New Generation of Curve Warning Devices

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MoDOT SE District
History:
Caution Series Signs:

1927
(44 Pages)
History: Curve Warning Signs
(Class: Slow Type Signs)

1935 MUTCD
(166 Pages)
Curve Warning Signs:

2009 MUTCD (816 Pages)
MUTCD - Then and Now

1927

2009
What should a warning sign look like?
Warning Signs

![Warning Sign](image)
Curve Warning Signs
Curve Warning Signs

Have you seen this sign?

EB US 441 on the TN side of Great Smokey Mountain National Park. (Called - Pigtail)
New Generation of Curve Warning Devices
Dynamic Curve Warning Signs

V.A.T.C.S.

And

Blinker LED & Solar Solutions
Dynamic Curve Warning Sign

V.A.T.C.S. –

Vehicle
Activated
Traffic
Calming
Sign
Dynamic Curve Warning Sign

V.A.T.C.S. – Vehicle Activated Traffic Calming Sign

Company: UNIPART DORMAN
Dynamic Curve Warning Sign

V.A.T.C.S. – Vehicle Activated Traffic Calming Sign

Company: UNIPART DORMAN

Specifications: Solar Powered
Dynamic Curve Warning Sign

V.A.T.C.S. – Vehicle Activated Traffic Calming Sign

Company: UNIPART DORMAN

Specifications: Solar Powered Radar (speed) Activated
Dynamic Curve Warning Sign

V.A.T.C.S. – Vehicle Activated Traffic Calming Sign

Company: UNIPART DORMAN

Specifications: Solar Powered
Radar (speed) Activated
30” Sign (Actual Size 46” x 74”)
Dynamic Curve Warning Sign

V.A.T.C.S. – Vehicle Activated Traffic Calming Sign

Company: UNIPART DORMAN

Specifications:
Solar Powered
Radar (speed) Activated
30” Sign (Actual Size 46” x 74”)
Weight: 135 lbs.
Dynamic Curve Warning Sign

V.A.T.C.S. – Vehicle Activated Traffic Calming Sign

Company: UNIPART DORMAN

Installed: (2) - 4” Pipe Posts

www.unipartdorman.com
OPTIONS
## Proposed Locations

<table>
<thead>
<tr>
<th>District</th>
<th>Location</th>
<th># SIGNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NE</td>
<td>US54 S Callaway/Audrain</td>
<td>1</td>
</tr>
<tr>
<td>KC</td>
<td>US 169 S</td>
<td>1</td>
</tr>
<tr>
<td>SL</td>
<td>Rte FF, Jefferson County</td>
<td>2</td>
</tr>
<tr>
<td>SW</td>
<td>MO 82 near Eldorado Springs</td>
<td>2</td>
</tr>
<tr>
<td>SE</td>
<td>IS55 EOR, (Between Exit 89 to 91)</td>
<td>2</td>
</tr>
<tr>
<td>SE</td>
<td>MO142, Butler County</td>
<td>1</td>
</tr>
</tbody>
</table>
V.A.C.T.S. Installation

- I-55 EOR

Cape Girardeau County
I-55 EOR, Cape Girardeau County
SB I-55 EOR - Activated
NB I-55 EOR - Video
History

• 5 years prior

  5 total crashes
  2 Motorcycle crashes
    1 High profile Fatality
    1 Disabling Injury
Effectiveness

• 5 years prior
  5 total crashes
  2 Motorcycle crashes
    1 High profile Fatality
    1 Disabling Injury

• NO reported crashes since installation
  (11/30/2012)
V.A.C.T.S. Installation

• MO 142

Butler County
Last Curve 3 miles

MO 142, Butler County
MO 142 SB - Profile
MO 142 SB - Activated
History

• 5 years prior

  3 total crashes
  1 Fatal
  1 Minor Injury
  1 PDO
MO142, Butler County

• Install a new sign to provide enhanced warning.
MO142, Butler County

- Install a new sign to provide enhanced warning.

- Will it reduce crashes?
MO 142, Butler County

Installed: 1/14/2013

Damaged: 1/16/2013
Effectiveness

• 5 years prior

  3 total crashes
  1 Fatal
  1 Minor Injury
  1 PDO

• Since Installation (January 2013)

  Only 1 PDO, ( Unreported )
  2 days after installation,
  ICE/SNOW related
  Failed to activate sign??
Dynamic Curve Warning Sign

Blinker LED and Solar Solutions –
Why blinker signs?

• Drivers are more distracted than ever
Why blinker signs?

- Drivers are more distracted than ever
- The next level beyond passive devices
Why blinker signs?

• Drivers are more distracted than ever

• The next level beyond passive devices

• Enhance the conspicuity of the traffic control device
Why blinker signs?

• Drivers are more distracted than ever

• The next level beyond passive devices

• Enhance the conspicuity of the traffic control device

• Gotcha!
Flexibility

• LED technology allows the use of solar power

• Which allows more location options
Flexibility

• LED technology allows the use of solar power

• Lower utility bills
Maintainability

• LED technology also leads to....

• Longer bulb life translates to less maintenance costs
MUTCD

- LEDs can be embedded on the sign legend and/or around the sign perimeter
- May flash constantly or be traffic or pedestrian actuated
- Section 2A.07 outlines LED color requirements for different sign types
In The Field

- Added to a Curve as part of a collaborative test between TAPCO, FHWA and Science Applications International Corporation

- Signs provided by TAPCO

- High number of Out of Control crashes, predominantly northbound

- Traffic actuated via radar detection
In The Field

• MO 221, St. Francois County, Northbound

• Downhill Reverse Curve with 40 MPH advisory speed

• AADT = 918

• Maintenance applied chip-seal July 2012

• Blinker REVERSE CURVE and Blinker CHEVRON signs added in August 2012
MO 221
MO 221
MO 221
Cost

• Signs  7 @  $1450 ea. = $10,150

• Radios  7 @  $864 ea. =  $6,048

• Radar    1 @ $1,080 ea. =  $1,080

Total = $17,278
Effectiveness

• 5 years prior
  31 total crashes
  25 out of control

1 year after
  no reported crashes.
Effectiveness

• Ongoing Study

• Speed and crash data are continuing to be monitored

• TAPCO provides maintenance of equipment during the test period
Questions?
Thanks!