Spot Safety Project Evaluation

Order # 41000005004
Project Log # 200811214

Spot Safety Project # 06-99-212

Spot Safety Project Evaluation of the Bridge Fencing Installation
I-95 at SR 2220 (Tom Starling Road) – Bridge Number 72
Cumberland County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Transportation Mobility and Safety Division
North Carolina Department of Transportation

Principal Investigator

_____ 3-11-2010
Jason B. Schronce Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 06-99-212 located at the SR 2220 (Tom Starling Road) Bridge Overpass crossing I-95 in Cumberland County, near the City of Hope Mills / Fayetteville. This site is located between I-95 Exit 41 and Exit 44 at Cumberland County I-95 Milepost 4.63.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the bridge fencing and area lighting installation on the SR 2220 Overpass crossing I-95. SR 2220 (Tom Starling Road) is a two lane roadway as it crosses over I-95 with no access ramps and has a 55 mph speed limit. I-95 at the location is a rural four-lane median divided facility with a 70 mph posted speed limit.

The original statement of problem mentioned that objects were being thrown from the bridge onto motorists traveling along I-95 late at night. The goal of the countermeasure was to alleviate this pattern by preventing the malicious activity with protective fencing and bringing more awareness to bridge with area lights.

The initial crash analysis was completed from January 1, 1995 to December 31, 1998 with four (4) reported crashes, all of which were deemed correctable. The final completion date for the improvement at the subject intersection was on March 3, 2003 with a total cost of $50,000.

Photo Traveling North on I-95 approaching the SR 2220 Bridge
See Light Poles on Ends and Fencing along Both Sides

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period were the months of February through March 2003. The before period consisted of reported crashes from May 1, 1996 through January 31, 2003 (6 years and 9 months); and the after period consisted of reported crashes from April 1, 2003 through December 31, 2009 (6 years and 9 months). The ending date for this analysis was determined by the date of available crash data at the time of analysis.

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that the Safety Evaluation Group scanned crashes on I-95 in the vicinity of SR 2220 only looking for crashes involving objects being thrown from the overpass.

Treatment Information	Before	After	Percent Reduction (-) Percent Increase (+)
Objects Thrown from Bridge Crashes	5	0	- 100.0 %
Total Severity Index	2.48	0.00	- 100.0 %
Volume	36,500	39,000	6.8 %

Injury Crash Summary	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	0	0	- 100.0 %
Class A injury Crashes	0	0	- 100.0 %
Class B injury Crashes	1	0	- 100.0 %
Class C Injury Crashes	0	0	- 100.0 %
Total Injury Crashes	1	0	- 100.0 %

The naive before and after analysis at the treatment location resulted in a 100 percent decrease in Total Crashes, and therefore a 100 percent decrease in the Total Severity Index. The before period ADT year was 1998 and the after period ADT year was 2006.

Results and Discussion

Referencing the *Tables above*, the before period presented a pattern of crashes where I-95 vehicles were struck by objects (mainly rocks and concrete) from the SR 2220 overpass as they traveled below. These five (5) incidents all occurred in the year 1997 with four (4) of them occurring during a two week period in the month of May. Since that time and the installation of fencing and lighting, there have been no more crash reports indicating that vehicles have been struck by objects thrown from this overpass. The Safety Evaluation Group did review all “debris stuck” collisions along the I-95 corridor in this area and observed that none clearly stated the object had been thrown from the SR 2220 (Tom Starling Road) bridge.

The calculated benefit to cost ratio for this project is **0.67 considering total crashes**. The benefits are calculated using the change in annual crash costs from the before to the after period. Operational and other benefits related to the project are not considered in this analysis. The costs of the project include the actual construction costs as well as the increase in annual maintenance and utility costs.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection

BENEFIT-COST ANALYSIS WORKSHEET - Object Thrown Crashes

LOCATION: SR 2220 Overpass at I-95
COUNTY: Cumberland
FILE NO.: SS 06-99-212

BY: JBS
DATE: 3/11/2010
NOTES: Total Crashes

DETAILED COST: TYPE IMPROVEMENT - Bridge Fencing and Area Lighting

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	$50,000	10	0.149	$7,451
	$0	0	0.000	$0
Right-of-Way	$0	0	0.000	$0
TOTALS	$50,000	10	0.149	$7,451

ESTIMATED INCREASE IN ANNUAL MAINT. COST = $0
ESTIMATED INCREASE IN ANNUAL UTILITY COST = $0

TOTAL ANNUAL COST= $7,451
TOTAL COST OF PROJECT= $50,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	6.75	0	0.00	1	0.15	4	0.59	$4,978
AFTER	6.75	0	0.00	0	0.00	0	0.00	$0

Annual Benefits from Crash Cost Savings $4,978

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = ($2,474)

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 0.67

TOTAL COST OF PROJECT - $50,000 COMPREHENSIVE B/C RATIO - 0.67