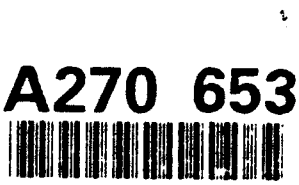

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Resistance and Seakeeping Model Tests of Two U.S. Coast Guard Notional Designs of 110 FT and 120 FT WPB Hulls

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16. Abstract

The research results presented in this report are concerned with the performance and seakeeping characteristics of two Notional WPB Designs, the 110 FT WPB and the 120 FT WPB. Model tests of the two hulls were conducted in calm water, in regular waves at 10 knots, in wave heights of 12.5% and 25% of the beam and in irregular head seas having significant wave heights of 40% and 60% of the beam at speeds from 25 to 70 knots. Spectral analyses were performed on the motions and accelerations in irregular waves and the results are tabulated and plotted, including the 1/c octave RMS accelerations. Resistance data in calm water and waves were scaled to full size and the predictions are tabulated.

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METRIC CONVERSION FACTORS

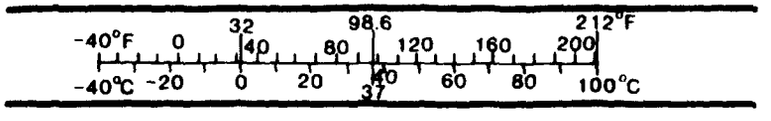
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
in	inches	* 2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	*meters*	*m*
mi	*miles*	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square *meters*	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (WEIGHT)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
tbsp	*tablespoons*	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	*0.47*	*liters*	*l*
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic *meters*	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (EXACT)		
°F	*Fahrenheit temperature*	*5/9 (after subtracting 32)*	Celsius *temperature*	°C

*1 in = 2.54 (exactly).

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply By	To Find	Symbol
		LENGTH		
mm	*millimeters*	0.04	*inches*	*in*
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	*square yards*	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares(10,000 m^2)	2.5	acres	
		MASS (WEIGHT)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	*tonnes (1000 kg)*	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	0.125	cups	c
l	liters	*2.1*	*pints*	*pt*
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (EXACT)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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NOMENCLATURE

A_P	projected planing bottom area, sq.ft
b	beam over chines, ft
C_D	drag coefficient based on beam squared, R/qb^2
CG	center of gravity
C_f	ATTC frictional resistance coefficient
C_F	frictional resistance coefficient based on beam squared, $C_f(S/b^2)$
CP	center of pressure, intersection of the resultant hydrodynamic force vector with the keel baseline
C_R	resistance coefficient, R/wb^3
C_T	total resistance coefficient, R/qS
C_V	velocity coefficient, $V/\sqrt{(gb)}$
C_Δ	load coefficient, Δ/wb^3
d	transom draft, depth of keel at transom below still water level, ft
Fnv	volume Froude Number, $V/\sqrt{(g\nabla^{1/3})} = C_V/C_\Delta^{1/6}$
f	frequency, Hz
fe	frequency of encounter, Hz
$f\sqrt{(b/g)}$	non-dimensional frequency
g	acceleration due to gravity, 32.17 fps^2
$H_{1/3}$	significant wave height, 4 x RMS wave elevation, ft
k	radius of gyration, ft
L/b	length-beam ratio
LBP	length between perpendiculars, ft
LCG	longitudinal position of the center of gravity (CG), measured from the transom parallel to the keel, ft
LCP	longitudinal position of the hydrodynamic center of pressure (CP), measured from the transom parallel to the keel, ft
LOA	length overall, ft
ℓ_c	chine wetted length, ft
ℓ_k	keel wetted length, ft
ℓ_m	mean wetted length, $(\ell_k + \ell_c)/2$
ℓ_m/b	mean wetted length-beam ratio
n	vertical acceleration or load factor, g units
p	waterplane coefficient
q	dynamic pressure, $\frac{1}{2} \rho V^2$

R	resistance, lb
R_{aw}	added resistance in waves, lb
RMS	process root-mean-square
RMS_n	RMS acceleration, g units
RMS_θ	RMS pitch, degrees
R_n	Reynolds Number
S	wetted area, sq.ft
S/b^2	non-dimensional wetted area
t	time, seconds
$t\sqrt{(g/b)}$	non-dimensional time
V	velocity, fps
V_k	speed, knots
w	specific weight of water, 62.28 lb/cu.ft fresh water at 71.5°F, 64.00 lb/cu.ft salt water at 59°F
β	deadrise angle, degrees
Δ	displacement, lb
θ	pitch angle excursion, degrees
ϱ	density of water, w/g
τ	trim angle of keel, degrees
∇	volumetric displacement, Δ/w, cu.ft

Area loading	$A_p/\nabla^{2/3} = p(L/b)/C_\Delta{}^{2/3}$
Slenderness ratio	$L/\nabla^{1/3} = (L/b)/C_\Delta{}^{1/3}$
Speed-length ratio	$V_k/\sqrt{L} = 3.36\ C_v/\sqrt{(L/b)}$

Subscripts

s	denotes full-size or ship scale
m	denotes model scale

Sign Convention

The trim is positive in the bow up sense and is zero when the afterbody keel is horizontal.

The pitch is positive in the bow up sense and is zero when the afterbody keel is horizontal.

The heave is the height of the tow point above the still water surface, is positive vertically upward, and is zero when the tow point is at the still water level.

The draft is the depth of the keel at transom below the still water surface, is positive vertically downward, and is zero when the keel at transom is at the still water level.

The drag is a horizontal force vector, positive aft in the bow-to-stern sense, and is zero when the boat is at rest.

The velocity is a horizontal vector, positive forward in the stern-to-bow sense, and is zero when the boat is at rest.

The vertical acceleration is a vertical vector, positive upward, and is zero when the boat is at rest.

INTRODUCTION

The Davidson Laboratory is conducting a series of planing boat studies in support of the U.S. Coast Guard's pursuit of R&D projects which will enable it to evaluate advanced marine vehicles and advanced technologies which enhance the effectiveness of ship resources. The experimental results obtained at the Davidson Laboratory are intended to contribute to a relevant technical data base for the evaluation of vessels which are in service and for designs which are being considered for service.

The objective of this research is to obtain basic hydrodynamic information about planing hulls through the use of captive model tests. This information is required for the study of the transverse stability, yaw/roll stability, course keeping, maneuvering and control of planing hulls, and for the study of seakeeping, and the loss of speed in a seaway, of planing hulls.

The research results presented in this report are concerned with the performance and seakeeping characteristics of two Notional WPB Designs - the 110 ft WPB and the 120 ft WPB. Tests were conducted at speeds up to 65 knots in calm water, regular waves, and in irregular head seas up to sea state 5.

MODEL AND INSTRUMENTATION

Two 1/18 scale models of the 110 ft WPB and the 120 ft WPB were fabricated (see Figure 1). The WPB profiles are presented on Figure 3. Figures 4 and 5 present the body lines of each hull. The model hulls were made of fiberglass and epoxy to USCG specifications. Internal body frames and cut-out decks were included to make the models rigid but lightweight. A lower deck, made of marine plywood, was installed inside each model and extended for about a third of each model's length. These decks were used for attaching weights, instrumentation, and the apparatus which attached the models to the overhead towing carriage.

Each model was towed through a pitch pivot box, which had its axis located at the intersection of the thrust line with the LCG. Thus the towpoint was at the LCG at a height of 6.38 ft above the baseline. Here, as throughout this report, values are given in terms of full-size equivalents. Above the pivot box a drag balance was mounted and attached to twin vertical heave poles supported by a standard free-to-heave apparatus. The models were towed

at constant speed along the center line of the tank at zero roll and yaw with freedom to pitch and heave. The photographs in Figure 2 show the 120 ft WPB model and its instrumentation, which was also used for the 110 ft WPB model tests. Five accelerometers were mounted in each model as shown on Figure 6. An inclinometer mounted in the model measured the trim in calm water and a linear differential transformer attached to the heave poles was used to measure the heave. The pitch excursions in waves were measured by a rotary differential transformer. Thin mylar strips were fastened to both chines of the 110 ft WPB and to the lower chine of the 120 ft WPB to ensure sharp edges on the scaled models. The spray rail built into the 120 ft WPB at the upper chine was V-shaped in cross-section, which resulted in a sharp edge, and therefore no mylar strip was required. The models were ballasted to the scaled values presented in Table 1.

TEST FACILITY

Tests were conducted in the Davidson Laboratory Tank 3 which is 313 ft long, 12 ft wide and 5.5 ft deep. A monorail above the water extends down the tank's length. A towing carriage rides on this rail and is attached to the model below it through the heave poles. The carriage is towed by a steel cable driven by an electric motor at one end of the tank. The model is accelerated up to the required constant speed, and data are acquired in the data trap. The signals are transmitted by overhead cables to shore-based signal conditioning equipment and thence to an on-line computer for processing and storage.

Calm water underwater photographs are taken using a water-tight camera box and a large underwater mirror. A color video camera was mounted ahead and to port of the model being tested. All runs were monitored on a shore based monitor, and a video recording was made of each run.

The Tank 3 wavemaker is an articulated double flap wet-back type in which the upper and lower flaps are powered by hydraulic cylinders. A dedicated computer generates the signals which control the movements of each of the hydraulic actuators.

The specified sea states had significant wave heights of 40 and 60 percent of each hull's maximum beam at the upper chine. These waves were generated and measured by a stationary wave-wire prior to tests with the

model. When the specified waves were obtained their parametric settings were locked in the computer. A moving wave strut was mounted forward and to port of the model to monitor the waves encountered during model tests. The full size spectra of the generated sea states, together with the corresponding idealized Pierson-Moskowitz spectra, are presented on Figures 7 and 8.

MODEL TESTS

Calm Water

The 110 ft WPB was tested at speeds corresponding to 10, 20, 25, 29.4, 32, 35, 40, 50, 60 and 70 knots. The 120 ft WPB was tested at speeds of 10, 20, 25, 30, 32.6, 35.1, 40, 50, 60 and 70 knots. Trim, heave, and drag were measured. The effect of thrust unloading was modeled: at each speed an upward unloading force was applied at the tow-point representing the vertical component of thrust arising from the inclination of the thrust line. Thus the resultant force applied to the model acted along the shaft line.

The water temperature was maintained at a value of 71.5°F which was checked twice daily. Underwater photographs were taken to record the wetted areas. These photographs were subsequently measured to determine the wetted lengths at keel and chine. Figures 9 and 10 present underwater photographs of the 110 ft and 120 ft WPB hulls at a speed of 35 knots.

Table 2 summarizes the calm water tests. No air tare tests were performed.

Irregular Waves

The ballast of each model was adjusted to obtain the specified radius of gyration in pitch equal to 25 percent of the model's LBP.

The models were tested at the half-load condition noted in Table 1 at three values of speed coefficient, Cv, equal to 1.5, 3.0 and 4.0, and in two Pierson-Moskowitz seas having significant wave heights of 40 and 60 percent of the maximum beam at chine. Pitch, heave, drag, and five vertical accelerations (see Figure 6) were measured.

Runs were made at the following matrix of test conditions:

Model designation	110 ft WPB	120 ft WPB
Speed, knots	25.04, 50.08, 66.78	23.22, 46.44, 61.91
Significant wave height, ft	9.87, 14.80	8.48, 12.72
Modal period, seconds	8.70, 10.65	8.06, 9.87

The model was accelerated to a steady speed and then data were acquired in the 150 ft data trap. Additional runs were made in different sections of the seaway, by inserting a known time offset into the wavemaker computer, until a minimum of 70 waves had been encountered at each test condition. The statistics were then calculated for this group of combined runs. Table 6 summarizes the irregular wave test conditions.

Regular Waves

Regular wave tests were performed at the cruising speed of 10 knots in wave heights of 12.5 and 25 percent of the maximum chine beam and at wave-length to hull-length ratios of 0.75, 1.0, 1.25, 1.5, 2.0, 2.5, 3, 4, 5 and 6. To determine the amplitude of the response, the RMS of each channel was calculated. Table 4 summarizes the regular wave test conditions.

DATA PROCESSING

The instrumentation was calibrated by applying known displacements to the motion transducers and wave strut, known loads to the force balance, and gravity multiples to the accelerometers. All calibrations were linear and a "least-squares" technique was used to determine the calibration rates, which were checked daily.

The primary measured quantities in the calm water tests included the drag, trim, and CG heave, and in the rough water tests included the drag, pitch, CG heave, and five accelerations. The heave is defined as the height of the tow point above the still water surface. The transom draft was calculated in the calm water tests from the observed heave and the position of the tow point relative to the keel at the transom.

A quantity known as the "static keel wetted length" (SKWL) was calculated from the trim and the transom draft. The SKWL is defined by the intersection of the still water surface with the keel profile in the running condition and does not allow for the wave rise at the keel. The SKWL, and its use, is more fully described later in the section on Calm Water Results.

The velocities were computed from the time taken to travel through the data trap which was 50 ft long for the calm water tests and 150 ft long for the rough water tests. During data collection all data channels were scanned at a rate of 250 Hz and the results stored in the computer for appropriate processing.

At tankside, wetted areas were estimated by a computer program so that the full size ship resistance could be calculated, for the purpose of determining thrust unloading. However the actual wetted areas were later calculated from the underwater photographs taken during the calm water tests, inserted into the program, and used to compute ship resistance. A zero roughness allowance was used in the computations.

For the irregular wave tests the mean values described above were computed, and in addition a peak-trough analysis was carried out for the pitch, heave, and the five accelerations. The peak-trough analysis computes for each signal the mean and rms, the number of oscillations, the average of the peaks and troughs, the average of the 1/3-highest and the 1/10-highest peaks and troughs, and the extreme values of the peaks and troughs. All data were scaled to full size units.

Wave height statistics generated from time-series data sometimes involve an analysis procedure which identifies wave crests and troughs as the maximum and minimum values of wave height occurring between zero crossings, or between crossings of a reference data level. This is not the procedure customarily employed at the Davidson Laboratory. The procedure used in this study identifies all maxima and minima regardless of magnitude, thereby avoiding a bias that would otherwise be introduced into the statistics. In his analysis of the motion maxima, Fridsma[1] employs the two-parameter Longuet-Higgins distribution and one of these parameters is the proportion of negative maxima (or maxima less than the reference level). If the zero-crossing criteria were used to identify maxima, this proportion would necessarily be zero, a clear perversion of the data. Spectral analyses were performed on the five accelerations, and the pitch and heave data.

Additionally 1/3-octave RMS analyses were performed on the five accelerations for those who wish to assess the habitability of the designs.

Regular wave data were processed by using the RMS values to compute the pitch, heave, and wave amplitudes. The non-dimensional heave response was obtained by dividing the heave amplitude by the wave amplitude, similarly the pitch amplitude was divided by the wave slope. In addition the pitch amplitude was divided by the wave amplitude.

RESULTS

The results of the tests are presented in dimensional form, both model and full-size, and in non-dimensional form. The non-dimensional form adopted for planing boats uses the maximum beam at the chine as the reference length and is based on the NACA planing coefficients[2]. These coefficients are defined in the Nomenclature section and include the beam loading coefficient, C_Δ, the resistance coefficient, C_R, and the speed coefficient, C_V.

The concept of load-on-water, or briefly load, was introduced by the NACA in recognition of the fact that the load-on-water is only equal to the displacement when the planing craft is at rest. When the craft is under way it is unloaded by the vertical component of the thrust so that the load is less than the displacement.

These coefficients form the basis for other normalizations. For example, a drag coefficient based on the velocity and the square of the beam is used in reporting and analyzing planing data. Since the drag and resistance are identical it follows that:

$$C_D = R/qb^2 = 2\ C_R/C_V^2$$

which may in turn be related to the total resistance coefficient based on the wetted area S:

$$C_T = R/qS = C_D\ (b^2/S)$$

The total resistance coefficient is used in expanding the model resistance to full-size:

$$C_{Ts} = C_{Tm} - C_{fm} + C_{fs}$$

where the subscript s refers to the full-size ship, and m refers to the model. The ATTC frictional resistance coefficient, C_f, is a function of the Reynolds Number based on the mean wetted length and the speed.

A few alternate coefficients have been introduced which are readily expressible in terms of the NACA coefficients. Typical of these are the volume Froude Number and the Slenderness ratio. A complete list of the non-dimensional coefficients is included in the Nomenclature, together with the conversion to some common equivalents such as speed-length ratio.

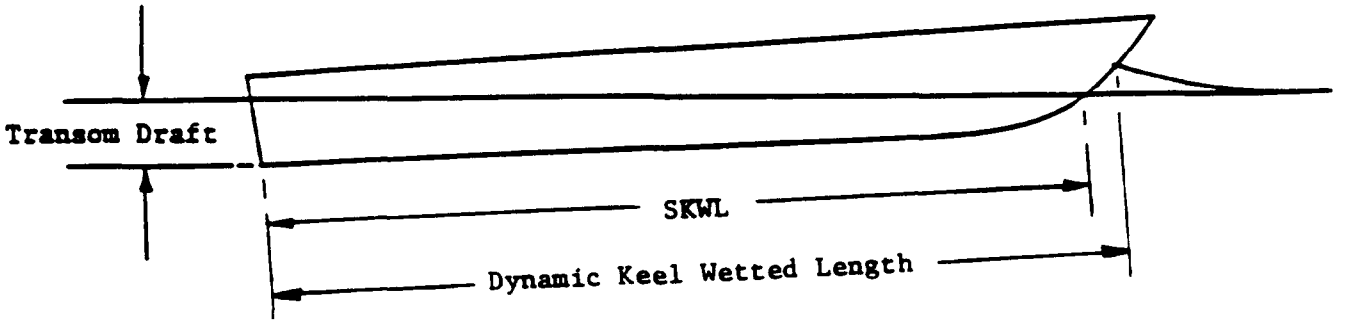
Calm Water Tests

The calm water results are presented in Table 3: the expanded full-size results are given in Table 3.1, the non-dimensional results are in Table 3.2, and the original model results are given in Table 3.3.

The column headings in Table 3.3 are abbreviated. The tabulated quantities include: Run number, Speed, Keel trim, Heave of the towpoint, Draft of the keel at transom, Wetted lengths at keel and chine as read from the underwater photographs, SKWL, Drag which is synonymous with resistance, and Load on water.

Resistance expansion of planing boats requires a knowledge of the wetted area which is calculated from the keel and chine wetted lengths observed in the underwater photographs. In rough water, however, it is not possible to use underwater photography and some other means has to be used to find the mean wetted area. This is the function of the static keel wetted length, because the SKWL can be calculated from the mean trim and transom draft in both calm and rough water. The dynamic wetted lengths at keel and chine from the underwater photographs are correlated with the static keel wetted length to provide the means for estimating the wetted area in rough water. This also serves to fair the wetted length data and for consistency the faired wetted lengths are used in both calm and rough water expansions.

The static keel wetted length is defined by the intersection of the still water surface with the keel profile in the running condition, and is computed from the observed trim, the transom draft, and the known geometry of the keel. The SKWL is shown in Sketch A:



Sketch A

The measured wetted lengths given in Table 3.3 were correlated with the static keel wetted length (SKWL) and the resulting faired values are those shown in Table 3.1. A comparison of the measured and faired wetted lengths in the two tables shows them to be practically identical.

The faired values of keel and chine wetted length, together with the girths of each WPB were used to compute the wetted areas given in Table 3.1. This wetted area was used to calculate the full-size drag or resistance tabulated in Table 3.1. The resistance-weight ratio is plotted as a function of volume Froude Number on Figure 11.

The non-dimensional values of speed coefficient, volume Froude Number, mean wetted length-beam ratio, model and full-size Reynolds Number, model and full-size frictional resistance coefficients normalized on beam squared, wetted area, and model and full-size drag coefficients are presented in Table 3.2.

Irregular Wave Tests

All wave test data tables and plots are given in full size units. A peak-trough analysis and a spectral analysis were performed on each group of runs tested at the same speed and sea state. The results of the peak-trough analysis are presented in Table 7.

Mean values of the pitch, i.e. trim, the heave-beam ratio, and the total rough water resistance coefficients both model and full size, are given in the top half of Table 7.1 together with the added resistance in waves. Since the rough water tests were conducted without thrust unloading, some special calm water tests without unloading were necessary in order to determine the added resistance in waves. The calm water and rough water model data without unloading were expanded to full scale and the differences used to compute the coefficients of the added resistance in waves.

The tabulated statistical quantities include the pitch, heave-beam ratio and the outputs from the five accelerometers. The RMS values are given in the lower half of Table 7.1. Average values of the crests and troughs are tabulated in Table 7.2. The 1/3-highest statistics are presented in Table 7.3 and the 1/10-highest statistics in Table 7.4. The 1/3-highest or significant values of the bow and CG accelerations, Accelerometers #5 and #2 respectively, for the two planing craft are plotted versus speed on Figures 12 through 15.

The full-size spectral estimates of the five accelerations on the 110 ft WPB and the 120 ft WPB are tabulated in Tables 8 and 9 respectively. The center frequency of each pass band is tabulated in the left hand column, and the variance density in each pass band is given in subsequent columns for the five accelerometers from bow to transom, see Figure 6.

The maximum frequency of the analysis is chosen so that there is no contribution to the variance from frequencies above the maximum. The numerical value of the maximum center frequency is somewhat arbitrary being a function of the scanning rate and the scale ratio: the maximum frequency is 7.3657 Hz. In addition rather narrow bandwidths are selected to improve the accuracy of subsequent transformations. The frequency scale is divided into 30 intervals resulting in bandwidths of 0.2455 Hz. This detailed analysis facilitates the transformation into the 1/3-octave presentation and into the graphical presentations in the Appendices. For example, in Table 8.1 at the center frequency of 0.49 Hz the variance density in the pass band for the #5 accelerometer is 0.6245 g^2/Hz. Multiplying by the bandwidth of 0.2455 Hz, the contribution to the variance in this band is 0.1533 g^2. Proceeding in this manner the detailed spectra can be transformed into broader and more practical bandwidths and into the 1/3-octave format.

The 1/3-octave rms accelerations are tabulated in Tables 10 and 11 for the 110 ft and the 120 ft WPB respectively. The center frequencies of these 1/3-octave bandwidths are those specified in International Standard ISO 2631[3] and in MIL-STD-1472A, and they are tabulated in the left hand column. The rms acceleration in each 1/3-octave pass band is given in the subsequent columns for the five accelerometers. It may be noted that the rms is simply the square root of the variance.

Pitch spectral estimates are presented in Tables 12 and 13 for the two hulls; heave spectral estimates are presented in Tables 14 and 15; and encountered wave spectral estimates are presented in Tables 16 and 17.

Because of their bulk, the plots of the spectral analysis and 1/3-octave analysis are presented in appendices. In the graphical presentation of the spectra the encountered frequency bandwidths were changed in the manner described above. Appendices A and B present plots of the spectral estimates of the accelerations of the 110 ft and 120 ft WPB, in bandwidths of 0.25 Hz. Appendices C and D are log-log plots of the 1/3-octave rms accelerations[3]. Appendices E and F are plots of the pitch spectral estimates, Appendices G and H are plots of the heave spectral estimates, and Appendices I and J are plots of the encountered wave spectral estimates all in bandwidths of 0.1 Hz.

Regular Wave Tests

The regular wave results at 10 knots are presented in non-dimensional form for wave heights corresponding to 12.5 and 25 percent of the beam in Table 5. Tabulated values include the Run number, Wave length, Frequency of encounter, Heave amplitude response, Pitch amplitude response, the Pitch amplitude-wave amplitude ratio, and the Resistance coefficient of the model. The motion responses and the model resistance coefficient as functions of frequency of encounter are shown on Figures 16, 17 and 18.

DISCUSSION

The calm water performance shown on Figure 11 in terms of the non-dimensional resistance-weight ratio, (which is the same as the drag-displacement ratio), is similar to that which would be predicted for planing hulls having a slenderness ratio of 7.

The accelerations at the bow (accelerometer #5) and at the CG (accelerometer #2) for the 110 ft WPB in irregular waves of significant height equal to 40 percent and 60 percent of the beam, as shown on Figures 12 and 13 respectively, show the typical increase in acceleration with speed and with forward location in the hull. The corresponding data for the 120 ft WPB on Figures 14 and 15 show similar trends, but the accelerations are somewhat lower due to the higher beam loading of this hull.

Detailed spectral analyses for all the accelerometers from bow (#5) to stern (#1) are presented in Appendices A and B for the full scale 110 ft and 120 ft WPB respectively. These form a most extensive data base and merit considerable study. For example Figures A2.1 to A2.5 show how the acceleration variance changes from bow to stern for the 110 ft hull in 40% beam significant wave height at a speed coefficient of 3. The corresponding pitch, heave, and wave spectra are shown on Figures E1.2, G1.2 and I1.2. It will be noticed in this example that whereas the motions and waves show dominant frequencies at about 0.4 Hz with little frequency content above 0.8 Hz, the accelerations show dominant frequencies at 0.6 Hz with significant contributions out to 4.0 Hz and beyond. The work entailed in correlating all this irregular wave data is outside the scope of this study.

The pitch and heave motions at the cruising speed of 10 knots in small regular waves are simpler to analyze. The heave response as a function of frequency of encounter is shown on Figure 16 and is essentially linear and exhibits little resonance. The pitch response is similarly shown on Figure 17, with maximum response occurring when the wave length is twice the hull length. However the 110 ft hull shows some evidence of non-linear pitch response in wave lengths from three-quarters to twice the hull length. The resistance in regular waves is shown on Figure 18, with the maximum added resistance occurring in wave lengths 1.5 times the hull length, which tends to correlate with the maximum pitch response. At the 10 knot cruising speed, the added resistance of the 110 ft hull varies approximately linearly with wave height, whereas that of the 120 ft seems to correlate with the square of the wave height.

CONCLUDING REMARKS

This study provides an extensive data base for validating the predicted performance of the two notional WPB designs identified as the 110 ft and the 120 ft hulls. Tabular and graphical presentations of the calm water performance and the seakeeping characteristics in regular and irregular waves are included.

It is recommended that these data be analyzed and incorporated into current planing boat performance and seakeeping prediction methodologies.

REFERENCES

1. Fridsma, G.: "A Systematic Study of the Rough-Water Performance of Planing Boats"
   Davidson Laboratory Report 1495, March 1971.

2. Shoemaker, J.M. and Parkinson, J.B.: "A Complete Test of a Model of a Flying Boat Hull--NACA Model No. 11"
   NACA TN 464, July 1933.

3. International Standards Organisation: "Guide for the Evaluation of Human Exposure to Whole Body Vibrations"
   ISO 2631, First Edition 1974-07-1

TABLE I

HULL CHARACTERISTICS

110 ft WPB at Half Load

Displacement	119.0 ℓ-tons	44.45 lb
LCG forward of AP	37.2 ft	24.8 in
VCG above baseline	8.9 ft	5.93 in
Maximum beam at upper chine	24.69 ft	16.46 in
Propeller shaft angle, degrees	15.0	15.0
Pich radius of gyration, percent LBP	25.0	25.0
LOA	110.0 ft	73.33 in
LBP	104.0 ft	69.33 in

120 ft WPB at Half Load

Displacement	135.0 ℓ-tons	50.43 lb
LCG forward of AP	42.9 ft	26.8 in
VCG above baseline	7.66 ft	5.11 in
Maximum beam at upper chine	21.20 ft	14.13 in
Propeller shaft angle, degrees	10.0	10.0
Pich radius of gyration, percent LBP	25.0	25.0
LOA	118.79 ft	79.20 in
LBP	110.0 ft	73.33 in

TABLE 2

CALM WATER TEST DIRECTORY

110 ft WPB		120 ft WPB	
V, knots	Run	V, knots	Run
0	104	0	124
10	111	10	135
20	118	20	136
25	112	25	137
29.4	119	30	138
32	120	32.6	139
35	113	35.1	140
40	121	40	141
50	114	50	142
60	115	60	143
70	116	70	144

TABLE 3.1

CALM WATER FULL-SIZE RESULTS WITH THRUST UNLOADING
(Salt water at 59°F)

RUN	SPEED	KEEL TRIM	HEAVE[1]	WETTED KEEL	LENGTH[2] CHINE	WETTED AREA	DRAG	DRAG/WEIGHT RATIO
	knots	deg	ft	ft	ft	sq.ft	lb	
			110 ft WPB - 119 ℓ-tons					
104	0.0	-1.2	1.56	-	-	-	-	-
111	10.0	-1.0	1.38	104	61	2,141	5,400	0.020
118	20.0	[illegible]	1.34	99	55	2,027	20,700	0.078
112	25.0	1.3	1.74	98	52	1,980	24,200	0.091
119	29.4	1.2	2.38	96	50	1,938	26,600	0.100
120	32.0	1.3	2.52	95	49	1,915	29,100	0.109
113	35.0	1.6	2.72	93	46	1,856	32,700	0.123
121	40.0	2.0	3.09	88	39	1,699	36,500	0.137
114	50.0	2.1	3.81	74	19	1,242	40,500	0.152
115	60.0	1.6	4.16	73	19	1,229	45,300	0.170
116	70.0	1.2	4.34	76	7	1,303	52,900	0.198
			120 ft WPB - 135 ℓ-tons					
124	0.0	0.0	1.41	-	-	-	-	-
135	10.0	0.2	1.23	109	81	2,138	4,400	0.015
136	20.0	1.9	1.05	106	74	2,038	21,300	0.070
137	25.0	2.3	1.36	104	71	1,996	25,600	0.085
138	30.0	2.1	2.04	103	69	1,960	28,500	0.094
139	32.6	2.2	2.10	103	68	1,950	31,300	0.104
140	35.1	2.2	2.26	102	68	1,937	32,300	0.107
141	40.0	2.6	2.48	100	64	1,876	36,700	0.121
142	50.0	3.2	3.22	89	47	1,561	41,600	0.138
143	60.0	3.1	3.74	82	37	1,362	47,000	0.155
144	70.0	2.7	4.05	80	34	1,302	52,000	0.172

Notes: 1. Height of towpoint above still water.

2. Faired values, see p. 8, cf. Table 3.3.

TABLE 3.2

CALM WATER NON-DIMENSIONAL RESULTS

RUN	C_V	F_{n_∇}	TRIM	ℓ_m/b	Re_m	Re_s	C_{F_m}	C_{F_s}	S/b^2	C_{D_m}	C_{D_s}
					$\times 10^{-6}$	$\times 10^{-8}$	$\times 10^{3}$	$\times 10^{3}$		$\times 10^{3}$	$\times 10^{3}$
					110 ft WPB, C_Δ = 0.27673						
104	0	0	-1.20	-	-	-	-	-	-	-	-
111	0.60	0.74	-0.95	3.34	1.77	1.09	13.91	7.19	3.512	37.78	31.06
118	1.20	1.49	1.11	3.06	3.31	2.04	11.77	6.25	3.325	35.44	29.92
112	1.50	1.86	1.31	3.04	4.02	2.48	11.11	5.95	3.249	27.51	22.34
119	1.76	2.18	1.20	2.96	4.61	2.84	10.62	5.72	3.179	22.70	17.80
120	1.92	2.37	1.34	2.92	4.96	3.05	10.37	5.60	3.142	21.18	16.41
113	2.10	2.60	1.60	2.83	5.24	3.22	9.95	5.38	3.045	20.01	15.44
121	2.40	2.97	2.03	2.57	5.45	3.36	9.05	4.90	2.787	17.35	13.21
114	3.00	3.72	2.10	1.89	5.01	3.09	6.71	3.62	2.038	12.43	9.34
115	3.59	4.45	1.64	1.87	5.94	3.66	6.45	3.51	2.016	10.24	7.30
116	4.19	5.19	1.24	1.98	7.31	4.50	6.60	3.62	2.137	9.26	6.27
					120 ft WPB, C_Δ = 0.49590						
124	0	0	0.02	-	-	-	-	-	-	-	-
135	0.64	0.73	0.18	4.49	2.04	1.26	18.36	9.55	4.758	43.26	34.45
136	1.29	1.45	1.94	4.22	3.84	2.36	15.62	8.35	4.532	48.89	41.62
137	1.62	1.82	2.25	4.14	4.72	2.90	14.78	7.96	4.442	38.81	31.99
138	1.94	2.18	2.11	4.06	5.53	3.41	14.12	7.66	4.361	31.34	24.88
139	2.11	2.37	2.16	4.04	5.98	3.68	13.87	7.54	4.339	29.48	23.16
140	2.27	2.55	2.15	4.00	6.39	3.98	13.62	7.43	4.310	26.79	20.59
141	2.59	2.90	2.59	3.87	7.05	4.34	12.98	7.10	4.174	23.86	17.98
142	3.23	3.63	3.24	3.22	7.30	4.50	10.73	5.88	3.473	17.92	13.07
143	3.88	4.36	3.06	2.82	7.69	4.73	9.29	5.10	3.030	14.43	10.24
144	4.52	5.08	2.73	2.70	8.58	5.28	8.72	4.81	2.897	12.26	8.35

TABLE 3.3

CALM WATER MODEL RESULTS WITH THRUST UNLOADING
(Fresh Water 71.5°F)

RUN	SPEED	KEEL TRIM	HEAVE[1]	DRAFT TRANSON	WETTED KEEL	LENGTH CHINE	SKWL	DRAG	LOAD
	fps	deg	in	in	in	in	in	lb	
				110 ft WPB, 44.5 lb					
104	0	-1.20	1.04	2.62	-	-	67.49	-	44.5
111	3.98	-0.95	0.92	2.85	69	41	67.40	1.09	44.3
118	7.97	1.11	0.89	3.29	65	43	64.99	4.10	43.7
112	9.96	1.31	1.16	3.58	64	34	64.03	4.97	43.3
119	11.71	1.20	1.59	3.11	64	33	63.24	5.67	43.0
120	12.74	1.34	1.68	3.08	64	32	62.82	6.26	43.1
113	13.93	1.60	1.81	2.37	62	31	61.72	7.07	42.9
121	15.93	2.03	2.06	2.99	57	26	58.93	8.02	42.7
114	19.95	2.10	2.54	2.55	50	21	51.40	9.01	42.5
115	23.86	1.64	2.77	2.15	49	15	51.20	10.62	42.4
116	27.82	1.24	2.89	1.83	51	10	52.37	13.05	42.1
				120 ft WPB, 50.4 lb					
124	0	0.02	0.94	3.01	-	-	71.31	-	50.4
135	3.98	0.18	0.82	3.21	73	-	71.32	0.92	50.3
136	7.97	1.94	0.70	4.21	71	50	69.40	4.17	49.7
137	9.97	2.25	0.91	4.15	70	48	68.48	5.18	49.5
138	11.94	2.11	1.36	3.63	69	46	67.68	6.00	49.4
139	12.98	2.16	1.40	3.61	69	44	67.46	6.67	49.4
140	13.96	2.15	1.51	3.50	68	44	67.18	7.01	49.3
141	15.93	2.59	1.65	3.58	67	41	65.88	8.13	49.0
142	19.89	3.24	2.15	3.41	58	32	59.52	9.52	48.8
143	23.89	3.06	3.10	2.97	55	27	55.66	11.06	48.7
144	27.84	2.73	2.70	2.60	55	23	54.51	12.76	48.4

[1]Height of towpoint above still water: towpoint located at LCG and 6.38 ft above baselines

TABLE 4

REGULAR WAVE TEST DIRECTORY

WAVE LENGTH / HULL LENGTH	110 ft WPB WAVE HEIGHT		120 ft WPB WAVE HEIGHT	
	0.125b	0.250b	0.125b	0.250b
0.75	234	257	328	343
1.0	249	258	329	344
1.25	239	259	330	345
1.5	250	261	331	346
2.0	251	262	332	347
2.5	252	263	333	348
3.0	253	264	334	349
4.0	254	265	335	350
5.0	255	266	336	351
6.0	256	267	337	352

TABLE 5.1
110 FT WPB IN REGULAR WAVES
Speed = 10 knots

RUN	WAVE LENGTH / HULL LENGTH	FREQUENCY OF ENCOUNTER	HEAVE AMPLITUDE / WAVE AMPLITUDE	PITCH AMPLITUDE / WAVE SLOPE	PITCH AMPLITUDE / WAVE AMPLITUDE	C_{R_m}
	ft/ft	$f_e\sqrt{b/g}$	ft/ft	deg/deg	deg/ft	
		3.09 ft Nominal Wave Height - 12.5% Beam				
234	0.75	0.402	0.242	0.144	0.660	0.0096
249	1.00	0.333	0.587	0.503	1.74	0.0119
239	1.25	0.286	0.782	0.916	2.53	0.0118
250	1.50	0.251	0.775	1.08	2.49	0.0101
251	2.00	0.208	0.889	1.18	2.04	0.0086
252	2.50	0.179	1.00	1.16	1.61	0.0078
253	3.00	0.158	1.00	1.11	1.28	0.0075
254	4.00	0.128	1.07	1.09	0.947	0.0072
255	5.00	0.108	1.10	1.07	0.743	0.0071
256	6.00	0.093	1.11	1.03	0.596	0.0069
		6.18 ft Nominal Wave Height - 25% Beam				
257	0.75	0.402	0.270	0.190	0.858	0.0149
258	1.00	0.333	0.534	0.411	1.41	0.0194
259	1.25	0.286	0.714	0.693	1.90	0.0212
261	1.50	0.251	0.803	0.972	2.23	0.0189
262	2.00	0.208	0.871	1.17	2.02	0.0121
263	2.50	0.179	0.932	1.12	1.55	0.0097
264	3.00	0.158	0.993	1.10	1.26	0.0084
265	4.00	0.128	1.06	1.09	0.941	0.0075
266	5.00	0.108	1.06	1.07	0.742	0.0073
267	6.00	0.093	1.07	1.02	0.591	0.0071

TABLE 5.2
120 FT WPB IN REGULAR WAVES
Speed = 10 knots

RUN	WAVE LENGTH / HULL LENGTH	FREQUENCY OF ENCOUNTER	HEAVE AMPLITUDE / WAVE AMPLITUDE	PITCH AMPLITUDE / WAVE SLOPE	PITCH AMPLITUDE / WAVE AMPLITUDE	C_{R_m}
	ft/ft	$f_e\sqrt{b/g}$	ft/ft	deg/deg	deg/ft	
		2.65 ft Nominal Wave Height - 12.5% Beam				
328	0.75	0.364	0.237	0.132	0.573	.0141
329	1.00	0.299	0.417	0.450	1.47	.0164
330	1.25	0.256	0.536	0.813	2.13	.0172
331	1.50	0.225	0.657	0.990	2.16	.0159
332	2.00	0.185	0.852	1.07	1.74	.0132
333	2.50	0.159	0.949	1.08	1.42	.0118
334	3.00	0.140	1.00	1.07	1.16	.0113
335	4.00	0.113	1.02	1.06	0.863	.0108
336	5.00	0.095	1.07	1.06	0.694	.0106
337	6.00	0.082	1.08	1.07	0.585	.0107
		5.30 ft Nominal Wave Height - 25% Beam				
343	0.75	0.364	0.160	0.120	0.517	.0205
344	1.00	0.299	0.462	0.447	1.45	.0280
345	1.25	0.256	0.605	0.814	2.19	.0306
346	1.50	0.225	0.642	1.03	2.24	.0248
347	2.00	0.185	0.811	1.06	1.74	.0181
348	2.50	0.159	0.911	1.07	1.40	.0146
349	3.00	0.140	0.961	1.07	1.17	.0128
350	4.00	0.113	0.984	1.04	0.851	.0112
351	5.00	0.095	1.01	1.02	0.668	.0109
352	6.00	0.082	1.01	1.02	0.554	.0112

TABLE 6

WPB HULLS ROUGH WATER RUN DIRECTORY

C_V	$F_{n\nabla}$	RUNS						Number of Wave Encounters
		110 ft WPB, C_Δ = 0.2767						
		Significant Wave Height - 40% Beam						
1.5	1.86	221	222	223				75
3.0	3.72	224	225	226	227			73
4.0	4.96	228	229	230	231	232		78
		Significant Wave Height - 60% Beam						
1.5	1.86	171	190	191	192			75
3.0	3.72	172	193	194	195	199		68
4.0	4.96	173	200	201	202	219	220	77
		120 ft WPB, C_Δ = 0.5032						
		Significant Wave Height - 40% Beam						
1.5	1.68	290	291					70
3.0	3.36	292	293	294				86
4.0	4.48	295	296	297	298			106
		Significant Wave Height - 60% Beam						
1.5	1.68	299	301	302				82
3.0	3.36	311	312	313	314			95
4.0	4.48	315	316	317	319			84

TABLE 7.1
WPB ROUGH WATER MEAN AND RMS VALUES

Mean Values

RUN GROUP	WAVE HEIGHT / BEAM	C_V	TRIM deg	HEAVE / BEAM	C_{R_m}	C_{R_s}	$C_{R_{aw}}$
			110 ft WPB				
221	0.4	1.5	1.98	0.077	0.0380	0.0309	0.0061
224	0.4	3.0	2.84	0.174	0.0715	0.0569	0.0235
228	0.4	4.0	2.82	0.224	0.0898	0.0703	0.0200
171	0.6	1.5	3.33	0.082	0.0387	0.0321	0.0073
172	0.6	3.0	4.29	0.191	0.0745	0.0605	0.0272
173	0.6	4.0	4.47	0.267	0.0897	0.0738	0.0236
			120 ft WPB				
290	0.4	1.5	2.76	0.064	0.0588	0.0506	0.0125
292	0.4	3.0	3.31	0.139	0.1074	0.0832	0.0161
295	0.4	4.0	3.54	0.193	0.1353	0.1066	0.0299
299	0.6	1.5	3.03	0.065	0.0611	0.0529	0.0148
311	0.6	3.0	3.46	0.160	0.1143	0.0927	0.0256
315	0.6	4.0	3.82	0.204	0.1460	0.1189	0.0422

RMS Values

RUN GROUP	WAVE HEIGHT / BEAM	C_V	PITCH deg	HEAVE / BEAM	ACCELERATION, g #1	#2	#3	#4	#5
			110 ft WPB						
221	0.4	1.5	3.01	0.111	0.276	0.331	0.372	0.521	0.753
224	0.4	3.0	2.66	0.132	0.593	0.694	0.732	0.949	1.297
228	0.4	4.0	2.67	0.139	0.858	0.927	0.954	1.185	1.623
171	0.6	1.5	3.61	0.156	0.324	0.396	0.414	0.577	0.740
172	0.6	3.0	3.64	0.197	0.793	0.914	0.878	1.115	1.391
173	0.6	4.0	3.27	0.193	1.156	1.302	1.230	1.492	1.867
			120 ft WPB						
290	0.4	1.5	2.76	0.106	0.259		0.359	0.474	0.597
292	0.4	3.0	1.96	0.094	0.394	0.479	0.569	0.740	0.892
295	0.4	4.0	1.92	0.098	0.570	0.713	0.774	0.968	1.130
299	0.6	1.5	3.46	0.156	0.308	0.360	0.425	0.555	0.676
311	0.6	3.0	2.76	0.174	0.608	0.682	0.731	0.912	1.111
315	0.6	4.0	2.66	0.167	0.842	0.959	0.959	1.174	1.412

TABLE 7.2
WPB ROUGH WATER AVERAGE CRESTS AND TROUGHS

RUN GROUP	WAVE HEIGHT / BEAM	C_V	PITCH deg	HEAVE / BEAM	ACCELERATION, g #1	#2	#3	#4	#5
				CRESTS					
				110 ft WPB					
221	0.4	1.5	2.77	0.138	0.43	0.47	0.61	0.77	1.25
224	0.4	3.0	3.16	0.145	0.93	1.05	1.33	1.54	2.18
228	0.4	4.0	2.84	0.124	1.19	1.13	1.40	1.20	1.80
171	0.6	1.5	4.16	0.176	0.50	0.62	0.78	0.97	1.34
172	0.6	3.0	4.12	0.220	1.26	1.43	1.61	1.74	2.40
173	0.6	4.0	3.13	0.208	1.67	1.61	1.82	1.61	2.27
				120 ft WPB					
290	0.4	1.5	3.23	0.138	0.51		0.64	0.81	1.17
292	0.4	3.0	2.15	0.115	0.72	0.88	1.10	1.35	1.69
295	0.4	4.0	2.26	0.105	1.08	1.27	1.26	1.38	1.77
299	0.6	1.5	4.02	0.175	0.56	0.71	0.85	1.12	1.53
311	0.6	3.0	2.47	0.202	1.46	1.29	1.42	1.76	2.28
315	0.6	4.0	2.96	0.202	1.28	1.73	1.71	1.88	2.36
				TROUGHS					
				110 ft WPB					
221	0.4	1.5	-2.70	-0.125	-0.43	-0.34	-0.51	-0.59	-0.87
224	0.4	3.0	-2.01	-0.138	-0.40	-0.34	-0.27	-0.57	-0.98
228	0.4	4.0	-1.17	-0.149	-0.57	-0.49	-0.48	-0.76	-1.15
171	0.6	1.5	-4.19	-0.158	-0.41	-0.35	-0.37	-0.56	-0.90
172	0.6	3.0	-1.93	-0.218	-0.49	-0.40	-0.28	-0.71	-1.00
173	0.6	4.0	-1.12	-0.232	-0.48	-0.48	-0.32	-0.79	-0.95
				120 ft WPB					
290	0.4	1.5	-3.40	-0.127	-0.60		-0.60	-0.60	-0.97
292	0.4	3.0	-2.78	-0.107	-0.68	-0.65	-0.67	-0.65	-1.03
295	0.4	4.0	-2.64	-0.112	-0.68	-0.54	-0.70	-0.70	-0.98
299	0.6	1.5	-4.23	-0.159	-0.61	-0.47	-0.64	-0.71	-0.96
311	0.6	3.0	-3.51	-0.194	-0.49	-0.48	-0.61	-0.63	-0.98
315	0.6	4.0	-2.81	-0.206	-0.85	-0.59	-0.52	-0.69	-1.02

TABLE 7.3
WPB ROUGH WATER AVERAGE 1/3 LARGEST CRESTS AND TROUGHS

RUN GROUP	WAVE HEIGHT / BEAM	C_V	PITCH deg	HEAVE / BEAM	ACCELERATION, g #1	#2	#3	#4	#5
				CRESTS					
				110 ft WPB					
221	0.4	1.5	6.17	0.241	0.69	0.85	1.17	1.67	2.58
224	0.4	3.0	5.56	0.285	1.94	2.15	2.59	3.35	4.80
228	0.4	4.0	5.16	0.238	2.95	2.88	3.21	3.61	5.07
171	0.6	1.5	7.66	0.345	0.84	1.22	1.48	2.02	2.60
172	0.6	3.0	7.94	0.395	2.98	3.14	3.28	4.25	5.52
173	0.6	4.0	6.34	0.362	4.20	4.28	4.33	5.04	6.43
				120 ft WPB					
290	0.4	1.5	6.38	0.241	0.70		1.09	1.50	2.08
292	0.4	3.0	3.59	0.206	1.21	1.55	1.95	2.58	3.25
295	0.4	4.0	4.14	0.210	2.05	2.45	2.68	3.16	3.87
299	0.6	1.5	7.04	0.346	0.77	1.18	1.62	2.23	2.85
311	0.6	3.0	5.01	0.378	3.11	2.38	2.80	3.69	4.76
315	0.6	4.0	4.94	0.335	3.01	3.48	3.59	4.30	5.29
				TROUGHS					
				110 ft WPB					
221	0.4	1.5	-5.20	-0.136	-0.69	-0.73	-0.83	-1.00	-1.43
224	0.4	3.0	-4.81	-0.143	-0.91	-0.97	-0.95	-1.12	-1.62
228	0.4	4.0	-4.31	-0.154	-1.09	-1.11	-1.07	-1.27	-1.84
171	0.6	1.5	-7.32	-0.186	-0.76	-0.85	-0.85	-1.05	-1.41
172	0.6	3.0	-6.22	-0.228	-1.02	-1.13	-1.04	-1.28	-1.69
173	0.6	4.0	-4.99	-0.223	-1.20	-1.24	-1.10	-1.53	-1.90
				120 ft WPB					
290	0.4	1.5	-5.40	-0.203	-0.85		-0.91	-1.02	-1.41
292	0.4	3.0	-4.56	-0.170	-1.01	-1.02	-1.03	-1.09	-1.44
295	0.4	4.0	-4.26	-0.216	-1.05	-1.06	-1.08	-1.18	-1.51
299	0.6	1.5	-7.00	-0.282	-0.93	-0.90	-0.97	-1.14	-1.45
311	0.6	3.0	-5.53	-0.301	-1.41	-1.07	-1.09	-1.16	-1.52
315	0.6	4.0	-5.49	-0.298	-1.78	-1.40	-1.28	-1.41	-1.89

TABLE 7.4
WPB ROUGH WATER AVERAGE 1/10 LARGEST CRESTS AND TROUGHS

RUN GROUP	WAVE HEIGHT / BEAM	C_V	PITCH deg	HEAVE / BEAM	ACCELERATION, g #1	#2	#3	#4	#5
				CRESTS					
				110 ft WPB					
221	0.4	1.5	8.63	0.345	0.99	1.45	2.17	3.24	4.69
224	0.4	3.0	7.40	0.420	4.15	4.41	4.73	5.48	8.00
228	0.4	4.0	6.67	0.337	5.54	5.38	5.62	6.14	8.59
171	0.6	1.5	9.54	0.464	1.38	1.89	2.27	3.47	4.45
172	0.6	3.0	11.63	0.603	6.27	6.45	6.22	7.63	8.94
173	0.6	4.0	8.68	0.446	7.70	8.37	7.97	9.06	11.15
				120 ft WPB					
290	0.4	1.5	9.12	0.365	0.84		1.86	2.50	3.40
292	0.4	3.0	4.52	0.285	2.00	2.60	2.96	3.99	4.94
295	0.4	4.0	5.74	0.301	3.71	4.37	4.23	5.10	6.05
299	0.6	1.5	10.12	0.482	1.00	2.00	2.76	3.70	4.63
311	0.6	3.0	6.82	0.539	6.00	3.95	4.40	5.74	7.26
315	0.6	4.0	7.15	0.453	6.01	5.85	5.36	6.44	7.88
				TROUGHS					
				110 ft WPB					
221	0.4	1.5	-6.52	-0.262	-0.88	-0.94	-0.98	-1.14	-1.65
224	0.4	3.0	-5.88	-0.272	-1.14	-1.14	-1.07	-1.21	-1.88
228	0.4	4.0	-5.29	-0.281	-1.23	-1.25	-1.21	-1.58	-2.52
171	0.6	1.5	-9.13	-0.344	-0.94	-1.03	-0.99	-1.17	-1.56
172	0.6	3.0	-7.88	-0.448	-1.20	-1.33	-1.24	-1.61	-2.26
173	0.6	4.0	-6.99	-0.413	-1.40	-1.46	-1.28	-2.25	-2.56
				120 ft WPB					
290	0.4	1.5	-6.72	-0.267	-1.01		-1.06	-1.22	-1.64
292	0.4	3.0	-5.67	-0.219	-1.30	-1.15	-1.14	-1.20	-1.55
295	0.4	4.0	-4.79	-0.203	-1.32	-1.23	-1.19	-1.38	-1.76
299	0.6	1.5	-8.63	-0.376	-1.19	-1.11	-1.10	-1.26	-1.59
311	0.6	3.0	-6.32	-0.372	-2.03	-1.22	-1.20	-1.28	-1.64
315	0.6	4.0	-6.15	-0.362	-2.57	-2.06	-1.73	-1.79	-2.50

TABLE 8.1
ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Significant Wave Height 40% Beam
C_V = 1.5

Runs 221, 222, 223

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.2803E+00	0.1603E+00	0.9355E-01	0.8029E-01	0.6075E-01
0.25	0.6149E+00	0.3366E+00	0.1844E+00	0.1540E+00	0.1157E+00
0.49	0.6254E+00	0.3250E+00	0.1635E+00	0.1310E+00	0.9712E-01
0.74	0.2400E+00	0.1147E+00	0.4802E-01	0.3338E-01	0.2081E-01
0.98	0.1210E+00	0.5618E-01	0.2122E-01	0.1216E-01	0.3518E-02
1.23	0.8626E-01	0.4010E-01	0.1555E-01	0.9122E-02	0.2779E-02
1.47	0.6036E-01	0.2805E-01	0.1111E-01	0.6758E-02	0.2072E-02
1.72	0.4585E-01	0.2114E-01	0.8461E-02	0.5199E-02	0.1390E-02
1.97	0.3597E-01	0.1672E-01	0.7011E-02	0.4498E-02	0.1280E-02
2.21	0.2734E-01	0.1265E-01	0.5265E-02	0.3436E-02	0.8365E-03
2.46	0.2265E-01	0.1050E-01	0.4433E-02	0.3023E-02	0.7895E-03
2.70	0.1735E-01	0.7926E-02	0.3319E-02	0.2357E-02	0.4906E-03
2.95	0.1444E-01	0.6671E-02	0.2819E-02	0.2115E-02	0.4617E-03
3.19	0.1114E-01	0.5099E-02	0.2152E-02	0.1611E-02	0.2786E-03
3.44	0.9687E-02	0.4508E-02	0.1941E-02	0.1348E-02	0.3042E-03
3.68	0.7686E-02	0.3534E-02	0.1493E-02	0.9816E-03	0.1845E-03
3.93	0.6699E-02	0.3132E-02	0.1361E-02	0.9236E-03	0.2101E-03
4.17	0.5265E-02	0.2441E-02	0.1068E-02	0.7076E-03	0.1277E-03
4.42	0.4722E-02	0.2218E-02	0.1008E-02	0.6856E-03	0.1547E-03
4.67	0.3824E-02	0.1730E-02	0.7937E-03	0.5304E-03	0.9358E-04
4.91	0.3450E-02	0.1600E-02	0.7558E-03	0.5171E-03	0.1194E-03
5.16	0.2689E-02	0.1252E-02	0.5974E-03	0.3943E-03	0.7332E-04
5.40	0.2435E-02	0.1171E-02	0.5768E-03	0.3884E-03	0.9797E-04
5.65	0.1930E-02	0.9025E-03	0.4584E-03	0.2918E-03	0.6278E-04
5.89	0.1771E-02	0.8778E-03	0.4565E-03	0.2804E-03	0.8361E-04
6.14	0.1348E-02	0.6434E-03	0.3435E-03	0.1945E-03	0.4620E-04
6.38	0.1222E-02	0.5985E-03	0.3323E-03	0.1932E-03	0.5972E-04
6.63	0.9150E-03	0.4155E-03	0.2514E-03	0.1323E-03	0.3763E-04
6.88	0.8682E-03	0.4053E-03	0.2446E-03	0.1301E-03	0.4787E-04
7.12	0.6654E-03	0.2637E-03	0.1751E-03	0.7803E-04	0.2553E-04
7.37	0.5860E-03	0.2790E-03	0.1681E-03	0.7638E-04	0.2989E-04

TABLE 8.2
ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Significant Wave Height 40% Beam
C_V = 3.0

Runs 224, 225, 226, 227

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.3506E+00	0.2266E+00	0.1517E+00	0.1386E+00	0.1013E+00
0.25	0.1160E+01	0.7190E+00	0.4578E+00	0.4066E+00	0.2964E+00
0.49	0.1622E+01	0.9688E+00	0.5870E+00	0.5067E+00	0.3611E+00
0.74	0.9718E+00	0.5366E+00	0.2921E+00	0.2385E+00	0.1578E+00
0.98	0.5610E+00	0.2858E+00	0.1426E+00	0.1126E+00	0.7237E-01
1.23	0.4074E+00	0.2057E+00	0.1051E+00	0.8524E-01	0.5805E-01
1.47	0.3016E+00	0.1499E+00	0.7848E-01	0.6748E-01	0.5086E-01
1.72	0.2332E+00	0.1134E+00	0.6005E-01	0.5490E-01	0.4415E-01
1.97	0.2035E+00	0.9843E-01	0.5308E-01	0.5091E-01	0.4192E-01
2.21	0.1509E+00	0.7180E-01	0.4172E-01	0.4363E-01	0.3796E-01
2.46	0.1304E+00	0.6142E-01	0.3663E-01	0.4013E-01	0.3459E-01
2.70	0.1133E+00	0.5192E-01	0.3039E-01	0.3531E-01	0.3069E-01
2.95	0.9423E-01	0.4334E-01	0.2612E-01	0.3277E-01	0.2736E-01
3.19	0.7899E-01	0.3661E-01	0.2285E-01	0.3069E-01	0.2404E-01
3.44	0.6825E-01	0.3123E-01	0.1948E-01	0.2608E-01	0.2124E-01
3.68	0.5896E-01	0.2615E-01	0.1622E-01	0.2119E-01	0.1856E-01
3.93	0.5331E-01	0.2335E-01	0.1458E-01	0.1887E-01	0.1673E-01
4.17	0.4403E-01	0.1863E-01	0.1192E-01	0.1603E-01	0.1459E-01
4.42	0.3947E-01	0.1646E-01	0.1040E-01	0.1367E-01	0.1277E-01
4.67	0.3240E-01	0.1315E-01	0.8551E-02	0.1140E-01	0.1095E-01
4.91	0.2929E-01	0.1195E-01	0.7790E-02	0.1027E-01	0.9678E-02
5.16	0.2560E-01	0.1013E-01	0.6576E-02	0.8726E-02	0.8209E-02
5.40	0.2168E-01	0.8475E-02	0.5720E-02	0.7484E-02	0.7065E-02
5.65	0.1836E-01	0.7162E-02	0.5100E-02	0.6451E-02	0.5987E-02
5.89	0.1662E-01	0.6624E-02	0.4844E-02	0.5763E-02	0.5251E-02
6.14	0.1374E-01	0.5269E-02	0.4086E-02	0.4844E-02	0.4484E-02
6.38	0.1221E-01	0.4720E-02	0.3798E-02	0.4263E-02	0.3995E-02
6.63	0.9943E-02	0.3730E-02	0.3348E-02	0.3625E-02	0.3456E-02
6.88	0.9071E-02	0.3472E-02	0.3311E-02	0.3450E-02	0.3034E-02
7.12	0.7574E-02	0.2743E-02	0.2987E-02	0.2977E-02	0.2411E-02
7.37	0.6928E-02	0.2553E-02	0.2858E-02	0.2694E-02	0.1852E-02

TABLE 8.3
ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Significant Wave Height 40% Beam
C_V = 4.0

Runs 228, 229, 230, 231, 232

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.2578E+00	0.1676E+00	0.1107E+00	0.9509E-01	0.6842E-01
0.25	0.1245E+01	0.7995E+00	0.5277E+00	0.4576E+00	0.3376E+00
0.49	0.1991E+01	0.1267E+01	0.8444E+00	0.7460E+00	0.5798E+00
0.74	0.1311E+01	0.7695E+00	0.4868E+00	0.4330E+00	0.3596E+00
0.98	0.1046E+01	0.5548E+00	0.3171E+00	0.2717E+00	0.2228E+00
1.23	0.8762E+00	0.4374E+00	0.2398E+00	0.2101E+00	0.1883E+00
1.47	0.6398E+00	0.3105E+00	0.1753E+00	0.1654E+00	0.1643E+00
1.72	0.4886E+00	0.2470E+00	0.1536E+00	0.1526E+00	0.1489E+00
1.97	0.3584E+00	0.1798E+00	0.1165E+00	0.1227E+00	0.1224E+00
2.21	0.3239E+00	0.1564E+00	0.1012E+00	0.1117E+00	0.1118E+00
2.46	0.2863E+00	0.1374E+00	0.8659E-01	0.9591E-01	0.8858E-01
2.70	0.2174E+00	0.1034E+00	0.6912E-01	0.8259E-01	0.7765E-01
2.95	0.1988E+00	0.9154E-01	0.6033E-01	0.7471E-01	0.7026E-01
3.19	0.1925E+00	0.8443E-01	0.5224E-01	0.6567E-01	0.6064E-01
3.44	0.1654E+00	0.7221E-01	0.4500E-01	0.5822E-01	0.5155E-01
3.68	0.1294E+00	0.5580E-01	0.3693E-01	0.5003E-01	0.4628E-01
3.93	0.1139E+00	0.4611E-01	0.2972E-01	0.4096E-01	0.4132E-01
4.17	0.1127E+00	0.4502E-01	0.2827E-01	0.3726E-01	0.3763E-01
4.42	0.1073E+00	0.4248E-01	0.2537E-01	0.3193E-01	0.3207E-01
4.67	0.9289E-01	0.3477E-01	0.1999E-01	0.2551E-01	0.2702E-01
4.91	0.7876E-01	0.2879E-01	0.1829E-01	0.2447E-01	0.2614E-01
5.16	0.6669E-01	0.2492E-01	0.1684E-01	0.2206E-01	0.2240E-01
5.40	0.6349E-01	0.2347E-01	0.1519E-01	0.1910E-01	0.1928E-01
5.65	0.5171E-01	0.1810E-01	0.1293E-01	0.1702E-01	0.1750E-01
5.89	0.4103E-01	0.1429E-01	0.1235E-01	0.1562E-01	0.1620E-01
6.14	0.3323E-01	0.1184E-01	0.1202E-01	0.1436E-01	0.1465E-01
6.38	0.3241E-01	0.1094E-01	0.1018E-01	0.1185E-01	0.1260E-01
6.63	0.3099E-01	0.1008E-01	0.9299E-02	0.1056E-01	0.1135E-01
6.88	0.2822E-01	0.8809E-02	0.8813E-02	0.9756E-02	0.1016E-01
7.12	0.2430E-01	0.7504E-02	0.8661E-02	0.8776E-02	0.8604E-02
7.37	0.2391E-01	0.6888E-02	0.7228E-02	0.6801E-02	0.6928E-02

TABLE 8.4
ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Significant Wave Height 60% Beam
C_V = 1.5

Runs 171, 190, 191, 192

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.3522E+00	0.2356E+00	0.1407E+00	0.1409E+00	0.1019E+00
0.25	0.6639E+00	0.4474E+00	0.2496E+00	0.2408E+00	0.1720E+00
0.49	0.6217E+00	0.4120E+00	0.2127E+00	0.1957E+00	0.1384E+00
0.74	0.2300E+00	0.1423E+00	0.6255E-01	0.5037E-01	0.3252E-01
0.98	0.1212E+00	0.7302E-01	0.2717E-01	0.1793E-01	0.7250E-02
1.23	0.8669E-01	0.5364E-01	0.1979E-01	0.1298E-01	0.5080E-02
1.47	0.5777E-01	0.3764E-01	0.1438E-01	0.1015E-01	0.4134E-02
1.72	0.4447E-01	0.2954E-01	0.1130E-01	0.8341E-02	0.3302E-02
1.97	0.3595E-01	0.2426E-01	0.9504E-02	0.7447E-02	0.3205E-02
2.21	0.2631E-01	0.1785E-01	0.6871E-02	0.5534E-02	0.2234E-02
2.46	0.1919E-01	0.1301E-01	0.4961E-02	0.4290E-02	0.1655E-02
2.70	0.1392E-01	0.9353E-02	0.3419E-02	0.3295E-02	0.9866E-03
2.95	0.1202E-01	0.7667E-02	0.2824E-02	0.3660E-02	0.8185E-03
3.19	0.9822E-02	0.6086E-02	0.2210E-02	0.3665E-02	0.6917E-03
3.44	0.7594E-02	0.4957E-02	0.1911E-02	0.3414E-02	0.8896E-03
3.68	0.5146E-02	0.3566E-02	0.1390E-02	0.2687E-02	0.7131E-03
3.93	0.4288E-02	0.3142E-02	0.1272E-02	0.1800E-02	0.5906E-03
4.17	0.3412E-02	0.2563E-02	0.1044E-02	0.9952E-03	0.3147E-03
4.42	0.3092E-02	0.2274E-02	0.9873E-03	0.8566E-03	0.2465E-03
4.67	0.2439E-02	0.1709E-02	0.7863E-03	0.6975E-03	0.1027E-03
4.91	0.2144E-02	0.1533E-02	0.7269E-03	0.6236E-03	0.1212E-03
5.16	0.1582E-02	0.1180E-02	0.5298E-03	0.3835E-03	0.6792E-04
5.40	0.1382E-02	0.1153E-02	0.5168E-03	0.3397E-03	0.1035E-03
5.65	0.9992E-03	0.9121E-03	0.3978E-03	0.2932E-03	0.4766E-04
5.89	0.9307E-03	0.8443E-03	0.4072E-03	0.3727E-03	0.7471E-04
6.14	0.6818E-03	0.5703E-03	0.2915E-03	0.2832E-03	0.2787E-04
6.38	0.6624E-03	0.5531E-03	0.2865E-03	0.2802E-03	0.5300E-04
6.63	0.4948E-03	0.4245E-03	0.2726E-03	0.2388E-03	0.2504E-04
6.88	0.4363E-03	0.4158E-03	0.3688E-03	0.2660E-03	0.5895E-04
7.12	0.2795E-03	0.2590E-03	0.3312E-03	0.1696E-03	0.3866E-04
7.37	0.2480E-03	0.2523E-03	0.3304E-03	0.1681E-03	0.5575E-04

TABLE 8.5
ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Significant Wave Height 60% Beam
C_V = 3.0

Runs 172, 193, 194, 195, 199

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.5525E+00	0.4334E+00	0.2935E+00	0.3151E+00	0.2258E+00
0.25	0.1332E+01	0.1012E+01	0.6637E+00	0.7087E+00	0.5123E+00
0.49	0.1568E+01	0.1116E+01	0.6921E+00	0.7312E+00	0.5447E+00
0.74	0.9357E+00	0.5811E+00	0.3115E+00	0.3148E+00	0.2474E+00
0.98	0.6225E+00	0.3745E+00	0.1914E+00	0.1882E+00	0.1410E+00
1.23	0.4504E+00	0.2827E+00	0.1539E+00	0.1581E+00	0.1144E+00
1.47	0.3657E+00	0.2255E+00	0.1221E+00	0.1276E+00	0.9451E-01
1.72	0.3057E+00	0.1837E+00	0.1007E+00	0.1089E+00	0.8494E-01
1.97	0.2631E+00	0.1594E+00	0.9076E-01	0.1030E+00	0.8108E-01
2.21	0.2133E+00	0.1292E+00	0.7500E-01	0.8971E-01	0.7046E-01
2.46	0.1875E+00	0.1109E+00	0.6425E-01	0.8013E-01	0.6446E-01
2.70	0.1692E+00	0.9527E-01	0.5380E-01	0.6919E-01	0.5740E-01
2.95	0.1420E+00	0.7978E-01	0.4637E-01	0.6309E-01	0.5189E-01
3.19	0.1204E+00	0.6883E-01	0.4168E-01	0.5959E-01	0.4517E-01
3.44	0.1014E+00	0.5917E-01	0.3734E-01	0.5572E-01	0.4123E-01
3.68	0.8343E-01	0.4892E-01	0.3163E-01	0.4813E-01	0.3581E-01
3.93	0.7051E-01	0.4302E-01	0.2878E-01	0.4362E-01	0.3289E-01
4.17	0.6181E-01	0.3859E-01	0.2691E-01	0.4032E-01	0.3034E-01
4.42	0.5625E-01	0.3436E-01	0.2391E-01	0.3641E-01	0.2819E-01
4.67	0.5137E-01	0.3034E-01	0.2074E-01	0.3209E-01	0.2518E-01
4.91	0.4487E-01	0.2718E-01	0.1953E-01	0.2944E-01	0.2319E-01
5.16	0.3919E-01	0.2317E-01	0.1696E-01	0.2508E-01	0.2020E-01
5.40	0.4000E-01	0.2293E-01	0.1580E-01	0.2231E-01	0.1840E-01
5.65	0.3675E-01	0.2019E-01	0.1350E-01	0.1867E-01	0.1605E-01
5.89	0.3201E-01	0.1810E-01	0.1326E-01	0.1721E-01	0.1424E-01
6.14	0.2535E-01	0.1437E-01	0.1154E-01	0.1495E-01	0.1245E-01
6.38	0.2498E-01	0.1397E-01	0.1056E-01	0.1321E-01	0.1135E-01
6.63	0.2204E-01	0.1197E-01	0.9019E-02	0.1085E-01	0.9905E-02
6.88	0.1891E-01	0.1061E-01	0.9227E-02	0.1007E-01	0.9215E-02
7.12	0.1580E-01	0.8914E-02	0.9274E-02	0.9165E-02	0.7946E-02
7.37	0.1603E-01	0.8845E-02	0.8480E-02	0.7554E-02	0.6610E-02

TABLE 8.6
ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Significant Wave Height 60% Beam
C_V = 4.0

Runs 173, 200, 201, 202, 219, 220

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.4302E+00	0.3387E+00	0.2489E+00	0.2623E+00	0.1975E+00
0.25	0.1423E+01	0.1158E+01	0.8363E+00	0.8848E+00	0.6559E+00
0.49	0.2045E+01	0.1622E+01	0.1151E+01	0.1225E+01	0.9272E+00
0.74	0.1500E+01	0.1042E+01	0.6674E+00	0.6934E+00	0.5341E+00
0.98	0.1213E+01	0.7565E+00	0.4444E+00	0.4503E+00	0.3626E+00
1.23	0.9275E+00	0.5785E+00	0.3679E+00	0.3971E+00	0.3519E+00
1.47	0.7946E+00	0.4784E+00	0.3045E+00	0.3403E+00	0.3081E+00
1.72	0.6750E+00	0.3953E+00	0.2539E+00	0.2939E+00	0.2642E+00
1.97	0.5933E+00	0.3352E+00	0.2141E+00	0.2576E+00	0.2324E+00
2.21	0.5447E+00	0.2989E+00	0.1887E+00	0.2323E+00	0.2043E+00
2.46	0.4948E+00	0.2725E+00	0.1716E+00	0.2157E+00	0.1836E+00
2.70	0.4412E+00	0.2399E+00	0.1505E+00	0.1964E+00	0.1609E+00
2.95	0.4200E+00	0.2185E+00	0.1298E+00	0.1736E+00	0.1379E+00
3.19	0.3767E+00	0.1940E+00	0.1165E+00	0.1634E+00	0.1249E+00
3.44	0.3158E+00	0.1609E+00	0.9909E-01	0.1466E+00	0.1137E+00
3.68	0.2938E+00	0.1459E+00	0.8593E-01	0.1273E+00	0.9668E-01
3.93	0.2668E+00	0.1364E+00	0.8152E-01	0.1183E+00	0.8665E-01
4.17	0.2242E+00	0.1153E+00	0.7240E-01	0.1067E+00	0.7930E-01
4.42	0.1937E+00	0.9951E-01	0.6473E-01	0.9518E-01	0.6926E-01
4.67	0.1658E+00	0.8451E-01	0.5672E-01	0.8530E-01	0.6269E-01
4.91	0.1461E+00	0.7623E-01	0.5344E-01	0.7857E-01	0.5616E-01
5.16	0.1279E+00	0.6712E-01	0.4812E-01	0.6906E-01	0.4856E-01
5.40	0.1141E+00	0.6045E-01	0.4489E-01	0.6197E-01	0.4221E-01
5.65	0.9716E-01	0.5100E-01	0.3970E-01	0.5385E-01	0.3708E-01
5.89	0.8567E-01	0.4542E-01	0.3673E-01	0.4759E-01	0.3 0E-01
6.14	0.7897E-01	0.4056E-01	0.3335E-01	0.4162E-01	0.2961E-01
6.38	0.6957E-01	0.3595E-01	0.3041E-01	0.3642E-01	0.2535E-01
6.63	0.6223E-01	0.3112E-01	0.2743E-01	0.3177E-01	0.2190E-01
6.88	0.5550E-01	0.2726E-01	0.2600E-01	0.2823E-01	0.1869E-01
7.12	0.4763E-01	0.2274E-01	0.2367E-01	0.2334E-01	0.1516E-01
7.37	0.4373E-01	0.2077E-01	0.2205E-01	0.1962E-01	0.1197E-01

TABLE 9.1
ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Significant Wave Height 40% Beam
C_V = 1.5

Runs 290, 291

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.1720E+00	0.1302E+00	0.8107E-01		0.4850E-01
0.25	0.3902E+00	0.2891E+00	0.1715E+00		0.1021E+00
0.49	0.3801E+00	0.2750E+00	0.1535E+00		0.8855E-01
0.74	0.1306E+00	0.9025E-01	0.4415E-01		0.1638E-01
0.98	0.6039E-01	0.4075E-01	0.1860E-01		0.5572E-03
1.23	0.4286E-01	0.2880E-01	0.1331E-01		0.6561E-03
1.47	0.3344E-01	0.2222E-01	0.1043E-01		0.5326E-03
1.72	0.2374E-01	0.1556E-01	0.7175E-02		0.1849E-03
1.97	0.1685E-01	0.1104E-01	0.5228E-02		0.3113E-03
2.21	0.1199E-01	0.7827E-02	0.3732E-02		0.7927E-04
2.46	0.9642E-02	0.6445E-02	0.3142E-02		0.2118E-03
2.70	0.7165E-02	0.4667E-02	0.2264E-02		0.4575E-04
2.95	0.6042E-02	0.4005E-02	0.1981E-02		0.1495E-03
3.19	0.4318E-02	0.2844E-02	0.1410E-02		0.3443E-04
3.44	0.3531E-02	0.2356E-02	0.1216E-02		0.1119E-03
3.68	0.2483E-02	0.1590E-02	0.8136E-03		0.2494E-04
3.93	0.2109E-02	0.1393E-02	0.7476E-03		0.8747E-04
4.17	0.1456E-02	0.9125E-03	0.4990E-03		0.1589E-04
4.42	0.1280E-02	0.8562E-03	0.4797E-03		0.5860E-04
4.67	0.8636E-03	0.5422E-03	0.3112E-03		0.7447E-05
4.91	0.8385E-03	0.5633E-03	0.3269E-03		0.4252E-04
5.16	0.6012E-03	0.3779E-03	0.2256E-03		-0.5044E-05
5.40	0.6121E-03	0.4214E-03	0.2545E-03		0.2750E-04
5.65	0.4159E-03	0.2495E-03	0.1606E-03		-0.2139E-05
5.89	0.4209E-03	0.2849E-03	0.1765E-03		0.3019E-04
6.14	0.2668E-03	0.1585E-03	0.1041E-03		0.2177E-05
6.38	0.2760E-03	0.2047E-03	0.1294E-03		0.2065E-04
6.63	0.2023E-03	0.1111E-03	0.8128E-04		0.6948E-06
6.88	0.2432E-03	0.1531E-03	0.1097E-03		0.3338E-04
7.12	0.1892E-03	0.5203E-04	0.6390E-04		0.3533E-04
7.37	0.1616E-03	0.9440E-04	0.7137E-04		0.5713E-04

TABLE 9.2
ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Significant Wave Height 40% Beam
C_V = 3.0

Runs 292, 293, 294

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.9449E-01	0.7761E-01	0.5679E-01	0.5279E-01	0.4219E-01
0.25	0.4365E+00	0.3453E+00	0.2332E+00	0.1973E+00	0.1516E+00
0.49	0.7857E+00	0.6030E+00	0.3801E+00	0.2934E+00	0.2138E+00
0.74	0.5385E+00	0.3969E+00	0.2272E+00	0.1502E+00	0.9632E-01
0.98	0.2768E+00	0.1984E+00	0.1050E+00	0.5813E-01	0.2721E-01
1.23	0.1991E+00	0.1411E+00	0.7395E-01	0.3940E-01	0.1678E-01
1.47	0.1563E+00	0.1087E+00	0.5613E-01	0.2959E-01	0.1374E-01
1.72	0.1128E+00	0.7744E-01	0.4018E-01	0.2196E-01	0.1128E-01
1.97	0.9443E-01	0.6376E-01	0.3225E-01	0.1711E-01	0.9575E-02
2.21	0.7424E-01	0.4918E-01	0.2406E-01	0.1257E-01	0.8020E-02
2.46	0.5568E-01	0.3628E-01	0.1738E-01	0.9209E-02	0.7034E-02
2.70	0.4534E-01	0.2922E-01	0.1344E-01	0.6735E-02	0.5592E-02
2.95	0.3733E-01	0.2407E-01	0.1109E-01	0.5813E-02	0.5026E-02
3.19	0.3085E-01	0.1973E-01	0.8893E-02	0.4325E-02	0.3884E-02
3.44	0.2444E-01	0.1575E-01	0.7310E-02	0.3844E-02	0.3359E-02
3.68	0.1835E-01	0.1173E-01	0.5410E-02	0.2770E-02	0.2487E-02
3.93	0.1552E-01	0.1006E-01	0.4756E-02	0.2523E-02	0.2060E-02
4.17	0.1168E-01	0.7679E-02	0.3758E-02	0.2123E-02	0.1513E-02
4.42	0.9315E-02	0.6256E-02	0.3211E-02	0.1948E-02	0.1179E-02
4.67	0.6994E-02	0.4711E-02	0.2504E-02	0.1624E-02	0.8090E-03
4.91	0.5507E-02	0.3871E-02	0.2200E-02	0.1521E-02	0.6468E-03
5.16	0.4296E-02	0.3050E-02	0.1817E-02	0.1368E-02	0.4032E-03
5.40	0.3357E-02	0.2500E-02	0.1590E-02	0.1368E-02	0.3249E-03
5.65	0.2526E-02	0.1874E-02	0.1232E-02	0.1122E-02	0.1668E-03
5.89	0.2114E-02	0.1622E-02	0.1109E-02	0.1083E-02	0.1465E-03
6.14	0.1824E-02	0.1342E-02	0.9044E-03	0.9995E-03	0.7615E-04
6.38	0.1726E-02	0.1258E-02	0.8147E-03	0.9747E-03	0.1018E-03
6.63	0.1552E-02	0.1042E-02	0.6295E-03	0.9035E-03	0.8148E-04
6.88	0.1646E-02	0.1005E-02	0.5205E-03	0.9034E-03	0.1333E-03
7.12	0.2004E-02	0.1083E-02	0.4067E-03	0.8703E-03	0.1768E-03
7.37	0.1774E-02	0.1079E-02	0.3626E-03	0.8957E-03	0.2912E-03

TABLE 9.3
ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Significant Wave Height 40% Beam
C_V = 4.0

Runs 295, 296, 297, 298

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.8965E-01	0.7408E-01	0.5334E-01	0.4637E-01	0.3051E-01
0.25	0.5117E+00	0.4177E+00	0.2938E+00	0.2524E+00	0.1661E+00
0.49	0.9865E+00	0.7986E+00	0.5519E+00	0.4697E+00	0.3068E+00
0.74	0.7537E+00	0.5966E+00	0.3922E+00	0.3188E+00	0.2012E+00
0.98	0.5037E+00	0.3854E+00	0.2317E+00	0.1710E+00	0.1043E+00
1.23	0.3876E+00	0.2922E+00	0.1735E+00	0.1268E+00	0.7828E-01
1.47	0.2792E+00	0.2078E+00	0.1264E+00	0.9687E-01	0.6205E-01
1.72	0.2280E+00	0.1676E+00	0.1025E+00	0.8125E-01	0.5352E-01
1.97	0.1846E+00	0.1342E+00	0.8132E-01	0.6817E-01	0.4931E-01
2.21	0.1632E+00	0.1159E+00	0.6780E-01	0.5669E-01	0.4219E-01
2.46	0.1617E+00	0.1131E+00	0.6409E-01	0.5186E-01	0.3573E-01
2.70	0.1244E+00	0.8730E-01	0.5038E-01	0.4516E-01	0.3130E-01
2.95	0.9306E-01	0.6490E-01	0.3702E-01	0.3556E-01	0.2623E-01
3.19	0.7955E-01	0.5551E-01	0.3172E-01	0.3298E-01	0.2413E-01
3.44	0.6793E-01	0.4749E-01	0.2701E-01	0.2819E-01	0.1926E-01
3.68	0.6082E-01	0.4182E-01	0.2272E-01	0.2391E-01	0.1731E-01
3.93	0.4941E-01	0.3435E-01	0.1879E-01	0.2128E-01	0.1481E-01
4.17	0.4094E-01	0.2846E-01	0.1521E-01	0.1712E-01	0.1111E-01
4.42	0.3664E-01	0.2541E-01	0.1329E-01	0.1547E-01	0.1052E-01
4.67	0.2871E-01	0.2003E-01	0.1065E-01	0.1309E-01	0.7970E-02
4.91	0.2485E-01	0.1748E-01	0.9256E-02	0.1132E-01	0.6619E-02
5.16	0.2066E-01	0.1463E-01	0.7746E-02	0.9981E-02	0.5555E-02
5.40	0.1640E-01	0.1180E-01	0.6450E-02	0.8826E-02	0.4056E-02
5.65	0.1383E-01	0.9821E-02	0.5345E-02	0.7418E-02	0.3487E-02
5.89	0.1059E-01	0.7654E-02	0.4308E-02	0.6833E-02	0.2728E-02
6.14	0.8666E-02	0.6361E-02	0.3578E-02	0.6240E-02	0.2119E-02
6.38	0.7312E-02	0.5548E-02	0.2953E-02	0.5854E-02	0.1748E-02
6.63	0.6505E-02	0.4767E-02	0.2315E-02	0.5445E-02	0.1404E-02
6.88	0.7306E-02	0.5209E-02	0.2236E-02	0.5125E-02	0.1067E-02
7.12	0.7569E-02	0.5156E-02	0.1844E-02	0.4936E-02	0.9551E-03
7.37	0.7746E-02	0.5090E-02	0.1603E-02	0.5050E-02	0.7957E-03

TABLE 9.4
ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Significant Wave Height 60% Beam
C_V = 1.5

Runs 299, 301, 302

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.2494E+00	0.2009E+00	0.1303E+00	0.1087E+00	0.8401E-01
0.25	0.4886E+00	0.3840E+00	0.2349E+00	0.1849E+00	0.1484E+00
0.49	0.4426E+00	0.3389E+00	0.1946E+00	0.1414E+00	0.1166E+00
0.74	0.1532E+00	0.1123E+00	0.5727E-01	0.3145E-01	0.2092E-01
0.98	0.8288E-01	0.5989E-01	0.2932E-01	0.1263E-01	0.2704E-02
1.23	0.5964E-01	0.4281E-01	0.2142E-01	0.9971E-02	0.2617E-02
1.47	0.4922E-01	0.3500E-01	0.1765E-01	0.8331E-02	0.2181E-02
1.72	0.3899E-01	0.2755E-01	0.1378E-01	0.6461E-02	0.1518E-02
1.97	0.3178E-01	0.2244E-01	0.1135E-01	0.5569E-02	0.1504E-02
2.21	0.2553E-01	0.1774E-01	0.8980E-02	0.4372E-02	0.1064E-02
2.46	0.2164E-01	0.1507E-01	0.7643E-02	0.3852E-02	0.1088E-02
2.70	0.1695E-01	0.1179E-01	0.5962E-02	0.3062E-02	0.7331E-03
2.95	0.1432E-01	0.1001E-01	0.5103E-02	0.2787E-02	0.7267E-03
3.19	0.1134E-01	0.7847E-02	0.4022E-02	0.2220E-02	0.4836E-03
3.44	0.9627E-02	0.6699E-02	0.3479E-02	0.1969E-02	0.5018E-03
3.68	0.7487E-02	0.5181E-02	0.2709E-02	0.1530E-02	0.3175E-03
3.93	0.6376E-02	0.4478E-02	0.2373E-02	0.1377E-02	0.3372E-03
4.17	0.4836E-02	0.3405E-02	0.1827E-02	0.1075E-02	0.2042E-03
4.42	0.4071E-02	0.2952E-02	0.1610E-02	0.9833E-03	0.2313E-03
4.67	0.3136E-02	0.2252E-02	0.1235E-02	0.7593E-03	0.1434E-03
4.91	0.2758E-02	0.2035E-02	0.1140E-02	0.7042E-03	0.1642E-03
5.16	0.2138E-02	0.1544E-02	0.8917E-03	0.5458E-03	0.9066E-04
5.40	0.1891E-02	0.1419E-02	0.8314E-03	0.5457E-03	0.1208E-03
5.65	0.1437E-02	0.1031E-02	0.6310E-03	0.4520E-03	0.7156E-04
5.89	0.1306E-02	0.9493E-03	0.5908E-03	0.4558E-03	0.9767E-04
6.14	0.9464E-03	0.6891E-03	0.4459E-03	0.3754E-03	0.5894E-04
6.38	0.8315E-03	0.6750E-03	0.4318E-03	0.3911E-03	0.8582E-04
6.63	0.6242E-03	0.4581E-03	0.3173E-03	0.3601E-03	0.5853E-04
6.88	0.6124E-03	0.4594E-03	0.3142E-03	0.4156E-03	0.8719E-04
7.12	0.5065E-03	0.3064E-03	0.2297E-03	0.4705E-03	0.7946E-04
7.37	0.4340E-03	0.3083E-03	0.2053E-03	0.6955E-03	0.1252E-03

TABLE 9.5
ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Significant Wave Height 60% Beam
C_V = 3.0

Runs 311, 312, 313, 314

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.3084E+00	0.2389E+00	0.1804E+00	0.1755E+00	0.1387E+00
0.25	0.8374E+00	0.6367E+00	0.4630E+00	0.4359E+00	0.3417E+00
0.49	0.1103E+01	0.8155E+00	0.5580E+00	0.4920E+00	0.3743E+00
0.74	0.6357E+00	0.4488E+00	0.2742E+00	0.2060E+00	0.1388E+00
0.98	0.3714E+00	0.2559E+00	0.1460E+00	0.9647E-01	0.5201E-01
1.23	0.2867E+00	0.1975E+00	0.1156E+00	0.8077E-01	0.4550E-01
1.47	0.2126E+00	0.1446E+00	0.8594E-01	0.6340E-01	0.3957E-01
1.72	0.1715E+00	0.1147E+00	0.6793E-01	0.5278E-01	0.3474E-01
1.97	0.1439E+00	0.9526E-01	0.5623E-01	0.4580E-01	0.3199E-01
2.21	0.1212E+00	0.7906E-01	0.4606E-01	0.3836E-01	0.2870E-01
2.46	0.1050E+00	0.6782E-01	0.3909E-01	0.3393E-01	0.2592E-01
2.70	0.9013E-01	0.5722E-01	0.3165E-01	0.2808E-01	0.2172E-01
2.95	0.7985E-01	0.5042E-01	0.2756E-01	0.2539E-01	0.1942E-01
3.19	0.6647E-01	0.4129E-01	0.2179E-01	0.2058E-01	0.1746E-01
3.44	0.5985E-01	0.3692E-01	0.1906E-01	0.1781E-01	0.1590E-01
3.68	0.5164E-01	0.3173E-01	0.1599E-01	0.1515E-01	0.1418E-01
3.93	0.4329E-01	0.2643E-01	0.1282E-01	0.1221E-01	0.1349E-01
4.17	0.3789E-01	0.2304E-01	0.1087E-01	0.1011E-01	0.1222E-01
4.42	0.3282E-01	0.2004E-01	0.9390E-02	0.8743E-02	0.1048E-01
4.67	0.2758E-01	0.1680E-01	0.7531E-02	0.7037E-02	0.9269E-02
4.91	0.2343E-01	0.1427E-01	0.6338E-02	0.6117E-02	0.8101E-02
5.16	0.2039E-01	0.1230E-01	0.5365E-02	0.5057E-02	0.7015E-02
5.40	0.1697E-01	0.1035E-01	0.4493E-02	0.4335E-02	0.7217E-02
5.65	0.1432E-01	0.8544E-02	0.3633E-02	0.3574E-02	0.6410E-02
5.89	0.1265E-01	0.7427E-02	0.3249E-02	0.3373E-02	0.5858E-02
6.14	0.9954E-02	0.5778E-02	0.2473E-02	0.3271E-02	0.5629E-02
6.38	0.8066E-02	0.4687E-02	0.1987E-02	0.3544E-02	0.5378E-02
6.63	0.6969E-02	0.3971E-02	0.1702E-02	0.4128E-02	0.5679E-02
6.88	0.5792E-02	0.3279E-02	0.1532E-02	0.5226E-02	0.6666E-02
7.12	0.4796E-02	0.2453E-02	0.1167E-02	0.6533E-02	0.7103E-02
7.37	0.4183E-02	0.2154E-02	0.1157E-02	0.7917E-02	0.7108E-02

TABLE 9.6
ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Significant Wave Height 60% Beam
C_V = 4.0

Runs 315, 316, 317, 319

Accelerometer	#5	#4	#3	#2	#1
Frequency Hz	Spectral Estimates g^2/Hz				
0.00	0.2790E+00	0.2168E+00	0.1635E+00	0.1552E+00	0.1132E+00
0.25	0.1081E+01	0.8312E+00	0.6141E+00	0.5701E+00	0.4033E+00
0.49	0.1547E+01	0.1172E+01	0.8421E+00	0.7661E+00	0.5365E+00
0.74	0.9539E+00	0.6936E+00	0.4574E+00	0.3874E+00	0.2718E+00
0.98	0.6096E+00	0.4305E+00	0.2650E+00	0.2133E+00	0.1611E+00
1.23	0.5050E+00	0.3541E+00	0.2166E+00	0.1742E+00	0.1353E+00
1.47	0.4129E+00	0.2843E+00	0.1736E+00	0.1467E+00	0.1192E+00
1.72	0.3128E+00	0.2096E+00	0.1258E+00	0.1140E+00	0.1031E+00
1.97	0.2956E+00	0.1949E+00	0.1148E+00	0.1045E+00	0.9637E-01
2.21	0.2743E+00	0.1771E+00	0.1019E+00	0.9618E-01	0.9514E-01
2.46	0.2174E+00	0.1384E+00	0.7822E-01	0.8019E-01	0.8678E-01
2.70	0.1789E+00	0.1128E+00	0.6282E-01	0.6923E-01	0.8227E-01
2.95	0.1637E+00	0.1029E+00	0.5625E-01	0.6321E-01	0.7235E-01
3.19	0.1368E+00	0.8507E-01	0.4593E-01	0.5660E-01	0.6685E-01
3.44	0.1192E+00	0.7472E-01	0.4062E-01	0.5354E-01	0.6496E-01
3.68	0.1057E+00	0.6658E-01	0.3600E-01	0.4952E-01	0.6053E-01
3.93	0.9039E-01	0.5691E-01	0.3026E-01	0.4380E-01	0.5069E-01
4.17	0.7614E-01	0.4840E-01	0.2570E-01	0.4206E-01	0.4460E-01
4.42	0.7024E-01	0.4501E-01	0.2350E-01	0.3981E-01	0.3684E-01
4.67	0.5962E-01	0.3839E-01	0.2002E-01	0.3724E-01	0.3169E-01
4.91	0.5337E-01	0.3442E-01	0.1752E-01	0.3507E-01	0.2528E-01
5.16	0.4612E-01	0.2991E-01	0.1485E-01	0.3337E-01	0.1983E-01
5.40	0.3998E-01	0.2589E-01	0.1226E-01	0.3159E-01	0.1773E-01
5.65	0.3366E-01	0.2176E-01	0.9973E-02	0.3273E-01	0.1807E-01
5.89	0.3142E-01	0.2018E-01	0.8832E-02	0.3341E-01	0.1649E-01
6.14	0.2713E-01	0.1721E-01	0.7478E-02	0.3488E-01	0.1271E-01
6.38	0.2565E-01	0.1607E-01	0.7295E-02	0.3781E-01	0.1022E-01
6.63	0.2636E-01	0.1633E-01	0.8560E-02	0.4387E-01	0.1008E-01
6.88	0.3297E-01	0.2013E-01	0.1211E-01	0.5002E-01	0.1070E-01
7.12	0.4009E-01	0.2431E-01	0.1782E-01	0.5640E-01	0.1370E-01
7.37	0.4383E-01	0.2687E-01	0.2471E-01	0.5704E-01	0.1771E-01

TABLE 10.1
1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Significant Wave Height 40% Beam
C_V = 1.5

Runs 221, 222, 223

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.787	0.595	0.455	0.421	0.366
0.125	1.160	0.863	0.643	0.590	0.512
0.157	1.469	1.087	0.804	0.735	0.637
0.198	1.649	1.220	0.903	0.825	0.715
0.250	1.851	1.369	1.014	0.926	0.803
0.315	2.077	1.537	1.138	1.040	0.901
0.397	2.349	1.700	1.215	1.091	0.941
0.500	2.640	1.903	1.350	1.208	1.040
0.630	2.306	1.635	1.122	0.981	0.824
0.794	1.971	1.360	0.876	0.725	0.562
1.000	1.624	1.107	0.681	0.516	0.278
1.260	1.504	1.026	0.640	0.492	0.271
1.587	1.370	0.932	0.588	0.460	0.247
2.000	1.236	0.842	0.542	0.434	0.226
2.520	1.087	0.738	0.478	0.396	0.194
3.175	0.911	0.619	0.403	0.345	0.157
4.000	0.741	0.505	0.333	0.272	0.123
5.040	0.584	0.398	0.274	0.225	0.103
6.350	0.417	0.287	0.214	0.162	0.087
8.000	0.276	0.179	0.151	0.109	0.072

TABLE 10.2
1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Significant Wave Height 40% Beam
C_V = 3.0

Runs 224, 225, 226, 227

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.880	0.708	0.579	0.554	0.473
0.125	1.531	1.209	0.969	0.916	0.782
0.157	2.018	1.589	1.268	1.195	1.020
0.198	2.265	1.783	1.423	1.341	1.145
0.250	2.542	2.001	1.597	1.505	1.285
0.315	2.854	2.247	1.793	1.689	1.442
0.397	3.700	2.866	2.238	2.083	1.761
0.500	4.251	3.286	2.557	2.376	2.006
0.630	4.115	3.118	2.365	2.169	1.801
0.794	3.993	2.955	2.171	1.958	1.591
1.000	3.499	2.497	1.765	1.569	1.260
1.260	3.284	2.331	1.670	1.511	1.259
1.587	3.073	2.157	1.564	1.470	1.296
2.000	2.905	2.017	1.494	1.477	1.349
2.520	2.660	1.818	1.396	1.472	1.369
3.175	2.383	1.617	1.269	1.452	1.308
4.000	2.099	1.381	1.094	1.254	1.187
5.040	1.734	1.099	0.891	1.023	0.994
6.350	1.323	0.821	0.742	0.791	0.757
8.000	1.010	0.589	0.676	0.592	0.448

TABLE 10.3
1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Significant Wave Height 40% Beam
C_V = 4.0

Runs 228, 229, 230, 231, 232

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.755	0.609	0.495	0.459	0.389
0.125	1.544	1.238	1.006	0.936	0.803
0.157	2.090	1.675	1.361	1.267	1.088
0.198	2.346	1.880	1.528	1.422	1.222
0.250	2.633	2.110	1.715	1.597	1.371
0.315	2.956	2.369	1.925	1.792	1.539
0.397	4.068	3.246	2.649	2.488	2.187
0.500	4.710	3.757	3.067	2.883	2.542
0.630	4.674	3.649	2.940	2.768	2.482
0.794	4.731	3.600	2.845	2.677	2.438
1.000	4.797	3.488	2.633	2.440	2.215
1.260	4.811	3.391	2.517	2.371	2.267
1.587	4.464	3.138	2.411	2.371	2.353
2.000	4.025	2.836	2.274	2.340	2.334
2.520	3.837	2.656	2.135	2.279	2.214
3.175	3.619	2.417	1.925	2.162	2.072
4.000	3.219	2.060	1.644	1.899	1.881
5.040	2.886	1.758	1.398	1.591	1.620
6.350	2.187	1.270	1.222	1.328	1.354
8.000	1.790	0.918	1.083	0.911	0.827

TABLE 10.4
1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Significant Wave Height 60% Beam
C_V = 1.5

Runs 171, 190, 191, 192

Accelerometer	#5*	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.882	0.722	0.558	0.558	0.475
0.125	1.228	1.007	0.759	0.749	0.634
0.157	1.526	1.253	0.936	0.919	0.777
0.198	1.713	1.407	1.051	1.032	0.872
0.250	1.923	1.579	1.179	1.158	0.979
0.315	2.159	1.772	1.324	1.300	1.099
0.397	2.358	1.922	1.391	1.340	1.128
0.500	2.632	2.143	1.540	1.477	1.242
0.630	2.283	1.834	1.280	1.201	0.996
0.794	1.933	1.519	0.999	0.890	0.706
1.000	1.626	1.263	0.770	0.626	0.397
1.260	1.502	1.187	0.723	0.589	0.370
1.587	1.344	1.089	0.674	0.572	0.362
2.000	1.227	1.007	0.628	0.555	0.359
2.520	1.005	0.826	0.507	0.477	0.286
3.175	0.832	0.663	0.404	0.503	0.238
4.000	0.599	0.510	0.325	0.380	0.206
5.040	0.455	0.393	0.266	0.237	0.106
6.350	0.300	0.282	0.217	0.198	0.082
8.000	0.208	0.166	0.259	0.208	0.118

* Runs 190, 191, 192 only

TABLE 10.5
1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Significant Wave Height 60% Beam
C_V = 3.0

Runs 172, 193, 194, 195 ,199

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	1.105	0.979	0.805	0.835	0.707
0.125	1.690	1.478	1.201	1.242	1.055
0.157	2.162	1.885	1.526	1.577	1.341
0.198	2.427	2.115	1.713	1.770	1.505
0.250	2.725	2.374	1.923	1.987	1.689
0.315	3.058	2.665	2.158	2.230	1.896
0.397	3.679	3.118	2.466	2.537	2.184
0.500	4.180	3.526	2.777	2.854	2.464
0.630	4.042	3.296	2.510	2.555	2.231
0.794	3.949	3.106	2.268	2.277	2.013
1.000	3.685	2.862	2.050	2.035	1.760
1.260	3.482	2.754	2.031	2.062	1.758
1.587	3.444	2.689	1.984	2.044	1.781
2.000	3.348	2.605	1.965	2.103	1.864
2.520	3.208	2.449	1.856	2.077	1.870
3.175	2.925	2.211	1.718	2.050	1.804
4.000	2.473	1.925	1.580	1.945	1.689
5.040	2.213	1.697	1.421	1.731	1.550
6.350	1.874	1.401	1.237	1.373	1.274
8.000	1.378	1.039	1.259	1.036	0.830

TABLE 10.6
1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Significant Wave Height 60% Beam
C_V = 4.0

Runs 173, 200, 201, 202, 219, 220

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.975	0.865	0.742	0.762	0.661
0.125	1.696	1.525	1.298	1.335	1.151
0.157	2.235	2.016	1.713	1.762	1.517
0.198	2.509	2.263	1.923	1.978	1.703
0.250	2.816	2.540	2.159	2.220	1.912
0.315	3.161	2.851	2.423	2.492	2.146
0.397	4.148	3.700	3.120	3.218	2.796
0.500	4.773	4.252	3.581	3.695	3.214
0.630	4.880	4.191	3.438	3.525	3.080
0.794	5.066	4.191	3.336	3.395	2.988
1.000	5.153	4.069	3.126	3.154	2.840
1.260	5.022	3.953	3.153	3.286	3.100
1.587	5.096	3.929	3.141	3.348	3.180
2.000	5.116	3.838	3.064	3.362	3.180
2.520	5.187	3.838	3.044	3.432	3.150
3.175	5.117	3.673	2.851	3.374	2.977
4.000	4.695	3.346	2.616	3.170	2.731
5.040	3.912	2.822	2.373	2.852	2.403
6.350	3.157	2.258	2.089	2.294	1.901
8.000	2.359	1.587	1.881	1.575	1.196

TABLE 11.1
1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Significant Wave Height 40% Beam
C_V = 1.5

Runs 290, 291

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.617	0.537	0.423		0.327
0.125	0.921	0.794	0.615		0.475
0.157	1.170	1.007	0.776		0.599
0.198	1.314	1.131	0.871		0.672
0.250	1.474	1.269	0.977		0.754
0.315	1.655	1.425	1.097		0.846
0.397	1.837	1.566	1.176		0.896
0.500	2.058	1.750	1.308		0.993
0.630	1.760	1.484	1.083		0.771
0.794	1.448	1.202	0.839		0.492
1.000	1.147	0.942	0.637		0.112
1.260	1.070	0.876	0.597		0.133
1.587	1.005	0.817	0.557		0.112
2.000	0.847	0.685	0.471		0.098
2.520	0.708	0.575	0.400		0.083
3.175	0.571	0.465	0.329		0.083
4.000	0.407	0.328	0.239		0.064
5.040	0.284	0.229	0.176		0.044
6.350	0.200	0.158	0.129		0.050
8.000	0.222	0.147	0.116		0.093

TABLE 11.2
1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Significant Wave Height 40% Beam
C_V = 3.0

Runs 292, 293, 294

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.457	0.414	0.354	0.342	0.305
0.125	0.917	0.817	0.675	0.625	0.550
0.157	1.238	1.101	0.905	0.832	0.730
0.198	1.389	1.236	1.015	0.934	0.819
0.250	1.559	1.387	1.140	1.048	0.919
0.315	1.750	1.557	1.279	1.177	1.032
0.397	2.540	2.229	1.776	1.568	1.343
0.500	2.959	2.592	2.058	1.808	1.543
0.630	2.968	2.572	1.991	1.683	1.395
0.794	2.955	2.533	1.910	1.542	1.222
1.000	2.457	2.079	1.512	1.124	0.767
1.260	2.308	1.939	1.402	1.023	0.673
1.587	2.180	1.813	1.304	0.954	0.665
2.000	2.002	1.643	1.165	0.849	0.643
2.520	1.741	1.405	0.968	0.697	0.607
3.175	1.475	1.183	0.801	0.573	0.537
4.000	1.115	0.899	0.622	0.459	0.405
5.040	0.745	0.624	0.473	0.404	0.244
6.350	0.512	0.427	0.335	0.371	0.129
8.000	0.473	0.363	0.263	0.408	0.205

TABLE 11.3
1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Significant Wave Height 40% Beam
C_V = 4.0

Runs 295, 296, 297, 298

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.445	0.405	0.343	0.320	0.260
0.125	0.981	0.887	0.745	0.691	0.560
0.157	1.340	1.211	1.015	0.941	0.764
0.198	1.504	1.359	1.140	1.057	0.857
0.250	1.688	1.525	1.279	1.186	0.962
0.315	1.895	1.712	1.436	1.331	1.080
0.397	2.837	2.554	2.125	1.961	1.585
0.500	3.315	2.983	2.480	2.288	1.849
0.630	3.429	3.066	2.513	2.289	1.833
0.794	3.546	3.148	2.540	2.278	1.807
1.000	3.321	2.904	2.250	1.933	1.510
1.260	3.196	2.772	2.141	1.838	1.448
1.587	2.994	2.575	2.011	1.774	1.429
2.000	2.855	2.428	1.882	1.714	1.454
2.520	2.860	2.396	1.815	1.669	1.397
3.175	2.379	1.988	1.501	1.509	1.280
4.000	2.057	1.712	1.257	1.324	1.101
5.040	1.582	1.328	0.970	1.093	0.818
6.350	1.095	0.932	0.667	0.916	0.514
8.000	1.060	0.859	0.614	0.891	0.462

TABLE 11.4
1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Significant Wave Height 60% Beam
C_V = 1.5

Runs 299, 301, 302

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.743	0.666	0.537	0.490	0.431
0.125	1.048	0.932	0.735	0.657	0.585
0.157	1.310	1.161	0.908	0.805	0.722
0.198	1.470	1.303	1.019	0.904	0.810
0.250	1.650	1.463	1.144	1.015	0.909
0.315	1.852	1.642	1.284	1.139	1.021
0.397	1.995	1.750	1.333	1.145	1.038
0.500	2.221	1.943	1.472	1.255	1.140
0.630	1.901	1.650	1.224	0.999	0.882
0.794	1.580	1.352	0.963	0.706	0.561
1.000	1.344	1.143	0.800	0.526	0.245
1.260	1.269	1.074	0.760	0.519	0.266
1.587	1.248	1.051	0.745	0.511	0.256
2.000	1.167	0.979	0.696	0.485	0.246
2.520	1.065	0.888	0.632	0.449	0.229
3.175	0.911	0.760	0.544	0.405	0.201
4.000	0.718	0.601	0.438	0.334	0.156
5.040	0.523	0.446	0.336	0.267	0.120
6.350	0.352	0.302	0.244	0.241	0.105
8.000	0.267	0.201	0.203	0.365	0.151

TABLE 11.5
1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Significant Wave Height 60% Beam
C_V = 3.0

Runs 311, 312, 313, 314

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.826	0.727	0.632	0.623	0.554
0.125	1.324	1.156	0.990	0.964	0.854
0.157	1.714	1.495	1.275	1.237	1.095
0.198	1.924	1.678	1.431	1.388	1.229
0.250	2.160	1.883	1.606	1.558	1.380
0.315	2.424	2.114	1.803	1.749	1.549
0.397	3.063	2.638	2.191	2.067	1.807
0.500	3.506	3.014	2.493	2.341	2.042
0.630	3.360	2.856	2.299	2.083	1.772
0.794	3.231	2.711	2.112	1.820	1.480
1.000	2.852	2.367	1.789	1.457	1.071
1.260	2.756	2.285	1.750	1.470	1.114
1.587	2.605	2.140	1.649	1.433	1.146
2.000	2.495	2.028	1.555	1.403	1.180
2.520	2.381	1.909	1.440	1.342	1.173
3.175	2.203	1.740	1.268	1.225	1.115
4.000	1.932	1.510	1.052	1.021	1.064
5.040	1.561	1.216	0.809	0.789	0.939
6.350	1.114	0.847	0.559	0.763	0.921
8.000	0.771	0.561	0.575	0.990	1.067

TABLE 11.6
1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Significant Wave Height 60% Beam
C_V = 4.0

Runs 315, 316, 317, 319

Accelerometer	#5	#4	#3	#2	#1
Center Frequency Hz	1/3 Octave RMS meters/sec^2				
0.099	0.785	0.692	0.601	0.586	0.500
0.125	1.460	1.281	1.103	1.064	0.897
0.157	1.948	1.708	1.468	1.415	1.190
0.198	2.186	1.917	1.648	1.588	1.335
0.250	2.454	2.152	1.850	1.782	1.499
0.315	2.755	2.415	2.076	2.000	1.683
0.397	3.608	3.144	2.669	2.549	2.134
0.500	4.151	3.614	3.063	2.922	2.445
0.630	4.048	3.487	2.893	2.712	2.270
0.794	3.978	3.387	2.740	2.515	2.115
1.000	3.662	3.077	2.413	2.165	1.88
1.260	3.690	3.085	2.412	2.173	1.923
1.587	3.580	2.953	2.299	2.146	1.982
2.000	3.599	2.916	2.232	2.141	2.077
2.520	3.428	2.734	2.054	2.091	2.198
3.175	3.142	2.486	1.833	2.021	2.193
4.000	2.775	2.208	1.612	1.980	2.085
5.040	2.342	1.882	1.332	1.965	1.628
6.350	2.063	1.632	1.174	2.405	1.338
8.000	2.221	1.775	1.927	2.099	1.789

TABLE 12
PITCH VARIANCE SPECTRAL DENSITY
110 ft WPB

Column	
1	Runs 221, 222, 223
2	Runs 224, 225, 226, 227
3	Runs 228, 229, 230, 231, 232
4	Runs 171, 190, 191, 192
5	Runs 172, 193, 194, 195, 199
6	Runs 173, 200, 201, 202, 219, 220

	Significant Wave Height 40% Beam			Significant Wave Height 60% Beam		
	C_V=1.5	C_V=3.0	C_V=4.0	C_V=1.5	C_V=3.0	C_V=4.0
Frequency Hz	Spectral Estimates deg²/Hz			Spectral Estimates deg²/Hz		
0.00	0.3391E+01	0.7012E+01	0.2168E+01	0.2133E+01	0.1226E+02	0.3364E+00
0.04	0.3737E+01	0.6546E+01	0.6847E+01	0.2625E+01	0.1609E+02	0.9347E+01
0.08	0.3204E+01	0.4257E+01	0.9212E+01	0.1868E+01	0.1411E+02	0.1902E+02
0.12	0.2953E+01	0.3950E+01	0.6485E+01	0.9001E+01	0.1336E+02	0.1830E+02
0.16	0.9825E+01	0.2793E+01	0.4747E+01	0.3665E+02	0.1418E+02	0.1330E+02
0.20	0.3107E+02	0.5143E+01	0.8956E+01	0.6828E+02	0.2489E+02	0.1709E+02
0.24	0.4670E+02	0.1195E+02	0.1298E+02	0.7220E+02	0.4744E+02	0.1671E+02
0.28	0.4243E+02	0.1407E+02	0.1001E+02	0.4923E+02	0.4822E+02	0.2631E+02
0.32	0.3285E+02	0.2182E+02	0.1168E+02	0.3455E+02	0.4048E+02	0.2694E+02
0.35	0.2594E+02	0.4077E+02	0.2346E+02	0.3067E+02	0.4487E+02	0.2598E+02
0.39	0.1547E+02	0.3371E+02	0.2252E+02	0.1855E+02	0.2909E+02	0.1804E+02
0.43	0.7072E+01	0.1122E+02	0.1473E+02	0.9785E+01	0.1062E+02	0.1093E+02
0.47	0.4380E+01	0.6784E+01	0.1158E+02	0.6158E+01	0.8211E+01	0.1191E+02
0.51	0.2329E+01	0.3635E+01	0.5283E+01	0.2551E+01	0.4650E+01	0.5430E+01
0.55	0.1520E+01	0.2181E+01	0.2262E+01	0.1562E+01	0.2388E+01	0.3320E+01
0.59	0.8201E+00	0.1596E+01	0.1864E+01	0.8650E+00	0.2892E+01	0.3355E+01
0.63	0.4179E+00	0.9476E+00	0.1729E+01	0.6954E+00	0.2569E+01	0.2674E+01
0.67	0.1393E+00	0.6510E+00	0.1534E+01	0.2879E+00	0.1862E+01	0.1835E+01
0.71	0.1587E+00	0.8798E+00	0.2874E+01	0.2857E+00	0.1815E+01	0.2215E+01
0.75	0.2762E-01	0.6593E+00	0.1683E+01	0.1164E+00	0.1366E+01	0.2060E+01
0.79	0.1066E+00	0.6682E+00	0.8553E+00	0.1820E+00	0.9115E+00	0.3067E+01
0.83	0.2044E+00	0.5711E+00	0.1314E+01	0.1706E+00	0.2234E+00	0.2861E+01
0.87	0.3776E+00	0.1066E+01	0.1126E+01	0.3242E+00	0.8829E+00	0.2761E+01
0.90	0.2927E+00	0.1106E+01	0.2027E+01	0.1908E+00	0.1990E+01	0.3171E+01
0.94	0.1846E+00	0.1581E+01	0.2466E+01	0.1765E+00	0.2467E+01	0.4610E+01
0.98	0.2844E-01	0.1124E+01	0.3334E+01	0.1160E+00	0.1048E+01	0.5422E+01
1.02	0.8808E-01	0.6714E+00	0.3237E+01	0.2106E+00	0.6687E+00	0.5355E+01
1.06	0.7339E-01	0.4019E+00	0.1068E+01	0.1209E+00	0.8492E+00	0.4201E+01
1.10	0.1374E+00	0.4000E+00	0.3860E+00	0.2462E+00	0.1079E+01	0.2105E+01
1.14	0.5572E-01	0.3537E+00	0.6561E+00	0.1675E+00	0.5388E+00	0.2171E+01
1.18	0.7182E-01	0.4474E+00	0.1117E+01	0.1781E+00	0.4751E+00	0.2195E+01

TABLE 13
PITCH VARIANCE SPECTRAL DENSITY
120 ft WPB

Column	
1	Runs 290, 291
2	Runs 292, 293, 294
3	Runs 295, 296, 297, 298
4	Runs 299, 301, 302
5	Runs 311, 312, 313, 314
6	Runs 315, 316, 317, 319

	Significant Wave Height 40% Beam			Significant Wave Height 60% Beam		
	C_V=1.5	C_V=3.0	C_V=4.0	C_V=1.5	C_V=3.0	C_V=4.0
Frequency Hz	Spectral Estimates deg²/Hz			Spectral Estimates deg²/Hz		
0.00	0.2645E+01	0.4104E+00	0.1477E+01	0.3887E+01	0.3205E+01	0.1171E+01
0.04	0.2718E+01	0.5751E+00	0.2015E+01	0.3796E+01	0.4569E+01	0.2765E+01
0.08	0.2856E+01	0.6121E+00	0.1715E+01	0.3363E+01	0.4014E+01	0.5865E+01
0.12	0.2129E+01	0.6495E+00	0.1783E+01	0.6728E+01	0.2492E+01	0.5030E+01
0.16	0.5500E+01	0.6312E+00	0.1887E+01	0.2697E+02	0.3804E+01	0.2952E+01
0.20	0.1986E+02	0.9816E+00	0.1813E+01	0.5104E+02	0.8476E+01	0.3947E+01
0.24	0.3406E+02	0.3373E+01	0.1065E+01	0.5899E+02	0.1669E+02	0.7579E+01
0.28	0.3612E+02	0.9937E+01	0.1784E+01	0.4946E+02	0.2981E+02	0.1794E+02
0.32	0.3556E+02	0.1360E+02	0.4869E+01	0.3944E+02	0.3725E+02	0.2731E+02
0.35	0.2676E+02	0.1479E+02	0.1215E+02	0.3115E+02	0.3083E+02	0.3098E+02
0.39	0.1285E+02	0.1659E+02	0.1545E+02	0.1702E+02	0.1965E+02	0.2639E+02
0.43	0.6673E+01	0.1091E+02	0.1202E+02	0.9209E+01	0.1146E+02	0.1675E+02
0.47	0.3788E+01	0.6824E+01	0.7012E+01	0.4489E+01	0.7552E+01	0.6276E+01
0.51	0.1739E+01	0.5447E+01	0.3556E+01	0.1471E+01	0.4378E+01	0.3472E+01
0.55	0.6030E+00	0.3602E+01	0.3359E+01	0.5183E+00	0.2642E+01	0.3377E+01
0.59	0.3881E+00	0.2212E+01	0.2499E+01	0.2576E+00	0.1901E+01	0.2006E+01
0.63	0.1546E+00	0.1105E+01	0.1421E+01	0.1422E+00	0.1124E+01	0.1297E+01
0.67	0.1035E+00	0.9573E+00	0.8254E+00	0.1201E+00	0.1118E+01	0.2069E+01
0.71	0.5909E-01	0.7042E+00	0.9961E+00	0.4032E-01	0.1032E+01	0.2050E+01
0.75	0.1147E+00	0.4616E+00	0.8153E+00	0.9785E-01	0.5204E+00	0.1801E+01
0.79	0.1721E+00	0.3808E+00	0.7442E+00	0.2025E+00	0.1733E+00	0.1728E+01
0.83	0.3422E+00	0.4410E+00	0.1392E+01	0.3612E+00	0.2592E+00	0.1373E+01
0.87	0.[illegible]37E+00	0.7880E+00	0.1764E+01	0.3371E+00	0.5886E+00	0.1163E+01
0.90	0.2170E+00	0.1165E+01	0.1710E+01	0.2202E+00	0.1057E+01	0.1388E+01
0.94	0.1019E+00	0.7812E+00	0.2706E+01	0.1024E+00	0.9529E+00	0.1730E+01
0.98	0.9128E-01	0.7834E+00	0.2479E+01	0.1040E+00	0.5061E+00	0.1386E+01
1.02	0.2476E-01	0.6874E+00	0.1469E+01	0.6873E-01	0.3786E+00	0.1094E+01
1.06	0.3841E-01	0.3382E+00	0.7778E+00	0.9316E-01	0.5354E+00	0.7684E+00
1.10	0.8847E-02	0.3009E+00	0.5642E+00	0.2631E-01	0.3337E+00	0.5462E+00
1.14	0.1734E-01	0.1736E+00	0.3103E+00	0.2565E-01	0.3149E+00	0.4697E+00
1.18	-0.2008E-01	0.4166E-01	0.3256E+00	-0.3406E-02	0.3753E+00	0.5730E+00

TABLE 14
HEAVE VARIANCE SPECTRAL DENSITY
110 ft WPB

Column	
1	Runs 221, 222, 223
2	Runs 224, 225, 226, 227
3	Runs 228, 229, 230, 231, 232
4	Runs 171, 190, 191, 192
5	Runs 172, 193, 194, 195, 199
6	Runs 173, 200, 201, 202, 219, 220

	Significant Wave Height 40% Beam			Significant Wave Height 60% Beam		
	C_V=1.5	C_V=3.0	C_V=4.0	C_V=1.5	C_V=3.0	C_V=4.0
Frequency Hz	Spectral Estimates ft^2/Hz			Spectral Estimates ft^2/Hz		
0.00	0.1245E+01	0.6157E+01	0.3555E+01	0.9985E-02	0.1069E+02	0.2894E+01
0.04	0.1537E+01	0.5916E+01	0.8690E+01	0.6272E+00	0.1342E+02	0.1529E+02
0.08	0.1441E+01	0.4148E+01	0.1012E+02	0.2224E+01	0.9749E+01	0.2737E+02
0.12	0.1988E+01	0.3443E+01	0.8468E+01	0.2498E+02	0.8605E+01	0.2839E+02
0.16	0.1133E+02	0.3221E+01	0.6165E+01	0.7026E+02	0.2113E+02	0.1468E+02
0.20	0.3490E+02	0.7234E+01	0.1070E+02	0.9442E+02	0.6439E+02	0.1395E+02
0.24	0.4839E+02	0.2130E+02	0.1588E+02	0.8504E+02	0.1188E+03	0.4411E+02
0.28	0.3876E+02	0.3202E+02	0.1822E+02	0.4987E+02	0.1161E+03	0.8926E+02
0.32	0.2484E+02	0.4812E+02	0.2411E+02	0.2661E+02	0.9494E+02	0.1014E+03
0.35	0.1638E+02	0.6295E+02	0.4584E+02	0.1833E+02	0.8484E+02	0.1021E+03
0.39	0.8358E+01	0.4399E+02	0.4746E+02	0.9948E+01	0.4933E+02	0.6052E+02
0.43	0.3083E+01	0.1280E+02	0.3525E+02	0.4288E+01	0.1072E+02	0.3776E+02
0.47	0.1582E+01	0.6513E+01	0.2582E+02	0.2317E+01	0.4326E+01	0.2806E+02
0.51	0.7094E+00	0.5574E+01	0.1122E+02	0.6715E+00	0.5132E+01	0.1085E+02
0.55	0.3568E+00	0.4440E+01	0.5416E+01	0.3751E+00	0.4383E+01	0.7447E+01
0.59	0.1576E+00	0.2292E+01	0.2490E+01	0.1943E+00	0.1573E+01	0.3786E+01
0.63	0.8733E-01	0.7383E+00	0.1608E+01	0.2575E+00	0.5972E+00	0.1805E+01
0.67	0.3112E-01	0.1989E+00	0.1029E+01	0.1890E-01	0.1877E+00	0.5634E+00
0.71	0.5842E-01	0.3541E+00	0.1712E+01	0.4964E-01	0.4861E+00	0.1550E+01
0.75	0.2266E-01	0.2593E+00	0.1667E+01	-0.2022E-01	0.4414E+00	0.8545E+00
0.79	0.3535E-01	0.2750E+00	0.1130E+01	0.4760E-01	0.5118E+00	0.1175E+01
0.83	0.2168E-01	0.2006E+00	0.3718E+00	-0.1733E-01	0.3066E+00	0.6234E+00
0.87	0.3700E-01	0.4527E+00	0.2960E+00	0.6371E+01	0.5532E+00	0.5366E+00
0.90	0.1016E-01	0.4081E+00	0.1541E+00	-0.2342E-01	0.2338E+00	0.5266E-01
0.94	0.2184E-01	0.3099E+00	0.6353E+00	0.1050E-01	0.1813E+00	0.4215E+00
0.98	0.3392E-03	0.2456E+00	0.2467E+00	-0.2608E-01	0.1088E+00	0.2306E+00
1.02	0.1558E-01	0.2524E+00	0.3722E+00	0.4576E-01	0.2366E+00	0.6368E+00
1.06	0.2714E-02	0.1814E+00	0.3749E+00	-0.1503E-01	0.1284E+00	0.1939E+00
1.10	0.1876E-01	0.1605E+00	0.3676E+00	0.3644E-01	0.2348E+00	0.2182E+00
1.14	-0.1800E-02	-0.9995E-03	0.1125E+00	-0.2121E-01	0.1531E+00	0.1673E+00
1.18	0.8719E-02	-0.3038E-01	0.1525E+00	0.2529E-01	0.2541E+00	0.3428E+00

TABLE 15
HEAVE VARIANCE SPECTRAL DENSITY
120 ft WPB

Column	
1	Runs 290, 291
2	Runs 292, 293, 294
3	Runs 295, 296, 297, 298
4	Runs 299, 301, 302
5	Runs 311, 312, 313, 314
6	Runs 315, 316, 317, 319

	Significant Wave Height 40% Beam			Significant Wave Height 60% Beam		
	C_V=1.5	C_V=3.0	C_V=4.0	C_V=1.5	C_V=3.0	C_V=4.0
Frequency Hz	Spectral Estimates ft^2/Hz			Spectral Estimates ft^2/Hz		
0.00	0.4418E+00	0.2857E+00	0.1186E+01	0.1528E+01	0.4293E+01	0.1687E+01
0.04	0.5298E+00	0.3896E+00	0.2311E+01	0.1047E+01	0.6037E+01	0.3318E+01
0.08	0.4597E+00	0.4976E+00	0.2839E+01	0.2128E+01	0.5591E+01	0.6326E+01
0.12	0.9944E+00	0.7515E+00	0.3528E+01	0.1142E+02	0.4241E+01	0.6834E+01
0.16	0.6322E+01	0.7078E+00	0.3139E+01	0.4194E+02	0.9611E+01	0.4731E+01
0.20	0.2014E+02	0.1214E+01	0.2519E+01	0.6631E+02	0.2887E+02	0.4887E+01
0.24	0.2928E+02	0.6510E+01	0.2124E+01	0.6037E+02	0.5304E+02	0.1699E+02
0.28	0.2624E+02	0.1752E+02	0.3958E+01	0.3945E+02	0.7352E+02	0.4515E+02
0.32	0.2180E+02	0.2024E+02	0.9633E+01	0.2528E+02	0.6769E+02	0.6404E+02
0.35	0.1394E+02	0.1666E+02	0.2179E+02	0.1702E+02	0.4086E+02	0.6026E+02
0.39	0.5297E+01	0.1570E+02	0.2292E+02	0.7534E+01	0.2387E+02	0.5057E+02
0.43	0.2022E+01	0.9612E+01	0.1425E+02	0.3148E+01	0.1254E+02	0.2974E+02
0.47	0.9544E+00	0.5011E+01	0.7691E+01	0.1236E+01	0.6738E+01	0.1066E+02
0.51	0.4012E+00	0.3451E+01	0.4520E+01	0.3993E+00	0.4397E+01	0.4952E+01
0.55	0.8361E-01	0.1980E+01	0.3841E+01	0.8828E-01	0.3080E+01	0.2561E+01
0.59	0.2674E-01	0.1057E+01	0.2377E+01	0.1263E+00	0.1603E+01	0.9764E+00
0.63	-0.7015E-02	0.5688E+00	0.1351E+01	0.3091E-01	0.6795E+00	0.8194E+00
0.67	0.2225E-01	0.4189E+00	0.7268E+00	0.8128E-01	0.7830E+00	0.1095E+01
0.71	0.3723E-02	0.2595E+00	0.8488E+00	0.6600E-02	0.6590E+00	0.1032E+01
0.75	0.1621E-01	0.1863E+00	0.4562E+00	0.5075E-01	0.2546E+00	0.8174E+00
0.79	0.1267E-02	0.1279E+00	0.2279E+00	0.1239E-01	0.1615E+00	0.6951E+00
0.83	0.7459E-02	0.8811E-01	0.1472E+00	0.7357E-01	0.7488E-01	0.3473E+00
0.87	-0.1186E-01	0.4591E-01	0.2478E+00	0.1292E-01	0.8436E-01	0.2019E+00
0.90	-0.4964E-03	0.6096E-01	0.9413E-01	0.4757E-01	0.8680E-01	0.6341E-01
0.94	-0.1187E-01	0.4605E-01	0.1501E+00	-0.3034E-02	0.1040E+00	0.1897E+00
0.98	-0.6336E-03	0.4854E-01	0.6428E-01	0.4027E-01	0.6044E-01	0.2024E+00
1.02	-0.1368E-01	0.5057E-01	0.7083E-01	0.5330E-03	0.1383E+00	0.2821E+00
1.06	-0.3345E-02	0.4012E-01	-0.3098E-01	0.3837E-01	0.1616E+00	0.1696E+00
1.10	-0.1115E-01	0.2203E-01	0.4854E-01	-0.3164E-02	0.1485E+00	0.1052E+00
1.14	-0.1133E-02	0.1415E-01	0.1688E-01	0.3381E-01	0.1315E+00	0.1191E+00
1.18	-0.1124E-01	-0.3268E-02	0.1271E+00	-0.6321E-02	0.1653E+00	0.2350E+00

TABLE 16
WAVE VARIANCE SPECTRAL DENSITY
110 ft WPB

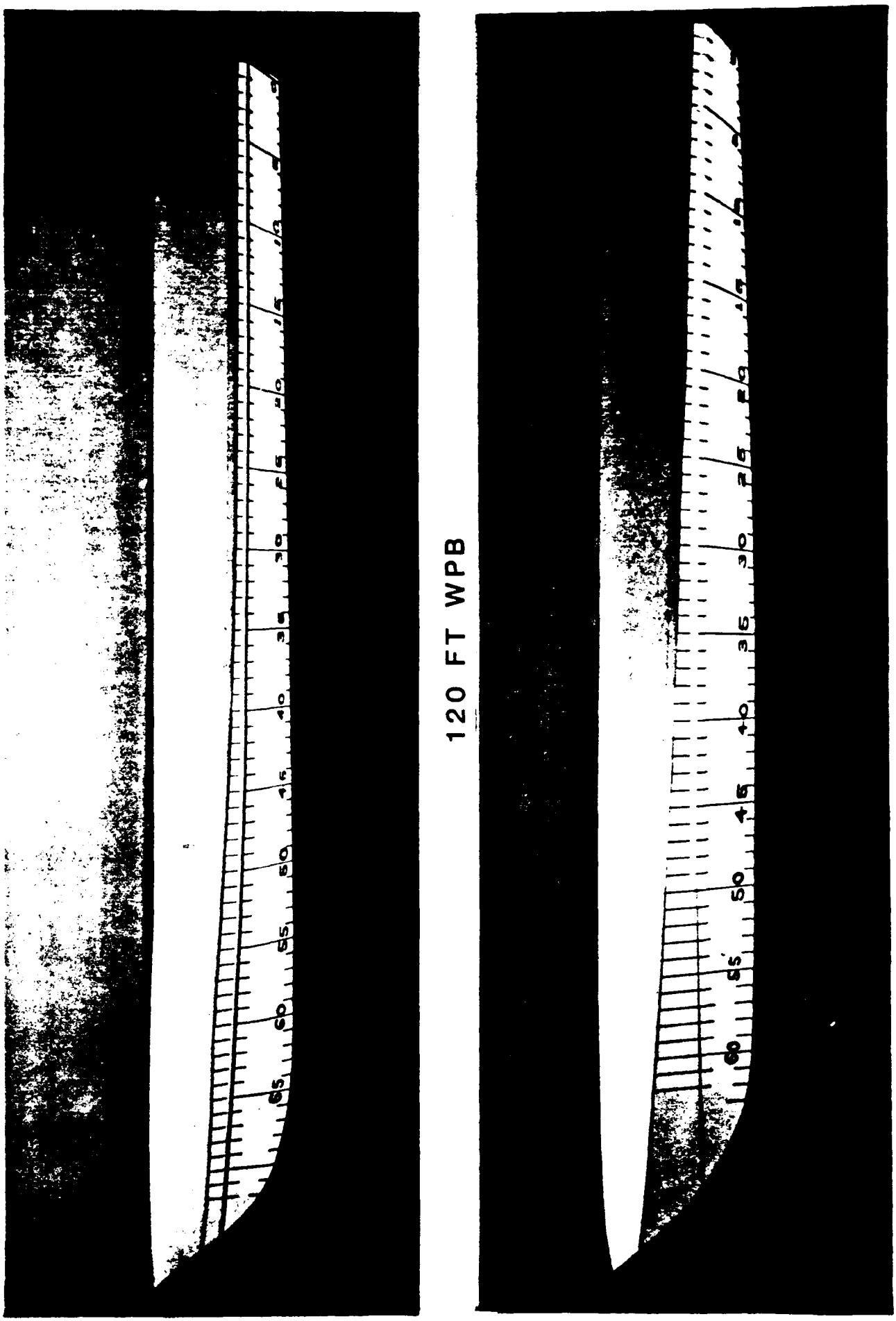
Column	
1	Runs 221, 222, 223
2	Runs 224, 225, 226, 227
3	Runs 228, 229, 230, 231, 232
4	Runs 171, 190, 191, 192
5	Runs 172, 193, 194, 195, 199
6	Runs 173, 200, 201, 202, 219, 220

	Significant Wave Height 40% Beam			Significant Wave Height 60% Beam		
	C_V=1.5	C_V=3.0	C_V=4.0	C_V=1.5	C_V=3.0	C_V=4.0
Frequency Hz	Spectral Estimates ft^2/Hz			Spectral Estimates ft^2/Hz		
0.00				1.18	0.42	0.45
0.04				1.68	0.61	1.07
0.08	0.12			3.38	0.75	0.73
0.12	1.49			27.21	0.00	0.44
0.16	9.13	0.01	0.02	62.76	3.26	0.59
0.20	16.03	1.21	0.45	84.21	24.10	5.63
0.24	20.71	4.55	1.33	75.08	53.03	26.39
0.28	20.36	8.54	4.20	41.58	45.03	49.03
0.32	13.38	13.14	6.32	26.79	35.58	45.75
0.35	7.92	17.57	9.28	23.58	36.78	41.74
0.39	3.87	16.23	10.85	14.82	26.28	30.27
0.43	2.08	6.50	12.08	8.83	7.29	23.97
0.47	2.43	5.09	15.90	9.58	4.51	24.87
0.51	2.28	6.12	9.07	6.76	7.11	11.14
0.55	2.19	5.48	5.46	3.98	7.15	10.10
0.59	1.80	3.94	5.76	3.65	4.37	9.99
0.63	1.24	1.84	6.47	3.05	1.84	6.51
0.67	0.76	1.21	6.38	1.55	1.62	5.84
0.71	0.47	1.53	5.21	1.74	1.77	6.15
0.75	0.38	2.00	2.84	1.38	2.42	4.59
0.79	0.41	1.79	1.04	1.19	1.73	5.31
0.83	0.40	2.28	0.50	0.61	1.28	3.72
0.87	0.31	2.03	1.47	0.42	1.70	2.44
0.90	0.28	0.86	1.45	0.09	1.58	2.47
0.94	0.19	0.98	1.76		1.21	3.50
0.98	0.16	1.48	1.51		1.14	3.78
1.02	0.17	1.11	1.49		0.92	2.11
1.06	0.18	0.56	1.24		0.41	
1.10	0.12	0.55	0.74		0.42	
1.14						
1.18						

TABLE 17
WAVE VARIANCE SPECTRAL DENSITY
120 ft WPB

Column	
1	Runs 290, 291
2	Runs 292, 293, 294
3	Runs 295, 296, 297, 298
4	Runs 299, 301, 302
5	Runs 311, 312, 313, 314
6	Runs 315, 316, 317, 319

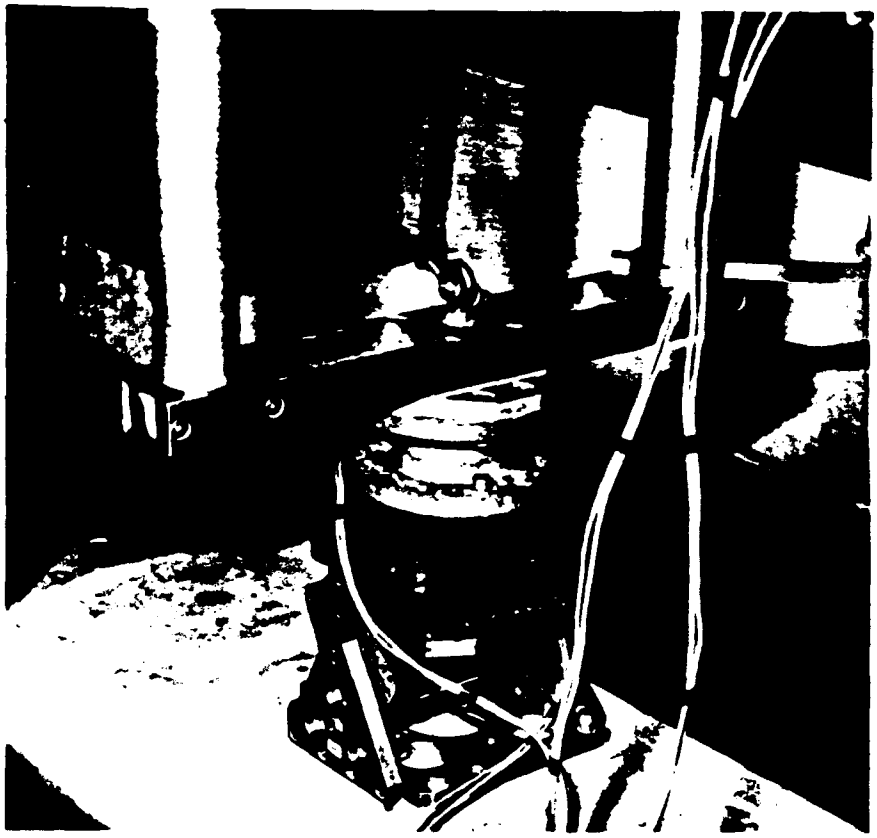
	Significant Wave Height 40% Beam			Significant Wave Height 60% Beam		
	C_V=1.5	C_V=3.0	C_V=4.0	C_V=1.5	C_V=3.0	C_V=4.0
Frequency Hz	Spectral Estimates ft^2/Hz			Spectral Estimates ft^2/Hz		
0.00						
0.04				0.62		
0.08	0.10			1.32		0.22
0.12	0.66	0.03		10.43	0.06	0.52
0.16	5.01	0.12		33.95	3.51	0.62
0.20	14.78	0.58	0.11	48.21	14.84	3.99
0.24	21.62	2.44	0.36	42.88	27.45	10.03
0.28	17.89	6.87	1.69	27.02	30.75	17.64
0.32	12.47	8.58	3.47	15.68	29.40	20.73
0.35	8.45	8.13	6.17	11.81	25.93	23.00
0.39	4.17	10.72	7.64	7.04	17.75	26.15
0.43	3.06	9.37	9.18	5.75	10.71	20.06
0.47	3.43	6.35	7.37	5.09	8.07	12.84
0.51	2.96	6.84	5.53	3.57	8.40	10.93
0.55	2.05	6.18	7.29	2.49	7.85	6.93
0.59	1.94	3.73	6.00	2.01	5.27	5.24
0.63	1.41	2.46	4.94	1.67	3.09	5.88
0.67	0.80	2.64	4.77	1.71	2.98	5.37
0.71	0.53	3.49	5.16	1.24	3.16	3.76
0.75	0.52	3.72	3.99	0.78	3.07	2.84
0.79	0.72	3.67	2.60	0.61	3.19	2.99
0.83	0.76	2.22	2.35	0.72	2.55	3.24
0.87	0.57	1.28	2.64	0.65	2.10	3.67
0.90	0.41	2.03	2.82	0.42	1.97	4.81
0.94	0.27	1.98	2.10	0.23	1.58	4.47
0.98	0.24	1.30	2.35	0.16	1.28	3.71
1.02	0.31	0.89	2.77	0.05	1.09	2.75
1.06	0.26		2.26		1.46	1.77
1.10	0.23		0.85		1.34	2.13
1.14	0.23					2.61
1.18	0.19					2.05



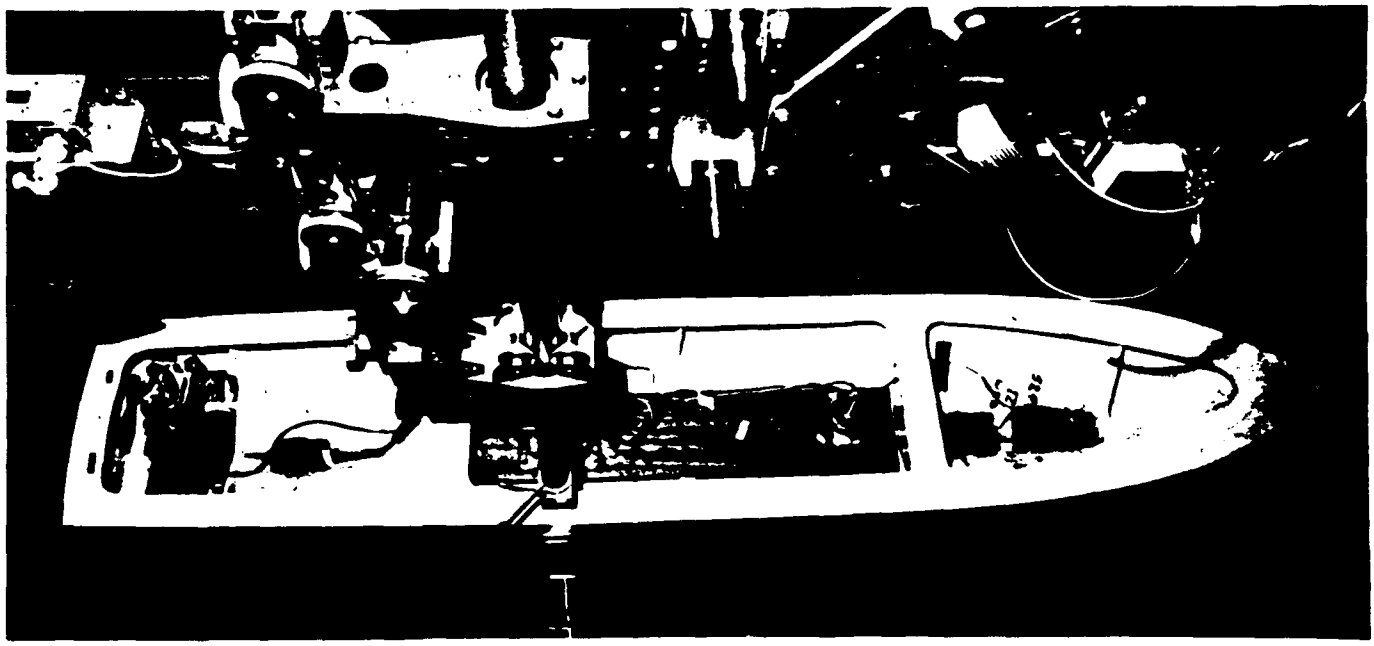
120 FT WPB

110 FT WPB

FIGURE 1 – MODEL HULLS

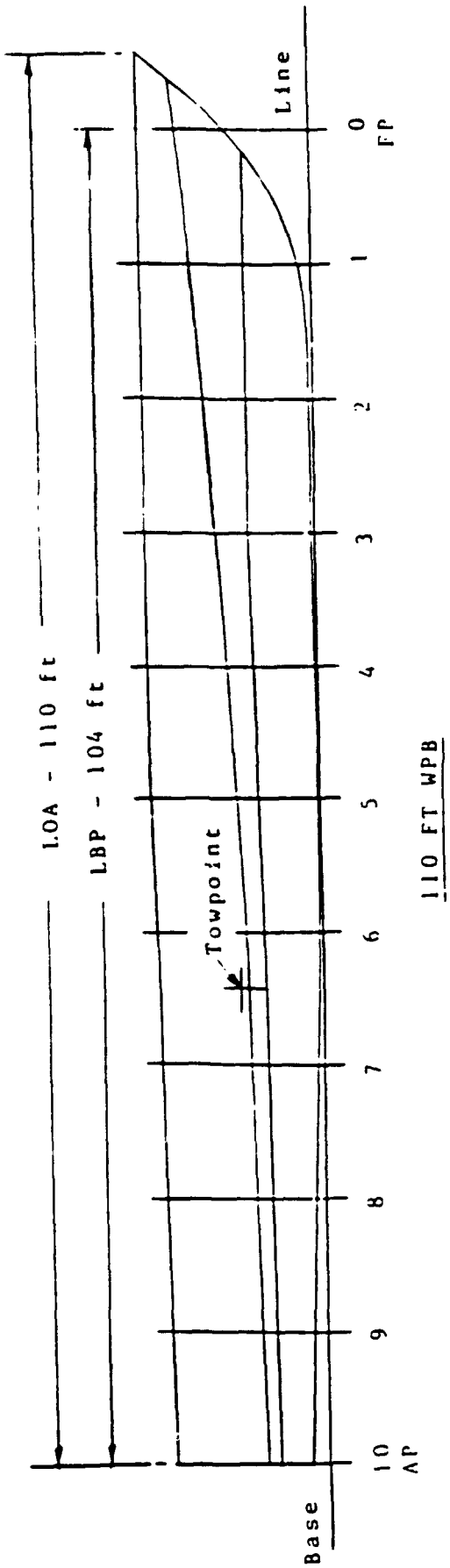


DRAG BALANCE & PITCH PIVOT BOX

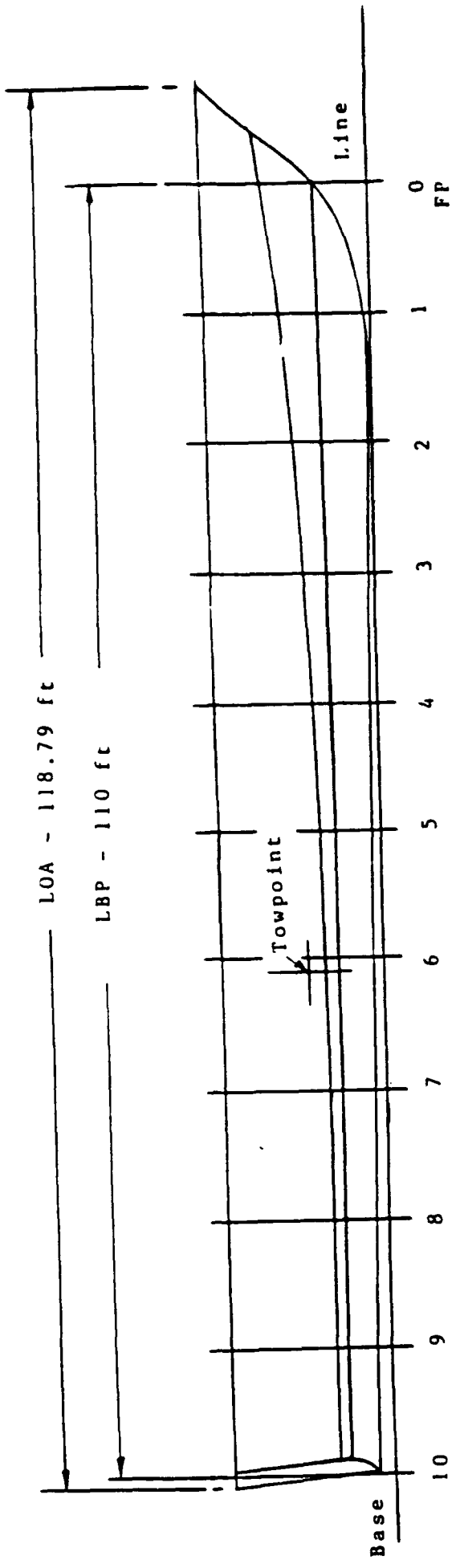


INSTRUMENTED 120 FT WPB

FIGURE 2



110 FT WPB



120 FT WPB

FIGURE 3 WPB PROFILES

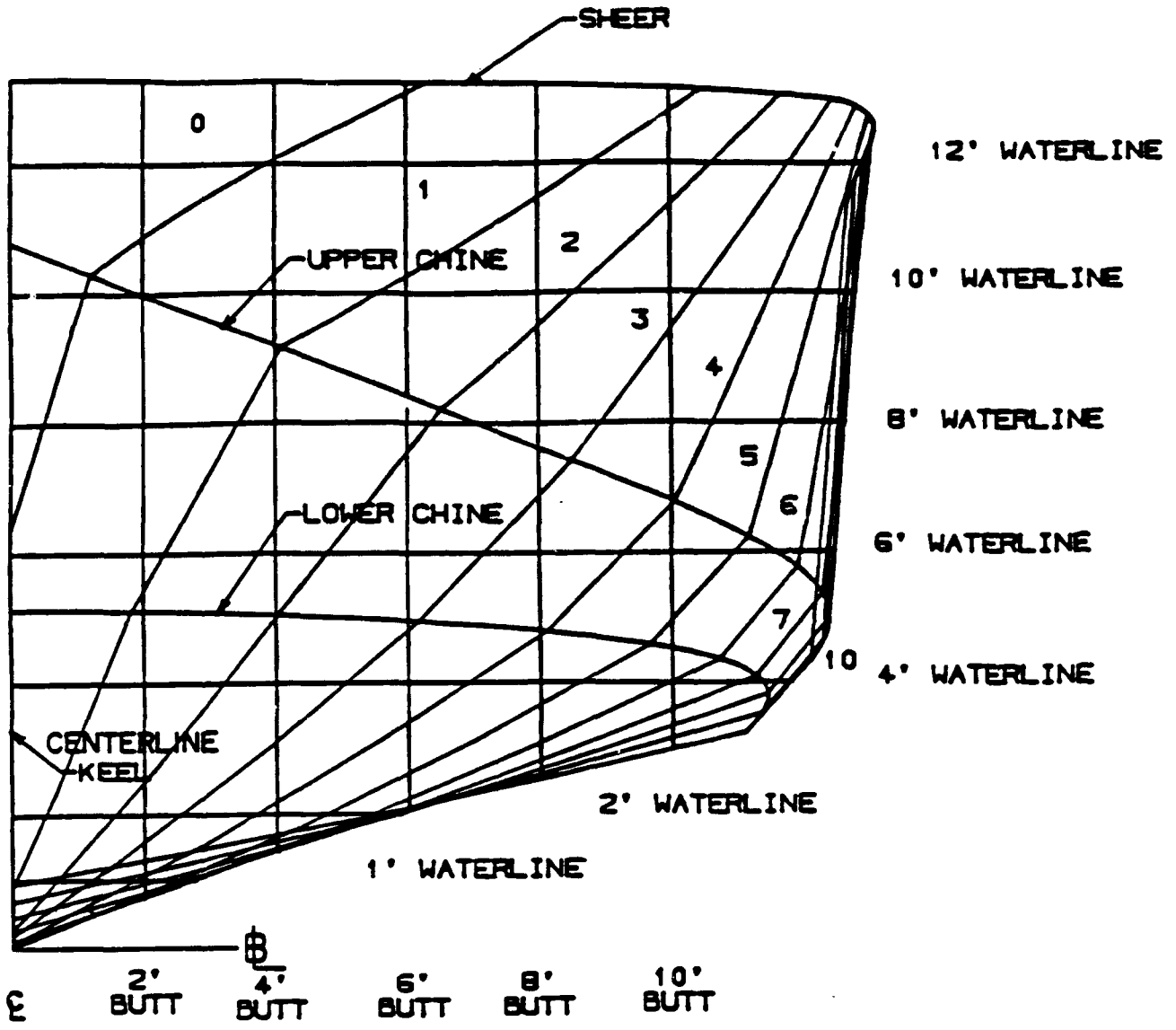


FIGURE 4 110 FT WPB BODY LINES

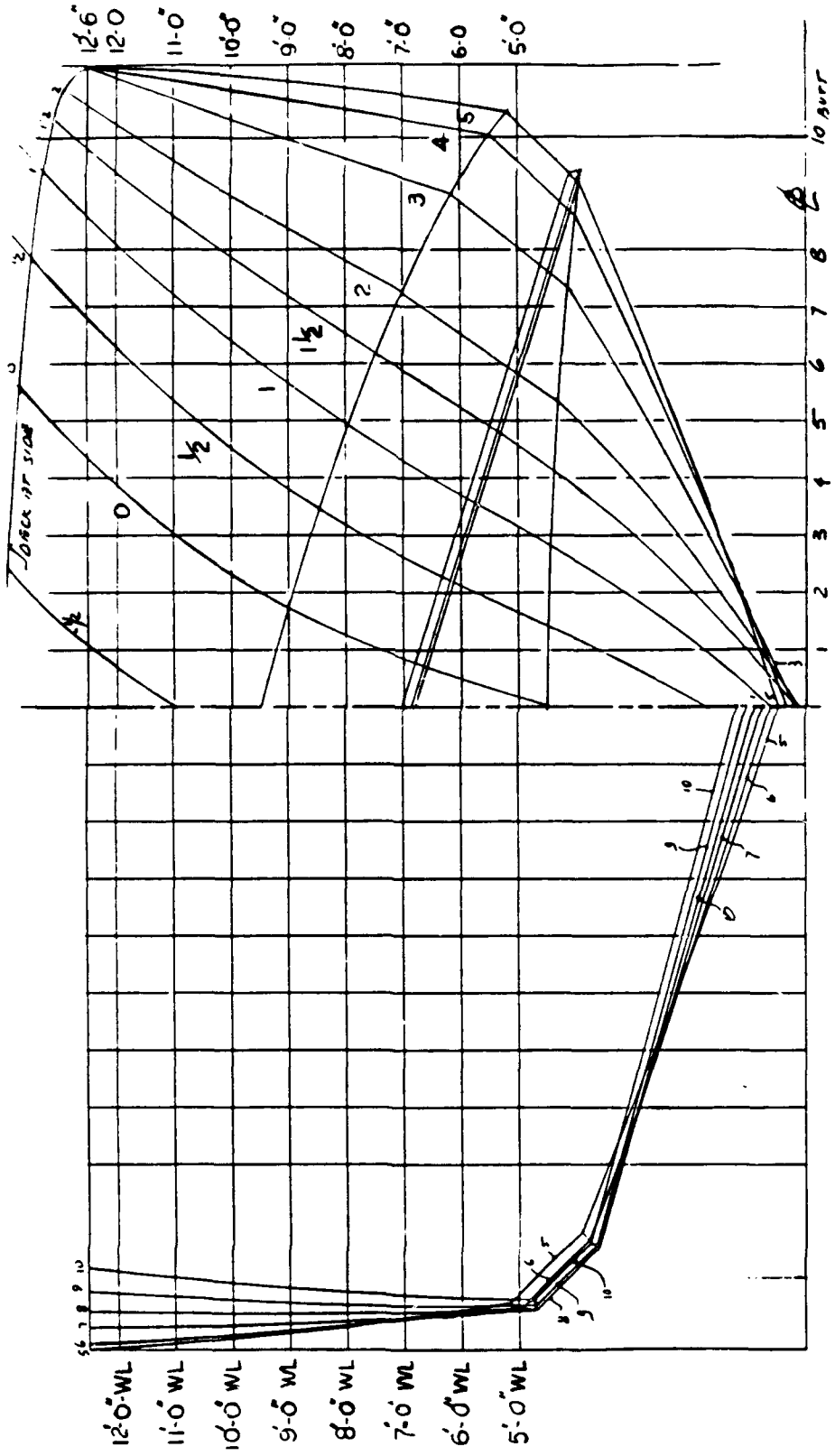
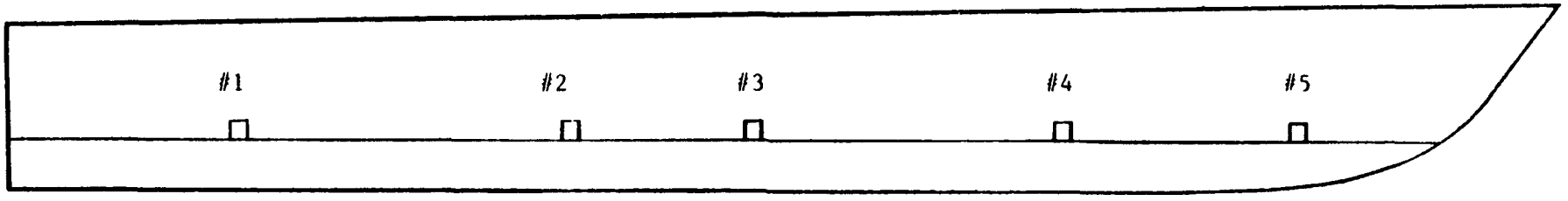


FIGURE 5 120 FT WPB BODY LINES



ACCELEROMETER	110 FT WPB BEAMS	110 FT WPB FEET FWD AP	120 FT WPB BEAMS	120 FT WPB FEET FWD AP
1	0.8	19.76	0.8	16.97
2	1.5	37.2 (LCG)	2.02	42.9 (LCG)
3	2.0	49.38	3.0	63.6
4	3.0	74.07	4.0	84.8
5	4.0	98.76	4.5	95.4

FIGURE 6 LOCATIONS OF VERTICAL ACCELEROMETERS

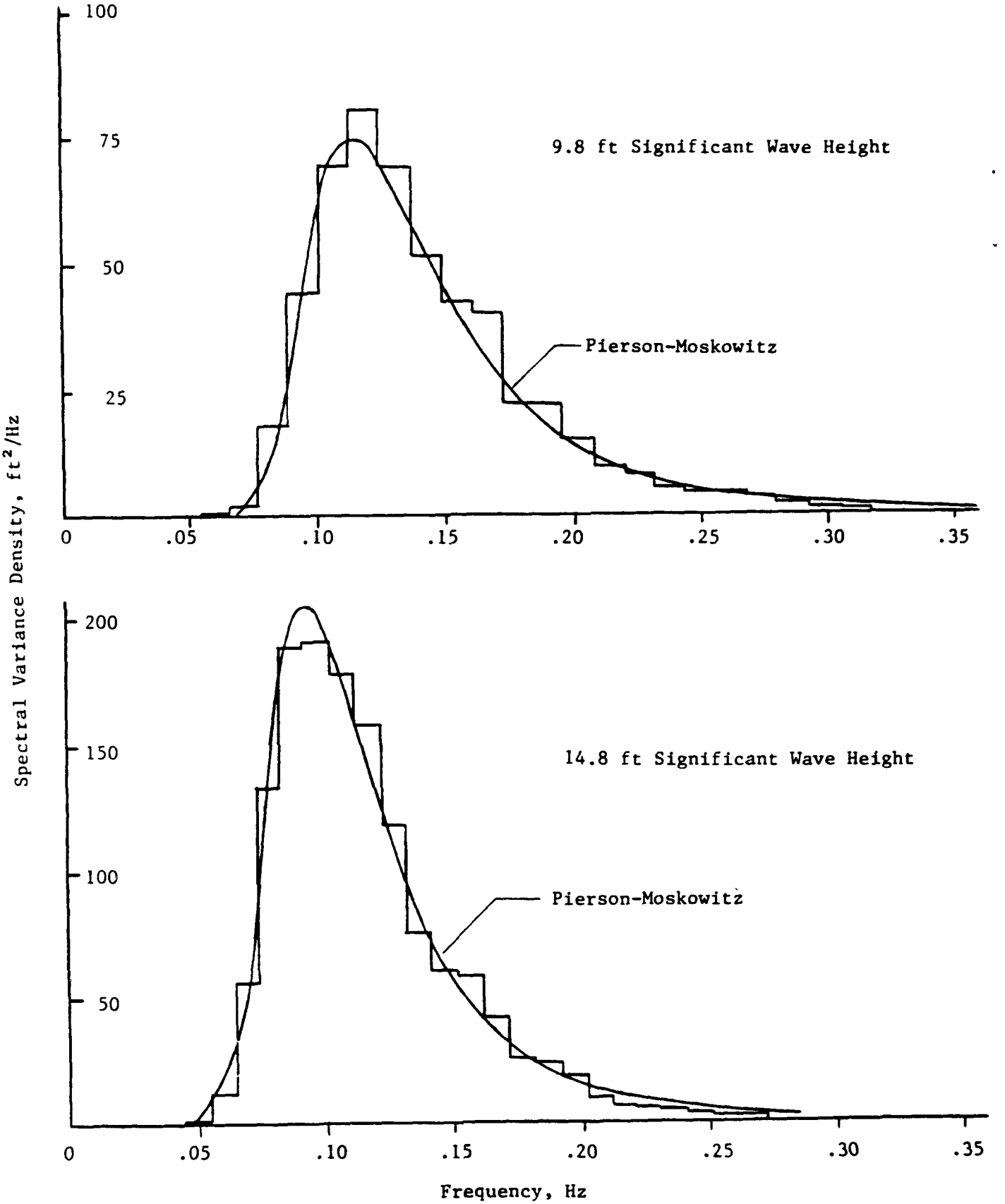


FIGURE 7 110 FT WPB TEST WAVE SPECTRA

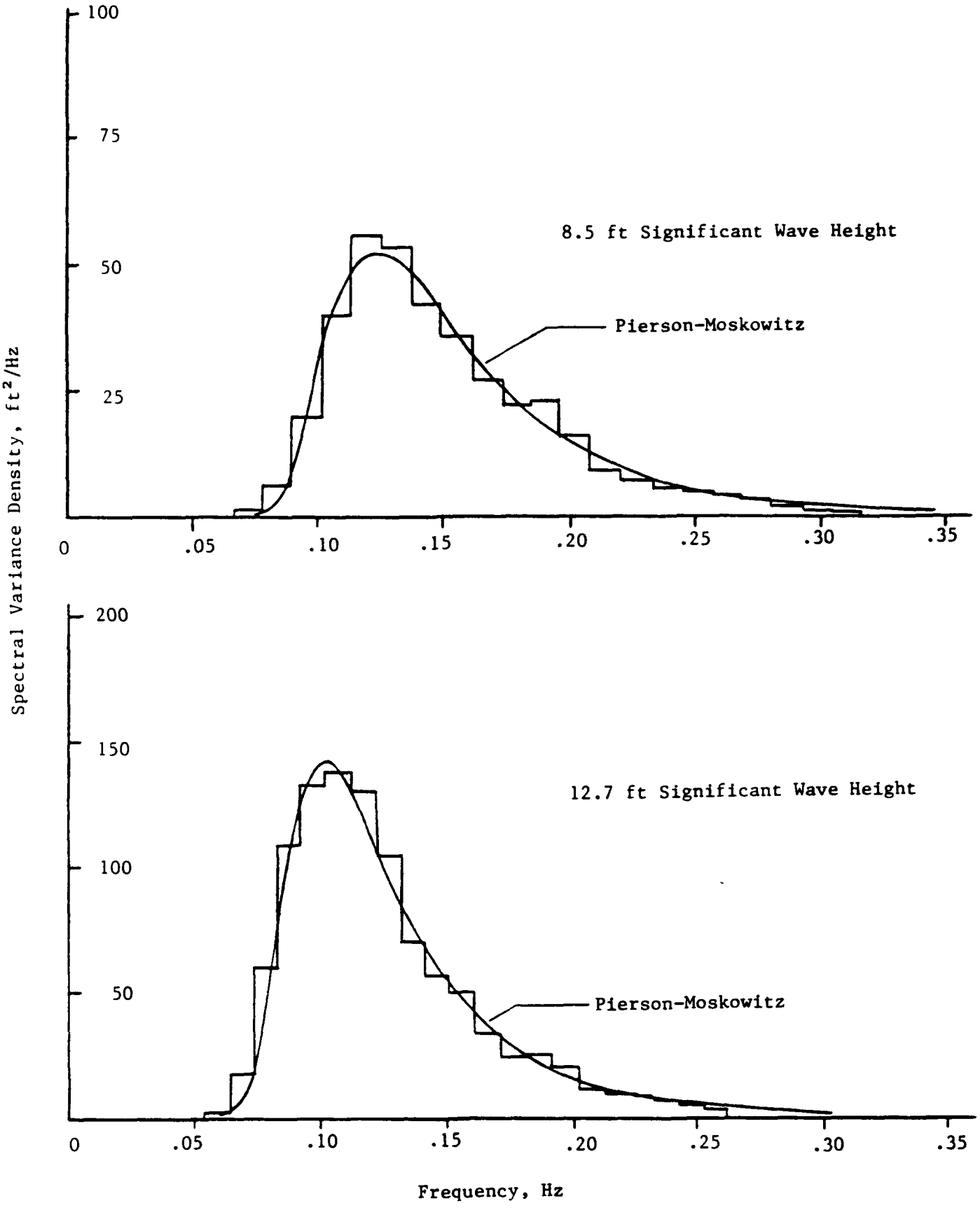


FIGURE 8 120 FT WPB TEST WAVE SPECTRA

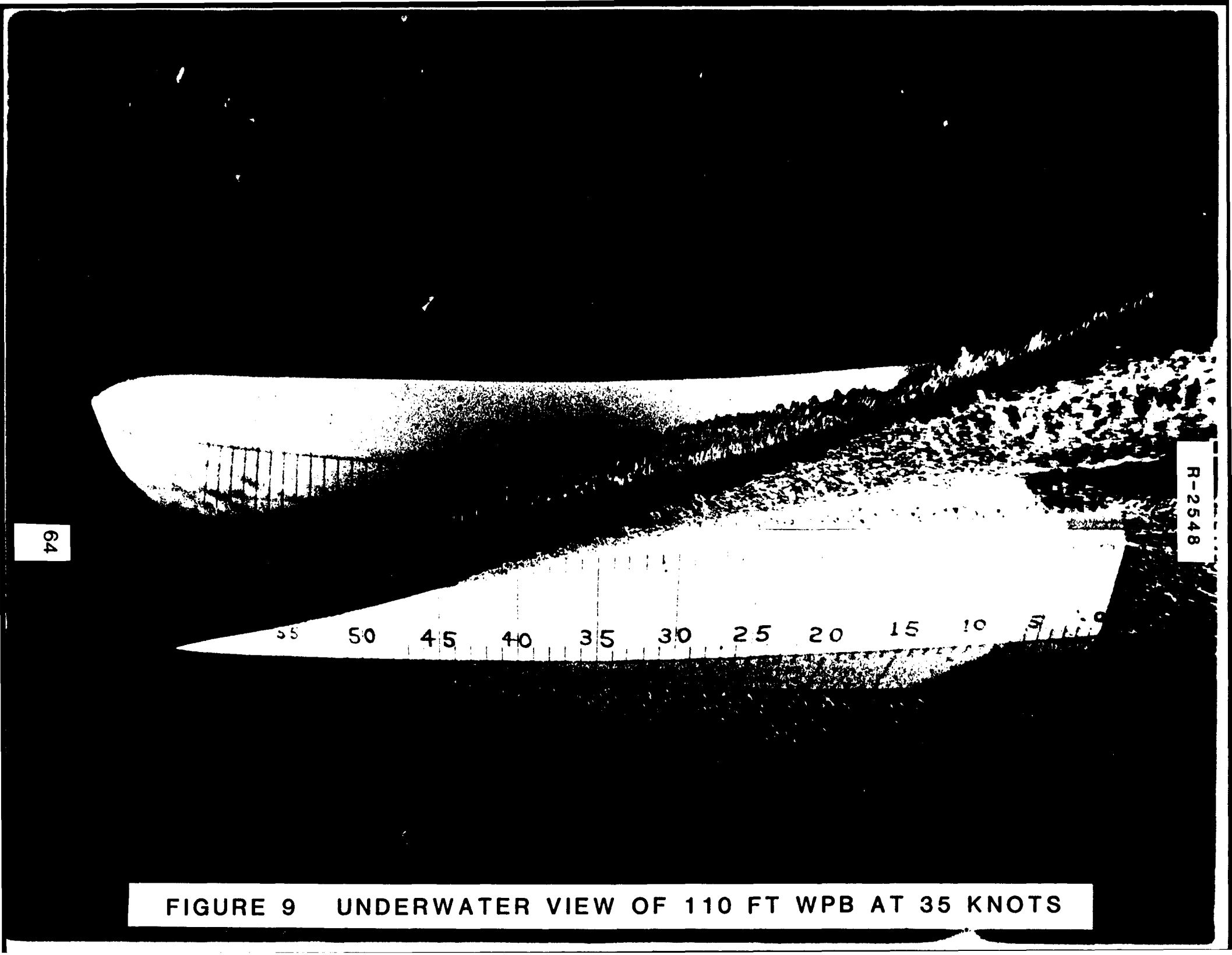
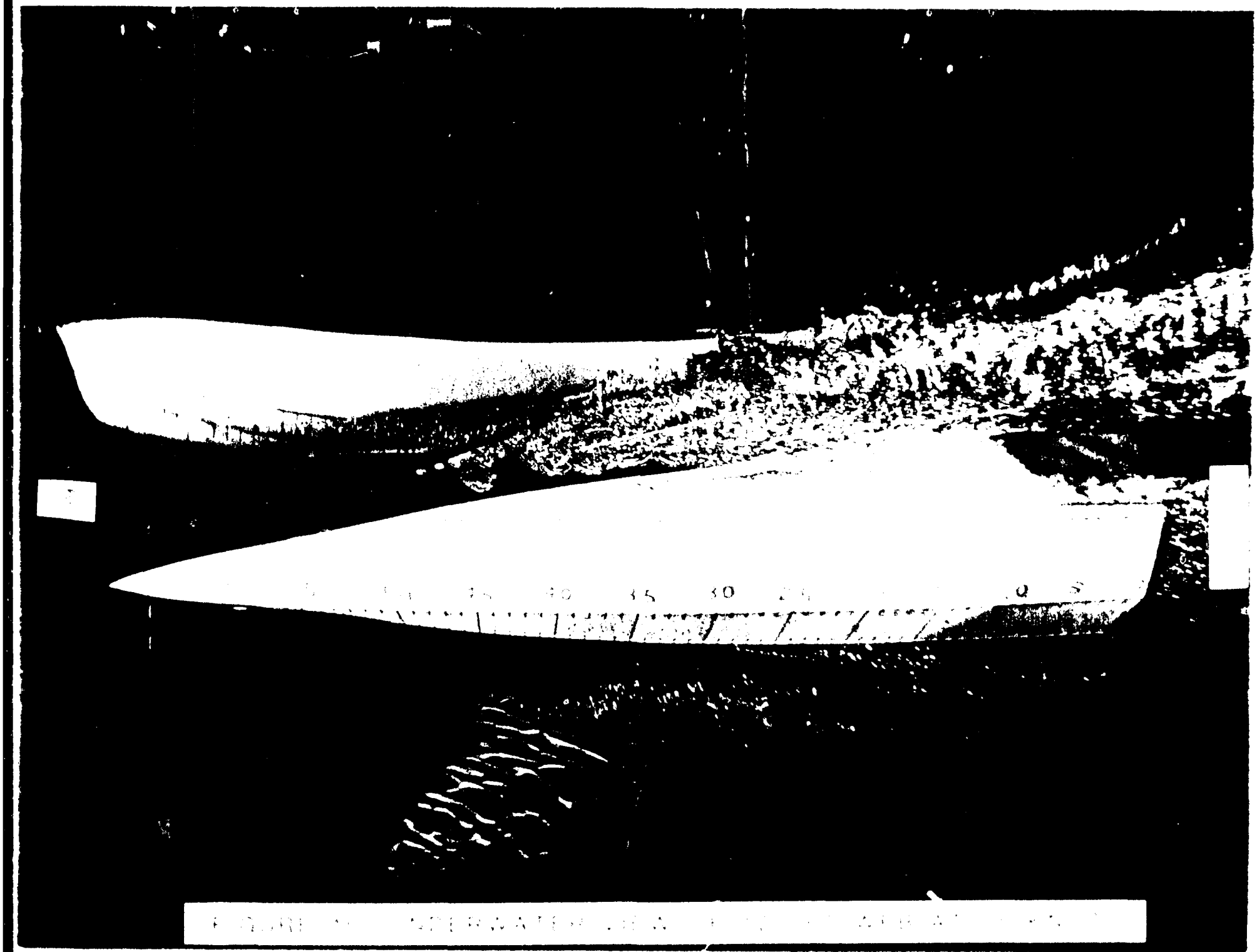


FIGURE 9 UNDERWATER VIEW OF 110 FT WPB AT 35 KNOTS

R-2548



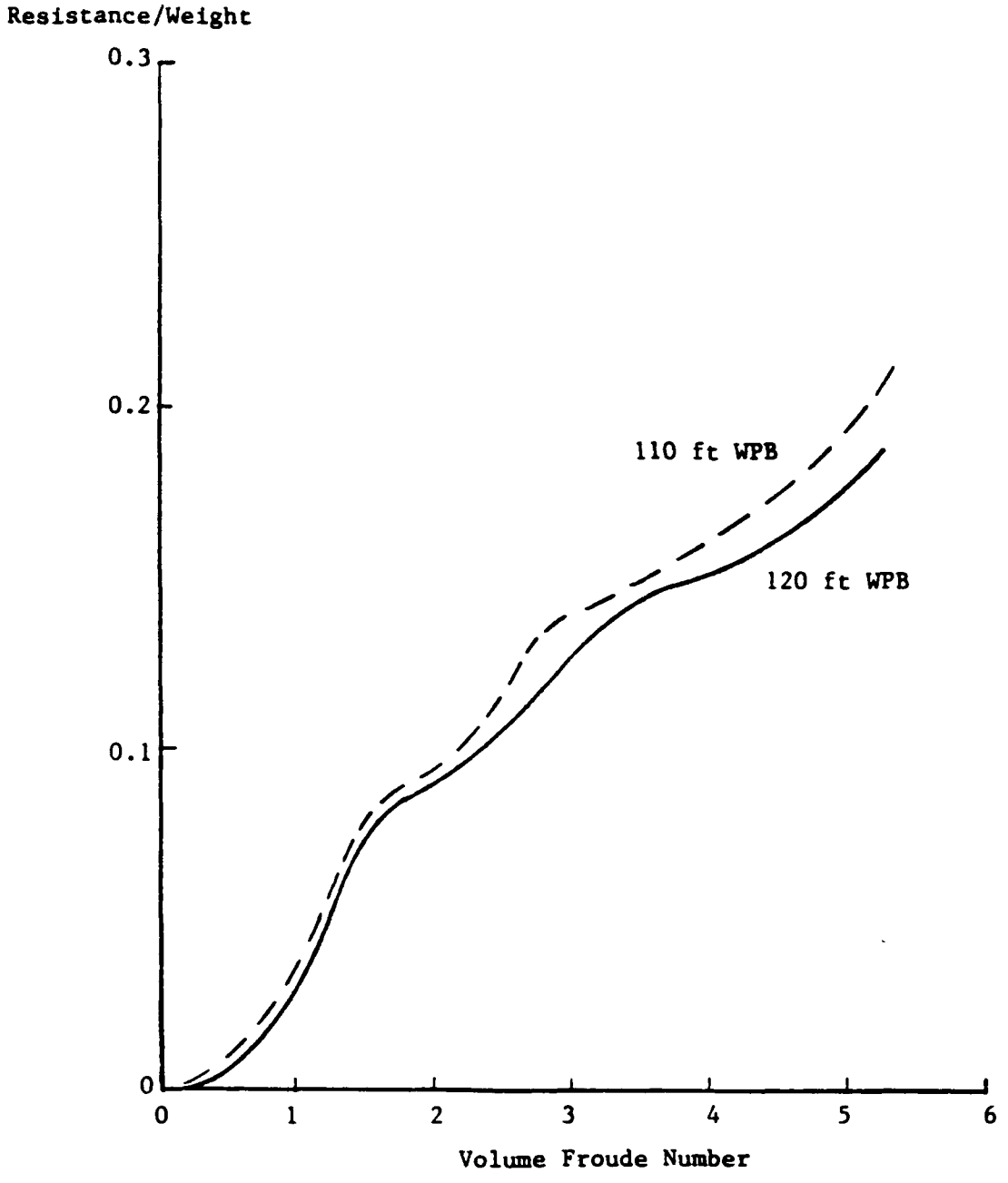


FIGURE 11 WPB CALM WATER PERFORMANCE

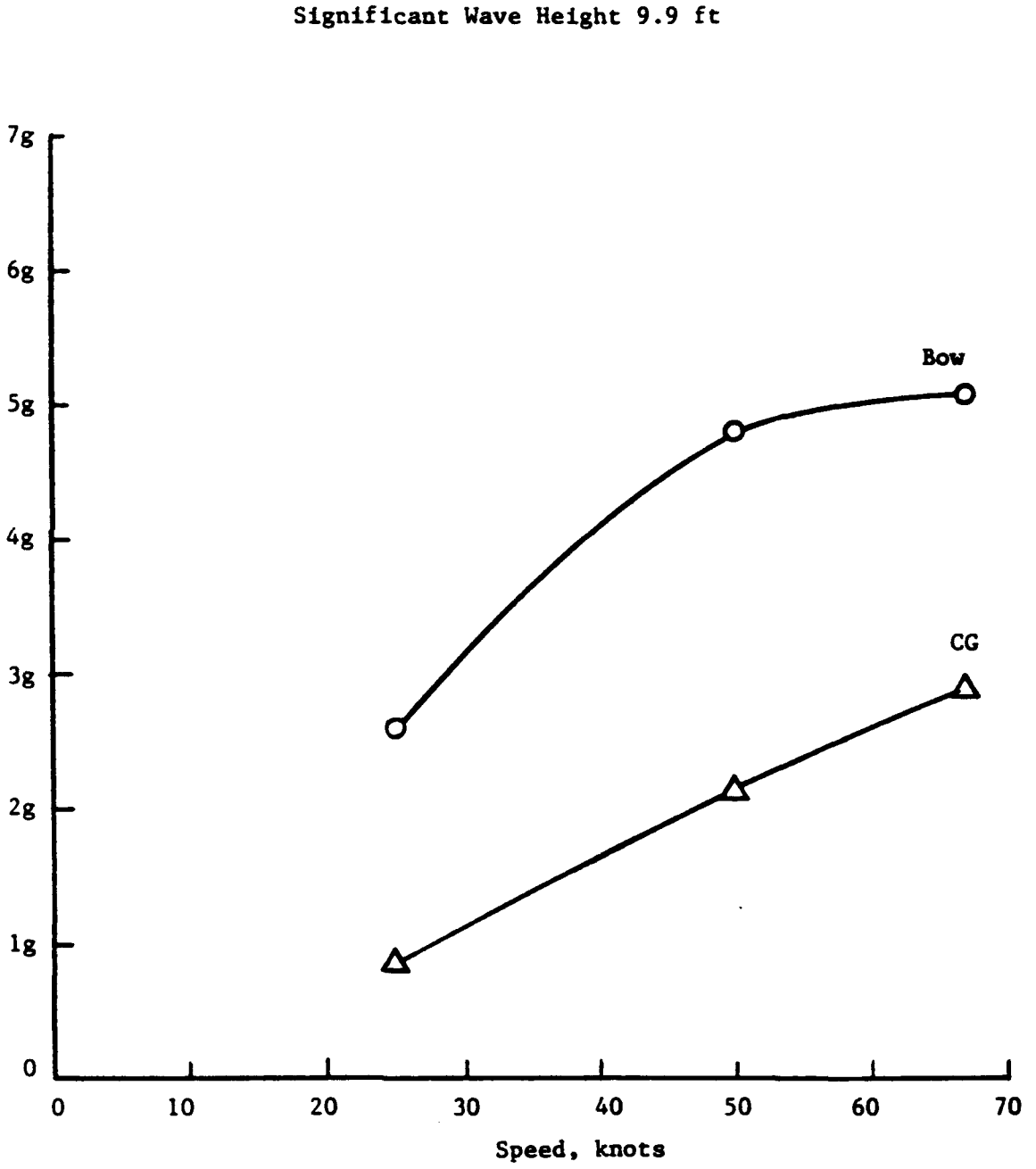


FIGURE 12 SIGNIFICANT ACCELERATIONS - 110 ft WPB

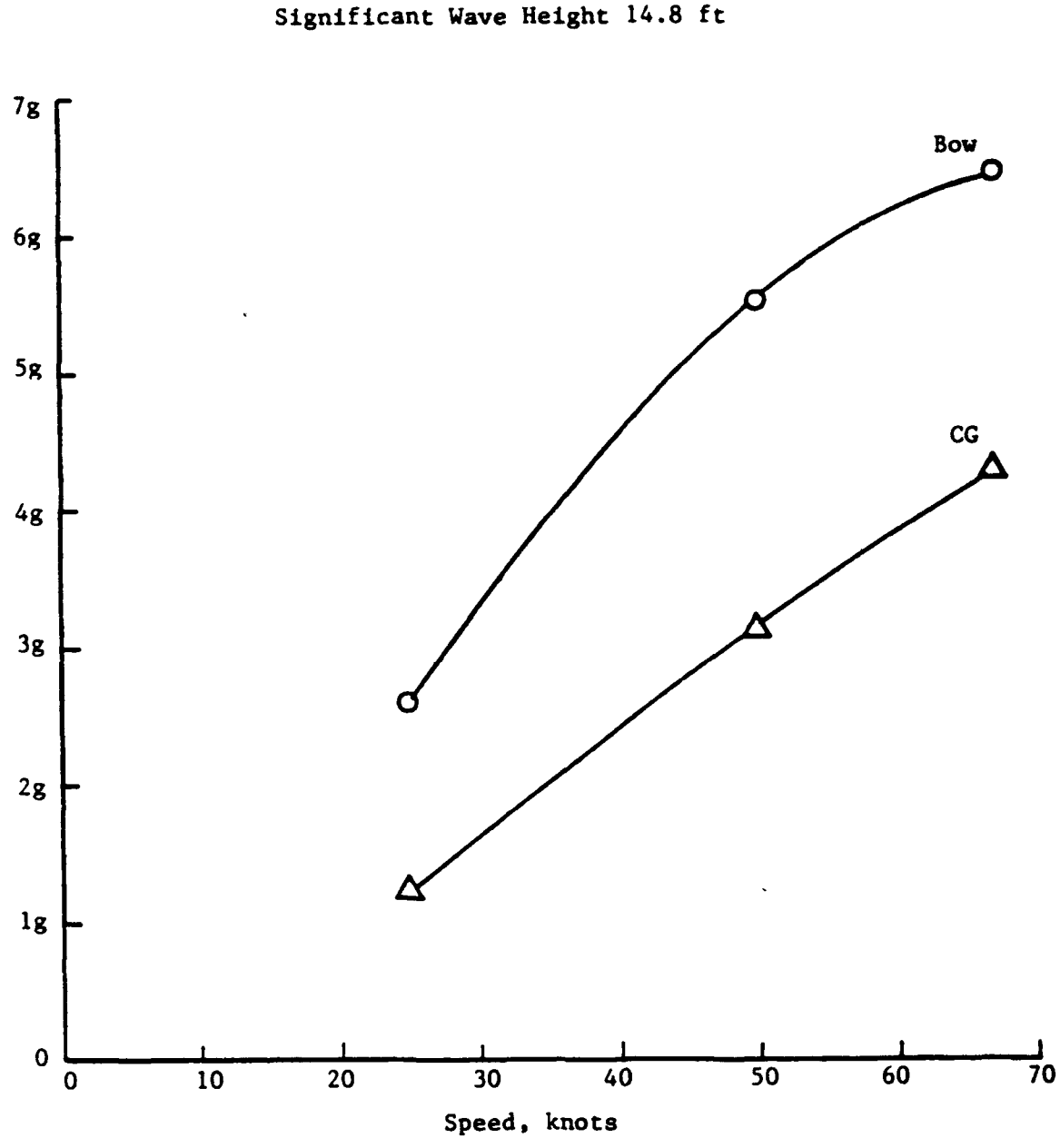


FIGURE 13 SIGNIFICANT ACCELERATIONS - 110 ft WPB

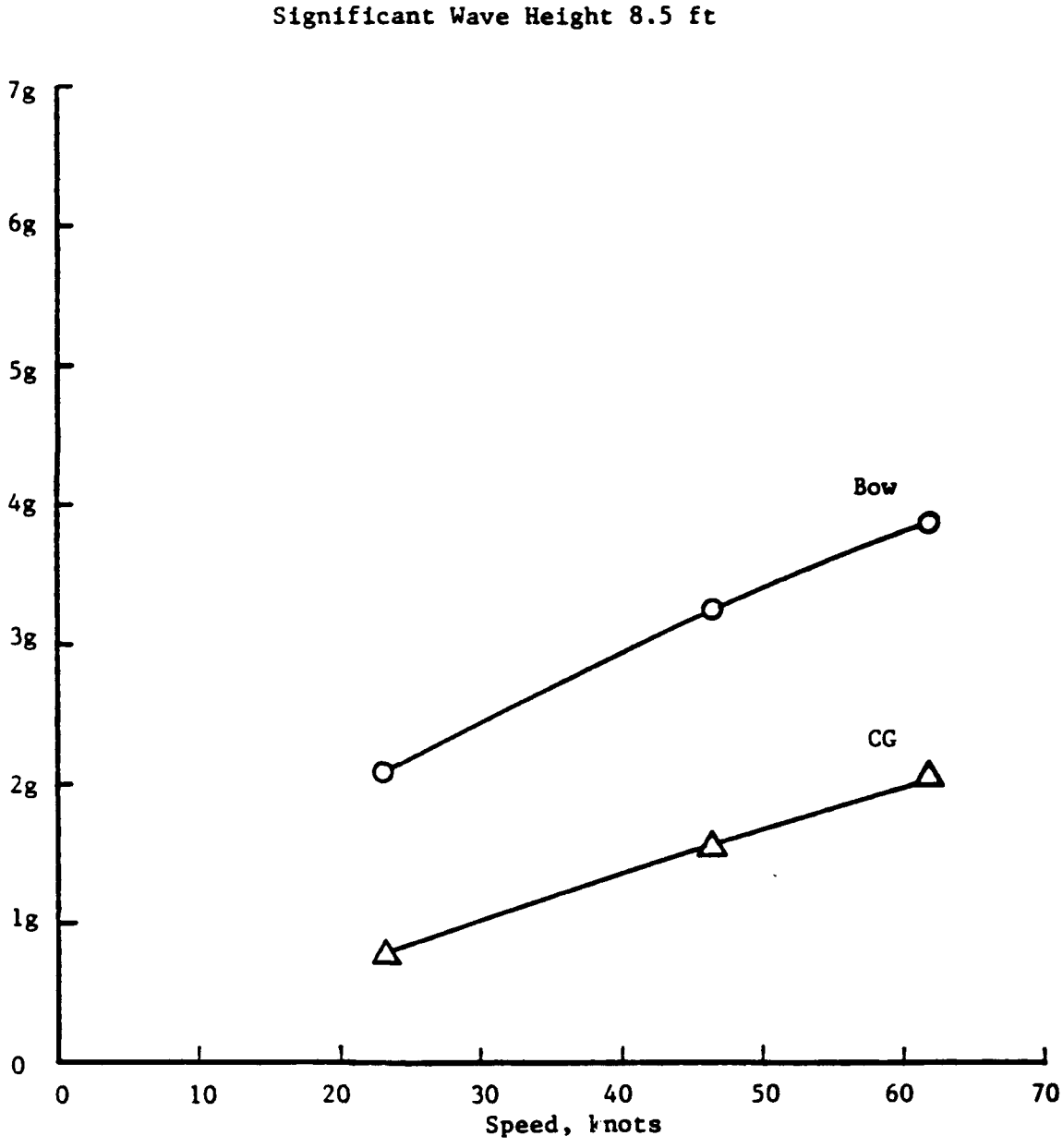


FIGURE 14 SIGNIFICANT ACCELERATIONS - 120 ft WPB

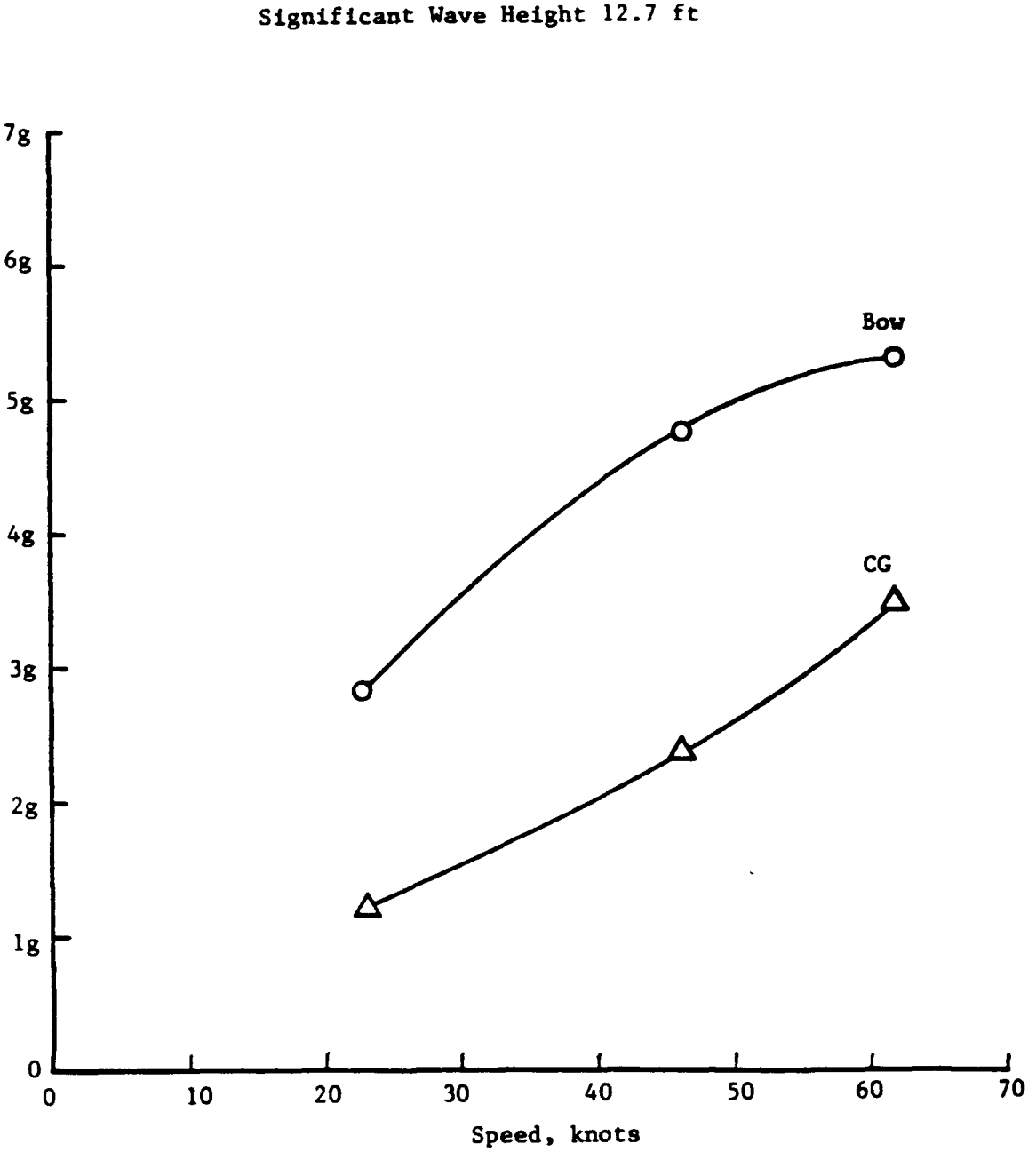


FIGURE 15 SIGNIFICANT ACCELERATIONS - 120 ft WPB

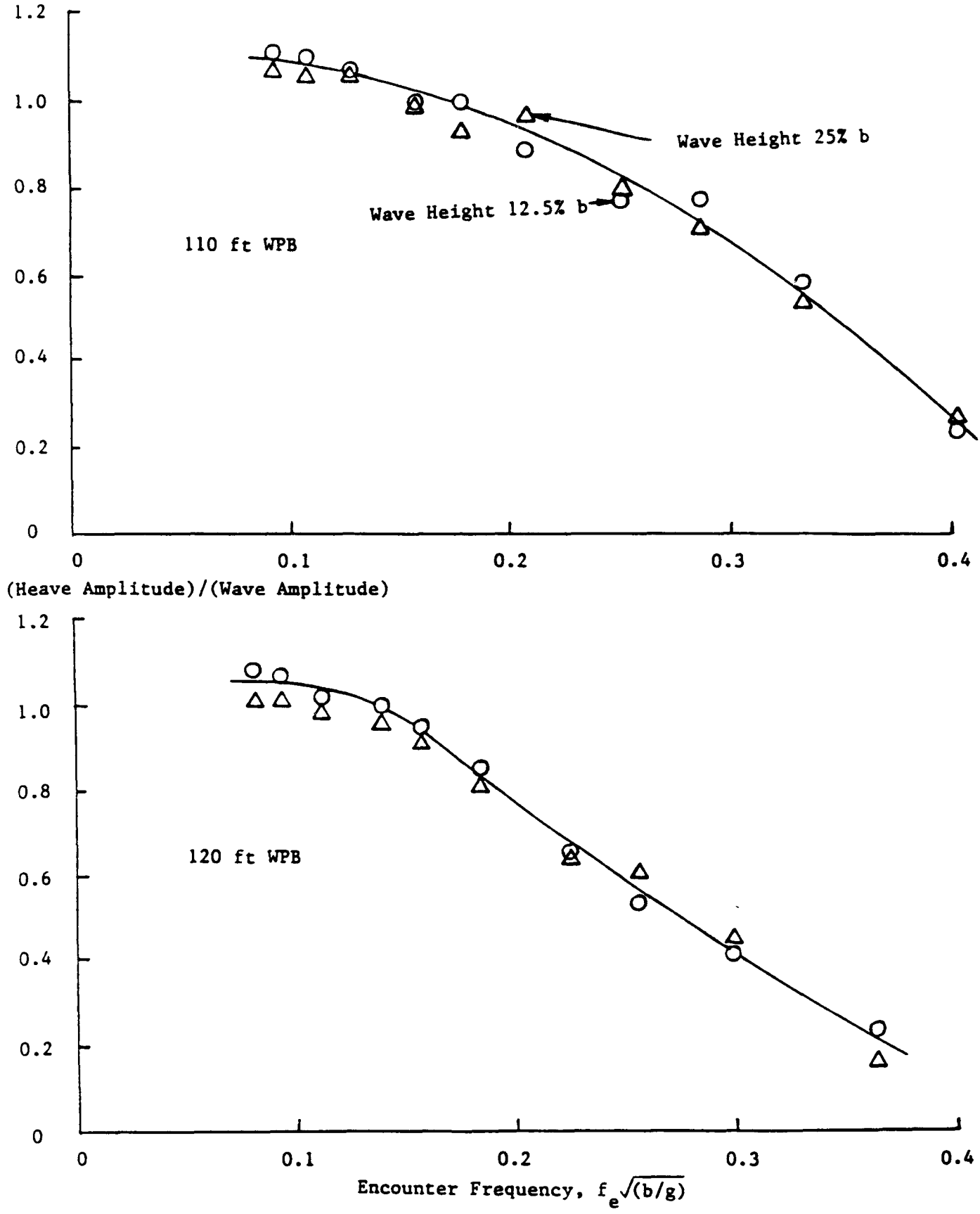


FIGURE 16 HEAVE AMPLITUDE RESPONSE IN REGULAR WAVES AT 10 knots

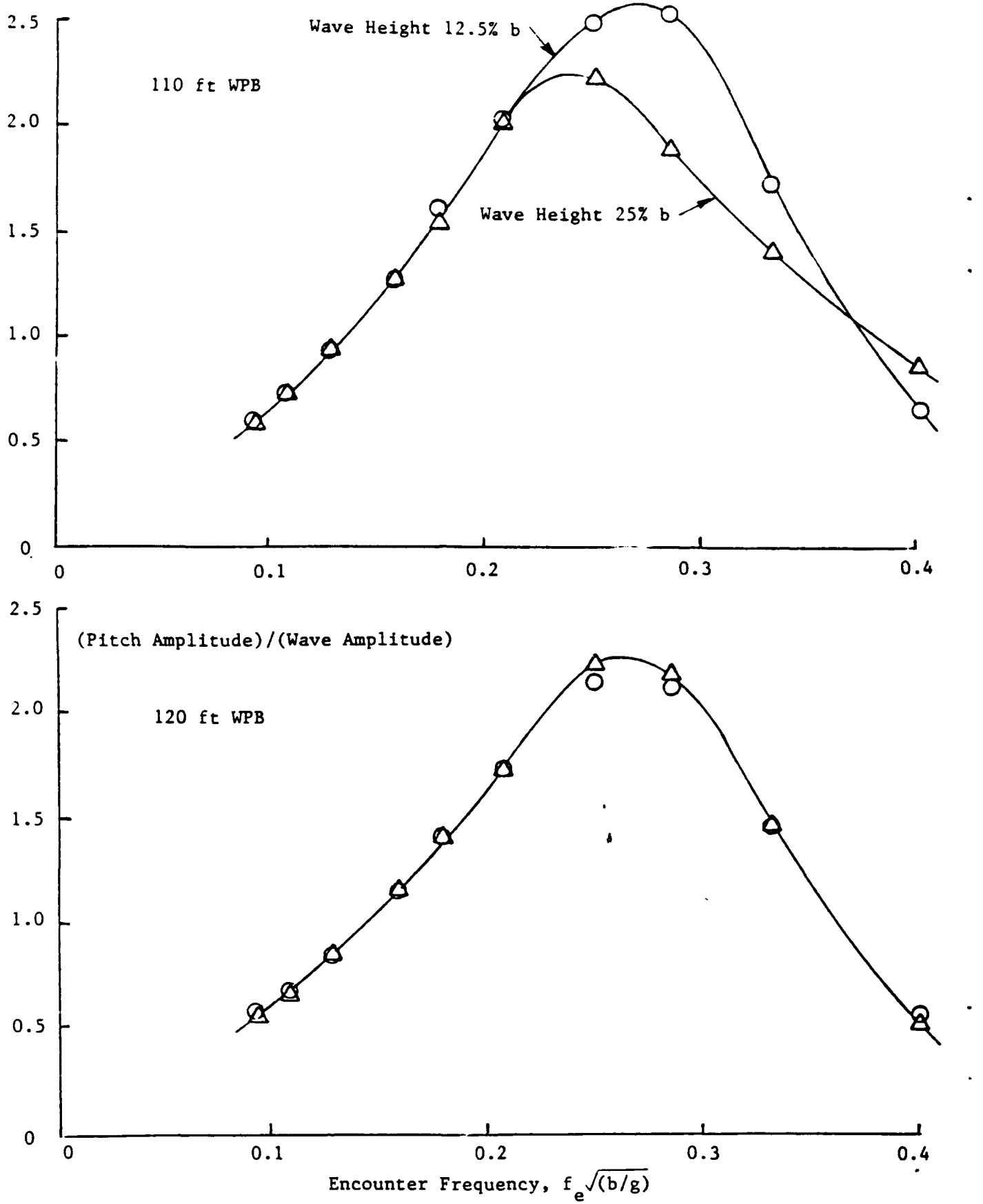


FIGURE 17 PICH AMPLITUDE RESPONSE IN REGULAR WAVES AT 10 knots

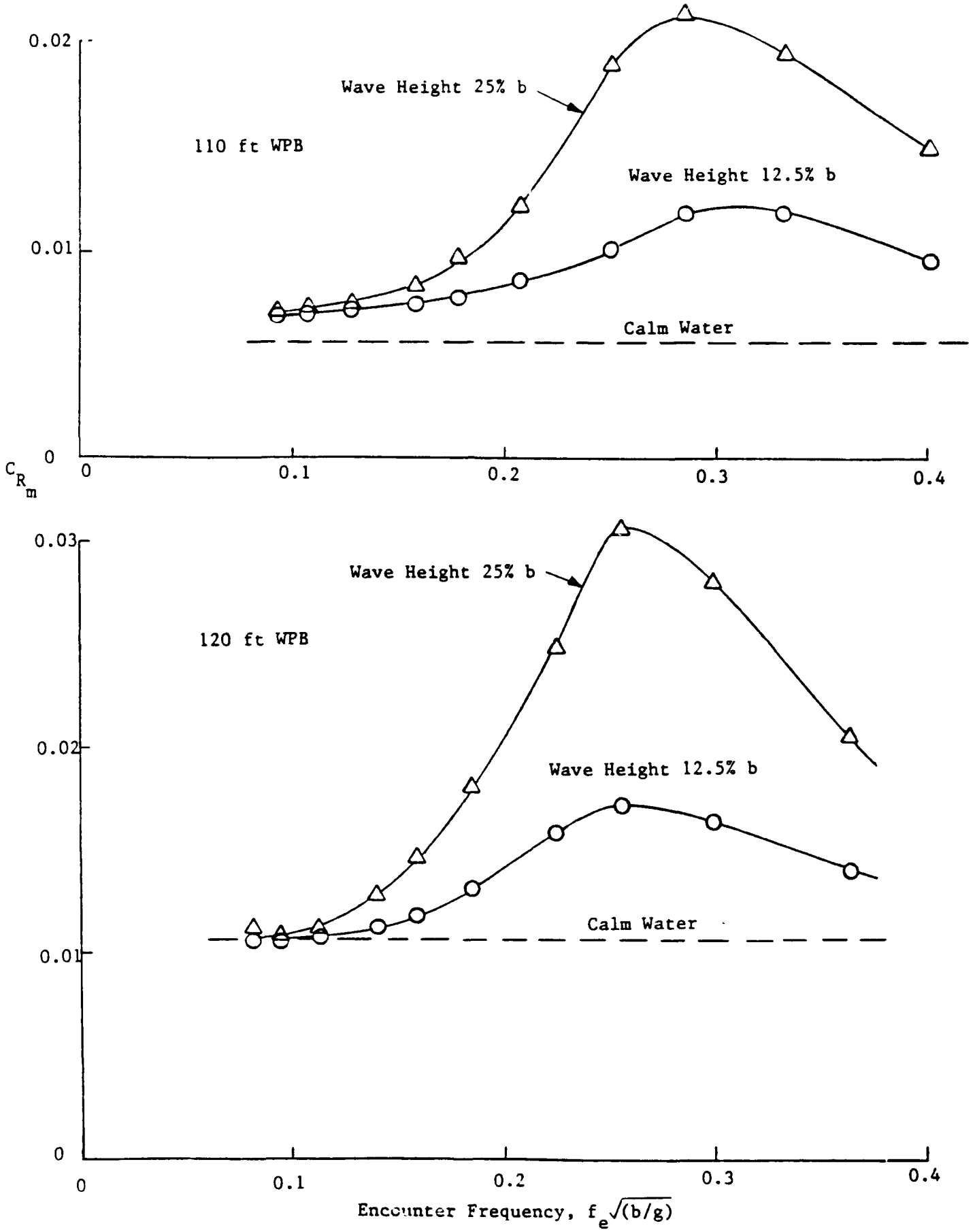


FIGURE 18 RESISTANCE IN REGULAR WAVES AT 10 knots

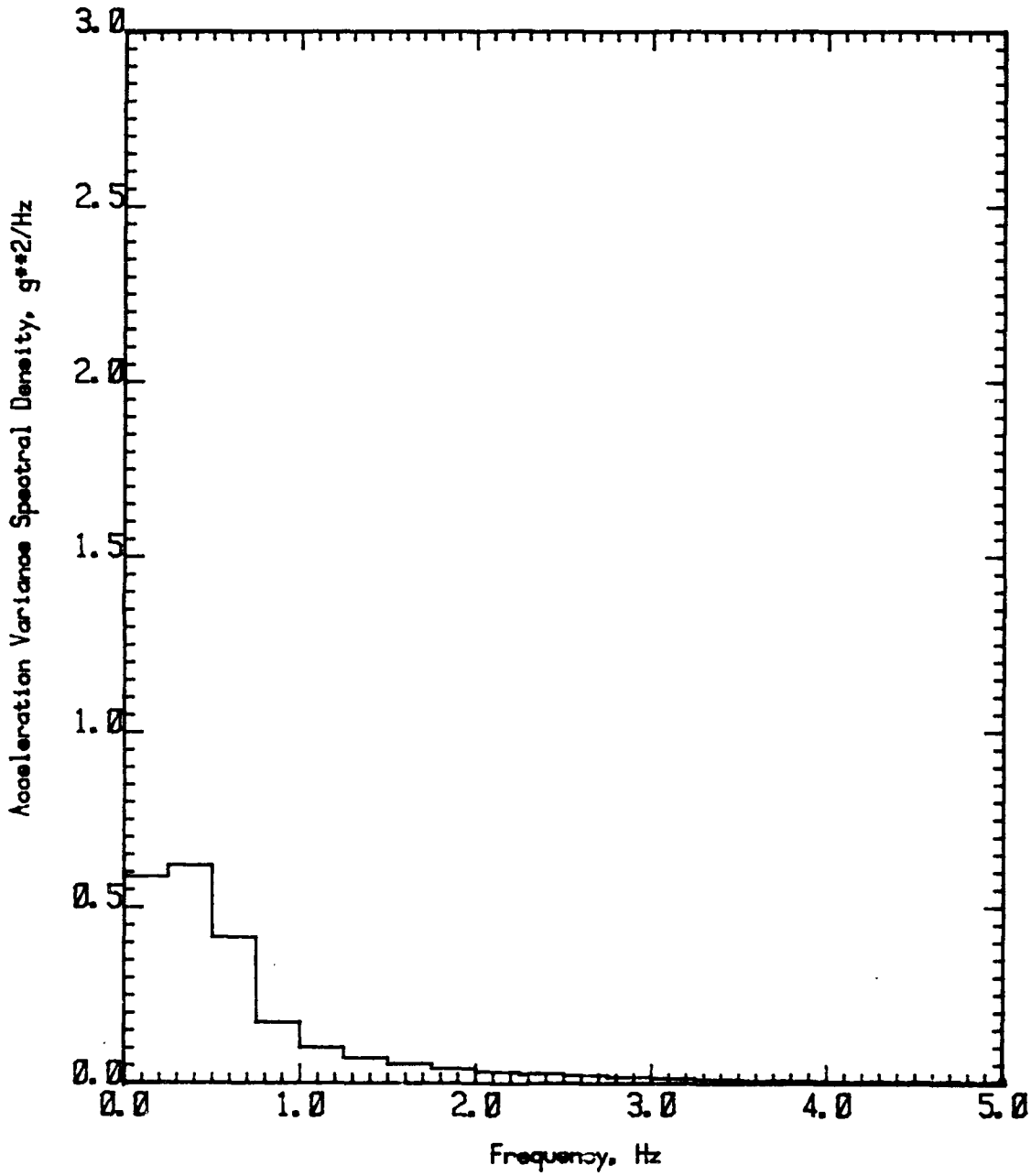


FIGURE A 1.1 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

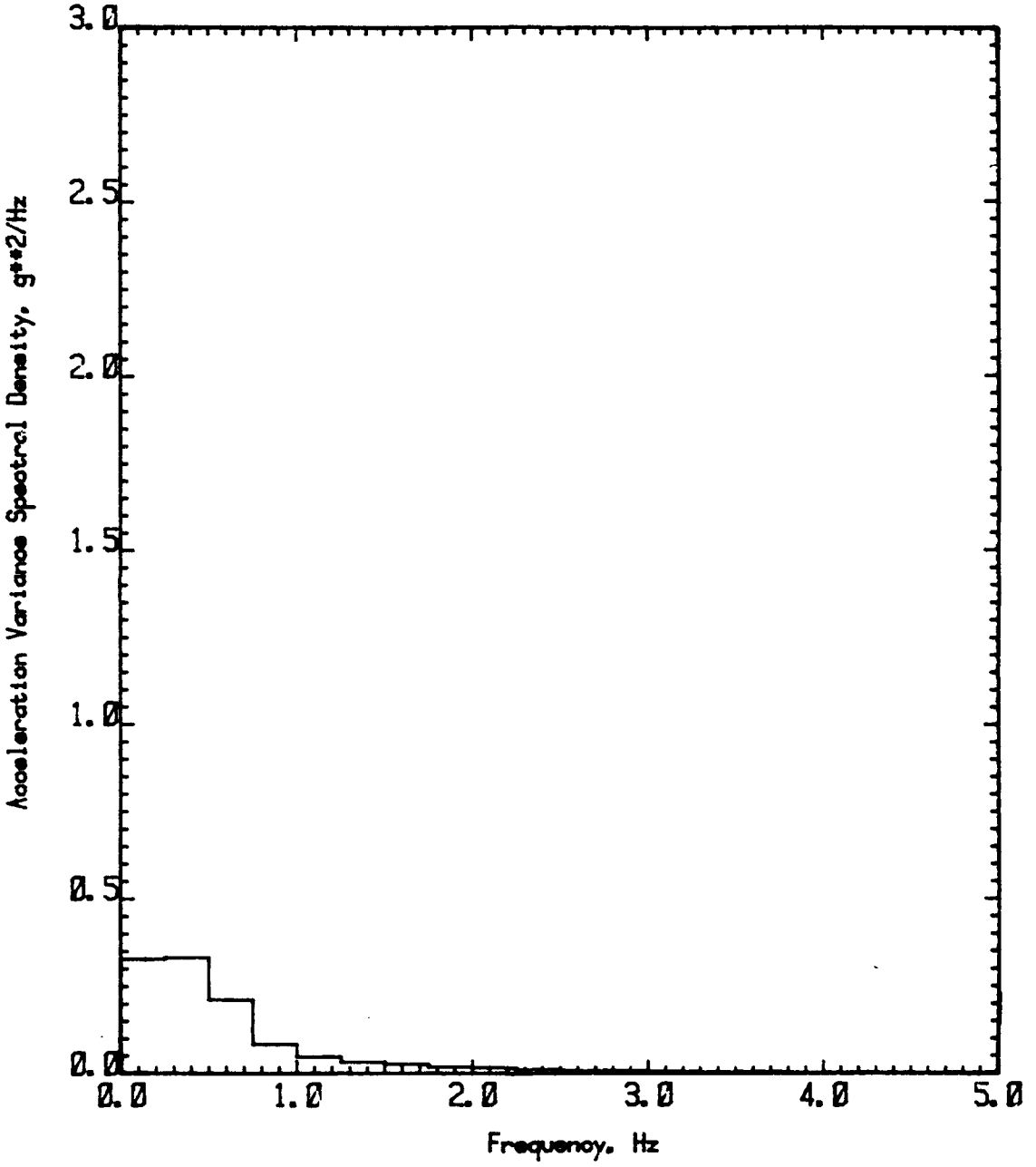


FIGURE A 1.2 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

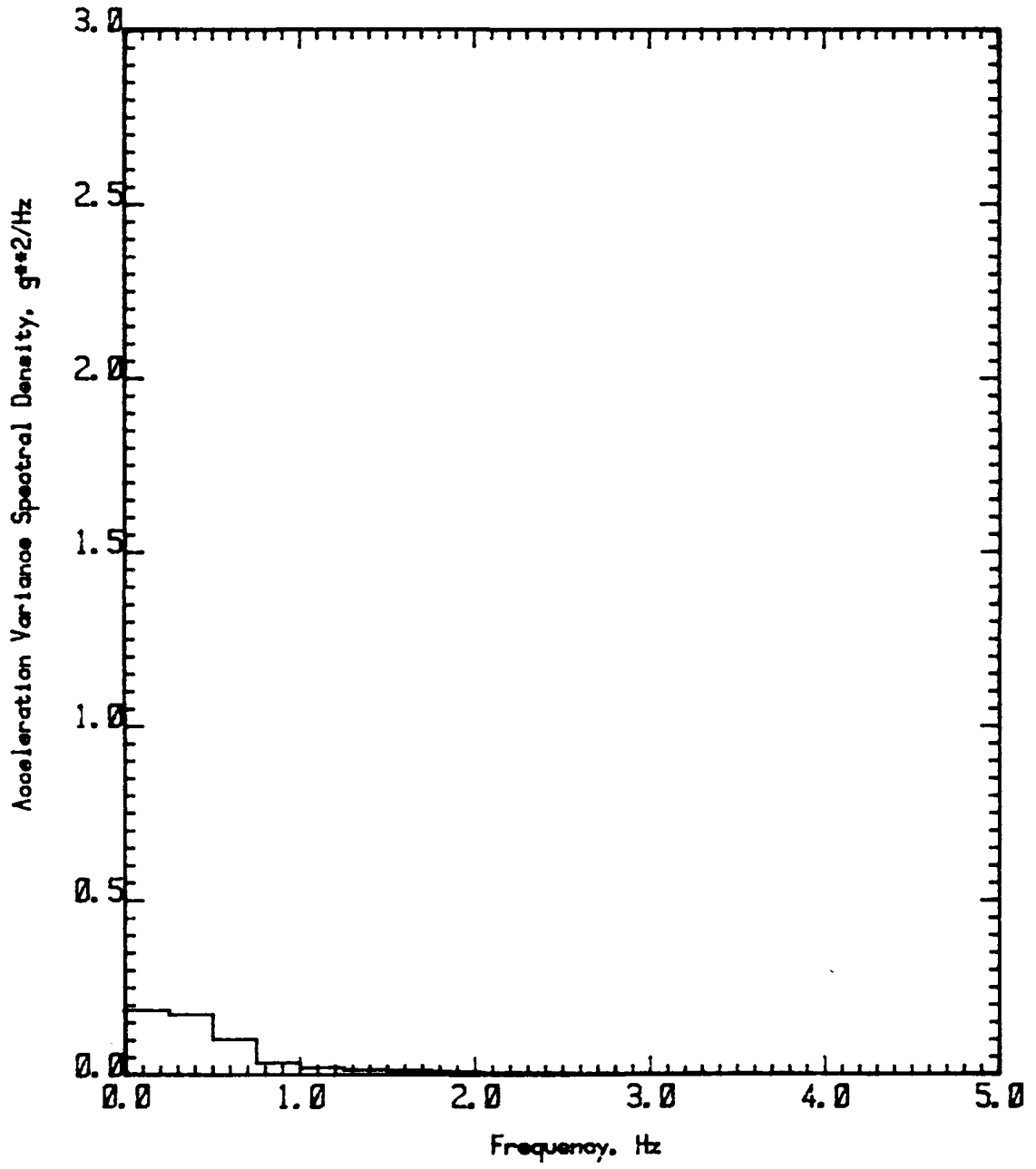


FIGURE A 1.3 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

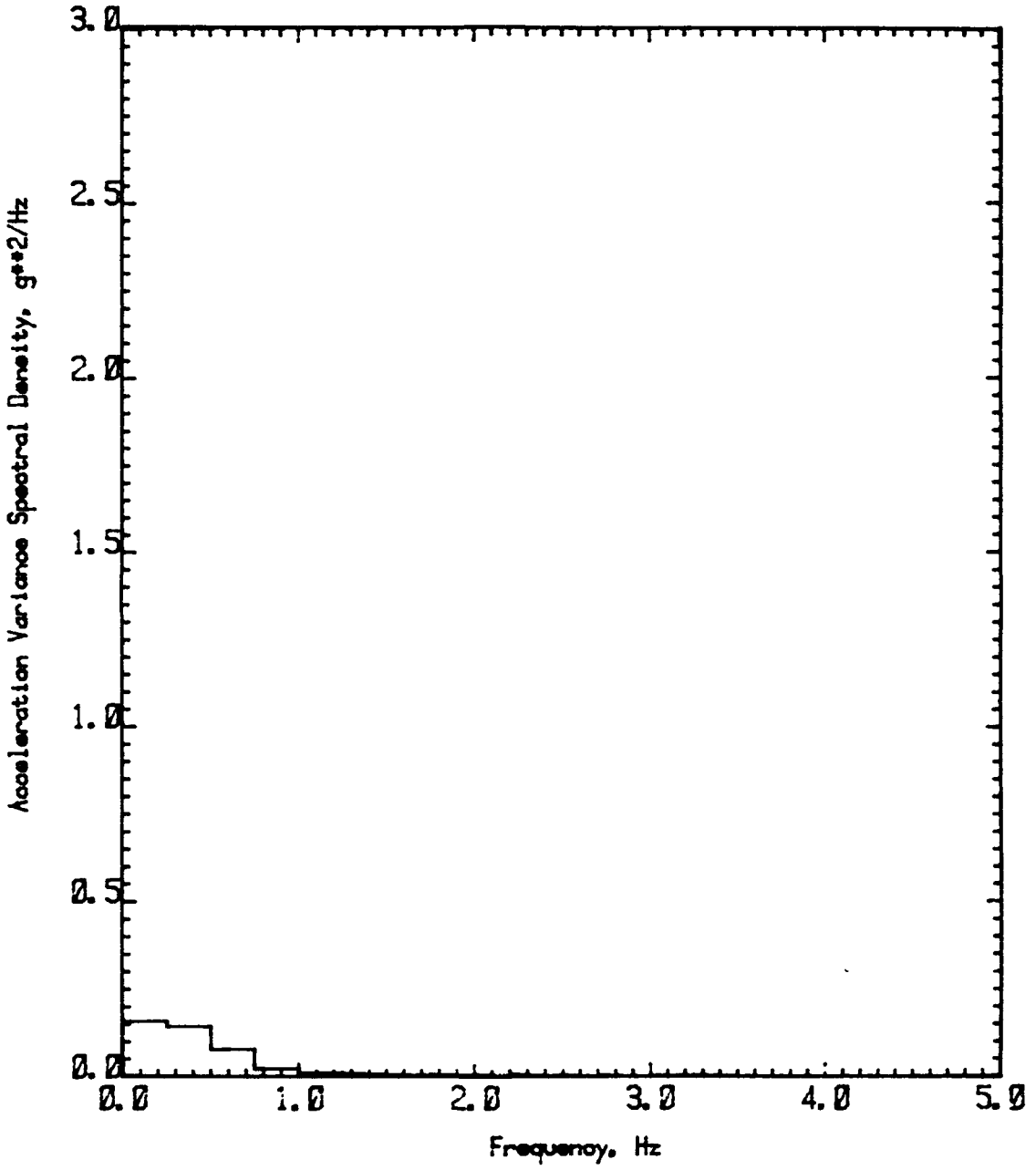


FIGURE A 1.4 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

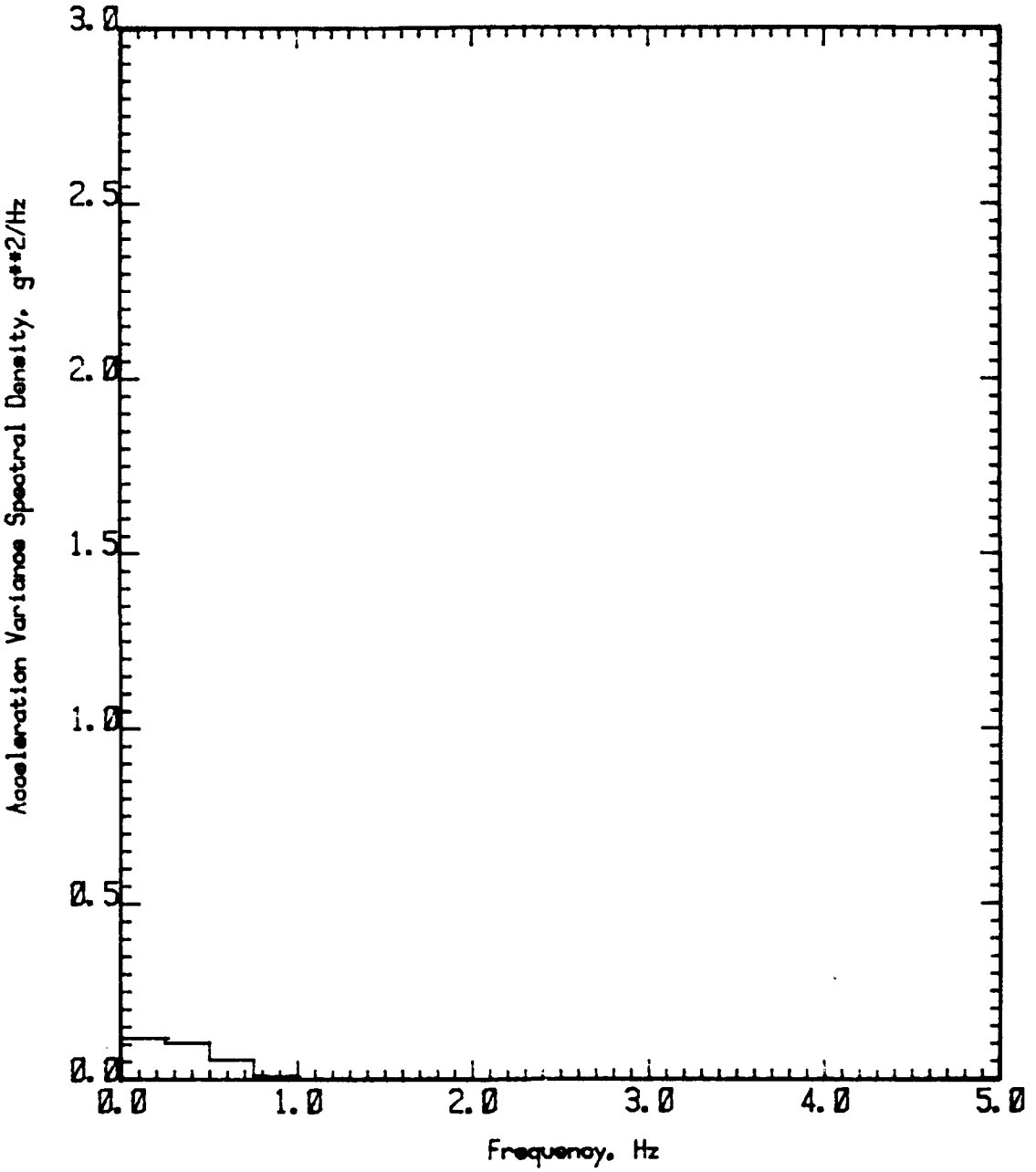


FIGURE A 1.5 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

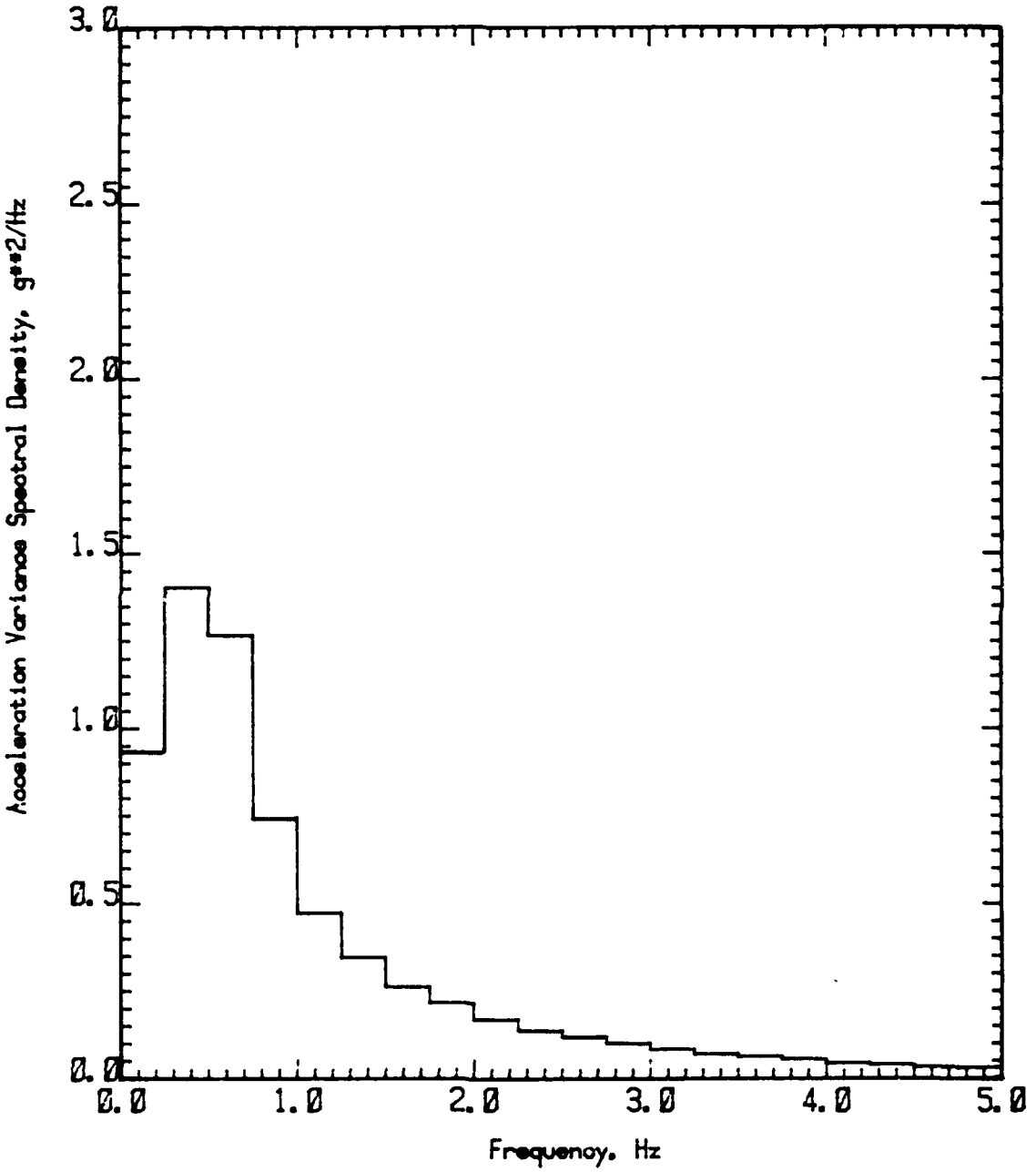


FIGURE A 2.1 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

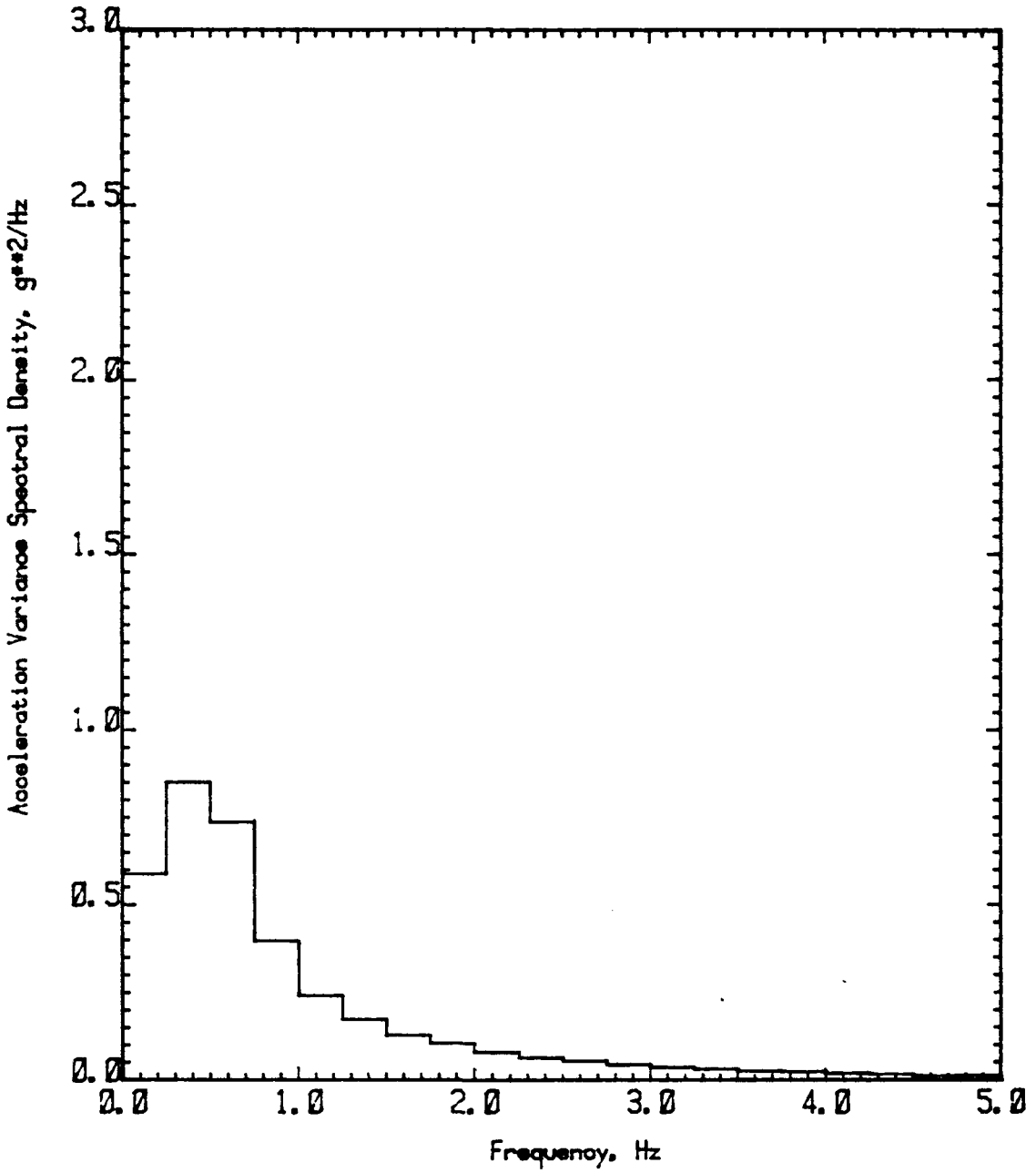


FIGURE A 2.2 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

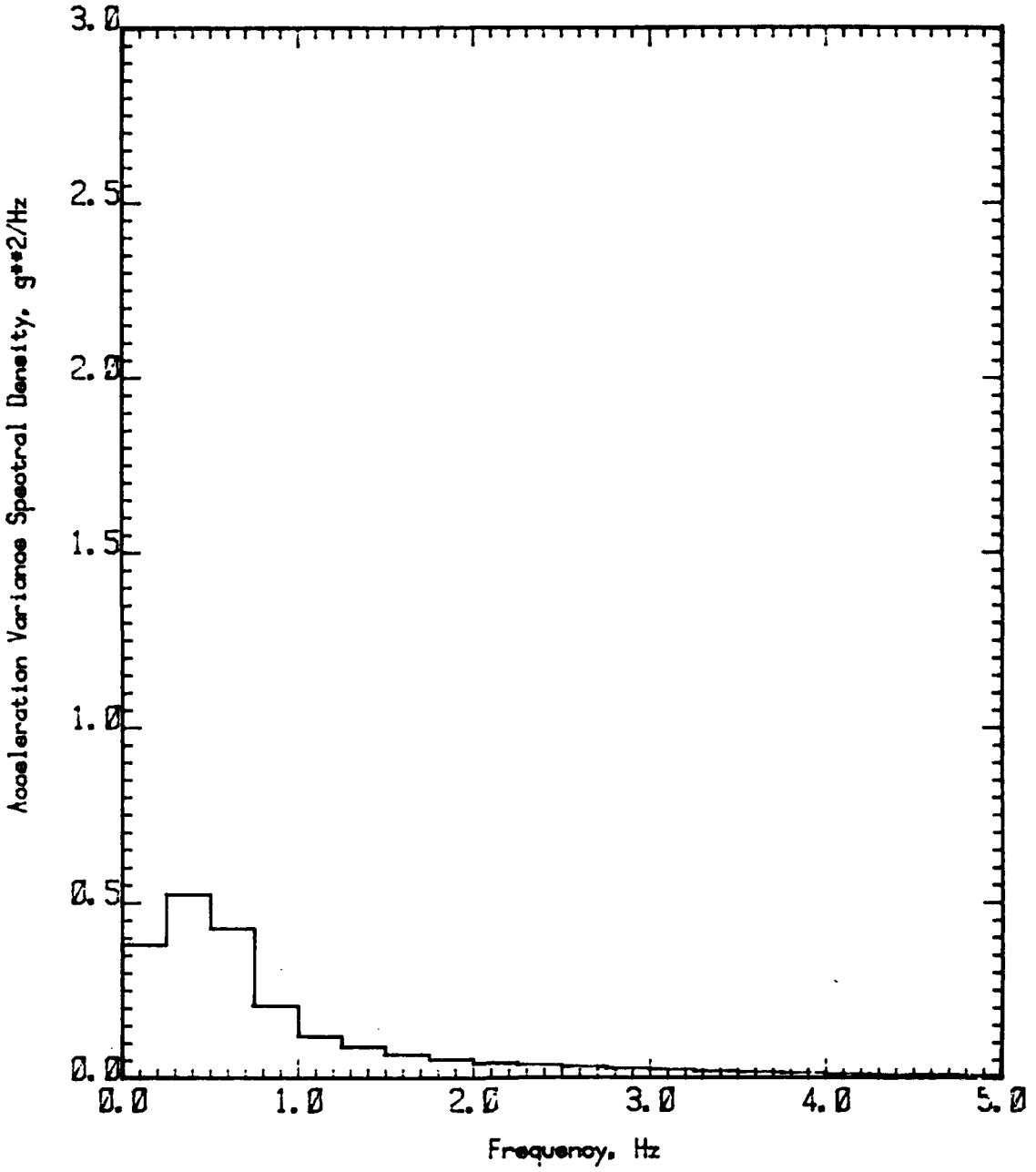


FIGURE A 2.3 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

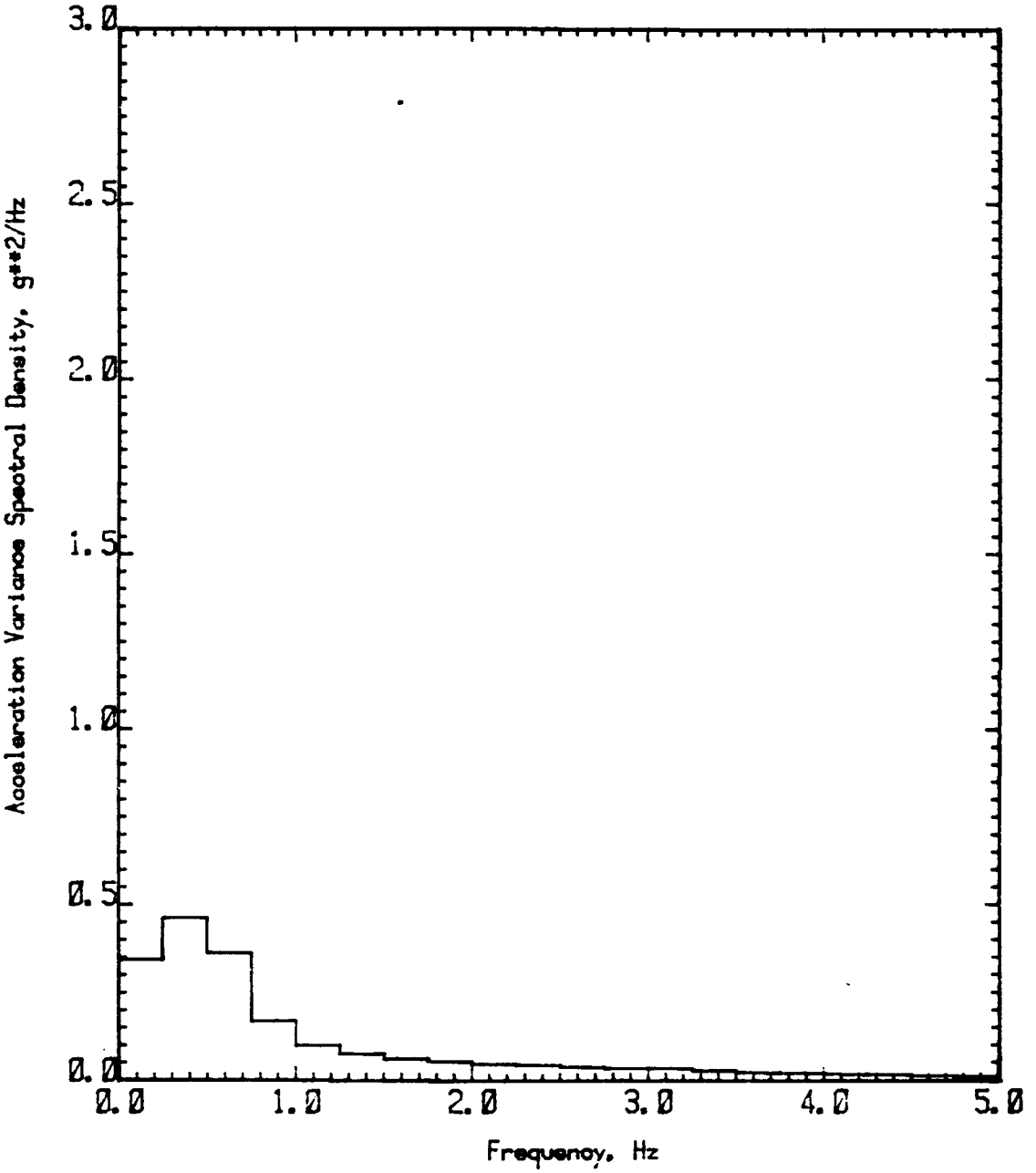


FIGURE A 2.4 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

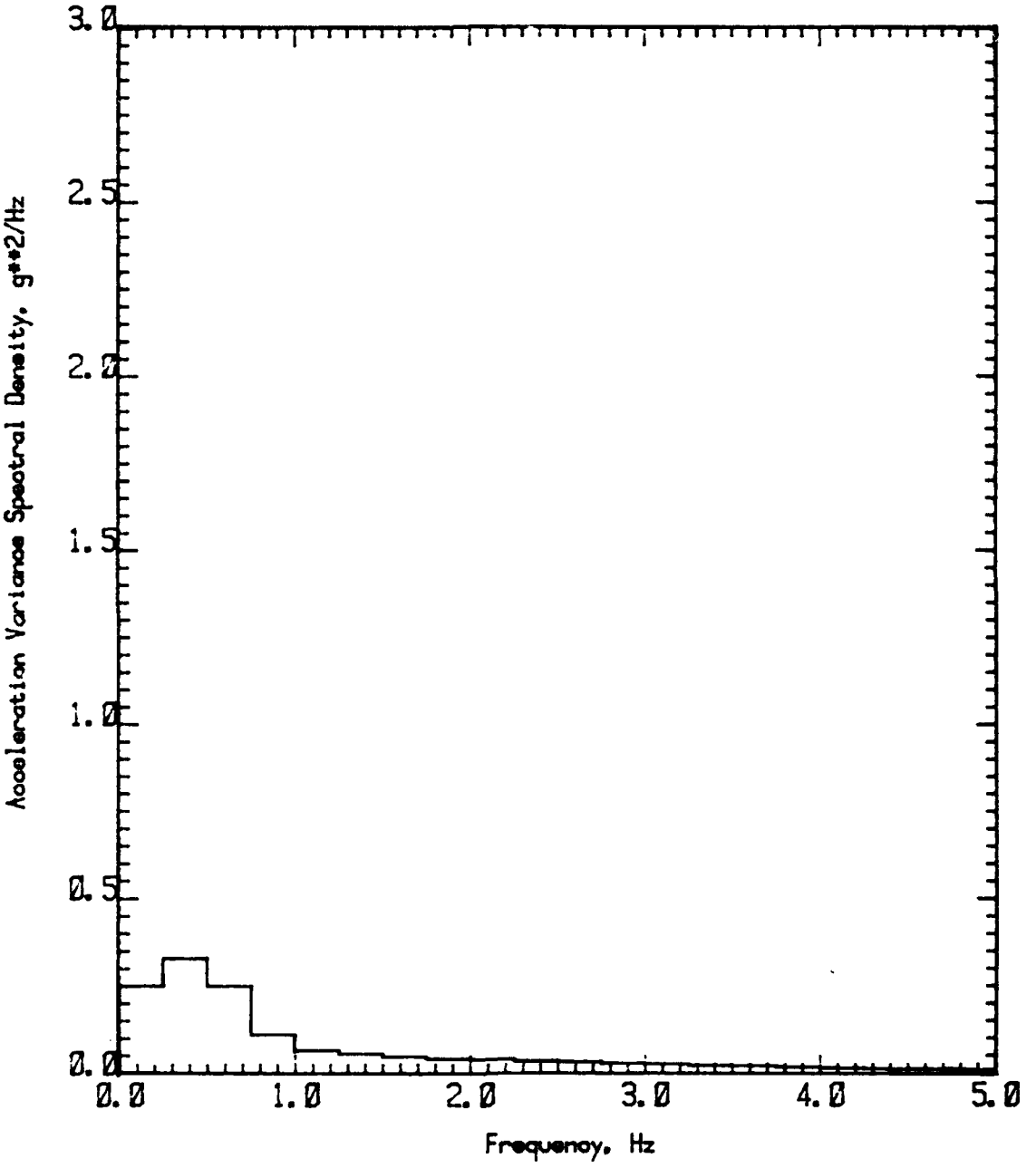


FIGURE A 2.5 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

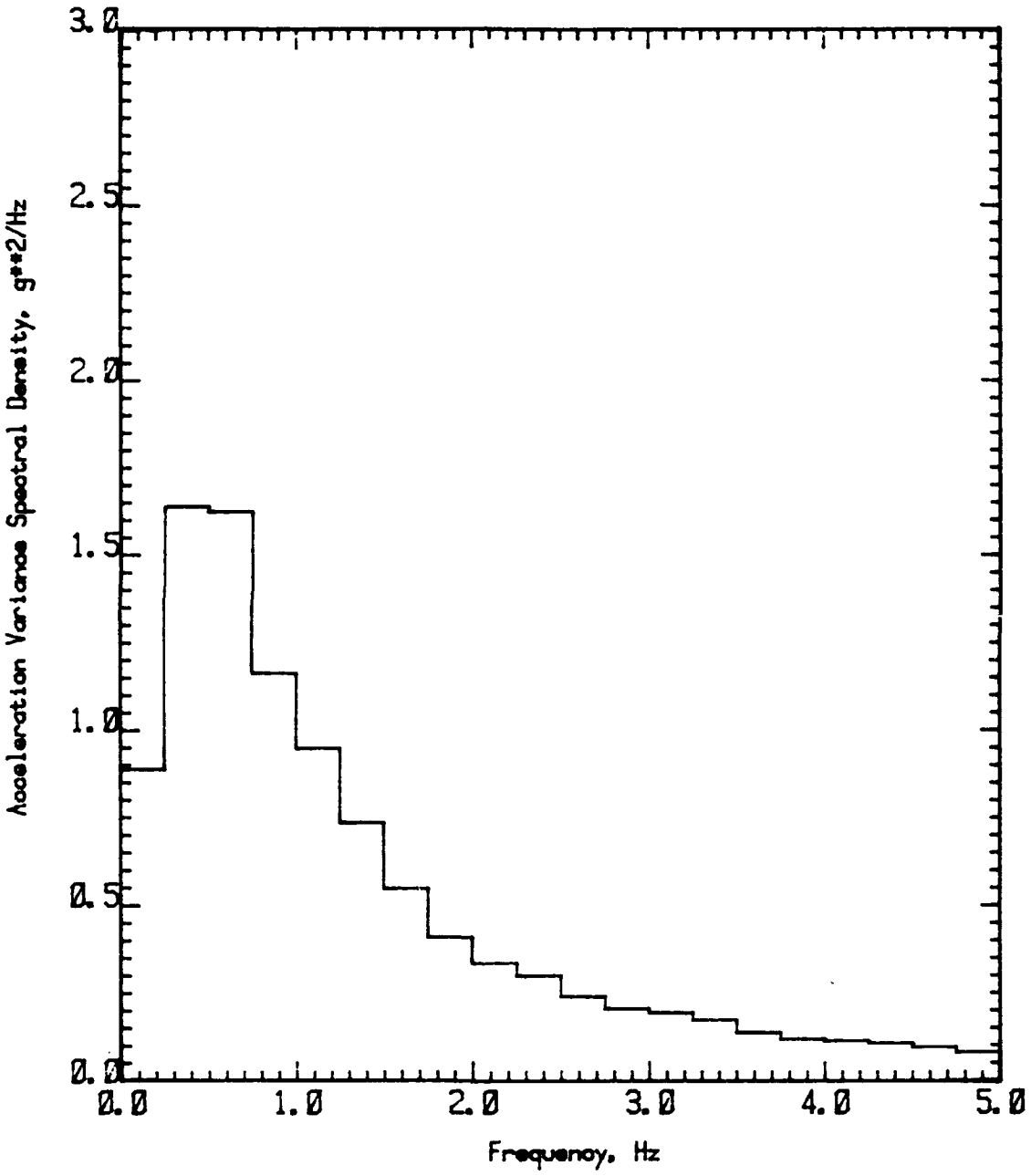


FIGURE A 3.1 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

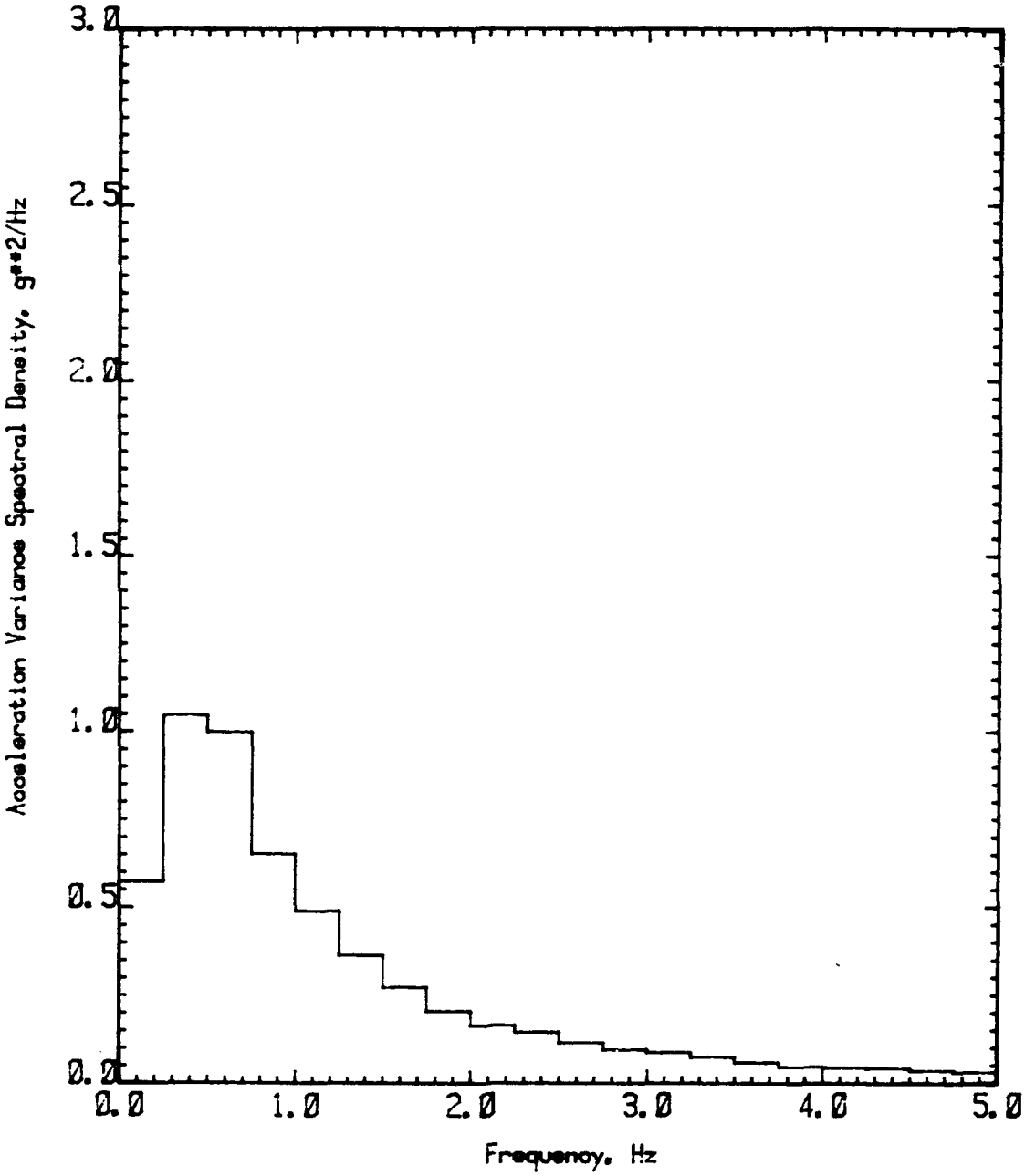


FIGURE A 3.2 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 1.00
Significant Wave Height 40.0% Beam

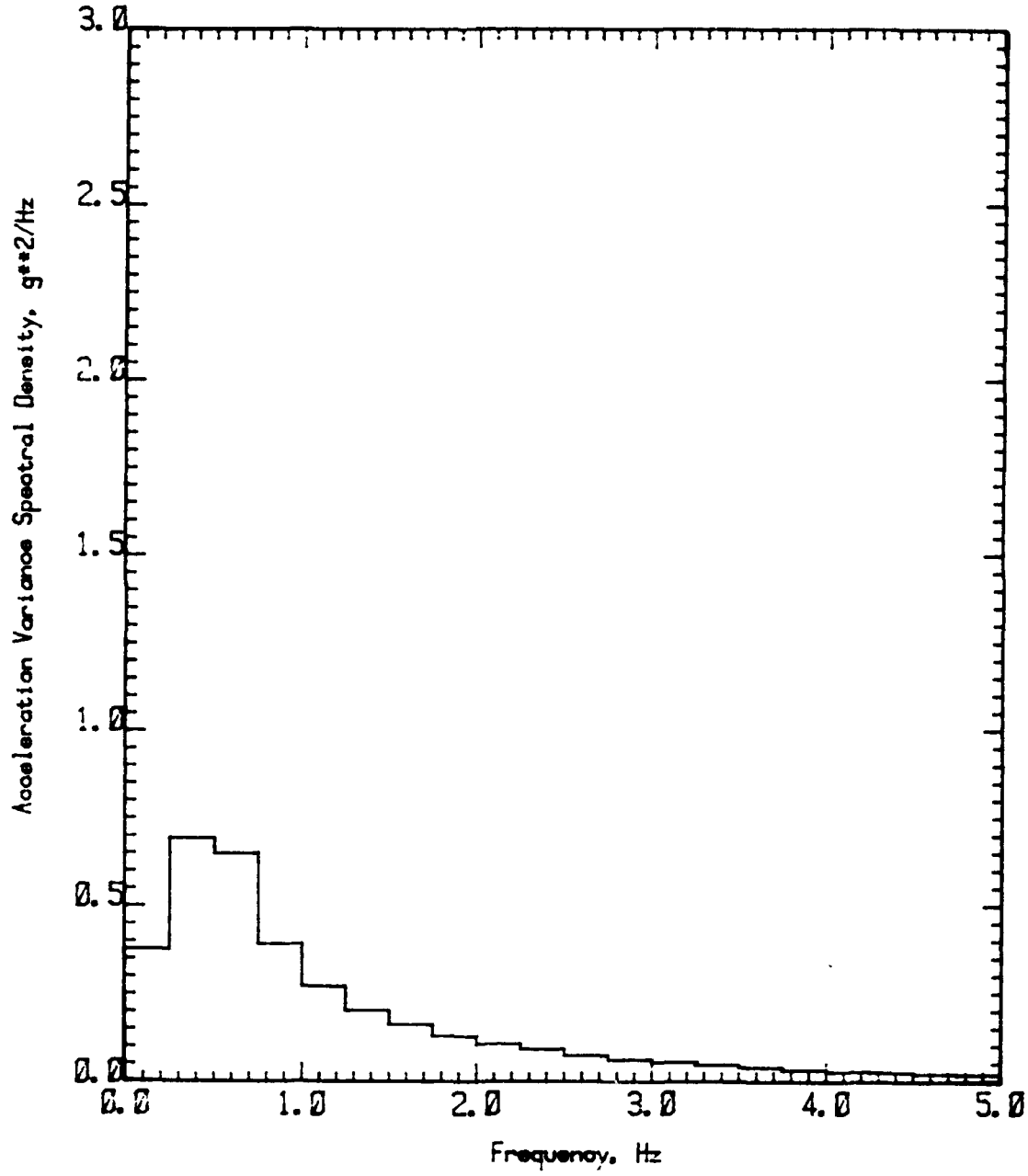


FIGURE A 3.3 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

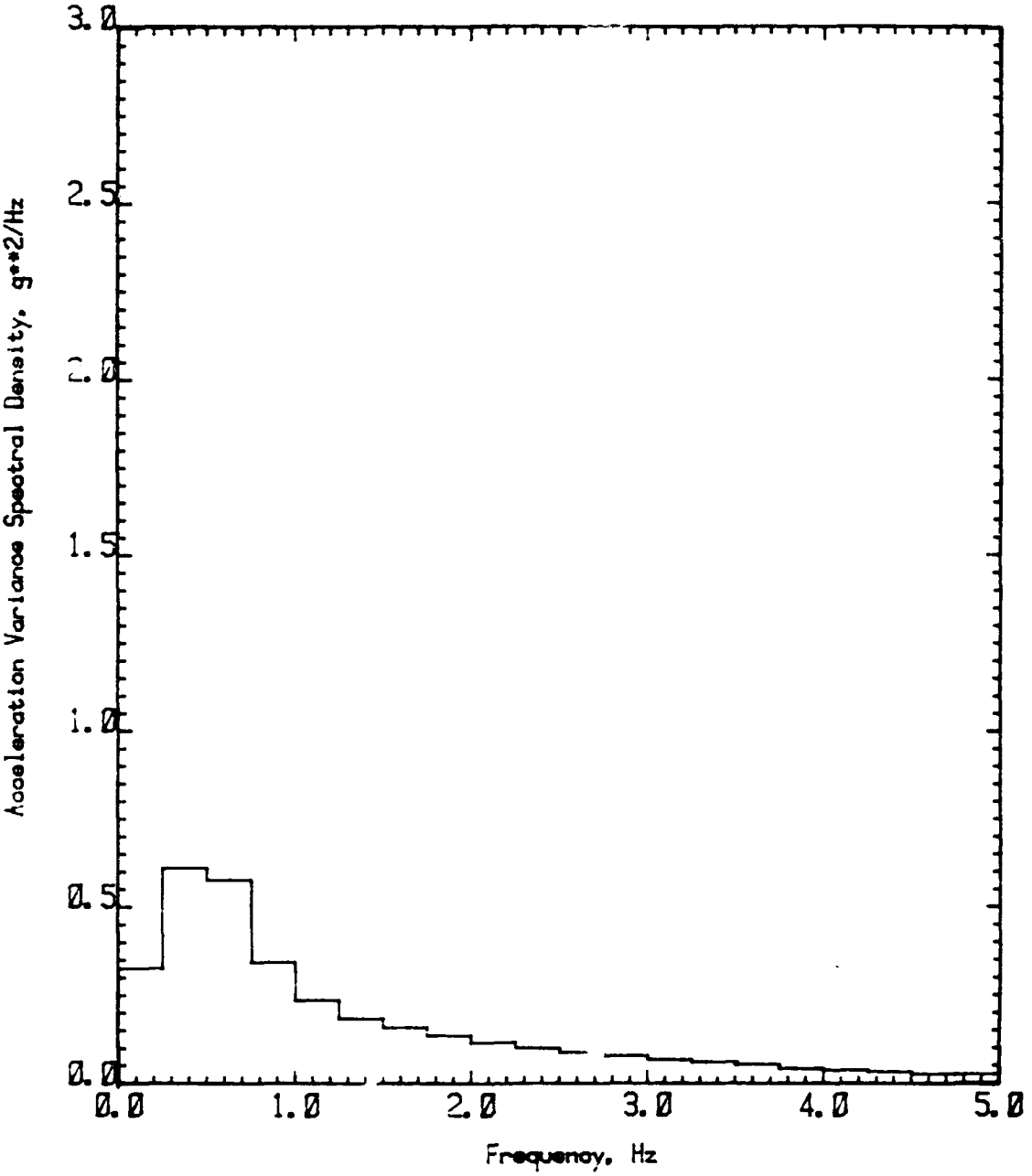


FIGURE A 3.4 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

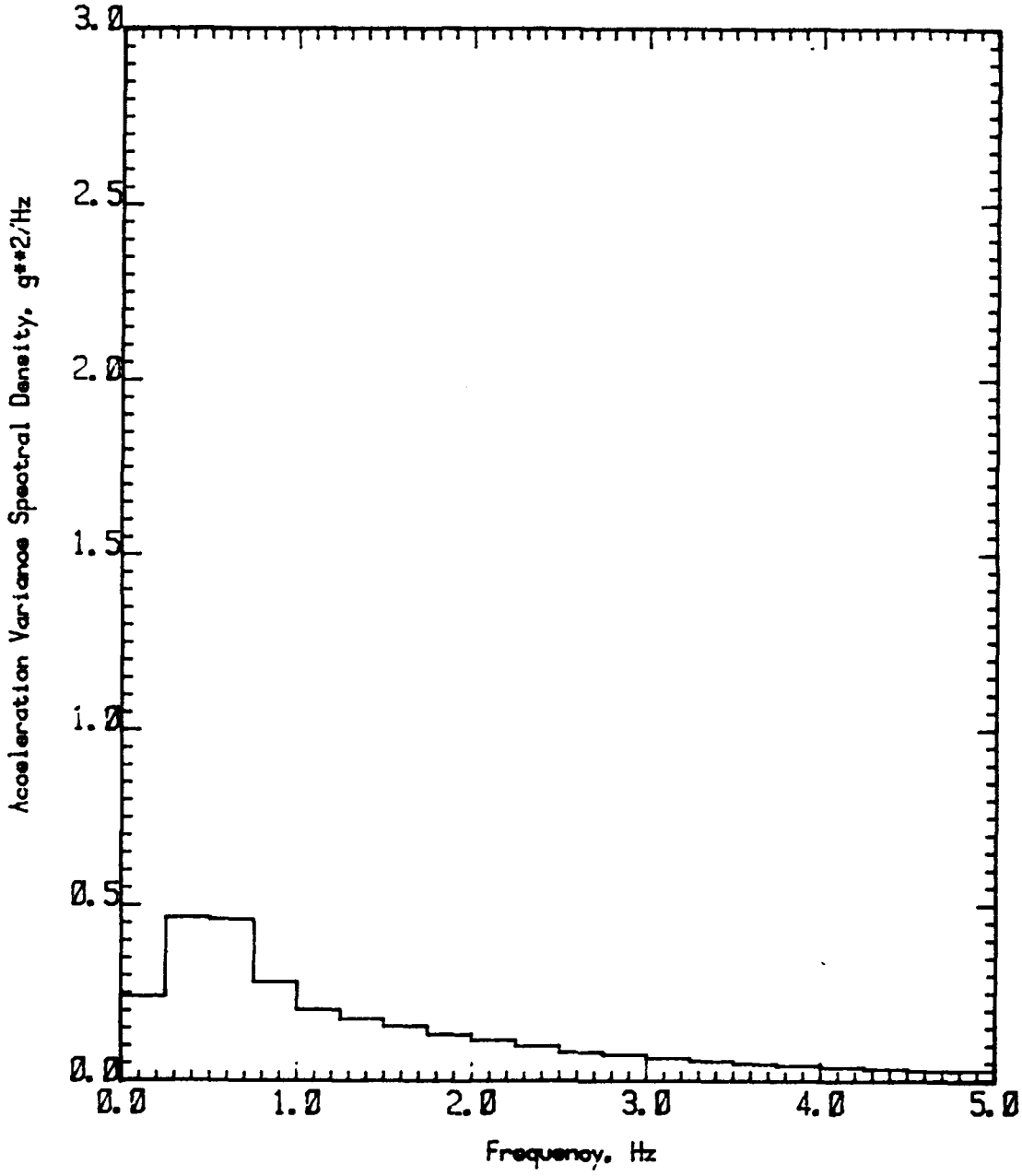


FIGURE A 3.5 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

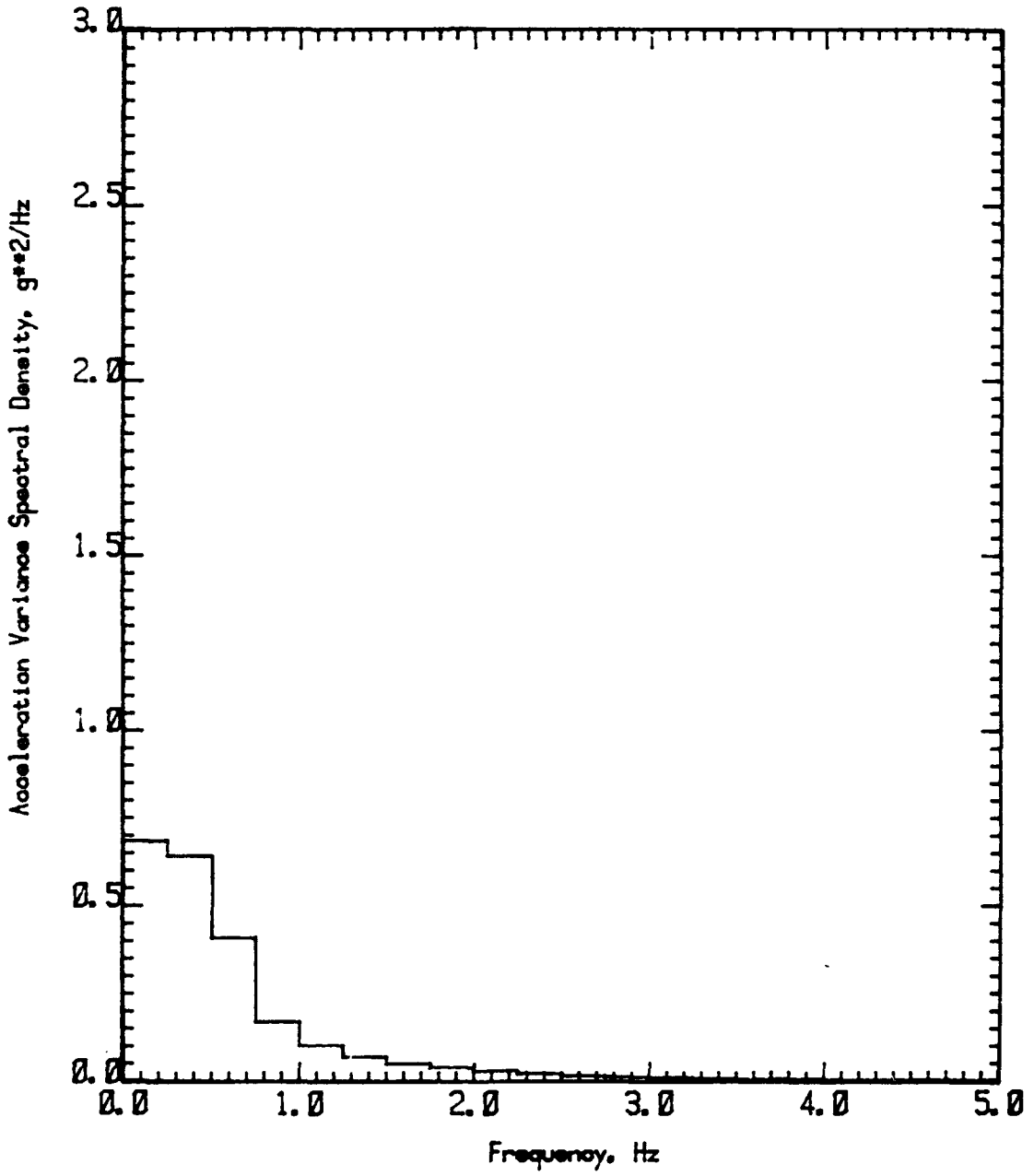


FIGURE A 4.1 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

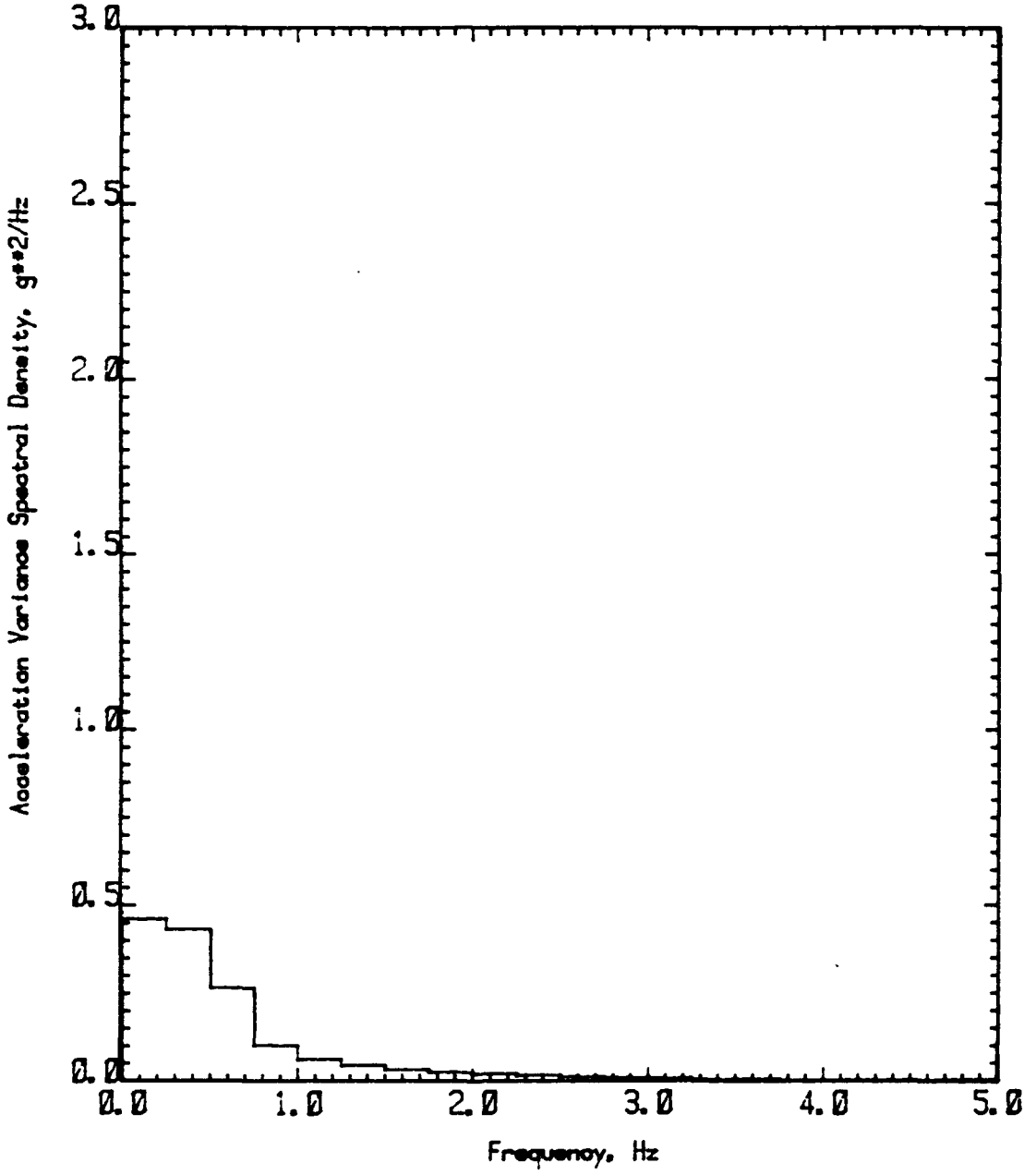


FIGURE A 4.2 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

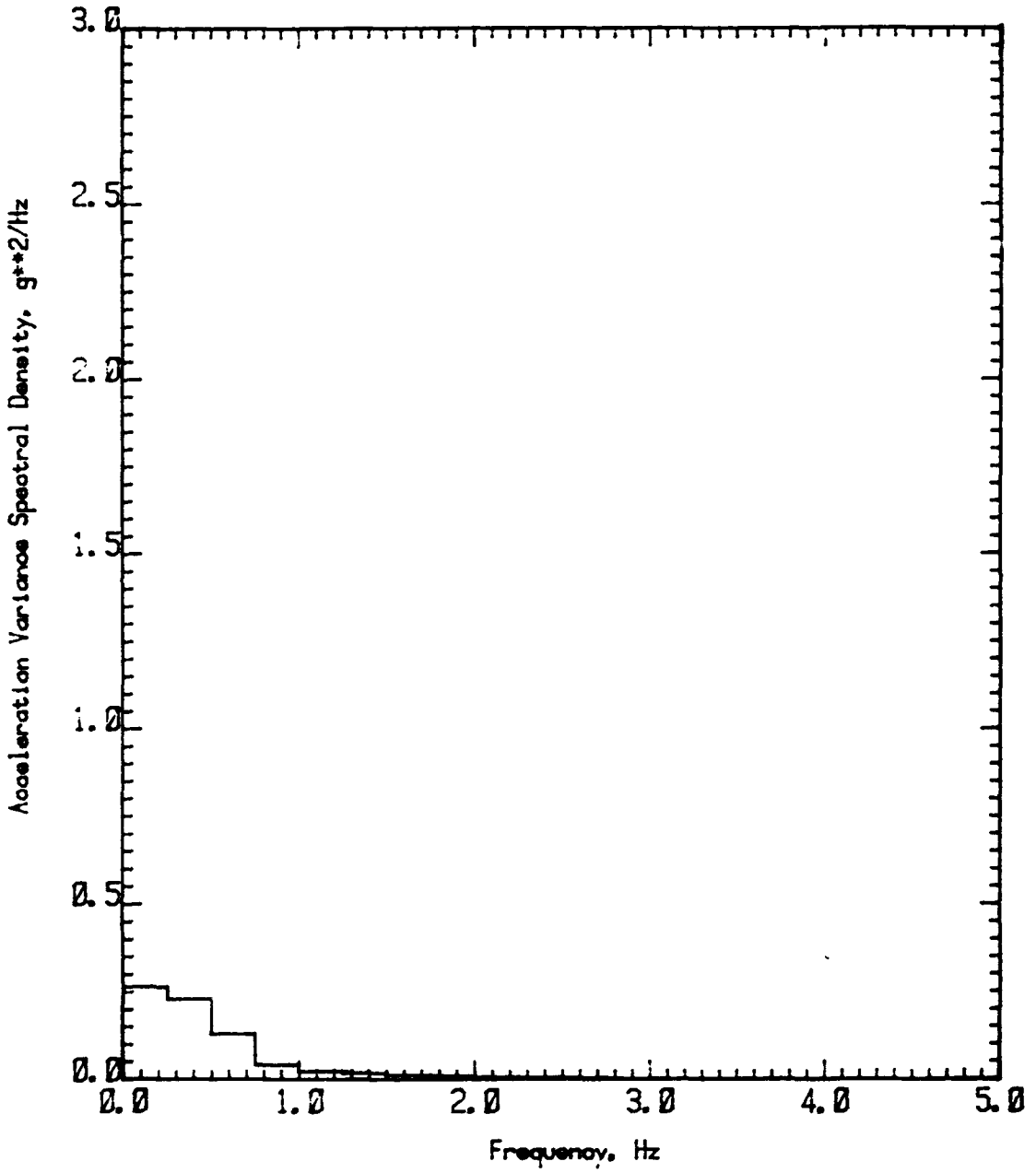


FIGURE A 4.3 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

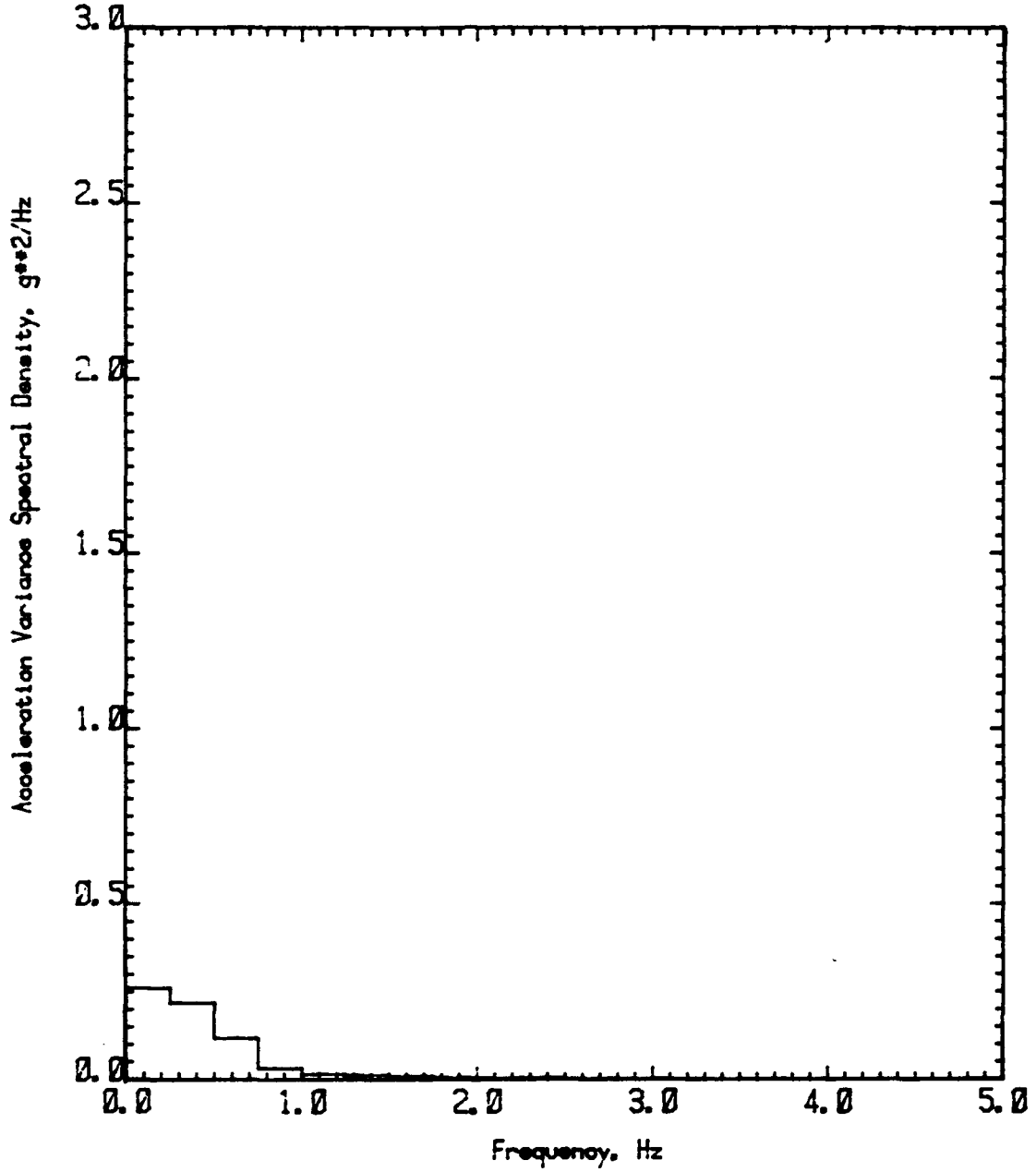


FIGURE A 4.4 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

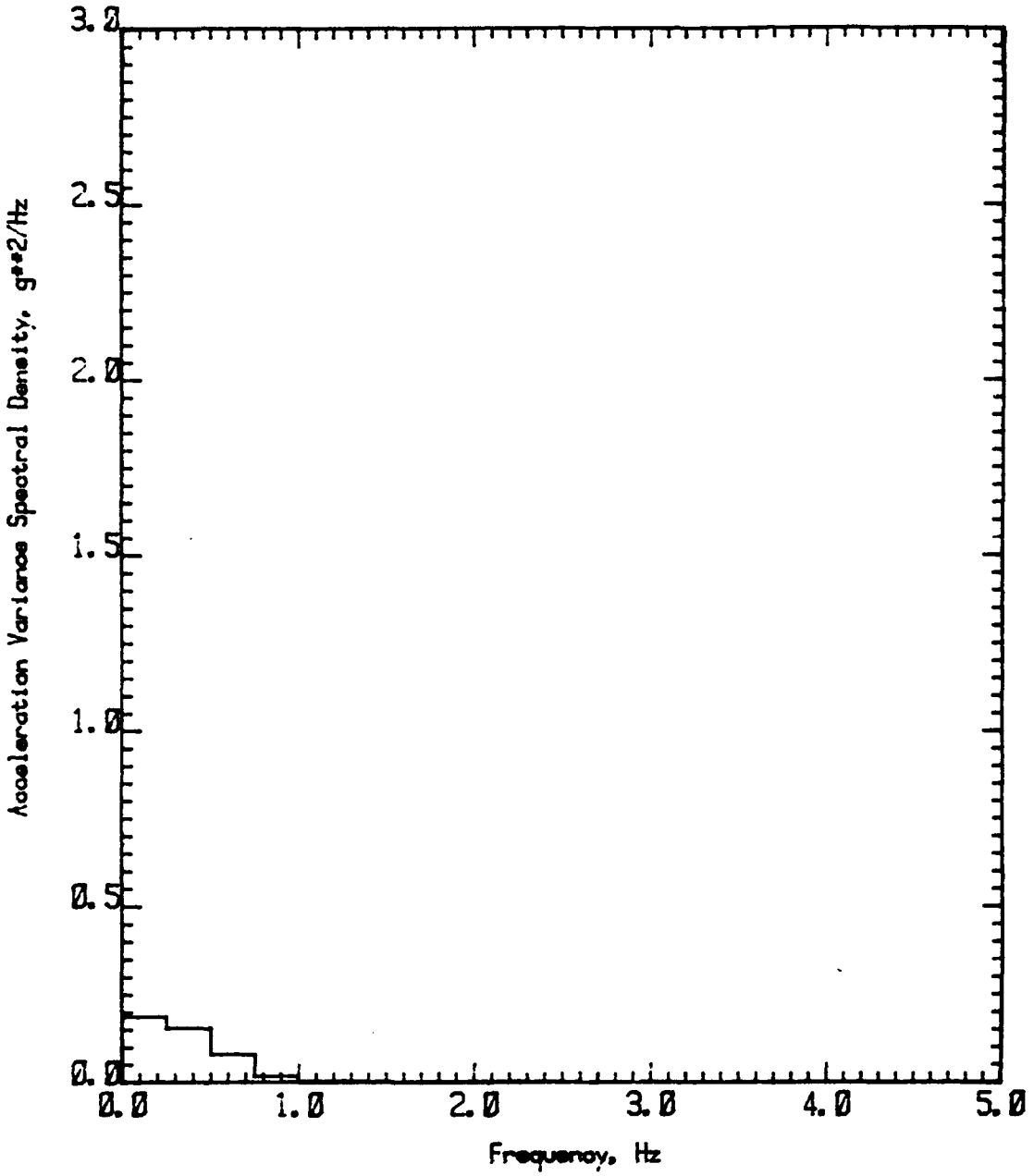


FIGURE A 4.5 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

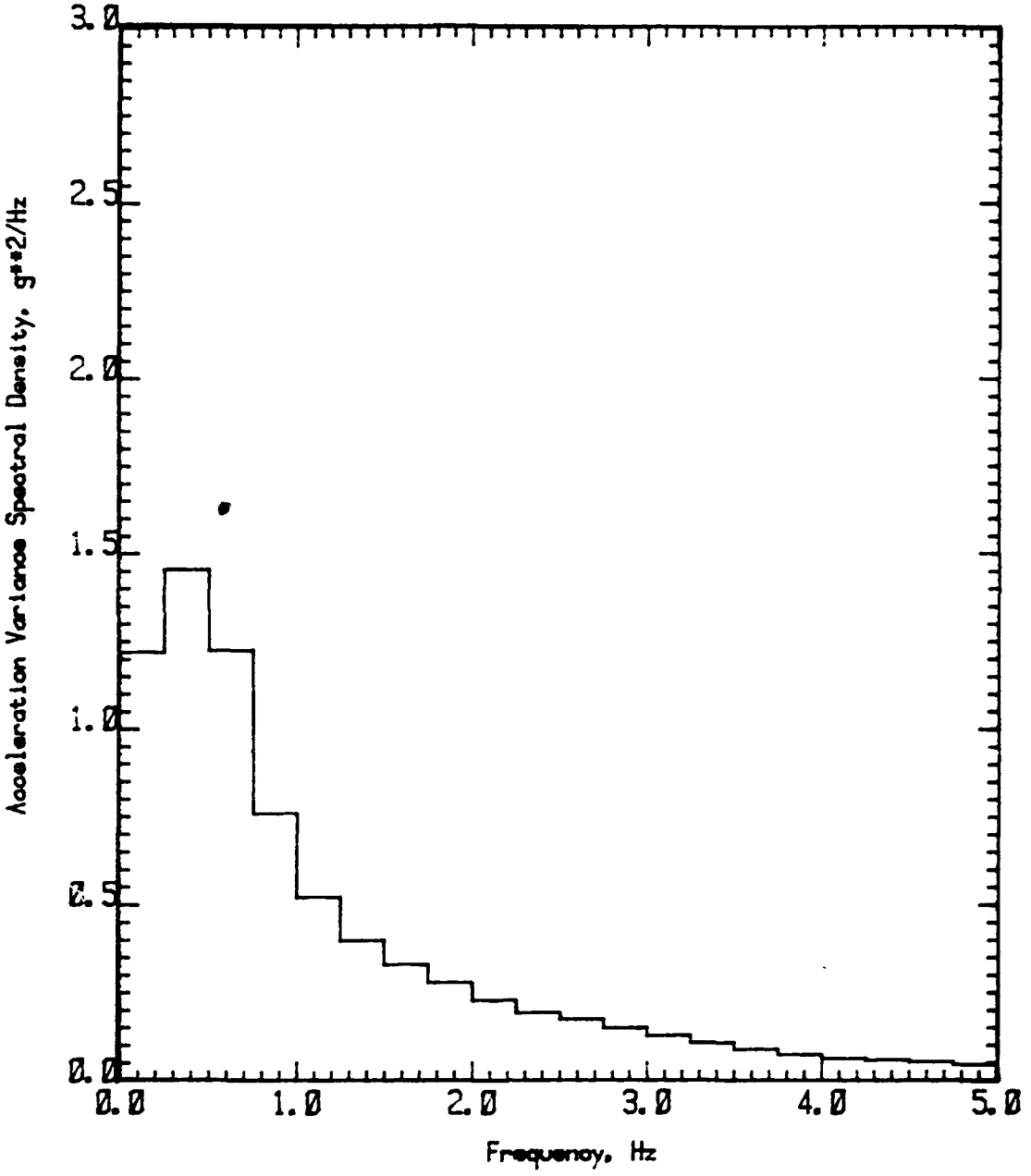


FIGURE A 5.1 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

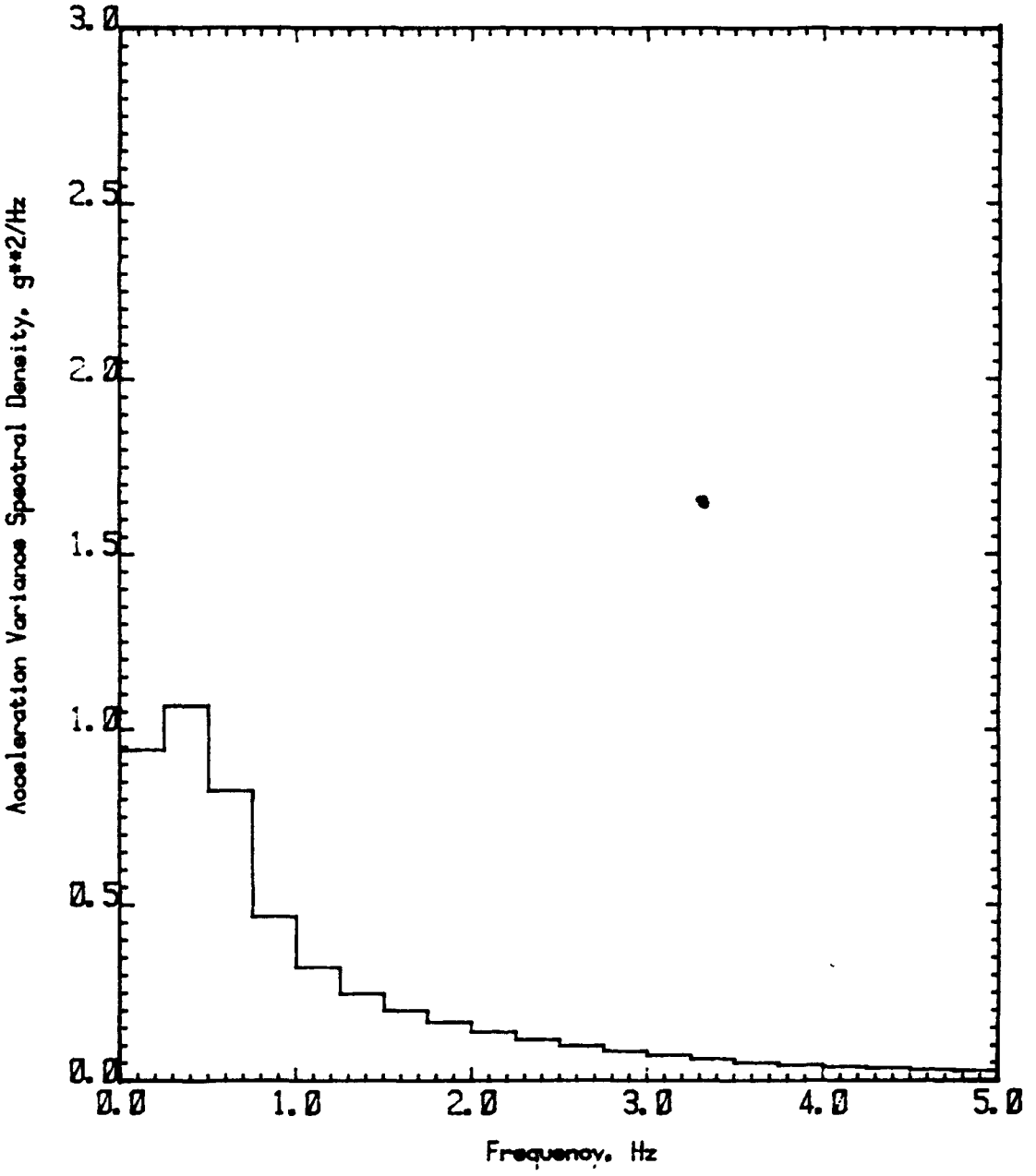


FIGURE A 5.2 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

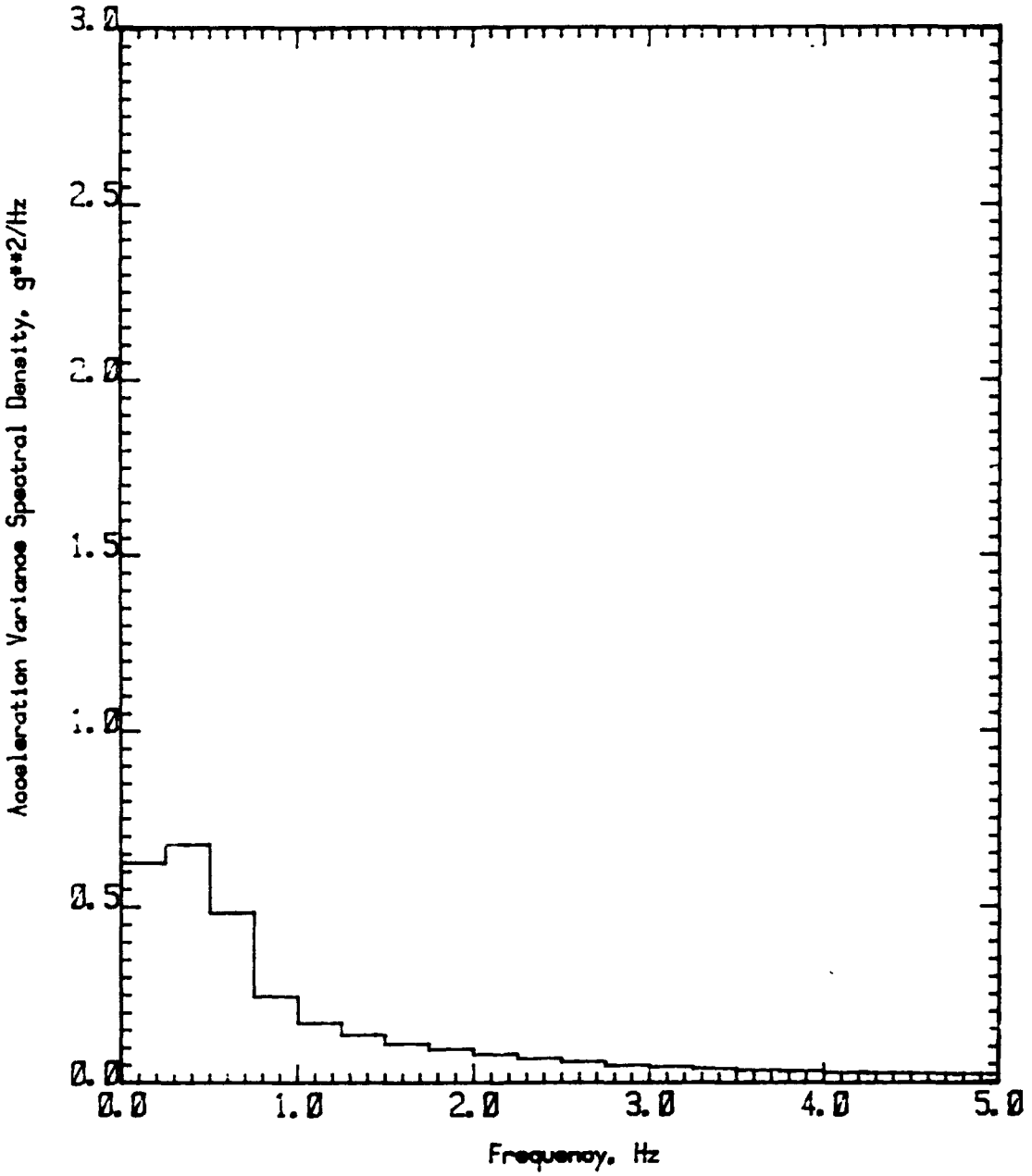


FIGURE A 5.3 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

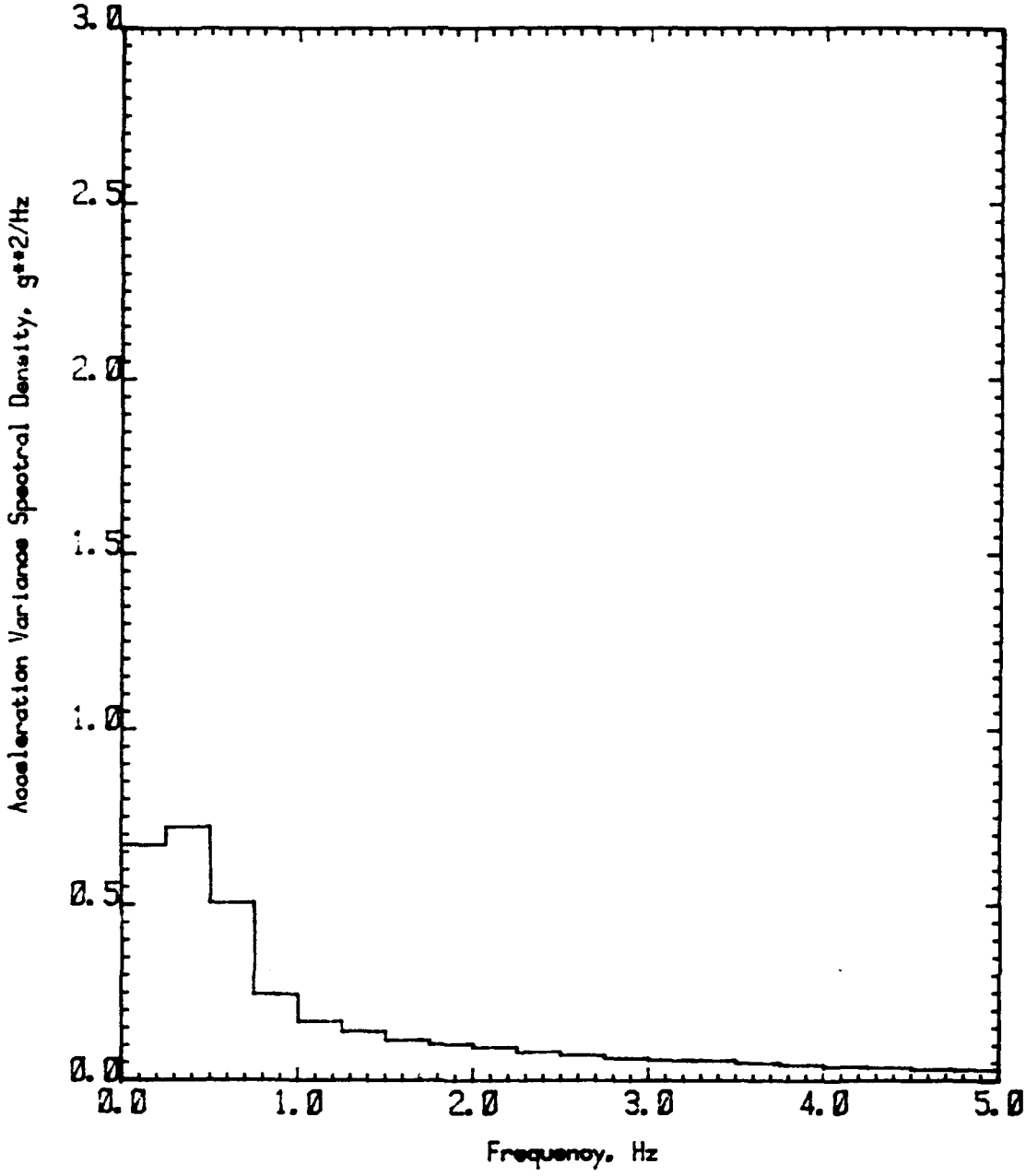


FIGURE A 5.4 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

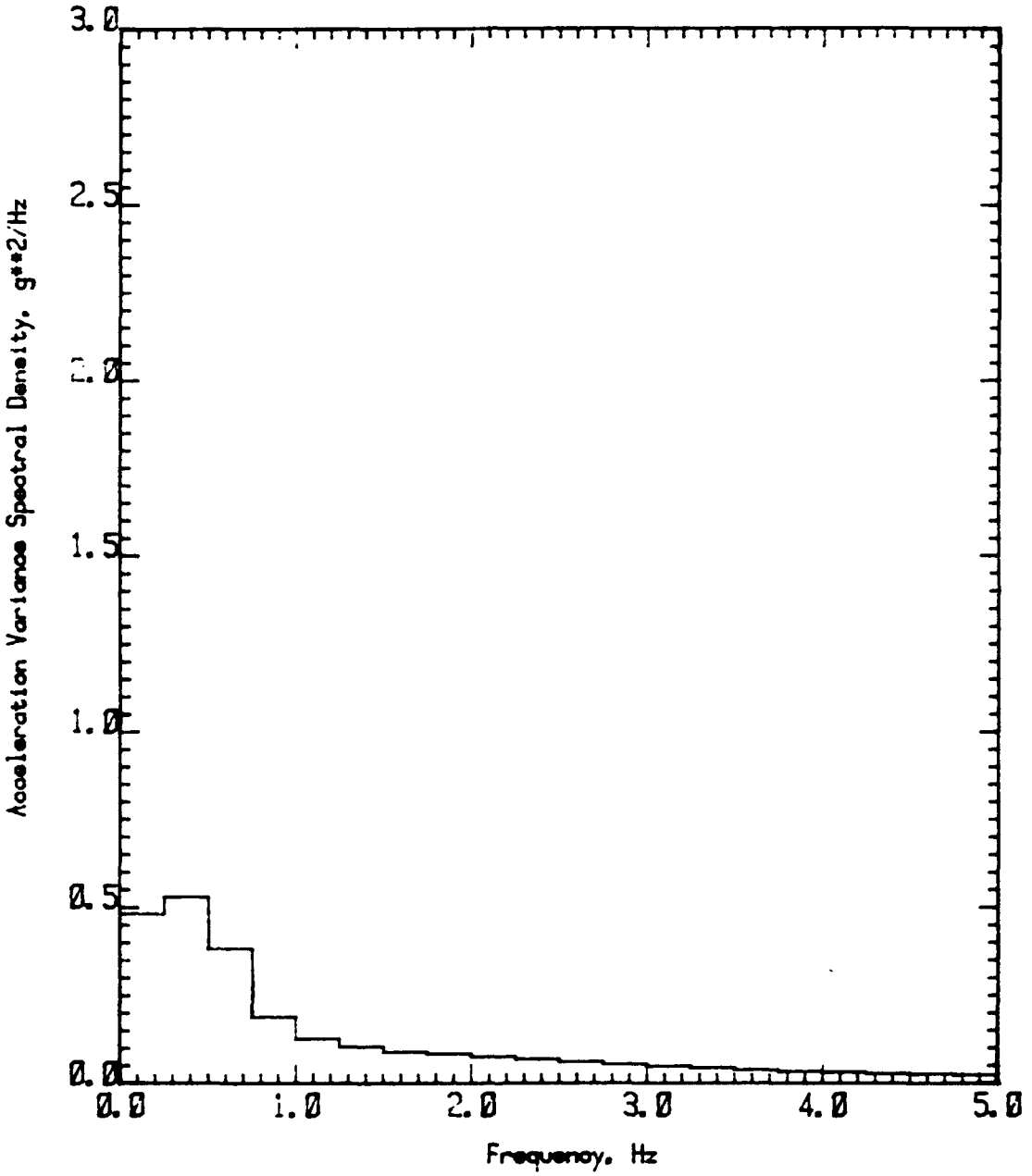


FIGURE A 5.5 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

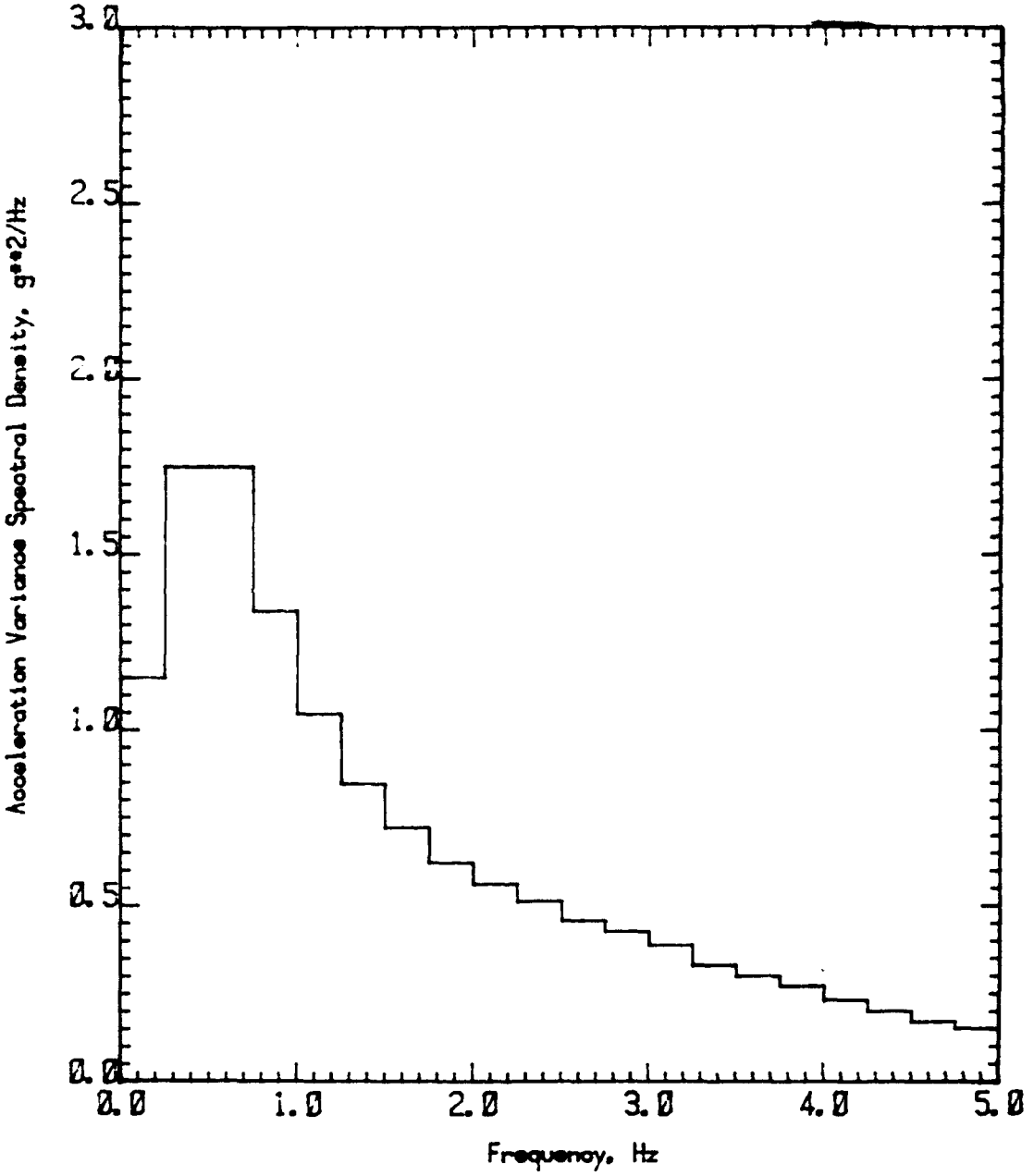


FIGURE A 6.1 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

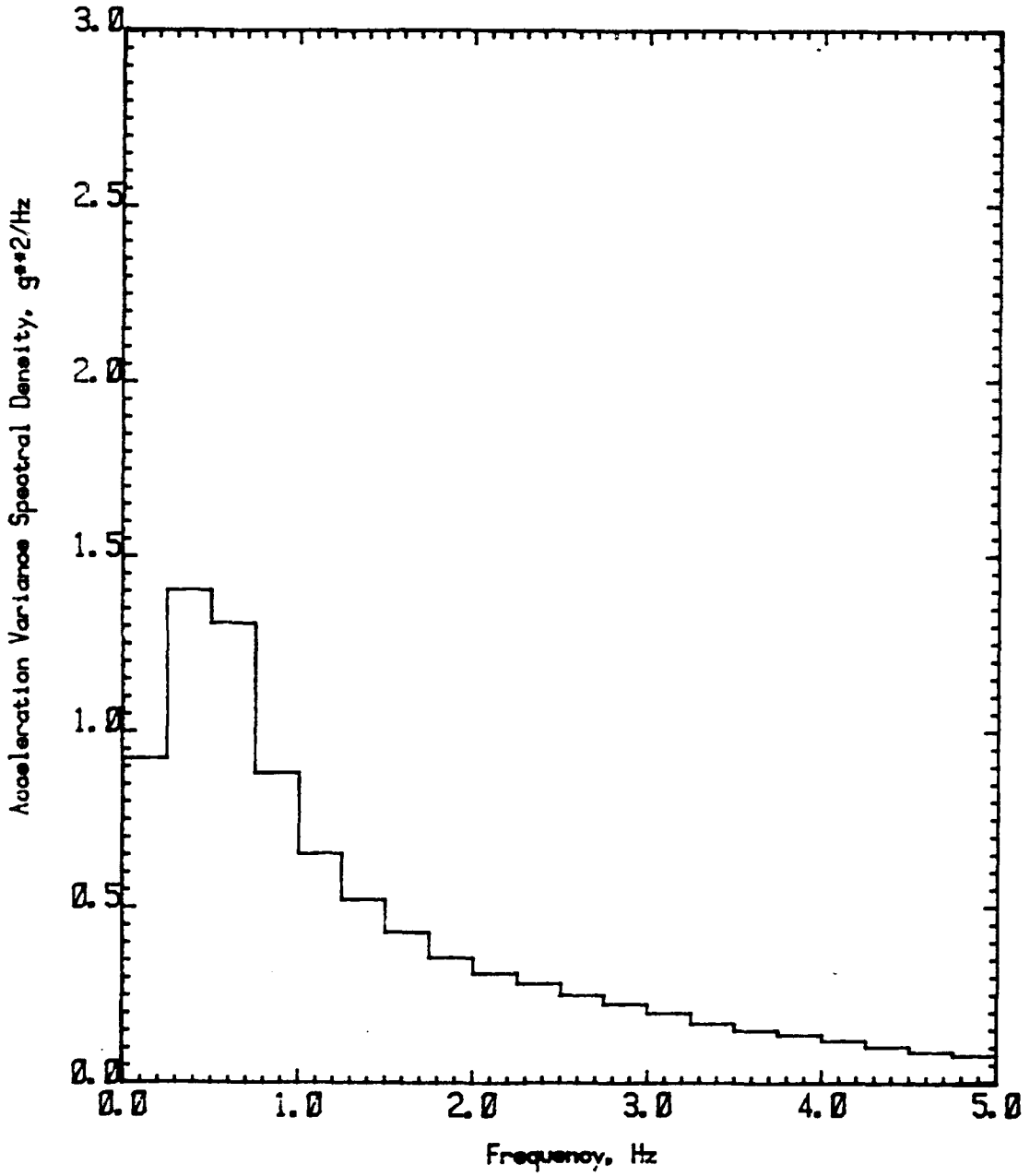


FIGURE A 6.2 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

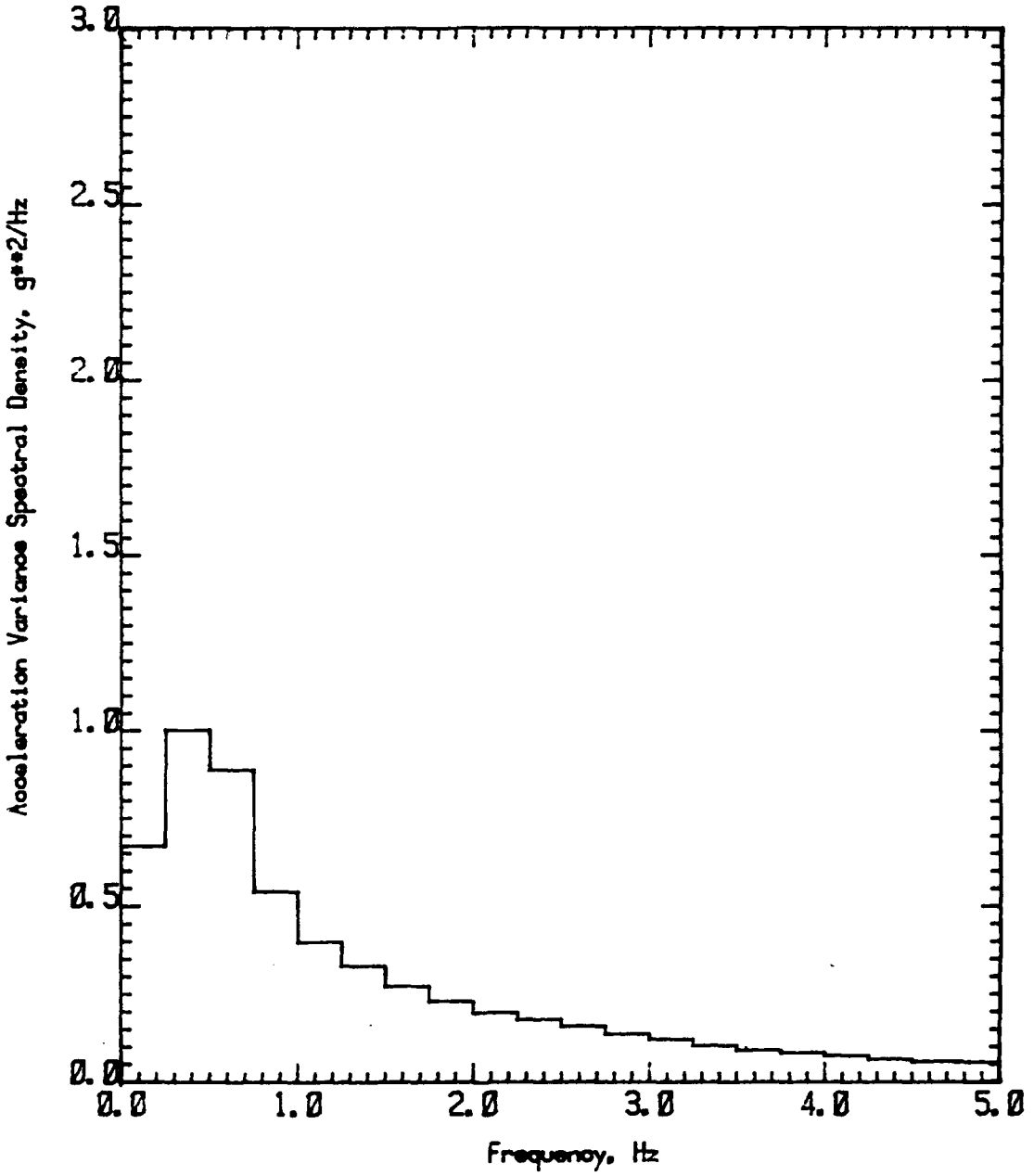


FIGURE A 6.3 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

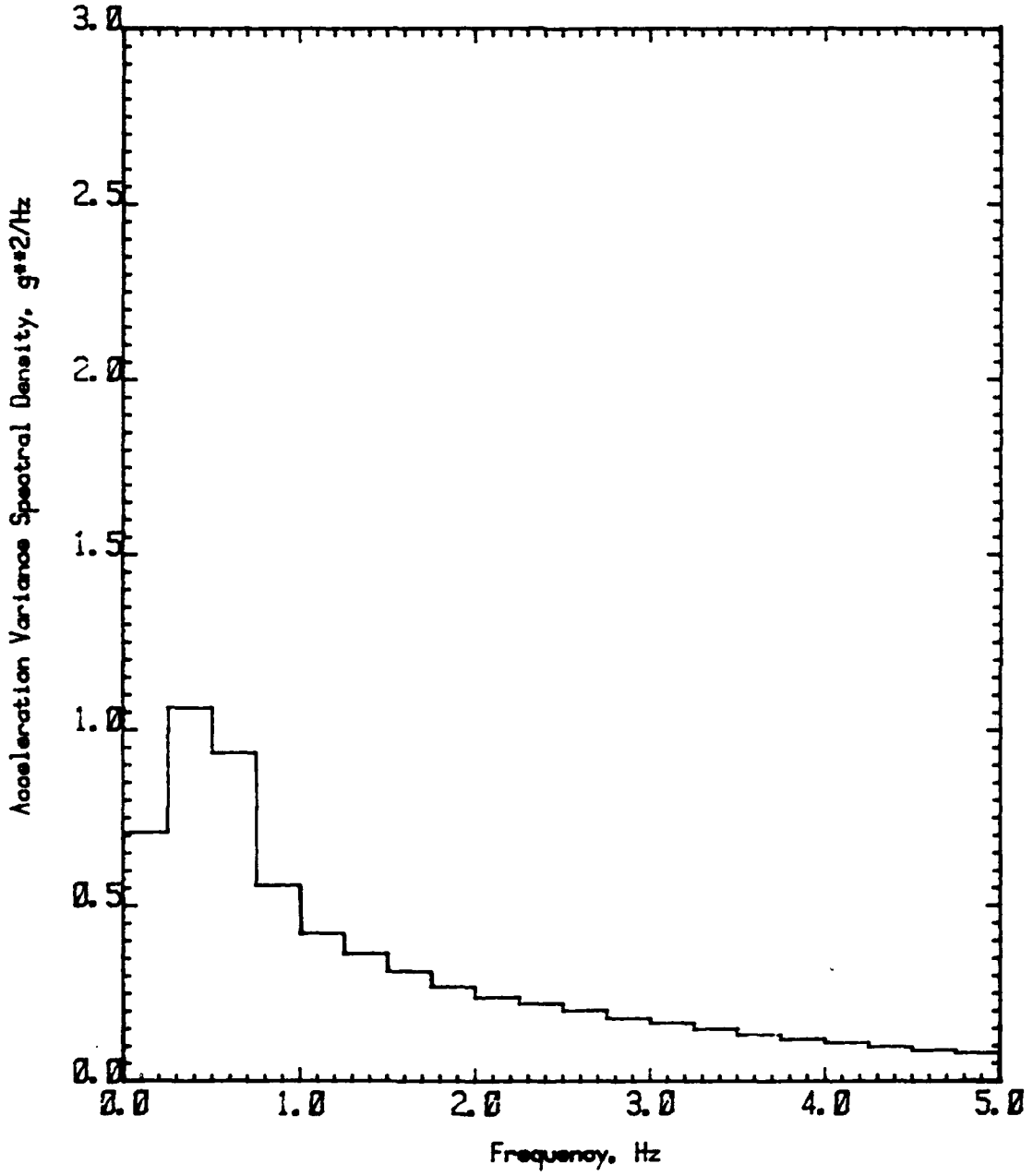


FIGURE A 6.4 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

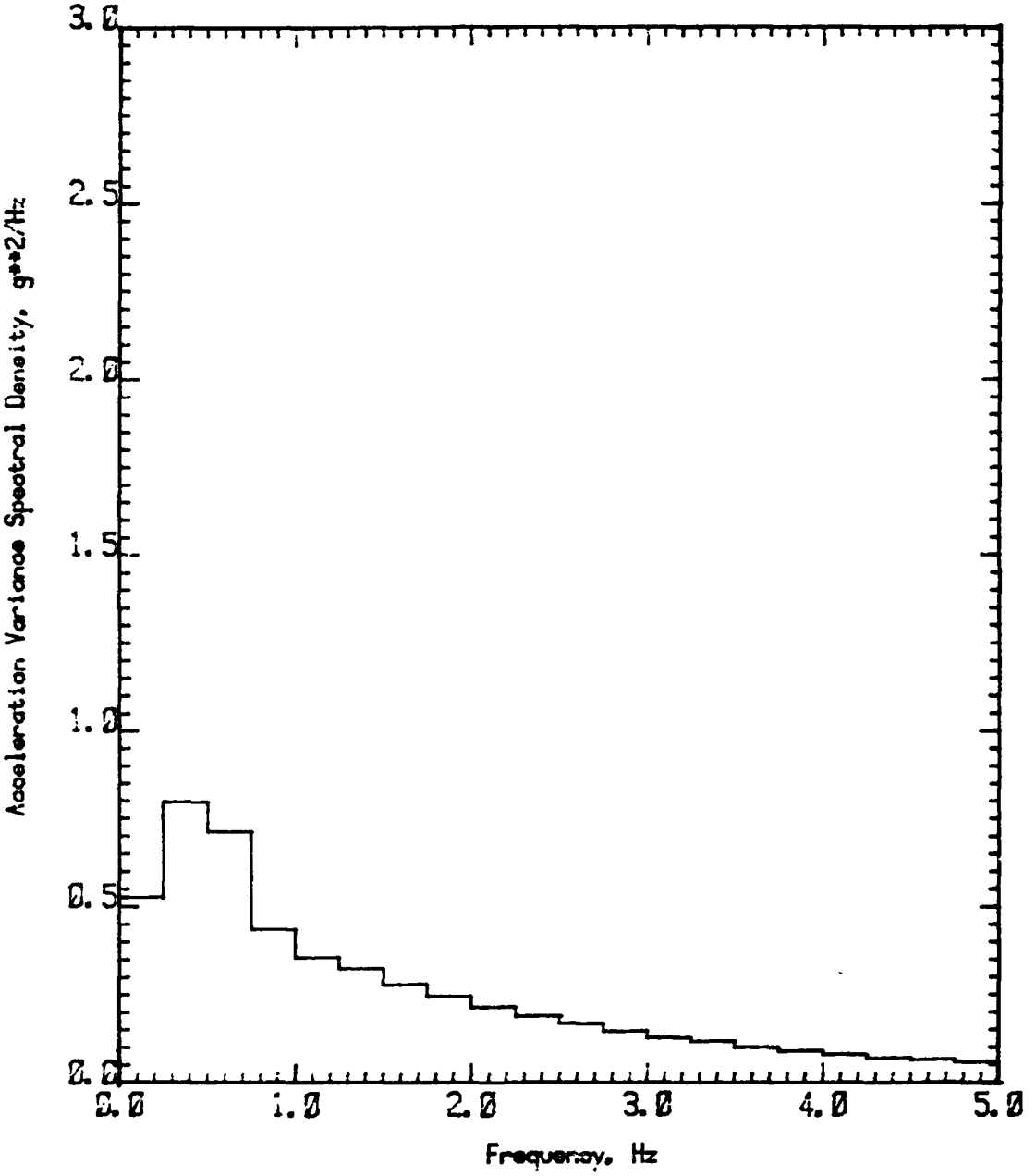


FIGURE A 6.5 ACCELERATION VARIANCE SPECTRAL DENSITY
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

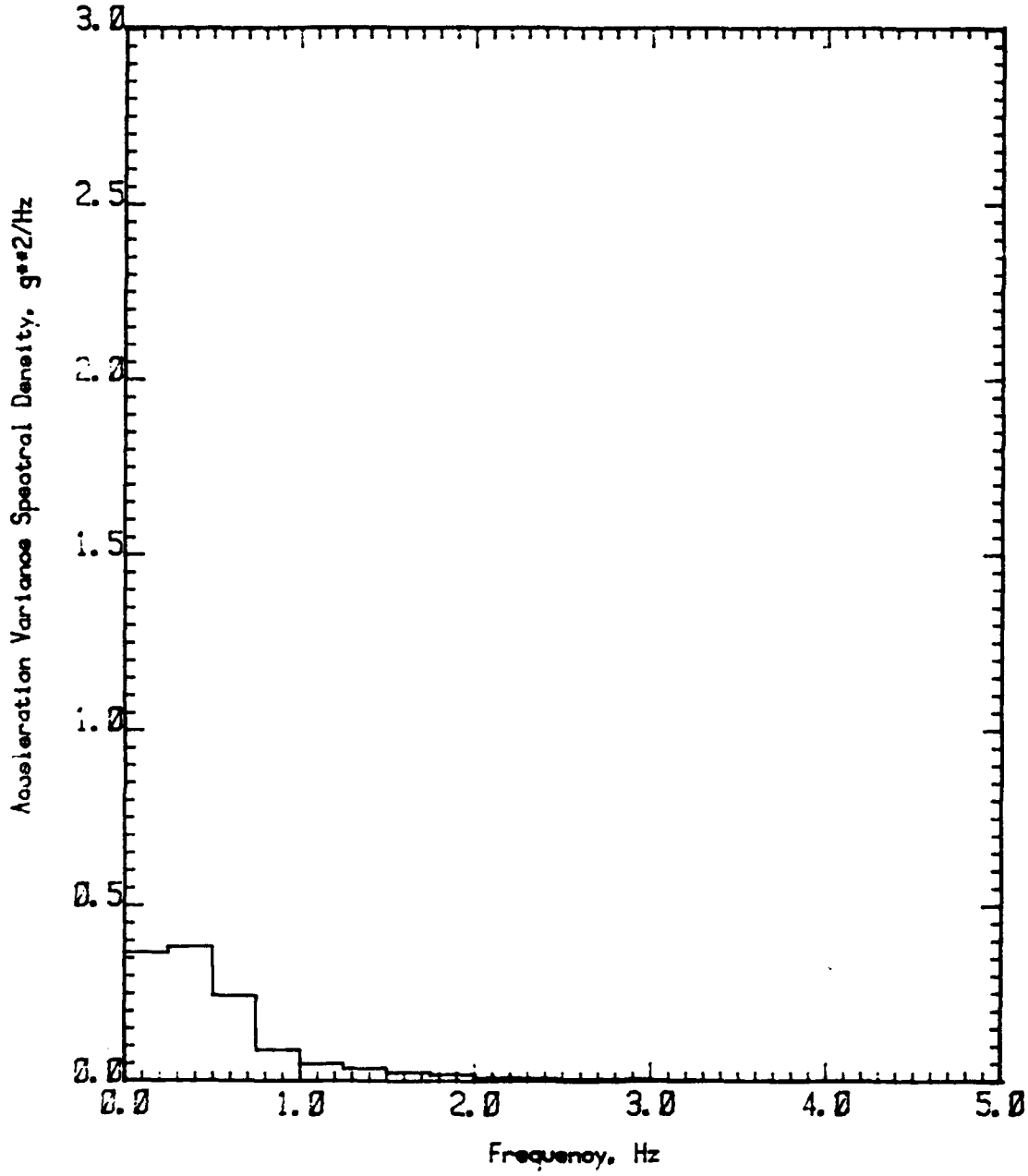


FIGURE B 1.1 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

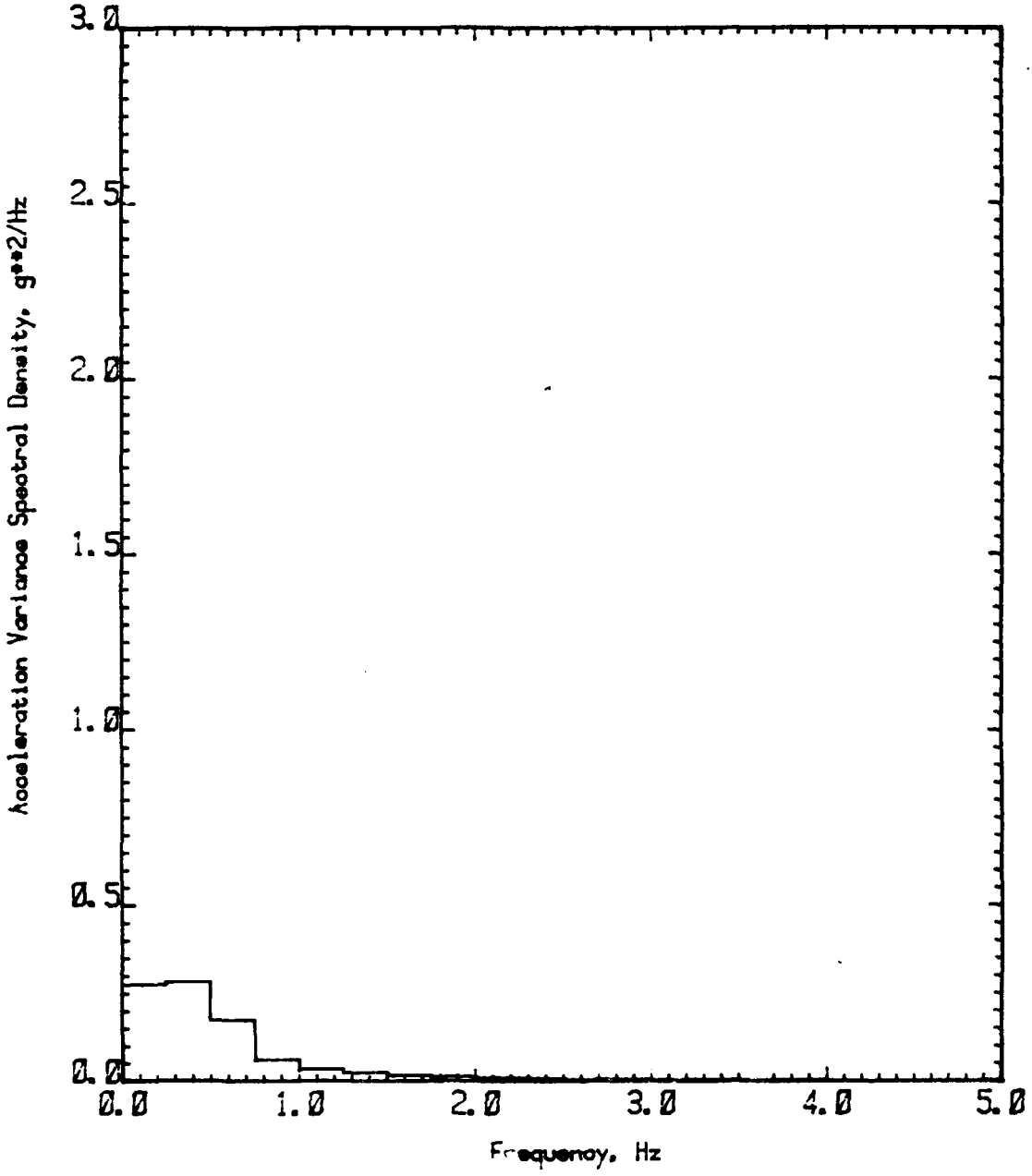


FIGURE B 1.2 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

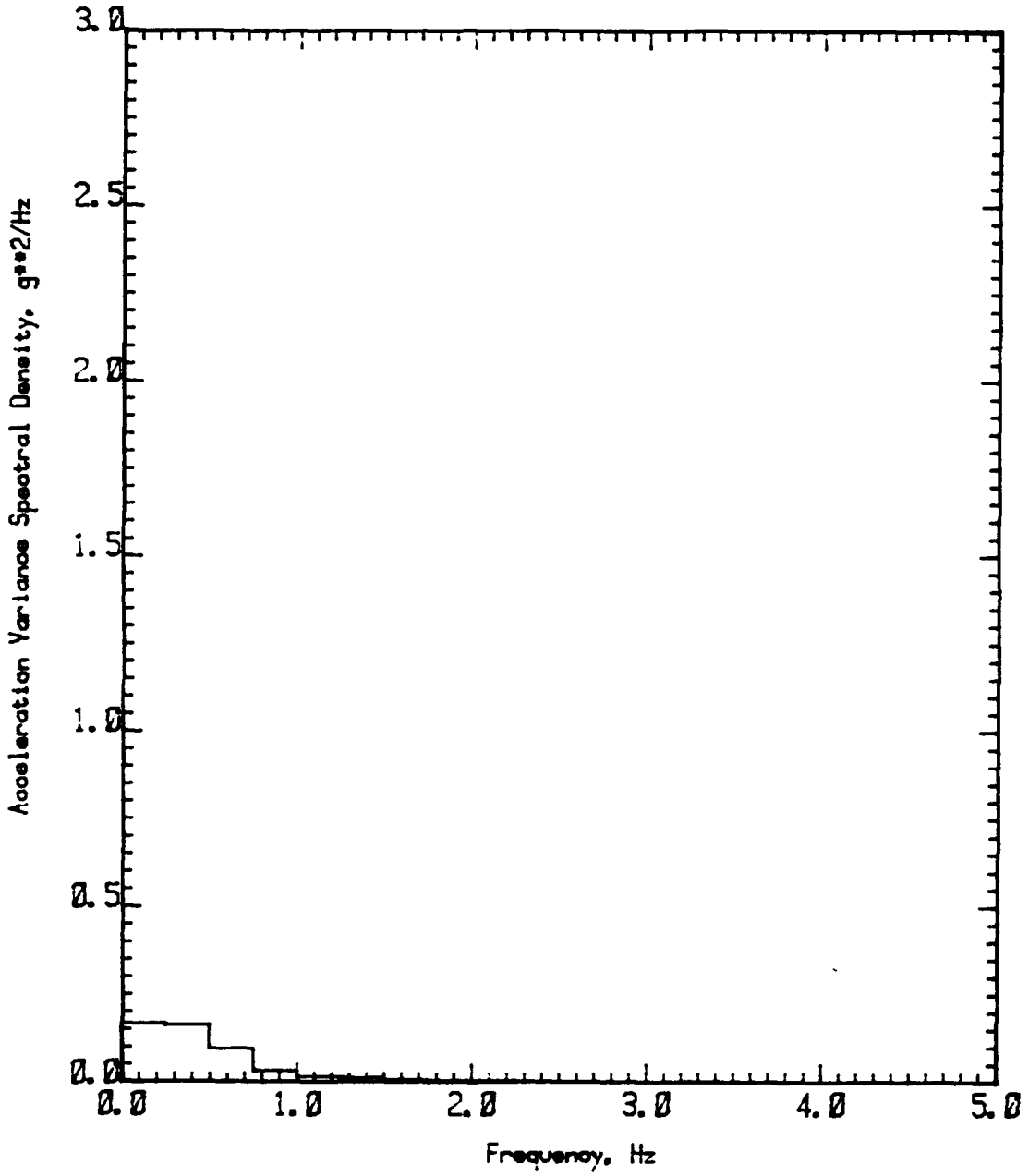


FIGURE B 1.3 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

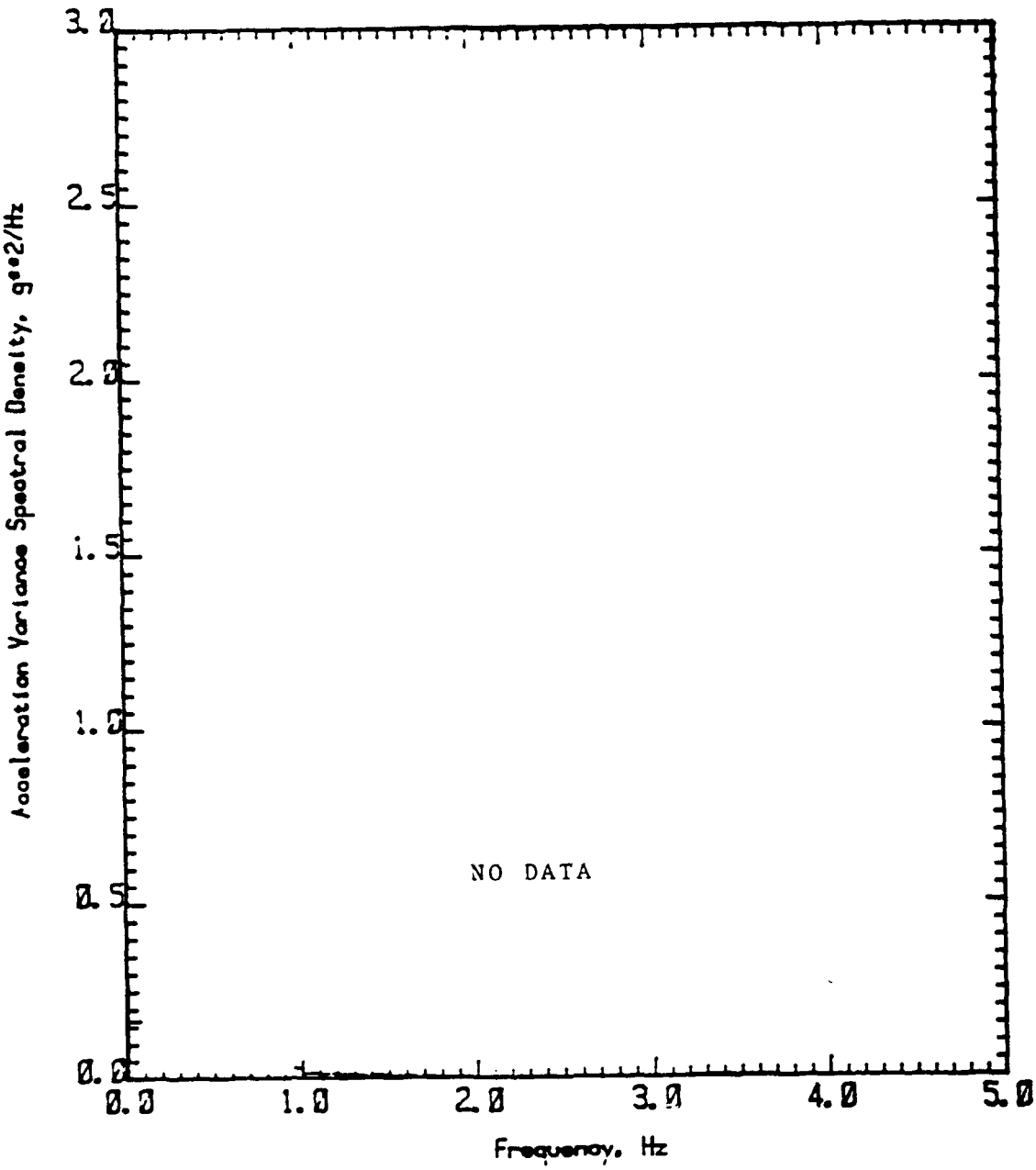


FIGURE B 1.4 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

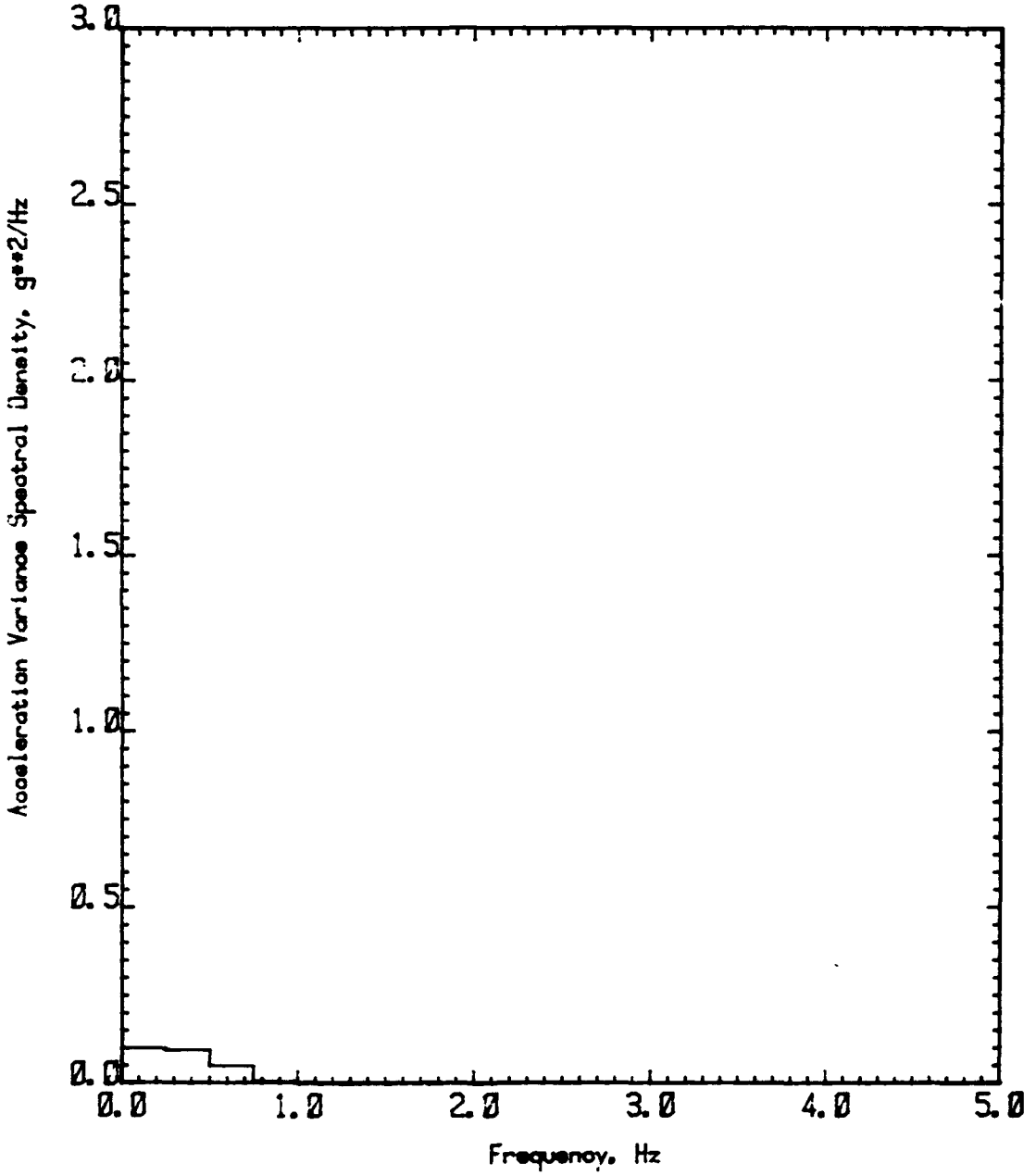


FIGURE B 1.5 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

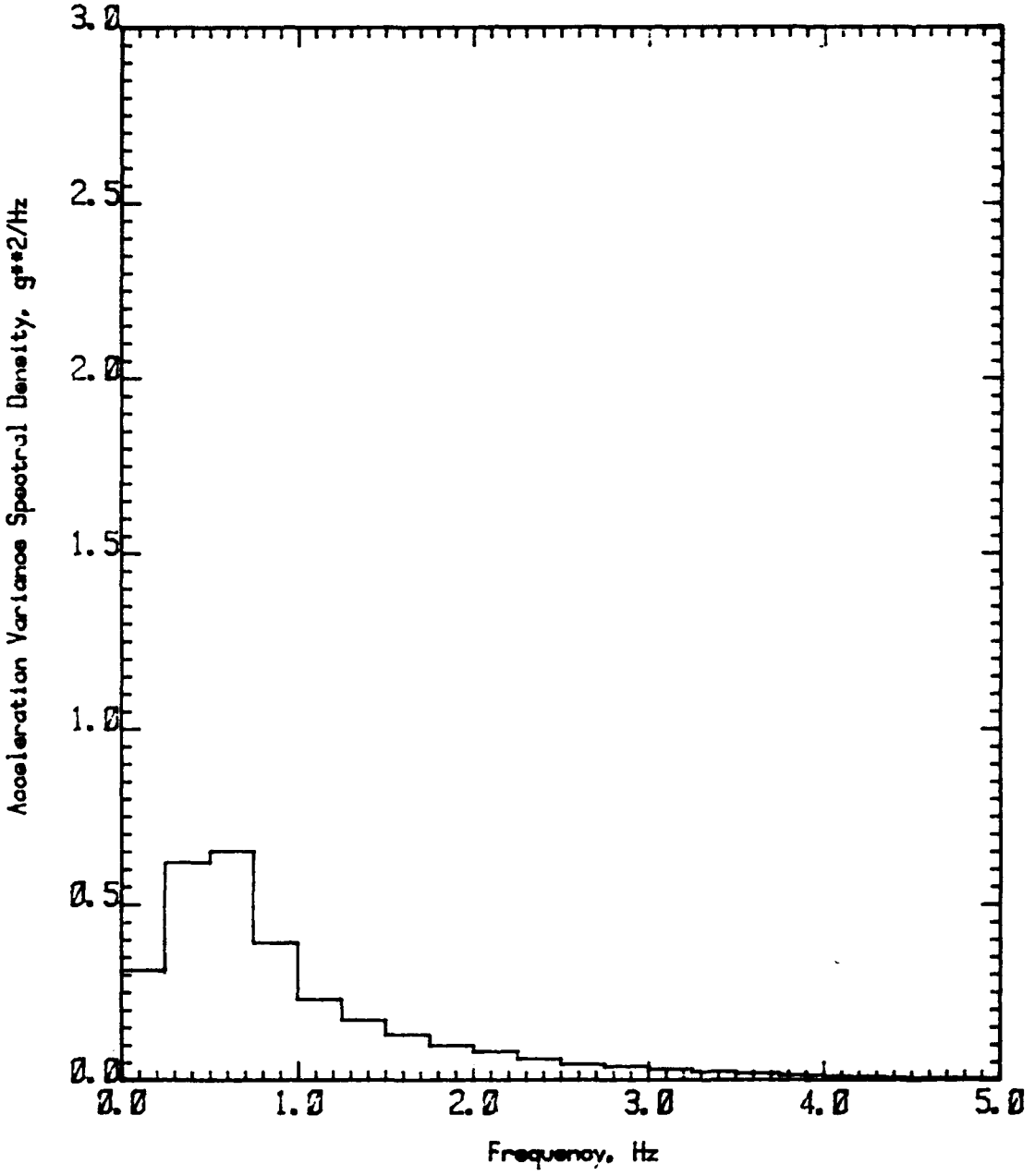


FIGURE B 2.1 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

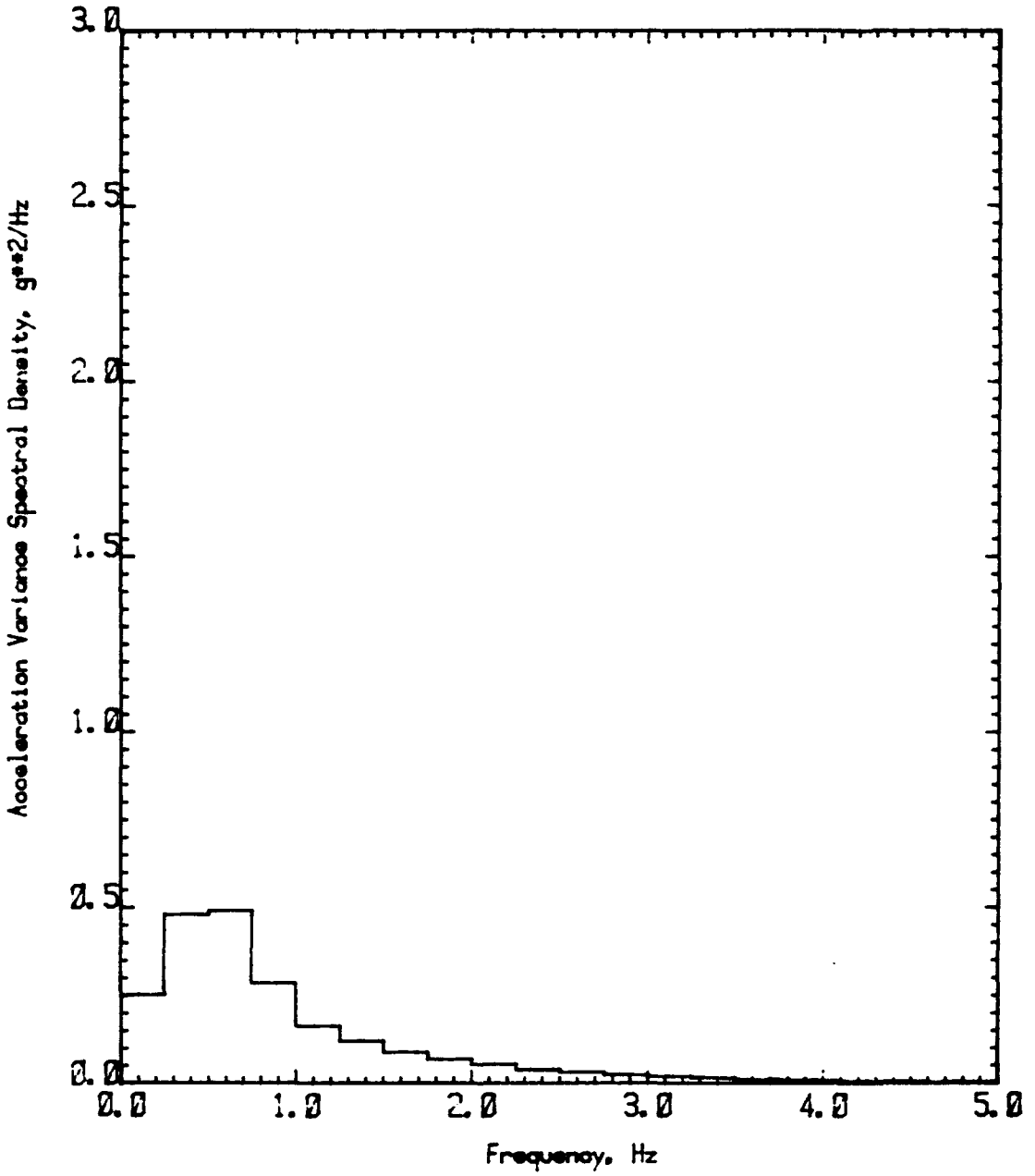


FIGURE B 2.2 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

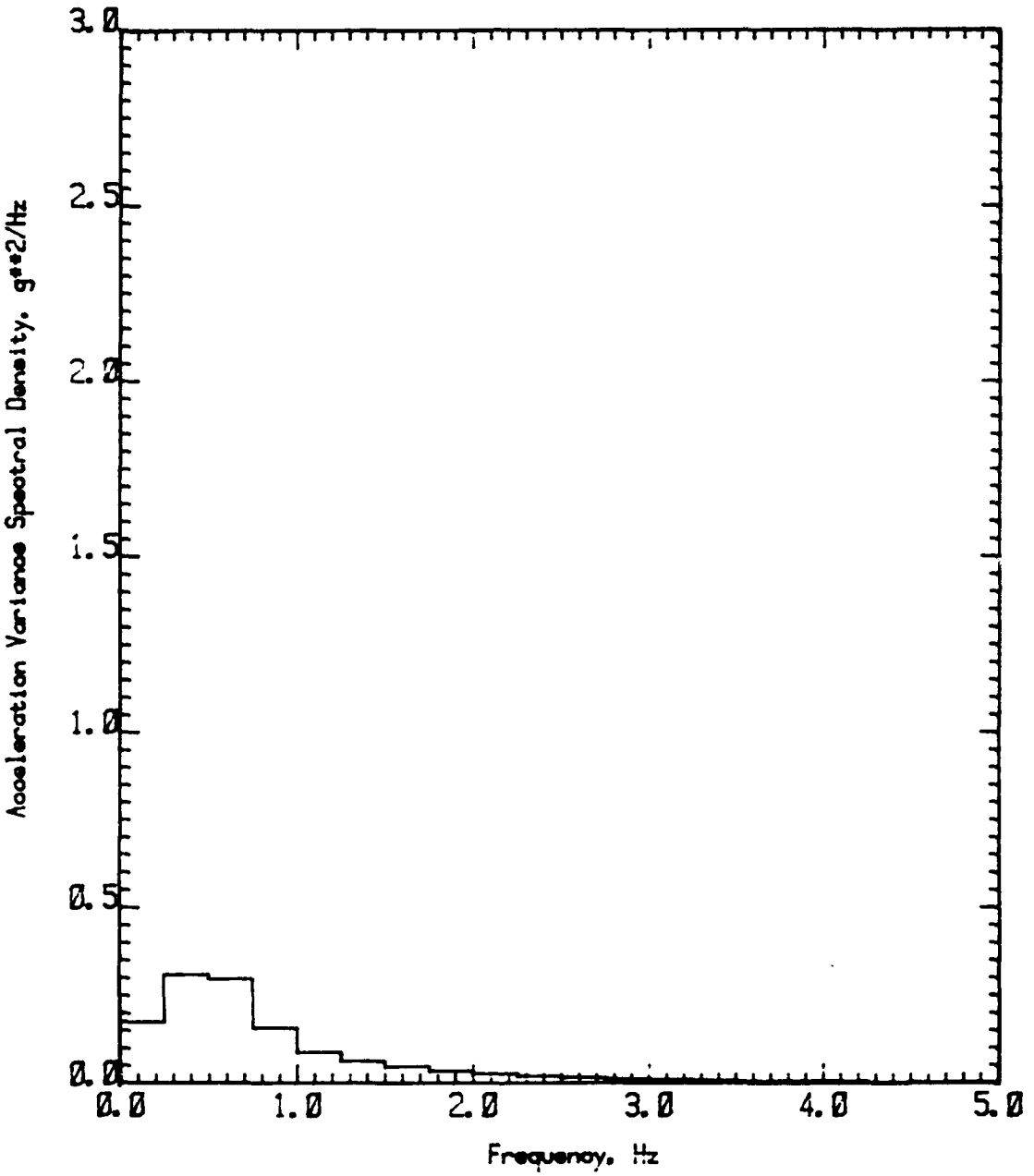


FIGURE B 2.3 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

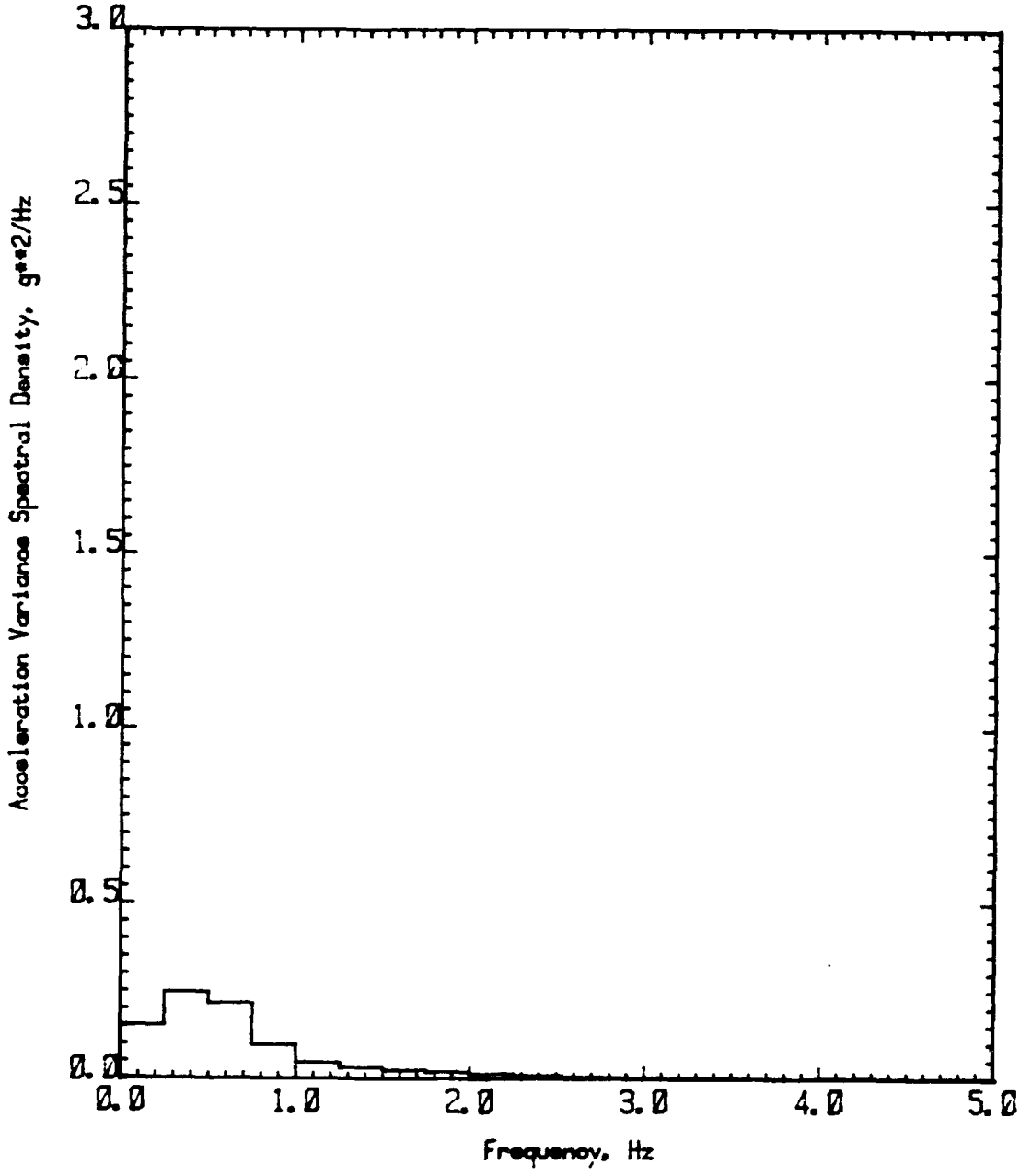


FIGURE B 2.4 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

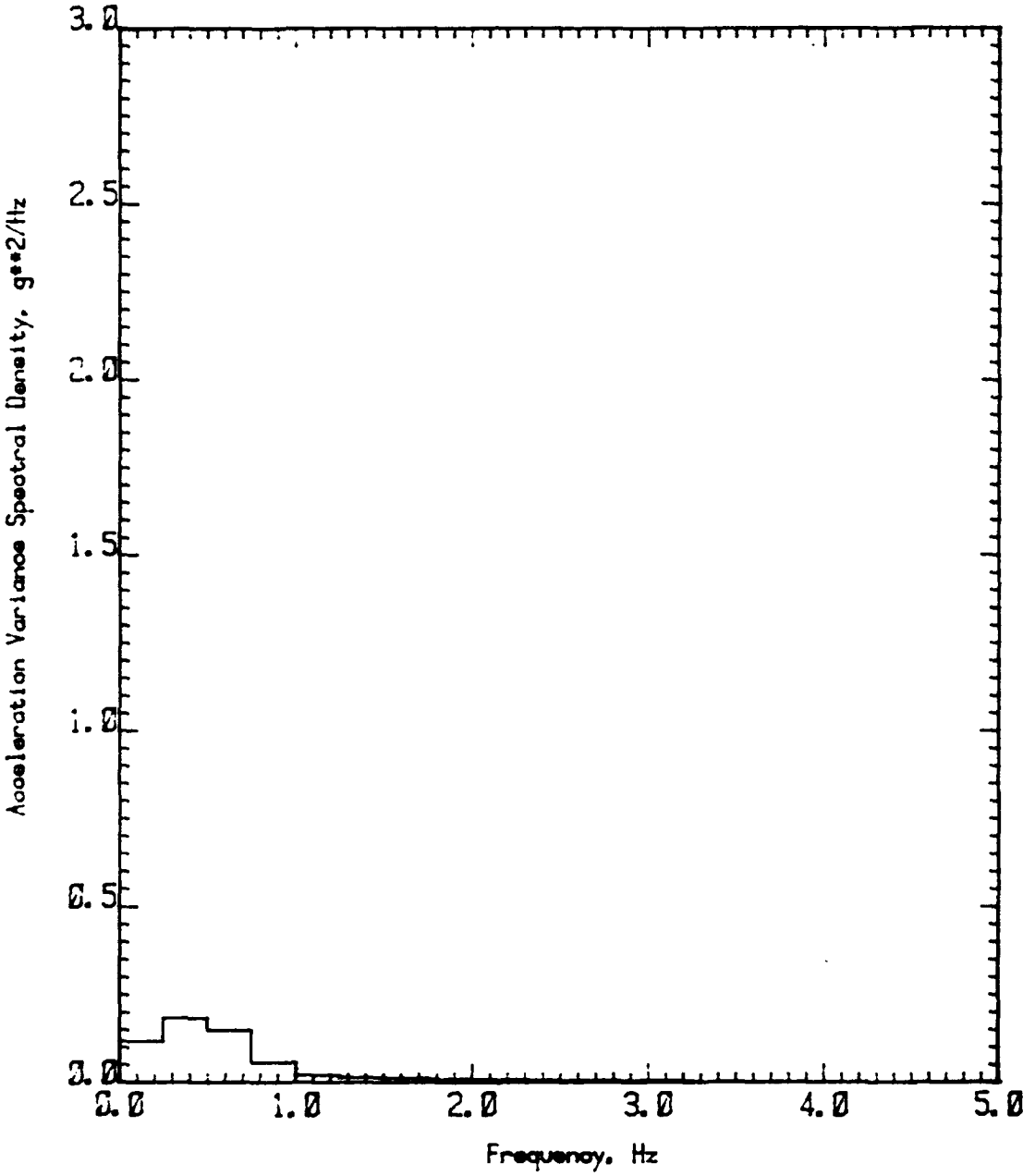


FIGURE B 2.5 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

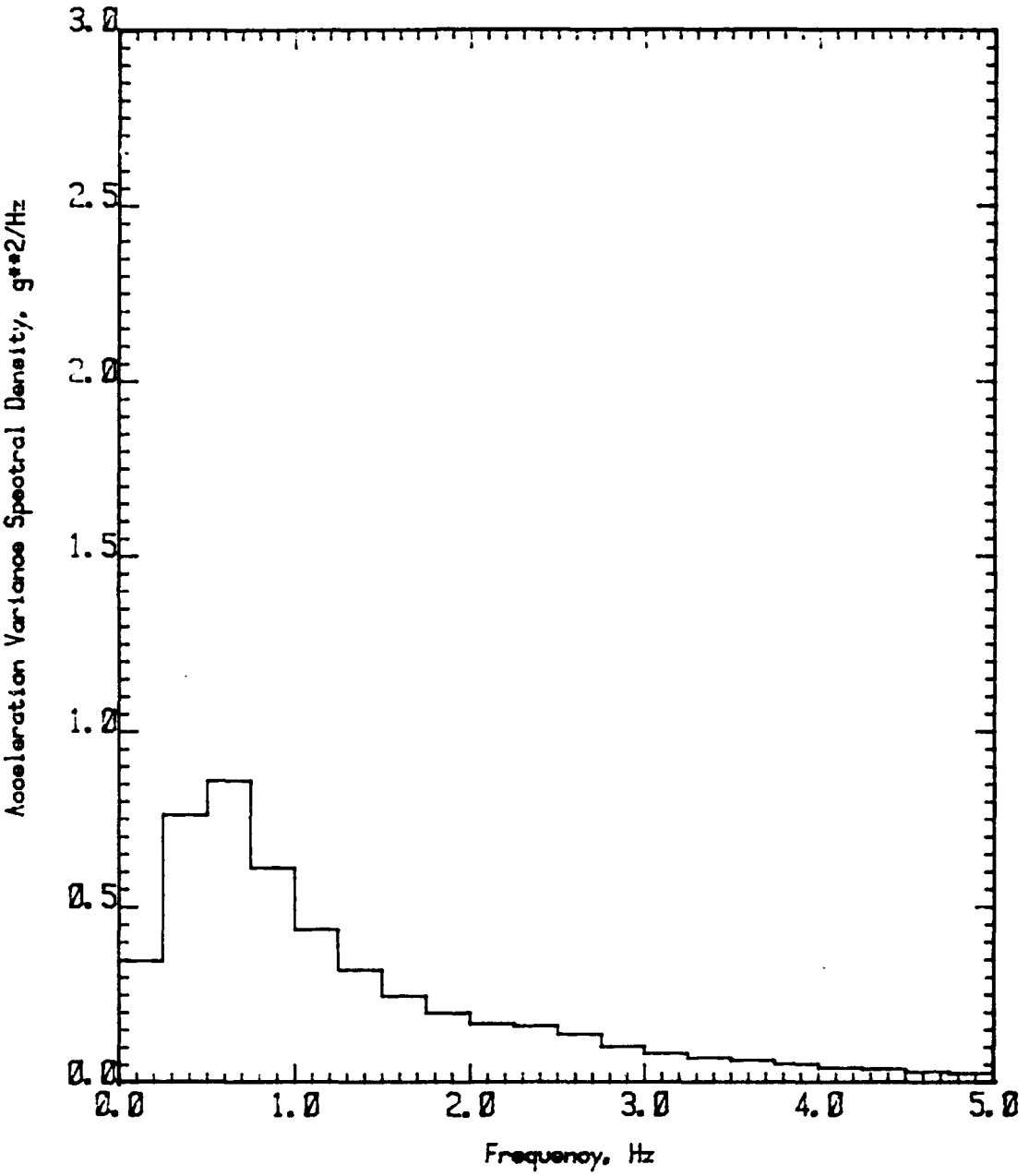


FIGURE B 3.1 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

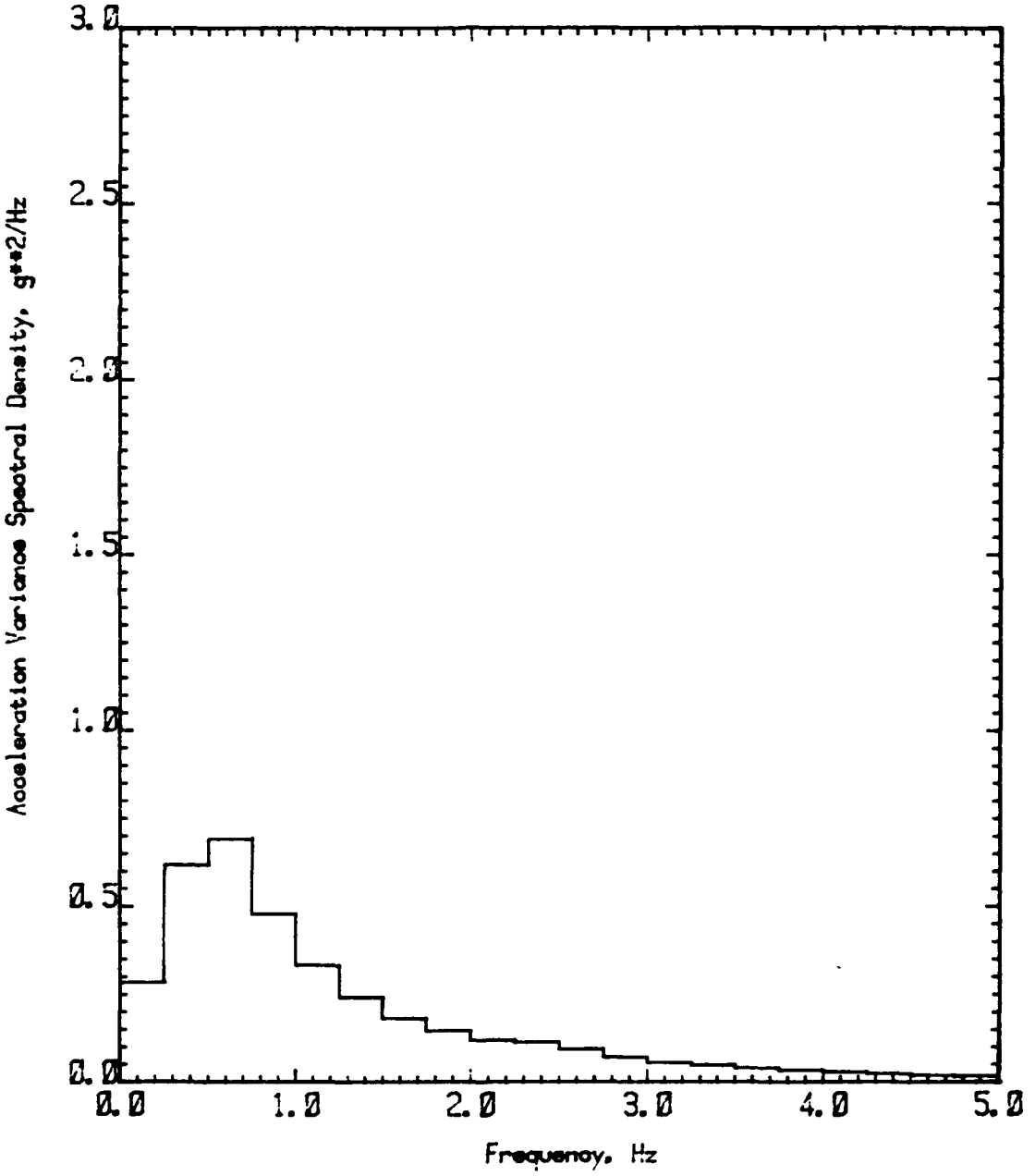


FIGURE B 3.2 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

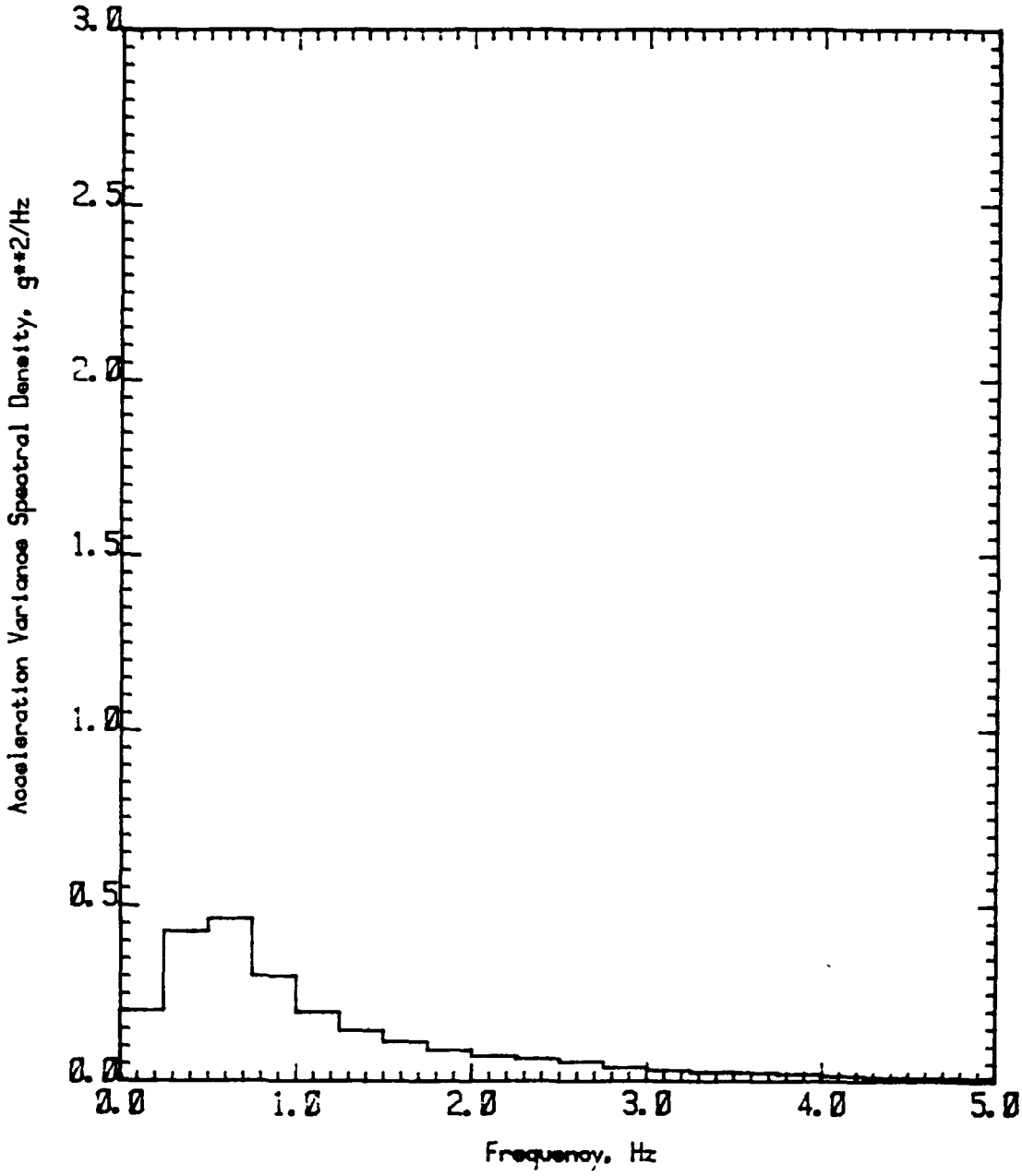


FIGURE B 3.3 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

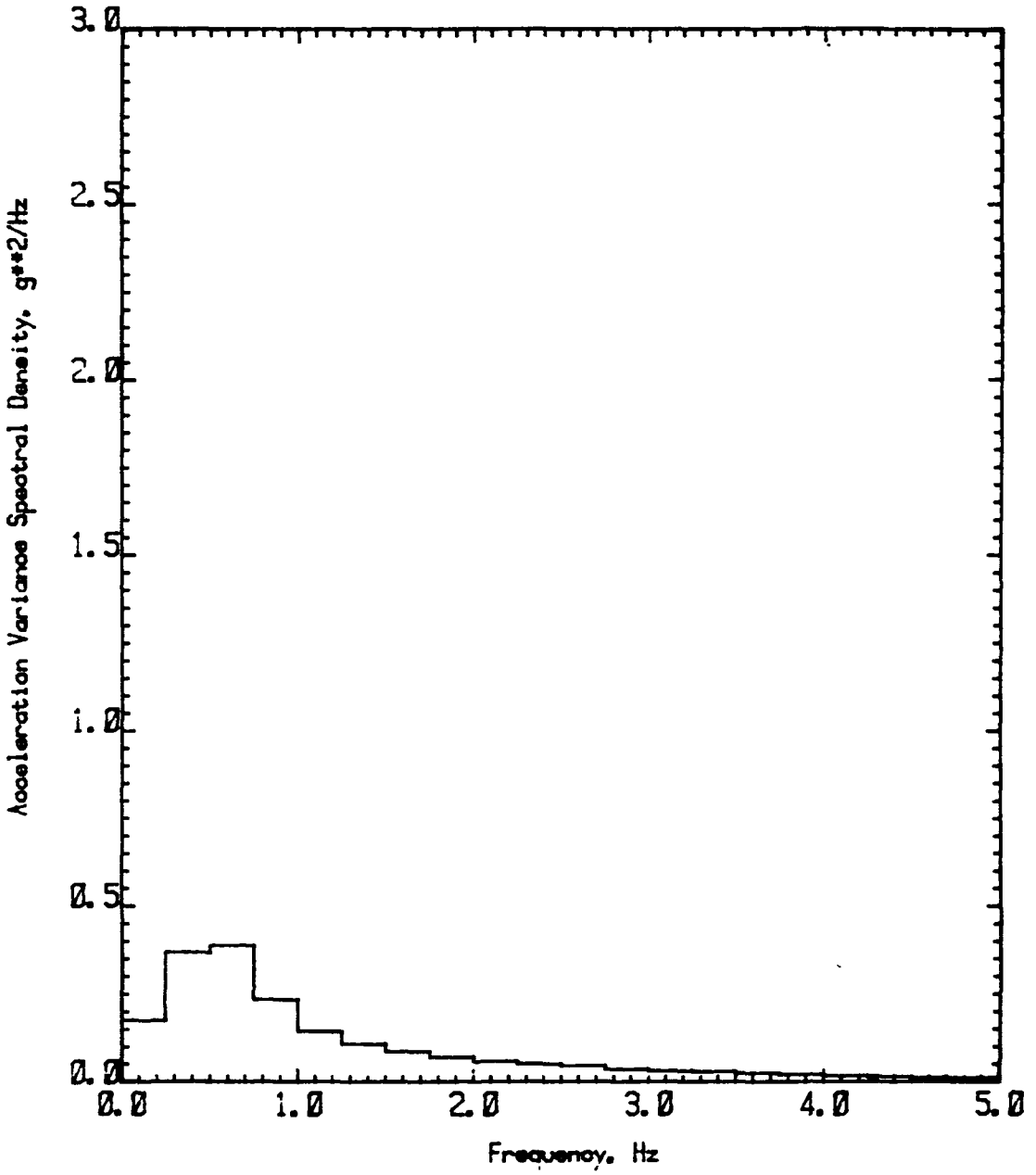


FIGURE B 3.4 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

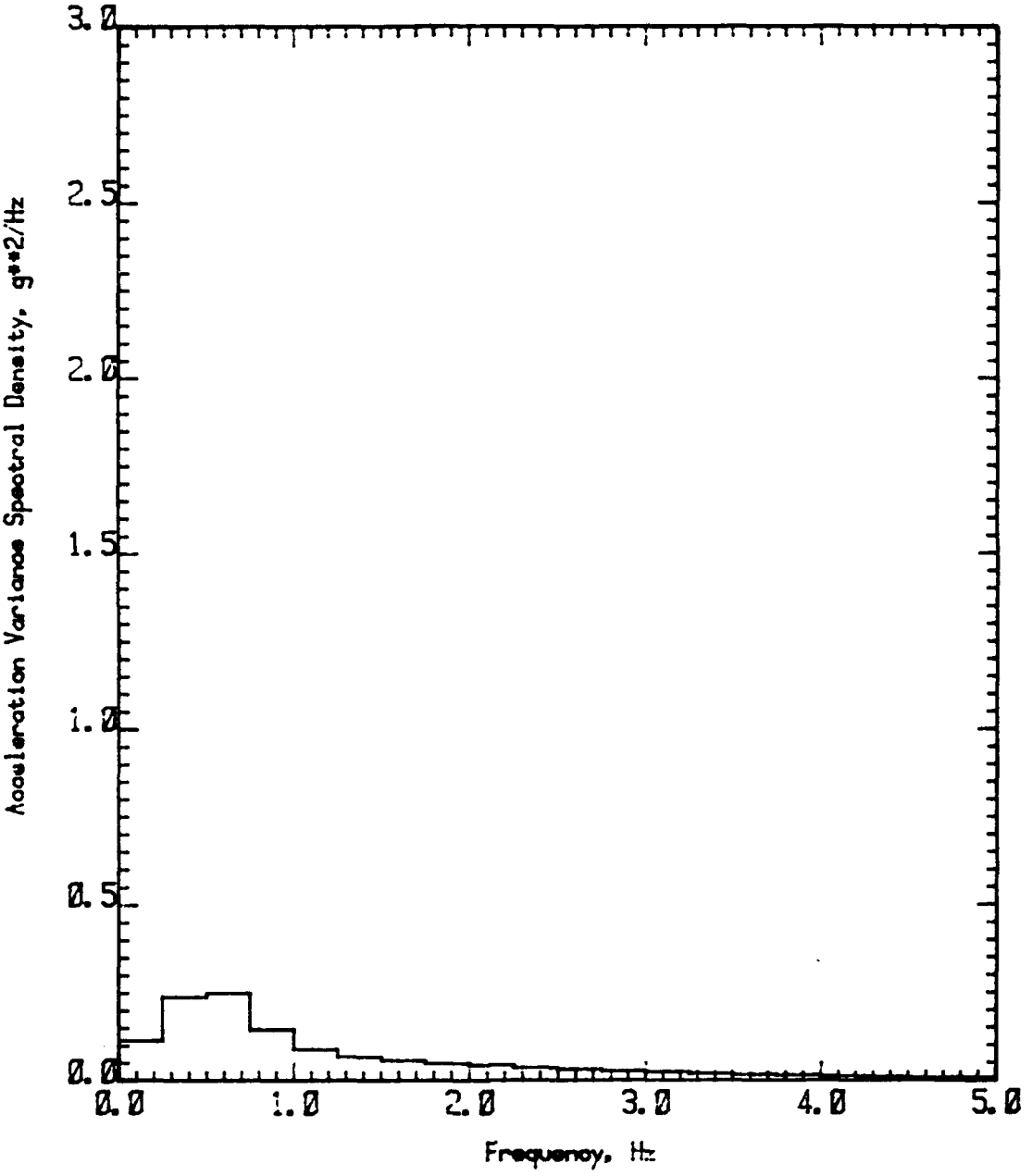


FIGURE B 3.5 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

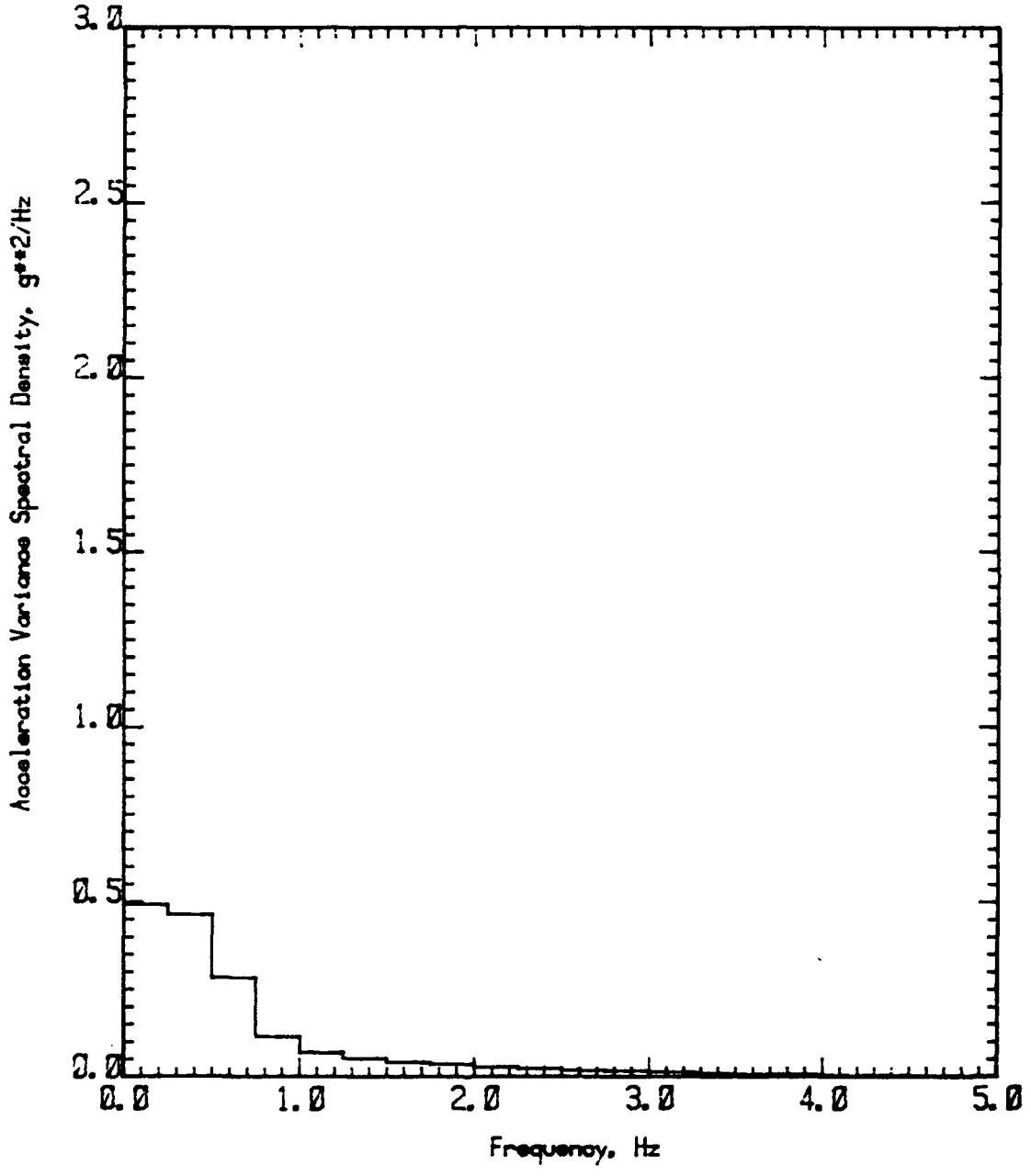


FIGURE B 4.1 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

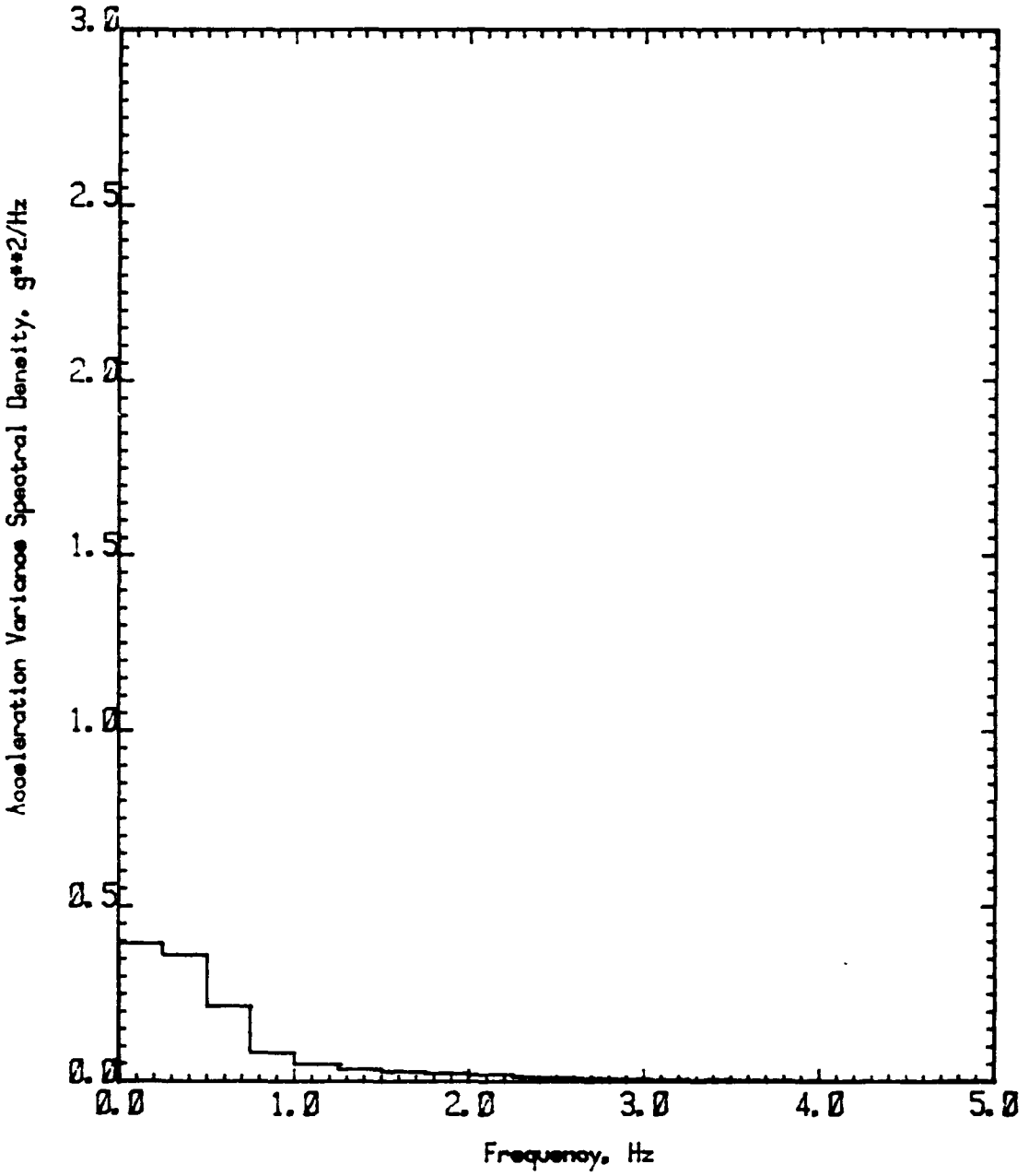


FIGURE B 4.2 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

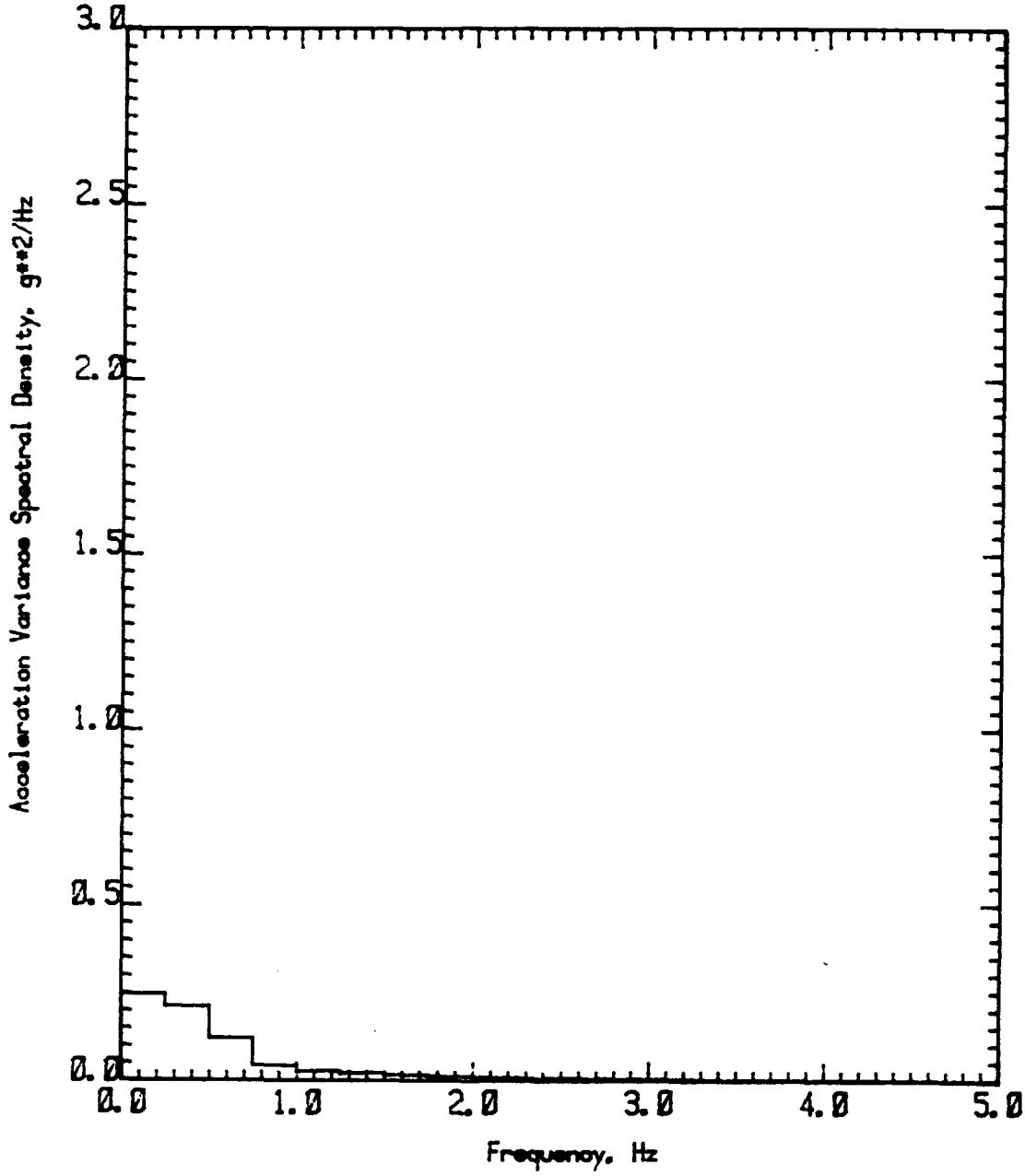


FIGURE B 4.3 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

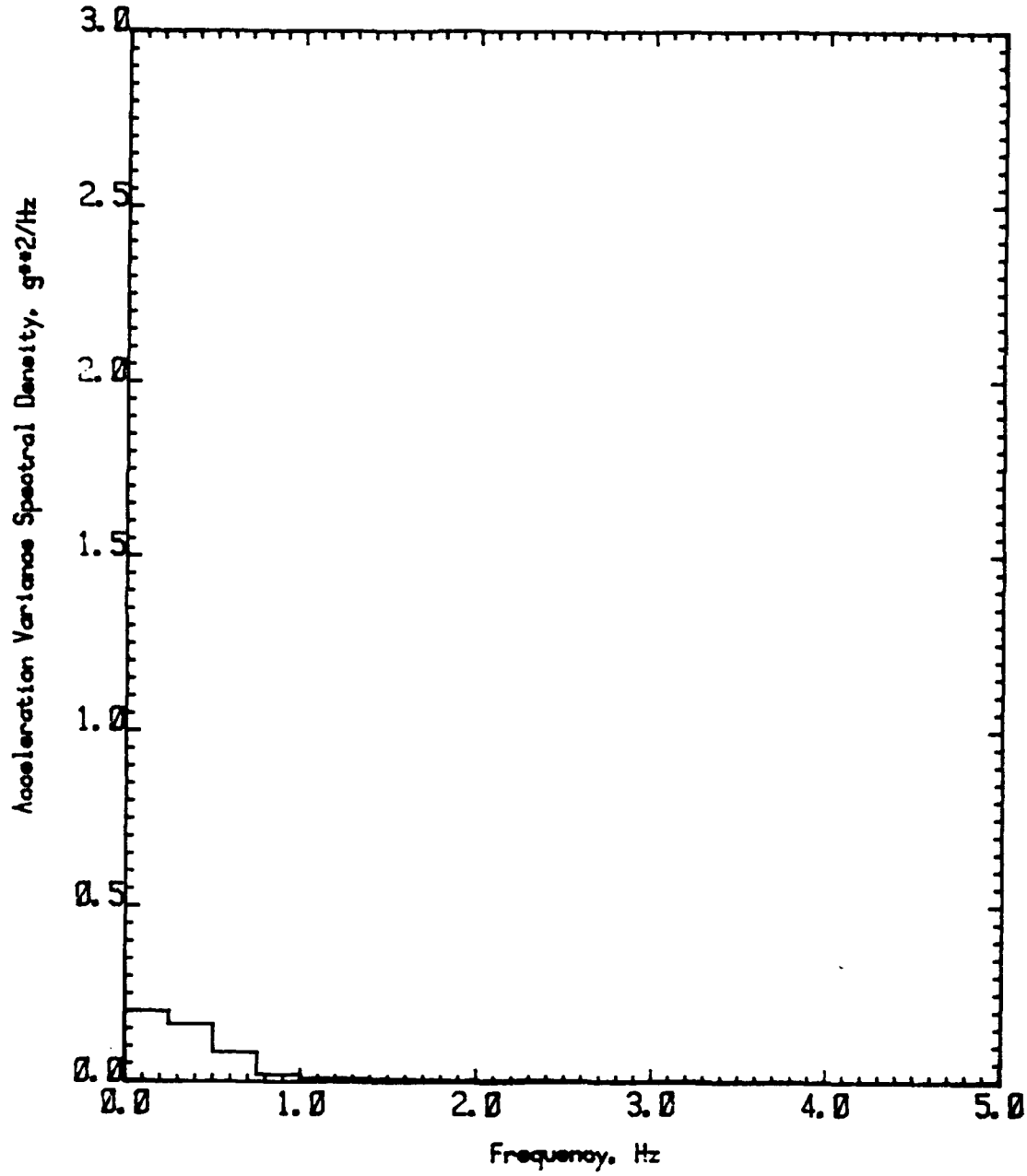


FIGURE B 4.4 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

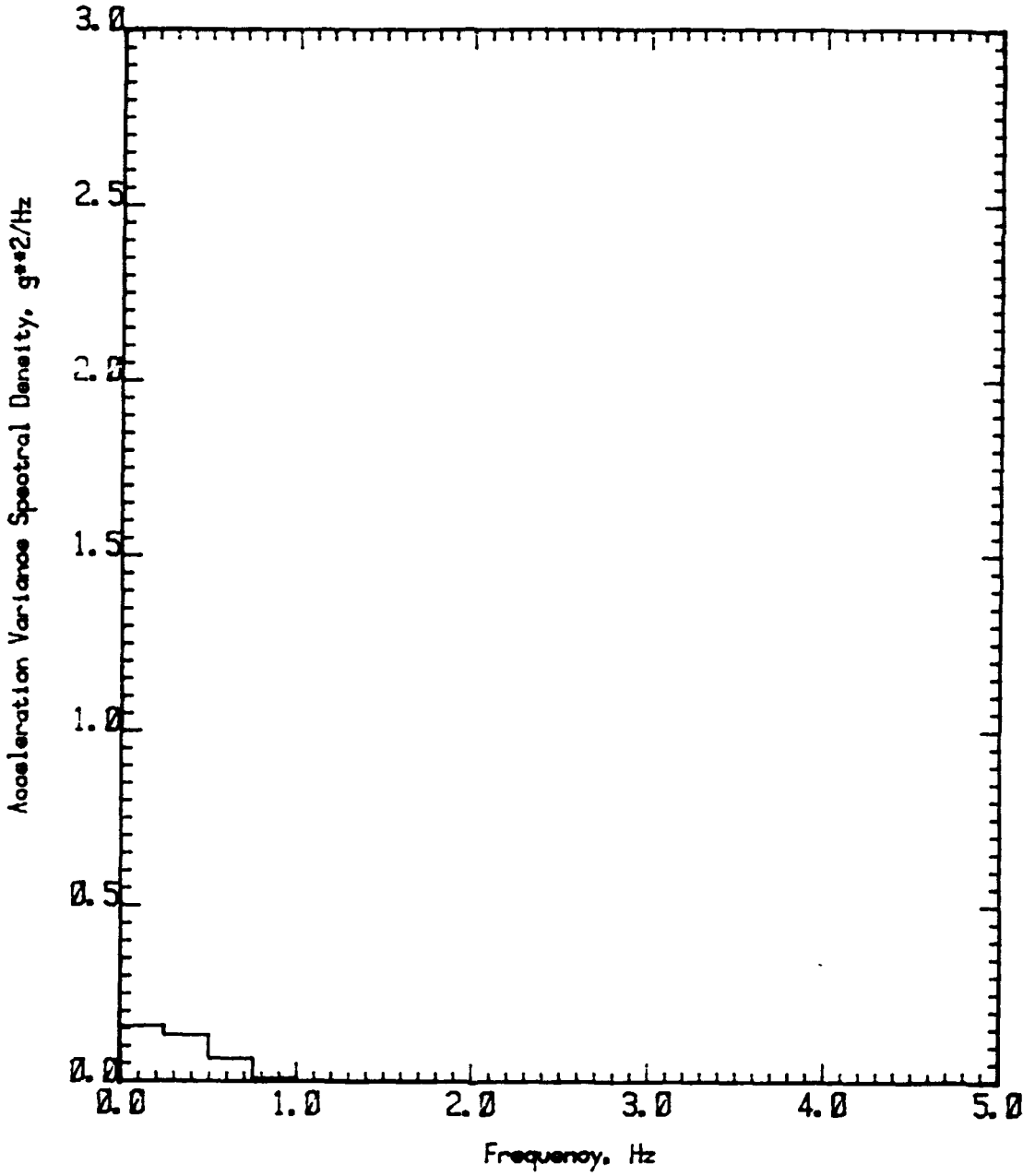


FIGURE B 4.5 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

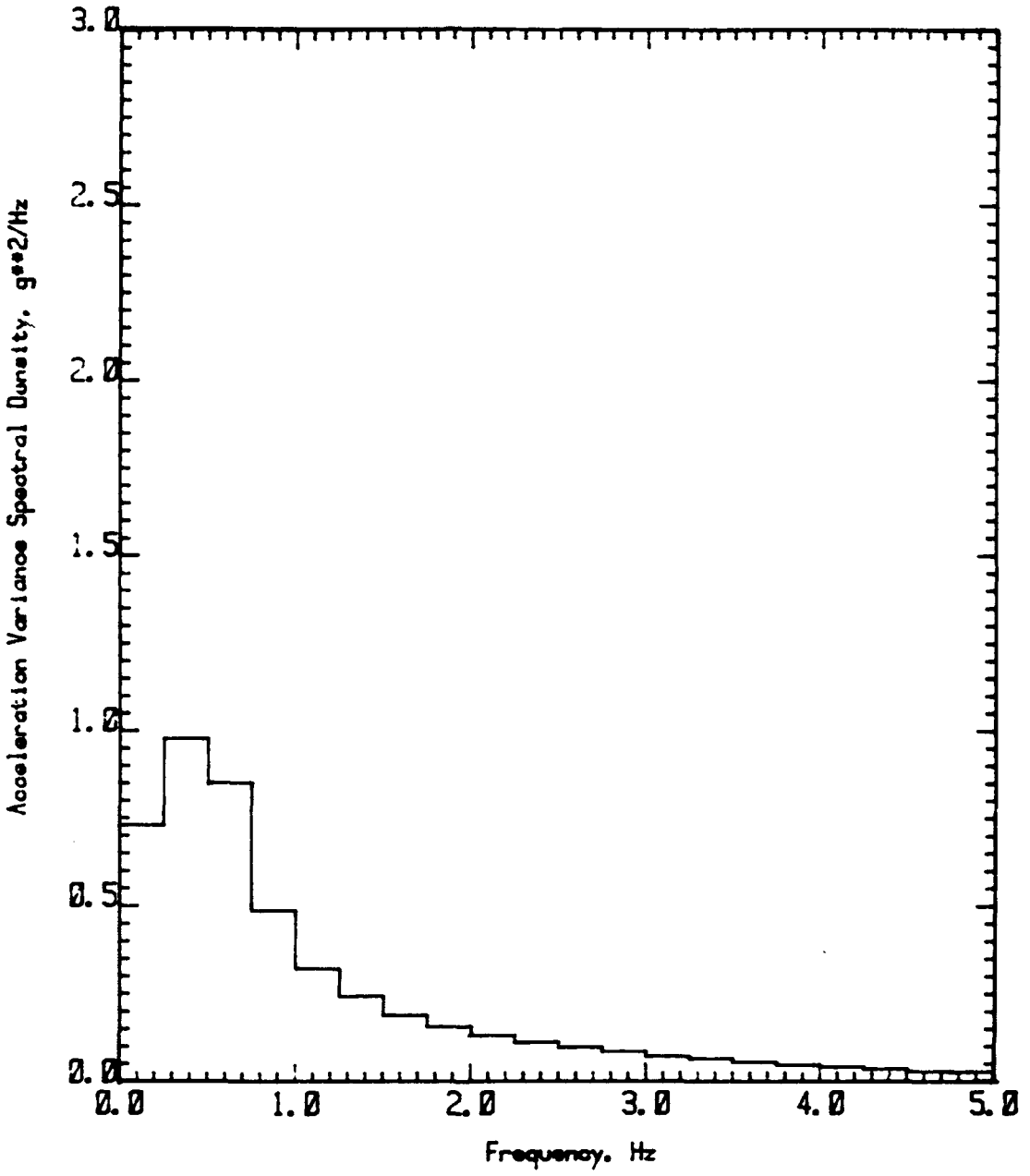


FIGURE B 5.1 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

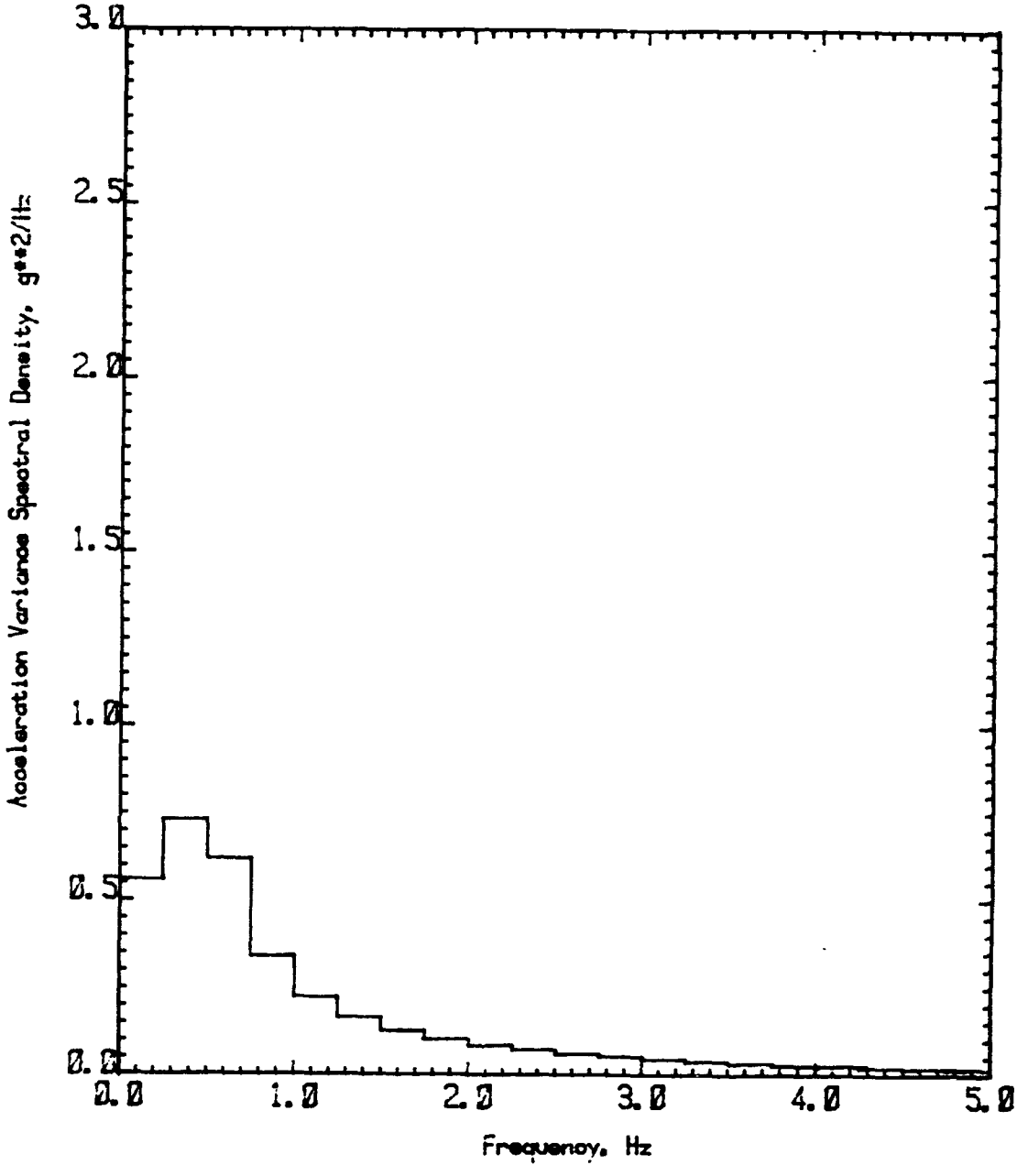


FIGURE B 5.2 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

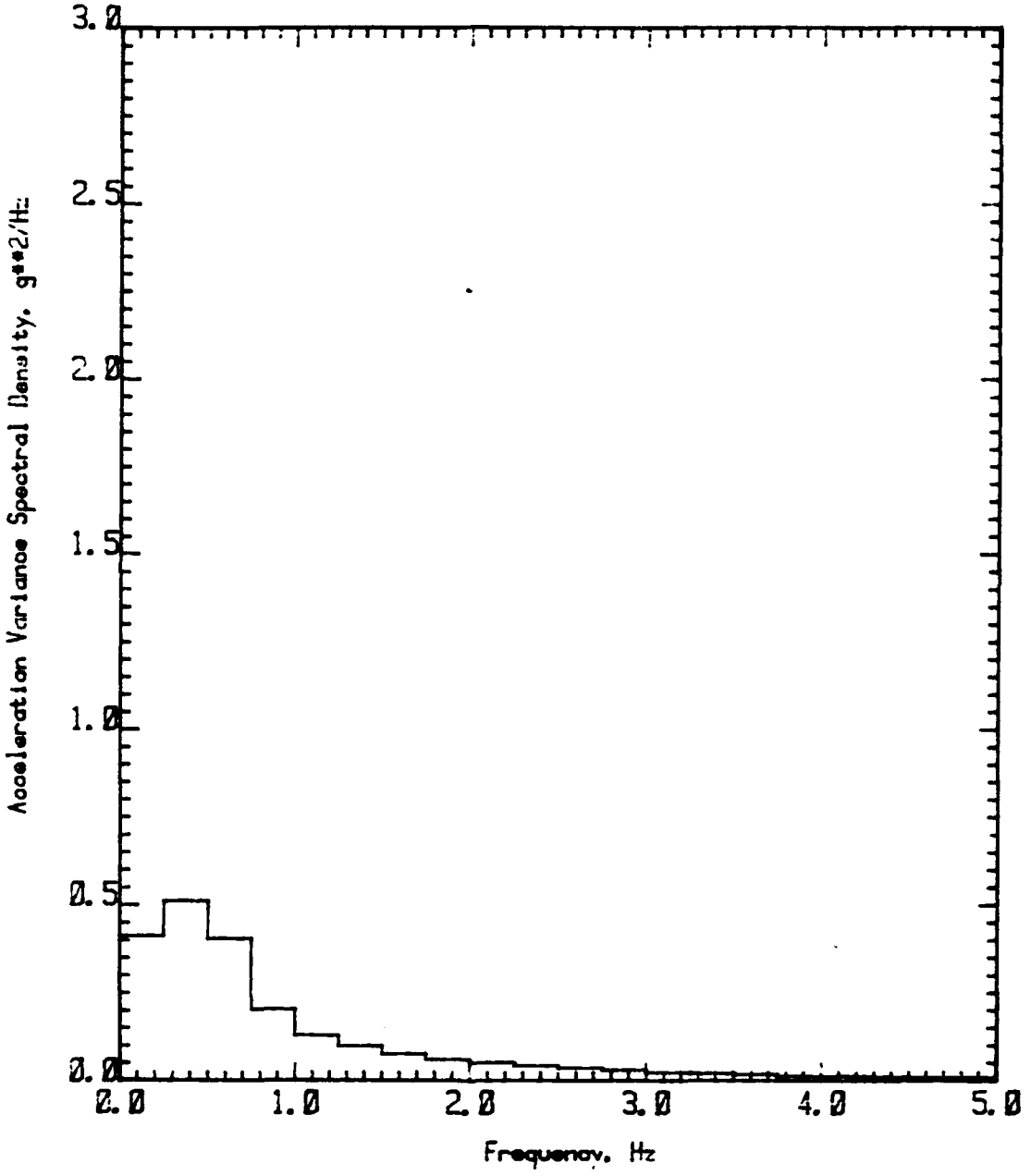


FIGURE B 5.3 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

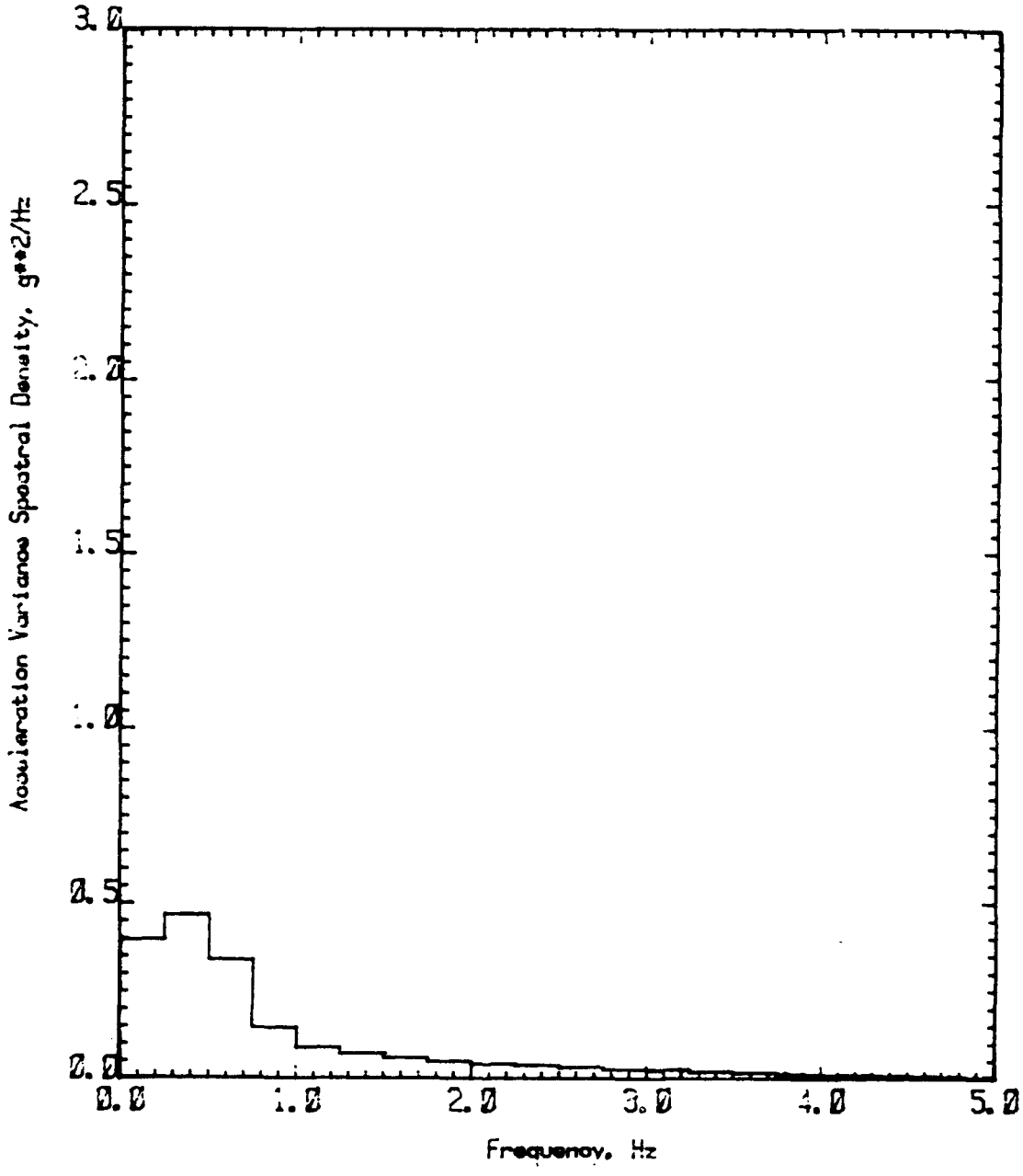


FIGURE B 5.4 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

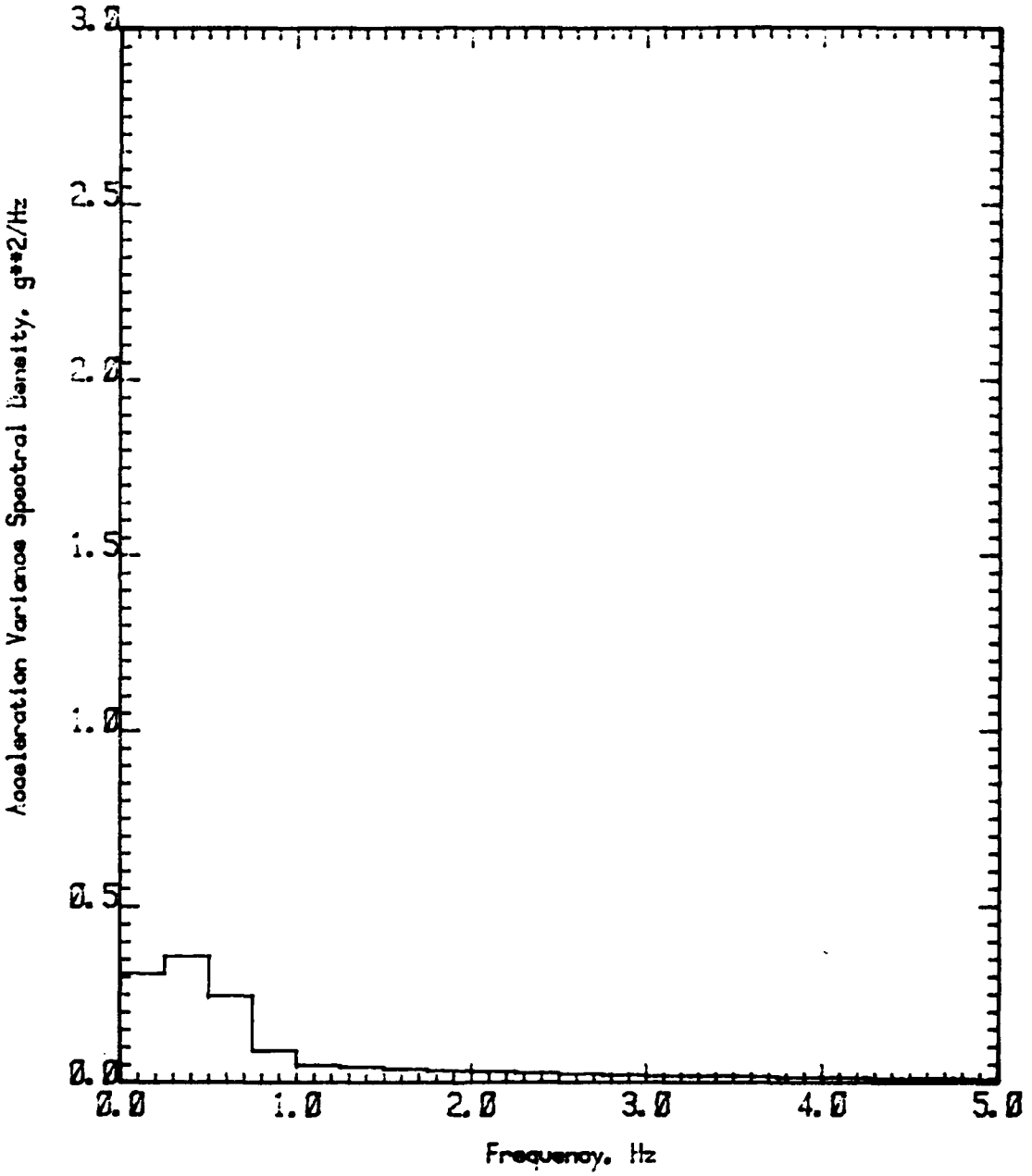


FIGURE B 5.5 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

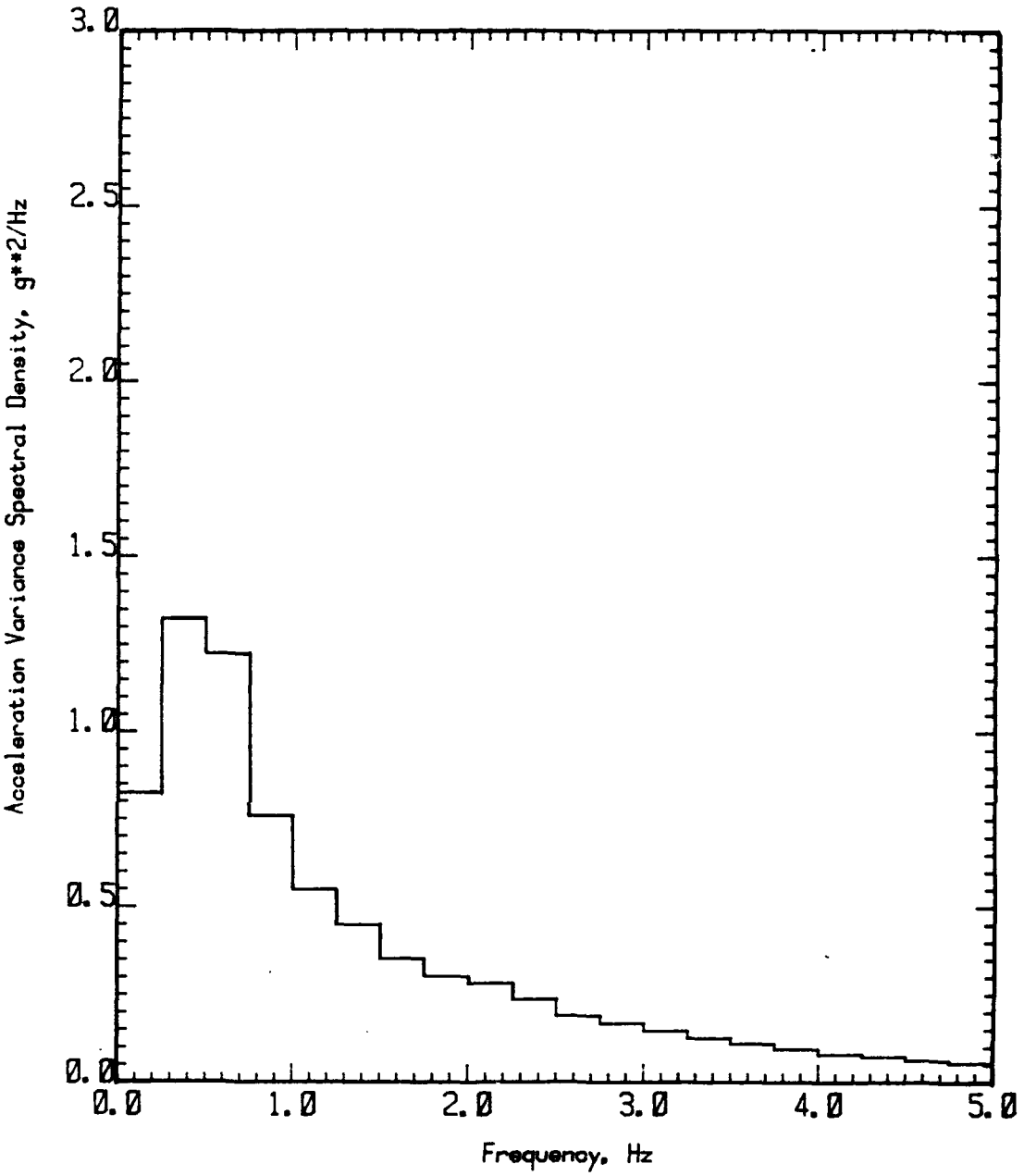


FIGURE B 6.1 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

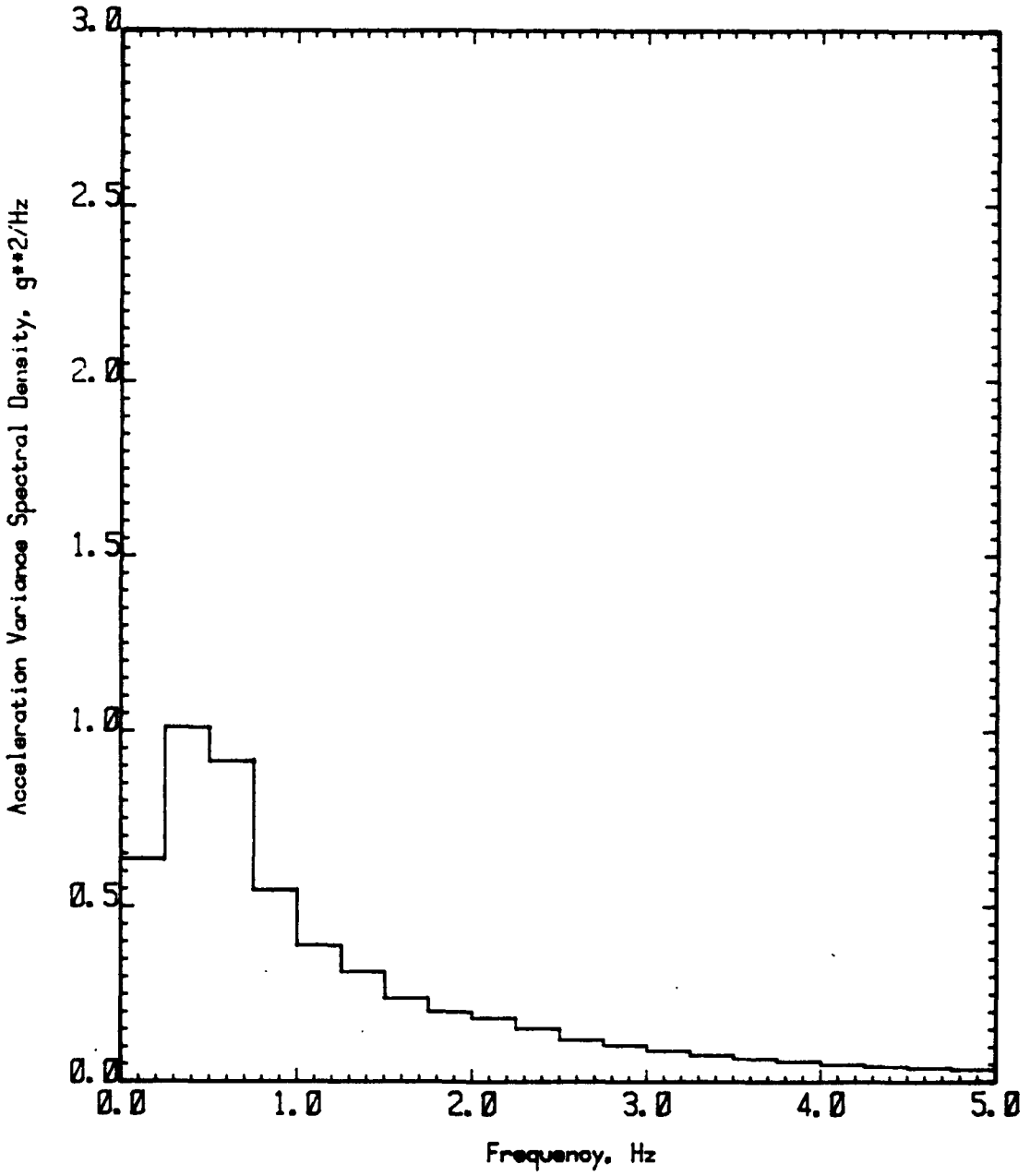


FIGURE B 6.2 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

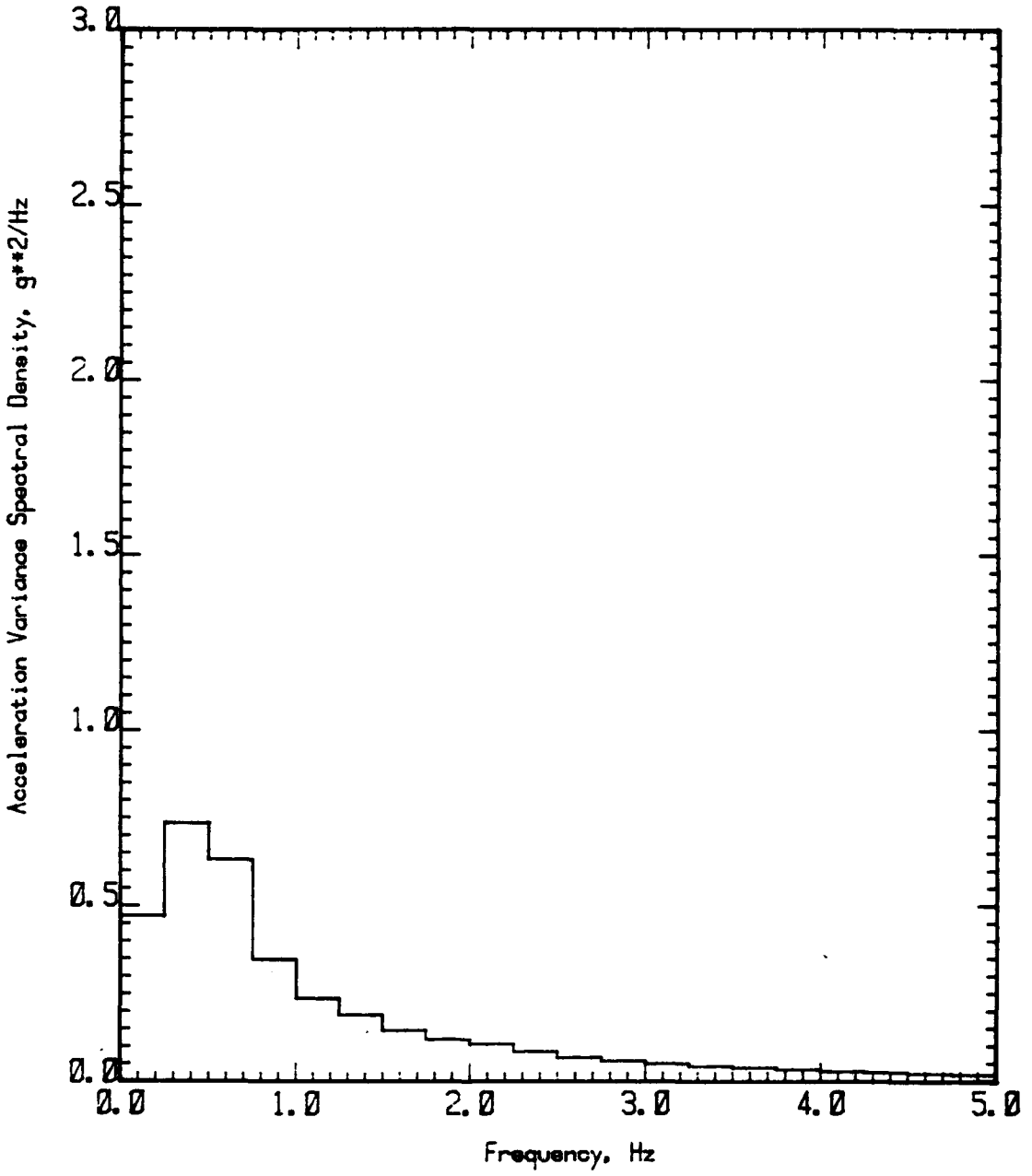


FIGURE B 6.3 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

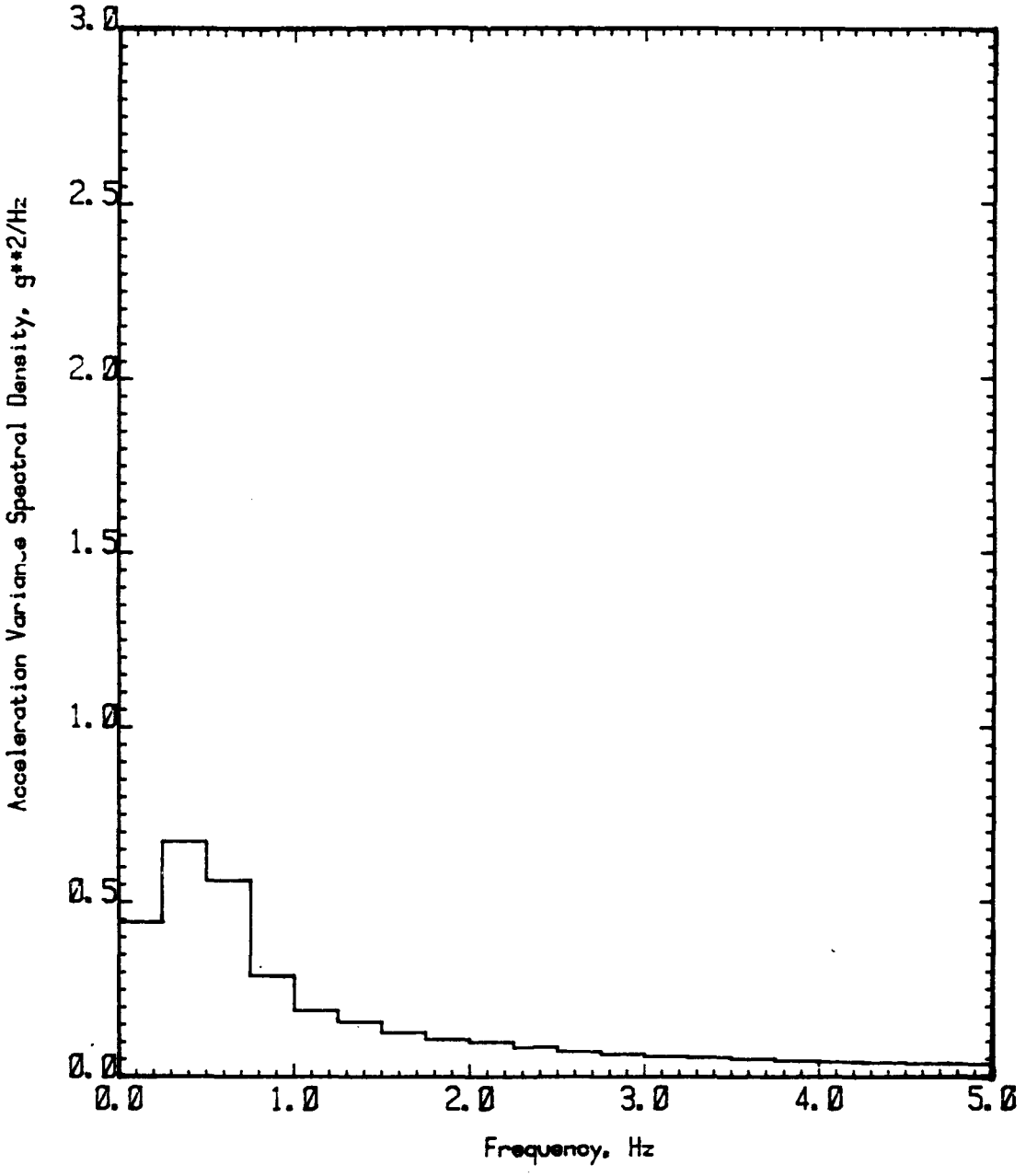


FIGURE B 6.4 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

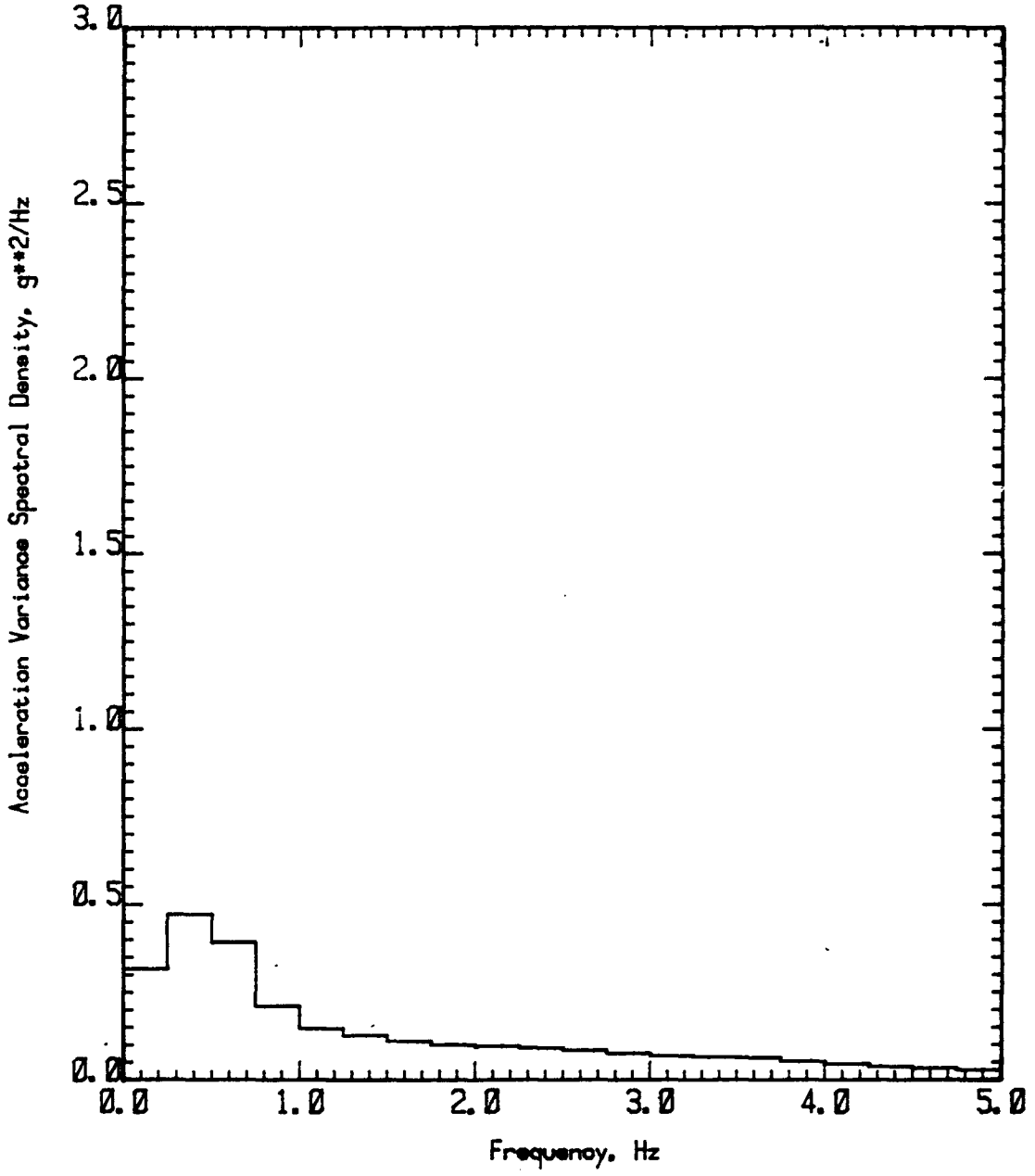


FIGURE B 6.5 ACCELERATION VARIANCE SPECTRAL DENSITY
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

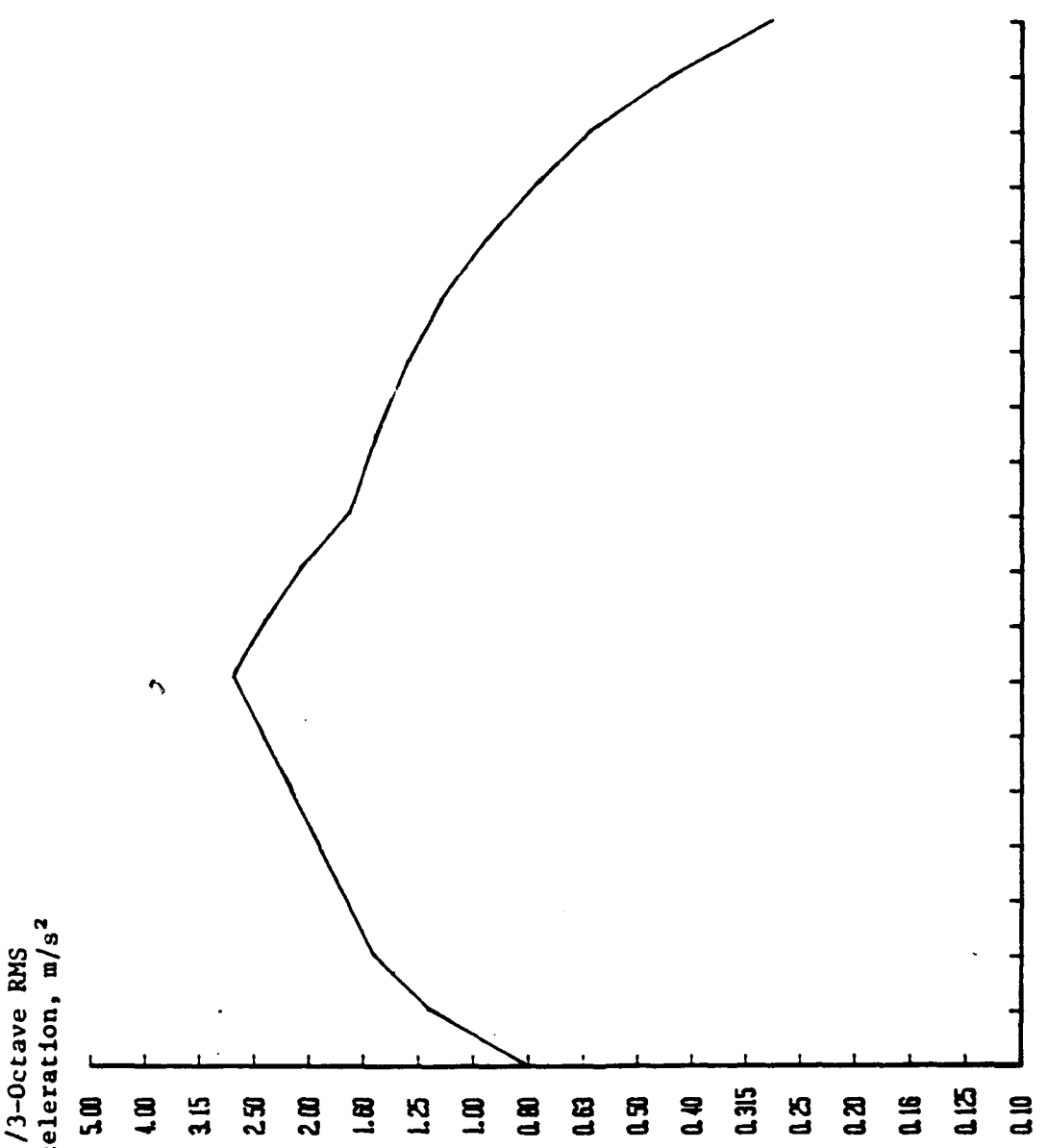


FIGURE C 1.1 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

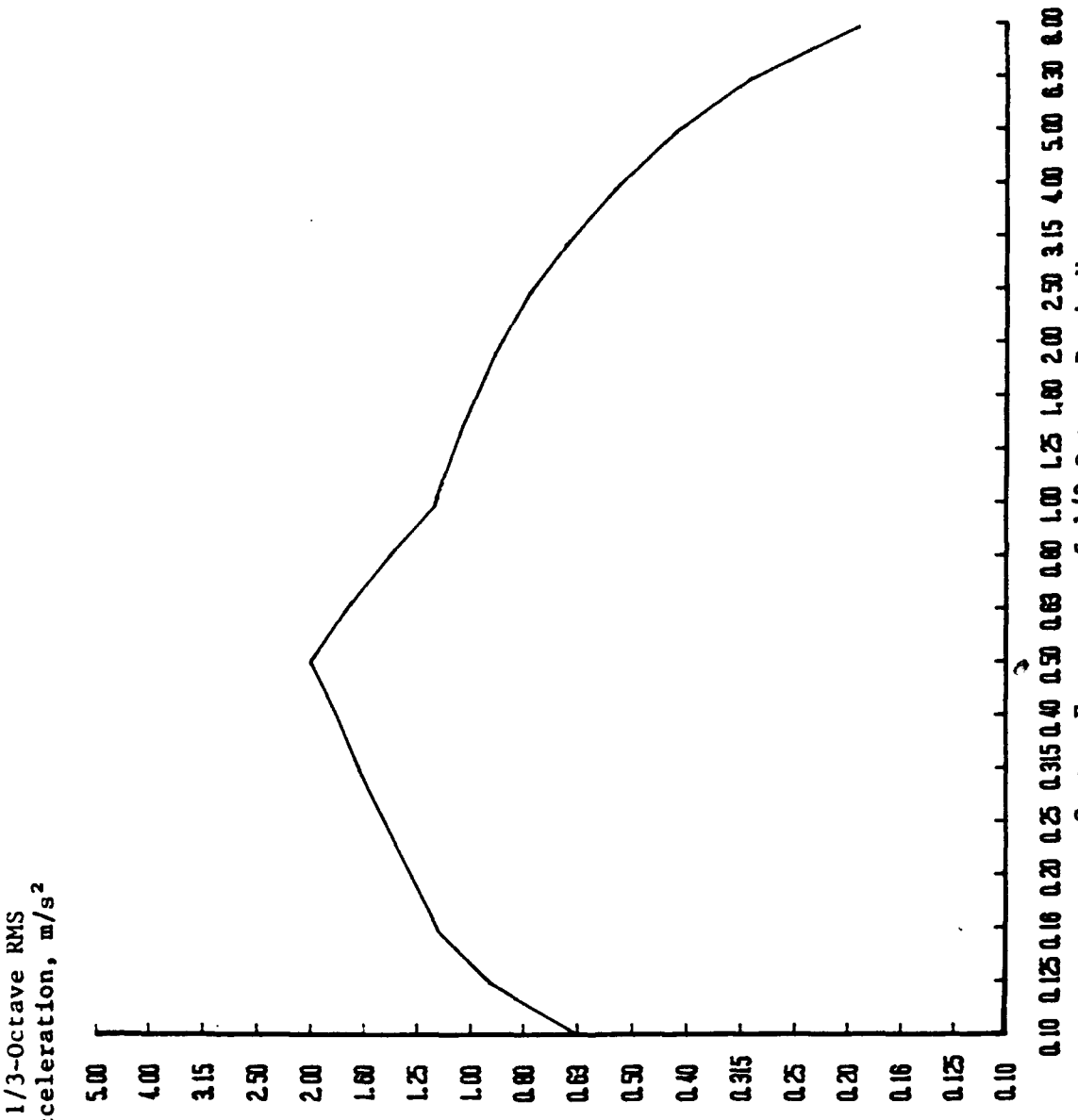


FIGURE C 1.2 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

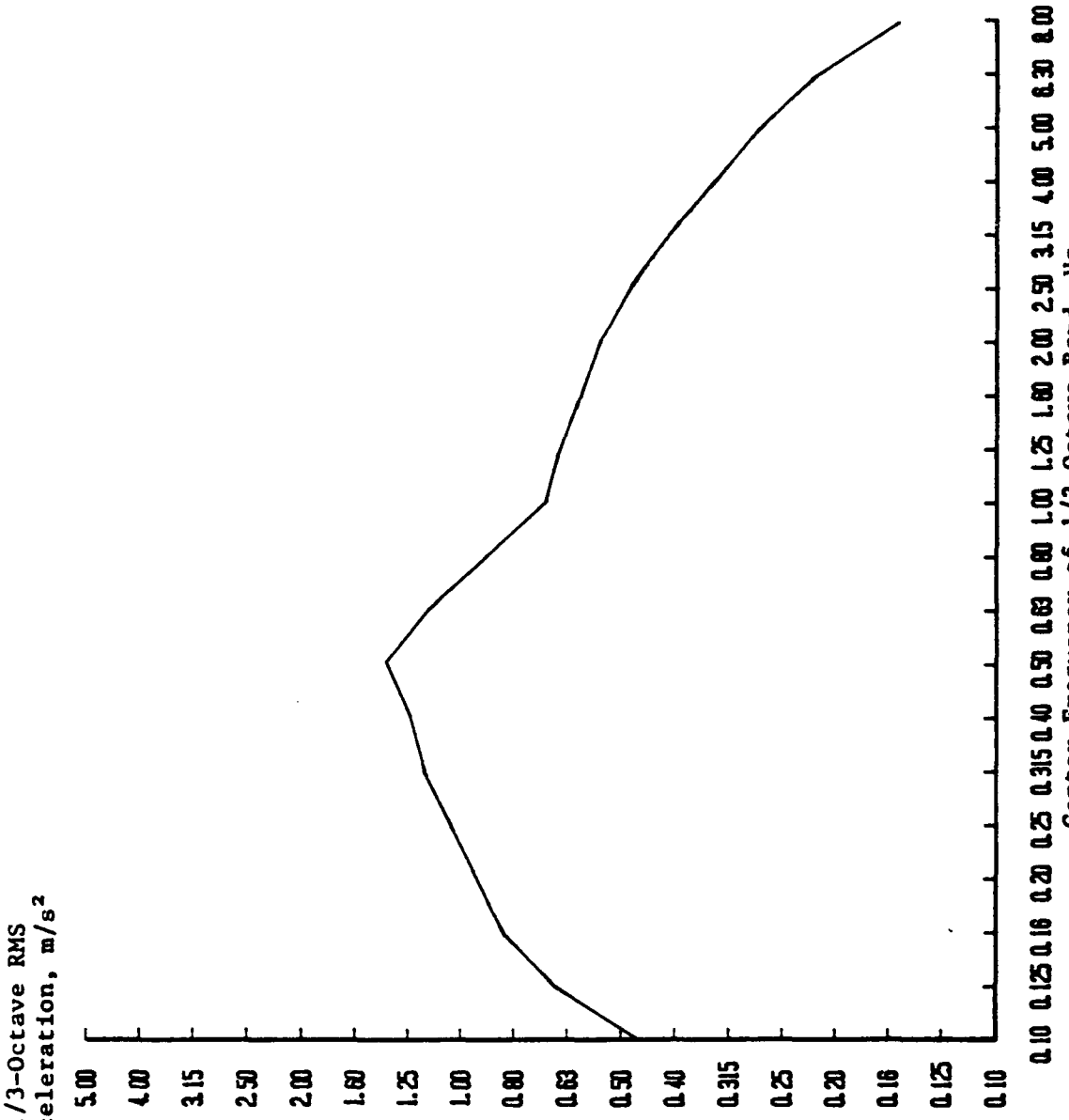


FIGURE C 1.3 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

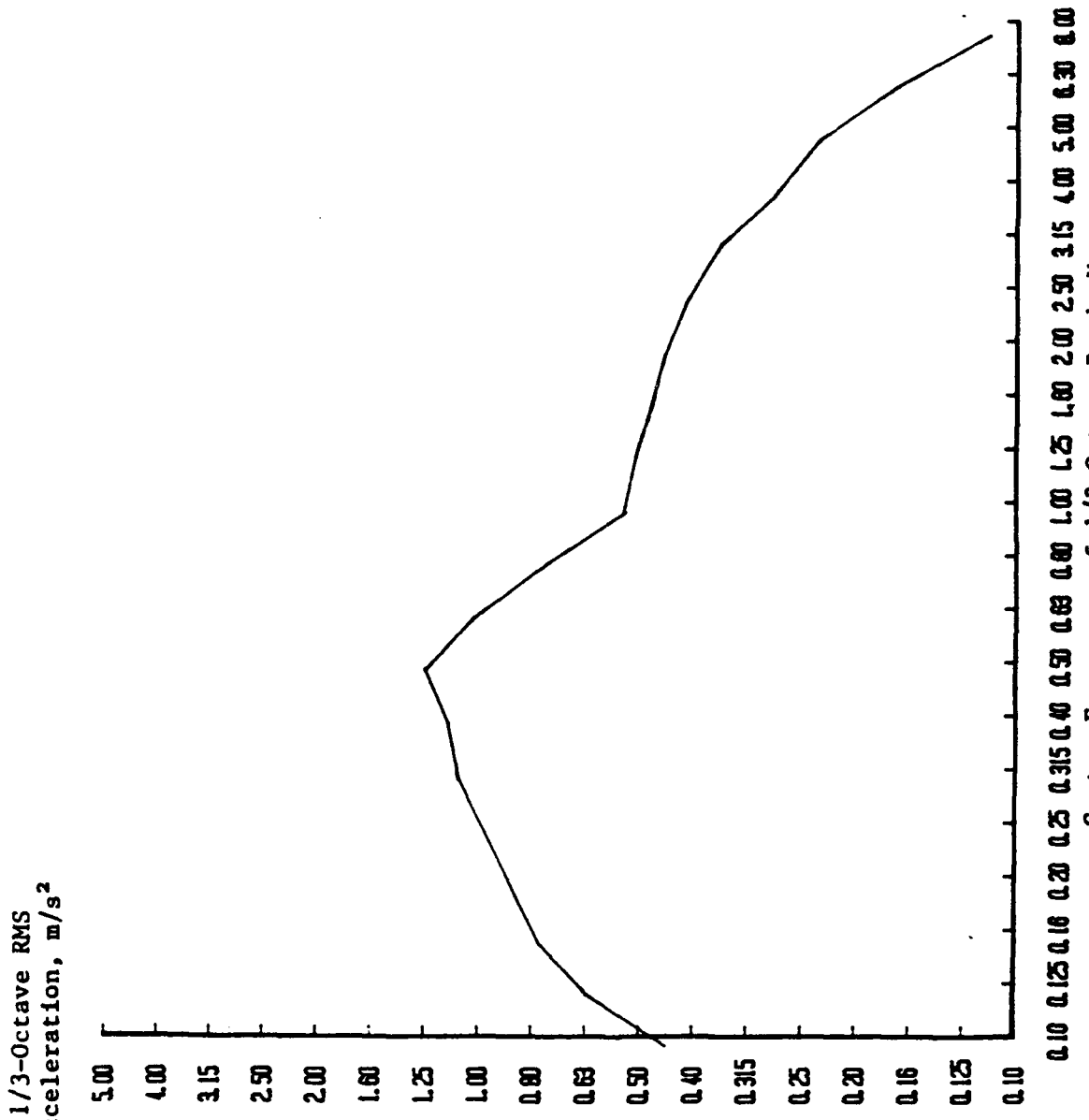


FIGURE C 1.4 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

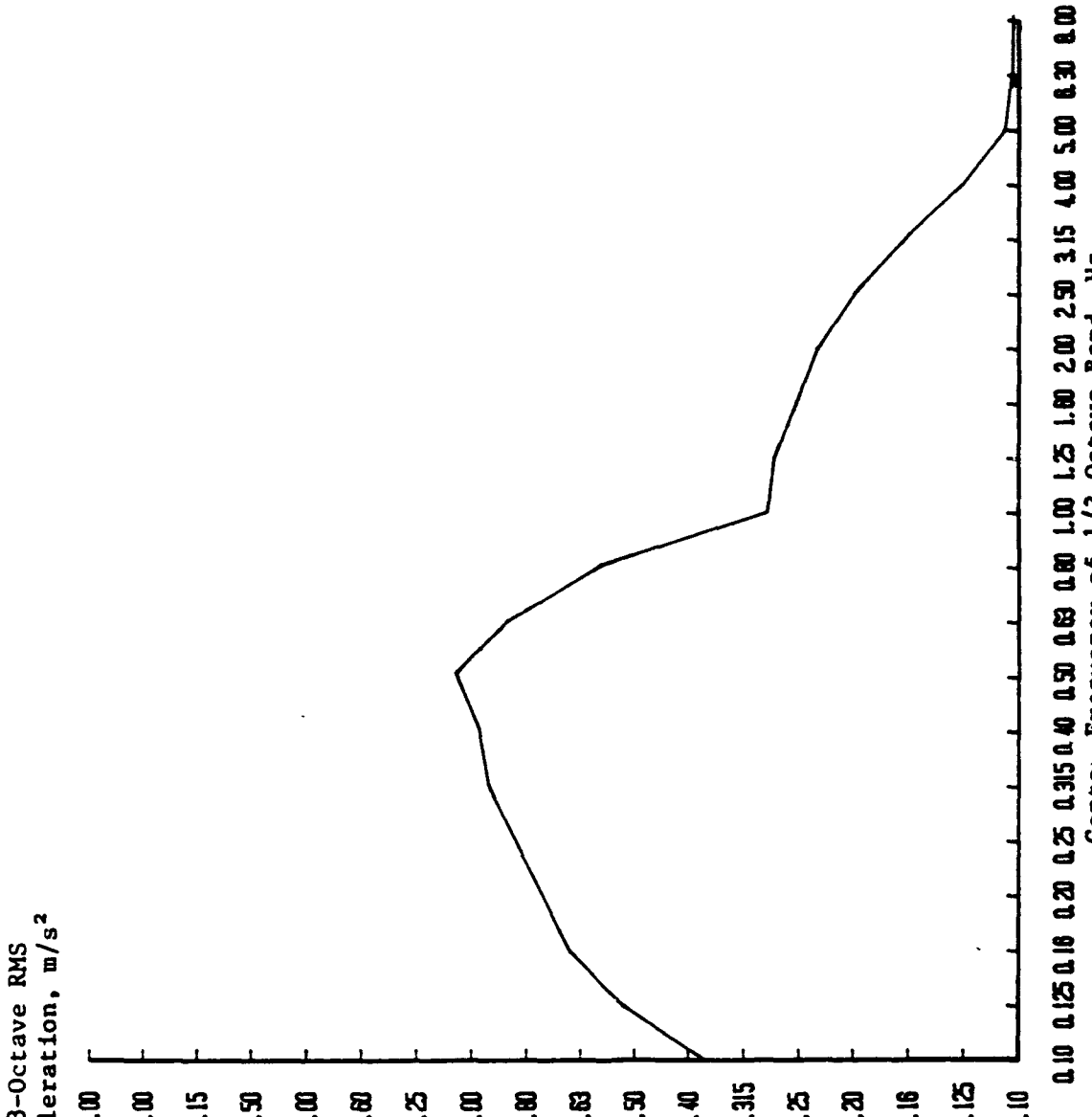


FIGURE C 1.5 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No.1
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

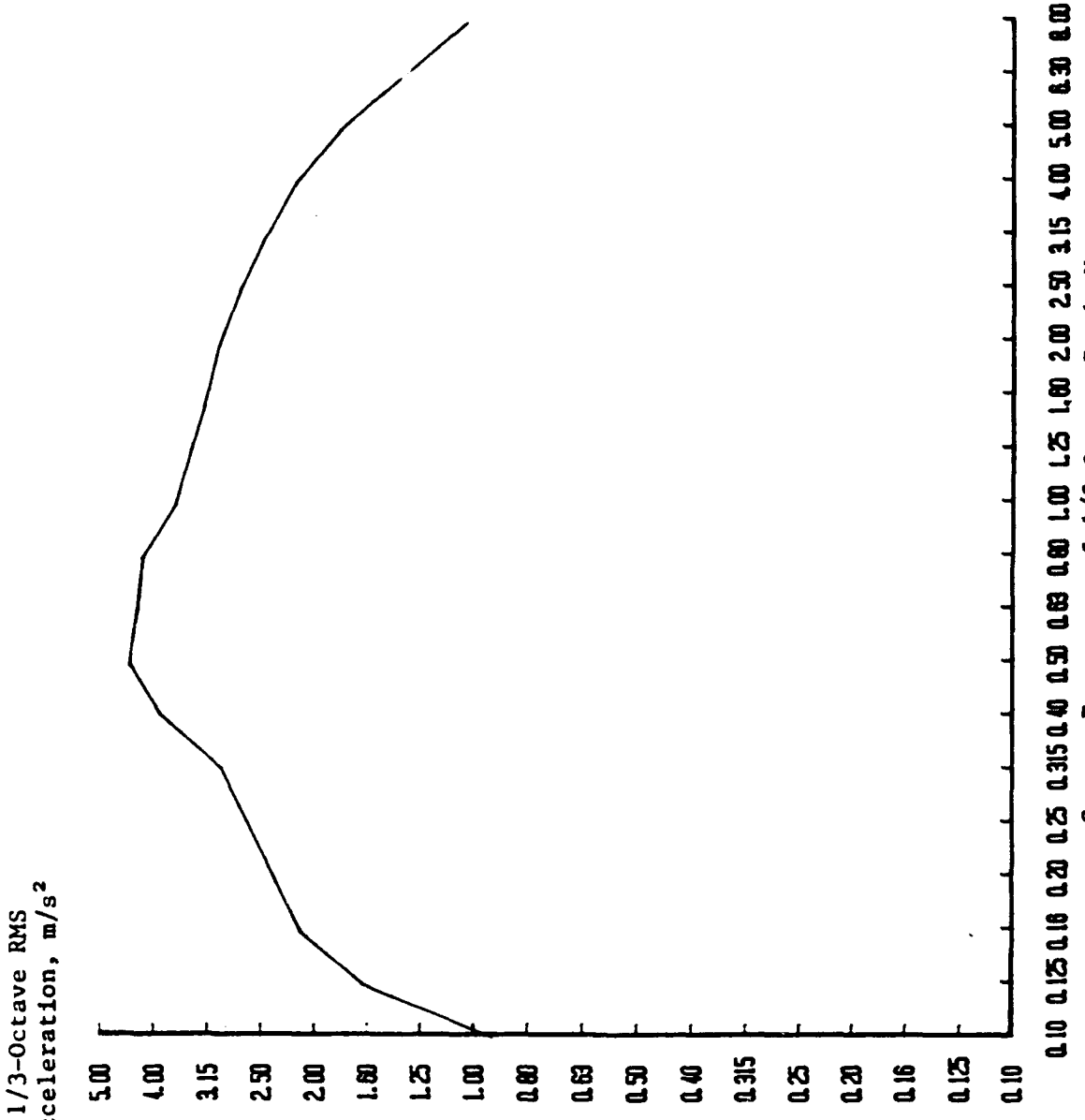


FIGURE C 2.1 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

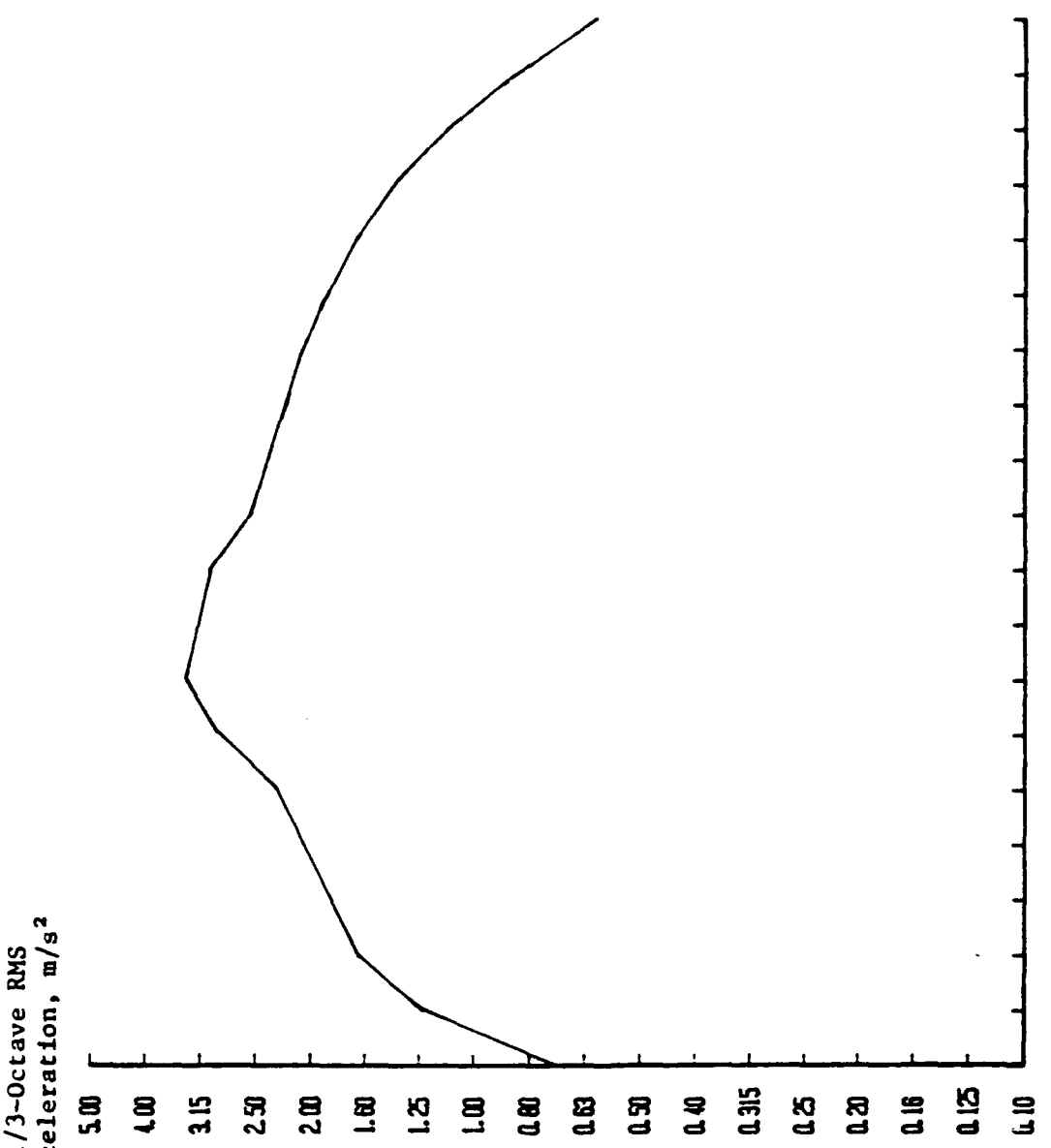


FIGURE C 2.2 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

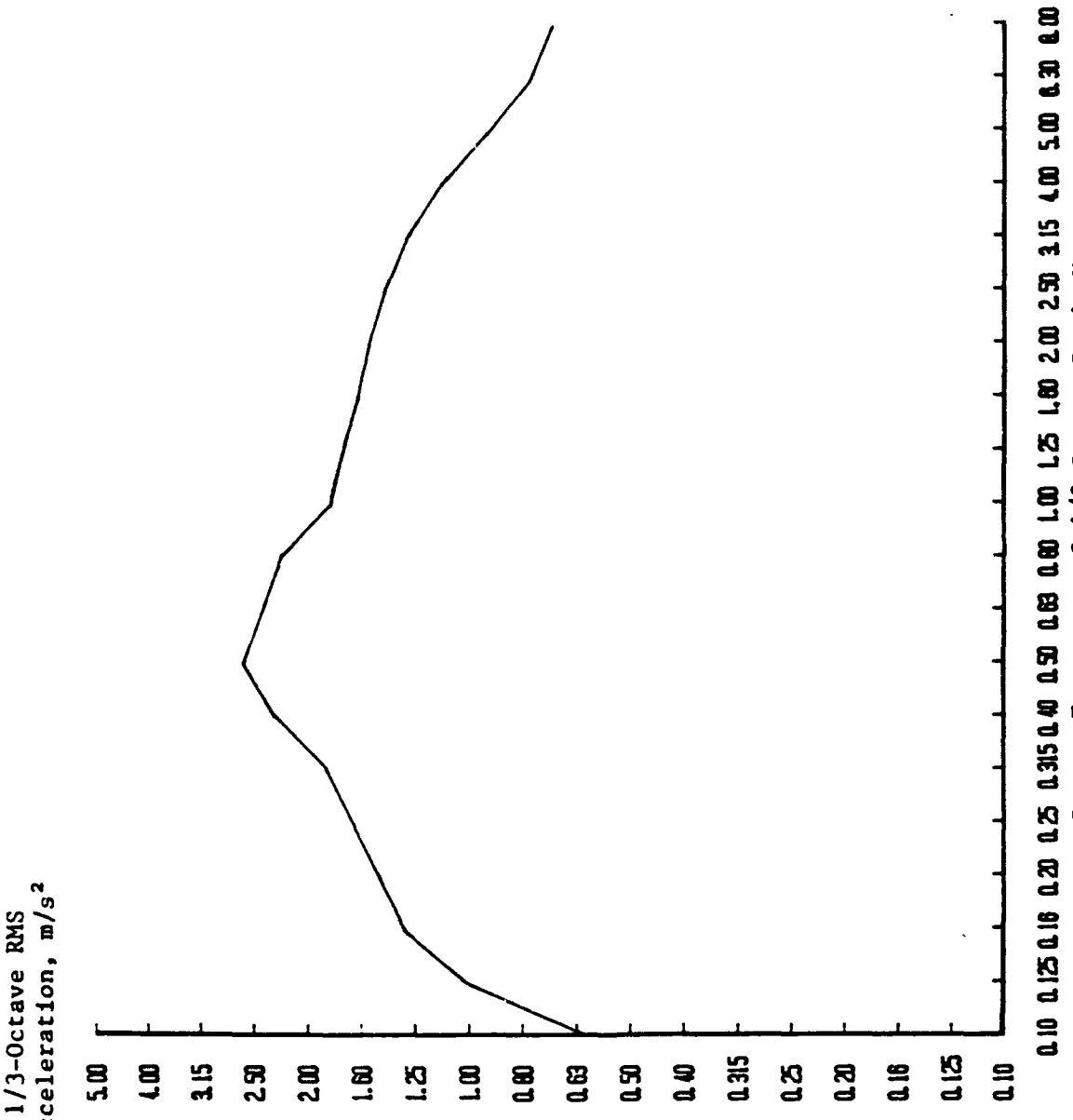


FIGURE C 2.3 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

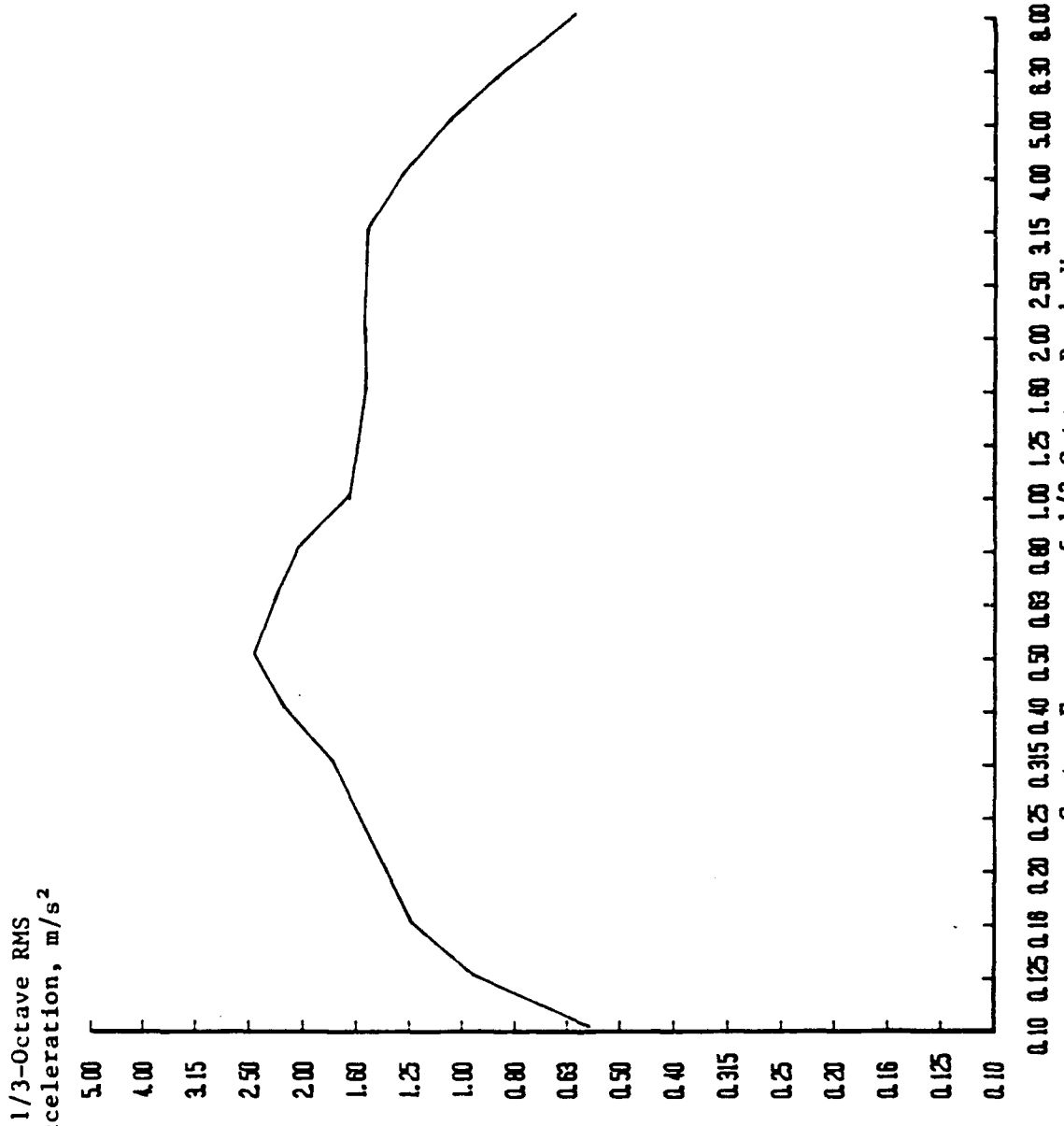


FIGURE C 2.4 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0 % Beam

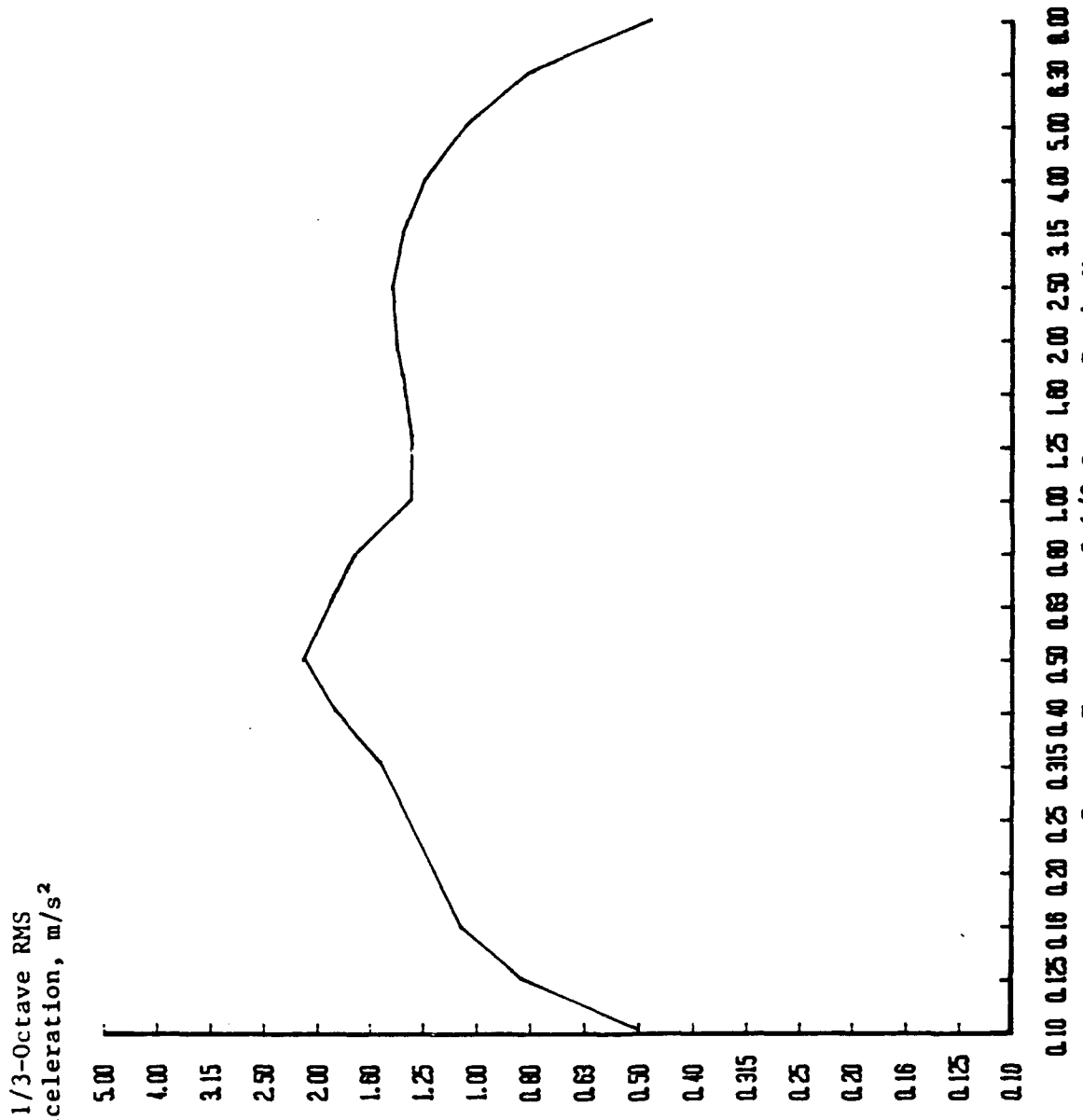


FIGURE C 2.5 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

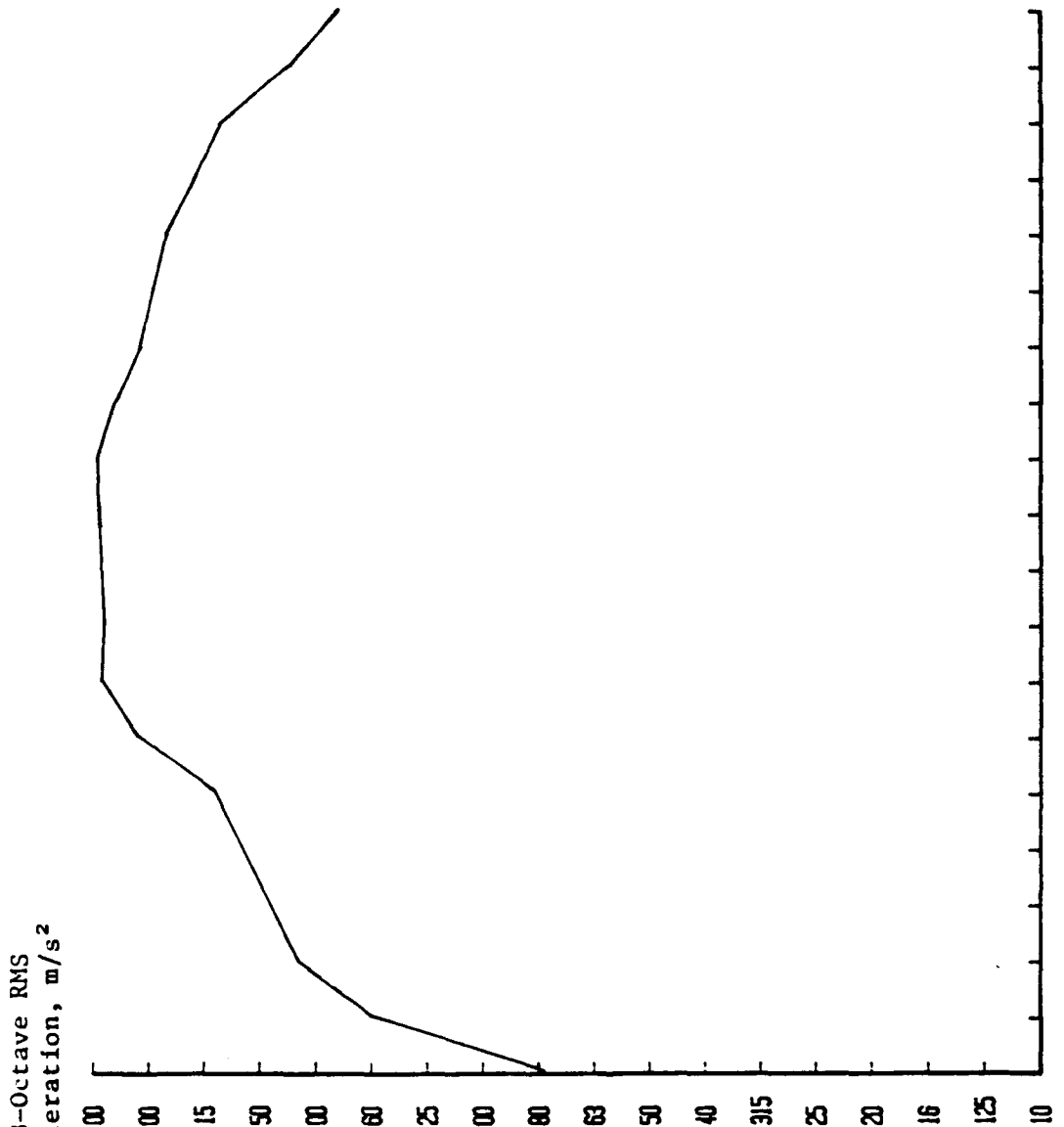


FIGURE C 3.1 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

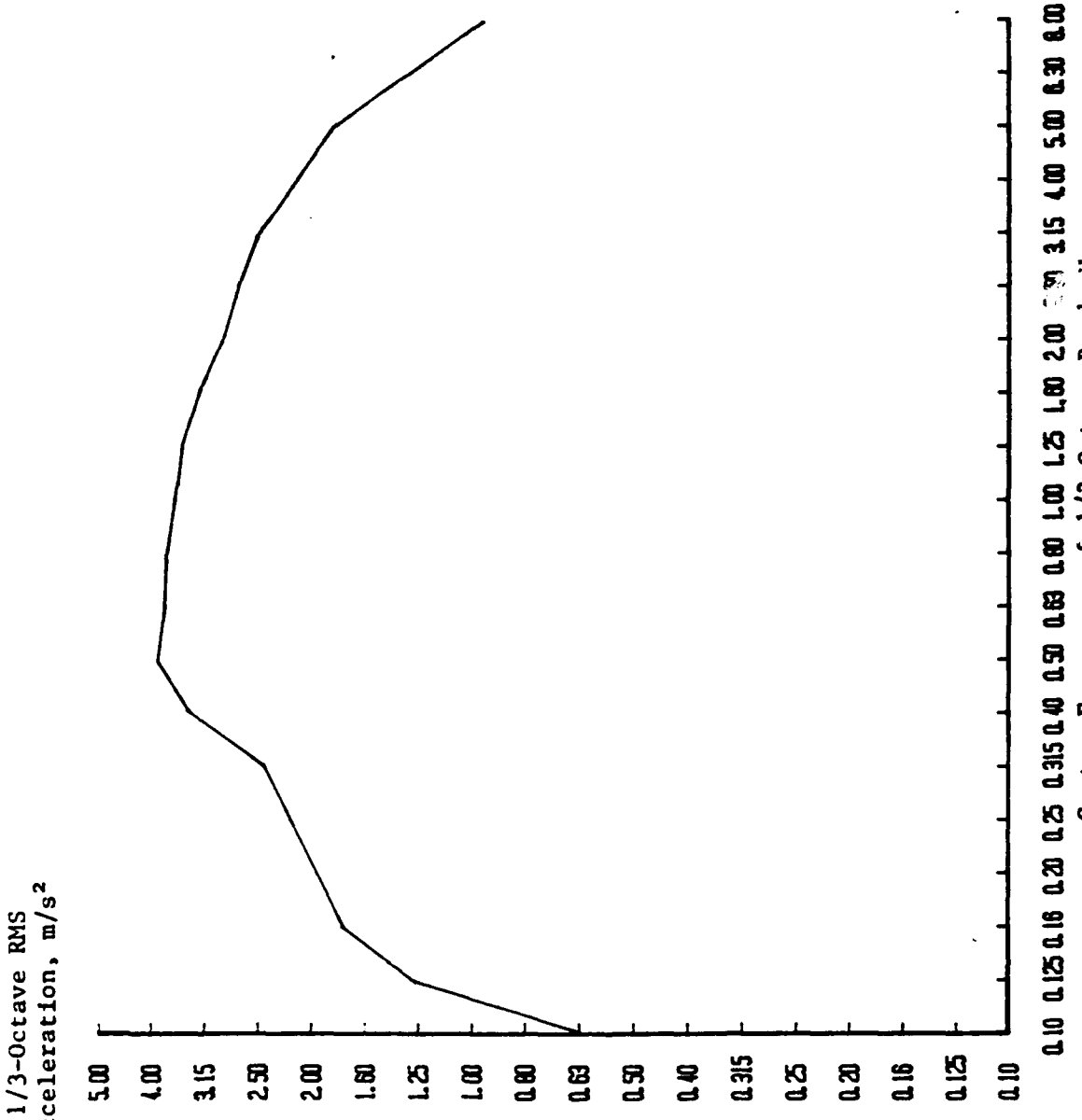


FIGURE C 3.2 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

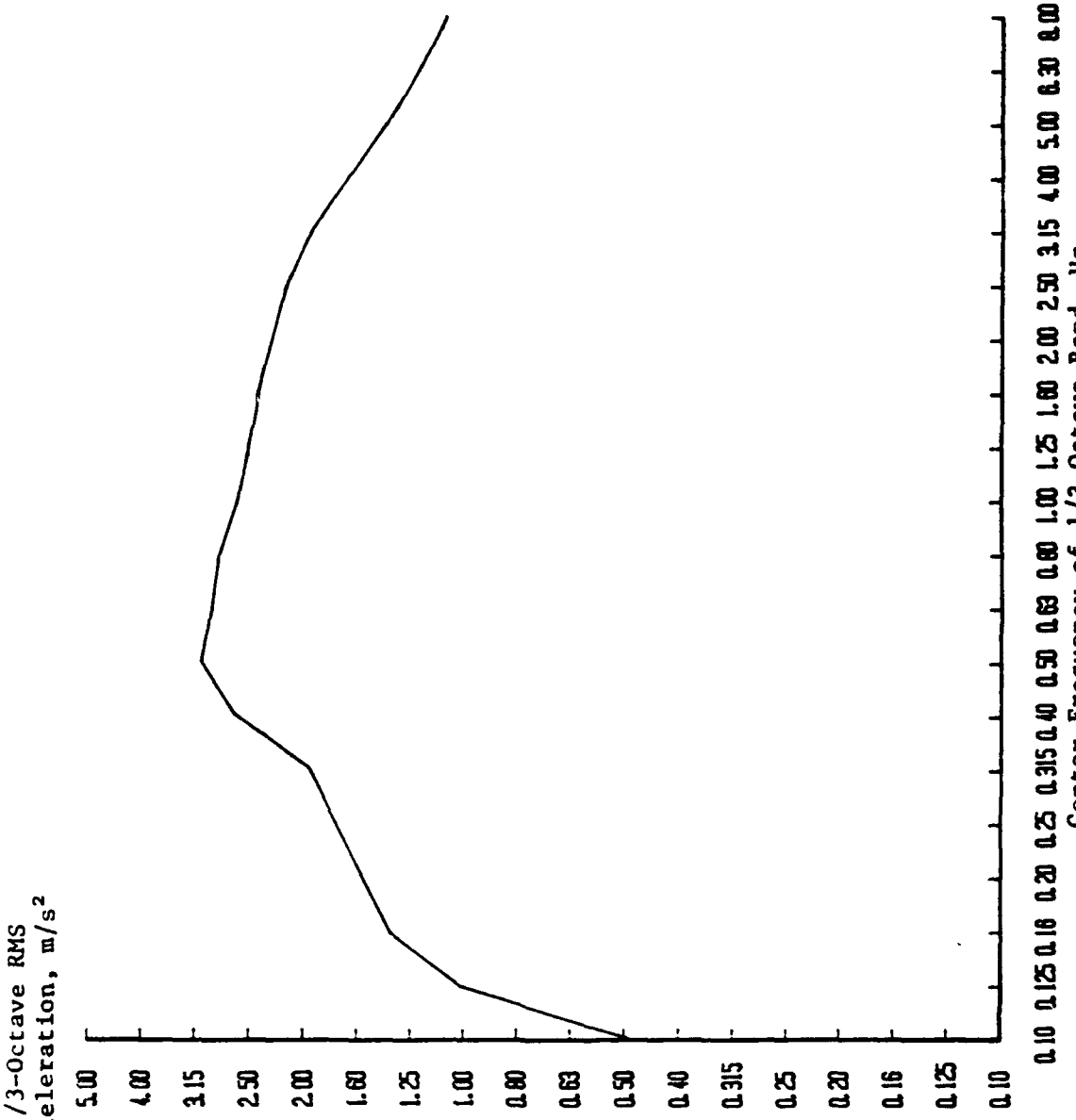


FIGURE C 3.3 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

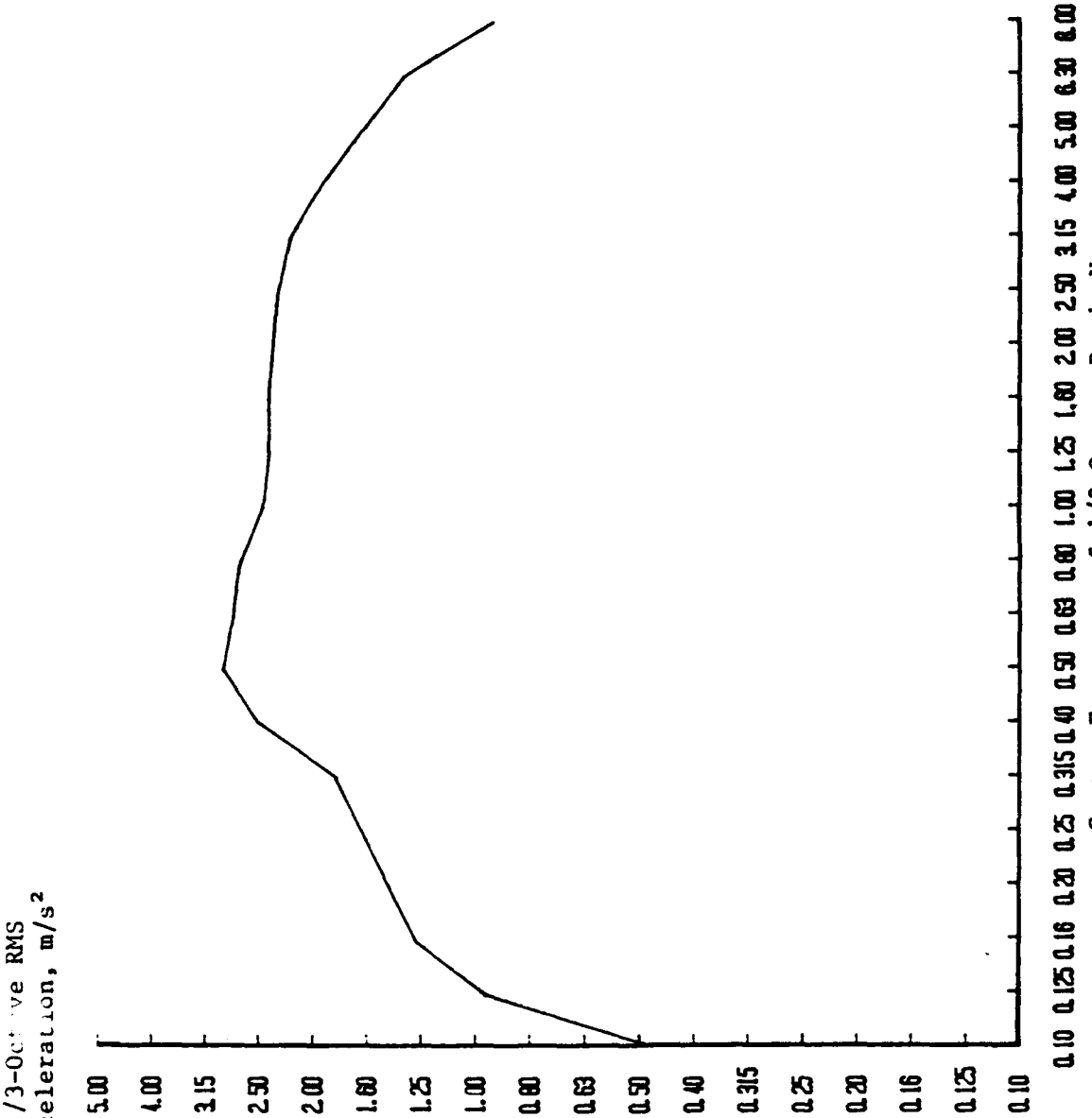


FIGURE C 3.4 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

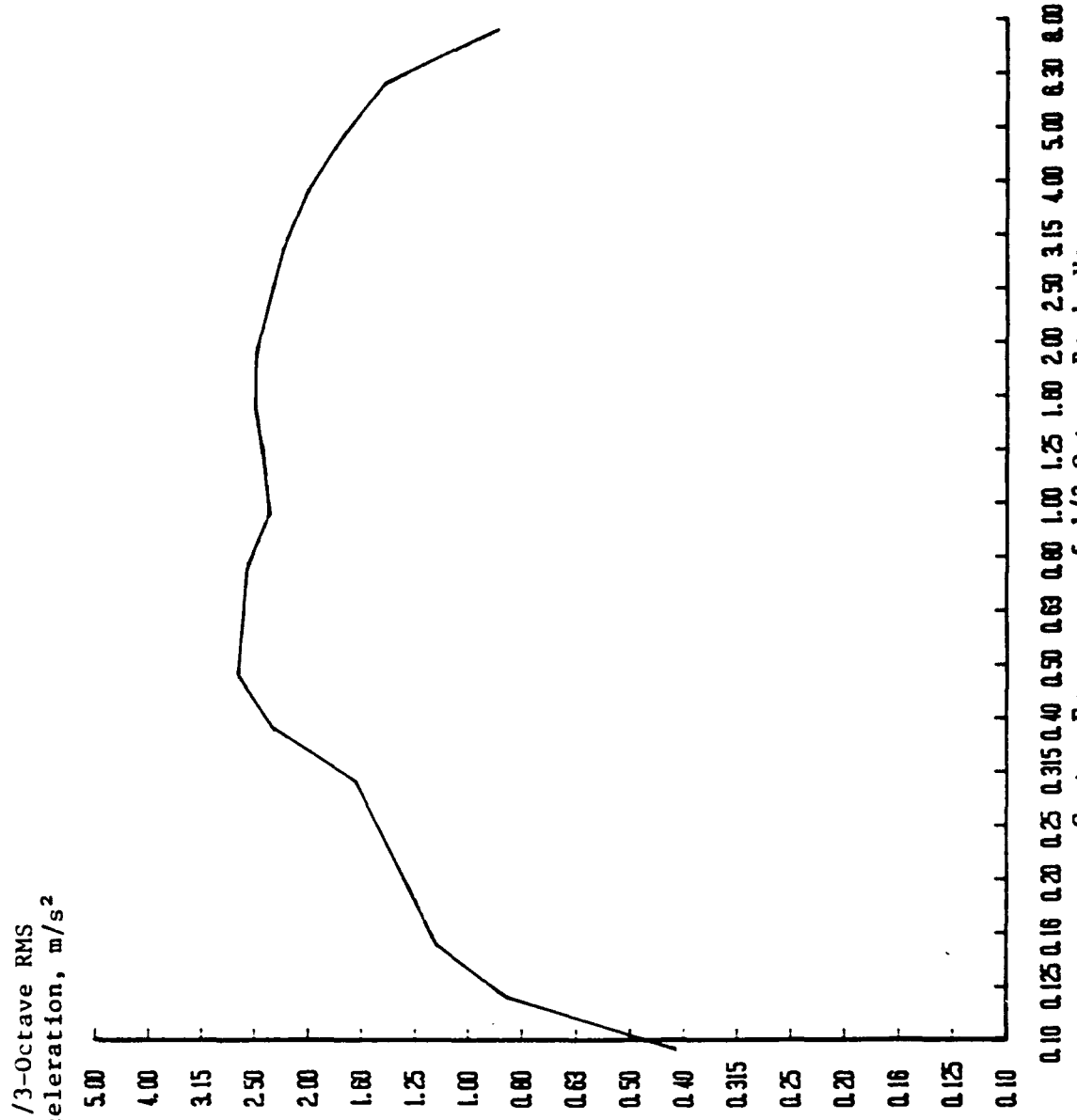


FIGURE C 3.5 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

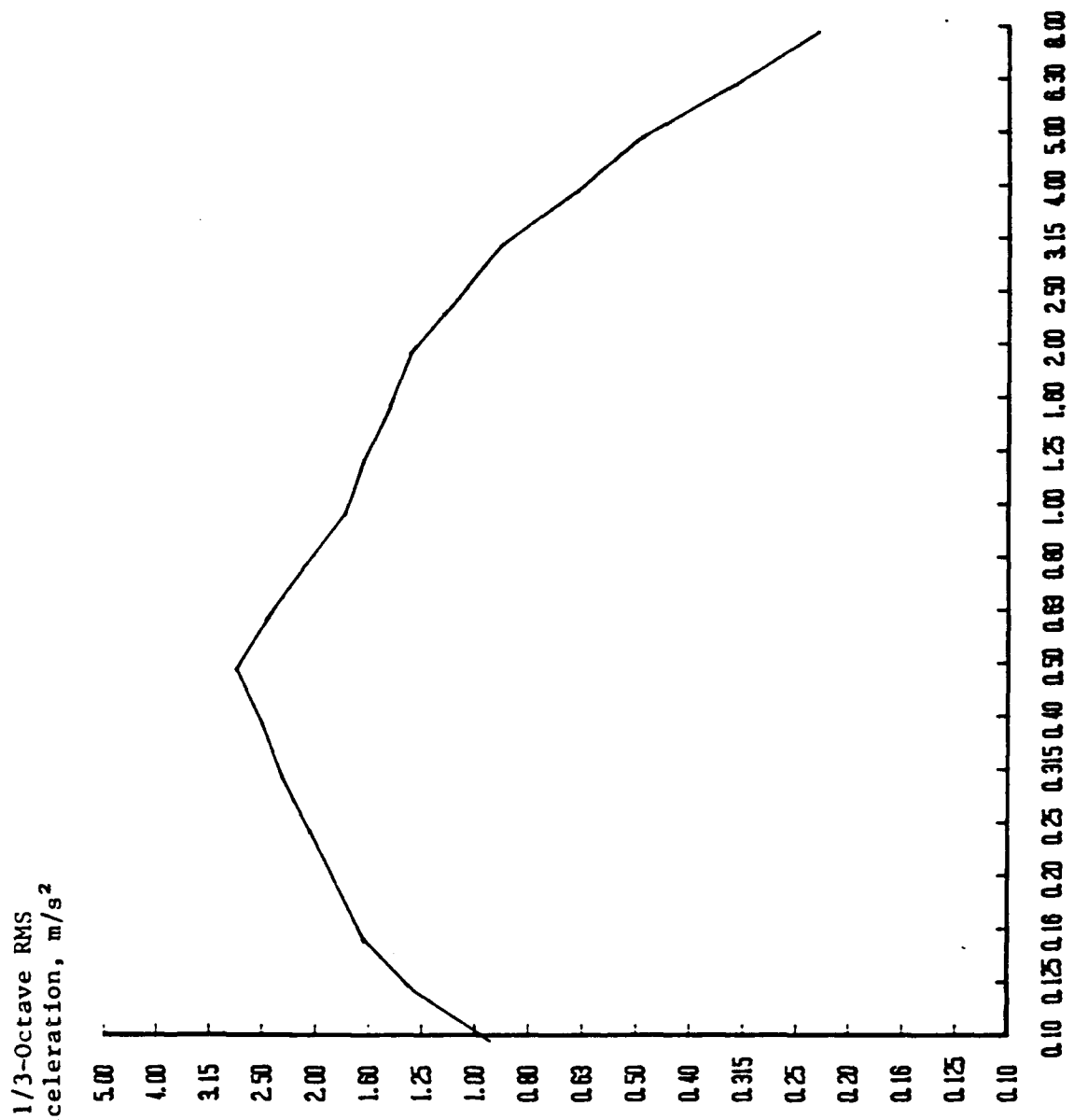


FIGURE C 4.1 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

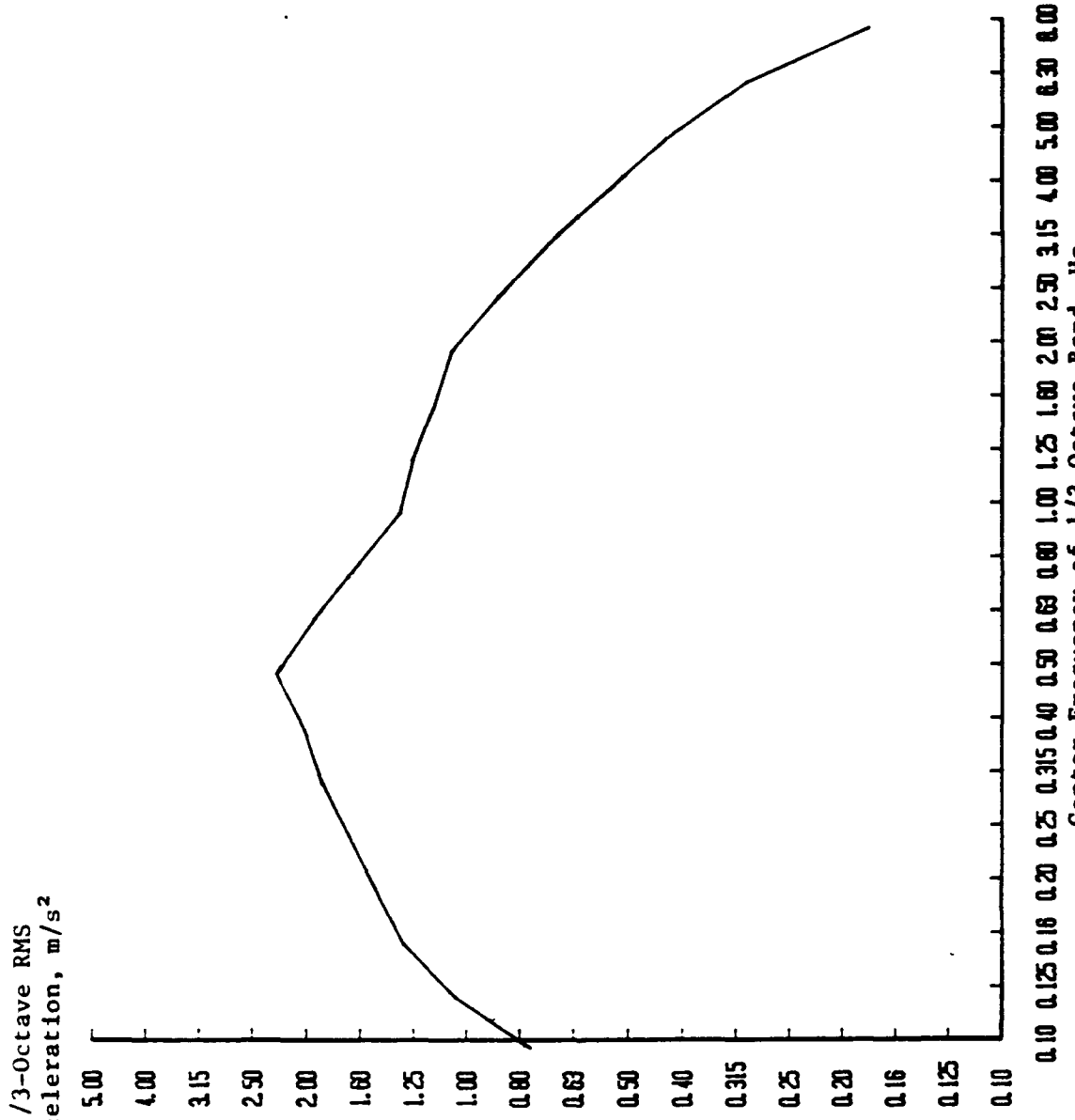


FIGURE C 4.2 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

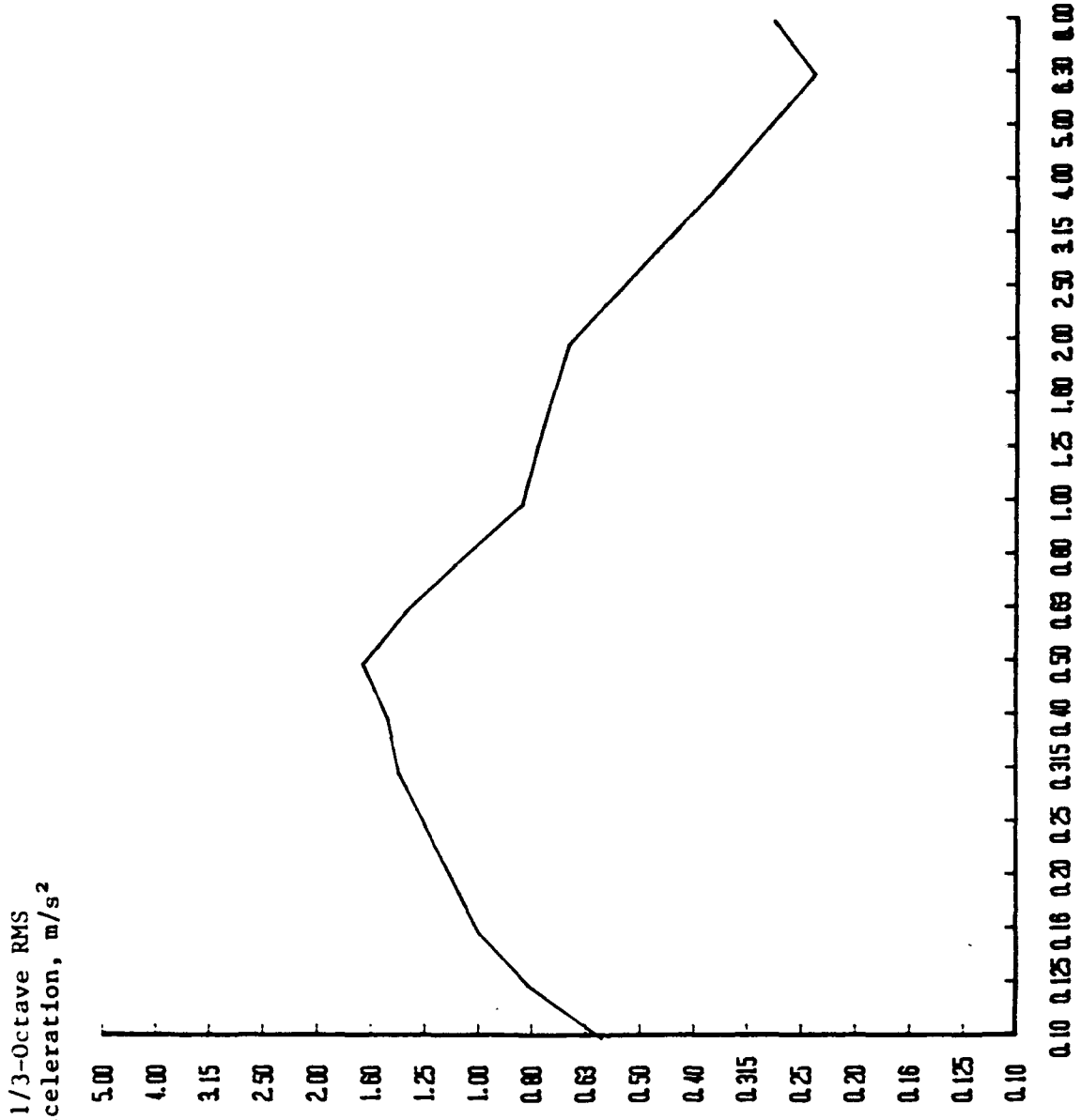


FIGURE C 4.3 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

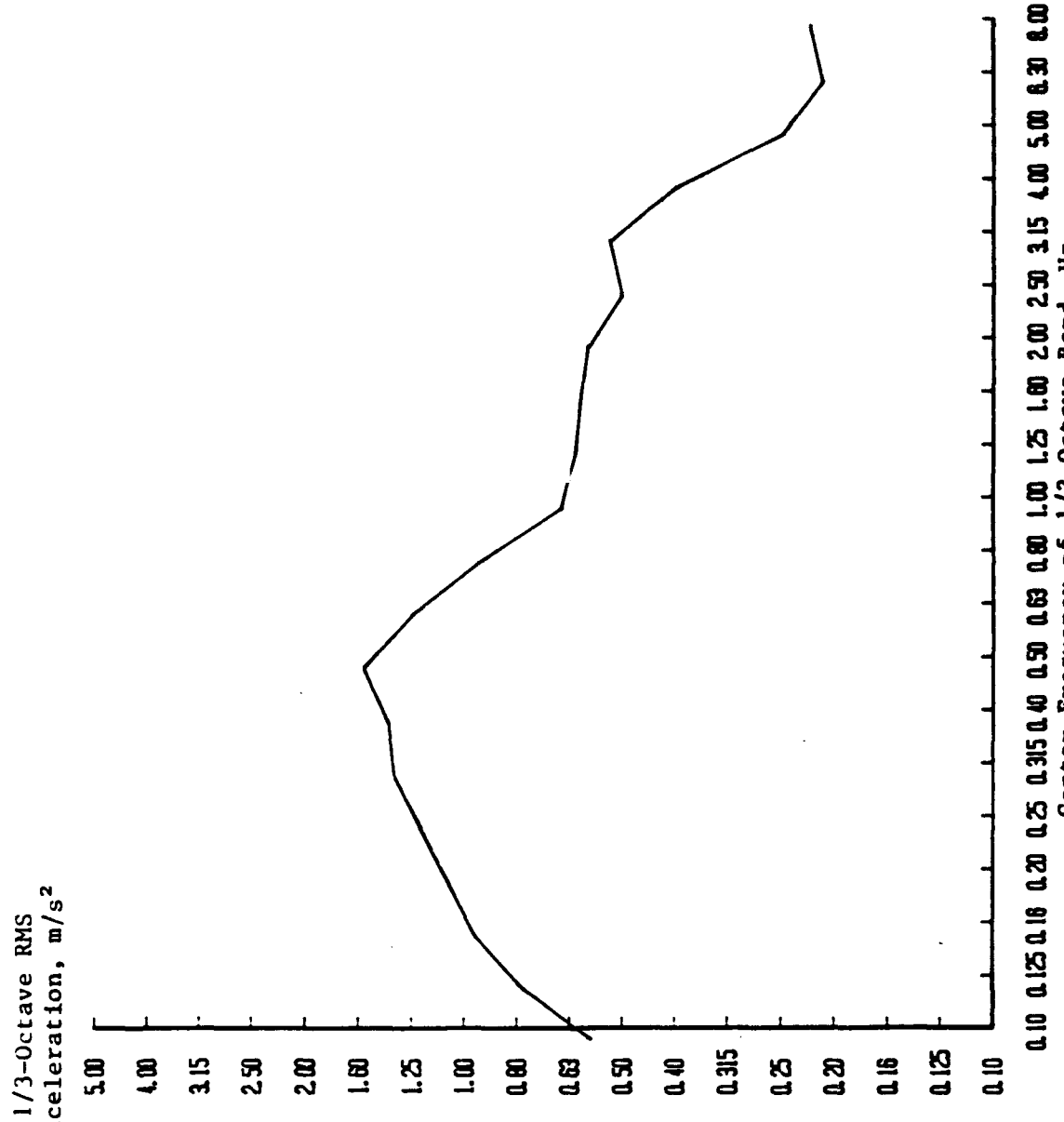


FIGURE C 4.4 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

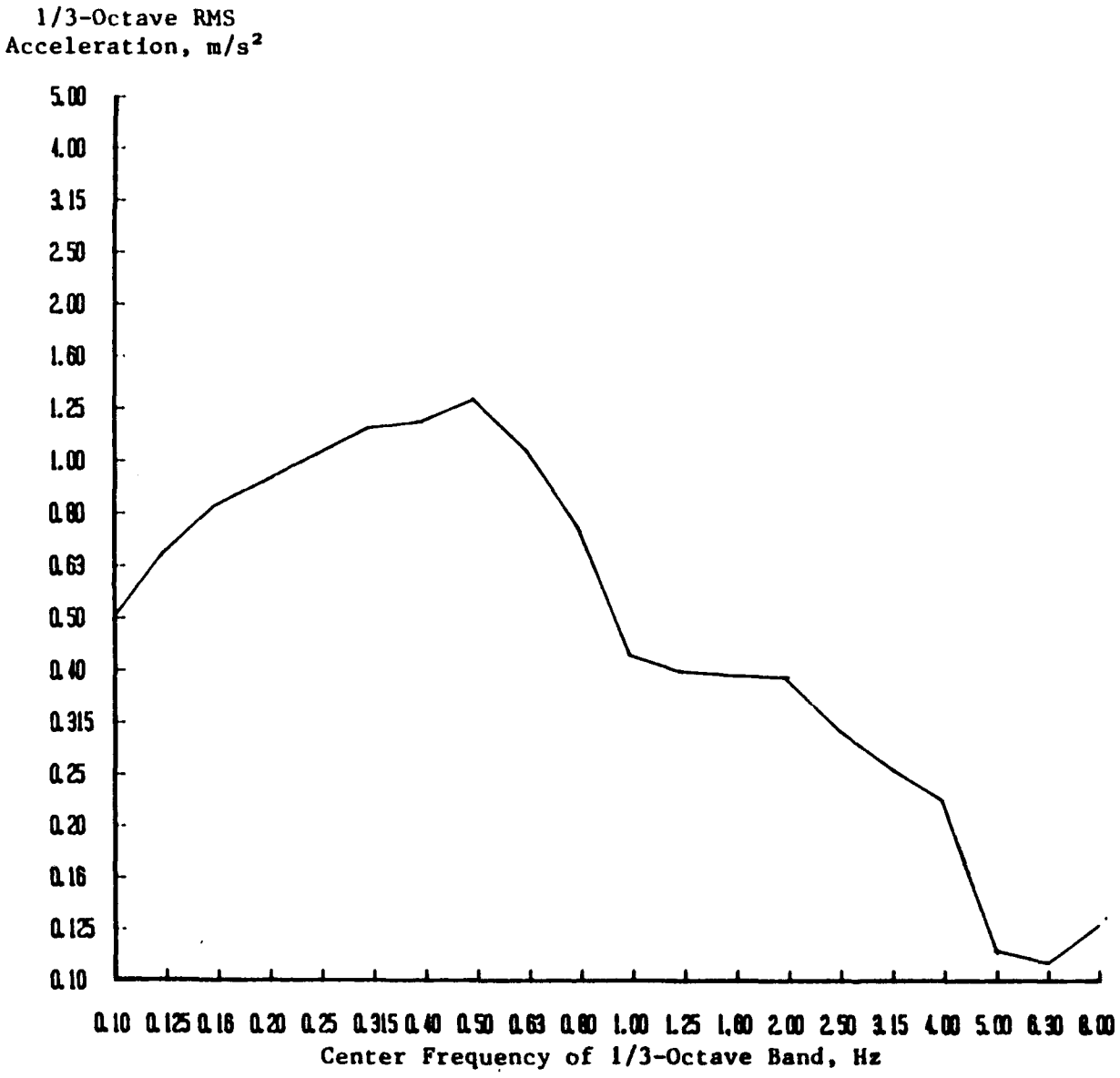


FIGURE C 4.5 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

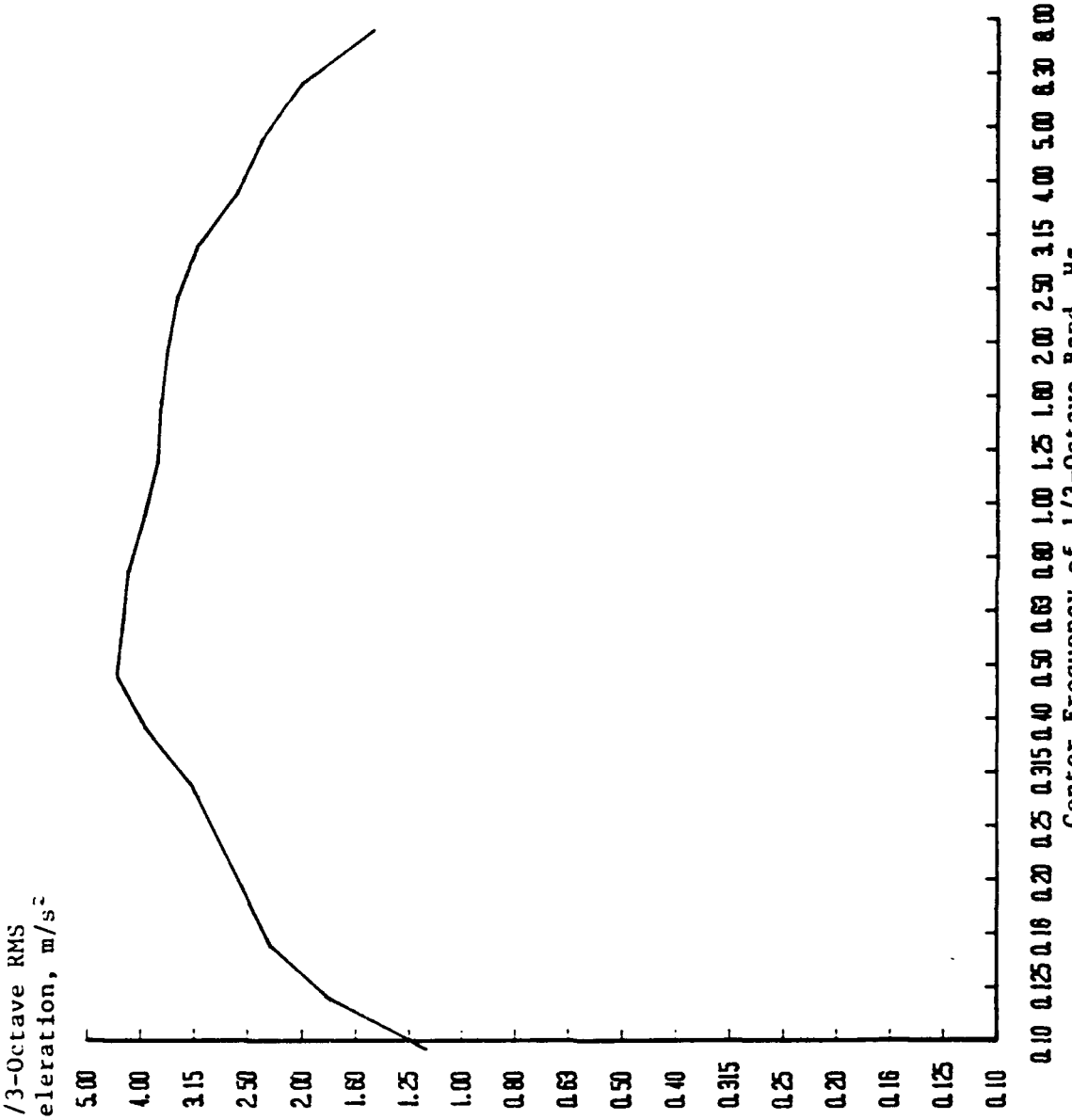


FIGURE C 5.1 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

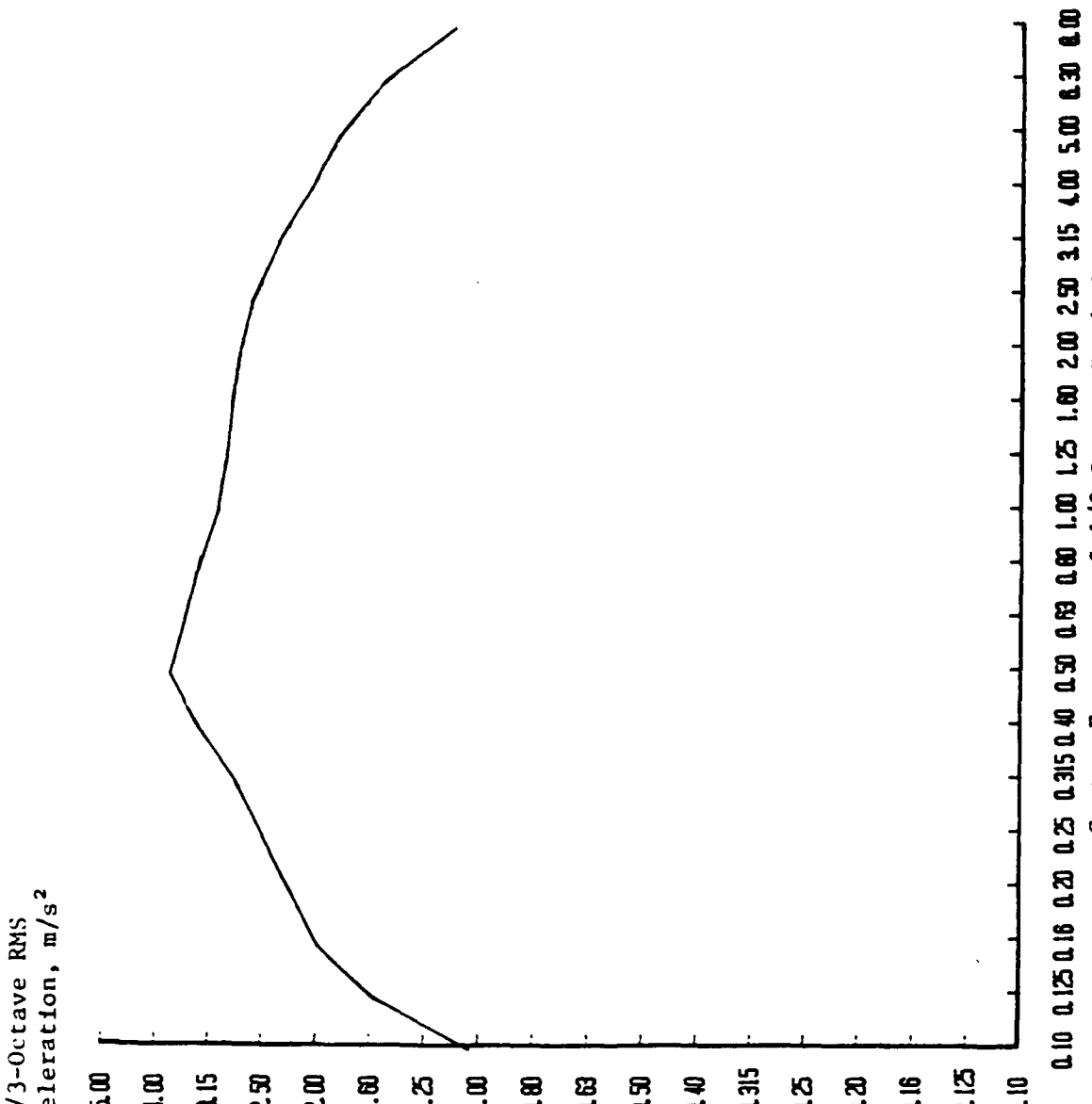


FIGURE C 5.2 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

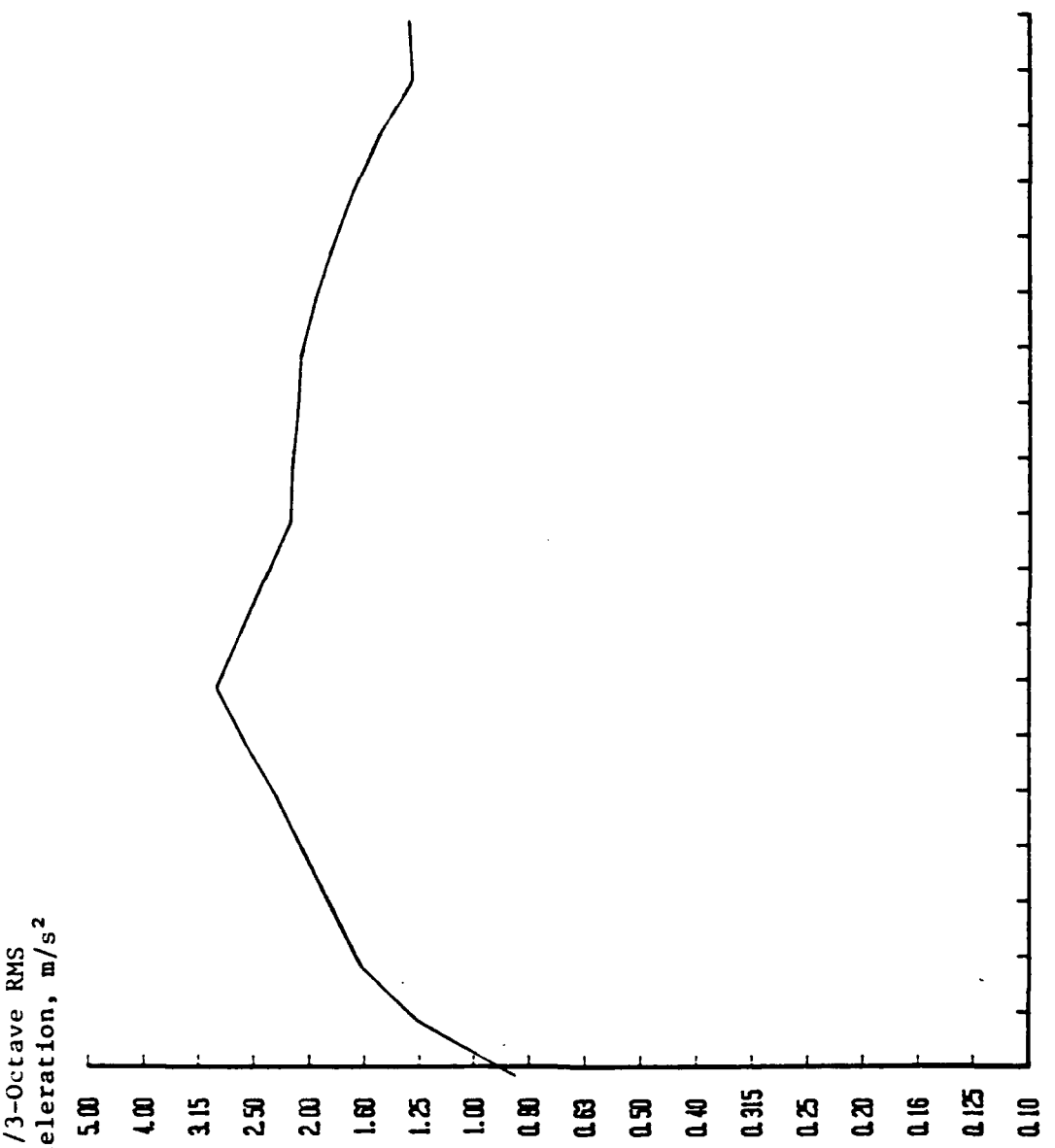


FIGURE C 5.3 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0 % Beam

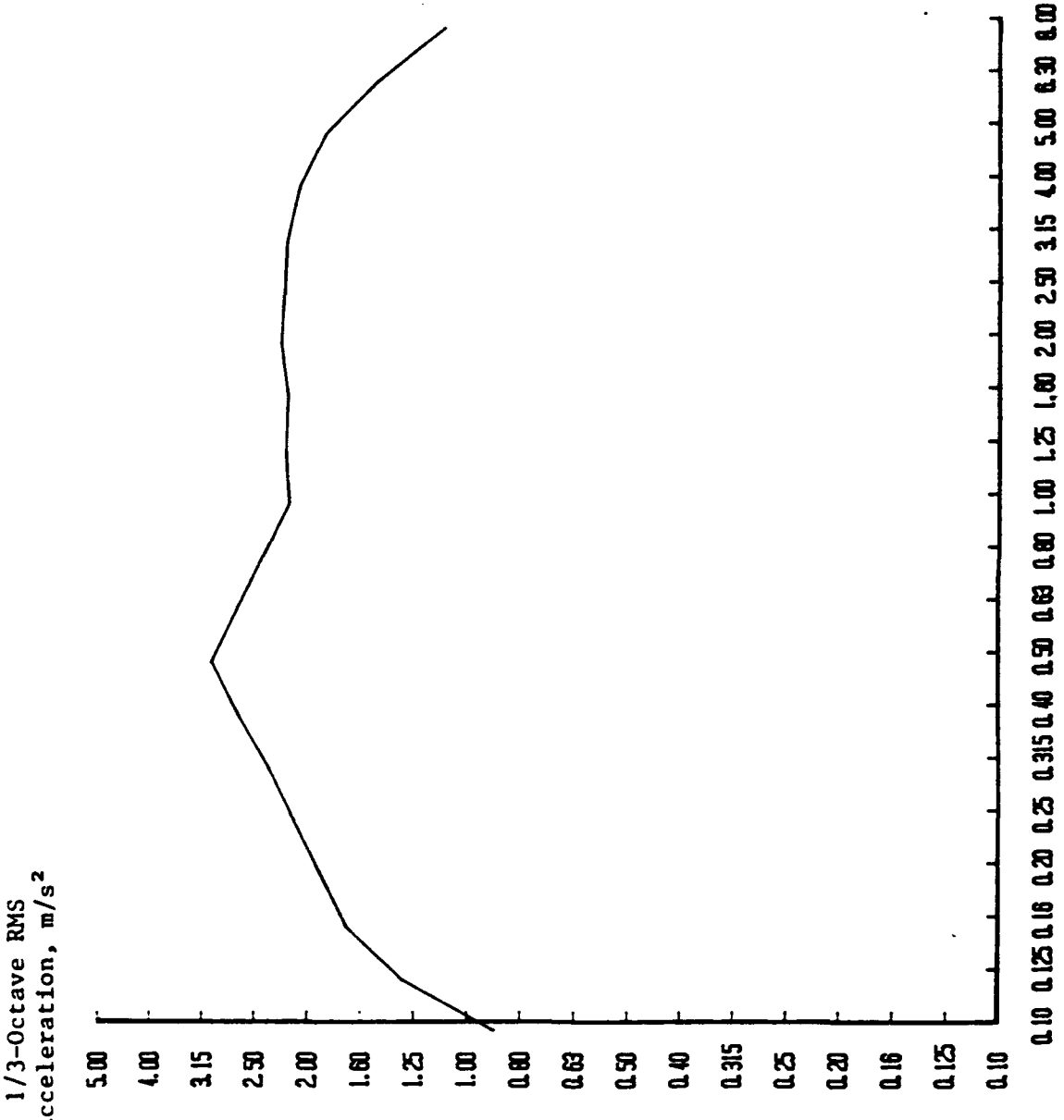


FIGURE C 5.4 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

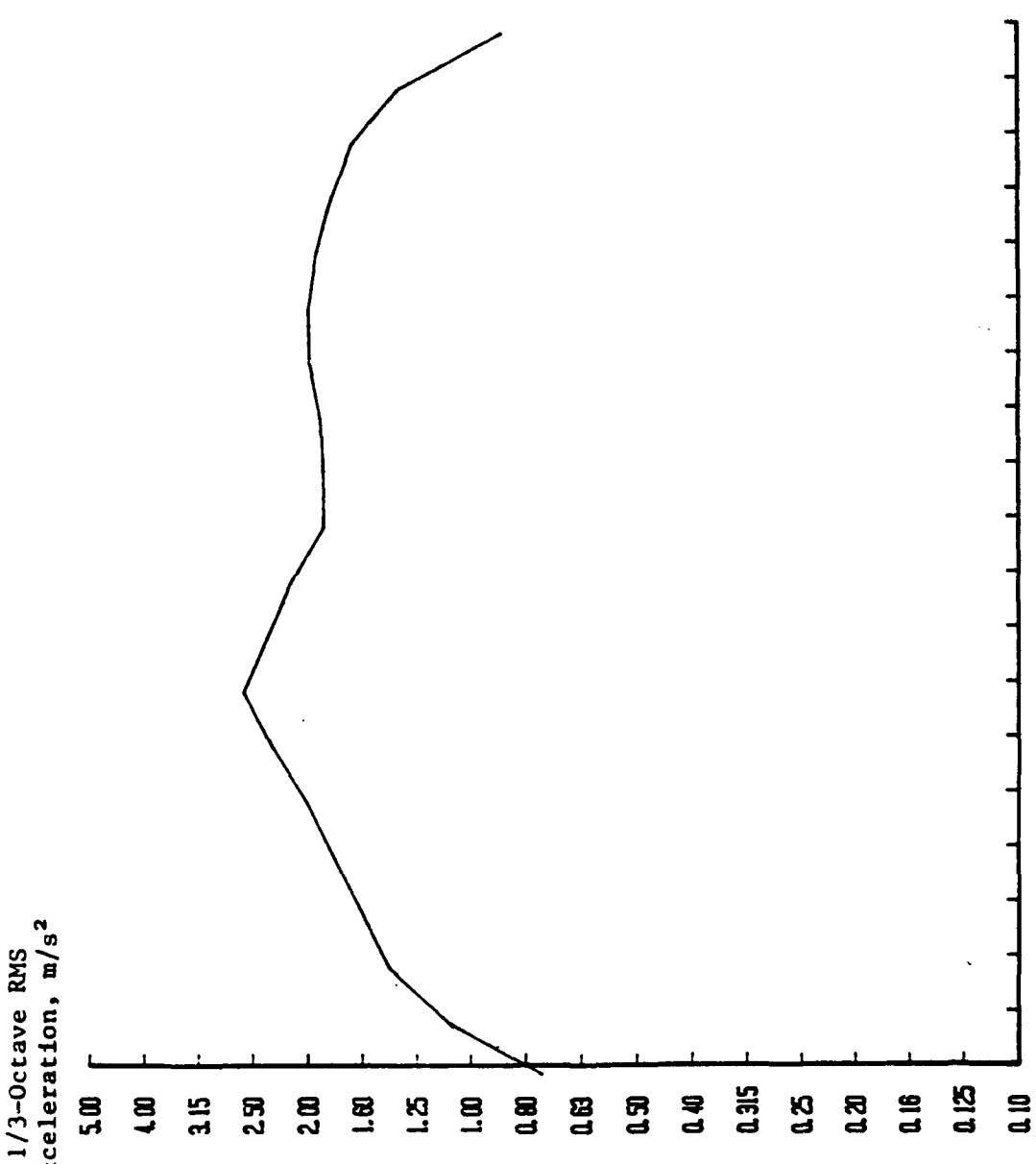


FIGURE C 5.5 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

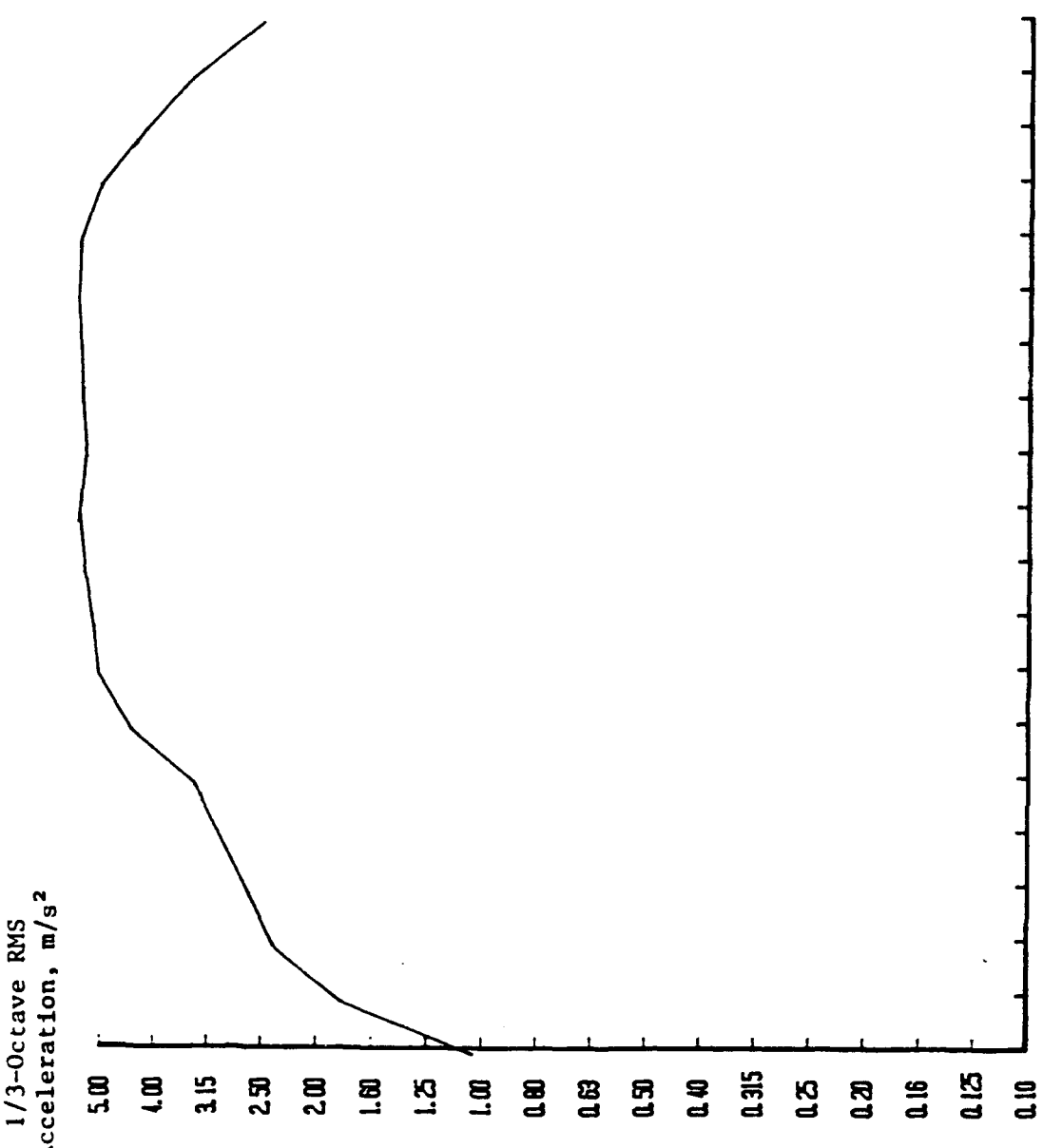


FIGURE C 6.1 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

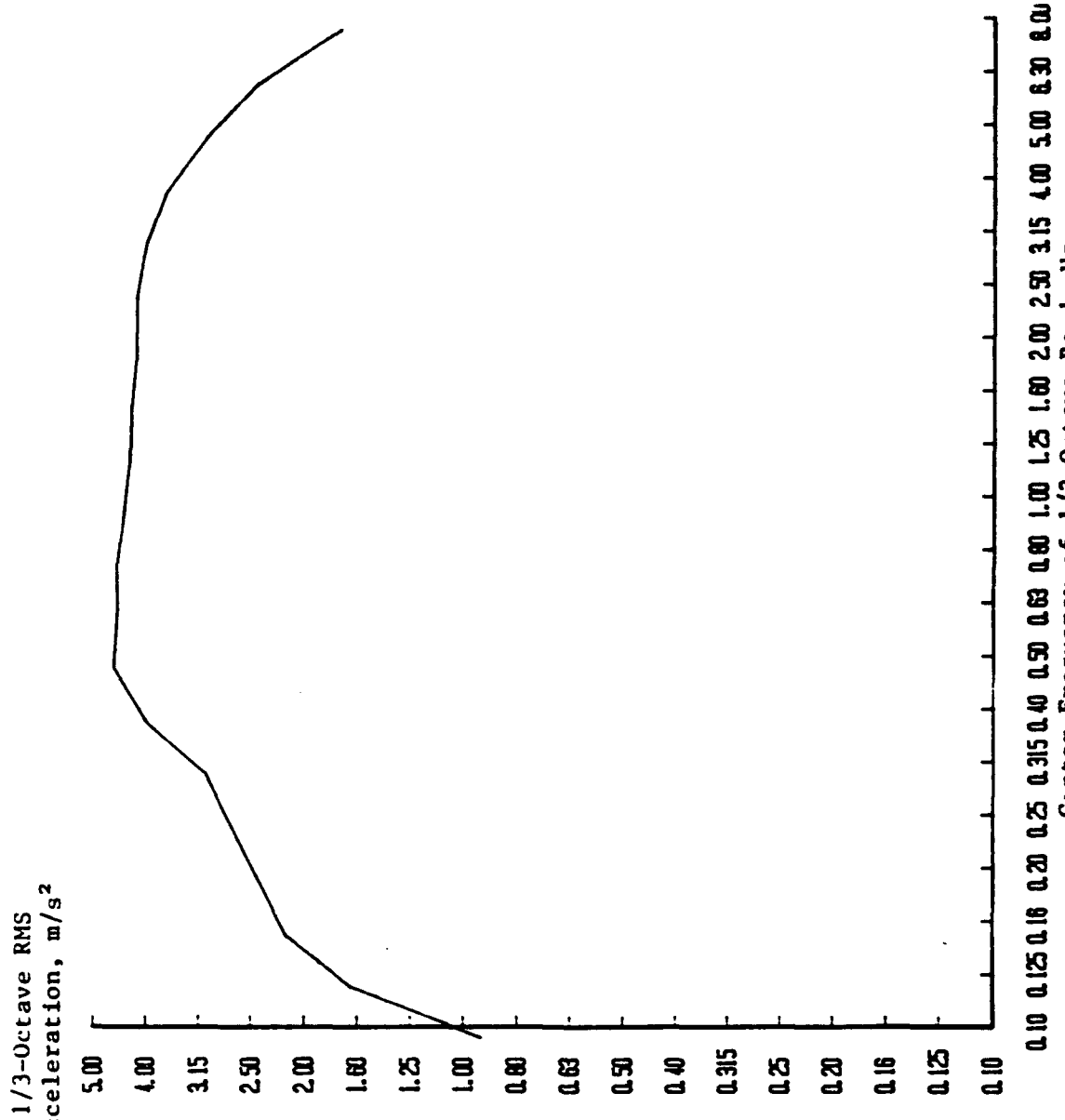


FIGURE C 6.2 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

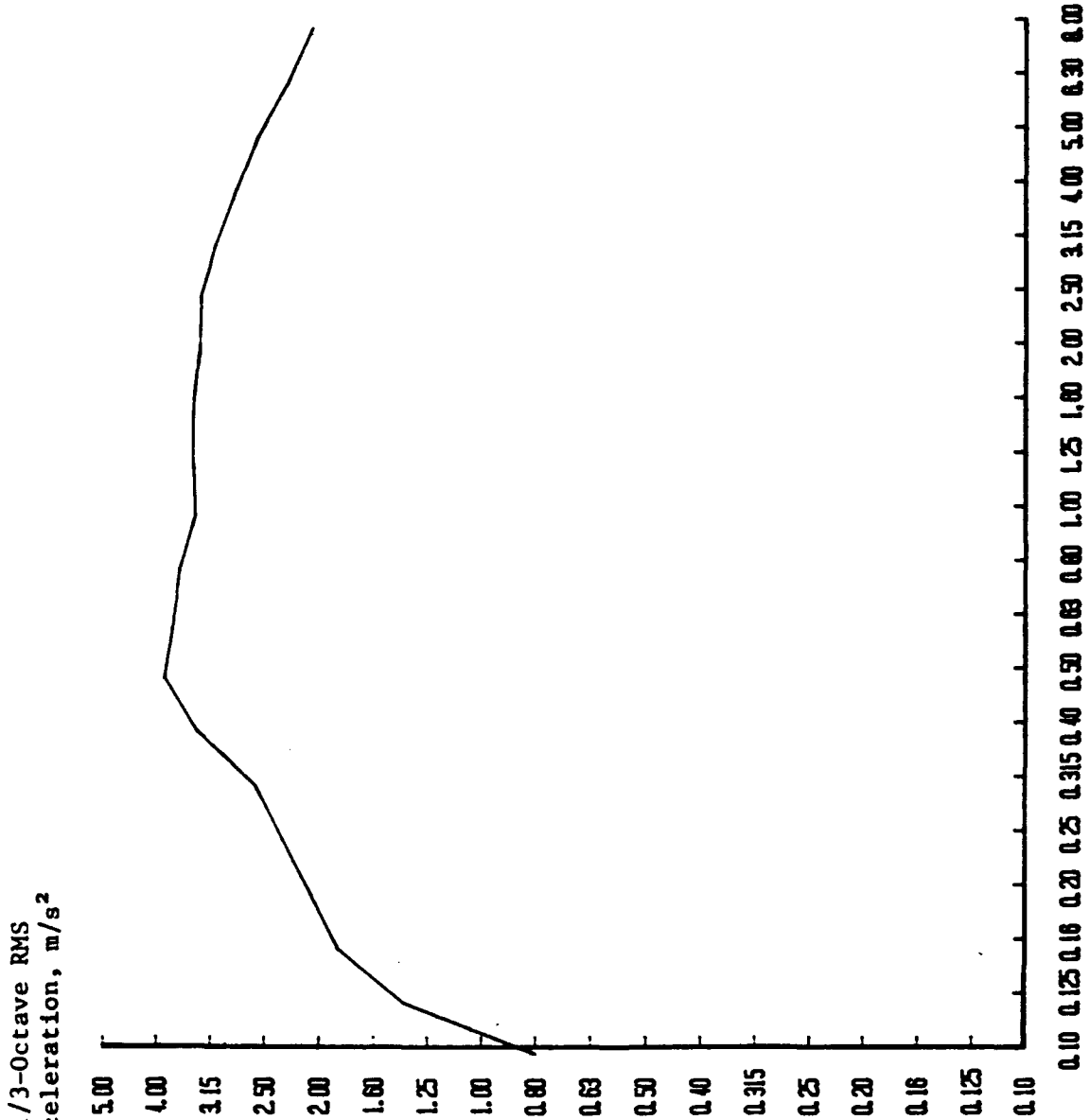


FIGURE C 6.3 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

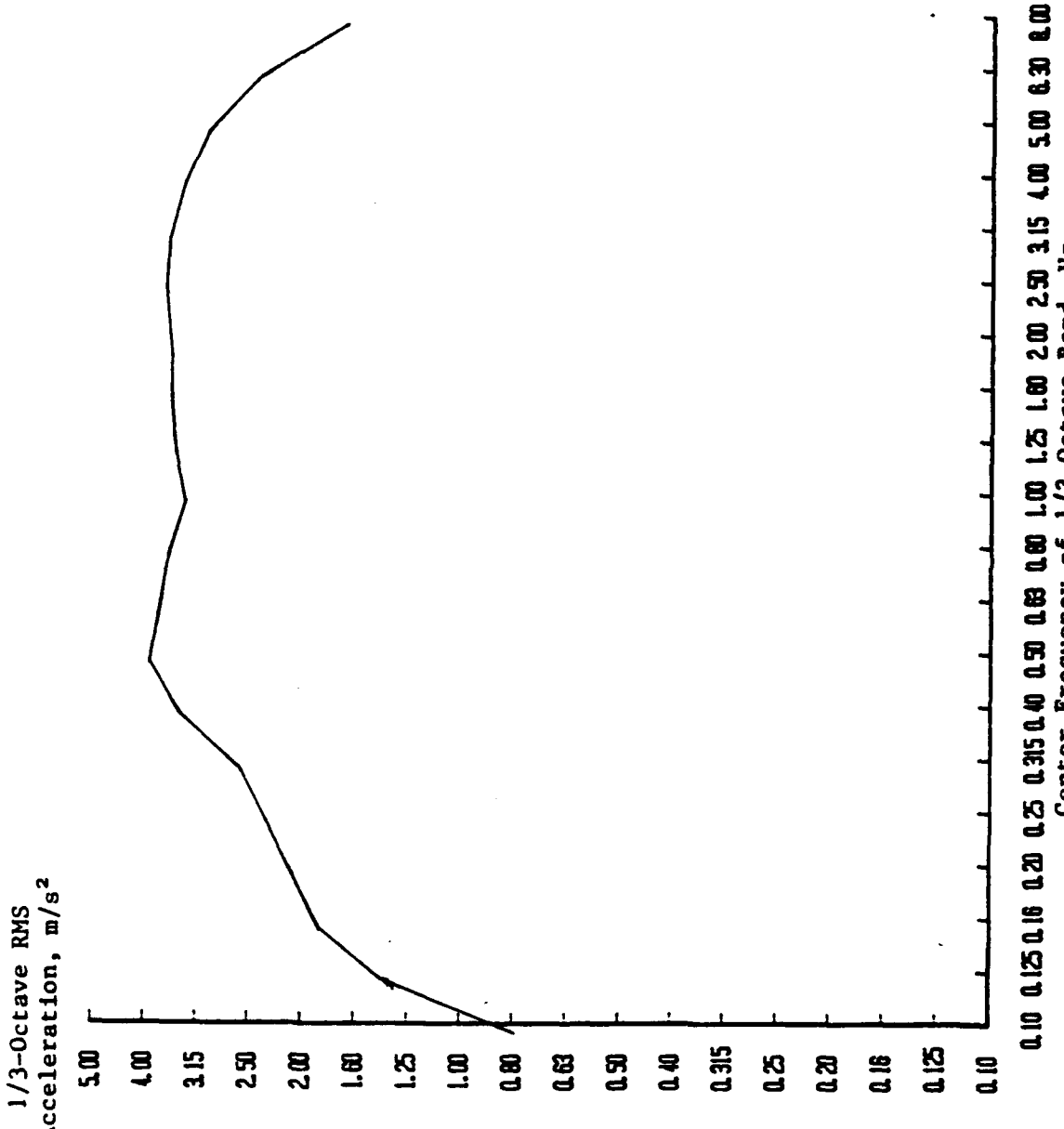


FIGURE C 6.4 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

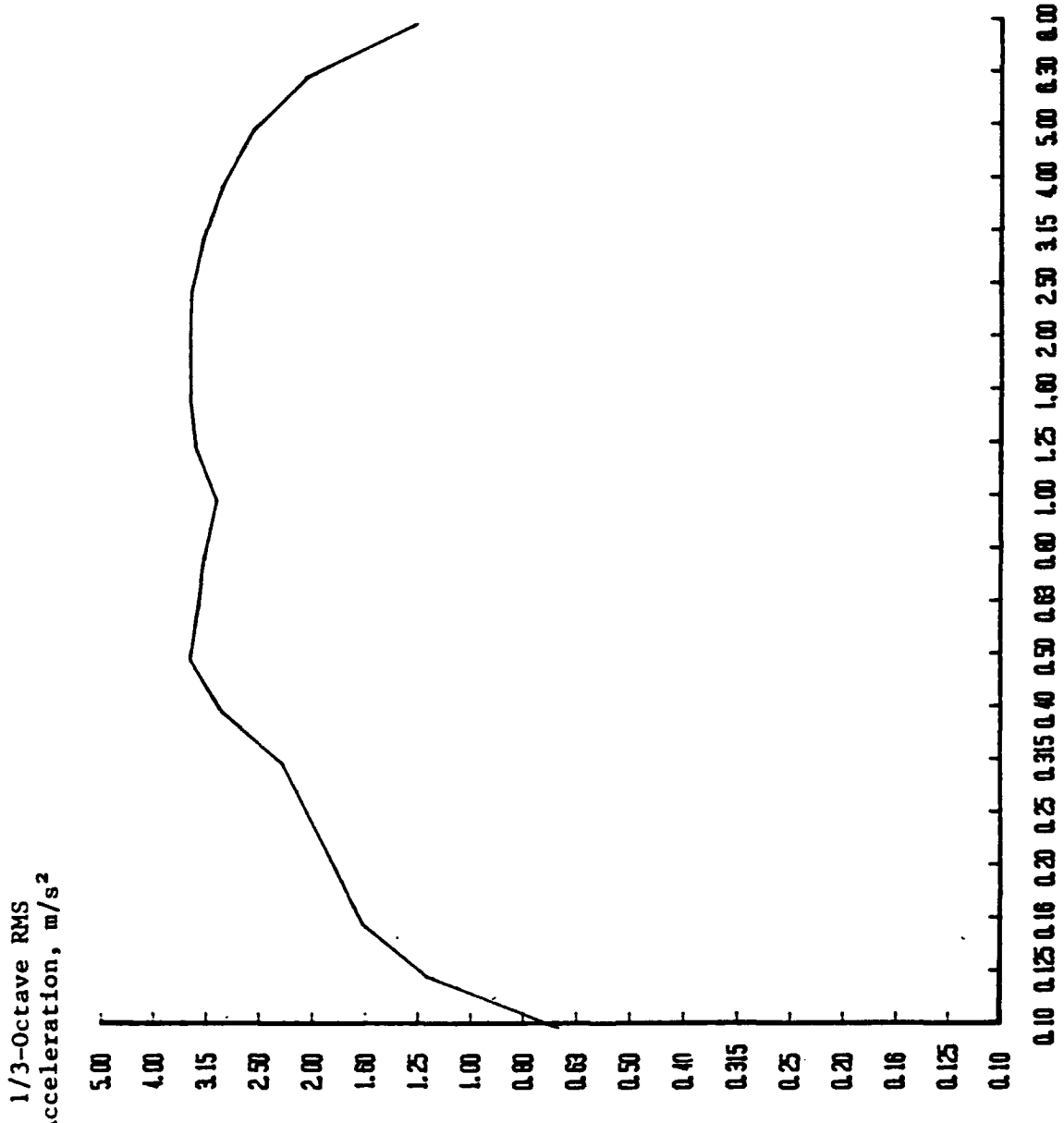


FIGURE C 6.5 1/3 OCTAVE RMS ACCELERATIONS
110 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

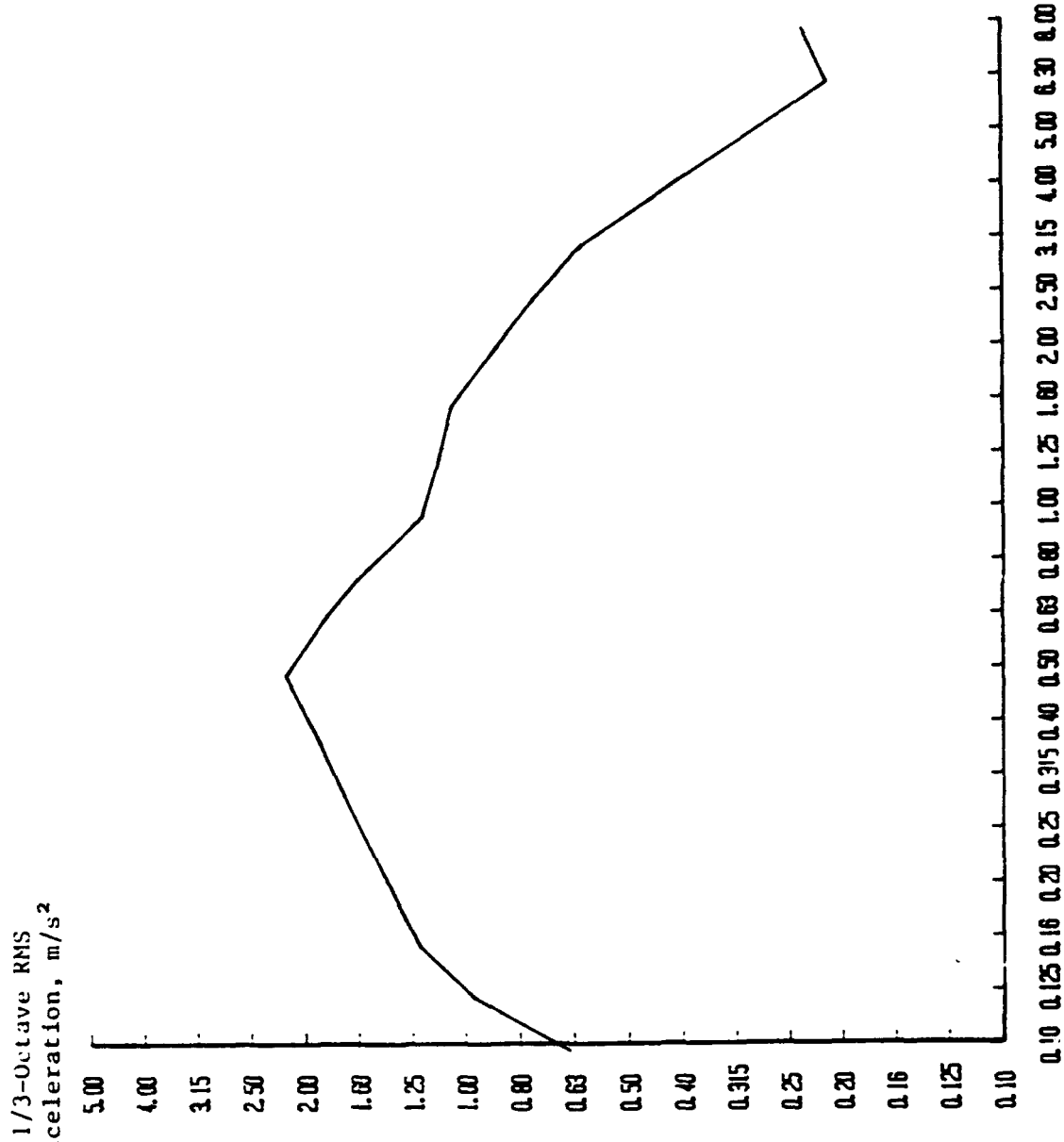


FIGURE D 1.1 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

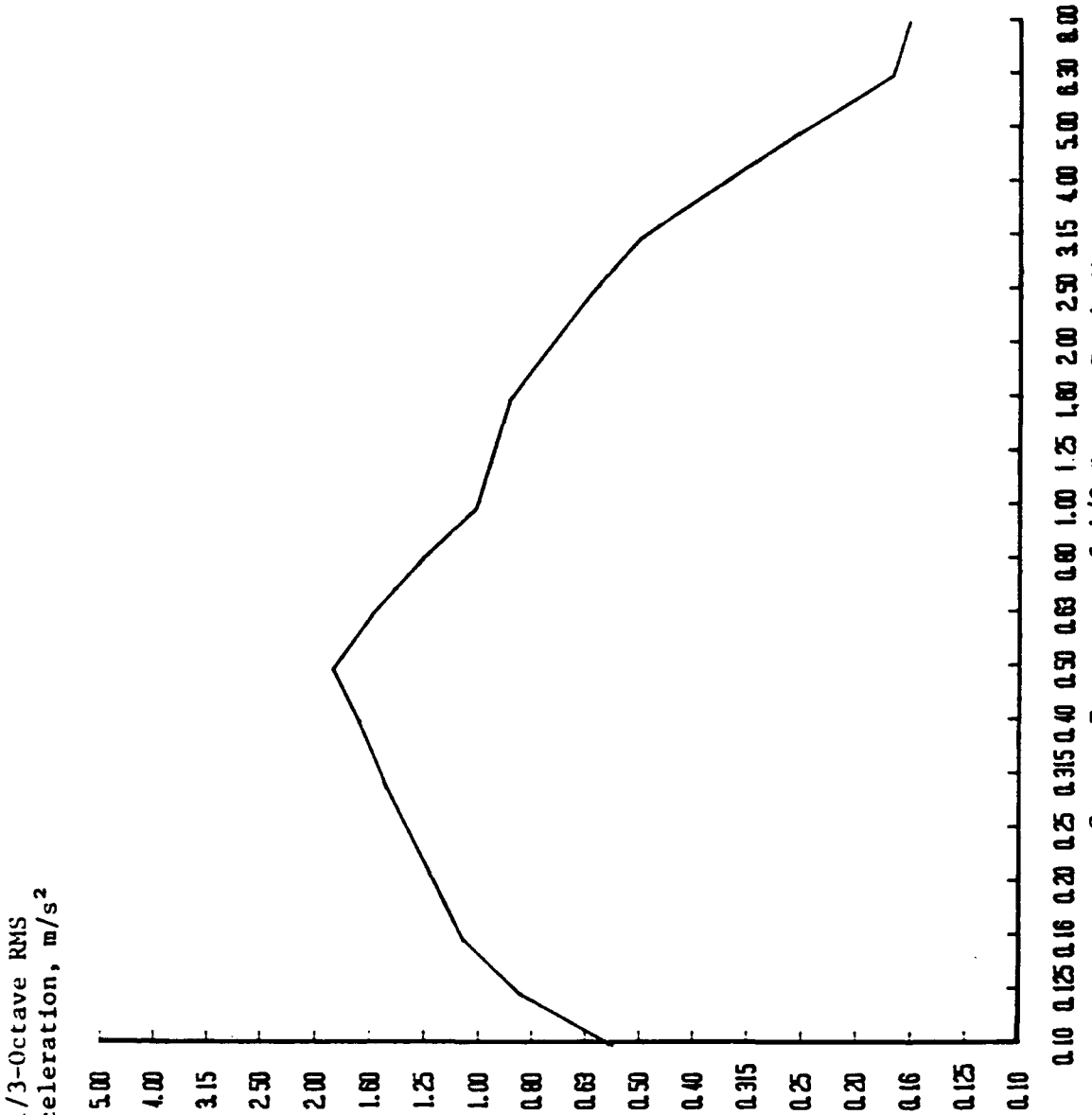


FIGURE D 1.2 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

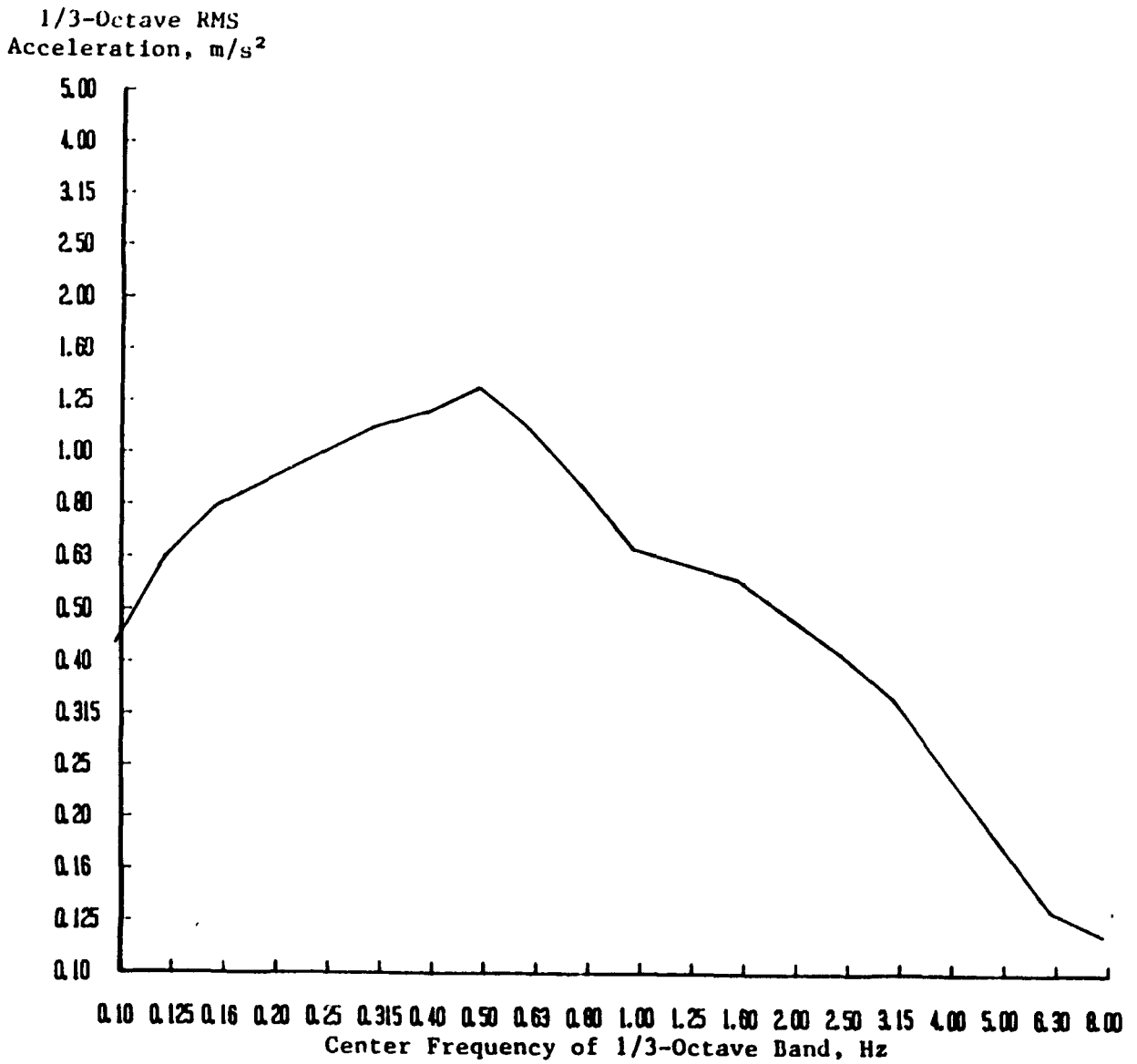


FIGURE D I.3 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0 % Beam

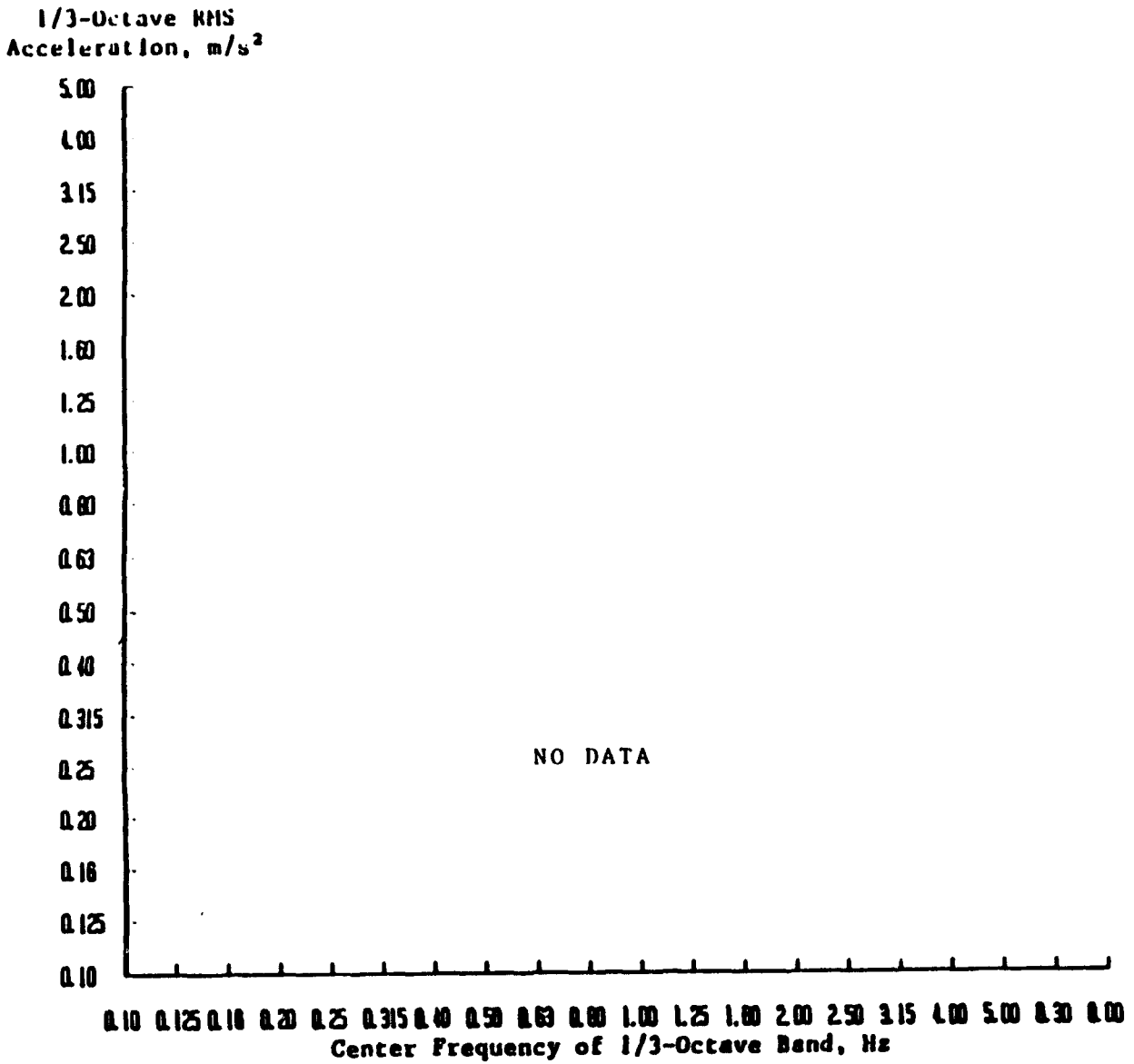


FIGURE D 1.4 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0 % Beam

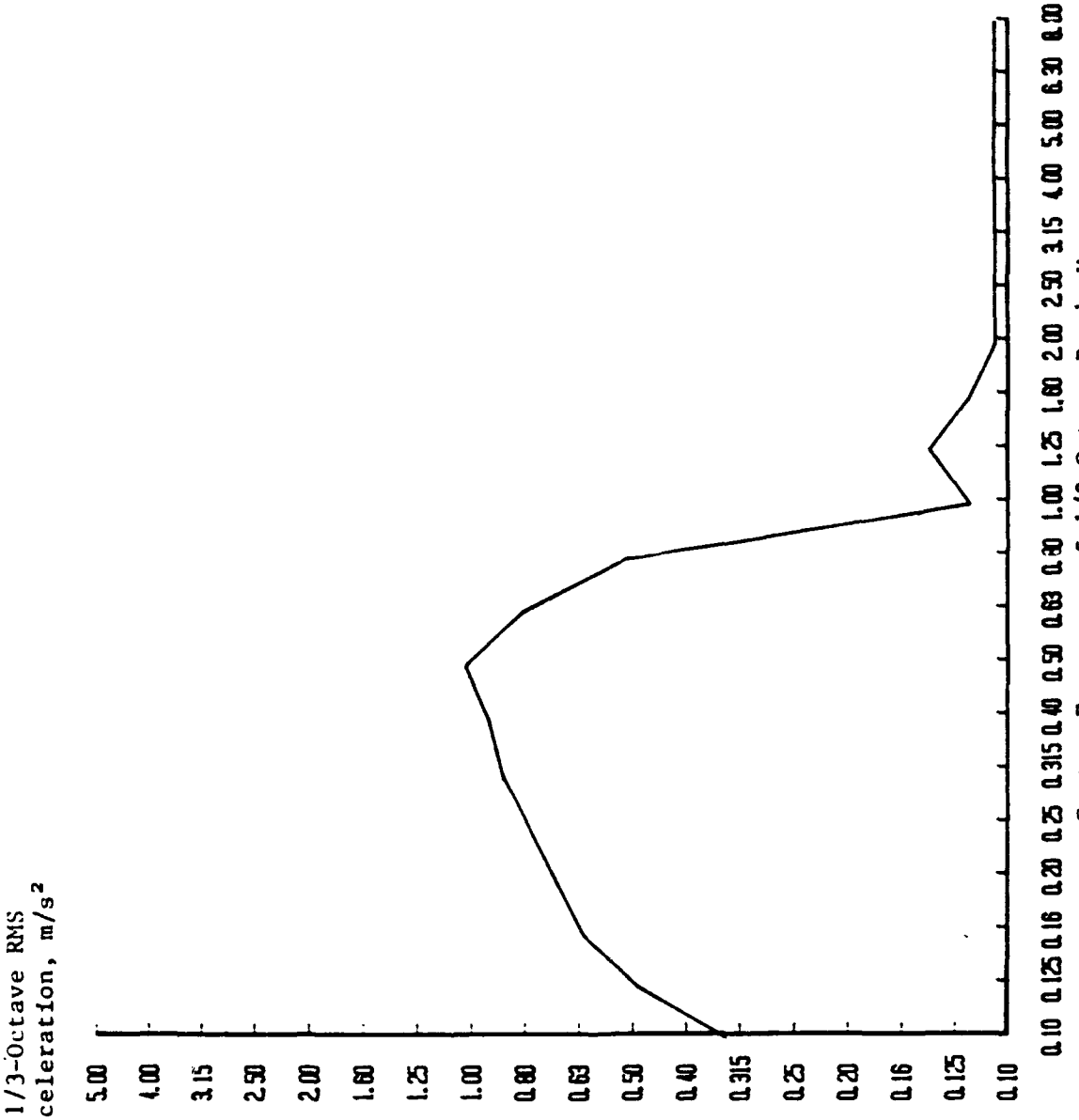


FIGURE D 1.5 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

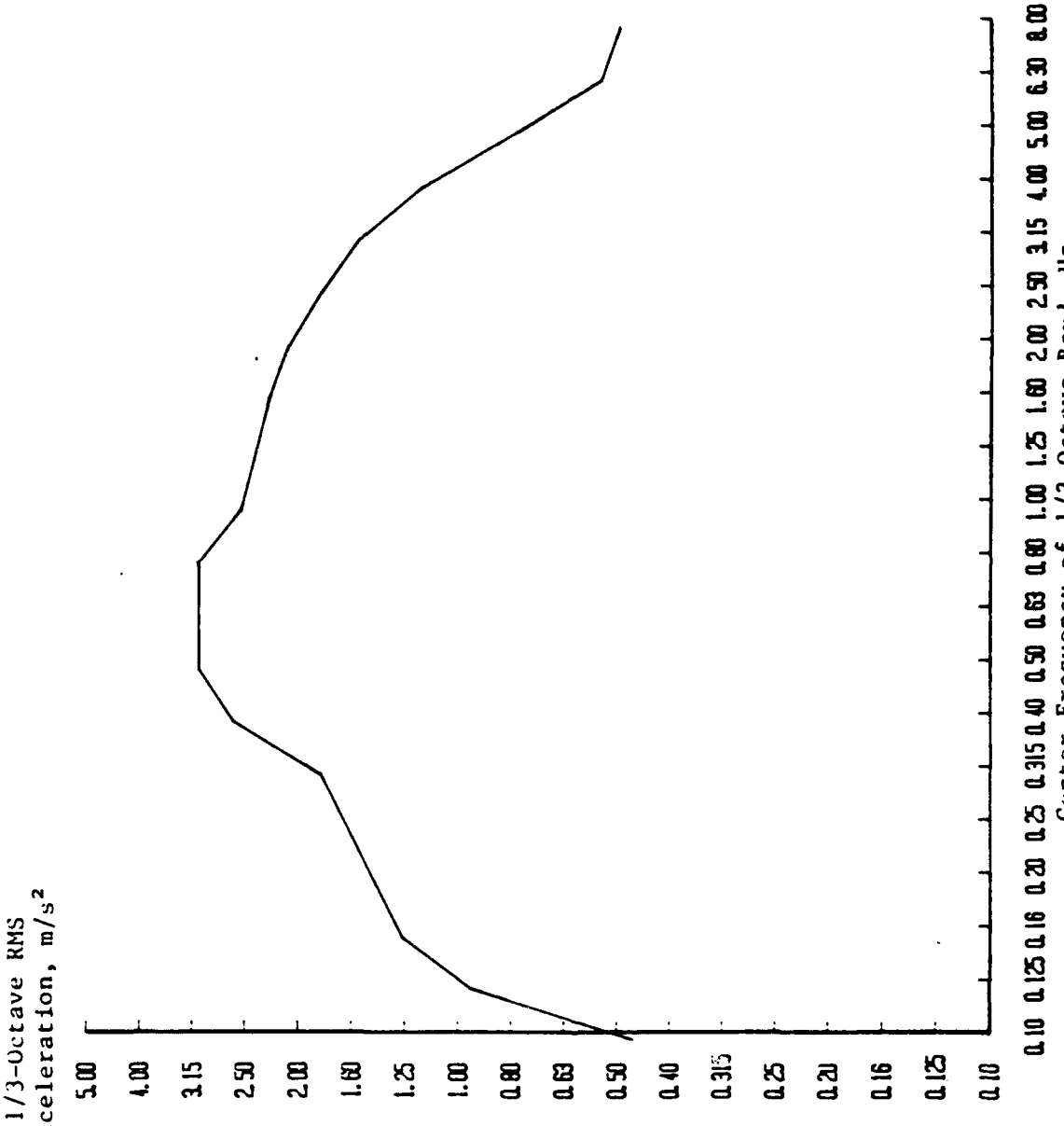


FIGURE D 2.1 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0 % Beam

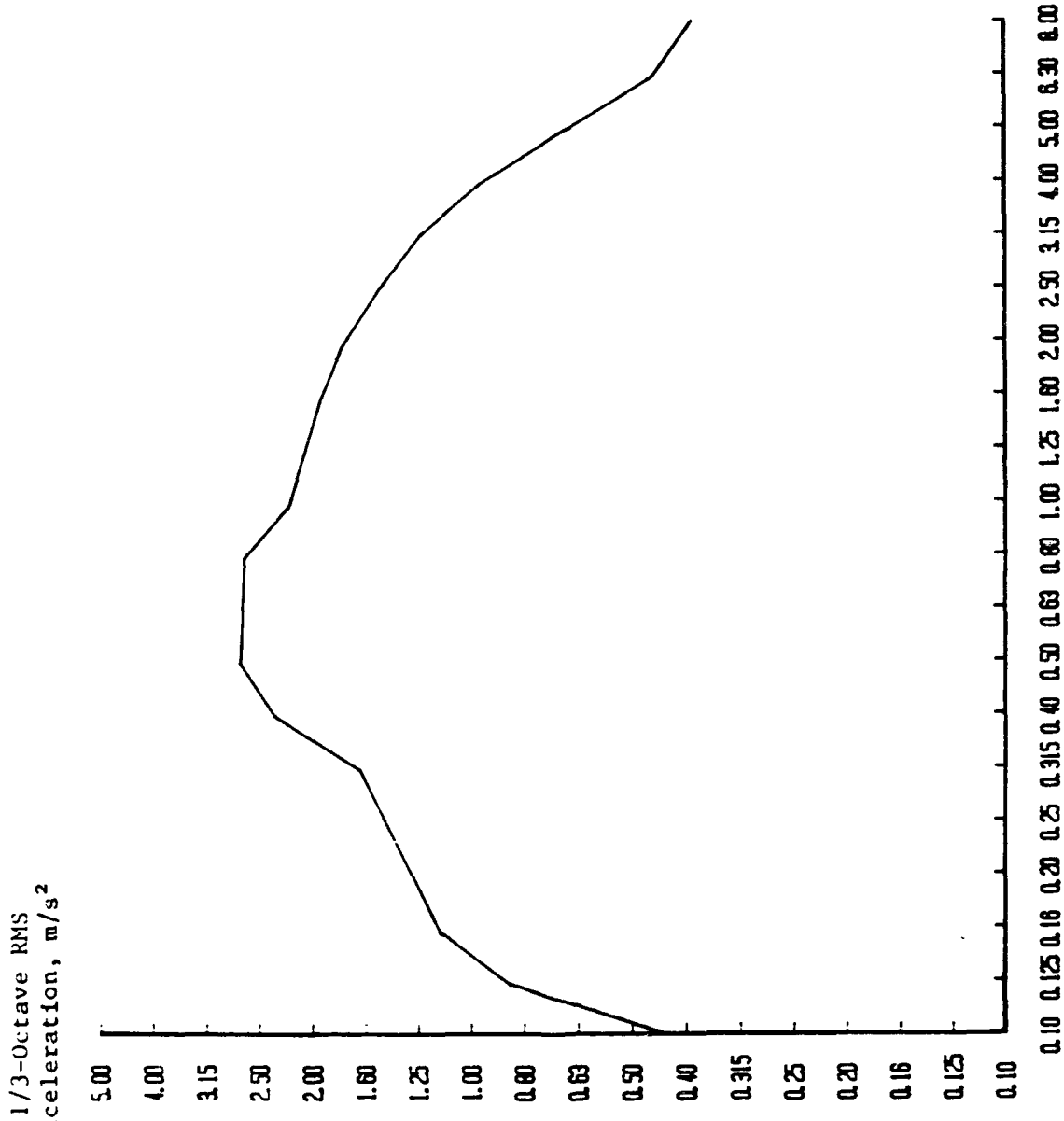


FIGURE D 2.2 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

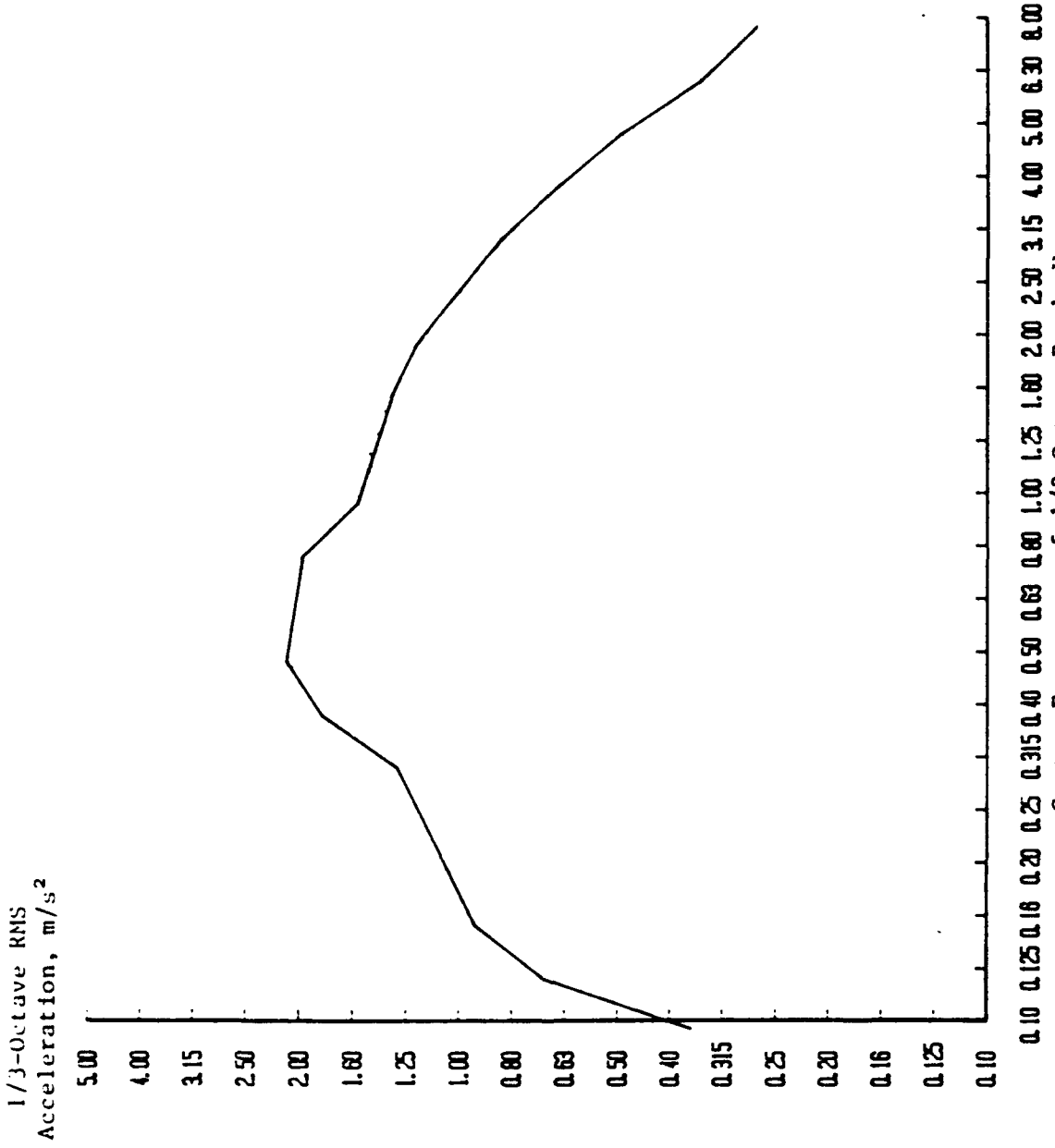


FIGURE D 2.3 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

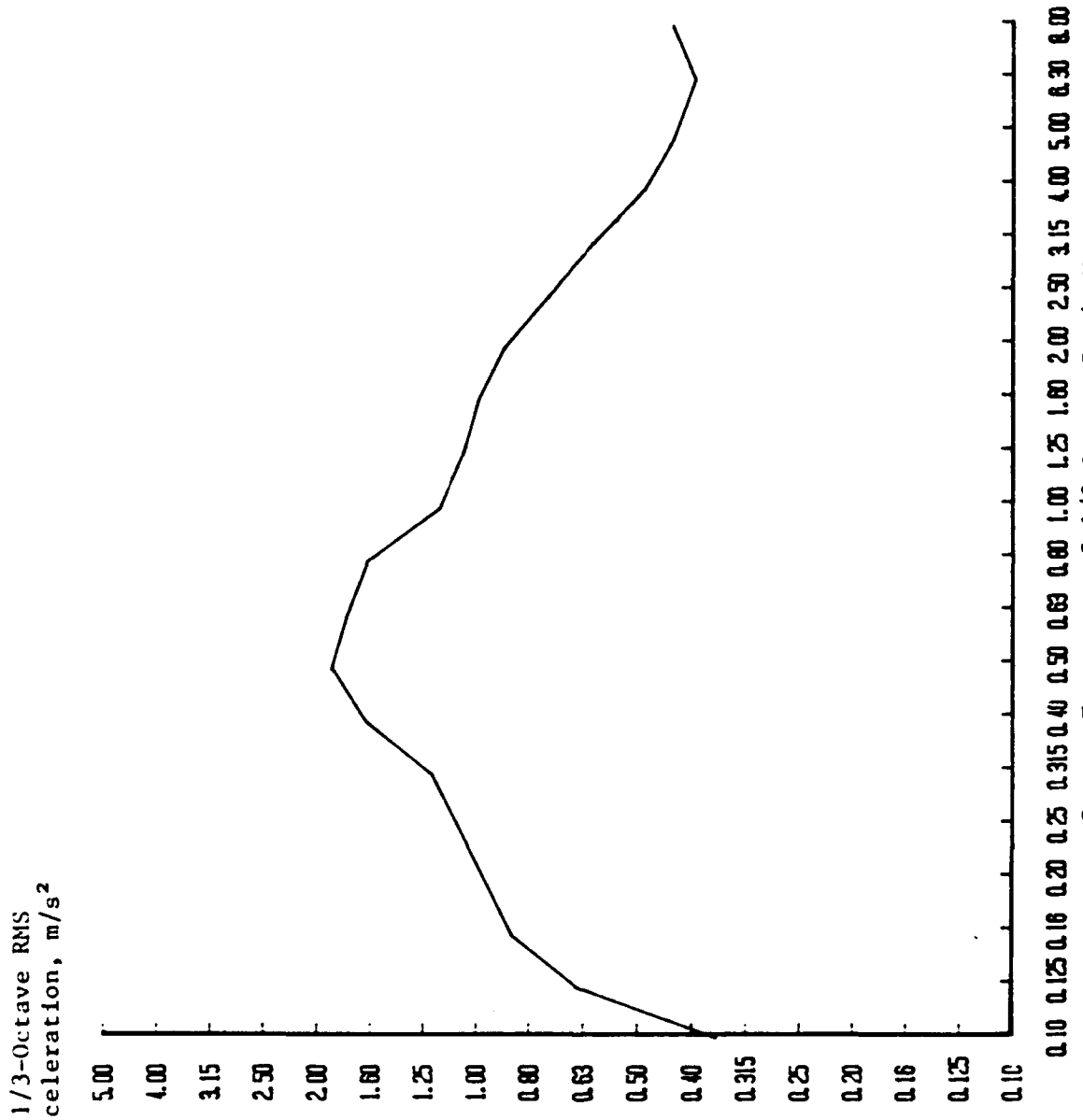


FIGURE D 2.4 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

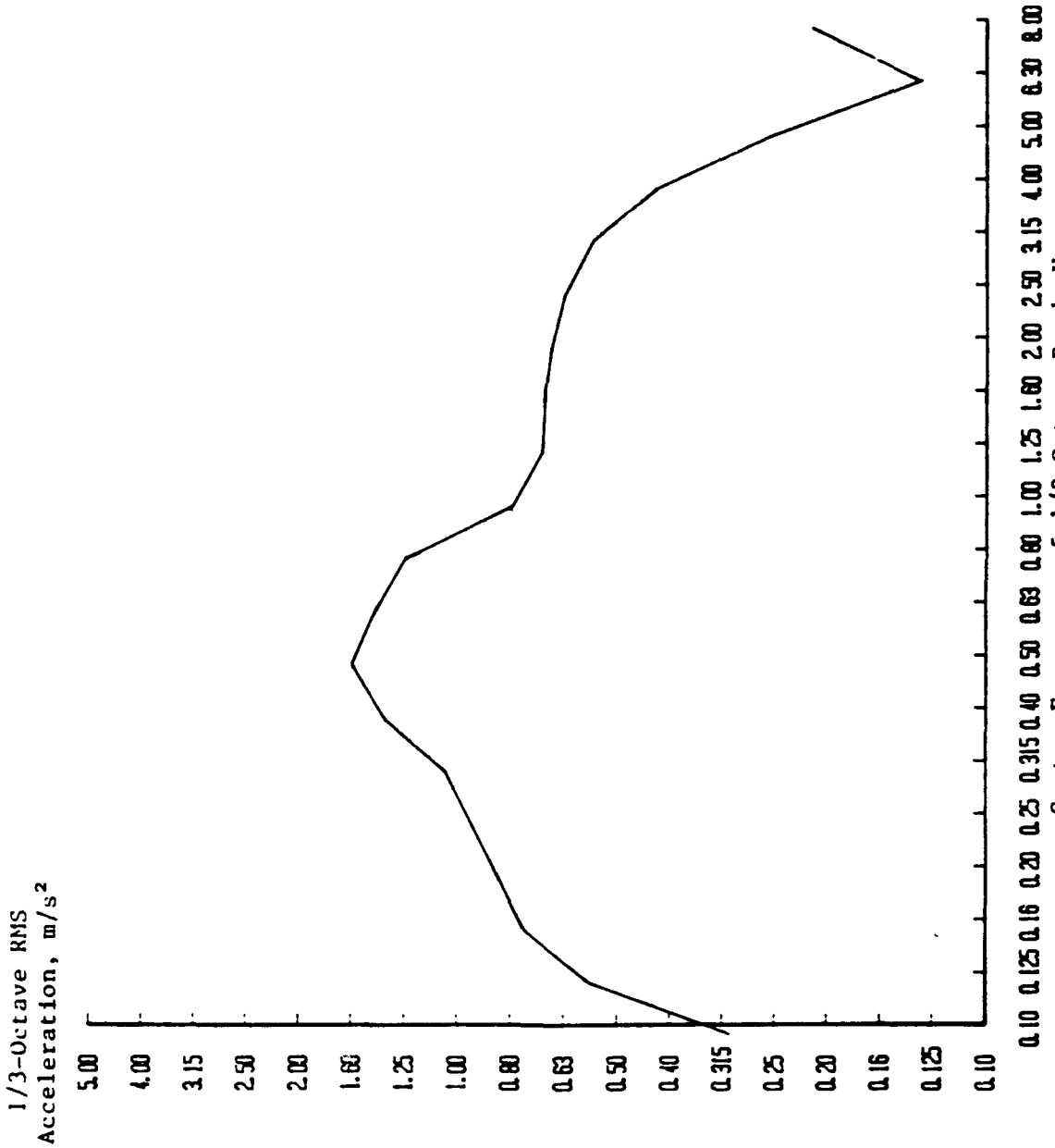


FIGURE D 2.5 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0 % Beam

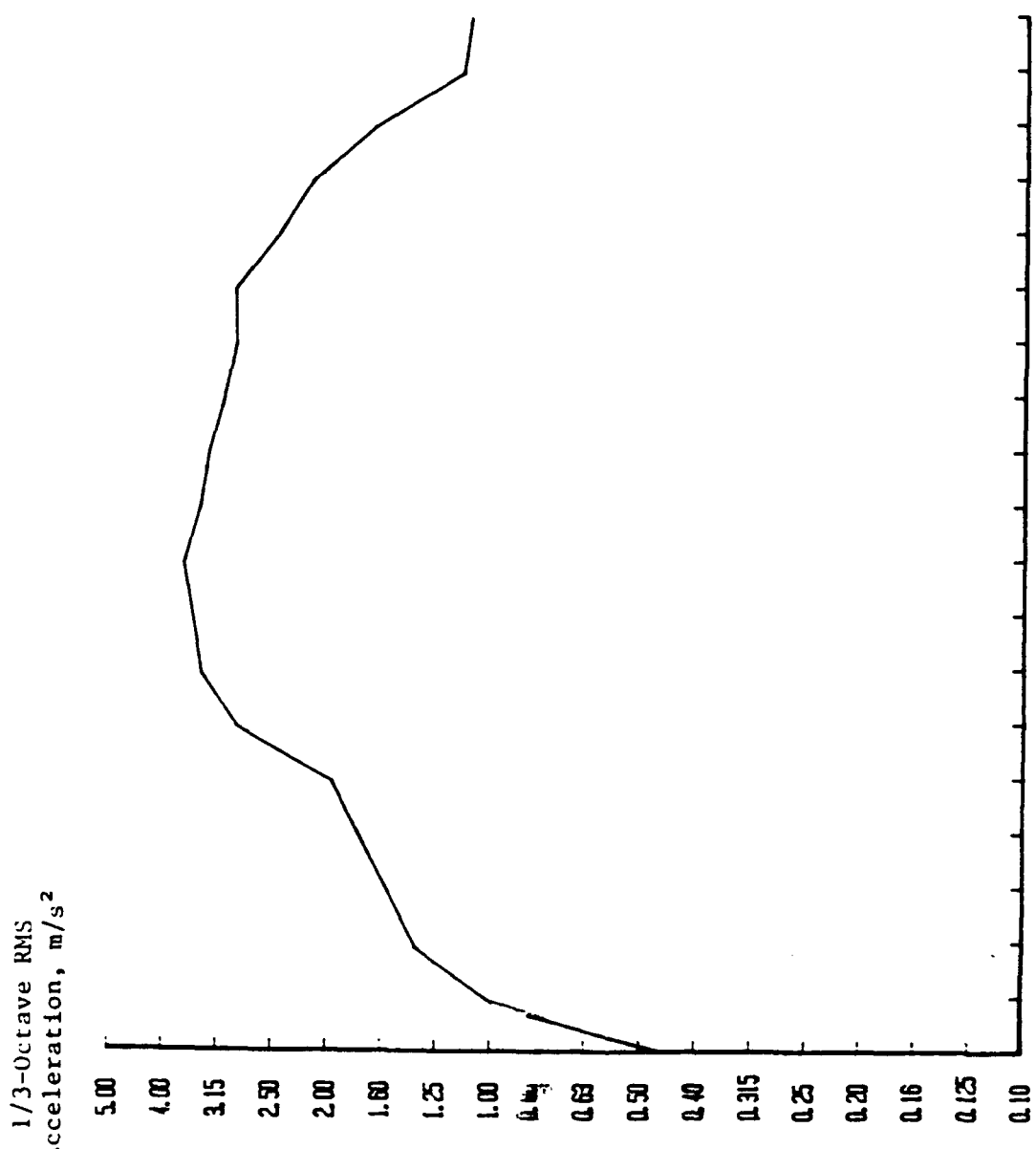


FIGURE D 3.1 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

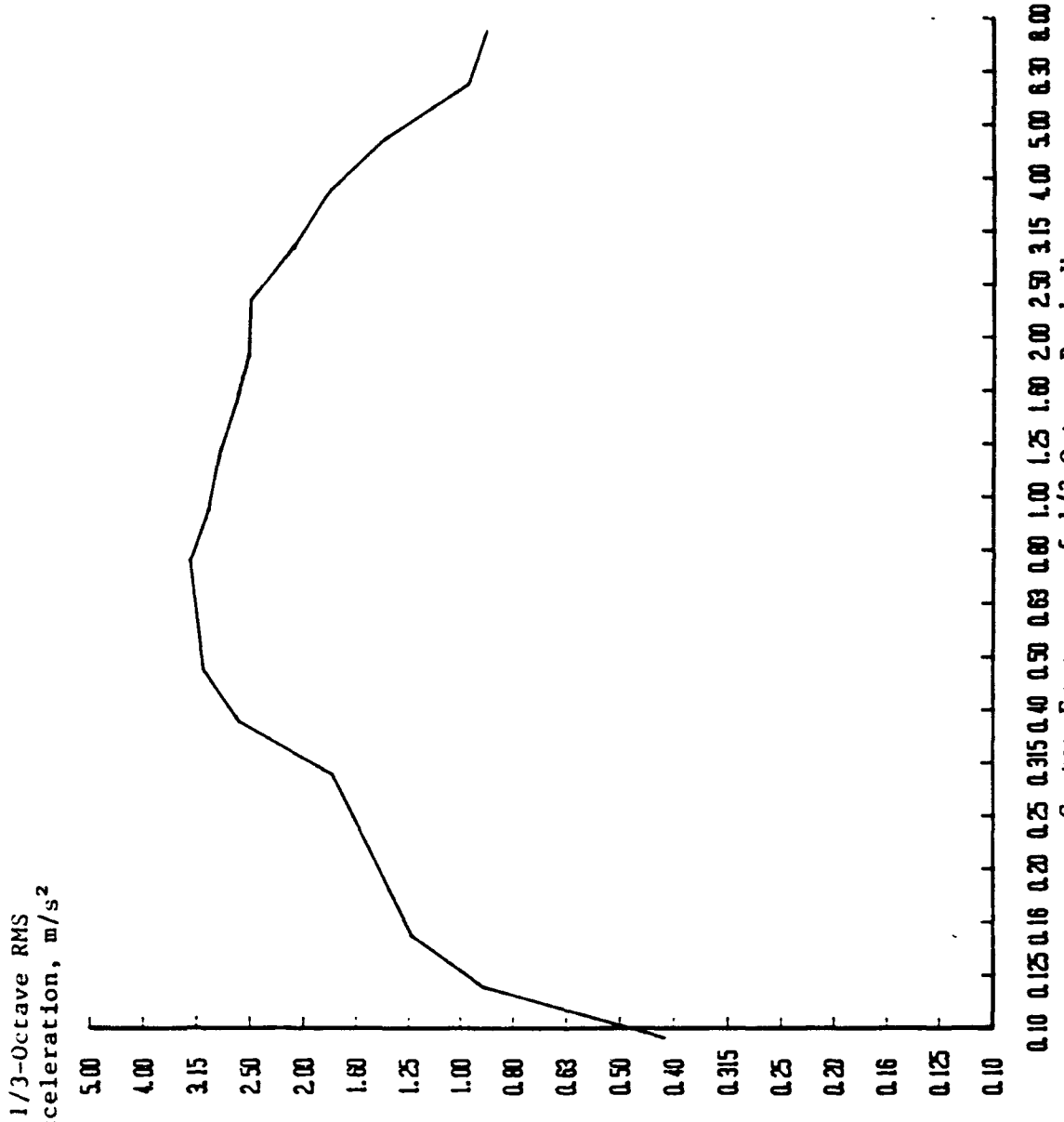


FIGURE D 3.2 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

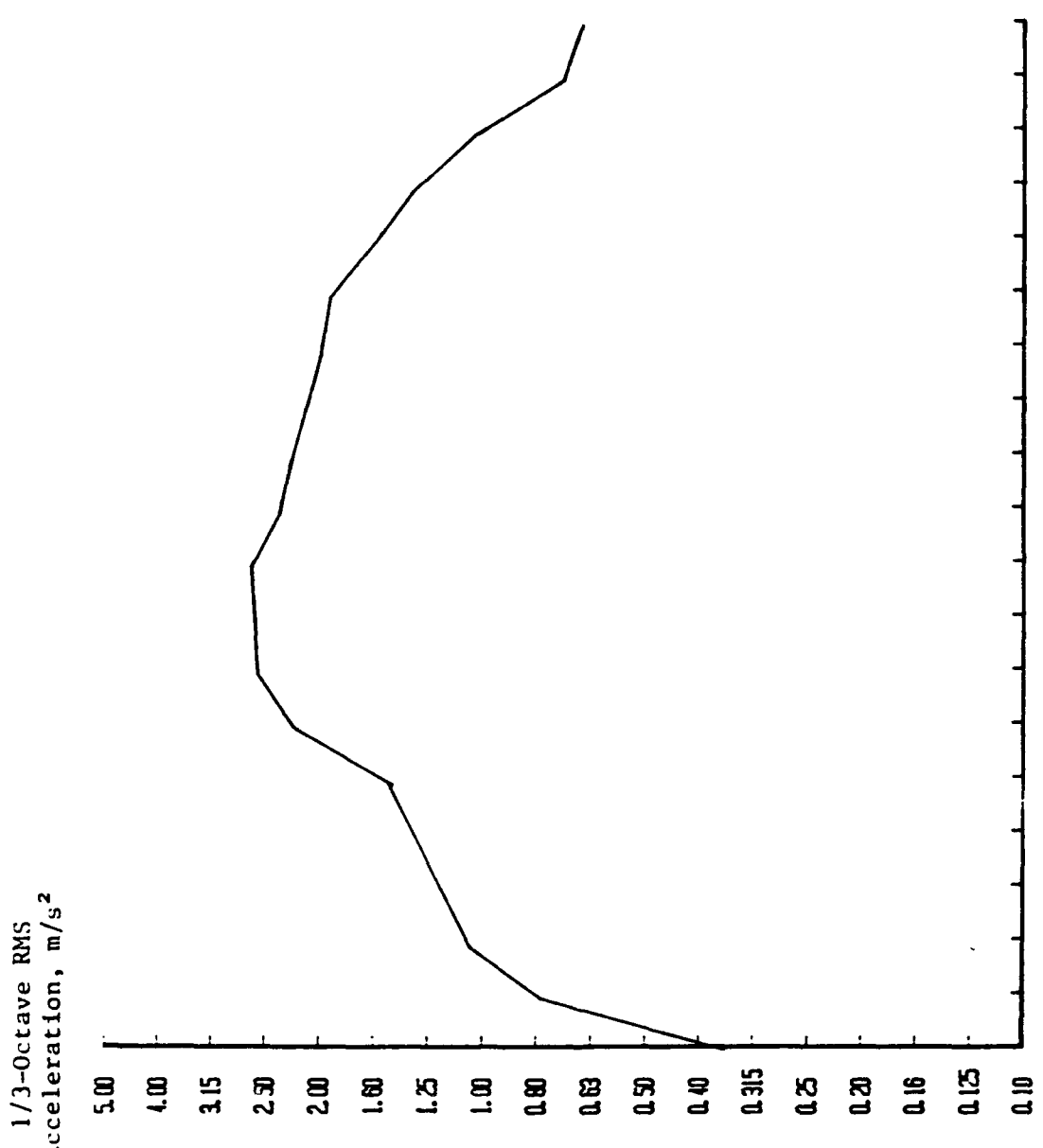


FIGURE D 3.3 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

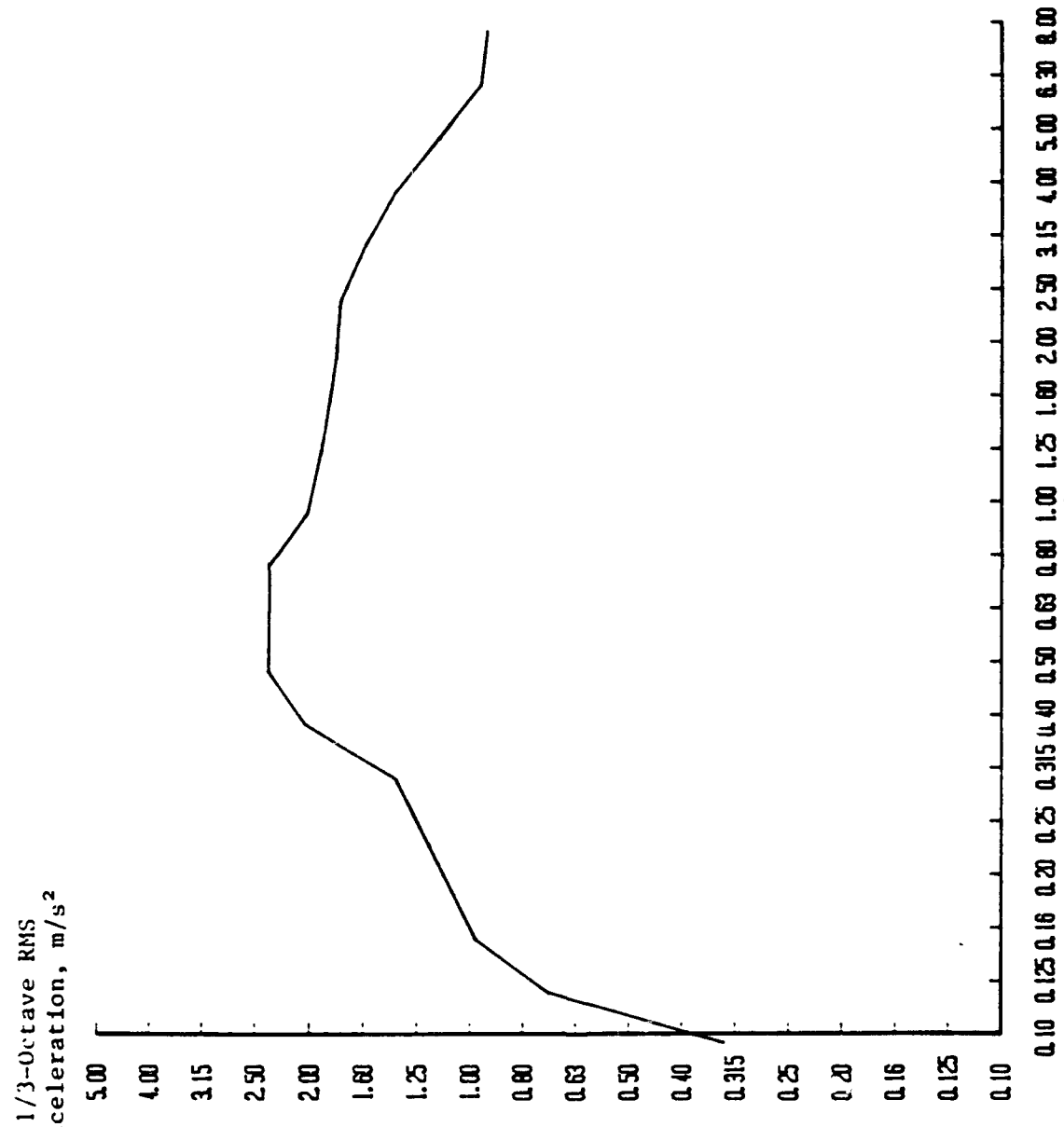


FIGURE D 3.4 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

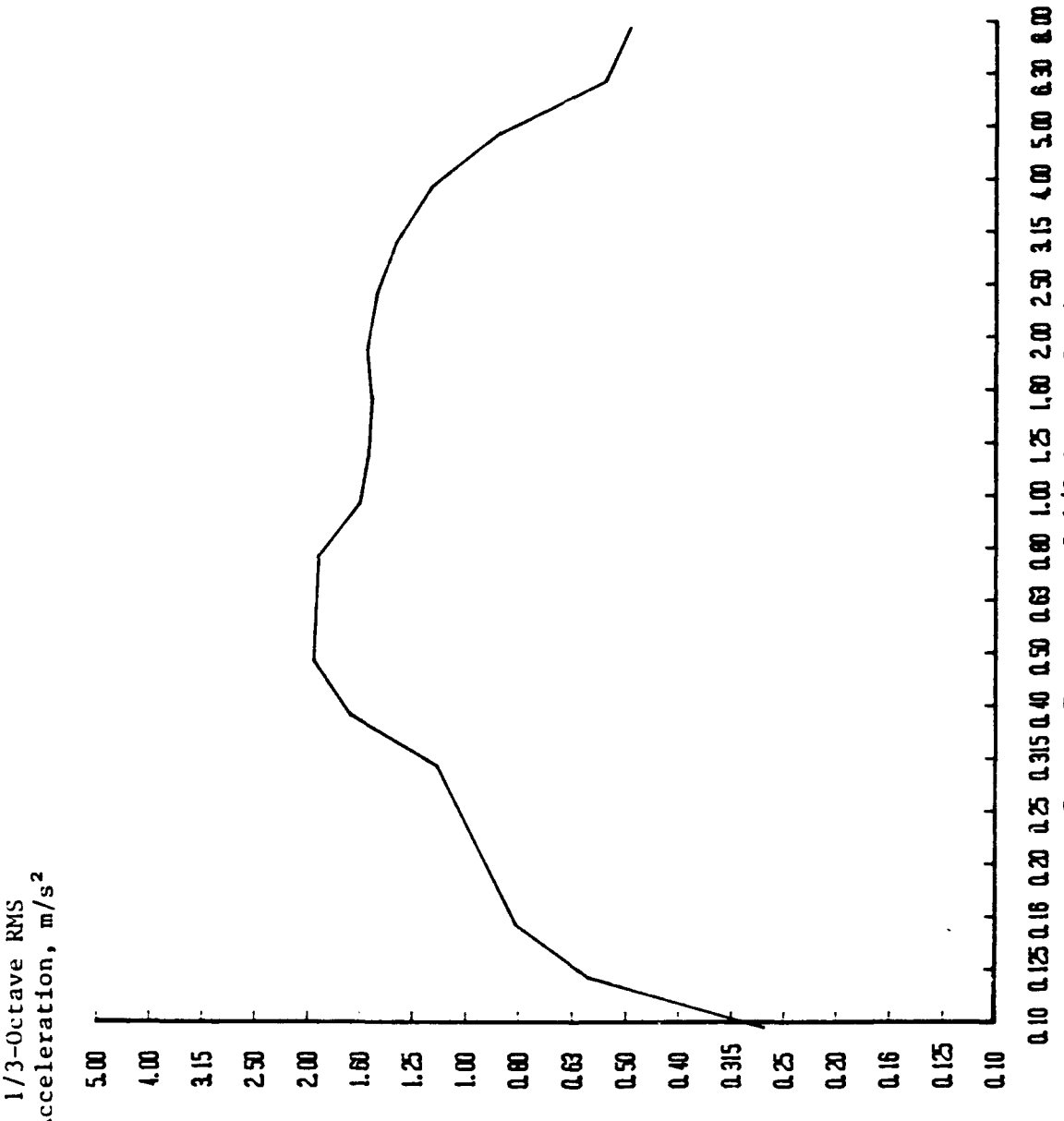


FIGURE D 3.5 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

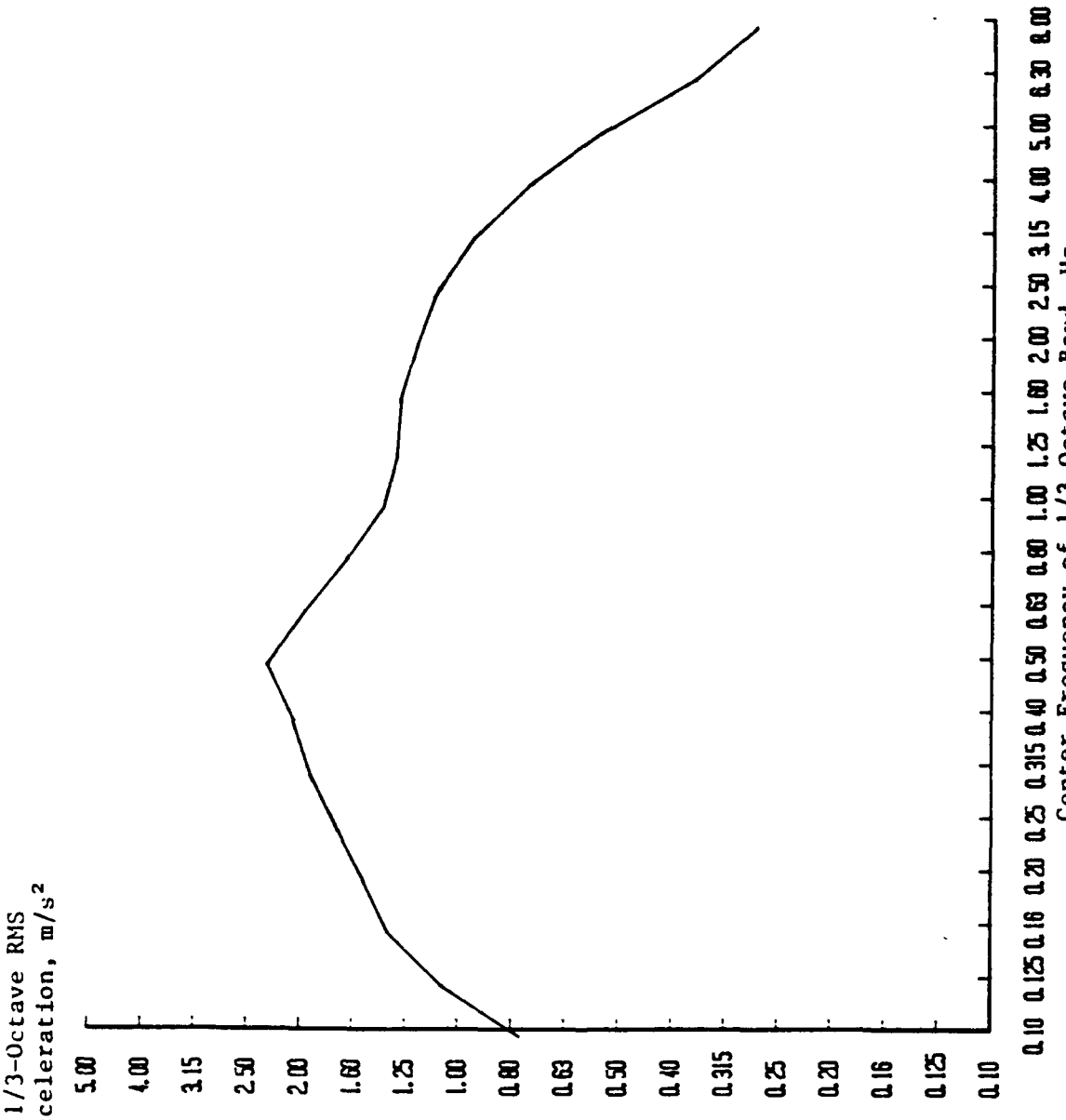


FIGURE D 4.1 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

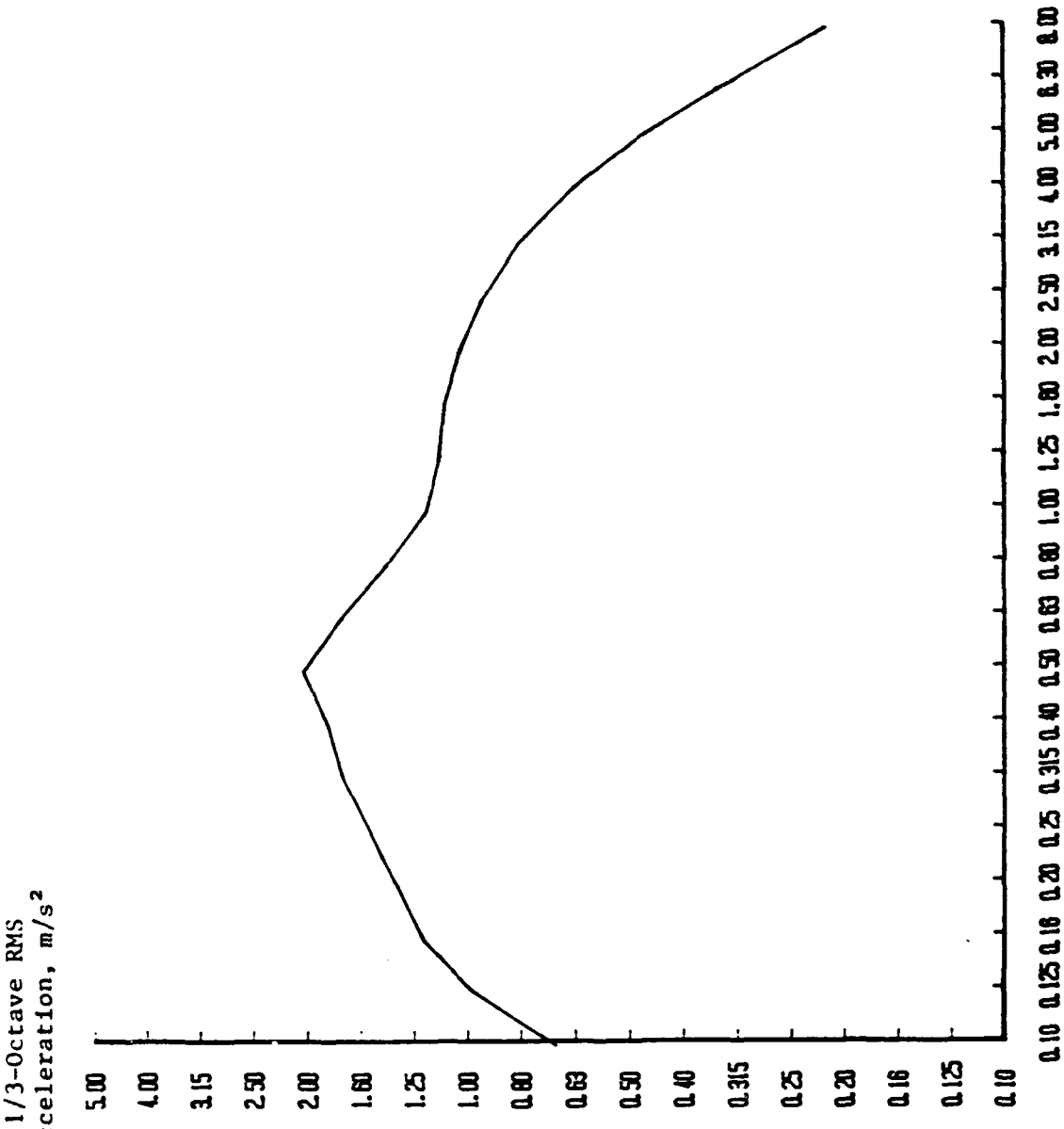


FIGURE D 4.2 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

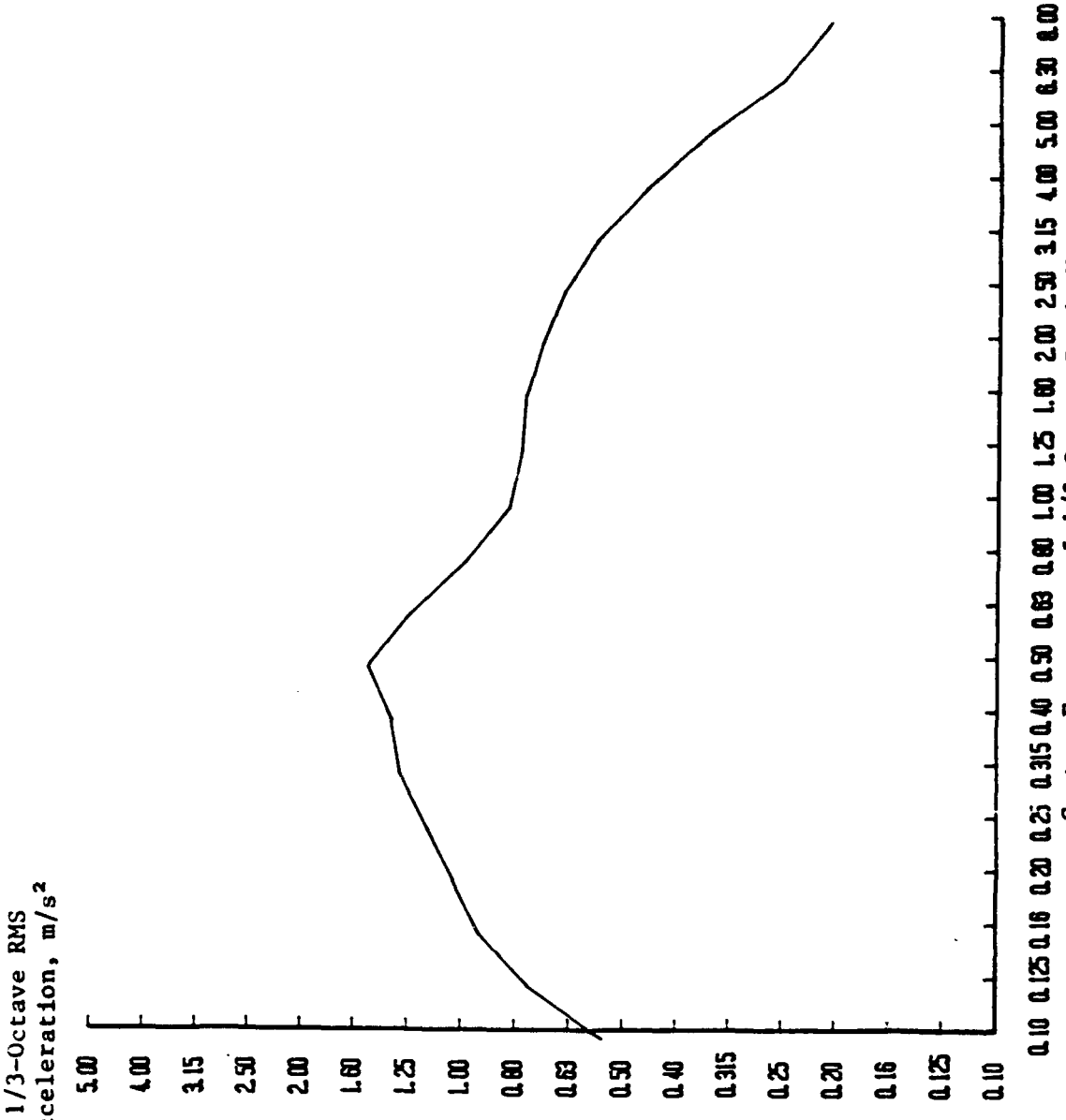


FIGURE D 4.3 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

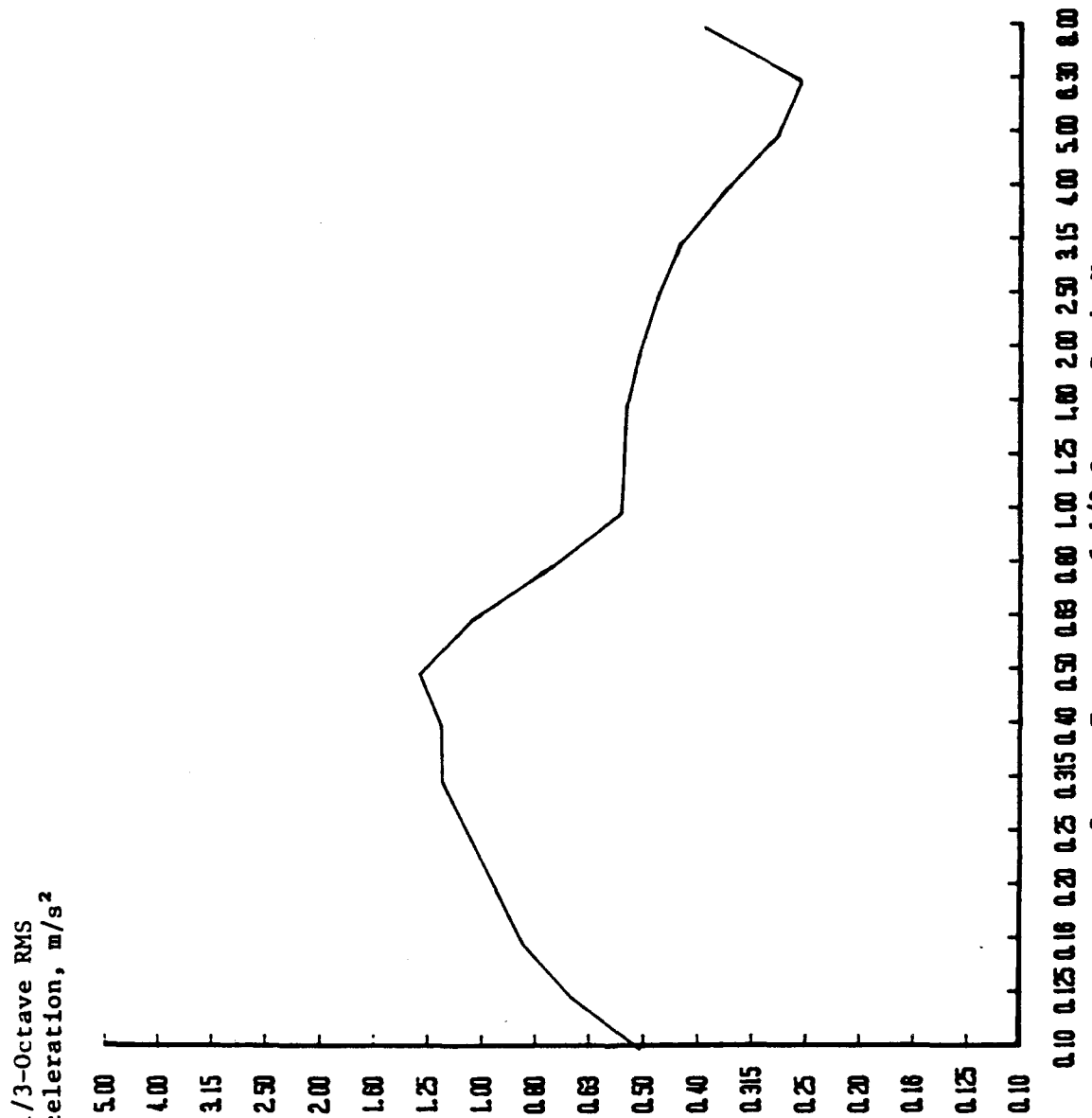


FIGURE D 4.4 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

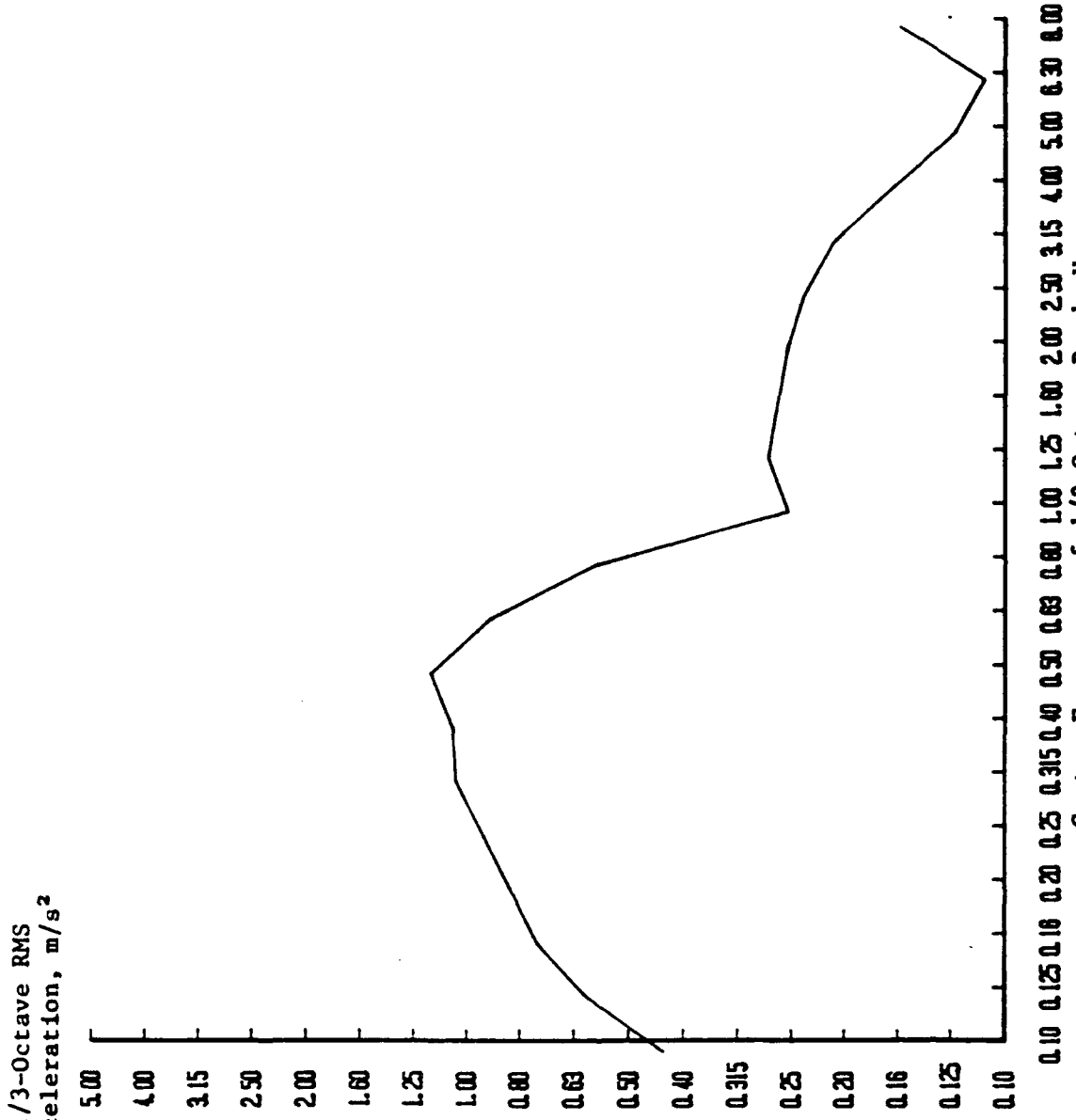


FIGURE D 4.5 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

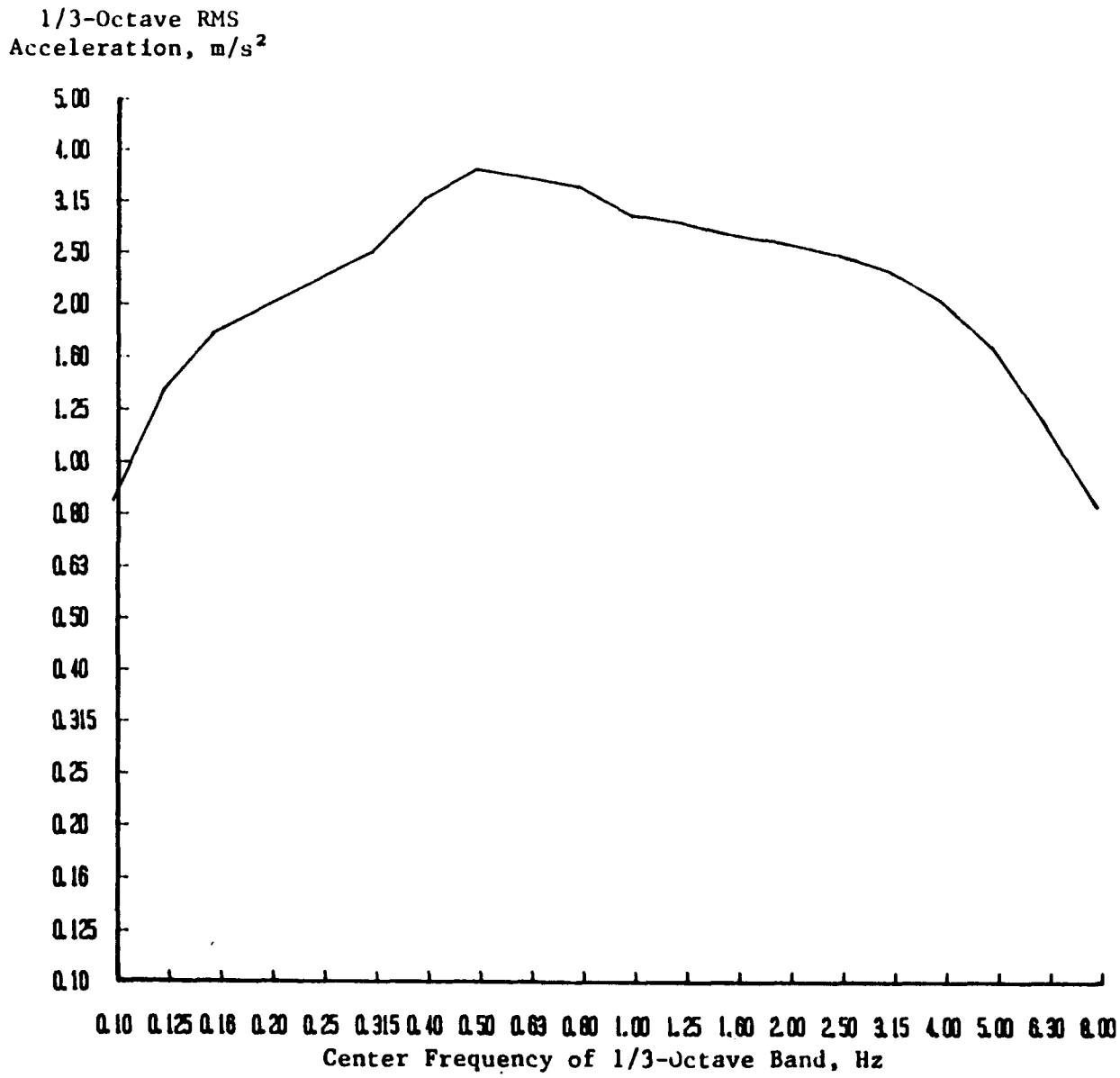


FIGURE D 5.1 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

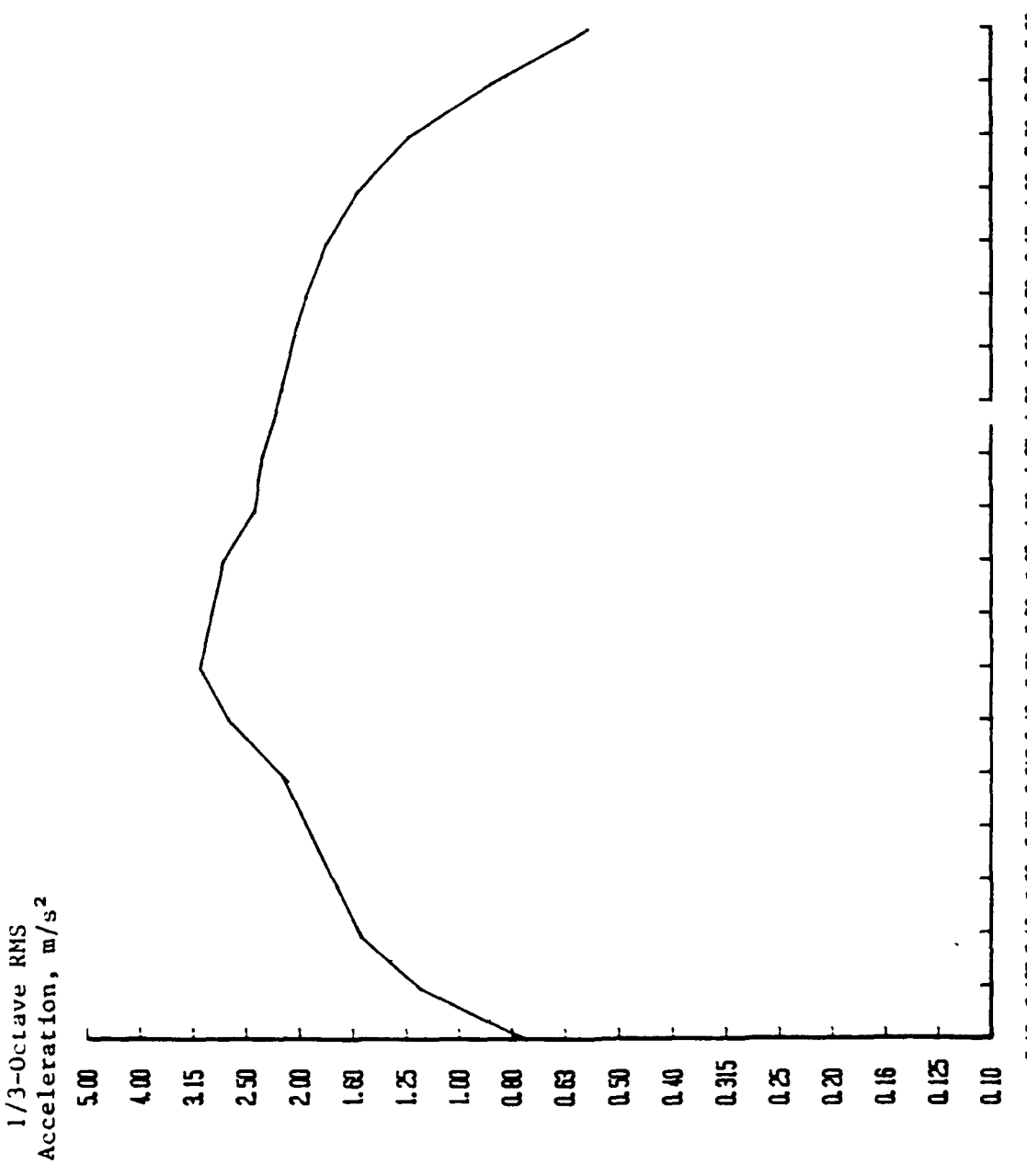


FIGURE D 5.2 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0 % Beam

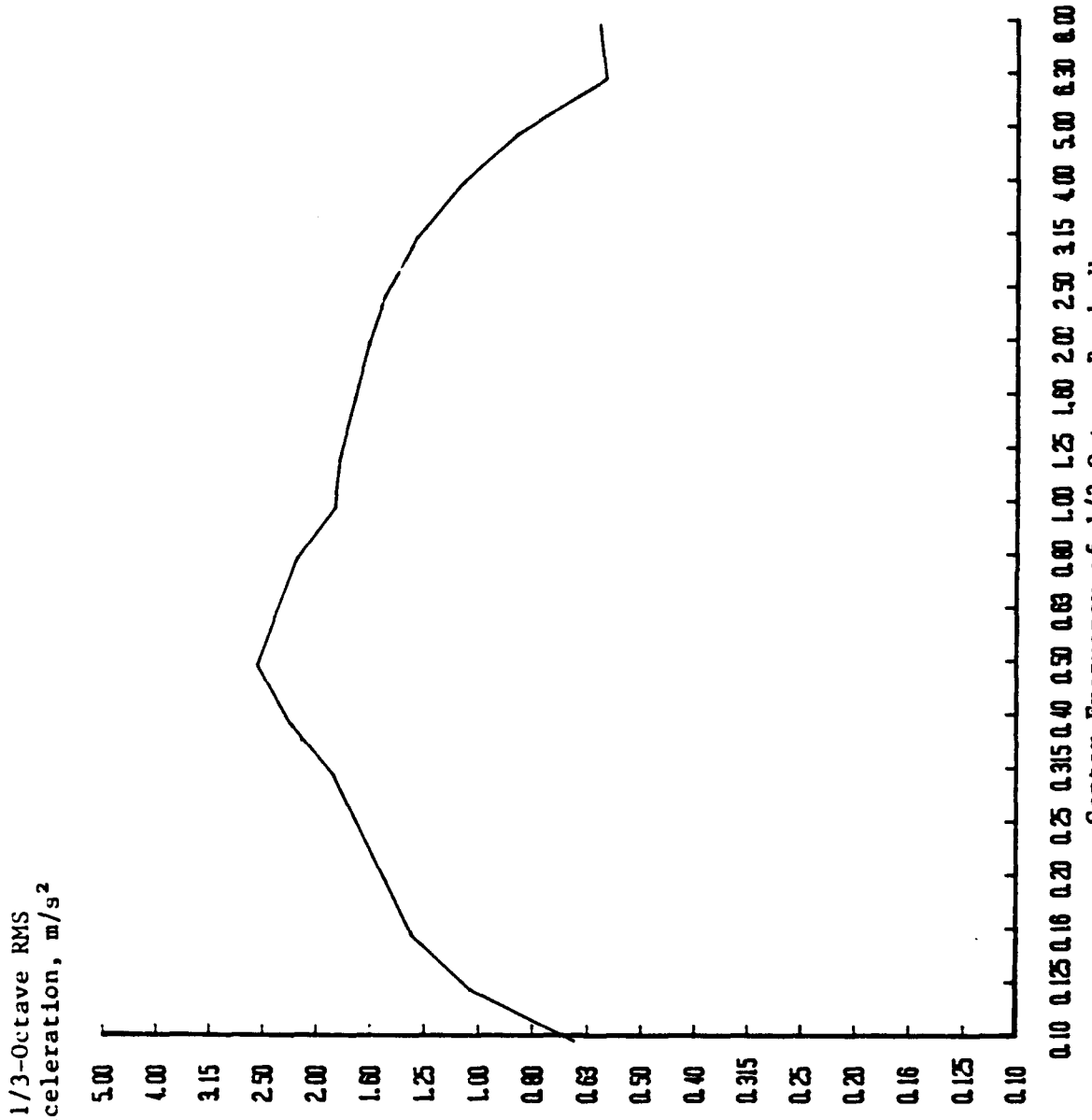


FIGURE D 5.3 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

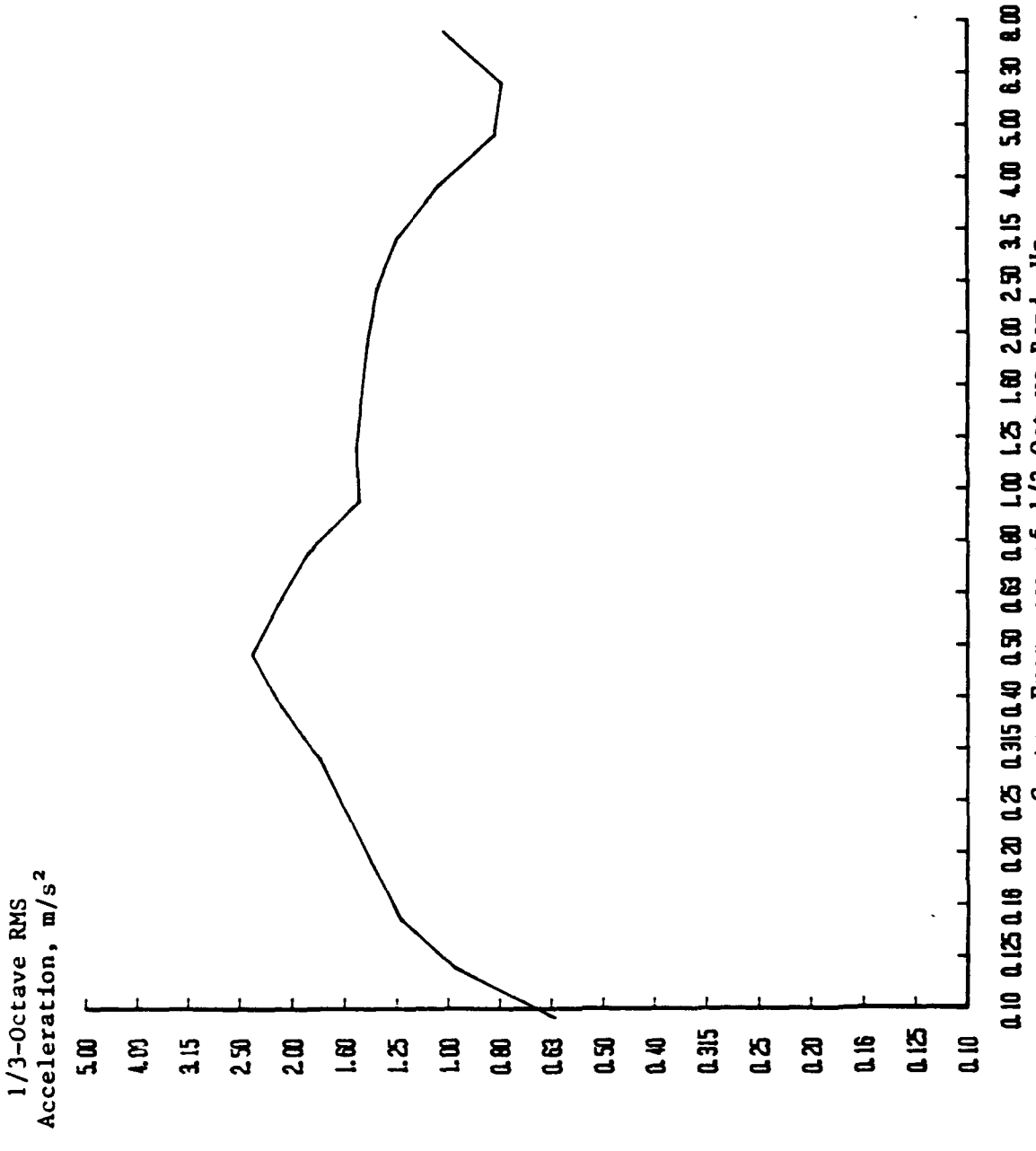


FIGURE D 5.4 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

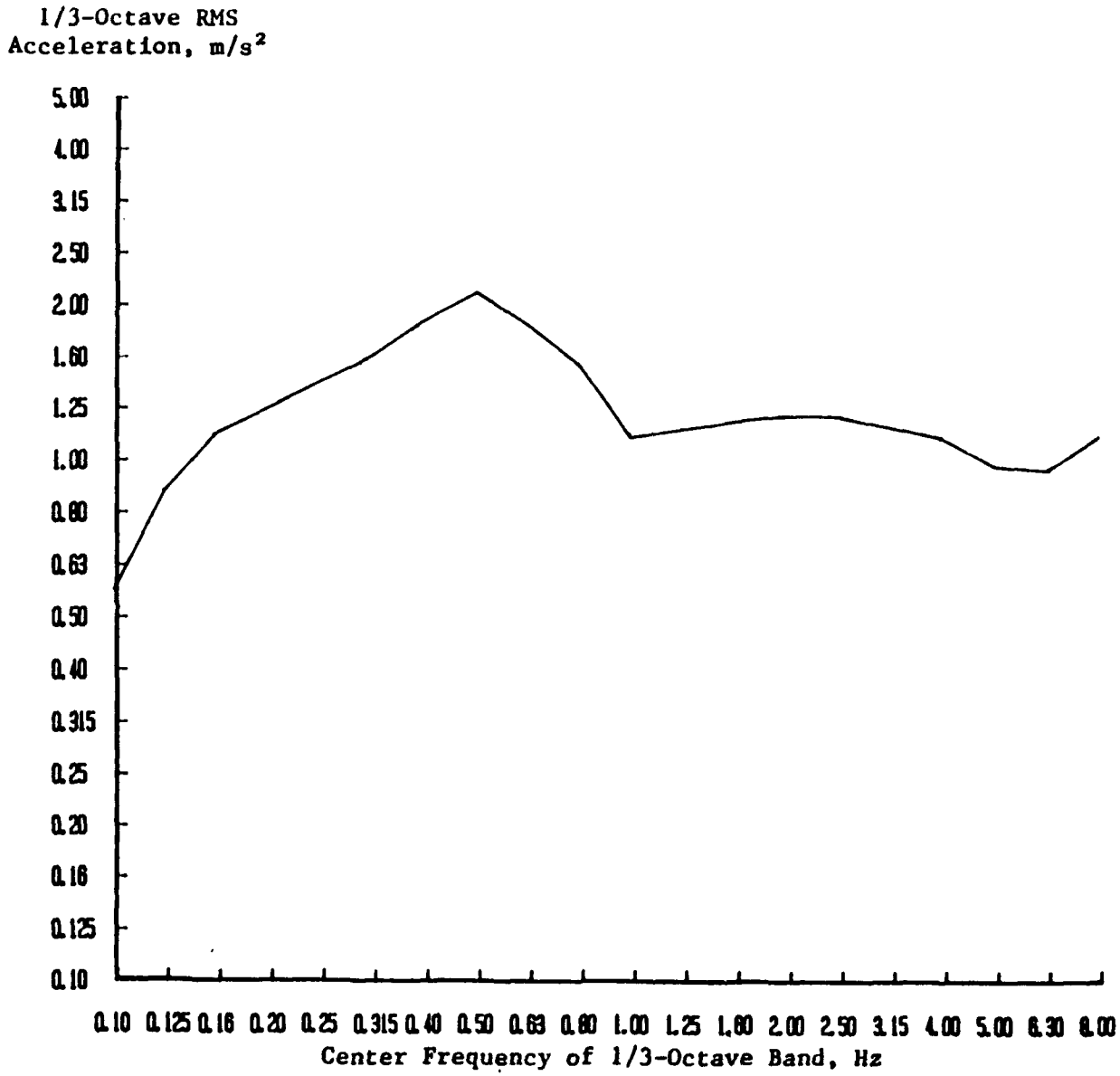


FIGURE D 5.5 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

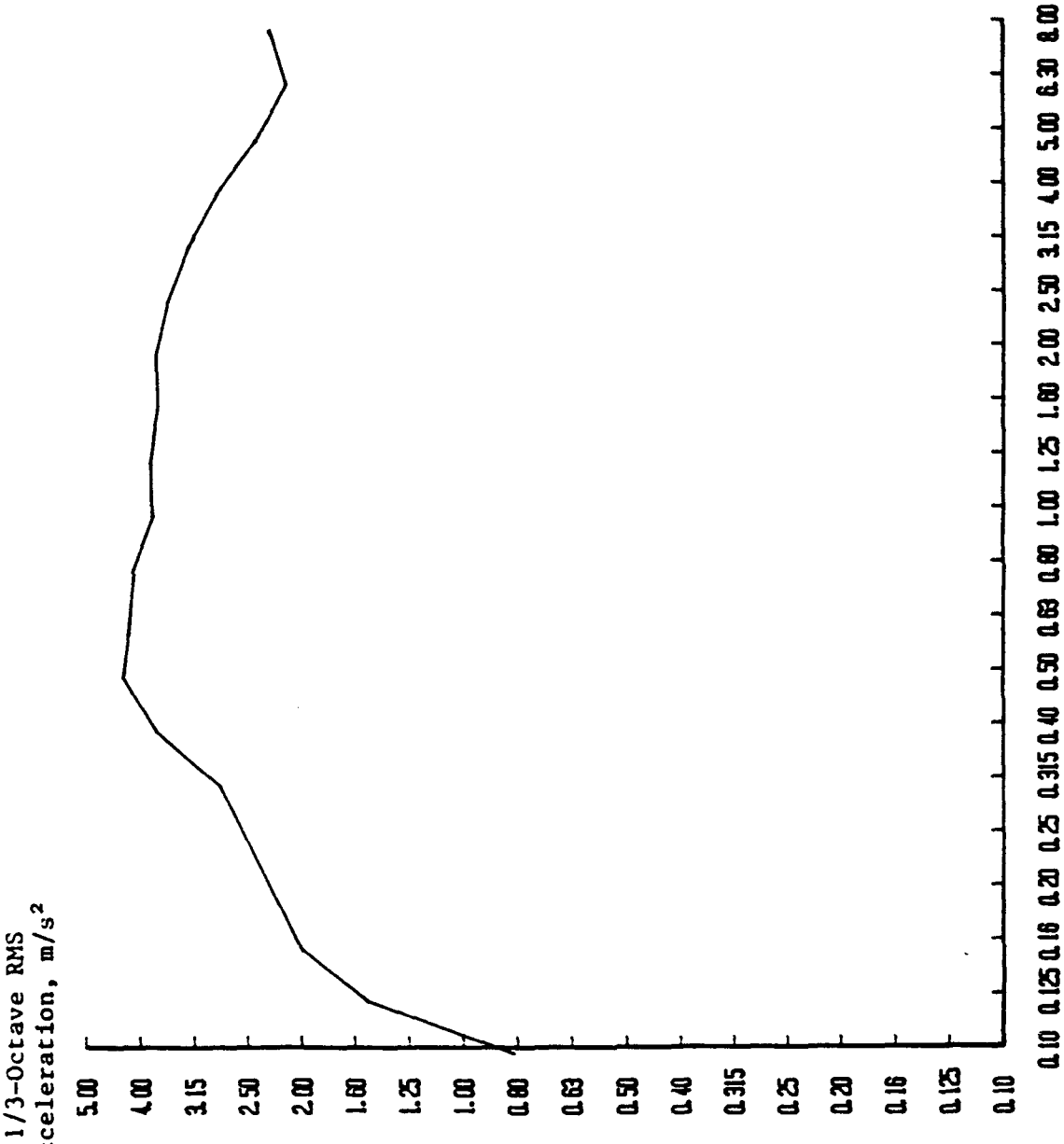


FIGURE D 6.1 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 5
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

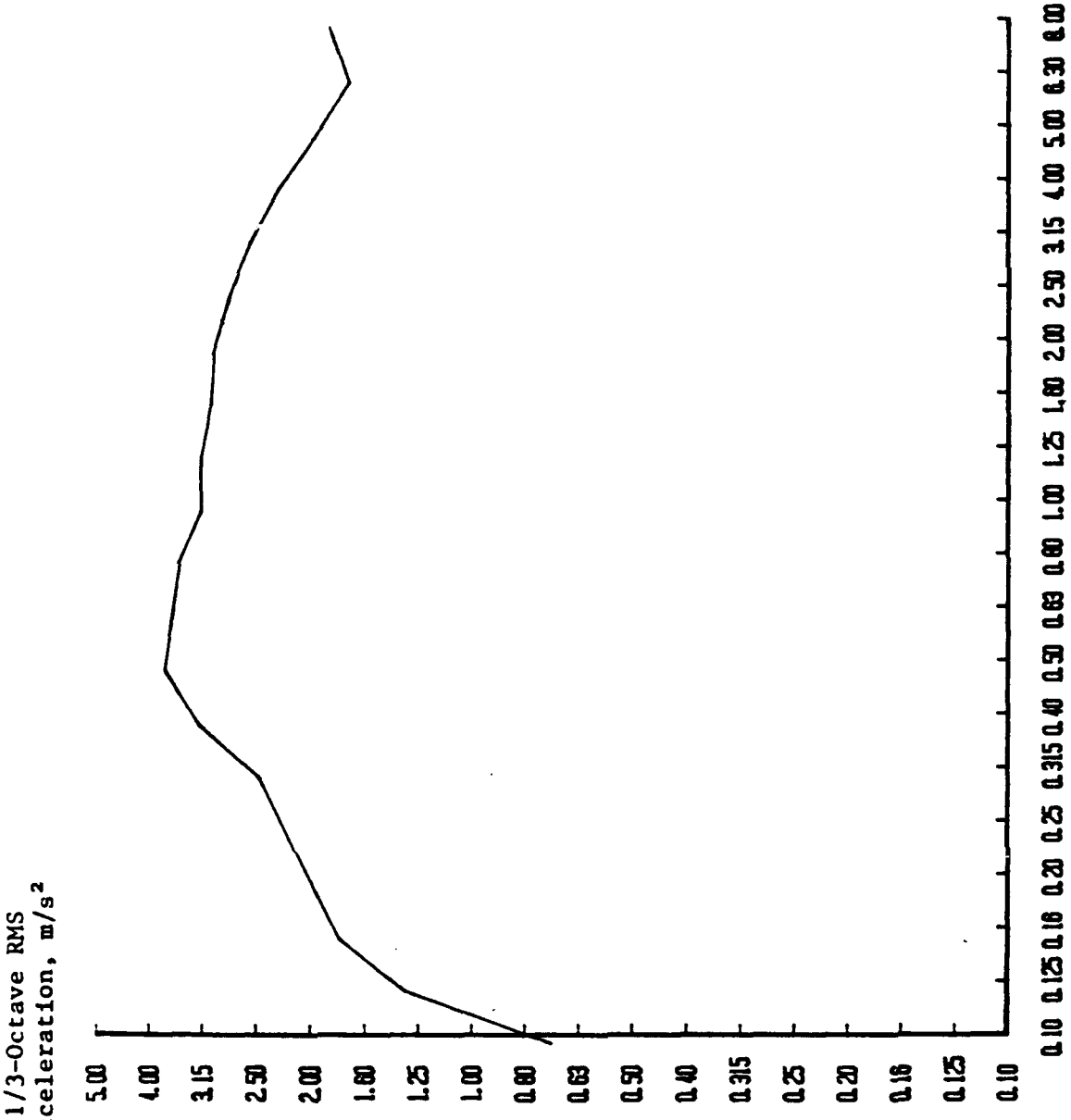


FIGURE D 6.2 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 4
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

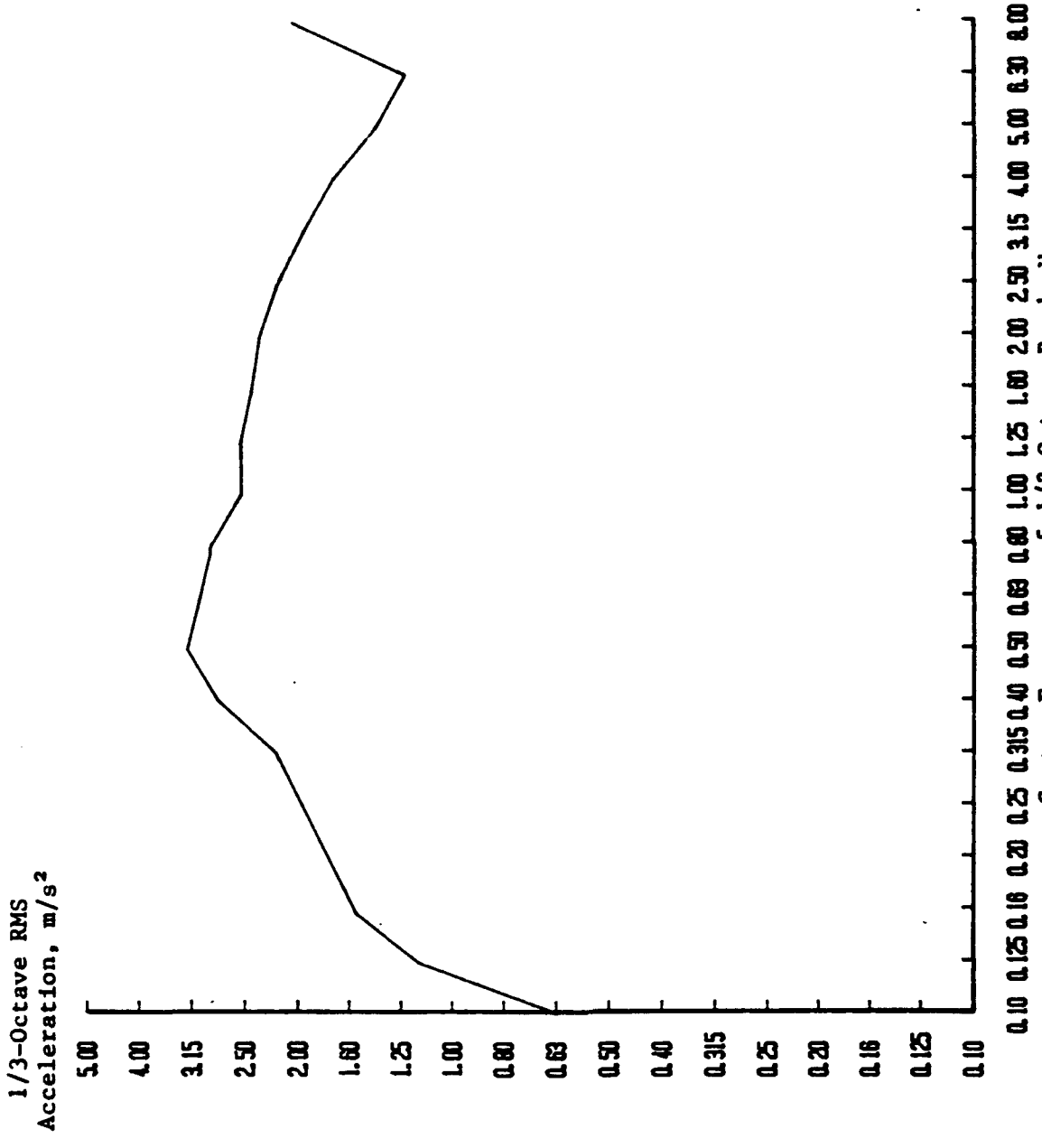


FIGURE D 6.3 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 3
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

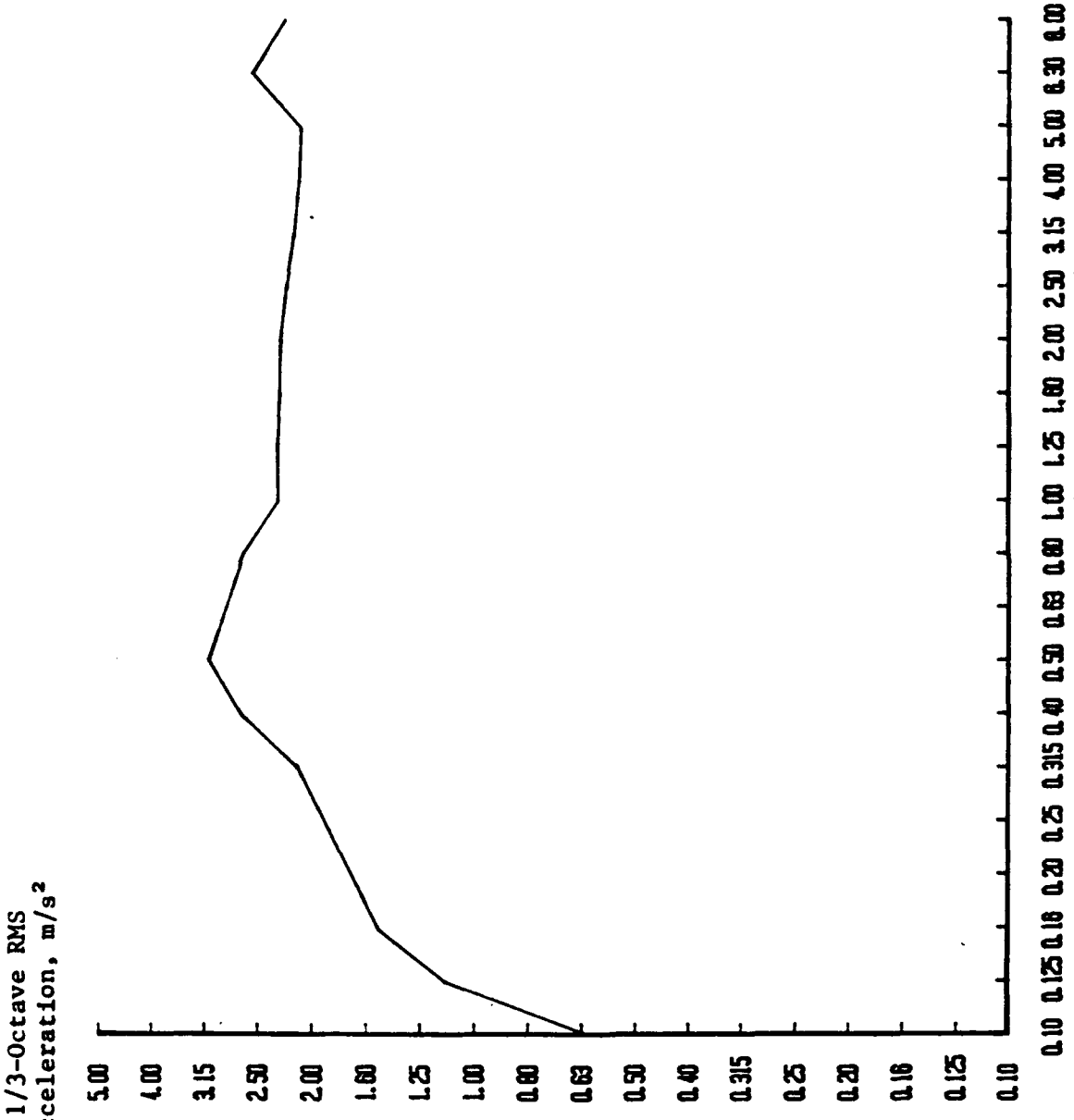


FIGURE D 6.4 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 2
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

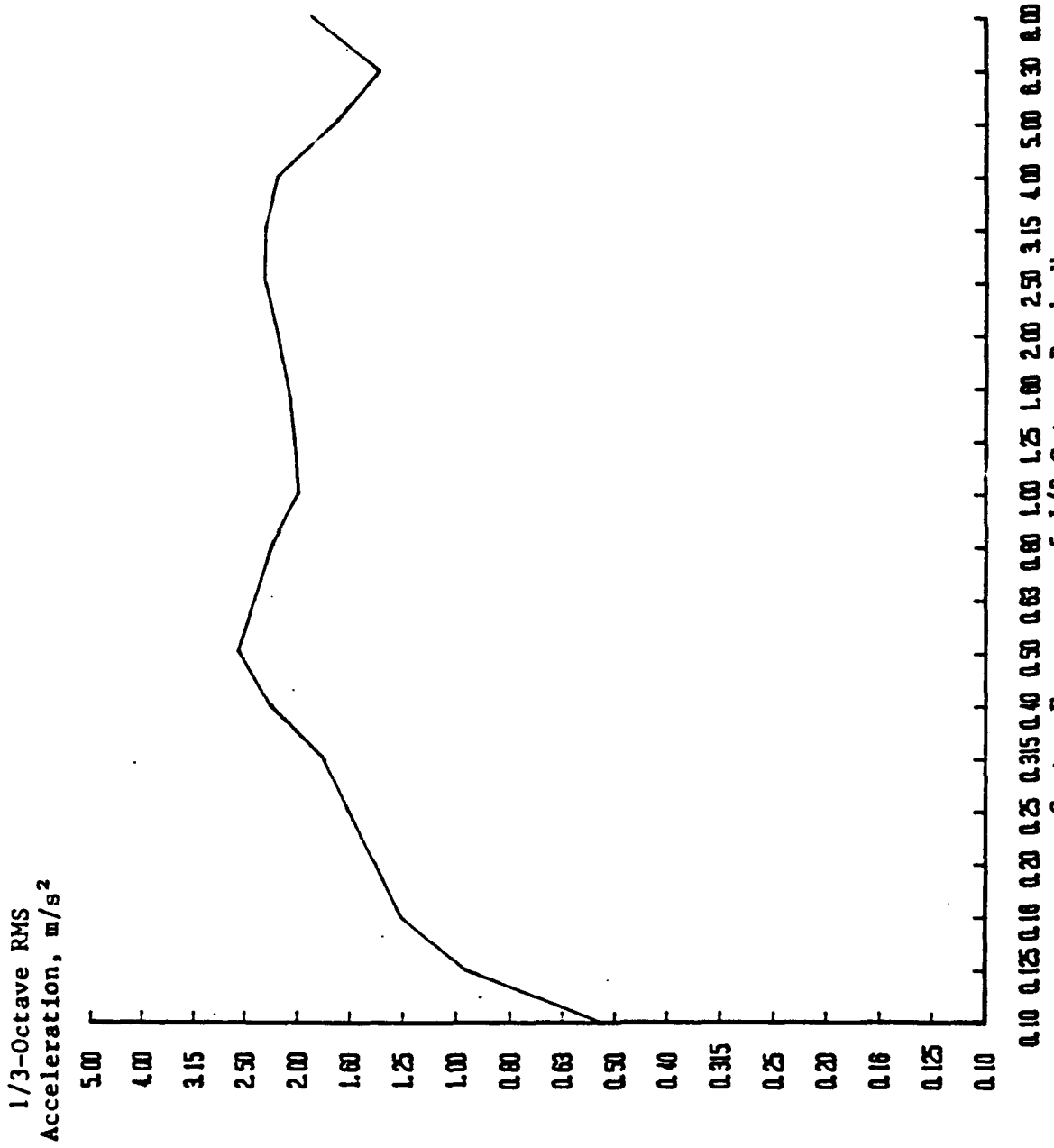


FIGURE D 6.5 1/3 OCTAVE RMS ACCELERATIONS
120 ft WPB
Accelerometer No. 1
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

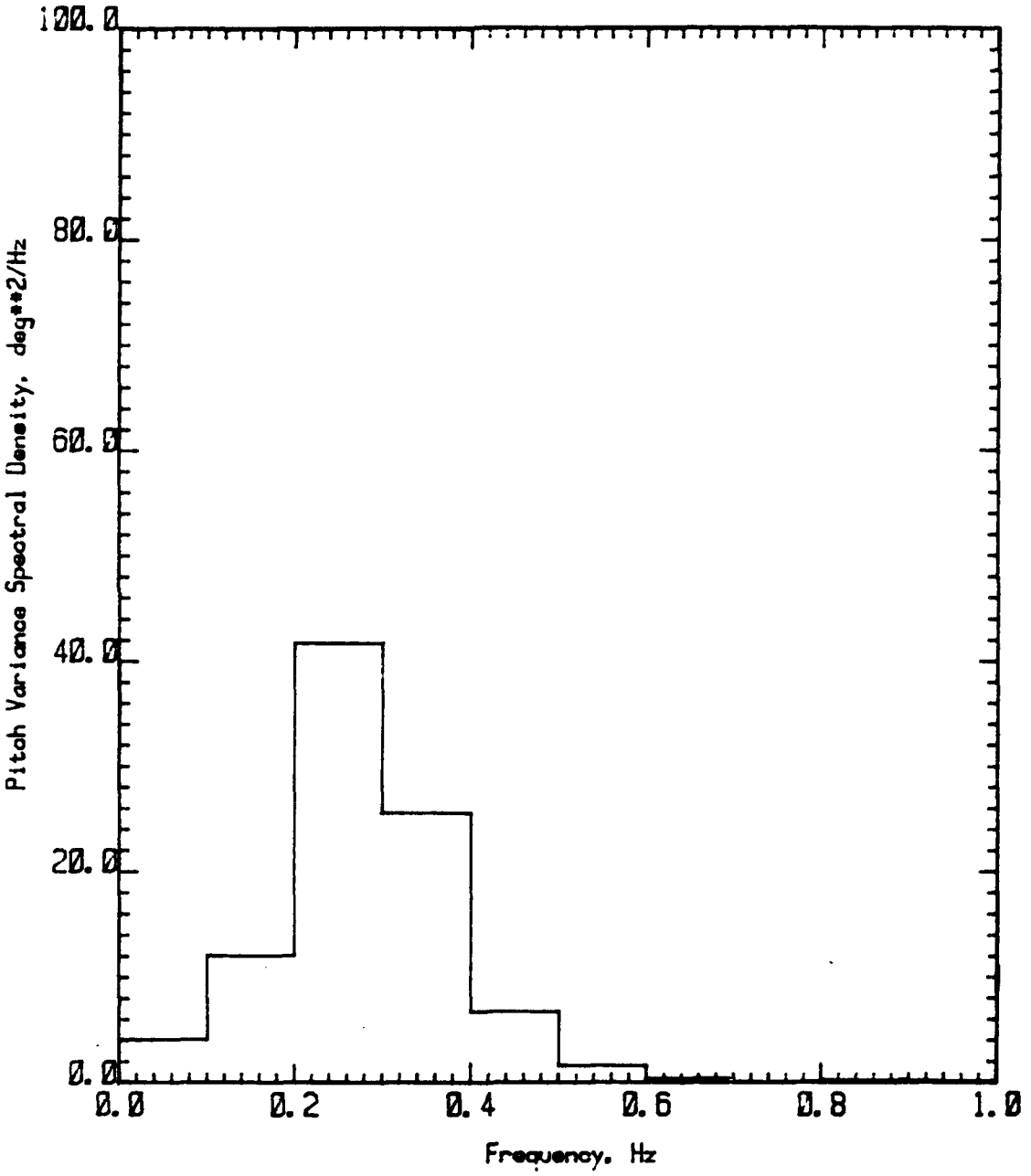


FIGURE E 1.1 PITCH VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

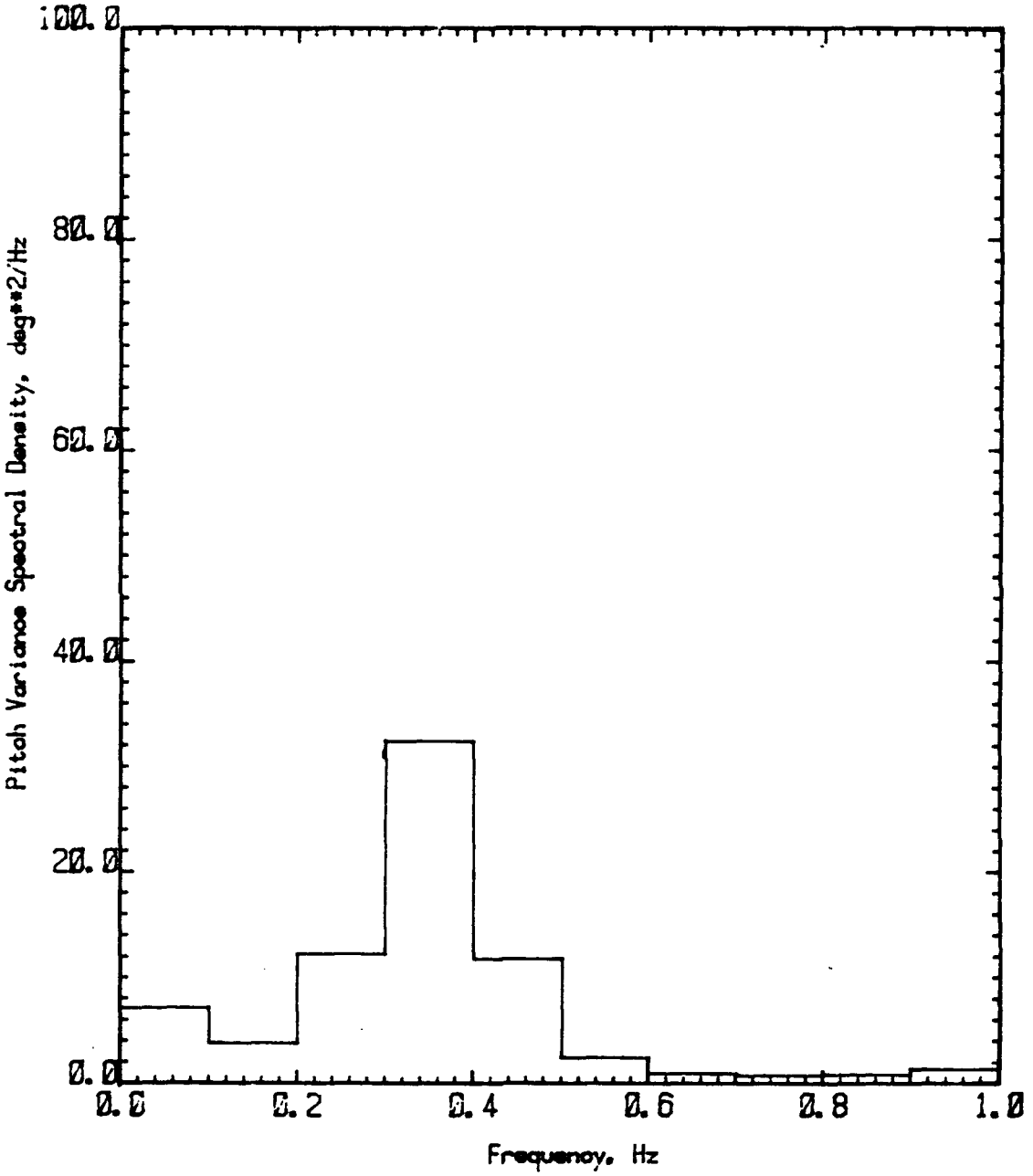


FIGURE E 1.2 PITCH VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

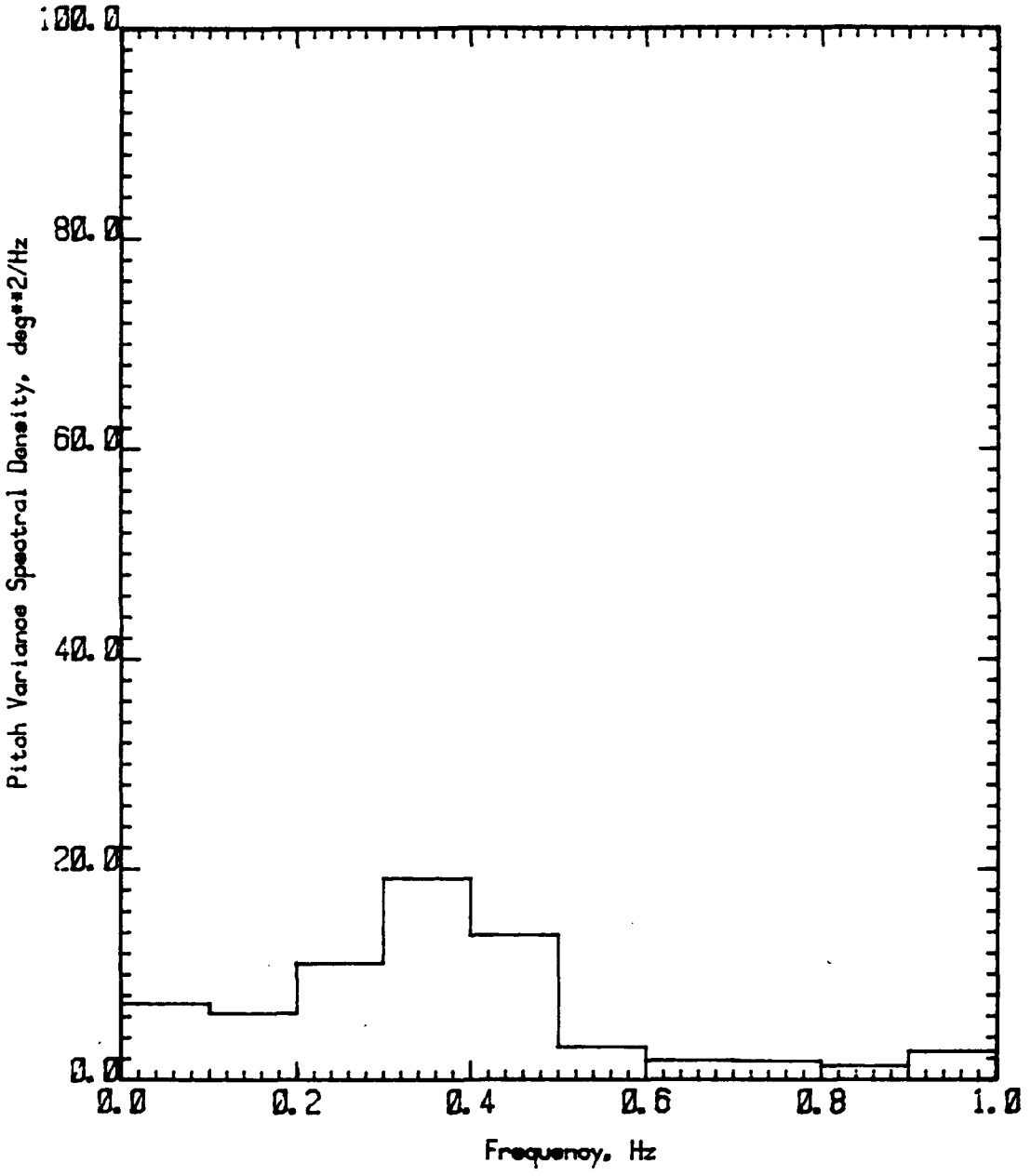


FIGURE E 1.3 PITCH VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

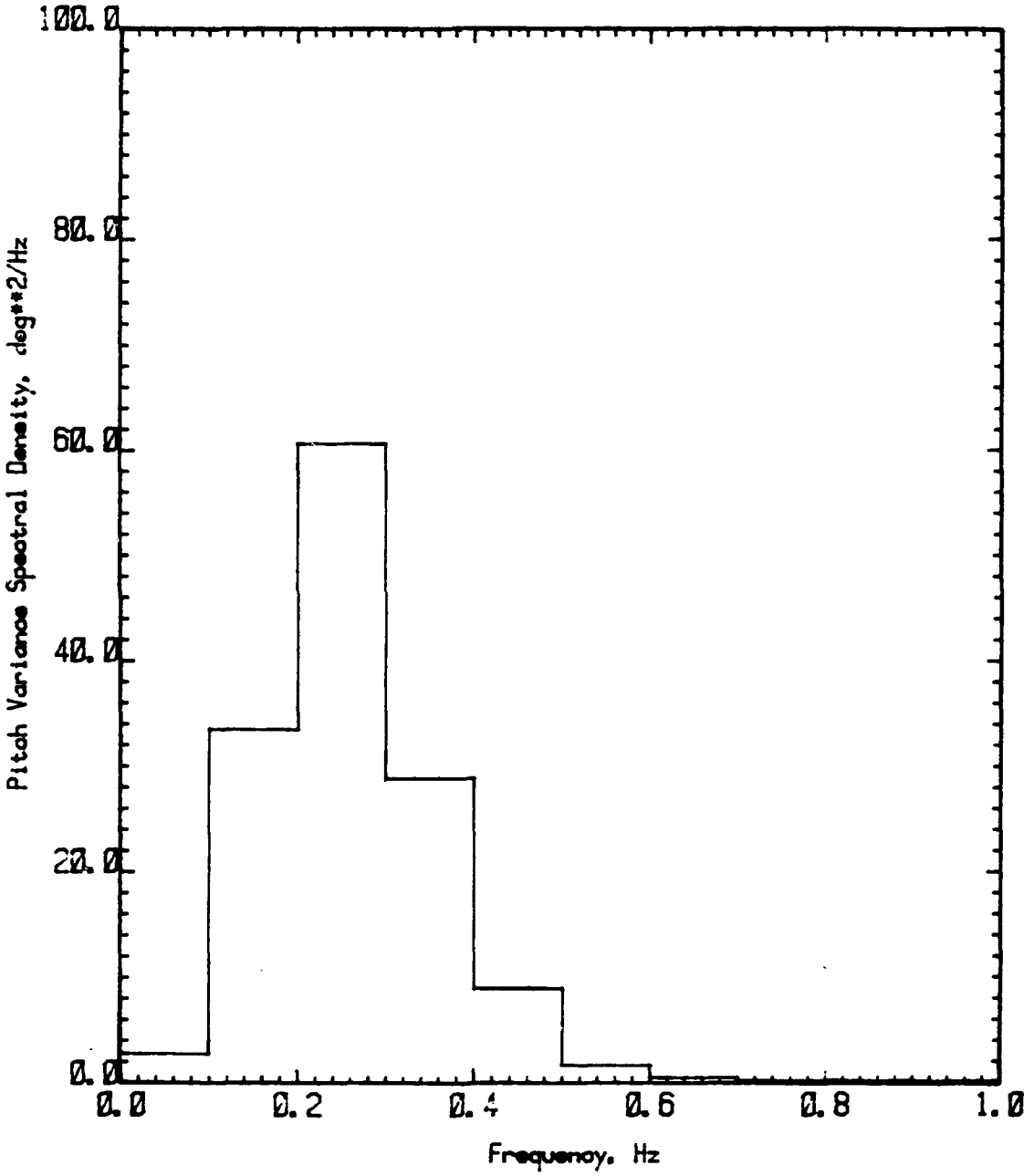


FIGURE E 1.4 PITCH VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

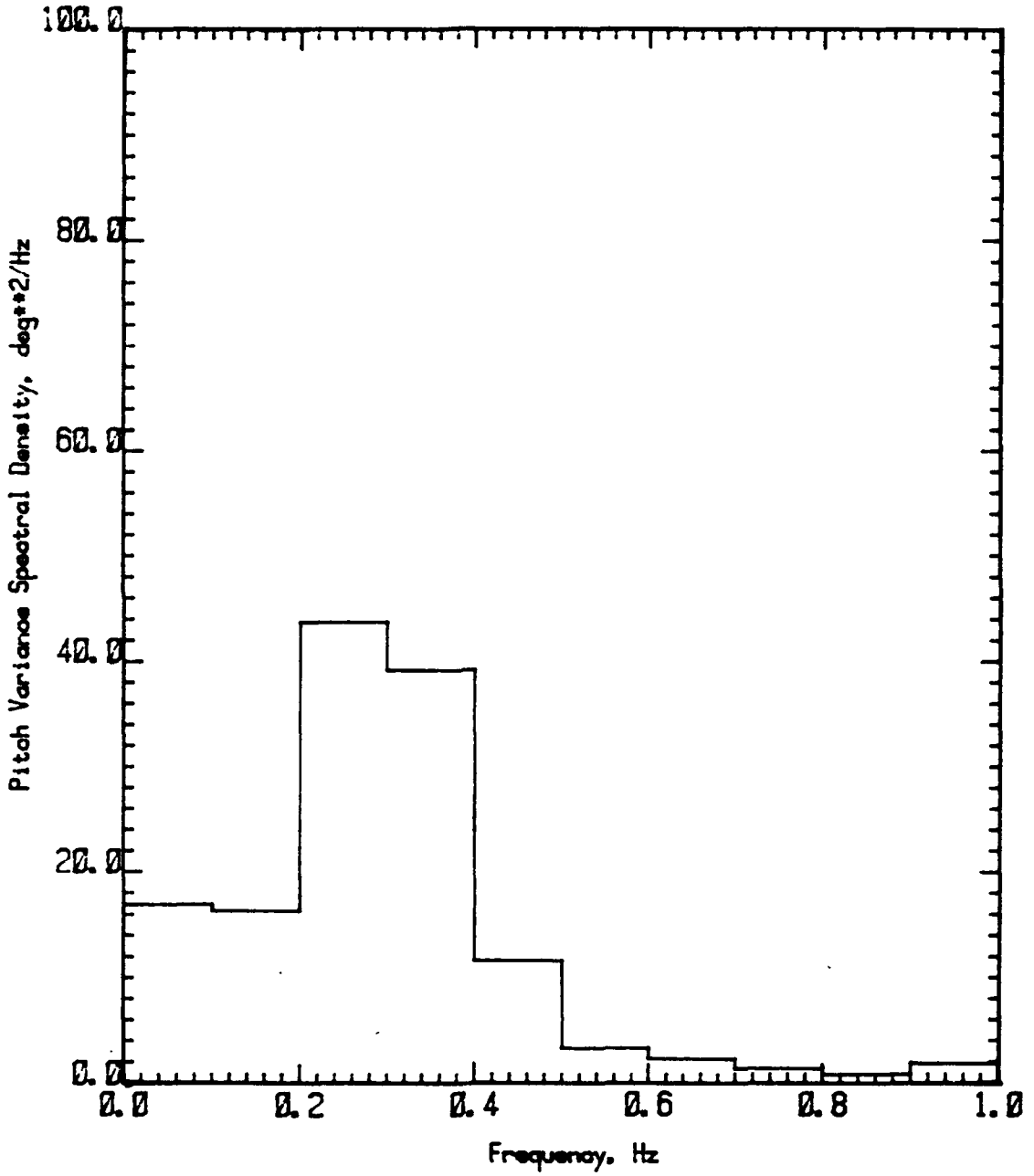


FIGURE E 1.5 PITCH VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

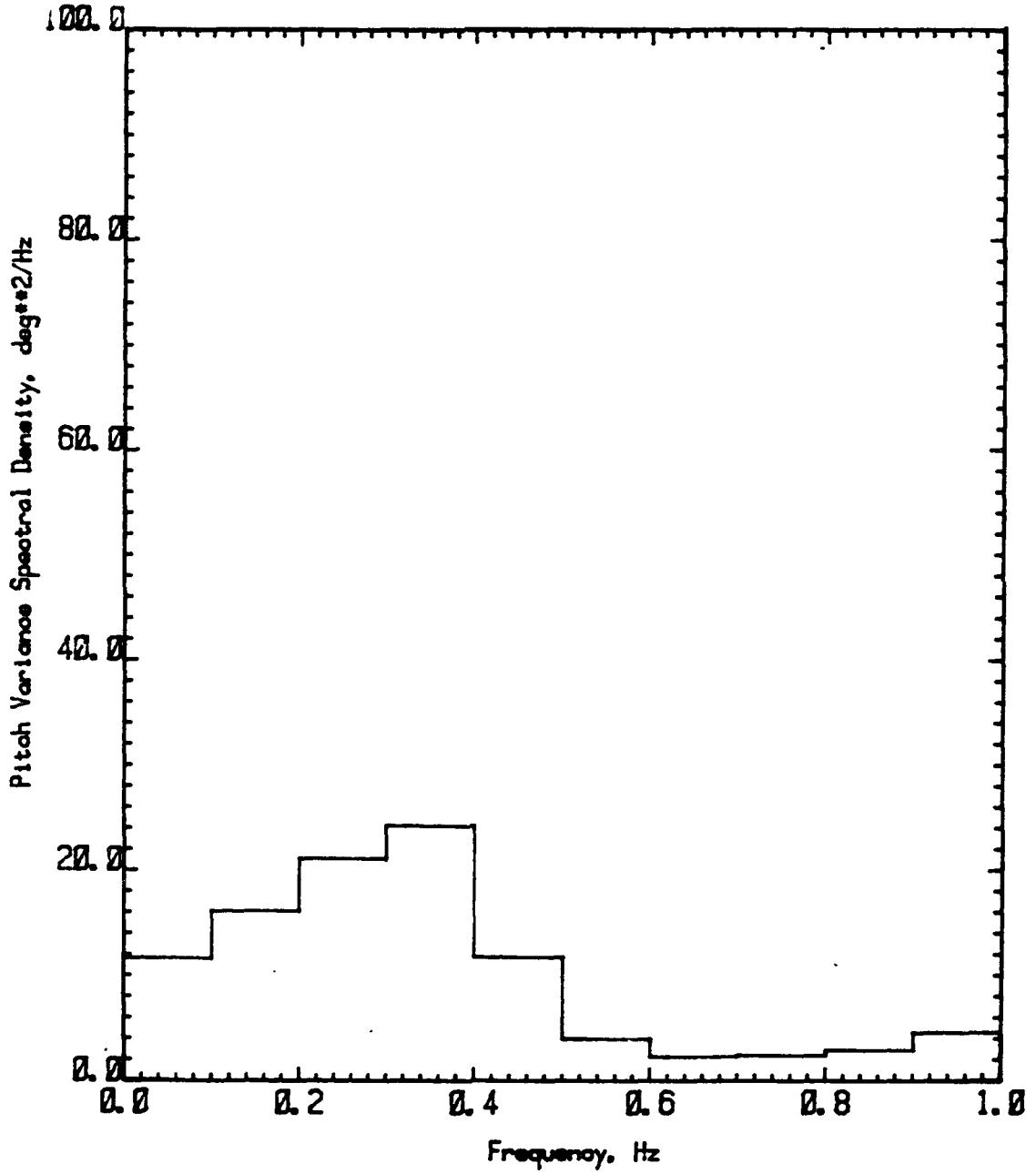


FIGURE E 1.6 PITCH VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

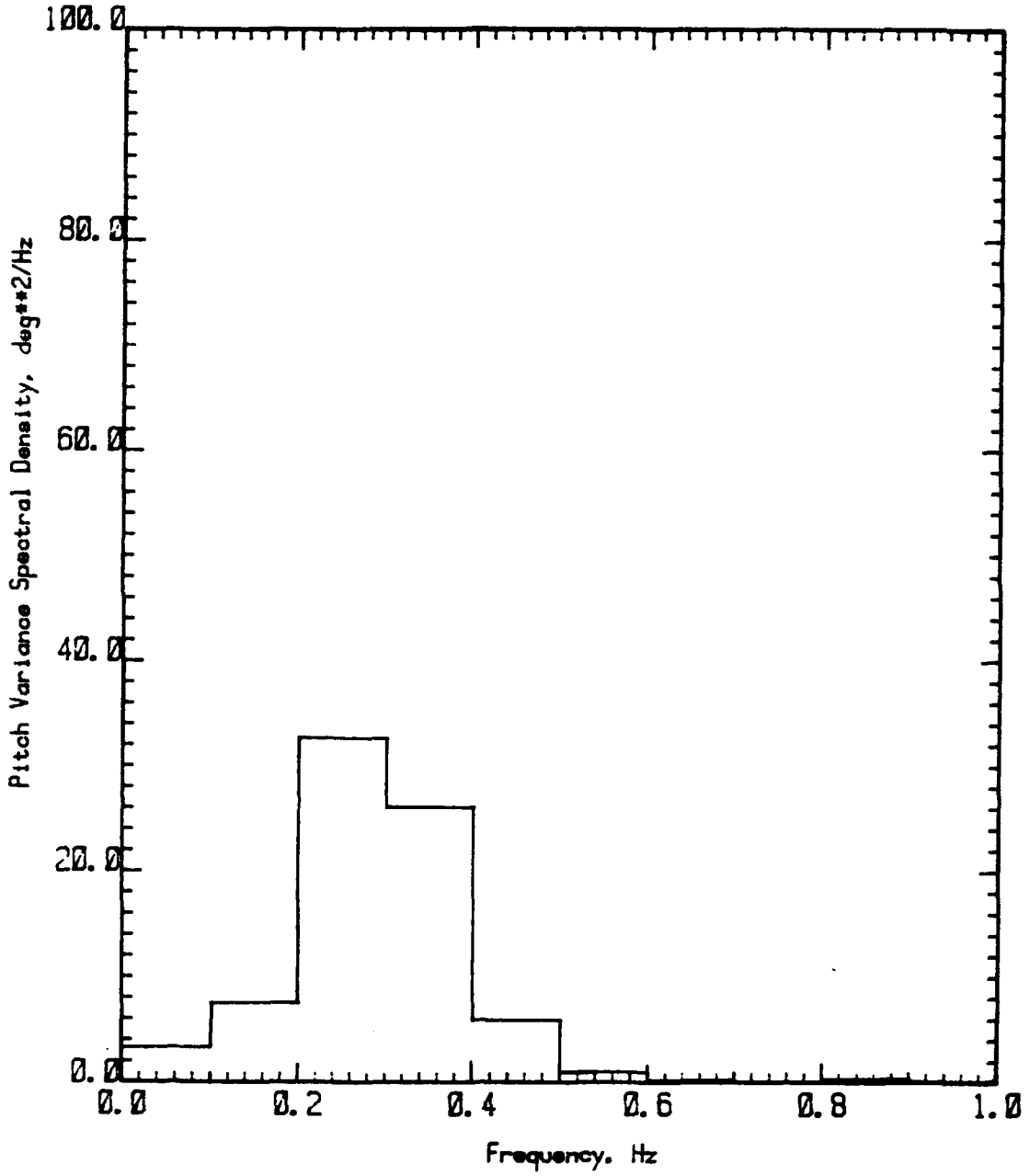


FIGURE F 1.1 PITCH VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

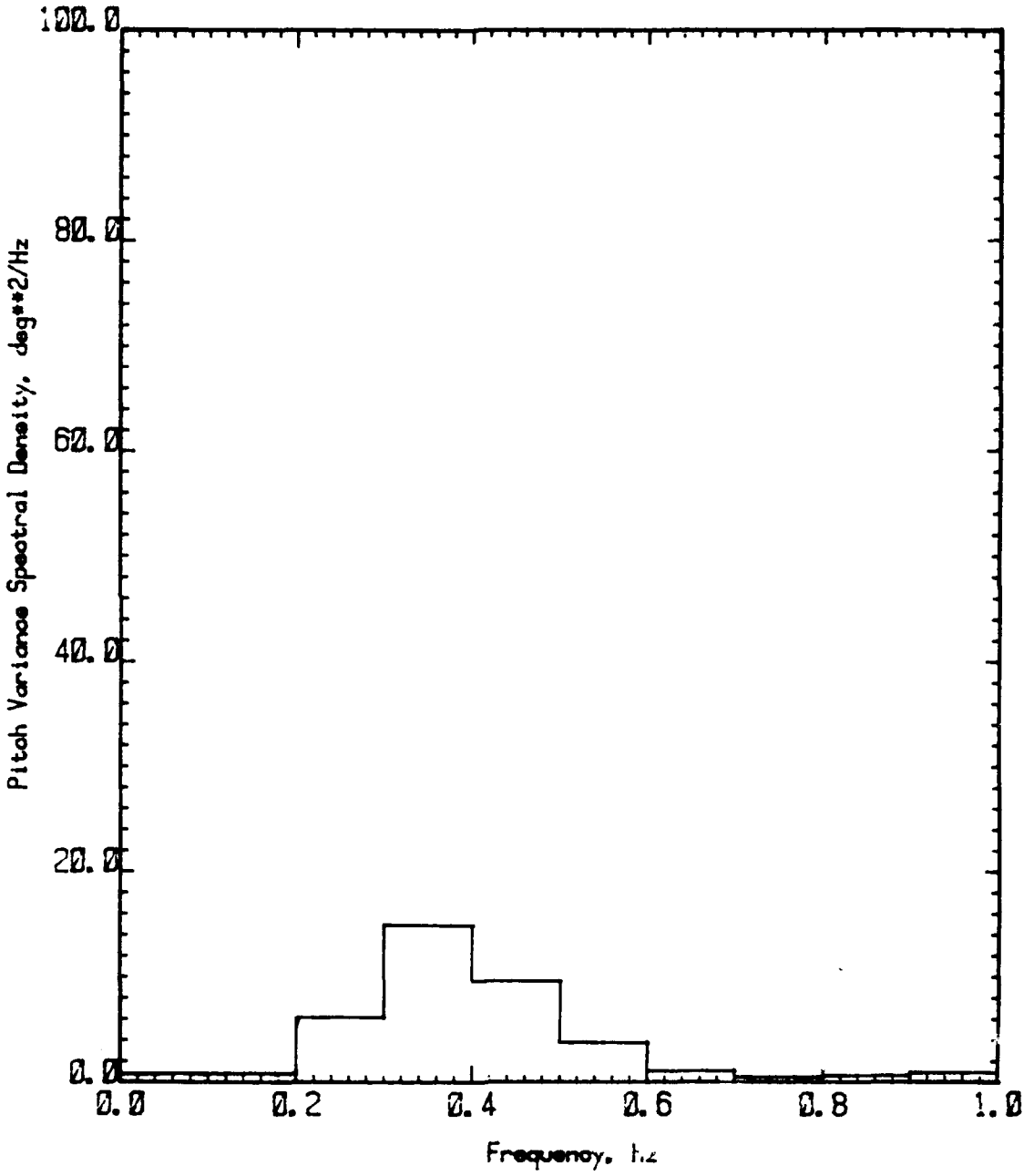


FIGURE F 1.2 PITCH VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

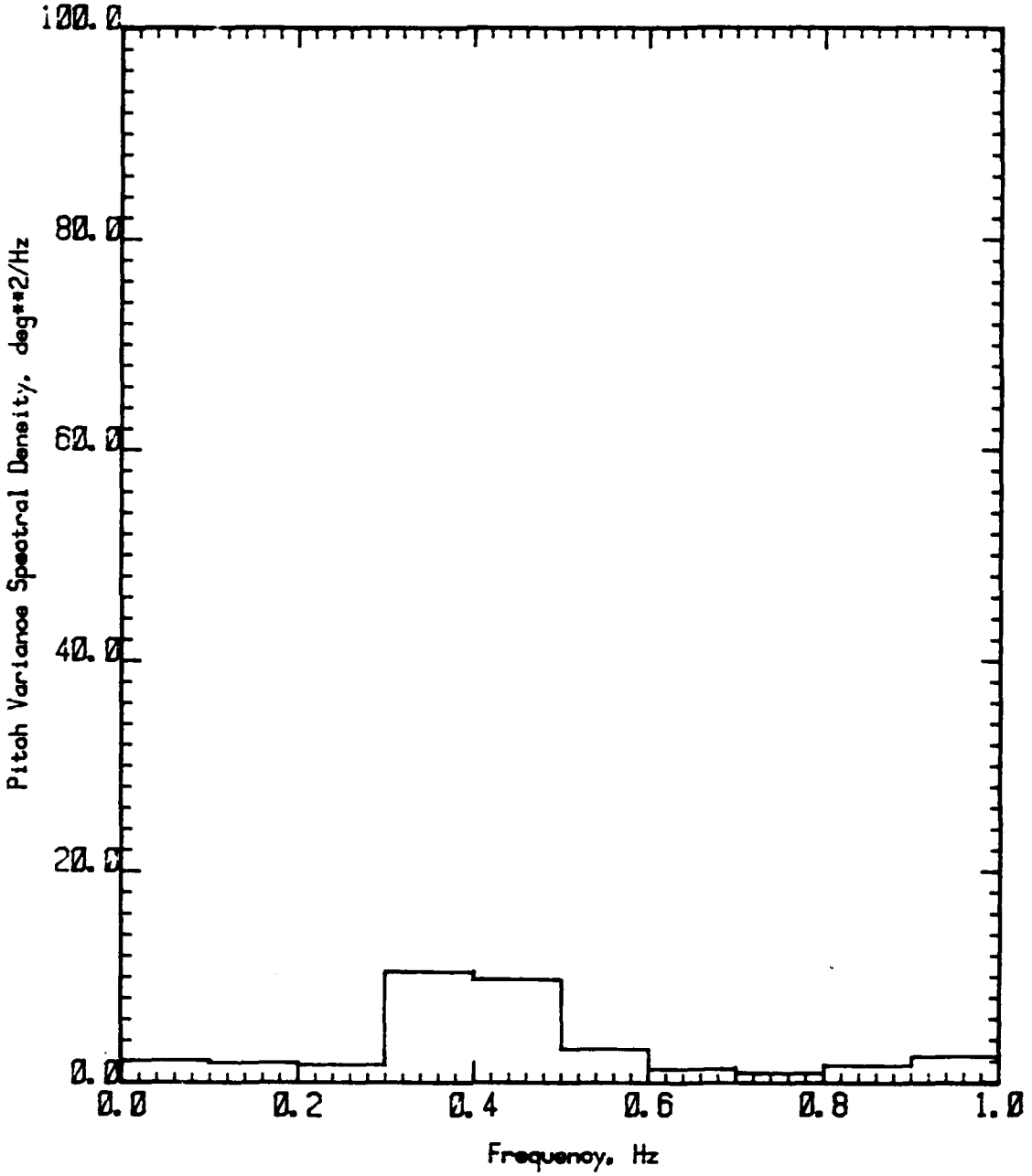


FIGURE F 1.3 PITCH VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

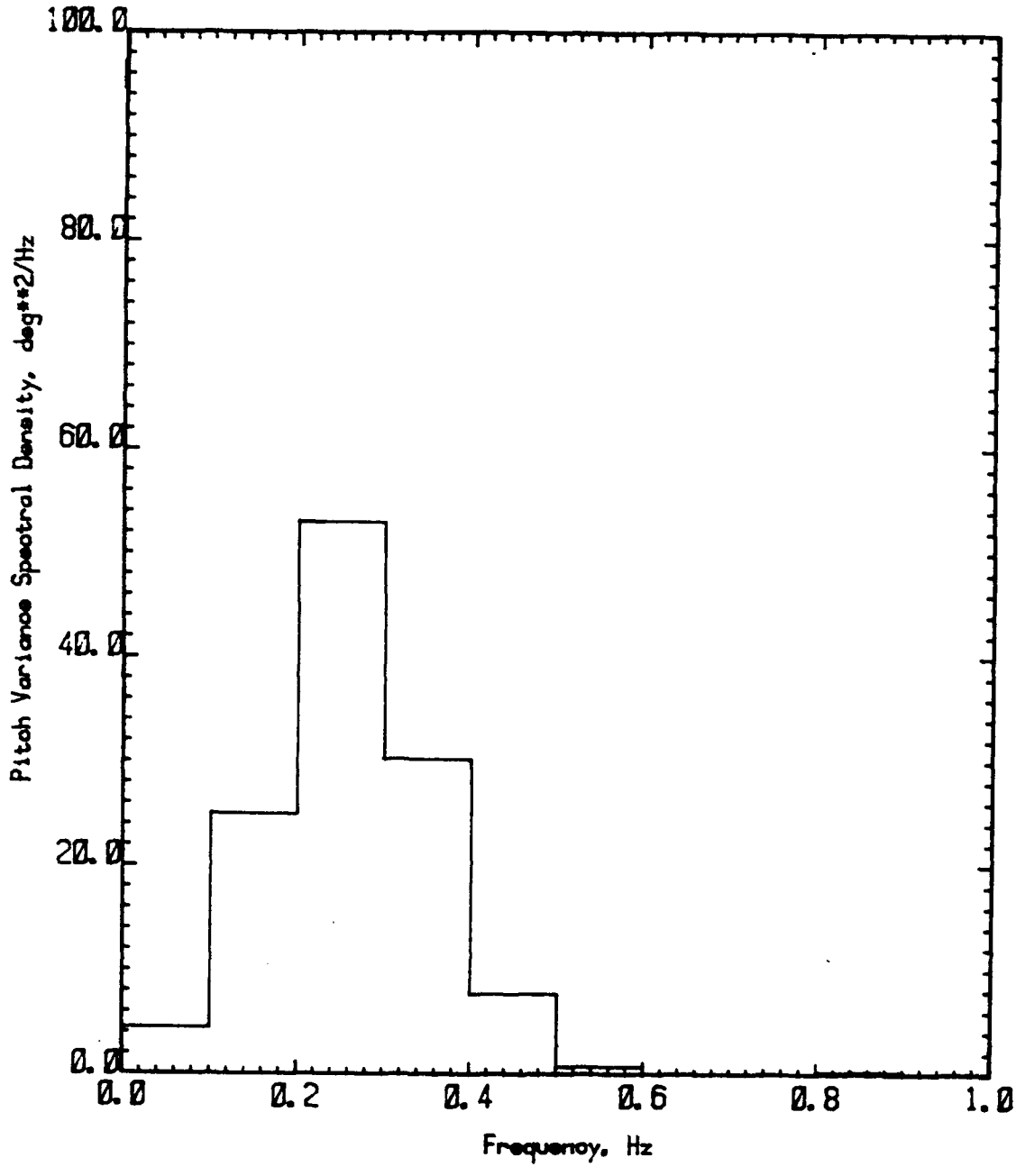


FIGURE F 1.4 PITCH VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

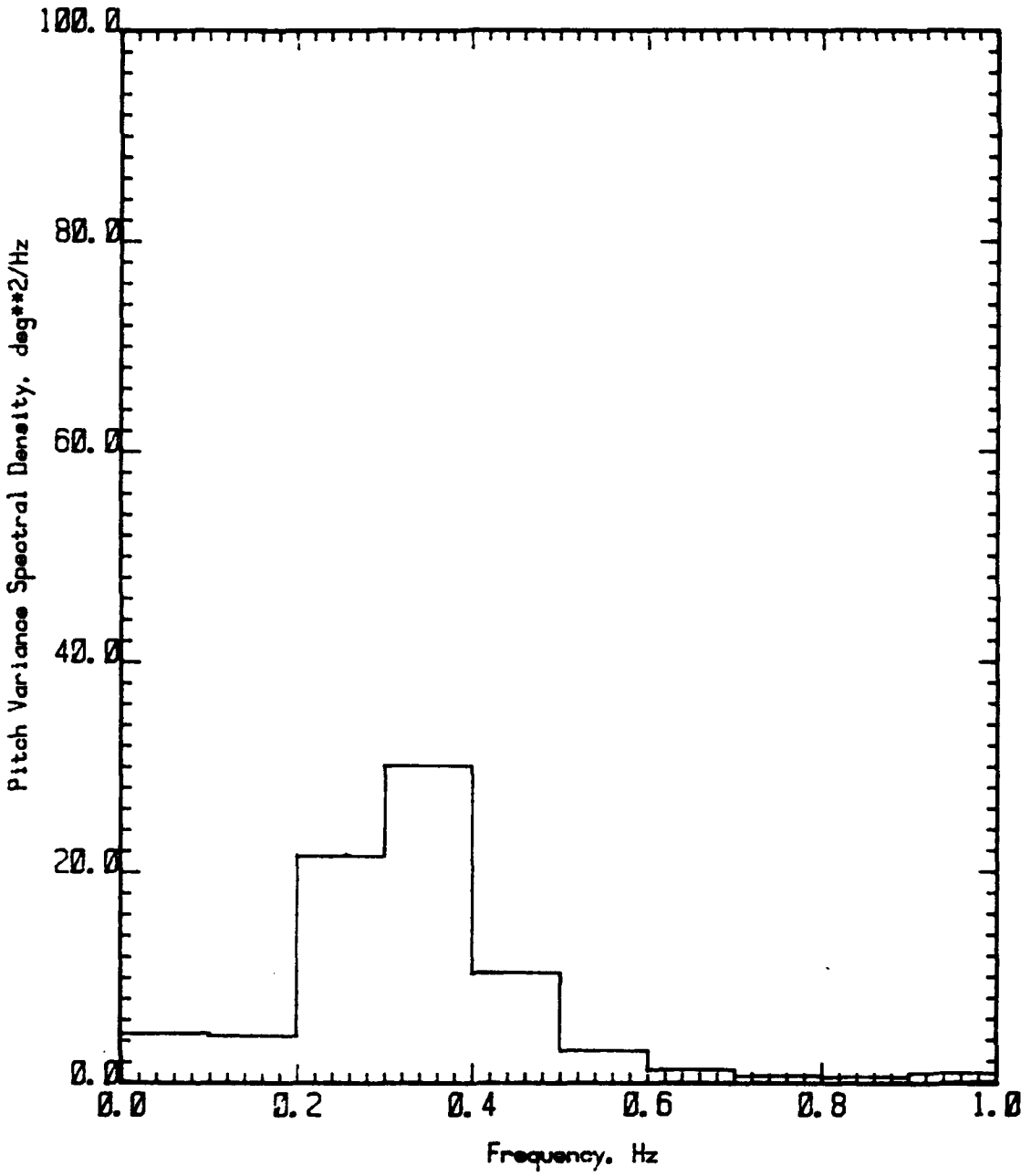


FIGURE F 1.5 PITCH VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

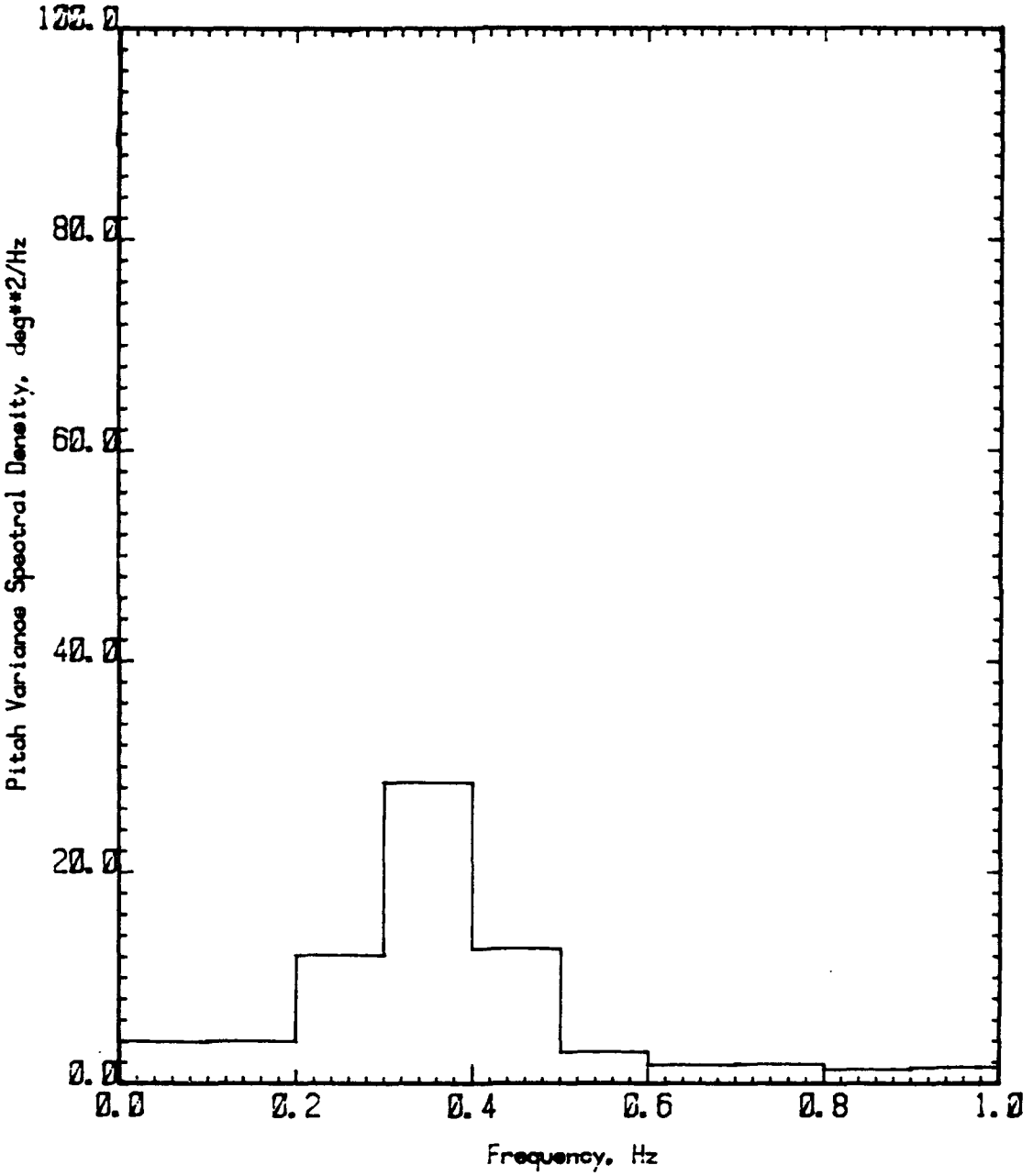


FIGURE F 1.6 PITCH VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

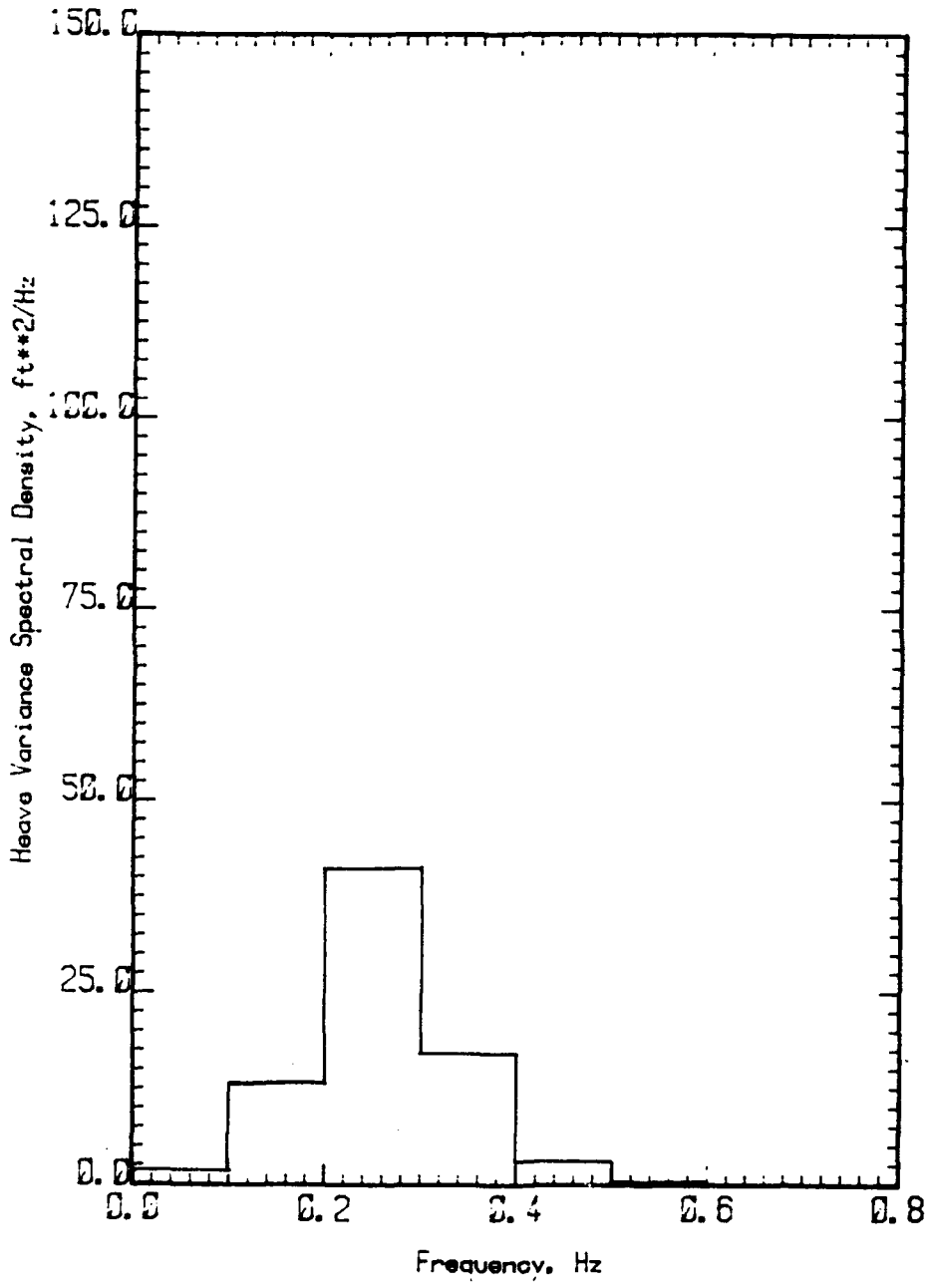


FIGURE G 1.1 HEAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

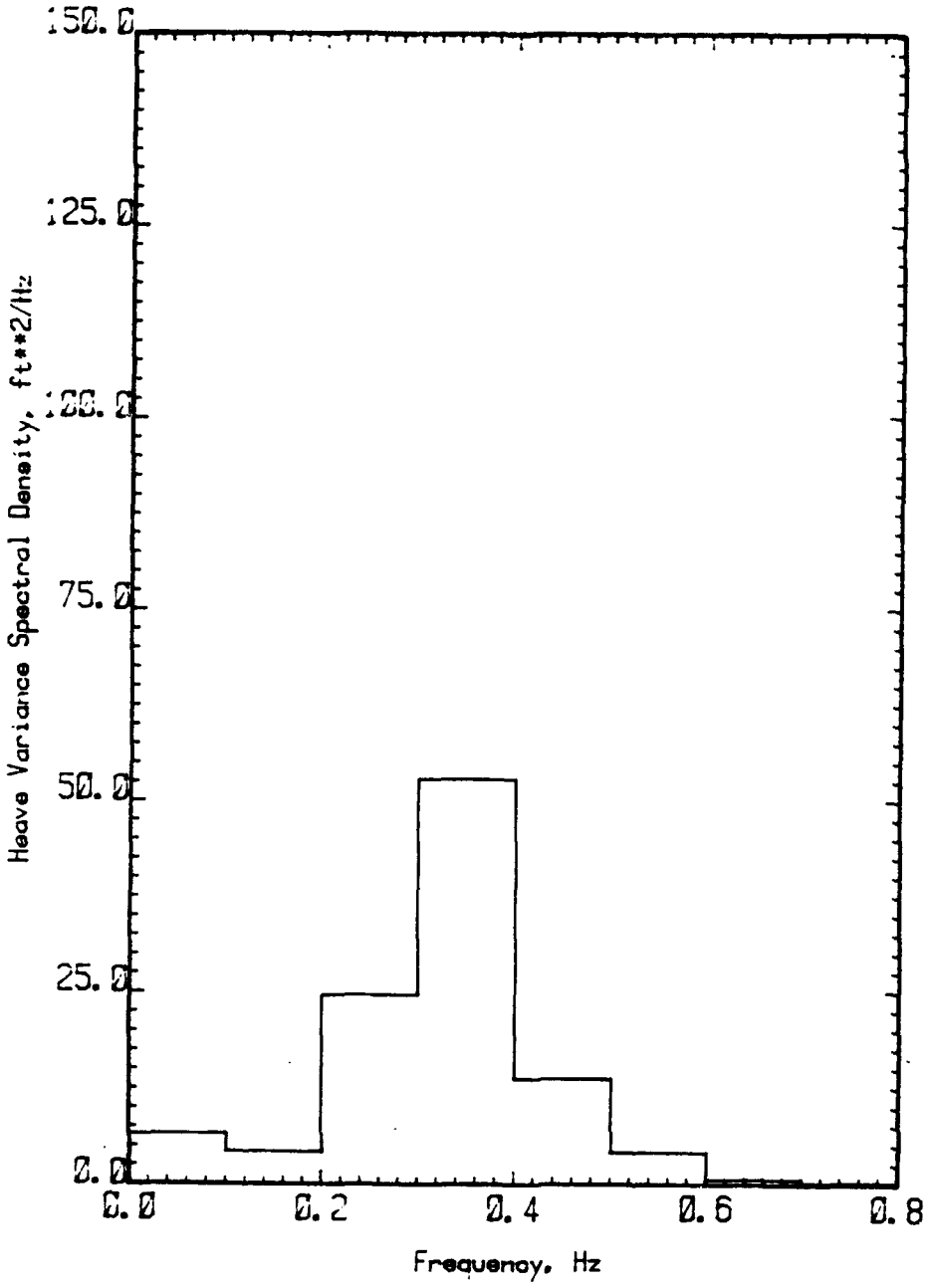


FIGURE G 1.2 HEAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

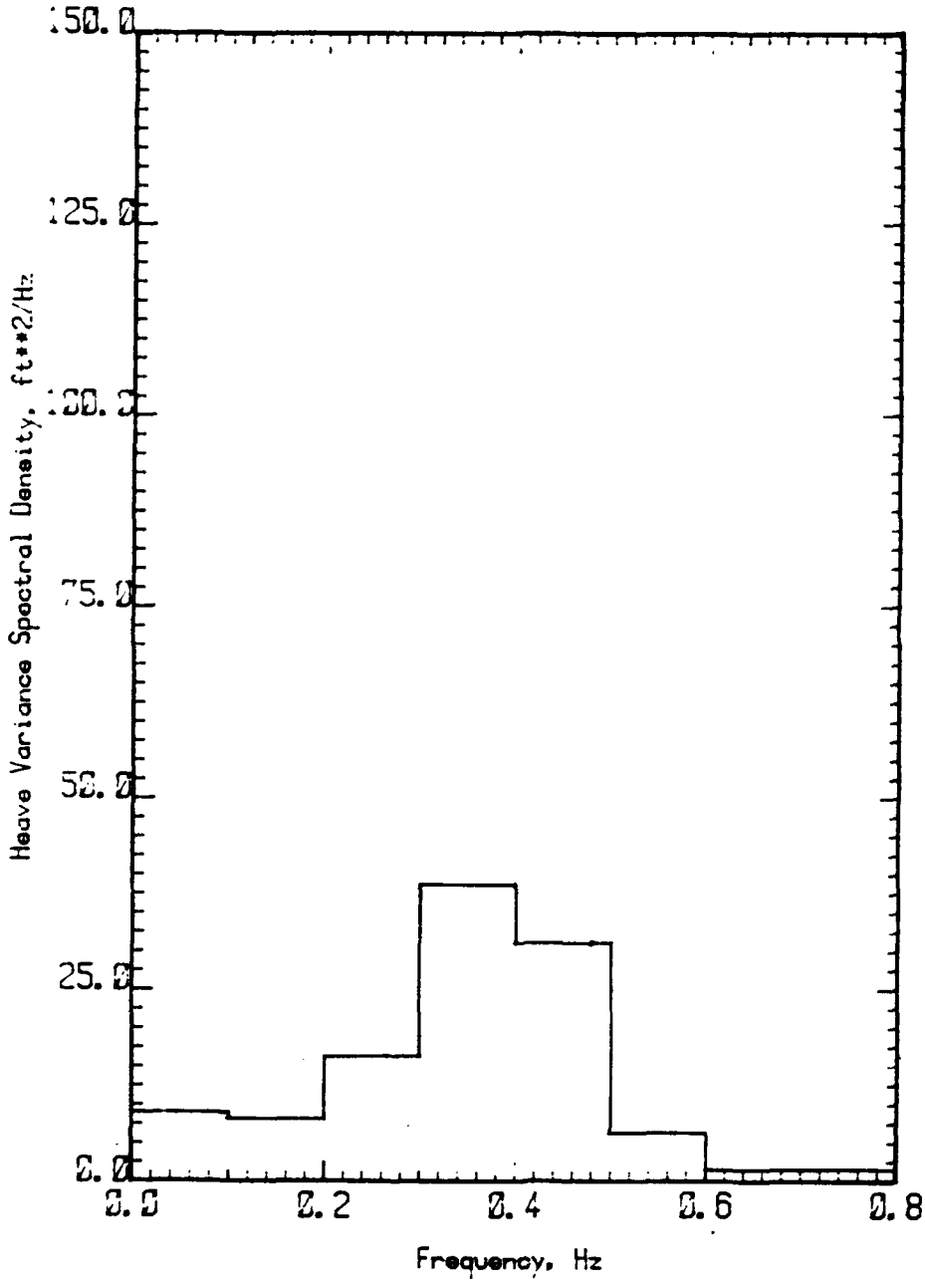


FIGURE G 1.3 HEAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

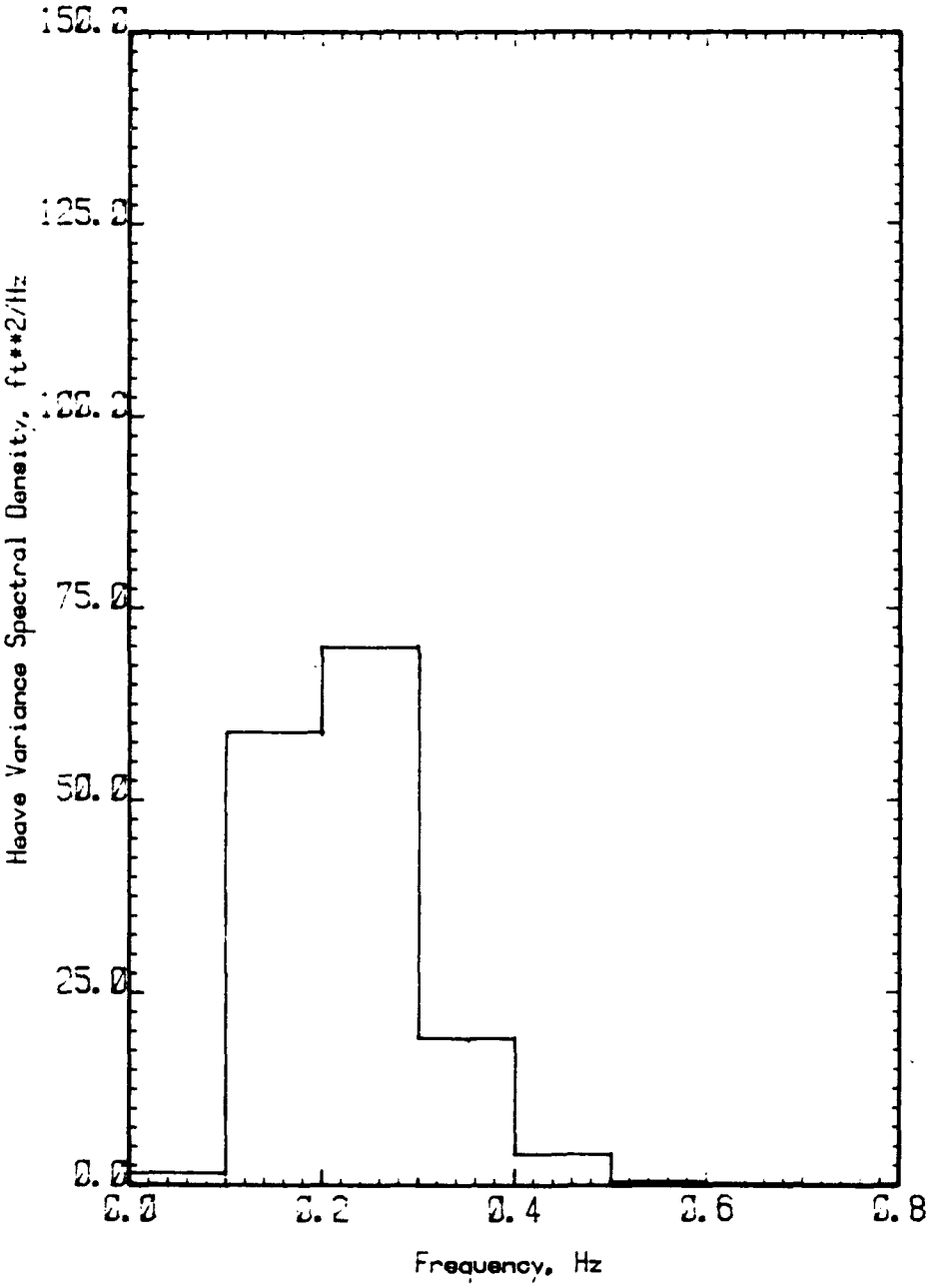


FIGURE G 1.4 HEAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

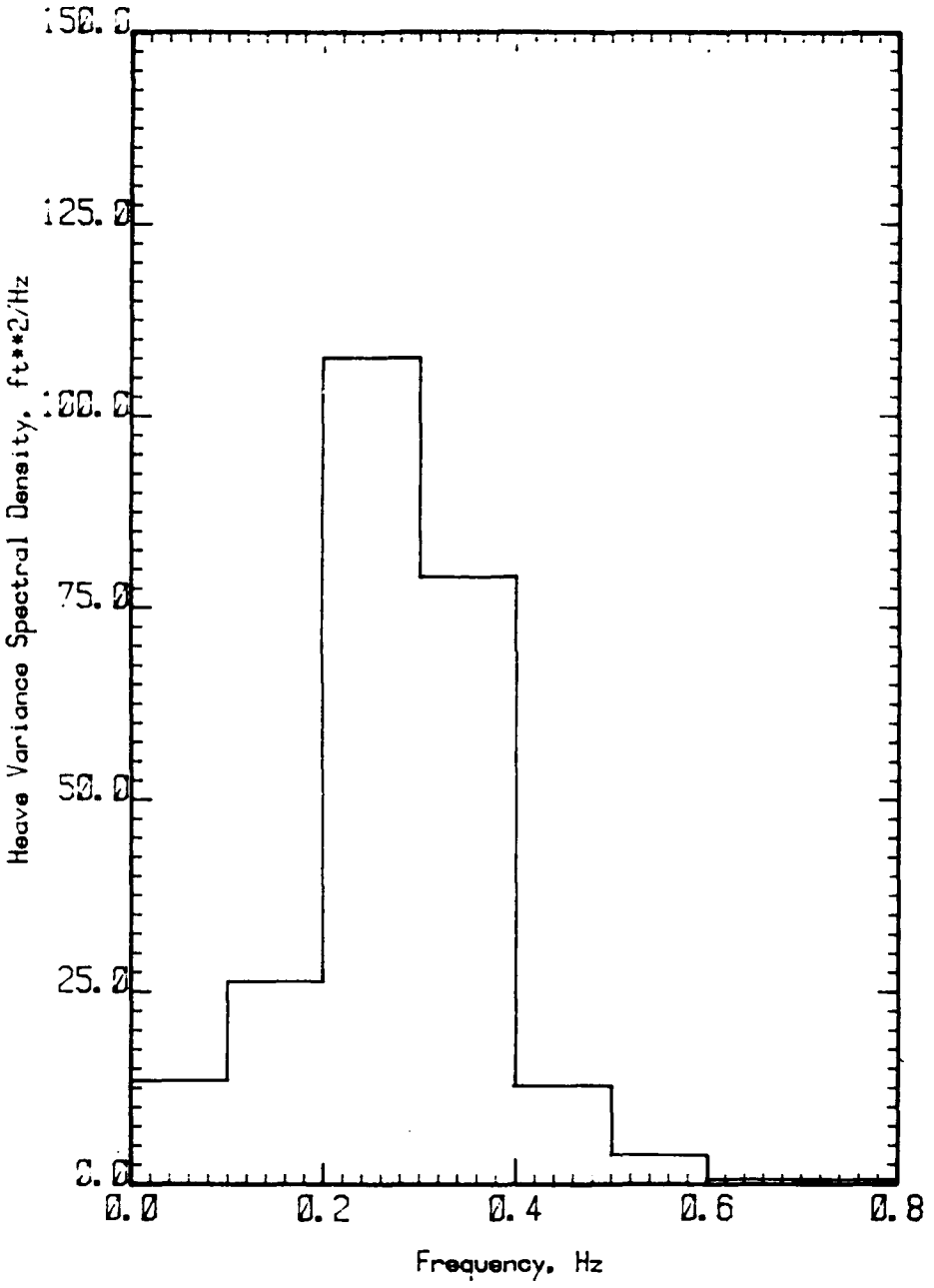


FIGURE G 1.5 HEAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

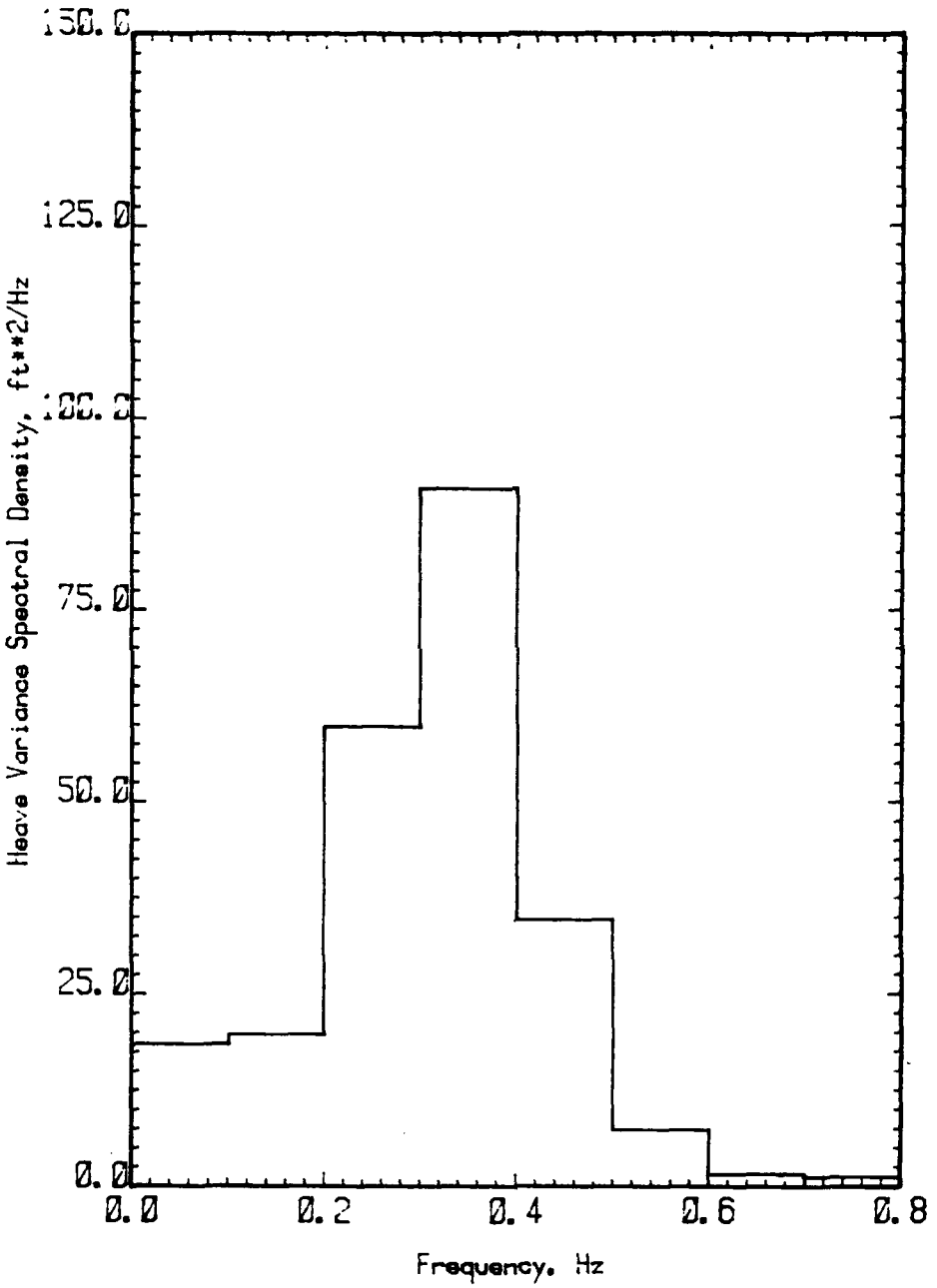


FIGURE G 1.6 HEAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

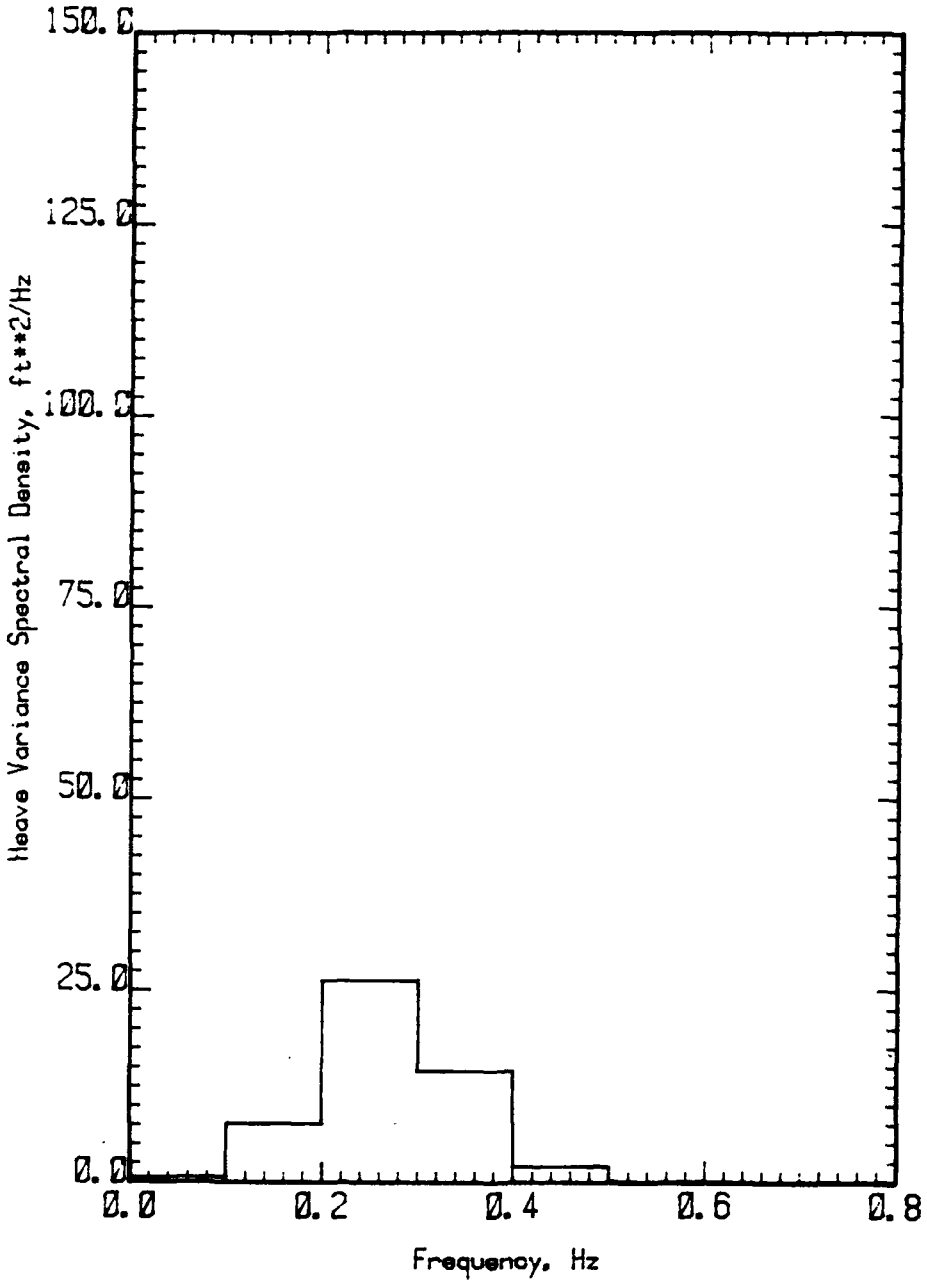


FIGURE H 1.1 HEAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

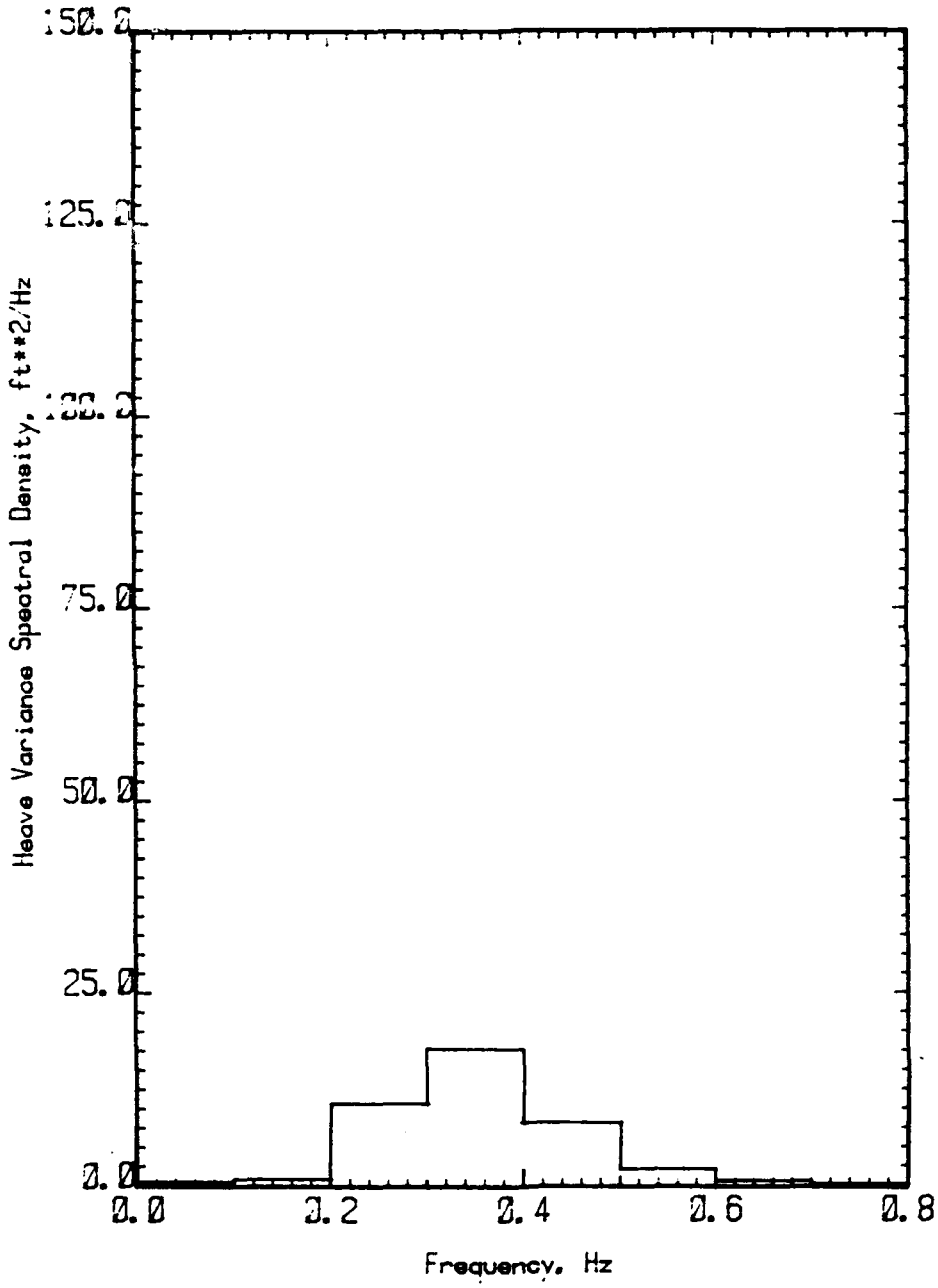


FIGURE H 1.2 HEAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

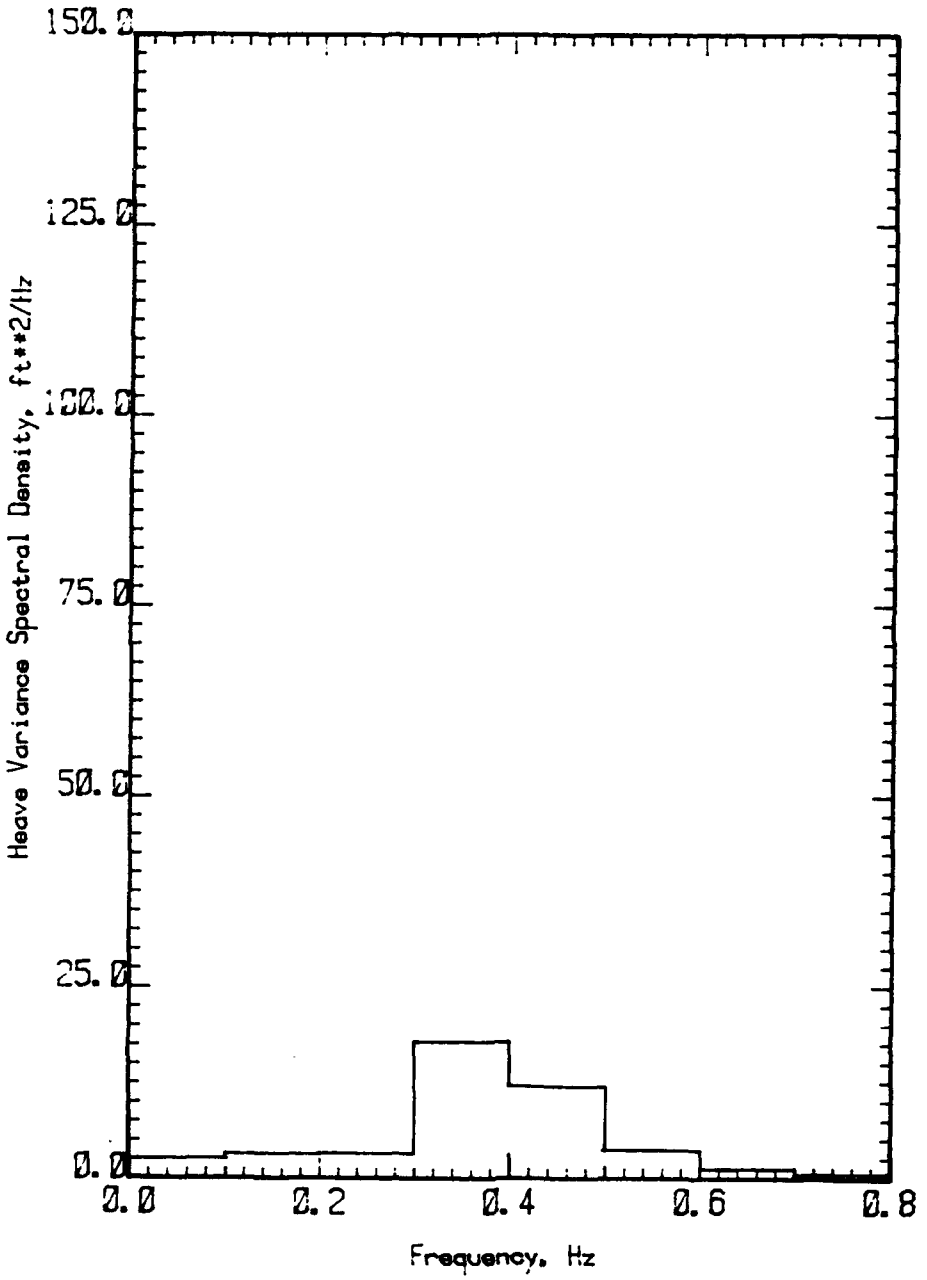


FIGURE H 1.3 HEAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

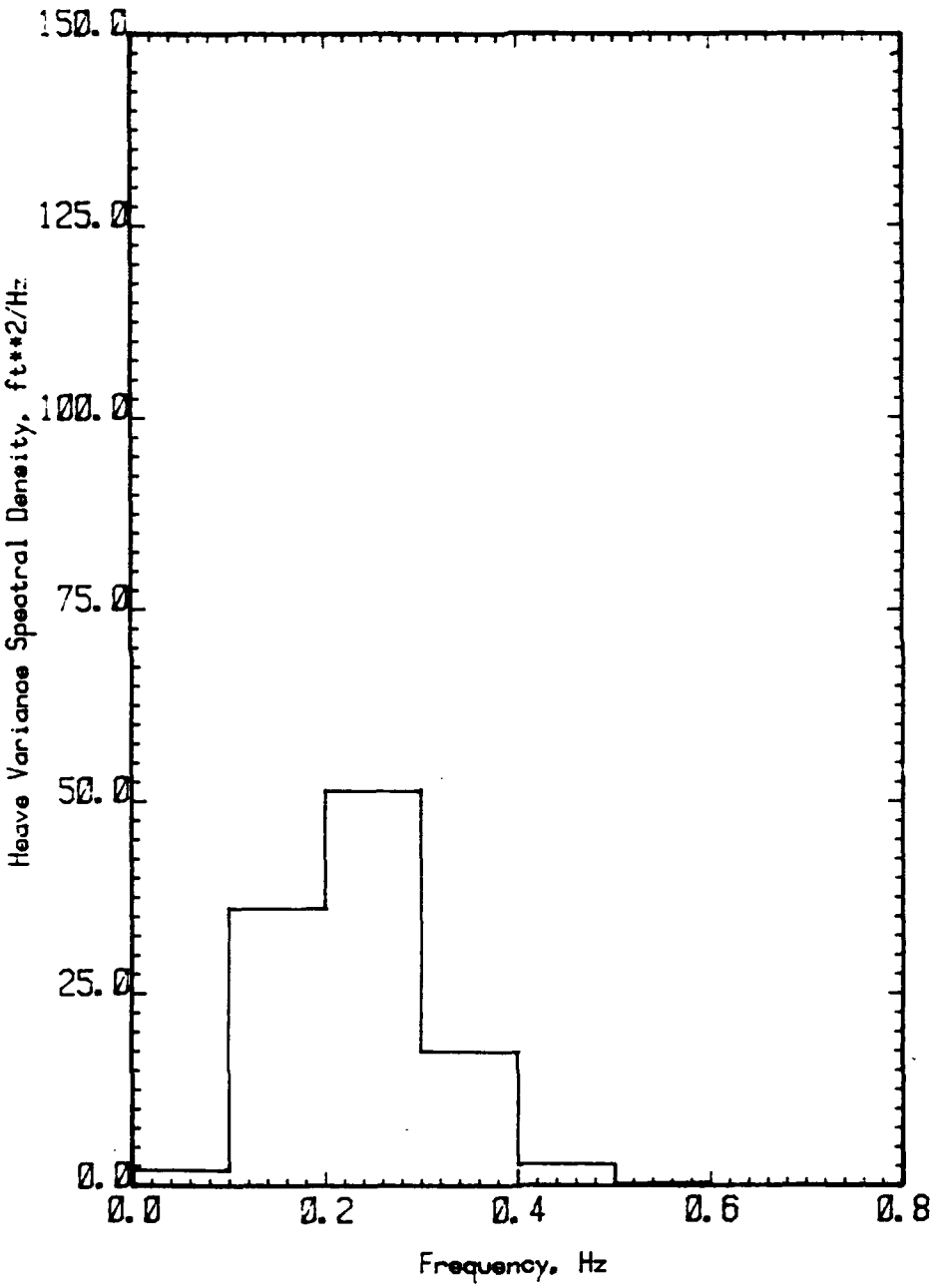


FIGURE H 1.4 HEAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

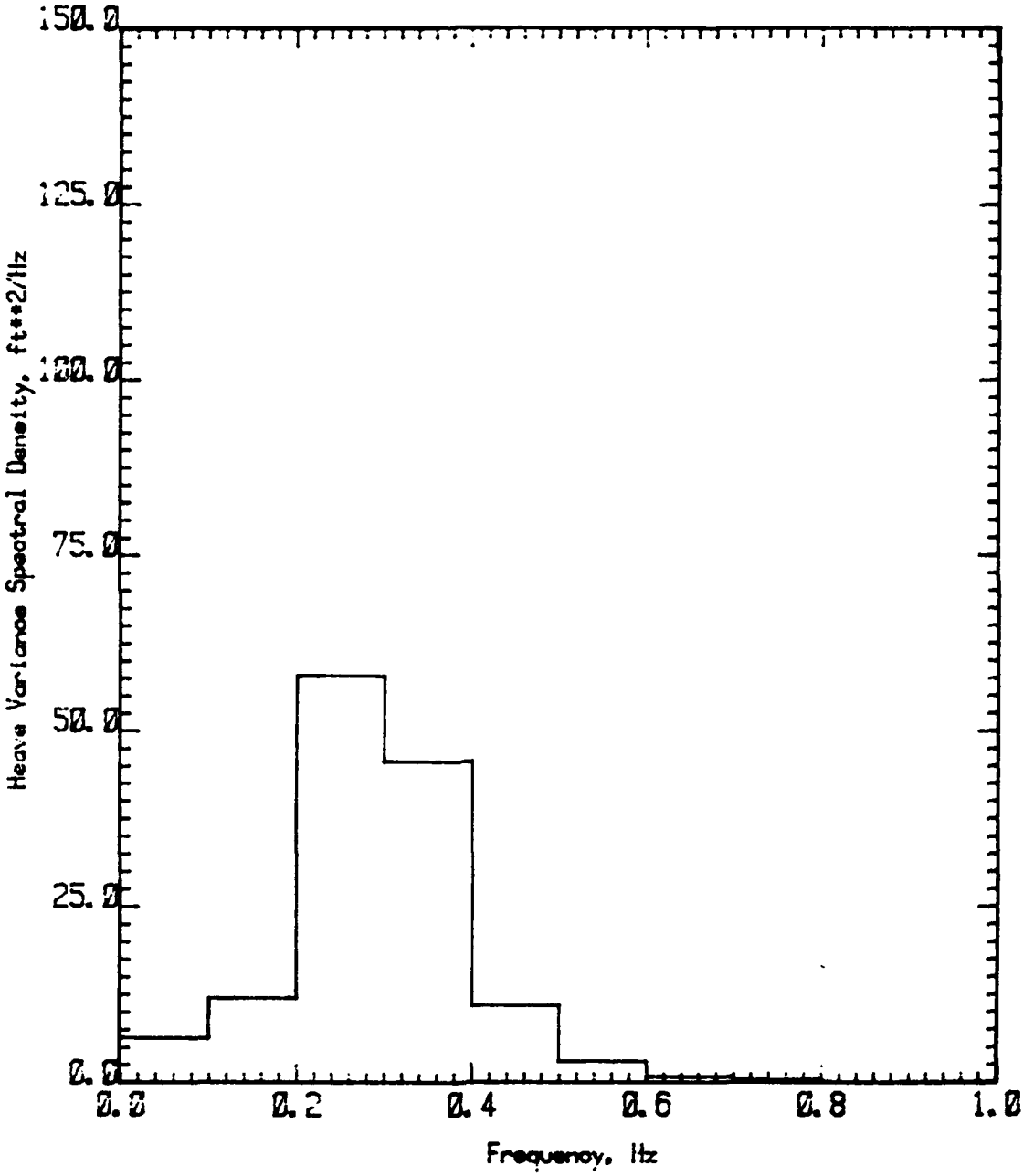


FIGURE H 1.5 HEAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

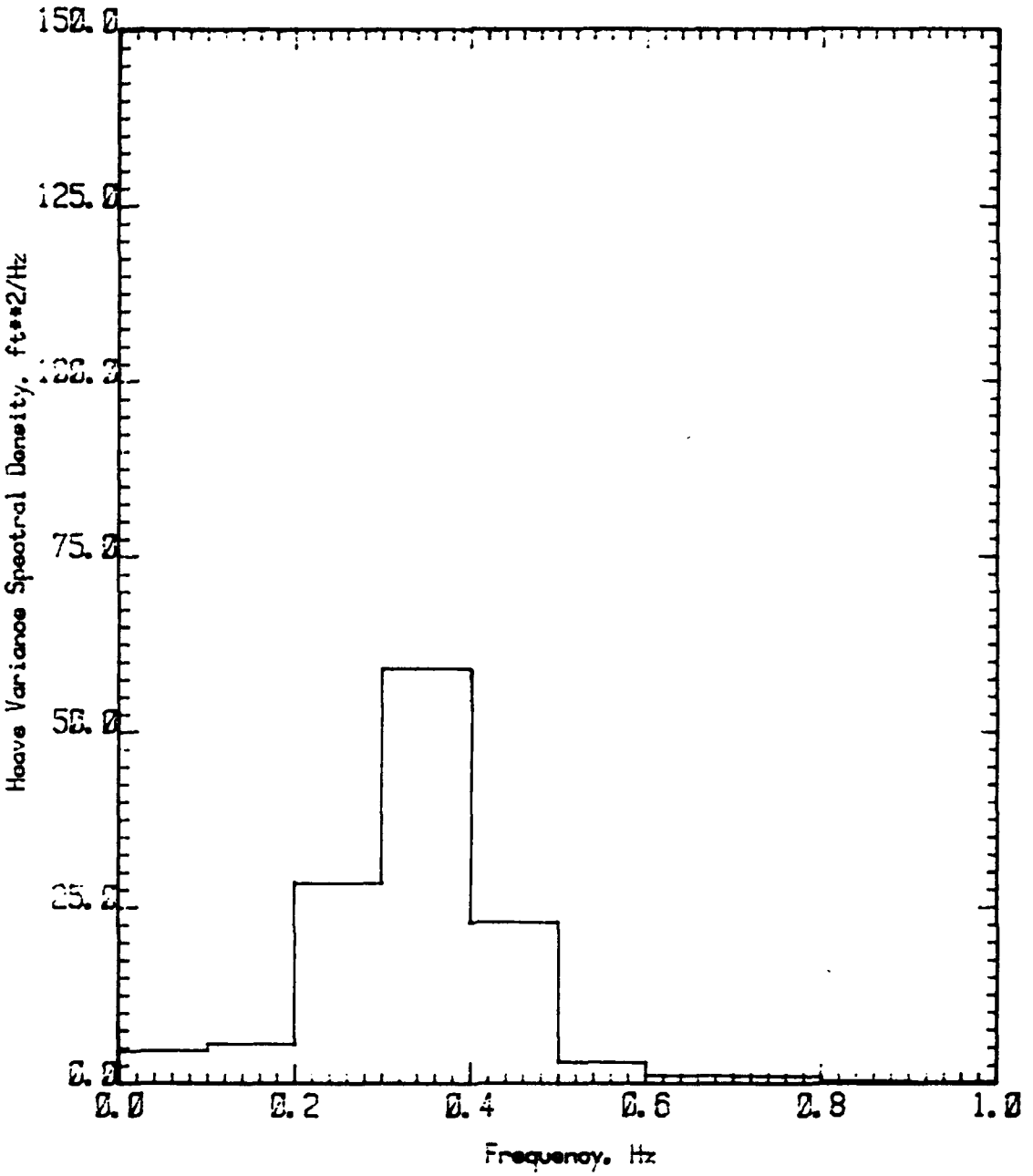


FIGURE H 1.6 HEAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

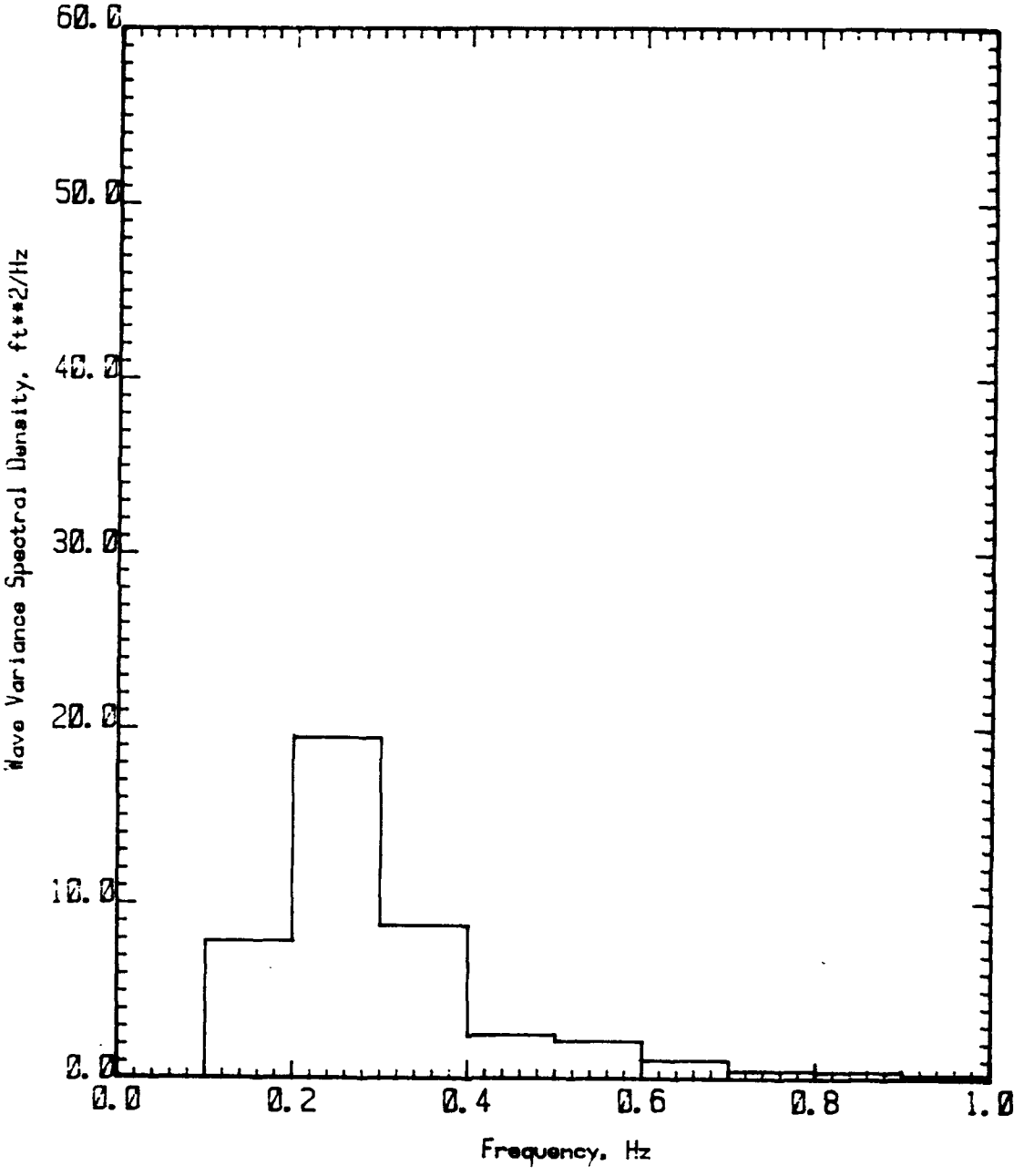


FIGURE I 1.1 WAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

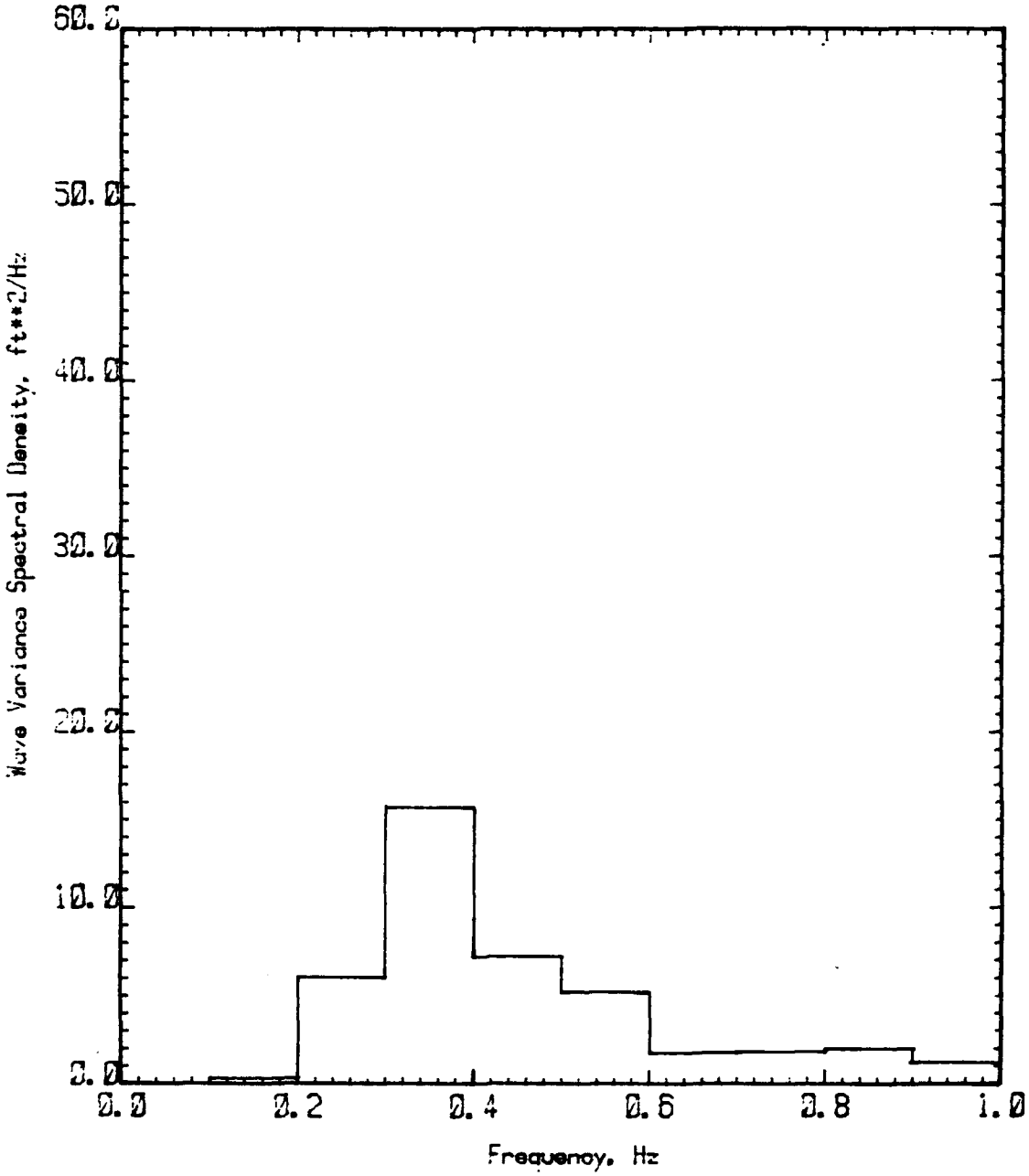


FIGURE I 1.2 WAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

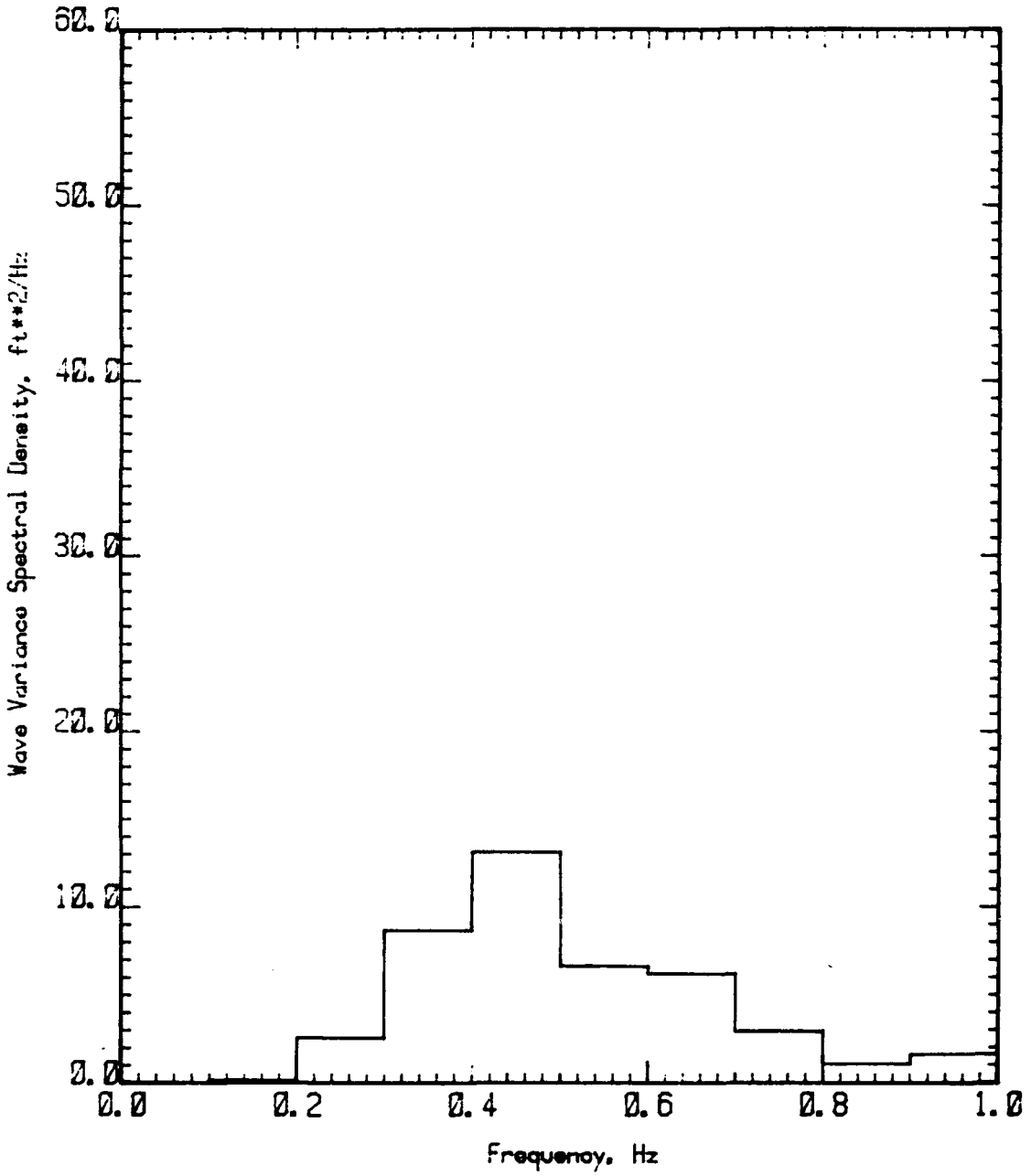


FIGURE I 1.3 WAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

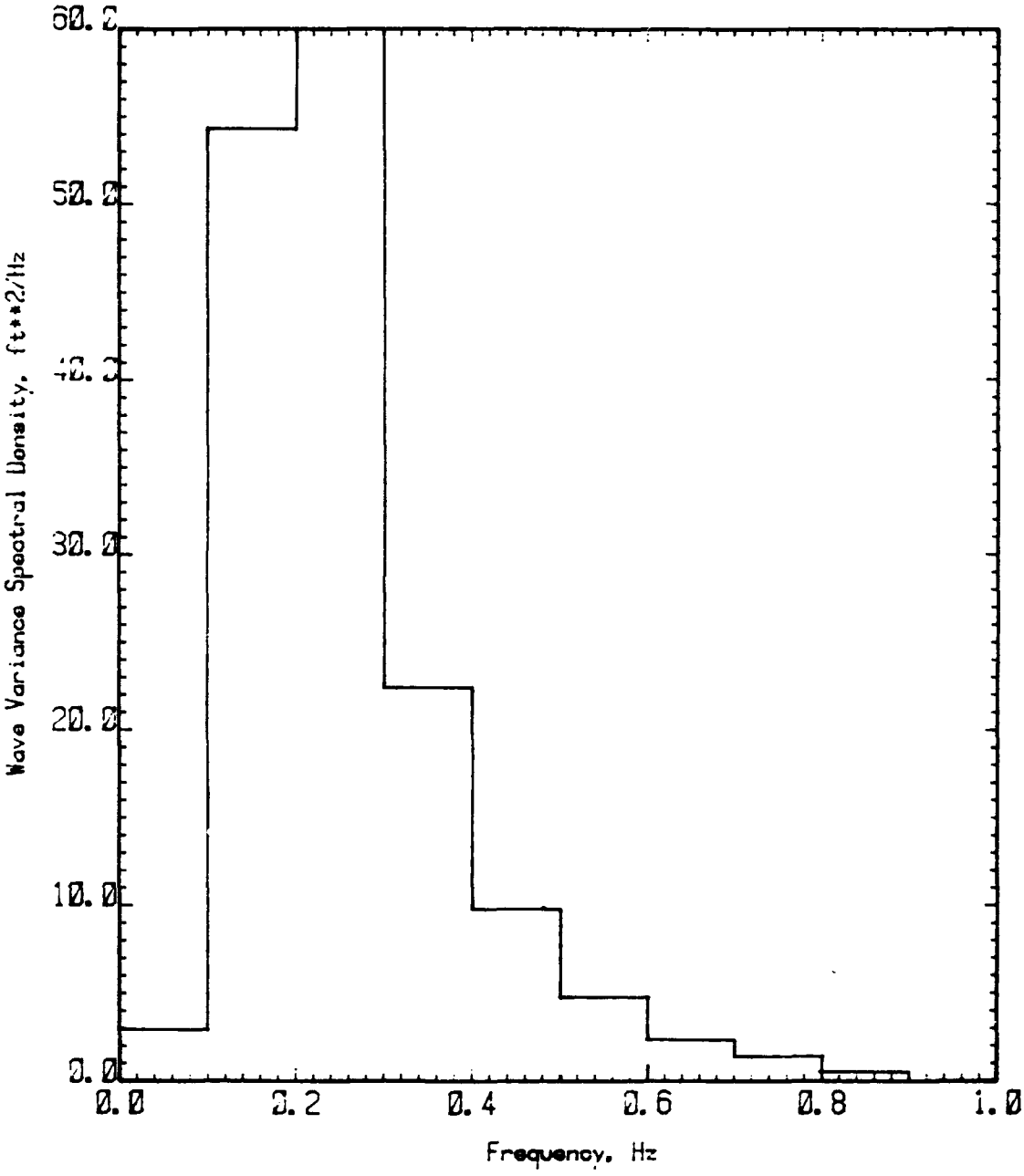


FIGURE I 1.4 WAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

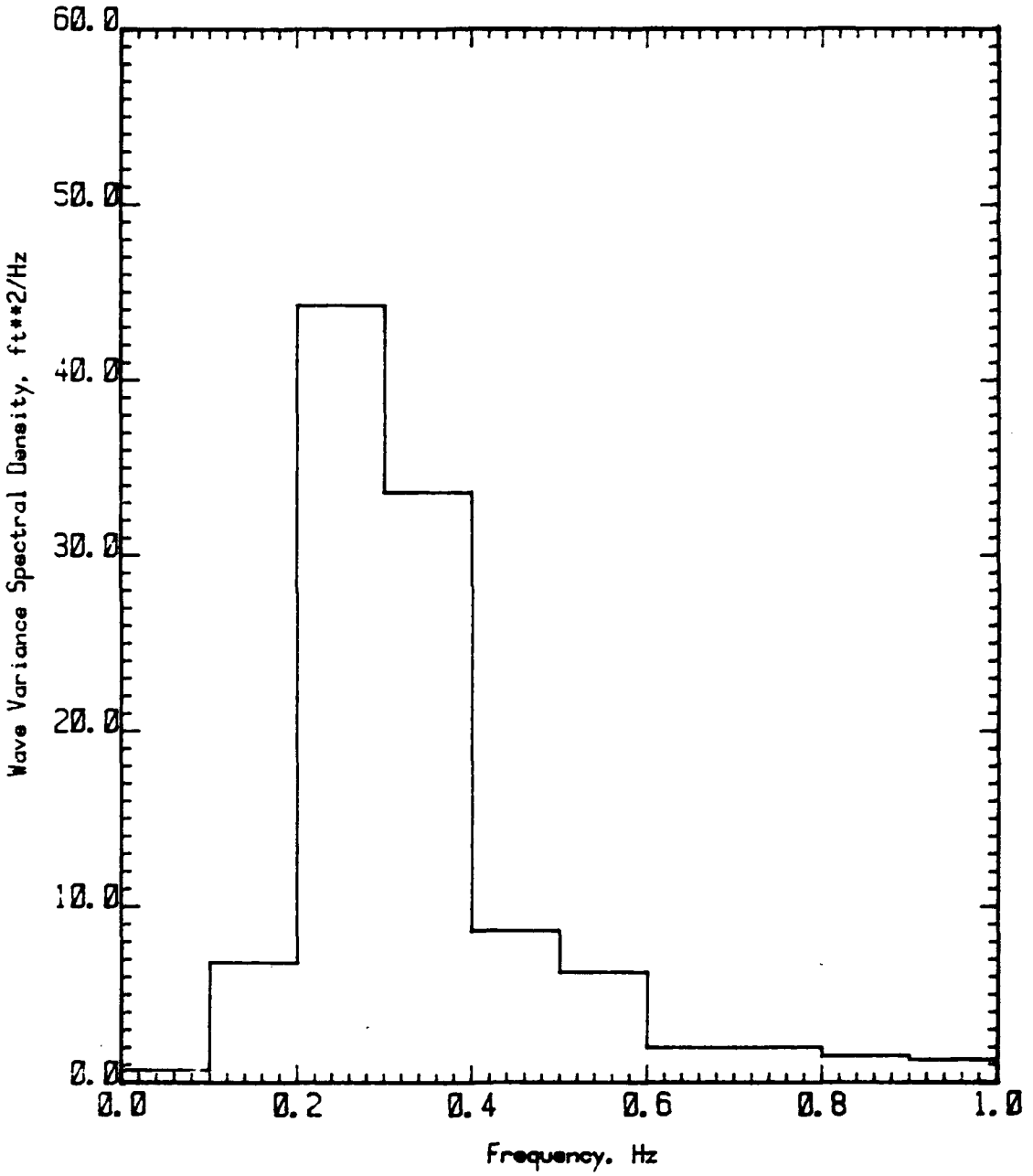


FIGURE I 1.5 WAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 60.0% Beam

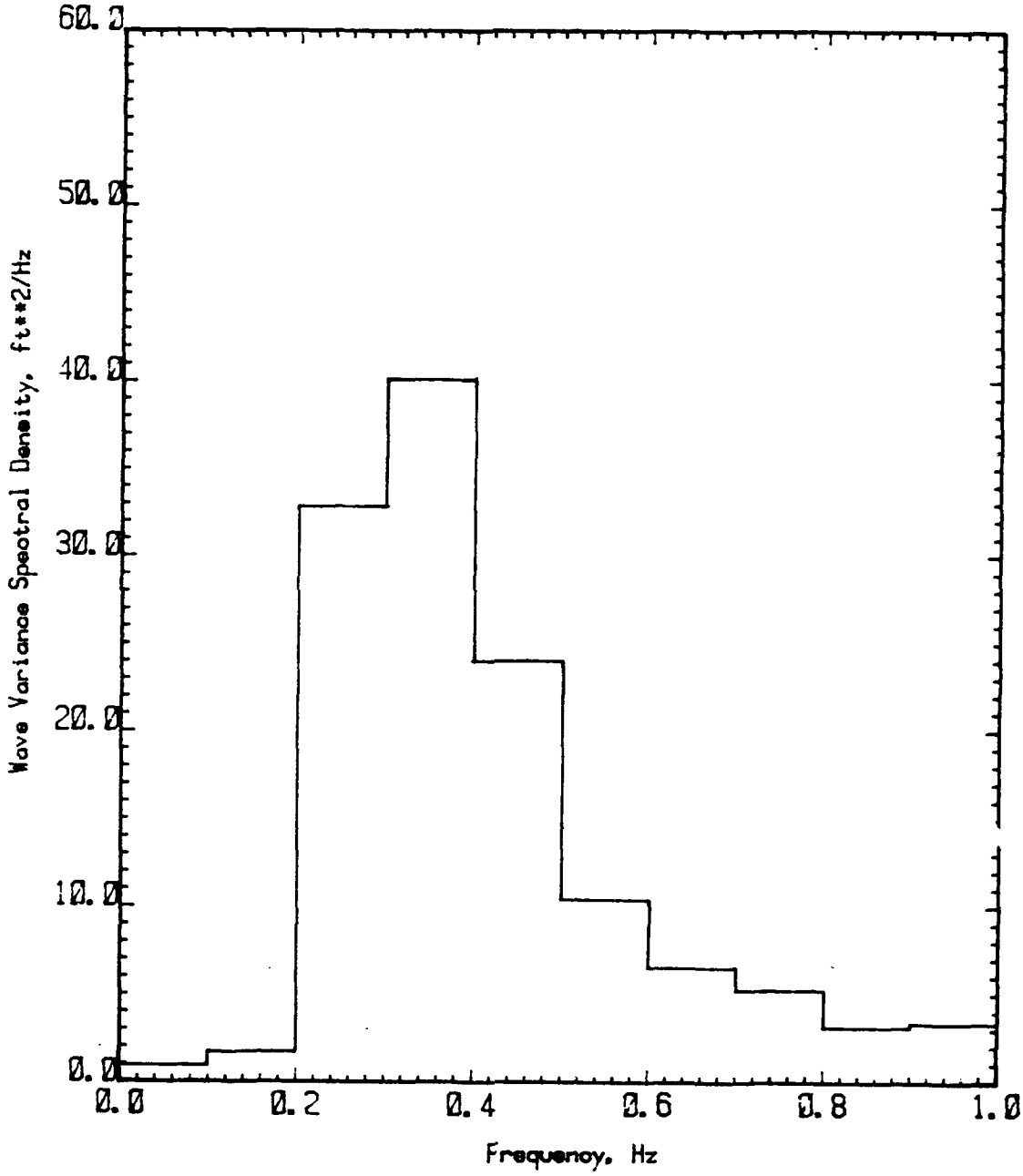


FIGURE I 1.6 WAVE VARIANCE SPECTRAL DENSITY
110 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 60.0% Beam

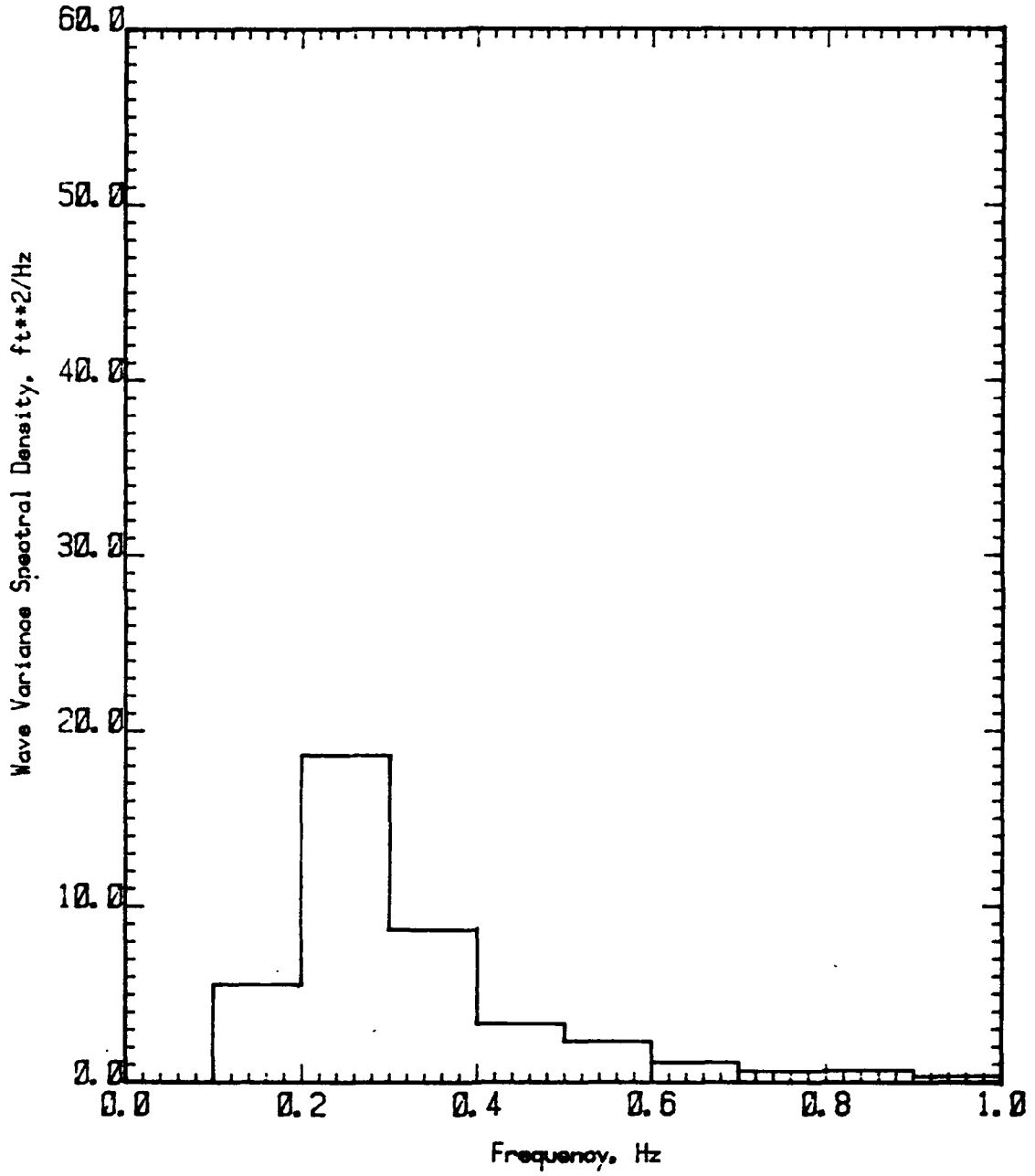


FIGURE J 1.1 WAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 40.0% Beam

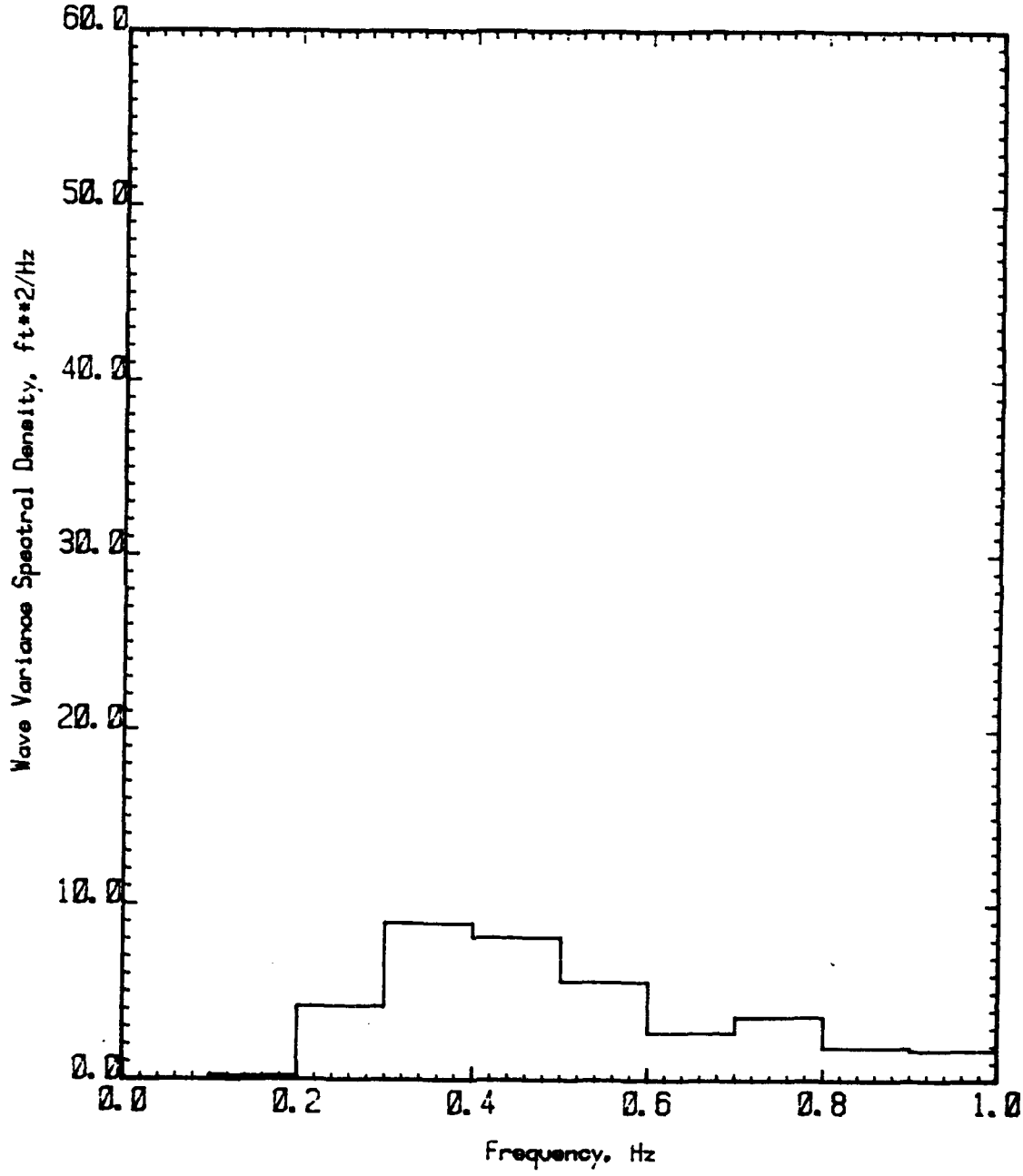


FIGURE J 1.2 WAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 3.00
Significant Wave Height 40.0% Beam

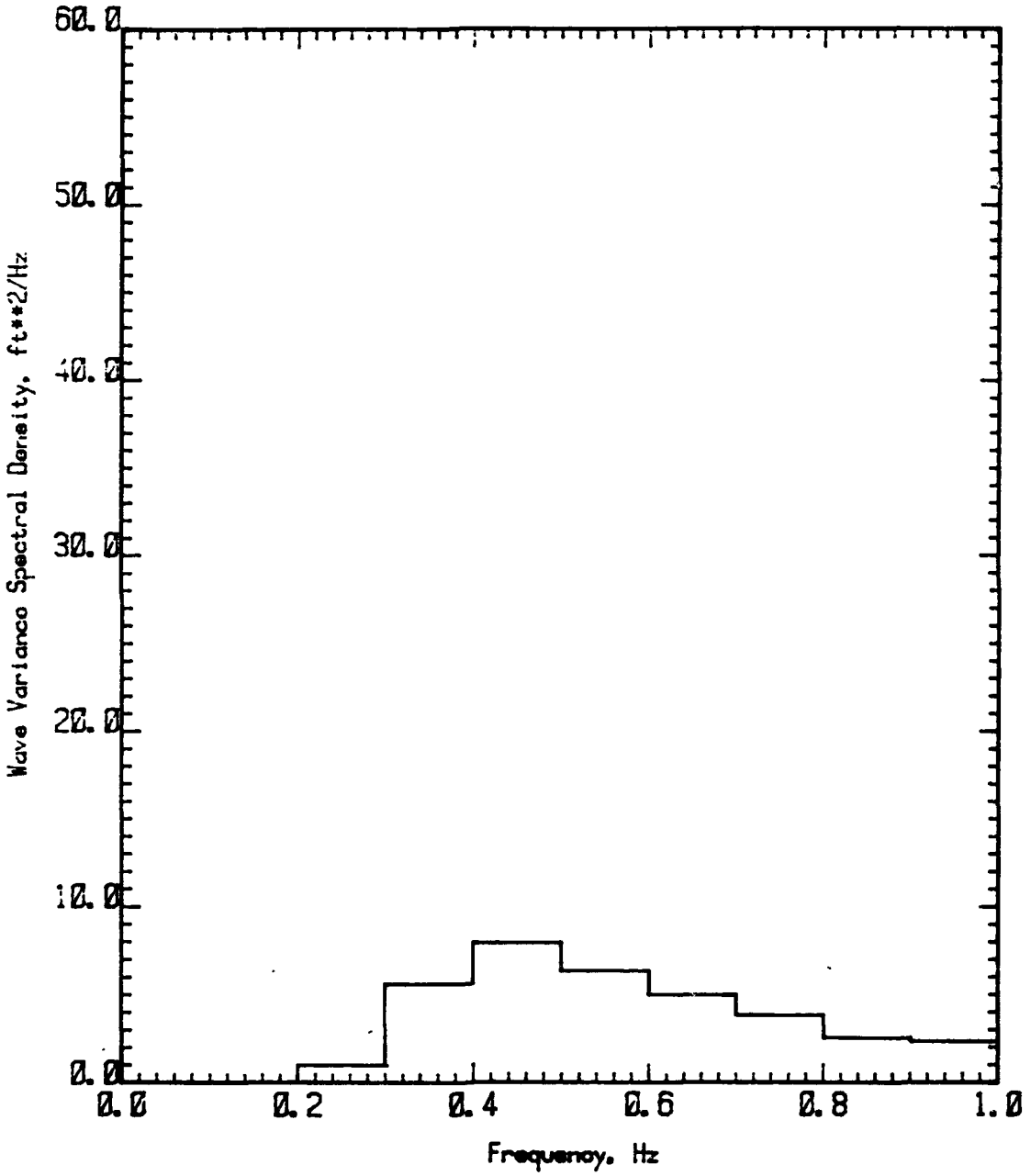


FIGURE J 1.3 WAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 4.00
Significant Wave Height 40.0% Beam

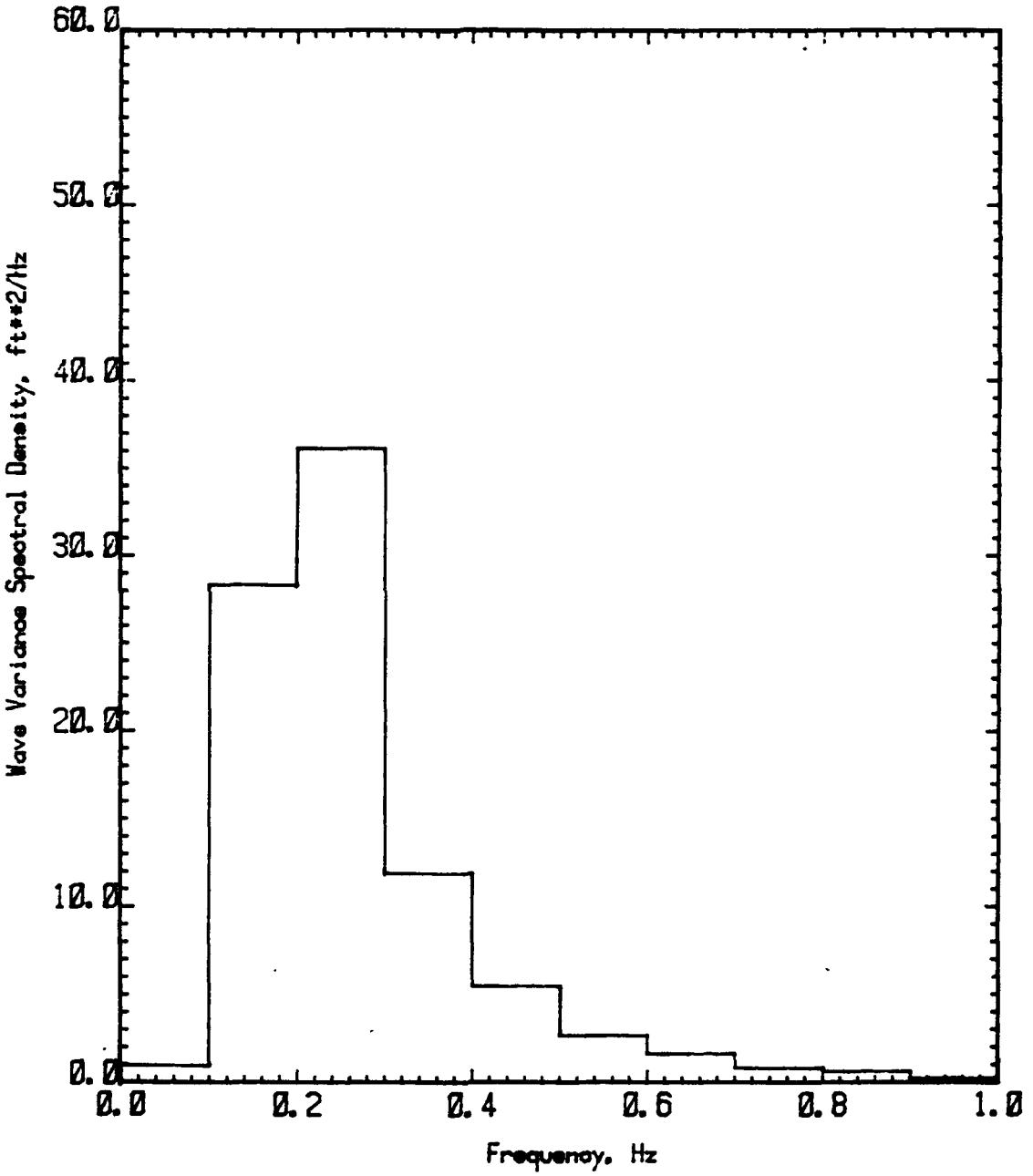


FIGURE J 1.4 WAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 1.50
Significant Wave Height 60.0% Beam

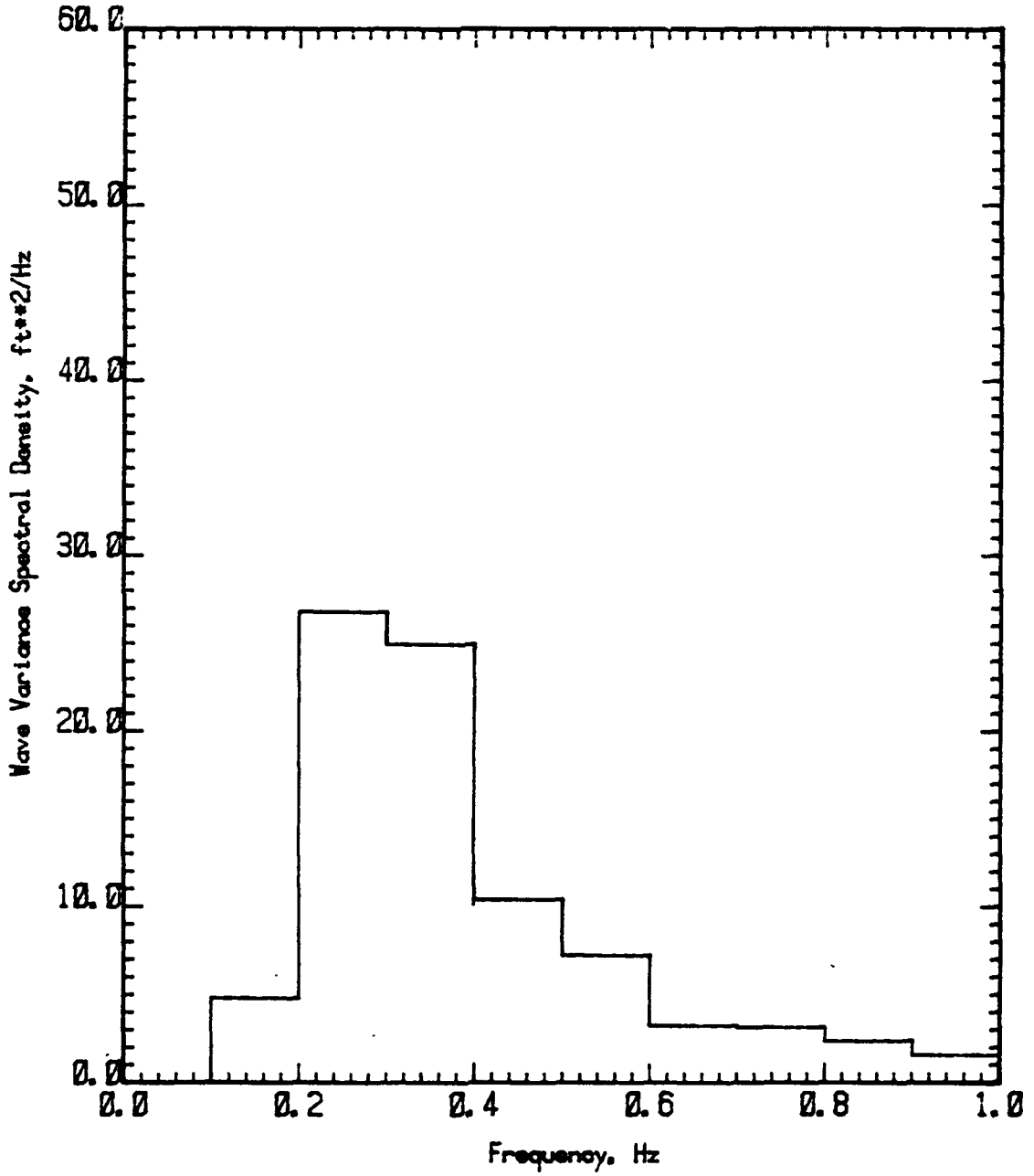


FIGURE J 1.5 WAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
Speed Coefficient (CV) 3.00
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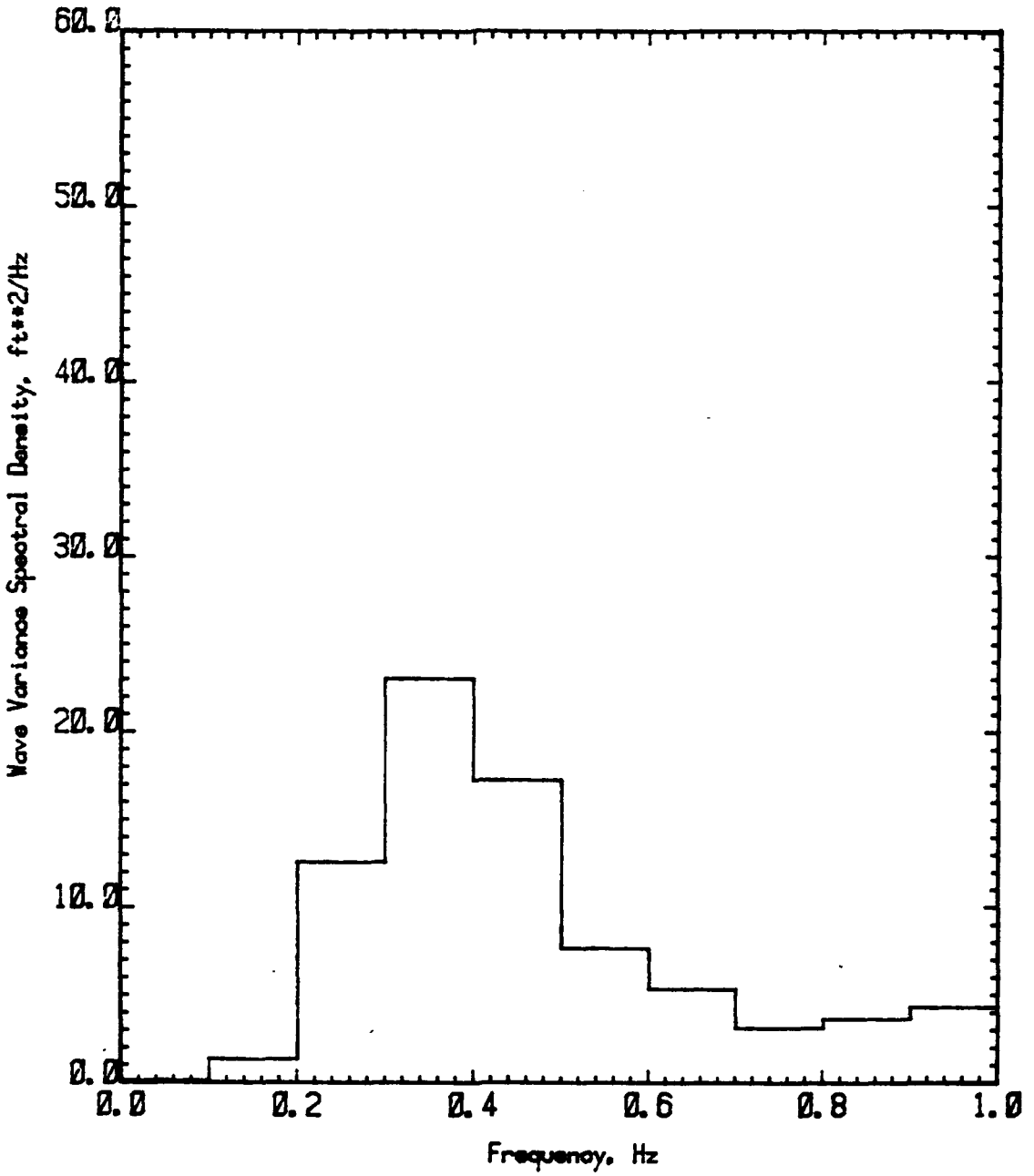

FIGURE J 1.6 WAVE VARIANCE SPECTRAL DENSITY
120 ft WPB
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