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# Update on U.S. Rail Trespassing & Suicide: Research Findings & Needs

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Presented by:  
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Right-of-Way Trespass & Suicide Prevention  
Transportation Research Board

## **Federal Railroad Administration Safety Statistics:**

- From 2012-2015, 43% of railroad fatalities were trespassers and 29% were suicide
- In 2017, there were a total of 1,062 fatalities on FRA-regulated rail systems (includes freight, Amtrak and commuter rail)
- 2017 trespassing and suicide fatalities: 782 (74% of total fatalities)
- The split is 70% trespass and 30% suicide, subject to change as cause of death officially determined

## **Federal Transit Administration Safety Statistics:**

- In 2017, there were a total of 145 FTA-reported fatalities on rail transit systems (Metro, Light Rail, Streetcar)
- Of these transit fatalities, 66 were suicides; 25 were people waiting or leaving; 19 were bicyclists or pedestrians

**Scope of the Problem**

**2017 Fatalities on the U.S. General Railway System**

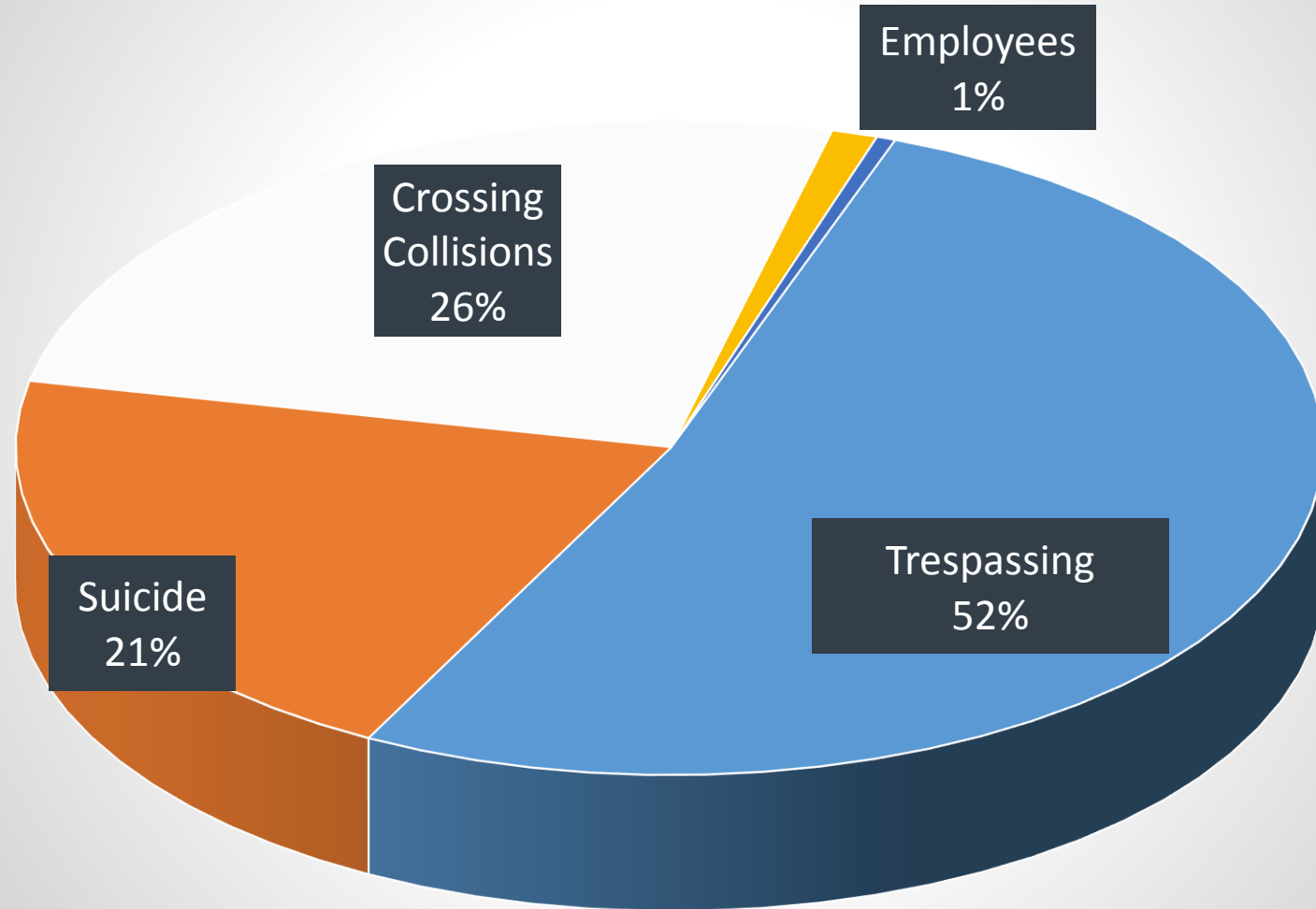
Regulated by FRA

1,062 total fatalities

73% of deaths trespass or suicide



**2017 General Railway System Fatalities**  
*(freight, Amtrak & commuter rail)*



## Scope of the Problem

# 2017 Fatalities on U.S. Rail Transit Systems

Rail Transit includes Metro, Light Rail, Streetcars

Regulated by SSOAs and FTA

145 total fatalities

45% of deaths were suicide (66)

No specific “trespassing” data



## 2017 Rail Transit System Fatalities

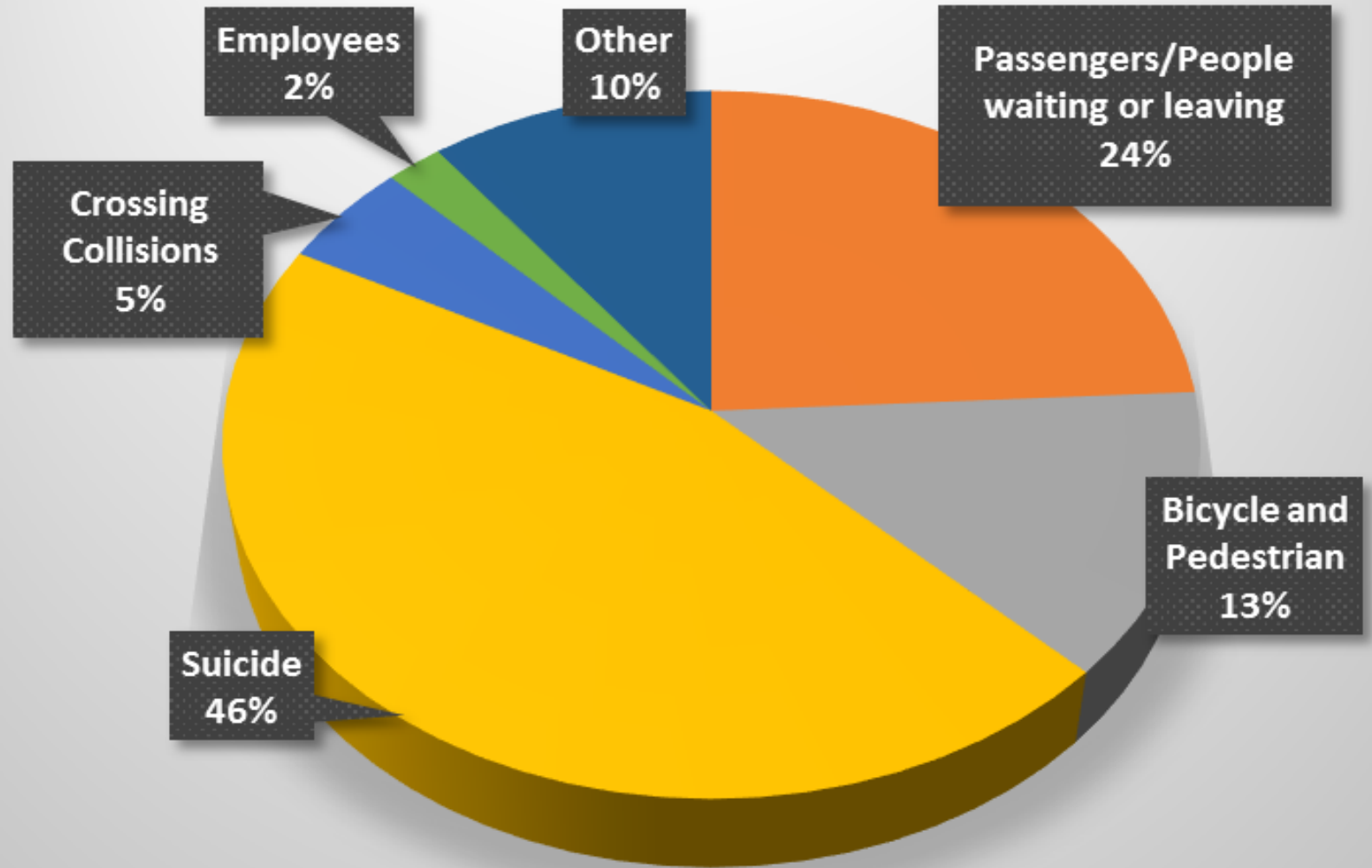




PHOTO BY MARK LLANUZA



## Seeing the “Big Picture”

- There is no easy way to compile FRA and FTA safety data together, or to compare relative risk factors
- FRA and FTA use different measures for safety data

FRA	FTA
Crossing Collisions	Other Vehicle Occupant
Trespassing	Ped in Crossing
	Ped Not in Crossing
	Ped Crossing Tracks
	Ped Walking Along Tracks
Suicide	Suicide
Employee on Duty	Operator
	Employee
	Other Worker
	Bicyclist
Non-Crossing Collisions	
	Passenger
	People Waiting or Leaving

OK, Rail  
Trespassing and  
Suicide is a big  
problem ....

How do we find  
the answer?



**Neil Armstrong:**  
“Research is creating  
new knowledge”

## Role of FRA

Most rail trespassing research in U.S. is conducted by FRA through Volpe Transportation Systems Center

FRA has conducted Research Needs Workshops on trespass and suicide prevention in 2008, 2012 and 2015

The workshops –

- Provide FRA and stakeholders with update on research and demonstration activities
- Solicit ideas for new or expanded initiatives, programs, or research projects



**Top 24  
Recommended  
Actions from  
2015 Research  
Needs  
Workshop**

## **Pedestrian Safety Issues**

1. Effective Signage
2. Crossing Guards
3. Grade Crossing Safety Clearinghouse
4. Pedestrian Safety Workshop
5. Best Practices Guide

## **Design, Technology & Infrastructure**

6. Unmanned Aerial Vehicle use for detection
7. Automated or operator-based technologies to detect trespasser and ROW obstructions
8. Technologies to influence human behavior
9. Environments and conditions mitigations
10. Standardized data for collecting and reporting trespass, near-miss, hot spots



**Top 24  
Recommended  
Actions from  
2015 Research  
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Workshop**

## **Community Outreach & Education**

11. Target national associations to raise trespass awareness
12. U.S. National Railroad Safety Day/Week
13. Community outreach with Major League sports teams
14. Nationwide media buy public awareness campaign
15. Driver's Ed and CDL licensing test questions on rail safety

## **Enforcement**

16. Model Trespass Statute for States
17. Grant Program for Railroad Safety Enforcement
18. Model Railroad Law Enforcement Authority
19. Use of technology by local law enforcement agencies to detect, deter and apprehend trespassers

**Top 24  
Recommended  
Actions from  
2015 Research  
Needs  
Workshop**

## **Intentional Deaths/Suicide Attempts**

20. Talk to suicide survivors for best practices
21. Develop rail media guidelines for responsible reporting
22. Coroner education – current determination process slow and inconsistent, need better quality data
23. Universal rail emergency phone number
24. Secondary probable suicide statistics – add reporting category for probable cause of death at scene

# Role of Transportation Research Board

- In January 2017, TRB AHB60 Standing Committee on Highway/Rail Grade Crossings formed a Subcommittee to focus on Rail ROW trespass and suicide research
- First task of the Subcommittee has been a Literature Review of recent research
- Total of 102 research studies reviewed, of which 46 were cited in the resulting report
- The Literature Review helped the Subcommittee:
  - *Make general findings regarding rail trespass and suicide epidemiology, countermeasures, and data adequacy*
  - *Identify research gaps and needs*



# Summary of TRB Literature Review Findings

Study Process	Epidemiologic Findings	Causation and Risk Factor Findings	Countermeasure Findings	Data Findings
Recent studies (2010 onward)	Rail suicide is much more prevalent choice in EU than U.S. (12% vs. <1%)	Rail suicides tend to occur in suburban or rural areas.	Organizational and procedural measures	FRA and FTA data is not harmonized
102 studies reviewed, 49 studies cited	Rail trespassing is much more prevalent in U.S. than EU (>43% in U.S. vs. 17% in EU)	Rail suicides have a high percentage of co-morbidity with alcohol (94% above .08 BAC)	Physical and technological measures	Sample sets tend to be limited and study periods short
28 studies applied to U.S. systems	Lethality: 50% of trespassers are fatal; 90% of rail suicides fatal	About 50% of rail trespasser fatalities had alcohol or drugs in their system	Automatic detection and warning	More studies needed to increase empirical data
	Demographics Victim Age: 38. Men outnumber women 3.5 to 1.	55 percent of rail trespassing fatalities were using headphones or mobile phones	Public awareness and education measures	
		A potential factor in higher rail suicide risk in EU vs. U.S. could be firearm availability	Law enforcement approaches	

# Top 10 Research Needs Identified

Need	Research Needs - Short Description
One	Analyze factors that influence <b>lethality</b> of trespassing and railroad suicide attempts.
Two	<b>Warning Systems:</b> Identify and evaluate potential technologies that can warn pedestrians along rights-of-way or at rail stations of trespassing and/or oncoming trains.
Three	<b>Data:</b> Identify and evaluate rail trespass and suicide-related data sources. Explore harmonization of FRA and FTA trespass and suicide data.
Four	<b>Countermeasure:</b> Behavioral analysis to understand impact and effectiveness of anti-trespass education
Five	<b>Countermeasure:</b> Survey railroad employees to identify and evaluate trespass locations, countermeasures

Need	Research Needs - Short Description
Six	<b>Countermeasure:</b> Empirical study of rail trespass and suicide prevention countermeasures' effectiveness. Establish database of countermeasures in use and their results. Analyze benefits versus costs of selected rail trespass/suicide prevention countermeasures.
Seven	<b>Access Control:</b> Evaluate the "built environments" around and along rail rights-of-way to determine most common reasons for trespassing and points of access. Explore initiatives to minimize trespassing opportunity that can be generalized to other communities.
Eight	<b>Access Control:</b> Identify and evaluate the design of railroad rights-of-way to determine specific points of access and minimize trespassing opportunities.
Nine	<b>Detection:</b> Describe and estimate costs and effectiveness of different trespass detection technologies, including UAVs, forward-facing cameras on locomotives, Strava fitness mapping data.
Ten	Understand <b>causal factors/intent</b> of rail trespassers and persons attempting suicide.



## The Ask

Can your  
agency,  
company, or  
organization  
help further  
this research?

I have ideas on potential research programs that might have available funding – please contact me!

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