

ABSTRACT

BUS SCHEDULING MANAGEMENT IN BANGKOK

By

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ABSTRACT

The author wishes to express his heartfelt appreciation and deep gratitude to his advisor, Prof. Dr. [Name]. The public bus transit system of Bangkok is one of the largest in the world. Efficient managerial policies are required to provide good service at minimal cost in a very hectic traffic environment.

The design of an adapted, computerized bus scheduling methodology is the main subject of this dissertation. Trip frequency scheduling for bus routes is studied taking into account the present practices, lack of modern equipment, lack of parking spaces, and the fluctuating traffic conditions throughout the day. An integer programming model is developed and two heuristic methods, one of which is based on linear programming and the other being a straightforward derivation from the present bus operation, are presented. Complementary bus and crew scheduling methods are also developed taking into account the special feature that buses and crews are not assigned to a specific trip before the start of the daily operation.

Based on the bus and crew schedules, the relationships between the total employed and daily crew sizes are established. Crew rostering methods are developed: a procedure to generate a day off pattern is proposed; an integer programming model to represent the crew rostering problem with day off and shift constraints is developed; a heuristic method using the Bottleneck Assignment Problem and a procedure to generate an initial solution are proposed.

The resulting methodology is tested on two selected bus routes in Bangkok and extensive comparisons are made. All practical aspects, such as parking space and depot location constraints, are considered. It appears from the study that at similar exploitation costs significantly better service can be offered to the public.

The practical implementation of the new approach and data collection is also discussed. The approach has been implemented for two bus routes in the city of Bangkok.

Apart from the very practical approaches mentioned, a more theoretical probabilistic analysis has been made of the distribution of buses along a bus route in a city with many traffic congestions. A specific queuing model was developed allowing to predict where bus concentration will occur.

Finally, the author is indebted to his parents, for their support and encouragement; to his beloved wife, Huiping, for her understanding and sacrifice. This dissertation is dedicated to them.