RISK AND RELIABILITY ANALYSIS STUDY OF OFFSHORE AQUACULTURE OCEAN PLANTATION SYSTEM

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RISK AND RELIABILITY ANALYSIS STUDY OF OFFSHORE AQUACULTURE OCEAN PLANTATION SYSTEM

By

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A thesis submitted in partial fulfillment of
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DEPARTMENT OF MARITIME TECHNOLOGY
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DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled: **Risk and Reliability Analysis Study of Offshore Aquaculture Ocean Plantation System** by **Nur Sakinah Amirah binti Rosli**, Matric No. **UK 20656** have been examined and all errors identified have been corrected. This report is submitted to the Department of Maritime Technology as partial fulfillment towards obtaining the **Bachelor Degree of Applied Science (Maritime Technology)**, Faculty of Maritime Studies and Marine Science, Unitversiti Malaysia Terengganu.

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DECLARATION

I hereby declare that this thesis entitled **RISK AND RELIABILITY ANALYSIS STUDY OF OFFSHORE AQUACULTURE OCEAN PLANTATION SYSTEM** is the result of my own research except as cited in the references.

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RISK AND RELIABILITY ANALYSIS STUDY OF OFFSHORE AQUACULTURE OCEAN PLANTATION SYSTEM

ABSTRACT

Complex system design is increasingly adopting risk and reliability analysis for safety, efficiency and sustainable development purpose. Approach population and urban development expand in landscape island countries or countries with long coastlines, city planners and engineers resort to land reclamation to ease the pressure on existing heavily-used land and underground spaces use risk based design for reliable purpose. Risk based design has also been used on system that use fill materials from seabed, system hills, deep underground excavations, and even construction debris, engineers are able to create relatively vast and valuable land from the sea. Through risk based design of aquaculture industry is one of the fastest producing sectors in the world. Seaweed farming has become an economically important natural resource for Malaysia since 1978, when it was first introduced to Semporna, east coast of Sabah on a commercial scale. It has develop the aquaculture activities in Sabah as a second largest contributor from marine aquaculture which produce 60% from total value of exported fisheries product at RM114 million (1994-1997). Considerable interest exists in developing open ocean aquaculture in response to a shortage of suitable, sheltered inshore locations and possible husbandry advantages of oceanic sites. Adopting the concept of very large floating structure in aquaculture farming in offshore environment is like to produce more aquaculture product like seaweed. All being property and support for growing aquaculture industry. Risk analysis study of offshore aquaculture ocean plantation system is very important to determine the system functionality and capability that meet sustainable and reliability requirement. The research qualitatively assesses system risk and quantifies mooring failure probability, maximum force and required number of mooring as well as associated cost.

RISIKO DAN KEBOLEHPERCAYAAN KAJIAN ANALISIS DARI LUAR PERSISIRAN AKUAKULTUR SISTEM PELADANGAN LAUT UNTUK STRUKTUR TAMBATAN

ABSTRAK

Reka bentuk sistem yang kompleks semakin mengambil risiko dan analisis kebolehpercayaan bagi tujuan keselamatan, kecekapan dan pembangunan mampan. Penduduk pendekatan dan pembangunan bandar berkembang di negara-negara pulau landskap atau negara dengan pantai yang panjang, perancang bandar dan jurutera beralih kepada tanah penambakan untuk meringankan tekanan ke atas banyak digunakan tanah dan ruangan bawah tanah sedia ada menggunakan reka bentuk berasaskan risiko untuk tujuan yang boleh dipercayai. Reka bentuk berasaskan risiko juga telah digunakan pada sistem yang menggunakan bahan-bahan isi dari bukit sistem dasar laut, dalam penggalian bawah tanah, dan juga sisa pembinaan, jurutera dapat mewujudkan tanah yang agak luas dan berharga dari laut.Melalui reka bentuk berasaskan risiko industri akuakultur adalah salah satu sektor yang paling pesat pengeluar di dunia. Penanaman rumpai laut telah menjadi satu sumber semulajadi yang penting dari segi ekonomi bagi Malaysia sejak 1978, apabila ia mula diperkenalkan ke Semporna, pantai timur Sabah pada skala komersial. Ia mempunyai membangunkan aktiviti akuakultur di Sabah sebagai penyumbang kedua terbesar dari akuakultur marin yang menghasilkan 60% daripada jumlah nilai perikanan produk yang dieksport pada RM114 juta (1994-1997). Minat yang besar wujud dalam membangunkan laut terbuka akuakultur di tindak balas kepada kekurangan yang sesuai, lokasi pantai terlindung dan mungkin kelebihan penternakan laman lautan. Mengamalkan konsep struktur yang sangat besar terapung dalam akuakultur pertanian dalam persekitaran luar pesisir adalah seperti untuk menghasilkan lebih akuakultur produk seperti rumpai laut. Semua harta dan sokongan untuk berkembang industri akuakultur. Risiko kajian analisis luar pesisir lautan sistem perladangan akuakultur adalah sangat penting untuk menentukan kefungsian sistem dan keupayaan yang memenuhi keperluan mampan dan kebolehpercayaan. Penyelidikan kualitatif menilai risiko sistem dan kuantiti kebarangkalian kegagalan tambatan, daya maksimum dan bilangan yang diperlukan tambatan serta kos yang berkaitan.