

**Project Title**

Impact of Rail Trespasser Fatalities & Suicide on Mental Health and Safety Culture of Rail Transportation Workers

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**Research Needs**

According to recent reports approximately 289 individuals commit suicide each year on the U.S. rail system accounting for almost one third of the fatalities related to railroad operations in the U.S. Railroad carriers alone cannot solve this tragic loss of life. Trespassing is the leading cause of rail-related casualties (injuries and fatalities) in the U.S. and many of these trespass deaths are the result of an intentional act of suicide. The increasing number of fatalities resulting from trespassing prompted Congress to direct FRA to create a National Trespass Prevention Strategy. In its strategy, FRA identified approaches to reduce the occurrence of trespassing, including collaboration with stakeholders to address the issue of suicide.

Kidda (2020) summarized Federal Railroad Administration (FRA) trespasser data from 2012–2017, including intentional and accidental fatalities along the right-of-way (ROW). Figure 1 charts the number of fatal suicide and non-suicide strikes by year, showing consistent numbers

throughout the time period. The FRA statistics reveal that California, New York, Florida, and Texas had the highest number of fatalities. Persons involved averaged between 15 and 34 years of age for all fatalities. Fatal suicides most often involved lying down, while for non-suicides, individuals were likely walking along or stepping on or over tracks. Freight trains more than passenger or commuter trains were more often identified as related to suicides.<sup>1</sup> Trespasser casualties, including intentional acts of suicide, were the “leading cause of rail-related death in the United States” (FRA, 2018).<sup>2</sup> It should be noted that the impact of these incidents reaches beyond the loss of life: train crews experience trauma; railroads and their surrounding communities experience disrupted service and road closures with an estimated overall economic impact of 4.6 million per incident (FRA, 2018).

Based on the FRA data published on the FRA Dashboard<sup>3</sup>, out of the 15 counties with the highest number of trespasser fatalities in the 2011 to 2020 period nationwide, eleven of the top 15 counties are in California. (See Figure 1)

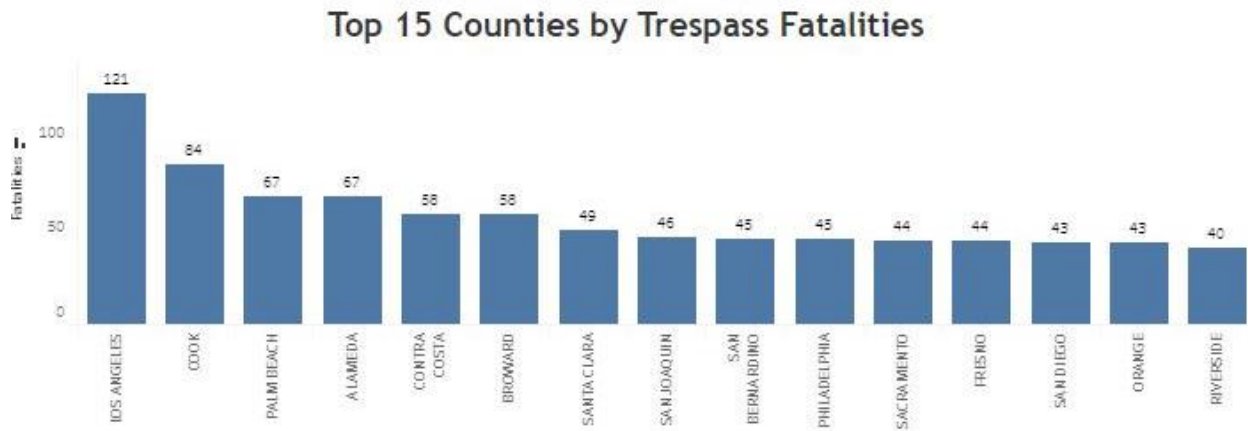


Figure 1. Trespasser fatalities nationwide - Top 15 Counties national wide

As the following graph shows, Los Angeles, Orange, Santa Clara, and Riverside counties are in the top 25 counties nationwide with the highest numbers of rail-related suicides (See Figure 1). This pattern is also mirrored in similar numbers for reported trespasser incidents. However, the impact of rail related suicide and trespasser fatalities on railroad and other transportation workers is not fully understood or documented. Bardon, Dargis & Mishara (2022) recently reported on the effects of critical incidents on 74 train drivers. They concluded that CIs have a significant negative impact on train drivers and that recovery from the effects of these incidents is variable and related to the services received and other and other contributing factors.<sup>4</sup> Consequently, the present project is being undertaken to attempt to understand the impact of these events on

<sup>1</sup> <https://railroads.dot.gov/sites/fra.dot.gov/files/2020-01/Fatal%20Trespasser%20Strikes.pdf>

<sup>2</sup> Federal Railroad Administration. (2018). *National Strategy to Prevent Trespassing on Railroad Property*. Washington, DC: U.S. Department of Transportation.

<sup>3</sup> <https://railroads.dot.gov/divisions/highway-rail-crossing-and-trespasser-programs/see-data-new-way-interact-trespassing>

<sup>4</sup> Bardon C, Dargis L, Mishara BL. Impact of Railway Critical Incidents on Train Drivers and Effectiveness of Critical Incident Management and Support Protocols: A Recovery Trajectory Analysis. *J Occup Environ Med.* 2022 Feb 1;64(2):e70-e77. doi:10.1097/JOM.0000000000002456. PMID: 34879030.

railroad workers psychological health and well being as well as the overall safety culture of the railroad. Gathering additional data on those involved in the events, those who deal with the aftereffects of these tragic events is important to understand.

On the Southern California Regional Rail Authority (SCRRA) Metrolink suicides have occurred system-wide and generally along the right-of-way and grade crossings. The current SCRRA Suicide Prevention Program is designed to prevent and reduce the number of incidents on Metrolink property and promote awareness of the resources available for those at risk of harming themselves.

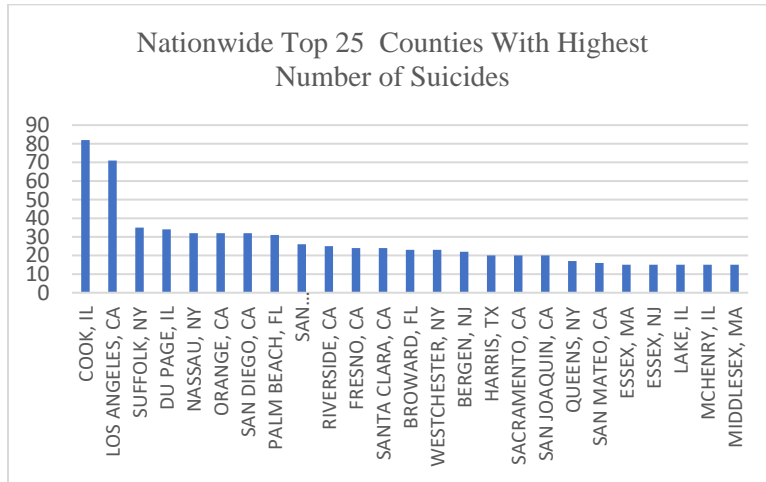


Figure 2. Top 25 Counties in Trespasser Suicide Fatalities.

The suicide rate in Santa Clara County (SCC), California dropped to 6.95 suicides per 100,000 people in 2017 from 6.98 and 7.77 in 2016 and 2015 respectively. Across the U.S., the suicide rate rose. In 2017 the U.S. suicide rate was 14.0 suicides per 100,000 people, compared to 13.0 in 2016 and 13.3 in in 2015. The California rate remained higher than in Santa Clara County, and has increased since 2015. The 2017 California suicide rate was 10.5 suicides per 100,000 people; the same rate of 10.5 per 100,000 people in 2016 and 10.3 per 100,000 people in 2015.<sup>5</sup> Unfortunately, after a three-year decline from 2014-17 SCC’s suicide count and rate increased to 148 deaths (7.6 per 100,000) in 2018 and 2019 with 169 deaths (8.8 per 100,000 see Figure 3). The SCC’s suicide rate continues to be lower than the California state suicide rate, which was 10.9 per 100,000 in 2018 and which has increased each year since 2015 (2019 state suicide data is not yet available). Nevertheless, these statistics indicate the prevalence of the suicide problem and the potential for affecting those in the transportation fields.

<sup>5</sup> Santa Clara County Health Systems (2019). <https://www.sccgov.org/sites/hhs/news-and-stories/Pages/suicide-rate-declined.aspx>

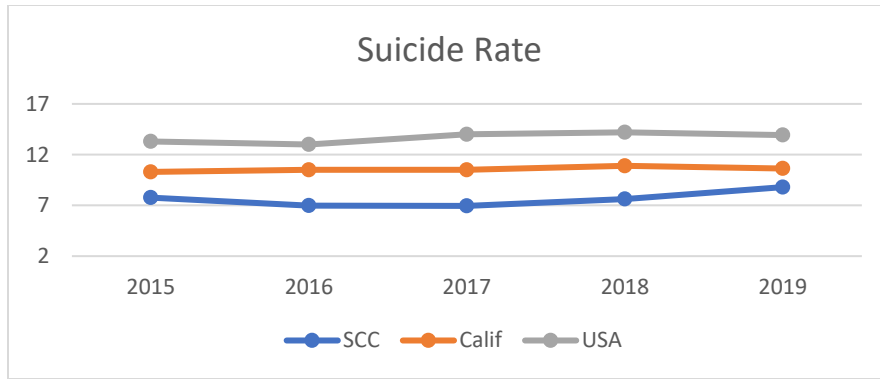


Figure 3. Source: ASFPS Fact Sheet and Santa Clara County 2019-2020 Annual Report.

In a railroad suicide situation, railroad personnel are typically the *last* line of defense in that they may observe the individual on or near the tracks. Their job in responding to a suicidal individual will be to identify them as a risk and help them to seek assistance from other resources in the community. Figley (1983) was the first to describe the phenomenon of secondary traumatization, which he defined ‘as the stress deriving from helping others who are suffering or who have been traumatized’ (Figley, 1999, p. 10). Railroad personnel who respond to trespasser suicide incidents may be at risk for developing the symptoms associated with secondary traumatization. Since the original article subsequent work has identified a variety of symptoms similar to those associated with PTSD namely, intrusive thoughts, avoidance behaviors, and hyperarousal or anxiety and hyper vigilance as well as depressive and anxiety symptoms. These symptoms are seen as natural and consequential to the first responders’ work environment (Bride,2007). Secondary trauma has also been referred to as compassion fatigue or compassion stress, which has the associated symptoms of feeling of helplessness, confusion, isolation, and symptoms of STS. Repeated or cumulative exposure to compassion stress (i.e. trespasser suicide) may lead to compassion fatigue defined as a recurring and pervasive ‘state of exhaustion and dysfunction, biologically, and emotionally’ (Figley, 1995, p. 253). Such individuals are no longer able to feel and express sincere understanding, empathy, and support for others (Hofmann, 2009).

The proposed project will assess the impact of exposure to trespasser fatalities and suicide on the mental health, safety and perceived safety culture of railroad workers. Previous research has identified the need for more effective training and intervention for gatekeepers and other persons associated with or proximate to individuals considering intentional death by suicide using rail. ( Aini, 2017; Berman, et. al. 2014; Dumensil & Verger, 2009; York, et. al., 2012). The role of suicide awareness and prevention training in properly inoculating some and preparing railroad employees for dealing with these incidents is apparent. Properly constructing training programs that provide information, set appropriate expectations, and teach preventative coping techniques is essential to minimizing the negative effects of these incidents on railroad and other transportation workers.

The proposed project will assess railroad staff, first responders, law enforcement, and other key stakeholders and members of the community who have been or will likely be exposed to railroad trespasser suicide. Several measures will be administered to a sample of railroad workers and other key first line responders who will be attending a rail suicide awareness program. These measures will be designed to assess symptoms associated with compassion fatigue and secondary

trauma, awareness of common myths associated with suicide and a measure of corporate safety culture.

The proposed project will benefit several different groups and organizations. First, it will document the mental health and safety needs of persons exposed to rail trespass suicides. The proposed research will also identify the prevalence of signs and symptoms associated with exposure to railroad trespass suicide. In addition, the project will document suggested training materials that can be used with person who have been involved in these types of incidents. Providing a resource and training to person who deal with these incidents will hopefully benefit the railroad workforce. Dealing with the tragic occurrences has been well-documented as being a detrimental effect to the mental health and well-being of the persons who work on the railroad. We hope that all these individuals and groups will benefit from the activities outlined in this proposal.

### **Research Objectives**

The proposed project will address the effects of fatalities trespass & intentional death by suicide on railroads on rail transportation workers in select areas by:

1. Assessing the impact of railroad suicides and trespass fatalities on railroad workers.
2. Assessing the mental health and psychological health of those exposed to or likely to be exposed to those involved with railroad trespasser suicide and fatalities.
3. Assessing the impact of railroad trespasser suicide and fatalities on perceived safety culture.
4. Producing a checklist for railroad personnel and first responders for identifying the signs and symptoms associated with the negative effects of being involved in trespass fatalities and suicides.
5. Promote awareness in the railroad organizations and railroad community regarding the effects of involvement with railroad trespasser suicides and fatalities.
6. Development of recommendations to respond to concerns of employees exposed to railroad trespasser suicide and fatalities.
7. Conduct workshop to facilitate technology transfer regarding what has been learned.
8. Presentations at key conferences.
9. Post final report on web site.

### **Research Methods**

The current project will gather data on the effects of involvement in fatalities involving trespassers and intentional death by rail. In addition, the project will provide training designed to increase awareness and knowledge of the preventative techniques designed to cope with the effects the impact of trauma in the workplace. Lastly, the project will assess the safety culture associated with the these events. A post assessment of the change in knowledge and attitudes towards the trespasser suicide and fatalities events will be assessed as well.

**Study Participants.** Study participants will be the members of a large railroad organization in the southwestern united states. Approximately 300 individuals, who are likely to or have been exposed to railroad trespasser suicide or fatality will be administered a short questionnaire.

**Measures.** The measures used in this study will be adapted from previously validated instruments designed to measure railroad Safety Culture, the Compassion Satisfaction and Fatigue Scale (ProQOL) (Stamm, 2009)<sup>6</sup>, the Compassion Fatigue Scale (Figley, 1995)<sup>7</sup>, the Maslach Burnout Inventory (MBI)<sup>8</sup>, and the Safety Culture Scale (Sherry, 2018).

**Railroad Employees and Associated Personnel Critical Incident Safety Training Session.** A small conference will be held in Summer 2023 designed to increase awareness and engagement among railroad personnel on this topic. The session will focus on an overall approach to understanding the psychological and work related impact of trespasser fatalities and intentional death by rail. The involvement of key officials from local governmental agencies and social and mental health agencies is will be requested. Based on the "hot spot" locations signage and public service announcements will be used to alert individuals and other community members of services available. The proposed project will disseminate the Media Reporting Guidelines<sup>9</sup> recommendations on language and terminology to be used in publications and media reports regarding intentional death by rail endorsed by the Action Alliance and the American Association of Suicidology. (Bohanna & Wang, 2012). Involvement of key members of the railroad and first responder community, including railroad staff and organized labor, that will likely come in contact with trespasser fatalities and suicide and others who may have attempted intentional death by rail will be undertaken.

**Evaluation of Critical Incident Safety Training Session.** The major outcome and evaluation measures will be the examination of the number of participants and their presence in the training programs. In addition, the utilization of pre and post measures of attitude, knowledge and behavior relative to the identification and prevention of suicide. In addition, we will endeavor to ascertain the number of near misses, the number of calls to suicide prevention lines, and the number of face-to-face interventions. We will survey the attitudes and perceptions of persons in the railroad industry to see if they have reported any change in their attitudes and perceptions. A comparison of attitudes and knowledge between those who attend the training program and those who do not will also be conducted.

### **Expected Outcomes**

The proposed project will benefit several different groups and organizations. First, it will provide additional documentation on the psychological, mental health and job-related impacts of exposure to railroad trespasser suicide and fatalities. Second, it will benefit railroad employees and related first responders by increasing awareness and knowledge of possible prevention interventions available. Other beneficiaries of the program will be the commuter rail customers who are indirectly affected by trespass and suicide incidents on the rail, which shut down sections of the railroad. Lastly, families of those persons who witness or are otherwise involved in trespass fatalities and suicides will also likely benefit from the results of this project. Understanding and mitigating the aftereffects of witnessing or being involved with traumatic

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<sup>6</sup> Stamm, B. (2009). Professional Quality of Life: Compassion Satisfaction and Fatigue Version 5 (ProQOL). [/www.isu.edu/~bhstamm](http://www.isu.edu/~bhstamm) or [www.proqol.org](http://www.proqol.org).

<sup>7</sup> Figley, C.R., (1995). *Compassion Fatigue*, New York: Brunner/Mazel.

<sup>8</sup> Maslach, C., Jackson, S. E., & Leiter, M. P. (1997). Maslach Burnout Inventory: Third edition. In C. P. Zalaquett & R. J. Wood (Eds.), *Evaluating stress: A book of resources* (pp. 191–218). Scarecrow Education.

<sup>9</sup> Best Practices for Reporting on Suicide (2015). <https://reportingonsuicide.org/wp-content/themes/ros2015/assets/images/ROS-001-One-Page-1.13.pdf>

events involving trespasser fatalities or suicides will be of great benefit to society and the scientific community. We hope that all these individuals and groups will benefit from the activities outlined in this proposal.

### Relevance to Strategic Goals

This project will contribute to the two of the USDOT Strategic Goals, namely safety and economic competitiveness. In addition, economic competitiveness of the transportation system is also influenced by the improving safe worker behavior, well-being, safe practices and safety culture in that safety is directly tied to the bottom line of a transportation organization. Decreasing the impact and aftereffects of involvement with trespasser fatalities and suicide accident injuries and fatalities on railroad workers and other frontline personnel contributes to ensuring the safe, ethical operation and economically competitive nature of the system.

The proposed study is also relevant to the strategic goals will also contribute to the transportation industry by contributing to the development of an innovative technology that will that Improve the Safety and Performance of the Nation's Transportation System. the project will enhance the existing federal effort by **contributing to safety, increasing economic competitiveness** and efficiency, developing the work force, and contributing to innovation in the transportation system in the US.



Lastly, the project will supplement the efforts of the FRA which has engaged in a Strategic Plan to reduce the trespasser incidents and fatalities nationwide. The project will contribute to mitigating the effects of trespasser incidents and fatalities. Lastly, the proposed study will also be related to the strategic goals in that it parallels the activities of the US DOT namely, the “[National Strategy to Prevent Trespassing on Railroad Property](#).”<sup>10</sup> In its report on the Fiscal Year 2018 budget, the House of Representatives Committee on Appropriations requested the Federal Railroad Administration (FRA) to identify and study the consequences of trespassing incidents on railroad property and develop a National Strategy. FRA’s National Strategy to prevent trespassing on railroad property includes four strategic focus areas: data gathering and analysis, community site visits, funding, and partnerships with stakeholders.

### Educational Benefits

Several graduate students will assist with the project thereby contributing to the development and education of graduate students who will later be employed in the industry. These students will gain experience in the data collection techniques commonly used in the transportation industry. In addition, they will gain an understanding of the theory and best practices associated with safety and workforce development.

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[https://railroads.dot.gov/sites/fra.dot.gov/files/fra\\_net/18320/ROA%206310005\\_Congress\\_TrespasserPreventionStrategy\\_2018.pdf](https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/18320/ROA%206310005_Congress_TrespasserPreventionStrategy_2018.pdf)

## **Technology Transfer**

In order to facilitate the technology transfer obtained in the present investigation three separate events will be undertaken.

1. Educational briefing for stakeholders in the immediate project held on the site or the premises of the research sites.
2. A conference with invitees from local DOT and other community agencies to review and discuss key findings.
3. Web pages with training materials and intervention checklists will also be developed that can be accessible to the public and railroad professionals.
4. The development of a video and webinar on the findings to be posted on NCIT web page.

## **Work Plan**

Achieving the overarching goal of this project requires the completion of several different tasks. Since the project will be built upon the previous work and studies, we anticipate that the results will be a significant contribution to the existing literature.

### **Task 1 - Literature Review**

Review relevant psychological, operational, and experimental studies and papers to determine the measurement of impact of work related trauma following exposure to workplace critical events and fatalities.

### **Task 2 – Development of Assessment Instrument**

Develop an instrument to assess the effects of involvement with trespasser fatalities that measures symptoms and behaviors such as compassion fatigue and secondary trauma reported in the literature.

### **Task 3 – Development of Training Materials**

Develop training materials that identifies symptoms associate with involvement with trespass suicide and fatalities. The training materials will draw upon published research in related areas and include checklists of possible symptoms as well as descriptions of techniques and activities to respond to the events.

### **Task 4 – Delivery of Training**

Training sessions will be developed and scheduled to accommodate the three groups: frontline railroad employees and associated railroad personnel.

### **Task 5 – Collection of Data – Pre and Post**

Surveys of attitudes, knowledge, interventions and practical behaviors will be administered to potential participants in the field, during safety briefings, and pre-post participation in the training sessions.



**Task 6 – Data Analysis**

Data will be analyzed to assess the relationship between the various measures, relative to attitudes, knowledge and behaviors related to involvement with trespass suicide and fatalities.

**Task 7 - Reporting Writing**

Draft report will be discussed with stakeholders describing the results of the research and identification of hypothesized linkages.

**Task 8 - Stakeholder Feedback**

Following the completion of the draft report stakeholders’ relevant feedback will be integrated into the report.

**Task 9 – Additional Tech Transfer Meetings**

The draft report will be shared with stakeholders and relevant findings will be disseminated.

**Task 10 – Project Closeout**

The final report will be shared and disseminated.

Task	Months			
	1 – 2	3 – 6	7 - 9	10 – 12
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

**Project Cost:**

Total Project Costs: \$583,630  
MPC Funds Requested: \$291,815  
Matching Funds: \$291,815  
Source of Matching Funds: SCRRA Los Angeles, California

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