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Research Summary Series

*A series to disseminate results of research being conducted
by the Midwest Regional University Transportation Center and
the Federal Highway Administration*

Purchasing and Rebuilding Buses for Transit Asset Management



Project 02-01

Research results in a quick and easy-to-read format

Research Methodology

In 1992, the Federal Transit Administration conducted a study that showed the annual cost of replacing the nation's transit fleet easily exceeding one billion dollars. While it is desirable to replace all old buses with new ones, budgetary constraints make it impossible to fund the purchase of new buses. The methodology proposed consists of two stages that will enable state DOTs to allocate resources for purchasing and rebuilding buses, and distribute these funds among the constituent transit agencies in an equitable manner. Stage 1 examines the economic consequences of postponing the replacement of a bus that has exceeded the minimum normal service life requirements. This stage also justifies the maximum cost of rebuilding existing buses, when all benefits and costs are measured. Stage 2 is comprised of two optimization models that allocate and distribute capital dollars in order to purchase new buses and rebuild existing buses according to the needs of all constituent transit agencies.

Optimization Models

This research approach included two models that use the principles of optimization to accomplish its objectives. Model 1 maximizes the weighted fleet life of the group of buses that are being purchased and rebuilt, subject to demand and cost constraints. Model 2 maximizes the remaining life of the entire fleet in groups comprised of existing, rebuilt, and replacement buses, subject to fleet constraints resulting from Model 1. The testing of the models indicates that they are viable and require fleet life data that is usually available with state DOTs. They showed that transit agencies could satisfy the fleet requirements through the best combination of buses within the constraints of a given budget, and funds for the additional buses could be allocated among the constituent agencies in an equitable manner. With these models, state DOTs could recognize each individual agency's fleet requirements within the larger framework of the fleet group.

Research Objective

The objective of this research was to develop a set of procedures that can be used by state Departments of Transportation (DOTs) to optimally allocate limited capital dollars for purchasing new buses, rebuilding existing buses, and funding specific programs used by local transit agencies.

Current State of Practice

To determine how different states currently allocate capital resources to its transit agencies, telephone interviews were conducted with some DOTs in the Great Lakes Region. The Michigan Department of Transportation (MDOT) does not have a formal process in place. The funding is provided through various programs, and transit agencies submit funding applications each year. The Wisconsin Department of Transportation (WisDOT) only provides state funding to support the operation of its transit systems. Like MDOT, WisDOT receives funding applications annually from transit agencies. The Ohio Department of Transportation (ODOT) provides financial assistance to approximately 62 public transit agencies in Ohio. Every Ohio transit agency must list the inventory number, type, age, and mileage of the vehicle to be considered for replacement.

Lessons Learned

The states that were interviewed are making conscious efforts to meet their agency's fleet needs; however, their funding should be increased to meet increasing replacement costs and maintain the quality of service. With the implementation of these optimization models, the state DOTs can begin to better meet their transit needs.