



Enhanced Horizontal Curve Safety Treatments

Course Number: CE-03-903

PDH: 3

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After the course has been purchased, review the technical material and then complete the quiz at your convenience.

A Certificate of Completion is available once you pass the exam (70% or greater).

If a passing grade is not obtained, you may take the quiz as many times as necessary until a passing grade is obtained).

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INTRODUCTION

AASHTO's **Strategic Highway Safety Plan** set a goal of reducing annual highway fatalities by 5000 to 7000. Various guides are available to identify methods for reducing injuries and fatalities in targeted areas – one such area is the issue of vehicle crashes at horizontal curves.

The average crash rate for horizontal curves in the U.S. is roughly three times that for other highway sections. **A Guide for Reducing Collisions on Horizontal Curves** reports that nearly 25% of U.S. traffic fatalities are killed in vehicle crashes at curves annually with:

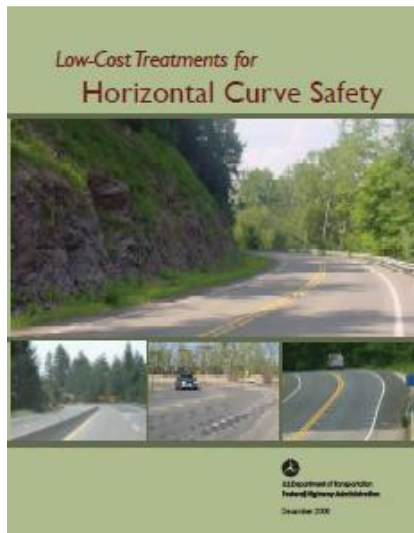
76% - single vehicles leaving the roadway

75% - rural roads

70% - two-lane secondary (local) road crashes

11% - head-on crashes.

Due to these statistics, the Federal Highway Administration (FHWA) identified Roadway Departure as one of its program emphasis areas and developed practical information publications for local agencies. The main reference for this course, **Low-Cost Treatments for Horizontal Curve Safety*** is a result of these Roadway Departure program goals.



http://safety.fhwa.dot.gov/roadway_dept/horcurves/fhwasa07002/fhwasa07002.pdf

* This reference may also be referred to as “LCTHCS” throughout this document and includes only those engineering treatments that are low cost strategies.



COURSE CONTENTS

This course summarizes practical information on where, when, or how to apply safety treatments for horizontal curves or winding sections. These treatments are relatively low cost versus geometric design improvements (degree of curve, shoulders, superelevation, curve length, cross-section, etc.). Information for each treatment will generally include:

Description

Application guidelines – installation practices

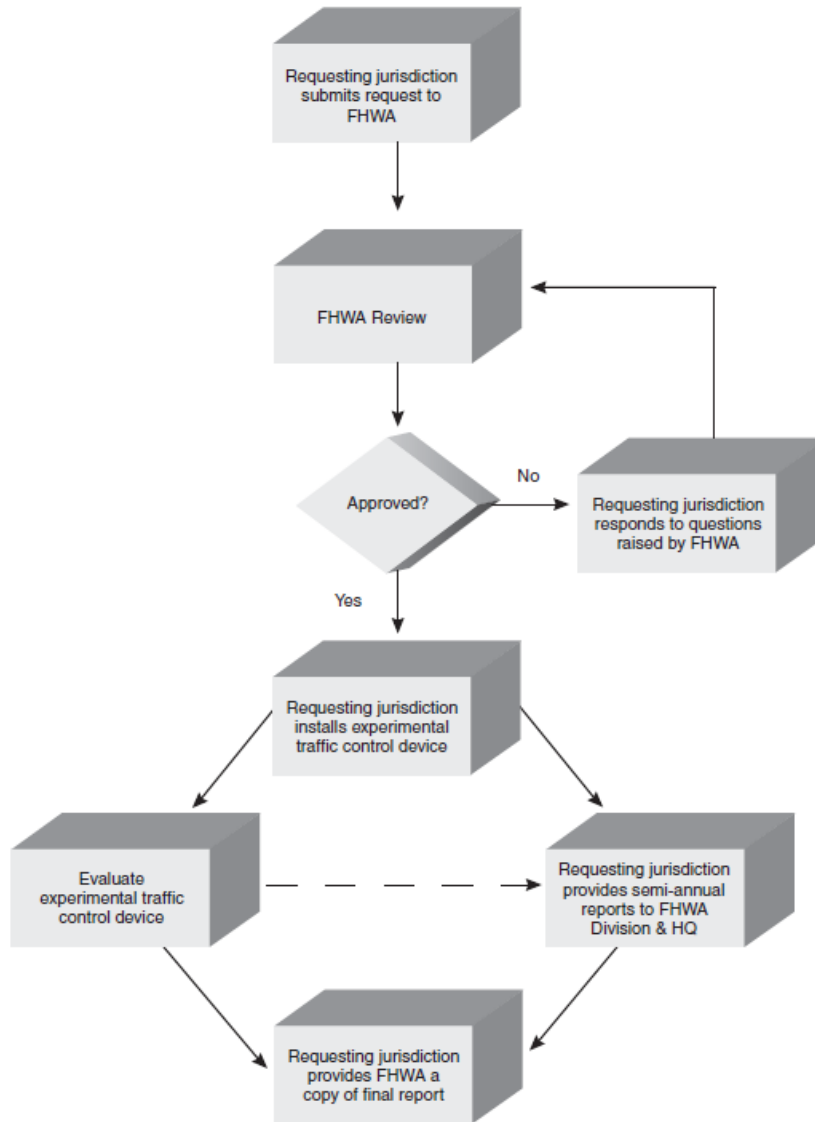
Design elements and materials

Effectiveness – safety improvements

Cost

Some of these traffic control devices or treatments may be considered to be “experimental” and may not comply with the MUTCD. Anyone wanting to use noncompliant devices on a public road must get FHWA approval for testing.

Figure 1A-1. Process for Requesting and Conducting Experimentations for New Traffic Control Devices



Estimates for treatment effectiveness in reducing crashes are included if available. Actual observed effectiveness values of a treatment may vary depending on its location.



Topics covered in this course include:

Enhanced Basic Treatments

Treatments considered to be enhancements to basic devices

Larger devices

Doubling-up

Retroreflective and fluorescent sheeting

Flashing beacons

Profile thermoplastic markings

Raised Pavement Markers

Other Traffic Control Device Treatments

Treatments not in the MUTCD which are used by State and local agencies

Reflective barrier delineation

Roadside object delineation

Dynamic Curve Warning System

Speed Limit Advisory Marking

Rumble Strips

Overview of applications

Centerline

Shoulder

Roadway

Minor Roadway Improvements

Low-cost treatments requiring minor roadway or shoulder improvements

Paved Shoulder Treatment

Shoulder drop-off elimination

Widen shoulder

Skid-resistive pavement surface



Innovative and Experimental Treatments

New treatments that have not been applied extensively

The purpose of this course is to encourage readers to use this information to evaluate problems and implement appropriate treatments for problem curve locations. These treatments should help reduce roadway departure crashes, injuries, and fatalities.

ENHANCED BASIC TREATMENTS

Many basic safety treatments for horizontal curves can be improved in various ways to increase visibility. The key is to provide the driver with adequate perception-response time to see the device, determine its meaning, and negotiate the section. The following treatments have proved effective in attracting motorists' attention:

- Larger devices
- Doubling up of devices
- High retroreflective intensity and fluorescent yellow sheeting
- Flashing beacons
- Profile Thermoplastic Markings
- Raised Pavement Markers

LARGER DEVICES

For typical roadway locations, the MUTCD requires using “conventional road” (not “minimum”) sign sizes. However, it does allow “minimum” sizes for low-speed road where the reduced letter size is sufficient or where larger sizes are not practical. Oversized and larger signs may be used for safety problems such as horizontal curves where speed, volume, or other factors require increased emphasis, improved recognition, or increased legibility.



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the technical materials.