



UNIVERSITY OF MORATUWA

Faculty of Engineering

Department of Transport and Logistics Management

MBA in Supply Chain Management

**The Study of Determining the Factors Affecting the Truck Turnaround Time
in a Container Terminal**

(With special reference to Jaya Container Terminal –Port of Colombo)

Thesis

By

MPACD Jayasekara - 199166R

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DECLARATION

I certify that all the material in this research study that is not my work has been adequately cited and referenced the sources. I also declare that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my personal views and are not necessarily endorsed by the University.



MPACD Jayasekara (199166R)

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Supervised by:



30/08/2021

Dr. Indika Sigera

Department of Transport and Logistics Management

University of Moratuwa

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ABSTRACT

Maritime transportation has become the most popular cargo transportation mode over a long period of time. It has evolved, today, up to container transportation where it has geared up the platform to container terminal operation. Port of Colombo is one of the major transshipment hub ports in the world, which consists of three major container terminals including the Jaya Container Terminal which is the largest government owned container terminal. The East Container Terminal was added to the above terminals at the end of the year 2020 which is also operates under the Sri Lanka Port Authority. Around 80 per cent of the containers handled inside the Port of Colombo are transshipment. To maintain the highest connectivity rates the shipping lines have to move the transshipment containers among the vessels calling across these container terminals. Therefore, the truck movements are on the increase inside the port area as well as in the respective terminals. Hence, this research is focused on one of the critical parameters for the terminals; Truck Turnaround Time.

This research is carried out as a case study analysis, to find out the most important factors that affect the truck turnaround time inside a container terminal and thereby improve the terminal's efficiency and productivity levels in minimizing the effects of the factors identified. The factors were identified using a pilot survey and literatures on the related studies. A questionnaire is adopted to collect the data using Likert scale values and the data analysis is performed using statistical techniques such as Hypothesis Testing, Karl Pearson's Correlation Coefficient, Regression Analysis and the question by question analysis.

As per the research findings, the relationships against all the four independent variables; Vessel Operations, Yard Utilization, Handling Equipment and the Human factor, were found with the Truck Turnaround Time (TTT). Pearson correlation coefficients for the above factors were found as 0.636, 0.816, -0.091 and 0.656 respectively. Therefore, we may summarize the relationships as follows.

- TTT vs Factors relating to Vessel Operations - Strong Positive Relationship
- TTT vs Factors relating to Yard Utilization - Strong Positive Relationship
- TTT vs Factors relating to Handling Equipment - Negative Relationship
- TTT vs Human factors - Strong Positive Relationship

However, the analysis data has an R-squared value of 0.721. Therefore, it further hints that there can be many other factors that could affect the dependent variable. Apart from the data gathered through interviews and the questionnaire, the relationships found are tested with the real data to get a better understanding of the numerical values. The measurable figures give an idea of the threshold values of each of the major factors on the acceptable Truck Turnaround Time values. However, it is to be noted that the container terminal operation is highly dynamic in nature. So that the threshold values identified in the study require continuous assessments with time. From the outcome of the analysis, suitable recommendations are made for the Jaya Container Terminal to reduce the truck turnaround time within the terminal and finally to improve its overall productivity

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KEY WORDS

- CICT – Colombo International Container Terminal
- EQF – Handling Equipment related Factors
- ITT – Inter Terminal Transfer
- JCT – Jaya Container Terminal
- KPI – Key Performance Indicator
- MNF – Manning related Factors
- PDS – Position Detection System
- POC – Port of Colombo
- QC – Quay Crane
- RF ID – Radio Frequency Identification
- RMG – Rail Mounted Gantry cranes
- RTG – Rubber Tyred Gantry cranes
- SAGT – South Asia Gateway Terminal
- SLPA – Sri Lanka Ports Authority
- TEU – Twenty-foot container Equivalent Unit
- TMS – Terminal Management System
- TTT – Truck Turnaround Time
- VOPF – Vessel Operation related Factors
- YUF – Yard Utilization related Factors

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