Coastal Inlets Research Program

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Wave Breaking on a Current at an Idealized Inlet with an Ebb Shoal

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Preface

The research investigation described herein was conducted as part of the Coastal Inlets Research Program (CIRP) under the work unit "Inlet Laboratory Investigations." Partial support for this study was provided by the Inlet Modeling System (IMS) Work Unit of the CIRP. Overall program management for CIRP is directed by Headquarters, U.S. Army Corps of Engineers (HQUSACE). Program Monitors for the CIRP at HQUSACE are Messrs. Barry W. Holliday and Charles B. Chesnutt. The Program Manager was Mr. Clark McNair, followed by Dr. William McAnally, U.S. Army Engineer Research and Development Center (ERDC), Coastal and Hydraulics Laboratory (CHL), and CIRP Technical Leader is Dr. Nicholas C. Kraus, CHL. Mr. William C. Seabergh, CHL, is Principal Investigator of the Inlet Laboratory Investigations Work Unit, and Dr. Adele Militello, CHL, is Principal Investigator of the IMS Work Unit.

The mission of the CIRP is to conduct applied research to improve USACE's capability to manage federally maintained inlets which exist on all coasts of the United States (including Atlantic, Gulf, Pacific, and the Great Lakes regions). Objectives are to (a) make management of channels--design, maintenance, and operation--more effective to reduce the cost of dredging, and (b) preserve the adjacent beaches in a systems approach that treats the inlet and beach together. To achieve the above objectives, CIRP includes work units on short-wave and circulation modeling, channels and adjacent shorelines, inlet scour, laboratory investigations, field investigations, and technology transfer.

The study was conducted by CHL personnel, under the general direction of Mr. Thomas W. Richardson, Acting Director, CHL. Direct guidance was provided by Mr. Dennis Markle, Chief, Harbors and Entrances Branch, CHL. Experiments were conducted by Ms. Betty Stephens, Messrs. Cecil Dorrell and Hugh F. Acuff, Jr., Civil Engineering Technicians, and Mr. William Henderson, Computer Assistant, under the direction of Mr. Seabergh and Dr. Jane M. Smith, CHL. Messrs. Wallace Guy and David Daily, ERDC, Information Technology Laboratory, provided instrumentation support. This report was prepared by Dr. Smith and Mr. Seabergh. Word Processing and formatting were completed by Mmes. Myra E. Willis and J. Holley Messing, CHL.

At the time this study was conducted, Director of ERDC was Dr. James R. Houston. Commander was COL James S. Weller, EN.

1 Introduction

Waves in tidal inlets steepen and break on strong ebb currents as they travel from deeper water, over the ebb shoal, and into the navigation channel toward the bay. Wave and current interaction is of coastal engineering significance with respect to (a) navigation, as the steeper wave leads to more difficult vessel operation, (b) sediment transport in the inlet, especially near the navigation channel, and (c) wave processes inside the inlet entrance, such as beach erosion.

Background

The motivation for these laboratory experiments was to measure wave breaking in typical coastal inlet conditions. The measurements were made to parameterize wave breaking for application in numerical wave transformation models, e.g., in the steady-state spectral wave model STWAVE (Smith, Resio, and Zundel 1999). In coastal inlets, where waves are steepened by ebb current, depth-limited breaking relationships fail. Wave steepness-based dissipation relationships (used to simulate white capping in wave generation models) also fail (Ris and Holthuijsen 1996; Smith, Resio, and Vincent 1997). The data collected and analyzed for this study are an extension of the data set collected by Smith et al. (1998) in the same physical model facility. Smith et al. (1998) evaluated and developed dissipation algorithms using these data. Whitecapping formulations, strongly dependent on wave steepness, generally under-predict dissipation. A relationship for dissipation as a function of wave height squared was developed by Smith et al. (1998), which gave improved agreement between calculated and predicted dissipation compared to other work. The relationship also worked as well as others in modeling the wave height.

These data presented in this report include a larger range of incident waves and ebb currents than the previous data set (Smith et al. 1998). These experiments also include an elliptical ebb shoal seaward of the inlet. The shoal induces depth-limited breaking (in addition to the current-induced breaking in the inlet), which is a typical feature of many coastal inlets. Also, an examination of effects of laboratory scaling was performed by varying wave height, period, and water level.

Objectives

In this report, wave breaking on a current is examined through physical-model measurements in an idealized inlet with a steady ebb current. Wave and current measurements will be used to evaluate wave dissipation models. The goal of the study is to provide the data to develop a dissipation function for wave breaking on a current that is based on integrated wave parameters, is applicable for arbitrary water depths, and is robust.

Scope

The introduction describes the preceding study of wave breaking on a current and the motivation for these measurements. Next, the experimental setup (including the laboratory facility, the instrumentation, and the incident waves and currents) and experiment procedures and data analysis (including sequence of events, calibration, sampling, data analysis methods, data format, and example plots) are presented in Chapters 2 and 3. Chapter 4 presents example results of wave breaking on an ebb current in the Idealized Inlet Facility physical model. These results include a discussion of model scaling of the breaking process, modification of wave spectral shape as a result of breaking and wave-current interaction, and transformation of wave height caused by shoaling and breaking. In Chapter 5, conclusions are given.

Appendixes A through F provide additional information in the forms of a Notation, data tables, basin bathymetry files, and gauge nomenclature and locations, respectively.

2 Laboratory Facility and Equipment

As part of the Coastal Inlets Research Program (CIRP), a physical model facility was created to address research and field problems of tidal inlets (Seabergh 1999). The model and appurtenances necessary to study inlet problems are discussed in this chapter.

Idealized Inlet Laboratory Facility

An idealized inlet was designed to fit in a 46-m- (150-ft-) wide by 99-m- (325-ft-) long concrete basin with 0.6-m- (2-ft-) high walls. The approach was to design an inlet with simplified bathymetry and relatively steep beach slopes so that additional features (such as an ebb shoal) could easily be added. Plans included using fine sand as both a tracer and as a fully mobile bed that could be placed over the concrete bottom in a thick veneer. A 1:50 undistorted scale was assumed to determine reasonable inlet dimensions to model; however, other scales can easily be assumed to accommodate studies of specific processes with the simplified bathymetry.

Figure 1 shows the facility and basin area. The Idealized Inlet Facility is connected to a large sump (not shown, volume of 1.98×10^6 liters (523,000 gal)) for water exchange. Tides may be produced in the facility's ocean to drive tidal currents into and out of the inlet bay. A constant inflow is introduced from the sump into the basin's ocean, while a rolling gate either reduces or increases flow area over an exit pipe into the sump which causes ocean rise or fall, respectively. The rolling gate is regulated by a controller connected to a feedback loop comparing actual to desired water level. The two cylinders in Figure 1 are storage tanks each holding 182,000 liters (48,000 gal) water. The tanks allow a much larger bay area by storing flood tide water and releasing it back to the bay to flow to the ocean during ebb flow. Pumps and control valves associated with this procedure are located adjacent to the storage tanks.

A steady-state flow may also be established for simulating ebbing or flooding currents. The piping system appears in Figures 1 and 2. Water is either collected (flood flow) or distributed (ebb flow) through a system of manifolds in the bay that may be adjusted for one, two, or three bay channels or a uniform flow across the bay. Water is either released (flood flow) or taken from (ebb flow) the ocean

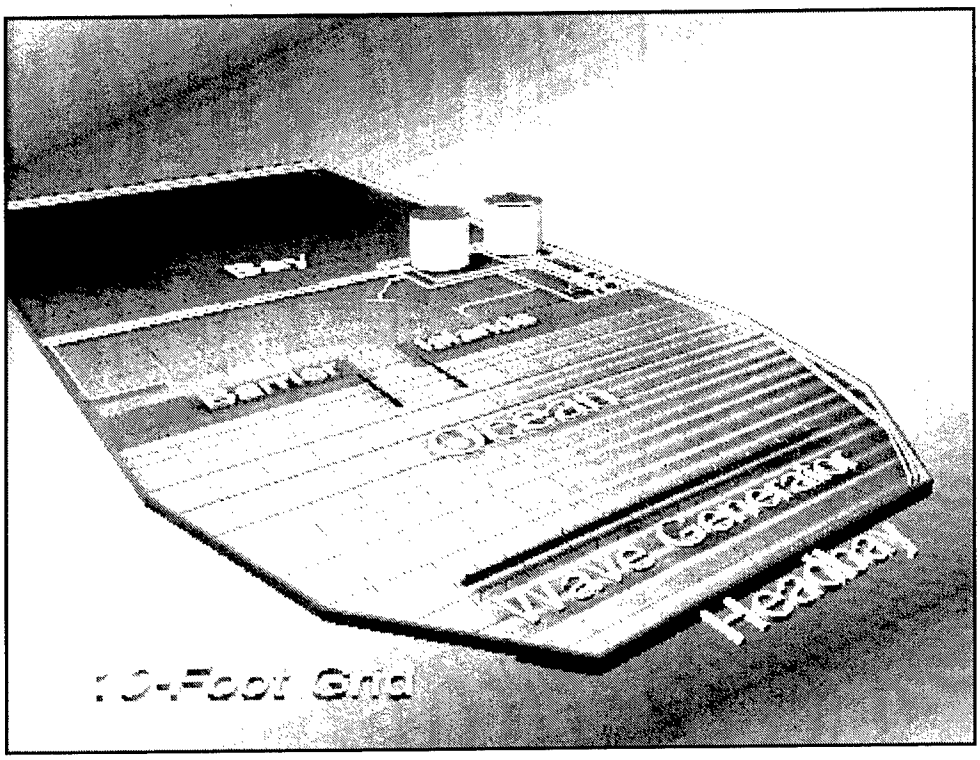

Figure 1. Idealized Inlet model research facility

headbay to complete the circulation energized by the pumps located in the upper right side of Figure 1.

Figure 2 shows bottom contours at a 1:50 scale. The ocean-side parallel contours were specified by applying an equilibrium profile equation from Dean (1977) as

$$d = Ax^{2/3} \tag{1}$$

where

d = still-water depth

x = distance offshore (from still-water shoreline)

A = empirical coefficient determined by sediment characteristics

A value of $A = 0.24\ m^{1/3}$ was specified as it represented a relatively steep beach. The contoured beach slope extends to the 18.3-cm (0.6-ft) mean low water (mlw) depth (or 9.1 m (30 ft) scaled by 1:50).

The inlet throat region converges to a depth of 15.2 cm (or if scaled to 1:50, 7.6 m (25 ft)) relative to a mlw datum. The minimum width is 267 cm across the inlet between mlw contours (or if scaled by 1:50, it represents a width of 133.4 m (438 ft)).

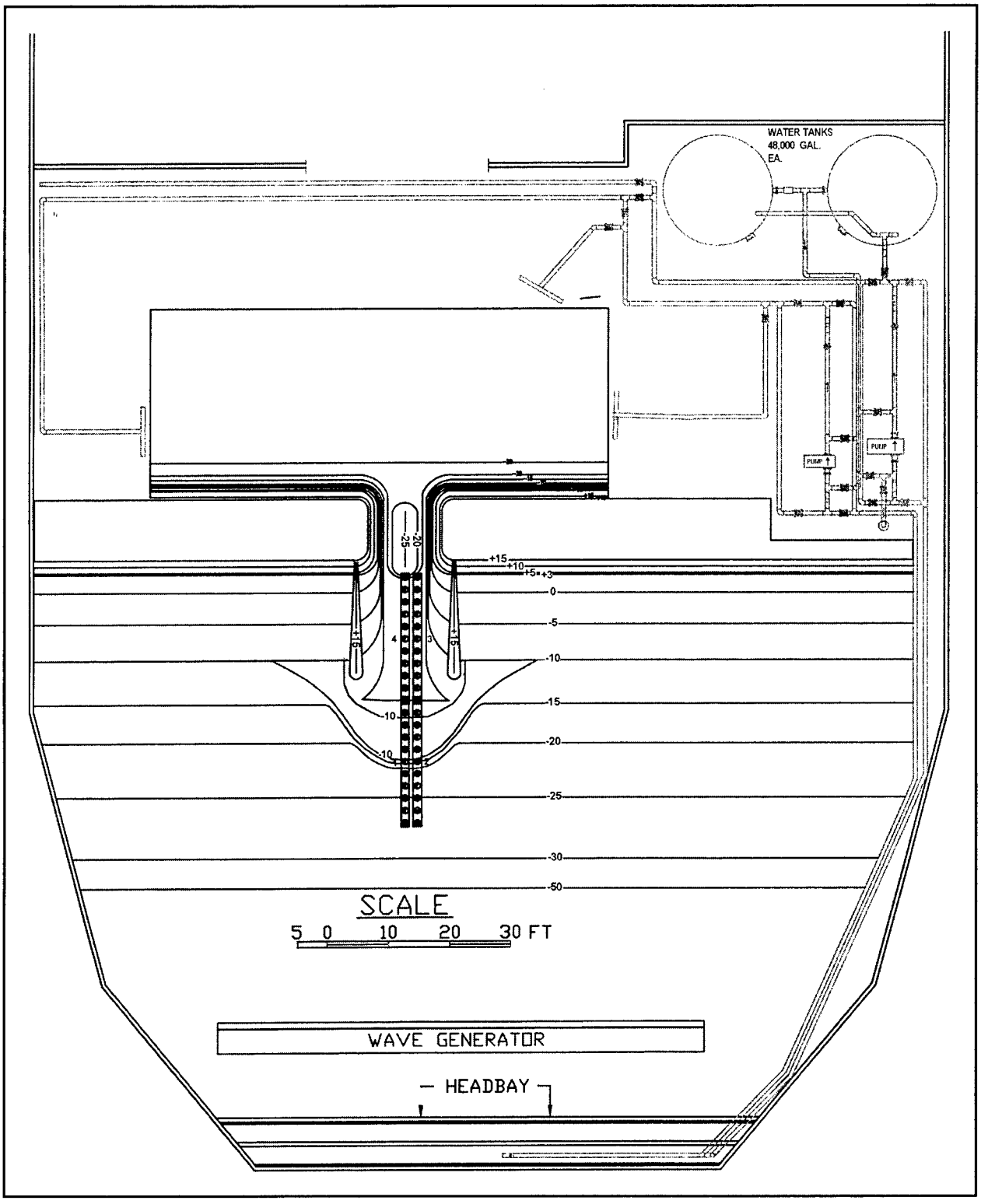

Figure 2. Model facility showing bathymetry, including ebb shoal and gauge rack locations. (To convert feet to meters, multiply by 0.3048)

Figure 3 shows the inlet throat and entrance channel with parallel jetties which were constructed for this study. They have a spacing of 3.66 m (12.0 ft) from one jetty center-line crest to the other. The crest elevation is at +9.14 cm, mlw (or if scaled to 1:50, 4.57 m (15 ft)). The side slope for the rock jetties was 1V to 2H. The jetties terminated offshore at the 7.32-cm contour, mlw (or if scaled to 1:50, 3.66 m (12 ft)).

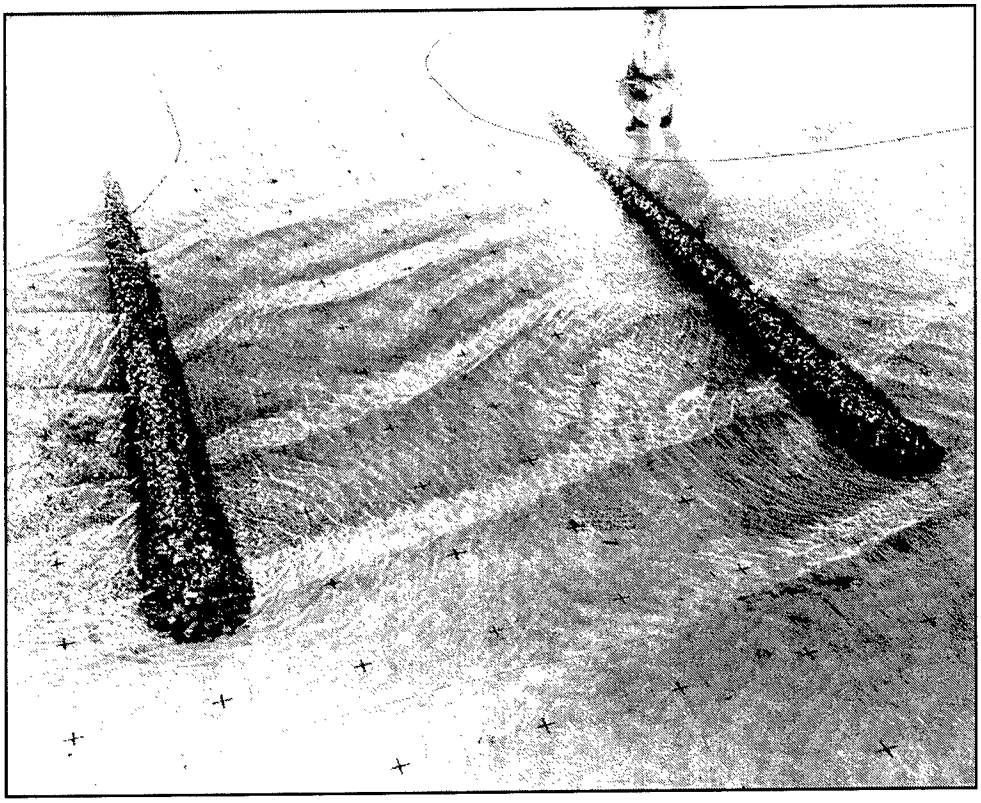

Figure 3. Idealized Inlet entrance channel with obligue waves approaching inlet (spacing 62 cm between "+" marking on research facility basin floor)

Based on Froude's model law (Hughes 1993) and the linear scale of 1:50, the model-prototype relations in Table 1 were derived. Dimensions are in terms of length (ℓ) and time (t). Figure 3 shows the model inlet during testing. As mentioned previously, other scales may be assumed for the bathymetric contours, therefore different scaling relationships would apply than listed in Table 1.

Table 1
Model-Prototype Scale Relations at 1:50 Undistorted Scale

Characteristic	Dimension	Model-Prototype Scale Relation
Length	ℓ	ℓ_r = 1:50
Area	ℓ^2	$A_r = \ell_r^2$ = 1:2,500
Volume	ℓ^3	$V_r = \ell_r^3$ = 1:125,000
Time (tidal and short wave period)	t	$t_r = \sqrt{\ell_r}$ = 1:7.07
Velocity	ℓ / t	$U_r = \ell_r / t_r$ = 1:7.07

A movable, 24-m- (80-ft-) long, unidirectional wave generator (Figure 1) was located on the ocean side of the facility to produce irregular or monochromatic waves. Unscaled wave periods could be varied from 0.5 to about 3 s and wave heights to 10 cm (at the generator location and for this model configuration). Wave angle was varied for specific tests by moving the generator on its castors.

Instrumentation and Calibration

Wave height and period data were collected on electrical capacitance wave gauges which were calibrated daily with a computer-controlled procedure incorporating a least squares fit of measurements at 11 steps. This averaging technique, involving 21 voltage samples per gauge, minimizes the errors of slack in the gear drives and hysteresis in the sensors. Typical calibration errors are less than 1 percent of full scale for the capacitance wave gauges. Wave signal generation and data acquisition were controlled by a DEC MicroVax I computer.

Water velocity data were collected with SonTek 2D Acoustic Doppler Velocimeters (ADV) with a side-looking probe that is oriented to collect x-y horizontal velocity information in a horizontal plane. Samples were collected at 10 Hz, though the instrument makes 250 pings/s and averages for each output sample. Accuracy is 0.5 percent of the measured velocity, with resolution of 0.1 mm/s and threshold of 0.1 cm/s. The probe samples a 0.25-cm^3 volume located 5 cm from the sensor heads.

The sensors were placed as seen in Figure 4. A gauge rack was designed to hold both the wave and current meters in a co-linear manner, with a 0.61-m (2.0-ft) separation between alternating sensors. The rack was then moved to three other locations for test reruns of the same wave and current condition to complete a data set. Gauge setups 1 (seaward) and 4 (bayward) were oriented along the channel center line and setups 2 (seaward) and 3 (bayward) were shifted 0.6 m (2 ft) to the right of center line, looking from the model ocean to the bay.

Incident Waves and Currents

Wave conditions for the study were zero-moment wave height H_{mo} = 3.7 and 5.5 cm, peak spectral period T_p = 0.7 and 1.4 s, and incident wave direction perpendicular to the jetties. All waves were generated with the Texel, Marsen, and Arsloe (TMA) spectral form (Bouws et al. 1985) using a gamma value of 3.30. The current velocities were 0, 12, 24, and 32 cm/s as determined from a reference gauge located in the center of the channel seaward of the inlet gorge, but located between the jetties. The current decreased approximately 20 percent seaward of the jetties. A summary of wave and current parameters considered in this study is given in Table 2.

The wave and current parameters cover a wide range of values, which makes the data useful to evaluate the wave dissipation formulations for current-induced wave breaking. Each experiment run was repeated four times, at the four gauge array positions shown in Figure 4. The wave gauges located at the center position

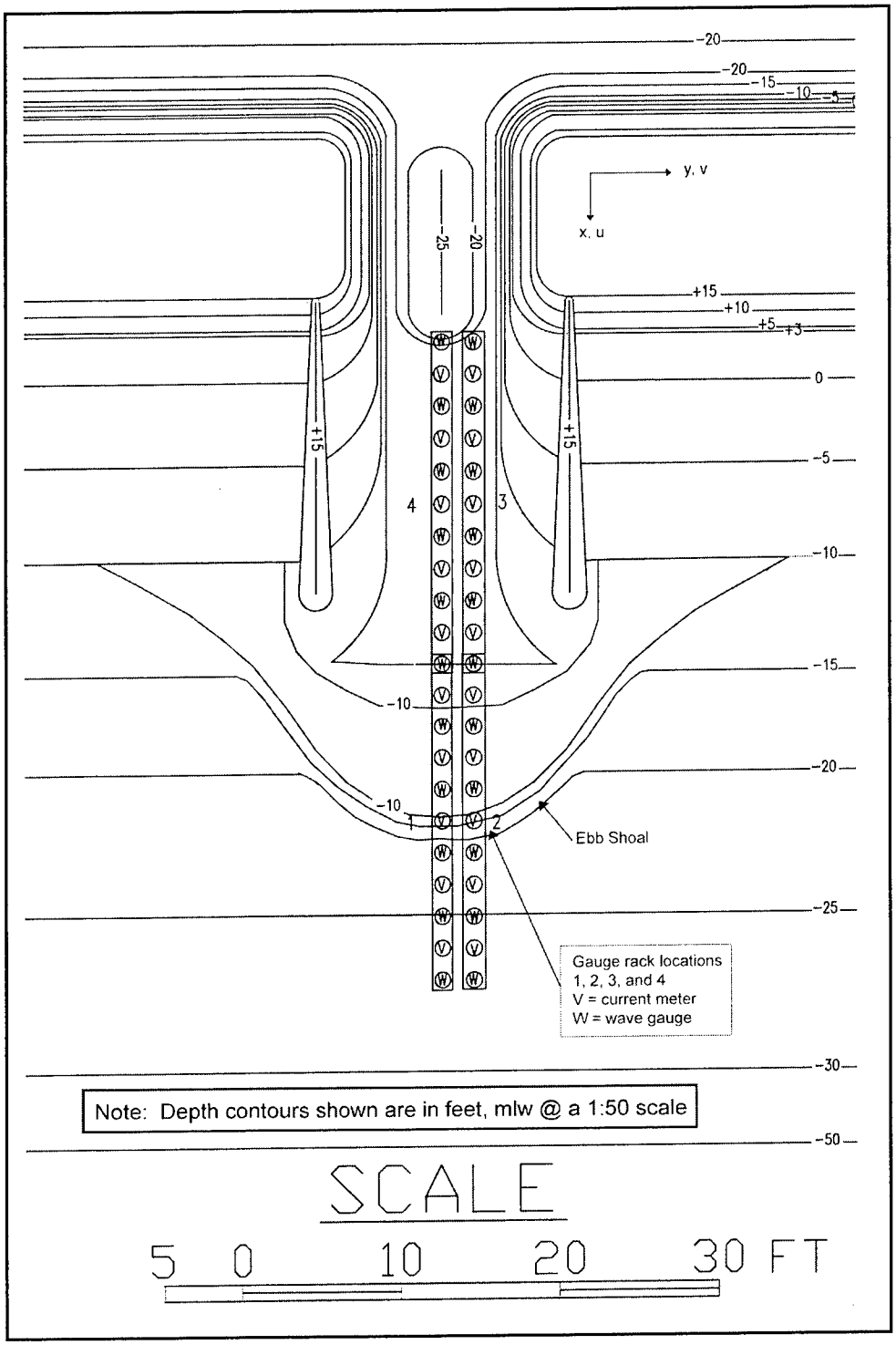

Figure 4. Wave gauge (W) and current meter (V) locations for gauge array positions 1, 2, 3, and 4; bathymetry contours in prototype units of meters (feet) mlw

Table 2
Laboratory Wave and Current Parameters

H_{mo} (cm)	T_p (s)	U (cm/s)	H_{mo}/L	U/C	H_{mo}/d	kd	$k\,H_{mo}/2$
3.7 & 5.5 cm (1.85 & 2.75 m @1:50 scale)	0.7 & 1.4 s (4.9 & 9.9 s @ 1:50 scale)	0, 14, 24, 32 (0, 1.0, 1.7, 2.3 m/s @1:50 scale)	0.025-0.11	0-0.45	0.25-0.63	0.4-1.4	0.07-0.3

Note: U = the average current magnitude; L = wavelength; C = the wave celerity; d = still-water depth; and k = wave number ($2\pi/L$).

overlapped, so wave heights could be compared between runs of similar incident conditions. Waves and currents at the two positions across the channel were similar and were averaged.

3 Measurement Procedures and Data Analysis

This chapter provides information on the data collection and analysis. Selected example plots of data are also shown.

Sequence of Events and Data Sampling

Following daily calibration of the wave gauges (Chapter 2), the ebb flow was first set in the proper range based on a flow meter installed in the pipeline downstream of the pump location. The flow setting was then refined by bringing the current to its proper speed based on a reference current meter in the inlet channel. With a stable flow in the channel, current velocities were collected at all locations for about 70 s (700 data samples); then the wave generator was turned on and both current and wave data collected. The wave generator was operated for 1,020 s. Wave gauge sampling rate was 20 Hz, so 20,400 water elevation data points were collected at each gauge, and 10,200 additional velocity data samples (10-Hz sampling rate) for each sensor were collected during a run.

Figure 5 shows a comparison of target and measured spectra at a wave gauge location in front of the wave generator. Figure 6 shows a snapshot of water surface variation over a portion of a run at some of the gauges, first for a waves-only data-collection run (upper two panels), and then a wave-current data-collection run (lower two panels).

Data Analysis

The velocity data were analyzed in the time domain. The prewave velocity record was averaged over the initial 700 samples. Velocity records after the wave generator was started were examined individually to determine when a steady-state condition was reached and the subsequent record was averaged, usually on the order of 8,000 to 9,000 samples (up to 900 s of data). Figure 7 shows the currents at stations for a particular experiment. Initially there was steady-state flow without waves; once wave activity began, there was a transitory period for adjustment to a near steady state, with oscillations superimposed from the wave orbital velocities.

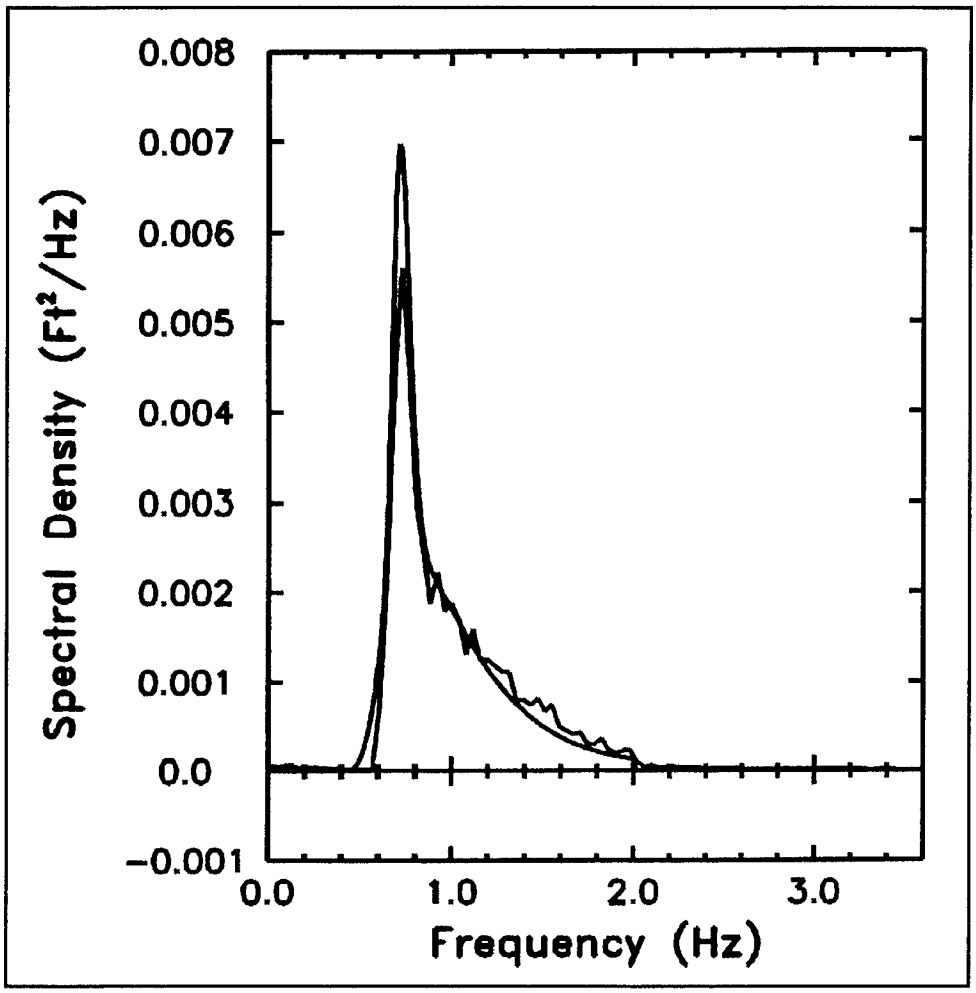

Figure 5. Comparison of targeted and measured spectra for wave generation. (To convert square feet to square meters, multiply by 0.09290304)

Wave data were analyzed in two ways. A down-crossing analysis was performed on the time series of water elevations as well as spectral analysis using a Fast Fourier Transform (FFT). The down-crossing analysis produced the calculated parameters shown in Table 3.

FFT or single-channel frequency domain analysis was performed over the entire 20,400 data points ($\Delta t = 0.05$ s). In the analysis, the mean was removed and a cosine square taper applied over 10 percent of the data at the beginning and end of the data record. The spectral parameters calculated are listed in Table 4.

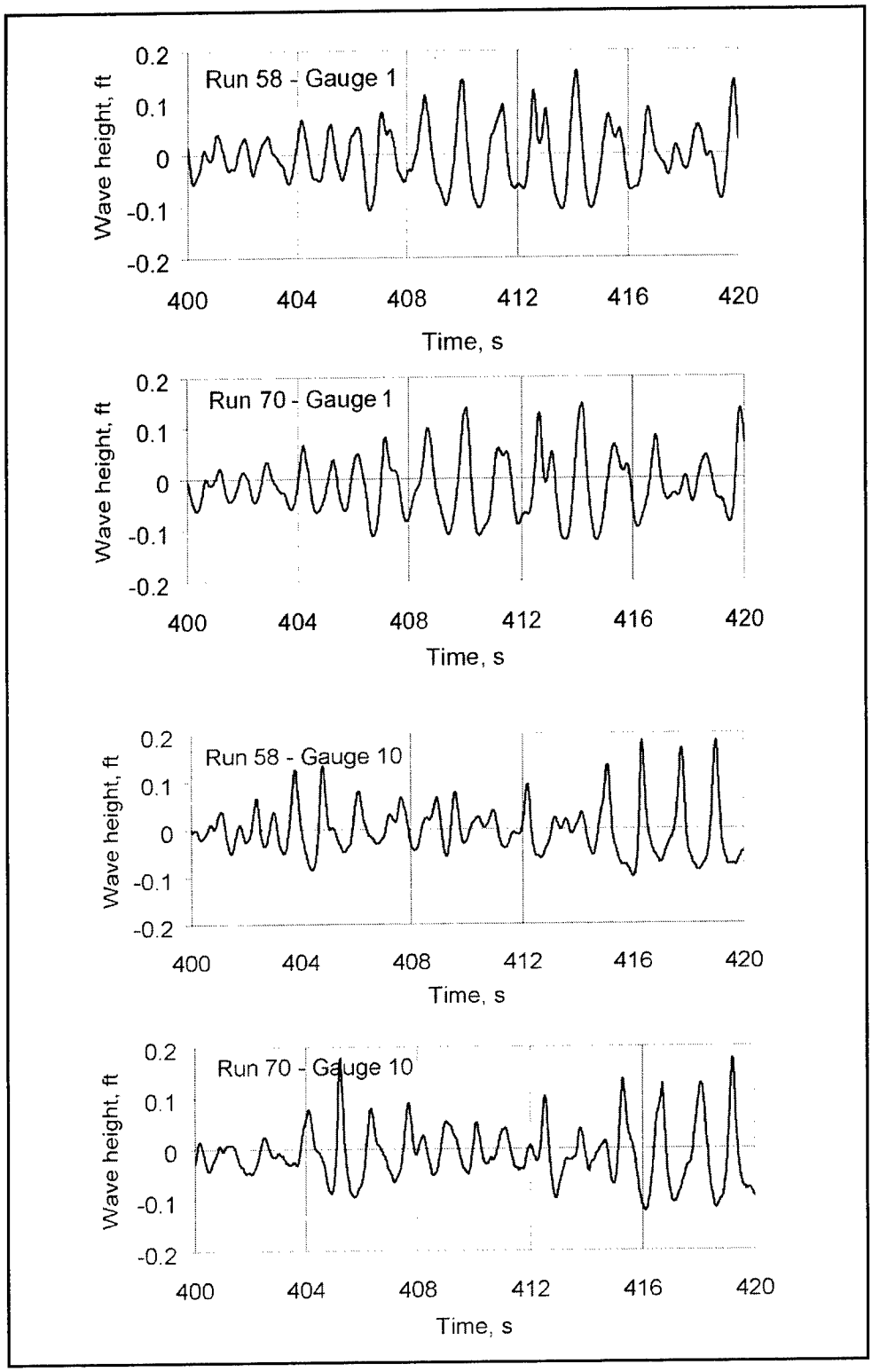

Figure 6. Snapshot of water surface elevation, η, at wave generator (Gauge 1) and in entrance channel (Gauge 10) at same time for a run without currents (Run 58) and with ebb currents (Run 70). (To convert feet to meters, multiply by 0.3048)

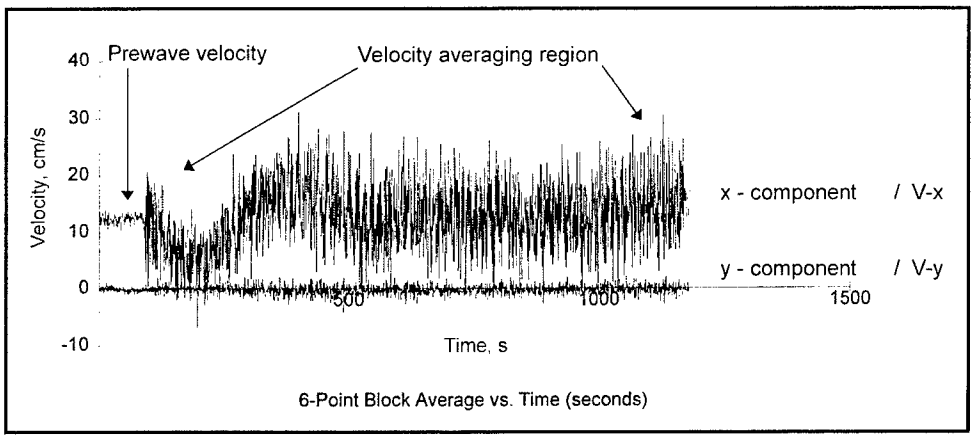

Figure 7. Time series of currents in channel at meter Location 4

Table 3
Calculated Wave Parameters from Down-crossing Analysis

Parameter Name	Description
ETABAR	Average water level
ETARMS	Root-mean-squared water level
ETAMAX	Maximum water surface elevation
ETASD	Standard deviation of water level
RHOHH	Correlation between wave heights
RHOHT	Correlation between heights and periods
HMIN	Smallest wave height
HMAX	Largest wave height
HBAR	Average wave height
H 1/3	Significant wave height, average of highest 33% of wave heights
H 1/10	Average of highest 10% of wave heights
H 1/20	Average of highest 5% of wave heights
H 1/100	Average of highest 1% of wave heights
TBAR	Average wave period
T 1/3	Significant wave period, average period of highest 33% of waves
T 1/10	Average wave period of highest 10% of wave heights
T 1/20	Average wave period of highest 5% of wave heights
T 1/100	Average wave period of highest 1% of wave heights
WEIBULL ALPHA	For Rayleigh distribution of wave heights, alpha = 2 and beta = 0.5. Truncation of higher wave heights by breaking increases alpha.
WEIBULL BETA	
NO. OF WAVES	Number of waves in record.
H (P=0.5)	Median wave height (exceeded 50%)
T (P=0.5)	Median wave period (exceeded 50%)

Table 4
Calculated Wave Parameters from Single-Channel Frequency Domain Analysis

Parameter Name	Description
FPC	Peak frequency, CERC[1] method (Ahrens 1983)
FPS	Peak frequency, single band
FPD	Peak frequency
TPC	Peak period, CERC[1] method (Ahrens 1983)
TPS	Peak period, single band
TPD	Peak period
HMO	Wave height, zero moment
QPG	Spectral width parameter (Goda 1970)
EMO	Zeroth moment of the energy spectrum
EM1	First moment of the energy spectrum
EM2	Second moment of the energy spectrum
TO2	Average period, calculated as $(EMO/EM2)^{0.5}$

[1] CERC (Coastal Engineering Research Center).

4 Example Results and Discussion

The motivation for these laboratory experiments was to measure wave breaking in typical coastal inlet conditions. The measurements are being used to parameterize wave breaking for application in numerical wave transformation models. In coastal inlets, where waves are steepened by ebb current, depth-limited breaking relationships fail. Wave steepness-based dissipation relationships (used to simulate white capping in wave generation models) also fail (Ris and Holthuijsen 1996, Smith, Resio, and Vincent 1997). The data presented in this chapter are an extension of the data collected by Smith et al. (1998). The newer data include a larger range of incident waves and ebb currents. These experiments also include an elliptical ebb shoal seaward of the inlet. The shoal induces depth-limited breaking (in addition to the current-induced breaking in the inlet), which is a typical feature of many coastal inlets.

The purpose of this chapter is to present example results of wave breaking on an ebb current in the Idealized Inlet physical model. These results include a discussion of scaling of the breaking process, modification of wave spectral shape due to breaking and wave-current interaction, and transformation of wave height caused by shoaling and breaking.

Scaling

Small-scale physical models are used to replicate prototype processes in controlled laboratory settings. The premise is that the physical model behaves similar to the prototype, and the model results can be "scaled up" to estimate prototype results. Surface gravity wave processes are scaled using the Froude Number, which is the ratio of inertial forces to gravity forces. The Froude Number, F, is given by

$$F = \frac{u}{\sqrt{g\ell}} \tag{2}$$

where

u = characteristic velocity

g = gravitational acceleration

ℓ = is a characteristic length

To achieve similitude, the Froude number must be the same for model and prototype. For constant gravitational acceleration, the scaling for velocity is given by

$$\frac{u_m}{u_p} = \sqrt{\frac{\ell_m}{\ell_p}} \tag{3}$$

where

m = denotes a model parameter

p = denotes a prototype parameter

The scaling for wave period, T, is given by

$$\frac{T_m}{T_p} = \sqrt{\frac{\ell_m}{\ell_p}} \tag{4}$$

Froude scaling is applicable for processes in which inertial forces are balanced primarily by gravitational forces, as is the case in most gravity wave problems. Additional information on physical model similitude is given by Hughes (1993).

Stive (1985) conducted a scale comparison of wave breaking on a 1:40-slope beach and found no significant deviation from Froude scaling for a wave height range of 0.1 to 1.5 m with periods of 1.6 to 5.4 s. The wave heights used in the present study range from 2 to 8 cm with periods of 0.7 to 1.7 s. The wave heights in the study are smaller than those presented by Stive, the bathymetry is more complex, and the waves are breaking on a strong ebb current. To confirm the applicability of Froude scaling, a series of model runs was scaled up by a factor of 1.45 and repeated. The wave height, water depth, wave period, and current speed were all scaled (wave height and water depth by a factor of 1.45, and wave period and current speed by a factor of $\sqrt{1.45}$). The full model bathymetry was not altered for the scale tests, but the model water level was adjusted to give the correct scaled depth on shallowest portion of the ebb shoal, where the most intense breaking occurs.

Figure 8 shows a cross-sectional view of the model depths and gauge positions. Figures 9 to 11 show results of the wave height variation over the ebb shoal and into the inlet channel for incident wave height of 5.5 cm, peak period of 0.7 s, and current speed of 0, 16, and 27 cm/s. The scaled wave heights are plotted in the same figures. The results show good agreement in the wave height across the ebb shoal (cross-shore distance 300 to 800 cm). The heights in the flat channel

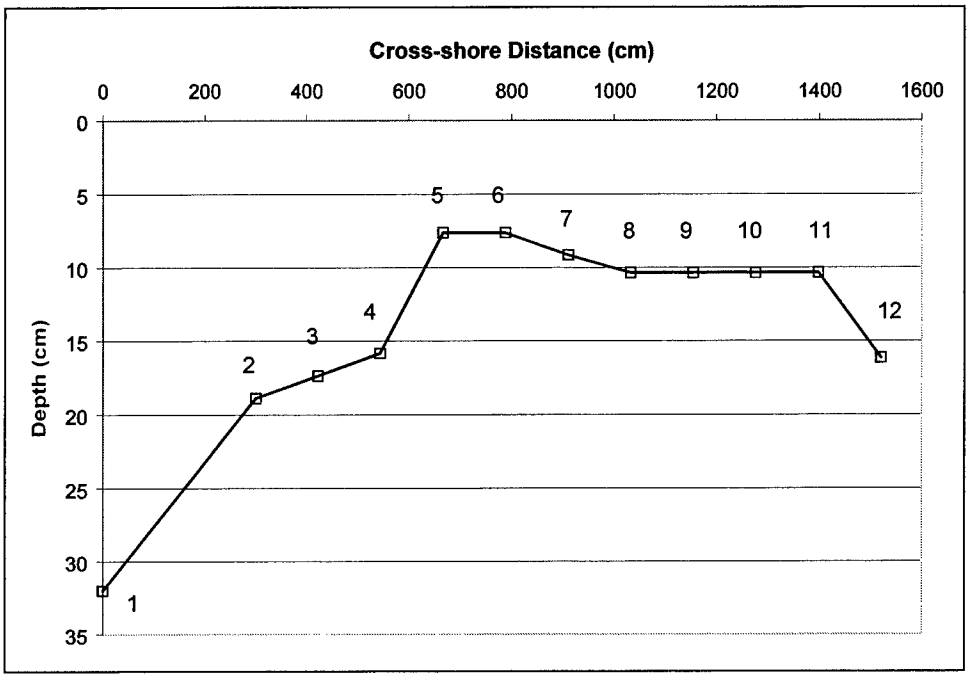

Figure 8. Laboratory cross-shore still-water depth profile and gauge loocations 1 through 12

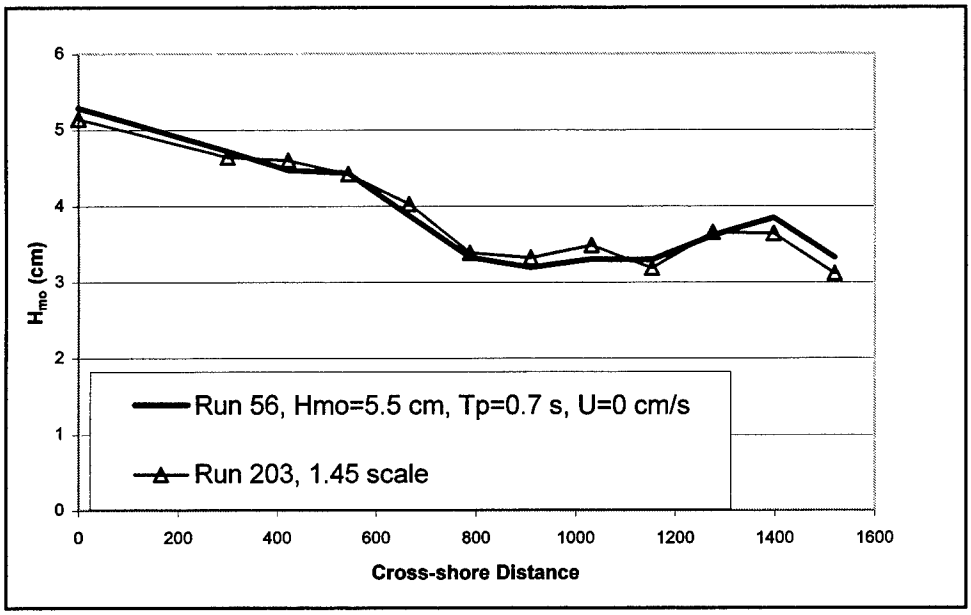

Figure 9. Wave heights for Runs 56 and 203 (scaled down by 1/1.45)

(cross-shore distance > 800 cm) show poorer agreement because the depth is not scaled and the current distribution in the channel varies somewhat between cases. Incident wave conditions and associated numbers for all runs are given in Appendix D.

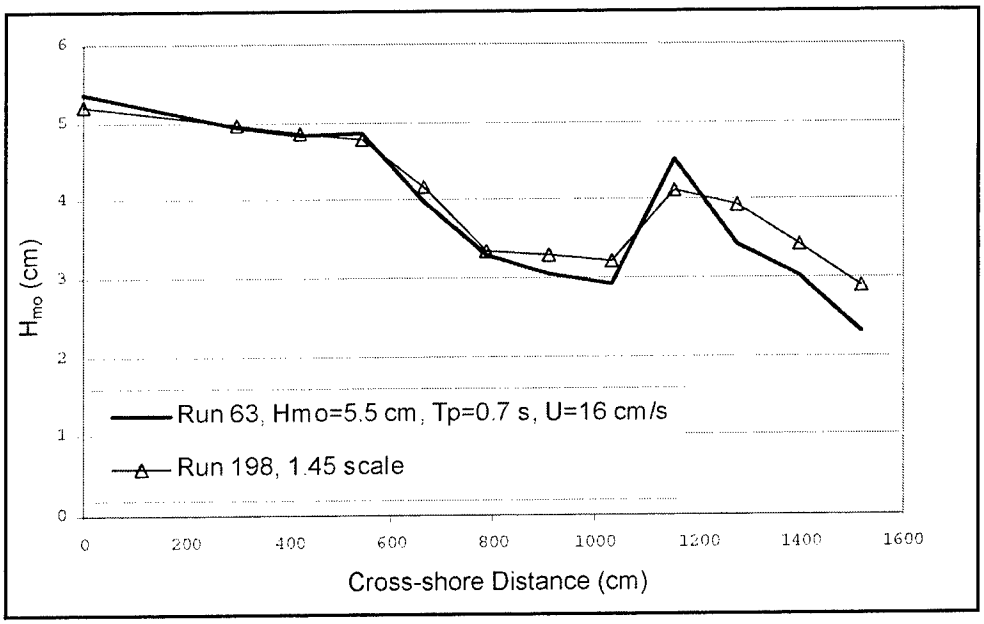

Figure 10. Wave heights for Runs 63 and 198 (scaled down by 1/1.45)

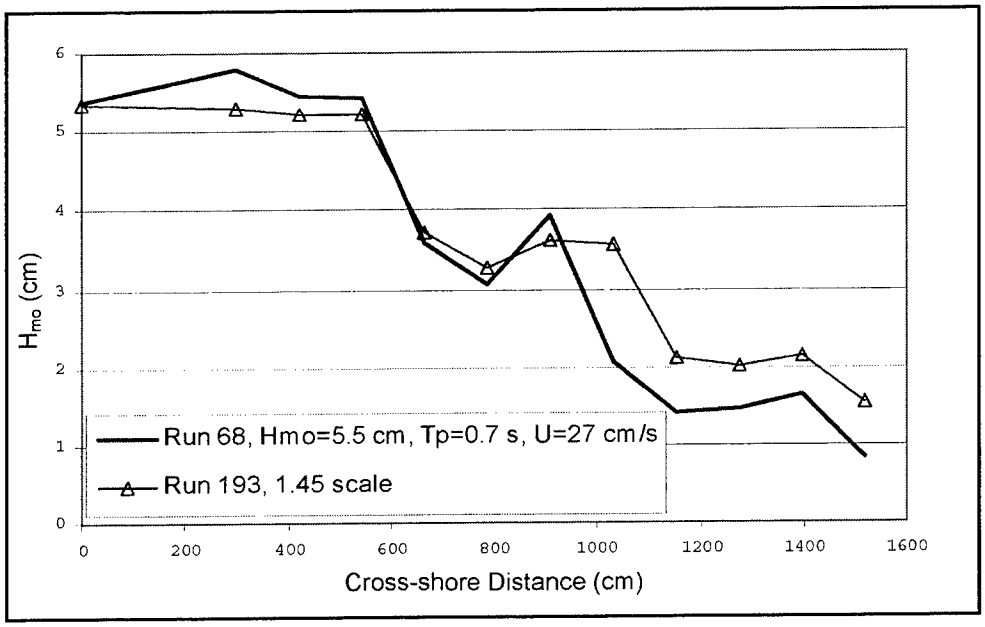

Figure 11. Wave heights for Runs 68 and 193 (scaled down by 1/1.45)

Wave Spectra

As waves propagate from offshore, across a shallow ebb shoal, and into an inlet with a strong current, the spectral shape changes through the processes of shoaling, breaking, blocking, and nonlinear interaction. Waves increase in height through depth- and current-induced shoaling. As the wave height-to-depth ratio or the wave steepness becomes large, energy is dissipated through breaking. Very strong ebb currents block waves, reflecting or dissipating the incident energy.

Nonlinear interactions redistribute energy within the spectrum. These interactions can increase the peak period of a spectrum and thus increase the ebb current required to block the wave. This section presents sample spectra for a variety of inlet currents and two incident peak wave periods. The examples illustrate the processes of wave transformation at an inlet and the changes in spectral shape.

Transformation of 1.4-s waves

Figures 12 through 15 show wave spectral evolution for an incident wave of height 5.5 cm and peak period of 1.4 s for ebb currents of 0 (no current), 16 (weak current), 27 (medium current), and 35 cm/s (strong current), respectively. The maximum current is measured in the inlet throat at Gauge 12. The current magnitude decreases offshore of Gauge 6, as the current diffuses offshore of the jetties. Spectra are shown for selected gauges only, to prevent the plots from being cluttered. Note that each of the plots has the same scale, and the peak energy density of the incident spectrum (Gauge 1) is approximately 5 cm^2/Hz.

At Gauge 2, for all currents, the energy density increases as the waves shoal (depth decreases from 32 to 19 cm). The ebb current at Gauge 2 increases from approximately 0 cm/s for the no-current case to 8 cm/s for the strong current. The shoaling increases as the ebb current increases at Gauge 2 because of the wave-current interaction. Wave breaking is the dominant process from Gauges 5 to 7. The dissipation is greatest at Gauges 5 and 6, where the depth is smallest. The spectral densities at Gauges 6 and 7 are smaller for the medium and large current because the steepening of the waves by the current enhances dissipation.

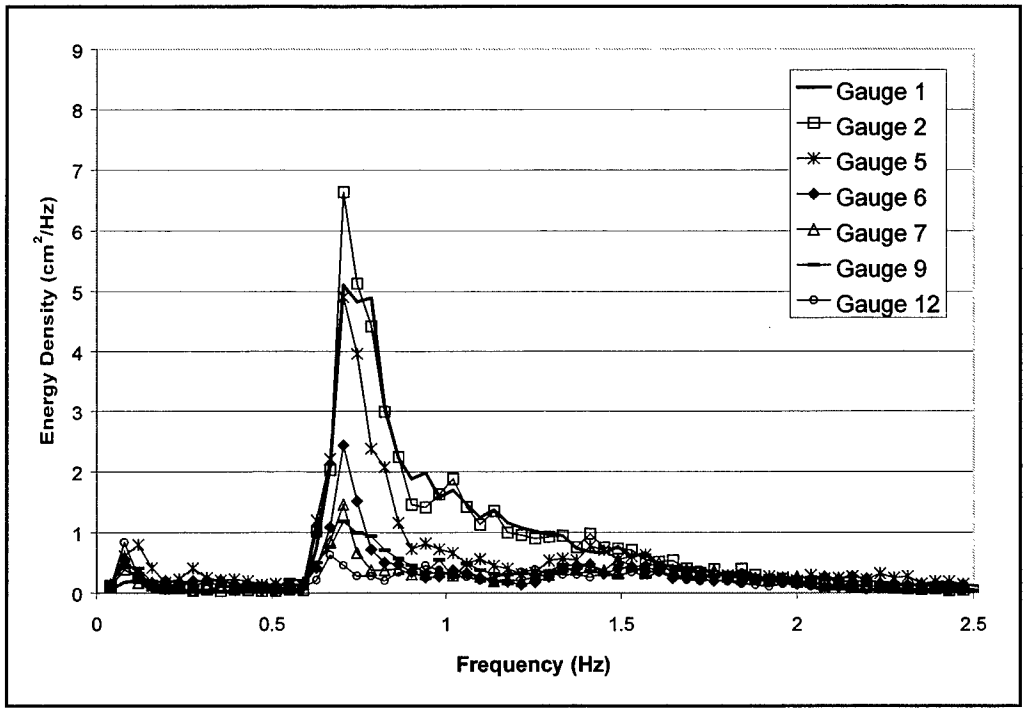

Figure 12. Selected spectra from Run 58 (H_{mo}=5.5 cm, T_p=1.4 s, U=0 cm/s)

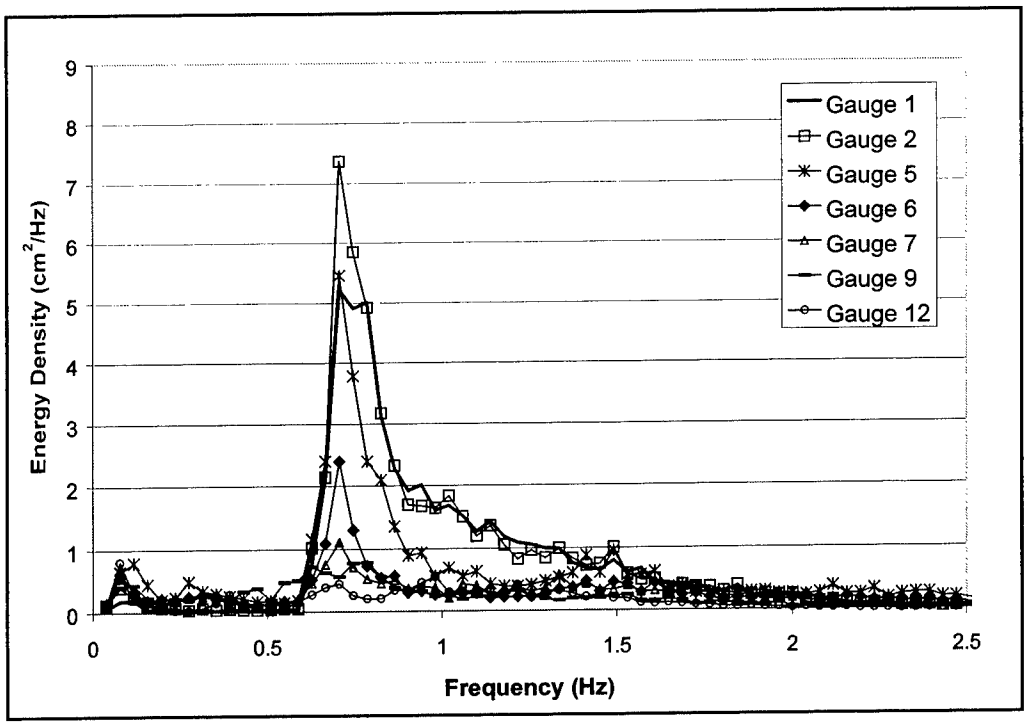

Figure 13. Selected spectra from Run 61 (H_{mo}=5.5 cm, T_p=1.4 s, U=16 cm/s)

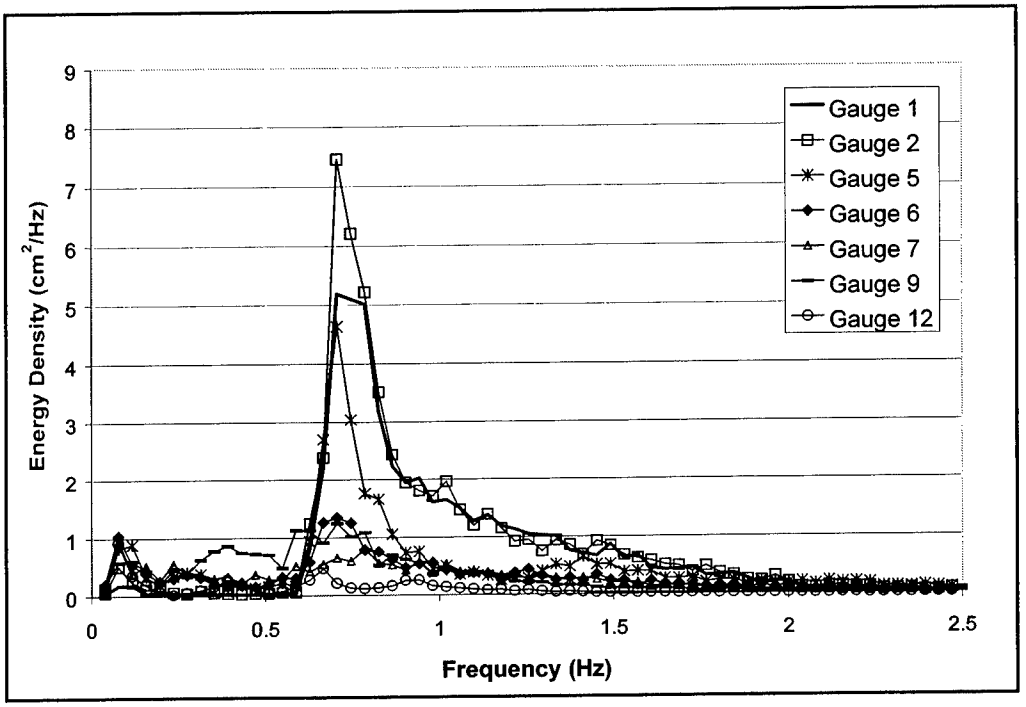

Figure 14. Selected spectra from Run 70 (H_{mo}=5.5 cm, T_p=1.4 s, U=27 cm/s)

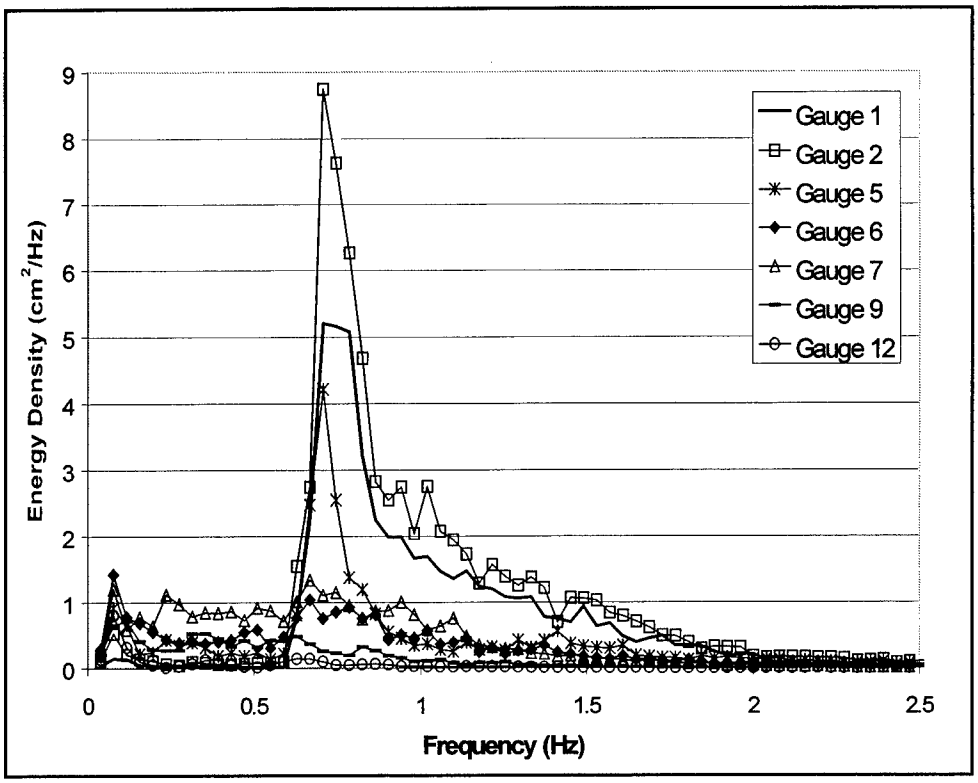

Figure 15. Selected spectra from Run 92 (H_{mo}=5.5 cm, T_p=1.4 s, U=35 cm/s)

Dissipation through breaking removes wave energy at the spectral peak and higher frequencies (the equilibrium range of the spectrum). Thus, the mean frequency was reduced during breaking in these runs, but the peak frequency often remained constant. Breaking can be parameterized with a reduction in the equilibrium range. Generally, linear wave-breaking models are formulated to remove energy proportionally across the entire spectrum, which maintains constant peak and mean frequencies. As the waves enter shallow water and break, the spectral shape becomes much flatter and less peaked (compare Gauges 2 and 6 in Figure 15). Energy is transferred to frequencies both higher and lower than the peak by nonlinear interactions. These interactions increase in regions of small water depth and large current. In both the medium and large current cases, significant increases in low frequency energy are evident.

Transformation of 0.7-s waves

Figures 16 through 19 show wave spectral evolution for an incident wave of height 5.5 cm and peak period of 0.7 s for ebb currents of 0 (no current), 16 (weak current), 27 (medium current), and 35 cm/s (strong current), respectively. The peak period for these cases is half the value of that in the previous example (0.7 versus 1.4 s). The shorter period reduces the depth-induced shoaling but increases the current-induced shoaling and breaking. Because the shorter period waves are propagating more slowly, the current has a greater influence.

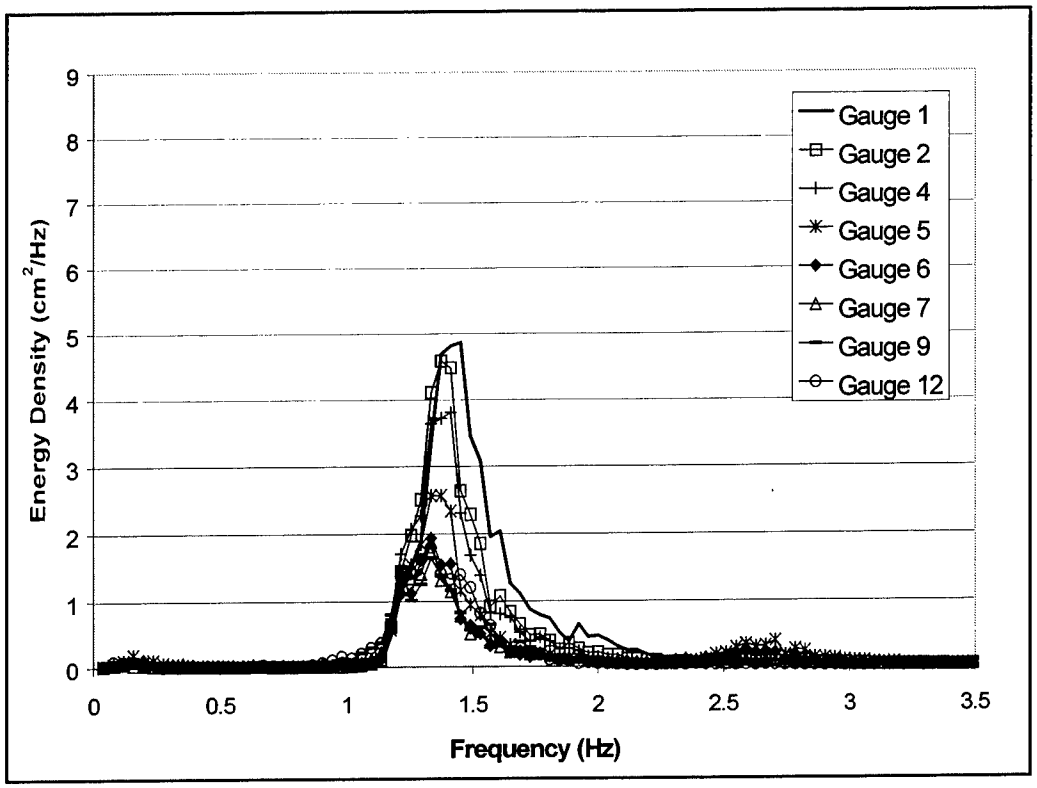

Figure 16. Selected spectra from Run 56 (H_{mo}=5.5 cm, T_p=0.7 s, U=0 cm/s)

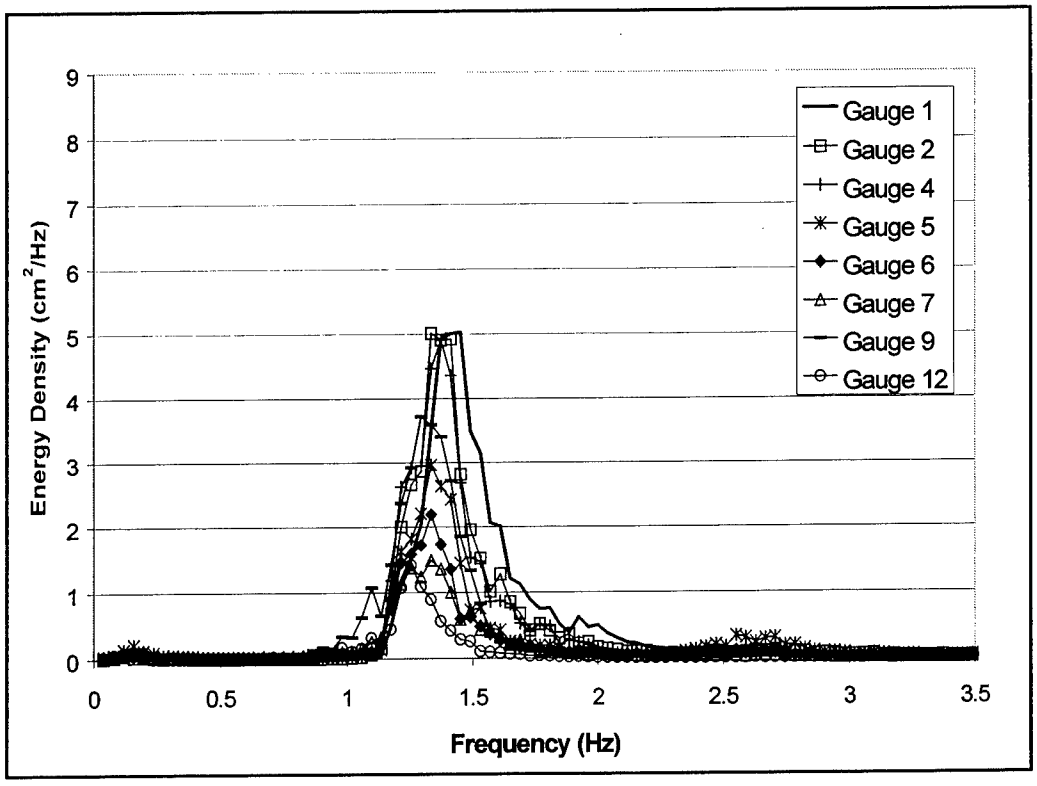

Figure 17. Selected spectra from Run 63 (H_{mo}=5.5 cm, T_p=0.7 s, U=16 cm/s)

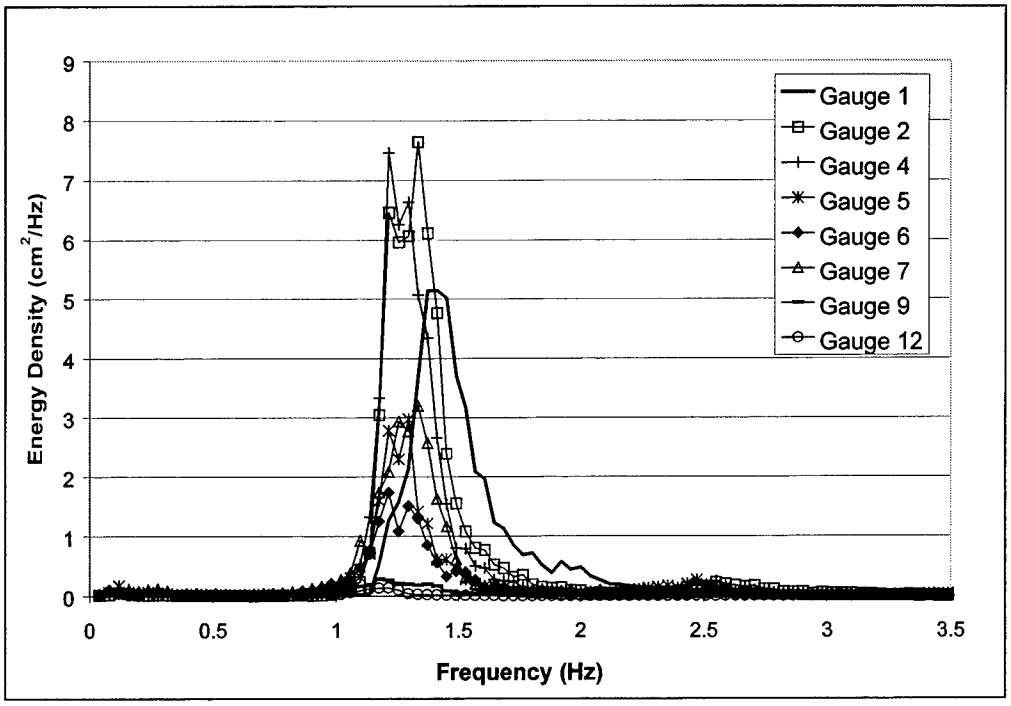

Figure 18. Selected spectra from Run 68 (H_{mo}=5.5 cm, T_p=0.7 s, U=27 cm/s)

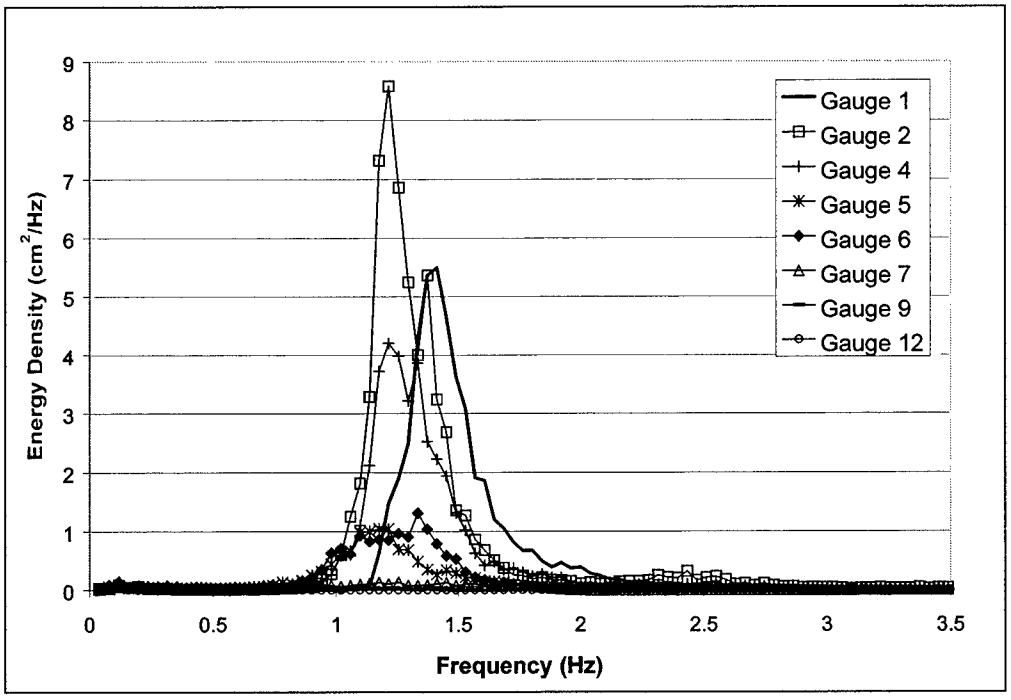

Figure 19. Selected spectra from Run 91 (H_{mo}=5.5 cm, T_p=0.7 s, U=35 cm/s)

The no-current case (Figure 16) shows no shoaling of the spectrum between Gauges 1 and 2, with dissipation occurring between Gauges 2 and 6. This is similar to Figure 12 (1.4-s period and no current) with less shoaling but breaking farther offshore. The increase in dissipation at deeper depths is probably the result of larger wave steepness. The weak-current case (Figure 17) is similar to no-current case, except the wave height (and energy) peaks for a second time in the channel. The wave dissipates from Gauge 2 to Gauge 8, peaks again at Gauge 9, and dissipates through Gauge 12. The peaking at Gauge 9 occurs because the current is slightly stronger in the inner portion of the channel. A slight trend toward downshifting of the peak frequency is seen in the weak-current case. This appears more strongly in the medium and strong currents, and it will be discussed next.

Flume measurements of wave breaking on a strong current made by Lai, Long, and Huang (1989) and by Chawla and Kirby (2000) show that side-band instabilities develop (Benjamin and Feir 1967) and shift significant wave energy to lower frequencies. Energy from the spectral peak is shifted into side bands (peaks occurring symmetrically on either side of the peak frequency). These energy transfers generally occur over long distances, but waves propagating on opposing currents near the blocking limit (where the group celerity approaches zero) travel slowly, thus long times are available for the energy transfers to occur. Near the blocking limit, waves are also very steep, which fuel the side-band development. Lower wave frequencies require a larger opposing current to be blocked; therefore, energy at the peak frequency and upper side band may be blocked, while the lower side band can propagate through the current. In this manner, nonlinear energy transfers allow waves to propagate through the linear blocking limit.

The side-band growth and frequency downshift is illustrated in Figure 18 for the medium current. At Gauges 2 and 4, two frequency peaks are evident, and energy is shoaled and shifted from the incident peak to the lower side band. The upper side band in this run is blocked by the current. Shoreward of the shift in peak frequency, the energy is dissipated by breaking (predominantly through Gauges 5 and 6 on the shoal). The waves shoal again to Gauge 7 and then are further dissipated/blocked through Gauge 12. The strong-current case shows a similar behavior with dissipation and blocking occurring shoreward of Gauge 6. The strong-current, 0.7-s-period case was visually observed to have no wave action in the inlet throat.

Wave Height Transformation

Wave height as discussed in this section is defined as the zero-moment wave height ($H_{mo} = 4\sqrt{m_0}$, where m_0 is the zeroth moment of the spectrum, or more simply, the area under the spectrum). Wave height is typically the first-order parameter used in the design and evaluation of coastal inlet projects, such as jetties and channels. Wave breaking, in particular, is of interest because:

a. Breaking waves in coastal entrances are a hazard to navigation.

b. Turbulence generated by breaking waves stirs sediment and can increase sediment transport, contributing to scour near structures or to channel shoaling.

c. Gradients in wave height caused by wave breaking generate currents that transport sediment.

This section presents examples of wave height transformation across the ebb shoal and through the idealized inlet for a variety of inlet currents and incident waves.

Figure 20 shows the wave height transformation from offshore (Gauge 1 at distance = 0 cm) through the inlet throat (Gauge 12 at distance = 1,500 cm) for incident waves with height of 5.5 cm and peak period of 1.4 s. The wave heights for four current magnitudes are shown on the same plot for comparison. These four runs correspond to the spectra plotted in Figures 12 through 15. For the no-current run, there is a small amount of shoaling between Gauges 1 and 2, and dissipation occurs through the remainder of the profile. Most of the dissipation occurs across the ebb shoal (distance of 600 to 800 cm), where the depth is smallest (7.6 cm). Some additional dissipation occurs in the inlet channel (distance > 800 cm), which is probably caused by diffraction into the rock jetties (Melo and Guza 1991). The reduced wave height at the most inshore gauge (Gauge 12, distance = 1,500 cm) is the result of inverse shoaling and refraction away from the deeper gorge in the center of the inlet. The trend of decreased wave height at Gauge 12 is consistent through all the runs. As the current is increased, there is more shoaling in the region offshore of the ebb shoal (distance 0 to 600 cm), and there is greater dissipation across the ebb shoal. In the inlet throat, waves reform and shoal on the medium and strong current but break again in the region with the strongest current (distance > 800 cm).

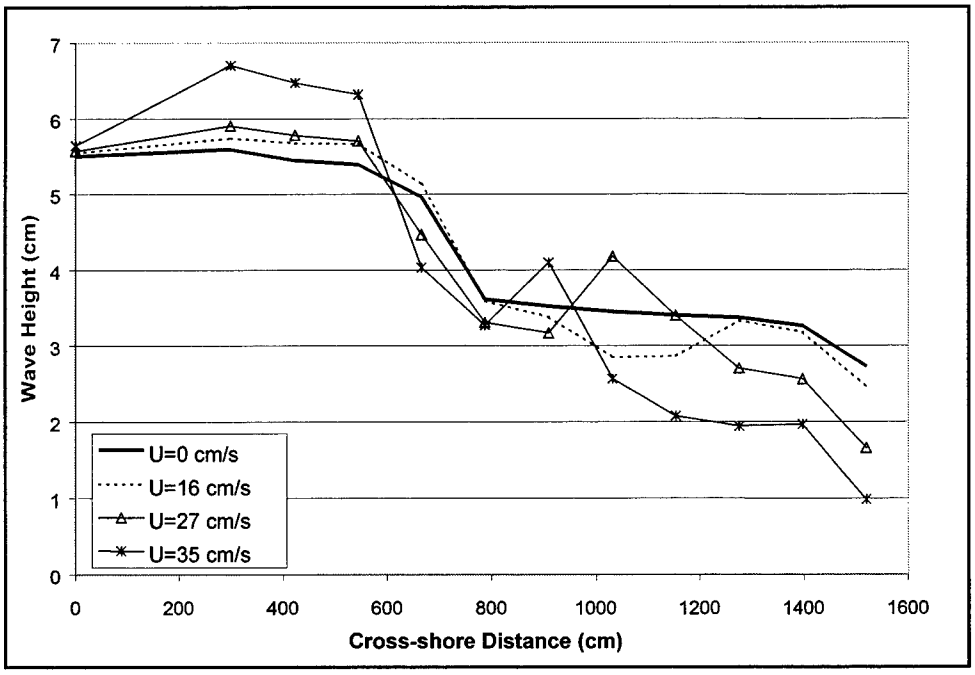

Figure 20. Wave height transformation from Runs 58, 61, 70, and 92 (H_{mo}=5.5 cm, T_p=1.4 s)

Figure 21 shows the wave height transformation for waves with height of 5.5 cm and peak period of 0.7 s for the same four current magnitudes. These cases correspond to the spectra plotted in Figures 16 through 19. These waves are steeper than those shown in Figure 20 (shorter wavelength gives a larger wave height-to-length ratio), and the shorter/slower waves interact more strongly with the current. Compared to the 1.4-s waves, the 0.7-s waves break in deeper water depths, and they reform, shoal, and break more strongly in the inlet throat because of the interaction of the waves with the current. For the strong current, the 0.7-s waves are blocked in the inner channel. The very small wave heights shown in the plot correspond to energy at low frequencies.

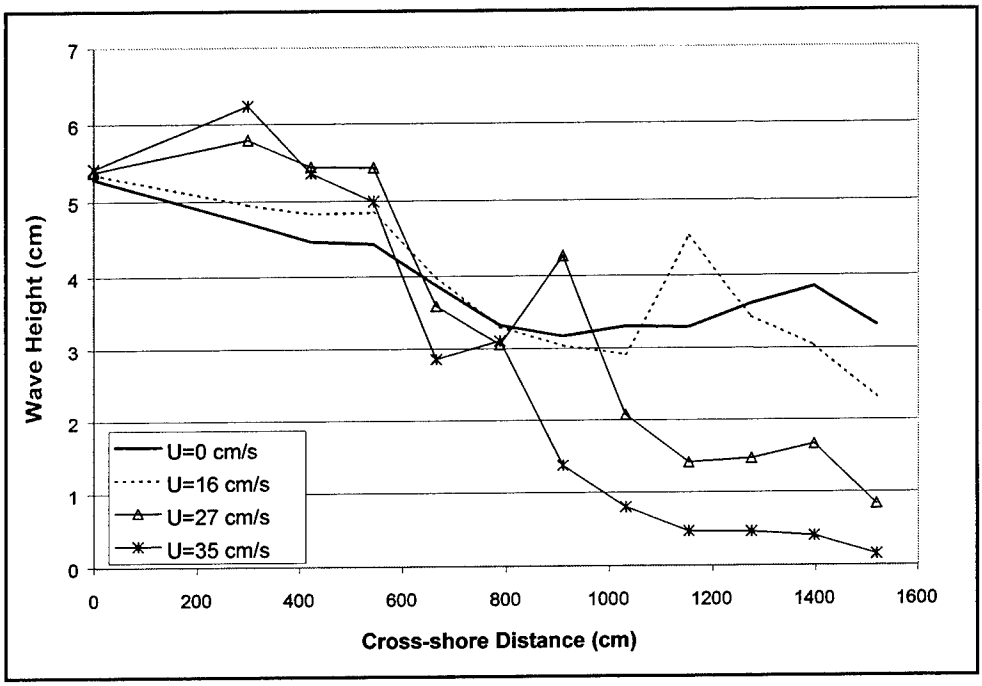

Figure 21. Wave height transformation from Runs 58, 61, 70, and 92 (H_{mo}=5.5 cm, T_p=0.7 s)

The wave transformation through the inlet can be broken down into three regions: offshore, ebb shoal, and inlet throat. In the offshore region, the wave height may increase slightly through shoaling or decrease slightly through breaking. Shorter, steeper waves tend to break, and longer waves tend to shoal. The addition of an ebb current increases shoaling in this region. Across the ebb shoal, wave breaking is the dominant process, with the greatest dissipation occurring in the smallest water depth. The addition of the ebb current increases the dissipation. In the inlet throat, the wave height is relatively constant with no current present. The addition of the ebb current causes wave reformation and shoaling, and then breaking and dissipation. An increase in the ebb current leads to a decrease in wave height at the most shoreward measurement point. But, within the throat, the local wave height may increase with increasing ebb current magnitude, prior to breaking. This local increase in wave height and breaking can pose a significant navigation hazard.

Appendixes B and C contain tabular listings of wave parameters for the irregular and monochromatic runs, respectively. The tables include incident conditions and measurements of water depth, wave height, wave period, and velocity at each of the 12 gauges. Appendix D is a listing of all experimental runs and associated wave height, wave period, wave type, gauge arrangement number, ebb current speed, and stillwater level. Appendix E is a listing of basin bathymetry which can be scanned by the user. Appendix F contains coordinates of the wave and current meter gauges relative to the coordinate system defined in Appendix E. Photographs 1-22 provide examples of overhead views on waves on the ebb shoal for selected tests. In the photos, offshore is to the left, with the offshore tips of the jetties appearing on the right-hand side.

5 Conclusions

Wave breaking at coastal inlets poses a hazard to navigation and enhances sediment transport through the generation of turbulence and nearshore currents. Wave breaking occurs at coastal inlets and entrances because of small water depths across ebb-shoal bars and increased wave steepening caused by interaction of waves with the ebb current. Few data sets are available to quantify the breaking process in the presence of an ebb shoal and a current.

Wave-breaking measurements were made in the 3D (three-dimensional) Idealized Inlet Laboratory Facility with normally incident, unidirectional irregular and monochromatic waves. The model scale is approximately 1:50. The physical model includes an offshore equilibrium slope, an ebb shoal, rubble jetties, and a flat entrance channel. This report provides results from 47 irregular and 41 monochromatic wave-breaking tests (Appendixes B and C, respectively). Waves and current were measured along a model cross section through the jetties. These data are an extension of those given by Smith et al. (1998) with the addition of an ebb shoal and a larger range of ebb currents and incident waves.

The application of scale-model wave-breaking results to prototype problems requires verification of Froude scaling for small-scale wave breaking on a current. A series of scaling runs was made with a geometric scale factor of 1.45. The appropriate scaling was applied to the wave height, wave period, and water depth across the ebb shoal. The scaling runs showed good agreement in wave height and energy dissipation across the ebb shoal.

Analysis of the wave spectra shows that dissipation of an incident wave increases as the ebb current increases. The dissipation occurs at the spectral peak and higher frequencies. Linear models that dissipate energy proportionally across the entire spectrum will, therefore, overestimate mean frequency. Wave energy is also transferred within a spectrum through nonlinear interactions. Through the breaking process, spectra tend to become flatter and energy increases in the lower frequencies. Near the blocking limit (as the wave group velocity goes to zero), wave energy is transferred from the incident peak to upper and lower side bands. The current in some cases blocks the upper side band and the incident peak, but energy in the lower side band propagates through the blocking limit. The result is a downshifting of the peak frequency. The nonlinear energy transfers allow waves to propagate through the linear blocking limit.

Wave transformation in the Idealized Inlet can be broken into three regions:

a. In the offshore, wave height increases slightly through shoaling or decreases slightly through breaking. Shoaling and breaking increase as the ebb current increases. Also, shorter, steeper waves tend to break and longer waves tend to shoal.

b. Across the ebb shoal, wave breaking is the dominant process. The greatest dissipation occurs where the water depth is smallest. The wave dissipation increases as the ebb current increases.

c. In the inlet throat (between the jetties), the wave height is relatively constant with no current. The addition of the ebb current causes wave reformation and shoaling, and then breaking and dissipation.

An increase in the ebb current magnitude results in lower wave heights at the most shoreward wave gauge in the Idealized Inlet Facility. This occurs because wave-current interaction increases the height and steepness of the waves and, thus, increases breaking and dissipation. But, within the inlet throat, increasing the current causes an increase in wave steepness and breaking and local peaks in wave height. These processes may result in a significant navigation hazard on ebb current.

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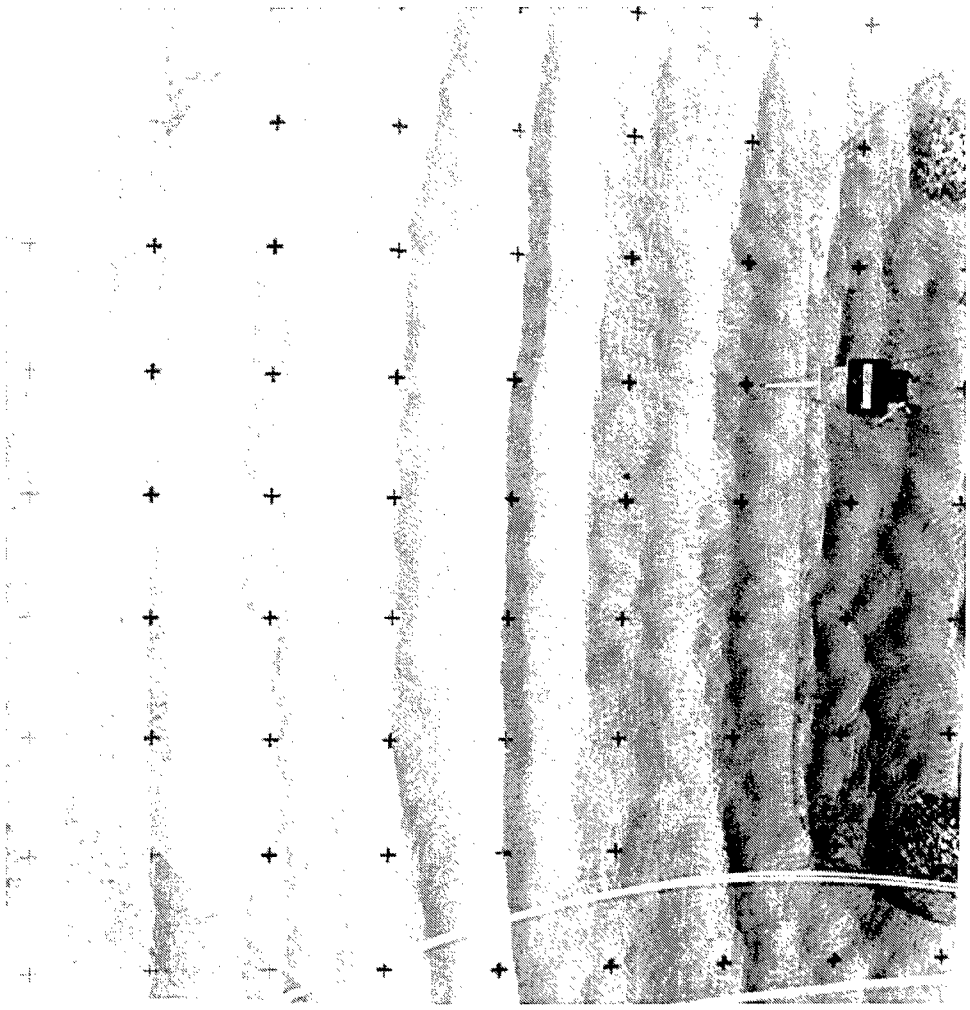


Photo 1. Wave height 3.7 cm, wave period 0.71 s (irregular wave), no current

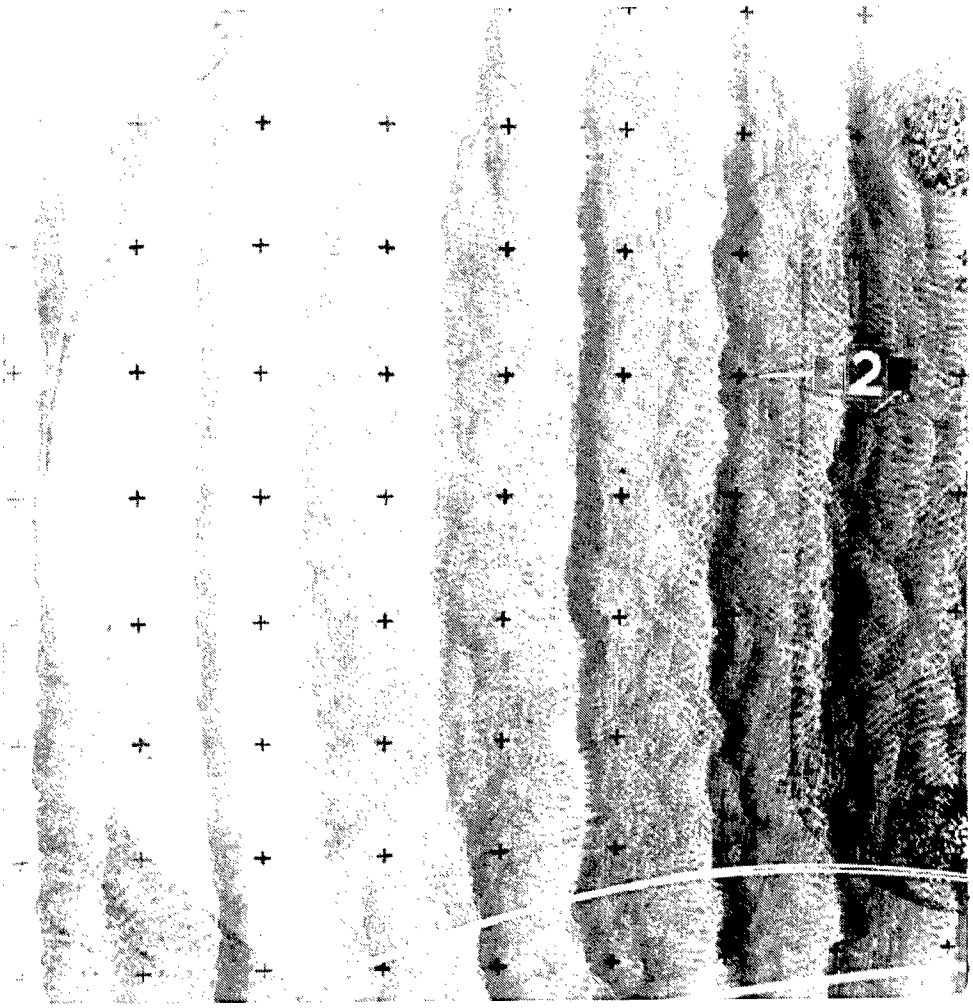


Photo 2. Wave height 5.5 cm, wave period 0.71 s (irregular wave), no current

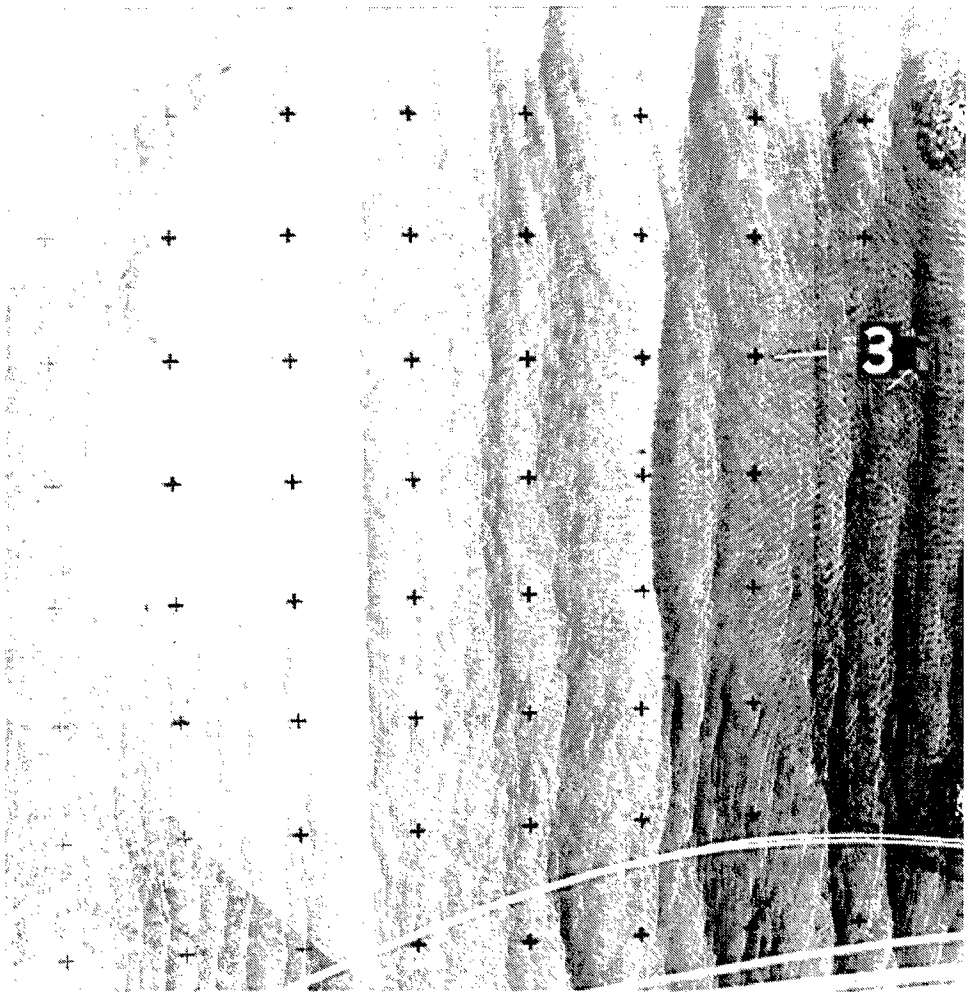
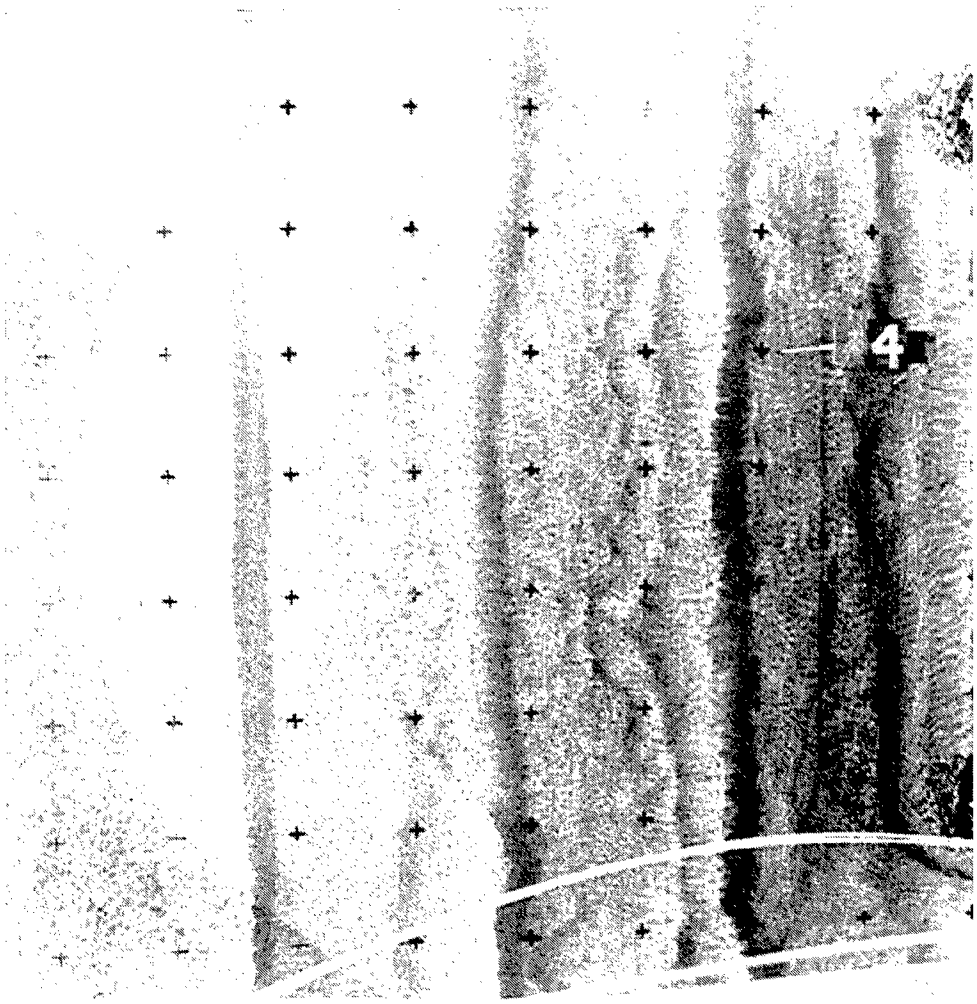


Photo 3. Wave height 3.7 cm, wave period 1.41 s (irregular wave), no current



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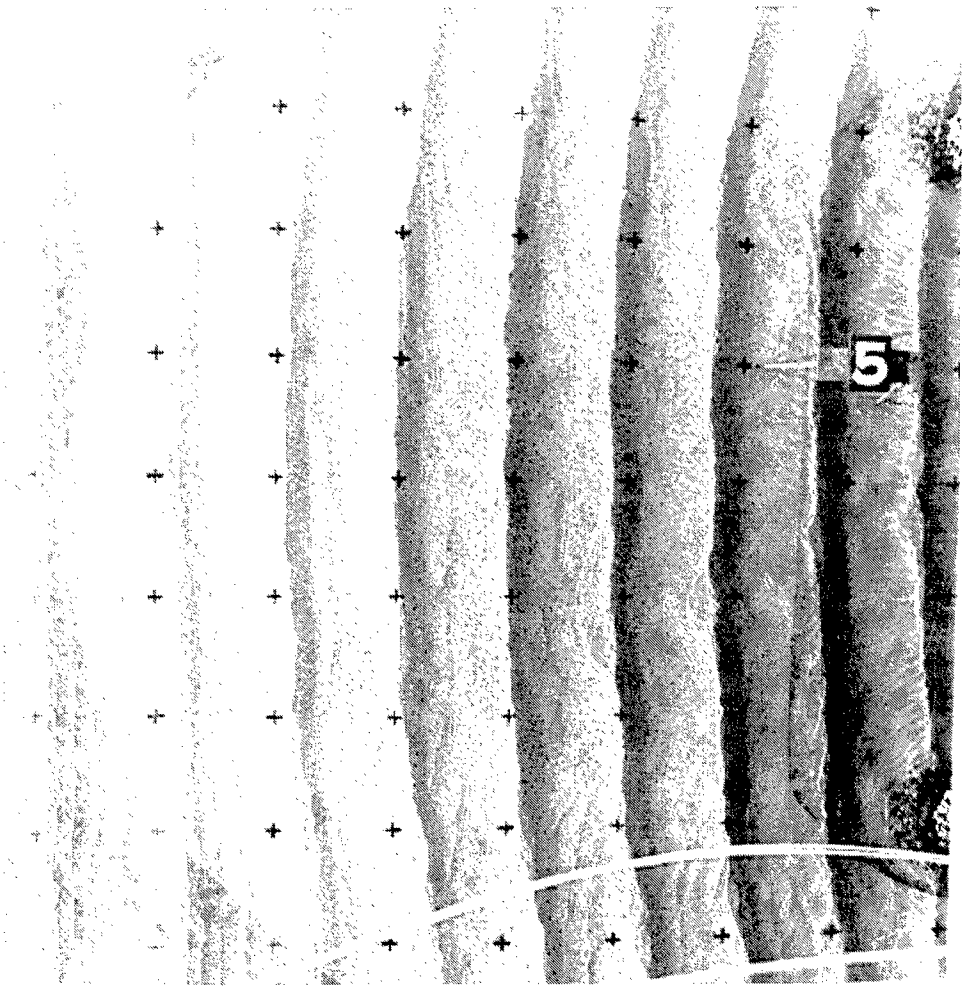


Photo 5. Wave height 5.5 cm, wave period 0.71 s (monochromatic wave), no current

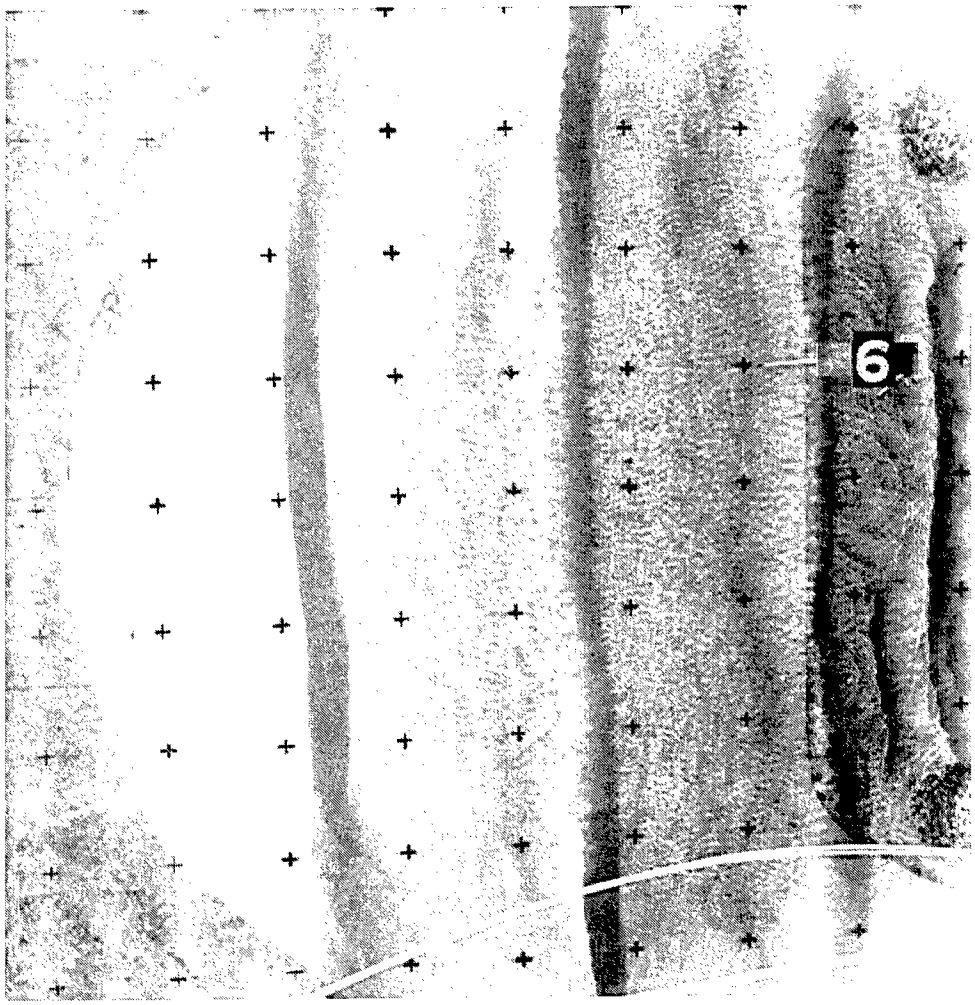


Photo 6. Wave height 5.5 cm, wave period 1.41 s (monochromatic wave), no current

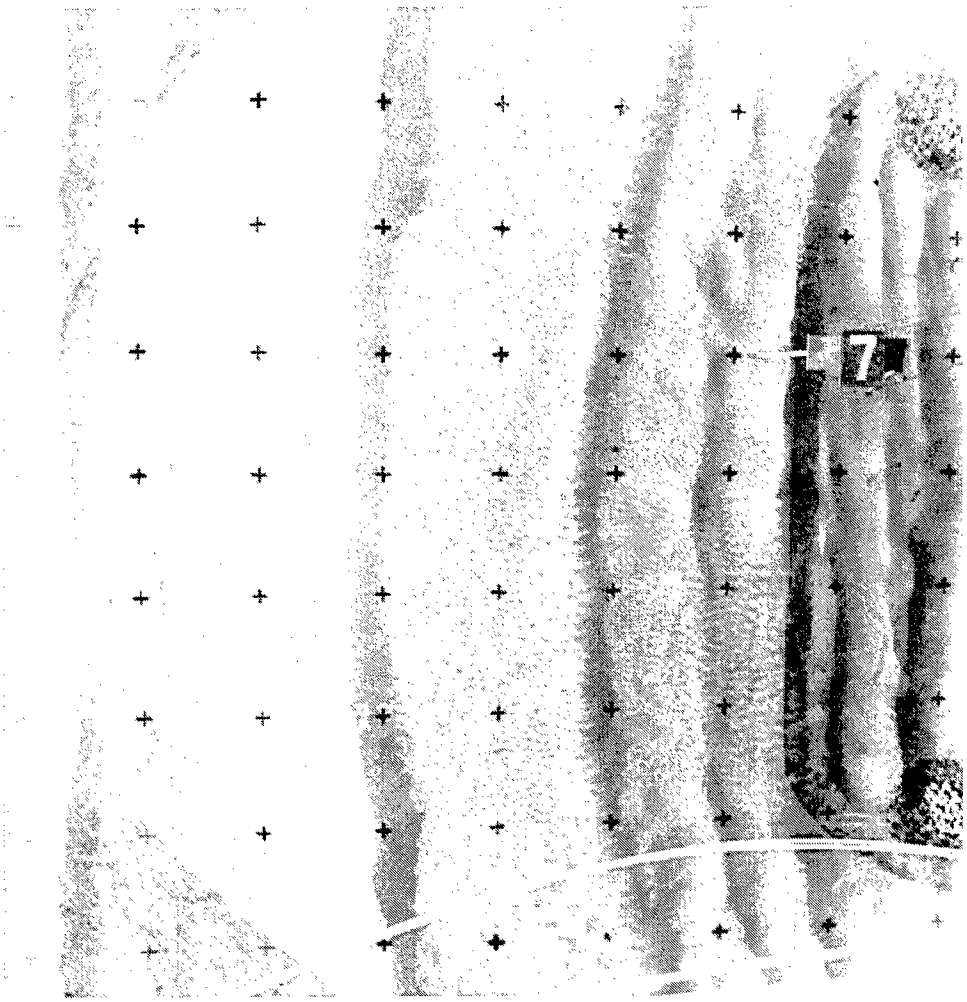


Photo 7. Wave height 5.5 cm, wave period 1.41 s (irregular wave), ebb current 12 cm/s

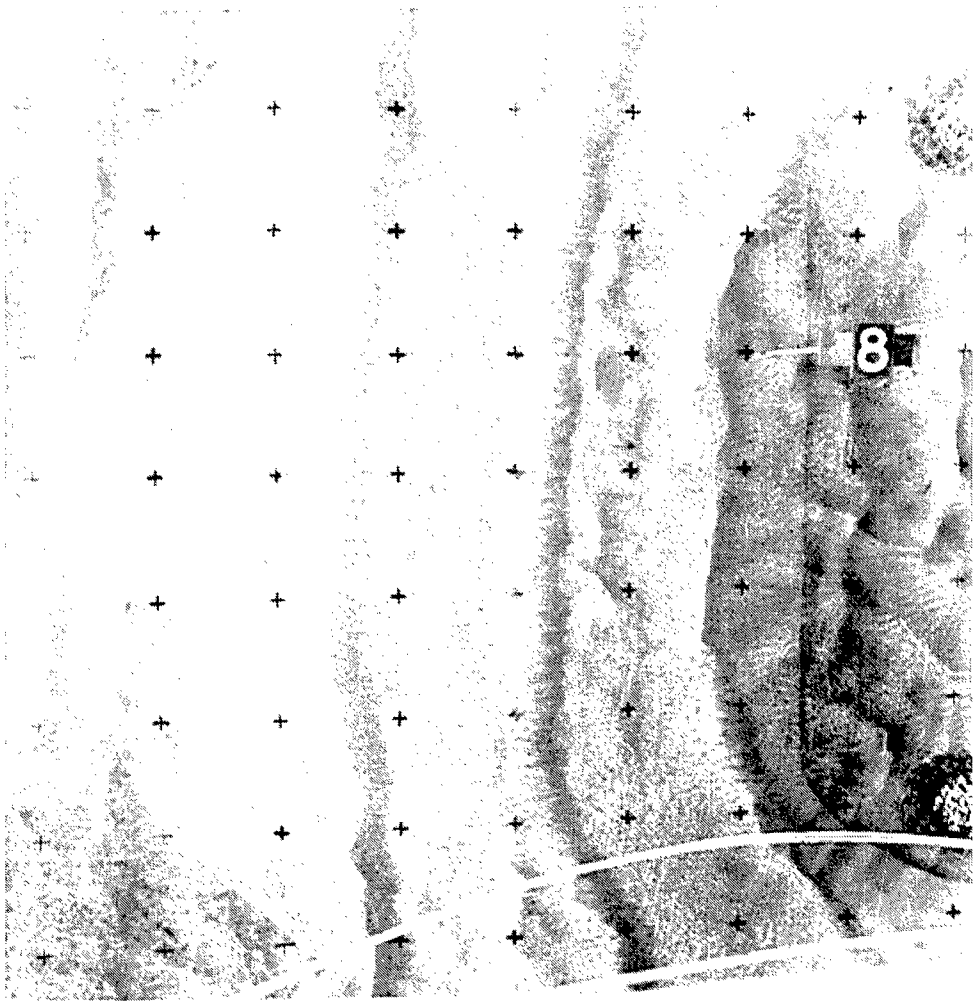


Photo 8. Wave height 3.7 cm, wave period 1.41 s (irregular wave), ebb current 12 cm/s

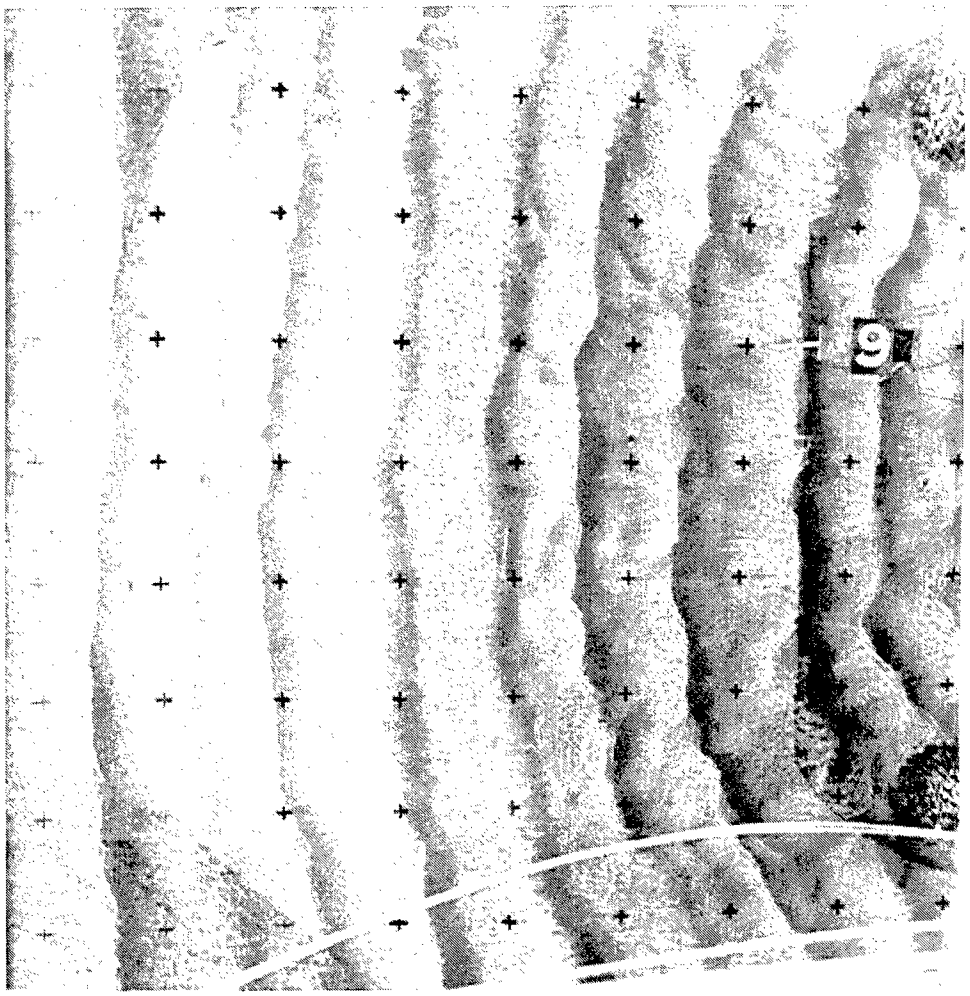


Photo 9. Wave height 5.5 cm, wave period 0.71 s (irregular wave), ebb current 12 cm/s

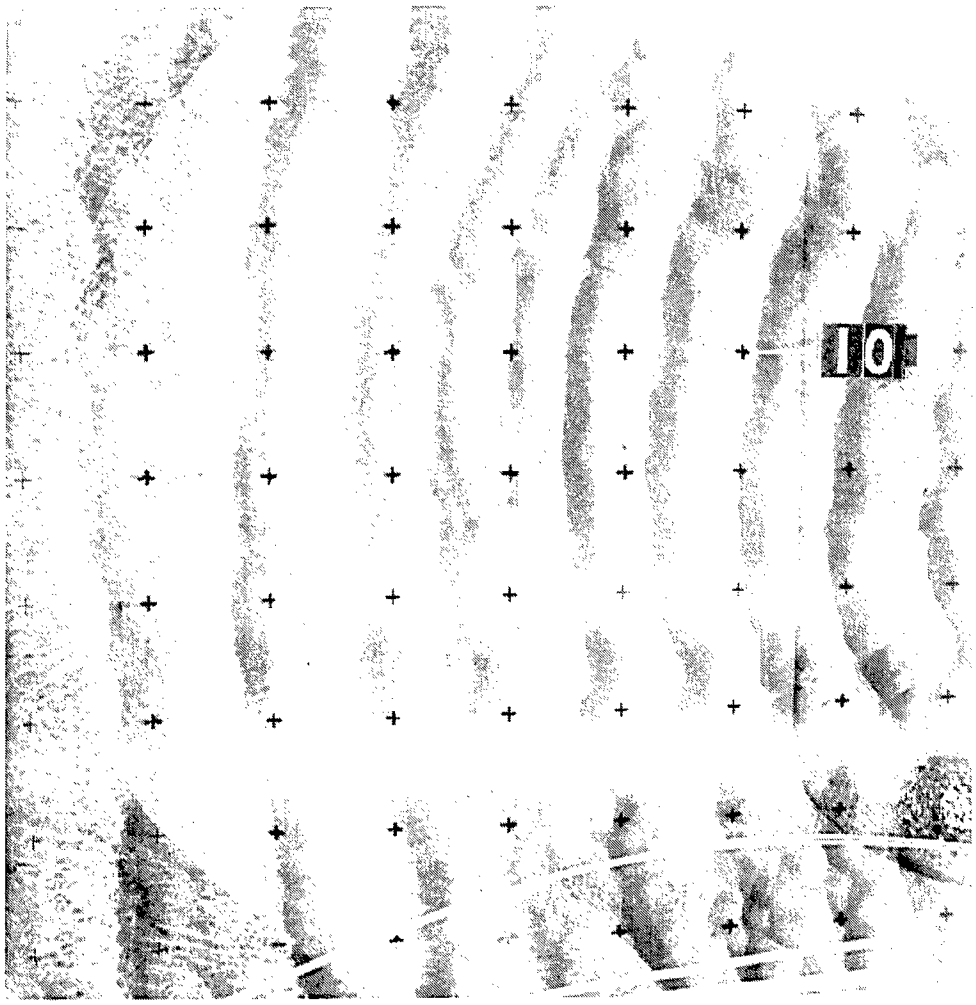


Photo 10. Wave height 3.7 cm, wave period 0.71 s (irregular wave), ebb current 12 cm/s

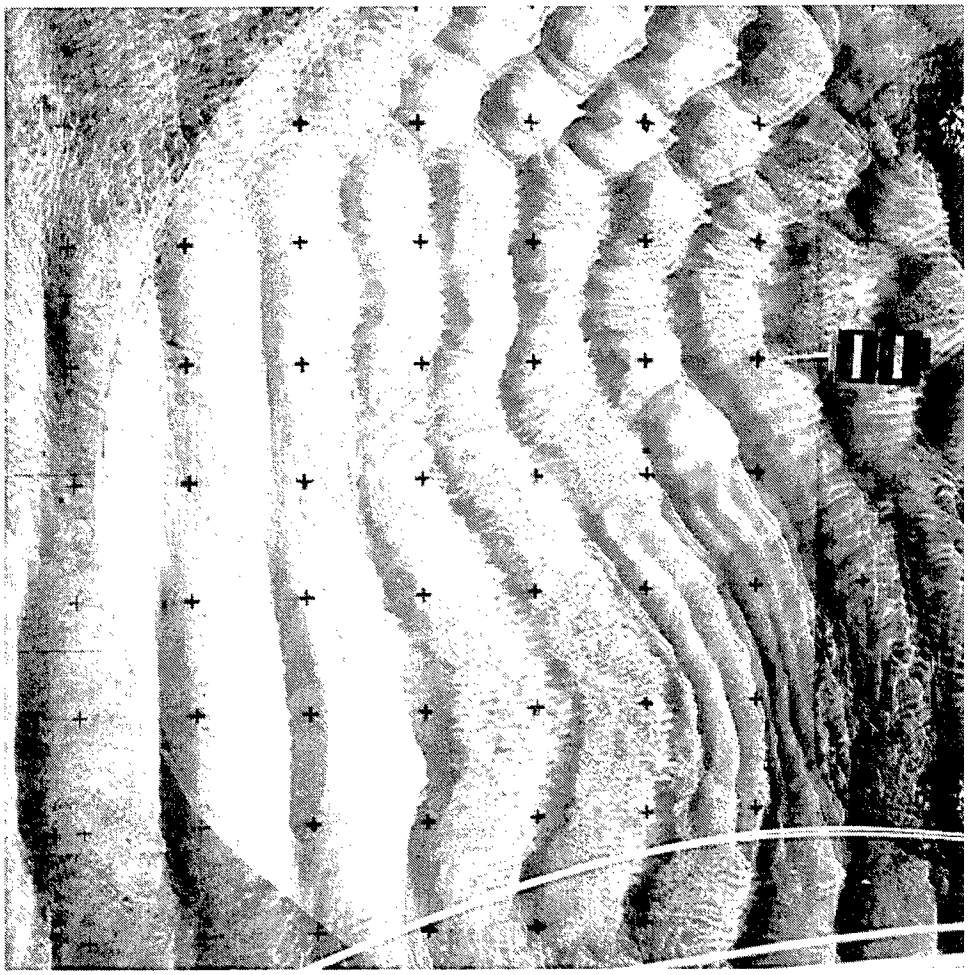


Photo 11. Wave height 5.5 cm, wave period 0.71 s (monochromatic wave), ebb current 12 cm/s

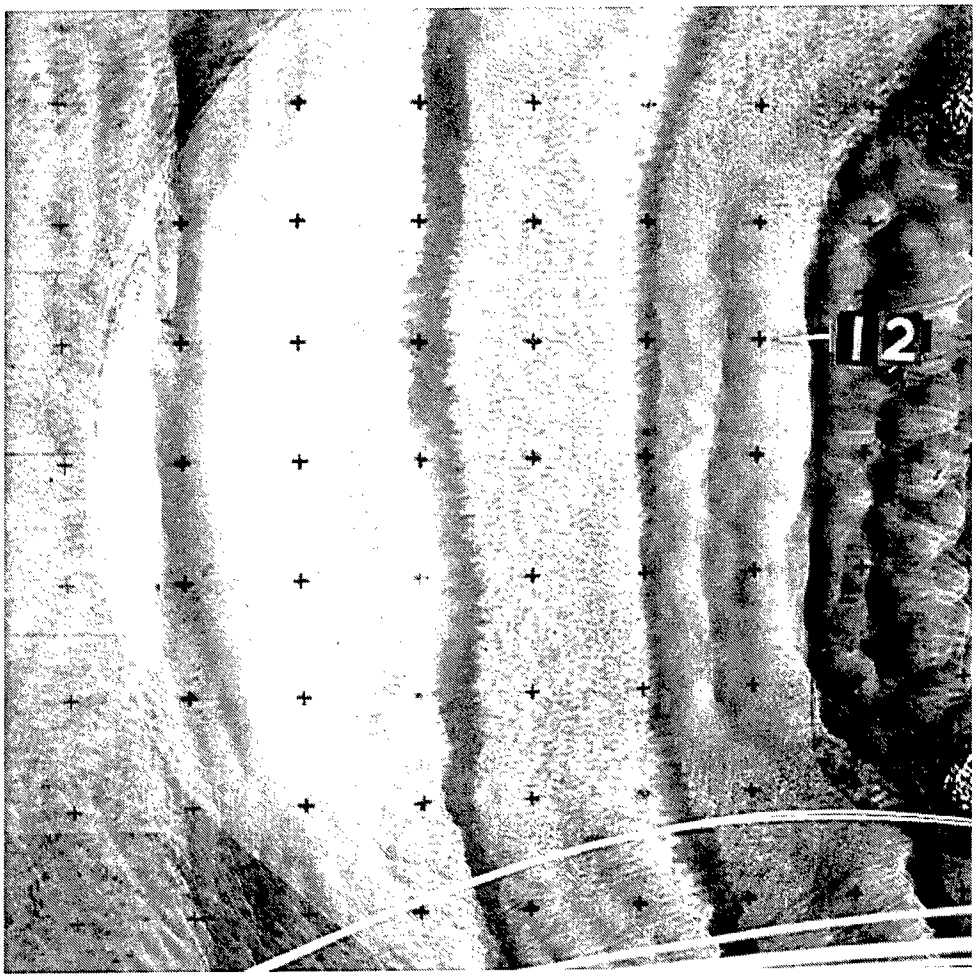


Photo 12. Wave height 5.5 cm, wave period 1.41 s (monochromatic wave), ebb current 12 cm/s

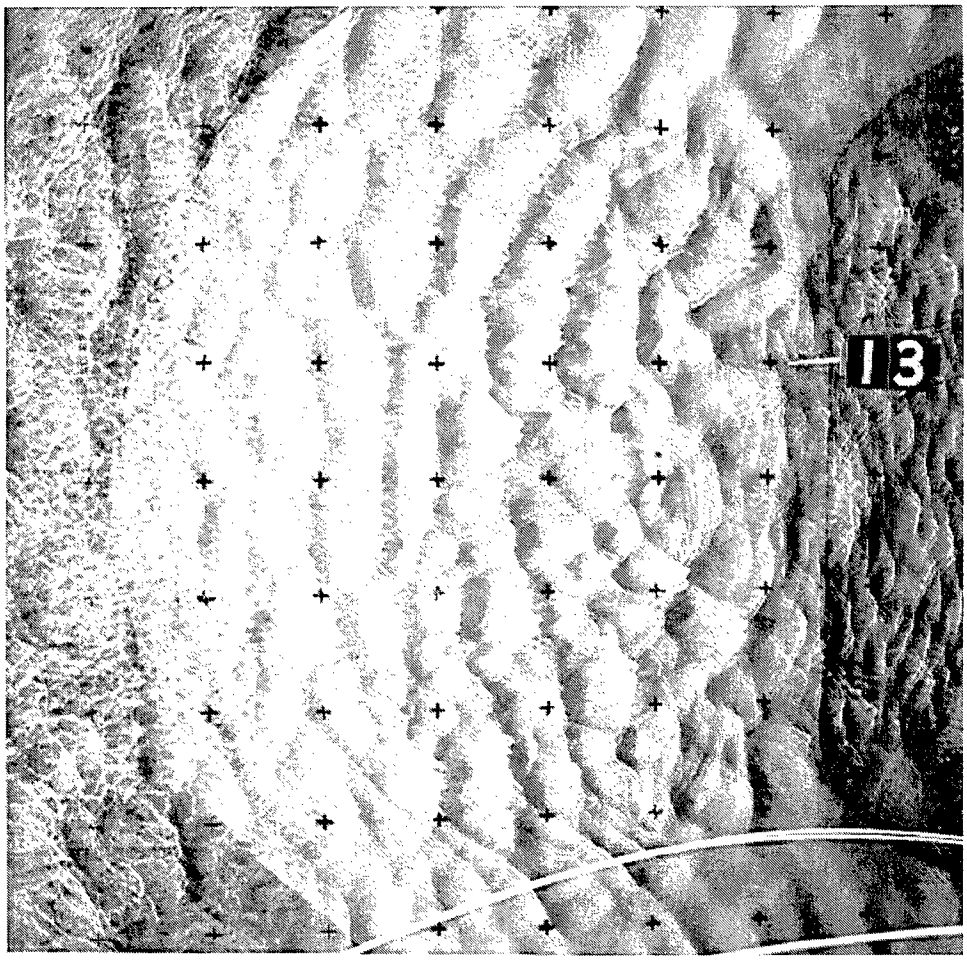


Photo 13. Wave height 3.7 cm, wave period 0.71 s (irregular wave), ebb current 24 cm/s

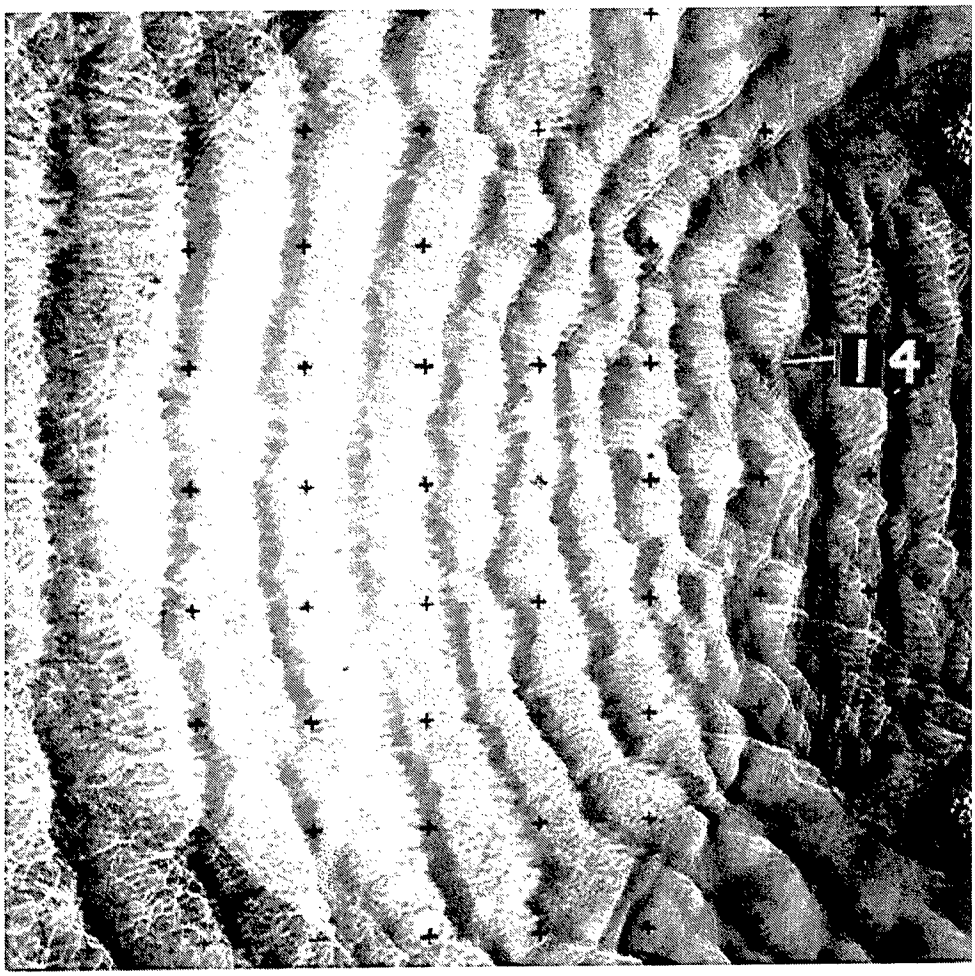


Photo 14. Wave height 5.5 cm, wave period 0.71 s (irregular wave), ebb current 24 cm/s

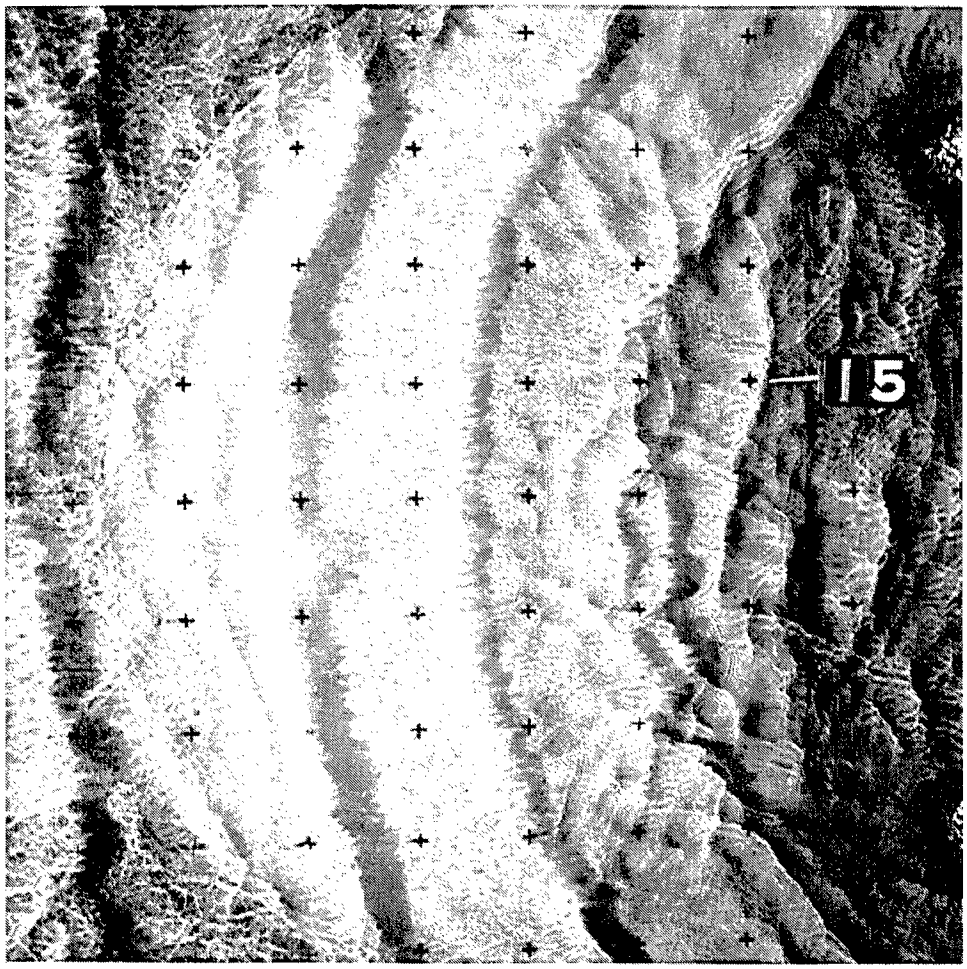


Photo 15. Wave height 3.7 cm, wave period 1.41 s (irregular wave), ebb current 12 cm/s

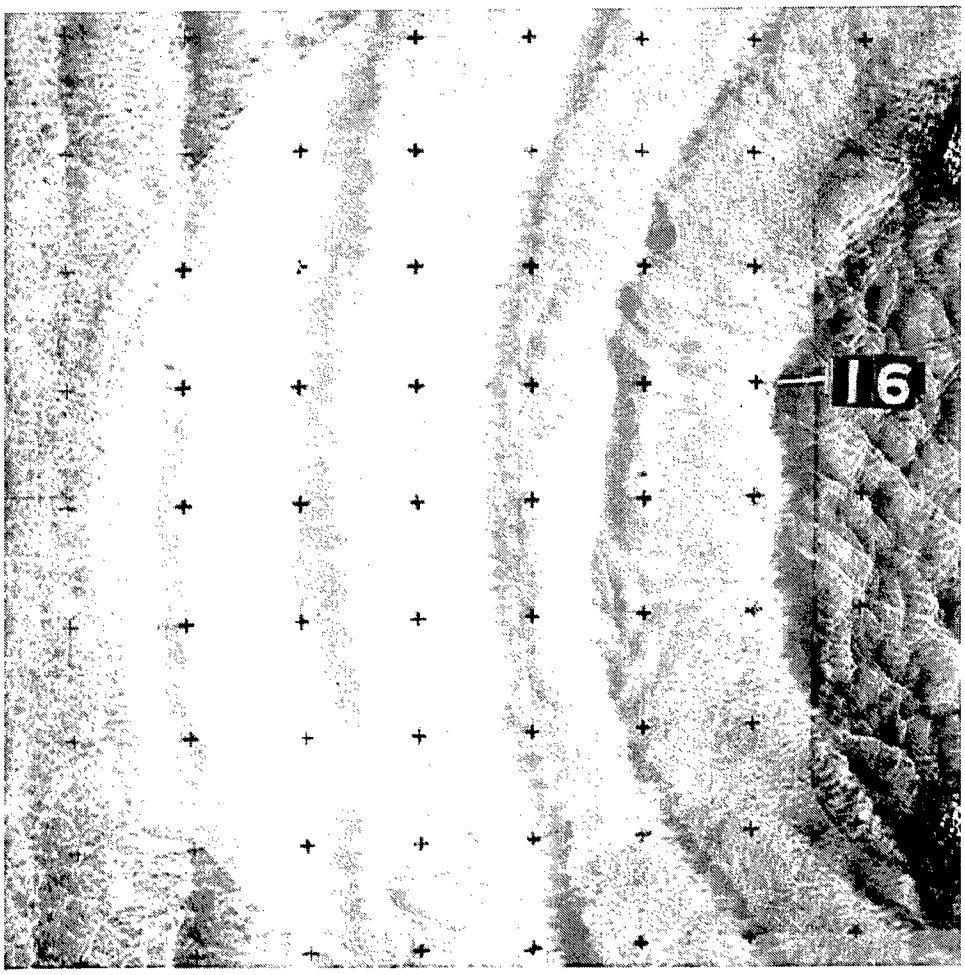


Photo 16. Wave height 5.5 cm, wave period 1.41 s (irregular wave), ebb current 24 cm/s

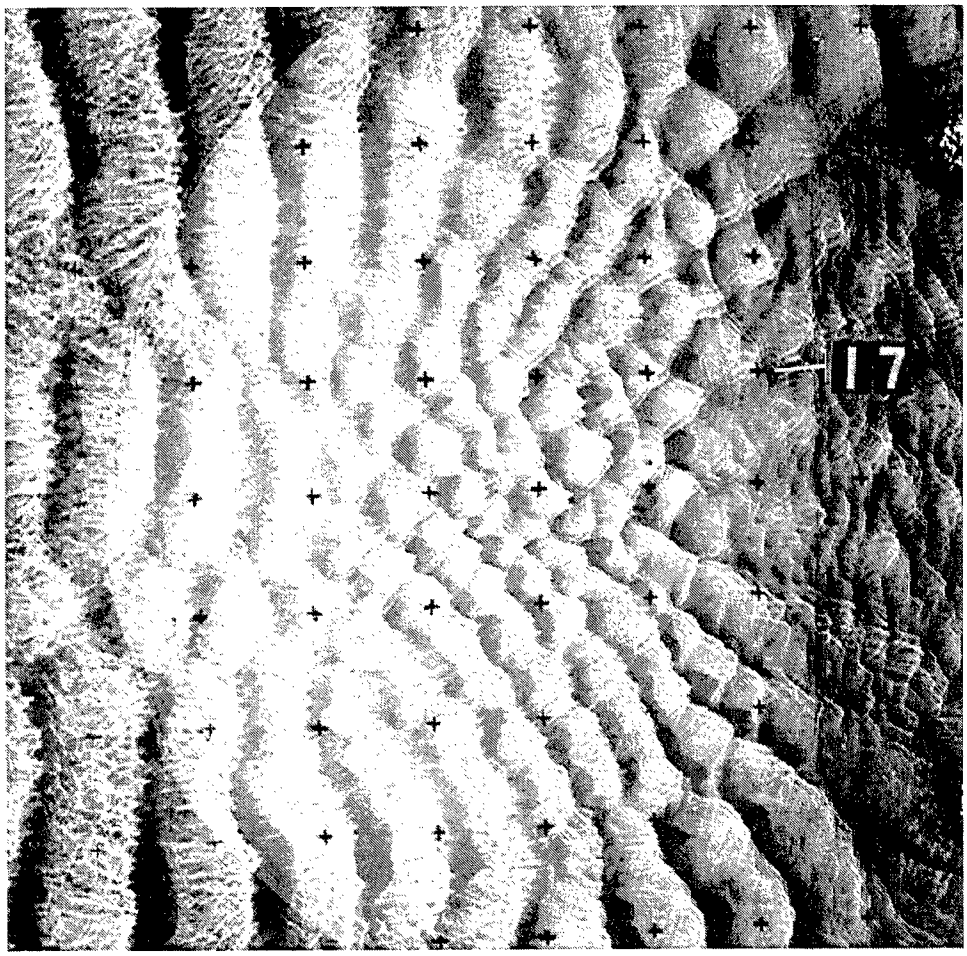
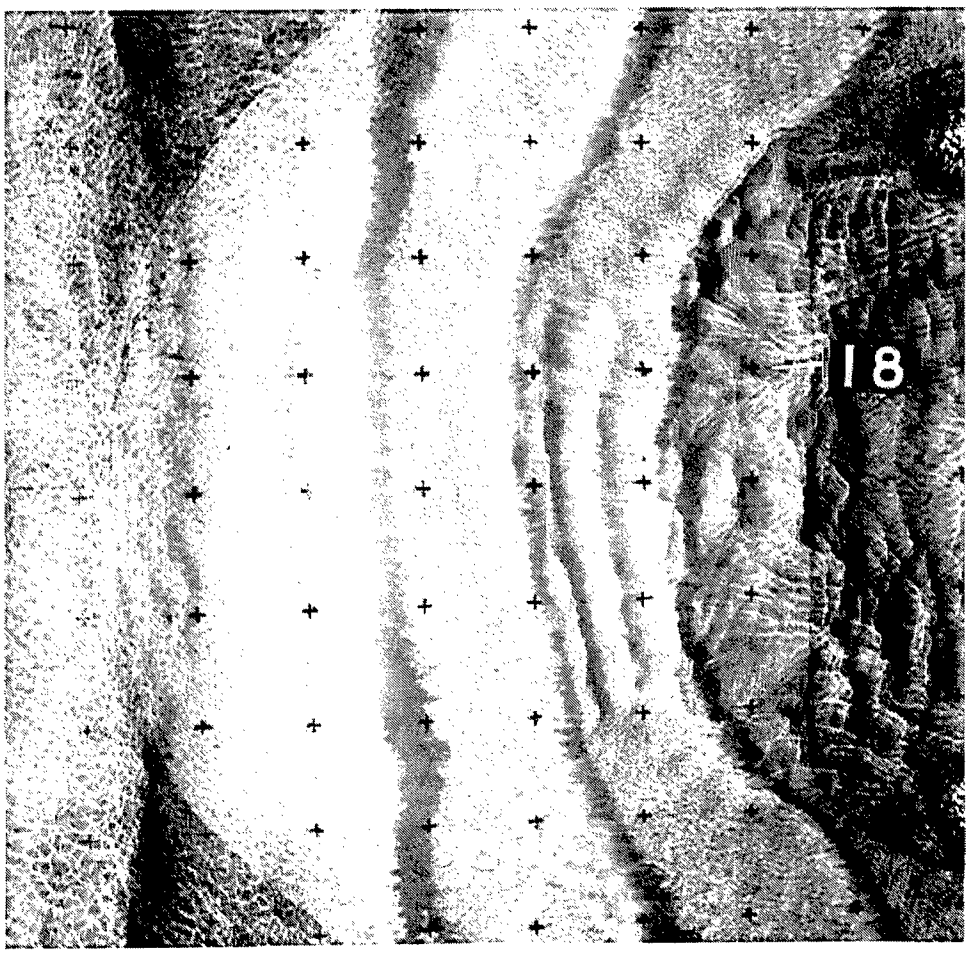


Photo 17. Wave height 5.5 cm, wave period 0.71 s (monochromatic wave), ebb current 24 cm/s



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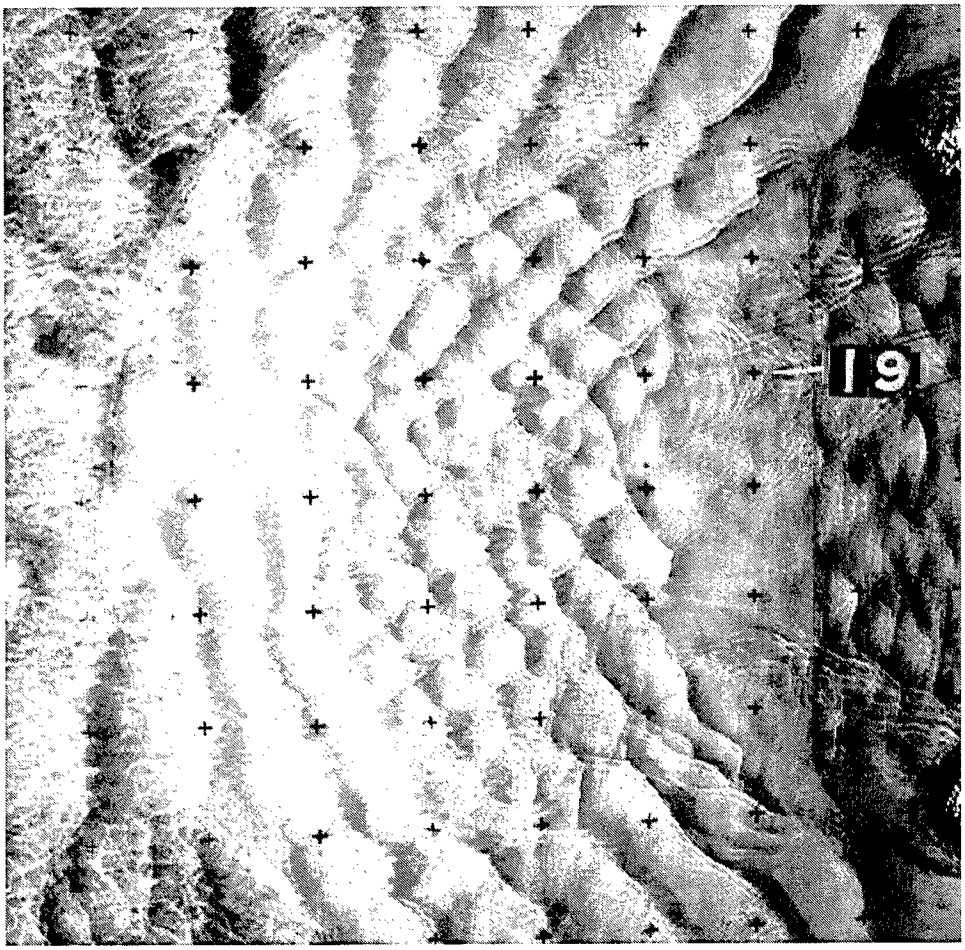

Photo 19. Wave height 5.5 cm, wave period 0.71 s (irregular wave), ebb current 32 cm/s

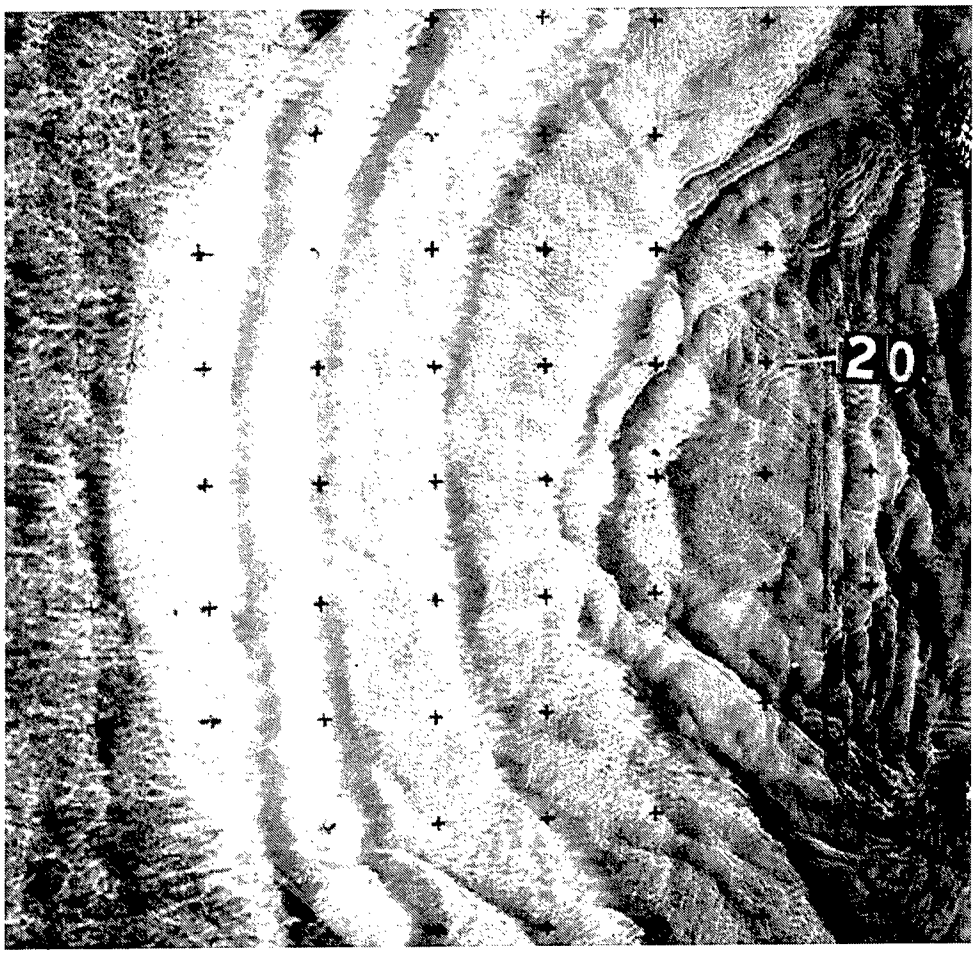

Photo 20. Wave height 5.5 cm, wave period 1.41 s (irregular wave), ebb current 32 cm/s

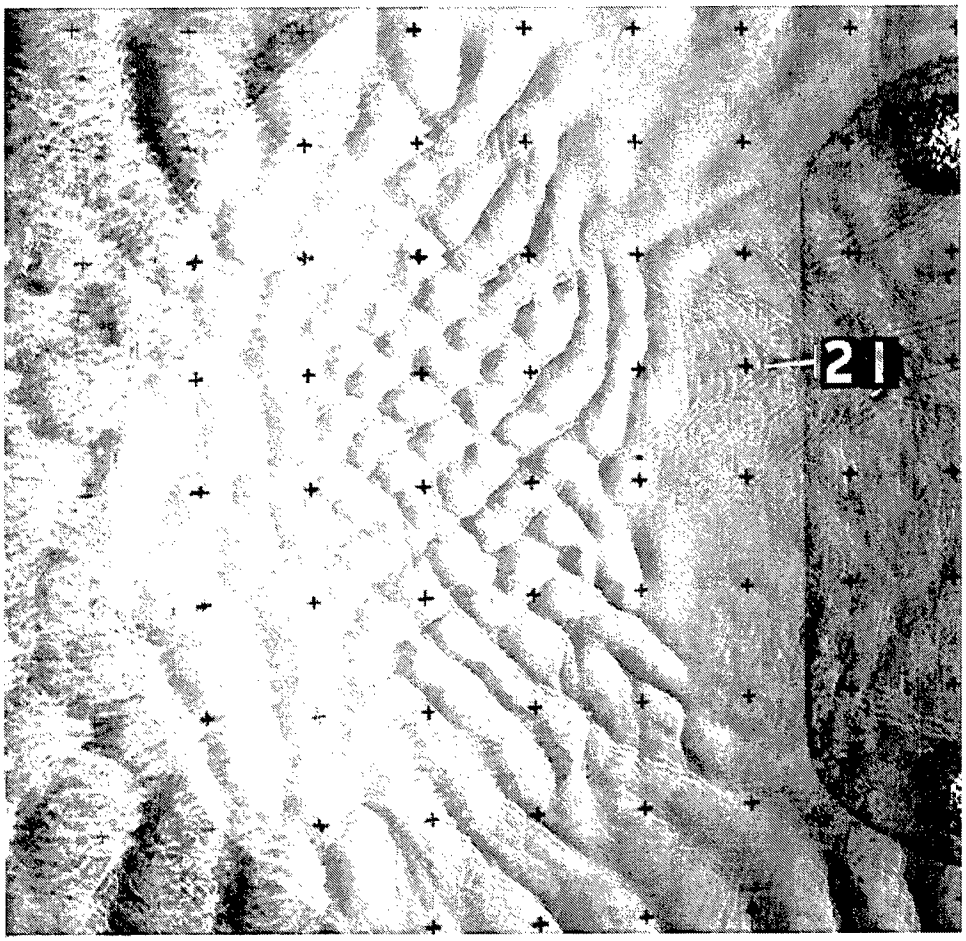

Photo 21. Wave height 5.5 cm, wave period 0.71 s (monochromatic wave), ebb current 32 cm/s

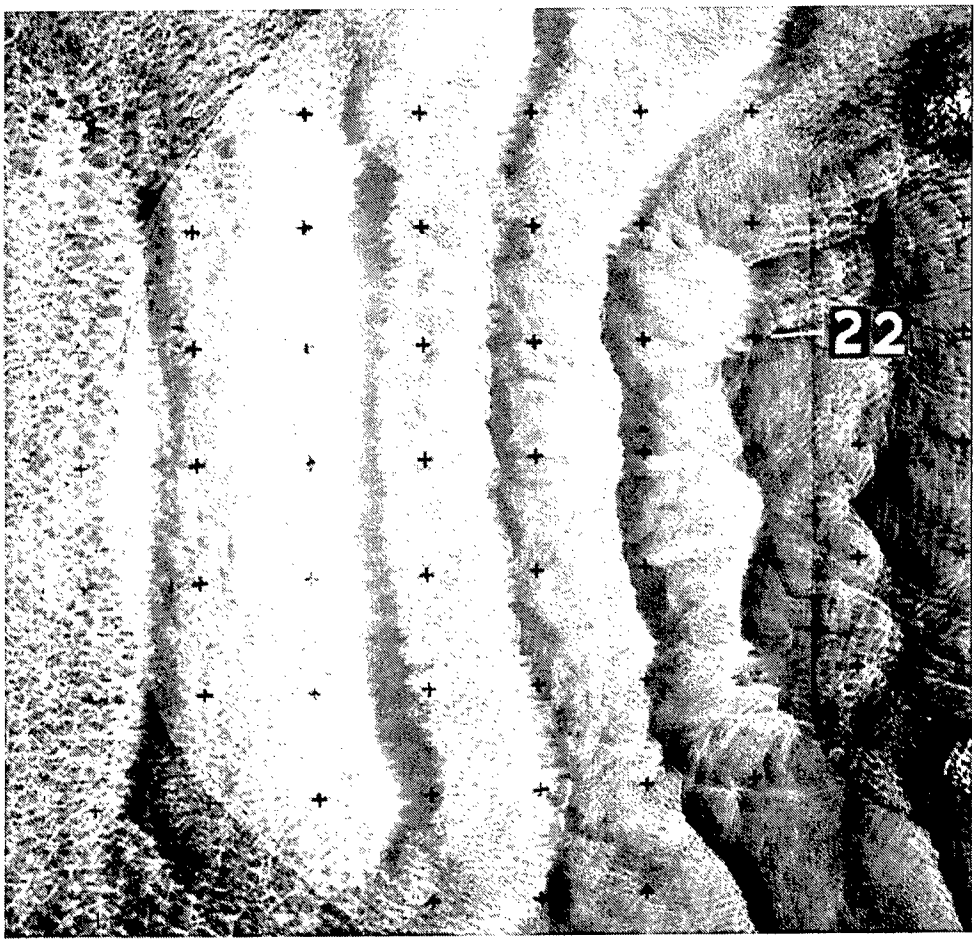

Photo 22. Wave height 5.5 cm, wave period 1.41 s (monochromatic wave), ebb current 32 cm/s

Appendix A
Notation

A	Coefficient in Equation 1, $m^{1/3}$
C	Wave celerity, cm/s
d	Still-water depth, cm
e	Average water level relative to preexperiment still-water level, cm, referenced to mean water level
g	Gravitational acceleration, m/s^2
H_b	Average wave height from down-crossing time series analysis
H_m	Maximum wave height, cm
H_{mo}	Zero-moment wave height determined from FFT, cm
H_s	Significant wave height from down-crossing time series analysis, cm
k	Wave number, m^{-1}
ℓ	Characteristic length, m
L	Airy wavelength, cm
ℓ^2	Area, m^2
ℓ^3	Volume, m^3
ℓ_m / ℓ_p	Linear scale of the model
ℓ_r	Model length scale, ℓ_m / ℓ_p
m	Model quantity
m_0	Zeroth moment of energy spectrum, cm^2
p	Prototype quantity

t	Time, s
T	Wave period, s
T_b	Average wave period from down-crossing time series analysis, s
T_p	Wave period of peak energy density of spectrum, s
T_s	Significant wave period from down-crossing time series analysis, s
U	Current velocity, cm/s (along channel component of the velocity)
u	A characteristic velocity
V	Current velocity, cm/s (the across-channel component of velocity)
V	Velocity sensor location (Figure 4)
W	Wave gauge location (Figure 4)
x	Coordinate axis, cm
η	Water surface elevation, ft (Figure 6)

Appendix B
Data Tables for Irregular Waves

Tables B1 through B47 list measurements for the irregular wave runs. Run numbers are summarized in Appendix D. For each run, the tables include the still-water depth (d), wave setup (e), zero-moment wave height (H_{mo}), peak period (T_p), mean wave height (H_m) and period (T_m), mean cross-shore (U) and alongshore velocity (V), root-mean-square cross-shore (U_{rms}) and alongshore velocity (V_{rms}), estimated wavelength (L), height-to-wavelength ratio (H/L), and height-to-depth ratio (H/d). Gauge 1 is the gauge farthest offshore (near the generator) and Gauge 12 is in the inlet throat. The gauge spacing is 122 cm between consecutive gauges for Gauges 2 to 12. The gauge locations are shown in Figure 8, as well as in Appendix F.

Table B1
Runs 55 & 113 H,cm = 3.7 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.08	3.9	0.70	2.4	0.62	3.8	0.65	0.00	0.00	0.00	0.00	77.8	0.050	0.121
2	18.9	-0.05	3.6	0.71	2.2	0.65	3.5	0.65	0.12	0.09	3.73	0.77	72.7	0.049	0.189
3	17.4	-0.03	3.4	0.73	2.1	0.65	3.4	0.65	-0.11	0.08	8.43	2.51	71.7	0.048	0.197
4	15.9	0.00	3.4	0.73	2.1	0.65	3.4	0.65	-0.51	0.13	9.17	2.47	70.6	0.048	0.215
5	7.6	-0.07	3.2	0.73	2.1	0.67	3.4	0.65	-1.46	0.44	5.74	0.95	56.4	0.057	0.425
6	7.6	-0.06	3.0	0.74	2.0	0.67	2.9	0.65	-1.94	0.46	6.12	1.04	56.8	0.052	0.390
7	9.1	-0.04	2.9	0.74	1.9	0.67	2.8	0.67	-0.85	0.19	5.41	0.80	59.8	0.049	0.319
8	10.4	-0.02	3.0	0.76	1.9	0.68	2.8	0.71	0.31	0.24	5.11	0.72	61.4	0.048	0.286
9	10.4	-0.02	3.1	0.73	2.0	0.68	2.9	0.71	0.69	0.20	5.27	0.72	61.1	0.050	0.297
10	10.7	-0.04	3.4	0.76	2.3	0.70	3.3	0.74	0.56	-0.02	5.62	0.64	61.8	0.056	0.323
11	10.4	-0.02	3.6	0.73	2.4	0.71	3.4	0.73	0.56	-0.03	5.33	0.46	61.2	0.059	0.345
12	16.2	0.00	3.1	0.73	2.0	0.70	2.9	0.72	0.63	0.02	3.75	0.34	69.7	0.044	0.191

Table B2
Runs 56 & 114 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.08	5.3	0.71	3.4	0.65	5.1	0.68	0.00	0.00	0.00	0.00	77.8	0.068	0.165
2	18.9	-0.09	4.7	0.73	3.0	0.69	4.8	0.68	-0.64	0.30	6.12	1.45	73.6	0.064	0.250
3	17.4	-0.06	4.5	0.73	2.8	0.69	4.5	0.66	-1.11	0.43	6.54	1.27	72.8	0.061	0.257
4	15.9	-0.06	4.4	0.73	2.8	0.69	4.5	0.67	-2.50	0.79	7.12	1.49	72.7	0.061	0.280
5	7.6	-0.11	3.9	0.73	2.7	0.70	4.1	0.68	-3.28	0.67	7.03	1.67	58.0	0.067	0.509
6	7.6	-0.07	3.3	0.72	2.3	0.71	3.3	0.68	-1.57	0.16	3.40	0.73	56.5	0.059	0.437
7	9.1	-0.04	3.2	0.76	2.2	0.71	3.0	0.69	-0.65	-0.19	2.96	0.62	59.6	0.054	0.349
8	10.4	-0.01	3.3	0.76	2.2	0.71	3.1	0.74	-0.43	-0.25	6.05	1.17	62.1	0.053	0.319
9	10.4	-0.01	3.3	0.73	2.2	0.72	3.1	0.75	0.46	-0.11	5.94	0.97	61.3	0.054	0.318
10	10.7	-0.02	3.6	0.84	2.5	0.74	3.5	0.77	0.41	-0.08	6.19	0.73	61.9	0.058	0.339
11	10.4	-0.01	3.8	0.73	2.6	0.74	3.7	0.76	0.35	-0.03	5.90	0.51	61.4	0.063	0.371
12	16.2	0.03	3.3	0.79	2.2	0.74	3.1	0.74	0.46	0.02	4.19	0.37	69.9	0.048	0.206

Table B3
Runs 57 & 115 H,cm = 3.6576 T,s = 1.41 wl,cm = 1.524

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L
1	32.004	-0.0709	3.618	1.3722	2.1798	0.9139	3.4876	1.11	0	0	0	0	222.75	0.0162
2	18.894	-0.1633	3.6454	1.413	2.2296	0.9643	3.5784	1.096	-1.19	0.05	7.07	0.73	181.58	0.0201
3	17.374	-0.1312	3.5814	1.413	2.1943	0.9709	3.5052	1.104	-1.825	0.205	7.165	1.18	176.13	0.0203
4	15.854	-0.0999	3.5966	1.429	2.2186	0.9793	3.4778	1.137	-2.7	0.33	6.935	1.38	170.63	0.0211
5	7.624	-0.1362	3.8039	1.429	2.6033	0.9865	4.2916	1.119	-1.47	0.15	3.305	0.565	120.98	0.0314
6	7.624	-0.1263	3.2492	1.429	2.2177	0.8563	3.4656	1.103	-0.265	0.01	2.33	0.285	119.19	0.0273
7	9.144	-0.0821	3.2542	1.455	2.1592	0.8194	3.2476	1.0485	-1.145	0.015	5.5	0.785	131.13	0.0248
8	10.364	-0.0547	3.173	1.413	2.0623	0.8435	2.9901	0.9633	-0.99	0.31	6.47	0.96	138.68	0.0229
9	10.364	-0.046	3.2065	1.429	2.0943	0.9231	3.0047	1.105	-0.01	0.51	6.365	1.005	137.2	0.0234
10	10.664	-0.054	3.2918	1.463	2.1418	0.912	3.2796	1.082	0.315	0.165	6.17	0.935	138.53	0.0238
11	10.364	-0.0124	3.1608	1.269	2.0382	0.8651	3.0724	0.9908	0.345	-0.05	5.44	0.63	136.67	0.0231
12	16.154	-0.0198	2.6963	1.463	1.723	0.8352	2.5265	0.9438	0.44	0.005	3.845	0.435	167.09	0.0161

Refer to Notation, Appendix C.

Table B4
Runs 58 & 116 H,cm = 5.4864 T,s = 1.41 wl,cm = 1.524

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L
1	32.004	-0.1652	5.5065	1.3511	3.3693	0.943	5.3845	1.119	0	0	0	0	222.75	0.0247
2	18.894	-0.0498	5.5961	1.413	3.5174	0.9869	5.6784	1.099	-4.95	1.21	9.09	2.54	187.55	0.0298
3	17.374	-0.0978	5.4498	1.429	3.4534	0.9811	5.4773	1.097	-4.77	0.84	8.305	2.115	180.76	0.0301
4	15.854	-0.1037	5.3919	1.429	3.4412	0.9973	5.3675	1.15	-2.295	0.235	3.76	0.845	169.99	0.0317
5	7.624	-0.2019	4.9652	1.429	3.5601	1.004	5.3431	1.131	-0.325	0.06	3.61	0.44	119.28	0.0416
6	7.624	-0.0816	3.6149	1.429	2.5433	0.8912	3.7521	1.109	-0.595	0.23	7.575	0.975	119.68	0.0302
7	9.144	-0.042	3.4555	1.472	2.3279	0.7889	3.5265	1.0554	-1.305	0.325	7.575	1.225	131.37	0.0263
8	10.364	-0.0401	3.4503	1.431	2.2372	0.7722	3.301	0.8943	-1.15	0.385	7.305	1.215	138.93	0.0248
9	10.364	-0.028	3.4046	1.431	2.2025	0.8203	3.304	0.9884	-0.14	0.39	7.08	1.085	137.4	0.0248
10	10.664	-0.0514	3.368	1.316	2.154	0.8441	3.3437	1.027	0.05	0.13	6.82	0.97	138.94	0.0242
11	10.364	-0.0022	3.2583	1.316	2.1266	0.8497	3.2857	0.9676	0.16	-0.005	6.1	0.695	136.95	0.0238
12	16.154	-0.0039	2.7206	1.543	1.7453	0.8139	2.6231	0.9306	0.315	0.085	4.71	0.495	167.29	0.0163

Table B5
Runs 61 & 122 H,cm = 5.4864 T,s = 1.41 wl,cm = 1.524

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.004	-0.1344	5.5479	1.3701	3.3992	0.951	5.4167	1.131	0	0	0	0	222.75	0.0249	0.1734
2	18.894	-0.0489	5.7424	1.413	3.7003	1.016	6.0168	1.106	0.77	1.28	7.2	1.11	178.44	0.0322	0.3039
3	17.374	-0.0837	5.6784	1.429	3.6119	0.9922	5.8369	1.101	0.475	1.35	7.755	1.22	172.49	0.0329	0.3268
4	15.854	-0.1133	5.6693	1.429	3.621	1.001	5.7028	1.149	-0.11	1.765	9.885	1.59	166.57	0.034	0.3576
5	7.624	-0.0695	5.1359	1.429	3.8009	1.028	5.5535	1.138	0.09	1.87	10.68	2.35	118.66	0.0433	0.6736
6	7.624	0.0746	3.5905	1.429	2.6103	0.9432	3.7033	1.114	3.19	1.435	8.795	2.225	114.05	0.0315	0.4709
7	9.144	0.0544	3.259	1.431	2.1897	0.8833	3.2705	1.0835	7.395	0.975	7	1.515	118.22	0.0276	0.3564
8	10.364	0.0673	2.8465	1.431	1.816	0.9623	2.7496	1.125	11.15	0.665	6.35	1.535	120.07	0.0237	0.2747
9	10.364	-0.0231	2.8593	1.627	1.8395	1.038	2.8051	1.262	13.68	-0.02	6.61	1.585	116.1	0.0246	0.2759
10	10.664	0.0504	3.3284	1.538	2.1589	1.066	3.2857	1.184	15.37	-0.275	7.05	1.295	115.19	0.0289	0.3121
11	10.364	0.0555	3.176	1.291	2.0766	1.036	3.1608	1.157	16.075	0.165	6.255	0.92	112.3	0.0283	0.3064
12	16.154	0.0203	2.4536	1.048	1.5417	0.9475	2.3787	1.072	15.855	-0.065	4.42	0.8	142.13	0.0173	0.1519

Table B6
Runs 62 & 121 H,cm = 3.6576 T,s = 1.41 wl,cm = 1.524

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.004	-0.1093	3.6812	1.3926	2.226	0.9377	3.5583	1.124	0	0	0	0	222.75	0.0165	0.115
2	18.894	-0.2124	4.0264	1.429	2.5448	1.002	4.1453	1.091	0.52	0.21	5.15	0.65	178.84	0.0225	0.2131
3	17.374	-0.1171	3.9898	1.429	2.5317	1.017	4.1118	1.11	0.695	0.27	5.34	0.72	172.14	0.0232	0.2296
4	15.854	-0.1373	3.9837	1.429	2.5103	1.026	4.0477	1.128	1.835	0.445	7.06	1.03	163.51	0.0244	0.2513
5	7.624	-0.1503	4.1087	1.429	2.9922	1.055	4.764	1.132	5.85	0.52	8.92	1.56	110.06	0.0373	0.5389
6	7.624	-0.111	3.3132	1.413	2.3887	0.9836	3.432	1.091	10.225	0.53	8.53	1.595	103.44	0.032	0.4346
7	9.144	-0.067	3.0771	1.43	2.0658	1.0072	2.9948	1.1115	11.175	0.59	7.035	1.46	112.41	0.0274	0.3365
8	10.364	0.0073	3.3223	1.476	2.0662	0.9717	3.304	1.169	11.66	0.665	7.48	1.77	119.27	0.0279	0.3206
9	10.364	-0.0619	4.3861	1.431	2.8142	1.045	4.6848	1.168	13.115	0.08	8.45	1.64	116.99	0.0375	0.4232
10	10.664	0.0295	3.7673	1.431	2.5061	1.115	3.8527	1.209	15.065	-0.21	7.755	1.11	115.68	0.0326	0.3533
11	10.364	0.0478	3.1913	1.323	2.1089	1.084	3.1547	1.19	15.925	0.18	6.14	0.815	112.54	0.0284	0.3079
12	16.154	0.0026	2.4094	1.466	1.5267	0.9876	2.3028	1.142	15.58	-0.255	4.035	0.745	142.59	0.0169	0.1492

Table B7
Runs 63 & 120 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.10	5.4	0.71	3.4	0.66	5.2	0.68	0.00	0.00	0.00	0.00	77.8	0.069	0.167
2	18.9	-0.20	5.0	0.76	3.1	0.70	5.1	0.67	0.49	-0.08	4.23	0.70	72.3	0.068	0.262
3	17.4	-0.13	4.8	0.73	3.0	0.70	4.9	0.67	0.45	-0.14	4.85	0.88	71.1	0.068	0.278
4	15.9	-0.10	4.8	0.73	3.0	0.71	4.9	0.68	1.48	-0.05	6.62	1.27	68.5	0.071	0.306
5	7.6	-0.18	4.0	0.76	2.8	0.72	4.0	0.68	5.83	0.29	7.52	1.63	49.9	0.080	0.523
6	7.6	-0.11	3.3	0.74	2.3	0.73	3.1	0.67	10.82	0.52	6.94	1.71	45.2	0.073	0.433
7	9.1	-0.05	3.0	0.78	2.0	0.75	2.9	0.70	12.41	0.64	6.03	1.76	46.9	0.065	0.333
8	10.4	0.02	2.9	0.73	1.8	0.73	2.9	0.75	12.59	0.75	6.23	1.93	48.9	0.060	0.281
9	10.4	-0.01	4.5	0.74	3.0	0.76	4.6	0.76	13.10	0.23	6.90	1.58	48.3	0.094	0.436
10	10.7	0.00	3.4	0.78	2.2	0.78	3.3	0.79	14.65	-0.07	6.28	1.02	47.0	0.073	0.322
11	10.4	0.01	3.0	0.80	1.9	0.79	2.9	0.79	15.42	0.20	4.80	0.75	45.6	0.066	0.292
12	16.2	0.01	2.3	0.82	1.5	0.80	2.2	0.79	15.62	-0.03	3.13	0.69	51.2	0.045	0.144

Table B8
Runs 64 & 119 H,cm = 3.7 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.01	3.9	0.71	2.5	0.62	3.8	0.64	0.00	0.00	0.00	0.00	77.8	0.050	0.123
2	18.9	0.05	4.2	0.73	2.6	0.69	4.3	0.65	3.06	0.21	3.19	0.61	69.3	0.060	0.220
3	17.4	0.02	3.9	0.73	2.4	0.69	3.9	0.66	3.22	0.18	3.64	0.76	68.0	0.057	0.224
4	15.9	0.04	3.8	0.73	2.4	0.70	3.9	0.66	4.60	0.18	5.04	1.17	65.0	0.058	0.239
5	7.6	0.04	3.4	0.74	2.3	0.70	3.5	0.65	8.34	0.27	6.04	1.37	47.6	0.072	0.451
6	7.6	0.02	3.1	0.76	2.1	0.73	3.0	0.65	11.99	0.42	6.08	1.35	44.0	0.071	0.411
7	9.1	-0.01	3.0	0.74	2.0	0.73	2.9	0.68	12.37	0.49	5.85	1.56	47.0	0.064	0.329
8	10.4	-0.04	3.0	0.73	1.9	0.72	3.0	0.73	11.85	0.49	6.71	1.72	49.8	0.061	0.293
9	10.4	-0.07	4.3	0.76	2.9	0.75	4.3	0.75	12.64	0.01	6.99	1.32	48.9	0.089	0.420
10	10.7	0.00	3.1	0.84	2.0	0.77	2.9	0.77	14.58	-0.23	5.60	0.82	47.1	0.065	0.289
11	10.4	0.01	2.6	0.84	1.6	0.77	2.5	0.77	15.43	0.06	4.09	0.65	45.6	0.056	0.248
12	16.2	-0.01	2.0	0.84	1.2	0.79	1.9	0.78	15.51	-0.31	2.70	0.61	51.4	0.038	0.121

Table B9
Runs 67 & 125 H,cm = 3.7 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.33	4.0	0.71	2.5	0.64	3.9	0.64	0.00	0.00	0.00	0.00	77.8	0.051	0.125
2	18.9	-0.25	5.0	0.80	3.1	0.70	5.3	0.66	13.51	-0.08	4.62	2.35	55.7	0.091	0.267
3	17.4	-0.22	4.1	0.78	2.5	0.68	4.2	0.68	12.89	-0.11	4.78	2.63	55.8	0.073	0.236
4	15.9	-0.21	4.1	0.71	2.5	0.68	4.1	0.69	14.69	0.22	6.10	3.31	52.4	0.078	0.257
5	7.6	-0.41	3.2	0.85	2.2	0.72	3.1	0.67	19.92	0.49	6.28	3.04	35.1	0.092	0.421
6	7.6	-0.32	2.7	0.83	1.7	0.72	2.7	0.65	24.82	0.53	5.36	3.01	27.5	0.098	0.353
7	9.1	-0.26	2.4	0.83	1.4	0.77	2.4	0.71	23.55	0.59	4.51	3.07	32.3	0.076	0.267
8	10.4	-0.26	1.4	0.89	0.9	0.82	1.4	0.84	21.74	0.42	3.15	1.86	36.9	0.039	0.139
9	10.4	-0.25	1.0	0.87	0.6	0.85	1.0	0.86	23.55	-0.69	2.56	1.13	33.7	0.029	0.094
10	10.7	-0.25	1.0	0.90	0.6	0.84	0.9	0.85	25.87	-0.89	2.38	0.95	28.8	0.034	0.090
11	10.4	-0.27	1.1	0.81	0.7	0.84	1.1	0.84	26.63	-0.07	2.33	0.86	26.1	0.043	0.110
12	16.2	-0.12	0.5	0.89	0.3	0.88	0.5	0.90	25.95	-0.78	2.14	0.86	30.5	0.017	0.031

Table B10
Runs 68 & 126 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.36	5.4	0.71	3.4	0.66	5.2	0.67	0.00	0.00	0.00	0.00	77.8	0.069	0.168
2	18.9	-0.34	5.8	0.76	3.7	0.74	5.9	0.68	6.68	-0.11	6.02	1.39	64.9	0.089	0.307
3	17.4	-0.34	5.4	0.82	3.5	0.74	5.4	0.68	6.67	-0.09	6.56	1.61	63.9	0.085	0.313
4	15.9	-0.33	5.4	0.82	3.5	0.75	5.4	0.69	9.77	0.14	8.67	2.71	58.9	0.092	0.343
5	7.6	-0.41	3.6	0.80	2.5	0.76	3.4	0.68	16.77	0.41	8.22	2.88	38.9	0.092	0.471
6	7.6	-0.31	3.1	0.83	2.1	0.77	3.0	0.68	23.38	0.55	6.34	2.58	30.1	0.102	0.401
7	9.1	-0.22	3.9	0.79	2.5	0.78	3.9	0.72	22.84	0.63	5.68	2.86	33.5	0.117	0.429
8	10.4	-0.25	2.1	0.84	1.3	0.85	2.1	0.88	21.34	0.53	4.16	2.04	37.5	0.055	0.200
9	10.4	-0.21	1.4	0.84	0.9	0.88	1.4	0.89	23.44	-0.61	3.27	1.25	33.9	0.042	0.136
10	10.7	-0.22	1.5	0.85	0.9	0.86	1.5	0.87	25.84	-0.88	3.09	1.06	28.9	0.051	0.137
11	10.4	-0.25	1.7	0.85	1.0	0.86	1.7	0.85	26.66	-0.12	2.87	0.92	26.1	0.064	0.161
12	16.2	-0.08	0.8	0.84	0.5	0.90	0.8	0.92	26.20	-0.92	2.24	0.88	29.7	0.028	0.052

Table B11
Runs 69 & 127 H,cm = 3.7 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.37	3.7	1.38	2.3	0.94	3.6	1.13	0.00	0.00	0.00	0.00	222.8	0.017	0.117
2	18.9	-0.27	5.3	1.43	3.3	0.97	5.4	1.09	5.22	-0.08	7.42	1.50	171.2	0.031	0.283
3	17.4	-0.28	5.1	1.41	3.2	0.99	5.1	1.12	5.09	-0.13	7.96	1.65	165.1	0.031	0.294
4	15.9	-0.34	5.1	1.41	3.2	0.97	5.1	1.12	7.80	0.11	10.34	2.36	154.0	0.033	0.322
5	7.6	-0.44	4.3	1.41	3.0	1.02	4.4	1.12	15.63	0.37	10.07	2.40	95.1	0.045	0.559
6	7.6	-0.30	3.3	1.42	2.3	1.08	3.4	1.11	23.24	0.44	8.06	2.15	83.1	0.039	0.429
7	9.1	-0.23	3.2	1.41	2.1	1.07	3.3	1.19	22.96	0.77	8.37	2.69	93.7	0.034	0.349
8	10.4	-0.28	4.1	1.52	2.7	1.29	4.2	1.40	21.74	0.84	8.48	2.28	103.1	0.040	0.400
9	10.4	-0.23	3.1	1.55	2.1	1.30	3.3	1.41	23.82	-0.46	7.29	1.45	99.7	0.031	0.302
10	10.7	-0.25	2.4	1.25	1.6	1.22	2.5	1.41	26.49	-0.82	5.95	1.17	96.9	0.025	0.226
11	10.4	-0.28	2.4	1.19	1.6	1.23	2.3	1.38	27.55	-0.04	4.94	0.99	93.3	0.025	0.229
12	16.2	-0.08	1.5	1.55	1.0	1.22	1.5	1.41	26.97	-0.81	3.47	0.90	122.8	0.013	0.096

Table B12
Runs 70 & 128 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.44	5.6	1.38	3.4	0.95	5.4	1.12	0.00	0.00	0.00	0.00	222.8	0.025	0.174
2	18.9	-0.41	5.9	1.41	3.8	1.01	6.2	1.10	2.66	-0.05	8.19	1.51	175.4	0.034	0.313
3	17.4	-0.42	5.8	1.43	3.7	1.01	5.8	1.10	3.01	0.08	8.89	1.63	168.5	0.034	0.333
4	15.9	-0.44	5.7	1.41	3.7	1.04	5.7	1.14	6.58	0.55	11.55	2.36	156.0	0.037	0.360
5	7.6	-0.49	4.5	1.43	3.2	1.07	4.6	1.12	15.06	0.78	10.88	2.49	96.0	0.047	0.587
6	7.6	-0.31	3.3	1.43	2.4	1.11	3.5	1.11	22.87	0.66	8.47	2.18	83.7	0.040	0.434
7	9.1	-0.22	3.0	1.31	2.0	1.07	3.2	1.24	22.79	0.94	8.54	3.15	94.0	0.032	0.329
8	10.4	-0.22	4.2	1.64	2.8	1.29	4.4	1.48	21.98	1.05	8.69	3.07	102.7	0.041	0.404
9	10.4	-0.26	3.4	1.45	2.3	1.40	3.7	1.62	24.22	-0.27	8.00	1.82	99.0	0.034	0.328
10	10.7	-0.25	2.7	2.61	1.8	1.31	2.9	1.65	26.72	-0.61	6.74	1.32	96.5	0.028	0.253
11	10.4	-0.28	2.6	2.24	1.7	1.29	2.7	1.54	27.48	0.21	5.59	1.10	93.4	0.027	0.247
12	16.2	-0.13	1.7	1.57	1.1	1.27	1.7	1.63	26.66	-0.54	4.15	0.98	123.4	0.013	0.103

Table B13
Runs 91 & 131 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.27	5.4	0.72	3.5	0.67	5.3	0.66	0.00	0.00	0.00	0.00	77.8	0.070	0.169
2	18.9	0.20	6.2	0.82	3.9	0.74	6.4	0.68	19.02	0.15	6.32	3.54	46.8	0.133	0.330
3	17.4	-0.02	5.4	0.75	3.4	0.73	5.4	0.70	18.33	0.22	6.34	3.86	47.5	0.113	0.309
4	15.9	0.02	5.0	0.83	3.1	0.71	5.0	0.72	20.98	0.60	7.62	4.56	42.3	0.118	0.315
5	7.6	0.11	2.9	0.85	1.9	0.78	2.7	0.69	28.53	1.28	7.05	4.33	-	-	0.375
6	7.6	0.03	3.1	0.77	1.9	0.76	3.0	0.67	34.37	1.45	4.92	4.18	-	-	0.408
7	9.1	-0.19	1.3	0.74	0.8	0.82	1.3	0.77	31.96	0.80	3.87	3.70	-	-	0.145
8	10.4	-0.36	0.8	0.82	0.5	0.96	0.8	0.98	29.43	0.27	2.73	1.95	-	-	0.077
9	10.4	-0.37	0.5	0.80	0.3	1.10	0.5	1.34	30.98	-1.07	2.36	1.08	-	-	0.045
10	10.7	-0.36	0.5	0.88	0.3	1.12	0.5	1.30	34.05	-1.21	2.27	0.97	-	-	0.043
11	10.4	-0.42	0.4	1.23	0.3	1.55	0.4	1.86	35.20	-0.09	2.19	0.93	-	-	0.039
12	16.2	-0.18	0.1	3.16	0.1	1.87	0.2	3.29	34.74	-1.08	1.92	0.94	-	-	0.009

Table B14
Runs 92 & 132 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.34	5.6	1.38	3.5	0.94	5.5	1.12	0.00	0.00	0.00	0.00	222.8	0.025	0.176
2	18.9	0.19	6.7	1.41	4.3	1.01	6.9	1.09	7.98	0.36	9.49	1.88	166.7	0.040	0.355
3	17.4	-0.09	6.5	1.43	4.1	0.99	6.5	1.07	8.09	0.39	10.11	2.16	160.3	0.040	0.373
4	15.9	-0.16	6.3	1.43	4.1	1.01	6.4	1.12	12.61	0.74	13.02	3.56	146.2	0.043	0.399
5	7.6	0.15	4.0	1.43	2.8	1.11	4.0	1.11	22.25	1.28	12.14	3.55	84.7	0.048	0.529
6	7.6	0.14	3.3	1.57	2.3	1.21	3.6	1.11	31.28	1.35	9.24	2.89	69.4	0.047	0.429
7	9.1	-0.16	3.7	1.44	2.6	1.38	4.1	1.44	30.81	1.03	9.04	3.32	80.3	0.047	0.409
8	10.4	-0.33	2.6	3.07	1.8	1.66	2.9	2.17	28.66	0.72	7.79	2.49	91.4	0.028	0.247
9	10.4	-0.35	2.1	3.26	1.3	1.52	2.3	2.00	31.15	-0.75	6.50	1.56	87.0	0.024	0.200
10	10.7	-0.35	1.9	1.64	1.3	1.37	2.0	1.75	34.43	-1.04	5.78	1.33	82.5	0.024	0.182
11	10.4	-0.45	2.0	1.37	1.3	1.58	2.1	1.81	35.67	0.01	4.87	1.16	78.4	0.025	0.190
12	16.2	-0.15	1.0	1.55	0.7	1.74	1.1	2.38	35.00	-1.01	3.66	1.03	107.5	0.009	0.061

Table B15
Runs 73 & 95 H,cm = 3.7 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.03	3.9	0.71	2.4	0.62	3.8	0.65	0.00	0.00	0.00	0.00	77.8	0.050	0.121
2	18.9	-0.03	3.5	0.72	2.2	0.64	3.5	0.65	0.10	0.12	3.09	0.49	72.8	0.048	0.186
3	17.4	0.01	3.4	0.73	2.1	0.65	3.4	0.65	0.06	0.12	4.57	1.06	71.5	0.048	0.196
4	15.9	0.03	3.4	0.73	2.1	0.65	3.4	0.65	-0.28	0.10	5.54	1.17	70.3	0.049	0.215
5	7.6	0.00	3.3	0.71	2.1	0.66	3.4	0.65	-0.96	0.20	5.59	0.97	56.0	0.058	0.427
6	7.6	0.01	3.0	0.74	2.0	0.66	2.9	0.65	-1.11	0.46	6.41	1.12	56.1	0.053	0.391
7	8.8	-0.01	3.2	0.76	2.1	0.67	3.0	0.67	-0.42	0.39	5.80	0.85	58.7	0.054	0.358
8	10.4	0.00	3.1	0.73	2.0	0.68	2.9	0.70	0.38	0.25	5.22	0.72	61.3	0.050	0.297
9	10.4	-0.01	3.3	0.73	2.2	0.69	3.2	0.72	0.75	0.11	5.60	0.68	61.0	0.054	0.319
10	10.5	0.01	3.1	0.73	2.1	0.69	3.0	0.70	0.65	-0.05	5.34	0.61	61.4	0.051	0.298
11	10.2	-0.01	2.8	0.73	1.8	0.70	2.7	0.71	0.40	0.03	4.52	0.66	61.0	0.047	0.278
12	14.3	0.00	2.6	0.73	1.7	0.71	2.4	0.71	0.47	0.03	3.41	0.46	67.7	0.038	0.181

Table B16
Runs 74 & 96 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.05	5.3	0.71	3.4	0.65	5.2	0.67	0.00	0.00	0.00	0.00	77.8	0.068	0.166
2	18.9	-0.06	4.6	0.73	2.8	0.69	4.6	0.68	-0.73	0.55	4.29	0.71	73.7	0.062	0.242
3	17.4	-0.02	4.5	0.73	2.8	0.69	4.5	0.67	-0.68	0.47	5.17	0.90	72.3	0.062	0.260
4	15.9	-0.01	4.5	0.74	2.8	0.69	4.5	0.67	-1.08	0.37	6.49	1.14	71.2	0.063	0.285
5	7.6	-0.05	4.0	0.73	2.7	0.70	4.3	0.67	-2.13	0.50	7.05	1.56	57.0	0.071	0.528
6	7.6	-0.01	3.4	0.74	2.4	0.70	3.4	0.67	-2.38	0.83	7.37	1.75	57.2	0.060	0.449
7	8.8	-0.03	3.6	0.75	2.4	0.71	3.4	0.69	-1.68	0.84	6.80	1.40	59.8	0.060	0.406
8	10.4	-0.02	3.5	0.74	2.3	0.70	3.2	0.72	-0.55	0.40	6.08	1.15	62.2	0.056	0.333
9	10.4	-0.03	3.5	0.76	2.4	0.72	3.3	0.74	0.38	-0.03	6.17	0.95	61.4	0.058	0.342
10	10.5	0.02	3.4	0.76	2.3	0.72	3.1	0.73	0.44	-0.16	5.74	0.75	61.6	0.055	0.322
11	10.2	0.01	2.8	0.76	1.8	0.72	2.6	0.73	0.25	-0.07	4.57	0.69	61.2	0.045	0.270
12	14.3	0.04	2.3	0.74	1.6	0.74	2.2	0.75	0.15	0.01	3.52	0.52	68.1	0.034	0.163

Table B17
Runs 75 & 97 H,cm = 3.7 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.03	3.6	1.37	2.2	0.91	3.5	1.12	0.00	0.00	0.00	0.00	222.8	0.016	0.113
2	18.9	-0.05	3.5	1.41	2.2	0.98	3.5	1.11	-0.57	0.37	4.66	0.55	180.6	0.020	0.186
3	17.4	-0.03	3.5	1.41	2.1	0.99	3.4	1.13	-0.69	0.37	5.64	1.00	174.3	0.020	0.200
4	15.9	-0.01	3.5	1.43	2.2	0.99	3.4	1.13	-1.04	0.38	6.70	1.12	168.0	0.021	0.223
5	7.6	-0.08	3.8	1.41	2.6	1.03	4.3	1.12	-1.36	0.40	7.07	1.28	120.8	0.032	0.501
6	7.6	-0.05	3.3	1.41	2.2	0.86	3.5	1.11	-1.74	0.75	7.29	1.61	121.4	0.027	0.434
7	8.8	-0.02	3.4	1.06	2.2	0.81	3.4	1.04	-1.59	1.10	6.79	1.27	129.8	0.026	0.383
8	10.4	-0.02	3.4	1.43	2.2	0.82	3.2	0.94	-0.60	0.86	6.59	0.99	138.1	0.025	0.328
9	10.4	-0.02	3.6	1.43	2.3	0.83	3.4	0.97	0.04	0.33	6.64	1.00	137.1	0.026	0.343
10	10.5	0.03	3.3	1.46	2.1	0.78	3.2	0.89	-0.02	-0.08	6.04	1.11	138.1	0.024	0.313
11	10.2	0.03	2.8	1.35	1.8	0.81	2.7	0.95	-0.25	-0.16	5.03	1.10	136.6	0.020	0.273
12	14.3	0.07	2.4	1.27	1.6	0.79	2.3	0.88	-0.17	-0.06	3.75	0.69	159.3	0.015	0.171

Table B18
Runs 76 & 98 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.13	5.5	1.35	3.4	0.94	5.4	1.13	0.00	0.00	0.00	0.00	222.8	0.025	0.173
2	18.9	-0.06	5.4	1.41	3.4	0.99	5.5	1.10	-0.51	0.18	6.92	0.82	180.5	0.030	0.288
3	17.4	-0.10	5.4	1.41	3.4	0.98	5.4	1.09	-0.63	0.17	7.78	1.21	174.2	0.031	0.309
4	15.9	-0.15	5.5	1.43	3.4	1.00	5.4	1.14	-1.38	0.19	9.52	1.44	168.6	0.032	0.345
5	7.6	-0.23	5.3	1.41	3.8	1.05	5.7	1.14	-3.36	0.32	9.86	2.10	123.8	0.043	0.695
6	7.6	-0.11	3.8	1.43	2.7	0.92	3.9	1.11	-4.79	1.11	8.65	2.51	125.9	0.030	0.495
7	8.8	-0.02	3.6	1.43	2.4	0.79	3.6	1.04	-3.26	1.46	7.64	1.88	132.3	0.027	0.406
8	10.4	0.02	3.6	1.43	2.3	0.77	3.4	0.87	-0.49	0.93	7.31	1.43	137.9	0.026	0.346
9	10.4	0.07	3.6	1.43	2.3	0.80	3.5	0.91	0.61	0.53	7.11	1.28	136.3	0.026	0.347
10	10.5	0.11	3.4	1.54	2.2	0.79	3.3	0.88	0.46	0.18	6.66	1.32	137.4	0.024	0.319
11	10.2	0.10	2.9	1.32	1.9	0.81	2.8	0.92	0.45	0.08	5.79	1.25	135.6	0.022	0.285
12	14.3	0.16	2.5	1.32	1.6	0.81	2.4	0.94	0.60	0.12	4.62	0.82	158.1	0.016	0.173

Table B19
Runs 82 & 104 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.12	5.6	1.37	3.4	0.95	5.4	1.13	0.00	0.00	0.00	0.00	222.8	0.025	0.174
2	18.9	-0.04	5.9	1.43	3.7	1.00	6.1	1.10	0.57	0.53	7.49	1.46	178.8	0.033	0.310
3	17.4	-0.05	5.7	1.41	3.6	0.98	5.8	1.06	0.37	0.63	8.09	1.57	172.7	0.033	0.331
4	15.9	-0.14	5.8	1.43	3.7	1.00	5.8	1.14	-0.03	0.93	9.95	1.80	166.4	0.035	0.364
5	7.6	-0.13	5.4	1.43	4.0	1.05	5.9	1.14	1.49	2.86	10.66	2.55	116.6	0.047	0.715
6	7.6	0.03	3.7	1.43	2.7	0.97	3.8	1.11	5.62	4.36	9.45	2.51	110.4	0.034	0.489
7	8.8	0.08	3.5	1.43	2.3	0.90	3.5	1.06	8.04	3.21	7.68	1.73	115.3	0.030	0.392
8	10.4	0.08	3.2	1.54	2.1	0.92	3.1	1.04	10.09	1.57	8.32	2.08	121.7	0.026	0.309
9	10.4	0.05	3.4	1.28	2.2	0.97	3.4	1.07	12.51	0.34	12.42	3.15	118.0	0.029	0.329
10	10.5	0.10	3.0	1.54	1.9	0.99	2.9	1.12	12.92	0.25	10.18	2.57	118.2	0.025	0.283
11	10.2	0.10	2.9	1.62	1.9	0.99	2.8	1.08	13.37	1.96	5.35	1.41	115.7	0.025	0.279
12	14.3	0.11	2.4	0.92	1.5	0.94	2.3	1.09	14.11	1.00	7.38	1.95	136.6	0.017	0.166

Table B20
Runs 81 & 103 H,cm = 3.7 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	0.00	3.7	1.40	2.2	0.93	3.6	1.12	0.00	0.00	0.00	0.00	222.8	0.017	0.115
2	18.9	0.02	4.1	1.43	2.6	0.99	4.2	1.11	0.21	-0.13	5.29	1.07	179.3	0.023	0.220
3	17.4	0.04	4.1	1.41	2.6	1.00	4.1	1.13	0.25	0.06	5.85	1.00	172.9	0.024	0.238
4	15.9	0.05	4.2	1.41	2.6	1.01	4.2	1.14	1.60	0.61	7.56	1.23	163.9	0.026	0.267
5	7.6	0.02	4.5	1.41	3.2	1.04	5.2	1.13	5.98	1.67	8.64	1.79	109.9	0.041	0.595
6	7.6	0.04	3.4	1.41	2.4	0.98	3.4	1.10	11.38	2.47	8.28	1.87	101.7	0.033	0.442
7	8.8	0.04	3.1	1.42	2.1	0.99	3.0	1.11	10.89	1.87	7.80	1.94	110.9	0.028	0.345
8	10.4	-0.01	3.7	1.43	2.4	0.95	3.7	1.09	9.91	1.03	7.36	2.45	122.0	0.031	0.361
9	10.4	-0.03	2.9	1.43	1.9	0.99	2.8	1.15	11.71	0.51	6.40	2.35	119.2	0.024	0.280
10	10.5	0.02	2.7	1.52	1.8	1.03	2.7	1.20	11.54	0.50	5.23	1.72	120.4	0.023	0.259
11	10.2	0.02	2.6	1.35	1.7	1.04	2.6	1.23	12.38	1.89	4.65	1.42	117.2	0.023	0.259
12	14.3	0.05	2.2	1.18	1.4	0.96	2.1	1.13	13.98	1.31	3.86	1.15	136.8	0.016	0.152

Table B21
Runs 80 & 102 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.01	5.3	0.71	3.4	0.66	5.2	0.67	0.00	0.00	0.00	0.00	77.8	0.0685	0.1666
2	18.9	-0.01	5.1	0.73	3.2	0.70	5.2	0.67	0.46	0.29	4.51	0.78	72.4	0.0701	0.2686
3	17.4	0.06	4.9	0.73	3.1	0.71	5.0	0.67	0.54	0.15	4.93	0.82	71.0	0.0691	0.2823
4	15.9	0.04	4.9	0.76	3.2	0.71	5.0	0.68	2.17	0.48	6.42	1.27	67.7	0.0723	0.309
5	7.6	0.03	4.3	0.74	3.0	0.72	4.4	0.68	7.06	1.58	7.22	1.75	48.8	0.0883	0.5653
6	7.6	0.03	3.3	0.76	2.3	0.74	3.1	0.68	12.63	2.34	7.01	1.90	43.4	0.0769	0.4374
7	8.8	0.01	3.0	0.76	2.0	0.74	2.9	0.70	12.71	1.91	6.05	1.93	46.0	0.066	0.3432
8	10.4	-0.02	3.4	0.74	2.3	0.75	3.4	0.75	7.72	0.85	4.76	1.56	54.2	0.0635	0.3317
9	10.4	-0.04	3.6	0.74	2.3	0.77	3.5	0.76	8.85	0.37	4.76	1.42	53.0	0.0681	0.3479
10	10.5	-0.01	2.5	0.75	1.6	0.77	2.5	0.78	13.07	0.39	6.33	1.70	48.6	0.0508	0.235
11	10.2	0.00	2.5	0.83	1.6	0.77	2.5	0.78	13.43	1.55	5.82	1.39	47.7	0.0534	0.2496
12	14.3	0.01	2.3	0.78	1.4	0.78	2.2	0.78	14.42	0.83	3.66	0.95	51.6	0.0447	0.1608

Table B22
Runs 79 & 101 H,cm = 3.7 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	0.00	3.9	0.71	2.5	0.62	3.8	0.65	0.00	0.00	0.00	0.00	77.8	0.050	0.122
2	18.9	-0.02	4.0	0.73	2.4	0.68	4.0	0.65	2.94	0.02	3.38	0.88	69.5	0.058	0.214
3	17.4	0.00	3.9	0.73	2.4	0.69	3.9	0.66	3.16	0.02	3.94	0.98	68.0	0.057	0.225
4	15.9	0.03	4.0	0.72	2.5	0.69	4.0	0.66	4.77	0.15	5.41	1.40	64.8	0.062	0.252
5	7.6	0.00	3.7	0.74	2.5	0.70	3.8	0.65	9.23	0.95	6.42	1.79	46.7	0.078	0.480
6	7.6	-0.02	3.0	0.73	2.1	0.72	3.0	0.65	13.52	1.79	6.58	1.81	42.4	0.072	0.398
7	8.8	-0.03	3.1	0.76	2.1	0.72	3.0	0.68	12.69	1.58	6.15	1.88	46.0	0.068	0.355
8	10.4	-0.07	4.0	0.76	2.6	0.73	3.8	0.74	11.12	1.07	6.27	1.94	50.6	0.078	0.382
9	10.4	-0.05	2.4	0.76	1.5	0.74	2.4	0.74	10.88	0.50	7.96	2.11	50.8	0.047	0.230
10	10.5	-0.02	2.7	0.76	1.7	0.76	2.6	0.75	11.08	0.16	6.64	1.67	50.9	0.053	0.256
11	10.2	-0.02	2.5	0.76	1.6	0.77	2.4	0.77	12.46	1.45	4.08	0.97	48.8	0.052	0.247
12	14.3	-0.01	2.1	0.76	1.4	0.76	2.1	0.76	13.66	1.16	5.56	1.46	52.6	0.040	0.147

Table B23
Runs 85 & 107 H,cm = 3.7 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.40	4.2	0.90	2.7	22.11	3.6	0.64	0.00	0.00	0.00	0.00	77.8	0.053	0.130
2	18.9	-0.37	4.9	0.78	2.9	0.71	4.9	0.66	14.63	-0.56	4.93	2.90	54.0	0.090	0.257
3	17.4	-0.39	4.5	0.79	2.7	0.70	4.5	0.68	14.29	-0.76	4.99	2.92	53.8	0.083	0.256
4	15.9	-0.32	4.5	0.77	2.8	0.70	4.5	0.69	15.64	-0.68	5.98	3.12	51.0	0.089	0.285
5	7.6	-0.54	3.3	0.84	2.3	0.74	3.2	0.66	20.18	0.76	6.86	3.01	34.8	0.094	0.429
6	7.6	-0.40	2.8	0.82	1.8	0.71	2.8	0.65	25.75	2.69	6.45	3.26	25.5	0.109	0.365
7	8.8	-0.22	2.4	0.81	1.4	0.75	2.3	0.70	23.66	2.25	4.88	3.08	31.6	0.075	0.268
8	10.4	-0.12	1.6	0.87	1.0	0.81	1.6	0.83	20.57	1.04	3.73	1.89	38.7	0.042	0.155
9	10.4	-0.14	1.1	0.82	0.7	0.84	1.1	0.86	22.50	0.92	4.35	1.49	35.6	0.031	0.106
10	10.5	-0.19	1.1	0.82	0.6	0.83	1.0	0.84	21.99	1.12	4.13	1.26	36.7	0.029	0.101
11	10.2	-0.13	1.2	0.85	0.7	0.82	1.2	0.83	22.89	2.97	2.99	1.00	34.8	0.035	0.118
12	14.3	0.00	0.7	0.86	0.4	0.83	0.6	0.88	25.44	1.48	2.22	0.92	31.8	0.021	0.046

Table B24
Runs 86 & 108 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.33	5.5	0.71	3.4	0.66	5.2	0.67	0.00	0.00	0.00	0.00	77.8	0.071	0.173
2	18.9	-0.33	6.0	0.76	3.9	0.75	6.0	0.68	6.93	0.05	6.04	1.40	64.6	0.093	0.319
3	17.4	-0.41	5.7	0.82	3.7	0.76	5.7	0.68	7.09	-0.05	6.67	1.62	63.4	0.091	0.331
4	15.9	-0.35	5.8	0.79	3.7	0.75	5.7	0.70	9.92	0.40	8.64	2.62	58.7	0.099	0.365
5	7.6	-0.50	4.0	0.80	2.8	0.77	3.8	0.68	17.48	1.88	8.19	2.97	38.1	0.104	0.518
6	7.6	-0.33	2.9	0.79	1.9	0.75	2.8	0.67	25.12	3.32	6.55	3.27	26.9	0.106	0.374
7	8.8	-0.20	3.4	0.74	2.1	0.76	3.3	0.71	23.72	2.61	5.42	3.53	31.5	0.107	0.382
8	10.4	-0.13	2.0	0.78	1.3	0.82	2.0	0.82	21.30	1.35	3.94	2.30	37.6	0.054	0.197
9	10.4	-0.13	1.6	0.85	1.0	0.86	1.6	0.85	23.68	0.98	3.47	1.35	33.5	0.048	0.155
10	10.5	-0.19	1.5	0.85	1.0	0.85	1.5	0.84	24.50	1.10	3.28	1.13	32.0	0.048	0.147
11	10.2	-0.13	1.6	0.84	1.0	0.86	1.6	0.84	25.10	3.27	2.99	1.12	30.3	0.052	0.155
12	14.3	0.01	1.0	0.83	0.6	0.85	1.0	0.87	26.04	1.76	2.20	0.98	29.9	0.033	0.070

Table B25
Runs 87 & 109 H,cm = 3.7 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.26	3.8	1.40	2.3	0.95	3.6	1.14	0.00	0.00	0.00	0.00	222.8	0.017	0.119
2	18.9	-0.27	5.7	1.41	3.5	0.97	5.7	1.10	6.82	-0.20	7.75	2.15	168.6	0.034	0.301
3	17.4	-0.38	5.6	1.43	3.5	0.99	5.5	1.11	6.57	-0.15	8.37	2.18	162.7	0.034	0.321
4	15.9	-0.36	5.5	1.41	3.5	1.00	5.5	1.12	8.94	0.60	10.46	2.73	152.2	0.036	0.349
5	7.6	-0.54	4.7	1.43	3.4	1.06	4.8	1.13	17.41	2.42	10.19	2.91	92.4	0.051	0.616
6	7.6	-0.34	3.2	1.41	2.3	1.11	3.3	1.11	25.47	3.75	8.56	2.97	79.4	0.040	0.414
7	8.8	-0.11	3.5	1.51	2.5	1.16	3.7	1.18	23.81	2.77	7.88	3.87	90.4	0.039	0.400
8	10.4	0.01	2.6	1.25	1.7	1.14	2.6	1.34	21.33	1.53	6.65	3.80	103.8	0.025	0.253
9	10.4	-0.05	2.3	1.56	1.5	1.22	2.3	1.50	23.38	1.13	5.91	2.55	100.4	0.023	0.220
10	10.5	0.00	2.2	1.18	1.4	1.17	2.2	1.36	25.62	1.19	5.45	1.70	97.5	0.022	0.206
11	10.2	0.02	2.1	1.25	1.4	1.14	2.1	1.32	26.53	3.71	4.69	1.50	94.2	0.022	0.206
12	14.3	-0.02	1.4	1.25	0.9	1.15	1.4	1.37	26.41	2.21	3.42	1.20	115.7	0.012	0.100

Table B26
Runs 88 & 110 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	32.0	-0.29	5.6	1.38	3.4	0.96	5.4	1.12	0.00	0.00	0.00	0.00	222.8	0.025	0.174
2	18.9	-0.34	6.0	1.41	3.8	0.98	6.2	1.11	3.12	0.23	8.02	1.14	174.7	0.034	0.316
3	17.4	-0.37	5.9	1.43	3.8	1.01	5.9	1.11	3.76	0.27	8.91	1.41	167.2	0.035	0.338
4	15.9	-0.45	6.1	1.41	3.9	1.03	6.1	1.13	7.63	1.01	11.56	2.54	154.3	0.039	0.383
5	7.6	-0.57	5.0	1.41	3.6	1.09	5.2	1.13	16.77	2.69	11.00	2.97	93.4	0.053	0.654
6	7.6	-0.34	3.1	1.35	2.3	1.13	3.4	1.12	24.98	3.88	8.75	2.89	80.2	0.039	0.409
7	8.8	-0.10	3.4	1.58	2.3	1.11	3.6	1.22	23.68	2.95	8.41	3.79	90.6	0.037	0.383
8	10.4	0.02	3.3	1.25	2.2	1.19	3.4	1.40	21.53	1.67	7.66	3.82	103.5	0.031	0.314
9	10.4	-0.05	2.7	1.18	1.8	1.32	2.8	1.66	23.64	1.15	7.11	2.64	100.0	0.027	0.261
10	10.5	0.00	2.5	2.61	1.6	1.30	2.6	1.58	25.48	1.08	6.62	1.85	97.7	0.026	0.240
11	10.2	0.02	2.4	1.29	1.5	1.22	2.5	1.48	26.63	3.70	5.57	1.71	94.0	0.025	0.230
12	14.3	-0.01	1.6	1.22	1.0	1.25	1.6	1.55	26.73	2.28	4.17	1.30	115.2	0.014	0.112

Table B27
Runs 136 & 171 H,cm = 1.8 T,s = 1.0 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.05	1.8	0.97	1.1	0.68	1.7	0.83	0.00	0.00	0.00	0.00	135.0	0.013	0.064
2	15.1	0.00	1.8	0.97	1.1	0.74	1.7	0.82	-0.02	0.05	2.19	0.19	109.3	0.016	0.117
3	13.6	-0.01	1.8	0.97	1.1	0.75	1.7	0.82	-0.10	0.01	2.47	0.30	104.9	0.017	0.130
4	12.0	-0.01	1.7	0.97	1.1	0.74	1.6	0.83	-0.34	-0.08	3.21	0.44	100.3	0.017	0.142
5	3.8	-0.05	1.7	0.97	1.2	0.74	1.9	0.83	-0.93	-0.36	3.95	0.62	60.6	0.028	0.445
6	3.8	0.00	1.4	0.98	1.0	0.64	1.4	0.82	-1.03	-0.27	3.93	0.65	60.7	0.024	0.374
7	5.3	0.00	1.5	1.02	1.0	0.74	1.4	0.80	-0.31	0.04	3.59	0.56	70.1	0.021	0.281
8	6.6	-0.01	1.7	1.06	1.1	0.72	1.6	0.82	0.10	0.13	3.65	0.53	76.5	0.023	0.263
9	6.6	-0.02	1.9	1.01	1.2	0.72	1.8	0.84	-0.03	0.27	3.92	0.56	76.7	0.024	0.282
10	6.9	-0.03	1.9	1.01	1.2	0.75	1.8	0.86	-0.12	0.07	3.42	0.49	78.3	0.024	0.279
11	6.6	-0.05	1.7	1.01	1.1	0.75	1.6	0.85	0.02	-0.06	2.83	0.33	76.6	0.022	0.257
12	12.3	0.00	1.3	1.06	0.8	0.72	1.2	0.81	0.23	0.04	2.15	0.45	100.6	0.013	0.104

Table B28
Runs 137 & 172 H,cm = 2.7 T,s = 1.0 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.08	2.8	0.98	1.7	0.70	2.7	0.83	0.00	0.00	0.00	0.00	135.0	0.020	0.098
2	15.1	-0.04	2.7	1.00	1.7	0.74	2.7	0.83	-0.37	-0.40	3.56	0.26	109.7	0.025	0.181
3	13.6	-0.05	2.7	0.97	1.7	0.75	2.7	0.82	-0.53	-0.56	3.95	0.38	105.4	0.026	0.201
4	12.0	-0.05	2.6	0.97	1.7	0.75	2.5	0.84	-0.99	-0.78	4.74	0.51	101.0	0.026	0.219
5	3.8	-0.08	2.1	0.97	1.6	0.75	2.2	0.83	-2.56	-0.50	4.66	0.84	62.3	0.034	0.551
6	3.8	0.02	1.5	1.06	1.0	0.56	1.5	0.82	-3.42	-0.11	4.05	0.93	63.2	0.024	0.401
7	5.3	0.03	1.6	0.93	1.0	0.62	1.4	0.76	-1.67	0.01	3.93	0.82	71.5	0.022	0.293
8	6.6	-0.02	1.8	0.89	1.1	0.65	1.6	0.75	-0.17	0.29	4.08	0.92	76.8	0.023	0.269
9	6.6	-0.02	1.8	0.89	1.1	0.68	1.7	0.79	-0.16	0.53	4.15	0.97	76.8	0.023	0.270
10	6.9	-0.02	1.6	1.00	1.1	0.74	1.6	0.83	-0.32	0.32	3.72	0.86	78.6	0.021	0.240
11	6.6	0.00	1.4	0.88	0.9	0.76	1.4	0.85	-0.32	0.09	3.20	0.59	77.0	0.018	0.213
12	12.3	0.02	1.1	1.05	0.7	0.73	1.1	0.85	-0.04	0.09	2.60	0.55	100.9	0.011	0.087

Table B29
Runs 139 & 174 H,cm = 1.8 T,s = 1.4 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.07	2.0	1.37	1.2	0.88	1.9	1.13	0.00	0.00	0.00	0.00	212.1	0.010	0.073
2	15.1	-0.07	2.1	1.33	1.2	0.96	2.0	1.09	-0.55	-0.31	3.18	0.25	163.6	0.013	0.137
3	13.6	-0.07	2.1	1.48	1.3	0.97	2.0	1.10	-0.68	-0.34	3.52	0.32	156.2	0.014	0.156
4	12.0	-0.04	2.1	1.43	1.3	0.97	2.0	1.12	-1.12	-0.32	4.65	0.44	148.7	0.014	0.171
5	3.8	-0.08	2.1	1.43	1.5	0.97	2.3	1.12	-2.90	-0.09	5.22	0.82	89.3	0.023	0.542
6	3.8	-0.01	1.4	1.45	1.0	0.66	1.5	1.11	-3.85	0.01	4.49	0.93	90.7	0.016	0.379
7	5.3	0.03	1.4	1.47	0.9	0.60	1.3	0.93	-2.13	-0.05	3.72	0.77	103.3	0.014	0.261
8	6.6	0.00	1.5	1.46	0.9	0.64	1.3	0.74	-0.60	0.35	3.53	0.87	111.4	0.013	0.227
9	6.6	-0.01	1.3	1.46	0.8	0.73	1.2	0.87	-0.25	0.66	3.51	0.90	110.9	0.012	0.203
10	6.9	0.00	1.2	1.46	0.8	0.80	1.2	0.97	-0.21	0.36	3.23	0.81	113.3	0.011	0.177
11	6.6	0.02	1.1	1.46	0.7	0.82	1.1	0.99	-0.06	0.10	2.78	0.60	110.6	0.010	0.166
12	12.3	0.05	0.9	1.46	0.6	0.80	0.9	1.00	0.29	0.09	2.06	0.48	148.2	0.006	0.075

Table B30
Runs 140 & 175 H,cm = 2.7 T,s = 1.4 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.13	3.0	1.37	1.8	0.89	2.8	1.12	0.00	0.00	0.00	0.00	212.1	0.014	0.107
2	15.1	-0.14	3.1	1.43	1.9	0.95	3.0	1.09	-0.55	-0.26	4.81	0.38	163.6	0.019	0.208
3	13.6	-0.11	3.2	1.43	2.0	0.98	3.2	1.10	-0.69	-0.31	5.26	0.47	156.2	0.021	0.239
4	12.0	-0.13	3.0	1.43	1.9	0.97	2.9	1.12	-1.36	-0.32	6.46	0.64	149.1	0.020	0.253
5	3.8	-0.11	2.5	1.43	1.9	0.97	2.7	1.12	-4.05	-0.07	6.46	1.14	91.0	0.028	0.667
6	3.8	0.01	1.6	1.45	1.1	0.74	1.7	1.11	-5.40	0.06	5.20	1.23	92.9	0.017	0.410
7	5.3	0.04	1.5	1.45	1.0	0.57	1.5	0.93	-3.16	0.11	4.34	1.01	104.8	0.015	0.285
8	6.6	0.01	1.5	1.46	1.0	0.58	1.4	0.69	-1.30	0.52	4.09	1.04	112.5	0.014	0.236
9	6.6	0.04	1.4	1.43	0.9	0.67	1.3	0.81	-0.83	0.74	4.11	0.95	111.8	0.012	0.207
10	6.9	0.03	1.2	1.43	0.8	0.73	1.2	0.94	-0.84	0.49	3.90	0.87	114.2	0.010	0.174
11	6.6	0.04	1.0	1.43	0.7	0.79	1.1	0.99	-0.96	0.26	3.66	0.68	112.0	0.009	0.159
12	12.3	0.07	0.9	1.43	0.6	0.78	0.9	0.99	-0.85	0.13	3.16	0.53	150.0	0.006	0.070

Table B31
Runs 143 & 164 H,cm = 1.8 T,s = 1.0 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.01	1.8	0.97	1.1	0.72	1.8	0.83	0.00	0.00	0.00	0.00	135.0	0.014	0.065
2	15.1	-0.04	2.2	0.97	1.4	0.73	2.3	0.83	7.37	0.25	0.78	0.35	100.0	0.022	0.148
3	13.6	-0.05	2.2	0.97	1.3	0.75	2.2	0.83	3.73	0.39	3.19	0.73	100.3	0.022	0.161
4	12.0	0.03	2.1	0.97	1.3	0.77	2.1	0.83	4.43	0.68	3.16	0.72	94.6	0.022	0.175
5	3.8	0.03	1.9	0.97	1.4	0.76	2.0	0.84	6.60	0.68	2.61	0.52	52.6	0.035	0.488
6	3.8	0.06	1.3	0.97	0.9	0.66	1.3	0.83	6.18	0.24	2.62	0.61	53.0	0.025	0.347
7	5.3	0.05	1.1	1.06	0.7	0.79	1.0	0.81	6.05	0.04	2.02	0.37	63.2	0.018	0.209
8	6.6	0.03	0.8	1.06	0.5	0.88	0.7	0.96	4.86	0.15	2.73	0.33	71.3	0.011	0.115
9	6.6	0.09	0.7	1.06	0.5	0.90	0.7	1.09	6.48	0.08	1.75	0.37	69.5	0.010	0.104
10	6.9	0.07	0.9	1.06	0.6	0.88	0.9	1.05	7.63	-0.04	1.63	0.35	69.7	0.012	0.126
11	6.6	0.05	1.0	1.06	0.6	0.87	0.9	1.01	7.53	-0.05	1.65	0.39	68.3	0.014	0.145
12	12.3	0.13	0.7	1.06	0.5	0.87	0.7	0.98	7.16	-0.03	1.48	0.42	92.3	0.008	0.059

Table B32
Runs 144 & 165 H,cm = 2.7 T,s = 1.0 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.02	2.8	0.97	1.7	0.72	2.7	0.83	0.00	0.00	0.00	0.00	135.0	0.021	0.099
2	15.1	-0.06	2.8	0.99	1.8	0.76	2.8	0.83	5.99	0.41	0.69	0.29	101.8	0.028	0.186
3	13.6	-0.09	2.9	0.97	1.8	0.75	2.8	0.82	2.22	0.33	3.64	0.78	102.1	0.028	0.210
4	12.0	0.02	2.9	0.97	1.9	0.77	2.9	0.84	3.27	0.55	3.68	0.80	96.0	0.030	0.239
5	3.8	0.04	2.2	0.97	1.6	0.76	2.3	0.83	4.79	0.47	3.54	0.64	54.5	0.040	0.575
6	3.8	0.12	1.5	0.97	1.0	0.63	1.5	0.82	4.41	-0.02	3.63	0.71	54.9	0.027	0.384
7	5.3	0.11	1.3	1.02	0.8	0.70	1.2	0.78	4.47	0.08	2.46	0.65	64.9	0.020	0.242
8	6.6	0.06	0.9	1.06	0.6	0.83	0.8	0.94	3.64	0.27	3.72	0.77	72.7	0.012	0.136
9	6.6	0.14	0.8	1.06	0.5	0.95	0.8	1.15	6.38	0.07	3.41	0.69	69.6	0.011	0.117
10	6.9	0.12	0.9	1.00	0.6	0.89	0.9	1.08	7.65	-0.11	3.49	0.66	69.7	0.013	0.131
11	6.6	0.11	1.0	1.00	0.6	0.87	1.0	1.01	8.10	-0.04	3.40	0.53	67.7	0.014	0.146
12	12.3	0.21	0.7	1.04	0.5	0.85	0.7	0.97	7.43	0.23	2.98	0.50	91.9	0.008	0.059

Table B33
Runs 146 & 167 H,cm = 1.8 T,s = 1.4 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	0.00	2.1	1.38	1.2	0.89	1.9	1.14	0.00	0.00	0.00	0.00	212.1	0.010	0.073
2	15.1	-0.04	2.3	1.33	1.4	0.98	2.2	1.11	2.85	0.21	2.40	0.28	158.3	0.014	0.151
3	13.6	-0.08	2.3	1.43	1.4	0.99	2.3	1.13	0.83	0.10	4.30	0.84	153.9	0.015	0.171
4	12.0	0.05	2.3	1.33	1.4	0.99	2.3	1.12	1.14	0.15	4.85	0.89	145.3	0.016	0.192
5	3.8	0.06	2.2	1.43	1.7	0.99	2.4	1.12	2.95	0.02	4.20	0.61	80.9	0.028	0.584
6	3.8	0.13	1.5	1.46	1.0	0.71	1.6	1.12	3.83	-0.26	3.72	0.64	79.6	0.019	0.393
7	5.3	0.09	1.3	0.64	0.9	0.68	1.2	0.94	6.08	-0.14	2.36	0.43	91.2	0.015	0.251
8	6.6	-0.02	1.0	1.46	0.6	0.84	0.9	0.96	7.13	-0.07	2.76	0.49	100.0	0.010	0.153
9	6.6	0.14	0.9	1.46	0.6	1.03	0.9	1.23	7.71	-0.07	2.30	0.42	99.1	0.009	0.140
10	6.9	0.12	1.0	1.46	0.7	0.98	1.0	1.17	8.13	-0.06	1.98	0.34	100.8	0.010	0.151
11	6.6	0.10	1.2	1.46	0.8	0.88	1.2	1.03	7.74	-0.18	1.88	0.37	99.1	0.012	0.182
12	12.3	0.25	1.0	1.46	0.6	0.81	0.9	0.96	7.28	-0.12	1.49	0.37	137.4	0.007	0.078

Table B34
Runs 147 & 168 H,cm = 2.7 T,s = 1.4 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.08	3.0	1.37	1.8	0.89	2.9	1.13	0.00	0.00	0.00	0.00	212.1	0.014	0.108
2	15.1	-0.13	3.4	1.33	2.1	0.97	3.5	1.10	0.72	-0.38	5.27	0.48	161.6	0.021	0.225
3	13.6	-0.16	3.5	1.30	2.2	0.99	3.5	1.10	0.58	-0.44	5.72	0.57	154.3	0.022	0.255
4	12.0	-0.01	3.4	1.43	2.2	0.99	3.3	1.11	-0.34	-0.49	7.51	0.91	147.5	0.023	0.281
5	3.8	0.02	2.7	1.43	2.0	0.97	2.9	1.12	-2.87	0.10	8.17	1.52	89.3	0.030	0.706
6	3.8	0.15	1.6	1.45	1.1	0.76	1.7	1.11	-2.57	0.54	7.01	1.49	88.8	0.018	0.419
7	5.3	0.15	1.4	1.43	0.9	0.62	1.4	0.94	3.73	0.08	4.19	0.76	94.7	0.015	0.268
8	6.6	0.04	1.1	3.22	0.7	0.70	1.1	0.88	7.70	-0.20	3.30	0.53	99.1	0.011	0.170
9	6.6	0.21	0.9	3.28	0.6	0.91	0.9	1.24	7.66	-0.14	3.14	0.46	99.2	0.009	0.134
10	6.9	0.17	0.9	1.44	0.6	0.94	0.9	1.31	7.82	-0.09	2.96	0.36	101.3	0.009	0.130
11	6.6	0.16	1.0	1.45	0.6	0.86	1.0	1.11	7.46	-0.17	2.87	0.42	99.5	0.010	0.148
12	12.3	0.32	0.8	1.45	0.5	0.83	0.8	1.05	6.95	-0.12	2.50	0.42	137.9	0.006	0.065

Table B35
Runs 150 & 157 H,cm = 1.8 T,s = 1.0 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.11	1.8	0.97	1.1	0.73	1.8	0.83	0.00	0.00	0.00	0.00	135.0	0.014	0.065
2	15.1	-0.20	2.1	0.97	1.3	0.77	2.2	0.82	13.52	0.53	4.18	1.02	91.9	0.023	0.138
3	13.6	-0.24	2.0	0.97	1.3	0.77	2.1	0.82	13.00	0.67	4.22	1.07	88.5	0.023	0.148
4	12.0	-0.08	1.9	0.97	1.2	0.79	1.9	0.84	14.88	1.12	3.65	1.04	81.5	0.023	0.154
5	3.8	-0.09	1.7	0.97	1.2	0.79	1.7	0.83	16.96	1.44	3.48	1.08	41.1	0.040	0.434
6	3.8	-0.09	1.1	1.06	0.7	0.95	1.0	0.83	16.26	0.75	3.20	1.04	41.9	0.025	0.276
7	5.3	0.04	0.9	1.03	0.6	0.98	0.9	0.95	16.33	0.15	3.10	0.87	51.5	0.018	0.174
8	6.6	-0.07	1.4	1.06	0.9	1.05	1.5	1.15	17.81	0.08	3.08	0.77	56.2	0.026	0.220
9	6.6	0.03	0.9	1.05	0.6	1.05	0.9	1.24	18.07	-0.03	2.17	0.58	55.9	0.017	0.142
10	6.9	0.03	0.7	1.06	0.4	1.03	0.7	1.25	17.54	-0.01	1.95	0.49	58.0	0.012	0.105
11	6.6	-0.01	0.7	1.04	0.4	1.00	0.6	1.18	16.38	0.35	11.89	3.02	58.0	0.011	0.100
12	12.3	0.11	0.4	1.04	0.3	1.12	0.4	1.23	14.83	0.77	19.08	4.90	82.5	0.005	0.036

Table B36
Runs 151 & 158 H,cm = 2.7 T,s = 1.0 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.15	2.8	0.97	1.7	0.72	2.7	0.82	0.00	0.00	0.00	0.00	135.0	0.021	0.098
2	15.1	-0.24	3.1	0.98	2.0	0.76	3.2	0.82	6.94	1.05	4.38	0.78	100.6	0.031	0.205
3	13.6	-0.31	3.0	0.97	1.9	0.77	3.1	0.83	5.64	0.73	4.59	1.00	97.9	0.031	0.221
4	12.0	-0.07	2.9	0.97	1.8	0.78	2.8	0.84	8.21	0.65	4.53	0.95	90.0	0.032	0.237
5	3.8	0.00	2.0	0.97	1.5	0.80	2.0	0.83	10.92	0.76	4.46	0.87	47.9	0.042	0.529
6	3.8	0.04	1.2	0.97	0.8	0.86	1.2	0.83	10.53	0.39	3.73	0.89	48.3	0.025	0.316
7	5.3	0.11	1.0	1.12	0.6	0.96	0.9	0.98	10.04	0.20	2.66	1.04	58.7	0.016	0.181
8	6.6	-0.06	0.9	1.00	0.6	1.00	0.9	1.22	11.00	0.26	2.84	1.29	64.3	0.014	0.134
9	6.6	0.06	0.9	1.55	0.6	1.04	0.9	1.35	14.24	-0.09	3.09	1.10	60.6	0.014	0.132
10	6.9	0.07	0.9	1.62	0.5	0.94	0.8	1.22	14.16	-0.20	3.21	0.85	62.1	0.014	0.124
11	6.6	0.02	0.8	1.03	0.5	0.95	0.8	1.22	14.96	0.03	2.83	0.65	59.7	0.013	0.117
12	12.3	0.16	0.5	2.79	0.3	1.13	0.5	1.43	15.98	0.42	2.09	0.58	81.0	0.006	0.040

Table B37
Runs 153 & 160 H,cm = 1.8 T,s = 1.4 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.14	2.0	1.36	1.2	0.91	1.9	1.13	0.00	0.00	0.00	0.00	212.1	0.010	0.072
2	15.1	-0.23	2.3	1.33	1.5	0.98	2.4	1.09	6.55	1.48	5.29	0.98	152.4	0.015	0.154
3	13.6	-0.30	2.4	1.43	1.5	0.98	2.4	1.11	6.95	1.06	5.38	1.11	144.3	0.017	0.175
4	12.0	-0.05	2.3	1.43	1.5	0.98	2.3	1.13	8.30	0.82	4.78	1.05	134.2	0.018	0.195
5	3.8	-0.03	2.1	1.47	1.5	0.99	2.2	1.12	9.84	1.19	4.33	1.02	70.8	0.030	0.554
6	3.8	0.03	1.3	1.47	0.9	0.89	1.3	1.12	12.39	0.74	3.40	1.00	67.0	0.019	0.333
7	5.3	0.09	1.0	1.48	0.6	0.95	0.9	1.13	16.17	0.08	1.93	0.72	76.1	0.013	0.183
8	6.6	-0.11	1.1	1.44	0.7	0.97	1.1	1.28	17.75	0.08	2.51	0.69	83.8	0.013	0.165
9	6.6	0.05	1.1	1.18	0.7	1.02	1.1	1.34	17.72	0.08	2.40	0.62	83.9	0.014	0.173
10	6.9	0.07	1.0	1.72	0.6	1.05	1.0	1.40	17.82	0.02	1.85	0.53	86.0	0.012	0.145
11	6.6	0.01	0.9	1.72	0.5	1.08	0.9	1.40	16.66	0.42	4.50	1.22	85.5	0.010	0.134
12	12.3	0.24	0.6	1.56	0.4	1.31	0.6	1.52	15.47	0.98	5.59	1.53	124.4	0.005	0.047

Table B38
Runs 154 & 161 H,cm = 2.7 T,s = 1.4 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	28.2	-0.21	3.1	1.37	1.8	0.91	2.9	1.13	0.00	0.00	0.00	0.00	212.1	0.015	0.109
2	15.1	-0.30	3.3	1.33	2.1	1.00	3.5	1.10	9.78	0.98	11.32	1.46	147.3	0.022	0.217
3	13.6	-0.37	3.3	1.43	2.1	0.99	3.5	1.11	7.38	1.29	9.06	1.45	143.7	0.023	0.245
4	12.0	-0.11	3.2	1.43	2.0	0.99	3.2	1.10	8.18	1.46	7.05	1.38	134.4	0.024	0.264
5	3.8	-0.01	2.5	1.45	1.8	1.00	2.7	1.13	9.34	1.39	6.53	1.26	71.5	0.035	0.655
6	3.8	0.10	1.4	1.52	1.0	0.89	1.5	1.12	11.08	0.78	4.07	0.99	69.0	0.020	0.357
7	5.3	0.15	1.1	2.11	0.7	0.89	1.1	1.11	14.76	0.11	4.45	0.99	78.2	0.013	0.197
8	6.6	-0.06	0.8	1.36	0.5	0.95	0.8	1.30	15.86	0.12	5.51	1.01	86.7	0.009	0.122
9	6.6	0.11	0.7	3.31	0.5	1.01	0.8	1.52	16.96	0.16	3.31	0.67	85.0	0.009	0.113
10	6.9	0.12	0.8	1.53	0.5	0.95	0.8	1.34	16.99	0.09	2.91	0.59	87.3	0.009	0.119
11	6.6	0.08	0.8	1.47	0.5	1.07	0.8	1.49	15.96	0.55	8.30	1.99	86.6	0.009	0.120
12	12.3	0.29	0.6	1.47	0.4	1.44	0.6	1.93	14.94	0.56	8.87	2.19	125.2	0.004	0.045

Table B39
Runs 192 & 177 H,cm = 4.3 T,s = 0.9 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	34.9	-0.29	4.5	0.88	2.9	0.74	4.5	0.78	0.00	0.00	0.00	0.00	120.1	0.038	0.130
2	21.8	-0.29	5.8	0.92	3.7	0.83	5.8	0.79	18.32	0.88	6.39	3.41	81.6	0.071	0.265
3	20.2	-0.28	5.3	0.93	3.4	0.81	5.5	0.77	17.55	1.04	6.45	3.44	81.2	0.066	0.263
4	18.7	-0.13	5.3	0.95	3.4	0.82	5.4	0.83	19.13	0.53	7.52	3.68	76.9	0.069	0.285
5	10.5	-0.28	4.9	0.97	3.5	0.86	4.8	0.81	25.35	0.41	7.68	3.41	52.2	0.094	0.470
6	10.5	-0.09	4.4	0.96	3.0	0.86	4.4	0.79	29.26	0.93	6.75	3.31	45.4	0.098	0.423
7	12.0	0.00	4.0	0.96	2.5	0.86	4.0	0.84	27.92	-0.06	6.26	3.62	51.3	0.078	0.331
8	13.2	-0.21	3.1	1.07	1.9	0.93	3.2	0.98	27.60	0.43	5.34	2.77	54.2	0.057	0.235
9	13.2	-0.13	2.4	1.01	1.5	0.95	2.4	0.99	28.98	0.73	4.39	1.73	51.5	0.047	0.181
10	13.5	-0.12	2.1	1.03	1.3	0.94	2.1	0.98	30.71	-0.30	3.72	1.35	48.1	0.045	0.159
11	13.2	-0.21	2.4	1.02	1.5	0.93	2.3	0.97	31.37	0.25	3.22	1.20	46.0	0.052	0.180
12	19.0	0.00	1.5	0.98	0.9	0.87	1.4	0.99	30.94	1.22	2.41	1.15	53.4	0.028	0.078

Table B40
Runs 193 & 178 H,cm = 7.9 T,s = 0.9 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	34.9	-0.36	7.7	0.88	5.1	0.77	7.5	0.83	0.00	0.00	0.00	0.00	120.1	0.064	0.222
2	21.8	-0.33	7.7	0.90	5.0	0.88	7.6	0.84	9.30	0.56	8.85	2.10	95.4	0.080	0.352
3	20.2	-0.30	7.6	0.92	5.0	0.89	7.6	0.43	9.70	0.55	9.46	2.44	92.8	0.081	0.374
4	18.7	-0.25	7.6	0.90	4.9	0.88	7.4	0.85	13.31	0.14	11.50	3.60	85.6	0.088	0.404
5	10.5	-0.31	5.4	0.92	3.9	0.90	5.2	0.85	21.06	0.12	10.72	3.55	58.4	0.092	0.515
6	10.5	-0.04	4.7	0.97	3.4	0.91	4.7	0.84	27.06	0.59	8.41	2.91	49.4	0.096	0.452
7	12.0	0.03	5.3	0.90	3.5	0.90	5.2	0.89	27.52	-0.14	9.49	4.03	52.0	0.101	0.437
8	13.2	-0.18	5.2	0.99	3.4	1.01	5.4	1.03	27.87	0.50	8.83	3.63	53.7	0.096	0.391
9	13.2	-0.06	3.1	1.05	2.0	1.06	3.1	1.10	29.35	0.78	6.17	1.99	50.7	0.061	0.234
10	13.5	-0.04	2.9	1.01	1.8	1.00	2.9	1.09	30.78	-0.28	5.30	1.57	48.0	0.061	0.217
11	13.2	-0.13	3.1	0.95	2.0	1.02	3.1	1.08	31.11	0.30	4.83	1.37	46.7	0.067	0.236
12	19.0	0.11	2.2	1.00	1.4	0.98	2.2	1.07	30.70	1.36	3.66	1.22	54.1	0.041	0.117

Table B41
Runs 195 & 180 H,cm = 4.3 T,s = 1.7 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	34.9	-0.19	4.6	1.68	2.8	1.08	4.4	1.32	0.00	0.00	0.00	0.00	288.9	0.016	0.132
2	21.8	-0.24	7.1	1.66	4.5	1.12	7.2	1.35	10.74	0.35	9.84	2.66	215.3	0.033	0.325
3	20.2	-0.27	6.9	1.61	4.4	1.15	6.9	1.18	10.03	0.46	10.36	2.61	209.3	0.033	0.340
4	18.7	-0.17	7.0	1.66	4.4	1.15	6.9	1.32	12.29	0.13	12.62	3.19	197.2	0.035	0.373
5	10.5	-0.32	6.2	1.74	4.4	1.19	6.2	1.33	21.06	0.13	12.25	3.22	129.8	0.048	0.595
6	10.5	-0.01	4.8	1.74	3.5	1.22	4.9	1.33	27.50	0.69	10.18	2.77	117.5	0.041	0.456
7	12.0	0.10	5.4	1.74	3.7	1.25	5.7	1.40	27.01	-0.03	11.04	3.55	129.1	0.042	0.452
8	13.2	-0.10	6.9	1.73	4.8	1.46	7.0	1.56	27.21	0.57	11.63	3.42	136.7	0.050	0.521
9	13.2	0.06	5.3	1.73	3.7	1.46	5.4	1.56	28.76	0.86	10.28	2.15	133.6	0.040	0.400
10	13.5	0.11	4.6	1.73	3.1	1.38	4.7	1.61	30.50	-0.20	8.73	1.56	132.0	0.035	0.341
11	13.2	0.03	4.3	1.73	2.9	1.36	4.3	1.59	31.38	0.30	7.20	1.41	128.4	0.034	0.327
12	19.0	0.31	2.9	1.69	1.8	1.21	2.8	1.53	31.18	1.27	4.90	1.31	161.0	0.018	0.153

Table B42
Runs 197 & 182 H,cm = 4.3 T,s = 0.9 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	34.9	-0.13	4.3	0.87	2.7	0.73	4.3	0.79	0.00	0.00	0.00	0.00	120.1	0.036	0.125
2	21.8	-0.11	6.0	0.92	3.8	0.80	6.0	0.79	6.10	0.03	6.30	1.63	99.8	0.060	0.276
3	20.2	-0.12	5.8	0.92	3.6	0.81	5.8	0.74	5.74	0.08	6.62	1.70	98.2	0.060	0.289
4	18.7	-0.12	5.5	0.92	3.4	0.81	5.5	0.80	6.56	-0.09	7.88	1.95	94.8	0.058	0.294
5	10.5	-0.19	5.1	0.92	3.5	0.82	5.2	0.79	11.40	0.03	8.49	2.01	70.6	0.072	0.488
6	10.5	-0.11	4.4	0.92	3.0	0.84	4.1	0.79	15.57	0.36	7.87	1.79	65.6	0.066	0.415
7	12.0	-0.10	4.4	0.91	3.0	0.84	4.2	0.80	14.91	-0.18	7.44	2.24	70.5	0.063	0.367
8	13.2	-0.13	6.0	0.88	3.9	0.85	6.0	0.86	14.62	0.11	8.83	2.63	73.8	0.082	0.455
9	13.2	-0.07	5.9	0.90	4.0	0.90	5.9	0.91	15.90	0.45	9.22	1.88	72.1	0.082	0.447
10	13.5	-0.06	4.6	0.98	3.1	0.91	4.4	0.92	17.28	-0.05	7.60	1.16	70.9	0.064	0.337
11	13.2	-0.09	4.3	0.97	2.8	0.91	4.2	0.92	17.82	0.10	6.22	0.96	69.5	0.062	0.327
12	19.0	0.01	3.2	0.90	2.0	0.88	3.1	0.92	17.60	0.47	5.42	1.21	79.7	0.040	0.167

Table B43
Runs 198 & 183 H,cm = 7.9 T,s = 0.9 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	34.9	-0.224	7.5	0.89	4.9	0.77	7.4	0.83	0.00	0.00	0.00	0.00	120.1	0.063	0.216
2	21.8	-0.079	7.2	0.90	4.7	0.84	7.3	0.83	0.84	0.87	7.59	1.23	106.8	0.067	0.330
3	20.2	-0.157	7.0	0.92	4.6	0.85	7.1	0.39	0.65	0.82	8.19	1.34	104.8	0.067	0.348
4	18.7	-0.143	6.9	0.92	4.5	0.85	6.8	0.84	1.73	0.65	10.09	1.82	100.9	0.069	0.370
5	10.5	-0.199	6.0	0.92	4.3	0.86	6.2	0.83	7.35	0.58	10.86	2.58	75.3	0.080	0.575
6	10.5	-0.058	4.8	0.92	3.5	0.87	4.7	0.83	13.06	0.62	9.64	2.62	68.6	0.071	0.462
7	12.0	-0.063	4.8	0.96	3.3	0.87	4.5	0.84	14.85	0.01	8.59	2.38	70.6	0.068	0.397
8	13.2	-0.159	4.7	0.90	3.1	0.86	4.6	0.89	16.20	0.24	8.25	2.61	71.7	0.065	0.353
9	13.2	-0.059	6.0	0.97	4.0	0.91	6.0	0.94	17.03	0.49	8.97	2.19	70.6	0.085	0.452
10	13.5	-0.049	5.7	0.89	3.9	0.93	5.5	0.94	17.79	-0.05	9.10	1.42	70.2	0.081	0.421
11	13.2	-0.065	5.0	0.89	3.4	0.94	4.7	0.93	17.99	0.17	7.59	1.09	69.3	0.072	0.375
12	19.0	0.066	4.2	0.89	2.8	0.92	4.0	0.91	17.63	0.63	5.58	1.06	79.6	0.053	0.221

Table B44
Runs 200 & 185 H,cm = 4.3 T,s = 1.7 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	34.9	-0.134	4.6	1.71	2.8	1.09	4.4	1.32	0.00	0.00	0.00	0.00	288.9	0.016	0.132
2	21.8	-0.049	5.3	1.69	3.4	1.14	5.4	1.34	3.53	0.50	6.95	1.17	229.1	0.023	0.243
3	20.2	-0.075	5.4	1.66	3.4	1.13	5.4	1.24	3.59	0.40	7.56	1.30	221.5	0.024	0.265
4	18.7	-0.080	5.3	1.66	3.3	1.13	5.3	1.33	5.20	0.11	9.41	1.71	210.6	0.025	0.285
5	10.5	-0.157	5.7	1.64	4.0	1.16	6.2	1.34	10.73	0.25	10.28	2.17	148.9	0.038	0.544
6	10.5	-0.082	4.6	1.64	3.2	1.12	4.8	1.34	15.16	0.54	9.35	2.03	140.8	0.033	0.437
7	12.0	-0.101	4.4	1.68	3.0	1.08	4.4	1.29	15.15	-0.10	8.79	2.13	151.7	0.029	0.368
8	13.2	-0.246	5.9	1.75	3.9	1.14	5.9	1.38	15.20	0.13	10.61	2.58	159.8	0.037	0.445
9	13.2	-0.103	6.9	1.74	4.8	1.15	6.8	1.26	16.37	0.44	11.44	2.09	157.6	0.044	0.524
10	13.5	-0.074	5.4	1.74	3.9	1.25	5.6	1.31	18.04	-0.08	9.75	1.38	156.4	0.035	0.403
11	13.2	-0.096	4.8	1.62	3.3	1.26	4.9	1.36	18.45	0.17	7.90	1.11	153.7	0.031	0.364
12	19.0	0.068	3.8	1.62	2.4	1.14	3.6	1.35	18.06	0.77	5.71	1.07	187.6	0.020	0.199

Table B45
Runs 202 & 187 H,cm = 4.3 T,s = 0.9 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	34.9	0.07	4.2	0.88	2.6	0.71	4.1	0.79	0.00	0.00	0.00	0.00	120.1	0.035	0.121
2	21.8	-0.08	3.8	0.86	2.3	0.73	3.7	0.79	0.23	-0.15	3.55	0.40	107.6	0.035	0.173
3	20.2	0.02	3.8	0.86	2.3	0.73	3.7	0.72	0.15	-0.16	4.22	0.66	105.4	0.036	0.187
4	18.7	0.01	3.7	0.91	2.3	0.73	3.6	0.80	-0.07	-0.21	5.06	0.76	103.1	0.036	0.197
5	10.5	0.01	3.7	0.90	2.4	0.75	3.7	0.80	-0.38	-0.33	5.93	0.74	83.7	0.044	0.351
6	10.5	-0.04	3.7	0.92	2.3	0.76	3.6	0.79	-0.41	-0.29	6.40	0.80	83.8	0.044	0.348
7	12.0	-0.02	3.8	0.92	2.4	0.78	3.7	0.80	-0.18	-0.09	6.25	0.79	88.1	0.043	0.314
8	13.2	0.02	4.2	0.92	2.8	0.81	4.1	0.85	0.36	0.01	6.59	0.84	90.9	0.046	0.317
9	13.2	-0.02	4.1	0.92	2.6	0.79	4.0	0.85	0.86	-0.14	6.95	0.77	90.3	0.045	0.306
10	13.5	0.01	4.9	0.92	3.3	0.82	4.8	0.88	0.54	-0.27	7.38	0.64	91.4	0.054	0.362
11	13.2	0.00	4.8	0.90	3.3	0.82	4.7	0.85	0.21	-0.15	6.90	0.50	91.0	0.053	0.367
12	19.0	0.02	4.1	0.90	2.7	0.81	3.9	0.83	0.43	-0.05	4.88	0.43	103.1	0.040	0.216

Table B46
Runs 203 & 188 H,cm = 7.9 T,s = 0.9 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	34.9	-0.09	7.5	0.89	4.9	0.77	7.3	0.83	0.00	0.00	0.00	0.00	120.1	0.062	0.214
2	21.8	0.03	6.7	0.90	4.3	0.83	6.7	0.83	-1.08	0.91	7.28	1.10	109.3	0.062	0.309
3	20.2	-0.03	6.7	0.92	4.3	0.83	6.6	0.41	-1.33	0.99	7.61	1.20	107.2	0.062	0.330
4	18.7	-0.10	6.4	0.92	4.1	0.83	6.3	0.84	-1.91	1.18	8.95	1.43	105.4	0.061	0.342
5	10.5	-0.14	5.8	0.90	4.1	0.85	6.1	0.83	-3.00	1.36	9.89	2.25	86.5	0.068	0.557
6	10.5	-0.04	4.9	0.90	3.6	0.85	4.8	0.83	-3.49	1.15	9.31	2.45	87.0	0.057	0.468
7	12.0	0.01	4.8	0.88	3.4	0.85	4.6	0.85	-2.32	0.56	8.83	1.96	90.5	0.053	0.401
8	13.2	0.05	5.1	0.92	3.5	0.85	4.8	0.87	-0.15	0.17	8.73	1.83	91.4	0.055	0.382
9	13.2	0.03	4.6	0.88	3.2	0.83	4.5	0.86	1.18	0.02	8.51	1.45	89.9	0.051	0.349
10	13.5	0.06	5.3	0.92	3.8	0.88	5.1	0.90	0.97	-0.07	8.71	1.06	90.9	0.058	0.392
11	13.2	0.05	5.3	0.88	3.7	0.88	5.1	0.87	0.61	-0.01	8.08	0.78	90.6	0.058	0.399
12	19.0	0.09	4.5	0.88	3.1	0.86	4.2	0.86	0.62	0.03	6.06	0.57	102.8	0.044	0.237

Table B47
Runs 205 & 190 H,cm = 4.3 T,s = 1.7 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms, cm/s	V_rms, cm/s	L,cm	H/L	H/d
1	34.9	0.01	4.3	1.71	2.6	1.04	4.2	1.31	0.00	0.00	0.00	0.00	288.9	0.015	0.124
2	21.8	-0.02	4.3	1.61	2.6	1.08	4.2	1.32	-0.34	0.17	5.56	0.53	236.4	0.018	0.196
3	20.2	-0.03	4.3	1.69	2.7	1.07	4.2	1.20	-0.36	0.20	5.82	0.58	228.9	0.019	0.215
4	18.7	0.01	4.3	1.66	2.7	1.08	4.2	1.34	-0.50	0.29	6.94	0.73	221.3	0.020	0.231
5	10.5	-0.04	4.7	1.64	3.1	1.12	5.0	1.32	-1.01	0.31	8.35	0.91	170.0	0.028	0.448
6	10.5	0.02	4.4	1.62	2.9	1.01	4.8	1.33	-1.74	0.46	8.34	1.07	171.3	0.026	0.419
7	12.0	-0.05	4.2	1.62	2.8	0.99	4.4	1.28	-1.56	0.47	7.75	1.19	182.2	0.023	0.351
8	13.2	-0.03	4.5	1.61	2.9	0.94	4.2	1.07	-0.09	0.26	8.05	1.11	187.9	0.024	0.339
9	13.2	-0.03	4.6	1.61	2.9	1.01	4.4	1.20	0.79	0.11	8.26	1.03	186.3	0.025	0.346
10	13.5	-0.02	5.0	1.63	3.2	0.95	4.7	1.12	0.42	-0.13	8.23	0.99	188.9	0.026	0.369
11	13.2	-0.04	4.8	1.63	3.0	0.90	4.6	1.07	0.14	-0.16	7.23	0.74	187.5	0.026	0.362
12	19.0	0.03	3.9	1.73	2.5	0.87	3.7	0.99	0.38	-0.05	4.99	0.54	221.2	0.018	0.206

Appendix C
Data Tables for Monochromatic Waves

Tables C1 through C41 provide measurements for the monochromatic wave runs. Run numbers are summarized in Appendix D. For each run, the tables include the still-water depth (d), wave setup (e), peak period (T_p), mean wave height (H_m) and period (T_m), mean cross-shore (U) and alongshore velocity (V), root-mean-square cross-shore (U_{rms}) and alongshore velocity (V_{rms}), estimated wavelength (L), height-to-wavelength ratio (H/L), and height-to-depth ratio (H/d). Gauge 1 is the gauge farthest offshore (near the generator), and Gauge 12 is in the inlet throat. The gauge spacing is 122 cm between consecutive gauges for Gauges 2 to 12. The gauge locations are shown in Figure 8 and Appendix F.

Table C1
Runs 59 & 117 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.01	4.3	0.71	3.1	0.71	3.2	0.70	0.00	0.00	0.00	0.00	77.8	0.055	0.134
2	18.9	-0.08	3.8	0.71	2.7	0.71	2.8	0.70	1.01	0.07	7.24	0.83	71.7	0.054	0.203
3	17.4	0.01	3.5	0.71	2.5	0.71	2.6	0.70	0.51	0.04	3.62	0.42	71.0	0.050	0.203
4	15.9	0.02	3.8	0.71	2.7	0.71	2.7	0.70	-0.04	-0.03	1.86	0.22	70.1	0.055	0.243
5	7.6	-0.02	3.9	0.71	3.0	0.71	3.1	0.70	-0.99	-0.07	3.77	0.46	56.0	0.070	0.514
6	7.6	-0.04	4.3	0.71	3.1	0.71	3.2	0.70	-0.73	-0.13	4.92	0.51	55.8	0.076	0.558
7	9.1	-0.04	3.8	0.71	2.8	0.71	2.9	0.71	0.37	-0.21	5.94	0.56	58.7	0.064	0.412
8	10.4	-0.02	3.7	0.71	2.7	0.71	2.8	0.71	0.74	-0.08	6.80	0.82	61.0	0.061	0.356
9	10.4	-0.06	4.3	0.71	3.1	0.71	3.2	0.71	1.07	-0.10	7.54	0.81	60.7	0.071	0.416
10	10.7	0.01	4.8	0.71	3.4	0.71	3.6	0.71	0.90	-0.34	7.82	0.48	61.5	0.078	0.447
11	10.4	0.00	5.2	0.71	3.8	0.71	4.0	0.71	0.80	-0.25	7.19	0.34	61.0	0.086	0.506
12	16.2	0.00	4.0	0.71	2.9	0.71	3.0	0.71	0.73	-0.08	4.71	0.27	69.6	0.058	0.250

Table C2
Runs 60 & 118 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.12	4.0	1.41	2.9	1.41	3.0	1.41	0.00	0.00	0.00	0.00	222.8	0.018	0.124
2	18.9	-0.15	4.9	1.41	3.6	1.41	3.7	1.41	0.00	0.00	0.00	0.00	179.7	0.027	0.259
3	17.4	-0.11	4.4	1.41	3.2	1.41	3.3	1.41	0.05	-0.03	3.17	0.38	173.2	0.025	0.251
4	15.9	-0.11	4.1	1.41	3.0	1.41	3.1	1.42	1.56	-0.19	5.29	0.80	164.0	0.025	0.260
5	7.6	-0.18	5.0	1.41	4.3	1.41	4.5	1.41	1.12	-0.03	6.57	0.83	117.1	0.043	0.657
6	7.6	-0.11	3.6	1.41	2.3	0.91	3.6	1.41	-1.72	0.33	8.52	0.73	121.4	0.030	0.476
7	9.1	-0.03	3.0	0.70	1.9	0.63	3.4	1.12	-3.22	-0.47	7.33	0.98	134.2	0.023	0.333
8	10.4	0.02	3.8	0.71	2.5	0.70	2.9	0.77	-1.82	-0.45	6.08	1.12	139.9	0.027	0.363
9	10.4	0.00	3.5	0.71	2.0	0.69	2.6	0.69	0.37	0.57	5.81	0.98	136.6	0.026	0.339
10	10.7	0.03	3.0	1.41	1.9	0.72	2.3	0.81	0.33	0.57	6.22	1.04	138.5	0.022	0.283
11	10.4	0.03	2.7	0.70	1.5	0.67	2.6	0.92	-0.02	0.36	5.05	0.87	137.2	0.019	0.256
12	16.2	0.03	2.4	0.70	1.5	0.75	2.2	0.90	-0.01	0.19	3.22	0.61	167.8	0.014	0.149

Table C3
Runs 65 & 123 H,cm = 5.4864 T,s = 0.71 wl,cm = 1.524

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.004	-0.0214	4.3601	0.7097	3.0517	0.71	3.2768	0.7087	0	0	0	0	77.81	0.056	0.1362
2	18.894	0.0216	4.4775	0.7093	3.0084	0.7094	3.9776	0.7093	2.67	-0.21	3.94	1.28	69.79	0.0642	0.237
3	17.374	0.0241	4.4928	0.7098	3.1212	0.7093	4.2276	0.7096	2.765	-0.21	4.625	1.555	68.49	0.0656	0.2586
4	15.854	0.0148	4.2337	0.7098	2.9288	0.7068	4.1118	0.7094	3.88	-0.195	6.605	2.24	65.81	0.0643	0.267
5	7.624	0.0322	4.7214	0.7108	3.4503	0.7072	4.3556	0.7093	8.515	0.145	7.78	2.795	47.42	0.0996	0.6193
6	7.624	0.0055	3.8649	0.7113	2.6835	0.6899	3.7826	0.7093	13.325	0.59	7.185	3.03	42.64	0.0906	0.5069
7	9.144	-0.0168	3.8569	0.7076	2.5122	0.6911	3.7475	0.7084	13.195	0.75	6.01	3.105	46.06	0.0837	0.4218
8	10.364	0.014	3.5936	0.7078	2.3293	0.6817	3.7186	0.711	12.655	0.83	6.285	3.665	48.85	0.0736	0.3467
9	10.364	-0.0573	4.9012	0.7103	3.1791	0.696	4.8128	0.7105	13.7	0.215	6.545	3.06	47.66	0.1028	0.4729
10	10.664	0.0198	3.5204	0.7128	2.3457	0.7029	3.4016	0.7099	15.295	-0.135	5.015	1.485	46.22	0.0762	0.3301
11	10.364	0.0192	2.5661	0.7128	1.7319	0.6986	2.471	0.7074	15.875	0.19	3.605	0.93	45.06	0.0569	0.2476
12	16.154	-0.0221	2.0394	0.7128	1.3487	0.6997	1.997	0.7065	15.6	0.065	2.375	0.87	51.22	0.0398	0.1262

Refer to Notation, Appendix C.

Table C4
Runs 66 & 124 H,cm = 5.4864 T,s = 1.41 wl,cm = 1.524

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.004	-0.1213	4.023	1.4116	2.8884	1.41	3.0392	1.408	0	0	0	0	222.75	0.0181	0.1257
2	18.894	-0.0469	5.4072	1.407	4.0112	1.41	4.6878	1.409	0.51	1.07	7.46	1.27	178.86	0.0302	0.2862
3	17.374	-0.0327	4.9439	1.407	3.7887	1.409	4.4409	1.413	0.185	1.05	7.45	1.37	172.95	0.0286	0.2846
4	15.854	-0.0828	4.6269	1.407	3.5753	1.41	4.3038	1.411	-0.185	1.425	9.1	1.605	166.69	0.0278	0.2918
5	7.624	-0.0994	6.0228	1.407	5.1633	1.41	5.8613	1.411	0.21	1.015	9.87	2.055	118.48	0.0508	0.79
6	7.624	0.0878	3.7582	1.413	2.8712	1.167	3.7033	1.41	2.88	0.44	7.515	2.195	114.51	0.0328	0.4929
7	9.144	0.0989	3.0132	0.7059	1.9514	0.7342	3.066	1.213	6.195	0.725	5.25	1.635	120.05	0.0251	0.3295
8	10.364	0.0829	2.3332	1.413	1.5286	0.938	2.0702	1.068	10.165	0.65	4.31	1.325	121.61	0.0192	0.2251
9	10.364	-0.0202	1.7998	1.417	1.1025	0.7718	1.7578	0.9709	13.535	-0.115	4.24	1.325	116.33	0.0155	0.1737
10	10.664	0.0494	1.9961	1.413	1.2643	0.8464	1.8477	1.077	15.285	-0.34	4.66	1.075	115.33	0.0173	0.1872
11	10.364	0.055	2.425	1.413	1.5703	0.9677	2.2473	1.115	15.88	0.1	4.19	0.875	112.61	0.0215	0.234
12	16.154	0.0104	1.8032	1.413	1.1735	0.8791	1.7063	0.9467	15.55	-0.36	3.05	0.805	142.64	0.0126	0.1116

Table C5
Runs 71 & 129 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.35	4.5	0.71	3.1	0.71	3.6	0.71	0.00	0.00	0.00	0.00	77.8	0.059	0.142
2	18.9	-0.26	6.6	0.71	4.3	0.70	6.2	0.71	5.46	0.01	5.97	2.54	66.4	0.099	0.347
3	17.4	-0.27	6.3	0.71	4.1	0.70	6.1	0.71	5.63	0.02	6.84	2.97	65.2	0.097	0.363
4	15.9	-0.30	5.8	0.71	3.8	0.70	5.8	0.71	8.65	0.20	9.31	3.83	60.2	0.096	0.366
5	7.6	-0.47	4.0	0.71	2.7	0.68	3.7	0.71	15.43	0.50	8.37	3.48	40.4	0.099	0.525
6	7.6	-0.33	3.0	0.70	2.0	0.67	3.0	0.71	21.93	0.61	5.42	3.03	32.3	0.093	0.396
7	9.1	-0.24	3.4	0.71	2.1	0.68	3.3	0.71	22.25	0.66	3.99	2.89	34.5	0.100	0.375
8	10.4	-0.22	1.6	0.71	1.0	0.72	1.6	0.72	21.71	0.61	2.67	1.77	36.9	0.044	0.156
9	10.4	-0.27	1.1	0.73	0.7	0.72	1.1	0.73	23.73	-0.57	2.28	1.04	33.4	0.033	0.106
10	10.7	-0.26	1.0	0.71	0.6	0.72	1.0	0.73	26.12	-0.85	2.07	0.90	28.0	0.036	0.095
11	10.4	-0.29	1.3	0.79	0.8	0.76	1.3	0.76	26.34	-0.07	2.05	0.83	27.1	0.049	0.127
12	16.2	-0.16	0.4	0.84	0.2	0.78	0.4	0.80	25.75	-0.86	1.78	0.80	31.2	0.013	0.026

Table C6
Runs 72 & 130 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.37	4.0	1.41	2.9	1.41	3.0	1.41	0.00	0.00	0.00	0.00	222.8	0.018	0.126
2	18.9	-0.37	4.5	1.40	3.5	1.41	4.2	1.41	3.79	0.05	6.60	1.00	173.6	0.026	0.240
3	17.4	-0.34	4.4	1.40	3.4	1.41	4.2	1.41	4.09	0.05	7.19	1.27	166.7	0.027	0.255
4	15.9	-0.32	4.5	1.41	3.4	1.41	4.1	1.41	7.08	0.15	9.87	1.94	155.2	0.029	0.282
5	7.6	-0.49	5.0	1.41	4.2	1.31	5.4	1.41	15.32	0.23	9.52	1.87	95.6	0.052	0.658
6	7.6	0.14	3.1	1.41	2.5	1.23	3.1	1.41	22.81	0.32	8.04	1.62	83.8	0.037	0.405
7	9.1	-0.06	3.6	1.06	2.3	0.82	3.4	1.07	22.37	0.87	9.86	2.07	94.7	0.038	0.391
8	10.4	-0.23	6.0	1.41	4.4	1.37	5.4	1.41	22.01	1.07	10.57	1.82	102.7	0.059	0.580
9	10.4	-0.25	3.5	1.41	2.7	1.40	3.1	1.41	24.37	-0.39	7.49	1.14	98.7	0.036	0.339
10	10.7	-0.24	2.4	1.42	1.9	1.33	2.5	1.39	26.91	-0.79	4.69	0.98	96.2	0.025	0.229
11	10.4	-0.27	2.8	1.42	2.1	1.35	2.5	1.39	27.41	0.06	4.59	0.96	93.6	0.030	0.273
12	16.2	-0.13	1.5	1.42	1.1	1.27	1.3	1.40	26.56	-0.69	3.28	0.89	123.6	0.012	0.093

Table C7
Runs 93 & 133 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.25	4.6	0.71	3.1	0.71	3.9	0.70	0.00	0.00	0.00	0.00	77.8	0.060	0.145
2	18.9	0.34	6.1	0.71	4.1	0.70	6.1	0.70	19.97	1.34	5.07	3.34	45.1	0.136	0.323
3	17.4	0.07	5.5	0.71	3.5	0.69	5.4	0.71	18.89	1.22	5.27	3.54	46.6	0.118	0.315
4	15.9	0.11	5.2	0.71	3.3	0.69	5.1	0.71	20.72	1.39	6.71	4.02	42.8	0.121	0.326
5	7.6	0.15	2.6	0.70	1.7	0.68	2.5	0.70	29.17	1.79	6.24	4.22	-	-	0.336
6	7.6	0.07	3.4	0.71	2.1	0.69	3.2	0.70	35.12	1.65	3.55	3.63	-	-	0.440
7	9.1	-0.17	1.0	0.71	0.6	0.72	1.0	0.71	31.91	0.90	2.67	2.59	-	-	0.110
8	10.4	-0.36	0.5	0.71	0.3	0.74	0.4	0.76	29.74	0.32	2.33	1.48	-	-	0.045
9	10.4	-0.38	0.2	0.71	0.1	0.75	0.2	0.83	31.49	-1.06	1.92	0.92	-	-	0.023
10	10.7	-0.33	0.3	0.71	0.2	0.75	0.3	0.75	34.72	-1.22	1.83	0.88	-	-	0.028
11	10.4	-0.41	0.1	1.21	0.1	1.24	0.1	1.91	35.88	-0.03	1.87	0.85	-	-	0.011
12	16.2	-0.14	0.1	2.96	0.0	0.94	0.1	1.96	35.19	-1.02	1.79	0.90	-	-	0.004

Table C8
Runs 94 & 134 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.31	4.2	1.41	3.0	1.41	3.2	1.41	0.00	0.00	0.00	0.00	222.8	0.019	0.131
2	18.9	0.17	4.8	1.41	3.8	1.41	4.6	1.41	5.61	0.46	7.56	1.15	170.6	0.028	0.254
3	17.4	-0.10	5.0	1.41	4.0	1.41	4.6	1.41	5.48	0.34	8.46	1.50	164.5	0.031	0.290
4	15.9	-0.06	5.5	1.41	4.3	1.41	4.7	1.41	8.86	0.60	12.78	2.53	152.3	0.036	0.349
5	7.6	0.12	4.7	1.41	3.6	1.28	4.5	1.41	18.08	1.18	11.89	2.49	91.3	0.051	0.612
6	7.6	0.25	3.2	1.41	2.2	1.09	3.3	1.41	29.04	1.66	8.56	1.88	73.4	0.043	0.416
7	9.1	-0.12	3.4	1.41	2.3	1.25	3.1	1.37	30.33	1.46	10.68	2.28	81.1	0.041	0.367
8	10.4	-0.36	3.1	1.41	2.3	1.39	2.9	1.40	28.55	0.78	8.76	2.04	91.6	0.034	0.299
9	10.4	-0.37	2.1	1.41	1.5	1.34	1.9	1.40	31.30	-0.80	5.67	1.43	86.7	0.024	0.200
10	10.7	-0.33	2.4	1.41	1.7	1.32	2.2	1.39	34.99	-1.06	5.29	1.31	81.4	0.029	0.221
11	10.4	-0.48	2.5	1.41	1.7	1.36	2.2	1.40	36.17	0.01	4.43	1.23	77.5	0.032	0.239
12	16.2	-0.12	1.2	1.41	0.7	0.99	1.1	1.22	35.38	-1.12	3.01	1.07	106.7	0.011	0.071

Table C9
Runs 77 & 99 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	0.02	4.2	0.71	3.0	0.71	3.2	0.71	0.00	0.00	0.00	0.00	77.8	0.054	0.131
2	18.9	-0.07	4.0	0.71	2.8	0.71	2.9	0.71	0.27	0.51	3.44	0.37	72.6	0.055	0.211
3	17.4	0.03	4.1	0.71	2.9	0.71	3.0	0.71	0.12	0.49	4.24	0.64	71.5	0.057	0.236
4	15.9	0.07	3.9	0.71	2.7	0.71	2.8	0.71	0.20	0.58	5.38	0.71	69.8	0.055	0.244
5	7.6	0.05	4.2	0.71	3.1	0.71	3.2	0.71	0.79	0.36	6.50	0.66	54.5	0.076	0.546
6	7.6	0.03	3.5	0.71	2.6	0.71	2.8	0.71	0.07	0.35	8.71	1.34	55.1	0.064	0.465
7	8.8	-0.01	4.1	0.71	3.0	0.71	3.3	0.71	-0.20	0.54	8.78	1.39	58.5	0.069	0.459
8	10.4	-0.01	4.5	0.71	3.2	0.71	3.3	0.71	0.95	0.29	7.51	1.02	60.8	0.074	0.432
9	10.4	0.04	4.8	0.71	3.4	0.71	3.6	0.71	1.19	-0.05	7.92	0.89	60.6	0.080	0.468
10	10.5	0.09	4.6	0.71	3.2	0.71	3.5	0.71	0.84	-0.22	7.59	0.69	61.2	0.075	0.436
11	10.2	0.05	4.2	0.71	3.0	0.71	3.2	0.71	0.44	-0.16	6.52	0.80	61.0	0.069	0.412
12	14.3	0.12	4.0	0.71	2.8	0.71	2.9	0.71	0.50	-0.08	4.92	0.59	67.7	0.059	0.281

Table C10
Runs 78 & 100 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.09	4.0	1.41	2.9	1.41	3.0	1.41	0.00	0.00	0.00	0.00	222.8	0.018	0.124
2	18.9	-0.14	4.6	1.41	3.4	1.41	3.5	1.41	-0.85	0.00	7.06	0.39	181.0	0.026	0.246
3	17.4	-0.10	4.7	1.41	3.4	1.41	3.5	1.41	-0.96	0.01	7.34	0.61	174.8	0.027	0.268
4	15.9	-0.10	4.8	1.41	3.4	1.41	3.5	1.41	-1.41	-0.07	8.95	0.63	168.6	0.028	0.302
5	7.6	-0.16	5.7	1.41	4.8	1.41	4.9	1.42	-2.89	-0.58	9.42	0.72	123.1	0.047	0.750
6	7.6	-0.08	3.4	1.41	1.9	0.73	3.4	1.41	-5.67	-0.46	7.84	1.48	127.2	0.027	0.446
7	8.8	-0.02	3.3	0.70	2.2	0.69	3.4	1.18	-4.48	0.59	6.93	1.63	134.1	0.025	0.375
8	10.4	-0.02	4.2	0.71	3.0	0.70	4.0	0.61	0.34	0.92	6.29	1.32	136.7	0.030	0.401
9	10.4	-0.06	3.7	1.41	2.2	0.70	3.0	0.72	2.08	0.60	6.17	1.36	134.0	0.027	0.354
10	10.5	0.00	3.4	1.41	2.2	0.72	2.8	0.86	1.42	0.51	6.25	1.23	136.0	0.025	0.320
11	10.2	0.04	2.8	0.71	1.8	0.67	2.6	0.86	0.72	0.49	5.19	1.12	135.2	0.021	0.277
12	14.3	0.00	2.6	0.71	1.8	0.70	2.2	0.67	0.56	0.28	3.57	0.79	158.2	0.017	0.184

Table C11
Runs 83 & 105 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	0.01	4.3	0.71	3.0	0.71	3.3	0.71	0.00	0.00	0.00	0.00	77.8	0.055	0.133
2	18.9	-0.09	4.1	0.71	2.8	0.71	3.8	0.71	2.15	-0.06	3.68	1.75	70.4	0.059	0.219
3	17.4	-0.07	4.2	0.71	2.9	0.71	4.2	0.71	2.50	-0.20	4.19	1.93	68.8	0.061	0.242
4	15.9	-0.03	4.0	0.71	2.6	0.71	3.9	0.71	4.48	-0.21	5.38	2.49	65.1	0.061	0.250
5	7.6	-0.05	4.3	0.71	3.0	0.70	4.2	0.71	9.30	1.03	7.46	3.15	46.7	0.091	0.560
6	7.6	-0.05	4.4	0.71	3.1	0.70	4.3	0.71	13.22	2.21	8.75	3.43	42.8	0.103	0.575
7	8.8	0.04	3.8	0.71	2.5	0.69	3.7	0.71	12.77	1.89	7.33	3.39	45.9	0.083	0.431
8	10.4	0.10	4.9	0.71	3.2	0.70	4.5	0.71	12.34	1.21	6.25	3.34	49.2	0.099	0.469
9	10.4	0.03	3.6	0.71	2.3	0.70	3.5	0.71	12.63	0.54	7.88	2.97	48.9	0.074	0.348
10	10.5	0.08	3.2	0.71	2.1	0.70	3.1	0.71	12.23	0.42	6.48	1.93	49.6	0.065	0.308
11	10.2	0.08	2.5	0.71	1.6	0.70	2.3	0.71	13.03	1.95	3.46	1.11	48.2	0.052	0.245
12	14.3	0.09	2.3	0.71	1.5	0.70	2.1	0.71	14.59	1.42	2.88	1.00	51.3	0.044	0.159

Table C12
Runs 84 & 106 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.12	4.0	1.41	2.8	1.41	3.0	1.41	0.00	0.00	0.00	0.00	222.8	0.018	0.124
2	18.9	-0.13	5.0	1.41	3.7	1.41	4.2	1.41	1.13	0.66	7.38	1.01	177.9	0.028	0.267
3	17.4	-0.16	5.4	1.41	4.1	1.41	4.6	1.41	0.69	0.54	7.68	1.05	172.2	0.031	0.309
4	15.9	-0.13	5.0	1.41	3.8	1.41	4.3	1.41	0.27	0.57	9.24	1.41	166.0	0.030	0.318
5	7.6	-0.15	6.1	1.41	5.1	1.41	5.4	1.41	2.62	1.69	10.40	2.36	114.9	0.053	0.799
6	7.6	-0.01	3.6	1.41	2.5	1.04	3.6	1.41	5.37	3.59	8.49	2.39	110.8	0.033	0.476
7	8.8	0.06	3.2	0.71	2.0	0.76	3.1	1.19	6.59	3.71	5.89	1.60	117.5	0.027	0.360
8	10.4	0.03	2.9	1.41	1.8	0.74	2.4	0.87	7.72	2.41	11.17	2.80	125.4	0.024	0.284
9	10.4	-0.01	2.6	1.42	1.6	0.83	2.4	1.06	9.25	1.23	21.49	5.30	123.0	0.021	0.250
10	10.5	-0.04	2.8	1.41	1.7	0.73	2.3	0.83	9.78	0.77	15.01	3.70	123.1	0.023	0.270
11	10.2	0.04	2.4	1.41	1.5	0.79	2.1	1.00	11.43	1.99	4.23	1.32	118.7	0.020	0.238
12	14.3	0.06	2.0	1.41	1.2	0.78	1.8	1.00	14.92	1.17	10.11	2.93	135.3	0.014	0.137

Table C13
Runs 89 & 111 H,cm = 5.5 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	0.02	4.4	0.71	3.0	0.71	3.5	0.71	0.00	0.00	0.00	0.00	77.8	0.057	0.138
2	18.9	0.07	6.0	0.71	3.8	0.71	5.8	0.71	5.51	-0.32	5.78	2.54	66.4	0.091	0.318
3	17.4	0.07	6.5	0.71	4.3	0.71	5.9	0.71	5.71	-0.20	6.73	2.89	65.1	0.100	0.375
4	15.9	0.02	6.7	0.71	4.5	0.71	6.4	0.71	8.25	0.63	9.24	3.75	60.7	0.111	0.425
5	7.6	-0.08	4.5	0.71	3.2	0.70	4.2	0.71	15.29	2.06	8.32	3.63	40.5	0.111	0.588
6	7.6	0.15	3.0	0.71	1.9	0.67	2.9	0.71	22.91	3.12	5.89	3.30	30.9	0.096	0.387
7	8.8	0.10	3.3	0.71	2.1	0.69	3.3	0.71	22.34	2.45	4.78	3.30	33.9	0.097	0.371
8	10.4	0.05	1.8	0.71	1.1	0.71	1.8	0.72	20.49	1.39	3.17	2.13	38.9	0.047	0.175
9	10.4	0.00	1.2	0.71	0.7	0.71	1.2	0.72	22.68	1.05	2.52	1.14	35.3	0.035	0.118
10	10.5	0.03	1.1	0.71	0.7	0.72	1.1	0.72	24.24	1.08	2.39	0.99	32.5	0.035	0.109
11	10.2	0.06	1.4	0.74	0.8	0.75	1.3	0.75	24.96	3.48	2.33	1.01	30.7	0.045	0.134
12	14.3	0.02	0.6	0.79	0.4	0.77	0.6	0.78	25.48	1.94	1.79	0.91	31.7	0.020	0.044

Table C14
Runs 90 & 112 H,cm = 5.5 T,s = 1.4 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.02	4.1	1.41	2.9	1.41	3.1	1.41	0.00	0.00	0.00	0.00	222.8	0.018	0.128
2	18.9	0.00	4.7	1.41	3.6	1.41	4.3	1.41	5.81	0.06	7.50	1.09	170.3	0.028	0.251
3	17.4	0.00	5.2	1.41	3.9	1.41	4.4	1.41	5.80	0.05	8.42	1.23	164.0	0.032	0.297
4	15.9	-0.06	5.4	1.41	4.1	1.41	4.5	1.41	8.18	0.61	10.75	1.96	153.4	0.035	0.342
5	7.6	-0.12	6.2	1.41	5.6	1.38	6.2	1.41	16.32	2.49	9.92	2.33	94.1	0.066	0.812
6	7.6	0.17	3.1	1.41	2.5	1.25	3.1	1.41	23.55	3.71	8.01	2.40	82.6	0.037	0.401
7	8.8	0.13	4.4	1.41	3.3	1.27	4.5	1.41	22.43	2.61	8.12	3.44	92.6	0.047	0.493
8	10.4	0.06	2.5	0.70	1.5	0.81	2.4	1.07	21.44	1.54	6.85	4.20	103.6	0.024	0.241
9	10.4	0.00	3.1	1.42	2.3	1.38	2.9	1.41	23.51	1.15	6.30	3.37	100.2	0.031	0.301
10	10.5	0.04	2.9	1.41	2.1	1.27	2.7	1.40	25.19	1.16	6.33	1.82	98.2	0.030	0.277
11	10.2	0.07	2.7	1.42	2.0	1.32	2.4	1.40	26.25	3.79	5.07	1.47	94.7	0.029	0.265
12	14.3	0.03	1.8	1.41	1.3	1.32	1.6	1.40	26.50	2.16	3.19	1.32	115.6	0.015	0.124

Table C15
Runs 135 & 170 H,cm = 2.7 T,s = 0.5 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	28.2	-0.08	3.6	0.50	2.5	0.50	2.8	0.49	0.00	0.00	0.00	0.00	39.0	0.093	0.129
2	15.1	-0.02	3.5	0.50	2.5	0.50	2.7	0.48	-0.05	-0.10	2.21	0.46	38.5	0.092	0.234
3	13.6	-0.04	3.3	0.50	2.3	0.50	2.5	0.48	-0.24	-0.17	2.66	0.54	38.4	0.086	0.243
4	12.0	-0.04	3.1	0.50	2.1	0.50	2.3	0.49	-0.79	-0.43	4.17	0.70	38.3	0.080	0.254
5	3.8	-0.06	2.3	0.50	1.7	0.50	1.9	0.49	-2.80	-0.39	4.70	1.03	29.1	0.078	0.593
6	3.8	0.03	1.4	0.50	1.0	0.48	1.3	0.49	-2.99	-0.08	3.51	1.18	29.3	0.049	0.373
7	5.3	0.04	1.5	0.50	1.1	0.49	1.3	0.49	-0.98	0.05	2.63	0.87	31.6	0.048	0.286
8	6.6	0.01	1.5	0.50	1.0	0.50	1.4	0.50	-0.16	0.23	2.58	0.69	33.2	0.046	0.232
9	6.6	0.04	1.0	0.50	0.7	0.48	1.0	0.49	0.06	0.31	2.64	0.71	33.0	0.032	0.160
10	6.9	0.04	1.3	0.50	0.9	0.50	1.2	0.50	0.02	0.11	2.49	0.48	33.5	0.040	0.193
11	6.6	0.04	1.4	0.50	0.9	0.48	1.2	0.50	0.01	0.00	2.48	0.26	33.1	0.041	0.207
12	12.3	0.05	1.4	0.50	0.9	0.50	1.2	0.50	0.09	0.01	2.16	0.23	37.7	0.038	0.116

Table C16
Runs 138 & 173 H,cm = 2.7 T,s = 1.0 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	28.2	-0.19	3.3	1.00	2.5	1.00	2.7	1.01	0.00	0.00	0.00	0.00	135.0	0.025	0.117
2	15.1	-0.17	3.3	1.00	2.4	1.00	2.4	1.01	-0.19	-0.30	5.42	0.51	109.5	0.030	0.220
3	13.6	-0.16	3.6	1.00	2.6	1.00	2.7	1.01	-0.41	-0.29	6.19	0.75	105.3	0.034	0.267
4	12.0	-0.13	3.5	1.00	2.5	1.00	2.5	1.00	-1.02	-0.19	6.93	0.72	101.1	0.035	0.292
5	3.8	-0.15	2.1	1.00	1.9	1.00	2.2	1.01	-2.91	0.28	6.08	0.94	62.7	0.034	0.550
6	3.8	0.05	1.4	0.33	1.0	0.50	1.5	1.01	-3.61	0.33	5.21	1.18	63.4	0.023	0.378
7	5.3	0.06	1.6	0.75	1.0	0.52	1.4	0.78	-1.90	0.02	4.61	0.90	71.8	0.023	0.307
8	6.6	0.04	1.8	1.00	1.1	0.58	1.6	0.74	-0.53	0.22	4.00	1.07	77.2	0.023	0.268
9	6.6	0.03	1.6	1.00	1.0	0.57	1.4	0.63	-0.37	0.58	3.89	1.32	77.1	0.021	0.242
10	6.9	0.02	1.2	1.00	0.8	0.63	1.1	0.72	-0.94	0.55	3.80	1.25	79.2	0.015	0.177
11	6.6	0.05	1.2	1.00	0.8	0.59	1.2	0.63	-1.18	0.24	3.70	0.86	77.9	0.015	0.180
12	12.3	0.01	1.0	1.00	0.6	0.59	1.0	0.56	-0.81	0.09	3.34	0.56	101.9	0.010	0.082

Table C17
Runs 141 & 176 H,cm = 2.7 T,s = 1.4 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	28.2	-0.26	3.7	1.41	2.7	1.41	2.8	1.41	0.00	0.00	0.00	0.00	212.1	0.018	0.132
2	15.1	-0.30	3.8	1.41	2.9	1.41	3.1	1.41	-0.87	-0.29	6.45	0.86	164.1	0.023	0.253
3	13.6	-0.28	4.1	1.41	3.3	1.41	3.4	1.41	-1.04	-0.27	6.74	0.77	156.8	0.026	0.303
4	12.0	-0.27	3.7	1.41	3.0	1.41	3.1	1.41	-1.91	-0.28	8.95	1.18	149.9	0.025	0.308
5	3.8	-0.28	3.5	1.41	3.0	1.41	3.3	1.41	-5.49	0.38	8.75	1.97	93.1	0.037	0.907
6	3.8	0.01	1.5	1.41	1.4	1.34	1.6	1.41	-6.25	0.56	5.84	1.67	94.2	0.016	0.401
7	5.3	0.05	1.7	0.94	1.1	0.54	1.7	1.12	-2.71	0.37	5.01	1.65	104.1	0.016	0.319
8	6.6	0.07	1.4	1.41	0.9	0.50	1.3	0.64	-1.43	1.61	4.80	2.15	112.7	0.012	0.208
9	6.6	0.08	1.0	1.41	0.6	0.48	1.0	0.64	-1.83	2.13	4.57	1.90	113.2	0.009	0.154
10	6.9	0.09	0.8	1.41	0.4	0.50	0.8	0.63	-2.05	1.05	4.68	1.56	116.0	0.007	0.113
11	6.6	0.10	0.8	1.42	0.5	0.67	0.8	0.79	-1.96	0.21	4.67	1.22	113.4	0.007	0.117
12	12.3	0.13	0.7	1.42	0.4	0.61	0.7	0.66	-1.72	0.06	4.24	0.78	151.3	0.005	0.057

Table C18
Runs 142 & 163 H,cm = 2.7 T,s = 0.5 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	28.2	-0.07	3.5	0.50	2.5	0.50	2.7	0.50	0.00	0.00	0.00	0.00	39.0	0.091	0.126
2	15.1	-0.06	3.8	0.50	2.7	0.50	3.2	0.49	-1.24	0.48	10.52	1.16	39.6	0.096	0.251
3	13.6	-0.06	4.0	0.50	2.8	0.50	3.3	0.49	-0.34	0.51	7.42	1.27	38.5	0.103	0.293
4	12.0	-0.03	3.7	0.50	2.6	0.50	3.1	0.49	1.32	0.53	6.57	1.17	36.5	0.103	0.311
5	3.8	-0.04	2.0	0.50	1.5	0.50	1.7	0.49	2.82	0.49	6.63	0.87	25.7	0.079	0.535
6	3.8	0.06	1.3	0.50	0.9	0.48	1.2	0.49	5.04	0.22	3.25	0.65	24.2	0.053	0.336
7	5.3	0.05	1.2	0.50	0.8	0.50	1.1	0.50	7.69	0.00	1.44	0.43	25.5	0.048	0.230
8	6.6	0.05	0.7	0.50	0.4	0.52	0.8	0.51	8.62	0.04	1.52	0.41	26.4	0.028	0.114
9	6.6	0.07	0.7	0.50	0.4	0.52	0.6	0.51	8.27	0.05	1.40	0.35	26.7	0.025	0.100
10	6.9	0.06	0.7	0.50	0.4	0.51	0.6	0.51	8.05	0.05	1.34	0.26	27.2	0.024	0.096
11	6.6	0.05	0.6	0.50	0.4	0.52	0.6	0.51	7.51	0.27	1.53	0.30	27.4	0.023	0.096
12	12.3	0.12	0.6	0.50	0.3	0.51	0.5	0.50	6.93	0.32	1.66	0.38	31.2	0.018	0.046

Table C19
Runs 145 & 166 H,cm = 2.7 T,s = 1.0 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	28.2	-0.15	3.4	1.00	2.5	1.00	2.6	1.00	0.00	0.00	0.00	0.00	135.0	0.025	0.120
2	15.1	-0.18	3.9	1.00	2.8	1.00	3.3	1.00	6.57	0.34	0.81	0.32	101.1	0.038	0.257
3	13.6	-0.21	4.1	1.00	3.0	1.00	3.5	1.00	1.57	0.79	4.76	1.03	102.9	0.040	0.303
4	12.0	-0.10	3.9	1.00	2.8	1.00	3.2	1.00	2.47	0.90	4.74	1.03	97.0	0.040	0.321
5	3.8	-0.07	2.4	1.00	2.1	0.97	2.9	1.00	3.31	0.36	4.58	0.70	56.1	0.043	0.629
6	3.8	0.16	1.5	1.00	0.9	0.53	1.5	1.00	2.98	0.06	4.61	0.79	56.5	0.026	0.381
7	5.3	0.13	1.5	1.00	0.9	0.56	1.2	0.82	7.93	-0.12	1.59	0.43	61.1	0.024	0.273
8	6.6	0.01	1.1	1.00	0.6	0.60	1.0	0.67	7.65	-0.18	4.10	0.52	68.2	0.016	0.162
9	6.6	0.17	0.8	1.00	0.6	0.85	0.7	0.92	7.55	-0.08	3.69	0.47	68.3	0.012	0.123
10	6.9	0.14	0.8	1.00	0.5	0.86	0.7	0.98	7.64	-0.02	3.44	0.35	69.7	0.011	0.112
11	6.6	0.05	0.3	1.00	0.2	1.00	0.3	1.00	6.98	0.09	3.60	0.45	68.9	0.004	0.046
12	12.3	0.16	1.0	1.00	0.6	0.89	0.9	1.00	6.65	0.15	3.14	0.39	92.9	0.011	0.079

Table C20
Runs 148 & 169 H,cm = 2.7 T,s = 1.4 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	28.2	-0.20	3.8	1.41	2.7	1.41	2.8	1.41	0.00	0.00	0.00	0.00	212.1	0.018	0.135
2	15.1	-0.28	4.3	1.41	3.4	1.41	3.6	1.41	7.42	0.03	1.33	0.57	151.0	0.028	0.284
3	13.6	-0.30	4.6	1.41	3.6	1.41	3.8	1.41	0.76	0.47	4.38	1.34	154.0	0.030	0.336
4	12.0	-0.17	4.2	1.41	3.3	1.41	3.6	1.41	0.78	0.90	4.43	1.22	145.8	0.029	0.351
5	3.8	-0.08	3.3	1.41	2.8	1.34	3.3	1.41	3.15	0.88	4.15	1.26	80.6	0.041	0.862
6	3.8	0.18	1.5	1.41	1.3	1.14	1.7	1.41	3.22	0.44	3.97	1.35	80.5	0.019	0.397
7	5.3	0.21	1.6	1.41	1.1	0.59	1.6	1.17	7.63	-0.12	1.85	0.47	88.9	0.019	0.309
8	6.6	0.11	1.5	1.41	1.0	0.61	1.5	0.62	7.34	-0.15	4.28	0.52	99.7	0.015	0.228
9	6.6	0.27	1.1	1.42	0.7	0.67	1.1	0.69	7.21	-0.10	4.09	0.46	99.9	0.011	0.172
10	6.9	0.24	1.2	1.42	0.8	0.76	1.1	0.88	7.22	-0.07	3.97	0.35	102.2	0.012	0.178
11	6.6	0.22	1.3	1.41	0.8	0.69	1.2	0.92	6.83	0.17	4.21	0.52	100.4	0.013	0.196
12	12.3	0.37	1.0	1.41	0.6	0.68	0.9	0.89	6.40	0.33	3.81	0.52	138.8	0.007	0.081

Table C21
Runs 149 & 156 H,cm = 2.7 T,s = 0.5 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	28.2	-0.23	3.7	0.50	2.6	0.50	2.8	0.50	0.00	0.00	0.00	0.00	39.0	0.094	0.130
2	15.1	-0.24	4.1	0.50	2.8	0.50	3.4	0.50	6.89	0.80	7.93	1.46	31.6	0.131	0.273
3	13.6	-0.26	3.9	0.50	2.7	0.50	3.4	0.49	6.98	0.93	5.65	1.45	31.3	0.126	0.290
4	12.0	-0.16	3.9	0.50	2.6	0.50	3.2	0.49	9.45	1.19	4.13	1.19	28.4	0.138	0.326
5	3.8	-0.13	1.8	0.50	1.3	0.50	1.6	0.49	12.70	1.36	3.79	0.96	18.6	0.098	0.478
6	3.8	-0.06	0.9	0.50	0.6	0.51	0.9	0.49	13.91	0.70	2.23	0.92	17.6	0.053	0.245
7	5.3	-0.05	0.6	0.50	0.4	0.56	0.6	0.54	16.16	-0.03	1.65	0.73	17.5	0.036	0.118
8	6.6	-0.14	0.3	0.50	0.2	0.63	0.3	0.66	18.67	-0.10	1.43	0.60	13.9	0.022	0.046
9	6.6	-0.12	0.3	0.51	0.2	0.67	0.3	0.67	18.17	-0.01	1.38	0.53	15.1	0.020	0.046
10	6.9	-0.10	0.4	0.52	0.2	0.68	0.4	0.60	17.35	0.08	1.69	0.49	16.7	0.022	0.053
11	6.6	-0.06	0.2	0.56	0.1	0.78	0.2	0.71	16.51	0.17	2.18	0.60	17.9	0.013	0.035
12	12.3	0.14	0.1	2.87	0.1	1.09	0.1	1.13	15.36	0.47	3.39	0.97	20.8	0.006	0.010

Table C22
Runs 152 & 159 H,cm = 2.7 T,s = 1.0 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	28.2	-0.27	3.3	1.00	2.3	1.00	2.5	1.00	0.00	0.00	0.00	0.00	135.0	0.024	0.117
2	15.1	-0.35	3.8	1.00	2.8	1.00	3.7	1.00	6.38	0.75	7.92	1.35	101.3	0.037	0.251
3	13.6	-0.42	3.9	1.00	2.9	1.00	3.7	1.00	4.19	1.26	8.50	1.63	99.7	0.039	0.289
4	12.0	-0.17	3.6	1.00	2.6	1.00	3.1	1.00	5.25	1.44	6.71	1.32	93.6	0.038	0.296
5	3.8	-0.06	2.3	1.00	1.9	0.91	2.6	1.00	6.71	1.08	5.56	0.97	52.5	0.044	0.609
6	3.8	0.13	1.2	1.00	0.8	0.70	1.3	1.00	9.71	0.53	4.50	1.02	49.2	0.024	0.311
7	5.3	0.16	0.9	1.00	0.6	0.69	0.9	0.79	15.54	-0.08	3.93	0.73	52.4	0.017	0.171
8	6.6	-0.04	0.7	0.50	0.4	0.66	0.7	0.73	17.70	-0.06	4.15	0.73	56.4	0.012	0.102
9	6.6	0.12	0.5	1.00	0.3	0.83	0.5	0.98	17.30	-0.04	3.89	0.67	56.9	0.009	0.076
10	6.9	0.12	0.5	1.00	0.3	0.80	0.5	1.02	16.99	-0.04	3.59	0.54	58.7	0.008	0.070
11	6.6	0.08	0.4	1.00	0.3	0.97	0.4	1.13	16.12	-0.01	3.91	0.77	58.3	0.007	0.059
12	12.3	0.29	0.3	1.00	0.2	1.07	0.3	1.09	14.91	0.04	5.00	1.06	82.4	0.004	0.025

Table C23
Runs 155 & 162 H,cm = 2.7 T,s = 1.4 wl,cm = -2.3

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	28.2	-0.34	3.8	1.41	2.7	1.41	2.8	1.41	0.00	0.00	0.00	0.00	212.1	0.018	0.134
2	15.1	-0.46	4.2	1.41	3.3	1.41	3.6	1.41	2.70	1.08	16.58	1.81	158.5	0.027	0.278
3	13.6	-0.51	4.7	1.41	3.8	1.41	4.2	1.41	3.87	1.74	11.91	2.08	149.2	0.032	0.348
4	12.0	-0.25	4.1	1.41	3.1	1.41	3.7	1.41	6.46	1.63	10.83	1.82	137.1	0.030	0.339
5	3.8	-0.04	3.0	1.41	2.5	1.33	3.2	1.41	7.54	1.59	9.80	1.25	74.2	0.041	0.798
6	3.8	0.19	1.4	1.42	1.0	0.83	1.5	1.41	9.34	1.17	5.78	1.01	71.5	0.019	0.360
7	5.3	0.23	1.2	0.70	0.8	0.71	1.2	1.14	8.60	0.34	5.79	1.11	87.5	0.014	0.234
8	6.6	0.01	0.9	1.42	0.6	0.90	1.0	0.94	8.97	0.62	5.69	1.17	97.2	0.009	0.140
9	6.6	0.16	0.7	1.41	0.4	0.75	0.7	0.99	13.50	0.13	6.24	0.96	90.4	0.008	0.105
10	6.9	0.13	0.7	1.41	0.5	0.81	0.7	1.02	16.05	-0.24	6.54	0.88	88.8	0.008	0.107
11	6.6	0.13	0.7	1.41	0.4	0.83	0.6	0.98	16.76	-0.12	6.34	0.68	85.4	0.008	0.102
12	12.3	0.33	0.6	0.70	0.4	0.86	0.6	0.93	15.22	0.36	5.79	0.85	124.8	0.005	0.048

Table C24
Runs 194 & 179 H,cm = 7.9 T,s = 0.9 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	34.9	-0.58	10.4	0.84	7.5	0.84	8.1	0.90	0.00	0.00	0.00	0.00	120.1	0.087	0.299
2	21.8	-0.43	10.7	0.90	7.8	0.90	8.5	0.90	1.19	2.32	12.75	2.51	106.4	0.100	0.490
3	20.2	-0.42	9.7	0.90	7.1	0.90	8.3	0.38	0.96	1.98	13.18	2.52	104.4	0.092	0.477
4	18.7	-0.37	11.4	0.90	8.1	0.90	8.7	0.90	4.33	1.89	15.18	3.19	97.7	0.117	0.611
5	10.5	-0.46	7.5	0.90	5.5	0.88	6.8	0.90	13.69	2.10	13.33	4.29	67.9	0.111	0.715
6	10.5	0.17	5.2	0.90	3.7	0.87	4.9	0.90	21.49	1.55	10.00	4.22	57.8	0.090	0.496
7	12.0	0.20	5.0	0.90	3.5	0.88	5.0	0.90	24.47	-0.06	9.05	4.11	57.1	0.088	0.417
8	13.2	-0.06	5.1	0.90	3.3	0.85	5.3	0.90	27.47	0.34	8.37	4.23	54.4	0.094	0.387
9	13.2	0.09	5.5	0.90	3.8	0.89	5.3	0.90	29.50	0.77	7.77	3.03	50.4	0.110	0.419
10	13.5	0.13	4.4	0.90	3.0	0.89	4.3	0.89	30.73	-0.22	6.42	1.94	48.1	0.092	0.328
11	13.2	0.03	4.3	0.91	2.9	0.89	4.2	0.90	30.95	0.26	5.21	1.65	47.1	0.092	0.329
12	19.0	0.32	2.8	0.91	1.7	0.84	2.8	0.90	30.40	1.27	3.70	1.51	54.9	0.051	0.146

Table C25
Runs 196 & 181 H,cm = 7.9 T,s = 1.7 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	34.9	-0.65	9.7	1.54	7.7	1.58	8.2	1.70	0.00	0.00	0.00	0.00	288.9	0.034	0.279
2	21.8	-0.56	10.2	1.70	8.1	1.69	8.7	1.70	2.67	5.38	15.42	3.05	230.7	0.044	0.467
3	20.2	1.13	9.1	1.70	7.5	1.74	8.7	0.52	2.44	5.64	14.34	3.51	223.7	0.041	0.448
4	18.7	-0.57	9.9	1.70	7.4	1.55	8.3	1.70	4.39	5.43	16.31	4.20	212.1	0.047	0.526
5	10.5	-0.60	10.0	1.70	7.8	1.69	8.2	1.70	12.77	2.56	17.71	4.99	145.2	0.069	0.958
6	10.5	0.02	6.1	1.70	4.6	1.55	5.7	1.70	19.93	0.42	12.71	4.28	131.9	0.047	0.586
7	12.0	0.36	4.8	1.70	3.3	1.11	5.1	1.60	21.29	-0.12	9.45	3.00	140.2	0.035	0.403
8	13.2	0.08	4.9	1.71	3.2	1.10	4.7	1.33	24.79	0.45	10.07	2.86	141.5	0.035	0.373
9	13.2	0.21	5.3	1.70	3.8	1.41	5.2	1.57	28.09	0.76	9.92	2.42	135.0	0.039	0.398
10	13.5	0.25	5.2	1.71	3.7	1.34	5.0	1.57	29.63	-0.26	9.32	2.00	133.8	0.039	0.387
11	13.2	0.21	6.2	1.71	4.6	1.54	5.8	1.69	30.17	0.20	8.78	1.70	130.8	0.047	0.469
12	19.0	0.47	4.5	1.71	3.1	1.38	4.1	1.59	29.95	1.03	6.71	1.61	163.6	0.028	0.237

Table C26
Runs 199 & 184 H,cm = 7.9 T,s = 0.9 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	34.9	-0.57	10.5	0.84	7.5	0.84	8.0	0.90	0.00	0.00	0.00	0.00	120.1	0.088	0.302
2	21.8	-0.33	10.7	0.90	7.9	0.90	8.5	0.90	1.25	1.75	11.06	1.31	106.3	0.100	0.490
3	20.2	-0.34	10.2	0.90	7.5	0.90	8.5	0.36	0.93	1.86	11.77	1.49	104.4	0.098	0.504
4	18.7	-0.35	10.4	0.90	7.4	0.90	8.0	0.90	0.22	2.66	13.97	2.07	102.8	0.101	0.555
5	10.5	-0.43	8.6	0.90	6.7	0.90	7.1	0.90	-0.86	3.53	14.71	4.16	84.3	0.102	0.817
6	10.5	0.00	4.7	0.90	3.7	0.87	4.5	0.90	1.83	2.95	12.01	4.61	81.4	0.058	0.452
7	12.0	0.05	4.3	0.90	3.0	0.83	4.1	0.89	8.29	1.07	8.95	3.10	78.5	0.054	0.354
8	13.2	-0.11	4.1	0.90	2.7	0.83	4.2	0.89	14.31	0.59	8.17	2.90	74.2	0.056	0.312
9	13.2	0.01	3.7	0.91	2.6	0.87	3.8	0.89	17.32	0.56	8.58	2.93	70.2	0.053	0.283
10	13.5	0.04	6.0	0.90	4.2	0.90	5.6	0.90	17.91	-0.05	9.38	2.25	70.0	0.086	0.447
11	13.2	0.01	5.5	0.90	3.8	0.90	4.8	0.90	17.77	0.18	8.91	1.48	69.6	0.079	0.417
12	19.0	0.17	4.5	0.90	3.1	0.89	3.9	0.90	17.31	0.65	6.89	1.42	80.1	0.056	0.235

Table C27
Runs 201 & 186 H,cm = 7.9 T,s = 1.7 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	34.9	-0.75	9.7	1.54	7.7	1.58	8.2	1.70	0.00	0.00	0.00	0.00	288.9	0.034	0.279
2	21.8	-0.51	10.6	1.70	8.0	1.64	9.3	1.70	1.92	3.18	14.81	2.72	232.2	0.046	0.489
3	20.2	-0.52	10.7	1.70	7.9	1.40	9.9	0.53	1.55	3.13	14.11	3.21	225.4	0.047	0.528
4	18.7	-0.59	9.1	1.70	7.1	1.56	7.9	1.70	2.18	3.36	15.37	4.37	216.3	0.042	0.489
5	10.5	-0.70	9.4	1.70	7.6	1.69	8.0	1.70	6.26	3.17	17.59	5.31	157.0	0.060	0.896
6	10.5	-0.29	6.6	1.70	4.9	1.47	6.3	1.70	9.61	2.44	15.37	5.29	150.9	0.044	0.630
7	12.0	0.04	5.3	1.70	4.2	1.49	5.3	1.69	9.68	0.65	10.96	3.82	161.8	0.033	0.438
8	13.2	-0.07	5.0	1.70	3.2	1.02	4.9	1.36	12.23	0.07	9.70	2.39	165.3	0.030	0.374
9	13.2	0.06	4.8	1.70	3.2	1.19	4.3	1.45	15.57	0.43	10.34	2.01	159.1	0.030	0.361
10	13.5	0.09	5.1	1.70	3.2	1.01	5.2	1.16	17.11	-0.15	10.44	1.66	158.1	0.032	0.376
11	13.2	0.06	6.0	1.70	4.0	1.20	5.4	1.52	17.47	0.11	9.67	1.30	155.5	0.039	0.452
12	19.0	0.22	4.4	1.70	2.9	1.20	3.8	1.49	17.04	0.74	7.64	1.23	189.6	0.023	0.230

Table C28
Runs 204 & 189 H,cm = 7.9 T,s = 0.9 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	34.9	-0.39	10.3	0.87	7.3	0.84	7.9	0.90	0.00	0.00	0.00	0.00	120.1	0.086	0.295
2	21.8	-0.28	10.0	0.90	7.3	0.90	7.8	0.90	-0.41	1.34	10.71	0.74	108.4	0.092	0.458
3	20.2	-0.25	9.2	0.90	6.7	0.90	7.2	0.34	-0.59	1.36	11.22	0.69	106.3	0.087	0.457
4	18.7	-0.25	9.8	0.90	7.3	0.90	7.7	0.90	-1.39	1.82	13.26	0.84	104.7	0.094	0.525
5	10.5	-0.37	8.3	0.90	6.8	0.90	6.9	0.90	-2.46	1.97	12.87	2.57	85.9	0.097	0.791
6	10.5	-0.04	5.4	0.90	4.4	0.90	4.9	0.90	-6.42	1.96	9.64	3.43	90.1	0.060	0.518
7	12.0	0.01	3.9	0.90	2.7	0.68	3.6	0.88	-6.52	1.42	8.52	2.73	95.0	0.041	0.324
8	13.2	0.04	5.1	0.90	3.8	0.86	4.7	0.89	-1.59	0.83	9.36	2.24	93.0	0.055	0.384
9	13.2	0.03	4.9	0.90	3.8	0.90	4.5	0.90	0.07	0.85	9.81	1.62	91.2	0.054	0.373
10	13.5	0.01	5.2	0.90	4.0	0.90	4.7	0.90	0.22	0.40	9.87	1.37	91.8	0.057	0.386
11	13.2	0.01	5.5	0.90	4.1	0.90	4.5	0.90	0.17	0.18	9.32	0.99	91.1	0.060	0.415
12	19.0	0.04	4.6	0.90	3.4	0.90	3.7	0.90	0.37	0.20	7.58	0.94	103.1	0.044	0.240

Table C29
Runs 206 & 191 H,cm = 7.9 T,s = 1.7 wl,cm = 4.4

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	34.9	-0.64	9.4	1.54	7.3	1.58	7.8	1.70	0.00	0.00	0.00	0.00	288.9	0.033	0.270
2	21.8	-0.53	10.4	1.70	8.0	1.70	8.4	1.70	1.83	-0.28	14.85	0.99	232.3	0.045	0.476
3	20.2	-0.46	11.1	1.70	8.0	1.32	10.3	0.55	1.61	-0.14	13.95	1.21	225.2	0.049	0.550
4	18.7	-0.56	8.9	1.70	7.2	1.64	7.6	1.70	1.04	0.26	14.47	1.98	218.4	0.041	0.475
5	10.5	-0.73	9.1	1.70	6.7	1.48	7.8	1.70	1.08	0.79	16.92	2.68	166.3	0.055	0.868
6	10.5	-0.56	7.1	1.70	6.0	1.65	6.7	1.70	3.99	0.00	14.93	3.72	161.1	0.044	0.677
7	12.0	-0.15	5.5	1.70	4.3	1.47	5.5	1.66	1.71	0.79	11.88	4.89	176.3	0.031	0.455
8	13.2	0.03	5.3	1.70	3.5	0.97	5.7	1.34	-2.18	1.46	10.68	4.24	191.6	0.028	0.398
9	13.2	0.04	5.2	1.70	3.3	0.87	5.0	1.04	-0.93	0.19	9.53	3.29	189.4	0.028	0.397
10	13.5	0.08	4.6	1.70	3.0	0.98	4.1	1.16	-0.68	-0.12	9.77	3.04	190.9	0.024	0.340
11	13.2	0.10	4.8	1.70	3.3	1.27	4.7	1.57	-0.84	-0.18	9.24	2.41	189.2	0.025	0.362
12	19.0	0.13	3.8	1.70	2.5	1.13	3.7	1.43	-1.01	0.05	7.82	1.77	223.8	0.017	0.201

Table C30
Runs 207 & 225 H,cm = 2.0 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.38	1.9	0.70	1.3	0.69	1.6	0.68	0.00	0.00	0.00	0.00	75.8	0.025	0.058
2	18.9	-0.39	2.4	0.71	1.5	0.69	2.5	0.68	19.73	0.44	3.70	4.23	43.9	0.055	0.127
3	17.4	-0.31	2.0	0.72	1.3	0.68	2.0	0.68	18.00	0.41	3.49	3.32	46.5	0.044	0.117
4	15.9	-0.32	1.8	0.72	1.1	0.67	1.7	0.69	18.51	0.85	3.35	2.01	45.1	0.039	0.111
5	7.6	-0.51	1.5	0.72	1.0	0.69	1.5	0.68	25.71	0.87	3.08	1.80	24.3	0.063	0.201
6	7.6	-0.42	1.6	0.71	1.0	0.69	1.5	0.69	30.15	0.21	2.55	1.98	-	-	0.212
7	9.1	-0.28	0.5	0.70	0.3	0.72	0.5	0.70	26.13	0.00	2.08	1.56	-	-	0.052
8	10.4	-0.30	0.1	0.70	0.1	0.74	0.1	0.72	23.92	0.52	1.74	0.98	-	-	0.012
9	10.4	-0.24	0.2	0.70	0.1	0.70	0.2	0.73	25.97	-0.06	1.69	0.85	-	-	0.020
10	10.7	-0.18	0.2	0.70	0.1	0.74	0.2	0.74	28.63	-0.63	1.61	0.81	-	-	0.017
11	10.4	-0.15	0.1	0.92	0.1	0.89	0.1	0.92	29.72	-0.69	1.54	0.75	-	-	0.012
12	16.2	-0.02	0.1	0.96	0.0	0.69	0.1	1.14	29.69	-0.28	1.46	0.78	-	-	0.003

Table C31
Runs 208 & 226 H,cm = 6.0 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.39	8.3	0.70	5.9	0.70	6.4	0.70	0.00	0.00	0.00	0.00	75.8	0.109	0.258
2	18.9	-0.41	8.4	0.70	5.9	0.70	7.5	0.70	7.68	0.30	8.55	2.63	62.0	0.135	0.444
3	17.4	-0.44	8.6	0.70	6.1	0.70	7.6	0.69	9.01	0.26	9.11	3.19	59.4	0.145	0.494
4	15.9	-0.38	7.5	0.70	5.3	0.70	6.7	0.70	14.74	1.08	10.47	4.47	50.8	0.147	0.470
5	7.6	-0.31	3.1	0.70	2.1	0.66	2.9	0.70	23.20	1.50	8.03	4.34	29.4	0.105	0.406
6	7.6	-0.24	3.2	0.70	2.1	0.67	3.2	0.70	28.92	0.77	4.51	4.16	-	-	0.420
7	9.1	-0.12	2.0	0.70	1.2	0.71	2.0	0.71	25.57	0.29	3.81	3.72	-	-	0.213
8	10.4	-0.18	1.4	0.70	0.9	0.72	1.4	0.72	23.44	0.56	2.75	1.82	-	-	0.138
9	10.4	-0.17	0.7	0.70	0.4	0.76	0.7	0.76	26.94	-0.12	2.12	0.98	-	-	0.070
10	10.7	-0.13	0.7	0.70	0.4	0.78	0.7	0.77	29.29	-0.73	2.03	0.87	-	-	0.067
11	10.4	-0.07	0.7	0.82	0.4	0.92	0.7	0.86	30.01	-0.79	1.95	0.80	-	-	0.065
12	16.2	0.08	0.2	0.86	0.1	0.93	0.2	1.04	29.61	-0.32	1.89	0.82	-	-	0.012

Table C32
Runs 209 & 227 H,cm = 2.0 T,s = 0.8 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.33	2.3	0.77	1.6	0.75	2.0	0.76	0.00	0.00	0.00	0.00	90.4	0.026	0.072
2	18.9	-0.31	3.6	0.79	2.3	0.75	3.6	0.75	18.28	0.17	4.19	3.45	58.0	0.061	0.188
3	17.4	-0.29	3.4	0.79	2.1	0.76	3.4	0.76	16.90	0.25	4.18	3.02	59.2	0.058	0.197
4	15.9	-0.19	3.0	0.79	1.9	0.73	3.0	0.77	18.11	0.97	4.61	2.49	56.1	0.054	0.190
5	7.6	-0.37	2.7	0.79	1.9	0.76	2.5	0.75	25.86	1.10	4.46	2.40	31.7	0.085	0.353
6	7.6	-0.32	2.4	0.75	1.5	0.75	2.4	0.75	31.37	0.28	3.59	3.37	-	-	0.316
7	9.1	-0.18	0.8	0.79	0.5	0.79	0.8	0.78	27.51	-0.05	2.70	3.05	-	-	0.084
8	10.4	-0.29	0.3	0.77	0.2	0.81	0.3	0.82	24.73	0.46	1.93	1.33	-	-	0.030
9	10.4	-0.21	0.3	0.77	0.2	0.78	0.3	0.81	26.96	-0.13	1.78	0.89	-	-	0.032
10	10.7	-0.19	0.3	0.77	0.2	0.80	0.3	0.81	29.81	-0.75	1.64	0.85	-	-	0.032
11	10.4	-0.12	0.3	0.95	0.2	0.94	0.3	0.93	30.81	-0.91	1.57	0.80	-	-	0.030
12	16.2	0.03	0.1	0.77	0.0	0.73	0.1	1.02	30.61	-0.53	1.47	0.82	-	-	0.005

Table C33
Runs 210 & 228 H,cm = 6.0 T,s = 0.8 wl,cm = 1.5

d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
32.0	-0.44	8.2	0.77	5.9	0.77	6.4	0.76	0.00	0.00	0.00	0.00	90.4	0.091	0.257
18.9	-0.45	8.3	0.77	6.0	0.77	7.5	0.76	1.71	0.40	9.81	2.43	80.7	0.103	0.441
17.4	-0.51	8.4	0.77	5.8	0.76	7.5	0.71	2.82	0.31	10.50	3.03	77.7	0.109	0.486
15.9	-0.42	7.7	0.77	5.4	0.76	6.9	0.76	7.83	0.65	13.11	4.37	69.9	0.111	0.489
7.6	-0.31	3.9	0.77	2.7	0.73	3.7	0.76	16.91	1.28	11.56	4.23	43.9	0.089	0.511
7.6	-0.12	3.2	0.77	2.1	0.72	3.1	0.76	24.89	1.12	7.41	4.04	33.3	0.097	0.422
9.1	-0.04	2.4	0.78	1.5	0.75	2.4	0.77	23.88	0.66	5.60	3.71	38.2	0.062	0.260
10.4	-0.13	1.8	0.77	1.1	0.78	1.8	0.78	23.03	0.97	3.74	2.07	41.7	0.043	0.175
10.4	-0.10	1.6	0.78	0.8	0.79	1.5	0.78	26.75	0.15	2.90	1.28	34.9	0.045	0.153
10.7	-0.09	1.4	0.79	0.8	0.80	1.4	0.79	29.47	-0.64	2.65	1.03	26.7	0.052	0.130
10.4	-0.01	1.2	0.89	0.7	0.88	1.3	0.83	30.28	-0.86	2.37	0.90	-	-	0.119
16.2	0.15	0.5	0.81	0.2	0.89	0.5	0.85	29.76	-0.52	2.13	0.89	-	-	0.030

Table C34
Runs 211 & 229 H,cm = 2.0 T,s = 1.0 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.30	2.4	1.00	1.7	0.82	2.1	0.89	0.00	0.00	0.00	0.00	139.6	0.017	0.076
2	18.9	-0.33	2.6	1.00	1.7	0.94	2.7	0.96	15.72	0.05	5.14	3.04	97.2	0.026	0.136
3	17.4	-0.32	3.7	1.00	2.6	0.99	3.6	0.99	13.97	0.11	6.04	2.69	96.6	0.039	0.215
4	15.9	-0.16	4.5	1.00	3.2	1.00	3.9	0.99	14.27	0.72	8.44	2.31	92.8	0.049	0.286
5	7.6	-0.39	3.7	1.00	2.9	1.00	3.3	0.99	22.95	1.02	8.44	2.17	54.6	0.068	0.487
6	7.6	-0.25	2.9	1.00	2.0	0.94	3.0	0.92	30.25	0.51	6.63	2.59	43.5	0.068	0.387
7	9.1	-0.10	2.1	1.00	1.3	0.95	2.2	0.84	27.06	0.18	4.83	2.67	54.6	0.039	0.230
8	10.4	-0.19	1.6	1.00	1.0	0.97	1.6	0.99	24.70	0.66	3.43	1.90	62.5	0.026	0.159
9	10.4	-0.15	1.6	1.00	1.0	0.99	1.6	0.99	26.92	0.05	3.32	1.36	59.0	0.027	0.151
10	10.7	-0.14	1.2	1.02	0.8	0.96	1.2	0.99	29.72	-0.63	2.86	1.04	55.3	0.023	0.117
11	10.4	-0.08	1.6	1.00	1.0	0.97	1.5	0.98	31.10	-0.84	2.31	0.90	51.9	0.030	0.151
12	16.2	0.10	0.6	1.00	0.4	0.88	0.6	0.98	30.86	-0.49	1.74	0.88	66.2	0.010	0.039

Table C35
Runs 212 & 230 H,cm = 6.0 T,s = 1.0 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.48	7.8	1.00	5.8	0.99	6.3	0.99	0.00	0.00	0.00	0.00	139.6	0.056	0.244
2	18.9	-0.53	8.8	1.00	6.5	1.00	7.5	0.99	0.37	1.91	11.07	2.22	118.4	0.074	0.464
3	17.4	-0.60	8.3	1.00	6.0	1.00	6.9	0.93	0.53	1.79	11.77	2.01	114.6	0.073	0.479
4	15.9	-0.44	8.3	1.00	6.0	0.99	7.0	0.99	3.53	1.99	14.88	2.32	107.0	0.077	0.522
5	7.6	-0.39	4.9	1.00	3.7	0.93	4.9	0.99	11.62	1.89	13.41	3.04	68.8	0.072	0.648
6	7.6	0.01	3.3	1.00	2.4	0.90	3.3	0.99	20.64	1.33	9.47	3.16	57.7	0.058	0.439
7	9.1	0.04	3.2	1.00	2.1	0.91	3.1	0.99	22.66	0.92	7.79	3.37	61.1	0.053	0.351
8	10.4	-0.09	2.7	1.00	1.7	0.99	2.7	0.99	23.02	1.05	5.63	3.04	64.9	0.041	0.258
9	10.4	-0.06	2.3	1.00	1.4	0.98	2.3	1.00	25.81	0.24	4.87	2.03	60.8	0.038	0.221
10	10.7	-0.06	2.0	1.02	1.3	0.98	2.0	1.00	28.50	-0.59	4.54	1.45	57.4	0.035	0.189
11	10.4	0.01	2.3	1.00	1.5	0.98	2.1	1.00	29.82	-0.91	3.98	1.21	54.2	0.042	0.221
12	16.2	0.20	1.3	1.00	0.8	0.89	1.2	0.99	29.74	-0.67	3.09	1.11	68.4	0.018	0.078

Table C36
Runs 213 & 219 H,cm = 2.0 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	0.08	2.2	0.70	1.6	0.63	1.9	0.70	0.00	0.00	0.00	0.00	75.8	0.029	0.070
2	18.9	-0.01	2.0	0.70	1.4	0.69	1.7	0.70	0.17	-0.01	1.68	0.21	71.0	0.028	0.104
3	17.4	-0.04	1.9	0.70	1.4	0.68	1.6	0.65	0.16	-0.01	1.78	0.22	69.9	0.027	0.109
4	15.9	0.17	1.9	0.70	1.4	0.69	1.6	0.66	0.19	-0.01	2.25	0.25	68.4	0.028	0.120
5	7.6	0.19	1.9	0.70	1.4	0.70	1.6	0.63	0.32	-0.04	3.33	0.36	53.9	0.036	0.251
6	7.6	0.15	1.8	0.70	1.3	0.70	1.5	0.63	0.34	0.02	3.64	0.45	53.9	0.034	0.239
7	9.1	0.17	1.8	0.70	1.3	0.70	1.4	0.69	0.17	0.06	2.78	0.34	57.8	0.032	0.201
8	10.4	0.05	1.4	0.70	0.9	0.70	1.0	0.70	0.05	-0.01	2.81	0.41	60.5	0.022	0.131
9	10.4	0.05	1.5	0.70	1.1	0.70	1.1	0.70	0.07	-0.03	3.08	0.36	60.5	0.026	0.149
10	10.7	0.07	2.1	0.70	1.5	0.70	1.5	0.70	0.12	-0.04	3.30	0.13	61.0	0.035	0.197
11	10.4	0.09	2.4	0.70	1.7	0.70	1.8	0.70	0.15	-0.02	3.47	0.17	60.4	0.040	0.236
12	16.2	0.13	2.4	0.70	1.7	0.70	1.7	0.70	0.23	0.03	2.63	0.17	68.6	0.035	0.148

Table C37
Runs 214 & 220 H,cm = 6.0 T,s = 0.7 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.09	7.7	0.70	5.7	0.70	6.0	0.70	0.00	0.00	0.00	0.00	75.8	0.102	0.241
2	18.9	-0.14	8.3	0.70	6.0	0.70	6.4	0.70	-0.16	-0.23	7.32	0.85	71.4	0.117	0.441
3	17.4	-0.21	7.2	0.70	5.3	0.70	5.7	0.69	-0.35	-0.21	7.70	0.75	70.4	0.103	0.417
4	15.9	0.00	7.7	0.70	5.6	0.70	6.0	0.70	-1.29	-0.18	9.48	1.03	69.9	0.110	0.486
5	7.6	-0.04	6.1	0.70	4.8	0.70	5.3	0.70	-3.94	-0.17	9.59	2.39	57.5	0.106	0.800
6	7.6	0.16	3.0	0.70	2.3	0.64	2.9	0.70	-5.60	-0.11	8.16	2.61	58.9	0.051	0.395
7	9.1	0.20	4.1	0.70	3.1	0.69	3.7	0.70	-3.72	0.30	7.39	1.94	61.3	0.067	0.446
8	10.4	0.07	2.9	0.70	2.1	0.69	2.6	0.70	-1.49	1.06	6.37	2.21	61.9	0.046	0.276
9	10.4	0.07	2.8	0.70	2.0	0.66	2.8	0.70	-0.85	1.39	5.60	2.08	61.3	0.046	0.274
10	10.7	0.11	2.4	0.70	1.6	0.64	2.5	0.70	-0.79	1.02	5.16	1.55	61.9	0.040	0.229
11	10.4	0.14	1.9	0.70	1.2	0.62	2.2	0.70	-0.65	0.49	4.65	1.02	61.2	0.031	0.183
12	16.2	0.17	1.7	0.70	1.1	0.64	2.0	0.70	-0.32	0.21	4.03	0.64	69.2	0.025	0.106

Table C38
Runs 215 & 221 H,cm = 2.0 T,s = 0.8 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	0.03	2.2	0.77	1.6	0.74	1.8	0.77	0.00	0.00	0.00	0.00	90.4	0.024	0.069
2	18.9	0.00	2.2	0.77	1.6	0.77	1.7	0.71	0.25	-0.39	2.10	0.27	82.4	0.026	0.114
3	17.4	-0.02	1.9	0.77	1.4	0.77	1.5	0.78	0.19	-0.31	2.27	0.25	80.7	0.024	0.111
4	15.9	0.00	1.8	0.77	1.3	0.77	1.4	0.76	0.06	-0.09	2.93	0.40	78.8	0.023	0.115
5	7.6	0.01	2.2	0.77	1.6	0.77	1.7	0.77	-0.04	0.00	3.96	0.55	60.9	0.036	0.289
6	7.6	0.02	2.0	0.77	1.4	0.77	1.5	0.75	0.08	-0.02	4.24	0.46	60.8	0.032	0.258
7	9.1	0.03	1.8	0.77	1.3	0.77	1.4	0.77	0.19	-0.10	3.69	0.37	65.2	0.028	0.198
8	10.4	0.04	1.9	0.77	1.3	0.77	1.4	0.77	0.03	-0.14	3.65	0.44	68.5	0.028	0.187
9	10.4	0.02	2.3	0.77	1.6	0.77	1.7	0.77	-0.15	-0.05	4.09	0.47	68.7	0.033	0.219
10	10.7	0.03	2.7	0.77	2.0	0.77	2.0	0.77	-0.27	-0.06	4.68	0.44	69.5	0.039	0.252
11	10.4	0.00	2.7	0.77	2.0	0.77	2.0	0.77	-0.28	-0.02	4.48	0.36	68.8	0.040	0.263
12	16.2	0.03	2.0	0.77	1.4	0.77	1.4	0.77	-0.11	0.05	3.02	0.22	79.4	0.025	0.122

Table C39
Runs 216 & 222 H,cm = 6.0 T,s = 0.8 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.19	8.0	0.77	5.6	0.77	6.0	0.76	0.00	0.00	0.00	0.00	90.4	0.088	0.249
2	18.9	-0.23	7.8	0.77	5.8	0.77	6.2	0.76	-0.33	0.03	8.48	0.67	83.0	0.093	0.411
3	17.4	-0.29	7.9	0.77	5.6	0.77	5.9	0.76	-0.56	0.18	9.15	0.85	81.5	0.097	0.456
4	15.9	-0.24	7.8	0.77	5.8	0.77	6.2	0.76	-1.60	0.57	11.04	1.53	80.6	0.097	0.493
5	7.6	-0.25	6.1	0.77	5.0	0.77	5.6	0.76	-5.14	1.21	10.65	2.98	65.5	0.093	0.800
6	7.6	0.02	2.9	0.77	2.2	0.69	2.8	0.77	-6.24	1.02	8.39	2.92	66.4	0.043	0.377
7	9.1	0.09	4.5	0.77	3.4	0.77	4.0	0.76	-3.07	0.28	7.71	1.74	68.2	0.066	0.495
8	10.4	0.07	4.2	0.77	3.1	0.76	3.7	0.76	-0.74	-0.02	7.53	1.75	69.2	0.061	0.407
9	10.4	0.14	3.5	0.77	2.6	0.75	3.2	0.77	0.04	-0.22	7.05	1.69	68.5	0.052	0.342
10	10.7	0.10	3.6	0.77	2.6	0.75	3.2	0.77	-0.04	-0.29	7.01	1.47	69.3	0.052	0.338
11	10.4	0.06	3.6	0.77	2.5	0.76	3.1	0.77	-0.17	-0.10	6.77	1.16	68.7	0.052	0.345
12	16.2	0.12	3.0	0.77	2.1	0.76	2.6	0.77	-0.17	0.12	5.70	0.82	79.5	0.038	0.185

Table C40
Runs 217 & 223 H,cm = 2.0 T,s = 1.8 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	0.08	2.4	1.00	1.7	0.76	2.1	0.82	0.00	0.00	0.00	0.00	139.6	0.017	0.076
2	18.9	0.01	2.3	1.00	1.6	0.86	2.1	0.91	0.06	0.13	2.36	0.21	118.8	0.019	0.120
3	17.4	-0.04	2.3	1.00	1.6	0.87	2.0	0.86	0.03	0.15	2.47	0.22	115.3	0.020	0.130
4	15.9	0.08	2.2	1.00	1.7	0.94	1.9	0.95	0.02	0.20	3.03	0.30	111.4	0.020	0.141
5	7.6	0.11	2.1	1.00	1.5	0.83	1.9	0.69	0.05	0.15	4.11	0.40	82.0	0.026	0.280
6	7.6	0.08	2.4	1.00	1.7	0.87	2.1	0.93	0.11	0.04	5.14	0.42	81.9	0.029	0.316
7	9.1	0.06	2.3	1.00	1.7	0.94	2.0	0.84	0.04	0.02	5.11	0.52	88.8	0.026	0.250
8	10.4	-0.04	2.9	1.00	2.1	0.95	2.5	0.99	-0.04	-0.01	4.96	0.44	93.8	0.031	0.279
9	10.4	0.07	2.7	1.00	2.0	0.96	2.4	0.98	-0.06	-0.07	5.65	0.38	93.9	0.029	0.263
10	10.7	0.07	3.5	1.00	2.7	1.00	3.0	0.97	-0.14	-0.18	6.32	0.38	95.1	0.036	0.325
11	10.4	0.01	2.7	1.00	2.1	0.99	2.3	1.00	-0.13	-0.13	5.46	0.26	93.9	0.029	0.261
12	16.2	0.12	2.2	1.00	1.6	0.99	1.8	0.98	-0.11	0.00	3.47	0.26	112.3	0.020	0.136

Table C41
Runs 218 & 224 H,cm = 6.0 T,s = 1.0 wl,cm = 1.5

Gauge	d,cm	e,cm	Hmo,cm	Tp,s	Hm,cm	Tm,s	Hs,cm	Ts,s	U,cm/s	V,cm/s	U_rms	V_rms	L,cm	H/L	H/d
1	32.0	-0.22	7.6	1.00	5.6	1.00	6.0	0.99	0.00	0.00	0.00	0.00	139.6	0.055	0.238
2	18.9	-0.27	7.6	1.00	5.7	1.00	6.1	0.99	-0.90	0.31	10.09	0.72	120.0	0.064	0.405
3	17.4	-0.34	7.6	1.00	5.7	1.00	6.1	1.00	-1.02	0.37	10.20	0.74	116.6	0.065	0.436
4	15.9	-0.20	7.0	1.00	5.2	1.00	5.5	0.99	-1.98	0.65	11.96	1.15	113.8	0.061	0.440
5	7.6	-0.18	6.7	1.00	5.9	0.99	6.3	0.99	-4.78	1.43	11.66	3.22	87.3	0.076	0.875
6	7.6	0.12	3.1	1.00	2.5	0.85	3.2	1.00	-7.01	2.11	8.53	3.63	89.7	0.035	0.413
7	9.1	0.20	3.7	1.00	2.3	0.62	3.2	0.92	-4.09	1.04	8.20	2.49	93.5	0.040	0.407
8	10.4	0.11	4.0	1.00	2.8	0.83	4.0	0.91	-0.64	-0.07	8.52	2.14	94.5	0.042	0.381
9	10.4	0.05	3.4	1.00	2.3	0.80	3.3	0.91	-0.52	0.05	7.81	1.47	94.4	0.037	0.332
10	10.7	0.09	3.7	1.00	2.7	0.88	3.6	0.96	-0.65	-0.08	7.96	1.23	95.7	0.039	0.350
11	10.4	0.19	3.2	1.00	2.2	0.81	3.1	0.87	-0.64	-0.08	7.37	0.99	94.5	0.034	0.306
12	16.2	0.13	2.7	1.00	1.9	0.81	2.5	0.90	-0.68	0.03	6.16	0.73	113.0	0.024	0.169

Appendix D
Table of Experiments

Table D1
Conditions for Wave-Current Experiments with Ebb Shoal

Run	Wave Period, s	Wave Height, ft	Gauge Arrangement Number	Wave Type i=irregular m=monochromatic	Current, cm/sec	SWL (still-water level, ft, @1:50 scale)
55	0.71	0.12	1	i	0.0	+2.5
56	0.71	0.18	1	i	0.0	+2.5
57	1.41	0.12	1	i	0.0	+2.5
58	1.41	0.18	1	i	0.0	+2.5
59	0.71	0.18	1	m	0.0	+2.5
60	1.41	0.18	1	m	0.0	+2.5
61	1.41	0.18	1	i	12	+2.5
62	1.41	0.12	1	i	12	+2.5
63	0.71	0.18	1	i	12	+2.5
64	0.71	0.12	1	i	12	+2.5
65	0.71	0.18	1	m	12	+2.5
66	1.41	0.18	1	m	12	+2.5
67	0.71	0.12	1	i	24	+2.5
68	0.71	0.18	1	i	24	+2.5
69	1.41	0.12	1	i	24	+2.5
70	1.41	0.18	1	i	24	+2.5
71	0.71	0.18	1	m	24	+2.5
72	1.41	0.18	1	m	24	+2.5
73	0.71	0.12	2	i	0.0	+2.5
74	0.71	0.18	2	i	0.0	+2.5
75	1.41	0.12	2	i	0.0	+2.5
76	1.41	0.18	2	i	0.0	+2.5
77	0.71	0.18	2	m	0.0	+2.5
78	1.41	0.18	2	m	0.0	+2.5
79	0.71	0.12	2	i	12	+2.5
80	0.71	0.18	2	i	12	+2.5
81	1.41	0.12	2	i	12	+2.5
82	1.41	0.18	2	i	12	+2.5
83	0.71	0.18	2	m	12	+2.5
84	1.41	0.18	2	m	12	+2.5
85	0.71	0.12	2	i	24	+2.5
86	0.71	0.18	2	i	24	+2.5
87	1.41	0.12	2	i	24	+2.5
88	1.41	0.18	2	i	24	+2.5
89	0.71	0.18	2	m	24	+2.5
90	1.41	0.18	2	m	24	+2.5

(Sheet 1 of 4)

Table D1 (Continued)

Run	Wave Period, s	Wave Height, ft	Gauge Arrangement Number	Wave Type i=irregular m=monochromatic	Current, cm/sec	SWL (still-water level, ft, @1:50 scale)
91	0.71	0.18	2	i	32	+2.5
92	1.41	0.18	2	i	32	+2.5
93	0.71	0.18	2	m	32	+2.5
94	1.41	0.18	2	m	32	+2.5
95	0.71	0.12	3	i	0.0	+2.5
96	0.71	0.18	3	i	0.0	+2.9
97	1.41	0.12	3	i	0.0	+2.5
98	1.41	0.18	3	i	0.0	+2.5
99	0.71	0.18	3	m	0.0	+2.5
100	1.41	0.18	3	m	0.0	+2.5
101	0.71	0.12	3	i	12	+2.5
102	0.71	0.18	3	i	12	+2.5
103	1.41	0.12	3	i	12	+2.5
104	1.41	0.18	3	i	12	+2.5
105	0.71	0.18	3	m	12	+2.5
106	1.41	0.18	3	m	12	+2.5
107	0.71	0.12	3	i	24	+2.5
108	0.71	0.18	3	i	24	+2.5
109	1.41	0.12	3	i	24	+2.5
110	1.41	0.18	3	i	24	+2.5
111	0.71	0.18	3	m	24	+2.5
112	1.41	0.18	3	m	24	+2.5
113	0.71	0.12	4	i	0.0	+2.5
114	0.71	0.18	4	i	0.0	+2.5
115	1.41	0.12	4	i	0.0	+2.5
116	1.41	0.18	4	i	0.0	+2.5
117	0.71	0.18	4	m	0.0	+2.5
118	1.41	0.18	4	m	0.0	+2.5
119	0.71	0.12	4	i	12	+2.5
120	0.71	0.18	4	i	12	+2.5
121	1.41	0.12	4	i	12	+2.5
122	1.41	0.18	4	i	12	+2.5
123	0.71	0.18	4	m	12	+2.5
124	1.41	0.18	4	m	12	+2.5
125	0.71	0.12	4	i	24	+2.5
126	0.71	0.18	4	i	24	+2.5
127	1.41	0.12	4	i	24	+2.5
128	1.41	0.18	4	i	24	+2.5
129	0.71	0.18	4	m	24	+2.5
130	1.41	0.18	4	m	24	+2.5
131	0.71	0.18	4	i	32	+2.5
132	1.41	0.18	4	i	32	+2.5
133	0.71	0.18	4	m	32	+2.5
134	1.41	0.18	4	m	32	+2.5
135	0.5	0.09	1	m	0.0	-3.75
136	1.0	0.06	1	i	0.0	-3.75
137	1.0	0.09	1	i	0.0	-3.75
138	1.0	0.09	1	m	0.0	-3.75
139	1.41	0.09	1	i	0.0	-3.75
140	1.41	0.09	1	i	0.0	-3.75
141	1.41	0.09	1	m	0.0	-3.75
142	0.5	0.09	1	m	8.5	-3.75
143	1.0	0.06	1	i	8.5	-3.75
144	1.0	0.09	1	i	8.5	-3.75

(Sheet 2 of 4)

Table D1 (Continued)

Run	Wave Period, s	Wave Height, ft	Gauge Arrangement Number	Wave Type i=irregular m=monochromatic	Current, cm/sec	SWL (still-water level, ft, @1:50 scale)
145	1.0	0.09	1	m	8.5	-3.75
146	1.41	0.06	1	i	8.5	-3.75
147	1.41	0.09	1	i	8.5	-3.75
148	1.41	0.09	1	m	8.5	-3.75
149	0.5	0.09	1	m	16.3	-3.75
150	1.0	0.06	1	i	16.3	-3.75
151	1.0	0.09	1	i	16.3	-3.75
152	1.0	0.09	1	m	16.3	-3.75
153	1.41	0.06	1	i	16.3	-3.75
154	1.41	0.09	1	i	16.3	-3.75
155	1.41	0.09	1	m	16.3	-3.75
156	0.5	0.09	4	m	16.3	-3.75
157	1.0	0.06	4	i	16.3	-3.75
158	1.0	0.09	4	i	16.3	-3.75
159	1.0	0.09	4	m	16.3	-3.75
160	1.41	0.06	4	i	16.3	-3.75
161	1.41	0.09	4	i	16.3	-3.75
162	1.41	0.09	4	m	16.3	-3.75
163	0.5	0.09	4	m	8.5	-3.75
164	1.0	0.06	4	i	8.5	-3.75
165	1.0	0.09	4	i	8.5	-3.75
166	1.0	0.09	4	m	8.5	-3.75
167	1.41	0.06	4	i	8.5	-3.75
168	1.41	0.09	4	i	8.5	-3.75
169	1.41	0.09	4	m	8.5	-3.75
170	0.5	0.09	4	m	0.0	-3.75
171	1.0	0.06	4	i	0.0	-3.75
172	1.0	0.09	4	i	0.0	-3.75
173	1.0	0.09	4	m	0.0	-3.75
174	1.41	0.06	4	i	0.0	-3.75
175	1.41	0.09	4	i	0.0	-3.75
176	1.41	0.09	4	m	0.0	-3.75
177	0.9	0.14	4	i	28.2	+7.2
178	0.9	0.26	4	i	28.2	+7.2
179	0.9	0.26	4	m	28.2	+7.2
180	1.7	0.14	4	i	28.2	+7.2
181	1.7	0.26	4	m	28.2	+7.
182	0.9	0.14	4	i	14.7	+7.2
183	0.9	0.26	4	i	14.7	+7.2
184	0.9	0.26	4	m	14.7	+7.2
185	1.7	0.14	4	i	14.7	+7.2
186	1.7	0.26	4	m	14.7	+7.2
187	0.9	0.14	4	i	0.0	+7.2
188	0.9	0.26	4	i	0.0	+7.2
189	0.9	0.26	4	m	0.0	+7.2
190	1.7	0.14	4	i	0.0	+7.2
191	1.7	0.26	4	m	0.0	+7.2
192	0.9	0.14	1	i	28.2	+7.2
193	0.9	0.26	1	i	28.2	+7.2
194	0.9	0.26	1	m	28.2	+7.2
195	1.7	0.14	1	i	28.2	+7.2
196	1.7	0.26	1	m	28.2	+7.2
197	0.9	0.14	1	i	14.7	+7.2
198	0.9	0.26	1	i	14.7	+7.2

(Sheet 3 of 4)

Table D1 (Concluded)

Run	Wave Period, s	Wave Height, ft	Gauge Arrangement Number	Wave Type i=irregular m=monochromatic	Current, cm/sec	SWL (still-water level, ft, @1:50 scale)
199	0.9	0.26	1	m	14.7	+7.2
200	1.7	0.14	1	i	14.7	+7.2
201	1.7	0.26	1	m	14.7	+7.2
202	0.9	0.14	1	i	0.0	+7.2
203	0.9	0.26	1	i	0.0	+7.2
204	0.9	0.26	1	m	0.0	+7.2
205	1.7	0.14	1	i	0.0	+7.2
206	1.7	0.26	1	m	0.0	+7.2
207	0.7	0.066	1	m	30	+2.5
208	0.7	0.197	1	m	30	+2.5
209	0.77	0.066	1	m	30	+2.5
210	0.77	0.197	1	m	30	+2.5
211	1.0	0.066	1	m	30	+2.5
212	1.0	0.197	1	m	30	+2.5
213	0.7	0.066	1	m	0.0	+2.5
214	0.7	0.197	1	m	0.0	+2.5
215	0.77	0.066	1	m	0.0	+2.5
216	0.77	0.197	1	m	0.0	+2.5
217	1.0	0.066	1	m	0.0	+2.5
218	1.0	0.197	1	m	0.0	+2.5
219	0.7	0.066	4	m	0.0	+2.5
220	0.7	0.197	4	m	0.0	+2.5
221	0.77	0.066	4	m	0.0	+2.5
222	0.77	0.197	4	m	0.0	+2.5
223	1.0	0.066	4	m	0.0	+2.5
224	1.0	0.197	4	m	0.0	+2.5
225	0.7	0.066	4	m	30	+2.5
226	0.7	0.197	4	m	30	+2.5
227	0.77	0.066	4	m	30	+2.5
228	0.77	0.197	4	m	30	+2.5
229	1.0	0.066	4	m	30	+2.5
230	1.0	0.197	4	m	30	+2.5

(Sheet 4 of 4)

Appendix E
Basin Bathymetry

The basin bathymetry is provided in xyz coordinates. The origin is as shown in Figure E1. "x" and "y" values are in actual feet and the "z" value is the depth scaled at 1:50, in feet, and relative to the mean low water datum. Typically, the model was operated at the +5.0-ft water level for all but the scale effects runs, so that +5.0 ft (@1:50 scale) should be added for total water depth. Actual depth in feet is obtained by dividing by 50. Table D1 shows other water levels used for the scaling runs. Figure E1 below shows the origin, with the positive x-axis running horizontally and the y-axis running vertically from the point located in the upper right corner.

The first 733 lines describe the original bathymetry without the ebb shoal and the last 95 lines represent the ebb shoal, and its starting location is marked in the listing.

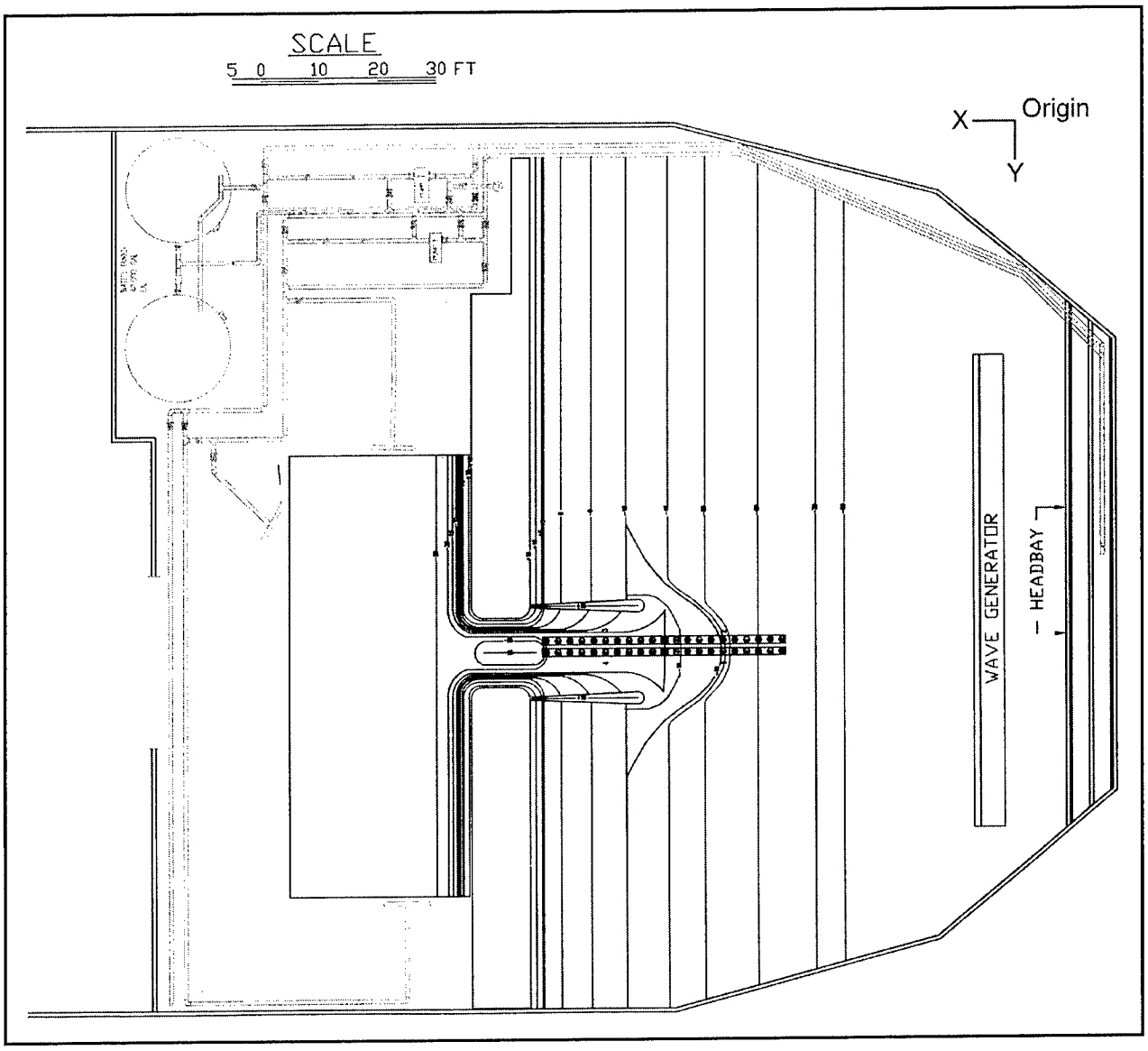

Figure E1. Model layout and origin of axes

bathymetry file

x	y	z
95.58	92.20	10.00
94.96	91.57	10.00
94.40	91.37	10.00
92.56	91.34	10.00
89.25	91.35	10.00
86.78	91.28	10.00
86.22	91.43	10.00
85.76	91.56	10.00
85.30	91.89	10.00
84.86	92.41	10.00
84.41	93.31	10.00
84.33	93.97	10.00
84.35	101.87	10.00
84.34	109.79	10.00
84.39	121.28	10.00
84.38	132.17	10.00
84.35	141.83	10.00
84.36	147.29	10.00
50.18	92.13	-25.00
50.25	116.61	-25.00
50.25	134.86	-25.00
43.68	-0.05	-30.00
43.61	7.29	-30.00
43.65	27.15	-30.00
43.63	48.29	-30.00
43.66	76.73	-30.00
43.68	102.10	-30.00
43.76	129.46	-30.00
43.79	142.85	-30.00
41.58	5.29	-50.00
41.59	22.94	-50.00
41.60	44.53	-50.00
41.67	74.37	-50.00
41.67	95.42	-50.00
41.66	114.95	-50.00
41.70	135.07	-50.00
41.70	140.92	-50.00
41.74	142.35	-50.00
81.25	1.77	0.00
81.27	11.09	0.00

81.28	33.89	0.00
81.31	56.39	0.00
81.38	76.78	0.00
81.53	77.70	0.00
81.83	78.46	0.00
82.49	79.44	0.00
83.55	80.40	0.00
84.59	80.87	0.00
85.40	81.12	0.00
86.37	81.17	0.00
87.91	81.14	0.00
89.89	81.14	0.00
92.03	81.12	0.00
93.91	81.15	0.00
94.72	81.15	0.00
95.16	81.04	0.00
95.58	80.93	0.00
96.11	80.62	0.00
96.57	80.32	0.00
96.89	79.87	0.00
97.17	79.50	0.00
97.33	79.11	0.00
97.38	78.77	0.00
97.40	76.96	0.00
97.39	73.85	0.00
97.39	70.24	0.00
97.38	66.00	0.00
97.41	62.32	0.00
97.40	59.09	0.00
97.41	56.36	0.00
97.36	52.05	0.00
97.42	127.87	0.00
97.42	119.61	0.00
97.40	108.86	0.00
97.38	100.86	0.00
97.41	94.35	0.00
97.39	92.39	0.00
97.27	91.75	0.00
96.78	91.00	0.00
95.94	90.35	0.00
94.52	89.93	0.00
90.91	89.93	0.00
86.47	89.91	0.00
84.77	90.16	0.00

84.23	90.33	0.00
83.60	90.67	0.00
82.92	91.21	0.00
82.11	92.23	0.00
81.40	94.24	0.00
81.37	102.03	0.00
81.36	110.52	0.00
81.37	124.33	0.00
81.39	136.44	0.00
81.36	147.29	0.00
95.82	52.07	10.00
95.83	59.39	10.00
95.88	73.93	10.00
95.86	77.60	10.00
95.87	78.15	10.00
95.50	78.87	10.00
94.76	79.50	10.00
93.90	79.82	10.00
90.67	79.82	10.00
87.44	79.83	10.00
86.44	79.81	10.00
85.74	79.50	10.00
85.02	78.99	10.00
84.40	77.93	10.00
84.32	76.47	10.00
84.30	67.87	10.00
84.29	57.41	10.00
84.29	43.27	10.00
84.27	27.94	10.00
84.22	13.78	10.00
84.23	1.73	10.00
95.87	127.87	10.00
95.88	120.80	10.00
95.89	109.20	10.00
95.86	93.34	10.00
85.33	32.45	15.00
85.33	44.21	15.00
85.33	55.58	15.00
85.34	67.60	15.00
85.39	73.75	15.00
85.39	77.72	15.00
85.53	78.44	15.00
86.00	78.95	15.00
86.85	79.48	15.00

87.98	79.53	15.00
90.99	79.56	15.00
92.84	79.53	15.00
93.64	79.53	15.00
94.04	79.42	15.00
94.33	79.25	15.00
94.65	79.08	15.00
94.97	78.75	15.00
95.12	78.52	15.00
95.26	78.22	15.00
95.33	77.94	15.00
95.40	77.64	15.00
95.42	74.92	15.00
95.39	70.51	15.00
95.39	65.81	15.00
95.38	59.22	15.00
95.37	55.88	15.00
95.38	54.08	15.00
95.44	52.05	15.00
85.37	147.22	15.00
85.37	142.99	15.00
85.37	133.85	15.00
85.37	123.74	15.00
85.35	113.12	15.00
85.35	104.02	15.00
85.38	98.11	15.00
85.36	94.45	15.00
85.38	93.34	15.00
85.58	92.76	15.00
86.02	92.21	15.00
86.60	91.85	15.00
87.29	91.67	15.00
88.89	91.65	15.00
92.41	91.64	15.00
93.83	91.59	15.00
94.30	91.72	15.00
94.71	91.93	15.00
95.06	92.31	15.00
95.31	92.75	15.00
95.42	93.04	15.00
95.45	95.06	15.00
95.46	99.53	15.00
95.38	105.04	15.00
95.41	111.46	15.00

95.40	119.00	15.00
95.42	123.29	15.00
95.43	126.99	15.00
95.45	129.81	15.00
95.45	137.15	15.00
95.41	147.05	15.00
50.09	1.90	-25.00
50.14	13.49	-25.00
50.13	33.50	-25.00
50.17	52.80	-25.00
50.18	71.79	-25.00
50.19	102.35	-25.00
50.26	125.15	-25.00
50.27	137.62	-25.00
50.25	144.50	-25.00
89.62	83.30	-25.00
90.35	83.51	-25.00
91.99	83.47	-25.00
92.72	83.46	-25.00
93.43	83.47	-25.00
93.82	83.64	-25.00
94.24	83.99	-25.00
94.56	84.45	-25.00
94.86	85.31	-25.00
94.86	85.90	-25.00
94.60	86.56	-25.00
94.06	87.17	-25.00
93.32	87.61	-25.00
90.96	87.58	-25.00
87.33	87.57	-25.00
84.50	87.57	-25.00
83.88	87.47	-25.00
83.22	86.84	-25.00
82.73	85.89	-25.00
82.68	85.39	-25.00
82.83	84.99	-25.00
83.01	84.52	-25.00
83.22	84.20	-25.00
83.42	83.99	-25.00
83.80	83.75	-25.00
84.27	83.52	-25.00
85.41	83.50	-25.00
87.09	83.47	-25.00
88.18	83.54	-25.00

90.20	83.50	-25.00
50.11	17.79	-25.00
50.15	35.26	-25.00
50.16	59.62	-25.00
83.16	92.33	3.00
83.05	92.82	3.00
82.97	93.21	3.00
83.00	93.93	3.00
83.01	95.20	3.00
83.01	99.15	3.00
83.02	102.72	3.00
83.02	107.15	3.00
83.03	111.24	3.00
82.98	116.44	3.00
83.01	122.01	3.00
83.02	129.57	3.00
83.00	135.04	3.00
83.04	138.94	3.00
83.04	142.63	3.00
83.05	144.75	3.00
83.04	147.24	3.00
83.17	1.81	5.00
83.16	7.16	5.00
83.18	18.31	5.00
83.22	26.30	5.00
83.26	35.34	5.00
83.23	45.56	5.00
83.27	54.99	5.00
83.27	64.26	5.00
83.29	67.52	5.00
83.26	71.89	5.00
83.26	75.12	5.00
83.26	76.86	5.00
83.29	77.50	5.00
83.28	77.76	5.00
83.37	78.25	5.00
83.69	78.88	5.00
84.18	79.46	5.00
84.78	79.98	5.00
85.35	80.23	5.00
85.76	80.37	5.00
86.78	80.50	5.00
89.26	80.49	5.00
93.47	80.44	5.00

94.29	80.49	5.00
94.82	80.31	5.00
95.20	80.18	5.00
95.62	79.96	5.00
95.84	79.71	5.00
96.19	79.41	5.00
96.42	79.14	5.00
96.65	78.72	5.00
96.74	78.50	5.00
96.82	77.89	5.00
96.79	75.23	5.00
96.80	72.16	5.00
96.81	69.20	5.00
96.79	65.38	5.00
96.79	62.66	5.00
96.80	59.22	5.00
96.83	57.58	5.00
96.80	56.02	5.00
96.79	53.64	5.00
96.79	52.07	5.00
96.81	127.80	5.00
96.83	125.57	5.00
96.83	117.58	5.00
96.83	110.75	5.00
96.82	106.89	5.00
96.82	100.59	5.00
96.86	95.99	5.00
96.83	92.73	5.00
96.52	91.99	5.00
96.24	91.64	5.00
95.78	91.16	5.00
95.14	90.79	5.00
94.43	90.60	5.00
93.33	90.62	5.00
89.29	90.59	5.00
85.74	90.72	5.00
85.11	90.96	5.00
84.69	91.17	5.00
84.11	91.73	5.00
83.83	92.08	5.00
83.61	92.54	5.00
83.42	92.88	5.00
83.35	93.17	5.00
83.38	93.62	5.00

83.31	93.97	5.00
83.30	95.18	5.00
83.33	98.36	5.00
83.25	101.82	5.00
83.33	104.57	5.00
83.29	107.55	5.00
83.30	111.44	5.00
83.30	116.97	5.00
83.31	124.38	5.00
83.33	130.23	5.00
83.32	136.49	5.00
83.32	140.76	5.00
83.33	144.95	5.00
83.28	147.24	5.00
85.27	1.86	15.00
85.26	9.06	15.00
85.28	19.29	15.00
95.71	89.95	-5.00
95.16	89.71	-5.00
94.56	89.65	-5.00
92.32	89.60	-5.00
89.59	89.61	-5.00
87.60	89.61	-5.00
85.19	89.66	-5.00
82.55	89.60	-5.00
81.41	89.77	-5.00
81.02	89.89	-5.00
80.40	90.13	-5.00
79.92	90.37	-5.00
79.44	90.58	-5.00
78.87	90.96	-5.00
78.36	91.36	-5.00
77.66	92.01	-5.00
77.14	93.09	-5.00
76.76	94.77	-5.00
76.61	99.25	-5.00
76.63	105.48	-5.00
76.60	111.80	-5.00
76.61	119.87	-5.00
76.59	127.22	-5.00
76.57	134.17	-5.00
76.55	140.66	-5.00
76.55	145.12	-5.00
76.52	147.30	-5.00

82.89	1.80	3.00
82.89	6.64	3.00
82.91	11.10	3.00
82.89	17.66	3.00
82.94	26.74	3.00
82.95	39.14	3.00
82.99	53.35	3.00
82.99	62.22	3.00
82.99	69.36	3.00
82.98	74.64	3.00
83.00	76.97	3.00
83.02	77.21	3.00
83.03	77.52	3.00
83.03	77.79	3.00
83.02	78.09	3.00
83.08	78.61	3.00
83.21	79.11	3.00
83.42	79.55	3.00
83.78	80.02	3.00
84.23	80.44	3.00
84.66	80.70	3.00
84.94	80.85	3.00
85.32	81.05	3.00
85.59	81.13	3.00
87.07	81.07	3.00
89.05	81.04	3.00
90.80	81.05	3.00
92.19	81.03	3.00
93.75	81.04	3.00
94.10	81.01	3.00
94.48	81.04	3.00
94.70	81.03	3.00
95.00	80.93	3.00
95.69	80.60	3.00
96.01	80.40	3.00
96.34	80.09	3.00
96.59	79.76	3.00
96.74	79.49	3.00
96.83	79.30	3.00
97.03	78.66	3.00
97.10	78.51	3.00
97.08	76.83	3.00
97.05	74.75	3.00
97.07	72.15	3.00

97.04	68.08	3.00
97.06	64.14	3.00
97.02	60.33	3.00
97.03	57.60	3.00
97.06	54.31	3.00
97.03	52.05	3.00
97.03	127.80	3.00
97.00	124.08	3.00
97.02	118.31	3.00
97.02	111.55	3.00
97.06	106.86	3.00
97.02	101.32	3.00
97.02	95.53	3.00
97.04	92.38	3.00
96.96	92.06	3.00
96.75	91.60	3.00
96.43	91.16	3.00
95.99	90.73	3.00
95.52	90.43	3.00
94.98	90.23	3.00
94.53	90.09	3.00
93.23	90.14	3.00
91.07	90.11	3.00
87.24	90.10	3.00
85.53	90.13	3.00
84.98	90.31	3.00
84.57	90.54	3.00
84.10	90.87	3.00
83.71	91.26	3.00
83.43	91.77	3.00
98.66	127.75	-15.00
98.63	126.43	-15.00
98.63	123.41	-15.00
98.66	118.37	-15.00
98.63	112.84	-15.00
98.62	108.05	-15.00
98.66	100.29	-15.00
98.66	94.52	-15.00
98.63	93.30	-15.00
98.62	92.77	-15.00
98.49	92.03	-15.00
98.20	91.20	-15.00
97.66	90.36	-15.00
96.97	89.74	-15.00

96.35	89.35	-15.00
95.66	89.09	-15.00
94.29	89.07	-15.00
91.30	89.08	-15.00
88.31	89.08	-15.00
84.58	89.08	-15.00
80.73	89.07	-15.00
77.89	89.08	-15.00
76.46	89.10	-15.00
75.04	89.13	-15.00
73.43	89.12	-15.00
72.71	89.18	-15.00
71.95	89.33	-15.00
70.99	89.58	-15.00
69.39	90.19	-15.00
68.57	90.84	-15.00
67.63	91.94	-15.00
66.70	92.88	-15.00
66.21	93.76	-15.00
65.71	94.94	-15.00
65.40	96.20	-15.00
65.29	96.96	-15.00
65.32	101.60	-15.00
65.28	106.48	-15.00
65.31	113.35	-15.00
65.32	120.74	-15.00
65.32	128.40	-15.00
65.31	136.03	-15.00
65.35	141.42	-15.00
65.35	145.10	-15.00
65.33	147.30	-15.00
97.65	52.02	-5.00
97.63	54.54	-5.00
97.63	57.57	-5.00
97.66	60.28	-5.00
97.62	63.26	-5.00
97.64	68.04	-5.00
97.65	72.08	-5.00
97.65	74.85	-5.00
97.65	77.45	-5.00
97.65	78.17	-5.00
97.65	78.61	-5.00
97.55	79.05	-5.00
97.37	79.58	-5.00

97.02	80.11	-5.00
96.79	80.48	-5.00
96.35	80.89	-5.00
95.88	81.17	-5.00
95.41	81.40	-5.00
94.79	81.55	-5.00
92.98	81.55	-5.00
90.85	81.53	-5.00
88.30	81.55	-5.00
85.32	81.54	-5.00
82.23	81.50	-5.00
81.61	81.41	-5.00
81.04	81.26	-5.00
80.35	81.06	-5.00
79.91	80.81	-5.00
79.47	80.58	-5.00
78.87	80.17	-5.00
78.04	79.55	-5.00
77.48	78.90	-5.00
77.10	77.75	-5.00
76.75	76.34	-5.00
76.63	75.00	-5.00
76.66	71.49	-5.00
76.67	65.53	-5.00
76.63	59.58	-5.00
76.61	52.50	-5.00
76.62	47.12	-5.00
76.59	37.06	-5.00
76.59	26.89	-5.00
76.46	15.37	-5.00
76.43	5.80	-5.00
76.45	1.79	-5.00
97.67	127.80	-5.00
97.68	124.80	-5.00
97.70	122.08	-5.00
97.68	119.12	-5.00
97.63	115.64	-5.00
97.66	111.08	-5.00
97.65	107.33	-5.00
97.68	102.87	-5.00
97.69	98.51	-5.00
97.65	94.80	-5.00
97.66	93.15	-5.00
97.58	92.34	-5.00

97.39	91.70	-5.00
97.10	91.12	-5.00
96.41	90.36	-5.00
72.70	77.82	-10.00
72.27	77.16	-10.00
71.94	76.48	-10.00
71.69	75.75	-10.00
71.50	75.13	-10.00
71.36	74.44	-10.00
71.32	74.12	-10.00
71.27	73.22	-10.00
71.28	68.40	-10.00
71.25	62.76	-10.00
71.27	57.39	-10.00
71.27	52.92	-10.00
71.28	47.77	-10.00
71.26	40.53	-10.00
71.21	34.62	-10.00
71.19	26.86	-10.00
71.20	18.89	-10.00
71.22	10.53	-10.00
71.23	5.49	-10.00
71.21	1.82	-10.00
97.96	127.77	-10.00
98.00	125.63	-10.00
97.96	122.49	-10.00
97.96	118.28	-10.00
97.95	112.92	-10.00
97.97	105.90	-10.00
98.00	100.82	-10.00
97.98	96.88	-10.00
97.95	93.11	-10.00
97.96	92.30	-10.00
97.87	92.00	-10.00
97.42	90.96	-10.00
97.10	90.59	-10.00
96.53	90.04	-10.00
95.90	89.68	-10.00
95.34	89.46	-10.00
93.56	89.42	-10.00
90.36	89.39	-10.00
86.30	89.48	-10.00
82.67	89.44	-10.00
79.07	89.47	-10.00

77.98	89.61	-10.00
77.12	89.88	-10.00
76.58	90.23	-10.00
75.49	90.68	-10.00
74.68	91.16	-10.00
73.83	91.92	-10.00
72.99	92.82	-10.00
72.33	93.82	-10.00
71.80	95.07	-10.00
71.42	96.68	-10.00
71.32	98.01	-10.00
71.35	100.51	-10.00
71.31	107.36	-10.00
71.29	113.48	-10.00
71.35	123.63	-10.00
71.36	132.85	-10.00
71.34	142.32	-10.00
71.32	147.28	-10.00
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98.62	61.68	-15.00
98.58	67.08	-15.00
98.64	75.19	-15.00
98.62	78.02	-15.00
98.42	78.96	-15.00
98.00	80.03	-15.00
97.22	80.98	-15.00
96.64	81.46	-15.00
96.07	81.81	-15.00
95.57	82.00	-15.00
95.23	82.11	-15.00
93.66	82.06	-15.00
90.65	82.03	-15.00
88.20	82.08	-15.00
87.03	82.08	-15.00
85.86	82.08	-15.00
83.52	82.08	-15.00
80.66	82.08	-15.00
79.25	82.08	-15.00
77.82	82.07	-15.00
75.49	82.11	-15.00
73.12	82.08	-15.00
72.51	82.00	-15.00
71.77	81.83	-15.00

70.99	81.62	-15.00
70.38	81.38	-15.00
69.37	81.03	-15.00
68.91	80.71	-15.00
68.63	80.35	-15.00
68.23	79.89	-15.00
67.66	79.27	-15.00
66.91	78.62	-15.00
66.49	77.92	-15.00
65.85	76.58	-15.00
65.55	75.71	-15.00
65.29	74.43	-15.00
65.29	72.17	-15.00
65.26	63.63	-15.00
65.24	52.63	-15.00
65.21	38.34	-15.00
65.21	23.92	-15.00
65.19	14.07	-15.00
65.16	6.62	-15.00
65.37	1.81	-15.00
101.36	52.10	-20.00
101.38	78.01	-20.00
101.43	102.70	-20.00
101.43	127.80	-20.00
101.35	52.07	-20.00
101.40	65.35	-20.00
101.40	84.52	-20.00
101.41	105.90	-20.00
101.46	118.60	-20.00
101.43	127.70	-20.00
99.37	52.04	-20.00
99.36	60.96	-20.00
99.36	68.84	-20.00
99.42	77.80	-20.00
97.70	81.79	-20.00
96.90	82.39	-20.00
96.42	82.62	-20.00
96.32	82.68	-20.00
94.47	82.71	-20.00
90.65	82.71	-20.00
86.21	82.69	-20.00
84.19	82.85	-20.00
82.71	84.24	-20.00
82.42	85.03	-20.00

82.40	86.20	-20.00
82.79	87.08	-20.00
83.30	87.69	-20.00
83.81	88.14	-20.00
84.39	88.42	-20.00
84.53	88.46	-20.00
85.37	88.45	-20.00
88.01	88.43	-20.00
91.00	88.42	-20.00
94.54	88.44	-20.00
96.24	88.39	-20.00
96.83	88.62	-20.00
97.43	89.03	-20.00
97.86	89.39	-20.00
98.35	89.92	-20.00
98.84	90.72	-20.00
99.26	91.66	-20.00
99.42	92.66	-20.00
99.43	93.66	-20.00
99.43	98.65	-20.00
99.42	104.79	-20.00
99.45	110.16	-20.00
99.40	117.17	-20.00
99.45	122.70	-20.00
99.42	125.87	-20.00
99.46	127.79	-20.00
58.15	1.85	-20.00
58.17	15.83	-20.00
58.18	35.02	-20.00
58.22	55.96	-20.00
58.21	76.83	-20.00
58.24	95.16	-20.00
58.26	108.58	-20.00
58.30	119.80	-20.00
58.29	130.64	-20.00
58.32	139.49	-20.00
58.34	144.96	-20.00
58.30	146.61	-20.00
97.95	52.06	-10.00
97.93	54.59	-10.00
97.94	57.35	-10.00
97.96	60.03	-10.00
97.97	62.59	-10.00
97.95	64.24	-10.00

97.94	68.28	-10.00	
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97.96	77.82	-10.00	
97.94	78.77	-10.00	
97.87	79.06	-10.00	
97.83	79.38	-10.00	
97.59	79.89	-10.00	
97.43	80.17	-10.00	
97.18	80.52	-10.00	
96.85	80.90	-10.00	
96.52	81.18	-10.00	
96.23	81.35	-10.00	
96.03	81.51	-10.00	
95.67	81.66	-10.00	
95.45	81.75	-10.00	
95.20	81.83	-10.00	
95.17	81.77	-10.00	
93.57	81.72	-10.00	
90.49	81.72	-10.00	
87.02	81.75	-10.00	
82.98	81.74	-10.00	
78.77	81.68	-10.00	
77.81	81.50	-10.00	
77.23	81.31	-10.00	
76.82	81.08	-10.00	
76.56	80.94	-10.00	
76.03	80.72	-10.00	
75.20	80.36	-10.00	
74.64	80.05	-10.00	
74.21	79.65	-10.00	
73.64	79.12	-10.00	
73.17	78.57	-10.00	
73.08	55.17	-20.00	start ebb shoal
76.33	55.17	-20.00	
77.33	54.58	-20.00	
79.33	52.83	-20.00	
81.33	51.42	-20.00	
82.67	51.08	-20.00	
84.33	50.92	-20.00	
86.17	51.00	-20.00	
88.08	51.17	-20.00	
90.58	52.25	-20.00	
92.58	53.92	-20.00	

92.83	54.25	-20.00
93.50	54.83	-20.00
94.42	55.17	-20.00
96.92	55.17	-20.00
99.92	61.50	-15.00
98.25	61.42	-15.00
97.33	61.00	-15.00
94.67	57.33	-15.00
92.58	54.92	-15.00
90.50	53.33	-15.00
88.17	52.17	-15.00
86.67	51.92	-15.00
84.33	52.00	-15.00
82.42	52.17	-15.00
81.33	52.58	-15.00
79.67	53.75	-15.00
77.67	55.58	-15.00
76.25	57.25	-15.00
74.67	59.58	-15.00
73.33	61.08	-15.00
72.83	61.50	-15.00
72.25	61.67	-15.00
70.83	61.58	-15.00
63.75	68.67	-10.00
68.92	65.67	-10.00
71.08	64.17	-10.00
72.75	62.75	-10.00
73.92	61.58	-10.00
75.25	59.83	-10.00
76.83	57.58	-10.00
78.00	56.00	-10.00
79.17	54.92	-10.00
80.58	53.75	-10.00
82.58	52.83	-10.00
84.00	52.50	-10.00
84.67	52.50	-10.00
85.92	52.33	-10.00
89.08	53.08	-10.00
90.33	53.92	-10.00
91.75	55.00	-10.00
93.17	56.58	-10.00
94.58	58.58	-10.00
96.33	60.92	-10.00
98.33	63.00	-10.00

100.67	64.83	-10.00
101.33	65.42	-10.00
103.75	66.83	-10.00
106.17	68.08	-10.00
106.83	68.67	-10.00
103.08	68.67	-10.00
98.33	68.67	-10.00
95.25	68.67	-10.00
95.25	67.00	-10.00
95.25	66.33	-10.00
95.25	64.58	-10.00
94.67	63.25	-10.00
93.17	61.50	-10.00
90.75	60.17	-10.00
89.00	59.58	-10.00
85.92	59.42	-10.00
84.33	59.42	-10.00
81.83	59.50	-10.00
79.67	60.33	-10.00
77.92	61.25	-10.00
76.58	62.50	-10.00
75.83	63.67	-10.00
75.42	64.83	-10.00
75.42	66.33	-10.00
75.42	68.67	-10.00
72.58	68.67	-10.00
67.67	68.83	-10.00
63.58	68.67	-10.00
81.83	68.25	-15.00
81.25	65.92	-15.00
79.83	63.67	-15.00
78.33	62.08	-15.00
81.25	62.08	-15.00
84.25	62.17	-15.00
87.00	62.17	-15.00
90.25	62.25	-15.00
92.25	62.25	-15.00
90.83	63.75	-15.00
89.50	65.67	-15.00
88.75	68.17	-15.00

Appendix F
Location of Gauges

The wave and current meters were located in a portable rack which was moved among four locations. These locations are noted in Figure F1. The gauge coordinates are given in Table F1. In Appendixes B and C, Gauge 1 in the tables is an average of the four wave gauges located 1.5 m in front of the wave generator. Setups 1 and 4 are combined and the numbering begins at the seaward most gauge denoted as Gauge 2. This is a wave gauge, followed by Velocity Gauge 2, and so on down the line to Wave Gauge 12, following Velocity Gauge 11. To interpret the tables in Appendixes B and C, note that the current values offshore and onshore of the wave gauge are averaged and assigned the gauge number of the wave gauge between the two. In the case of Wave Gauge 1, only the value of Current Meter 2 is used, and at Wave Gauge 12, only Current Meter 11 values are used.

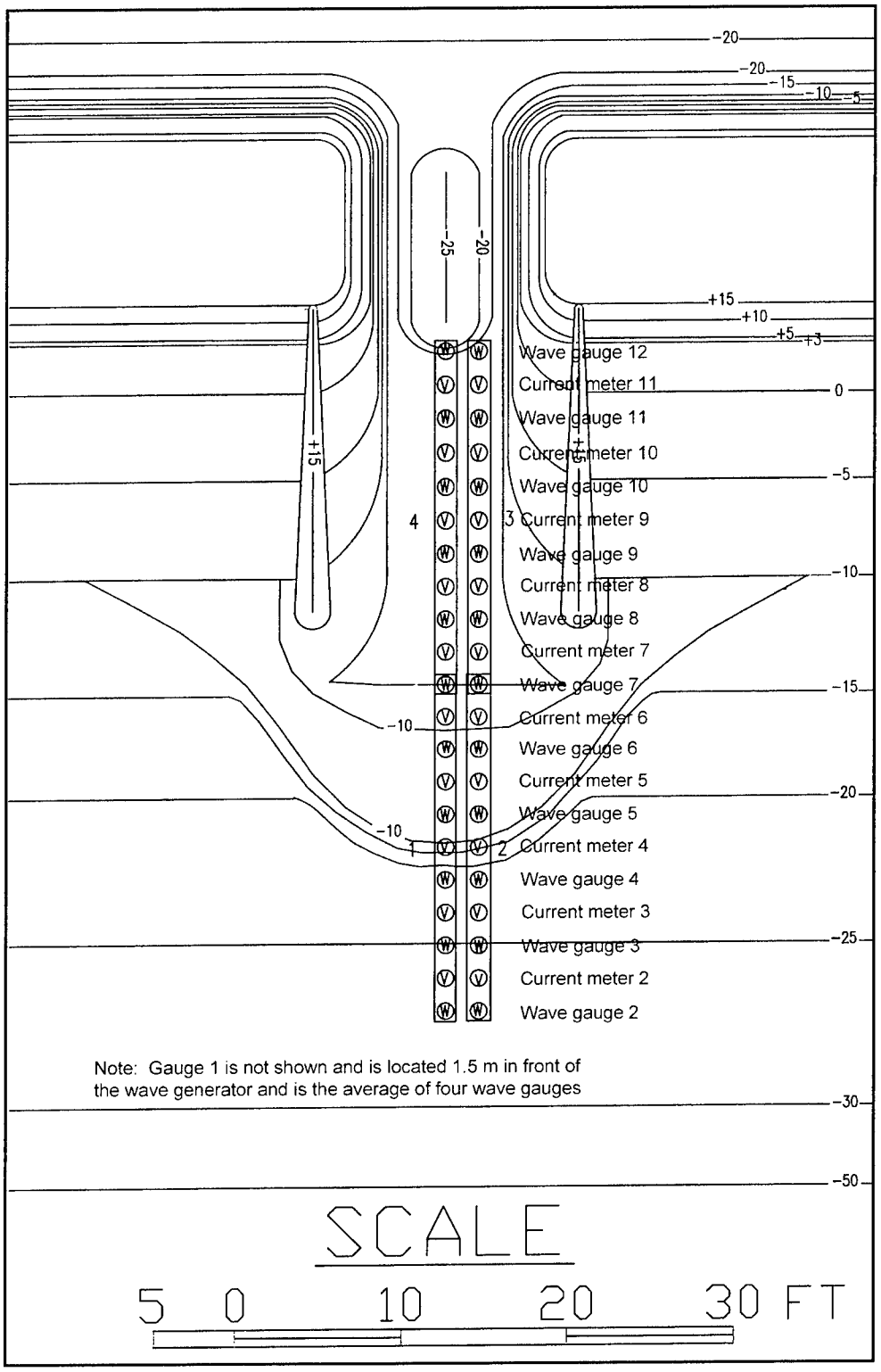

Figure F1. Gauge nomenclature

Table F1
Gauge Locations

Gauge Number	Sensor Type	Gauge Setup	X coordinate, ft[1]	Y coordinate, ft[1]
2	Wave	1 and 4	42.16	85.32
2	Current	1 and 4	44.16	85.32
3	Wave	1 and 4	46.16	85.32
3	Current	1 and 4	48.16	85.32
4	Wave	1 and 4	50.16	85.32
4	Current	1 and 4	52.16	85.32
5	Wave	1 and 4	54.16	85.32
5	Current	1 and 4	56.16	85.32
6	Wave	1 and 4	58.16	85.32
6	Current	1 and 4	60.16	85.32
7	Wave	1 and 4	62.16	85.32
7	Current	1 and 4	64.16	85.32
8	Wave	1 and 4	66.16	85.32
8	Current	1 and 4	68.16	85.32
9	Wave	1 and 4	70.16	85.32
9	Current	1 and 4	72.16	85.32
10	Wave	1 and 4	74.16	85.32
10	Current	1 and 4	76.16	85.32
11	Wave	1 and 4	78.16	85.32
11	Current	1 and 4	80.16	85.32
12	Wave	1 and 4	82.16	85.32
2	Wave	2 and 3	42.16	83.32
2	Current	2 and 3	44.16	83.32
3	Wave	2 and 3	46.16	83.32
3	Current	2 and 3	48.16	83.32
4	Wave	2 and 3	50.16	83.32
4	Current	2 and 3	52.16	83.32
5	Wave	2 and 3	54.16	83.32
5	Current	2 and 3	56.16	83.32
6	Wave	2 and 3	58.16	83.32
6	Current	2 and 3	60.16	83.32
7	Wave	2 and 3	62.16	83.32
7	Current	2 and 3	64.16	83.32
8	Wave	2 and 3	66.16	83.32
8	Current	2 and 3	68.16	83.32
9	Wave	2 and 3	70.16	83.32
9	Current	2 and 3	72.16	83.32
10	Wave	2 and 3	74.16	83.32
10	Current	2 and 3	76.16	83.32
11	Wave	2 and 3	78.16	83.32
11	Current	2 and 3	80.16	83.32
12	Wave	2 and 3	82.16	83.32

[1] To convert feet to meters, multiply by 0.3048.

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14. ABSTRACT

In this report, wave breaking on a current is examined through physical-model measurements in an idealized inlet with a steady ebb current. Wave and current measurements will be used to evaluate wave dissipation models. The goal of the study is to provide the data to develop a dissipation function for wave breaking on a current that is based on integrated wave parameters, is applicable for arbitrary water depths, and is robust.

The motivation for these laboratory experiments was to measure wave breaking in typical coastal inlet conditions. The measurements are being used to parameterize wave breaking for application in numerical wave transformation models, e.g., in the steady-state spectral wave model STWAVE.

The data collected and analyzed for this study are an extension of the data set collected by Smith et al. (1998) in the same physical model facility. Smith et al. (1998) evaluated and developed dissipation algorithms using these data. It was found that whitecapping formulations, strongly dependent on wave steepness, generally under-predict dissipation. A relationship for dissipation as a function of wave height squared was developed which gave improved agreement between calculated and predicted dissipation compared to other work. The relationship also worked as well as others in modeling the wave height.

(Continued)

15. SUBJECT TERMS

Coastal inlet, Ebb currents, Laboratory measurements, Wave breaking, Wave dissipation

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14. ABSTRACT

The data presented in this report include a larger range of incident waves and ebb currents than the previous data set (Smith et al. 1998). These experiments also include an elliptical ebb shoal seaward of the inlet. The shoal induces depth-limited breaking (in addition to the current-induced breaking in the inlet), which is a typical feature of many coastal inlets. Also, an examination of effects of laboratory scaling was performed.