Transit Advisory Committee for Safety February 2020 Conference Meeting Minutes

Conference Dates and Times:

February 25, 2020 (8AM-4:30PM)

February 26, 2020 (8AM-2:30PM)

Conference Location:

National Highway Institute

1310 North Courthouse Road

Arlington, VA 22201

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Attendance

TRACS Members	Public Participants		FTA Support
Scott Sauer, TRACS Chairperson, Southern Pennsylvania Transportation Authority (SEPTA)	**Rick Carlson**, Metrom Rail	**Mike Coplen**, TrueSafety Evaluation, LLC	**Paulina Orchard**, Division Chief, Office of System Safety (TSO-10), Federal Transit Administration (FTA)
Pamela Fischhaber, TRACS Vice Chairperson, Colorado Public Utilities Commission	**Ben Bakkum**, Transportation Technology Center Inc. (TTCI)	**Paul Carey**, Bombardier	**Kara Waldrup**, TRACS Program Manager, TSO-10, FTA
Elayne Berry, formerly of Metropolitan Atlanta Rapid Transit Authority (MARTA)	**Brett Lievers**, EMTRAC	**Paul King**, California Public Utility Commission	**Roy Chen**, Office of Research, Demonstration, and Innovation (TRI), FTA
David Harris, New Mexico Department of Transportation (NMDOT)	**Brian Alberts**, American Public Transportation Association (APTA)	**Pawel Waszczur**, Bombardier	**Jeff Thompson**, General Engineer, TSO-10, FTA
Jeff Lau, San Francisco Bay Area Rapid Transit District (BART)	**Emani Lee-Odai**, APTA	**Dr. Pei-Sung Lin,** Director of Traffic Operations and Safety, CUTR	**Dharm Guruswamy**, Transportation Program Analyst, TSO-10, FTA
Eric Muntan, Miami-Dade Transit	**Jamie Maguire**, Protran	**Richard Gent**, Hotrail Group	**Rhoderick Ramsey**, Program Analyst, TSO-10, FTA
Ron Nickle, Transit Safety Solutions	**Jamie Rossignoli**, Trapeze Group	**Rick Carlson Jr**., Metrom Rail	**Richard Wong**, Attorney Advisor, Office of Chief Counsel (TCC), FTA
Joyce Rose, WSP-Parsons Brinckerhoff	**Jon Meusch**, EMTRAC	**Ryan Bach**, Motorola Solutions	**Kristen Fredrich**, Program Analyst, Stakeholder Engagement, Office of Transit Safety and Oversight (TSO), FTA
Brian Sherlock, Amalgamated Transit Union (ATU)	**Kris Morgan**, EMTRAC	**Stephanie Quomo**, Interactive Elements, Inc.	
Karen Philbrick, Mineta Transportation Institute (MTI), San Jose State University (phone)	**Lisa Staes**, Center for Urban Transportation Research (CUTR)	**Matt Edmonds**, Miller Ingenuity	

Day 1 Opening Remarks and Introduction of Attendees

Paulina Orchard opened the February 2020 Transit Advisory Committee for Safety (TRACS) Conference by delivering welcoming remarks.

Kara Waldrup, the TRACS Program Manager, gave a brief overview of the two-day agenda, TRACS tasks, and meeting objectives. All TRACS members, public participants, and Federal Transit Administration (FTA) staff and support introduced themselves.

The Conference objectives were as follows:

- Assess emerging technologies and processes against technical evaluation criteria (TEC)
- Assess industry posture
- Begin development of recommendations
- Refine work plans for remainder of the 2018-2020 TRACS Charter

TRACS Task Review and FTA Updates

Kara Waldrup presented the three safety focus areas (Trespass and Suicide Prevention [TSP], Roadway Worker Protection [RWP], and Employee Safety Reporting [ESR]) and summarized outcomes from the March 2019 and September 2019 Conferences. Ms. Waldrup also reviewed the work that had been completed since the previous TRACS meeting and highlighted the accomplishments of the Committee. Ms. Waldrup presented a high-level agenda that reflects key milestones for the remainder of the 2018-2020 TRACS Charter.

Trespass and Suicide Prevention (TSP) Research Presentation

Presentation by Dr. Pei-Sung Lin

Dr. Pei-Sung Lin, Director of Traffic Operations and Safety at the Center for Urban Transportation Research (CUTR), gave a research presentation on rail trespass and suicide prevention statistics, emerging technology, and agency case studies. The presentation was broken down into three sections: 1) event examination and literature review, 2) rail transit agencies and commuter rail case studies, and 3) identification of effective existing systems and potential technologies. Dr. Lin's presentation is available on FTA's TRACS website.

Section 1: Event Examination and Literature Review

The event examination and literature review portion of the presentation outlined significant statistics and common approaches for preventing trespassing and acts of suicide on railways. Key statistics showed that 70 percent of railroad-related deaths are due to trespassing or suicide and that the male-to-female rail suicide ratios (3:1 to 3.5:1) closely parallel gender ratios for overall suicide. Dr. Lin also stated that common approaches for preventing trespassing have included community outreach, infrastructure modifications, and signage. Similarly, common suicide prevention approaches include community outreach, community collaboration, reduction of perceived viability of railroads, and prevention of railway access with barriers.

Section 2: Rail Transit Agencies and Commuter Rail Case Studies

For the second part of this presentation, Dr. Lin focused on the work performed by CUTR to study the programs that rail transit and commuter rail agencies have put into place to address injuries and fatalities due to trespassing and suicide. CUTR's survey received responses from 11 of the country's largest rail providers. The survey identified programs involving community outreach, signage, driver training, coordination with social services and intervention centers, and new technologies. Survey results demonstrated that some agencies do not use multiple methods, as they have not been faced with a significant number of trespass/suicide incidents. The survey also found that the top three adopted strategies for reducing trespassing and suicide were signage installation, community outreach programs, and changes to rail operator training.

Section 3: Identification of Effective Existing Systems and Potential Technologies

In the final component of Dr. Lin's presentation, he discussed existing systems and potential/emerging technologies that are or can be used to prevent trespassing and suicide. Trespassing detection and prevention technologies include guideway-intrusion detection systems, on-board detection, crossing obstacle detection systems, real-time obstacle detection for railroad crossing, rail side detection, aerial drone usage, and long-range radar/acoustic devices. Suicide prevention technologies include platform screen doors, suicide pits, and blue lights.

Large Group Discussion

After Dr. Lin's presentation, TRACS Members had the opportunity to ask questions and provide feedback. Questions and comments focused on what FTA data is available regarding rail and buses, and suicide prevention measures. Dr. Lin discussed how the industry needs to share and collect best practices both domestically and internationally. The Committee also discussed the disconnect between agencies' approaches regarding suicide and trespass incidents.

Public Comments

Public participants discussed whether the use of signage could be ineffective against suicide and trespass incidents. Dr. Lin expressed the need for a broader conversation about suicide in the transit world to help combat it. Dr. Lin also discussed research on various topics, such as the correlation between the status of the economy and suicide rates, as well as the high cost for suicide pits. Dr. Lin recognized that research on drug and opioid addiction and its correlation to suicide is scarce. He also pointed out that there has been no investment into new preventative trespass and suicide methods, largely because of prohibitive costs.

Roadway Worker Protection (RWP) Research Presentations

Presentation by Ben Bakkum and Dr. Dingqing Li

Ben Bakkum, Senior Engineer II, Transportation Technology Center Inc. (TTCI), and Dr. Dingqing Li, Executive Director of Government Programs and Engineering Services, TTCI, delivered a presentation that discussed research efforts on behalf of FTA and CUTR to reduce incidents and accidents within roadway work zones. Their presentation was arranged into four sections: 1)

advisory group collaboration, 2) literature review and industry survey, 3) risks and hazards analysis and incident data review, and 4) development of concept of operations (CONOPS).

Section 1: Advisory Group Collaboration

The first component of the presentation briefly discussed industry collaboration through an advisory group. This advisory group includes AJ Joshi, Vijay Khawani, Jim Fox, and Ed Watt from the Transit Standards Working Group. The group plans to hold internal meetings to continue industry collaboration throughout 2020.

Section 2: Literature Review and Industry Survey

The second component of the presentation discussed a RWP literature review and the results of an industry survey conducted by APTA. The literature review found that lack of details in job briefings and the poor quality of job briefings are a contributing cause of incidents and that, as the complexity of jobs and traffic increases, the likelihood of incidents increases. The APTA survey received responses from 12 agencies. The survey found that over 80 percent of agencies have specific policy sections in their operating rules covering RWP and less than half of agencies allow for lone workers (employees who are allowed to work in a right-of-way without additional support and oversight).

Section 3: Risks and Hazards Analysis and Incident Data Review

The third part of the presentation focused on roadway work group protection scenarios from TTCI and reviewed data from the National Transit Database (NTD). TTCI developed a list of unaddressed hazards that roadway workers face, which includes inattention, miscommunication, improper in-track data, and incapacitation. TTCI is currently developing track configurations and a framework for operational scenarios.

Section 4: Development of CONOPS

The final component of the presentation discussed the purpose behind CONOPS and use cases developed by TTCI. This includes the monitoring of roadway worker locations and the initial applications of such systems. Mr. Bakkum also noted that CONOPS will be refined once they gain more information.

FTA Safety Research Demonstration Program, Secondary RWP Systems by Lisa Staes

Lisa Staes, Program Director, CUTR, presented on four RWP technologies and their usage in various agencies. The first technology discussed was the use of Harsco Rail/Protran technologies used on the Washington Metropolitan Area Transit Authority (WMATA) redline. The technology involves wireless wayside transponders and a wearable armband for employees that blinks and provides a visual alert to approaching train operators. This technology has been used since March 2019 by WMATA and since December 2019 by the Sacramento Regional Transit District (SacRT).

The second technology discussed was the use of Miller Ingenuity ZoneGuard at the Maryland Transit Administration (MTA). This technology was deployed along the entire length of MTA's at-grade light rail (LR) mainline and was designed to provide 25 seconds of warning prior to LR

vehicle arrival. When a vehicle enters the mainline track, the system begins to strobe lights up and downstream from the workers' location to notify them of an approaching train. The testing phase of this system began in February of 2019 and is currently fully functional.

The third technology Ms. Staes discussed was the Metrom Rail (AURA) demo at New York MTA. The purpose of this demo was to evaluate if the system could provide workers a minimum of 15 seconds advanced warning of oncoming trains. The technology includes train antennas, safety vests, and wayside modules with antennas that transmit distance and communication data with the train. As trains approach, they emit alarms and alerts through audial and visual strobes. In order to silence the alert, workers must validate both their personal and wayside devices. Completed in January 2019, the demo found that radio-based systems did provide 15 seconds of warning to workers and that worker vests must be equipped with at least two ultra-wide band (UWB) radio-based antennas to ensure sufficient detection and warning.

The last technology presented was the use of Bombardier TrackSafe II on the northern sector of MARTA's red line. The project included the installation of wayside access units that provide authorized access to wayside workers by verifying worker identification and qualifications with rail control. The demo is currently underway, with plans to collect and evaluate data in June of 2020.

Large Group Discussion

Following these presentations, the Committee discussed trespasser and suicide prevention and protections for roadway worker. The discussion began with a conversation around the need to explore inattention in trespasser and suicide prevention related to fatigue and weather; research has demonstrated that trespasser and suicide-related incidents often occur in the evening when individuals are more tired and visibility is low. It is important to note, though, that general data only studied worse case scenarios. The Committee also discussed lone workers and watchmen protection and the framework of how they are to be protected. In addition, the topic of cyber risk was brought up regarding the wearable tech safe gear. MetroRail uses UWB radio transmission, so there are numerous components that safeguard against outside interference. Protran, on the other hand, uses fusion radio which identifies a signal and has not experienced cyber threats.

Public Comments

Public participants inquired on collaboration with EMTRAC and different State regulations for warning periods. Public Participants also discussed fouling protocol, which is the level of proximity between an individual and the tracks. Additionally, the public discussed the term "track zone" and engaged in a conversation about some parts of WMATA and BART that have no clearance or foul zones.

Technology Vendor Presentations

Technology vendors that have deployed, or are in the process of developing, RWP and TSP technologies delivered presentations. FTA does not endorse any product or company who presented during the Conference.

1. **RWP: Metrom Rail,** Rick Carlson, Jr.

The Metrom Rail solution is based on UWB technology, which allows operators to identify the distance between trains and other objects in work zones. The key to the system is a proactive response, which automatically stops trains before they reach platforms. Additionally, the UWB system creates a network that communicates with trains through an alarm system that is small and independent. The Committee discussion of this technology focused on radar components and how the devices can be turned into active radar systems. The Committee also discussed the technology's ability to differentiate between a person falling into the track and debris.

2. **RWP: Miller Ingenuity (ZoneGuard)**, Matt Edmonds

Miller Ingenuity's ZoneGuard technology puts train detectors throughout the tracks and train system, and has recently evolved to be portable and with increased security for worker safety. ZoneGuard focuses on industry work protection rules and integrating them into development. Over time, the technology can be used to collect data and analyze it to identify and monitor cars, people, and other objects at a high level. The Committee discussion of this technology focused on the full installation and functionality of ZoneGuard.

3. **RWP: Bombardier**, Paul Carey and Pawel Waszczur

Bombardier's TrackSafe solution provides employees with the ability to schedule wayside work in advance, which allows them to get leadership clearance and approval to work. The Bombardier solution also offers tag-in units and operator warning lights, which provide audible alerts to wayside personnel and visual warnings to operators about wayside personnel. Through their project on MARTA's system, Bombardier has determined that fixed assets are a time-consuming investment and that the surrounding environment can affect the technology. It is essential that the products adapt to changing weather conditions and environmental circumstances, such as dust accumulation and water residue, that may affect product performance.

4. **RWP: EMTRAC**, Brett Lievers and Kris Morgan

The EMTRAC solution provides increased safety to roadway workers through coordination and communication among devices, including a vehicle computer unit, priority detector, control head, vehicle interrogator, personal notification unit (PNU), system software, and detection and signaling apps. It is important to note that PNUs are geo-zoned and support a three-level alarm warning; PNUs can set a variety of different alerts for warnings to low battery, trains approaching, and lack of GPS information. TRACS Members discussed EMTRAC's ability to use an interfaced camera system to detect pedestrians and a smart phone system so that workers can be detected around vehicles.

5. **RWP: Trapeze Group**, Jamie Rossignoli

The Trapeze Group provides scheduling and operations solutions to the transit industry with military grade technology. Their technology provides the capability to see exactly where roadway workers are located, which adds an additional level of protection. Trapeze Group technology has the capability to provide safe communication between trains, operators, and workers, and can be less prone to human error. This technology is still in development to ensure its readiness for real-world application.

6. **RWP/TSP: Protran**, Jaime Maguire

Protran presented two technologies: one for RWP and one for trespass and suicide prevention. Protran's RWP solutions offer portable devices and permanently mounted devices that provide specific alerts for approaching trains, worker location awareness, and system data logs of all events and inspections. Protran also noted that their devices have self-diagnostic capabilities and use software alterations in real time to the Rail Operation Control Center if a wayside unit is not functioning properly. Protran's trespass prevention technologies feature numerous warnings and alerts to notify individuals that they are trespassing. They also have the capacity to detect intrusions if something falls on the track. The Committee discussed the technologies' ability to detect failures, as well as data security concerns.

7. **TSP: Hotrail Group**, Richard Gent

The Hotrail Group presented on its technological developments to aid in trespass and suicide prevention, which uses drones, data collection, and cameras to spot items on the tracks. Through its data collection, Hotrail Group was able to identify that a key reason people trespass is to disregard law enforcement. Additionally, on the Hotrail Group's test site, once the technology was implemented, suicides subsequently dropped from three to one.

8. **Motorola Solutions/Avigilon Video Security and Analytics**, Ryan Bach

The Motorola Solutions/Avigilon Video Security program is a self-learning, video analytic technology that is programed to identify 500,000 objects that may be found on a railroad system. Although Mr. Bach recognized that there is a learning curve for the technology, he stated that it is able to identify false positives over time to rule out concerns and become 'smarter' at identification.

Public Comments

Public participants asked questions and shared feedback with the Committee and presenters. One public member asked Protran if it has had any issues with false positives in more complex environments with tunnels and curves. Protran discussed how they have not seen any issues, as their system is hardwired.

Employee Safety Reporting (ESR) Research Presentation

Presentation by Lisa Staes

Lisa Staes presented her team's research focused on transit agencies that are developing ESR Programs (ESRPs). Additionally, her research efforts aimed to compile best practices used in non-punitive employee reporting programs and to support TRACS by identifying technologies and applications that are being used. The presentation was broken down into three sections: 1) literature review; 2) survey and interviews; and 3) tools, technology, and leading practices.

Section 1: Literature Review

Ms. Staes opened the presentation with a literature review that involved interviews and a survey of public transit agency representatives. The outcomes of this work included identification of elements of non-punitive ESR systems; identification of common and leading

practices; identification of technologies, tools, and applications; creation of a final report; and providing input to TRACS. The presentation also stressed that Safety Assurance and Safety Risk Management (two of the four Safety Management System [SMS] components) are drivers of a successful ESRP and its implementation for an effective SMS. The research presentation discussed FTA's guidance for a good ESRP from the September 2019 Joint SSO and RTA Workshop on ESRP, which includes factors such as commitment from management, framing safety as everyone's responsibility, clear safety goals, and an involved staff.

Section 2: Survey and Interviews

Ms. Staes provided an overview of a survey that was sent out to 19 transit agencies. The survey investigated methods of reporting, system age, confidentiality vs. anonymity, policies and reviews, training, employee input/acceptance, and familiarity with FTA's SMS pilot. The survey identified the most common reporting methods, as follows: online (74 percent), hard copy forms (58 percent), and phone (47 percent). It is also important to note that of the surveyed organizations, 84 percent of the organizations have confidential reporting and 89 percent of organizations can make anonymous reports.

Section 3: Tools, Technologies, and Leading Practices

Ms. Staes concluded with a presentation on the tools and technologies that different transit agencies are using to implement ESRPs. Two of the major systems that transit agencies are using are online employee portals/intranets, used by Santa Monica's Big Blue Bus, Capital Metro, LAMetro, Lynx Light Rail, MARTA, Miami-Dade Transit, Sarasota County Area Transit, Southeastern Pennsylvania Transit Authority (SEPTA), and TriMet. Third-party reporting platforms, such as Confidential Close Call Reporting Systems and Bureau of Transportation Statistics, are being used effectively by organizations such as Massachusetts Bay Transportation Authority, SEPTA, and WMATA. Best practices deemed integral to the success of programs included investigation and corrective actions, notification of hazards and dissemination, online reporting systems, and protection from punitive actions.

Public Comments

During the public comments period, public participants reflected on best practices and next steps for different transit agencies. They also discussed the idea of working groups as a tool that may be helpful, but costly. Additionally, public participants discussed how if FTA had more funds for working groups, these working groups would be beneficial for discussing ESRPs.

Day 1 Close of Business

Kara Waldrup thanked TRACS members and public participants for a productive first day. She then discussed a high-level agenda for Day 2 of the Conference.

Day 2 Welcoming Remarks

Kara Waldrup welcomed back the Committee members and public participants and reviewed the agenda for Day 2.

TEC Activity

Activity 1: Brainstorming

During a brainstorming session, the three subcommittees drafted recommendations addressing their specific safety focus area, considering the following eight TEC:

- Cost/economic considerations
- Potential impact to safety
- Potential impact to service (e.g., operations)
- Readiness to implement
- Ability to further SMS
- Risk-based safety data quality
- Systems integration
- Technology management

The subcommittee members categorized these recommendations based on similar themes. These themes were based on the key takeaways and information gaps identified during the September 2019 TRACS Conference, and the subcommittees were encouraged to identify additional themes.

Activity 2: Safety-Based Prioritization

The subcommittees prioritized the recommendations based on impact to safety, one of the eight TEC agreed upon at the March 2019 TRACS Conference. Impact to safety was determined relative to FTA's safety performance measures: fatalities, injuries, safety events, and system reliability. The subcommittees determined the level of impact to safety for each recommendation and prioritized them.

Activity 3: TEC Identification

The subcommittee selected the two to four most influential TEC applicable to each recommendation.

Activity 4: Recommendations Discussions

The subcommittee assessed the feasibility of each recommendation and identified any information gaps.

Behavior-Based Safety (BBS) Presentation

After the subcommittee small group activities, Mike Coplen, a public participant of the TSP and ESR subcommittees, delivered a presentation on BBS. This presentation covered safety culture, introduced BBS, the Federal Railroad Administration's (FRA) version of BBS, and empirical findings. Mr. Coplen emphasized that there must be commitment from all key stakeholders and that voluntary, confidential/anonymous, non-punitive behavioral observation and feedback is important. Additionally, he stated that it is essential to have systematic and objective data

gathering, analysis, and reporting and emphasized that organizations must implement safety improvement action processes with long-term sustaining mechanisms in place.

Large Group Discussion – Overall

The large group discussion identified key takeaways and information gaps from the presentations. The Committee discussed the challenges with technology, automation, and implementation and discussed the importance of agencies incorporating technology to support individuals and alter how people normally operate. The Committee also discussed interviewing people who deal with catastrophic losses and incidents. In most safety organizations, procedures exist to instill positive safety behaviors and relay information, but may indirectly cause violations of safety rules.

The Committee then discussed punishment and negative repercussions for behavior modification, accompanied by the need for agency transparency. One member brought up the example of Union Pacific, which has a program called Total Safety Culture that incorporates elements involving organizational restructuring. The Committee emphasized that for a cultural shift to occur successfully, there must be buy-in from first-level supervisors.

Public Comments

Public participants had the opportunity to ask questions and share feedback. The discussion revolved around the importance of preparation, management, and leadership in safety implementation. Safety inspectors are playing a dual role in monitoring and maintaining how safety systems are working with SMS and conducting oversight for violations.

Close of Business and Next Steps

Kara Waldrup closed the February 2020 TRACS Conference by thanking Committee members and the public for their participation and engagement. She summarized the accomplishments the Committee had made over the course of the meeting. She delivered guidance to TRACS members on the next meeting date, encouraged them to complete a short survey requesting feedback about the meeting, and informed Committee Members that they would be receiving support from FTA to set up their monthly subcommittee teleconference calls.