

**Heuristic Approach of Berth Allocation and
Quay Crane Scheduling for
Sri Lanka Ports Authority**

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DECLARATION

I hereby declare that this thesis was carried out by me for the degree of Master of Science / Information Technology under the guidance and supervision of Mr Saminda Premaratne. The previous works, articles and websites, which I have made use of, are acknowledged at the respective places in the text. For the present thesis, which I am submitting to the University, no degree or diploma or distinction has been conferred on me before, either in this or in any other University.

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ABSTRACT

Maximum utilization of resources is the key aspect for reducing the turnaround time of vessel calls for any container terminal. Among the various resources, effective utilization of berth and quay cranes are directly subscribed causes for the two important optimization problems arisen, which are the berth allocation and quay crane scheduling problems. The berth allocation problem deals with the generation of a berth plan, which determines a suitable berth and when a vessel has to berth alongside the quay. The quay crane scheduling problem illustrates the problem of allocating how many and which quay cranes will serve for each vessel. Given resolving the problems identified in quayside port operations, this project discusses the need for integrated optimization of Berth Allocation Problem (BAP) and Quay Crane Scheduling (QCS) under any circumstances. Online optimization of quayside resources is also a significant need in terms of unpredicted conditions. Therefore, in order to provide provision in discussing the research models associated with solving resource allocation for incoming vessels in port operations, this report surveys the current state of the art in relevant technologies and methods applicable in the industry. Hence, in this research survey, it is mainly focused on resource allocation problems which related to BAP, QCS and forecasting the vessel arrival patterns in Jaye Container Terminal (JCT) of Sri Lanka Ports Authority (SLPA).

Finally, in this project, an integrated heuristics based solution methodology is proposed that tackles both BAP and QCS problem. Also, the predictive analyzing model will be developed for forecasting the vessel arrival patterns to analyze the vessel calls using data mining techniques to improve the utilization and to achieve maximum productivity of SLPA simultaneously.

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