UNIVERSITI TEKNOLOGI MARA

SOLVING REAL-TIME CROSS DOCKING TRUCK-TO-DOOR ASSIGNMENT AND SCHEDULING USING MIXED INTEGER PROGRAMMING AND FUZZY LOGIC MODEL

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of the requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Efficiency of cross docking is mainly affected by the inbound operation's total operation time that involves truck-to-door assignment and scheduling. However, many cross docking centres are still practising conservative way for assigning and scheduling trucks to dock doors. Most current studies addressed deterministic truck scheduling model, thus, unable to deal with real time and dynamic environment of trucks arrival at the cross docking centre. Thus, this study embarks on four objectives which are to identify current issues of cross docking's truck-to-door assignment and scheduling, to estimate the unloading time of a truck using fuzzy logic modelling, to develop a Mixed Integer Programming (MIP) model that minimizes the total service time of trucks at the inbound operation based on the estimated unloading time; and to analyse the simulations of daily real time truck scheduling operations based on the proposed model. This study utilized data gathered from a third party logistics company (3PL). Results from data analysis were used as basis for establishing the models of this study. Statistical analysis was utilized for hypothesis testing. Monte Carlo simulation experiments using an automated Excel-VBA template were conducted for verification and validation of the models. Based on the results, the developed mathematical model has been proven to be reliable in producing feasible solutions with low waiting time per truck and low service time, thus, capable of minimizing the total service time for all trucks at inbound operation at cross docking centre. The models and findings of this study can be utilized to enhance the cross docking services especially in Malaysia.

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