

**IMPROVING EFFICIENCY OF A WAREHOUSE: CASE
STUDY FROM A TILE MANUFACTURING COMPANY IN
SRI LANKA**

Balamanage Chamila Tharidupriya Wimalarathna

(179226J)

**Dissertation submitted in partial fulfillment of the requirements for
the degree Master of Business Administration in Transport and
Logistics**

Department of Transport and Logistics Management

Faculty of Engineering

University of Moratuwa

Sri Lanka

May 2020

Candidate's Declaration

I declare that this is my own work and this thesis/dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Also, I hereby grant to the University of Moratuwa, the non-exclusive right to reproduce and distribute my thesis/dissertation, in whole or in part in print, electronic or other medium. I retain the right to use this content in whole or part in future works (such as articles or books).

.....
(Candidate: B.C.T. Wimalarathna)

.....
Date

Supervisor's declaration

The above candidate has carried out research for the MBA thesis Dissertation under my supervision.

.....
(Supervisor: Dr. T. Sivakumar)

.....
Date

Abstract

Warehouse operation and management is a critical part in manufacturing and service industry. This research analysis the strategies for improving the warehouse efficiency in leading tile manufacturing organization (RPL) in Sri Lanka and how to implementing the proper inventory management system in the warehouse. The Cumulative Net Flow Analysis (Inflow-Outflow) was used for check whether warehouse capacity was enough or not to cater the customer demand as well as Inflow quantity from the factory. And also it used 4M analysis(Man, Machine, Material, Method) with the internal warehouse processes to find that are there any errors with reference to 4Ms. In addition to that a questionnaire was given to employees in RPL to find the strategies which will be most significant and implementable.

Key Words: Warehouse Efficiency, Warehouse Layout, Forklift Routing

Acknowledgements

I would like to express my special thanks to my Supervisor Dr. T. Sivakumar who guided and supported me to make this research success. And without his advice, encouragement and patience, I couldn't be able to complete this research successfully with in the limited time frame and I should also offer gratitude to Prof. Amal S Kumarage who gave me the guidance and encouragements which really helped me to achieve the objectives of this research. It is my privilege to thanks Ms. Harishani Liyanage who gave me the guidance and knowledge made me embark on this research.

I would like to take this opportunity to thank the staff of the Department of Transport and Logistics Management, Faculty of Engineering, University of Moratuwa.

I am extremely thankful to Mr. Shammika, Mr. Buddika and Mr. Kasun who permitted me to collect and analyze the data of the RPL.

At last but not least, I should profusely thank to my loving mother and sister who encouraged me to complete this research on time which really helped me to succeed this research.

Table of Contents	PageNo
1 INTRODUCTION.....	1
1.1 Warehouse Capacity and Operations	1
1.2 Case Study Area.....	2
1.3 Process Structure and Existing Layout of RPL.....	2
1.3.1 Process Structure of RPL	2
1.3.2 Existing Layout of RPL.....	5
.....	5
1.4 Research Problem.....	5
1.4.1 Lack of Routing Schedule for Forklift Operators.....	5
1.5 Research Objective.....	6
1.6 Research Limitations.....	6
2 LITERATURE REVIEW.....	7
2.1 Generalization of the Literature Review	7
2.2 Warehouse Layouts	9
3 RESEARCH METHODOLOGY	11
3.1 Analysis Cumulative Net Flow(Inflow-Outflow)	11
3.2 Conduct a Questionnaire for Employees in RPL	11
3.3 Assign Standard Routing for Forklift Operators	11
3.4 Data Collection Process	12
4 DATA ANALYSIS	14
4.1 Analysis Cumulative Net Flow	14
4.2 Questionnaire Related Summary and Findings.....	17
4.2.1 Analysis No of Responses for Questions	17
4.2.2 Define Weighted Scale for Different Segments	18
4.2.3 Analysis Weighted Score against Importance and Easy	19
4.2.4 Analysis Weighted Score against Importance.....	21
4.2.5 Analysis Weighted Score against Easy	22
4.2.6 Analysis Weighted Score for Importance against Question Category	23
4.2.7 Analysis Weighted Score for Easy against Question Category.....	24
4.3 Analysis of Assign the Operation Activities	26
The Cost Metrix for how to assigning the operation activities(assigning standard routing for forklift operators) is below mentioned.	26
5 CONCLUSION AND RECOMMENDATIONS	29

5.1	Conclusion.....	29
5.2	Recommendations	30
	REFERENCES.....	31
	Appendix-A.....	33

List of Figures	Page No
Figure 1.1: Storing and Receiving Operations.....	3
Figure 1.2: Picking Operation.....	4
Figure 1.3: Existing Layout of the RPL.....	5
Figure 2.1: Layout-1.....	9
Figure 2.2: Layout-2.....	9
Figure 2.3: Layout-3.....	10
Figure 4.1: Net Flow(In-Out).....	16
Figure 4.2: Cummulative Net Flow(In-Out).....	16
Figure 4.4: Weighted Score Vs Question.....	21
Figure 4.5: Weighted Score Vs Importance.....	22
Figure 4.6: Weighted Score Vs Easy	23
Figure 4.7: Weighted Score for Importance Vs Question Category.....	24
Figure 4.8: Weighted Score for Easy Vs Question Category.....	25

List of Tables

Page No

Table 3.1: Sample Questionnaire.....	12
Table 4.1: Cummulative Net Flow.....	14
Table 4.2: Number of Responses for Question.....	17
Table 4.3: Weighted Scale for Different Segments.....	18
Table 4.4: Weighted Score Vs Important and Easy	19
Table 4.5: Weighted Score Vs Question.....	20
Table 4.6: Weighted Score Vs Importance.....	21
Table 4.7: Weighted Score Vs Easy.....	22
Table 4.8: Weighted Score for Importance Vs Question Category	24
Table 4.9: Weighted Score for Easy Vs Question Category	24
Table 5.0: Cost Metrix for Assigning Operation Activities	26
Table 5.1: Cost Metrix	27

List of Abbreviations

First-In First-Out	-FIFO
Just In Time	-JIT
Rocell(pvt) Ltd	-RPL
Work in Process	-WIP
Stock Keeping Units	-SKU

List of Appendices

Appendix	Description	Page No
Appendix-A	Sample Questionnaire	33