# Topic: Enhanced Edge Line Markings

## Key Points

- Increase roadway edge visibility
- Overall reduction in fatal and injury crashes
- Continuous stream of roadway delineation information that cannot be relayed by signs or signals

**What are Enhanced Edge Line Markings?**

Section 3A.06 of the national Manual on Uniform Traffic Control Devices (MUTCD) Item C(4) states, *"Width of the line indicates the degree of emphasis."* This statement first appeared in the 1971 edition and has virtually been unchanged ever since. Longitudinal pavement markings (color, pattern and width) are one of the most important mediums of conveying delineation information to motorists by providing a continuous stream of information that cannot be relayed by signs or signals. The MUTCD also states that the minimum width of these lines (yellow or white) is 4 inches and to increase the width, if desired, relies upon the agency's engineering judgment. The use of wide or enhanced edge line markings are becoming more prevalent. One of the most widely agreed upon reasons for using enhanced lines is to increase roadway visibility. A wider stripe provides motorists with brighter levels of retroreflectivity on the road surface which is one measure to address the issue of run-off-road (ROR) crashes.


**How effective are Enhanced Edge Line Markings?**

The use of wider edge line markings results in a reduction in total crashes. Characteristics that contribute to varying crash modification/reduction factors include the roadway facility type as well as presence of construction. A study performed by the Texas Transportation Institute (TTI) analyzing over 800 miles of rural two-lane highways suggest fatal injury crashes were reduced by 17% after increasing the line width from 4" to 6" in Michigan. Day/nighttime and weather related crash types were also reduced by a range of 12% to 24%. This same study found a 15% reduction in head on crashes as well. The table below provides Crash Modification Factors (CMFs) independent of the above mentioned study.

| Crash Type | CMF* | Standard Error |
|---|---|---|
| **Day time** | 0.714 | 0.043 |
| **Total Crashes** | 0.825 | 0.028 |
| **Nighttime** | 0.962 | 0.043 |

* CMFs collected from cmfclearinghouse.com

In addition to wider edge lines, a before-after study from TTI indicated that using enhanced centerlines and edge lines result in reduced vehicle lateral movement within the lane.

**Where is the best place for Enhanced Edge Line Markings?**

Widening edge line pavement markings would be best utilized in locations where there is a higher density of horizontal curves, roads with narrow or absent shoulders, and in construction zones. Rural paved two-lane roads could also benefit by increasing the retroreflectivity during all environmental driving conditions. A study in South Dakota found the best place to use 8" edge lines are roadways with volumes between 2,000 and 5,000 vehicles per day (vpd).

**What is the cost associated with Enhanced Edge Line Markings?**

The price of longitudinal pavement markings, typically charged by the linear foot, will differ depending on the material and permanency of the markings. Temporary longitudinal pavement markings typically use a type of adhesive tape and are generally installed in construction zones. Typical costs for 4" and 6" wide waterborne edge lines are approximately $0.10 per foot ($1,056 per mile) and $0.15 per foot ($1,584 per mile) respectively. For high volume roadways, the associated prices are going to increase due to more durable materials that will be used. A 1991 benefit/cost study estimated the average annual benefits of installing pavement markings to be around $19,000 per mile. The relatively low-cost alternative and large safety benefits result in a strong return for the taxpayers as well. Even a small decrease in crashes would still yield a favorable benefit/cost ratio.

**References**

FHWA/TTI. 2002. *The Use of Wider Longitudinal Pavement Markings.* 02-0024-1

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FHWA/CTR. 2006. *Before-After Comparison of Edgeline Effects on Rural; Two-Lane Highways.* FHWA/TX-07/0-5090-2

TTI. 2012. *An Evaluation of the Effectiveness of Wider Edge Line Pavement Markings.* (Sponsored by American Glass Bead Manufacturer's Association)