# GENETIC ALGORITHMIC APPROACH TO OPTIMISING LAND RECLAMATION PROCESS BY SHORELINE FILLING



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in partial fulfilment of the requirements for the

degree of Master of Science



by

**NELUM PANDULA PREMADASA**



**Supervised by: Prof. Lanka Udawatta**

**Department of Electrical Engineering**
**University of Moratuwa, Sri Lanka**

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## DECLARATION

The work submitted in this dissertation is the result of my own investigation, except where stated otherwise.

This has not already been accepted for any degree, and is also not being concurrently submitted for any other degree.

*UOM Verified Signature*

Nelum Pandula Premadasa
January 2010

I endorse the declaration by the candidate.

*UOM Verified Signature*

Prof. Lanka Udawatta

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# Abstract

Land reclamation by sea filling is the process of acquiring the area of ground available by increasing the existing sea bed level. The land reclamation plays a vital role in the modern world as the rapid increase of population and industrial parks and finally resulting lack of available ground for establish various physical purposes. In the sea filling practice, the most important property of the filled are is its geometric orientation and configuration. The common form of sea filling practice is to fill the sea along a contour line. Basic guidelines of theoretical sea filling have been introduced in various references. Such a comprehensive set of guidelines can be found in the "Coastal Engineering Manual". The configuration and orientation of the reclaimed land is depending on various factors. In this research first, all the factors affecting are identified. Then the feasibility of sea filling of a particular area is indicated by a quantity defined as Net Benefit of Area (NB). The effectiveness of sea filling process of a particular area is proportional to the NB. Then the relationship of the all the factors affecting to the sea filling orientation and configuration to Net Benefit is identified and parametric representation is established. Simplification of the mathematical representation is done based on the availability of corresponding on-site data, and also correctness of them. Finally, the problem is formulated as an Multivariable Constraint Optimization Problem. But traditional optimization techniques could not be employed because of the complexity. The problem can be satisfactorily solved by using a Genetic Algorithm (GA) approach. Application of genetic algorithms for this kind of problem is not found so far. The final results are obtained by multiple iterations of GA, and are represented in numerically and graphically superimposing on bathymetric survey map of the location.

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