



**SEDIMENT DISTRIBUTION AND LITTORAL  
DRIFT DIRECTION FOR THE COASTLINE  
BETWEEN BATU RAKIT AND SETIU,  
TERENGGANU**

**MOHD AZAM MAT YAACOB**

**Thesis Submitted in Fulfillment of the Requirement for  
the Degree of Master of Science in the  
Institute of Oceanography  
Universiti Malaysia Terengganu**

**May 2010**

*To my late father, Mat Yaacob Abd Aziz*

*To My Beloved Mother, Rahimah Hamzah*

*To My Beloved Wife, Nur Fatihah Che Wail*

*To My Beloved Family*

*Thank You for all the support*

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfillment of the requirement for the degree of Master of Science

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The main objective of this study is to determine the sediment distribution and investigate the net littoral drift direction from Batu Rakit to Kuala Setiu. The study is very important as a preliminary study to any coastal zone management decisions. The study area is located on the East Coast, influenced by the Northeast monsoon season (November-March) that is characterised by strong currents and high-energy waves.

Sediment characteristics and beach profiles were studied from Kg. Batu Rakit to Kuala Setiu. Beach sediment was found to be coarser during the Northeast monsoon season (November – March) and ranged between -0.33 to 1.91 phi. The sediment was also poorly-sorted and negatively-skewed during this season. For the beaches at Pantai Merang, sediment transportation is interrupted by a breakwater resulting in a wider beach due to accumulation of sediment.

In general, beach slopes followed the normal relationship of wider beaches having gentler slopes while steeper slopes have narrower beaches. Beach slope ranged from 0.01 (0.6°) to 0.51 (29.2°). Beach width ranged from 60 m to 120 m with little-or-no definite pattern.

The littoral sediment transport rate at the study area is 64,757 cubic meters per year. The littoral sediment transport rate was measured at 123,278 cubic meters per year during the Northeast monsoon season and 6,237 cubic meters per year during the non-monsoon season.

Littoral drift direction generated by longshore current and beach drift was determined to be from Southeast to the Northwest. The littoral drift was interrupted by a breakwater at station P7 (Kg. Merang) resulting in less sediment source at the downdrift (Kg. Telaga Papan) and forming a sandbar. In this study, the breakwater has been successfully used as a site-specific indicator for determination of net littoral drift direction at Merang coastline. The littoral drift direction at Kg. Merang is heading to the Northwest; changes its direction to the Southwest causing sediment accretion at the entrance of the breakwater. The sandbar was created here in response to wave action and prograde in the direction of littoral drift. The impacts to Kg. Telaga papan beach are coarser sand, poorly-sorted sediment types, steeper and narrower beach; and beach cusps formation in downdrift zone.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai memenuhi keperluan untuk ijazah Master Sains

**TABURAN SEDIMEN DAN ARAH HANYUTAN ENDAPAN PANTAI DI  
ANTARA PERSISIRAN PANTAI BATU RAKIT HINGGA SETIU,  
TERENGGANU.**

**MOHD AZAM BIN MAT YAACOB**

**Mei 2010**

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Objektif utama kajian ini adalah untuk mengkaji taburan sedimen dan menentukan arah hanyutan endapan bersih di sepanjang pantai Batu Rakit hingga Kuala Setiu, Terengganu. Kajian ini sangat penting sebagai kajian awal dalam menentukan sebarang keputusan pengurusan zon pantai. Kawasan kajian terletak di Pantai Timur yang dipengaruhi oleh Monsun Timur Laut (November-Mac) yang membawa arus kuat dan tenaga ombak yang tinggi.

Ciri-ciri sedimen dan profil pantai telah diukur daripada Kg. Batu Rakit hingga Kuala Setiu. Sedimen pantai adalah lebih kasar semasa musim Monsun Timur Laut dengan julat -0.33 hingga 1.91 phi. Sedimen juga menunjukkan sisihan tidak sempurna dan kepencongan negatif semasa musim ini. Pemecah ombak telah menyekat pengangkutan sedimen menyebabkan pantai semakin melebar apabila berlaku pemendapan berterusan sedimen.

Secara umumnya, profil pantai menunjukkan perhubungan yang normal dengan pantai berkecerunan landai menunjukkan pantai yang lebar. Manakala pantai berkecerunan curam menunjukkan kelebaran pantai adalah kecil. Kecerunan pantai di kawasan kajian adalah di antara  $0.01$  ( $0.6^\circ$ ) hingga  $0.51$  ( $29.2^\circ$ ). Kelebaran pantai pula adalah di antara  $60$  m hingga  $120$  m.

Kadar pengangkutan enapan pesisiran pantai di kawasan kajian ialah  $64,757$   $m^3$  per tahun. Kadar pengangkutan enapan pesisir semasa musim monsun pula adalah  $123,278$   $m^3$  per tahun dan semasa musim bukan monsun adalah sebanyak  $6,237$   $m^3$  per tahun.

Arah hanyutan endapan di kawasan kajian dijana oleh arus pesisir pantai dan hanyutan endapan pantai dari Tenggara ke Barat Laut. Hanyutan endapan telah disekat oleh pemecah ombak di stesen P7 (Kg. Merang) menyebabkan kawasan 'downdrift' (Kg. Telaga Papan) kekurangan sumber sedimen. Kajian ini telah menunjukkan struktur pemecah ombak adalah petunjuk kawasan spesifik yang baik dalam menentukan arah hanyutan bersih di pesisiran pantai Merang. Arah hanyutan endapan di Kg. Merang telah bertukar dari Barat Laut, menuju ke arah Barat Daya menyebabkan pengumpulan sedimen di muka masuk pemecah ombak dan membentuk beting pasir di Kuala Merang. Beting pasir pula terbentuk akibat dari tindakan ombak ke arah hanyutan endapan. Pantai Kg. Telaga Papan pula akan mempunyai pasir yang lebih kasar, sisihan tidak sempurna, pantai curam dan sempit; dan pembentukan *beach cusps* di kawasan *downdrift*.