

Spot Safety Project Evaluation

Project Log # 200712088

Spot Safety Project # 14-99-201

**Spot Safety Project Evaluation of the Guardrail Installation and
Curve Flasher Addition on US 129 (Tallulah Rd) from the
Cherokee County Line (0.00) to 0.1 Mile South of SR 1206 (8.05)
Graham County**

Documents Prepared By:

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Principal Investigator



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10-15-2008
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 14-99-201 located along the highway of US 129 (Tallulah Rd) from Milepost 0.00 to 8.05 in Graham County, southeast of Robbinsville.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasures chosen for the subject location was the installation of approximately 3500 feet of standard w-beam guardrail and the addition of pole mounted flashers on the existing curve warning signs just south of SR 1206. US 129 (Tallulah Rd) is a mountainous terrain two-lane roadway with sharp widening vertical and horizontal curves. The posted speed limit is 55 mph with advisory curve warnings of 45 mph.

The original statement of problem was the presence of several thousand feet of substandard guardrail. The existing guardrail has no offset blocks, has 12'6" post spacing and is lower than current standard guardrail. Also, the most isolated issue exists at the reverse curve just south of SR 1206. There have been two fatal crashes in the vicinity of this curve within two consecutive years (1997 – 1998). The goal is to reduce the number and severity of ran off roadway crashes along this section of roadway.

The initial crash analysis was completed from January 1, 1996 to December 31, 1998 with twenty-seven (27) reported crashes. The final completion date for the improvement along this strip was on September 5, 2002 with a total cost of \$75,000.00.

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 August and September 2002. The before period consisted of reported crashes from March 1, 1997 through July 31, 2002 (5 years and 5 months); and the after period consisted of reported crashes from October 1, 2002 through February 28, 2008 (5 years and 5 months). The ending date for this analysis was determined by the date of available crash data at the time of analysis.

The treatment data consisted of all crashes along the segment of US 129 and the analysis was conducted with a zero foot y-line of the subject roadway. *Please see attached location map and photos for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Lane Departure Crashes were the target crashes for the applied countermeasure. The Lane Departure Crash types considered are as follows: Fixed Object; Head on; Overturn / Rollover; Ran Off Road – Left; Ran Off Road – Right; and Sideswipe, Opposite Direction.

Total Treatment Information			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	46	48	4.3 %
Total Severity Index	17.24	18.14	5.2 %
Target Crashes	30	35	16.7 %
Target Crash Severity Index	14.81	18.91	27.7 %
Night Crashes	15	10	- 33.3 %
Wet Roadway Crashes	11	11	0.0 %
Volume	2,470	2,240	- 9.3 %
Injury Crash Summary - Total			
Fatal injury Crashes	4	5	25.0 %
Class A injury Crashes	4	4	0.0 %
Class B injury Crashes	9	9	0.0 %
Class C Injury Crashes	10	10	0.0 %
Total Injury Crashes	27	28	3.7 %

Target Crash Information			
	Before	After	Percent Reduction (-) Percent Increase (+)
Severe Injury (K+A)	4	7	75.0 %
Moderate Injury (B+C)	15	13	- 13.3 %
PDO Crashes	11	15	36.4 %
Curve Flasher – Lane Departure	4	1	- 75.0 %
Severe Injury (K+A) at Curve Flasher	1	0	- 100.0 %
Lane Departure Crash Type			
Fixed Object	8	25	212.5 %
Head On	1	1	0.0 %
Overturn / Rollover	2	6	200.0 %
Ran Off Road – Left	10	0	- 100.0 %
Ran Off Road – Right	6	3	- 50.0 %
Sideswipe, Opposite Direction	3	0	- 100.0 %

The naive before and after analysis at the treatment location resulted in a 4 percent increase in Total Crashes, a 17 percent increase in Target Crashes, and a 5 percent increase in the Total Severity Index. The before period ADT year was 1999 and the after period ADT year was 2005.

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 4 percent increase in Total Crashes and a 17 percent increase in Target Crashes. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have increased at the treatment location from the before to the after period.

Referencing the *Tables* above, both total and target number of crashes and their corresponding severities increased after the countermeasures were installed. Fixed object (guardrail) crashes increased by over 200 percent and severe injury target crashes increased by 75 percent. Overall, the section of roadway is still performing closely to the same as it did in the before period.

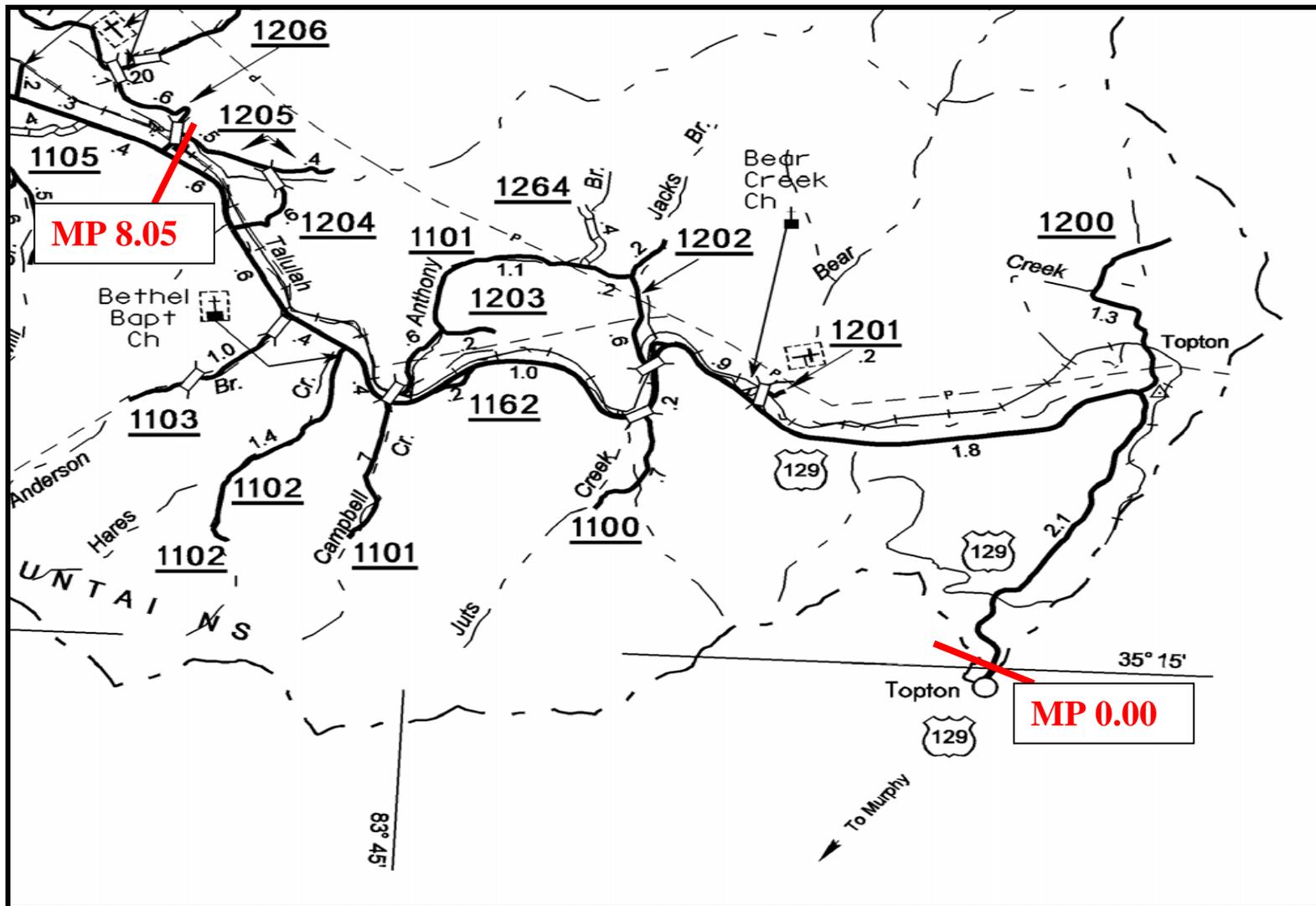
From the analysis, motorcycle involved crashes increased from four (4) in the before period to seven (7) after the guardrail upgrade. However, motorcycle crashes only account for one (1) of the eleven (11) severe injury crashes through the study and this collision was a rear end after period collision. Therefore, motorcycles versus guardrail crashes are not the result of the increase in total number or severity of crashes in this analysis.

Also, the addition of the flashers on the existing curve warning signs appears to have benefited the crash pattern as lane departure crashes involving this curve have decreased from four (4) in the before period with one (1) fatality to only one (1) non-injury crash in the after.

The calculated benefit to cost ratio for this project is **(-6.40) considering total crashes**. The benefit to cost ratio **considering only target crashes is (-18.78)**. 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.

Please see the attached *Treatment Site Photos*. Photos are provided for US 129 heading eastbound showing the upgraded guardrail and westbound showing the flasher addition to the curve warning sign. 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.

Location Map
Graham County
Evaluation of Spot Safety Project # 14-99-201



Treatment Location: US 129 from the Cherokee County Line (MP 0.0)
to 0.1 mile South of SR 1206 (MP 8.05)

TREATMENT SITE PHOTOS TAKEN 9/17/2008



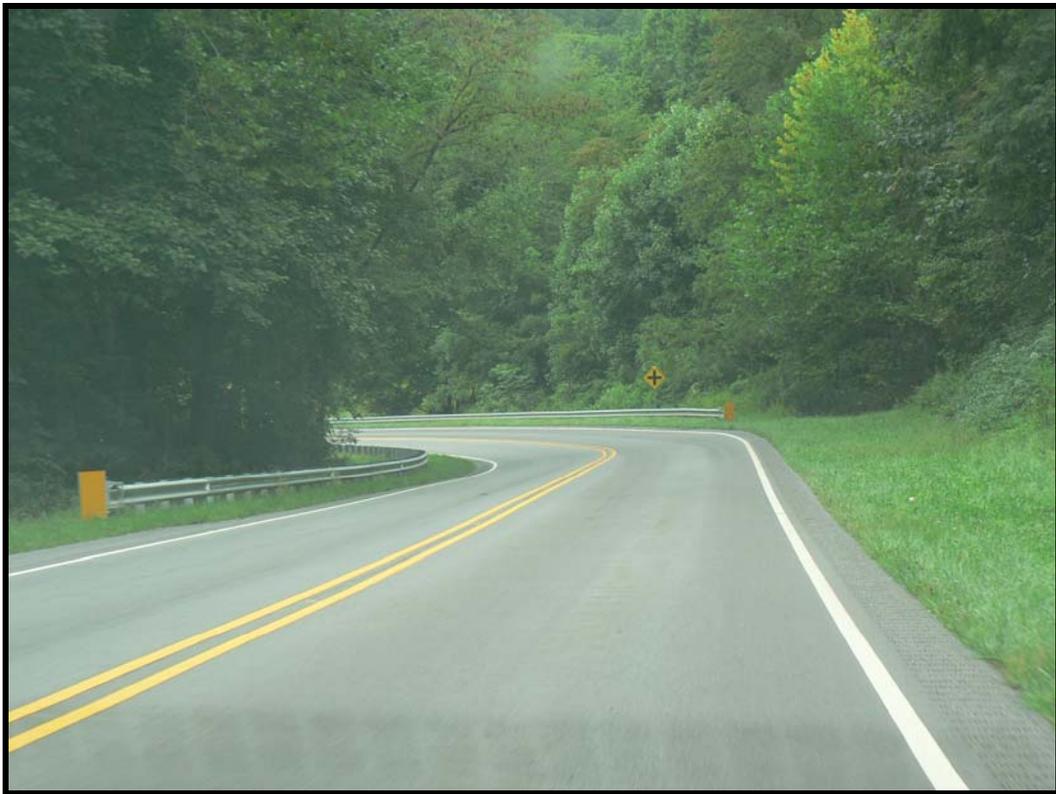
Traveling West on US 129 (Tallauha Rd)



Traveling West on US 129



Traveling East on US 129



Traveling East on US 129



Traveling East on US 129



Traveling East on US 129

