



Kansas RTAP Fact Sheet

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Make a Plan to Keep Your Vehicles Rolling: Deciding When to Replace and When to Repair

By Clifton Hall

As a transit manager, you know the value your assets have in your operation, especially your vehicles. Repair and replacement is definitely one of the primary concerns in maintaining your vehicle fleet, but new best practices are emerging to help transit agencies determine when it makes the most economic sense to replace a vehicle, allowing for better planning for securing funds for repair and replacement. This article will explain investment prioritization, an important part of transit asset management that helps even small agencies decide which vehicles should be replaced, and in what order. It will introduce basic principles of investment prioritization, how it applies to small transit providers, and some analytical tools to perform calculations to assist with informed decision-making.

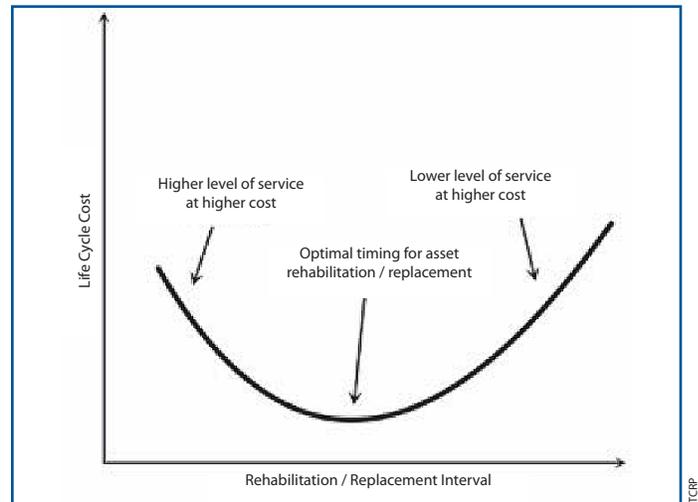
Investment prioritization: What is it?

Investment prioritization is the process of deciding the best schedule for replacement and/or rehabilitation of your assets; for rural transit agencies these assets are primarily vehicles. The primary goal of investment prioritization is to reduce backlog, which is the cost of bringing all assets to an ideal state-of-good-repair. More information on transit asset management and state-of-good-repair can be found in the April 2014 *Kansas TransReporter* article, "Transit Asset Management Plans: What Are They and How Do They Apply to Rural Transit?"

From an economic perspective, the ideal time to replace an asset is when its life cycle costs reach a minimum. An asset's life cycle cost is the price paid for that asset plus the cost of maintaining it in operation.

Typically, a vehicle's performance follows this pattern over time: 1) The vehicle performs efficiently, with low maintenance cost, and begins to pay for itself; 2) The vehicle's life cycle costs hit a low point as the initial investment is paid for, but maintenance costs slowly start to rise; 3) The vehicle's life cycle costs begin to increase because of increased maintenance costs due to age or wear-and-tear.

Replacing a vehicle cannot always be done at will because of financial limitations, and that is important to consider when



Relationship between life cycle cost and intervention interval. TCRP Report 157.

deciding to replace rather than repair or refurbish a vehicle. The ideal time to replace an asset is not when the operating costs of the vehicle exceed the net benefit it provides. Replacing a vehicle does have high initial costs, but replacing a vehicle with rising life cycle costs will help your agency the most in the long run.

Determine your assets' life spans

The service life of a vehicle is the time or mileage the vehicle is designed to operate at a certain service level. The remaining service life (RSL) of a vehicle is the time between the end of the vehicle's service life and the present. In Kansas, KDOT policy requires a minimum of 100,000 miles on a vehicle (or excessive maintenance costs) when application for funding is submitted for its replacement under the Section 5311 or 5310 programs.

When planning to rehabilitate or replace an asset, it is important to keep in mind how likely the asset is to fail before it reaches the projected end of its service life. Also, it

is helpful to think of the components of an asset as having their own service lives. The vehicle itself may be an “ongoing concern,” with smaller, replaceable components that have easily-predictable life spans. The prospect of replacing a major part, such as a transmission in an older vehicle, for example, may trigger the replacement of the entire asset as opposed to rehabilitating the vehicle by replacing the expensive component.

Balance performance and costs

When you consider replacing your assets, it is often because the cost of repair exceeds the cost of replacing the vehicle. By tracking the ongoing costs of each of your vehicles, you will be able to compare them to the monetary benefits the asset produces.

Performance measures quantify the service level and capabilities of a given asset. They help determine the benefit an asset is giving during its lifecycle, as opposed to its cost, helping you understand the value the asset brings to your operation.

Performance measures include on-time performance, vehicle reliability, and customer satisfaction. Whatever strategies your agency uses to record the outputs and benefits your system produces for customers can be seen as performance measures.

Optimal replacement time

In general, the best time to replace a vehicle is when the benefits minus costs of a new vehicle outweigh the benefits minus costs of the current vehicle. Understanding and planning for the replacement of a vehicle based on its remaining service life, even if the need for replacement isn't immediate, is the backbone of a vehicle prioritization system.

For example, if one of your vehicles begins to need more repairs and is also experiencing decreasing fuel economy and low on-time performance, it may be a good idea to look ahead at replacing the vehicle. Repair prices will likely continue to rise as the vehicle continues to age, and a new vehicle will perform better than the current one in the future.

Tools available for prioritizing assets

With transit asset management growing across the country, TCRP has released analytical tools to help managers understand the monetary benefits their assets produce, and which assets require more immediate attention.

TCRP provides Excel spreadsheets, described below, to

help calculate when assets should be replaced and in what order. Using these spreadsheets also gives transit managers an idea of what types of data can be collected for vehicles and other assets.

TCRP's Vehicle Modeling Tool. This tool serves two functions: first, it helps estimate the cost-minimizing point where rehabilitation or replacement is ideal; second, it helps predict the priority the vehicle will rank in the fleet. The model considers cost of rehabilitation or replacement, fuel and maintenance costs, delay costs, and potential savings yielded by replacing the vehicle. It then generates a PI (prioritization index) value that allows asset priorities to be compared to one another. This is a very comprehensive tool, and may only apply to Kansas agencies with larger vehicle fleets, but can apply to any agency depending on the detail of data collected.

TCRP's Prioritization Modeling Tool. This tool helps generate a set of rehabilitation and replacement scenarios by entering a budget and list of funding projects. It requires PI calculations from the vehicle modeling tool that help quantify the cost and economic benefits of each project.

These two tools are available online from the Transportation Research Board at <http://www.trb.org/TCRP/Blurbs/167637.aspx>. Alongside blank spreadsheets are examples populated with sample data to give you an idea of how the spreadsheets work.

Lay the groundwork for transit asset management

Prioritizing your investments is not only a good business practice for your agency, it will be helpful in your preparation for taking on new responsibilities in transit asset management (TAM). Asset prioritization is a key concept in TAM. While firm regulations have not been released by the Federal Transit Administration on transit asset management, thinking about his practice will help you be prepared, and meanwhile, help you keep your buses and other vehicles on the road. ●

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Sources

- TCRP Report 157. State of Good Repair: Prioritizing the Rehabilitation and Replacement of Existing Capital Assets and Evaluating the Implications for Transit. 2012.
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- Iowa DOT, Policies developed to guide Office of Public Transit procedures, requirements and funding distribution, Accessed May 1, 2012. <http://www.iowadot.gov/transit/policies.html>