A Resource Guide for State DOT's Maintenance Equipment Fleet Management Decisions

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Tran-SET

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Total Project Cost:

$140,000

Developing a resource guide to aid equipment managers make better-informed decisions on replacing equipment

Strategies for highway maintenance and repair activities across the state include using contractors or in-house personnel combined with equipment either purchased, leased, or rented. State DOTs tend to use their own personnel and equipment. As such, they typically possess a large fleet of vehicles and equipment. Equipment ownership cost and operating costs are the two main categories of costs used to determine the lifecycle cost of equipment. Ownership and operating costs are estimated using several published methods in literature or available rate-schedule published by equipment manufacturers, the Federal Emergency Management Agency (FEMA), or Cost Recovery Rental Rate Blue Book. As more state DOTs adopt electronic equipment management systems, fleet managers should be able to estimate ownership and operating costs based on accurate data so more economical decisions can be made. The Oklahoma Department of Transportation (ODOT) uses "rental rates" as the main metric in its equipment budget. The rental rate is the sum of equipment depreciation costs and operating costs. An earlier study by the researchers shows that the rates have not been updated since Fiscal Year 2010. Furthermore, there is no established management practice for analyzing and adjusting equipment rental rates for reporting and budget predicting. This creates uncertainty and inaccuracies.

Problem Statement

The ODOT has over 4000 pieces of equipment, with equipment purchase years ranging from 1964 to the present. Much of the equipment has exceeded its useful life. Using equipment under suboptimal conditions increases operating costs due to equipment deterioration. The default equipment useful life specified by ODOT is subjective and lacks impartial, scientific reasoning. Equipment replacement decisions are purely dependent on fleet managers' experience. Furthermore, ODOT primarily buys equipment. When it comes to equipment sourcing, strategies include own, rent, and lease. ODOT may miss the opportunity of investigating other equipment sourcing methods.

Objectives

The underlying goal of this research project is to help ODOT strategically improve its equipment management practices using the data recorded in its equipment fleet management system. The specific objectives of this project are to:

- Assist ODOT in calculating ownership and operating costs of the selected types of equipment
- Develop models for equipment management decisions (including replacement and own, rent, or lease decisions)
- Develop a resource guide to introduce ODOT management to the latest techniques and practices in equipment management.

Intended Implementation of Research

Workforce Development: This will be achieved directly by training graduate, undergraduate, and high school students interested in pursuing a career in STEM or Transportation Engineering career.

Education: This task supports the federal initiative to prepare the next generation of transportation professionals to meet the demands of the rapidly changing equipment management systems. The PI currently supports and mentors five graduate students and three undergraduate students from external grants. The proposed study will help the PI to recruit and train more graduate and undergraduate students in transportation research.

Outreach: Technical articles, journal publications, posters, and presentations will be delivered at yearly national and local conferences and

symposia such as ASCE, Transportation Research Board, and Tran-SET.

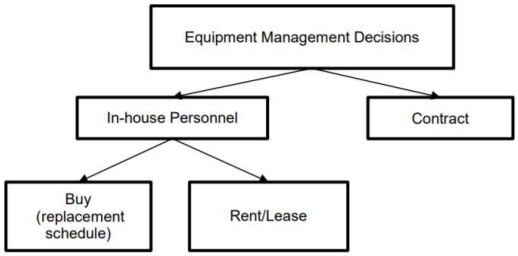

Figure 1: The Family Tree of Equipment Management Decisions

Anticipated Impacts/Benefits of Implementation

The main deliverables from this study are: (1) a final report that acts as a resource guide for maintenance equipment; (2) a webinar to disseminate the findings of this study to a general audience. and (3) presentations will be given at the TRB annual conference and Tran-SET conference

Web links

- Tran-SET's website https://transet.lsu.edu/research-in-progress/

Tran-SET

Tran-SET is Region 6's University Transportation Center. It is a collaborative partnership between 11 institutions (see below) across 5 states (AR, LA, NM, OK, and TX). Tran-SET is led by Louisiana State University. It was established in late November 2016 "to address the accelerated deterioration of transportation infrastructure through the development, evaluation, and implementation of cutting-edge technologies, novel materials, and innovative construction management processes".

Learn More

For more information about Tran-SET, please visit LinkedIn, Twitter, Facebook, and YouTube pages. Also, please feel free to contact Mr. Momen Mousa (Tran-SET Program Manager) directly at transet@lsu.edu.