

Spot Safety Project Evaluation

Project Log # 200702014

Spot Safety Project # 03-00-201

**Spot Safety Project Evaluation of the Roadway Widening of
SR 1230 (Haw Branch Rd) from NC 24 to US 258,
16 feet to 20 feet Roadway Width Change
Onslow County**

Documents Prepared By:

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Principal Investigator

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7-17-07

Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 03-00-201 – SR 1230 (Haw Branch Road) from NC 24 to US 258 in Onslow County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the resurfacing and widening of the existing roadway from 16 feet to 20 feet. The project increased the lane width from 8-foot to 10-foot lanes. This section of SR 1230 (Haw Branch Road) is a rural 2-lane facility with multiple sharp curves and many private driveway entrances. The speed limit is 55 mph for the full segment.

The original statement of problem was that the route has become a thoroughfare used by commuters and truck traffic. Eight-foot narrow lanes present a potential safety hazard due to the ever increasing traffic volume. It was also noted that increasing truck traffic has caused pavement drop off issues furthering a major maintenance problem on the edge of the roadway.

This project was considered a proactive remedy to potential ran-off roadway and head-on type collisions. Additional funding for this project was achieved through two additional work orders.

The initial crash analysis for this intersection was completed from December 1, 1996 to November 30, 1999 with a total of 23 crashes; 5 of which were considered correctable by this countermeasure. Of the correctable crashes, three were ran-off roadway and one head-on crash that combine resulted in two class-A, six class-B, and two class-C injuries.

The final completion date for the widening and resurface of SR 1230 was January 8, 2002, with a total cost of \$280,000. Spot Safety Funds provided \$140,000 of the total cost.

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 was from September 1, 2001 to April 30, 2002. The before period consisted of reported crashes from February 1, 1997 through August 31, 2001 (4 Years, 7 Months) and the after period consisted of reported crashes from May 1, 2002 through November 30, 2006 (4 Years, 7 Months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The treatment data consisted of all reported crashes on SR 1230 outside the influence area of both NC 24 and US 258. Crashes included in this report occurred between 150' north of NC 24 (SR

1230 milepost 6.328) and 150' south of US 258 (SR 1230 Milepost 9.072). Please see *attached Collision Diagrams* and *Location Map* for further details.

The following data table depicts the Naïve Before and After Analysis for the treatment location. Please note that Ran-off Roadway and Head-on collisions were the target crashes for the applied countermeasure as labeled by the project information.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	11	10	- 9.09 %
Total Severity Index	9.24	18.38	95.53 %
Target Crashes	7	6	- 14.29 %
Target Crashes Severity Index	13.94	28.73	106.10 %
Volume	650	710	9.23 %
<u>Injury Summary</u>			
Fatal Injuries	0	2	200.00 %
Class A Injuries	1	0	- 100.00 %
Class B Injuries	2	1	- 50.00 %
Class C Injuries	0	2	200.00 %
Total Injuries	3	5	66.67 %

The naïve before and after analysis at the treatment location resulted in a 9 percent decrease in Total Crashes, a 14 percent decrease in Target Crashes, and a 9 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1999 and the after period ADT year was 2004.

Results and Discussion

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data shows a 9 percent decrease in Total Crashes, an 14 percent decrease in Target Crashes, a 95.5 percent increase in the Total Severity Index, and a 106 percent increase in the Target Severity Index.

Referencing the *Collision Diagrams* and the above table, it is apparent that the chosen countermeasure was ineffective in reducing crashes at the subject location. However, affects on the shoulder maintenance may have improved. Observed from the field investigation, the shoulders appeared to be in good condition. Due to the low number of crashes in both the before and after periods, the perceivable improvement from the table above appears misleading. The crash pattern of ran-off roadway and head-on crashes on this segment appears to have remained the same.

The large increase in the Total and Target Severity Indexes can be attributed to multiple fatality target crashes in the after period. Crash #4 was a Head-on Collision in wet roadway conditions and Crash #6, which occurred when a single vehicle left the roadway and struck a tree.

From the *collision diagrams*, it appears as if the ran-off roadway and head-on collisions are occurring due to vehicles proceeding at high rates of speed through the curves. The vehicle then either loses control off the roadway after overcorrecting or crosses the center lane into oncoming traffic. Of note, a limited number of skid marks were observed during the field investigation.

From review of the two after period fatal reports, collected from the Regional Engineer, shoulder rehab maintenance work was requested after each incident. It is assumed but could not be determined if such work was completed at these locations. Speed was also believed to be the main contributing factor in both fatal crashes in which the drivers were clearly traveling over the posted speed before impact or ignored the curve warning advisory speed.

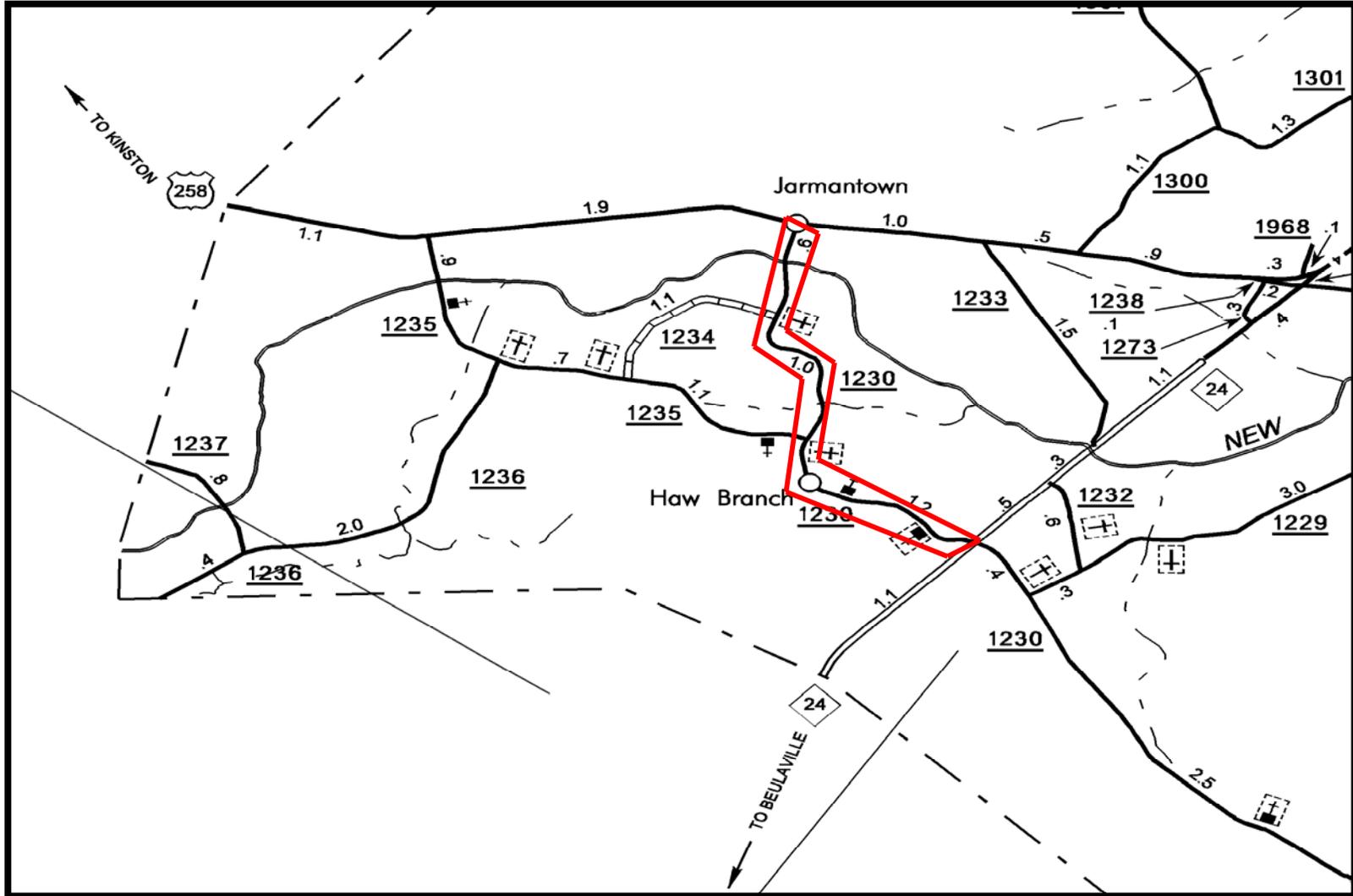
The field investigation also identified a problem area of sunken pavement approximately 500' from the NC 24 intersection. The area had been marked and was in the process of being repaired.

Please see the attached *Treatment Site Photos* for roadway conditions.

The calculated benefit to cost ratio for this project is -3.88 considering total crashes. The benefit to cost ratio considering only target crashes is -3.77 . 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. This countermeasure did not cause an increase in the maintenance or utility costs. Please note that the total project cost of \$280,000 was included in the b-c analysis, even though it was funded from three different sources within the DOT.

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 countermeasure.

**Location Map
Onslow County
Evaluation of Spot Safety Project # 03-00-201**



Treatment Location: SR 1230 (Haw Branch Rd) from NC-24 to US-258

Treatment Site Photos Taken 4/12/2007



Driving North on SR 1230 (Haw Branch Rd) from NC-24



Driving North on SR 1230, notice sunken pavement (to be repaired)



Driving North on SR 1230 (Haw Branch Rd)



Driving North on SR 1230 (Haw Branch Rd)



Driving North on SR 1230 (Haw Branch Rd)



High Water Caution Sign near New River Culvert

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: SR 1230 from NC 24 to US 258
 COUNTY: Onslow
 FILE NO.: SS 03-00-201

BY: JBS
 DATE: 6/26/2007
 NOTES: Target Crashes

DETAILED COST: TYPE IMPROVEMENT - Roadway Widening (16' to 20')

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$280,000	20	0.102	\$28,519
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$280,000	20	0.102	\$28,519

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$0
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$0
 TOTAL ANNUAL COST= \$28,519
 TOTAL COST OF PROJECT= \$280,000

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	4.58	1	0.22	2	0.44	4	0.87	\$120,437
AFTER	4.58	2	0.44	2	0.44	2	0.44	\$227,904

Annual Benefits from Crash Cost Savings (\$107,467)

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = (\$135,986)
 BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = -3.77

TOTAL COST OF PROJECT - \$280,000 COMPREHENSIVE B/C RATIO - -3.77

