



TCRP Synthesis Report 126:
Successful Practices and Training Initiatives
to Reduce Bus Accidents and Incidents
at Transit Agencies

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Outline

- Background and objectives
- Research methods
- Survey results
- Case studies
- Common threads
- Lessons learned

BACKGROUND AND OBJECTIVES



3

Background and Objectives

MAP-21 and FAST Act have been the basis of FTA's evolving regulatory narrative for transit agencies. Of specific relevance to this study:

1. SMS framework – which will be enforced by FTA through safety oversight responsibilities
2. PTSCP – the Public Transportation Safety Certification Training Program – currently voluntary for bus only systems



4

Background and Objectives

The primary objective of this synthesis is to **document** public transit agency bus operator **training** programs and other **strategies** that have been successful in reducing accidents and incidents, **resulting in safer transit systems** for the communities they serve.



5

RESEARCH METHODS



6

Research Methods

- Literature review
- Survey disseminated to 42 transit agencies
 - 88% response rate (37 responses) achieved
- Interviews with 11 case study sites began on March 17, 2016 and concluded on May 2, 2016
- Final report issued by TRB – February 2017



7

SURVEY SUMMARY



8

Survey Summary

- The 28-question survey was divided into the following sections:
 - System characteristics
 - Accident review and risk assessment
 - Bus operator training
 - Use of technologies
 - Other agency policies
 - Model practices



9

Survey Summary – System characteristics

- How many operators does your agency employ?
 - Responses ranged from **3 full-time** bus operators in Montana to **11,500 full-time** bus operators in New York City
- What is your Bus and Van fleet size?
 - Responses ranged from **less than 20** buses to **more than 5,700**



10

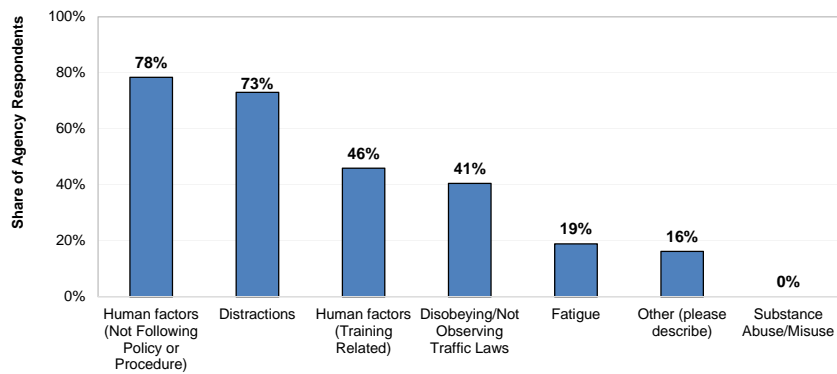
Survey Summary – Accident Review and Risk Assessment

- Do you have an accident review board?
 - 87% of responding agencies have an accident review board or a similar process
- What are the roles of the review board?
 - 94% are tasked with determining preventability
 - 52% identify areas of risk
- Does your agency track causal factors?
 - 92% track contributing factors of safety related events
- Does your agency utilize a database or electronic reporting system to track safety incidents?
 - 83% use a database or electronic reporting



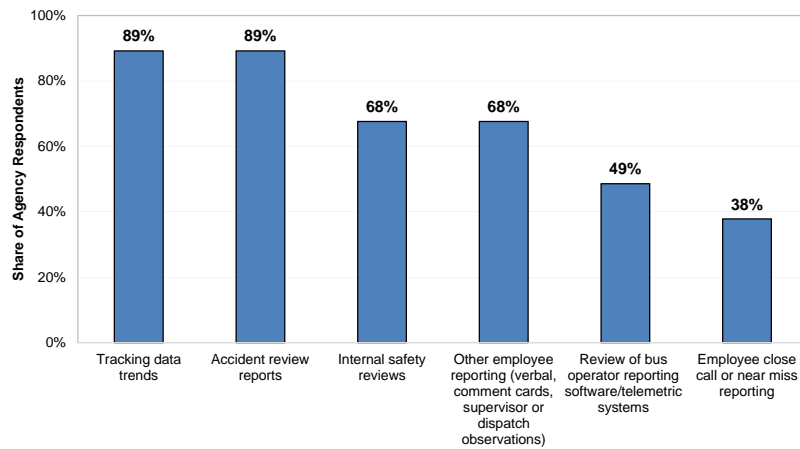
Survey Summary – Accident Review and Risk Assessment

- What are the most prevalent contributing factors?



Survey Summary – Accident Review and Risk Assessment

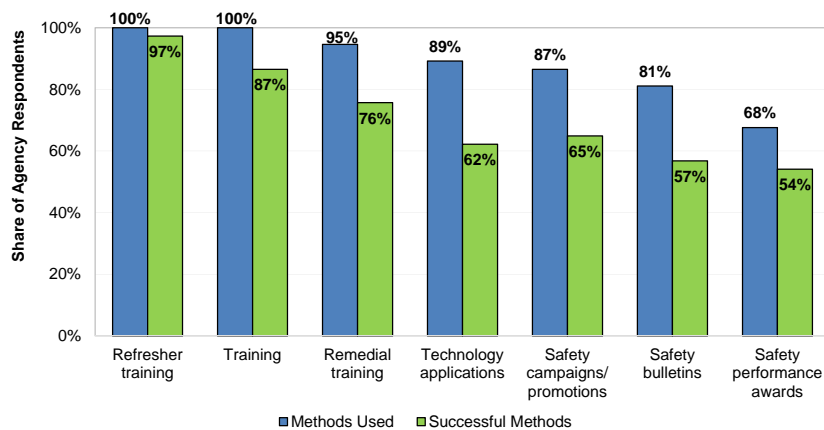
- How are safety related issues identified?



13

Survey Summary – Bus Operator Training & Other Methods

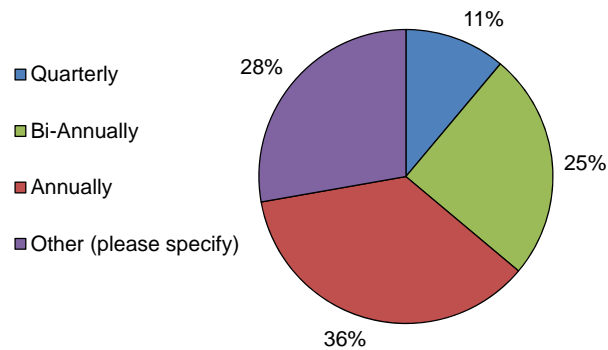
- What methods were used to mitigate safety issues, and were those methods successful?



14

Survey Summary – Bus Operator Training

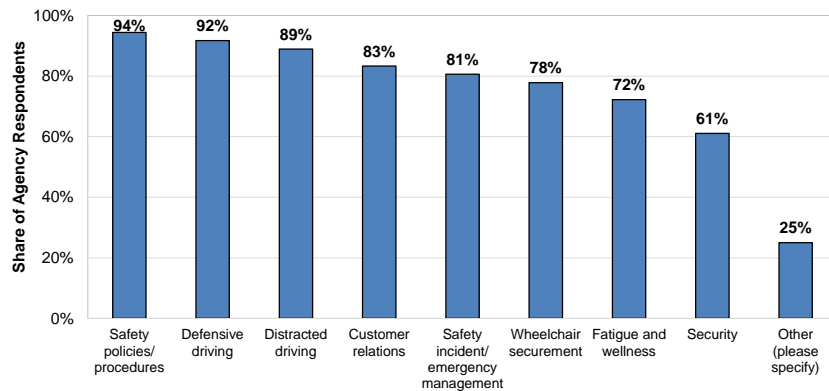
- Do you offer refresher safety training?
 - 100% of respondents offer refresher training
 - 61% offer specifically targeted refresher training
- How often do you provide refresher training?



Survey Summary – Bus Operator Training

C. Bus operator training

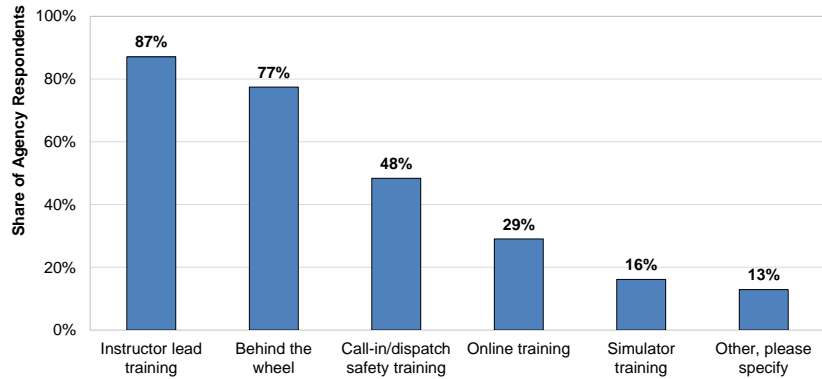
- What topics are covered in operator refresher training?



Survey Summary – Bus Operator Training

C. Bus operator training

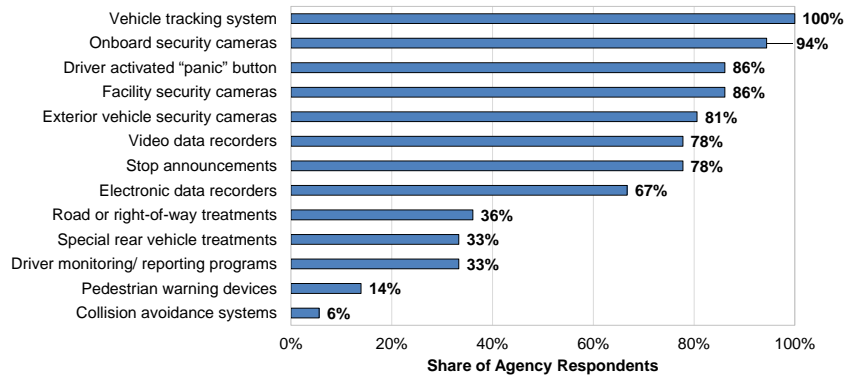
- What delivery method is used for training & at what frequency is each method used?



17

Survey Summary – Use of Technologies

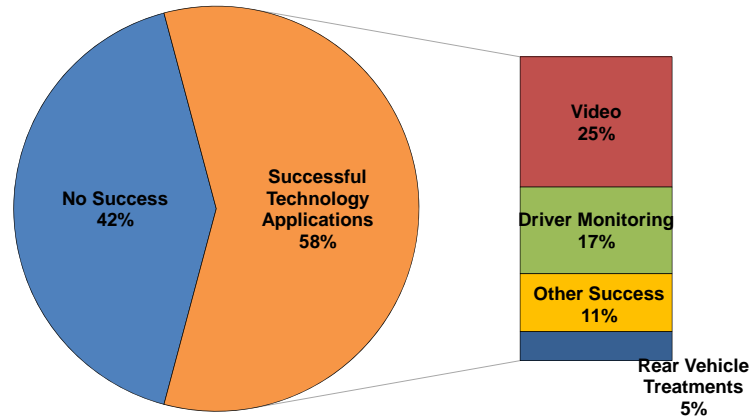
- Which safety technologies are utilized at your agency?



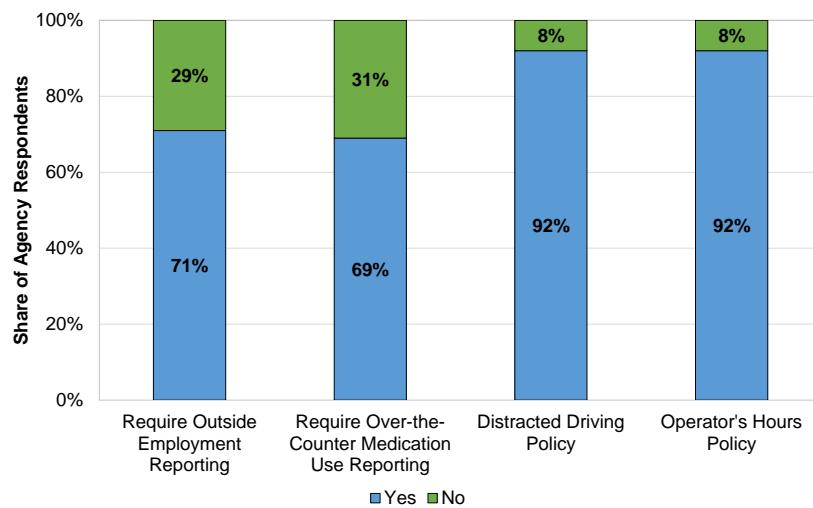
18

Survey Summary – Use of Technologies

- Have the technologies resulted in documented safety improvements?



Survey Summary – Other Agency Policies



Survey Summary - Model practices

- Model practices responses included:
 - Comprehensive training program – new hires, refresher, and remedial
 - Review and update training materials
 - Organization wide accountability
 - Collaboration between operations and safety
 - Include labor union from the beginning
 - Proactive risk assessment
 - Holistic approach to incident reviews

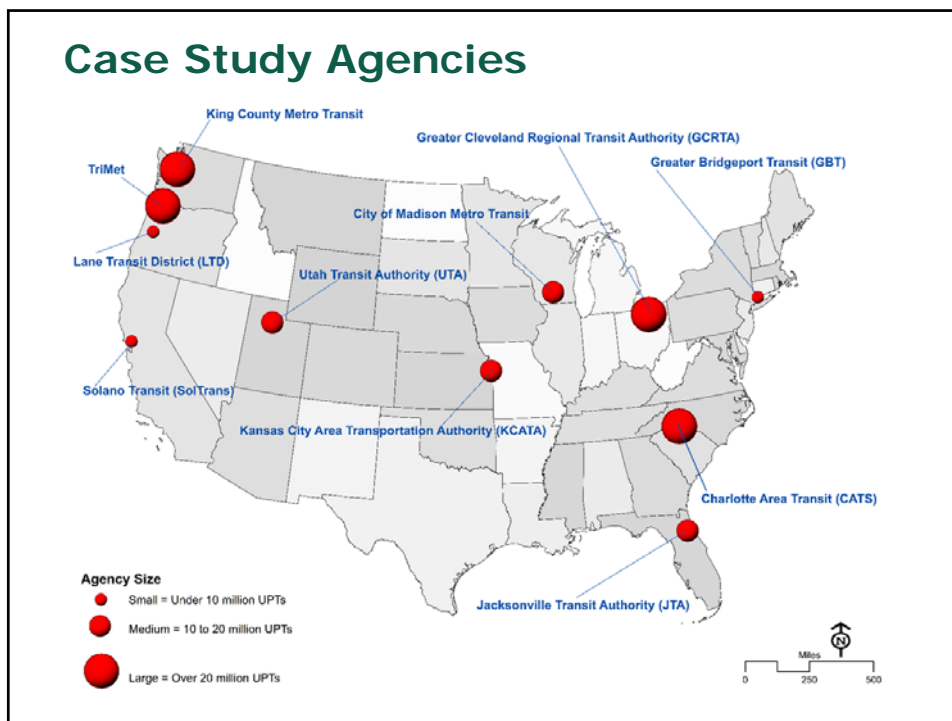


21

CASE STUDIES



22



Charlotte Area Transit



- **Video surveillance** was indicated as most effective technology application in use
 - Substantiate **complaints**
 - Identify poor driving **behaviors**
 - **Preemptively** address issues before incidents occur
 - Use for **training** purposes

Charlotte Area Transit



- **Community engagement** also reported as successful
 - International Bus Operator Appreciation Day (passengers are encouraged to thank an operator for what they do)
 - Personal responsibility **safety campaign** that asks the public to take a pledge to stay alert and avoid distractions
 - CATS “**See Say**” app enables riders to alert transit police if they see something of concern

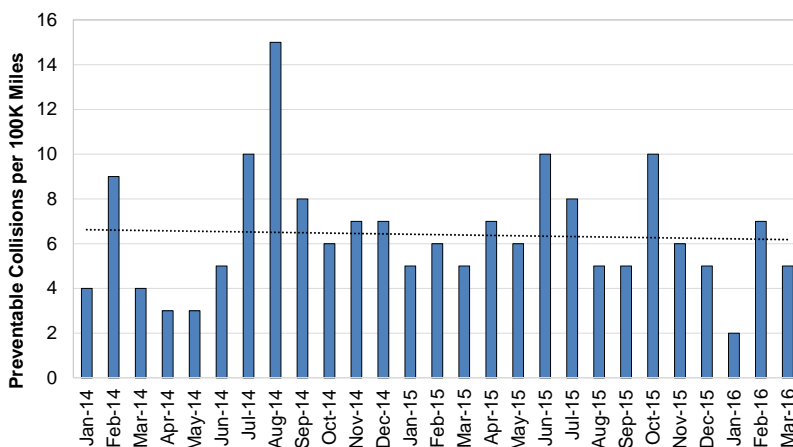


25

Charlotte Area Transit



CATS Preventable Bus Incident Rate



26

City of Madison – Metro Transit



- Revamped **training**
 - Increased **focus on driving**
 - Described benefits to having as few as **two trainees per instructor per bus**
 - Allocated **more resources** to training
 - Hired **more trainers**
 - Reduced **class sizes**
 - Assigned **additional training bus** to ensure each trainee has **4 to 5 hours of BTW** per day of training



27

City of Madison – Metro Transit



- Annual **refresher** training
 - Roundtable discussion structure: “**Madison Metro Safety Roundabout**”
 - Gathers safety concerns **directly from bus operators**
 - Focus **additional training** on these areas of concern
- All initiatives have resulted in a **24%** reduction in preventable collisions from 2008 - 2015

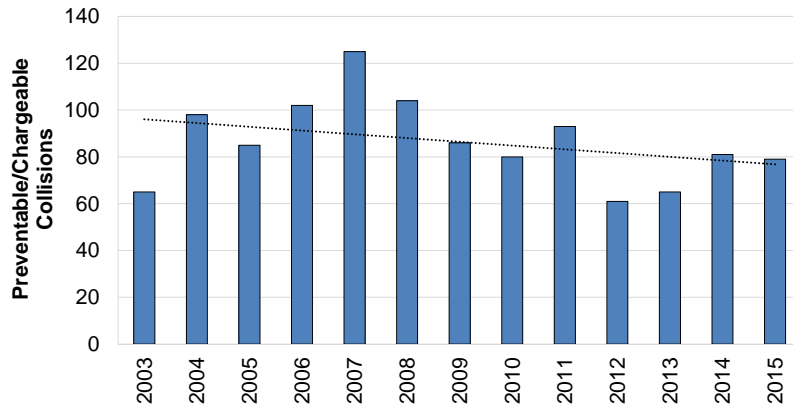


28

City of Madison – Metro Transit



Metro Preventable/Chargeable Collisions



29

Greater Bridgeport Transit



- Two **new safety positions**: Manager of Safety Training and Manager of Transportation Operations
- New bus operators must complete “**qualifying training**” to ensure their capabilities and route familiarization
 - **Quizzed** on every route in the system
- **Defensive driving** course is 4 hours long – required of new operators, but selected by existing operators (receive discount for their personal vehicle insurance)



30

Greater Bridgeport Transit



- **Safety Vision** on-board surveillance coupled with **AVL** allows managers to fully understand safety events
- Most successful practice: **“teamwork”**
- Improvements attributed to **combination** of many initiatives
- Improved preventable rate since initiation of restructuring in 2012

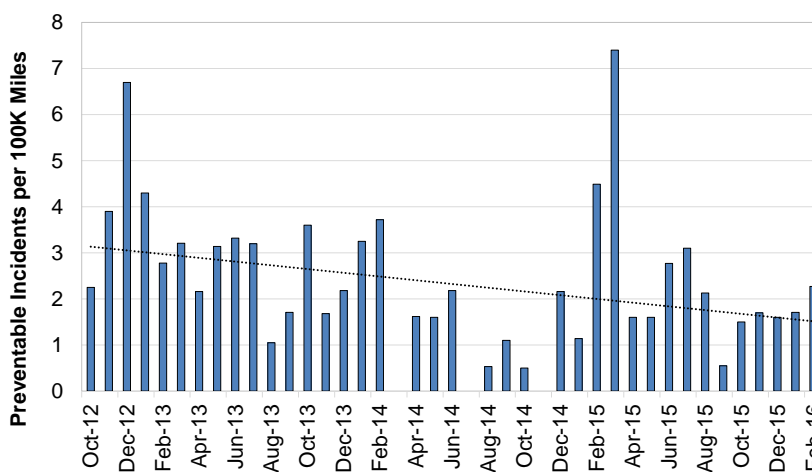


31

Greater Bridgeport Transit



GBT Preventable Incident Rate



32

Greater Cleveland RTA



- LYTX DriveCam installed fleet-wide (2014)
 - Significant **reductions** in unsafe behaviors
 - Posted speed violations
 - Red light violations
 - Improved seat belt usage*
- Open and honest **dialogue** with employees
- **“Relentless”** pursuit of improvement
- Recognizing and **rewarding employees** for exceptional safety performance
- **Teamwork** between Safety & Operations
- **Consistent, agency-wide** understood definition of safety

*From literature review

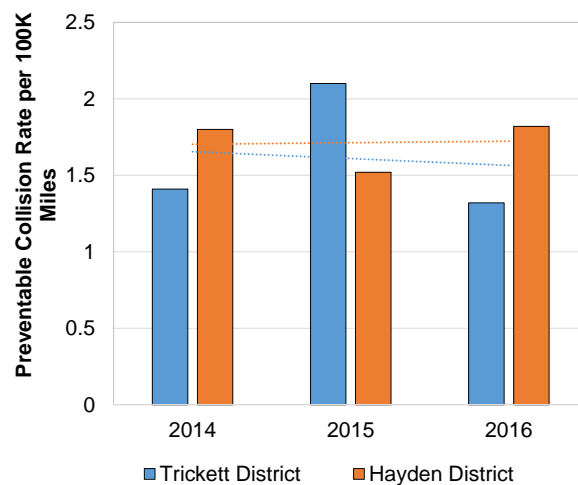
33



Greater Cleveland RTA



RTA Preventable Collision Rate



34



Jacksonville Transportation Authority



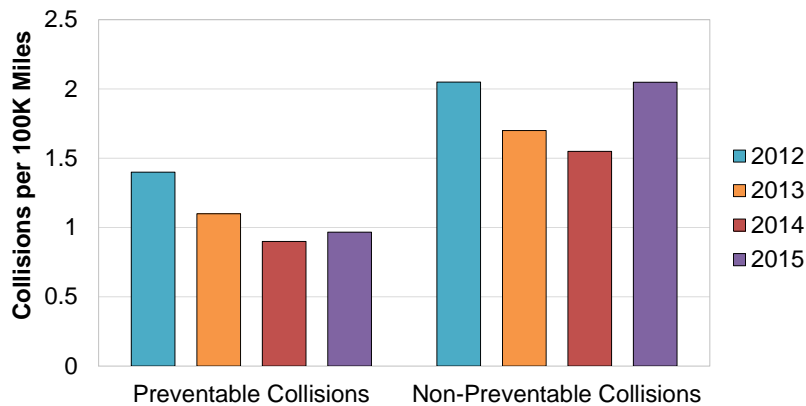
- **Installed DriveCam in 2015** – 50% reduction in unsafe decision making and 40% reduction in judgement errors and traffic violations
- 90% reduction in riskiest bus operator behaviors in first 9 months
- **“Keep it in Your Pocket” distracted driving campaign**
- **Training simulator** is used at JTA, primarily for new bus operator training
 - They can repeat the situation until the proper actions and reactions are **automatic**.



Jacksonville Transportation Authority



JTA Preventable versus Non-Preventable Collision Rate



Kansas City Area Transportation Authority



- **Five point plan** – the five “E”s – began in 2013
- Objectives
 - Eliminate pedestrian collisions
 - Reduce auto liability costs by 10%
 - Reduce on-board incidents by 15%
 - Reduce bus collisions by 10%
- Targeted focus on **pedestrian awareness and hazards of blind spots** – new and fresher training
- Pedestrian Safety Week and Pedestrian Safety Tips communicated throughout the agency



37

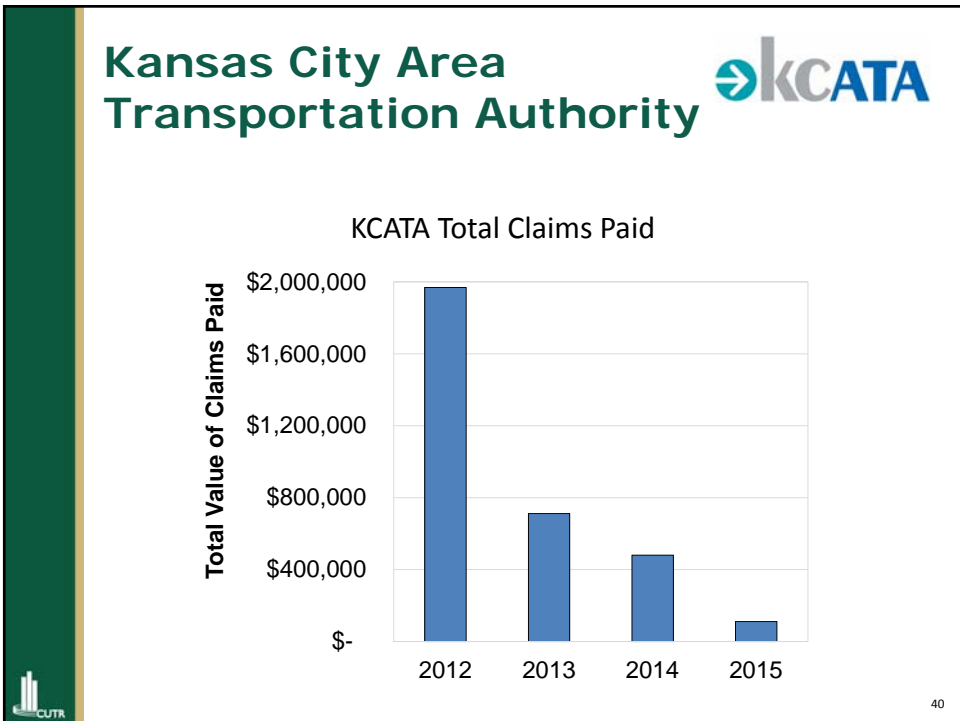
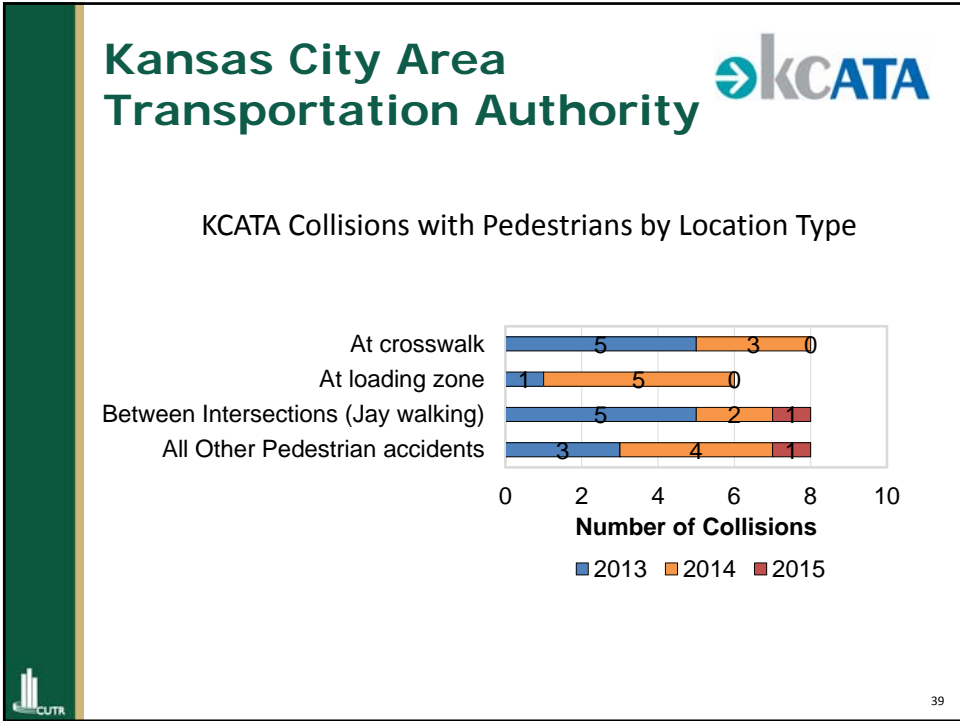
Kansas City Area Transportation Authority




- Suggested passenger and pedestrian safety campaigns and programs be considered **model for agencies** cross the country
- Use of simulator reported as **“absolutely effective”**
 - also used to identify color blindness




38




King County Metro




- **Mandatory** annual refresher training for all bus operators, with a focus on **pedestrian awareness** – includes **distracted driving** and **left turn** movements (squared left turn)
- An **upgraded ride check** program to ensure operators are using proper safety practices
- Statistical analysis focusing on the times and locations of accidents, so operators know when and where to **expect the greatest risk**
- Recruitment and development of senior operators as **“Safety Champions”**
- **Operator Assaults** Reduction Initiative


41

King County Metro







“Outhouse Journals” Safety Reminder

Transit Safety's Outhouse Journal

Passenger Care

PREVENT the FALLS

Take **TIME** to allow Passengers both to enter the bus and to arrive safely at a seat, or if standing, to see that they are holding on, prior to moving the Coach ahead.





Be alert to wet floors.
During adverse weather, please warn passengers of wet steps and floors. Start smoothly, and “feather the brakes” when stopping. Increase your following distance with vehicles ahead – **AVOID** quick stops.

There is no reason to rush – take time – give time for the safety of all.

SAFETY – SERVICE - SCHEDULE

“Let's Prevent, the Preventables” Transit Safety 7-2-07



King County Metro



- **Reduction** in both preventable and non-preventables
- Significant **reduction** in pedestrian incidents (35% from 2013 to 2014)
- Liability claims **reduced**
- Credits success to vigorous and focused **safety meetings, training, and follow-up** on safety issues; open **communications** policy; ability to **contribute** through committees and **working groups**



43

Lane Transit District



- Agency-wide focus on customer service: **Customer service** attributes are more highly valued than years of driving experience
- Advertisements for new operators are placed in the **customer service** category rather than the driving category
- Identifies the **Smith Driving System** as highly effective – attributing a 27% decrease of accidents since its implementation



44

Lane Transit District



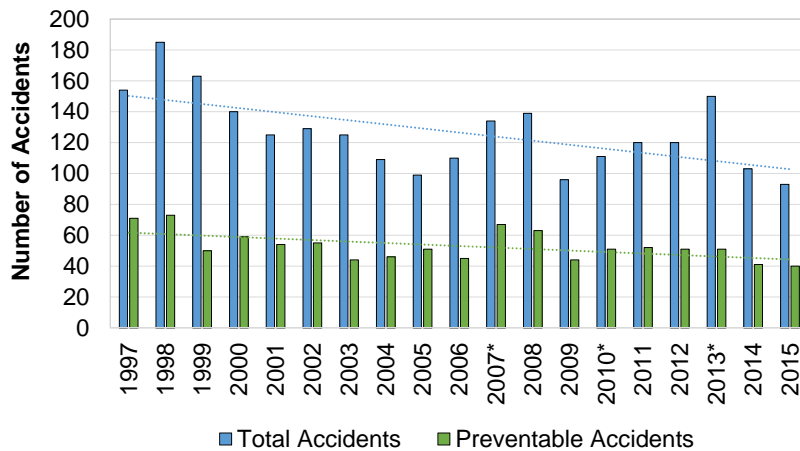
- Monthly **review of all accidents**, preventable and non-preventable, that occurred during the previous month with incident photos and videos initiate discussion among operators and give them “what went right” and “what went wrong” perspectives
- **Visualizing the impacts** major collisions and hard braking incidents have on LTD passengers, has made a very strong impression on their bus operators



Lane Transit District



Total Accidents and Preventable Accidents at LTD




■ Total Accidents ■ Preventable Accidents

* Snow and icy conditions inflated incident totals




SolTrans (by National Express)



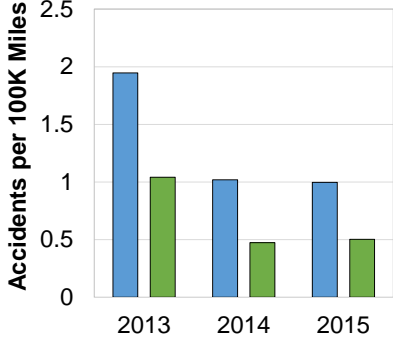
- **Smith Driving System** was reported as very useful
- Mixing time **BTW** with classroom each day described as increasing retention
- Suggested national standard of 20 hours BTW training required for new operators (SolTrans **requires 25 hours**)
- Focus on treating employees as **internal customers**
- **71%** decrease in incidents from first six months of 2013 to end of 2013 – passenger falls and employee injuries also decreased
- Safety trends continue to **improve**


47

SolTrans (by National Express)

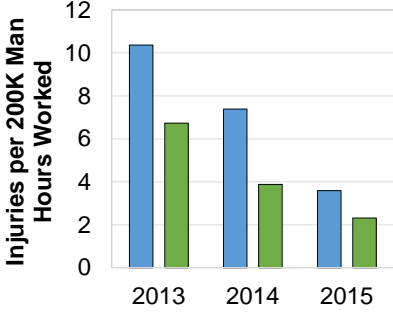


SolTrans Total Accident and Preventable Accident Rate




Year	Total Accident Rate	Preventable Accident Rate
2013	~1.9	~1.0
2014	~1.0	~0.5
2015	~1.0	~0.5

SolTrans Total Injury Rate and Lost Time Injury Rate



Year	Total injury Rate	Lost Time Injury Rate
2013	~10.5	~6.8
2014	~7.5	~4.0
2015	~3.8	~2.5


48

TriMet

- Sharpened focus on pedestrian collisions
 - Community outreach:
 - “Be Seen, Be Safety,”
 - “Stay Alert, Stay Alive”



- Safety is the reported “**core value**” and the lens used to make operational, planning, and strategic decisions



49

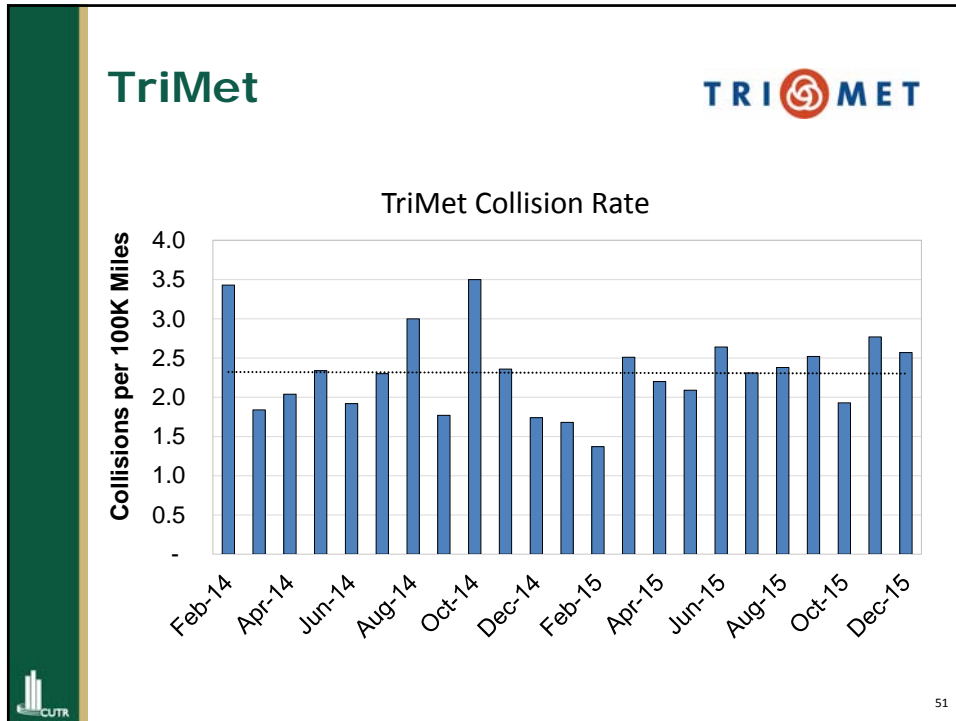
TriMet




- Safety **Education** Advisory Committee – TriMet personnel and community representatives
- Transit **Change** and **Review** Committee – reviews every accident to determine if there are organizational factors that influence collisions
- Task Force on **Safety** and **Service** Excellence
 - “How to migrate TriMet to the highest levels of safety performance, and thereby improve performance in all areas of its business”
- Training and safety are **not mutually exclusive**, but go hand-in-hand, along with customer service




50




Utah Transit Authority



- Installation of **SmartDrive** camera systems in 2014 identified as impactful
 - Unsafe driving behaviors
 - Incident investigation
 - Coaching bus operators
 - Training tool: refresher and remedial
 - Data collection and analysis
- The **rear of the bus** was updated with a **camera** and an illuminated **“YIELD”** sign to increase visibility and reduce rear-end collisions




52

Utah Transit Authority

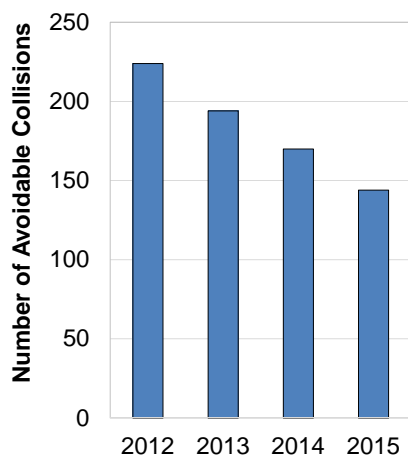
- Training –new hire and annual recertification consistently **evaluated and modified** as needed (received approval to extend new bus operator training by 3 days)
- **16 hours** of refresher training approved for 2016
- From 2012 to 2015, “avoidable” collisions reduced by **36%**
- Public Ordinance 5-1-M



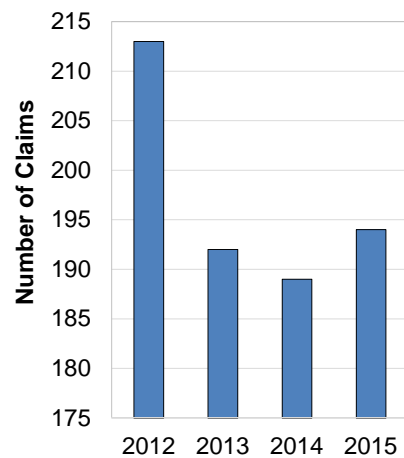
53

Utah Transit Authority

UTA Avoidable Bus Collisions



Number of Claims Payments Made by UTA



54

COMMON THREADS



55

Common Threads

- All case study agencies have adopted and enforced **distracted driving**/wireless distraction policies and procedures. The majority of the agencies have **“zero-tolerance”** for these violations
- All case study agencies apply **multiple approaches** in addressing areas of critical safety concern
- All case study agencies **work across teams** to improve transit safety and this process is supported by and the culture is set by their **CEO/GM**
- All case studies perform **thorough** accident and **incident investigation** and **utilize audio/video** recordings in their examination



56

Common Threads

- All agencies have a structured process for **data collection, analysis, and review**
- All case study agencies provide **regular, comprehensive refresher training** for their bus operators
 - Most agencies provide this refresher training on an **annual** basis and many deliver training content during **monthly or quarterly** bus operator safety meetings
 - The use of actual **on-board video and audio recordings in refresher and remedial training**, and in counseling sessions with specific bus operators, was stated as valuable by all case study agencies



57

Common Threads

- Each agency recognizes the **value of their employees** to their organizations
- Each provides bus operators **opportunities for input and engagement** with transit agencies leadership
- Four case study locations that use **telemetric operator monitoring systems** discussed the value of these systems for modifying driver behavior and improving system safety



58

LESSONS LEARNED



59

Lessons Learned

- Successful programs – multipronged or **multifaceted coordinated** efforts to address transit safety
- The importance of **recurring refresher training** could not be overstated by the case study agencies. Each agency has found success in their safety improvement programs, of which training was reported as a **central element**
- When used **in conjunction with a safety management plan** – **incentive programs can be successful** in improving the safety of the system, morale, and employee-employer relationships by increasing the focus on positive behavior



60

Lessons Learned

- **Working closely with** members of the **labor union** when implementing new programs, procedures, or technology applications is vital
- **Technology applications and associated tools** - contribute to a better understanding of past events and behaviors that could be **causal or contributing** in future events
- It is important to give technology applications a **sufficient trial period**, adopting a “**in it for the long run**” mentality, **avoiding programs that are overly punitive**, and consistently delivering a message that reminds employees “why we’re doing this and what the costs are if we don’t”



61

QUESTIONS



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62