Low-Cost Safety Improvements

Date viewed _____

Participant Worksheet – **Each participant must complete their own form.**

Fax or email completed forms to KUTC Training at (785) 864-3199 or *kutc_training@ku.edu*. Thank you.

Name: _____

Agency:_____

Address: _____

Phone: _____

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Please complete the following questions to receive a certificate of attendance.

1. The two engineers below have different perspectives on how to best identify high crash sites that will benefit from the implementation of a low-cost countermeasure. Which engineer's point of view represents a commitment to use substantive approach to defining safety?


a) "I am confident that a roadway is "safe" when it conforms to current standards. Because I rely on compliance with standards, warrants, guidelines and sanctioned design procedures, I can make wise decisions about where to make roadway improvements."

b) "When assessing options and making decisions, I look at the expected crash frequency and severity for a specific segment of roadway. I use crash modification factors to determine the expected reduction in crashes for potential countermeasures. With data in hand, I am confident that the countermeasures selected will reduce crashes."

Answer: _____

2. Complete the Six-Step Crash Mitigation Process (CMP) diagram by matching each step with its primary purpose. Enter the lower case letter of the item on the right beside the corresponding item on the left.
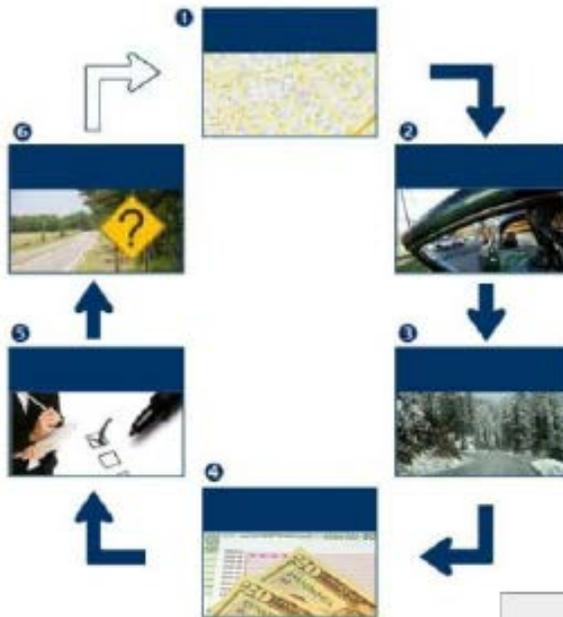
Step 1	a) Characterize field condition
Step 2	b) Characterize the crash experience
Step 3	c) Analyze data and identify high-crash locations
Step 4	d) Access countermeasures and select most appropriate countermeasure
Step 5	e) Identify contributing factors and possible countermeasures
Step 6	f) Evaluate countermeasure(s) after implementation

3. How many crashes would be expected after installing larger STOP signs if the expected crashes without treatment = 10 crashes per year, and the CMF for this countermeasure is 0.81?
   a) 1.9
   b) 0.19
   c) 8.1
   d) 0.81

4. A rural two-lane highway has a high head-on fatality crash experience. The county engineer in charge of the road decides to install centerline rumble strips. What crash reduction factor would be associated with this countermeasure for this type of crash? (Refer to the slide in your presentation material)
   a) 14
   b) 68
   c) 25
   d) 21

5. The width of the bridge in this photograph is less than 16 feet. What types of crashes would you expect at this location? (Select all that apply)
    a) Collision with a fixed object
    b) Angle collisions
    c) Wet-weather related collisions
   d) Head-on crashes

6. Match the name of the network screening tool with its description. Enter the lower case letter of the item on the right beside the corresponding item on the left.

__ Conventional

__ PSI Index

__ SafetyAnalyst

a) In this tool, values for fatalities, injuries and property damage only crashes are combined. The result is a measure of the excess accident frequency, above the expected value, that might be reduced if a safety improvement were implemented.

b) This tool, which has been used for over 50 years, relies solely on crash rates and crash frequency.

c) This tool uses an Empirical Bayes approach that combines observed and expected crash frequencies to provide estimates of the safety performance of specific sites.

7. Each of the network screening tools has its limitations. Match each limitation with the tool. Enter the lower case letter of the item on the right beside the corresponding item on the left.

___ Conventional

___ PSI Index

___ SafetyAnalyst

a) This is a new tool (2008) that may not be widely available.

b) The relationship between crash frequency and traffic volume is known to be non-linear, but this tool treats that relationship as if it were linear.

c) Some doubt exists as to whether cost is the proper weighing method since it may not be clear what costs are included, and other items such as pain and suffering are difficult to quantify.

8. Match the name of each crash-based measure to its description. Enter the lower case letter of the item on the right beside the corresponding item on the left.

___ Crash rate

___ Crash severity

___ Severity Index

___ Crash density

a) Crashes per mile

b) Level of injury

c) Crashes per million vehicle miles

d) Ratio of crashes involving fatality or injury to total crashes

9. View the collision diagram shown. Select the answers that represent the crash patterns depicted in the diagram. (Select all that apply)
   a) Right-angle crashes
   b) Sideswipe crashes
   c) Run-off-the-road crashes
   d) Wet weather crashes
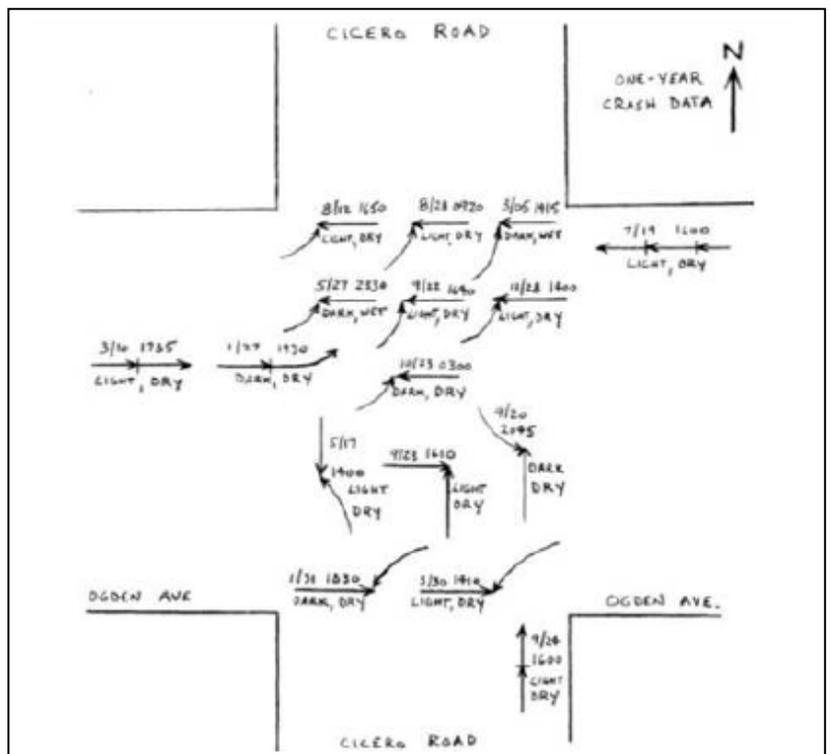
10. For the high-crash site shown in this photograph, a local road engineer has been asked to suggest potential low-cost safety improvements. Keeping in mind the criteria of low-cost countermeasures and the need to do something as soon as possible, what would be the most appropriate next steps to achieve substantive safety at this location? (Select all that apply)

a) Add a yellow overhead flasher
b) Add longitudinal rumble strips
c) Add a curve warning sign
d) Flatten the curve
e) Add chevrons