



CMF / CRF Details

CMF ID: 4847

Change in average vertical curve grade from X to Y (% grade)

Description: Change in average vertical curve grade on rural two-lane highways from X to Y (% grade)

Prior Condition: average vertical curve grade of X (% grade)

Category: Alignment

Study: [Efficacies of roadway safety improvements across functional subclasses of rural two-lane highways, Labi, 2011](#)

Star Quality Rating:

[\[View score details\]](#)

Crash Modification Factor (CMF)

Value:

$$CMF = e^{(0.0738(Y-X))}$$

Adjusted Standard Error:

Unadjusted Standard Error:

Crash Reduction Factor (CRF)

Value:

$$CRF = 100 \times (1 - e^{(0.0738(Y-X))})$$

Adjusted
Standard
Error:

Unadjusted Standard Error:	
-----------------------------------	--

Applicability	
----------------------	--

Crash Type:	All
Crash Severity:	A (serious injury),B (minor injury),C (possible injury)
Roadway Types:	Minor Arterial
Number of Lanes:	2
Road Division Type:	Undivided
Speed Limit:	
Area Type:	Rural
Traffic Volume:	
Time of Day:	All

<i>If countermeasure is intersection-based</i>	
---	--

Intersection Type:	
Intersection Geometry:	
Traffic Control:	
Major Road Traffic Volume:	
Minor Road Traffic Volume:	

Development Details	
----------------------------	--

Date Range of Data Used:	1997 to 2000
Municipality:	
State:	IN
Country:	
Type of Methodology Used:	7

Sample Size Used:	2160 Site-years
--------------------------	-----------------

Other Details

Included in Highway Safety Manual?	No
---	----

Date Added to Clearinghouse:	May-01-2013
-------------------------------------	-------------

Comments:	There is no indication of statistical significance in the paper. As such, the star rating does not reflect the level of significance. Also, there is no indication of sample size in terms of number of crashes. The star rating reflects a moderate sample based on the number of site-years.
------------------	--

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

The information contained in the Crash Modification Factors (CMF) Clearinghouse is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The U.S. Government assumes no liability for the use of the information contained in the CMF Clearinghouse. The information contained in the CMF Clearinghouse does not constitute a standard, specification, or regulation, nor is it a substitute for sound engineering judgment.