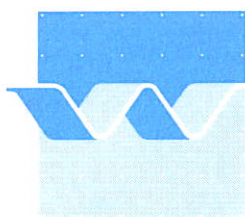


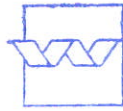
H 228 Part 1D, Figures
November 1987

Verification of numerical wave propagation models with laboratory measurements

HISWA verification in the directional
wave basin



delft hydraulics



bibliotheek
postbus 177 - 2600 MH Delft
waterloopkundig laboratorium Delft

	bibliotheek postbus 177 - 2600 MH Delft waterloopkundig laboratorium/WL
BB	0003234
WL	H10220,110
EXPL	WL/Delft Hydraulics

c 141029 

Verification of numerical wave propagation models with laboratory measurements

HISWA verification in the directional wave basin

M.W. Dingemans

LIST OF FIGURES

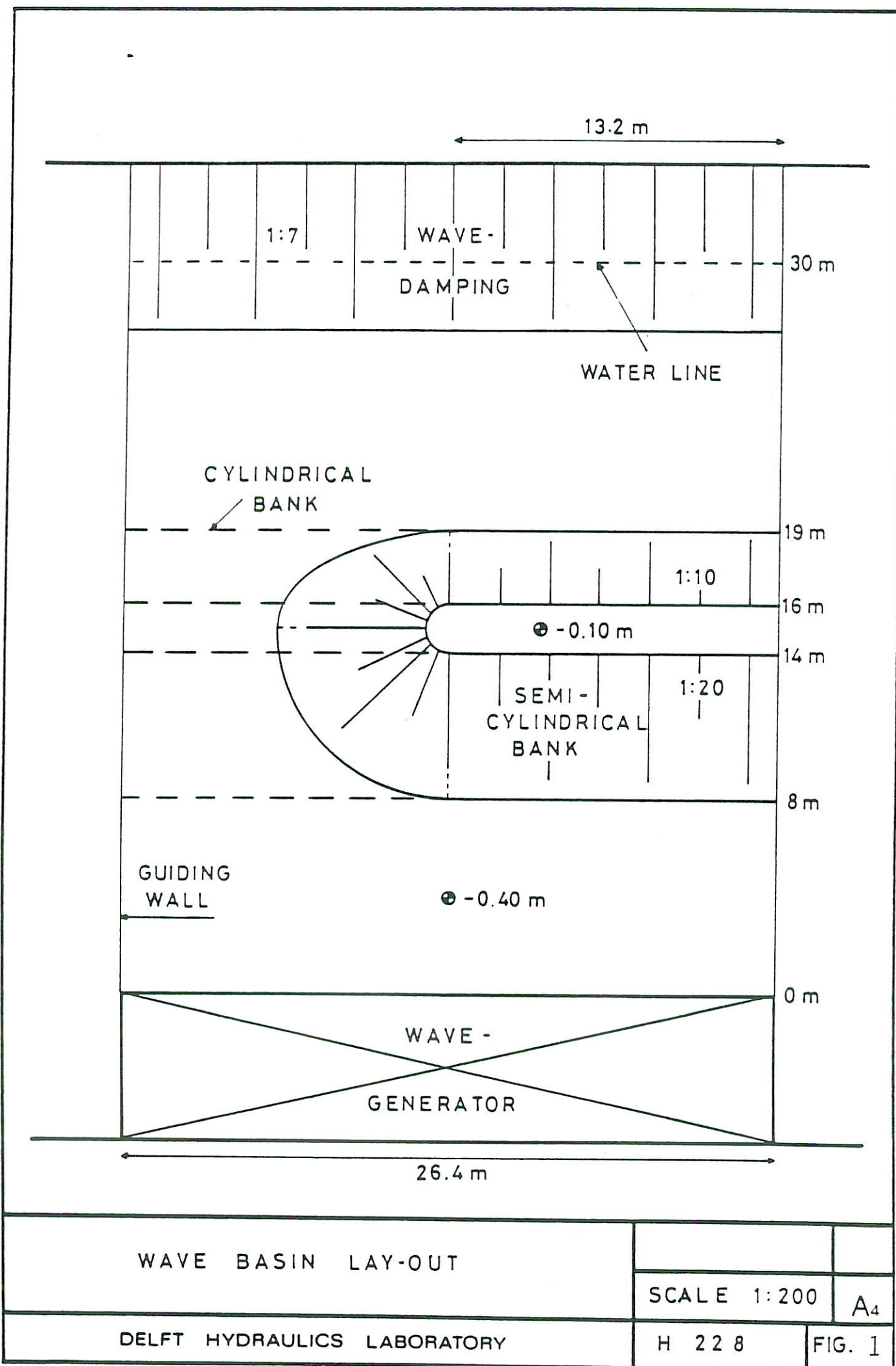
1. Wave basin lay-out.
2. Measuring postions.
3. Jonswap-type spectra with $\gamma_0 = 3.3$ and 7.
4. Directional distributions $\cos^m \theta$.
5. Sketch of directional meter GRSM.
6. Variance spectrum $E(f)$ at site 10 for me35.
7. Variance spectrum $E(f)$ at site 29 for me35.
8. Variance spectrum $E(f)$ at site 28 for me35.
9. Normalized spectrum at site 10 for me35 together with theoretical JONSWAP spectrum.
10. Normalized spectrum at site 29 for me35 together with theoretical JONSWAP spectrum.
11. Normalized spectrum at site 28 for me35 together with theoretical JONSWAP spectrum.
12. Current measuring positions.
- 13-21 Scatter plots wave heights HISWA computations ve2x.
 13. Scatter plot ve21a.
 14. Scatter plot ve22.
 15. Scatter plot ve22a.
 16. Scatter plot **ve23**
 17. Scatter plot ve24.
 18. Scatter plot ve25.
 19. Scatter plot ve26.
 20. Scatter plot ve27.
 21. Scatter plot ve28.
- 22-35 Scatter plots wave heights HISWA computations ve3x.
 22. Scatter plot ve31.
 23. Scatter plot ve32.
 24. Scatter plot ve33.
 25. Scatter plot ve34.
 26. Scatter plot ve35.
 27. Scatter plot ve35aa.
 28. Scatter plot ve35b.
 29. Scatter plot ve35bs.
 30. Scatter plot ve35s1.
 31. Scatter plot ve35s2.
 32. Scatter plot ve36.

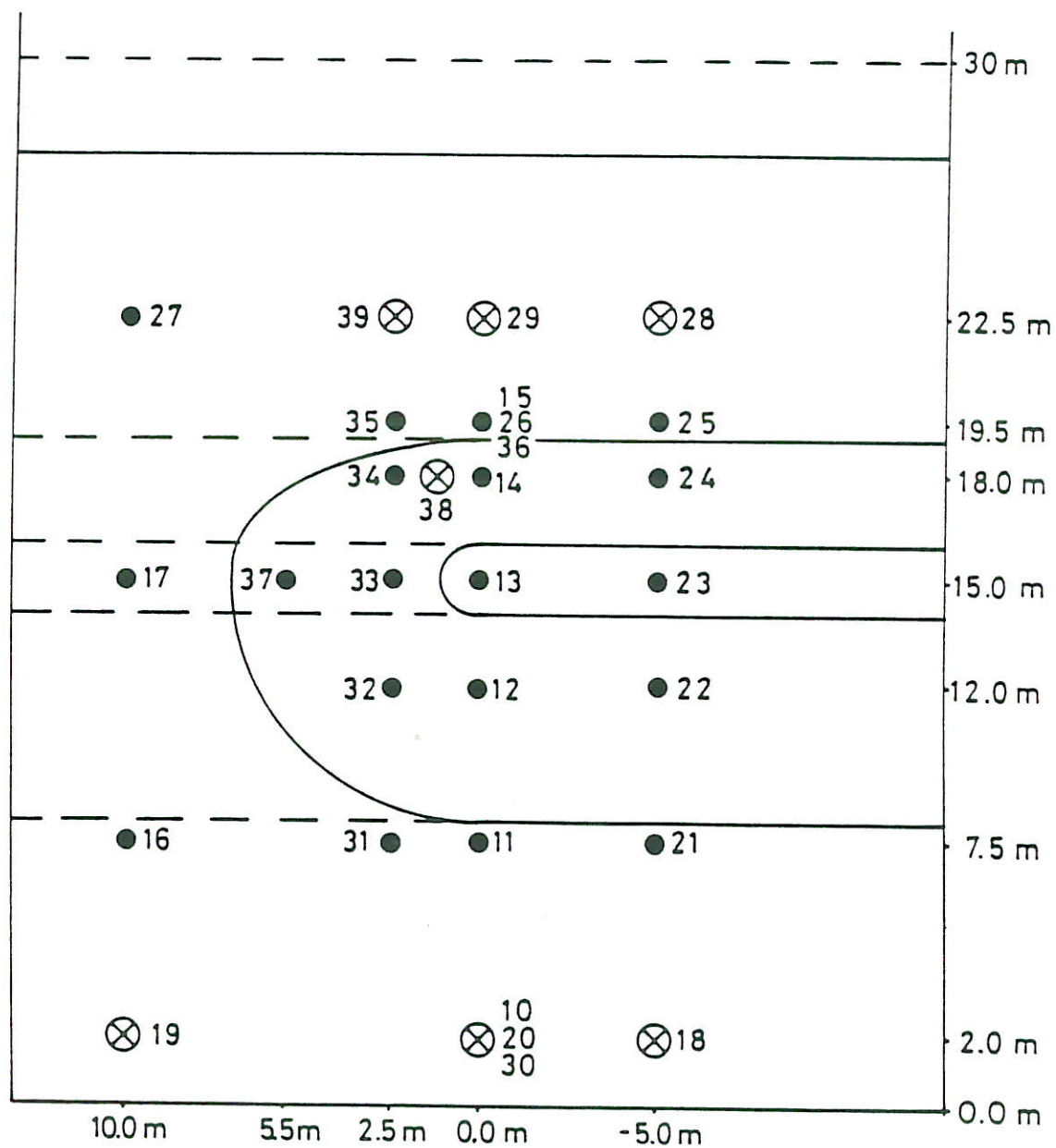
LIST OF FIGURES (continued)

33. Scatter plot ve37.
34. Scatter plot ve38.
35. Scatter plot ve35c.
36. Current field from WAQUA, used in ve35bs.
37. Wave heights along some lines, for ve32.
38. Wave heights along some lines, for ve35b.
39. Iso-wave height contours for HISWA computation ve35b.
40. Iso-wave height contours for HISWA computation ve35s1.
41. Iso-wave height contours for HISWA computation ve35s2. (not available)
42. Iso-wave period contours for HISWA computation ve35b.
43. Iso-wave period contours for HISWA computation ve35s1.
44. Iso-wave period contours for HISWA computation ve35s2. (not available)
45. Wave directions for HISWA computation ve35a.
46. Wave directions for HISWA computation ve35s1.
47. Wave directions for HISWA computation ve35s2.
- 48-65 Scatter plots wave heights CREDIZ computations.
 48. Scatter plot ce31.
 49. Scatter plot ce31a.
 50. Scatter plot ce31b.
 51. Scatter plot ce31c.
 52. Scatter plot ce32.
 53. Scatter plot ce32a.
 54. Scatter plot ce32b.
 55. Scatter plot ce35.
 56. Scatter plot ce35a.
 57. Scatter plot ce35b.
 58. Scatter plot ce35b1.
 59. Scatter plot ce35ba.
 60. Scatter plot ce35bb.
 61. Scatter plot ce35bc.
 62. Scatter plot ce35s1.
 63. Scatter plot ce35sa.
 64. Scatter plot ce35sb.
 65. Scatter plot ce35c.
66. Computational grid for ODYSSEE computation.
67. Velocity field from ODYSSEE computation ve35a.

LIST OF FIGURES (continued)

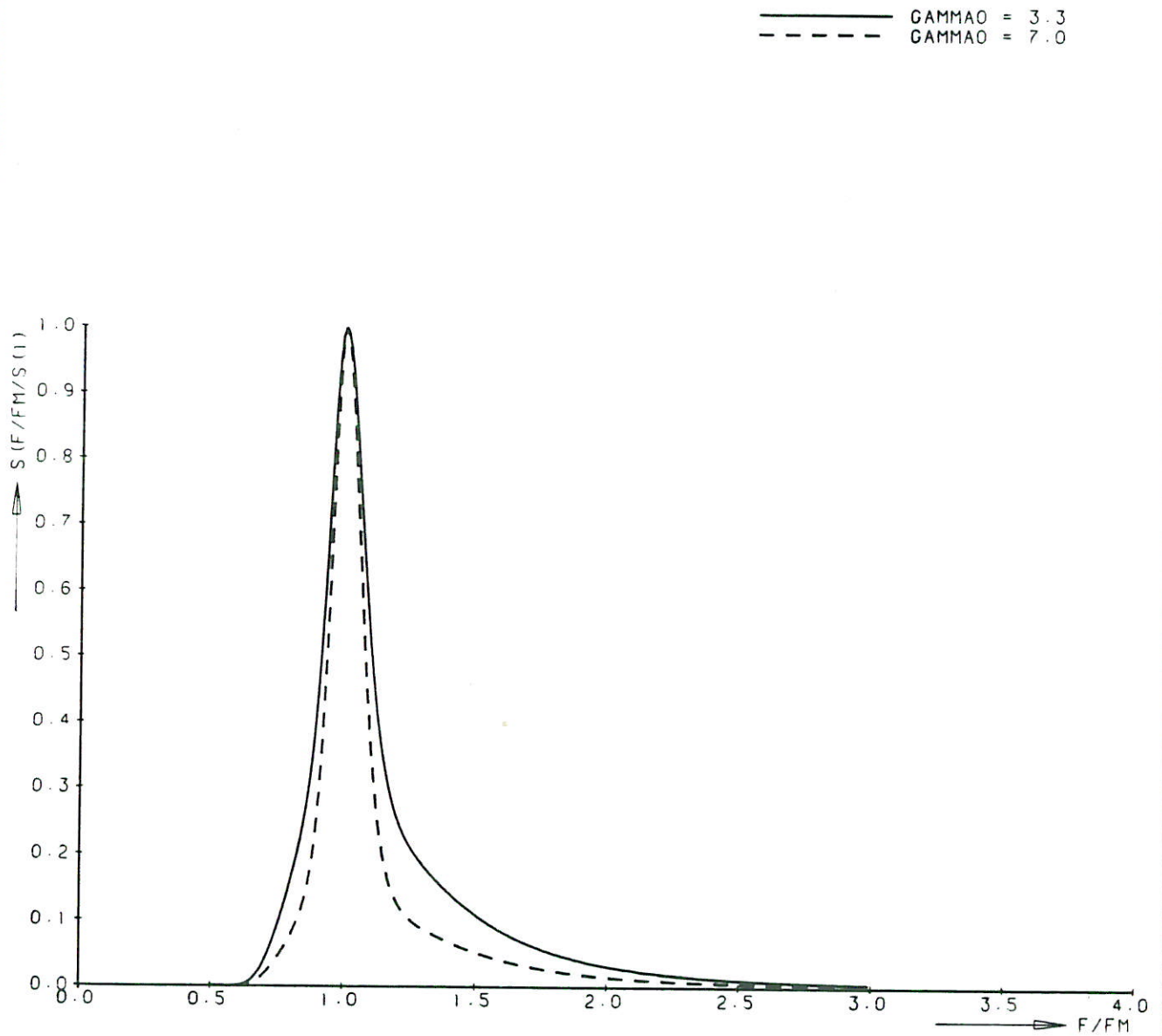
68. Stream function plot for ODYSSEE computation ve35a.
69. Velocity field from ODYSSEE computation ve35az.
70. Stream function plot for ODYSSEE computation ve35az.
71. Velocity field from ODYSSEE computation ve35am.
72. Stream function plot for ODYSSEE computation ve35am.
73. Velocity field from ODYSSEE computation ve35s1.
74. Stream function plot for ODYSSEE computation ve35s1.
75. Velocity field from ODYSSEE computation ve35s2.
76. Stream function plot for ODYSSEE computation ve35s2.
77. Measured velocity field, condition me35.
78. Measured velocity field, condition me38.
79. Velocity field ve35a at the measuring positions.
80. Velocity field ve35az at the measuring positions.
81. Velocity field ve35am at the measuring positions.
82. Velocity field ve35s2 at the measuring positions.
83. Velocity field from WAQUA computation ve35vh1.
84. Velocity field from WAQUA computation ve35vh2.
85. Velocity field from WAQUA computation ve35vh3.
86. Velocity field from WAQUA computation ve35vh4.
87. Velocity field from WAQUA computation ve35vk1.
88. Velocity field from WAQUA computation ve35vk2.
89. Velocity field from WAQUA computation ve35vk3.
90. Velocity field from WAQUA computation ve35vk4.
91. Time history ve35vh1.
92. Time history ve35vh2.
93. Time history ve35vh3.
94. Time history ve35vh4.
95. Time history ve35vk1.
96. Time history ve35vk2.
97. Time history ve35vk3.
98. Time history ve35vk4.





⊗ WAVE DIRECTION METER
 ● WAVE GAUGE

MEASURING POSITIONS	SCALE 1: 200	
		A ₄
DELFT HYDRAULICS LABORATORY	H 228	FIG. 2



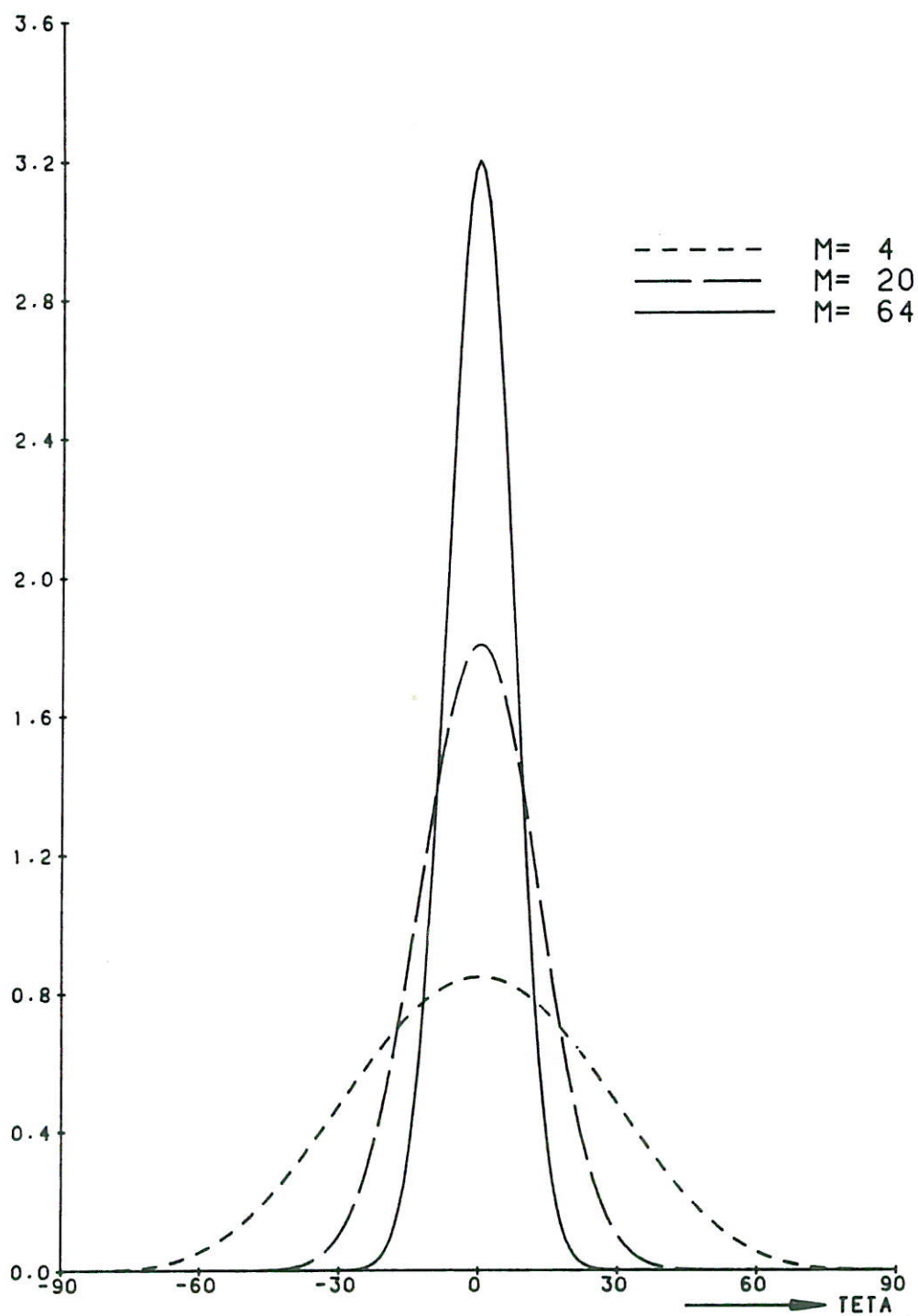
DIMENSIONLESS JONSWAP SPECTRUM

PMD3.A

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 3

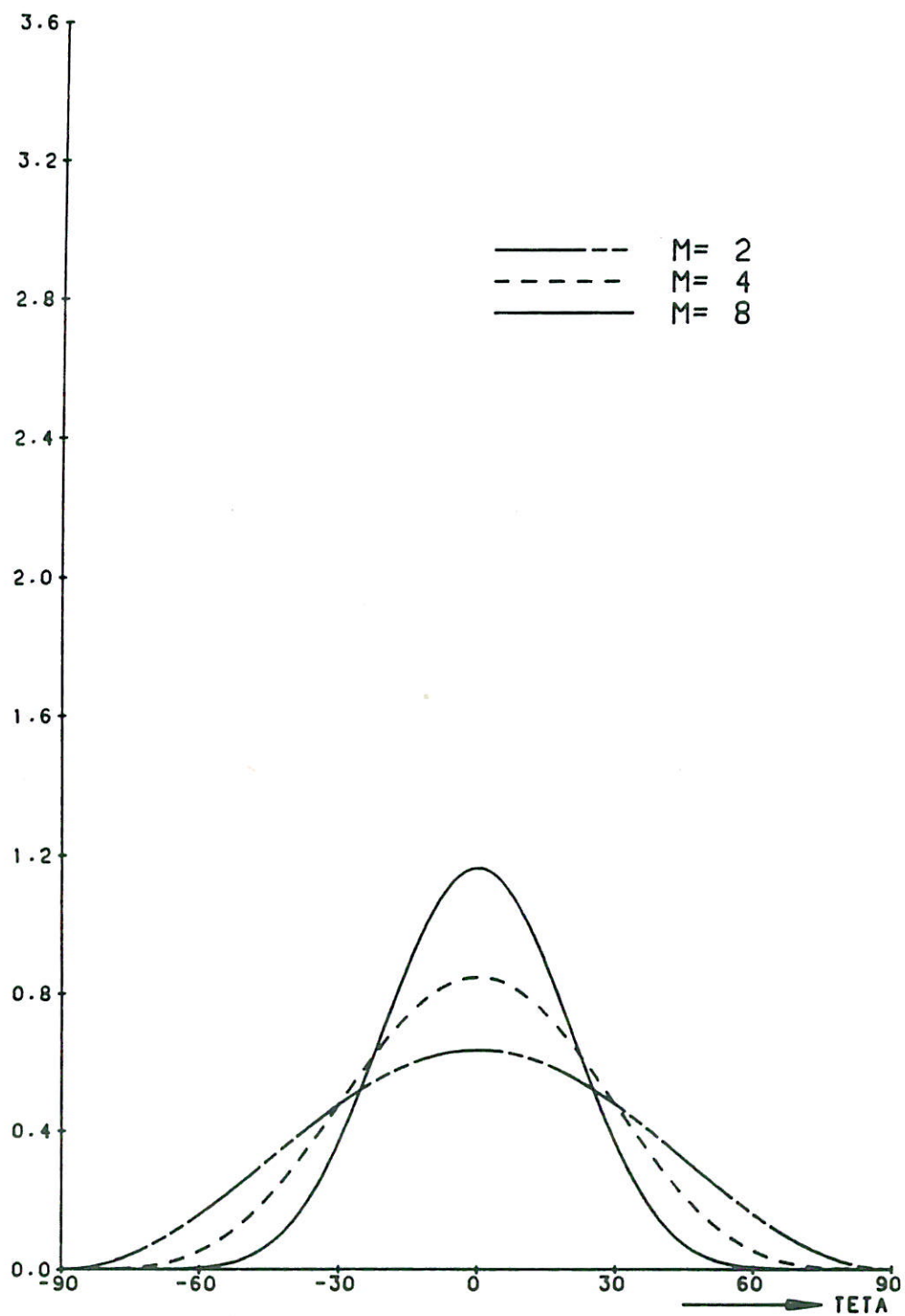


DIRECTIONAL DISTRIBUTION B2COS (TETA)

DELFT HYDRAULICS LABORATORY

H228

FIG. 4A

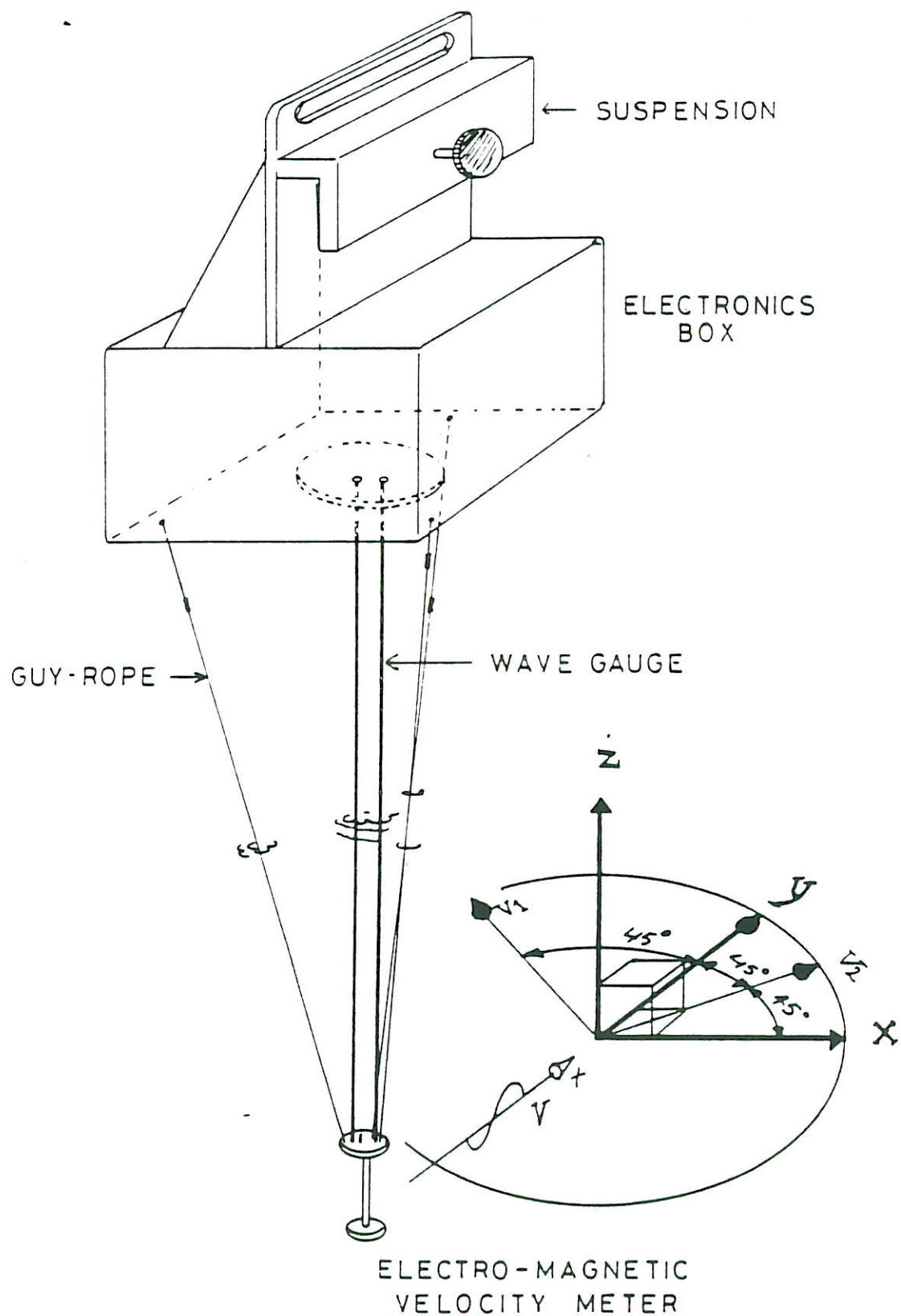


DIRECTIONAL DISTRIBUTION B2COS (TETA)

DELFT HYDRAULICS LABORATORY

H228

FIG. 4B



WAVE DIRECTION METER GRSM

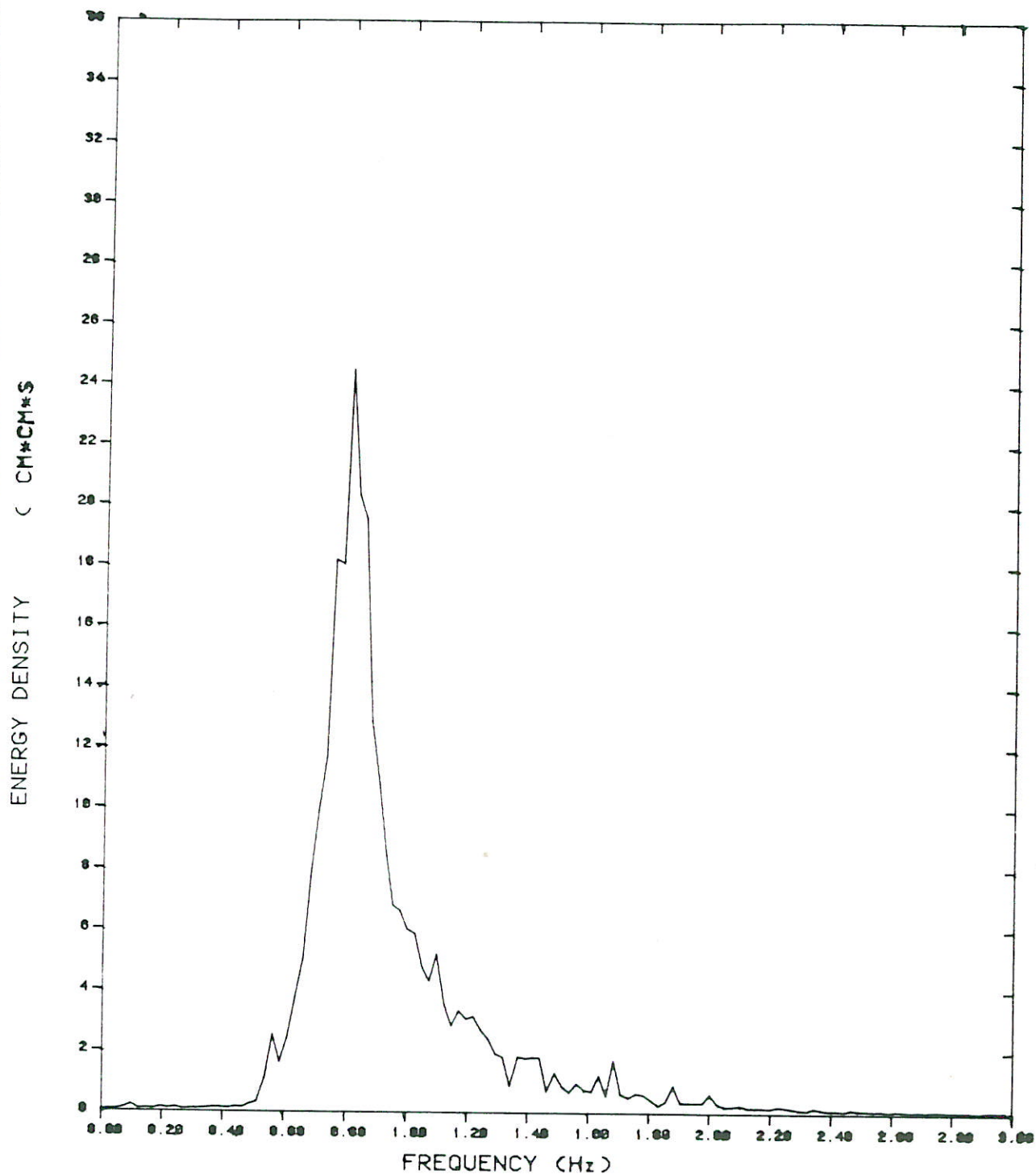
SCALE 1:5

A4

DELFT HYDRAULICS LABORATORY

H 228

FIG. 5



$M_0 = 6.70$ CM^2/CM
 $T_p = 1.24$ S
 $F_{HY} = 3.1250$ Hz
 $DF = 0.0244$ Hz
 $EDF = 64$

CHANNEL : 10 me 35

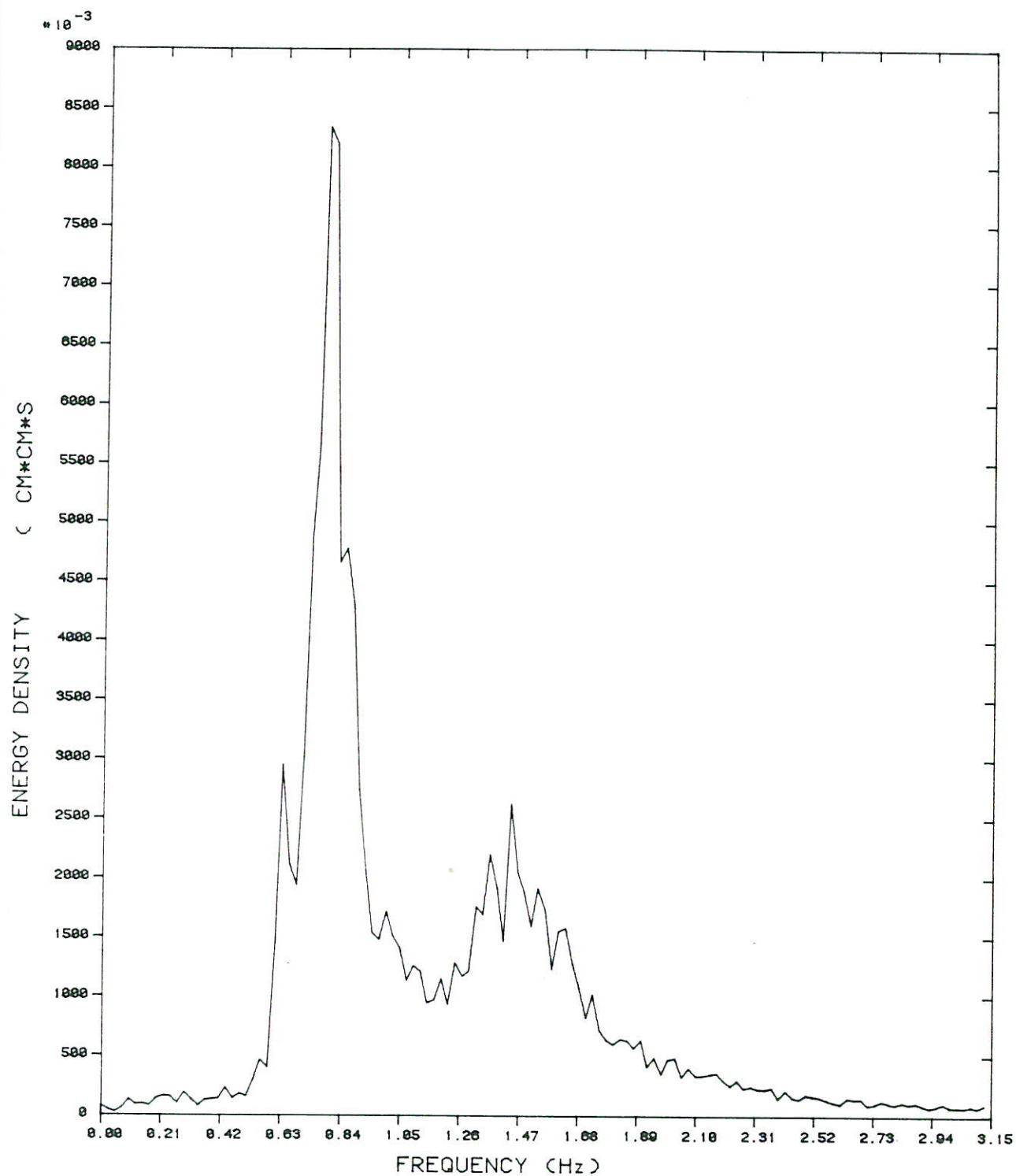
ENERGY DENSITY SPECTRUM

WATER WAVES
 $N_L = 1.00$
 DATE : 02-DEC-85
 TEST : P315

DELFT HYDRAULICS LABORATORY

site 10

FIG. 6



$M = 3.01$ CM*CM
 $T_p = 1.28$ S
 $F_{NY} = 3.1250$ Hz
 $DF = 0.0244$ Hz
 $EDF = 64$

CHANNEL : 16 me 35

ENERGY DENSITY SPECTRUM

WATER WAVES

$N_L = 1.00$

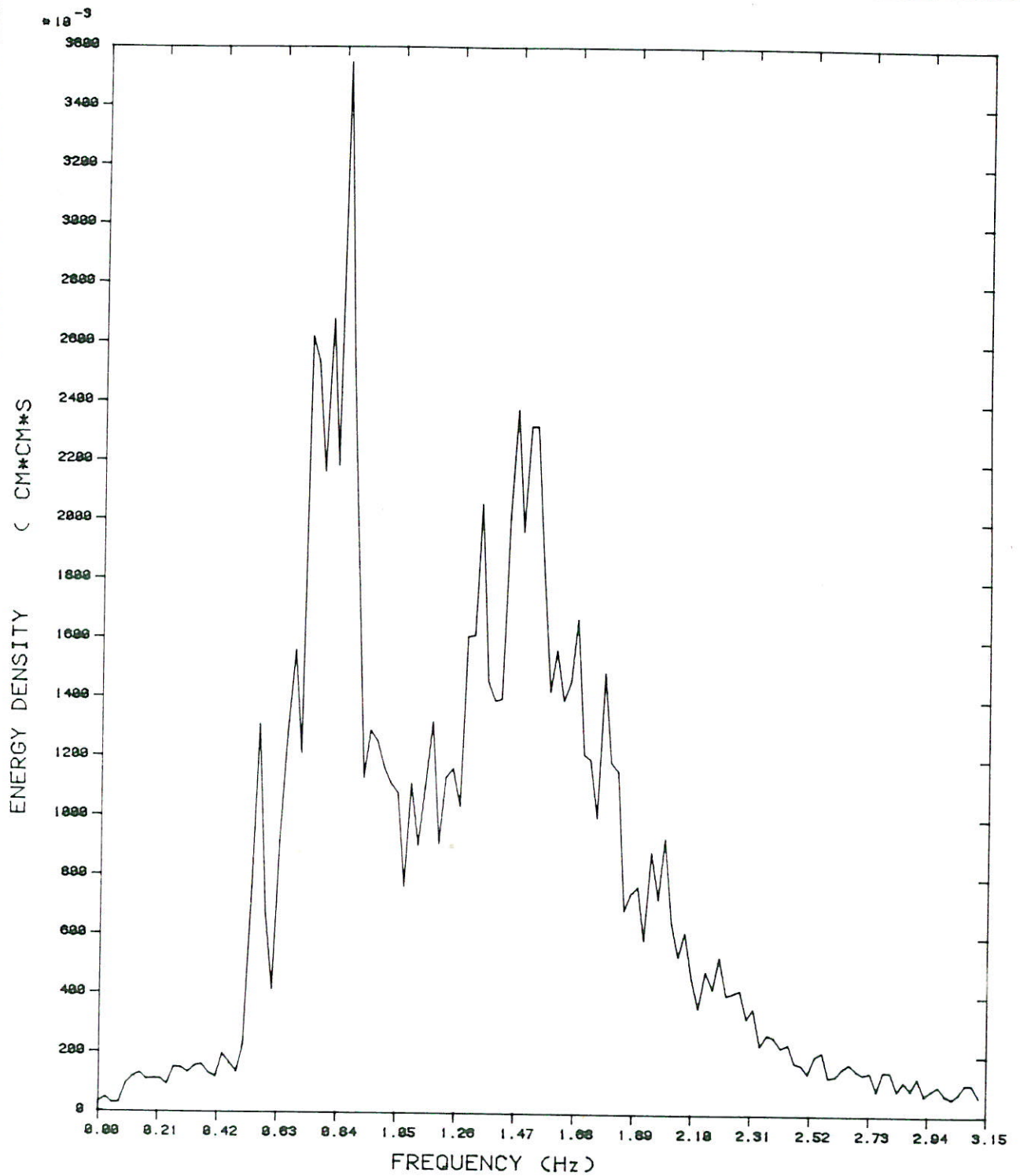
DATE : 05-DEC-85

TEST : P325

DELFT HYDRAULICS LABORATORY

site 29

FIG. 7



$M = 2.45$ CM*CM
 $T_P = 1.17$ S
 $F_{NY} = 3.1250$ Hz
 $DF = 0.0244$ Hz
 $EDF = 64$

CHANNEL : 13 me 35

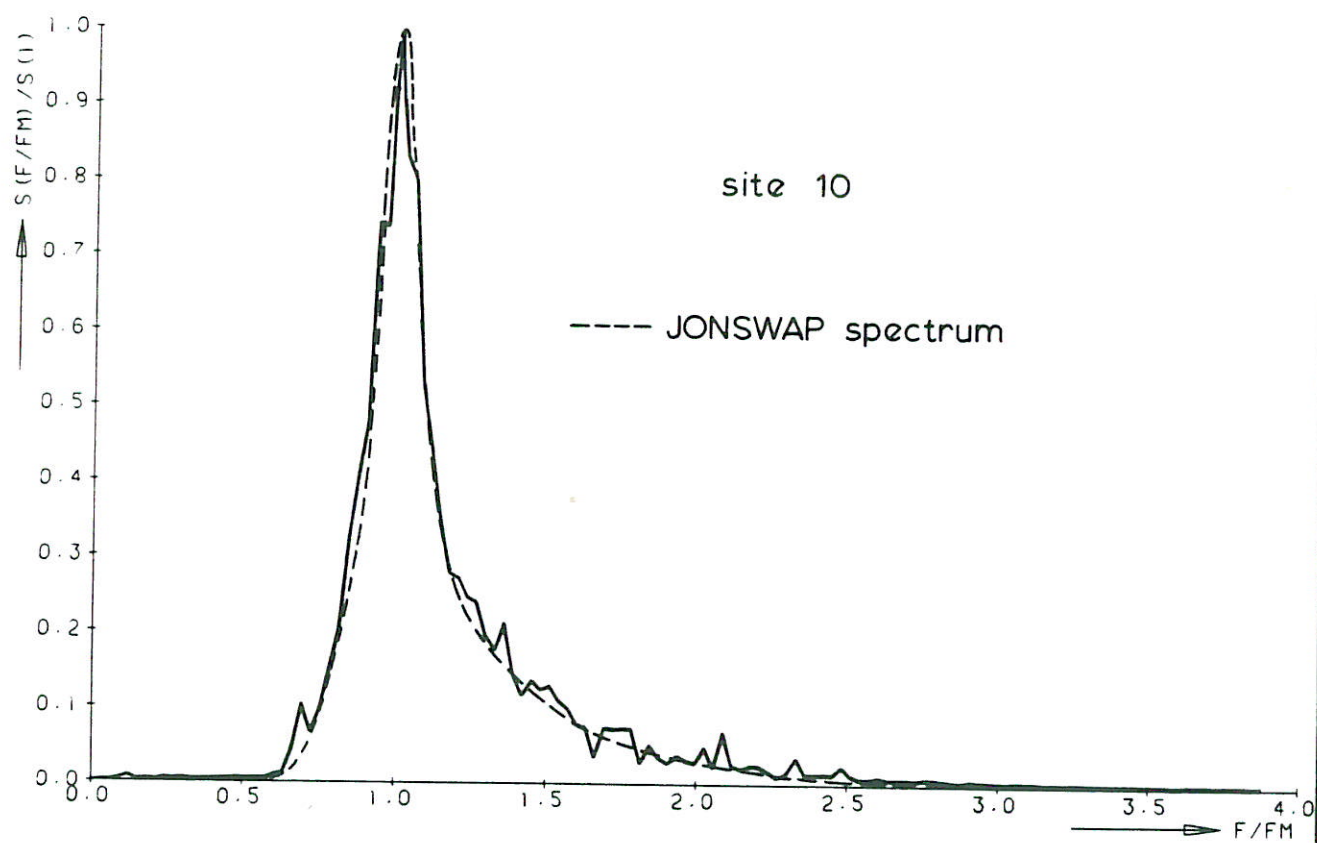
ENERGY DENSITY SPECTRUM

WATER WAVES
 $N_L = 1.00$
 DATE : 05-DEC-85
 TEST : P325

DELFT HYDRAULICS LABORATORY

site 28

FIG. 8



DIMENSIONLESS WAVE SPECTRUM CONDITION 5
SEMI-CYLINDRICAL BANK

SITE 10

P315K10

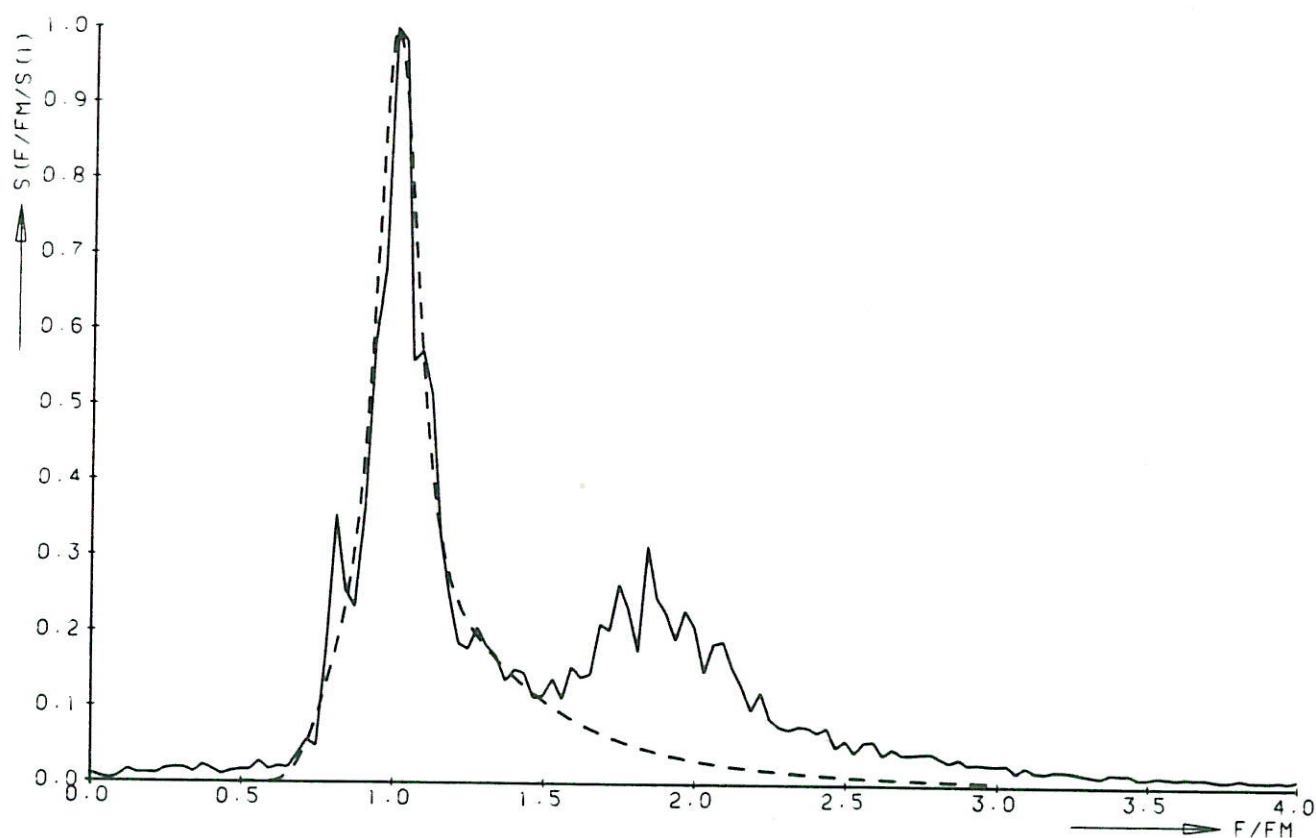
DELFT HYDRAULICS LABORATORY

H228-03

FIG. 9

SITE 29

----- JONSWAPSPECTRUM



DIMENSIONLESS WAVE SPECTRUM CONDITION 5
SEMI-CYLINDRICAL BANK

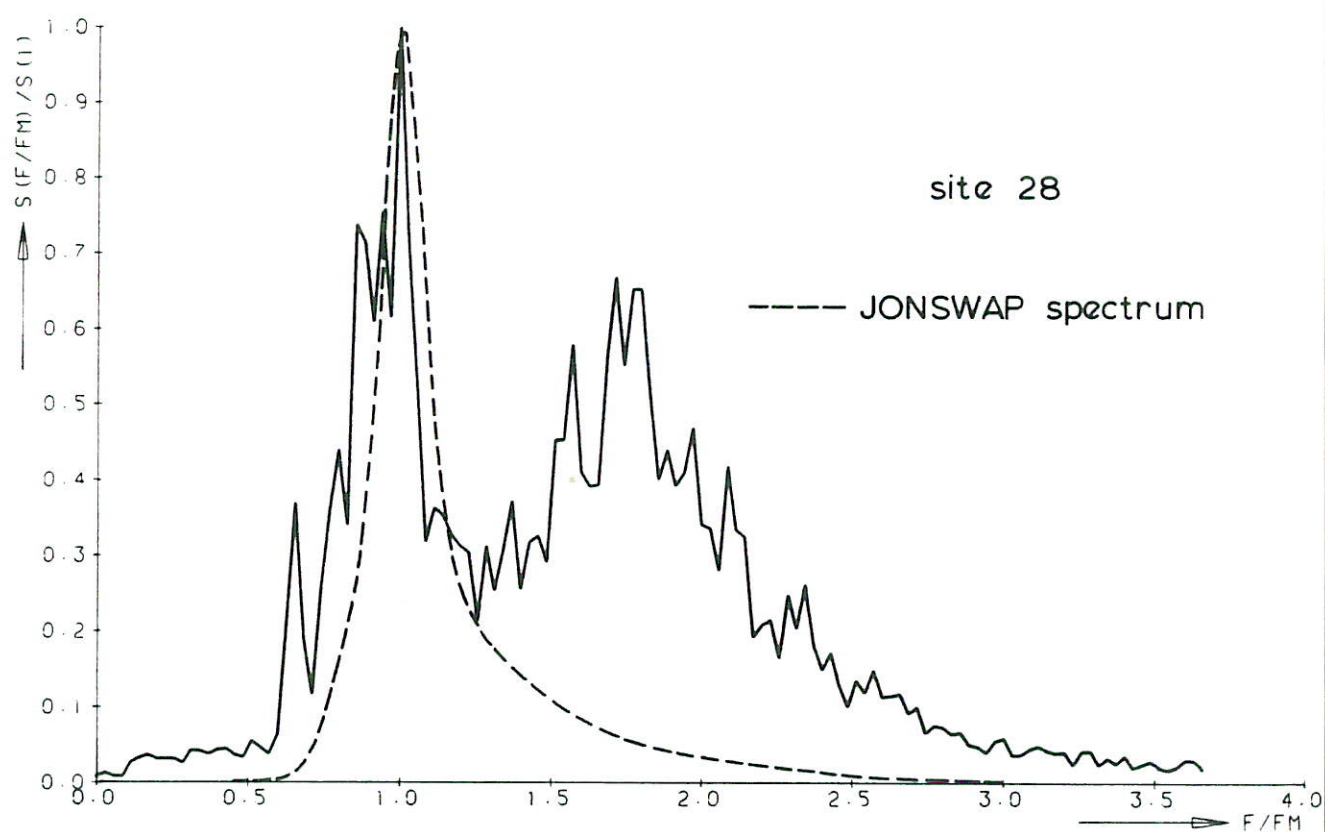
SITE 29

P325K16

DELFT HYDRAULICS LABORATORY

H228-3

FIG.10



DIMENSIONLESS WAVE SPECTRUM CONDITION 5
SEMI-CYLINDRICAL BANK

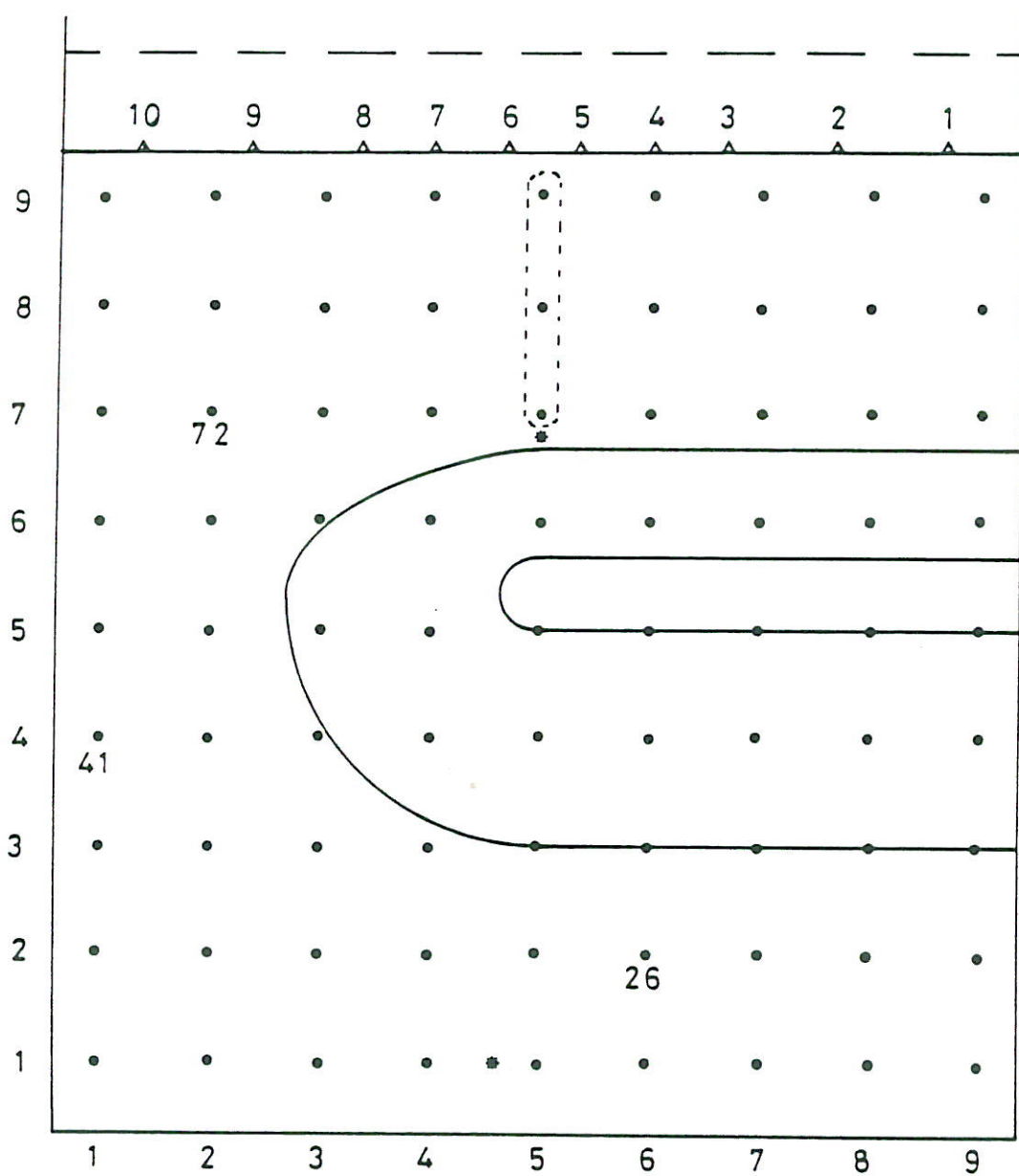
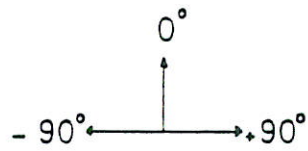
SITE 28

P325K13

DELFT HYDRAULICS LABORATORY

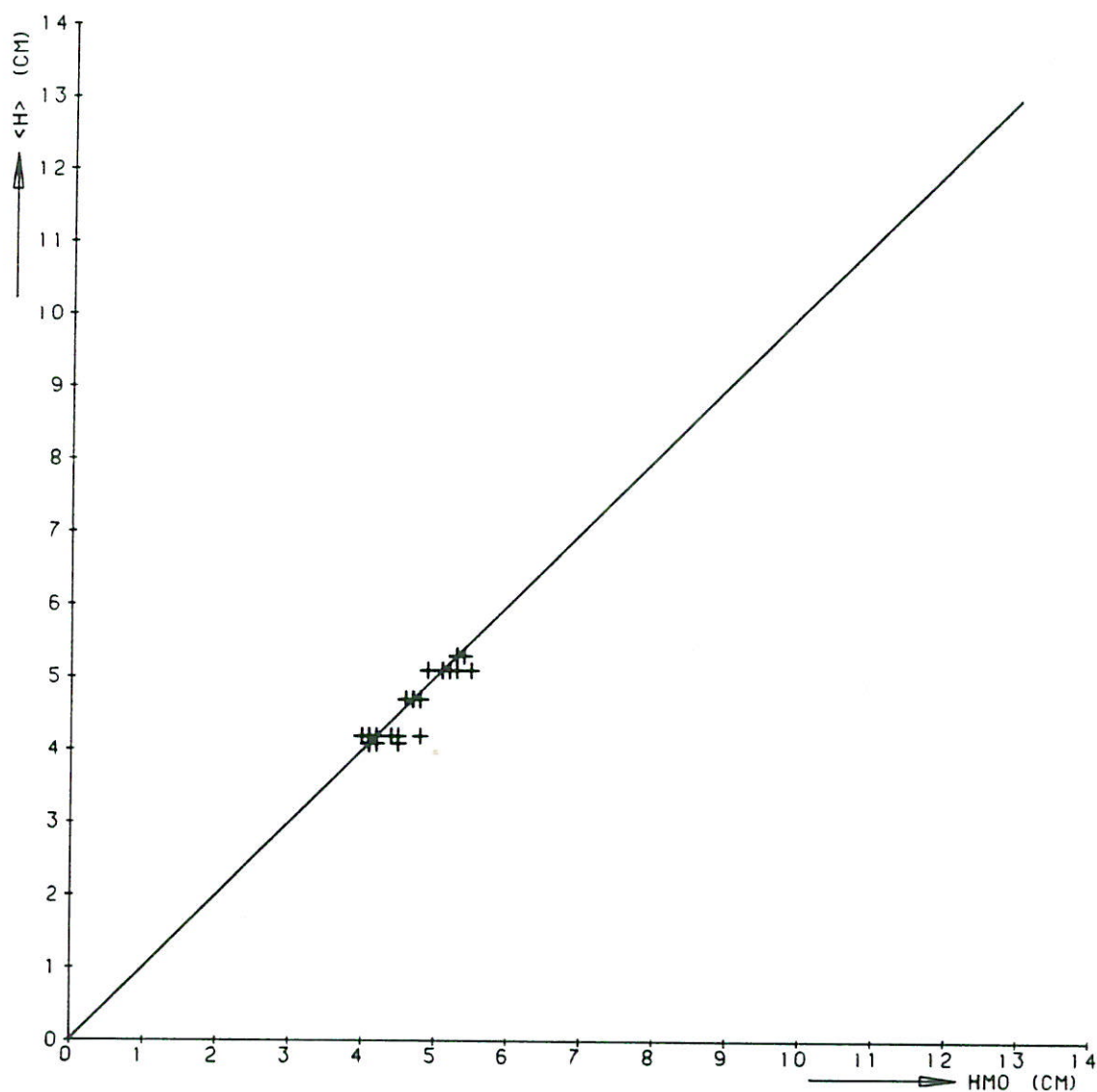
H228-03

FIG. 11



- VELOCITY MEASURING POINT
- * WAVE GAUGE
- △ GAUGE GLASS CONNECTION
- () POSITIONS WITH MEASUREMENTS AT DIFFERENT LEVEL

MEASURING POSITIONS	SCALE 1: 200	
		A4
DELFT HYDRAULICS LABORATORY	H 306	FIG.12



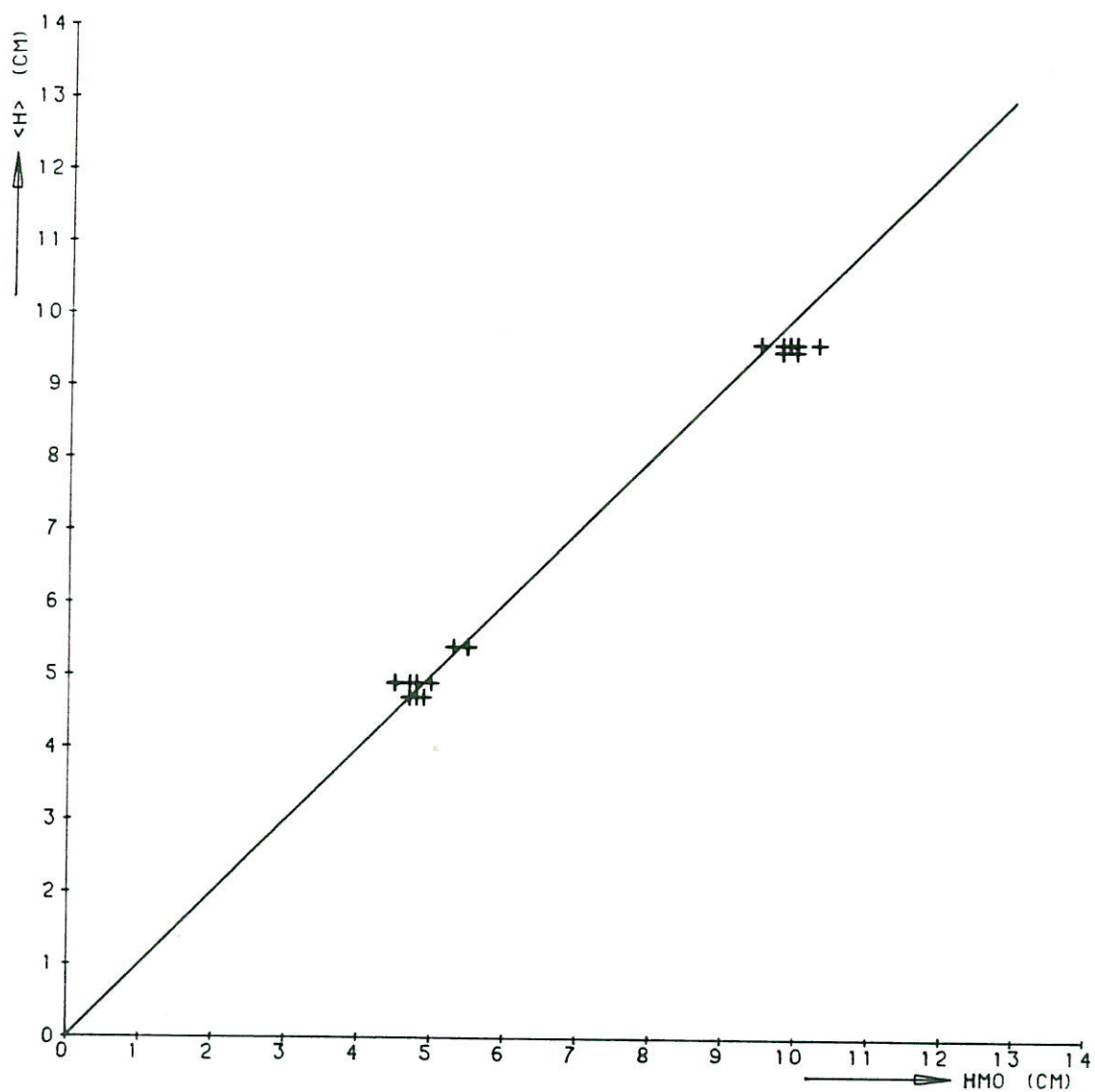
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE21A

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 13



HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

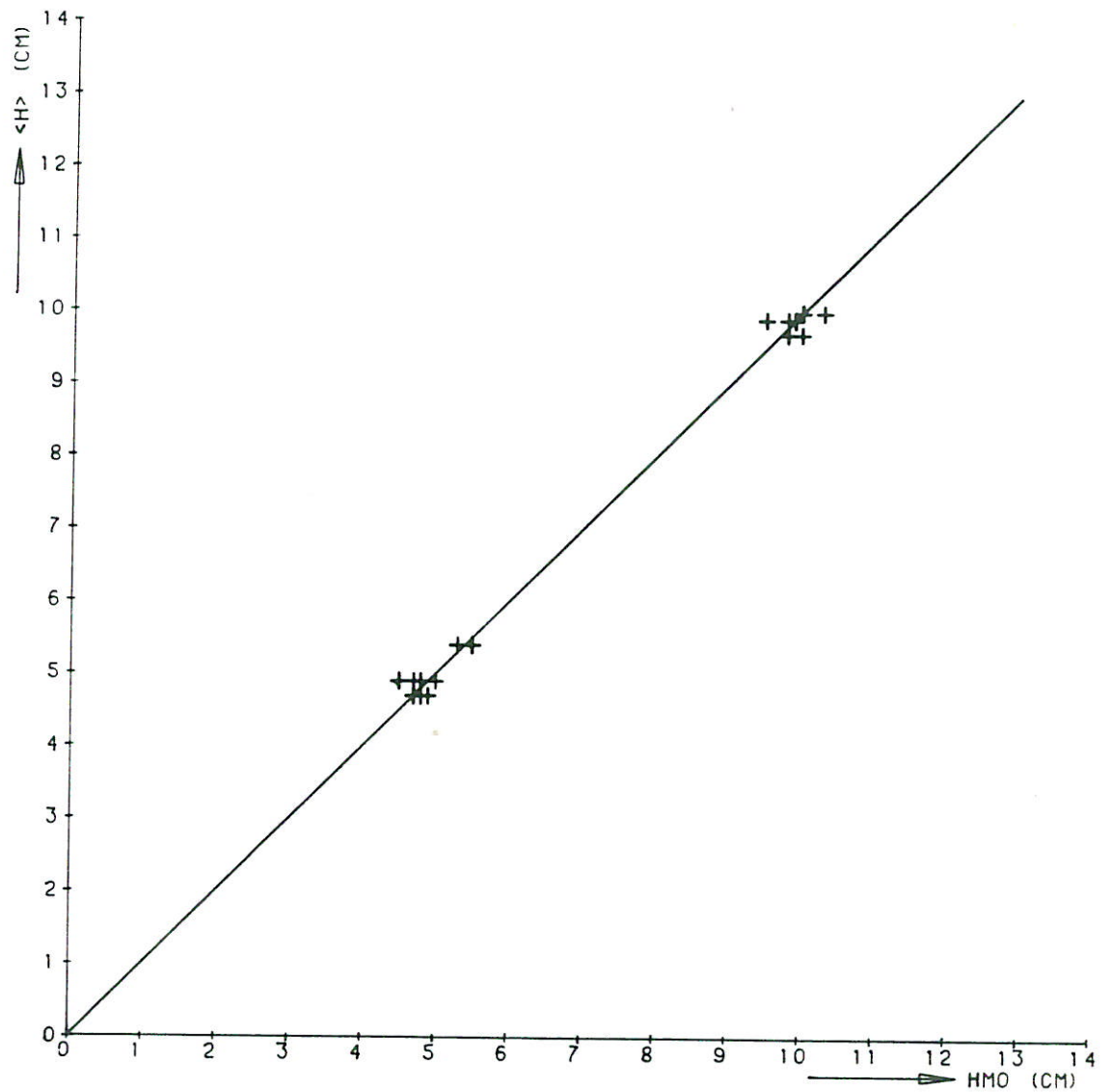
VE22

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 14

HISWA COMPUTATION VE22A



HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

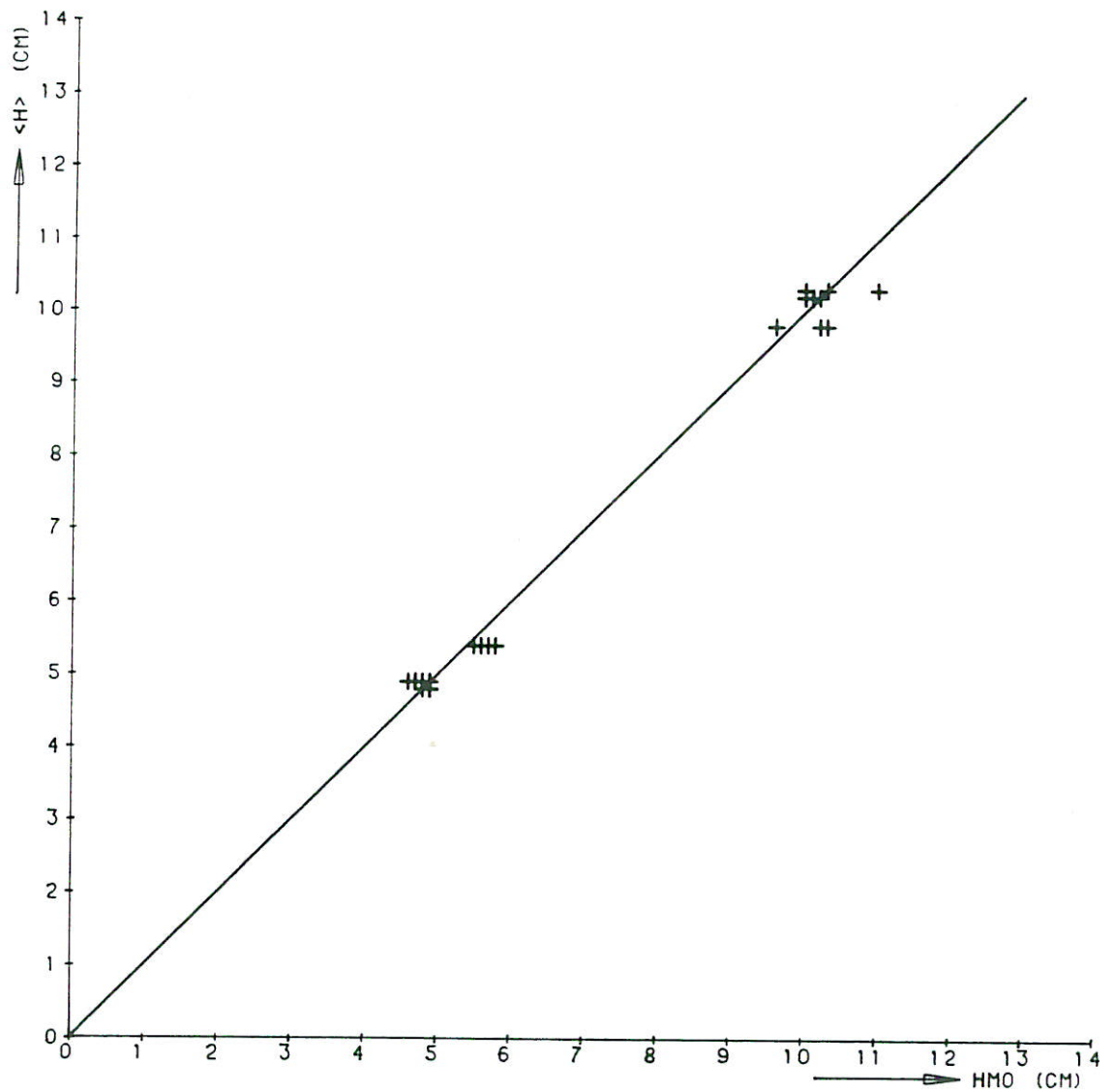
VE22A

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 15

HISWA COMPUTATION VE23



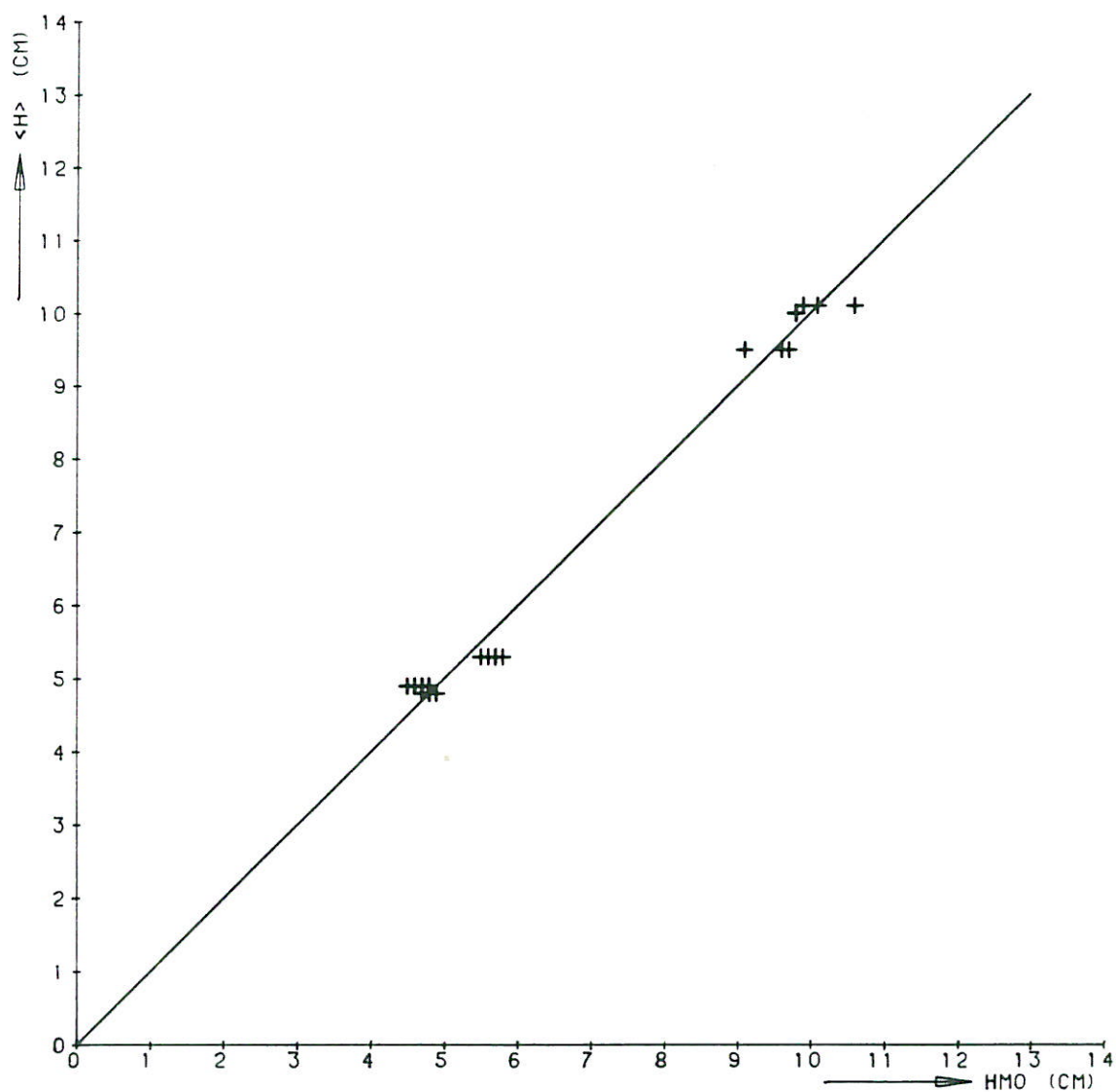
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE23

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 16



HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS.

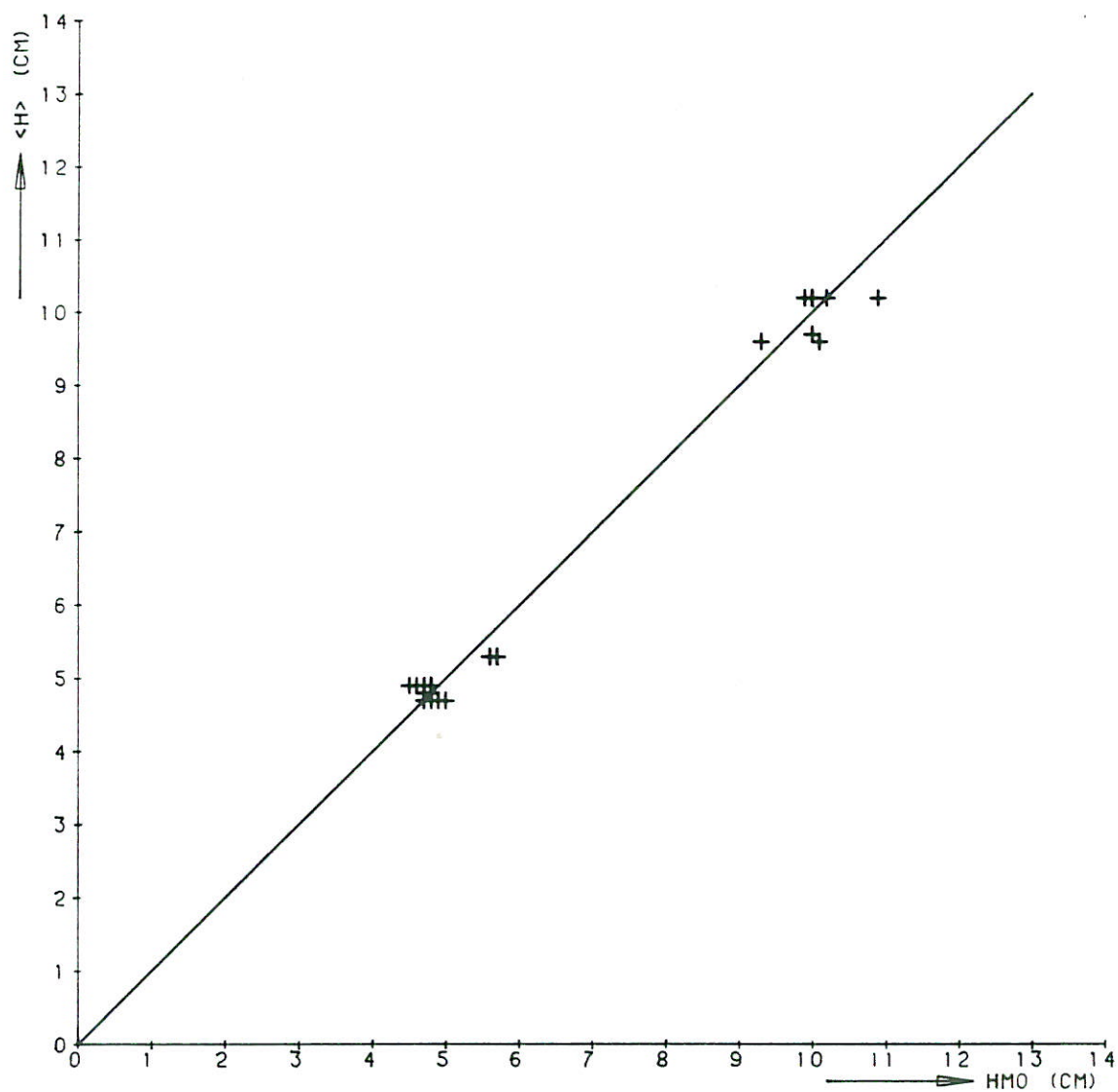
VE24

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 17

HISWA COMPUTATION VE25



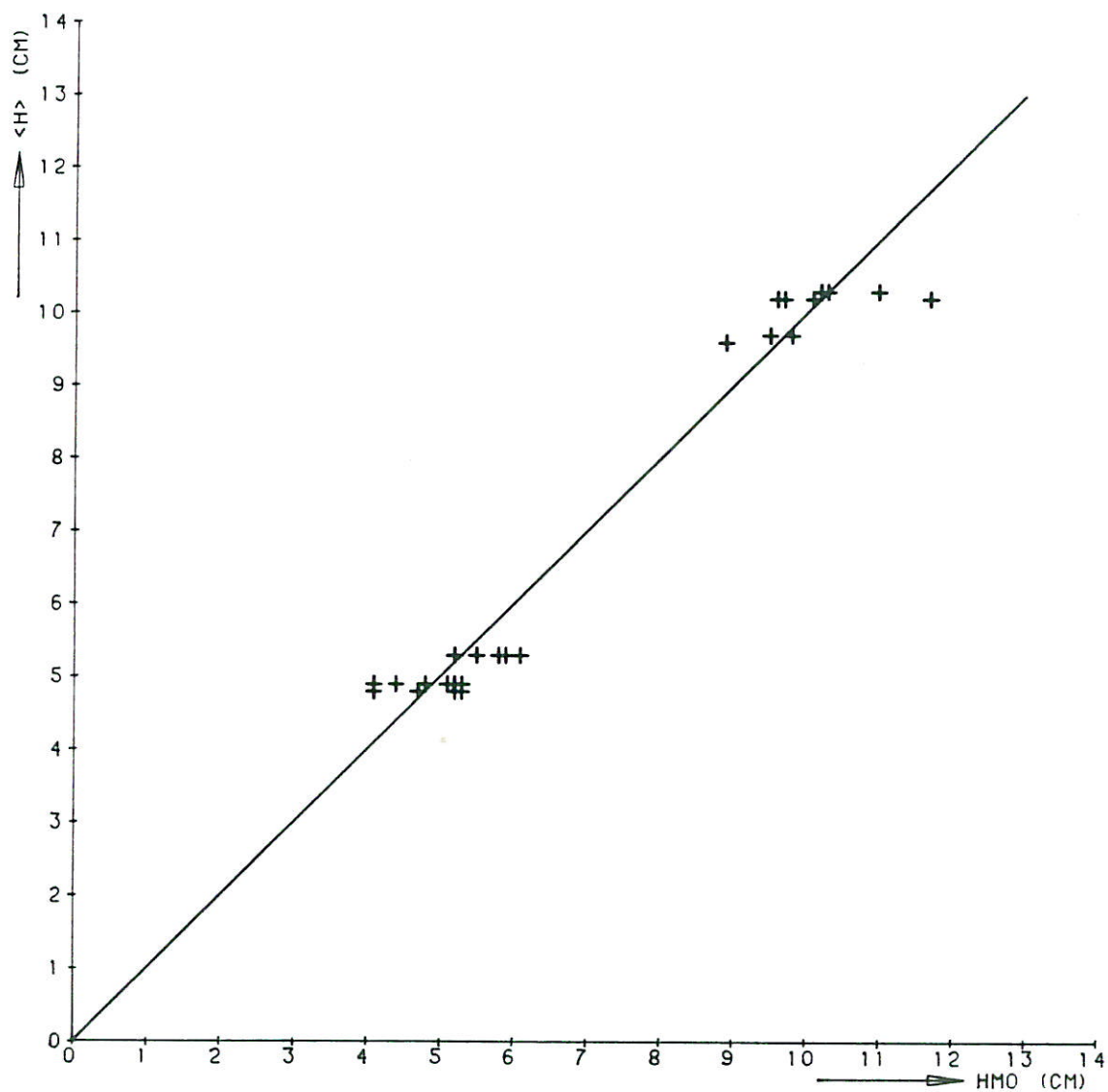
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE25

DELFT HYDRAULICS LABORATORY

H228-3

FIG.18



HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

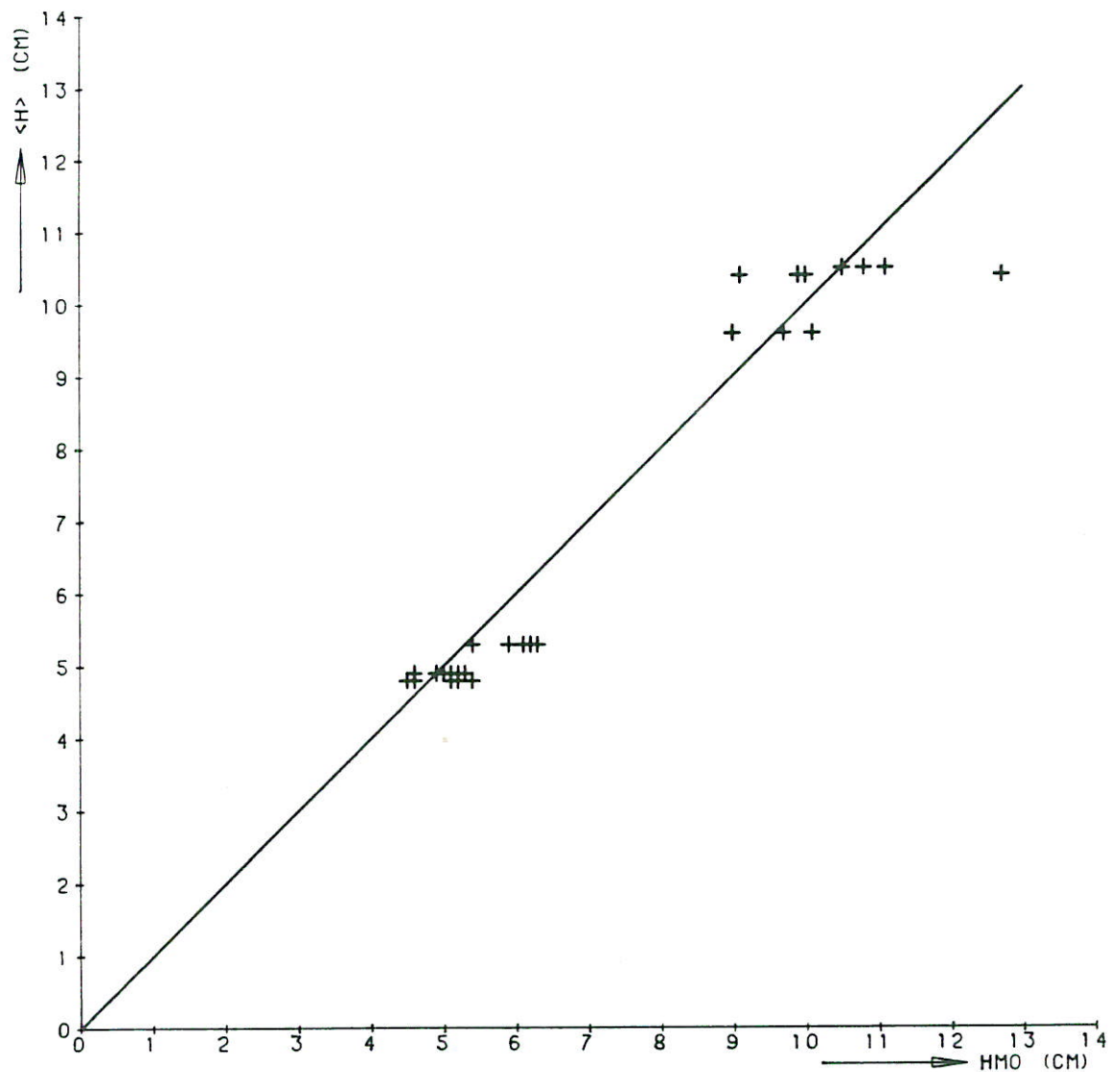
VE26

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 19

HISWA COMPUTATION VE27



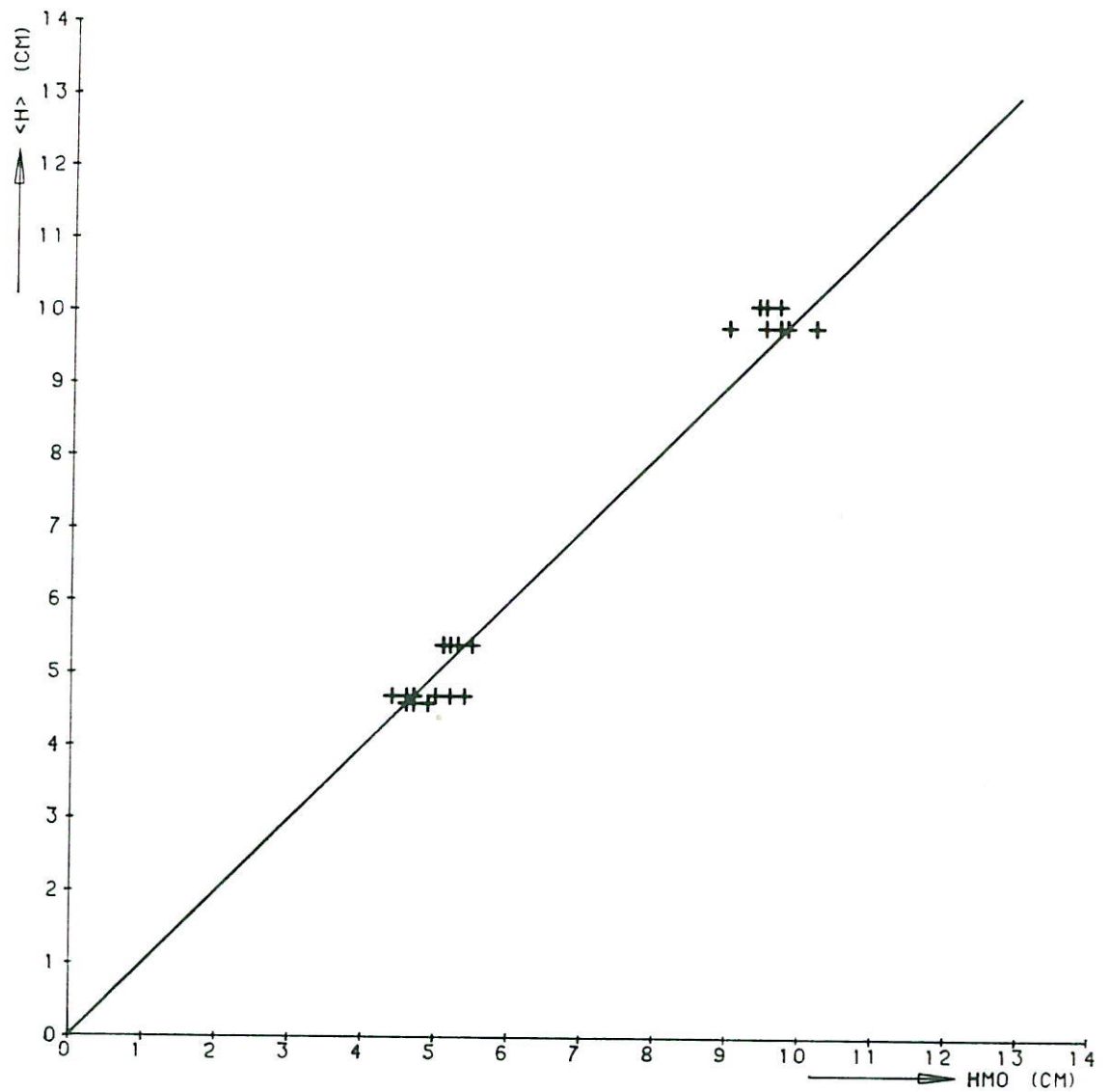
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS.

VE27

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 20



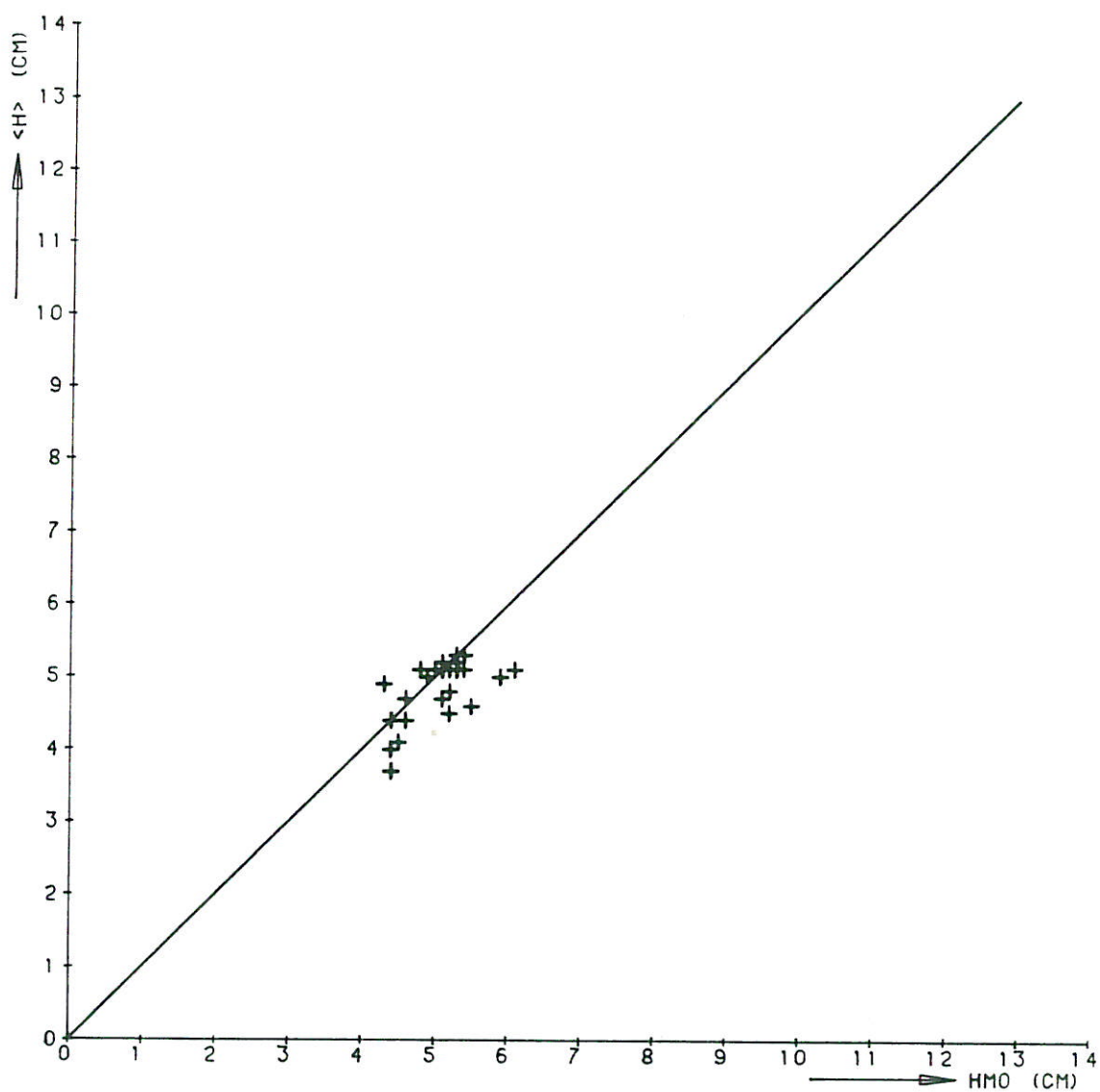
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE28

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 21



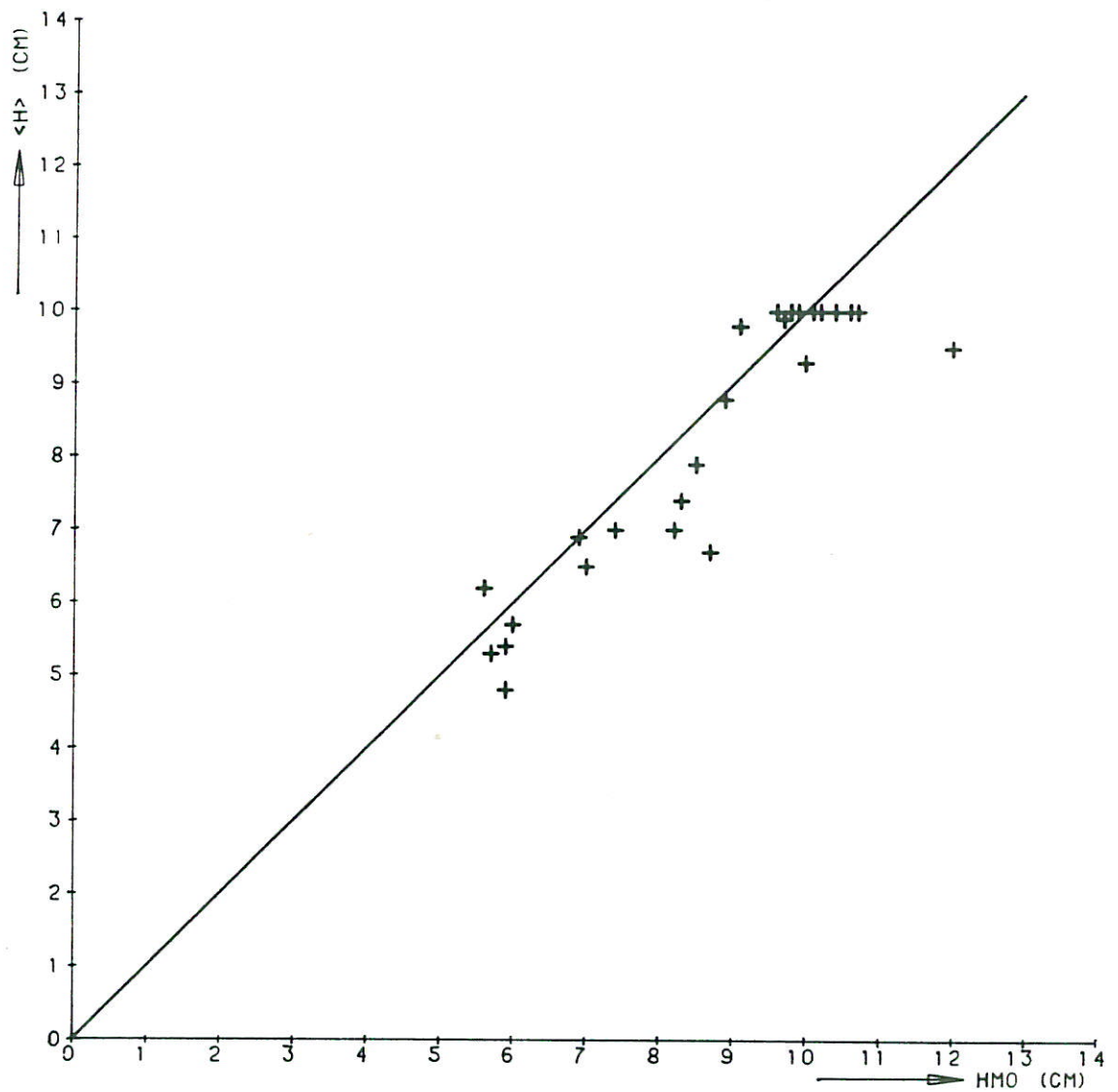
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS.

VE31

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 22



HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS.

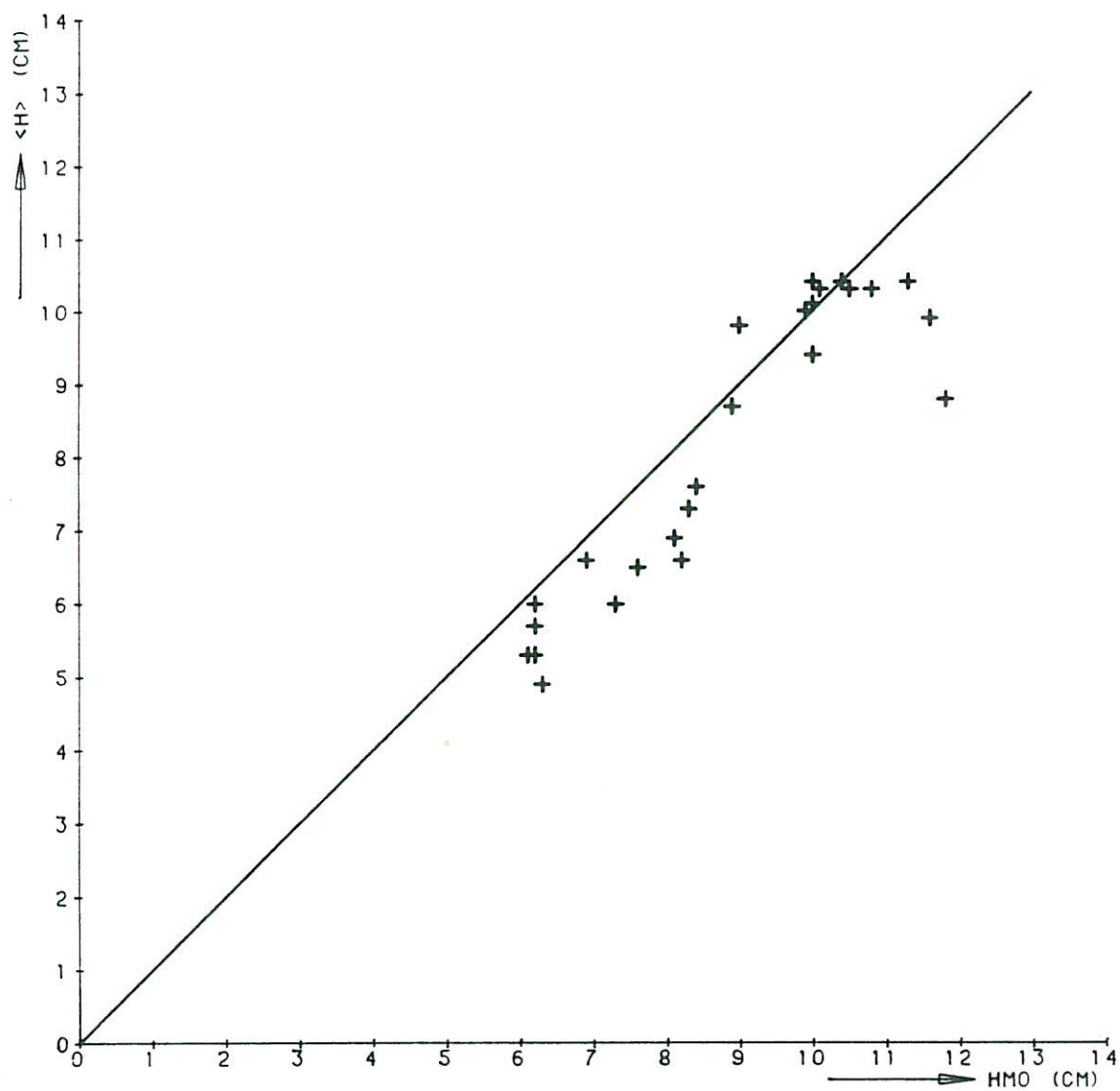
VE32

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 23

HISWA COMPUTATION VE33



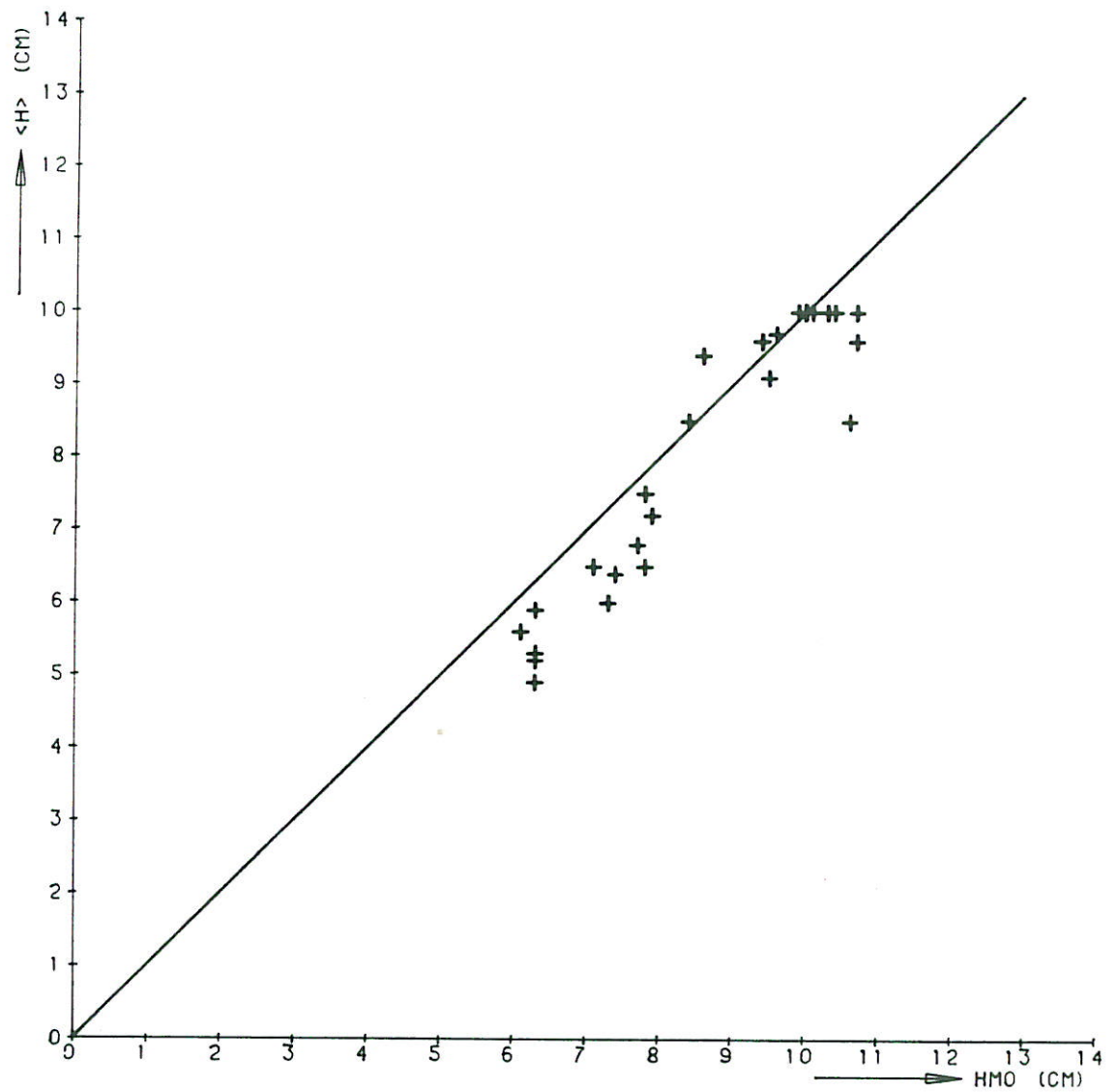
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE33

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 24



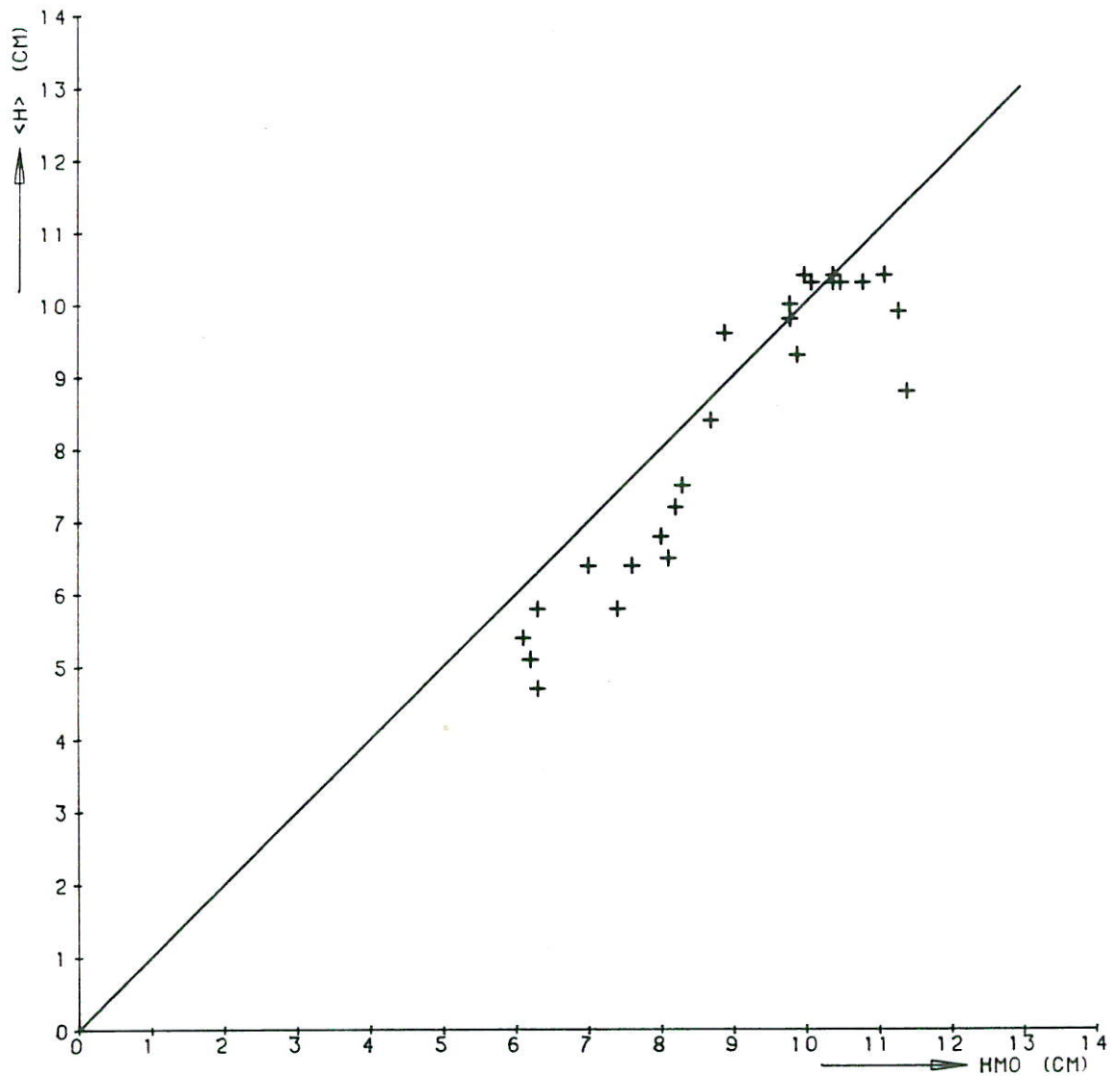
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE34

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 25



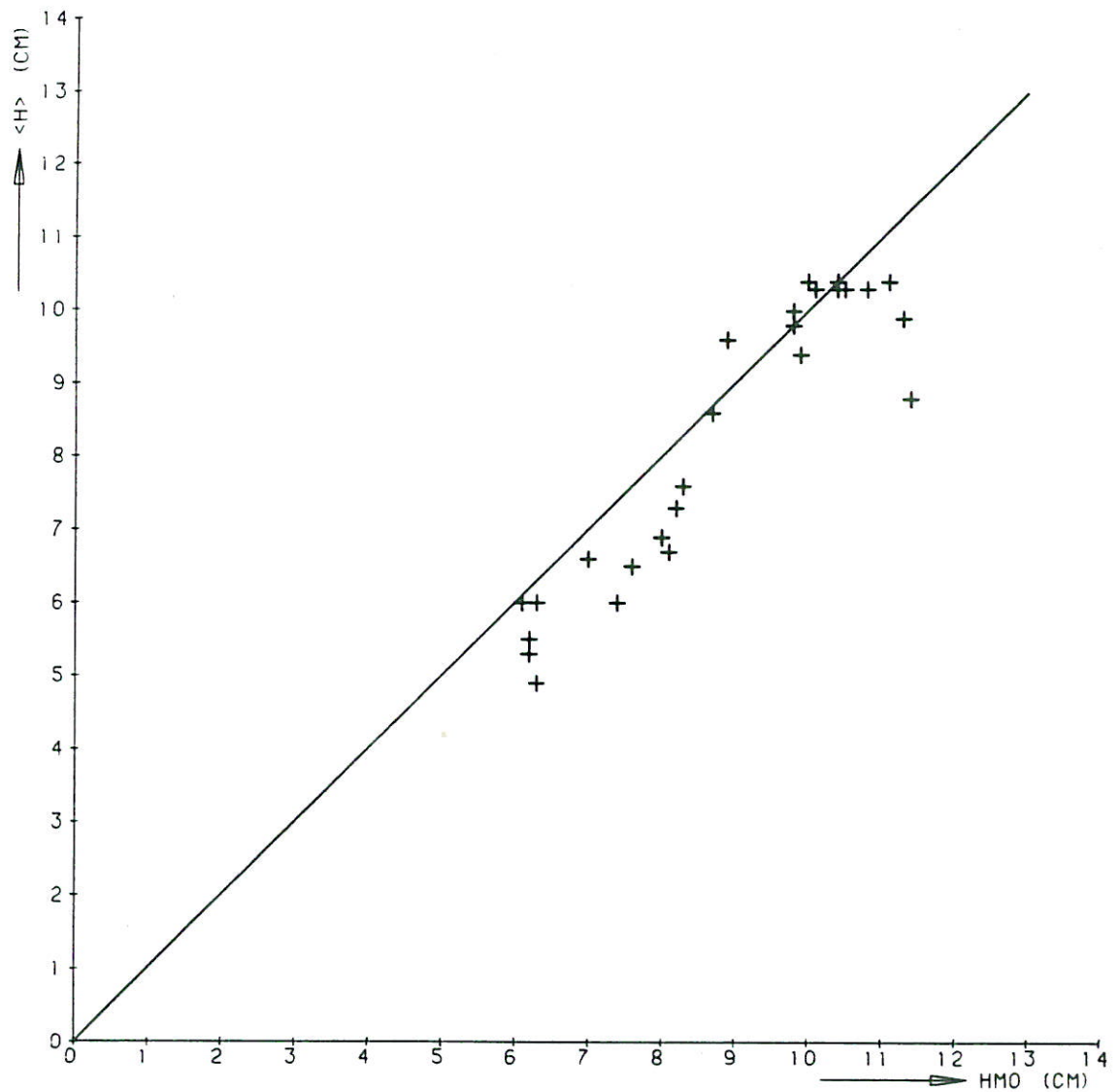
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE35

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 26



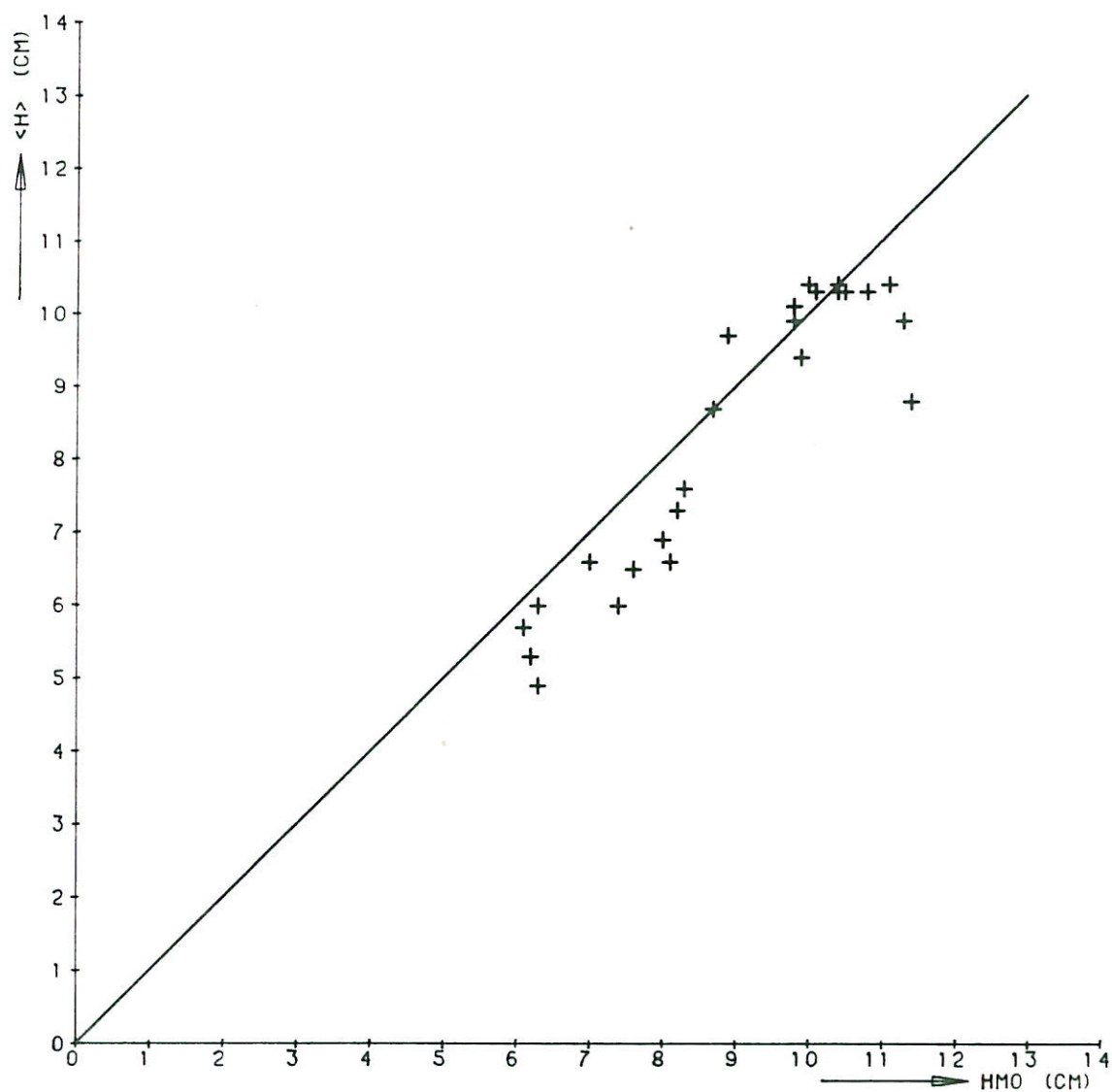
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE35AA

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 27



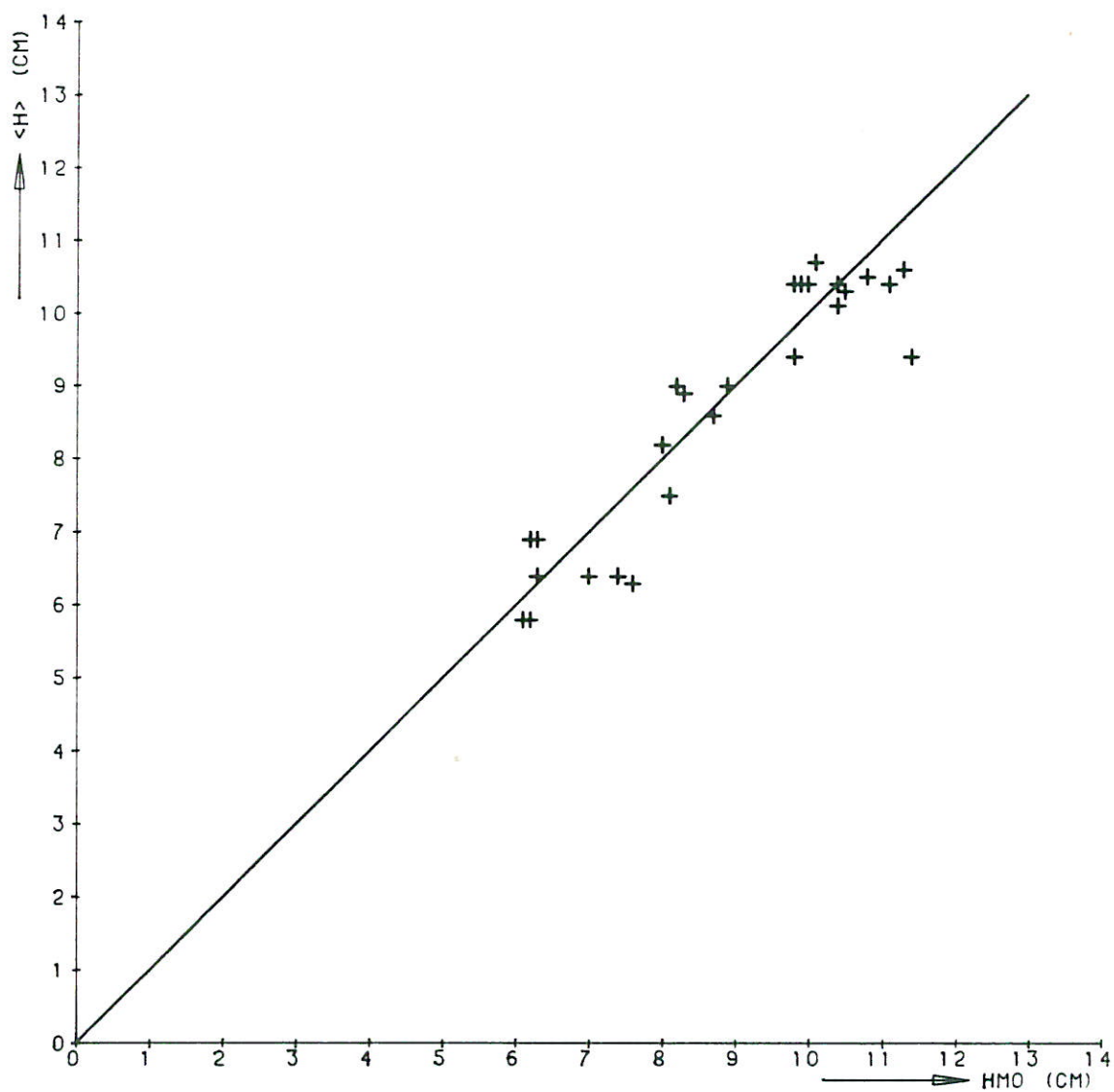
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE35B

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 28



HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

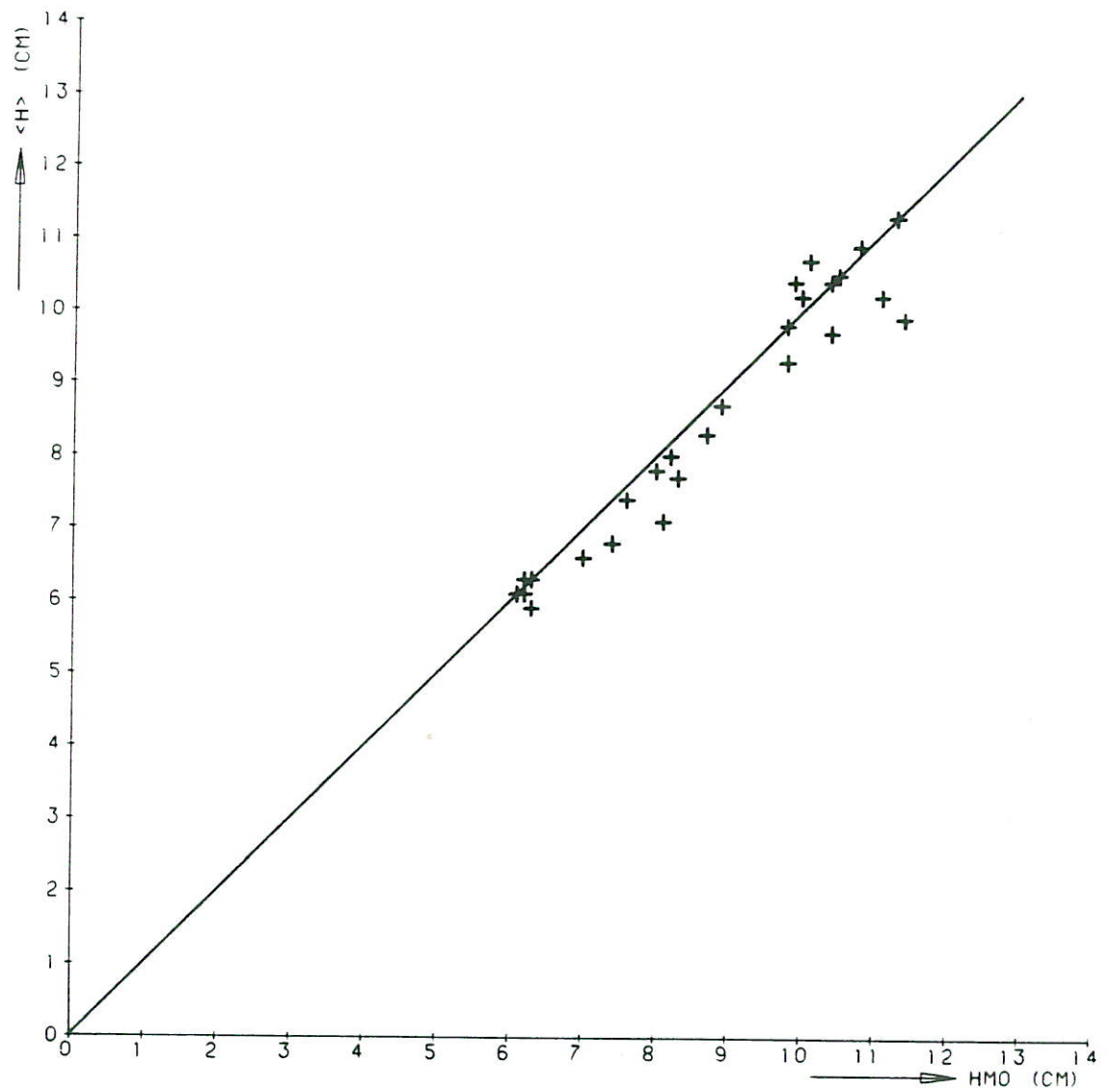
VE35BS

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 29

HISWA COMPUTATION VE35S1



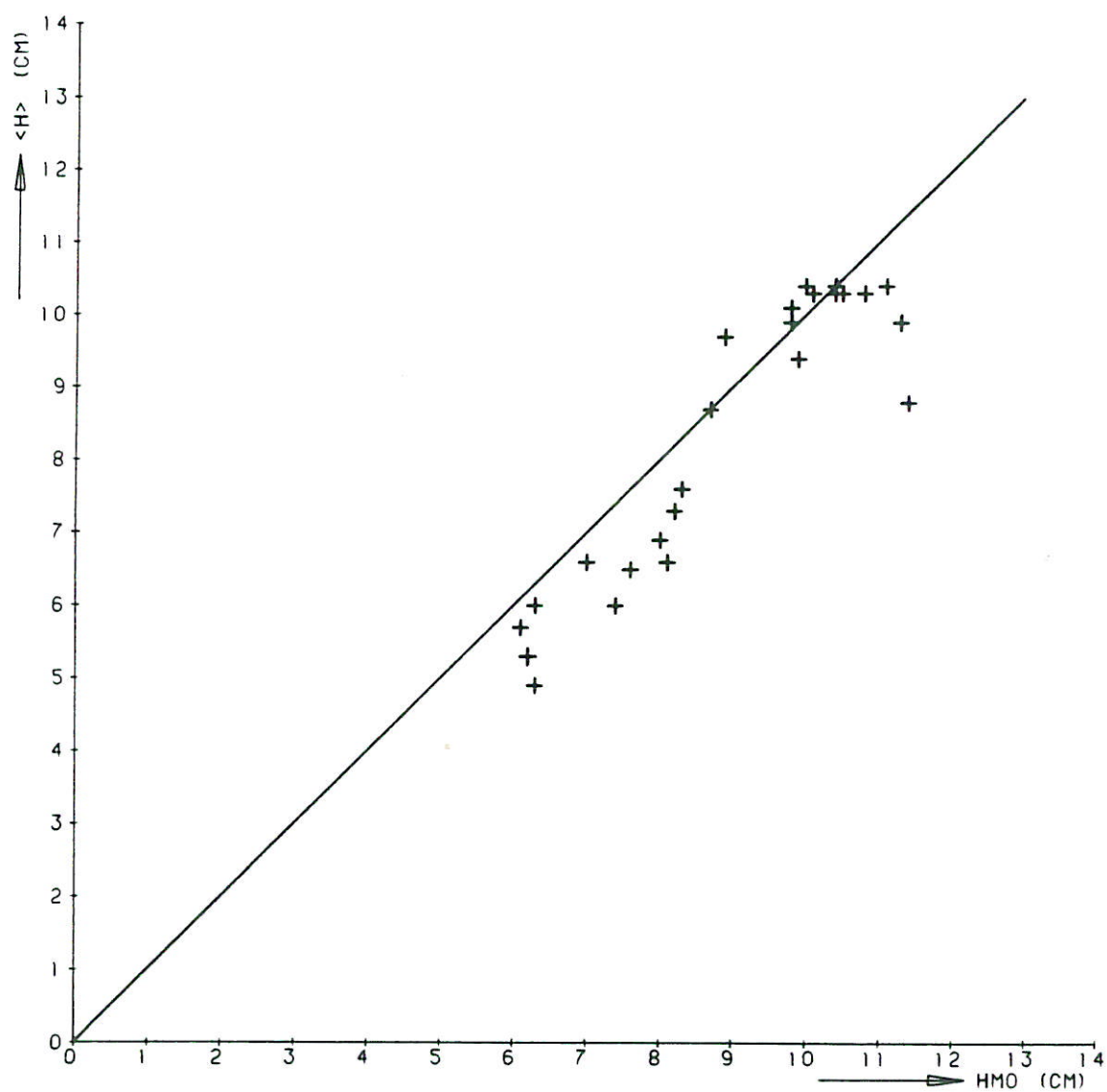
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE35S1

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 30



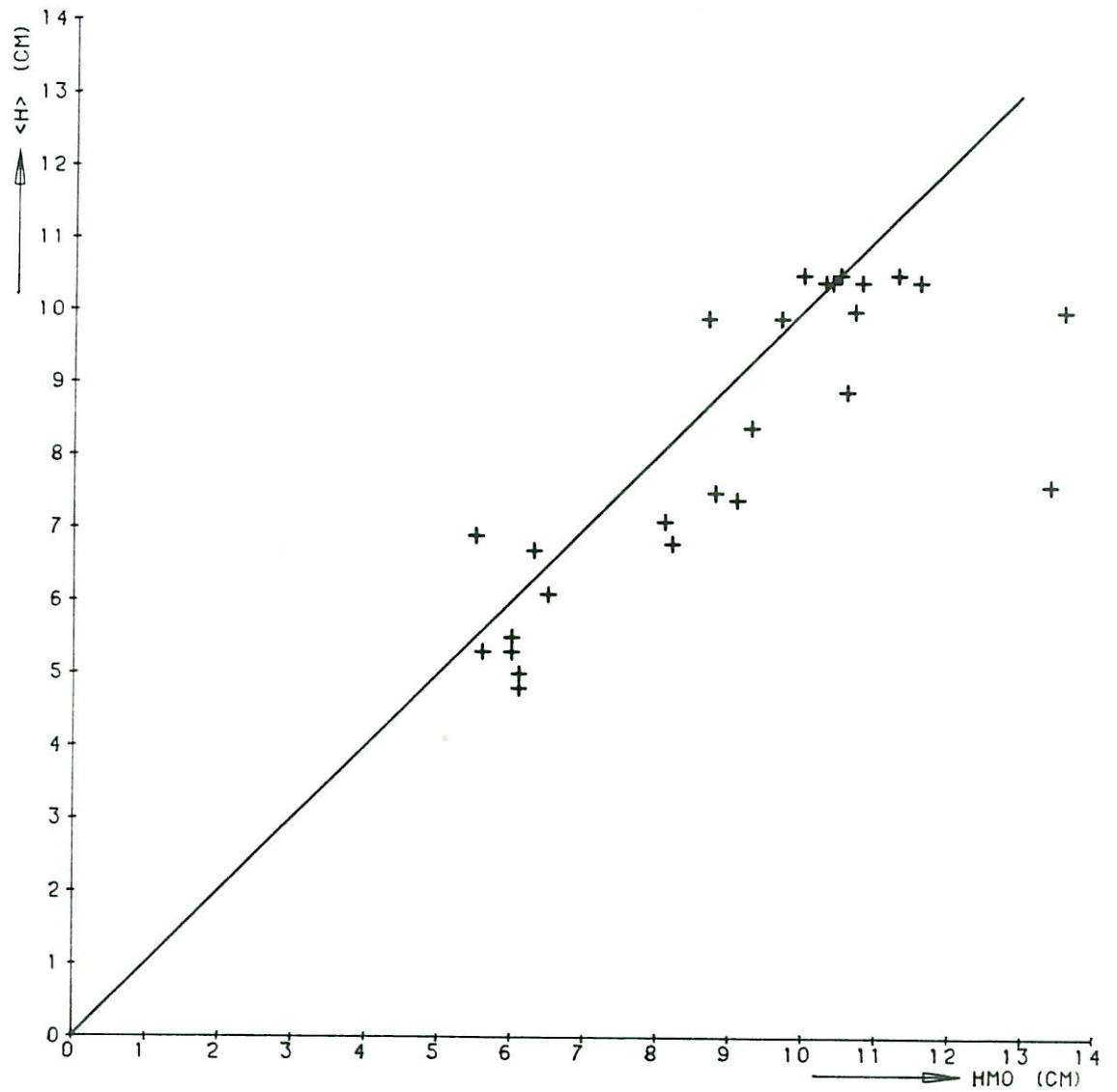
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS.

VE35S2

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 31



HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

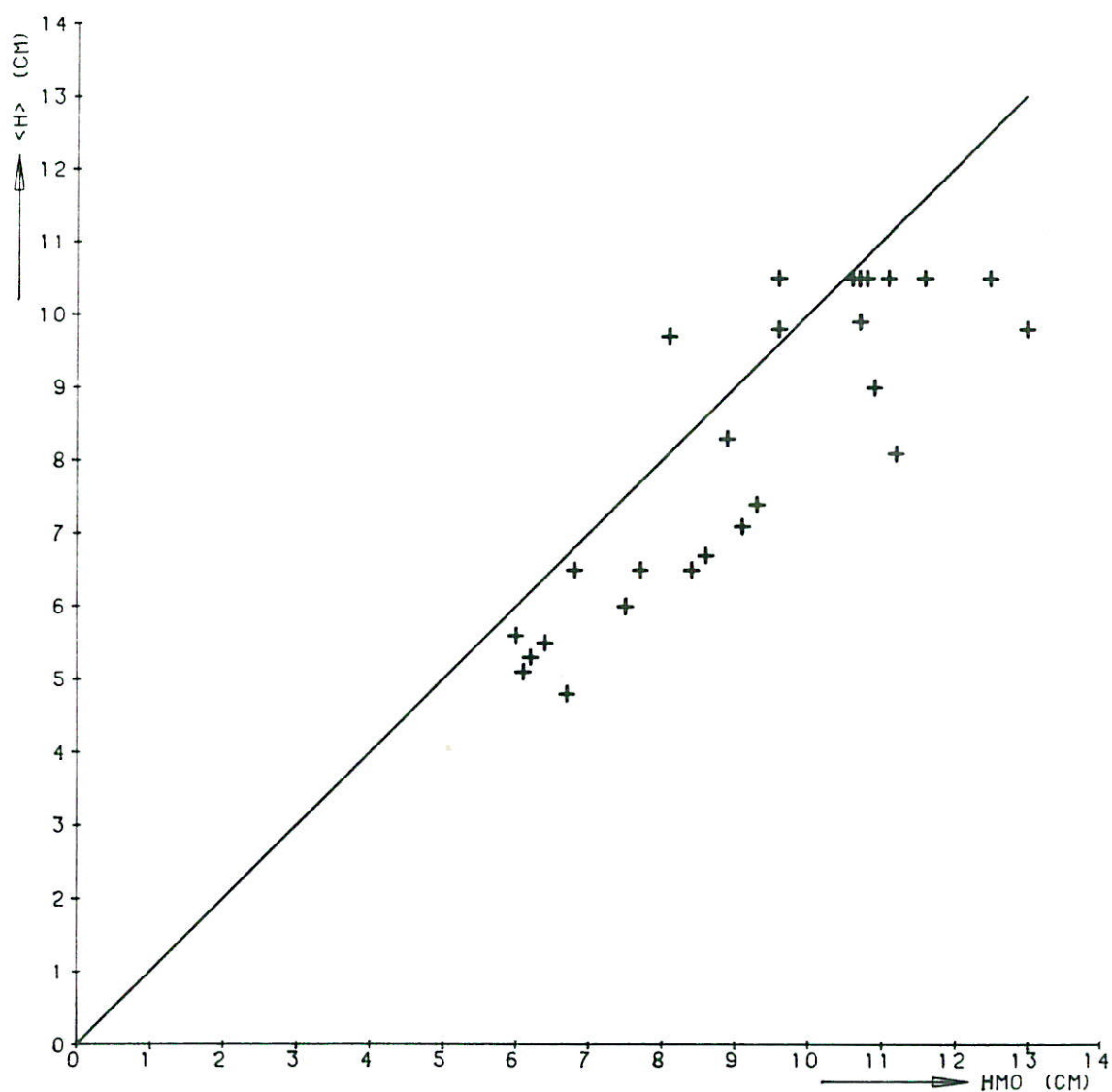
VE36

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 32

HISWA COMPUTATION VE37



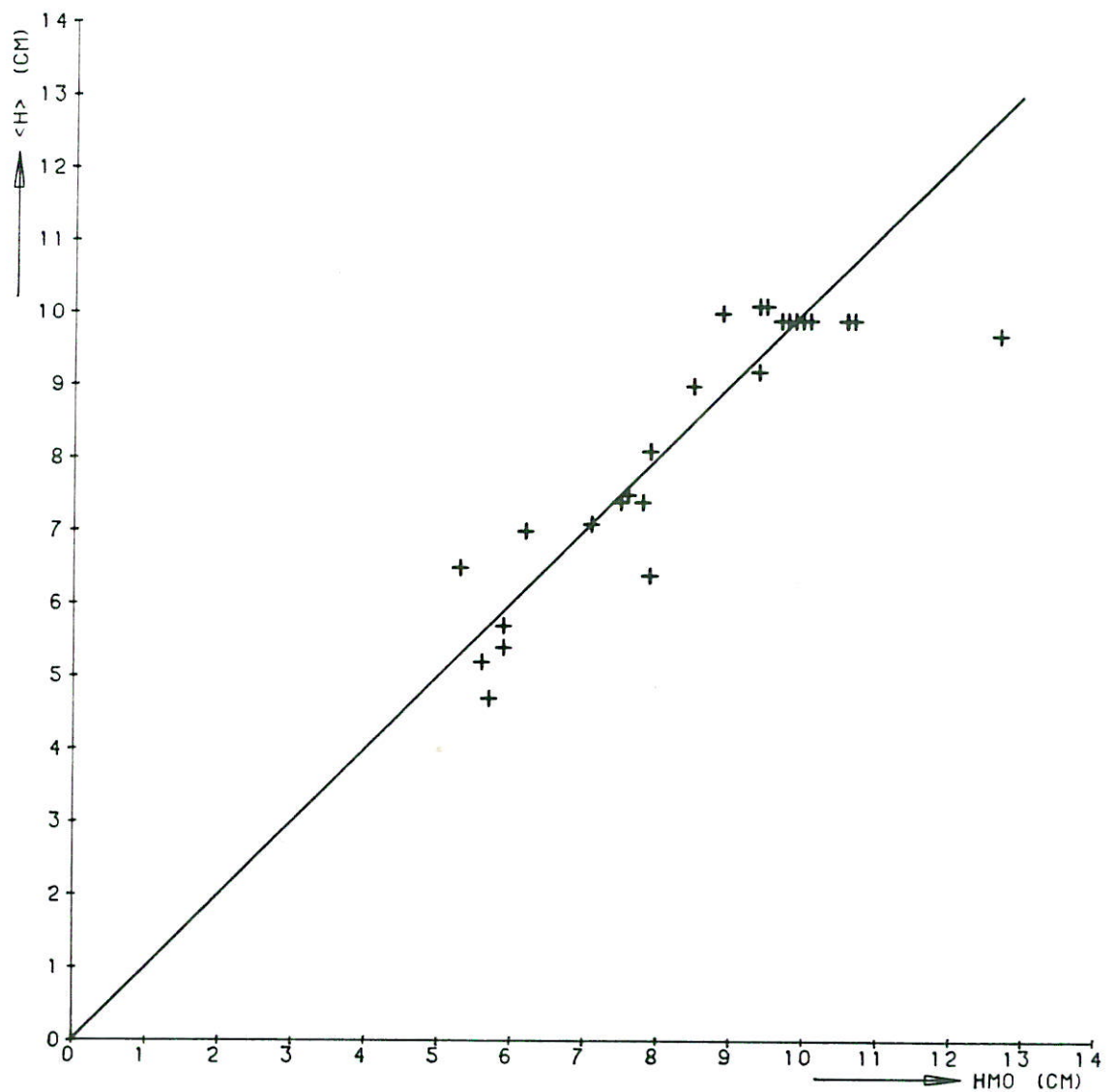
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE37

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 33



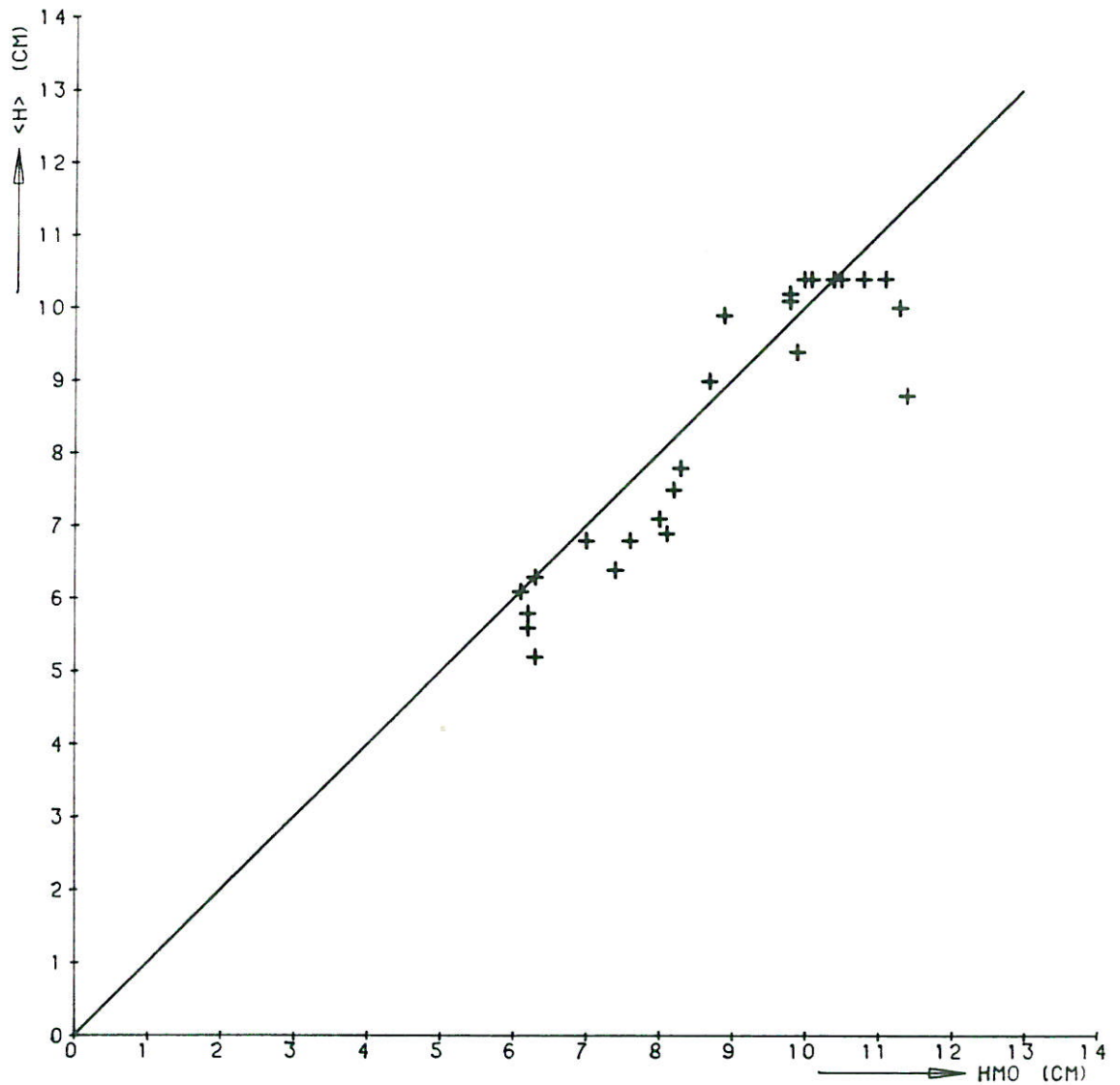
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE38

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 34



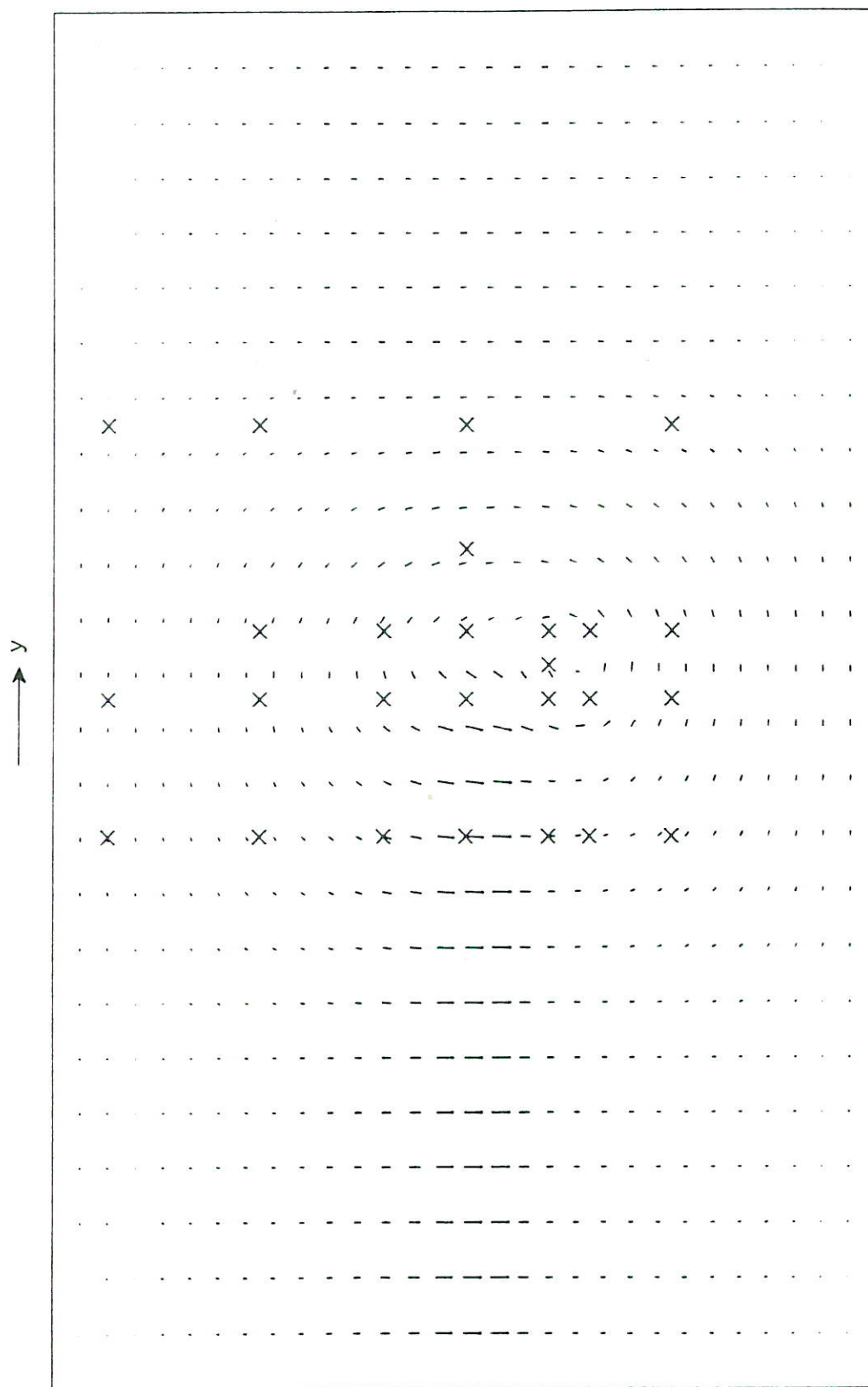
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

VE35C

DELFT HYDRAULICS LABORATORY

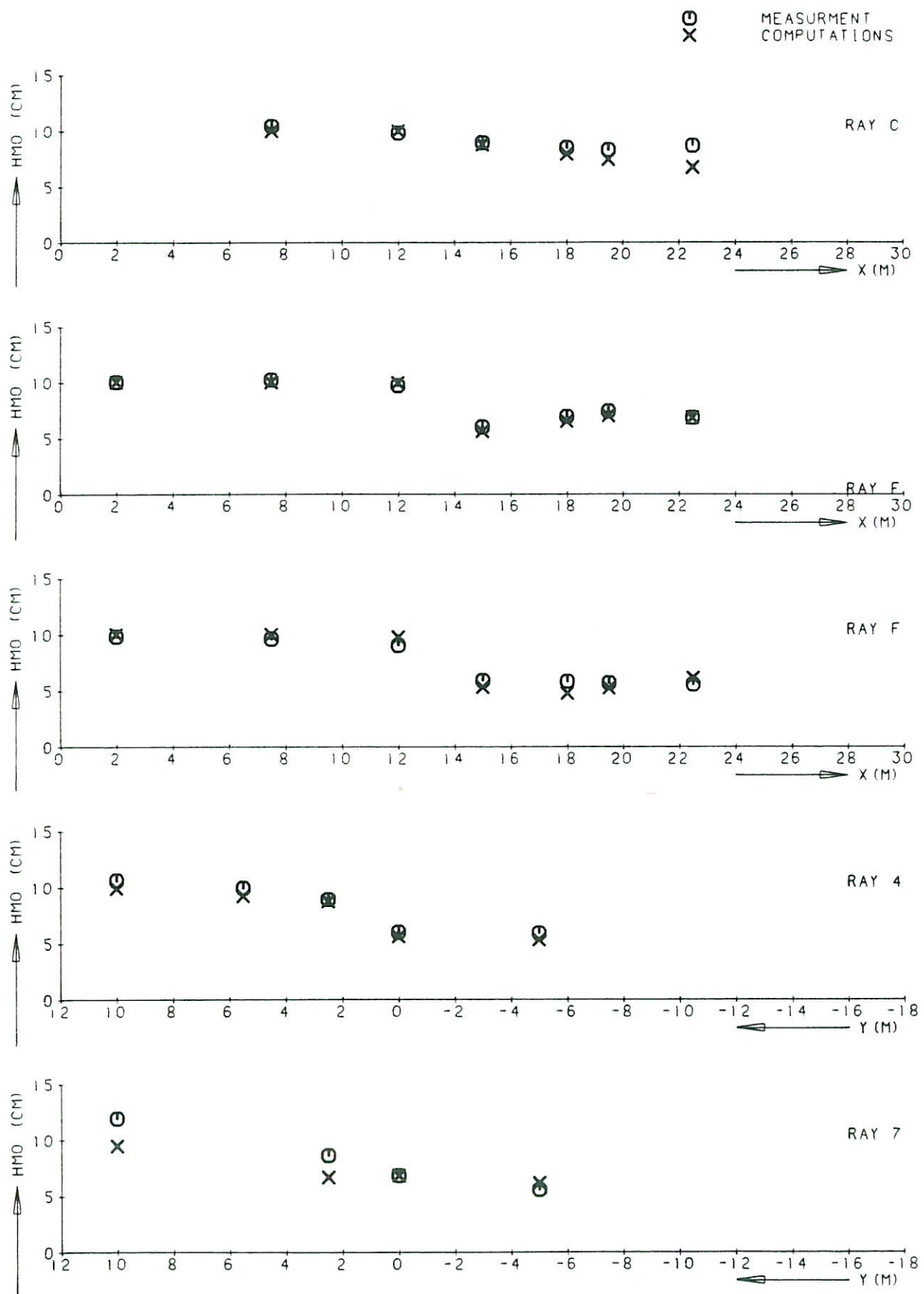
H228-3

FIG. 35



CURRENT FIELD FROM WAQUA, IN THE (WIDE)
COMPUTATIONAL REGION

VE35BS
FIG 36



HISWA VERIFICATION DIRECTIONAL BASIN
COMPARISON WAVE HEIGHTS
SEMI-CYLINDRICAL BANK

DELFT HYDRAULICS LABORATORY

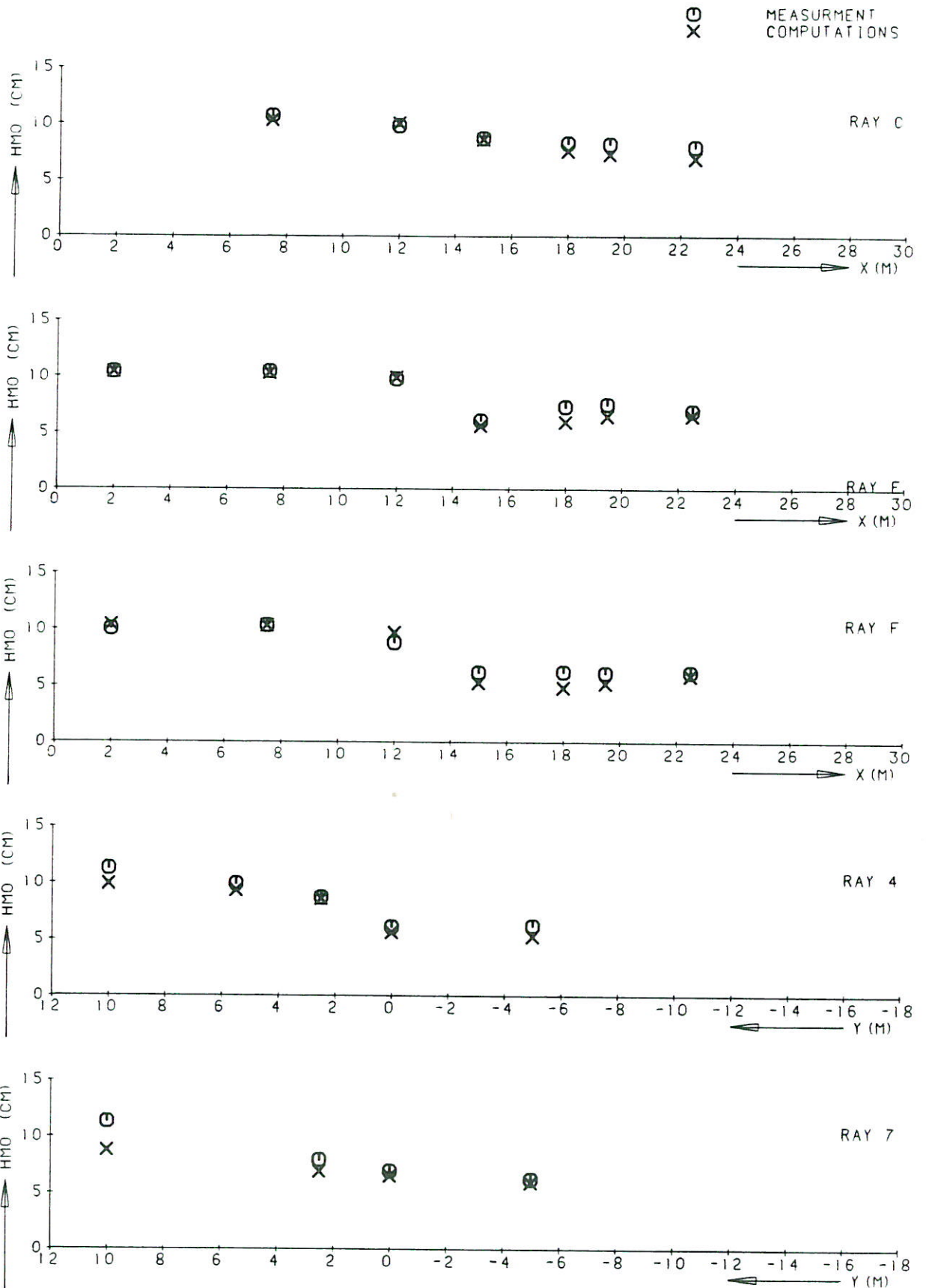
VE32

ME32

CONDITION 2

H228

FIG. 37



HISWA VERIFICATION DIRECTIONAL BASIN
COMPARISON WAVE HEIGHTS
SEMI-CYLINDRICAL BANK

VE35B

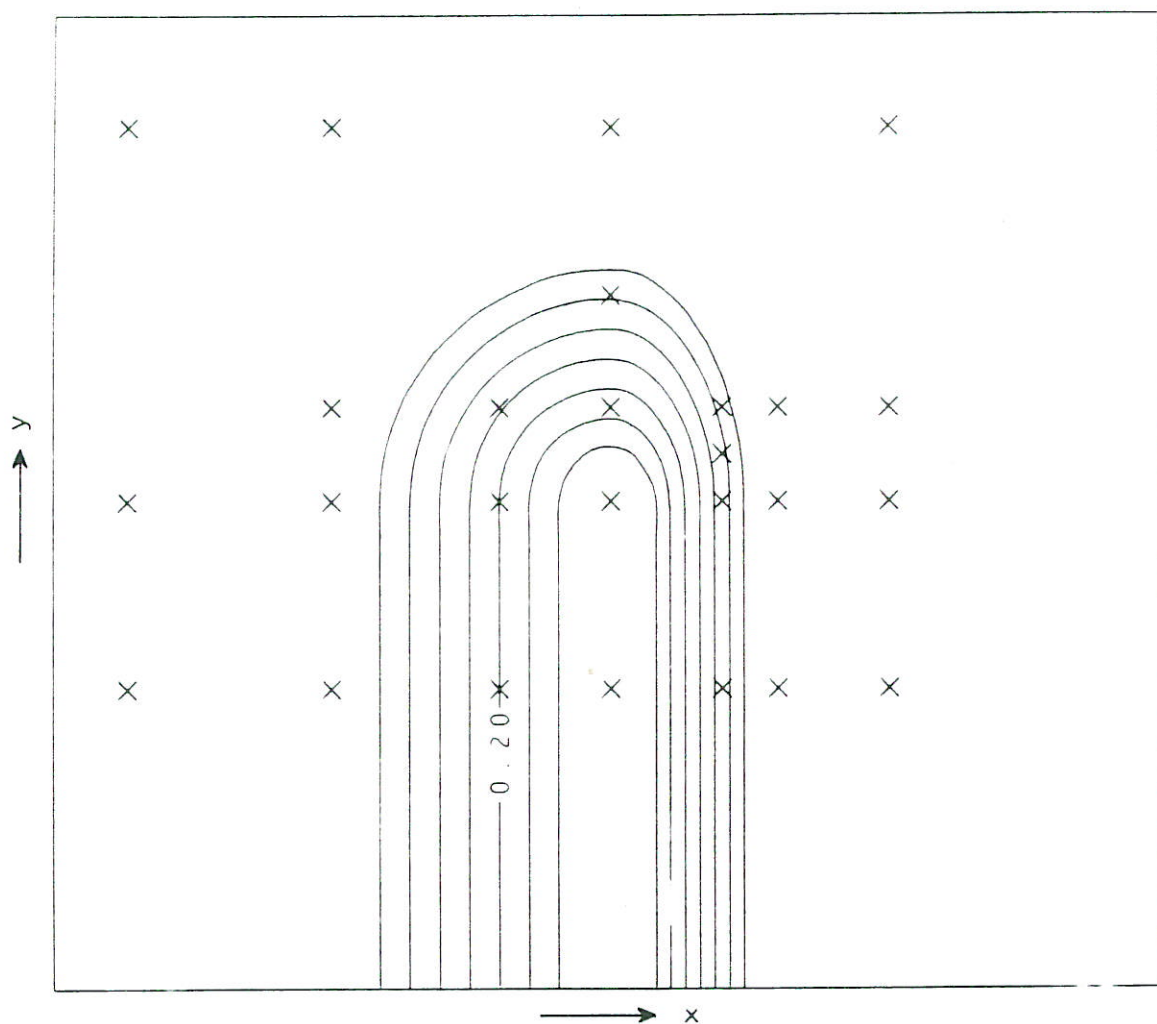
ME35

CONDITION 5

DELFT HYDRAULICS LABORATORY

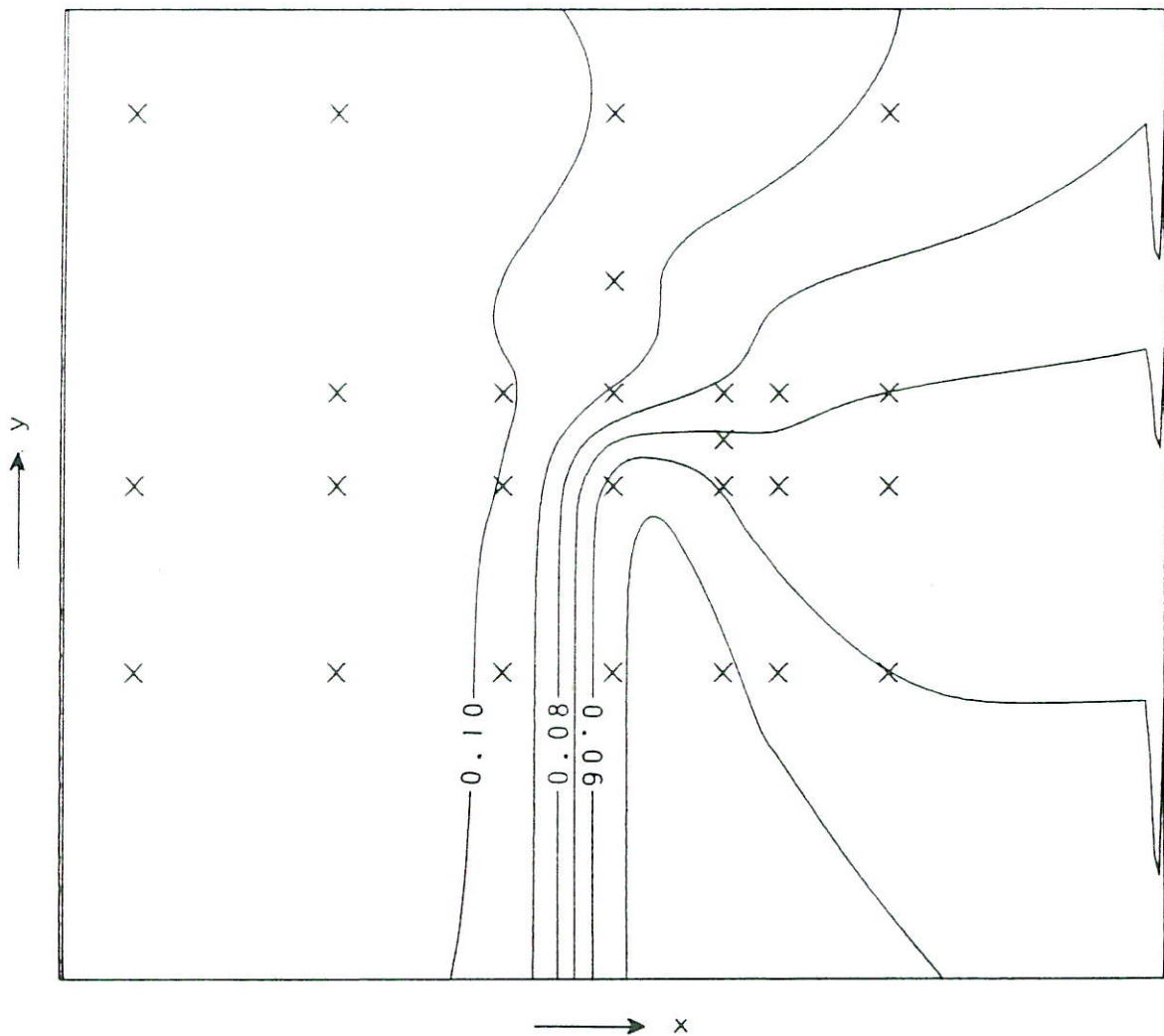
H228

FIG. 38



BOTTOM CONFIGURATION WITH LOCATION OF SIDES

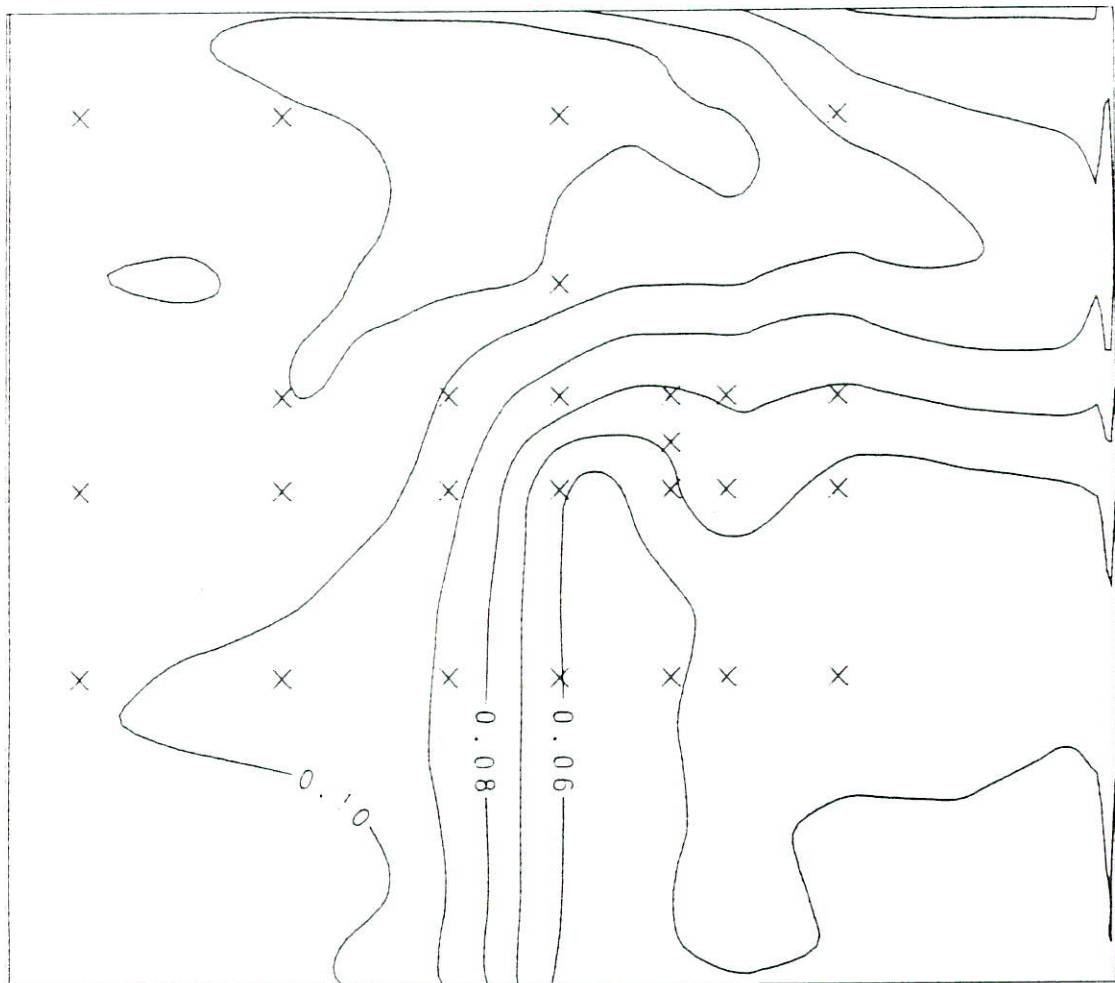
FIG 38A



WAVE HEIGHT H_s

VE35B

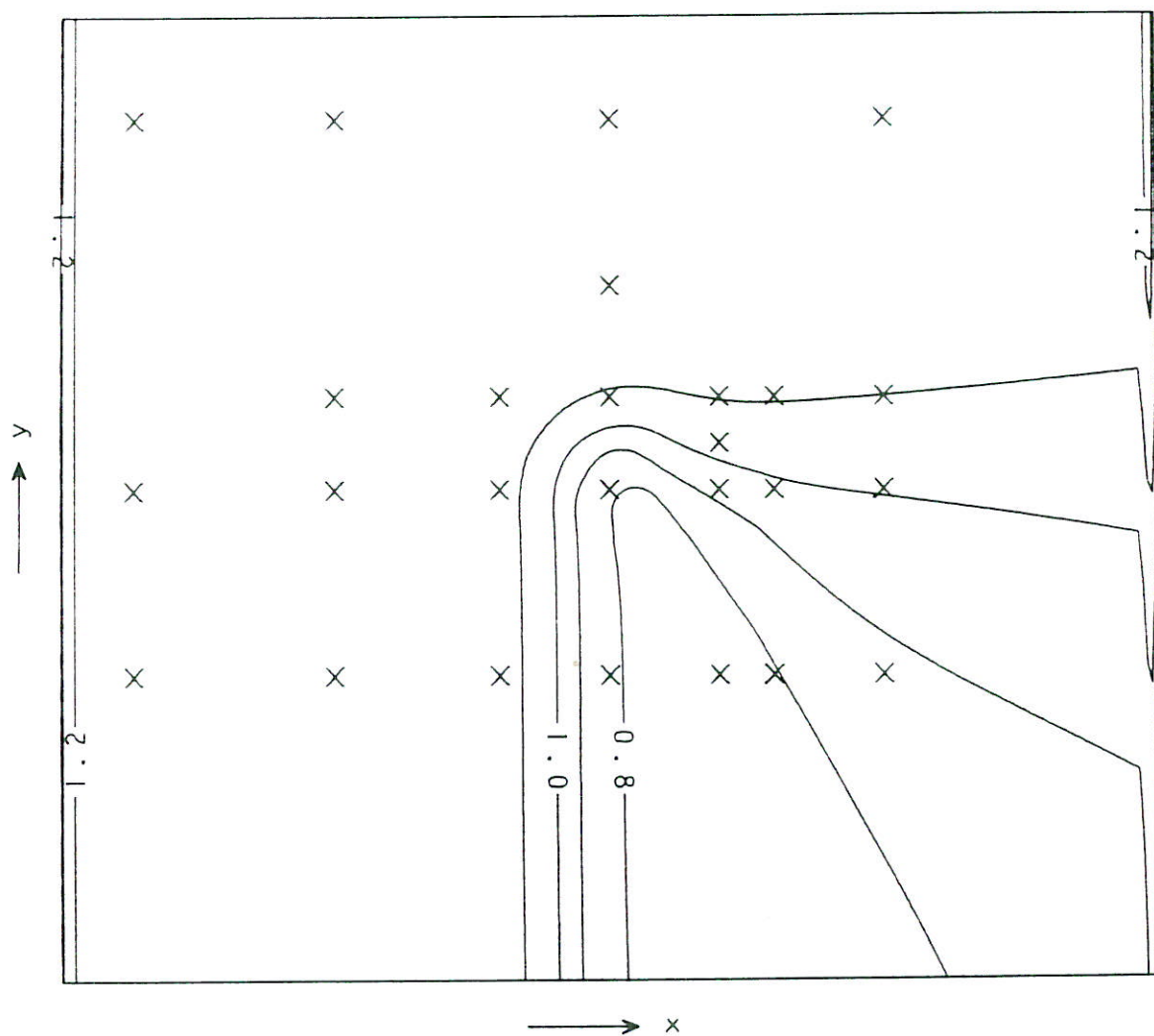
FIG 39



WAVE HEIGHT

VE35s1

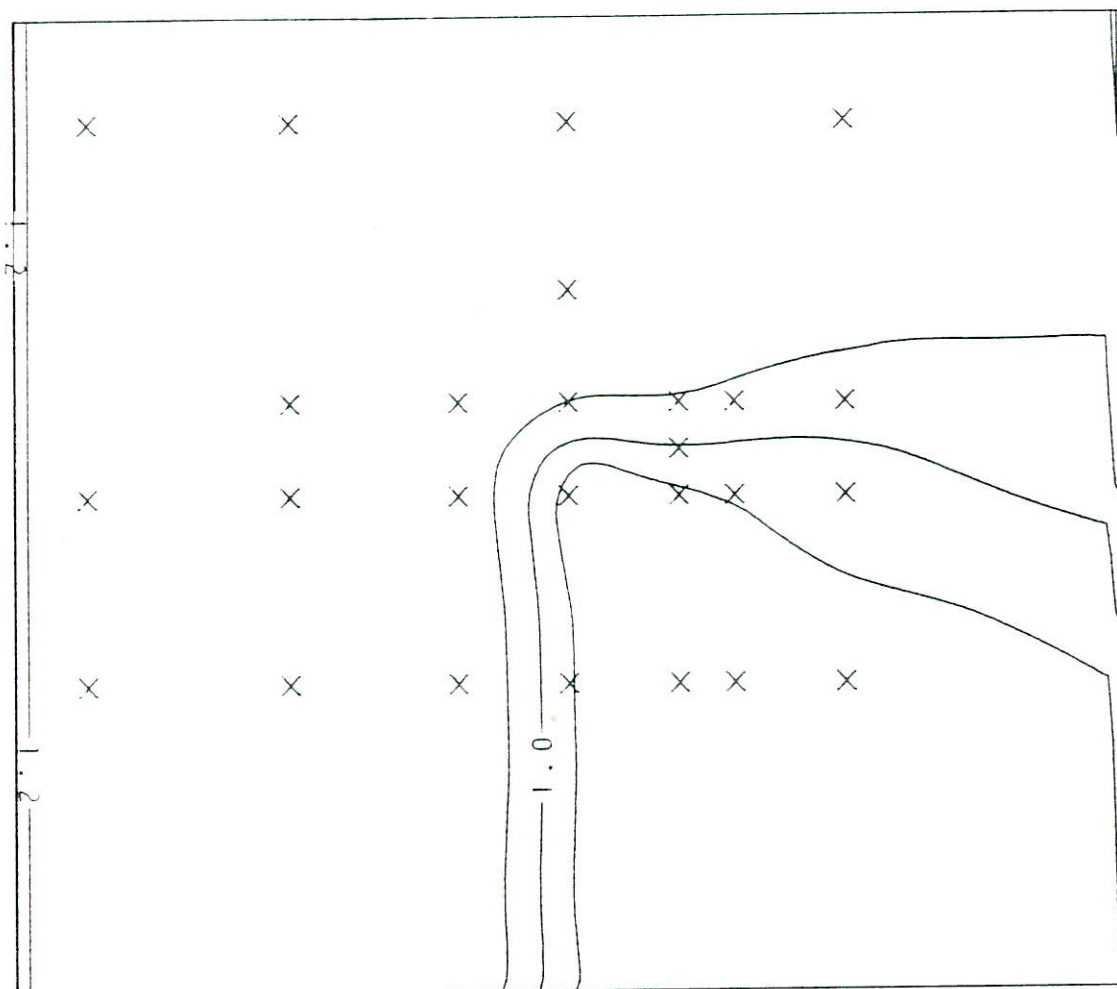
FIG 40



WAVE PERIOD T

VE35B

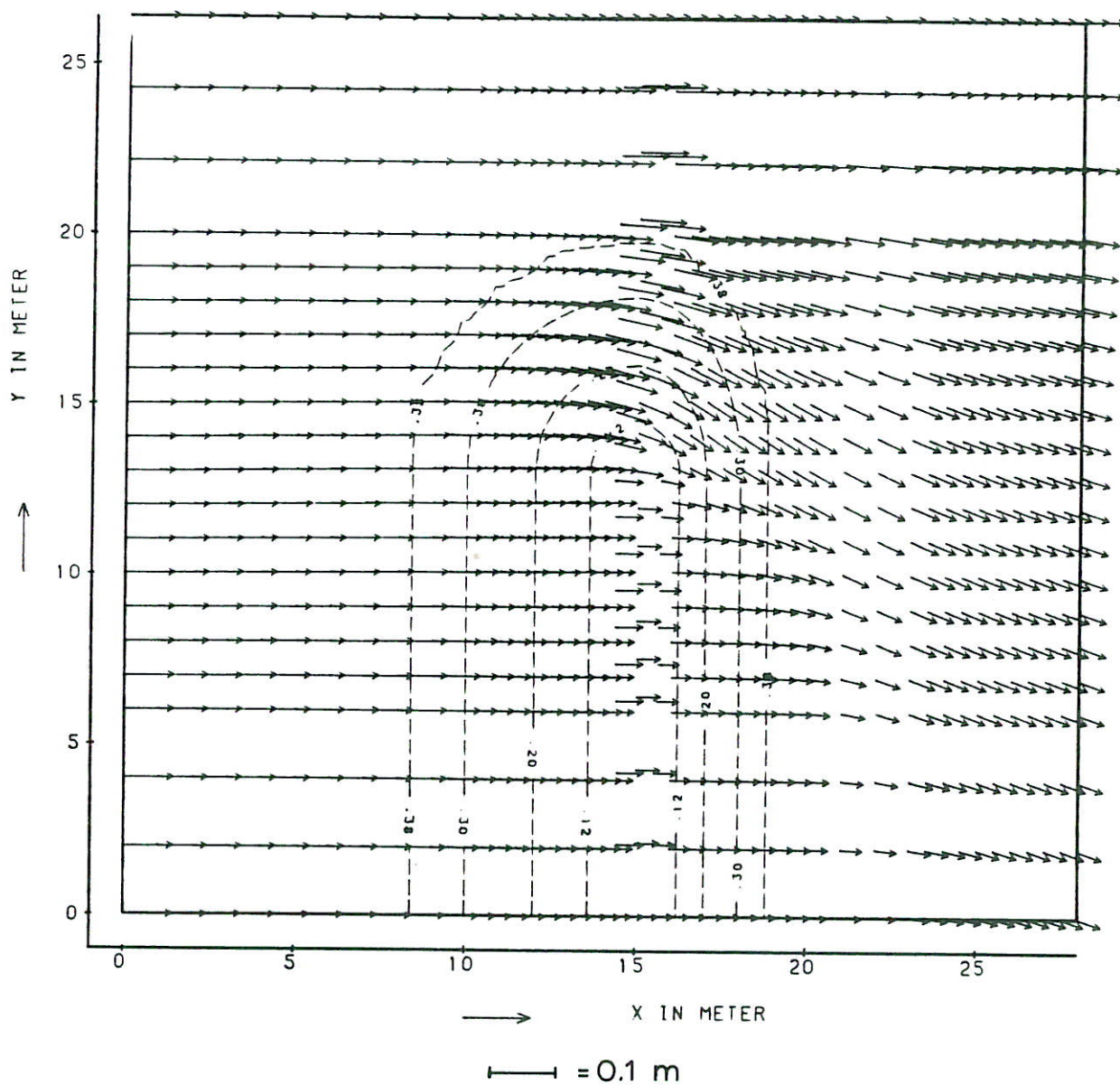
FIG 42



WAVE PERIOD T

VE35s1

FIG 43



SCHAAL 1 CM=0.1 M

HISWABAK ZONDER KUST TESTBEREKENING
BODEMCONTOUREN EN GOLFHOOGTEN

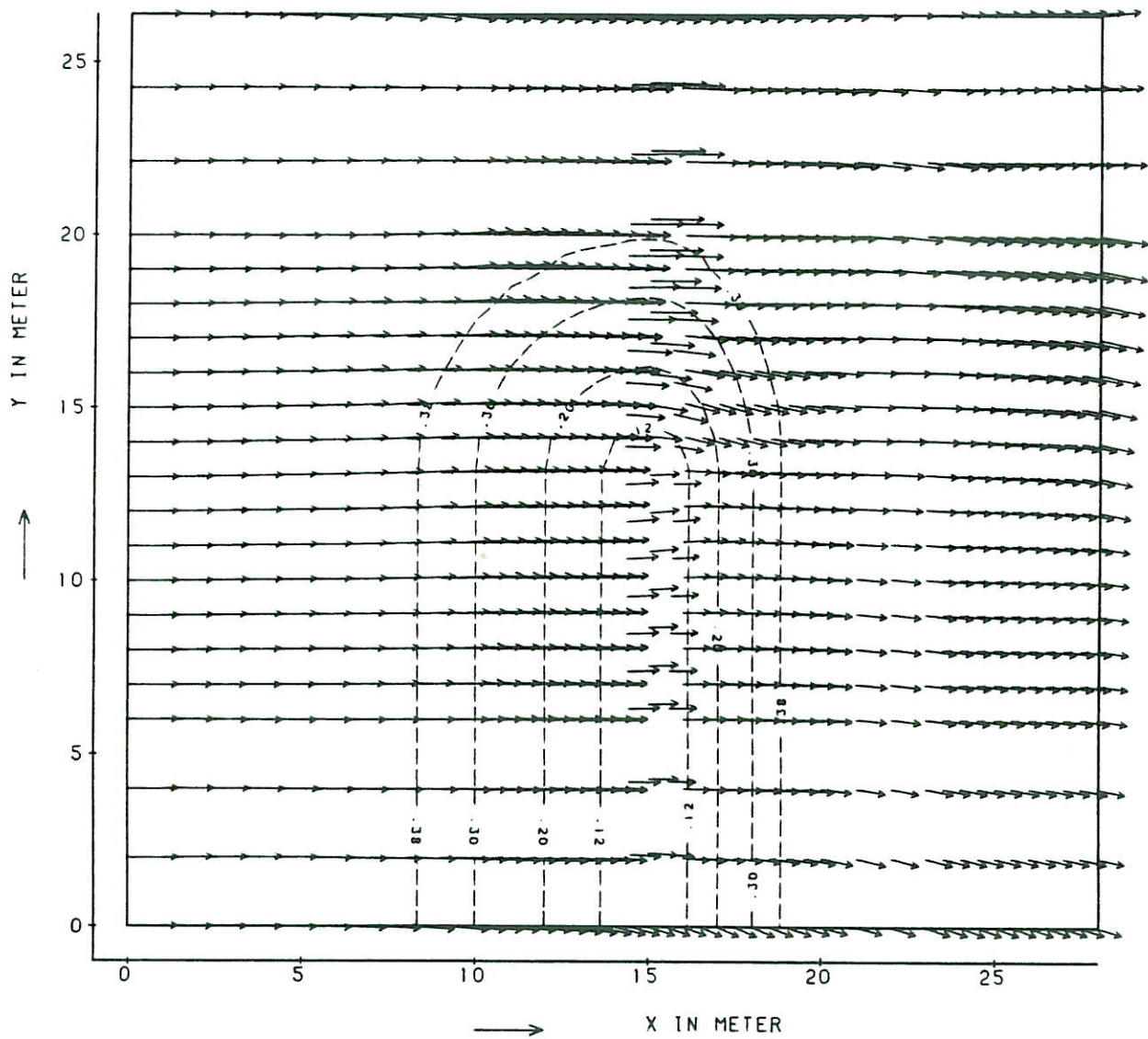
VE35A

THETA=0

WATERLOOPKUNDIG LABORATORIUM

H228-03

FIG. 45



SCHAAL 1 CM=0.1 M

HISWABAK ZONDER KUST TESTBEREKENING
GOLFHOOGTEN

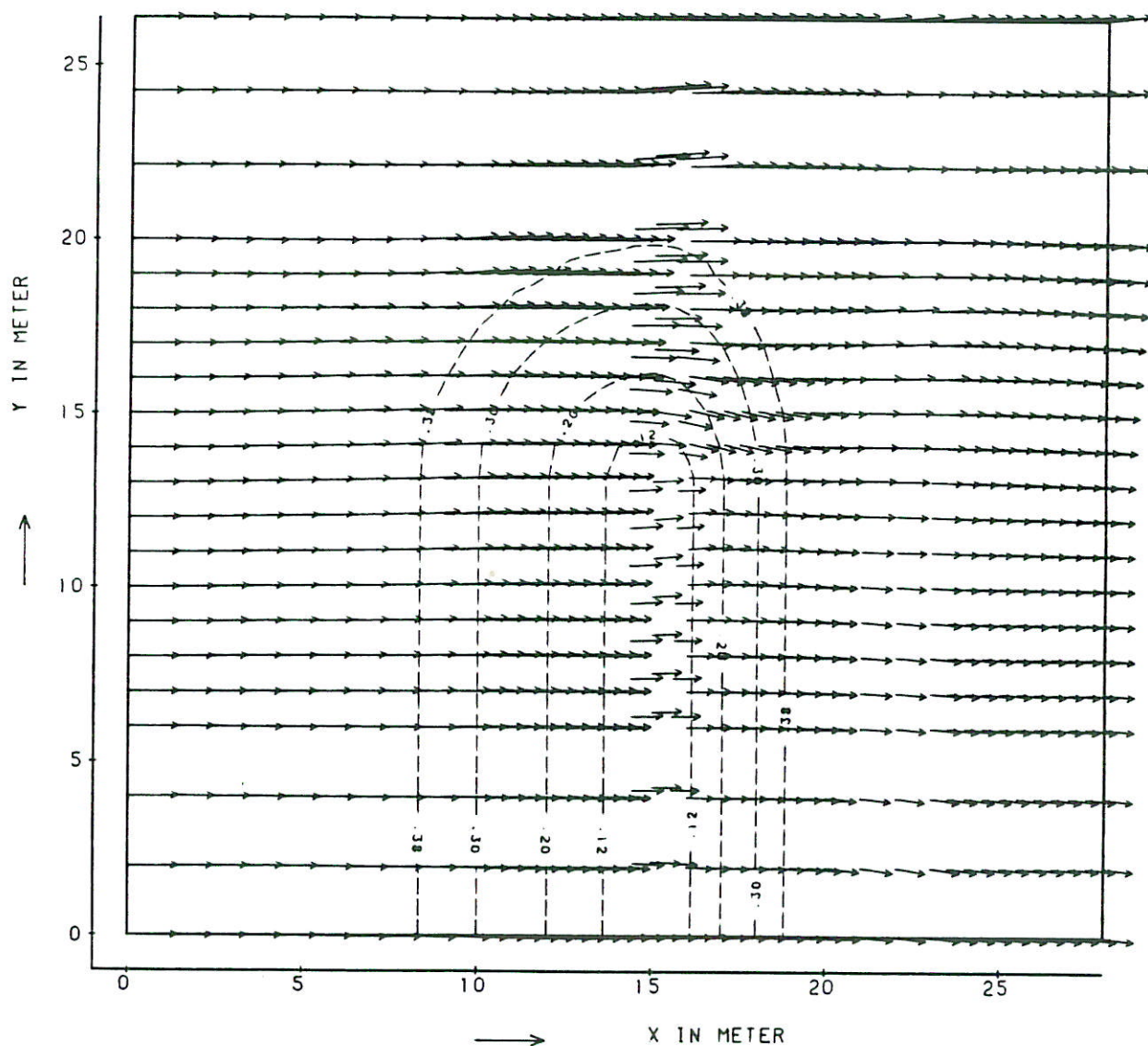
VE35S1

THETA=0

WATERLOOPKUNDIG LABORATORIUM

H228-03

FIG. 46



SCHAAL 1 CM=0.1 M

HISWABAK ZONDER KUST TESTBEREKENING
GOLFHOOGTEN

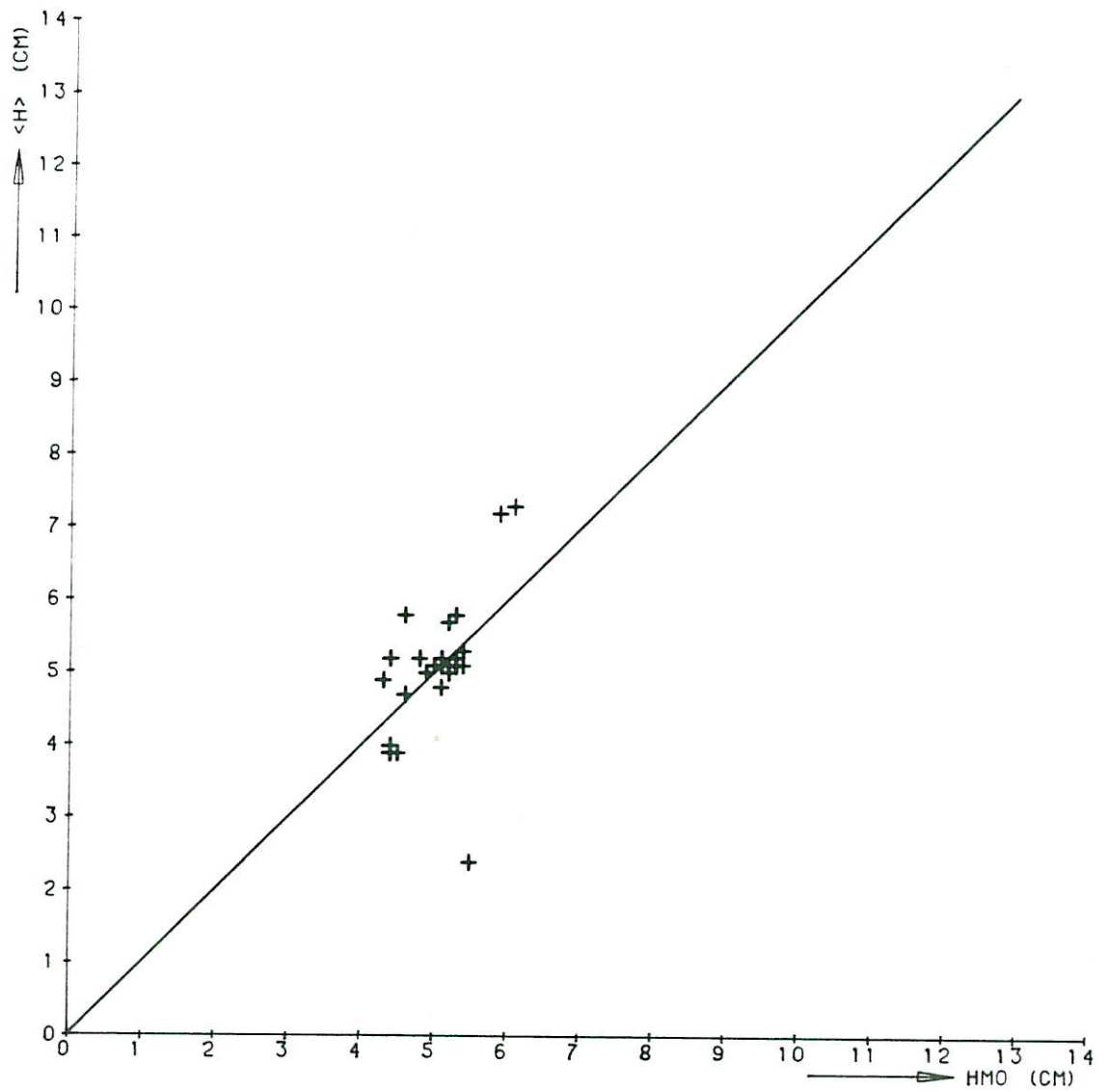
VE35S2

THETA=0

WATERLOOPKUNDIG LABORATORIUM

H228-03

FIG. 47



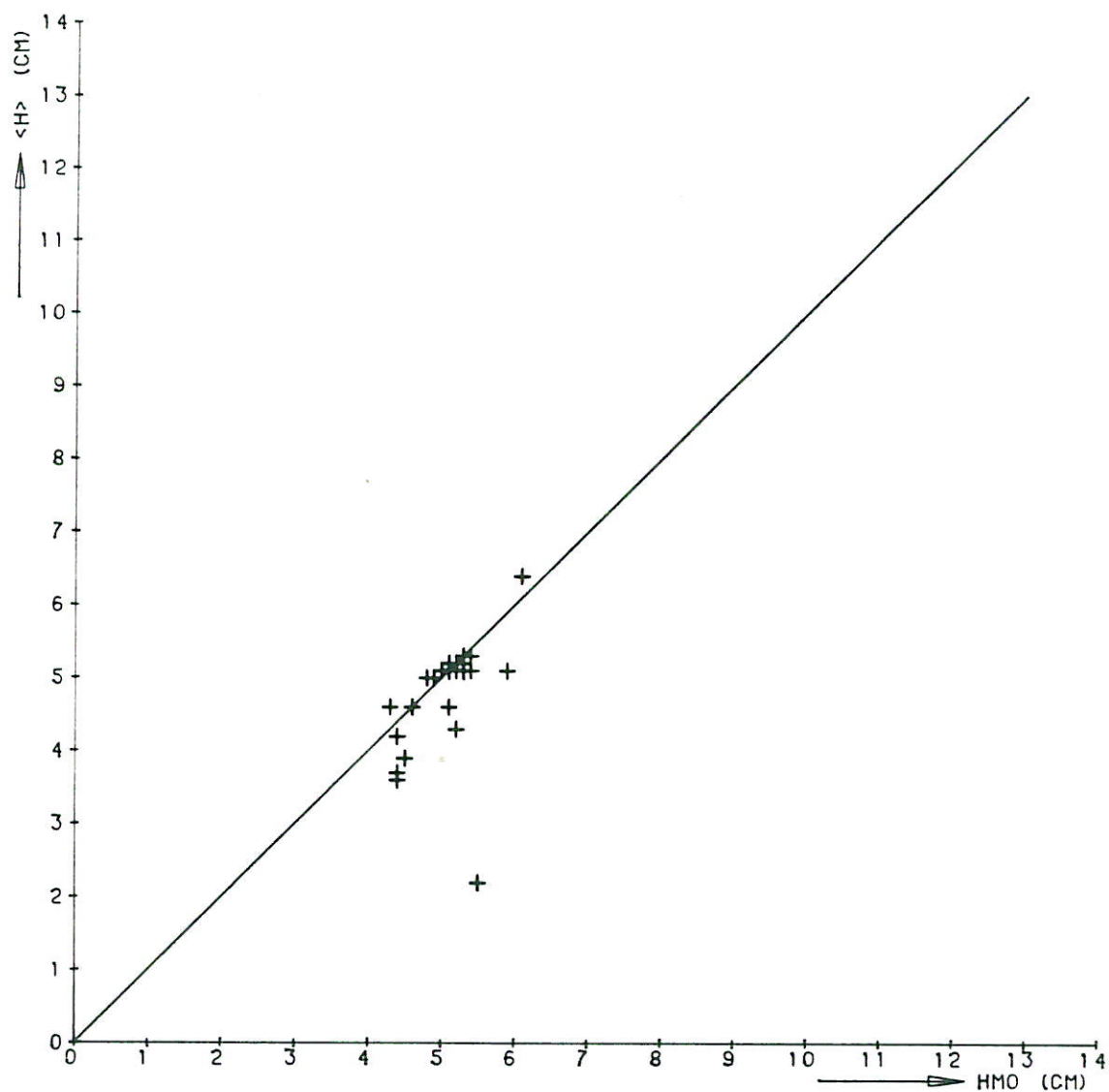
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

CE31

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 48



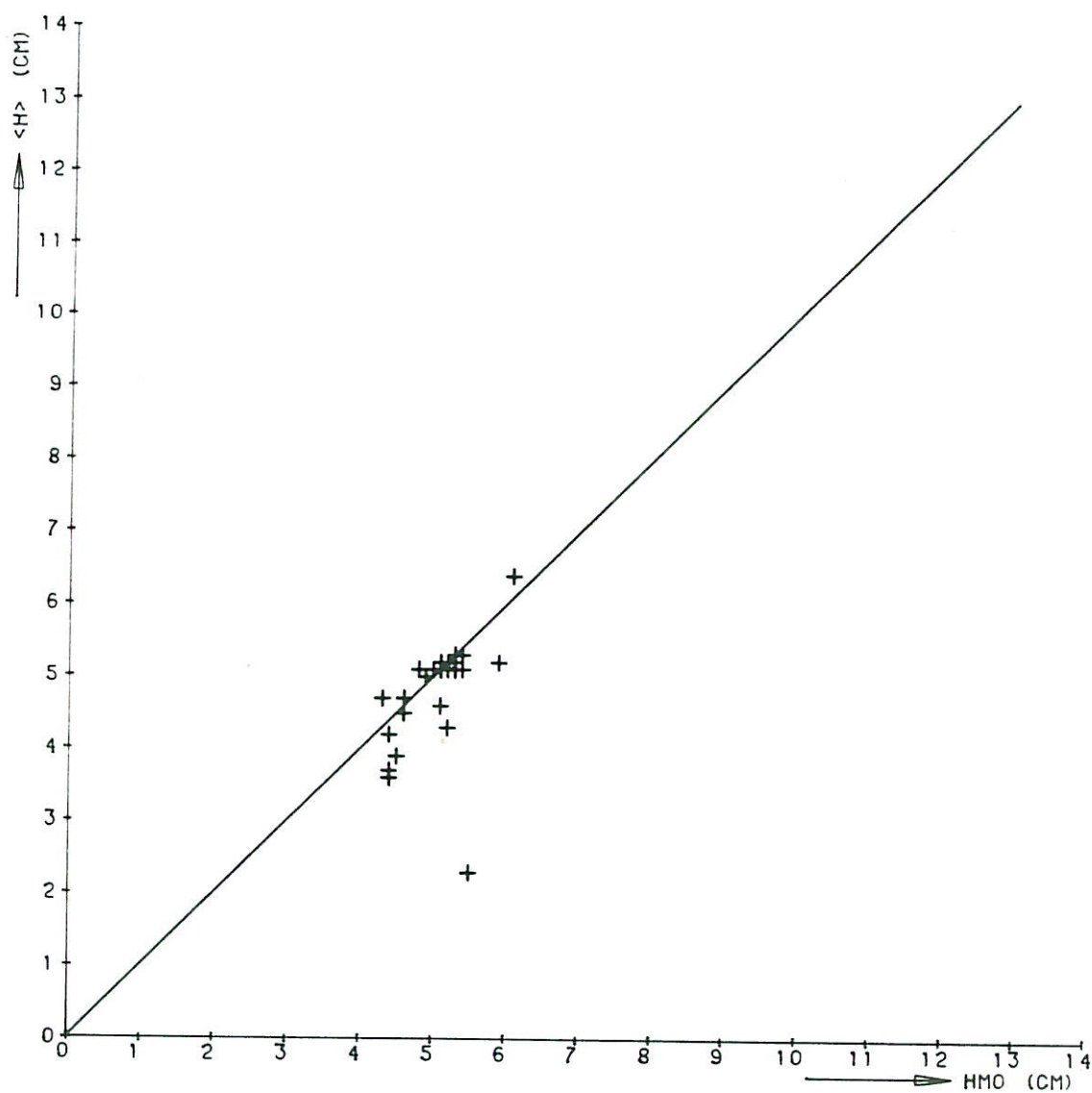
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS CREDIZ.

CE31A

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 49



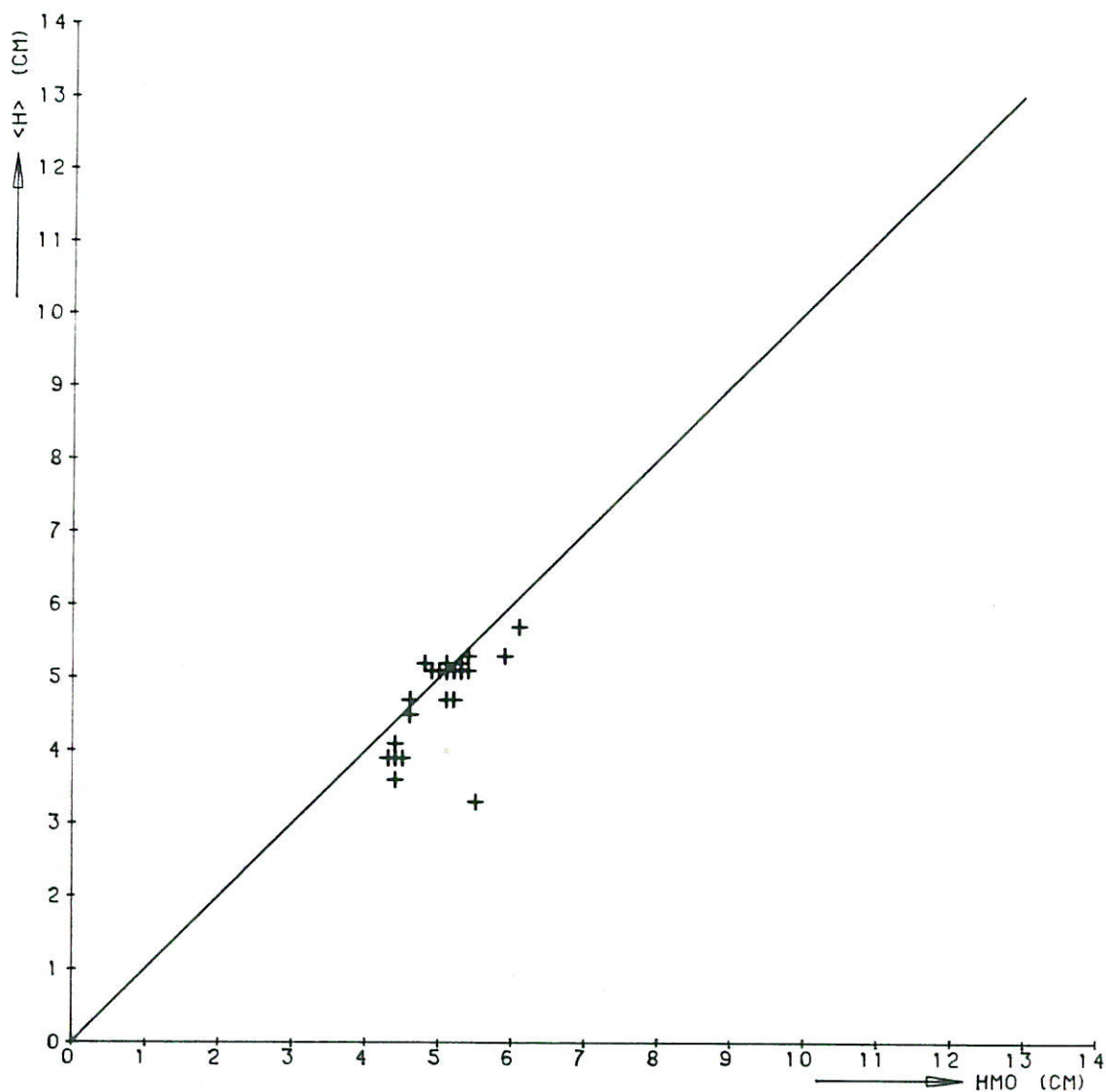
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS CREDIZ.

CE31B

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 50



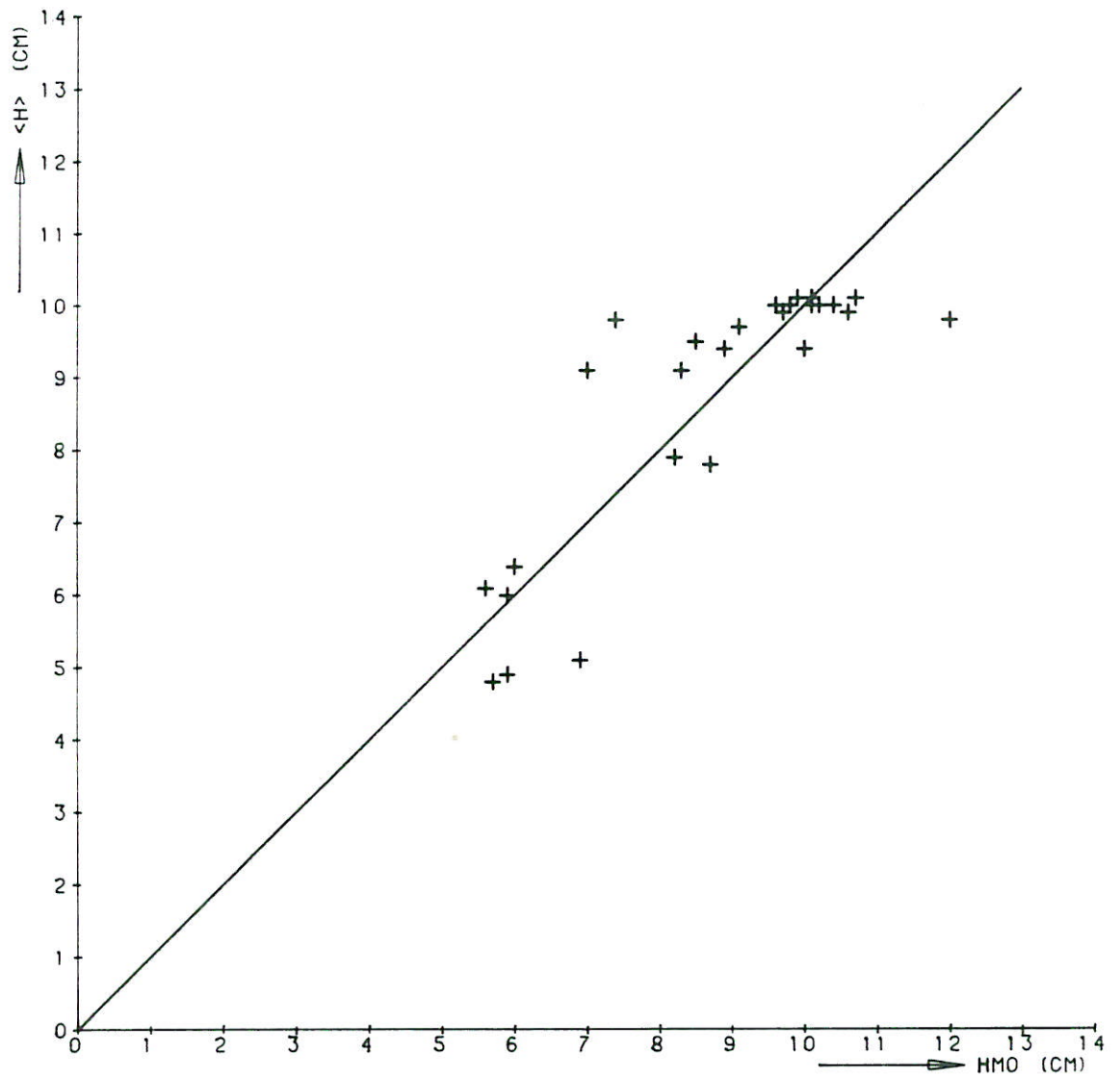
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS CREDIZ.

CE31C

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 51



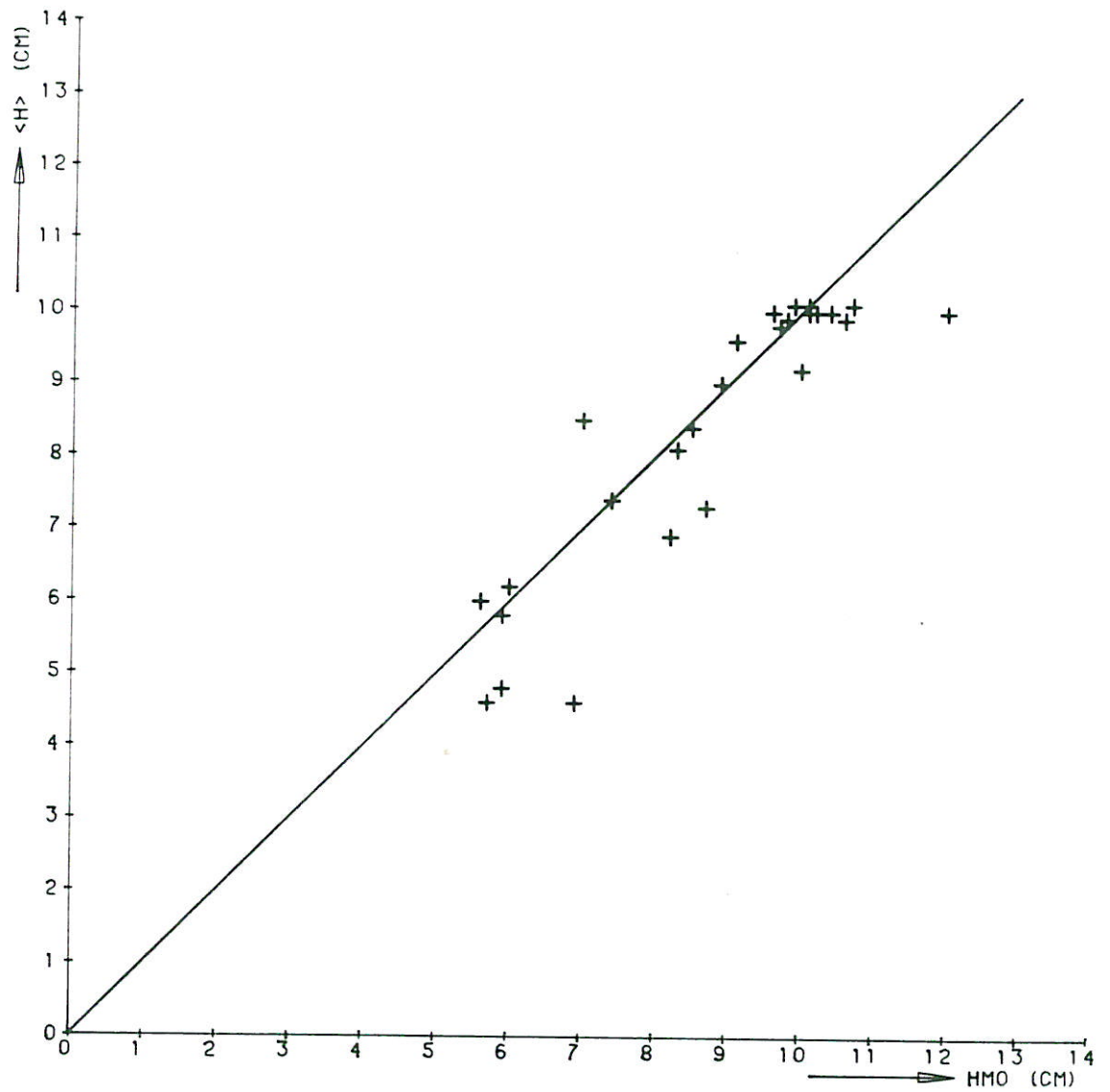
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

CE32

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 52



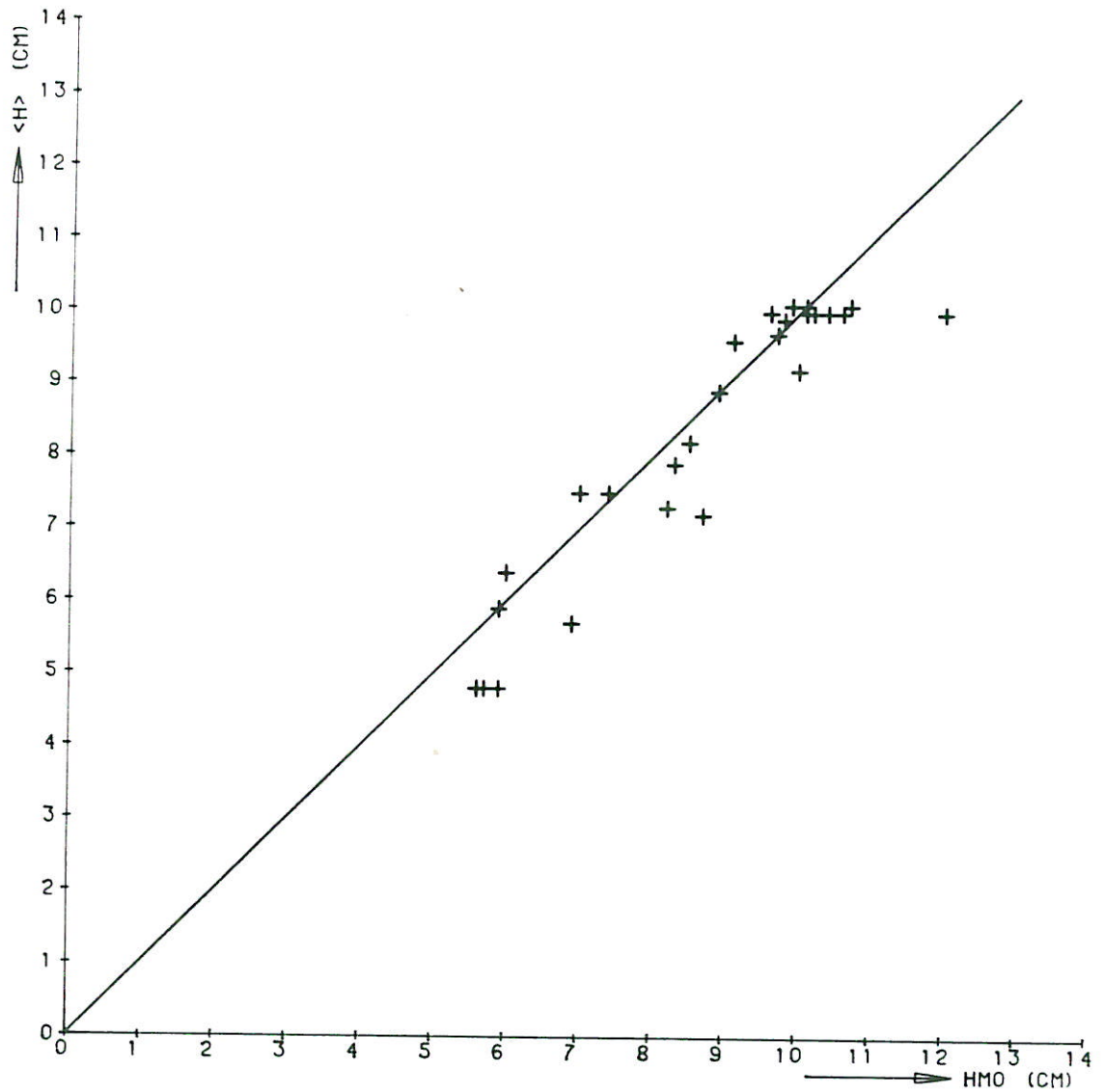
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS CREDIZ.

CE32A

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 53



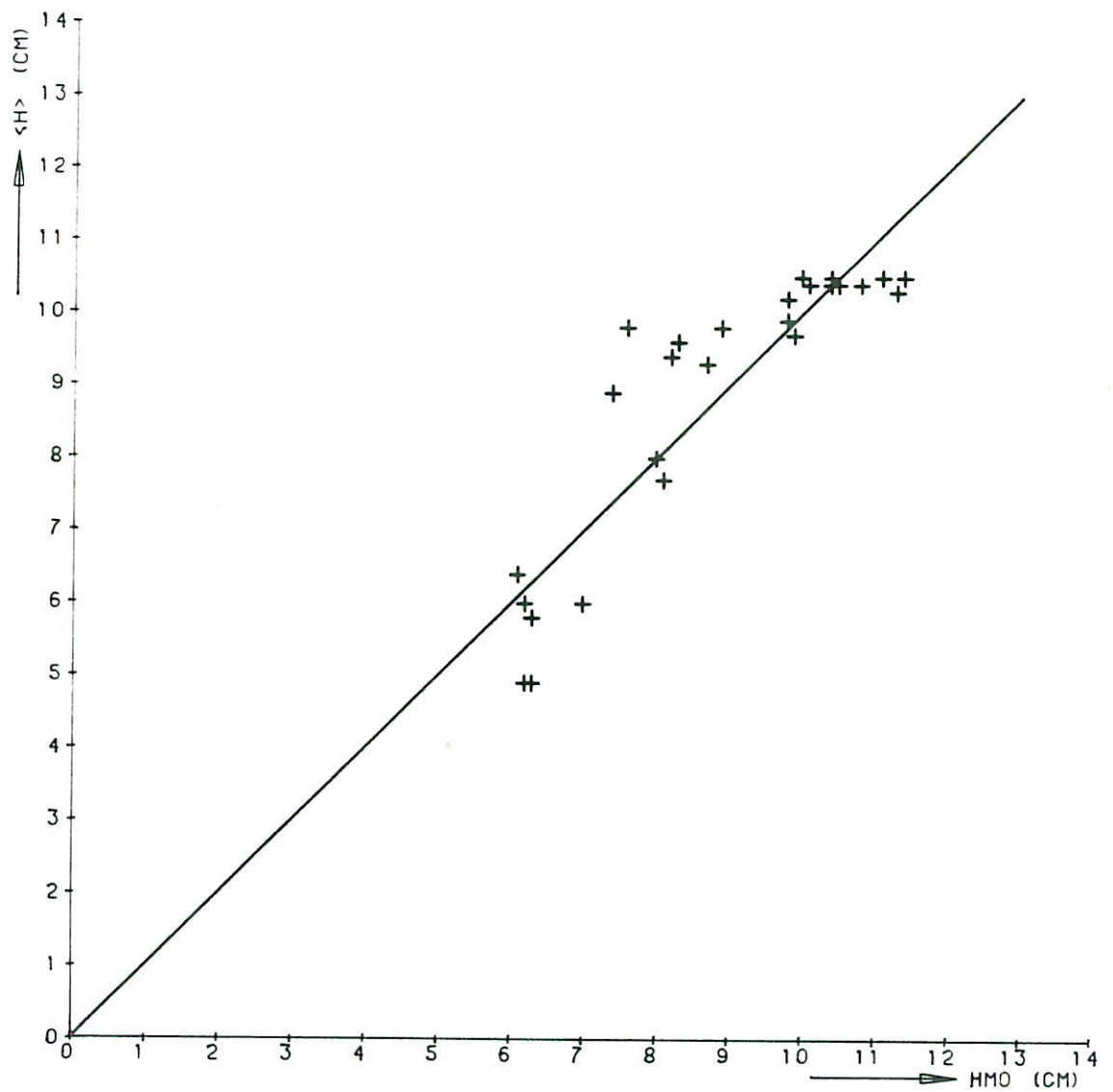
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS CREDIZ.

CE32B

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 54



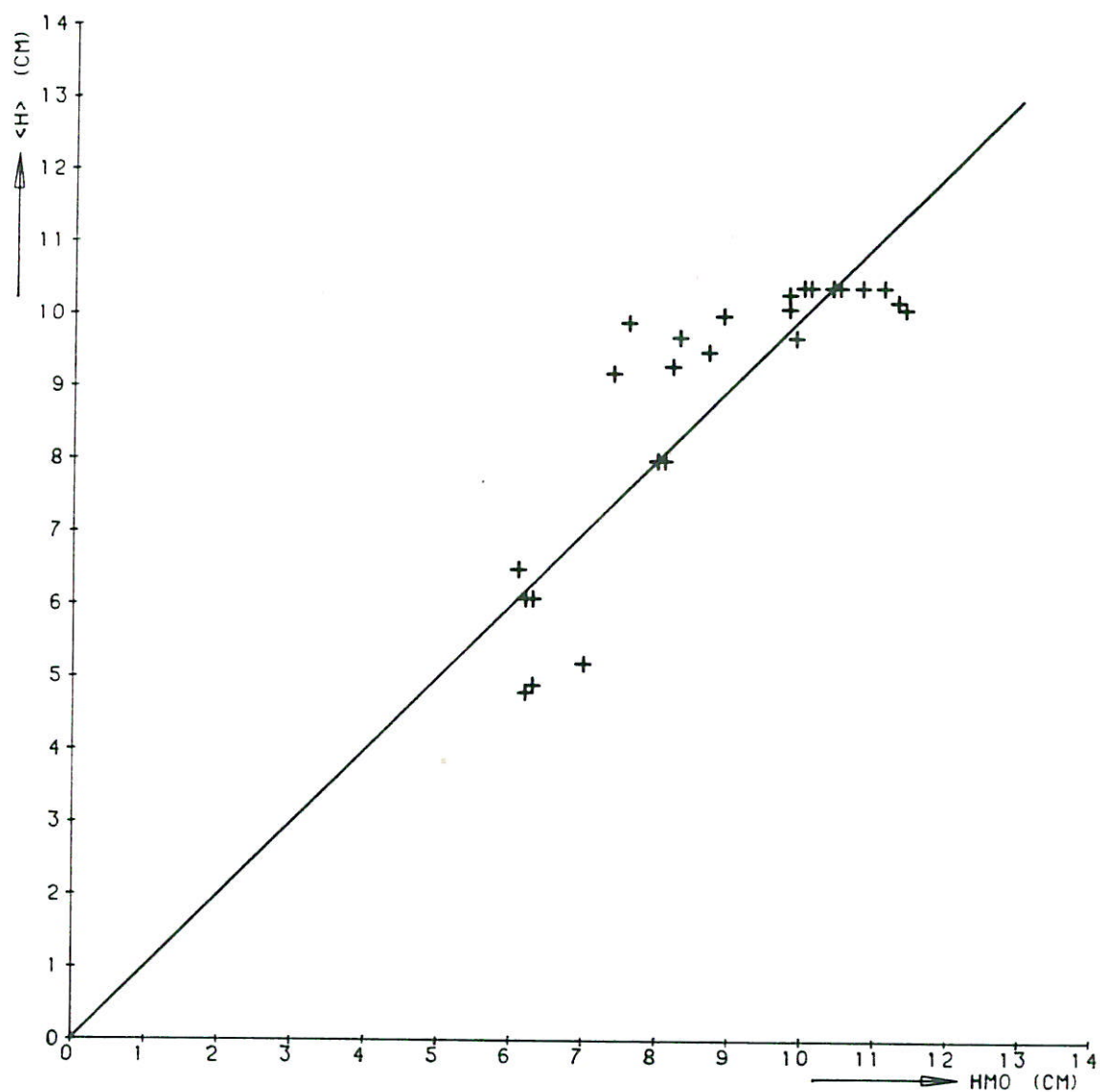
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS.

CE35

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 55



HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS.

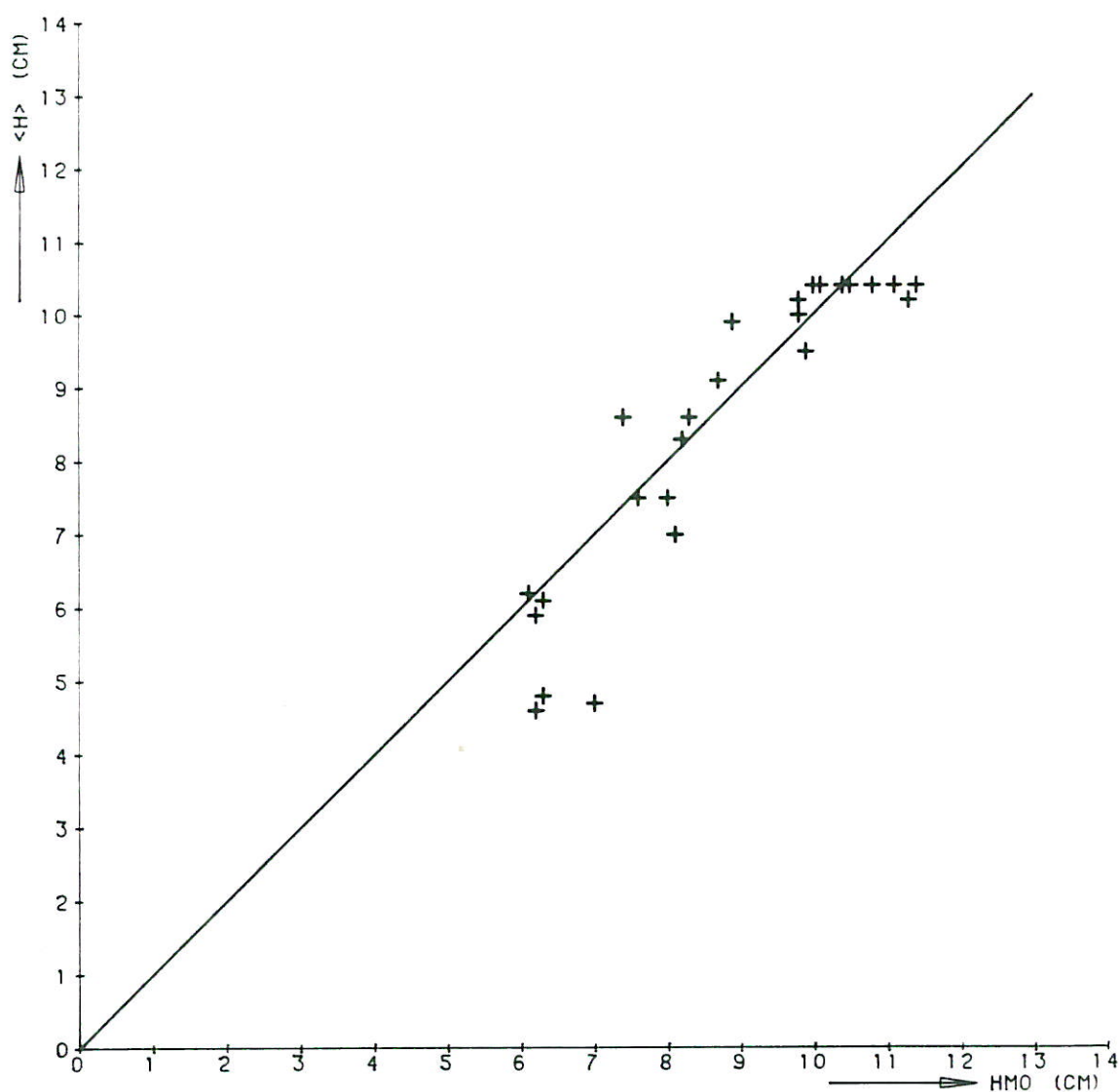
CE35A

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 56

HISWA COMPUTATION CE35B



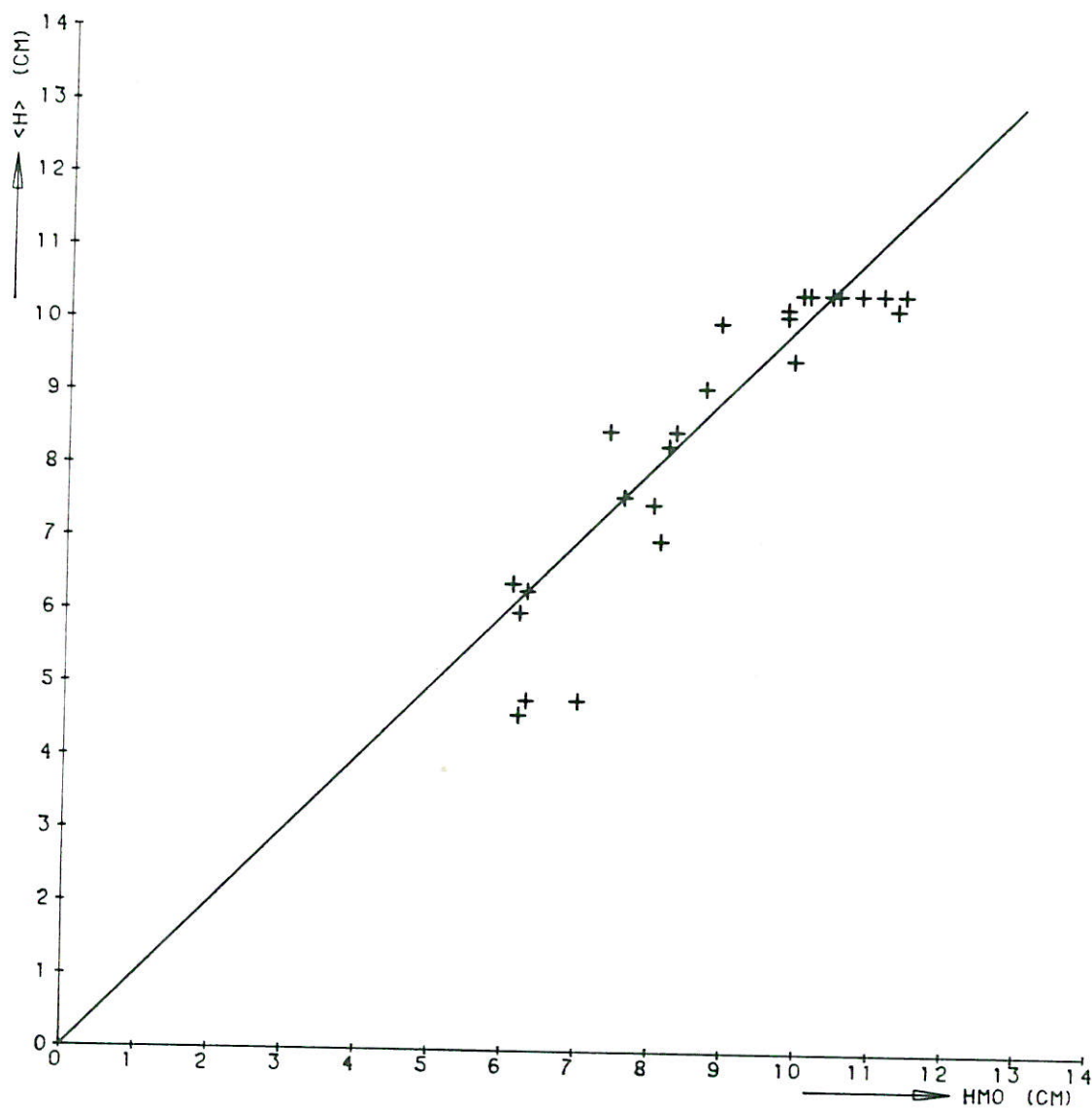
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS CREDIZ.

CE35B

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 57



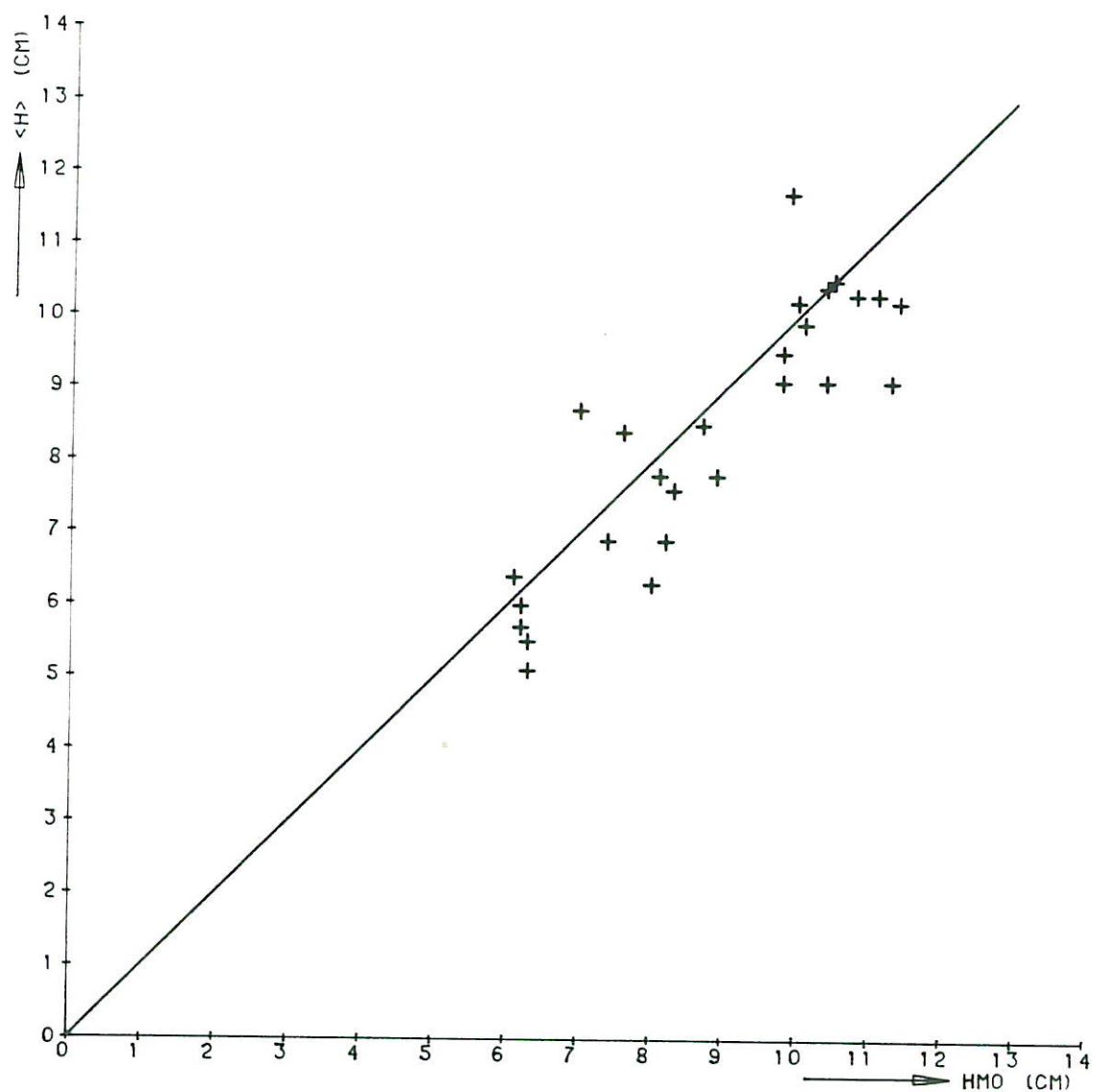
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS CREDIZ.

CE35B1

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 58



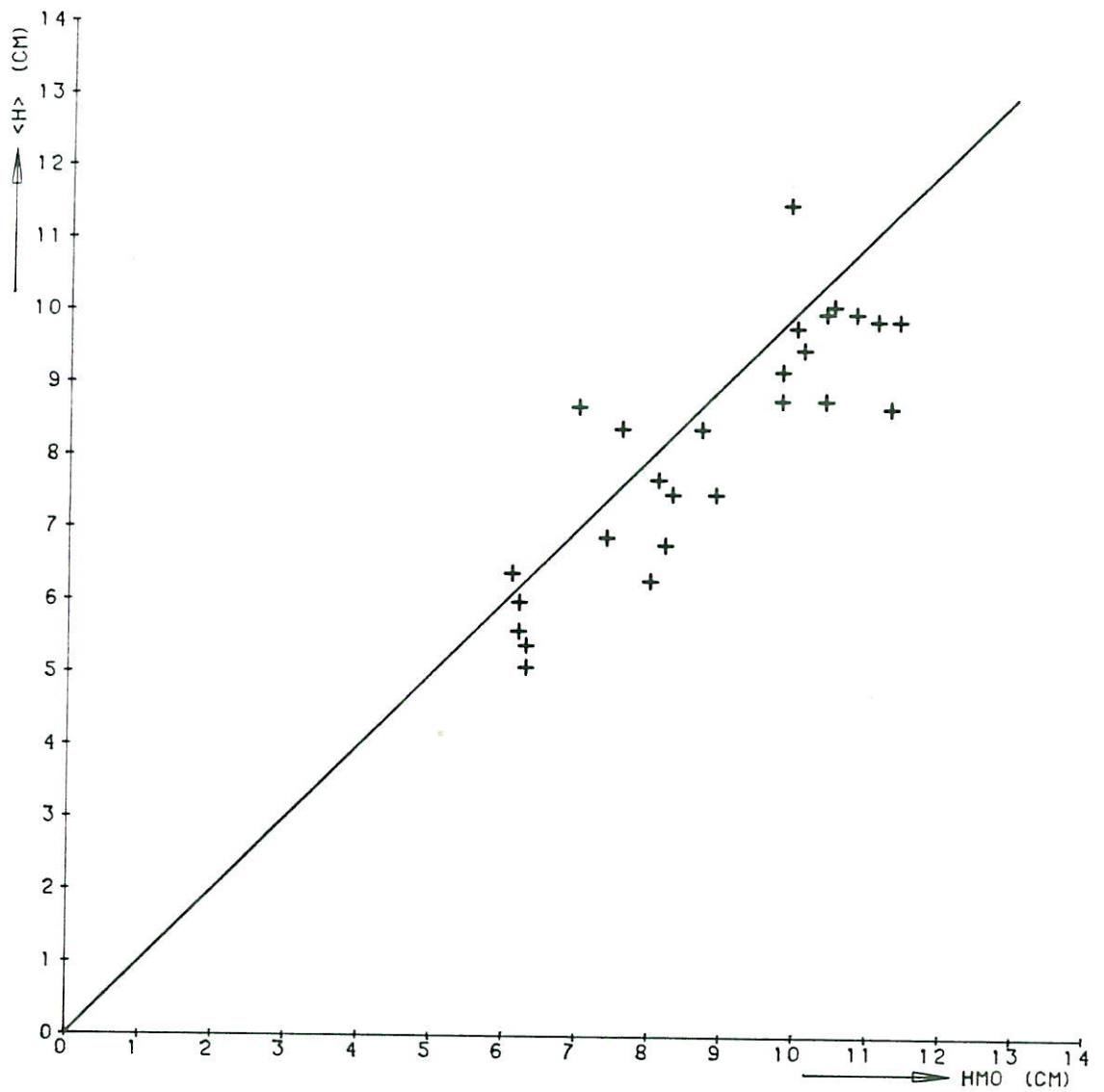
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS CREDIZ.

CE35BA

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 59



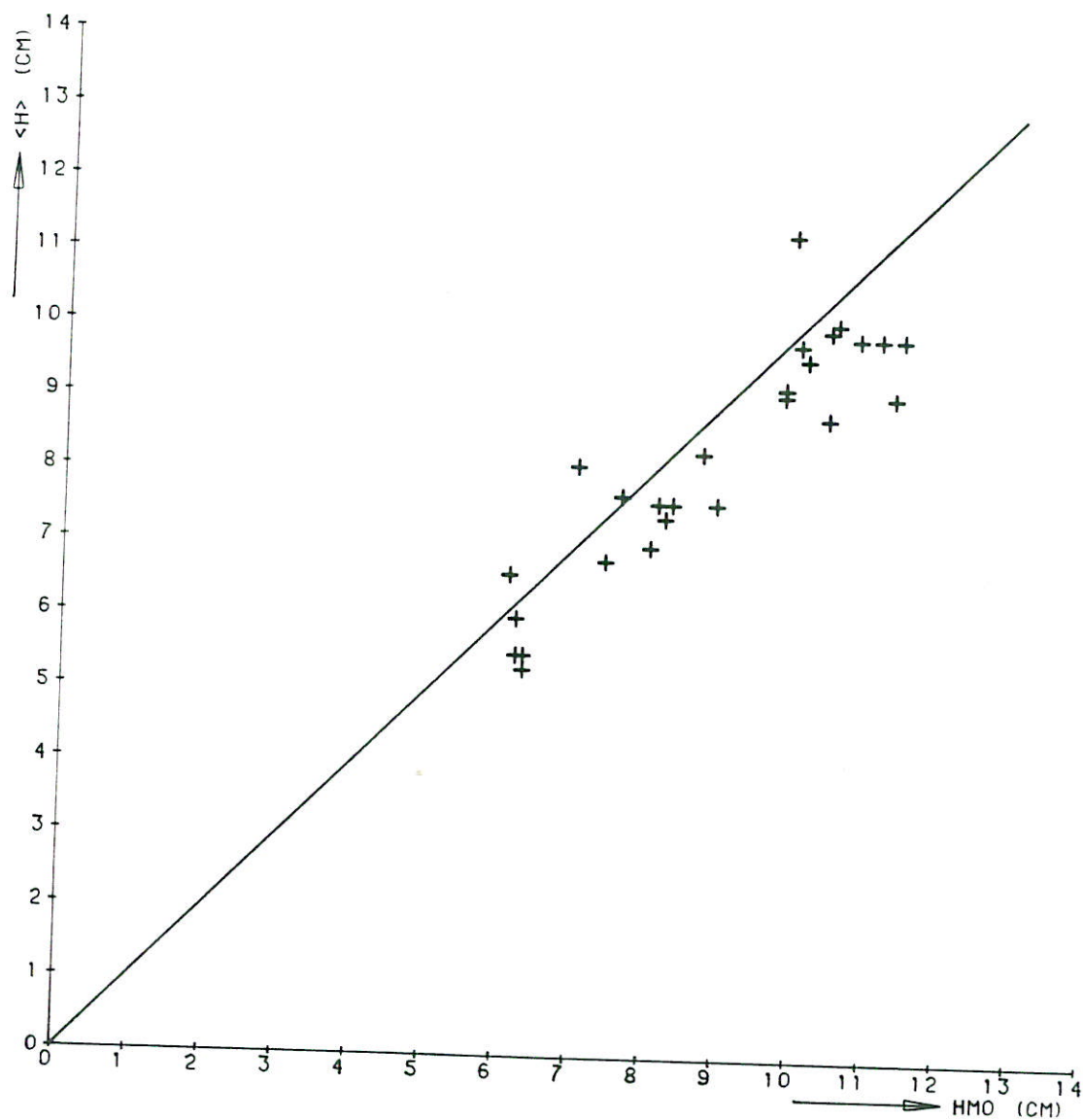
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS CREDIZ.

CE35BB

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 60



HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
($\langle H \rangle$) WAVE HEIGHTS CREDIZ.

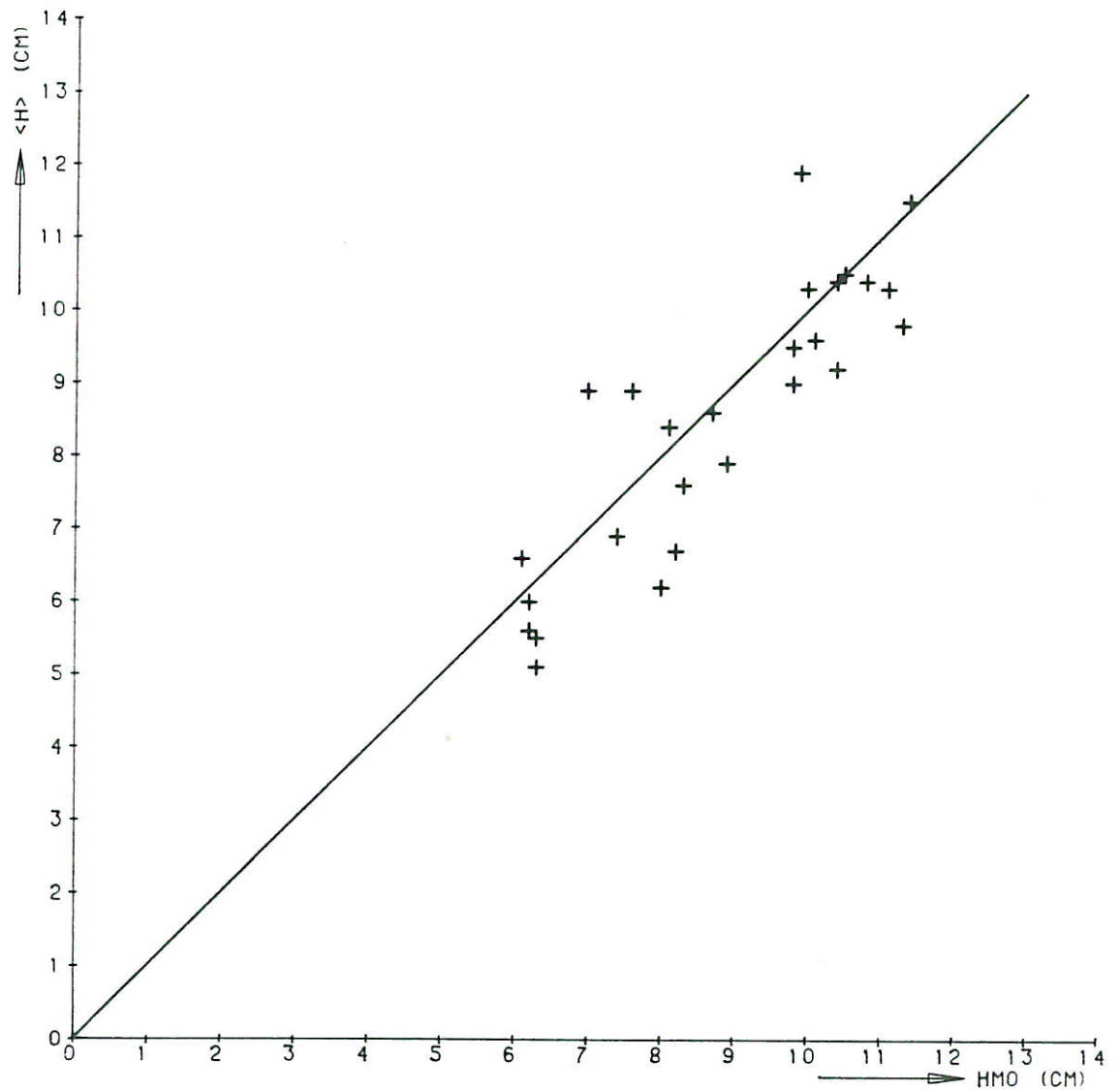
CE35BC

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 61

HISWA COMPUTATION CE35S1



HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS.

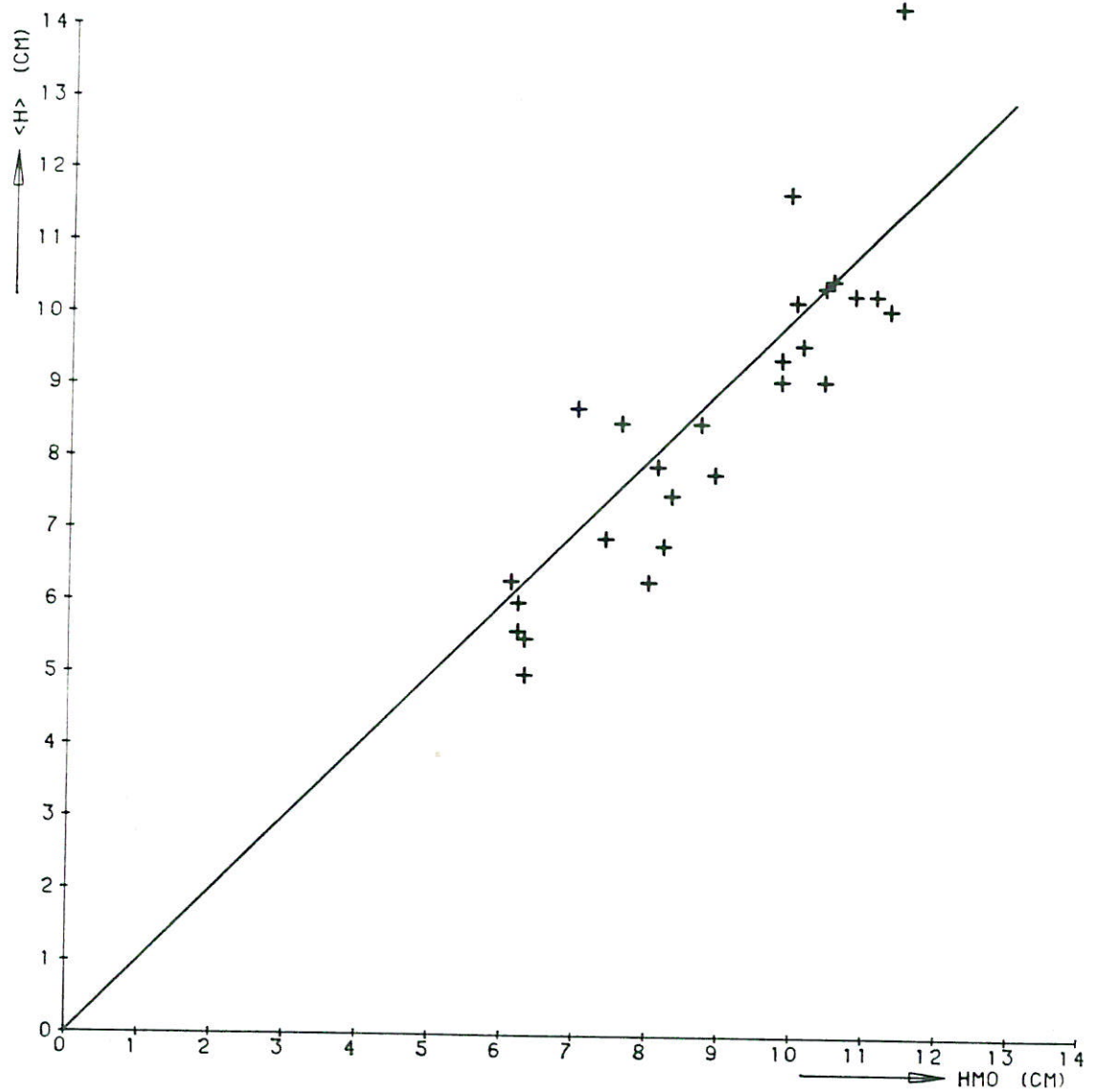
CE35S1

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 62

HISWA COMPUTATION CE35SA



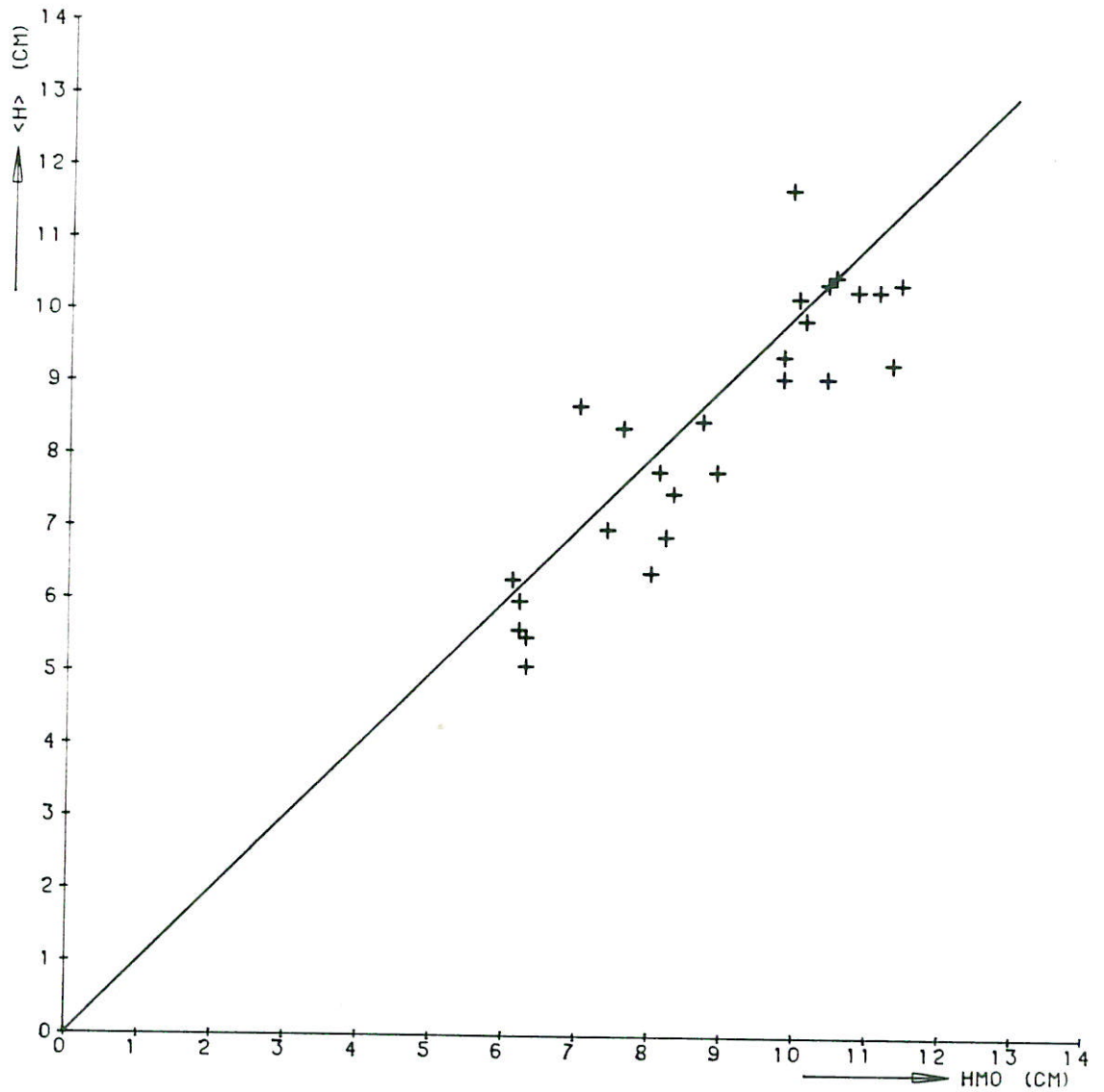
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS CREDIZ.

CE35SA

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 63



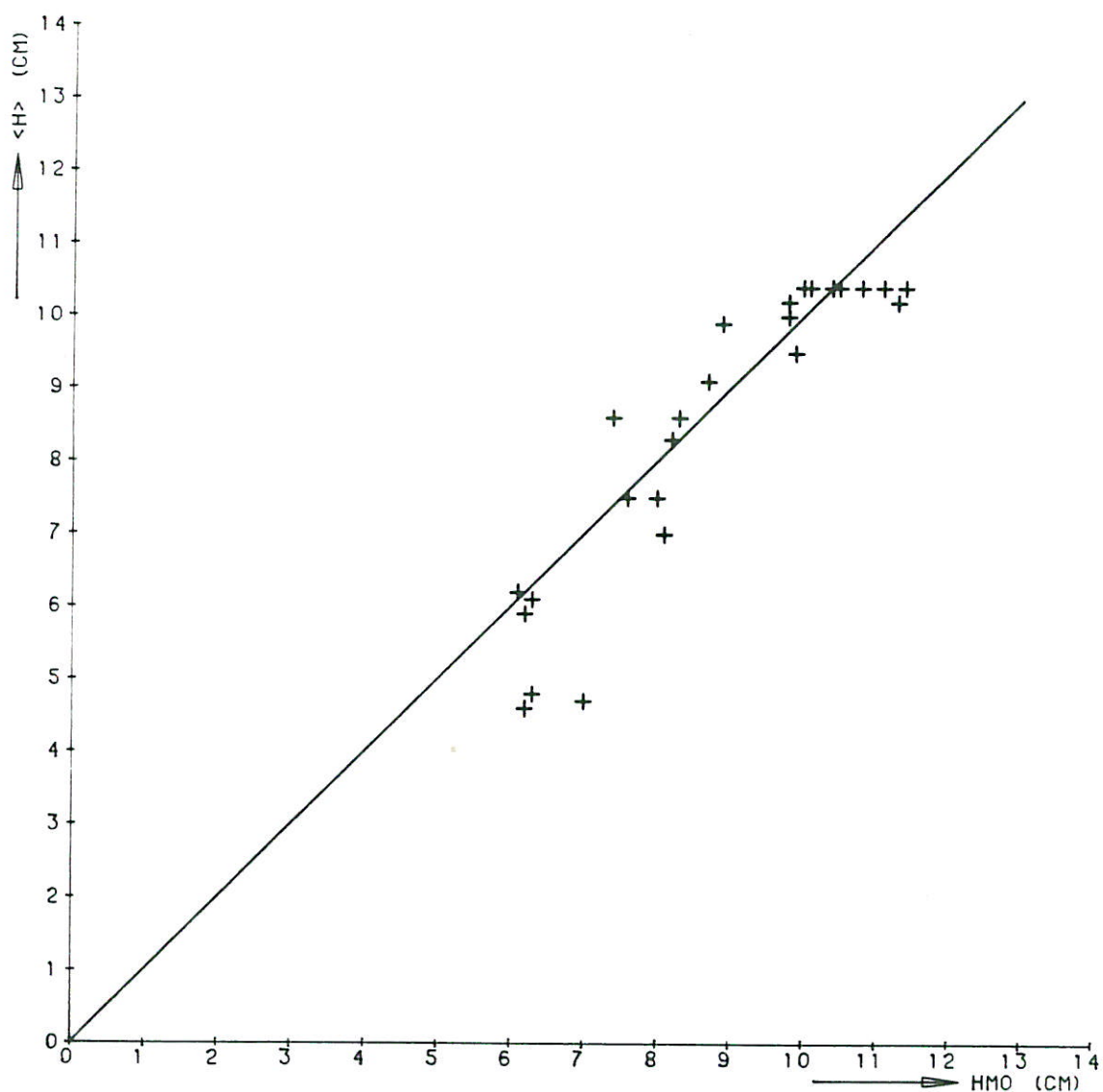
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS CREDIZ.

CE35SB

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 64



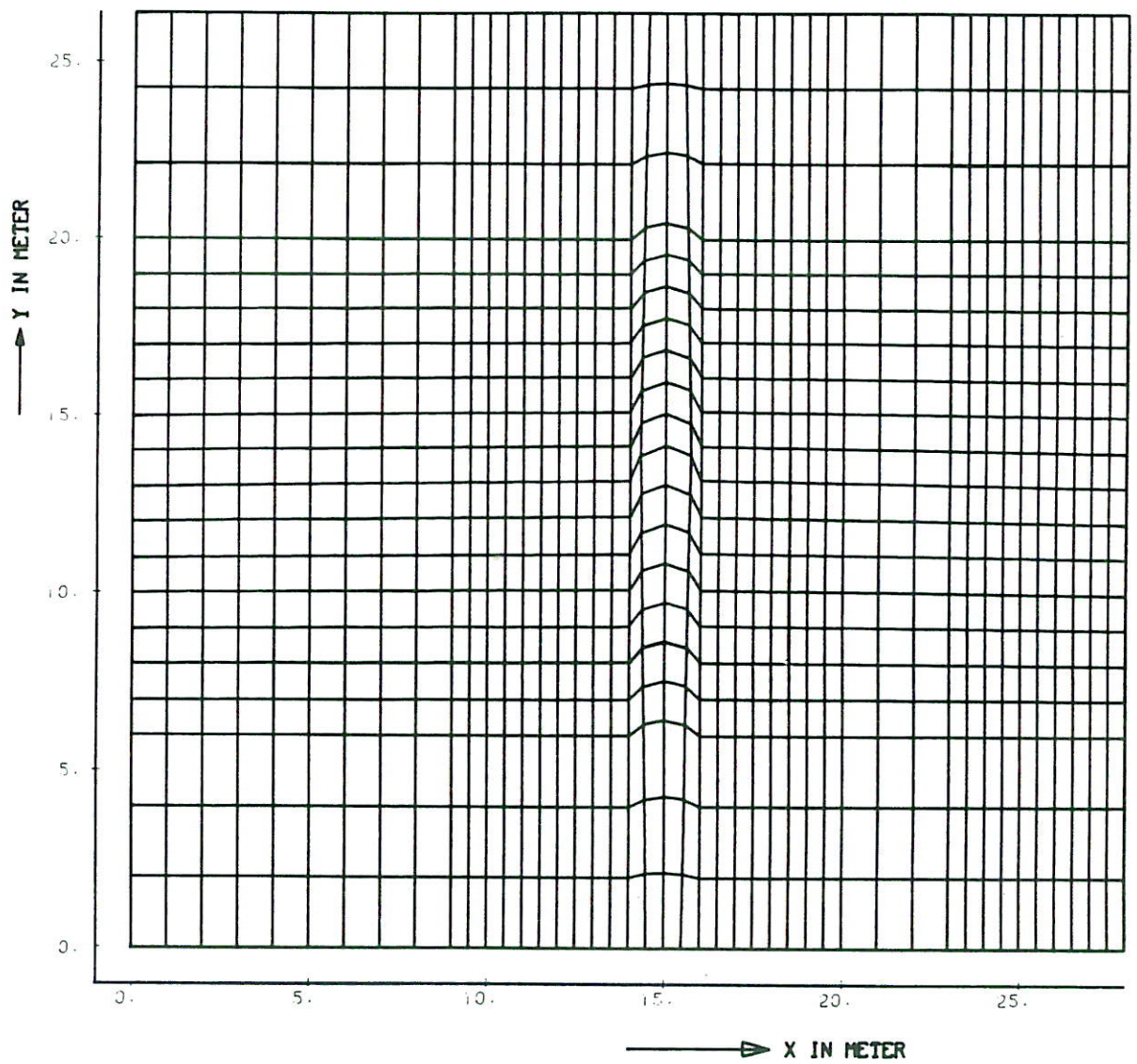
HISWA VERIFICATION STUDY
COMPARISON MEASURED (HMO) AND COMPUTED
(<H>) WAVE HEIGHTS CREDIZ.

CE35C

DELFT HYDRAULICS LABORATORY

H228-3

FIG. 65



GRID

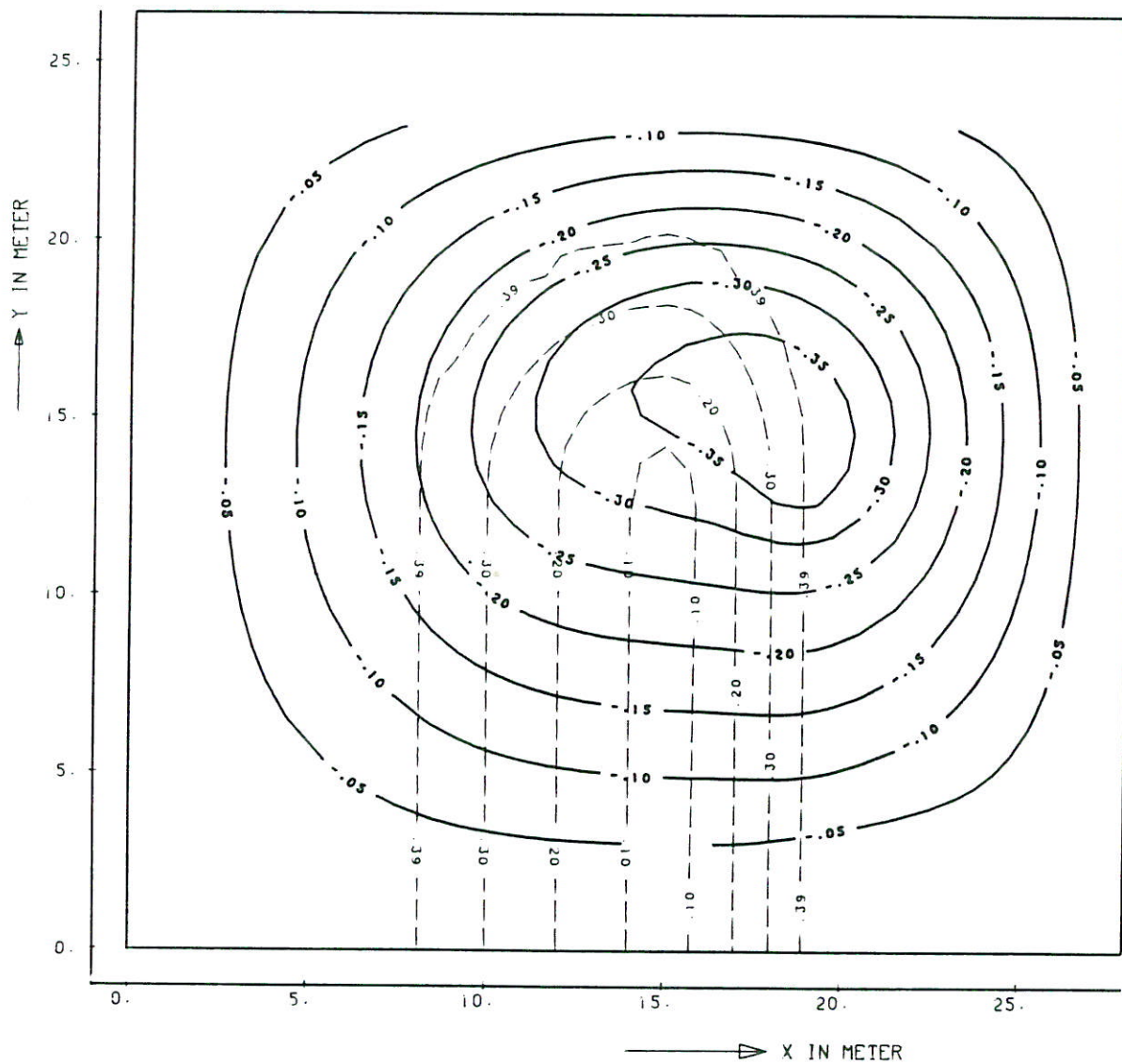
VE35

DELFT HYDRAULICS

H0451

FIG 66

FIG 67



STREAMLINES AFTER 30 TIMESTEPS

DT = 10 S.

VE35A

DELFT HYDRAULICS

H0451

FIG. 68

FIG 69



VE35AZ

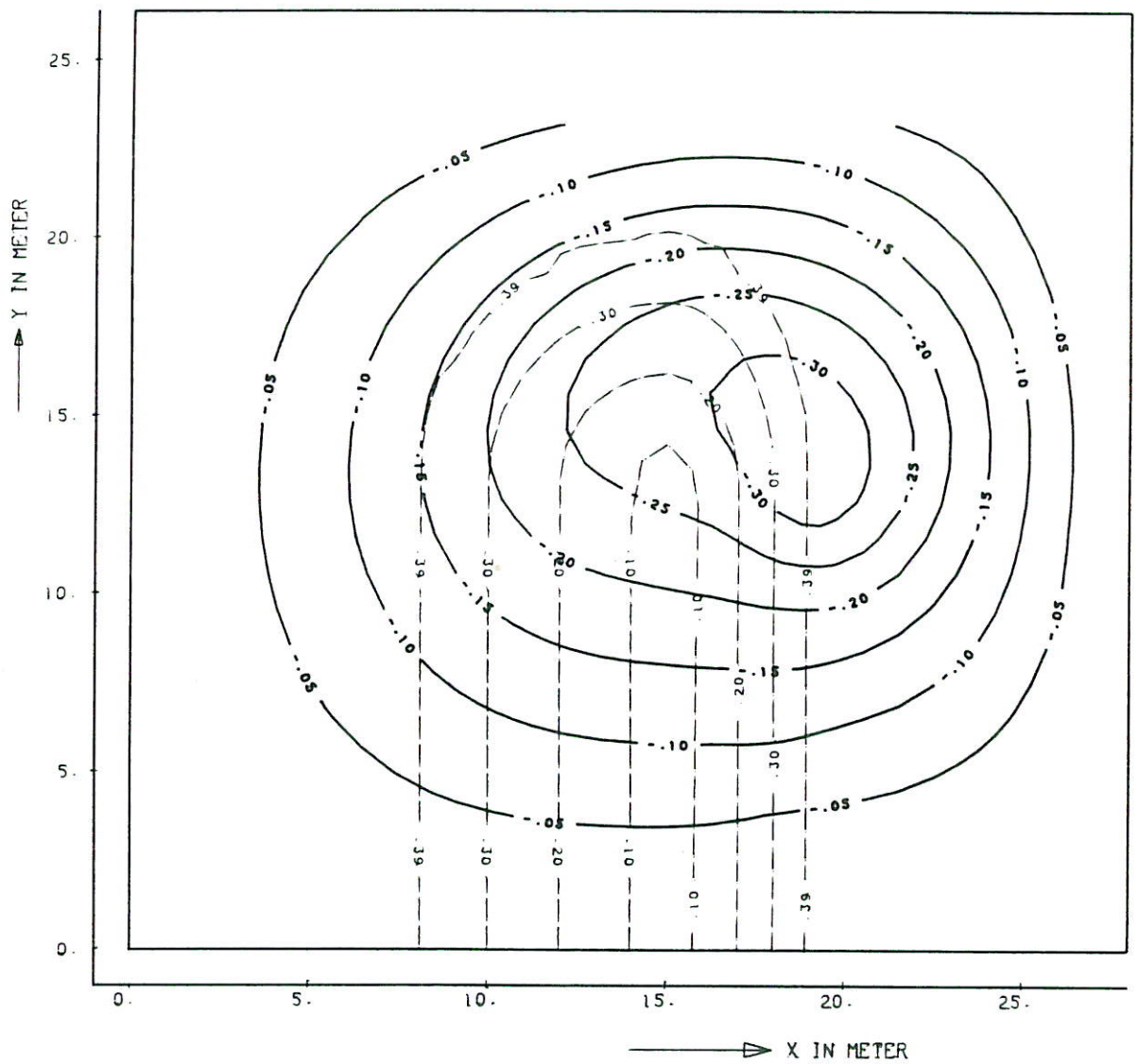
$$DT = 10 \text{ S.}$$

DELFT HYDRAULICS

H0451

FIG 70

FIG 71



STREAMLINES AFTER 30 TIMESTEPS

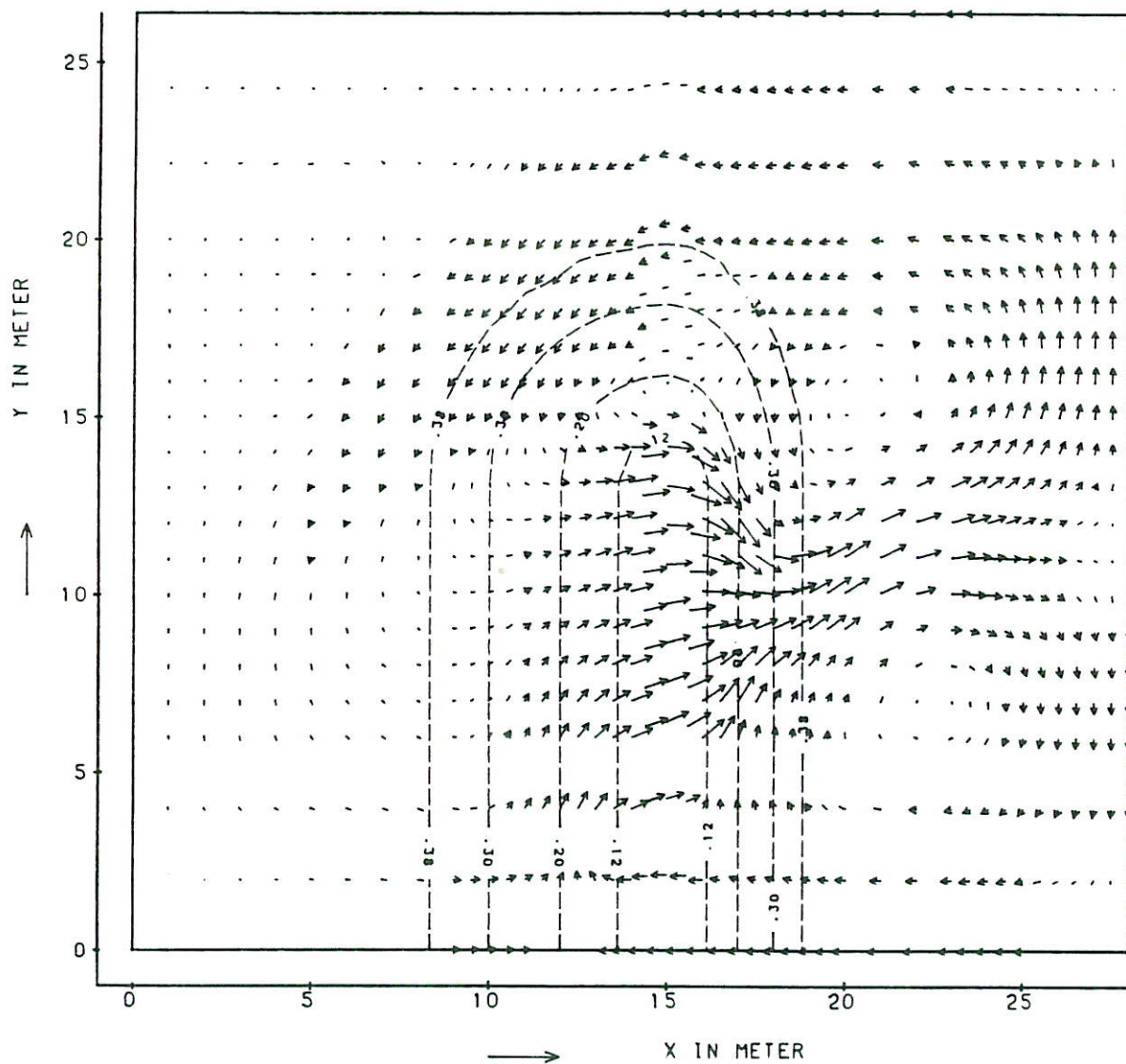
DT = 10 S.

VE35AM

DELFT HYDRAULICS

H0451

FIG 72



SCHAAL 1 CM=0.5 M/S

HISWABAK ZONDER KUST TESTBEREKENING
STROOMSNELHEDEN NA 30 STAPPEN

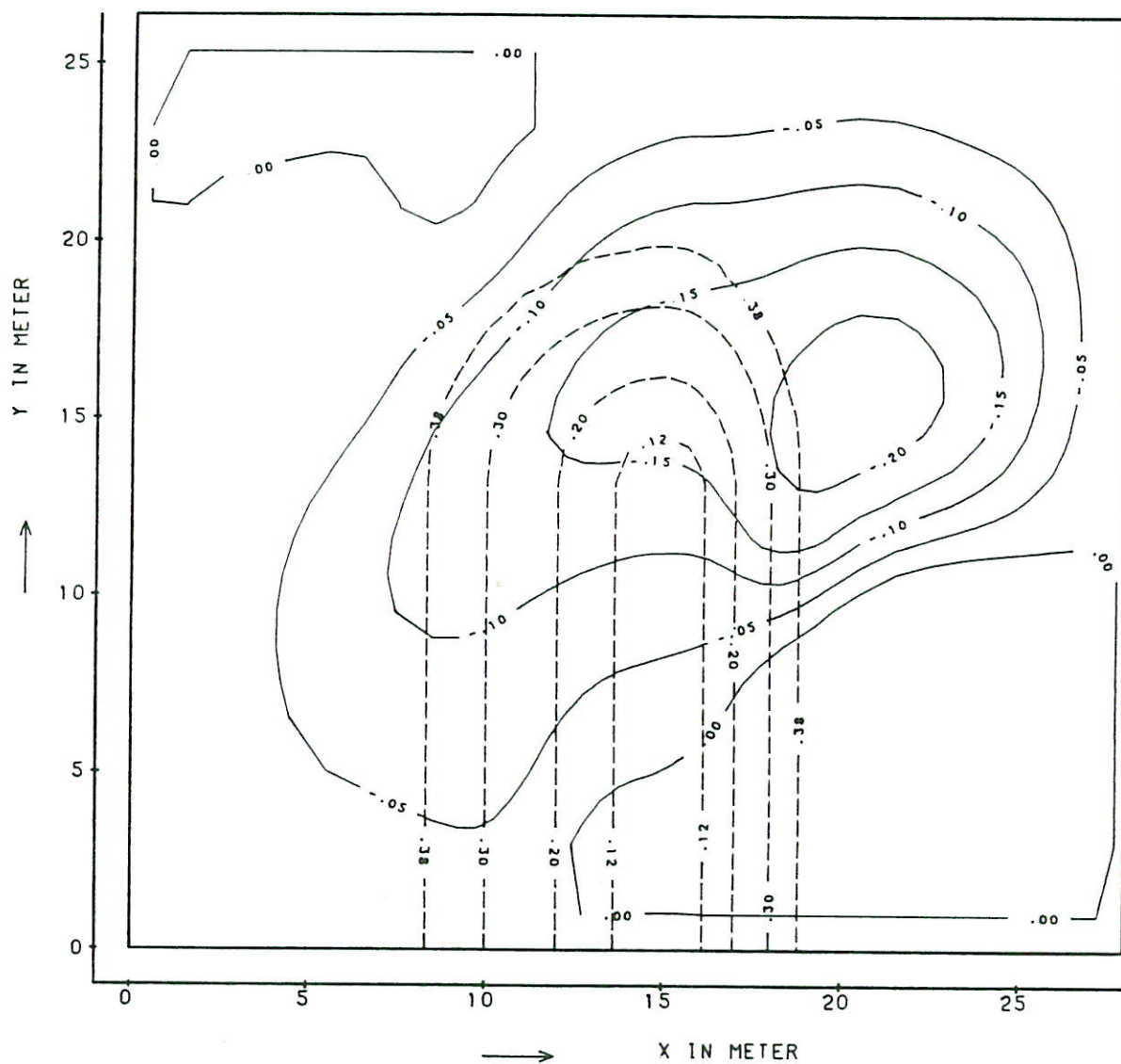
VE35S1

THETA=0

WATERLOOPKUNDIG LABORATORIUM

H228-03

FIG. 73

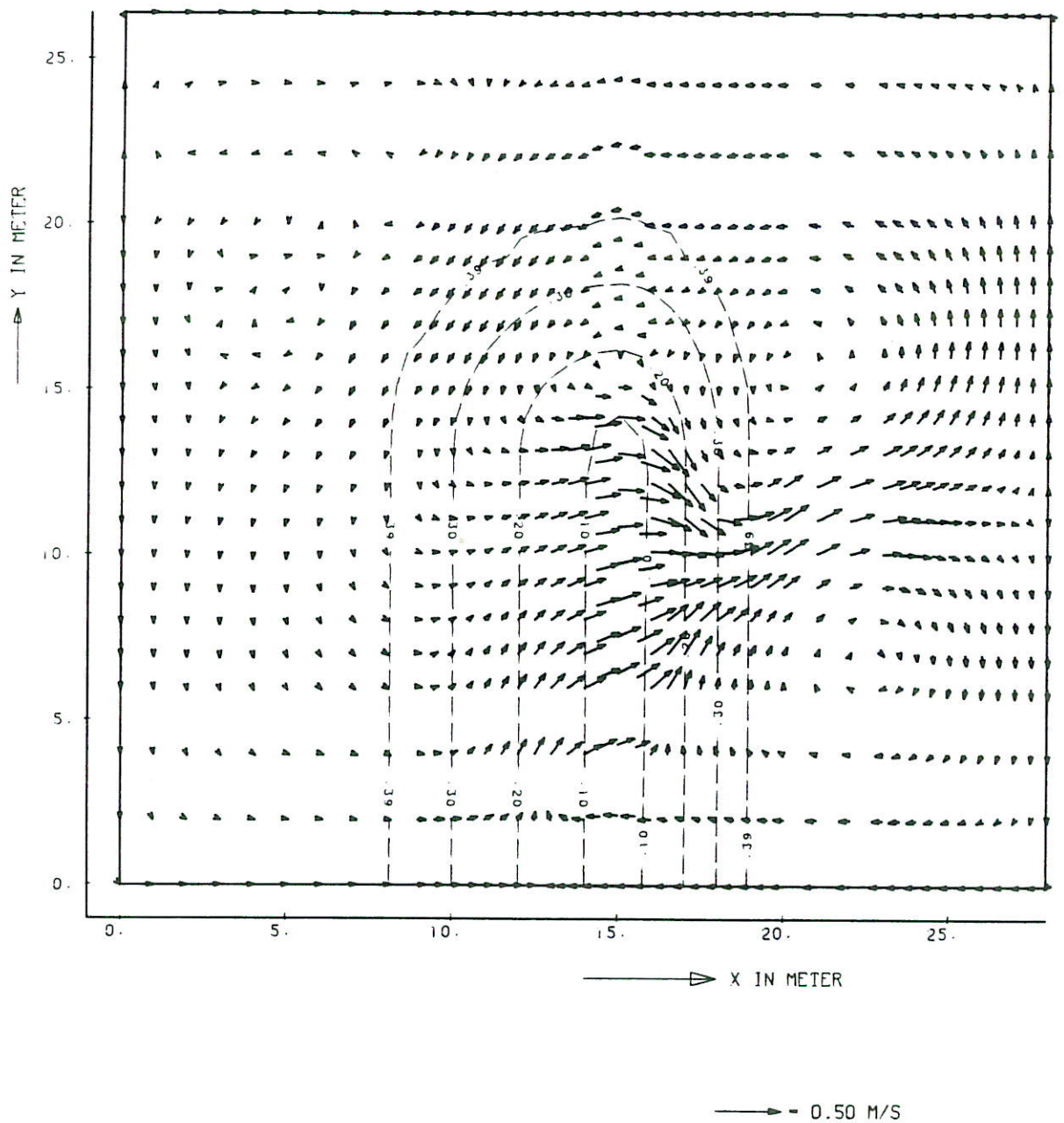


HISWABAK ZONDER KUST TESTBEREKENING
STROOMFUNCTIE CONTOUREN NA 30 STAPPEN

VE35S1 THETA=0

WATERLOOPKUNDIG LABORATORIUM

H228 03 FIG. 74



VELOCITY FIELD AFTER 30 TIMESTEPS

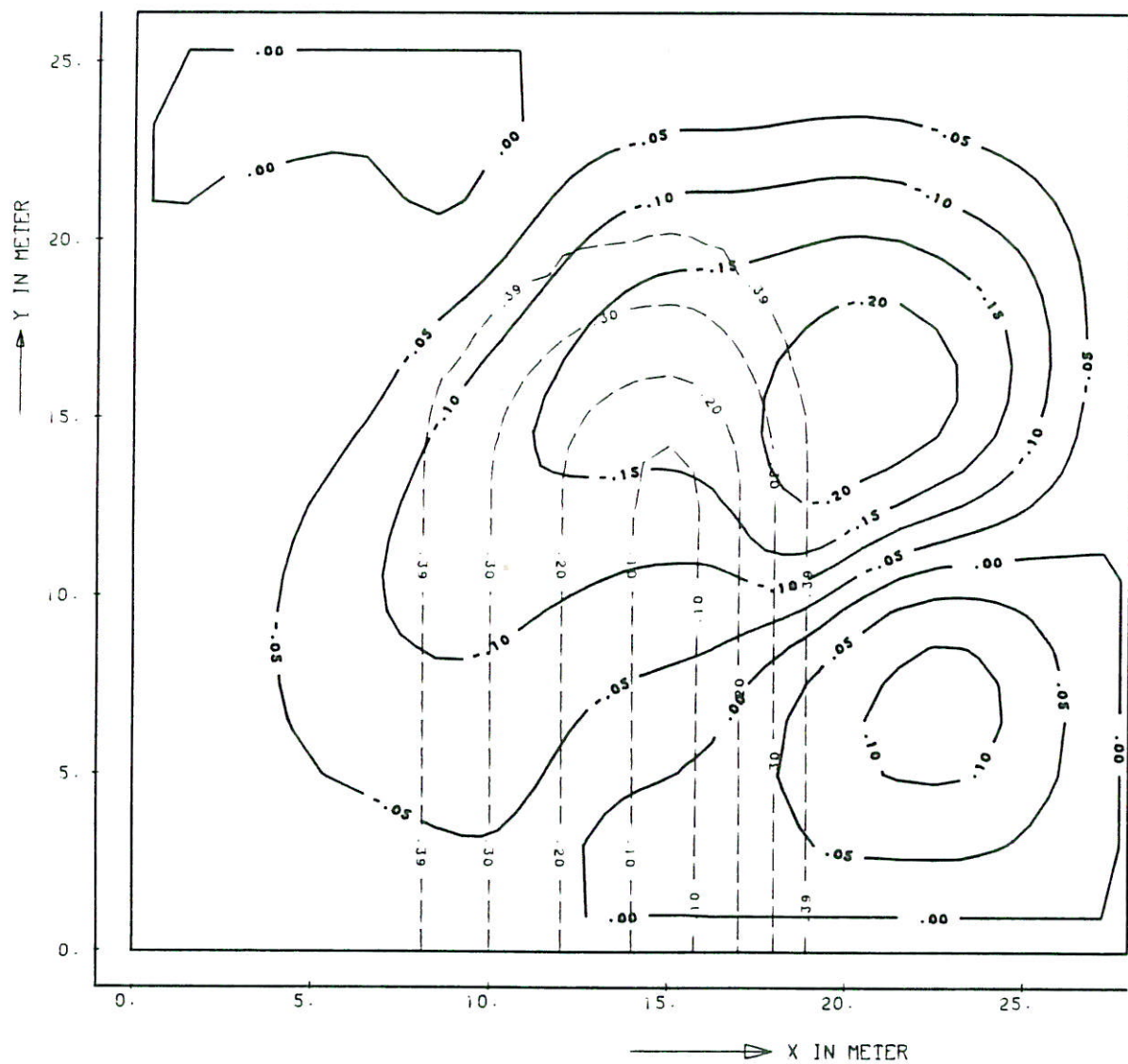
VE35S2

DT = 10 S.

DELFT HYDRAULICS

H0451

FIG 75



STREAMLINES AFTER 30 TIMESTEPS

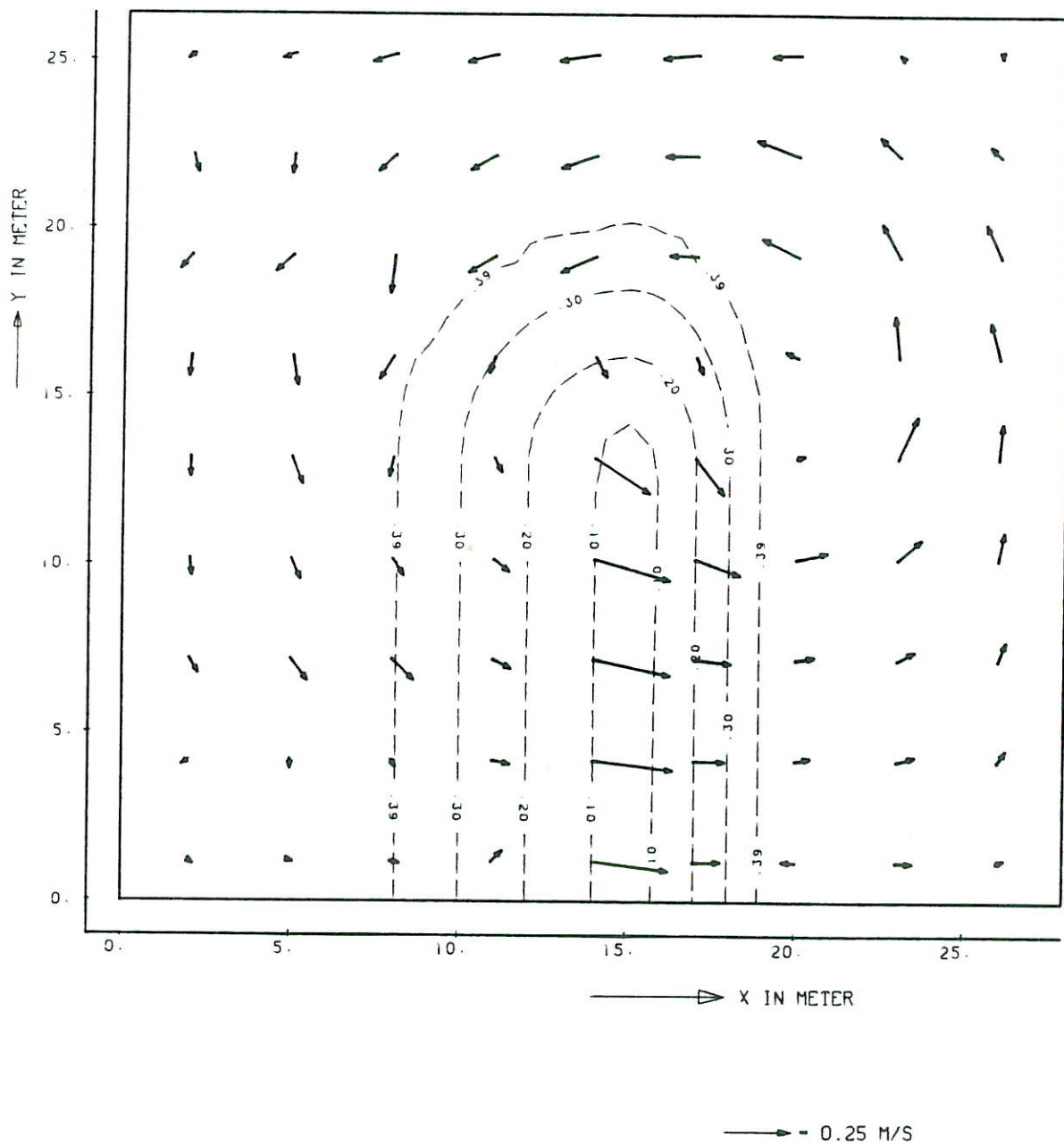
DT = 10 S.

VE35S2

DELFT HYDRAULICS

H0451

FIG 76



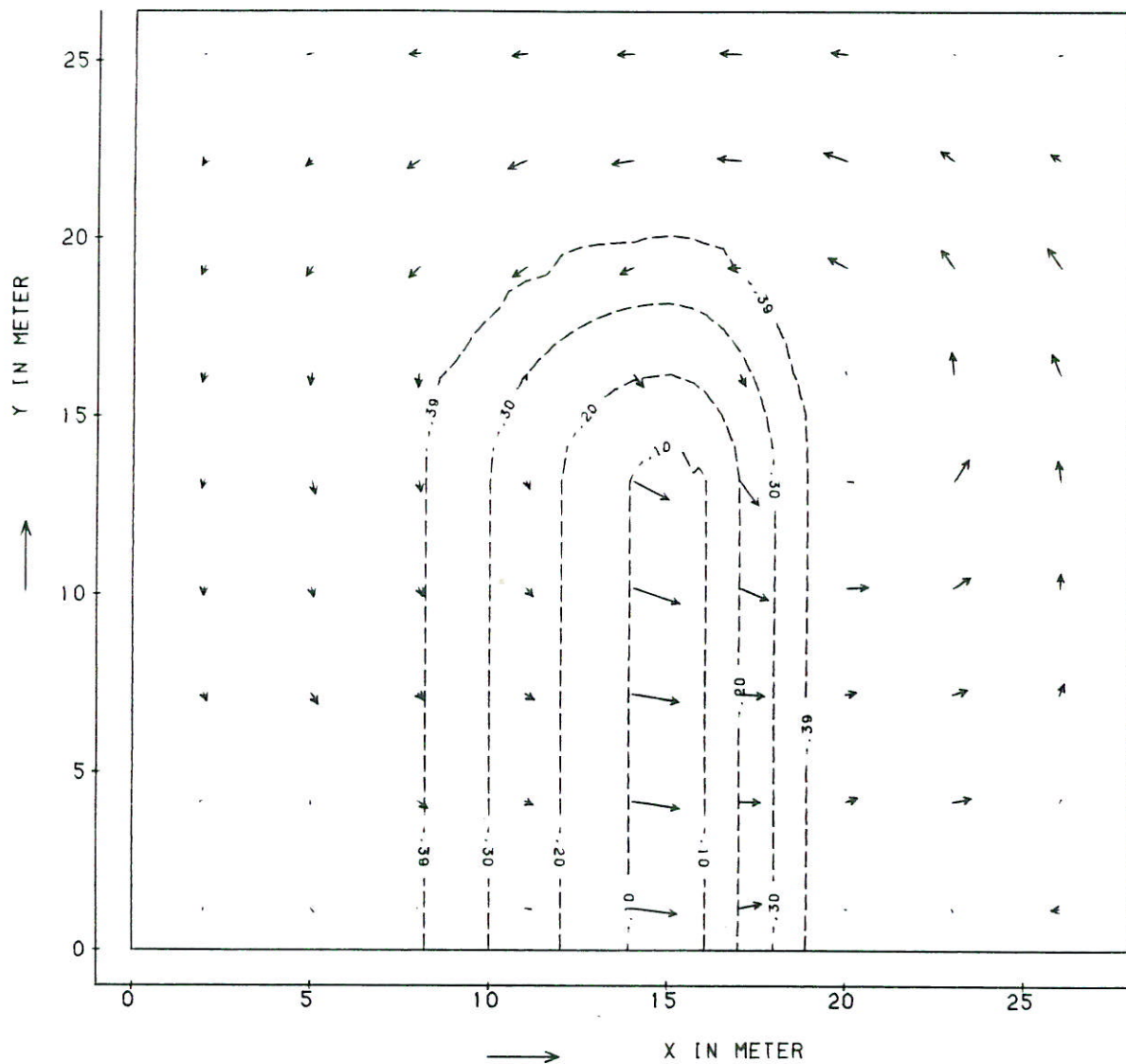
VELOCITY FIELD

ME35

DELFT HYDRAULICS

H0451

FIG. 77



SCHAAL 1 CM=0.5 M/S

HISWABAK ZONDER KUST
METING 8
BODEMCONTOUREN EN SNELHEDEN

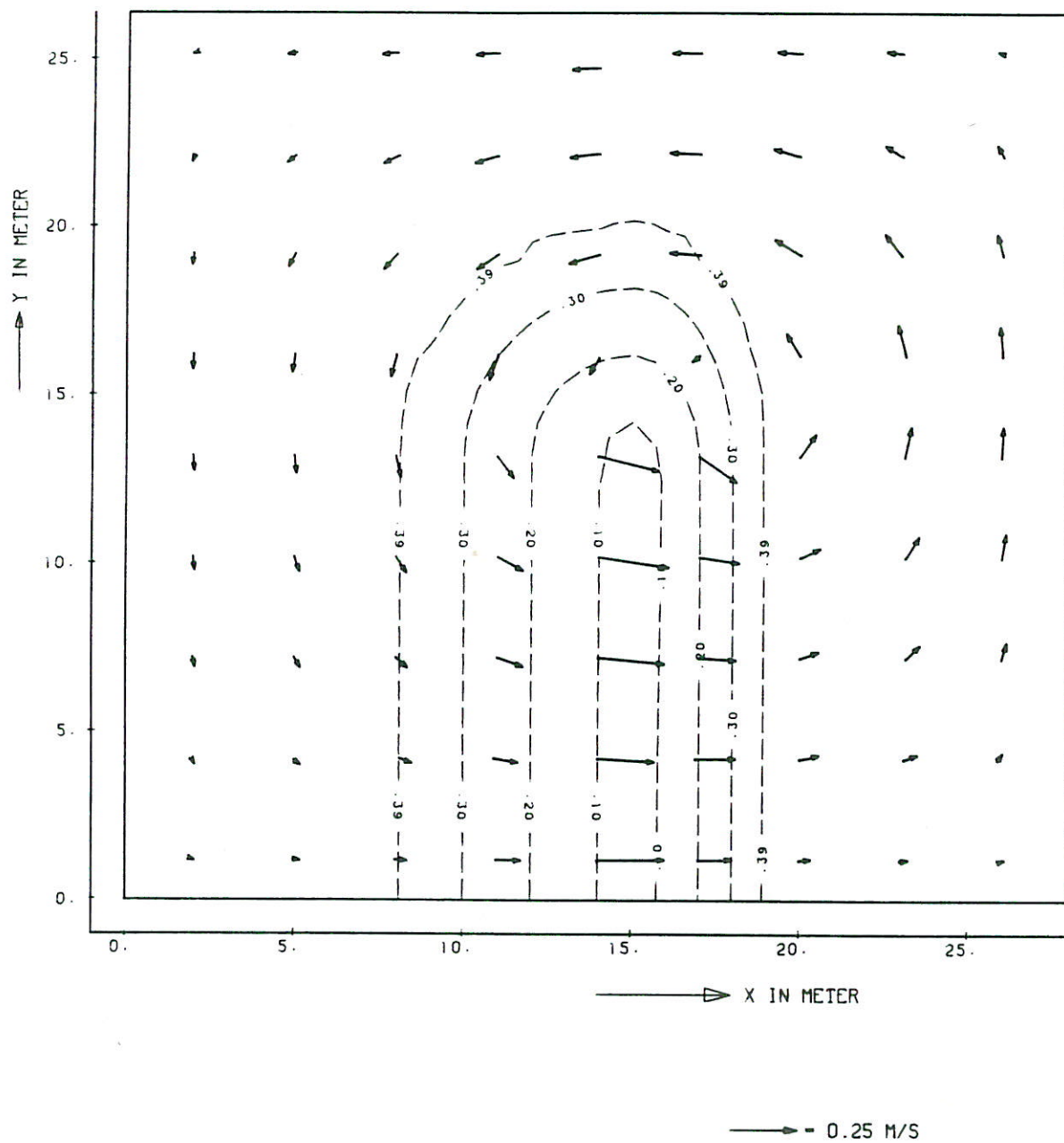
T=1.25 S THETA=0

HS=10.42 CM

WATERLOOPKUNDIG LABORATORIUM

H228 03

FIG. 78



VELOCITY FIELD AFTER 30 TIMESTEPS

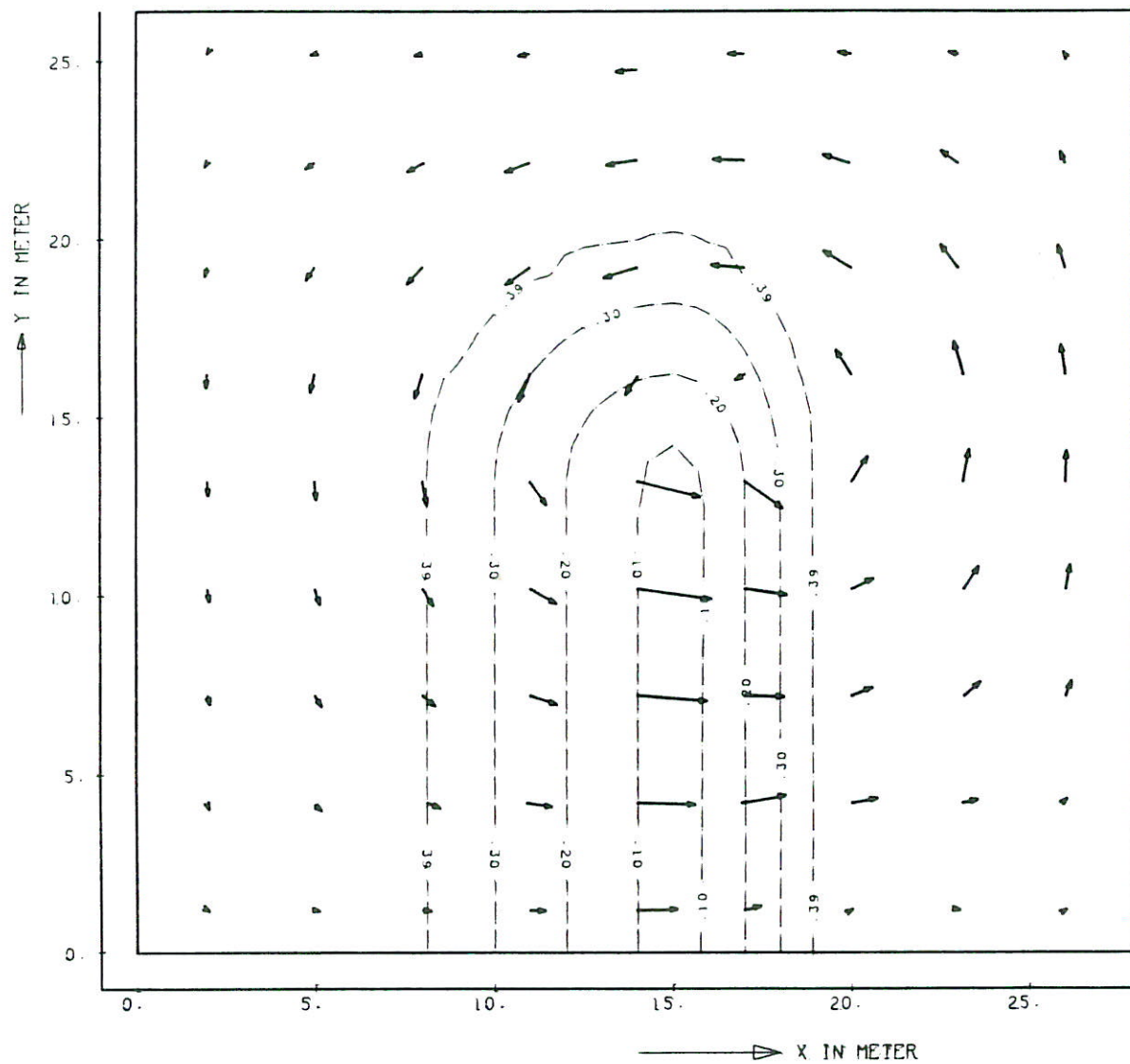
DT = 10 S.

VE35A

DELFT HYDRAULICS

H0451

FIG. 79



VELOCITY FIELD AFTER 30 TIMESTEPS

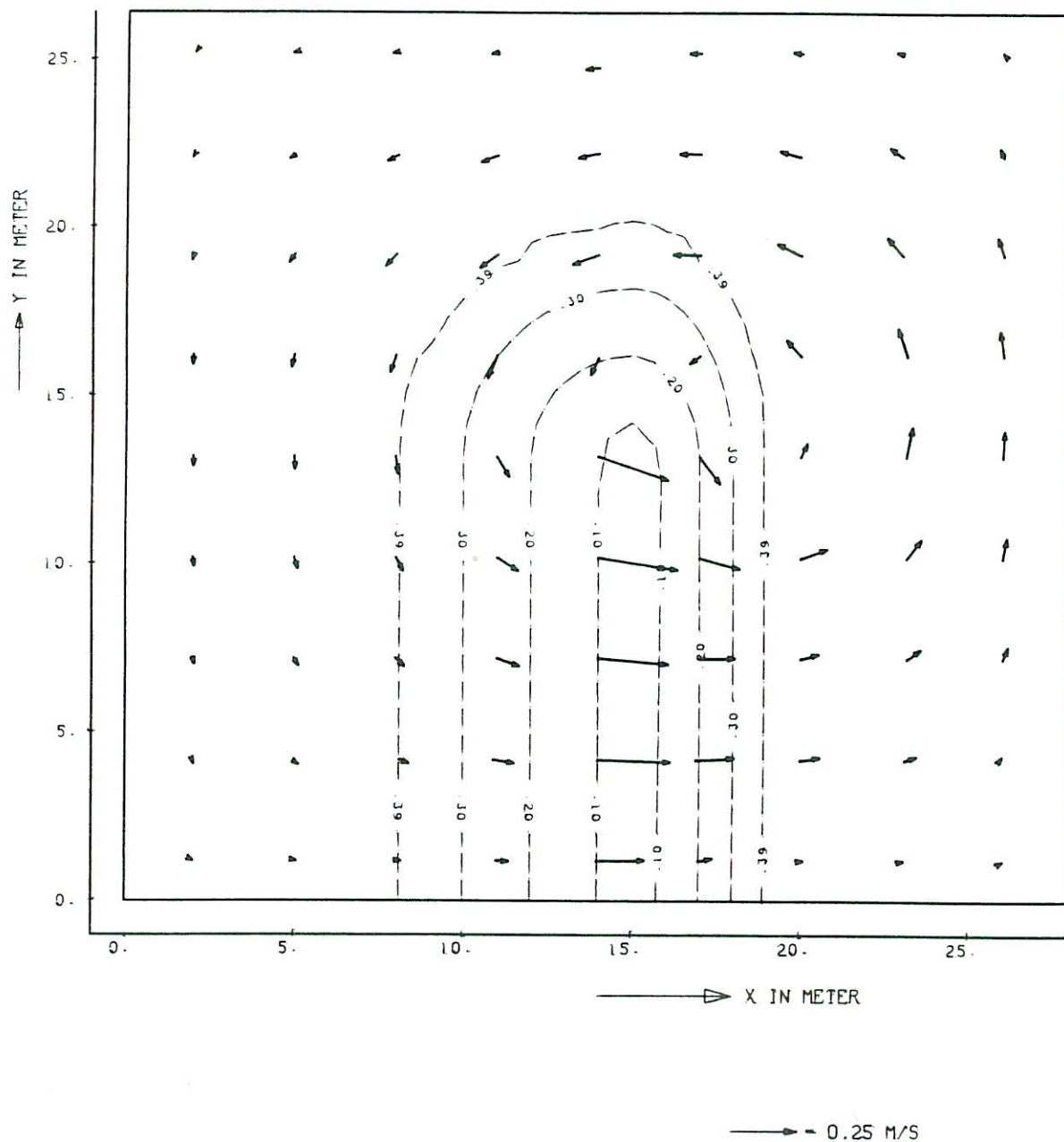
VE35AZ

DT = 10 S.

DELFT HYDRAULICS

H0451

FIG 80



VELOCITY FIELD AFTER 30 TIMESTEPS

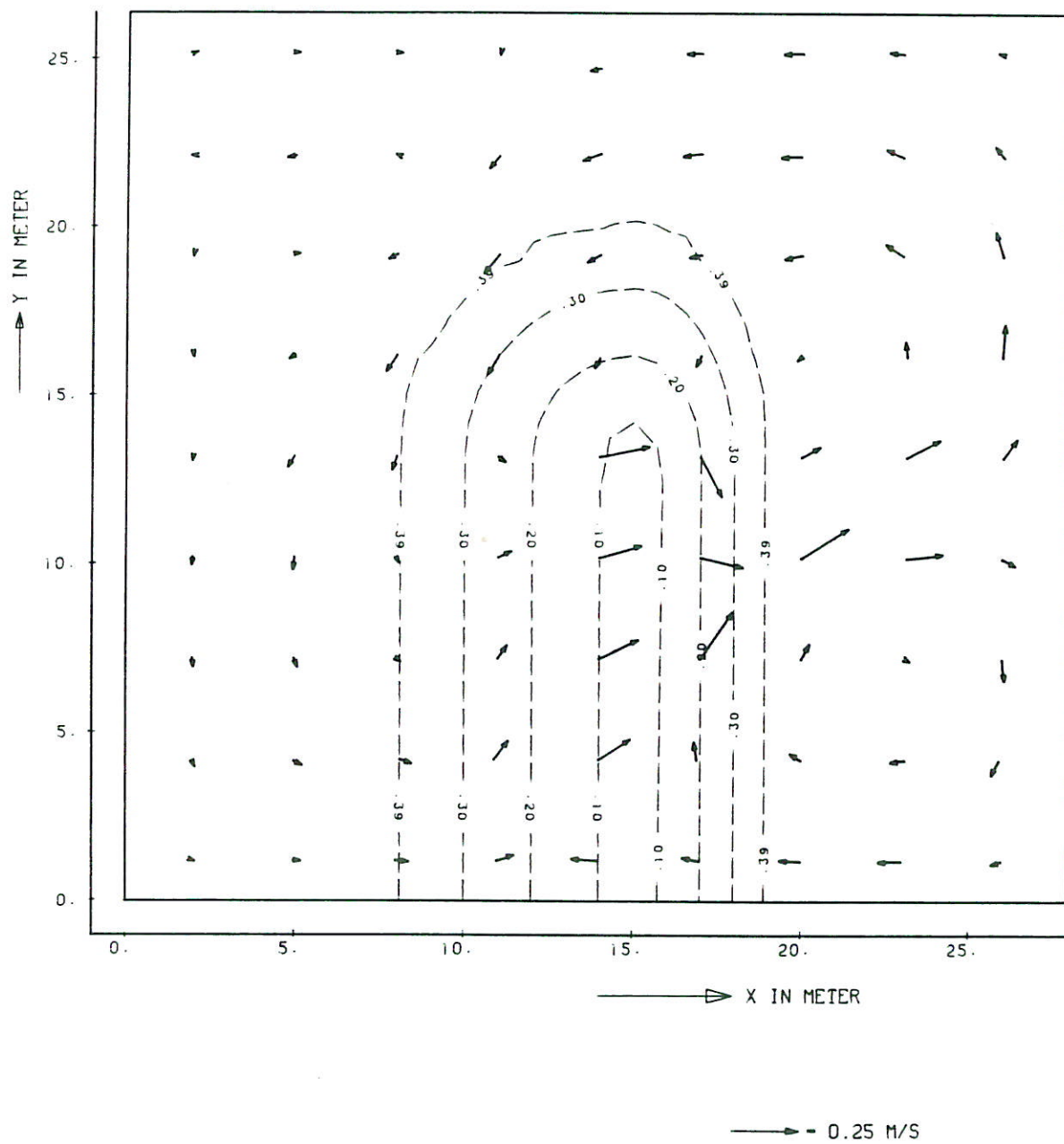
DT = 10 S.

VE35AM

DELFT HYDRAULICS

H0451

FIG 81



VELOCITY FIELD AFTER 30 TIMESTEPS

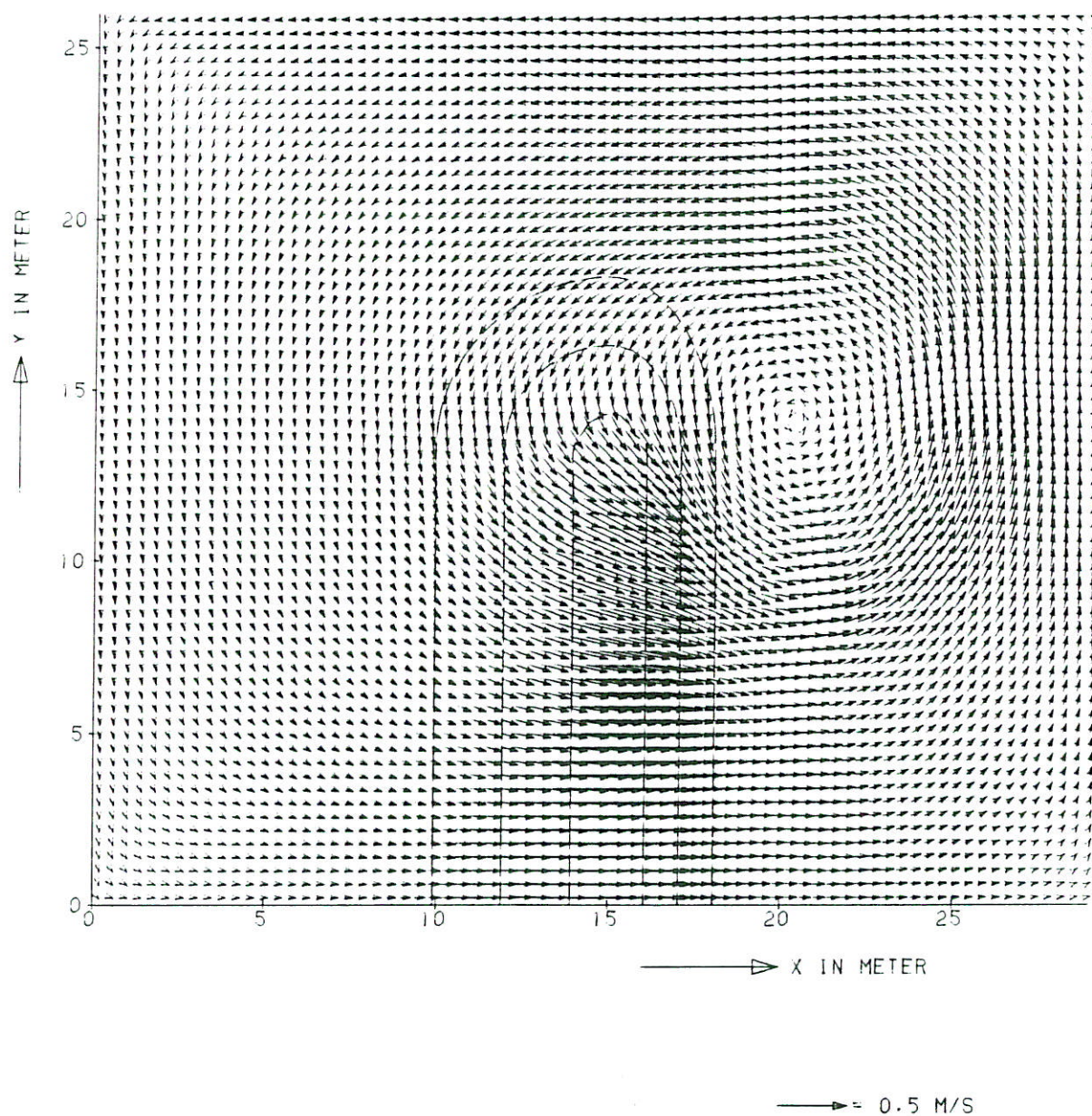
DT = 10 S.

VE35S2

DELFT HYDRAULICS

H0451

FIG 82



WAQUA CURVILINEAR COMPUTATIONS FOR
 WAVE BASIN BASED ON HISWA VE35A
 VELOCITY FIELD AFTER 15 MIN.
 DX=0.40 DT=3.0 SEC. **NO MASSFLUX**

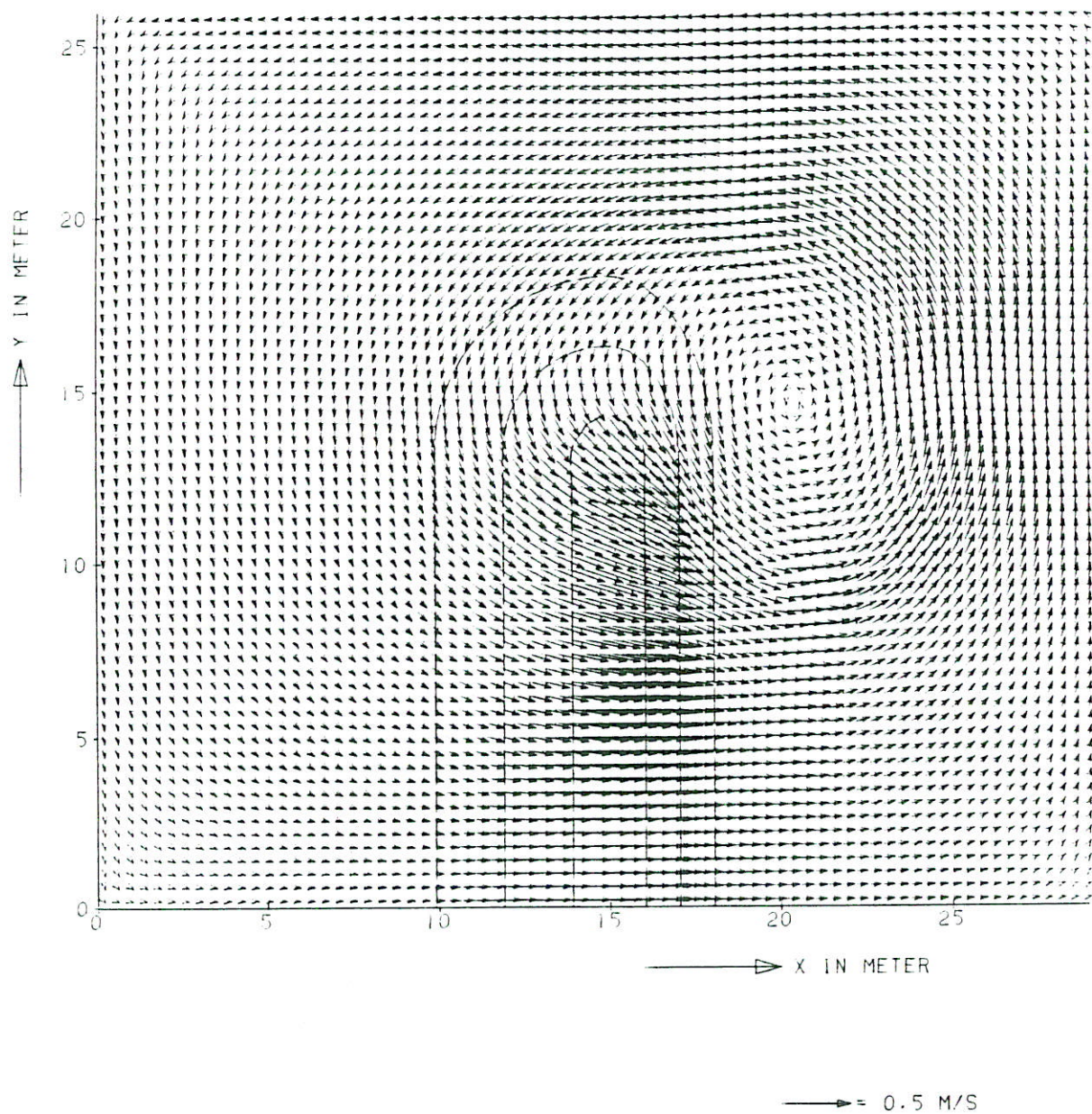
VE35AZ

VE35WK1

DELFT HYDRAULICS

H0526

FIG. 83



WAQUA CURVILINEAR COMPUTATIONS FOR
 WAVE BASIN BASED ON HISWA VE35A
 VELOCITY FIELD AFTER 15 MIN.
 DX=0.40 DT=1.5 SEC. NO MASSFLUX

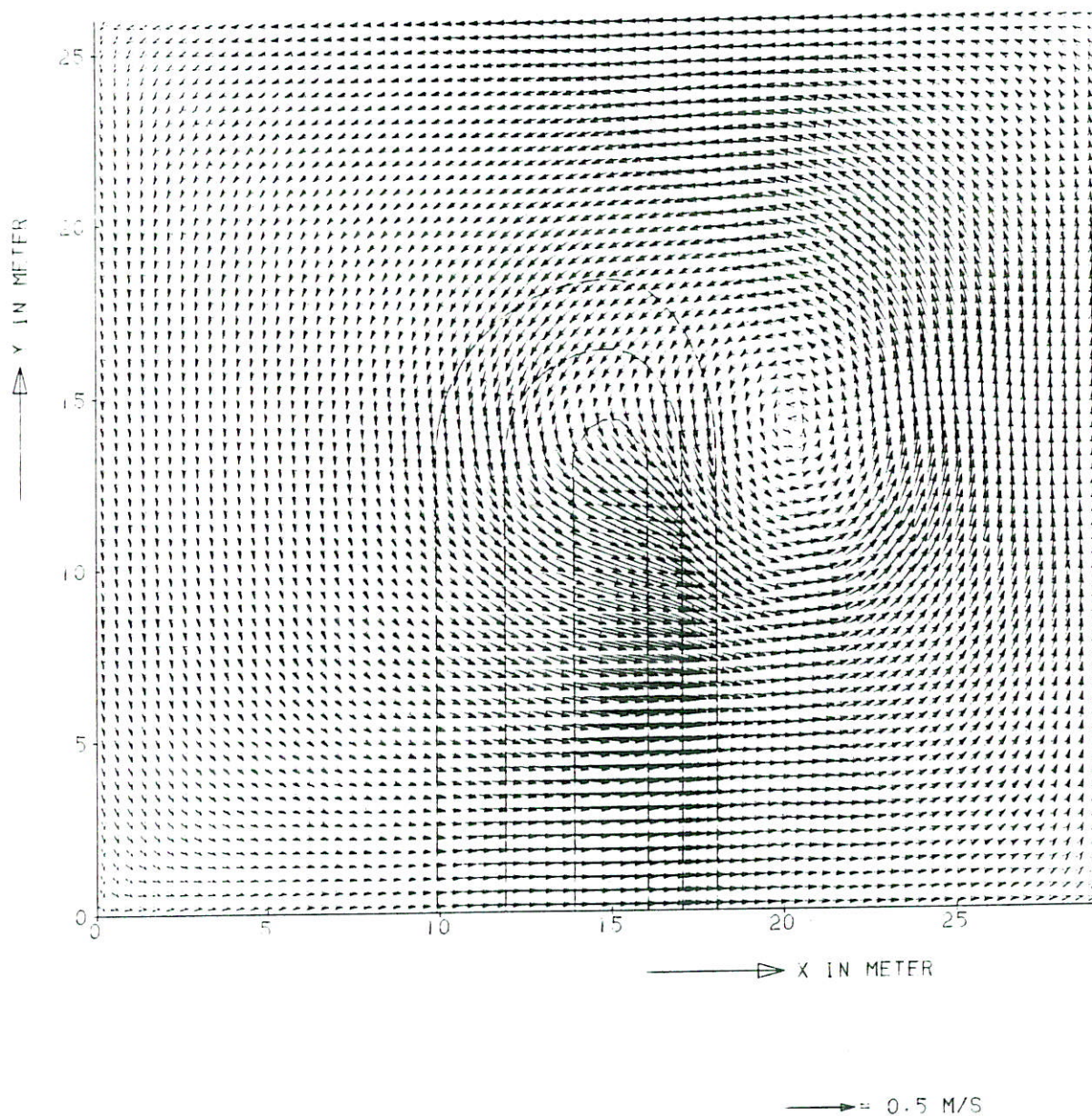
VE35AZ

VE35WH2

DELFT HYDRAULICS

H0526

FIG. 84



WAQUA CURVILINEAR COMPUTATIONS FOR
 WAVE BASIN BASED ON HISWA VE35A
 VELOCITY FIELD AFTER 15 MIN.
 DX=0.40 DT=3.0 SEC. **MASSFLUX**

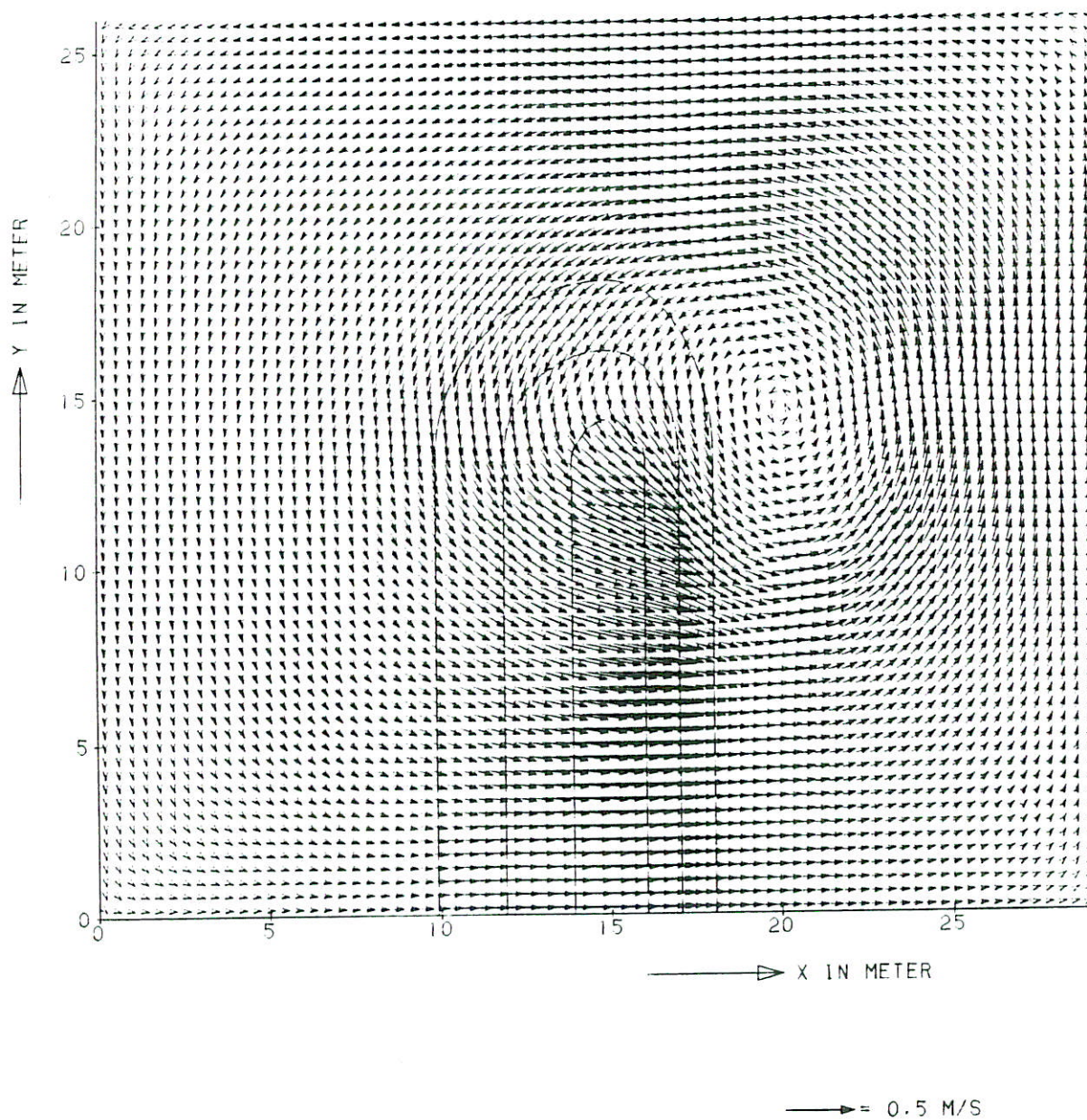
WE35AM

VE35WH3

DELFT HYDRAULICS

H0526

FIG. 85



WAQUA CURVILINEAR COMPUTATIONS FOR
 WAVE BASIN BASED ON HISWA VE35A
 VELOCITY FIELD AFTER 15 MIN.
 DX=0.40 DT=1.5 SEC. **MASSFLUX**

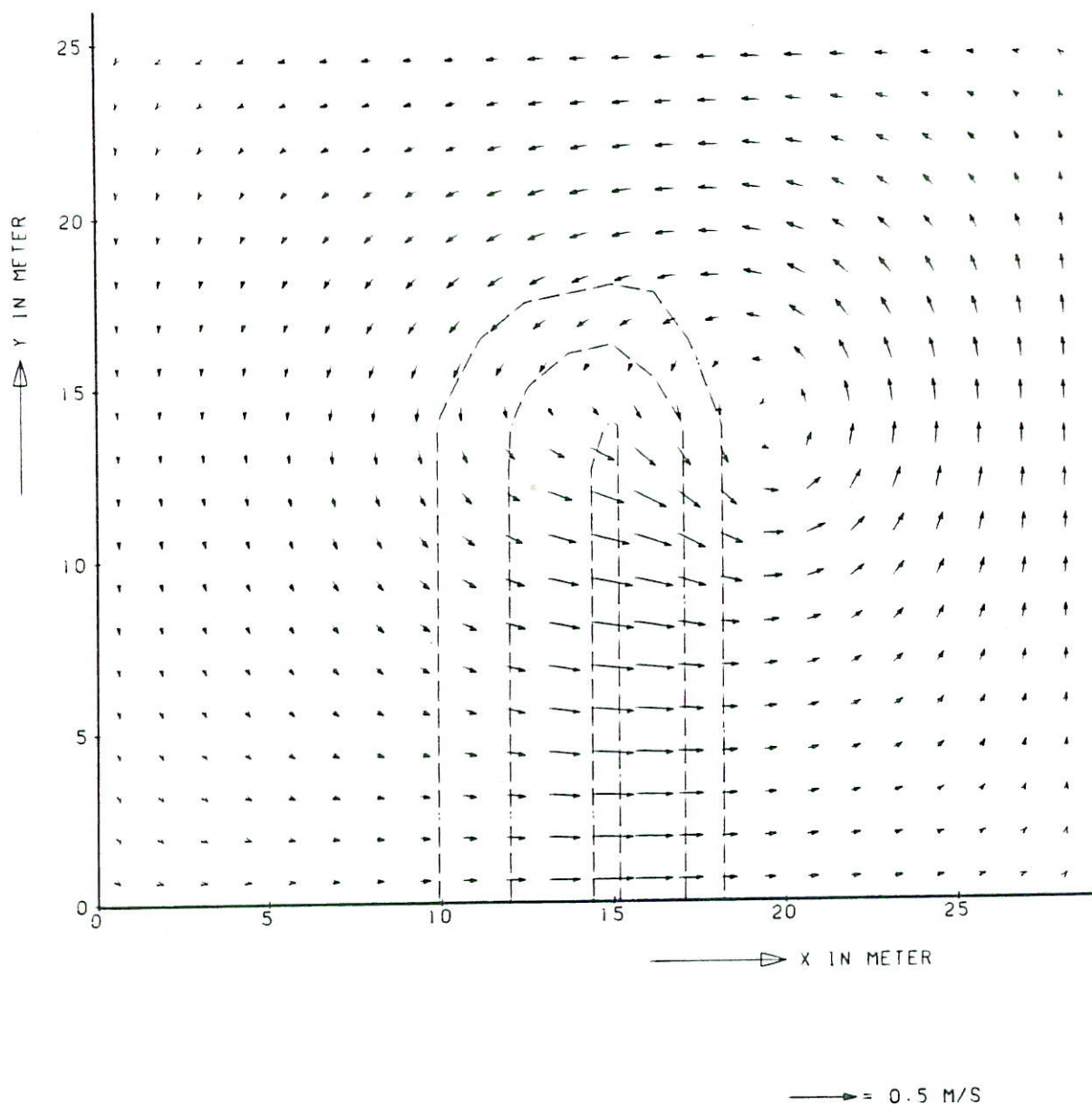
WE35AM

VE35WH4

DELFT HYDRAULICS

H0526

FIG.86



WAQUA CURVILINEAR COMPUTATIONS FOR
 WAVE BASIN BASED ON HISWA VE35A
 VELOCITY FIELD AFTER 15 MIN.
 DX=1.25 DT=6.0 SEC. NO MASSFLUX

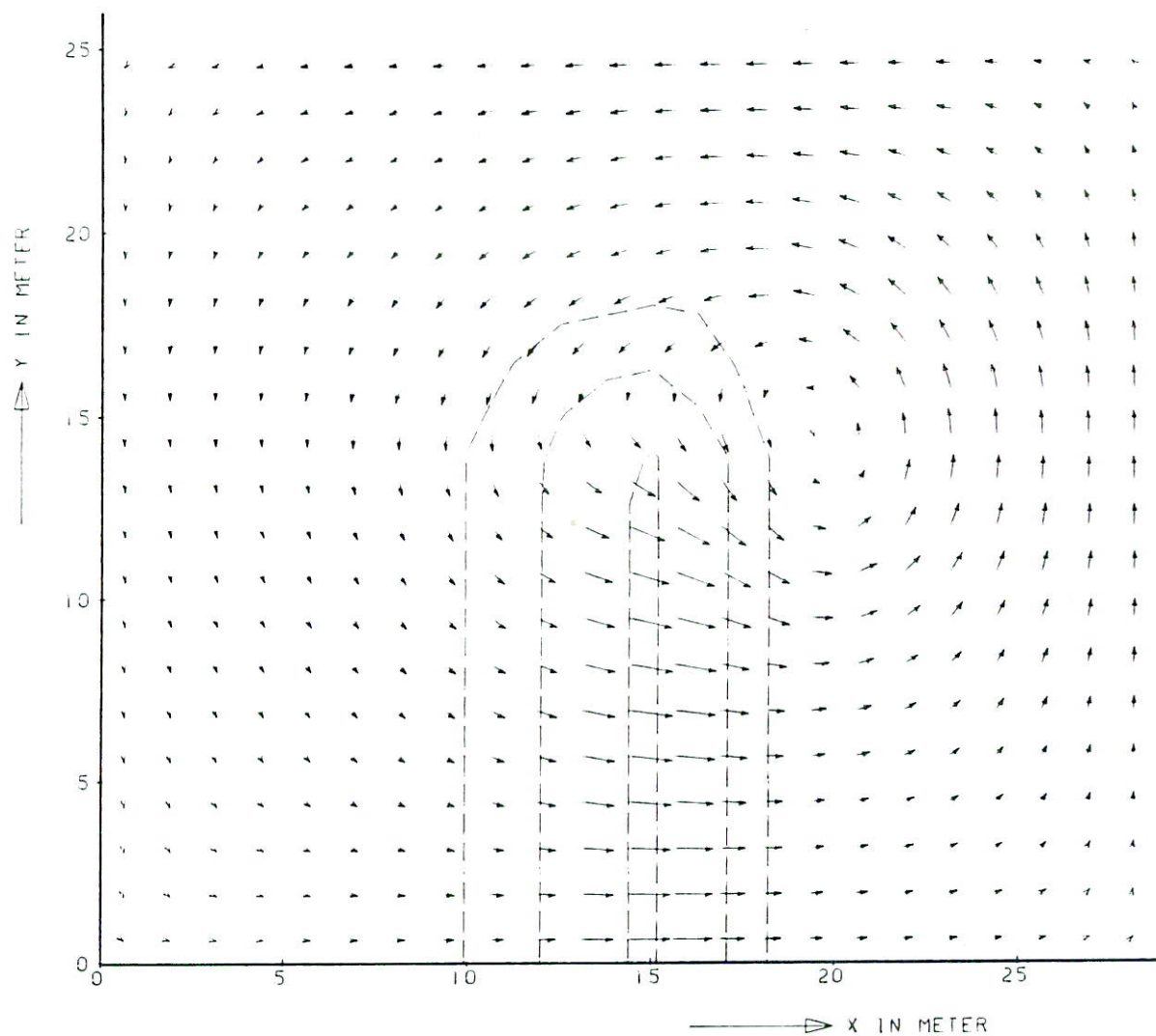
VE35AZ

VE35WK1

DELFT HYDRAULICS

H0526

FIG.87



WAQUA CURVILINEAR COMPUTATIONS FOR
 WAVE BASIN BASED ON HISWA VE35A
 VELOCITY FIELD AFTER 15 MIN.
 DX=1.25 DT=3.0 SEC. NO MASSFLUX

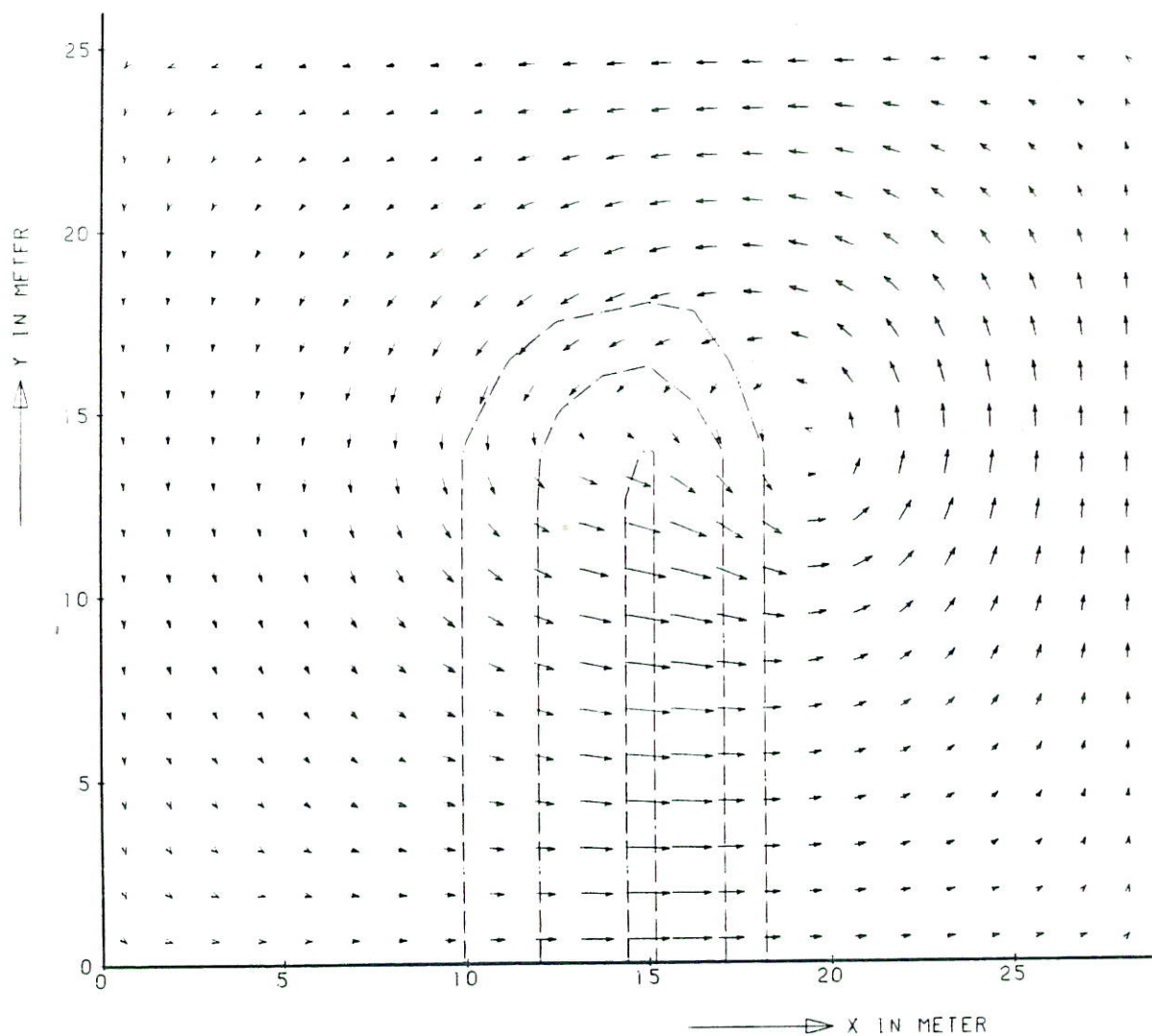
WE35AZ

VE35WK2

DELFT HYDRAULICS

H0526

FIG.88



WAQUA CURVILINEAR COMPUTATIONS FOR
 WAVE BASIN BASED ON HISWA VE35A
 VELOCITY FIELD AFTER 15 MIN.
 DX=1.25 DT=6 SEC. MASSFLUX

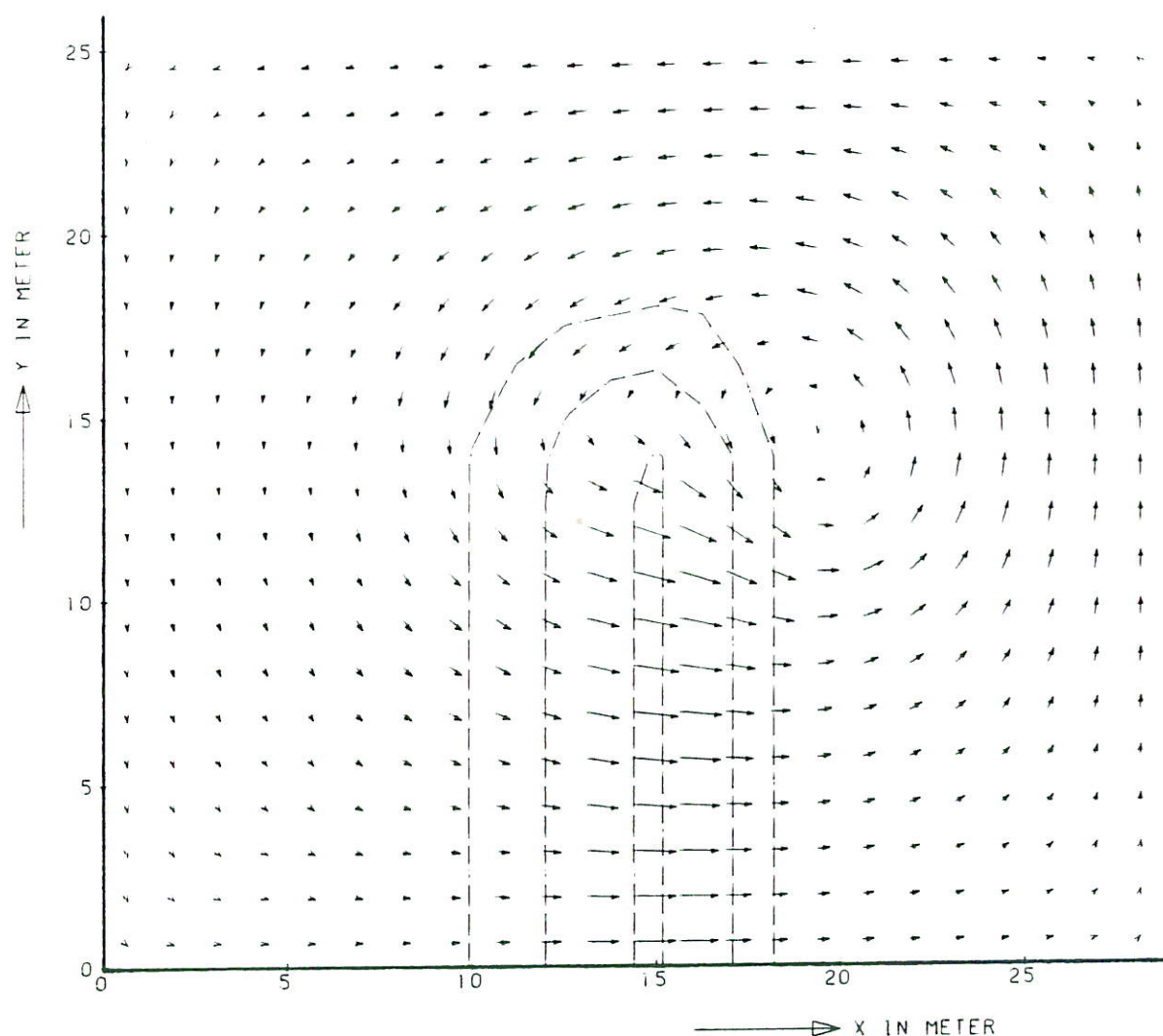
WE35AM

VE35WK3

ELFT HYDRAULICS

H0526

FIG. 89



WAQUA CURVILINEAR COMPUTATIONS FOR
 WAVE BASIN BASED ON HISWA VE35A
 VELOCITY FIELD AFTER 15 MIN.
 DX=1.25 DT=3 SEC. MASSFLUX

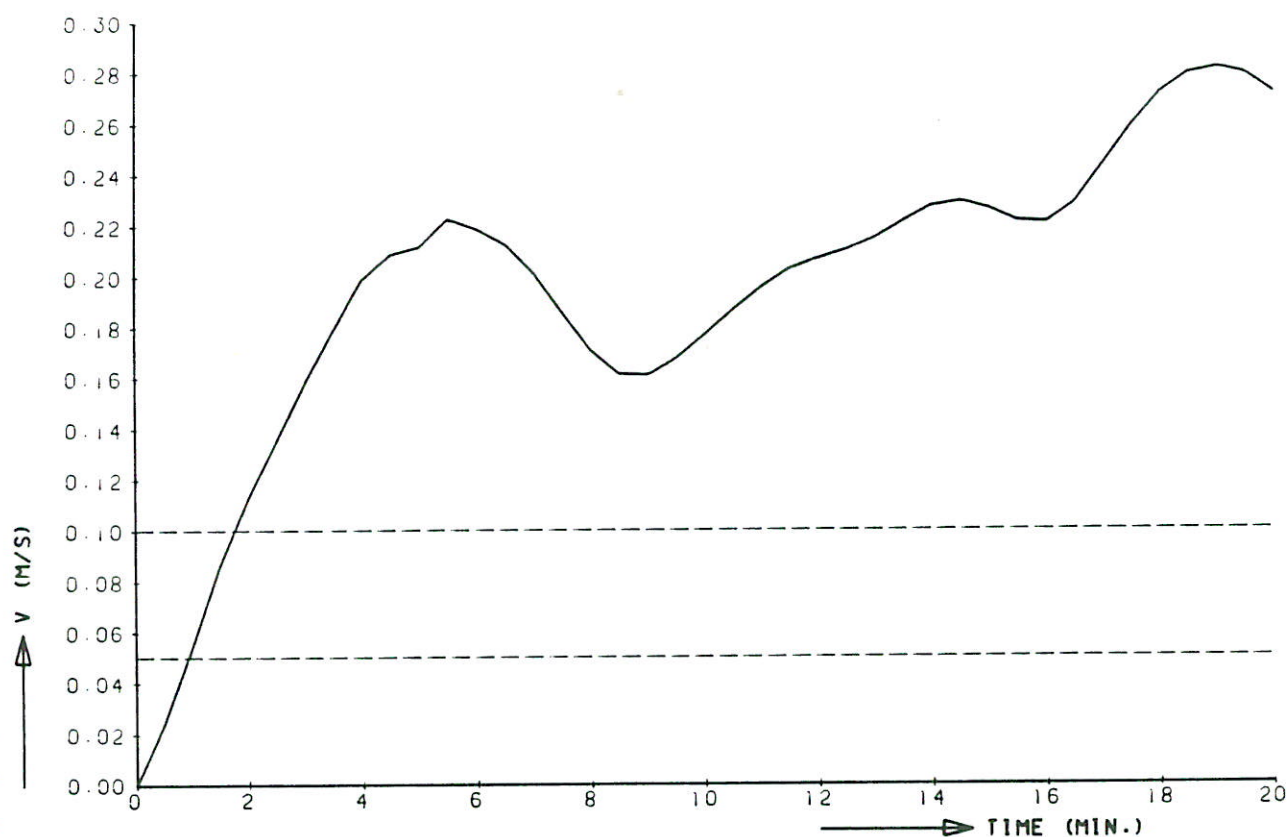
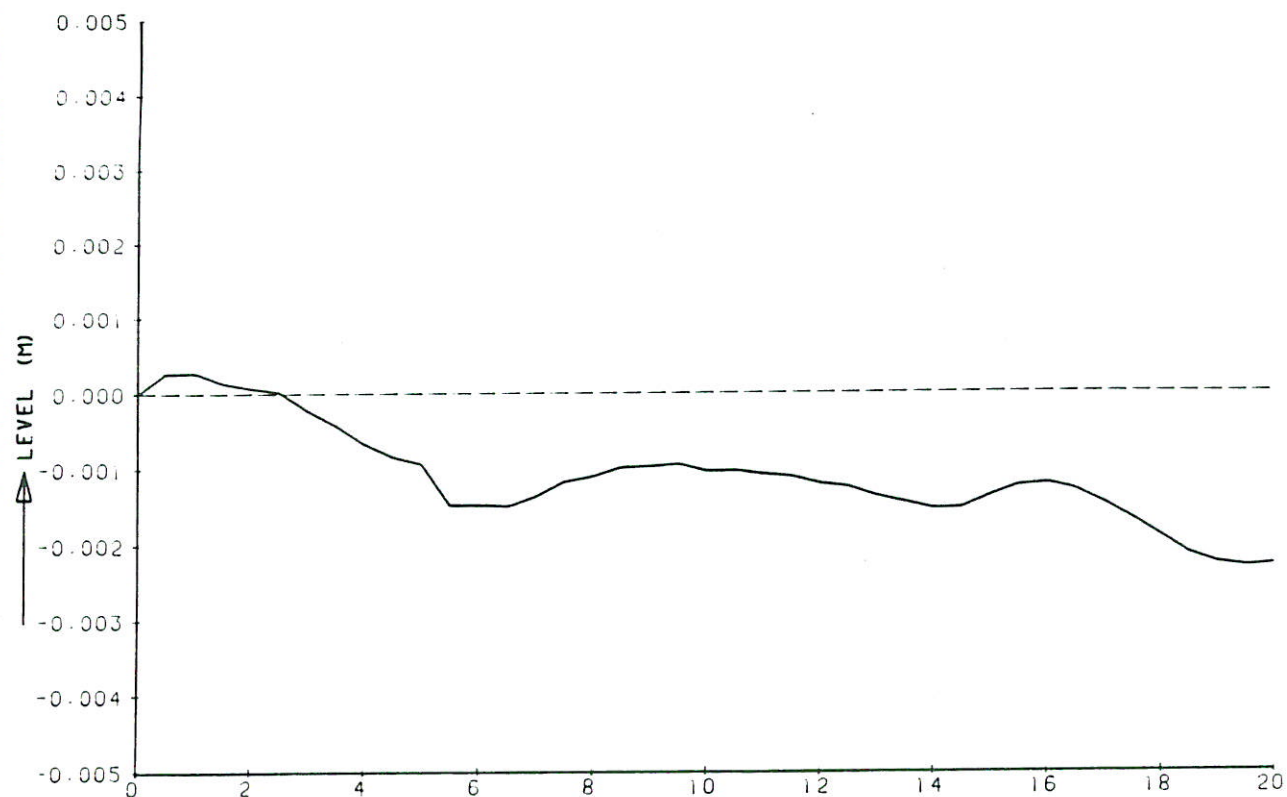
WE35AM

VE35WK4

DELFT HYDRAULICS

H0526

FIG. 90



WAQUA CURVILINEAR COMPUTATIONS FOR 38/34
 WAVE BASIN BASED ON HISWA VE35A
 TIME HISTORIES OF VELOCITY AND WATERLEVEL
 DX = 0.40 DT = 3.0 SEC. NO MASSFLUX

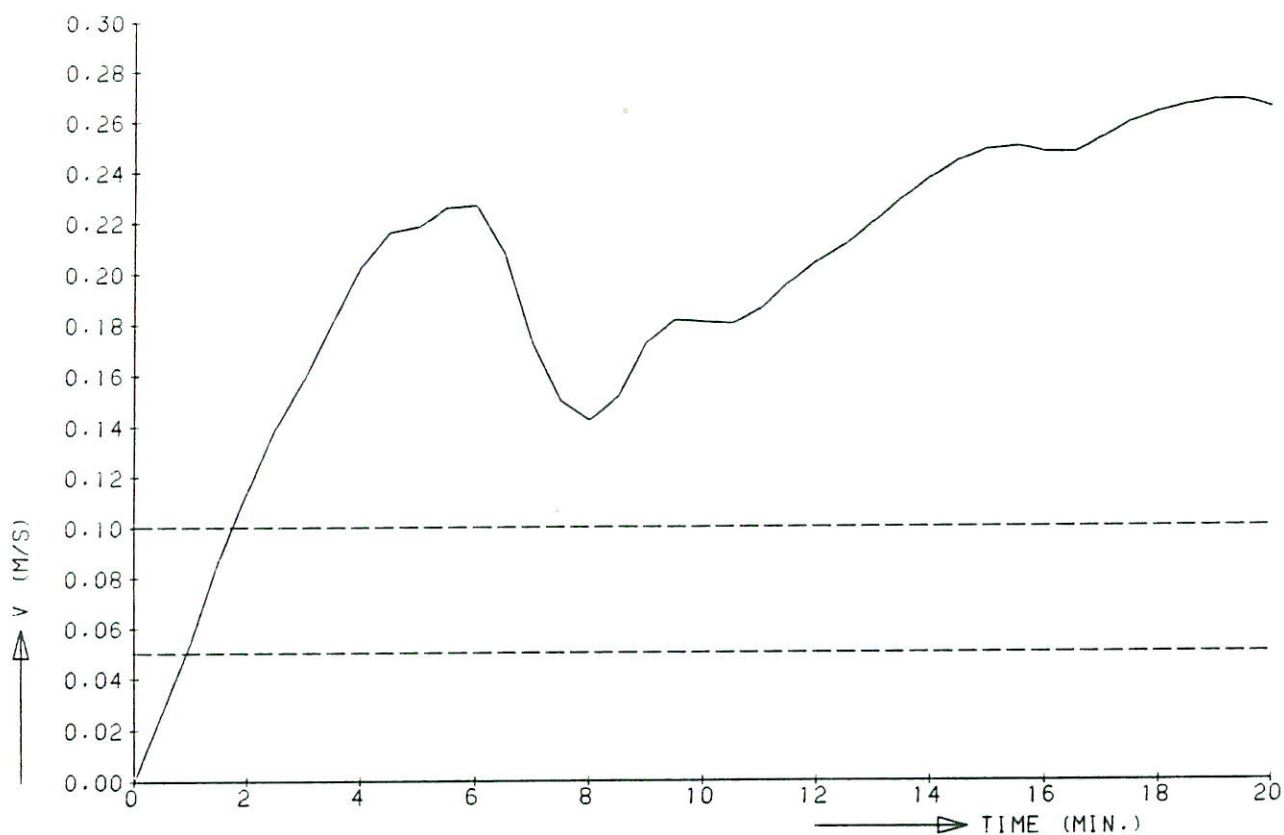
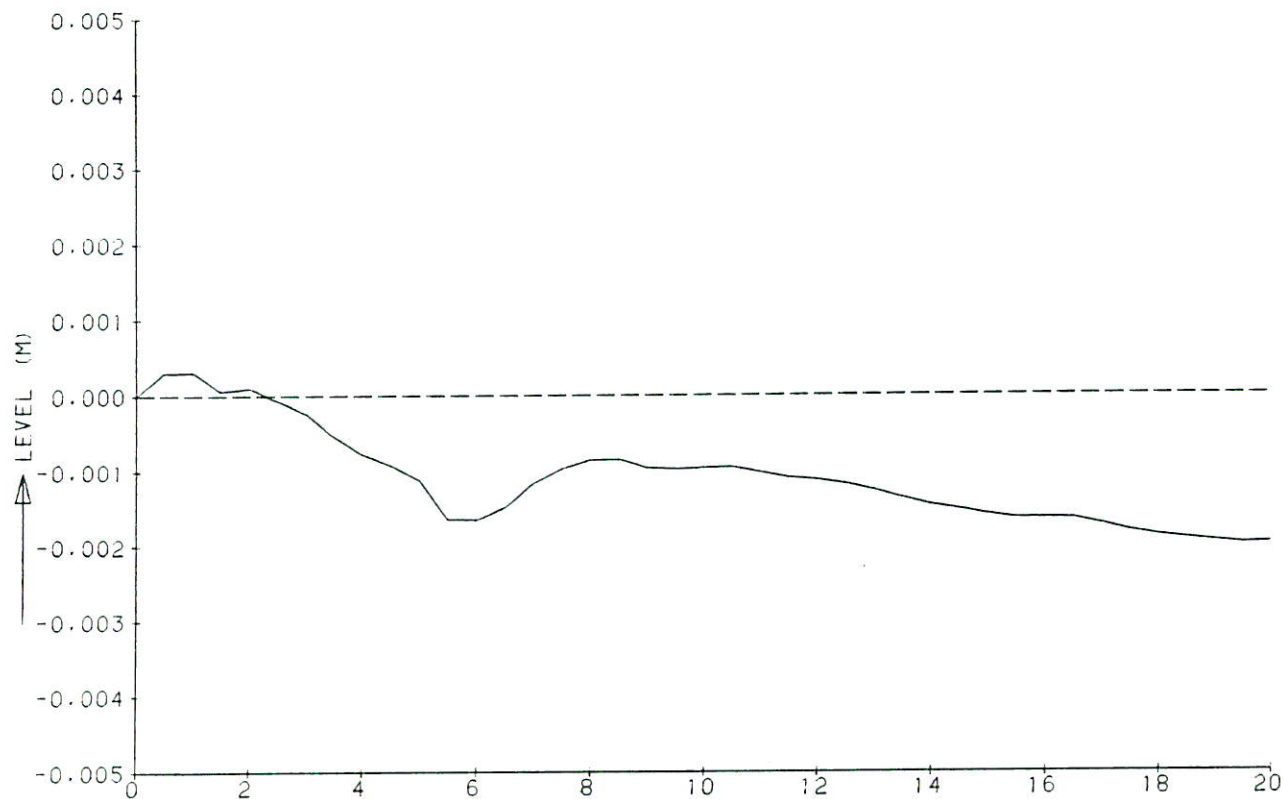
WE35AZ

VE35WH1

DELFT HYDRAULICS

H 526

FIG.91



WAQUA CURVILINEAR COMPUTATIONS FOR 38/34
 WAVE BASIN BASED ON HISWA VE35A
 TIME HISTORIES OF VELOCITY AND WATERLEVEL
 DX = 0.40 DT = 1.5 SEC. **NO MASSFLUX**

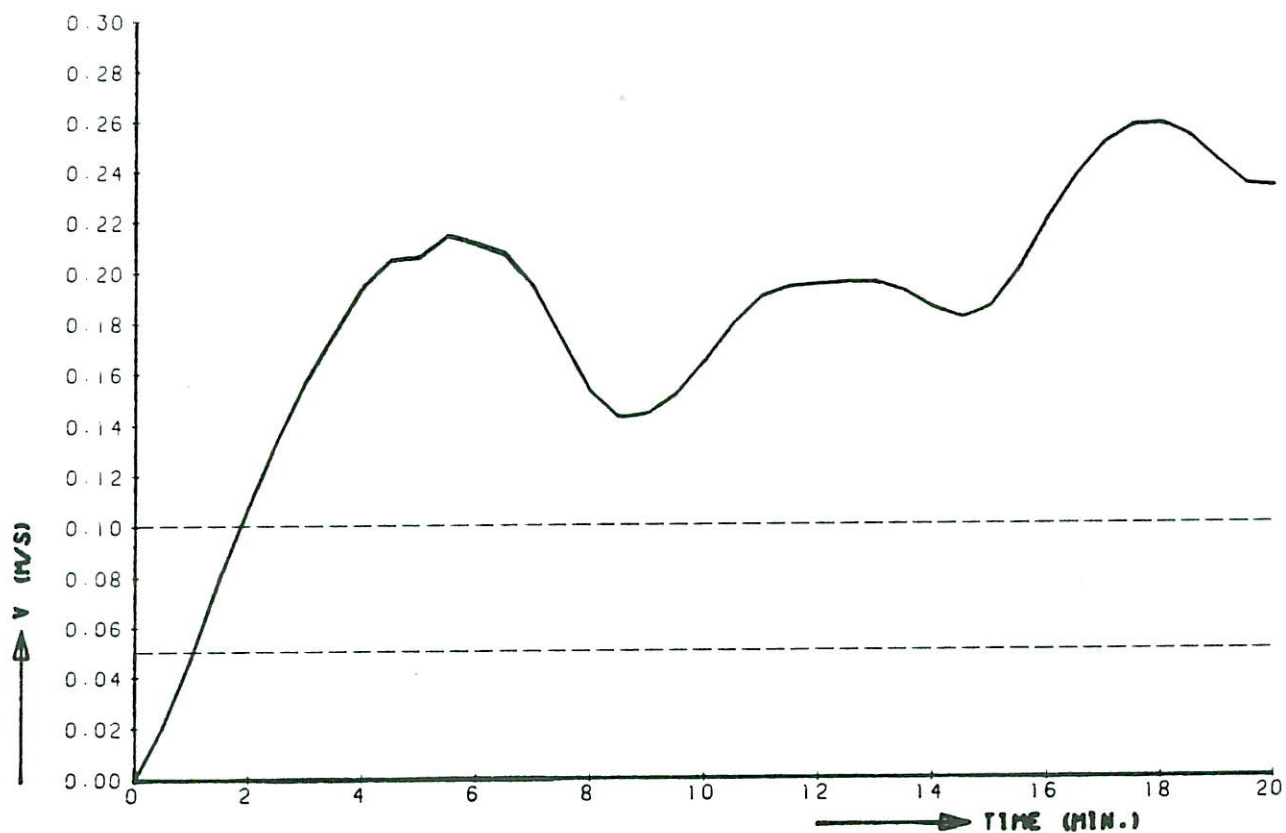
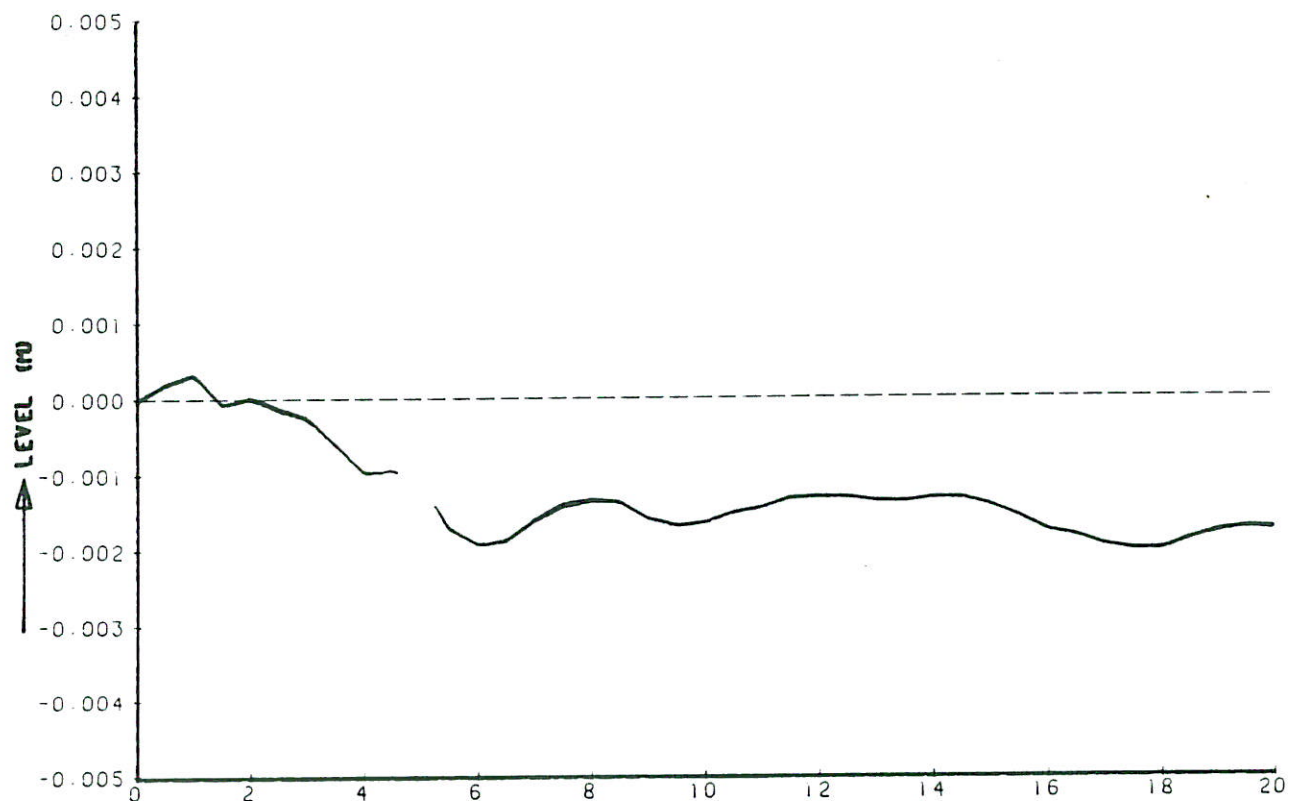
WE35AZ

VE35WK2

DELFT HYDRAULICS

H 526

FIG.92



WAQUA CURVILINEAR COMPUTATIONS FOR 38/34
 WAVE BASIN BASED ON HISWA VE35A
 TIME HISTORIES OF VELOCITY AND WATERLEVEL
 DX = 0.40 DT = 3.0 SEC. MASSFLUX

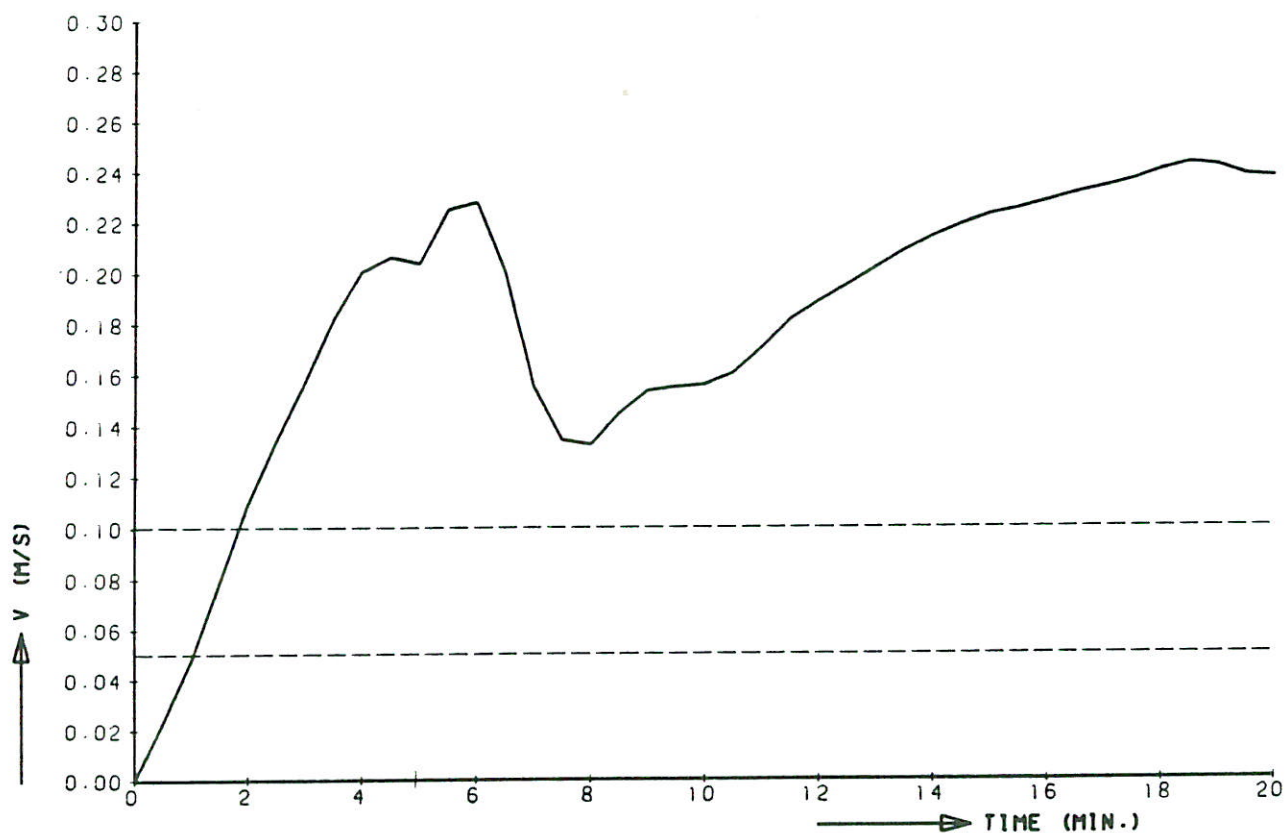
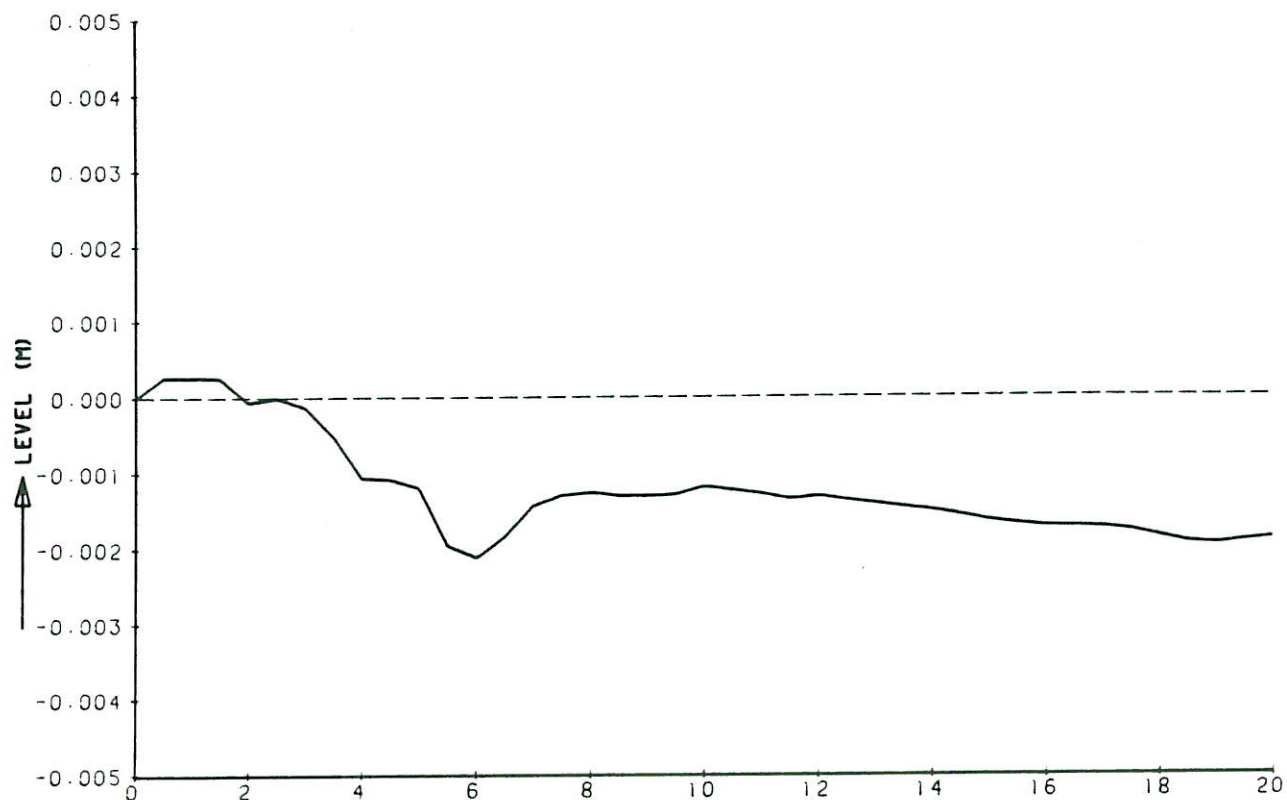
WE35AM

VE35WH3

DELFT HYDRAULICS

H 526

FIG. 93



WAQUA CURVILINEAR COMPUTATIONS FOR 38/34
 WAVE BASIN BASED ON HISWA VE35A.
 TIME HISTORIES OF VELOCITY AND WATERLEVEL
 DX = 0.40 DT = 1.5 SEC. MASSFLUX

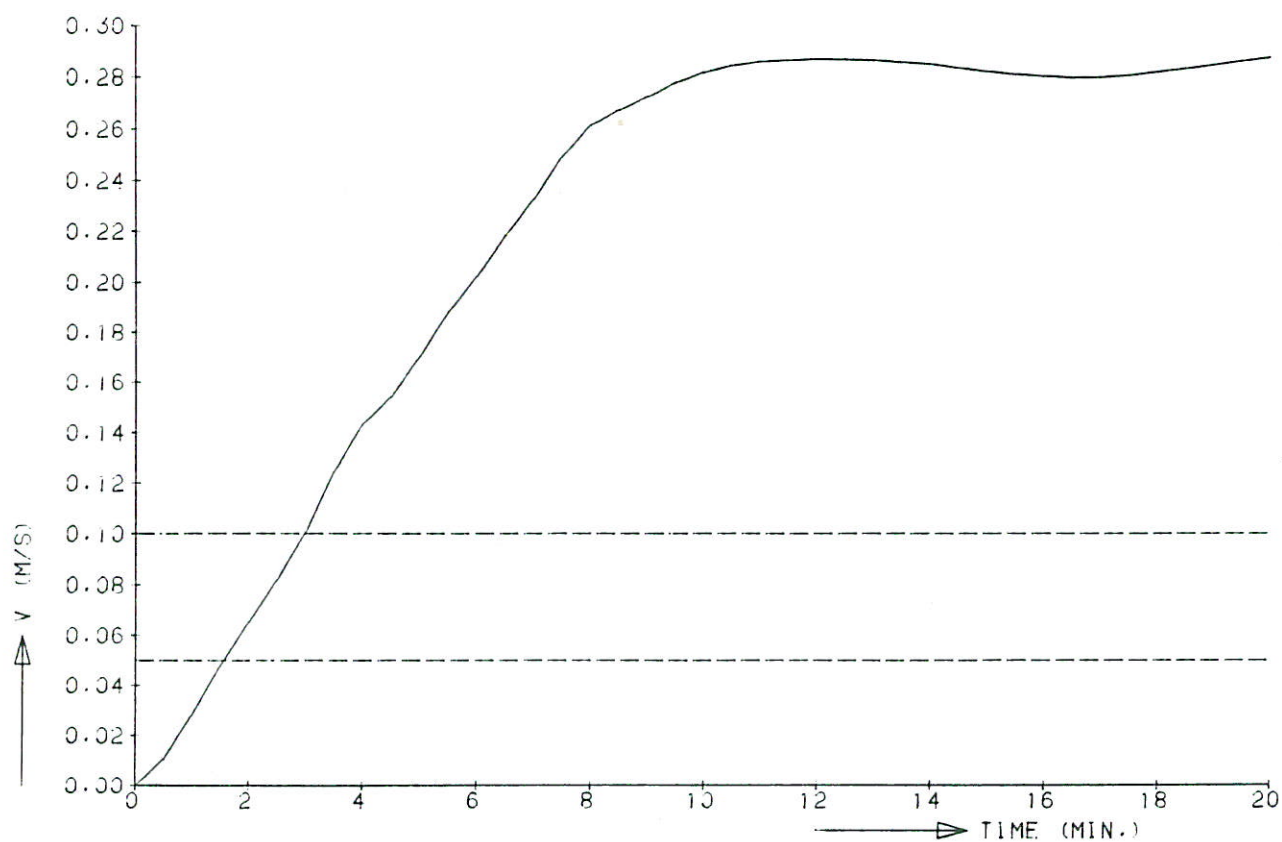
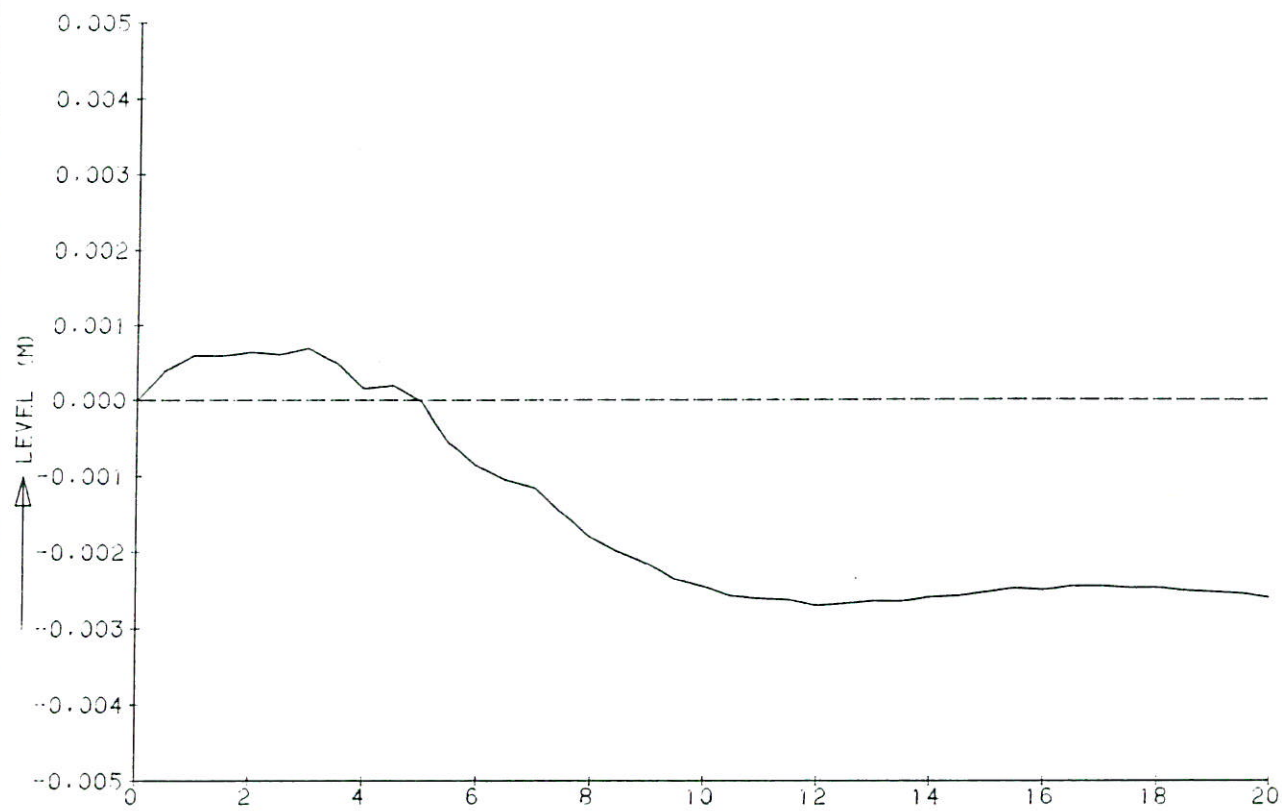
WE35AM

VE35WH4

DELFT HYDRAULICS

H 526

FIG.94



WAQUA CURVILINEAR COMPUTATIONS FOR 14/10
 WAVE BASIN BASED ON HISWA VE35A
 TIME HISTORIES OF VELOCITY AND WATERLEVEL
 DX = 1.25 DT = 6 SEC. **NO MASSFLUX**

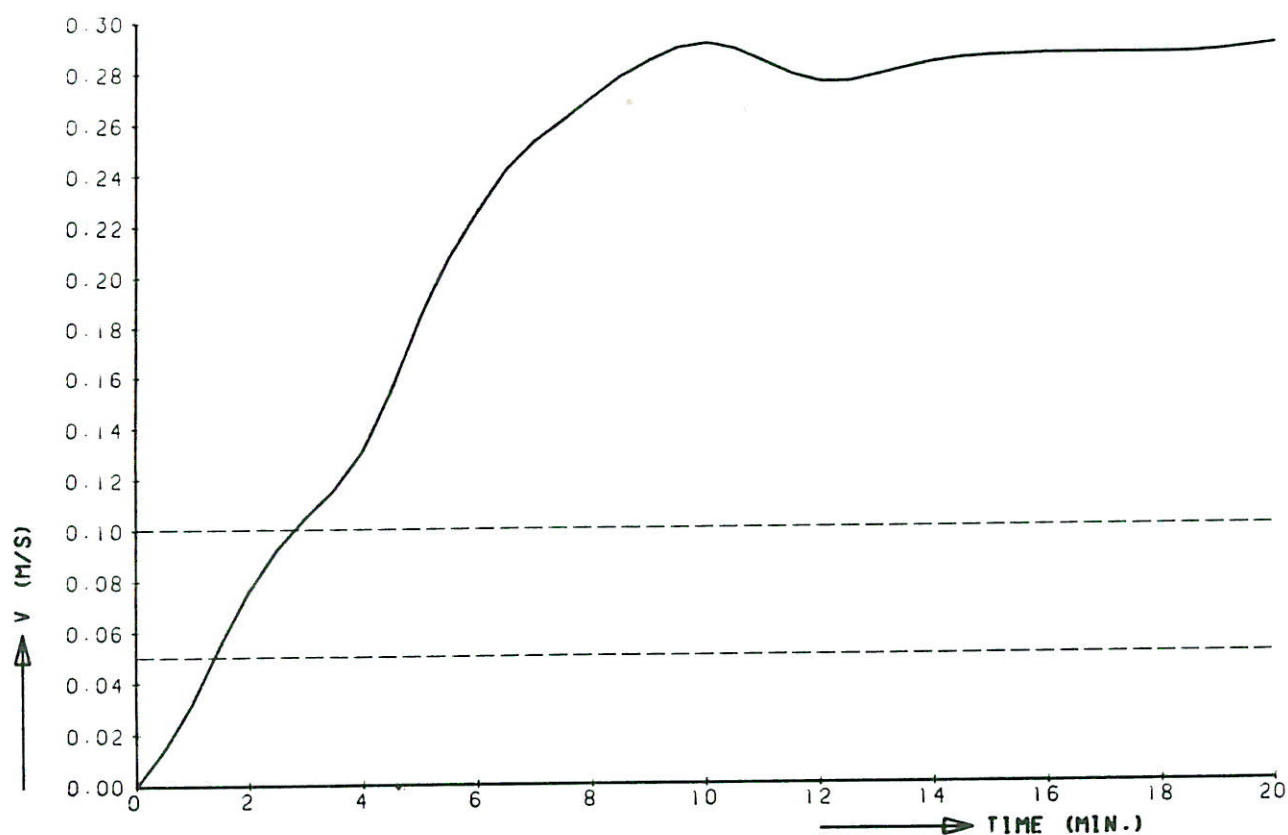
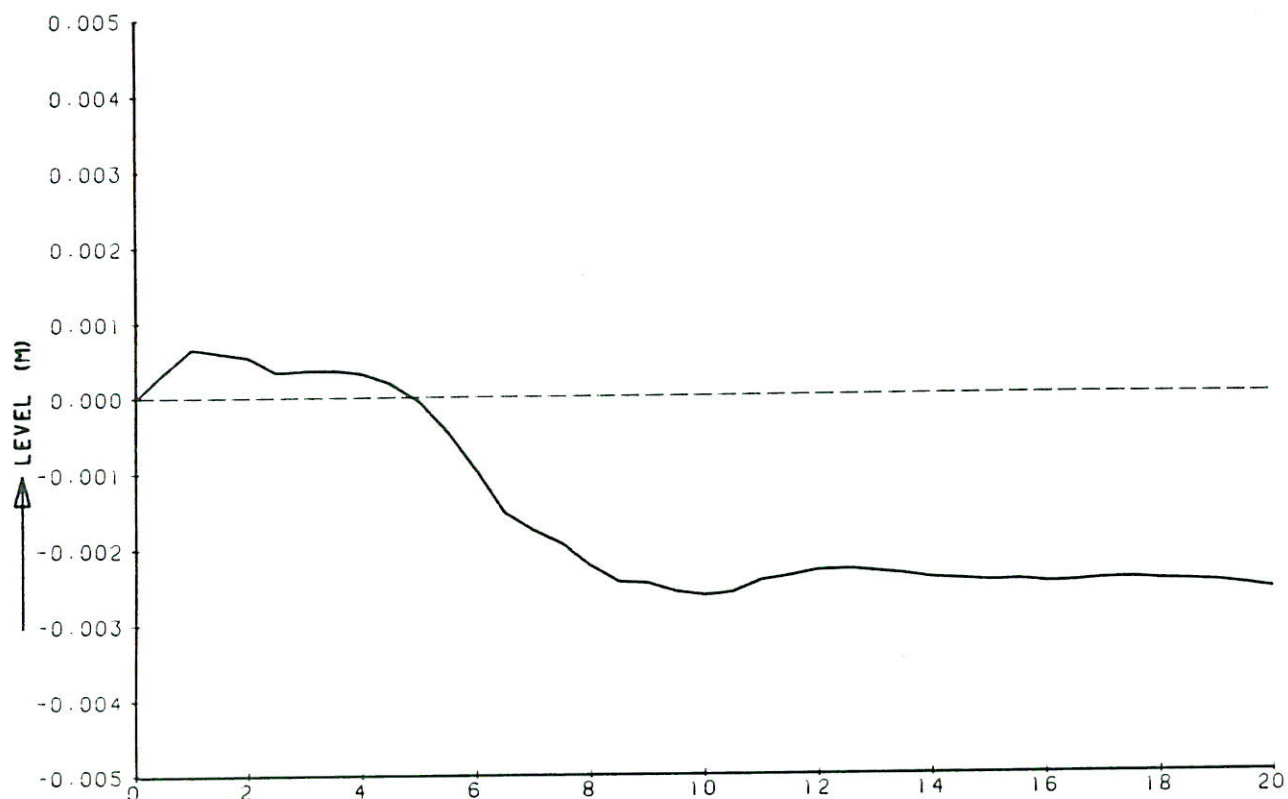
WE35AZ

VE35WK1

DELFT HYDRAULICS

H 526

FIG. 95



WAQUA CURVILINEAR COMPUTATIONS FOR 14/10
 WAVE BASIN BASED ON HISWA VE35A
 TIME HISTORIES OF VELOCITY AND WATERLEVEL
 DX = 1.25 DT = 3 SEC. NO MASSFLUX

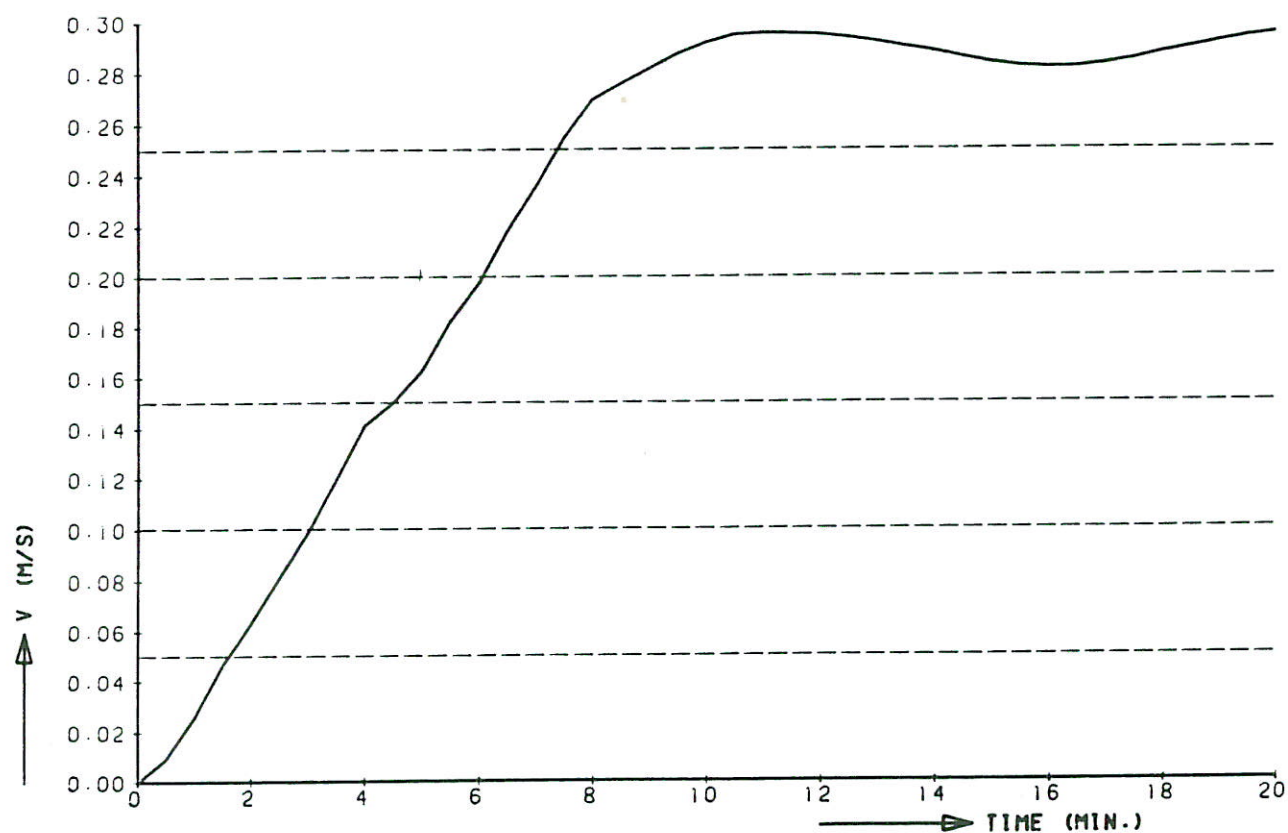
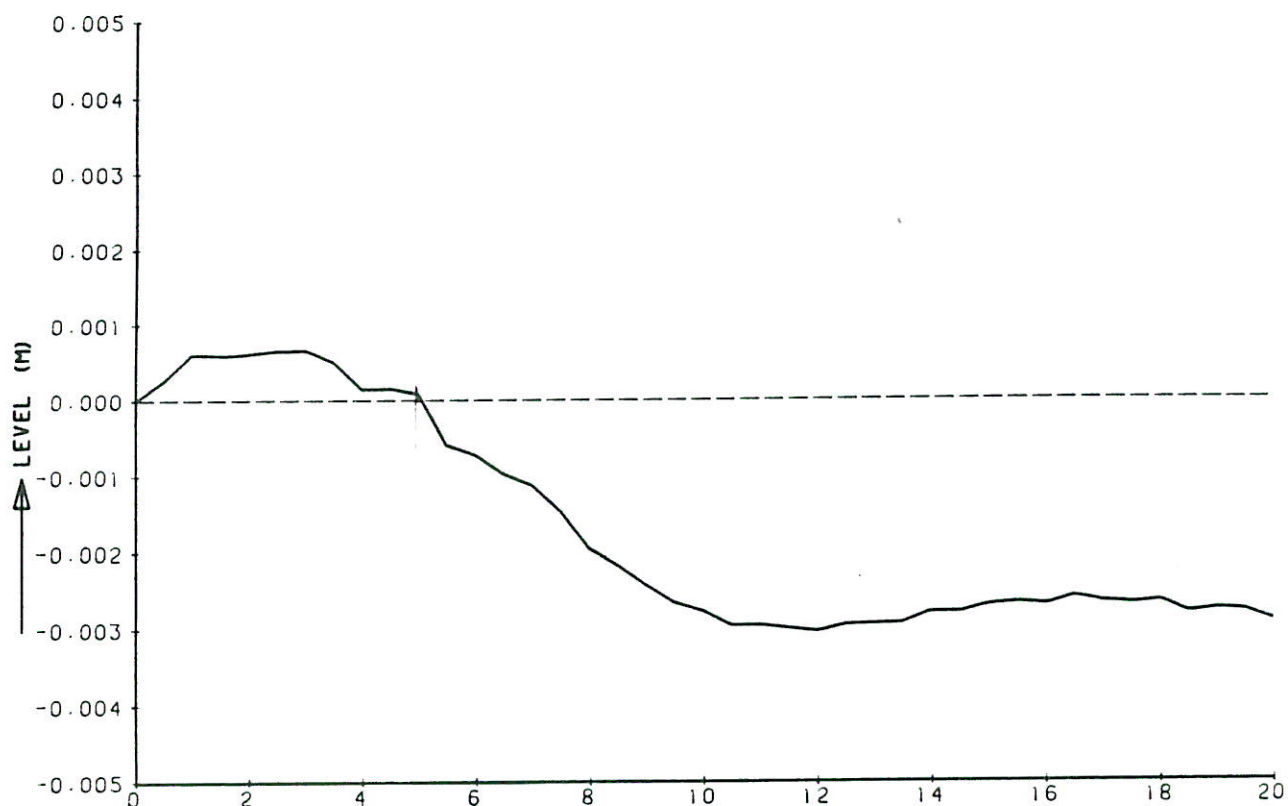
WE35AZ

VE35WK2

DELFT HYDRAULICS

H 526

FIG. 96



WAQUA CURVILINEAR COMPUTATIONS FOR 14/10
 WAVE BASIN BASED ON HISWA VE35A
 TIME HISTORIES OF VELOCITY AND WATERLEVEL
 DX = 1.25 DT = 6 SEC. MASSFLUX

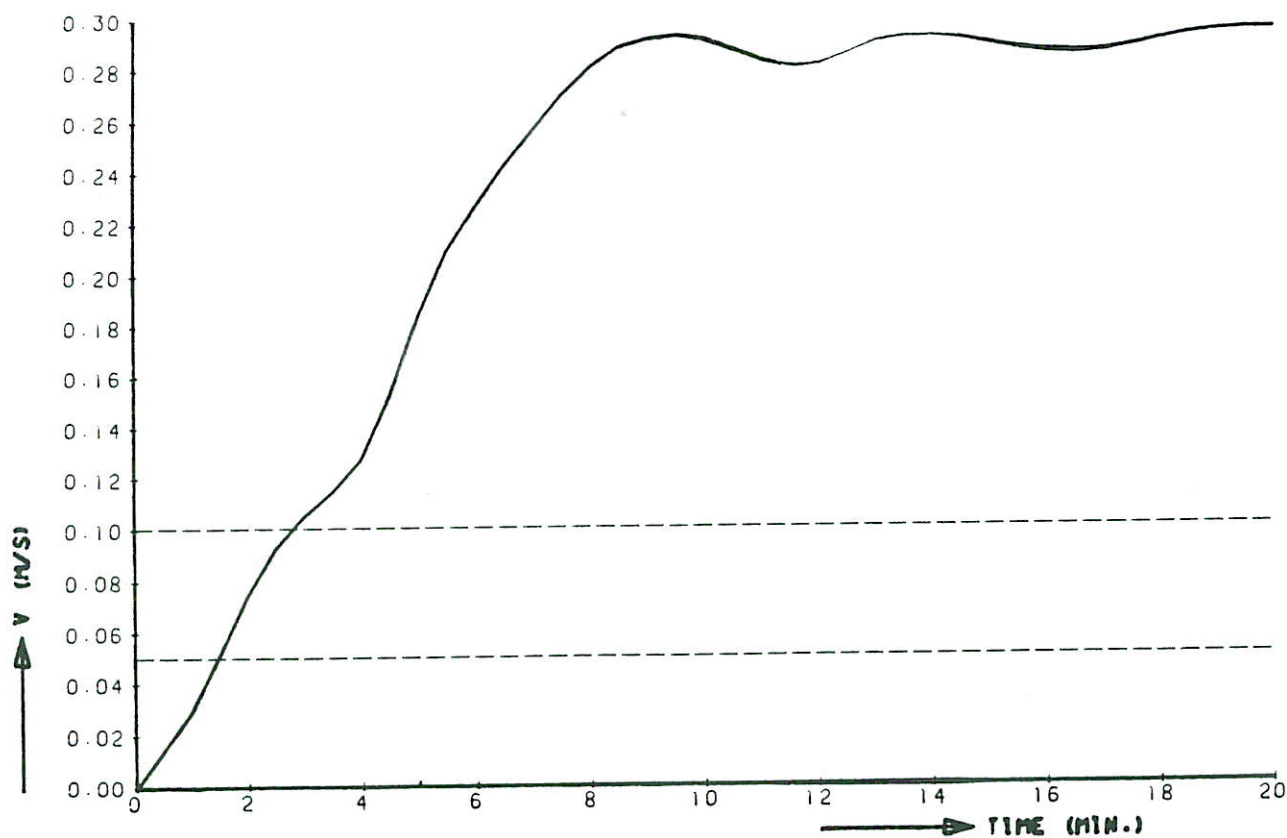
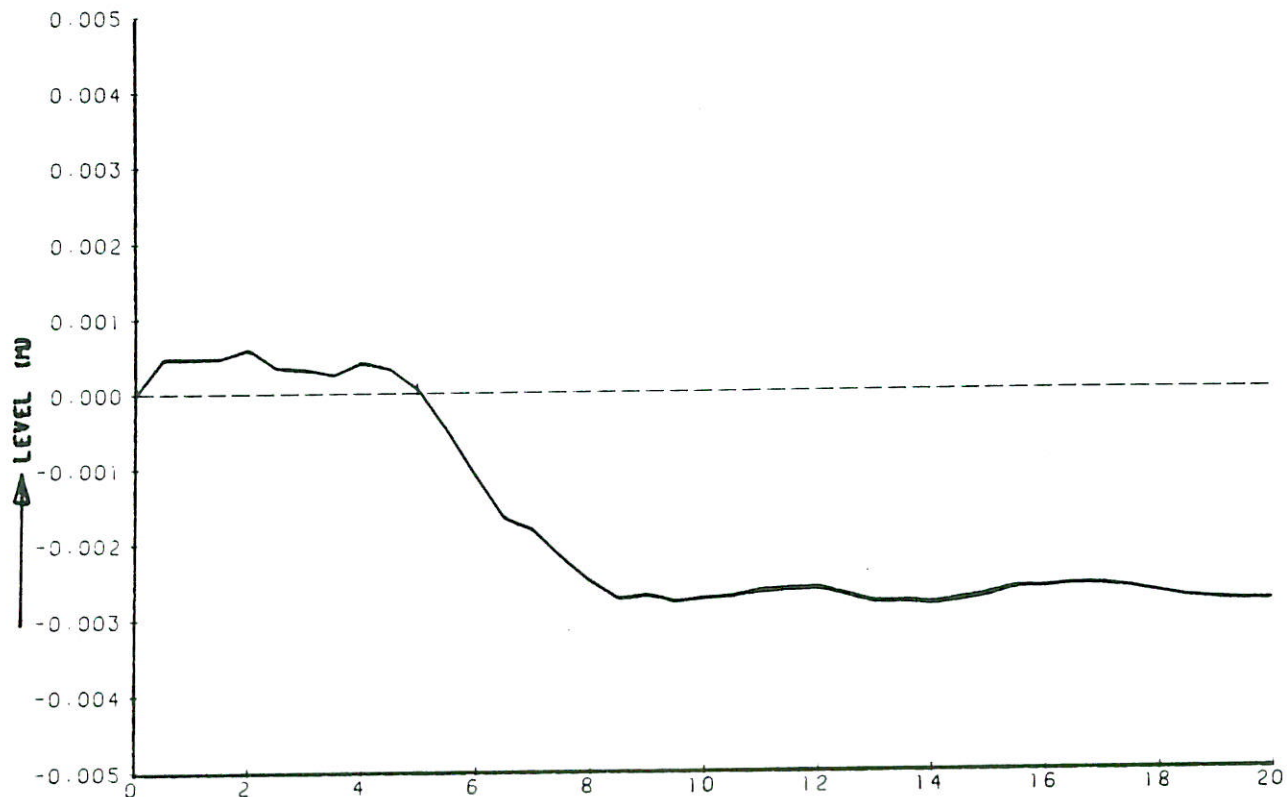
WE35AM

VE35WK2

DELFT HYDRAULICS

H 526

FIG. 97



WAQUA CURVILINEAR COMPUTATIONS FOR 14/10
 WAVE BASIN BASED ON HISWA VE35A
 TIME HISTORIES OF VELOCITY AND WATERLEVEL
 DX = 1.25 DT = 3 SEC. MASSFLUX

WE35AM

VE35WK4

DELFT HYDRAULICS

H 526

FIG. 98



delft hydraulics
consultancy & research