Transit Cooperative Research Program

Fiscal Year 2021 **May 2021**

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 J-07 Oversight Committee recently selected Synthesis projects for the Fiscal Year 2021 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 for panel members should be submitted online from the TRB website by June 30, 2021, 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 $45,000. 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 27, 2021.** Topic panel meetings are anticipated during September and October 2021. During the meetings, scopes of work will be finalized and principal investigators chosen.

Transit Cooperative Research Program Synthesis Topics in the Fiscal Year 2021 Program

(Titles are HOTLINKS)

TCRP J-07/Topic SA-54
Pedestrian and Bicycle Safety in Bus/BRT Corridors

TCRP Staff: Mariela Garcia-Colberg

Background:

America's arterial corridors host a variety of users including passenger cars, trucks, buses, bicycles and pedestrians. Many of these corridors lack basic safety for pedestrians and cyclists such as sidewalks, bike lanes, and crosswalks. Unsafe corridors are inequitably prevalent in low-income communities and communities of color. Yet along these corridors, commerce, housing, transportation, and all manner of origins and destinations exist.

A new bus transit corridor project involving a dedicated bus lane(s) is an opportunity to identify and improve dangerous or nonexistent pedestrian and bicycle infrastructure, potentially improving the health and safety of transit users and community residents. This study will provide benefits to the transit industry by documenting how new bus transit project sponsors look to incorporate pedestrian/bike safety and complete streets within their transit improvement designs.

Synthesis Objective:

The objective of this synthesis is to examine the state of practice in bus transit corridor planning, design and construction as it relates to pedestrian and bike safety, public health, and equity. The specific focus will be on dedicated bus lanes and their relationship to the issues of safety, public health and equity. The study will include the interaction of buses with bicyclists, pedestrians, and vehicles especially at bus stops, driveways and intersections.

Information To Be Gathered:

Will include specific items as determined by the panel during the first panel meeting. These might include (among others):

- Analysis of bike and pedestrian improvements in the design and construction phases
- Other measures implemented as part of the transit project that are focused on enhancing bicycle and pedestrian safety as well as the safe operation of buses
- Percent change in bike and pedestrian injuries and fatalities since implementation of new sidewalks and/or bike lanes

How the Information Will Be Gathered:

- Literature review
- A survey of agencies
- Follow-up interviews with selected agencies for the development of case study examples
- Identification of knowledge gaps and suggestions for research to address those gaps

Information Sources:

TRB E-Circular 239: Arterial Roadways Research Needs and Concerns

https://pubmed.ncbi.nlm.nih.gov/26226889/

https://trid.trb.org/view.aspx?id=1099061

TCRP Bus Rapid Transit, Volume 1: Case Studies in Bus Rapid Transit

Impact of new rapid transit on physical activity: A meta-analysis Jana A. Hirsch,a Danielle N. DeVries,b Michael Brauer,c Lawrence D. Frank,d and Meghan Winterse,

Journal of Transport & Health: 1884 - Health Impacts and Assessment from BRT and Complete Streets: Mexico City's Line 5 Metrobus Corridor

TCRP J-07/Topic SA-55
On Street Bus Operations Management

TCRP Staff: Mariela Garcia-Colberg

Background:

A consistent complaint from bus riders over the years has been poor service reliability. Street management of bus operations attempts to maximize reliability for the benefit of passengers and operating efficiency. Key features of street operations typically include: how agencies monitor schedule performance and how this data is used to inform central control and street supervisors of manifesting problems; as well as how corrective measures are then communicated to bus operators. It also includes proactive coordination practices to avoid foreseeable problems.

Recently, many bus transit operators have implemented sophisticated run-cutting and scheduling practices and real-time automatic vehicle location (AVL) systems. Street operations supervision practices, however, seem to not have significantly changed on many transit systems. A review of current operations management practices is needed for small, medium, and large transit systems.

Synthesis Objective:

The purpose of this synthesis is to identify current practices in real-time management of street operations. The research will describe how transit agencies are monitoring and managing street operations including the tools, staffing, organizational structure, and functions being used for the purpose.

Information To Be Gathered:

Will include specific items as determined by the panel during the first panel meeting. These might include (among others):

- Procedures, technologies and facilities for monitoring street operations – including GPS location and on-board cameras linked to operations or dispatch centers, as well as field transit supervisor tools and roles/responsibilities/authority as well as features of operation modern centers.
- Procedures and technologies for communicating with drivers and dispatch – radios, cellphones, and laptops or tablets with internet service.

How the Information Will be Gathered:

• Literature review/internet search
• survey of transit systems
• Selected case examples

Information Sources:
Transit Agencies, Major technology companies serving this sector (like AVL vendors), APTA guidelines, TRB bus transit research, UTIP guidelines

TCRP J-07/Topic SB-35
Customer Education and Awareness of On-Demand Mobility

TCRP Staff: Mariela Garcia-Colberg

Background:

Transit agencies engaging in pilots or continuing on-demand mobility services have frequently cited challenges in slow adoption of their new services. Reasons for slow adoption and low ridership can include customer unawareness about the service, unfamiliarity on how to use the new service compared to traditional transit, safety concerns about non-bus drivers (for services with transportation network companies or TNCs or microtransit services), or discomfort in using newer technologies. Slow adoption can lead to lower-than-estimated ridership and cause services to under-perform operationally and financially. Previous research on transit agency partnerships with TNCs or microtransit services shows that agencies should have a robust marketing and outreach campaign to make targeted ridership groups are aware of the service and understand how to use it (Feigon and Murphy, 2016).

Synthesis Objective:

Transit agencies need the ability to effectively market new on-demand services and provide tools to educate customers about how to use the service in order to facilitate greater awareness and service utilization. This synthesis will document current practices in how on-demand services with transit agencies are marketed to various rider groups, with a particular focus on outreach to persons with disabilities, older adults, and marginalized populations.

Information To Be Gathered:

Will include specific items as determined by the panel during the first panel meeting. These might include (among others):

- Examine the state of the industry in transit agencies with on-demand pilots or services engage in customer outreach and marketing
- Learn how transit agencies may assess the effectiveness of outreach through metrics or other determining factors

How the Information Will Be Gathered:

This research would gather and synthesize information about current examples of community input, marketing, outreach, and customer education from on-demand services with transit agencies around the US through a literature review and targeted survey. The

synthesis would look at case examples of transit agencies with innovative practices in outreach and inclusion for their new service, including examples from different geographic areas of the country and outside of the largest metropolitan areas.

Information Sources:

- Tooley, Melissa; Zmud, Johanna; Ettelman, Benjamin; Moran, Maarit; Higgins, Laura; Shortz, Ashley; Wheeler, Eric. Older Drivers and Transportation Network Companies: Investigating Opportunities for Increased Safety and Improved Mobility. Safe-D National UTC. College Station, TX, 2019.
- Westervelt, Marla; Huang, Emma; Schank, Joshua; Borgman, Nolan; Fuhrer, Tamar; Peppard, Colin; Narula-Woods, Rani. UpRouted: Exploring Microtransit in the Unites States. Eno Center for Transportation, Washington DC. 2018.
- Feigon, Sharon; Murphy, Colin. TCRP 188: Shared Mobility and the Transformation of Public Transit. The National Academies Press, Washington DC. 2016.
- National Center for Mobility Management. Considerations for TNC Partnerships: Seniors and Individuals with Disabilities. National Center for Mobility Management. Chicago, IL, 2018
- Volinski, Joel. TCRP Synthesis 141: Microtransit or General Public Demand Response Transit Services: State of the Practice. The National Academies Press, Washington DC. 2019.

TCRP J-07/Topic SB-35
Dynamic Optimization on ADA Paratransit Service

TCRP Staff: Mariela Garcia-Colberg

Background:

Despite decades of experience with automated scheduling for paratransit services, true batch optimization (i.e., considering all trips at once) has only advanced as systems move from paper-based schedules to app-based schedules. Dynamic optimization requires the driver to be working with an app-based schedule that provides the driver with only one to two hours of scheduled rides at a time, thereby allowing for last-minute schedule changes.

Several software vendors have developed different approaches to dynamic optimization, and their different versions are now being implemented by scores of transit agencies in the U.S., Canada, and elsewhere.

There are two basic approaches to optimization -- On-Demand and Pre-Book.

On-demand is where the riders generally communicate directly with the driver through an app, and schedule optimization is limited to short-term, direct application to the available fleet on the day of service. Pre-book optimization is applied to systems with large subscription demand where the system is susceptible to significant cancellation rates, and there is minimal daily contact with the rider. These systems remove rides on late running vehicles experiencing unexpected traffic congestion, accidents, breakdowns, etc.

The prospective benefits of dynamic dispatching include one or more of the following:

- Improved productivity and on-time performance
- Reduced cost of dispatch labor by reducing the number of dispatchers needed
- More focused dispatching on immediate chores, such as no-show requests
- A broadened and less expensive labor pool for prospective dispatchers
- Increased efficiencies by linking ADA paratransit with microtransit services operated by ADA paratransit-certified drivers.

While these benefits are significant, the results have not been constant in all transit systems.

Synthesis Objective:

This Synthesis will document the current use of dynamic optimization in ADA paratransit, and the benefits realized, if any. This synthesis will develop benchmarks and operational performance measures that define the experience in the industry from the perspective of

transit agencies, dispatchers, drivers, and riders. This synthesis will document the ways in which transit agencies have addressed the shortcomings and challenges that have manifested themselves in the tailoring, deployment, and use of the dynamic optimization systems, including issues with technology and service delivery.

Information To Be Gathered:

Will include specific items as determined by the panel during the first panel meeting.

Information Will Be Gathered:

By a literature review and a survey of transit agencies. The report will include case examples.

TCRP J-07/Topic SG-20
Performance Metrics in Third Party Contracts for Bus Operations and Maintenance

TCRP Staff: Mariela Garcia-Colberg

Background:

Transit agencies typically utilize three basic models to provide bus transit services to the public. The models are:

- Full inhouse Operations and Maintenance (O&M) by the transit agency.
- Fully contracted O&M by a third party.
- Hybrid, where certain routes O&M are contracted out and the remainder are run inhouse.

An understanding of the service models is clearly relevant for the potential to maximize operational efficiencies and manage costs. For example, rural transit agencies have an interest to fully contract O&M to a third party for the lower fixed cost (Ng et al., 2012). However, there is higher-variability in the quality and costs. Further, it is more difficult to measure quality and efficiency. Medium size and larger urban systems have different interests and challenges when considering the operations and maintenance of their bus transit services.

Synthesis Objective:

The synthesis will document current practices and metrics used to contract out bus operations and maintenance in North America. It will look at all situations where O&M services are contracted out (i.e. the entire network is contracted out or divisions or sections of the network are contracted out). The synthesis will document the reasons for outsourcing and the metrics used by agencies for evaluating whether to self-operate or contract out bus operations and maintenance in North America. In addition, the synthesis will ascertain how agencies are holding their third party providers accountable against contractual terms as well as methodologies that agencies use to monitor and oversee contractors.

Information To Be Gathered:

Will include specific items as determined by the panel during the first panel meeting.

How the Information Will Be Gathered:

- Survey of North American public transit agencies
- Literature review of past research
- Structured interviews with agencies

- Example performance metrics and reports gathered from agencies
- Third party contracts examples from agencies

Information Sources:

- Ng, E.-H., Beruvides, M., Simonton, J., Chiu-Wei, C.-C., Peimbert-García, R., Winder, C., & Guadalupe, L. (2012). Public Transportation Vehicle Maintenance and Reginal Maintenance Center: An Analysis of Existing Literature. Engineering Management Journal; EMJ, 24.
- Fatih Canitez, Pelin Alpkokin, John Andrew Black, Agency costs in public transport systems: Net-cost contracting between the transport authority and private operators - impact on passengers, Cities, Volume 86, 2019, Pages 154-166, ISSN 0264-2751,https://doi.org/10.1016/j.cities.2018.09.010.

TCRP J-07/Topic SH-22
Inclusive Public Participation in Transit Decisionmaking

TCRP Staff: Mariela Garcia-Colberg

Background:

U.S. Department of Transportation (DOT) Guidance and Title VI of the Civil Rights Act of 1964 must be integrated into each transit agency's public participation plan that explicitly describes proactive strategies, procedures, and desired outcomes. Federal transit law, 49 U.S.C. §5307(c)(I), requires transit agencies receiving §5307 urbanized area formula funds to have a locally developed process to solicit and consider public comment before raising a fare or carrying out a major reduction of transportation. A major reduction in fixed route service must also include consideration of the impact on ADA complementary paratransit service. DOT ADA regulations at 49 CFR §37.137(c) require transit agencies to establish an ongoing mechanism for people with disabilities to participate in the continued development and assessment of paratransit service. In each case, local decisions determine which specific public participation measures are most appropriate and how, when, and how often specific activities should happen.

Synthesis Objective:

This synthesis will document current, effective, ongoing public participation mechanisms resulting in and instilling participation from communities of color, LEP and low-income populations, and people with disabilities in transit decisionmaking. The Synthesis will highlight practices that comply with ADA regulations as well as those that go beyond the ADA requirements. The synthesis should describe innovative approaches and challenges from both the transit agency and customer perspectives.

Information To Be Gathered:

Will include specific items as determined by the panel during the first panel meeting and might include (among others) strategies used to partner with communities and organizations, methods for soliciting and collecting public comments, and measures for defining equity and successful public employment.

How the Information Will Be Gathered:

- Literature review
- A survey of transit agencies
- Follow-up interviews with selected agencies for the development of case examples

Information Sources:

National Academies of Sciences, Engineering, and Medicine 2011. Public Participation Strategies for Transit. Washington, DC: The National Academies Press. https://doi.org/10.17226/22865.

U.S. Department of Transportation Title VI regulations at 49 CFR Part 21, www.transit.dot.gov.

FTA Circular 4702.1B, Title VI Requirements and Guidelines for Federal Transit Administration Recipients, October 1, 2012, www.transit.dot.gov.

U.S. Department of Transportation ADA regulations at 49 CFR §37.137(c), www.transit.dot.gov.

FTA Circular 4710.1 Americans with Disabilities Act Guidance, November 4, 2015, www.transit.dot.gov.

George Mason University Policy Brief, Crisis as Opportunity: Fostering Inclusive Public Engagement in Local Government, April 24, 2020, https://www.mercatus.org/publications/covid-19-policy-brief-series/crisis-opportunity-fostering-inclusive-public-engagement.

Mass Transit Magazine, City and transit officials unveil Philadelphia's Transit Plan, February 23, 2021, https://www.masstransitmag.com/management/article/21211395/city-and-transit-officials-unveil-philadelphias-transit-plan.

TCRP J-07/Topic SH-23
Partnerships for Equitable Pandemic Response and Recovery

TCRP Staff: Mariela Garcia-Colberg

Background:

COVID-19 has disrupted our economy and society and will continue to impact aspects of American life for years to come. The crisis has exposed inadequate community-level and state/regional systems for ensuring the health and wellbeing of vulnerable Americans. The public transportation sector's mobilization of resources and coordinated action has been critical in enabling many transportation-disadvantaged people to satisfy essential needs and reach jobs to support their families and society at large.

Current public transit operations have shifted due to COVID-19. At a time when demand for transit rides is lower and some service has been reduced, transit agencies are pivoting to deploy resources for other temporary "incidental uses" to respond to the public health crisis. Incidental use refers to a transit system's use of federally funded assets by another public or private entity for non-transit purposes. Incidental use of federally funded assets is permitted for FTA recipients of funding under all FTA grant programs, and is being widely utilized during the COVID-19 public health crisis. There are also other kinds of creative partnerships and funding arrangements that can extend resources to more holistically address community needs.

Transit agencies are mobilizing resources and engaging in creative incidental use and other partnerships to carry out essential services like meal delivery, delivering laptops and hotspots to school children, and transporting essential health workers. Through these incidental uses of vehicles and facilities public transit agencies across the country are keeping workers actively employed while expanding equitable access in unprecedented ways. Through creative partnerships at the state, regional and local levels, these partnerships are expanding access to essential services, especially for the transportation disadvantaged in entirely new ways.

Synthesis Objective:

- Document COVID-19 public transportation incidental use and other cross-sector partnerships for essential services, how the partnerships developed, and what critical services were provided to the community;
- Identify how the partnerships aligned public transportation funded assets with community needs during the COVID-19 public health emergency, and how these partnerships could be utilized in the future as well as in future emergencies;
- Record data collection practices, including communities who shared relevant data to help assess excess capacity, gaps in services, and community needs; and

- Understand policy guidance necessary to sustain pandemic- catalyzed-partnerships in 'normal' times, identifying opportunities to leverage federal transportation funding from non-DOT federal agencies to meet community needs.

Information To Be Gathered:

Will include specific items as determined by the panel during the first panel meeting.

How the Information Will Be Gathered:

- Targeted Survey of transit systems.
- Survey of the FTA-funded National Center for Mobility Management (NCMM)'s Regional Liaisons
- Follow up interviews with selected agencies

Information Sources

- Information sources include the following relevant organizations:
  FTA-funded national technical assistance centers:
  - National Center for Mobility Management (NCMM); Director, Amy Conrick
  - National Rural Transit Assistance Program (NRTAP); Director, Robin Phillips
  - National Aging and Disability Transportation Center (NADTC); Director, Carol Wright Kenerdine
  - Shared Use Mobility Center (SUMC); Director, Al Benedict and
    National Center for Applied Transit Technology (N-CATT); Director, Andrew Carpenter