CHAPTER 5: RAIL SAFETY AND SECURITY

This chapter focuses on rail safety and security in Kentucky, including general concerns regarding safety, accident statistics, accident types, the KYTC Railroad Crossing Safety Program, nationwide initiatives, and state regulations, roles, and policies. A focal point of the Railroad Crossing Safety Program is the intersection of the state's highway and rail networks at highway-rail at-grade crossings. One goal of the program is to provide a crossing identification sign at every highway-rail at-grade crossing. The sign includes a contact number and location information for reporting malfunctioning equipment. Also, in the case of a highway-rail crossing accident, a photograph of the crossing ID sign will facilitate the recording of the location and reporting requirements.

Example Crossing ID Sign, Louisville Kentucky
Photo by Parsons Brinckerhoff, 2014

5.1 NATIONAL HIGHWAY-RAIL CROSSING STATISTICS

The U.S. rail system is comprised of over 138,000 miles of track.[66] In 2013, this nationwide system was crossed at-grade by 211,728 streets, roads, highways, alleys, driveways, unimproved trails, and other thoroughfares – equivalent to more than 1.5 crossings intended for the passage of motor vehicles, bicycles, and/or pedestrians per route-mile of track.[67]

The FRA Office of Safety maintains statistics dating back to 1994 on highway-rail crossing accidents, categorized by warning device.[68] Highway-rail at-grade crossing incidents have been steadily decreasing since the mid-1990s. **Figure 5-1** shows the number of highway-rail at-grade crossing accidents nationally from 1994 through 2013. There are no records for 1997 and 2001. Nationwide, in 2013, a total of 2,087 highway-rail crossing accidents occurred, a decrease of more than 50 percent from 1994.

[66] Association of American Railroads, www.aar.org/keyissues/Pages/Railroads-And-States.aspx#.U0RjSfldWqk, 2014
[67] FRA Office of Safety, http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/crossing/xingqryloc.aspx, 2014
[68] FRA, Office of Safety http://safetydata.fra.dot.gov/officeofSafety/default.aspx, 2014

Figure 5-1: U.S. Highway-Rail At-Grade Crossing Accidents, 1994-2013

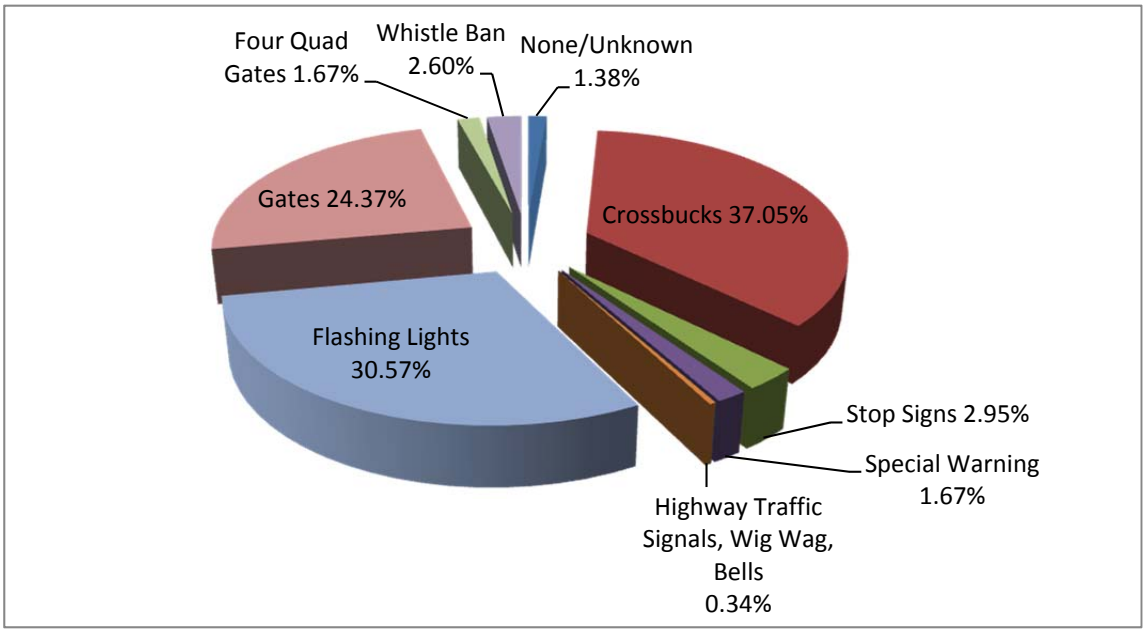
Source: Federal Railroad Administration (FRA) Office of Safety, 2013
Note: No data was available for 1997 or 2001

5.1.1 Kentucky Highway-Rail At-Grade Crossing Statistical Summary

According to the FRA Office of Safety, 4,707 highway-rail at-grade crossings are currently in operation in Kentucky, including 2,293 public and 2,414 private crossings. This is equivalent to more than 1.1 crossings per route-mile of track, just under the national average of 1.5.

The KYTC's records of public highway-rail at-grade crossings, which are usually more current than the FRA's, indicate 2,088 public crossings in Kentucky. According to the KYTC data, just over one percent of the public highway-rail at-grade crossings in Kentucky have either no warning devices or the type of protection is unknown. **Figure 5-2** shows the distribution of public highway-rail at-grade crossing types by warning device in Kentucky in 2013.

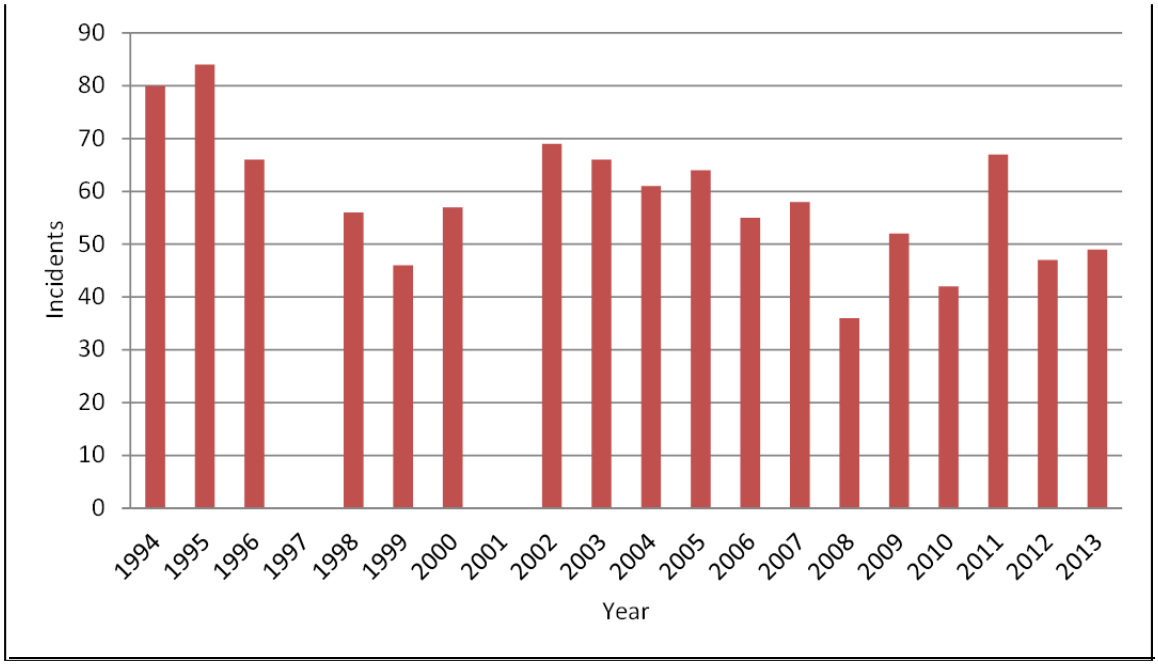
Figure 5-2: Kentucky Highway-Rail At-Grade Crossings by Warning Device, 2013



Source: KYTC Division of Right of Way and Utilities, Rail Safety Branch, 2013

Highway-rail at-grade crossing accidents have decreased overall in Kentucky since 1994. **Figure 5-3** shows Kentucky highway-rail at-grade crossing accidents from 1994 to 2013. A total of 49 highway-rail at-grade crossing accidents occurred in Kentucky in 2013, compared to 80 in 1994.

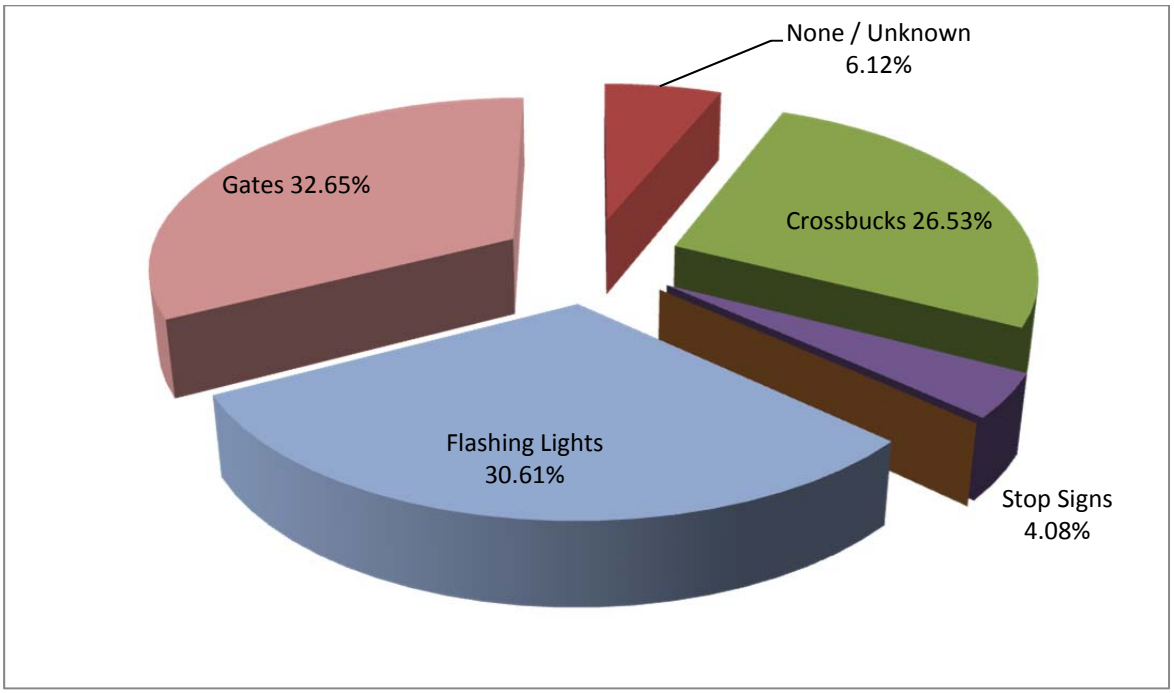
Figure 5-3: Kentucky Highway-Rail At-Grade Crossing Accidents, 1994-2013



Source: FRA Office of Safety, 2014
Note: No data was available for 1997 or 2001

Figure 5-4 shows Kentucky public highway-rail at-grade crossing accidents for 2013 by warning device. Crossbucks, flashing lights, stop signs, and gates make up the majority of warning devices for all public highway-rail at-grade crossings, and account for nearly 94 percent of crossings at which accidents occurred. Crossings without warning devices, which make up just over one percent of total public at-grade crossings in Kentucky, account for the remaining six percent of accidents.

Figure 5-4: Kentucky Highway-Rail Crossing Accidents by Warning Device, 2013



Source: FRA Office of Safety, 2013

In addition to statistics on crossing warning devices, the FRA also maintains statistics on the number of fatalities and injuries at highway-rail at-grade crossing and pedestrian trespass locations. In 2013, Kentucky was in the top 20 in the United States for both fatalities (No. 15) and injuries (tied for No. 18) at highway-rail at-grade crossing facilities. However, the state has seen a steady decrease in fatalities since 2010, while the trend of injury accidents has been stable. **Table 5-1** shows the fatality and injury accidents since 2008.

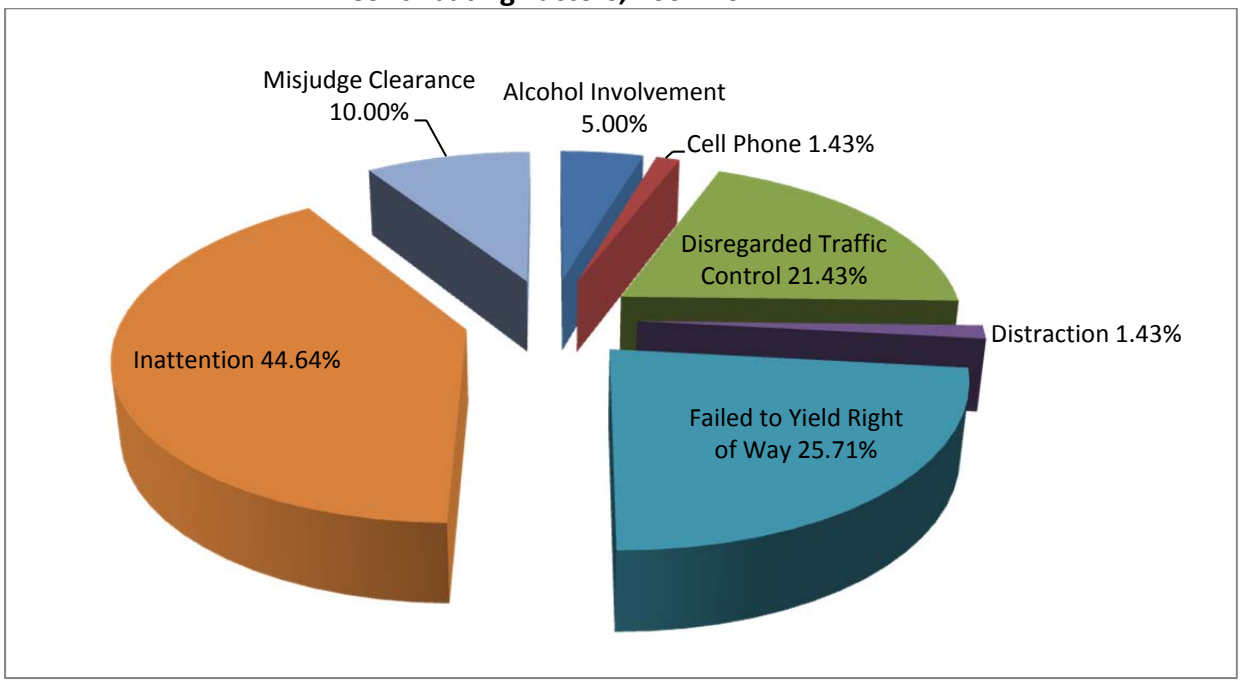
Table 5-1: Injury and Fatality Highway-Rail At-Grade Accidents, 2008-2013

	Fatalities	Injuries
2008	4	17
2009	1	22
2010	10	23
2011	7	29
2012	5	24
2013	5	23

Source: FRA Office of Safety, 2013

Figure 5-5 details highway-rail at-grade crossing accidents by motorist action. According to the 2007 to 2012 editions of Kentucky Traffic Accident Facts,[69] the biggest contributor to highway-rail at-grade crossing accidents was driver inattention, while failure to yield right of way was the second biggest contributor. Multiple factors contribute to some accidents, resulting in the sum of percentages being higher than 100 percent.

Figure 5-5: Kentucky Highway-Rail Crossing Accidents (Total) by Driver Contributing Factors, 2007-2012



Source: Kentucky Traffic Accident Facts, Kentucky State Police, www.kentuckystatepolice.org/pdf/KY_Traffic_Collision_Facts_2012.pdf, 2014

[69] Kentucky Transportation Center, *Kentucky Traffic Accident Facts*, published annually

5.1.2 Kentucky Highway-Rail At-Grade Crossing Accidents

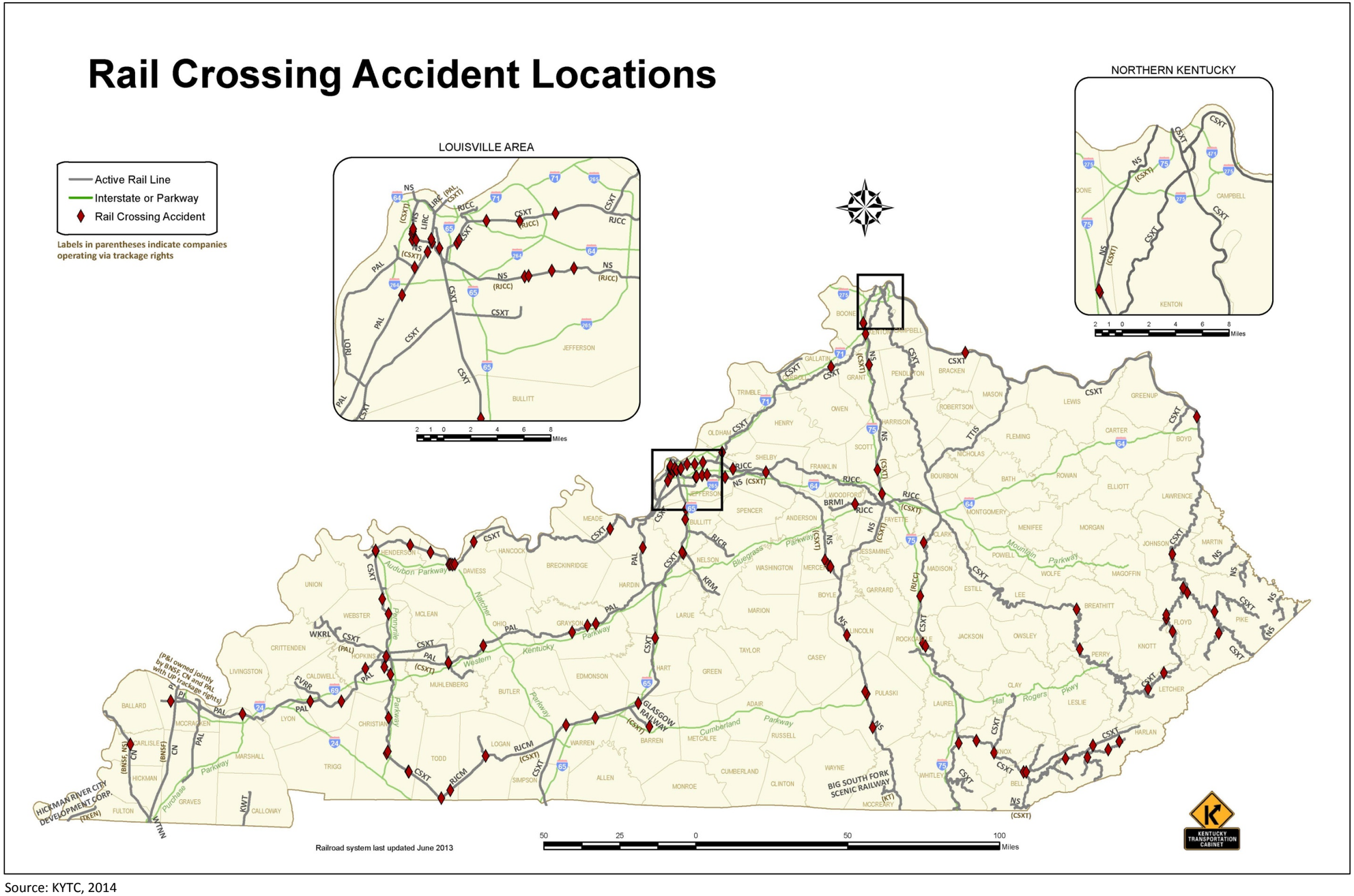
Highway-rail at-grade crossings make up the largest portion of rail accident locations in Kentucky. In **Figure 5-6**, accidents over a three-year period are mapped by location and identified by severity, utilizing data from the FRA Office of Safety.

In **Table 5-2,** the 2008-2013 FRA data is used to identify locations of Kentucky's fatal highway-rail crossing accidents. Four of the 28 locations have no type of warning device in place. During the six-year span contained in the table, each location has had only one fatal accident.

Another major rail safety concern is trespassing on railroad property. Trespassers are defined by the FRA as persons who are on the part of railroad property used in railroad operation and whose presence is prohibited, forbidden, or unlawful.[70] In Kentucky, railroad trespass is a misdemeanor crime and is punishable by law.[71] An overwhelming majority of accidents and fatalities for non-vehicle incidents are due to trespass. In 2012, 12 fatal and 14 non-fatal injuries occurred as a result of trespassing. In 2013, nine fatal and seven non-fatal injuries occurred as a result of trespassing.

[70] http://www.fra.dot.gov/eLib/details/L04702, 2014
[71] http://www.lrc.ky.gov/Statutes/statute.aspx?id=14027, 2014

Figure 5-6: Kentucky Highway-Rail At-Grade Crossing Accidents, 2010-2012



Source: KYTC, 2014

Table 5-2: Kentucky Highway-Rail At-Grade Crossing Fatalities in Kentucky, 2008-2012

Crossing ID	County	Fatal Incidents	Total Fatalities	Total Non-Fatal Injuries	Railroad Code	Route Number	Route Name	Crossing Type	Warning Device Type
229342M	Bracken	1	1	0	CSXT	PR 1316	Private Road	Private	None
229435G	Campbell	1	1	0	CSXT	PR 1355	Aquaramp	Private	Crossbucks
345246C	Christian	1	3	1	CSXT	CS 2006	Duffy Street	Public	Crossbucks
345292D	Christian	1	1	0	CSXT	CS4015	Brown Street	Public	Gates
343654F	Edmonson	1	3	0	CSXT	CR 1119	Ray Houchins Road	Private	Crossbucks
724515N	Fayette	1	1	0	NS	KY 1977	Spur Road	Public	Gates
346848W	Fayette	1	1	0	CSXT	KY 2335	Houston Antioch Road	Public	Flashing Lights
347275U	Harlan	1	1	0	CSXT	CR 1329	Murphy Lane	Public	Crossbucks
345400X	Henderson	1	1	0	CSXT	CS 1368	Washington St.	Public	Gates
345318D	Hopkins	1	1	0	CSXT	CS 3016	W Moss Ave.	Public	Flashing Lights
343952F	Jefferson	1	1	0	CSXT	CS1080G	Shelby Street	Public	Gates
344857N	Knox	1	1	0	CSXT	KY 2421	Cumberland Ave.	Public	Gates
344841S	Knox	1	1	0	CSXT	CR 1370	Arkle Road	Public	Crossbucks
229154X	Lewis	1	1	0	ATK	PR 1093	Private Road	Private	None
353537M	Madison	1	1	0	CSXT	CS 2324	Mayde Street	Public	Flashing Lights
344070R	Meade	1	1	1	CSXT	KY 1736	SR 1736	Public	Crossbucks
735674B	Mercer	1	1	0	NS	KY 390	Bohon Road	Public	Flashing Lights
353572B	Rockcastle	1	1	0	CSXT	CR 1004	Cover Branch Road	Public	Crossbucks
343668N	Warren	1	1	0	CSXT	CS 5002	Vine Street	Public	Flashing Lights
343731D	Warren	1	1	0	CSXT	CR 1272	Memphis	Public	Flashing Lights
345359H	Webster	1	1	0	CSXT	CR 1084	Sebree Springs	Public	Crossbucks
349122X	Whitley	1	1	1	CSXT	CR 1056	Brick Pond Road	Public	Gates
850983C	Jefferson	1	1	0	CSXT	CS 1045	25th Street	Public	Flashing Lights
229386M	Campbell	1	1	1	CSXT	-	Private Entrance	Private	None
352483F	Harlan	1	1	1	CSXT	-	Private Entrance	Private	None
296921C	Grayson	1	1	1	PAL	CR 1066	Hughes Mill Road	Public	Crossbucks
344312J	Henderson	1	1	0	CSXT	-	Private Entrance	Private	Crossbucks
349155K	Whitley	1	1	0	CSXT	CS 1132	2nd Street	Public	Flashing Lights
Total:		*28*	*32*	*6*					

Source: FRA Office of Safety, 2012

5.2 RAILWAY-HIGHWAY CROSSING PROGRAMS

As discussed in **Section 4.2.1**, in 2013, Kentucky announced that $3.2 million from the Highway Construction Contingency Fund would be made available to help short line railroads fund safety improvements at highway-rail at-grade crossings in Kentucky. This contingency fund is derived from the Kentucky Legislature's allocation of the General Fund and is not affiliated with the dedicated KYTC Highway Fund. Another $3.2 million ($1.6 million per year) was entered into the Transportation Budget (HB 236) by the Kentucky Legislature for FY 2015 and FY 2016 for more short line rail safety improvements.

As discussed in **Section 4.1.3**, the FHWA Section 130 Railway-Highways Crossing Program was established by FHWA to fund highway-rail at-grade crossing improvements. As of early 2014, approximately 522 of 2,088 open, public highway-rail at-grade crossings have been fully upgraded to include automatic gates. The remaining 1,566 public crossings have cross buck signs, flashing lights, are either with or without a bell(s), or have no warning devices at all. These remaining crossings are candidates for being upgraded under the KYTC Railroad Crossing Safety Program.

5.3 OPERATION LIFESAVER

The Operation Lifesaver Program is one of the most widely known and effective programs working to make railroads and highways safer. It is a nationwide, non-profit organization dedicated to ending collisions, deaths, and injuries at highway-rail at-grade crossings and along railroad corridors. Operation Lifesaver works to accomplish its task through promoting education, engineering, and enforcement. Their programs are co-sponsored by federal, state, and local governmental agencies, highway safety organizations, and individual railroad companies.

Kentucky's Operation Lifesaver Program is funded by federal, state, local, and private partners. The KYTC, the Kentucky Department of Agriculture, the Kentucky Community and Technical College System, and the Kentucky Fire Commission each have a spot on the Kentucky Operation Lifesaver Board of Directors. Kentucky currently participates in Operation Lifesaver through its School Bus Driver Training, Safety Blitz, and Officers on Trains programs. The target audiences for Operation Lifesaver programs are school groups, driver education classes, professional drivers, law enforcement officers, and emergency responders. The KYTC has provided funding for educational materials and printing services for Kentucky's Operation Lifesaver.

5.4 KYTC HIGHWAY-RAIL AT-GRADE CROSSING EVALUATION

KRS 189.561[72] charges the KYTC with the responsibility of investigating any public highway-rail at-grade crossing that meets all of the following criteria:

- Crossing is not equipped with gates;
- Crossing has an average daily traffic of 4,000 vehicles or more; and,
- Crossing has two or more accidents within a consecutive five-year period involving a train and a vehicle traversing the crossing (qualifying accidents are detailed in 603 KAR 9:020[73]).

A highway-rail at-grade crossing identified as a safety concern based on the above criteria is investigated to determine if additional safety equipment is needed at the crossing, or if the crossing needs to be closed. After collaborating with the affected local government and railroad company, the KYTC may contract out the installation of proper safety equipment or close the crossing. The cost of the safety equipment is typically split between the KYTC (90 percent) and the railroad (10 percent). The local government incurs no cost.

Whenever deemed necessary for public safety, the KYTC can also order any company owning or operating a railroad in the state to eliminate a public highway-rail at-grade crossing or change an existing overpass or underpass structure. It can subsequently determine whether a substitute crossing should be constructed and the form that crossing takes, e.g. overpass or underpass.

The KYTC has the responsibility of developing a list of highway-rail at-grade crossings proposed to be closed. The criteria for a crossing to be considered for closure are detailed in 603 KAR 9:010[74] as follows:

- An alternate highway-rail crossing is available within one-quarter track mile in urban areas and the highway has a current average daily traffic count of 500 vehicles or less; or,

- An alternate highway-rail crossing is available within one track mile in rural areas and the highway crossing has a current average daily traffic count of 150 vehicles or less; or,

- The highway-rail at-grade crossing has sight distance obstructions or other geometric characteristics which create unsafe conditions, the closure of the crossing is an economically preferable alternative to correcting the deficiencies at the site, and an alternate crossing is available nearby.

[72] http://www.lrc.ky.gov/statutes/statute.aspx?id=6414, 2014
[73] http://www.lrc.state.ky.us/kar/603/009/020.htm, 2014
[74] http://www.lrc.state.ky.us/kar/603/009/010.htm, 2014

The full text of the applicable KRS and KAR sections regarding railroad crossings can be found in **Appendix B**.

5.5 FEDERAL RAILROAD ADMINISTRATION (FRA) SAFETY ACTIVITIES

The FRA's mission is "to enable the safe, reliable, and efficient movement of people and goods for a strong America, now and in the future."[75] It works to accomplish this mission primarily through issuance, implementation, and enforcement of safety regulations, selective investment in rail corridors across the country, and research and technology development.

The FRA employs approximately 400 safety inspectors operating out of eight regional offices throughout the country.[76] Kentucky is in the FRA's Region III, headquartered in Atlanta, Georgia. Regular inspections are conducted for compliance with safety regulations. Safety areas include:

- Hazardous materials;
- Motive power and equipment;
- Operating practices;
- Signal and train control; and,
- Track condition.[77]

The FRA's safety efforts in the past decade have contributed to the decline in the number of rail-related accidents and incidents by 22 percent. Total rail accidents have dropped by 28 percent while fatalities and injuries have fallen by 27 percent, and highway-rail at-grade crossing accidents have decreased by 36 percent.[78]

5.5.1 FRA Purpose and Activities

Between 2007 and 2010, the FRA's responsibilities grew from a primary focus on improving safety to a multidimensional core of safety and development activities. The Rail Safety Improvement Act of 2008 (RSIA), Passenger Rail Investment and Improvement Act of 2008 (PRIIA), American Recovery and Reinvestment Act of 2009 (ARRA), and subsequent appropriation bills have transformed the FRA with new requirements and initiatives and provided more than $10 billion for rail corridor improvement, development, and planning grants.[79]

[75] FRA, http://www.fra.dot.gov/Page/P0002, 2014
[76] FRA, http://www.fra.dot.gov/Page/P0010, 2014
[77] FRA, http://www.fra.dot.gov/Page/P0010, 2014
[78] FRA, http://www.fra.dot.gov/Page/P0351, 2014
[79] FRA, http://www.fra.dot.gov/Page/P0351, 2014

The RSIA appropriated $1.3 billion between 2009 and 2013 for railroad safety improvements. Title II of RSIA provides guidance for highway-rail at-grade crossings, pedestrian safety, and trespasser prevention. Topics discussed in Title II include:

- Pedestrian crossing safety;
- State action plans;
- Improvements to sight distance at highway-rail at-grade crossings;
- National crossing inventory;
- Posting of telephone number to report at-grade crossing problems;
- Operation Lifesaver;
- Federal grants to states for highway-rail at-grade crossing safety;
- Trespasser prevention and highway-rail at-grade crossing safety;
- Accident reporting; and,
- Fostering introduction to new technology to improve safety at highway-rail at-grade crossings.[80]

5.5.2 FRA Rule-Quiet Zones

The FRA has been instrumental in developing and formalizing legislation and subsequent rules for locomotive horn use. Existing regulations require that a locomotive horn be sounded while a train is approaching and entering any public highway-rail at-grade crossing to warn motorists and pedestrians of its approach. Quiet zones are intended to give a community an alternative to the sounding of locomotive horns. They may be established by negotiating with the affected railroad and with the FRA and agreeing on a set of safety measures to counteract the removal of the train horn warning.

The quiet zone rule, entitled Use of Locomotive Horns at Highway-Rail Grade Crossings, is part of the Code of Federal Regulations (CFR) Title 49, Parts 222.[81] The Louisville quiet zones are an example of the benefits of this legislation. To be considered for a quiet zone designation, the following must be true:

1. The locomotive speed is 15 mph or less and the train crew or appropriately equipped flaggers provide warning to

Quiet Zone Signage Located in Louisville, KY
Photo by Parsons Brinckerhoff, 2014

[80] FRA, http://www.fra.dot.gov/eLib/Details/L03588, 2014
[81] CFR http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&tpl=/ecfrbrowse/Title49/49cfr222_main_02.tpl, 2015

motorists;

2. Corridors are equipped with supplemental safety measures as detailed by CFR 49 at each public highway-rail at-grade crossing; and,

3. Corridors have a Quiet Zone Risk Index (QZRI) at or below the Nationwide Significant Risk Threshold (NSRT), or the Risk Index With Horns (RIWH).

A quiet zone must be at least one-half mile in length, and all crossings within the corridor must, at a minimum, be equipped with gates and lights. Guidance on the quiet zone designation process can be found on the FRA's website at http://www.fra.dot.gov/Page/P0689.

5.5.2.1 Quiet Zones in Kentucky

In 2009, working closely with the FRA, Louisville Metro Government and CSXT created the country's first major quiet zones in the Germantown and Shelby Park areas of Louisville, Kentucky. The corridor is located along CSXT's Louisville Division Line and includes 12 highway-rail at-grade crossings. The objectives of this Louisville Quiet Zone were as follows:[82]

- Provide a highway/rail safety plan that will discontinue the use of locomotive horns;
- Close certain street and alley crossings; and,
- Improve safety at crossings not designated for closure.

In establishing the Louisville Quiet Zone, Louisville Metro Government gained local agreement to close four street crossings and three alley crossings. In the process, they opened one new alley crossing, added cul-de-sacs on streets where crossings were closed, cut curbs, added bollards, and widened one street to accommodate two-way traffic. In addition, the project allowed each of the pedestrian crossings to remain open. Several sources of funding were utilized to successfully implement this project: FHWA Section 130 funds, Louisville Metro General Funds, CSXT funds, and KYTC Highway Safety Funds. A total of 10 quiet zones have been established in Kentucky, including nine in the Louisville area and one in Covington.

5.6 RAIL SECURITY

The following sections discuss rail security in Kentucky.

5.6.1 Homeland Security

Rail security is a concern for both passengers and freight. In the wake of the U.S. terrorist attacks of September 11, 2001, and recent train derailments involving hazardous cargo, the discussion of rail security has received more attention at the national and state levels. For example, after a major CSXT derailment, CSXT gave the Kentucky Office of Homeland Security real time access to their rail traffic. Most operating railroads have a plan for ensuring rail

[82] http://www.facers.org/wp-content/uploads/2011/01/quietzonereport.pdf, 2014

security, including action plans to deploy during manmade or natural incidents. Increased coordination among federal, state, local, and private partners is ongoing.[83]

There are additional concerns with the transportation of hazardous materials. The FRA issued Emergency Order No. 28 following the July 6, 2013, catastrophe in Lac-Mégantic, Quebec, a derailment which resulted in an explosion, a massive crude oil spill, and the deaths of 47 people. Emergency Order No. 28 established additional requirements for the monitoring and security of certain freight trains and vehicles on mainline track or mainline siding outside of a yard or terminal. The FRA also began working on regulations governing the importance of proper characterization, classification, and selection of a packing group for Class 3 materials, and the corresponding requirements in the federal hazardous materials regulations for safety and security planning. In addition, the FRA emphasized its expectation for shippers and rail carriers to revise safety and security plans required by the federal hazardous materials regulations. This included completion of required risk assessments and addressing safety and security issues identified in the FRA's Emergency Order No. 28 and the Safety Advisory issued jointly with the Pipeline and Hazardous Materials Safety Administration (PHMSA) on August 7, 2013. In May 2014, the FRA issued emergency action rules requiring notification of larger shipments of oil and strongly recommended the use of safer railroad cars for the shipment of oil.[84] Currently, the FRA is considering new safer tank car manufacturing regulations that would improve safety of tank cars involved in a crash.

Passenger rail security is overseen at the federal level by the Transportation Security Administration (TSA), which routinely provides security and random checks of passengers and luggage on the Amtrak system at various locations and on select transit systems across the United States. These checks can match passengers' identification with issued tickets, checked bags, and other belongings, providing a basic line of security at stations and aboard vehicles.

Rail security is generally a federal responsibility through the Interstate Commerce Clause and related acts. Some states have taken action to enhance rail security, such as Georgia's Program Standard for Rail Safety and Security.[85] This document introduces and sets forth the legislative authority for the Georgia Department of Transportation (GDOT) State Safety Oversight (SSO) program, which establishes oversight of local and regional transit and freight or intercity passenger rail.

Since the rail system is privately owned and operated in Kentucky, few public programs exist that explicitly address security of the rail system. Without statutory authority and additional resources, the KYTC's primary role in rail security is to provide technical support and act as a

[83] FRA, http://www.fra.dot.gov/Page/P0322, 2014
[84] http://www.fra.dot.gov/eLib/details/L05223, 2014
[85] GDOT, http://www.dot.ga.gov/travelingingeorgia/rail/Documents/ProgramStandard-RailSafety.pdf, 2014

clearinghouse for information. All Class I railroads, Amtrak, and some of the smaller railroads employ law enforcement officers to patrol and protect their assets and customers. Kentucky Homeland Security provides some monitoring of railroads and has developed a contingency plan to protect rail bridges at key locations, such as crossings of the Ohio River.

5.6.2 Seismic Incidents

As previously mentioned, each railroad has a safety and security plan, and an action plan to respond to incidents. Seismic incidents are included in those plans. Railroads in this region are coordinating with federal, state, and local partners through the Central United States Earthquake Consortium to plan a response to a seismic event on or near the New Madrid Fault. The group's planning activities include multimodal scenarios that involve railroads. Railroads have contingency operating plans and the ability to reroute traffic after an incident while the conditions of their facilities are assessed.