

**Development of conceptual model for Main Line Container
Vessel Berth allocation in a Transshipment Container
Terminal**

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Dr.Indika Sigera

Abstract

Berth allocation is essential for efficient terminal utilization in container ports and it can identify as a most critical activity which should manage in strategic ways to achieve long term benefits. Previous studies have empathized that, Port/ Terminal congestion i.e unexpected waiting times before berthing, as a main factor which affects to the schedule unreliability in container Shipping. Terminal operators' objective is to minimize the sum of port staying times of container vessels while maximizing berth occupancy of terminal and that minimizes dissatisfaction of the ships in terms of the berthing order. Main container Shipping lines strive to maintain their sailing schedules to manage expected level of schedule reliability. Focusing on that, this research is aimed to develop a common model which beneficial to both Container Terminal Operators & Shipping Lines when arranging berths in container terminals. The study was focused on main line container vessels' berth allocation practices in Transshipment container terminals. Analysis of the study was carried out from both Terminal operators' and Shipping Lines' aspects. Eight criteria have identified from terminal operators' aspect which are consider when allocating and prioritizing berths for incoming container vessels. From the Container shipping lines' aspect eight criteria have identified which are consider by them when requesting berths for their vessels. Finalized criteria from both aspects were structured in to two questionnaires and one sent to the managerial level of selected ten major transshipment terminals and other one sent to the ten leading container shipping lines in world. Collected expert judgments regarding the subject criteria was analyzed using Analytical Hierarchy Process (AHP) technique and as a final outcome those were ranked based on the weight assigned. Products of the two aspects were combined to develop a common model which considered to be as a win-win approach. Common criteria from both aspects have extracted to develop a product of two matrixes. In common model criteria named "Berthing Pro-Forma" ranked as a most critical and important one having weight of 0.2701. Other seven criteria were ranked based on the calculated weights as Punctuality of service (0.2255), Investment in terminal (0.1791), Liner connectivity (0.1268), Commercial aspects (0.0862), Relationship and market power (0.0537), Service agreements and policies (0.0317) and Special requirements (0.0222). Since mentioned eight criteria make a positive impact on the berthing arrangement equation has developed by adding those together. Within this study applicability of the modal to the real-world berth

allocation problem have discussed as a final step of the analysis. As currently practiced in container terminals, berth allocation has done based on the practical experience and intuition of relevant professionals and it was an activity they daily performed. Since they are focusing on this as a day to day activity, in long term negative impacts can occur due to customer dissatisfaction. This happens because terminal operators and shipping lines are working separately to achieve their individual objectives by neglecting the importance of mutual agreements. That gap will fill by this study and developed model can use in berth allocation which may generate long term mutual benefits to both parties. Future studies can be focusing on to apply the same concept in feeder line operation and any type of port terminal.

Key words: Berth Allocation, Port staying time, Transshipment terminal, Analytical Hierarchy Process, Schedule reliability

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List of Acronyms

AHP	Analytical Hierarchy Process
TEU	Twenty-Foot Equivalent Unit
ITT	Inter Terminal Trucking
FCFS	First Come First Serve
THC	Terminal Handling Charges
ETA	Estimated Time of Readiness
BAP	Berth Allocation Problem
QC	Quay Crane
MUT	Multi User Container Terminal
KPI	Key Performance Indicator
TSA	Terminal Service Agreement

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