

# The Science of Safety

New tools to combat an age-old transportation problem

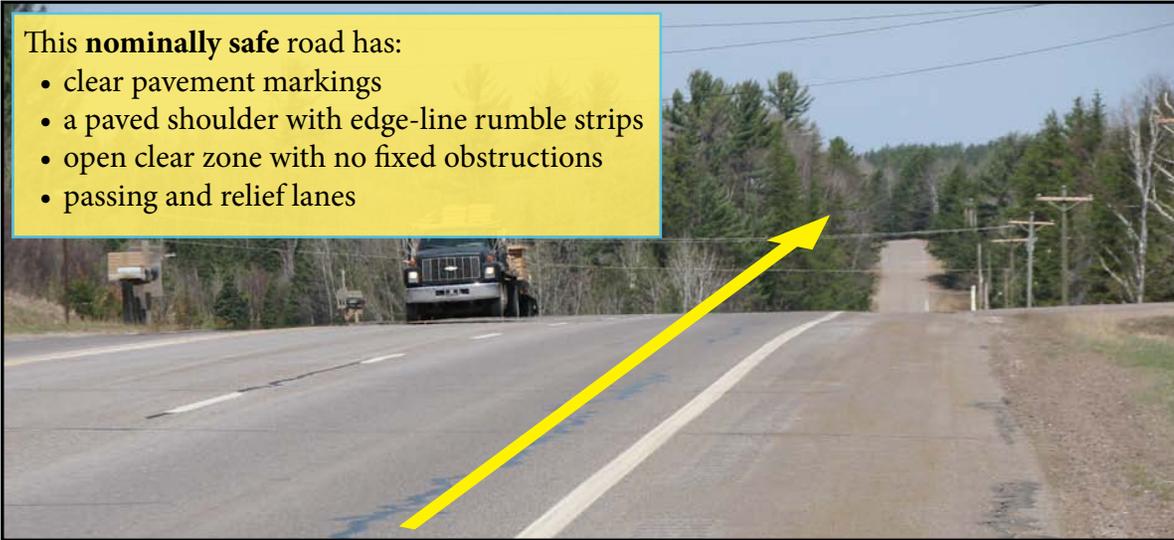
**SAFETY IS  
NOT EXPENSIVE:  
IT'S PRICELESS**

## Do You Know Which Road You Are Following? *Safety Considerations in Transportation Design Standards*

It is not uncommon for a roadway to be **nominally safe** (all design elements meet design criteria), but at the same time demonstrate a high rate of crashes relative to expectations.

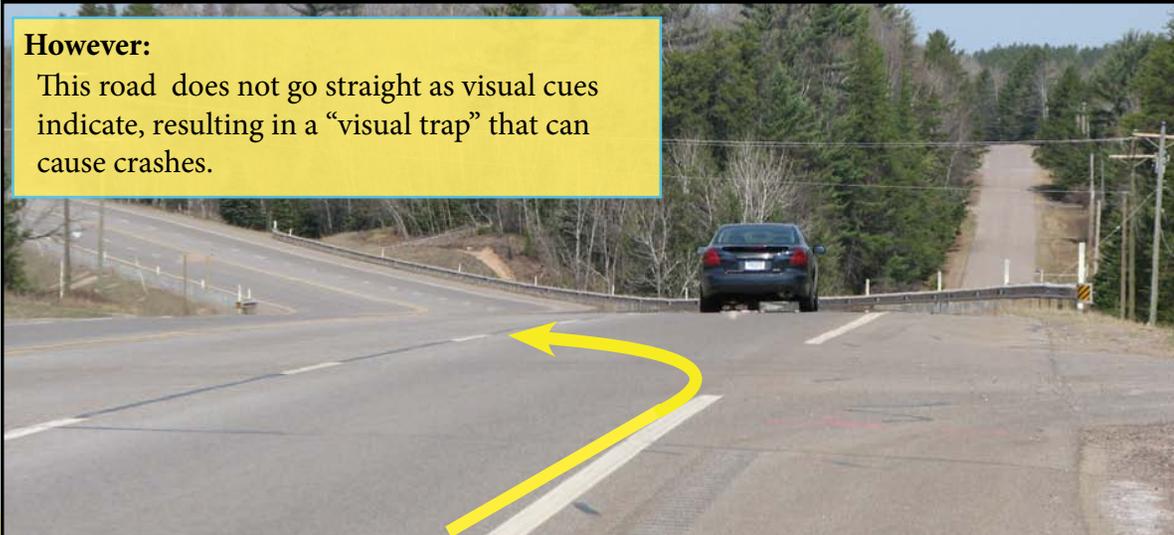
This **nominally safe** road has:

- clear pavement markings
- a paved shoulder with edge-line rumble strips
- open clear zone with no fixed obstructions
- passing and relief lanes



**However:**

This road does not go straight as visual cues indicate, resulting in a “visual trap” that can cause crashes.



## Solving Road Safety Issues

Quantitative safety analysis is the science behind modern safety analysis.

**Modern safety analysis techniques can:**

- Identify where safety improvements are needed
- Provide understanding of how driver perceptions can lead to crashes
- Determine the expected benefits from making a safety improvement
- Provide a data-driven process for improving safety

## Screening

### *Finding the Needle in the Haystack*

Determining where to apply a safety improvement can be an overwhelming process for a local agency.

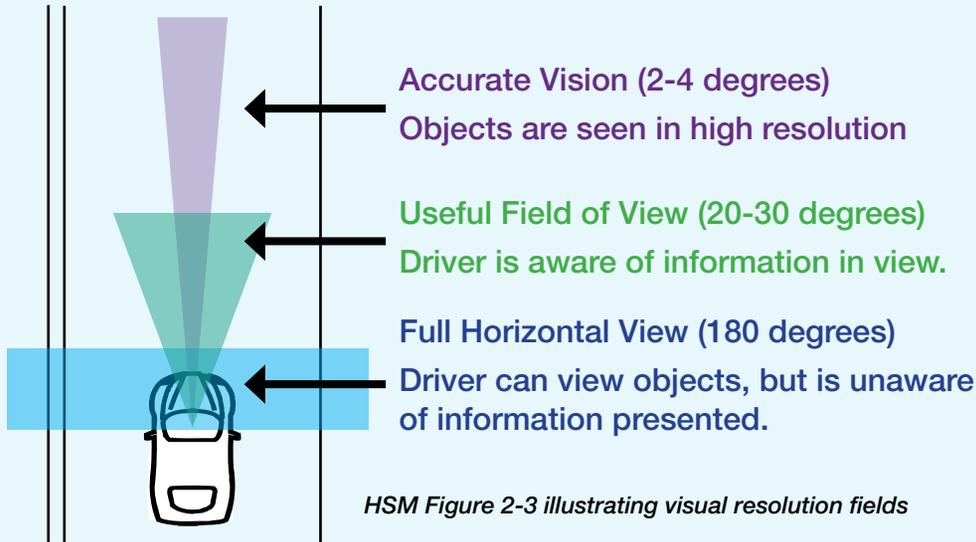
- Should road managers focus on inexpensive fixes spread over the entire road network, or one big project on a high-volume road?
- Which location will provide the best return on investment in terms of reduced crashes?

The tools on the following page provide methods of network screening to answer these questions and more.

## Human Factors

### *Understanding Drivers and Their Limitations*

It is a well-known fact that human error is related in over 90% of all crashes.<sup>1</sup> Understanding the limited zones of human eyesight can provide guidance on how best to place information that the driver will see.



## The Traffic Safety Cycle *A Continuous Improvement Process*

The AASHTO Highway Safety Manual provides a framework for making safety analysis a part of your agency's everyday operation. Local agencies can develop a safety culture that actively and passively promotes safety.

## Crash Modification Factors *Testing Outcomes Before Investing*

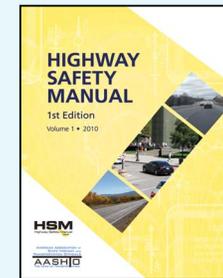
The science of quantitative safety provides tools for determining the safety impact when changes are made to a road network.

To determine the best improvement for a road, crash modification factors will estimate the safety benefit (i.e., reduction in crashes) that will result from making design changes such as widening a road, adding a shoulder, upgrading signs or using wider pavement markings.

The tools below provide guidance on how to use crash modification factors to determine safety outcomes before you invest money on making changes in the field.

## Tools for Improving Road Safety

### ***AASHTO Highway Safety Manual***



To obtain a copy of the AASHTO Highway Safety Manual (HSM), visit <http://highwaysafetymanual.org>

or contact your Local Technical Assistance Program (LTAP) office for assistance.

### ***Crash Modification Factors Clearinghouse***



The Crash Modification Factors Clearinghouse is a central, web-based repository of crash modification factors (CMFs) for transportation professionals. CMF Clearinghouse can be found at

<http://cmfclearinghouse.org>

<sup>1</sup> Abdelwab, W., and Klavin, F. (1995). "Application of fuzzy pattern recognition to the identification of accident prone locations", Journal of Transportation Engineering ASCE, USA 121(4), pp 352-358.