



MEDICAL

CENTER



WEST

Interstate Median Barrier Report

Introduction

Median crossover crashes on South Carolina's interstates have a tremendous socioeconomic impact in terms of lives, injuries, and property damage. The causes and locations of these crashes are difficult to identify and therefore difficult to directly address. It is however both possible and practical to reduce the frequency and severity of these very dangerous crashes. The installation of median barriers can help prevent median crossover crashes and also reduce the severity of crashes when they occur.

South Carolina is not the only state experiencing the consequences of median crossover crashes. Other states, including North Carolina, California, and Oregon have implemented median barrier programs in recent years. Preventing these crashes has been identified in AASHTO's Strategic Highway Safety Plan as a key element in reducing fatalities on our nations highway.

The strong economy in South Carolina has produced a population growth rate which is straining all infrastructure systems, including our highways. The population boom is reflected in more vehicle miles of travel without a corresponding increase in highway capacity. These increased lane densities, increased interstate speeds and unprotected narrow medians combine to produce a higher potential for crashes.

Twenty years ago, if a vehicle crossed the median, it was less likely to encounter opposing traffic. Today, it is almost opposite. Many of our interstates have a substantial increase in the number of vehicles traveling all hours of the day and night, and the probability of striking an oncoming vehicle increases accordingly.

Crash History Data

Approximately 8%, or over 8,000, of the traffic crashes in 1999 occurred on South Carolina's interstates. These crashes resulted in 144 fatalities, or about 14% of 1999's total. Identification of which crashes and fatalities occurred as a result of median crossovers, and determining where these crashes take place, present a distinct set of problems. South Carolina's Uniform Collision Report Form contains no specific entry that indicates a median crossover is involved as a part of a crash. As a result, each individual report must be manually retrieved and the law enforcement officer's description and sketch of the crash interpreted. The location of each crash must then be determined and plotted.

To determine and prioritize interstate segments based upon crash history and severity (3 to 5 years of data) would involve retrieving and reviewing somewhere between 24,000 to 40,000 crash reports. This task could be made more efficient and effective through the use of new technology and upgrading

the current Department of Public Safety's system to better identify the location and cause of crashes

A cursory review of crash data indicates that median crossover crashes are random in nature and do not appear to be isolated to specific locations. Events leading up to median crossover crashes range from inattention, fatigue, improper lane change, medical emergencies, equipment failures, and a variety of other issues. In many cases, the crossover is a secondary event. A vehicle is cutoff, sideswiped, or overcorrected and then crosses the median out of control. Crashes occur on both horizontal and vertical curves, as well as on tangent sections of roadway.

Interstate Median Cross Sections

South Carolina has approximately 830 miles of interstate. Median widths vary considerably, ranging from just a few feet where opposing traffic is separated by concrete barrier on many of our urban interstates to more than 100 feet on some rural interstate segments. Of this mileage, approximately 284 miles have been identified from SCDOT's Roadway Inventory as having median widths of 36 feet or less. These sections are indicated on the attached map.

Section 6.2 of the AASHTO Roadside Design Guide indicates that barriers for median widths of 33 feet or more are considered to be optional and are not considered to be warranted unless supported by crash history for flat medians of more than 50 feet. Statistics presented in a 1998 North Carolina DOT report indicate that 85% of the median crossover crashes occurred on interstates with median widths of 50 feet or less. The probabilities of median crossover crashes appear to increase as median widths decrease and traffic volumes and operating speeds increase.

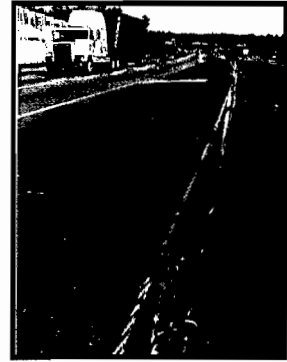
In the absence of complete crash history, and in light of information presented in the AASHTO Roadside Design Guide and the NCDOT report, Phase I of the South Carolina median barrier program should concentrate on the identification and systematic installation of median barriers on interstates with the most critical median widths. Due to the significant amount of existing interstates with medians of 36 feet or less, the first phase should concentrate on installing median barriers on these segments.

Barrier Systems

All barrier systems utilized on the National Highway System must meet NCHRP-350 criteria. At the present time, there are essentially three types of crashworthy barrier systems applicable for interstate median applications in South Carolina. Each of these systems has a distinct set of installation criteria which must be considered.

3 Strand Cable

- Requires 11-12 foot deflection area
- Can be installed on 6:1 slopes
- Single run can be used near center line of median
- Installation cost approximately \$80,000 to \$100,000 per mile



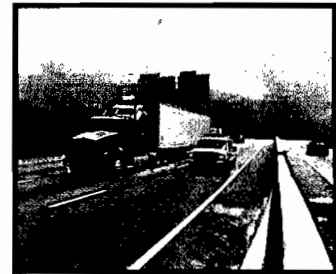
W-Beam

- Requires 10:1, or flatter slopes
- Dual run required for narrow median protection
- Installation cost approximately \$150,000 to \$180,000 per mile



Concrete Safety Shape

- Requires 10:1, or flatter slopes
- Requires extensive grading, drainage, and paving
- Installation cost approximately \$600,000 to \$1,000,000 per mile



Cable barrier is recommended for installation on most interstate sections with narrow medians. Cable barrier is crash tested to the same level as w-beam and concrete safety shape. All three barrier types arrest passenger vehicles and light trucks which compose 95% of the vehicles crossing medians in South Carolina. Providing barriers specifically to accommodate large vehicles, such as trailer trucks, would cost far in excess of \$1,000,000 per mile.

A large percentage of the narrow medians have slopes of 6:1 or flatter and are of widths to allow for sufficient deflection. This allows for installation of a single run of cable rail near the median centerline without additional grading or drainage requirements. For medians with slopes steeper than 6:1, cable guardrail or standard w-beam guardrail should be installed along both median shoulders, if slopes cannot be flattened. For medians less than 24-feet wide, adequate deflection distance is not available to allow for a single run in the median; therefore, cable or standard w-beam guardrail should also be installed along both median shoulders.

Priority Listing

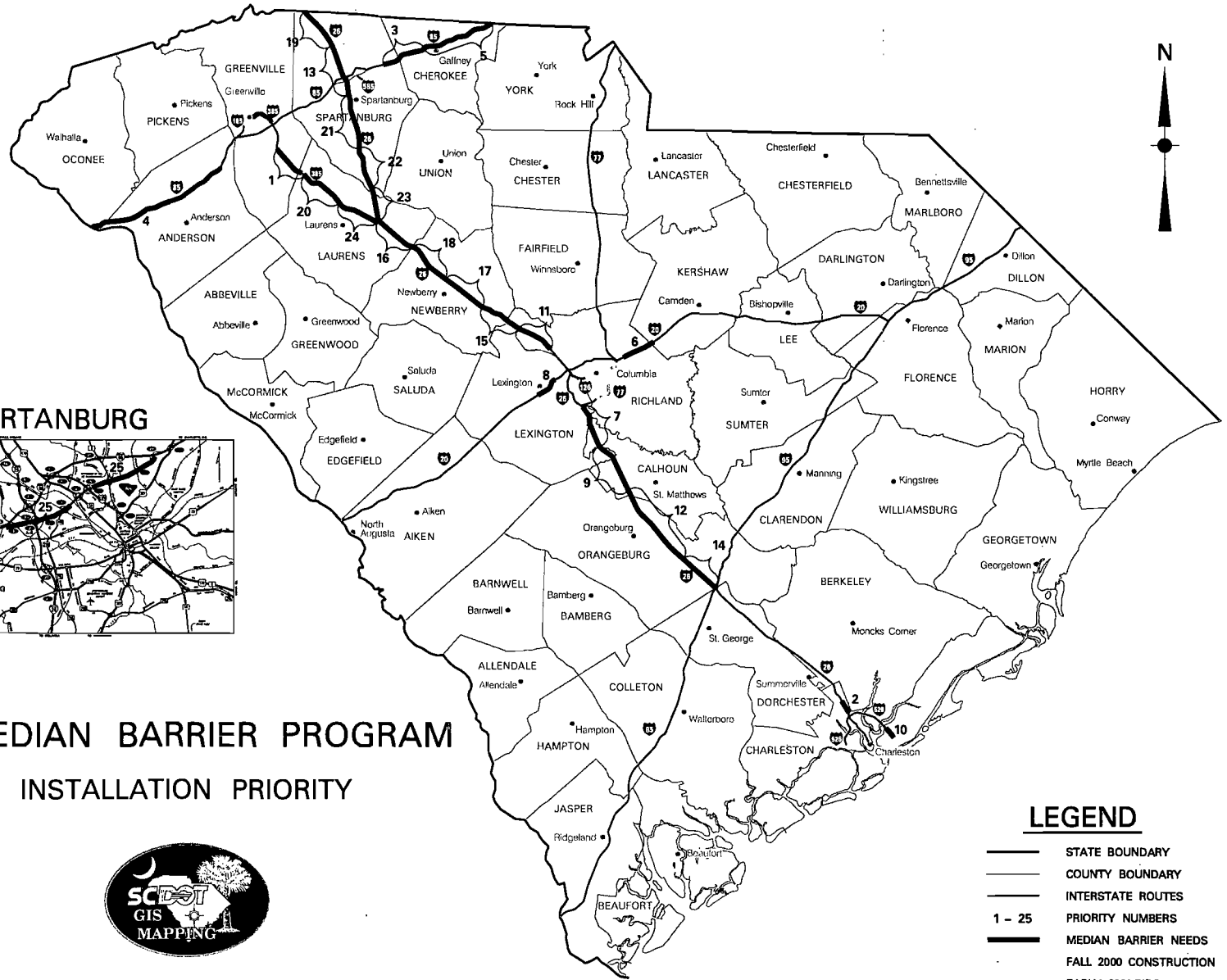
Those interstates with median widths of 36 feet or less are prioritized based upon median width, AADT, and % trucks. Prioritization is based 40% on median width, 40% on AADT, and 20% on trucks.

Installation of barrier on the approximately 284 miles of interstate with 36 feet or less medians is estimated to cost at least \$40 million. This estimate is based upon utilizing a single run of cable guardrail, and costs will increase accordingly if dual runs of guardrail or grading become necessary.

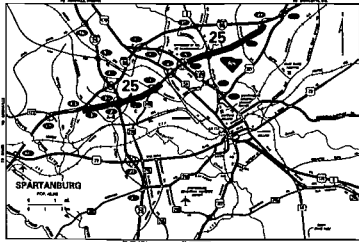


Interstate Median Barrier Priority List

<i>Priority Number</i>	<i>Route</i>	<i>Beginning Mile Post</i>	<i>Ending Mile Post</i>	<i>Length (Miles)</i>	<i>Median Width (Feet)</i>	<i>Traffic Volume (AADT)</i>	<i>% Trucks</i>	<i>County</i>
1	I-385	20.88	21.44	0.6	14 to 15	27,600	20	Greenville
1	I-385	21.76	30.08	8.3	15 to 26	36,916	20	Greenville/Laurens
2	I-26	208.54	211.52	3.0	36 to 40	109,474	7	Charleston
3	I-85	79.90	89.76	9.9	36	49,362	30	Spartanburg/Cherokee
4	I-85	0.06	0.89	0.8	36	38,267	35	Oconee
4	I-85	1.01	19.44	18.4	36	38,100	35	Oconee/Anderson
5	I-85	89.76	106.28	16.5	36	45,227	30	Cherokee
6	I-20	77.41	85.27	7.9	36	48,180	20	Richland/Kershaw
7	I-26	116.25	127.33	11.1	36	45,727	20	Lexington/Calhoun
8	I-20	54.38	60.28	5.9	36	44,166	20	Lexington
9	I-26	127.33	139.28	12.0	36	41,162	20	Calhoun/Lexington
10	I-526	16.16	19.56	3.4	36	30,876	25	Charleston
11	I-26	92.18	100.87	8.7	36	38,651	20	Richland
12	I-26	139.28	158.94	19.7	36	37,117	20	Calhoun/Orangeburg
13	I-26	9.97	21.99	12.0	36	32,885	20	Spartanburg
14	I-26	158.94	169.03	10.1	36	32,772	20	Orangeburg
15	I-26	82.21	92.18	10.0	36	32,109	20	Newberry/Lexington
16	I-26	51.68	61.27	9.6	36	28,366	20	Laurens
17	I-26	71.53	82.21	10.7	36	28,138	20	Newberry
18	I-26	61.27	71.53	10.3	36	27,300	20	Newberry
19	I-26	0.00	9.97	10.0	36	21,640	20	Spartanburg
20	I-385	10.32	20.88	10.6	36	20,481	20	Laurens
21	I-26	22.14	34.51	12.4	36	19,533	20	Spartanburg
22	I-26	34.51	44.08	9.6	36	17,853	20	Spartanburg
23	I-26	44.08	51.68	7.6	36	17,000	20	Spartanburg/Laurens
24	I-385	0.00	10.32	10.3	36	16,253	20	Laurens
25	I-85 (BUSINESS)	0.00	3.52	3.5	36	24,851	8	Spartanburg
25	I-85 (BUSINESS)	4.94	8.60	3.7	36	17,591	8	Spartanburg



SPARTANBURG



**MEDIAN BARRIER PROGRAM
INSTALLATION PRIORITY**



- LEGEND**
- STATE BOUNDARY
 - COUNTY BOUNDARY
 - INTERSTATE ROUTES
 - 1 - 25 PRIORITY NUMBERS
 - MEDIAN BARRIER NEEDS
 - FALL 2000 CONSTRUCTION
 - EARLY 2001 BIDS

Interstate Median Barrier

Most Cost Effective Priority Groupings

Priorities	Location	Miles
1	I-385 (Greenville-Laurens)	8.9
2, 10	I-26 & 526 (Charleston)	6.4
3, 5	I-85 (Cherokee-Spartanburg)	26.4
4	I-85 (Anderson-Oconee)	19.2
6, 8	I-20 (Kershaw-Lexington-Richland)	13.8
7, 9, 11	I-26 (Calhoun-Lexington-Richland)	31.8
12, 14	I-26 (Calhoun-Orangeburg)	29.8
13, 19	I-26 (Spartanburg)	22.0
15, 17, 18	I-26 (Lexington-Newberry)	31.0
16, 20, 24	I-26 & I-385 (Laurens)	30.5
21, 22, 23	I-26 (Laurens-Spartanburg)	29.6
25	I-85 Business (Spartanburg)	7.2