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Final Report

Statewide Training of Safety Analyst in Florida

(Project# 2015-003)

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STRIDE Project 2015-003S

Statewide Training of Safety Analyst in Florida

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DISCLAIMER

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- Dr. Albert Gan, Professor, Florida International University (FIU)
- Dr. Dibakar Saha, Research Associate, FIU
- Dr. Siva Srinivasan, Associate Professor, University of Florida (UF)

ABSTRACT

Safety Analyst is a state-of-the-art analytical tool for making system-wide highway safety decisions. Often advertised as a companion to Part B of the Highway Safety Manual (HSM), Safety Analyst automates all the steps in the roadway safety management process. Florida Department of Transportation (FDOT) has been preparing for deploying Safety Analyst for the past few years. An important step in implementing Safety Analyst is to train the FDOT district officials on using the software. As such, the specific objectives of this project include: (1) conducting a one-hour session on Engineering Statistics 101 for Safety at the 2015 FDOT Design Expo, and (2) developing and recording a one-hour session providing the overview of Safety Analyst. The one-hour presentation at the 2015 Design Expo provided the background on the traditional and new highway safety analysis methods. It primarily targeted the general audience who are interested in understanding the big picture of the highway safety analysis. The one-hour webinar that was subsequently recorded provided the overview of Safety Analyst, its capabilities, and Florida's progress with its deployment. The webinar also included a detailed demonstration of the software using Florida data.

TABLE OF CONTENTS

BACKGROUND

Safety Analyst was developed as a cooperative effort by Federal Highway Administration (FHWA) and participating state and local agencies. The software provides a suite of analytical tools to identify and manage system-wide highway safety improvements. Often advertised as a companion to Part B of the Highway Safety Manual (HSM), Safety Analyst automates all the steps in the roadway safety management process for all the three facility types: segments, intersections, and ramps (AASHTO, 2010). It includes many modules and could act as a complete "safety toolbox" for any safety office. The modules in Safety Analyst include (AASHTO, 2010):

1. *Network Screening Module:* It identifies and ranks sites with potential for safety improvements.
2. *Diagnosis and Countermeasure Selection Module:* The diagnosis module is used to diagnose the nature of safety problems at specific sites. The countermeasure selection module assists the user in selecting the countermeasures to reduce crash frequency and severity at specific sites.
3. *Economic Appraisal and Priority Ranking Module:* The economic appraisal module performs an economic appraisal of a specific countermeasure or several alternative countermeasures for a specific site while the priority ranking module provides a priority ranking of sites and proposed improvement projects based on the benefit and cost estimates determined by the economic appraisal tool.
4. *Countermeasure Evaluation Module:* It provides the capability to conduct before/after evaluations of implemented safety improvements.

Safety Analyst includes the Data Management Tool, the Analytical Tool, the Administration Tool, and the Implemented Countermeasure Management Tool to perform the complete roadway safety management process. The Data Management Tool is used to import, post-process, and calibrate data. The Analytical Tool is used to perform analysis on the data. The four Safety Analyst modules described above could be performed in this tool. The Administration Tool helps an agency to tailor the SafetyAnalyst data model and to modify the default data used in conducting safety analyses. The Implemented Countermeasure Management Tool is used to specify, modify, or remove implemented countermeasure data.

The Florida Department of Transportation (FDOT) had participated in the development of Safety Analyst, and has been working toward deploying the application. FDOT has three main challenges pertaining to Safety Analyst deployment. First, Safety Analyst has stringent data requirements. Safety Analyst requires a number of import files to be generated in line with the data requirements and format recommended by the software (Harwood et al., 2010). This process "of generating Safety Analyst import files is tedious because data may need to be retrieved and merged from multiple sources and significant amounts of data recoding may be required" (Alluri and Ogle, 2012). To address this challenge, researchers at Florida International University (FIU) have developed a conversion program to automatically generate Safety Analyst import files for the entire state road network in Florida. However, the program needs to be updated to include data from non-state roads.

The second challenge with Safety Analyst deployment is that it requires agency-specific Safety Performance Functions (SPFs). Researchers at FIU have developed Florida-specific SPFs to use with Safety Analyst. Note that they have also generated Florida-specific intersection and ramp subtypes that are different from the default site subtypes used in Safety Analyst. The third hurdle for Safety Analyst's deployment is lack of training for safety engineers on using the software. As such, this project aims to develop a webinar that provides an overview of Safety Analyst.

PROJECT OBJECTIVES

The main goal of this project is to assist FDOT in implementing Safety Analyst. The specific objectives include: (1) conducting a one-hour session on Engineering Statistics 101 for Safety at the 2015 FDOT Design Expo, and (2) developing and recording a one-hour session providing the overview of Safety Analyst.

ENGINEERING STATISTICS 101 FOR SAFETY

FDOT has been preparing for deploying Safety Analyst for the past few years. By deploying it statewide, FDOT will have a standardized system to consistently conduct safety analysis across the state. An important step in implementing Safety Analyst is to train the FDOT district officials on using the software. As part of the implementation efforts, a one-hour session on *Engineering Statistics 101 for Safety* and a one-hour webinar on Safety Analyst were planned.

The one-hour session on *Engineering Statistics 101 for Safety* was held during the 2015 FDOT Design Training Expo on June 11, 2015 at the Buena Vista Palace Hotel in Orlando, Florida. It provided the background on the traditional and new highway safety analysis methods. It primarily targeted the general audience who are interested in understanding the big picture of the highway safety analysis.

The session attracted over hundred safety engineers from local, district, and state offices, and their consultants. The session aimed to introduce the advanced methods in highway safety analysis. Recent advances in highway safety analysis and the issues with the traditional methods were discussed in this session. More specifically, the regression-to-the-mean (RTM) effect, the issues with crash frequencies and crash rates, non-linear relationship between crashes and exposure (i.e., traffic), and the differences between reactive and proactive approaches were discussed. The empirical Bayes (EB) Method, safety performance functions (SPFs), crash modification factors (CMFs), calibration factors (C), and the potential for Safety Improvement (PSI), were also explained. Appendix A provides the slides used in this presentation.

WEBINAR ON SAFETY ANALYST OVERVIEW

A one-hour session providing the overview of Safety Analyst was prepared and recorded in July 2016. The session started with a few slides introducing Safety Analyst. The software was demonstrated next using Florida data.

The following topics are covered in the presentation slides (see Appendix B):

- What is Safety Analyst?
- Why use Safety Analyst?
- What can you do with Safety Analyst?
- What are the capabilities of Safety Analyst?
- Safety Analyst development timeline
- Safety Analyst data model
- Tools and Modules in Safety Analyst
  - Data Management Tool
  - Administration Tool
  - Implemented Countermeasure Management Tool
  - Analytical Tool
    - Network Screening Module
    - Diagnosis and Countermeasure Selection Module
    - Economic Appraisal and Priority Ranking Module
    - Countermeasure Evaluation Module
- Safety Analyst application process in Florida
- FDOT's progress with Safety Analyst deployment

The following steps are performed in the software demonstration:

- Network Screening
- Site-specific Diagnosis
  - Crash Summary Report
  - Safety Performance Report
  - Collision Diagram
- Countermeasure Selection
- Economic Appraisal
- Countermeasure Evaluation

The draft recording was reviewed by Mr. Joseph Santos, P.E., FDOT State Safety Engineer. Mr. Santos's review comments were addressed, and the webinar was re-recorded in September 2016. The webinar is available on the STRIDE website at the link: http://stride.ce.ufl.edu/workshops-webinars--conferences-

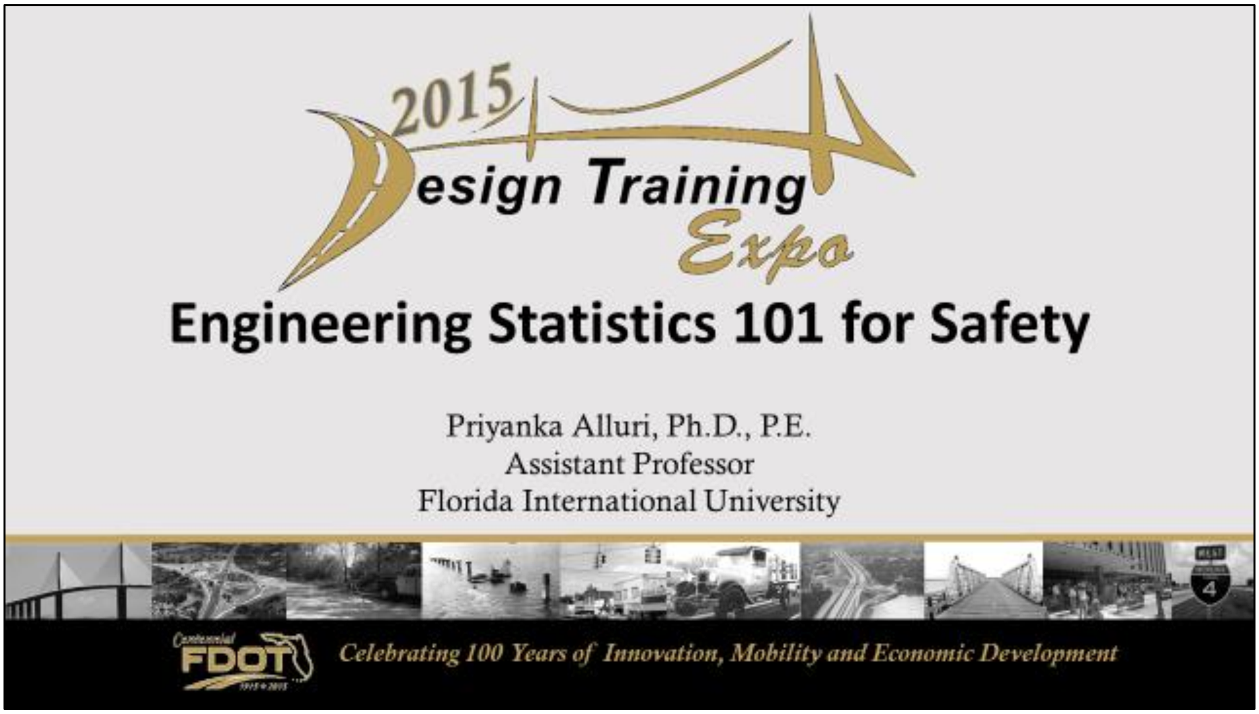
REFERENCES

Alluri, P., and Ogle, J. (2012). Road Safety Analysis in the United States: States' Current Practices and Their Future Direction. *Transportation Research Record: Journal of the Transportation Research Board*, *2318*(1), 7-15.

American Association of State Highways and Transportation Officials (AASHTO). (2010). SafetyAnalyst. Retrieved from http://www.safetyanalyst.org. Retrieved on November 22, 2016.

Harwood, D. W., Torbic, D. J., Richard, K. R., and Meyer, M. M. (2010). "SafetyAnalyst: Software Tools for Safety Management of Specific Highway Sites (No. FHWA-HRT-10-063). Midwest Research Institute, Kansas City, MO.

APPENDIX A: ENGINEERING STATISTICS 101 FOR SAFETY PRESENTATION SLIDES


2015 Design Training Expo
Engineering Statistics 101 for Safety
Priyanka Alluri, Ph.D., P.E.
Assistant Professor
Florida International University
Centennial FDOT
Celebrating 100 Years of Innovation, Mobility and Economic Development


Acknowledgements
Joseph B. Santos, P.E.
State Safety Engineer, FDOT State Safety Office
Sivaramakrishnan (Siva) Srinivasan, Ph.D.
Associate Professor, University of Florida
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2

Presentation Overview

- Reactive and Proactive Approaches
- Issues with basic site selection methods
- Empirical Bayes Method

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Reactive vs. Proactive Approaches

- Reactive Approach
  - Based on analysis of crash data
  - Ex: Identification of high crash locations using crash counts
- Proactive Approach
  - Focuses on the evolving specific safety implications of highway design and operations decisions
  - Ex: Identification of high crash locations using empirical Bayes method

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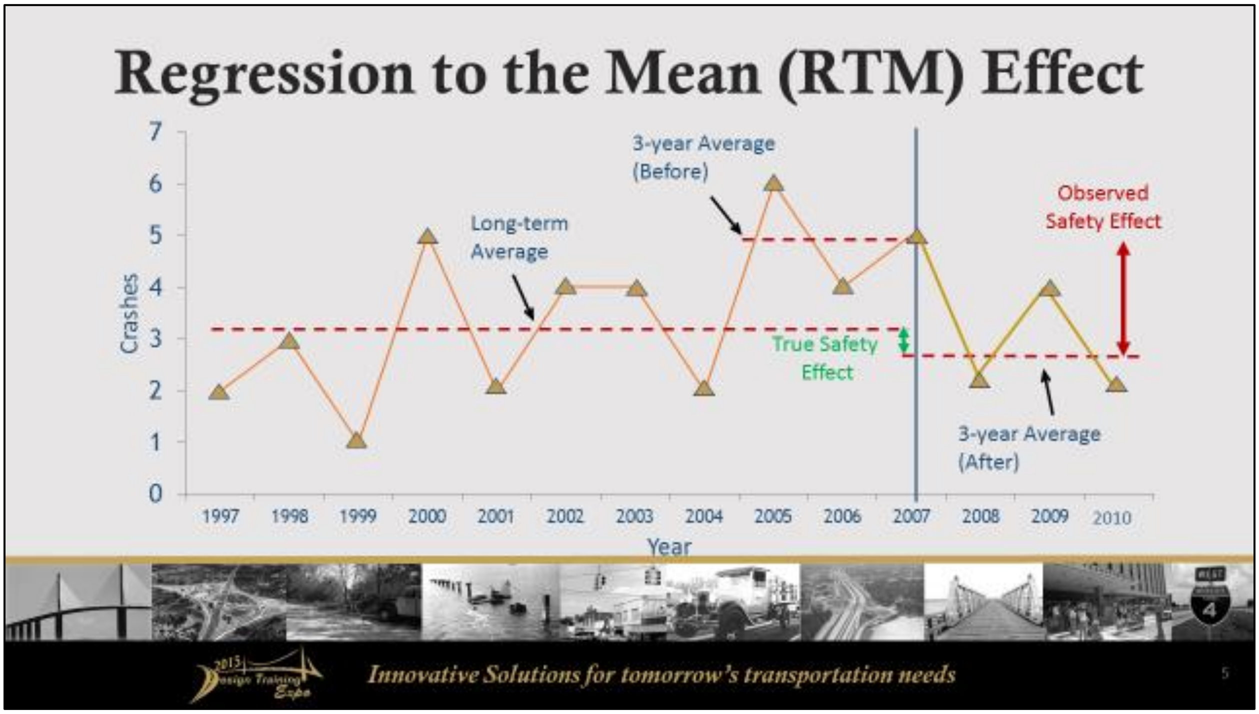


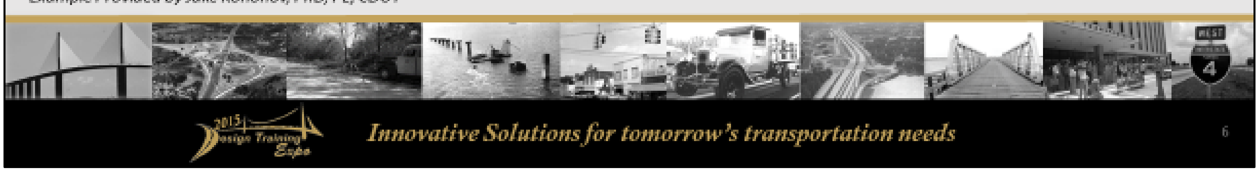
Influence of Low AADT on Crash Rates

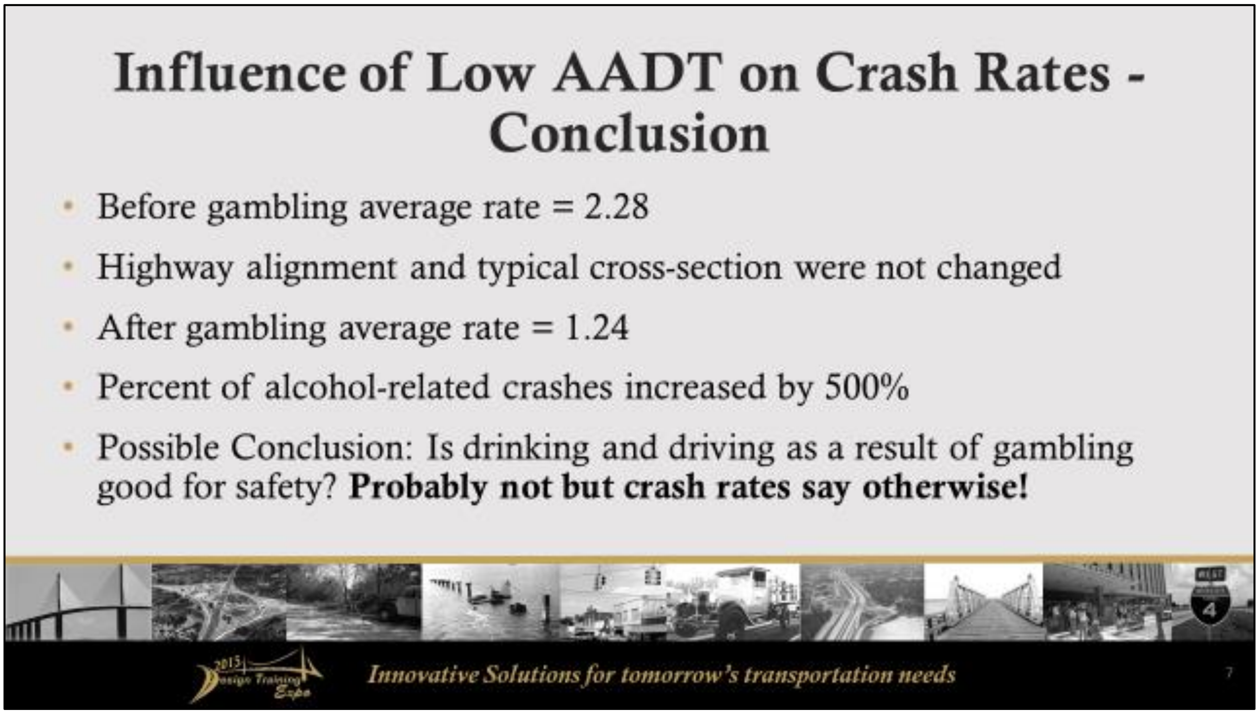
BEFORE				AFTER			
Year	No. of Crashes	AADT	Crash Rate	Year	No. of Crashes	AADT	Crash Rate
1988	13	2,900	2.11	1992	30	10,618	1.33
1989	11	2,900	1.79	1993	30	13,200	1.07
1990	13	3,050	2.01	1994	36	14,300	1.19
1991	23	3,400	3.19	1995	40	13,900	1.36

Average Rate = 2.28 — Average Rate = 1.24

Gambling Introduced in 1992

Example Provided by Jake Kononov, PhD, PE, CDOT




Influence of Low AADT on Crash Rates - Conclusion
Before gambling average rate = 2.28
Highway alignment and typical cross-section were not changed
After gambling average rate = 1.24
Percent of alcohol-related crashes increased by 500%
Possible Conclusion: Is drinking and driving as a result of gambling good for safety? Probably not but crash rates say otherwise!
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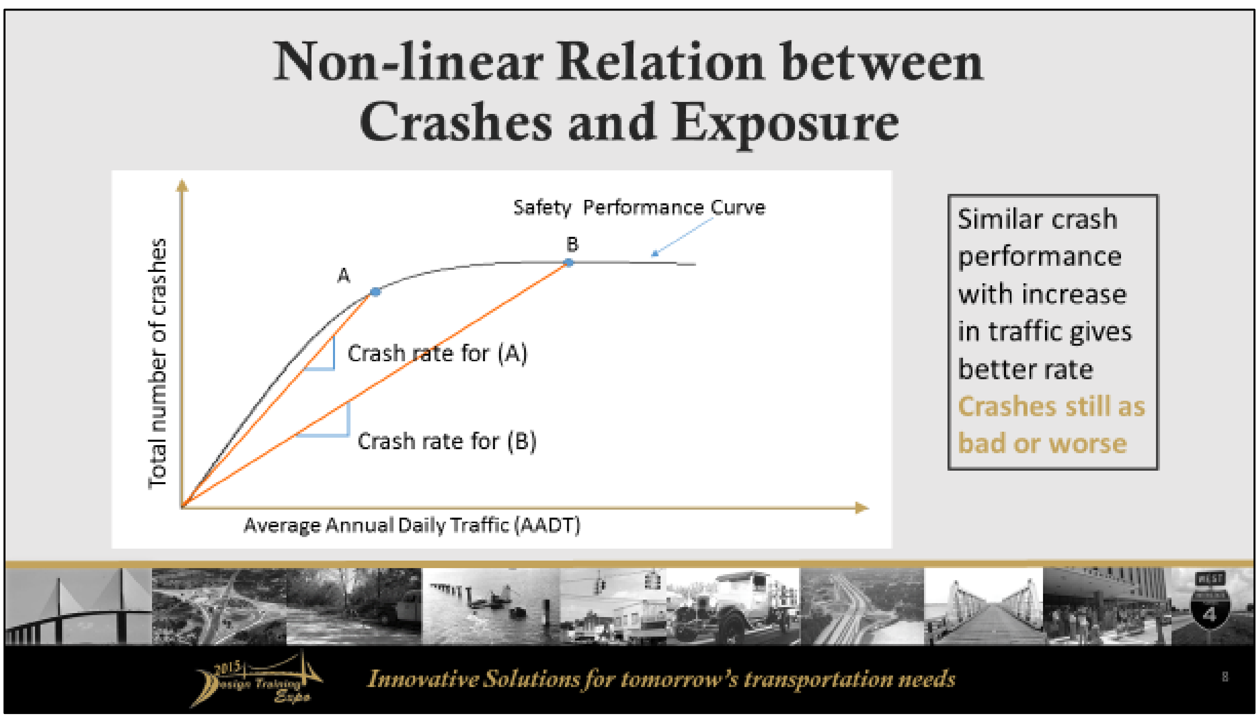
7


Non-linear Relation between Crashes and Exposure
Safety Performance Curve
A
B
Crash rate for (A)
Crash rate for (B)
Total number of crashes
Average Annual Daily Traffic (AADT)
Similar crash performance with increase in traffic gives better rate
Crashes still as bad or worse
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8

Safety Performance Functions (SPFs)

- An SPF describes the relation between number of crashes and measure of exposure
- Simple/Traffic SPFs

  Predicted Crashes = *f(traffic)* $Crashes/year = 0.6278 \times SCL \times (AADT/1000)^{1.024}$

- All-inclusive/Full SPFs

  Predicted Crashes = *f(traffic + roadway geometric design features)*

  $Crashes/year = 0.001465 \times (CCR)^{0.0538} \times (AADT)^{0.7086} \times (TPERCNT)^{0.2064} \times (SEGLEN)^{0.3018} \times (SPDIFSQ)^{0.0479}$

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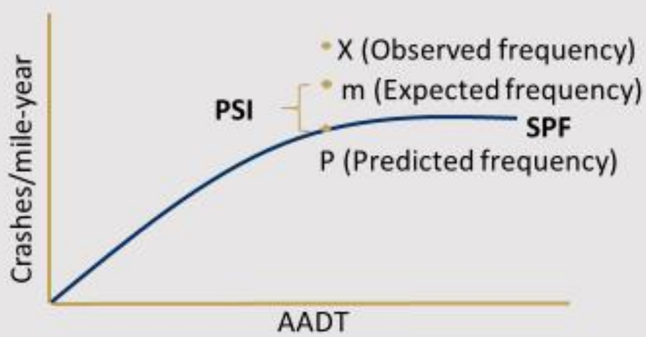
Empirical Bayes (EB) Approach



Expected crash frequency is the weighted average of the observed and predicted crash frequency

$$m = w(P) + (1 - w)(X)$$

$$0 \leq W \leq 1$$

$$w = \frac{1}{1 + k(\sum_{all\ yrs} P)}$$

k is over dispersion parameter

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Advantages of EB Approach

- Addresses RTM bias
- Uses non-linear relation between crashes and exposure
- Predicts the expected number of crashes in the future
- Ranks sites based on PSI
- Provides measures to determine the reliability of safety predictions

EB Analysis as discussed in the HSM

$$\boxed{SPF} \times \boxed{CMF} \times \boxed{C} = Predicted\ Crashes$$

- SPF is a regression equation used to estimate the predicted crash frequency at a site for a given "base condition"
- CMFs are used to adjust the "base condition" in the SPF to specific site characteristics
- Calibration Factor (C) is used to adjust average predicted crash frequencies to local site conditions

2013 Design Training Expo
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Safety Performance Functions

- SPF is a regression equation used to estimate the predicted crash frequency at a site for a given "base condition"
- Segments
  $N = \exp [a + b \times \ln (AADT) + \ln (Length)]$
- Intersections
  $N = \exp [a + b \times \ln (AADT_{major}) + c \times \ln (AADT_{minor})]$

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CMFs and CRFs

- A crash modification factor (CMF) is a multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site.
- A crash reduction factor (CRF) is the percentage crash reduction that might be expected after implementing a given countermeasure at a specific site.

$$CMF = \frac{Expected\ average\ crash\ frequency\ with\ condition\ 'b'}{Expected\ average\ crash\ frequency\ with\ condition\ 'a'}$$

$$CMF = 1 - \frac{CRF}{100}$$

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Calibration Factor

- To account for differences between jurisdictions not reflected in the base SPF and CMFs
  - Geographic area/terrain type
  - Seasonal factor
  - Drivers' attributes
  - Animal population
  - Crash reporting threshold
- To account for differences between time period for which the models were developed and to which they are applied

$$C = \frac{\sum_{\text{all sites}} \text{observed crashes}}{\sum_{\text{all sites}} \text{predicted crashes}}$$

Example 1: Calculate $N_{Expected}$

- Two-lane rural road segment
- Segment length is 0.1 miles

Year	AADT	Observed Crashes
2008	8,000	1
2009	8,200	3
2010	8,500	2

Steps to Calculate $N_{Expected}$ Crashes

1. Collect data (roadway characteristics, AADT, crash)
2. Apply SPF to calculate $N_{Predicted}$ under base conditions
3. Apply CMFs to adjust for base conditions
4. Calcualte $N_{Predicted}$ under site-specific conditions
5. Compute weighting factor
6. Determine $N_{Expected}$ crashes

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Step 1: Roadway Characteristics Data

- Lane width: 11 ft
- Shoulder width: 2 ft
- Shoulder type: gravel
- Grade: 1%
- Radius of horizontal curve: 1,200 ft
- Length of horizontal curve: 0.10 mile
- No spiral transition
- Superelevation rate: 0.04
- Driveway density: 5 driveways per mile
- No passing lane
- No centerline rumble strip
- No two-way left-turn lane
- No lighting
- No automated speed enforcement

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Step 1: Yearly AADT and Crash Data

Year	AADT	Observed Crashes
2008	8,000	1
2009	8,200	3
2010	8,500	2

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Step 2: Apply SPF

Apply the appropriate SPF for rural two-way two-lane segment

$$N_{spf} = AADT \times L \times 365 \times 10^{-6} \times e^{(-0.312)}$$
$$= 8000 \times 0.1 \times 365 \times 10^{-6} \times e^{(-0.312)}$$
$$= 0.214 \text{ crashes}$$

⇩

Predicted crash frequency under "base" conditions

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Step 3: Apply CMFs

Data	Base Conditions	Site Conditions	CMF Calculation
Lane width	12 ft	11 ft	$CMF_{1r} = (CMF_{ra} - 1.0) \times p_{ra} + 1.0$ $= (1.05 - 1.0) \times 0.78 + 1.0 = \mathbf{1.04}$
Shoulder width	6 ft	2 ft	$CMF_{2r} = (CMF_{wra} \times CMF_{tra} - 1.0) \times p_{ra} + 1.0$ $= (1.30 \times 1.01 - 1.0) \times 0.78 + 1.0 = \mathbf{1.24}$
Shoulder type	paved	gravel	
Length of horizontal curve	0 mi	0.1 mi	$CMF_{3r} = \frac{(1.55 \times L_C) + (80.2/R) - (0.012 \times S)}{(1.55 \times L_C)}$ $= \frac{(1.55 \times 0.1) + (80.2/1200) - (0.012 \times 0)}{(1.55 \times 0.1)} = \mathbf{1.43}$
Radius of curvature	0 ft	1,200 ft	
Spiral transition curve	not present	not present	
Superelevation variance	<0.01	0.02	$CMF_{4r} = 1.06 + 3(SV - 0.02) = 1.06 + 3(0.02 - 0.02) = \mathbf{1.06}$
Grade	0%	1%	$CMF_{5r} = \mathbf{1.00}$ (grade < 3%)
Driveway density	5 driveways/mi	0	$CMF_{6r} = \mathbf{1.00}$ ($\leq$ 5 driveways/mi)

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Step 3: Apply CMFs (cont'd)

Data	Base Conditions	Site Conditions	CMF Calculation
Centerline rumble strip	not present	not present	$CMF_{7r} = \mathbf{1.00}$
Passing lanes	not present	not present	$CMF_{8r} = \mathbf{1.00}$
Two-way left-turn lane	not present	not present	$CMF_{9r} = \mathbf{1.00}$
Roadside hazard rating	3	5	$CMF_{10r} = \frac{\exp(-0.6869+0.0668 \times RHR)}{\exp(-0.4865)} = \frac{\exp(-0.6869+0.0668 \times 5)}{\exp(-0.4865)} = \mathbf{1.14}$
Segment lighting	not present	not present	$CMF_{11r} = \mathbf{1.00}$
Auto speed enforcement	not present	not present	$CMF_{12r} = \mathbf{1.00}$

$$CMF_{combined} = CMF_{1r} \times CMF_{2r} \times \ldots \times CMF_{12r} = 1.04 \times 1.24 \times 1.43 \times 1.06 \times 1.14 = \mathbf{2.23}$$

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Step 4: $N_{Predicted}$ Under Site-Specific Conditions

$$N_{predicted} = N_{spf} \times CMF_{combined} \times \text{Calibration Factor}$$

$$N_{predicted} = 0.214 \times 2.23 \times 1.10 = 0.525 \text{ crashes}$$

Year	AADT	N_{SPF}	$N_{Predicted}$
2008	8,000	0.214	0.53
2009	8,200	0.219	0.54
2010	8,500	0.227	0.56

$$N_{spf} = AADT \times L \times 365 \times 10^{-6} \times e^{(-0.312)}$$

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Step 5: Compute Weighting Factor

$$w = \frac{1}{1 + k \times \sum_{years} N_{predicted}}$$

$$k = \frac{0.236}{L} = \frac{0.236}{0.1} = 2.36$$

$$w = \frac{1}{1 + 2.36 \times (0.53 + 0.54 + 0.56)} = 0.206$$

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Step 6: Determine $N_{Expected}$

$$N_{expected} = w \times N_{predicted} + (1 - w) \times N_{observed}$$

$$N_{expected} = 0.206 \times \frac{(0.525+0.537+0.557)}{3} + (1 - 0.206) \times \frac{(1+3+2)}{3}$$

$$N_{expected} = 1.70 \text{ crashes per year}$$

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Example 2: Before/After Safety Effectiveness Evaluation

- Passing lane is installed at the site in December 2010

Year	AADT	$N_{Observed}$	$N_{Predicted}$
2008	8,000	1	0.53
2009	8,200	3	0.54
2010	8,500	2	0.56
2011	8,600	1	0.56
2012	8,750	1	0.57

Passing lane is installed

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Steps to Calculate $N_{Expected}$ Crashes

1. Collect data (roadway characteristics, AADT, crash)
2. Apply SPF to calculate $N_{Predicted}$ under base conditions
3. Apply CMFs to adjust for base conditions
4. Calcualte $N_{Predicted}$ under site-specific conditions
5. Compute weighting factor
6. Determine $N_{Expected}$ crashes

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Steps to Calculate Safety Effectiveness of a Treatment (Cont'd)

7. Apply adjustment factor to account for differences between "before" and "after" periods in duration and traffic volume
8. Calculate average $N_{Expected}$ in "After" period without treatment
9. Determine safety effectiveness

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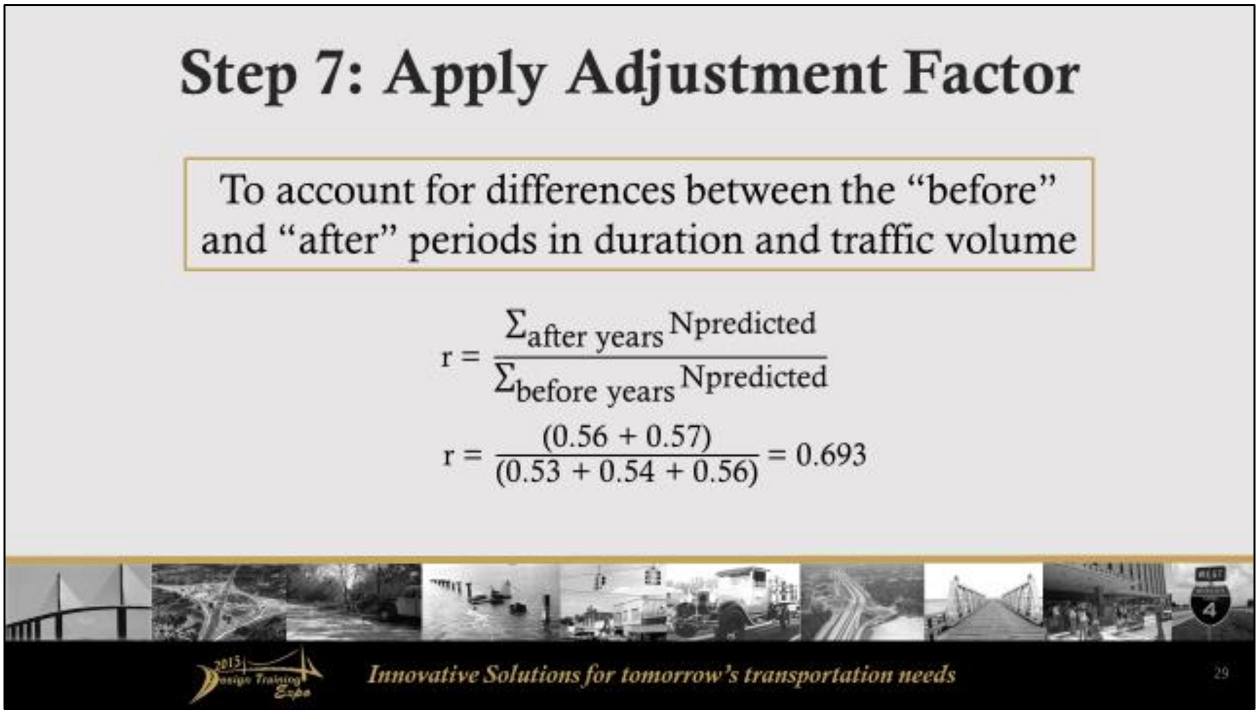
Step 7: Apply Adjustment Factor
To account for differences between the "before" and "after" periods in duration and traffic volume
$r = \frac{\sum_{after\ years} N_{predicted}}{\sum_{before\ years} N_{predicted}}$
$r = \frac{(0.56 + 0.57)}{(0.53 + 0.54 + 0.56)} = 0.693$
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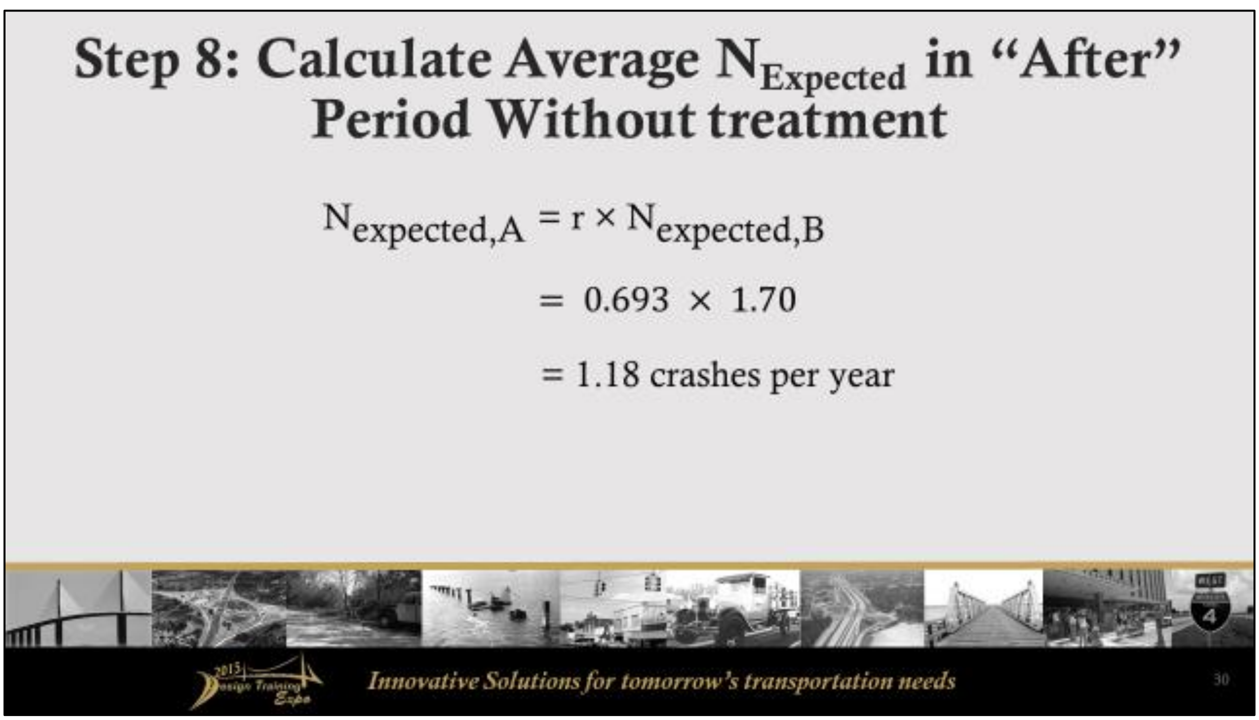
29


Step 8: Calculate Average $N_{Expected}$ in "After" Period Without treatment
$N_{expected,A} = r \times N_{expected,B}$
$= 0.693 \times 1.70$
$= 1.18$ crashes per year
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30

Step 9: Determine Safety Effectiveness

$$\text{Safety Effectiveness} = 100 \times (1 - \text{OR})$$

$$\text{OR} = \text{Odds Ratio} = \frac{N_{observed,A}}{N_{expected,A}}$$

$$\text{OR} = \frac{2}{2 \times 1.18} = 0.847$$

$$\text{Safety Effectiveness} = 100 \times (1 - 0.847)$$

$$= 15.3\%$$

Percentage Reduction in Crashes

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Summary

- We discussed about:
  - Issues with basic site selection methods
  - Empirical Bayes Method (SPFs, CMFs, calibration factor, expected crashes)
- The EB method is used in the newer safety analysis tools

AASHTOWare Safety Analyst AASHTO

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Thank you!
Questions?
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FIU FLORIDA INTERNATIONAL UNIVERSITY
UF UNIVERSITY of FLORIDA
Centennial FDOT 1915 ★ 2015
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33

APPENDIX B: WEBINAR SLIDES

HIGHWAYSAFETYMANUAL

HIGHWAY SAFETY MANUAL TRAINING

Florida Department of Transportation

WEBINAR #2

INTRODUCTION TO SAFETY ANALYST

FDOT HSM

Introductions

Safety Analyst Instructor:

Priyanka Alluri, PhD, PE
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Miami, FL 33174
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FDOT HSM

2-46

Safety Analyst

Provide state-of-the-art analytical tools for use in the decision-making process to identify and manage a systemwide program of site-specific improvements to enhance highway safety by cost-effective means.

2-48

Why Use Safety Analyst?

- Safety Analyst can proactively determine which sites have the highest potential for safety improvement
- Safety Analyst integrates all parts of the roadway safety management process into a single software package
- Safety Analyst automates state-of-the-art statistical approaches as described in the Part B of the HSM

2-49

What Can You Do With Safety Analyst?

- Identify locations with greatest potential for safety improvement
- Perform site-specific diagnosis to identify crash contributing factors and crash patterns
- Select countermeasure(s)
- Conduct economic appraisal and prioritize safety improvement projects
- Evaluate countermeasures

FDOT HSM

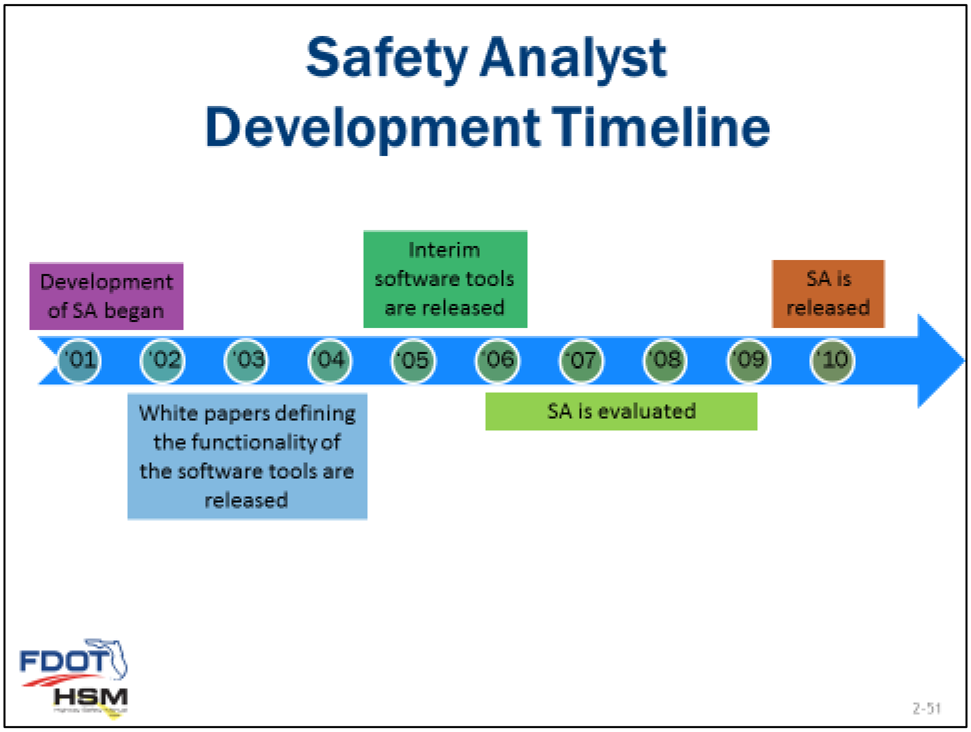
2-50

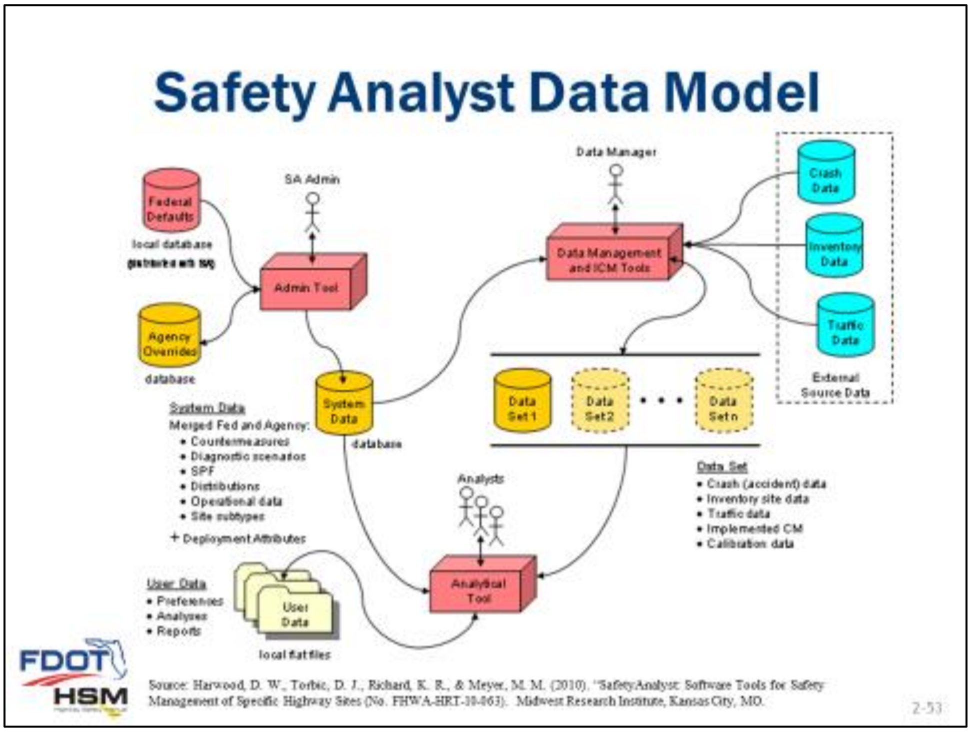
Safety Analyst Capabilities

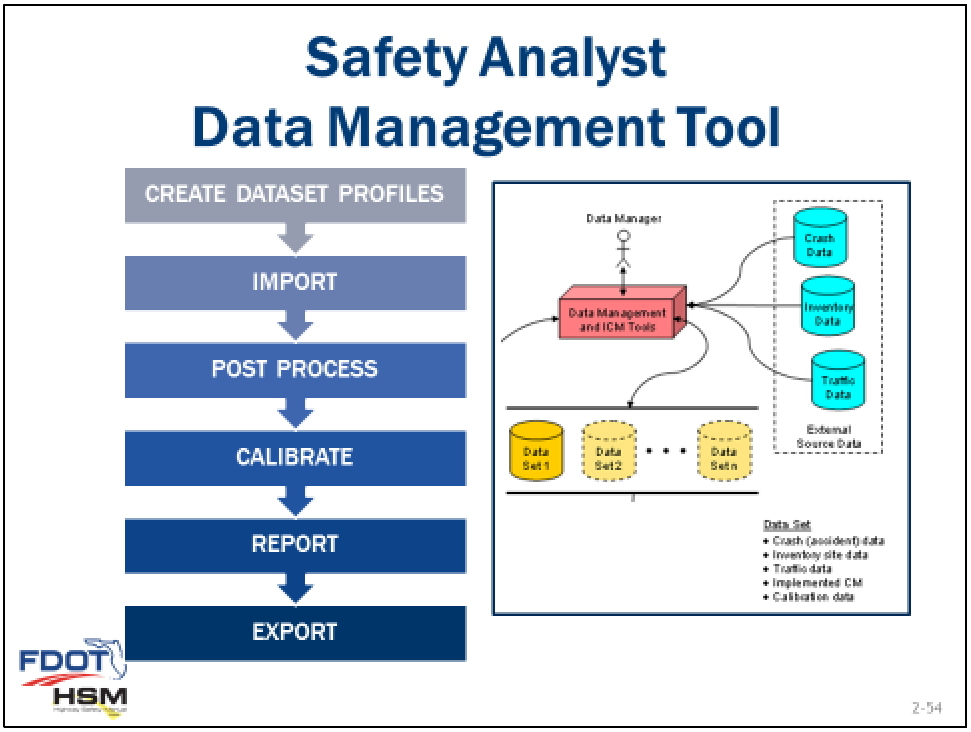
- Automates all the steps in the roadway safety management process
- Automatically divides the entire road network into predefined site subtypes
- Performs quality control and identifies problems with the data sets
- Applies empirical Bayes (EB) method and ranks problematic sites based on their potential for safety improvement
- Provides expert system to diagnose site conditions and collision patterns and suggest potential countermeasures

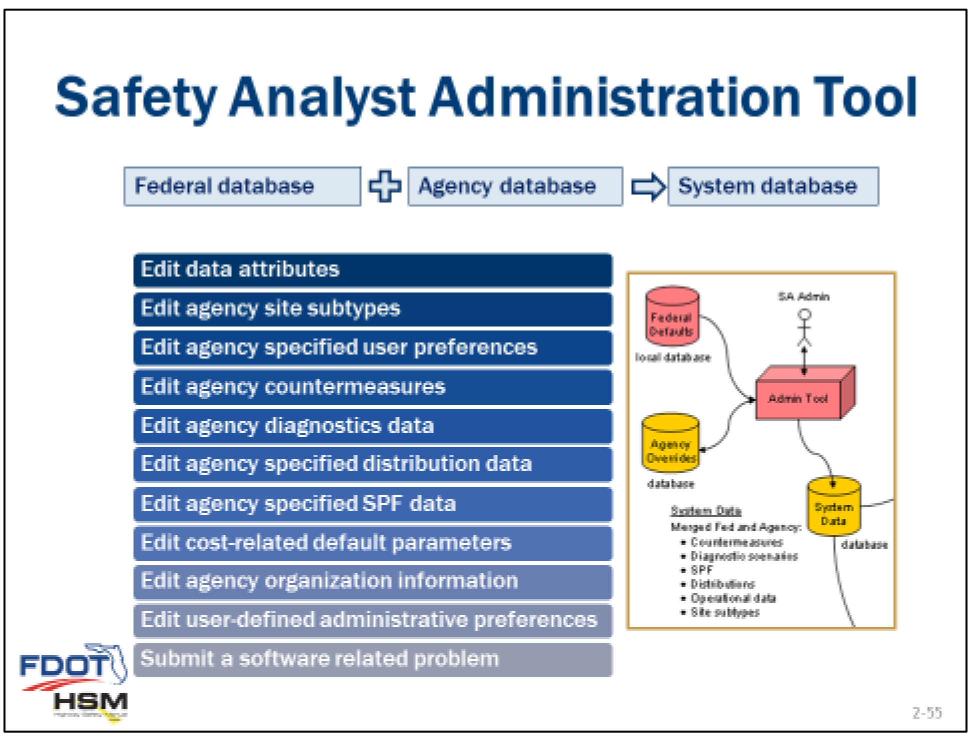
FDOT HSM

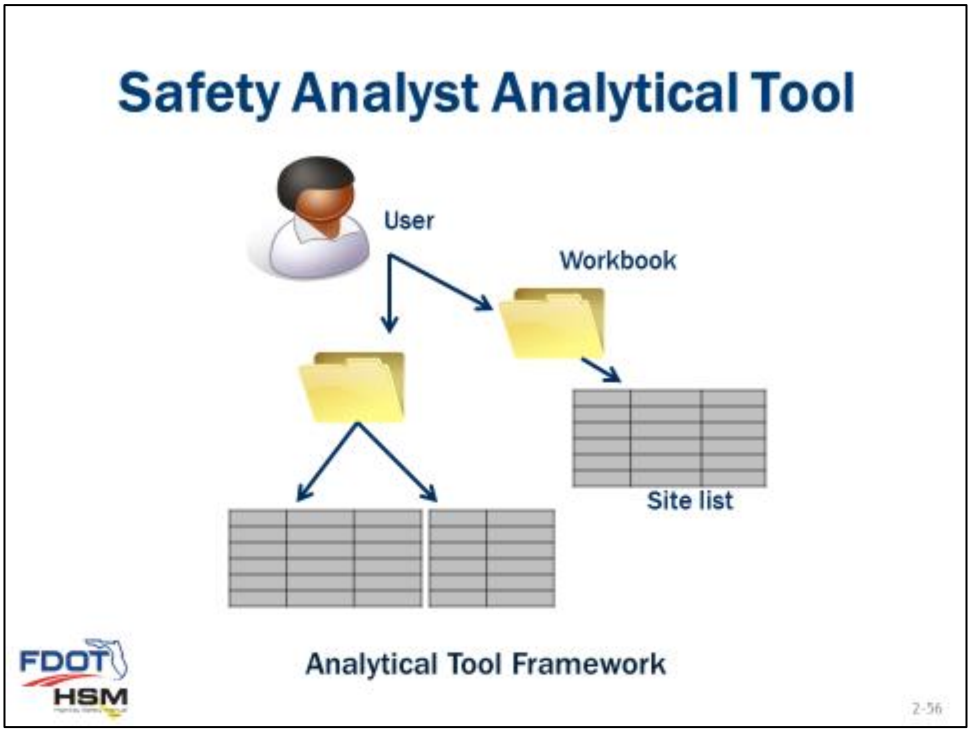
2-52

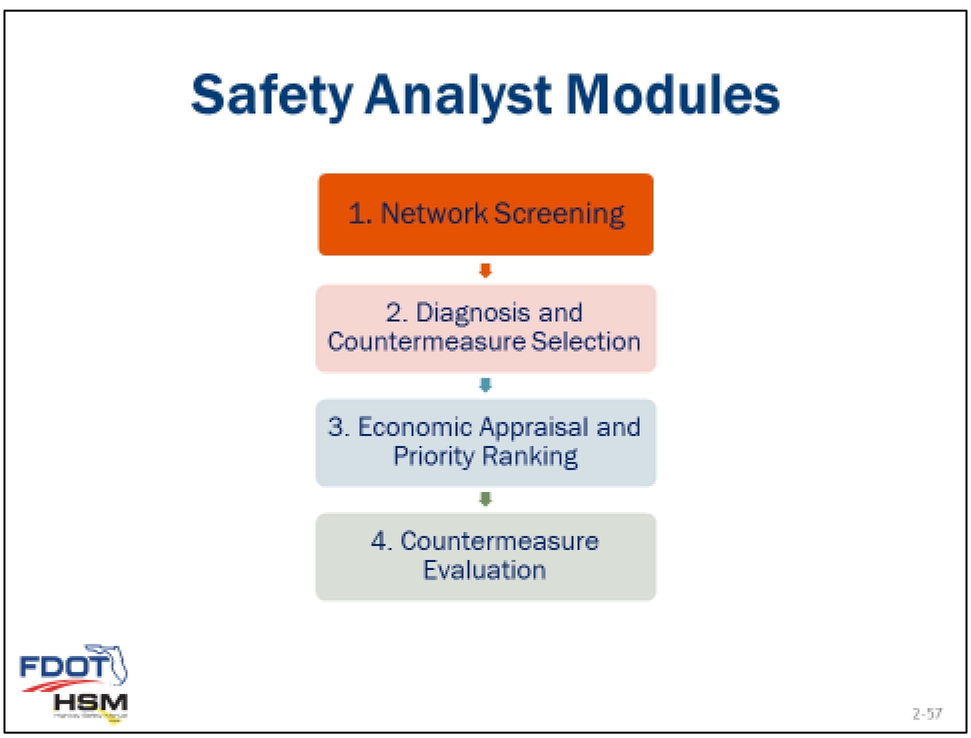

Safety Analyst
Development Timeline
Development of SA began
Interim software tools are released
SA is released
'01
'02
'03
'04
'05
'06
'07
'08
'09
'10
White papers defining the functionality of the software tools are released
SA is evaluated
FDOT
HSM
2-51


Safety Analyst Data Model
Federal Defaults
local database
Agency Overrides
database
SA Admin
Admin Tool
System Data
database
System Data
Merged Fed and Agency:
• Countermeasures
• Diagnostic scenarios
• SPF
• Distributions
• Operational data
• Site subtypes
+ Deployment Attributes
Data Manager
Data Management and ICM Tools
Crash Data
Inventory Data
Traffic Data
External Source Data
Data Set 1
Data Set2
Data Set n
Data Set
• Crash (accident) data
• Inventory site data
• Traffic data
• Implemented CM
• Calibration data
Analysts
Analytical Tool
User Data
• Preferences
• Analyses
• Reports
User Data
local flat files
FDOT
HSM
Source: Harwood, D. W., Torbic, D. J., Richard, K. R., & Meyer, M. M. (2010). "SafetyAnalyst: Software Tools for Safety Management of Specific Highway Sites (No. FHWA-HRT-10-063). Midwest Research Institute, Kansas City, MO.
2-53

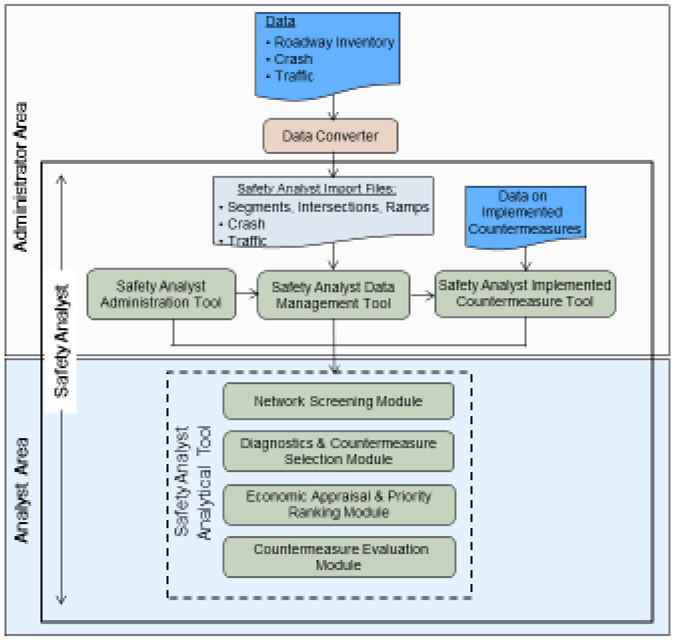

Safety Analyst
Data Management Tool
CREATE DATASET PROFILES
IMPORT
POST PROCESS
CALIBRATE
REPORT
EXPORT
Data Manager
Data Management and ICM Tools
Crash Data
Inventory Data
Traffic Data
External Source Data
Data Set 1
Data Set2
Data Set n
Data Set
+ Crash (accident) data
+ Inventory site data
+ Traffic data
+ Implemented CM
+ Calibration data
FDOT
HSM
2-54


Safety Analyst Administration Tool
Federal database
Agency database
System database
Edit data attributes
Edit agency site subtypes
Edit agency specified user preferences
Edit agency countermeasures
Edit agency diagnostics data
Edit agency specified distribution data
Edit agency specified SPF data
Edit cost-related default parameters
Edit agency organization information
Edit user-defined administrative preferences
Submit a software related problem
SA Admin
Federal Defaults
local database
Admin Tool
Agency Overrides
database
System Data
database
System Data
Merged Fed and Agency:
• Countermeasures
• Diagnostic scenarios
• SPF
• Distributions
• Operational data
• Site subtypes
FDOT
HSM
2-55


Safety Analyst Analytical Tool
User
Workbook
Site list
Analytical Tool Framework
FDOT
HSM
2-56


Safety Analyst Modules
1. Network Screening
2. Diagnosis and Countermeasure Selection
3. Economic Appraisal and Priority Ranking
4. Countermeasure Evaluation
FDOT
HSM
2-57

Safety Analyst Application Process



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2-58

Summary

- Roadway safety management is a data-intensive, statistically complex, and computationally rigorous process.
- Safety Analyst automates all the steps in roadway safety management process.
- Safety Analyst requires minimum statistical expertise.
- Data requirements are intense. However, it is a one-time process.
- Safety Analyst can play an important role so that highway agencies get the greatest possible safety benefit from each safety dollar spent.
- Safety Analyst can be used to create safety assessment reports based on rigorous data analysis to secure safety funds and justify their use.

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2-59

FDOT's Progress with Safety Analyst Deployment

- A conversion program has been developed to automatically generate Safety Analyst import files. However, the program needs to be updated to include data from non-state roads.
- Florida-specific Safety Performance Functions (SPFs) have been developed to use with Safety Analyst.
- We will provide technical support and expert advice on Safety Analyst.

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2-60

Thank you!

Questions?

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