Announcement of TCRP Synthesis Topics

The Transit Cooperative Research Program (TCRP) undertakes research and other technical activities in response to the needs of the public transportation industry on a variety of problems involving operations, service configuration, engineering, maintenance, human resources, administration, policy, and planning. The TCRP is a partnership of the Federal Transit Administration (FTA); the National Academies of Sciences, Engineering, and Medicine, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a non-profit educational and research organization established by the American Public Transportation Association (APTA). The TCRP Oversight and Project Selection (TOPS) Commission, the governing board for the program, recently selected Synthesis projects for the Fiscal Year 2022 program. This announcement is to inform the research community of these projects and to solicit project panel nominations and consultants' letters of interest.

TCRP synthesis reports on various practices, making recommendations where appropriate. Each document is a compendium of the best knowledge available on measures found to be successful in resolving specific problems. To develop these syntheses in a comprehensive manner and to ensure inclusion of significant knowledge, TRB hires a consultant with expertise in the topic area to gather and analyze available information assembled from numerous sources including a large number of transit agencies, and write a summary report. A panel of experts in the subject area is established to guide the researcher and to review the synthesis report. For each topic, the project objectives are (1) to locate and assemble documented information; (2) to learn what practice has been used for solving or alleviating problems; (3) to identify all ongoing research; (4) to learn what problems remain largely unsolved; and (5) to organize, evaluate, and document the useful information that is acquired.

Nominations of others and self-nominations of panel members should be submitted online and will be reviewed on a rolling basis. Please submit nominations as soon as possible at the MyTRB portal at this link: Online Panel Nominations

You will be asked to login to MyTRB. If you do not already have an account, you will be asked to quickly create one using your email and a password. To ensure proper consideration of nominations, please provide all of the information requested. A current resume is necessary to determine relevant knowledge and experience.

Communication to determine an individual's interest and availability in serving will be made from this office only after we have matched available expertise (e.g., knowledge and experience as presented in the resume) with that required by the nature of the project.

TCRP is also looking for consultants to perform as synthesis principal investigators. To formally express interest in authoring a topic, a two-page cover letter and professional resume or CV is required. Fixed fee is $55,000. Please submit letters of interest to the Letters of Interest Submission Portal.

A cover letter and resume or CV should provide a panel of topic experts with a concise idea of your knowledge of the topic and a list of work accomplished in the subject area. **The deadline for letters of interest is August 26, 2022.** Virtual topic panel meetings are anticipated during September and October 2022. During the meetings, scopes of work will be finalized and principal investigators chosen.

Transit Cooperative Research Program Synthesis Topics in the Fiscal Year 2022 Program
(**Titles are HOTLINKS**)

TCRP J-07/Topic SA-56
Use of Automatic Vehicle Monitoring (AVM) and Vehicle Health Monitoring/Diagnostic Systems by Transit Agencies

Background:

Automatic Vehicle Monitoring (AVM) is a vehicle health diagnostic system that integrates the monitoring of an array of on-board components in order to assist in the early identification of potential mechanical problems and thus support effective maintenance. These are also sometimes referred to as multiplex vehicle health monitoring systems.

Sensors monitor the performance of various engine and vehicle components and systems. This functionality takes on different forms and levels of sophistication or integration:

- An integrated comprehensive AVM monitoring, diagnostic, and reporting system that is built into the maintenance system. AVM may be fully integrated with the on-based CAD/AVL system, or a stand-alone system.
- Vehicle engine and component suppliers provide their own independent diagnostic systems used by maintenance departments.
- A limited number of engine sensors integrated into the Automatic Vehicle Location (AVL) system that only provide real-time alarms of faults or critical failures (e.g., temperature, pressure, etc.).

AVM can be used to identify likely mechanical failures and make maintenance more accurate or efficient. The monitoring systems provide an itemized report of all vehicle faults, allowing the maintenance department to prioritize repairs. Early identification of faults on a daily basis through expanded onboard monitoring allows the agency to respond more quickly with preventive maintenance (PM) action, which typically would not take place until the next scheduled PM interval or after a sudden breakdown occurred. The system allows direct assignment of personnel to required repair actions, thereby eliminating major costs associated with diagnostic time.

Synthesis Objective:

This synthesis will document the current use and benefits of using AVM as part of enhanced data-driven bus maintenance practice.

Information To Be Gathered (Not an exhaustive list):

- What is the extent of use of comprehensive AVM or vehicle health monitoring systems in the transit industry?
- Are these systems integrated into the AVL/ITS platform, or are they stand-alone? What are the perceived benefits of each alternative?
- How many transit systems rely solely on the diagnostic systems provided by individual component suppliers, as opposed to using comprehensive AVM systems as part of their maintenance?
- How have AVM systems changed maintenance procedures where they have been deployed?
- If AVM systems are not utilized what maintenance procedures are followed by the agencies?

How the Information Will be Gathered:

- a literature review (e.g. agency reports, peer reviewed journal articles, web articles, agency websites) that will include description of all the technologies available);
- a survey on a broad range of North American transit agencies (diverse in terms of geography, socioeconomics, size, and all types of vehicles in transit revenue service); and,
- At least five case examples that will gather information on the practices, challenges and successes

TCRP J-07/Topic SA-57
Statewide Approaches to the Development of Comprehensive Transit Information Systems

Background:

Over the past several years a number of State Departments of Transportation (DOTs) and a few Metropolitan Planning Organizations (MPOs) have taken on the role of developing statewide / regionwide transit information systems that are intended to collect comprehensive information about the availability of transit services and their attributes. This has largely taken place in the wake of the development of common data standards, such as General Transit Feed Specification (GTFS) which includes comprehensive information on the service attributes including routes, stop locations, and schedule information for fixed-route, fixed-schedule transit services.

The development of additional data standards, such as GTFS-Flex as a way of adding demand-response services (serving rural areas), along with intercity bus service information has led some states and regions to take on the role of supporting the development of this data, its maintenance, and the development of platforms to allow its access by planners, policy-makers, and potential transit users. By bringing together this information states may be able to present statewide transit services as a connected network and enable potential users to discover all the available services and how they connect.

The goals, intended uses, mechanisms, organizational support structure, and user access mechanisms can vary considerably, depending on the resources of the DOT or MPO, types of agencies in the state, and priorities of project leaders and stakeholders. An initial step for any state or region contemplating the development of such an information platform is a review of what other states and regions are doing similar projects, their goals, the process they are using to collect data, their organizational structure, the intended users, and their progress to date.

Synthesis Objective:

This synthesis will document the current practice of the creation of statewide / regionwide transportation information systems. A review of states doing similar projects, their goals, the process they are using to collect data, their organizational structure, the intended users, and their progress to date shall be included.

Information To Be Gathered (Not an exhaustive list):

- Identification of existing projects;
- Goals—intended uses/user groups, anticipated benefits Responsible agencies and organizational structure, staffing;
- Funding;
- Data requirements, sources;
- Support for data collection and maintenance;
- User interfaces available to participating agencies;
- Process for updating and maintaining data.

TCRP J-07/Topic SA-58
Analysis of Transit Exclusion Policies in Passenger Transportation Systems

Background:

Many of the passenger railway operators maintain an exclusion or trespass policy that effectively bans violators from using the system for a period of time in conjunction with, or in lieu of, other penalties related to the violation.

There is currently insufficient data and understanding of the scope of the use of such policies, and the effectiveness of the types of policies is worthy of analysis. Exclusion policies vary in scope, qualifiers, purpose, and approach. Timelines for exclusion and triggers for exclusion from a transit system, in particular, vary across transit providers. There are no centralized industry best practices or policy models for implementing or maintaining a transit exclusion policy.

National and international transit security partners would benefit from greater knowledge of the various types of policies currently in use, as well as their scope. To understand how exclusion policies should be crafted and when they should be used, it is essential to know which transit operators use exclusion policies, the policy designs that are currently in use, and how they are measured for effectiveness.

Synthesis Objective:

This synthesis will document the practice of the use of transportation exclusion policies in North American transit systems. The final deliverable should assist transit agencies to understand the usefulness of such policies, as well as methods for creating, amending, or supplementing exclusion policies to maximize their effectiveness in reducing crime and disorder within their respective transit systems.

Information To Be Gathered (Not an exhaustive list):

- Definition of a transit exclusion policy

- Examples of exclusion policies across medium and large transit agencies

- Effectiveness of the exclusion policy

- Differences between exclusion policies and ejectment or ejection policies

- Impact of transit exclusion policies on crime

How the Information Will Be Gathered:

- a literature review (e.g. agency reports, peer reviewed journal articles, web articles, agency websites) that will include description of all the technologies available);
- a survey on a broad range of North American transit agencies; and,
- At least five case examples that will gather information on the policies, its effectiveness, challenges of implementation, etc.

TCRP J-07/Topic SA-59

Electronic Surveillance of Railroad-Highway Crossings for Collision Avoidance, State of the Practice

Background:

While the highway-rail grade crossing collision rate has fallen steadily since 1980, opportunities remain to further improve grade crossing safety through a mix of engineering, education and enforcement of applicable traffic laws. Electronic surveillance through rail crossing cameras has been increasingly employed to monitor grade crossings. Information gained from analysis of the surveillance data can then enhance engineering, education and enforcement efforts.

Synthesis Objective:

The objective of this study is to document current practices and lessons learned from rail service providers regarding the successes and failures of rail crossing camera programs. The synthesis will also touch on potential future advancements in rail crossing surveillance.

Information to be Gathered (Not an exhaustive list):

- Data collection and analysis methodologies

- System components and configuration

- Capital and operating Costs

- Challenges and constraints (legal, institutional, technological)

- Measures of effectiveness

How the Information Will be Gathered:

- a literature review (e.g. agency reports, peer reviewed journal articles, web articles, agency websites) that will include description of the technologies available);
- a survey on a broad range of North American transit agencies (diverse in terms of geography, socioeconomics, size, and all types of vehicles in transit revenue service) that utilize rail crossing cameras; and,
- Up to five case examples that will gather information on the practices, challenges and successes.
- Gaps in knowledge and research needs will also be identified.
- International examples should be included.

Examination of Transit Agency Coordination with Electric Utilities

Background:

In order for transit agencies to convert part or all of their fleets to EVs and other zero-emission fleet technologies, it will require large investments in charging infrastructure as well as new demands on the power grid, which provide opportunities for partnership with electric utilities to upgrade grid supply, energy loads, and also to reduce costs during peak load.

Synthesis Objective:

This synthesizes will document the current practices by transit agencies to coordinate or partner with electric utilities to negotiate rate structure and increase energy loads in relation to transit fleet electrification and other zero-emissions fleet transitions. Specifically, the synthesis will focus on bus fleet electrification whether for specific bus routes or the larger transit network.

Information to be Gathered (Not an exhaustive list):

- Identification of transit agency practices in relation to utility coordination (with utility providers and different types of utility arrangements and/or separately evaluating energy demands and supply needs);
- Examine international practices/approaches, as appropriate;
- Assess utility coordination practices in reference with fleet electrification goals and additional parallel efforts to increase energy loads through upgrades to the grid and energy transition to renewable electricity generation, including grid upgrade potential or additional forms of energy generation and storage along transit rights-of-way (ROW) and other ROW.

How the Information Will Be Gathered:

- a literature review (e.g. agency reports, peer reviewed journal articles, web articles, agency websites);

- a survey on a broad range of North American transit agencies (diverse in terms of geography, socioeconomics, size (small, medium, and large);

- at least five case examples from agencies at multiple stages of coordination (including initial planning and siting considerations) that will gather information on the practices, challenges and successes; and,

- Identification of knowledge gaps and suggestions for research to address those gaps.

Transit Agency Goals and Non-Traditional Performance Indicators Focused on Equity

Background:

A primary goal of public transit is to connect people to jobs, goods and services and other essentials on a daily basis. Historically, ridership has been the primary way public transit agencies have communicated their success and public value in making connections for community. COVID-19 impacts have changed the context and typical relationships between service levels and ridership. Awareness and acknowledgement of inequities based on race, ethnicity, national origin, physical ability, income, age or gender in our community is prompting agencies to carefully consider how its own service decisions impact diverse communities. Agencies are attempting to define and communicate the magnitude and impact of their efforts to improve access to connections and monitor and correct potential disparities even in times of depressed ridership.

Transit agencies across the United States have started to measure progress in new ways that capture levels of investment in service and the rider experience as well as investigate if there are differences across demographic groups. The COVID-19 pandemic's impact and an acknowledgement of disparaties in access to essential services and connections to oppportunity adds pressure to adopt new goals and performance indicators, in particular to track the efficiency of systems facing lower ridership and the need to serve essential employees and trip purposes.

Several agencies have shifted services and enhanced performance tracking in recent years, continuing to explore non-traditional performance indicators moving forward as well as the means to tie funding to these indicators and emphasize their importance. With several years of non-traditional performance indicators tracking underway, a beginning understanding of COVID-19 impacts, and a continued emergence of new service models, the industry is at a key point to understand and document current practice.

Synthesis Objective:

The objective of this synthesis is to document the current practice of transit systems in relation to service planning equity . The study will focus on understanding how transit agencies set goals, the targets they set, and the key performance indicators that they use to measure the success or failures of these goals.

Information to be Gathered (Not an exhaustive list):

- Transit agencies service equity goals. Goals beyond federal and state law;
- Goal setting and definitions of population;
- Tools and performance indicators that transit agencies use to track and meet service equity goals;
- Data tools and capabilities (e.g., vendor data availability, analysis processing complexity, potential data flaws);
- Time period of indicators in performance evaluation;
- Impacts to service and customer populations;
- Changes to transit services, infrastructure, or organization have transit agencies taken to improve service equity; and,

- Challenges for transit agencies in defining and achieving goals (e.g. Political barriers, technical limitations, funding constraints, etc.).

How the Information Will Be Gathered:

- a literature review (e.g. agency reports, peer reviewed journal articles, web articles, agency websites);
- a survey on a broad range of North American transit agencies [diverse in terms of geography, socioeconomics, size (including rural, intercity, tribal, and frontier areas)];
- examples of practice documents, reports, and other guidance in performance measurement;
- at least five case examples from agencies that will gather information on the practices, challenges and successes; and,
- identification of knowledge gaps and suggestions for research to address those gaps.

Accessible Vehicle Fleet Configuration

Background:

The increase in the population of frail elderly who are ambulatory but are eligible to use paratransit has increased the demand for paratransit service delivery. This increase has, in turn, led some transit agencies to move away from standard one-vehicle type fleets in favor of a mixed fleet incorporating smaller accessible vehicles and non-accessible (generally sedans) vehicles.

The first wave of fleet configuration changes has provided some expected benefits of lower operating costs and service delivery flexibility due to incorporating smaller vehicles into the fleet mix. These changes have also brought forward a set of service delivery issues including increase costs, maintenace concerns, a complication of reassignmnet of riders, etc.

Synthesis Objective:

This synthesis will document the different configurations of accessible vehicle fleets own by transit systems in North America.

Information to be Gathered (Not an exhaustive list):

- What factors do transit agencies consider in reconfiguring the fleet mix for accessible vehicles?
- What are the previous range of fleet mixes, and how are they changing?
- Have the fleet mix changes yielded the expected benefits?
- What unexpected outcomes have arisen from adjusting fleet mix?
- Are transit agencies adjusting vehicle performance metrics to account for the fleet mix?
- What may be affecting their decisions in future operations?

How the Information Will Be Gathered:

- a literature review (e.g. agency reports, peer reviewed journal articles, web articles, agency websites);
- a survey on a broad range of North American transit agencies (diverse in terms of geography, socioeconomics, size (small, medium, and large);
- at least five case examples from agencies with different types of vehicles fleets that will gather information on the practices, challenges and successes; and,
- identification of knowledge gaps and suggestions for research to address those gaps.