THE SAFETY OF NAVIGATION THROUGH TERENGGANU RIVER MOUTH FROM BREAKWATER TO MAINIR BRIDGE

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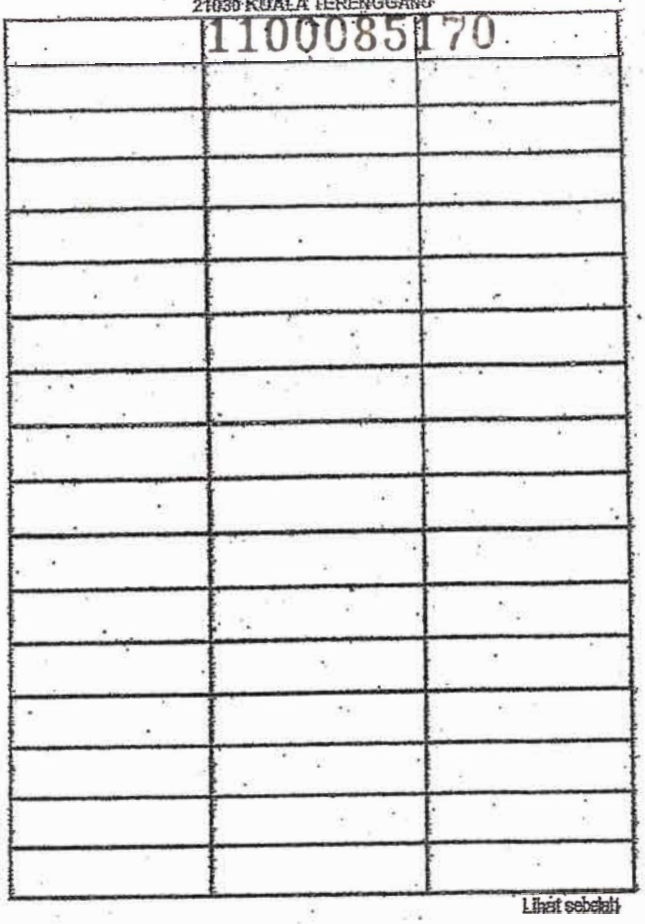
The safety of navigation through Terengganu river mouth breakwater to Manir bridge / Mohd Noor Haidzir Mohd Pauzi.



THE SAFETY OF NAVIGATION THROUGH TERENGGANU RIVER MOUTH FROM BREAKWATER TO MANIR BRIDGE.

By

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Research Report submitted in partial fulfilment of the requirement for the degree of Bachelor of Science Nautical Science and Maritime Transportation

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DEPARTMENT OF NAUTICAL SCIENCE AND MARITIME TRANSPORTATION

FACULTY OF MARITIME STUDIES AND MARINE SCIENCE

DECLARATION AND VERIFICATION REPORT

FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled:

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by Mohd Noor Haidzir b Mohd Fauzi, Matric No. uk 15749 have been examined and all errors identified have been corrected. This report is submitted to the Department of Nautical Science and Maritime Transportation as partial fulfillment towards obtaining the Degree of Nautical Science and Maritime Transportation, Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

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ABBREVIATION

%	Percentage
GIS	Maritime Geographical Information System
GM	Metacentric height
GPS	Global Positioning System
JPS	Jabatan Pengairan dan Saliran
JUPEM	Jabatan Ukur dan Pemetaan Malaysia
km	Kilometers
m	Meters
RORO	Roll-on / roll-off
s	Seconds
SATNAV	Global Navigation Satellite System
TSS	Traffic Separation System
UKC	Under-Keel Clearance
VLEO	Velocity of longshore current

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ABSTRACT

Terengganu River is one of the most important mode of transportation especially in Kuala Terengganu area. The usage of Terengganu River are mainly for fishing, tourism and also for goods transportation. Due to the increasing of the importance of Terengganu River, the safety of navigation at Terengganu River should be prioritized in order to avoid any damages to people, ship, cargo as well as the environment. But, there is only a few studies that related to the safety of navigation at Terengganu River that leads to the confusion regarding the actual safety status at this river. The sounding of the depth of Terengganu River by using echo sounder and GPS was done in the upperstream area to obtain the data about the depth of the river while the data of the depth of the river was obtained from Jabatan Pengairan dan Saliran (JPS). The data for wave, wind speed and current were obtained from previous researches, and the map of Terengganu River was obtained from Jabatan Ukur dan Pemetaan Malaysia (JUPEM). From the data obtained, it can be said that in term of the depth of the river, Terengganu River is safe for navigation from breakwater up to Manir bridge but there are also some shallow points in the upperstream area. For downstream area, there should be no problem as the river was dredged up to 10 meters during the construction of the breakwater. The construction of breakwater also enables the navigation can be done safely in Terengganu River, even during Monsoon season in term of wave, wind speed and also current. The breakwater acts as a wall to bounce back strong waves to open sea and also as a wind shield from strong wind during monsoon season. As for current, most of the water from the river will be trapped inside the area of breakwater as the breakwater do not allow the water to flow inward and outward of the river mouth. So the current of the water is not that much because of the less movement of water flowing either to the open sea or to the river mouth.

ABSTRAK

KESELAMATAN NAVIGASI DI MUARA SUNGAI TERENGGANU DARI BENTENG PEMECAH OMBAK SEHINGGA KE JAMBATAN MANIR.

Sungai Terengganu merupakan salah satu sungai terpenting terutamanya kepada penduduk sekitar Kuala Terengganu. Kegunaan utama Sungai Terengganu adalah termasuk untuk perikanan, pelancongan dan juga perkhidmatan pengangkutan. Oleh kerana kepentingan Sungai Terengganu ini semakin meningkat, keselamatan navigasi patut diutamakan untuk mengelakkan kemalangan kepada manusia, kapal, barangan dan juga alam sekitar. Tetapi, sehingga kini, tidak banyak penyelidikan yentang keselamatan navigasi di Sungai Terengganu sehingga menimbulkan kekeliruan tentang tahap keselamatan navigasi di Sungai Terangganu. Pengukuran kedalaman Sungai Terangganu telah dilakukan di bahagian atas Sungai Terengganu menggunakan pengesan gelombang (echo sounder) dan juga GPS manakala data untuk bahagian bawah sungau diperolehi dari Jabatan Pengairan dan Saliran (JPS). Maklumat untuk gelombang, kelajuan angin dan juga arus diperolehi daripada hasil penyelidikan-penyelidikan yang lepas dan peta Sungai Terengganu diperolehi dari Jabatan Ukur dan Pemetaan Malaysia (JUPEM). Daripada data yang diperolehi, dari segi kedalaman sungai, tahap keselamatan navigasi di Sungai Terengganu adalah selamat sehingga ke Jambatan Manir tetapi terdapat juga beberapa kawasan yang cetek. Untuk kawasan bawah sungai, tiada masalah kerana sungai telah dikorek sehingga ke 10 meter dalam semasa pembinaan banteng pemecah ombak. Pembinaan banteng pemecah ombak juga membolehkan navigasi di Sungai Terengganu boleh dilakukan dengan selamat dari segi gelombang, kelajuan angin dan juga arus meskipun ketika musim monsun. Benteng pemecah ombak bertindak sebagai dinding yang memantulkan gelombang yang kuat kembali ke laut dalam dan juga bertindak sebagai penahan angin kencang ketika musim monsun. Untuk arus, kebanyakan air dari sungai akan terperangkap di dalam kawasan sebelah dalam banteng pemecah ombak disebabkan oleh banteng pemecah ombak itu yang tidak membenarkan pengaliran air masuk atau keluar dari muara sungai. Jadi, arus tidaklah terlalu laju disebabkan oleh kurangnya pergerakan air yang mengalir sama ada mengalir ke laut dalam ataupun mengalir ke dalam muara sungai