U.S. Department of Transportation

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Characteristics of Trespassing Incidents in the United States (2012-2014)

Office of Research,
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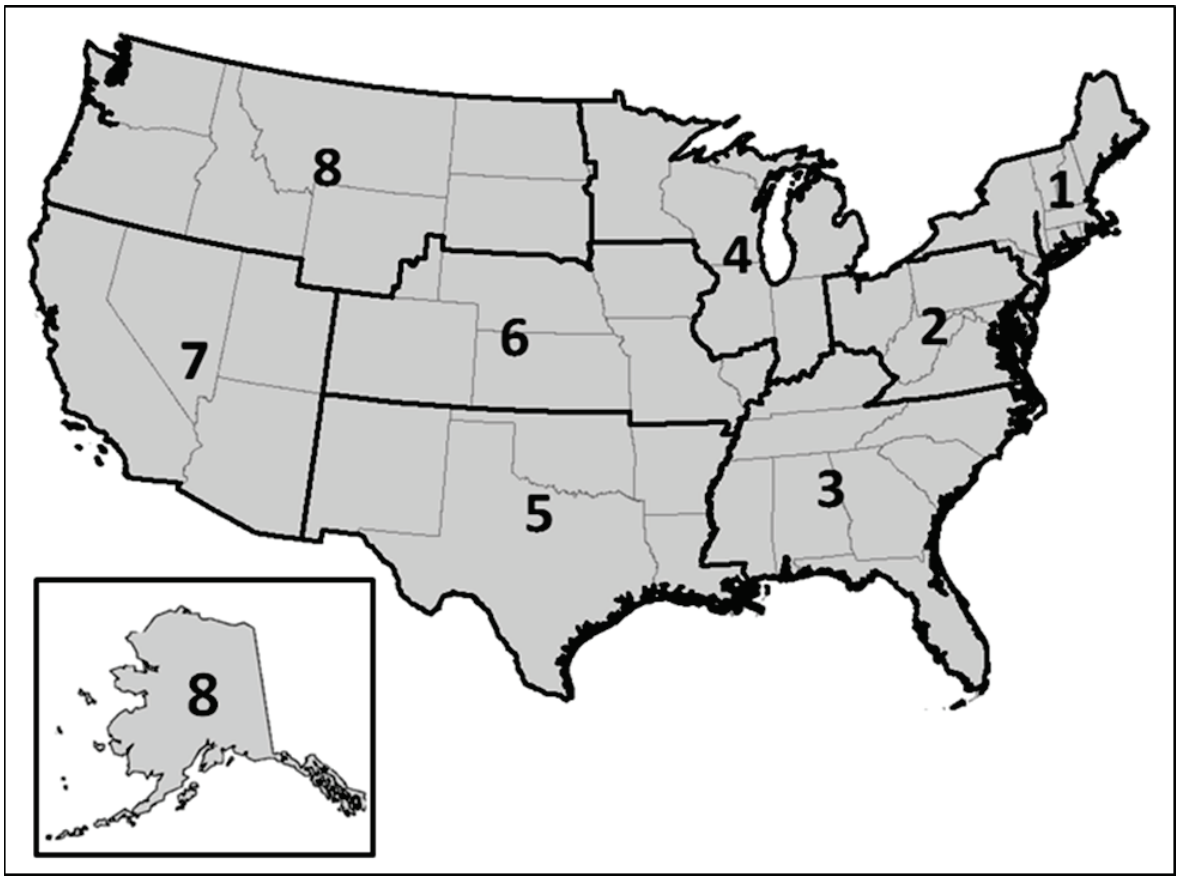
Washington, DC 20590



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13. ABSTRACT (Maximum 200 words)
Trespassing is the leading cause of rail-related fatalities in the United States. A large proportion of these trespasser fatalities are from intentional acts (i.e., suicides). The John A. Volpe National Transportation Systems Center (Volpe Center) has been tasked by the Federal Railroad Administration (FRA) to examine trespasser and suicide incident data on railroad rights-of-way to provide a better understanding of the contributory factors involved in these incidents and provide recommendations of potential mitigation strategies. This document provides a baseline measure of FRA trespassing and suicide incident data from 2012 through 2014. Findings illustrate a number of environmental and individual factors that are associated with each incident, such as location (region, state, and right-of-way vs. grade crossing), time (season, month, day of the week, time of day), and characteristics of the individual (age, gender, physical act that immediately preceded the incident). Each of these factors is analyzed in the hope that they may give predictive value in the future and a better understanding of the best ways to mitigate trespasser incidents on rail.

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1 foot (ft) = 30 centimeters (cm)	1 centimeter (cm) = 0.4 inch (in)
1 yard (yd) = 0.9 meter (m)	1 meter (m) = 3.3 feet (ft)
1 mile (mi) = 1.6 kilometers (km)	1 meter (m) = 1.1 yards (yd)
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1 gallon (gal) = 3.8 liters (l)	
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1 cubic yard (cu yd, yd^3) = 0.76 cubic meter (m^3)	1 cubic meter (m^3) = 1.3 cubic yards (cu yd, yd^3)
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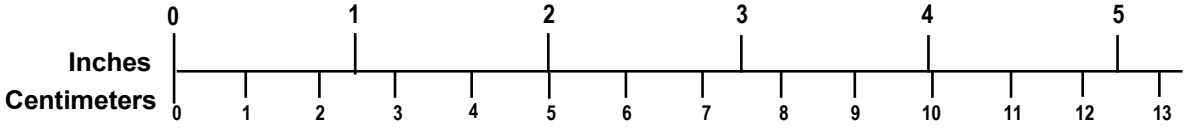

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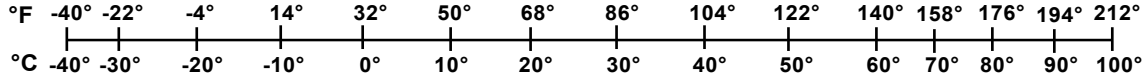

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Executive Summary

This report contains a baseline measure of FRA trespassing and suicide incident data from 2012-2014. This information should assist railroads and researchers who wish to learn which populations and locations are at most risk for trespass and suicide. This may provide predictive value in the future and inform the development of strategies to mitigate the number trespasser incidents on railroads.

From 2012 to 2014, 3,648 individuals were found to trespass without intention of doing harm to themselves in the US. Of those individuals, 1,713 incidents led to a fatality. During the same time period, an additional 782 trespass fatalities were determined to be suicides by a coroner or medical examiner. Additional findings illustrate a number of environmental and individual factors that are associated with each incident, including location (region, state, and right-of-way vs. grade crossing), time (season, month, day of the week, time of day), and characteristics of the individual (age, gender, physical act at the time of the incident).

For suicide fatalities, timing trends emerged that could be attributed to increased opportunities for incidents to occur, for example, during increased passenger train frequency that occurs during typical weekday evening commuting hours. Seasonal timing trends were also found, which follow national suicide seasonal trends which have shown to peak in the spring. In terms of the decedents involved, it was found that age of the decedents is younger than would be expected based on national suicide rates. When compared with incidents that resulted in an injury, it was found that fatalities more often involved a passive action (e.g., lying down, sitting, and standing), while more injuries involved a more active movement (e.g., running, jumping, and walking).

Trespass incidents did not follow the seasonal peak in the spring and summer as with suicide fatalities; rather, trespass incidents peaked in the summer and fall. Additionally, trespass incidents occurred more often on weekends than suicide attempts, particularly when a passenger train was involved. They also followed a slightly different time pattern throughout the day.

When the authors reviewed grade crossing incidents, it allowed them to obtain information that could not be currently gained in other types of incident reports. While most fatalities occurred at higher train speeds and injuries at lower train speeds, this was not always the case. Several incidents resulted in injuries when the train was traveling at higher speeds; likewise, several fatalities occurred when the train was traveling at lower speeds.

An update of this demographic data will be conducted every two years, which will allow for greater reliability of existing trends seen in the present report and also give more opportunities to look at the data more rigorously with larger sample sizes. Also, individual factors within the report will be examined to better understand potential predictive ability for the occurrence of these incidents.

The results of this report are organized based on the type of incident, intent, and factors being examined as follows:

Section 3 introduces each of the variables in isolation with counts of total trespassing incidents by year (not split by intention of the individual).

Section 4 looks exclusively at suicide (or intentional) fatality incident data and explores the data by looking at variables in isolation as well as in combination with others. A subsection is also included that examines suicide injury incident data.

Section 5 compares trespassing incidents based on intention of the individual, either suicide (intentional) or trespass (unintentional). Variables will be discussed in the same order as in the previous section.

Section 6 discusses incidents from the Highway-Rail Grade Crossing Accident/Incident Report database which contains additional information about the decedent or injured individual and the incident's location.

Section 7 discusses the FRA reporting systems used in this effort with a discussion of its benefits and limitations. Additional discussion of potential recommendations for future data collection efforts is included.

1. Introduction

For decades, a variety of safety initiatives have been proposed and implemented to keep the communities near the railroad right-of-way safe. Still, hundreds of people are injured or killed each year by trespassing at grade crossings or on a right-of-way.

The Federal Railroad Administration (FRA) 2011 definition of trespassing is "persons who are on the part of railroad property used in railroad operation and whose presence is prohibited, forbidden, or unlawful", (Table 1). If someone trespasses as a train is approaching, the incident may end in tragedy. Therefore, it is critical to better understand who is trespassing and their rationale for doing so.

The John A. Volpe National Transportation Systems Center (Volpe Center) has been tasked by the FRA to examine trespasser and suicide incident data on railroad rights-of-way, develop a better understanding of the causal and contributory factors involved in these incidents, and provide recommendations of potential mitigation measures. This report includes baseline information from the FRA reporting system, which can create a foundation for building a broader understanding of the present trespassing situation in the United States (US) and potential best practices to mitigate these incidents.

1.1 Trespassing

Usually, an individual who decides to trespass on the right-of-way has one of the following motives:

- Use the right-of-way as a shortcut
- Recreational or criminal purposes (graffiti, theft)
- Use the railroad as a means to end his or her own life

Understanding an individual's reason for trespassing strongly predicts the best course of action in mitigating that event. Operation Lifesaver (OLI), which informs communities about the risks of crossing the tracks and educates them on safe behaviors around the right-of-way, is one mitigation strategy that is aimed at trespassing. Since its formation in 1972, OLI has successfully sent their message out to communities.

For example, OLI's efforts have helped reduce the number of train/motor vehicle collisions from approximately 12,000 in 1972 to 2,286 in 2014.[1] OLI also produced a toolkit for communities to assist in informing their constituents about rail safety. However, the messages used in some mitigation strategies may only positively influence individuals who are on the train tracks for a limited period of time. For trespassers who intend to fatally injure themselves, those messages may not change their intentions and in some cases, it may increase the rate that incidents occur in this particular subgroup.

One example of an OLI media campaign about the risks involved with trespassing on active tracks is depicted below. Figure 1 has three advertisements that describe a collision between a person [man] or vehicle and a train. The advertisements may be compelling for the trespasser who may try to cross the tracks when a train is approaching. However, the individual who is

[1] Retrieved from http://oli.org/about-us/news/statistics/frasite November 17, 2015.

contemplating ending their life may see that a "lopsided clash" is a "deadly danger" that may persuade those individuals that the railroad is an effective option for ending their life. Contrary to what many people may believe, not everyone who is struck by a train dies. From 2012-2014, the FRA reported that 39 percent of the 3,487 train-person collisions that occurred on the rail system resulted in a fatality.[2] Twelve percent of the individuals who were confirmed to have intended to end their life on the rail system were left with injuries, some of which were severely debilitating.

Figure 1. Three Examples of Operation Lifesaver's Graphical Campaign

1.1.1 Trespassing – Unintentional Fatalities

Many people cross the right-of-way because it serves as a shortcut to a destination, and others may do so for recreational (e.g., photography, exercise) or criminal (e.g., graffiti, theft) motives. In these examples, any death or injury resulting from their actions on the right-of-way is not intentional, thought it still has an impact on the trespassers and those who witness the incident (such as the train crew or bystanders).

From 2012 to 2014, 3,648 individuals were found to trespass for other reasons than doing harm to themselves, which resulted in death or injury. Of those, 1,713 incidents resulted in a fatality and 1,935 resulted in an injury. The psychological impact on all that are involved in the incident is far reaching. For example, those who witness or bereave a violent death such as an individual struck by a train, may experience higher levels of sleep disturbances, depression and physical health issues (Sherry, 2011; Stroebe, Schut & Stroebe, 2007; Vatshelle & Moen, 1997). Post-Traumatic Stress Disorder (PTSD) is also a documented effect (Mehnert, Nanninga, Fauth & Schafer, 2012; Sherry, 2011; Stroebe et al., 2007; Vatshelle & Moen, 1997), with train drivers particularly affected by these events. A study of 830 train drivers in Norway found that 48 percent of participants who had experienced at least one on-the-track accident reported significantly more health problems than those without such exposure (Vatshelle & Moen, 1997). In 2013, the FRA issued a final rule requiring all railroads covered under the rule to have a plan to care for rail employees affected by a pedestrian-train strike. Gist's 2014, report describes the

[2] Citation would be the Safety Data Website: http://safetydata.fra.dot.gov/OfficeofSafety/Default.aspx

current state of knowledge about treating individuals who have been exposed to potentially traumatic events and proposed key elements for a program in the rail industry. This paper was used to support the 2013 FRA issued rule.

1.1.2 Trespassing – Intentional Fatalities (suicides)

For trespassing incidents involving individuals who intend to end their life, different mitigation efforts will be necessary. In 2013, 41,149 individuals intentionally ended their lives (died by suicide) in the United States.[3] It is estimated that less than one percent of those individuals took their lives on railroad rights-of-way (310 FRA reported suicides in 2013). Despite the relatively small number of suicides that occur on the rights-of-way, these incidents have a significant impact on the individuals who are directly and indirectly involved in the incident.

In the United States, determining the exact number of suicides that occur on the railroad rights-of-way is difficult. Prior to June 2011, the FRA did not systematically collect any information about suicide incidents because FRA reporting exempted fatalities on the railroad right-of-way determined to be a suicide by a medical examiner or coroner. In June 2011, the FRA removed this exemption and began to collect incident reports of suicide as specified by the revised Code of Federal Regulations (CFR) and reflected in the FRA Guide for Preparing Accident/Incident Reports (FRA, 2011).

Before the FRA published this data in aggregate form, researchers have used a number of different sources to estimate the prevalence of trespassing and suicide on railroad rights-of-way in the United States, including state mortality surveillance systems, railroad trespasser fatality records, and media reports (George, 2008; Martino, Gabree, and Chase, 2013). However, these data sources were not rail specific and it was often difficult to get a reliable estimate of the number of incidents which occur on the rail system. An update or addition to these research findings is warranted.

1.2 Report Objective

The purpose of this document is to provide a baseline measure of trespassing incidents that occur with the intention of completing a suicide attempt and its comparison group of non-intentional trespassing fatalities in the United States. This baseline should assist railroads and researchers in understanding the populations and locations which are most at risk to trespass and suicide, and this may assist in their efforts to mitigate the number of incidents that occur.

[3] http://www.cdc.gov/nchs/fastats/suicide.htm. Last retrieved on 11/20/2015.

2. Methodology

2.1 Data

Trespassing incident reports were collected from two FRA railroad reporting systems[4]: the FRA F 6180.55 Injury and Illness Summary (and 6180.55a Injury and Illness Continuation Sheet) Report and the FRA F 6180.57 Highway-Rail Grade Crossing Accident/Incident Report. When any incident occurs and an individual is injured or killed, the railroad carrier must fill out an FRA F 6180.55 (Railroad Injury and Illness Summary) and the accompanying 6180.55a Continuation Sheet. In addition, incidents that occur at a grade crossing and result in an injury, fatality, or reportable damage require an additional form to be completed, the FRA F 6180.57 Highway-Rail Grade Crossing Accident/Incident Report.

Both of these forms are available through the FRA Office of Safety Analysis website:

http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Forms.aspx

These forms are submitted monthly to the FRA Office of Safety, as stated in the FRA Guide for Preparing Accident/Incident Reports (pp. 3, 5-6). In this study, we only included data from pedestrian trespass incidents that resulted in an injury or fatality, with a focus on fatal incidents, regardless of the individual's intent (accidental or suicide). All incidents that involved vehicles or an individual riding a bicycle were excluded for our analyses.

Although the Injury and Illness Summary Report (FRA F 6180.55) includes all incidents involving an injury or death, we also included data from Highway-Rail Grade Crossing Accident/Incident Report (FRA F 6180.57). Though most people associate grade crossing incidents involving a vehicle, 17 percent (438) of the 2,529 reported injury or fatality incidents at grade crossings between 2012 and 2014 involved pedestrians. We included this additional form in our analysis because it asks for additional information on grade crossing incidents that is not found in the Railroad Injury and Illness Summary Report. This additional information includes gender, temperature, train speed, warning device status and weather. Since these data are collected through a separate reporting system, the grade crossing data are reported in a separate section of this paper (Section 6). We only included grade crossing incidents that involved pedestrians rather than individuals who were struck while inside a vehicle so that these data could more easily be compared with the pedestrian trespass (non-intentional) and suicide (intentional) data from the Injury and Illness Summary. All incidents that involved vehicles or an individual riding a bicycle were excluded.

2.2 Incident report variables

Each incident report includes information that can give insight into what factors are involved in incident to better predict where, when and who is involved.

We looked at each variable in isolation and in combination with other variables. From the Injury and Illness Summary Report (and continuation sheet), we looked at the following variables in the incident data (note that the original FRA variable names are presented in brackets under the new

[4] FRA reporting forms are available at http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Forms.aspx.

category, if different), shown in Table 1 (see Appendix A for a copy of the incident forms used by the FRA):

Table 1. Variables from Injury and Illness Report and Continuation Sheet

Variable	Definition	Categories Used for Examination
Type of Person	Classifies person involved in reported casualty	Trespassers
Intent of the Trespasser	Classifies whether the injury or death was a result of a suicide attempt, or an unintentional act, as determined by a coroner, medical examiner, or public police officer with legal authority to declare a casualty a suicide or attempted suicide Note: Not on form but provided for internal federal use and reported only in aggregate	Suicide
Outcome	Classifies whether the incident resulted in an injury or fatality Note: Not on form but provided by FRA	Injury Fatality
FRA Region	FRA designated region in which the incident occurred Note: Not on form but provided by FRA	FRA Regions 1 – 8
State	State in which the incident occurred (excluding Hawaii, which does not have rail operations)	State
Type of Equipment [Location: Part II]	Type of rail equipment involved in the incident	Freight [Freight car(s)- moving, Freight car(s)-standing, Freight train-moving, Freight train-standing] Passenger [Passenger car(s)-moving, Passenger car(s)-standing, Passenger train-moving, Passenger train-standing]

Variable	Definition	Categories Used for Examination
Year [Report Year]	Calendar year in which the incident occurred	Year
Month of the Year [Report Month]	Month of the year in which the incident occurred	Months of the year
Season	Season in which the incident occurred Note: Not tracked by FRA (derived from month data)	Spring (March – May) Summer (June – August) Fall (September – November) Winter (December – February)
Time of day	Time of day at which the incident occurred	Hours using 12-hour clock
Day of the week	Day of the week when the incident occurred Note: Not tracked by FRA (derived using month, day and year)	Days of the week
Age	Age of the decedent or injured individual at the time of the incident	Age in years

Variable	Definition	Categories Used for Examination
Physical Act	Physical act of the decedent or injured individual at the time of the incident Note: Some categories were merged into one, as reflected in the next column	Crossing [Crossing over, Crossing under, Crossing between] Jumping [Jumping from, Jumping onto Lying down [Lying down, Laying] Riding Running Sleeping Sitting [Sitting, Bending/ Stooping Standing Walking [Walking, Stepping down, Stepping over, Stepped on Other [Adjusting coupler, Arresting/apprehending, Climbing on/over, cutting, Getting off, Handling, Moving, Reaching, Other]

As mentioned previously, we also looked at additional variables from the Highway-Rail Grade Crossing Accident/Incident Report database, as shown in Table 2 below. Note that physical act information is not collected in Highway-Rail Grade Crossing Accident/Incident Reports (see Appendix B for a copy of the incident form used by the FRA):

Table 2. Variables from Highway-Rail Grade Crossing Accident/Incident Report

Variable	Definition	Categories Used for Examination
Intent of the Trespasser [Highway User]	Classifies whether the injury or death was a result of a suicide attempt, or an unintentional act, as determined by a coroner, medical examiner, or public police officer with legal authority to declare a casualty a suicide or attempted suicide	Suicide/Attempted suicide
Outcome [Casualties to Highway-Rail Crossing Users]	Classifies whether the incident resulted in an injury or fatality	Injury [Injured] Fatality [Killed]
FRA Region	FRA designated region in which the incident occurred Note: Not on form but provided by FRA	FRA Regions 1 – 8
State [State Abbr.]	State in which the incident occurred (excluding Hawaii, which does not have rail operations)	State
Type of Equipment [Type of Equipment Consist]	Type of rail equipment involved in the incident	Freight Train Passenger – Passenger Train-Pulling, Passenger Train-Pushing, Commuter Train-Pulling, Commuter Train-Pushing
Year [Date of Accident/Incident]	Calendar year in which the incident occurred	Year
Month of the Year [Date of Accident/ Incident]	Month of the year in which the incident occurred	Months of the year
Season	Season in which the incident occurred Note: Not tracked by FRA (derived from month data)	Spring (March – May) Summer (June – August) Fall (September – November) Winter (December – February)

Variable	Definition	Categories Used for Examination
Time of day [Time of Accident/ Incident]	Time of day at which the incident occurred	Hours using 12-hour clock
Day of the week	Day of the week when the incident occurred Note: Not tracked by FRA (derived using month, day and year)	Days of the week
Weather	Weather conditions at the time of the incident	Clear Cloudy Rain Fog Sleet Snow
Temperature	Outside temperature at the time of the incident	Degrees Fahrenheit (°F)
Age [Highway User's Age]	Age of the decedent or injured individual at the time of the incident	Age in years

The remainder of the report is split into five sections:

- Section 3 introduces the variables in isolation and includes counts of total trespassing incidents by year (not split by intention of the individual)
- Section 4 looks exclusively at suicide (or intentional) fatality incident data and explores the data by looking at variables in isolation as well as in combination with others. A subsection is included that examines suicide injury incident data
- Section 5 compares trespassing incidents based on intention of the individual, either suicide (intentional) or trespass (unintentional). Variables are discussed in the same order as in the previous section (section four)
- Section 6 discusses incidents from the Highway-Rail Grade Crossing Accident/Incident Report database, which contains additional information about the decedent or injured individual and the incident's location
- Section 7 discusses the FRA reporting systems used in this effort with a discussion of its benefits and limitations

From this point forward we will call intentional fatality incidents *suicide incidents* and refer to unintentional incidents *as trespass incidents.* This is to reduce any confusion between the terms when discussing data findings.

3. Overview of FRA Pedestrian Trespass Data

This section provides a high-level overview of pedestrian trespass and suicide incident reports. Each incident reported to FRA has one of two outcomes, an injury or a death. Overall, 4,533 reports involving trespass were included in the FRA railroad injury and illness database from 2012-2014.[5] Based on the inclusion criteria (see previous section), a total of 2,357 pedestrian trespass reports were included. Each report described a suicide fatality (intentional), suicide injury (intentional), or trespass fatality (unintentional), as seen in Table 3. Incidents that result in an injury include suicide (intentional acts) incidents in the primary analysis, while trespass injuries (non-intentional acts) are only used in the specific secondary analysis.

Table 3. Incidents Included for Examination

Report Type	Year			Total
	2012	2013	2014	
Suicide	288	312	251	851
Suicide Fatality	250	291	220	761
Suicide Injury	38	21	31	90
Trespass Fatality	459	481	566	1,506
Total	747	793	817	2,357

3.1 Location: Where do Incidents Take Place?

When an incident's location is captured, it can have many different levels of detail (such as region, state, or whether the individual was at a grade crossing). Each of the levels can give valuable information about where incidents occur, which may lead to potential trends or the identification of hot spot locations. Equally interesting are locations where no incidents or fairly few have occurred.

3.1.1 Region and State

The FRA designates eight regions in the US, as shown in Figure 2.

[5] Last retrieved July 13, 2015.

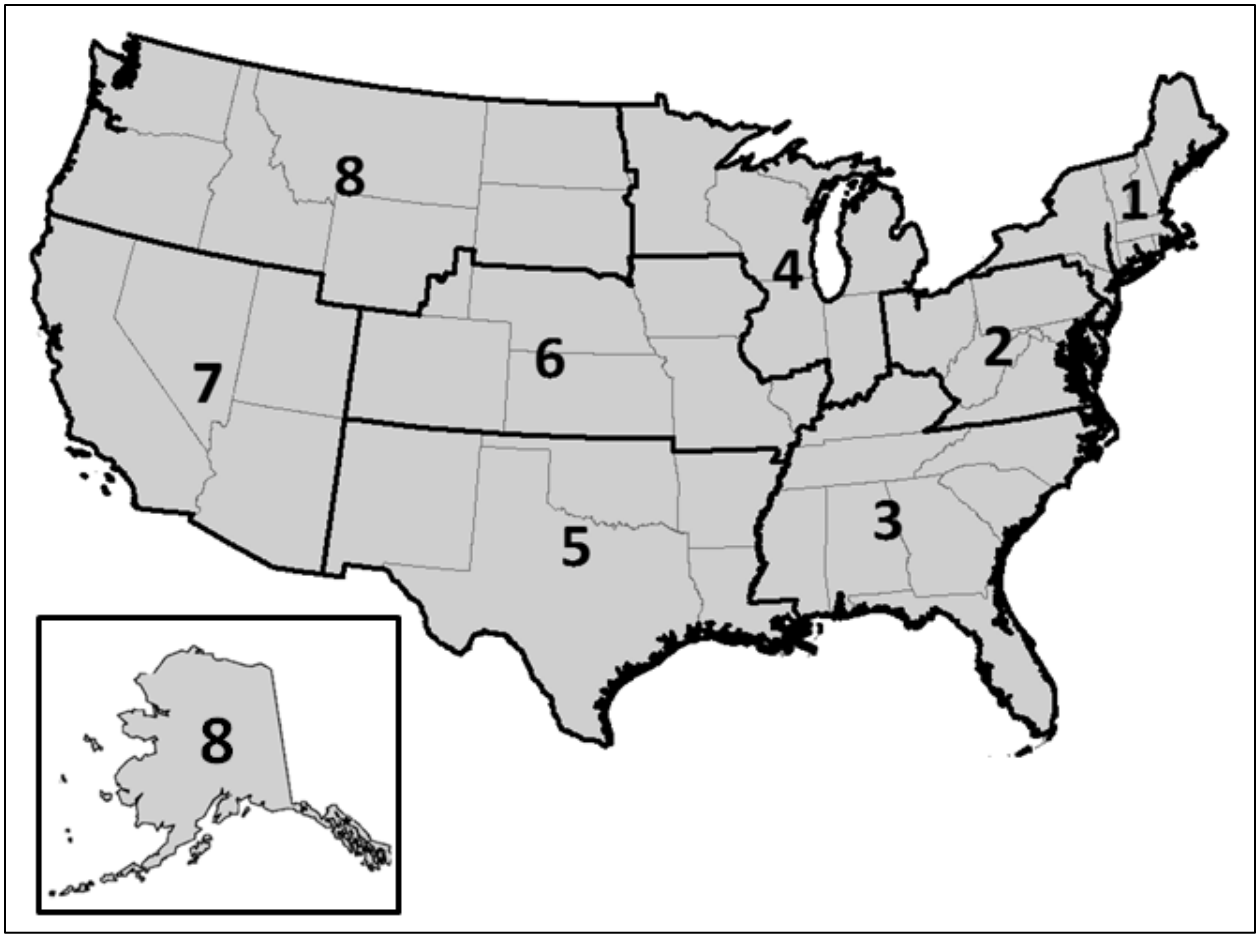

Figure 2. FRA Regional Map

Each region contains multiple states and, in some cases, different parts of a state may belong to different regions. For example, the majority of Illinois is in Region 4 but Metro St. Louis and the area from I-70 southwards to the Illinois-Indiana border is in Region 6. Most of Wyoming is in Region 8, although some counties (Albany, Carbon, Goshen, Laramie and Platte) are in Region 6. Additionally, the District of Columbia is included in Region 2 since it does not officially belong to any state. Including particular areas and counties in different regions can add complexity to data collection and analysis, particularly if the exact location is not given. It also makes state and FRA region comparisons less straightforward.

The number of incidents varied greatly between regions, although it stayed relatively consistent within the regions though the 2012-2014 time period. The highest percent of incidents occurs in Region 7 for 2012 (22 percent of incidents) 2013 (21 percent incidents) and 2014 (22 percent incidents). The number of incidents is lowest in Regions 6 and 8 for 2012 (5 percent and 6 percent of incidents, respectively), 2013 (5 percent of incidents), and 2014 (6 percent and 5 percent of incidents, respectively). Figure 3 breaks down the incidents by FRA region.

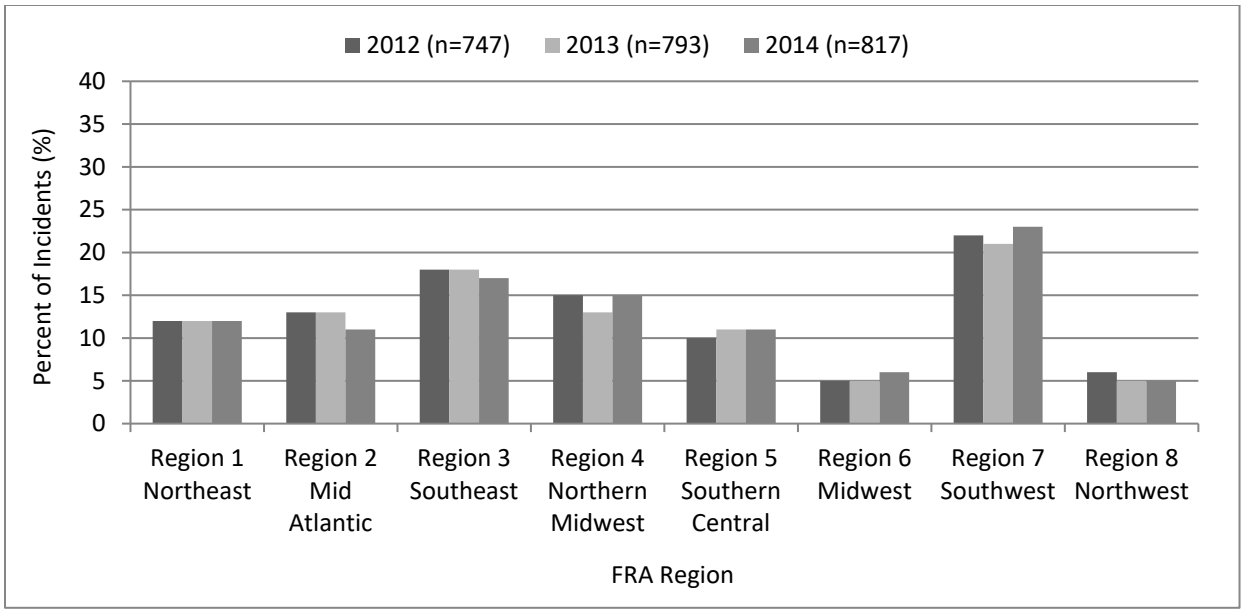

Figure 3. Percent of Suicide Fatality (and Injury) Incidents and Trespass Fatality Incidents by Year and FRA Region (2012 – 2014)

The number of right-of-way incidents varied between states (note that Hawaii does not have rail operations). The variations may be due to a variety of factors, including the number of train operations and population of each state. California consistently had the highest number of incidents per year, followed by Illinois, Texas and New York. Table 4 lists the 10 states with the highest number of incidents during 2012, 2013 and 2014.

Table 4. States with the Highest Number of Suicide Fatality (and Injury) Incidents and Trespass Fatality Incidents (2012 – 2014)

	State	2012		State	2013		State	2014
1	California	143 (19%)	1	California	139 (19%)	1	California	162 (20%)
2	Illinois	60 (8%)	2	Illinois	53 (7%)	2	Illinois	60 (7%)
3	Texas	47 (6%)	3	Texas	47 (6%)	3	Texas	57 (7%)
4	New York	46 (6%)	4	New York	46 (6%)	4	New York	43 (5%)
5	Pennsylvania	44 (6%)	5	Florida	38 (5%)	5	Florida	42 (5%)

	State	2012		State	2013		State	2014
6	Florida	34 (5%)	6	Ohio	32 (4%)	6	Pennsylvania	35 (4%)
7	Ohio	28 (4%)	7	New Jersey	31 (4%)	7	Indiana	23 (3%)
8	Indiana	22 (3%)	8	Pennsylvania	31 (4%)	8	New Jersey	23 (3%)
9	North Carolina	22 (2%)	9	Indiana	27 (4%)	9	Wisconsin	23 (3%)
10	New Jersey	20 (3%)	10	North Carolina	26 (4%)	10	North Carolina	22 (3%)

Alaska was the only state with no incidents between 2012 and 2014. New Hampshire and Rhode Island both only had one incident during the same 3-year period. Table 5 lists the states with the lowest number of incidents in 2012, 2013 and 2014. Note that only states with fewer than five incidents are presented.

Table 5. States with the Lowest Number of Suicide Fatality (and Injury) Incidents and Trespass Fatality Incidents (2012 – 2014)

	State	2012		State	2013		State	2014
1	Alaska	0 (0%)	1	Alaska	0 (0%)	1	Alaska	0 (0%)
2	New Hampshire	0 (0%)	2	New Hampshire	0 (0%)	2	Indiana	0 (0%)
3	Vermont	0 (0%)	3	Rhode Island	0 (0%)	3	Rhode Island	0 (0%)
4	Indiana	1 (<1%)	4	South Dakota	0 (0%)	4	South Dakota	0 (0%)
5	Maine	1 (<1%)	5	Wyoming	1 (<1%)	5	Vermont	1 (<1%)
6	Rhode Island	1 (<1%)	6	Connecticut	2 (<1%)	6	North Dakota	2 (<1%)
7	South Dakota	1 (<1%)	7	Maine	2 (<1%)	7	New Hampshire	2 (<1%)

	State	2012		State	2013		State	2014
8	Delaware	2 (<1%)	8	Montana	3 (<1%)	8	Wyoming	2 (<1%)
9	New Mexico	2 (<1%)	9	North Dakota	3 (<1%)	9	Montana	3 (<1%)
10	Montana	3 (<1%)	10	Vermont	3 (<1%)	10	Delaware	4 (<1%)
11	Nevada	3 (<1%)	11	Delaware	4 (1%)	11	Iowa	4 (<1%)
12	Wyoming	4 (1%)	12	Indiana	4 (1%)	12	Maine	4 (<1%)
13	--		13	Nebraska	4 (1%)	13	--	

3.2 Timing: When Do the Incidents Take Place?

3.2.1 Season and Month

Although seasons affect different parts of the US in different ways (e.g., April in Southern California can vary greatly in temperature and sunlight from Maine), a rough estimate of seasonal effect on incident rates can be generated. Each season's data was created by combining data from specific months: Spring (619 incidents), summer (679), fall (608) and winter (451). Overall, winter had the lowest number of incidents and accounted for no more than 19 percent of the incidents for any year (Figure 4). During 2012, suicide and trespass incidents were almost evenly split among spring, summer and fall (from 26 percent to 28 percent) with fall slightly lower at 27 percent followed by spring at 26 percent. In 2013, summer had the highest percentage of incidents followed by fall, then spring and winter. However, the percentage of incidents between fall and spring were almost the same (at 24 percent and 27 percent respectively). 2014 followed the same trend as 2012-2013 with summer (29 percent), fall (26 percent) and spring (26 percent) followed by winter (19 percent).

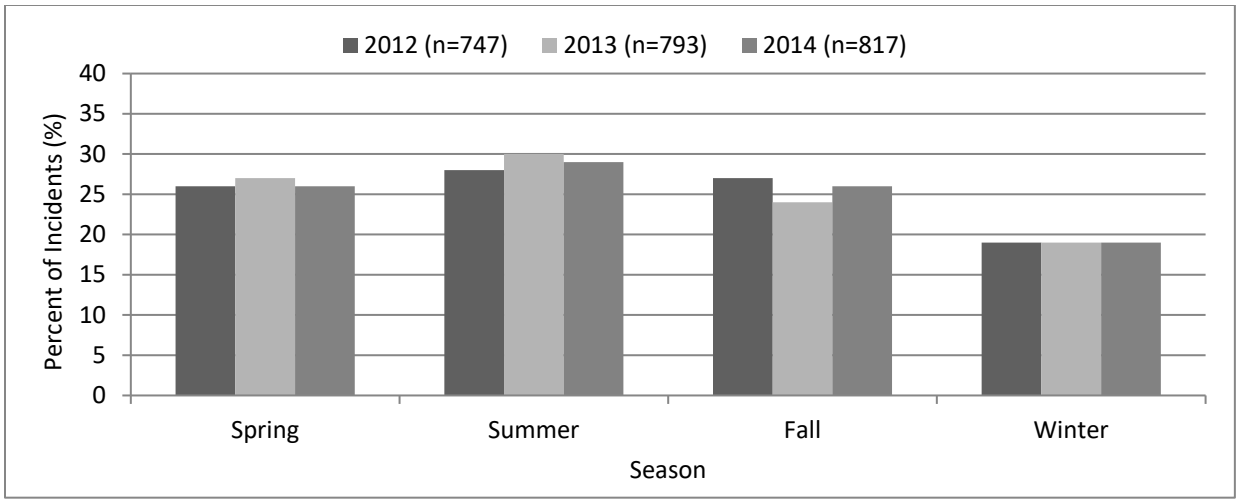

Figure 4. Percent of Suicide Fatality (and Injury) Incidents and Trespass Fatality Incidents by Year and Season (2012 – 2014)

To take a closer look at seasons, Figure 5 depicts the percentage of incidents that occurred per month by calendar year. The months with the highest percentage of incidents, with at least 10 percent of all incidents during a single year, were March, May, June, July, August, and October. All of the months belonged to either spring, summer or fall. Most of the months followed the same trend in 2012 and 2014, with the exception of February which saw a drop from 7 percent in 2012-2013 to 4 percent in 2014).

In 2013, the percentage of incidents varied the most during the months of August and October. August accounted for 8 percent of incidents in 2012, but rose to 11 percent in 2013. In October, incidents decreased from 10 percent to 8 percent and back to 10 percent in 2014. Also the increase in incidents that occurs between February and March during this time period is noteworthy, as well as the drop from November to December.

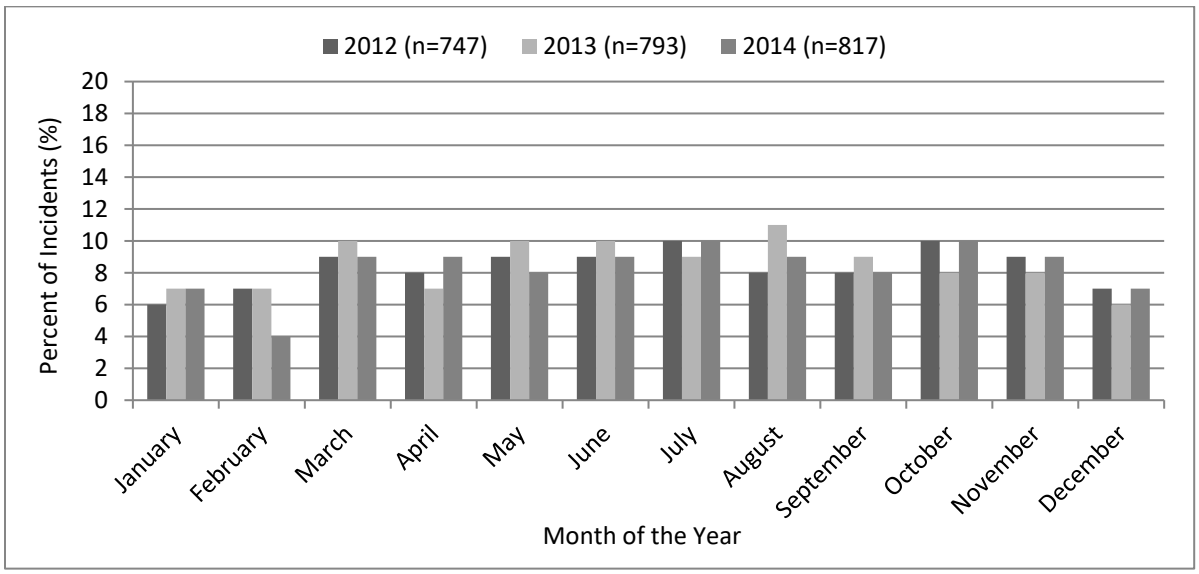

Figure 5. Percent of Suicide Fatality (and Injury) Incidents and Trespass Fatality Incidents by Year and Month of the Year (2012 – 2014)

3.2.2 Day of the Week

The day of the week may also be a predictive factor for incidents occurring. Figure 6 presents incidents by calendar year and day of the week. In 2012, the largest percentage of incidents occurred on Saturdays at 16 percent, followed by both Friday and Wednesday at 15 percent. The year 2013 had the highest percentage of incidents on Saturdays (17 percent), followed by Monday (15 percent) and Tuesday (15 percent). In 2014, the trend switched with Mondays having the highest percentage of incidents (16 percent) followed by Sunday, Friday and Saturday, all with 15 percent. Overall, Saturday was the only day that fell within the top three days of the week for each year of data.

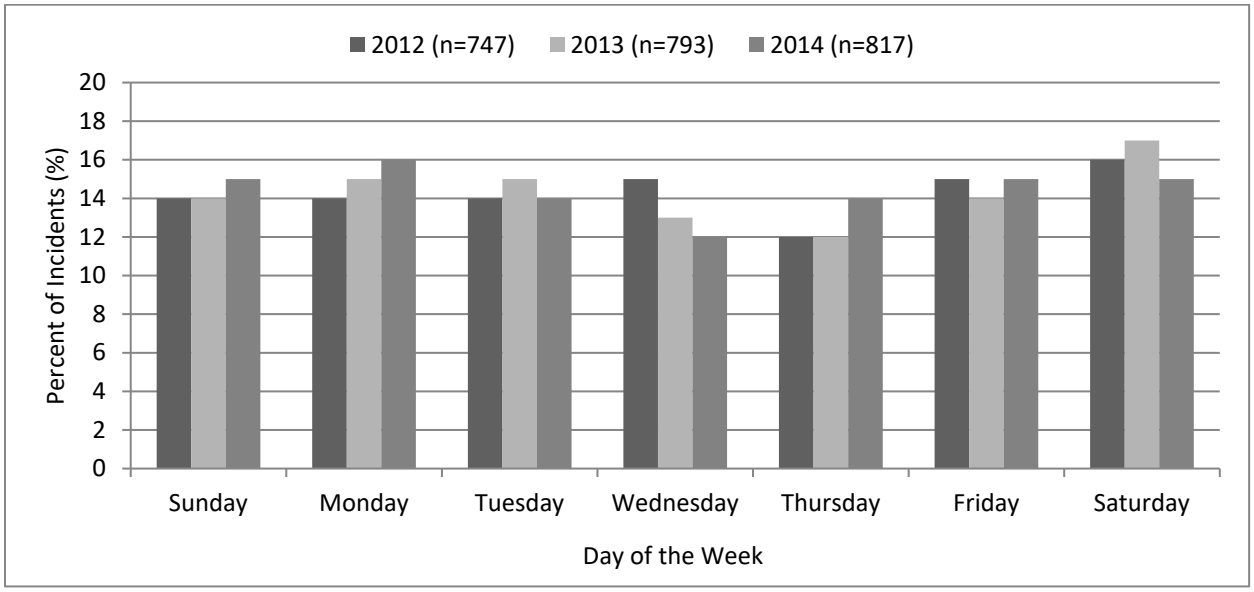

Figure 6. Percent of Suicide Fatality (and Injury) Incidents and Trespass Fatality Incidents by Year and Day of the Week (2012 – 2014)

3.2.3 Time of Day

The amount of daylight may influence when incidents occur. However, FRA data includes only time of day so that we do not know specifically how much daylight was available at that time due to location differences within a time zone and time of year that the incident occurred. Although the amount of daylight could be computed with much effort, it is beyond the scope of this paper. Instead, the authors conducted a high level overview of the time of day that incidents occurred within four hour increments. Table 6 lists the time categories.

Table 6. Criteria of Time Categories

Time Block Category	Description
12:00am to 4:00am	Pre-dawn to dawn
4:00am to 8:00am	Dawn to early morning
8:00am to 12:00pm	Late morning to mid-day
12:00pm to 4:00pm	Mid-day through afternoon (before rush hour)

Time Block Category	Description
4:00pm to 8:00pm	Rush hour and late evening
8:00pm to 12:00 am	Later evening to early night time

Figure 7 depicts when incidents occurred from 2012 through 2014. Each year, two time periods had the highest percentage of incidents: 4pm to 8pm and 8pm to 12am. Both time periods accounted for at least 20 percent of incidents individually. In 2012 and 2014, 4pm to 8pm had the highest percentage of incidents with a switch in 2013 with 8pm to 12am as the time period with the highest percentage of incidents. Additionally, 4am to 8am, and 8am to 12pm had the lowest percentage of incidents (less than 15 percent each year) with the exception of 2014, which also saw a drop in incidents from 12am to 4am.

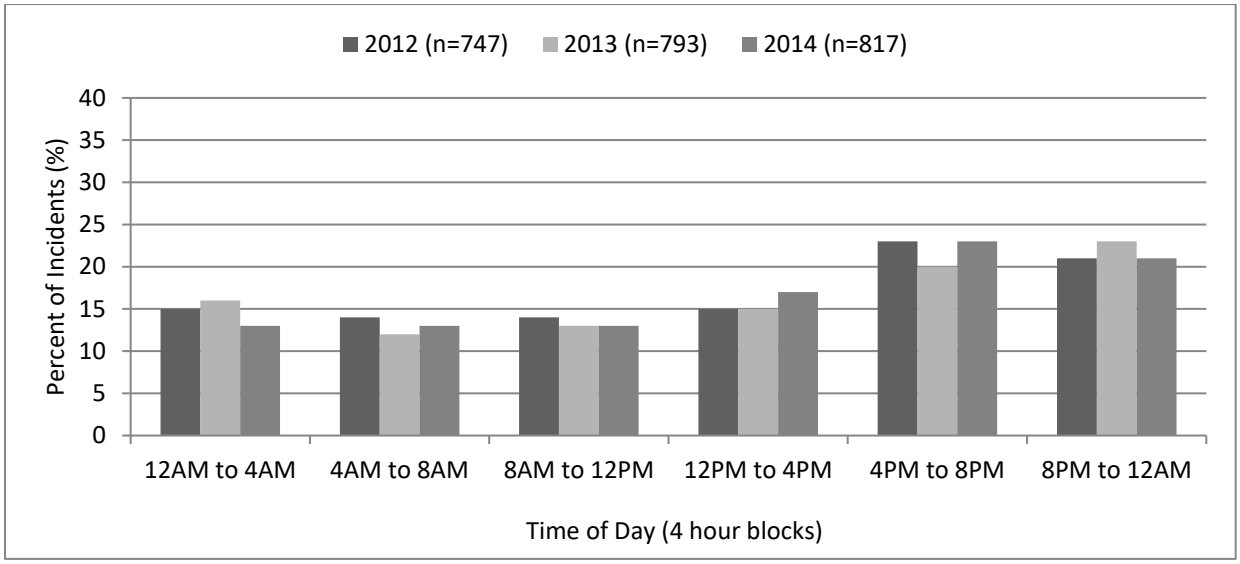

Figure 7. Percent of Suicide Fatality (and Injury) Incidents and Trespass Fatality Incidents by Year and Time of Day (2012 – 2014)

3.2.4 Type of Equipment

The type of rail equipment (i.e., trains) involved in the incidents was consistent from 2012-2014 with 60 to 70 percent of all incidents involving a freight train and 30 to 40 percent involving a passenger train. There is currently no single source which provides comparable data on the number of operations run by freight versus passenger trains in the United States. However, the Bureau of Transportation Statistics (BTS) provides train mile numbers for Amtrak[6] and Class 1 freight rail carriers, which provides an estimate of the difference between overall freight and passenger operations. Though these statistics do not include commuter rail systems, there was a large difference between freight train miles, (504 million miles travelled) and Amtrak miles (38 million miles travelled). See Figure 8 for a visual representation.

[6] Amtrak is a passenger carrier that operates in 46 states and the District of Columbia, and serves as a contractor in various capacities for several commuter rail agencies.

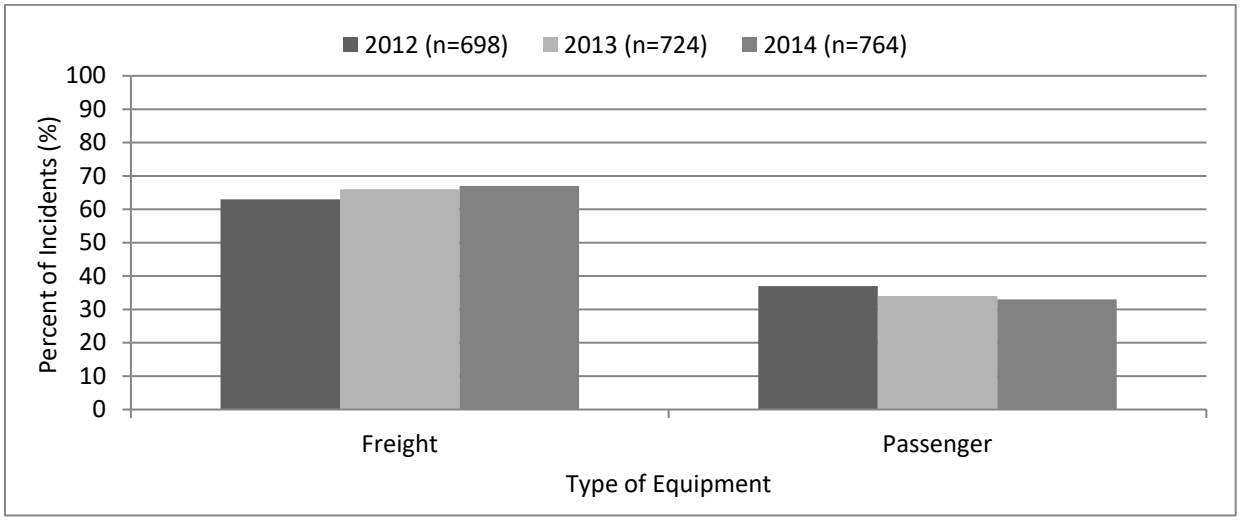

Figure 8. Percent of Suicide Fatality (and Injury) Incidents and Trespass Fatality Incidents by Year and Type of Equipment (2012 – 2014)

3.3 Characteristics of the Individual

3.3.1 Age of Individual

Age differences of the individuals who died by trespassing on the right-of-way were also explored. The age of the individual was examined in 10-year groupings (with the exception of the youngest and oldest groupings) by each year the incidents took place. Table 7 lists the age groups used:

Table 7. Age Groups

Age Groups
0-14 (15 year)
15 to 24 (10 year)
25 to 34 (10 year)
35 to 44 (10 year)
45 to 54 (10 year)
55 to 64 (10 year)
65 to 74 (10 year)
75 to 84 (10 year)
85+ (15+ year)

From these age groupings (as shown in Figure 9), only the age group of 15 to 24 years consistently accounted for at least 20 percent of all incidents that occurred for each year. Age

groups 25 to 34 years and 45 to 54 years were also found to account for a higher percentage of incidents although only reaching 20 percent in the 25 to 34 years age group in 2013. The lowest percentage of incidents occurred in individuals from 65 to 74 years age group and beyond, never reaching five percent of incidents for any year. Surprisingly, the 0-14 years age group accounted for over 10 percent of all incidents in 2012 and 2014.

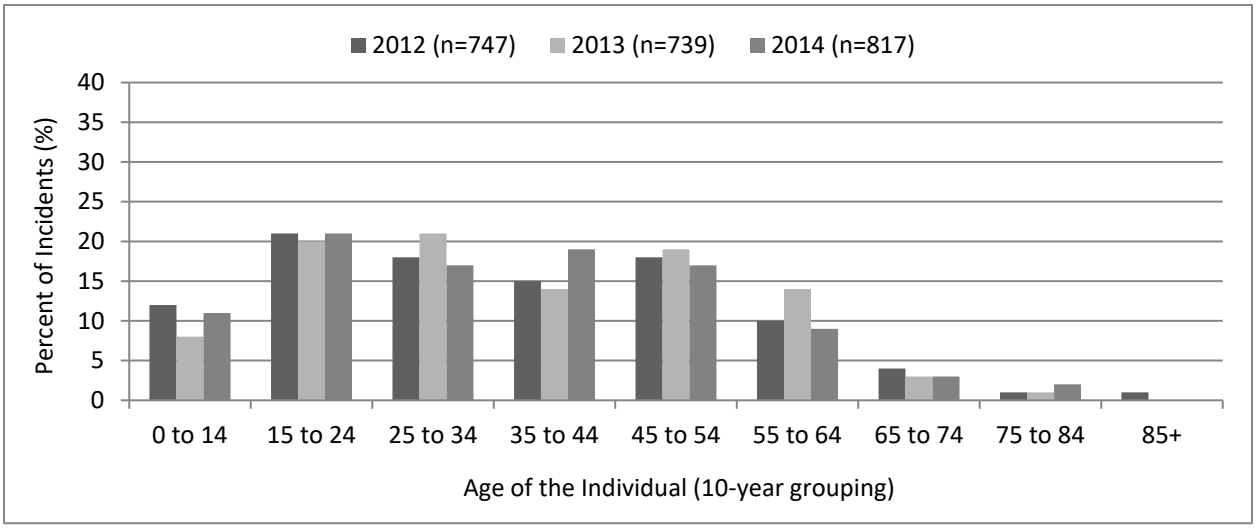

Figure 9. Percent of Suicide Fatality (and Injury) Incidents and Trespass Fatality Incidents by Year and Age of the Individual (2012 – 2014)

3.3.2 Physical Act

The action that the individual was taking when the incident occurred was captured by FRA reports. For a full list of the possible actions that can be captured, please refer to Appendix C of this document.[7] In some cases, we combined categories in order to simplify the data (see new action category), as seen in Table 8.

Table 8. Physical Act Categories

New Action Category	FRA Action Categories
Crossing	Crossing over, Crossing or crawling under, Crossing between
Jumping	Jumping from, Jumping onto
Lying Down[8]	Lying down, Laying
Riding	(no change)
Running	(no change)

[7] This information can also be found in Appendix F of the *FRA Guide for Preparing Accident/Incident Reports*, available at: http://safetydata.fra.dot.gov/OfficeofSafety/Default.aspx.

[8] Although *laying* officially refers to a person laying an object down on or near the tracks, we found from reading the report narratives (where available) that these categories are being used interchangeably. Thus, these categories are combined for the purposes of this report.

New Action Category	FRA Action Categories
Sitting	Bending/Stooping, Siting
Sleeping	(no change)
Standing	(no change)
Walking	Walking, Stepping down, Stepping over, Stepped on
Other	Adjusting coupler, Arresting/Apprehending, Climbing on/over, Cutting, Getting off, Handling, Moving, Reaching, Other

Figure 10 shows the percent of incidents for each physical act category by calendar year. The action with the highest average percentage of incidents across all three years is *walking*, ranging from 33 percent37 percent of incidents each year. The second and third most common actions across all three years are *lying down* (ranging from 25 percent28 percent) and *standing* (ranging from 13 percent15 percent). These three physical acts account for three-fourths (1,772) of the incidents overall.

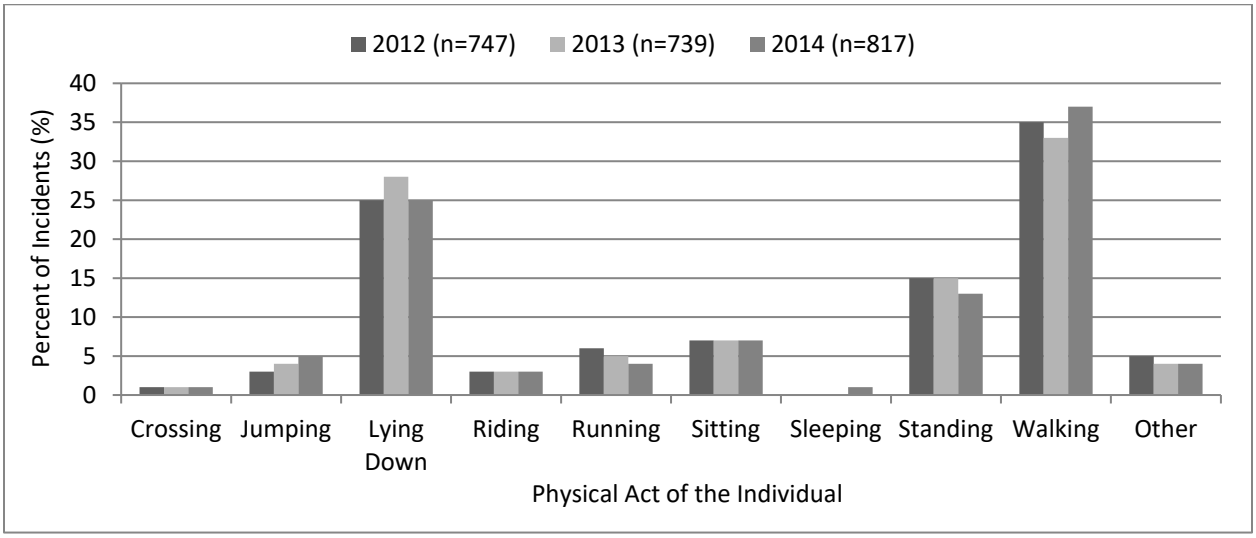

Figure 10. Percent of Suicide Fatality (and Injury) Incidents and Trespass Fatality Incidents by Year and Physical Act of the Individual (2012 – 2014)

If one of the categories was not deemed as an accurate representation of the action believed to be taken by the individual, then the *Other* category could be used. We took a closer look at what the *Other* category was comprised of by referring to the report narratives. Appendix D lists the actions included in the *Other* category as determined by the narratives.

4. Suicide Incidents

4.1 Suicide Fatality Incidents

The FRA categorizes fatal railroad trespassing incidents by intent: suicide (intentional) and unintentional. Although many suicide and trespass (unintentional) incidents have similar outcomes, suicide incidents should be considered a separate group when designing countermeasures to avoid undesirable effects after implementation. For example, countermeasures targeting trespassing may ultimately have a different or unexpected effect on suicide incident occurrence (Gabree, Chase, Doucette & Martino, 2014).

The determination of whether a fatality can be attributed to a suicide attempt is made by a coroner, medical examiner, or other public official.[9] Not every incident that is classified as a suicide in the FRA database involves trespassing. However, these non-trespass suicide fatalities[10] are excluded from this data, as trespassing incidents are the focus of the current effort.

This section looks exclusively at the 761 pedestrian suicide fatalities in the data to better understand a variety of factors involved in each incident and to understand potential trends in the data, which point to factors that may predict a higher potential for its occurrence. The characteristics of the incident (e.g., location and timing) are examined first (Sections 4.1.1 and 4.1.2), followed by the characteristics of the individual (e.g., age and actions of the decedent) (Section 4.1.4). Note that only pedestrian incidents were included. Incidents involving vehicles (e.g., automobiles, off-road vehicles, motorcycles and bicycles) were not included in the dataset (refer to Section 2.1 for an explanation of report inclusion criteria).

4.1.1 Location of the Incident

Characteristics associated with the incident's location were examined through the information provided in the FRA incident reports, including FRA region, state, location on track (i.e., right-of-way or grade crossing), and the type of equipment involved (i.e., freight or passenger). These characteristics are discussed in this section.

4.1.1.1 FRA Region

As previously stated, the FRA divides the US into eight separate regions (refer back to Figure 2). Although regions are not equal in size, population, or even type of train operations, looking at regions may provide insight into locations where different types of incidents are occurring in the US. In Figure 11, the percent of suicide fatality incidents from 2012 - 2014 is shown by the region that it occurred in.

[9] Note that trespass suicide incidents may be underreported due to differences in the criteria used for determining the cause of death. Refer to section XX for additional information.

[10] There are some suicide incidents that take place while an individual is legally on railroad property, for example, a passenger. Other incidents may initially occur on railroad property and end on property that is not railroad-owned. Twenty-six of these non-trespass suicide fatality reports were identified from 2012-2014 in the FRA data.

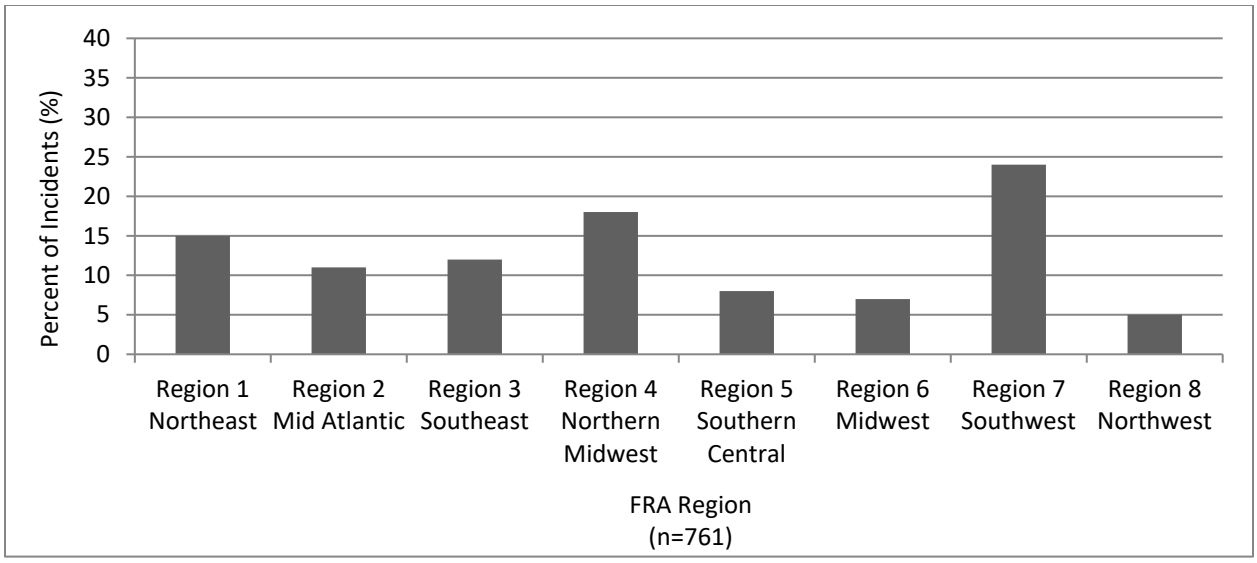

Figure 11. Percent of Suicide Fatality Incidents by FRA Region (2012 – 2014)

The regions with the largest amounts of fatal suicide incidents on railways are (in decreasing order):

1. Region 7 (Southwest), which includes California, Nevada, Utah, and Arizona (24 percent or 183 incidents).
2. Region 4 (Northern Midwest), including Minnesota, Wisconsin, Michigan, Illinois and Indiana (18 percent or 139 incidents)
3. Region 1 (Northeast) including Maine, New York, Vermont, New Hampshire, Massachusetts, Connecticut and Rhode Island (15 percent or 115 incidents)
4. Region 5 (Southern Central) with 8 percent of incidents
5. Region 6 (Midwest) with 7 percent of incidents
6. Region 8 (Northwest) with 5 percent of incidents

These findings may be driven, at least in part, by densely populated large metropolitan areas in Region 7, Region 4, and Region 1.

4.1.1.2 State

A more granular look at suicide fatality data can be found by viewing it at the state level, and will provide a better understanding of what parts of the region may see more incidents.

First, all three years of data were examined and the states were ranked by number of suicide fatality incidents. As seen in Table 9, the three states with the largest number of incidents were California, Illinois and New York, which all have metropolitan areas. Also, we added an additional column to Table 4 with the average state population over the same time period. Next, we computed the number of rail suicide fatalities per one million state residents, which allowed us to examine populations as potential predictors for number of suicide incidents. The top three states in terms of number of incidents are not the top three states in terms of rail suicide per one million residents. California, which ranked first in population, was only ranked fifth for suicide fatalities per one million residents, while Illinois ranked second in number of suicides and ranked

third for rates of suicide per one million. Surprisingly, New York ranked third for number of suicide incidents but was only ranked thirteenth for rail suicides per million residents, thus showing that population alone does not predict which states will have the most suicide fatality incidents. Additionally, Illinois had the second highest average suicide fatality incidents on railways and was ranked third highest in the country in terms of per capita rates. However, the limited sample size (only three years of data) should be considered when interpreting these results. For example, Delaware and North Dakota, have populations less than one million and they saw three incidents or less during each year of data. These states are ranked first and second in rail suicide fatalities per one million residents. See Appendix E for a complete listing of states.

Table 9. Rate of Suicide Fatality Incidents per Million Residents for States with the 10 Highest Suicide Fatality Rates (2012 – 2014)

State	Average Suicide Fatalities 2012-2014 (Rank)	Average State Population 2012-2014 (Rank)[11]	Rail Suicide Fatalities per 1M State Residents (Rank)
California	50.7 (1)	38,432,224 (1)	1.32 (5)
Illinois	26.7 (2)	12,881,632 (5)	2.07 (3)
New York	20.3 (3)	19,683,016 (3)	1.03 (13)
Florida	13.0 (4)	19,616,288 (4)	0.66 (24)
Texas	12.0 (5)	26,519,006 (2)	0.45 (33)
New Jersey	10.3 (6)	8,908,559 (11)	1.16 (10)
Ohio	9.6 (7)	11,572,356 (7)	0.83 (17)
Pennsylvania	9.3 (8)	12,779,516 (6)	0.73 (21)
Indiana	7.0 (9)	6,568,400 (16)	1.07 (12)
Wisconsin	6.7 (10)	5,741,802 (20)	1.17 (9)

Many other factors may play a role in predicting why one state may have a higher rate of suicide on the railway than another state. These factors include the number of railroad operations, including freight mileage or passenger ridership, and the overall suicide rate per state, as well as factors that affect access to other means of fatally harming oneself (e.g., gun control laws). Due to the small sample sizes available there is an absence of railroad operations information, mileage and ridership. However, it is anticipated that as more data becomes available and is accumulated in the coming years, such analyses may be possible in future updates to this report.

4.1.1.3 Location on Track

Investigating the locations of incidents within larger geographical areas can provide insight into how suicide rates are affected by regional and state differences, but more details about where

[11] Retrieved from https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml on 11/10/15.

these incidents occur may identify potential areas of interest for those who are implementing countermeasure strategies.

For example, it is important to know whether an incident took place at a grade crossing or on the right-of-way. Grade crossings may represent locations where pedestrians can safely and legally cross the tracks while a train is not approaching, whereas, the right-of-way is illegal to access at any time. Figure 12. Percent of Suicide Fatality Incidents by Location on Track (2012 – 2014) shows the average number of pedestrian suicide fatalities that occurred at a grade crossing (12 percent or 92 incidents) or on the right of way (88 percent or 669 incidents).

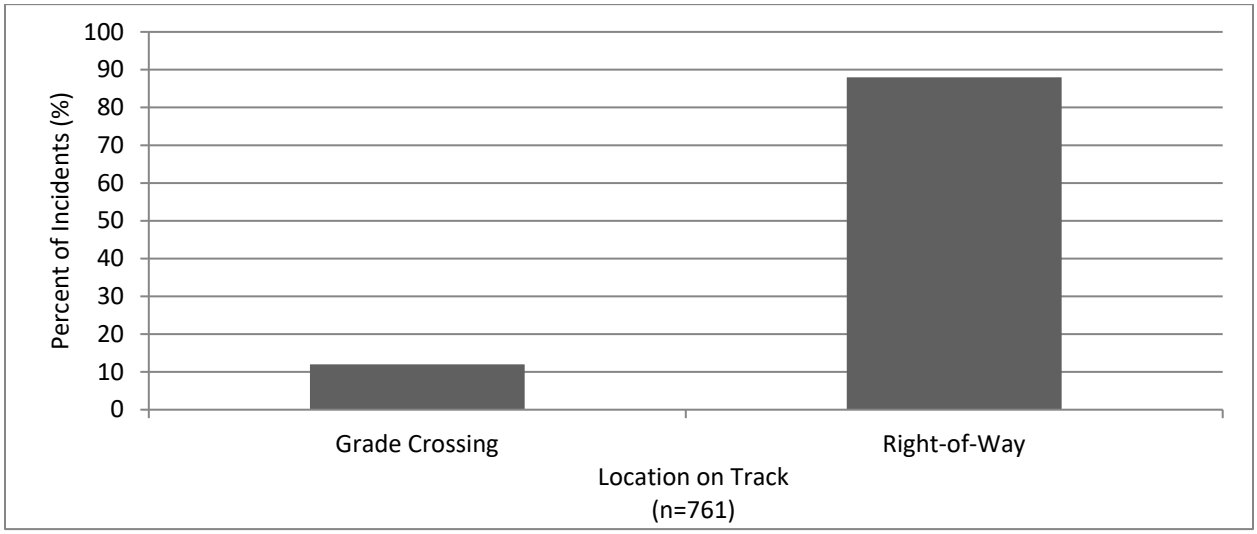

Figure 12. Percent of Suicide Fatality Incidents by Location on Track (2012 – 2014)

Almost 90 percent of suicide incidents occurred on the railroad right-of-way as opposed to a designated grade crossing, which may mean that future countermeasures that focus on rights-of-way may have the largest impact.

4.1.1.4 Type of Equipment

Knowing whether a freight train or a passenger train was involved may also add insight into these incidents (Figure 13). Sixty-two percent of all fatal suicide incidents involved freight trains, and only 38 percent occurred with a passenger train (438 and 267 incidents, respectively). Note that 56 incidents did not indicate whether the train was passenger or freight. This finding is consistent with the fact that the larger proportion of operations is estimated to be freight rather than passenger.

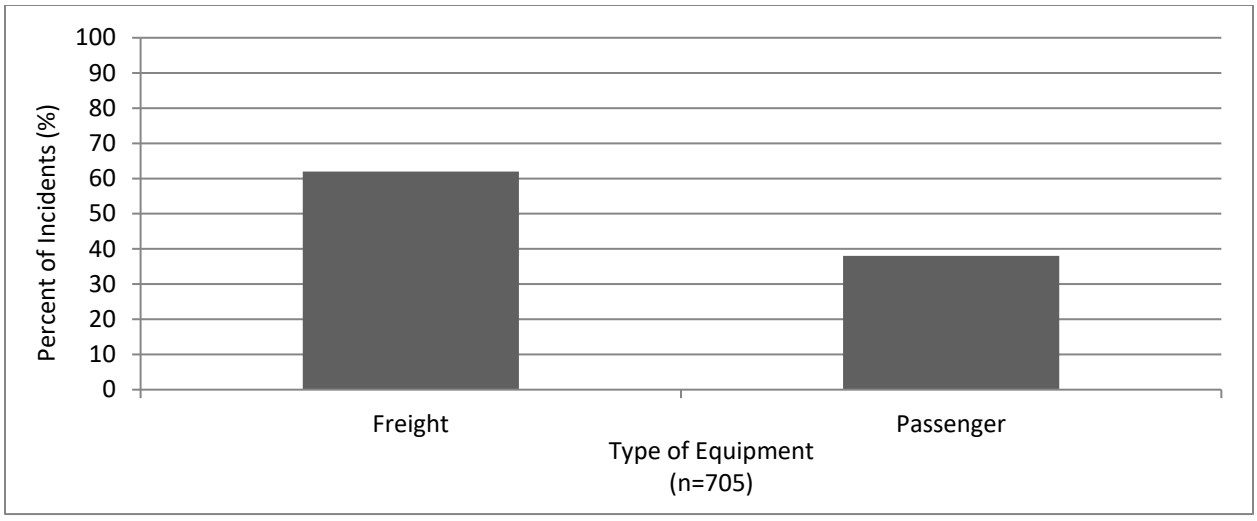

Figure 13. Percent of Suicide Fatality Incidents by Type of Equipment (2012 – 2014)

4.1.2 Timing of the Incident

In addition to the incident's location, the timing of the incidents may give more insight into why an incident may have occurred. In this section, suicide fatalities are examined by the season, month, day of the week, and time of day the incident occurred.

4.1.2.1 Season

As seasons begin and end throughout the country, a variety of changes occur, including temperature, weather, certain holidays or other cultural events. Therefore, differences in suicide rates were expected by season. Specifically, a seasonal peak in suicide occurrence during the spring or summer has been well documented (Ajdacic-Gross, Wang, Bopp, Eich, Rössler, & Gutzwiller, 2003; Kposowa & D'Auria, 2010; Maes, Cosyns, Meltzer, De Meyer, & Peeters 1993). However, it should be noted that some recent research has indicated that this trend may be diminishing (Bridges, Yip & Yang, 2005; Woo, Okusaga & Postolache, 2012).

Figure 14 shows the percentage of suicide fatalities by season from 2012 to 2014. In this report, each season is comprised of three months:

- Winter includes December, January, February;
- Spring includes March, April, May;
- Summer includes June, July, August;
- Fall includes September, October, November.

Spring and summer had the most suicide fatality incidents, with 288 (30 percent) in the spring and 220 (29 percent) in the summer. Winter had the least number of incidents at 132 (17 percent).

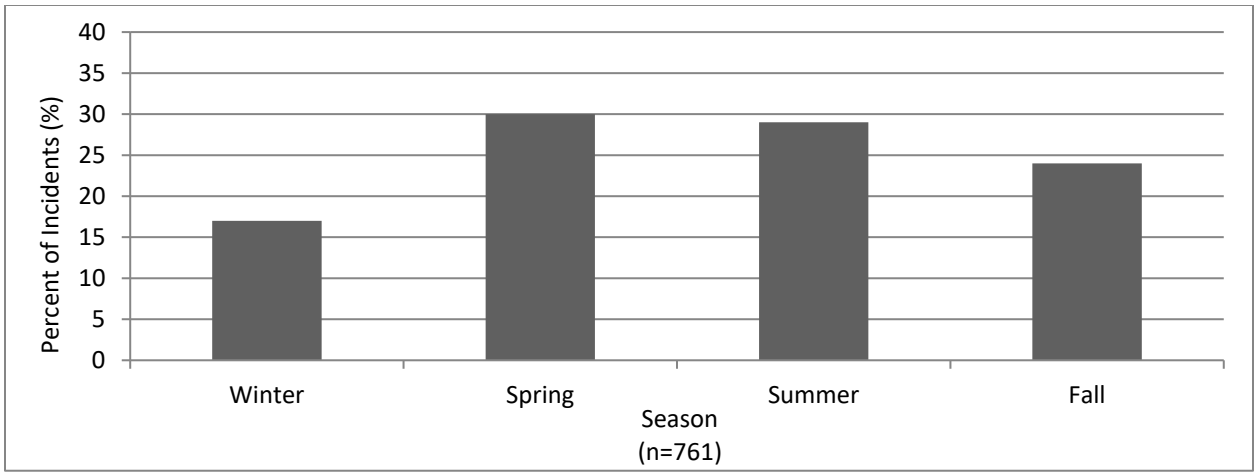

Figure 14. Percent of Suicide Fatality Incidents by Season (2012 – 2014)

4.1.2.2 Month

To take a slightly more granular look at suicide fatality data across the full calendar year, the different months were examined during the year (Figure 15). Overall, the data was relatively equal over months with slightly higher rates in the spring and summer months with March, May, June and July, which account for at least 10 percent of all suicide fatality incidents (ranging from 74-77 incidents). December and February had the lowest percentage of incidents with 6 percent and 5 percent, respectively (44 and 38 incidents).

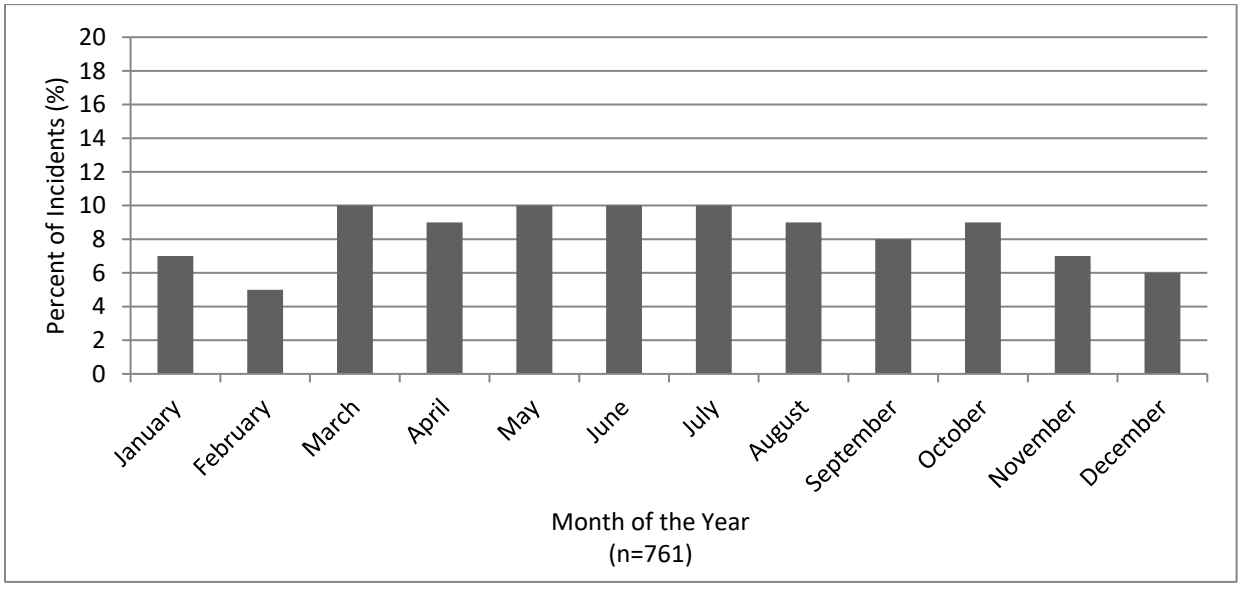

Figure 15. Percent of Suicide Fatality Incidents by Month of the Year (2012 – 2014)

4.1.2.3 Day of the Week

Not only can suicide fatality incidents be examined by the month of the year, we also investigated incident trends by the day of the week, which was independent of the time of year and thus may not reflect changes in weather or temperature. Instead, variations in the day of the week may be more indicative of commonplace day-to-day schedules, such as work and commuting schedules. The percent of suicide fatalities for each day of the week is shown below in Figure 16.

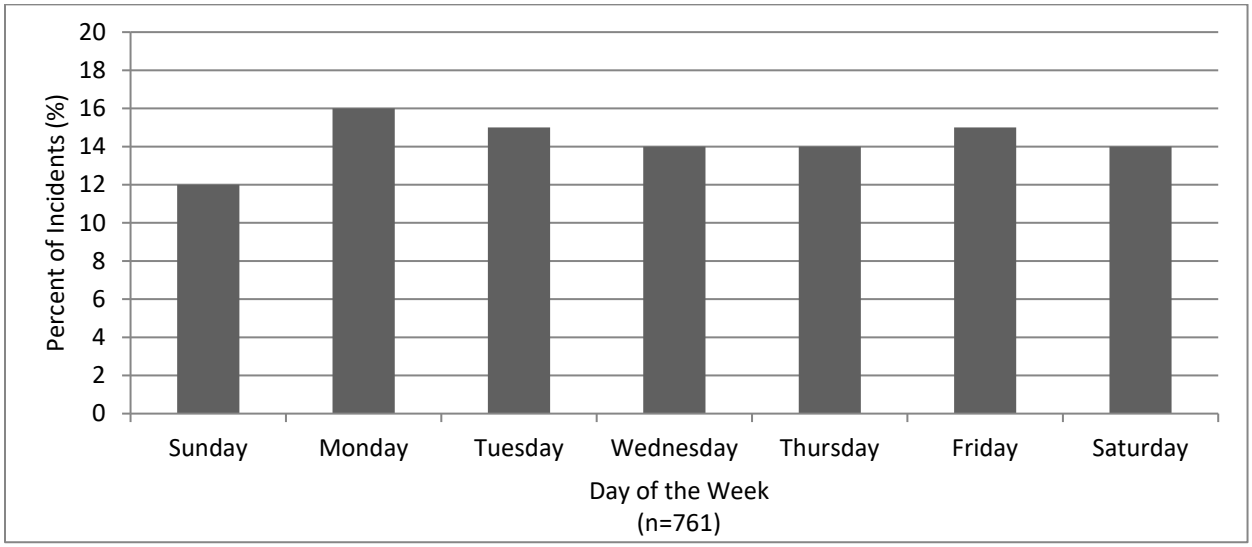

Figure 16. Percent of Suicide Fatality Incidents by Day of the Week (2012 – 2014)

There were no noticeable trends in the day of the week data. Overall, the day of the week with the highest average number of suicide fatality incidents was Monday at 16 percent (119 incidents), while Sunday had the lowest average number of suicide fatalities, though only slightly lower than Sunday at 12 percent (91 incidents). The percentage of incidents that occurred during a weekday, (ranging from 14 percent to 16 percent) was generally higher than on a weekend day (ranging from 12 percent to 14 percent of total incidents).

4.1.2.4 Time of Day

On even a smaller scale, the time of day (independent of day of the week or season) was also examined. The total number of suicide fatalities by time of day from 2012-2014 is presented in Figure 17. Each point represents the average number of suicide fatality incidents that took place per year during the hour specified on the horizontal axis. For example, the first point represents the average number of incidents occurring between 12:00 am and 1:00 am.

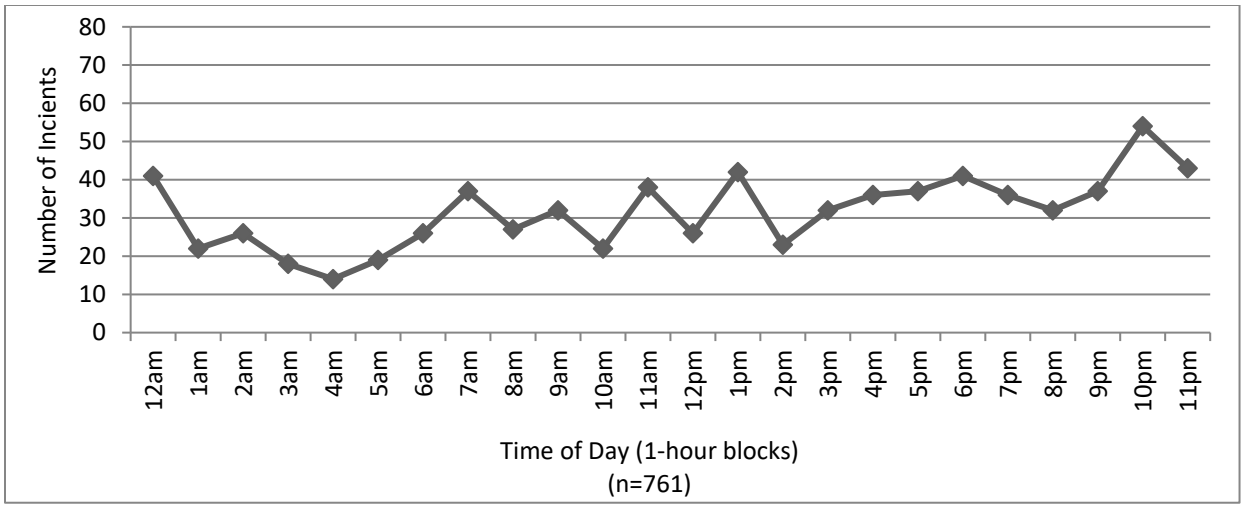

Figure 17. Number of Suicide Fatality Incidents by Time of Day (2012 – 2014)

Notably, the time of day that had the highest number of suicide fatality incidents was between 10:00 pm and 11:00 pm (54 incidents). Five additional one-hour blocks were slightly higher, around 40 incidents, at 12:00 am, 7:00 am, 11:00 am, 1:00 pm and 6:00 pm. It is interesting that no two-hour time blocks were consistently high. The lowest number of incidents is between 4:00 am and 5:00 am (14 incidents).

When the data was binned into more broad categories using percentages, the trend towards an increase during evening hours became more apparent (Figure 18). When shown in four-hour segments, the number of suicide fatalities appeared to rise during the 4:00 pm through 12:00 am time period. Pre-dawn hours and early morning though 8:00 am were seen to have the lowest percentage of incidents at 13 percent.

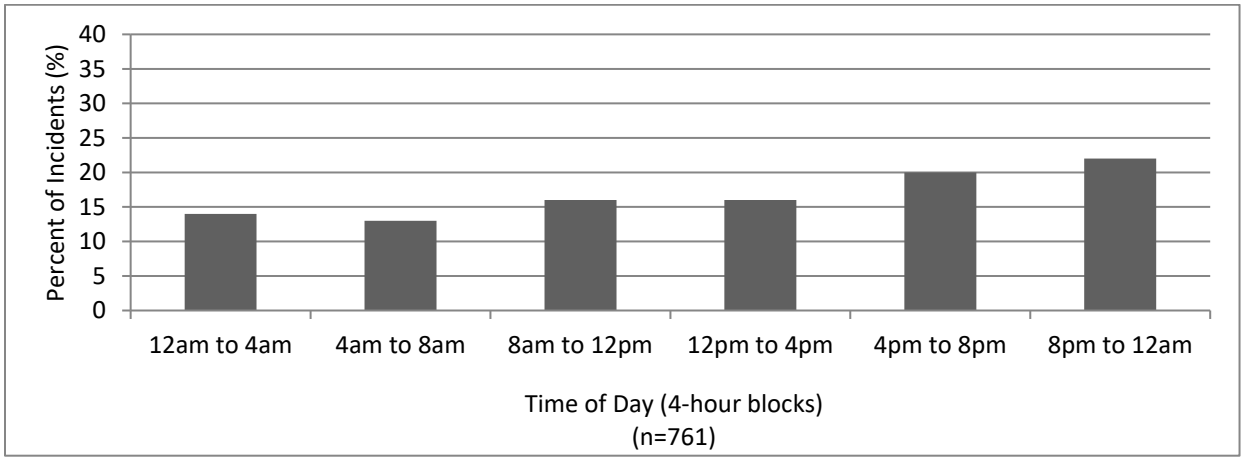

Figure 18. Average Suicide Fatalities by Time of Day within Four Hour Blocks (2012 – 2014)

4.1.3 Interactions among Location and Timing Characteristics

If the interaction between location and timing variables is studied, it may lead to a better understanding of why certain trends appear. In this section, we explore interactions that may tell a more complete story of when, where, and why these suicide fatalities occurred.

4.1.3.1 Location on Track and Region

Grade crossings may be more prevalent in certain parts of the country than in others. Figure 19 compares the percent of grade crossing incidents by FRA Region with the percent of incidents occurring on the right-of-way.

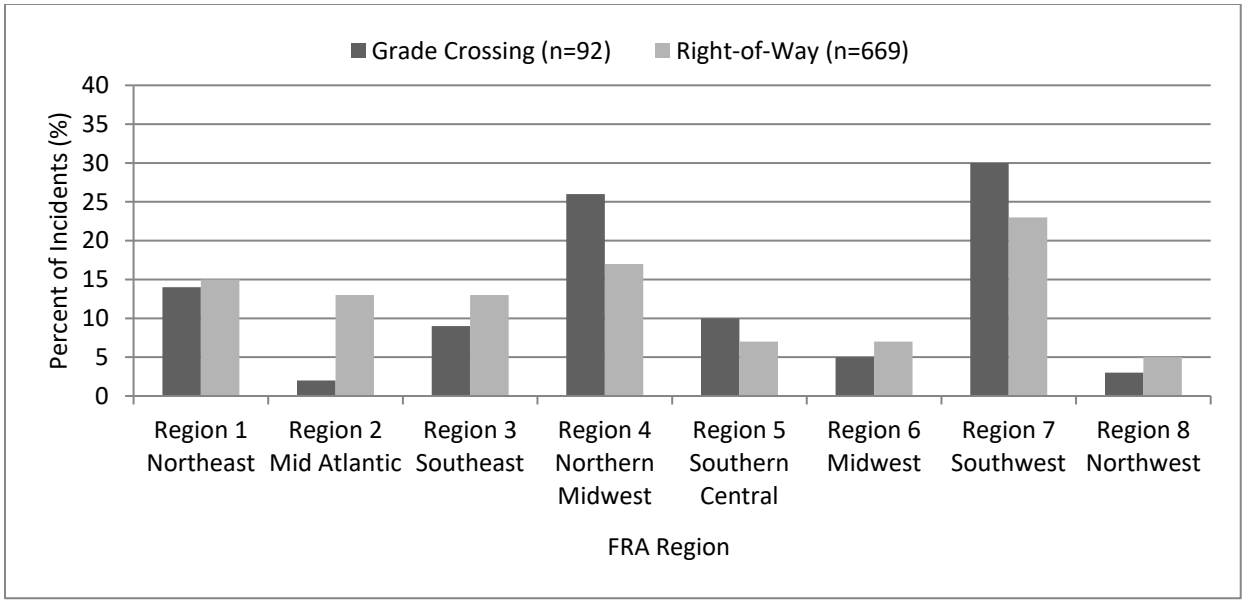

Figure 19. Percent of Suicide Fatality Incidents by Location on Track and FRA Region (2012 – 2014)

Incidents have similar trends in terms of the highest percentage of incidents, regardless of whether the incident occurred at a grade crossing or on the right-of-way. The highest percentage of grade crossing incidents and incidents on the right-of-way occurred in Region 7 (30 percent and 23 percent, respectively), followed by Region 4 (26 percent and 17 percent, respectively), and Region 1 (14 percent and 15 percent, respectively). Interestingly, Regions 4, 5 and 7 accounted for a higher percentage of grade crossing incidents than those on the right-of-way, while the remaining regions had a higher percentage of right-of-way incidents.

Also, while Region 2 has the lowest percentage of suicide fatalities at grade crossings (2 percent), it also has the third highest percentage of incidents on the right-of-way (13 percent).

4.1.3.2 Location on Track and Type of Equipment

The type of train involved (freight or passenger) was also considered with the frequency of fatalities that occurred at a grade crossing or on the right-of-way. As depicted in Figure 20, grade crossing incidents tend to involve a higher percentage of passenger trains, while incidents on the right-of-way tend to involve a higher percentage of freight trains.

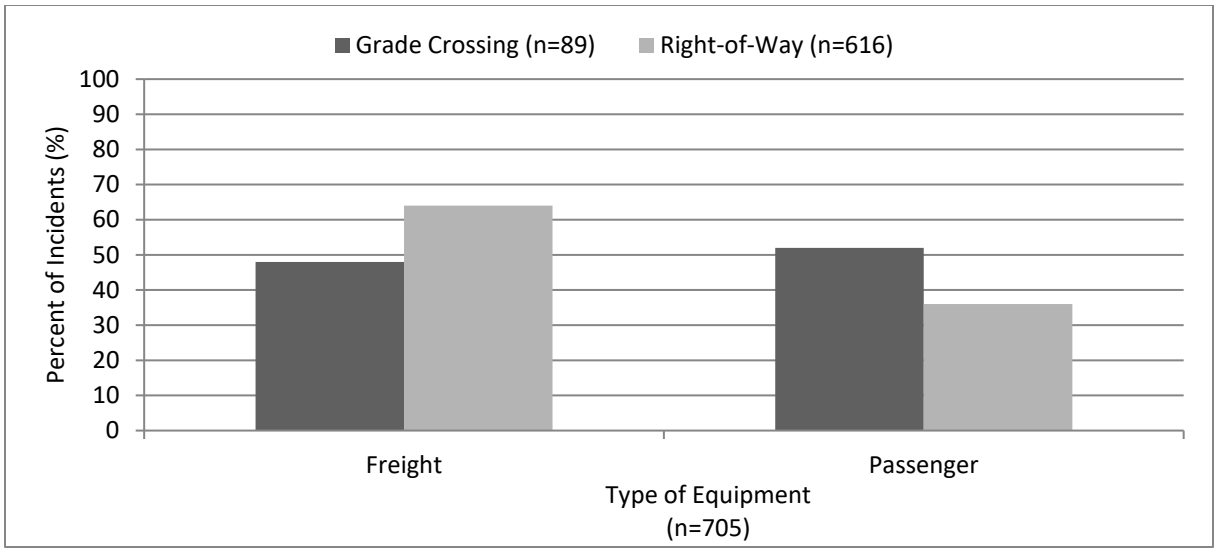

Figure 20. Percent of Suicide Fatality Incidents by Location on Track and Type of Equipment (2012 – 2014)

There was a greater difference in the type of equipment involved in incidents on the right-of-way than at a grade crossing. Forty-eight percent of incidents at a grade crossing involved a freight train (43 incidents), while 52 percent involved passenger trains (46 incidents). For incidents occurring on the right-of-way, 64 percent involved freight trains (395 incidents), while 36 percent involved passenger trains (221 incidents).

Knowing the locations of suicide fatality incidents only provides limited insight into where incidents occur and why. Examining how location and timing factors interact may provide additional insight into why certain trends appear.

4.1.3.3 Season and Region

Different locations are likely to be impacted differently by the seasons. For example, in the southern parts of the United States, the summer months are typically hotter and the winter months typically milder than the northern parts of the United States. Since FRA regions are mostly created by geographic regions, differences in regions should be seen by season, especially in the summer and winter months.

Differences among seasons were explored further in order to identify whether incidents occurred more or less often in particular locations during different times of the year. In winter, spring and summer, the highest percentage, of incidents occurred in Region 7 at 30 percent, 21 percent and 26 percent, respectively. This is somewhat expected, as Region 7 has the highest total number of suicide fatalities (183). However, during the fall, the highest percentage of incidents occurred in Regions 4 and 7, each at 22 percent. The lowest percentage of incidents during winter occurred in Region 6 at 7 percent, while the lowest percentage of incidents during spring, summer and fall occurred in Region 8 (4 percent, 2 percent and 6 percent, respectively). See Figure 21 below that compares each season by the region in which the incidents occurred.

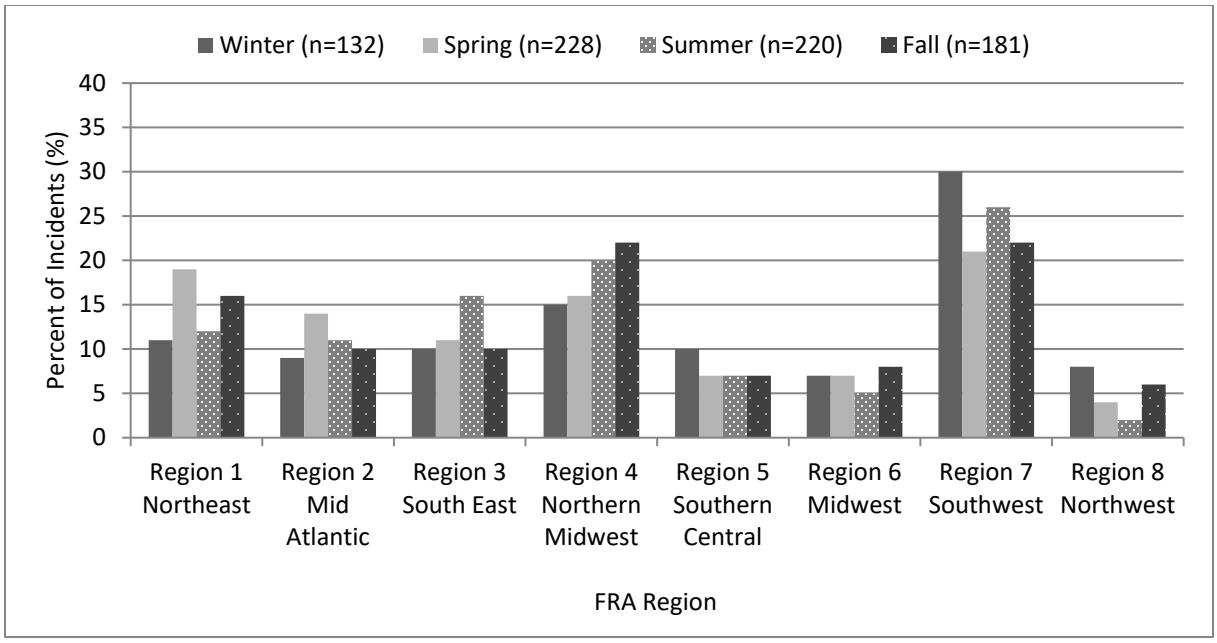

Figure 21. Percent of Suicide Fatality Incidents by Season and FRA Region (2012 – 2014)

4.1.3.4 Season and Time of Day

Seasonal variation may have differential impacts on fatal suicide incidents in different geographic areas due to differences the number of daylight hours, and changes in weather patterns. As previously mentioned, the actual amount of daylight at the time of the incidents is unknown, and may vary due to location differences within a time zone. Figure 22 depicts the percent of incidents within each season that occur during each four-hour time block.

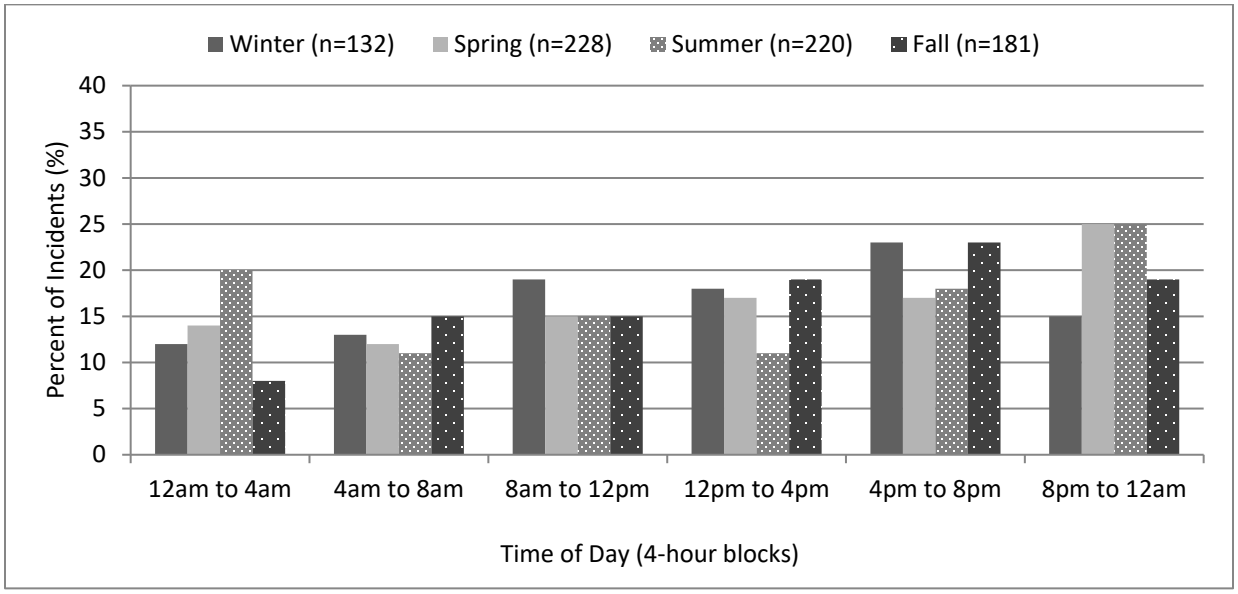

Figure 22. Percent of Suicide Fatality Incidents by Season and Time of Day (2012 – 2014)

Differences were found in the timing of suicide fatalities during spring and summer when compared to winter and fall. During spring and summer, 25 percent of incidents occur during the later evening between 8:00 pm to 12:00 am (56 and 55 incidents, respectively). However, during the winter and fall, the highest percent of incidents (each at 23 percent) occurred during evening commute hours between 4:00 pm and 8:00 pm (30 and 42 incidents, respectively).

During the summer, the lowest percentage of incidents occurred during the early morning and midday hours, from 4:00 am-8:00 am and 12:00 pm-4:00 pm, each at 11 percent. Note that summer is the only season that has the lowest percentage of incidents occurring during midday; the early morning hours tend to have the lowest percentage of incidents occurring in the other three seasons. During the spring, the lowest percentage of incidents also fell in the early morning hours, from 4:00 am-8:00 am (12 percent or 27 incidents). The lowest percentage of incidents in winter and fall occurred from 12:00 am-8:00 am (12 percent and 8 percent). In contrast, this time block also has the second highest percent of incidents occurring during the summer, at 20 percent (44 incidents).

4.1.3.5 Day of the Week, Type of Equipment and Time of Day

The type of equipment involved in the incident (i.e., freight or passenger train) may also be subject to different rates of suicide attempts based on the time of day at which incidents occur. For example, passenger trains often increase train frequency during weekday morning and evening commuting hours to accommodate common work and commuting schedules. Thus, differences may be expected between passenger and freight trends, particularly during typical commute times. Figure 23 displays the percent of incidents involving passenger and freight trains in four-hour time blocks.

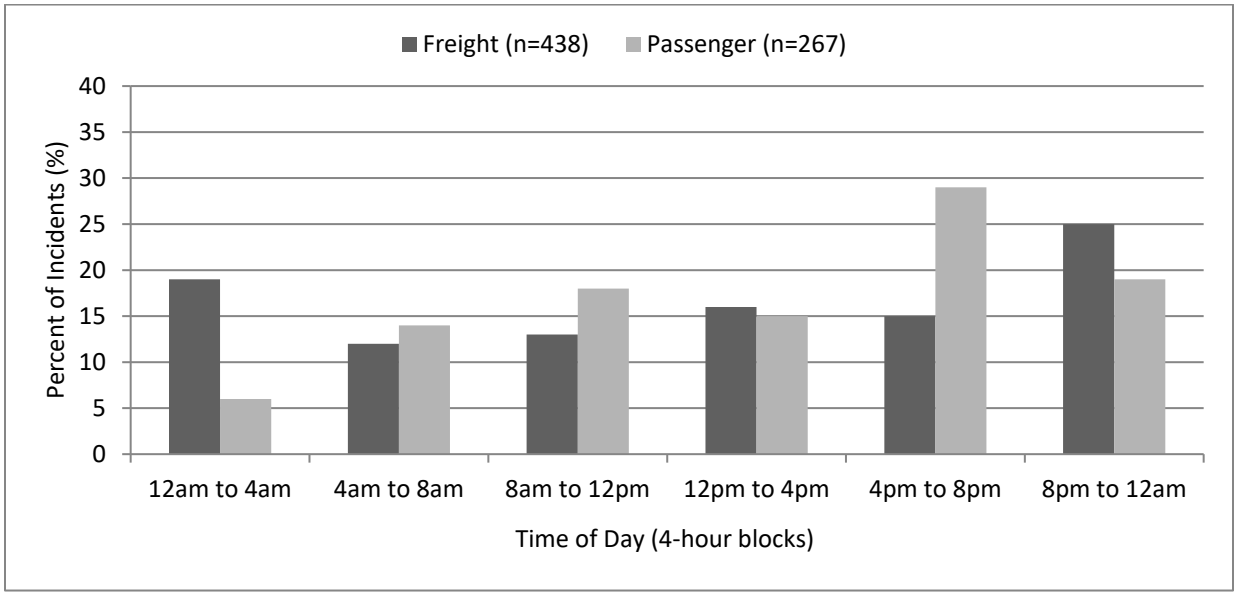

Figure 23. Percent of Suicide Fatality Incidents by Type of Equipment and Time of Day (2012 – 2014)

As expected, suicide fatalities involving passenger trains are less common in the early morning, before 4:00 am, when few passenger trains are operating. The 12:00 am to 4:00 am timeframe accounted for only 6 percent (15 incidents) of incidents involving a passenger train. Suicide

fatalities more commonly involve passenger trains during the typical evening commute hours between 4:00 pm and 8:00 pm when operations are likely more frequent. This time block accounts for the highest percentage of incidents involving a passenger train at 29 percent (77 incidents). Freight trains tend to be involved in more incidents in the later evening (8:00 pm-12:00 am) and overnight hours (12:00 am-4:00 am), at 25 percent and 19 percent, respectively (108 and 85 incidents).

If commute times are truly driving the suicide fatality trends for passenger trains, one might expect differences between weekdays and weekend days. Figure 24, compares the percent of suicide fatalities that occur on a weekday or weekend day, displayed by whether the incident involved a freight or passenger train.

Figure 24. Percent of Suicide Fatality Incidents by Weekday or Weekend and Type of Equipment (2012 – 2014)

As expected, suicide fatalities that occur on a weekday may be disproportionately more likely to involve a passenger train than on a weekend. As posited above, this could be due to increased passenger train operations during weekdays. Forty percent of weekday incidents involved a passenger train, while 32 percent of weekend day incidents involved a passenger train. Additionally, a higher percentage of weekend incidents (68 percent) involved a freight train when compared to incidents occurring on a weekday (60 percent).

Figure 25 breaks this down further by examining freight and passenger incidents that occur on a weekday or weekend day by the time-of-day the incidents occurred. The highest percentage of weekday incidents involving a passenger train occurs during evening commute hours from 4:00 pm-8:00 pm (30 percent or 71 incidents). This finding may be, at least partly, due to train frequency during this time period. However, this is trend does not appear during early morning commute hours; only 14 percent (33 incidents) of these incidents occurred during (4:00 am-8:00 am).

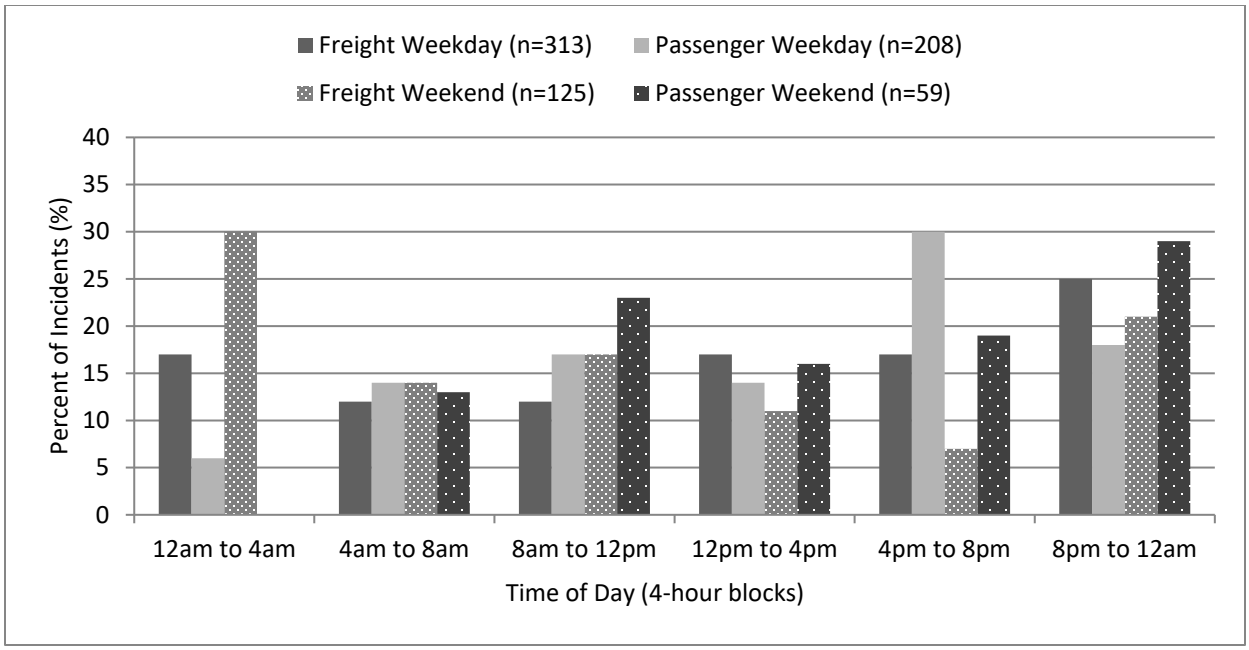

Figure 25. Percent of Suicide Fatality Incidents by Type of Equipment, Weekday or Weekend, and Time of Day (2012 – 2014)

4.1.4 Characteristics of the Decedent

This section examines attributes of the decedent involved in suicide fatality incidents in order to better understand who is involved in this type of incident. Information about the individuals involved may help to inform suicide prevention efforts and countermeasures by identifying those most at risk.

4.1.4.1 Age of the Decedent

The FRA has only collected limited information about the individuals involved in these incidents. However, the age and physical act of the decedent at the time of the incident are noted. This section explores potential trends related to the age of the decedent and the physical act taken by the decedent at the time of the incident.

The age of an individual may provide insight into how mitigation strategies should be developed by identifying target populations. The age of the decedents was separated into groups was examined using age groupings in ten-year spans, with the exception of the youngest (0-14 years) and oldest (85 years and older) individuals. The percent of suicide fatalities by age group is presented in Figure 26.

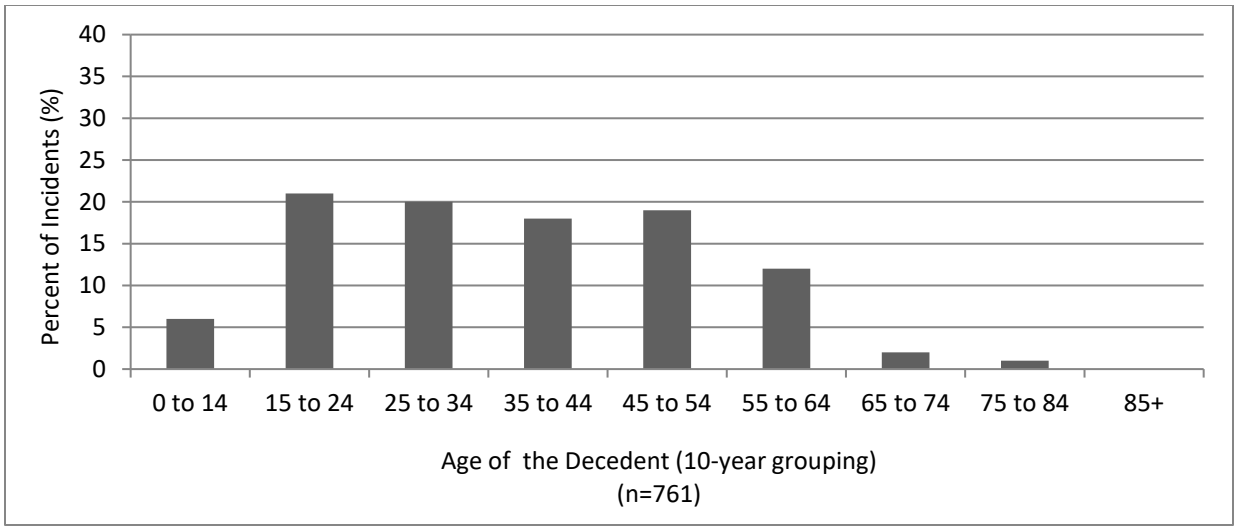

Figure 26. Percent of Suicide Fatality Incidents by Age of the Decedent (2012 – 2014)

Surprisingly, the 15-24 years age group is involved in a higher percentage of incidents than any other age group, accounting for 21 percent of the incidents (159 incidents). According to the American Foundation for Suicide Prevention, individuals between 45 and 64 years had the highest suicide fatality rate out of any age group between 2008 and 2013.[12] To better understand the difference in age groups, it may be helpful to compare specific age groups of those involved in fatal suicides by rail with fatal suicides by all means.

The Centers for Disease Control and Prevention (CDC) provides a searchable online database of fatal injury reports available to the public. Using this online tool, the age of the decedent could be retrieved for all fatal suicides by all means (including rail) occurring from 2012-2014. The comparison confirmed that the population most at risk for suicide on the Unites States' rail system skews slightly younger than would be expected based on typical ages of those who complete suicide by all means. The percentage of individuals under 45 years old who die by suicide on the rail is higher than overall CDC suicide age trends. Similarly, the percentage of individuals over the age of 45 who die by suicide on the rail is lower than the percentage for suicide by all means, (Figure 27).

[12] Retrieved from https://www.afsp.org/understanding-suicide/facts-and-figures on 12/22/15.

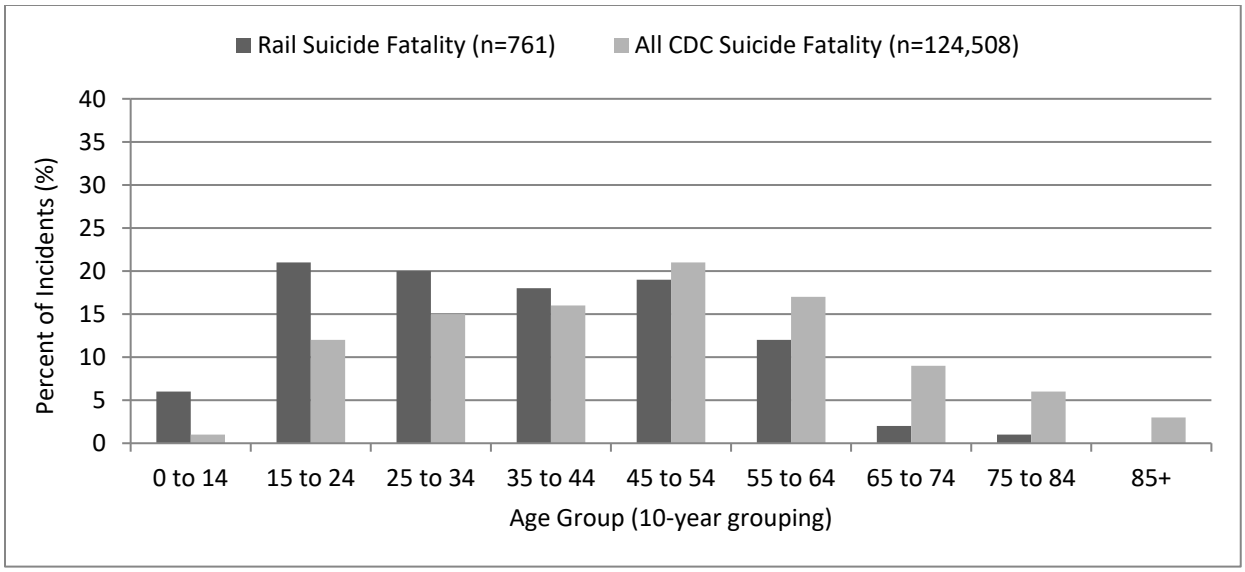

Figure 27. Percent of Suicide Fatality Incidents by Age Group of the Decedent: Rail Suicide Fatalities vs. All CDC Suicide Fatalities[13] (2012 – 2014)

Figure 28 presents the same comparison shown above in a simplified format with four age groupings of 20 year increments, with the exception of the 0-24 years and 65 years and older groups.

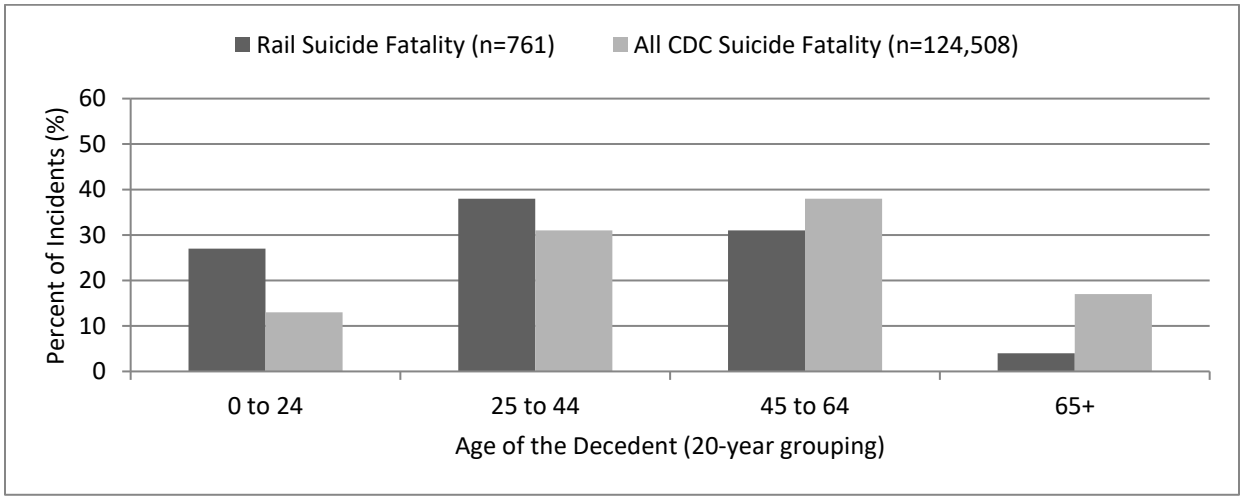

Figure 28. Percent of Suicide Fatality Incidents by Age Group of the Decedent: Rail Suicide Fatalities vs. All CDC Suicide Fatalities[13] (2012 – 2014)

The same trend toward younger individuals can be seen in these broader age groupings. The percentage of rail suicide fatalities for individuals younger than 45 is higher than for suicide fatalities by all means. While 27 percent of rail suicide fatalities involve an individual under 25,

[13] CDC data from http://webappa.cdc.gov/sasweb/ncipc/mortrate10_us.html on 12/18/15. This data reflects the number of fatal suicides by all means in the US, including rail. Note that there were 14 fatalities in which the age of the decedent is unknown. These are excluded from the data presented in Figure 28.

only 13 percent of all suicides in the CDC data involved an individual under 25. Conversely, individuals who were 65 years and older comprised only four percent of the rail-related suicide fatalities while accounting for 17 percent of suicide fatalities by all means. Furthermore, rail suicide fatalities had the highest percentage of incidents in the 25 to 44 years age group (38 percent), followed by the 45 to 64 years age group (27 percent). This is reversed when the data on suicide fatalities by all means is considered. The highest percentage of those incidents involved the 45 to 64 years age group (38 percent), followed by the 25 to 44 years age group (31 percent).

4.1.4.2 Physical Act

In addition to age, the FRA collects information about the actions of the individual at the time of the incident. This information is collected using a set of 96 possible actions[14] from which the person filling out the incident report can select (note that not all of the actions are applicable to trespass and suicide incidents[15]). Due to the large number of possible actions we simplified the categories by combining the FRA actions identified in the incidents into new categories, as defined in Table 10.

Table 10. Physical Act Categories

New Action Category	FRA Action Categories
Crossing	Crossing over, Crossing or crawling under, Crossing between
Jumping	Jumping from, Jumping onto
Lying Down	Lying down, Laying
Riding	(no change)
Running	(no change)
Sitting	Bending/Stooping, Siting
Sleeping	(no change)
Standing	(no change)
Walking	Walking, Stepping down, Stepping over, Stepped on
Other	Adjusting coupler, Arresting/Apprehending, Climbing on/over, Cutting, Getting off, Handling, Moving, Reaching, Other

The action with the highest percentage of incidents is *lying down* with 31 percent of incidents (237 incidents). The second and third most common actions are *walking* at 23 percent (173

[14] For a full list of the possible actions, please refer to Appendix C of this document. This information can also be found in Appendix F of the *FRA Guide for Preparing Accident/Incident Reports*, available at: http://safetydata.fra.dot.gov/OfficeofSafety/Default.aspx.

[15] Refer to section 7.5, which discusses why particular categories were combined due to the limitations of the current dataset.

incidents), and *standing* at 22 percent (167 incidents). These three physical acts account for approximately three-fourths of all suicide fatalities. Figure 29 presents the actions of the decedent at the time of the incident for suicide fatalities that occurred between 2012 and 2014.

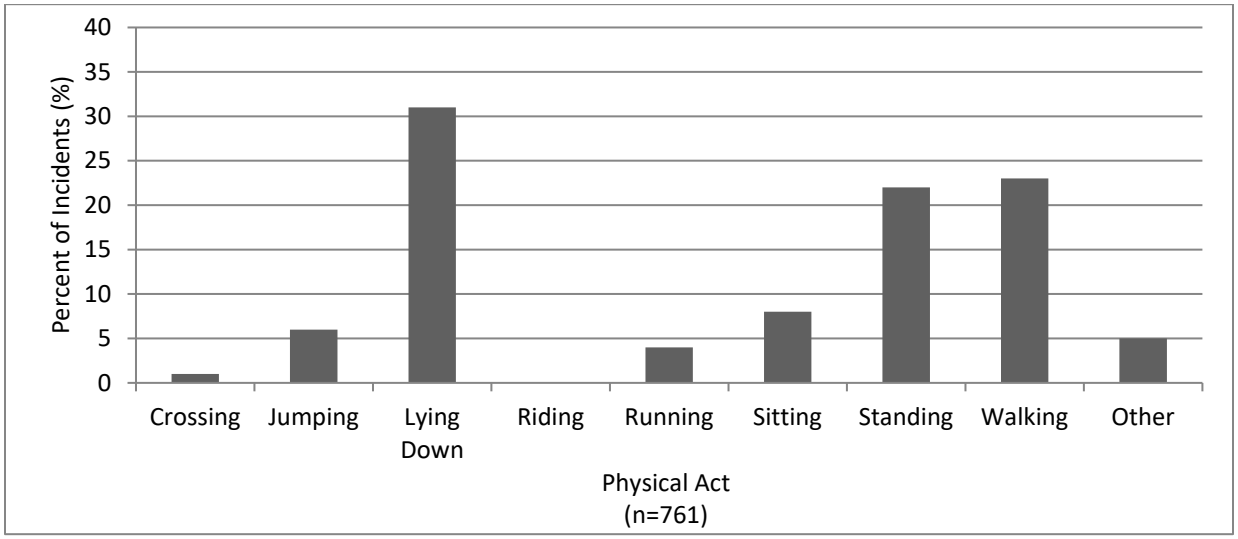

Figure 29. Percent of Suicide Fatality Incidents by Physical Act of the Decedent (2012 – 2014)

We further examined the action of the decedent by reading the report narratives, when available. In general, there is little information provided in the narratives, however, we were able to flesh out 11 suicide fatalities that took place on railroad property, but did not involve an individual being struck by a train. Six of these involved an individual jumping from a bridge or trestle (4 coded as *jumping* and 2 as *other*), four involved a hanged individual (all coded as *other*), and one involved use of a firearm (coded as *sitting*).

The following section explores interactions among characteristics of the incident itself and the decedent involved in order to better understand the trends identified above.

4.1.5 Interactions among Characteristics of the Incident and of the Decedent

4.1.5.1 Age and Physical Act

The physical act of the decedent at the time of the incident would be one variable that could be affected by age. It might be anticipated that more strenuous activities (e.g., jumping and running) would be more common among younger individuals when compared to more passive actions (e.g., sitting, standing, walking). This is explored in Figure 30, which presents the percent of suicide fatalities by physical act and age group.

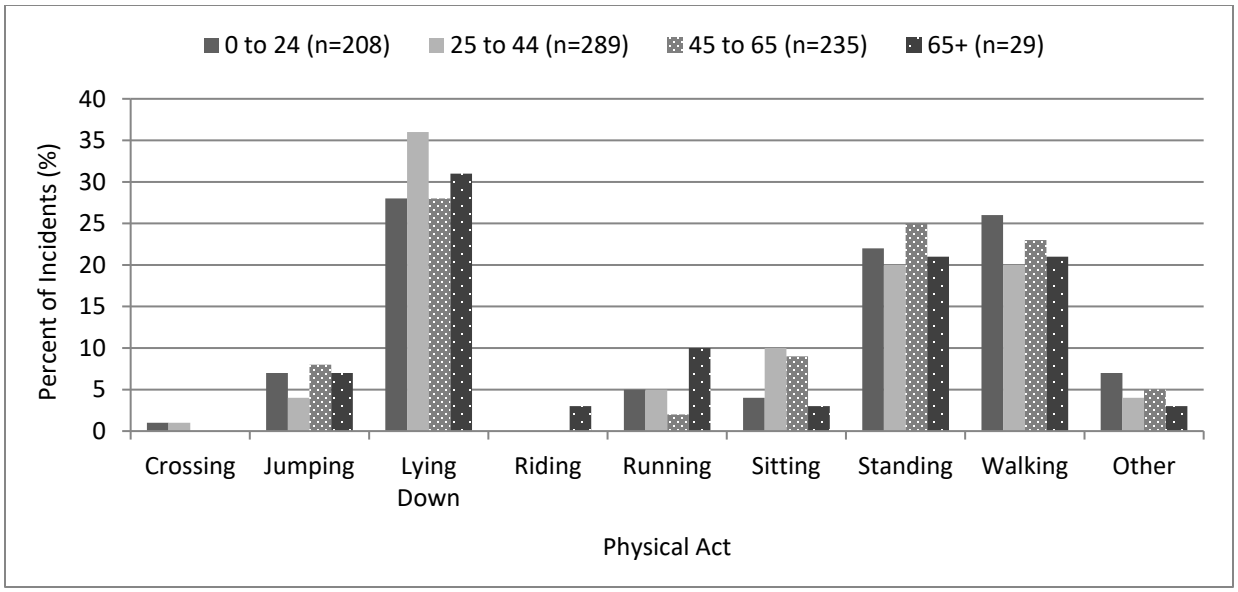

Figure 30. Percent of Suicide Fatality Incidents by Age and Physical Act of the Decedent (2012 – 2014)

When comparing the actions of younger and older individuals, more strenuous activities are not consistently more common in younger age groups. For example, of all age groups, *jumping* accounted for the highest percentage of incidents in the 45-64 age group (8 percent or 18 incidents). Additionally, the 65 years and over and group had the highest percentage of *running* compared to other age groups (10 percent or 3 incidents). However, it is important to consider the small sample size of only three years when interpreting these data.

Overall, *lying down* accounted for the highest percentage of incidents across all age groups. *Standing* and *walking* accounted for the second or third highest percentage of incidents across all age groups. This is also expected, as these three actions were the three most common overall (refer to Figure 30).

4.1.5.2 Age and Region

The age of the decedent involved in rail suicide fatalities may also vary depending on the location of the incident. Any differences may be used to tailor potential mitigation strategies for different age groups in different geographic locations.

The highest percentage of incidents for the 0-24 and 25-44 age groups falls in Region 7 at 29 percent and 26 percent (61 and 75 incidents), respectively. The highest percentage of incidents for the 45-64 and the 65 and over age groups occurred in Region 4, accounting for 21 percent and 34 percent (49 and 10 incidents), respectively. Figure 31 shows the percent of suicide fatalities by region within each age group.

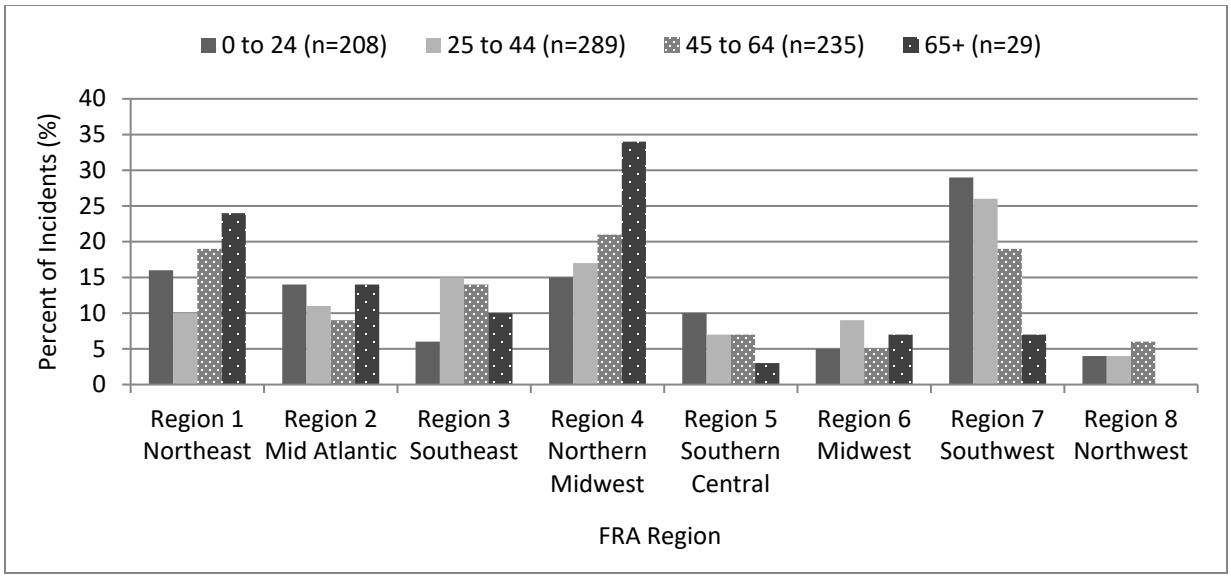

Figure 31. Percent of Suicide Fatality Incidents by Age of the Decedent and FRA Region (2012– 2014)

4.1.5.3 Physical Act and Type of Equipment

In addition to age, we also examined whether the physical act of the decedent at the time of the incident differs when a freight train is involved, compared to a passenger train. This may help to better understand the factors that influence an individual's actions at the time of the incident.

For passenger trains, *walking, standing, running* and *jumping* account for a higher percent of incidents than for freight trains. The actions accounting for the three highest percentages of passenger train incidents are *walking* (28 percent or 74 incidents), *standing* (24 percent or 64 incidents) and *lying down* (19 percent or 51 incidents). To further investigate this trend, we referred to the incident report narratives, when available, which revealed that several of these incidents involved an individual jumping from a train platform. This may explain why jumping was most often associated with a passenger train. The report narratives offered little insight into the other actions.

For freight trains, the highest percentage of incidents overwhelmingly involved an individual lying down, accounting for 40 percent of incidents (177). *Standing* and *walking* had the second highest percentage of freight train incidents, both with 21 percent (94 and 90 incidents, respectively). The percent of suicide fatalities by physical act for each type of train involved is presented in Figure 32.

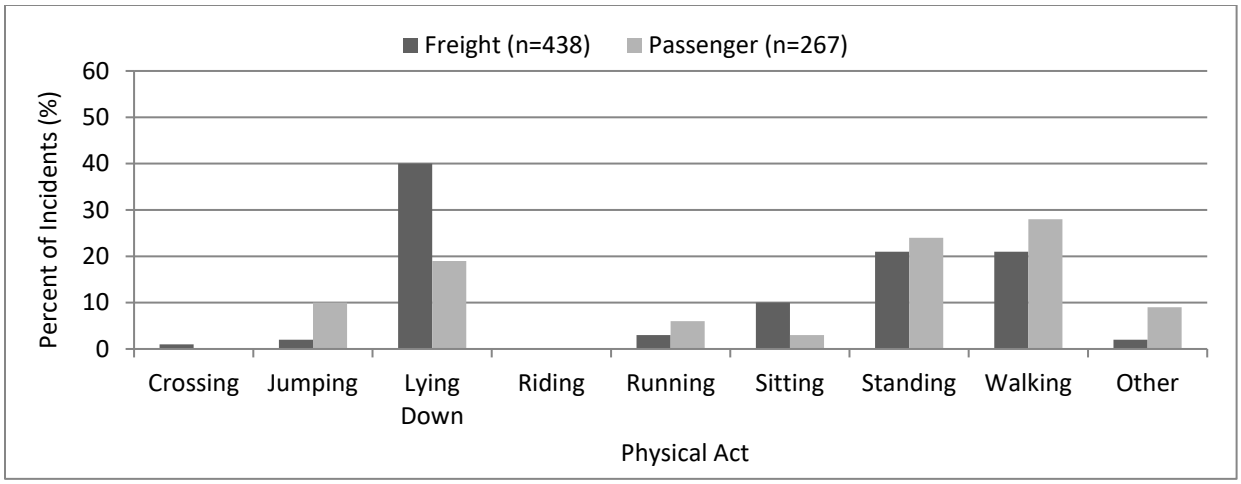

Figure 32. Percent of Suicide Fatality Incidents by Type of Equipment and Physical Act of the Decedent (2012 – 2014)

4.1.6 Summary

The characteristics of each suicide fatality was examined, including location, time, and the characteristics of the decedent involved (e.g. age and the physical act being performed at the time of the incident). As a result, several potential suicide fatality trends were identified. Most incidents occur on the right-of-way and involve a pedestrian strike by a freight train. A smaller number of incidents take place at grade crossings, but a higher percentage of grade crossing incidents involve a passenger train when compared to incidents on the right-of-way. Seasonal trends peaked in the spring, which is similar to national suicide trends that were identified in other research. Other time-related trends emerged that could be, in part, attributed to increased opportunities. For example, the frequency of passenger trains increases during typical weekday evening commuting hours (between 4:00 pm and 8:00 pm). In contrast, incidents involving freight trains were found to occur most often between on a weekend between 12:00 am and 4:00 am. The age of the decedent skewed slightly younger (less than 45 years) than national suicide trends show (over 45 years). In terms of the action taken at the time of the incident, lying down was identified to be the most common action, followed by standing and walking.

4.2 Comparison of Pedestrian Suicide Fatalities and Injuries

Not all suicide attempts end in a fatality. From 2012 through 2014, over 10 percent of all rail-related incidents only resulted in injuries. Although the individual's intent is the same regardless of the outcome, it is important to examine the factors associated with the outcomes of all suicide attempts. This section will review some of the main incident-related characteristics supplied by the FRA reporting system.

4.2.1 Location Characteristics

4.2.1.1 Type of Equipment

As with suicide fatalities, most suicide injuries involved a freight train (80 percent (n=64) of all injuries). A modest percentage of fatal suicide incidents (38 percent) and an even smaller percentage for suicide injuries (20 percent) are involved with passenger trains. Figure 33

provides a graphical representation of incidents that involve a freight or passenger train and categorizes them by fatality or injury.

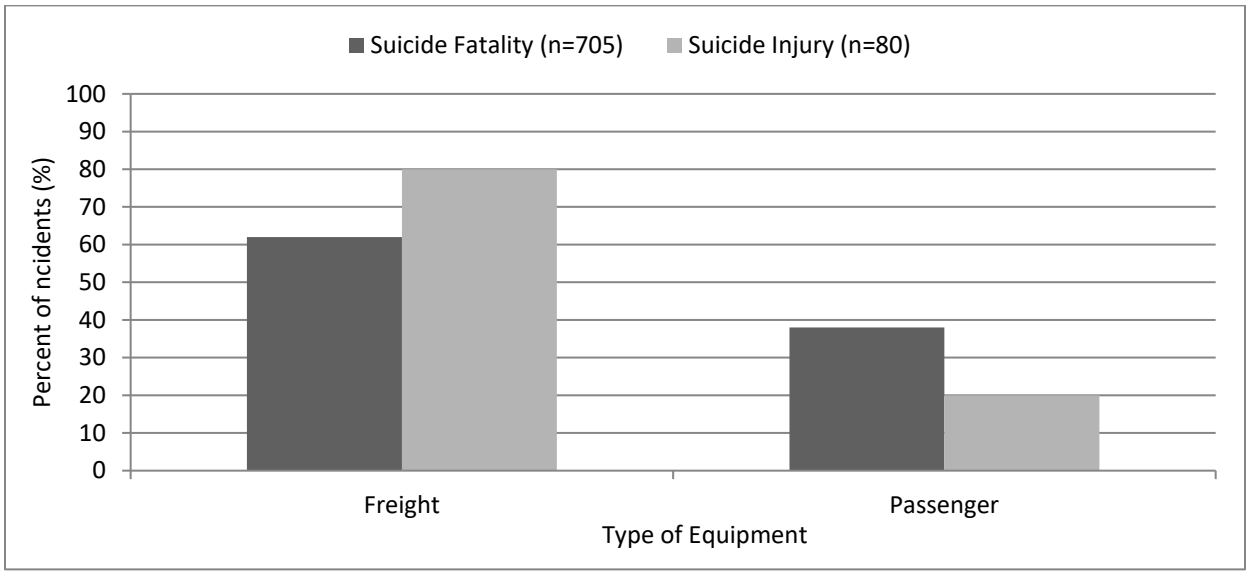

Figure 33. Percent of Suicide Fatality and Injury Incidents by Type of Equipment (2012 – 2014)

4.2.1.2 FRA Region

The primary differences within the FRA regions in terms of suicide fatalities and injuries, are Region 4 and Region 7. For suicide fatalities, Region 7 has the highest percentage of incidents (24 percent) followed by Region 4 (18 percent). For suicide injuries, Region 4 has the largest percentage of incidents (23 percent) followed by Region 3 and Region 7 (both at 14 percent). See Figure 34 for a graphical representation of suicide fatalities and injuries by FRA region.

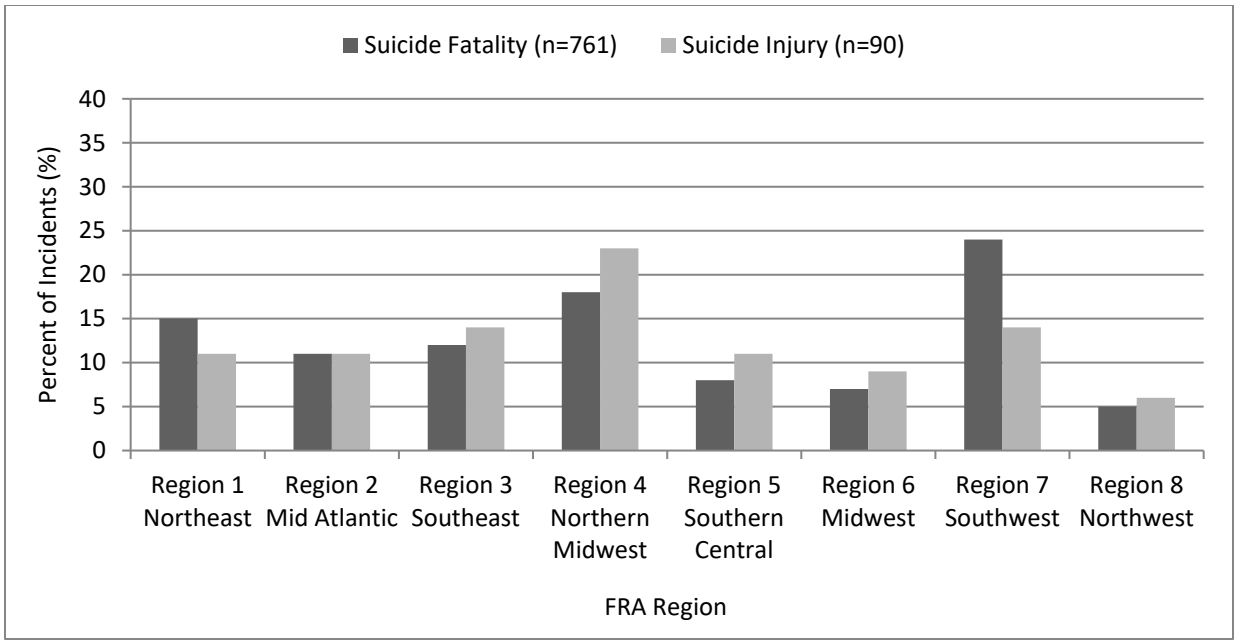

Figure 34. Percent of Suicide Fatality and Injury Incidents by FRA Region (2012 – 2014)

4.2.1.3 Season and Month

Suicide fatalities and injuries followed different trends in percentage of incidents by season, as depicted in Figure 35. For fatalities, spring, closely followed by summer (30 percent and 29 percent, respectively), had the highest percentage of incidents. For suicide injuries, summer was highest at 34 percent followed by winter. Spring, which had the highest percentage in fatalities, was third highest in percentage for suicide injuries.

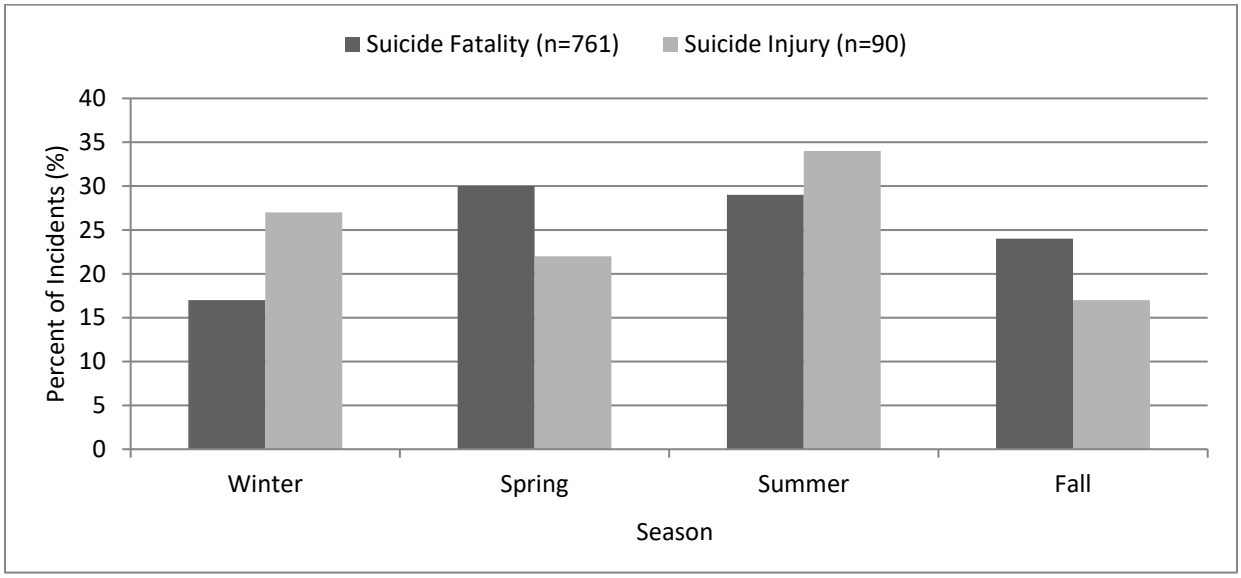

Figure 35. Percent of Suicide Fatality and Injury Incidents by Season (2012 – 2014)

As far as individual months are concerned, the highest percentage of suicide fatalities occurred in March, May, June and July, with each accounting for 10 percent of the incidents. The highest percentage of suicide injuries occurred in June, July and August (June at 12 percent and July and

August each at 11 percent) followed by February, November and December (all at 10 percent), in contrast to the months with the highest percentage of suicide fatality incidents. February had a higher percentage of injuries than fatalities, while the opposite happened in March. Figure 36 is a graphical representation of suicide fatalities and injuries by month of the year.

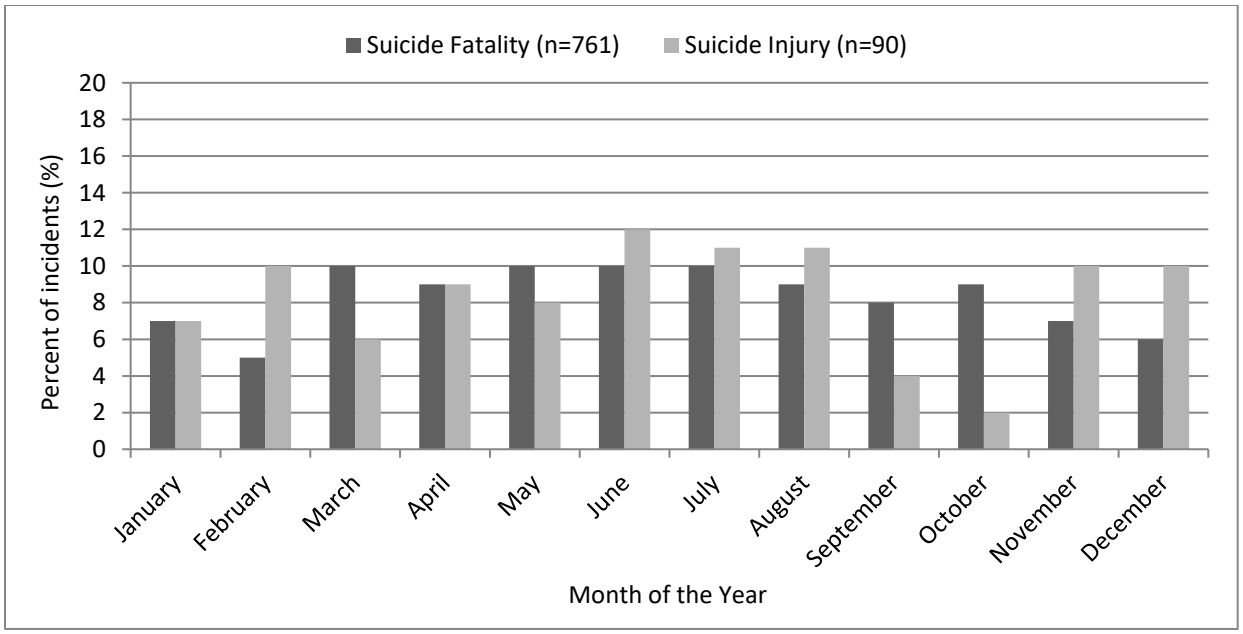

Figure 36. Percent of Suicide Fatality and Injury Incidents by Month of the Year (2012 – 2014)

4.2.1.4 Day of the Week

The day of the week when a suicide occurred followed similar trends for both suicide fatalities and injuries, with Monday (16 percent and 18 percent) and Friday (15 percent and 20 percent) having the highest percentage of incidents. However, Saturday also was seen to have a higher percentage of incidents for suicide injuries (19 percent) where fatalities (14 percent) did not. Also, fatalities were much more common on Tuesdays (15 percent) than injuries (8 percent), which had the lowest percentage of incidents. See Figure 37 for a graphical representation of suicide fatalities and injuries by day of the week.

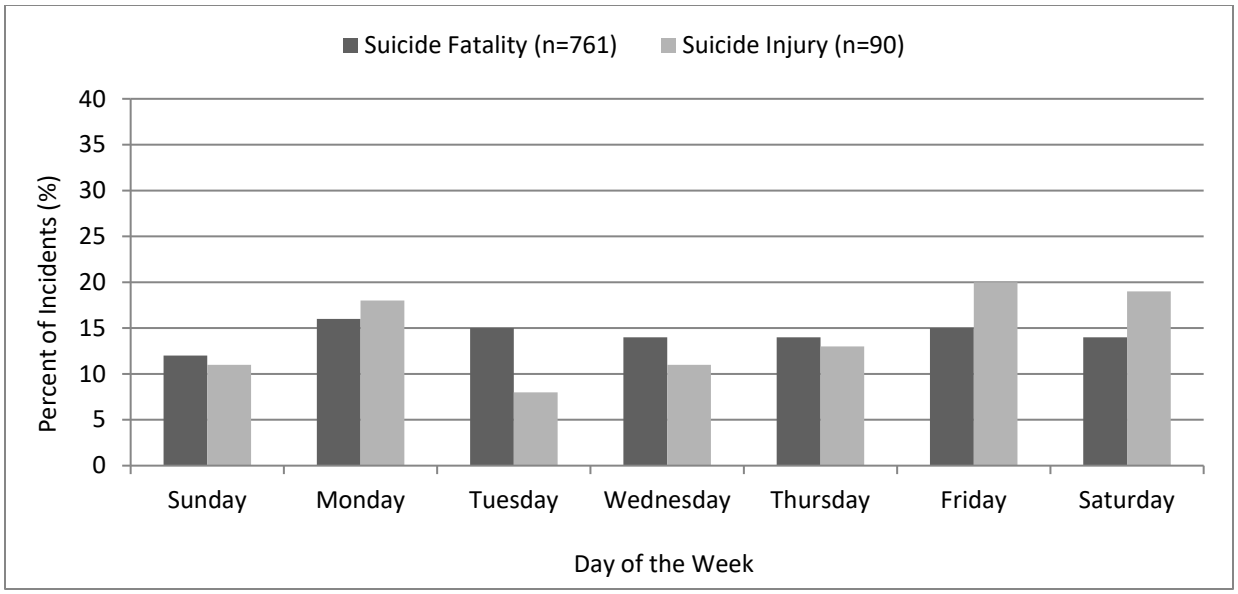

Figure 37. Percent of Suicide Fatality and Injury Incidents by Day of the Week (2012 – 2014)

4.2.1.5 Time of day

For both suicide fatalities and injuries, the highest percentage of incidents occurred from 4:00 pm to 8:00 pm (20 percent and 24 percent) and 8:00 pm to 12:00 am (22 percent and 24 percent). However, the third highest percentage of suicide injuries were from 12:00 am to 4:00 am (18 percent), while suicide fatalities were equally split between 8:00 am to 12:00 pm and 12:00 pm to 4:00 pm (both at 16 percent). See Figure 38 for a graphical representation of suicide fatalities and injuries by time of day. Overall there seems to be more suicide fatalities than injuries from 4:00 am to 4:00 pm (more daytime hours) and more injuries from 4:00 am to 4:00 pm (more nighttime hours).

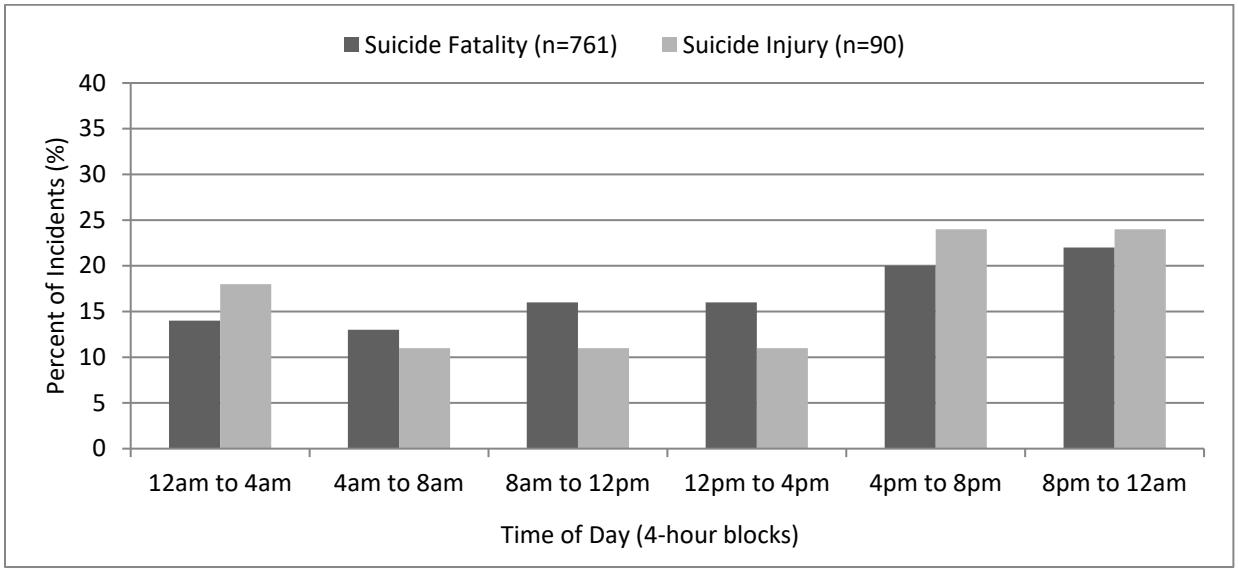

Figure 38. Percent of Suicide Fatality and Injury Incidents by Time of Day (2012 – 2014)

4.2.2 Characteristics of the Decedent

4.2.2.1 Age

The age of the individual who attempted suicide showed slight differences when injuries and fatalities were compared. The percent of suicide fatalities was highest in the 15 to 24 years age group (21 percent), followed by the 25 to 34 years age group (20 percent) and the 45 to 54 year olds (19 percent). Suicide incidents involving individuals who suffered injuries occurred most often with individuals in the 15 to 24 years age group (23 percent) followed by 35 to 44 (22 percent), and the third highest percentage of incidents at the 25 to 34 age group (18 percent). No suicide incidents occurred in the 85 and over grouping, with only suicide fatalities occurring in the 65 to 74 years (2 percent) and 75 to 84 years age groups (1 percent). See Figure 39 for a graphical representation of suicide fatalities and injuries by age of the individual.

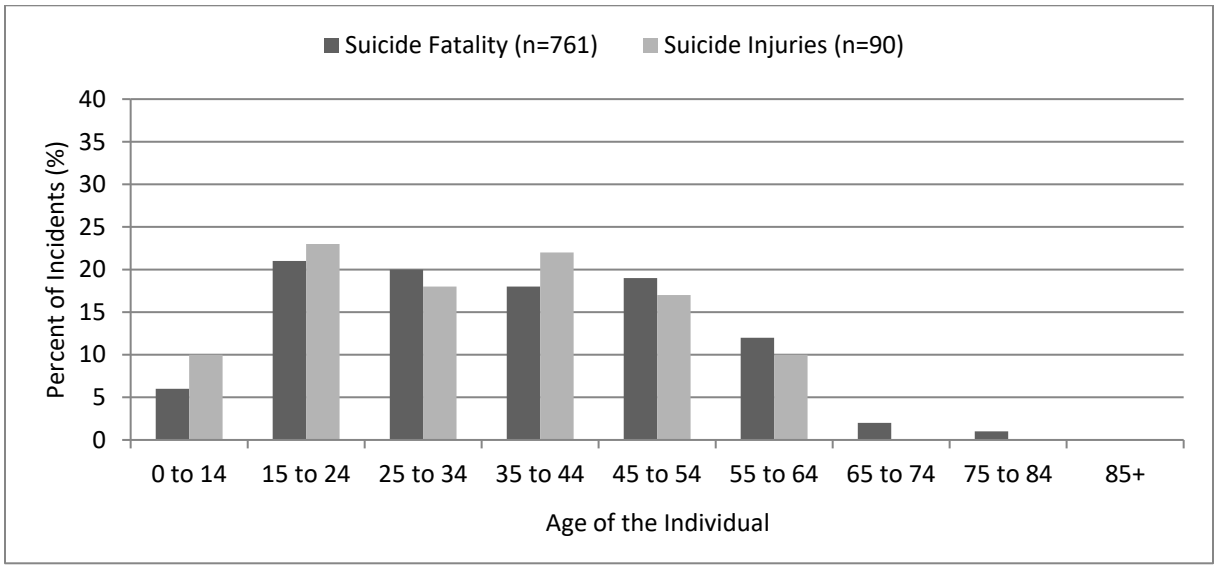

Figure 39. Percent of Suicide Fatality and Injury Incidents by Age of the Individual (2012 – 2014)

4.2.2.2 Physical Act

Some of the physical acts of the individual at the time of the incident were similar for injuries and fatalities. However, the most common physical act for a suicide fatality was lying down at 31 percent, followed by walking (23 percent) and standing (22 percent). In contrast, suicide injury incidents occurred most often when the individual was walking (34 percent) followed by lying down (27 percent). The physical act that the individual is performing at the time of the incident may be one of many predictive factors in terms of those who suffer injuries rather than die due to their suicide attempt. However, data would need to be collected over a long period of time to speculate any further. See Figure 40 for a graphical representation of suicide fatalities and injuries by physical act of the individual.

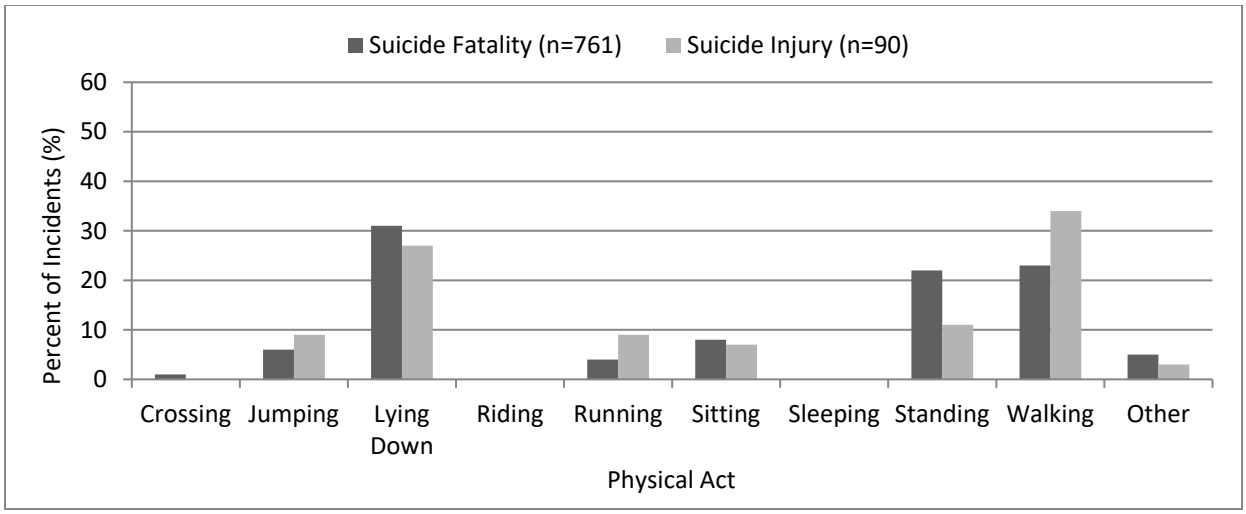

Figure 40. Percent of Suicide and Trespass Fatality Incidents by Physical Act of the Individual (2012 – 2014)

4.2.3 Summary

Although injuries are less common than fatalities as a result of suicide attempts, it is valuable to understand the different environmental factors and demographics that may make an individual's incident more likely to result in one outcome rather than the other (fatality vs. injury). Suicide incidents with different outcomes showed different patterns when compared across various factors, such as FRA Region, season, day of the week, as well as the individual's age and physical act prior to the collision with the train. Although no one factor can predict that an incident will occur, looking at the difference factors together may, in time, give some predictive ability in understanding when a suicide attempt on the right-of-way will be more likely occur.

5. Comparison of Pedestrian Trespass and Suicide Fatalities

Suicide fatality data, taken by itself, provides insights into patterns that surround these types of incidents. However, more information may be obtained by comparing the patterns in data related to suicide incidents to the data related to unintentional trespass fatalities. Suicide and unintentional trespass fatalities are thought to be very similar because they both involve trespassing, but they differ due to the intent behind the act. By comparing data from these two types of incidents, we can better recognize how these two groups vary and use this information to inform countermeasures and mitigation strategies.

5.1 Characteristics of the Incident

This section explores the different characteristics which surround the incident for both trespass and suicide fatalities. The characteristics are divided into two categories, as previously described:

- Location of the Incident
- Timing of the Incident

5.1.1 Location of the Incident

In this section, suicide and trespass fatalities are discussed in terms of FRA region, state, whether the incident occurred at a grade crossing or on the right-of-way, and the type of equipment involved (freight or passenger train).

5.1.1.1 FRA Region

Potential differences in the location of suicide and trespass fatalities by FRA region were examined. Region 7 had the highest percentage of both trespass and suicide fatality incidents 24 percent and 27 percent, respectively). A higher percentage of trespassing incidents occurred in Region 3 when compared with suicide incidents (21 percent and 12 percent, respectively). This is also seen in Regions 2, 5 and 8; however these regions had a smaller number of total incidents occur. Figure 41 shows the percent of suicide and trespass fatalities by region (refer to Appendix F for a comparison of fatal suicide and trespass incidents by state).

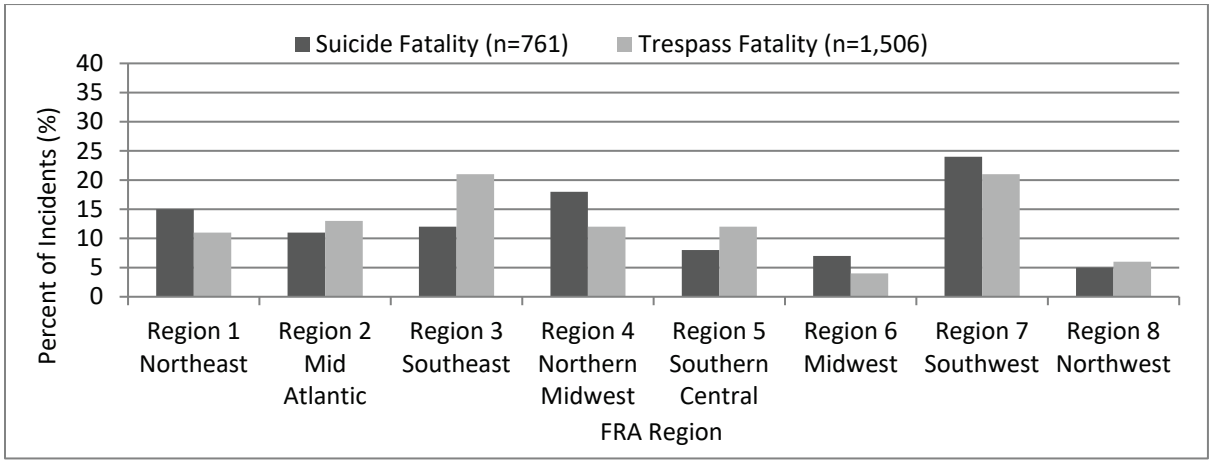

Figure 41. Percent of Suicide and Trespass Fatality Incidents by FRA Region (2012 – 2014)

5.1.1.2 Location on Track

Suicide and trespass fatalities were examined by whether they took place at a grade crossing or on the right-of-way. The majority of both suicide and trespass incidents occurred on the right-of-way, as depicted in Figure 42 below. No large differences between the two incident types.

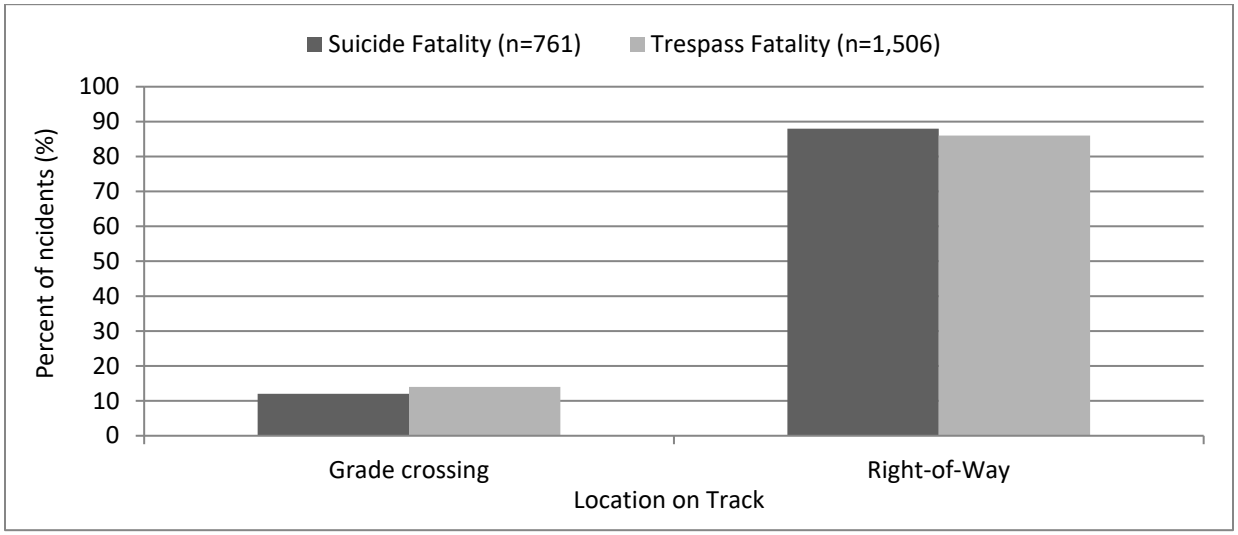

Figure 42. Percent of Suicide and Trespass Fatality Incidents by Type of Train (2012 – 2014)

5.1.1.3 Type of Equipment

We examined suicide and trespass incidents involving freight and passenger trains to identify any potential differences between trespass and suicide fatal incidents. As depicted in Figure 43[16], both suicide and trespass fatalities are more likely to involve a freight train than a passenger train (62-66 percent).

[16] The type of equipment (freight or passenger train) could not be determined for 56 suicide fatalities and 105 trespassing fatalities, and are excluded from Figure 33.

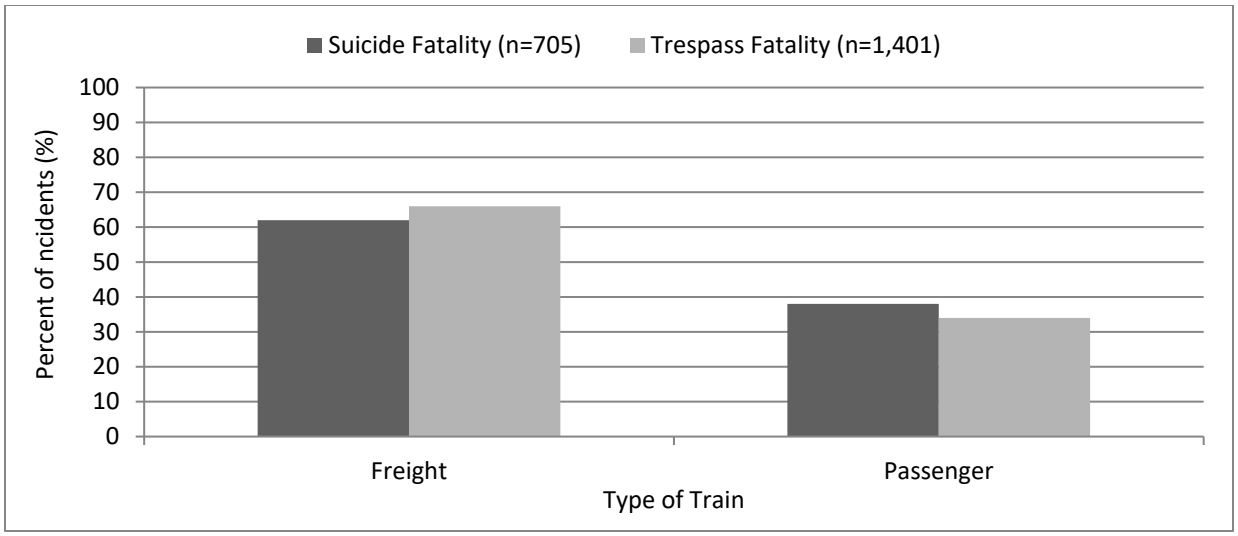

Figure 43. Percent of Suicide and Trespass Fatality Incidents by Type of Train (2012 – 2014)

5.1.2 Timing of the Incident

Data about the time of the incidents are discussed here, including season, month, day of the week, and time of day.

5.1.2.1 Season

There are slight differences between trespass and suicide fatalities in terms of season. The highest percent of suicide fatalities occurred in spring and summer, each at approximately 30 percent, while trespass fatalities were highest during summer and fall, which accounted for close to 30 percent of the incidents. This follows the previously documented trend that suicide rates tend to peak in the spring, which is not seen in the current data for trespass incidents. The percent of suicide and trespass fatalities is displayed, according to the season in which the incident occurred, in Figure 44.

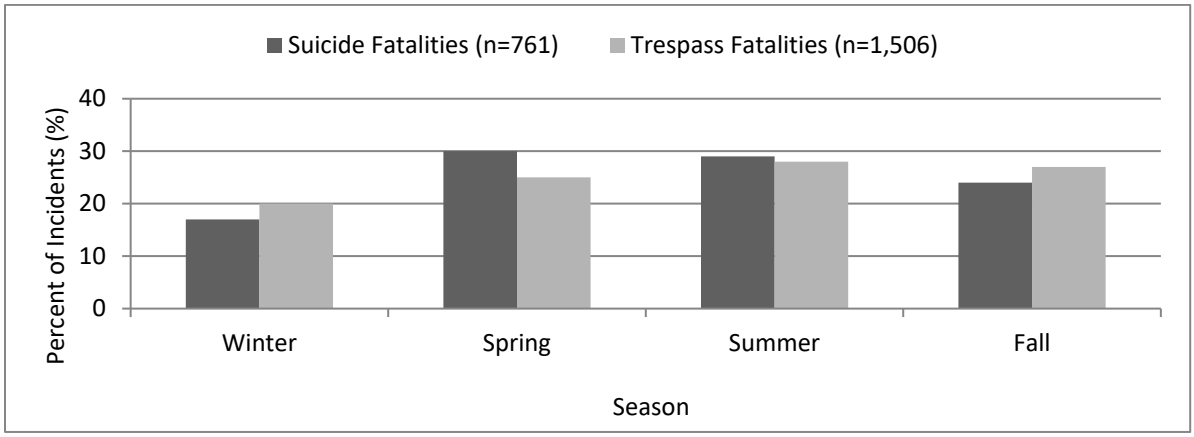

Figure 44. Percent of Suicide and Trespass Fatality Incidents by Season (2012 – 2014)

5.1.2.2 Month

The average number of suicide and trespass fatalities by month is presented in Figure 45. Trespass incidents do not display the same seasonal trend that is seen with suicide incidents. The percent of suicide fatalities was highest in March, May, June and July, all at 10 percent, while the percent of trespass fatalities was highest in July and October, also at 10 percent.

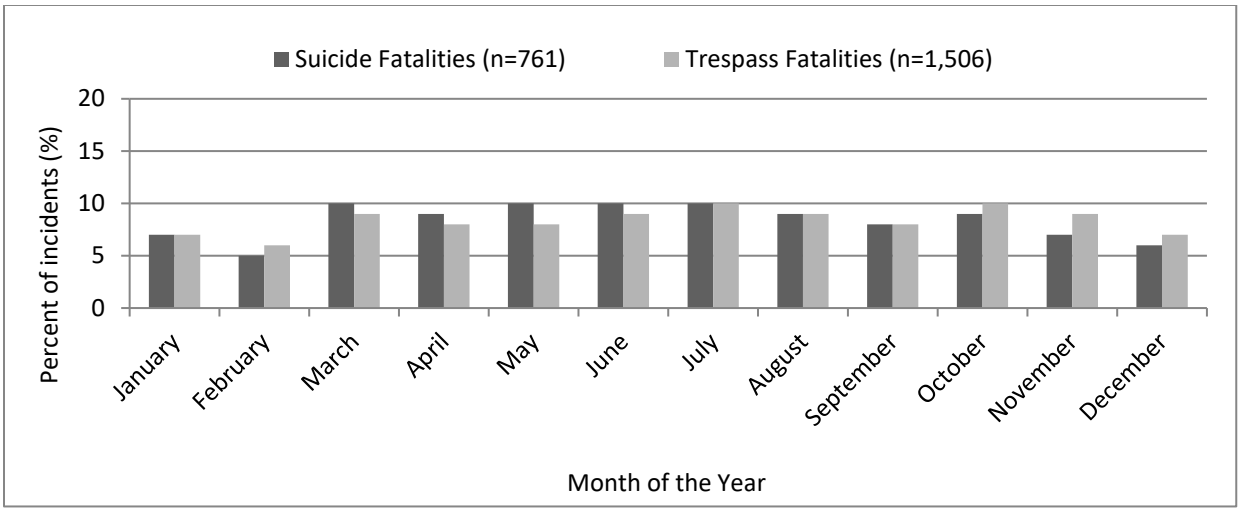

Figure 45 Percent of Suicide and Trespass Fatality Incidents by Month of the Year (2012 – 2014)

5.1.2.3 Day of the Week

Unlike with suicide fatalities, Saturday and Sunday account for the highest percent of trespass fatalities (17 percent and 15 percent, respectively). Note that the lowest percentage of suicide incidents occurred on Sunday (12 percent), while the day with the lowest percent of trespass fatalities is Thursday (12 percent). Figure 46 shows the percent of suicide and trespass incidents by the day of the week on which they occurred.

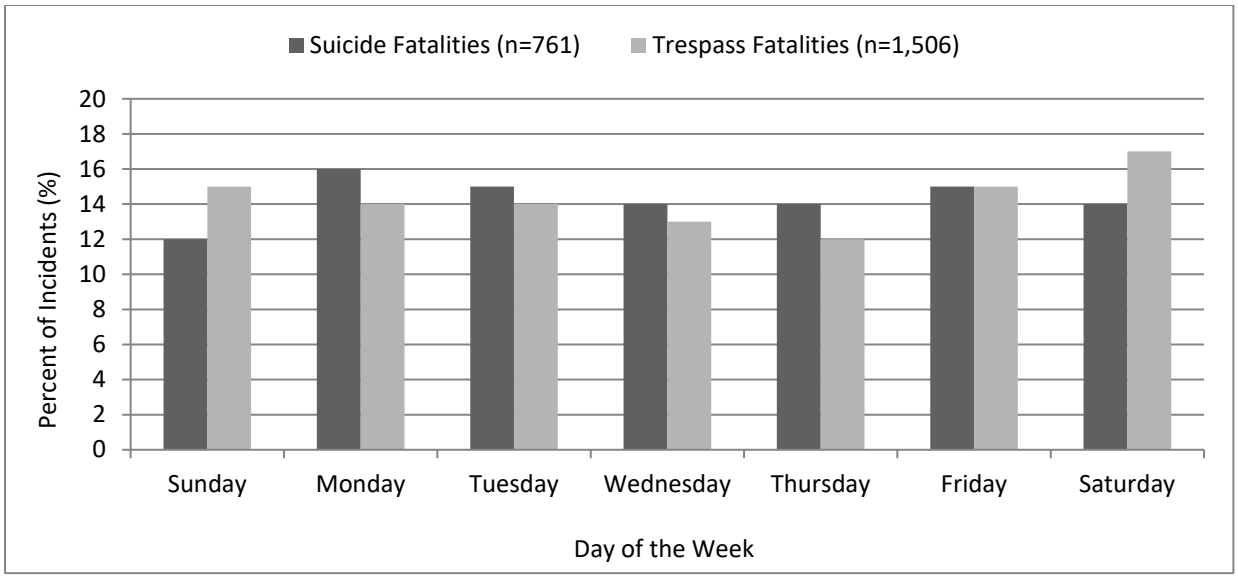

Figure 46. Percent of Suicide and Trespass Fatality Incidents by Day of the Week (2012 – 2014)

The data suggest that unlike suicide fatality incidents, trespass fatality incidents may not follow common work and commuting schedules. As shown in Figure 47, a higher percentage of trespass incidents occur on a weekend compared to suicide incidents (32 percent compared to 26 percent). Likewise, a higher percentage of suicide incidents (74 percent) took place on a weekday than trespass incidents (68 percent). This is further explored in the following section.

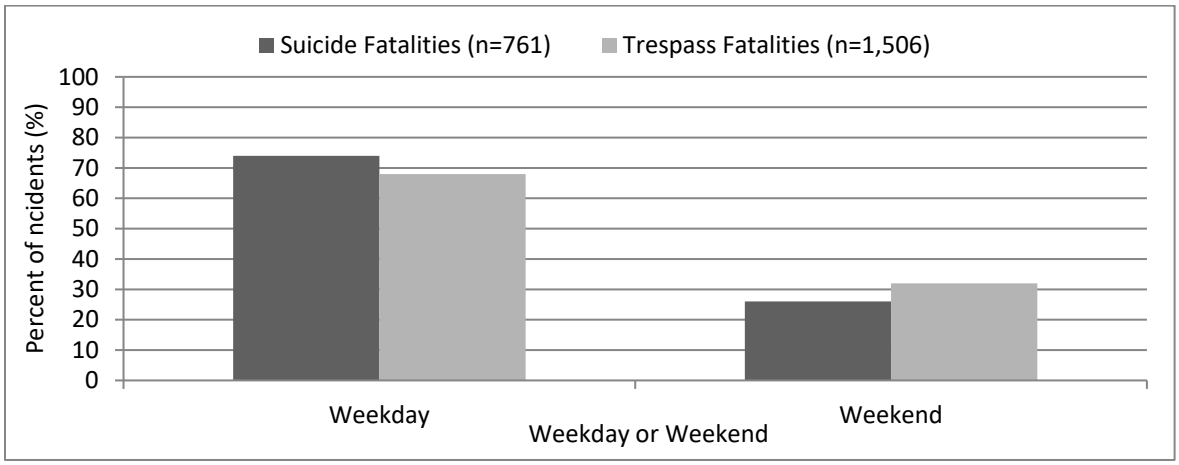

Figure 47. Percent of Suicide and Trespass Fatality Incidents by Weekday or Weekend (2012 – 2014)

5.1.2.4 Time of Day

The time of day that the incidents occurred differed slightly for suicide fatalities and trespassing fatalities. Figure 48 shows the percentage of suicide and trespass fatalities that took place throughout the day in four-hour blocks.

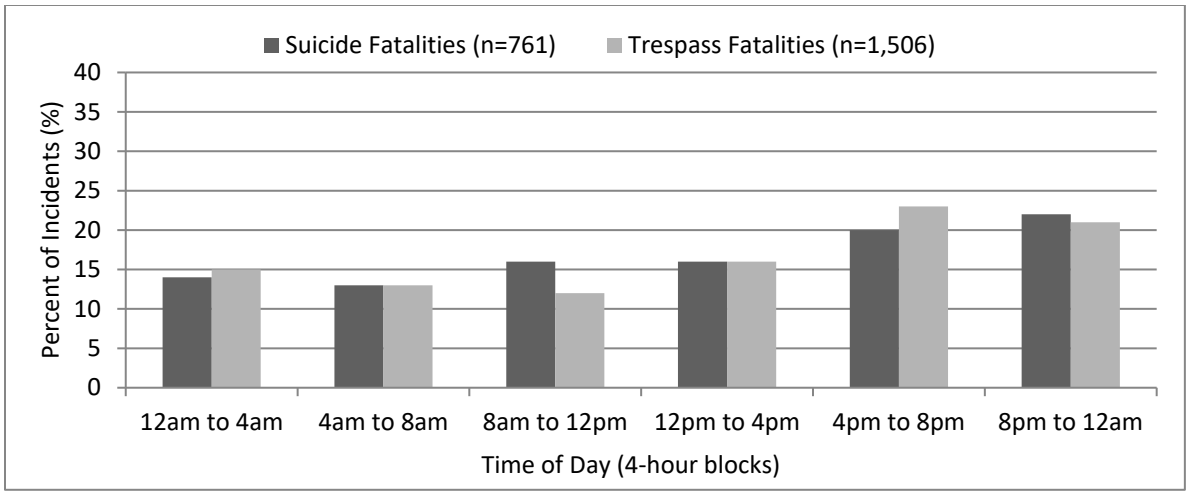

Figure 48. Percent Suicide and Trespass Fatality Incidents by Time of Day (2012 – 2014)

The highest percent of trespass fatalities is in the evening commute hours, between 4:00 pm and 8:00 pm (23 percent), compared to suicide fatality incidents at their second most common time block at 20 percent highest percent of suicide fatalities is in the late evening, between 8:00 pm and 12:00 am (22 percent), compared trespassing incidents at their second most common time block at 21 percent. The two categories differ the largest difference in percent of the two types of incidents is seen from 8 AM to 12 PM, where suicide fatalities account for the largest percentage of incidents (16 percent) than their trespass counterparts (12 percent).

5.1.3 Interactions among Timing and Location Characteristics

In this section, we explore potential interactions between the time and the location of suicide and trespass fatalities. Figure 49 presents the percentage of suicide and trespass fatalities by type of day of the week (i.e., weekday vs. weekend) and time of day.

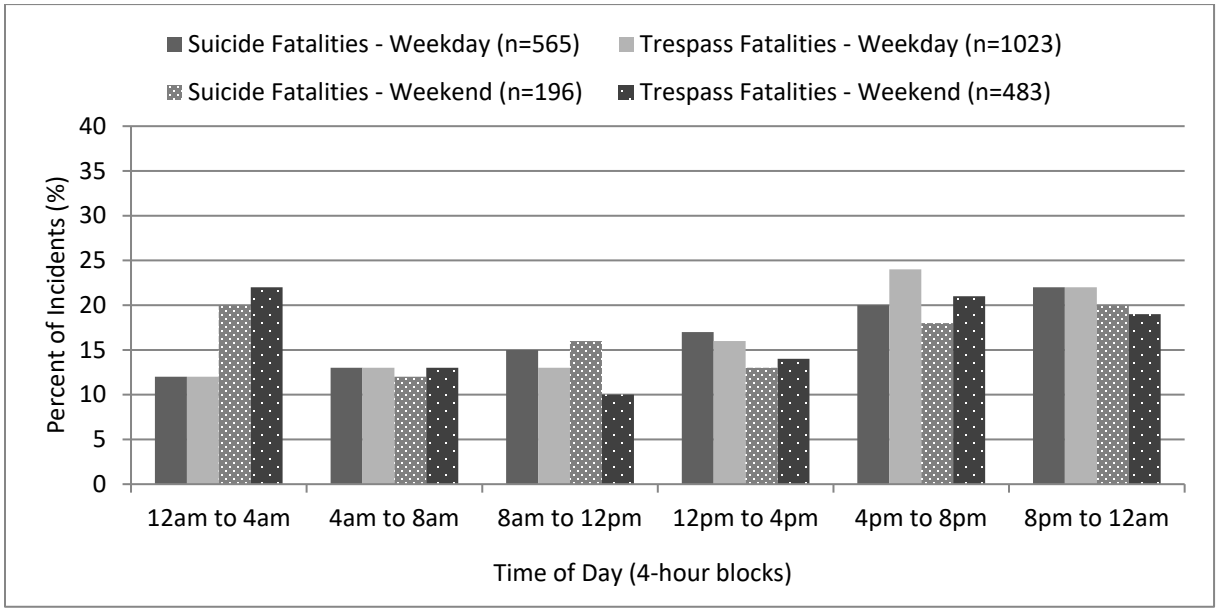

Figure 49. Percent of Suicide and Trespass Fatality Incidents by Weekday or Weekend and Time of Day (2012 – 2014)

In terms of the day of the week and the time of day in which these incidents occur, the percentage of trespass fatalities tends to vary more than suicide fatalities. The highest percent of trespass fatalities on the weekend occurs between 12:00 am and 4:00 am (22 percent) with the highest percent of trespass fatalities during a weekday between 4:00 pm and 8:00 pm (24 percent). Additionally, weekend fatalities have a higher percentage of incidents occurring between 12:00-4:00 am than for both suicide and trespass, while weekday incidents have a higher percentage occurring between 4:00 pm and 12:00 am. For both suicide and trespass incidents, this increase is not seen in the early morning hours between 4:00 am and 8:00 am.

If trespass incidents have similar percentages as suicide incidents during common commute times, it would be expected that a similar difference between the times these incidents tend to occur would be seen, depending upon whether the incidents involve freight or passenger train on a weekday or weekend (i.e., suicide incidents involving a passenger train saw a peak during evening commute times between 4:00 pm and 8:00 pm). This comparison is presented in Figure 50 (Refer to Figure 25 for this same comparison of only suicide fatality incidents).

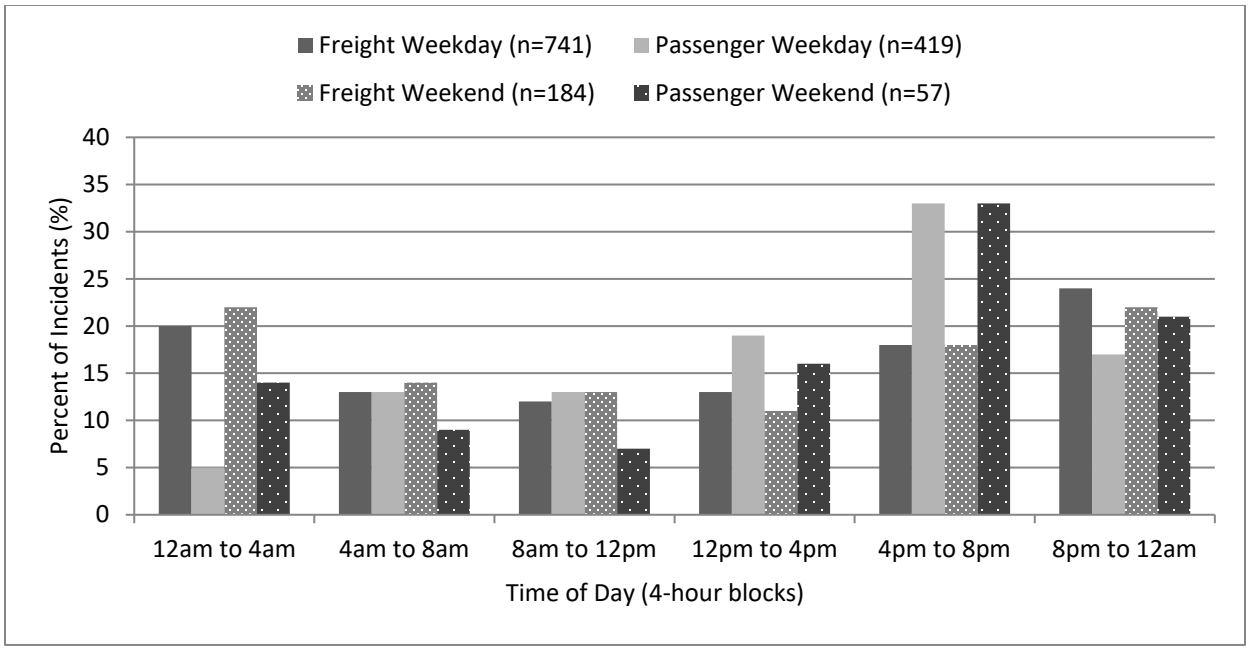

Figure 50. Percent of Trespass Fatality Incidents by Type of Equipment, Weekday or Weekend, and Time of Day (2012 – 2014)

As with suicide fatalities, the percent of weekday incidents involving a passenger train was highest during the hours of 4:00 pm and 8:00 pm (33 percent). Interestingly, this spike was also seen for trespass incidents involving passenger trains on the weekend (33 percent); this was not seen not for suicide incidents. This may indicate a potential difference between suicide and trespass incidents; however, additional data is needed due to the small number of weekend passenger incidents that occur.

5.1.4 Characteristics of the Decedent

5.1.4.1 Age

Although many of the age groupings saw close to equal proportions of incidents for both suicide and trespass, (15 to 24 years, 25 to 34 years, 35 to 44 years and 44 to 54 years), 15 to 24 years had the largest percent of incidents for both suicide and trespass fatalities (20 percent and 21X percent respectively). For the 0 to 14 years and 55 to 64 years groups, the percentage of trespass fatalities was almost equal (12 percent and 15 percent). For suicide fatalities, only 6 percent of incidents involved an individual 0-14. For 65 and older age groups, both suicide and trespass fatalities accounted for less than 5 percent of the total number of incidents with no incidents beyond the age of 84. See Figure 51 for comparison of suicide and trespass fatalities based on age of the individual involved.

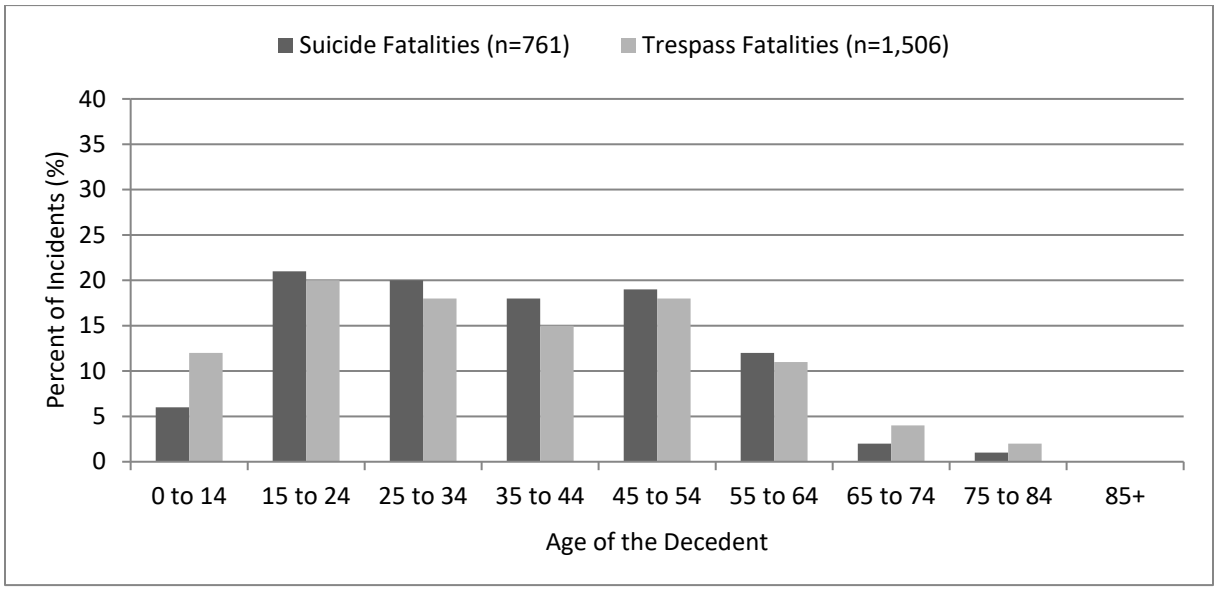

Figure 51. Percent of Suicide and Trespass Fatality Incidents by Age of the Decedent (2012 – 2014)

5.1.4.2 Physical Act

The physical act that the individual performed at the time of the incident differed depending on whether they were intentionally trying to harm themselves or were not trying. For those individuals involved in a suicide attempt, over 30 percent were lying on the tracks followed by walking at 23 percent and standing at 22 percent. Usually, individuals who had trespassed on the right-of-way without the intention of harming themselves were either walking when they were struck (41 percent) or were lying down (23 percent). All other physical acts accounted for less than 10 percent of the total incidents. Standing, in particular, seems to be more closely related to individuals involved in a suicide fatality than a trespass fatality. Additionally, sleeping and riding was only noted in trespass incidents and very few were reported. In cases when riding occurred, the report narrative (when available) often indicated that the individual was riding atop of a train rather than riding as a passenger. See Figure 52 for a comparison of suicide and trespass fatality by the physical act of the individual involved in the incident.

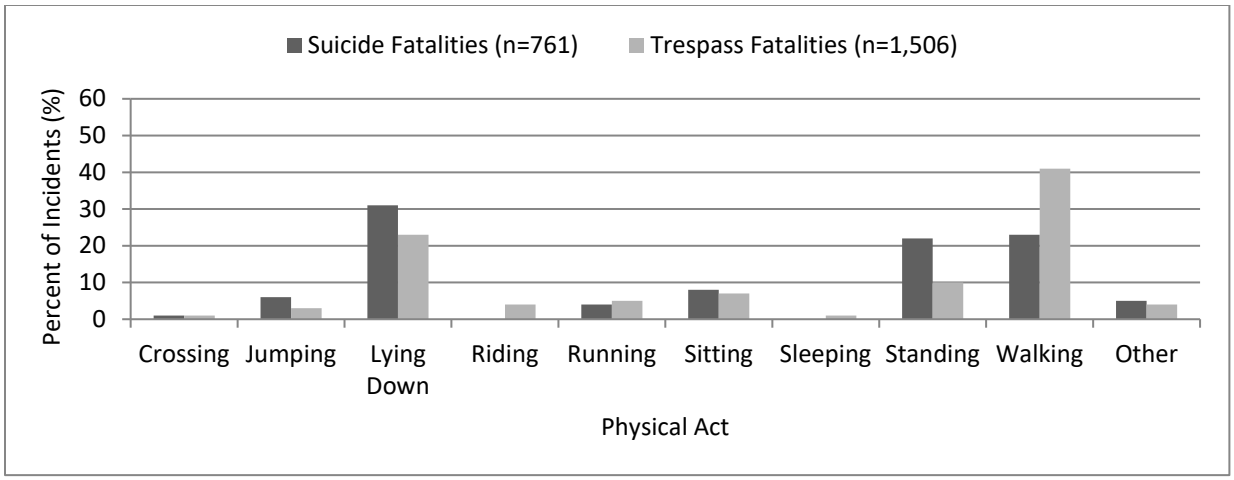

Figure 52. Percent of Suicide and Trespass Fatality Incidents by Physical Act of the Decedent (2012 – 2014)

5.1.5 Summary

Similarities and differences were identified between suicide and trespass fatalities on the railroad, based on characteristics that surrounded the incidents, including the location, time, and attributes of the decedent involved. These types of incidents are similar because they tend to take place on the on the right-of-way and most often involve freight trains; however, trespass incidents involve a slightly higher percentage of freight trains than suicide incidents. In terms of the time when the incidents occur, the same seasonal peak seen in suicide incidents is not seen in trespass incidents. Furthermore, trespass incidents occur more often on a weekend than do suicide attempts.

Although both types of incidents do occur most often in the evening hours between 4:00 pm and 12:00 am, trespass incidents follow a slightly different time pattern depending on:

- Whether the incident took place on a weekday or a weekend.
- Whether a freight or passenger train was involved.

A much higher percentage of trespass incidents involving a passenger train occurred on the weekend in comparison to suicide incidents. This is a potential indicator that suicide incidents may be more strongly associated with the increased train frequency than trespass incidents; however additional data is needed in order to examine this further. A few differences between suicide and trespass incidents were also identified in terms of the action of the decedent at the time of the train strike. Walking was found to be most common in trespass incidents, lying down was found to be the most common for suicide incidents.

6. Grade Crossing: Pedestrian Incidents

The FRA has one form for collecting general information about injuries and fatalities[17] and another form for collecting information about each incident that takes place at a grade crossing. Thus, different categories of information are available for examining grade crossing incidents, which may give a more complete picture of the characteristics of these incidents than examining FRA Injury and Illness reports alone. This section examines pedestrian suicide fatalities using data collected specifically for incidents that occurred at grade crossings.

After an overview of pedestrian grade crossing incidents is presented, the remainder of Section 6 discusses the characteristics surrounding the pedestrian fatality incidents that occurred at grade crossings from January 2012 through December 2014. A comparison of suicide and trespass (unintentional) fatality incidents is given based on information found in grade crossing incident reports.

6.1 Overview of Pedestrian Grade Crossing Incidents

A total of 2,529 grade crossing incidents that involved an injury or fatality were reported from 2012 – 2014. Of those, 438 incidents involved pedestrians, as 2,091 incidents did not involve a pedestrian (refer to Table 11).

Table 11. Grade Crossing Incidents Included for Examination (2012 – 2014)

Location	2012	2013	2014	Total
Suicide	33	42	22	97
Suicide Fatality	28	39	19	86
Suicide Injury	5	3	3	11
Trespass	93	112	136	341
Trespass Fatality	56	65	85	206
Trespass Injury[18]	38	47	52	137
Total	126	154	158	438

Note: Two trespassing incidents involved more than one person, and resulted in both fatality and injury (one incident in 2012 and one incident in 2014). The incidents are reflected in both the Trespass Fatality and Trespass Injury rows; however, the incidents were counted only once in the Trespass and Total rows.

Overall, the percentages of suicide and trespass fatalities that occur at a grade crossing and on the right-of-way are very similar. Approximately 85 percent of incidents occurring on the right-of-way rather than at a grade crossing, with a slightly higher percent of grade crossing trespass

[17] FRA Form 6180.57 is used to collect information about all grade crossing incidents. FRA form 6180.55a is used to collect information about all injury and fatality incidents.

[18] Note that trespass injury incidents are only included and discussed when examining train speed as a factor.

fatalities than suicide fatalities. See Figure 53 for a graphical representation of incidents that took place at a grade crossing or right-of-way by type of incident (suicide fatality vs. trespass fatality).

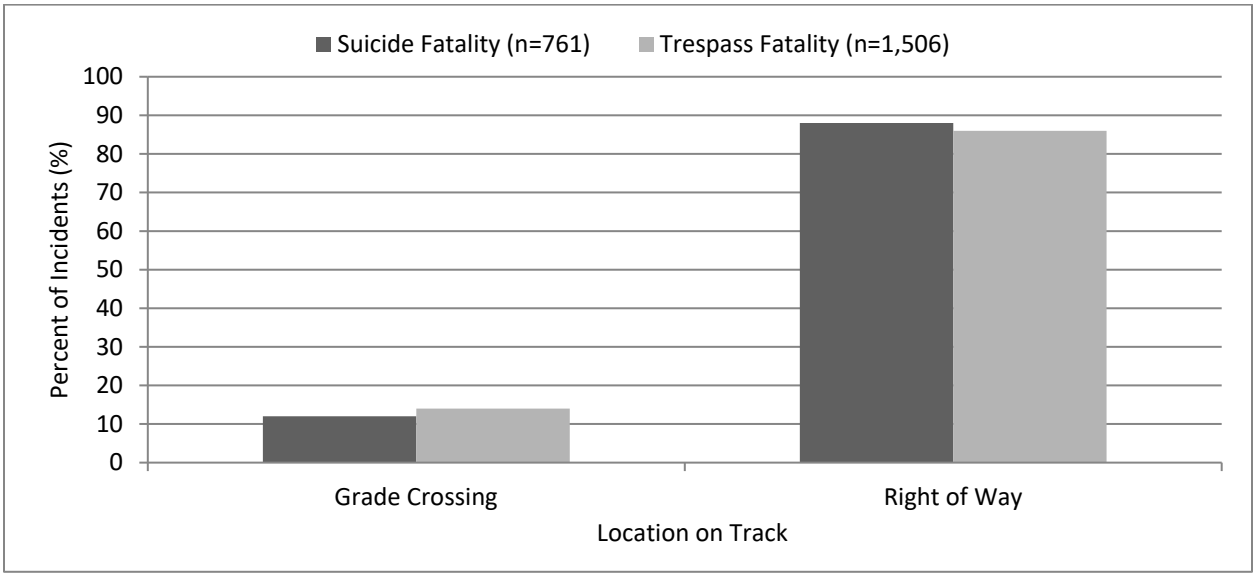

Figure 53. Percent of Suicide and Trespass Fatality Incidents by Location on Track (2012 – 2014)

6.2 Comparison of Pedestrian Grade Crossing Trespass and Suicide Fatalities

This section presents a comparison of pedestrian grade crossing trespass (non-intentional) and suicide (intentional) fatalities from January 2012 through December 2014. Section 6.2.1 discusses characteristics of the incident, and Section 6.2.2 discusses characteristics of the individual.

6.2.1 Characteristics of the Incident

6.2.1.1 Regions

The largest percentage of suicide and trespass (unintentional) incidents occurred in Region 4 with 30 percent for suicides and 21 percent for trespass, and Region 7 with 27 percent for suicide and 32 percent for trespass. This is in line with findings from incidents that occurred away from a grade crossing on the right-of-way. See Figure 54 for a graphical representation of incidents that occurred at a grade crossing by region (refer to Appendix G for a comparison of fatal grade crossing suicide and trespass incidents by state).

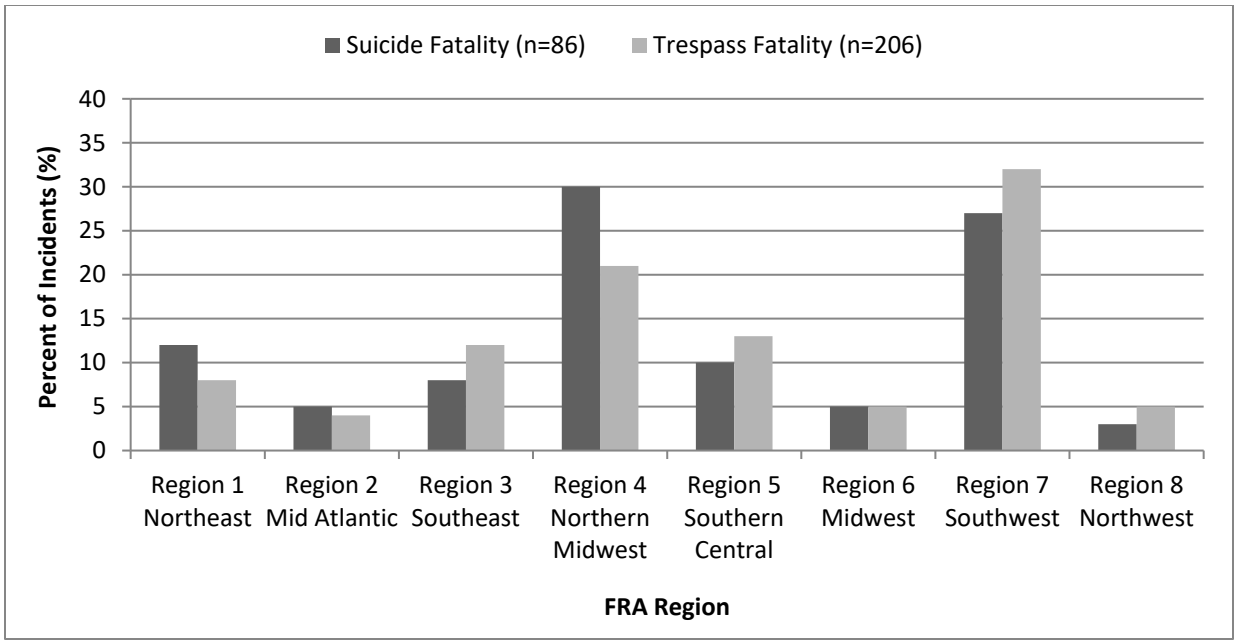

Figure 54. Percent of Grade Crossing Suicide and Trespass Fatality Incidents by FRA Region (2012 – 2014)

6.2.1.2 Type of Crossing

We were also interested in whether suicide fatalities occur at active crossings more often than trespass fatalities. Between 90 and 100 percent of all incidents (both suicide and trespass) occur at an active crossing with less than 10 percent at a passive crossing. A comparison of the percentage of suicide and trespass fatalities by type of crossing is presented the Figure 55.

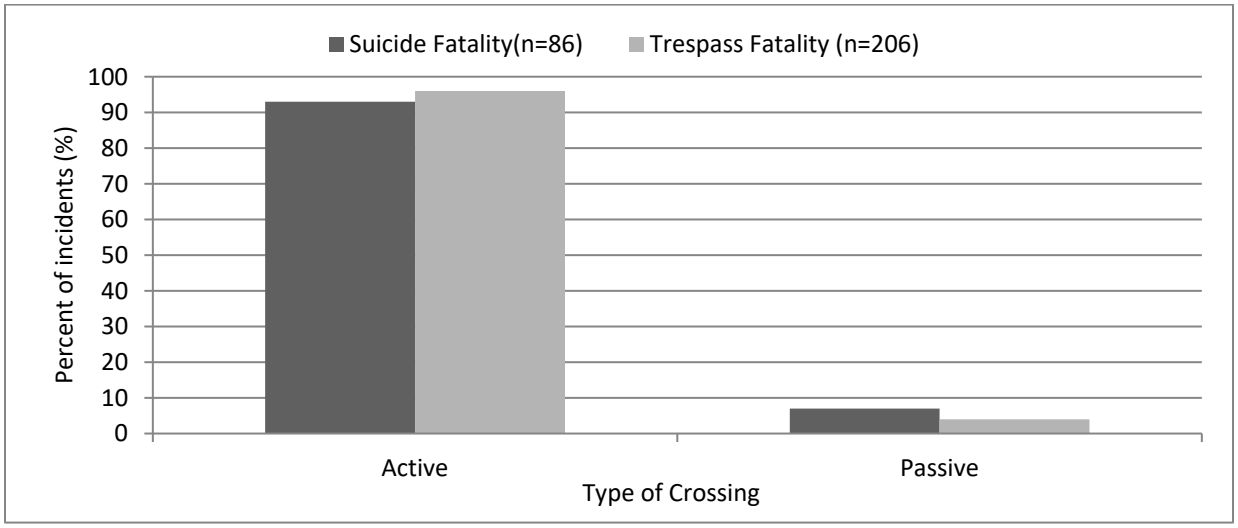

Figure 55. Percent of Grade Crossing Suicide and Trespass Fatality Incidents by Type of Crossing (2012 – 2014)

Both suicide and trespass pedestrian fatalities are most likely to occur at active crossings. One possible reason is for this is that active crossings are more common in heavily populated areas, which may lead to an increase in trespass frequency. Additionally, active crossings alert

pedestrians that a train is approaching, and it may also inform an individual looking to harm themselves that the train will be arriving soon.

As seen in incidents that occur on the railroad right-of-way, freight trains are involved in more grade crossing incidents (between 55 percent and 60 percent) for both suicide and trespass fatality incidents. Figure 56 presents a comparison of the percentage of suicide and trespass fatalities by type of train involved.

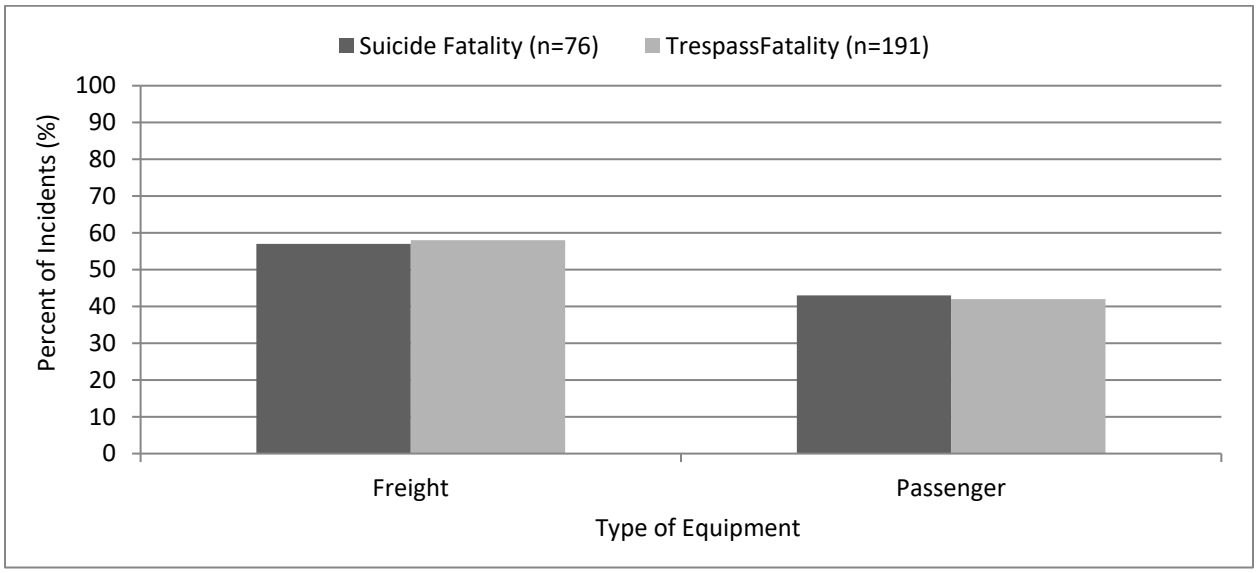

Figure 56. Percent of Grade Crossing Suicide and Trespass Fatality Incidents by Type of Train (2012 – 2014)

6.2.1.3 Train Speed

Train speed is often thought to be positively correlated with the severity of the outcome and lethality of an incident – the faster the train is traveling, the more lethal the injury. However, a number of injuries were identified that occurred at high speeds over 60 miles per hour (mph), while a number of fatalities were identified that occurred at speeds under 15 mph. This finding is further explored in this section. A number of different comparisons of train speeds in trespass and suicide grade crossing incidents is presented in Figure 57, Figure 58 and-Figure 59.

Overall most fatal incidents (regardless of the individual's intent) occur with a train speed between 30 and 59 mph. For suicide fatalities, the largest percentage takes place equally between 30 to 44 mph and 45 to 59 mph (30 percent each). For trespass fatalities, 30 to 44 mph was the most common train speed category followed by 30 to 44 mph. A comparison of the percentage of suicide and trespass fatalities by train speed is presented the Figure 57.

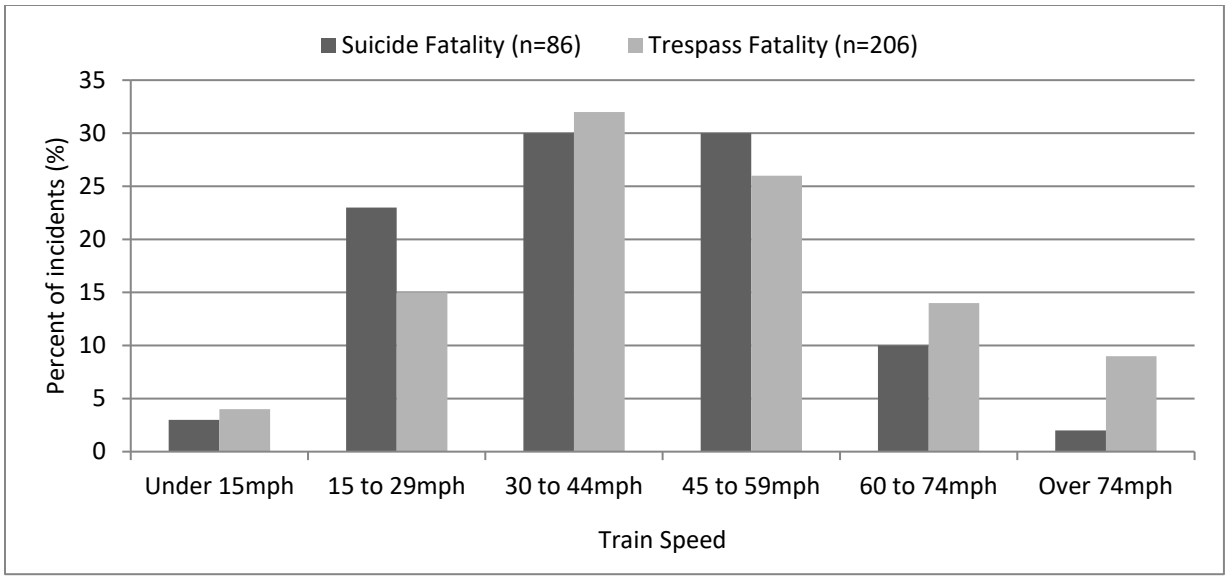

Figure 57. Percent of Grade Crossing Suicide and Trespass Fatality Incidents by Train Speed (2012 – 2014)

Looking specifically at suicide grade crossing incidents, incidents that ended in a fatality most often involved a train with speeds of 30 to 44 mph and 45 to 59 mph at impact (each at 30 percent). However, when the incident ended in an injury, trains speeds were largely in the 15 to 29 mph range (approximately 55 percent). It is important to note that only 11 suicide injury incidents occurred; these numbers may show the beginning of a trend, but should be taken cautiously. A comparison of the percentage of suicide fatalities and injuries by train speed is presented in Figure 58.

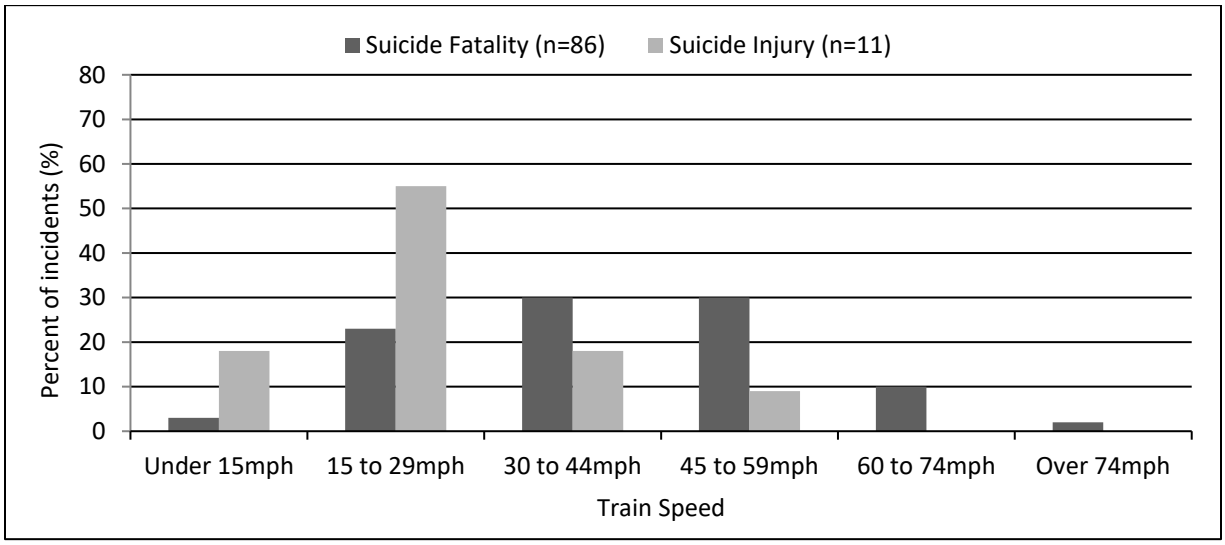

Figure 58. Percent of Grade Crossing Suicide Fatality and Injury Incidents by Train Speed (2012 – 2014)

Incidents where the individual was trespassing (unintentional fatality) had different trends based on train speeds. For trespassing incidents, train speeds were most common with trains going at 30 to 44 mph (30 percent) followed closely by 15 to 29 mph (26 percent) and under 15 mph (24

percent). However, when the incidents are intentional, the largest percentage of incidents involved train speeds between 15 to 29 mph (55 percent). The reason for this is unclear. However, the average train speed for injuries overall is lower (30 mph) in comparison to overall fatalities (44 mph). A comparison of the percentage of suicide and trespass injuries by train speed is presented the Figure 59.

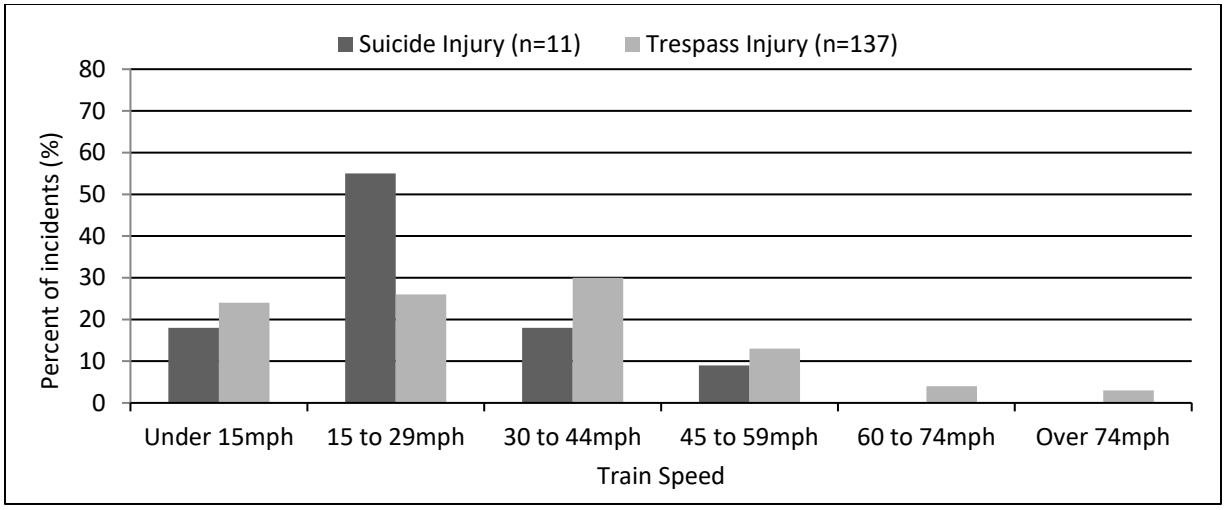

Figure 59. Percent of Grade Crossing Suicide Fatality and Injury Incidents by Train Speed (2012 – 2014)

6.2.1.4 Time of Day

Incidents resulting in a suicide fatality (intentional) were approximately evenly split between two time periods 12:00 pm to 4:00 pm and 4:00 pm to 8:00 pm, both accounting for 20 percent of the total number of suicide incidents, followed closely by 8:00 am to 12:00 pm (19 percent). Trespass fatalities (unintentional) were seen to occur predominately during the 4:00 pm to 8:00 pm time period (27 percent), which is in line with findings for overall suicide and trespass fatalities, followed by 8:00 pm to 12:00 am (19 percent). A comparison of the percentage of suicide and trespass fatalities by time of day is presented the Figure 60.

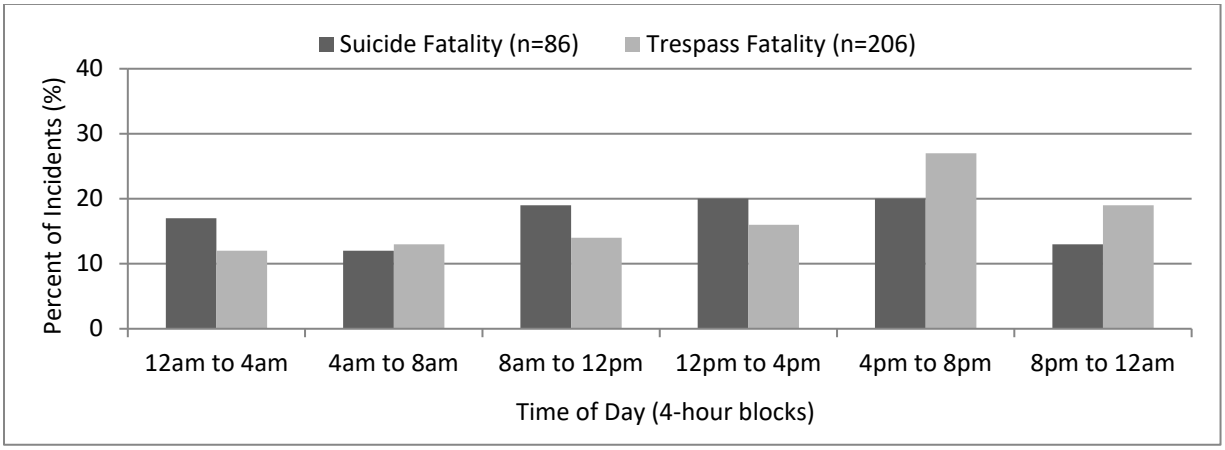

Figure 60 Percent of Grade Crossing Suicide and Trespass Fatality Incidents by Time of Day (2012 – 2014)

6.2.1.5 Season

Spring had the highest percentage of incidents regardless of the individual's intent, with 34 percent for suicide incidents and 30 percent for trespass (unintentional) incidents. This trend mirrors the seasonal trend identified in overall suicide fatality incidents on the rail. The second most common season for suicide fatalities was seen in summer (26 percent) while trespass fatality was winter (24 percent). Additionally, for suicide, winter had the lowest percentage of incidents and trespass had the lowest percentage for summer, which is in direct contrast with suicide incidents. Figure 61 compares the percentage of suicide and trespass fatalities by season.

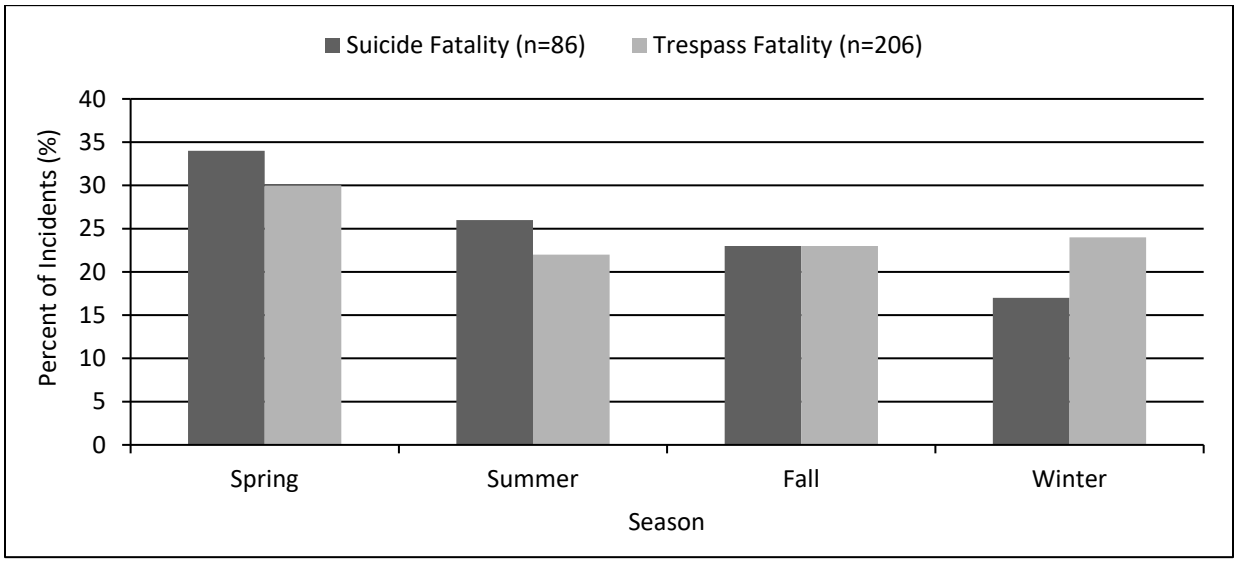

Figure 61. Percent of Grade Crossing Suicide and Trespass Fatality Incidents by Season (2012 – 2014)

6.2.1.6 Weather and Temperature

The weather and outside air temperature at the time of the incident is displayed in Figure 62 and 63. Both suicide and trespass pedestrian fatalities at grade crossings tend to occur when the weather is clear (70 percent of all incidents). Cloudy conditions were the second most common weather conditions for suicide fatalities at 24 percent and trespass at 22 percent. None of the incidents occurred with sleet and only one trespass fatality incident occurred with snowy weather conditions.

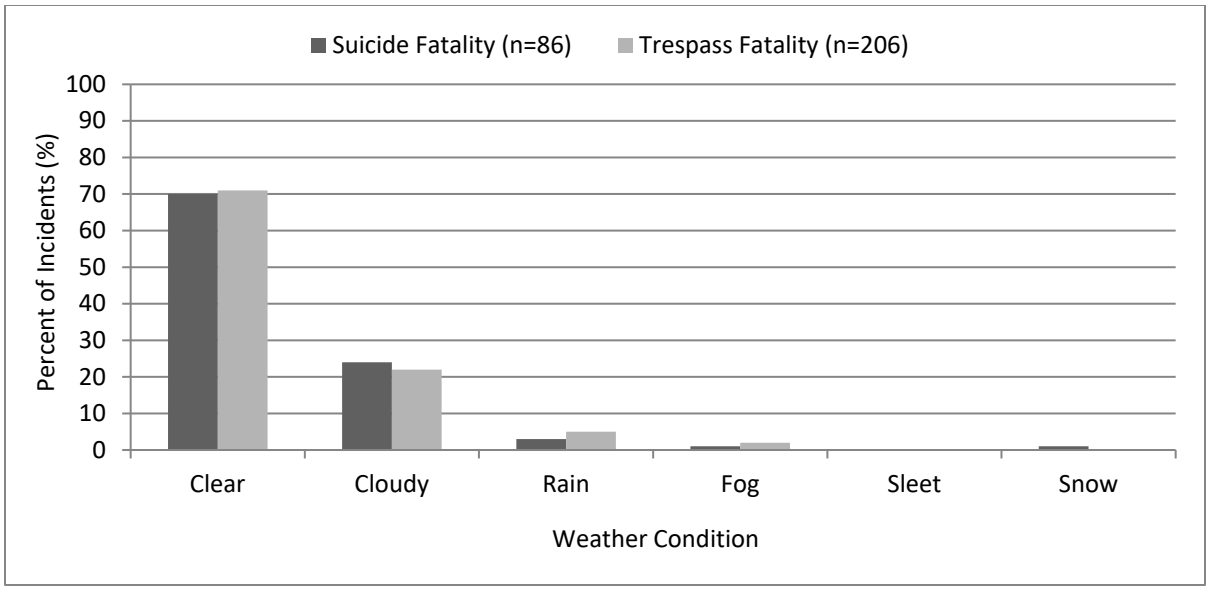

Figure 62. Percent of Grade Crossing Suicide and Trespass Fatality Incidents by Weather Condition (2012 – 2014)

Along with weather conditions, the outdoor temperature at the time of the incident may also be valuable in predicting when these incidents will occur. Most suicide and trespass fatalities occur when the temperature is moderate, between 60°F and 74°F (40 percent and 36 percent of incidents, respectively), as shown in Figure 63 below. Less than 10 percent of all incidents occurred where temperatures were at the extremes, either 29 degrees or under as well as 90 degrees and upward.

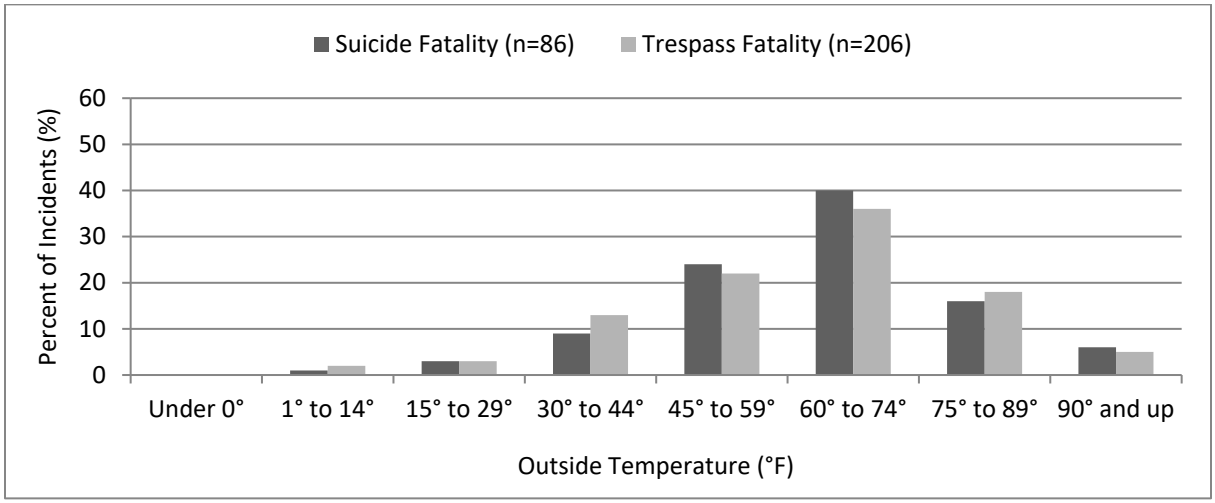

Figure 63. Percent of Grade Crossing Suicide and Trespass Fatality Incidents by Outside Temperature (2012 – 2014)

These trends for both weather and outside air temperature indicate that both suicide and trespass incidents are more likely to occur during pleasant weather. This may dispel myths that an individual may be more likely to consider suicide during conditions that lend themselves to a gloomy atmosphere (e.g., a rainy day), or that trespass fatalities occur during low visibility when the train operator and/or trespasser may not see the impending danger ahead.

6.2.2 Characteristics of the Decedent

6.2.2.1 Gender

According to the CDC[19], males are more likely to intentionally fatally injure themselves than females. Incident data on pedestrian grade-crossing fatalities confirmed that males were more likely to be involved in suicides at highway-rail grade crossings. This same trend is also found in trespass fatalities. These trends are shown in Figure 64.[20] Overall, males accounted for 72 percent of the pedestrian grade crossing suicide fatalities that occurred between 2012 and 2014. Males accounted for a slightly higher percent (82 percent) of pedestrian trespass fatalities at grade crossings, and females accounted for a slightly higher percent of suicide fatalities (27 percent) than trespass fatalities (18 percent) at grade crossings.

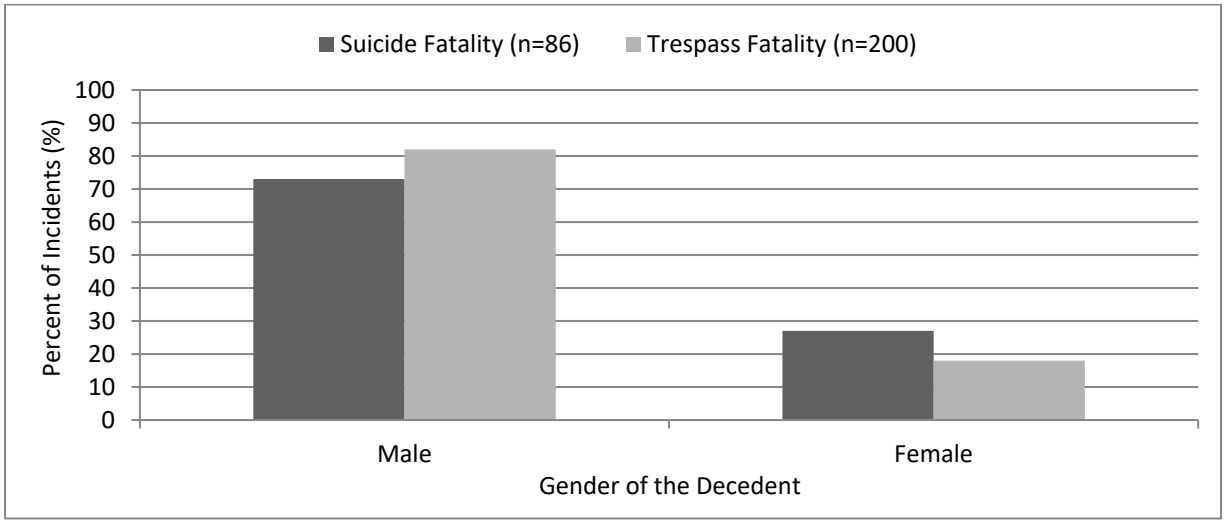

Figure 64. Percent of Grade Crossing Suicide and Trespass Fatality Incidents by Gender of Decedent (2012-2014)

Age

The average number of grade crossing suicide and trespass fatalities by age group is presented below in Figure 65. Ten-year age groups were used with the exception of the first and last groups (0-14 and 85+).

[19] Retrieved on 12/18/15 from: http://www.cdc.gov/violenceprevention/pdf/suicide-datasheet-a.pdf.

[20] Note that six of the trespass fatality incidents did not indicate whether the decedent was male or female, and are excluded from the figure.

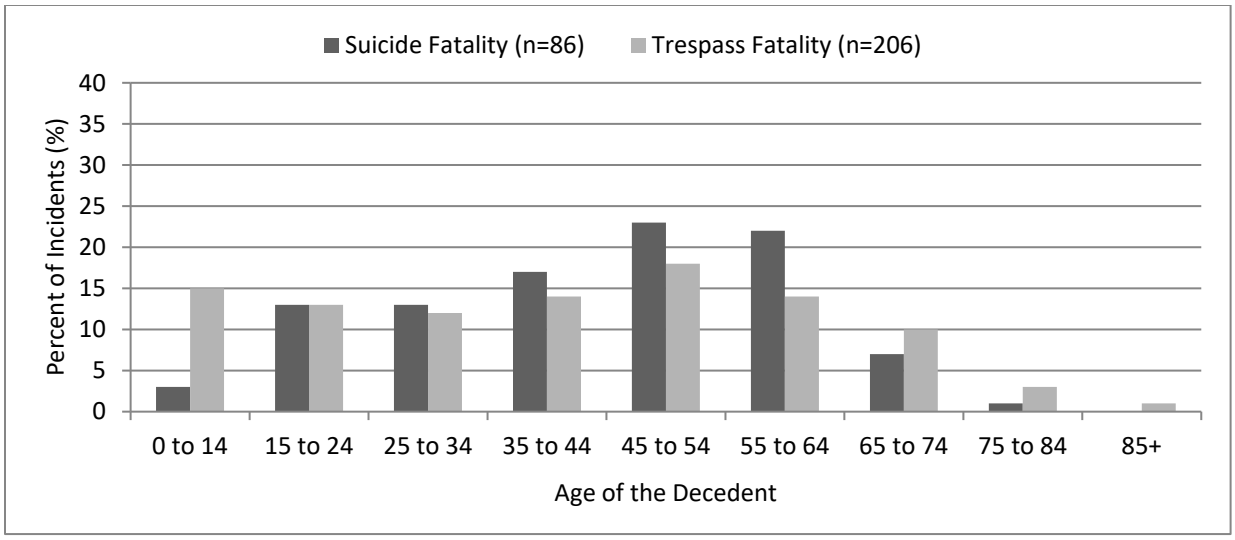

Figure 65. Percent of Grade Crossing Suicide and Trespass Fatality Incidents by Age of the Decedent (2012 – 2014)

There is a slight difference between the percent of fatalities in the age groups for suicide and trespass fatalities. The age groups with the highest percentage of suicide fatalities are 45-54 years (23 percent) followed closely by 55-64 years (22 percent). The age groups with the lowest percentage of suicide fatalities are 75-84 years (1 percent) and 0-14 years (3 percent).

The age group with the highest percentage of trespass fatalities is the same as with suicide fatalities: 45-54 years (18 percent). The second most common age group is also the youngest from 0 to 14 years (15 percent). This is a surprising finding due to the disparity between suicide and trespass fatality incidents in that age group (3 percent for suicide; 15 percent for trespass).

The age trends identified for grade crossing incidents differ from overall suicide and trespass fatalities. The age trend for grade crossing suicide incidents is skewed slightly older, while the trend for overall suicide and trespass incidents is slightly younger (less than 45 years of age). However, due to the small group sizes, additional data is needed to further explore these potential differences.

6.2.3 Interactions between Gender and Age of the Decedent

Differences for potential trends were identified between pedestrian suicide and trespass grade crossing fatalities in terms of the age and gender of the decedent. Figure 66 presents the interaction between age and gender of the decedent.

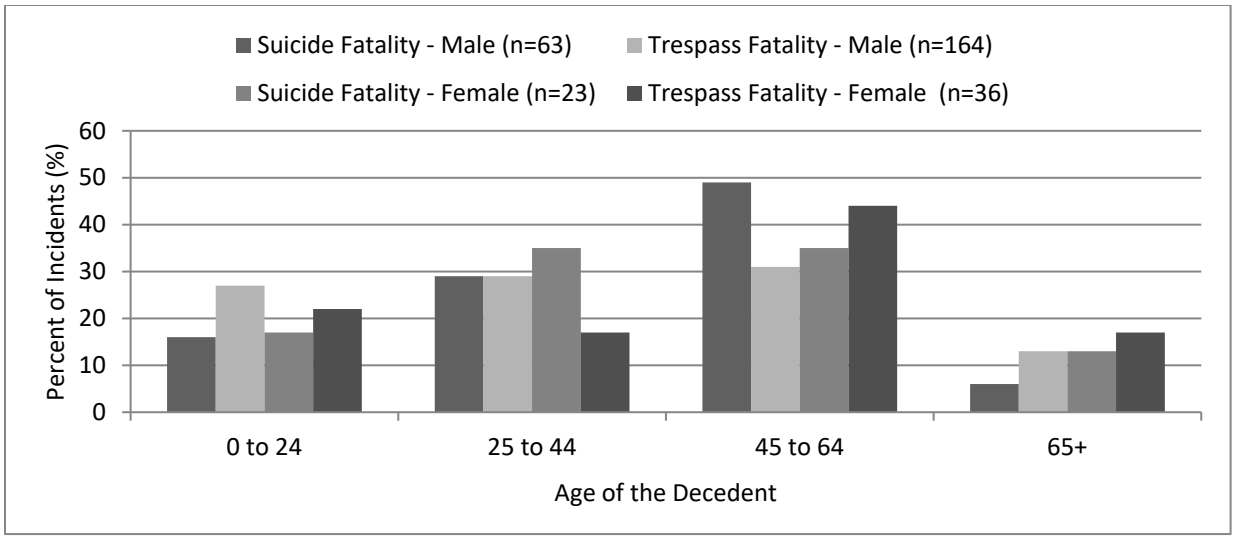

Figure 66. Percent of Grade Crossing Suicide and Trespass Fatality Incidents by Gender and Age of the Decedent (2012 – 2014)

Suicide fatalities involving a male decedent were most common for the age group of 45 to 64 years (49 percent), with 25 to 44 years as the second most common (29 percent). Male decedents involved in a trespass fatality were found to been more equally spread across the age groups of 0 to 24 (27 percent), 25 to 44 years (29 percent) and 45 to 64 years (31 percent). Suicide fatalities involving a female decedent were equally most common in the age groups of 25 to 44 years and 45 to 64 years (both at 35 percent). Female decedents involved in a trespass fatality were found to be most common in the age groups of 45 to 64 (44 percent), with 0 to 24 years as second most common at 22 percent.

6.2.4 Summary

Only a small proportion of trespass and suicide incidents occur at grade crossings, however, these incidents provide additional insights into the circumstances that surround trespass and suicide casualties. The additional information reported during a grade crossing incident provides insights that right-of-way incidents do not (i.e., gender, weather, train speed). As seen with national suicide trends, the majority of incidents involved males rather than females. Additionally, the data indicate that incidents are more likely to occur on clear days with moderate outside temperatures. Although most fatalities occurred at higher train speeds, this was not always the case, as several incidents resulted in an injury when the train was traveling at higher speeds. Likewise, most injuries occurred at lower train speeds, but several fatalities also occurred. It is important to note that due to the small sample size, additional data is needed to further explore these findings.

7. Discussion

7.1 Overview

This document provides a baseline for trespassing incidents that occur with the intention of completing a suicide attempt and its comparison group of non-intentional trespassing fatalities in the United States. This baseline should assist railroads and researchers in understanding the populations and locations which are most at risk to trespass and attempt suicide, which may assist in their efforts to mitigate the number of incidents that occur.

This report compared FRA trespass and suicide fatality data in a number of different ways. In the first section, all trespass fatality incidents (regardless of intention) were examined together to give a high level view of trespassing incidents. The second section discussed suicide (intentional) fatality incidents and included a subsection that compares fatality and injury suicide incidents to give a broader understanding of the factors involved in suicide incidents and any secondary differences seen based on the incident's outcome (fatality or injury). Third, a discussion of trespass vs. suicide fatalities provides a better understanding of the similarities and differences between the two types of fatal incidents. Finally, incidents at grade crossings were discussed and a comparison between the two railroad locations was made.

7.2 Suicide Incidents

Several potential trends were identified in the data that may help to identify underlying driving factors involved in suicide incidents. Timing trends could be attributed to an increased opportunity for an incident to occur, for example, during increased passenger train frequency that occurs during typical weekday evening commuting hours (4:00 pm and 8:00 pm). However, this also raises the question of why this trend does not appear during typical morning commute hours. Seasonal timing trends followed national suicide seasonal trends which peak in the spring. This could be related to complex relationships among environmental, physiological and other individual factors as they relate to suicidal behavior. In terms of who is involved in these incidents, it was found that age of the decedents is younger than would be expected based on national suicide rates. It is unknown what could be driving this trend, although this could be an important factor in determining a target population for mitigation strategies.

Suicide incidents that resulted in a fatality were compared with those that resulted in an injury in order to identify factors that may affect the outcome of these incidents. It was found that fatalities more often involve an individual lying down, sitting, and especially standing, while more injuries involve running, jumping, and especially walking. One potential area of interest that may warrant additional investigation is whether incidents are more likely to be fatal when the individual is engaging in a stationary action or is in motion at the time of the collision.

7.3 Trespass and Suicide Incidents

Trespass incidents did not follow the seasonal peak in the spring and summer as with suicide fatalities; rather, trespass incidents peaked in the summer and fall. Additionally, trespass incidents occur more often on a weekend than suicide attempts, particularly when a passenger train is involved. They also follow a slightly different time pattern. This is a potential indicator that suicide incidents may be more strongly associated with an increased opportunity for an

incident to occur (i.e., increased train frequency) than trespass incidents. However, additional research in this area would be needed before a conclusion could be drawn.

7.4 Grade Crossing Incidents

Specifically, data from grade crossing incident allowed the authors to obtain insights that cannot be currently gained from other types of incident reports. Additional information available in grade crossing reports includes weather, train speed, gender of the individual, and information about the type of warning signals present at the time of the incident.

One of the more interesting and potentially meaningful findings is related to train speed. Although most fatalities occur at higher train speeds, and most injuries occur at lower train speeds, this was not always the case. Several incidents resulted in an injury when the train was traveling at higher speeds; likewise, several fatalities occurred when the train was traveling at lower speeds. This is an important point when considering using train lethality as a means to prevent trespassing and/or suicide on the railway. For example, trespassers may believe that a slower train poses less of a danger, contributing to their decision to try to beat a train across the tracks. This same belief about train lethality may draw a suicidal individual to the rail as a means to end their life due to the incorrect belief that a faster train is more likely to cause a fatal injury, when, in reality, there is a very real risk of a disabling and disfiguring injury. It is important to consider that only a small percentage of incidents occur at grade crossings, and although, these incidents provide additional insight into the circumstances that surround trespass and suicide casualties, additional data is needed to further explore these findings.

7.5 Limitations

This report reviews the existing data from the FRA, and the limitations of this report are linked to the quantity and quality of the data which are available. As of publication, there is only three full years' worth of suicide data, which makes it difficult to be confident in the trends that have emerged through the provided descriptive analyses. This does not mean that the analyses are without value, however, since it is necessary to begin collecting this data in order to develop a baseline against which changes can be measured. These results can be seen as trends that the authors plan to track over the coming years.

Another challenge from the available data is that the FRA process relies on local coroner or medical examiners to make all final cause of death determinations. All reports provided to the FRA prior to this official determination are listed as a non-suicide and were only changed in the FRA system if a fatality comes back as a suicide and the rail carrier obtained this report from the coroner or medical examiner. This process may take many months, or in some cases over a year. Therefore, the data provided in this document may still be subject to change if any suicide incidents have taken longer than a year to finalize. This delay is the reason why the report covers only data through 2014 despite the release of the report in 2016 – the 2015 trespass/suicide determinations are still in flux and likely will not settle until much later in 2016. The most recent data on the FRA website will show this delay in processing, with trespass casualties over-represented and suicide casualties under-represented, although the degree of this problem is unknown.

The data provided by rail carriers through the FRA-mandated collection forms are generally quite consistent and reliable; however, there are a few exceptions that makes analyses a bit more challenging. First, basic data, which are collected through the grade crossing incident report

form, are not collected through the other injury report form. Factors such as weather, temperature, and gender may help better understand why trespass incidents occur, but these factors are not collected for most trespass incidents. Also, one of the most informative factors, physical act, may be confusing for carriers to fill out since the coding schema has 96 different codes and many appear to overlap to some degree. For example, there are separate codes for "Lying down" (B6) and for "Laying" (42), the former of which is supposed to refer to an individual lying down on the track and the latter to refer to an individual laying an object on the track. However, from the data available, it is unlikely that carriers always understand this distinction, as 138 (18 percent) pedestrian suicide incidents were reported to include an individual's physical act of laying something on the track. When available, report narratives indicated that these codes were being used interchangeably. There are other codes like this that may cause confusion without a concrete definition available to the carriers, e.g., if a person jumps onto the track from a platform and then stands on the track, should this be "Jumped onto" (41), "Jumped from" (40), or "Standing" (62)? This ambiguity makes it challenging to use these codes to truly understand how these individuals may have accessed the track or what mitigations may have prevented them from doing so.

7.6 Next Steps

With the primary goal of mitigating both suicide and trespass incidents on the railroad, there is a need to maintain updated demographic information, such as this baseline study, because the information will play essential roles in understanding how and where the best mitigation strategies could be placed with maximum benefit. Therefore, this demographic data will be updated every two years. This will allow for greater reliability of existing trends seen in the present report and also give more opportunities to look at the data more rigorously with larger sample sizes. A secondary goal would be to examine individual factors within the study to better understand its predictive ability for the incident occurring. This may be done in combination with additional datasets from individual railroads that wish to share their data, as well as media reports on the different incidents and how the incidents' factors were portrayed. These additional data sources will allow us to create a more complete picture, provide a better understanding of the intricacies of these effects, and learn how to best mitigate the occurrence of such incidents.

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Appendix A. FRA Railroad Injury and Illness Summary and Continuation Sheet

The FRA forms used for reporting any injury or illness on railroad property are provided below (6180.55 and 55a). These forms can also be accessed at:
http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Forms.aspx

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

RAILROAD INJURY AND ILLNESS SUMMARY

OMB No. 2130-0500

1. Name of Reporting Railroad	2. Alphabetic Code	3. Report Month & Year	4. State Alphabetic Code	5. County

6. Name of Reporting Officer	7. Official Title
8. Address	9. Telephone *(Area Code) (Number)*

10.

If executed within the United States, its territories, possessions, or commonwealths:

I declare (or certify, verify, or state) under penalty of perjury that the information on this form is true and correct.

Executed on _____ *(date)*.

_____ *(Signature)*.

If executed without (i.e., outside of) the United States:

I declare (or certify, verify, or state) under penalty of perjury under the laws of the United States of America that the information on this form is true and correct.

Executed on _____ *(date)*.

_____ *(Signature)*.

OPERATIONAL DATA & ACCIDENT/INCIDENT COUNTS FOR REPORT MONTH

11. Freight Train Miles	12. Passenger Train Miles	13. Yard Switching Train Miles	14. Other Train Miles

15. Railroad Worker Hours	16. Passenger Miles Operated	17. Number of Passengers Transported

18. REPORTED CASUALTIES

Type of Person	Fatal	Nonfatal
Worker on duty – railroad employee		
Railroad employees not on duty		
Passengers on trains		
Nontrespassers/ on railroad property		
Trespassers		
Worker on duty - contractor		
Contractor - other		
Worker on duty - volunteer		
Volunteer - other		
Nontrespassers/ off railroad property		
Grand total		

19. NUMBER OF FRA FORMS ATTACHED

FRA Form Number	Number Attached
6180.54	
6180.55a	
6180.56	
6180.57	
6180.81	

20. Remarks Section. Please describe operational, environmental, or other circumstances that account for unusual fluctuations in train miles operated, employee hours, or passenger counts.

NOTE: This report is part of the reporting railroad's accident report pursuant to the accident reports statute and, as such shall not "be admitted as evidence or used for any purpose in any suit or action for damages growing out of any matter mentioned in said report. . . ." 49 U.S.C. 20903. See 49 C.F.R. 225.7 (b).

This collection of information is mandatory under 49 CFR 225, and is used by FRA to monitor national rail safety. Public reporting burden is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing databases, gathering and maintaining the data needed, and completing and reviewing the collection of information. The information collected is a matter of public record, and no confidentiality is promised to any respondent. Please note that an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number for this collection is 2130-0500.

FORM FRA F 6180.55 (Rev. 08/10) *This report is required by law (49 USC 20901). Failure to report can result in the imposition of civil penalties.*

OMB approval expires 05/31/2017

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

RAILROAD INJURY AND ILLNESS SUMMARY

(Continuation Sheet)

SHEET ___ OF ___

OMB No. 2130-0500

1. Name of Reporting Railroad	2. Alphabetic Code	3. Report Month	4. Report Year

5a. Accident/Injury Number	5b. Day	5c. Time of Day	5d. County	5e. State	5f. Type Person/ Job Code	5g. Age

5h. Drug/ Alcohol Test		5i. Injury Illness Code	5j. Physical Act	5k. Location	5l. Event	5m. Tools	5n. Cause	5o. Number of Days Away From Work	5p. Number of Days Restricted	5q. Exposure to Hazmat	5r. Special Case Codes
A	D										

5s. Latitude		5t. Longitude	
5u. Narrative (Up to 250 Characters)			

5a. Accident/Injury Number	5b. Day	5c. Time of Day	5d. County	5e. State	5f. Type Person/ Job Code	5g. Age

5h. Drug/ Alcohol Test		5i. Injury Illness Code	5j. Physical Act	5k. Location	5l. Event	5m. Tools	5n. Cause	5o. Number of Days Away From Work	5p. Number of Days Restricted	5q. Exposure to Hazmat	5r. Special Case Codes
A	D										

5s. Latitude		5t. Longitude	
5u. Narrative (Up to 250 Characters)			

5a. Accident/Injury Number	5b. Day	5c. Time of Day	5d. County	5e. State	5f. Type Person/ Job Code	5g. Age

5h. Drug/ Alcohol Test		5i. Injury Illness Code	5j. Physical Act	5k. Location	5l. Event	5m. Tools	5n. Cause	5o. Number of Days Away From Work	5p. Number of Days Restricted	5q. Exposure to Hazmat	5r. Special Case Codes
A	D										

5s. Latitude		5t. Longitude	
5u. Narrative (Up to 250 Characters)			

NOTE: This report is part of the reporting railroad's accident report pursuant to the accident reports statute and, as such shall not "be admitted as evidence or used for any purpose in any suit or action for damages growing out of any matter mentioned in said report. . . ." 49 U.S.C. 20903. See 49 C.F.R. 225.7 (b).

This collection of information is mandatory under 49 CFR 225, and is used by FRA to monitor national rail safety. Public reporting burden is estimated to average 20 minutes per response, including the time for reviewing instructions, searching existing databases, gathering and maintaining the data needed, and completing and reviewing the collection of information. In trespasser cases and in cases of suicide/attempted suicides, the estimated average time to complete this form is 50 minutes and 65 minutes, respectively. The information collected is a matter of public record, and no confidentiality is promised to any respondent. Please note that an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number for this collection is 2130-0500.

FORM FRA F 6180.55a (Rev. 08/10) **OMB approval expires 05/31/2017**

Appendix B. FRA Highway-Rail Grade Crossing Accident/Incident Report

The FRA form used for reporting grade crossing accidents or incidents is provided below (6180.57). This form can also be accessed at:
http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Forms.aspx

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION (FRA)

HIGHWAY-RAIL GRADE CROSSING ACCIDENT/INCIDENT REPORT

OMB No. 2130-0500

1. Name of Reporting Railroad	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
2. Name of Other Railroad or Other Entity Filing for Equipment Involved in Train Accident/Incident	2a. Alphabetic Code	2b. Railroad Accident/Incident No.
3. Name of Railroad or Other Entity Responsible for Track Maintenance *(single entry)*	3a. Alphabetic Code	3b. Railroad Accident/Incident No.
4. U.S. DOT Grade Crossing Identification Number	5. Date of Accident/Incident (month / day / year)	6. Time of Accident/Incident AM ☐ PM ☐

7. Nearest Railroad Station	8. Subdivision	9. County	10. State Abbr. / Code
11. City *(if in a city)*	12. Highway Name or Number Public ☐ Private ☐		

Highway User Involved

13. Type — Code
A. Auto B. Truck C. Truck-trailer D. Pick-up truck E. Van F. Bus G. School bus H. Motorcycle J. Other motor vehicle K. Pedestrian M. Other *(specify)*

14. Vehicle Speed *(est. mph at impact)*

15. Direction *(geographical)* — Code
1. North 2. South 3. East 4. West

16. Position — Code
1. Stalled or stuck on crossing 2. Stopped on crossing 3. Moving over crossing 4. Trapped on crossing by traffic 5. Blocked on crossing by gates

20a. Was the highway user and/or rail equipment involved in the impact transporting hazardous materials? — Code
1. Highway user 2. Rail equipment 3. Both 4. Neither

Rail Equipment Involved

17. Equipment — Code
1. Train *(units pulling)* 2. Train *(units pushing)* 3. Train *(standing)* 4. Car(s) *(moving)* 5. Car(s) *(standing)* 6. Light loco(s) *(moving)* 7. Light loco(s) *(standing)* 8. Other *(specify)* A. Train pulling – RCL B. Train pushing – RCL C. Train standing – RCL D. EMU Locomotive(s) E. DMU Locomotive(s)

18. Position of Car Unit in Train

19. Circumstance — Code
1. Rail equipment struck highway user 2. Rail equipment struck by highway user

20b. Was there a hazardous materials release by — Code
1. Highway user 2. Rail equipment 3. Both 4. Neither

20c. State here the name and quantity of the hazardous material released, if any.

21. Temperature *(Specify if minus)* * F	22. Visibility *(single entry)* — Code 1. Dawn 2. Day 3. Dusk 4. Dark	23. Weather *(single entry)* — Code 1. Clear 2. Cloudy 3. Rain 4. Fog 5. Sleet 6. Snow		
24. Type of Equipment Consist *(single entry)* — Code 1. Freight Train 2. Passenger Train-Pulling 3. Commuter Train-Pulling 4. Work train 5. Single Car 6. Cut of cars 7. Yard/switching 8. Light loco(s) 9. Maint./Inspect. Car A. Spec. MoW Equip. B. Passenger Train-Pushing C. Commuter Train-Pushing D. EMU E. DMU	25. Track Type Used by Rail Equipment Involved — Code 1. Main 2. Yard 3. Siding 4. Industry	26. Track Number or Name		
27. FRA Track Class (1-9, X)	28. Number of Locomotive Units	29. Number of Cars	30. Consist Speed *(Recorded speed, if available)* — Code R - Recorded E - Estimated MPH	31. Time Table Direction — Code 1. North 3. East 2. South 4. West
32. Type of Crossing Warning — 1. Gates 2. Cantilever FLS 3. Standard FLS 4. Wig wags 5. Hwy. traffic signals 6. Audible 7. Crossbucks 8. Stop signs 9. Watchman 10. Flagged by crew 11. Other *(specify)* 12. None Code(s)	33. Signaled Crossing Warning — Code *(See reverse side for instructions and codes)*	34. Roadway Conditions — Code A. Dry B. Wet C. Snow/slush D. Ice E. Sand, Mud, Dirt, Oil, Gravel F. Water (Standing, Moving)		
35. Location of Warning — Code 1. Both sides 2. Side of vehicle approach 3. Opposite side of vehicle approach	36. Crossing Warning Interconnected with Highway Signals — Code 1. Yes 2. No 3. Unknown	37. Crossing Illuminated by Street Lights or Special Lights — Code 1. Yes 2. No 3. Unknown		
38. Highway User's Age	39. Highway User's Gender — Code 1. Male 2. Female	40. Highway User Went Behind or in Front of Train and Struck or was Struck by Second Train — Code 1. Yes 2. No 3. Unknown	41. Highway User — Code 1. Went around the gate 2. Stopped and then proceeded 3. Did not stop 4. Stopped on crossing 5. Other *(specify)* 6. Went around/thru temporary barricade *(if yes, see instructions)* 7. Went thru the gate 8. Suicide/Attempted suicide	
42. Driver Passed Standing Highway Vehicle — Code 1. Yes 2. No 3. Unknown	43. View of Track Obscured by *(primary obstruction)* — Code 1. Permanent structure 2. Standing railroad equipment 3. Passing train 4. Topography 5. Vegetation 6. Highway vehicles 7. Other *(specify)* 8. Not obstructed			

Casualties to:	Killed	Injured	44. Driver was — Code 1. Killed 2. Injured 3. Uninjured	45. Was Driver in the Vehicle? — Code 1. Yes 2. No
46. Highway-Rail Crossing Users			47. Highway Vehicle Property Damage *(est. dollar damage)*	48. Total Number of Vehicle Occupants *(including driver)*
49. Railroad Employees			50. Total Number of People on Train *(include passengers and train crew)*	51. Is a Rail Equipment Accident/ Incident Report Being Filed? — Code 1. Yes 2. No
52. Passengers on Train				

53a. Special Study Block — Video Taken? ☐ Yes ☐ No — Video Used? ☐ Yes ☐ No

53b. Special Study Block

54. Narrative Description *(Be specific, and continue on separate sheet if necessary)*

55. Typed Name & Title	56. Signature	57. Date

NOTE: This report is part of the reporting railroad's accident report pursuant to the accident reports statute and, as such shall not "be admitted as evidence or used for any purpose in any suit or action for damages growing out of any matter mentioned in said report...." 49 U.S.C. 20903. See 49 C.F.R. 225.7 (b).

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* NOTE THAT ALL CASUALTIES MUST BE REPORTED ON FORM FRA F 6180.55A

OMB approval expires 05/31/2017

Appendix C. FRA Guide List of Physical Act Categories

This appendix presents a list of the 96 possible responses to question 5j (Physical Act) on the FRA Injury and illness Summary Report Continuation Sheet (6180.55a). This list can also be found in Appendix F of the *FRA Guide for Preparing Accident/Incident Reports*. The alphanumeric code is presented in bold, followed by a description of the physical act. Note that definitions for these categories are not provided in the aforementioned FRA guide and thus are not provided here.

01 Adjusting coupler
02 Adjusting drawbar
03 Adjusting, other
04 Applying rail anchor/fastener
B3 Arresting/apprehending/subduing
A2 Ascending
05 Bending, stooping
06 Carrying
07 Chaining, cabling car or locomotive
08 Cleaning/scrubbing
09 Climbing over/on
10 Closing
13 Coupling air hose
11 Coupling electric cables
12 Coupling steam hose
16 Crossing between
15 Crossing or crawling under
14 Crossing over
17 Cutting rail
18 Cutting vegetation
19 Cutting, other
77 Derail, applying
79 Derail, other
78 Derail, removing
A3 Descending
20 Digging, excavating
21 Driving (motor vehicle, forklift, etc.)
A4 Exercising
22 Flagging
23 Fueling
A5 Getting in
A6 Getting out
25 Getting off
24 Getting on
26 Grinding
74 Handbrakes, applying
75 Handbrakes, releasing
76 Handbrakes, other
27 Handling baggage
28 Handling car parts
30 Handling locomotive parts
29 Handling material, general
33 Handling other track material/supplies
34 Handling poles
37 Handling rail
35 Handling tie plates
36 Handling ties
31 Handling wheels/trucks
32 Handling, other
A7 Hauling
38 Inspecting
39 Installing

40 Jumping from

41 Jumping onto

42 Laying

44 Lifting equipment (tools, parts, etc.)

43 Lifting other material

45 Lining switches

46 Lining, other

47 Loading/unloading

B6 Lying down

48 Maintaining/servicing

A8 Moving

49 Opening

50 Opening/closing angle cock

51 Operating

53 Pulling

52 Pulling pin lifter/operating uncoupling lever

54 Pushing

55 Reaching

56 Removing rail anchors/fasteners

57 Repairing

A1 Replacing

58 Riding

59 Running

B2 Sanding

B1 Servicing

60 Sitting

B4 Sleeping

61 Spiking (installation/removal)

62 Standing

B5 Stepped on

80 Stepping across (passenger cars)

63 Stepping up

64 Stepping down

65 Stepping over

66 Uncoupling air hose

68 Uncoupling electric cables

67 Uncoupling steam hose

69 Using hand signals

70 Using hand tool

71 Using, other

72 Walking

A9 Washing

73 Welding (includes field welding)

99 Other (Narrative must be provided)

Appendix D. Description of Physical Act – Other Category

This appendix provides a list of the actions described in the narrative when the physical act of the individual at the time of the incident was indicated as *other* on the FRA Injury and Illness Summary Report (Table 12). In addition, any FRA action categories that the authors combined into the *other* category are included in the table and designated with an asterisk (*). The number of incidents that fell within each action is also provided.

Table 12. Physical Actions of the Individual Listed under *Other*

Action	Number of Incidents
Adjusting coupler*	1
Adjusting coupler* (narrative stated stepped in front of train)	1
Arresting/Apprehending*	1
Attempting to catch up with train	1
Attempting to use jack on truck to remove from crossing	1
Bending down	1
Child sitting in stroller	1
Climbing on/over*	10
Crawling	1
Cutting*	1
Drove wheelchair under gate	1
Fell from bridge	1
Fell from/dismounted after boarding train	1
Fetal position	1
Fouling crossing/track	2
Getting off/on*	3
Handling*	1
Hanged	4
In gauge	1
Jumped from bushes	2
Jumped from platform	2
Jumped/Dove in front of train	6
Jumped in front of train while on a bridge	1
Jumped off bridge	1

Action	Number of Incidents
Kneeling	3
Leaned into track	1
Lying down	1
Making graffiti	1
Moving*	1
Placed hands and head on rail	1
Placed neck on railhead	1
Placed self in front of train	1
Possibly fell from platform	1
Reaching*	2
Riding motorized wheelchair	1
Running/rolled under train	1
Running/stumbled	1
Shot	1
Sitting on rail	1
Slid down embankment and fell under train	1
Squatting	1
Standing	4
Stepped in front of train	6
Tried to beat the train	1
Unknown	22
Unknown – found along side of tracks	1
Unknown - found in pond	1
Unknown - on bridge	1
Unknown (no evidence of train strike)	1
Walking between cars	2

Appendix E. Suicide Fatality – State Data Table

Table 13 provides a complete list of the rate of suicide fatality incidents that occurred within each state between 2012 and 2014. The table is ordered from the highest to lowest average number of suicide fatalities over the three years of data.

Table 13. Rate of Suicide Fatality Incidents per Million Residents by State (2012 – 2014)

State	Average Suicide Fatalities 2012-2014 (Rank)	Average State Population 2012-2014[21] (Rank)	Rail Suicide Fatalities per 1M State Residents (Rank)
California	50.67 (1)	38,432,224 (1)	1.32 (5)
Illinois	26.67 (2)	12,881,632 (5)	2.07 (3)
New York	20.33 (3)	19,683,016 (3)	1.03 (11)
Florida	13.00 (4)	19,616,288 (4)	0.66 (21)
Texas	12.00 (5)	26,519,006 (2)	0.45 (30)
New Jersey	10.33 (6)	8,908,559 (11)	1.16 (9)
Ohio	9.67 (7)	11,572,356 (7)	0.84 (15)
Pennsylvania	9.33 (8)	12,779,516 (6)	0.73 (18)
Indiana	7.00 (9)	6,568,400 (16)	1.07 (10)
Wisconsin	6.67 (10)	5,741,802 (20)	1.16 (9)
Missouri	5.67 (11)	6,044,596 (18)	0.94 (13)
Arizona	5.00 (12)	6,640,906 (15)	0.75 (17)
Massachusetts	4.67 (13)	6,703,370 (14)	0.70 (19)
Oregon	4.67 (13)	3,932,330 (27)	1.19 (8)
Kansas	4.33 (14)	2,900,294 (34)	1.50 (4)
Kentucky	4.00 (15)	4,398,835 (26)	0.91 (14)
Michigan	4.00 (15)	9,897,617 (9)	0.40 (35)
North Carolina	3.33 (16)	9,847,021 (10)	0.34 (38)
Tennessee	3.33 (16)	6,500,599 (17)	0.51 (27)
Nevada	3.00 (17)	2,895,263 (35)	1.07 (10)
Washington	3.00 (18)	6,977,199 (13)	0.43 (32)

[21] Retrieved from http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk on 11/10/15.

State	Average Suicide Fatalities 2012-2014 (Rank)	Average State Population 2012-2014[21] (Rank)	Rail Suicide Fatalities per 1M State Residents (Rank)
Alabama	2.67 (19)	4,833,619 (23)	0.55 (24)
Delaware	2.67 (19)	1,014,535 (45)	2.88 (1)
Virginia	2.67 (19)	8,263,352 (12)	0.32 (39)
Colorado	2.33 (20)	5,273,220 (22)	0.44 (31)
Connecticut	2.33 (20)	3,596,793 (29)	0.65 (22)
Iowa	2.33 (20)	3,595,506 (30)	0.75 (17)
Louisiana	2.33 (20)	4,627,901 (25)	0.50 (28)
Nebraska	2.33 (20)	2,085,687 (37)	1.25 (7)
Utah	2.33 (20)	2,958,145 (33)	0.80 (16)
West Virginia	2.33 (20)	1,868,653 (38)	1.26 (6)
Arkansas	2.00 (21)	2,990,807 (32)	0.68 (20)
Maryland	2.00 (21)	5,935,654 (19)	0.34 (38)
Minnesota	2.00 (21)	5,419,949 (21)	0.37 (37)
Oklahoma	2.00 (21)	3,849,409 (28)	0.52 (26)
South Carolina	2.00 (21)	4,775,677 (24)	0.42 (33)
Georgia	1.67 (22)	10,003,701 (8)	0.17 (41)
North Dakota	1.67 (22)	735,024 (48)	2.31 (2)
Mississippi	1.33 (23)	3,091,801 (31)	0.45 (30)
Montana	1.00 (24)	1,053,721 (44)	0.99 (12)
New Mexico	1.00 (24)	2,795,279 (36)	0.48 (29)
Idaho	0.67 (25)	1,853,411 (39)	0.41 (34)
Maine	0.33 (26)	1,407,105 (41)	0.25 (40)
South Dakota	0.33 (26)	925,912 (46)	0.39 (36)
Vermont	0.33 (26)	647,681 (50)	0.53 (25)
Wyoming	0.33 (26)	626,518 (51)	0.57 (23)
Alaska	0.00 (27)	844,396 (47)	0.00 (42)
District of Columbia	0.00 (27)	721,681 (49)	0.00 (42)
New Hampshire	0.00 (27)	1,329,128 (42)	0.00 (42)

State	Average Suicide Fatalities 2012-2014 (Rank)	Average State Population 2012-2014[21] (Rank)	Rail Suicide Fatalities per 1M State Residents (Rank)
Rhode Island	0.00 (27)	1,323,575 (43)	0.00 (42)

Appendix F. Suicide and Trespass Fatality – State Data Table

Table 14 presents a comparison of the total number of fatal suicide and trespass incidents for each state between 2012 and 2014. The percent of those incidents is presented in parentheses. The table is ordered alphabetically.

Table 14. Suicide and Trespass Fatality Incidents by State (2012 – 2014)

State	Suicide (n=761)	Trespass (n=1,506)	State	Suicide (n=761)	Trespass (n=1,506)
Alabama	8 (1%)	29 (2%)	Montana	3 (<1%)	5 (<1%)
Arizona	15 (2%)	19 (1%)	Nebraska	7 (1%)	8 (1%)
Alaska	0 (0%)	0 (0%)	Nevada	9 (1%)	9 (1%)
Arkansas	6 (1%)	12 (1%)	New Hampshire	0 (0%)	2 (<1%)
California	152 (20%)	284 (19%)	New Jersey	31 (4%)	42 (3%)
Colorado	7 (1%)	11 (1%)	New Mexico	3 (0%)	18 (1%)
Connecticut	7 (1%)	13 (1%)	New York	61 (8%)	69 (5%)
Delaware	8 (1%)	2 (<1%)	North Carolina	10 (1%)	56 (4%)
District of Columbia	0 (0%)	0 (0%)	North Dakota	5 (1%)	8 (1%)
Florida	39 (5%)	74 (5%)	Ohio	29 (4%)	48 (3%)
Georgia	5 (1%)	49 (3%)	Oklahoma	6 (1%)	19 (1%)
Idaho	2 (<1%)	3 (<1%)	Oregon	14 (2%)	27 (2%)
Illinois	80	81	Pennsylvania	28	77

State	Suicide (n=761)	Trespass (n=1,506)	State	Suicide (n=761)	Trespass (n=1,506)
	(11%)	(5%)		(4%)	(5%)
Indiana	21 (3%)	47 (3%)	Rhode Island	0 (0%)	1 (<1%)
Iowa	7 (1%)	9 (1%)	South Carolina	6 (1%)	24 (2%)
Kansas	13 (2%)	22 (1%)	South Dakota	1 (<1%)	0 (0%)
Kentucky	12 (2%)	31 (2%)	Tennessee	10 (1%)	27 (2%)
Louisiana	7 (1%)	29 (2%)	Texas	36 (5%)	108 (7%)
Maine	1 (<1%)	5 (<1%)	Utah	7 (1%)	7 (<1%)
Maryland	6 (1%)	21 (1%)	Vermont	1 (<1%)	3 (<1%)
Massachusetts	14 (2%)	25 (2%)	Virginia	8 (1%)	25 (2%)
Michigan	12 (2%)	24 (2%)	Washington	9 (1%)	36 (2%)
Minnesota	6 (1%)	19 (1%)	West Virginia	7 (1%)	21 (1%)
Mississippi	4 (1%)	19 (1%)	Wisconsin	20 (3%)	16 (1%)
Missouri	17 (1%)	16 (1%)	Wyoming	1 (<1%)	6 (<1%)

Appendix G. Grade Crossing Suicide and Trespass Fatality – State Data Table

Table 15 presents a comparison of the total number of fatal suicide and trespass incidents that took place at a grade crossing for each state between 2012 and 2014. The percent of those incidents is presented in parentheses. The table is ordered alphabetically.

Table 15. Grade Crossing Suicide and Trespass Fatality Incidents by State (2012 – 2014)

State	Suicide	Trespass	State	Suicide	Trespass
Alabama	0 (0%)	1 (1%)	Montana	0 (0%)	1 (<1%)
Arizona	0 (0%)	1 (<1%)	Nebraska	0 (0%)	2 (1%)
Alaska	0 (0%)	0 (0%)	Nevada	0 (0%)	0 (0%)
Arkansas	1 (1%)	2 (1%)	New Hampshire	0 (0%)	0 (0%)
California	21 (24%)	61 (30%)	New Jersey	2 (2%)	5 (2%)
Colorado	0 (0%)	0 (0%)	New Mexico	0 (0%)	1 (<1%)
Connecticut	0 (0%)	0 (0%)	New York	7 (8%)	8 (4%)
Delaware	1 (1%)	1 (<1%)	North Carolina	0 (0%)	0 (0%)
District of Columbia	0 (0%)	0 (0%)	North Dakota	0 (0%)	1 (<1%)
Florida	4 (5%)	7 (3%)	Ohio	1 (1%)	3 (1%)
Georgia	0 (0%)	4 (2%)	Oklahoma	1 (1%)	6 (3%)
Idaho	1 (1%)	0 (0%)	Oregon	1 (1%)	3 (1%)

Illinois	16 (19%)	19 (9%)	Pennsylvania	2 (2%)	4 (2%)
Indiana	5 (6%)	8 (4%)	Rhode Island	0 (0%)	0 (0%)
Iowa	0 (0%)	1 (<1%)	South Carolina	2 (2%)	8 (4%)
Kansas	3 (3%)	7 (3%)	South Dakota	0 (0%)	0 (0%)
Kentucky	0 (0%)	3 (1%)	Tennessee	1 (1%)	1 (<1%)
Louisiana	2 (2%)	7 (3%)	Texas	5 (6%)	10 (5%)
Maine	0 (0%)	0 (0%)	Utah	2 (2%)	3 (1%)
Maryland	0 (0%)	0 (0%)	Vermont	0 (0%)	1 (<1%)
Massachusetts	1 (1%)	3 (1%)	Virginia	0 (0%)	1 (<1%)
Michigan	2 (2%)	4 (2%)	Washington	1 (1%)	6 (3%)
Minnesota	1 (1%)	4 (2%)	West Virginia	0 (0%)	0 (0%)
Mississippi	0 (0%)	1 (<1%)	Wisconsin	2 (2%)	8 (4%)
Missouri	1 (1%)	0 (0%)	Wyoming	0 (0%)	0 (0%)

Abbreviations and Acronyms

BTS	Bureau of Transportation Statistics
CDC	Center for Disease Control
CFR	Code of Federal Regulations
FRA	Federal Railroad Administration
MPH	Miles Per Hour
OLI	Operation Life Saver
US	United States