Transit CHALLENGES Practical SOLUTIONS

RESEARCH IN ACTION:

A CASE STUDY

TCRP

TRANSIT COOPERATIVE RESEARCH PROGRAM

Developing a Precision-Driven Asset Management Program

Bringing Asset Managers Together

THE SANTA CLARA VALLEY TRANSPORTATION AUTHORITY (VTA) operates over 400 buses, 42 miles of light rail, and paratransit service in the areas in and around San Jose, California's Silicon Valley. VTA also a funding partner in the area's regional rail services (ACE and CalTrain). VTA currently faces a more than $400 million state-of-good-repair (SGR) backlog. The agency's formal efforts to institute a blended asset-management program—combining policies that already work well with new approaches—has been five years in the making and is ongoing.

Bruce Abanathie, VTA's Principal Transportation Planner and Program Manager for Transportation Asset Management, has spearheaded the effort by serving as a managing liaison between the executive team and all of the divisions and consultants involved in the process.

One of the tools Abanathie has relied on to shape an effective asset management program is **TCRP Research Report 198**, ***The Relationship Between Transit Asset Condition and Service Quality***. The report offers detailed guidance to transit decisionmakers on how asset condition and transit service quality relate in terms of investment prioritization. Specifically, the report provides a quantitative method in the form of detailed worksheets for characterizing service quality and showing how this quantitative measure varies with changes in asset condition.

Implementing these quantitative methods has required a focus on change management principles and obtaining concurrence among the asset creators, asset owners, and maintenance personnel. For example, the original asset management work group formed at VTA was attended by seven people, including just one representative from operations who was out-numbered by outside consultants and staff from GIS and construction. Abanathie changed the group's makeup to ensure that it had "the asset owners in the room" to avoid duplicative efforts and coordinate more efficient practices. Today, the work group includes more than 28 members, the majority of them from operations (who also comprise three-quarters of the organization's staff). Abanathie acknowledges that overcoming turf battles has been a big part of the challenge.

TCRP Report 198 is clear about the need to address organizational silos that may inhibit best practices in asset management. The report states that "[D]espite the fact that asset maintenance and operations are inextricably linked, in many transit agencies the units with responsibility for these areas seem to view themselves in opposition to each other, given the need

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to compete for limited funds, and so units potentially overlook opportunities to work together to maximize performance."

Adopting a Common Analytical Framework

WITH A ROBUST ASSET management work group in place, VTA has recently completed a risk assessment process to establish a risk-based plan for asset management. The agency is now positioned to examine how operations invests in SGR and how that work can be fine-tuned and reliably data-driven.

TCRP Report 198 provides two tools plus the case studies illustrating the use of the tools. These include a Simplified Effective Journey Time (EJT) Calculator; a Comprehensive EJT Calculator; and (3) a fictional case study demonstrating how to put these tools into practice. The main purpose of these tools, the report notes, is to provide empirical data that agency leaders can use to relate the effects of maintenance on operations and vice versa and, ultimately, better support difficult decisions on how to best prioritize capital investments.

Each calculator (series of Excel worksheets) drills down to the level of granularity that real-world transit operators require to make informed decisions. For example, the Base Case scenario reflecting current conditions takes vehicle, service, station, and guideway parameters into account. Similarly, a Future Case Parameters worksheet helps define both a worst case and a typical future scenario.

Abanathie sees these tools as a way to establish common ground within the agency. "I can go to the head of each asset type, such as facilities or guideway, bring them together and say, here are some tools that work. How does this compare to what you're doing now? Can we save you time, effort, and improve our asset investment profile? Can we reduce asset risk?"

Effective Journey Time (EJT) Calculator

Simplified Model

BASIC PARAMETERS

Description	Default	Override
Vehicle type	Bus	
Vehicles per consist (enter 1 for bus)	1	
Average vehicle headway (minutes)	10	
Route length (miles)	5	
Average vehicle speed (miles per hour)	20	
Vehicle useful life (years)	14	
Average fleet age (years)	5	
Mean Distance Between Failures (miles)	8,000	
Percentage of fleet typically under repair	15%	
Spare vehicle ratio	20%	

ADVANCED PARAMETERS

Description	Default	Override
Headway standard deviation	3.85	
Average annual increase in failure rate (%)	8.0%	
Delay per passenger from vehicle failure (minutes)	10	
Adjustment factor - wait time	1.9	
Adjustment factor - in-vehicle time for deteriorated vehicle	1.2	
Adjustment factor - std. dev. of journey time	1.3	

Figure 5-1. EJT calculator – example data entry screen.

Adding Customer Service to the Quality Equation

ANOTHER COMPONENT of **TCRP Report 198** that informs VTA's work is a definitional set of data needed for relating asset condition and service quality. The report outlines four categories of data sources: asset inventory and condition; maintenance data; operations data; and customer service data. VTA will use this checklist against its own, to identify areas for improving data collection.

Abanathie notes that the weight placed on asset condition versus customer service data is another key area of analysis to be performed. **TCRP Report 198** includes a table summarizing transit service quality attributes (e.g., comfort, ease of access, frequency, reliability) that help to streamline this task.

The next steps in VTA's process involve finding ways to effectively bring risk calculations into the asset management strategy that's taking shape within both planning and operations. VTA has completed an asset risk matrix that contributes to the lifecycle investment planning of assets.