The purpose of this thesis is to determine the optimum number of buses and trips that yield the least total cost, defined as the sum of Bangkok Mass Transit Authority's cost and the passengers' cost. The study employed the case of Zone 3 Division 1 which is consisted of 5 bus routes : route 25*, route 25, route 142, route 145*, and route 145, using linear programming technique and sensitivity analysis as analytical tools.

Study results are obtained as follows:

1. The optimum number of buses for routes 25*, 25, 142, 145* and 145 are 89, 39, 15, 19 and 15 buses per day, respectively.

2. The optimum number of trips for routes 25*, 25, 142, 145* and 145 during peak hours are 5, 3, 5, 4 and 3 trips per bus per day, and during non-peak hours are 11, 7, 10, 11 and 7 trips per bus per day, respectively.

Major findings from sensitivity analysis are as follows:

1. The 10 per cent change in fuel oil price results in the 13 per cent change (in the same direction) in the total cost, with no effect on the optimum number of buses and trips

2. The 10 per cent rise in fixed cost results in the 9.85 per cent rise in the total cost, with no effect on the optimum number of buses and trips.

3. The increase in number of buses by 200 to the fleet affects the optimum number of buses and trips both during peak and non-peak hours.

4. The 10 per cent increase in travel time per trip also affects the optimum number of buses and trips both during peak and non-peak hours.

Analytical methods and results obtained would serve as a useful guideline for solving the BMTA's loss and for planning with respect to the number of buses and trips for all available routes.