The KYTC Sign Management Project has been established in response to the new MUTCD requirements which mandate that all states establish a method to manage sign retroreflectivity by January 1, 2012.

To accomplish this, the project has been broken down into four major tasks:

• Create an inventory of those signs that are already installed.

• Collect inventory data on new signs as they are being installed through routine maintenance, new installation on existing routes, and installation on newly constructed routes.

• Determine intermediate retroreflectivity management methods that may be needed temporarily in order to meet the FHWA deadlines.

• Determine ultimate retroreflectivity management method that will be used once the program is fully developed.
A well implemented sign management system will identify worn out signs, minimize requirements for field inspection and inspection costs, plan and budget resources properly, be useable as a liability defense, track problem areas, compliment existing inventory sets, and anticipate future needs.
Night Travel and Crashes

Source: National Safety Council

![Bar chart showing the number of fatalities per million miles traveled during nighttime and daytime.](chart.png)

Fatalities Per Million Miles Traveled

- **Nighttime**: 3.0
- **Daytime**: 1.2

Nighttime vs. Daytime Fatalities
Compliance Period:
From “Effective” Date of Final Rule (January 22, 2008):

- January, 2012
  Establish and implement method(s)

- January, 2015
  Replace identified regulatory, warning, ground mounted guide signs (except street-name)

- January, 2018
  Replace identified street name & overhead guide signs
Kentucky Sign Management Program

Teams:

- Technology
- OMS
- Existing Sign Inventory
- New Sign Installation
- Retroreflectivity
- Steering
### Sign Inventory

**Outdated Linear Reference System Sign Location Documents**

<table>
<thead>
<tr>
<th>Location</th>
<th>Mileage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20.07</td>
</tr>
<tr>
<td></td>
<td>19.90</td>
</tr>
<tr>
<td></td>
<td>SZA 19.88</td>
</tr>
<tr>
<td>Class Hill Road</td>
<td>19.87</td>
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<td>Speed Limit</td>
<td>19.76</td>
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<tr>
<td></td>
<td>19.70</td>
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<td>19.06</td>
</tr>
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<td></td>
<td>19.00</td>
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</table>

- Had not been updated
- Various data formats
- Non existent in some Districts
- No Statewide mandate to track sign Location
- No Central Office repository for data
Sign Inventory

Georeference Asset Location

2 Options for Data Collection:

- Photo Log Van
- Sign Click
KYTC Asset Collection Vehicle

Right of Way Cameras
3 cameras; One facing forward, right and left

Global Positioning System
Includes Differential and Inertial Measurement Systems
Sub-meter accuracy at highway speeds
Inertial Measurement System retains correct position during GPS Dropouts

Distance Measure Instrument

Roughness Measurement
Dynatest Mark IV RSP

Rutting Measurement
INO Laser Rut Measurement System
1280 Transverse points

http://maps.kytc.ky.gov/photolog/
Panoramic View
Sign Measurement
KYTC Photo Log

Photo Log Collection:

• Very accurate GPS
• Other data being collected when route driven
• Safer Urban collection
• Link to Object photo saved in database
• No travel time to collect objects from available data
Developed by KTC for asset collection

Equipment required:

- Laptop
- GPS device
- Vehicle

Collection method:

- Locate Asset by clicking map location
- Locate Asset by GPS Tracking
Add Assembly / Sign Face
Collected Existing Inventory
Sign Click

- Faster collection
- Less costly collection
- Less tedious collection method
- Collect areas not driven by Photo Log vehicle
- Less likely to miss signs
Manage New Sign Installations

Barcode all newly manufactured signs

Capture sign attributes in Operations Management System
  MUTCD
  Sheet Manufacture
  Date Manufactured
  Sheeting Type
  Sign Color
  Sign Text
  Barcode ID
Manage New Sign Installations

Track Installed location with GPS device

Motorola MC75 GPS Barcode scanner

Mobile OMS Asset Management Software

Create New Assembly location or Edit Existing Assembly (from existing inventory database)

Scan barcoded sign and add to Assembly in Mobile OMS

Device is cradled nightly and Assembly / Sign locations are uploaded to database
Mobile OMS Asset Manager

Replaced Stop Sign KY 199

Assembly Location
- Signs Class: Posts
- Signs Status: Installed
- Route: 098-KY-0199
- Reflect Tape: □
- Damage: □
- Comments: Replace Stop
- Installed Date: 3/16/11
- Geometry

Select Location
Add New
Begin Edit

Stop sign shown in green after completion
Interim Retroreflectivity Method

Nighttime Visual Inspection
- Low administrative and fiscal burden
- Low level sign waste
- Human error
- Exposure of conducting inspections

Measured Retroreflectivity
- Removes subjectivity
- Time consuming
- Expensive

Blanket Replacement
- Low administrative
- High sign waste
- High dedicated budget
<table>
<thead>
<tr>
<th>Sign Total Estimate</th>
<th>NTVI Hours (40 signs per hour)</th>
<th>Estimated Cost ($40 per hour)</th>
<th>Number of Signs Requiring Replacement (6% of total)</th>
<th>Cost of Replacing Signs ($70 per sign)</th>
<th>Total Estimate for NTVI (signs and inspection)</th>
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<tbody>
<tr>
<td>566,000</td>
<td>14150</td>
<td>$566,000</td>
<td>33960</td>
<td>$2,377,200</td>
<td>$2,943,200*</td>
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<table>
<thead>
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<th>Sign Total Estimate</th>
<th>Measured Retroreflectivity Hours (10 signs per hour)</th>
<th>Estimated Cost ($40 per hour)</th>
<th>Number of Signs Requiring Replacement (6% of total)</th>
<th>Cost of Replacing Signs ($70 per sign)</th>
<th>Total Estimate for MR (signs and inspection)</th>
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</thead>
<tbody>
<tr>
<td>566,000</td>
<td>56600</td>
<td>$2,264,000</td>
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</table>

<table>
<thead>
<tr>
<th>Sign Total Estimate</th>
<th>Total Replacement Cost ($70 per sign)</th>
<th>Seven Year Blanket Replacement Cycle Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>566,000</td>
<td>$39,620,000</td>
<td>$5,660,000*</td>
</tr>
</tbody>
</table>
Ultimate Retroreflectivity Method

Estimated Sign Life

• Sign sheeting warrant
• Sign test deck measurements

Control Signs

• May be field signs or test deck
• Retroreflectivity represents total population of signs