

Introduction

Public safety is one of government's crucial responsibilities. In the context of transportation planning, the consideration of safety has evolved into two related but separate elements: *safety* and *security*. This chapter addresses both. Safety deals generally with the reduction of injury and death to users of the transportation system. Security is related to a region's ability to maintain mobility for its citizens, even in adverse conditions, both by protecting the transportation system against threats and by providing multiple options for managing travel demand and destination routing.

Safety

Federal legislation has established the Highway Safety Improvement Program as a core program tied to strategic safety planning and performance. The HSIP program is aimed at making significant progress in reducing highway fatalities. Additional programs target specific areas of concern, such as work zones, older drivers, and pedestrians, including children walking to school.

The HSIP program requires data-driven strategic highway safety planning, focusing on results. In fact, highway safety was one of the first areas in which federal requirements were issued for performance-based planning and programming. As mentioned in Chapter 3, state DOTs and MPOs are expected to coordinate in establishing targets and monitoring progress for these measures of highway safety:

- Number of fatalities
- Rate of fatalities per 100 million vehicle-miles traveled
- Number of serious injuries
- Rate of serious injuries per 100 million vehicle-miles traveled
- Number of non-motorized user fatalities and serious injuries

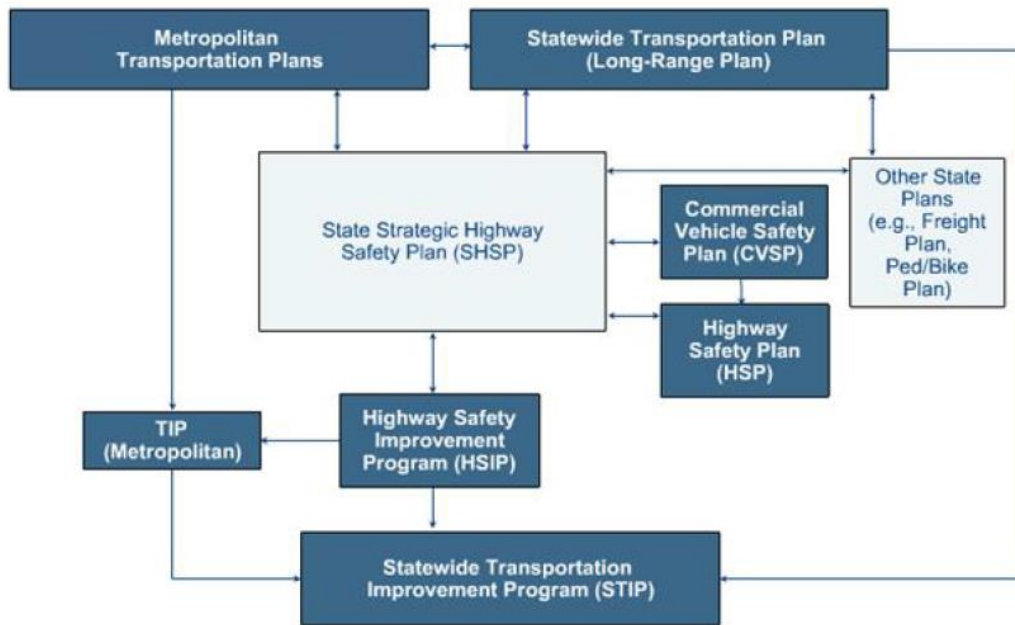
These measures are to be calculated based on the most recent five years of available crash data. As discussed below, SCDOT's state highway safety plan already incorporates most of the measures at the statewide level. RFATS will coordinate with SCDOT to ensure each measure is reported and tracked at the regional level as needed to meet state and federal requirements.

Framework for Safety Planning

The key planning process for highway safety in the RFATS area is the development of the statewide highway safety plan. The most recent edition was published in 2015 as *South Carolina's Strategic Highway Safety Plan*:

Target Zero. As **Figure 5.1** shows, the statewide highway safety plan provides the framework for SCDOT’s partner agencies and their planning documents, including RFATS and its LRTP.

Figure 5.1 - Relationship between the Highway Safety Plan and Other Plans



Source: South Carolina’s Strategic Highway Safety Plan: Target Zero (2015)

Statewide Conditions and Trends

Since South Carolina’s last *Strategic Highway Safety Plan: The Roadmap to Safety*, published in 2008, the state saw an overall reduction of 20.4% in roadway deaths between 2006 and 2012. However, significant work remains to be done, particularly since the state still has one of the highest traffic fatality rates in the country. To take its efforts to the next level, South Carolina developed and adopted its new *Strategic Highway Safety Plan: Target Zero* in 2015. Although its ultimate goal is to have zero traffic related fatalities occurring in South Carolina, the plan recognizes success will not occur overnight and will require long-term goals, strategies, and coordination to achieve.



Goals for 2015 through 2018 include:

- Reduce statewide traffic **fatalities** to a maximum of **575 persons** per year by 2018, with an annual reduction of 48 fatalities. (In comparison, traffic fatalities numbered 863 persons in 2012.)
- Reduce the statewide number of **fatal crashes** per 100 million vehicle miles travelled to 1.17. (This rate was 1.76 in 2012.)
- Reduce statewide number of **severe injuries** to 2,265 incidents per year by 2018. (Total severe injuries numbered 3,397 persons in 2012.)
- Reduce the statewide number of **severe injury crashes** per 100 million vehicle miles travelled to 4.63. (This number was 6.95 in 2012.)

Target Zero, in accordance with federal law, was developed collaboratively by a number of federal, state and local partners. SCDOT is the designated lead for the statewide implementation effort. RFATS participates in implementation by incorporating the relevant safety goals, priorities, countermeasures, and programs for the RFATS area into its own LRTP.

The four “E”s of safety were maintained as guiding principles in the development of *Target Zero*:

- Engineering
- Enforcement
- Education
- Emergency Medical Services (EMS)

Nine emphasis areas were selected by the Strategic Highway Safety Plan Steering Committee to concentrate efforts and monitor performance. Each of these emphasis areas has been identified as a leading cause of traffic fatalities in South Carolina and has its own goals for reduction of fatalities and severe injuries, along with associated objectives and strategies:

- **Roadway Departure;**
- **Unrestrained Motor Vehicle Occupants;**
- **Age-Related Crashes (Young Drivers: 19-24 years of age and Older Drivers: 65 or more years of age);**
- **Speed Related Crashes;**

- **Vulnerable Roadway Users (Motorcyclists, Pedestrians, Moped Operators and Bicyclists);**
- **Intersection and Other High-Risk Roadway Locations (Work Zones and Railroad Crossings);**
- **Impaired Driving;**
- **Commercial Motor Vehicle/Heavy Truck Crashes;**
- **Safety Data Collection Access, and Analysis.**

Regional Conditions and Trends

Fatal Crashes

The RFATS region experienced a total of 83 traffic-related fatalities during the period of 2011 to 2015, according to the Fatality Analysis Reporting System (FARS) maintained by the National Highway Traffic Safety Administration.

Based on the reported characteristics of these fatal crashes, the following *Target Zero* emphasis areas have been identified as having particular relevance to the RFATS region. Also shown below are potential strategies identified by *Target Zero* to reduce and/or mitigate each type of crash. RFATS and SCDOT officials should discuss the strategies most likely to be useful in the region, and which locations exhibit the greatest need based on crash data.

Roadway Departure

Almost 60 percent of the traffic deaths in South Carolina over the past five years resulted from vehicle roadway departure, also known as “run-off-road” crashes. This type of crash is more commonly seen in rural areas where pavement markings, lane and shoulder widths, and roadway lighting may not meet the same standards typically expected in urban locations. However, roadway departure was involved in more than half of the recent fatalities in the RFATS area, perhaps reflecting locations where growth is putting pressure on roadway facilities that have not been upgraded to meet the needs of increasing traffic levels.

Some of the strategies to help reduce roadway departure are relatively low-cost measures which can be incorporated during resurfacing projects. FHWA has been promoting “Safety Edge,” which several states have found effective in reducing roadway departure crashes on two-lane roads with unpaved shoulders. With this asphalt paving technique, the road pavement edge is



Safety Edge

tapered at a 30-degree angle instead of being left as a vertical drop-off. When a driver's wheel drops off the road, the gentler angle helps prevent the driver from losing control when steering back onto the roadway.

STRATEGIES

- Use centerline and edge line rumble strips in accordance with SCDOT policy
- Use "Safety Edge" where appropriate in repaving projects
- Identify opportunities to upgrade inadequate shoulders
- Educate drivers on proper recovery techniques



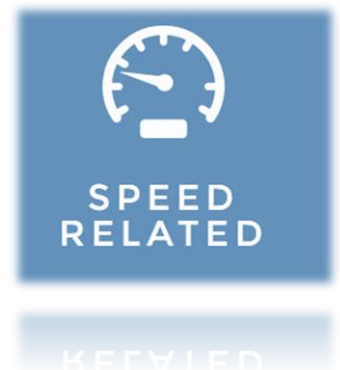
Speed-Related Crashes

Forty percent of recent fatalities in the RFATS area were related to speeding, which is somewhat higher than statewide levels. Although enforcement is the traditional approach to managing speeding, many communities are also beginning to look at the impact of roadway design on drivers' speeds. Traffic calming techniques on neighborhood streets can include narrowing lanes and introducing curves where there are long, straight sections of roadway.

Ironically, easing congestion can also reduce speeding in some circumstances. Law enforcement officials note that on some roadways, drivers tend to speed once they get past a significant bottleneck, presumably with the idea of catching up on lost time.

STRATEGIES

- High visibility enforcement at problem locations
- Use of roadway design to influence speed
- Timed, coordinated traffic signals to improve traffic flow, reduce red-light running, and manage speeds



Vulnerable Roadway Users

Pedestrians and bicyclists make up about 13 percent of traffic-related deaths in the RFATS region, on par with statewide levels. The majority of deaths are pedestrians; only two bicyclists in the RFATS area were killed between 2011 and 2015. Strategies to improve pedestrian and bicycle safety include expansion of the region’s network of sidewalks and bike facilities, as well as raising awareness of traffic laws among motorists and non-motorists. Local bicycle/pedestrian advocacy groups have helped to sponsor training for area law enforcement officers.

STRATEGIES

- Install separated facilities along corridors and at intersections where supported by crash analysis
- Consider pedestrian/cyclist safety and mobility during needs assessment for all projects
- Implement targeted enforcement campaigns for motorists and non-motorists. Educate officers on pedestrian laws.



Older Drivers

Nearly one in four traffic fatalities in the region is a driver 65 years or older, significantly higher than the statewide average of 16%. Physical changes to the transportation system, such as increasing visibility and improving legibility of signage, can help. Groups such as AARP may help to sponsor various training. Providing and publicizing public transit options is also important so that people feel they can relinquish driving without losing their participation in community life.

STRATEGIES

- Provide more protected left-turn signal phases at high-volume intersections, where supported by collision data
- Consider lighting and other engineering actions at locations where indicated by collision data
- Provide training to medical professionals and law enforcement for recognizing physical cognitive deficiencies that affect safe driving in older adults



Regional Safety Performance Measures

Although the Fatality Analysis Reporting System provides data on fatal crashes at the MPO level, information on crash rates and serious injuries is currently available to RFATS only at the county level. To provide consistency in reporting, York and Lancaster counties are therefore the basis for the performance data shown in **Table 5.1**. These numbers represent the average of the most recent available five years of crash data reported as of March 2017.

Table 5.1: RFATS Safety Performance Measures (2010-2014)

Measure	York County 5-Year Avg.	Lancaster County 5-Year Avg.
Number of fatalities	27	13
Rate of fatalities per 100 million vehicle miles traveled (VMT)	1.319	2.057
Number of serious injuries	1,915	766
Rate of serious injuries per 100 million VMT	91.669	113.200
Number of non-motorized user fatalities	4	1
Number of non-motorized user serious injuries	336	4

Sources: 2011-2014 fatalities and fatality rate from annual South Carolina Collision Fact Book. Non-motorized user fatalities from Federal Accident Reporting System. Non-motorized user serious injuries from Bike Walk RFATS plan.

Stakeholder Input

Safety issues were among the topics raised by stakeholders during the public involvement process for the LRTP. Comments focused on concern for bicycle and pedestrian safety, as well as the potential for traffic collisions due to congestion and the design of turning lanes on major arterial roads.

Security

Public awareness of security issues has been heightened as a result of recent disasters such as Hurricane Katrina and the terrorist attacks of September 11, 2001. Key considerations in transportation security include “hardening” critical infrastructure against both man-made and natural threats, and increasing the system’s resiliency, i.e. its ability to resume normal function quickly after a major impact. Resiliency can be improved through coordinated response – ranging from a pre-arranged plan to re-direct traffic to an agency’s streamlined procedures to allow rapid re-construction of a critical bridge. System resiliency can also be improved by ensuring “redundancy,” i.e. having multiple routes or more than one transportation mode to serve key destinations.

Roles in Transportation Security

Most states, regions and local governments have a dedicated department or agency that handles emergency planning and response. Transportation agencies such as SCDOT and RFATS play important supporting roles, as further described below.

The State Emergency Operations Plan is administered by the South Carolina Emergency Management Division, Office of the Adjutant General. Under the plan, SCDOT is responsible for the management of transportation assets and infrastructure during, or immediately following, a critical emergency or disaster incident. This function includes providing for coordinated plans, policies, and actions of state and local governments to ensure the access and safety of the public traveling on the transportation system during all hazards. Once the threat or hazard no longer exists, SCDOT performs prompt inspections of the transportation infrastructure and facilitates orderly re-entry into the area after an evacuation. Other missions may not involve evacuations, but are equally important. These may include responding to severe weather conditions, or re-routing traffic to protect travelers from hazardous material.

Hazards requiring action by SCDOT and partner agencies include hurricanes, winter storms, tornadoes, wildfires, dam failures, flooding, earthquakes, and national security emergencies. They also have responsibilities in incidents involving the potential release of hazardous materials, an issue which received additional attention from Congress in the latest reauthorization of surface transportation funds. As part of the FAST Act, a new grant program was created for training programs related to community preparedness and response to incidents involving hazardous materials.

Regional Conditions and Trends

One of the unique concerns for emergency response in the RFATS area is maintaining an evacuation plan for the area around the Catawba Nuclear Power Station, located on a peninsula in Lake Wylie. Most of the RFATS planning area is within a 10-mile radius of the station. Related security issues include transportation of hazardous materials as well as local evacuation routes to be used in case of an incident.

Planning and response for incidents involving the Catawba station are the responsibility of the York County Emergency Management Office. Many of the designated evacuation routes (**Figure 11.1**) are part of the road system for which RFATS has responsibility to plan and program funds. York County Emergency Management is therefore a critical partner in the RFATS planning process, to help identify routes or areas of the transportation network that may not be adequate for emergency use. RFATS should continue to give funding priority to improving SC 160, US 21 North, and other key routes designated in the Catawba station evacuation plan.

Resiliency

As new residential and commercial development continues, there is some risk that roads that were sufficient a decade ago will no longer have the capacity needed to quickly evacuate an increased number of residents and employees. However, local governments have considerable ability to improve the resiliency of the area's road network through their development policies, and the extent to which they follow the RFATS Collector Street Plan. As noted earlier, security is improved when a community has a more interconnected network; when one route is impacted by an incident, alternate routes are available. This is the reason that many communities require at least two entrances to large subdivisions: in dense areas, too many lives are at risk to rely on only one route for emergency responders to evacuate residents or reach them in case of disaster. The same concept holds true at a larger scale; a region is more secure with multiple connections among its major centers.

Non-Highway Modes

Transit security plans and training in the RFATS region are managed by the local operators (CATS and York County Council on Aging). Rock Hill/ York County Airport (Bryant Field) has its own emergency plan. Railroads must also perform comprehensive safety and security risk analyses to determine the safest routes for moving hazardous goods.

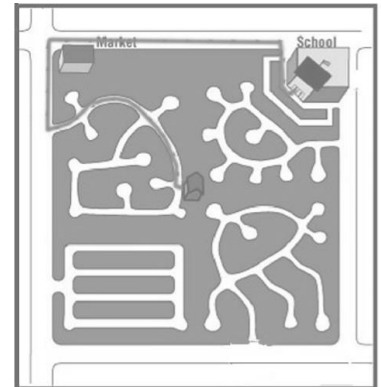
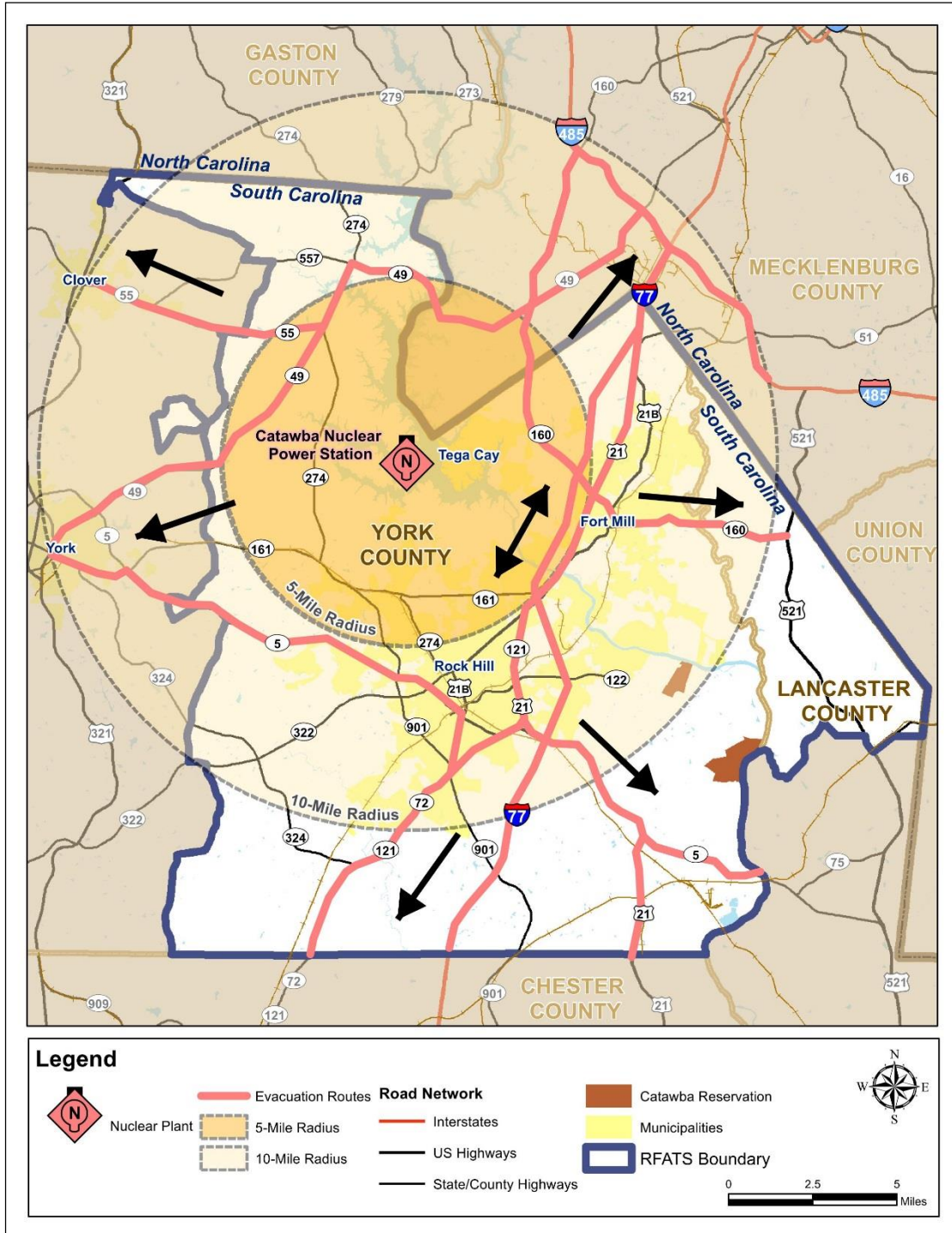


Figure 11.1 - Evacuation Routes from Catawba Nuclear Power Station



Sources: Duke Energy and York County Office of Emergency Management

Public transit is sometimes considered a more likely target for threats because of the concentration of people on vehicles and at stations. Each transit agency maintains security protocols and provides regular training for drivers and other staff. Most systems have also installed cameras and other security equipment such as automatic vehicle location (AVL) on their vehicles and at major facilities.

Public transit typically has a seat at the table for emergency planning because it offers critical resources to help emergency responders evacuate large numbers of people quickly from an area. Transit drivers also have a unique vantage point to help monitor area roadways and alert local officials to potential security concerns, since they are continually driving around the community's major routes. Many local transit agencies have implemented a version of the Federal Transit Administration's "Transit Watch" program, which encourages riders and drivers to report unattended packages or suspicious behavior.

