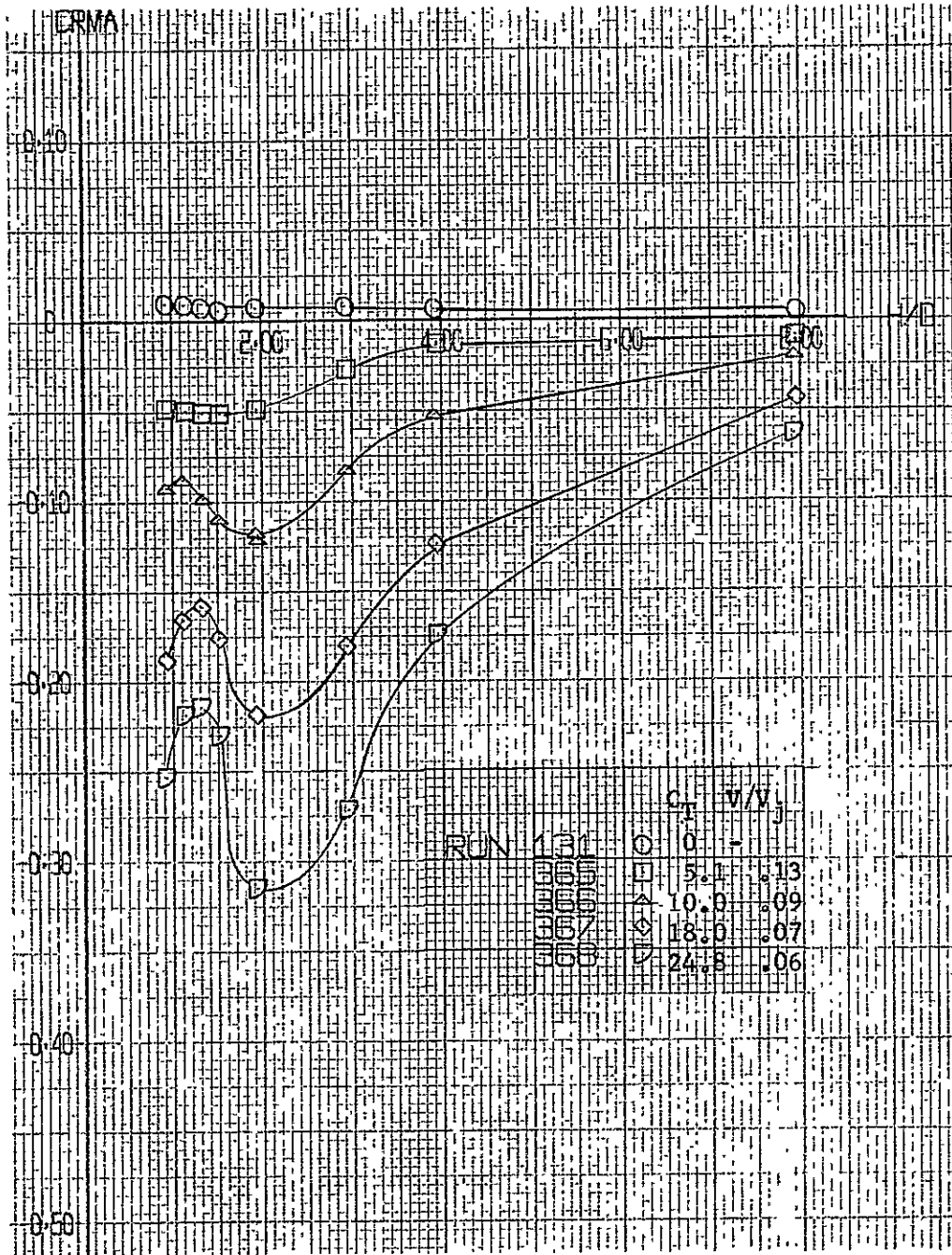


Figure A-44. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Concluded)

...PRODUCTIBILITY OF THE ORIGINAL PAGE IS POOR

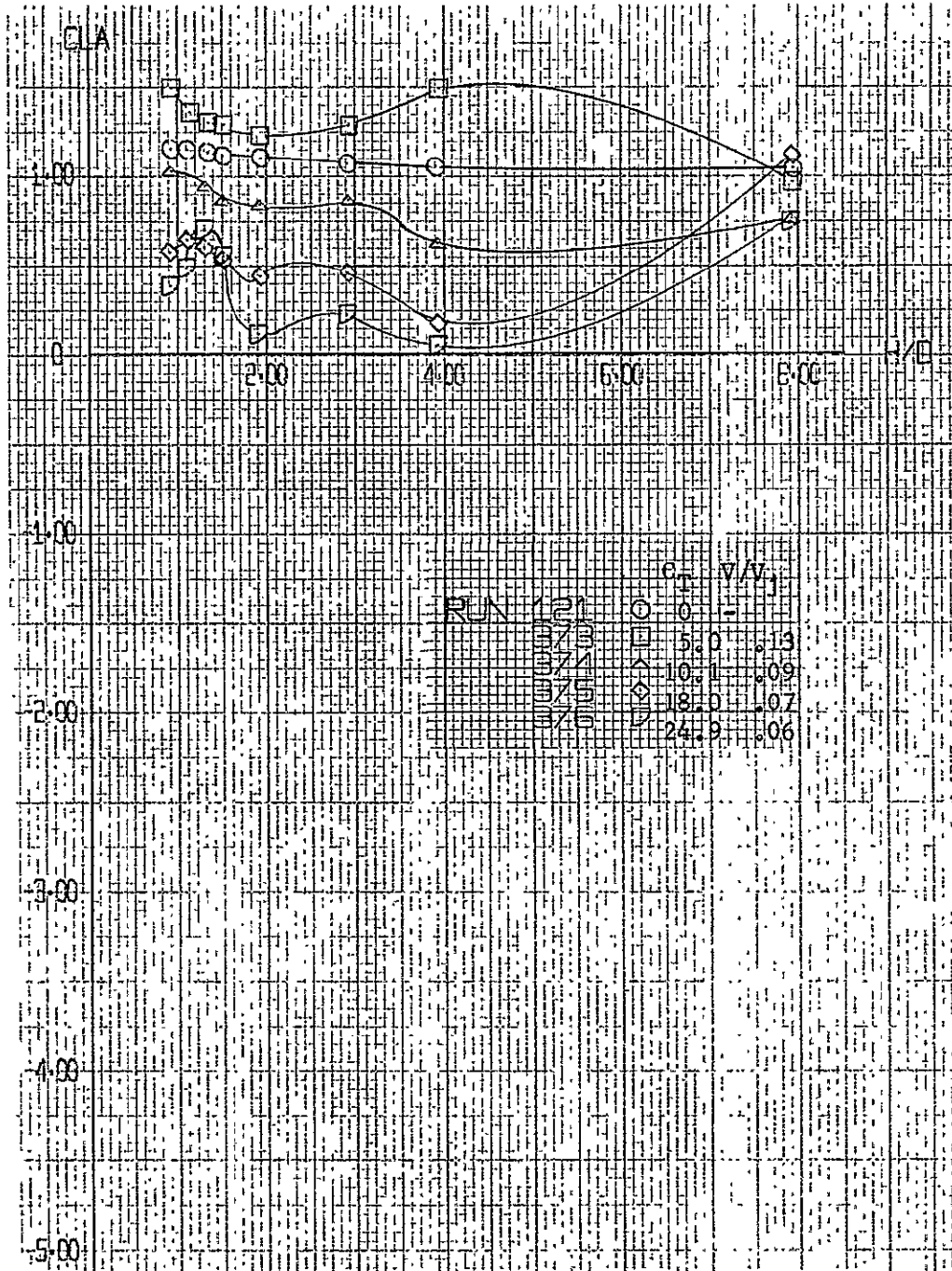


Figure A-45. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

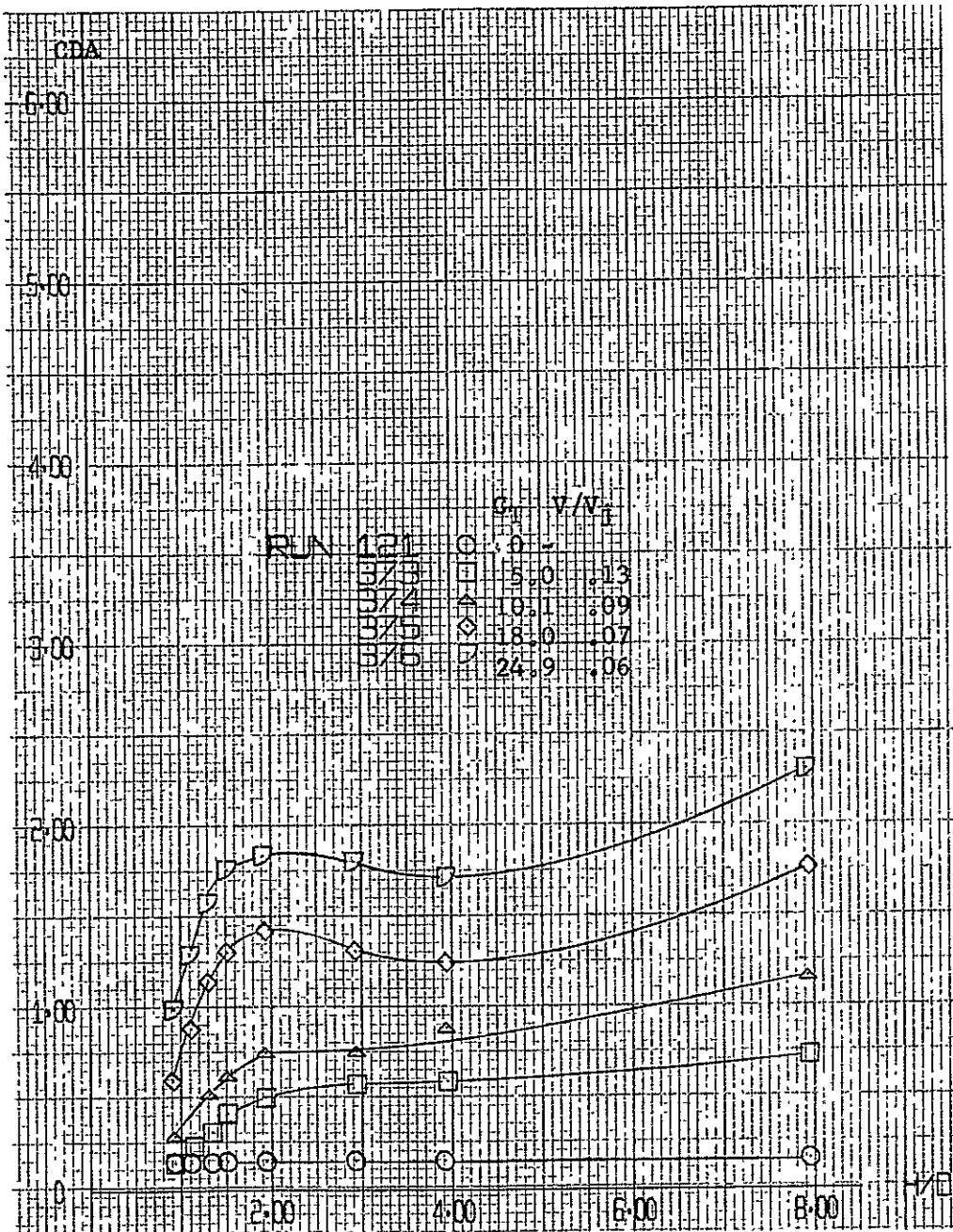


Figure A-45. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

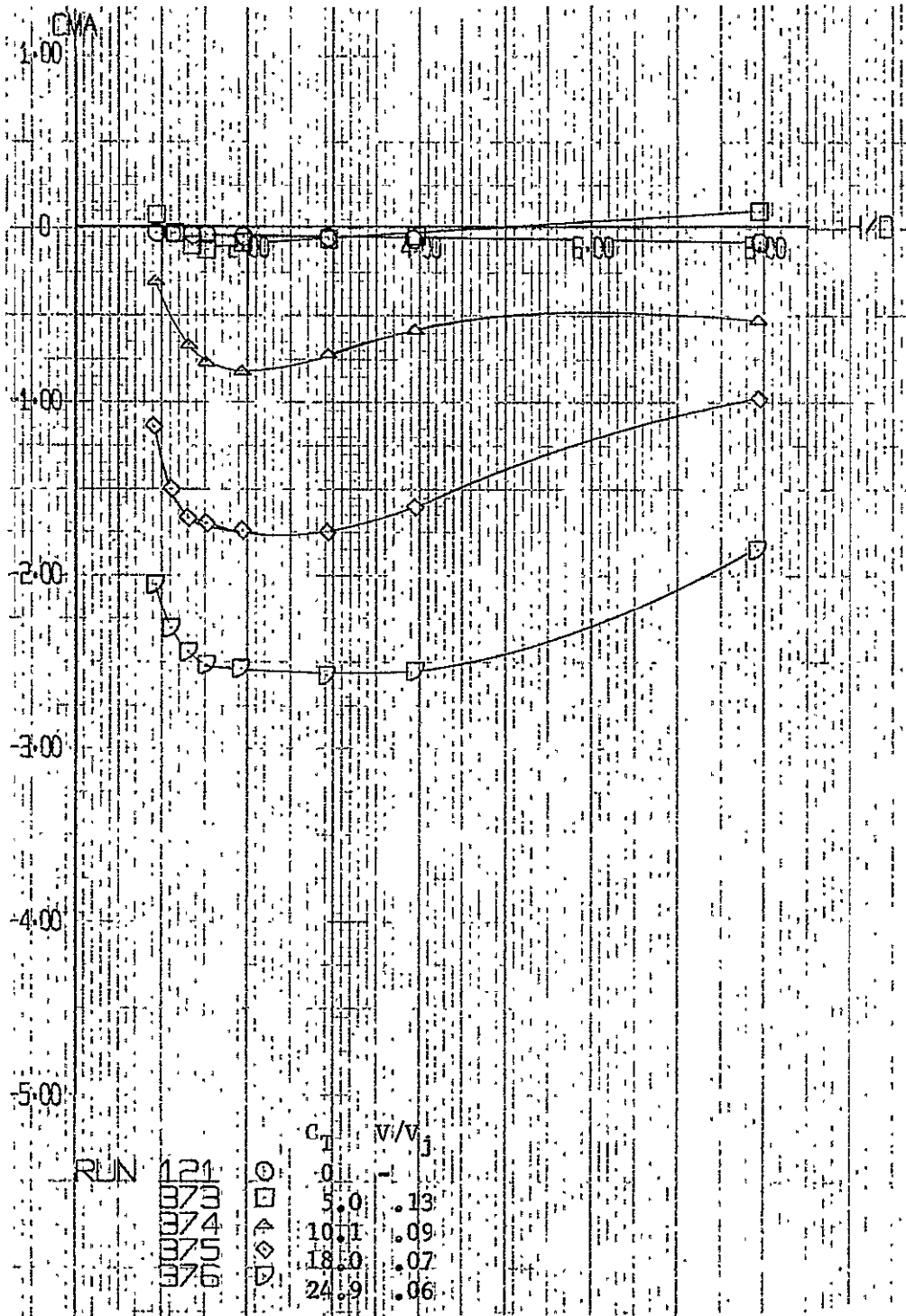


Figure A-45. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_{L0} = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

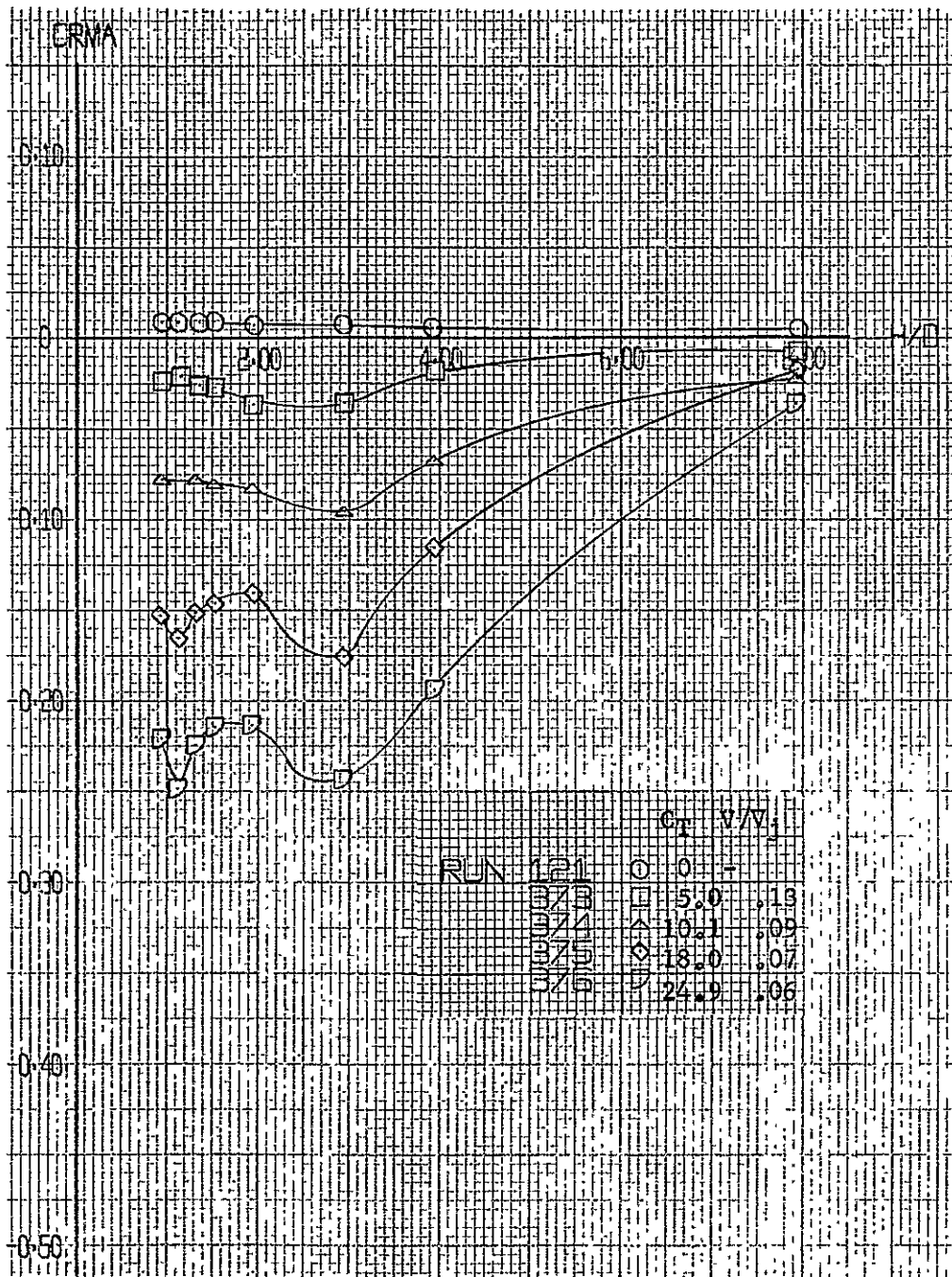


Figure A-45. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

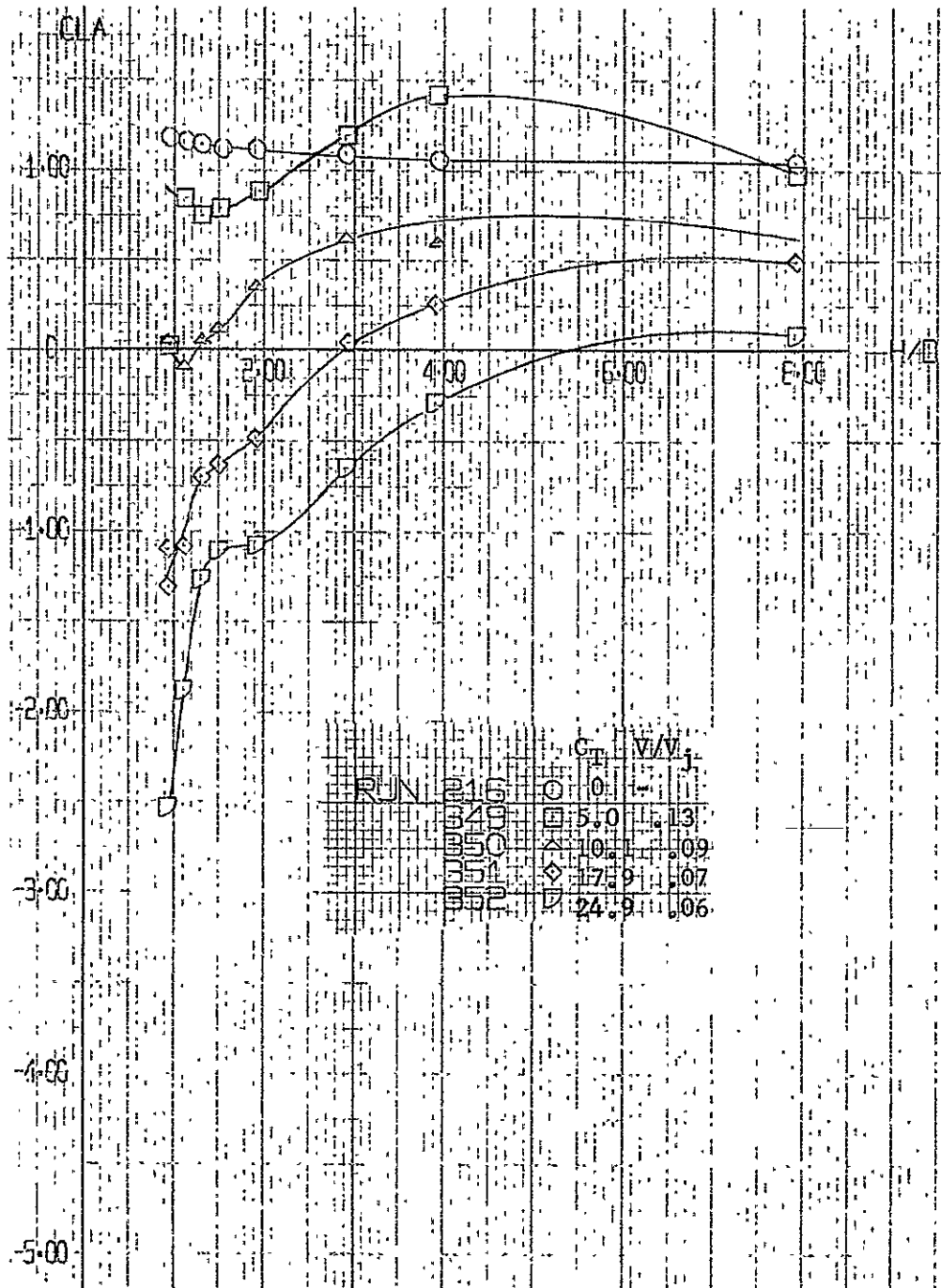


Figure A-46. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

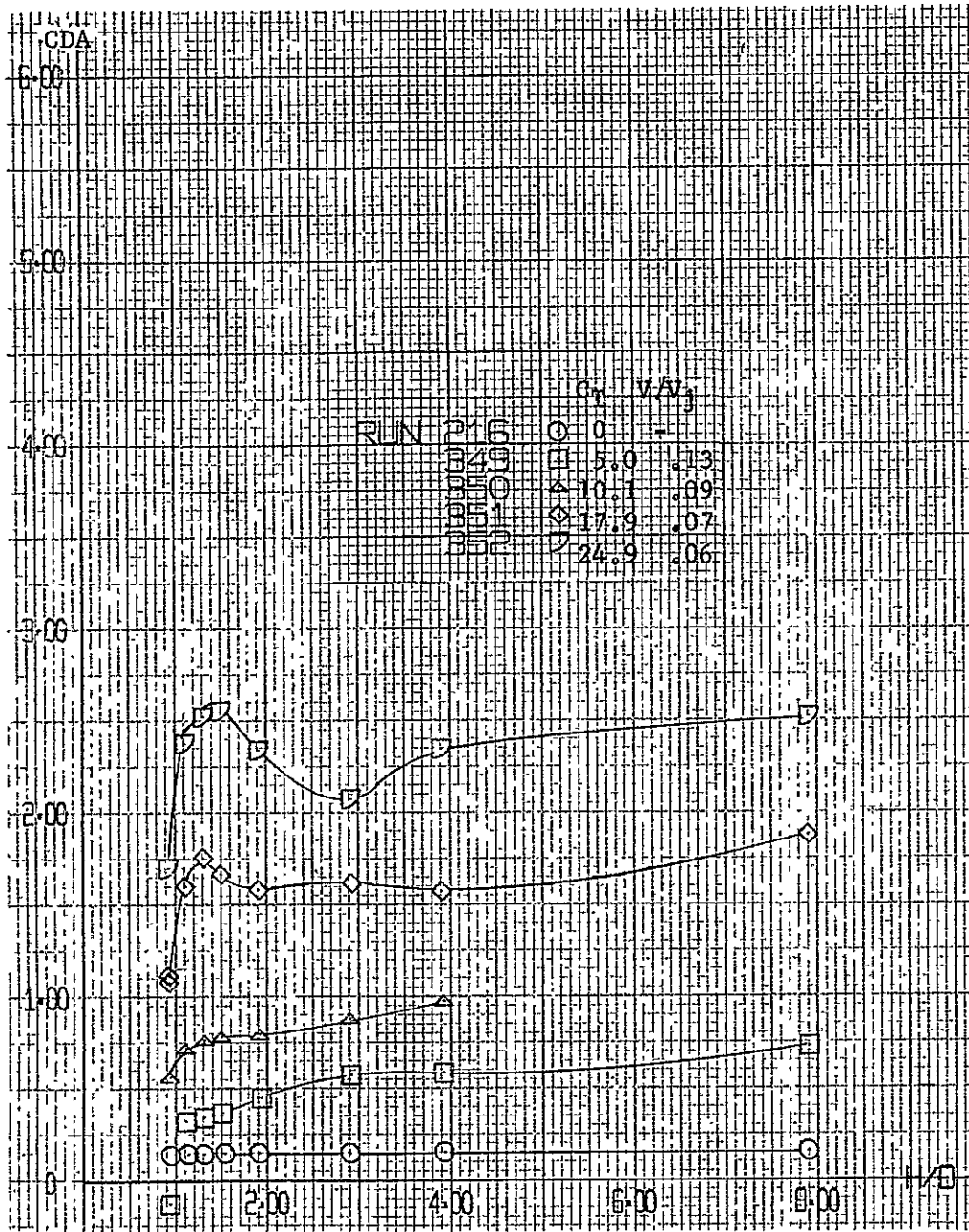


Figure A-46. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

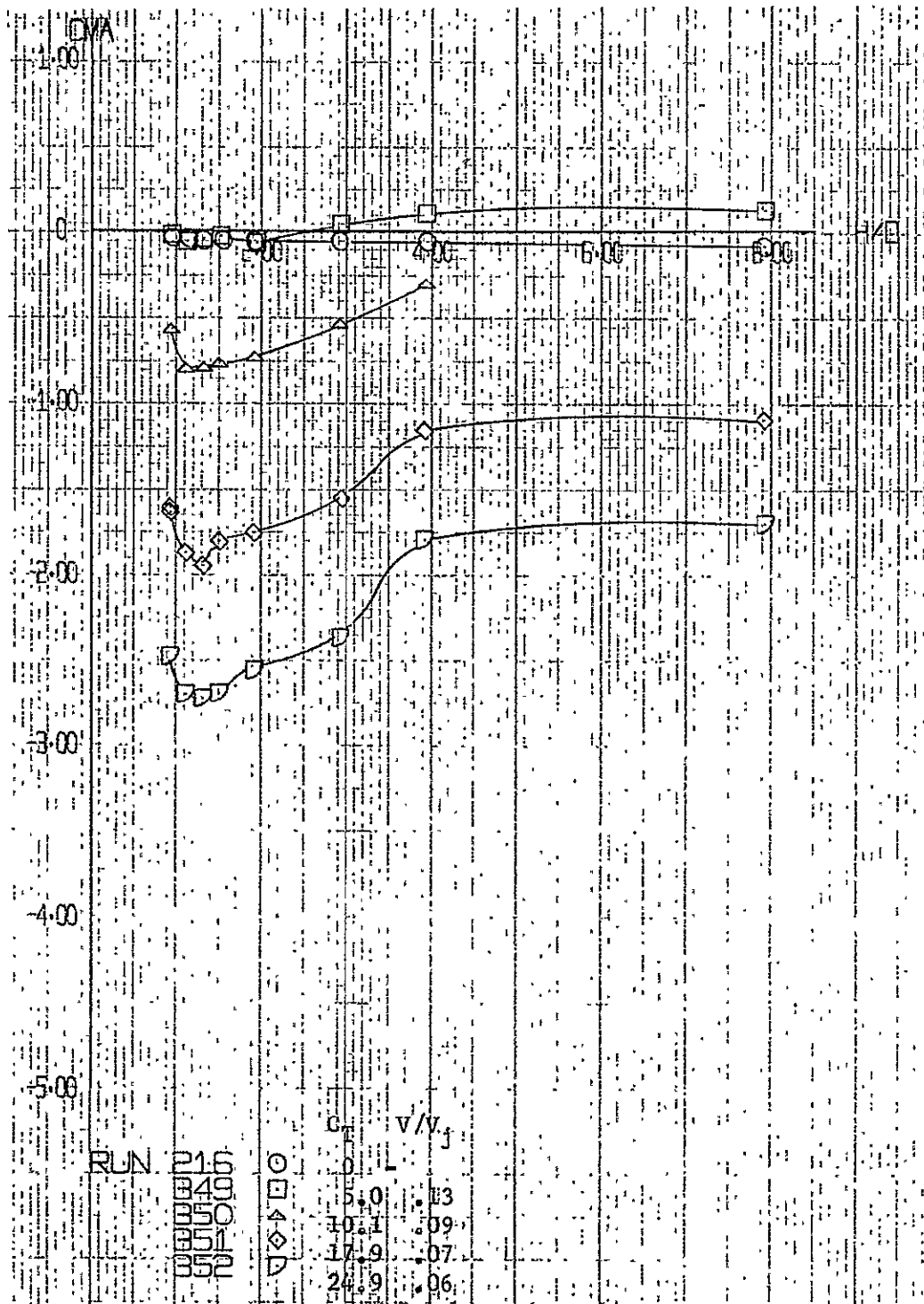


Figure A-46. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

C-3

ORIGINAL PAGE IS
OF POOR QUALITY

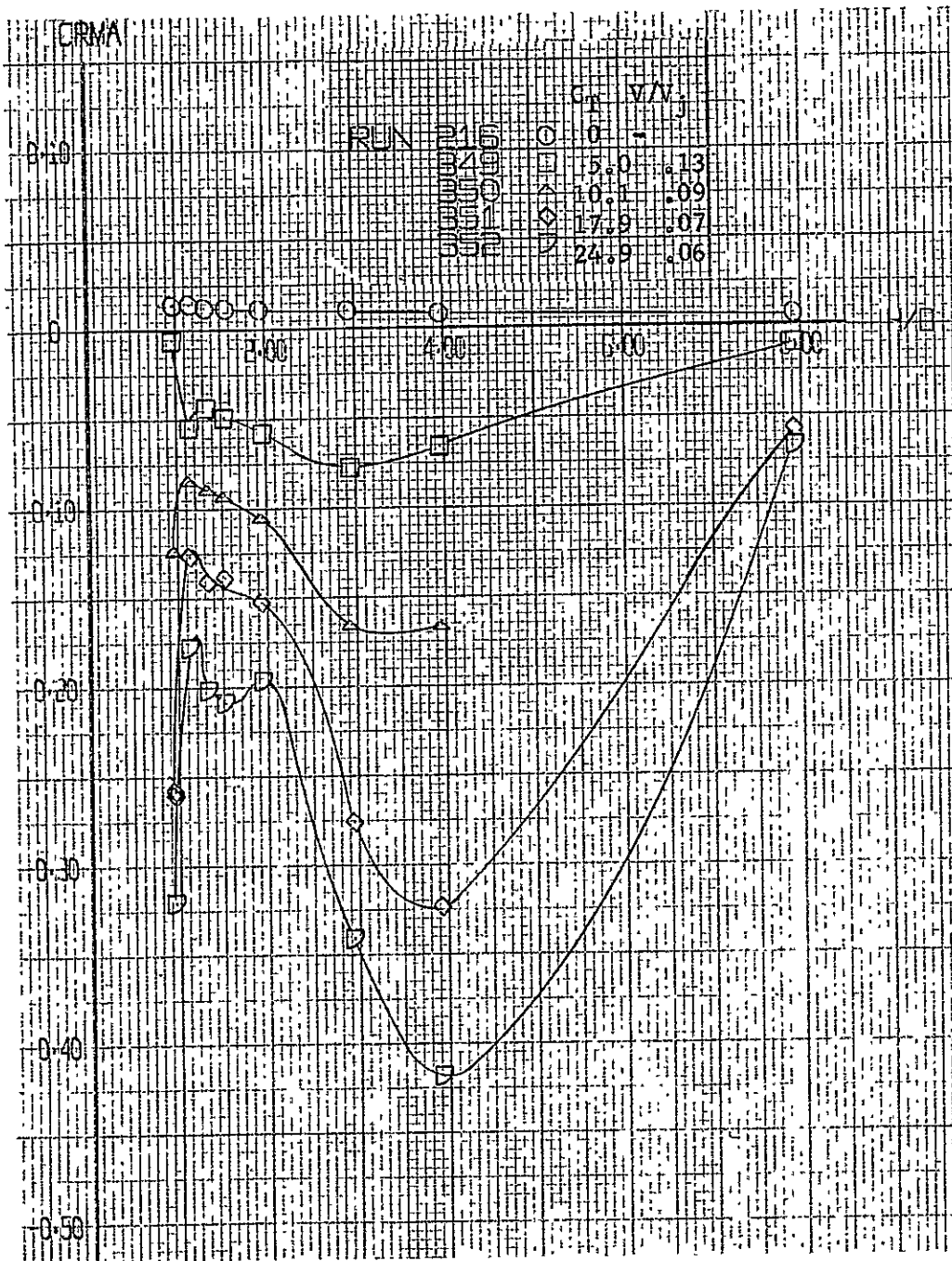


Figure A-46. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Concluded)

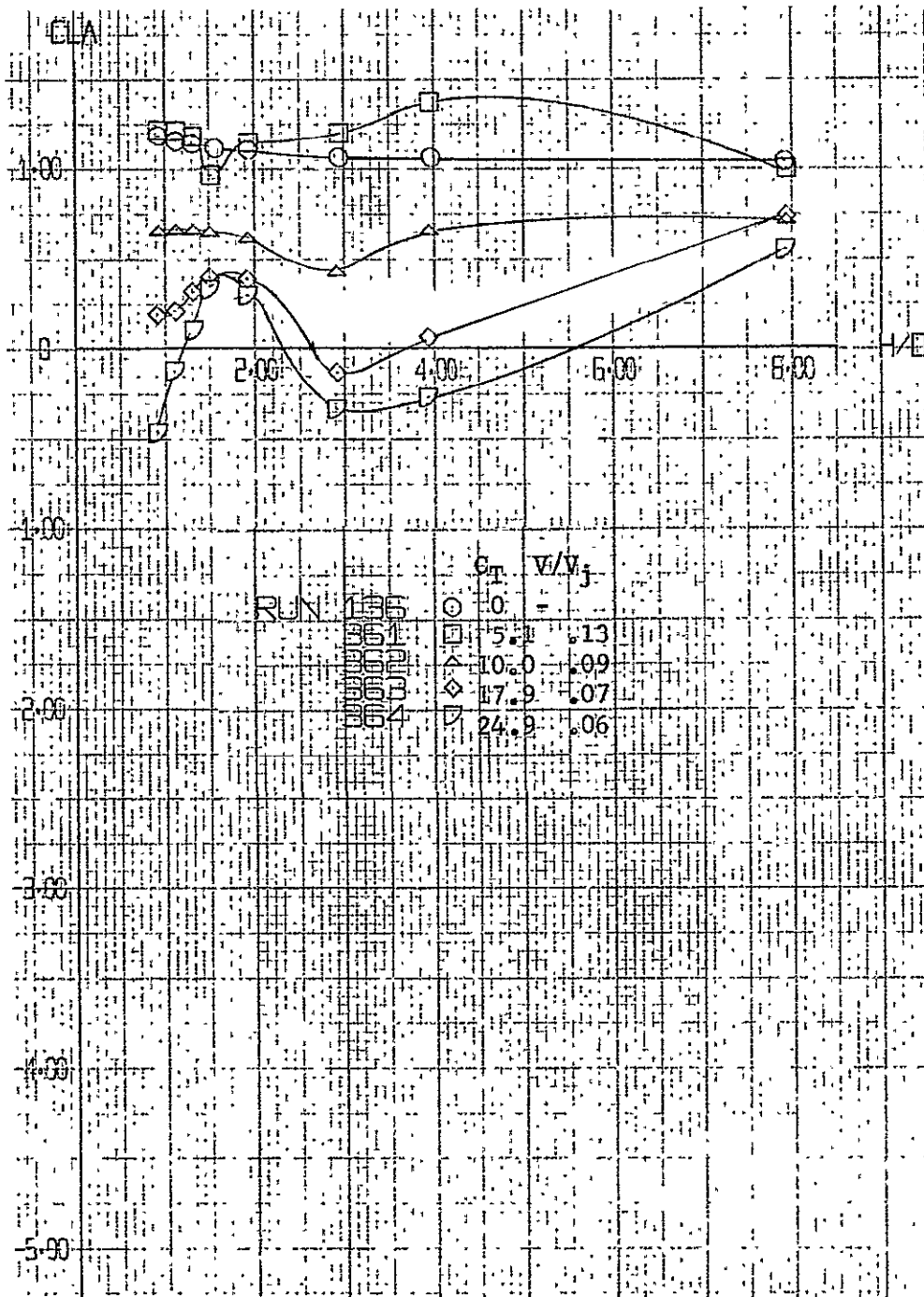


Figure A-47. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$

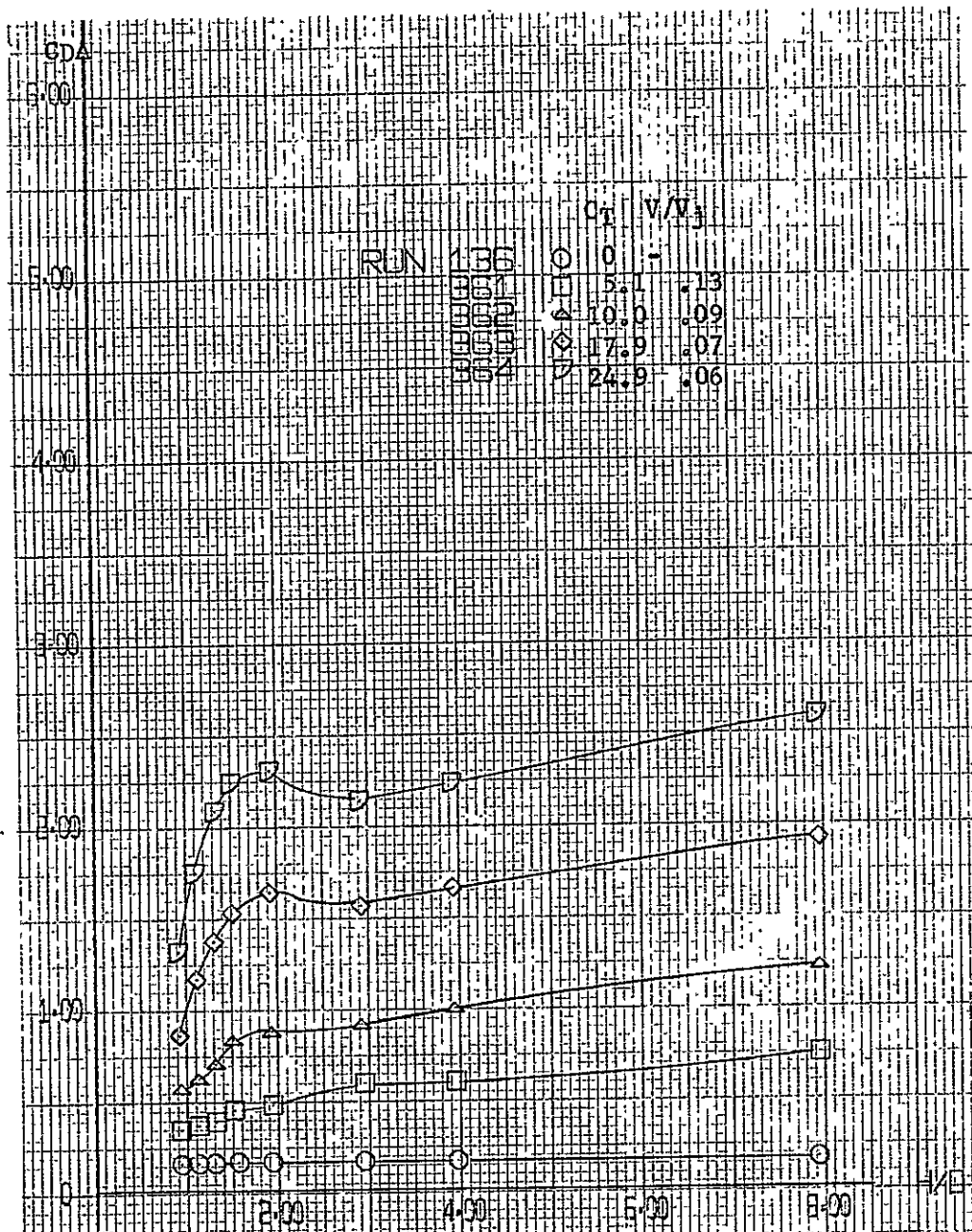


Figure A-47. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

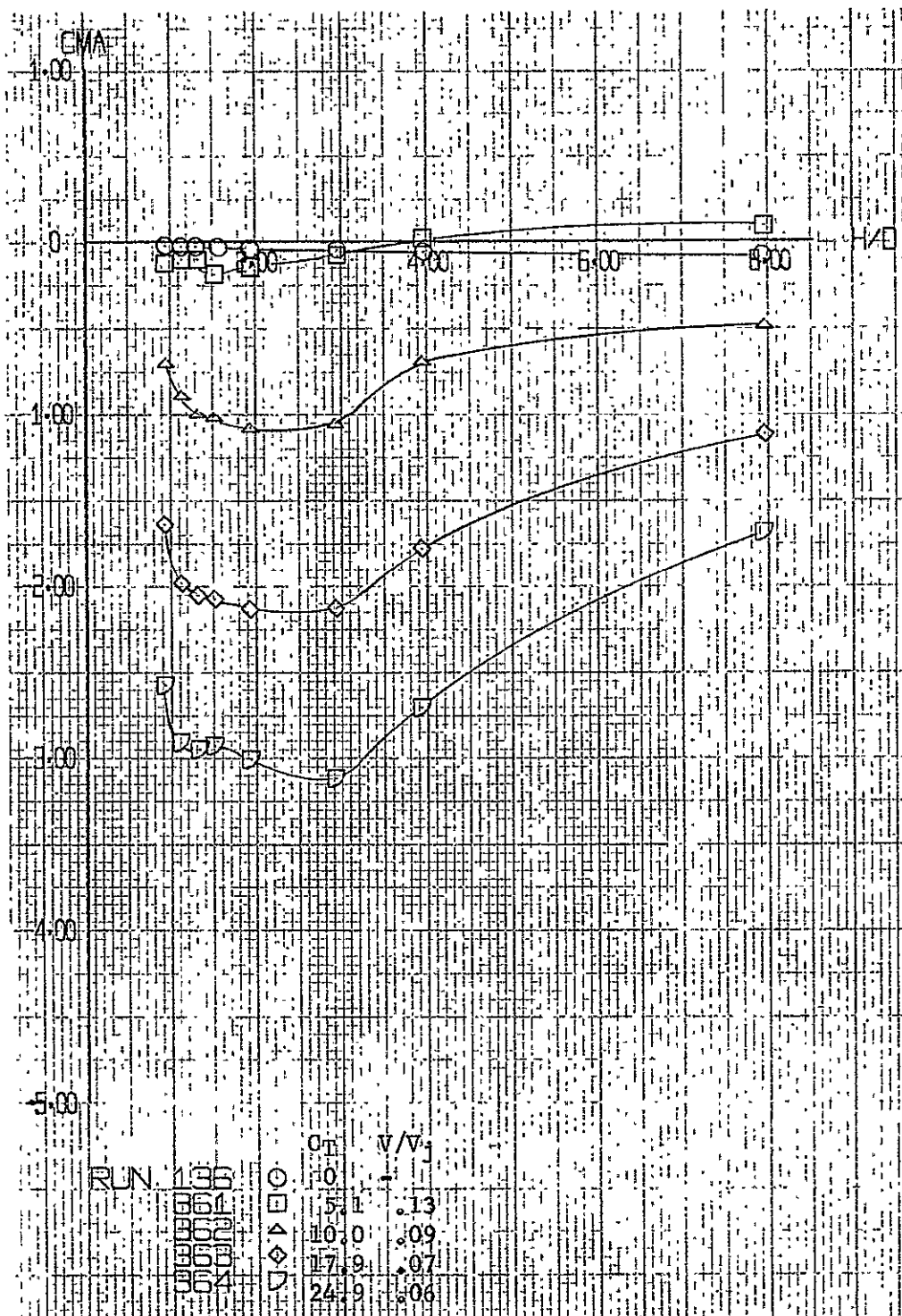


Figure A-47. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_{L_0} = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

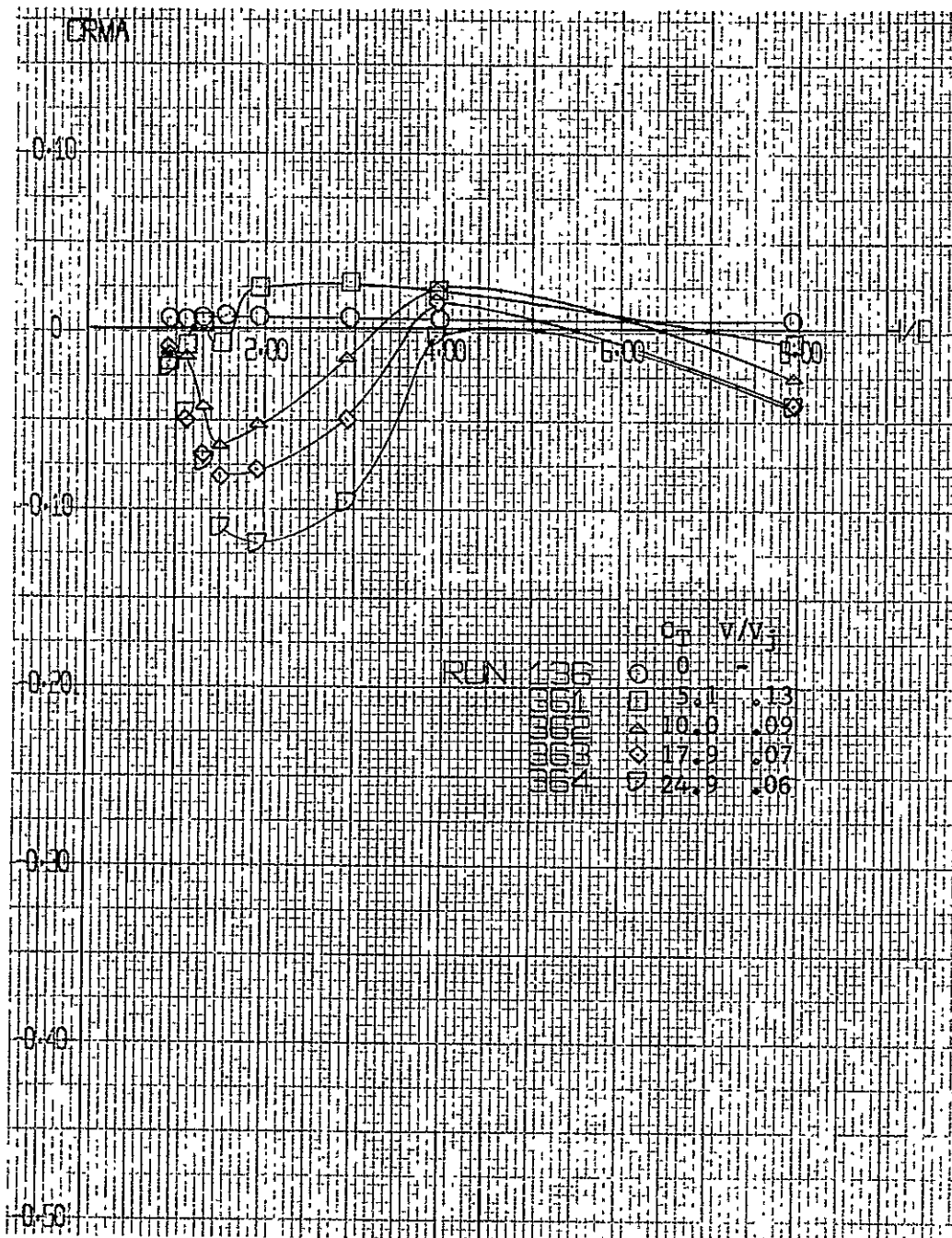


Figure A-47. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Concluded)

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

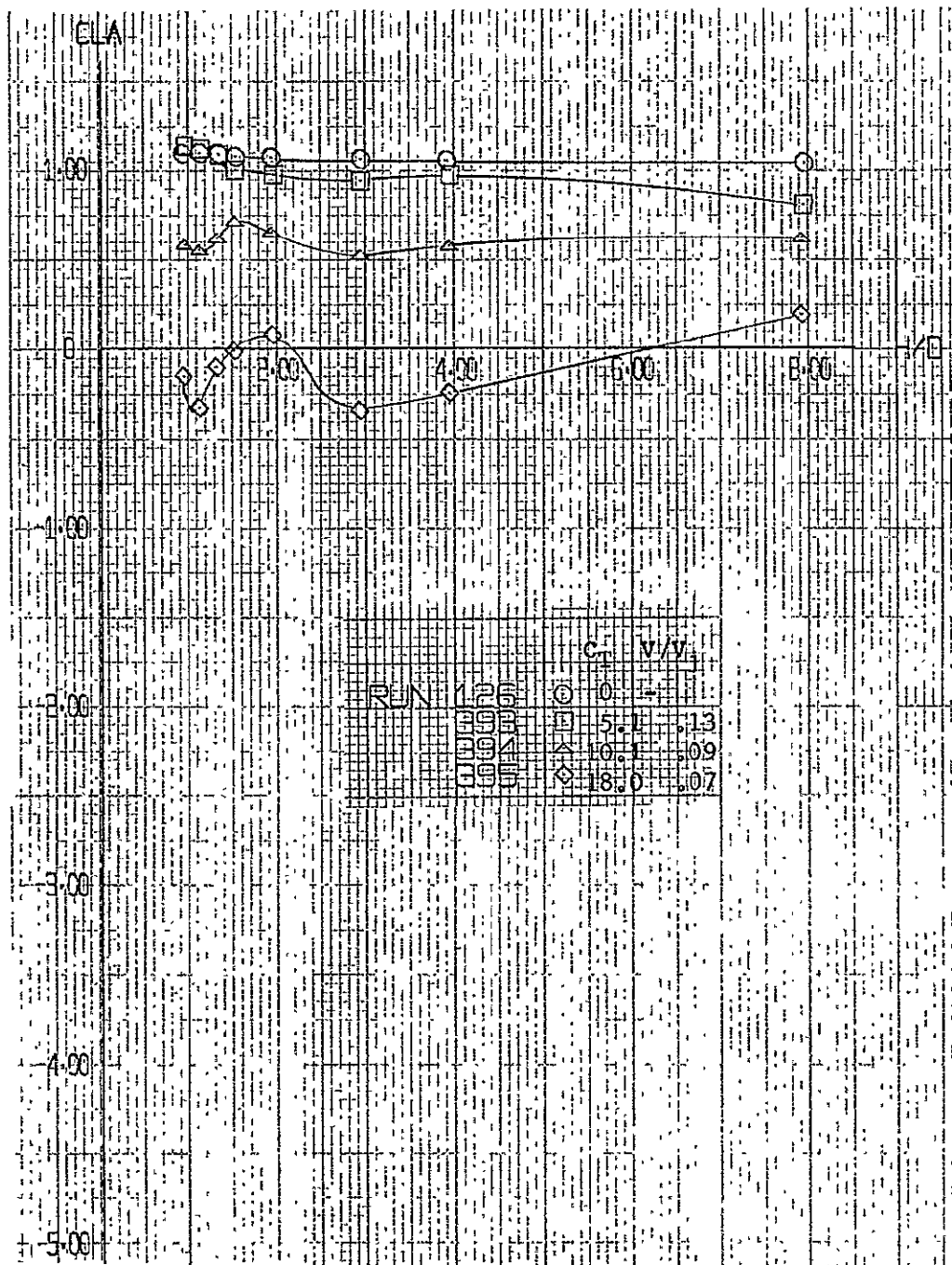


Figure A-48. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

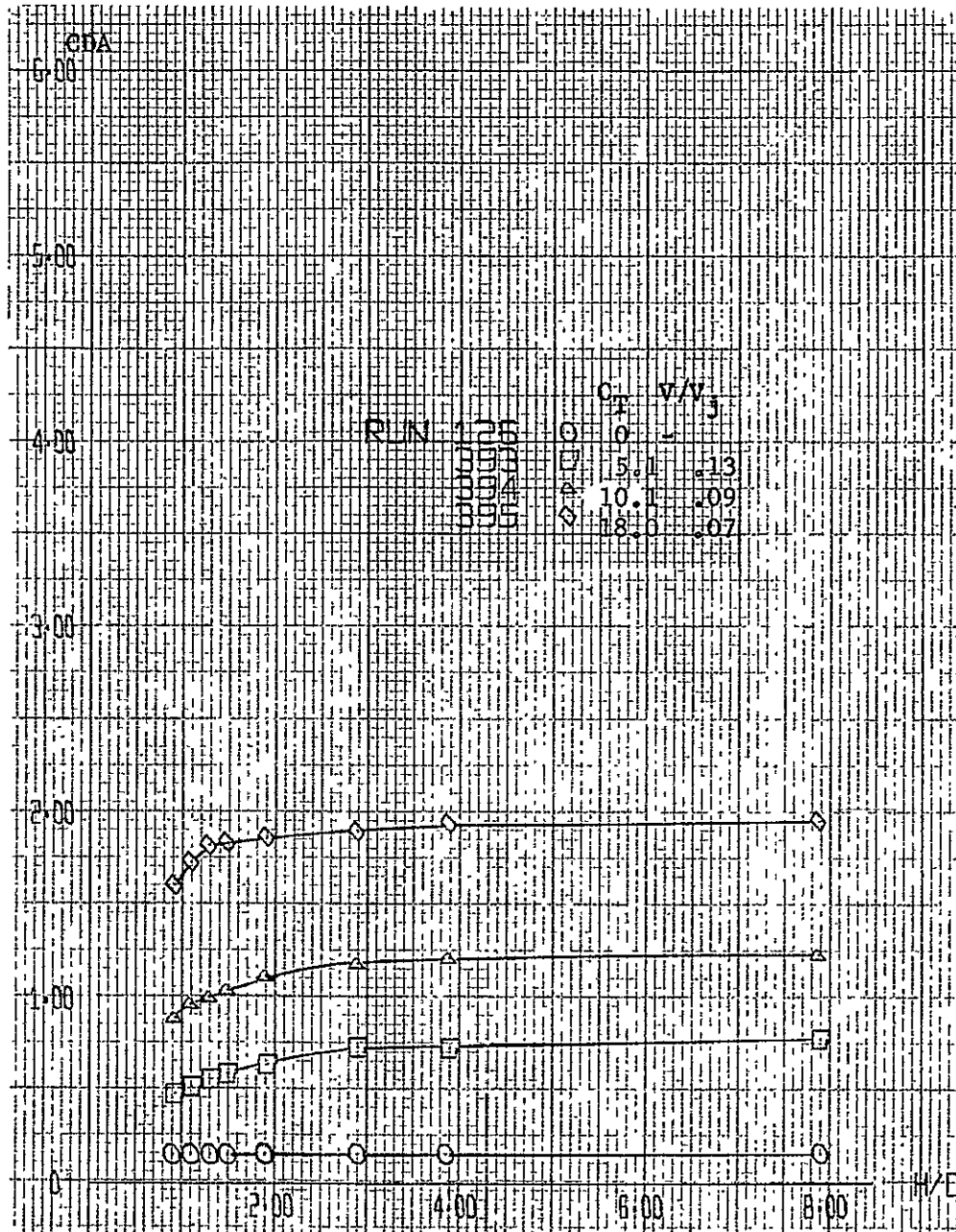


Figure A-48. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

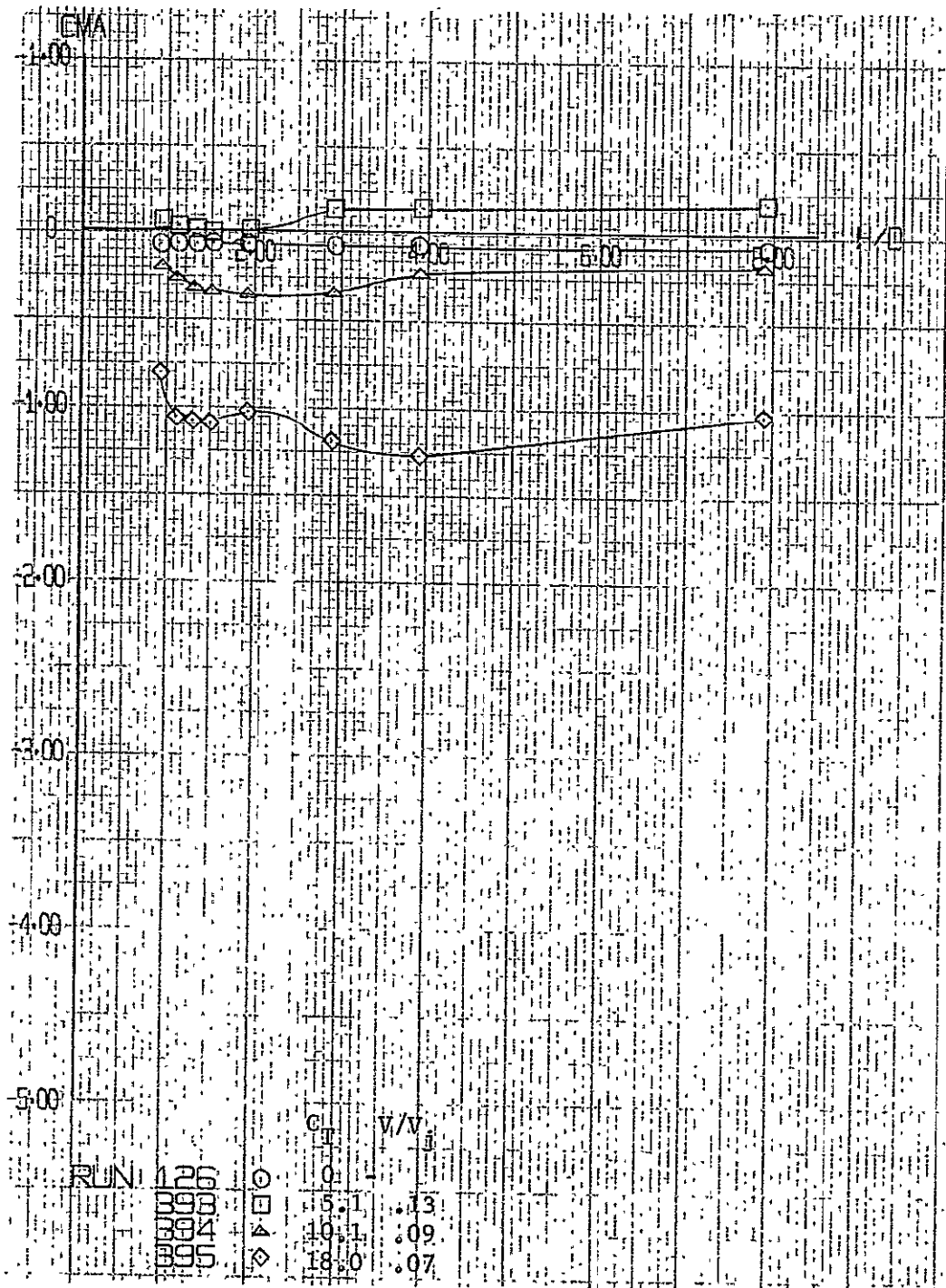


Figure A-48. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

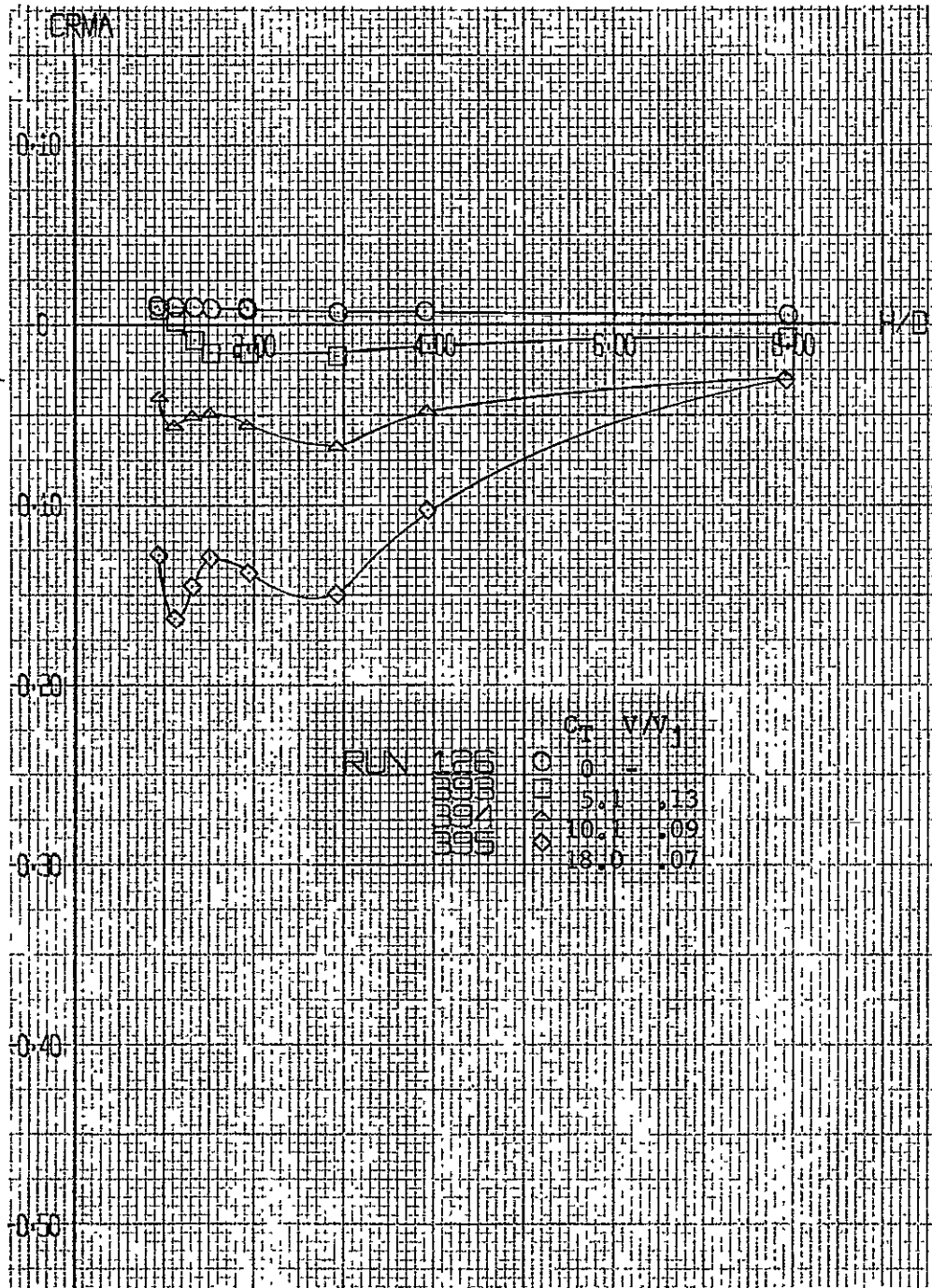


Figure A-48. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

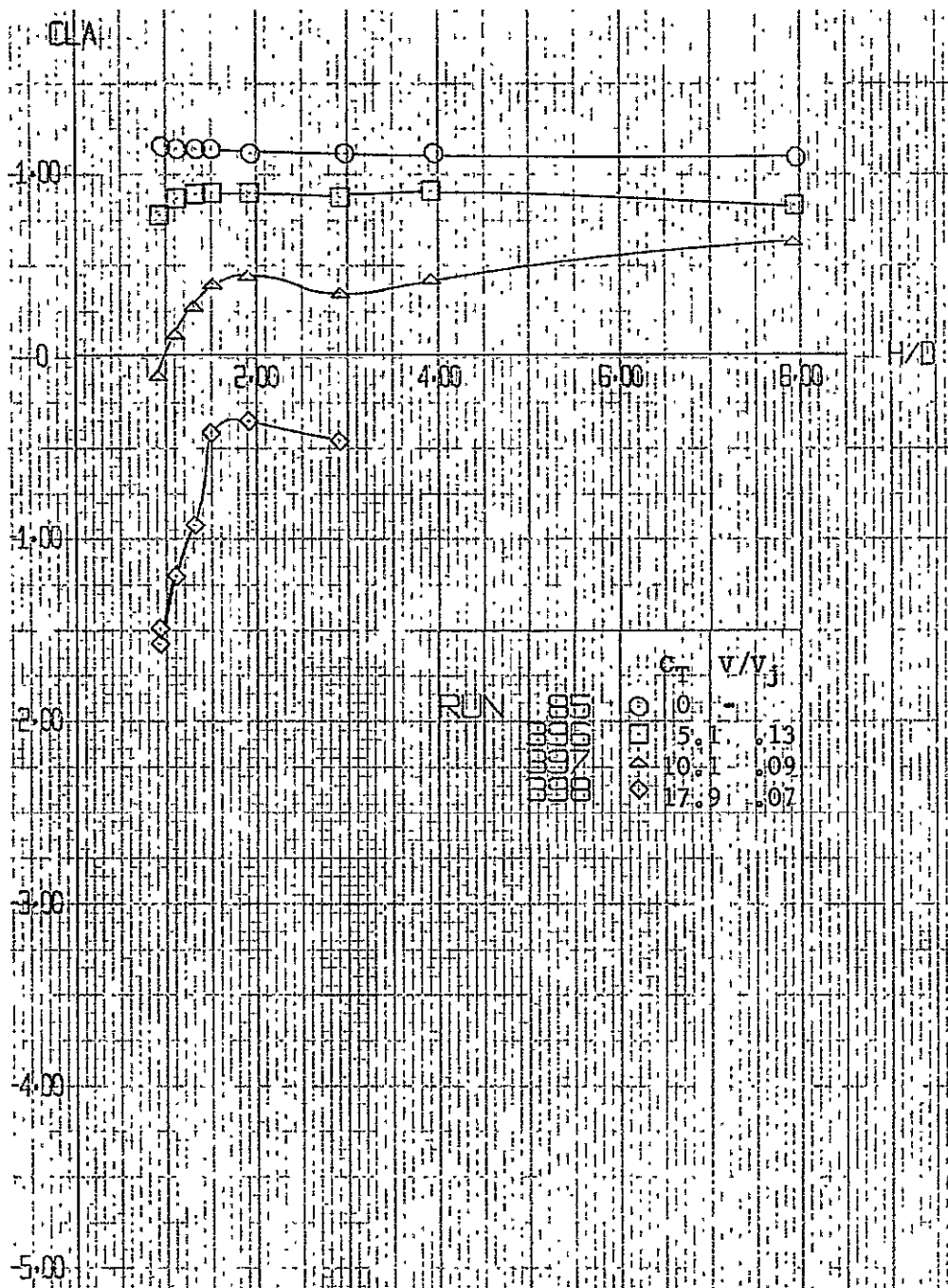


Figure A-49. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

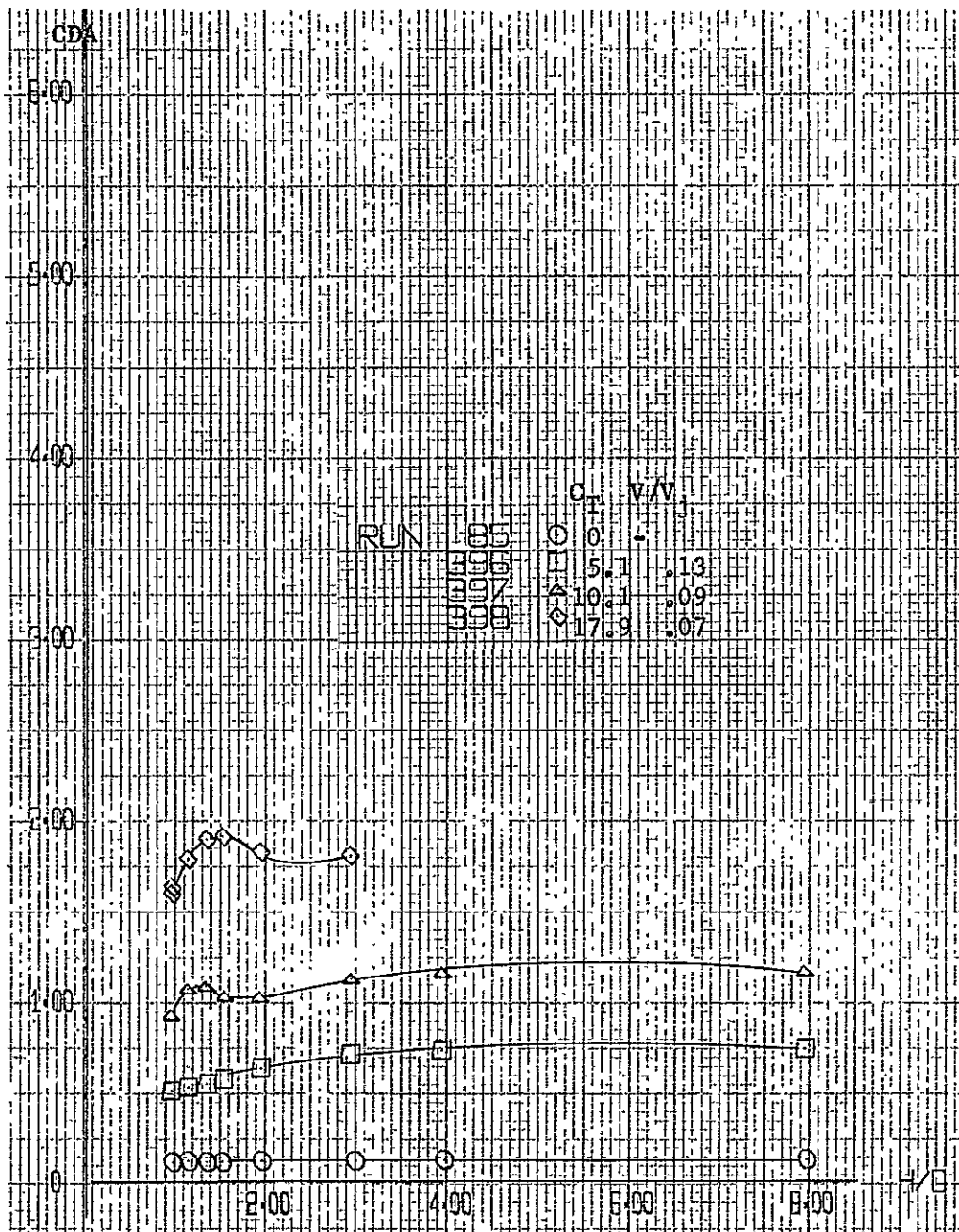


Figure A-49. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

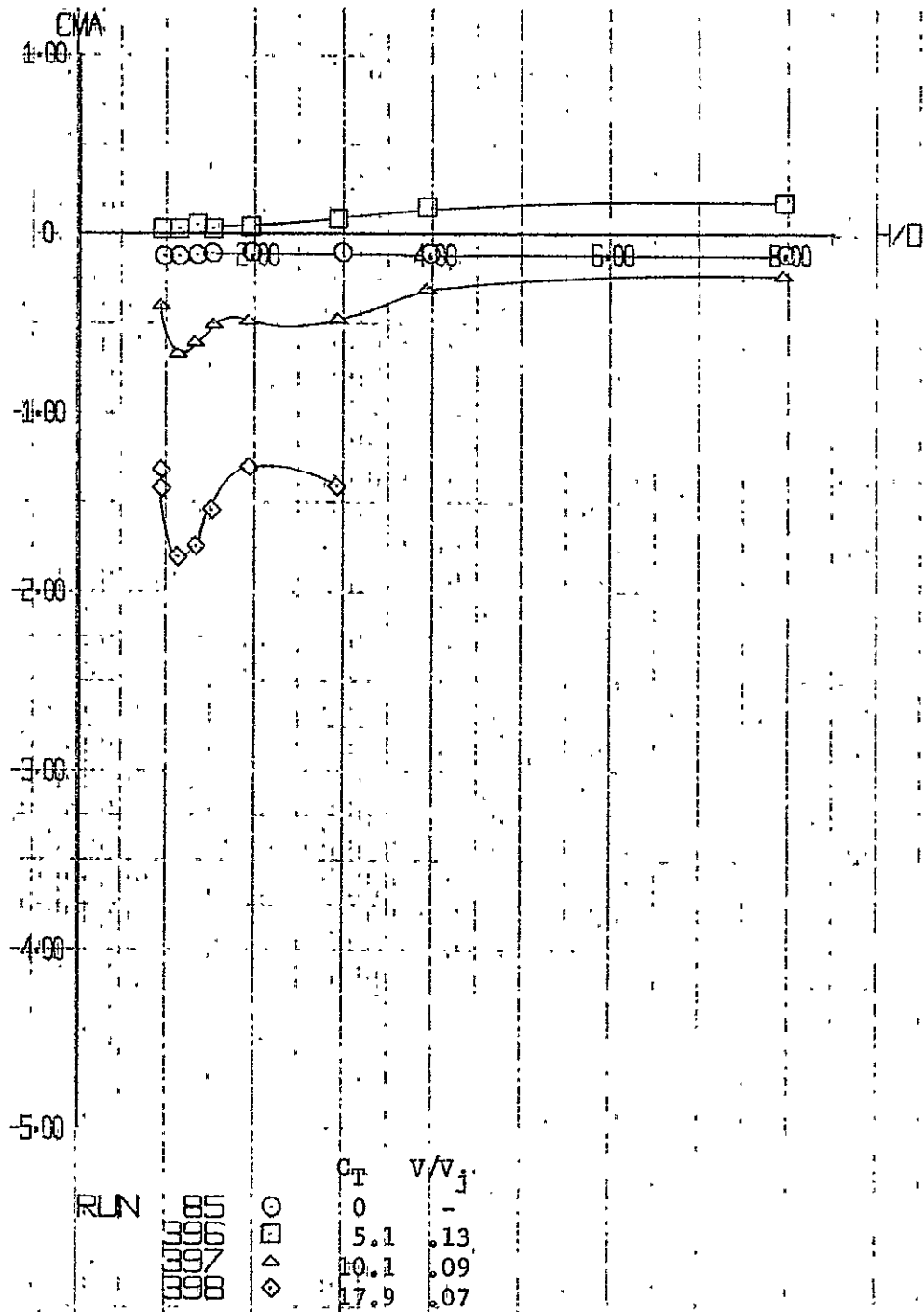


Figure A-49. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Continued)

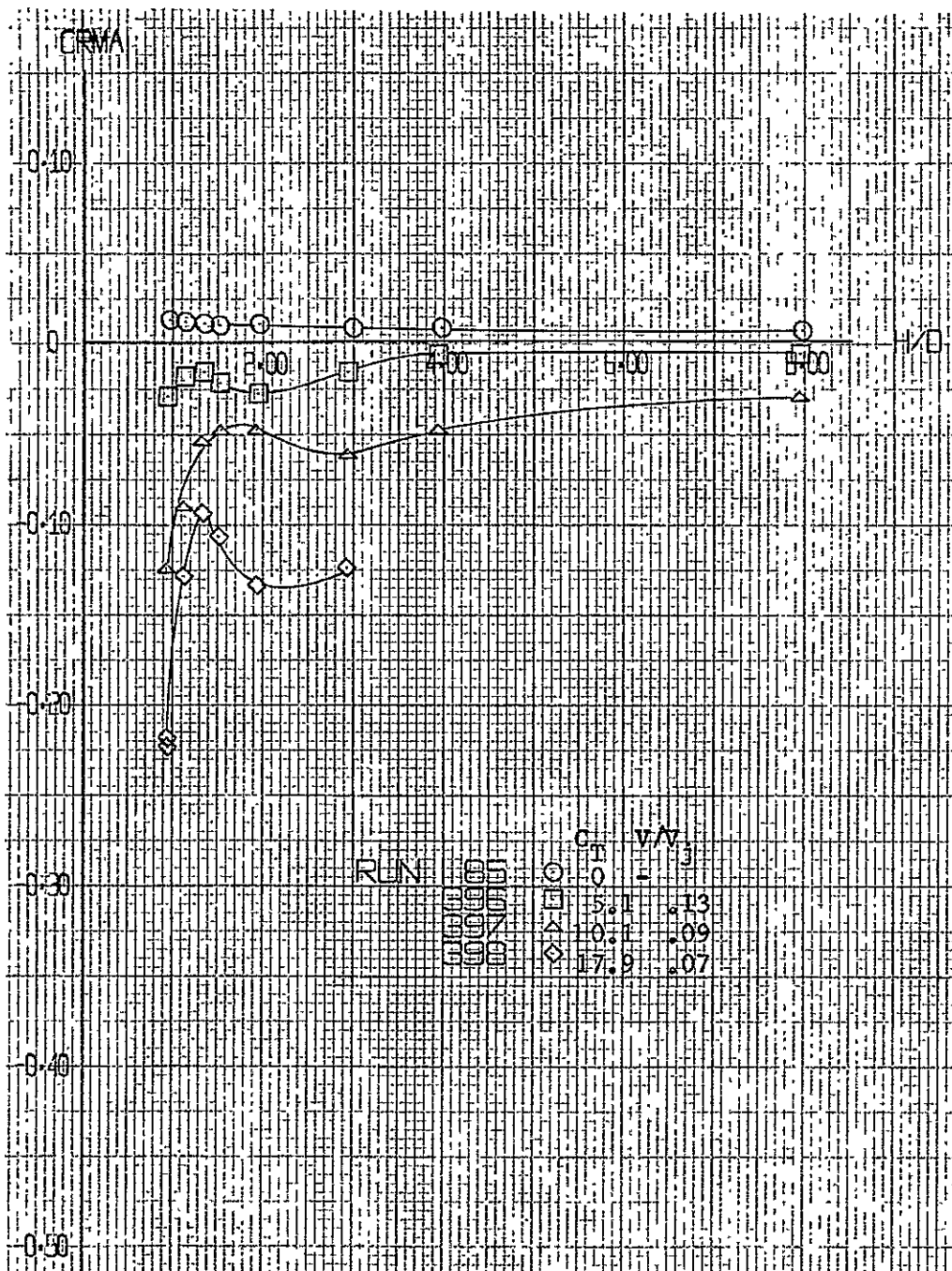


Figure A-49. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 5; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Concluded)

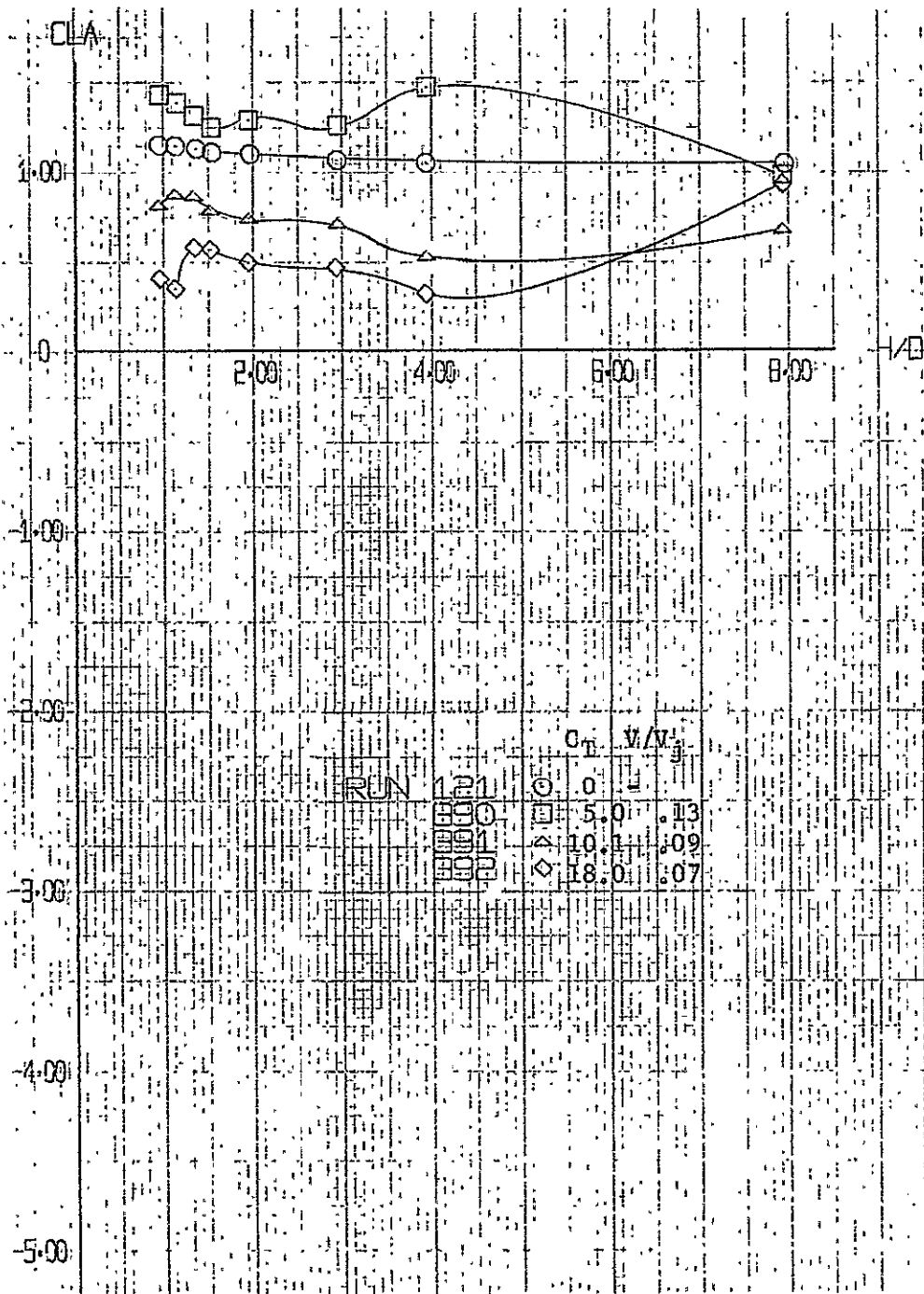


Figure A-50. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

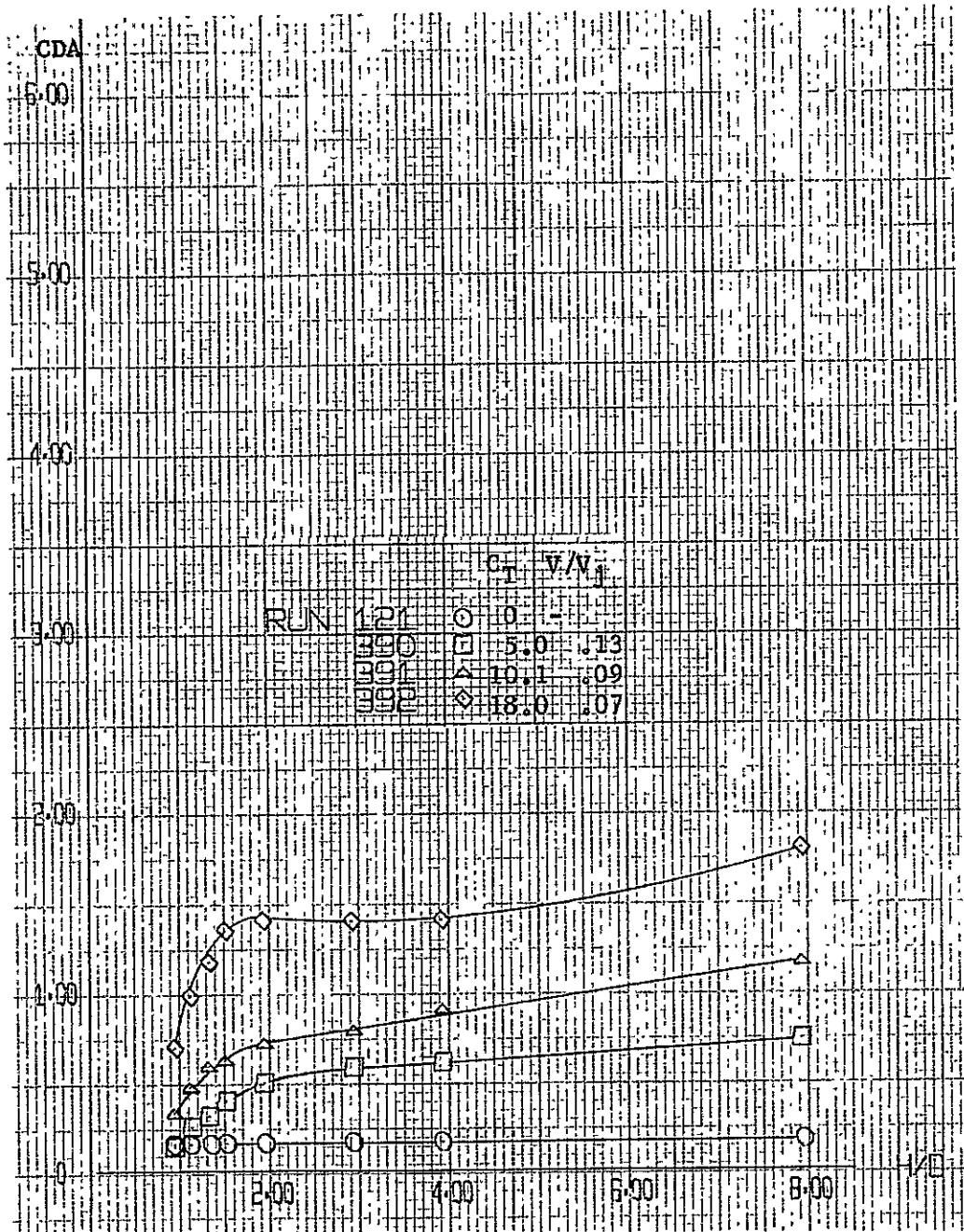


Figure A-50. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_{L_0} = 1.2$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

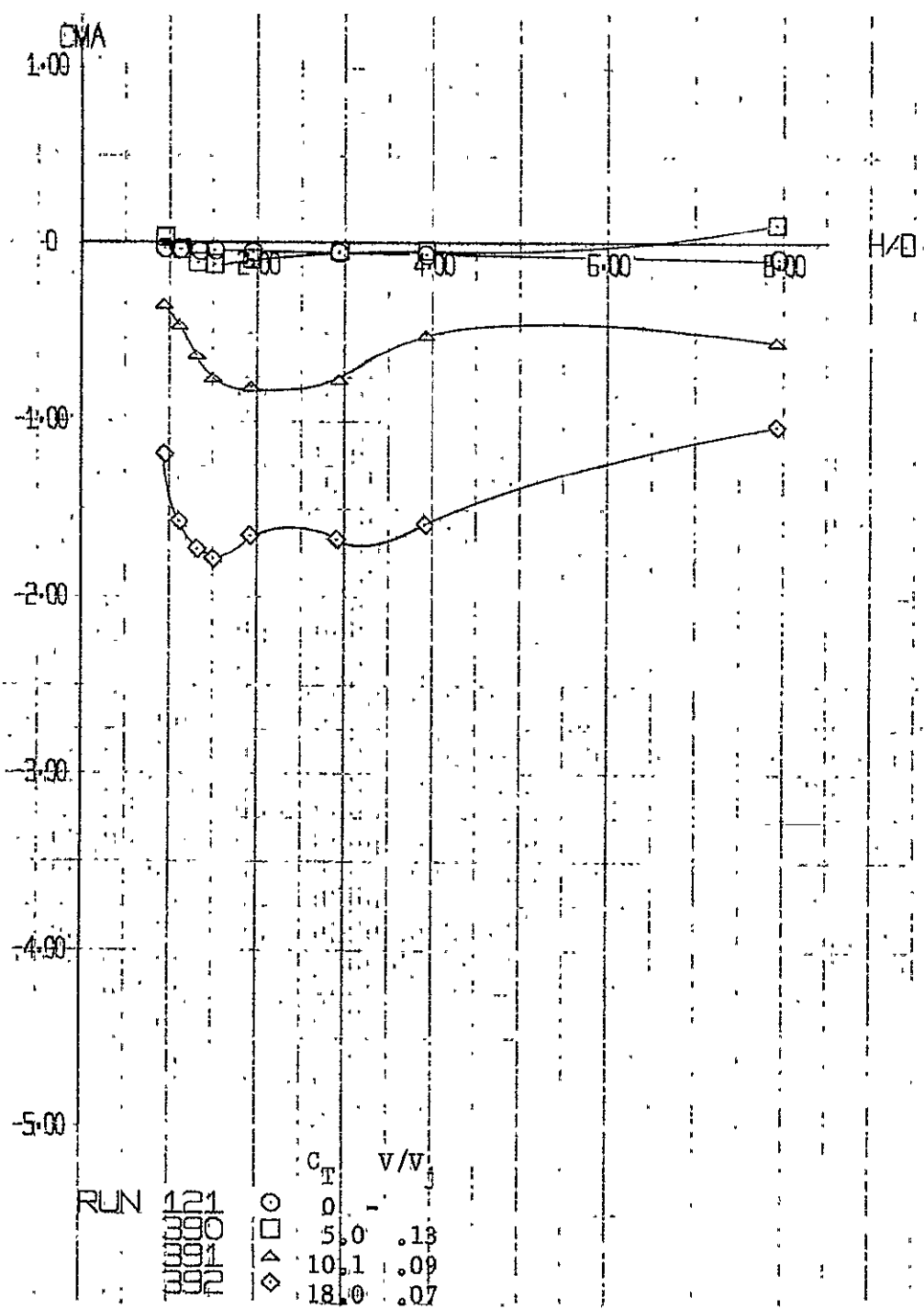


Figure A-50. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

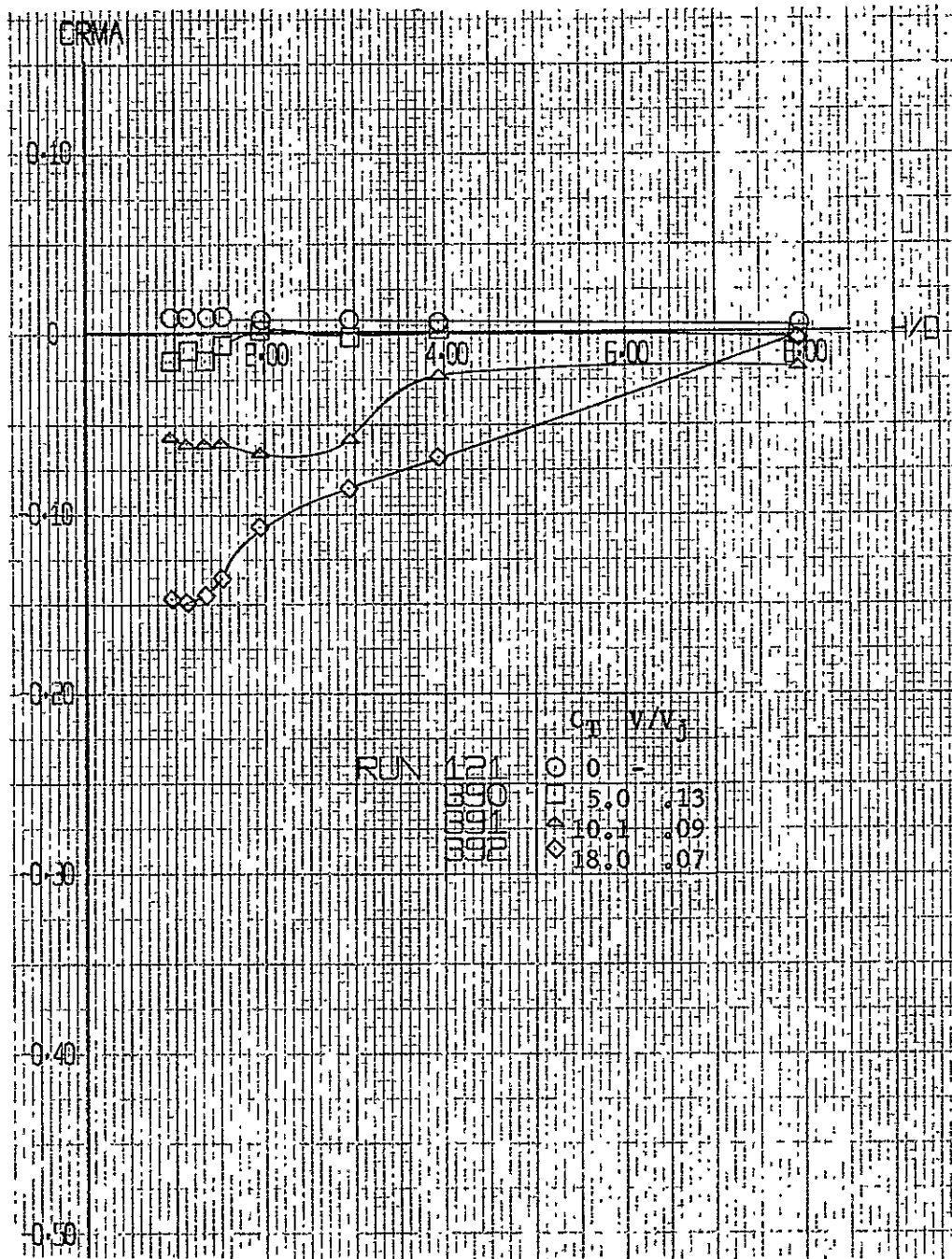


Figure A-50. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = 1.2$, Ground Board Configuration 4; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

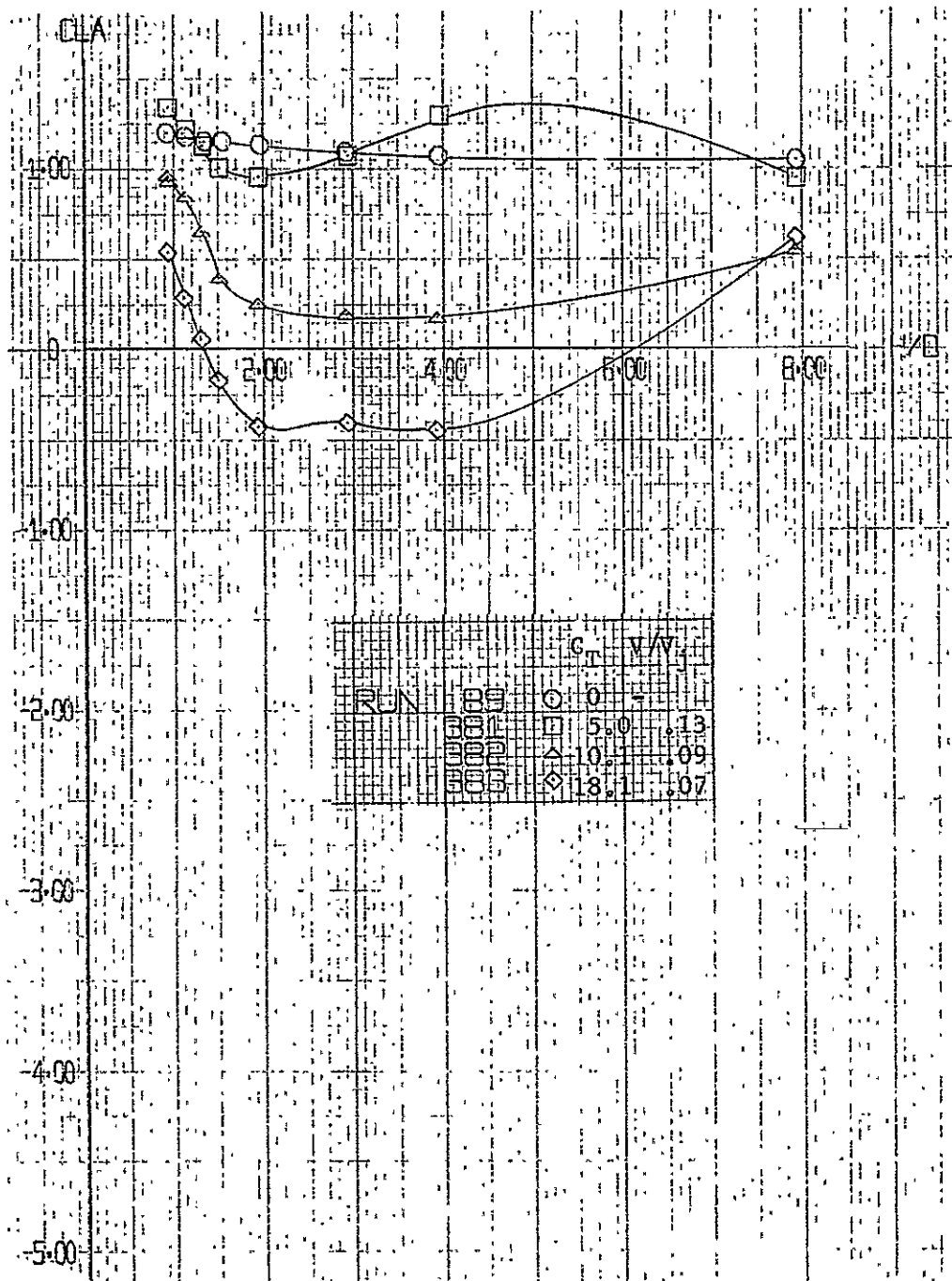


Figure A-51. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_{A_0} = 1.2$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$

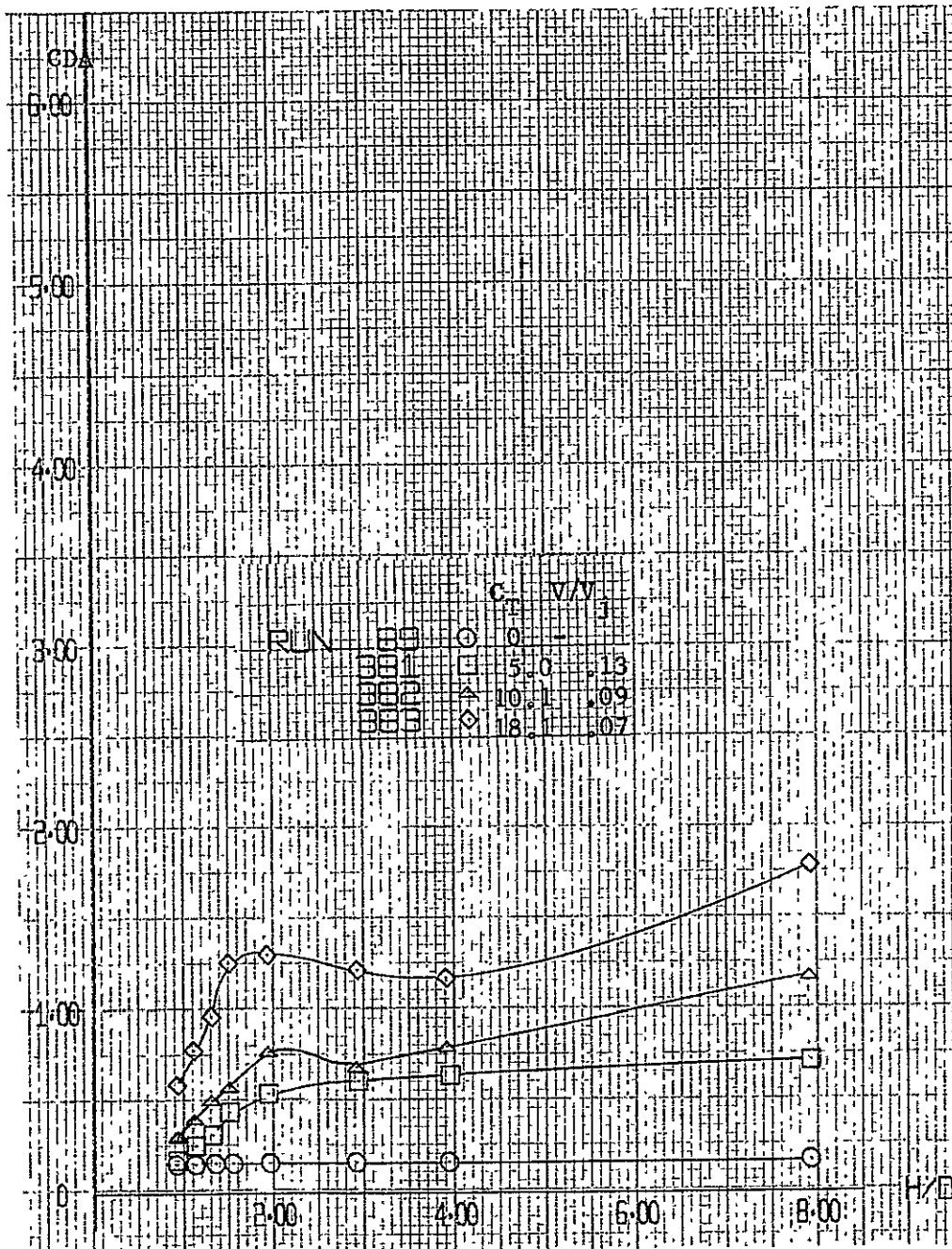


Figure A-51. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

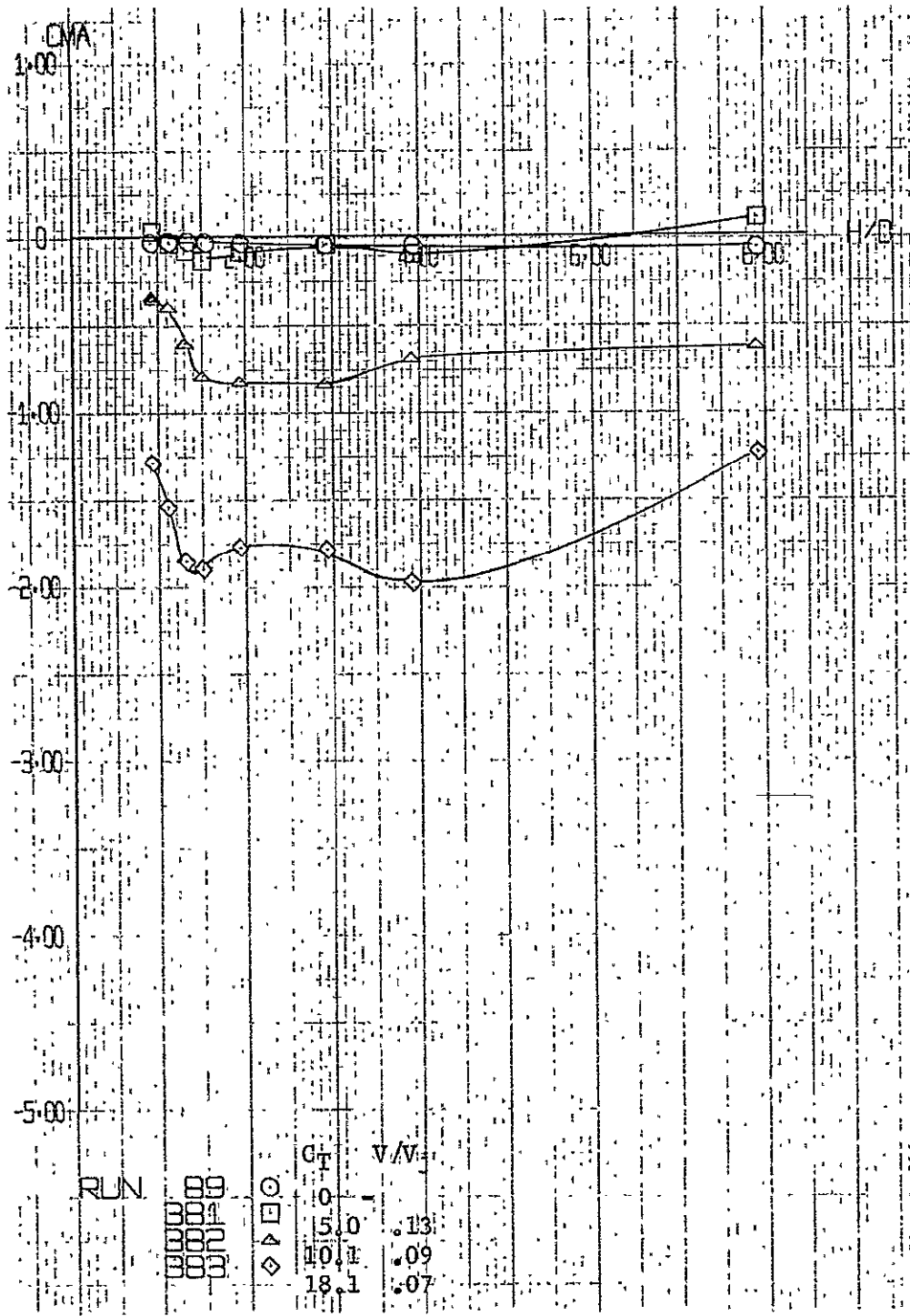


Figure A-51. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$ (Continued)

ORIGINAL PRICE IS
OF POOR QUALITY

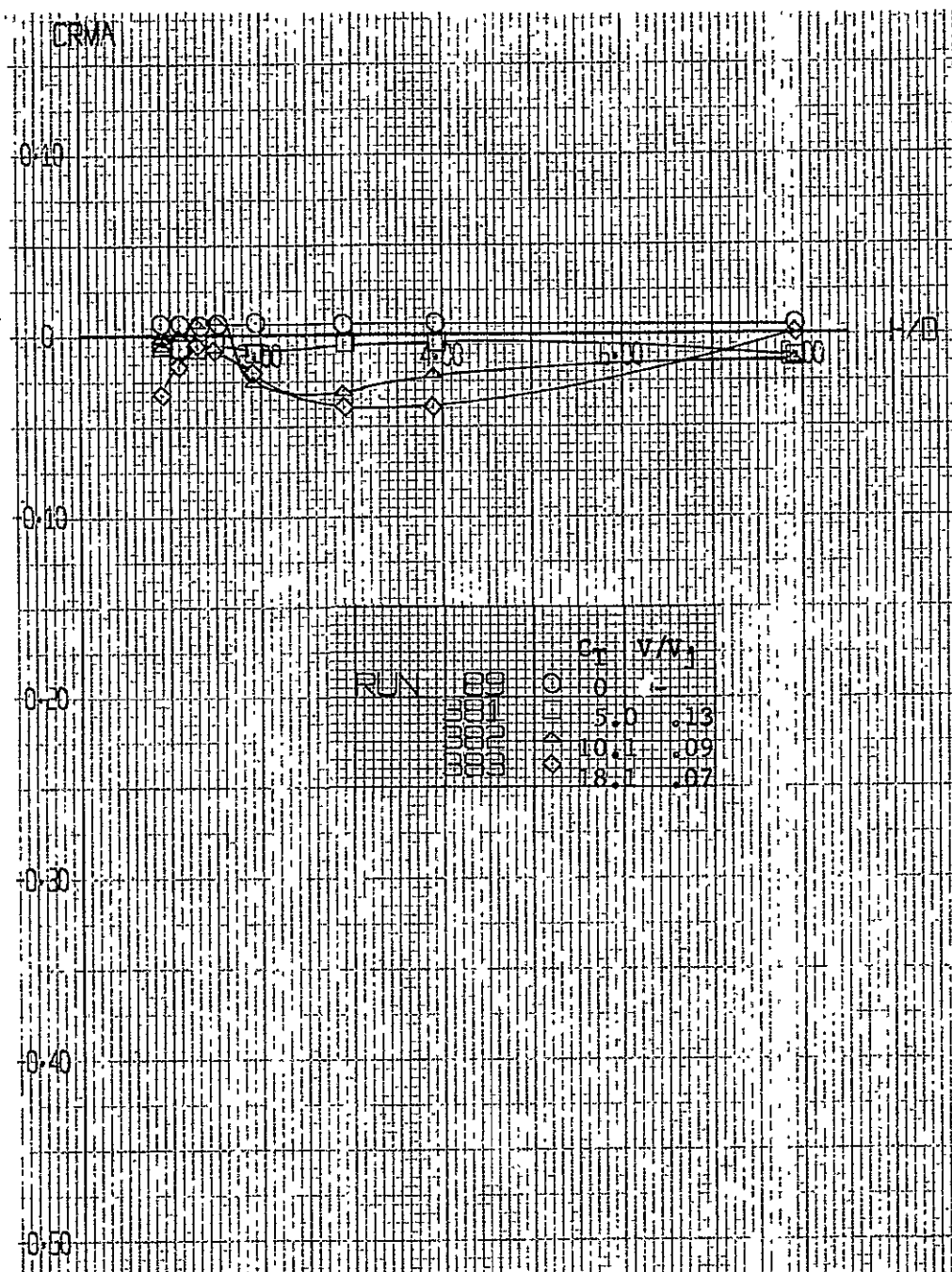


Figure A-51. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 1; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

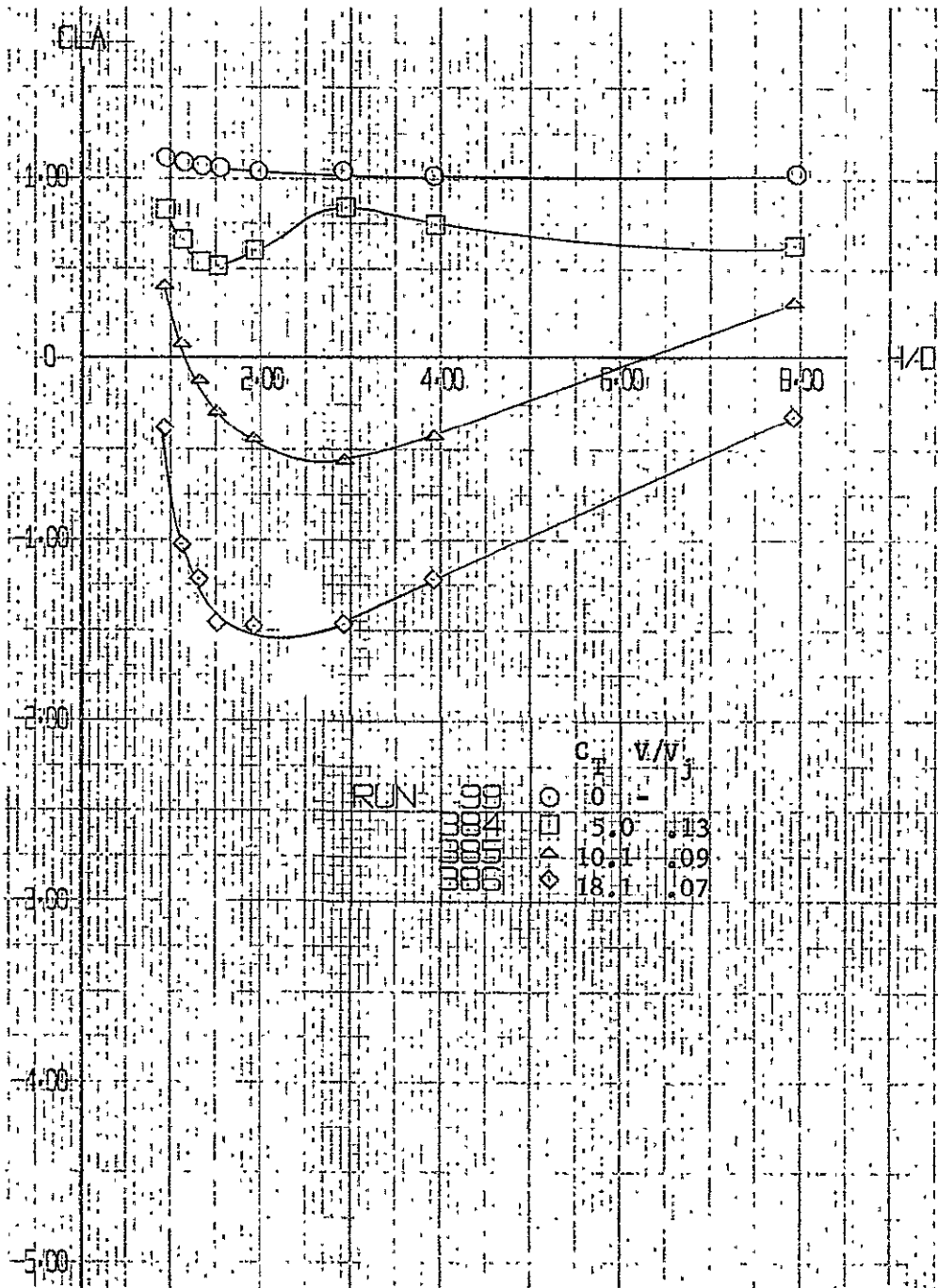


Figure A-52. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 2; $\delta_N = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$

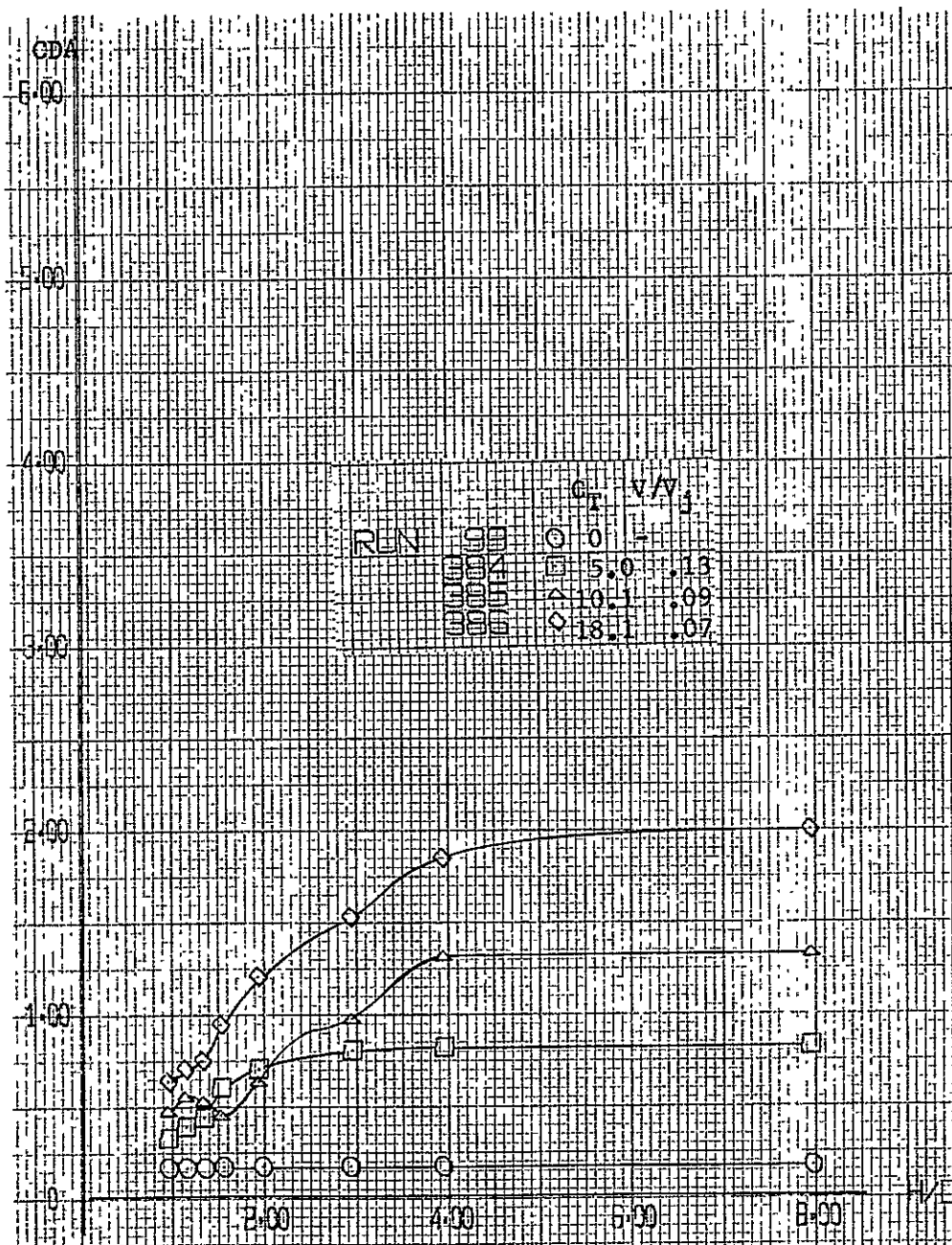


Figure A-52. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_{A0} = 1.2$, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

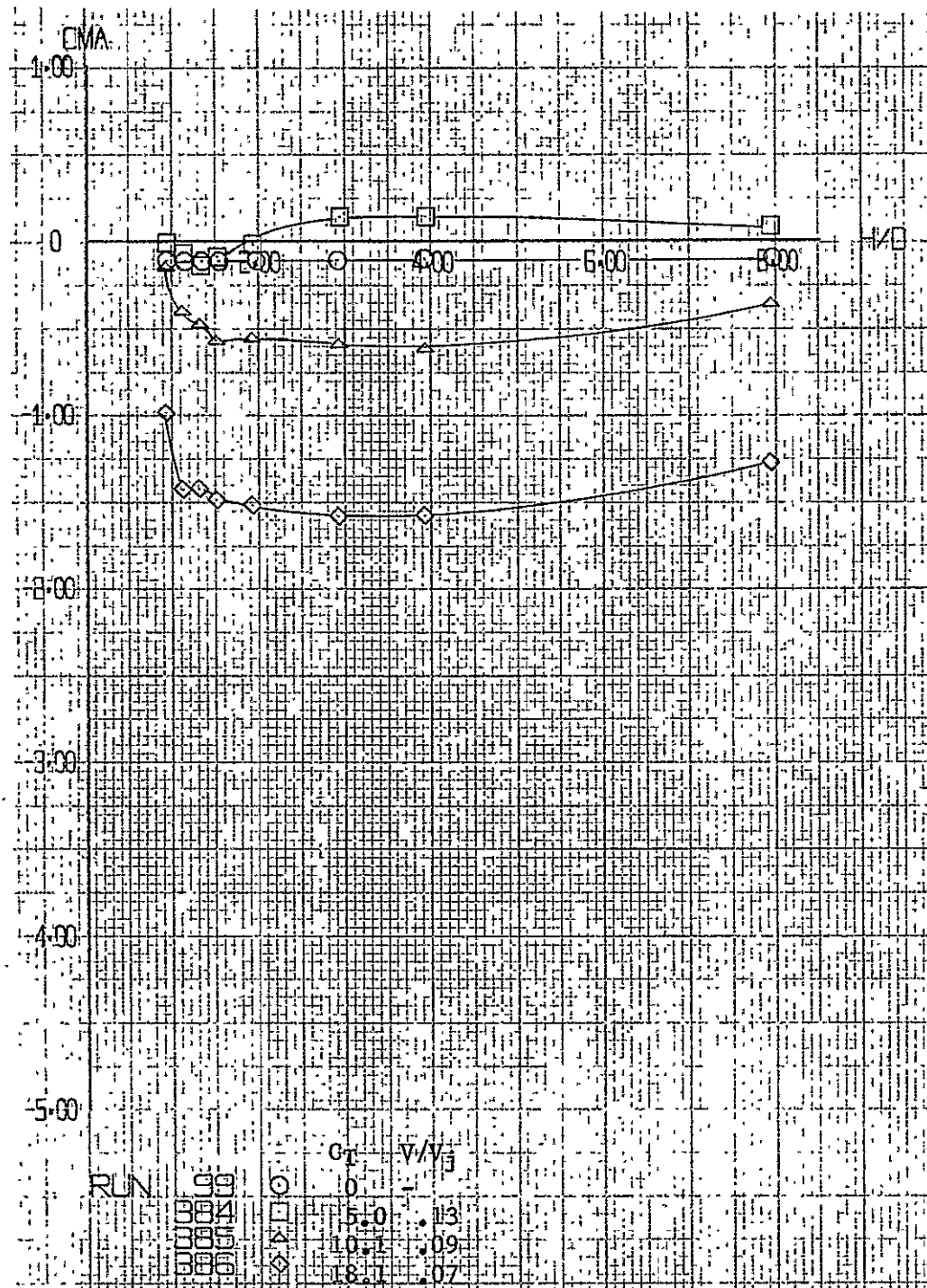


Figure A-52. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

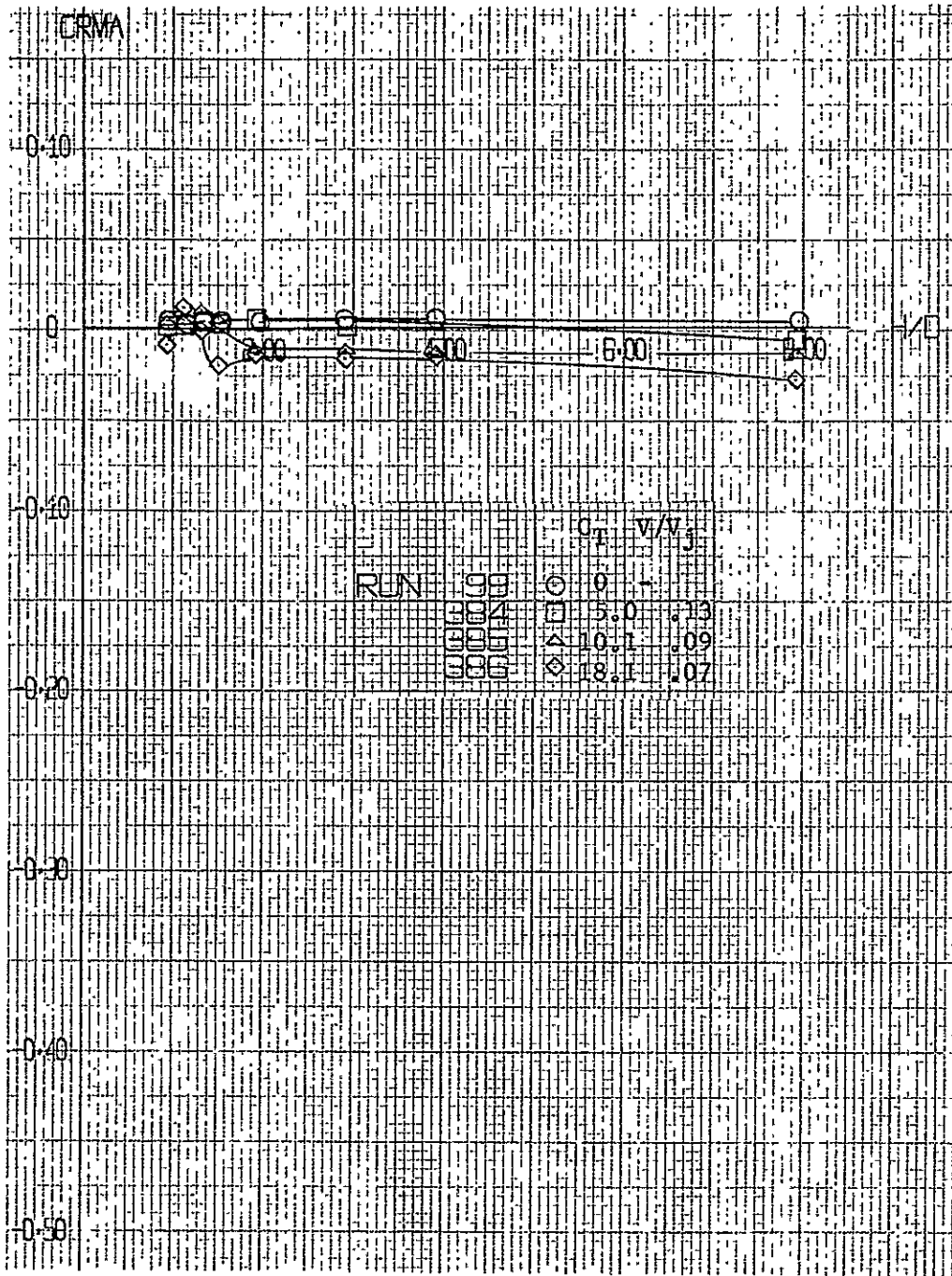


Figure A-52. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 2; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

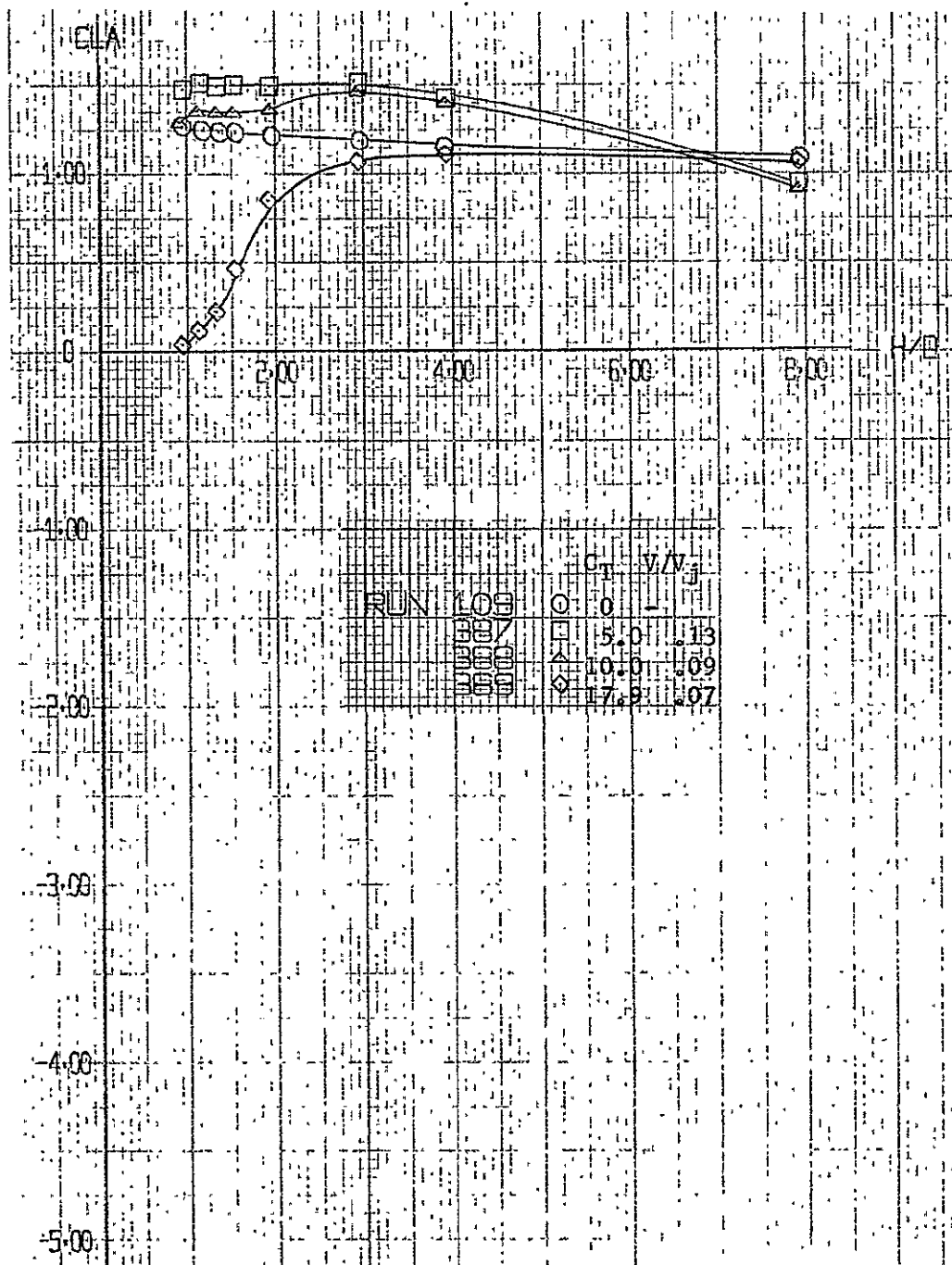


Figure A-53. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

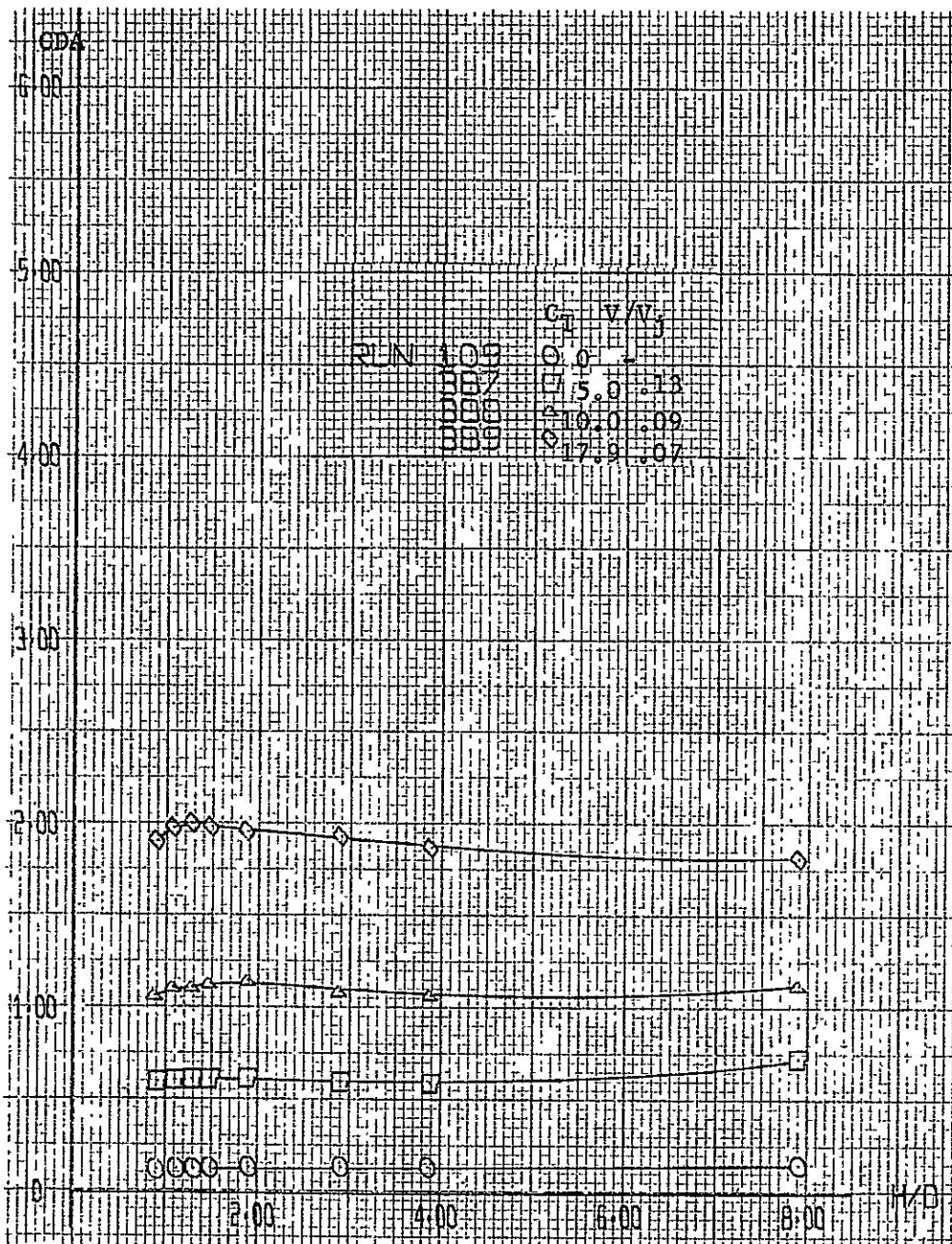


Figure A-53. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

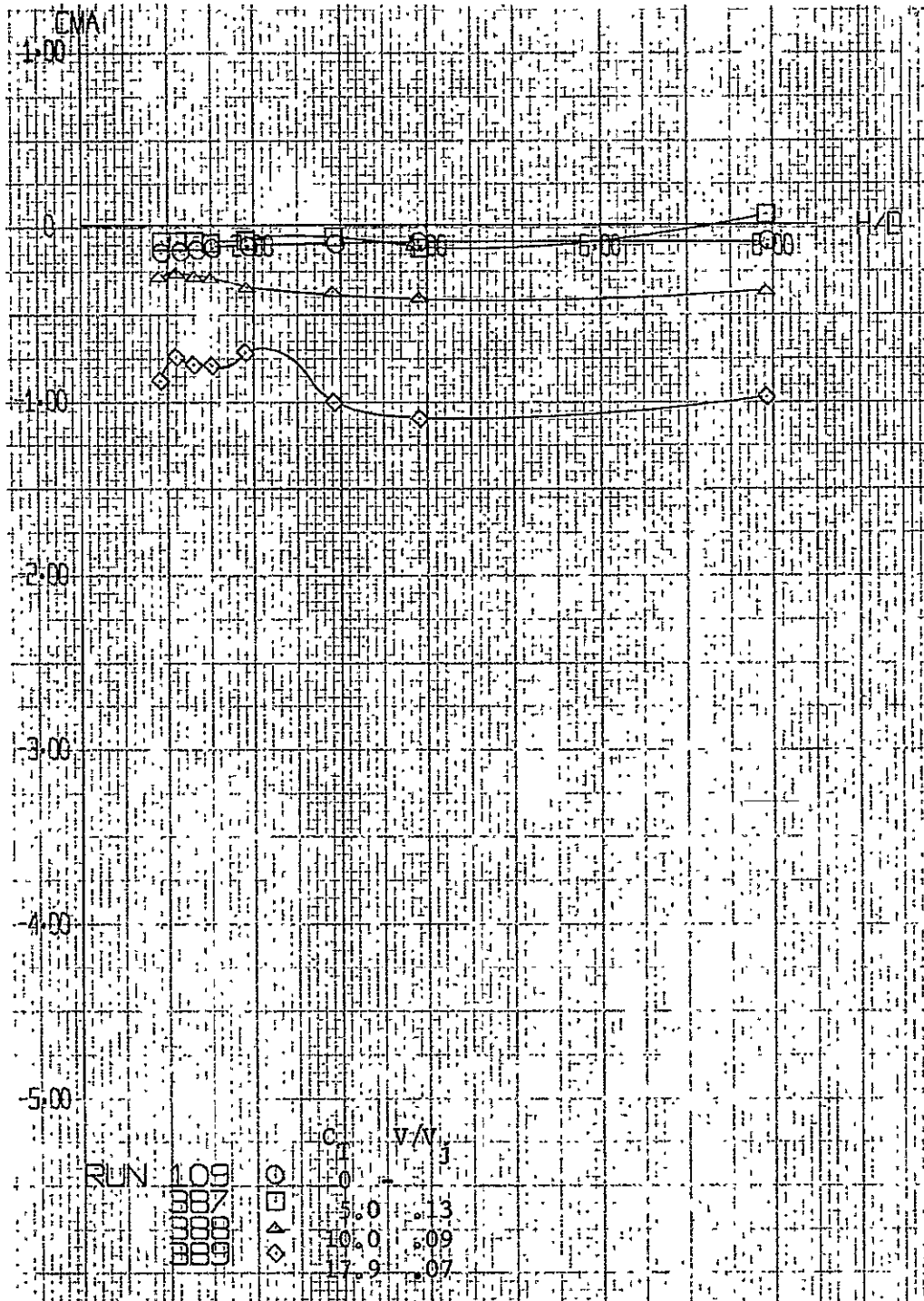


Figure A-53. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_{A_0} = 1.2$, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

ORIGINAL PAGE IS
OF POOR QUALITY

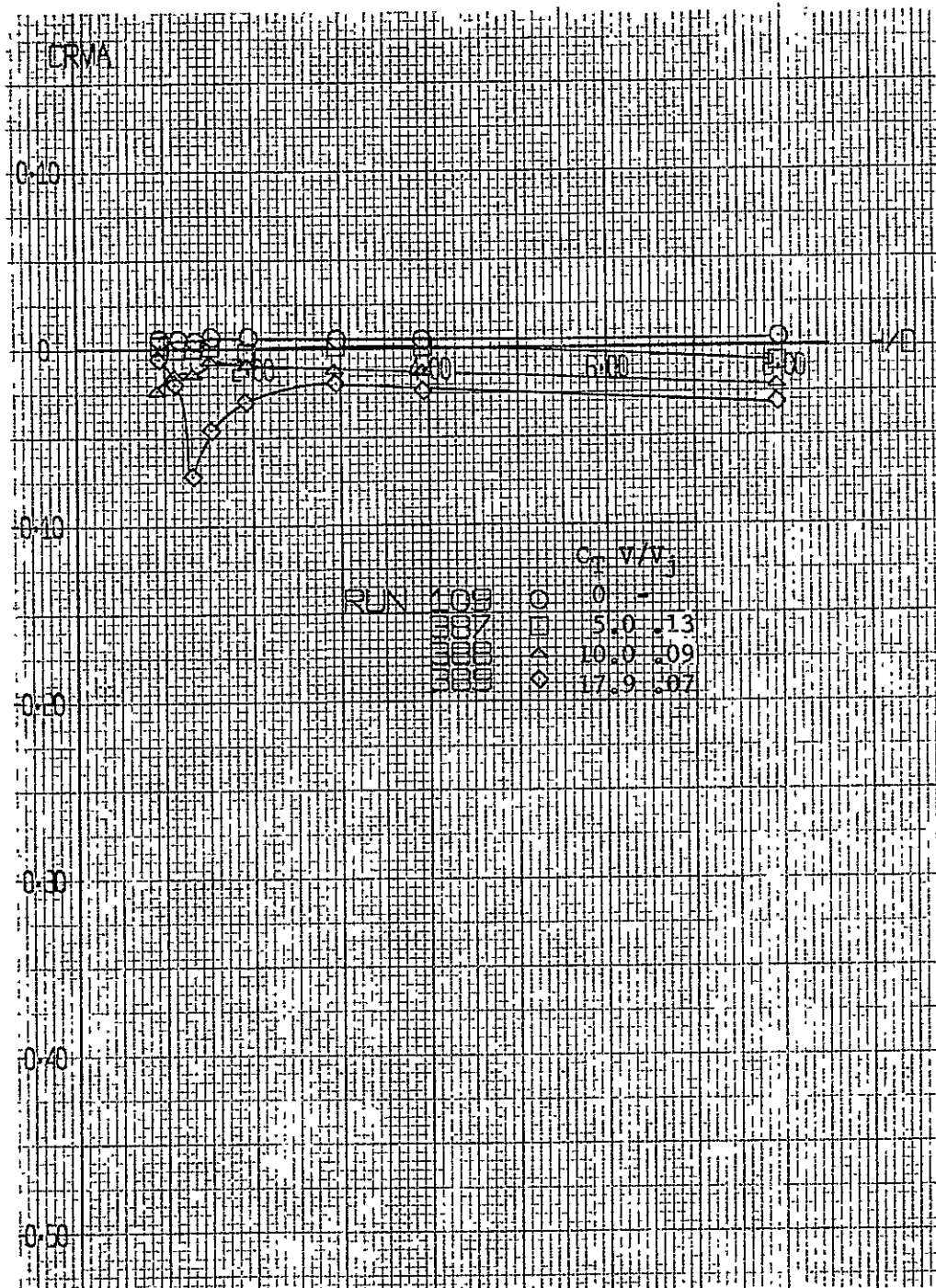


Figure A-53. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In, $T_F/T_A = 1.2$, Ground Board Configuration 3; $\delta_N = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

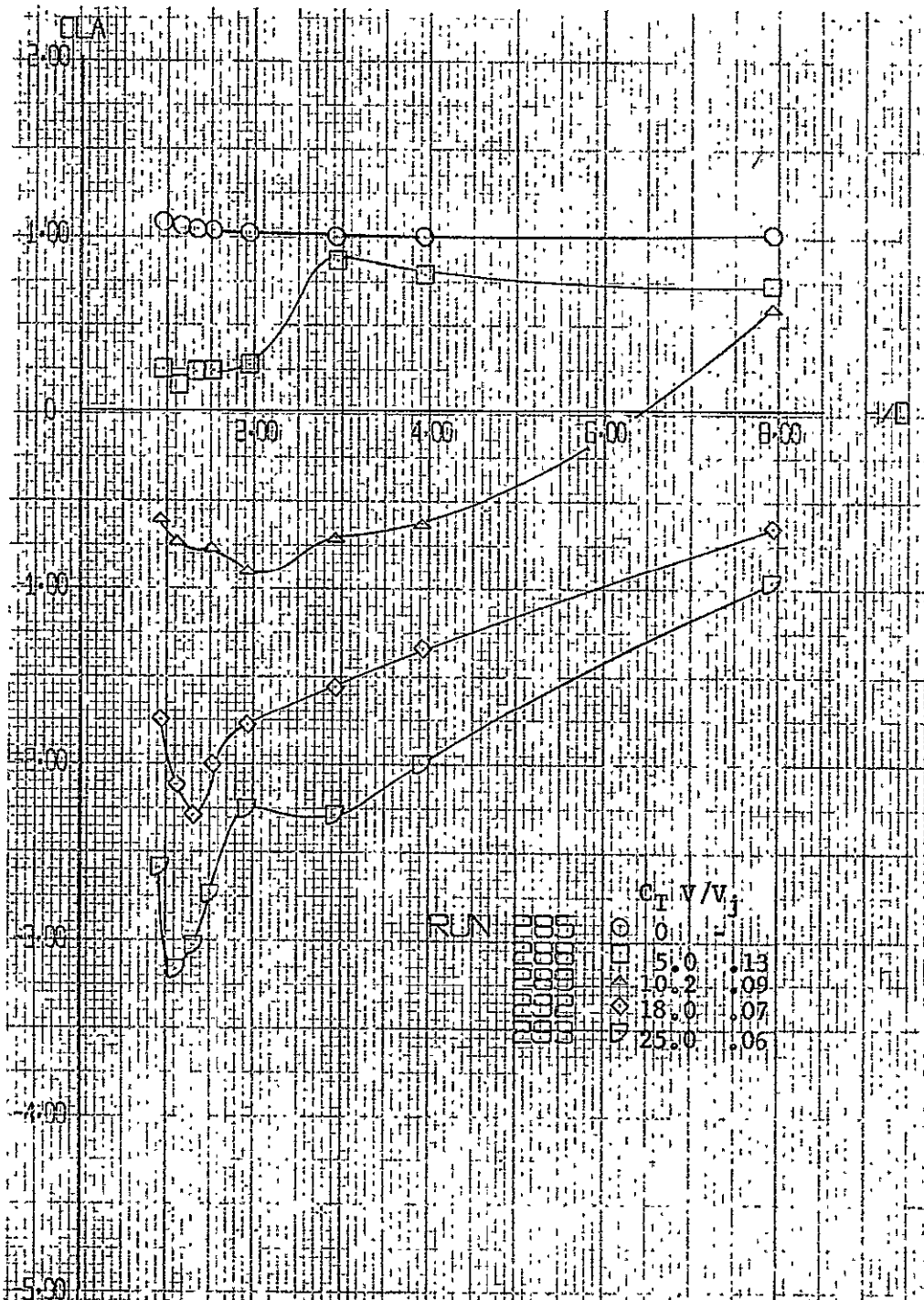


Figure A-54. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

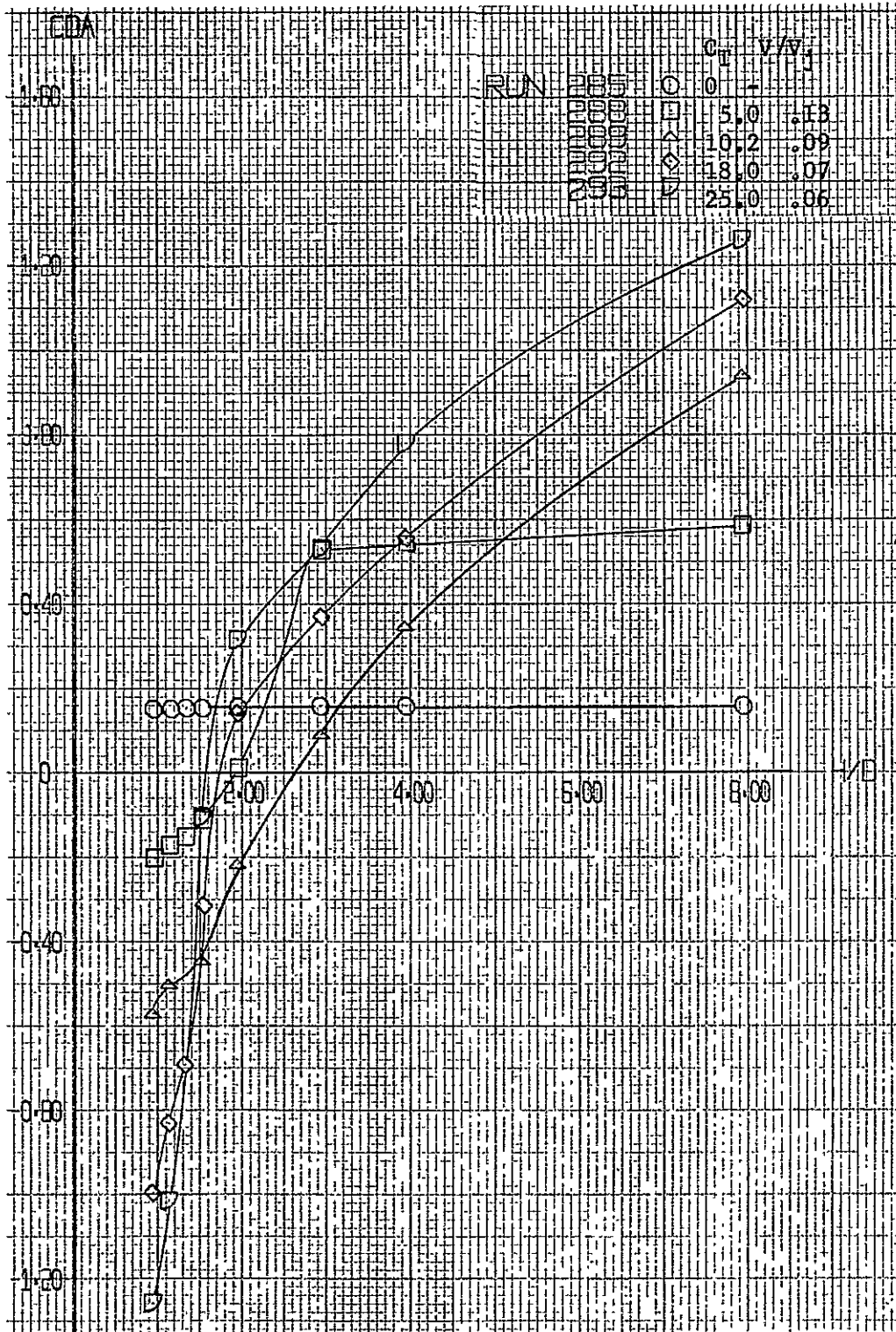


Figure A-54. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

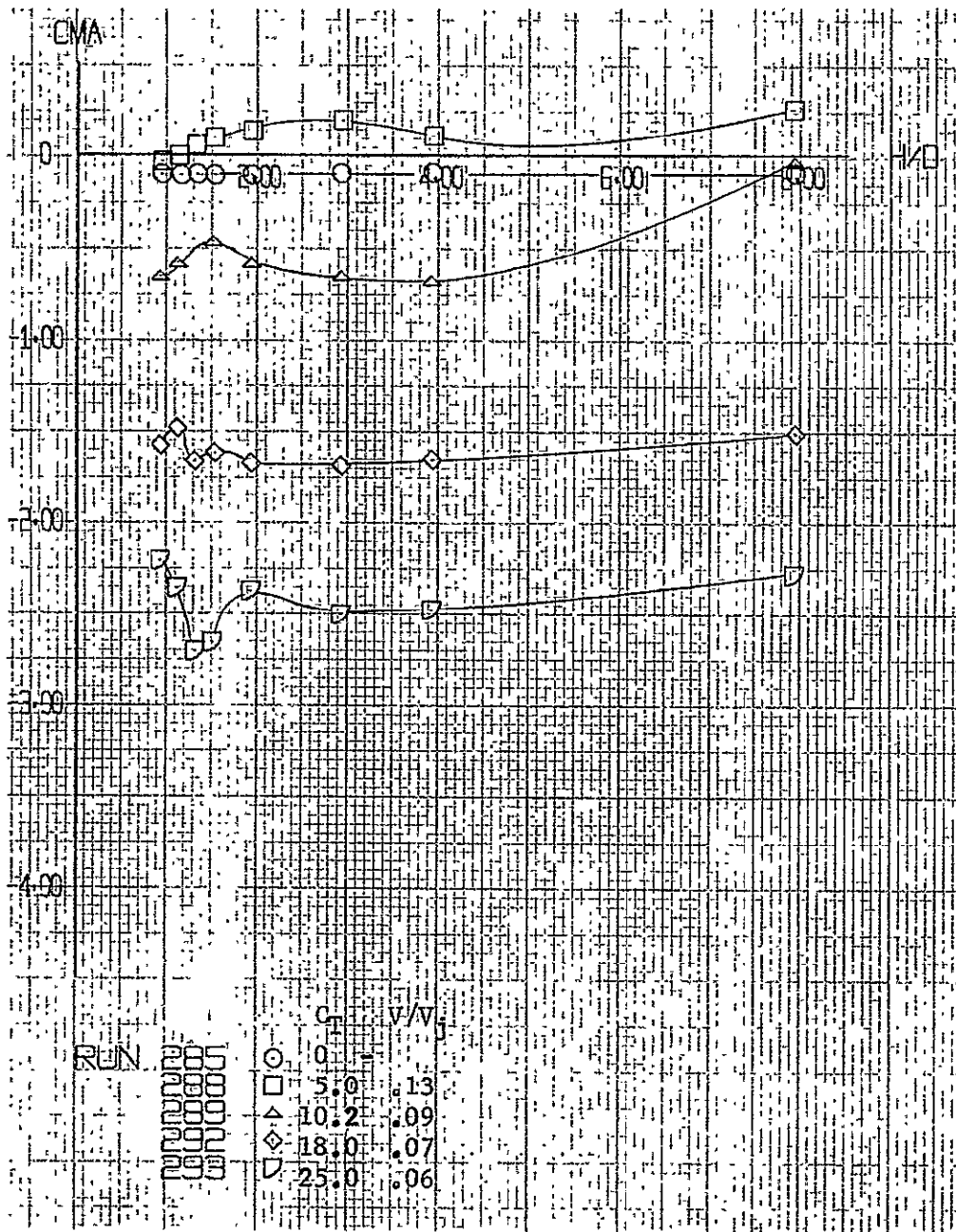


Figure A-54. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

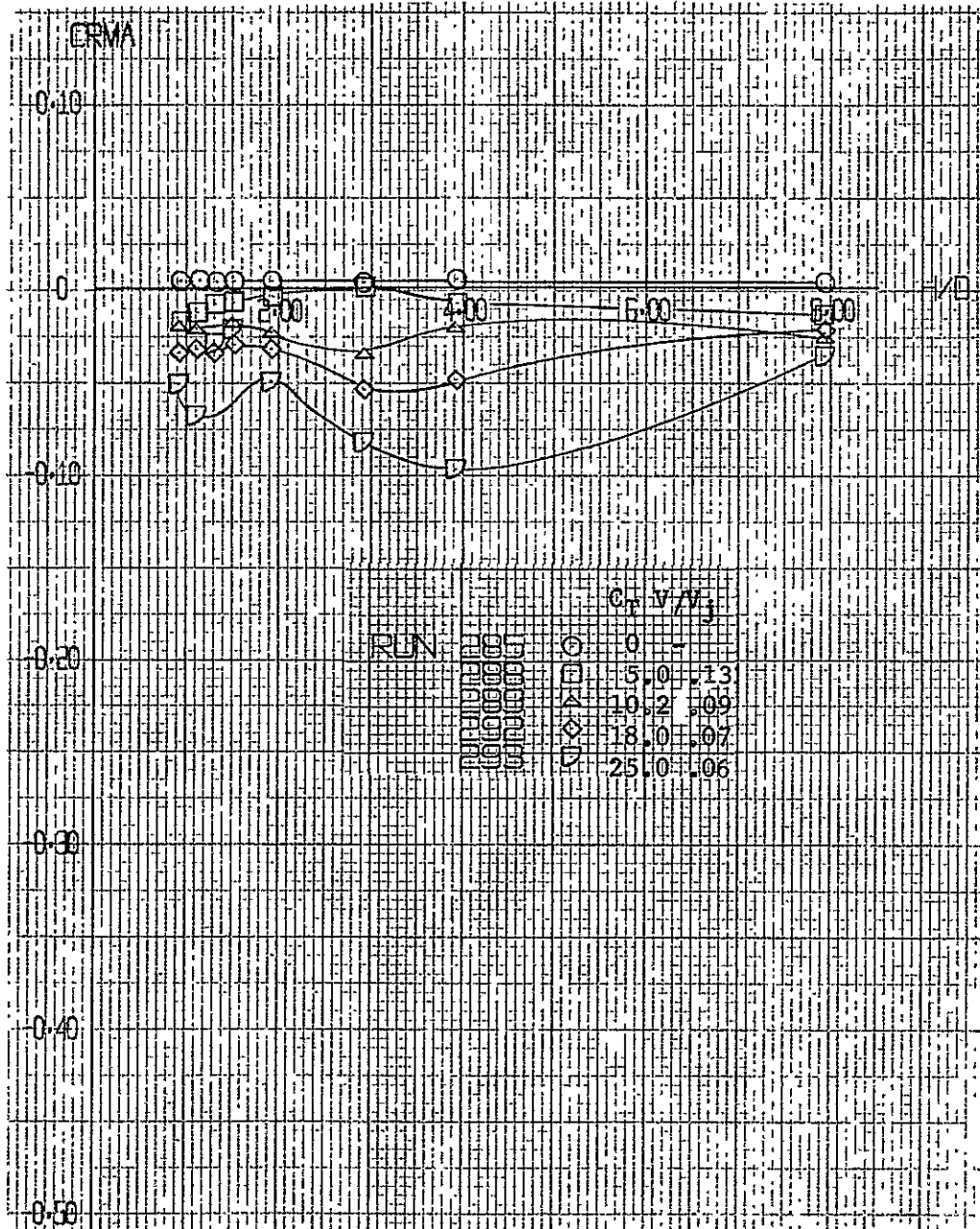


Figure A-54. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

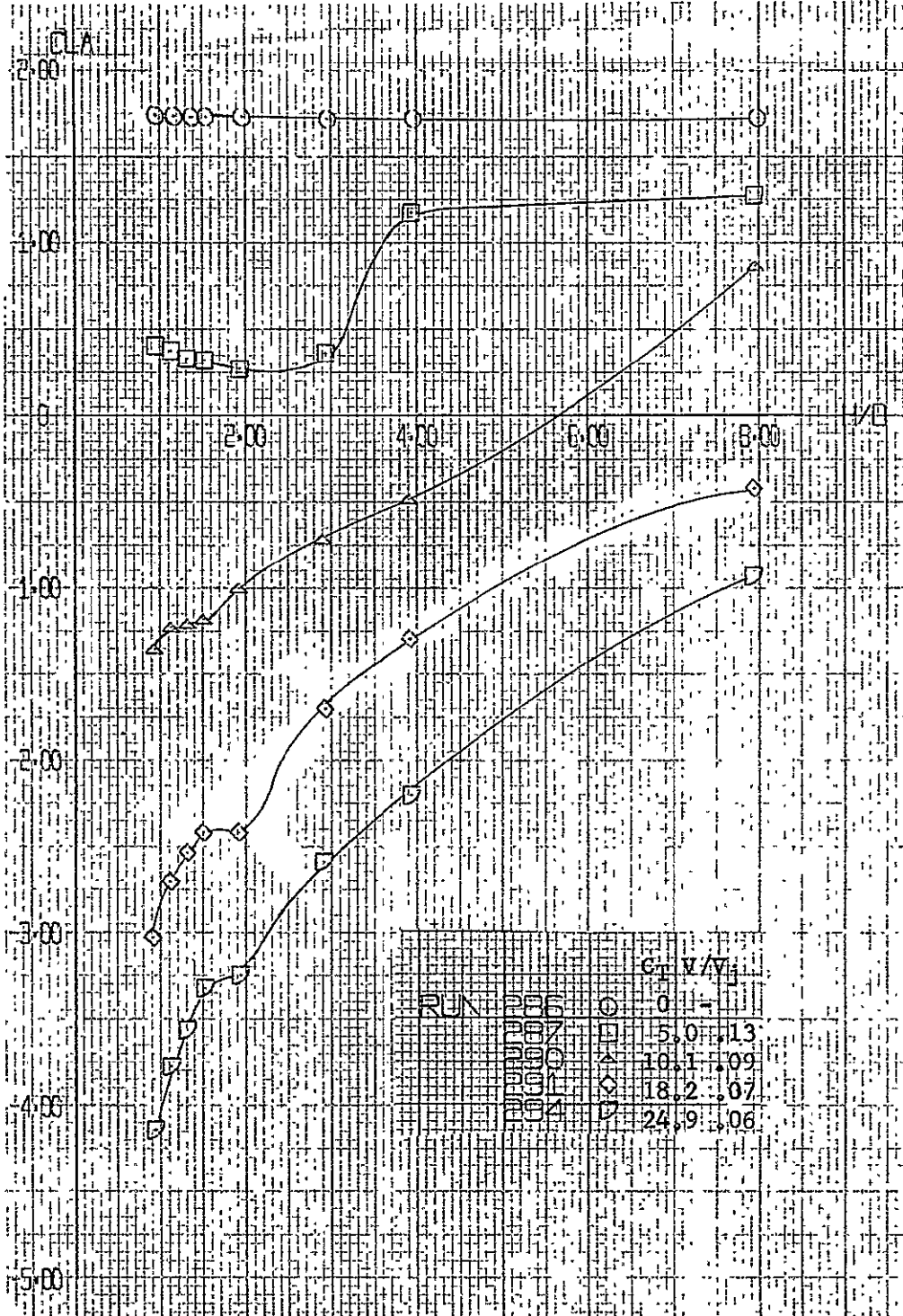


Figure A-55. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$

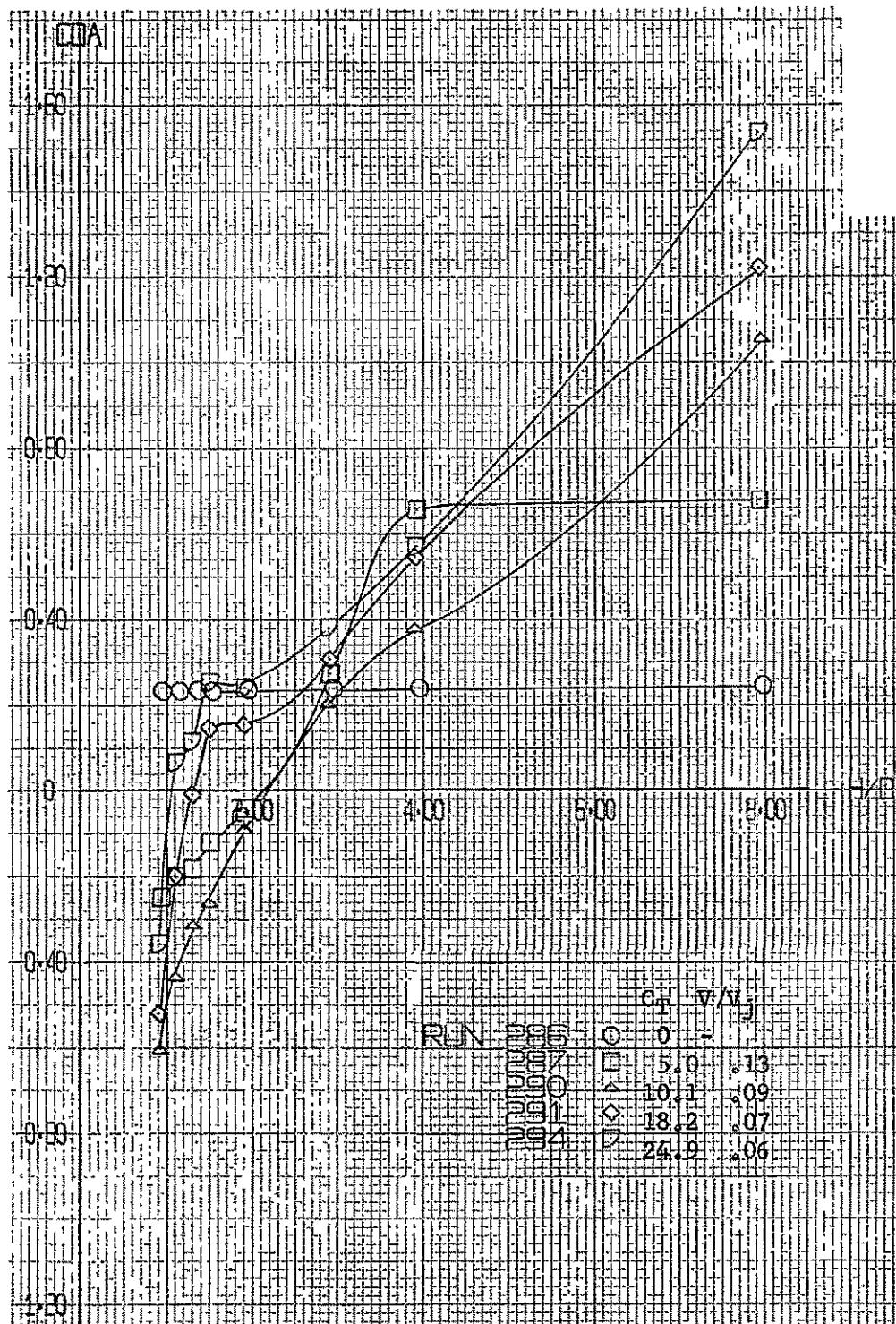


Figure A-55. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

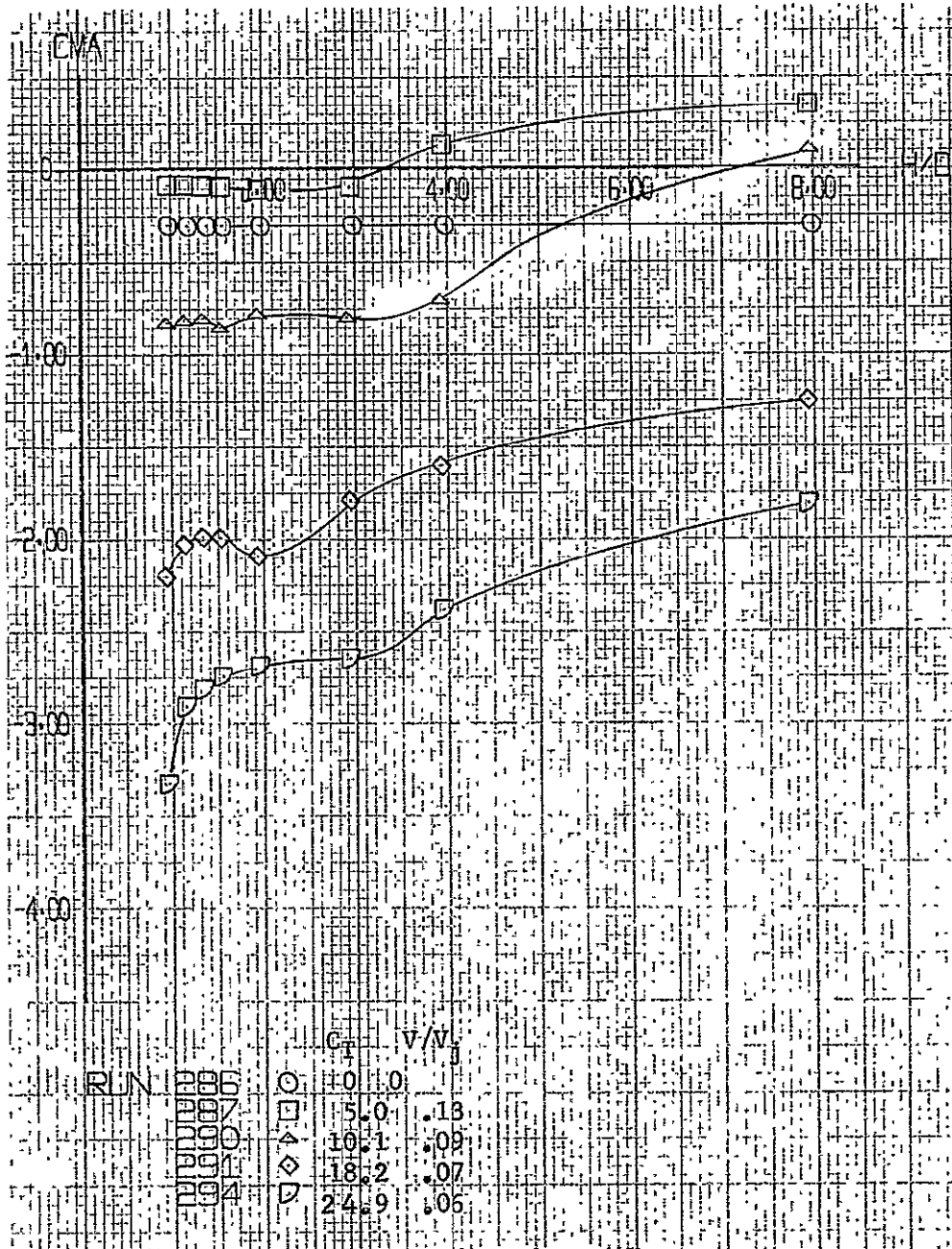


Figure A-55. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

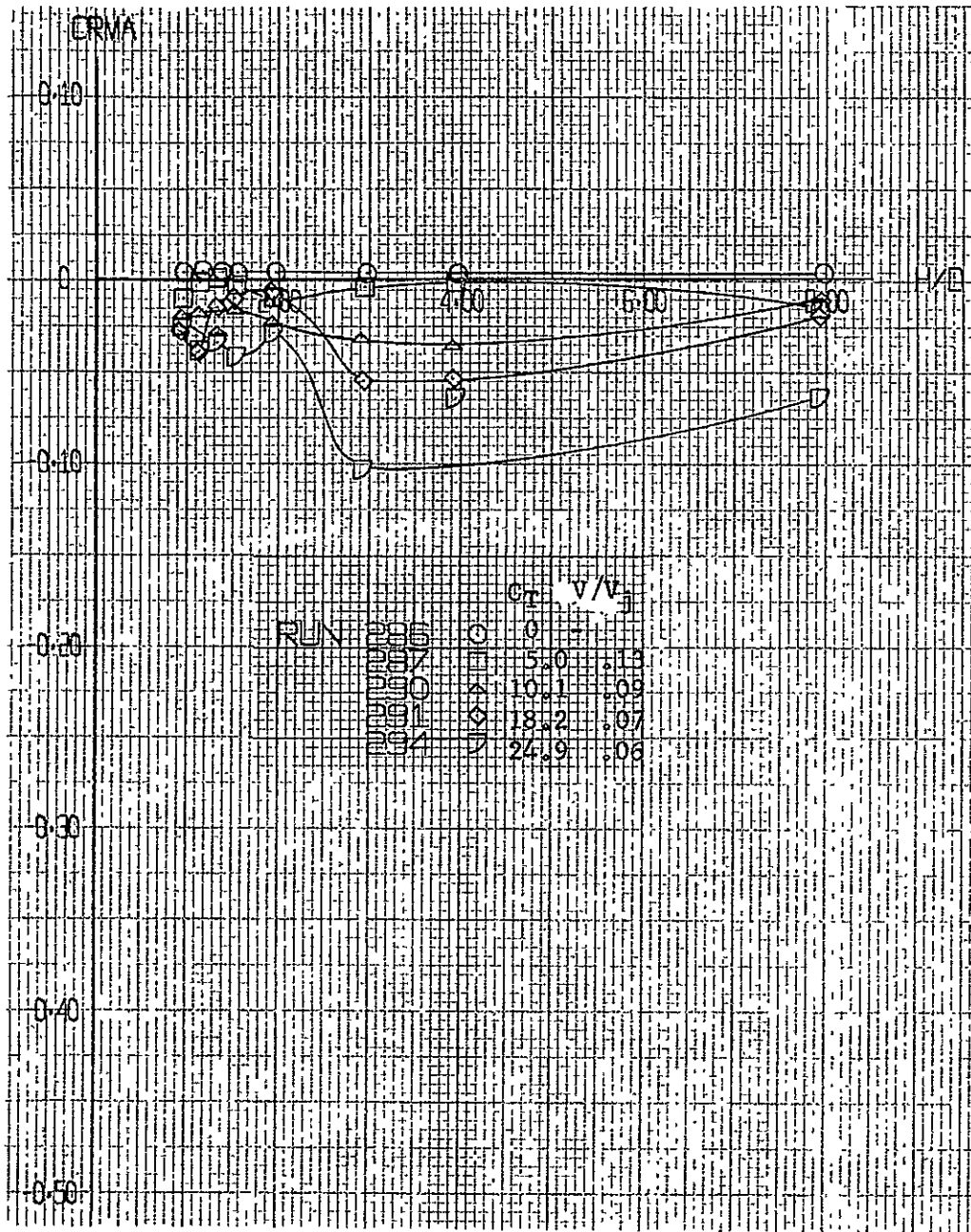


Figure A-55. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Concluded)

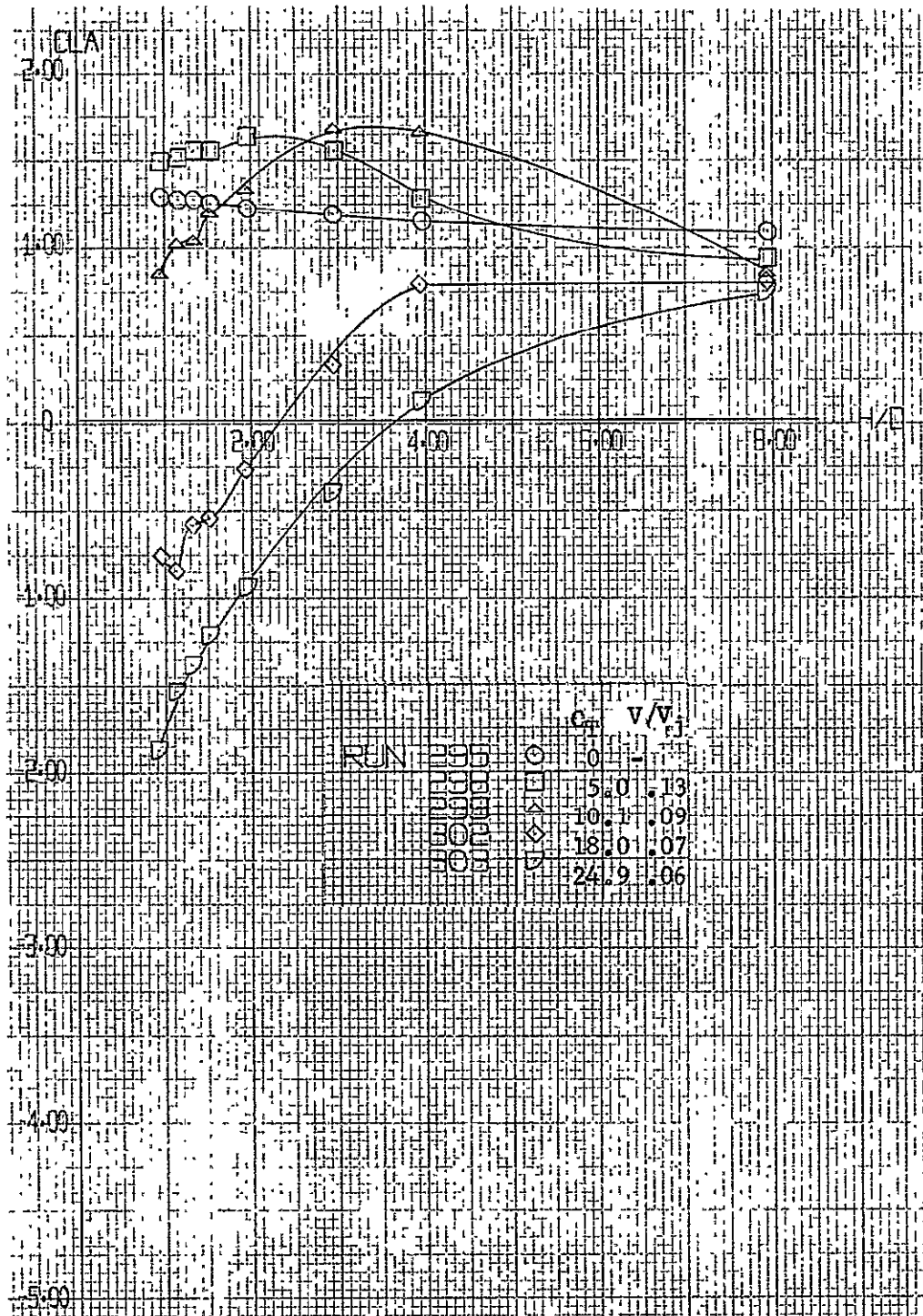


Figure A-56. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

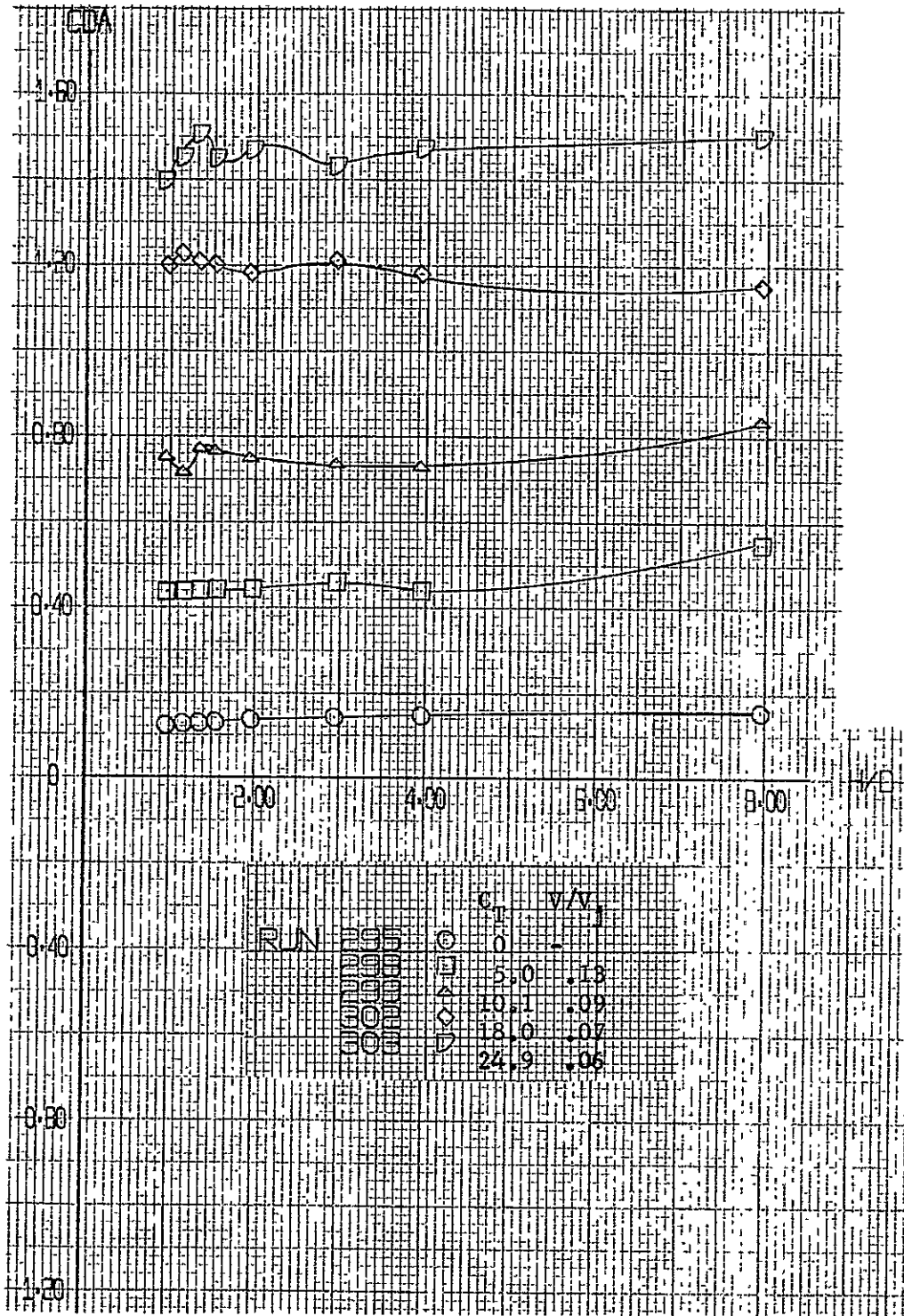


Figure A-56. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

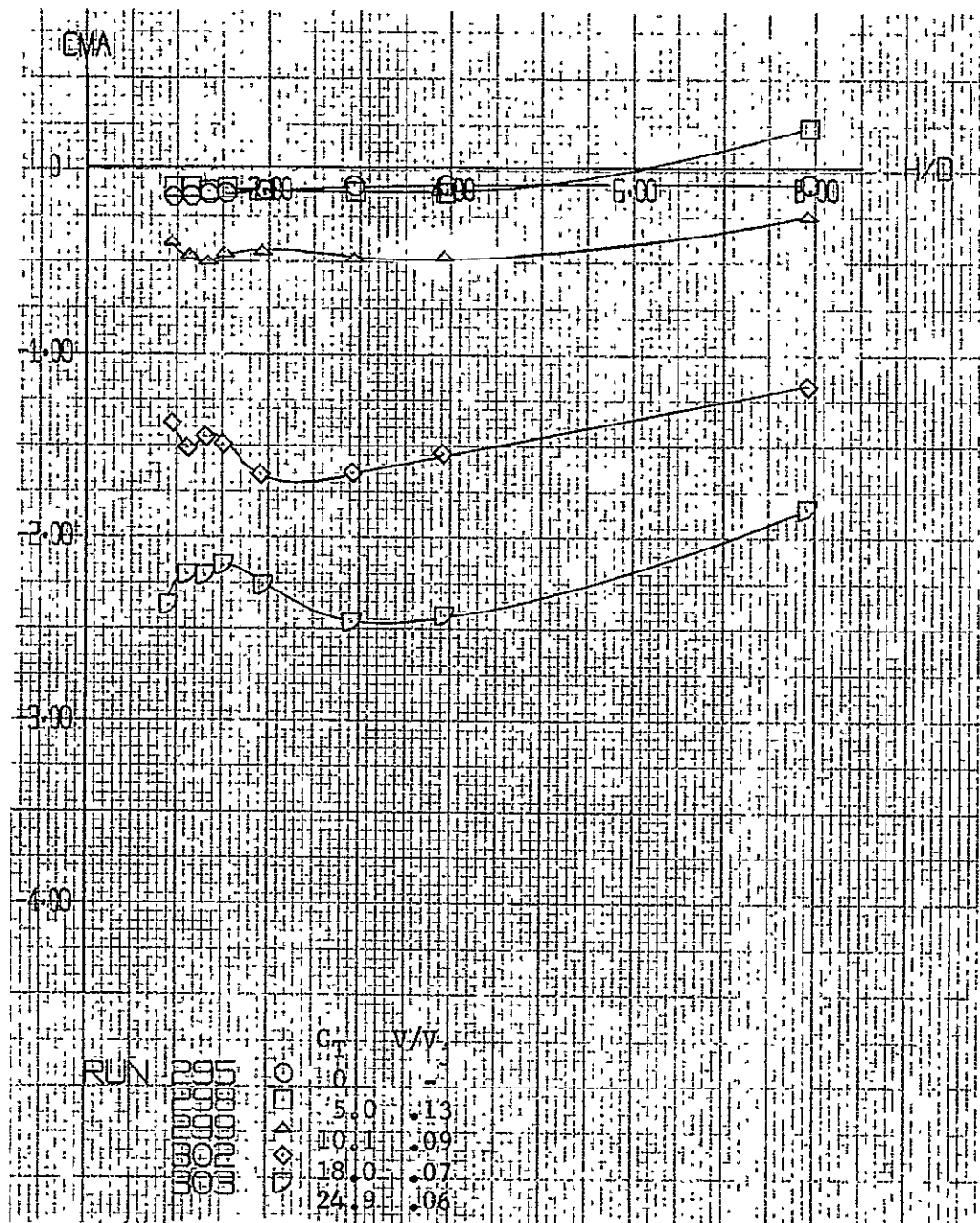


Figure A-56. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

ORIGINAL PAGE IS
OF POOR QUALITY

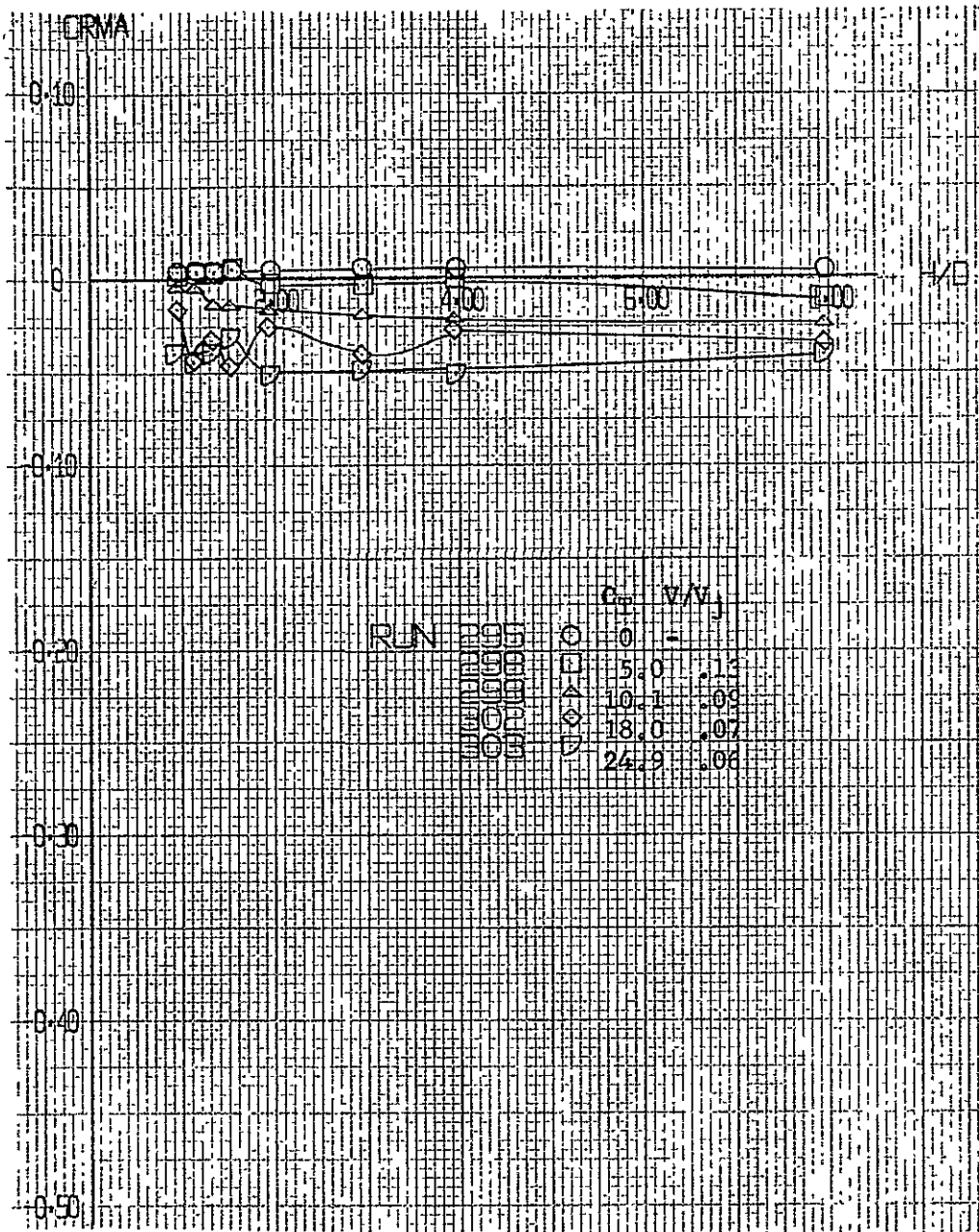


Figure A-56. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

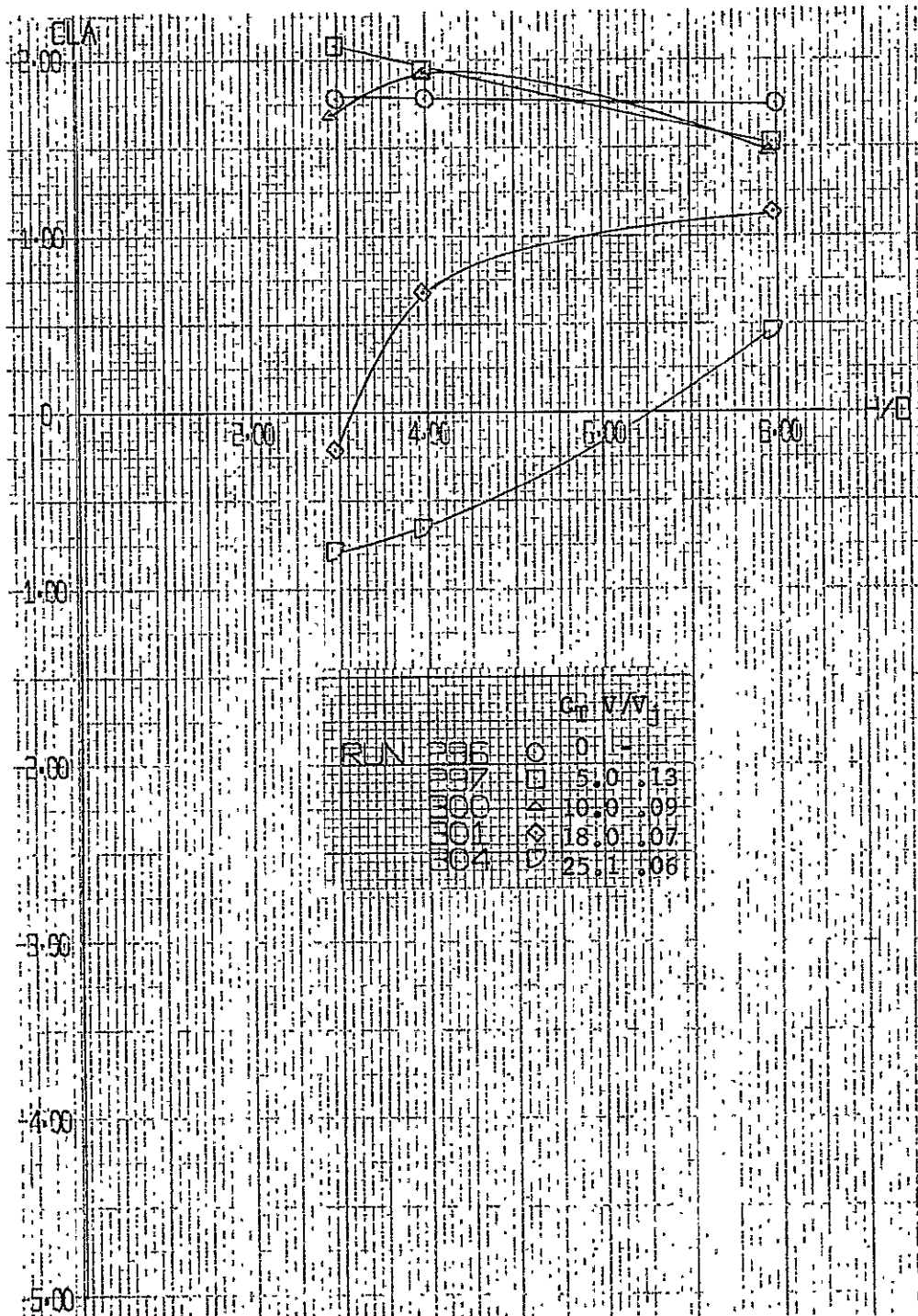


Figure A-57. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_{NT} = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$

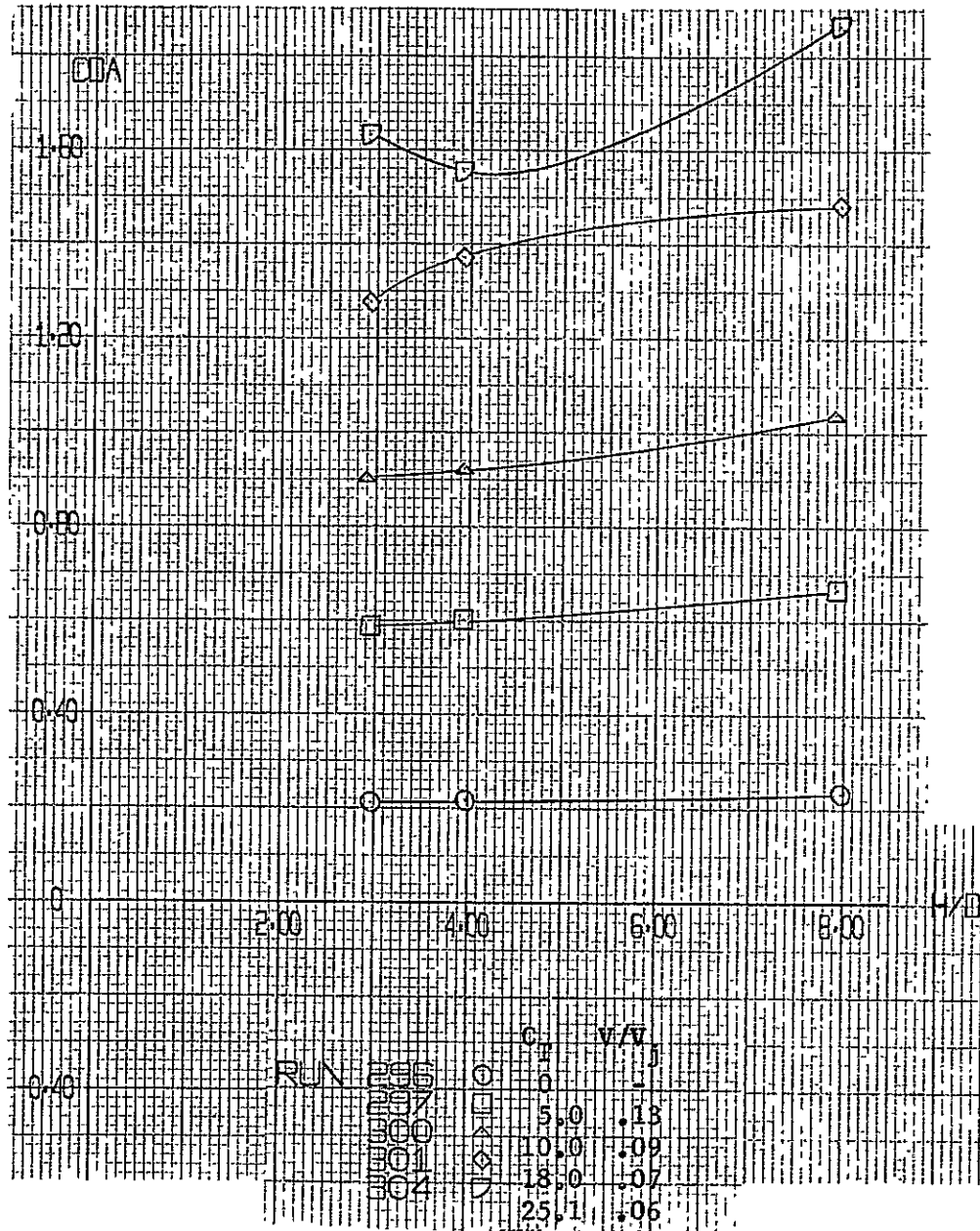


Figure A-57. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

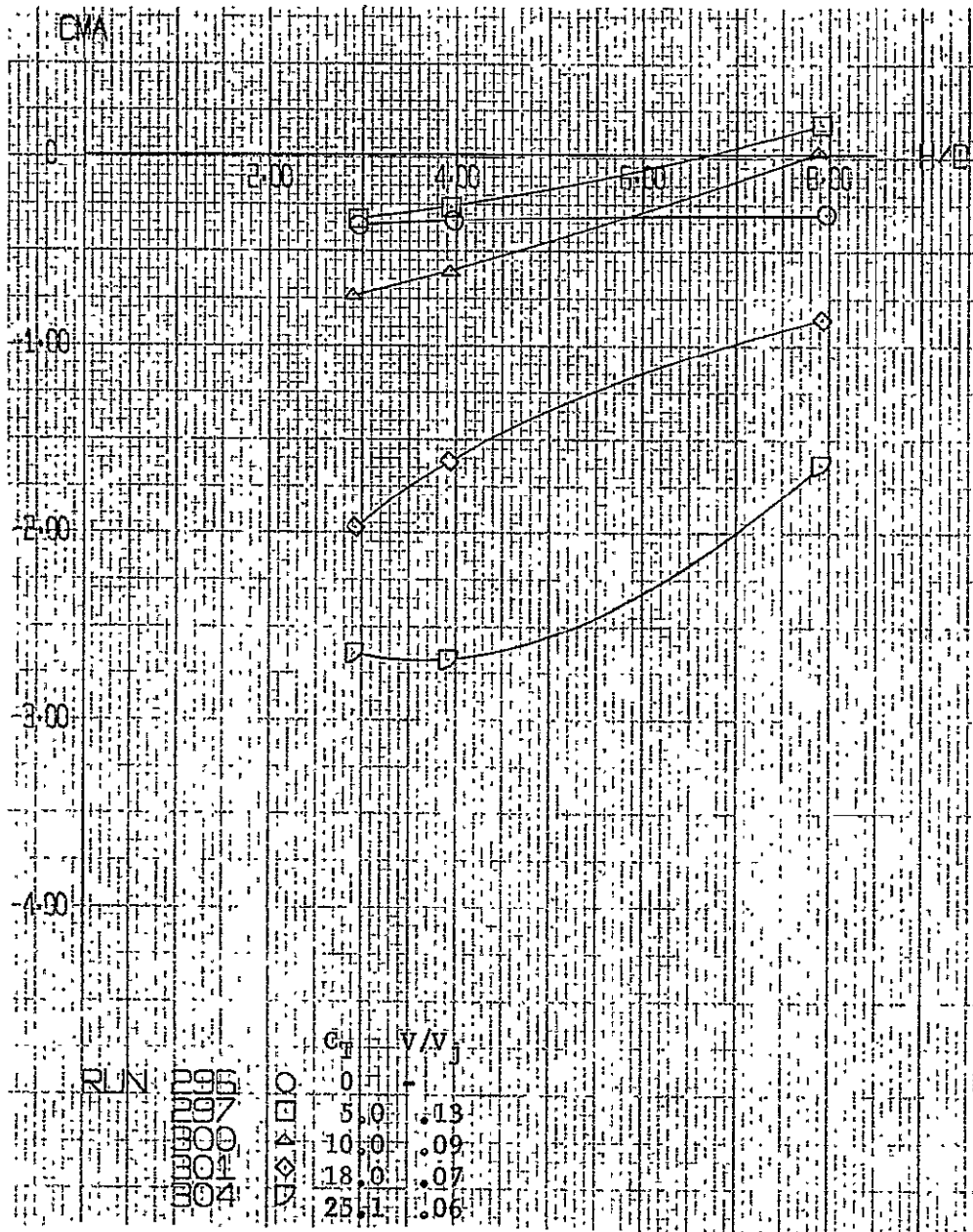


Figure A-57. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

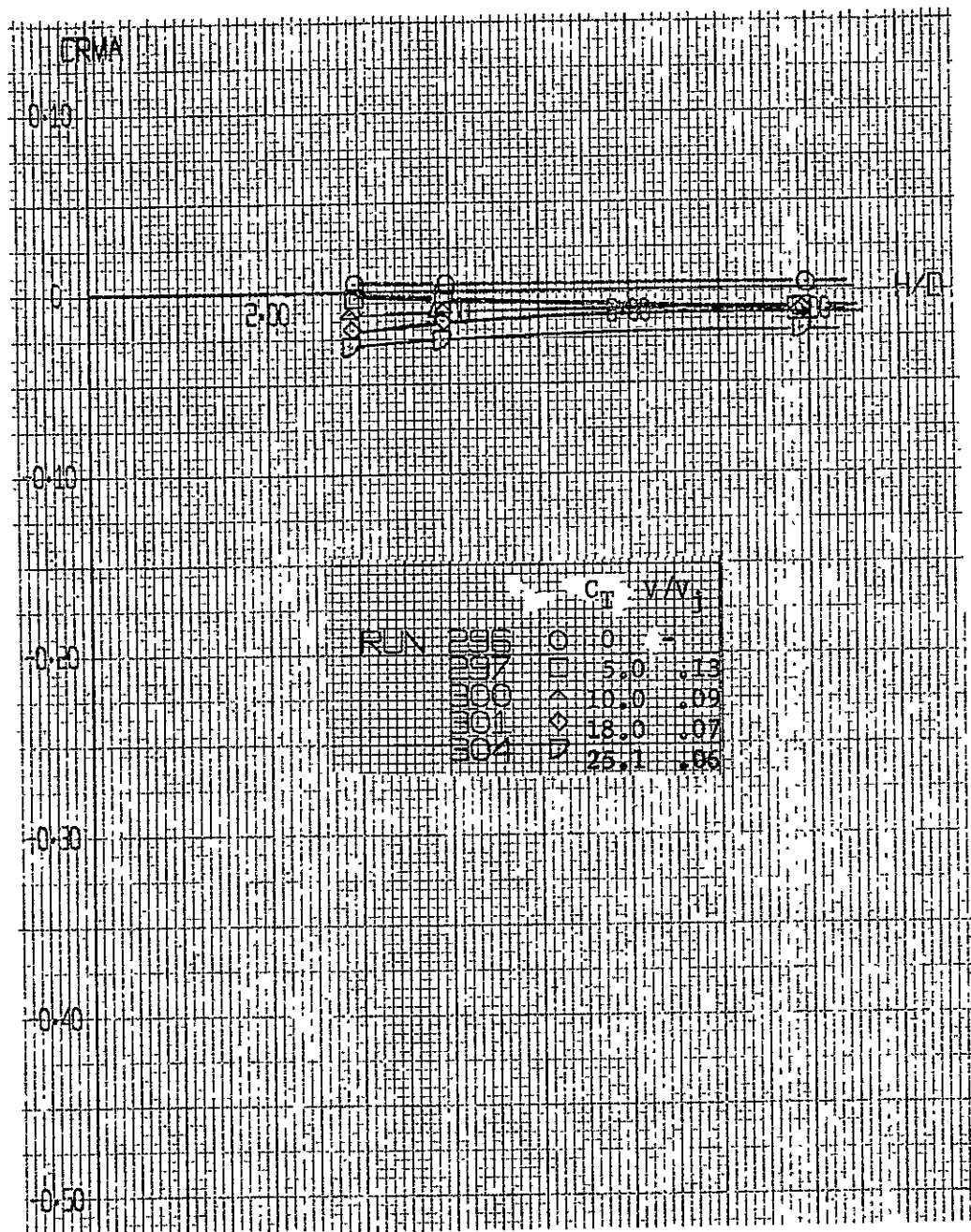


Figure A-57. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\theta = 0^\circ$ (Concluded)

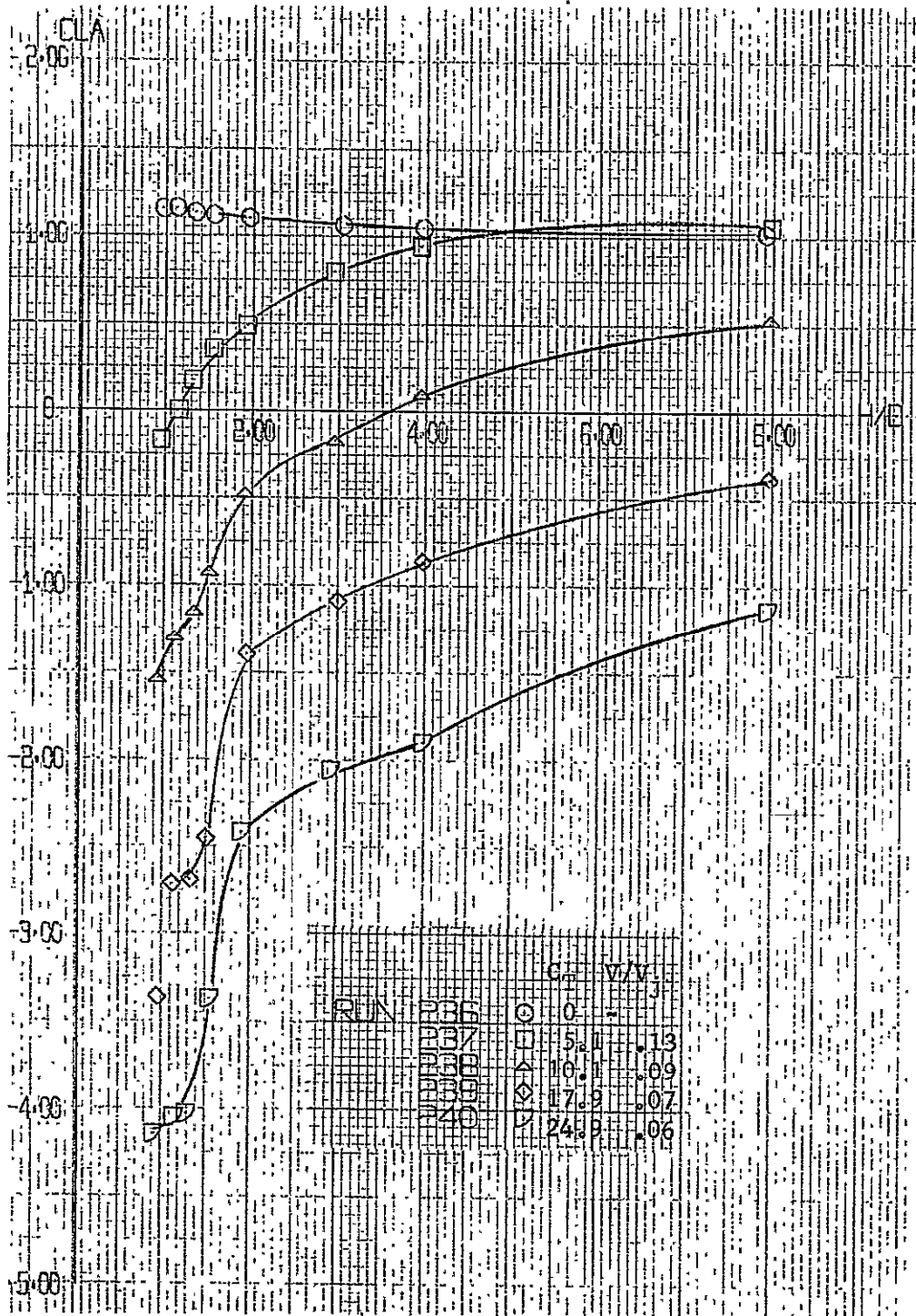


Figure A-58. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

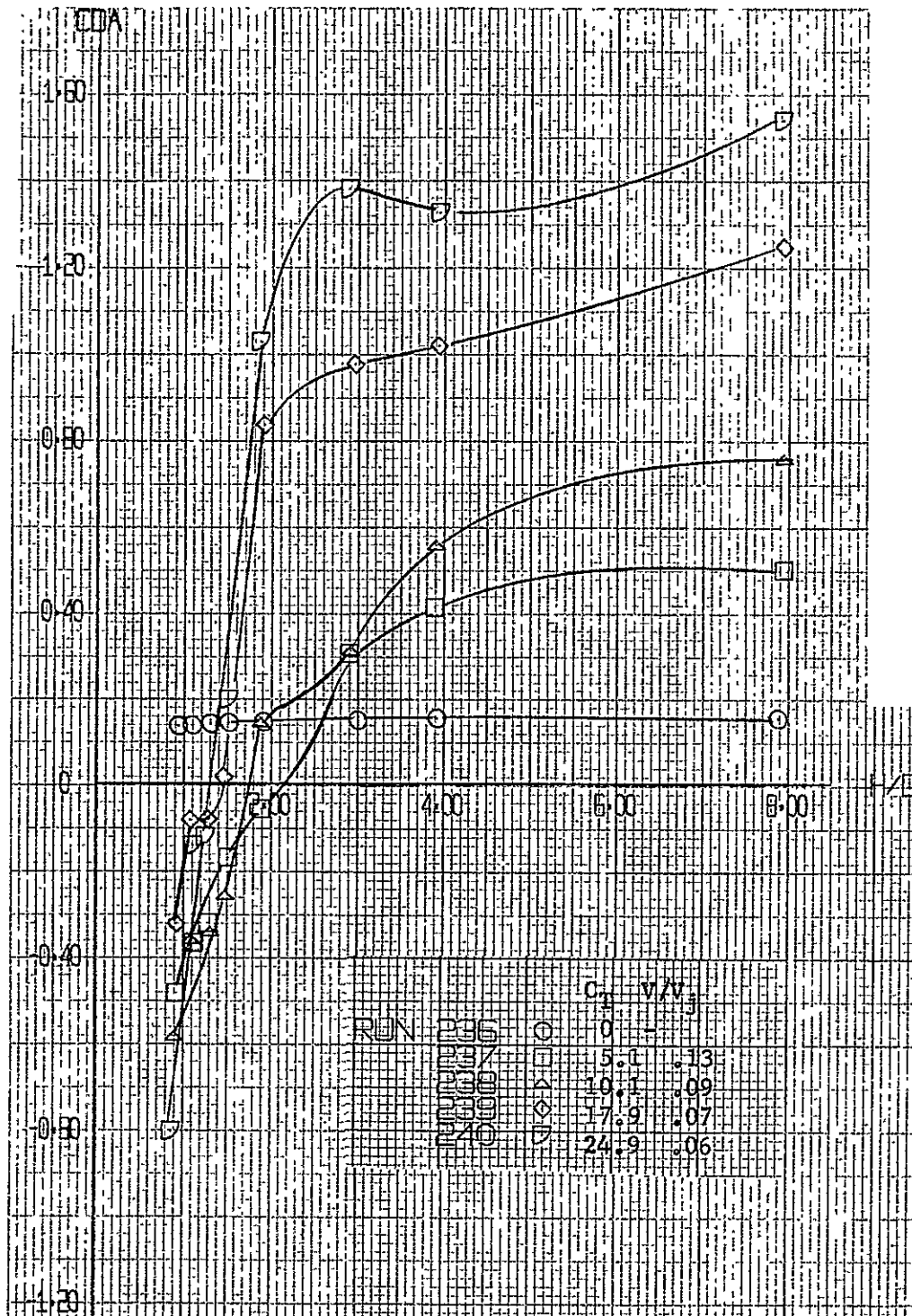


Figure A-58. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Continued)

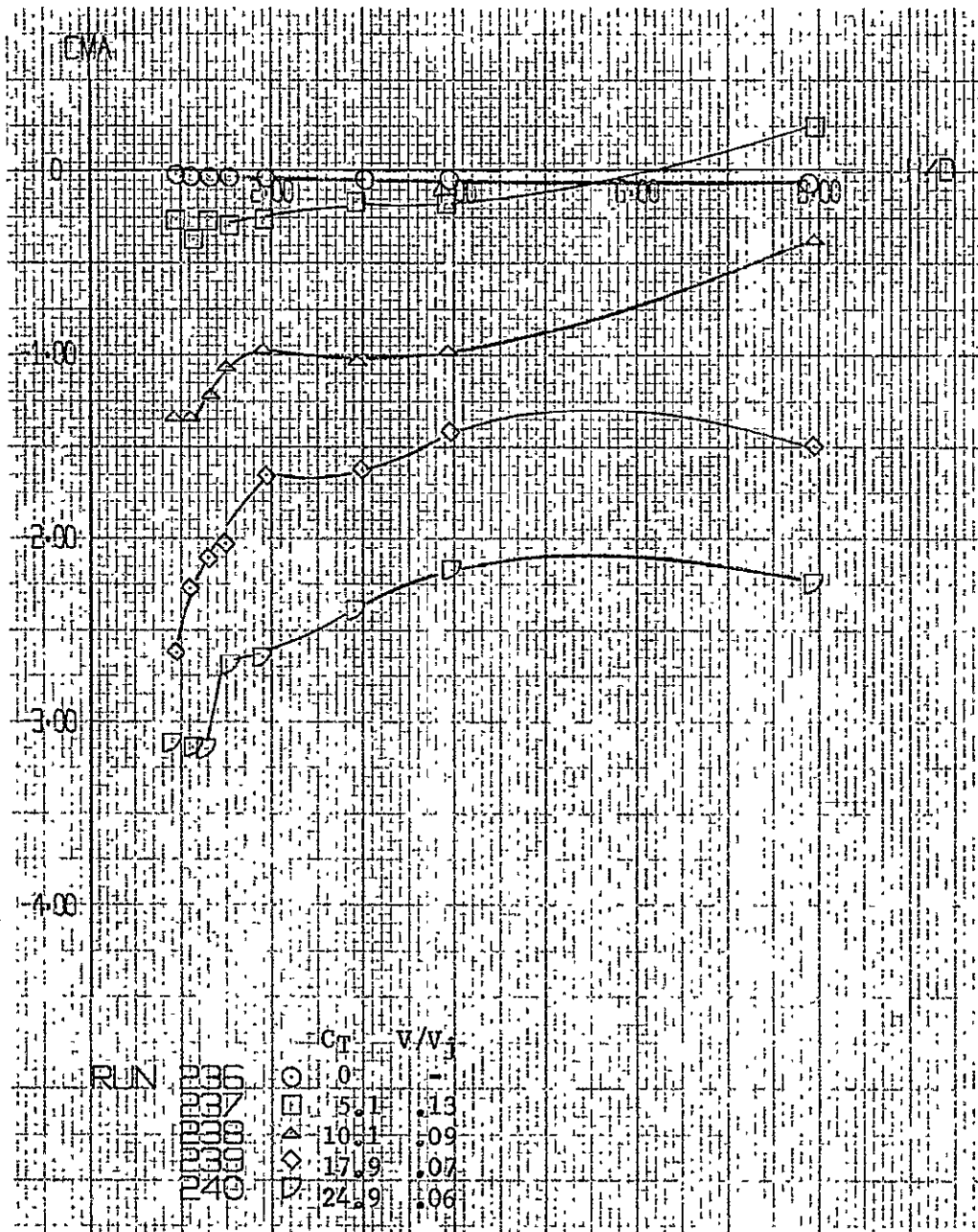


Figure A-58. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

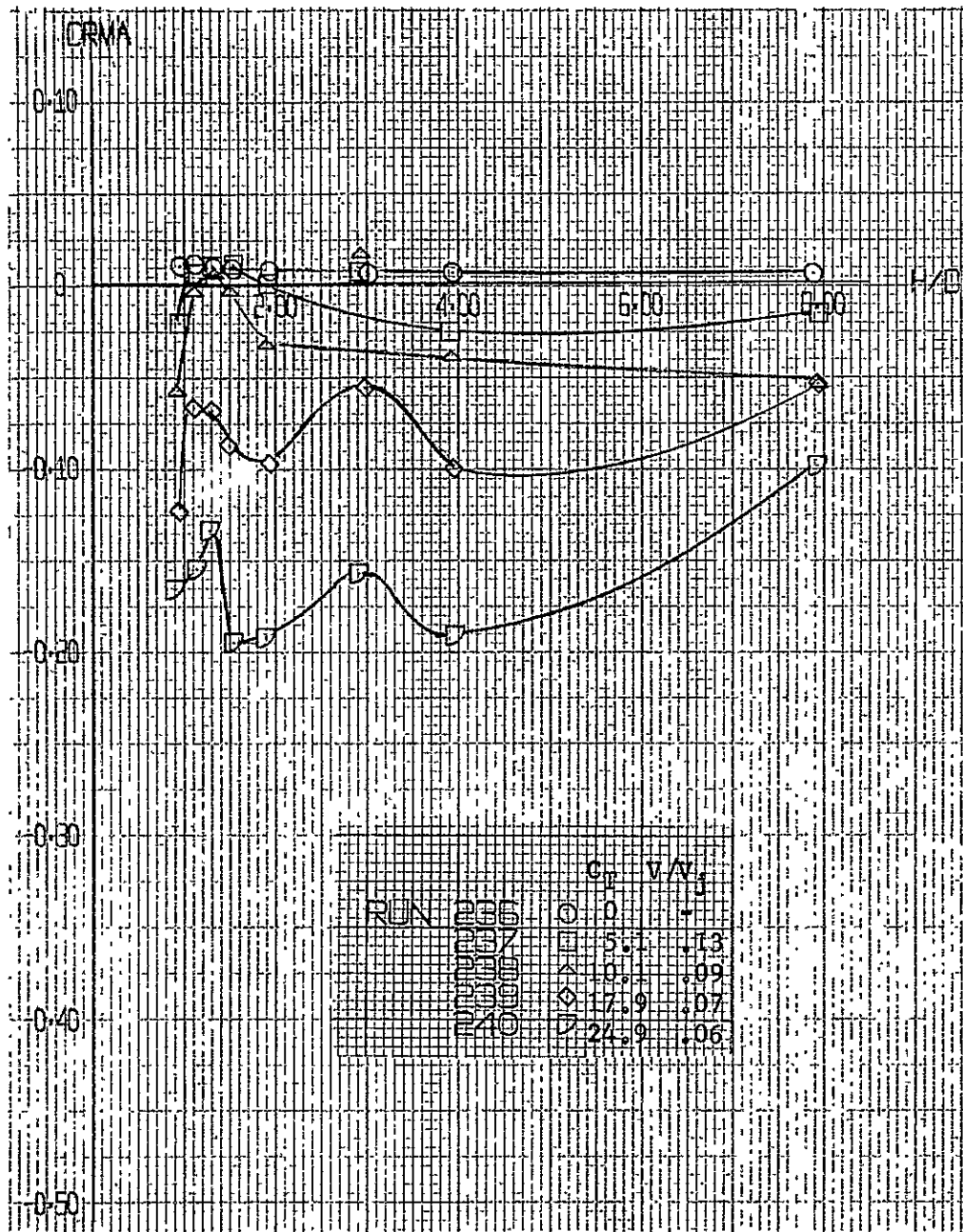


Figure A-58. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Concluded)

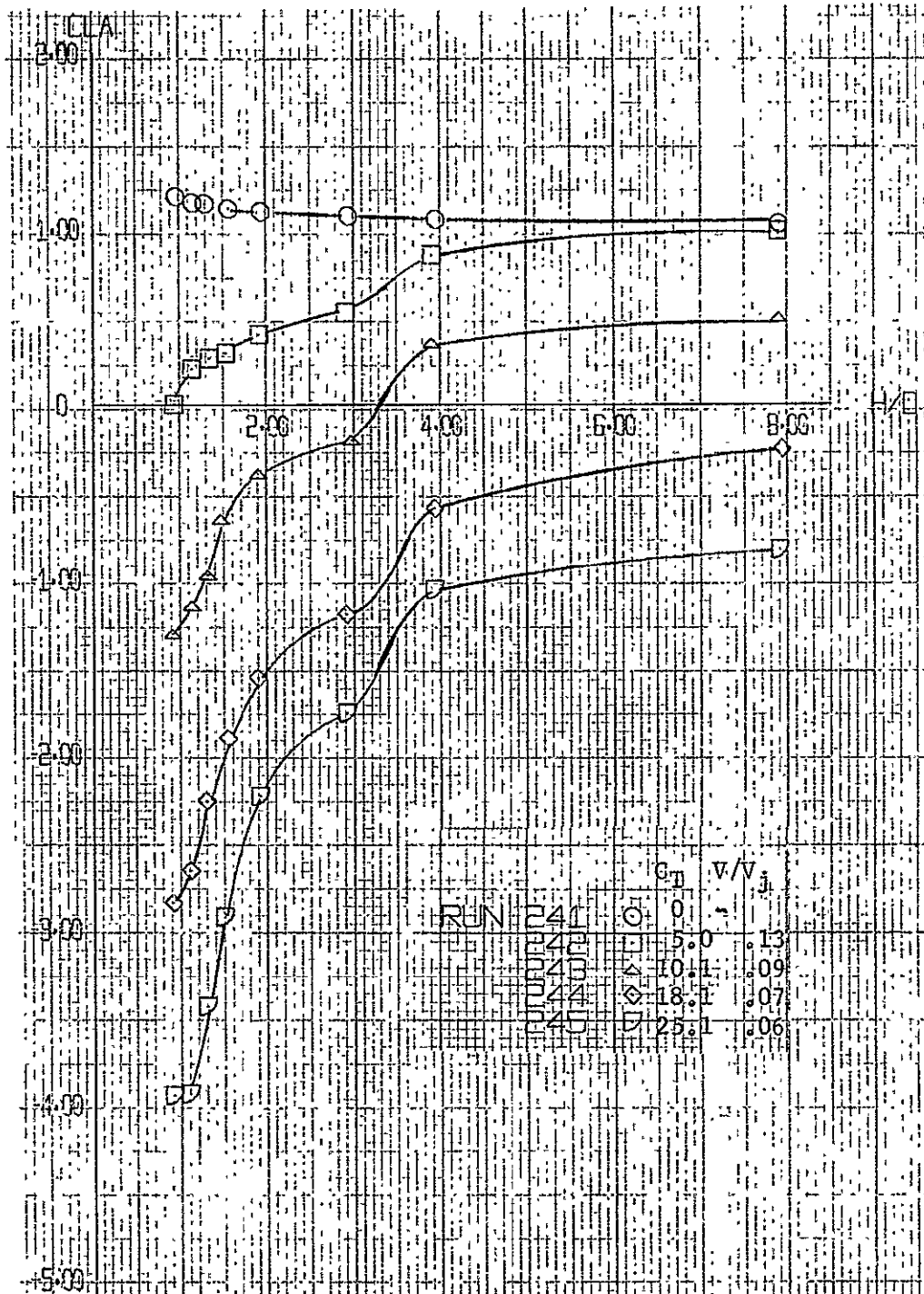


Figure A-59. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$

ORIGINAL PAGE IS
OF FOUR PARTS

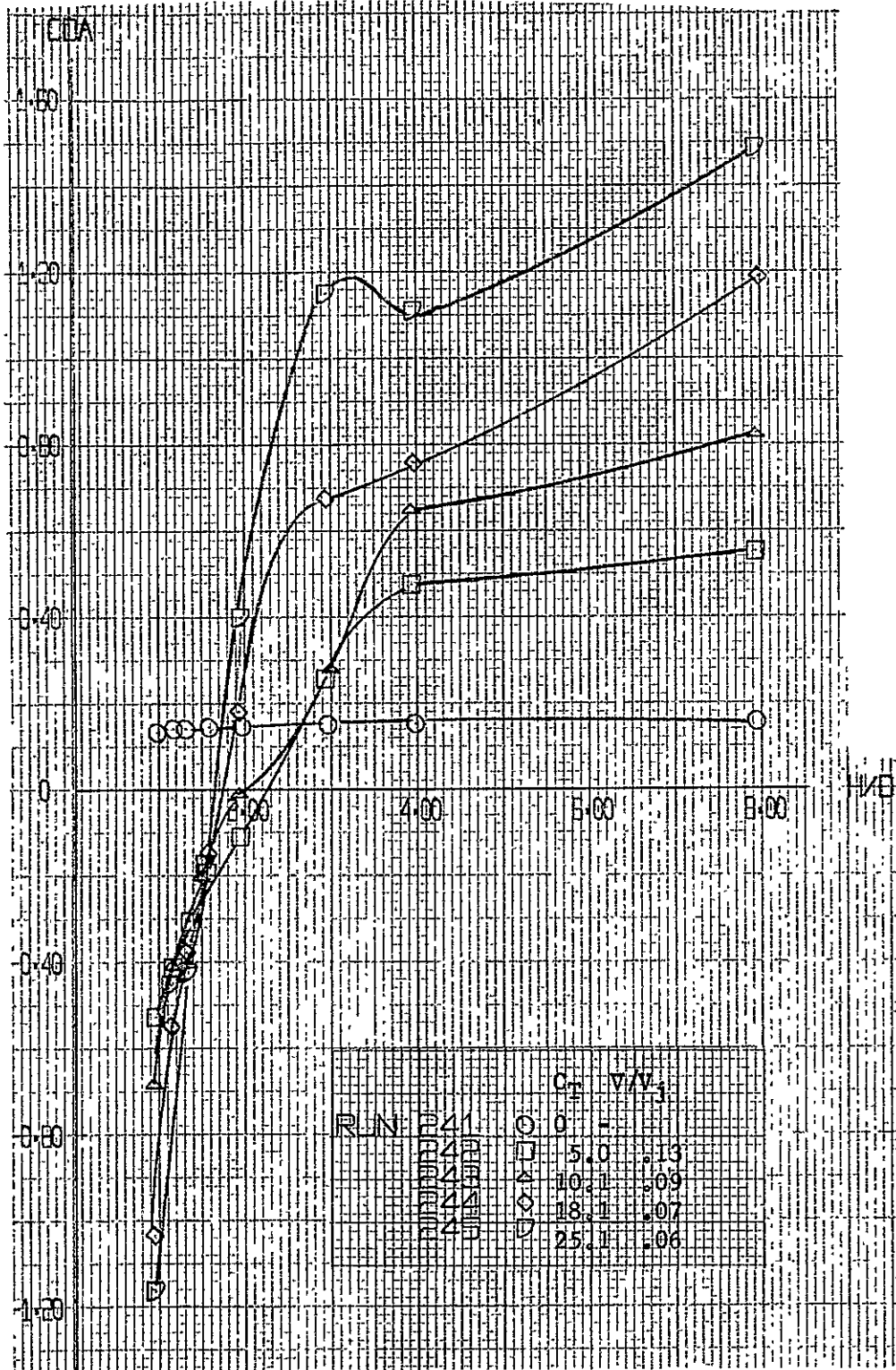


Figure A-59. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

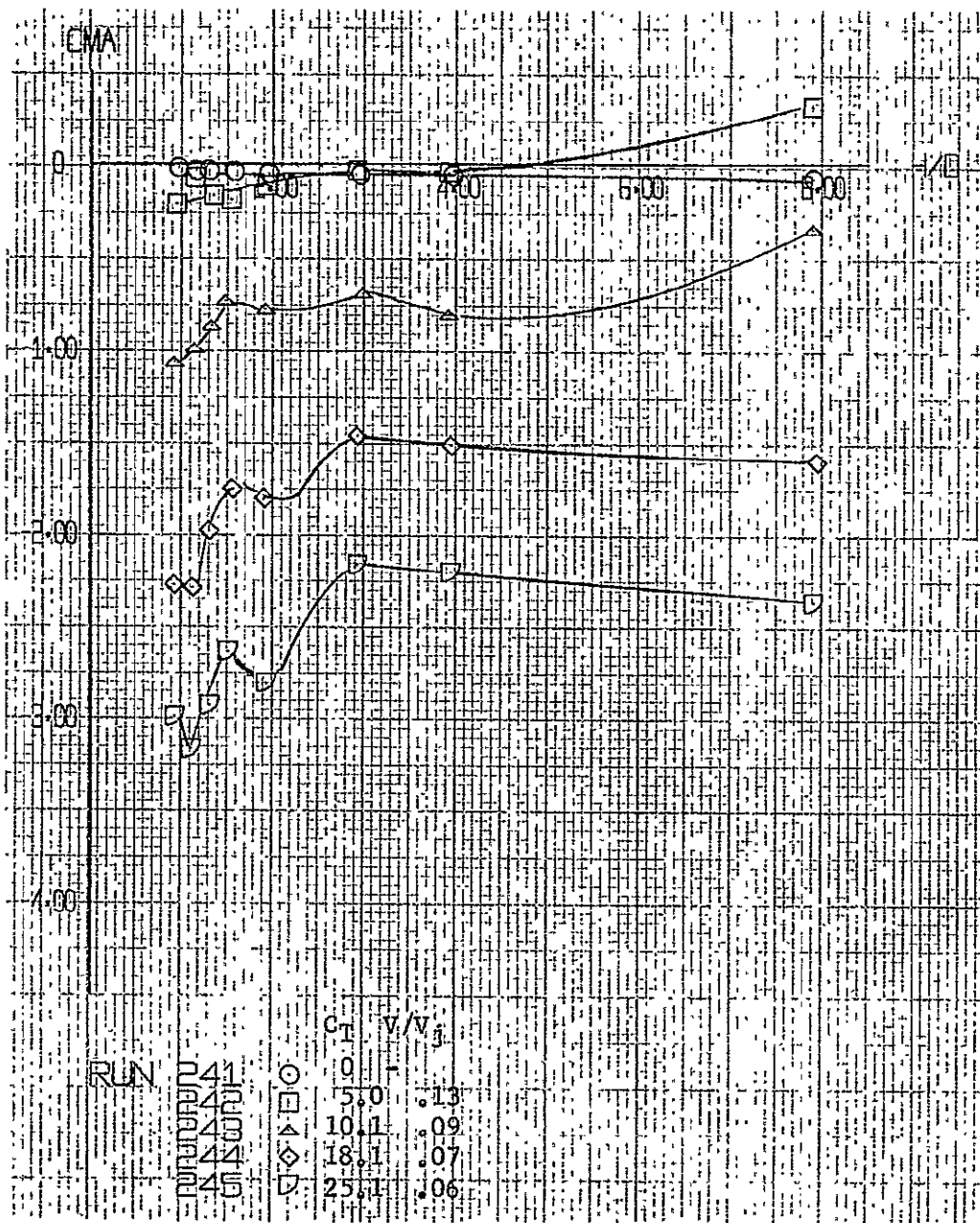


Figure A-59. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

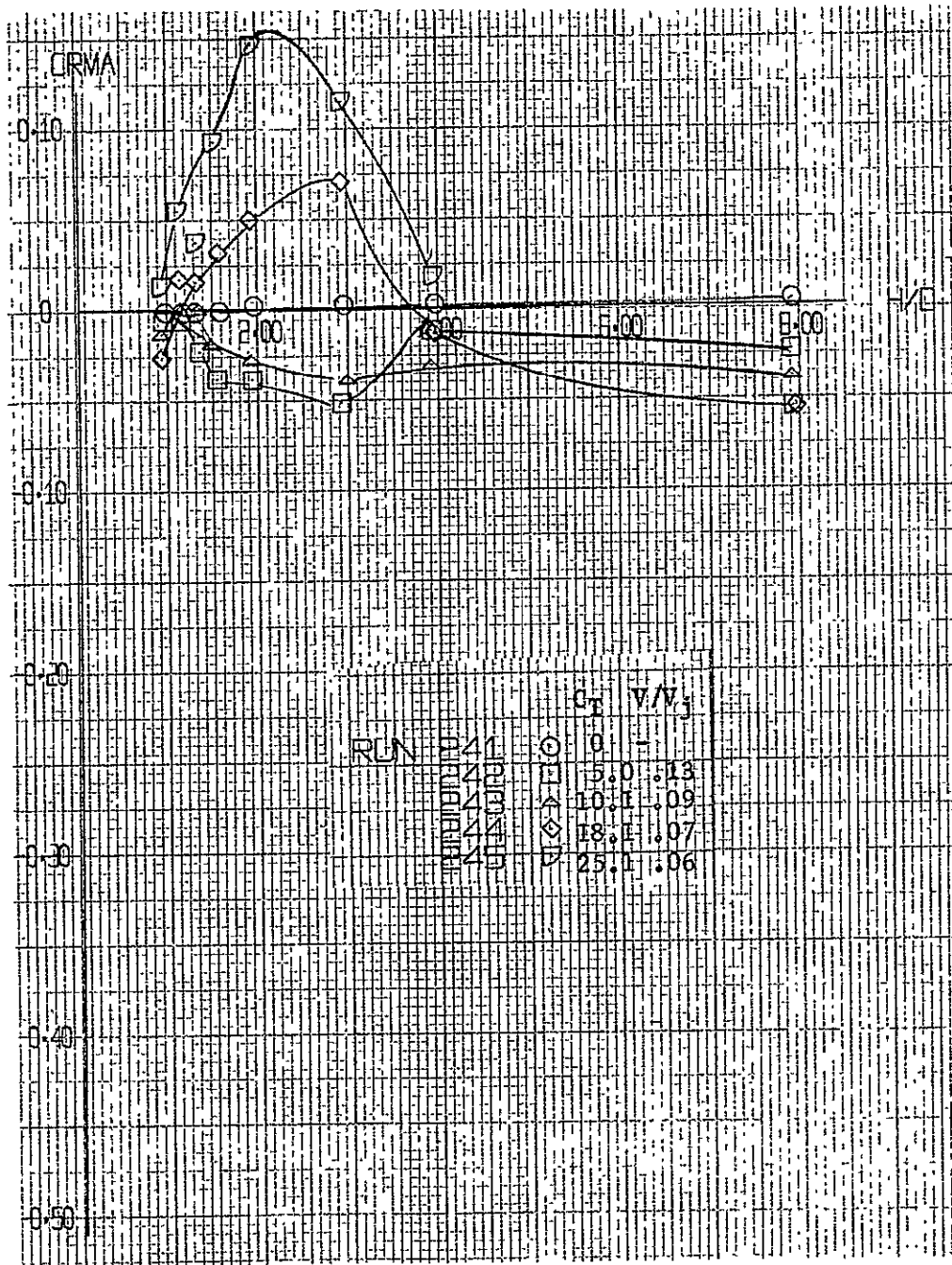


Figure A-59. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Concluded)

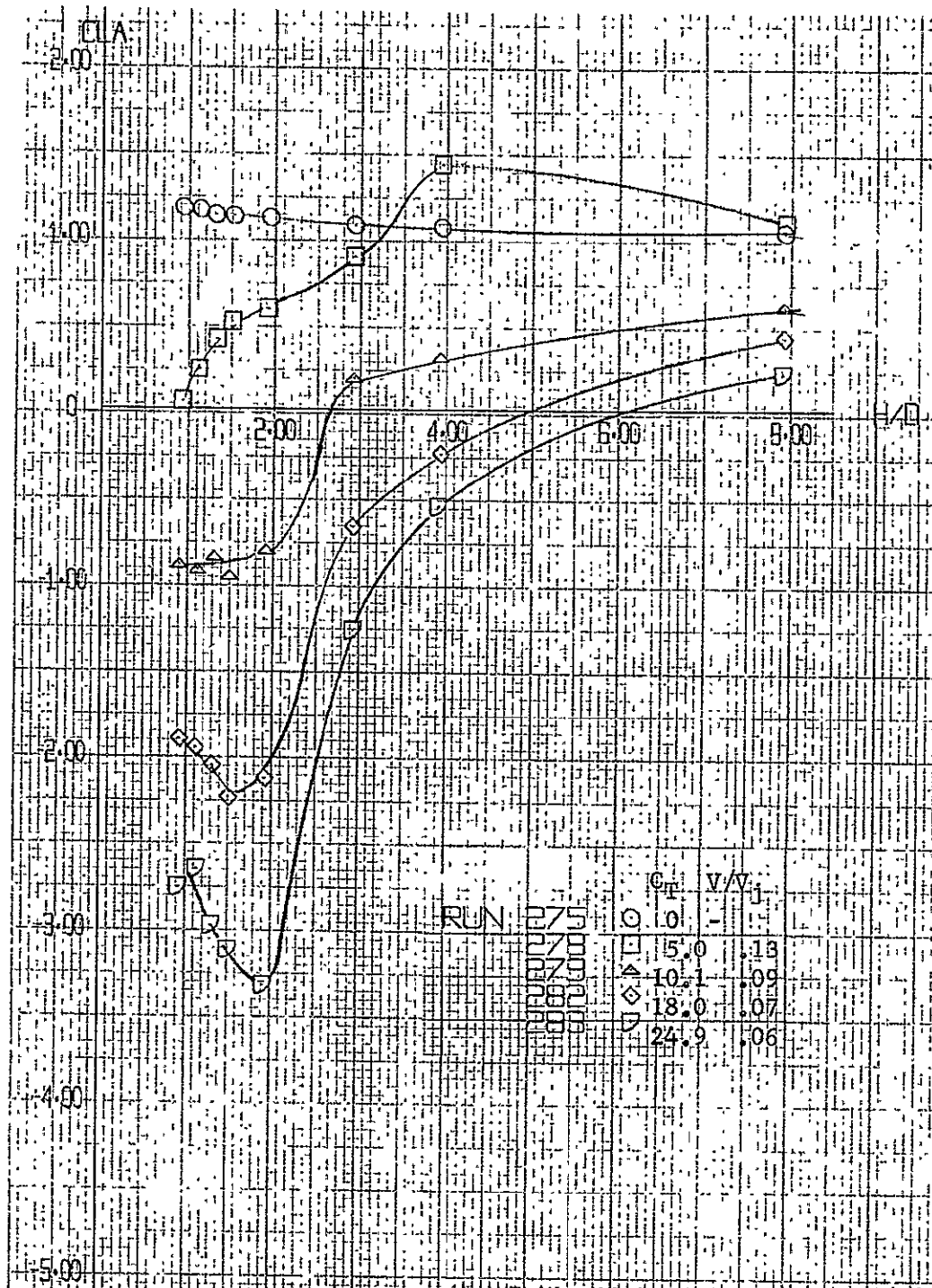


Figure A-60. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = 0^\circ$

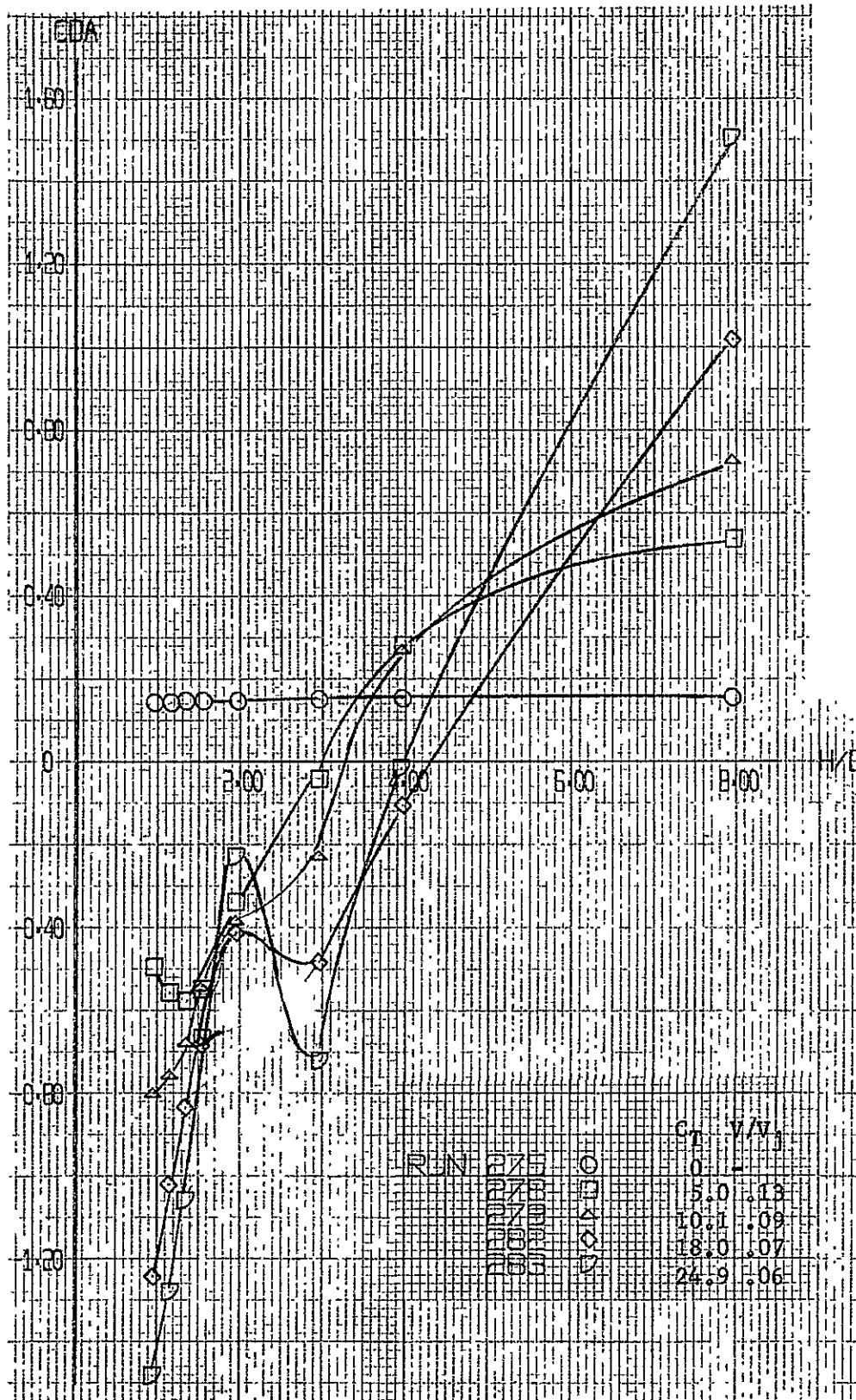


Figure A-60. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

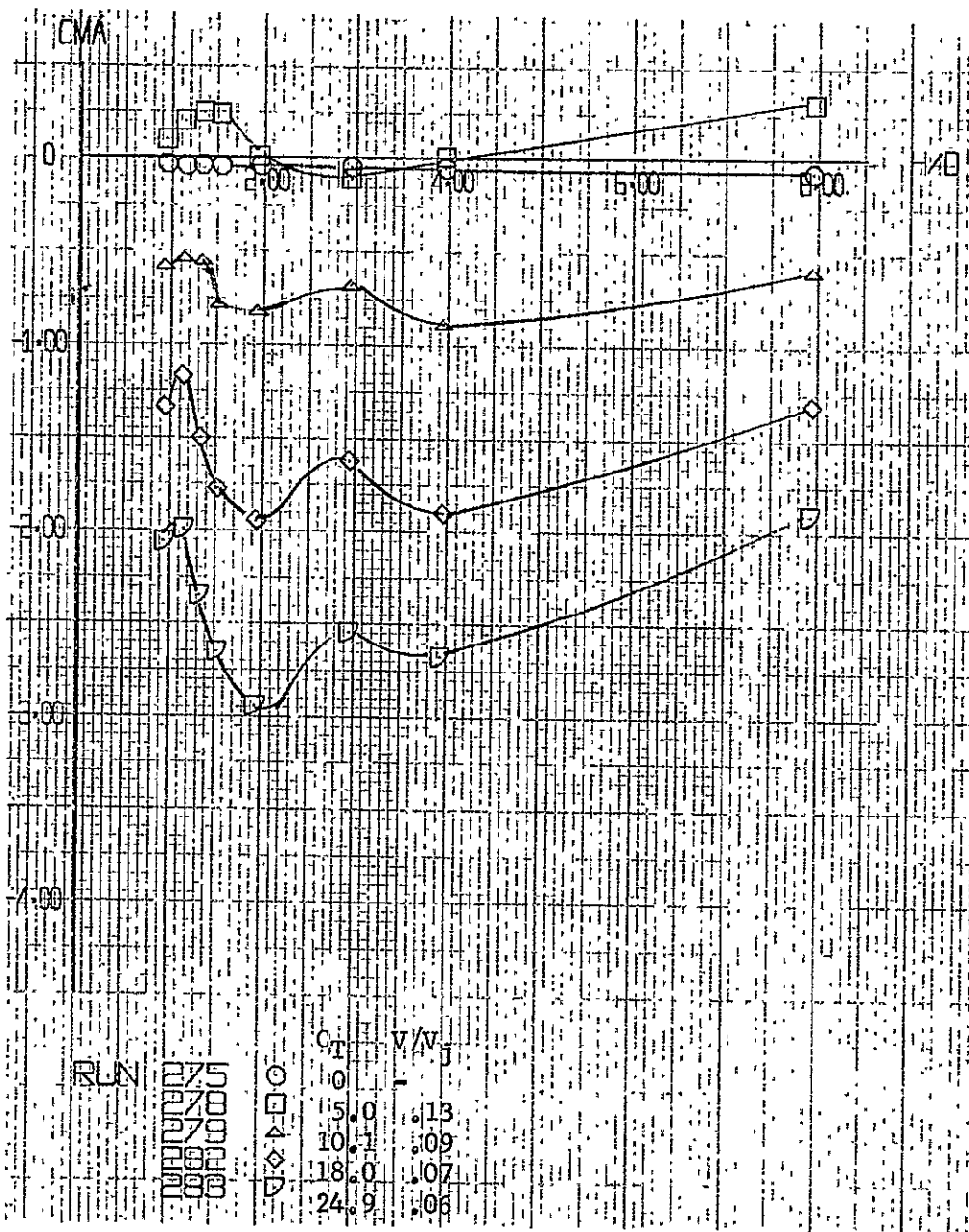


Figure A-60. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

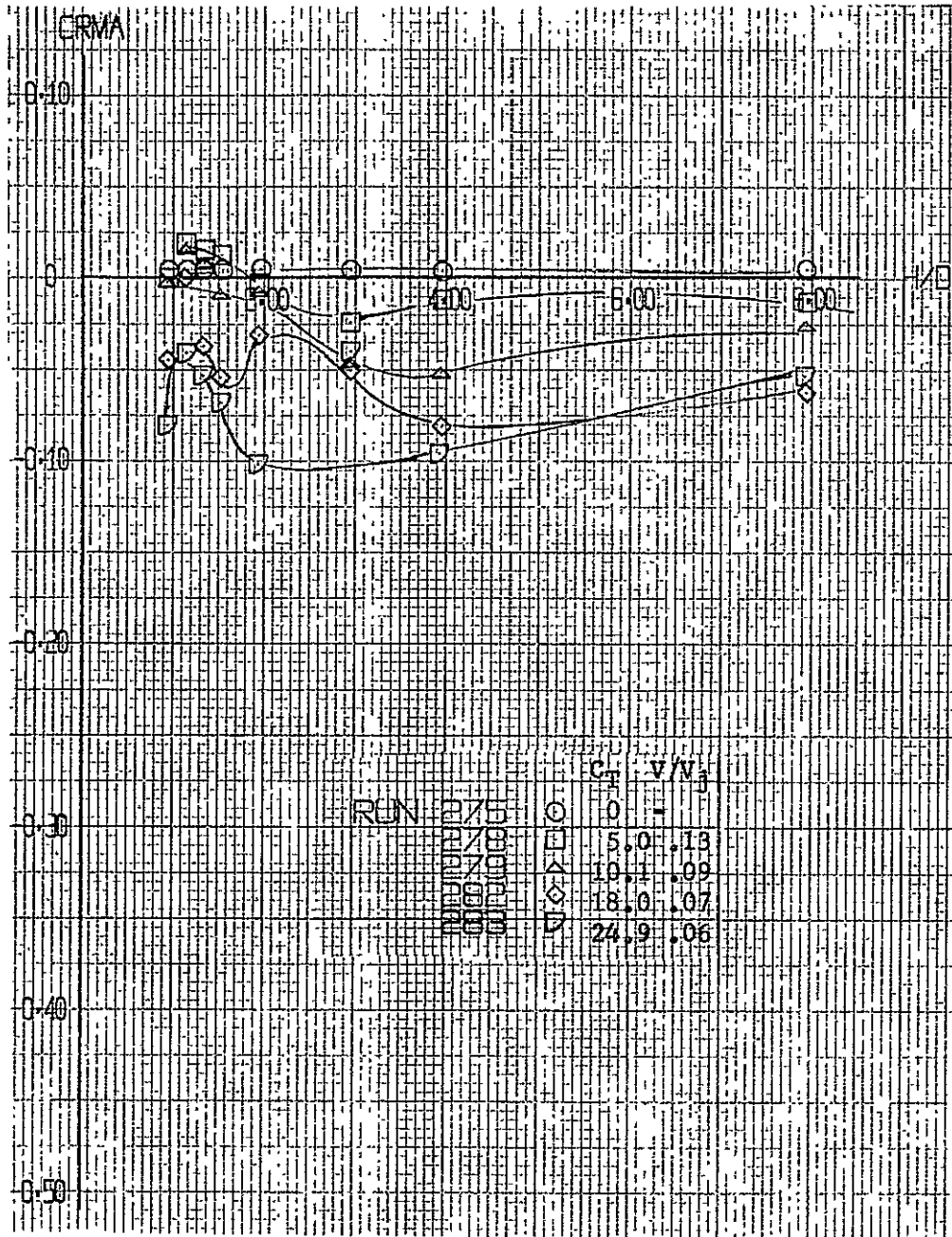


Figure A-60. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N \approx 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

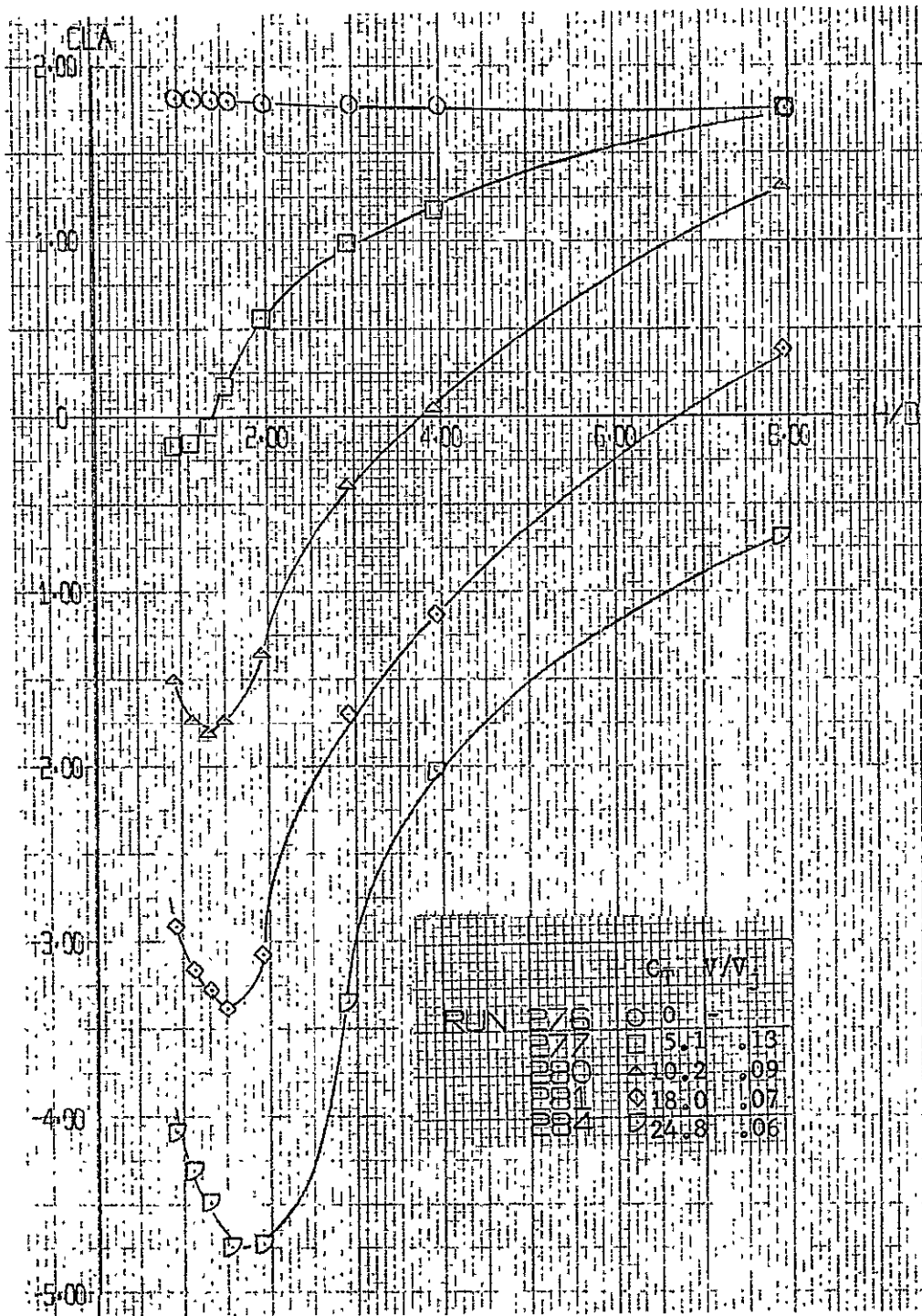


Figure A-61. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$

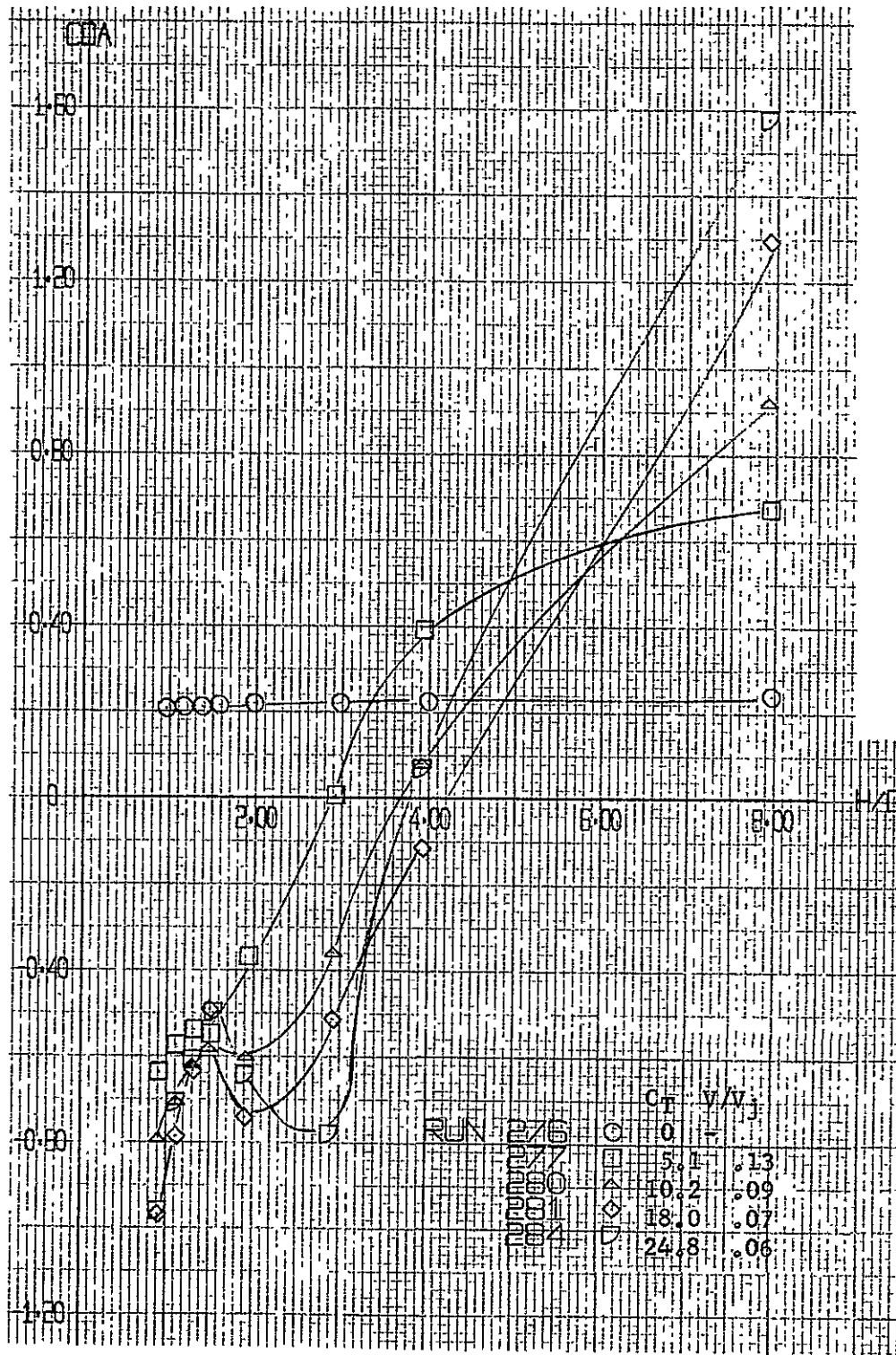


Figure A-61. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued):

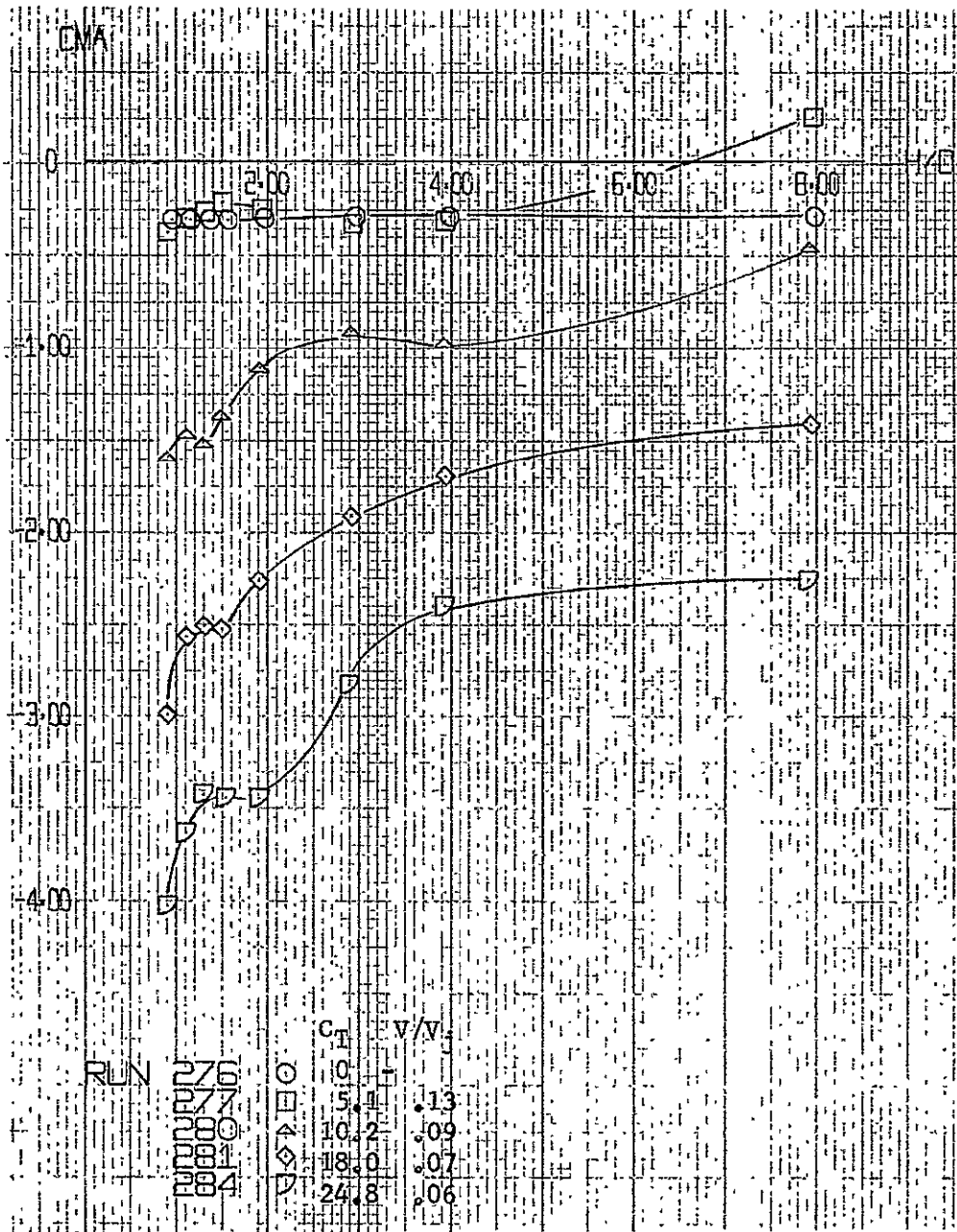


Figure A-61. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

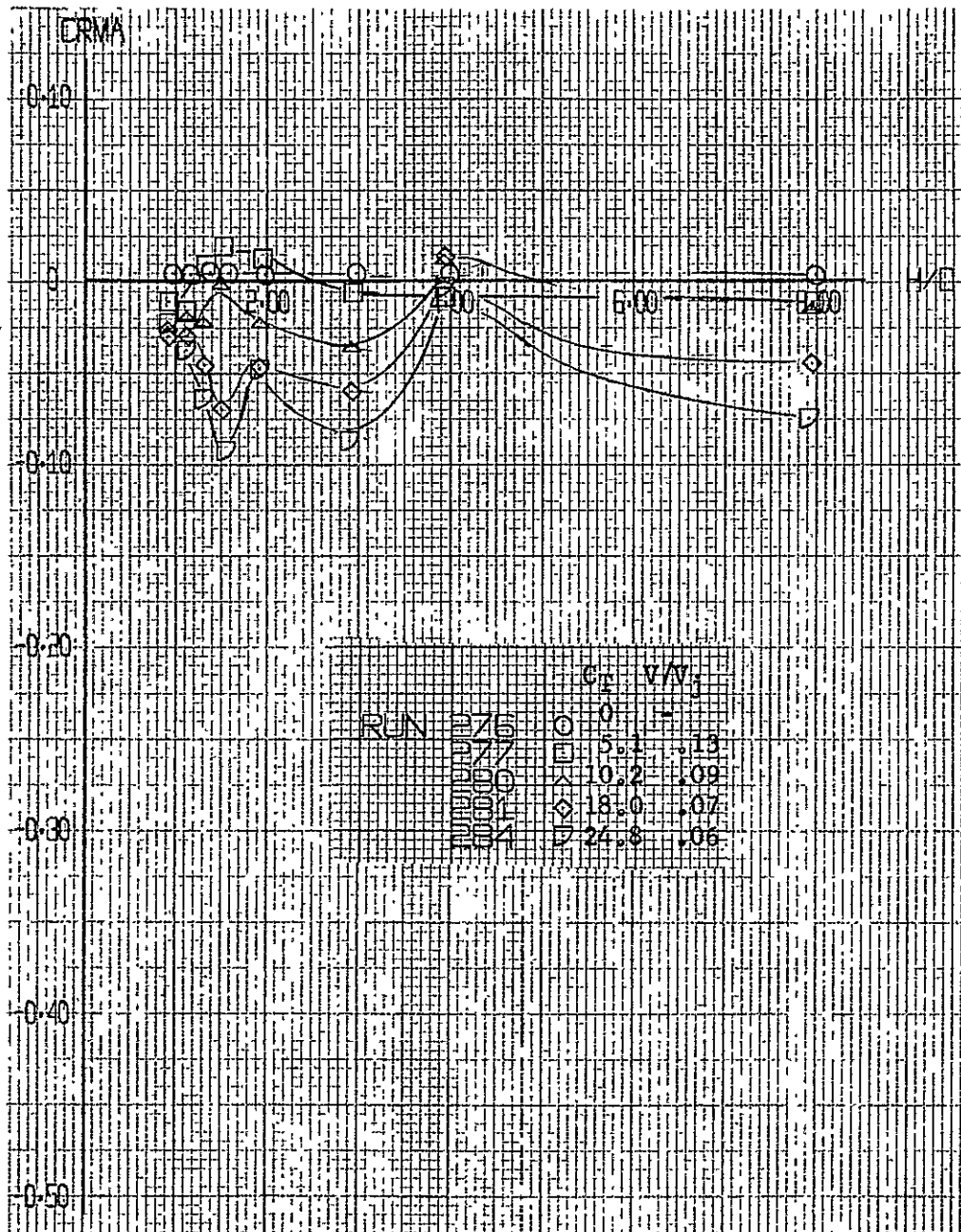


Figure A-61. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\theta = 0^\circ$ (Concluded)

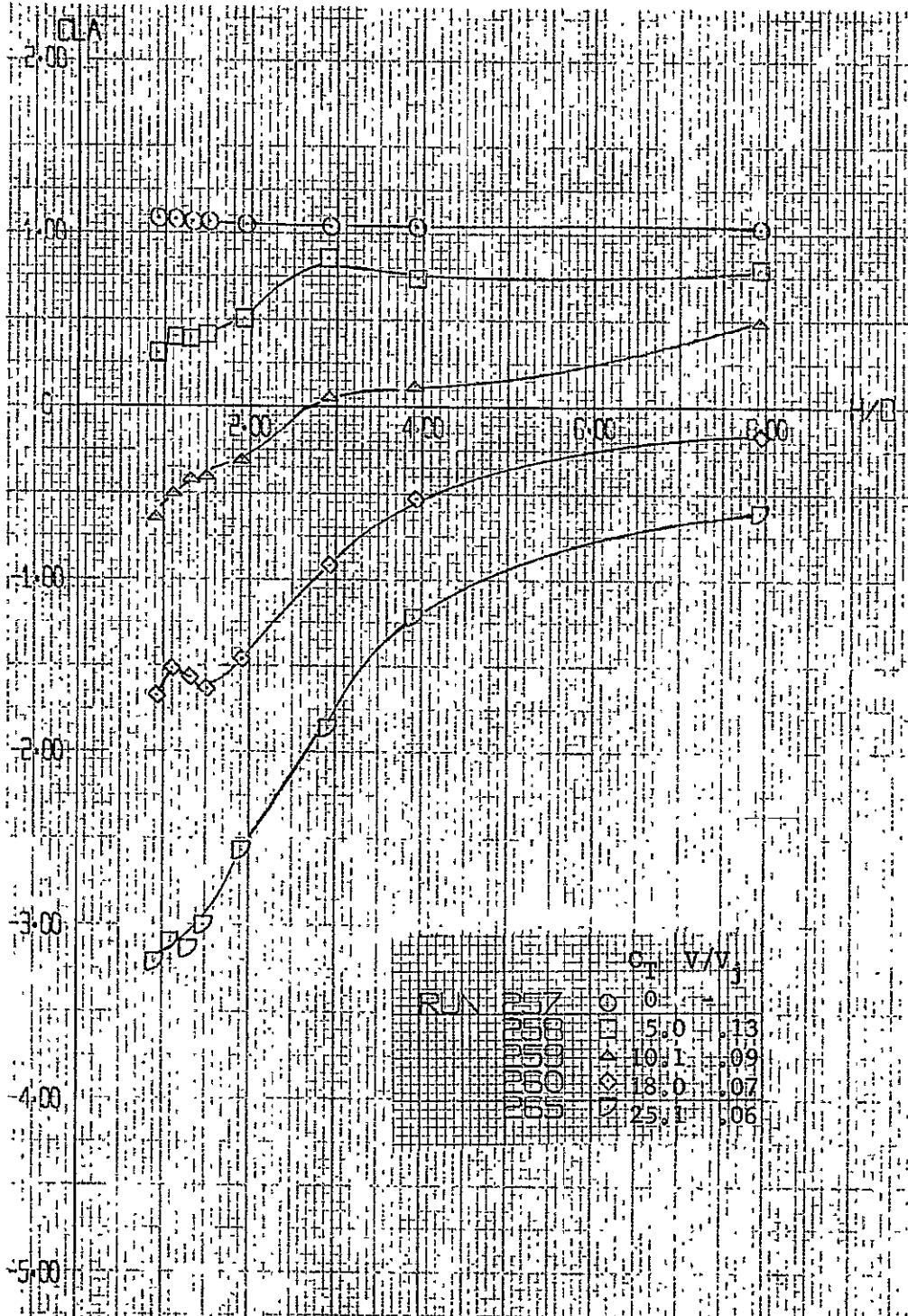


Figure A-62. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -1^\circ$

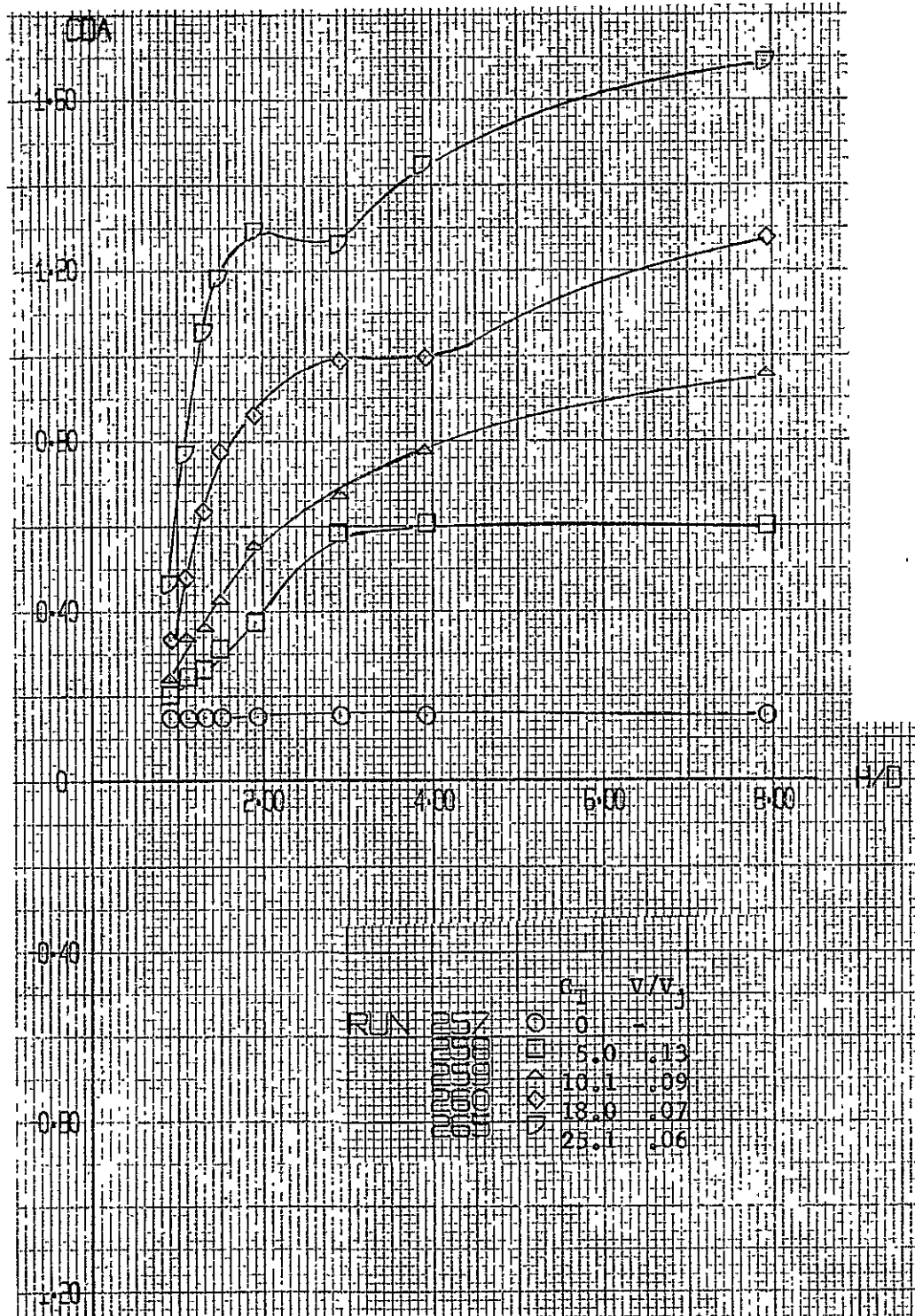


Figure A-62. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -1^\circ$ (Continued)

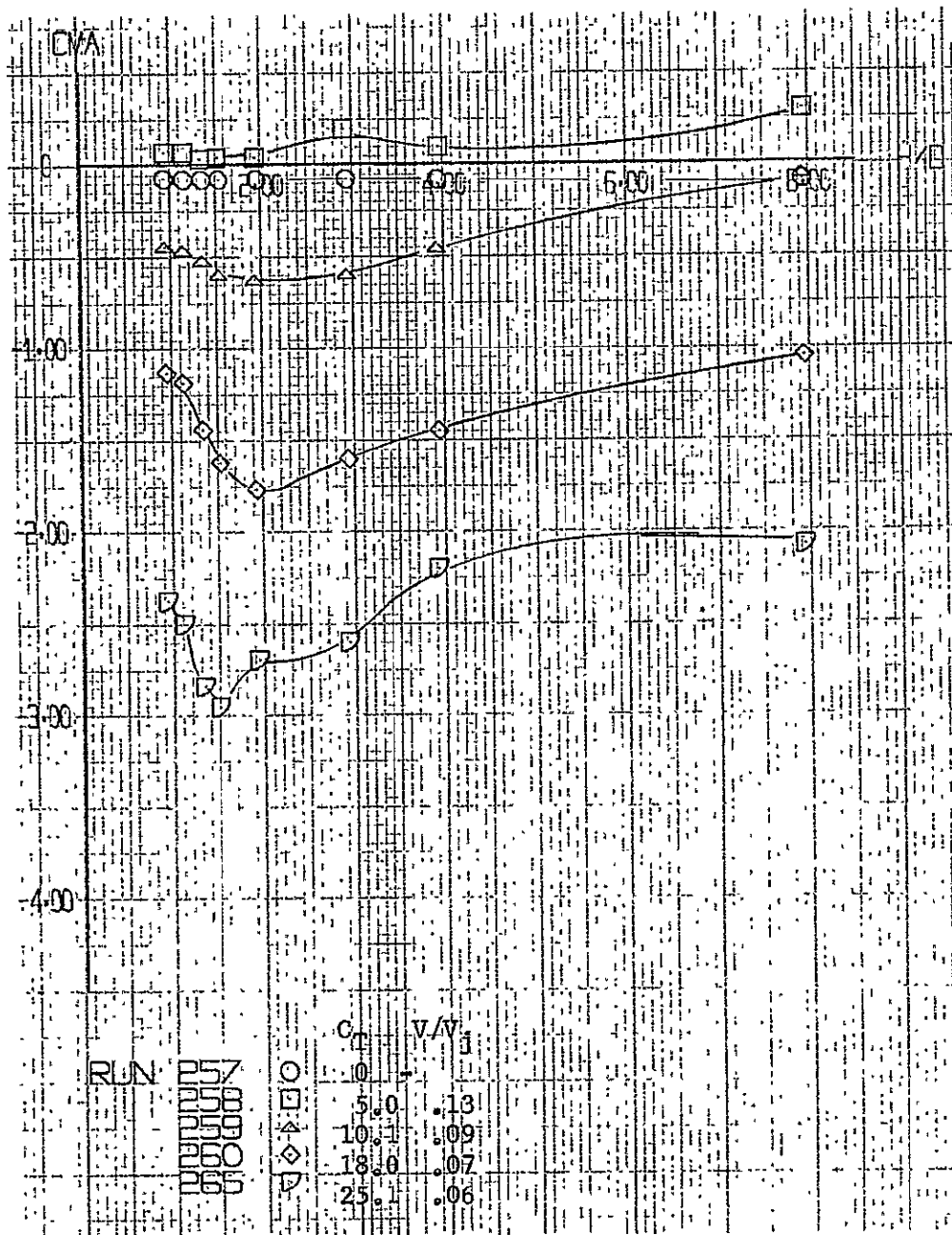


Figure A-62. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -1^\circ$ (Continued)

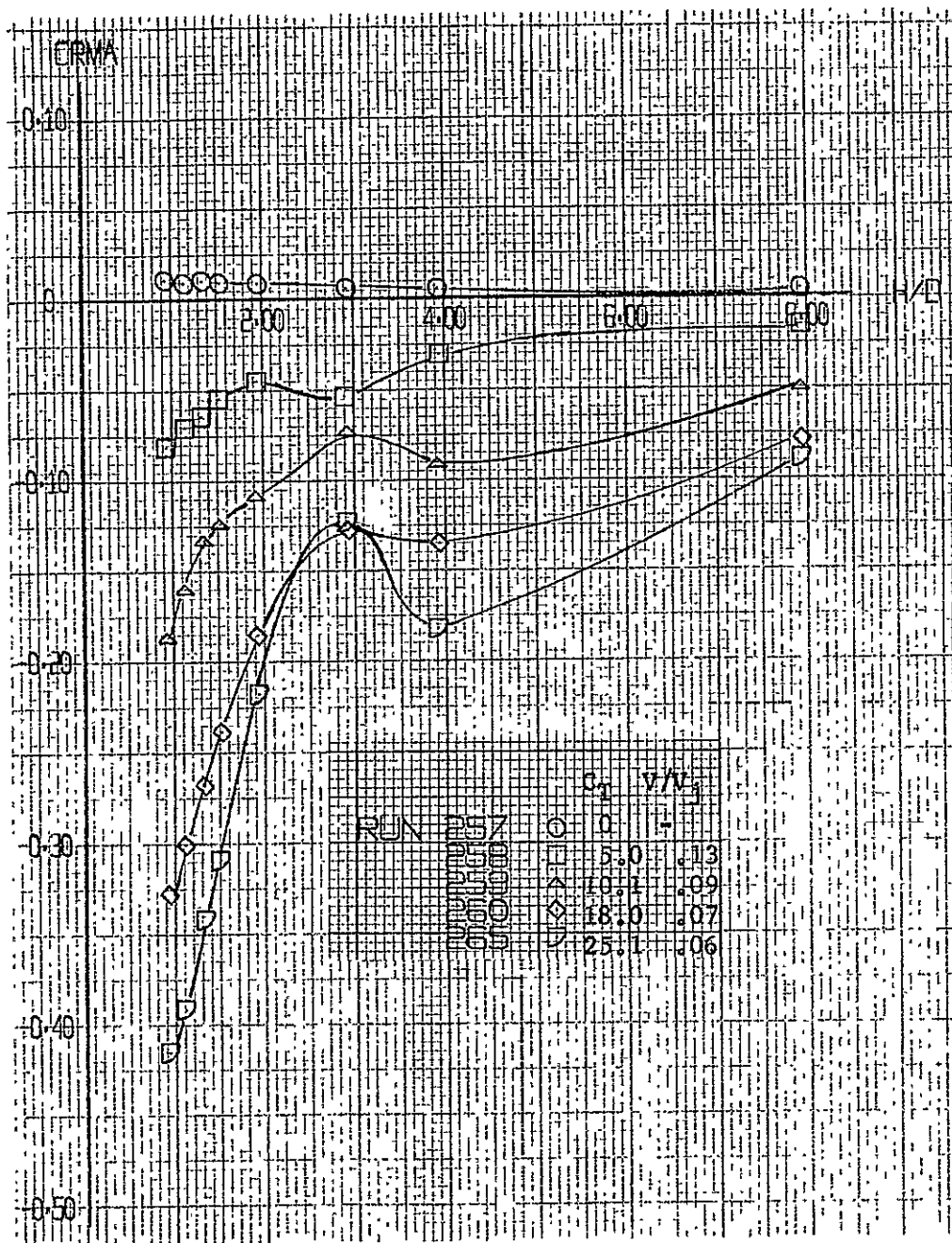


Figure A-62. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = -1^\circ$ (Concluded)

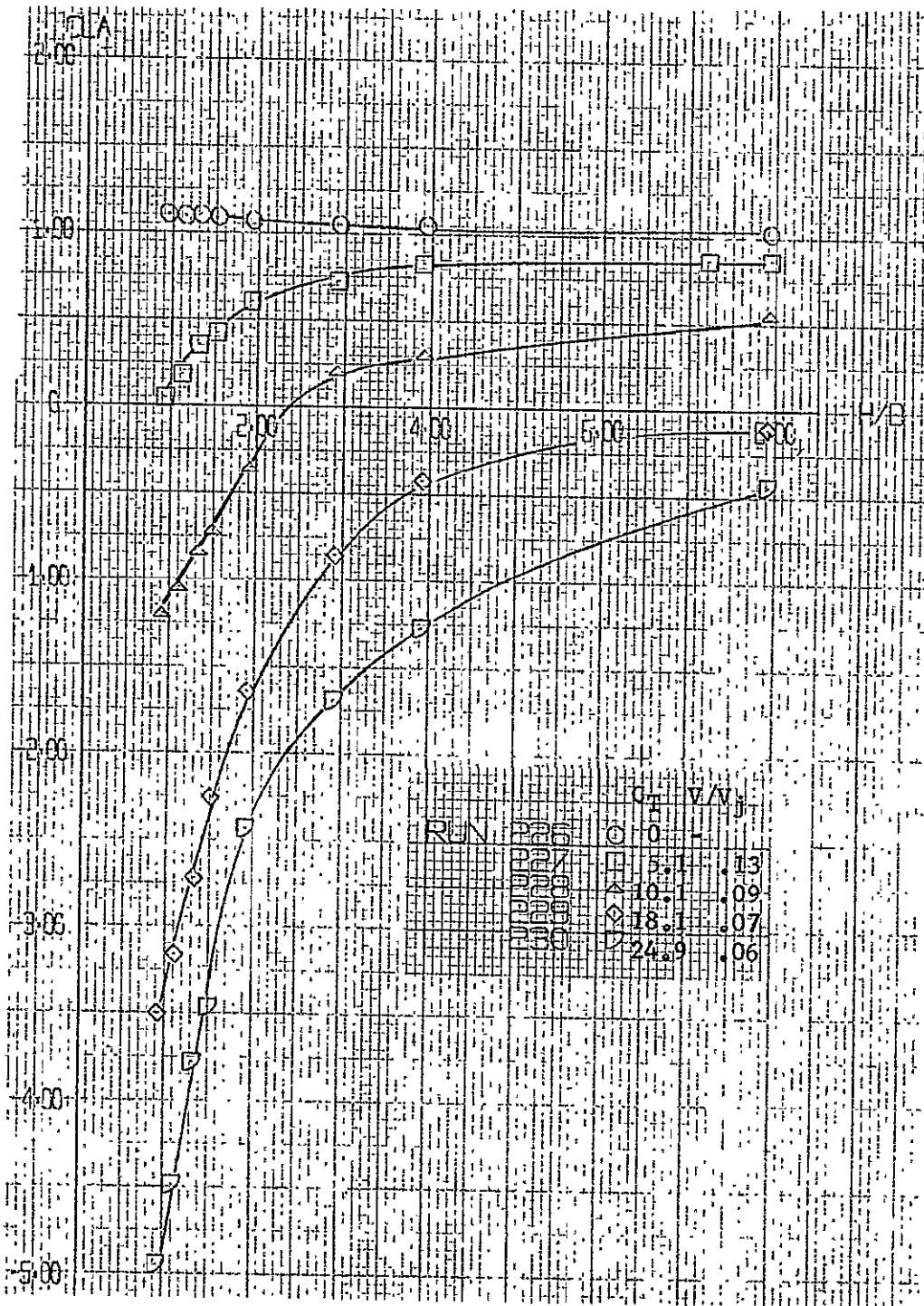


Figure A-63. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

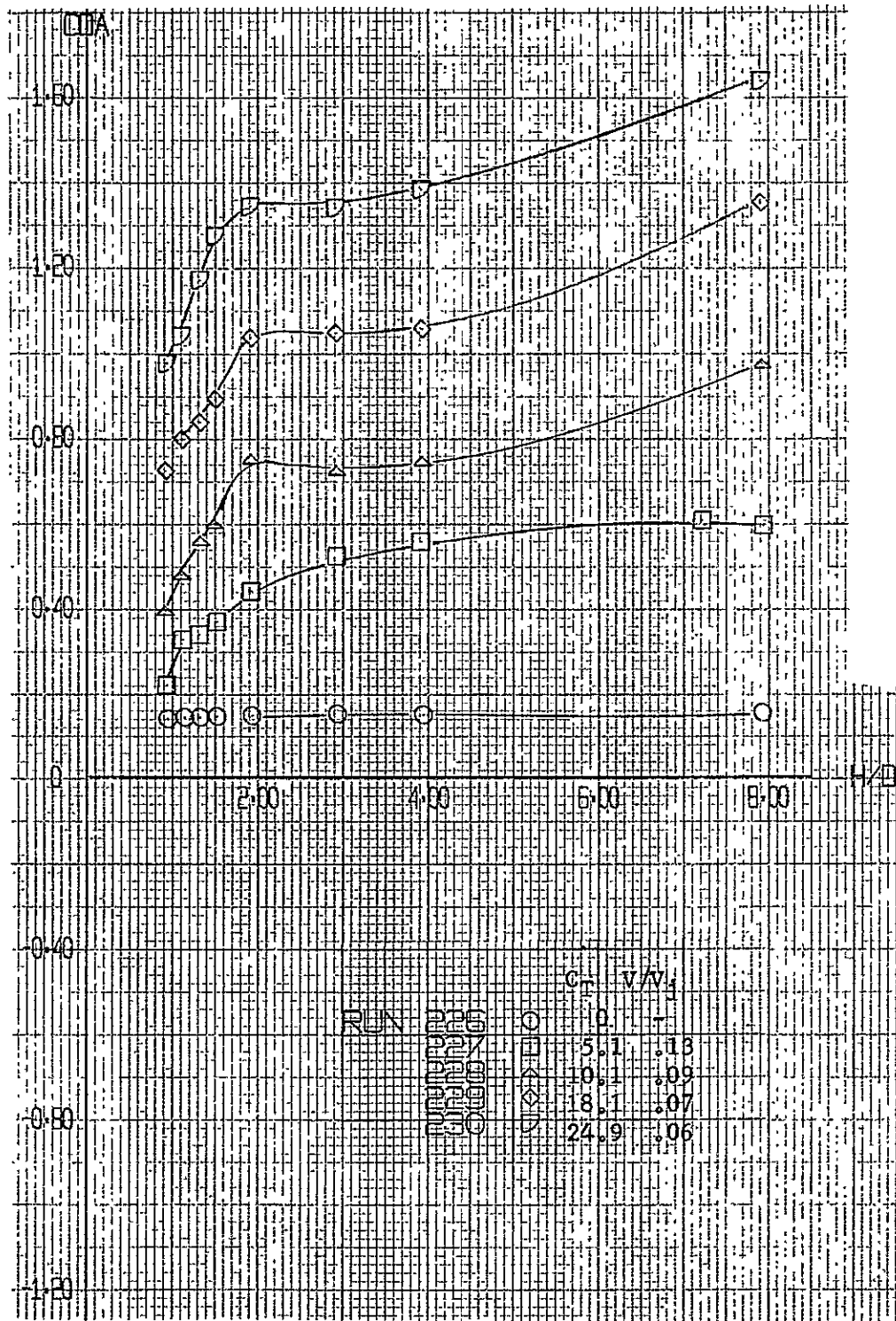


Figure A-63. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

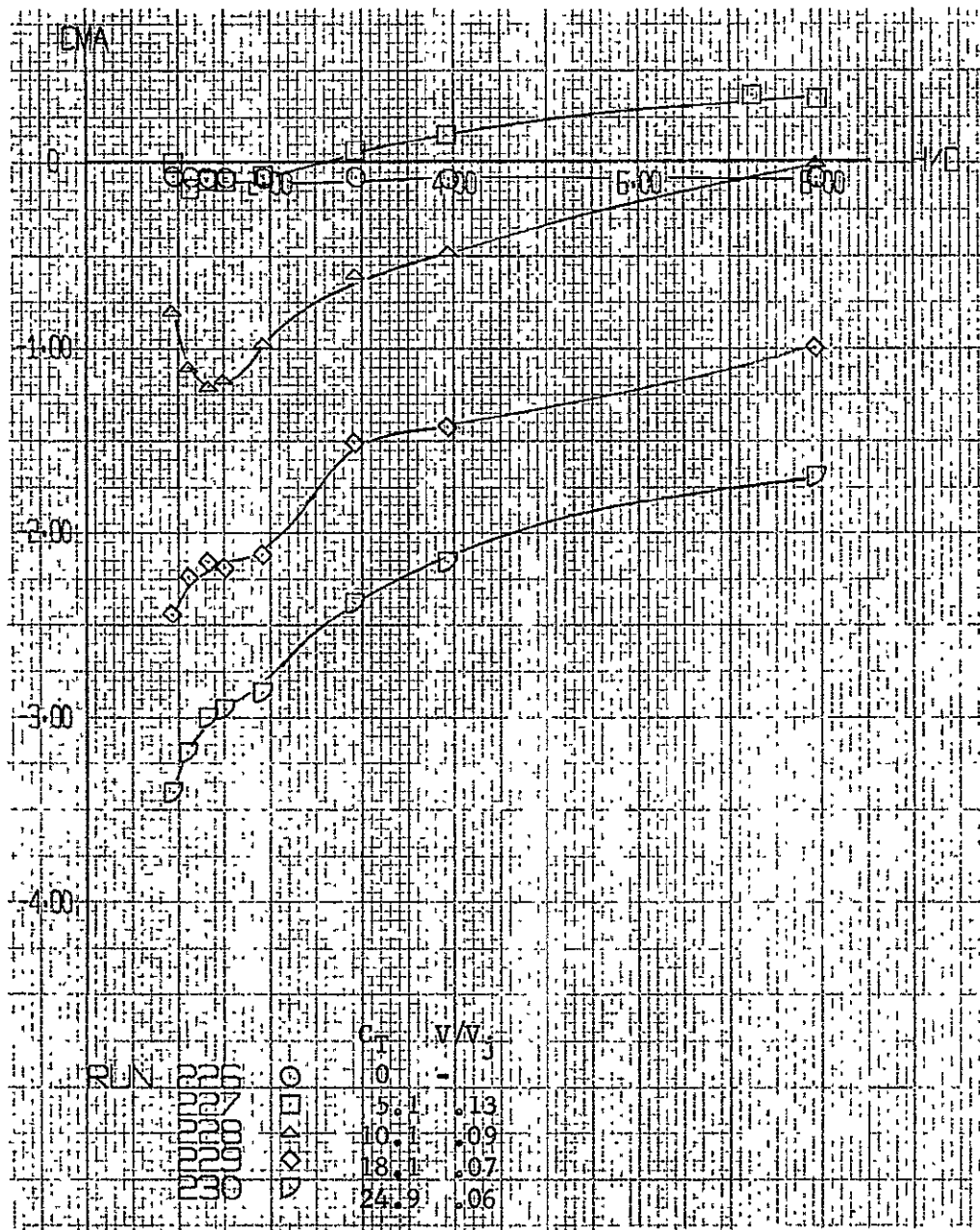


Figure A-63. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

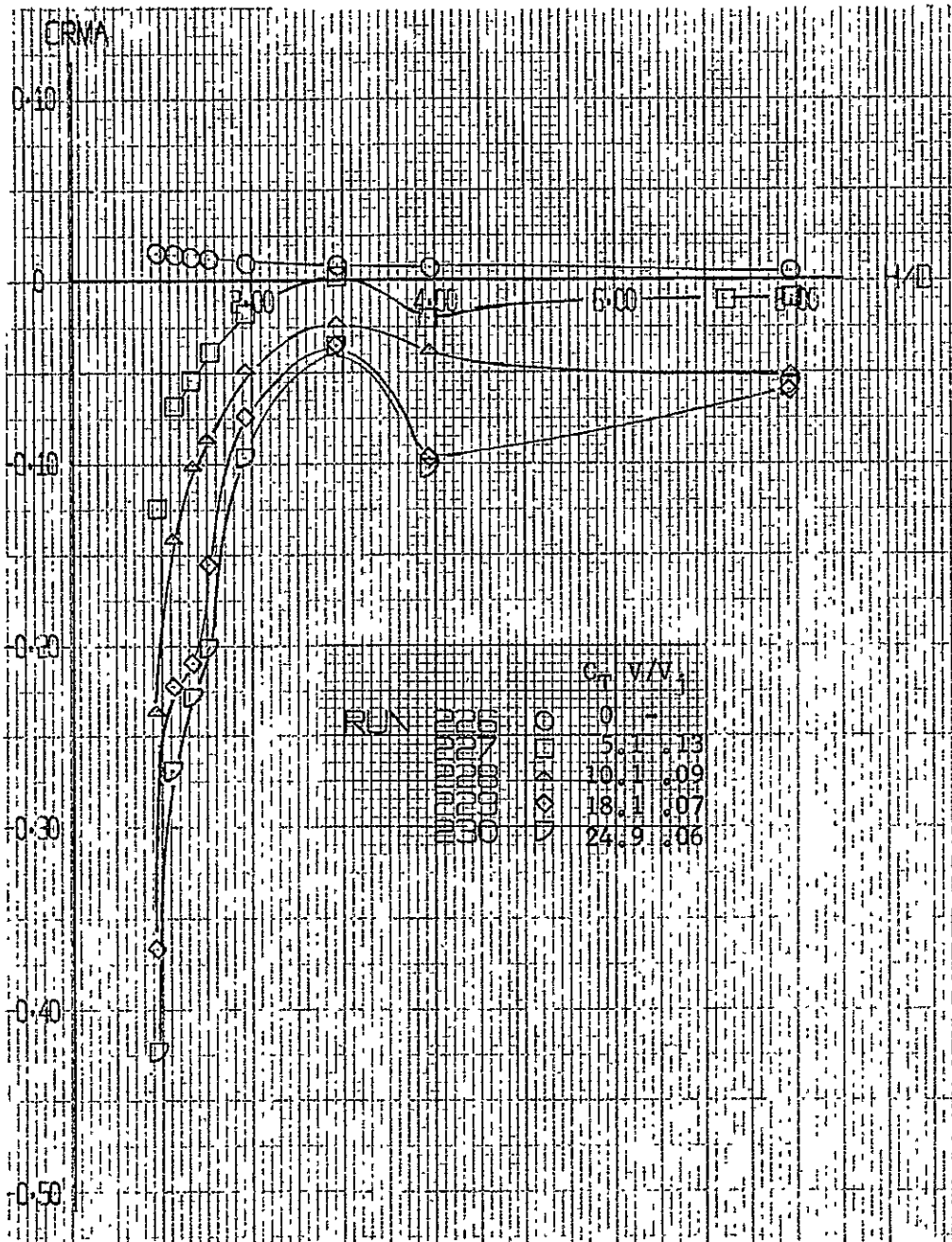


Figure A-63. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Concluded)

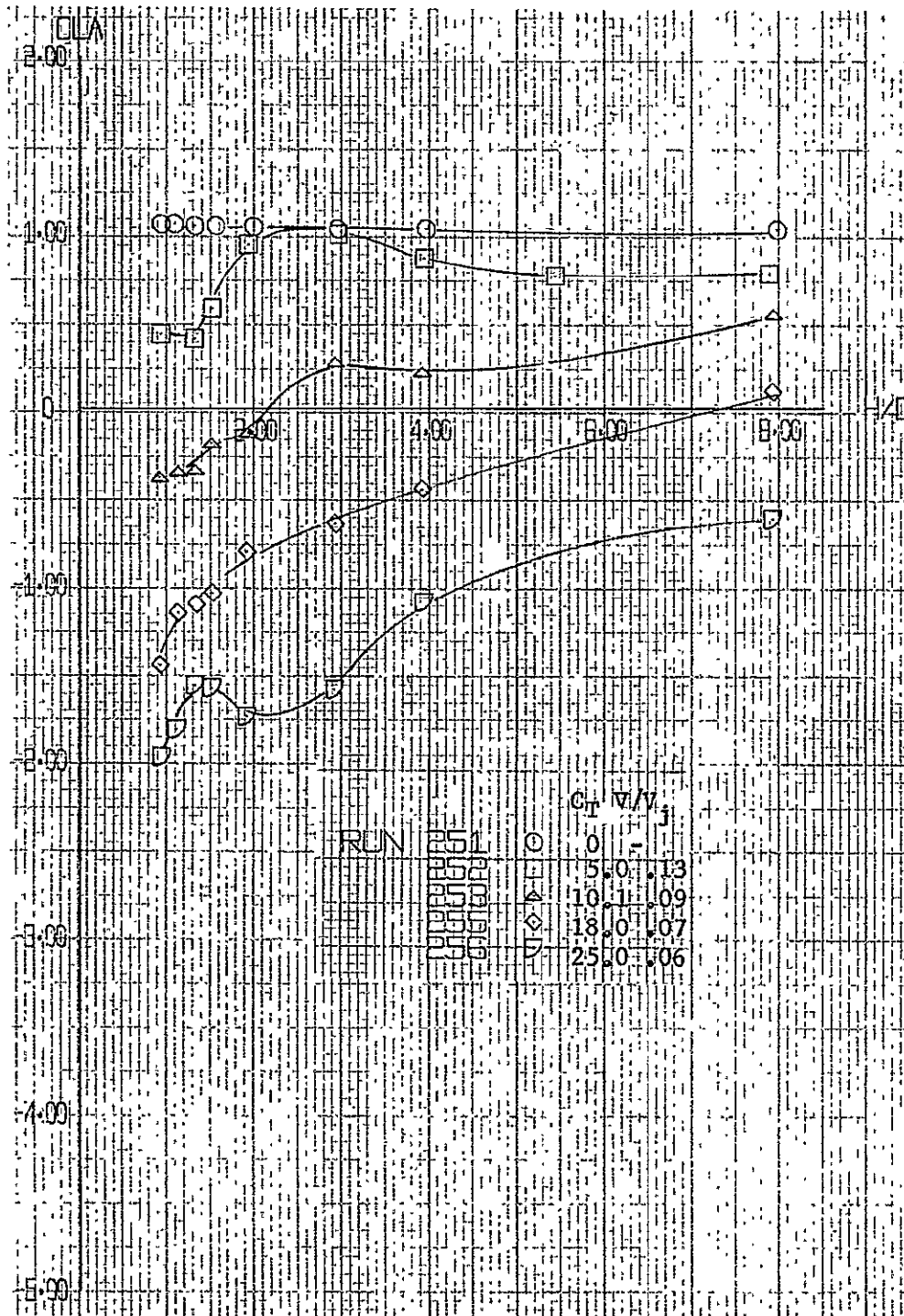


Figure A-64. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$

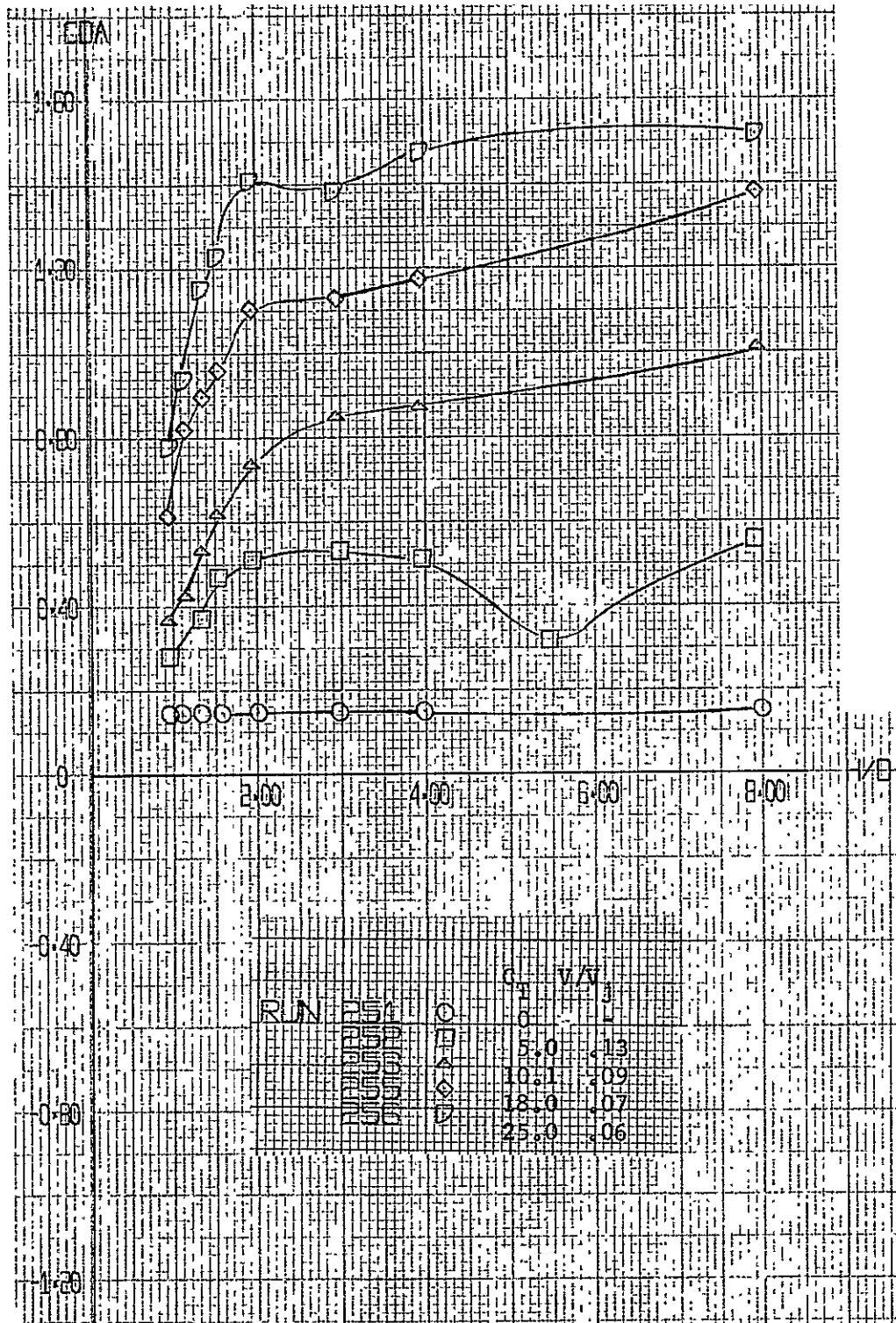


Figure A-64. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Continued)

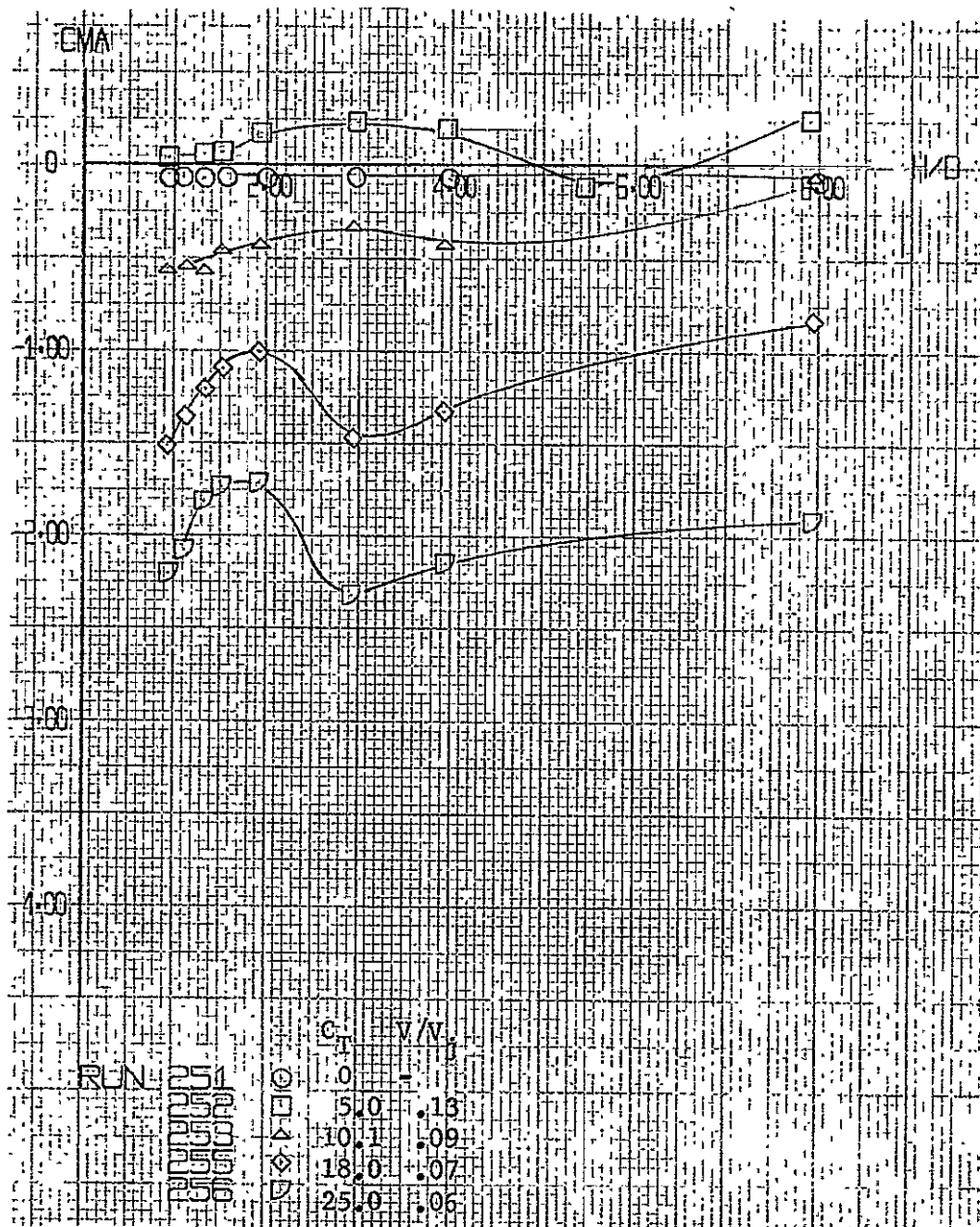


Figure A-64. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

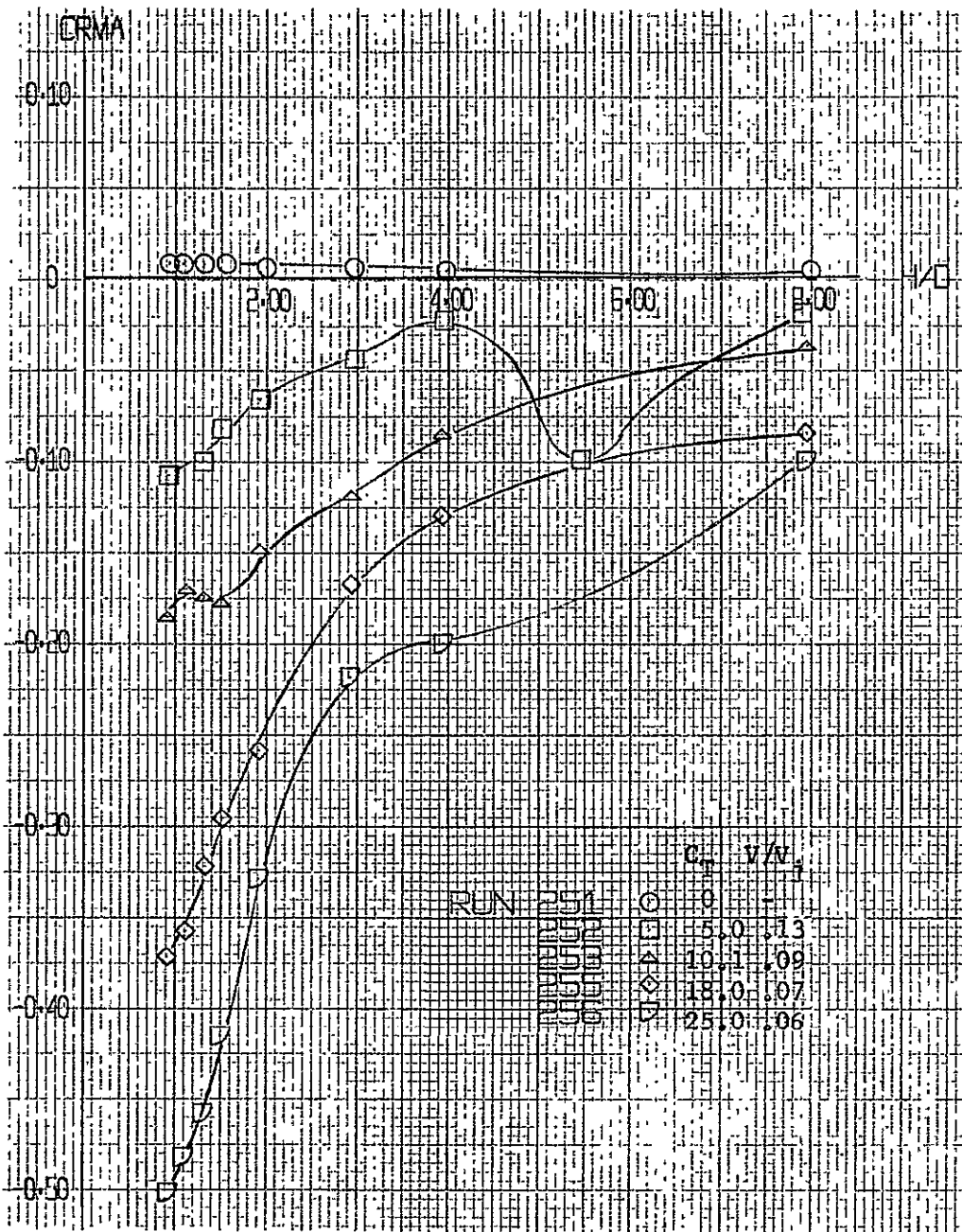


Figure A-64. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Concluded)

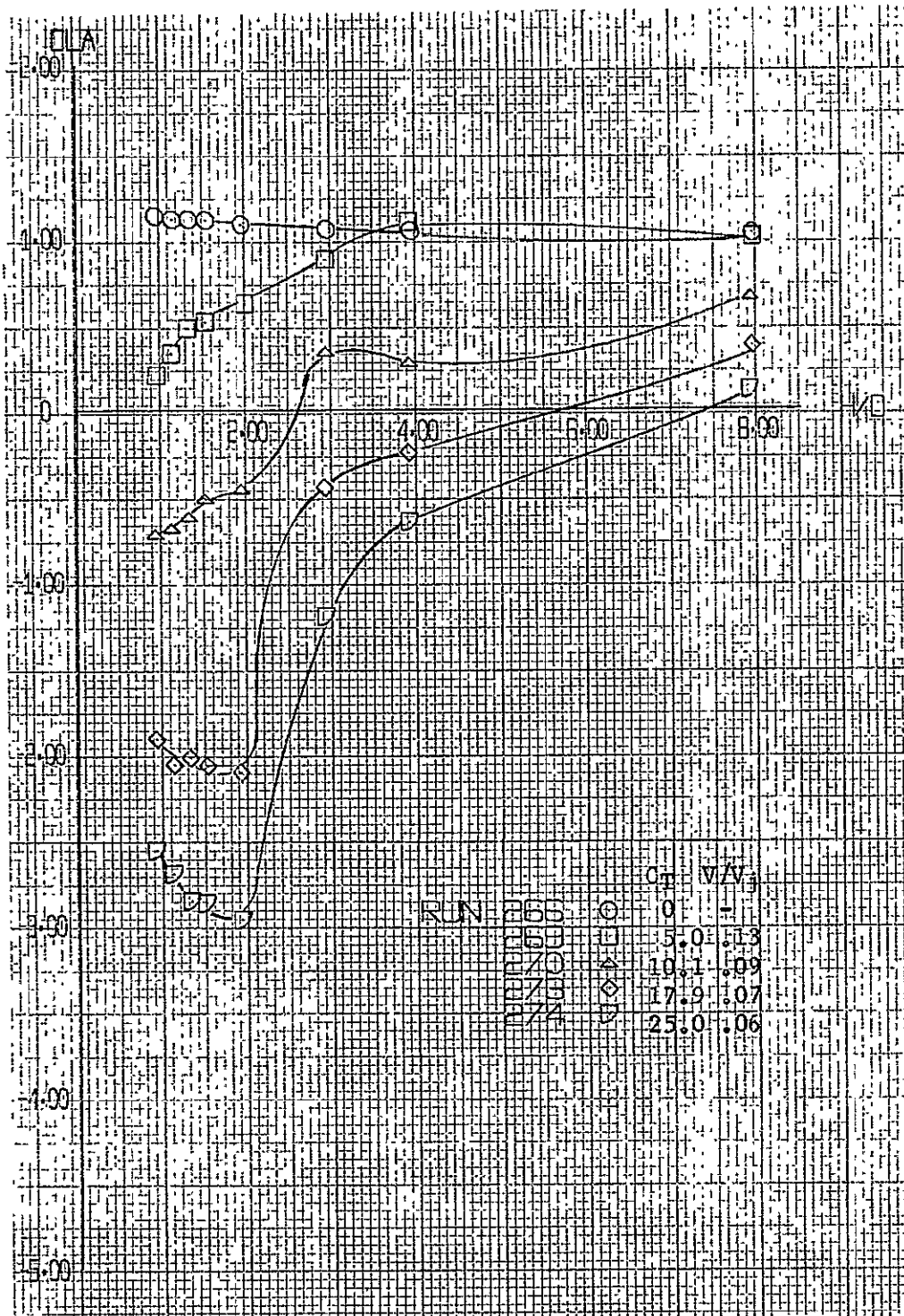


Figure A-65. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -1^\circ$

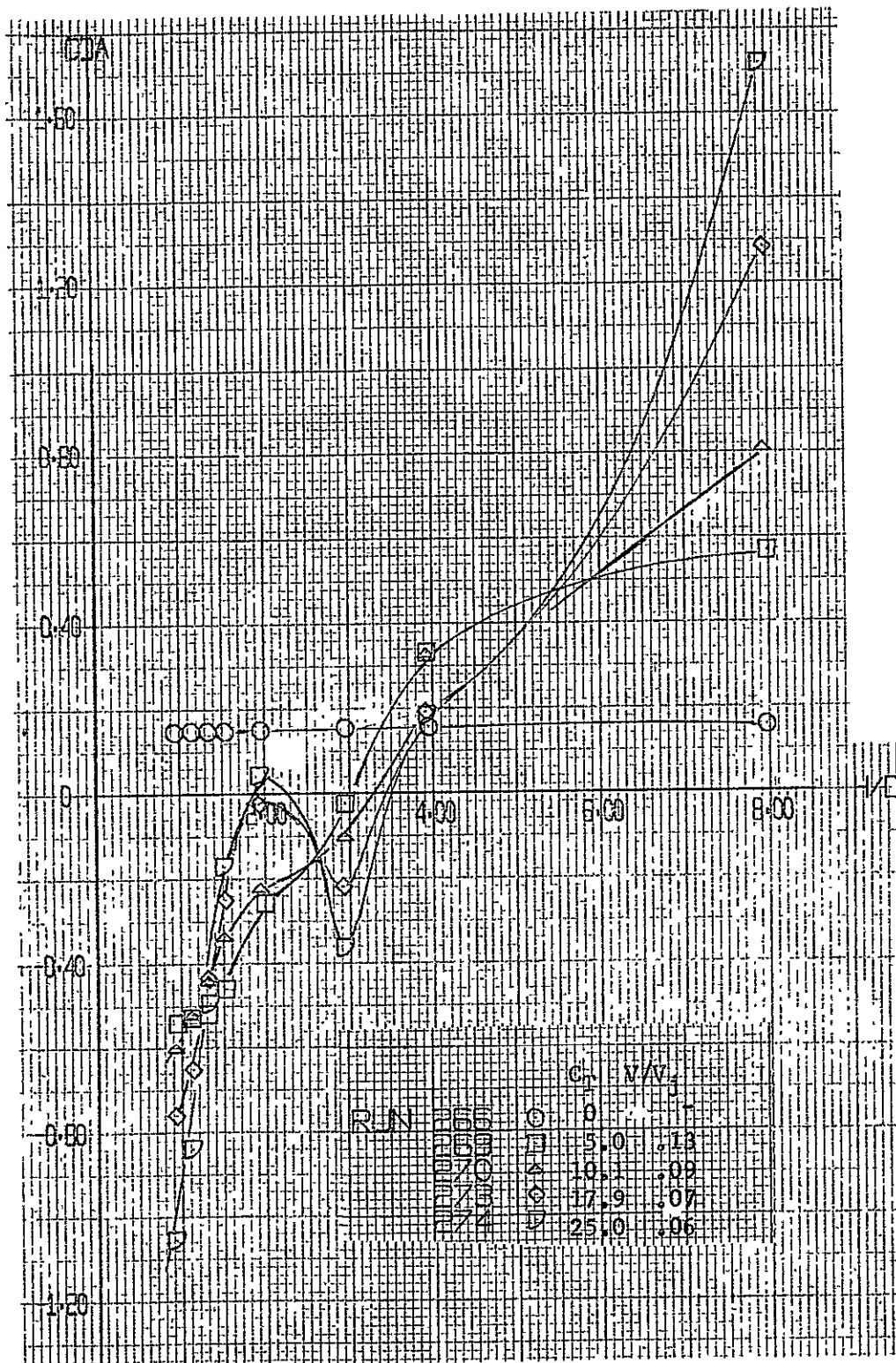


Figure A-65. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -1^\circ$ (Continued)

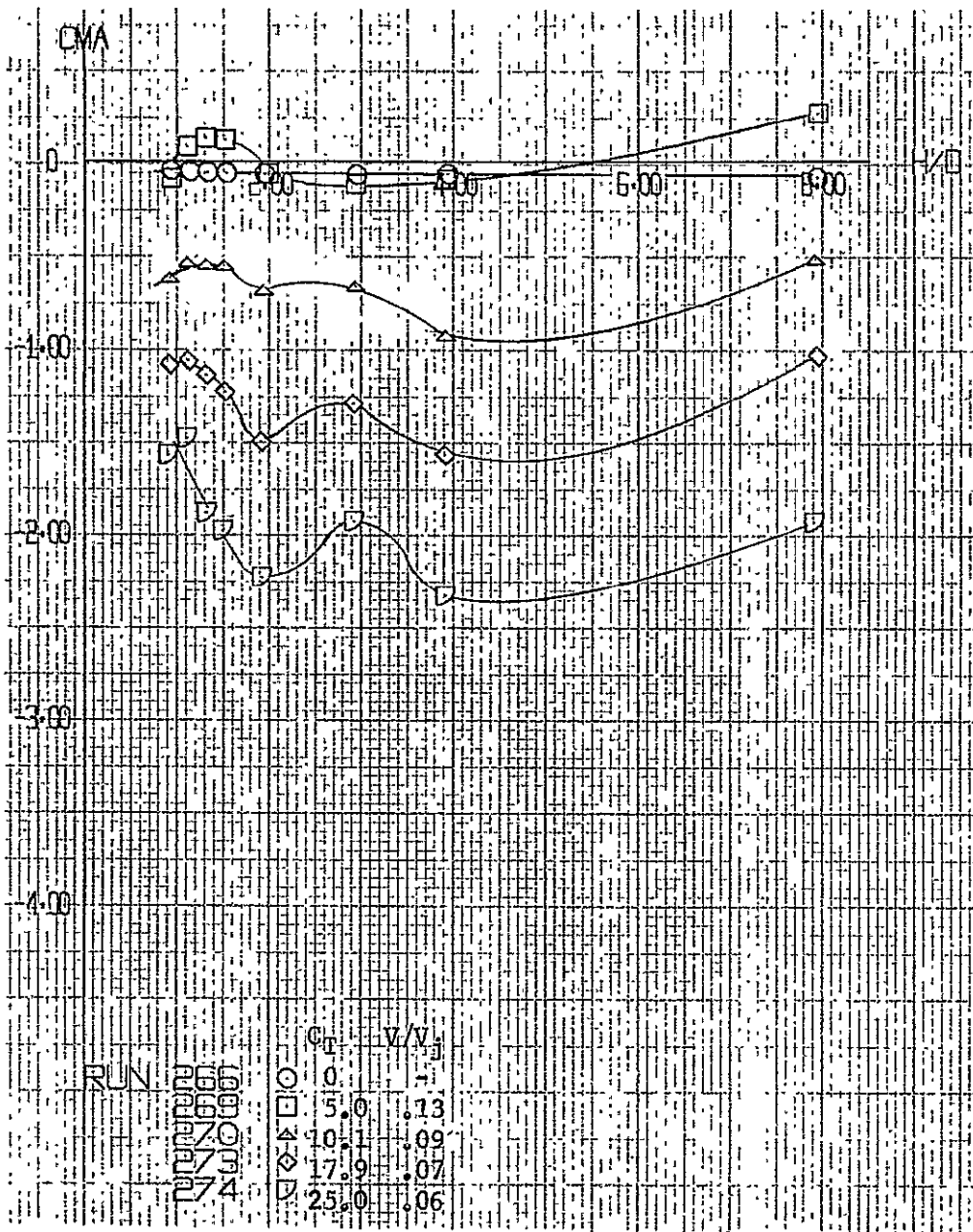


Figure A-65. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = -1^\circ$ (Continued)

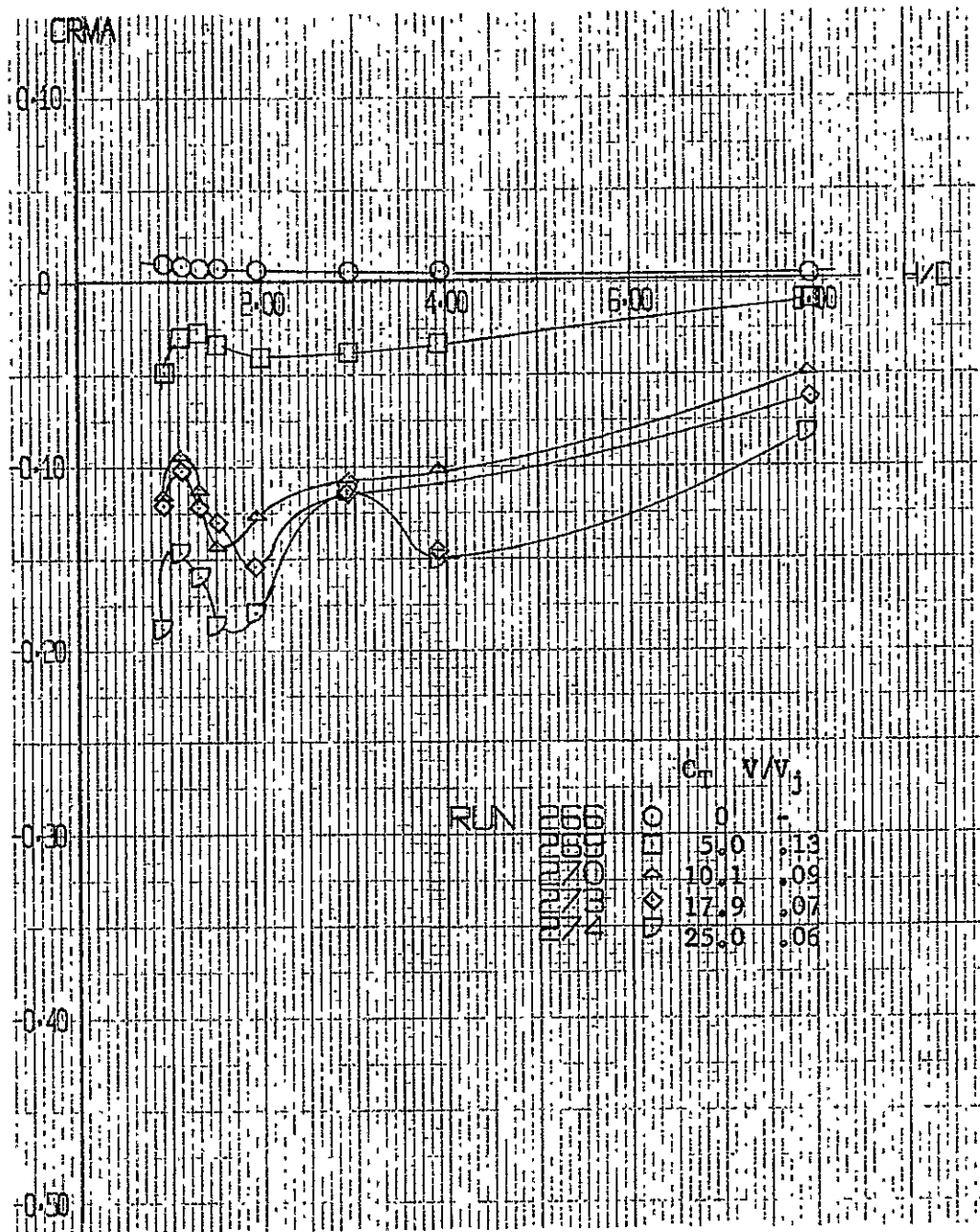


Figure A-65. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = -1^\circ$ (Concluded)

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS F002

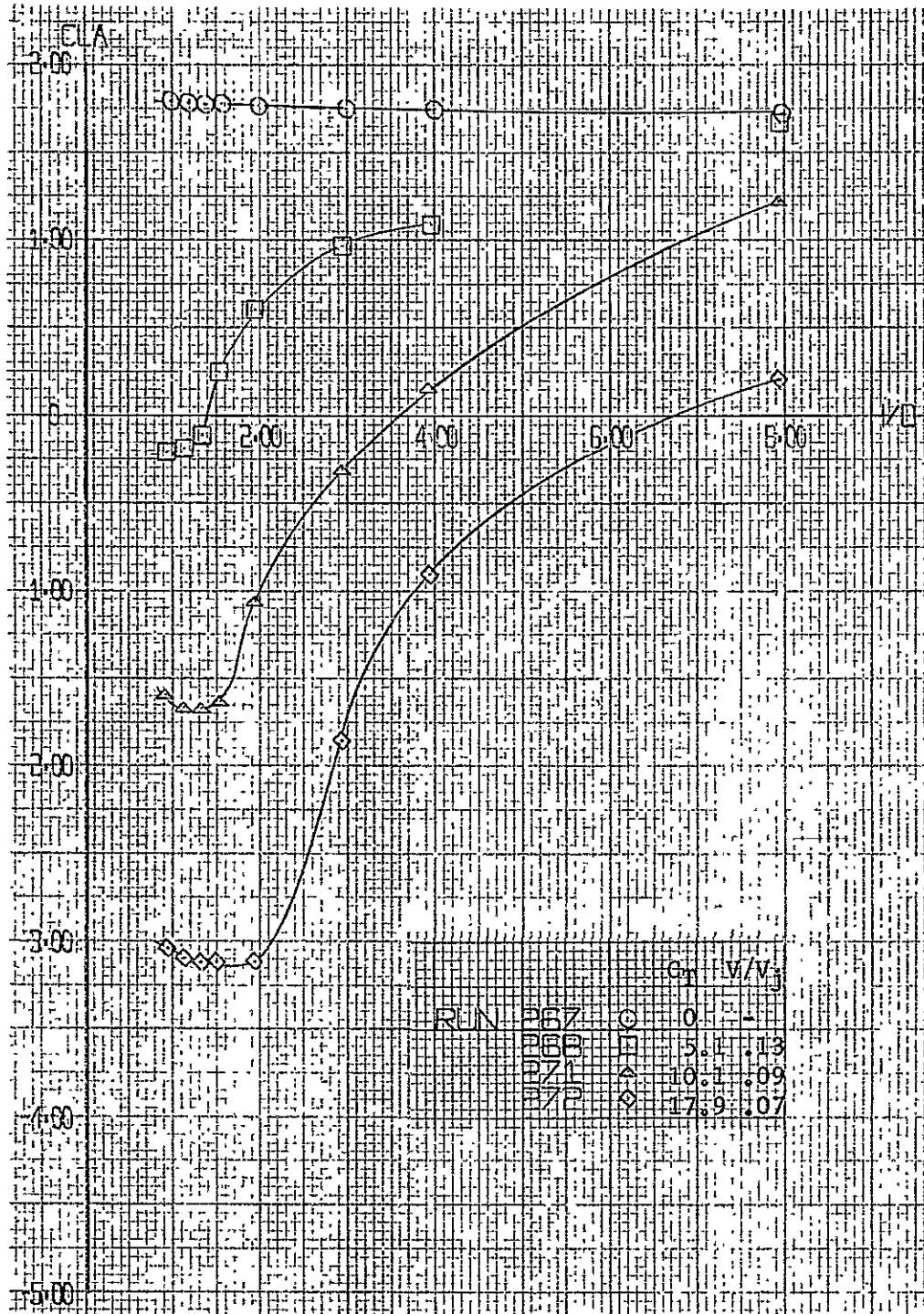


Figure A-66. Effect of Height on the Aerodynamic Coefficients
at Various Thrust Levels, Ground Board Configuration 4;
 $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = -1^\circ$

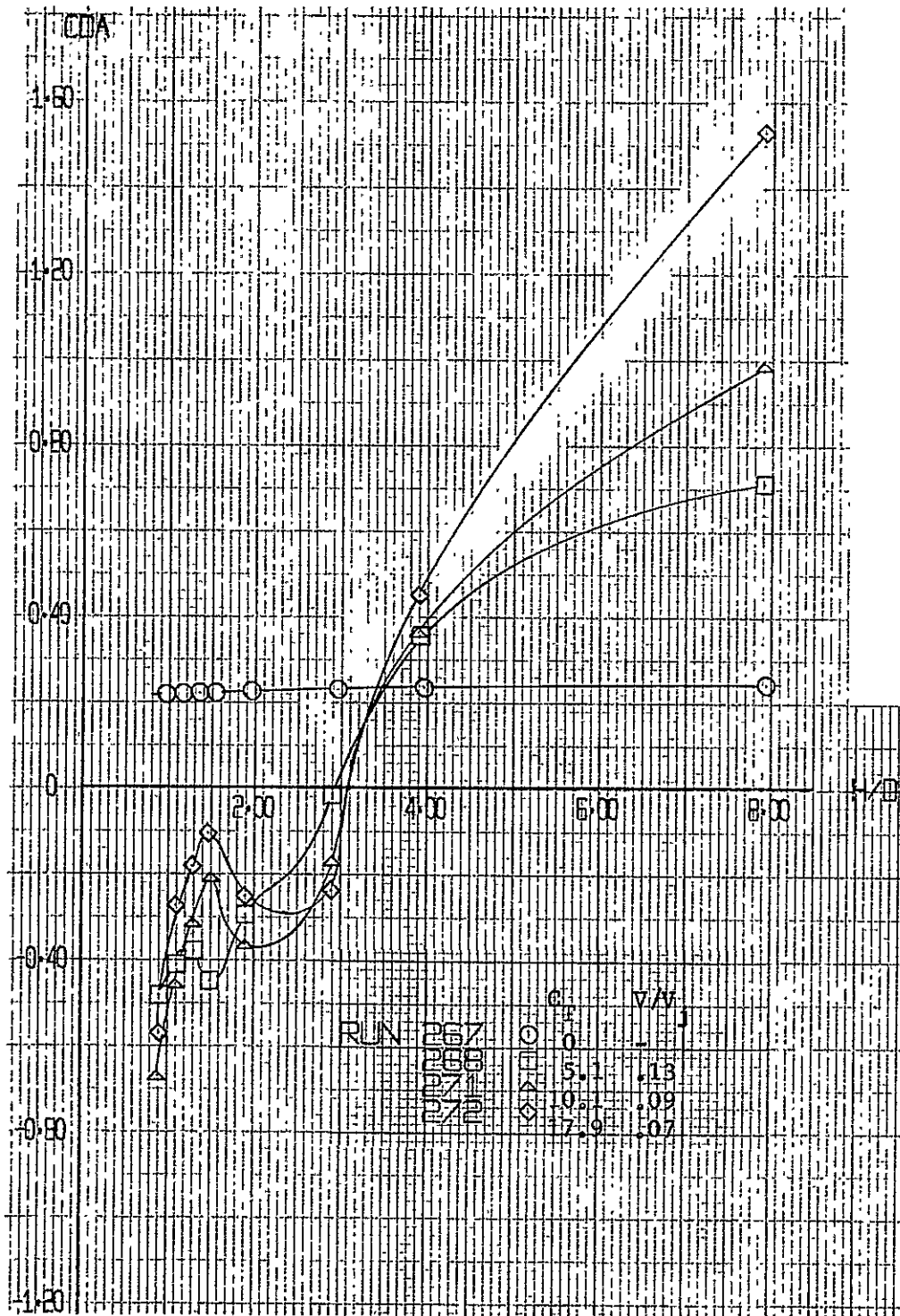


Figure A-66. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = -1^\circ$ (Continued)

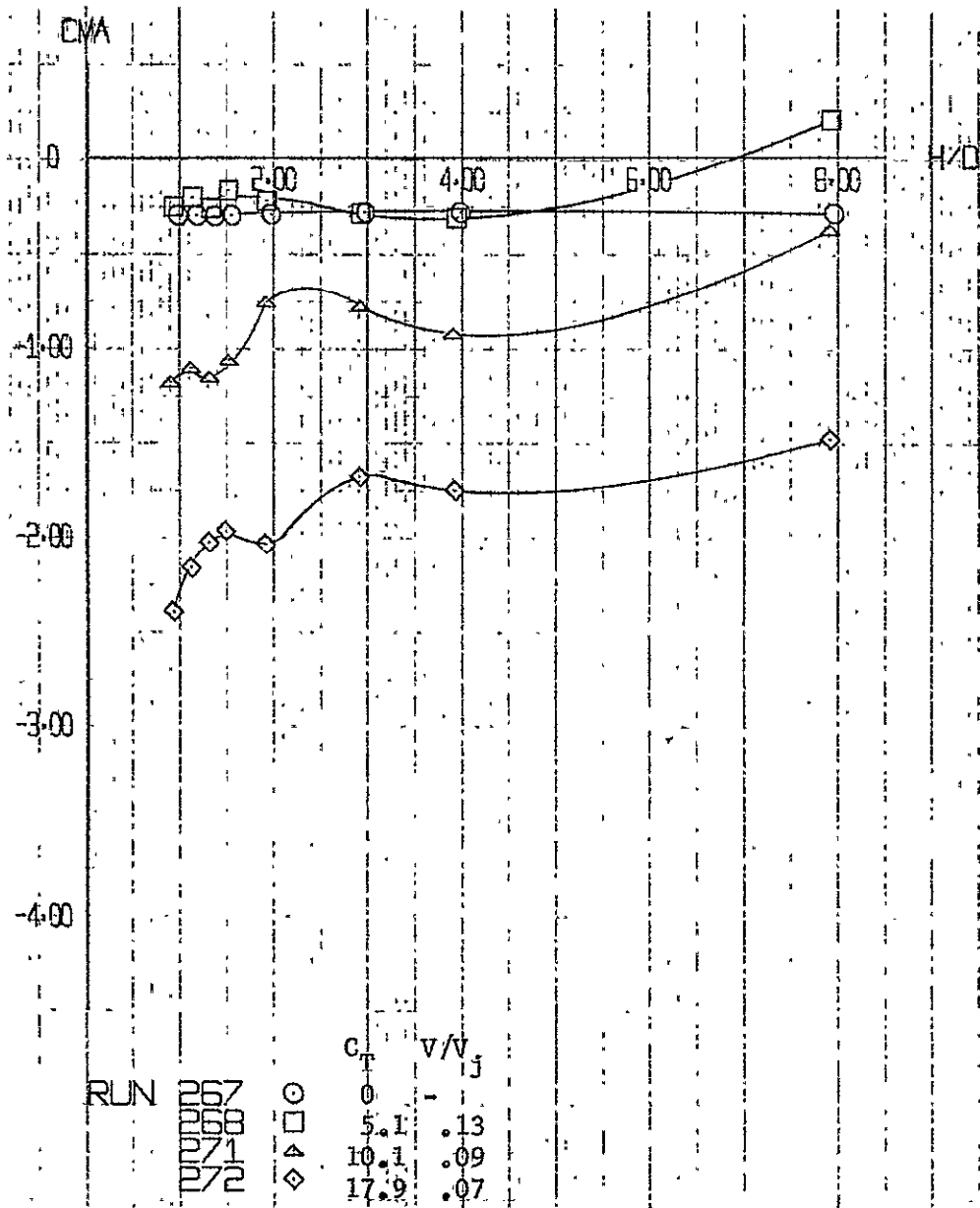


Figure A-66. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = -1^\circ$ (Continued)

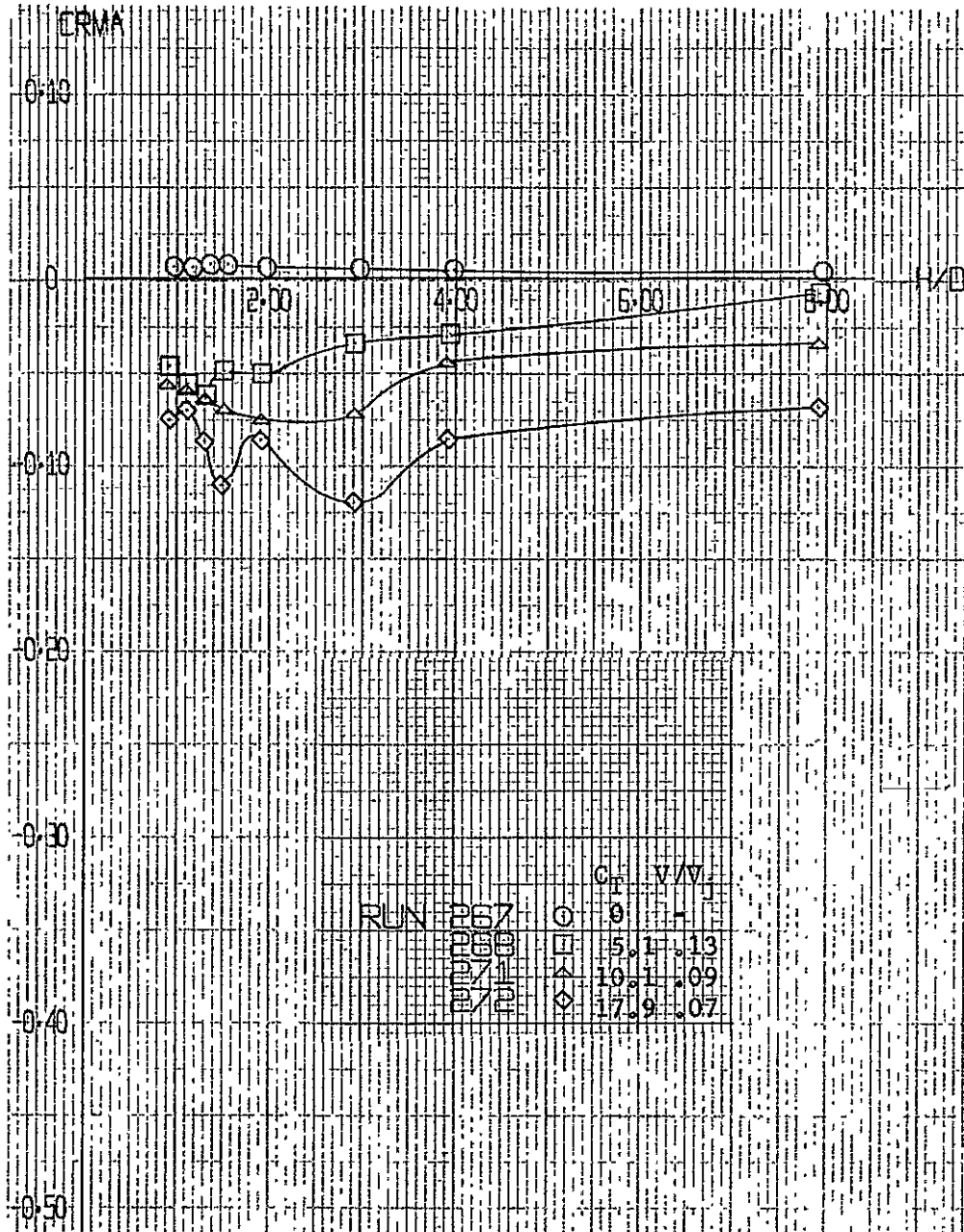


Figure A-66. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 8^\circ$; $\phi = -1^\circ$ (Concluded)

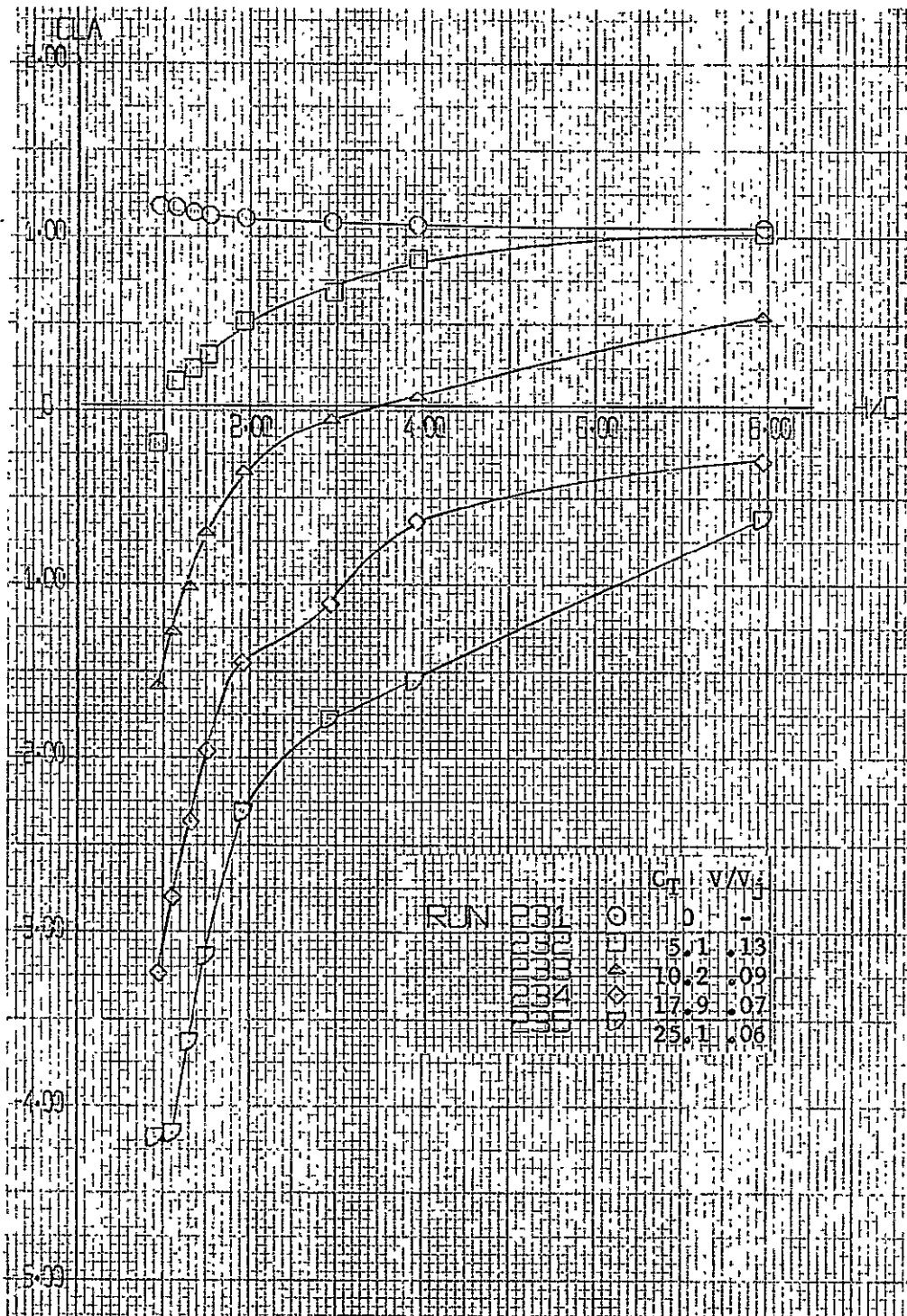


Figure A-67. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

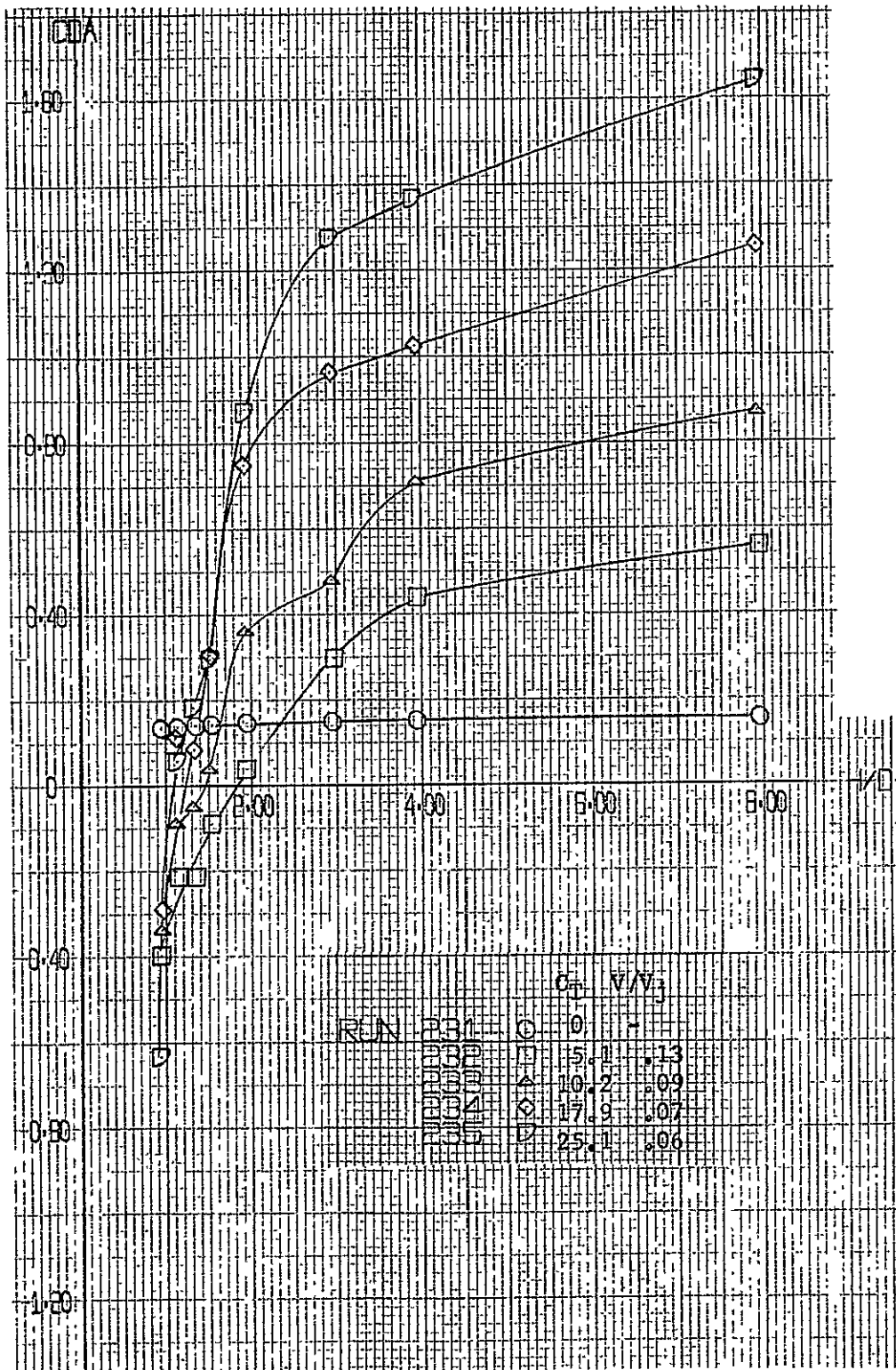


Figure A-67. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

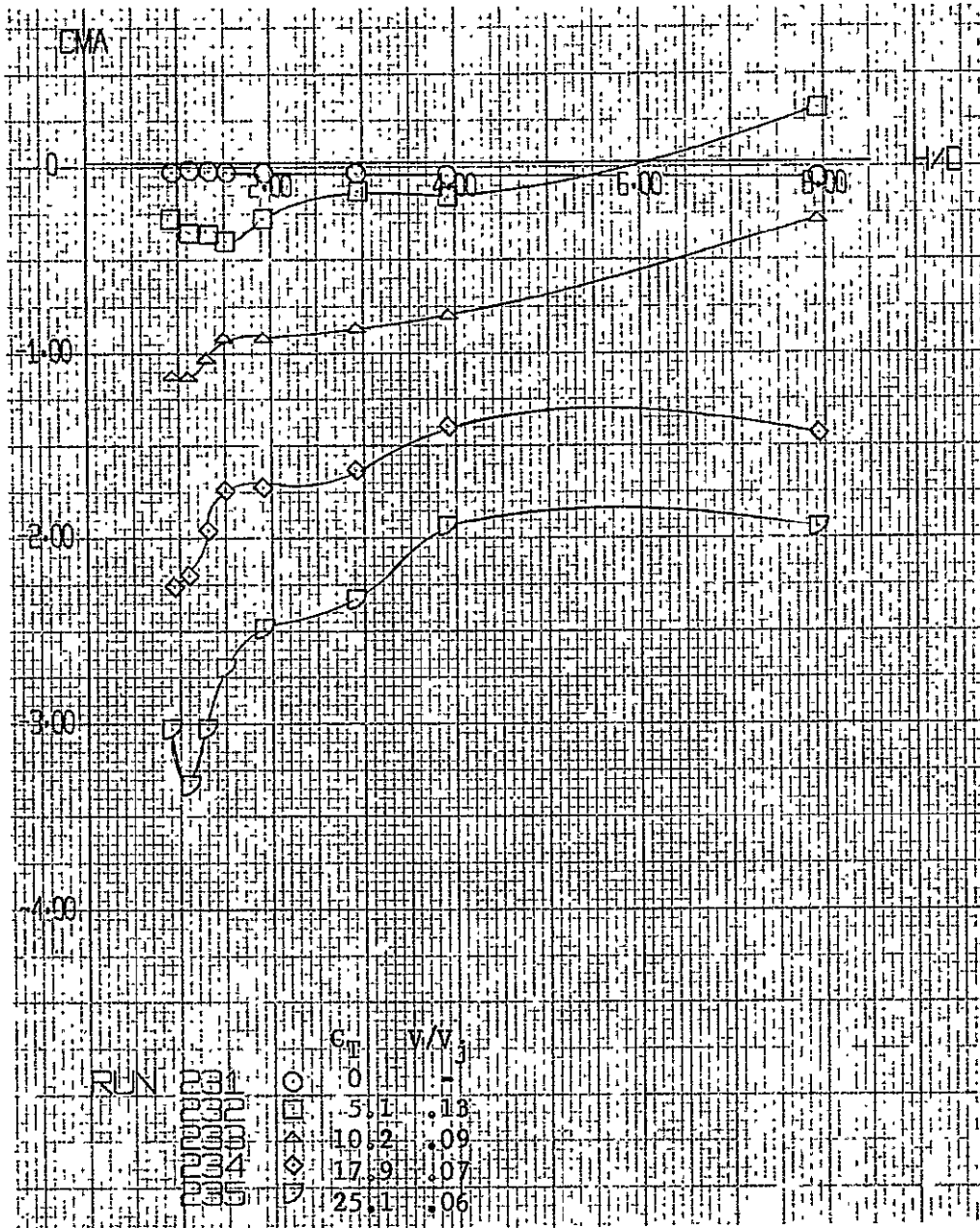


Figure A-67. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

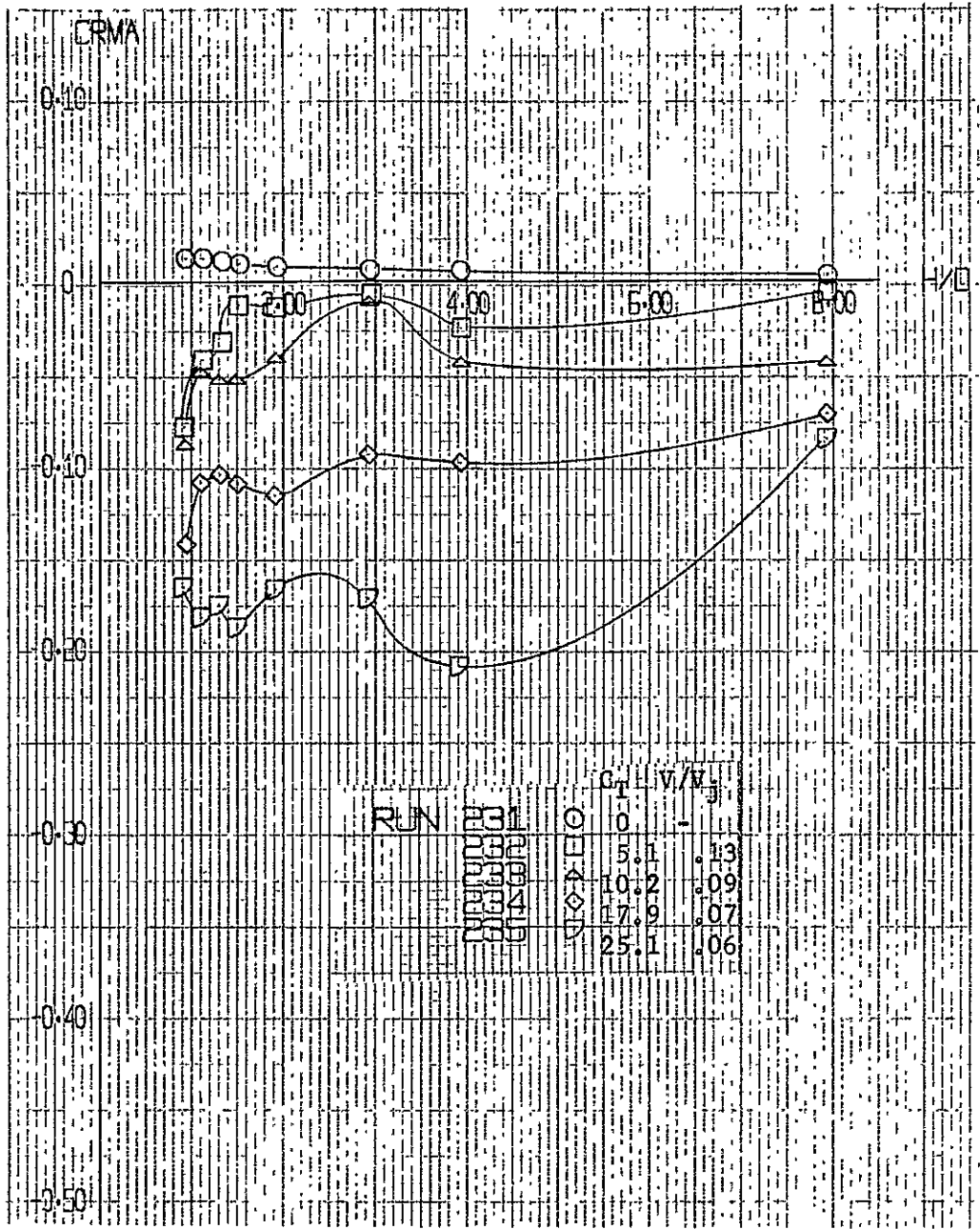


Figure A-67. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Concluded)

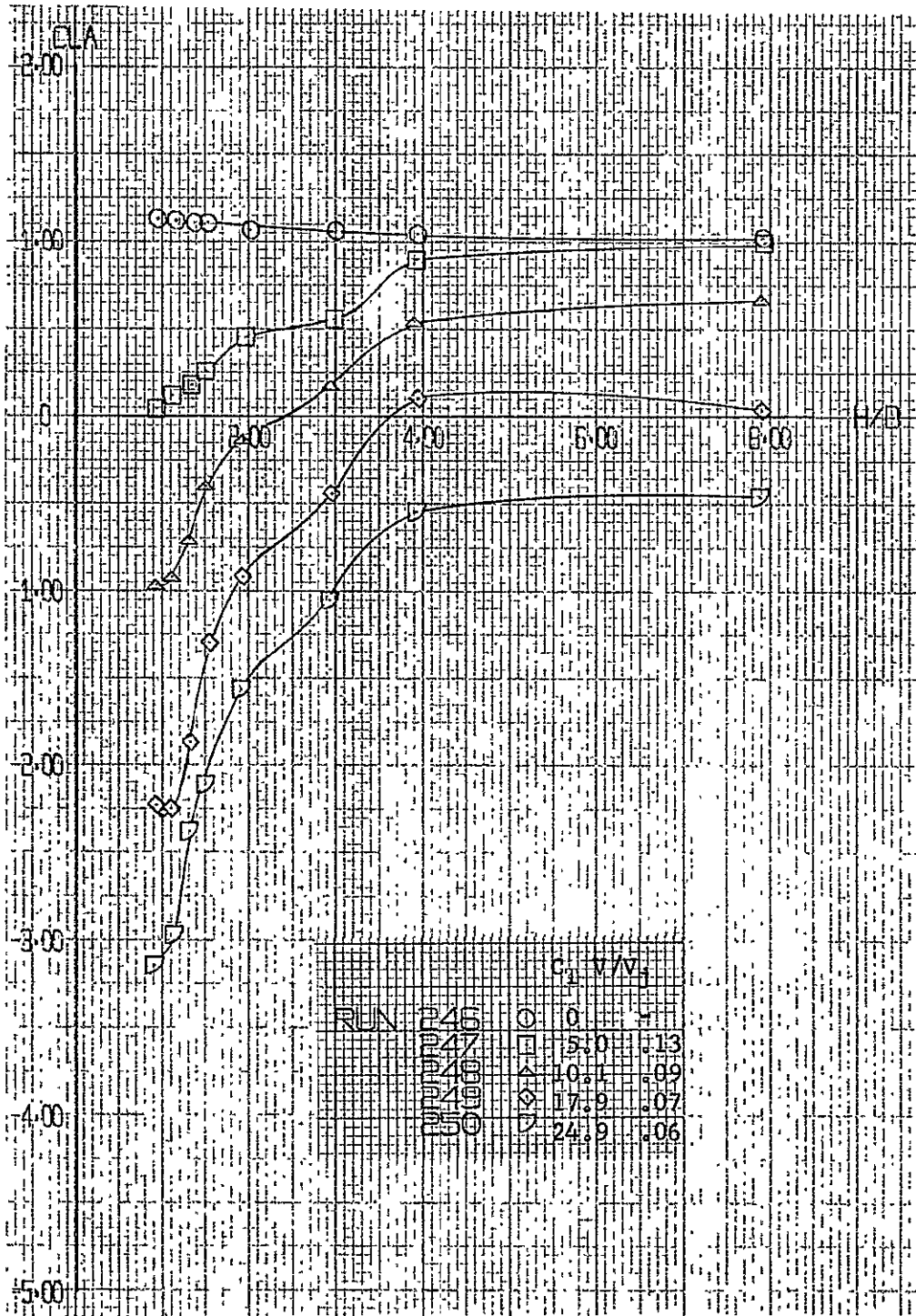


Figure A-68. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$

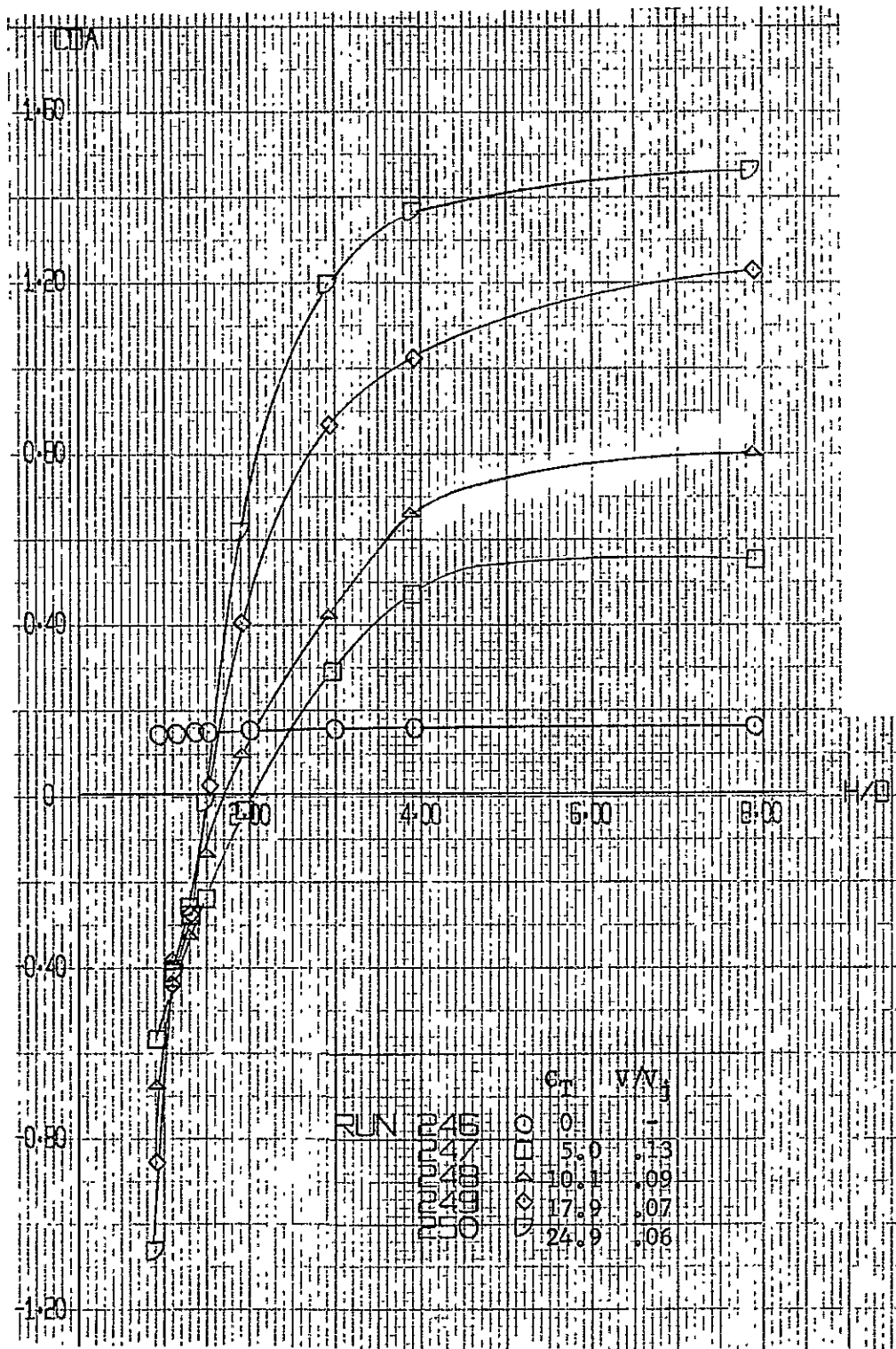


Figure A-68. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

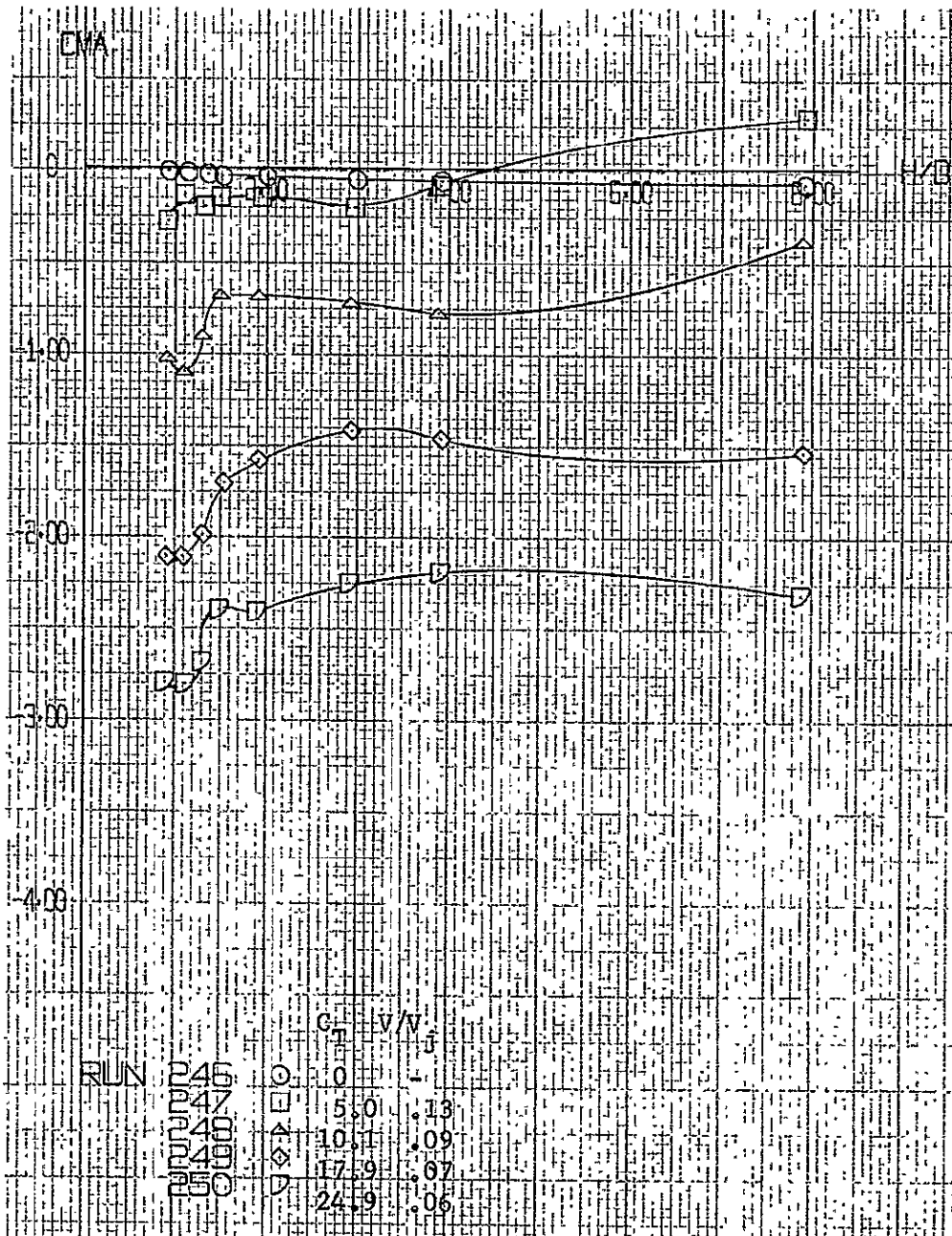


Figure A-68. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

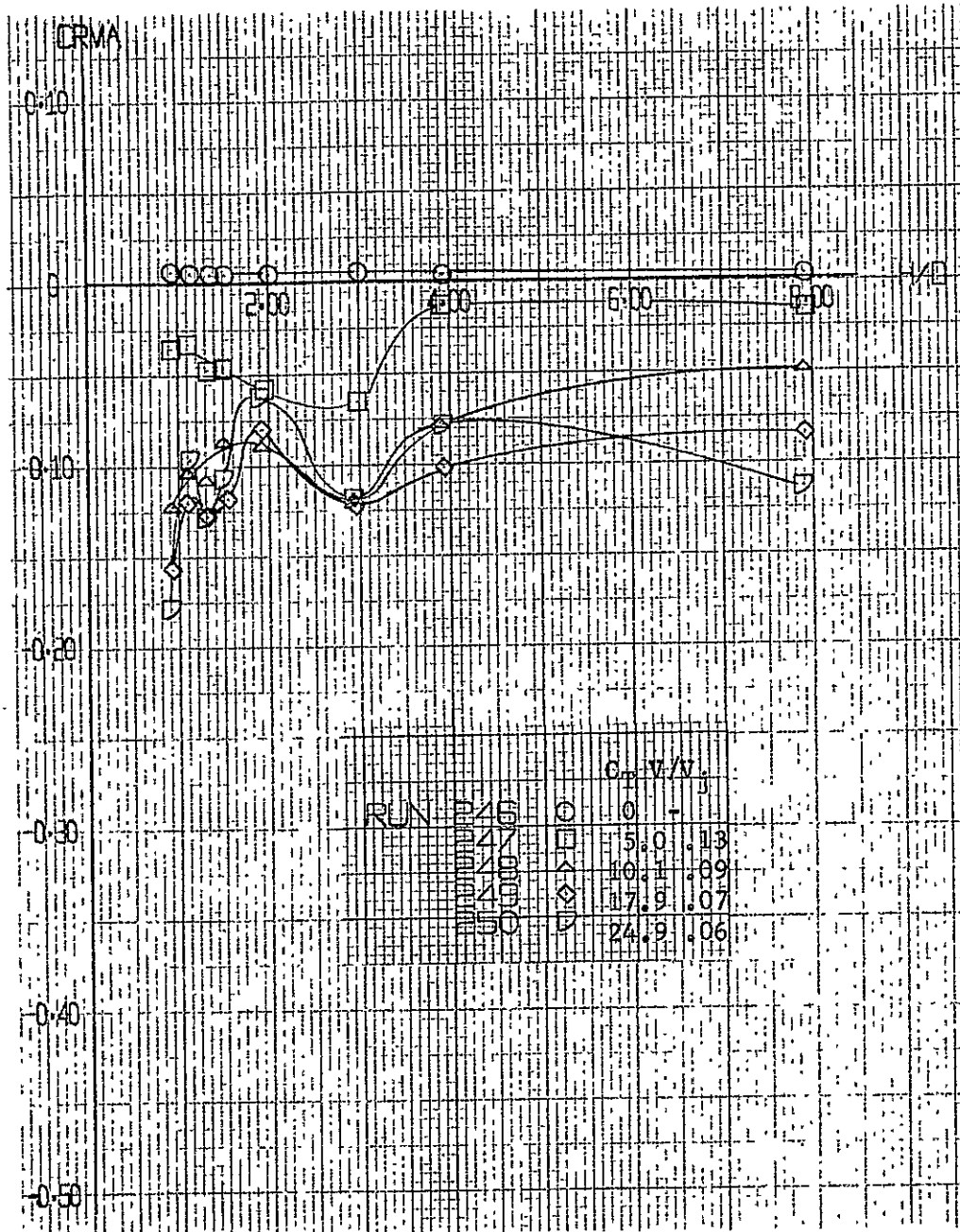


Figure A-68. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = 10^\circ$ (Concluded)

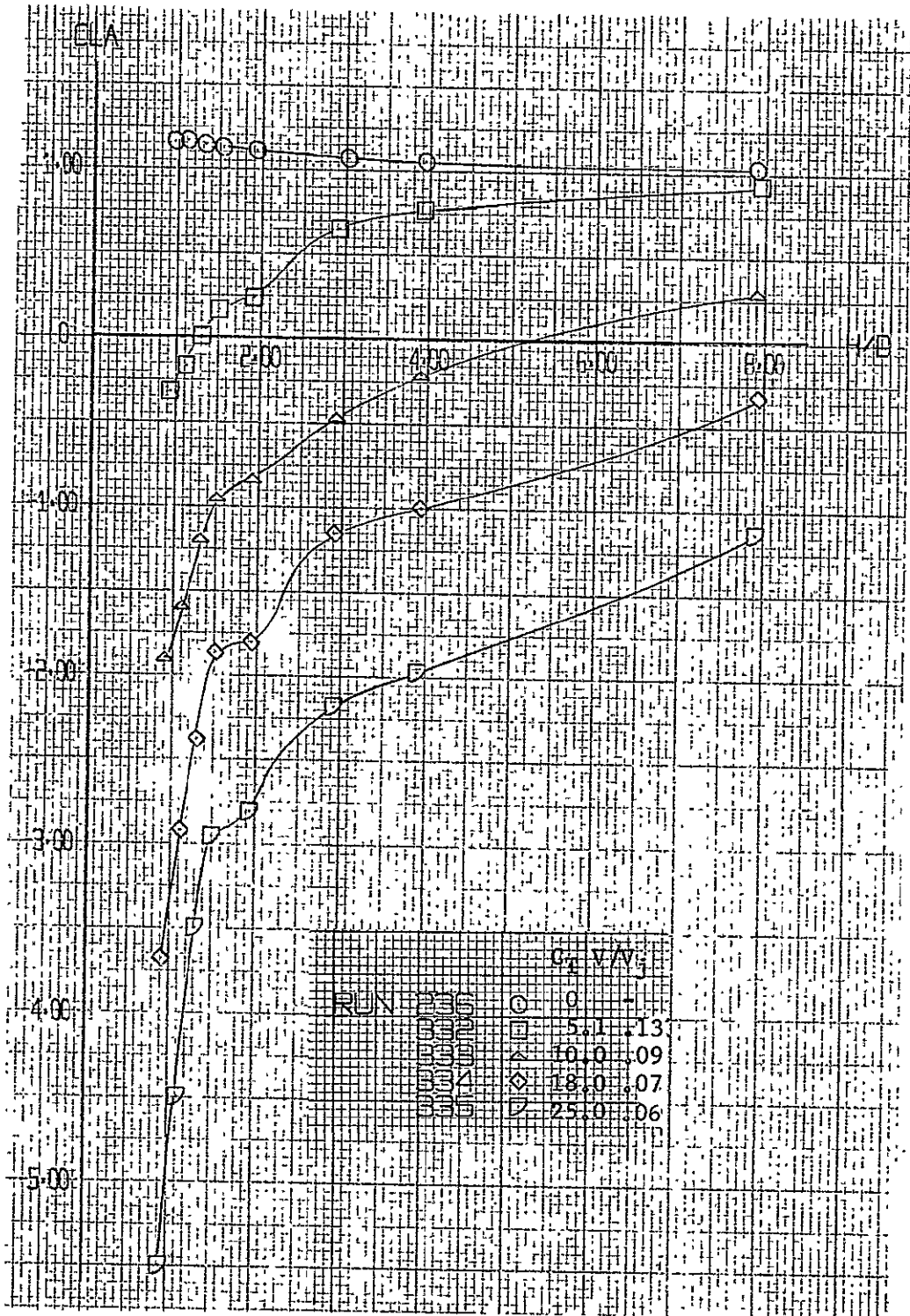


Figure A-69. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

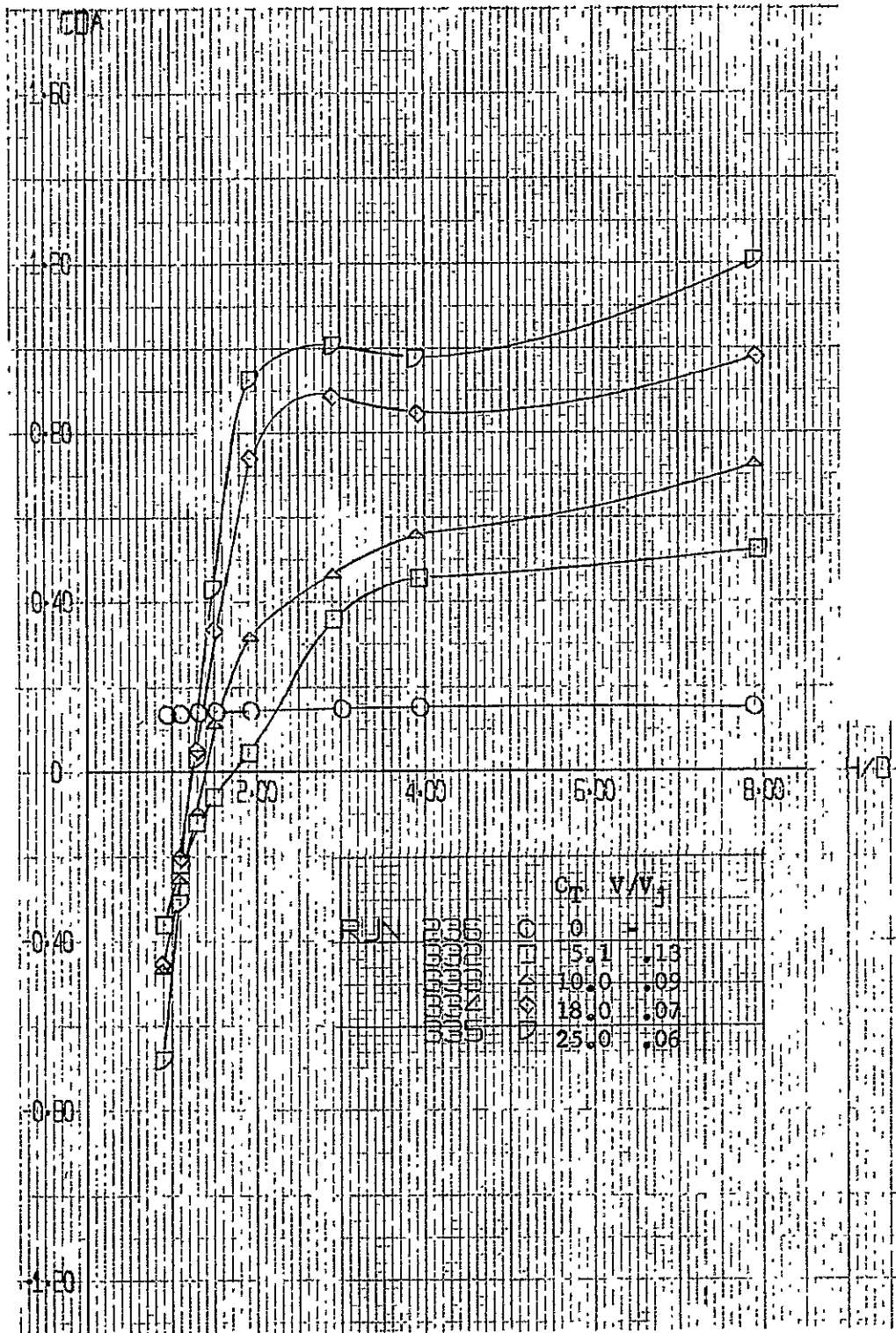


Figure A-69. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

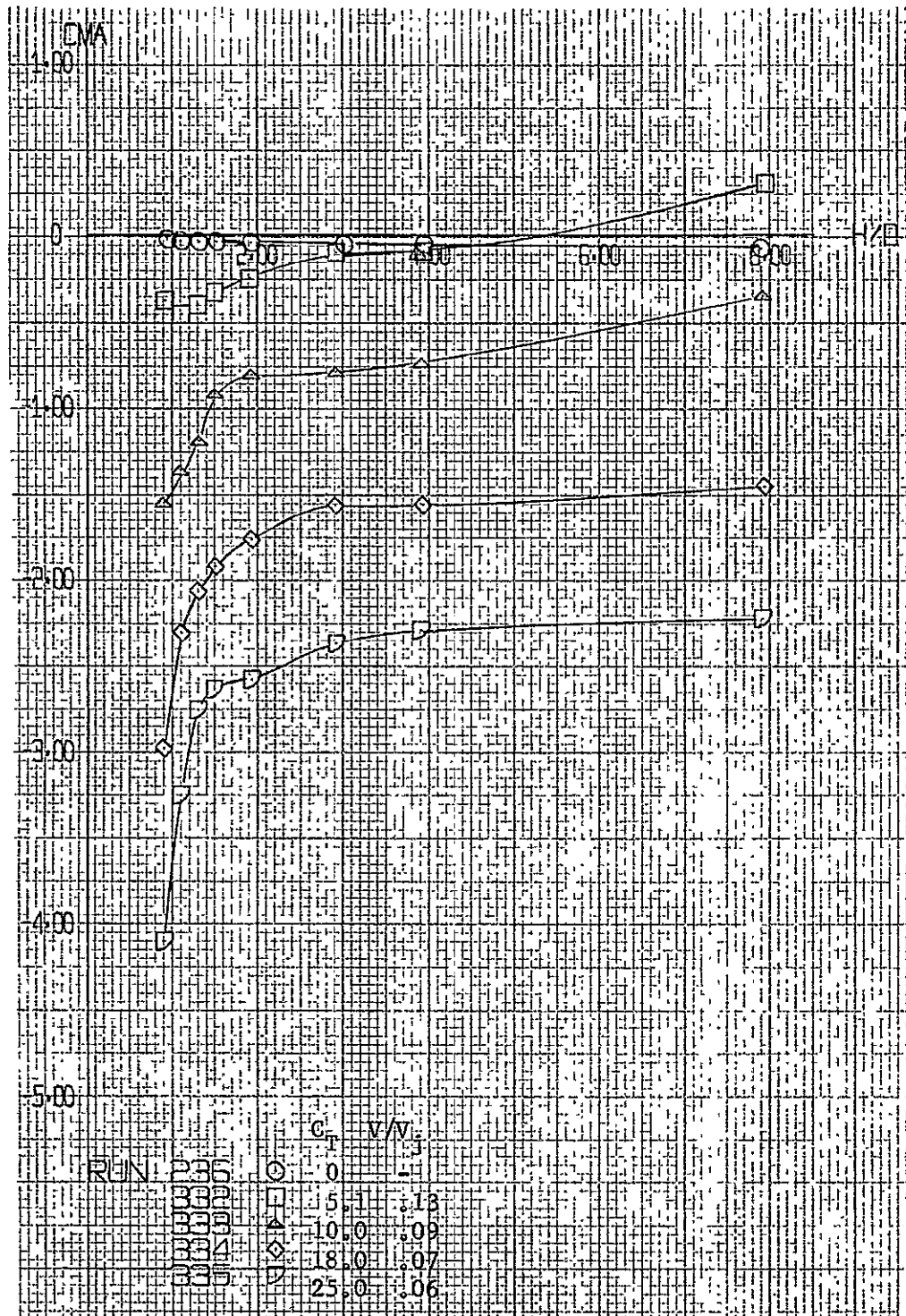


Figure A-69. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

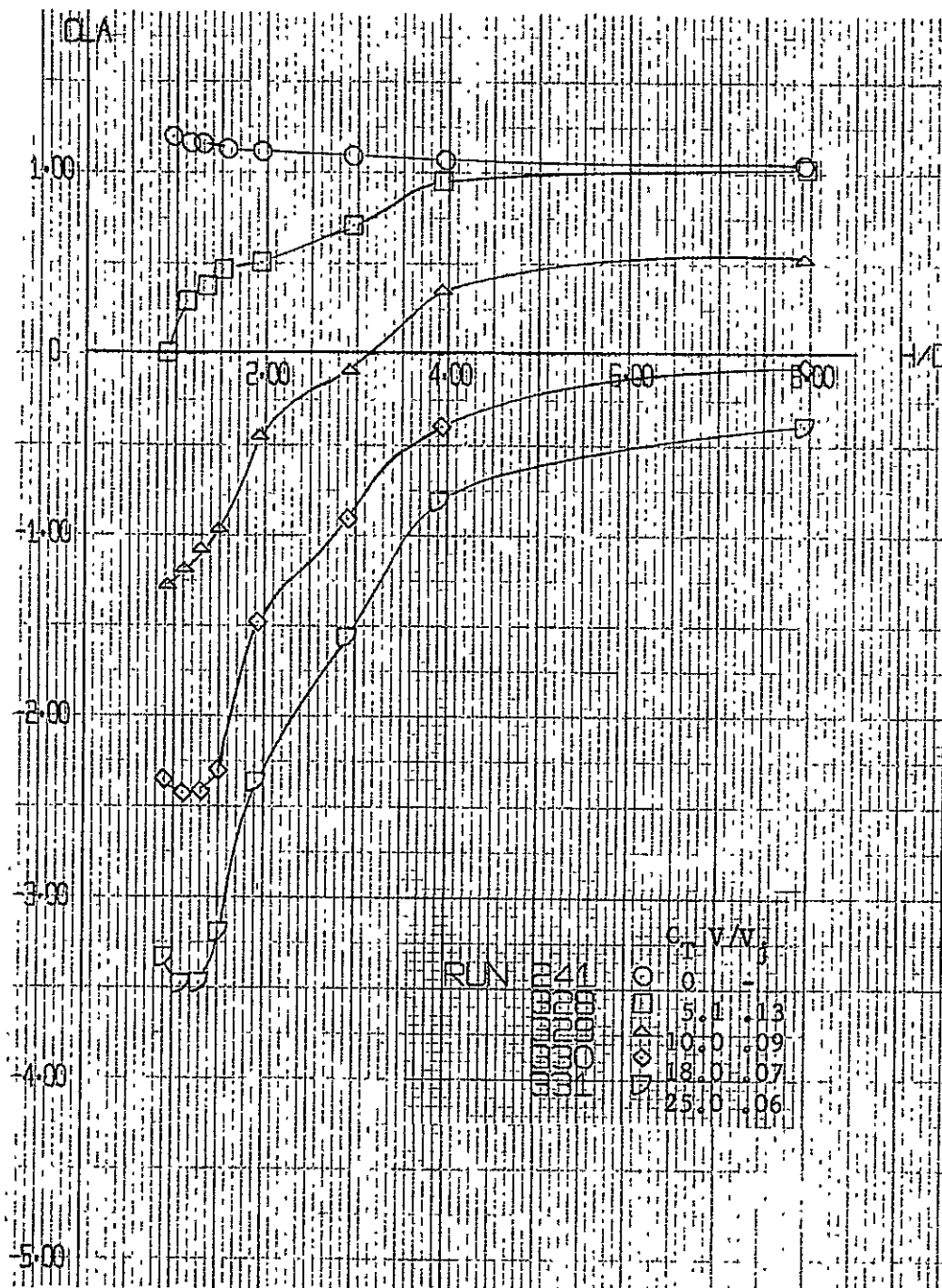


Figure A-69. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\theta = -10^\circ$ (Concluded)

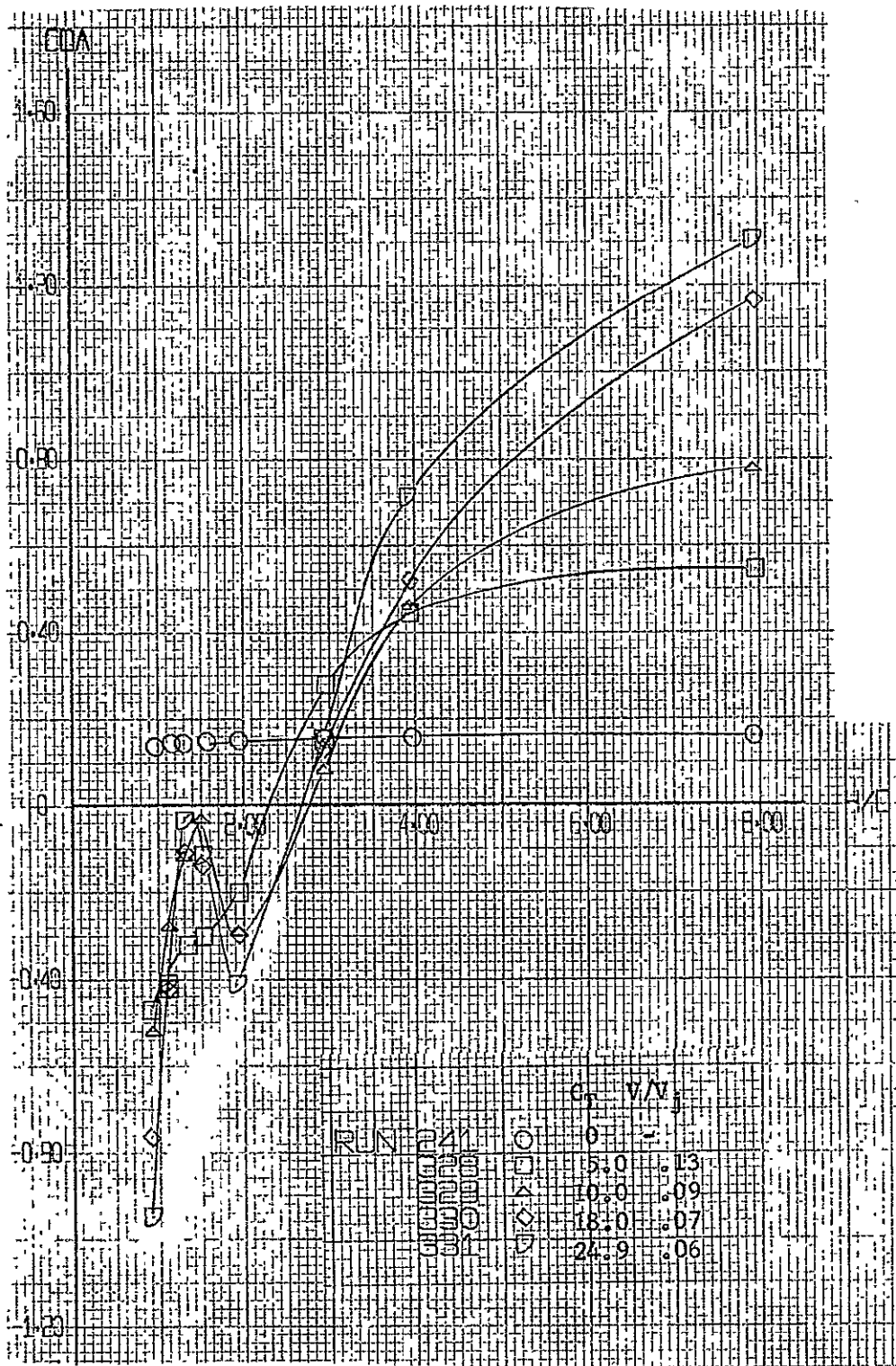


Figure A-70. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$

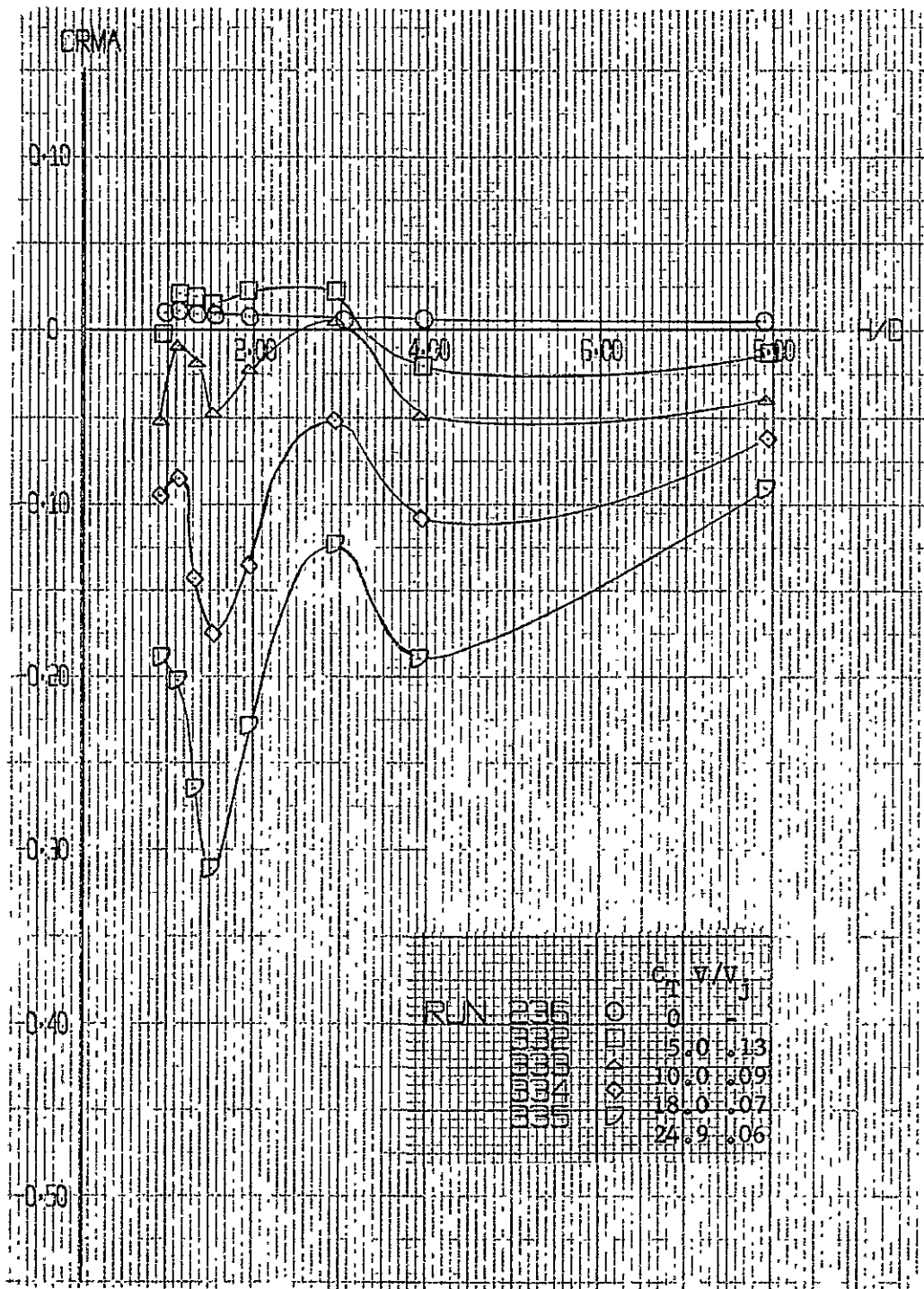


Figure A-70. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

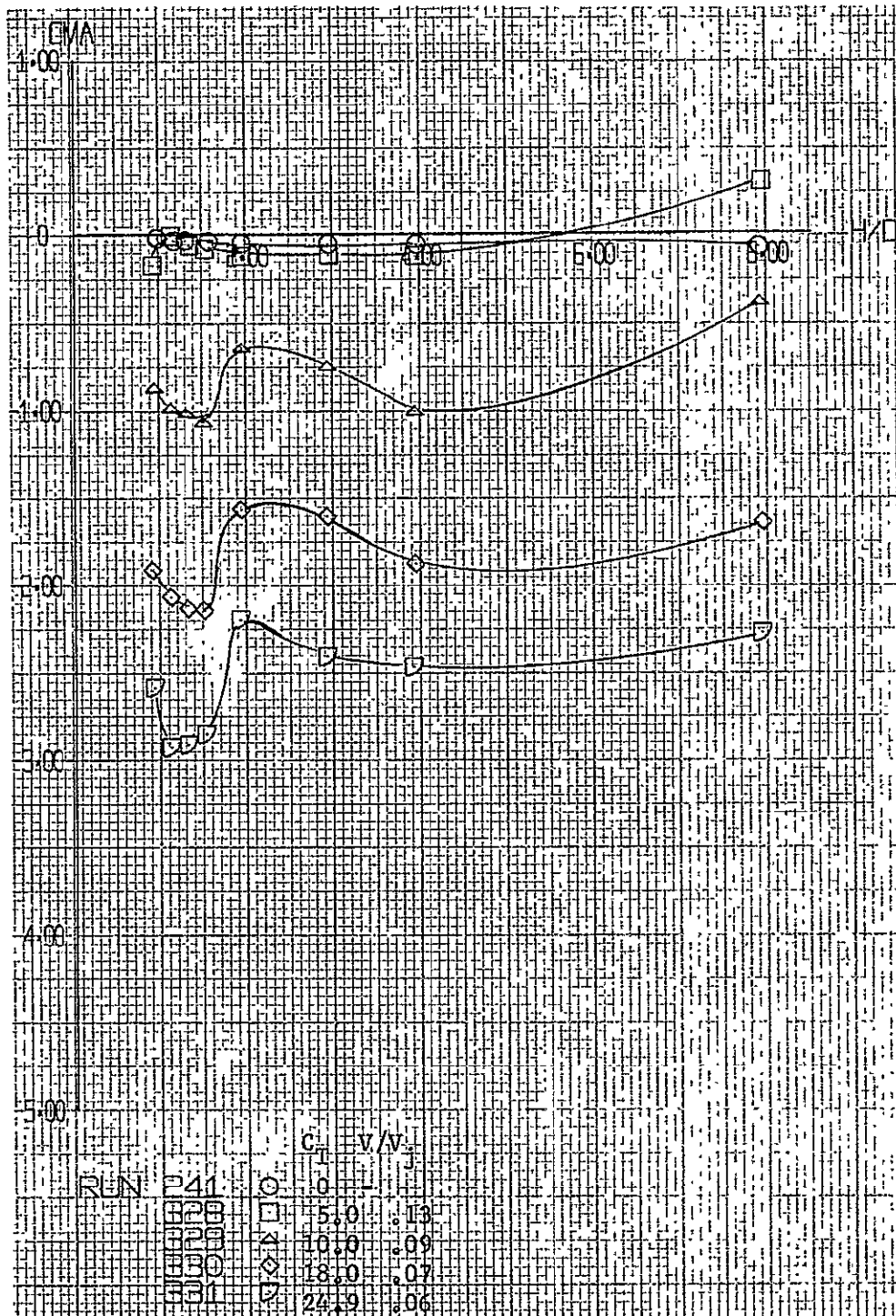


Figure A-70. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_T = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

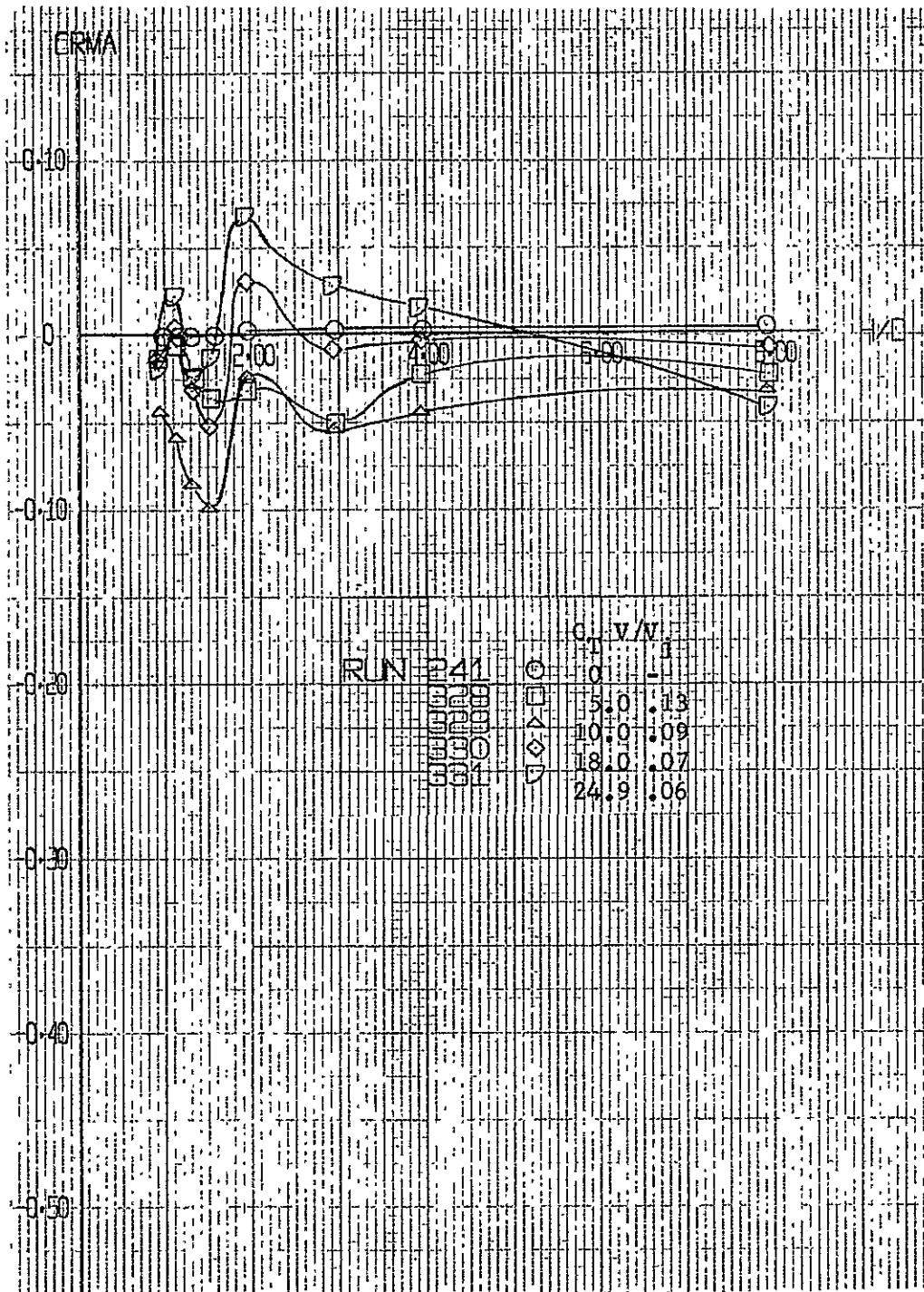


Figure A-70. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 10^\circ$ (Concluded)

C-4

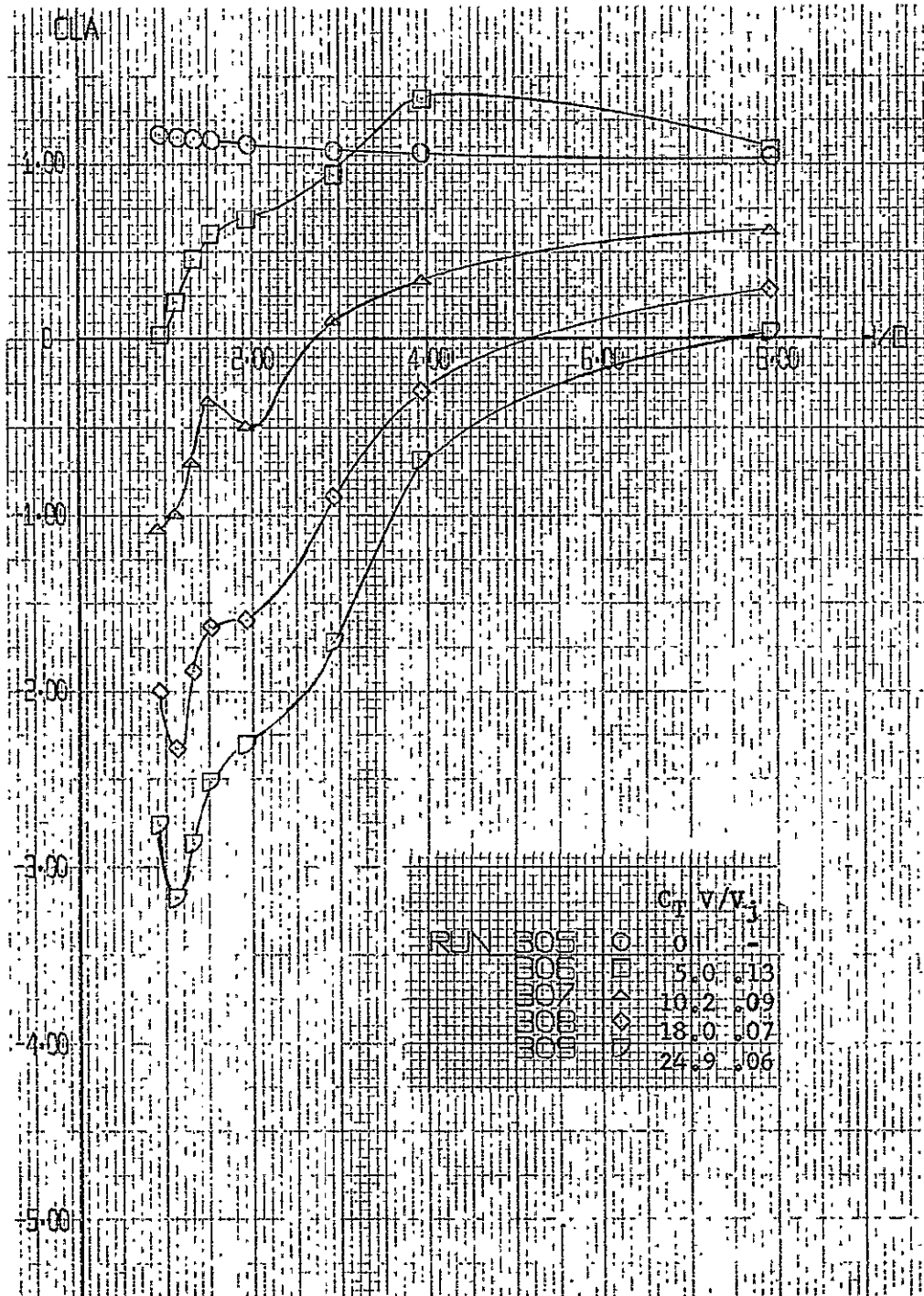


Figure A-71. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

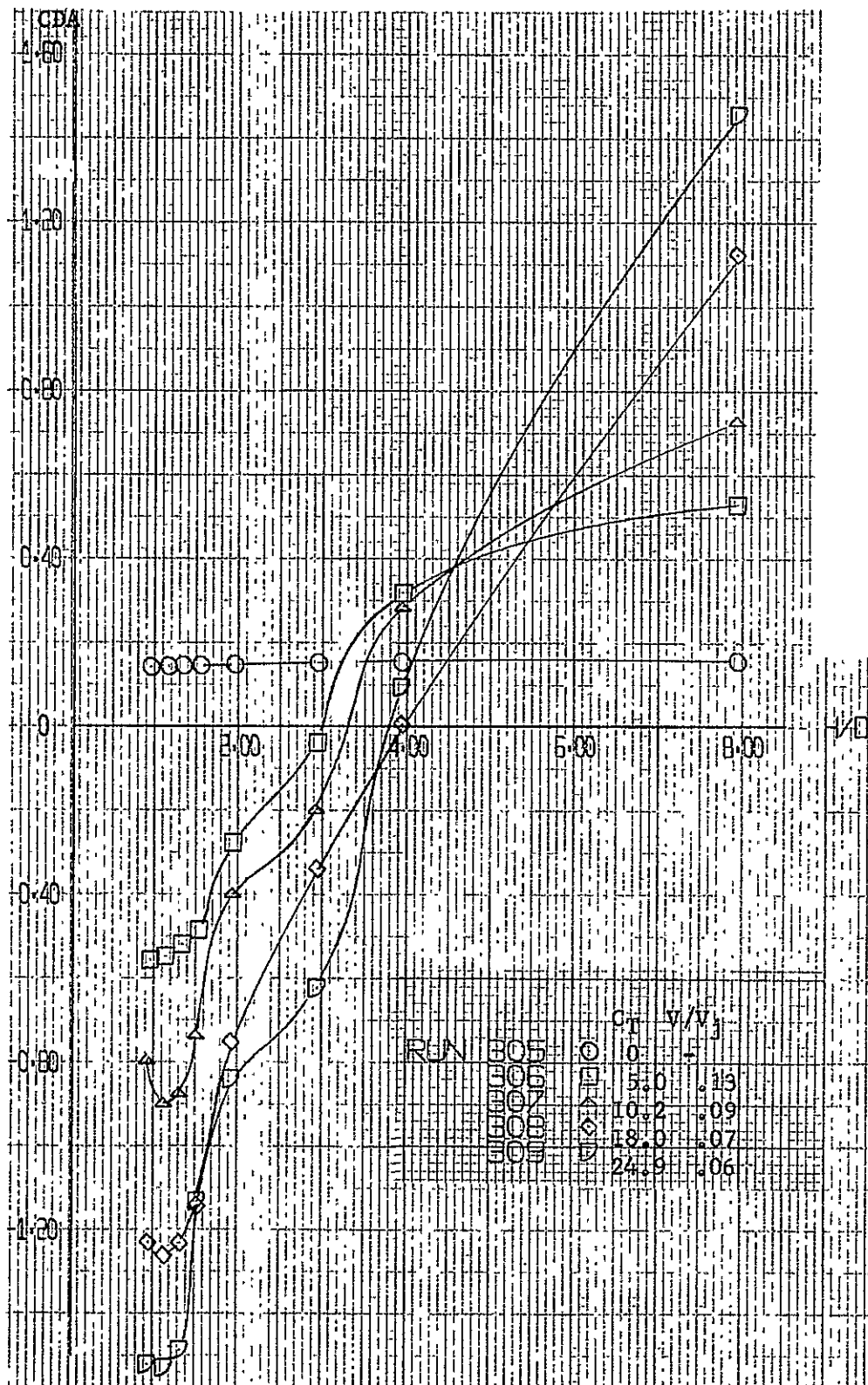


Figure A-71. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

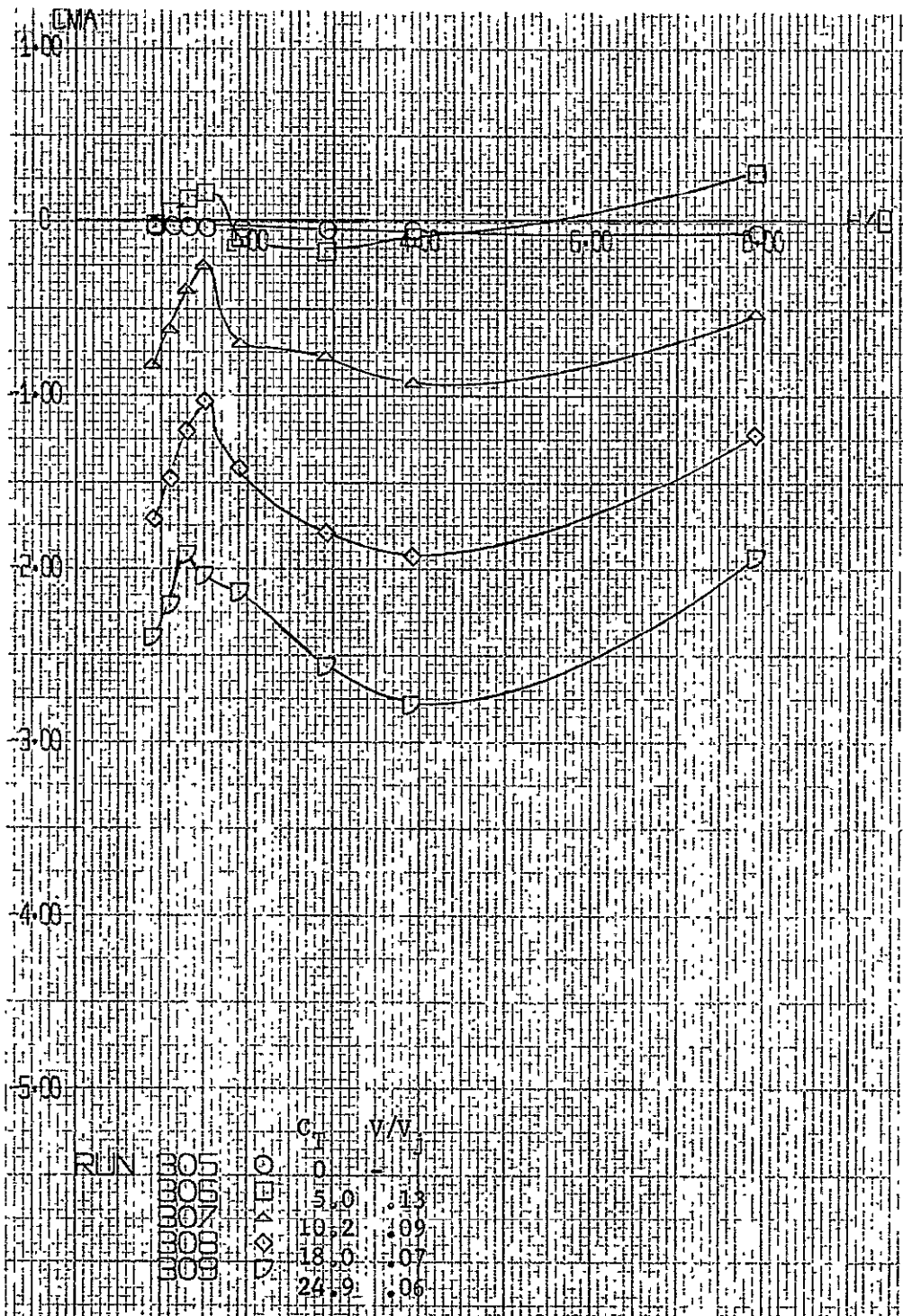


Figure A-71. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

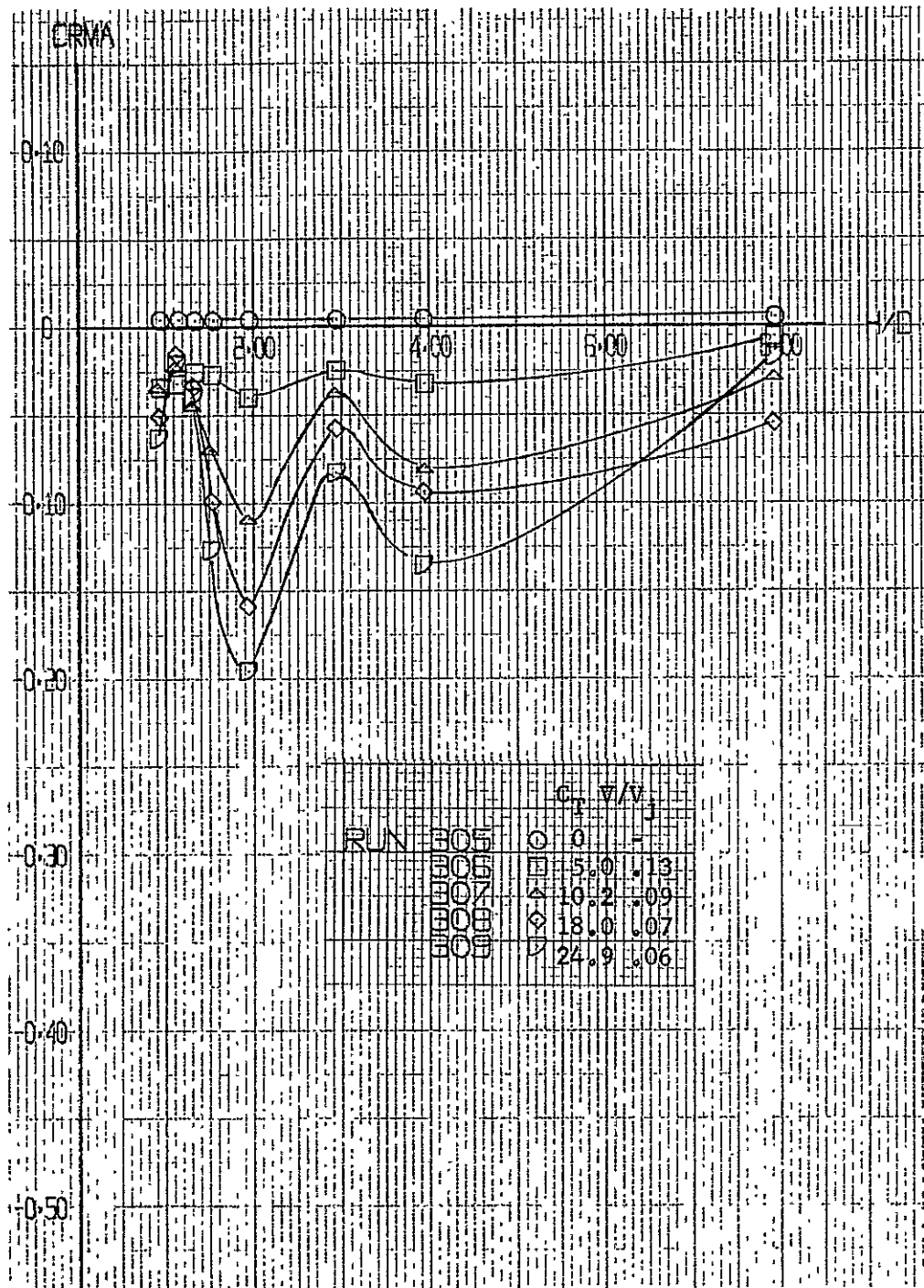


Figure A-71. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 1; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

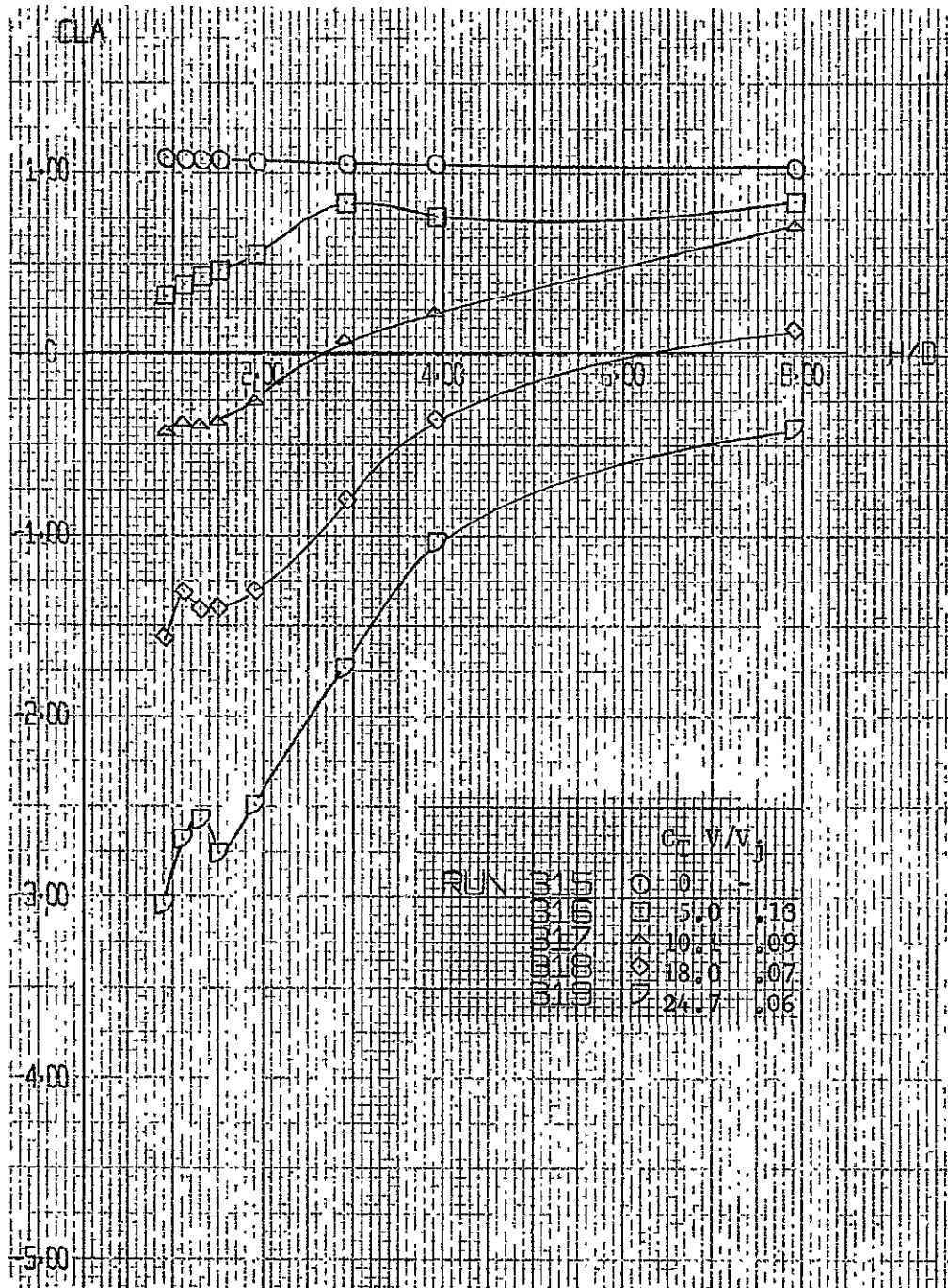


Figure A-72. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

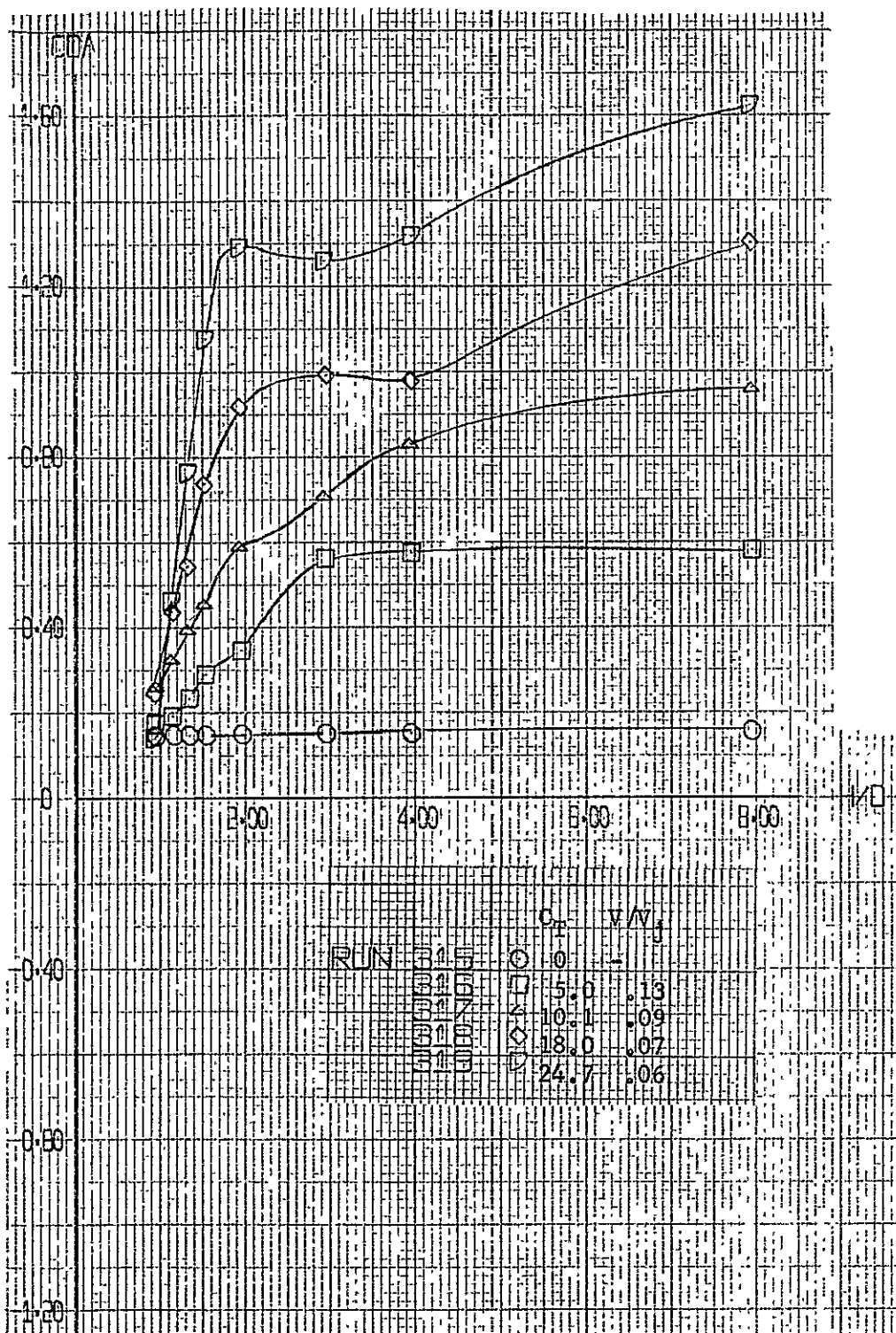


Figure A-72. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

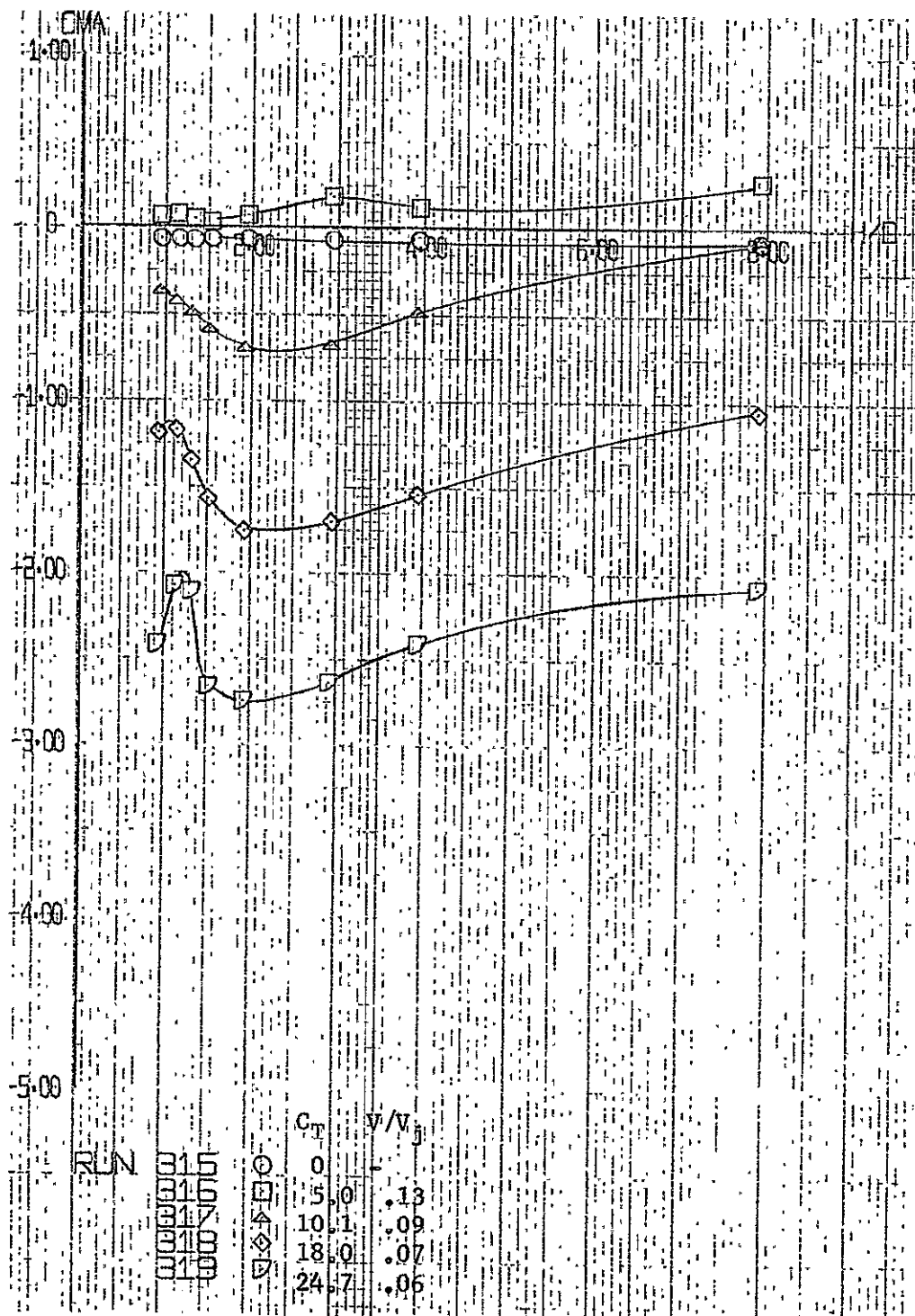


Figure A-72. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_{L0} = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

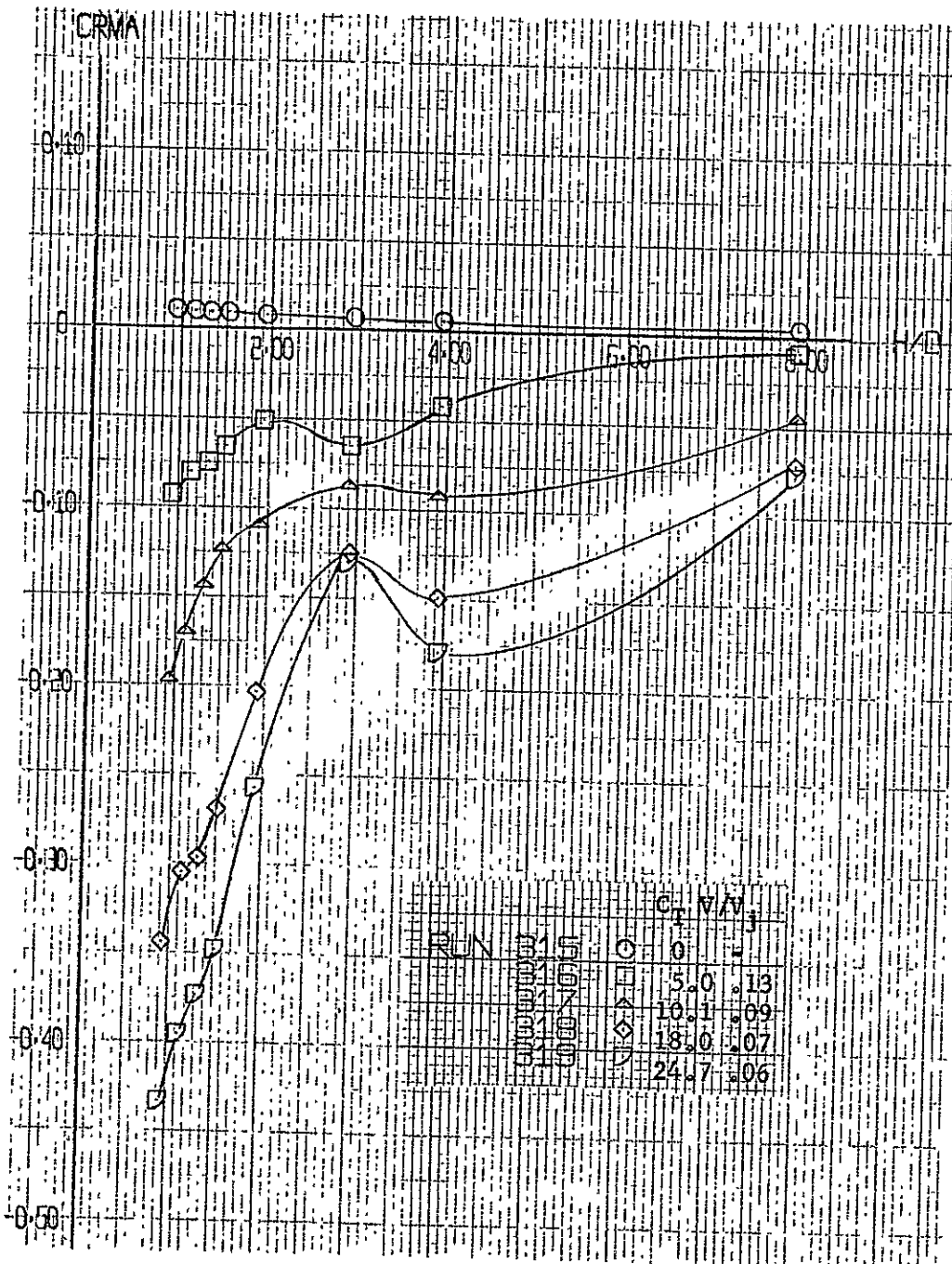


Figure A-72. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

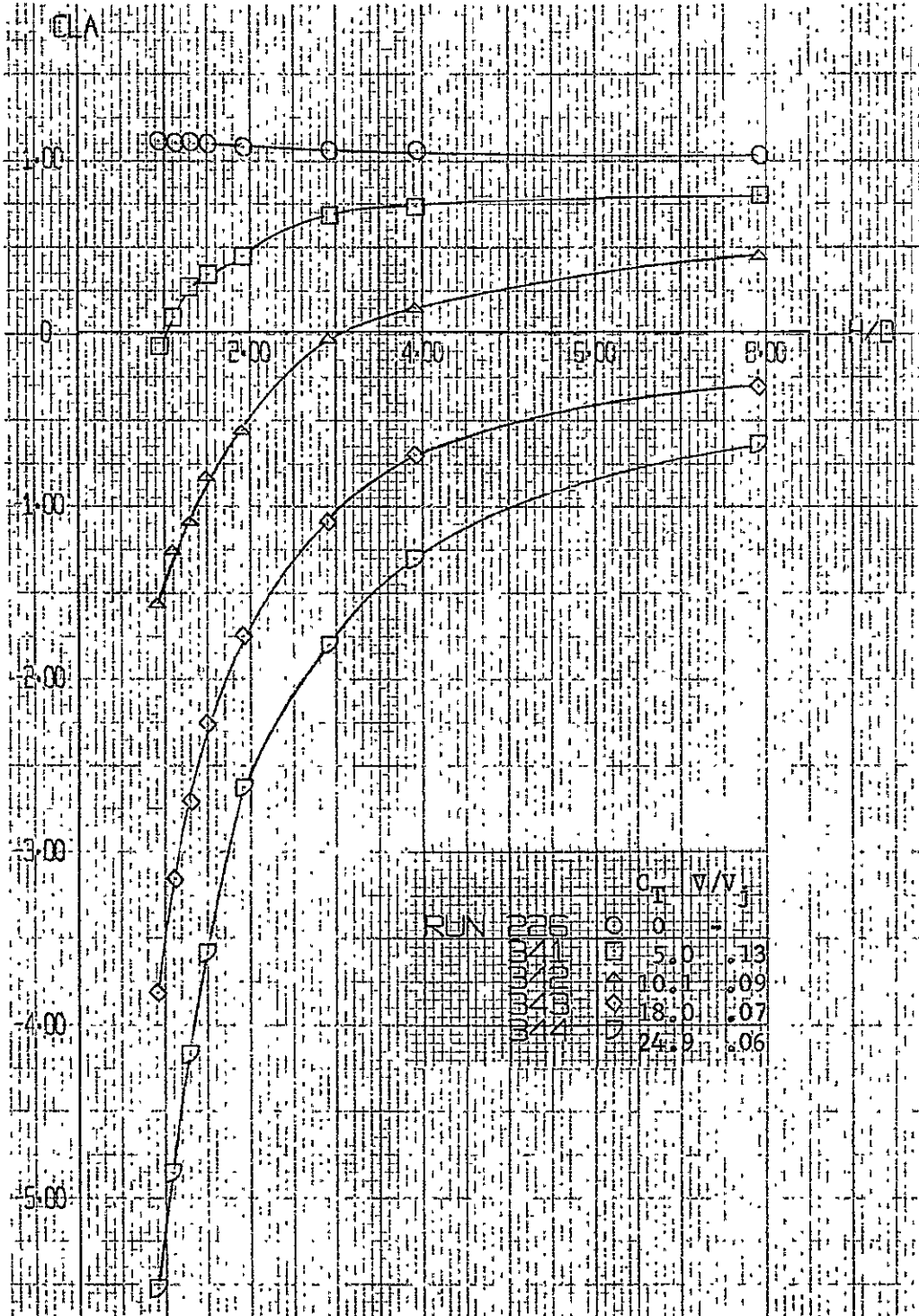


Figure A-73. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

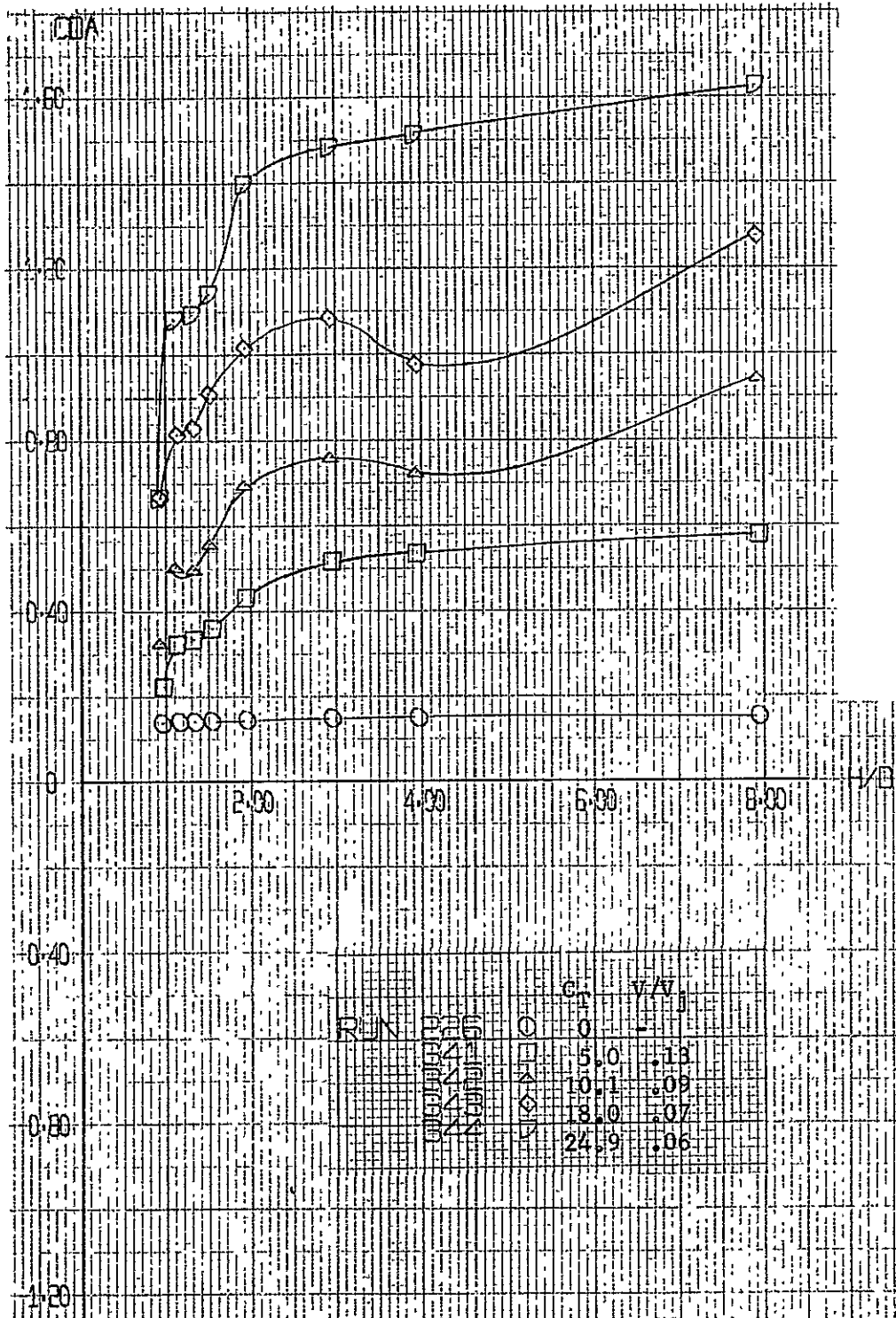


Figure A-73. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

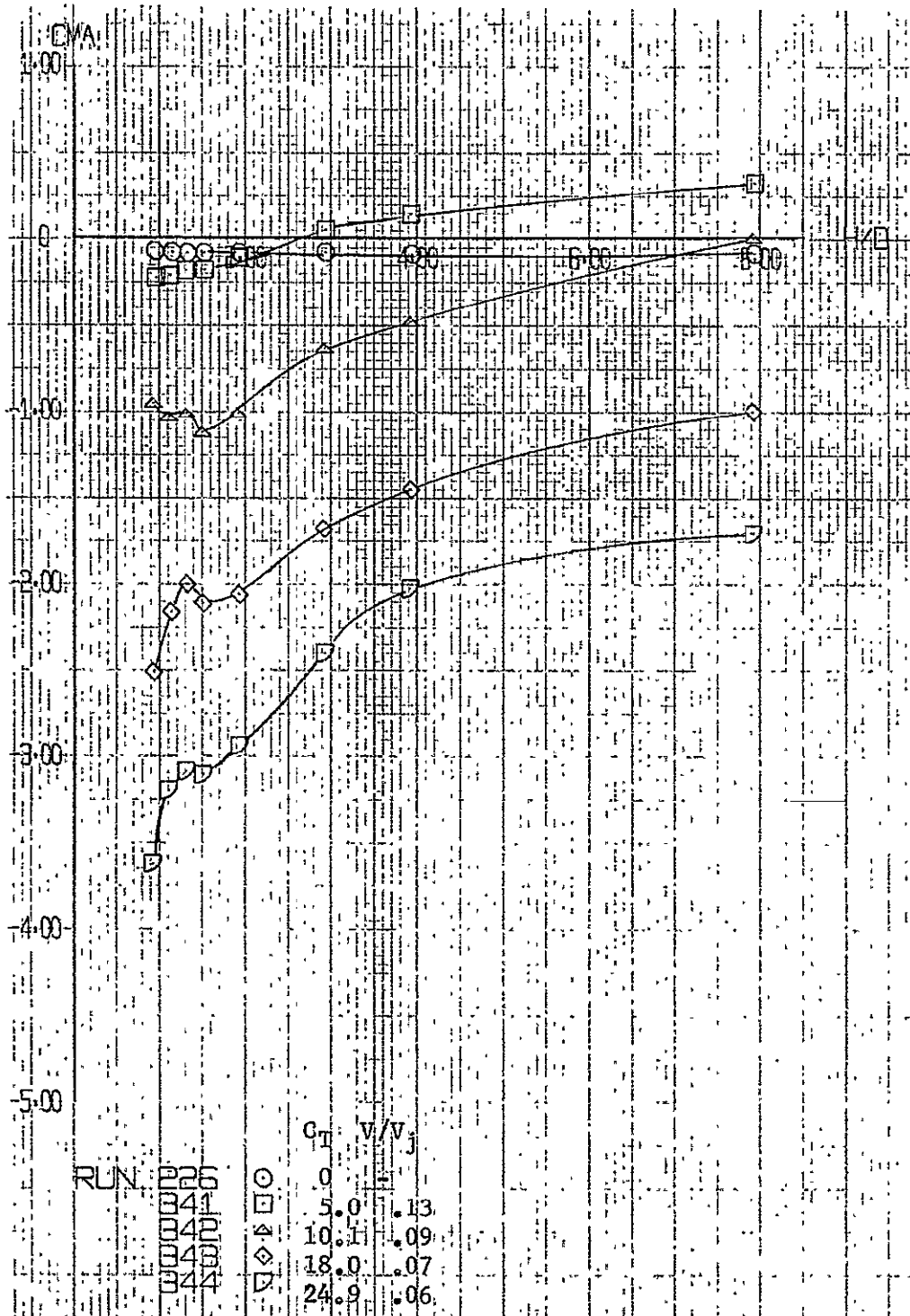


Figure A-73. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

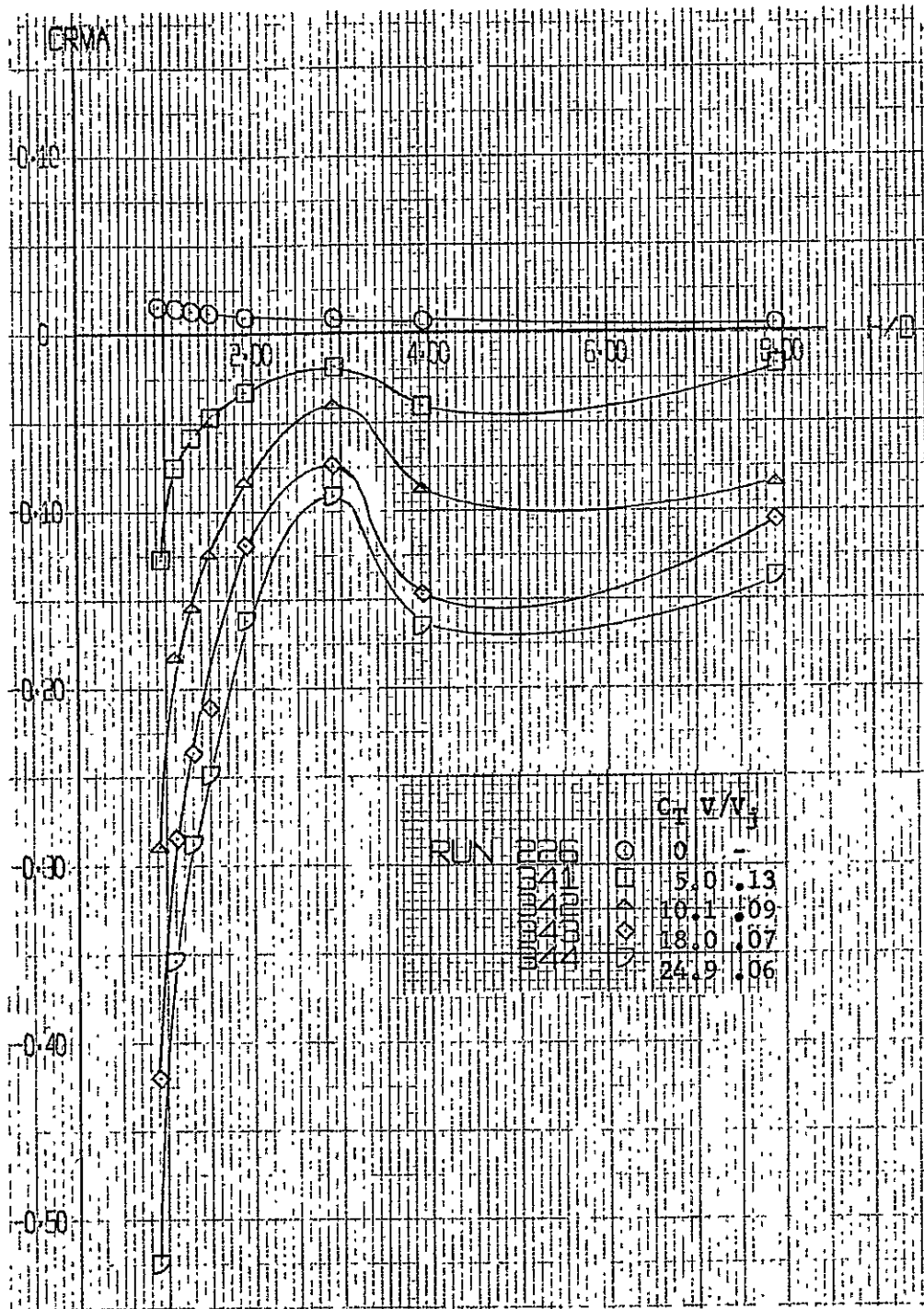


Figure A-73. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In, $T_R/T_{L0} = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Concluded)

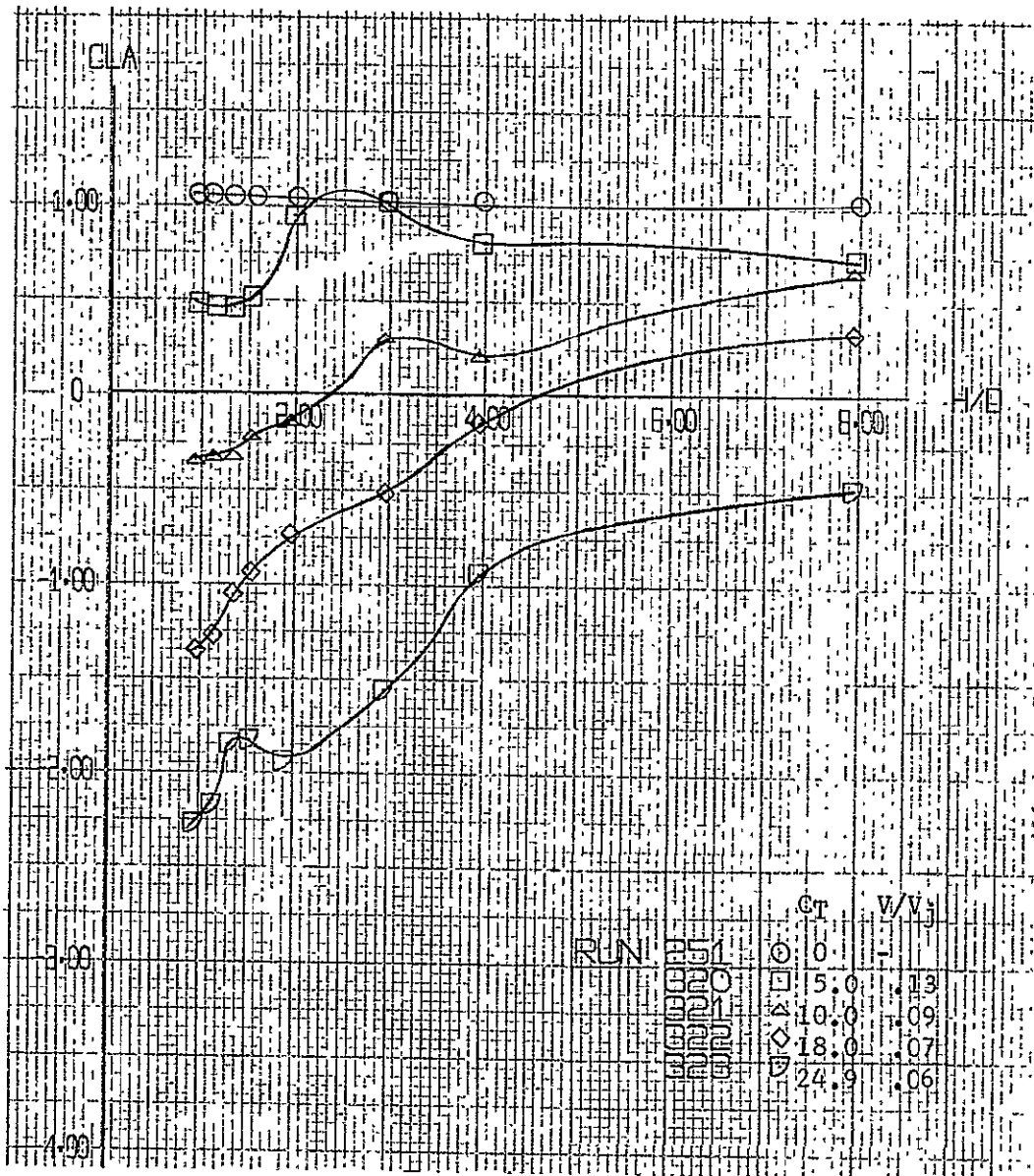


Figure A-74. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$

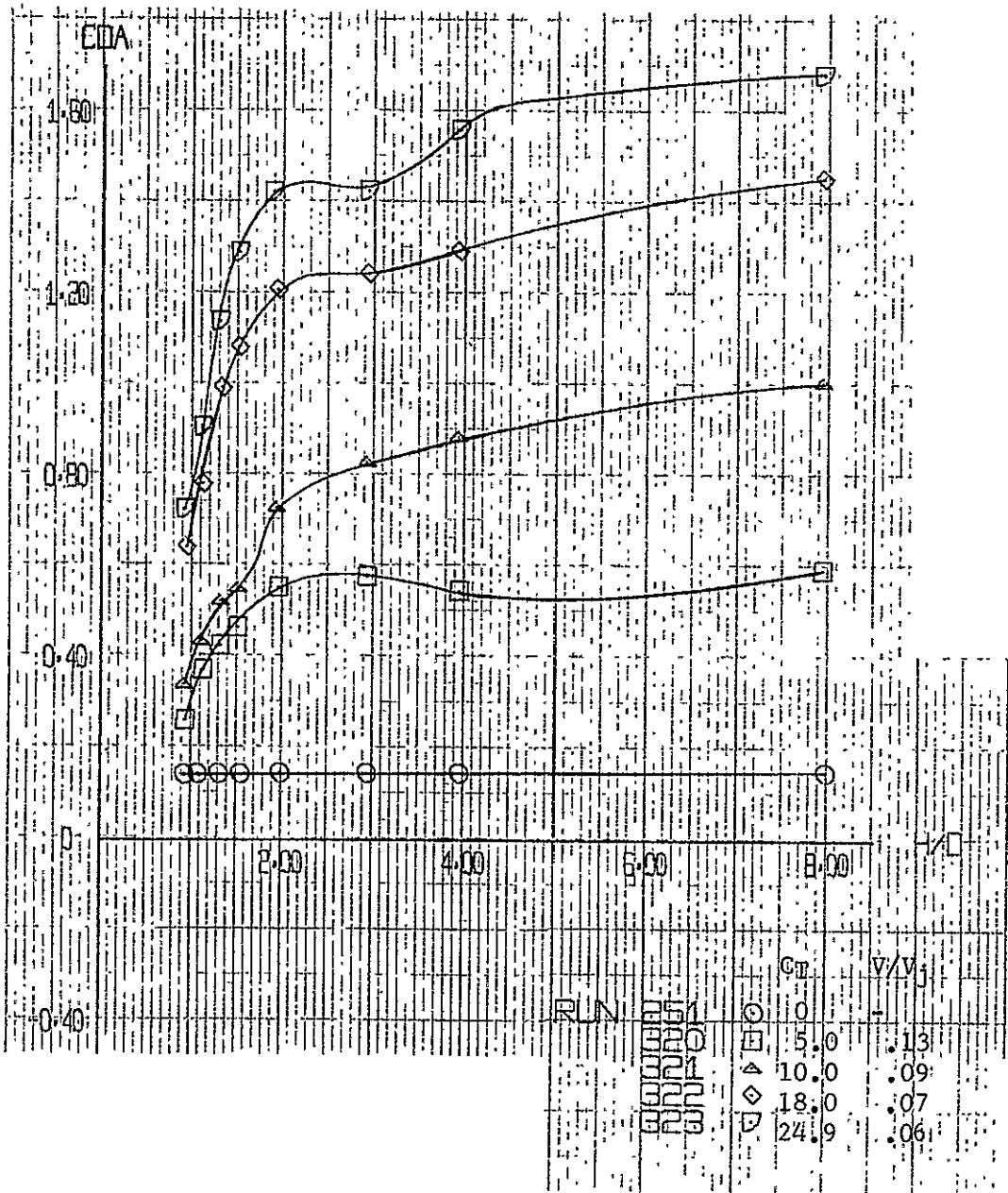


Figure A-74. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$ (Continued)

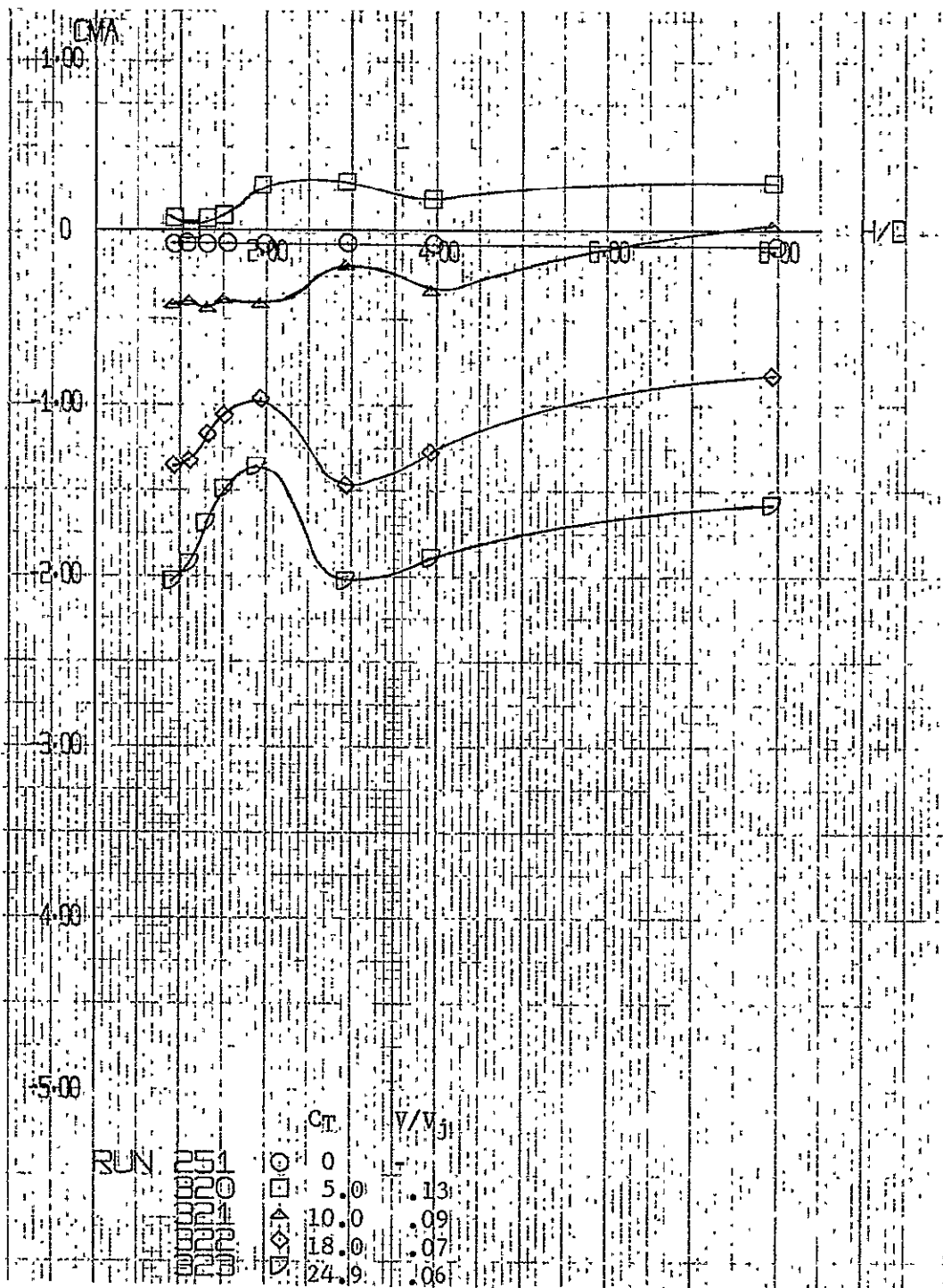


Figure A-74. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$ (Continued)

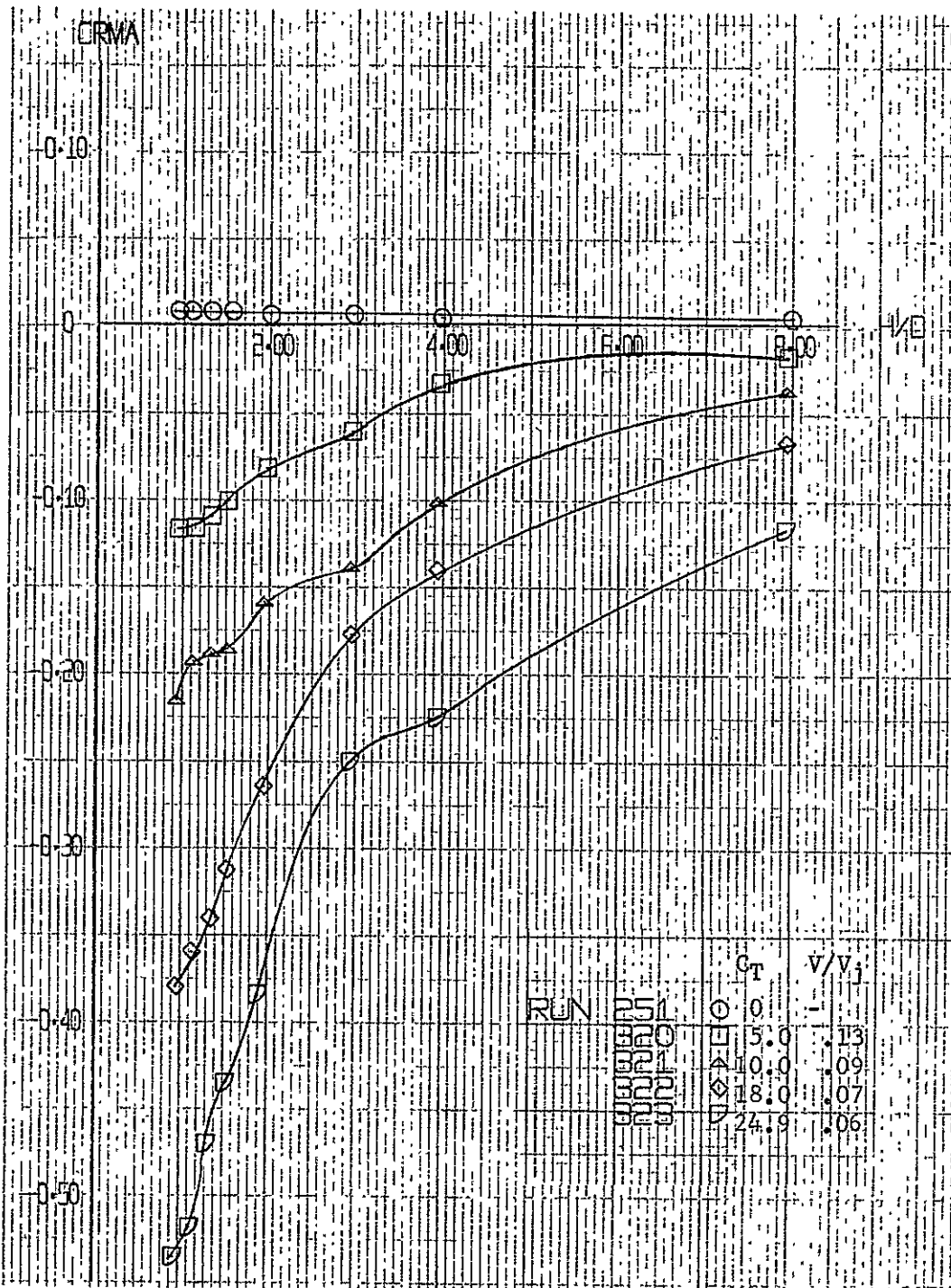


Figure A-74. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 5; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$ (Concluded)

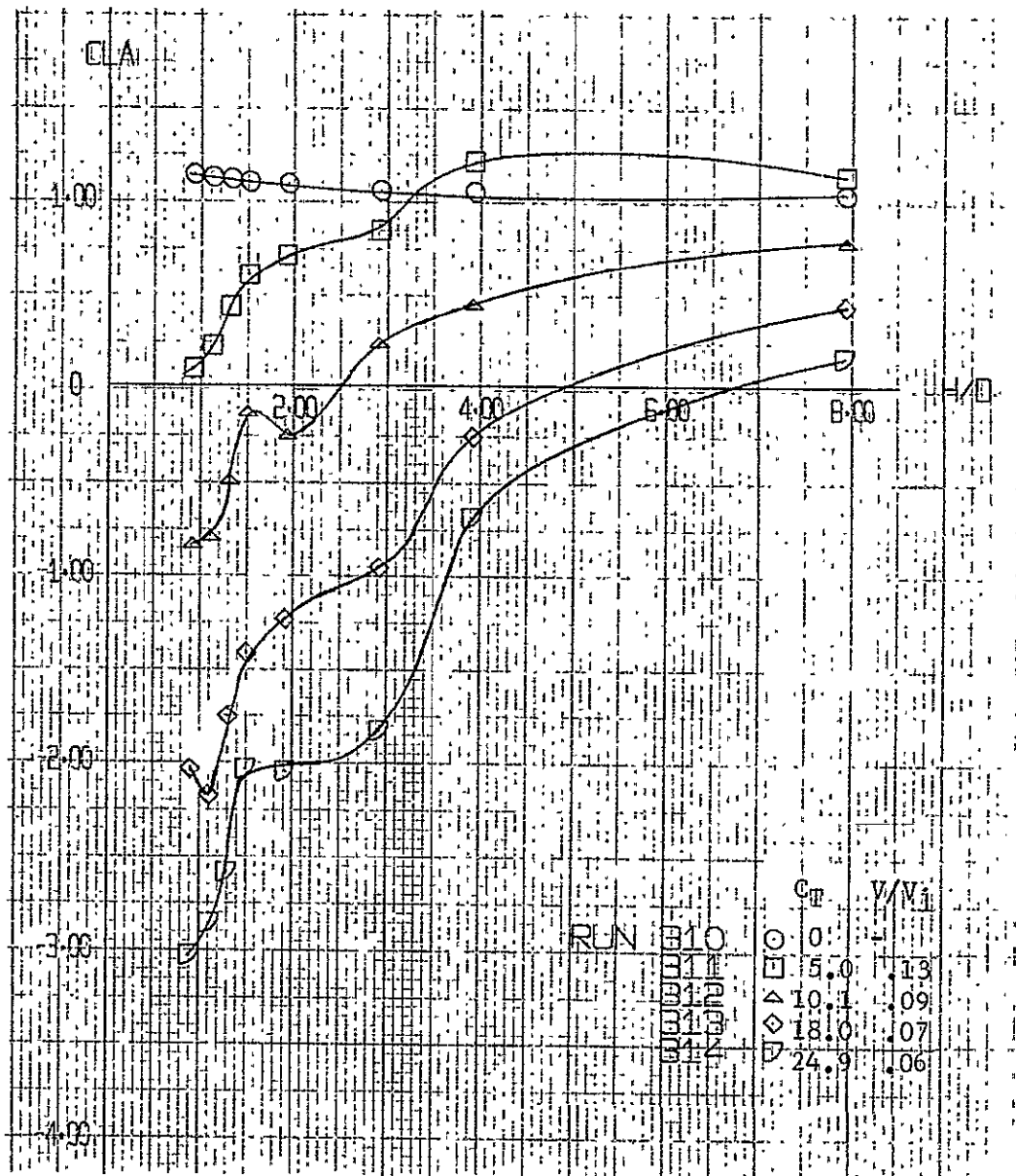


Figure A-75. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

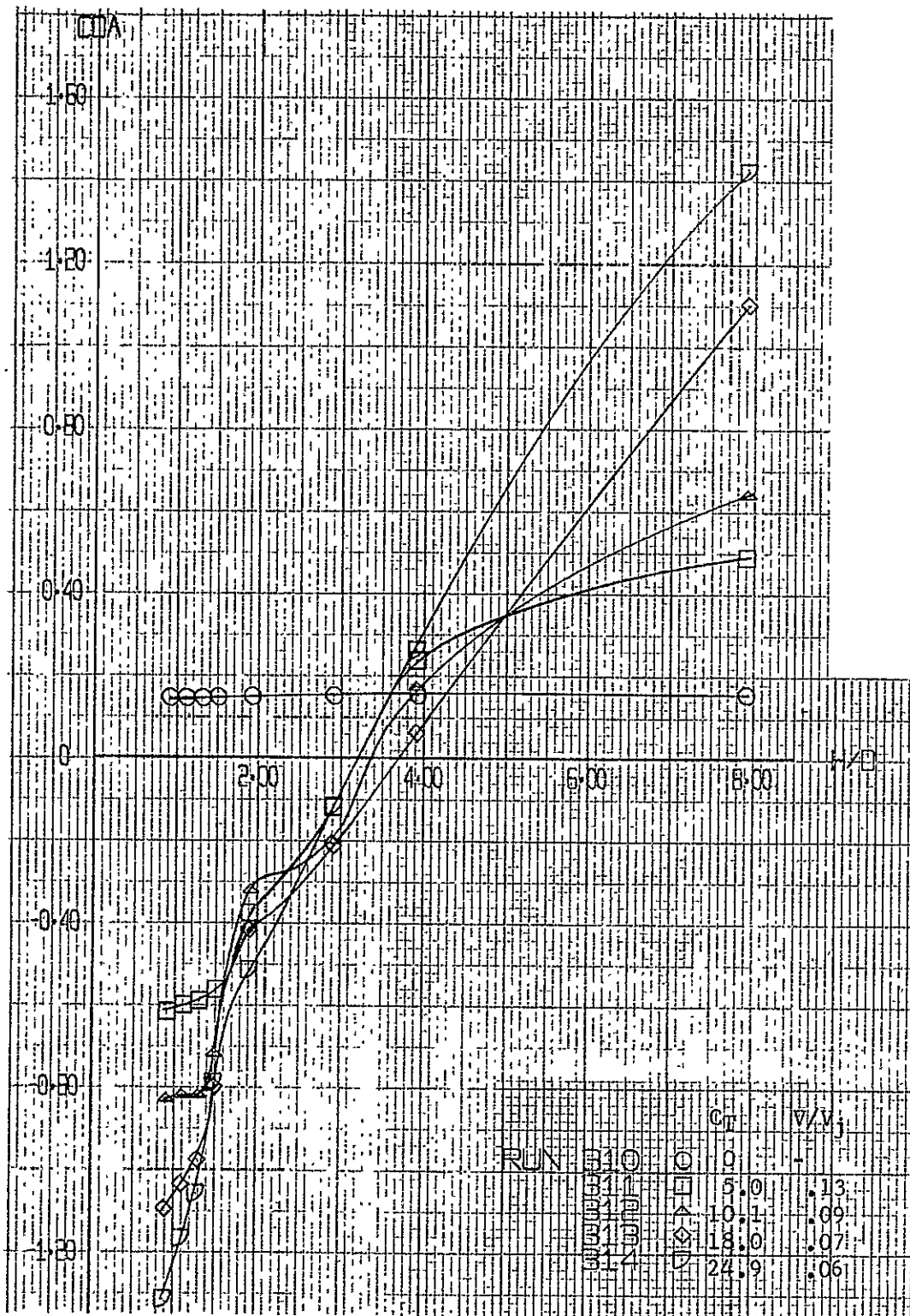


Figure A-75. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

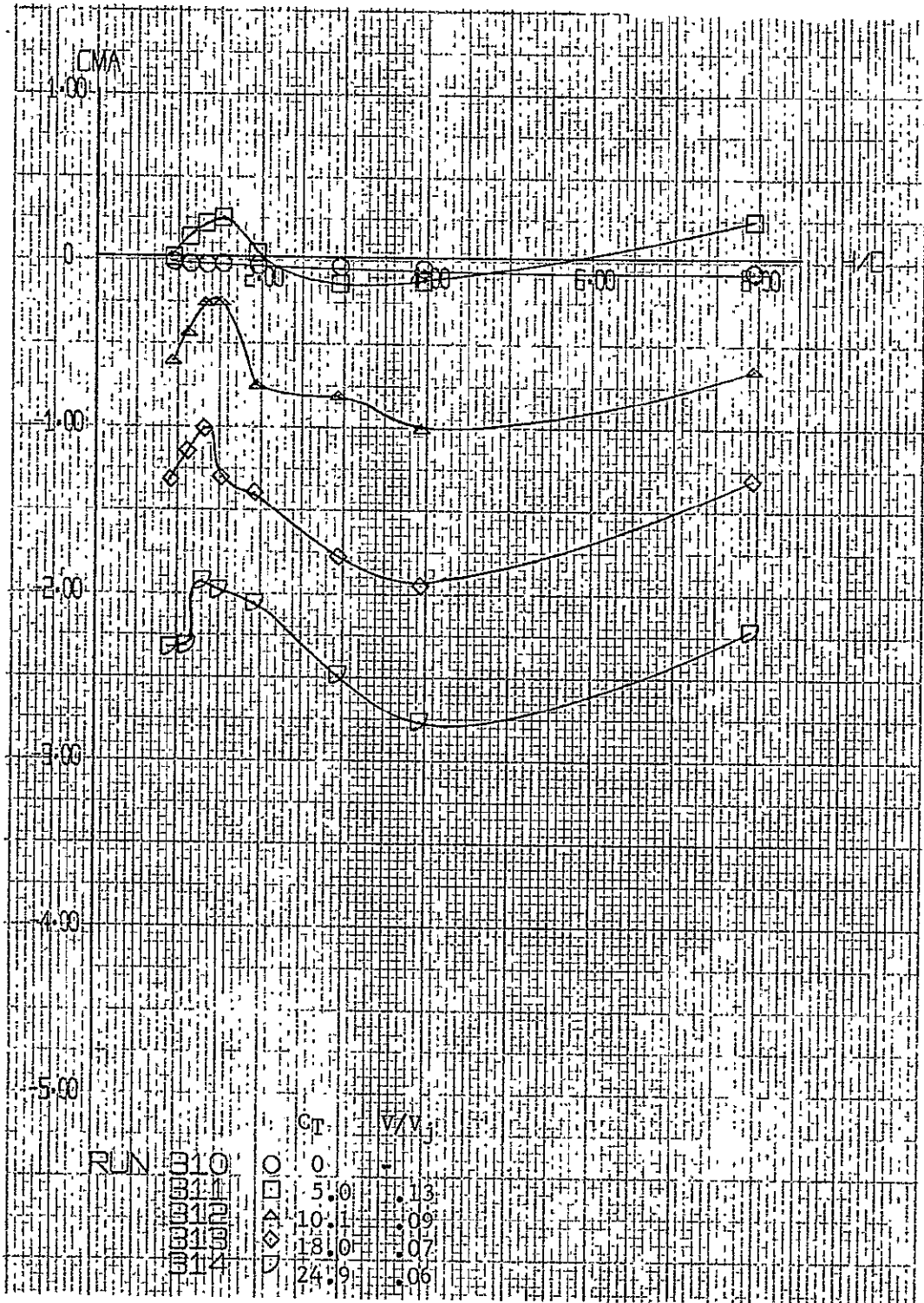


Figure A-75. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

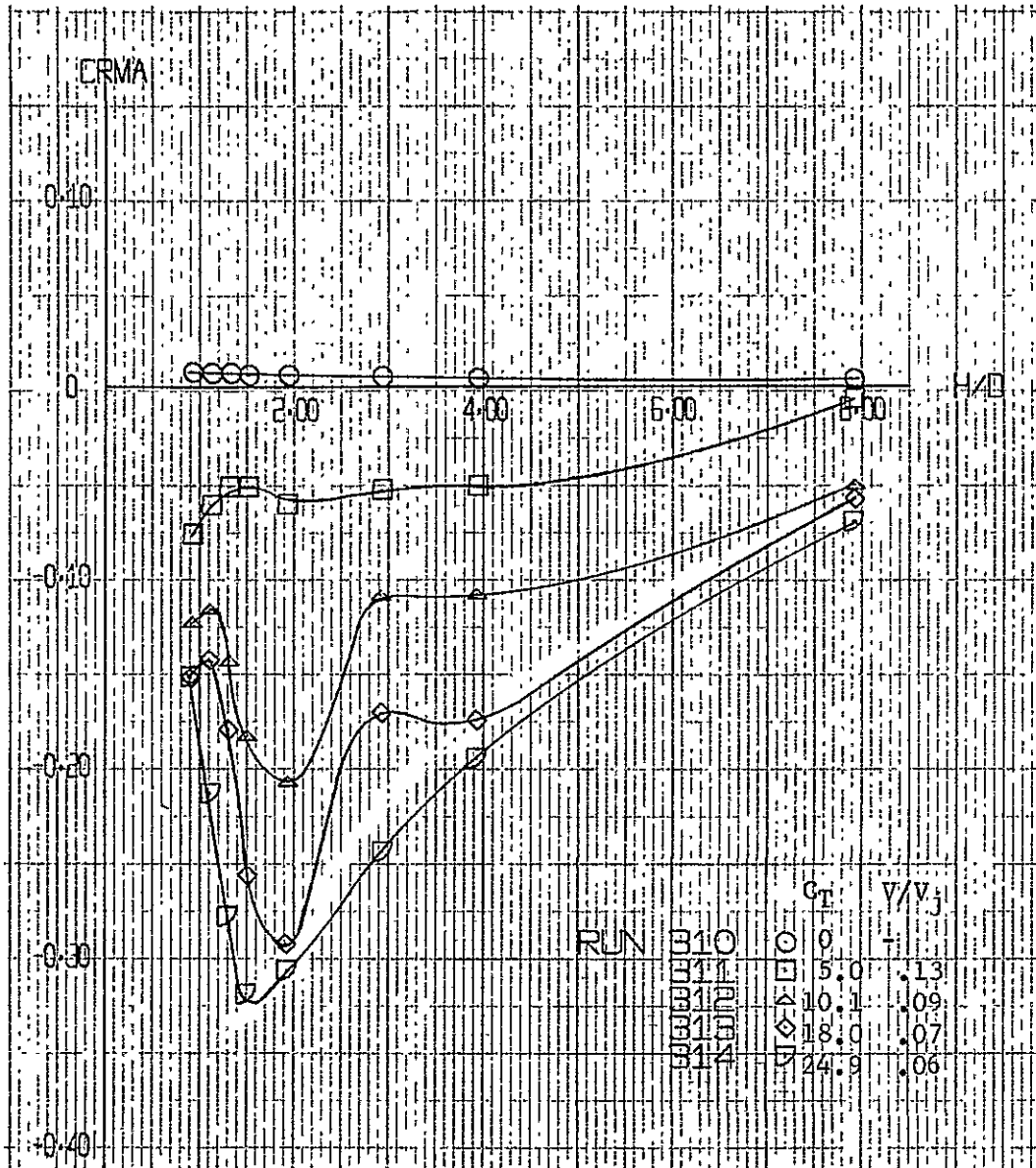


Figure A-75. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0$; $\phi = 0^\circ$ (Concluded)

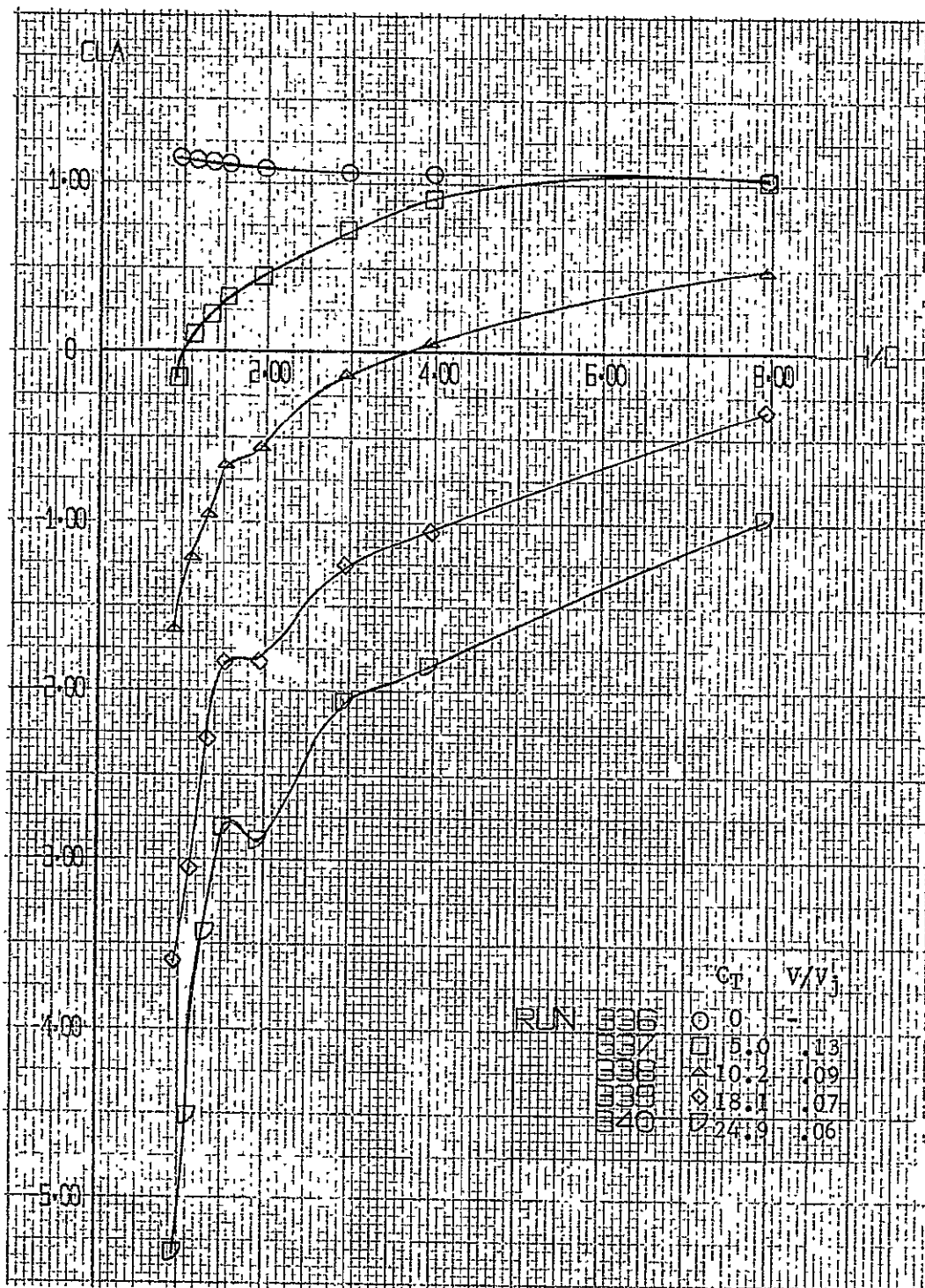


Figure A-76. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$

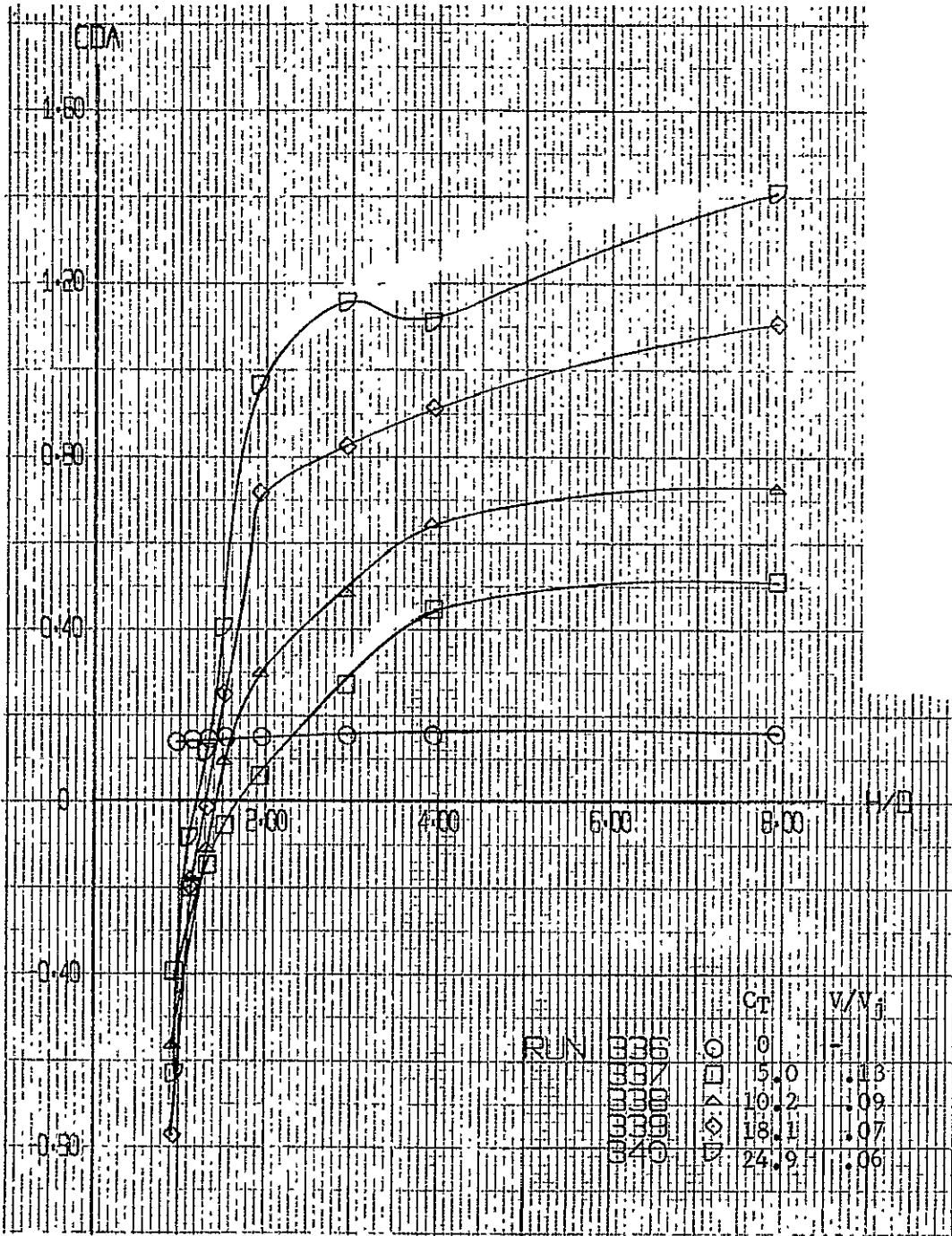


Figure A-76. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

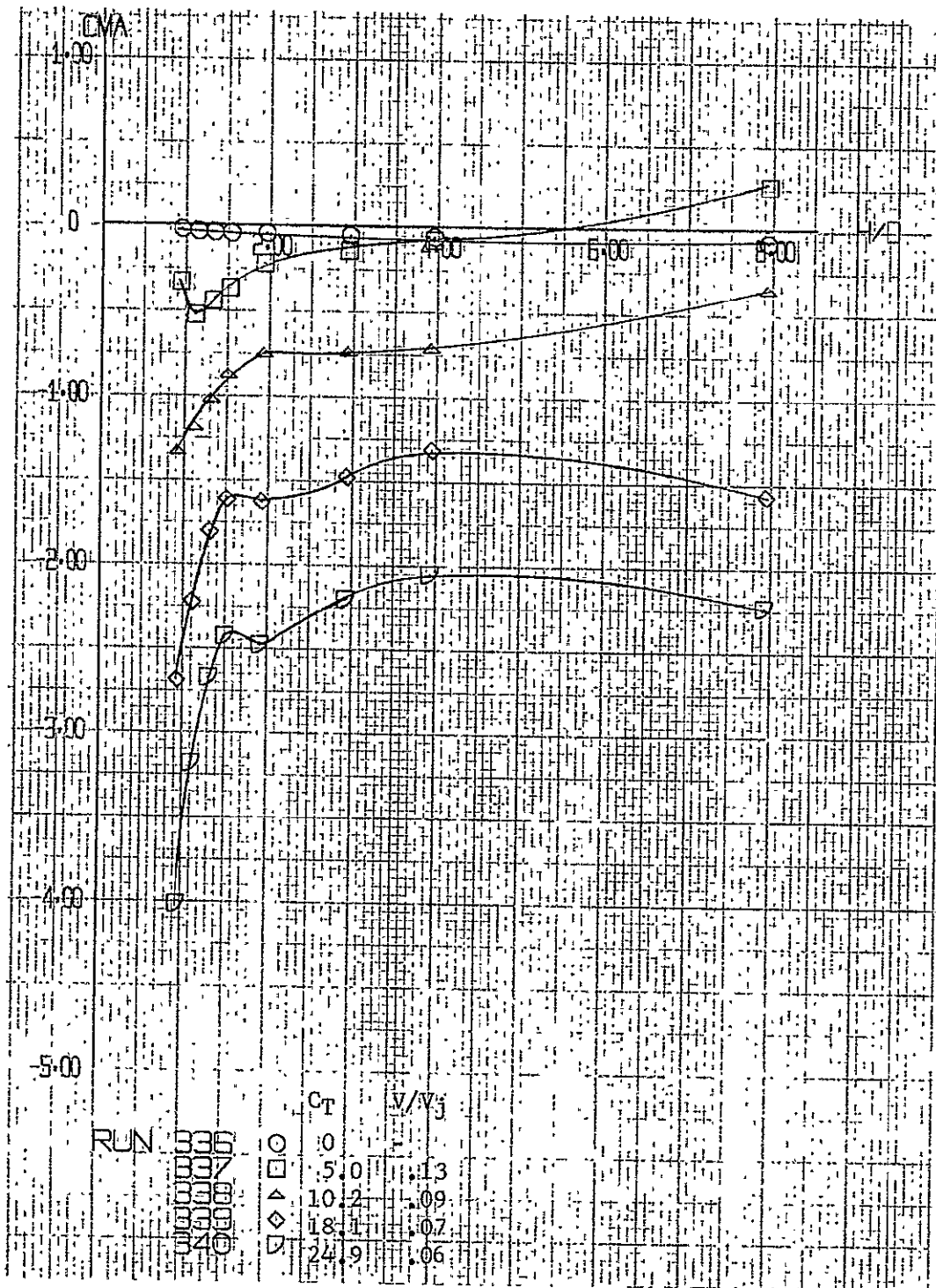


Figure A-76. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

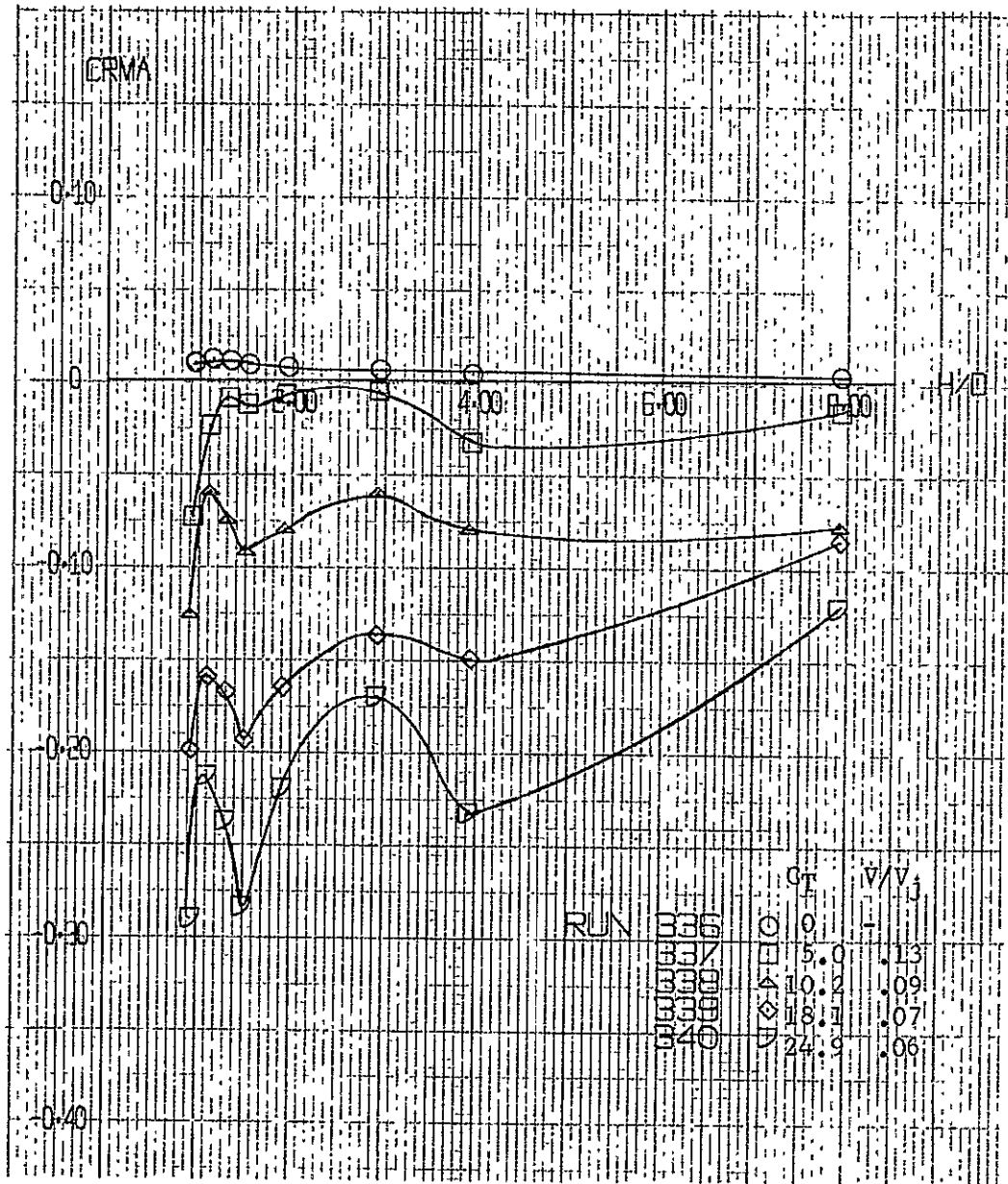


Figure A-76. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = -10^\circ$ (Concluded)

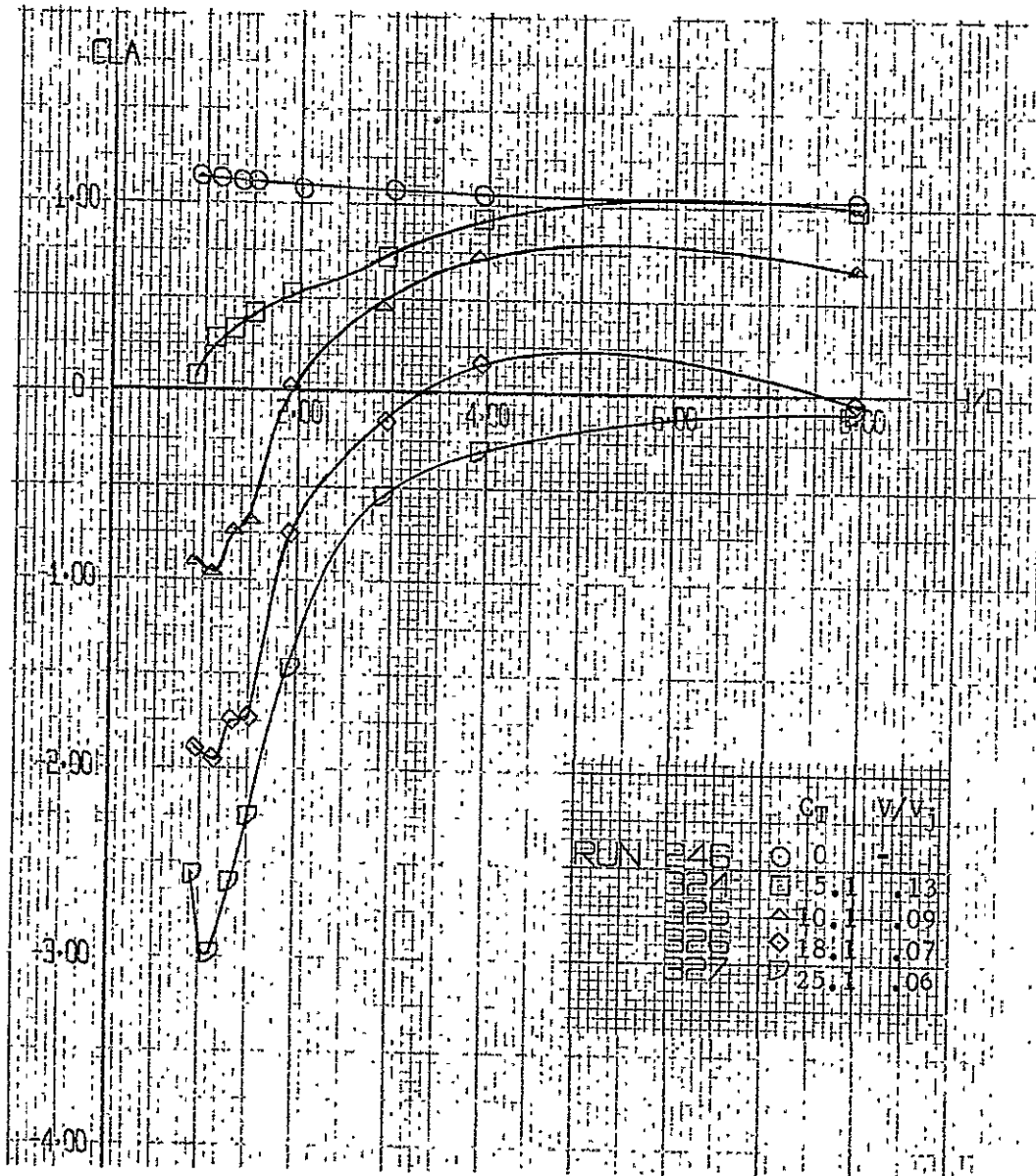


Figure A-77. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$

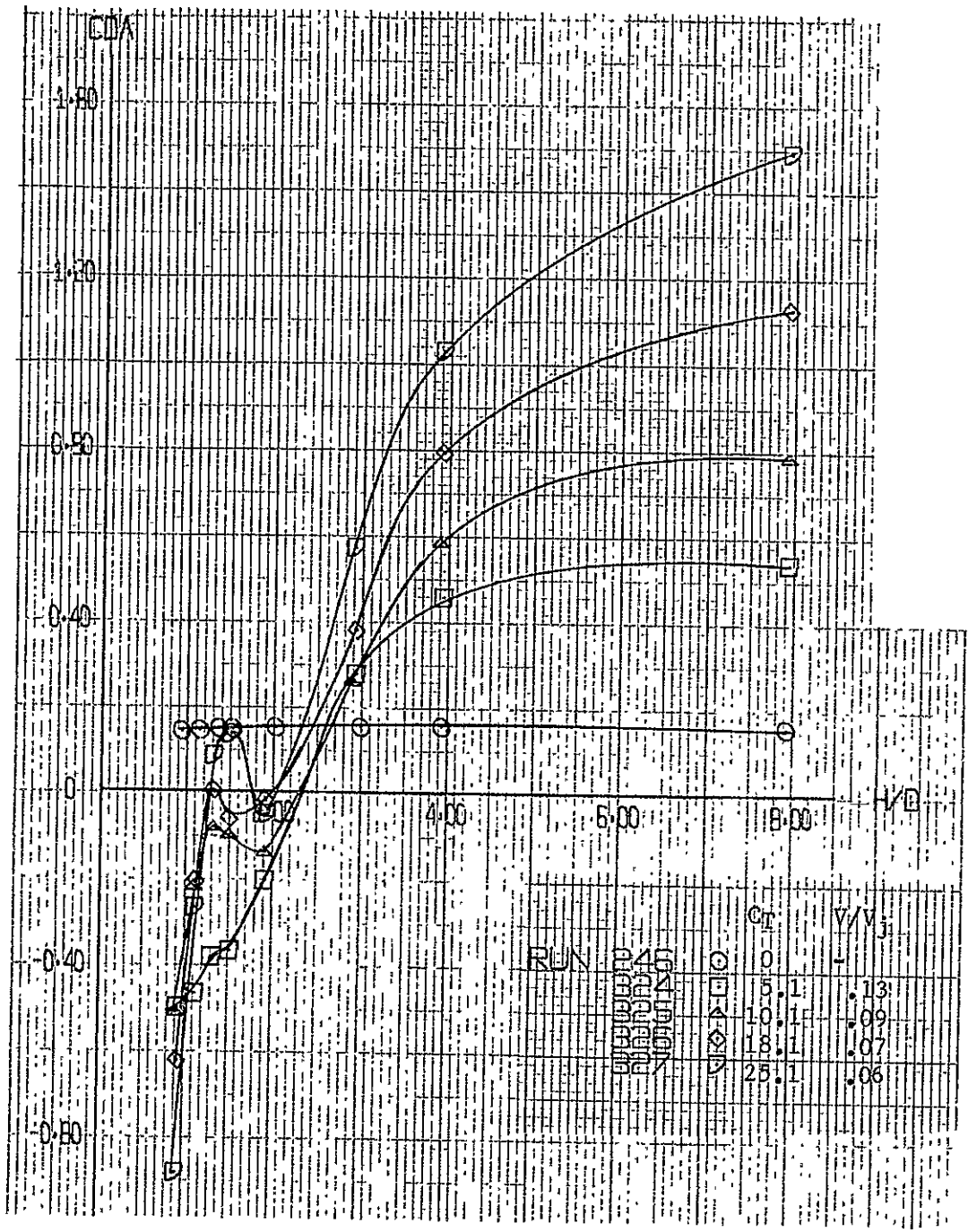


Figure A-77. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$ (Continued)

ORIGINAL PAGE IS
OF POOR QUALITY

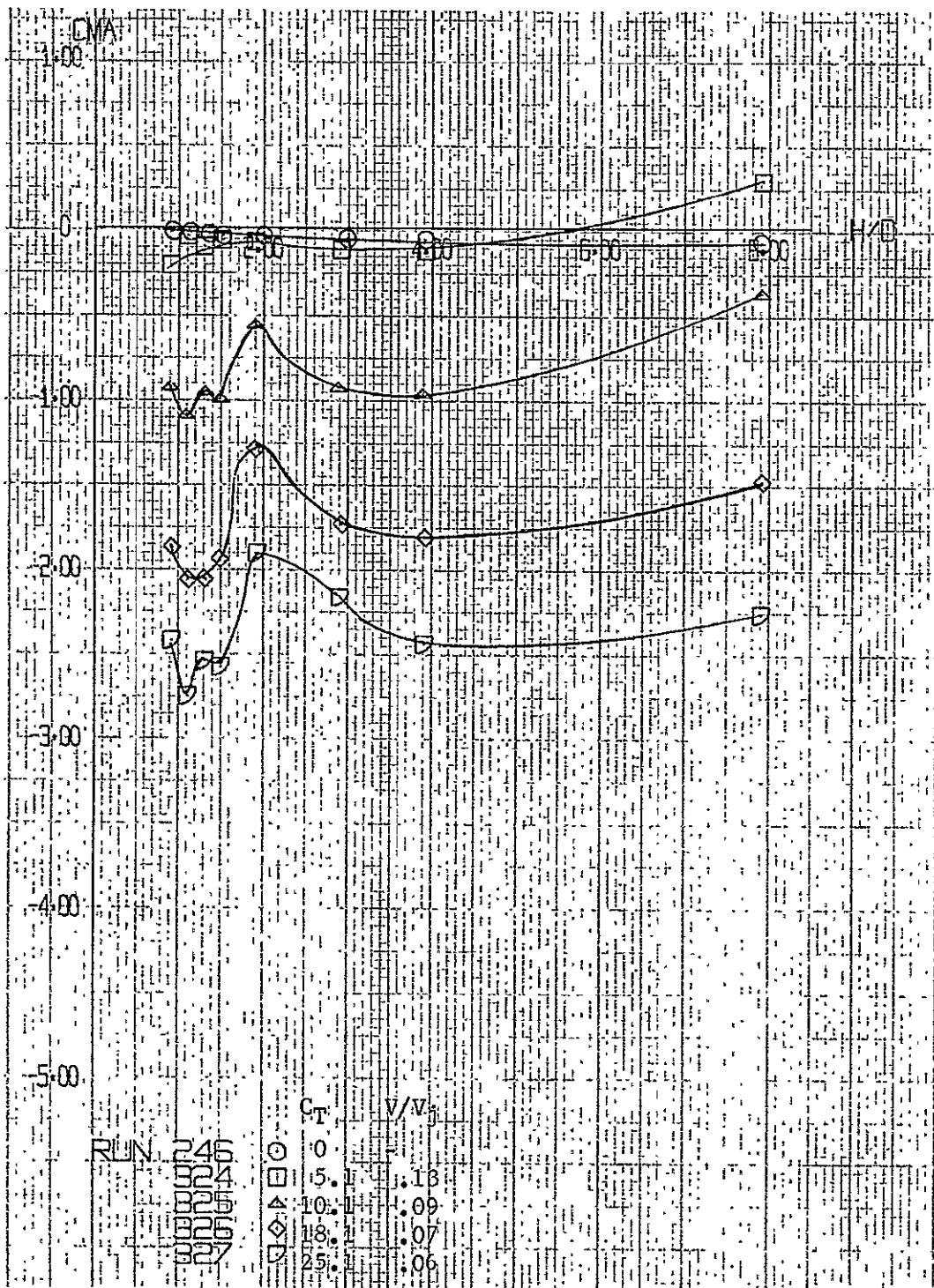


Figure A-77. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$ (Continued)

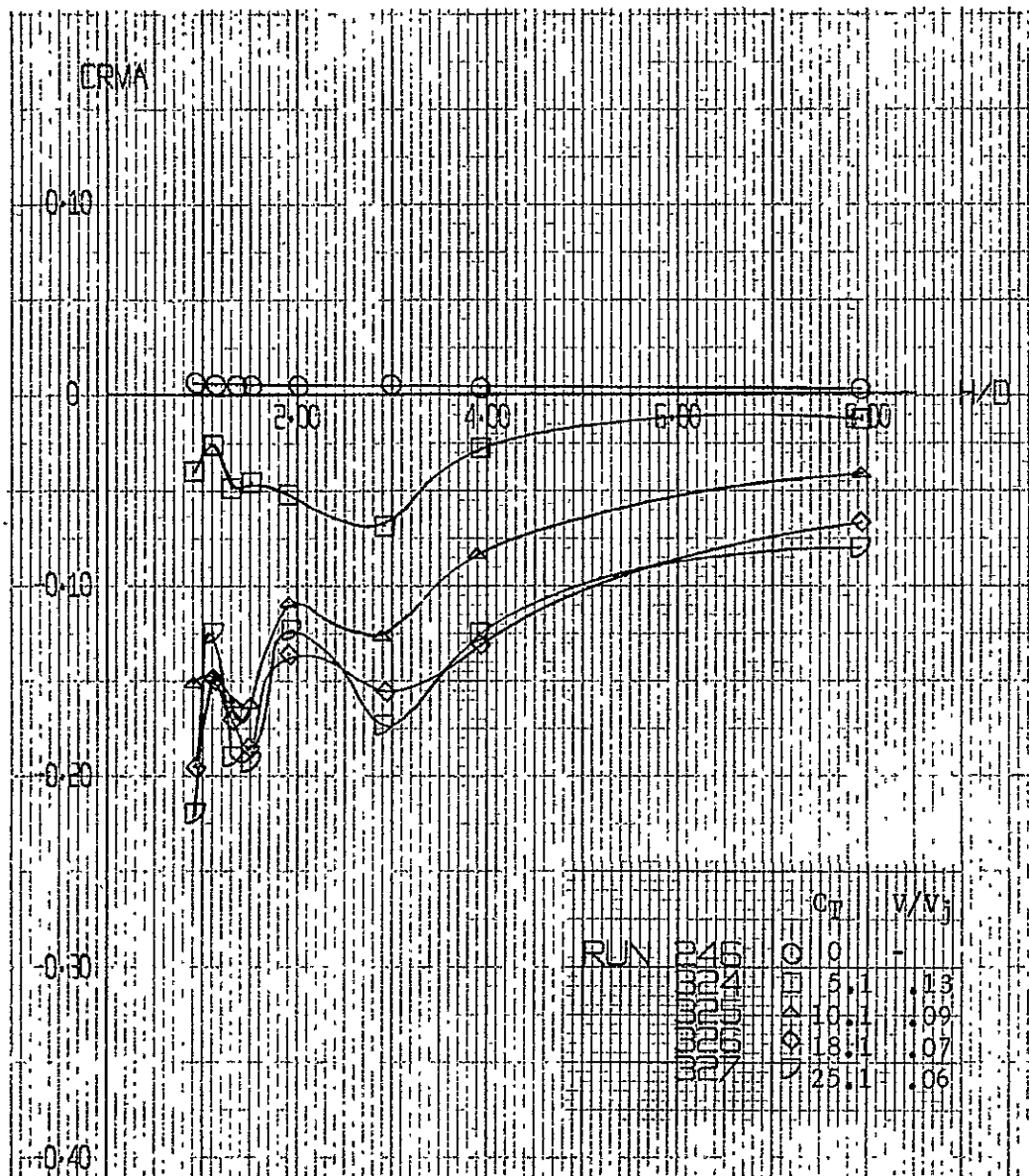


Figure A.77. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, $T_R/T_L = .8$, Ground Board Configuration 4; $\delta_N = 105^\circ$; $\alpha = 0^\circ$; $\phi = +10^\circ$ (Concluded)

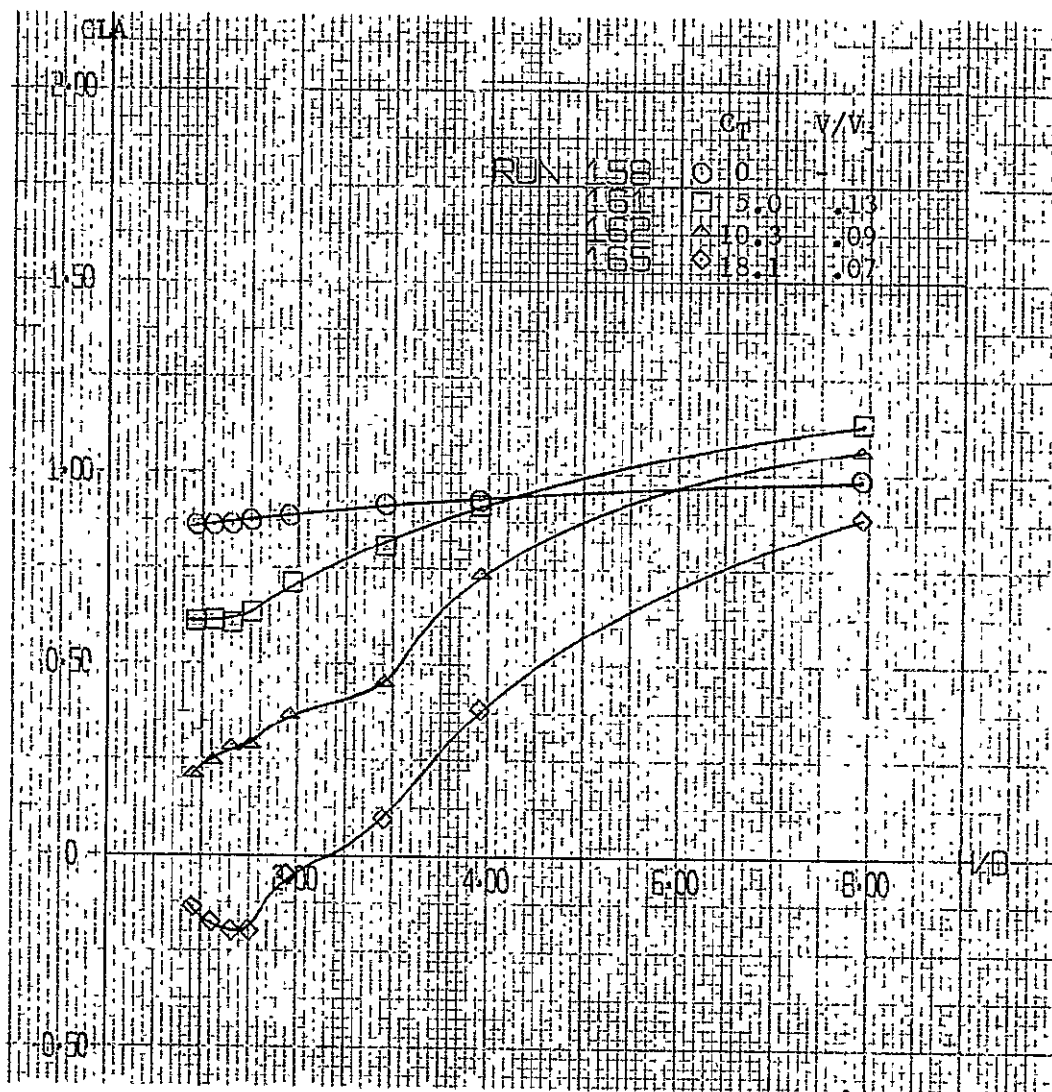


Figure A-78. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

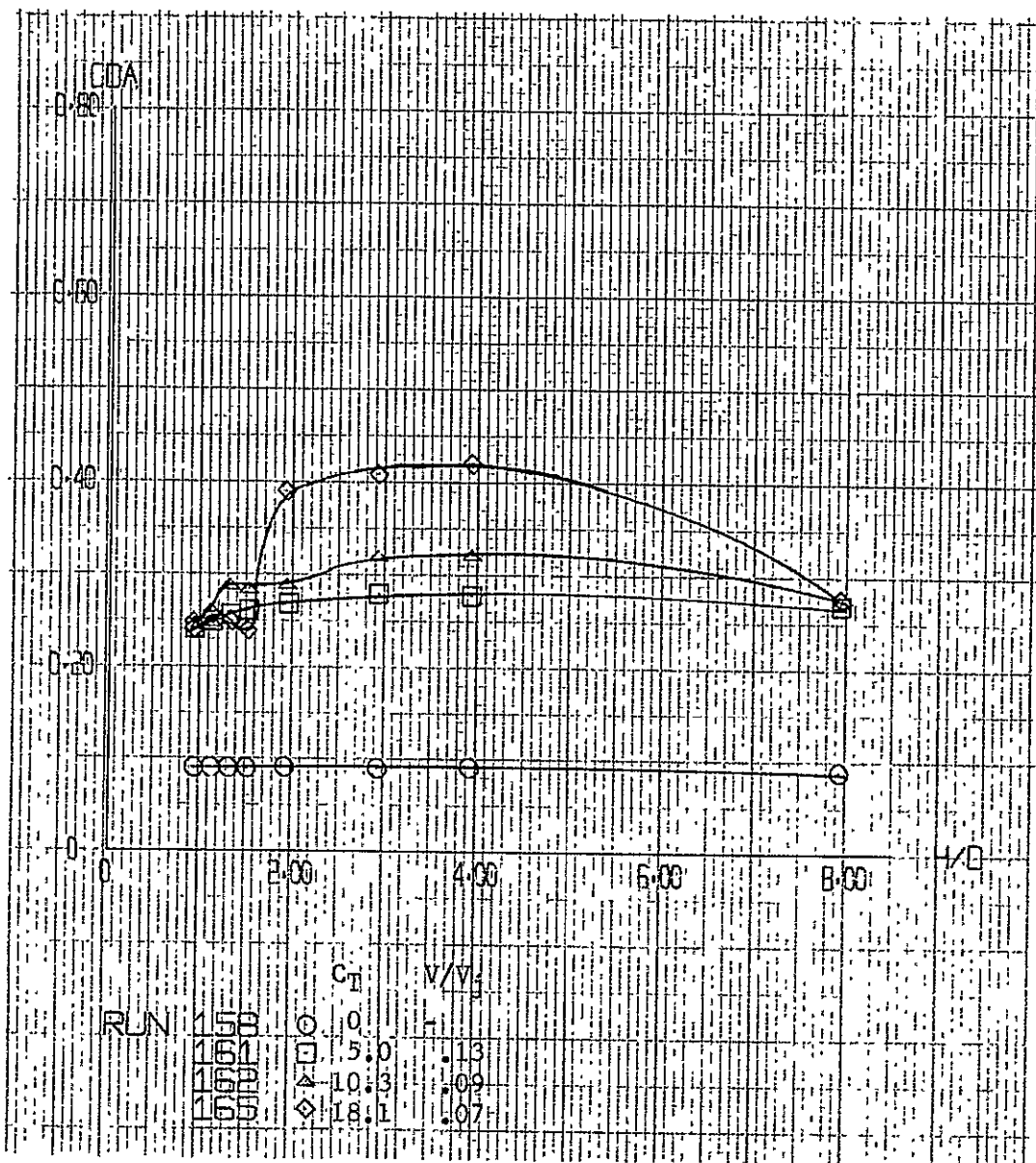


Figure A-78. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{Nose} = 80^\circ$, $\delta_{Aft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

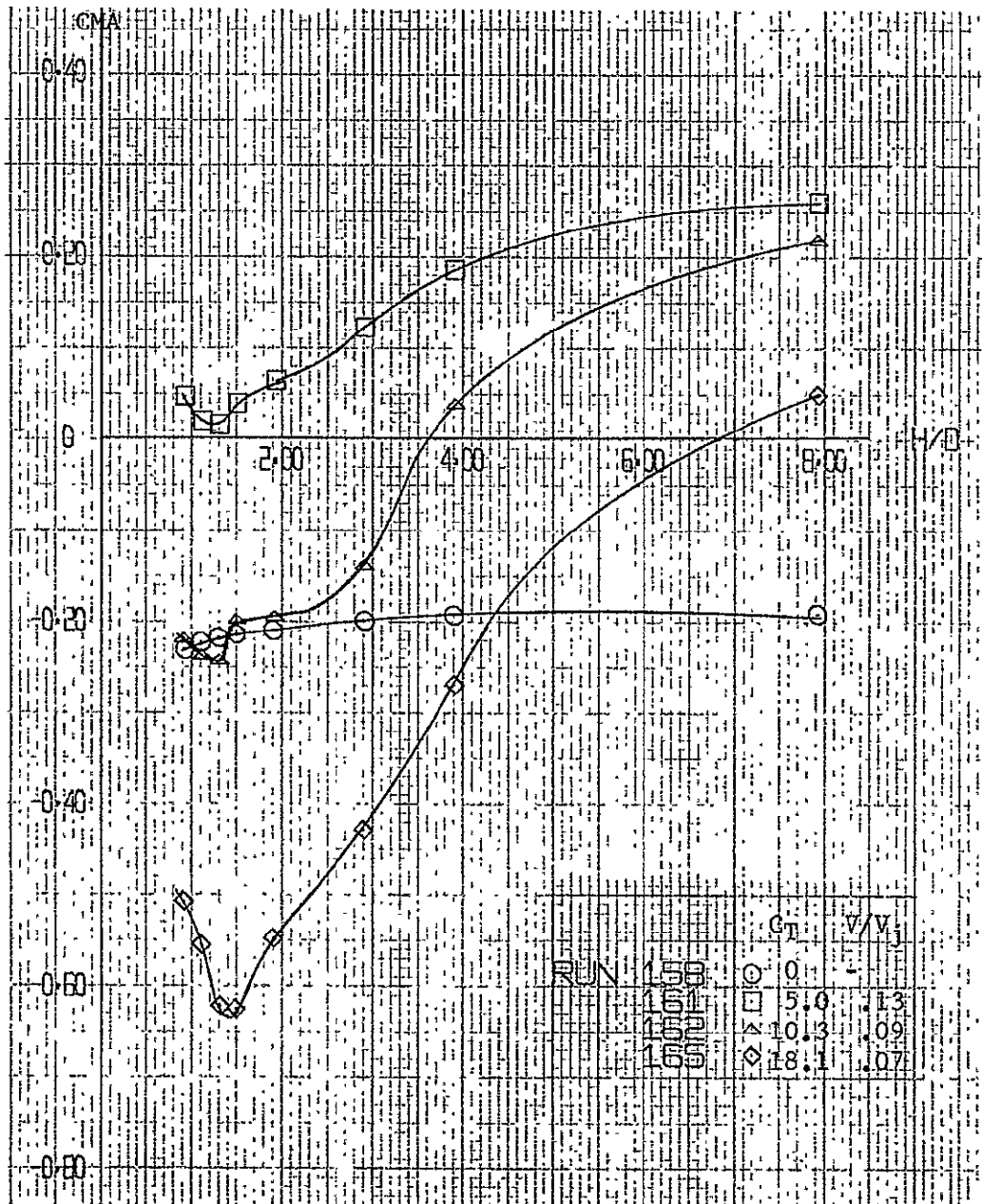


Figure A-78. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$; $\alpha = 0^\circ$, $\phi = 0^\circ$ (Continued)

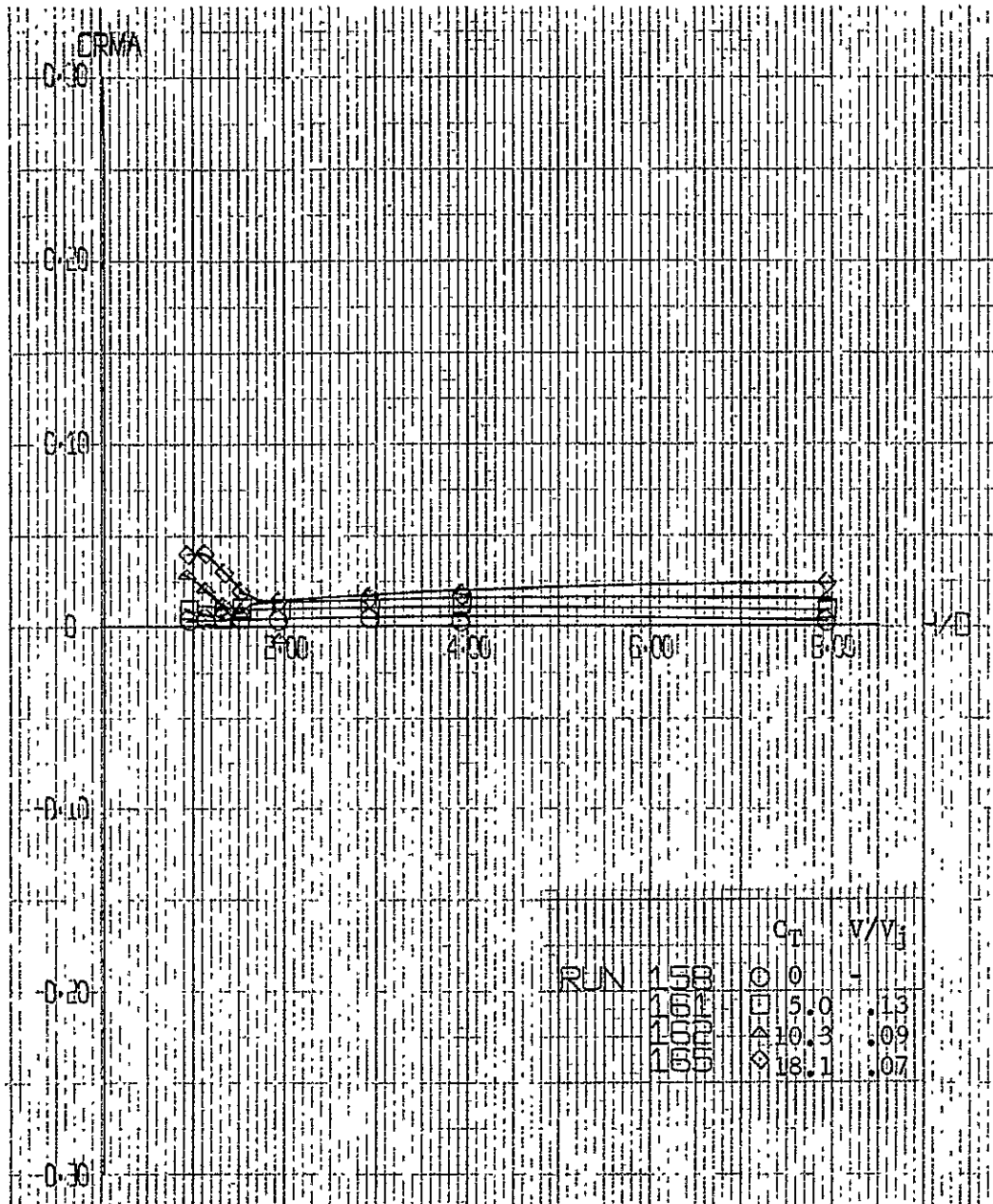


Figure A-78. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta N_{Nose} = 80^\circ$, $\delta N_{Aft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

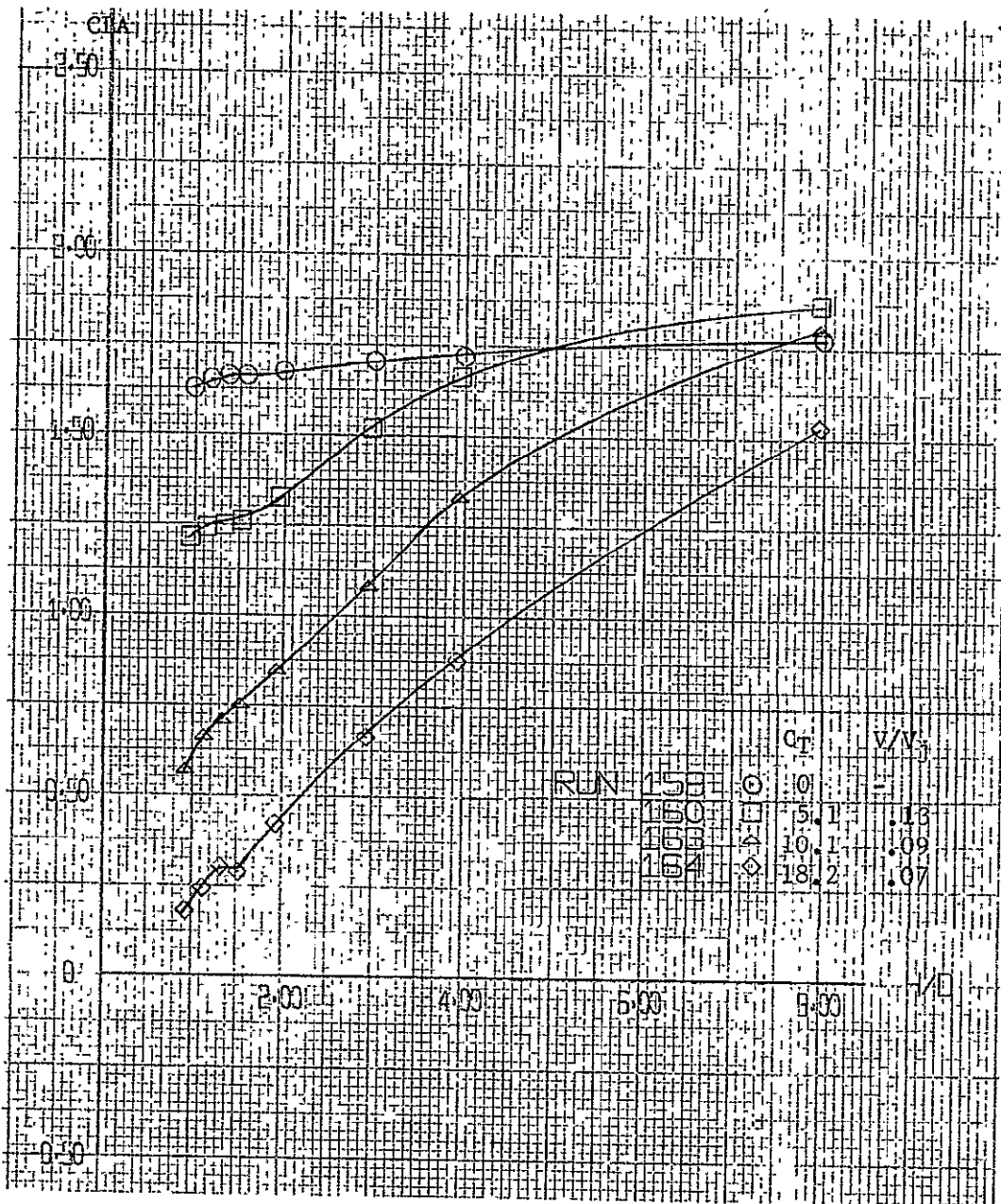


Figure A-79. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2; $\delta_{Nose} = 80^\circ$, $\delta_{Aft} = 90^\circ$, $\alpha = 8^\circ$; $\phi = 0^\circ$

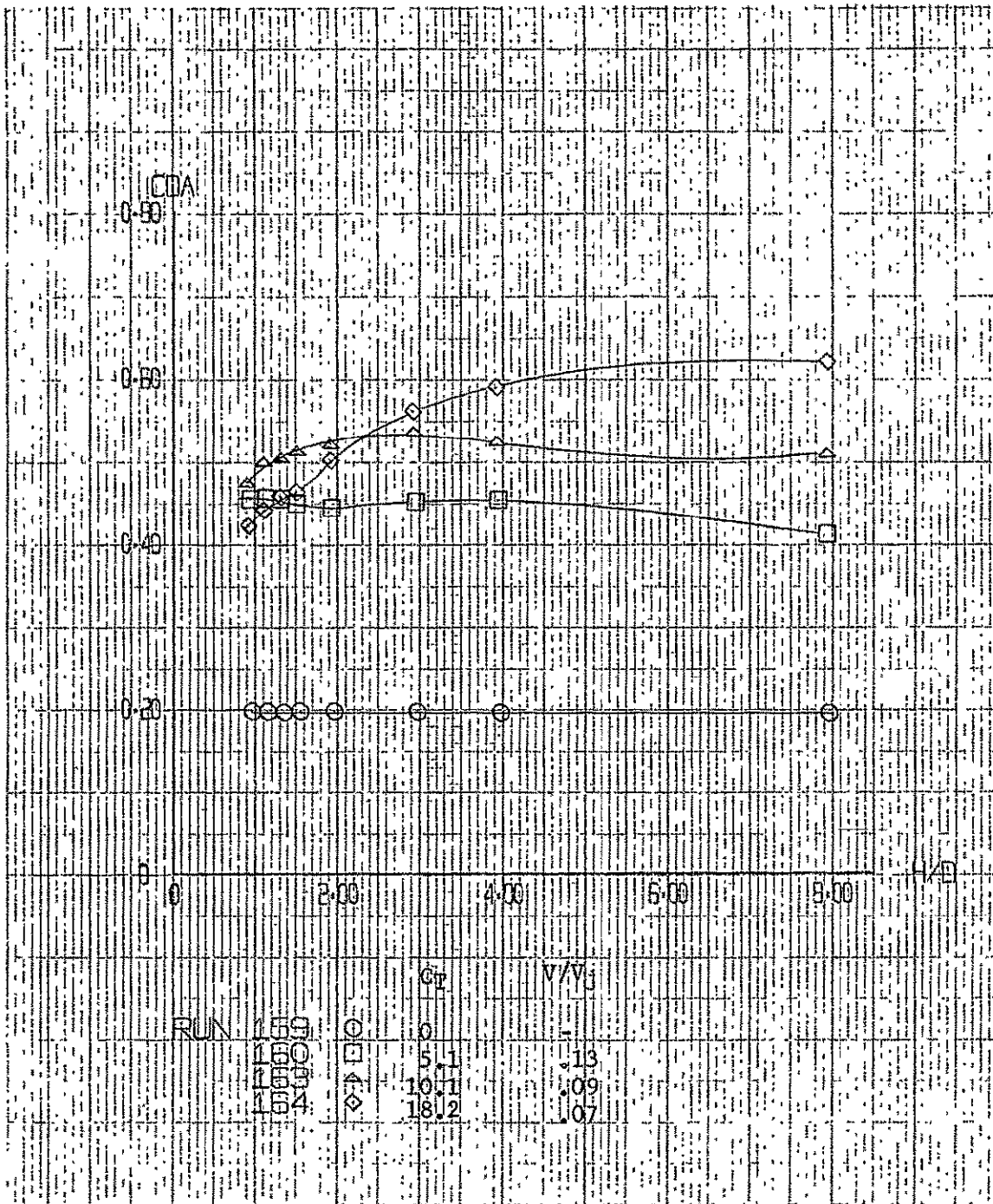


Figure A-79. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration $\delta_{N_{Nose}} = -80^\circ$, $\delta_{N_{Aft}} = 90^\circ$; $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

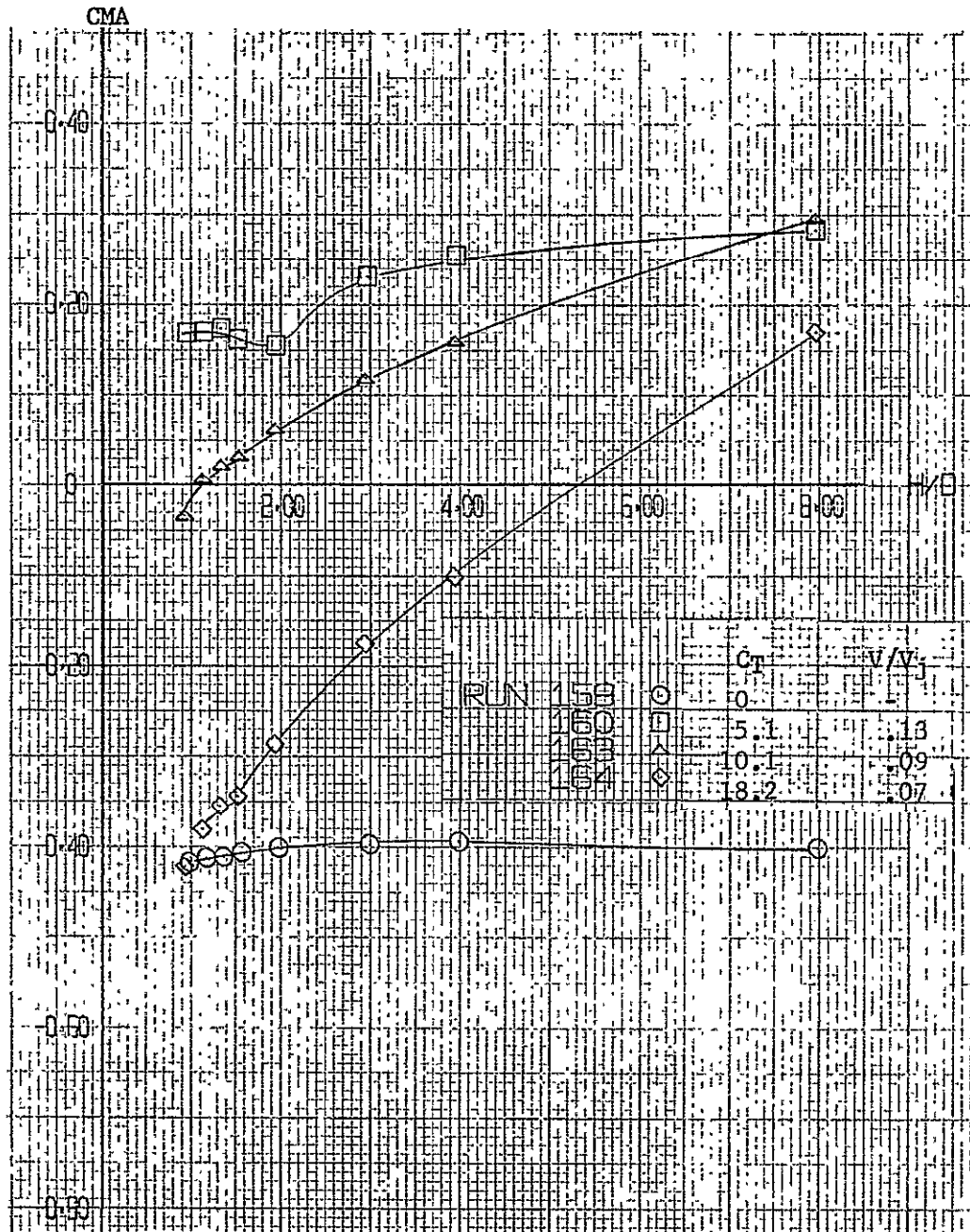


Figure A-79. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

Continued on page 15
OF REPORT

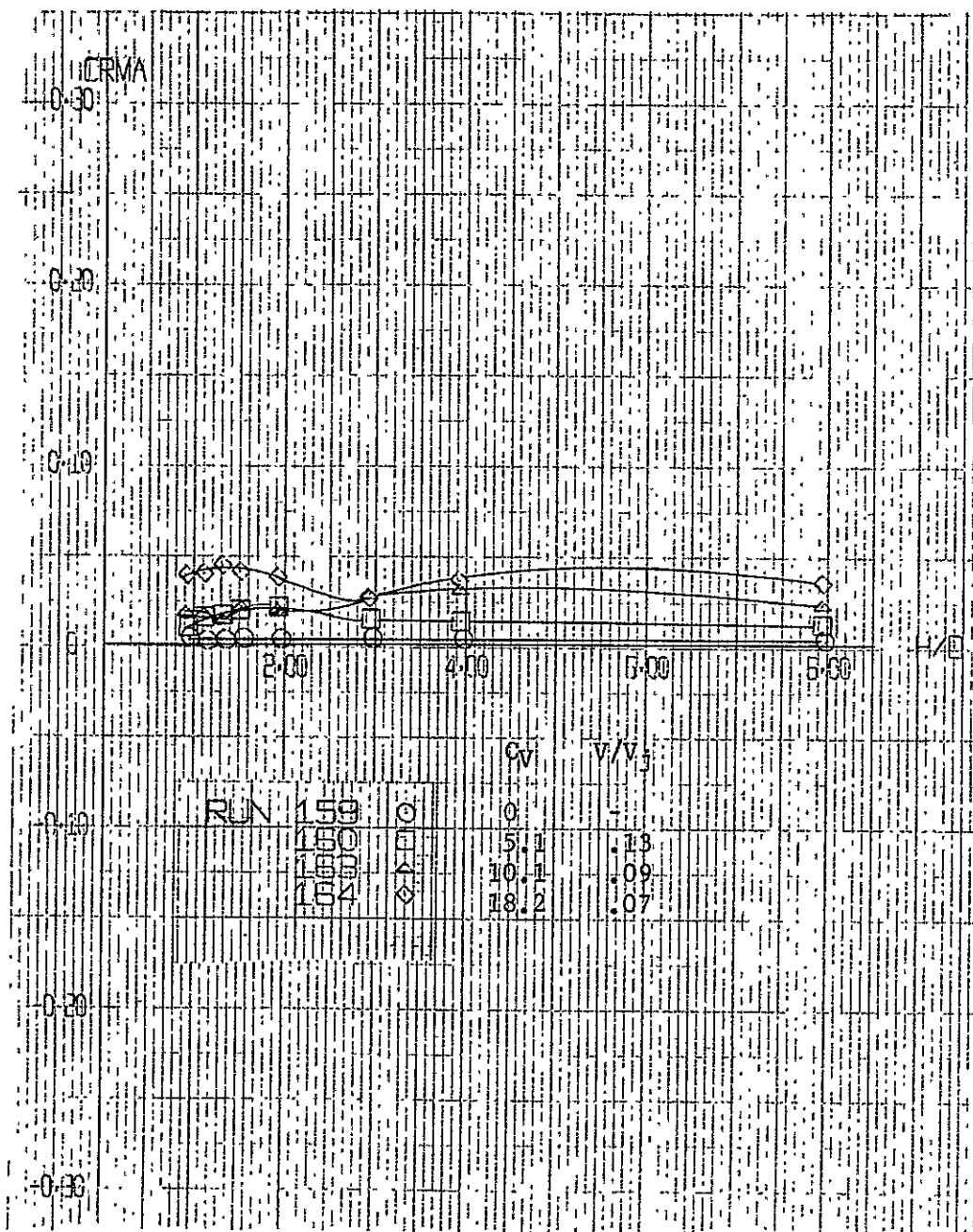


Figure A-79. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration $\delta_{Nose} = 80^\circ$, $\delta_{NAft} = 90^\circ$, $\alpha = 8^\circ$; $\phi = 0^\circ$ (Concluded)

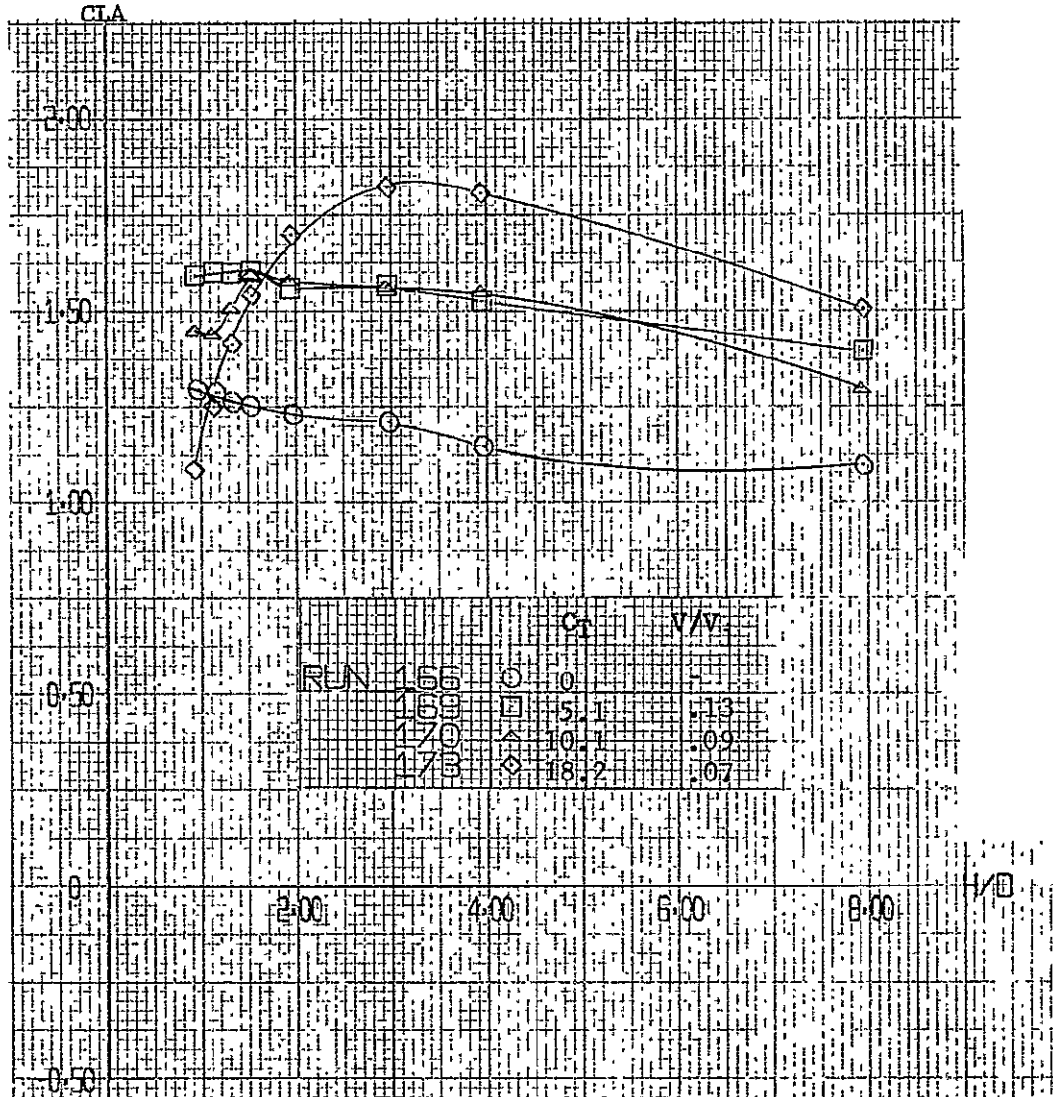


Figure A-80. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$

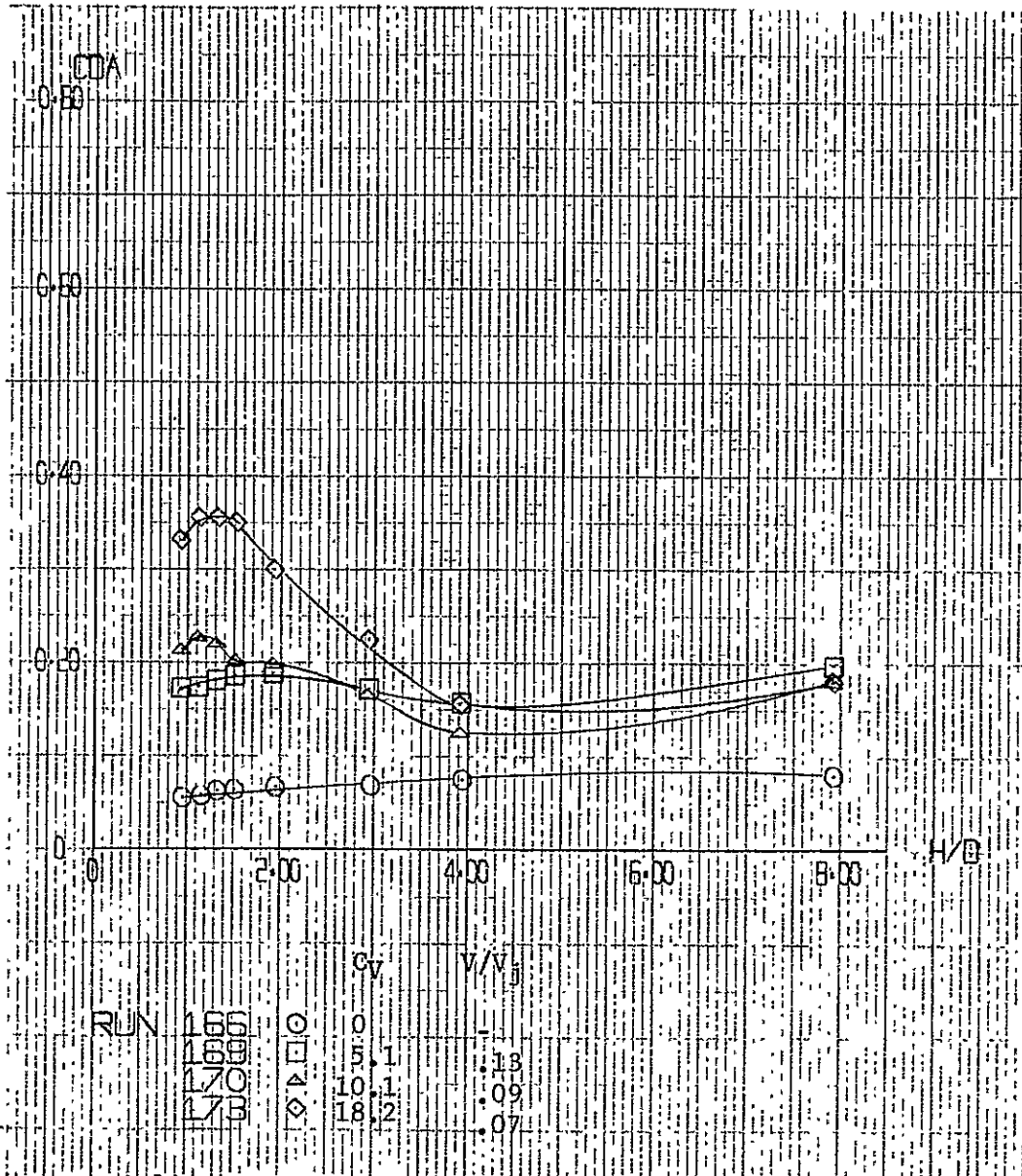


Figure A-80. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

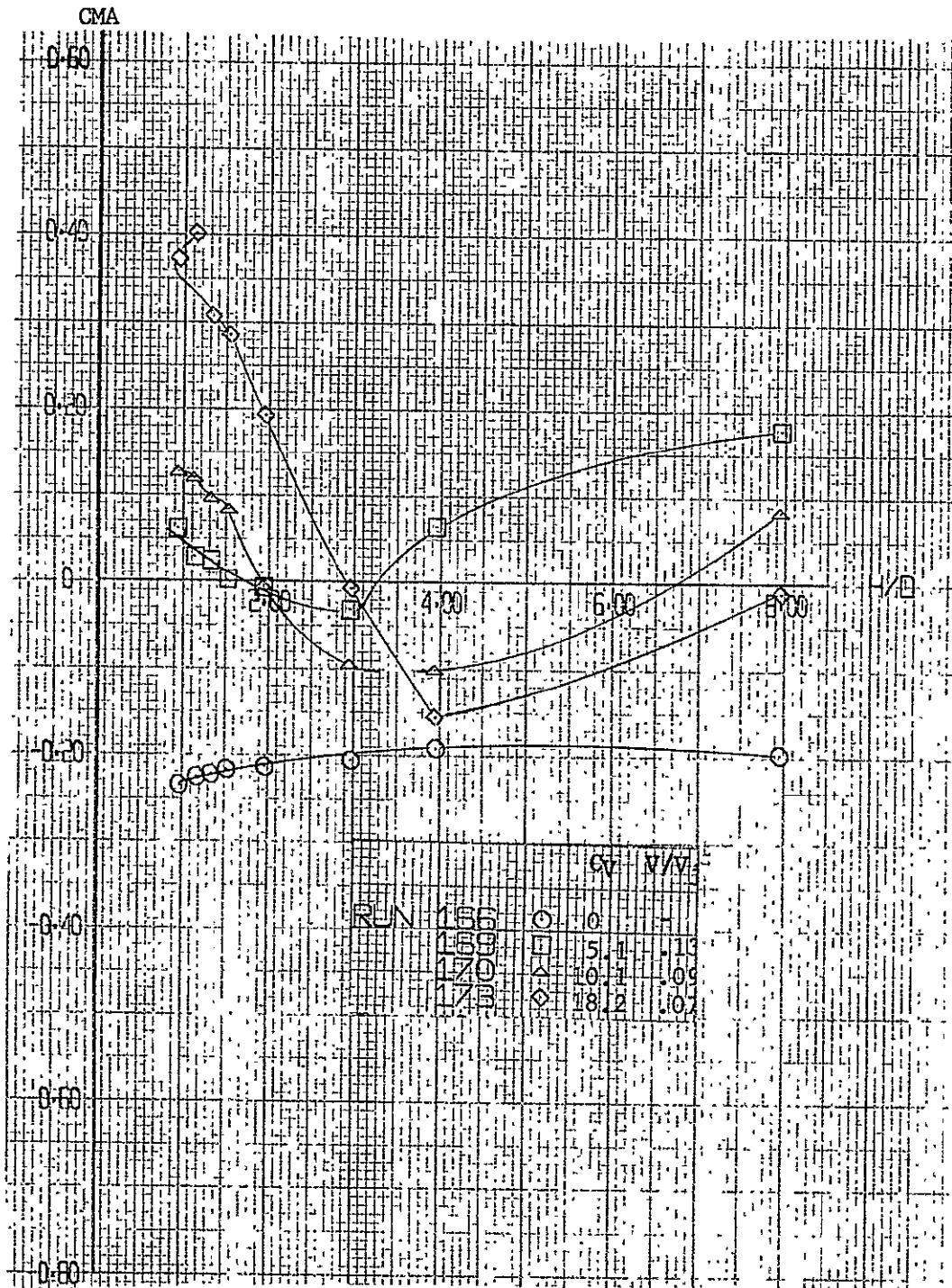


Figure A-80. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3; $\delta N_{Nose} = 80^\circ$, $\delta N_{Aft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

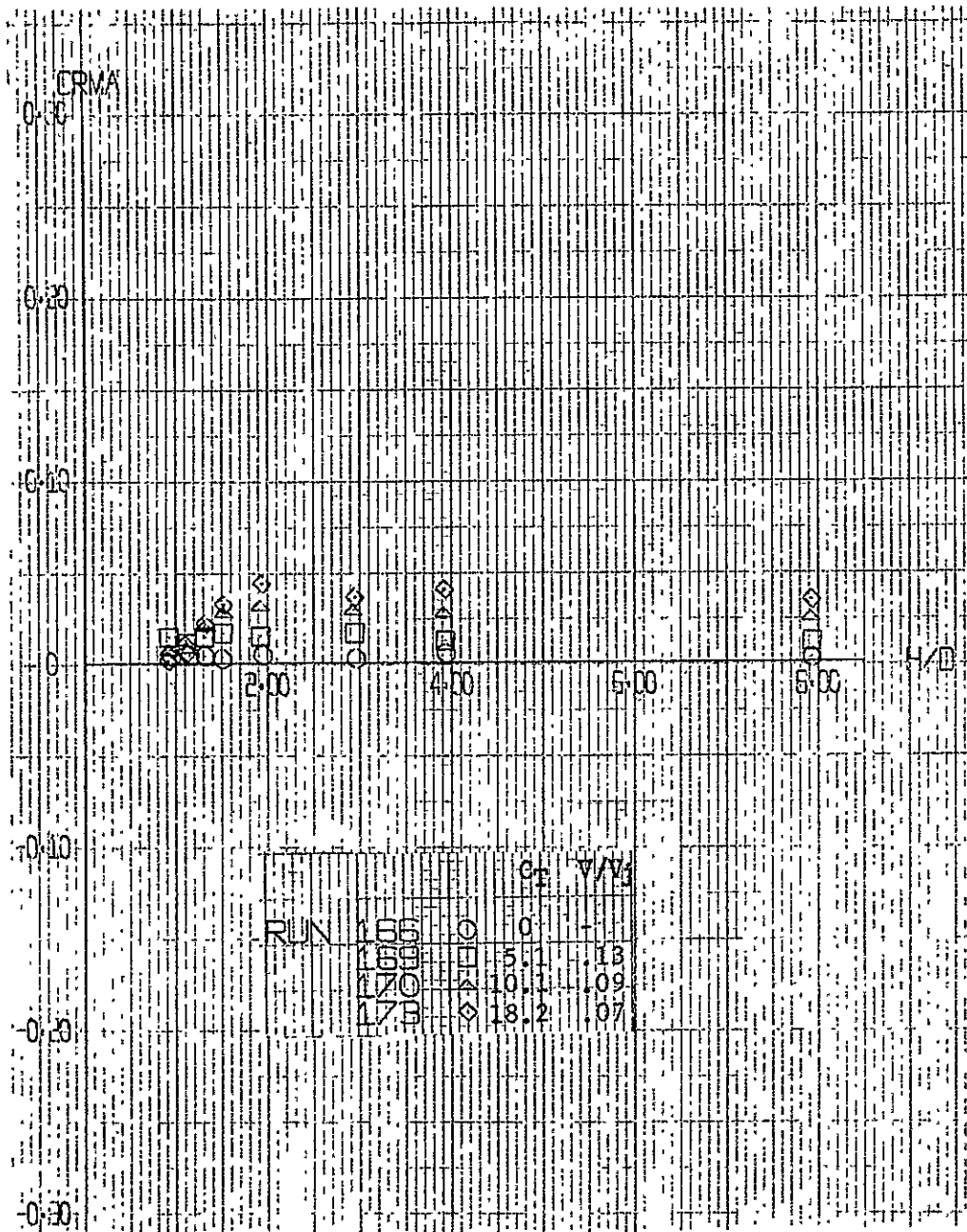


Figure A-80. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

CLA

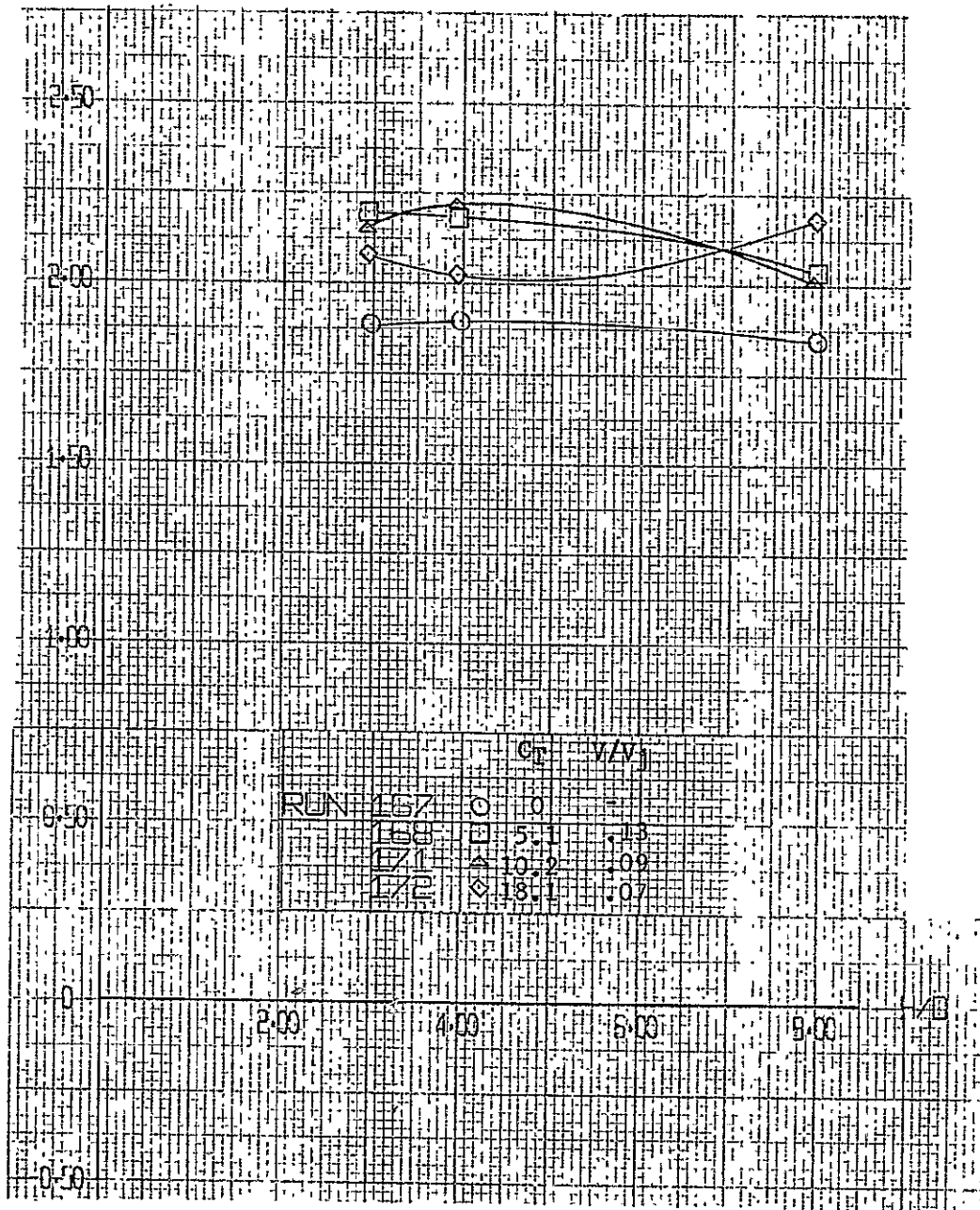


Figure A-81. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3; $\delta_{Nose} = 80^\circ$, $\delta_{Aft} = 90^\circ$, $\alpha = 8^\circ$; $\phi = 0^\circ$

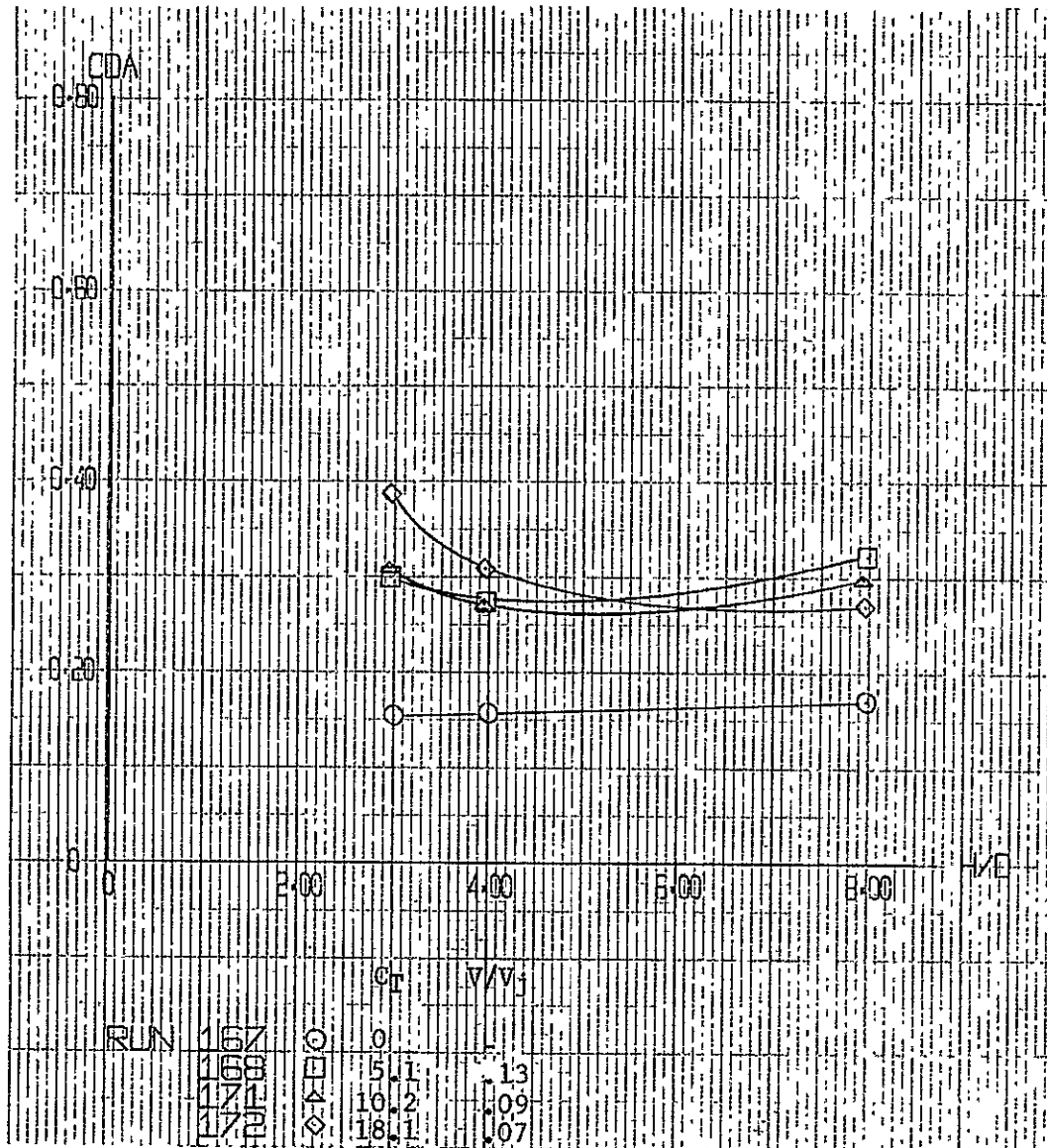


Figure A-81. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

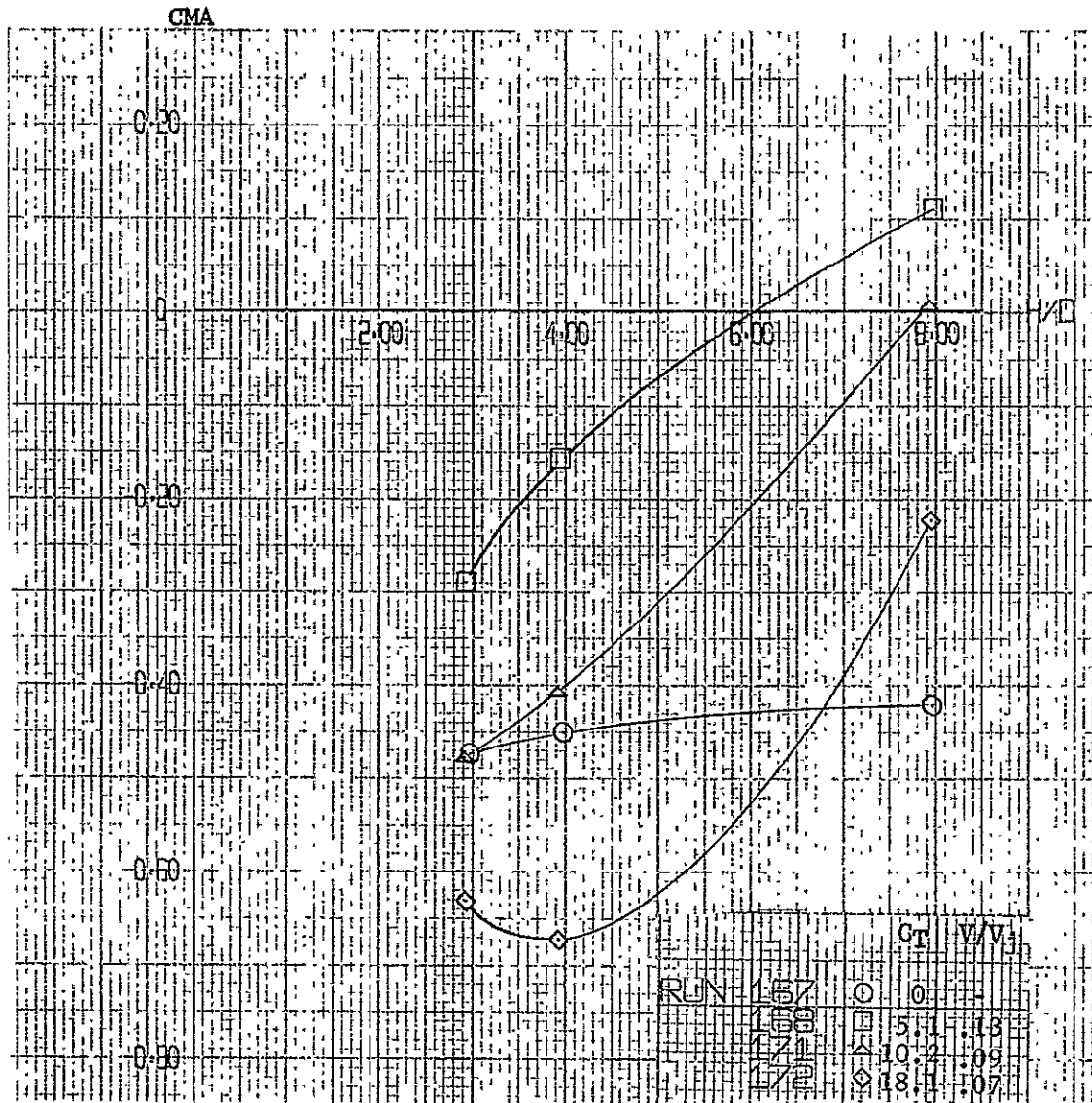


Figure A-81. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3; $\delta_{Nose} = 80^\circ$, $\delta_{NAft} = 90^\circ$, $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

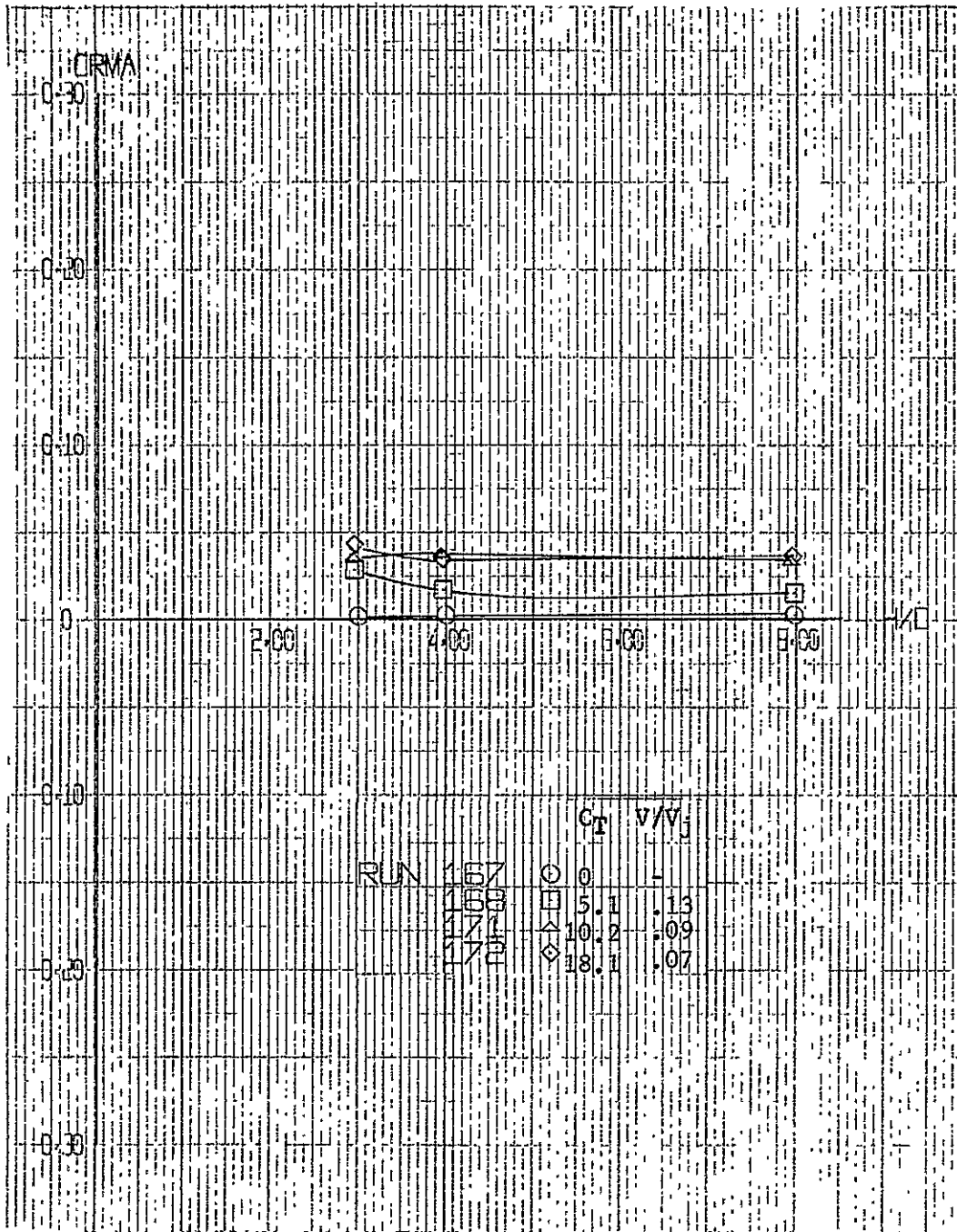


Figure A-81. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3, $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 8^\circ$; $\phi = 0^\circ$ (Concluded)

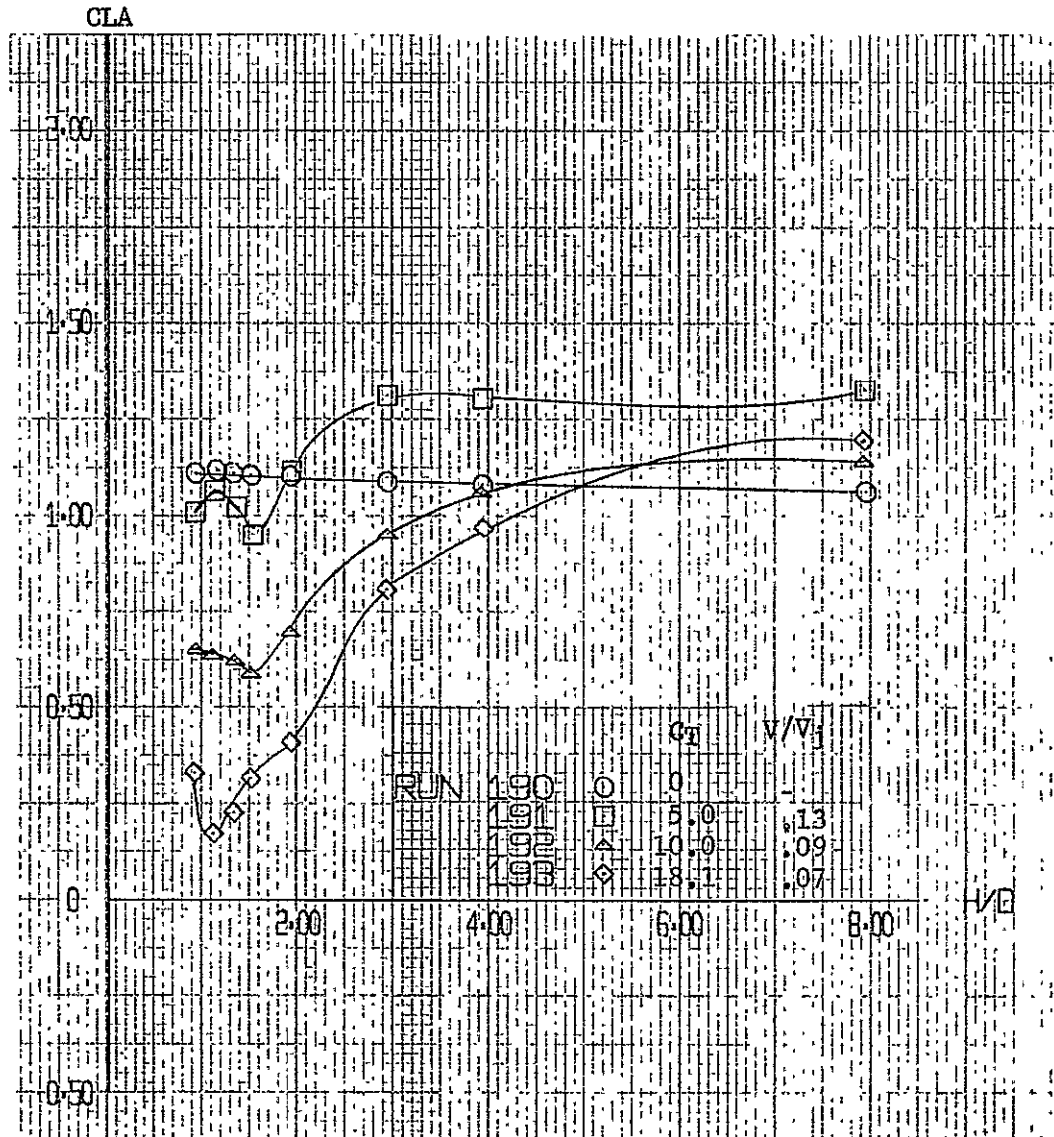


Figure A-82. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 1; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = -10^\circ$

ORIGIN PAGE 3

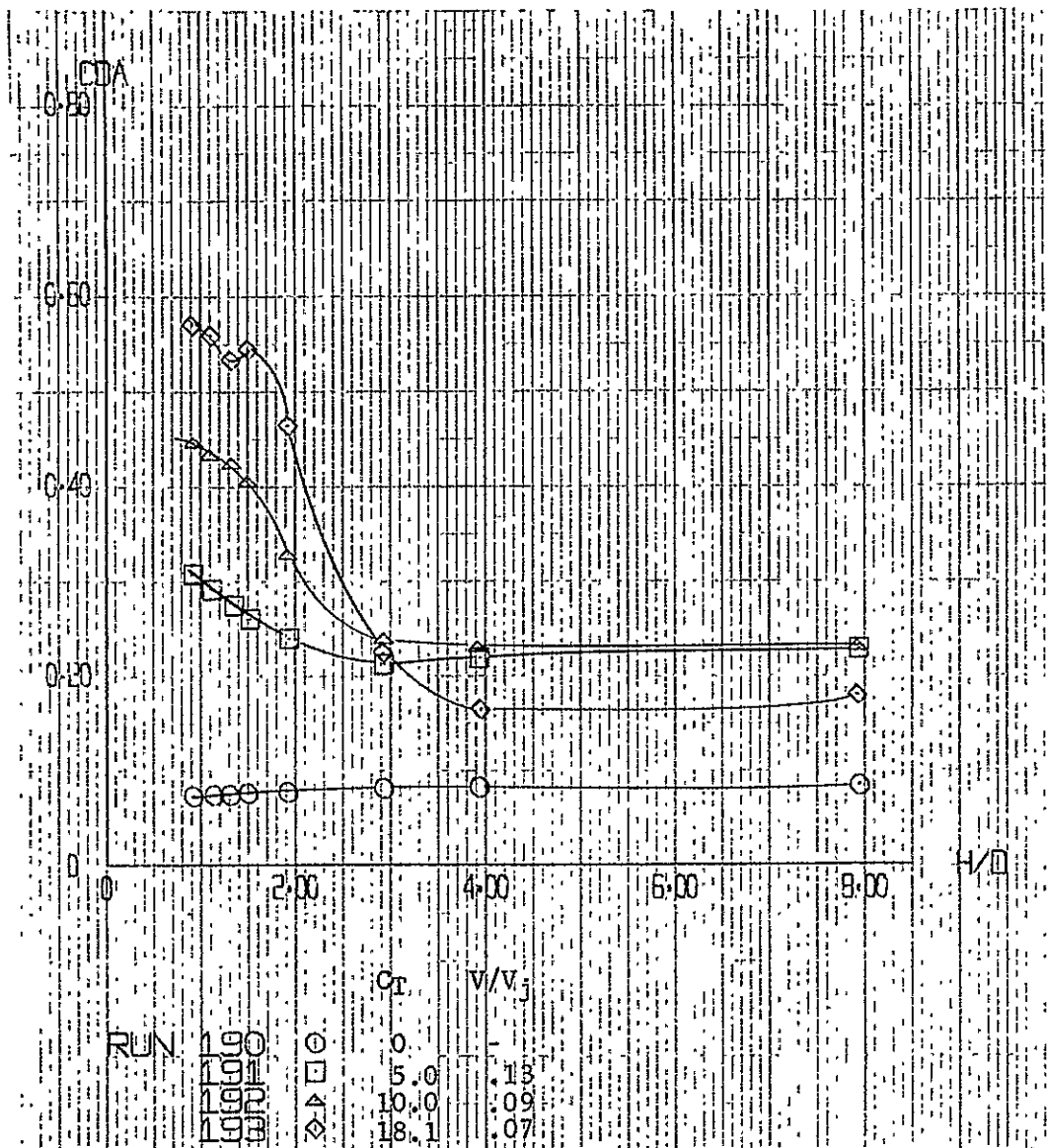


Figure A-82. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 1; $\delta N_{Nose} = 80^\circ$, $\delta N_{Aft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

ORIGINAL PAGE IS
OF POOR QUALITY

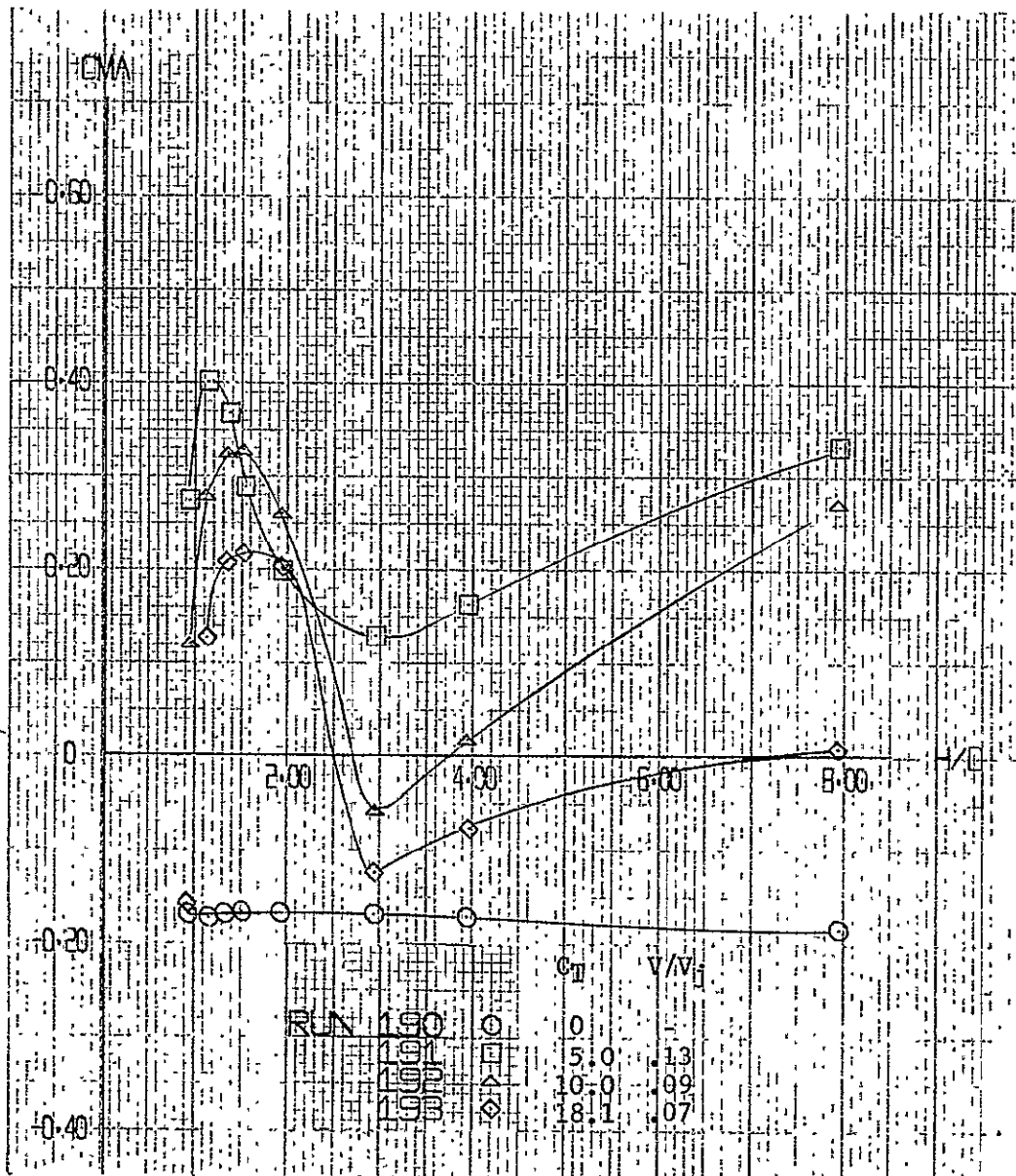


Figure A-82. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 1; $\delta N_{Nose} = 80^\circ$, $\delta N_{Aft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

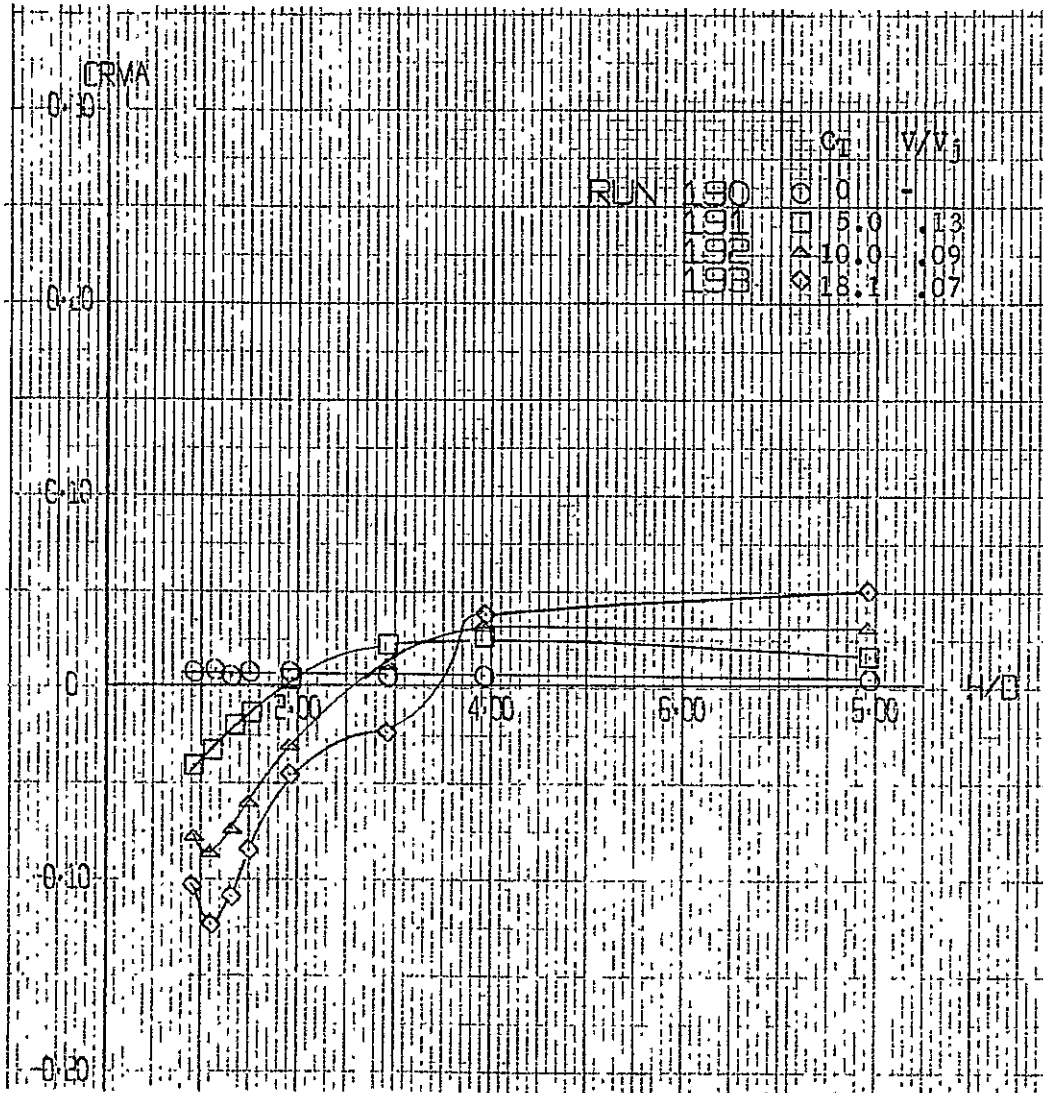


Figure A-82. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta N_{Nose} = 80^\circ$, $\delta N_{Aft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = -10^\circ$ (Concluded)

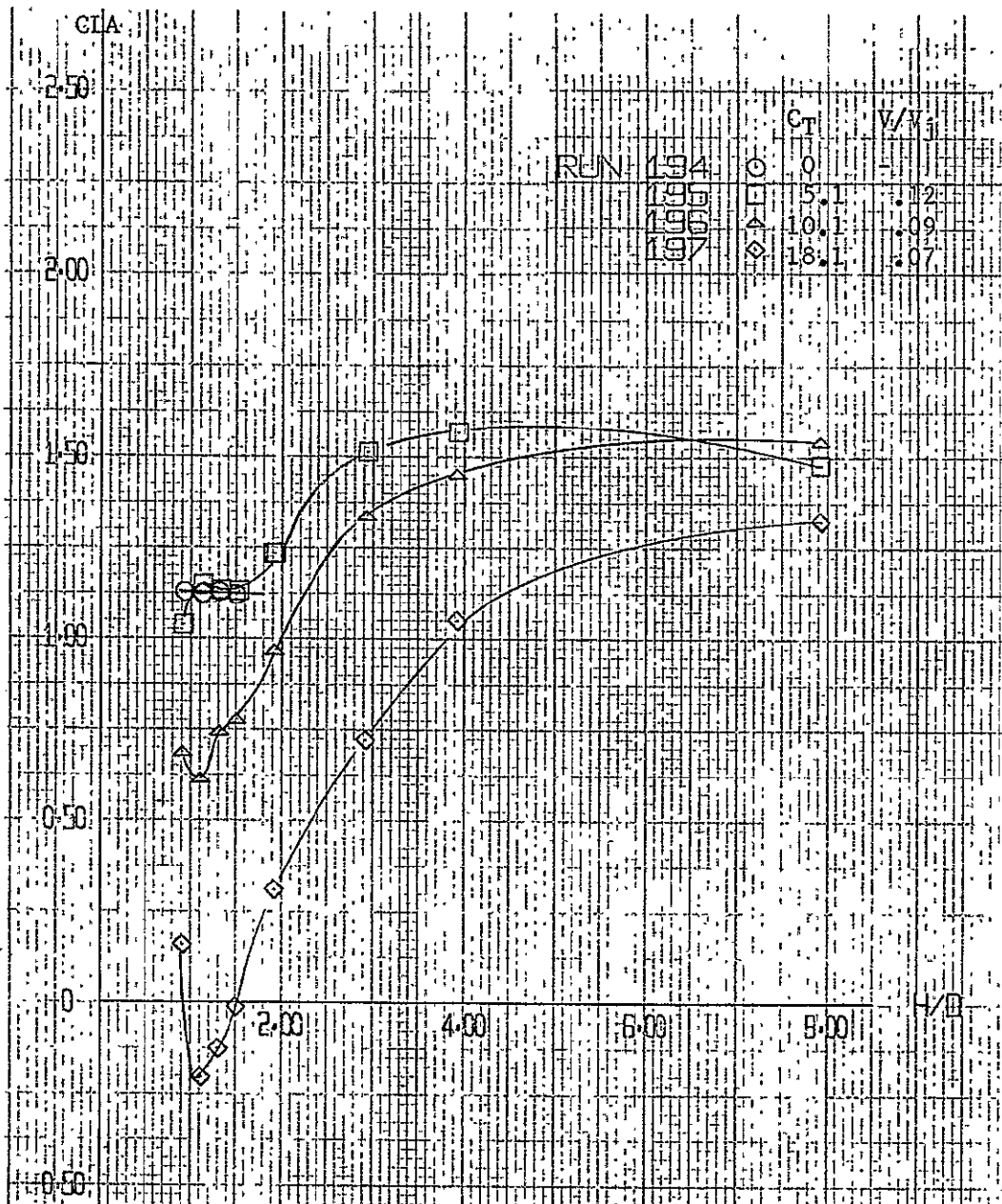


Figure A-83. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$

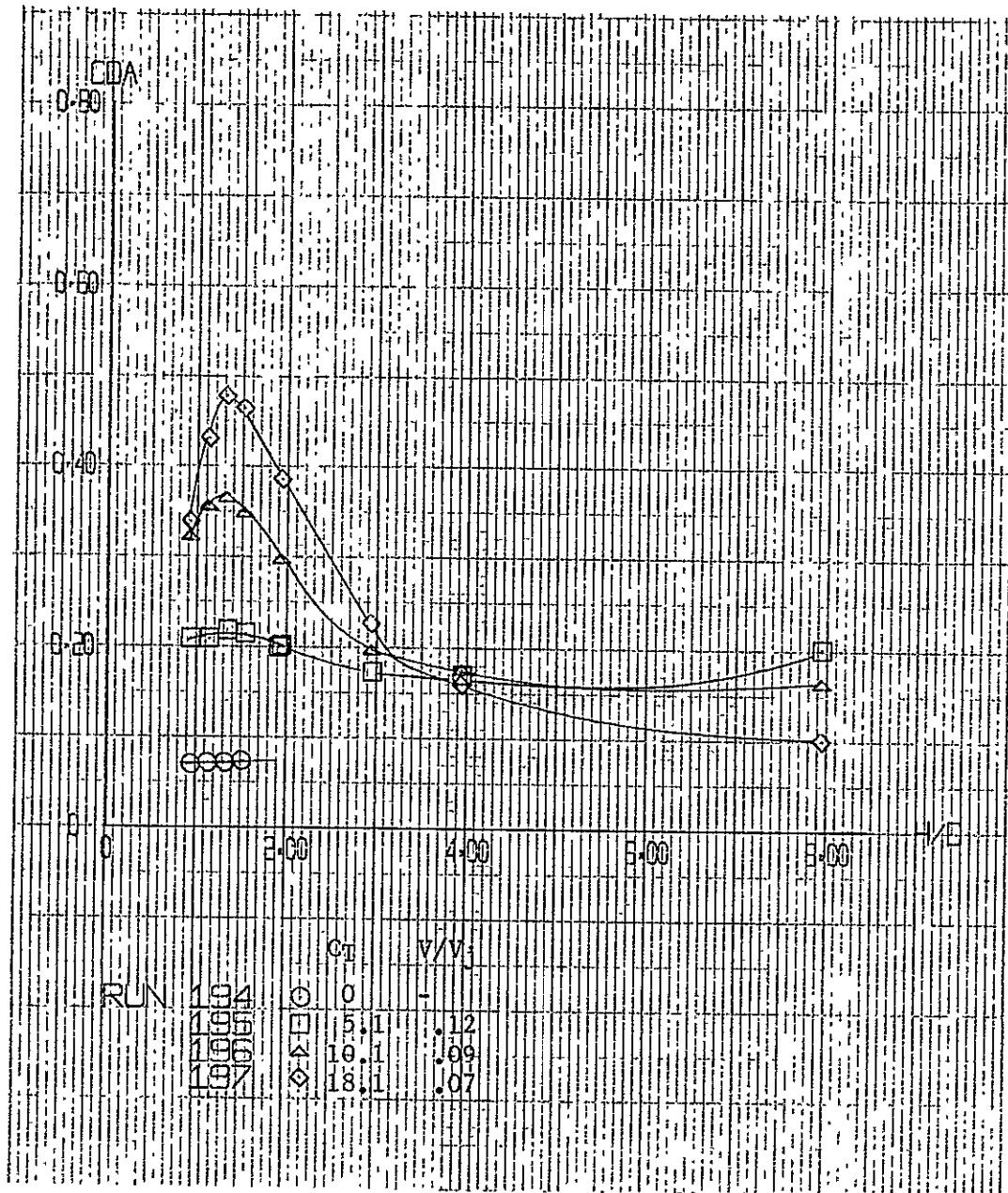


Figure A-83. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$ (Continued)

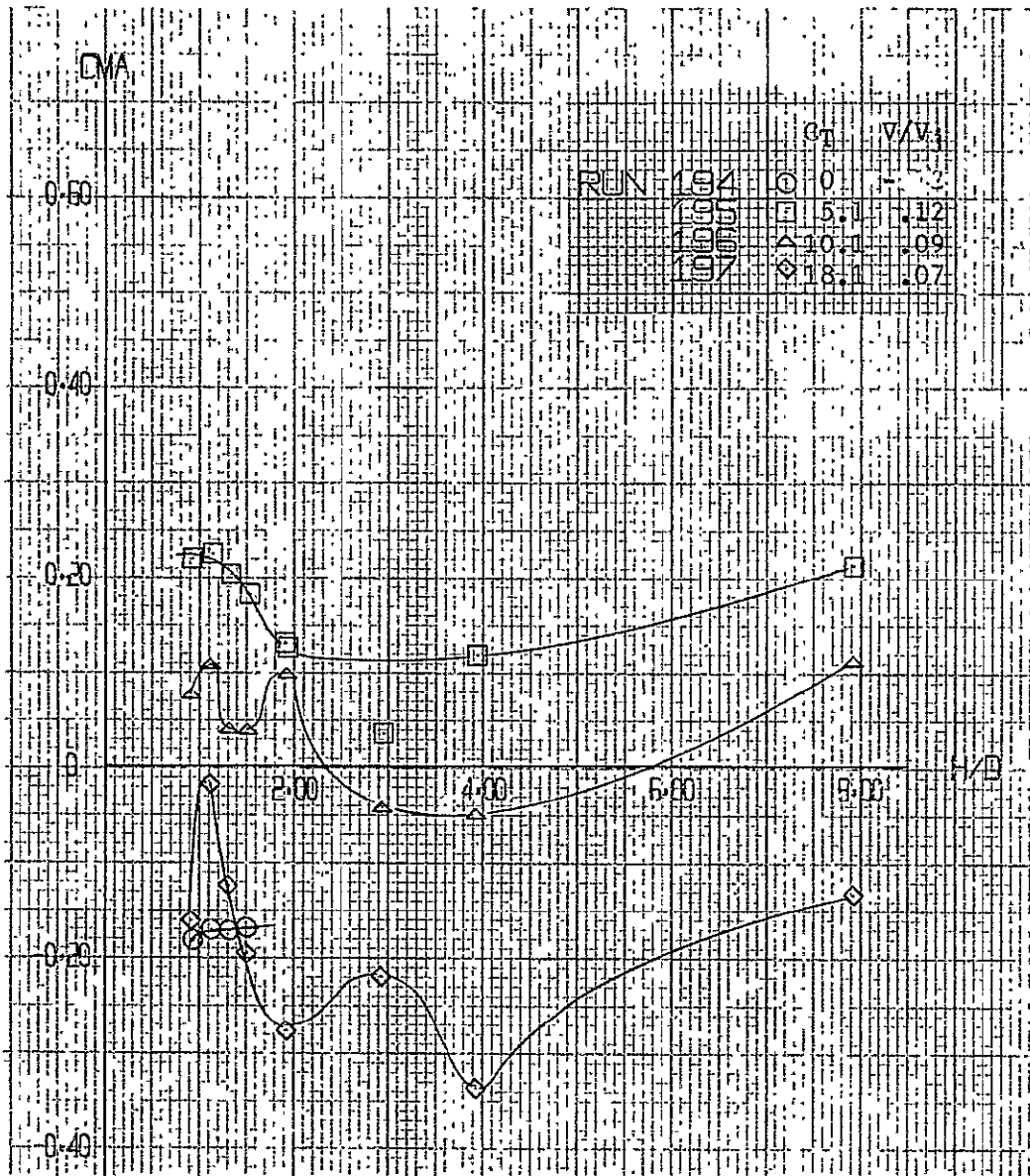


Figure A-83. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$ (Continued)

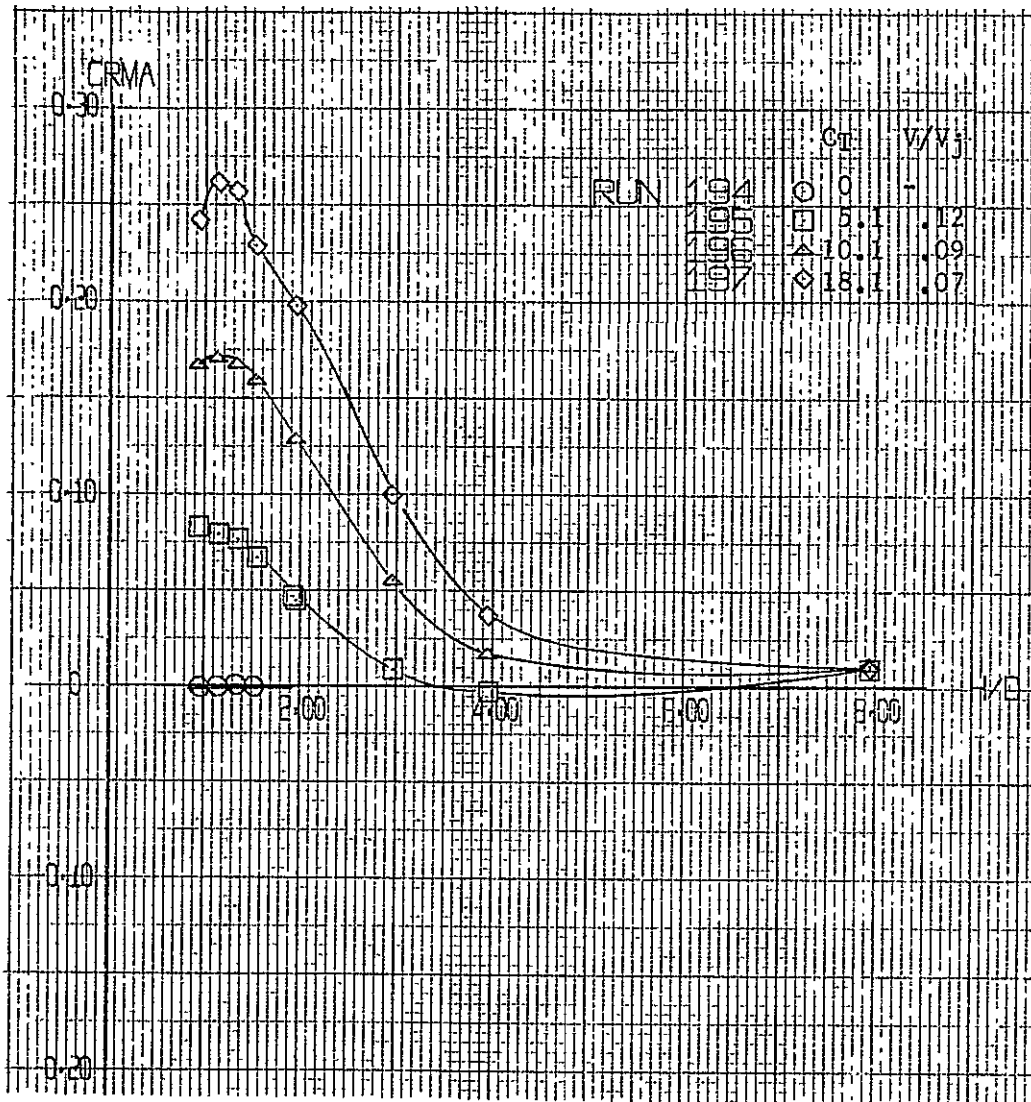


Figure A-83. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta N_{Nose} = 80^\circ$, $\delta N_{Aft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$ (Concluded)

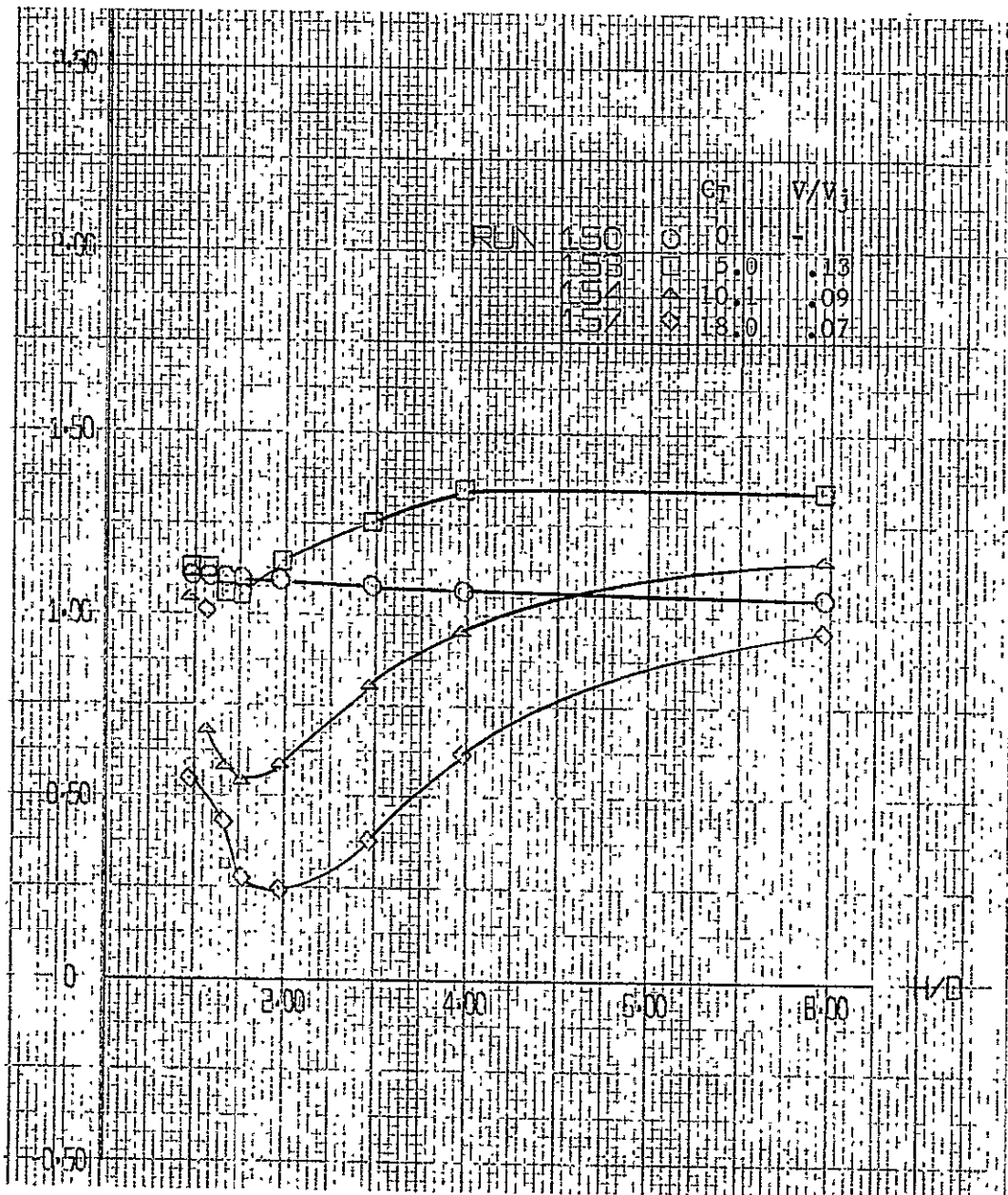


Figure A-84. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta N_{Nose} = 80^\circ$, $\delta N_{Aft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$

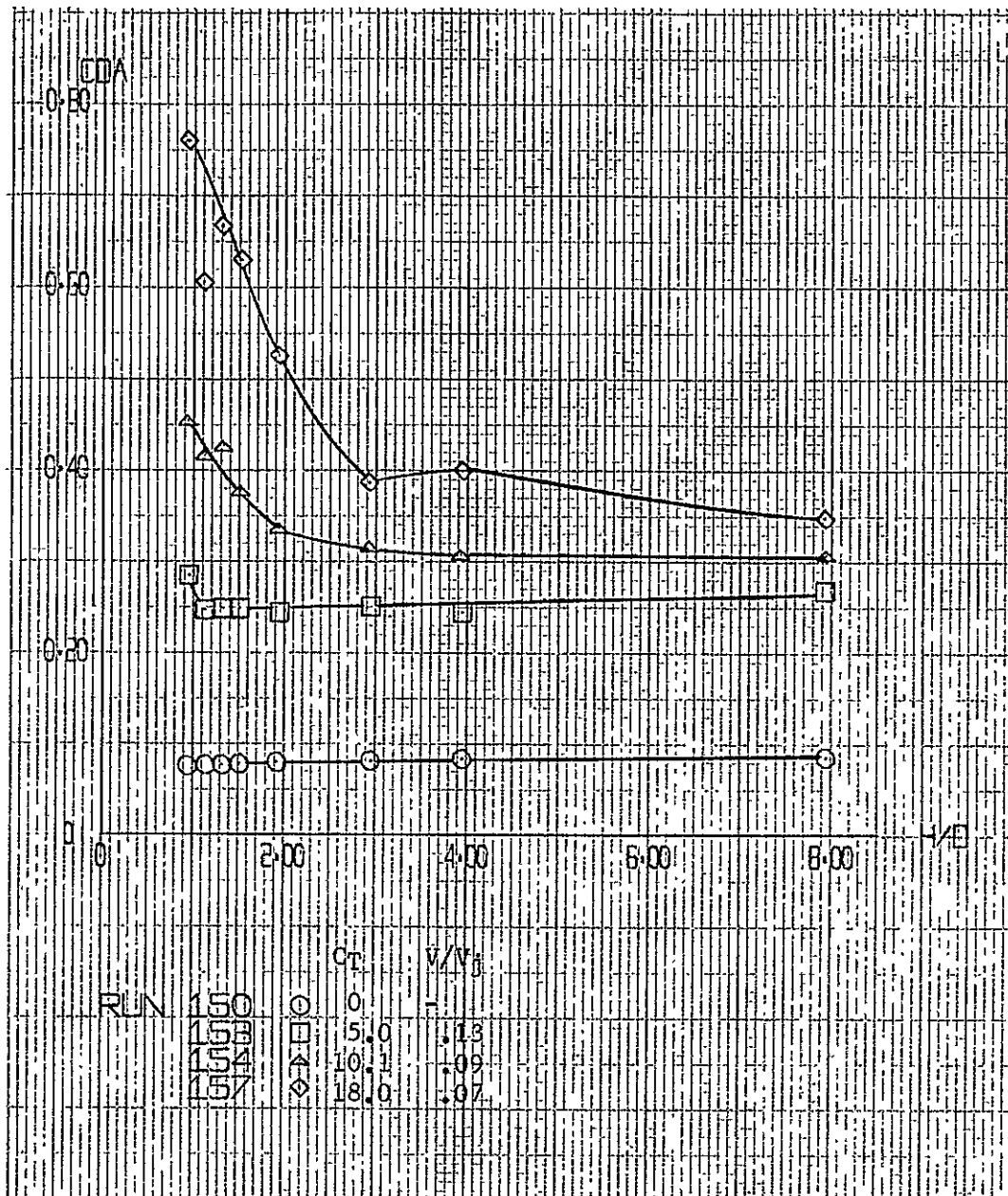


Figure A-84. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

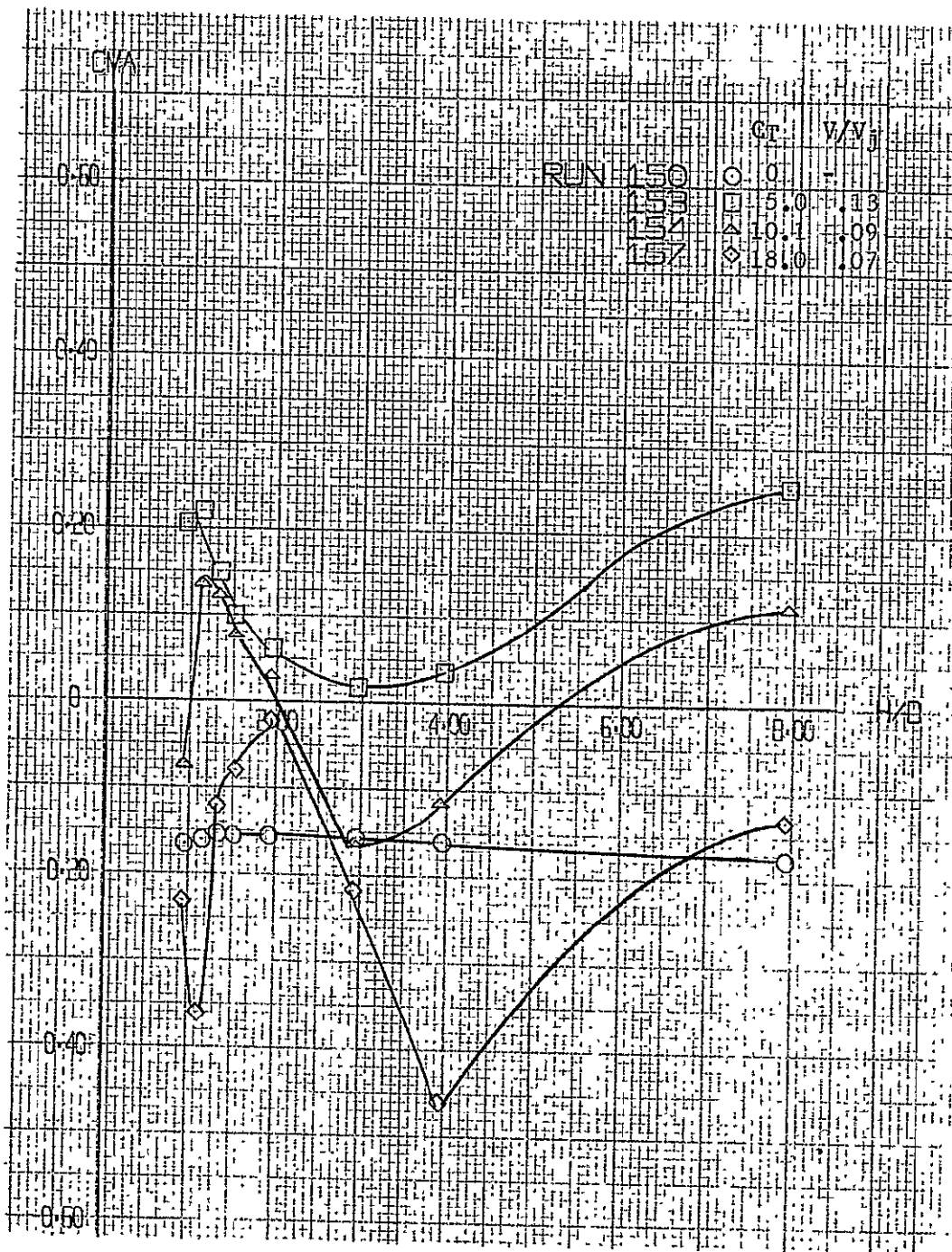


Figure A-84. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta N_{Nose} = 80^\circ$; $\delta N_{Aft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

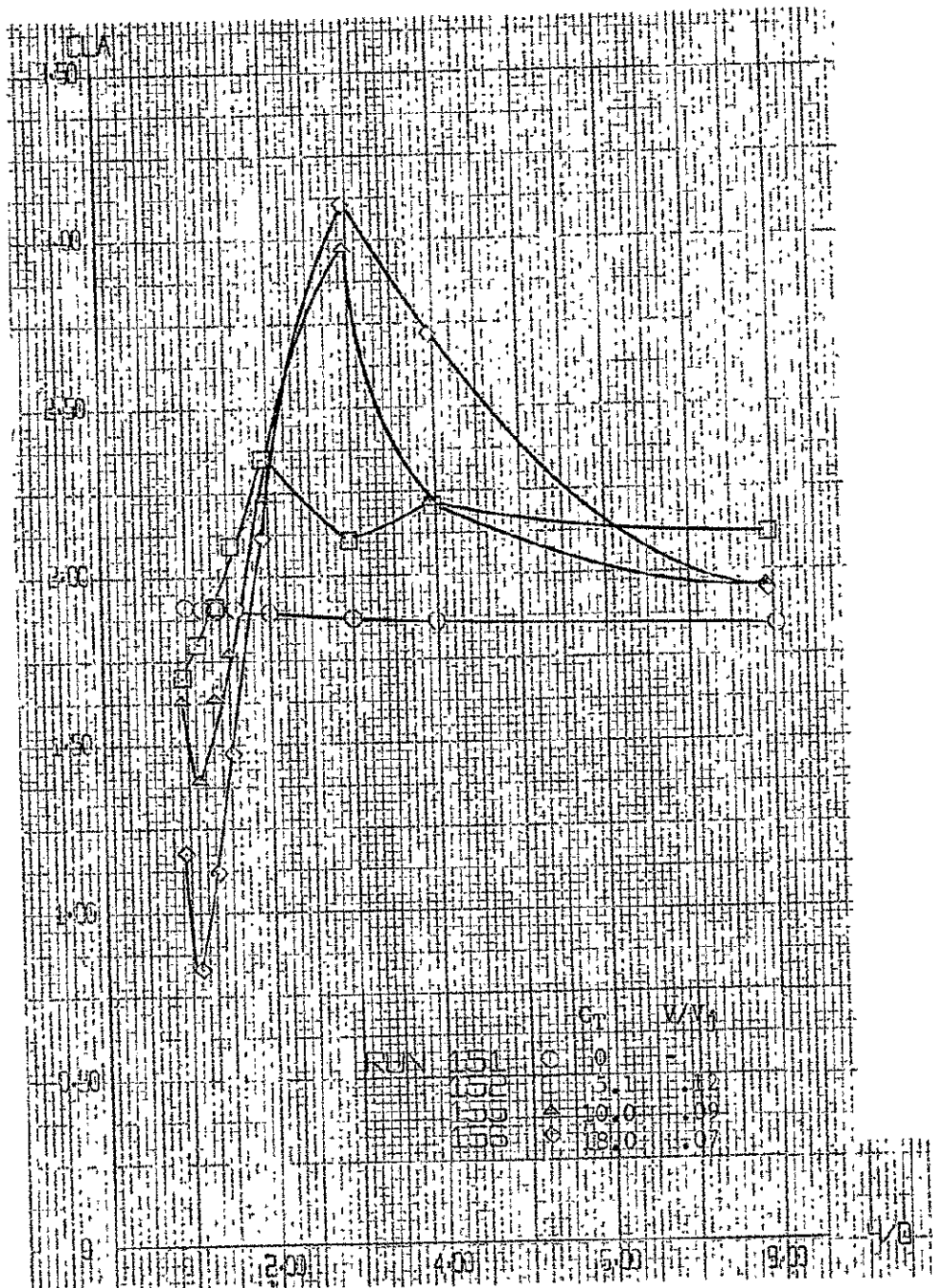


Figure A-85. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{Nose} = 80^\circ$, $\delta_{NAft} = 90^\circ$, $\alpha = 8^\circ$; $\theta = 0^\circ$

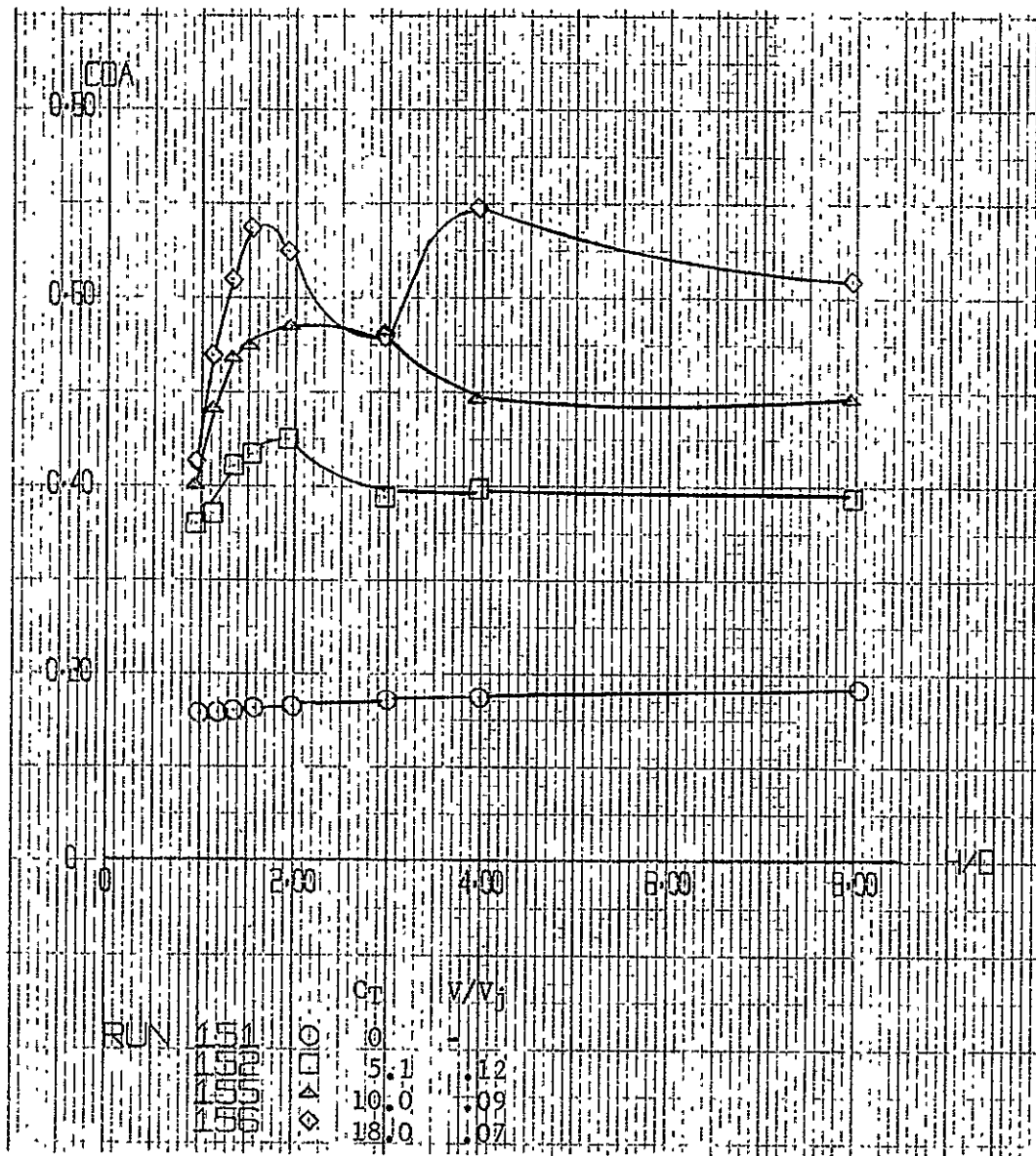


Figure A-85. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

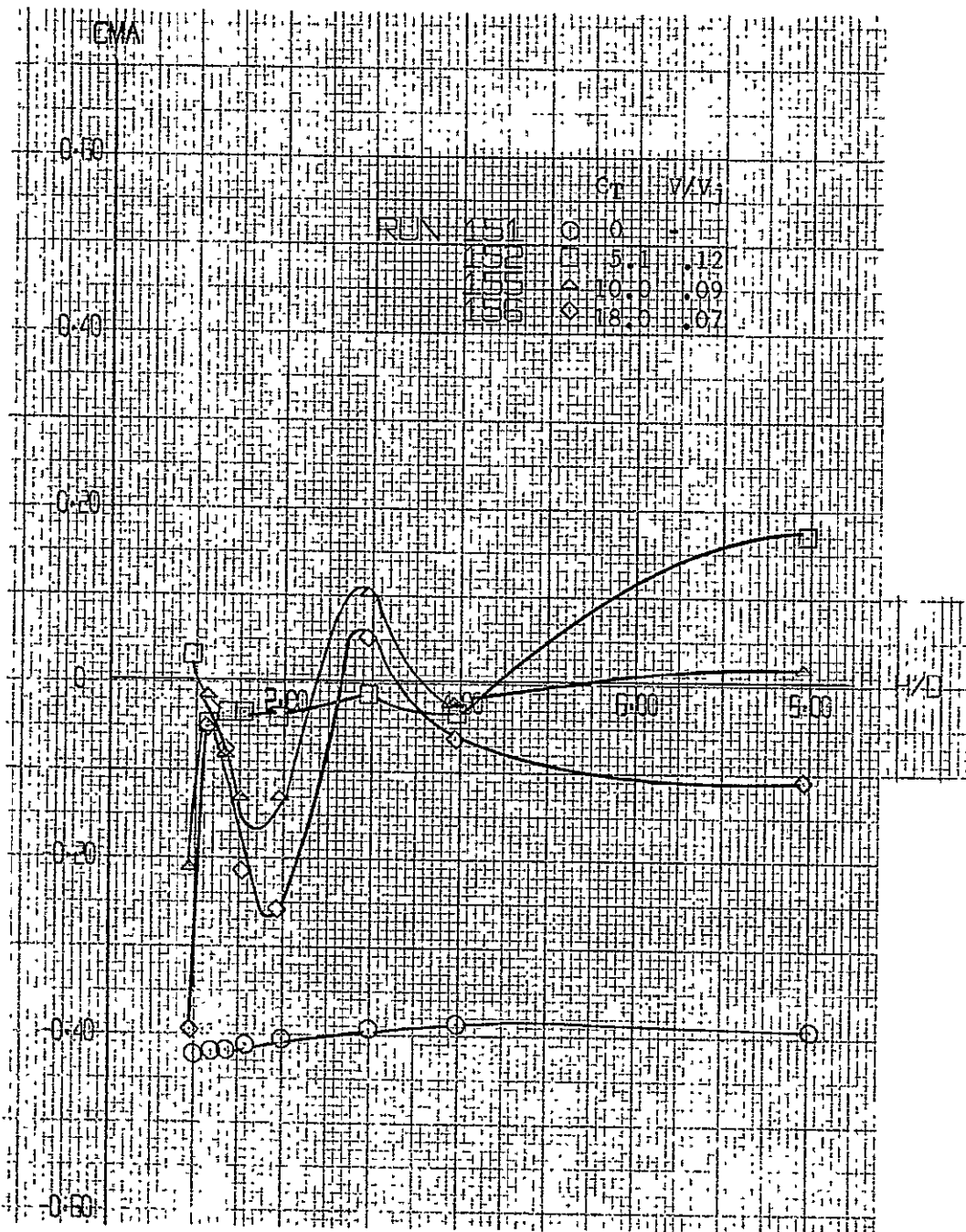


Figure A-85. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 8^\circ$; $\phi = 0^\circ$ (Continued)

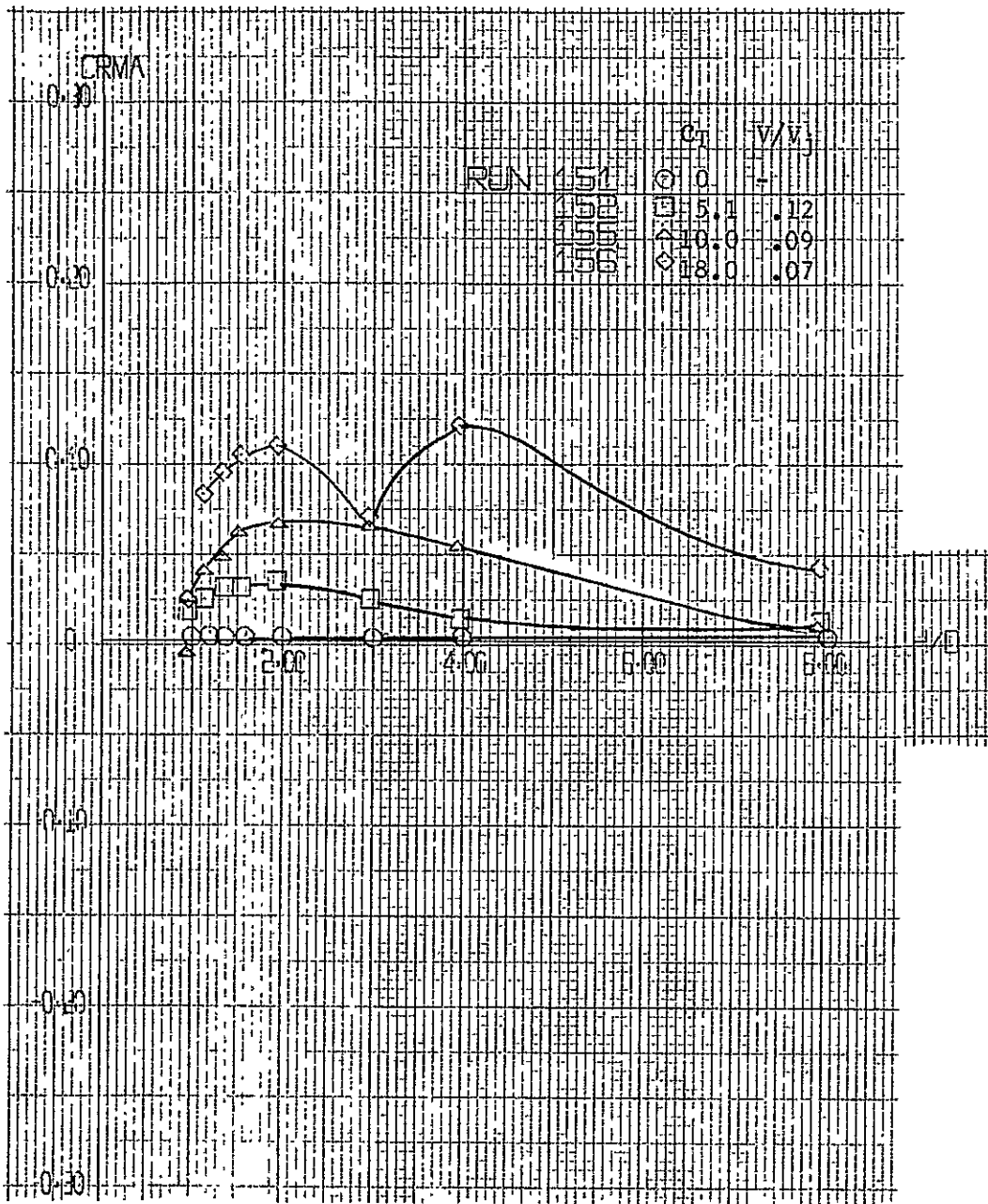


Figure A-85. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 8^\circ$; $\phi = 0^\circ$ (Concluded)

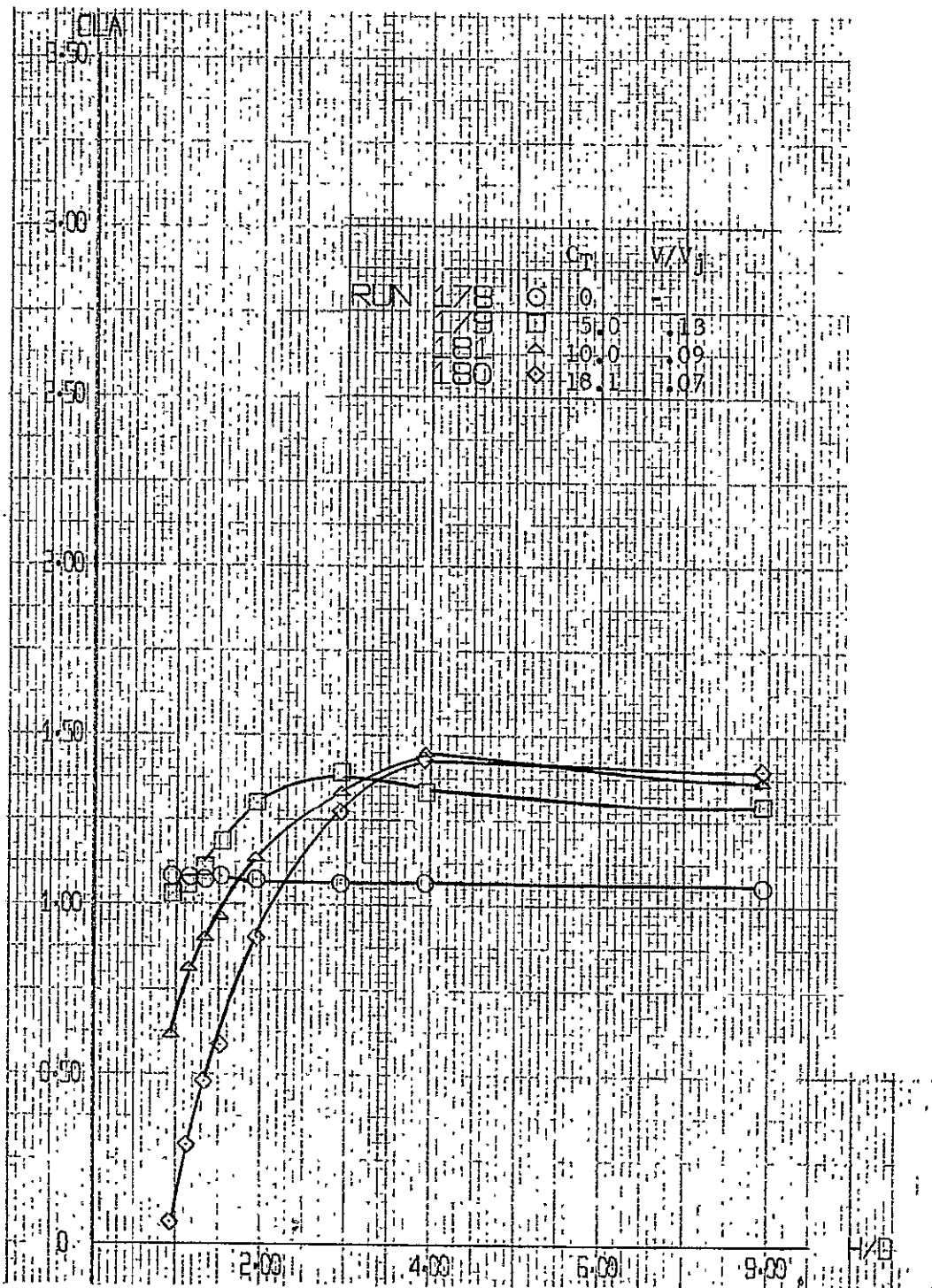


Figure A-86. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$

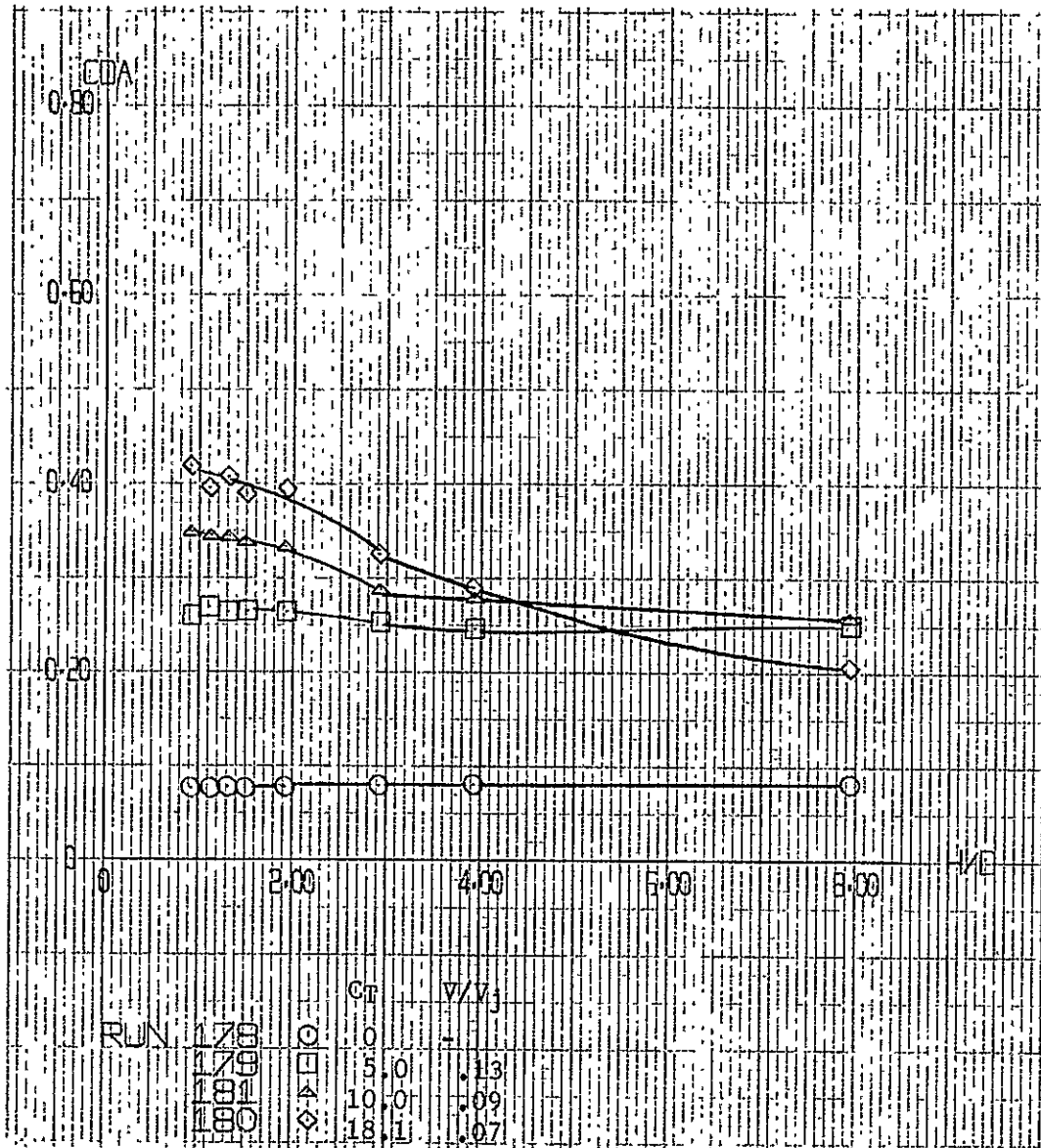


Figure A-86. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

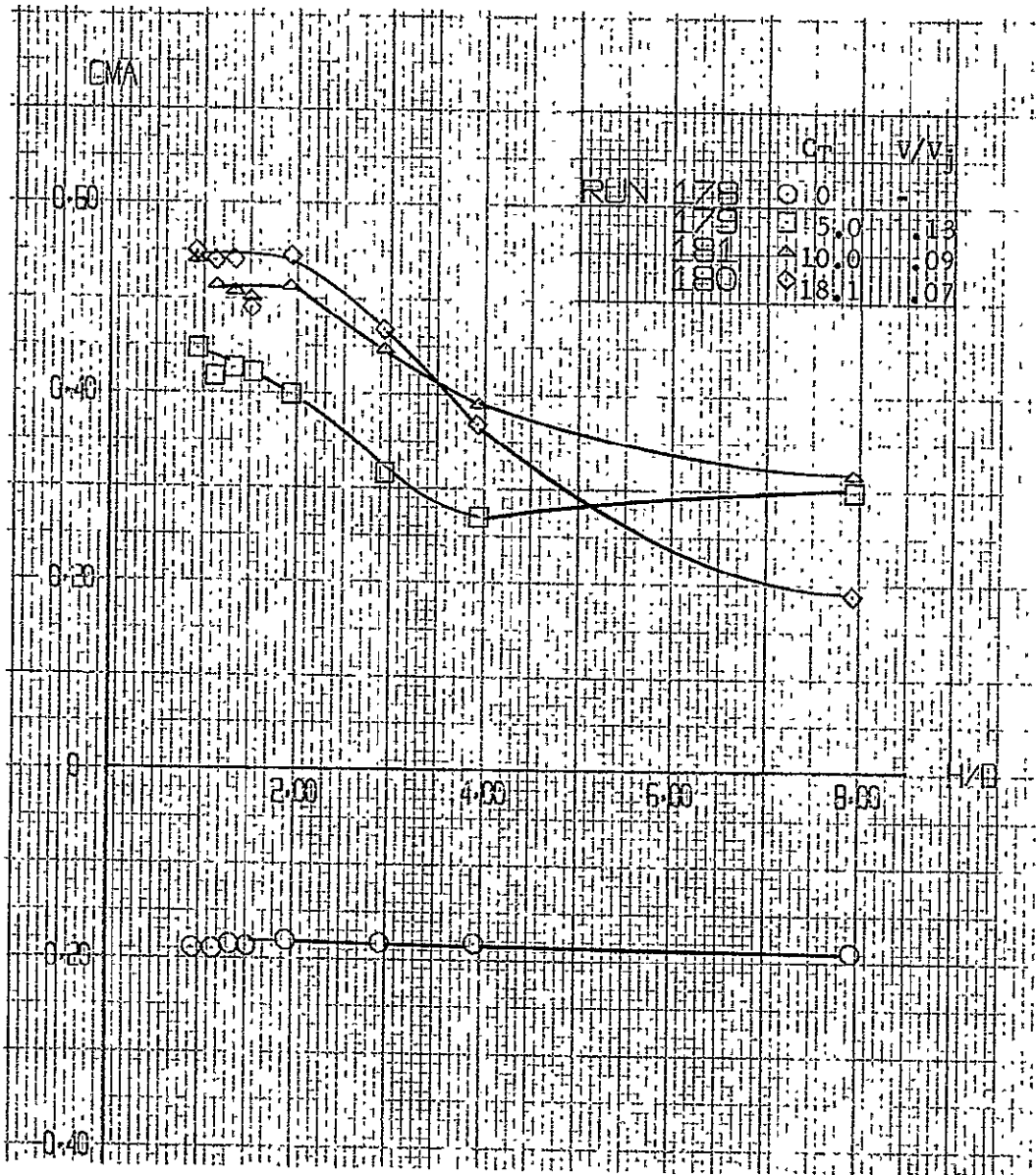


Figure A-86. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

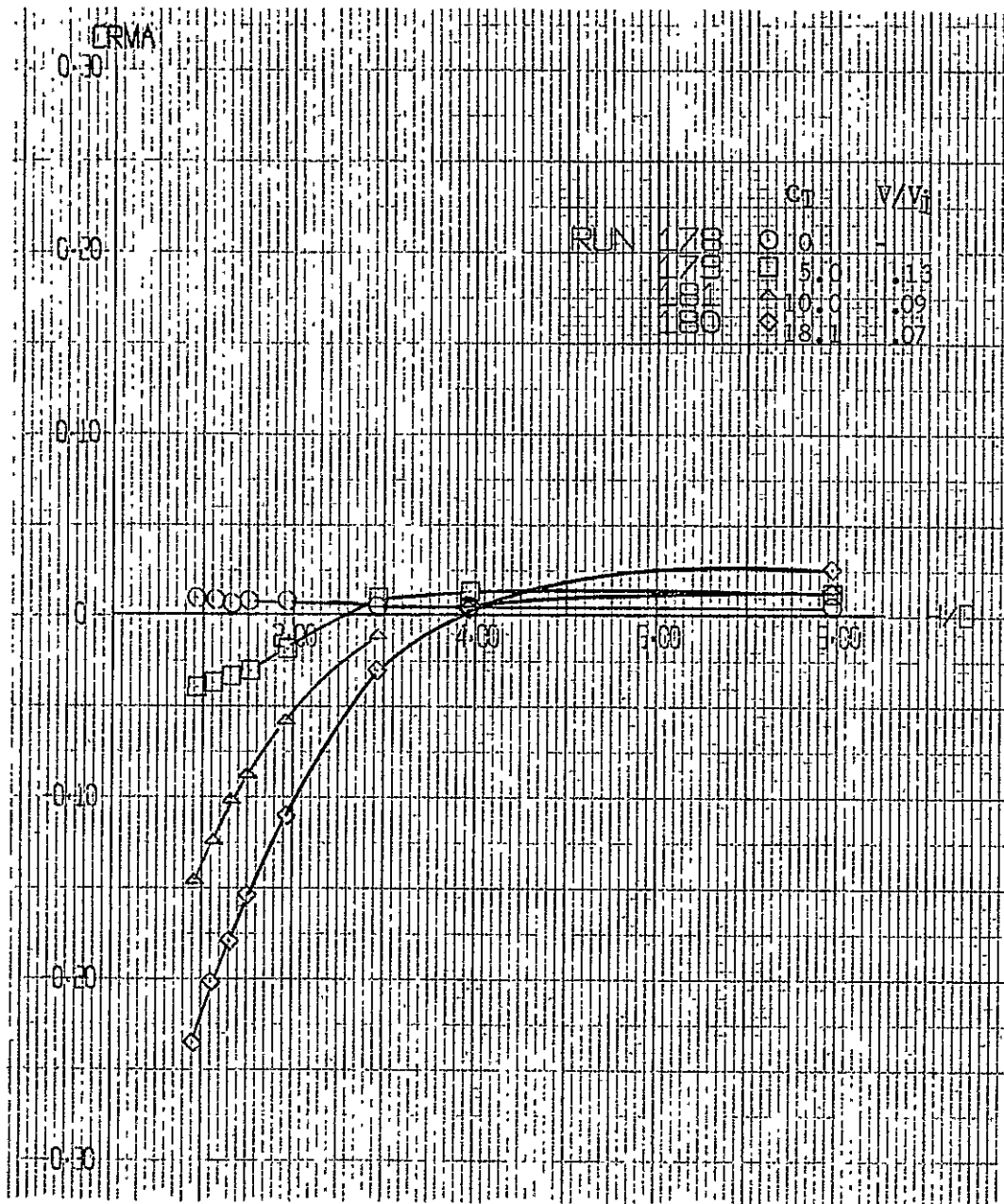


Figure A-86. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

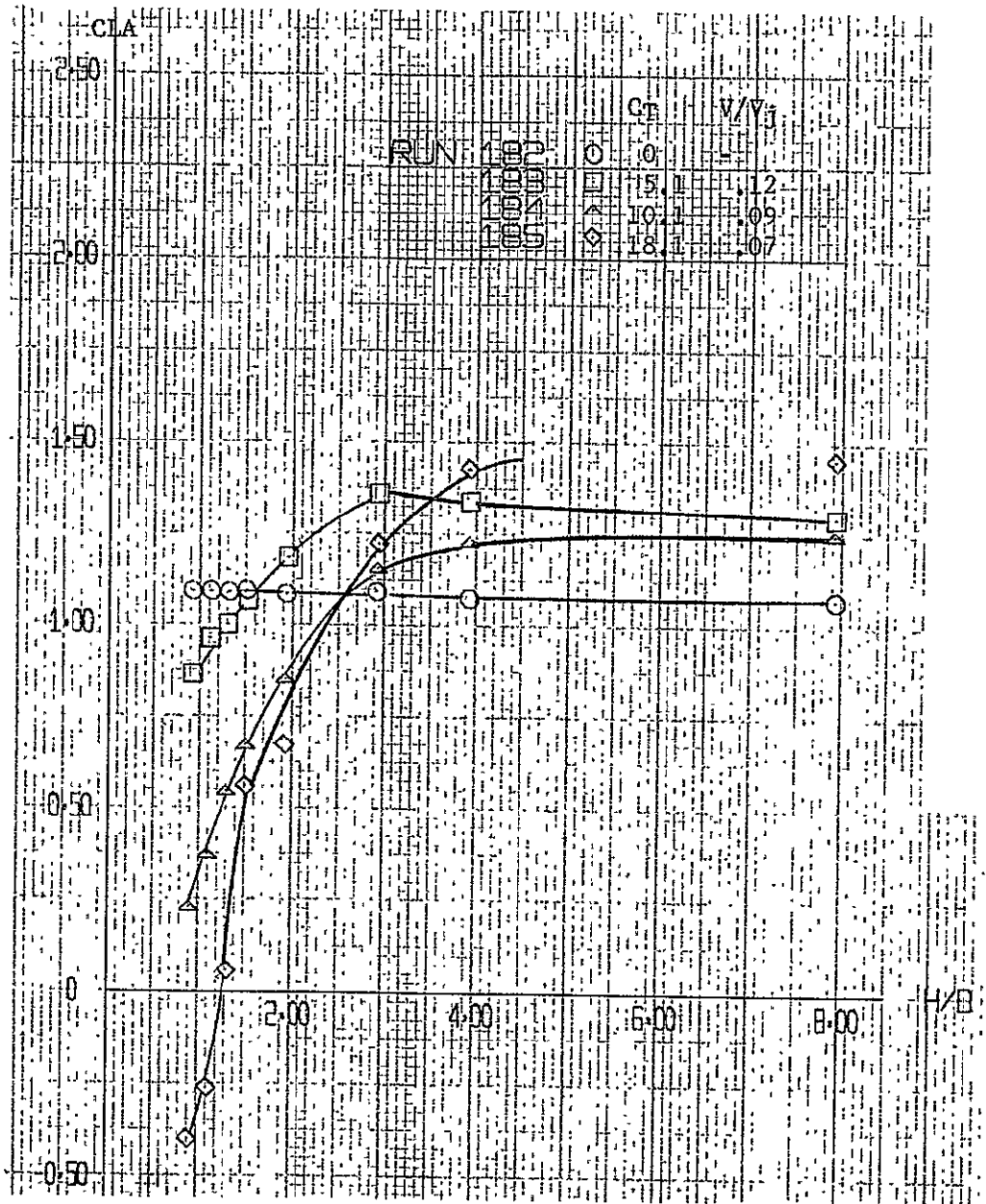


Figure A-87. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{Nose} = 80^\circ$, $\delta_{NAft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = -10^\circ$

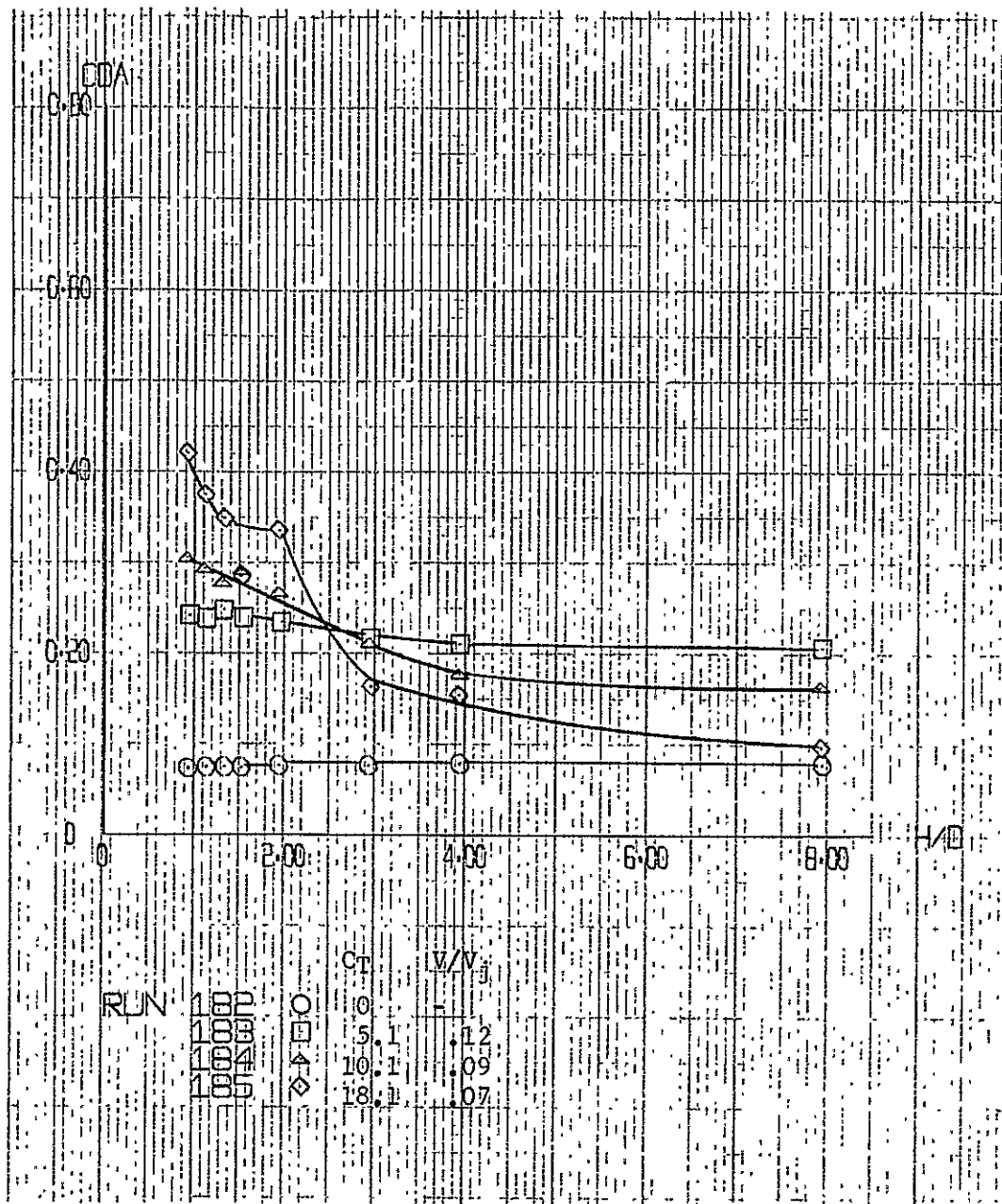


Figure A-87. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha' = 0^\circ$; $\phi = -10^\circ$ (Continued)

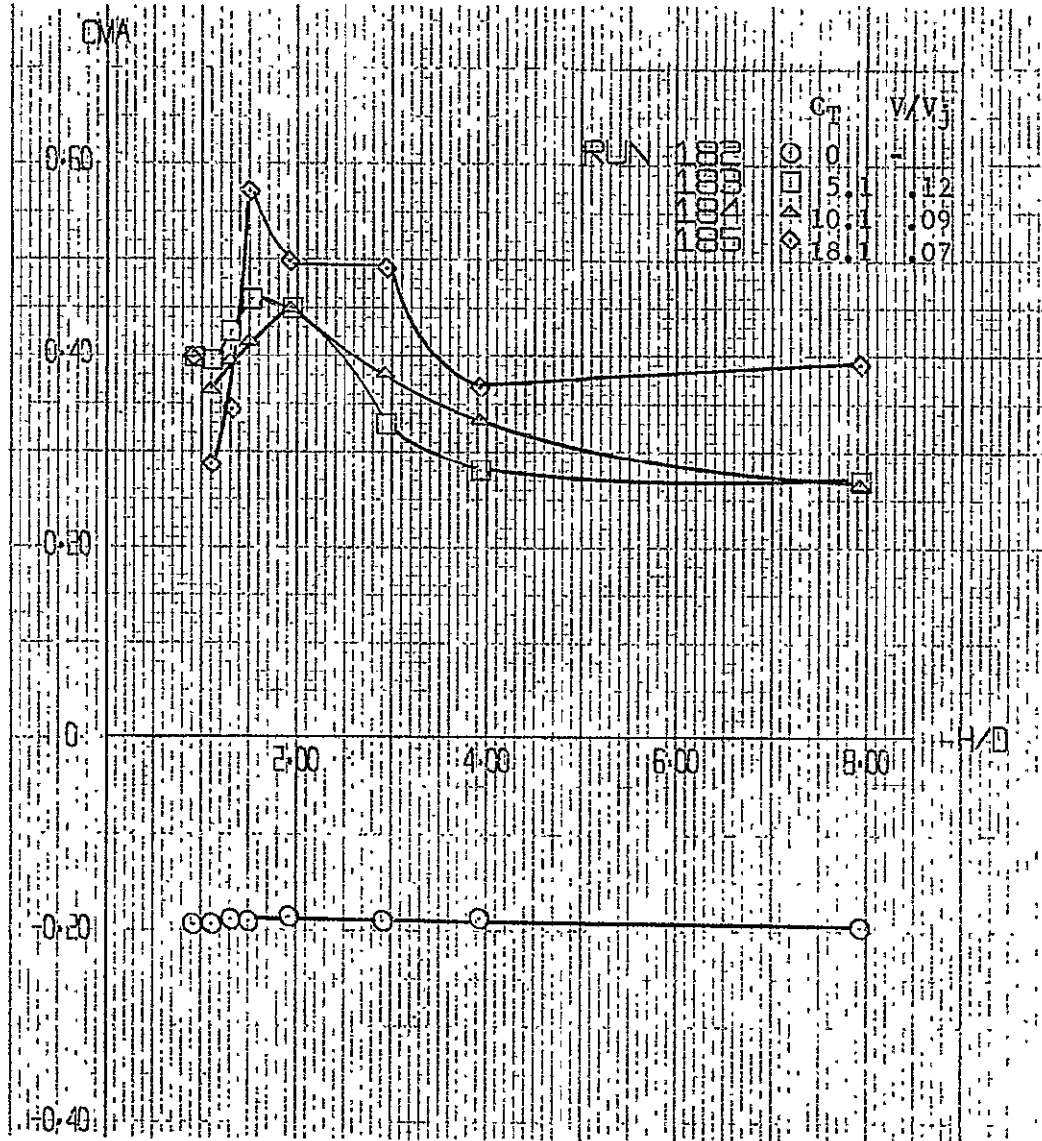


Figure A-87. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

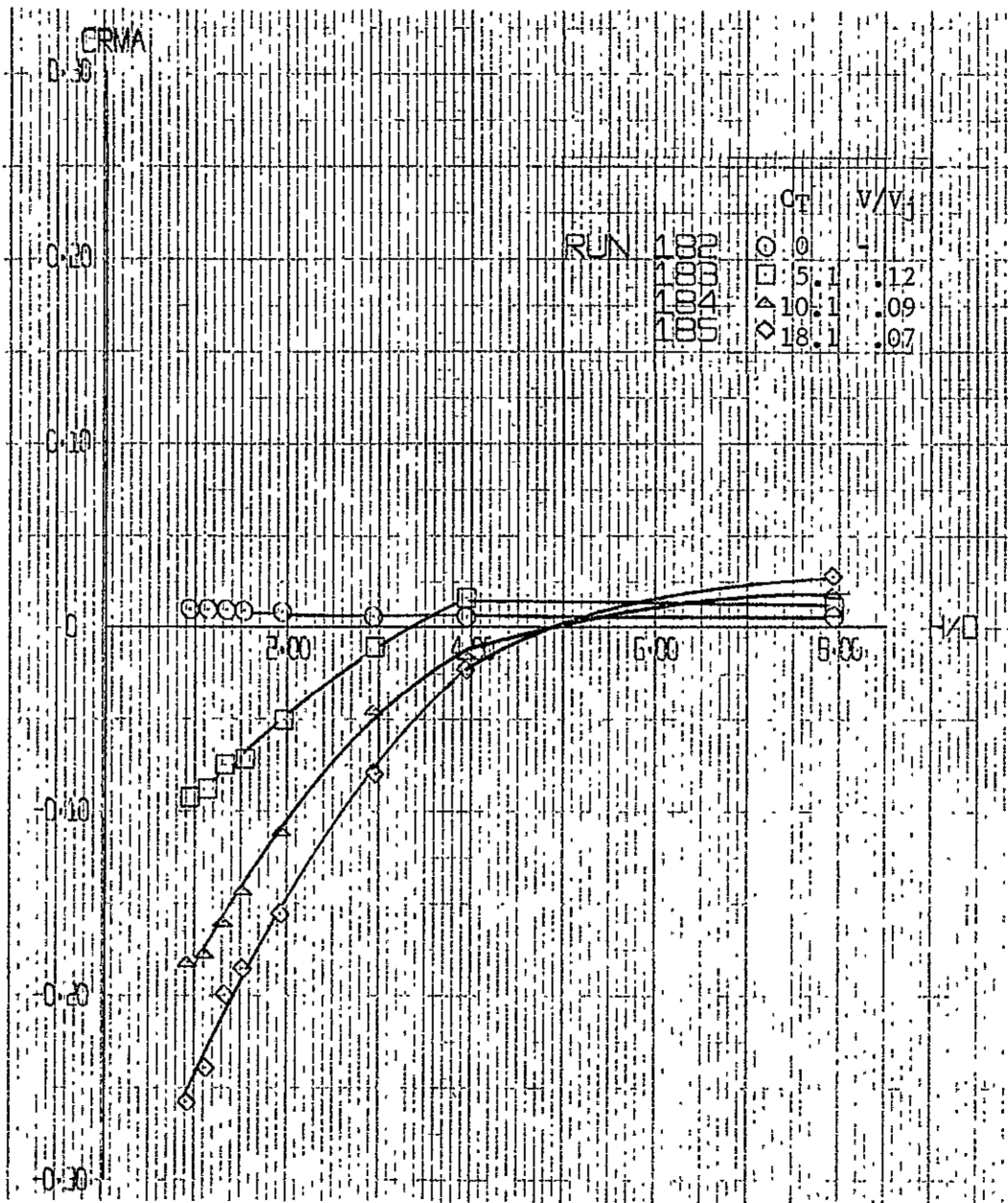


Figure A-87. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = -10^\circ$ (Concluded)

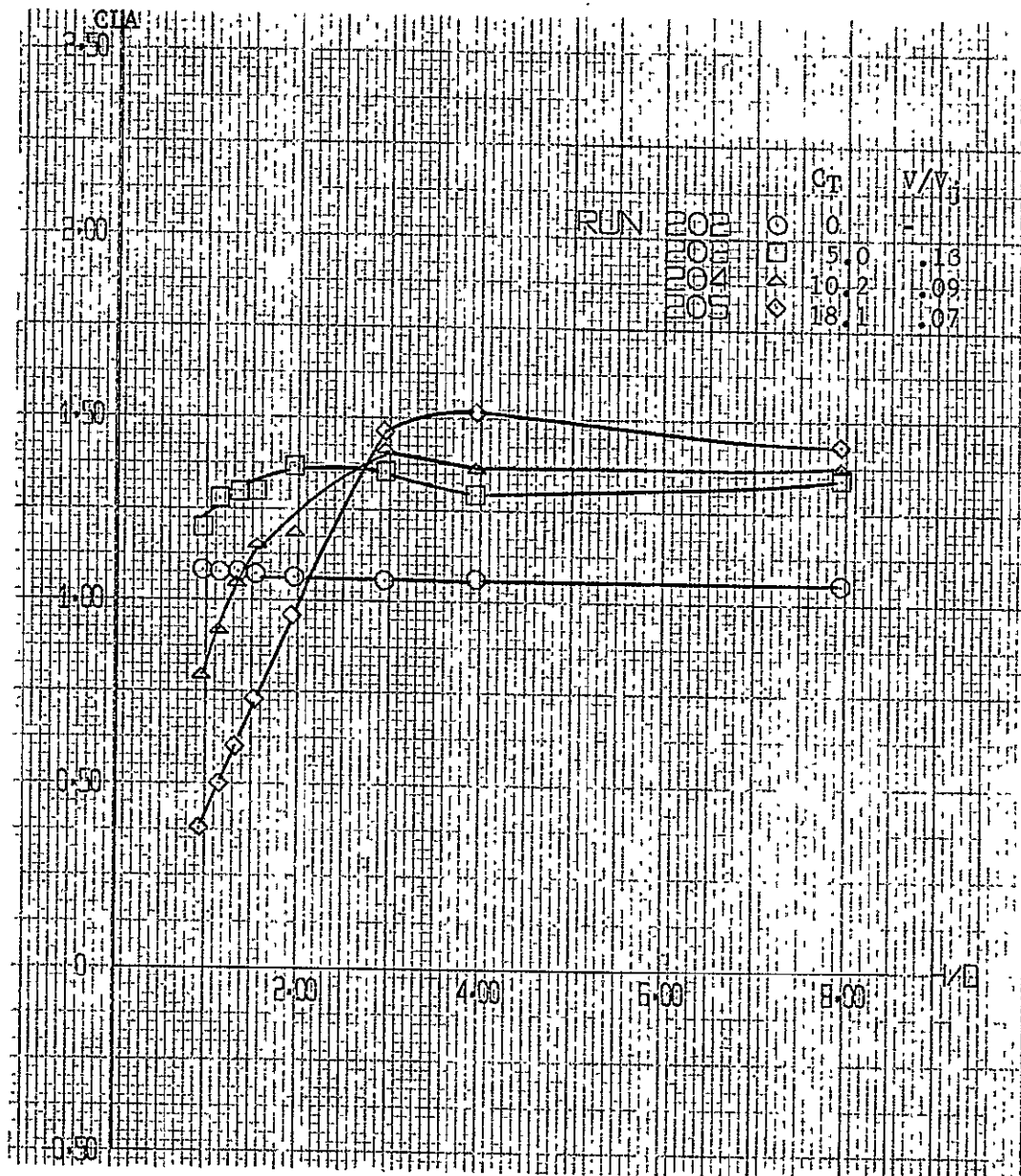


Figure A-88. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{Nose} = 80^\circ$, $\delta_{NAft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$

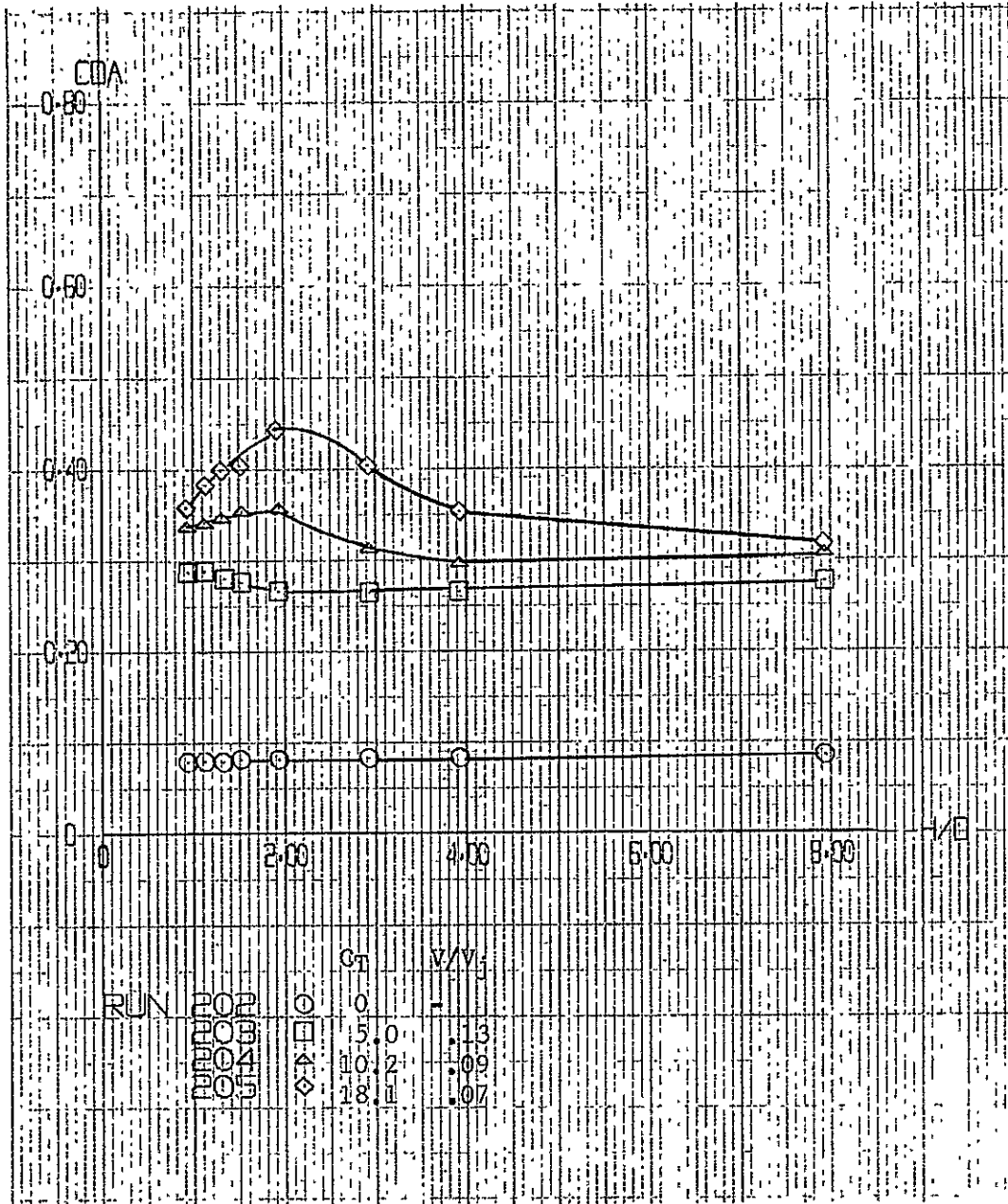


Figure A-88. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$ (Continued)

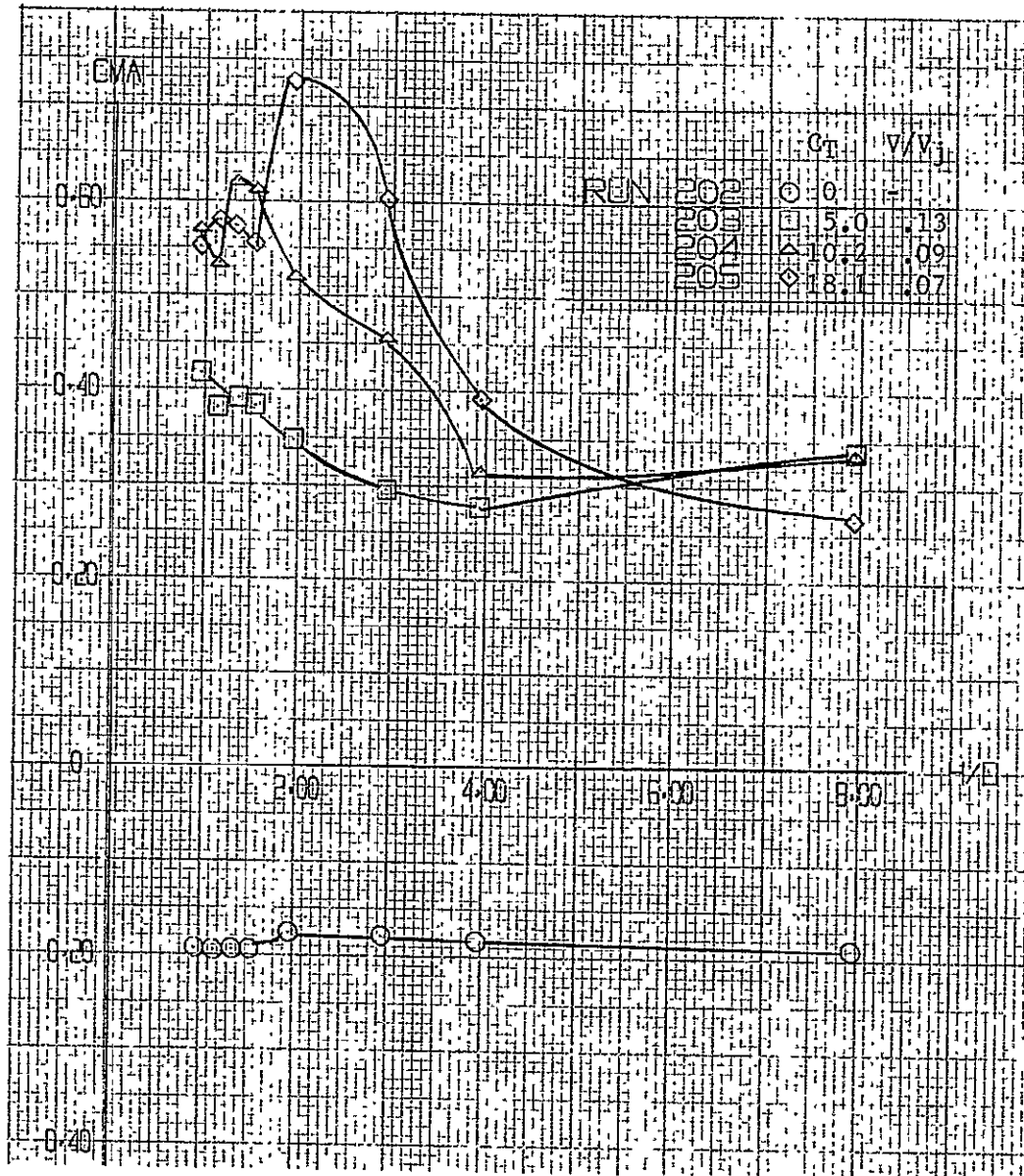


Figure A-88. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$ (Continued)

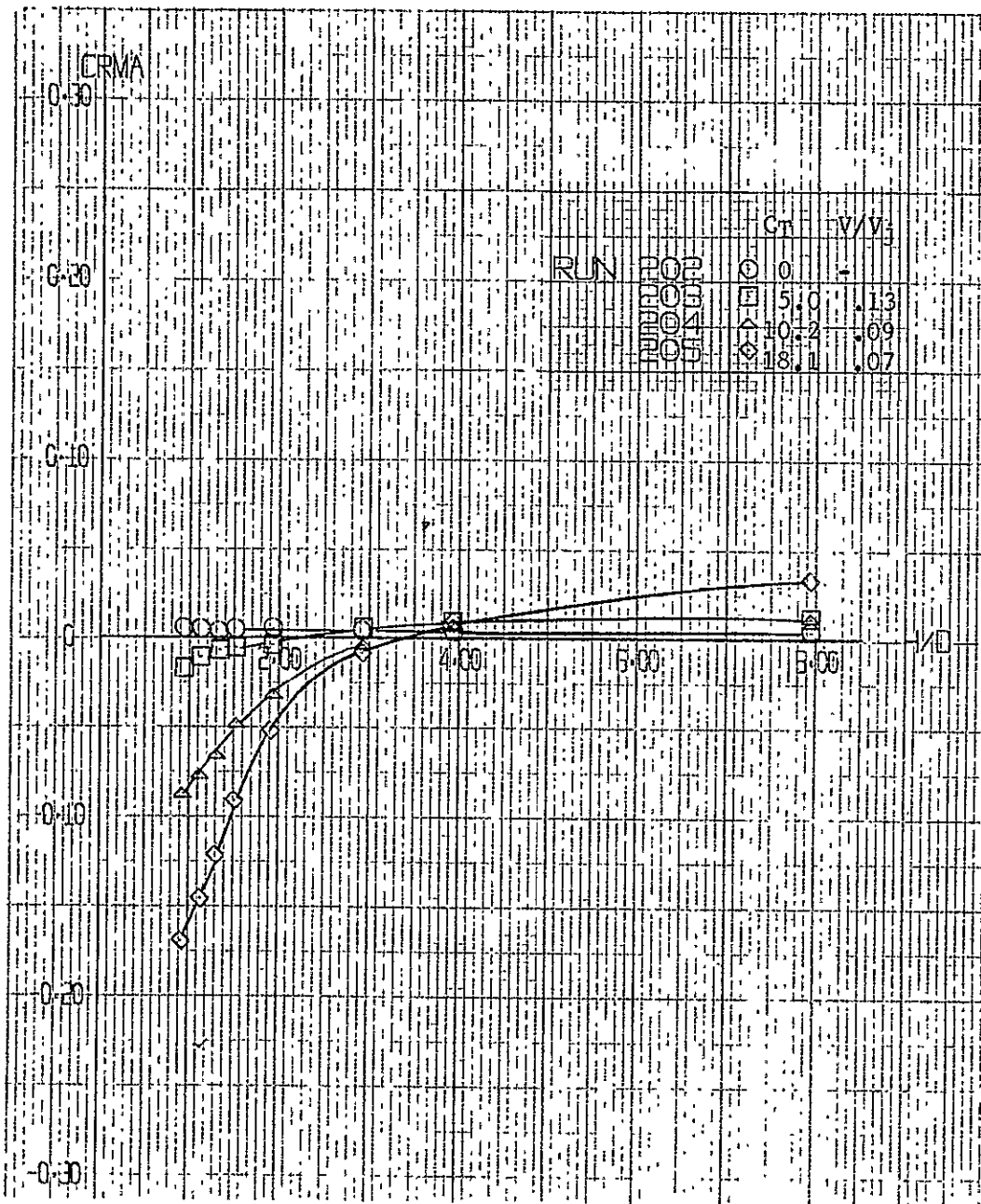


Figure A-88. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$ (Concluded)

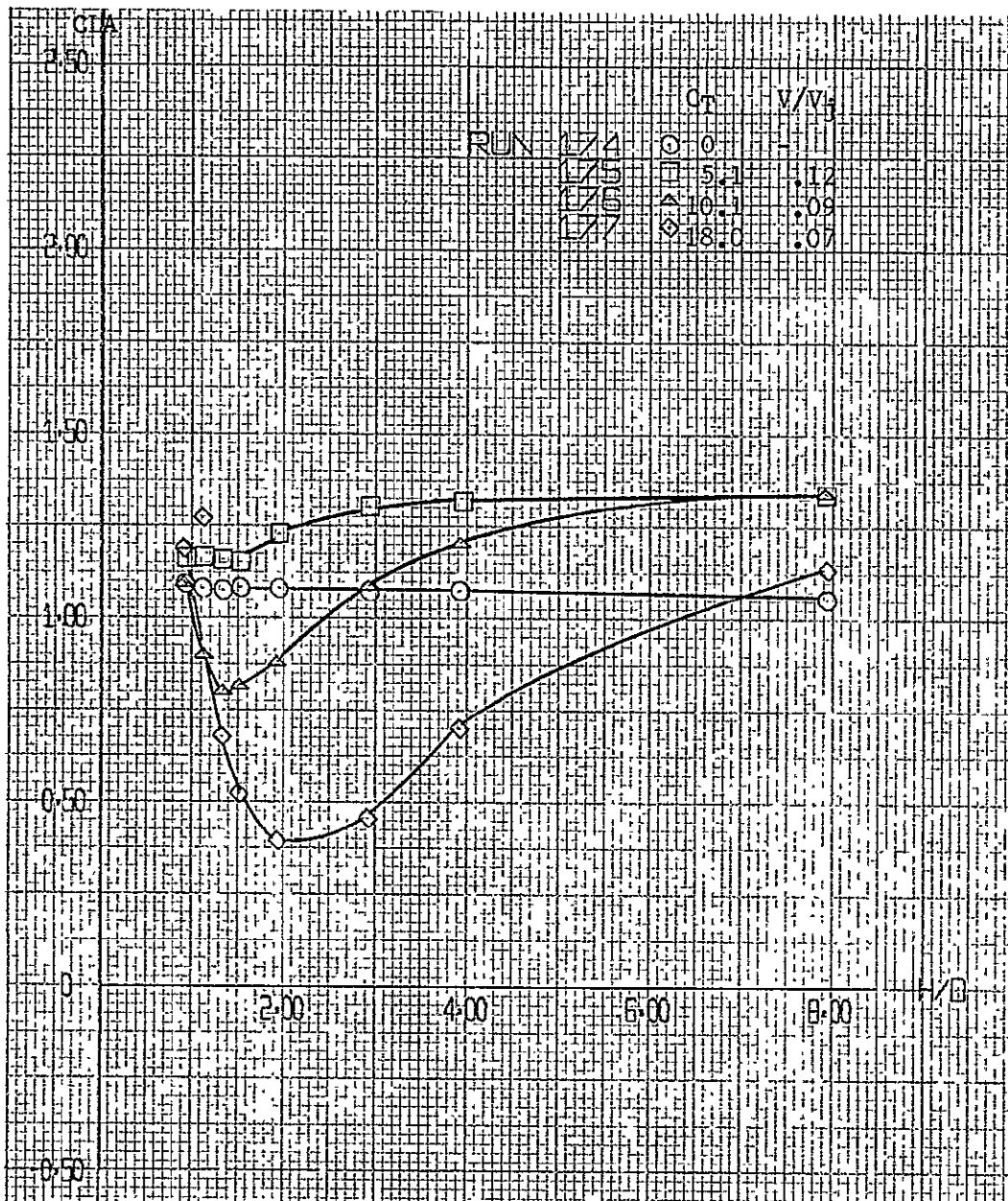


Figure A-89. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{Nose} = 80^\circ$, $\delta_{NAft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$

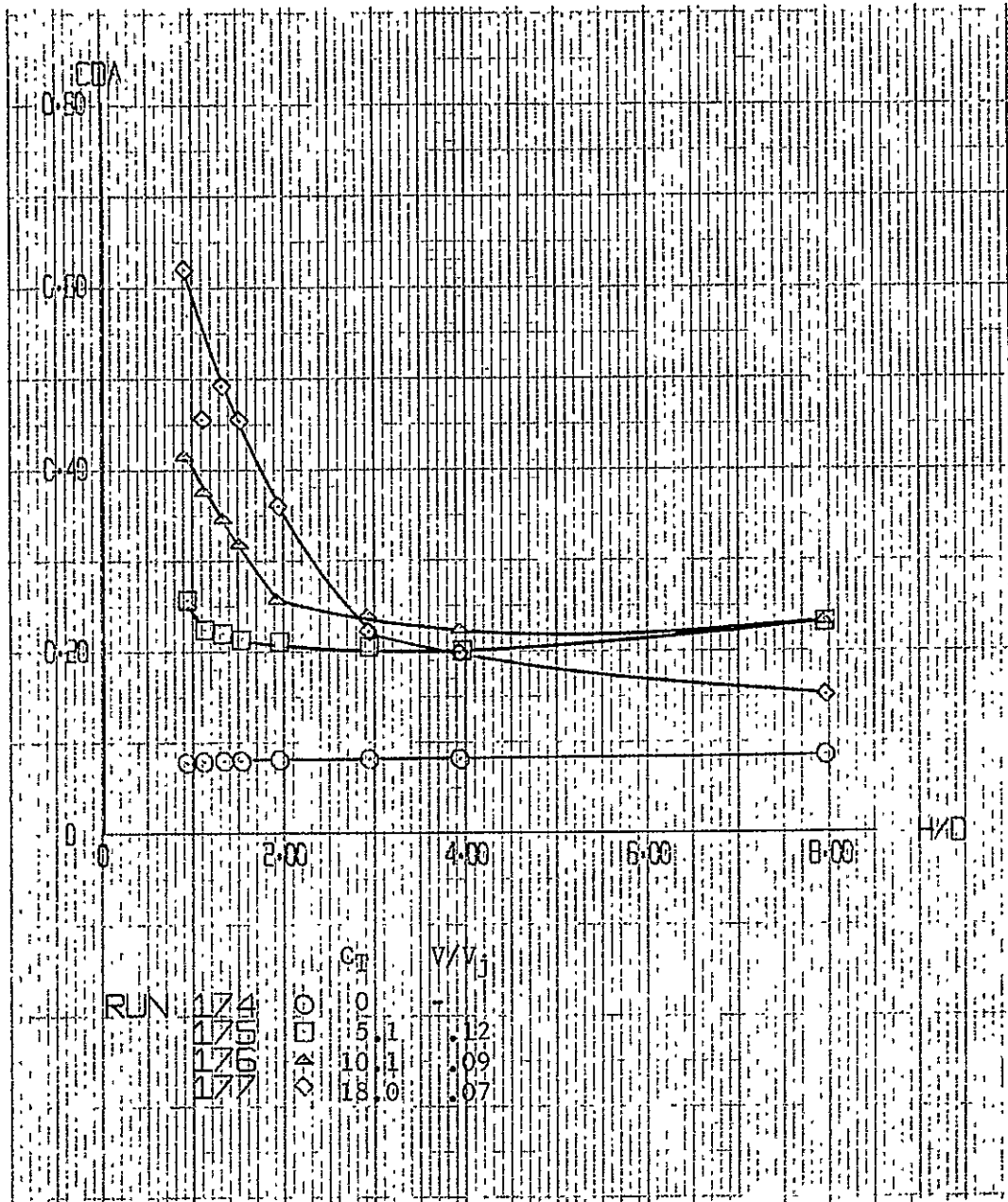


Figure A-89. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{Nose} = 80^\circ$, $\delta_{NAft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

ORIGINAL PAGE IS
OF POOR QUALITY

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

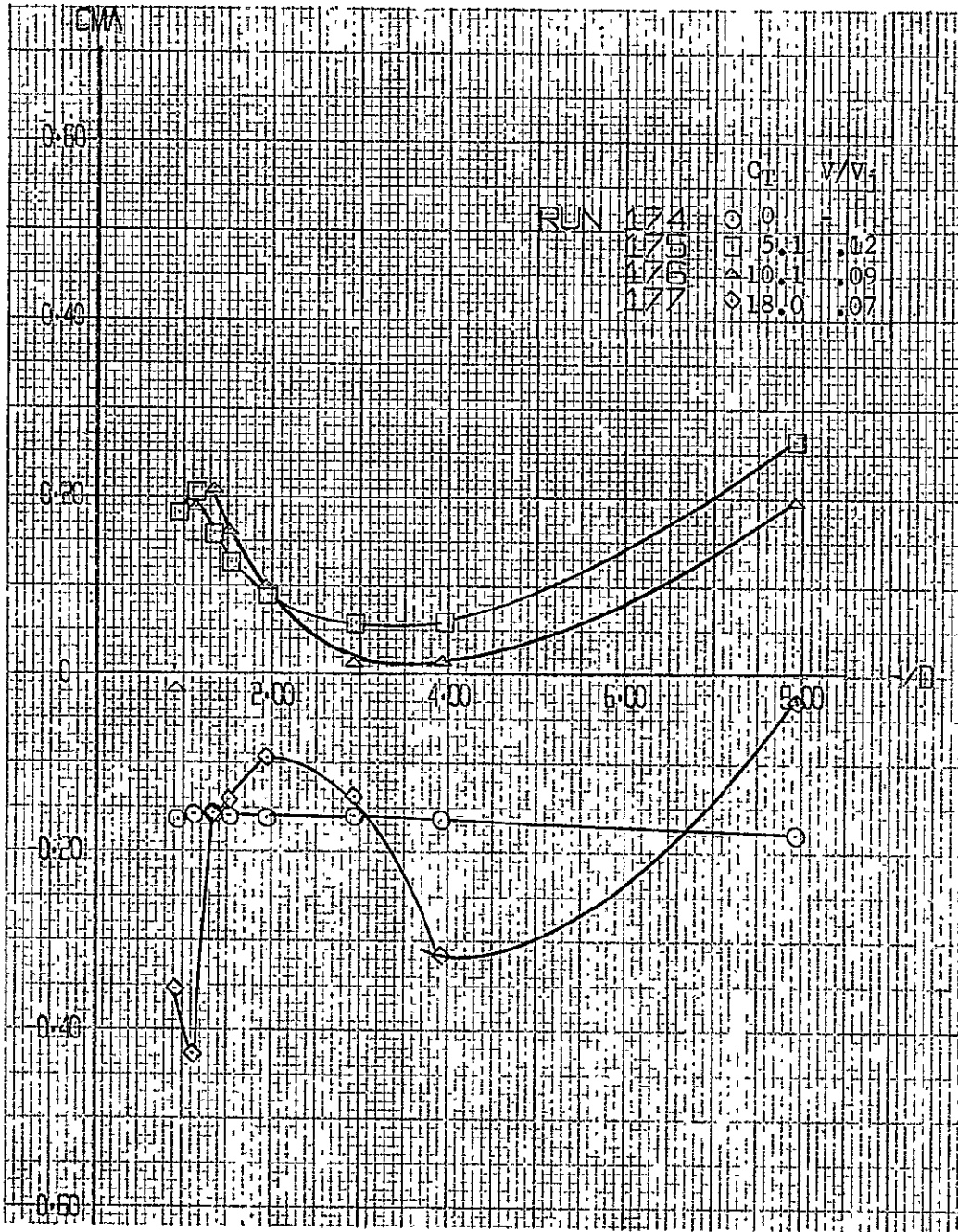


Figure A-89. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta N_{Nose} = 80^\circ$; $\delta N_{Aft} = 90^\circ$; $\alpha = 0^\circ$; $\phi = 0^\circ$ (Continued)

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

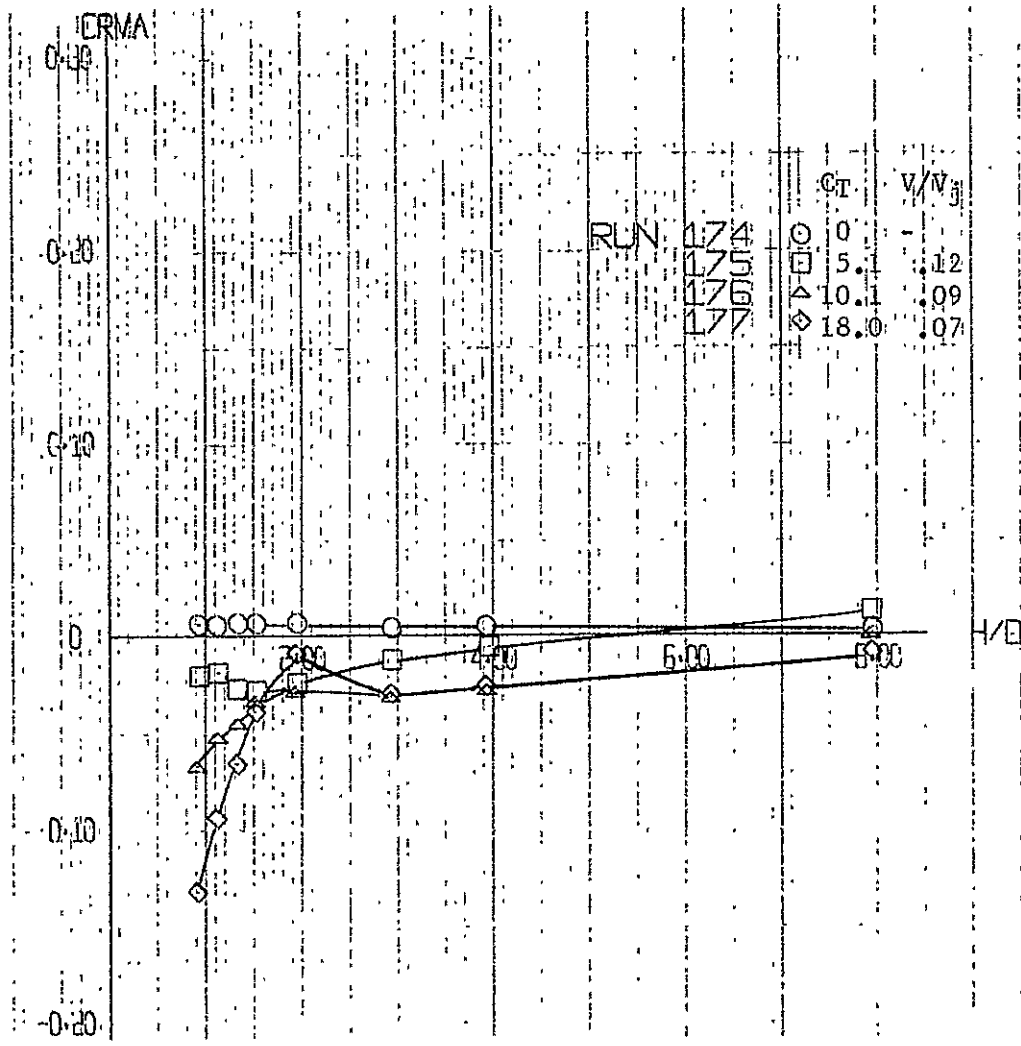


Figure A-89. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{Nose} = 80^\circ$, $\delta_{Aft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 0^\circ$ (Concluded)

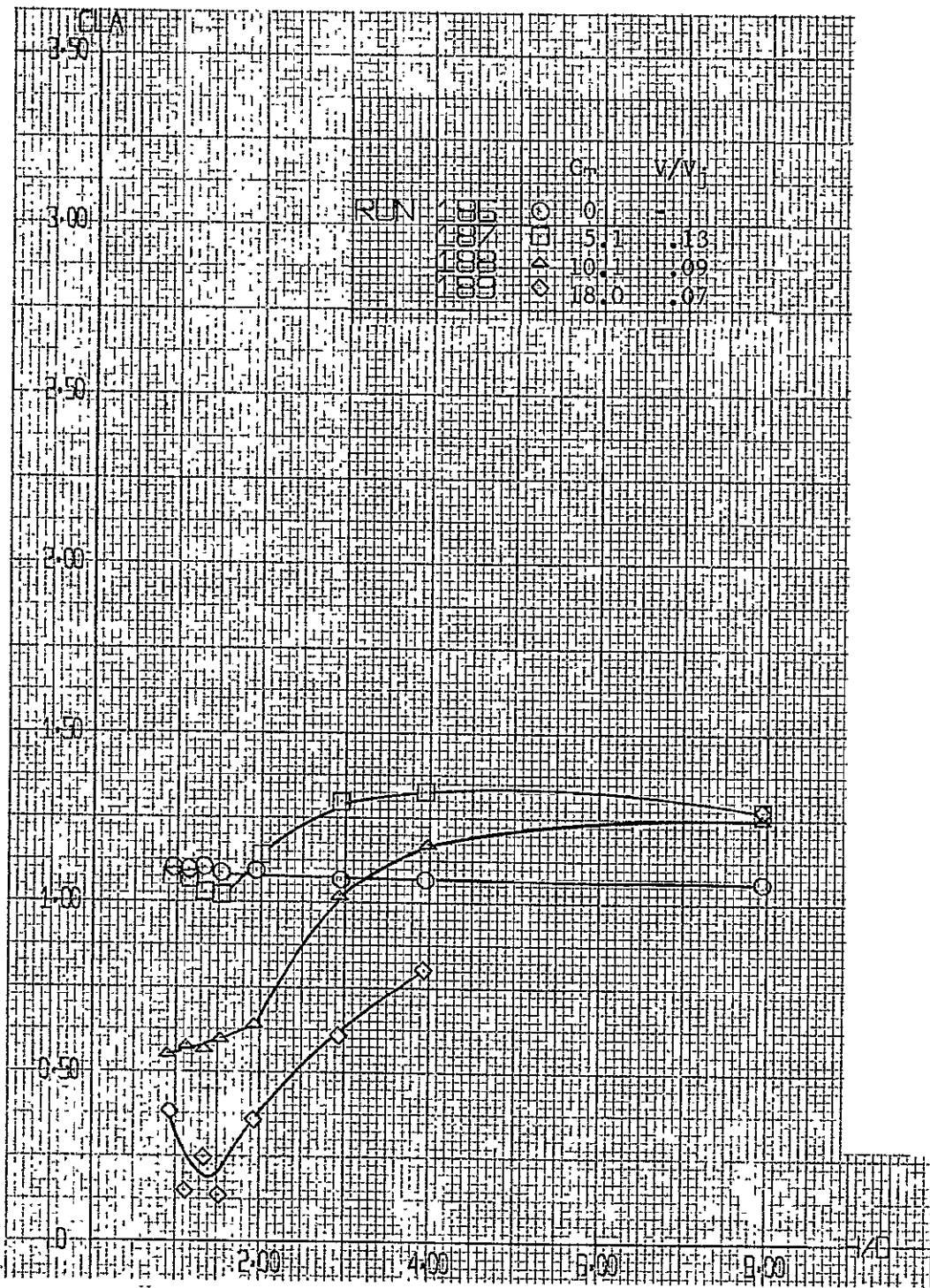


Figure A-90. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = -10^\circ$

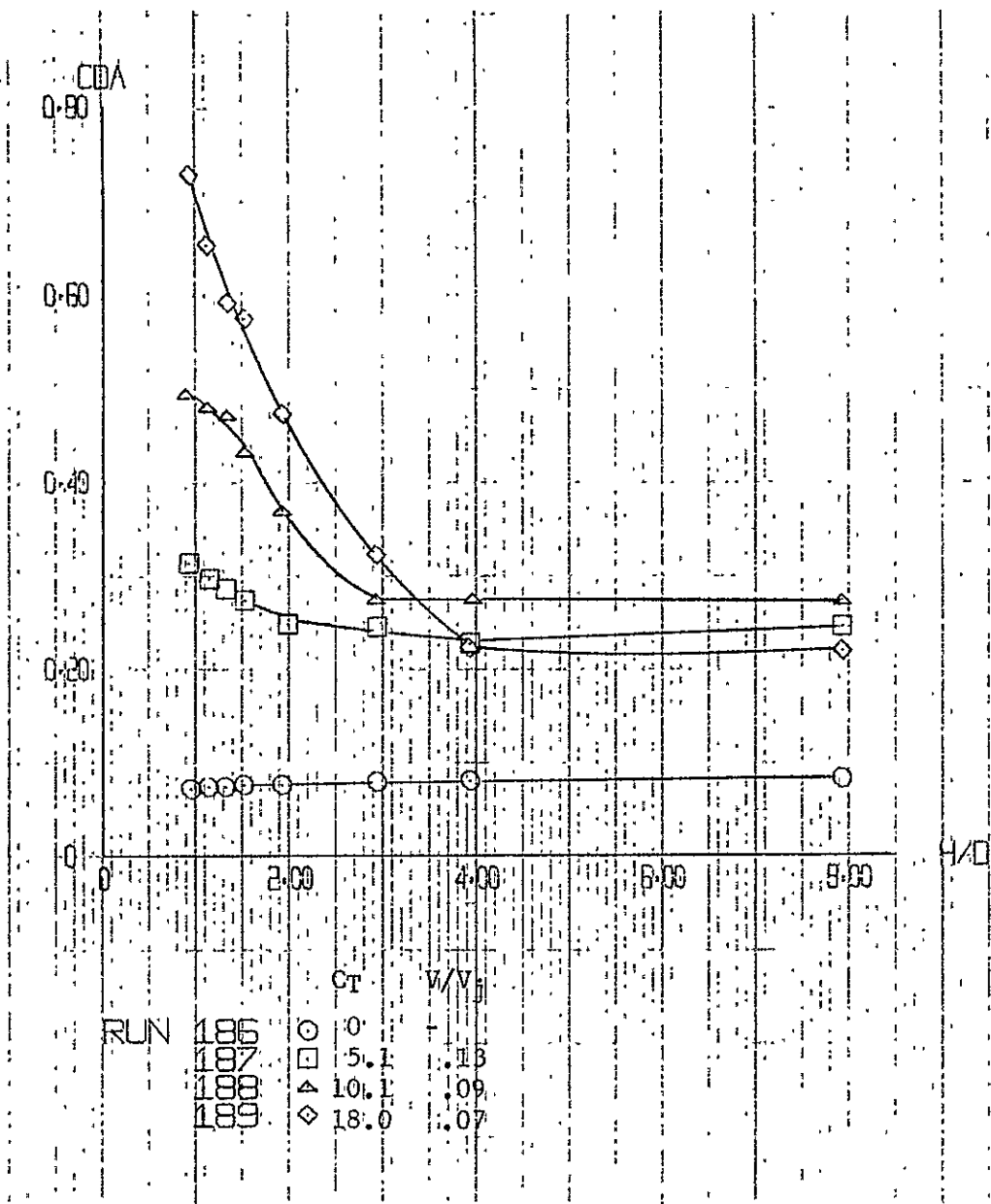


Figure A-90. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = -10^\circ$ (Continued)

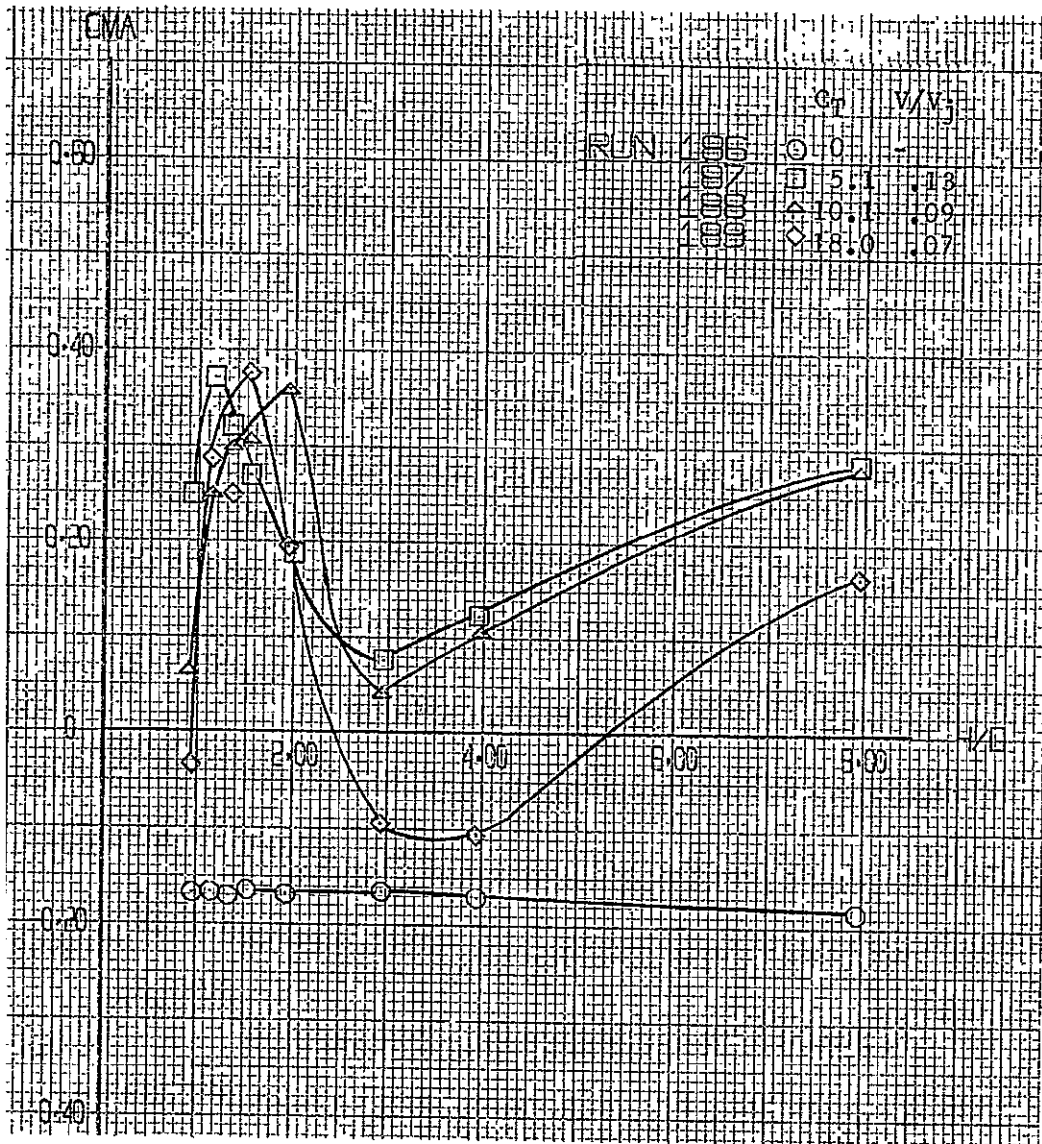


Figure A-90. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{Nose} = 80^\circ$, $\delta_{NAft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = 10^\circ$ (Continued)

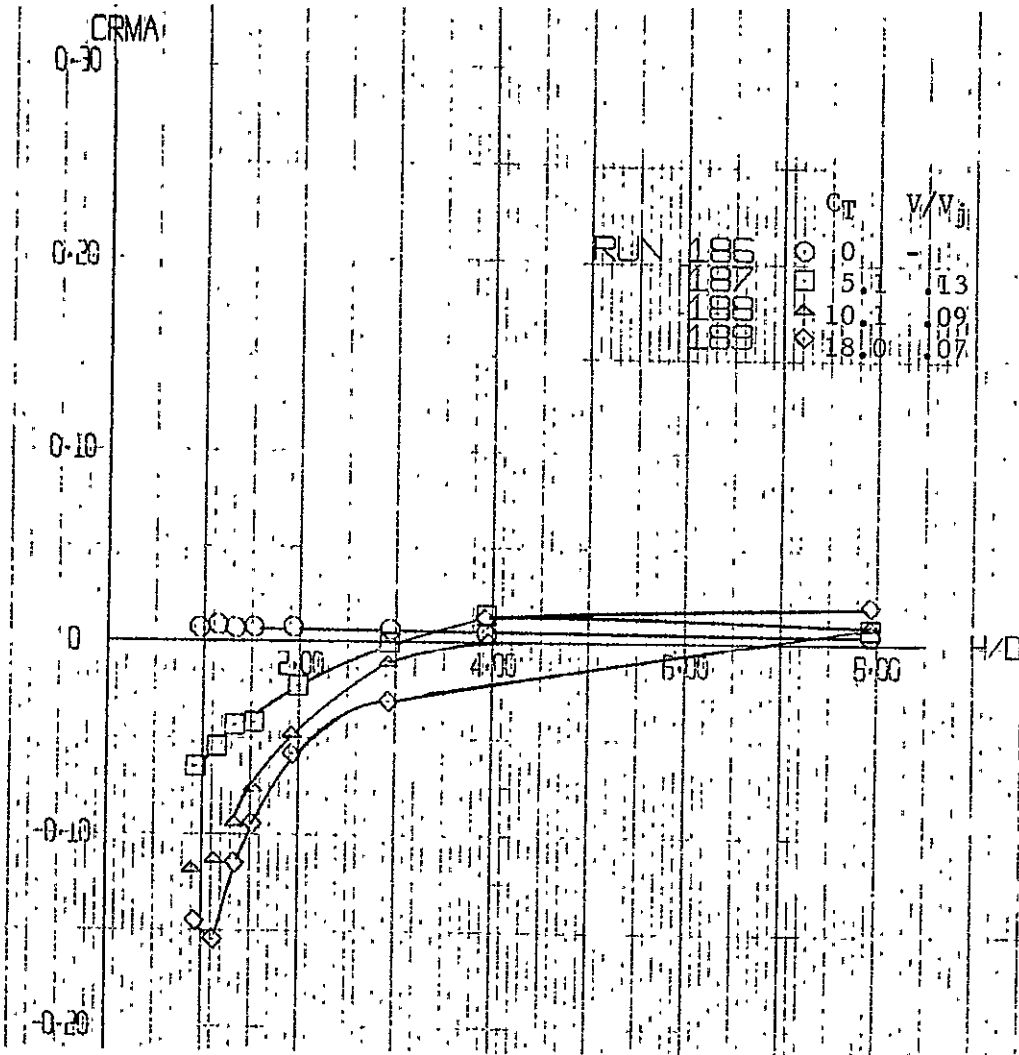


Figure A-90. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{Nose} = 80^b$, $\delta_{Aft} = 90^o$, $\alpha = 0^o$; $\phi = -10^o$ (Concluded)

REPRODUCED PAGE IS
OF POOR QUALITY

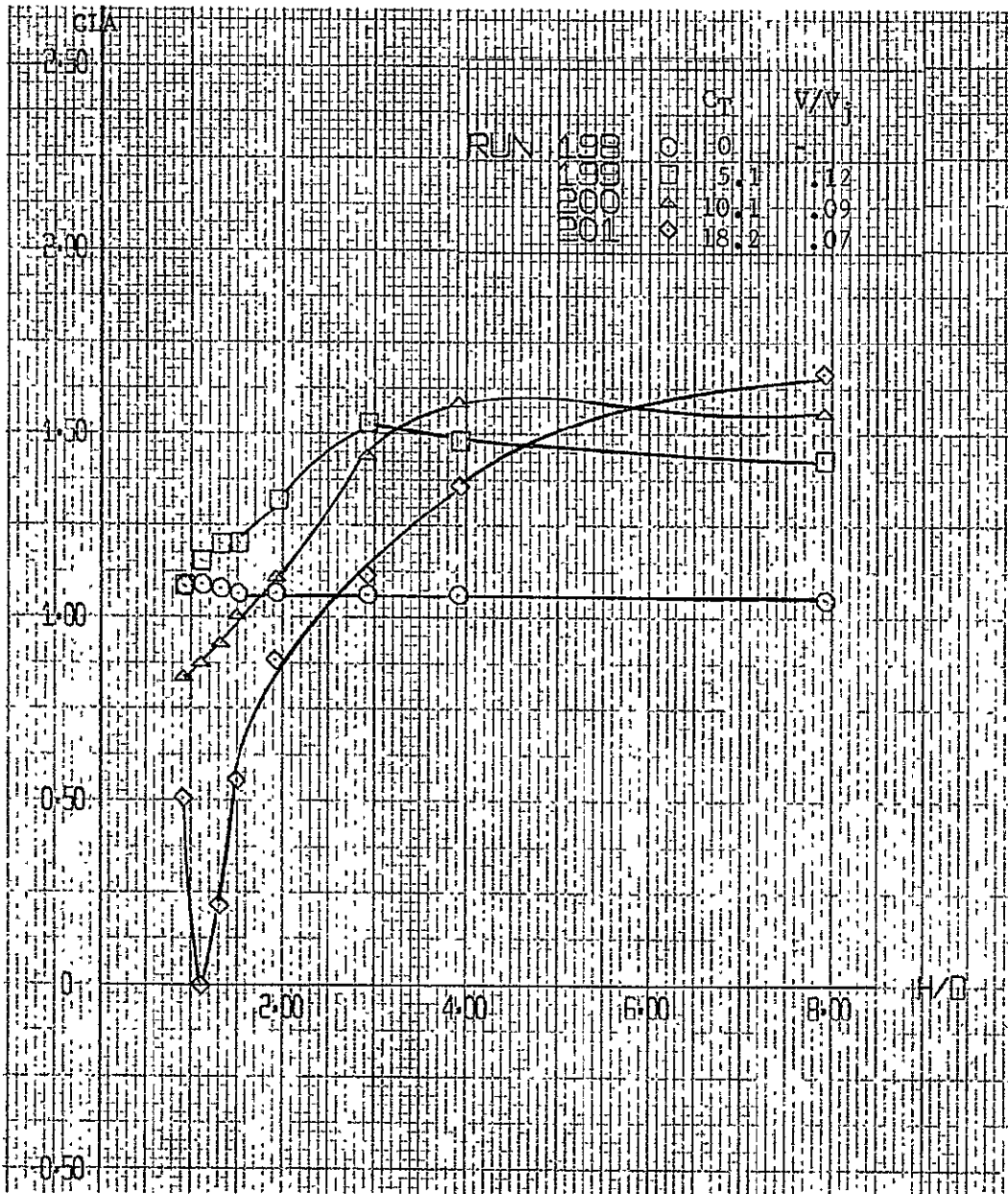


Figure A-91. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$

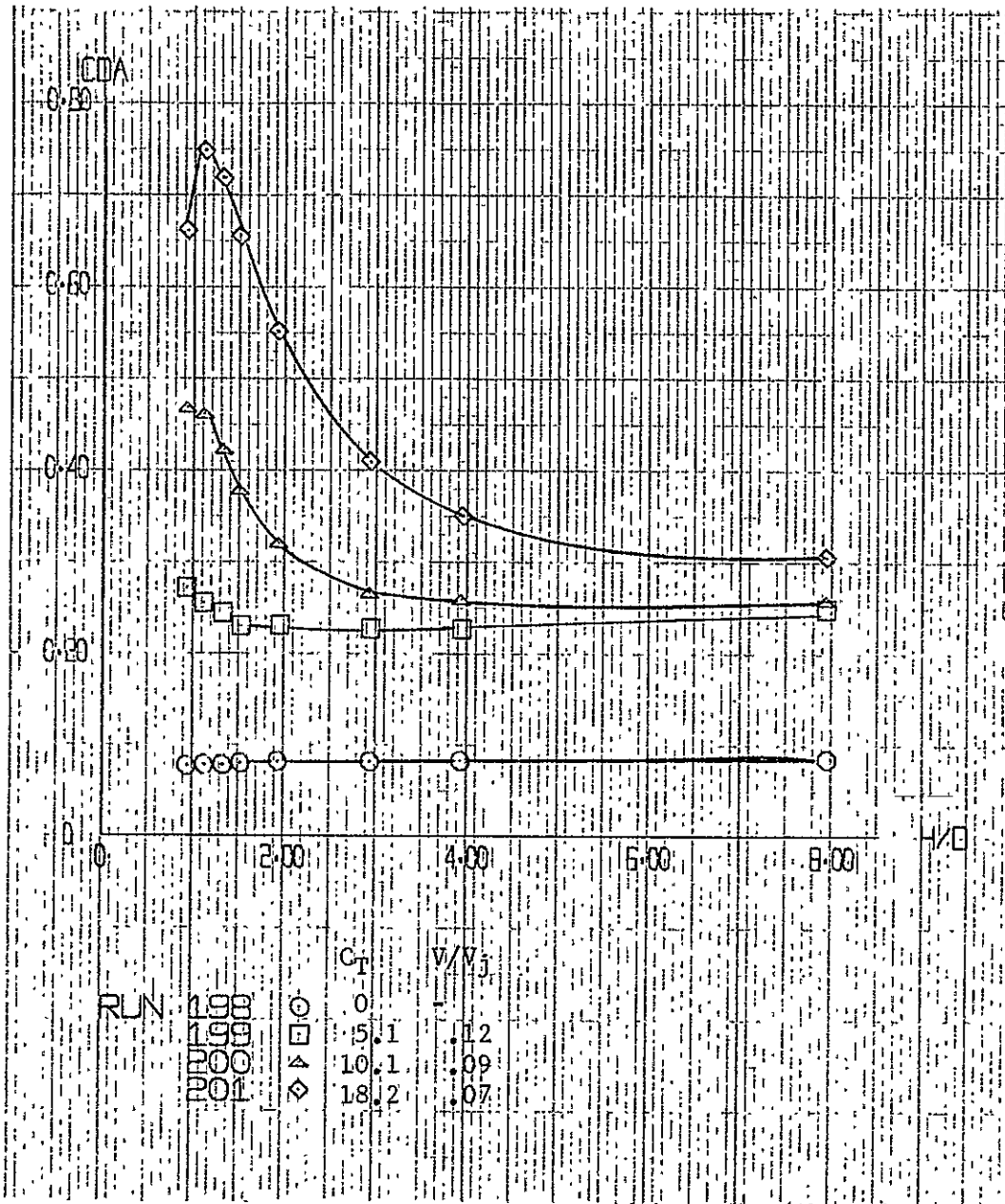


Figure A-91. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{Nose} = 80^\circ$, $\delta_{NAft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$ (Continued)

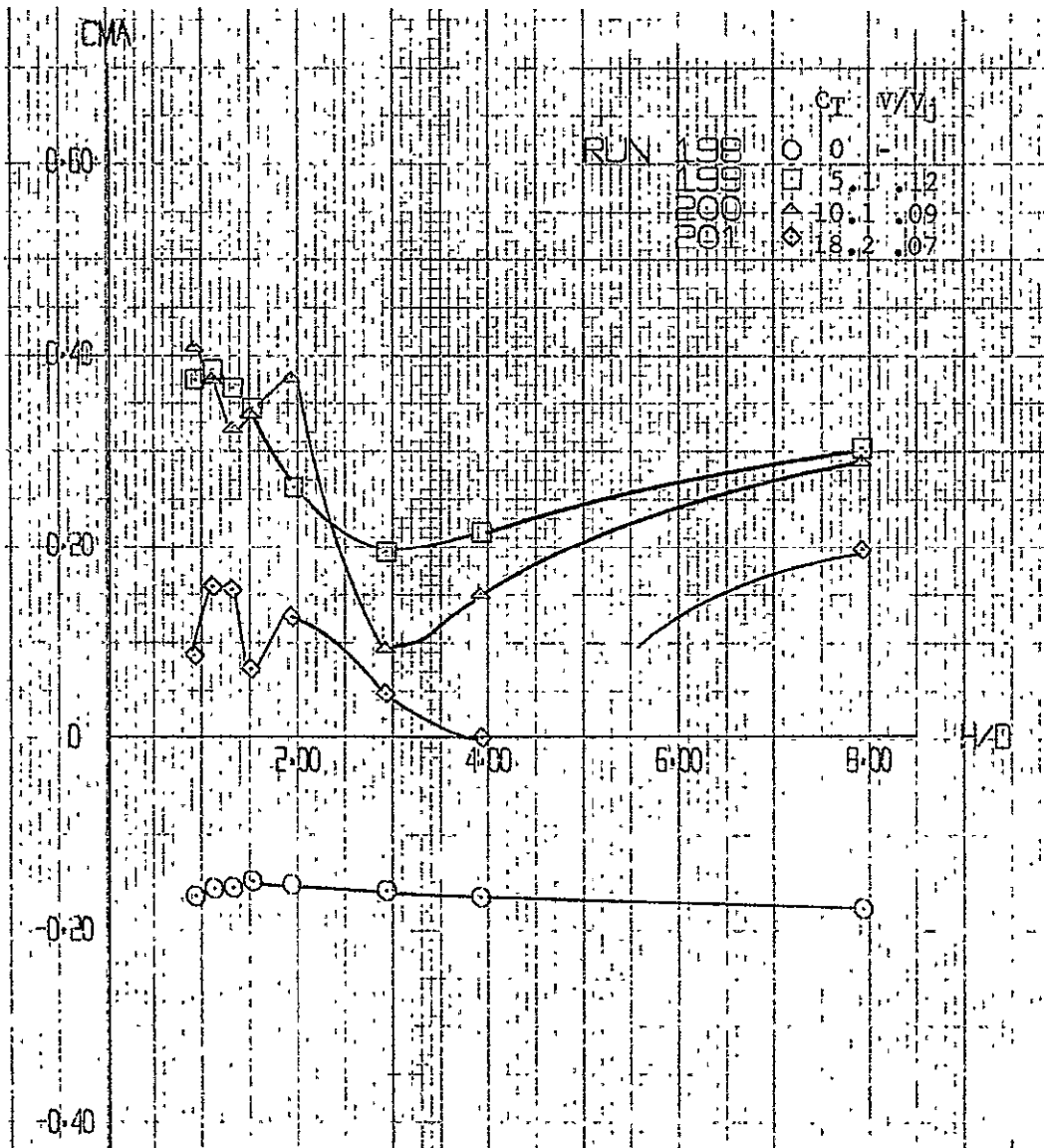


Figure A-91. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{Nose} = 80^\circ$, $\delta_{NAft} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$ (Continued)

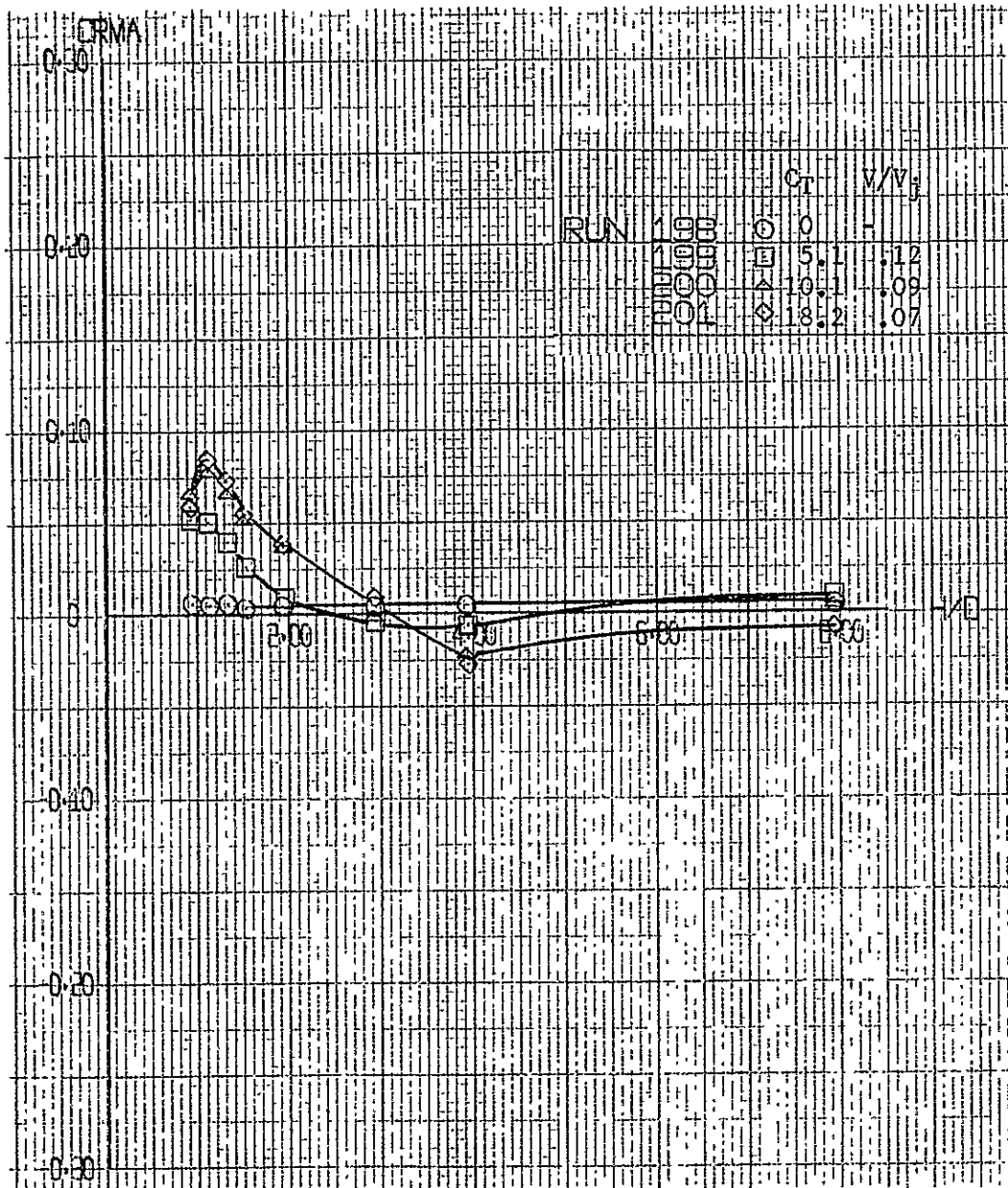


Figure A-91. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4; $\delta_{N_{Nose}} = 80^\circ$, $\delta_{N_{Aft}} = 90^\circ$, $\alpha = 0^\circ$; $\phi = +10^\circ$ (Concluded)

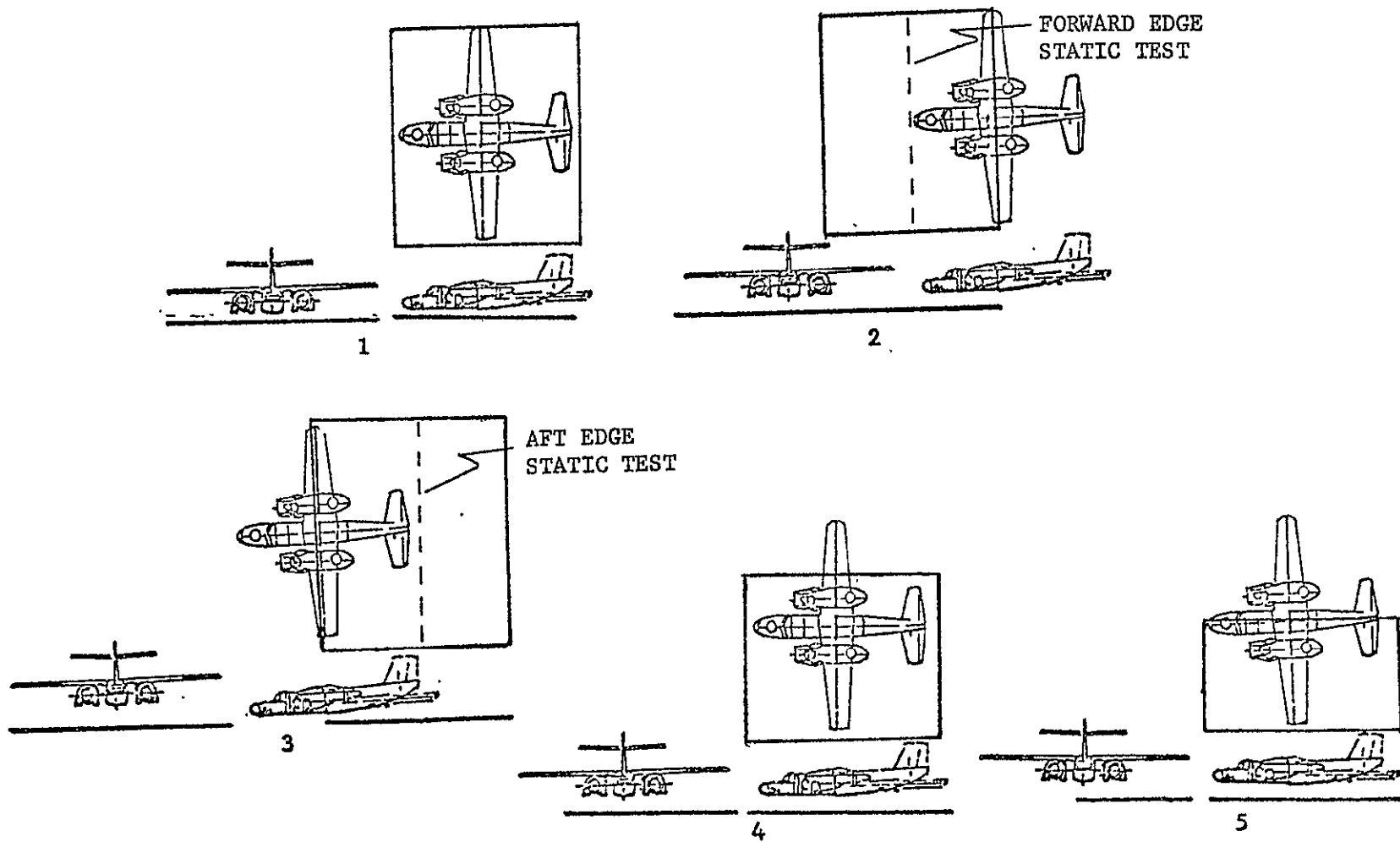


Figure A-92. Ground Board Configurations

LOW SPEED WIND TUNNEL TEST
OF GROUND PROXIMITY AND DECK EDGE
EFFECTS ON A LIFT-CRUISE-FAN V/STOL
CONFIGURATION

Vearl R. Stewart
Rockwell International
Columbus Aircraft Division

APPENDIX B - STATIC THRUST STAND DATA

VOLUME II

TO SUMMARY REPORT CR 152247

ORIGINAL PAGE IS
OF POOR QUALITY

LIST OF ILLUSTRATIONS

Figure	Title	Page
B-1	Static Test Data, Four Fan, $\delta_N = 105^\circ$	378
B-2	Static Test Data, Four Fan, $\delta_N = 90^\circ$	398
B-3	Static Test Data, Four Fan, $\delta_N = 80^\circ$	410
B-4	Static Test Data, Four Fan, $\delta_{N_{fwd}} = 30^\circ, \delta_{N_{aft}} = 60^\circ$. .	426
B-5	Static Test Data, Three Fan, $\delta_{N_{nose}} = 80^\circ, \delta_{N_{aft}} = 90^\circ$.	437
B-6	Ground Board Configurations	446

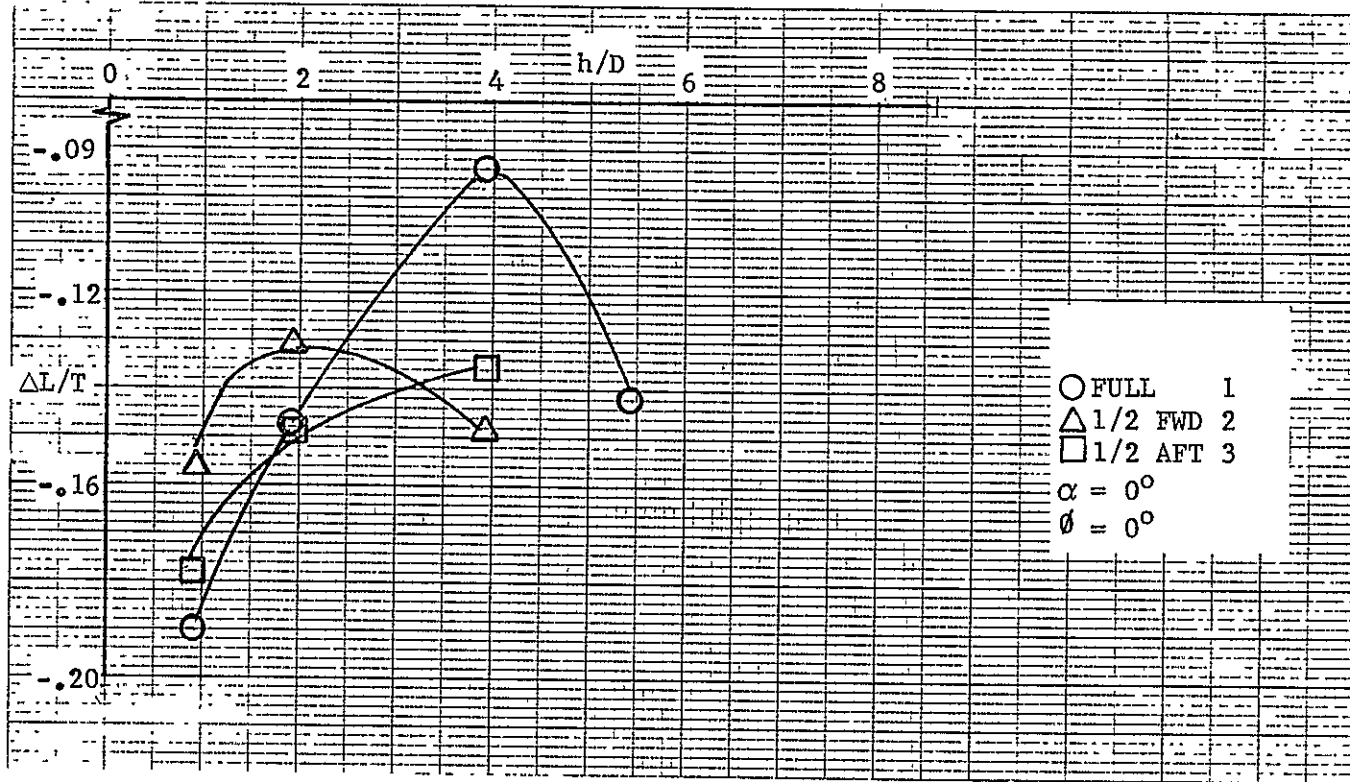


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$

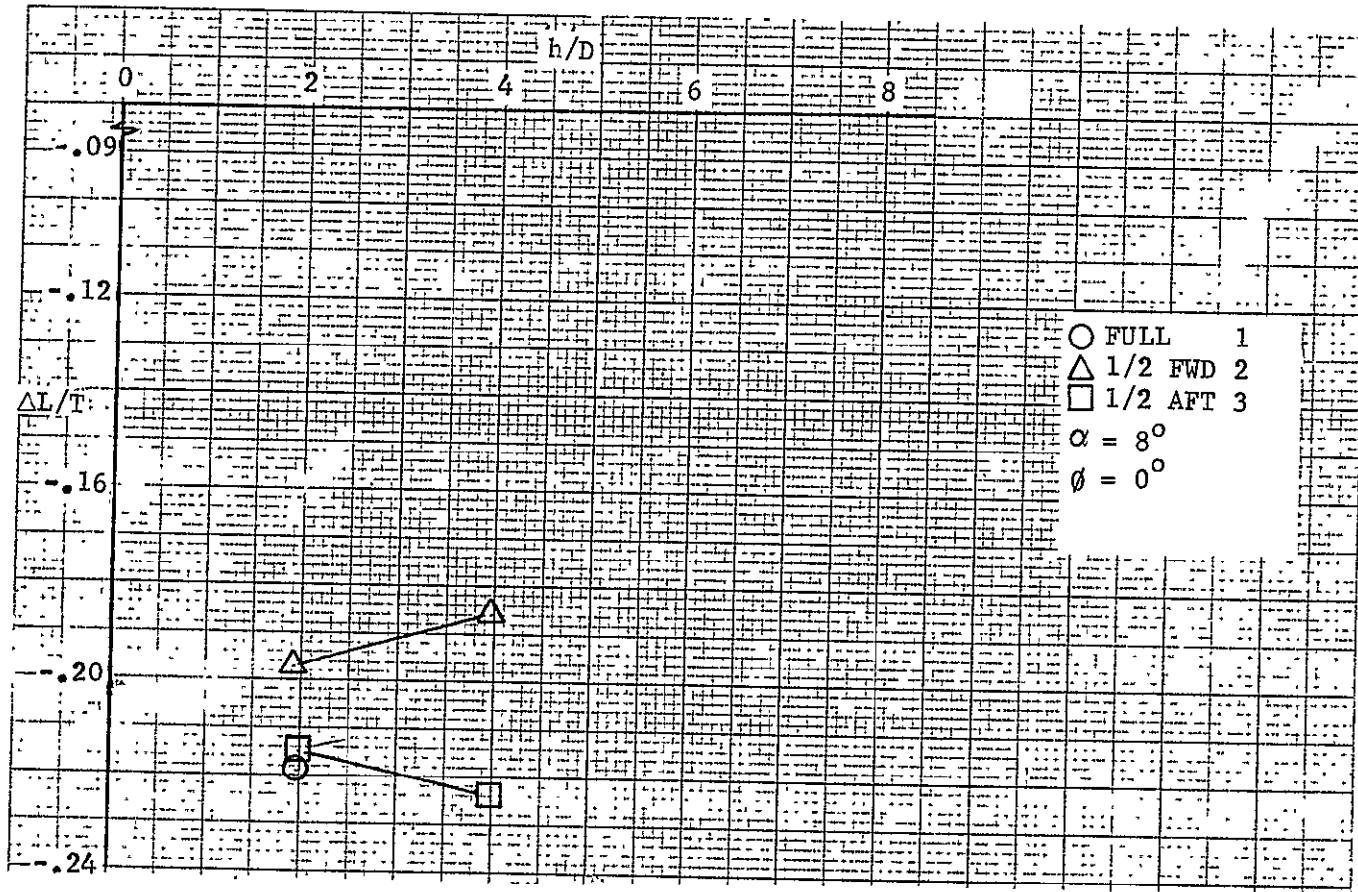


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

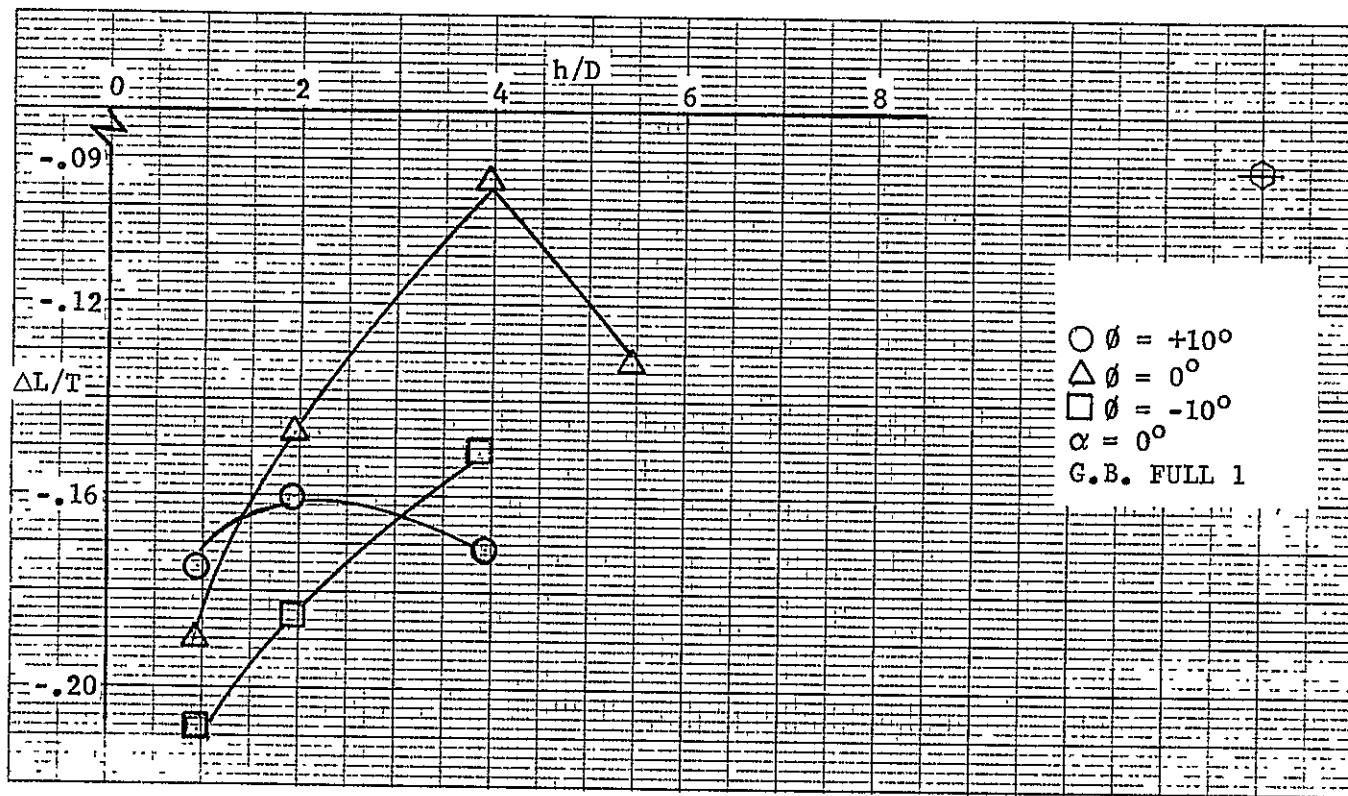


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

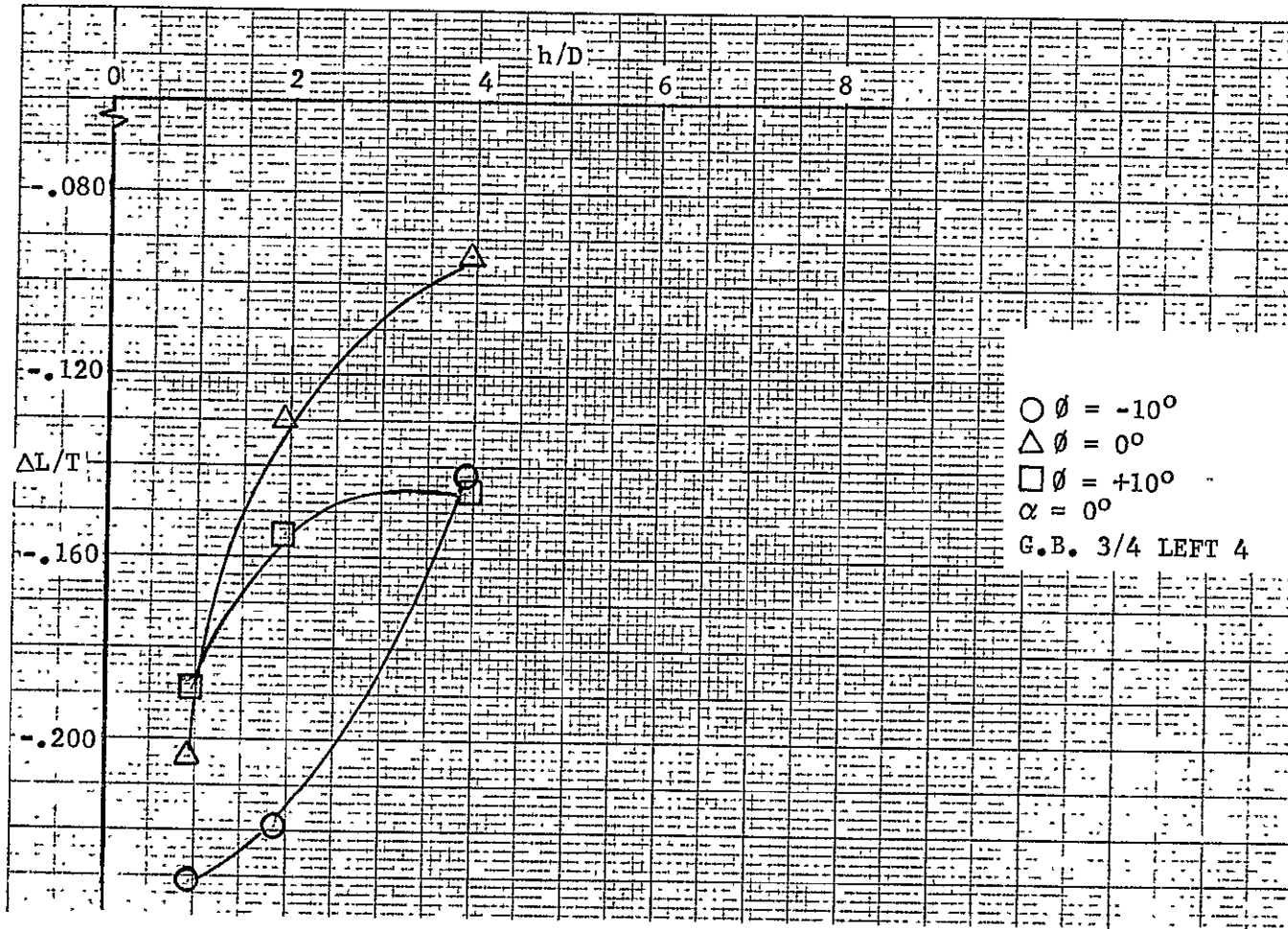


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

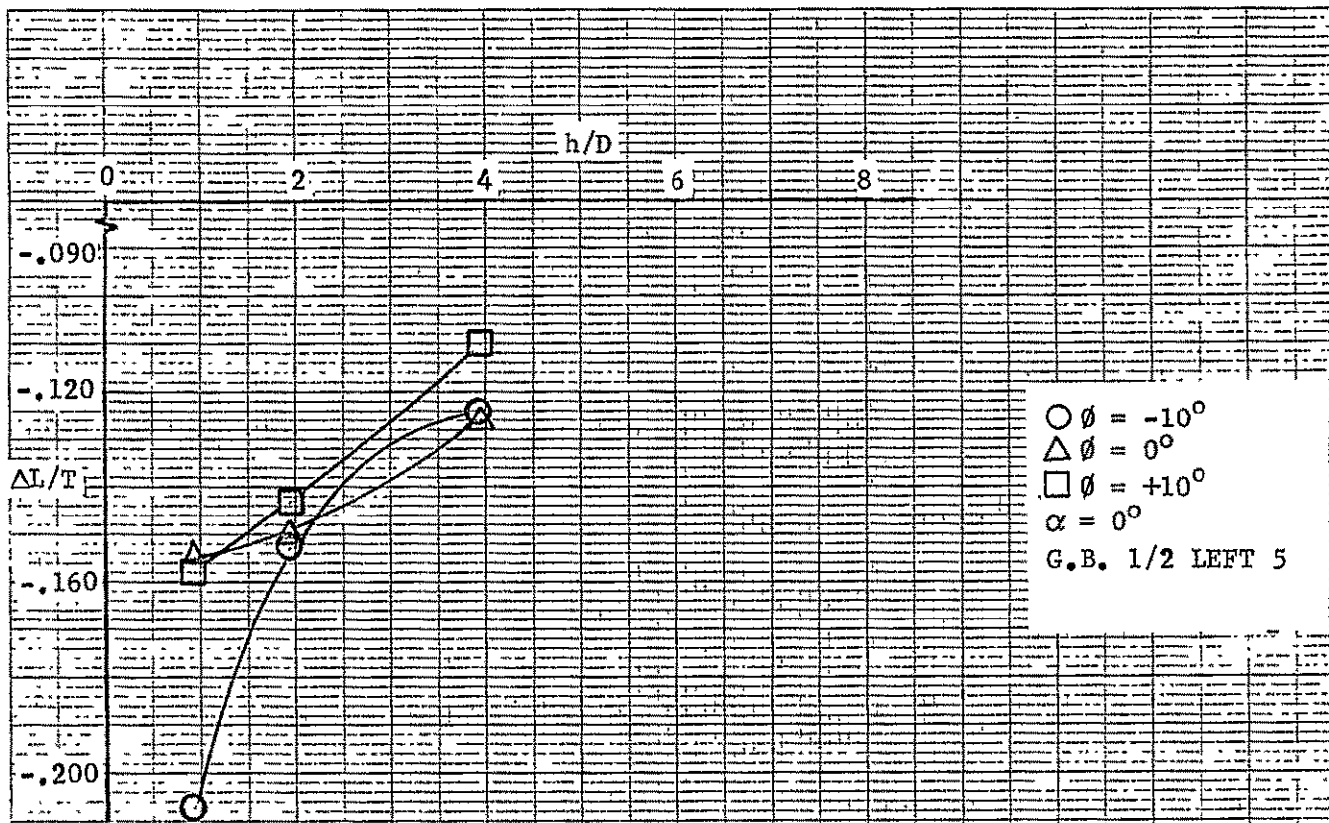


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

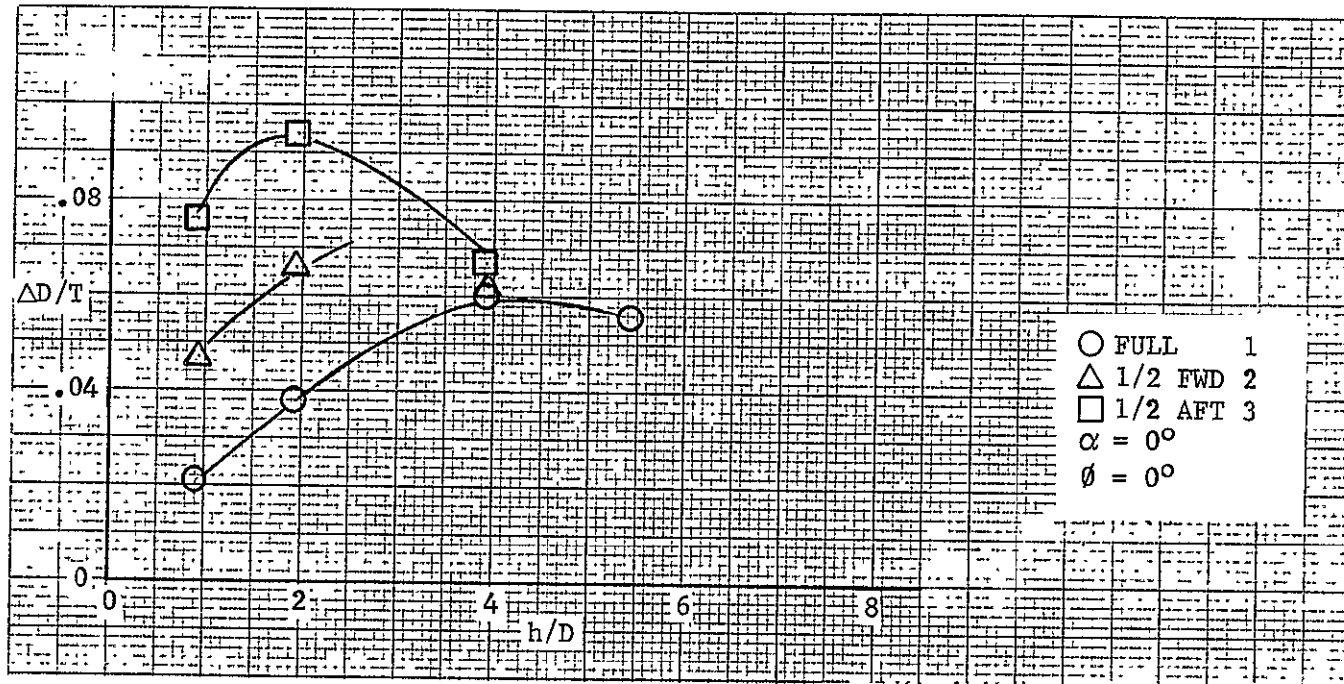


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

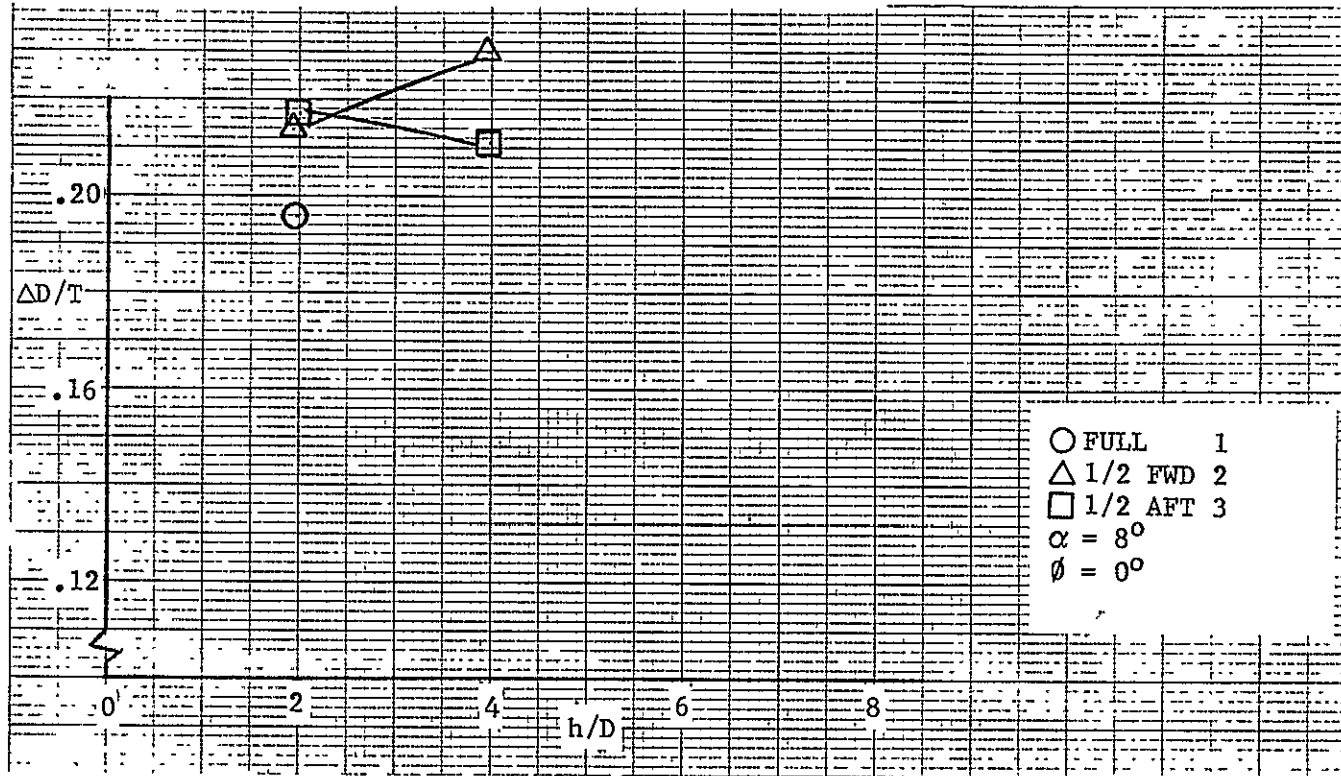


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

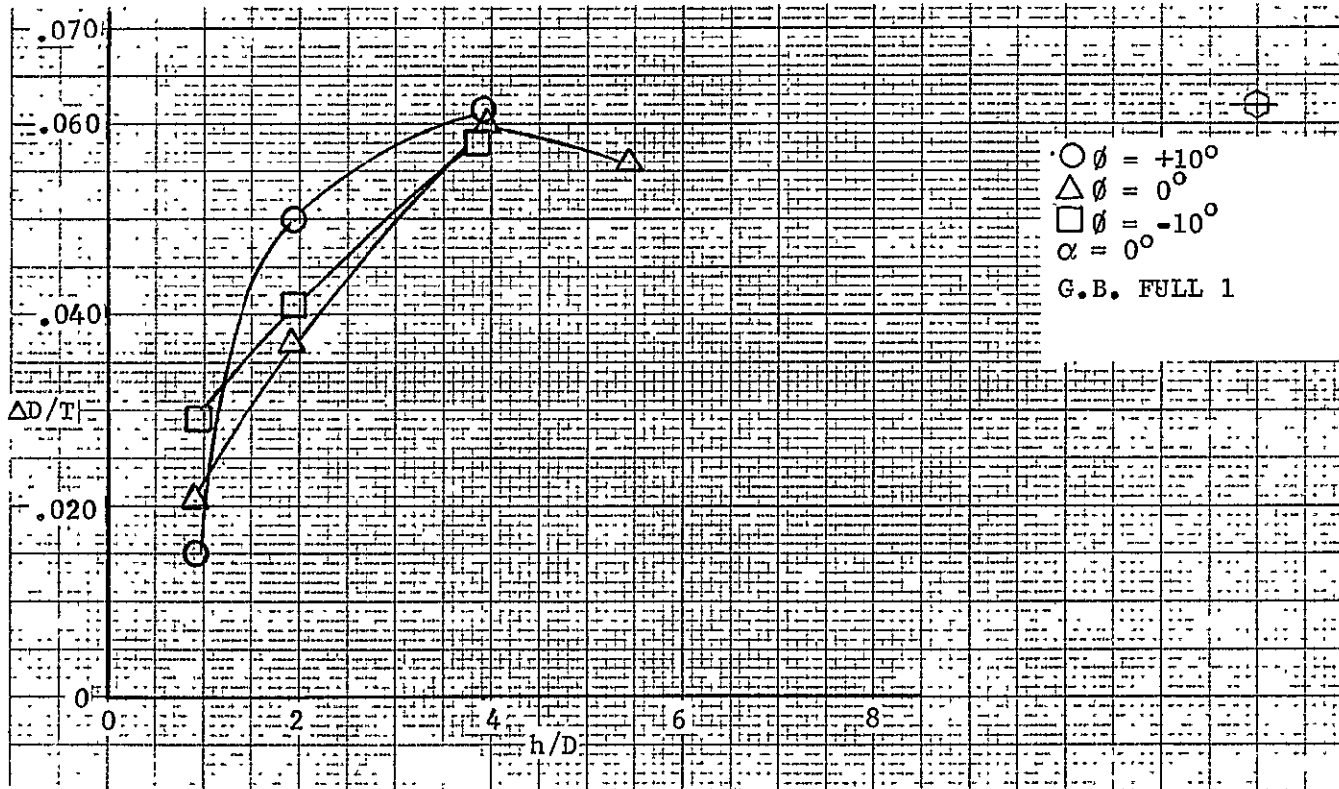


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

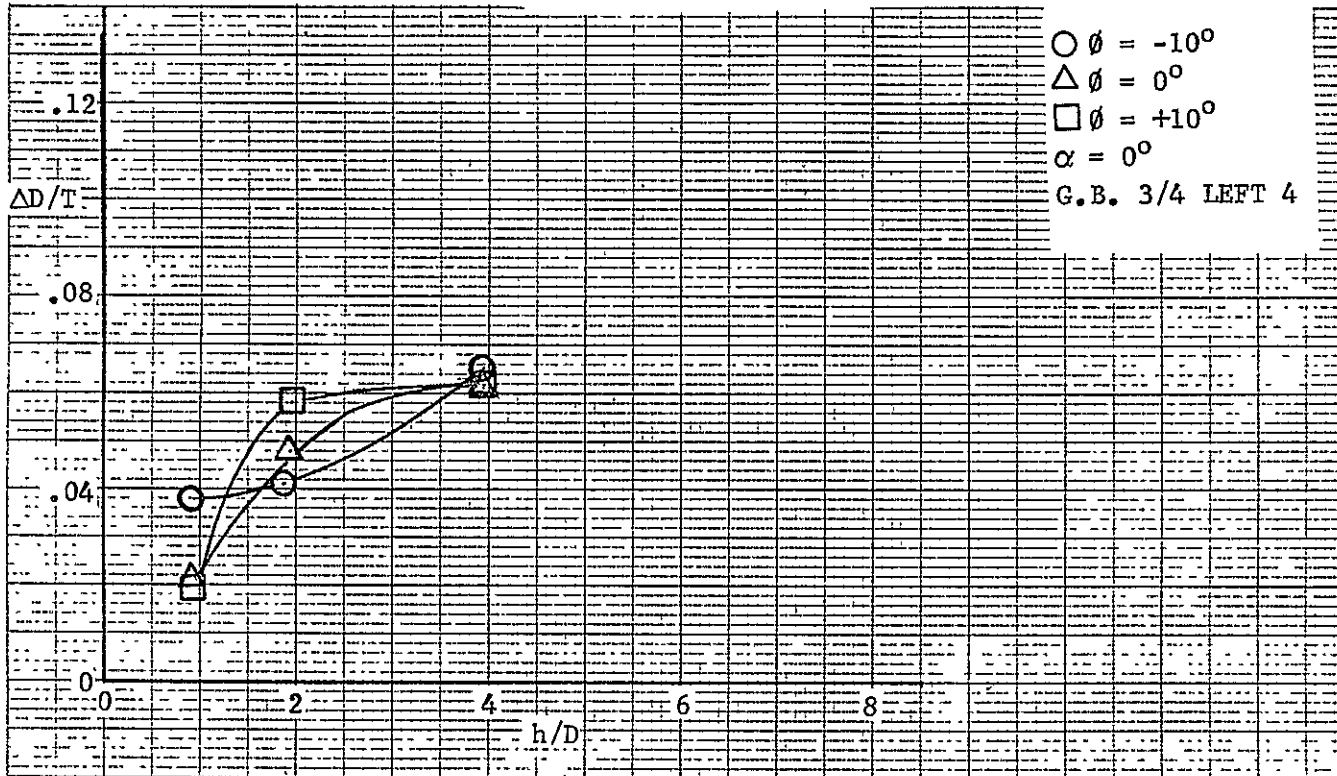


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

C-5

387

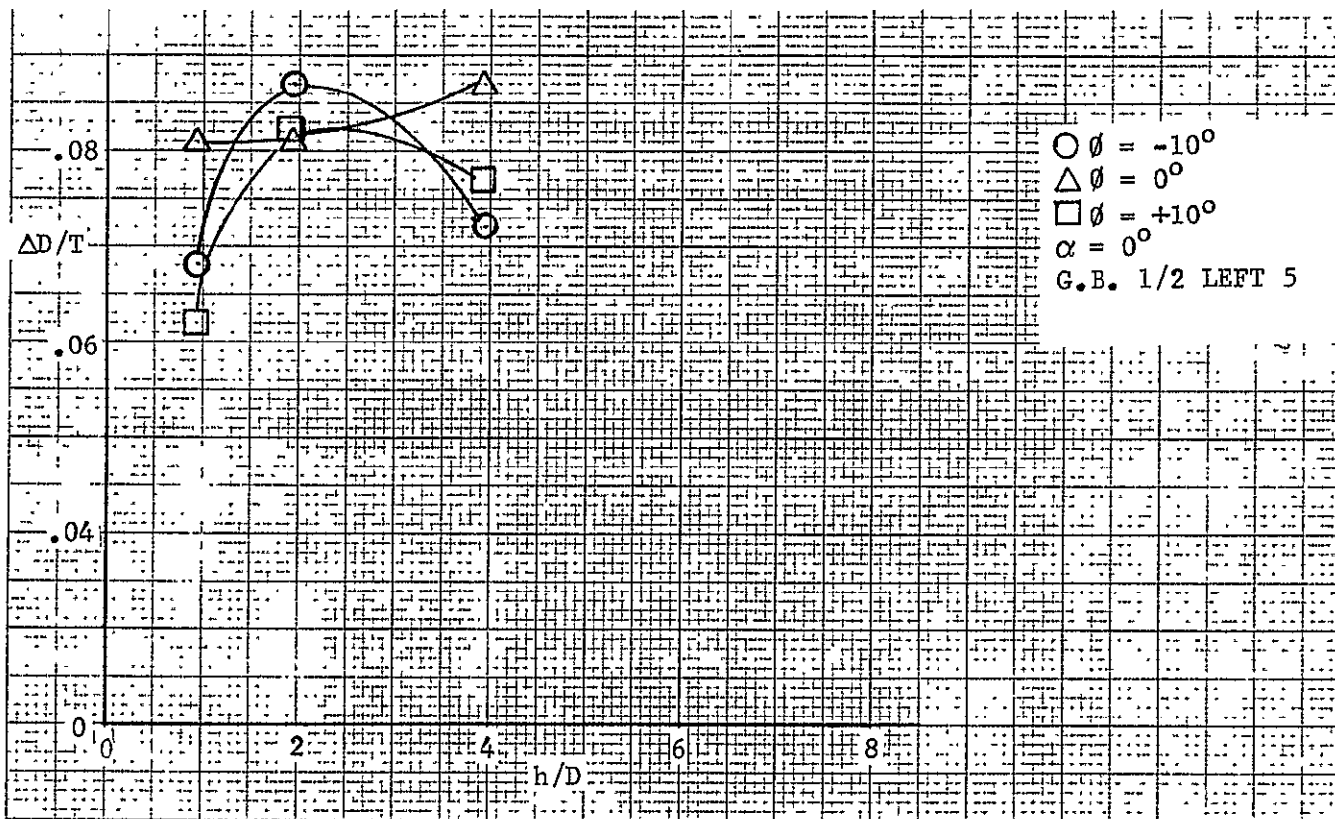


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

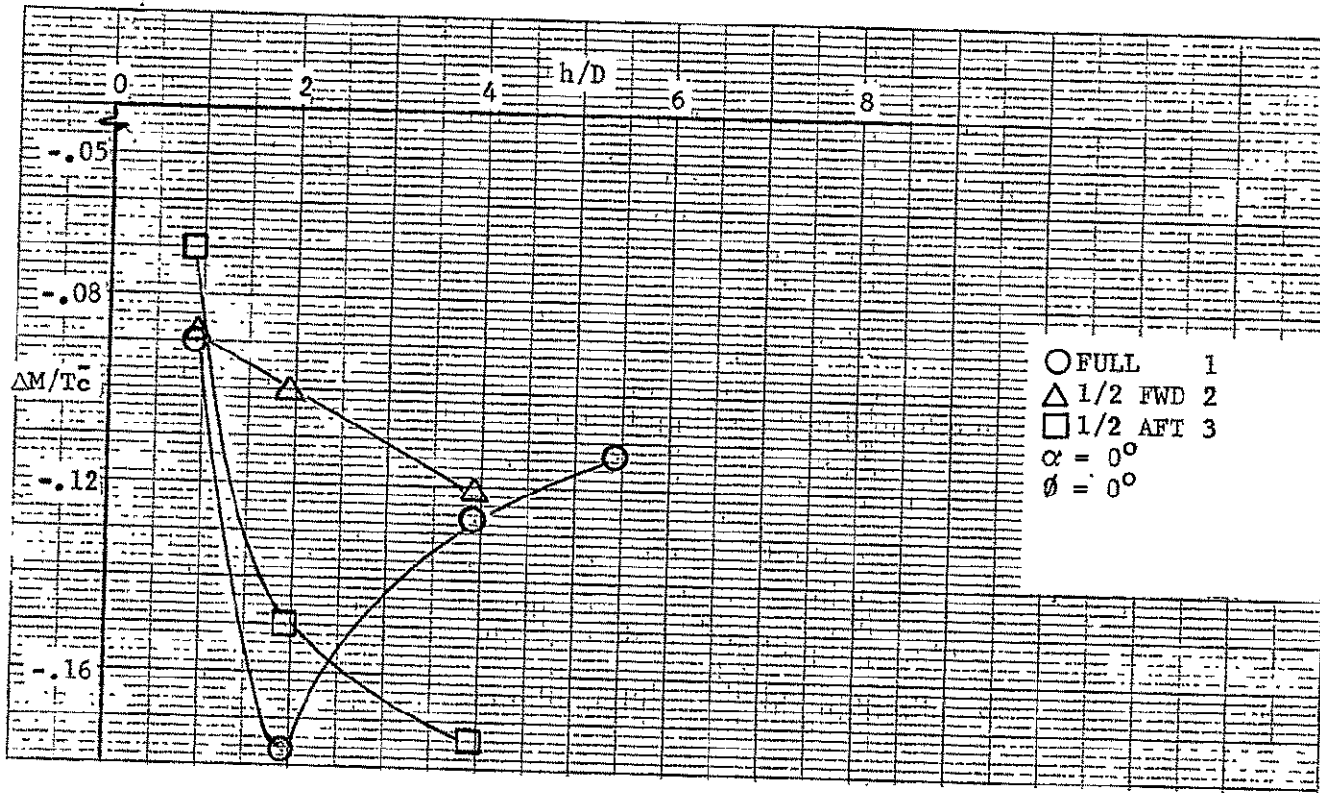


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

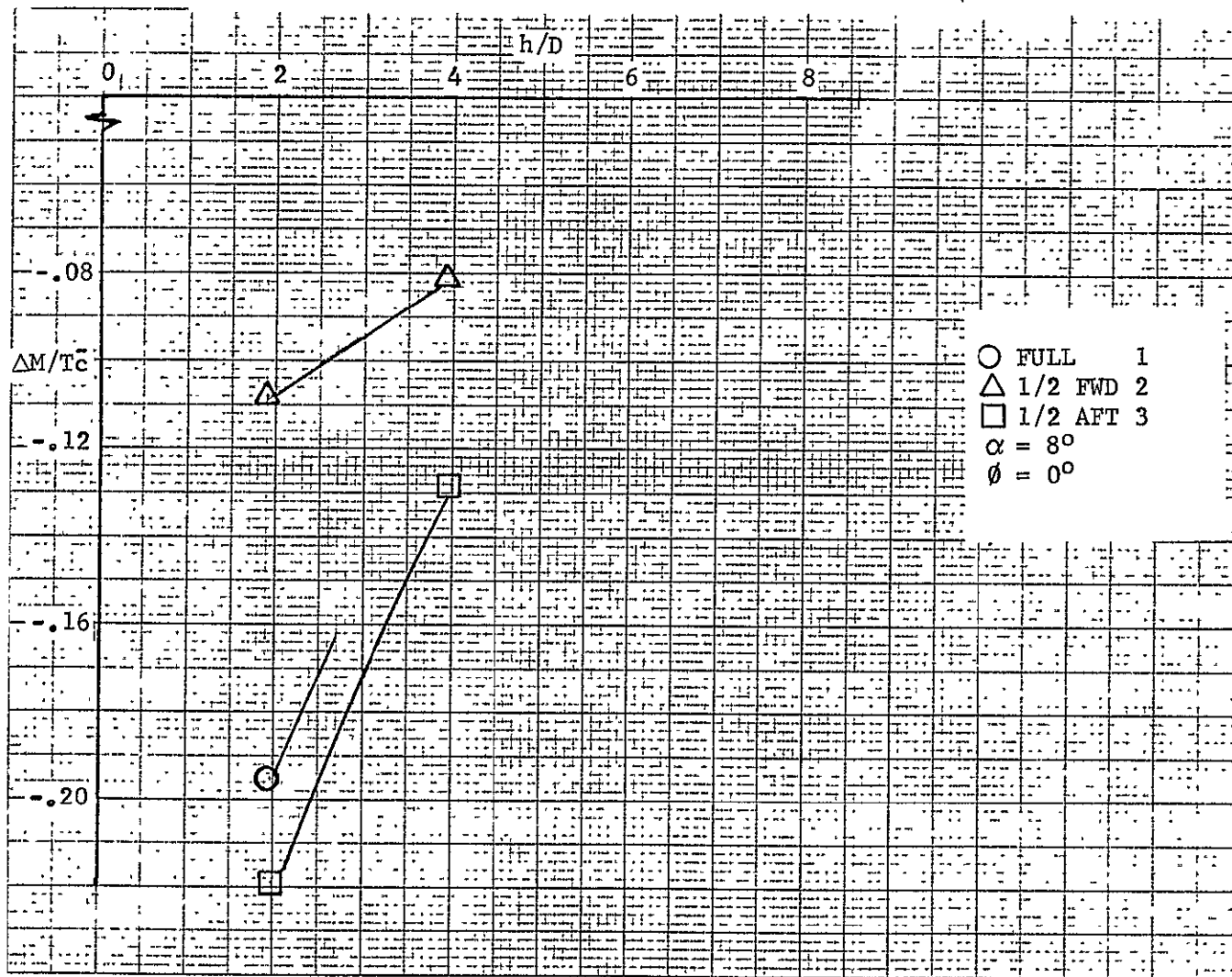


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

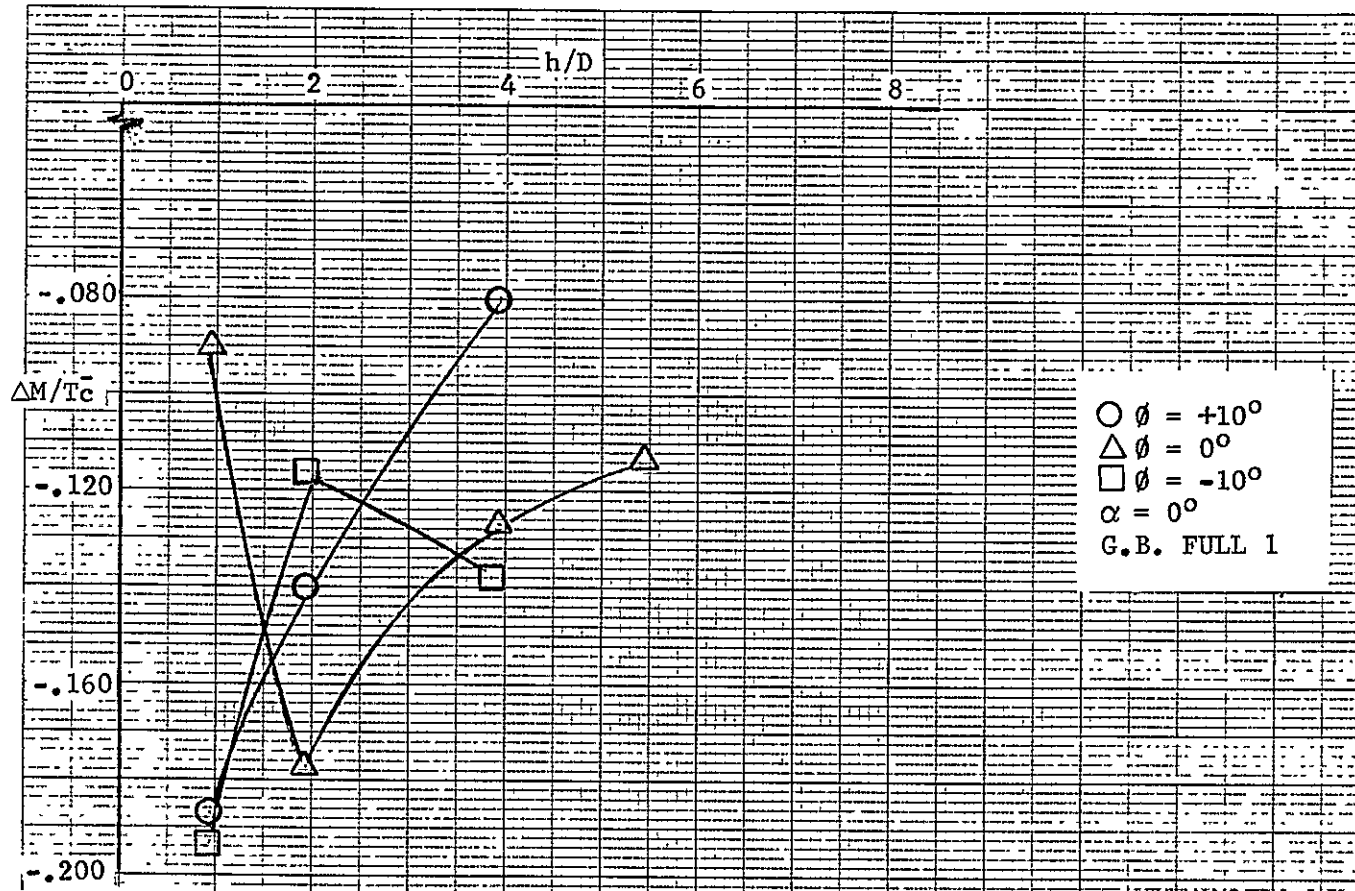


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

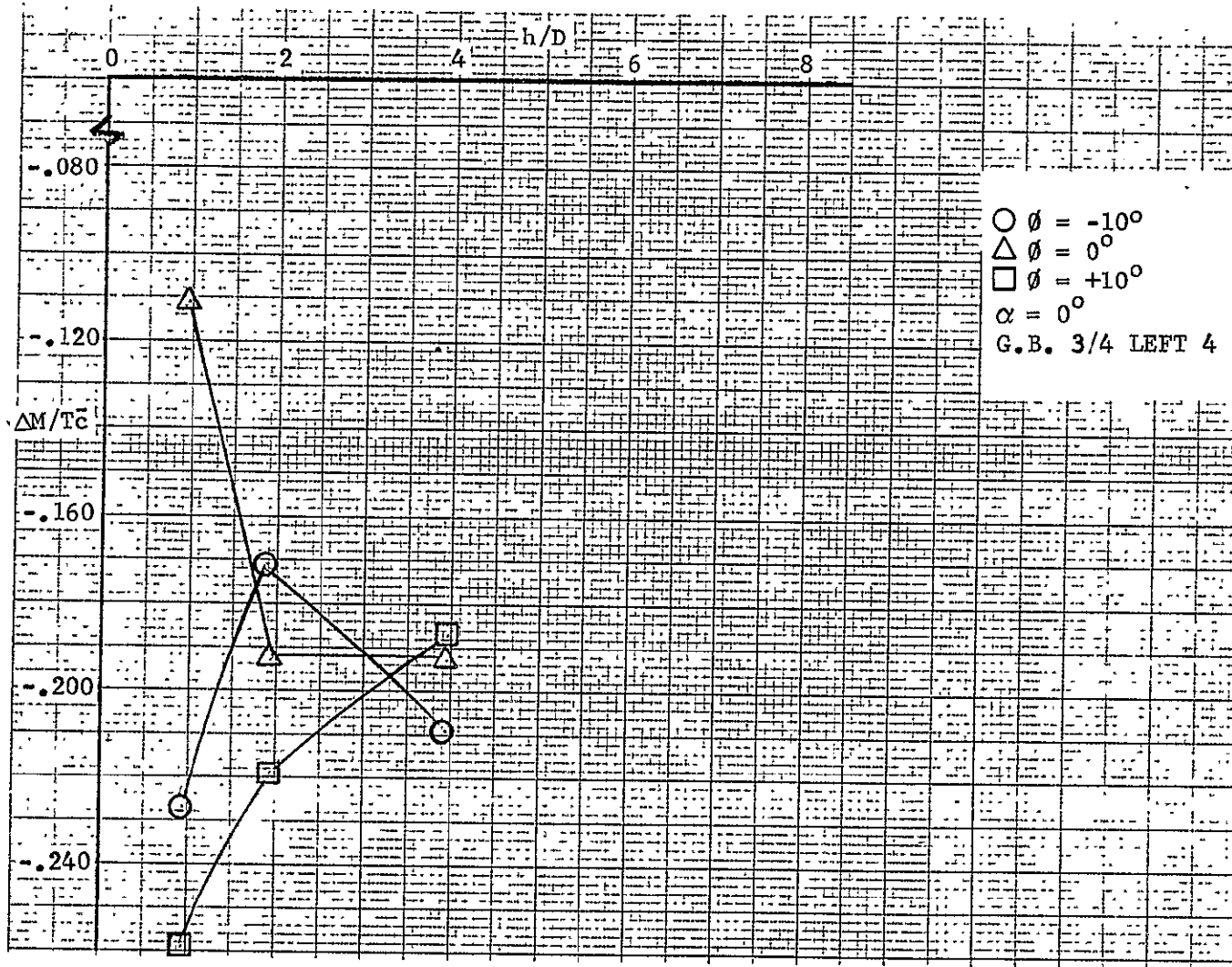


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

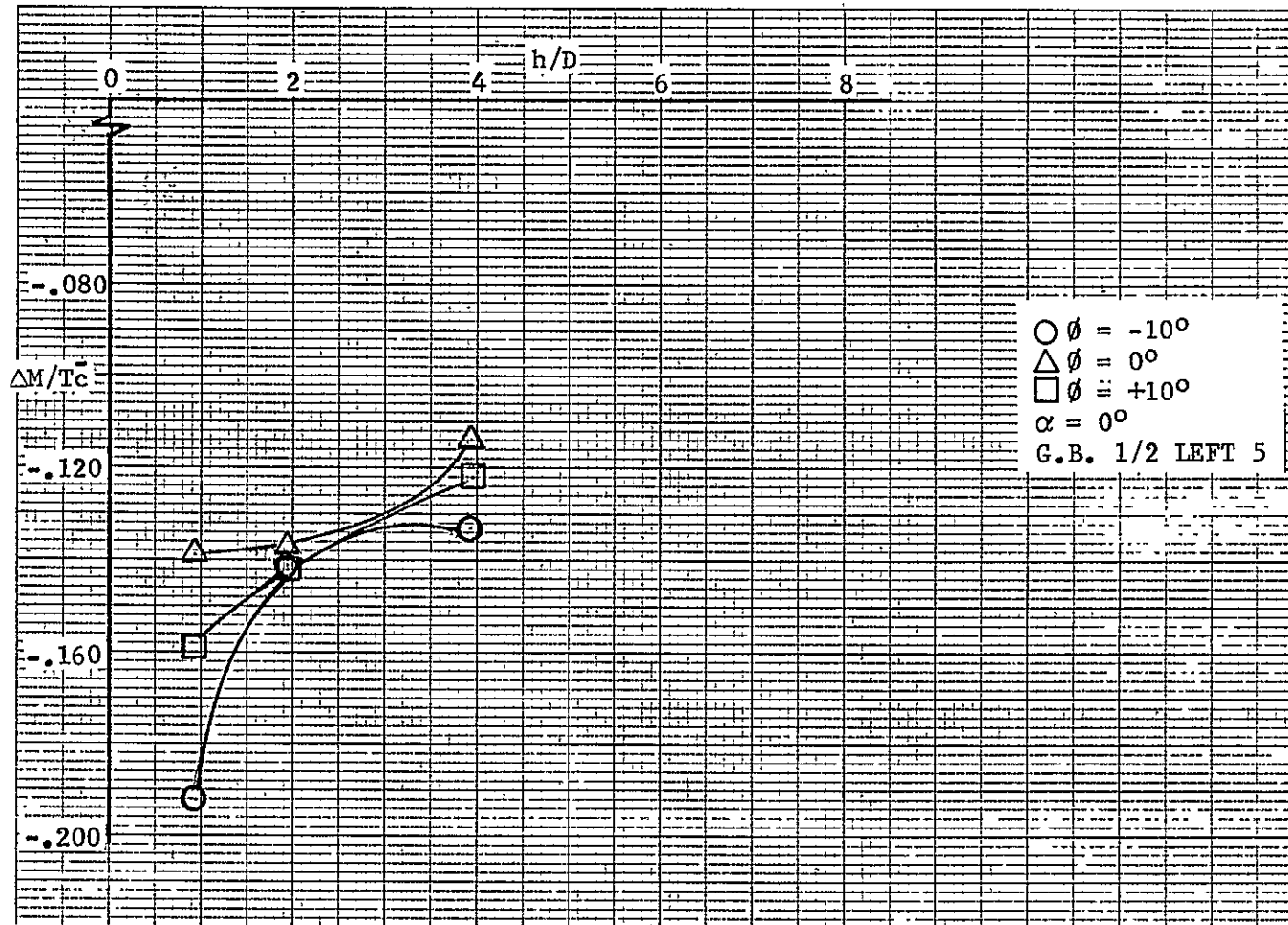


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

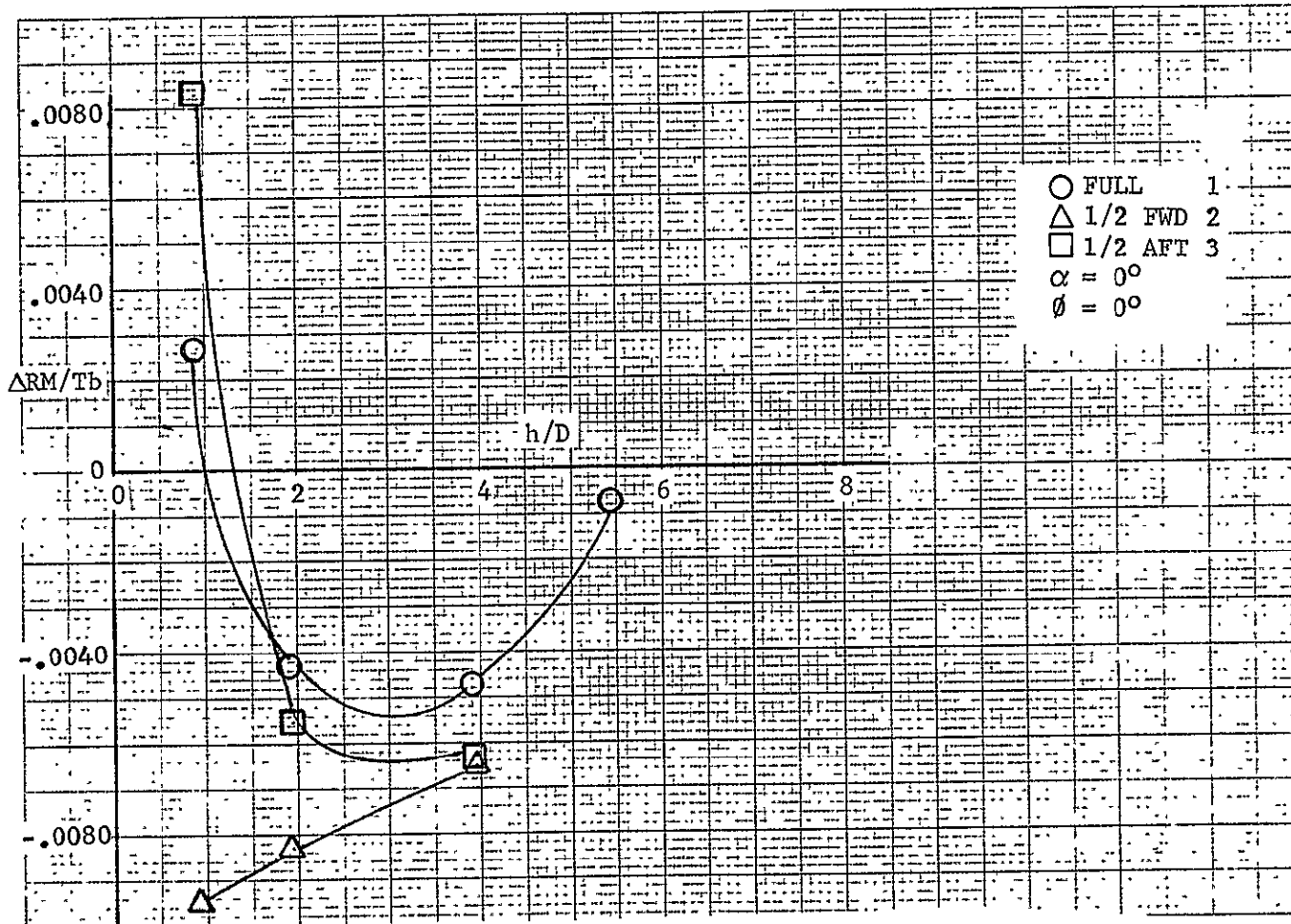


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

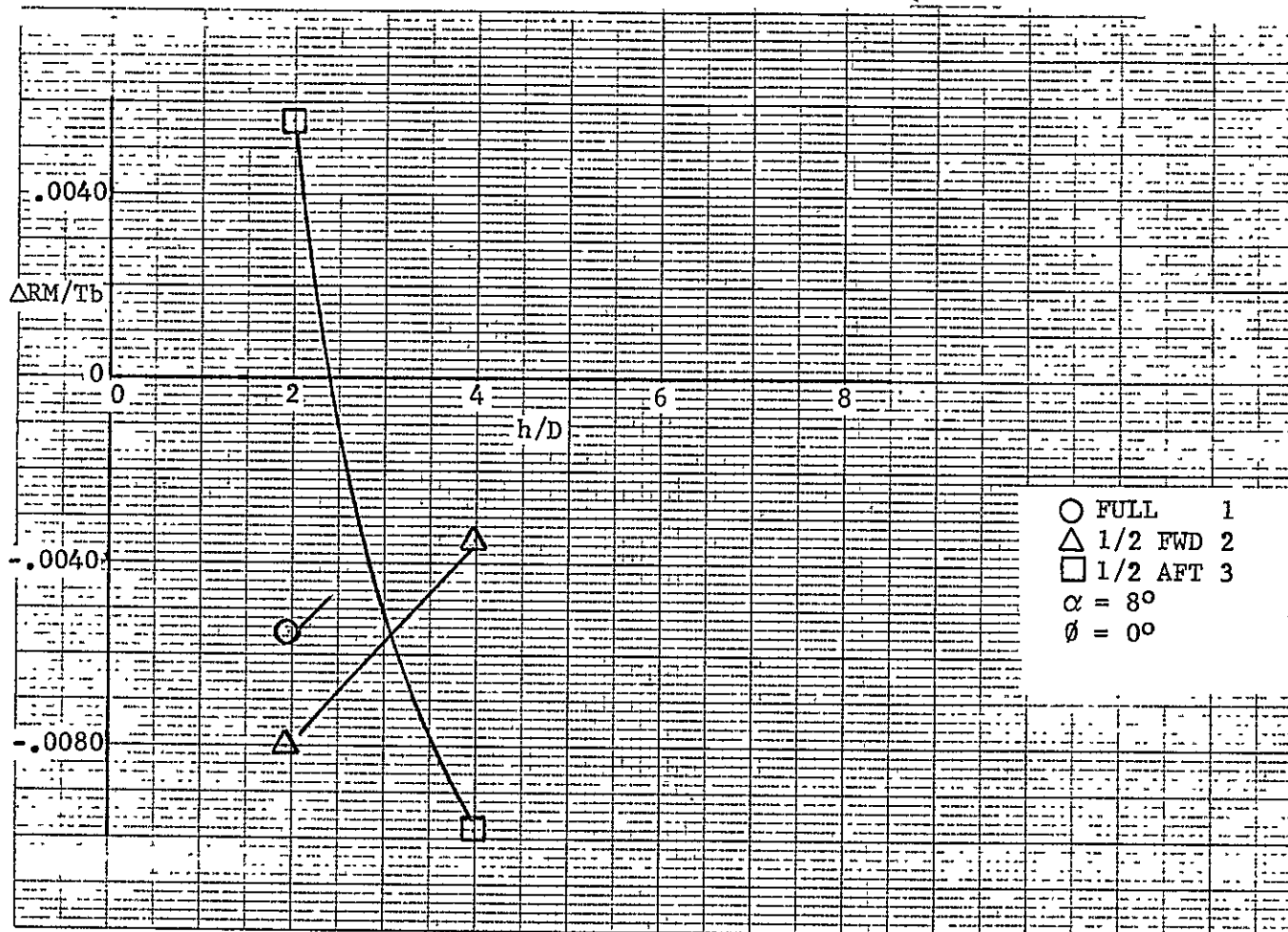


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

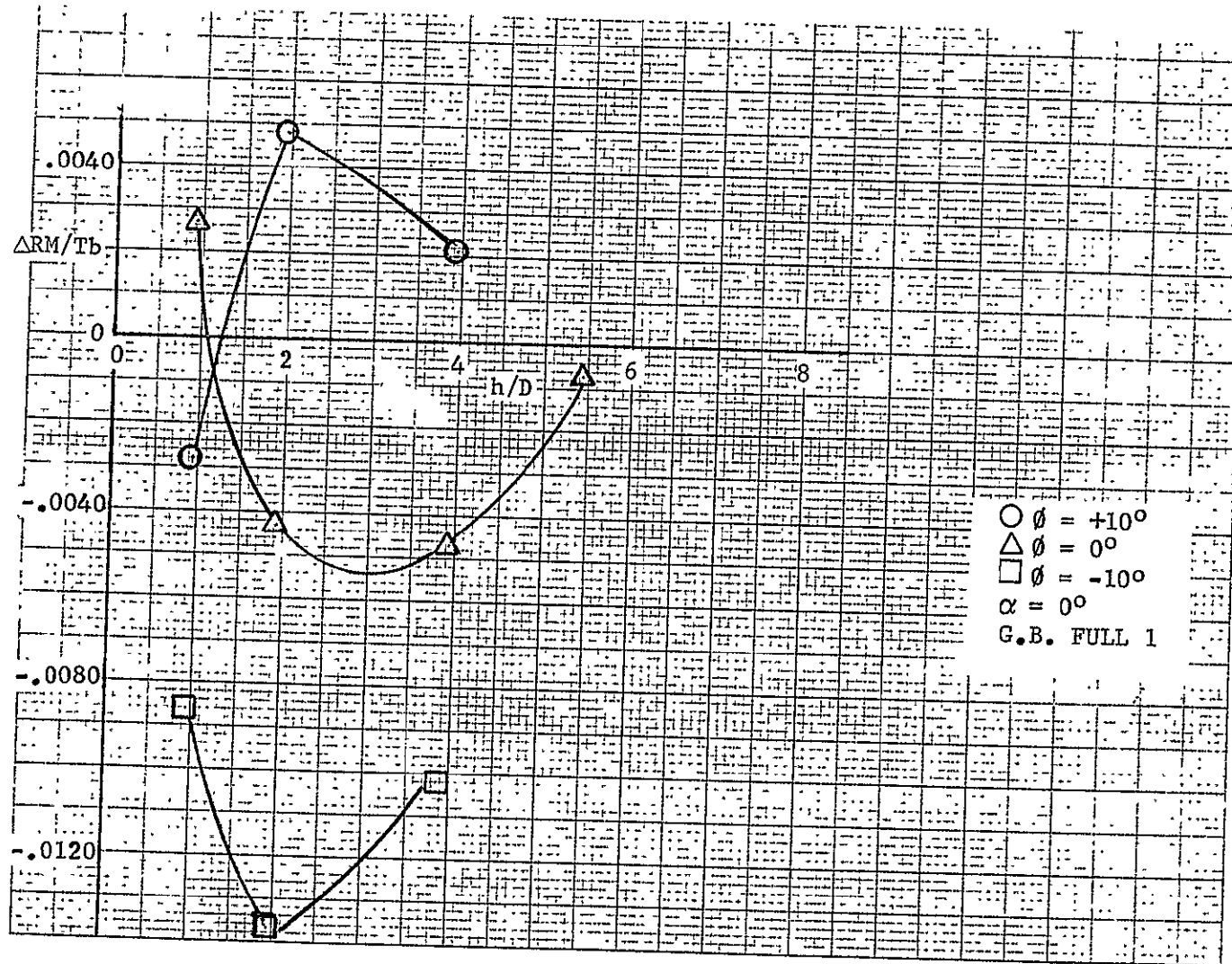


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

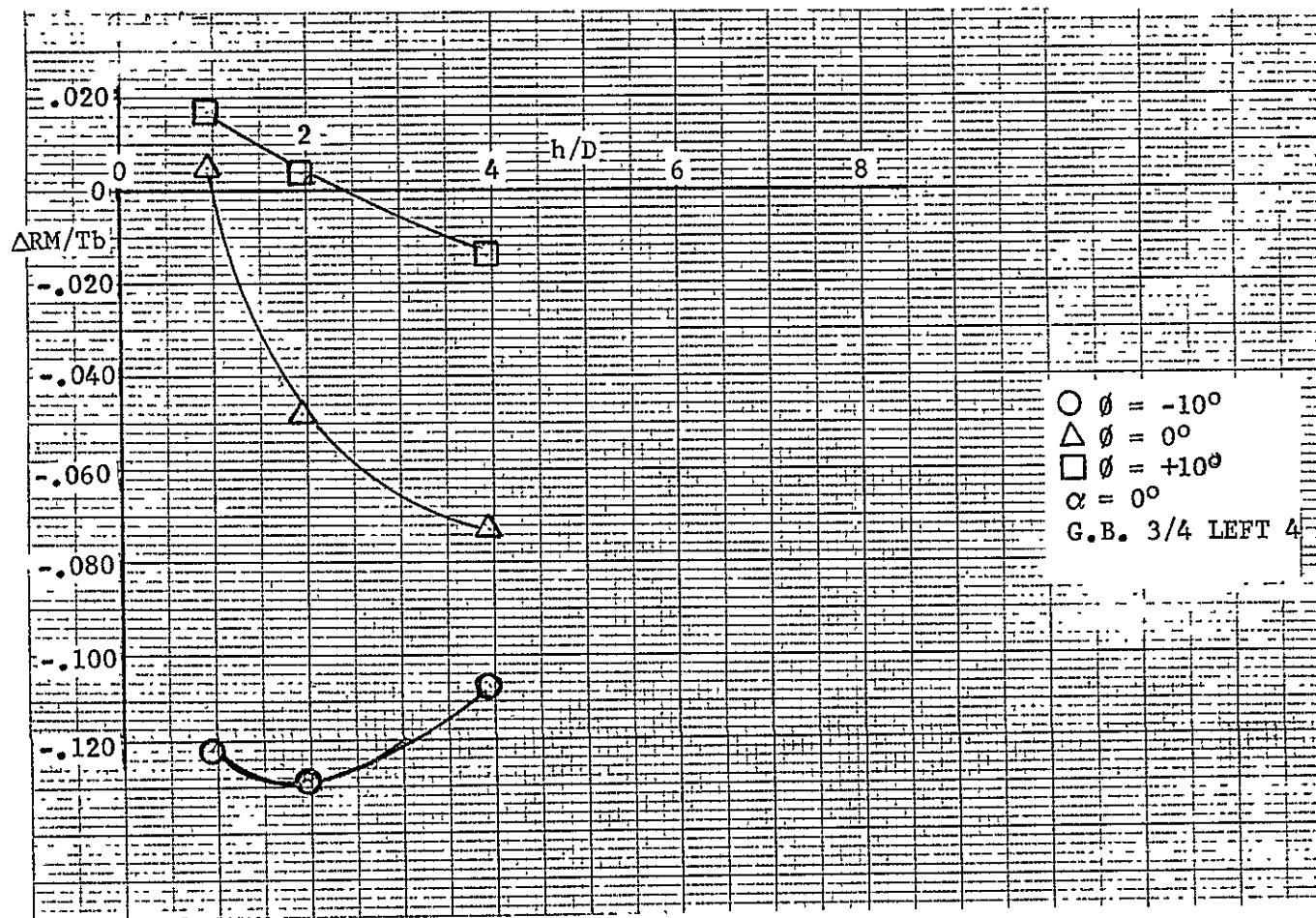


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Continued)

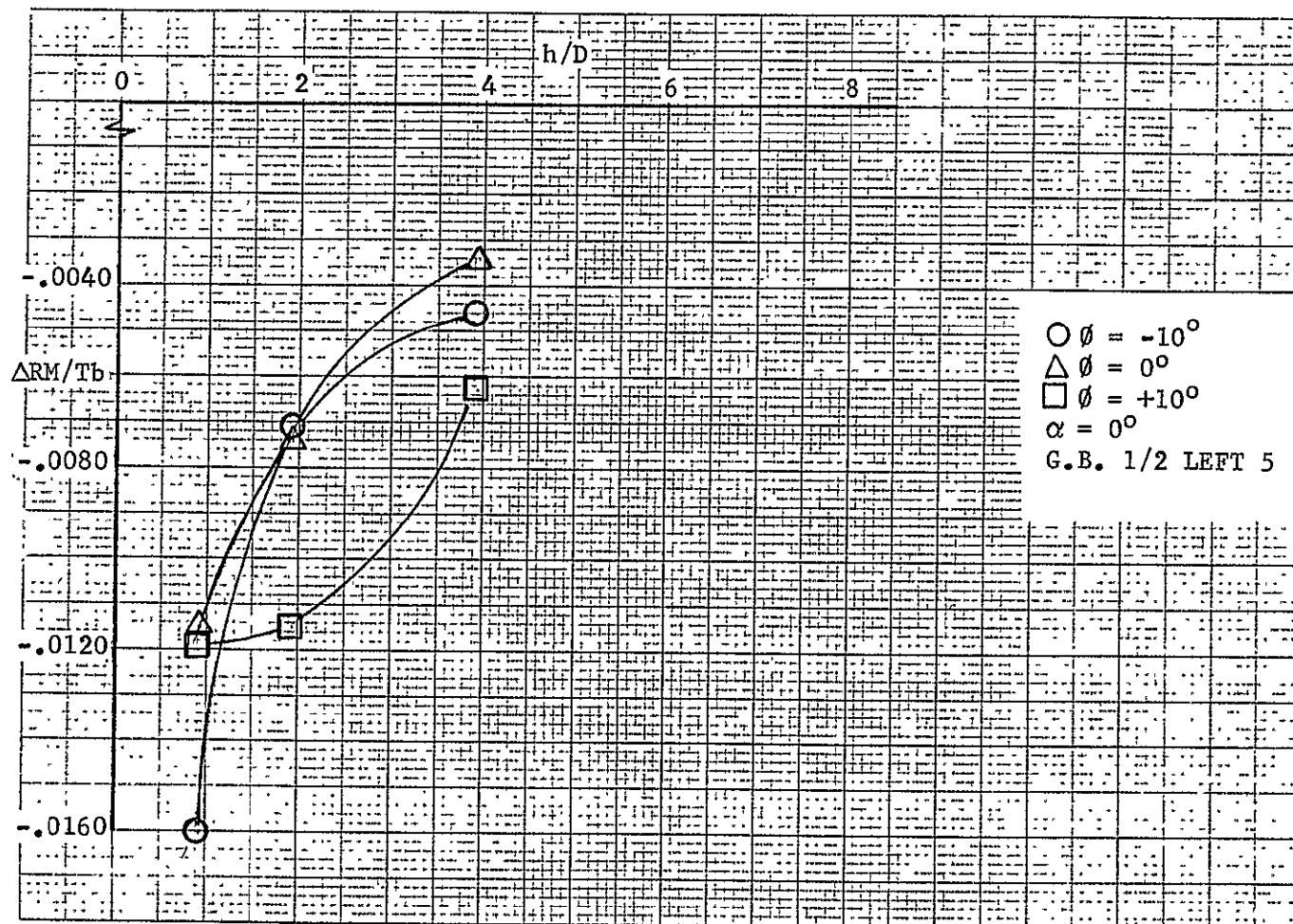


Figure B-1. Static Test Data, Four Fan, $\delta_N = 105^\circ$ (Concluded)

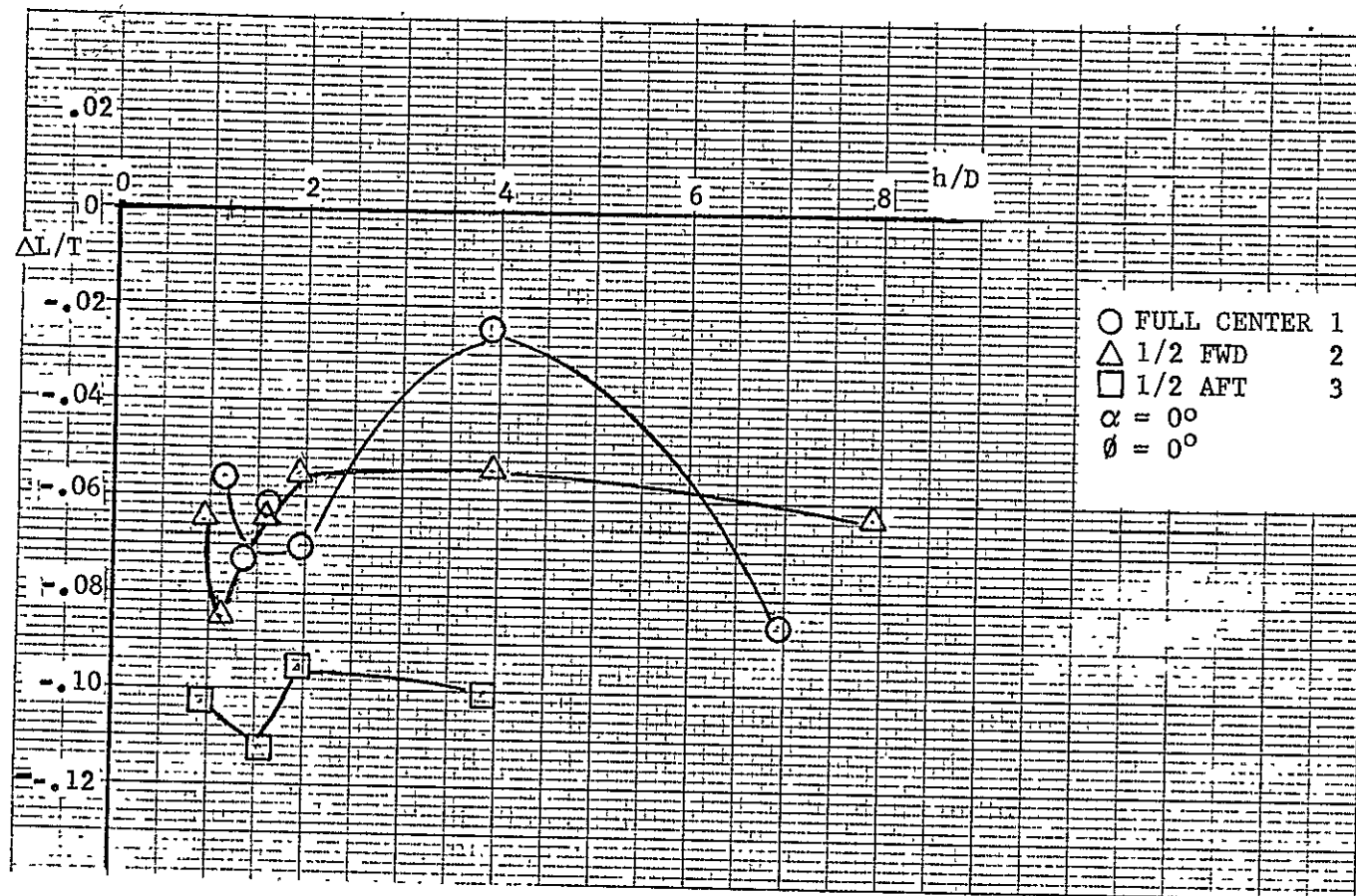


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$

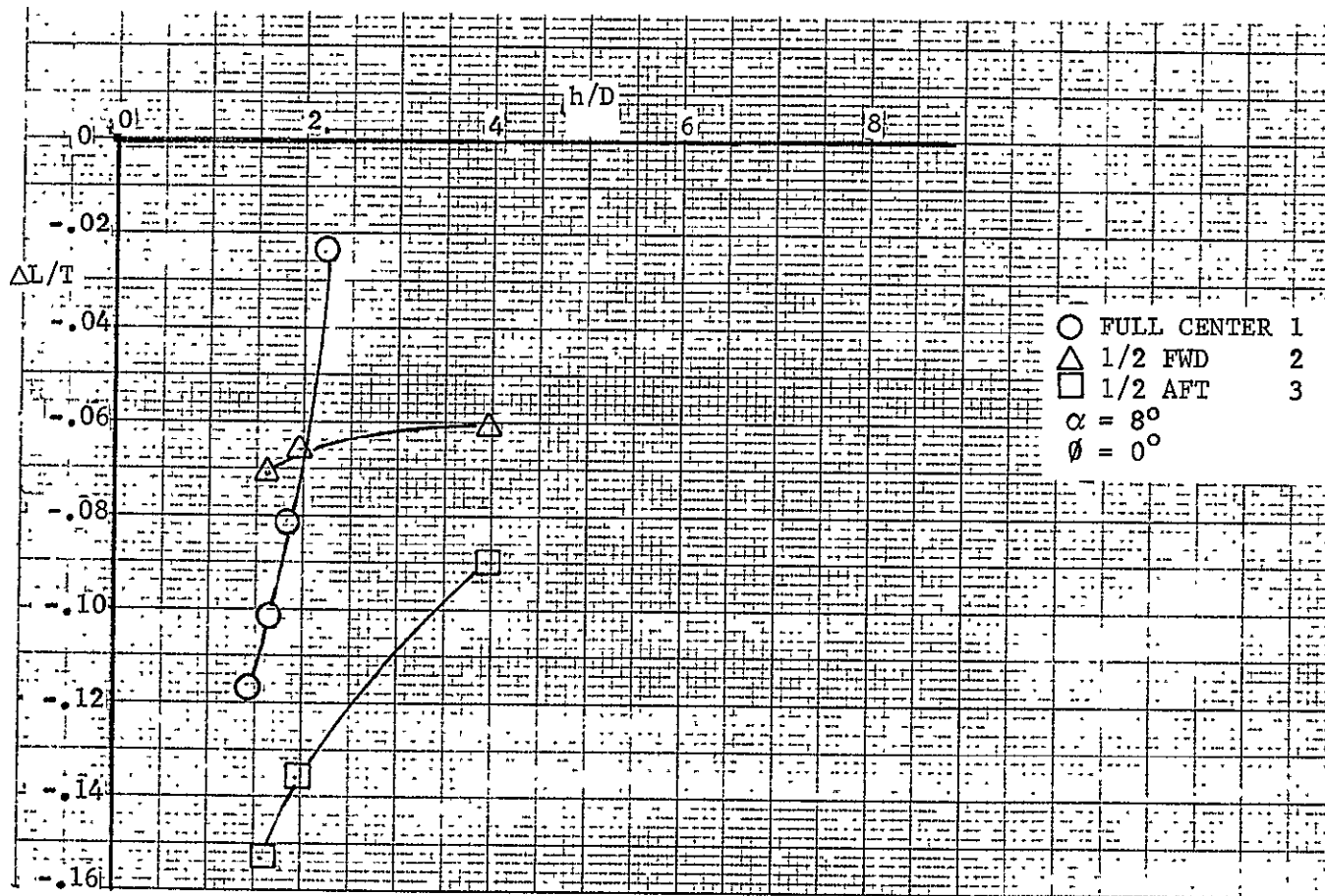


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Continued)

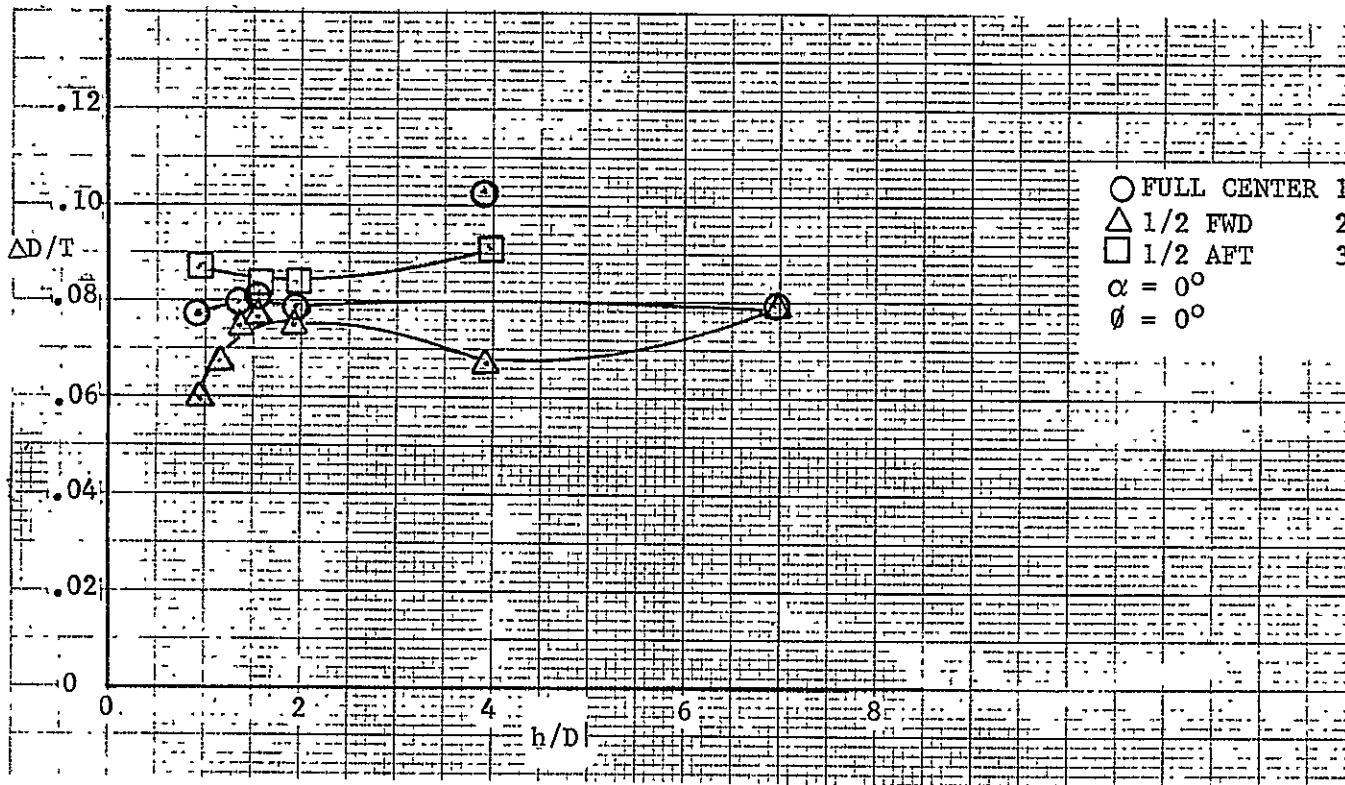


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Continued)

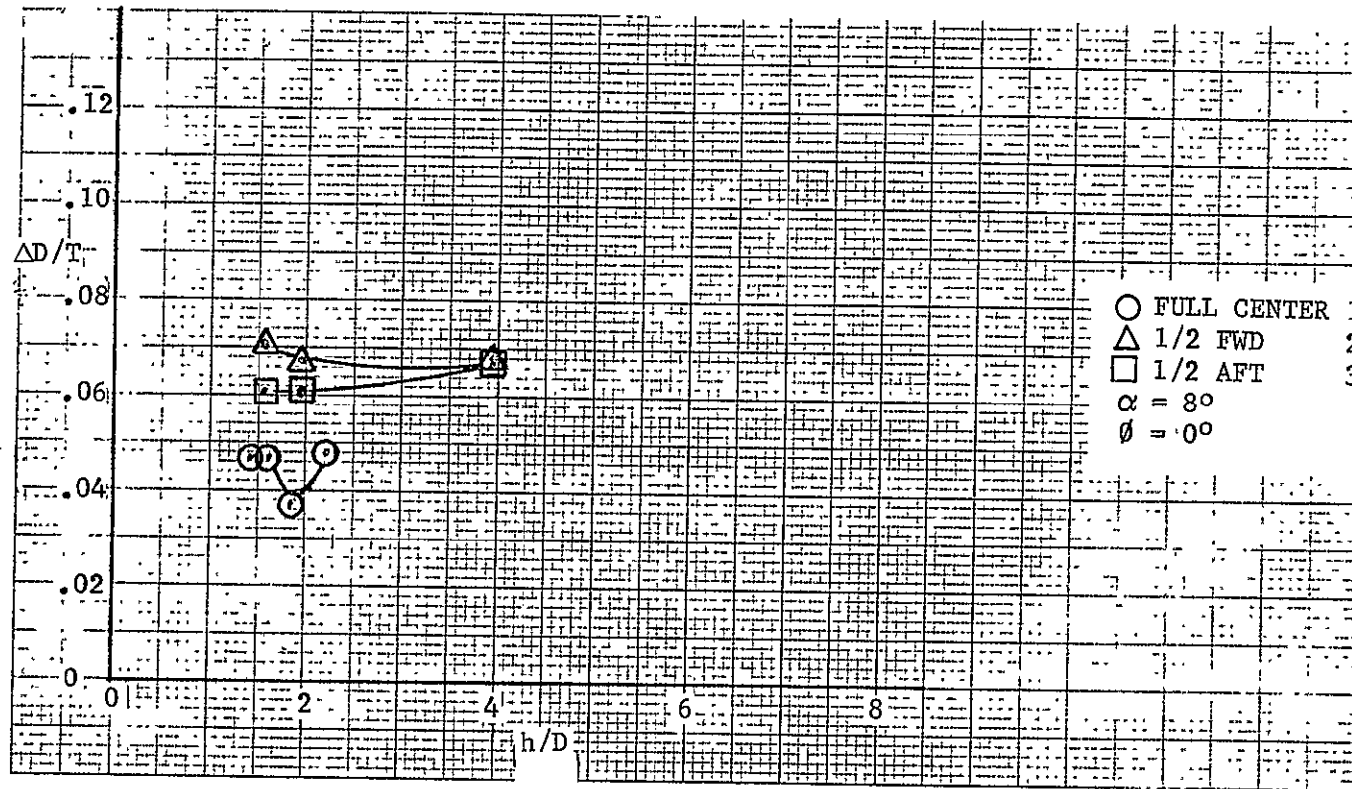


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Continued)

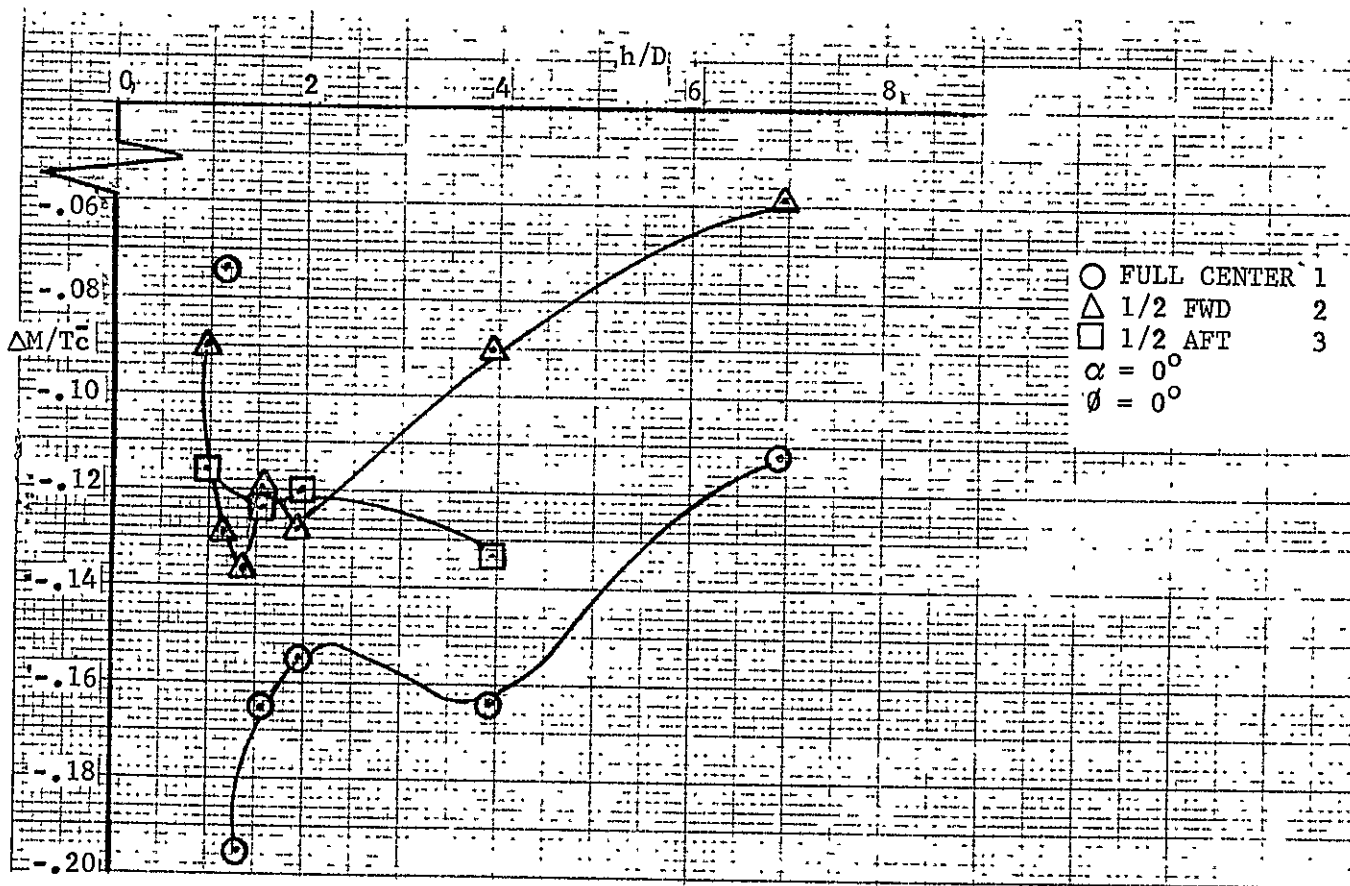


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Continued)

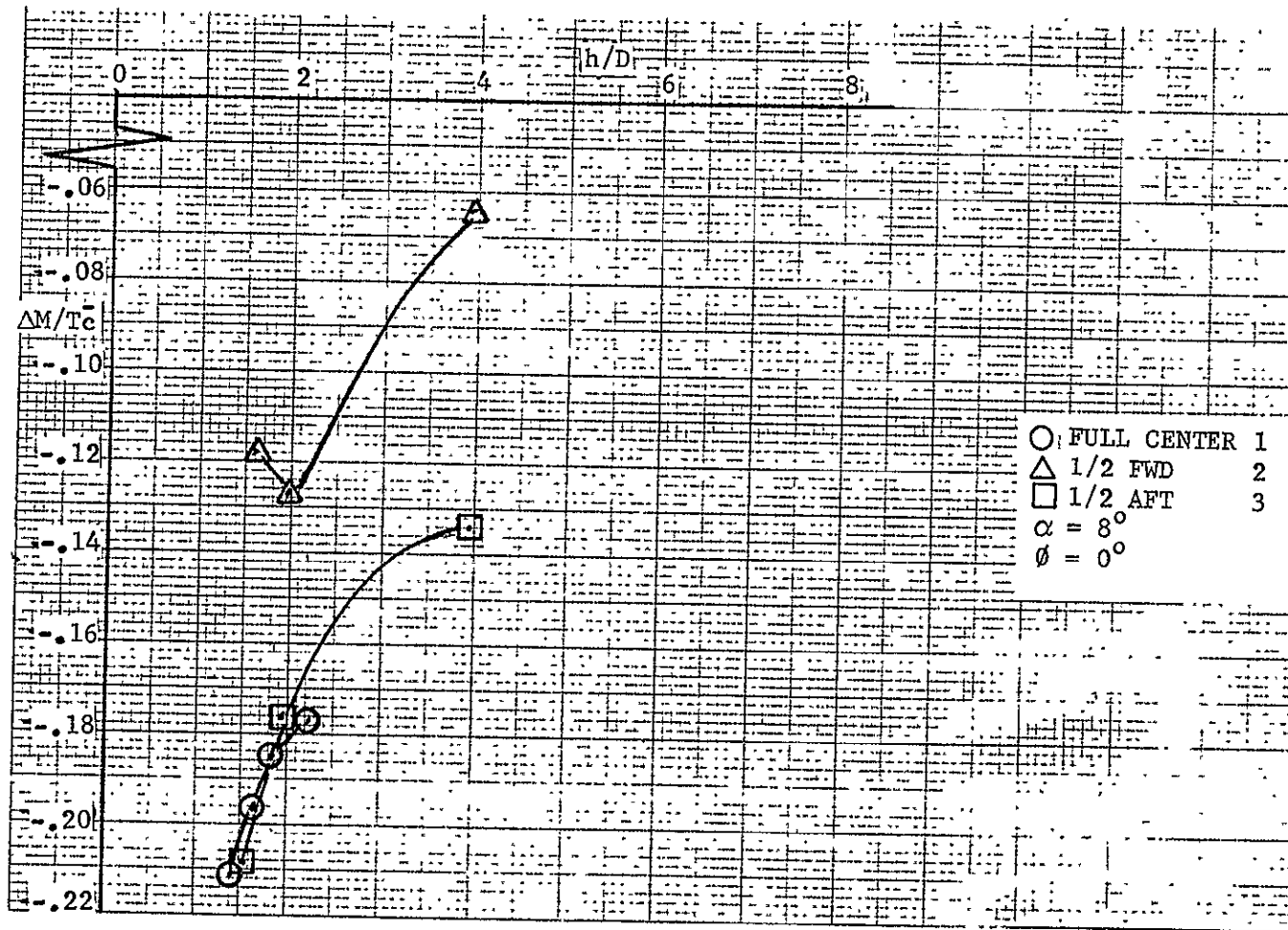


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Continued)

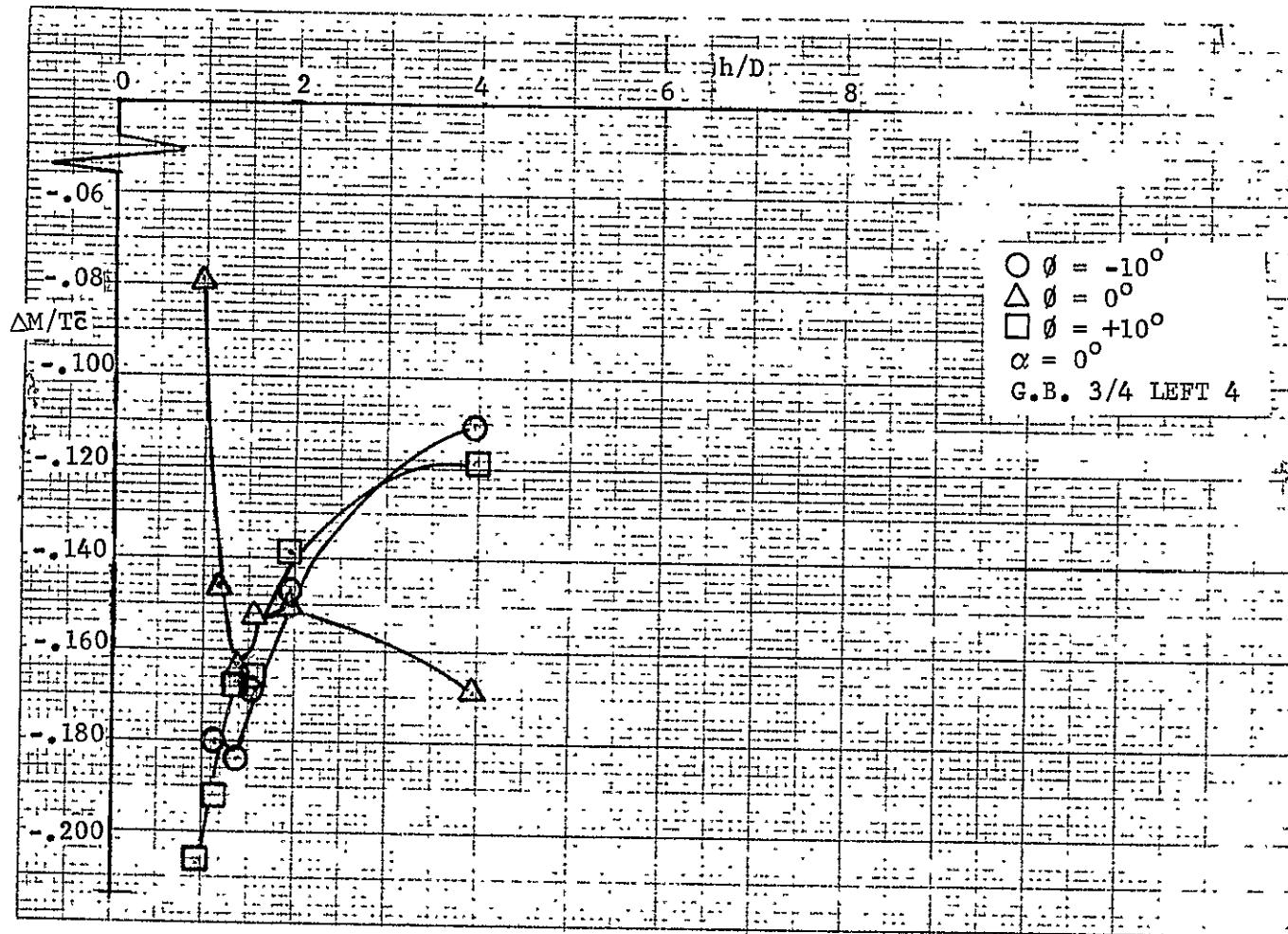


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Continued)

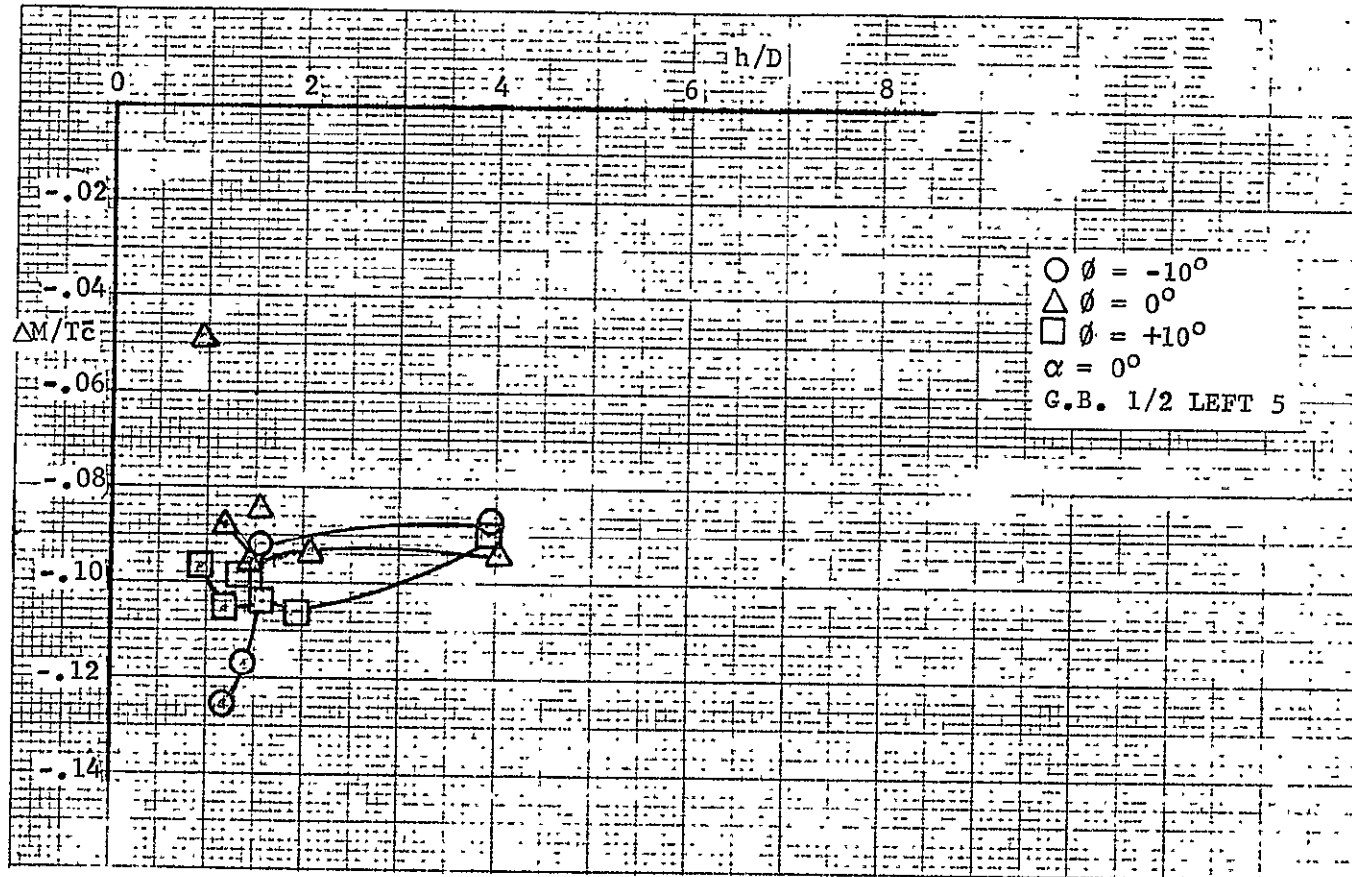


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Continued)

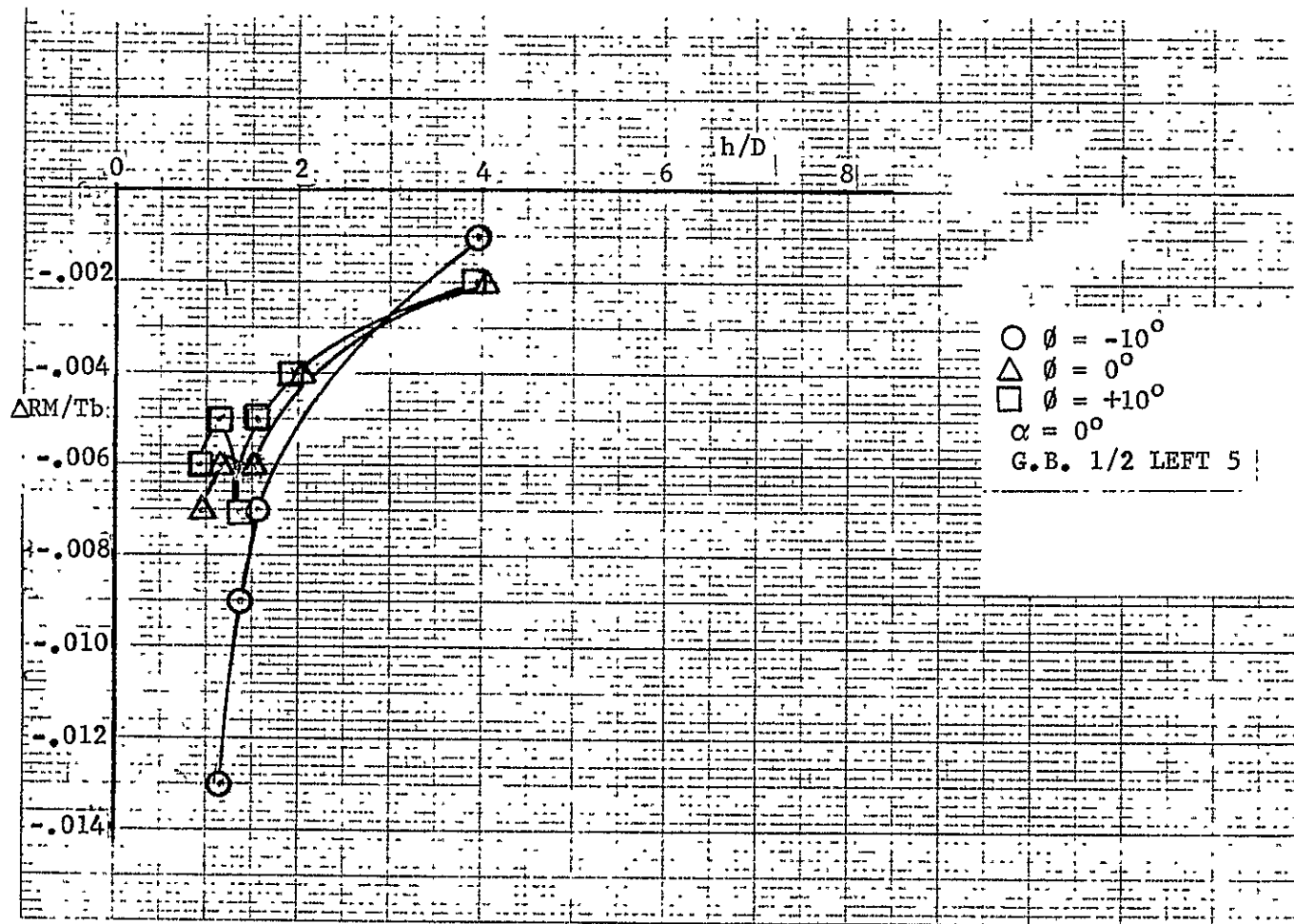


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Continued)

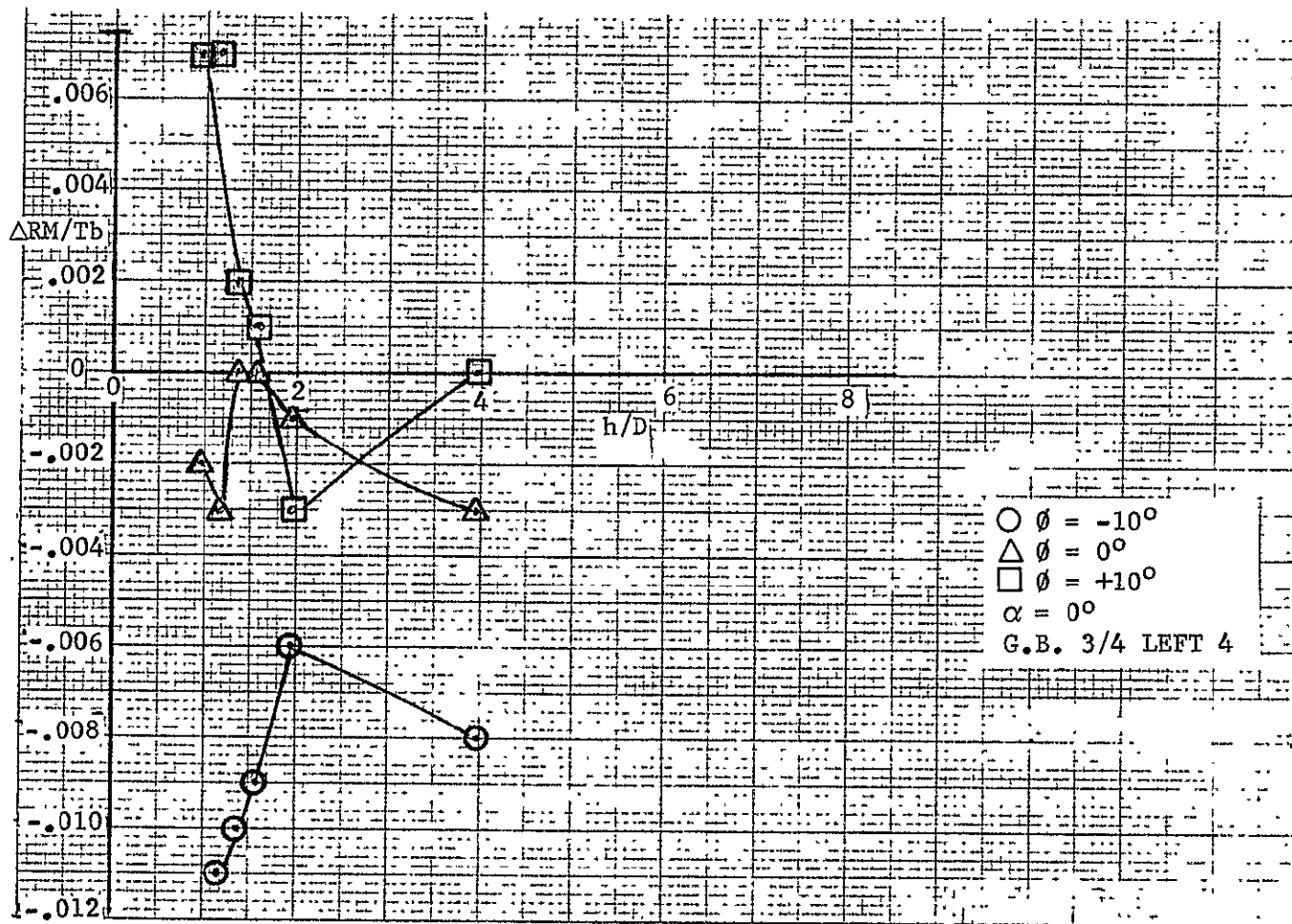


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Continued)

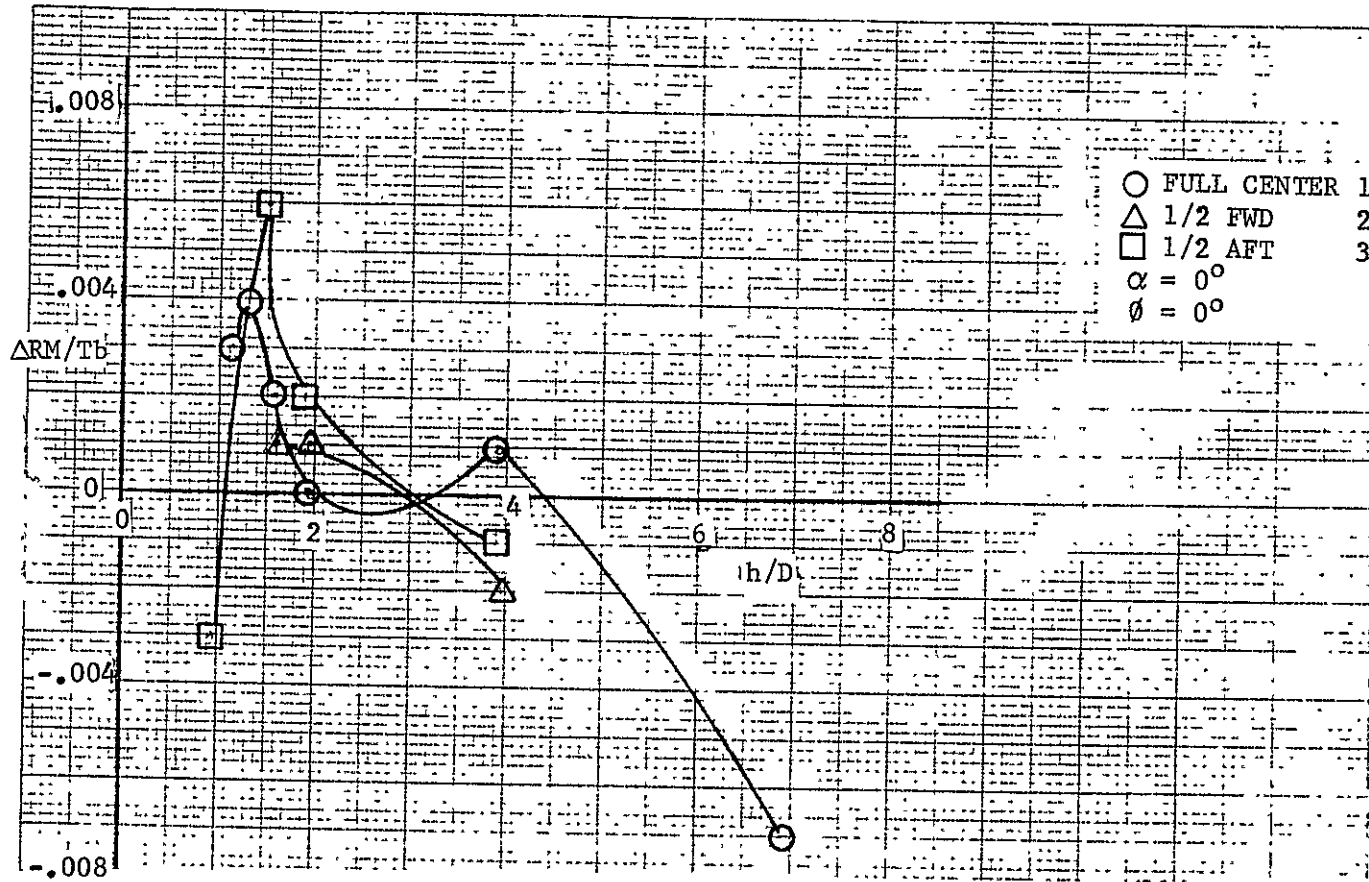


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Continued)

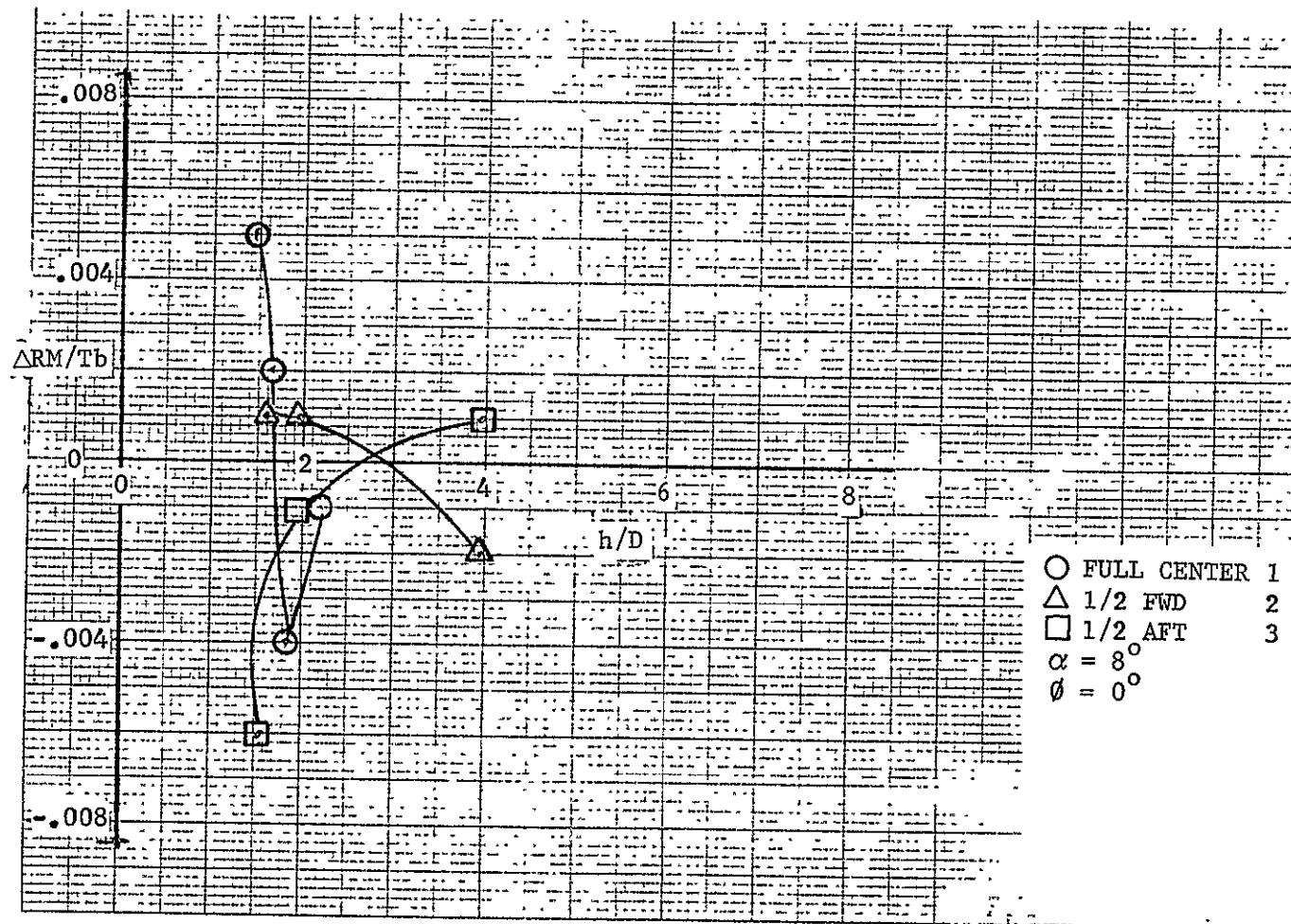


Figure B-2. Static Test Data, Four Fan, $\delta_N = 90^\circ$ (Concluded)

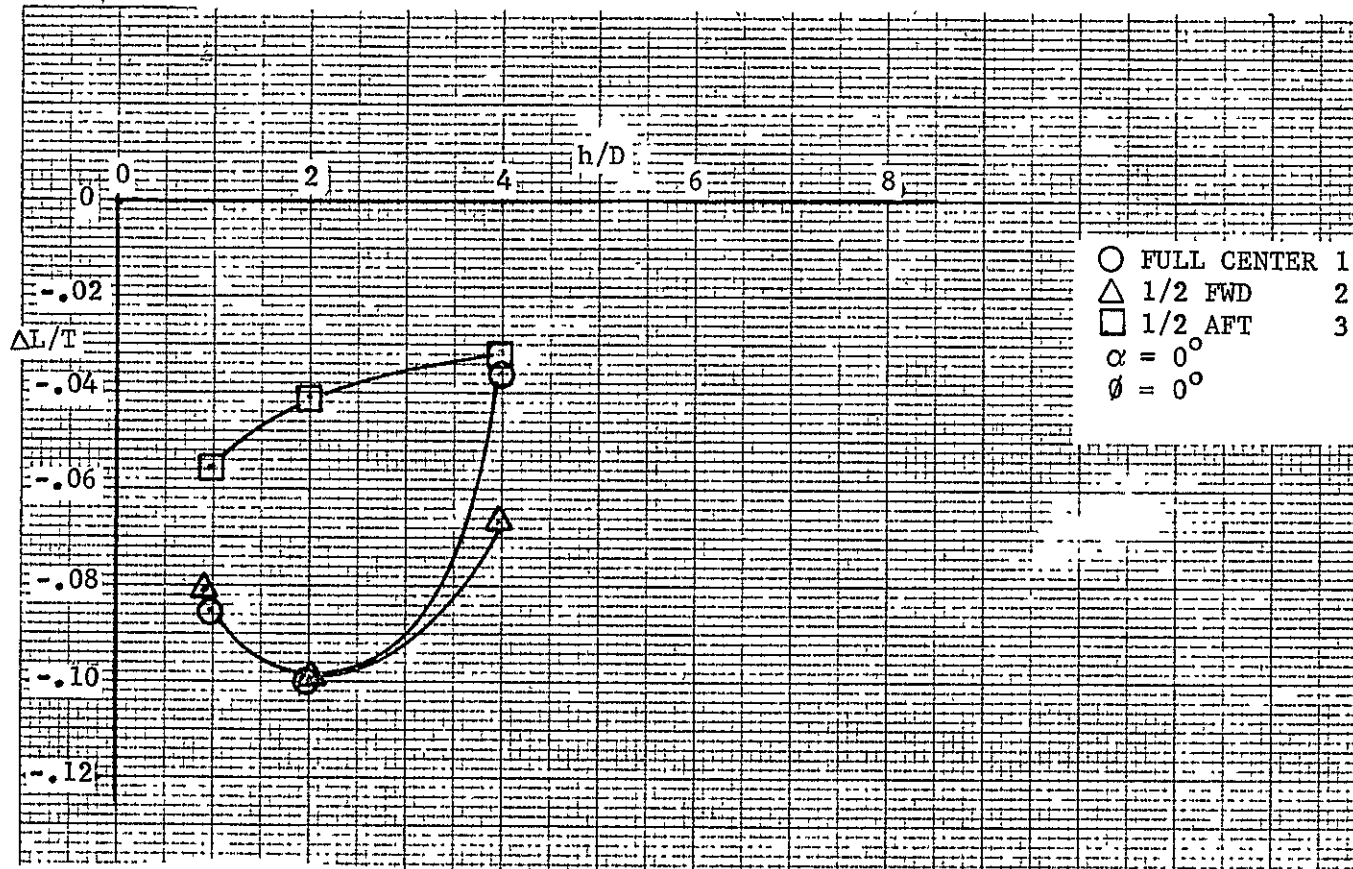


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$

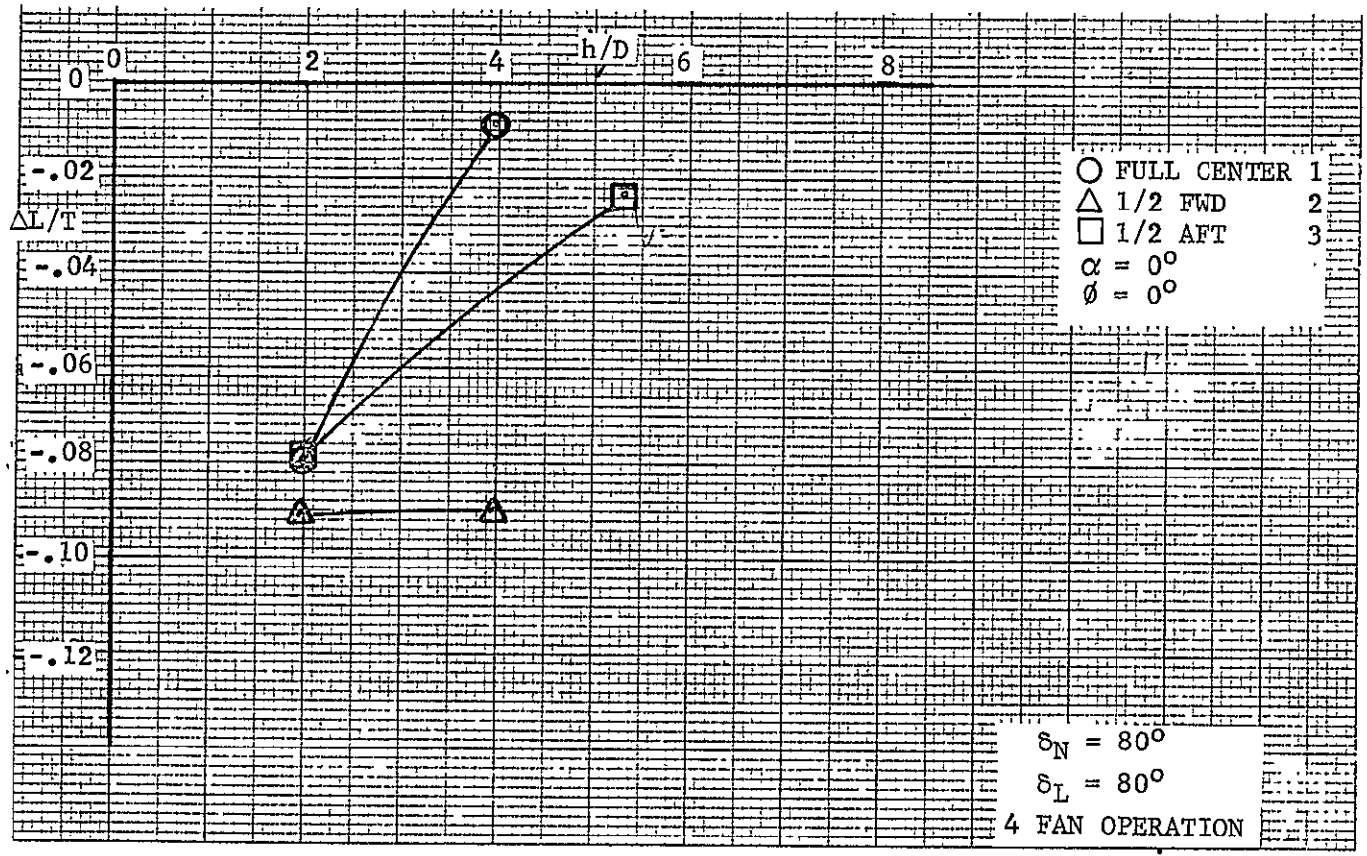


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

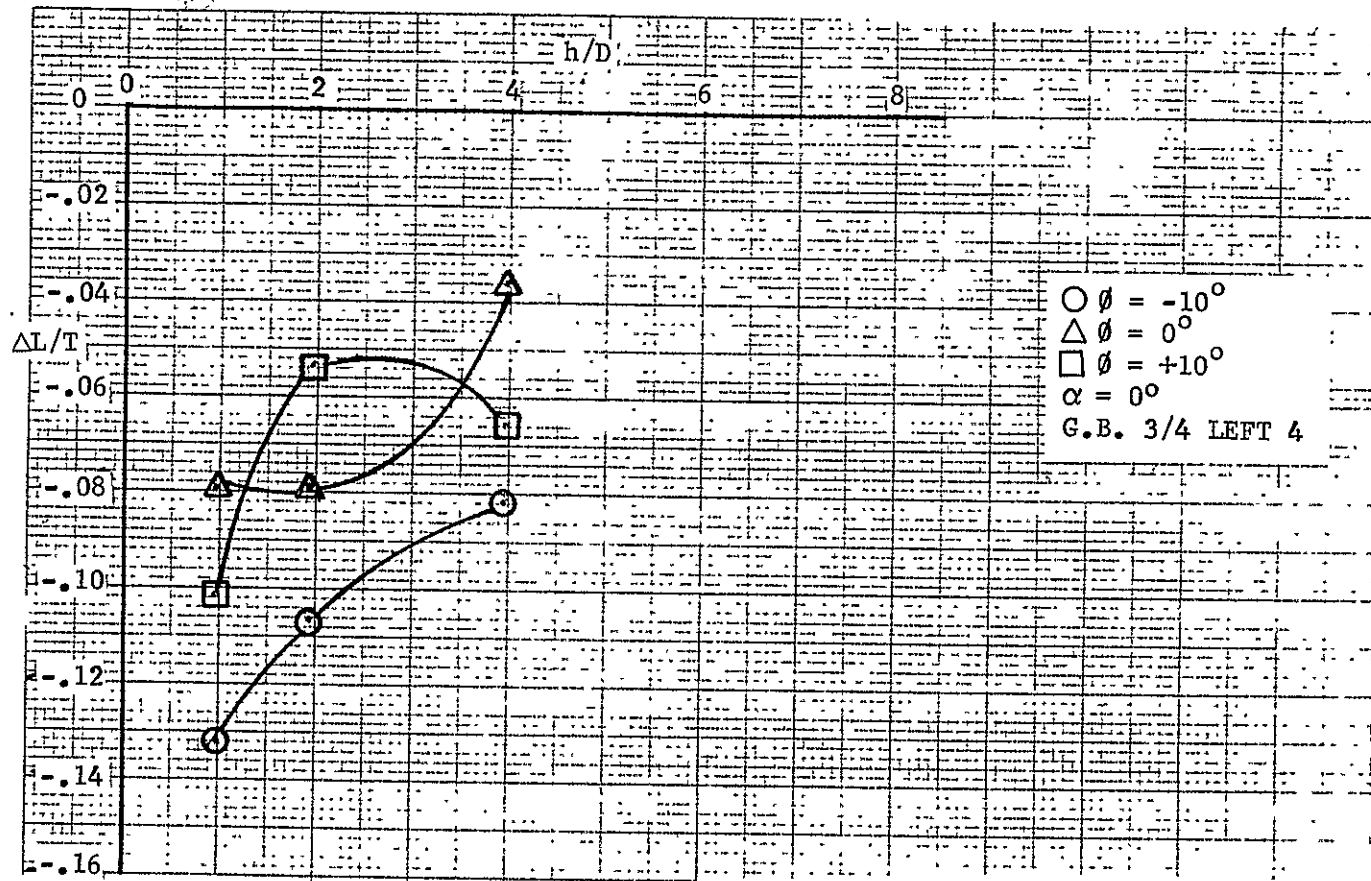


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

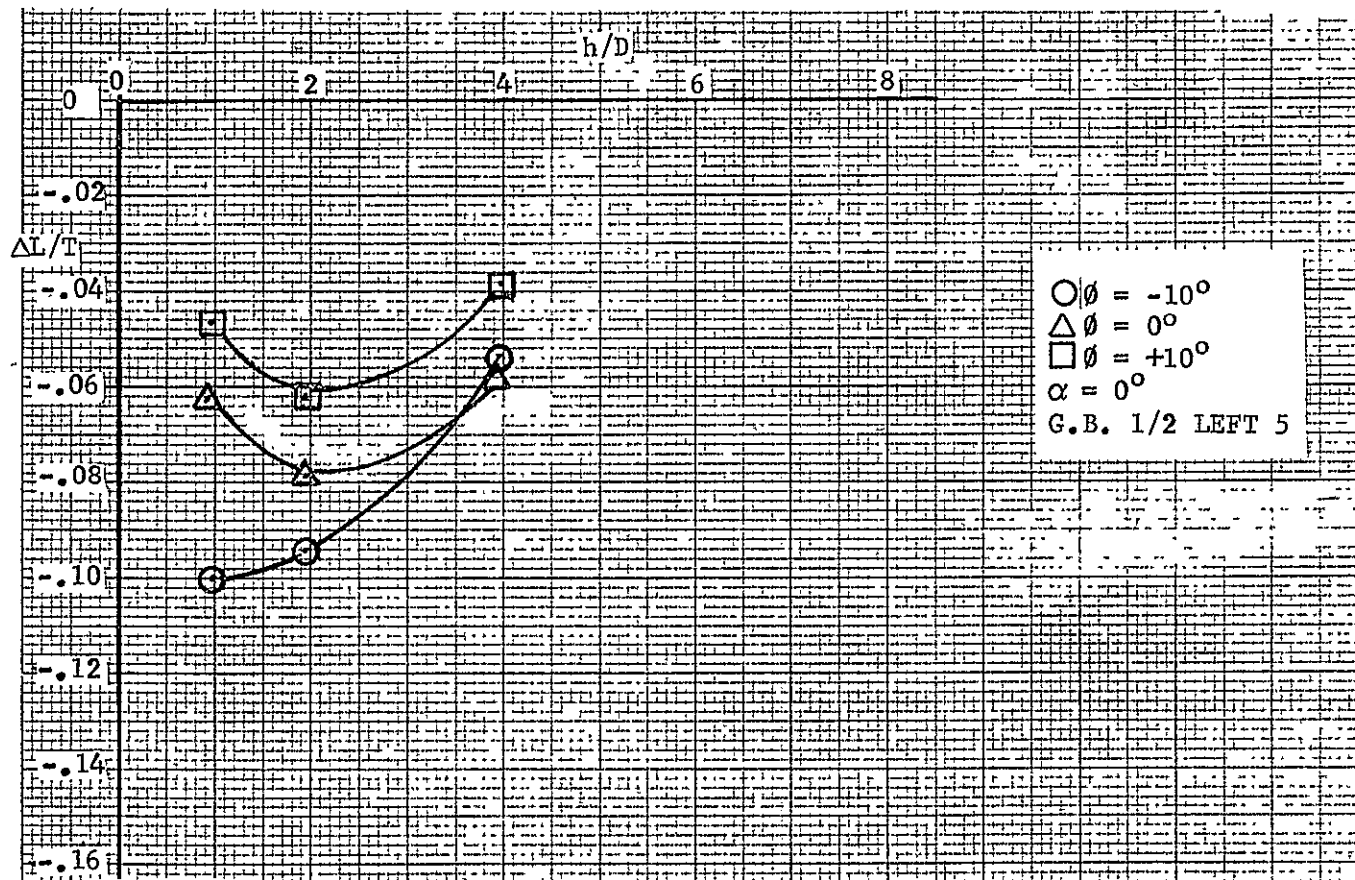


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

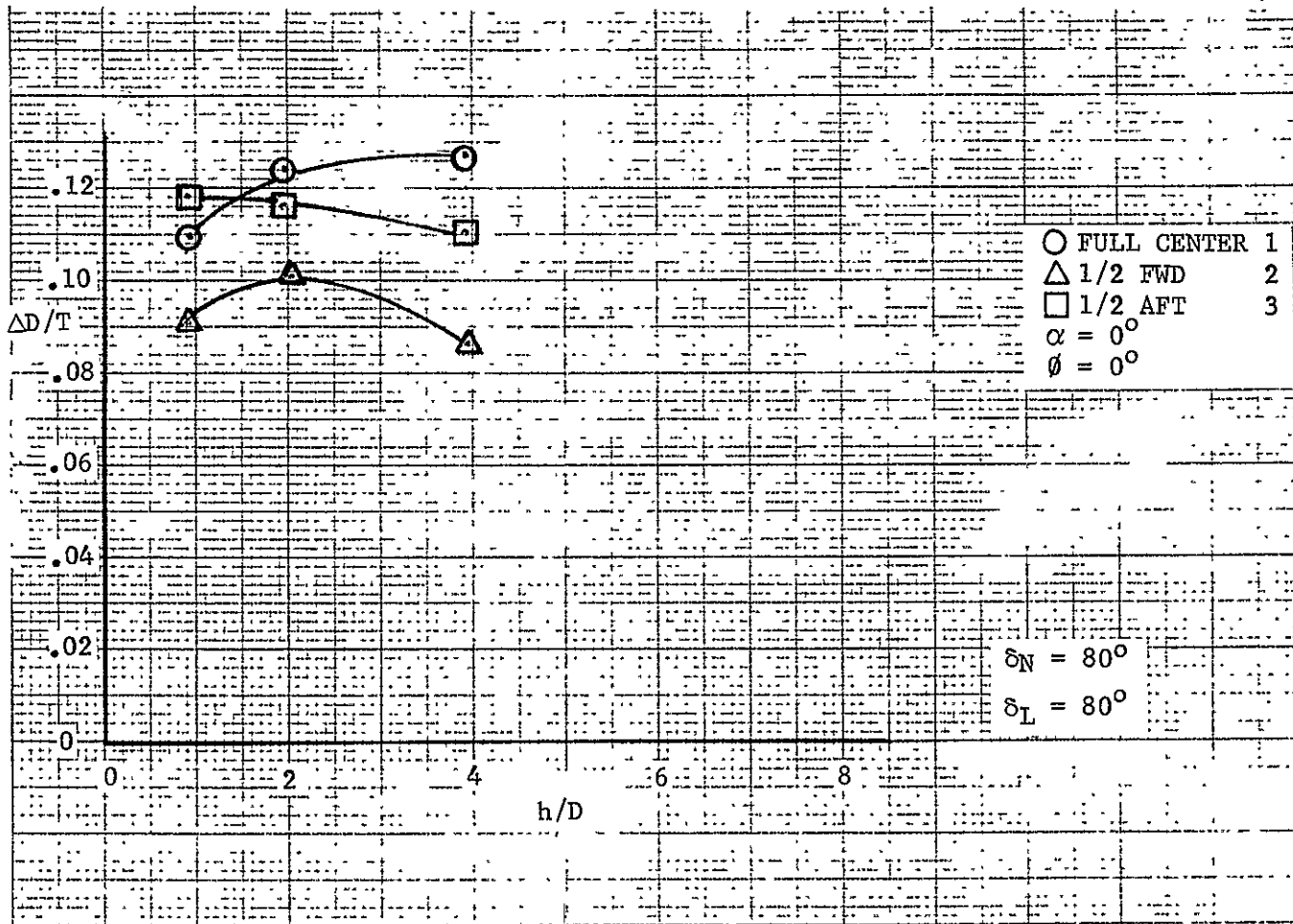


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

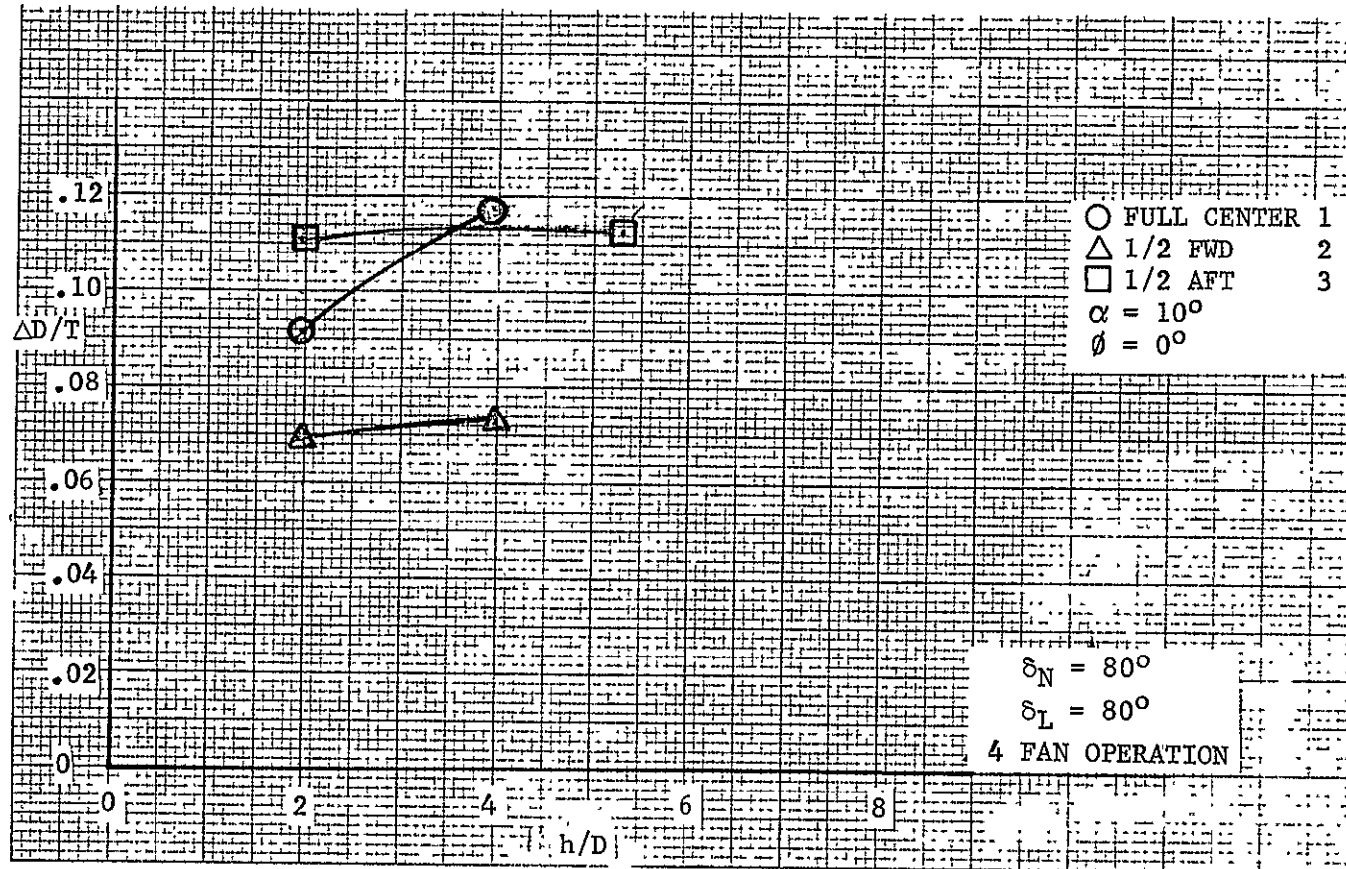


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

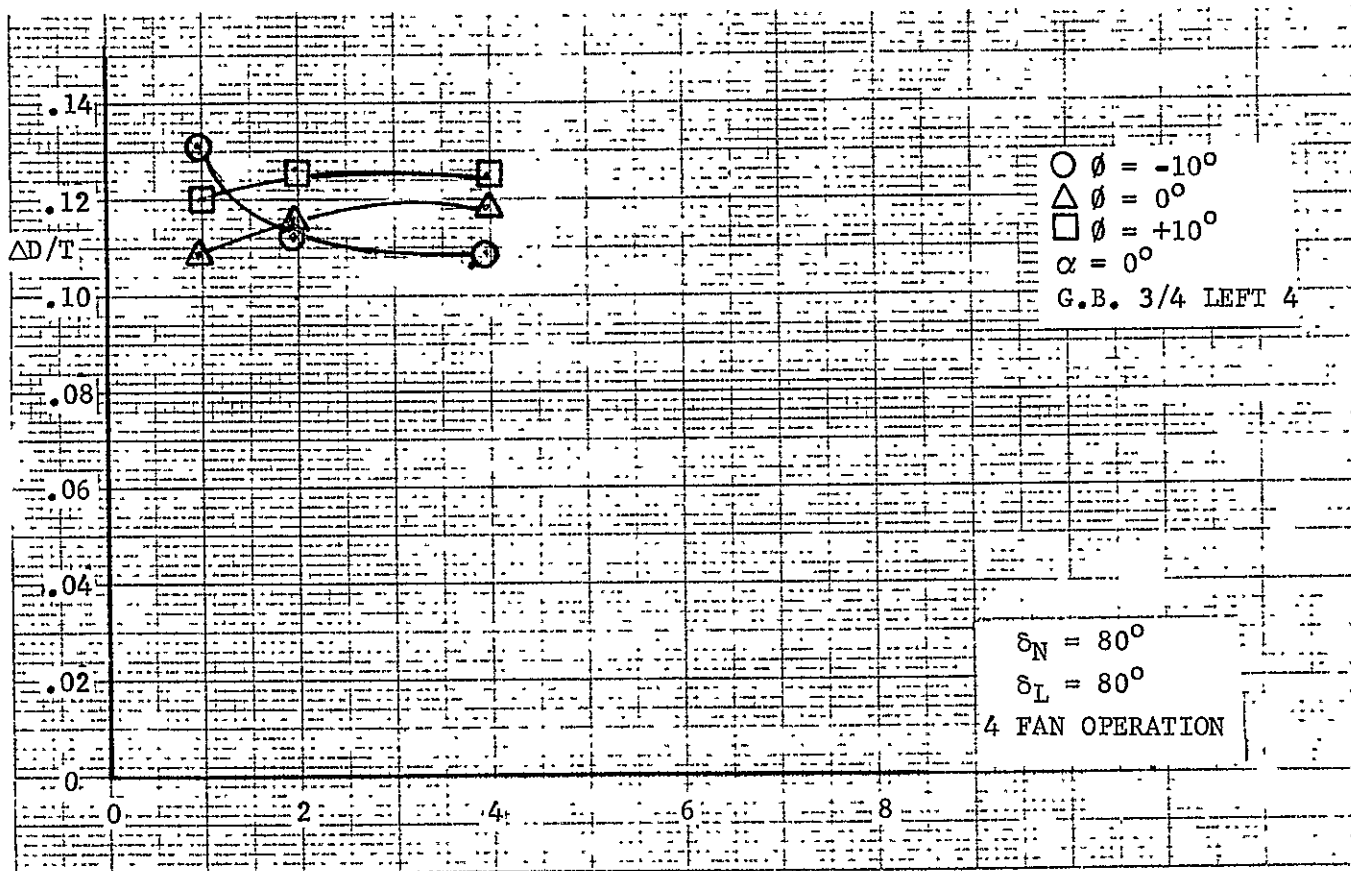


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

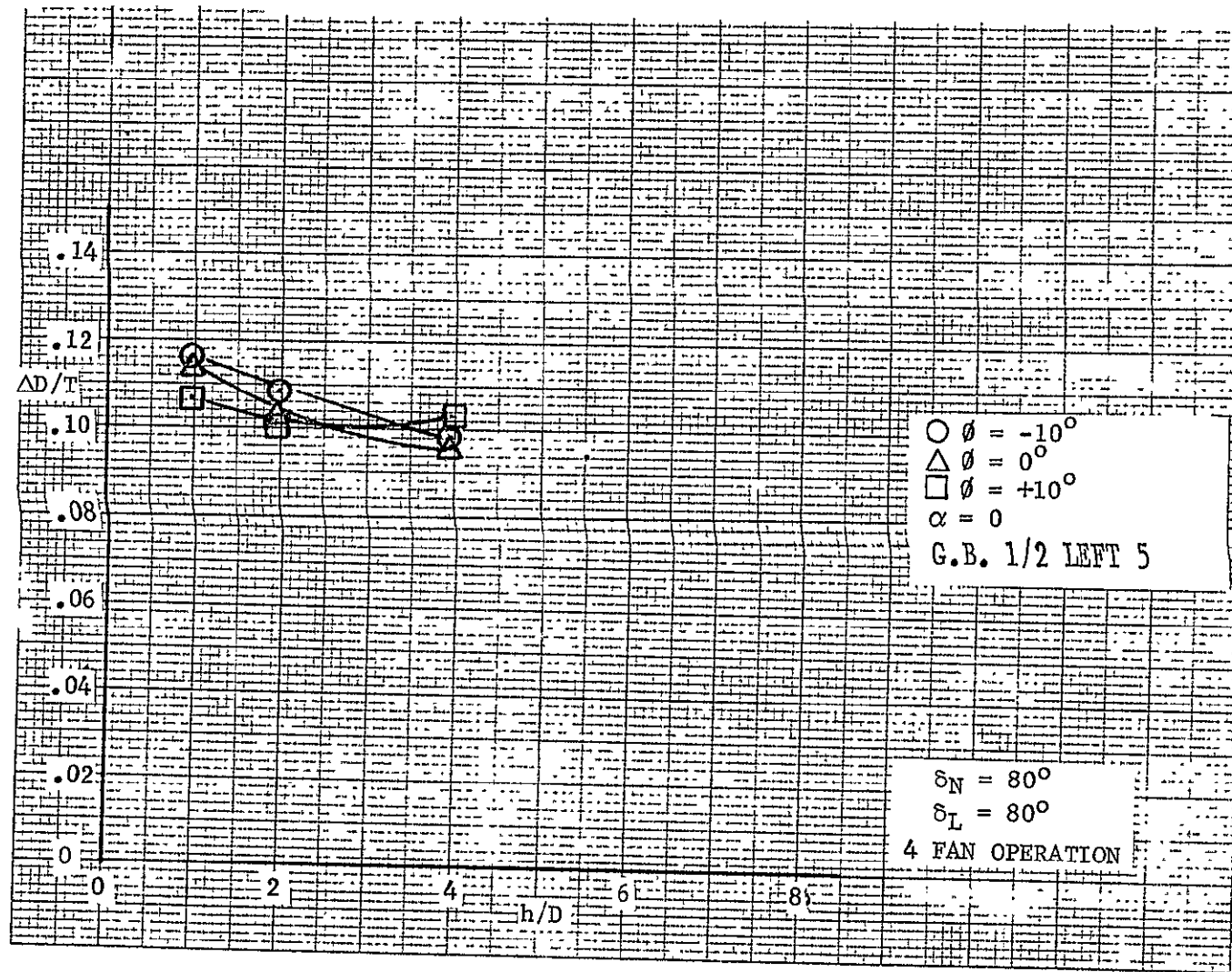


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

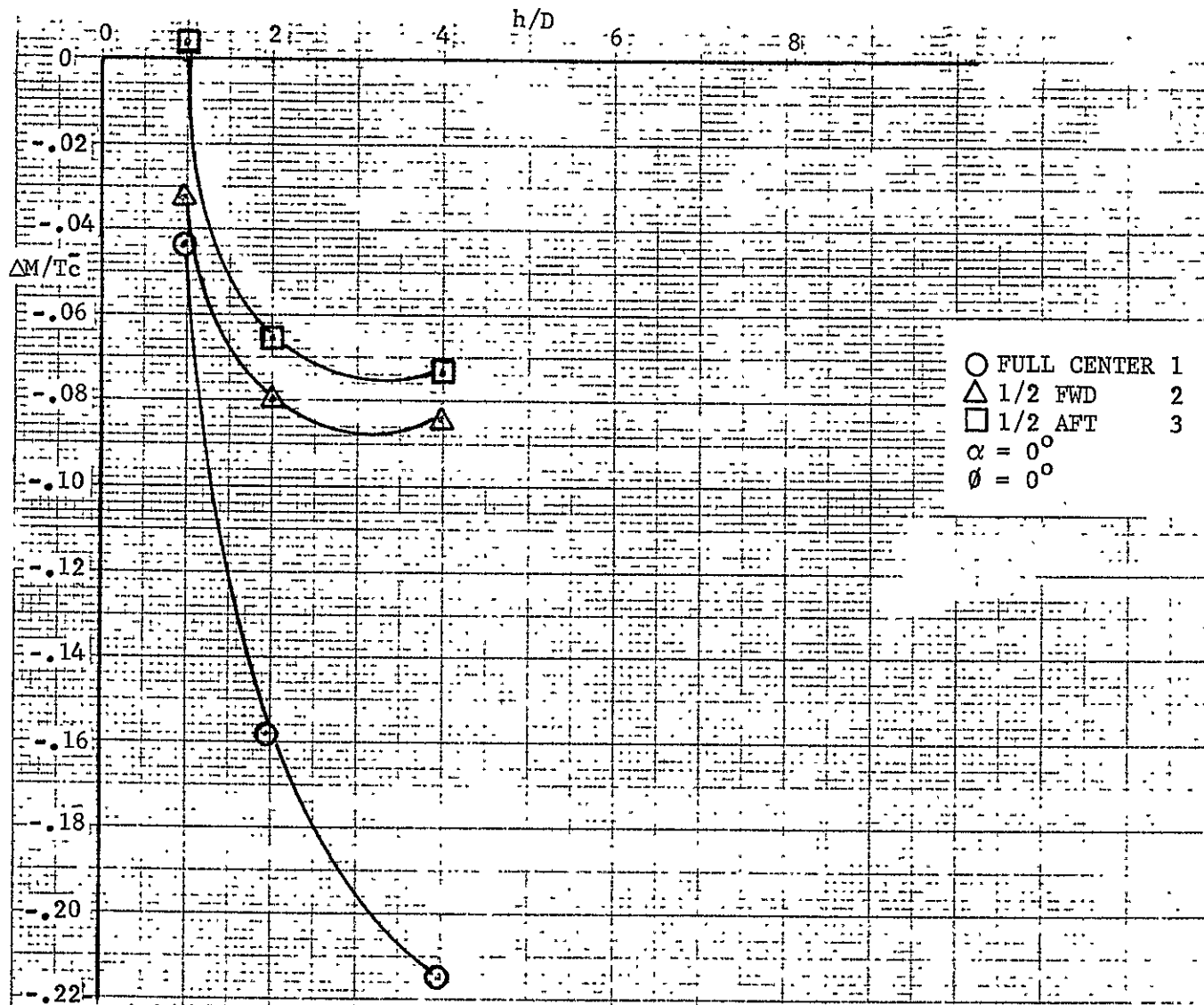


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

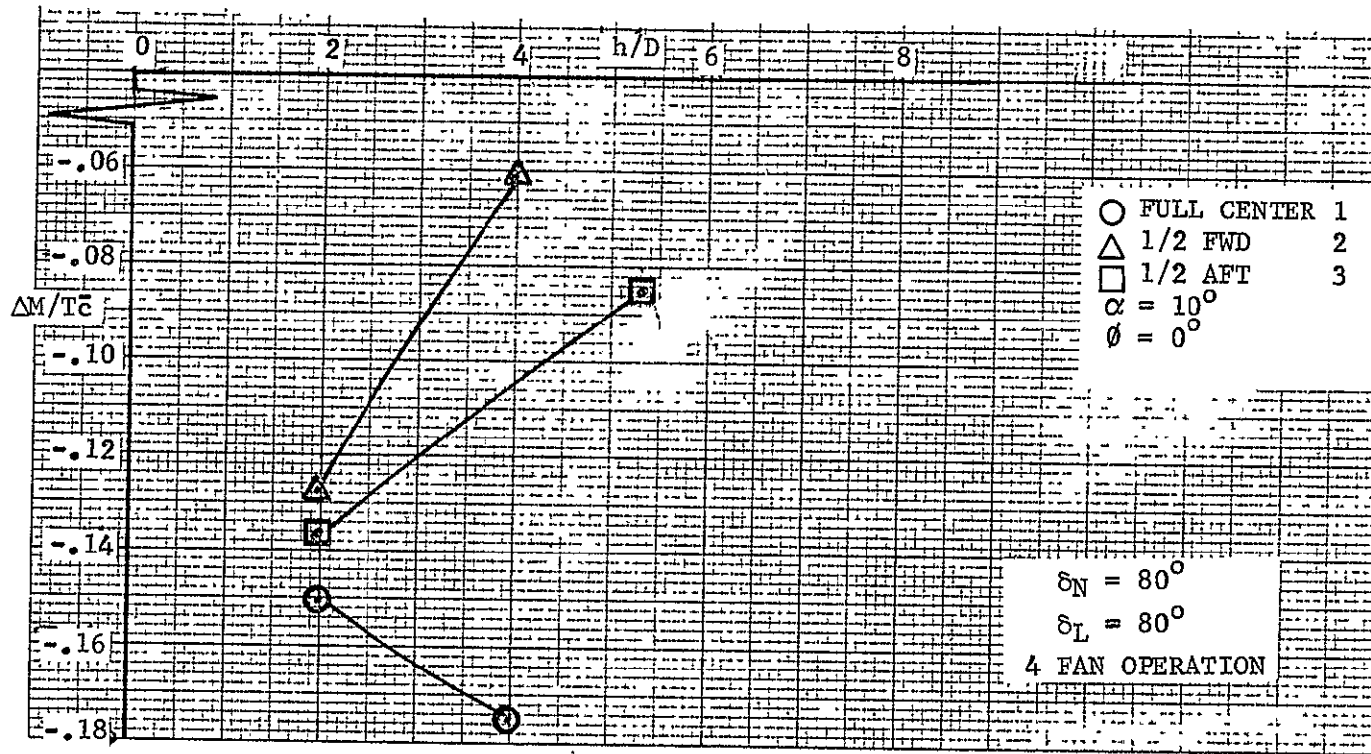


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

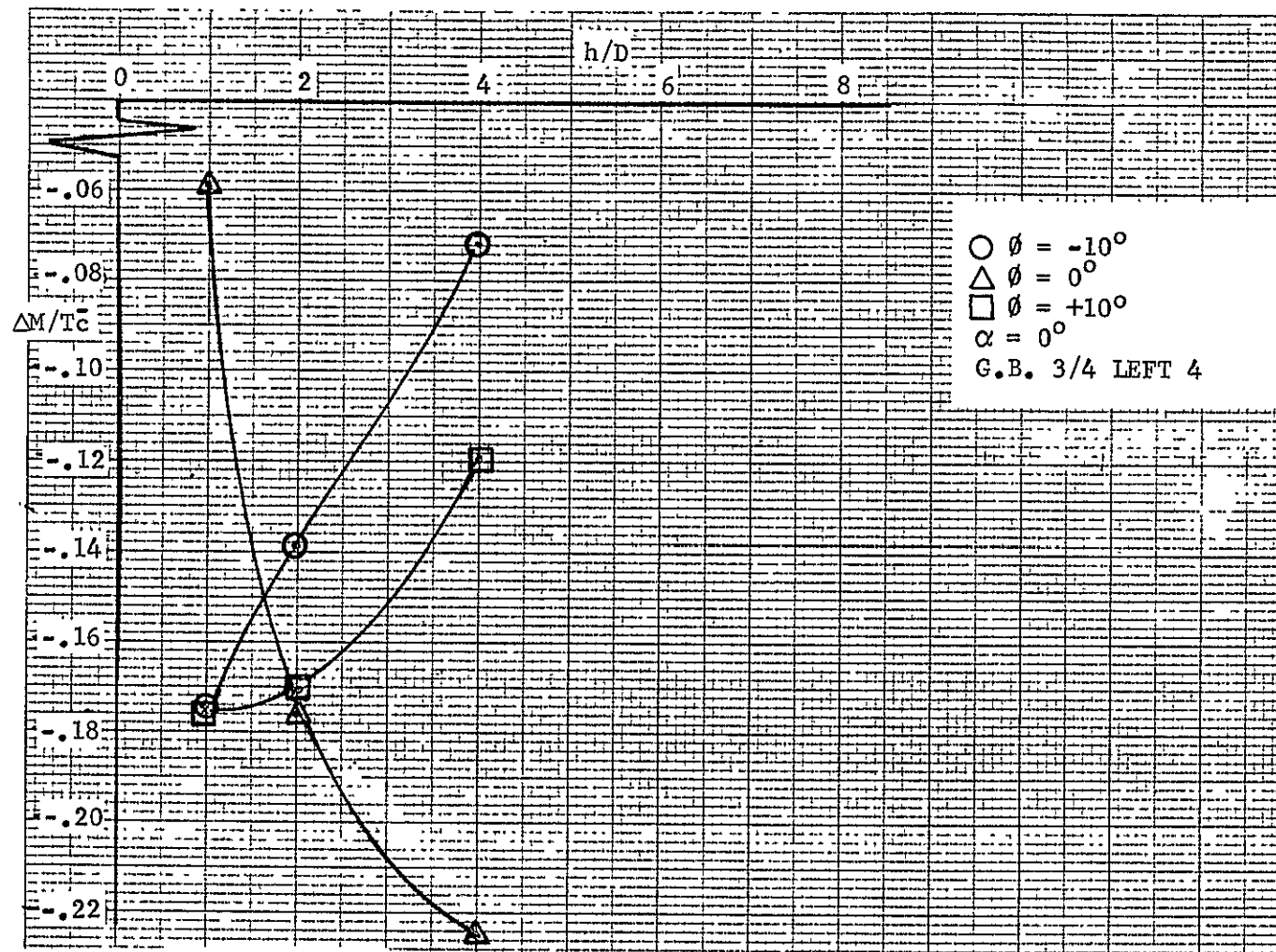


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

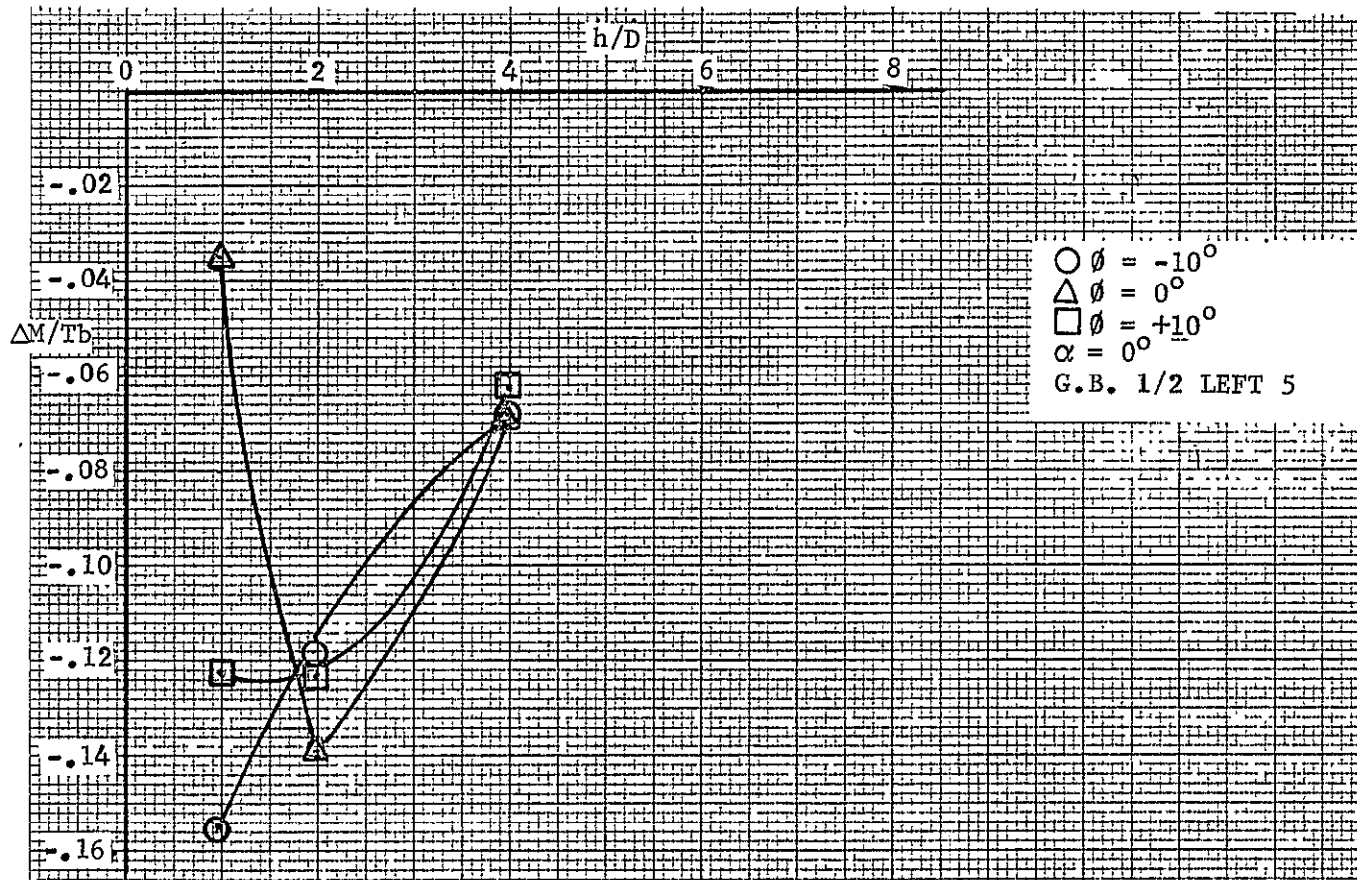
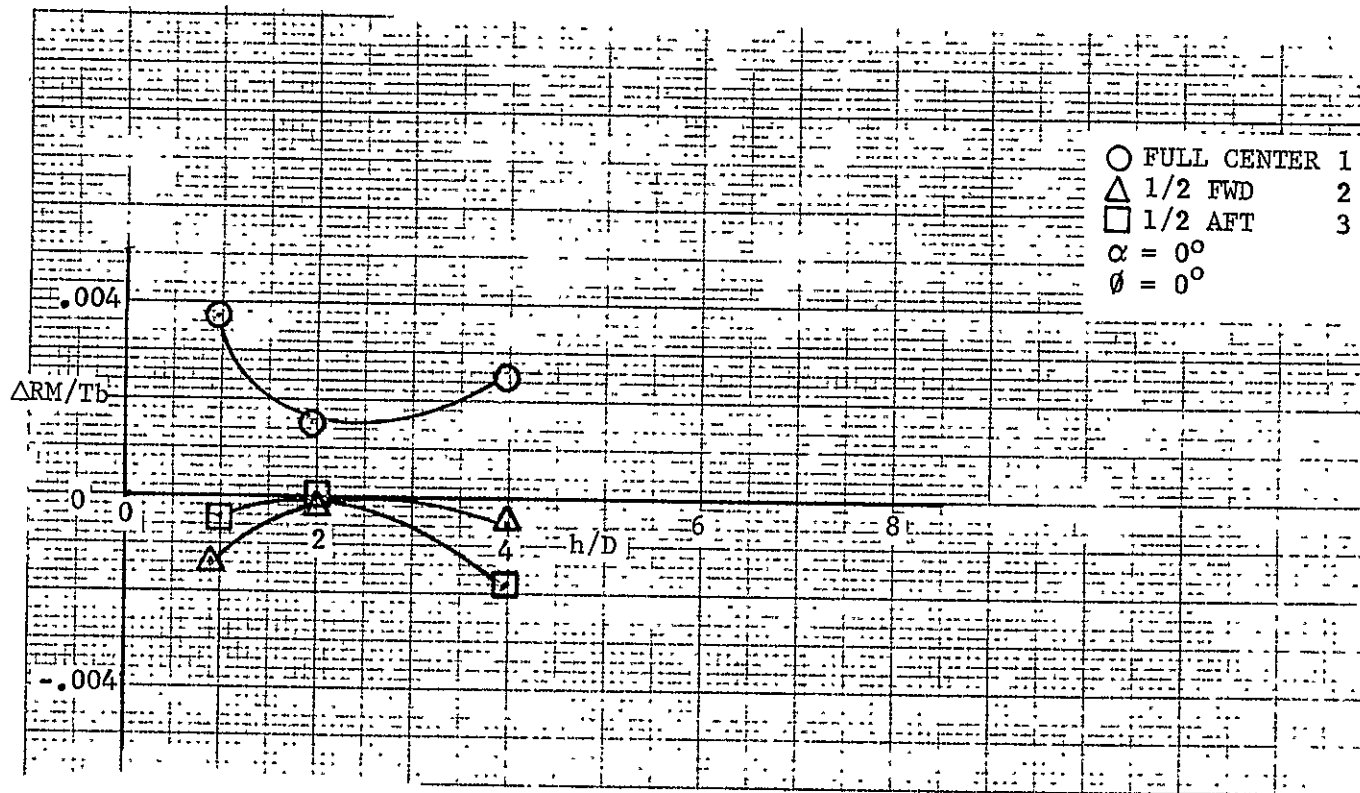


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

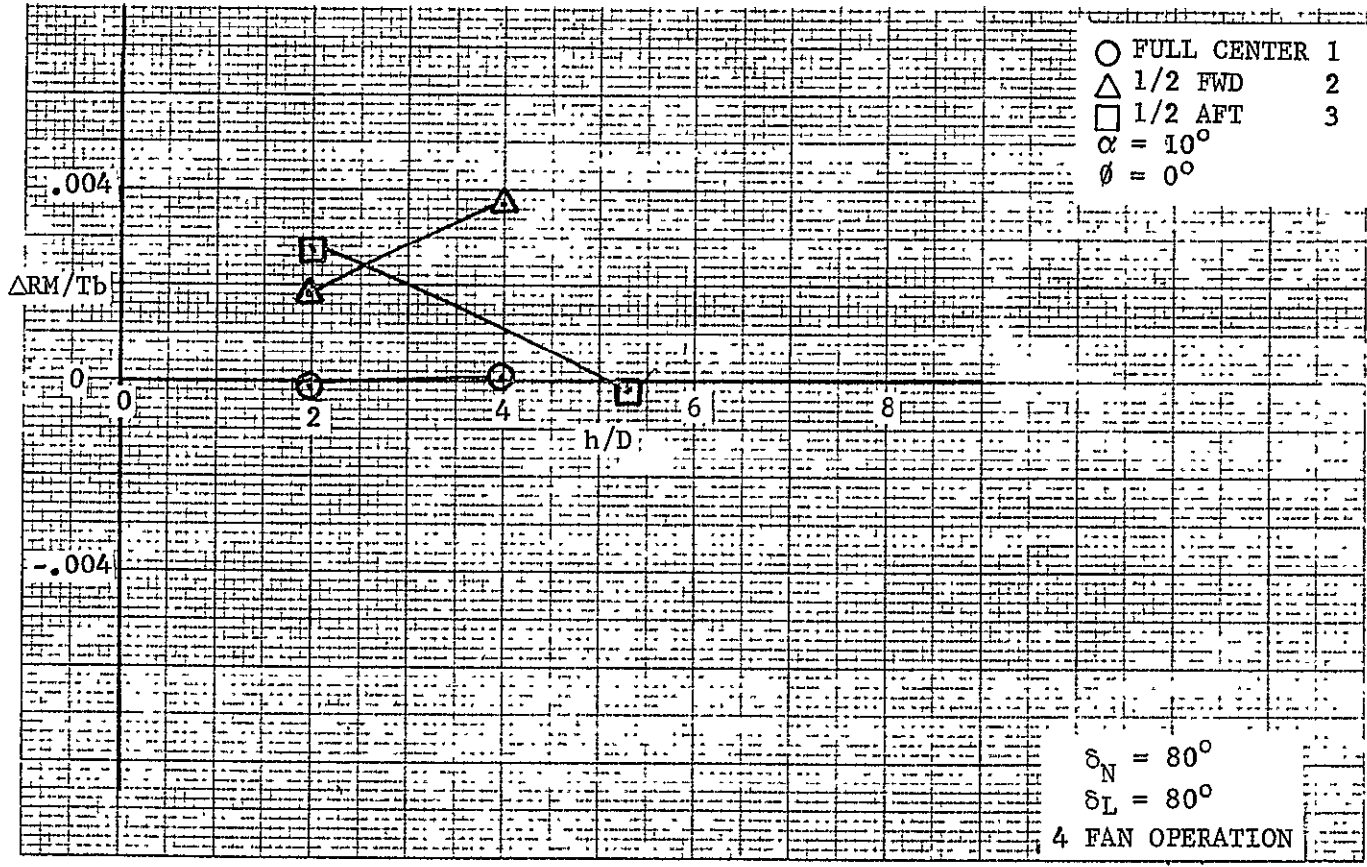


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Continued)

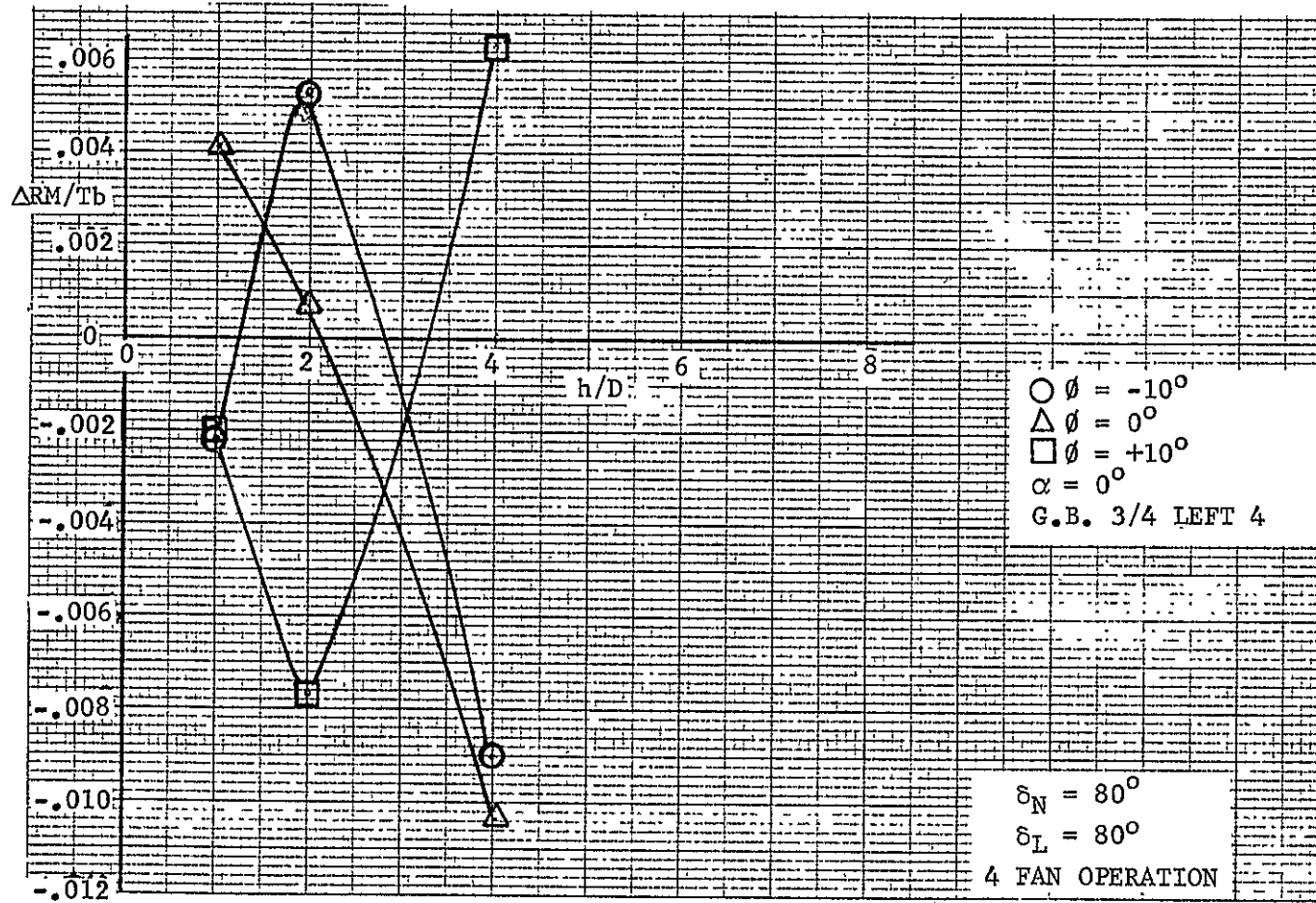


Figure B-3. Static Test Data, Four Fan, $\delta_{nr} = 80^\circ$ (Continued)

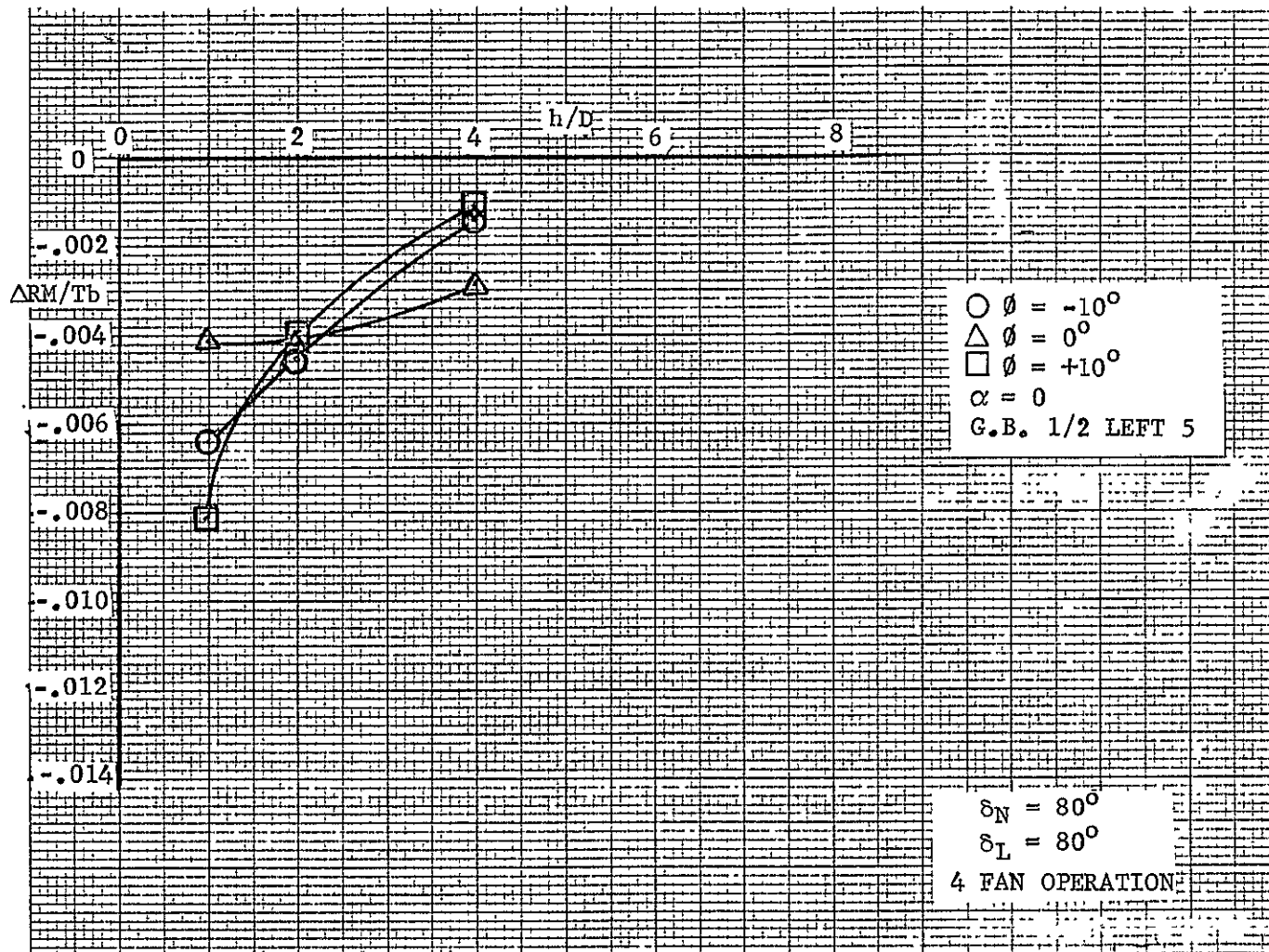


Figure B-3. Static Test Data, Four Fan, $\delta_N = 80^\circ$ (Concluded)

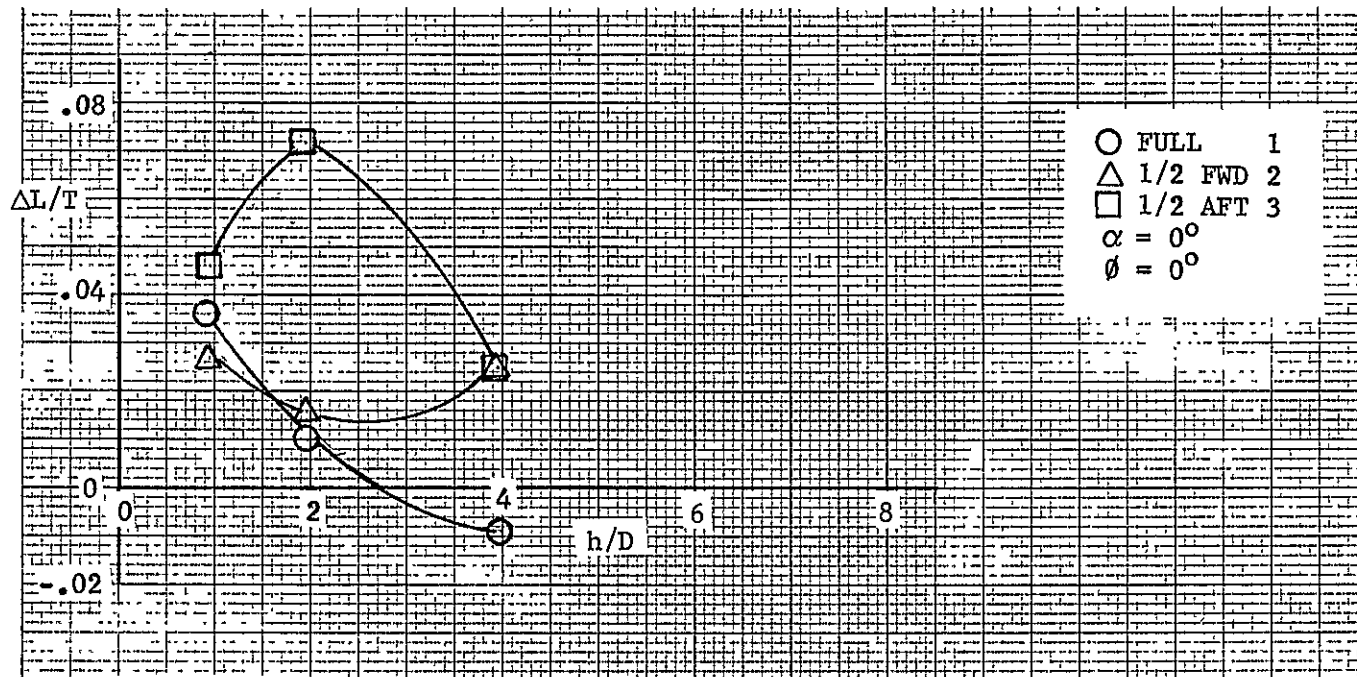


Figure B-4. Static Test Data Four Fan $\delta_{N_{fwd}} = 30^\circ$, $\delta_{N_{aft}} = 60^\circ$

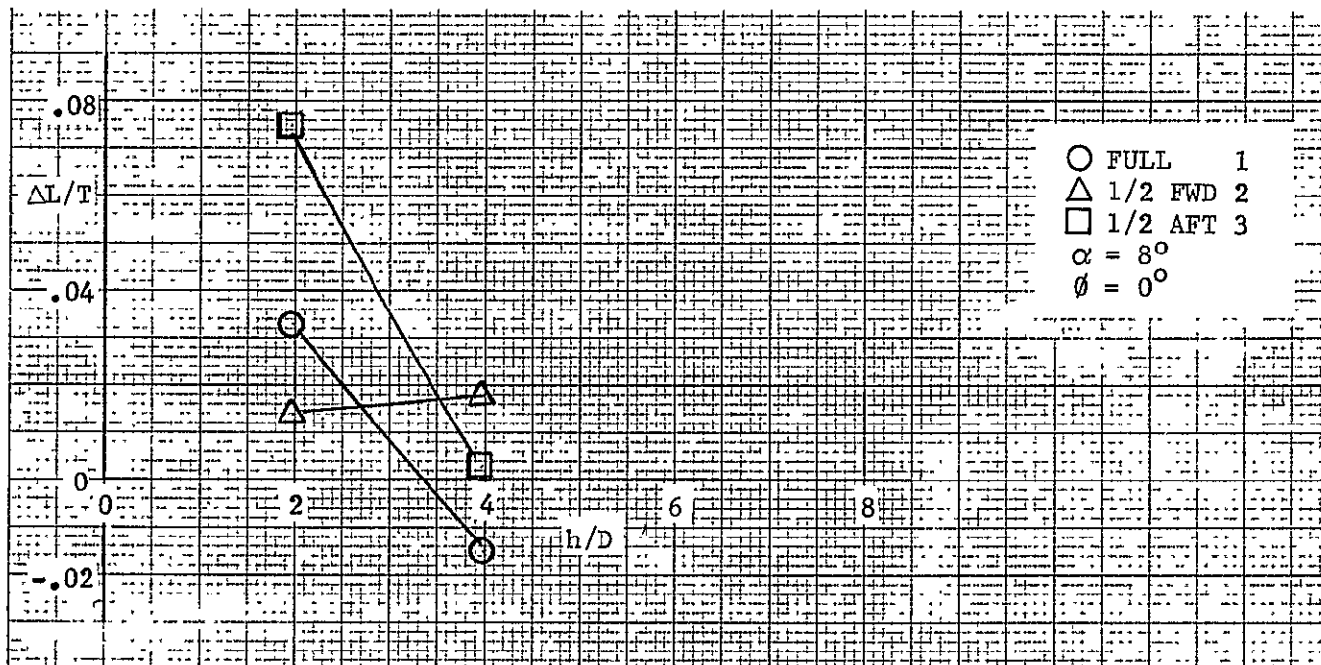


Figure B-4. Static Test Data Four Fan $\delta_{N_{fwd}} = 30^\circ$, $\delta_{N_{aft}} = 60^\circ$ (Continued)

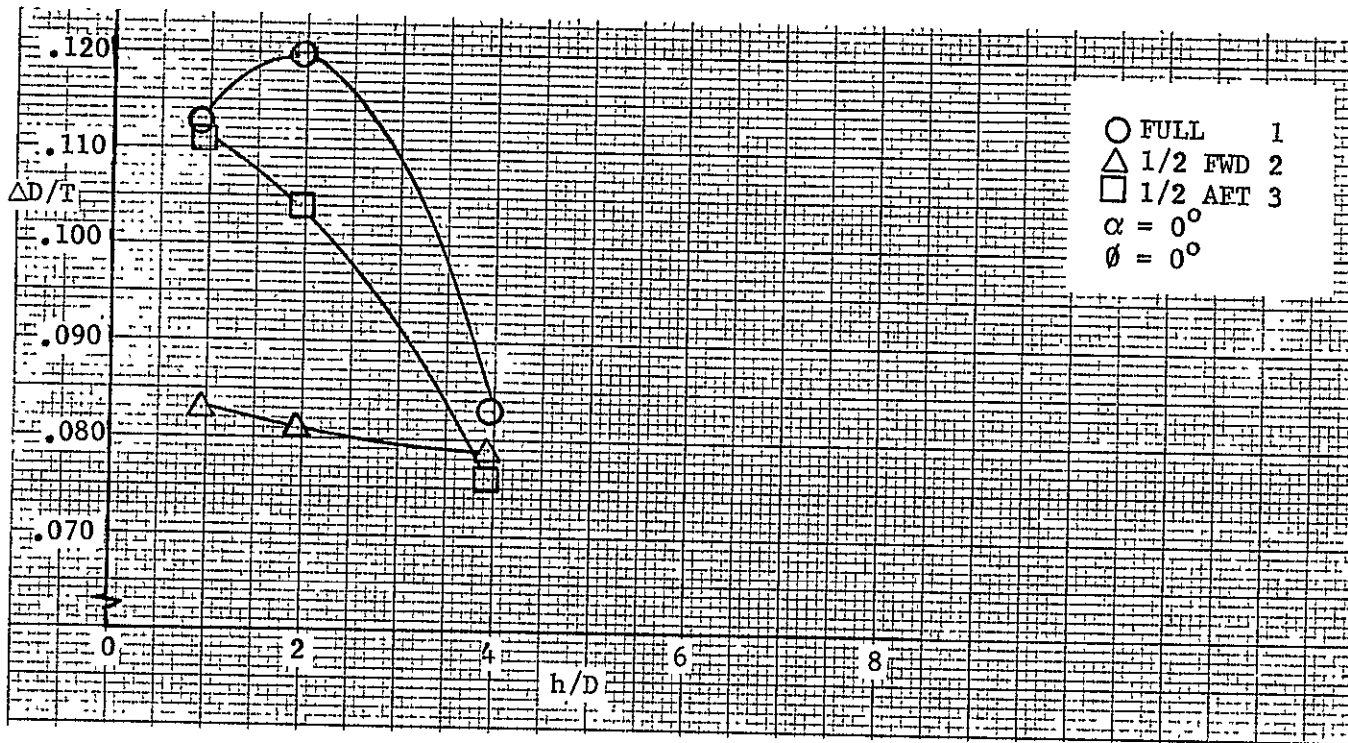


Figure B-4. Static Test Data Four Fan $\delta N_{fwd} = 30^\circ$, $\delta N_{aft} = 60^\circ$ (Continued)

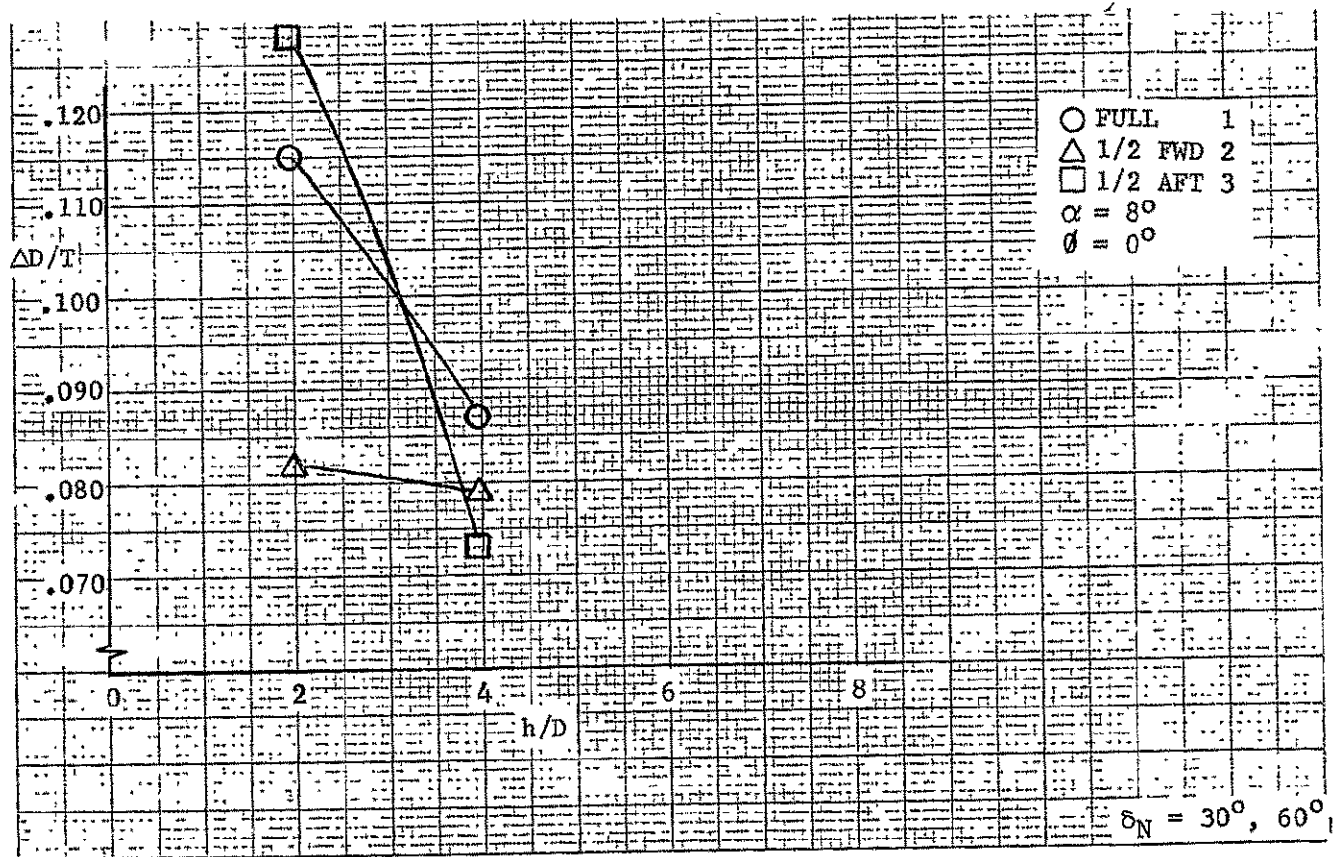


Figure B-4. Static Test Data Four Fan $\delta_{N_{fwd}} = 30^\circ$, $\delta_{N_{aft}} = 60^\circ$ (Continued)

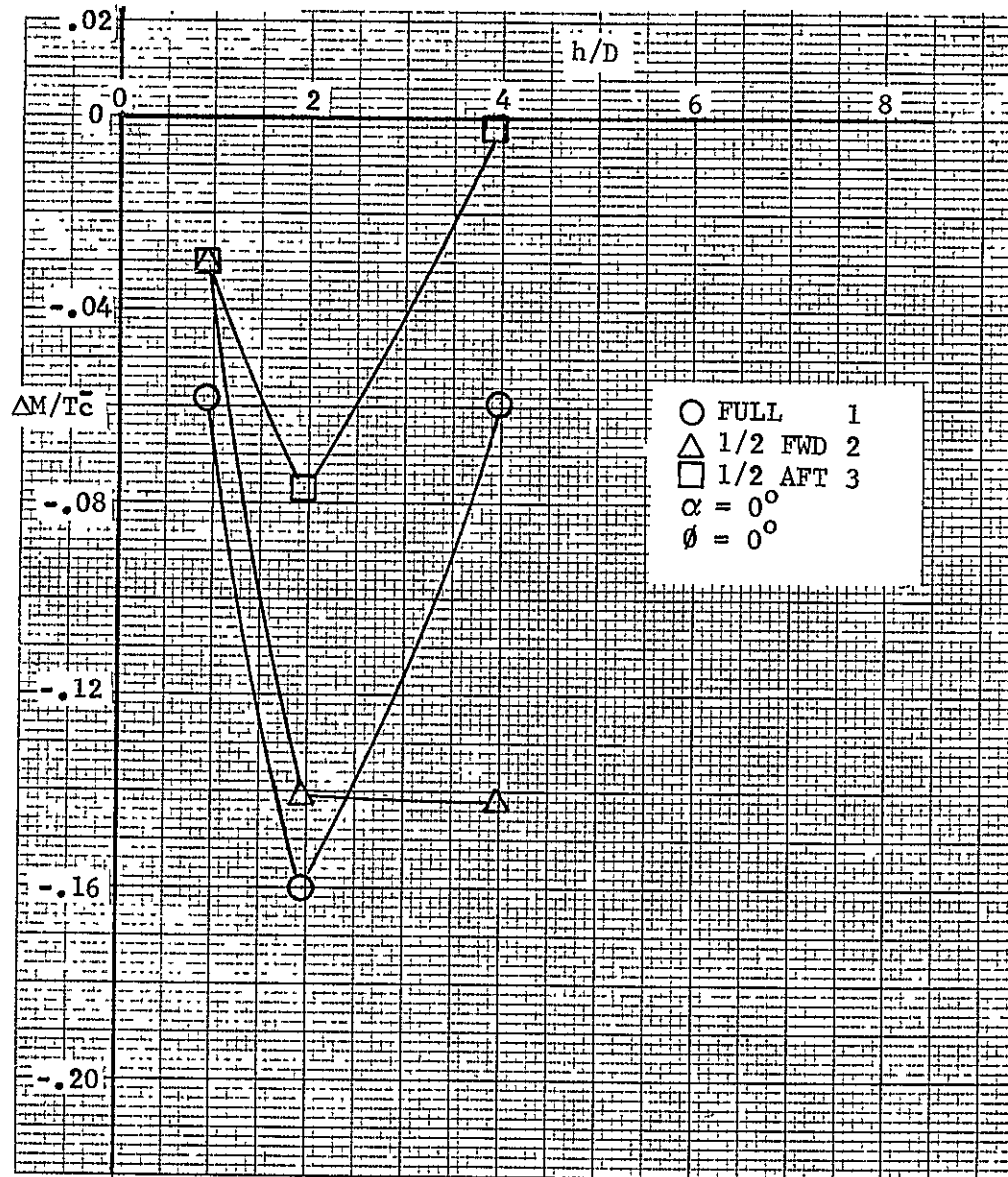


Figure B-4. Static Test Data Four Fan $\delta_{N_{fwd}} = 30^\circ$, $\delta_{N_{aft}} = 60^\circ$ (Continued)

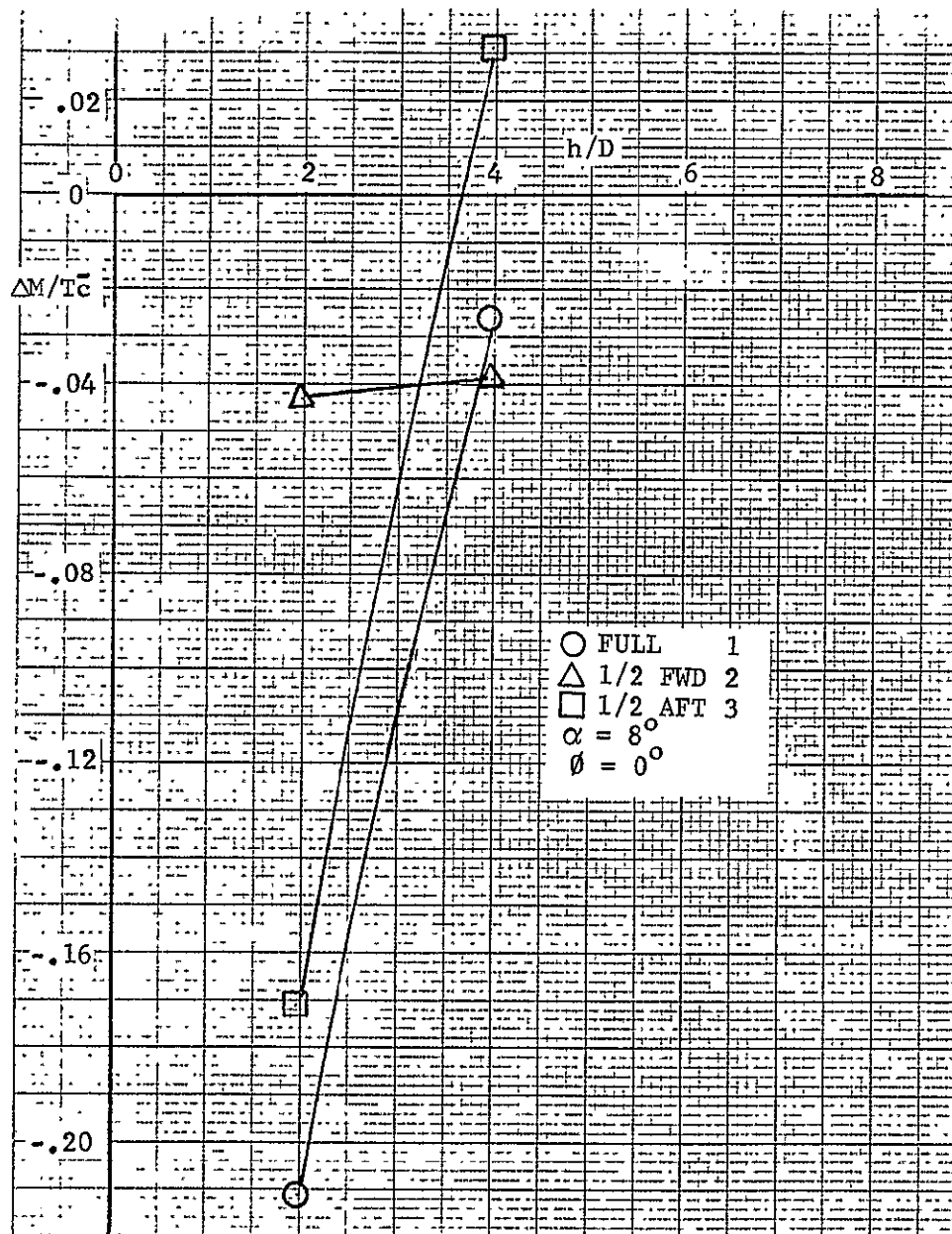


Figure B-4. Static Test Data Four Fan $\delta_{N_{fwd}} = 30^\circ$, $\delta_{N_{aft}} = 60^\circ$ (Continued)

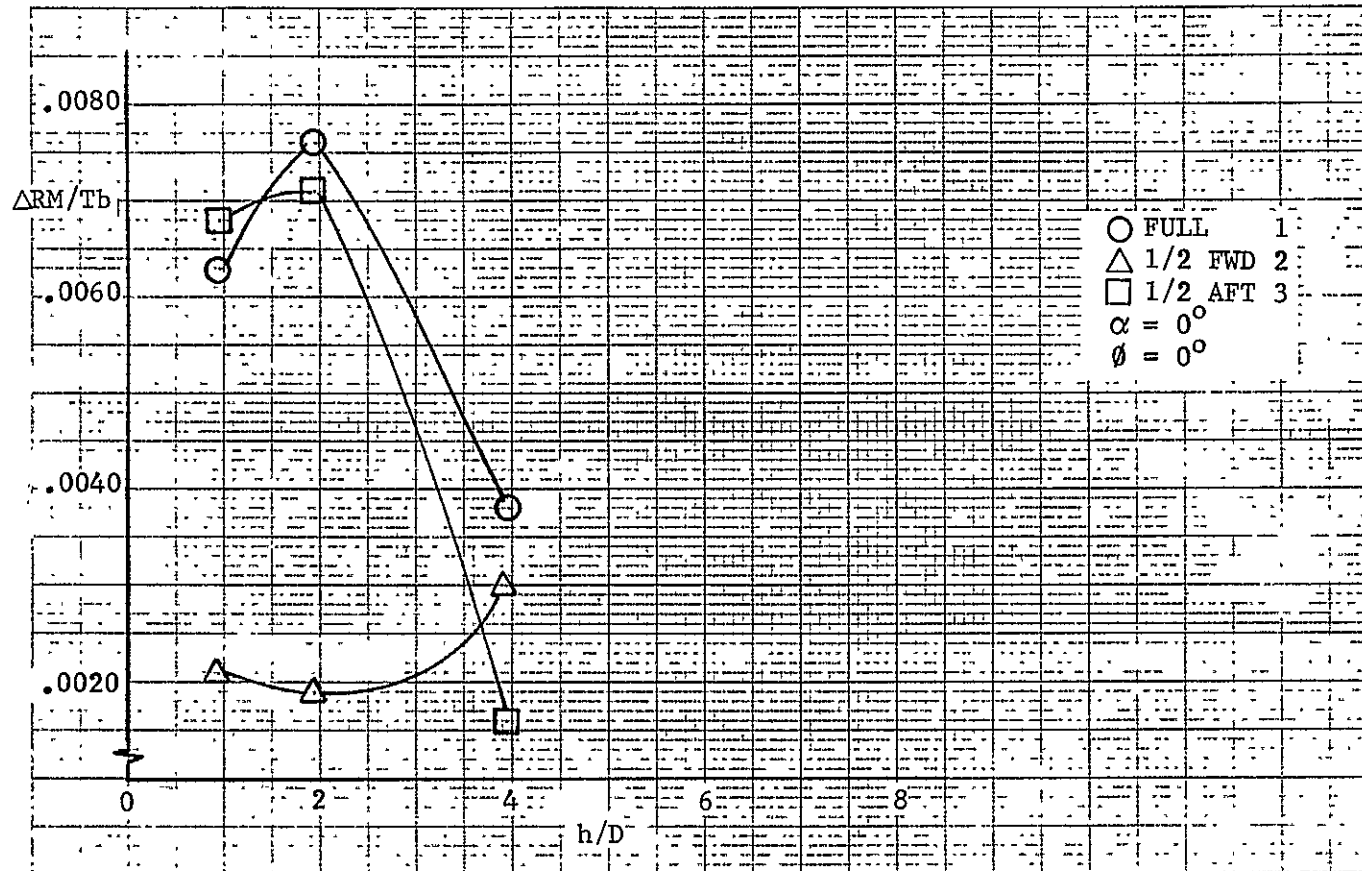


Figure B-4. Static Test Data Four Fan $\delta_{N_{fwd}} = 30^\circ$, $\delta_{N_{aft}} = 60^\circ$ (Continued)

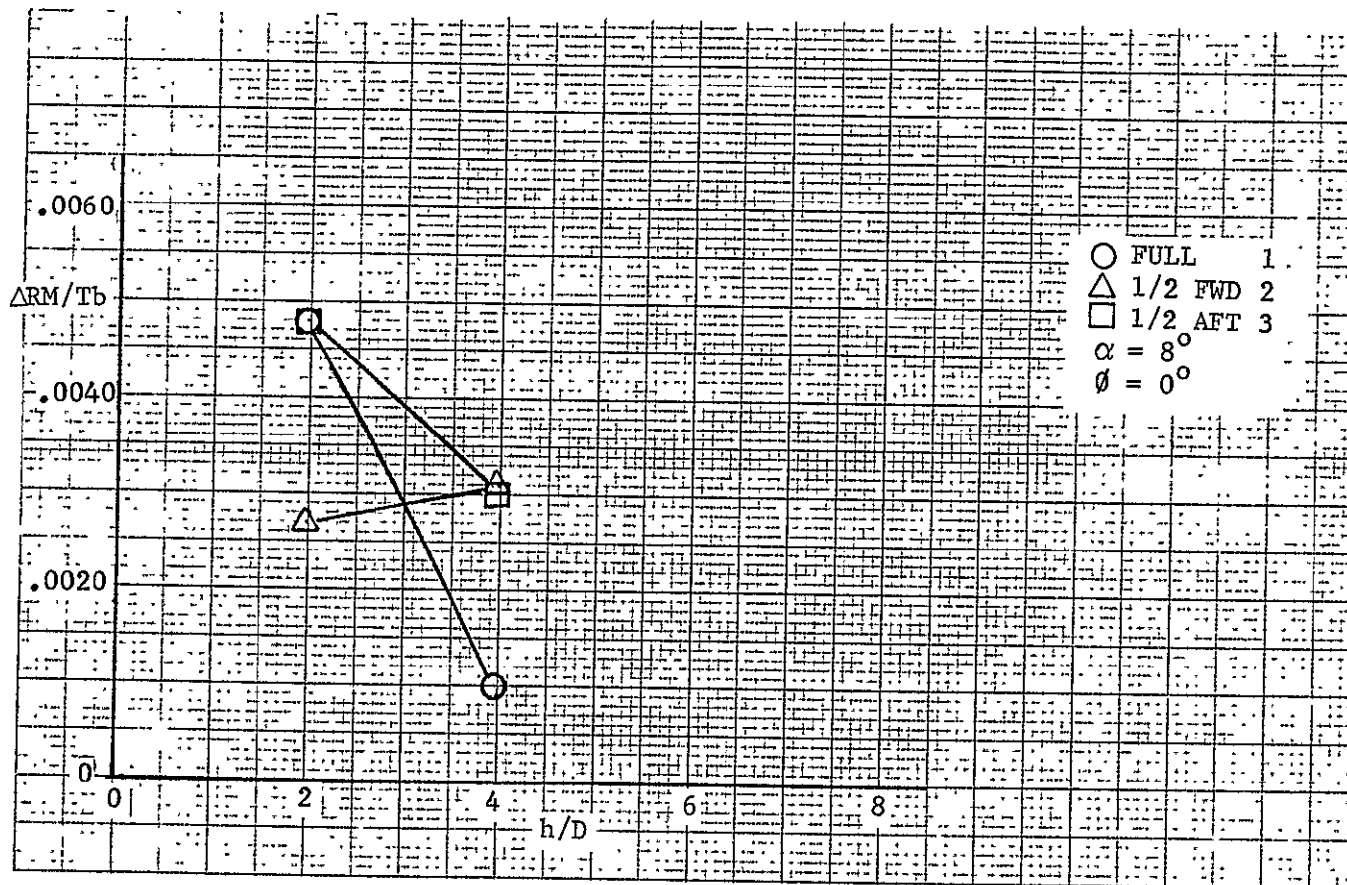


Figure B-4. Static Test Data Four Fan $\delta_{N_{fwd}} = 30^\circ$, $\delta_{N_{aft}} = 60^\circ$ (Continued)

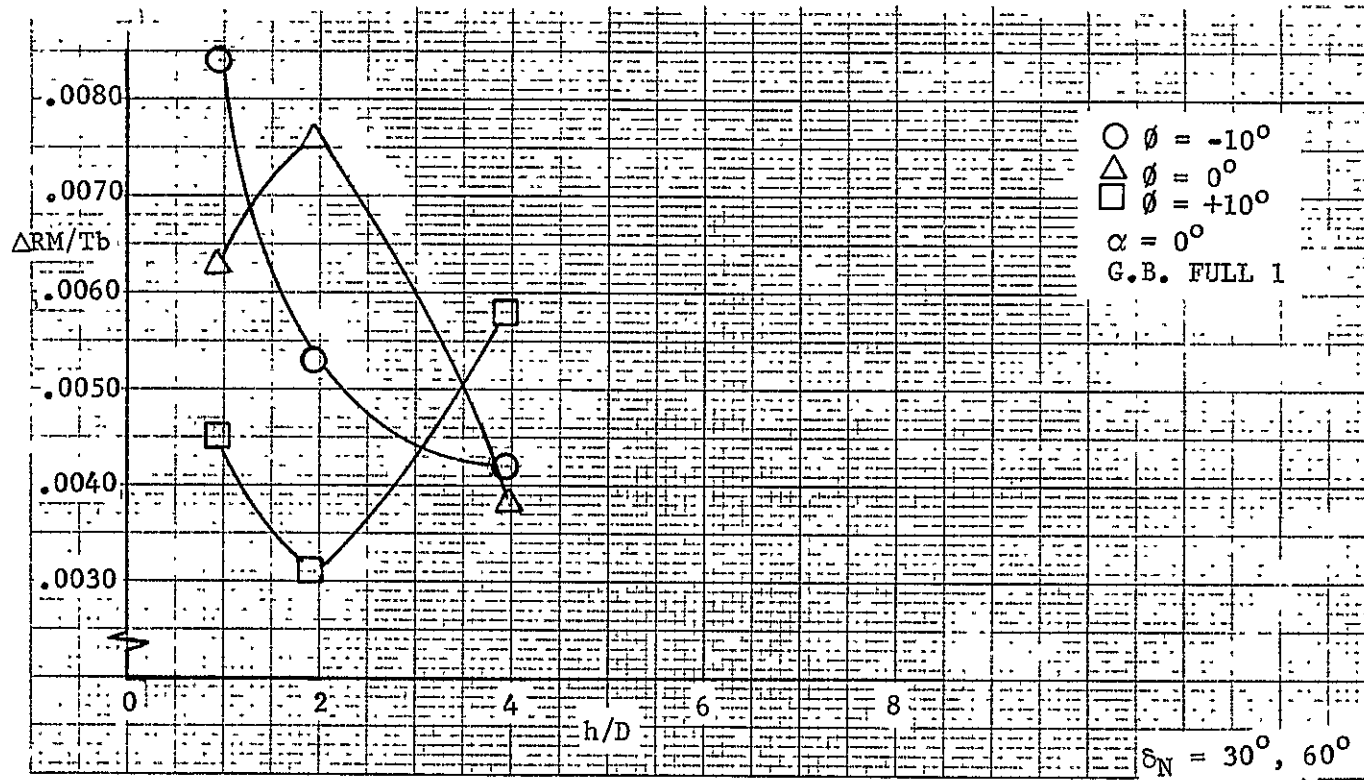


Figure B-4. Static Test Data | Four Fan $\delta_{N_{fwd}} = 30^\circ$, $\delta_{N_{aft}} = 60^\circ$ (Continued)

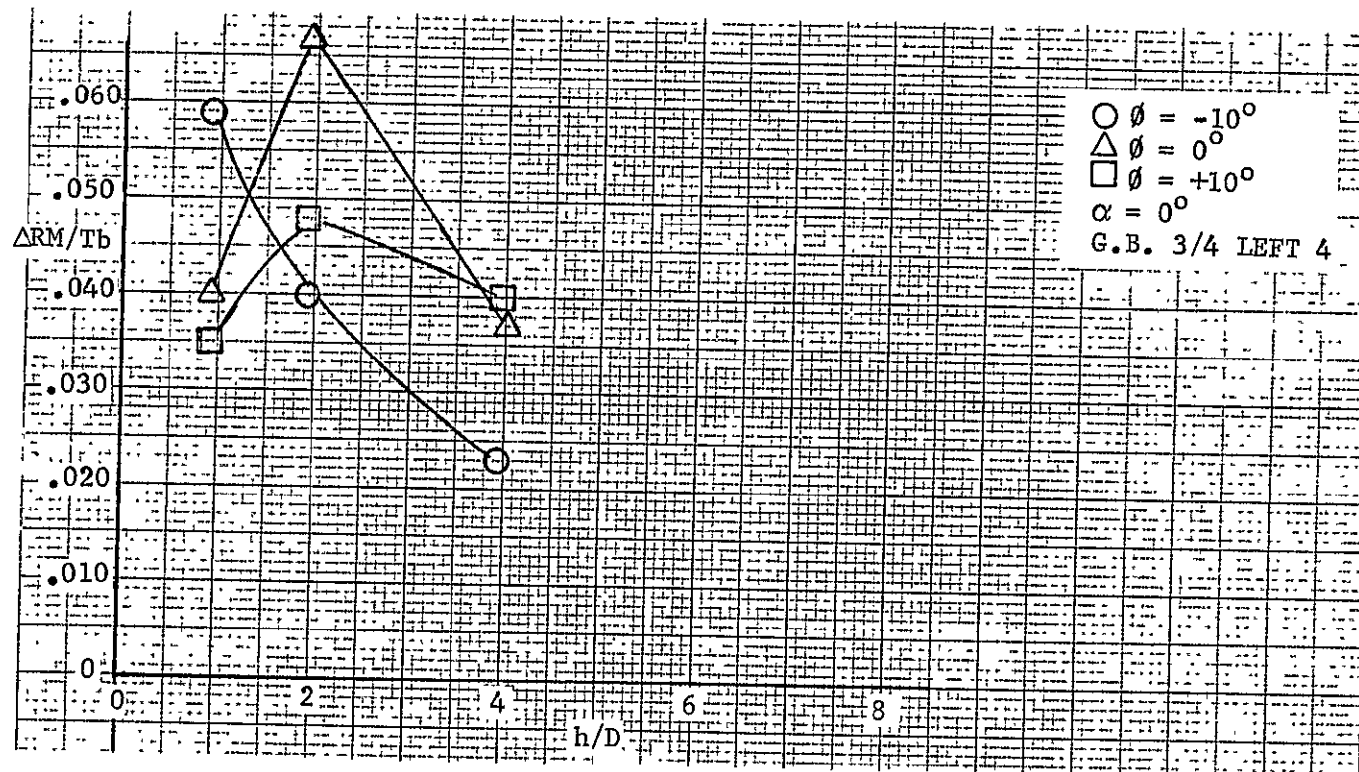


Figure B-4. Static Test Data Four Fan $\delta_{N_{fwd}} = 30^\circ$, $\delta_{N_{aft}} = 60^\circ$ (Continued)

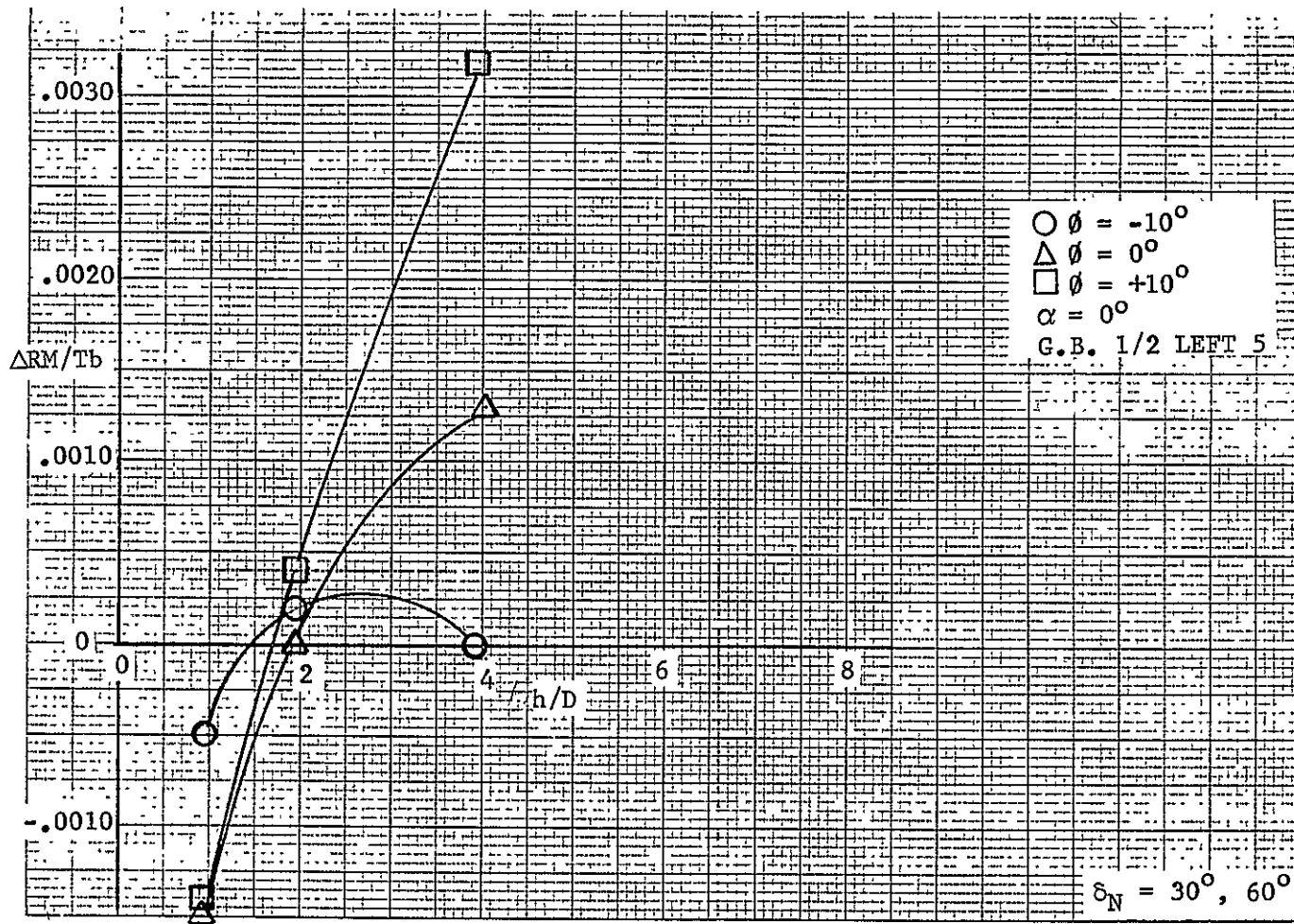


Figure B-4. Static Test Data Four Fan $\delta_{N_{fwd}} = 30^\circ$, $\delta_{N_{aft}} = 60^\circ$ (Concluded)

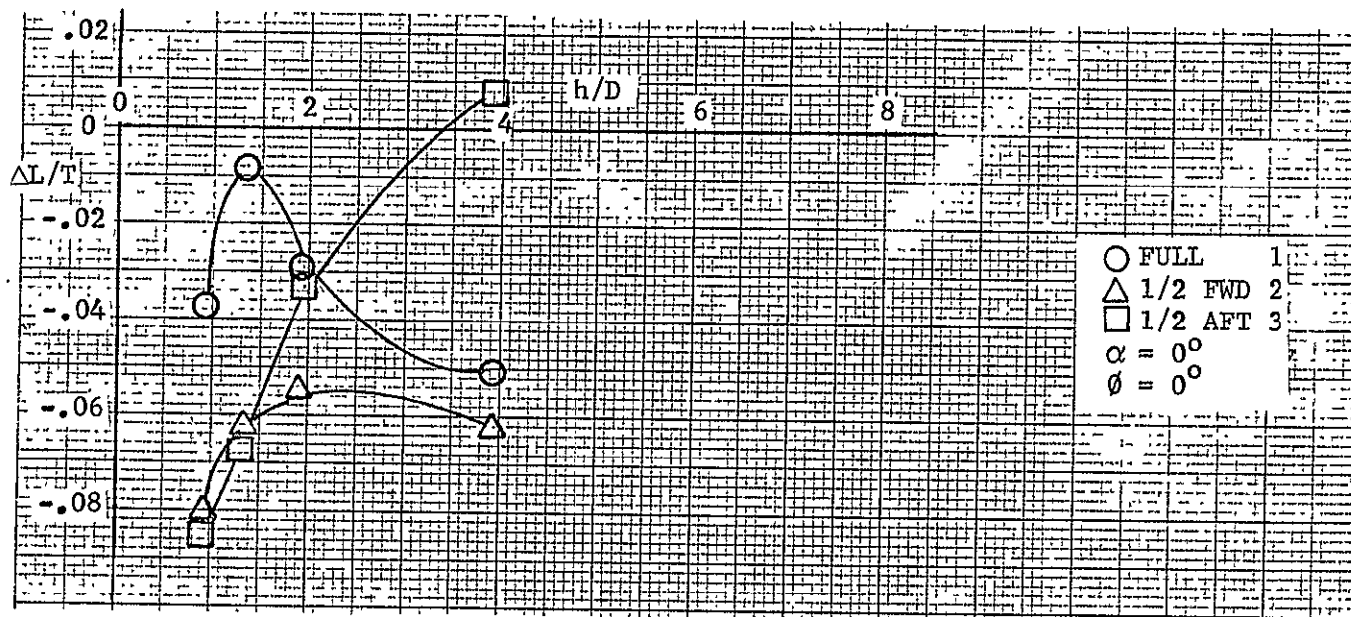


Figure B-5. Static Test Data Three Fan $\delta_{N_{nose}} = 80^\circ$, $\delta_{N_{aft}} = 90^\circ$

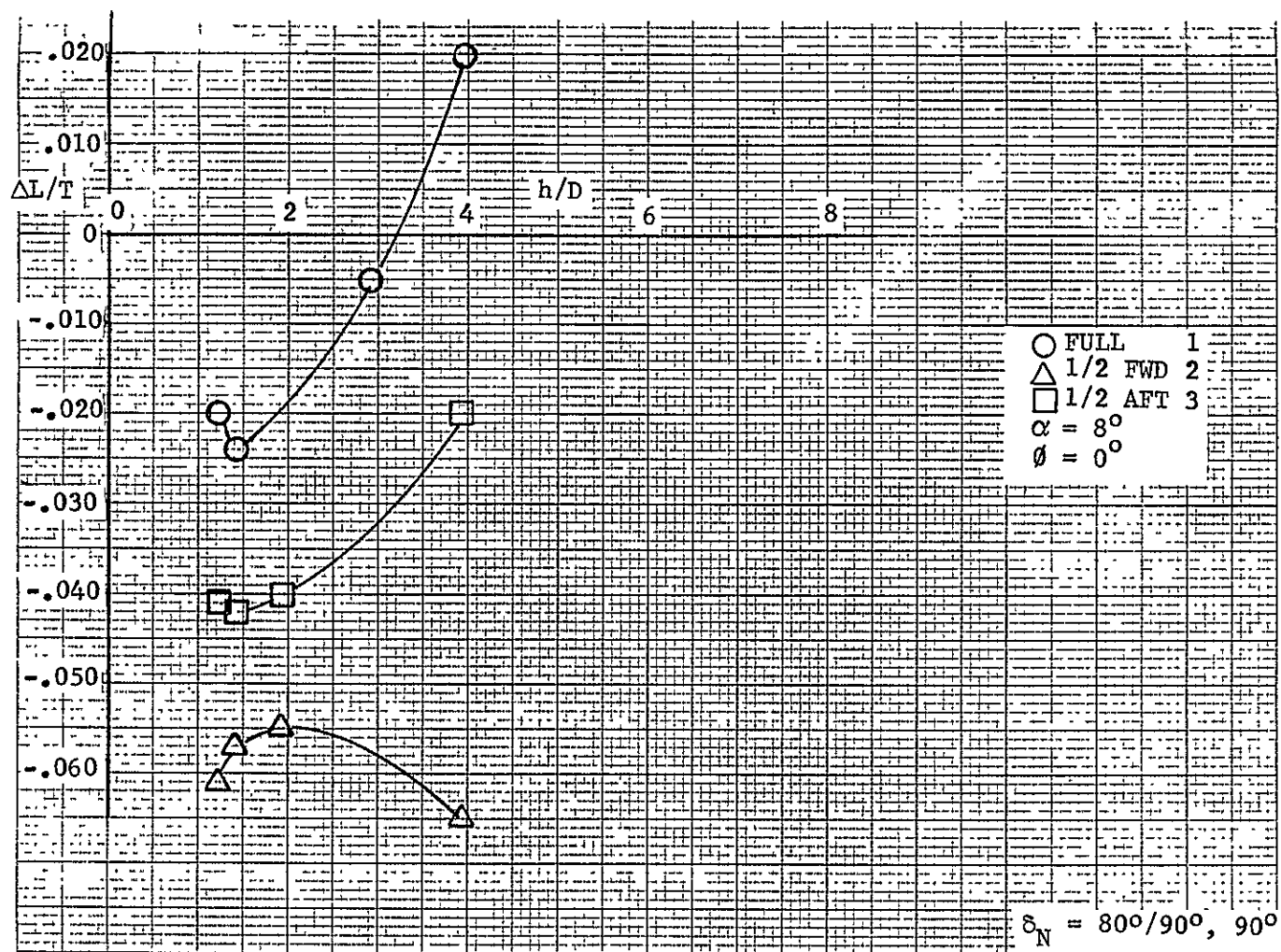


Figure B-5. Static Test Data Three Fan $\delta_{N_{nose}} = 80^\circ$, $\delta_{N_{aft}} = 90^\circ$ (Continued)

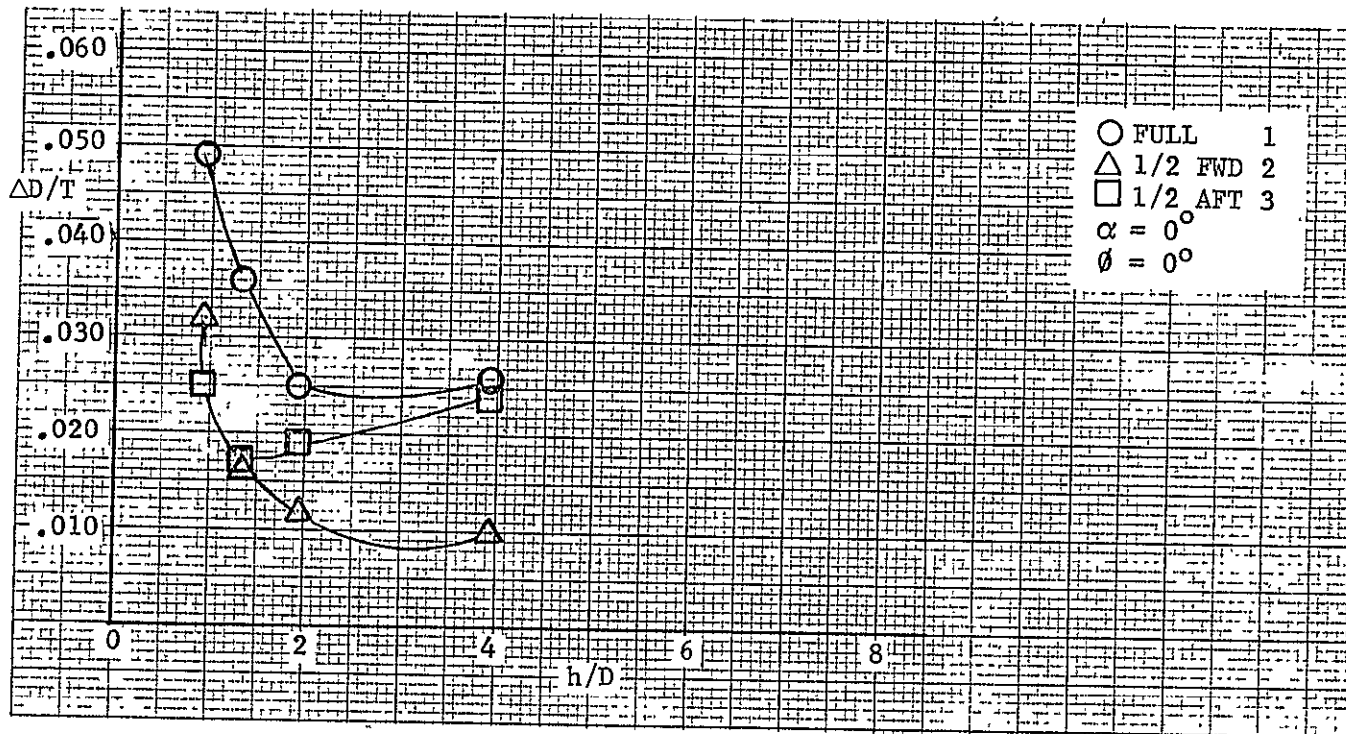


Figure B-5. Static Test Data Three Fan $\delta_{N_{nose}} = 80^\circ$, $\delta_{N_{aft}} = 90^\circ$ (Continued)

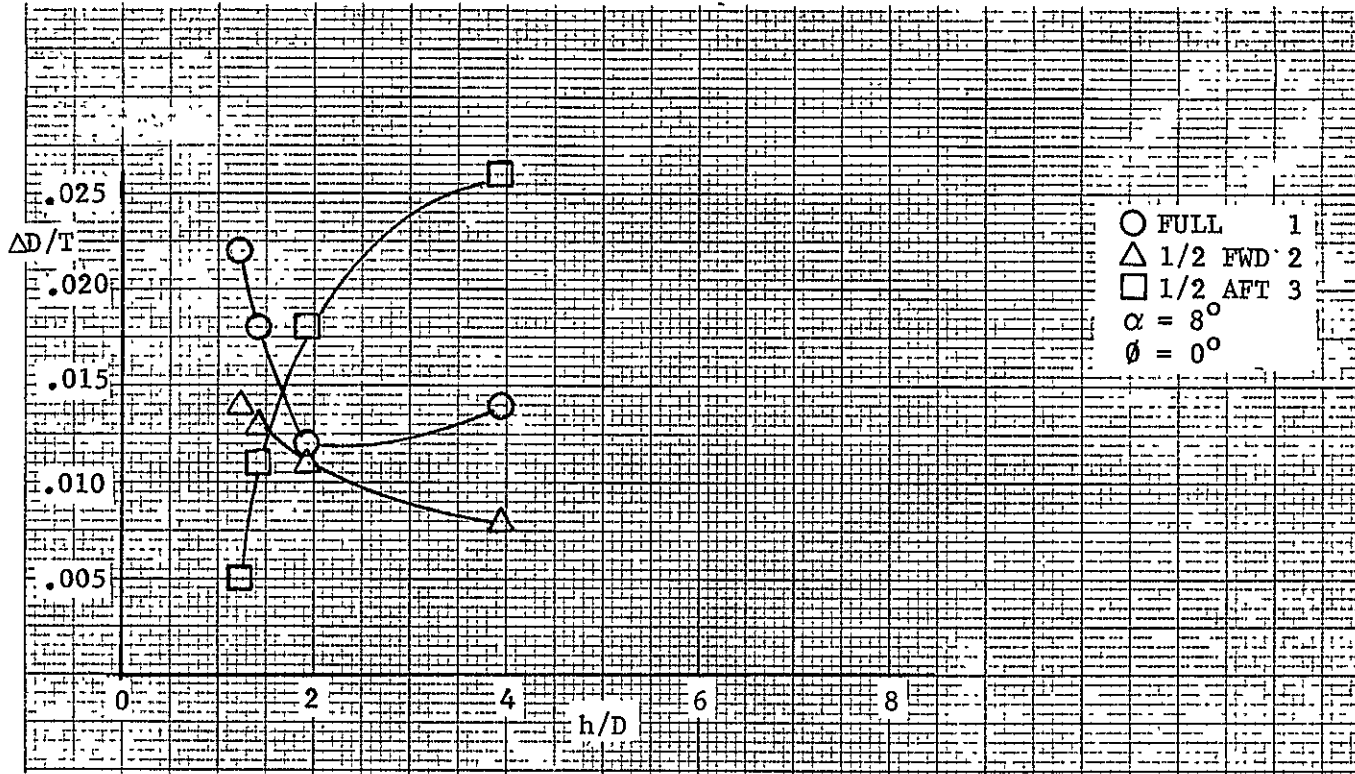


Figure B-5. Static Test Data Three Fan $\delta_{N_{nose}} = 80^\circ$, $\delta_{N_{aft}} = 90^\circ$ (Continued)

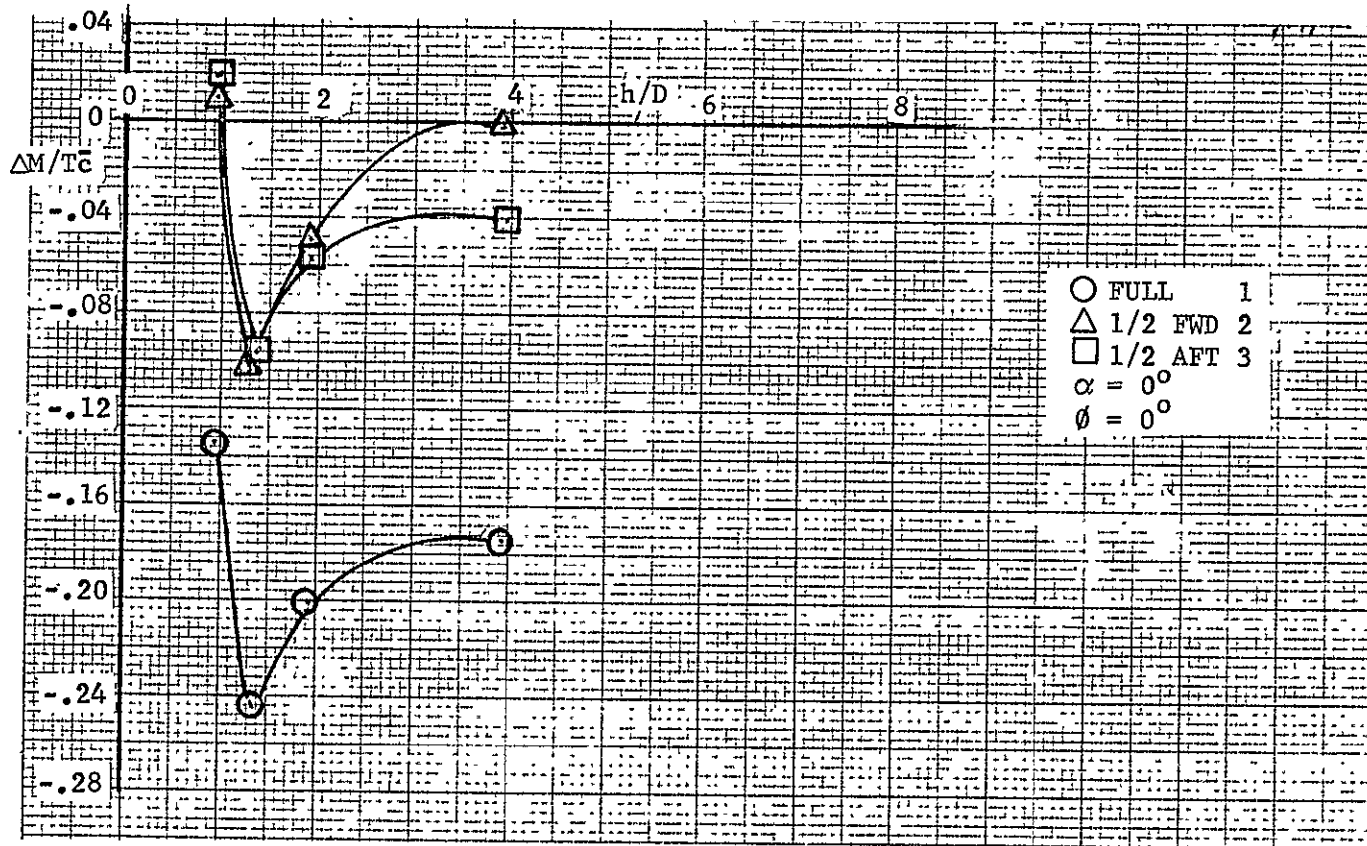


Figure B-5. Static Test Data Three Fan $\delta_{N_{nose}} = 80^\circ$, $\delta_{N_{aft}} = 90^\circ$ (Continued)

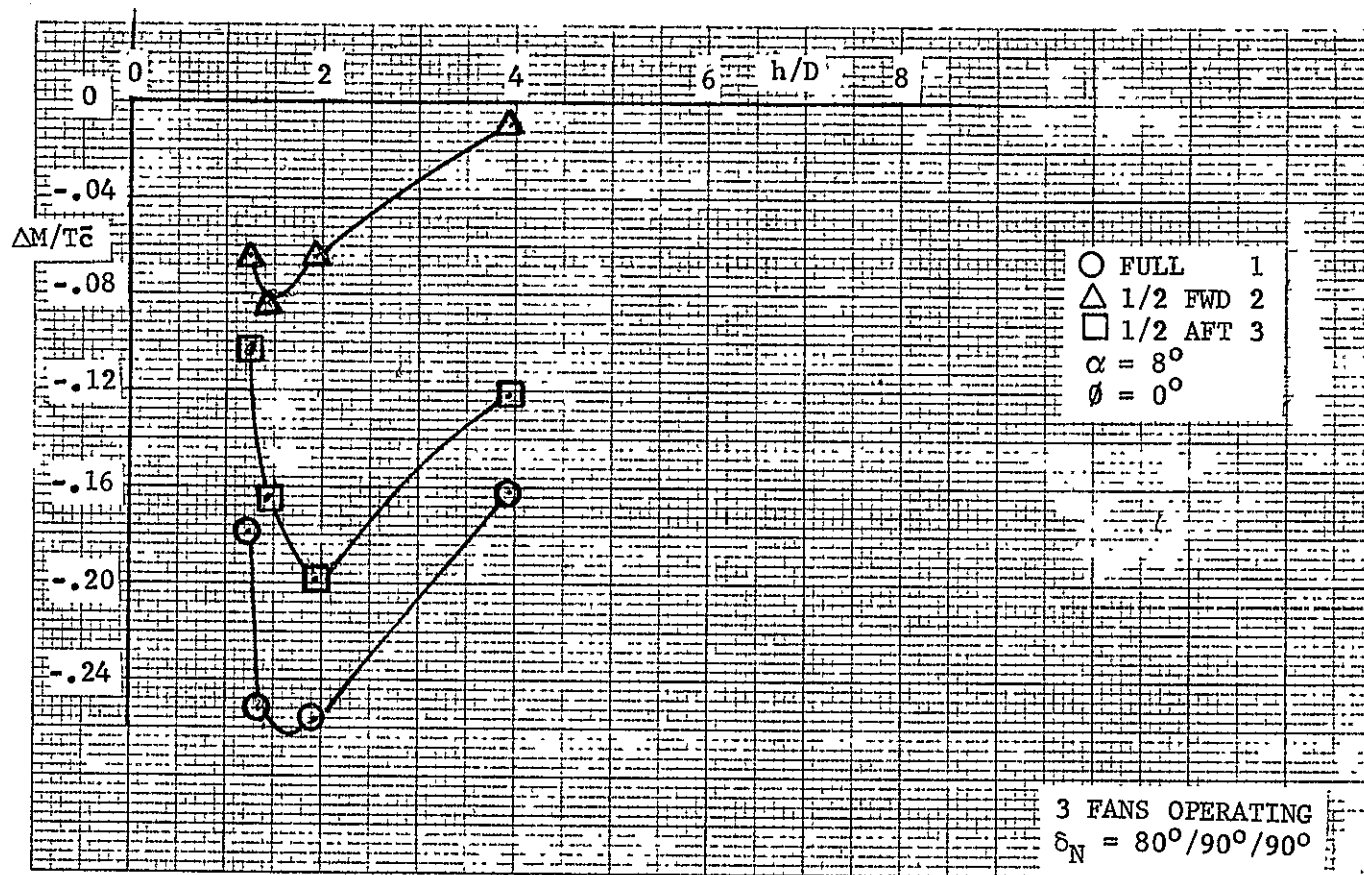


Figure B-5. Static Test Data Three Fan $\delta_{N_{nose}} = 80^\circ$, $\delta_{N_{aft}} = 90^\circ$ (Continued)

ORIGINAL PAGE IS
OF POOR QUALITY

443

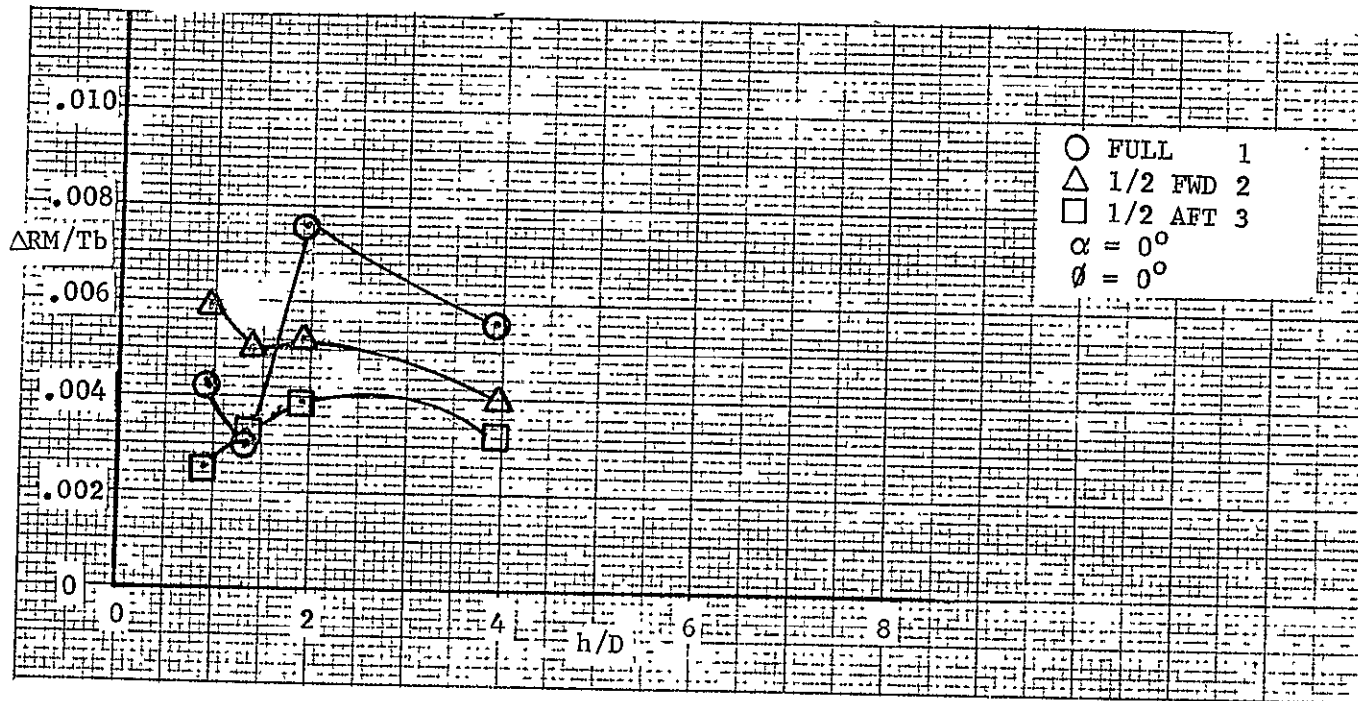


Figure B-5. Static Test Data Three Fan $\delta_{N_{nose}} = 80^\circ$, $\delta_{N_{aft}} = 90^\circ$ (Continued)

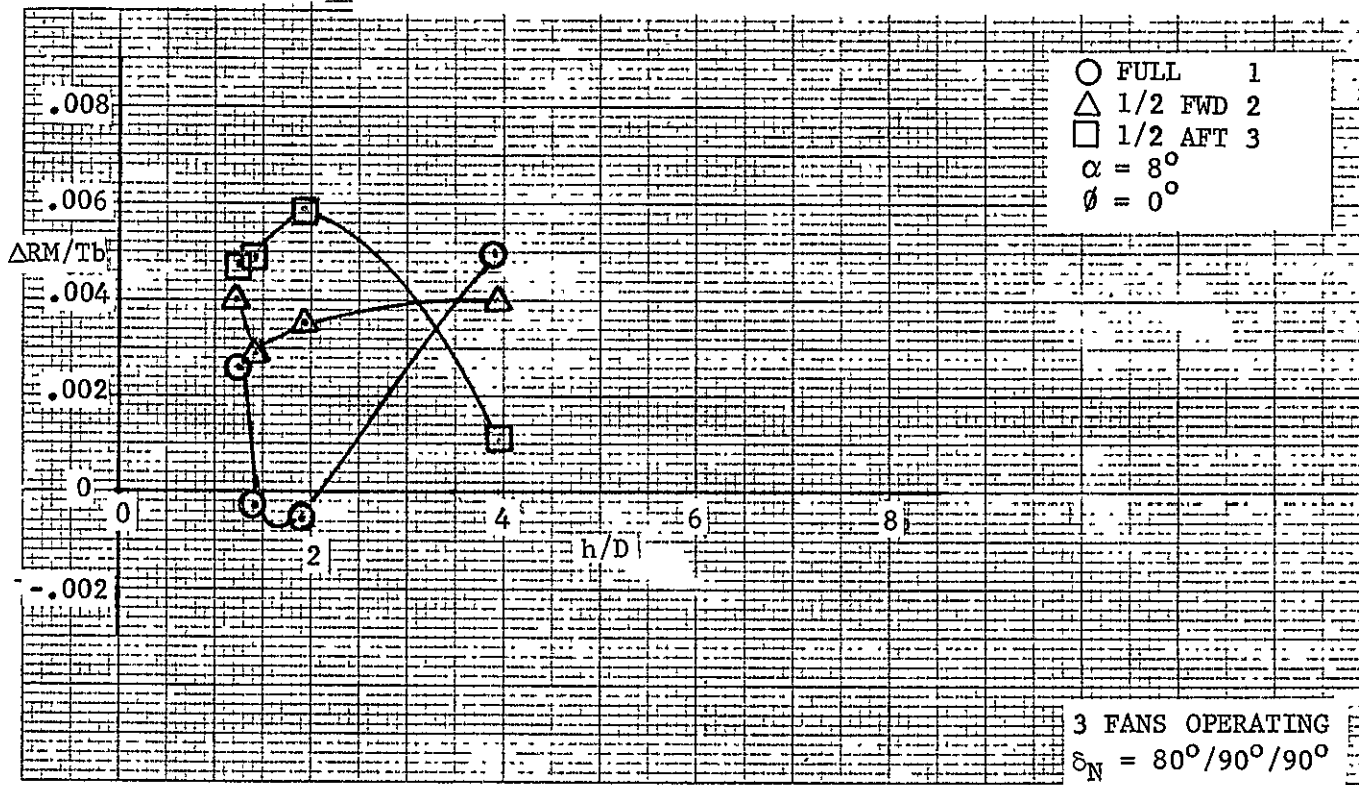


Figure B-5. Static Test Data Three Fan $\delta_{N_{nose}} = 80^\circ$, $\delta_{N_{aft}} = 90^\circ$ (Continued)

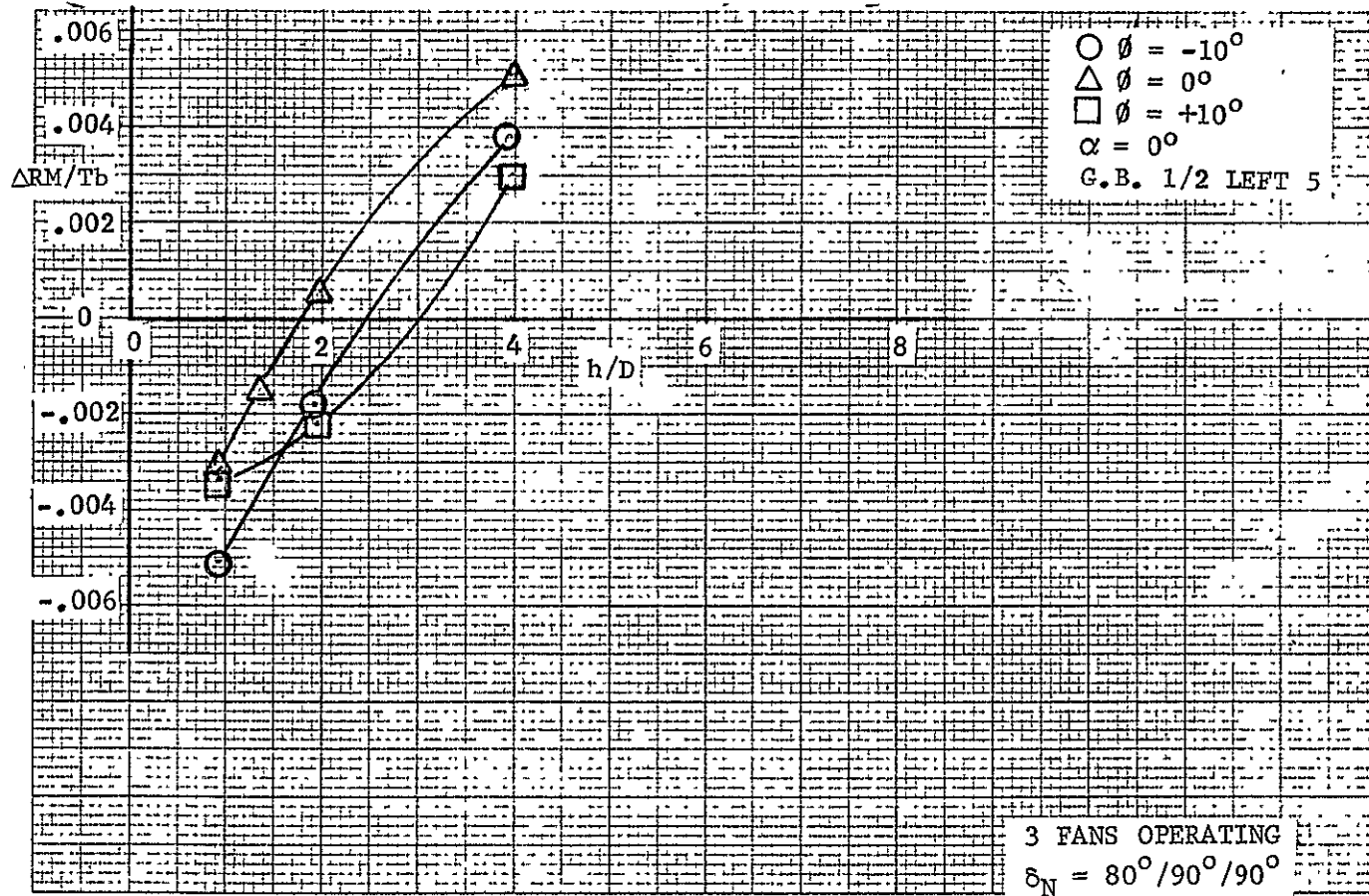


Figure B-5. Static Test Data Three Fan $\delta_{N_{nose}} = 80^\circ$, $\delta_{N_{aft}} = 90^\circ$ (Concluded)

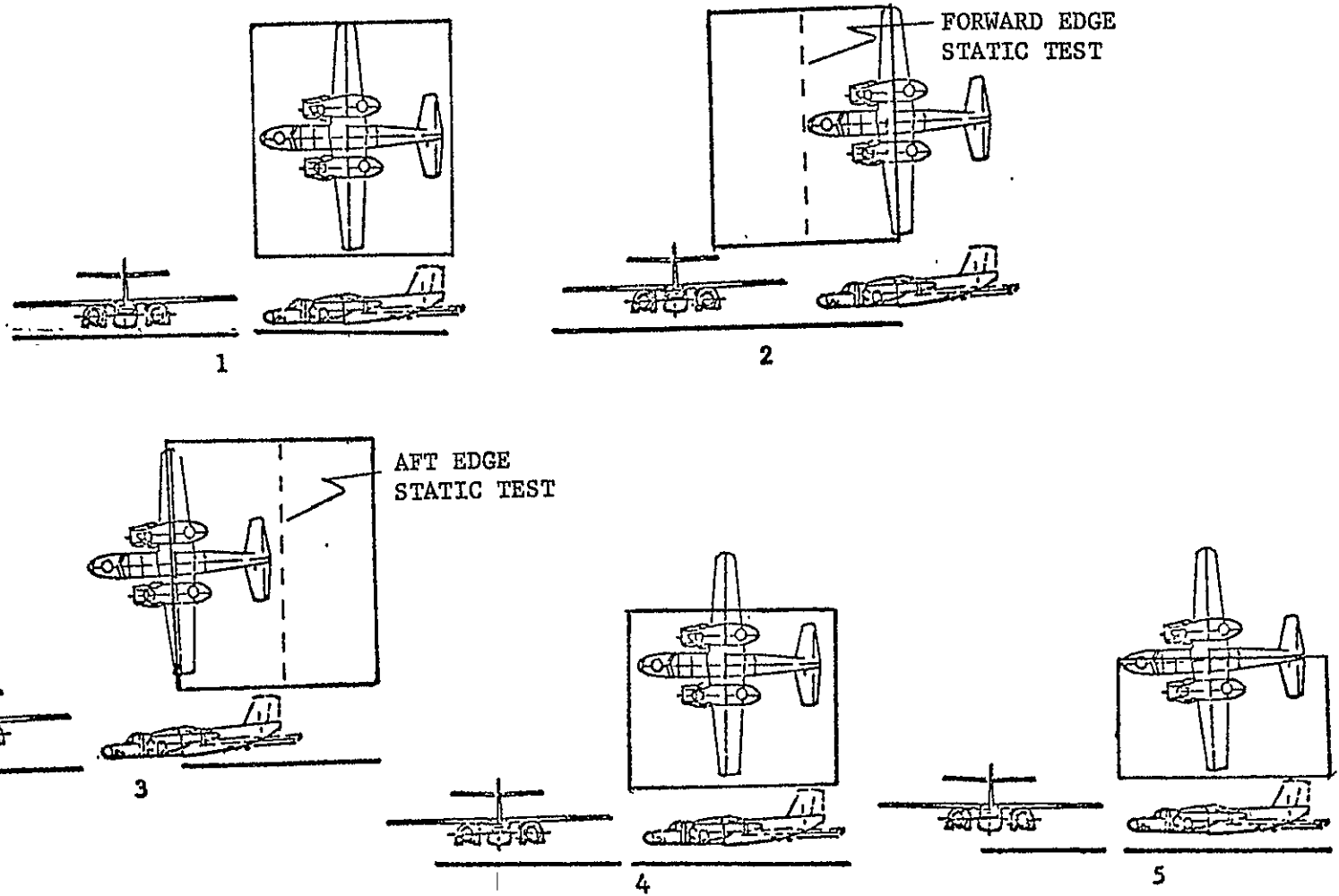


Figure B-6. Ground Board Configurations

LOW SPEED WIND TUNNEL TEST
OF GROUND PROXIMITY AND DECK EDGE
EFFECTS ON A LIFT-CRUISE-FAN V/STOL
CONFIGURATION

Vearl R. Stewart
Rockwell International
Columbus Aircraft Division

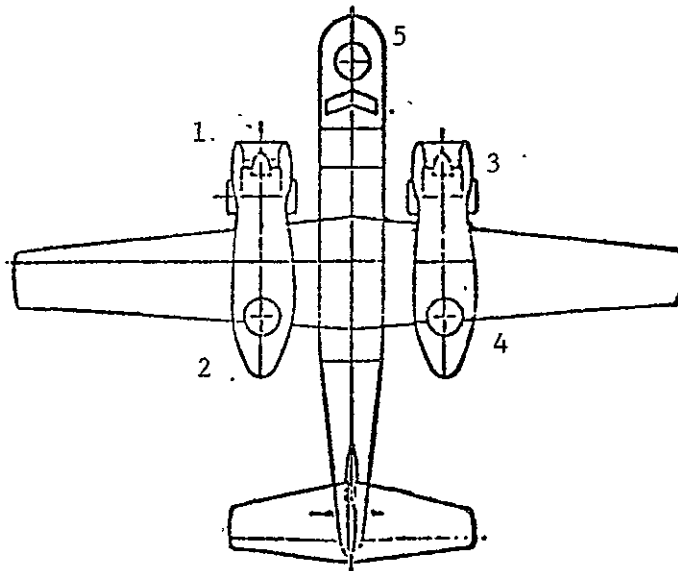
APPENDIX C - FAN CALIBRATION DATA

VOLUME II

TO SUMMARY REPORT CR-152247

LIST OF ILLUSTRATIONS

Figure	Title	Page
C-1	Fan Nomenclature	449
C-2	Fan Calibration Data, Fan #1, Ser. No. 364	450
C-3	Fan Calibration Data, Fan #2, Ser. No. 366	455
C-4	Fan Calibration Data, Fan #3, Ser. No. 365	460
C-5	Fan Calibration Data, Fan #4, Ser. No. 367	465
C-6	Fan Calibration Data, Fan #5, Ser. No. 421	475



Fan No.	Ser. No.	Location
1	364	Left Hand Nacelle Forward
2	366	Left Hand Nacelle Aft
3	365	Right Hand Nacelle Forward
4	367	Right Hand Nacelle Aft
5	421	Nose

Figure C-1. Fan Nomenclature

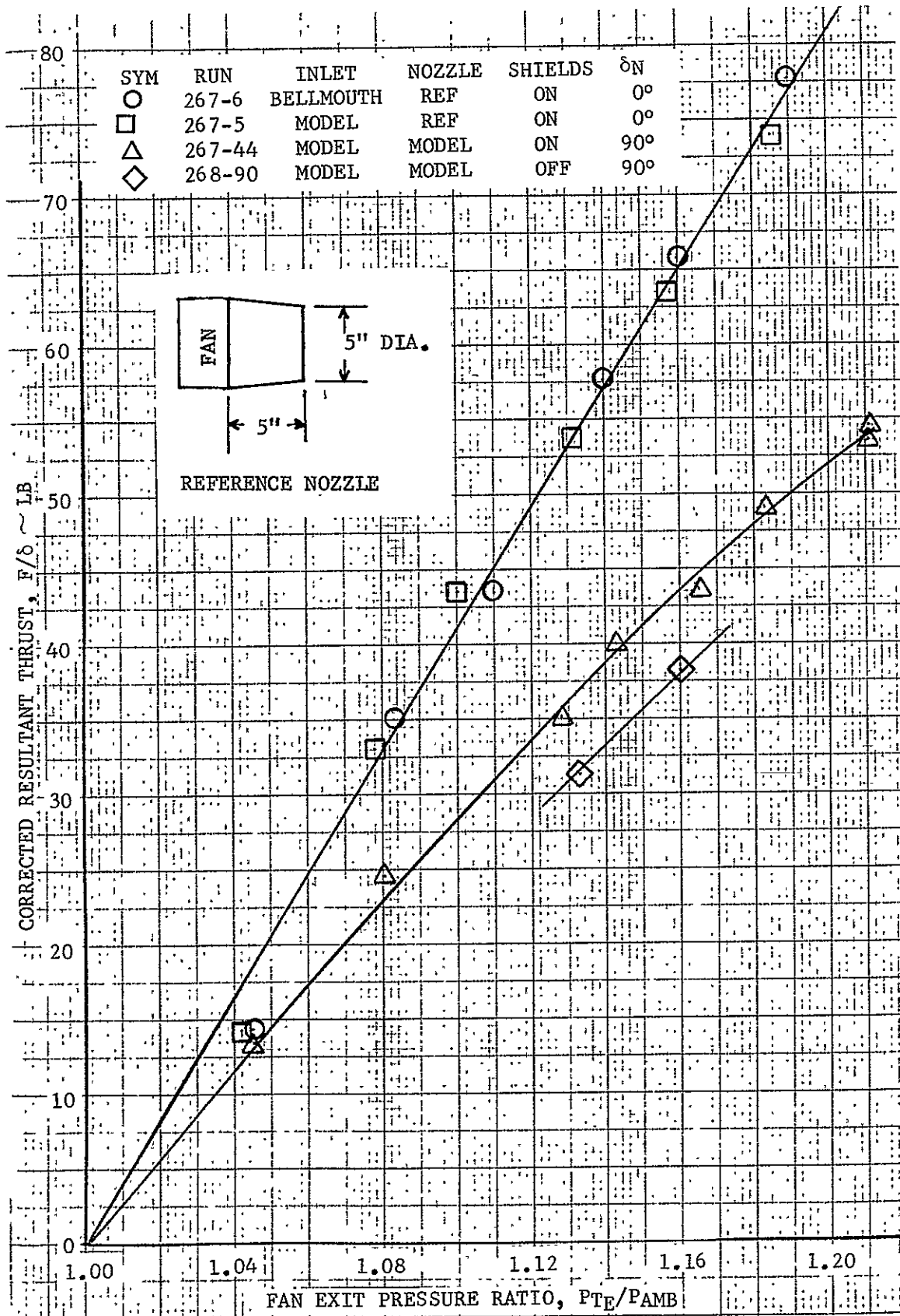


Figure C-2. Fan Calibration, Fan No. 1, Ser. No. 364

REPRODUCIBILITY OF TEST
 ORIGINAL PAGE IS POOR

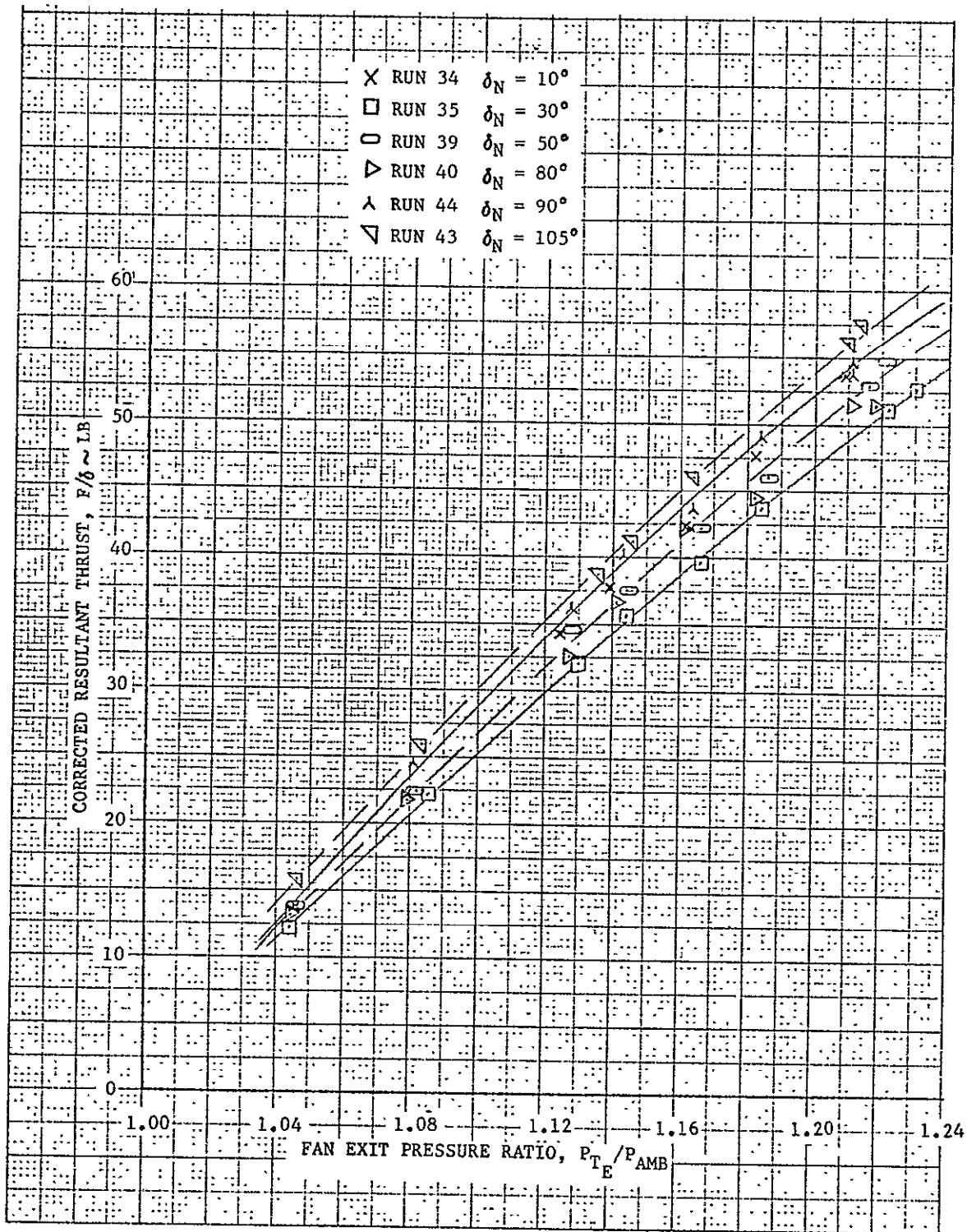


Figure C-2. Fan Calibration, Fan No. 1, Ser. No. 364 (Continued)

90° NOZZLE ANGLE

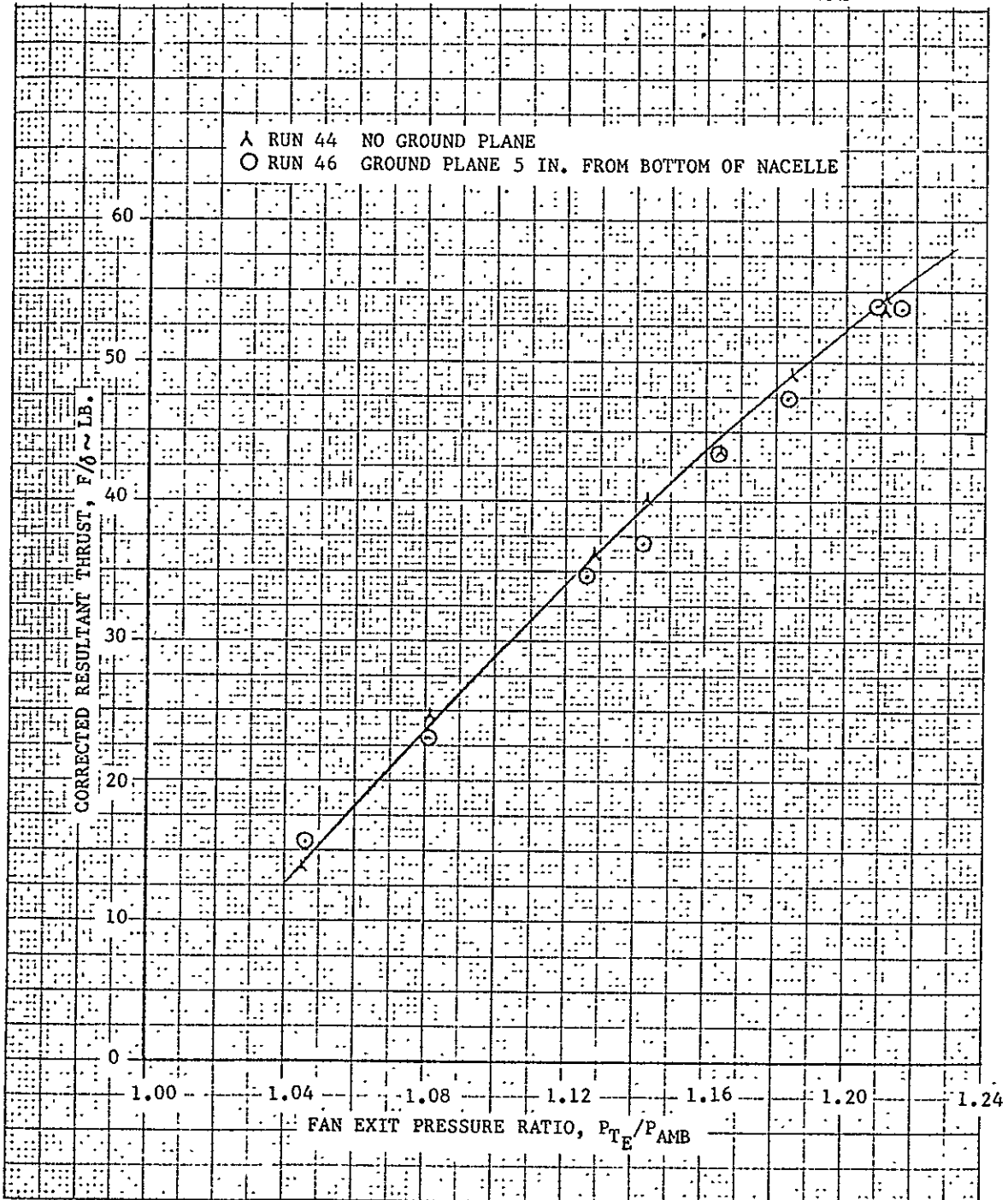


Figure C-2. Fan Calibration, Fan No. 1, Ser. No. 364 (Continued)

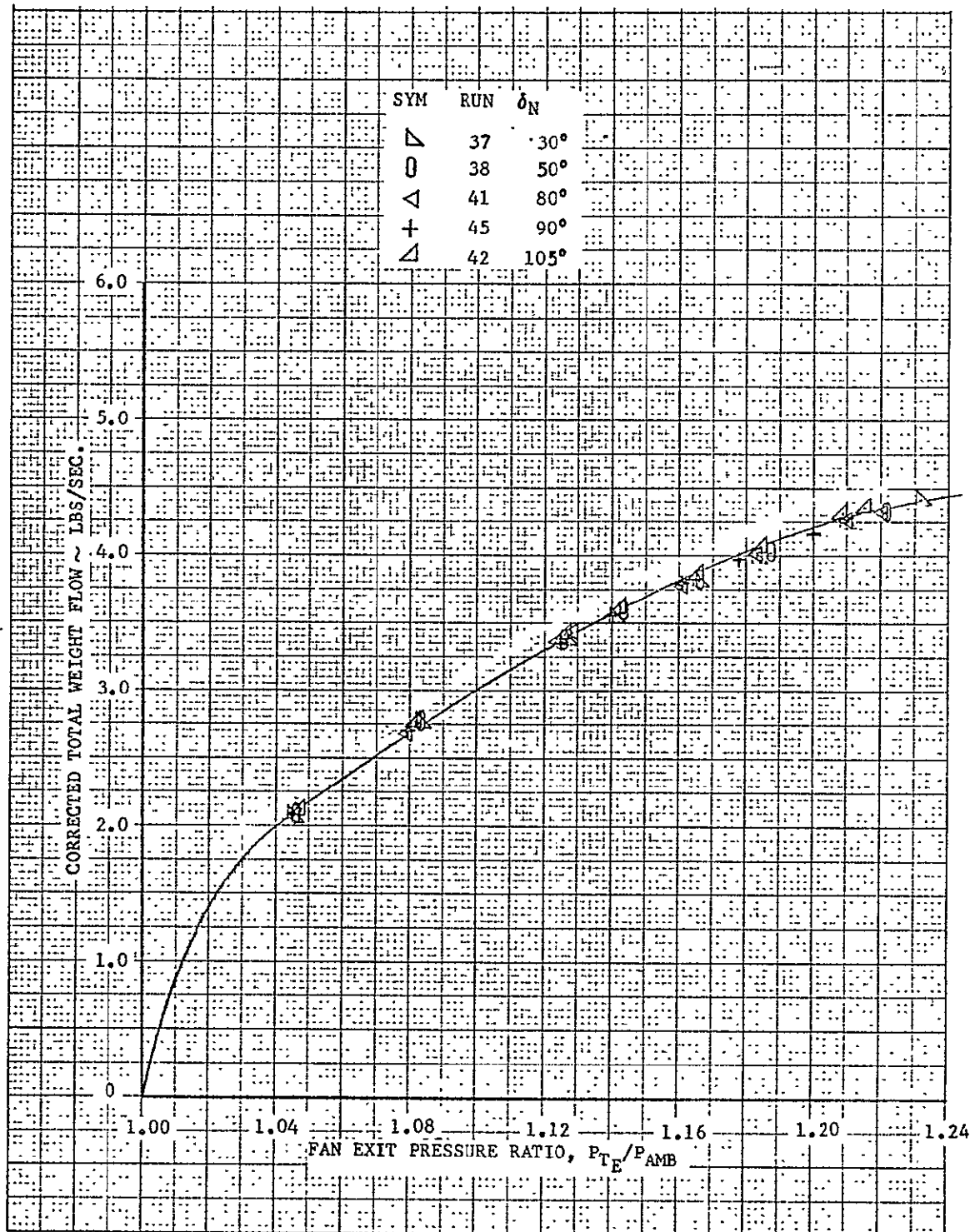


Figure C-2. Fan Calibration, Fan No. 1, Ser. No. 364 (Continued)

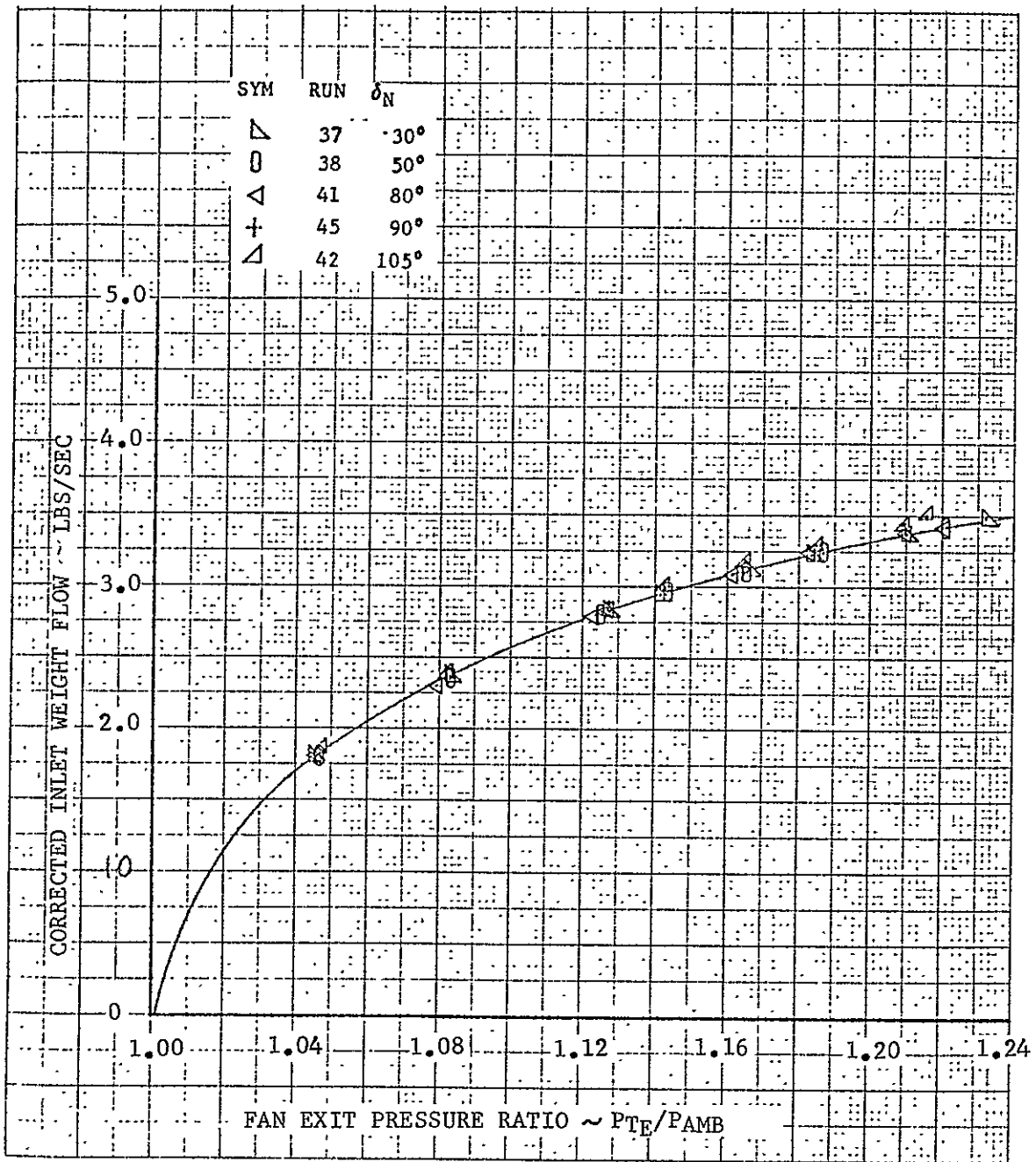


Figure C-2. Fan Calibration, Fan No. 1, Ser. No. 364 (Concluded)

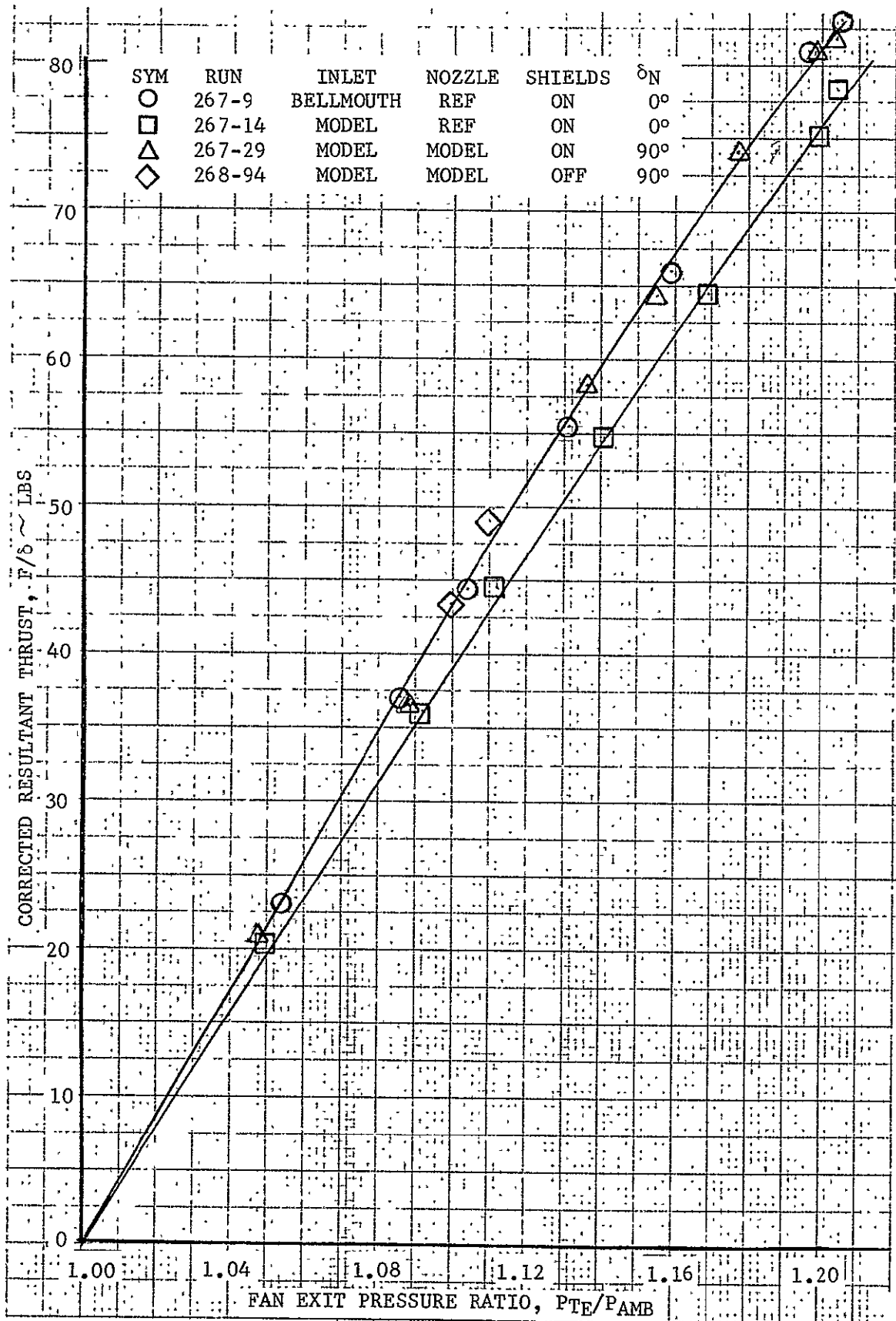


Figure C-3. Fan Calibration, Fan No. 2, Ser. No. 366

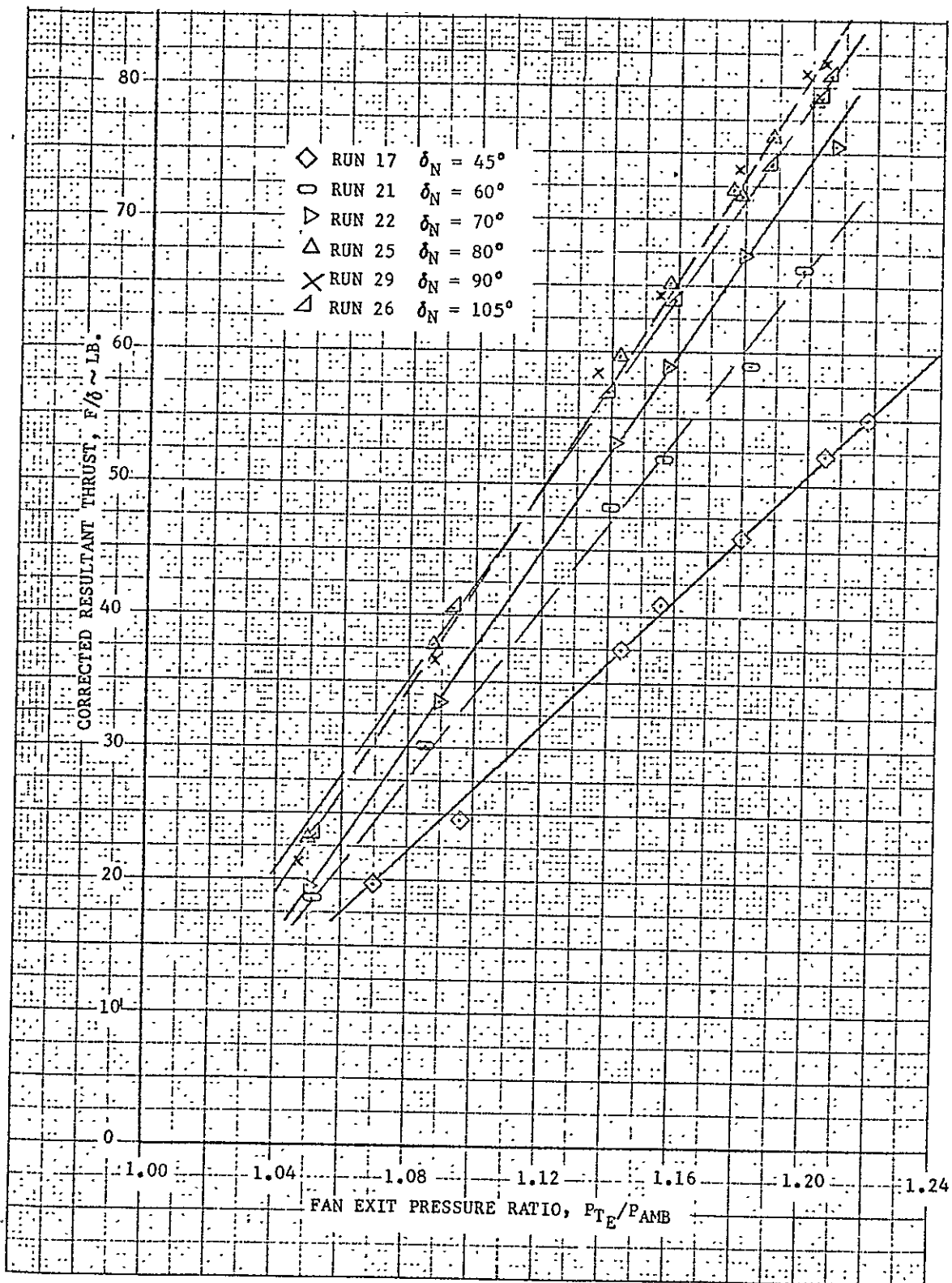


Figure C-3. Fan Calibration, Fan No. 2, Ser. No. 366 (Continued)

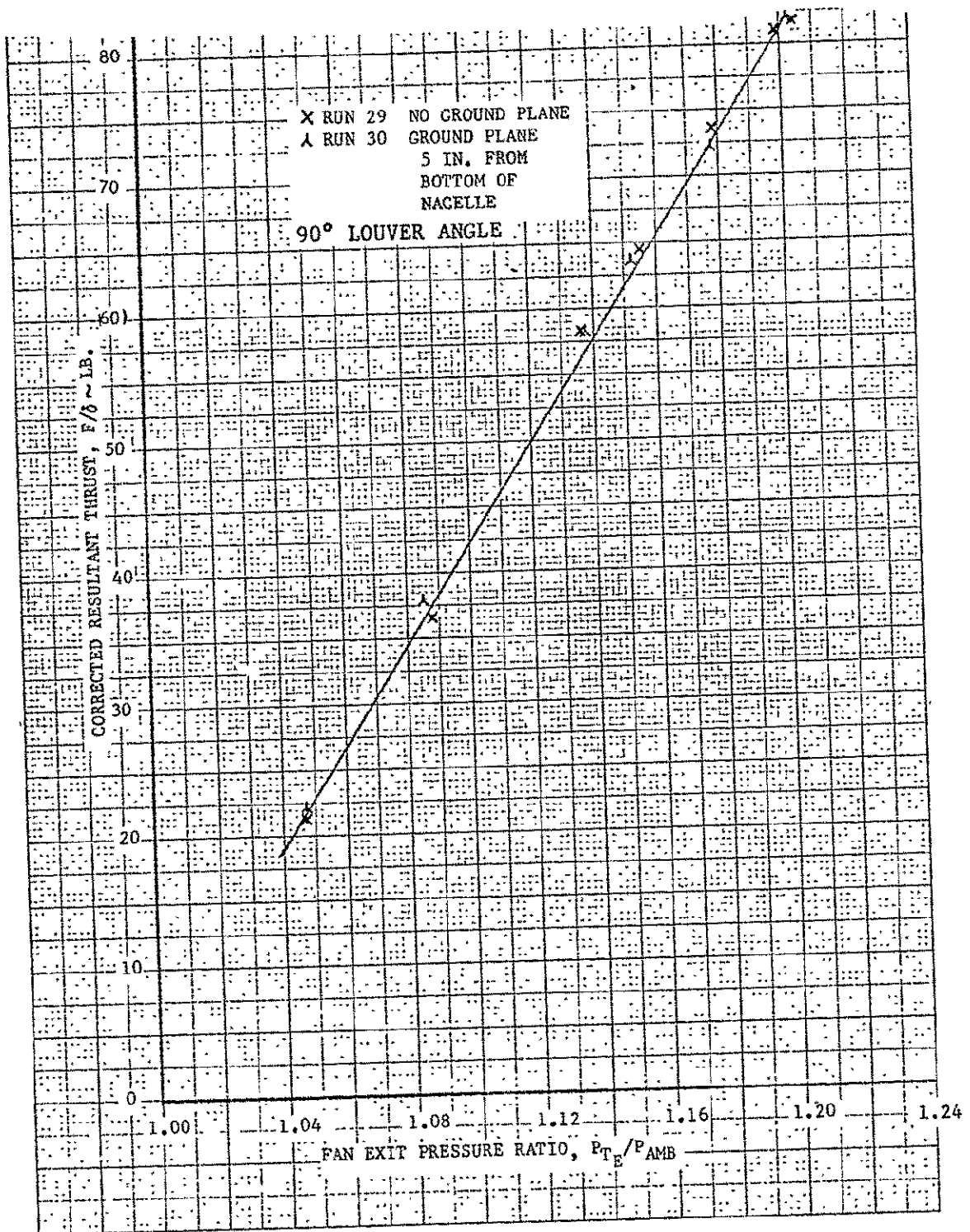


Figure C-3. Fan Calibration, Fan No. 2, Ser. No. 366 (Continued)

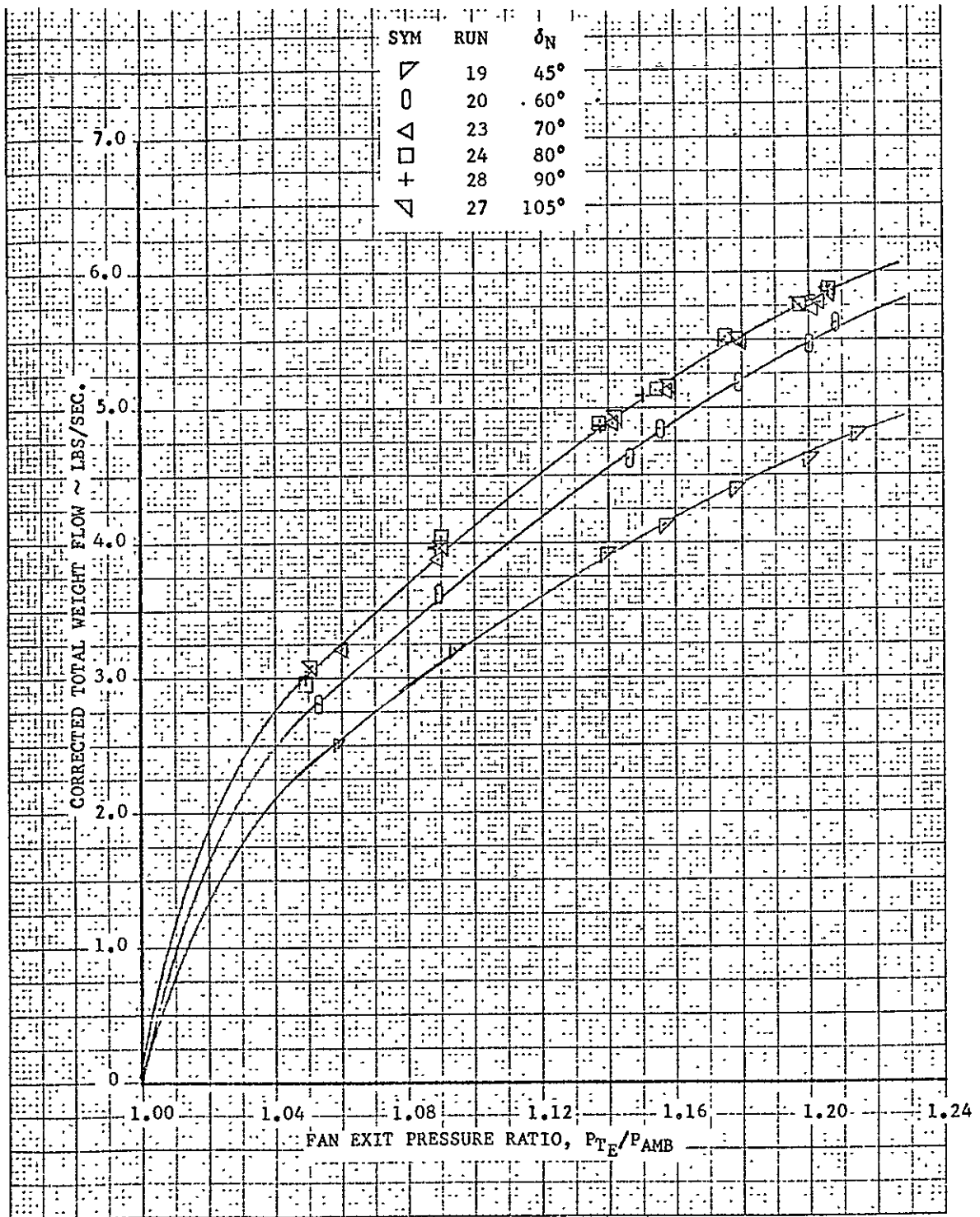


Figure C-3. Fan Calibration, Fan No. 2, Ser. No. 366 (Continued)

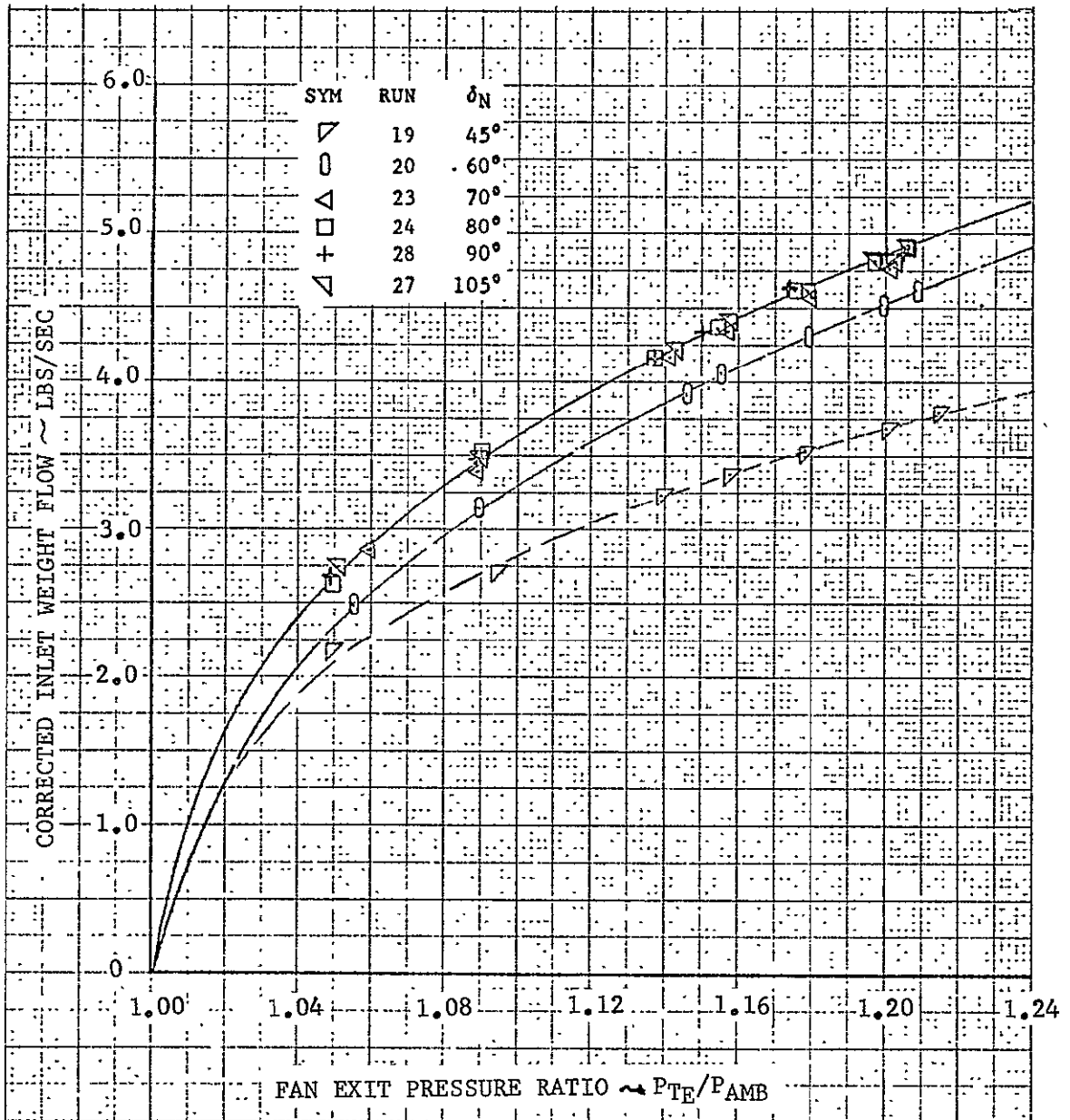


Figure C-3. Fan Calibration, Fan No. 2, Ser. No. 366 (Concluded)

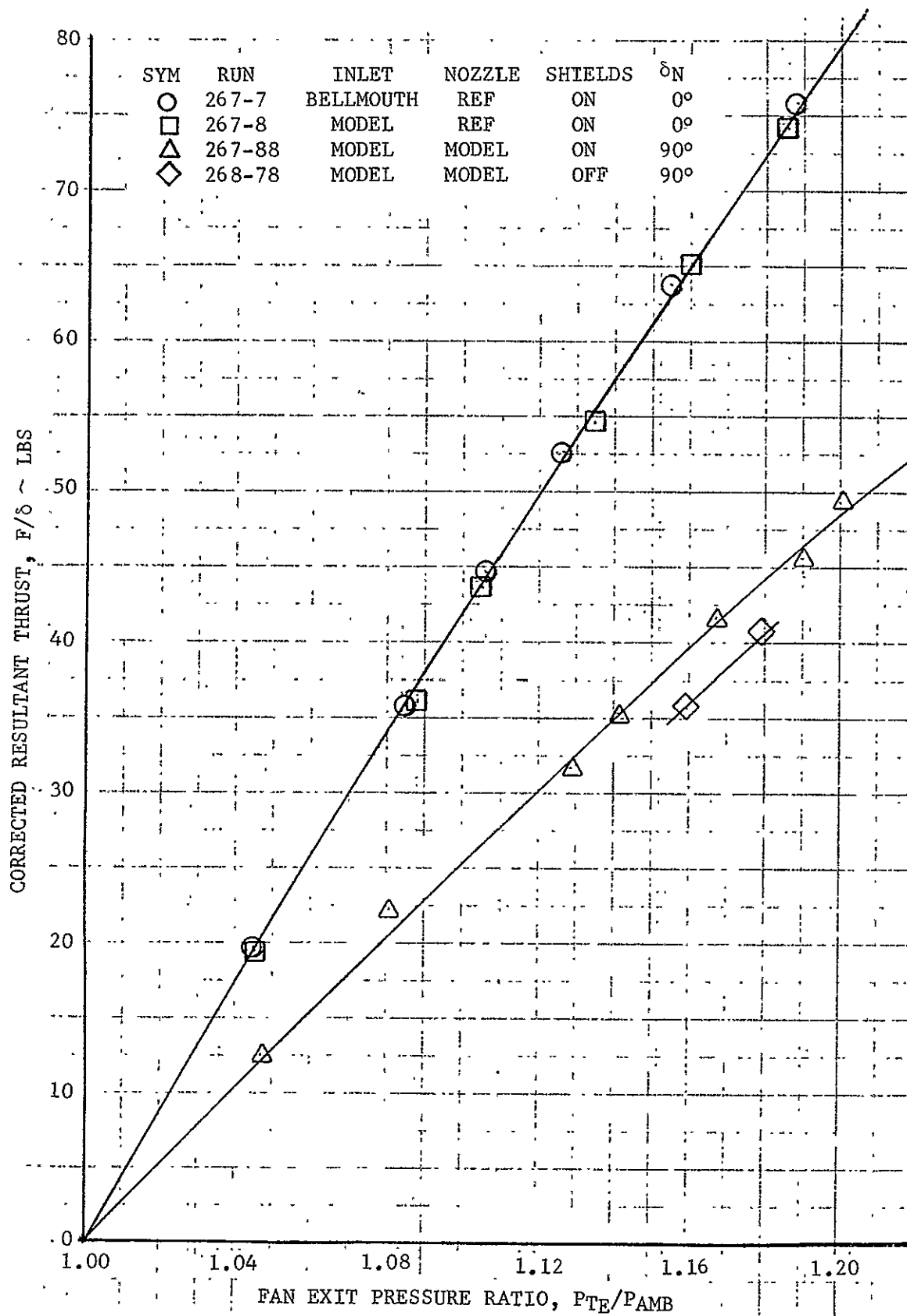


Figure C-4. Fan Calibration, Fan No. 3, Ser. No. 365

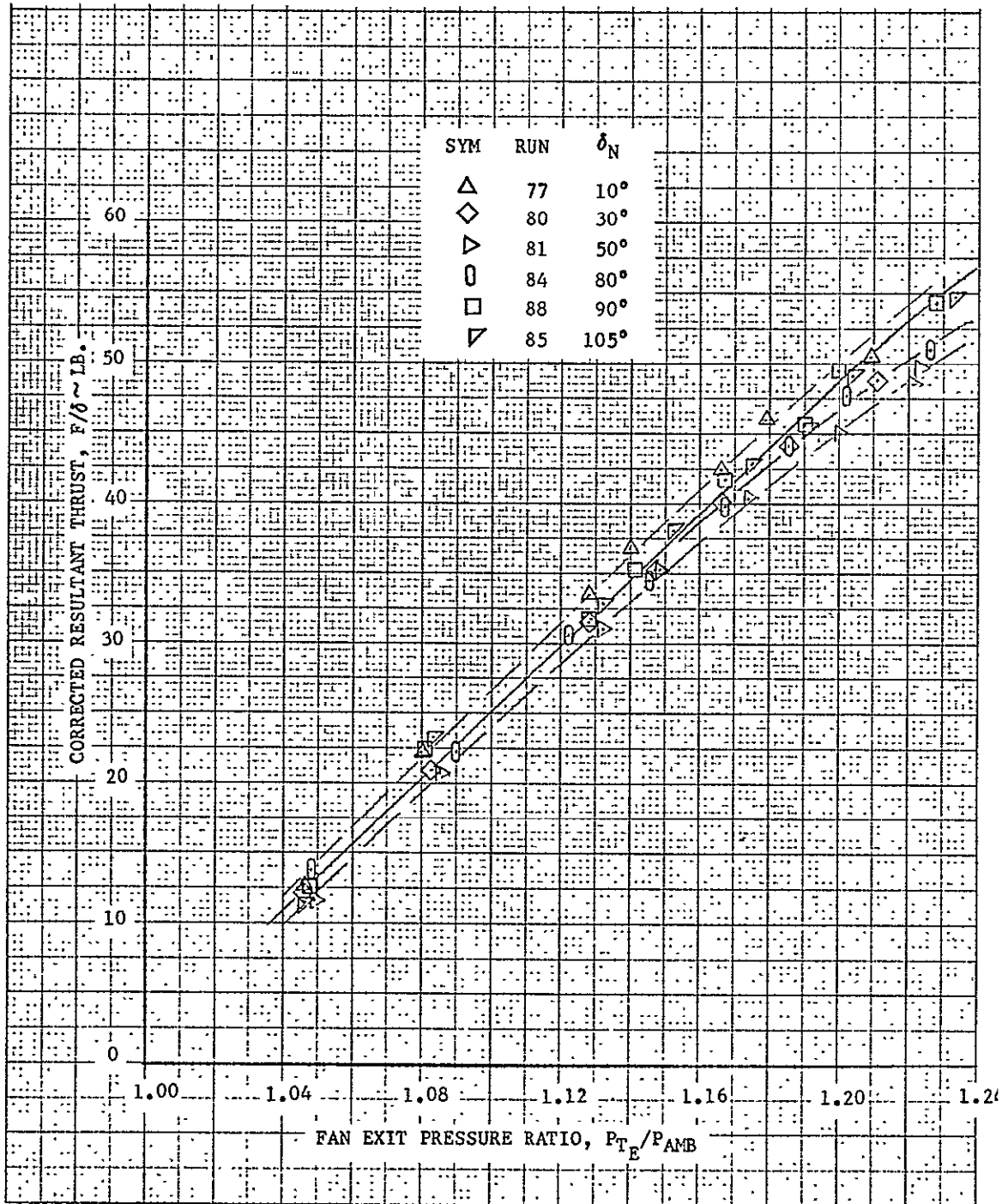


Figure C-4. Fan Calibration, Fan No. 3, Ser. No. 365 (Continued)

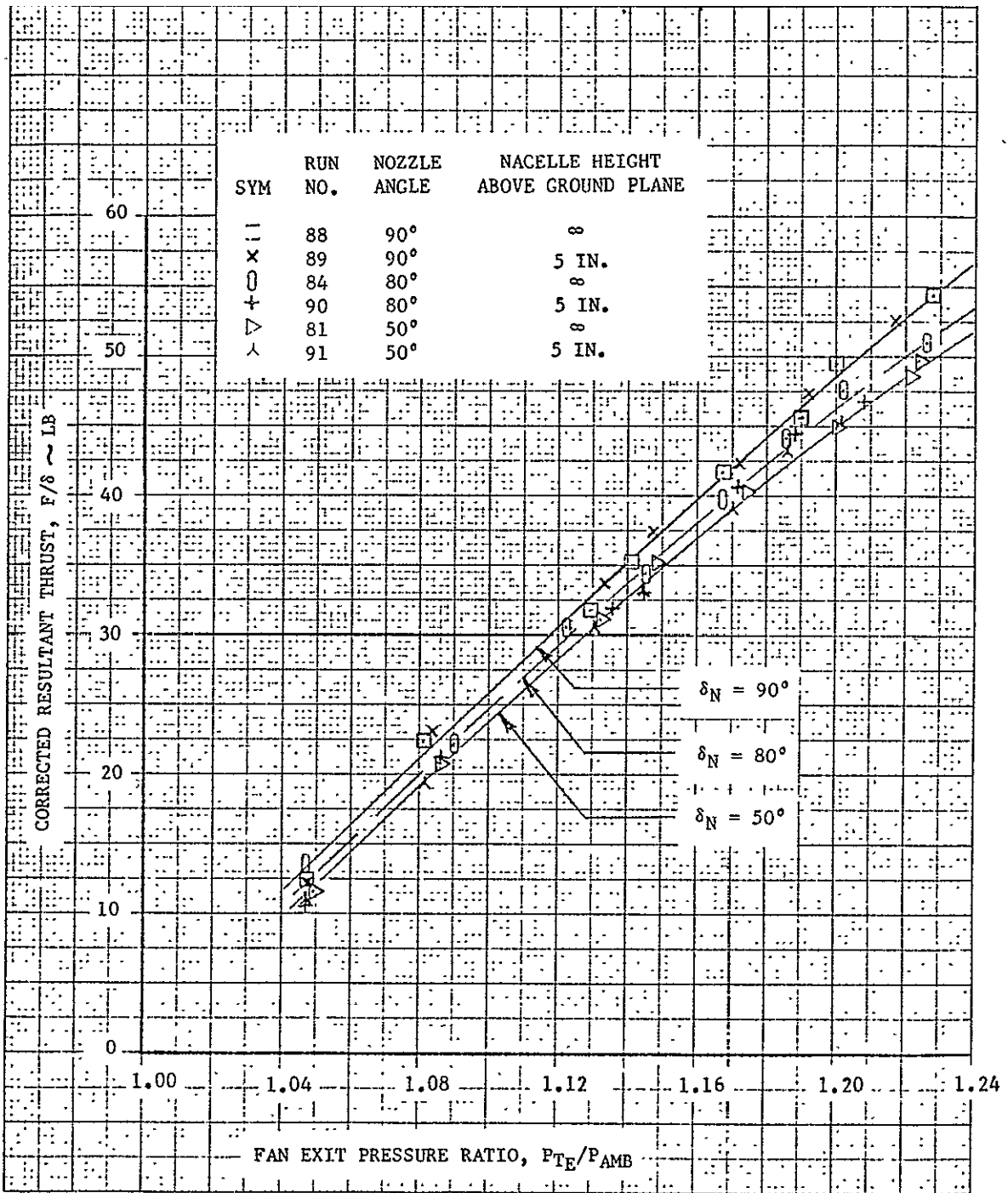


Figure C-4. Fan Calibration, Fan No. 3, Ser. No. 365 (Continued)

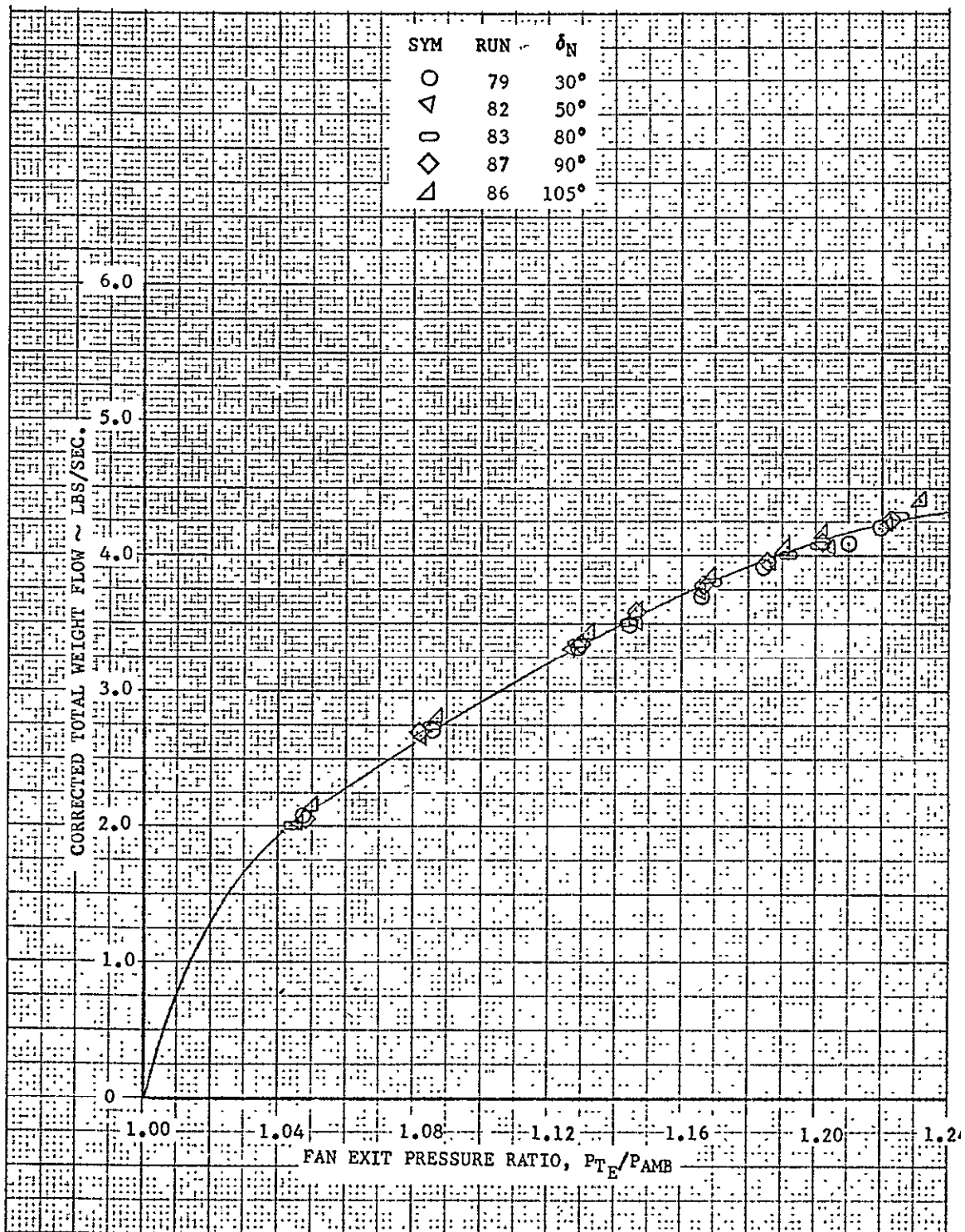


Figure C-4. Fan Calibration, Fan No. 3, Ser. No. 365 (Continued)

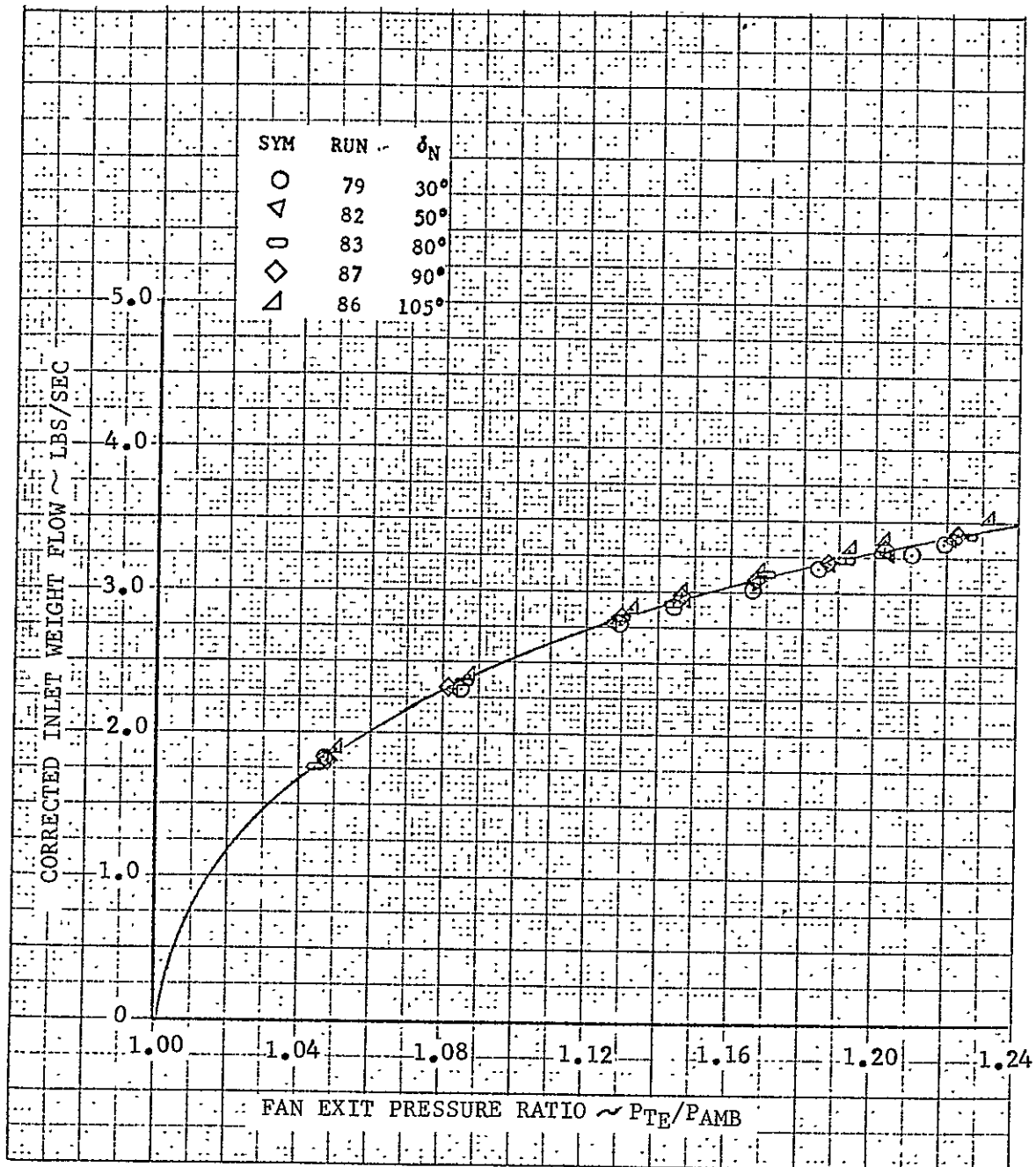


Figure C-4. Fan Calibration, Fan No. 3, Ser. No. 365 (Concluded)

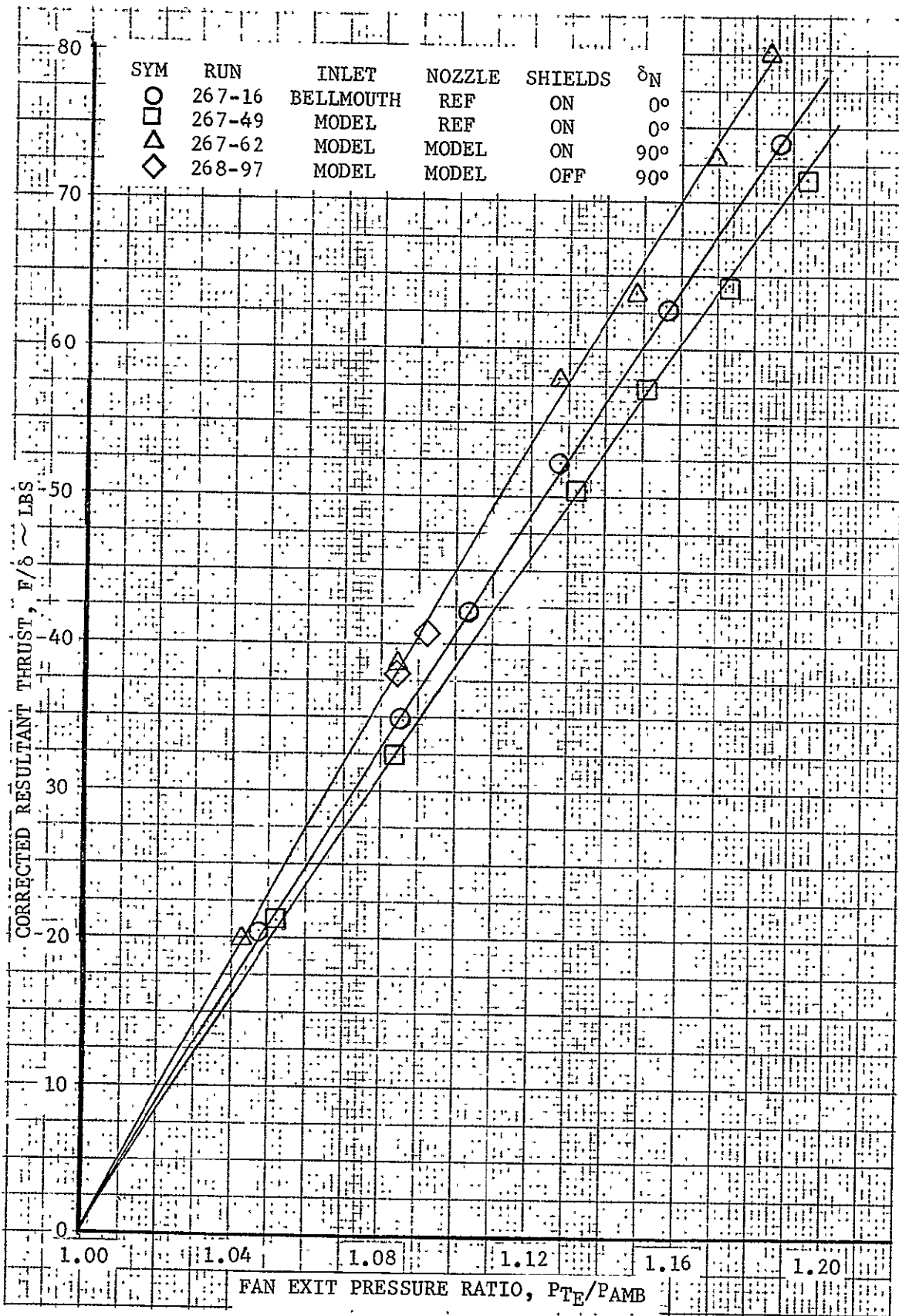


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367

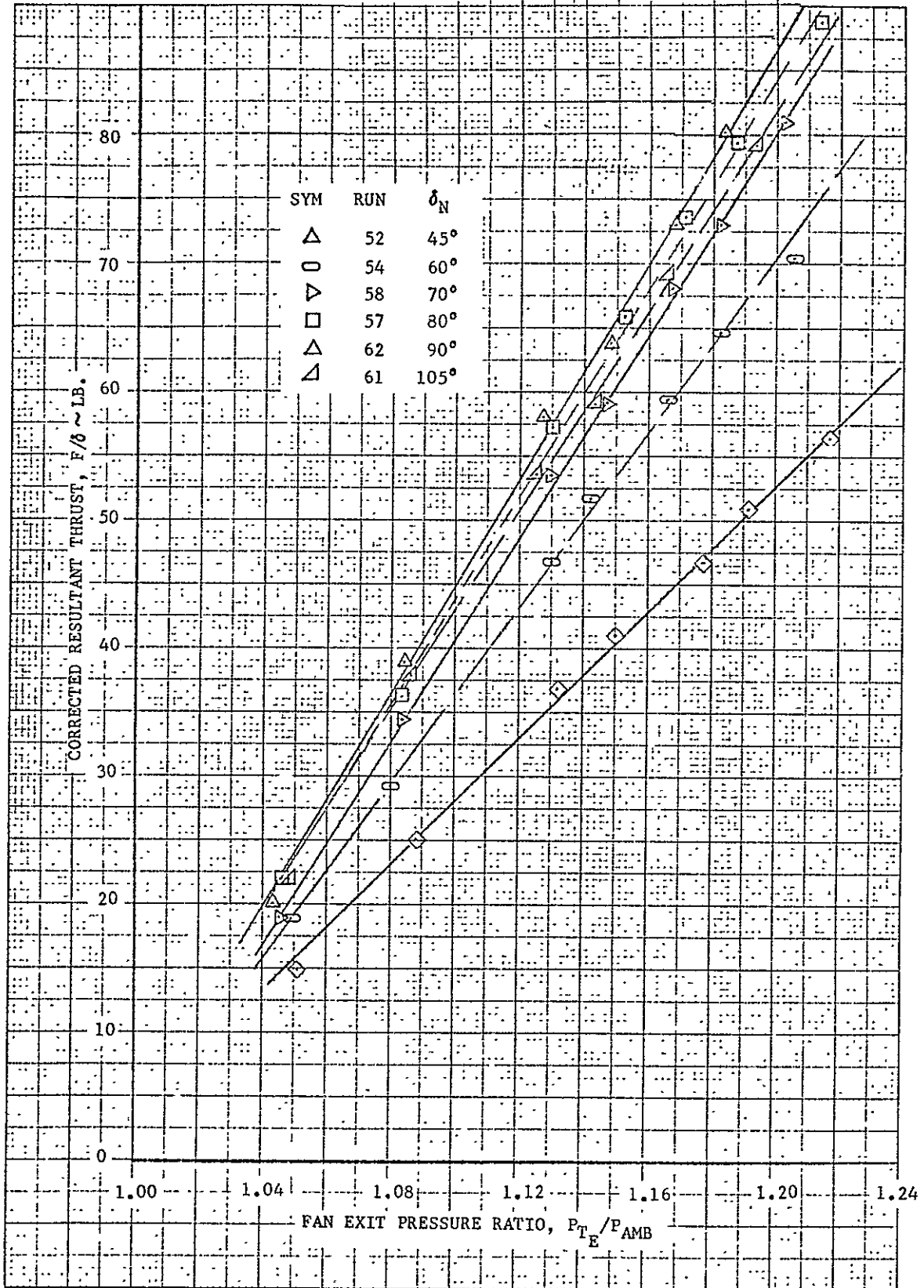


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

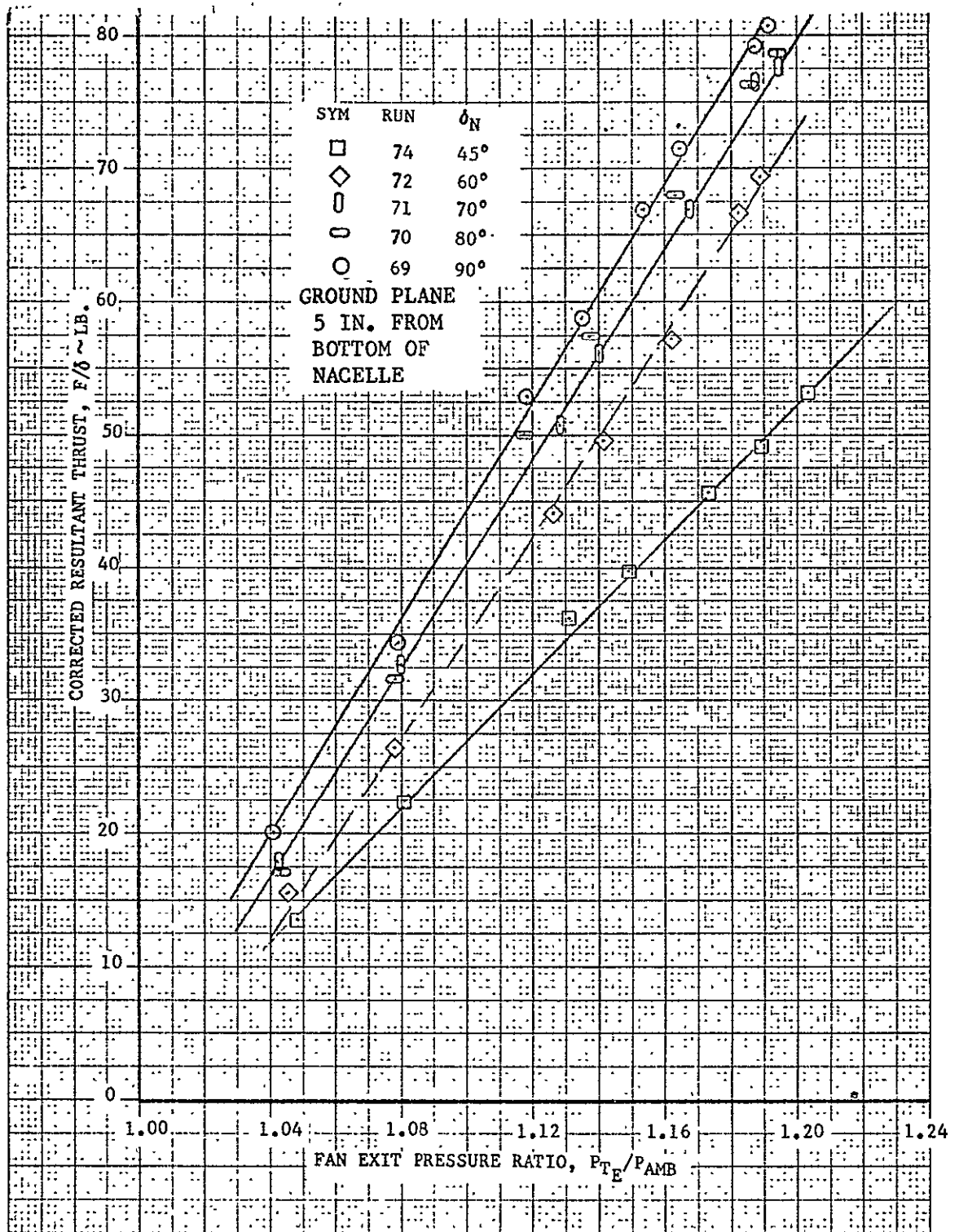


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

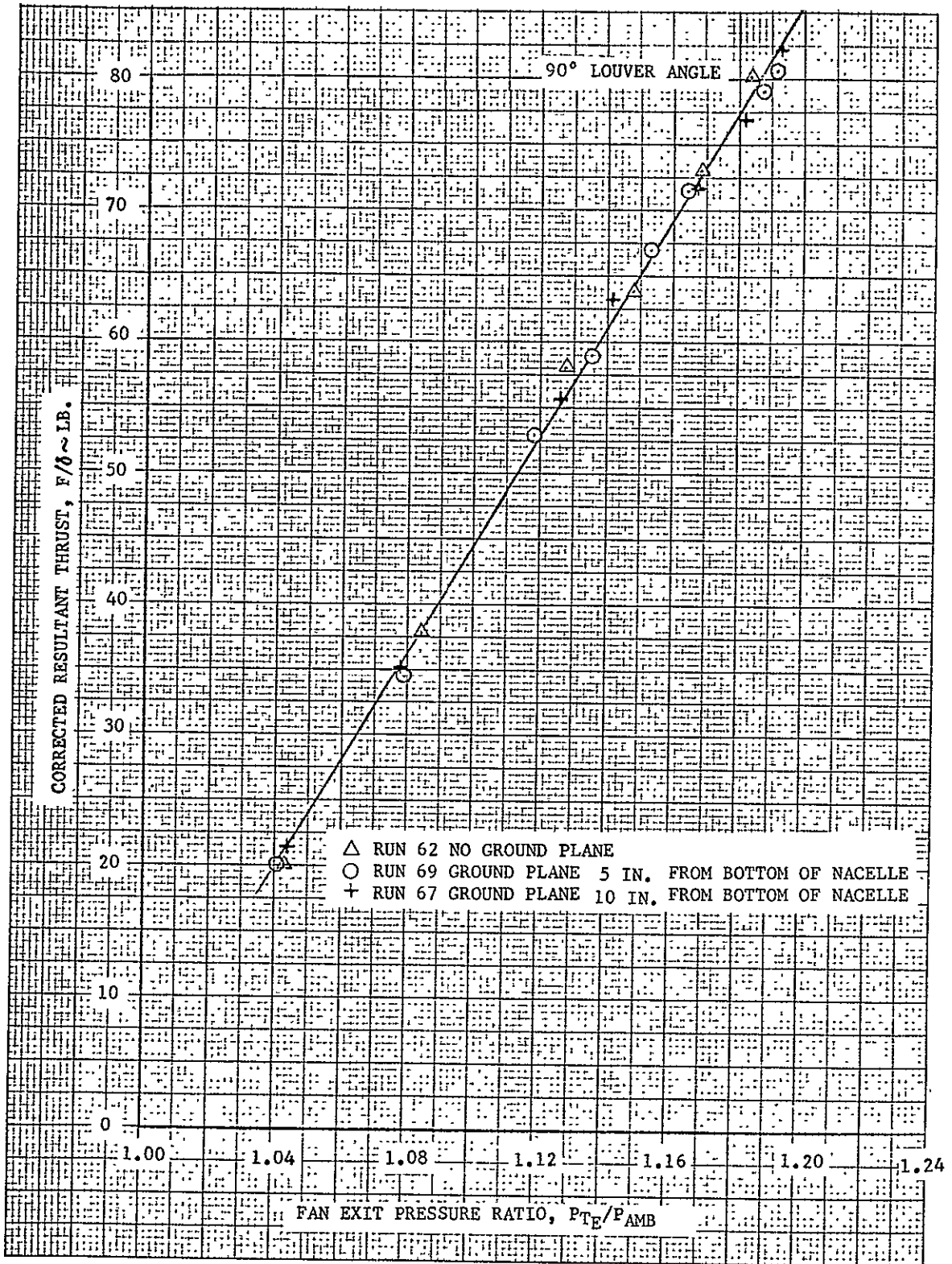


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

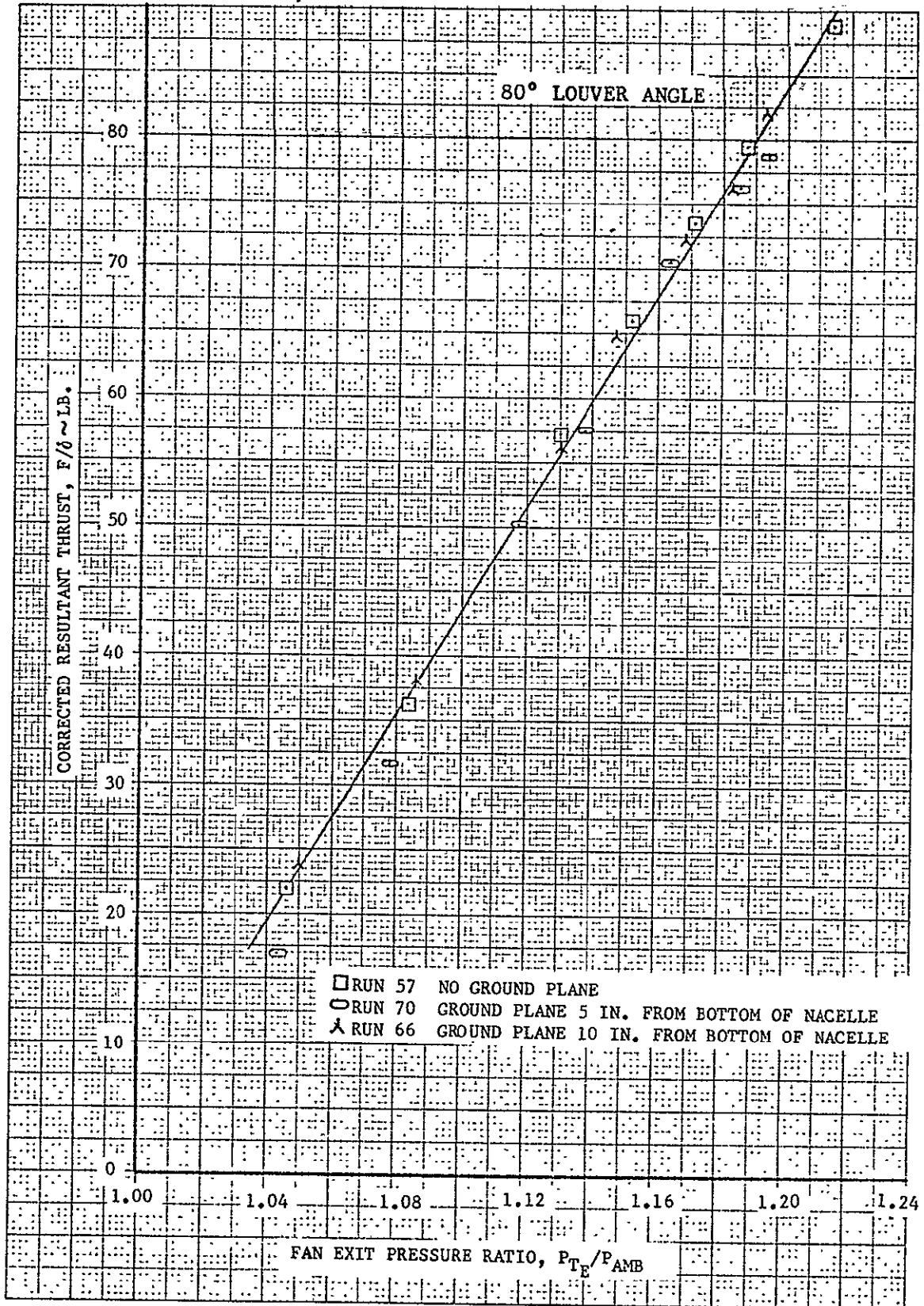


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

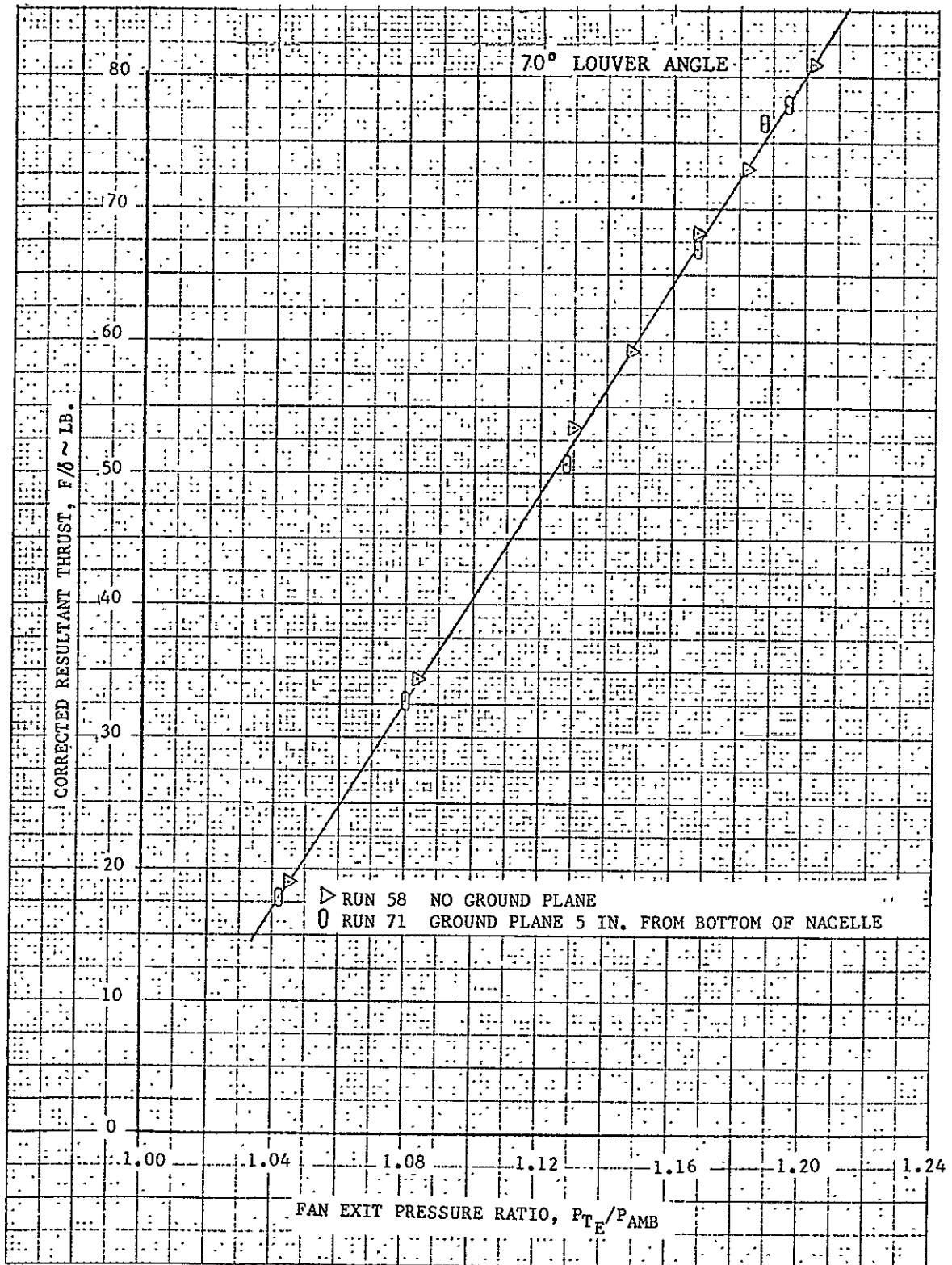


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

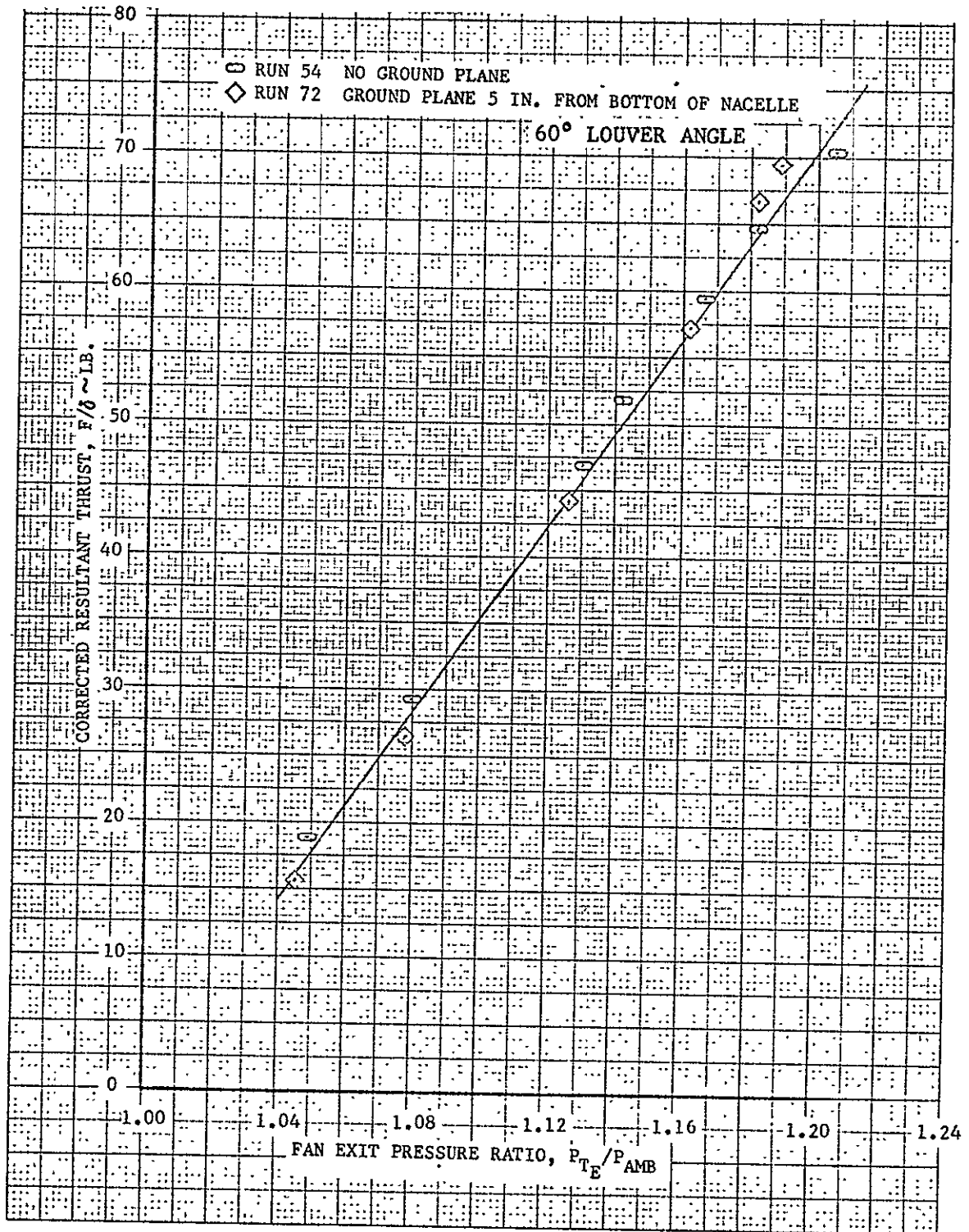


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

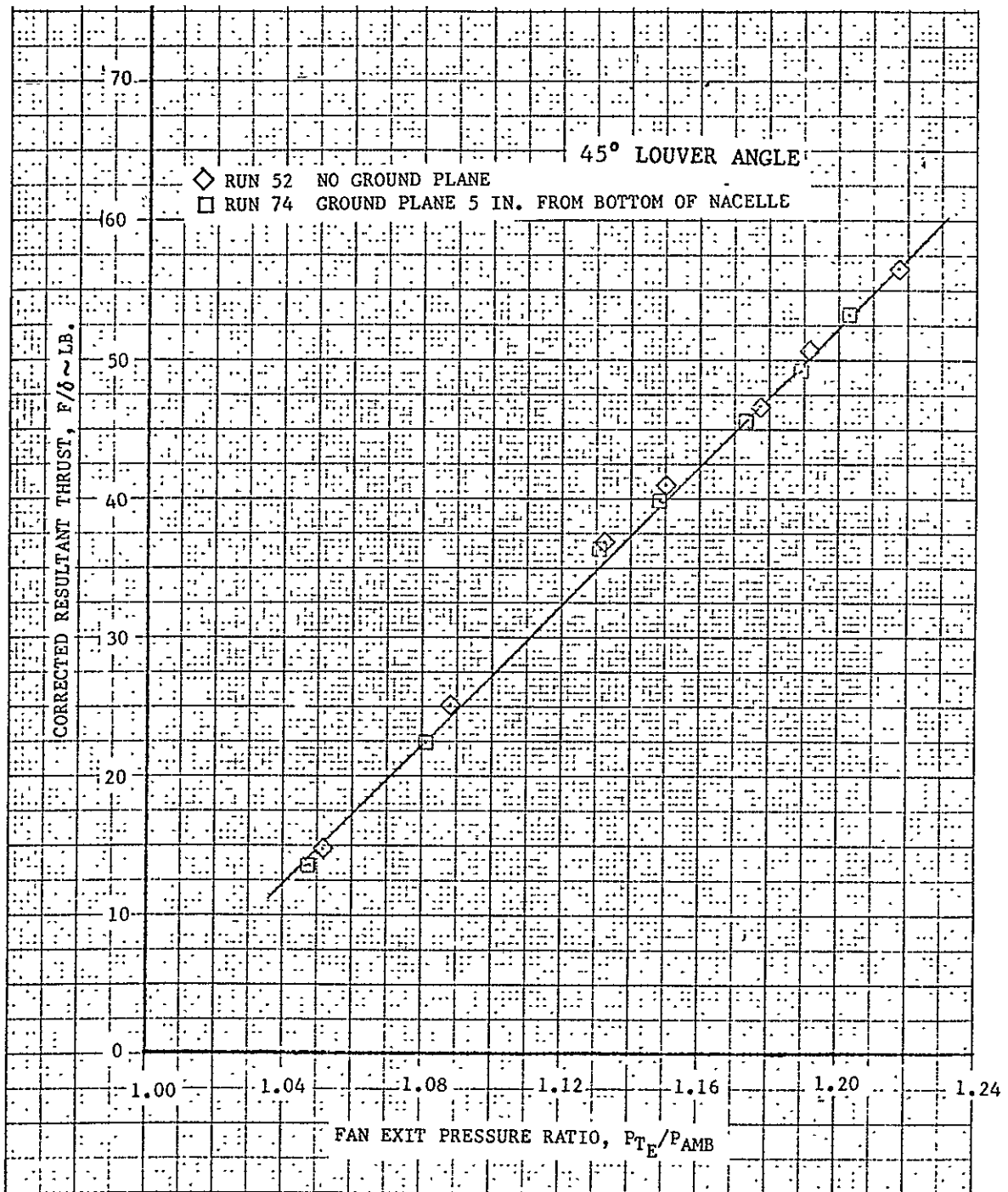


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

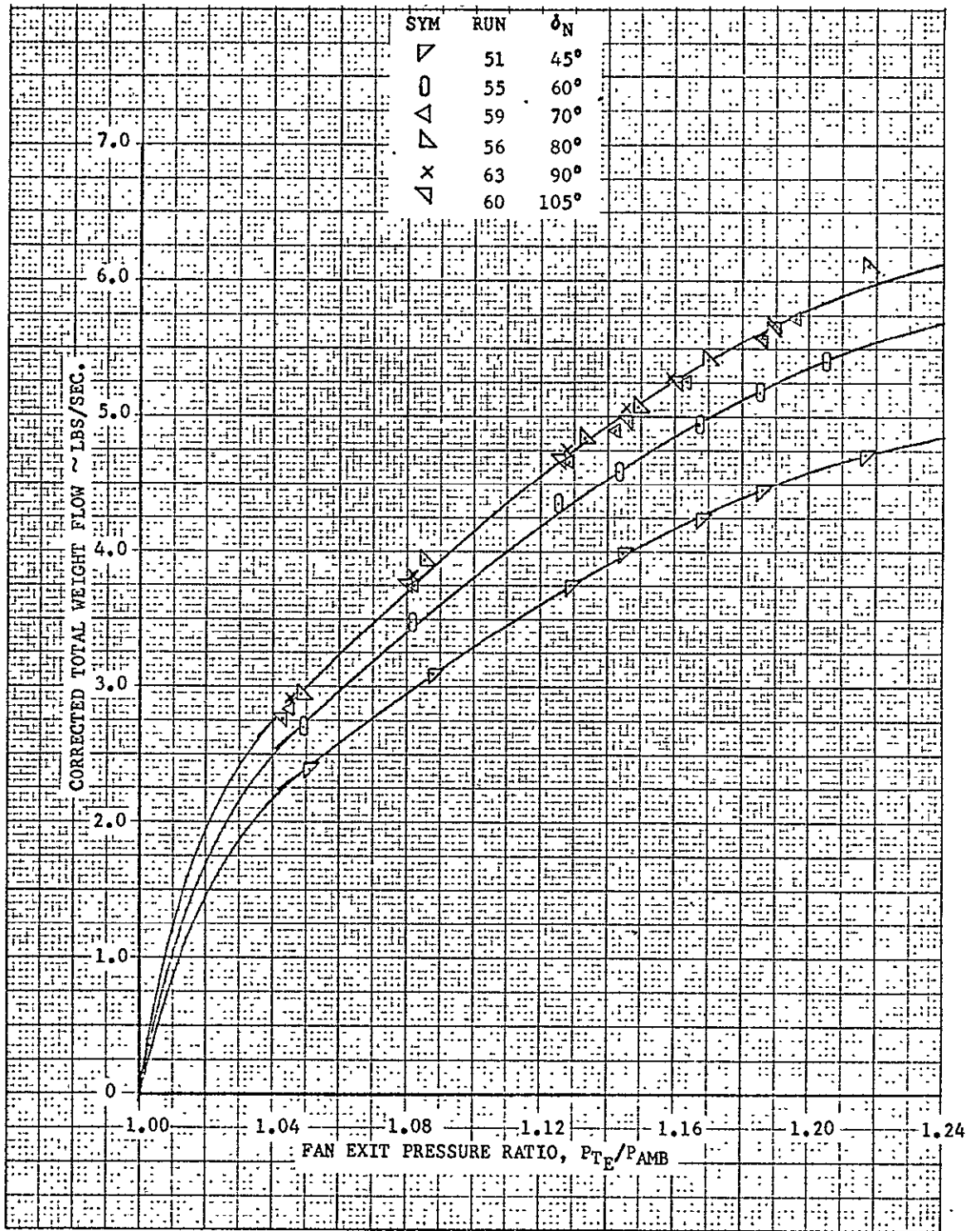


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

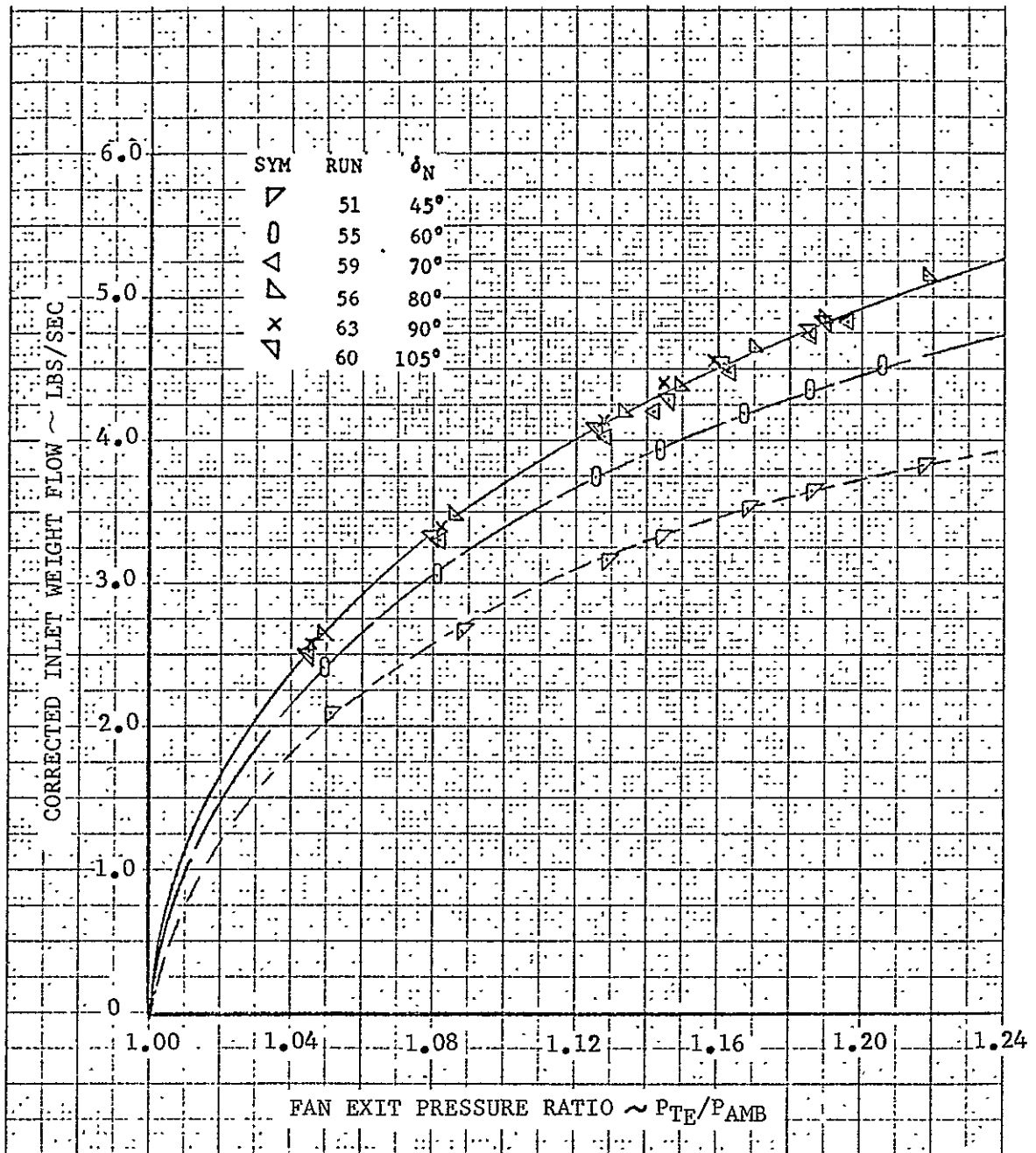


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Concluded)

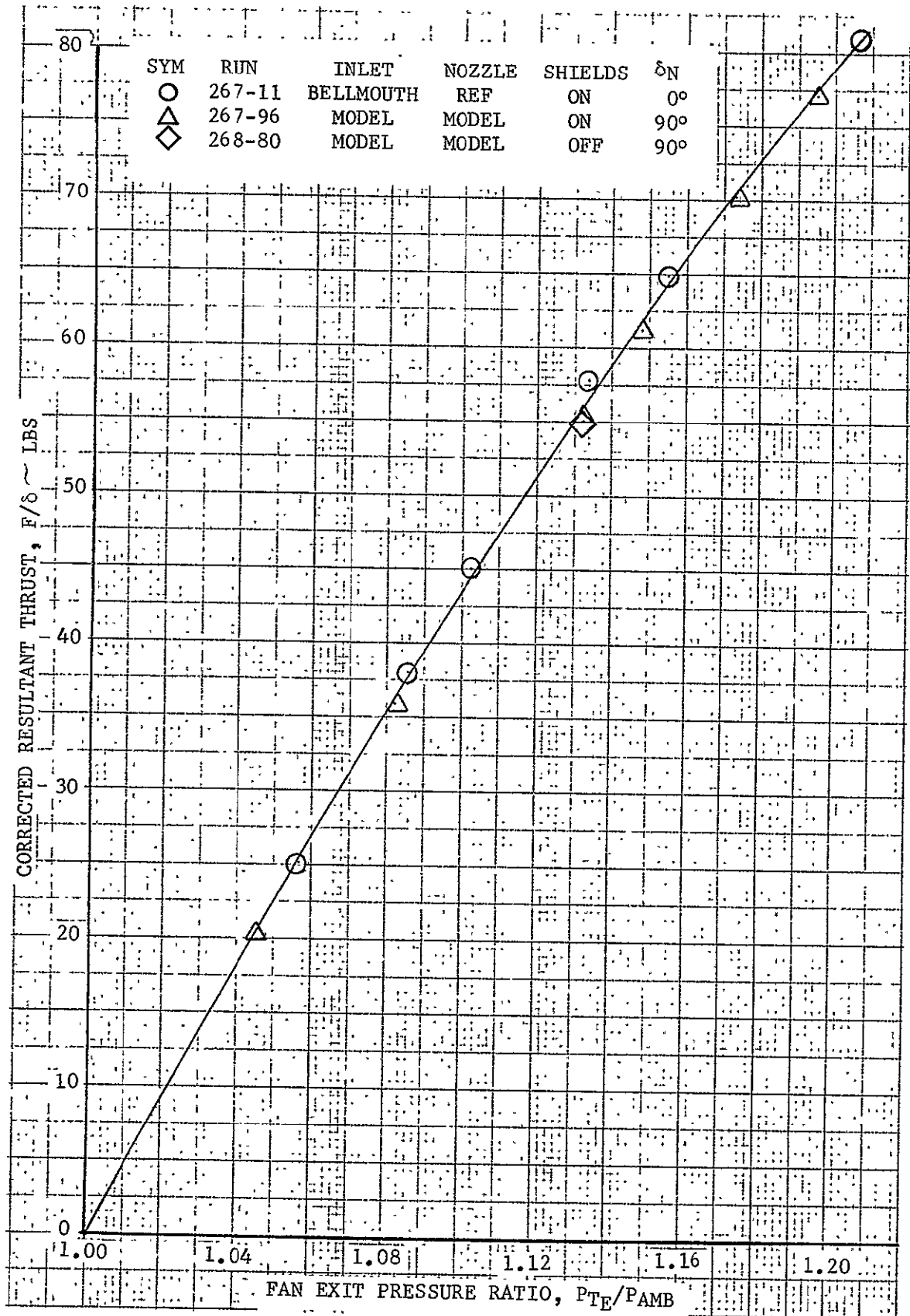


Figure C-6. Fan Calibration, Fan No. 5, Ser. No. 421

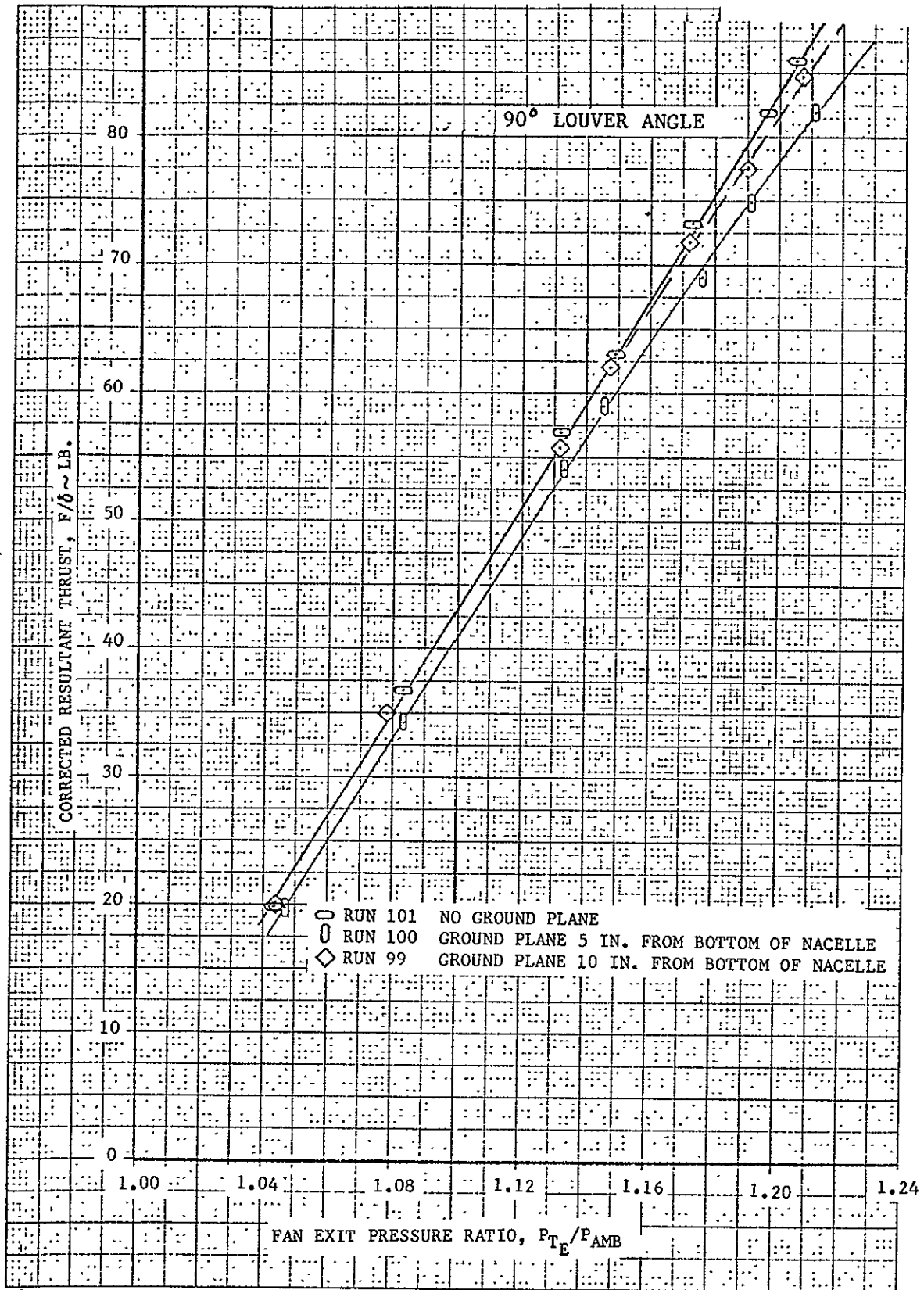


Figure C-6. Fan Calibration, Fan No. 5, Ser. No. 421 (Continued)

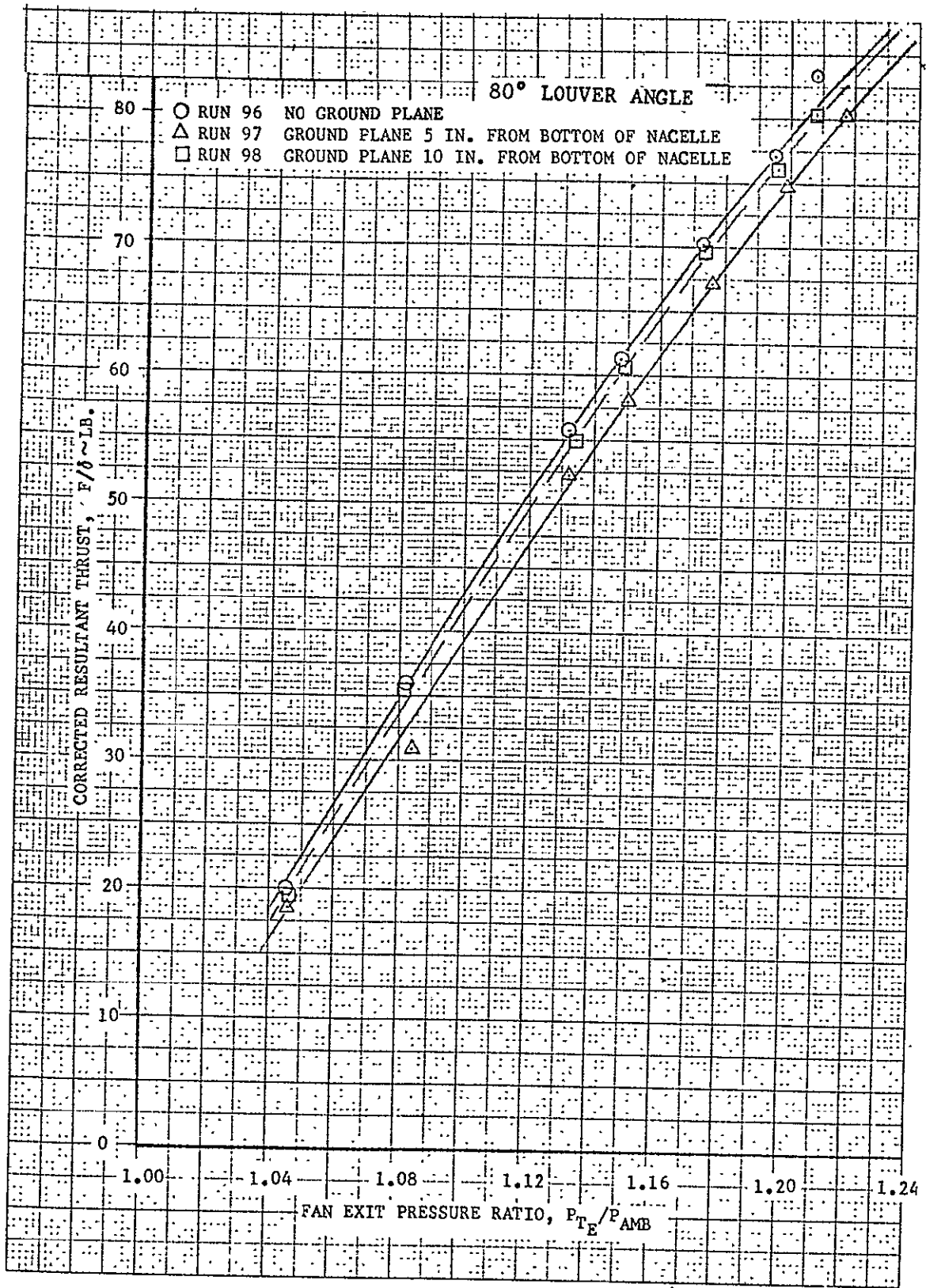


Figure C-6. Fan Calibration, Fan No. 5, Ser. No. 421 (Continued)

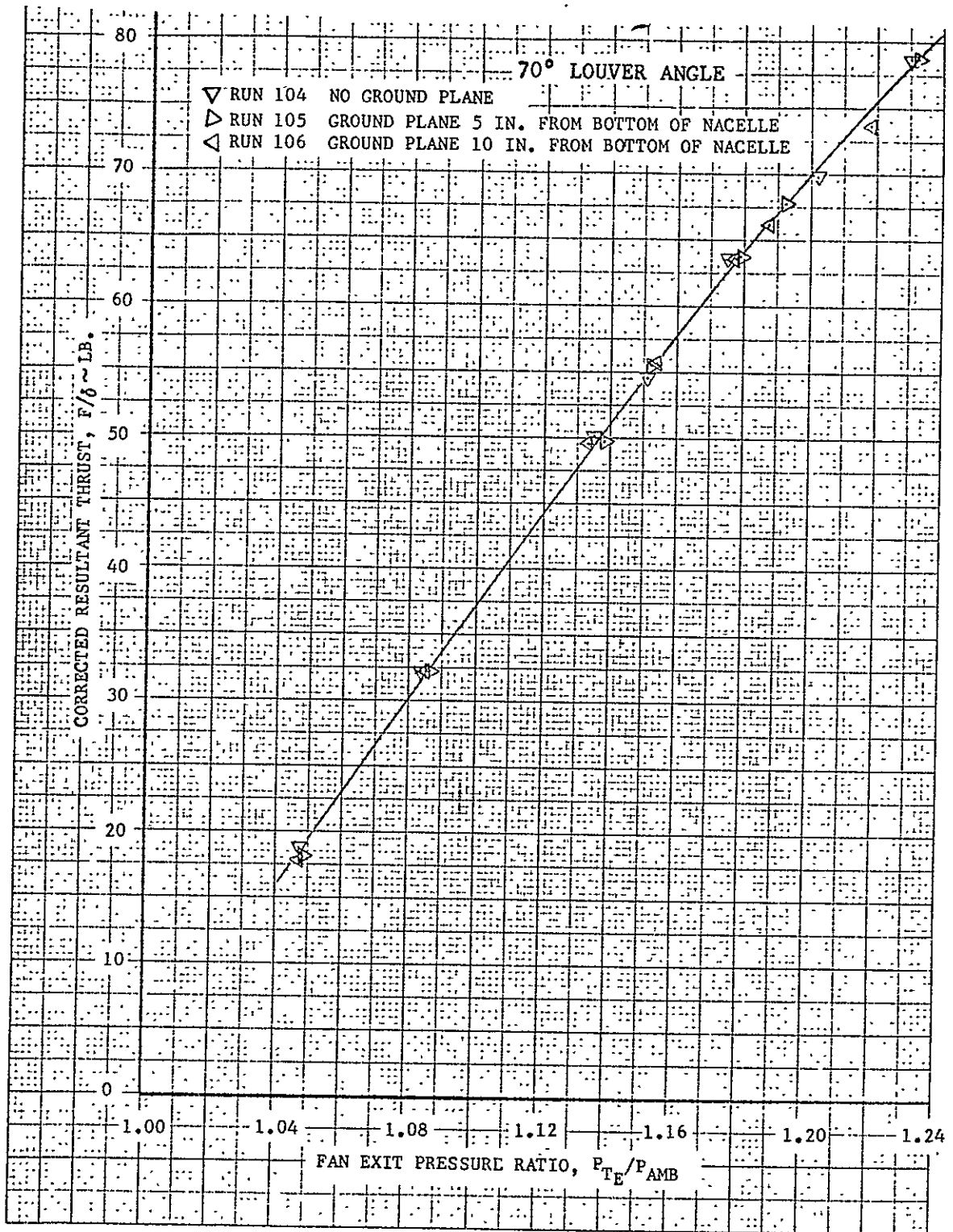


Figure C-6. Fan Calibration, Fan No. 5, Ser. No. 421 (Continued)