

STUDY ON IMPACTS OF COASTAL DEVELOPMENTS TOWARD BEACH
MORPHOLOGY AND SEDIMENT CHARACTERISTICS AT DUNGUN AND
KUALA TERENGGANU

NOOR FAIRUS BINTI IDRUS

FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU

2012

**STUDY ON IMPACTS OF COASTAL DEVELOPMENTS TOWARD BEACH
MORPHOLOGY AND SEDIMENT CHARACTERISTICS AT DUNGUN AND
KUALA TERENGGANU**

By

NOOR FAIRUS BINTI IDRUS

Research Report submitted in partial fulfilment of the requirements for the degree of

Bachelor of Science (Marine Science)

Department of Marine Science

Faculty of Maritime Studies and Marine Science

UNIVERSITI MALAYSIA TERENGGANU

2012

This project should be cited as:

Fairus, N. I. 2012. Study on Impacts of Coastal Developments toward Beach Morphology and sediment Characteristics at Dungun and Kuala Terengganu. Undergraduate thesis, Bachelor of Science in Marine Science, Faculty of Maritime Study and Marine Science, Universiti Malaysia Terengganu, Terengganu. 71p.

No part of this project report may be reproduced by any mechanical, photographic, or electronic process, or in the form of photographic recording, nor may it be stored in a retrieval system, transmitted, or otherwise copied for public or private use, without written permission from the author and the supervisor(s) of the project.



**DEPARTMENT OF MARINE SCIENCE
FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU**

DECLARATION AND VERIFICATION FORM

FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled: **Study on Impacts of Coastal Developments Toward Beach Morphology and Sediment Characteristics at Dungun and Kuala Terengganu**, by **Noor Fairus Binti Idrus**, Matric No. **UK 20001** has been examined and all errors identified have been corrected. This report is submitted to the Department of Marine Science as partial fulfillment towards obtaining the Degree of **Bachelor of Science (Marine Science)**, Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

Verified by:

Principal Supervisor

Name: Prof. Madya Dr. Rosnan Yaacob

PROF. MADYA DR. ROSNAN BIN YAACOB

Official stamp:

Ketua
Jabatan Sains Marin
Fakulti Pengajian Maritim dan Sains Marin
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Date: 21/06/12

Head of Department of Marine Science

Name: Prof. Madya Dr. Rosnan Yaacob

Official stamp:

PROF. MADYA DR. ROSNAN BIN YAACOB
Ketua
Jabatan Sains Marin
Fakulti Pengajian Maritim dan Sains Marin
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Date: 21/06/12

ACKNOWLEDGEMENTS

In the name of Allah, Alhamdulillah through His Blessing and dignity, finally my three years of study, I had did my research with my effort and I has come up to a conclusion through a successful write up of this thesis. First thing first I would like to express my appreciation and gratitude to my supervisor, Professor Madya Dr. Hj Rosnan bin Hj Yaacob and my co-supervisor Dr. Antonina Abdullah, who has supports me throughout my thesis with his and her guidance, patience and knowledge. Very special thanks for his encouragement and effort and without them, my thesis would not have been successful and completed. Besides, I would to thanks a lot to En Effi Helmy Ariffin who is muster student under Professor DR Rosnan that give a lot of knowledge and guidance during I do my final year project research. do not forget, thanks a lot to research assistance En Raja that guides me during lab section.

I would like to express my fully thanks to my friend Nur Azua Binti Wasis, Sunita Binti Daud, Muhammad Haziq Bin Zainol, Maisarah Izzah Binti Tajaruddin, Nur Liyana Binti Fauzi, Mohamad Amir Bin Razak, Mohd Syafiq Bin Manan, and Khairul Rijal Bin Bahrulazmi that help me along my sampling time added with an opinion in my research.

Last but not least, I like to thank to my mother, Faridah Binti Aziz and my father, Idrus bin Abdullah and also my little brother and sister, Nur Dalila Binti Idrus, Muhamad Adam bin Idrus and Muhamad Azlan bin Idrus and not to forget to Mohammad Jafni bin Ahmad Nasre that patience, inspiration, strength and moral support that he gave to me to finish this project I believe that their continue blessing and prayers have enable me to arrive at this stage

	PAGE
ACKNOWLEDGEMENT	iii
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	xi
LIST OF APPENDICES	xii
ABSTRACT	xiii
ABSTRAK	xiv
1.0 INTRODUCTION	1
1.1 Justification	5
1.2 Objective	6
2.0 LITERATURE REVIEW	
2.1 Sedimentology	7
2.1.1 Sediment Sources	8
2.1.2 Rock Cycle	8
2.2 Beach	10
2.2.1 Beach Profile	11
2.2.2 Erosion	12
2.3 Physical Processes On Coastal	13
2.3.1 Wind	14
2.3.2 Wave	14
2.3.3 Current	14
2.3.4 Tide	15

2.3.5.Monsoon	16
3.0: METHODOLOGY	
3.1 Locations of study area	17
3.1.1 Sampling Location	19
3.2 Measurement of Physical Parameters	20
3.3 Beach Profile Measurements	20
3.4 Coastal Sediment Sampling	20
3.5 Dry Sieve Analysis	21
3.6 Statistic Calculation	22
3.6.1 Mean	23
3.6.2 Standard Deviation	23
3.6.3 Skewness	24
3.6.4 Kurtosis	24
4.0 RESULTS	
4.1 Beach Profile	25
4.1.1 Beach Slope	31
4.2 Grain Size Analysis	33

4.2.1 Mean	33
4.2.2 Standard Deviation	37
4.2.3 Skewness	41
4.2.4 Kurtosis	44
4.3 Physical Parameters Analysis	47
4.3.1 Rainfall Distribution	47
4.3.2 Wind	49
4.3.3 Water level	50
5.0 DISCUSSION	
5.1 Beach Profile	51
5.2 Grain Size Analysis	52
5.2.1 Mean	52
5.2.2 Standard Deviation	53
5.2.3 Skewness	54
5.2.3 Kurtosis	55
5.3 Relationship of Mean against Beach Slope.	55
5.3 Relationship of Mean against Sorting	57

6.0 CONCLUSION	59
REFERENCES	60
APPENDICES	64
CURRICULUM VITAE	71

LIST OF TABLES

Table		Page
3.1	Coordinate For Sampling Site at Dungun	19
3.2	Coordinate For Sampling Site at Kuala Terengganu (Seberang Takir and Batu Buruk)	19
4.1 (a)	Average and Order of Beach Slope Degree at Dungun (negative value)	32
4.1 (b)	Average and Order of Beach Slope Degree at Kuala Terengganu (negative value)	32
4.2 (a)	Average of mean size (\emptyset) at Dungun	35
4.2 (b)	Average of Mean Size (\emptyset) at Kuala Terengganu	36
4.3 (a)	Average of Sorting Size (\emptyset) at Dungun	39
4.3 (b)	Average of Sorting Size (\emptyset) at Kuala Terengganu	40
4.4 (a)	Average of Skewness value sediment characteristic at Dungun	42
4.4 (b)	Average of Skewness value sediment characteristic at Kuala Terengganu	43
4.5 (a)	Average of Kurtosis Size (\emptyset) at Dungun Station	45
4.5 (b)	Average of Kurtosis Size (\emptyset) at Kuala Terengganu	46
4.6	Summary of Rainfall in Kuala Terengganu (2011).	48
4.7	Average of wind velocity in Kuala Terengganu (2011)	49
4.8	Tidal Range in Kuala Terengganu (2011)	50

LIST OF FIGURES

Figure	Page
3.1 Station of study area at Dungun and Kuala Terengganu	18
4.1 (a) Beach profile changes for station 1 at Dungun	27
4.1 (b) Beach profile changes for station 2 at Dungun	27
4.1 (c) Beach profile changes for station 3 at Dungun	27
4.1 (d) Beach profile changes for station 4 at Dungun	28
4.1 (e) Beach profile changes for station 5 at Dungun	28
4.1 (f) Beach profile changes for station 6 at Dungun	28
4.2 (a) Beach profile changes for station 1 at,KualaTerengganu	29
4.2 (b) Beach profile changes for station 2 at,KualaTerengganu	29
4.2 (c) Beach profile changes for station 3 at,KualaTerengganu	29
4.2 (d) Beach profile changes for station 4 at,KualaTerengganu	30
4.2 (e) Beach profile changes for station 5 at,KualaTerengganu	30
4.2 (f) Beach profile changes for station 6 at,KualaTerengganu	30
4.3 (a) Mean value at Dungun station	35
4.3 (b) Mean value at Kuala Terengganu	36
4.4 (a) Sorting value at Dungun	39
4.4 (b) Sorting value at Kuala Terengganu	40
4.5 (a) Skewness value at Dungun	42
4.5 (b) Skewness value at Kuala Terengganu	43
4.6 (a) Kurtosis value at Dungun	45
4.6 (b) Kurtosis value at Kuala Terengganu	46

5.1	Mean versus Beach Slope at Dungun	56
5.2	Mean versus Beach Slope at Kuala Terengganu	56
5.3	Mean against Sorting at Dungun	58
5.4	Mean against Sorting at Dungun	58

LIST OF ABBREVIATION

Abbreviation

1.	%	Percentage
2.	Ø	Phi
3.	Km	Kilometer
4.	M	Meter
5.	Mm	Millimeter
6.	µm	Micrometer
7.	G	Gram
8.	°	Degree
9.	'	Minutes
10.	N	North
11.	E	East

LIST OF APPENDICES

Appendix		Page
Appendix 1	Grain Size Sediment According to Blatt, Middleton and Murray (1972)	65
Appendix 2	Grain size Parameters of Sorting, Skewness and Kurtosis according to Folk and Ward (1957)	66
Appendix 3	Rock Cycle	67
Appendix 4	Sampling site at Dungun at Station 1, station 2 and station 3 at pre-monsoon and during monsoon	68
Appendix 5	Sampling site at Dungun at Station 4, station 5 and station 6 during pre-monsoon and during monsoon	69
Appendix 6	Sampling site at Seberang Takir, Kuala Terengganu at Station 1, station 2 and station 3 during pre-monsoon and during monsoon	70
Appendix 7	Sampling site at Batu Buruk, Kuala Terengganu at Station 1, station 2 and station 3 during pre-monsoon and during monsoon	71

ABSTRACT

Study on impacts of coastal development toward the beach morphology and sediment characteristics was conducted at Dungun and Kuala Terengganu. Kuala Terengganu, Seberang Takir and batu Buruk had been choose as study area. The study was carried out in order to determine the beach profile and sediment characteristics pre-monsoon and during monsoon. There are total of twelve stations, six stations at Dungun and six station at Kuala Terengganu. Sampling was done every station the interval of distance range 500m to 1km. Transit Sokkia was used to measure beach profile properties. Meanwhile, method of moments was employed to calculate the sedimentological parameters. Based on the beach profile analysis, at Dungun four out of six stations undergone erosion while other undergone deposition. At Kuala Terengganu, there are two station with are station 5 and station 6 undergone erosion, other the beach was undergone deposition. The pattern of beach at Kuala Terengganu each station happened deposition and erosion event at beginning or downward of beach vice versa. It proved that the decrease mean of grain size the sand are coarse. It shows that the beach has erosion occurred. The beach morphology change because natural phenomena (monsoon) beside, the impacts also come from the coastal development that had been built at the beach.

ABSTRAK

Kajian mengenai kesan pembangunan pantai terhadap morfologi pantai dan ciri-ciri sedimen telah dijalankan di Dungun dan Kuala Terengganu. Manakala, di Kuala Terengganu, Seberang Takir dan Batu Buruk telah dipilih sebagai kawasan kajian. Kajian telah dijalankan untuk menentukan profil pantai dan ciri-ciri sedimen pra-monsoon dan semasa monsoon. Terdapat 12 stesen, enam stesen di Dungun dan enam stesen lagi di Kuala Terengganu. Penyempelan dilakukan di setiap stesen selang julat jarak 500 m hingga 1 km. Transit Sokkia telah digunakan untuk mengukur sifat profil pantai. Sementara itu, kaedah momen telah digunakan untuk mengira parameter sedimentologi. Berdasarkan analisis profil pantai, di Dungun empat daripada enam stesen mengalami hakisan manakala yang lain mengalami pemendapan. Di Kuala Terengganu, terdapat dua stesen mengalami hakisan iaitu stesen 5 dan stesen 6 manakala yang lain mengalami pemendapan. Corak pantai di Kuala Terengganu boleh dikatakan setiap stesen mengalami pemendapan dan juga hakisan. Ia dapat dibuktikan lagi apabila min saiz rendah menunjukkan pasir kasar. Ia bermaksud pantai di kawasan itu mengalami hakisan berlaku. Perubahan morfologi pantai boleh terjadi kerana fenomena semulajadi (monsoon), selain itu kesan daripada pembangunan pantai yang telah dibina.