

Transit Cooperative Research Program

FY 2017

Announcement of Transit Research Projects November 2016

The Transit Cooperative Research Program (TCRP) undertakes research and other technical activities in response to the needs of local transit service providers and suppliers on a variety of transit 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) Committee, the governing board for the program, recently selected projects for the fiscal year 2017 program. The purpose of this announcement is to inform the research community of these projects.

This announcement contains problem statements that are preliminary descriptions of the selected projects. Detailed project statements, formally soliciting proposals for these projects, are expected to be released starting in March 2017.

TCRP project statements (RFPs) are available only on the Internet. Each project statement will be announced by electronic mail. A process to register for e-mail notification of project statements is available at TCRP's website, <http://www.trb.org/tcrp>.

Research project statements will be posted at the same Internet address when they are active.

The TCRP is an applied, contract research program with the objective of developing near-term solutions to problems facing transit-operating agencies. Proposals should evidence strong capabilities gained through extensive, successful experiences. Any research agency interested in submitting a proposal should first make a frank and thorough self-appraisal to determine whether it possesses the capability and experience necessary to ensure successful completion of the project. The specifications for preparing proposals are quite strict and are set forth in the brochure entitled *Information and Instructions for Preparing Proposals*, available on the Internet at the website referenced above. Proposals will be rejected if they are not prepared in strict conformance with the section entitled "Instructions for Preparing and Submitting Proposals."

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**Transit Cooperative Research Program
Projects in the Fiscal Year 2017 Program**

Project No.	Title	Page
C-24	Practices and Recommendations Concerning Determination of End-of-Life of Transit Traction Power Cables and Determination of Replacement Criteria	3
F-26	Improving the Health and Safety of the Transit Workforce with Corresponding Impacts on the Bottom-Line	4
G-17	Procurement Guidelines for Bus Operator Seating and Controls	4
H-55	Guidebook for Integrating Transportation and Health Care Providers	5
J-11/Task 26	Opportunities and Barriers for Collaborations between Public Transit and Transportation Network Companies	7

Summary of Approved Research Projects

- **Project C-24** *Practices and Recommendations Concerning Determination of End-of-Life of Transit Traction Power Cables and Determination of Replacement Criteria*
- Research Field: Engineering of Vehicles and Equipment
Allocation: \$250,000
TCRP Staff: Stephan Parker

The transit industry utilizes jacketed insulated cable for traction power supply and negative return cables between traction power substations, tie switches, and point of delivery to the vehicles, whether third (contact) rail or overhead contact system (OCS). In addition, third rail systems have jumper cables to provide continuity of power around expansion joints in the third rail. The outer jacket as used for traction power cable as well as for lower voltage power distribution and signal/communication systems typically has a specified life of thirty (30) years. Many of the transit systems in the United States are that age or greater.

In addition, major storms along the east coast of the U.S. have inundated transit tunnels with not just tons of fresh water, but sea water as well. A lot of the cables within the transit tunnels have had failures due to the water penetrating through the outer jacket and causing damage to the hygroscopic insulation and also causing corrosion of the copper conductor within the insulation.

Many of the transit tunnels that connect Manhattan with the other boroughs of New York City were flooded during Hurricane Sandy, as well as other major storms. Transit agencies in the New York City region, including northern New Jersey, sustained major water damage during Hurricane Sandy. Inspections of traction power, signaling, and remote-operated track switch machines revealed cables with repeated damage from Hurricane Sandy as well as storms in years past. In subway tunnels from Manhattan to New Jersey, the conduits themselves have degraded to the point where they cannot be cleaned out and reused for their original purpose.

In Washington, DC, cable fires have occurred due to the degradation of traction power cable sheathing and insulation.

The objective of this research is to develop a set of guidelines for determining when to replace transit system cables. The research will include a study of current practice for measuring insulation aging and replacement and pro-active replacement of cables before failure. In addition, the research will include current practice concerning cable replacement in transit systems for which there is no monitoring system.

The research effort will involve a literature review and survey process and to document the current practice. The survey process will be conducted of industry subject matter experts experienced in the design, construction, and operation of traction power systems. Research into cable monitoring systems, such as monitors that measure cable shield to earth ground resistance trends should also be included.

■ **Project F-26** *Improving the Health and Safety of the Transit Workforce with Corresponding Impacts on the Bottom-Line*
Research Field: Human Resources
Allocation: \$250,000
TCRP Staff: Larry Goldstein

Research has documented that driving a bus is one of the most unhealthy occupations due in part, to stress, physical demands of vehicle operation, work environment, sedentary nature of the job, lack of exercise, poor eating habits, and other related poor life style choices. Additionally, transit professionals often have inadequate, fragmented health care, do not actively participate in their health care/treatment decision making, and do not rigorously follow recommended treatment regimes.

Initial research has determined that health issues often go undetected, health conditions are not routinely monitored, and conditions are often over- or under-treated. These circumstances not only impact the transit professionals' well-being, but threaten their ability to perform essential job functions safely. Uncontrolled illness coupled with the use of potentially impairing prescription medications (Rx) and over-the-counter (OTC) medications pose significant risk to transit professionals and the riding public.

Loss of well-trained employees, absenteeism, worker's compensation claims, health care benefits, and risk management expenses are just a few of the costs that continue to escalate as a result. Improving the health and safety of the transit workforce and keeping quality employees on the job longer promises to be a source of cost savings.

The objective of this research is to determine the current status of the public transportation workforce and to identify implementable strategies to address related employee health, fitness-for-duty, work conditions, and safety issues that promise to extend longevity and productivity of transit professionals, create a healthier workforce, and generate cost-savings to the transit industry.

This research promises to quantify the status of the transit workforce and the transit industry's response to the current and impending dilemma facing the future of public transportation. Successful programs will be identified and transferrable components documented and quantified, where possible. Pilot programs will also be identified to demonstrate various alternative approaches. Examples of policies, procedures, forms, and other implementation aids will be collected as well as "lessons learned." Issues related to the Americans with Disabilities Act, HIPAA, privacy regulations, medical authority, mitigation of negative work condition impacts, and other related concerns will also be addressed. Sufficient detail will be provided to create a starting point for transit systems to initiate a successful program embraced by both management and labor.

■ **Project G-17** *Procurement Guidelines for Bus Operator Seating and Controls*
Research Field: Administration
Allocation: \$250,000
TCRP Staff: Dianne Schwager

Two decades ago, the remarkable *TCRP Report 25: Bus Operator Workstation Evaluation and Design Guidelines*, was published. Its partial update, *TCRP Report 185: Bus Operator Workstation Design for Improving Occupational Health and Safety* was just released, revisiting the packaging of the driver's work station. However, due to funding limitations, critical systems such as seats, pedals, and steering were not examined. In recent years, substantial progress has

occurred in the design of these systems, and the industry has great need for guidance in evaluating and implementing these significant options for improving operator health while reducing time loss, disability and external liability. The surprising scale of that opportunity has been shown in multiple research papers showing that the job of bus operator is among the least healthy job classifications. Time loss is several hundred percent higher than for the average in the U.S. working population. Musculoskeletal problems, such as low back pain, or wrist, elbow and shoulder pain, all are endemic in transit and new “active” systems for seating and steering, for example, have been proven to reduce these problems. Agencies need assistance in understanding and evaluating these currently available technologies. In a time of extreme financial pressure on our nation’s transit agencies, the opportunity to reduce rates of time loss, injury, and disability is of great importance.

The proposed research objective is to complete the work of *TCRP Report 185*, covering progress in the engineering of seats, steering, pedals, and controls where significant advances have been proven to reduce injuries, reduce costs, and improve safety performance. These critical updates to *TCRP Report 25* were not feasible within the *TCRP Report 185* budget and would greatly benefit the industry. An analysis of the how TCRP Reports 25 and 185 have contributed to the design and procurement process will be used to improve the content, layout, and dissemination of the final document. The product of the research will be a user-friendly manual that will allow agencies to address ergonomic concerns in the physical operating environment and evaluate the cost effectiveness of available options. As part of that work, the standards and processes for evaluating these technologies could be framed as a model for agencies examining future evolutions of these systems.

■ Project H-55	<i>Guidebook for Integrating Transportation and Health Care Providers</i>
Research Field:	Policy and Planning
Allocation:	\$200,000
TCRP Staff:	Dianne Schwager

The Fixing America’s Surface Transportation (FAST) Act mandates that the federal interagency Coordinating Council on Access and Mobility (CCAM) improve services for making trips to medical facilities, stressing the importance of effective partnerships between transportation and health care providers. Building partnerships will require a robust dialogue, the development of a shared vision, and overcoming many challenges.

The Federal Transit Administration (FTA) has initiated and supported several important efforts to improve access to healthcare and build coordination between transportation and healthcare providers.

- In 2015 FTA launched the *Rides to Wellness* initiative to increase partnerships between health and transportation providers and show the positive financial benefit of such partnerships. In 2016 FTA released over \$5M in Rides to Wellness grants to find solutions that increase access to care, improve health outcomes, and reduce healthcare costs.
- In June 2016 FTA sponsored a workshop that brought transportation planners, researchers, and service providers together with health care researchers and providers to explore critical issues. The workshop was conducted in collaboration with National Academies of Sciences, Engineering and Medicine.

<http://www.nationalacademies.org/hmd/Activities/PublicHealth/TransitandHealthcare.aspx>

- FTA is funding a community scan through Health Outreach Partners to answer important questions including: How does lack of transportation impact healthcare costs, including missed appointments? What percent of missed appointments are due to transportation issues? What are the direct costs associated with missed appointments? What are the indirect costs associated with missed appointments?

The Affordable Care Act and other recent policies and programs are providing incentives to consider and implement strategies, such as cross-sector partnerships, to meet the social needs of patients. As one example, the Centers for Medicare & Medicaid Services launched in early 2016 the Accountable Health Communities initiative, which will evaluate health system approaches to meet the social needs (including transportation) of Medicare and Medicaid beneficiaries. One of the three tracks of the initiative aims to “encourage partner alignment to ensure that community services are available and responsive to the needs of the beneficiaries.”

There is a need to review the findings of these projects, identify and address numerous challenges, and develop a guide for professionals in health and transportation to build effective partnerships and support each other’s missions.

- The health care sector is striving to ensure access to health care for all eligible people, help more people access free health screenings that could reduce the cost of care, and reduce missed appointments.
- The Transportation sector is striving to improve mobility and access for many trip purposes, including work, shopping, social, and importantly, health care. It needs additional investment and new service alternatives to improve access to all destinations and to support the goals of health care providers.

Measuring the value of these activities is challenging since there is inadequate data to help both health care and transportation providers communicate, assess, and report on the value derived from partnerships. In addition, funding mechanisms create additional challenges: in the health area money often follows the person, so it is at an individual level; and in public transportation funding largely flows to a transit system—from Federal formula grants. These funding mechanisms present difficulties in cost-sharing, an area currently being explored by the Coordinated Council on Access and Mobility – the interagency council charged with finding ways to coordinate transportation across federal agencies.

The complexity of transportation access to health care suggests the need for a research roadmap to identify next steps and future research priorities for advancing these efforts. There are many important research questions that must be answered such as: How can technology solutions integrate scheduling and dispatching for both health care appointments and needed transportation services? How does the flow of funding at both a person-level and transit-system-level help or hinder health and transportation coordination? How will fewer missed appointments impact health outcomes and health care costs? How can transportation be considered as part of health care payment reform efforts (to account for where funding comes from and where value is realized)? What institutional models have been tried and what lessons, both good and bad, can be learned about various institutional model?

The objectives of this research are to prepare two important deliverables:

- A guidebook on effective practices to build health and transportation partnerships to help professionals effectively communicate, overcome barriers, and implement effective programs for improving access to medical services.

- A research roadmap that outlines specific research projects to address existing needs and gaps in the area of access to health care facilities. Research roadmaps are a very effective way of planning for the future in areas where attitudes, conditions, or technologies are developing rapidly.

■ Project J-11/Task 26	<i>Opportunities and Barriers for Collaborations between Public Transit and Transportation Network Companies</i>
Research Field:	Policy and Planning (Under series of continuing projects titled, <i>Quick Response Research on Long-Term Strategic Issues</i>)
Allocation:	\$100,000
TCRP Staff:	Dianne Schwager

Transportation network companies (TNCs) have become a popular transportation mode for people to reach local destinations without making trip reservations or following transit-style schedules. TNCs allow people to hail a ride through a mobile phone application that matches the user to an available vehicle and driver in the area. Many like the convenience of being able to summon drivers directly to their location and completing fare payments through phone applications. TNCs operate in select markets across the United States and worldwide, typically selecting markets according to the demand for trips and local regulations for hiring drivers.

Conceptually, the relationship between TNCs and transit is complementary for users of both travel modes.

- For TNCs, transit customers and others are currently most likely to use their service during late night hours when transit services are less available.
- For transit agencies, the presence of TNCs can increase ridership by connecting new transit passengers that previously did not have a convenient access mode to transit stations and assisting with the first/last mile access by providing service to areas with limited transit service/frequency and in areas that are not appropriate for fixed route transit such as low-density residential neighborhoods.
- TNCs can also assist transit agencies by providing service in areas that burden the transit agency with low transit revenues and higher operational costs.
- Partnerships with TNCs to provide paratransit services may potentially reduce expensive operating costs for transit agencies (on average \$29.30 per trip in the U.S.), as well as provide improved trip reservation experiences for customers.

Recognizing the potential for mutual benefits, some transit agencies have begun to form partnerships with major TNCs through a variety of mechanisms.

- Dallas Area Rapid Transit (DART), Memphis Area Transit Authority (MATA), and GoTriangle in North Carolina have partnered with TNCs to create a seamless fare payment system on the agency mobile app, allowing users to pay for both trip segments in one place.
- Pinellas Suncoast Transit Authority (PSTA) in Pinellas Park, Florida created a program called Direct Connect, which utilizes partnerships with TNCs and a local taxi company to get riders in certain geographic zones to designated bus stops in order to reach transit service. For these trips, PSTA subsidizes half the cost of the TNC fare up to a maximum of \$3.

- Metropolitan Atlanta Rapid Transit Authority (MARTA) has partnered with a major TNC to provide users trips to-or-from transit stops and stations as part of the “Last Mile Campaign.” The campaign includes a one-time promotion code offering discounted rides for new users of the TNC.
- The Cape Cod Regional Transit Authority in Massachusetts has partnered with Uber to offer passengers of the CapeFlyer summer train service discounted first rides with Uber in order to provide passengers with last-mile connections.
- The Kansas City Area Transportation Authority (KCATA) recently partnered with Bridj to provide on-demand ridesharing service through 10 passenger vans in select geographic areas of the city. The partnership is part of a one-year pilot program, allowing residents in those areas the ability to request transit trips through a mobile phone app for a \$1.50 fare.
- Massachusetts Bay Transportation Authority (MBTA) in Boston plans to launch partnerships with Uber and/or Lyft, allowing paratransit customers to utilize same-day booking and vehicle tracking through the transit agency’s mobile app WMATA in Washington D.C. is seeking similar partnership opportunities for its MetroAccess service.
- San Francisco’s Metropolitan Transportation Commission is exploring a concept to partner with a TNC to provide opportunities for organizing its carpooling and vanpooling program.
- In May 2016, the Federal Transit Administration (FTA) announced a funding opportunity for the Mobility On Demand (MOD) Sandbox Demonstration Program. A total of \$8 million will be awarded to project team submissions with new innovate approaches to MOD concepts for transit agencies. Submissions for the program could potentially include new partnerships between transit agencies and TNCs.

The objective of this research is to prepare an up-to-date resource and guidance that addresses opportunities and barriers for collaborations between public transit agencies and TNCs. The resource should examine and present (1) the nascent and emerging collaborations and agreements between transit agencies and TNCs; (2) barriers, challenges, and legal restrictions that make transit agency agreements with TNCs difficult (e.g., accessibility equipment requirements, vehicle and driver insurances requirements, and driver background and drug testing policies); (3) best practices for transit/TNC integration; and (4) other relevant information, as discovered.

The research should provide specific examples and details of the types of agreements and collaborations by organizing them into common categories, investigating specific contract language and operational details, and studying impacts on ridership and costs for transit agencies.

Note: This project will be conducted as an expedited research project. Consequently, all panel meetings will be conducted as conference calls.