



# TRANSIT ADVISORY COMMITTEE FOR SAFETY (TRACS)

## 2018-2020 Charter

Employee Safety Reporting Final Report

## Contents

TRACS Members and Public Participants.....	3
Introduction: 2018-2020 TRACS Charter Tasking and Executive Summary.....	4
FTA's Tasking to TRACS and Overview of the Safety Focus Areas .....	4
Executive Summary.....	5
Recommendations .....	7
ESR Recommendation #1 FTA should review the current status of ESR programs at RTAs, assess their effectiveness, and identify any needed improvements. ....	7
ESR Recommendation #2 – Adopt Uniform ESR Strategies, attending to the differences between RTAs to provide any needed flexibility. ....	12
ESR Recommendation #3 – Improve Safety Culture.....	17
ESR Recommendation #4 – Transit Agencies should have Dedicated Staff who ensure that Agencies are SMS-Compliant and to conduct Quality Assurance. ....	23
ESR Recommendation #5 – FTA should provide a Third-Party Central Repository for Information that includes the ability to conduct Agency-to-Agency Comparisons and Confidential Close Call Reporting System (C <sup>3</sup> RS) .....	27
Appendices.....	32
A – 1 TRACS Conferences.....	32
March 26-27, 2019 Conference .....	32
September 9-10, 2019 Conference .....	34
February 25-26, 2020 Conference .....	37
July 21-22, 2020 Conference.....	38
A – 2 Literature Review and Recommended Reading .....	39
A – 3 Research Presentations .....	41

## **TRACS Members and Public Participants**

TRACS Members and Public Participants Supporting Employee Safety Reporting

**Elayne Berry**, Formerly of Metropolitan Atlanta Rapid Transit Authority (MARTA)

**James Hickey**, Formerly of Illinois Department of Transportation (IDOT)

**Eric Muntan**, Miami-Dade Transit (MDT)

**Brian Sherlock**, Amalgamated Transit Union (ATU)

**Victor Wiley**, Formerly of Memphis Area Transit Authority

**Brian Alberts (Public Participant)**, American Public Transportation Association (APTA)

**Frank Castellon (Public Participant)**, TriMet

**Michael Coplen (Public Participant)**, TrueSafety Evaluation, LLC

**Gardner Tabon (Public Participant)**, Capital Metro

**Paul King, Ph.D., (Public Participant)**, Rail Safety Division, California Public Utilities Commission

### **Other TRACS Members**

**Herman Bernal**, Arizona Department of Transportation (ADOT)

**Pamela Fischhaber, Ph.D.**, Colorado Public Utilities Commission

**David Harris**, New Mexico Department of Transportation (NMDOT)

**Jeffrey Lau**, Bay Area Rapid Transit (BART)

**Ronald Nickle**, Transit Safety & Security Solutions, Inc.

**Karen Philbrick, Ph.D.**, Mineta Transportation Institute (MTI), San Jose State University

**Joyce Rose**, WSP-USA

**Scott Sauer**, Southeastern Pennsylvania Transportation Authority (SEPTA)

## **Introduction: 2018-2020 TRACS Charter Tasking and Executive Summary**

### **FTA's Tasking to TRACS and Overview of the Safety Focus Areas**

The United States Department of Transportation's (DOT) Federal Transit Administration (FTA) encourages implementation of measures that will strengthen safety culture at every level of the transit industry and improve safety through modernization. Since its founding in 2009, the Transit Advisory Committee for Safety (TRACS) has supported FTA in this effort by providing information, advice, and recommendations on transit safety.

Under the 2018-2020 TRACS Charter, FTA tasked TRACS to “review emerging technologies and recommend public transportation innovations in safety that FTA can implement in support of the public transportation sector.” To assist the transit industry's shift towards the principles of Safety Management Systems (SMS), FTA encouraged the Committee to make recommendations using a SMS framework.

To support the 2018-2020 Charter, TRACS members formed three subcommittees focused on the following safety focus areas: 1) Trespass and Suicide Prevention (TSP), 2) Employee Safety Reporting (ESR), and 3) Roadway Worker Protections (RWP). The FTA selected and assigned the safety focus area, TSP, to the Committee. The FTA also requested that TRACS select two additional safety focus areas, so the Committee selected RWP and ESR because of their importance to ensuring transit safety. While TRACS has previously proposed recommendations on ESR<sup>1</sup> and on the related issues of safety culture and safety management systems, the recommendations under the 2018-2020 Charter will specifically address these safety focus areas through the lens of emerging technologies and innovative processes. All previous TRACS reports and recommendations can be found in the [TRACS Archive](#).

The recommendations in this report are intended to continue the progress to-date from the earlier TRACS report<sup>2</sup> and the subsequent requirements in the FTA's Public Transportation Safety Plan.<sup>3</sup> In this regard, while this report serves to continue that progress, it is still somewhat limited in that the current TRACS lacked the resources that have historically been provided. Prior TRACS Committees were supported by the Volpe Center as subject matter experts and technical writers to guarantee a high-quality product for the FTA. They also facilitated knowledge exchange among TRACS members and public participants, conducted

---

<sup>1</sup> See Transit Rail Advisory Committee for Safety (TRACS, 2012) Working Group 11-01 Report (2012) *Establishing a Confidential, Non-Punitive, Close Call Safety Reporting System for the Rail Transit Industry*. <https://www.transit.dot.gov/regulations-and-guidance/safety/close-call-safety-reporting-11-01>

<sup>2</sup> *Ibid*.

<sup>3</sup> USDOT, Federal Transit Administration (2018). *Public Transportation Agency Safety Plans*. Title 49 of the Code of Federal Regulations, Part 673. <https://ecfr.federalregister.gov/current/title-49/subtitle-B/chapter-VI/part-673>

scientific literature reviews, supported the drafting of feature rich advisory reports, and helped finalize evidence-based recommendations to the FTA and the transit industry.

Another depletion of TRACS Committee resources has been the reduction from thirty members to fifteen. The smaller committee has also faced extreme time conflicts due to running transit agencies and similar roles amid pandemic conditions. The limitations of the current report reflect the lack of support and needed resources previously available to TRACS.

The TRACS Committee would like to continue its rich history of providing invaluable recommendations in support of the safety missions of both the Secretary of the U.S. DOT and the Administrator of the FTA. In addition to its statutory role its reports have been very important to agencies, regulators and others interested in and understanding and solving industry problems. Management, labor unions, and others utilize TRACS reports as guidance documents for addressing industry-wide issues and safety improvement opportunities. The transit industry functions at its best with the foundational liaisons, best practice guidance, and safety leadership which TRACS provides.

## Executive Summary

This report provides recommendations for employee safety reporting (ESR) systems on transit systems under the purview of the Federal Transit Administration (FTA).

FTA has long viewed ESR as a top priority, and ESR was previously assigned to TRACS in 2011. In response to a 2011 tasking to TRACS,<sup>4</sup> the Committee prepared TRACS Report 11-01<sup>5</sup> which presents findings on the principles and characteristics of existing reporting models used by the Federal Aviation Administration (FAA) and the Federal Railroad Administration (FRA) for reporting. TRACS Report 11-01 outlines how to adapt existing FAA models to the rail transit industry related to establishing a pilot project by considering reporting systems that emphasize confidentiality, the selection of a pilot site, and a discussion of multiple criteria for success. Each of these considerations can be leveraged to support transit agencies in adapting their existing models to improve ESR. Lastly, TRACS Report 11-01 presents recommendations on how FTA can support the establishment of a confidential, non-punitive, close call safety reporting system for the rail transit industry.

In 2019, FTA issued the Public Transportation Agency Safety Plan (PTASP) regulation (49 CFR Part 673) which requires agencies to establish an ESR system. The regulation integrates many of the elements of the TRACS 11-01 report.

---

<sup>4</sup> See Federal Transit Administration. (2011). *FTA Administrator's Tasking to TRACS 11-01*. <https://www.transit.dot.gov/regulations-and-guidance/safety/tracs-task-11-01>

<sup>5</sup> See Transit Advisory Committee for Safety. (TRACS, 2012), *ibid*.

Under the current TRACS Charter, the ESR subcommittee aimed to further the work of TRACS Report 11-01 by focusing on specific emerging technologies and innovative ESR processes that transit agencies can adopt as they implement PTASP requirements.<sup>6</sup> The Committee's selection of ESR as a safety focus area under the Charter serves as an extension of its previous work on this topic and will align with the tenants of ESR contained in TRACS Report 11-01 and PTASP requirements.

In summary, TRACS recommends:

- 1) FTA should review the current status of ESR programs at RTAs, assess their effectiveness, and ensure that any needed improvements are made.
- 2) FTA should adopt uniform ESR strategies, attending to the differences between RTAs to provide any needed flexibility.
- 3) FTA should focus on improving safety culture through effective measurement of current safety culture, open and honest reporting, and the creation of a standardized toolkit for agencies to reference.
- 4) Transit agencies should have dedicated staff who ensure that agencies are SMS-compliant and to conduct quality assurance.
- 5) FTA should provide a third-party central repository for information that includes the ability to conduct agency-to-agency comparisons and Confidential Close Call Reporting System (C<sup>3</sup>RS).

---

<sup>6</sup> See Federal Transit Administration (2019), *Employee Safety Reporting Programs*, webinar, July 31, 2019,. <https://www.transit.dot.gov/regulations-and-guidance/safety/public-transportation-agency-safety-program/ptasp-employee-safety>

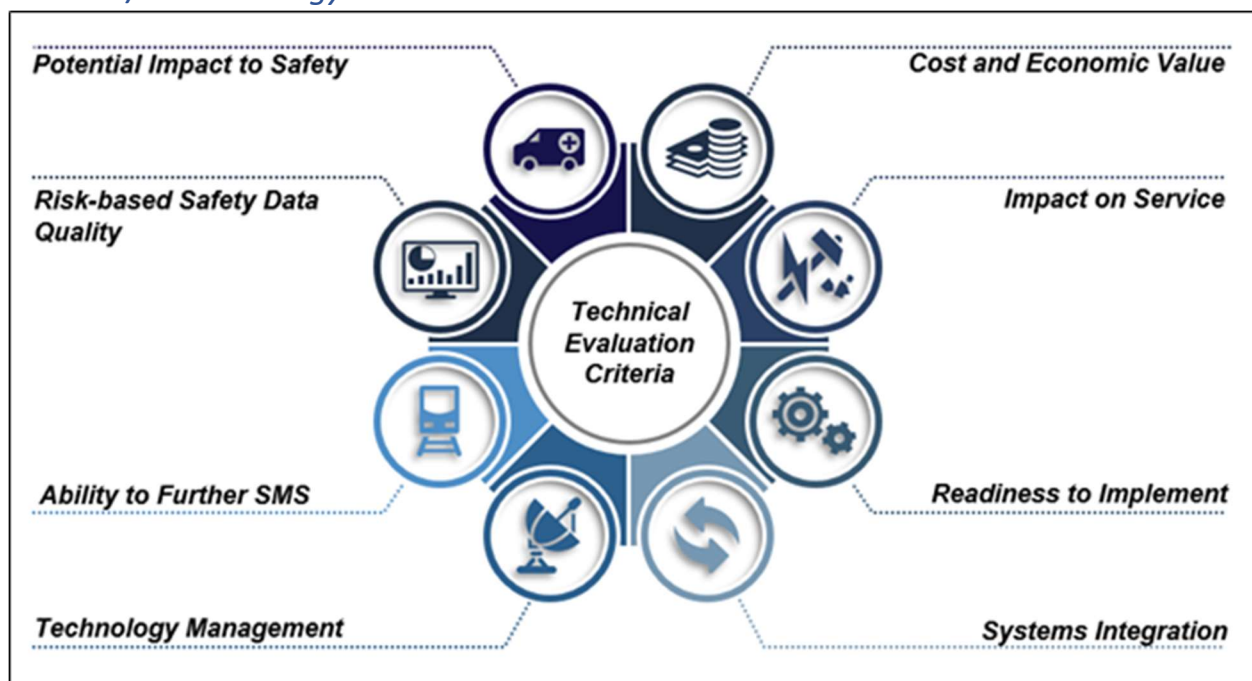
## Recommendations

**ESR Recommendation #1** FTA should review the current status of ESR programs at RTAs, assess their effectiveness, and identify any needed improvements.

### *Recommendation*

This recommendation is an important preliminary step in understanding the current status of ESR programs at the RTAs under the purview of the FTA before improvements can be identified, prioritized and adopted. Such a review should be the foundation for identifying any technological or process innovations.

### *Criteria/Methodology*



Given the need for a thorough review that was beyond the scope and resources of the current TRACS, the Committee recommends all the above evaluation criteria be included in future work. These criteria are considered in this recommendation, with *Potential Impact to Safety*, *Ability to Further SMS*, and *Systems Integration* as the most important to the purpose of any ESR system. Additionally, in the search for innovative technologies, *Technology Management* criterion is also considered important for future progress in these systems.

### *Key Takeaways*

- ESR systems at RTAs are in an early stage of maturity.

- The TRACS report, *Establishing a Confidential, Non-Punitive, Close Call Safety Reporting System for the Rail Transit Industry*, provides extensive guidance for establishing effective ESR systems, including evaluation criteria.<sup>7</sup>
- The FTA's *Public Transportation Agency Safety Plan* places essential, but rudimentary general ESR requirements on RTAs.<sup>8</sup>
- The FTA has provided training on ESR system requirements through webinars and workshops.<sup>9</sup>
- FTA establishing publicly available guidance and requirements that address any needed flexibility, can provide direction for both transit agencies and potential ESR technology vendors.
- New research by the *Transit Cooperative Research Program* (TCRP Report 218) has recently become available on non-punitive ESR systems in the rail transit environment.<sup>10</sup>

### *Information Gaps*

- The Committee was not aware of any assessment of implemented ESR systems that compared the recommendations in the TRACS report, *Establishing a Confidential, Non-Punitive, Close Call Safety Reporting System for the Rail Transit Industry*,<sup>11</sup> to the ESR programs as implemented and reviewed by FTA.
- Neither Part 673, nor any webinar materials available to TRACS, given the time and resource constraints, discuss what might be needed to implement a successful ESR system under varying levels of subordinate/supervisor mistrust.
- Confidentiality is mentioned in the above materials, but not anonymity, which is considered to provide the most protection and assurance of identity being protected, thus the best protection against punitive responses to reporting.

---

<sup>7</sup> See Transit Advisory Committee for Safety. (TRACS, 2012), *op cit.*, pp. 5, 18.

<sup>8</sup> See USDOT, Federal Transit Administration (2018). *Public Transportation Agency Safety Plans*. *op cit.*, sections 673.73(b), 673.27(b), and 673.29(b).

<sup>9</sup> See Federal Transit Administration, (2019a). *PTASP Employee Safety Reporting Programs* webinar, *op cit.*, and Federal Transit Administration, (2019b). *2019 Joint SSO and RTA Workshop: Employee Safety Reporting Programs (ESRP)*, September 25, 2019. [https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/133846/2019-joint-ss0-and-rta-workshop-tso-employee-safety-reporting\\_2.pdf](https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/133846/2019-joint-ss0-and-rta-workshop-tso-employee-safety-reporting_2.pdf)

<sup>10</sup> National Academies of Sciences, Engineering, and Medicine (2020). *Characteristics and Elements of Non-Punitive Employee Safety Reporting Systems for Public Transportation*. TCRP Research Report 218 Pre-Publication Draft-Subject to Revision. <https://www.nap.edu/catalog/25852/characteristics-and-elements-of-non-punitive-employee-safety-reporting-systems-for-public-transportation>

<sup>11</sup> Transit Advisory Committee for Safety. (TRACS, 2012), *op cit.*, p. 18.



- Success of the various RTAs' ESR systems. One important measure of success is whether employees report errors or mistakes they have made that could lead to discipline.
- Value the various RTAs' current ESR systems provide to other RTAs. Systems in other transportation modes have deemed the industry-wide sharing of "close call" information one of the most important elements of such systems. Is this information now shared and utilized optimally in the rail transit industry?
- There has been little research in the area of non-punitive ESR systems in a transit environment, with the exception of a recent ESR review by the *Transit Cooperative Research Program*.<sup>12</sup>

### *Additional Justification*

Leading subject matter experts in the transportation industry have pointed out the necessity for the complete flow of safety information in transportation organizations, as well as industry-wide. James Reason describes the most important element of safety culture to be a *learning culture*,<sup>13</sup> where information flows freely up and down the organizational hierarchy, and the organization acts on that information, continuously improving risk management. The largest gains have been seen to be information that flows up from those "on-the-ground" who see operations first-hand, and who would be the only ones to know about such risk-critical information unless they report it. Non-punitive confidential reporting programs must not only be constructed to ensure this flow of information, but they must be perceived as trustworthy in order for this to happen. Another essential element of safety culture is trust, or *just culture*, as Reason writes.<sup>14</sup> For trust to exist, organization members must experience fair processes that work towards their well-being.

This recommendation is important to the implementation of ESR systems on RTAs in general, as well as being an important starting point for any effort to enhance these systems. In order to know where and how to proceed, we need to know where we are. For example:

- Have the implemented systems generated perceived trust in coming forward with safety information that in the past could have resulted in punishment?
- Have employees bought into the program and its goals and processes?
- Has there been an improvement in the learning and safety cultures?
- Does there need to be an investment in reporting infrastructure similar to what has been the case in other implementations, such as the FAA's Aviation Safety Reporting

---

<sup>12</sup> National Academies of Sciences, Engineering, and Medicine (2020). *op cit*.

<sup>13</sup> Reason, J. (1997). *Managing the risks of organizational accidents*. Aldershot: Ashgate, and Reason, J. (1998). Achieving a Safe Culture: Theory and Practice. *Work and Stress: An International Journal of Work, Health, & Organizations*, 12(3), 293-306.

<sup>14</sup> *Ibid*.

System and the FRA's C<sup>3</sup>RS programs, which have a national reporting third party that guarantees anonymity, a national database, and peer review teams of experts to evaluate reports and propose mitigations?

More than one commenter described high levels of mistrust in many transit organizations. Experience in the past in other transportation modes suggests careful consideration to whether the FTA might need to fund a similar third-party intake and analysis service, such as that provided by NASA, if mistrust is seen as getting in the way of effective ESR implementation.

### *Conclusion*

The FTA is in the unique position of having the economy-of-scale to develop ESR system effectiveness on RTAs. Much progress has been made, and after a good assessment of the current status of these programs and how well they have been accomplishing the goals of ESR systems, progress will be well-guided. This recommendation is intended to provide a foundation for the rest of the recommendations herein.

### *Reference Sources*

- Federal Transit Administration. (2011). *FTA Administrator's Tasking to TRACS 11-01*.  
<https://www.transit.dot.gov/regulations-and-guidance/safety/tracs-task-11-01>
- Federal Transit Administration (2019a). *Employee Safety Reporting Programs*, webinar, July 31, 2019,. <https://www.transit.dot.gov/regulations-and-guidance/safety/public-transportation-agency-safety-program/ptasp-employee-safety>
- Federal Transit Administration, (2019b). *2019 Joint SSO and RTA Workshop: Employee Safety Reporting Programs (ESRP)*, September 25, 2019.  
[https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/133846/2019-joint-ss0-and-rta-workshop-tso-employee-safety-reporting\\_2.pdf](https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/133846/2019-joint-ss0-and-rta-workshop-tso-employee-safety-reporting_2.pdf)
- National Academies of Sciences, Engineering, and Medicine (2020). Characteristics and Elements of Non-Punitive Employee Safety Reporting Systems for Public Transportation. TCRP Research Report 218 Pre-Publication Draft-Subject to Revision.  
<https://www.nap.edu/catalog/25852/characteristics-and-elements-of-non-punitive-employee-safety-reporting-systems-for-public-transportation>
- Reason, J. (1997). *Managing the risks of organizational accidents*. Aldershot: Ashgate.
- Reason, J. (1998). Achieving a Safe Culture: Theory and Practice. *Work and Stress: An International Journal of Work, Health, & Organizations*, 12(3), 293-306.
- Transit Rail Advisory Committee for Safety (TRACS, 2012). Working Group 11-01 Report: *Establishing a Confidential, Non-Punitive, Close Call Safety Reporting System for the Rail Transit Industry*. <https://www.transit.dot.gov/regulations-and-guidance/safety/close-call-safety-reporting-11-01>

USDOT, Federal Transit Administration (2018). *Public Transportation Agency Safety Plans*. Title 49 of the Code of Federal Regulations, Part 673.

<https://ecfr.federalregister.gov/current/title-49/subtitle-B/chapter-VI/part-673>

## **ESR Recommendation #2 – Adopt Uniform ESR Strategies, attending to the differences between RTAs to provide any needed flexibility.**

### *Recommendation*

The Committee recommends that FTA develop and produce industry guidance to create a uniform, consistent strategy and framework to guide agencies in implementation of ESR programs, with particular emphasis to include: definitions and terminology; implementation of best practices; criteria for evaluation of technological ESR support systems; ESR training programs; and integration of ESR into PTASP. The Committee further recommends that FTA provide financial assistance to transit agencies to assist in ESR development, training, and procurement of technologies to support ESR. This funding could include an FTA discretionary grant program, so that agencies can create new ESR programs as well as improve upon current ESR programs already in place. Finally, this guidance should include protections from open-records requests from the public in order to fully protect employees who file reports.

In the July TRACS virtual meeting, commenters discussed different views on the pros and cons of guidelines versus requirements. Guidelines were seen as providing flexibility in implementing ESR systems on RTAs that differed greatly in size, infrastructure, and other characteristics that might affect successful implementation. Requirements were seen as essential for SSOAs and RTAs to be able to justify the necessary budgeting and to conduct SMS.

Some TRACS members expressed basic concerns about how guidelines can be a helpful part of SMS. Guidelines are subject to varied interpretation, which can cause problems in Safety Assurance, which requires objectivity and consistency.<sup>15</sup> The FTA, the FTA contractors, an SSOA, and an RTA, and its employees and their organizations can more easily interpret guidelines - differently from each other - than well-crafted requirements. The inherent ambiguity in guidelines makes objective assessment difficult. Personnel changes in any of these stakeholders can also lead to different subjective interpretations. For example, there is little more frustrating than to have received approval for a system or process, then to have a different party or new personnel subsequently assert non-approval.

TRACS believes this does not need to be a zero-sum game. Requirements can include flexibility to address RTA differences, while providing the imperative to adequately fund ESR implementation and ensure SMS. For example, different requirements can be set for large vs small RTAs, for union vs non-union RTAs, as well as other categories where industry-wide uniformity would not work as well. Uniformity within these categories can still be established. It is also important to remember that successful ESR systems start with a negotiated MOU to ensure fairness. As described in Recommendation #3, fairness in processes is essential for

---

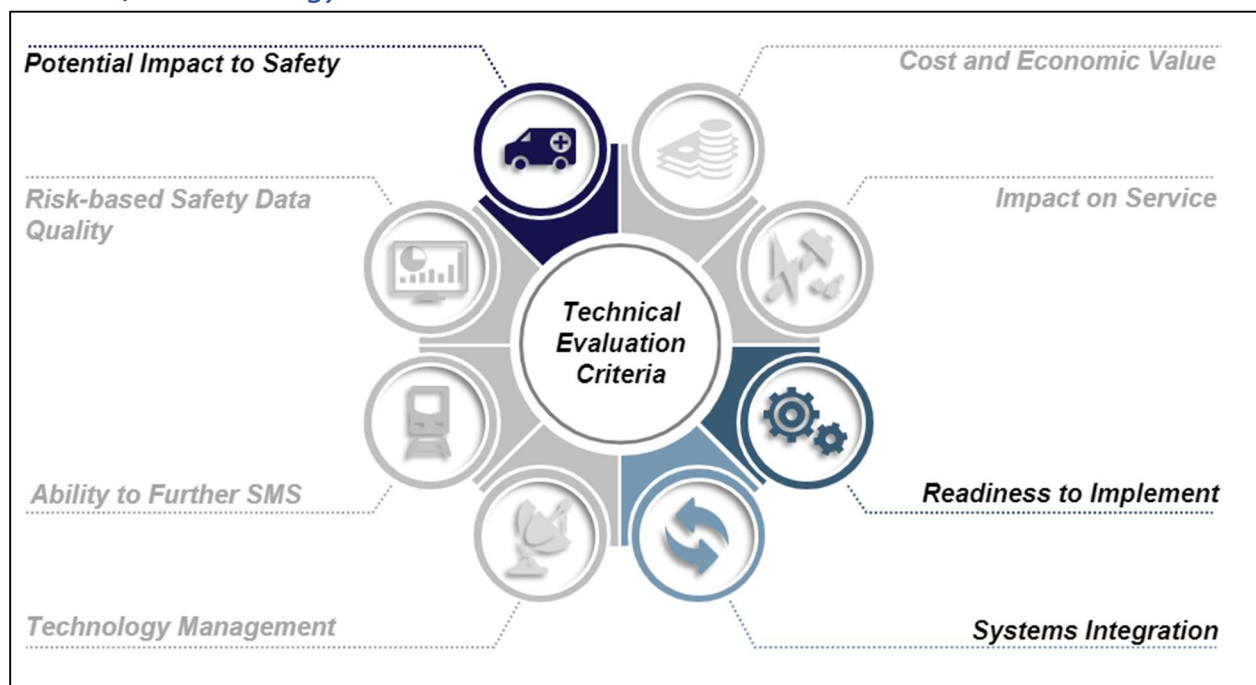
<sup>15</sup> Federal Aviation Administration. (2017). *Safety management system components*. <https://www.faa.gov/about/initiatives/sms/explained/components/>

perceived fairness in outcomes.<sup>16</sup> Stakeholders must negotiate and agree to the provisions of any to-be-adopted ESR system. The tension between guidance and requirement views can be mitigated by attending to fairness in the processes – the negotiations – that lead to an MOU. Requirements can be focused on processes more than on outcomes.

Additionally, commenters during the meeting pointed out that technologies, such as roadway worker protection safety technology, must have the private industry investment needed to develop and produce the technology. For this to happen, the industry needs to be assured of an eventual market. Two vendors stated that their development was prompted by a regulation. FTA should see if that may also be the case with progress for ESR technology innovations.

TRACS recommends uniform ESR strategies be adopted, attending to the differences between RTAs and making provisions for those differences, and to the degree possible, attending to processes in the adoption of the uniform strategies. While differences in opinions will no doubt remain, FTA is in the position to evaluate how well the current level of specificity, akin to guidelines, has been working. This can be part of what might be accomplished if Recommendation #1 is implemented. The discussion of guidelines versus requirements can result in achieving the best of both. TRACS poses that the above discussion should be continued with this in mind as strategies are adopted.

### *Criteria/Methodology*



<sup>16</sup> For a review, see Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O. L. H., & Ng, K. Y. (2001). Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology*, 86(3), 425–445.

The framework that guides ESR should be compatible with the technology-based systems that transit agencies may propose to use or already have in use (i.e. software programs, hotlines, and online/paper safety hazard identification forms (to name a few)). Thus, an ESR system should be flexible and scalable, just like the SMS of which it is a component. There should be less customization required if uniform strategies are adopted by the industry; however, any technology available must be equally useful for a small bus agency as it would be for a large rail service provider. Essentially, FTA should take the lead on providing guidance that would include definitions/terminology, criteria for evaluation, training programs and integration of ESR into PTASP. Therefore, technology vendors would most likely follow and produce products that would be useful to the industry and follow FTA guidance. Additionally, transit agency employees might exhibit a higher degree of trust regarding reporting if guidance was coming from FTA rather than from a more local level.

### *Key Takeaways*

- Information and best practices are frequently shared between transit agency leaders.
- In contrast to the aviation and railroad industries, rail transit peer agencies do not compete with each other, and as such, are more willing to share insights to help their counterparts. This should facilitate development of interagency safety information sharing platforms
- Consistency in approaches to common problems and sharing of lessons learned has proven to collectively benefit the industry. This could also benefit with consistency of definitions and terminology used throughout the transit industry.
- A shared framework for implementing ESR programs (ESRPs) would allow transit agencies to work through the learning curve together, as an industry, rather than as individual agencies.
- FTA establishing guidance can provide direction for transit agencies, SSOAs, and potential ESR technology vendors, but clarity and objectivity through adopted strategies, along with built-in flexibility, can assist in Safety Assurance, funding efforts, and consistency, and provide more clarity for potential vendors.

### *Information Gaps*

Leaders in the transit industry should be consulted with to agree on the uniform terminology and definitions that should be used in employee reporting systems. There should be agreement between those representing both large and small systems (as well as bus and rail). FTA and the American Public Transportation Association (APTA) have an opportunity to take the lead. APTA can assist FTA, if needed, in reaching out to the industry to determine what common ESR definitions and terminology are used at various size transit agencies.

### *Additional Justification*

Many transit agencies already have employee reporting systems (ERS), and some have multiple systems. Of these systems, some are highly developed and robust, and others are in a newer stage. Although PTASP regulation calls for a non-punitive system, additional FTA guidance to expand on the overall framework even further would be beneficial to ensure consistency. For example, the terms “close call” and “near miss” can be distinguished and understood at all levels of the organization.

### *Conclusion*

In taking the lead to guide the industry in developing ESR programs, FTA can help improve safety culture at transit agencies, encouraging a level of trust sufficient for employees to feel confident in utilizing their agencies’ ESR programs without fear of retribution (i.e., “non-punitive”). This is due to the authority FTA possesses and the relatively lower level of skepticism generally felt by employees toward FTA in comparison to agency management. Thus, FTA should make its role in guiding the industry and holding agencies accountable known to transit employees at all levels, especially those most likely to use ESR. Further, in the age of COVID-19, many agencies are strapped for funding (due to ridership losses and money being reallocated to other activities), so if FTA were to provide some level of grant funding, it would be extremely helpful for agencies that would like to establish an ESR system or build upon their current ESR systems.

### *Reference Sources*

- Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O. L. H., & Ng, K. Y. (2001). Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology*, 86(3), 425–445.
- Davey, M., Kidda, S., Morell, J., Ramney, J., & Zuschlag, M. (2019). *Confidential Close Call Reporting System (C3RS) Lessons Learned Evaluation – Final Report*.  
[https://railroads.dot.gov/sites/fra.dot.gov/files/fra\\_net/18350/C3RS%20Lessons%20Learned%20rev.pdf](https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/18350/C3RS%20Lessons%20Learned%20rev.pdf).
- Reason, J. (1997). *Managing the risks of organizational accidents*. Aldershot: Ashgate.
- Reason, J. (1998). Achieving a Safe Culture: Theory and Practice. *Work and Stress: An International Journal of Work, Health, & Organizations*, 12(3), 293-306.
- National Academies of Sciences, Engineering, and Medicine (2020). *Characteristics and Elements of Non-Punitive Employee Safety Reporting Systems for Public Transportation*. TCRP Research Report 218 Pre-Publication Draft-Subject to Revision.  
<https://www.nap.edu/catalog/25852/characteristics-and-elements-of-non-punitive-employee-safety-reporting-systems-for-public-transportation>
- Transit Rail Advisory Committee for Safety (TRACS, 2012) Working Group 11-01 Report (2012) *Establishing a Confidential, Non-Punitive, Close Call Safety Reporting System for the Rail*

*Transit Industry.* <https://www.transit.dot.gov/regulations-and-guidance/safety/close-call-safety-reporting-11-01>



## ESR Recommendation #3 – Improve Safety Culture

### *Recommendation*

*The Committee recommends that FTA develop implementation strategies for improving safety culture as a key mechanism of an effective and robust ERS.*

Safety culture improvement should start with measuring, using surveys and interviews to disclose the good and problematic features of current culture. Behavioral observations and interviews about shared behavioral expectations provide insight into the critical component of trust and taps into employee buy-in and knowledge of any relation such trust has to ESR participation and effectiveness. Measurements, if sufficiently objective, could assist any gap analysis. Additionally, the adage may apply where, “if you can measure it, you can change it.”

Trust is pervasively seen as the core element of safety culture, and its components *informed culture*, *learning culture*, and *just culture*.<sup>17</sup> Safety culture improvements and improvements in trust can work hand-in-hand synergistically to reverse decades of mistrust and lack of reporting.

Parallel interventions that can independently improve safety culture are the behavior-focused interventions based on the applied principles of positive reinforcement to replace old punitive discipline systems. FRA research has demonstrated how programs that intervene and train supervisors to change from punitive discipline to a positive reinforcement approach are very effective in reducing unsafe behavior and increasing safe behavior, thus improving safety culture and trust.<sup>18</sup>

Regarding improvements in safety culture that can directly impact the success of ESR implementation, there is a considerable literature on procedural fairness. The research in procedural fairness shows that even given the same outcome, processes that led to that outcome affect the evaluation of that outcome.<sup>19</sup> In other words, outcomes from processes perceived to be fair are better accepted and viewed more favorably than identical outcomes from processes that are not perceived to be fair. This principle has been addressed in the establishment of successful ESR systems. Memorandums of understanding (MOU) are negotiated that establish the processes by which the ESR system will be conducted. All significant stakeholders are included as necessary participants in MOU.

Measuring safety culture is important in assessing progress. Recommendations for measurement include:

---

<sup>17</sup> See for example, Reason, J. (1997). *op cit.*, and Reason, J. (1998). *op cit.*

<sup>18</sup> U.S. Department of Transportation, Federal Railroad Administration (2007). *Behavior-based safety at Amtrak-Chicago associated with reduced injuries and costs*. Research Results, RR07-07, Washington, DC. and U.S. Department of Transportation, Federal Railroad Administration (2009). *Improved safety culture and labor-management relations attributed to changing at-risk behavior process at Union Pacific*. Research Results, RR09-19, Washington, DC.

<sup>19</sup> For a review, see Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O. L. H., & Ng, K. Y. (2001), *op cit.*

- Ensuring that managers and employees feel safe enough to give honest answers.
- Constructing a positive, non-punitive culture and avoiding bias on any side (e.g., employee, manager, Union).
- Unstructured interviews – best to have a neutral party conduct these unstructured, confidential, non-punitive interviews.
- Building trust – between management and labor. Give both sides models for what creates positive reinforcement.
- Evidentiary Protections (via anonymity such as provided by NASA as a third party, or other options, such as the Bureau of Transportation Statistics or Confidential Information Protection and Statistical Efficiency Act).
- Implementing parallel behaviorally-focused interventions based on the principles of positive reinforcement, such as behavior-base safety (BBS).

Measurement should not only be quantitative, showing a degree of positive safety culture, but qualitative to determine where improvement is needed. With good qualitative measurement, the FTA could develop a toolkit for improving the different culture issues identified. Issues to address include:

- Surveys should be confidential and include input from employees and managers, tapping into the behavioral expectations that each have of each other.
- Can be augmented by informal conversations.
- Adopt and promote the U.S. Department of Transportation (DOT) definition of safety culture “The shared values, actions, and behaviors that demonstrate a commitment of safety over competing goals and demands.”<sup>20</sup>
- Develop other standardized terminology that facilitates a common language and common understanding of ERS.
- Develop a standardized suite of validated Safety Culture Assessment tools for continuous improvement, such as the Safety Culture Assessment process developed and implemented by the Short Line Safety Institute,<sup>21</sup> including:
  - Safety culture surveys
  - Interview protocols

---

<sup>20</sup> Federal Railroad Administration, (2015). *Safety Culture: A Significant Influence on Safety in Transportation*. Washington, D.C.: FRA Office of Research Development and Technology.  
[https://railroads.dot.gov/sites/fra.dot.gov/files/fra\\_net/17170/TR\\_SafetyCulture\\_Final.pdf](https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/17170/TR_SafetyCulture_Final.pdf)

<sup>21</sup> Short Line Safety Institute (2020a). *Safety culture assessment*. <https://www.shortlinesafety.org/safety-culture-assessment2/>

- Document reviews
- Field observations and site visits
- Develop a toolset for building collaboration and trust to facilitate an accurate and comprehensive ERS, specifically addressing the following:
  - Training and resources regarding positive reinforcement and its relative effectiveness compared to traditional approaches.
  - Safety culture training for both labor and management specifically emphasizing ERS and the importance of trust in building a strong safety culture.
  - Identification of examples of success, such as with the FAA's Aviation Safety Reporting System (ASRS), the FRA's C3RS,<sup>22</sup> and the FRA's behavior-based systems research.<sup>23</sup>
  - Implementation strategies "that allow employees to report safety conditions to senior management" (49 CFR Part 673.23 – Safety Management Policy) and for building a stronger transit safety culture such as:
    - positivity in communications and actions,
    - developing emotional intelligence,
    - mindfulness-based safety,
    - identification and coordination with all key stakeholders (e.g. labor, management, State DOTs, State Safety Oversight Agencies (SSOAs)),
    - protections for employees who report safety conditions to senior management, and
    - providing feedback to reporting employees.
  - A metric for assessing trust as a separate validated measure across all organizational levels.
  - Metrics of safety culture such as baseline measures and on-going monitoring as required; (49 CFR Part 673.27 - Safety Assurance).

---

<sup>22</sup> See Transit Advisory Committee for Safety. (2012). *Transit Advisory Committee for Safety (TRACS) 11-01 Final Report: Establishing a Confidential, Non-Punitive, Close Call Safety Reporting System for the Rail Transit Industry*. <https://www.transit.dot.gov/regulations-and-guidance/safety/close-call-safety-reporting-11-01>

<sup>23</sup> U.S. Department of Transportation, Federal Railroad Administration (2007). *op cit.*, and U.S. Department of Transportation, Federal Railroad Administration (2009), *op cit.*

- Provide feedback to individuals who submitted safety comments and reports.
- Sustainability strategies, specifically through senior leadership and contract changes.
- Develop customized toolsets and resources specifically tailored to those agencies that only receive 5310 and 5311 federal financial assistance.
- Provide funding to support pilot demonstration projects that apply and measure the effectiveness of safety culture intervention strategies (e.g. trust-building, behavior-based safety, training in emotional intelligence, and safety-based mindfulness) that can assist the development of effective employee reporting systems.

### Context

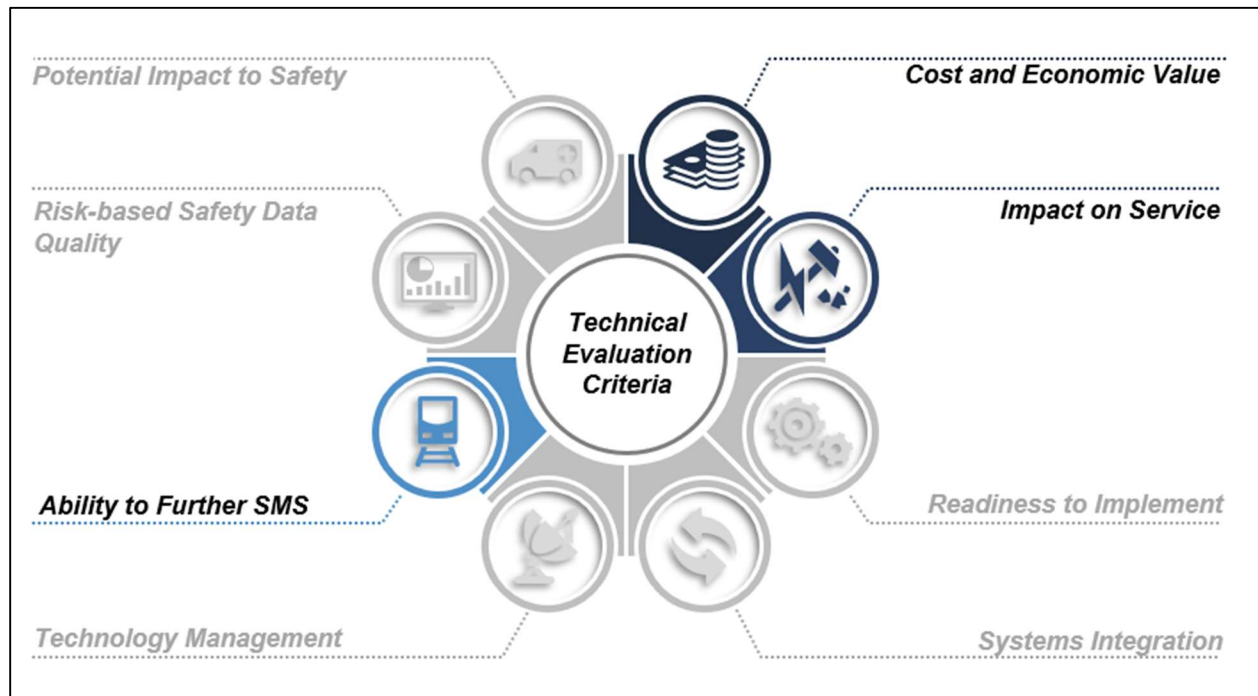
The prior TRACS Final Report 16-01 from 2017, *Building Toward a Strong Safety Culture Within the Bus and Rail Transit Industry*, identified tools and processes to promote a culture of safety at agencies of various sizes and modes, and made seven recommendations to be considered by FTA for implementation.<sup>24</sup> These tools and processes are considered critical for implementation of an effective employee reporting system. While some of these recommendations may have been implemented at different agencies, little knowledge or understanding exists as to how widely they have been adopted or the extent of their effectiveness.

This recommendation suggests implementation strategies, much needed future research, and proper resourcing. Transportation safety cannot be optimized without successful employee reporting, which can only occur with a strong safety culture. Therefore, the Committee recommends FTA implement this recommendation in support of the prior TRACS report on safety culture.

---

<sup>24</sup> Transit Advisory Committee for Safety. (2017). *TRACS Final Report 16-01: Building Toward a Strong Safety Culture Within the Bus and Rail Transit Industry*. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/64011/building-toward-strong-safety-culture-tracs-16-01-final-report.pdf>.

## Criteria/Methodology



## Key Takeaways

Employee safety reporting has been largely unsuccessful in the transit industry due to a pervasive history of distrust within the culture. Such deeply engrained feelings and traditions are very hard to change and doing so will require tools and incentives that are largely missing. Research on best practices is needed, not just from industries that have been successful in creating a culture of trust, but especially where a toxic culture was overcome. Strong leaders can create the incentives and organizational structures needed, but trust is personal and must be won individual by individual throughout an organization. That process requires bringing people together as equals, with shared objectives and inducements that fit their divergent positions.

## Information Gaps

Few transit agencies carefully measure their own culture and its impacts. Providing the tools and resources to do so resolves one key information gap. The next step is how to move from discipline-based incentives to the cooperative and trusting incentives indicative of a healthy culture. Last is the need for a set of tools measuring the outcomes of cultural change and the improvements in morale, safety, and service quality that are broadly expected.

## Additional Justification

A successful ESR system has been the key to the extraordinary safety record of aviation, which started as the least safe way to travel and has become safer than staying home. Saving health and lives is an unalloyed good.

### *Conclusion*

Although transit is a safe mode of transportation by comparison to personal cars, for example, it can become much more like aviation if the tools used there are adopted. It can and must be done, both for the good of the ridership and broader public, but also for the quality of life of those who provide the service.

### *Reference Sources*

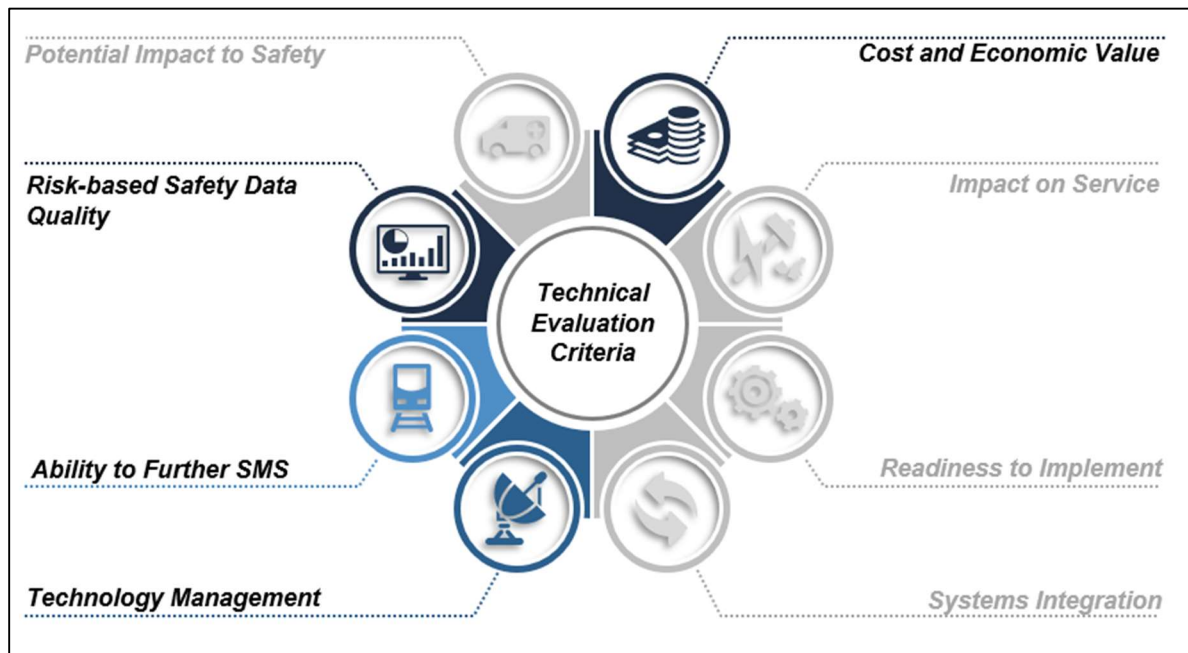
- Colquitt, J. A., Conlon, D. E., Wesson, M. J., Porter, C. O. L. H., & Ng, K. Y. (2001). Justice at the millennium: A meta-analytic review of 25 years of organizational justice research. *Journal of Applied Psychology*, 86(3), 425–445.
- Federal Railroad Administration, (2015). *Safety Culture: A Significant Influence on Safety in Transportation*. Washington, D.C.: FRA Office of Research Development and Technology. [https://railroads.dot.gov/sites/fra.dot.gov/files/fra\\_net/17170/TR\\_SafetyCulture\\_Final.pdf](https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/17170/TR_SafetyCulture_Final.pdf)
- Federal Transit Administration, Transit Advisory Committee for Safety. (2017). *TRACS Final Report 16-01: Building Toward a Strong Safety Culture Within the Bus and Rail Transit Industry*. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/64011/building-toward-strong-safety-culture-tracs-16-01-final-report.pdf>
- Multer, J. (2019). *Opportunities for innovation in employee safety reporting*. Presentation to the September 10, 2019, meeting of the Federal Transit Administration, Transit Advisory Committee for Safety. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/133641/tracs-opportunities-innovation-employee-safety-reporting-september-2019.pdf>
- National Academies of Sciences, Engineering, and Medicine. (2015). *TCRP Report 174: Improving safety culture in public transportation*. <https://www.nap.edu/download/22217>
- Reason, J. (1997). *Managing the risks of organizational accidents*. Aldershot: Ashgate.
- Reason, J. (1998). Achieving a Safe Culture: Theory and Practice. *Work and Stress: An International Journal of Work, Health, & Organizations*, 12(3), 293-306.
- Short Line Safety Institute (2020a). *Safety culture assessment*. <https://www.shortlinesafety.org/safety-culture-assessment2/>
- Short Line Safety Institute (2020b). *Ten core elements of a strong safety culture*. <https://www.shortlinesafety.org/about/strong-safety-culture/>

## **ESR Recommendation #4 – Transit Agencies should have Dedicated Staff who ensure that Agencies are SMS-Compliant and to conduct Quality Assurance.**

### *Recommendation*

The Committee recommends that the FTA establish a mandate for the transit industry to dedicate critical human and financial resources needed to ensure the effectiveness of its required PTASP. The FTA should provide capital funding to finance this mandate, and it should be all-encompassing, so that transit agencies of all sizes are able to adhere to the mandate.

### *Criteria/Methodology*



The recommendation is founded on the need to accurately gather and analyze data, with the objectives of enriching safety-related leading indicators, mitigating safety-related lagging indicators, creating greater internal stakeholder engagement opportunities, and ultimately enhancing an agency's safety culture.

Some may have assumed that implementing SMS would not result in the need to hire more staff. While this may be true in the long run, in the interim as SMS implementation matures and safety culture improves, it will be important to have specialized staff, not just to ensure adherence to SMS requirement, but to optimize to the core principles of SMS. For example, SMS cannot be fully successful without better information as can be provided by ESR.

Specialized staff can work to ensure an effective implementation of ESR, independent of any other intra-organizational pressures and competing goals.

Specialized staff would be in a good position to understand and oversee safety culture measurement, trust assessment, create trend analyses, identify training needs, needs for technical expertise development, and recommend actions to address those findings.

### *Key Takeaways*

As the premise behind SMS dictates, safety is a data-driven discipline which relies on the interpretation and synthesis of data into meaningful information and action. Key resources, both fiscal and personnel, should be dedicated to focus attention on the compilation and interpretation of all data collected into meaningful, proactive measures to address identified action items.

While some of the responsibilities of this mandate may previously have fallen under the responsibility of a transit agency's Chief Safety Officer (CSO), the Committee finds that having staff specifically trained in analyzing and parsing complex data will be important. Currently, transit agencies often attempt to address these responsibilities with staff who lack such skill sets, thus overwhelming the staff and posing a challenge to ensuring safety. Thus, a mandate providing for specifically trained staff would result in higher quality assurance and greater safety.

### *Information Gaps*

Although criteria for reporting requirements may have been included in the Federal and/or State Safety Oversight (SSO) guidance documentation, the known, preexisting allocation(s) throughout individual agencies is uncertain.

Finding personnel who possess data-analytic skills, as well as transit safety and SMS knowledge (e.g., leading/lagging indicators, performance measures, etc.) is challenging. Subsequent to data collection and compilation, the interpretation of the information, and the dissemination of activities to the appropriate personnel to address the findings, is challenging and needs to be placed under the purview of individuals whose sole responsibility is that particular job task. While looking at an agency's individual needs to fill positions such as this, minimum qualifications should be carefully considered in order for the agency to quickly begin structuring all activities around PTASP requirements.

Another challenge is the fear of public retaliation and litigation. Agencies fear receiving criticism rather than being seen as improving their safety culture through their ESR program. Without protections from public record requests, agencies remain vulnerable to such unwanted scrutiny.



### *Additional Justification*

Decades of negative safety culture cannot be reversed without the significant dedication of those with a solid understanding and responsibility for improving an organization's culture. Otherwise safety culture and SMS concepts are likely to become the new, overused, "politically correct" cliché, like "safety first" became. It takes far more than a proclamation of "safety first," or "we have a safety culture," or "we have a safety management system." It will be the behaviors that count, the shared expectations about how peers, supervisors, subordinates, managers, and executives will behave to the betterment of mutual trust and organizational improvement.

### *Conclusion*

FTA has demonstrated its commitment to the safety of the transit employee, transit customer, and general public with the newly established requirements of ESRPs found in 49 CFR Part 673 Public Transportation Safety Agency Plan (PTASP) - a Safety Risk Management (SRM) subcomponent within SMS. As a result, employees of transit agencies across the Nation now have opportunities to enhance safety cultures by identifying hazards before they escalate into accidents or incidents, through the formal reporting of hazards and poor safety-related behaviors – unlike any previous time in history. However, in order to ensure the strength and effectiveness of the program, agencies must have ample resources. If not, the program will be unsuccessful. Specialized attention to ESR and SMS success will be a critical part of this effort.

### *Resources*

- Davey, M., Kidda, S., Morell, J., Ramney, J., & Zuschlag, M. (2019). *Confidential Close Call Reporting System (C3RS) Lessons Learned Evaluation – Final Report*.  
[https://railroads.dot.gov/sites/fra.dot.gov/files/fra\\_net/18350/C3RS%20Lessons%20Learned%20rev.pdf](https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/18350/C3RS%20Lessons%20Learned%20rev.pdf).
- Federal Transit Administration, Transit Advisory Committee for Safety. (2011). *TRACS Final Report 10-01: Implementing Safety Management System Principles in Rail Transit Agencies*. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/64011/building-toward-strong-safety-culture-tracs-16-01-final-report.pdf>
- Federal Transit Administration, Transit Rail Advisory Committee for Safety (TRACS, 2012) Working Group 11-01 Report (2012) *Establishing a Confidential, Non-Punitive, Close Call Safety Reporting System for the Rail Transit Industry*.  
<https://www.transit.dot.gov/regulations-and-guidance/safety/close-call-safety-reporting-11-01>
- Multer, J. (2019). *Opportunities for innovation in employee safety reporting*. Presentation to the September 10, 2019, meeting of the Federal Transit Administration, Transit Advisory Committee for Safety.  
<https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/64011/building-toward-strong-safety-culture-tracs-16-01-final-report.pdf>

[guidance/safety/133641/tracs-opportunities-innovation-employee-safety-reporting-september-2019.pdf](#)

Robbins, K. (2019). Develop a Reporting Structure for Close Calls.

## **ESR Recommendation #5 – FTA should provide a Third-Party Central Repository for Information that includes the ability to conduct Agency-to-Agency Comparisons and Confidential Close Call Reporting System (C3RS)**

### *Recommendation*

The Committee recommends that FTA find a third-party Central Repository, chosen through competitive selection, for safety-related information that includes the ability to conduct Rail Transit Agency (RTA) agency-to-agency comparisons similar to the FAA's ASRS and the FRA's C<sup>3</sup>RS.<sup>25</sup> This would aid in the alignment of the National Public Transportation Safety Plan with established safety performance measures that would provide consistent safety reporting among agencies of various sizes and modes. This would also allow FTA to identify industry trends and recognize risks – and increase efforts to improve safety rulemaking. Further, it would allow:

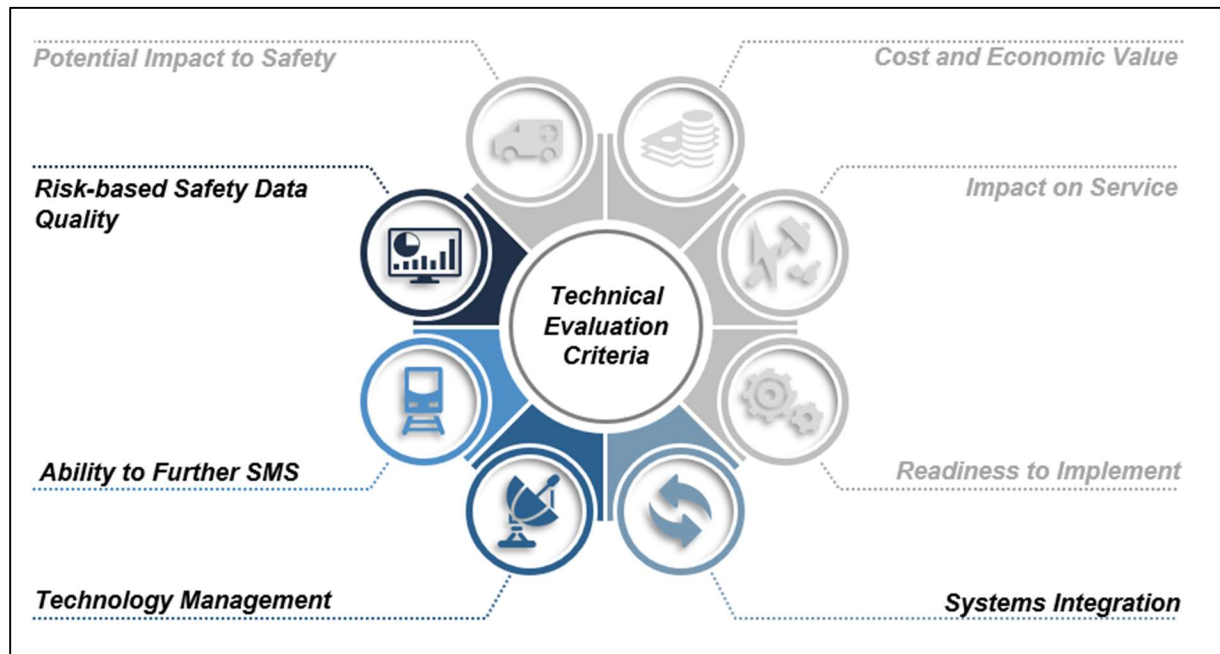
- FTA to provide a third-party Central Repository that will share RTA SMS data, categorized and quantified by subject
- RTA to develop tools to engage front line management in non-punitive safety data reporting
- RTA to develop employee communications (share concerns via hot-spot reporting) and or key performance indicators (KPIs) on employee reported issues
- Feedback closed-loop with supervision/ management
- Contributing factors to be defined and reported
- Right sizing programs based on budget and population
- Baseline data and needs

The FTA should support additional research on tracking progress on these recommendations industry-wide and reporting back to leadership on SMS's effectiveness. A central repository containing SMS data would augment FTA's ability to synchronize emerging technologies and innovative solutions in preventing or mitigating hazards. The Committee understands this recommendation has a somewhat narrower focus on RTAs, but believes this area also stands to gain the most from a central repository. Moreover, confidentiality or anonymity must be a critical aspect of this central repository to protect employees and not discourage employees from reporting unsafe behavior.

---

<sup>25</sup> See Federal Transit Administration, Transit Rail Advisory Committee for Safety (TRACS, 2012). Working Group 11-01, *op cit*.

## Criteria/Methodology



The Committee views risk-based safety data quality, the ability to further SMS, and technology management as the primary evaluation criteria for this recommendation as discussed below.

## Key Takeaways

- The Committee believes there are a variety of technologies that can support employee communication and reporting of safety issues. Technologies may include those utilized in existing programs in aviation and the railroad industry, such as software platforms that could be adapted for use on rail transit systems. For example, at the September 10, 2019, TRACS meeting the following ESR processes in the existing rail transit requirements were identified as candidates for innovative technological applications:<sup>26</sup>
  - Reporting methods.
  - Supporting investigation and analysis of individual safety conditions.
  - Identifying agency and industry safety trends and benchmarking.
  - Sharing information within an agency.
  - Sharing information across agencies: Develop a common data platform.

<sup>26</sup> See Multer, J. (2019). *Opportunities for innovation in employee safety reporting*. Presentation to the September 10, 2019, meeting of the Federal Transit Administration, Transit Advisory Committee for Safety. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/133641/tracs-opportunities-innovation-employee-safety-reporting-september-2019.pdf>

Technologies should be explored to determine which are the most appropriate and effective to assist in these areas.

- The Committee discussed the importance of ensuring a robust safety culture where safety incidents are reported. If a transit agency has a culture that encourages reporting, it can then collect and analyze this data, examine the results, and take actions to reduce the likelihood that such events will be replicated. The TRACS Report 11-01 discusses the principles of creating such a culture. To develop a successful ESR system, agencies must develop a culture of trust, upper management support, shared goals, and honesty, paired with legal and organizational protections, policy, union agreements, and feedback mechanisms. For many agencies, this would require a significant cultural shift in the relationship between employees and management; thus, some agencies may benefit by introducing a close call “ambassador” or change agent within the organization to lead the change. This could be an individual with both personal interaction skills and strong technical competency and authority for promoting change. Large agencies may face more challenges than smaller ones in changing the culture because of the large outreach needed to affect change and potential initial resistance to upsetting the status quo.
- The Committee believes that when used effectively and managed with the appropriate technologies, ESRPs produce actionable safety data that support the identification and mitigation of safety risks. While the use and analysis of data plays an important role in ESR, human error can affect data reliability. This includes reporting biases, analytical bias, poor investigatory and analytical procedures, inadequate risk assessments, causation and the problems of counterfactual reasoning, classification problems, unrealistic expectations, reliance on reminders and quick fixes, and flawed systemic views of failure.
- The Committee believes that it is important to engage staff and stakeholders early in the development process and to use a third party to maintain anonymity in the reporting process. Both will help to build trust and rapport between employees and management.
- The Committee explored innovative solutions during the literature review. First, the Committee recognized that leadership support, especially that from the Chief Executive Officer/General Manager, is critical to establishing a successful ESRP. Additionally, the Committee noted that establishing policies that enable anonymity and non-punitive reporting are some of the greatest challenges.
- The Committee explored the SSOA role in ESRP and the extent to which SSOAs should be involved, even potentially as a third party. In addition, the Committee discussed the role that individual agencies must play in developing and supporting their own ESRP, and the role of unions when discussing and/or considering collective bargaining agreements to support effective reporting policies.

## *Information Gaps*

- The Committee determined that there is a lack of information on current and emerging technologies that transit agencies can use for ESR. There does not seem to be an identified software, device, or common innovative practice that would be suitable for agencies of varying sizes and needs. The Committee requests additional information on ESRP related software, hardware, and best practices.
- The Committee identified important information gaps related to ESR, such as a lack of understanding about the psychological effects of ESR and how elements of behavior-based science could be incorporated. In addition, the Committee is interested in reviewing research about the different needs across agencies of varying size, as related to an ESRP. The Committee also noted the need to learn more about the best practices of an effective program, such as reporting information back to employees and gaining leadership support for an ESRP.
- The Committee identified that there is a lack of standardized terminology when recording data using ESRPs which complicates data analysis and Safety Assurance activities. Inconsistent terminology used in reporting programs prevents agencies from performing effective data and trend analyses to better understand and act upon organizational and safety issues. The Committee recognized that creating a standard taxonomy for reporting events and incidences may be a starting point for enabling more accurate data analysis. To support this initiative, TRACS suggests reviewing the National Transit Database (NTD) manual and other modal references from successful ESRP programs to determine if there is a commonality of descriptions.
- The Committee considered the protection of data reported through an ESRP in the form of anonymity and confidentiality, information technology (IT) permissions, and cybersecurity. The Committee identified a need for further discussion and research on how to secure information to enable anonymous, non-punitive reporting that is protected against external and internal malfeasance.
- The Committee would like to see more information on best practices and case studies for gaining leadership support, protecting data, and policies that support anonymity, confidentiality, and non-punitive reporting.
- The Committee also noted that although industry policies are in place, they are not often followed because they can be ineffective. The Committee sees this as an information gap because there is limited understanding as to why these policies are not always followed or why they are sometimes ineffective.

## *Conclusion*

The FTA should work in conjunction with RTAs to remove barriers that hinder employee communications and feedback related to hazards in the workplace.

### *Resources*

Federal Transit Administration. (2011). *FTA Administrator's Tasking to TRACS 11-01*.

<https://www.transit.dot.gov/regulations-and-guidance/safety/tracs-task-11-01>

Transit Rail Advisory Committee for Safety (TRACS, 2012). Working Group 11-01 Report: *Establishing a Confidential, Non-Punitive, Close Call Safety Reporting System for the Rail Transit Industry*. <https://www.transit.dot.gov/regulations-and-guidance/safety/close-call-safety-reporting-11-01>

## Appendices

### A – 1 TRACS Conferences

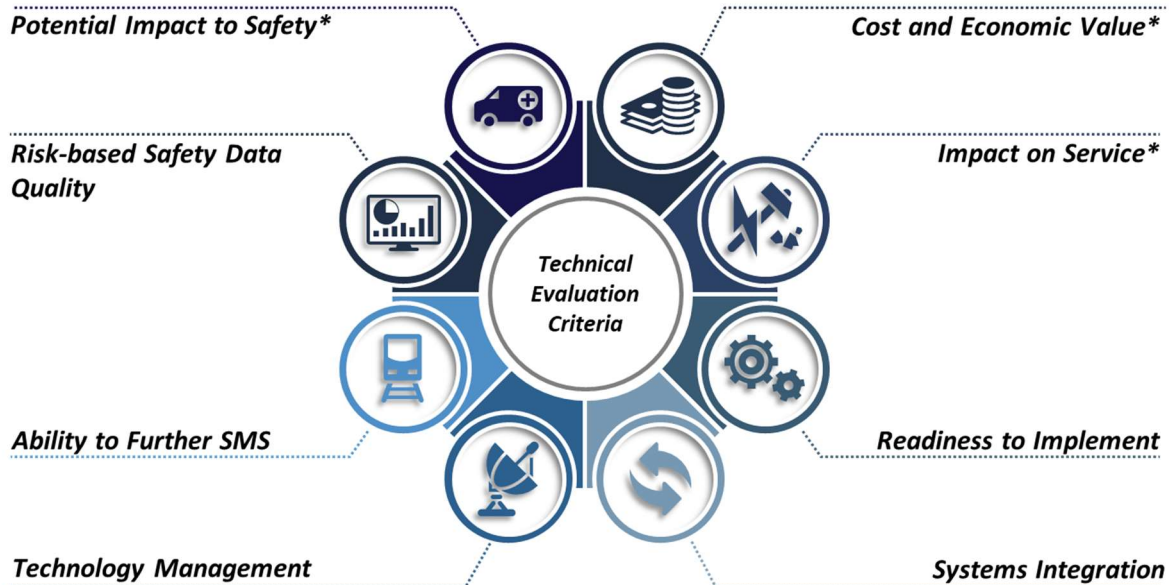
March 26-27, 2019 Conference

#### Goals and Objectives

In March of 2019, the 2018-2020 TRACS met for the first time and focused on defining the tasks from FTA. FTA assigned the Committee the safety focus area, TSP, and requested the selection of two additional safety focus areas. To help define the additional safety focus areas, FTA produced a list of 25 potential topics for the Committee to consider. Through a series of breakout groups and large group discussions, the Committee voted to select RWP and ESR. Through a voting process, the Committee selected and prioritized a list of technology evaluation criteria (TEC), which were used to evaluate emerging technologies and innovative processes to inform the Committee's recommendations.

#### Outcomes

During the March 2019 TRACS Conference, the Committee identified and prioritized TEC that apply to all three safety focus areas identified by the 2018-2020 Charter. TEC were established to support the assessment of technologies and innovations and were selected based on small- and large-group discussions. TEC are as follows:



An asterisks (\*) represents the high priority technical evaluation criteria

The Committee identified three TEC as high priority, the first of which is *Potential Impact to Safety*. *Potential Impact to Safety* was used to evaluate the technologies and innovations on the basis of FTA's four safety performance measures identified in FTA's National Public



Transportation Safety Plan: fatalities, injuries, safety events, and system reliability.<sup>27</sup> Fatalities and injuries represent “lagging indicators,” which support the assessment of long-term success *after* an intervention. This assessment is done by monitoring negative safety outcomes that agencies aim to prevent. Precursor safety events and system reliability declines are examples of “leading indicators,” which help predict the success of an intervention *before* it is implemented. As such, leading indicators are essential to evaluating emerging technologies. The Committee has consistently addressed both lagging and leading indicators in its safety reports.<sup>28</sup> It is also important to note that leading indicators can address near-miss reports, known risks of automation use, opportunities for failure, and other risk-informing knowledge where no casualties have been documented on rail transit.

The other criteria deemed high priority were *Cost and Economic Value* and *Impact on Service*. *Cost and Economic Value* includes multiple factors, such as short versus long term costs, return on investment, affordability, integration costs, and maintenance costs. The Committee also considered the *Impact on Service* for new technologies and processes. For example, if a technology is extremely beneficial in preventing accidents but significantly decreases the number of trains running per hour, it may not be a viable solution.

While *Potential Impact to Safety*, *Cost and Economic Value*, and *Impact on Service* were deemed the highest priority criteria for evaluating technology, the Committee selected additional TEC to consider. *Readiness to Implement* is a technology’s maturity level and whether it is compatible with existing systems. Similarly, the Committee deemed it important to look at *Systems Integration*, which evaluates technology from the viewpoint of how it would complement information technology, training requirements, and human factors/engineering considerations. Additionally, the Committee considered *Technology Management*, which involves maintenance requirements and the introduction of unforeseen risks.

Moreover, the Committee acknowledged that the implementation of a SMS approach is paramount to FTA’s overall safety focus, as it is a collaborative approach to managing safety that brings management and labor together to control risk, detect and correct safety problems earlier, analyze safety data more effectively, and measure safety performance more precisely. Therefore, the Committee supported the recommendation of technologies and processes that promote the transit industry’s shift toward furthering SMS. The Committee also recognized the increased importance that data has in the transit industry’s environment and will consider how

---

<sup>27</sup> Federal Transit Administration. (2017). *National Public Transportation Safety Plan*. [https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/National%20Public%20Transportation%20Safety%20Plan\\_1.pdf](https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/National%20Public%20Transportation%20Safety%20Plan_1.pdf).

<sup>28</sup> See Transit Advisory Committee for Safety (TRACS) 16-02 Final Report, 03/16/2017, *Safety Data and Performance Measures in Transit*. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/64016/safety-data-and-performance-measures-transit-tracs-16-02-final-report.pdf>.

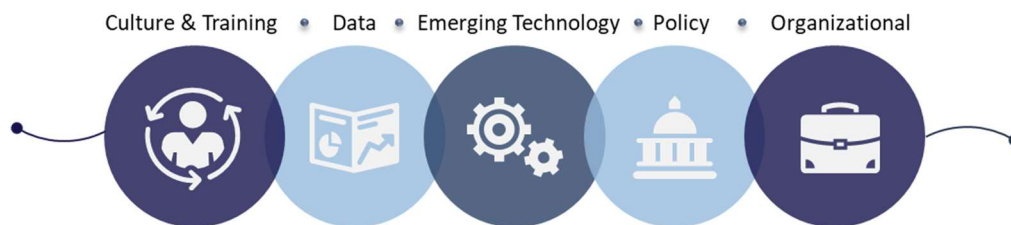
effective measuring and monitoring methods rely on obtaining and analyzing *Risk-based Safety Data Quality*.

Finally, the Committee recognized that transit agencies possess their own set of unique characteristics related to mission, size, operational practices, budget constraints, and so forth. The Committee considered these variables and agreed it would maintain the TEC as its primary driver for developing the Committee's recommendations.

## September 9-10, 2019 Conference

### Goals and Objectives

Through a literature review and multiple group discussions, during the September Conference, TRACS identified an extensive list of key takeaways and information gaps that will contribute to the Committee's recommendations for FTA. These key takeaways and information gaps were grouped into the following five themes or categories, which were consistently found in the research:<sup>29</sup>



The *Culture and Training* category reflects how societal and organizational cultures influence decision-making and safety. Additionally, it looks at how education can be leveraged to benefit culture. Through a review of *Emerging Technology*, the Committee sought to explore different technologies and how they can be/are being used to prevent trespassers and suicide attempts, increase safety for roadway workers, and improve ESRPs. The *Emerging Technology* theme assesses the various emerging technologies to see where and how each innovation will have the most impact. The *policy* theme seeks to understand what is needed for developing successful rules and regulations. Policy can be looked at from an internal organizational perspective or an external governing body perspective. On a similar note, the *Organizational* theme seeks to understand the impact that specific organizations or differences between organizations can have on understanding different components of the safety focus area. Finally, by looking at *Data*, the Committee hopes to understand how information is compiled, analyzed, and used, and how systems could be improved to better understand the circumstances and environments in which trespass events and suicide incidents occur. Additionally, TRACS considered how *data* can be used to apply value that comes from ESRPs.

---

<sup>29</sup> Note that none of the safety focus areas address key takeaways/information gaps in all five categories.

## Outcomes

### Emerging Technology

#### Key Takeaways

The Committee believes there are a variety of technologies that can support employee communication and reporting of safety issues. These technologies must be explored to determine which are the most appropriate and effective.

### Information Gaps

Similar to the ESR Emerging Technology key takeaway above, there is a lack of information on current and emerging technologies that transit agencies can use for ESR. There does not seem to be an identified software, device, or common innovative practice that would be suitable for agencies of varying sizes and needs. The Committee requests additional information on ESRP related software, hardware, and best practices.

### Culture and Training

#### Key Takeaways

The Committee discussed the importance of ensuring a robust safety culture where safety incidents are reported. If a transit agency has a culture that encourages reporting, it can then collect and analyze this data, examine the results, and take actions to reduce the likelihood that such events will be replicated. The TRACS Report 11-01 discusses the principles of creating such a culture, which the Committee will carry forward into the Charter's final report.<sup>30</sup> To develop a successful ESR system, agencies must develop a culture of trust, upper management support, shared goals, and honesty, paired with legal and organizational protections, policy, union agreements, and feedback mechanisms. For many agencies, this would necessitate a significant cultural shift in the relationship between employees and management; thus, some agencies may benefit by introducing a close call "ambassador" or change agent within the organization to lead the change. This could be an individual with both "soft" personal interaction skills and strong technical competency and authority for promoting change. Large agencies may face more challenges than smaller ones in changing the culture because of the large outreach needed to affect change and potential initial resistance to upsetting the status quo.

Additional key takeaways in the category of culture and training include engaging staff and stakeholders early in the development process and using a third party to maintain anonymity in the reporting process. Both will help to build trust and rapport between employees and management.

---

<sup>30</sup> See Transit Advisory Committee for Safety. (2012). *Transit Advisory Committee for Safety (TRACS) 11-01 Final Report: Establishing a Confidential, Non-Punitive, Close Call Safety Reporting System for the Rail Transit Industry*. <https://www.transit.dot.gov/regulations-and-guidance/safety/close-call-safety-reporting-11-01>

## Information Gaps

The Committee identified important information gaps related to ESR, such as a lack of understanding about the psychological effects of ESR and how elements of behavior-based science could be incorporated. In addition, the Committee is interested in reviewing research about the different needs across agencies of varying size, as related to an ESRP. The Committee also noted the need to learn more about the best practices of an effective program, such as reporting information back to employees and gaining leadership support for an ESRP.

## Data

### Key Takeaways

When used effectively and managed with the appropriate technologies, ESRPs produce actionable safety data that support the identification and mitigation of safety risks. While the use and analysis of data plays an important role in ESR, human error can affect data reliability. This includes reporting biases, analytical bias, poor investigatory and analytical procedures, inadequate risk assessments, causation and the problems of counterfactual reasoning, classification problems, unrealistic expectations, reliance on reminders and quick fixes, and flawed systemic views of failure.

## Information Gaps

The Committee identified that there is a lack of standardized terminology when recording data using ESRPs which complicates data analysis and Safety Assurance activities. Inconsistent terminology used in reporting programs prevents agencies from performing effective data and trend analyses to better understand and act upon organizational and safety issues. The Committee recognized that creating a standard taxonomy for reporting events and incidences may be a starting point for enabling more accurate data analysis. To support this initiative, TRACS is considering reviewing the NTD manual and other modal references from successful ESRP programs to determine if there is a commonality of descriptions.

Finally, the Committee considered the protection of data reported through an ESRP in the form of confidentiality, IT permissions, and cybersecurity. The Committee identified a need for further discussion and research on how to secure information to enable anonymous, non-punitive reporting that is protected against external and internal malfeasance.

## Policy

### Key Takeaways

The Committee explored innovative solutions during the literature review. First, the Committee recognized that leadership support, especially that from the CEO/General Manager, is critical to establishing a successful ESRP. Additionally, the Committee noted that establishing policies that enable anonymity and non-punitive reporting are some of the greatest challenges.

The Committee will explore the SSOA role in ESRP and the extent to which SSOAs should be

involved, even potentially as a third party. In addition, the Committee discussed the role that individual agencies should play in developing and supporting their own ESRP, and the role of unions when discussing and/or considering collective bargaining agreements to support effective reporting policies.

### Information Gaps

The Committee would like to see more information on best practices and case studies for gaining leadership support, protecting data, and policies that support anonymity and non-punitive reporting.

The Committee requested a briefing or further information about the work FTA is doing in the Transit Cooperative Research Program (TCRP) and on any other project related to ESRP in SMS policies, practices, and strategies. The Committee also noted that although industry policies are in place, they are not often followed because they can be ineffective. The Committee sees this as an information gap because there is limited understanding as to why these policies are not always followed or why they are sometimes ineffective.

### February 25-26, 2020 Conference

#### Goals and Objectives

The conference objectives were as follows:

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

#### Outcomes

During the February Conference, the Committee continued its work towards accomplishing its assigned task through research review and breakout group discussions covering the three safety focus areas approved by FTA. The agenda included a review of the TRACS tasking, work plan, and selected safety focus areas; an assessment of emerging technologies and processes against TEC identified during the March 2019 TRACS Conference; presentations on relevant research topics and technologies; public comments; and voting on decisions requiring consensus. An overview of the presentations is included in section A-3 of this Appendix.

## July 21-22, 2020 Conference

### Goals and Objectives

The July Conference objectives were for the TRACS subcommittees (RWP, ESR, and TSP) to present and discuss recommendations to be voted on for inclusion in the final TRACS reports submitted to FTA.

### Outcomes

The Committee discussed all recommendations, provided feedback on recommendations, and unanimously approved all eight RWP recommendations, all four ESR recommendations, and all seven TSP recommendations, with some recommendations requiring updates in advance of the final vote of approval on the final reports.

## A – 2 Literature Review and Recommended Reading

The ESR subcommittee reviewed journal articles and reports. The key takeaways and information gaps included in the ESR recommendations came from a selection of the following publications:

- Audenaerd, L., Massimini, P., & Orrell, G. (2017). Trust, Public-Private Partnerships, and Transportation Safety: Applicability of the Aviation Model for Rail Transportation. *The MITRE Corporation*. <https://www.mitre.org/sites/default/files/publications/pr-16-4791-rail-safety-vision-trust-public-private-partnerships.pdf>.
- Davey, M., Kidda, S., Morell, J., Ramney, J., & Zuschlag, M. (2019). *Confidential Close Call Reporting System (C3RS) Lessons Learned Evaluation – Final Report*. [https://railroads.dot.gov/sites/fra.dot.gov/files/fra\\_net/18350/C3RS%20Lessons%20Learned%20rev.pdf](https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/18350/C3RS%20Lessons%20Learned%20rev.pdf).
- Federal Railroad Administration, (2015). *Safety Culture: A Significant Influence on Safety in Transportation*. Washington, D.C.: FRA Office of Research Development and Technology. [https://railroads.dot.gov/sites/fra.dot.gov/files/fra\\_net/17170/TR\\_SafetyCulture\\_Final.pdf](https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/17170/TR_SafetyCulture_Final.pdf)
- Federal Transit Administration. (2011). *FTA Administrator’s Tasking to TRACS 11-01*. <https://www.transit.dot.gov/regulations-and-guidance/safety/tracs-task-11-01>
- Federal Transit Administration, Transit Advisory Committee for Safety. (2011). *TRACS Final Report 10-01: Implementing Safety Management System Principles in Rail Transit Agencies*. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/64011/building-toward-strong-safety-culture-tracs-16-01-final-report.pdf>
- Federal Transit Administration, Transit Rail Advisory Committee for Safety (TRACS, 2012) Working Group 11-01 Report (2012) *Establishing a Confidential, Non-Punitive, Close Call Safety Reporting System for the Rail Transit Industry*. <https://www.transit.dot.gov/regulations-and-guidance/safety/close-call-safety-reporting-11-01>
- Federal Transit Administration, Transit Advisory Committee for Safety. (2017). *TRACS Final Report 16-01: Building Toward a Strong Safety Culture Within the Bus and Rail Transit Industry*. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/64011/building-toward-strong-safety-culture-tracs-16-01-final-report.pdf>
- Federal Transit Administration (2019a). *Employee Safety Reporting Programs*, webinar, July 31, 2019,. <https://www.transit.dot.gov/regulations-and-guidance/safety/public-transportation-agency-safety-program/ptasp-employee-safety>
- Federal Transit Administration, (2019b). *2019 Joint SSO and RTA Workshop: Employee Safety Reporting Programs (ESRP)*, September 25, 2019. <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and->

[guidance/safety/133846/2019-joint-sso-and-rta-workshop-tso-employee-safety-reporting\\_2.pdf](#)

Johnson, C. (2003). *Failure in Critical Systems: A Handbook of Incidents and Accident Reporting*. Glasgow, University of Glasgow Press.

Multer, J. (2019). *Opportunities for innovation in employee safety reporting*. Presentation to the September 10, 2019, meeting of the Federal Transit Administration, Transit Advisory Committee for Safety.

<https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/safety/133641/tracs-opportunities-innovation-employee-safety-reporting-september-2019.pdf>

National Academies of Sciences, Engineering, and Medicine. (2015). *TCRP Report 174: Improving safety culture in public transportation*.

<https://www.nap.edu/download/22217>

No Author, (n.d.). Report to Congress: *Confidential Close Call Reporting Systems*.

Reason, J. (1997). *Managing the risks of organizational accidents*. Aldershot: Ashgate.

Reason, J. (1998). Achieving a Safe Culture: Theory and Practice. *Work and Stress: An International Journal of Work, Health, & Organizations*, 12(3), 293-306.

Robbins, K. (2019). Develop a Reporting Structure for Close Calls.

Short Line Safety Institute (2020a). *Safety culture assessment*.

<https://www.shortlinesafety.org/safety-culture-assessment2/>

Short Line Safety Institute (2020b). *Ten core elements of a strong safety culture*.

<https://www.shortlinesafety.org/about/strong-safety-culture/>

U.S. Department of Transportation, Federal Railroad Administration (2007). *Behavior-based safety at Amtrak-Chicago associated with reduced injuries and costs*. Research Results, RR07-07, Washington, DC.

U.S. Department of Transportation, Federal Railroad Administration (2009). *Improved safety culture and labor-management relations attributed to changing at-risk behavior process at Union Pacific*. Research Results, RR09-19, Washington, DC.

U.S. Department of Transportation, Federal Transit Administration (2018). *Public Transportation Agency Safety Plans*. Title 49 of the Code of Federal Regulations, Part 673.

<https://ecfr.federalregister.gov/current/title-49/subtitle-B/chapter-VI/part-673>



## A – 3 Research Presentations

March 2019 Conference	
Presenter(s)	Topic
Michael Coplen	TRACS Legislative/Rulemaking Update
Lisa Staes	Safety Data Analysis
Lisa Staes	Risk Based Analysis
Lisa Staes	Safety Risks and Potential Mitigations

September 2019 Conference	
Presenter(s)	Topic
Dr. Scott Gabree	Trespass and Suicide Prevention
Dr. Jordan Multer	Employee Safety Reporting

February 2020 Conference	
Presenter(s)	Topic
Dr. Pei-Sung Lei	FTA Standards Program Research: Mitigations for Trespasser and Suicide Fatalities and Injuries
Ben Bakkum and Dr. Dingqing Li	Roadway Worker Protection
Lisa Staes	Secondary Roadway Worker Protection Systems
Lisa Staes	Employee Safety Reporting Research Presentation
Michael Coplen	Behavior Based Safety (BBS) Presentation
Vendor Presentations: METROM-RAIL, Miller Ingenuity, Bombardier, EMTRAC, Trapeze Group, Protran, Hotrail Group, Motorola Solutions/Avigilon Video Security and Analytics	Vendor Presentations on RWP and TSP Technologies

Additional Presentations	
Presenter(s)	Topic
Hilary Konczal	Trespasser and Suicide Prevention Strategies
Dr. Richard Gist	Impact of Critical Incidents (CI) on Involved Train Crews
Dr. Paul King	BBS Studies/Articles written by Scott Geller