Performance Based Practical Design

Data Driven Safety Analysis
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Goal of the HSM

Site selected for treatment due to short term trend

Expected Average Crash Frequency (without treatment)

Observed Crash Frequency

Years

Perceived effectiveness of treatment

Actual effectiveness of treatment

Observed Average Crash Frequency (after treatment)
Safety Performance Functions (SPF)

Predicted Crashes

Observed / Historical Crashes

Potential for Safety Improvement

Expected Crashes

Predicted Crashes

Crash Frequency

AADT

0

5000

10000

15000

20000

25000

30000
Years

Crashes

Site is expected to have more crashes per year on average than its peers

$\rightarrow$ *Potential for improvement!*

Expected average crash frequency for the site

**Difference = Expected Excess Crashes (Potential for Safety Improvement)**

Site is expected to fewer more crashes per year on average than its peers

Predicted Average Crash Frequency for the site *(how are its peers performing on average?)*

Expected average crash frequency for the site
Available Site Types

- Ramps
- Divided Segment
- Urban Segment
- Ramp Terminal Intersections
- Signalized Intersections
- Stop Controlled Intersections

Rural Segment

Freeway Segment
Analyze every segment & intersection

Sum crashes across all segments & intersections

Repeat for each alternative

Evaluate alternate designs: compare # of crashes

\[ N_{(total)} = \sum N_{(all\ segments)} + \sum N_{(all\ intersections)} \]
# New Research

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<td>NCHRP 17-58</td>
<td>Safety Prediction Models for Six-Lane and One-Way Urban and Suburban Arterials</td>
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<td>NCHRP 17-70</td>
<td>Development of Roundabout Crash Prediction Models and Methods</td>
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