

# **Spot Safety Project Evaluation**

Project Log # 200610096

Spot Safety Project # 05-00-015

**Spot Safety Project Evaluation of the Directional Crossover Installation on US 64 at SR 1163  
(Kelly Rd) in Wake County**

Documents Prepared By:

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# ***Spot Safety Project Evaluation Documentation***

## **Subject Location**

Evaluation of Spot Safety Project Number 05-00-015 - Directional Crossover Installation on US 64 at SR 1163 (Kelly Rd) in Wake County.

## **Project Information and Background from the Project File Folder**

US 64 is a four-lane divided roadway where it intersects with SR 1163 (Kelly Rd.). US 64 has dedicated left and right turn lanes and a speed limit of 55 mph. SR 1163 is a two lane roadway without left turn lanes and a speed limit of 55 mph. The intersection is controlled by a stop condition on Kelly Rd. The original crash study was from 11/1/97 through 10/31/00 with 18 total crashes. There were 16 angle crashes that were considered correctable by improving the intersection. There was 1 Class A, 5 Class B, and 20 Class C injuries that resulted from these crashes.

The original problem statement was that vehicles were failing to yield to the right of way causing the angle crashes. The improvement chosen for the subject location was to install a directional crossover on US 64 to prohibit left turn and straight through movements from SR 1163 and allow left turn movements from US 64. The final completion date for the improvement at the subject location was on December 2, 2002 at a cost of \$40,000.

## **Naive Before and After Analysis**

After reviewing the spot safety project file folder along with all the crashes along the subject road, the crash data omitted from this analysis to consider for an adequate construction period was from November 2002 to January 2003. The before period consisted of reported crashes from March 1, 1999 through October 31, 2002 (3 years, 8 Months) and the after period consisted of reported crashes from February 1, 2003 through September 30, 2006 (3 Years, 8 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 crashes within 150 feet of the subject intersection. The following data table (Table 1) depicts the Naive Before and After Analysis for the above information. Please note that Frontal Impact crash types were the target crashes for the applied countermeasure. These crash types considered are as follows: Left Turn, same roadway; Left Turn, different roadway; Right Turn, same roadway; Right Turn, different roadway; Head On and Angle.

A naïve before and after analysis was also completed at the U-turns located at milepost 2.55 (westbound traffic) and milepost 3.14 (eastbound traffic). Past studies have shown that if a movement were eliminated in one area, traffic could migrate to another location to continue on their path. The data provided is for your information to see if migration has occurred and the effects it may have. (see Table 3)

<u>Treatment Information</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total crashes	43	35	-18.6
Total Severity Index	6.2	2.7	-56.6
Frontal Impact Crashes	28	1	-96.4
Frontal Severity Index	7.7	8.4	9.5
Volume	21590	28340	31.3
<u>Treatment Injury Crashes</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal	0	0	N/A
Class A	1	0	-100.0
Class B	7	0	-100.0
Class C	13	8	-38.5
Property Damage Only	22	27	22.7
<u>Frontal Injury Crashes</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal	0	0	N/A
Class A	1	0	-100.0
Class B	6	0	-100.0
Class C	9	1	-88.9
Property Damage Only	12	0	-100.0

Table 1.

The naive before and after analysis at the treatment location resulted in a 19 percent decrease in Total Crashes, a 96 percent decrease in Frontal Impact Crashes and a 31 percent increase in Average Daily Traffic (ADT). The before period ADT year was 2001 and the after period ADT year was 2005.

## Results and Discussion

The naïve before and after analysis involving the comparison of treatment before data versus treatment after data resulted in a 19 percent decrease in Total Crashes and a 96 percent decrease in Frontal Impact Crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in the number of Total Crashes and a decrease in the number of Frontal Impact Crashes from the before to the after period.

Referencing the collision diagrams there was one after period frontal impact crash. The crash involves a left turning vehicle from westbound US 64. During the field visit photos were taken looking downstream of eastbound US 64. When approaching the treatment intersection US 64 does have some vertical curves but not enough to adversely affect sight distance when making the left turn. Also, traffic flow seemed to be light and steady with plenty of gap time occurring when a downstream traffic signal went through its phasing.

The after period collision diagram also shows a rear end crash problem on SR 1163 north (see Table 2). As previously mentioned there is plenty of gap time and good sight distance looking west on eastbound US 64. With those two factors being reduced as a possible cause for the rear end crashes another factor was noticed during a field visit on January 25, 2007 from 6 A.M. to 9 A.M. During the field investigation, I noticed vehicles leaving the stop sign two at a time. Occasionally when driver 1 (lead vehicle) proceeds onto US 64 east, driver 2 does not stop and follows the lead vehicle while still looking left which results in a collision if the lead vehicle suddenly stops or hesitates.

	Before	After	Percent Reduction (-) Percent Increase (+)
Rear-End Crashes	11	30	172.7
Severity Index	3.0	2.7	-9.7
<b>Rear-End Injury Crashes</b>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	0	0	N/A
Class B	0	0	N/A
Class C	3	7	133.3
Property Damage Only	8	23	187.5

Table 2.

The following table shows the naïve before and after analysis completed at the U-turns located at milepost 2.55 (westbound traffic) and milepost 3.14 (eastbound traffic).

	Before	After	Percent Reduction (-) Percent Increase (+)
<b>Westbound</b>			
Total Crashes	4	2	-50.0
Total Severity Index	23.7	1.0	-95.8
<b>Eastbound</b>			
Total Crashes	1	1	0.0
Total Severity Index	1	1	0.0

Table 3.

From the information contained in Table 3, crash migration did not occur at either the eastbound or westbound crossover shown in the aerial photos.





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 road.



Location Map: US 64 at SR 1163 (Kelly Rd.) Wake County

*Treatment Site Photos taken January 25, 2007*



Driving west on US 64



On SR 1163 north looking west



Driving north on SR 1163 toward US 64



Driving north on SR 1163



Driving south on SR 1163 toward US 64



Driving south on SR 1163



On SR 1163 facing south looking east



Driving east on US 64 toward SR 1163



Driving east on US 64



