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SURAT PENCATATAN

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Dalam rangka pelindungan ciptaan di bidang ilmu pengetahuan, seni dan sastra berdasarkan Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta, dengan ini menerangkan:

Nomor dan tanggal permohonan	:	EC00202282779, 2 November 2022
Pencipta		
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Kewarganegaraan	:	Indonesia
Jenis Ciptaan	:	**Karya Rekaman Video**
Judul Ciptaan	:	**Sedimentation Analysis In Front Of A Submerged Rubble-mound Breakwater Due To Daily And Extreme Waves Simulations.**
Tanggal dan tempat diumumkan untuk pertama kali di wilayah Indonesia atau di luar wilayah Indonesia	:	8 Maret 2022, di Bandung
Jangka waktu pelindungan	:	Berlaku selama 50 (lima puluh) tahun sejak Ciptaan tersebut pertama kali dilakukan Pengumuman.
Nomor pencatatan	:	000398523

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The Fourth International Conference on
Sustainable Infrastructure and Build Environment

Sedimentation analysis in front of a submerged rubble-mound breakwater due to daily and extreme waves simulations

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Universitas Kristen Maranatha
Bandung-Indonesia, 8-9 March 2022

INTRODUCTION

Sedimentation analysis in front of a submerged rubble-mound breakwater due to daily and extreme waves simulations

INTRODUCTION

- Due to the influence of tides, waves, and currents, it will be easy to move sediments around the coastline, so that erosion will often occur on the coast
- There are several ways that can be done to protect the coastal are, strengthening the coast or protecting the coastal area so that it can withstand damage by constructing coastal structures

INTRODUCTION

- Modeling sediment transport that is induced by wave-structure interactions have been done using numerical models
- When developing a numerical model that need to be studied in more detail
- Physical models of laboratory experiments face very severe problems with sediment and wave scale
- Problem and issues that still arise in the experimental testing of the seabed response, sediment transport and the scour around coastal structures

INTRODUCTION

- In this study, physical models of laboratory tests emphasis to examine the sedimentation that occurred in front of the submerged rubble-mound breakwater
- Daily and extreme waves simulations
- All observation points in the study area of sedimentation were examined and resolved points that are subjected to scouring/deposition due to daily waves and/or extreme waves

METHODS

Sedimentation analysis in front of a submerged rubble-mound breakwater due to daily and extreme waves simulations

METHODS

- Laboratory tests are focused on a submerged rubble-mound breakwater model
- The height of the rubble-mound breakwater is 42 cm
- The side slope of rubble-mound breakwater facing the incident wave is 1:2.5 and the land slope of rubble-mound breakwater is 1:1.5

METHODS

Rubble-mound breakwater model

METHODS

Daily waves simulation

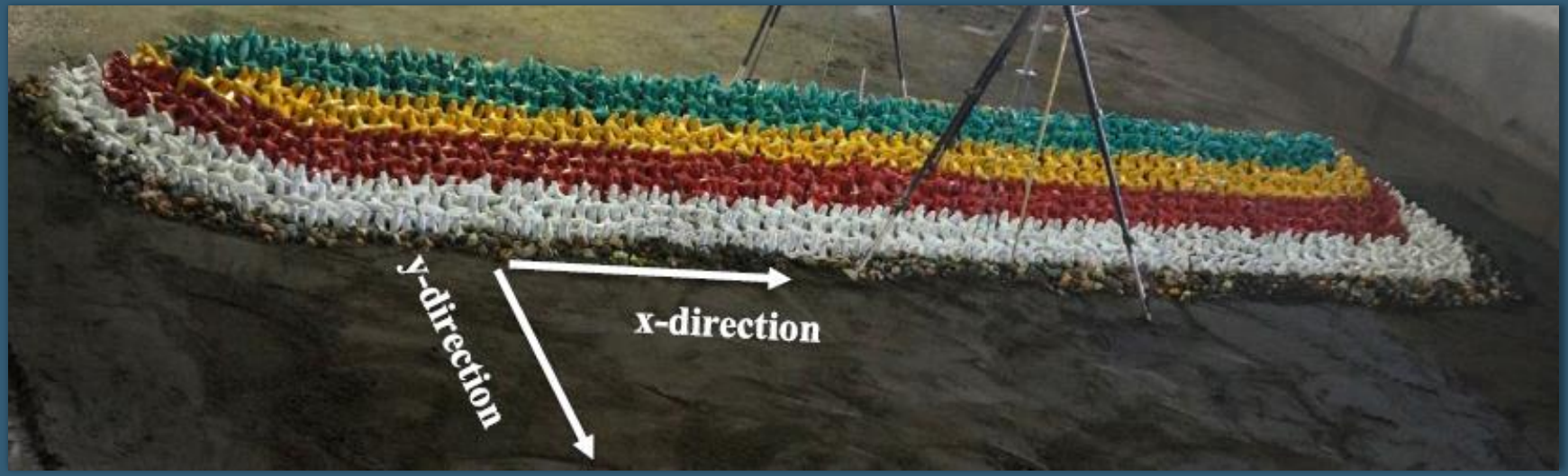
Water Level (cm)	Time (second)	Wave Frequency (Hz)	Wave Height (cm)	Wave Period (second)
30	900	10	3.2	2.50
	900	12	2.8	2.08
	900	14	4.8	1.79
35	900	10	2.7	2.50
	900	12	4.7	2.08
	900	14	8.2	1.79
40	900	10	10.5	1.69
	900	12	4.5	1.04
	900	14	8.6	2.44
42	900	10	7.2	2.50
	900	12	5.7	2.08
	900	14	7.2	1.75
45	900	10	6.0	2.50
	900	12	6.8	2.08
	900	14	9.1	1.79

METHODS

Extreme waves simulation

Water Level (cm)	Time (second)	Wave Frequency (Hz)	Wave Height (cm)	Wave Period (second)
45	13,500	14	9.1	1.79

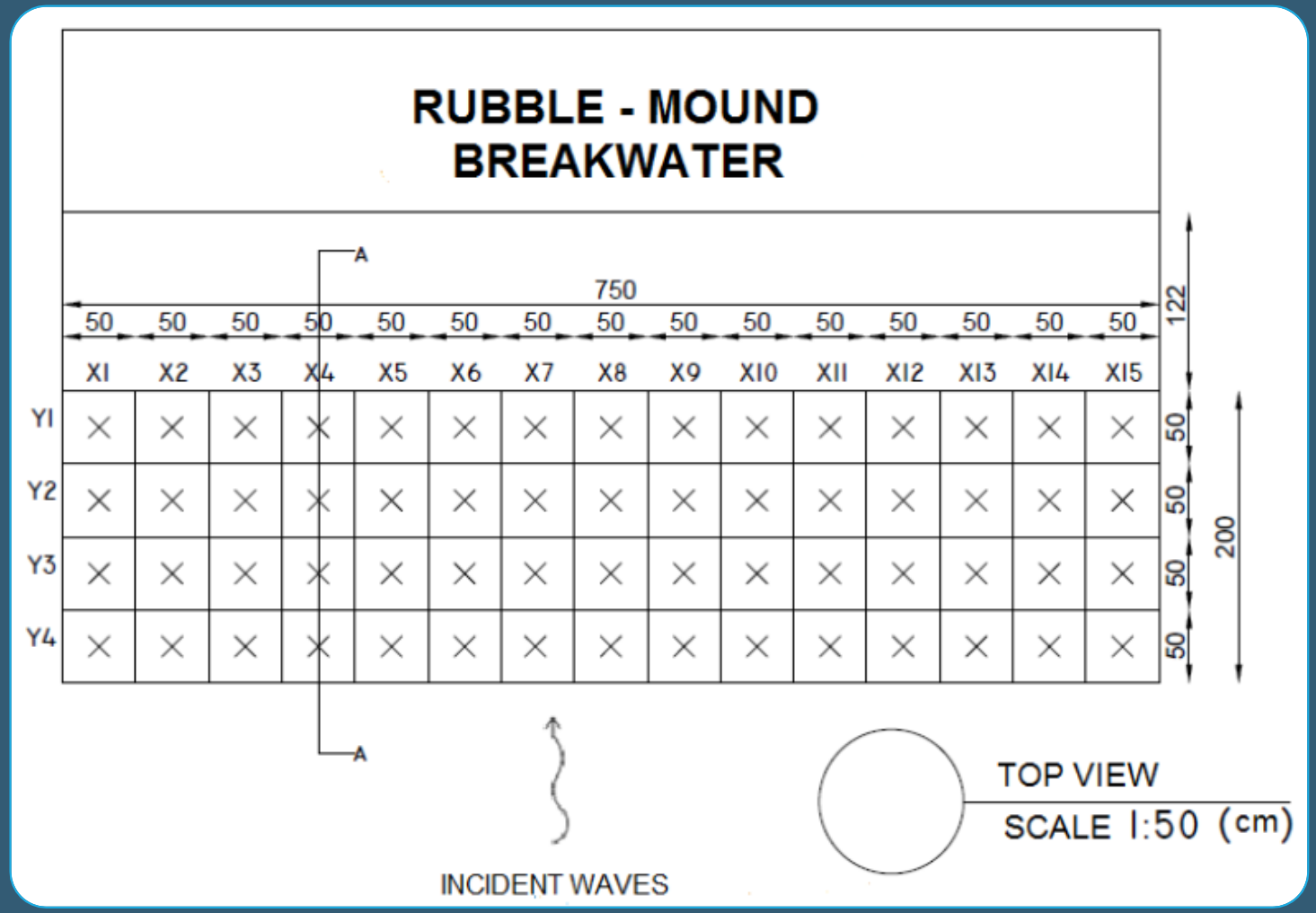
METHODS



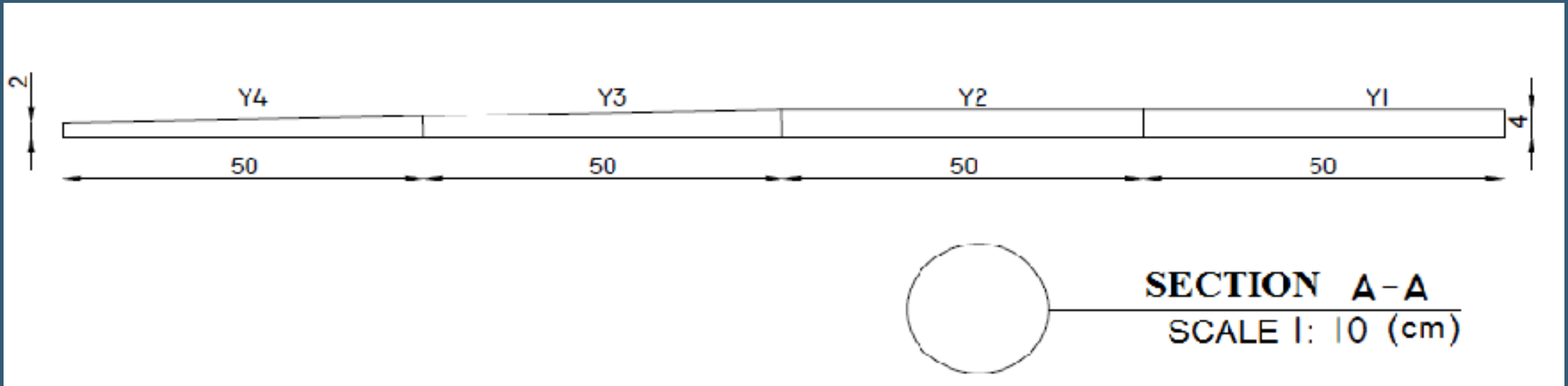
Sedimentation research area in x and y-directions

METHODS

Sedimentation research points



METHODS



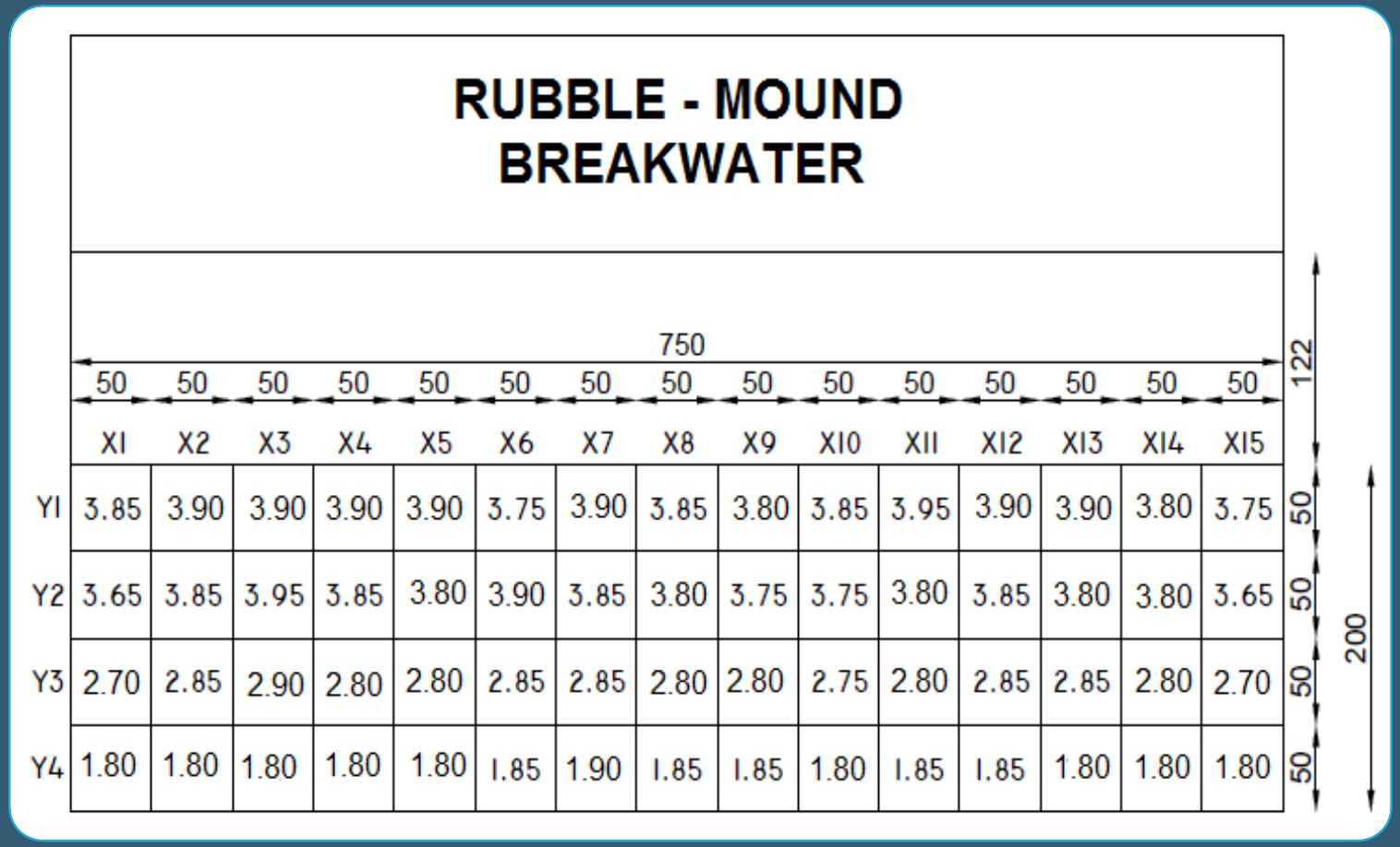
Side view of the sand thickness of the research area

RESULTS AND DISCUSSION

Sedimentation analysis in front of a submerged rubble-mound breakwater due to daily and extreme waves simulations

RESULTS AND DISCUSSION

Changes in sediment thickness due to daily waves simulation



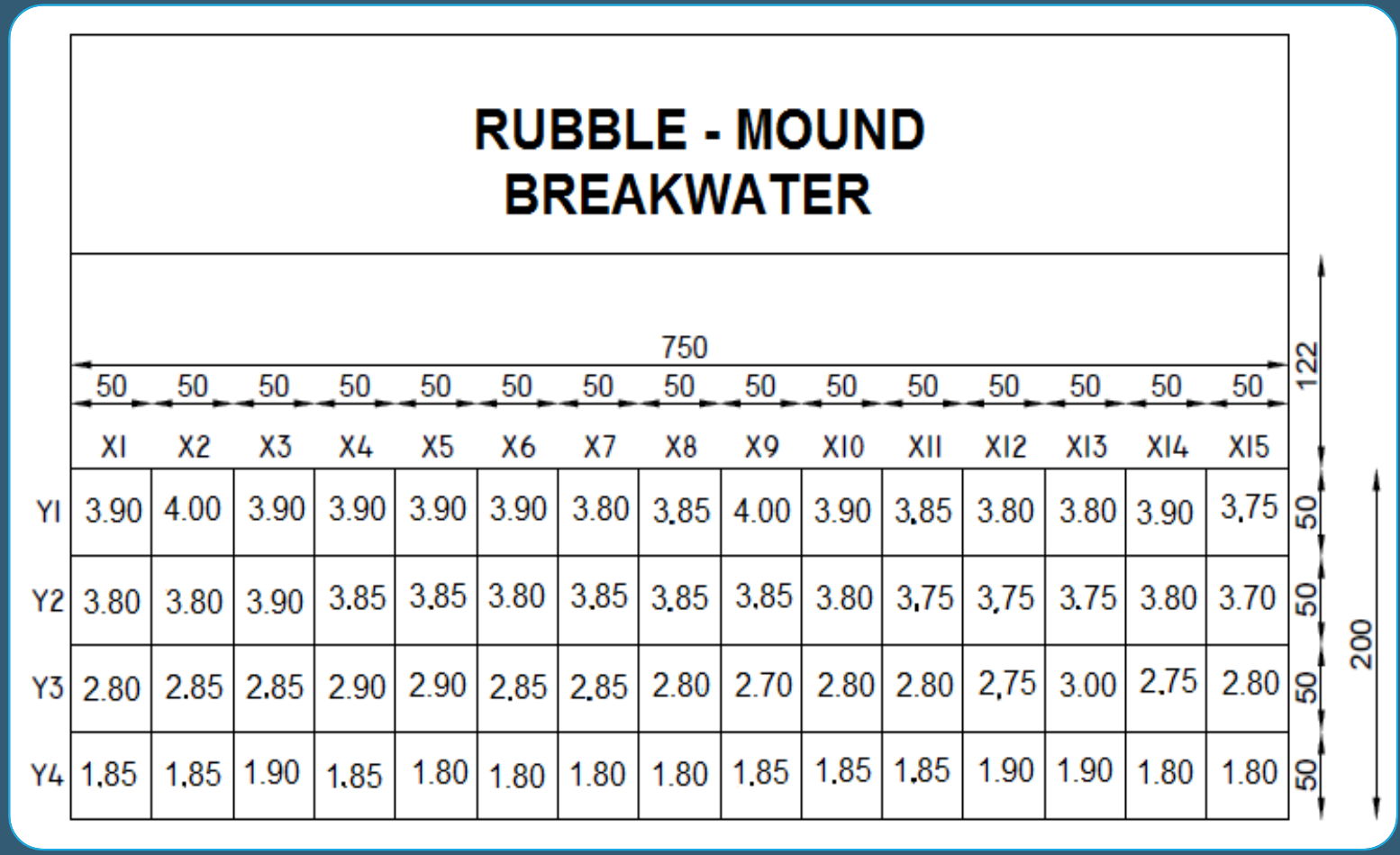
RESULTS AND DISCUSSION

Percentage of decline in sediment at each point due to daily waves simulation

Points	Y1	Y2	Y3	Y4
X1	3.75	8.75	10.00	10.00
X2	2.50	3.75	5.00	10.00
X3	2.50	1.25	3.33	10.00
X4	2.50	3.75	6.67	10.00
X5	2.50	5.00	6.67	10.00
X6	6.25	2.50	5.00	7.50
X7	2.50	3.75	5.00	5.00
X8	3.75	5.00	6.67	7.50
X9	5.00	6.25	6.67	7.50
X10	3.75	6.25	8.33	10.00
X11	1.25	5.00	6.67	7.50
X12	2.50	3.75	5.00	7.50
X13	2.50	5.00	5.00	10.00
X14	5.00	5.00	6.67	10.00
X15	6.25	8.75	10.00	10.00

RESULTS AND DISCUSSION

Changes in sediment thickness due to extreme waves simulation



	XI	X2	X3	X4	X5	X6	X7	X8	X9	XI0	XII	XI2	XI3	XI4	XI5
YI	3.90	4.00	3.90	3.90	3.90	3.90	3.80	3.85	4.00	3.90	3.85	3.80	3.80	3.90	3.75
Y2	3.80	3.80	3.90	3.85	3.85	3.80	3.85	3.85	3.85	3.80	3.75	3.75	3.75	3.80	3.70
Y3	2.80	2.85	2.85	2.90	2.90	2.85	2.85	2.80	2.70	2.80	2.80	2.75	3.00	2.75	2.80
Y4	1.85	1.85	1.90	1.85	1.80	1.80	1.80	1.80	1.85	1.85	1.85	1.90	1.90	1.80	1.80

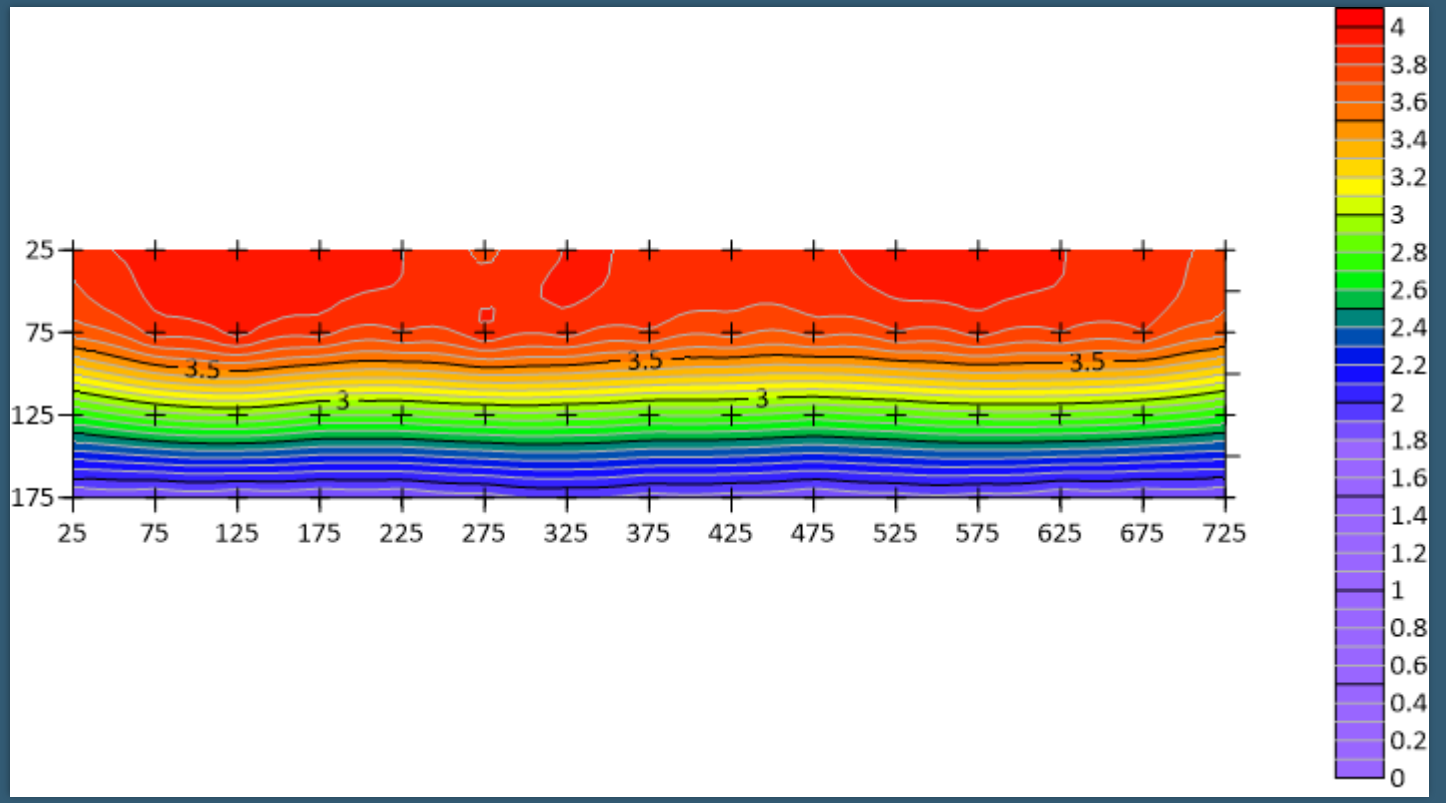
RESULTS AND DISCUSSION

Percentage of decline in sediment at each point due to extreme waves simulation

Points	Y1	Y2	Y3	Y4
X1	2.50	5.00	6.67	7.50
X2	0.00	5.00	5.00	7.50
X3	2.50	2.50	5.00	7.50
X4	2.50	3.75	3.33	5.00
X5	2.50	3.75	3.33	7.50
X6	2.50	5.00	5.00	10.00
X7	5.00	3.75	5.00	10.00
X8	3.75	3.75	6.67	10.00
X9	0.00	3.75	10.00	7.50
X10	2.50	5.00	6.67	7.50
X11	3.75	6.25	6.67	7.50
X12	5.00	6.25	8.33	5.00
X13	5.00	6.25	0.00	5.00
X14	2.50	5.00	8.33	10.00
X15	6.25	7.50	6.67	10.00

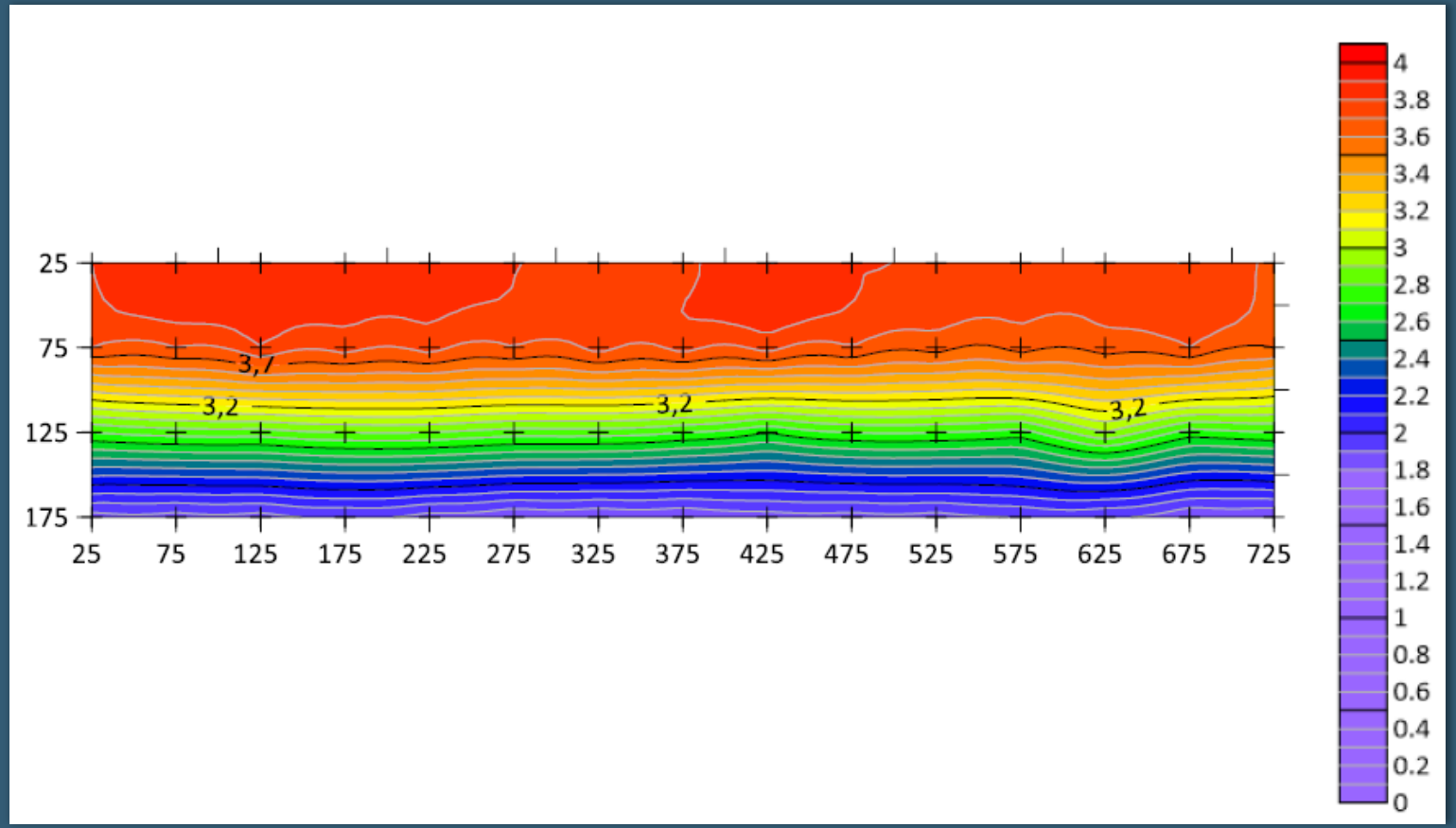
RESULTS AND DISCUSSION

Contour of sediment in front of the submerged rubble-mound breakwater using surfer software after loaded with daily waves simulation



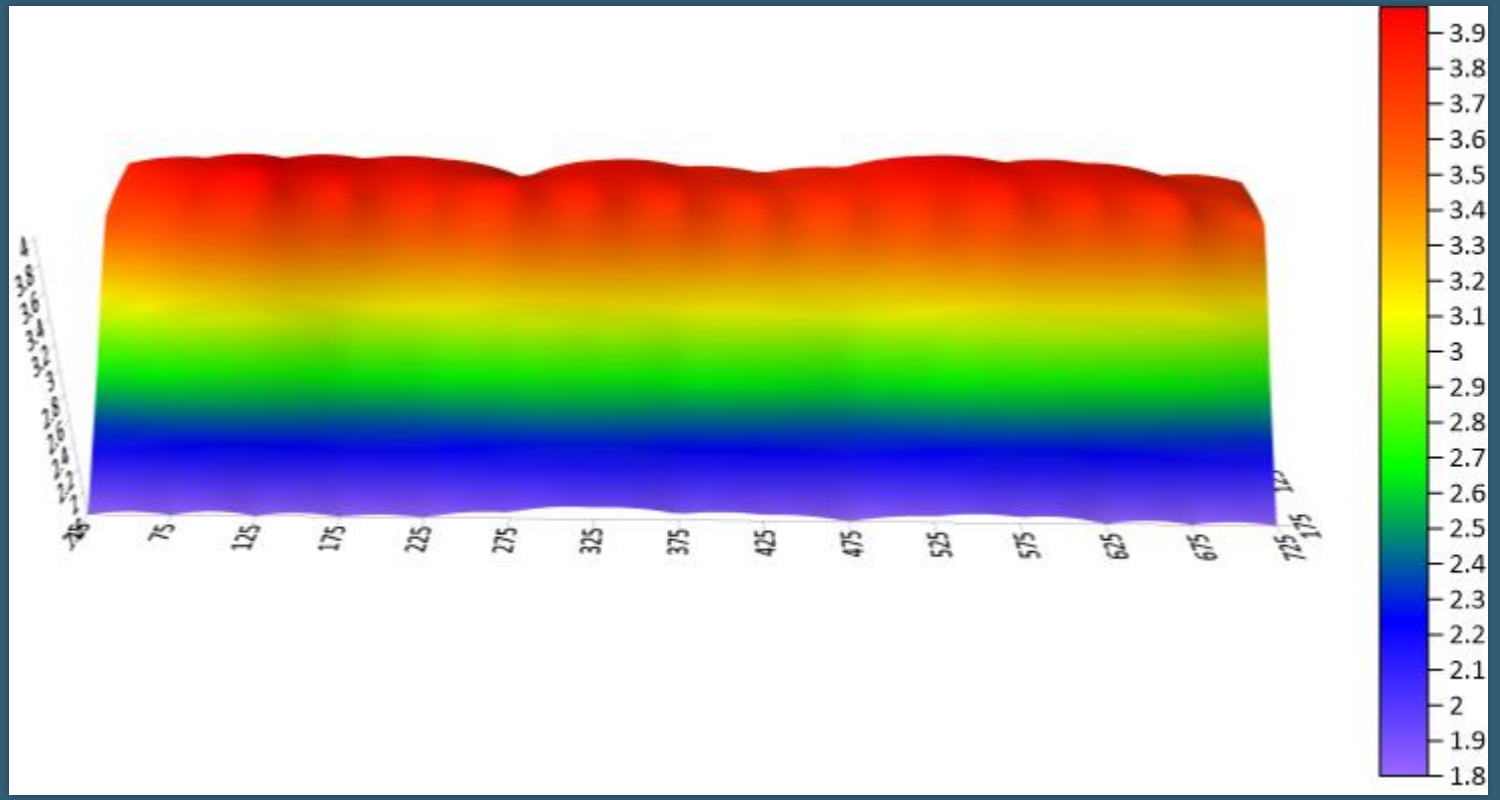
RESULTS AND DISCUSSION

Contour of sediment in front of the submerged rubble-mound breakwater using surfer software after loaded with extreme waves simulation



RESULTS AND DISCUSSION

3D front side of sediment after loading daily waves simulation



RESULTS AND DISCUSSION

Sediment condition after loaded with daily waves simulation

CONCLUSIONS

Sedimentation analysis in front of a submerged rubble-mound breakwater due to daily and extreme waves simulations

CONCLUSIONS

- The results of the analysis of all observation points in the sedimentation study area experienced erosion or decreased elevation
- The most extreme sediment erosion occurs on the outermost side of the front of the sediment research area facing the incident waves and on the outermost side of the left and right ends of the sediment research area

CONCLUSIONS

- Due to daily waves simulation, all the sediment observation points declined in the elevation
- Three sediment review points did not experience grinding and fifty-seven sediment review points were decreased due to extreme waves simulation
- The maximum sediment scouring is 8.8% due to daily waves and 7.83% due to extreme waves.

CONCLUSIONS

- Suggestions are increasing the number of observation points in the sedimentation research area and by decreasing the distance between the observation points, the data obtained will be more accurate.
- The impact of sedimentation on stability of the submerged rubble-mound breakwater due to daily and extreme waves simulation will be studied in future research.

Thank You

Stay safe, Keep healthy, and God bless you