


# CUTR

CENTER for URBAN  
TRANSPORTATION  
RESEARCH

Strategies to Prevent, Reduce, and  
Mitigate Bus Collisions

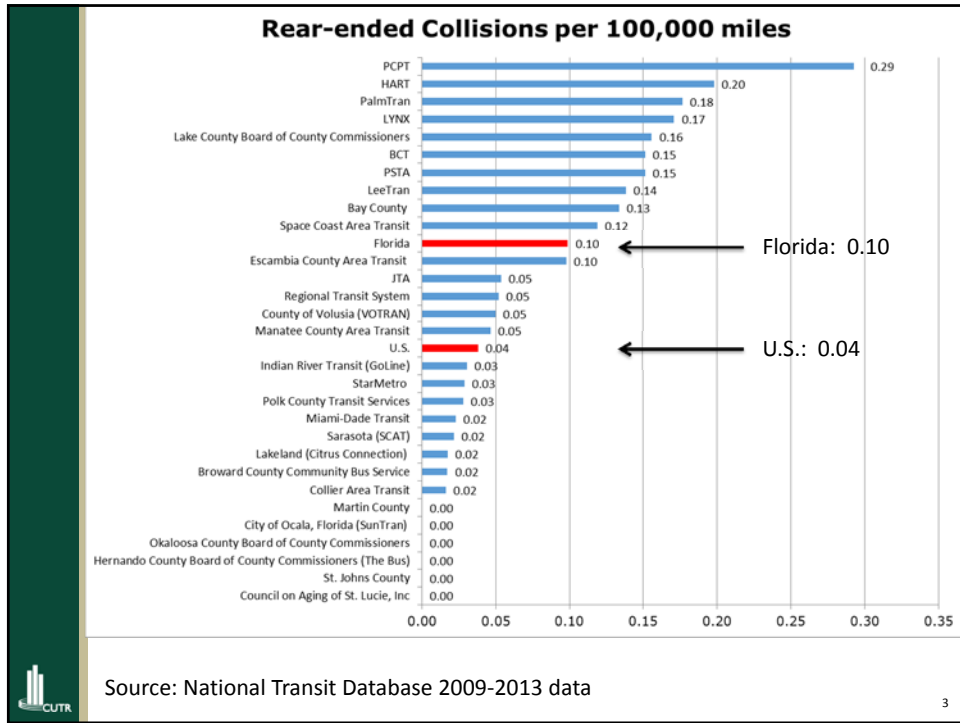
CUTR Webinar, June 9, 2016

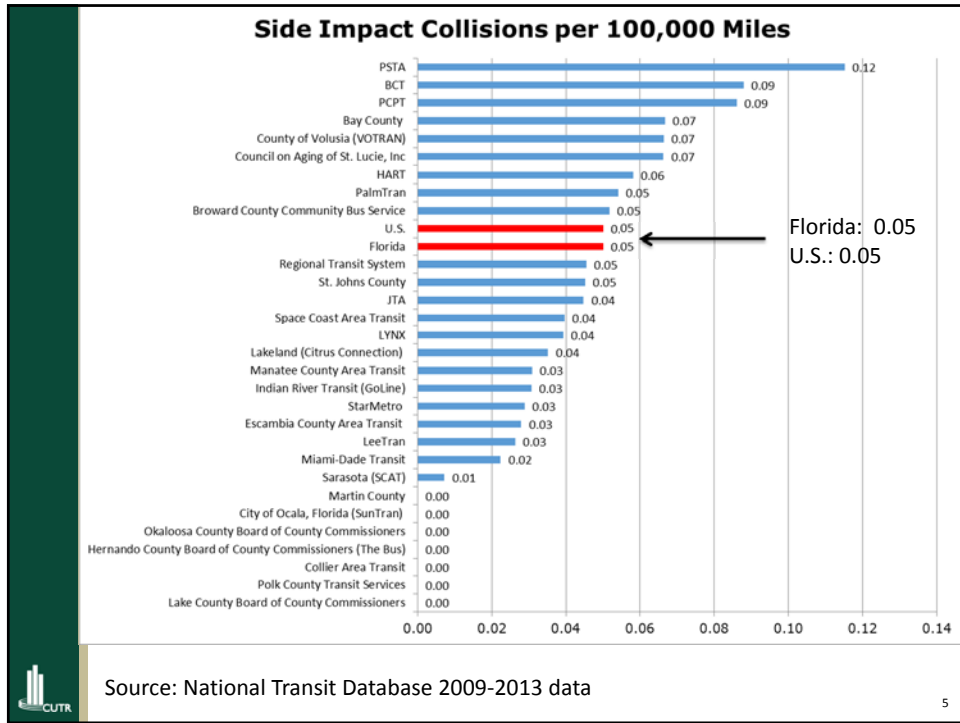


Center for Urban Transportation Research | University of South Florida

## Florida exceeds the national rate in bus rear-ended collisions





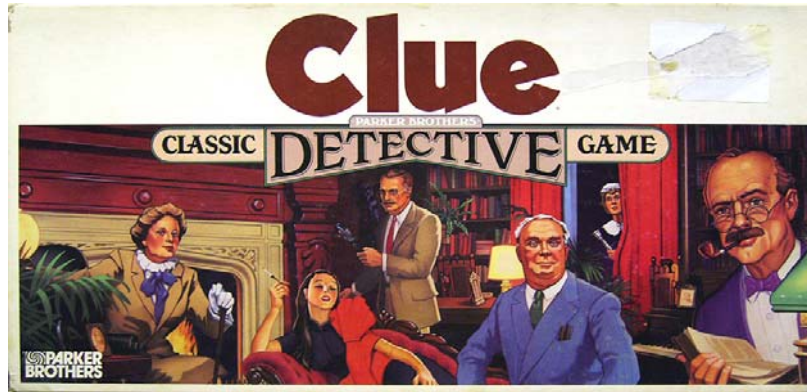


## Study Objective

Identify strategies that reduce, prevent and mitigate rear-ended and side impact collisions

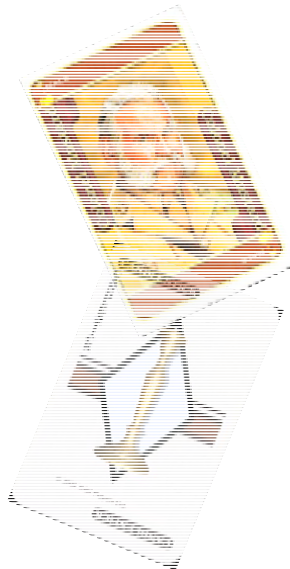
- Collision documentation and reporting
- Risk mgt. practices to managed liability
- Training, policies, procedures
- Rear end bus treatments
- Paint schemes and graphics

**I thought this study would be like**



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**At the end of the study, I'd accuse...**



It was the rookie bus driver, Colonel Mustard, and he was rear-ended on rainy day by a out of state tourist while driving a bus with lots of advertising on the back, and he forgot to turn on his 4-way flashers.



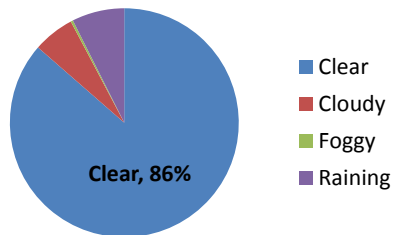
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## However, there's no smoking gun and no silver bullet

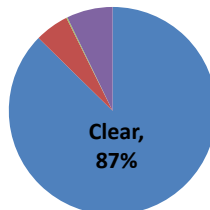


## Weather Conditions

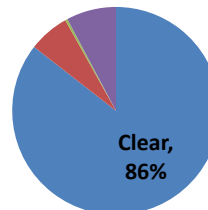
All Collisions



Rear-ended Collisions



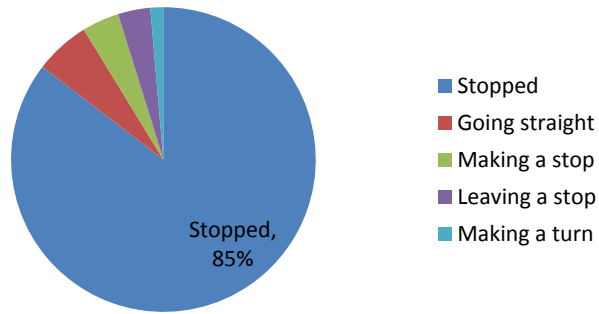
Side Impact Collisions



Source: NTD Data 2009-2013

## Action of Bus at Moment of Impact

### Rear-ended Collisions

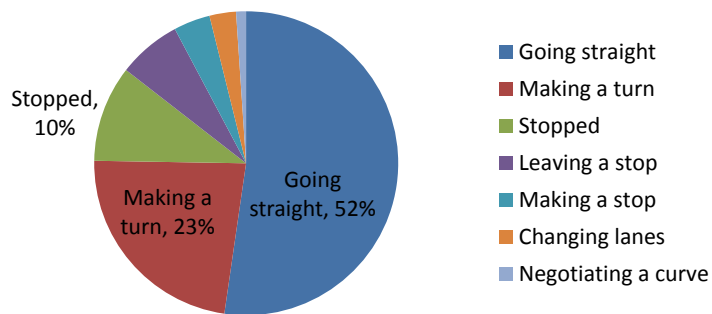


Source: NTD Data 2009-2013

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## Action of Bus at Moment of Impact

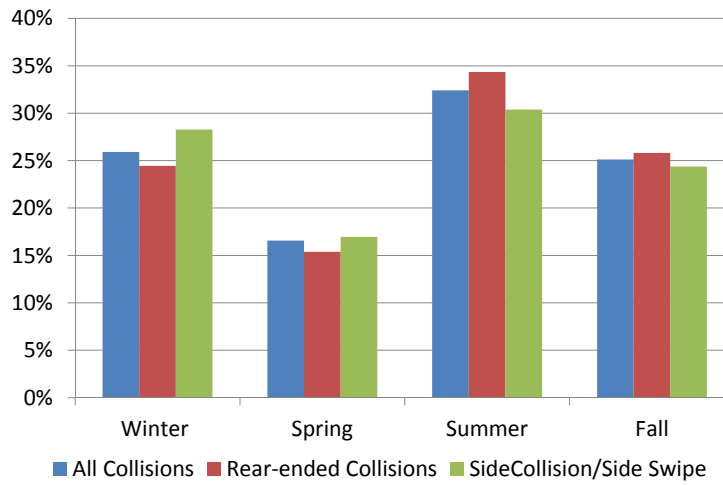
### Side Collisions



Source: NTD Data 2009-2013

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## Seasonal Variation of Accidents



Source: NTD Data 2009-2013

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## NATIONAL TRENDS



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## National Trends

What are other transit agencies doing to reduce bus collisions?



Metropolitan Transit Authority of  
Harris County



Chicago Transit Authority



Massachusetts Bay  
Transportation Authority



Los Angeles County  
Metropolitan  
Transportation Authority



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## National Trends

- No national standard either for types of warning devices or for their placement
- Agencies commonly use a “try and see” approach
- No single device or combination has substantially reduced rear collisions
- Florida transit agencies are in the same boat as other U.S. transit agencies



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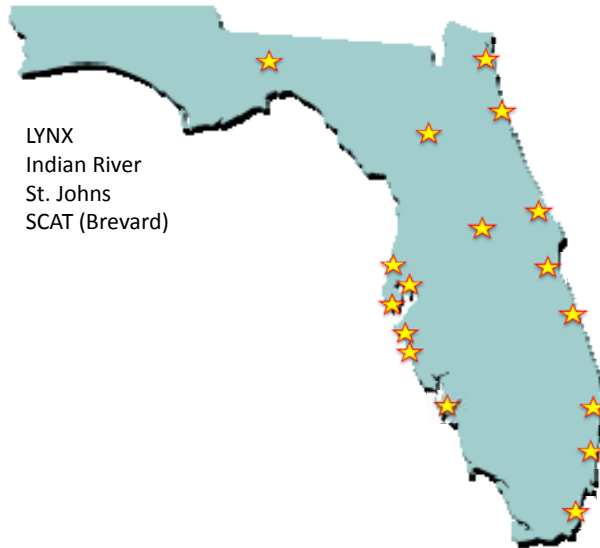
# SITE VISITS



## Florida Transit Agencies Visited

- RTS
- VOTRAN
- StarMetro
- PSTA
- JTA
- MDT
- BCT
- Palm Tran
- MCAT
- LeeTran
- SCAT (Sarasota)
- HART
- PCPT

- LYNX
- Indian River
- St. Johns
- SCAT (Brevard)



## Site Visit Discussion Topics

- Accident investigation process
- Determination of preventability
- Use of video footage
- Sharing of accident data w/in agency
- Use of accident data for training
- GIS mapping of accidents



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## Key Findings

- Similar accident investigation procedures
  - Most have sent supervisors to accident investigation course (e.g. TSI)
- Variation in who determines preventability
  - Formal vs. informal review committee
  - Review committee vs. single person
  - Labor representation vs. no representation



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## Key Findings

- Variation in the extent to which agencies use collision data to shape safety training
  - Some actively track data; others build training around anecdotal info
- Variation in extent of refresher training
  - RTS reported most hours (40 hrs/year)
  - Some agencies cut training due to budget or staff turnover



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## Key Findings

- Only RTS has mapped accident locations in GIS
- All agencies have video cameras in buses
  - Numbers vary from 5 to 12
  - All use video for accident investigation
  - Most use video footage in safety training
  - JTA experimenting with DriveCam system
- LYNX and SpaceCoast testing alternative lighting (i.e. strobe lights)



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## Experimental Strobes

LYNX



Space Coast



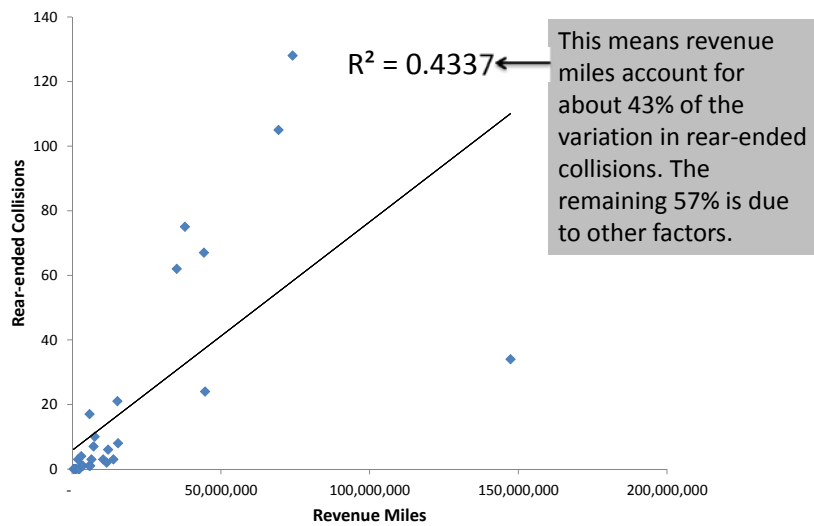
## NTD & NON-NTD DATA ANALYSIS

## Key Findings

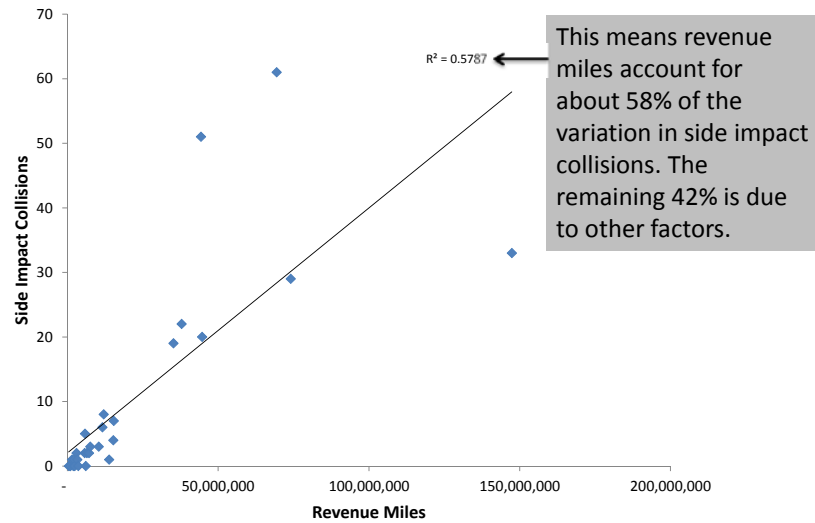
- In general, more bus revenue miles → higher collision rates
  - Some exceptions: MDT & PCPT



## Some correlation to revenue miles



## Some correlation to revenue miles



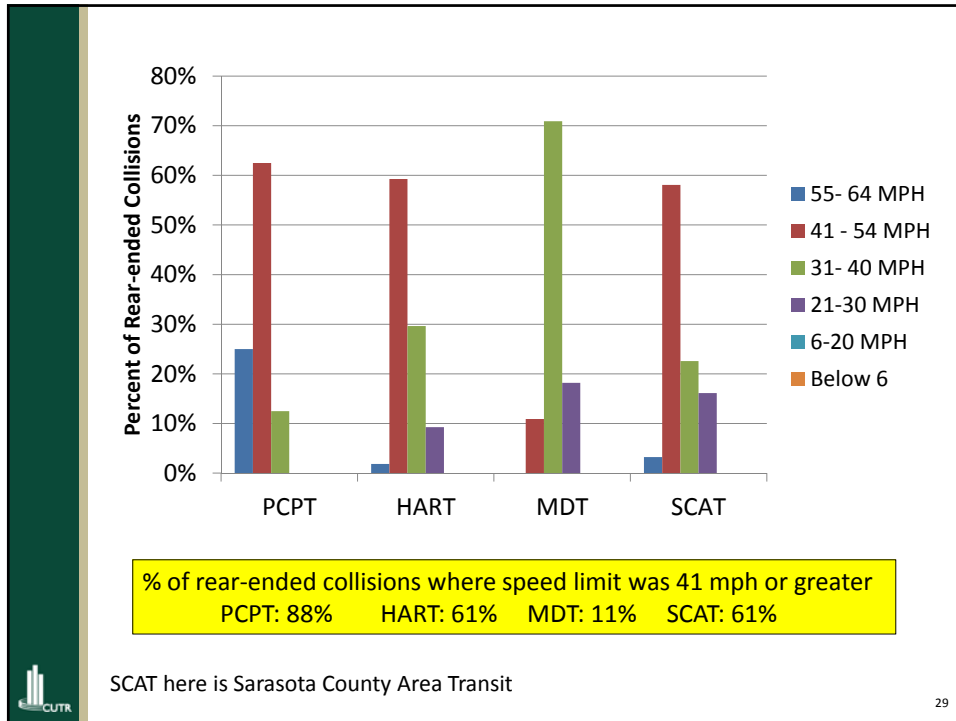
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## Key Findings

- Agencies with high rear-end collisions show large % on divided highways
  - LeeTran: 45% of rear-ended collisions
  - PalmTran: 79% of rear-ended collision
  - PCPT: 69% of all collisions were on a divided highway; 31% of rear ended collisions were on U.S. 19 alone



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## Key Findings

- In general, rookie operators have higher collision rates
  - HART, BCT, and Space Coast include date of hire in collision logs
  - Analyzed collision rates according to cohorts of years of experience
    - All rear-ended collisions
    - All preventable collisions

## Broward County Transit

### Rear-ended Collisions

Years of Experience	Number of Operators	Number of Collisions	Collisions per Operator
< 2 Years	119	21	0.18
2 to 5 Years	128	10	0.08
> 5 Years	429	49	0.11

### All Preventable Collisions

Not what you would expect

Years of Experience	Number of Operators	Number of Collisions	Collisions per Operator
< 2 Years	119	37	0.31
2 to 5 Years	128	16	0.13
> 5 Years	429	78	0.18



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## HART

### Rear-ended Collisions

Years of Experience	Number of Operators	Number of Collisions	Collisions per Operator
< 2 Years	113	10	0.09
2 to 5 Years	56	3	0.05
> 5 Years	204	19	0.09

### All Preventable Collisions

Years of Experience	Number of Operators	Number of Collisions	Collisions per Operator
< 2 Years	113	23	0.20
2 to 5 Years	56	7	0.13
> 5 Years	204	16	0.08



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## Space Coast Area Transit

### Rear-ended Collisions

Years of Experience	Number of Operators	Number of Collisions	Collisions per Operator
< 2 Years	43	3	0.07
2 to 5 Years	21	1	0.05
> 5 Years	34	6	0.18

### All Preventable Collisions

Not what you would expect

Years of Experience	Number of Operators	Number of Collisions	Collisions per Operator
< 2 Years	43	14	0.33
2 to 5 Years	21	0	0.00
> 5 Years	34	1	0.03



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## Other Key Findings

- Rear-bus advertising may be distracting automobile drivers




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Agency	Rear-ended Collisions per 100,000 Miles	Rear Advertising?
PCPT	0.29	Yes
HART	0.20	Yes
PalmTran	0.18	Yes
LYNX	0.17	Yes
BCT	0.15	Yes
PSTA	0.15	Yes
LeeTran	0.14	No
Space Coast Area Transit	0.12	Yes
<b>Florida</b>	<b>0.10</b>	<b>N/A</b>
JTA	0.05	Yes
Regional Transit System	0.05	Yes
VOTRAN	0.05	Yes
MCAT	0.05	No
Indian River Transit (GoLine)	0.03	No
StarMetro	0.03	Yes
Miami-Dade Transit	0.02	Yes
Sarasota (SCAT)	0.02	No
St. Johns County	0.00	No

12 of the 17 (71%) allow rear advertising

7 of the 8 above the statewide average allow rear advertising


4 of the 9 below the statewide average do not allow rear advertising



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## Other Key Findings

- Non-NTD collision data varies from agency to agency
  - Different data fields
  - Different data formatting
  - Makes statewide analysis difficult



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# RECOMMENDATIONS & BEST PRACTICES



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## Six Recommendations

1. Statewide Awareness Campaign
  - Emphasize need to be prepared to stop when behind buses
2. Create Statewide Transit Collision Database
  - With consistent data format
3. Support Innovate Bus Light Treatment
  - Support necessary legislation



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## Six Recommendations

- 4. Eliminate Bus Rear Advertising
  - Counterproductive to safety



- 5. Support Bus Pullouts where posted speed >40 mph



- 6. Include Operator Date of Hire in Collision Logs



## Best Practice

JTA's use of video-based Onboard Monitoring System (OSM)

- Targets risky driver behavior before an accident occurs



## To find the report

www.floridatsn.org

The screenshot shows the FDOT website with the following elements:

- FDOT Florida Department of TRANSPORTATION logo and navigation menu (Home, About FDOT, Contact Us, Offices, Maps & Data, Performance, Projects).
- E-Updates (FL511 | Mobile | Site Map) and Search FDOT field.
- Florida Transit Safety Network header.
- Navigation bar with items: FTSN HOME, ABOUT US, FOCUS AREA, **SERVICES & RESOURCES** (circled in yellow), TRAINING, LINKS, CONTACT FTSN TEAM.
- Main content area with a photo of a transit operator and a news article titled "Curbing Transit Operator Distracted Driving".
- "About" section text: "The Florida Transit Safety Network (FTSN) is comprised of members representing each of Florida's public transit agencies and the Florida Department of Transportation. The purpose of the FTSN is to provide a platform for discussions of safety challenges and opportunities impacting public transportation providers in Florida. This forum allows member transit agencies to identify safety issues and share leading practices that lead to better outcomes. The FTSN is a resource to the Florida Department of Transportation (FDOT) Public Transit Office bringing forward transit safety concerns which represent the greatest risks faced by local service providers."
- Page number 41 in the bottom right corner.

## Contact Information

Brian Pessaro  
Senior Research Associate  
Center for Urban Transportation Research  
University of South Florida  
(813) 974-5113  
pessaro@cutr.usf.edu