

Spot Safety Project Evaluation

Project Log # 200512180

Spot Safety Project # 09-98-209

Spot Safety Project Evaluation of the Intersection Relocation of SR 2990 (Fraternity Church Rd) and SR 2902 (Ebert St) Forsyth County

Documents Prepared By:

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Traffic Safety Systems Management Section
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Principal Investigator

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03-20-2006
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 09-98-209 – The Intersection of SR 2902 (Ebert St) and SR 2990 (Fraternity Church Rd) in Forsyth County.

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis of the treatment versus comparison data has been completed to measure the effectiveness of the spot safety improvement. Additional analysis methods were not utilized for this evaluation because a suitable comparison group was unattainable. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the relocation of the intersection of SR 2902 (Ebert St) and SR 2990 (Fraternity Church Rd) approximately 50 feet north. SR 2902 is a 2-lane facility with a speed limit of 55 mph and a 30 mph cautionary speed limit at the subject intersection. SR 2990 is also a 2-lane facility with a speed limit of 55 mph. There are advanced intersection warning signs on SR 2902 and a advanced stop ahead sign on SR 2990.

Prior to the relocation, the intersection was just before the peak of a hillcrest on SR 2902 (Ebert St). The initial statement of problem was that sight distance was severely restricted when making a left turn from SR 2902 onto SR 2990 (approximately 150 feet) and from SR 2990 onto SR 2902 (approximately 200 feet).

The initial crash analysis for this intersection was completed from January 1, 1995 to March 1, 1998 with a total of 7 crashes. These crashes included 2 Angle, 4 Left Turn-Same Roadway, and 1 Ran Off Road-Straight crashes. The final completion date for the relocation of the intersection was November 18, 1998, with a total cost of \$75,000.

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 October 1, 1998 to December 31, 1998. The before period consisted of reported crashes from November 1, 1991 through September 30, 1998 (6 Years, 11 Months) and the after period consisted

of reported crashes from January 1, 1999 through November 30, 2005 (6Years, 11 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 within 150 feet of the subject intersection. Please see attached *Location Map* for further detail. The following data table depicts the Naive Before and After Analysis at the treatment location. Please note Left Turn - Same Roadway and Left Turn – Different Roadway crashes were the Target Crashes for the applied countermeasure.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	11	1	-90.9
Total Severity Index	11.93	8.4	-29.6
Target Crashes	9	0	-100.0
Target Severity Index	5.11	0	-100.0
Volume	3800	4300	13.2

<u>Target Crash Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal Injury Crashes	0	0	N/A
Non-Fatal Injury Crashes	5	0	-100.0
Total Injury Crashes	5	0	-100.0
Night Crashes	1	0	-100.0
Wet Crashes	4	0	-100.0

The naive before and after analysis at the treatment location resulted in a 90.9 percent decrease in Total Crashes, a 100 percent decrease in Target Crashes, and a 13.2 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1995 and the after period ADT year was 2002.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 90.9 percent decrease in Total Crashes and a 100 percent decrease in Target Crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in both Total Crashes and Target crashes from the before to the after period.

As stated in the *Project Information and Background*, in the before period the intersection was located just before the peak of a hillcrest on SR 2902 (Ebert St). This created severe site distance issues for left turns into and out of SR 2990 (Fraternity Church Rd), especially given the speed

limits. A pattern of both Left Turn-Same Roadway and Left Turn-Different Roadway crashes can be seen in the attached *Collision Diagram, Before Period*. After reviewing the crash reports and the officer's statements, these crash patterns can definitely be attributed to the lack of sight distance due to the hillcrest. The one Pedestrian (also a Rear-End, Slow or Stop) crash in the before period was caused by a vehicle coming over the crest of the hill and not being able to slow down in time to avoid a collision.

Again Referencing the *Collision Diagrams*, the Left Turn crash patterns have disappeared in the after period. There was only a single crash in the after period, which was an angle crash caused by a running of the stop sign at night. In the before period there was also one crash caused by the running of the stop sign at night, resulting in a Ran Off Road-Straight crash.

Please see the attached *Treatment Site Photos*. Photos from each approach are provided, as well as site distances from SR 2990.

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.

TREATMENT SITE PHOTOS TAKEN 3/9/2006



Traveling North on SR 2902 (Ebert St)



Traveling North on SR 2902 – Taken from Approximate Location of Intersection Prior to Relocation. Notice the Limited Site Distance Due to the Hillcrest



Traveling South on SR 2902 (Ebert St)



Traveling South on SR 2902 (Truck is Located on Subject Intersection)



Traveling East on SR 2992 (Fraternity Church Rd)



Traveling East on SR 2992



Looking Right From SR 2992 (Fraternity Church). Note that Old Intersection Location Was Approximately 50 Feet in This Direction



Looking Left from SR 2902. Note the Still Limited Site Distance, Which Was Increased Due to Realignment



LEGEND

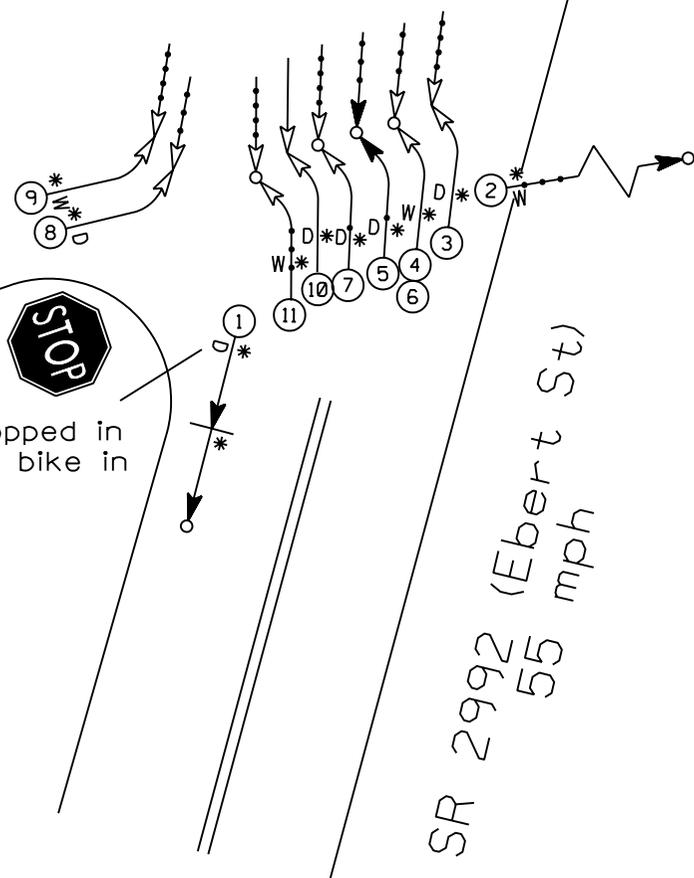
	VEHICLE		TRUCK		9 mph or less		P PEDESTRIAN
	BICYCLE		10 mph or more		20 mph or less		B BICYCLE
	TRUCK		30 mph or less		40 mph or less		T TRUCK
	VEHICLE		50 mph or less		60 mph or less		A ANIMAL
	VEHICLE		70 mph or less		80 mph or less		O OBJECT AT FAULT
	VEHICLE		90 mph or less		100 mph or less		D DRIVER
	VEHICLE		110 mph or less		SPEED UNKNOWN		W WET
	VEHICLE		120 mph or less		VEHICLE		I ICY OR SNOWY

SR 2990
(Fraternity Church Rd)
55 mph

SR 2902 (Ebert St)
AT SR 2992 (Fraternity Church Rd)
In the Before Period
From 11/1/1991-9/30/1998

Note: Vehicle stopped in roadway to load bike in vehicle.

SR 2992 (Ebert St)
55 mph



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		COLLISION DIAGRAM	
HIGHWAY SAFETY IMPROVEMENT PROGRAM	SAFETY INFORMATION MANAGEMENT AND SUPPORT	DIVISION: 9	AREA: ..
		STUDY PERIOD: 10/1/99 TO 9/30/998	
		DISTANCE: ..	Y-LINE: 150 FT
		ANALYSIS PREPARED BY: B. BOOTH000	
		DIAGRAM PREPARED BY: B. BOOTH000	
SAFETY EVALUATION		TRAFFIC SAFETY	
BEFORE REALIGNMENT		SCALE: NOT TO SCALE	
		DATE: Marcb.2006	
		LOG NUMBER: 2005000	
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			

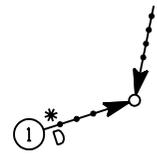


LEGEND

	9 mph or less		P Pedestrian
	10 mph or less		B Bicycle
	20 mph or less		T Truck
	30 mph or less		A Animal
	40 mph or less		C Other at Fault
	50 mph or less		D Div
	60 mph or less		W Wet
	70 mph or less		I Ice or Snow
	80 mph or less		
	90 mph or less		
	100 mph or less		
	110 mph or less		
	120 mph or less		
	130 mph or less		
	140 mph or less		
	150 mph or less		
	160 mph or less		
	170 mph or less		
	180 mph or less		
	190 mph or less		
	200 mph or less		

SR 2990
(Fraternity Church Rd)
55 mph

SR 2902 (Ebert St)
AT SR 2992 (Fraternity Church Rd)
In the After Period
From 1/1/1999-11/30/2005



SR 2992 (Ebert St)
55 mph

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		COLLISION DIAGRAM	
ROADWAY SAFETY IMPROVEMENT PROGRAM	SAFETY INFORMATION MANAGEMENT AND SUPPORT	DIVISION: 9	AREA: ..
		STUDY PERIOD: 1/1/1999 TO 11/30/2005	
		DISTANCE: Y-LINE: 150 FT	
		ANALYSIS PREPARED BY: B. BOHOSKO	
		DIAGRAM PREPARED BY: B. BOHOSKO	
		DIAGRAM REVIEWED BY:	
SAFETY REALIGNMENT		SCALE: NOT TO SCALE	
DATE: 02/02/2006		DATE: Nov 2006	
LOG NUMBER: 20050200			
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			