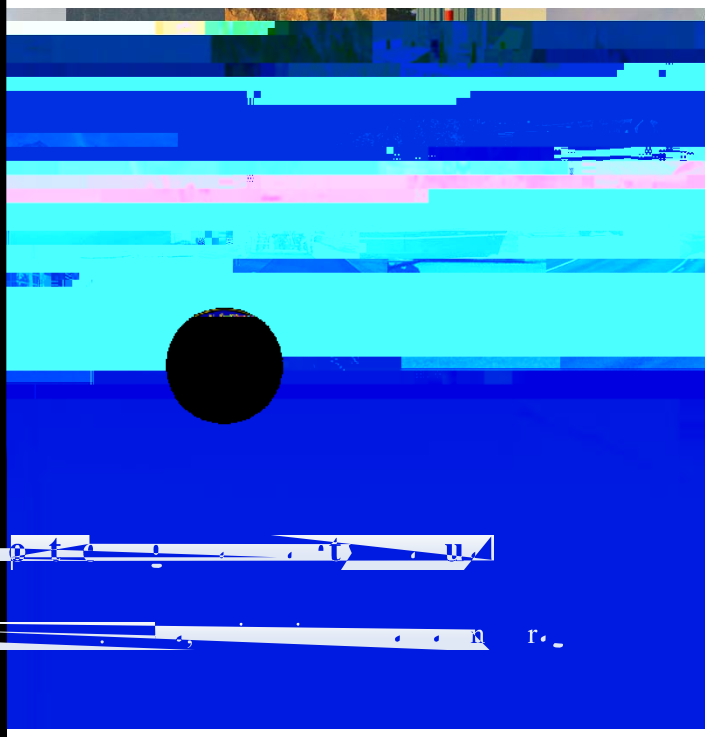
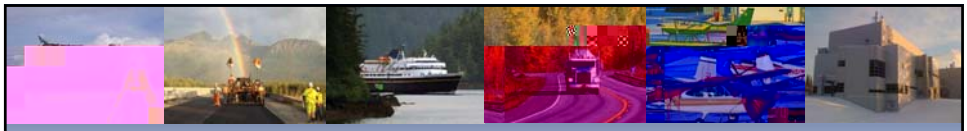




Current Progress for HSM

- Member of National Cooperative Highway Research Program Project Panel 17 -68., “Intersection Crash Prediction Methods for the Highway Safety Manual.” Washington D.C., FY 2014-17

Current Progress for HSM

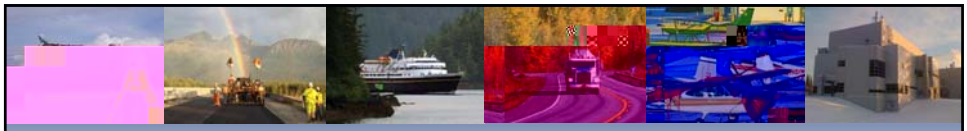
- Member of National Cooperative Highway Research Program Project Panel 17 -74., “Developing Crash Modification Factors for Corridor Access Management “ Washington D.C., FY 2015-18

Purpose and Need

- Why is a Calibration Factor needed?
  - Used to determine average predicted crash rates along sections of roadways/intersections
  - Method derived from Highway Safety Manual (HSM) which is based on lower 48 calibration data sets
  - Used to determine if cold region calibration factor(s) are significantly different than lower 48 calibration factor values and if necessary as a design criteria

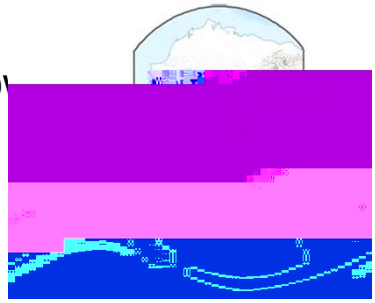
Site Types Calibrated

- Three- and Four-leg Stop-Controlled Intersections
- Four-leg Signalized Intersections
- Rural Two-lane Two-Way Highway Segments



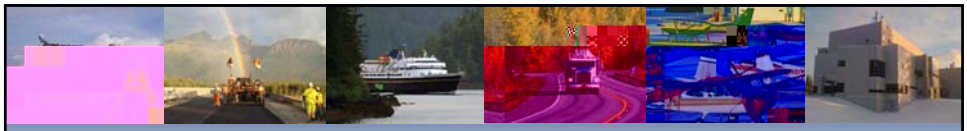
Regional Breakdown

- Central
  - Includes Anchorage Bo
- Northern
  - Includes Fairbanks
- Southcoast
  - Includes Ketchikan, Sitka, Juneau



Regional Differences

- Potential Regional Differences:
  - Weather/Climate
  - AADT
  - Driver Behavior
  - Congestion
  - Wildlife
  - Daylight Hours
  - Crash Rates



Methodology

- Acquire a list of sites to be calibrated
- Randomly sample sites until the appropriate sample size is reached (at least 100 crashes per intersection per year and at least 30 sites)
- Collect geometric information needed for Safety Performance Functions (SPFs)
  - In this study, this data was collected using Google Earth, Google Maps, site visits, MOA's map of AADT values, or was provided by the AKDOT&PF
- Apply HSM-given SPFs to find predicted crashes
- Apply the equation: $C = \frac{\sum all\ sites_{observed\ crashes}}{\sum all\ sites_{predicted\ crashes}}$

Methodology

In some cases, the methodology used differed for the different facility types calibrated, or deviated from the HSM. These deviations are discussed next.

Data Characteristics of Available Data

OA8

Stop Control Intersections

All Regions

Definitions

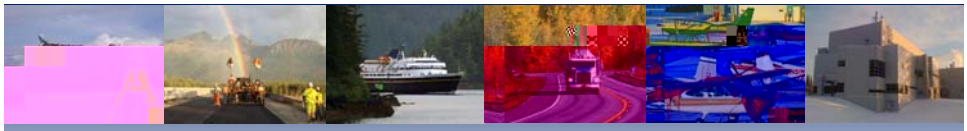
U 3ST/4ST : Urban and Suburban Arterial 3-leg/4-leg Stop-Controlled Intersections

R2 3ST/4ST: Rural Two-Lane 3-leg/4-leg Stop- Controlled Intersections

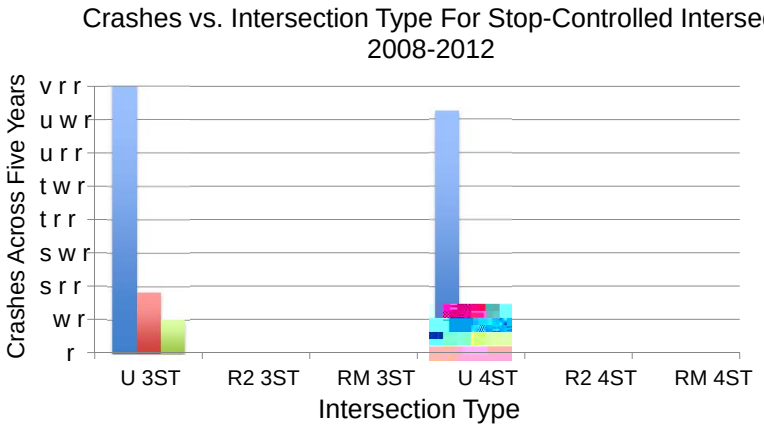
RM 3ST/4ST: Rural Multilane 3-leg/4-leg Stop- Controlled Intersection

Slide 16

OA8 Please enter the meaning of the a pppr niations in the fi gure in asepearte slid.
Osama Abaza, 10/17/2016



All Regions


Crashes vs. Intersection Type For Stop-Controlled Intersections, 2008-2012
Crashes Across Five Years
v r r
u w r
u r r
t w r
t r r
s w r
s r r
w r
r
U 3ST
R2 3ST
RM 3ST
U 4ST
R2 4ST
RM 4ST
Intersection Type

Slide 17

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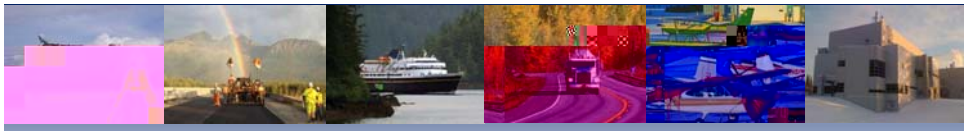
Osama Abaza, 10/17/2016



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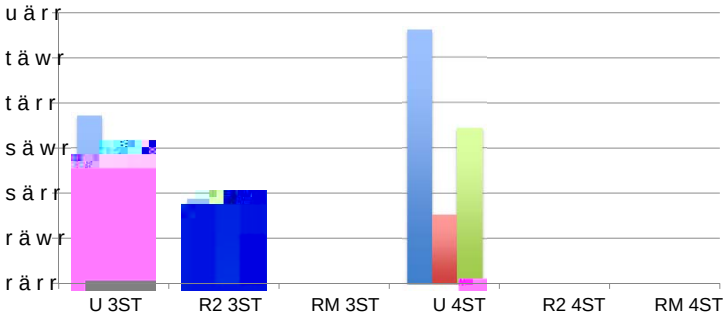
u ä r r
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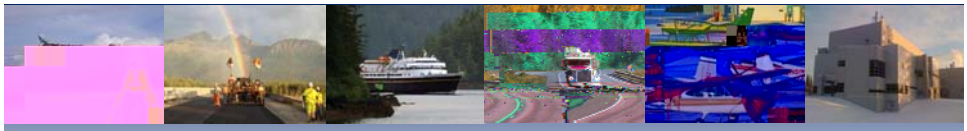
RM 4ST



Stop-Controlled Intersections Data Analysis

Major Street	Minor Street	Predicted Crashes	Observed Crashes
BADGER ROAD	NORDALE RD	7	10
CHENA HOT SPRINGS RD	NORDALE RD	4	5
RICHARDSON HIGHWAY	JACK WARREN ROAD * DELTA JCT	5	3
RICHARDSON HIGHWAY	JOHNSON ROAD * SALCHA	3	2
PARKS HIGHWAY	LESTER ROAD * HEALY	2	1
RICHARDSON HIGHWAY	DENALI HIGHWAY	1	0
MURPHY DOME ROAD			

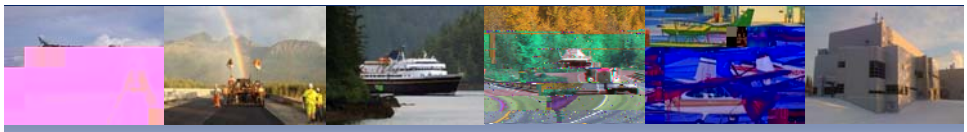
Stop-Controlled Intersections Calibration Results- Central Region

- Urban 3ST
  - CF = 1.72
- Urban 4ST
  - CF = 2.37
- Rural Two-Lane 3ST

  CF = 0.82
- Rural Two-Lane 4ST
  - CF = 0.80
- Multilane intersections not calibrated due to lack of information

Stop-Controlled Intersections Validation

- Intersections not used f**or**iginal calibration were then combined and another validation CF values found from these intersections
- Urban 3ST
  - Validation CF value = 1.85
- Urban 4ST
  - Validation CF value = 1.83
- Suggests higher CF values are indeed valid



Major Street	Minor Street	Predicted Crashes	Observed Crashes
100TH AVENUE	KING STREET	2	7
15TH AVENUE	LAKE ST S PARKWAY	9	134
MINNESOTA DRIVE	26TH AVENUE	26	28
H STREET	4TH AVENUE	7	25
5TH AVENUE	CONCRETE STREET	28	61
5TH AVENUE	AIRPORT HEIGHTS DRIVE	37	226
MULDOON ROAD	6TH AVENUE	21	88
88TH AVENUE	TOLOSI STREET	10	10
INTL AIRPORT ROAD	ARCTIC BLVD	25	101
TUDOR ROAD	BAXTER ROAD/BEAVER PLACE	25	52
O'MALLEY ROAD	BIRCH ROAD	7	11
BONIFACE PARKWAY	NORTHERN LIGHTS BLVD	34	180
TUDOR ROAD	BONIFACE PARKWAY	26	109
MULDOON ROAD	BOUNDARY AVENUE	26	88
C STREET	POTTER DRIVE b " Ê A.á•a#6 !. òB€ÐÀ 0	18	61

Signalized Intersections Results

- Four-leg Signalized Intersection Calibration Factors:
  - Central: 3.66
  - Northern: 3.29
  - Southcoast: 1.84

Signalized Intersections Validation

- Central Region Validation Set of 46 Intersections Taken:

t-Test: Paired Two Sample for Means		
	N predicted	N observed
Mean	68.81	56.67
Variance	1260.67	2405.09
Observations	45	45
Pearson Correlation	0.67010693	
df	44	
t Stat	2.232	
P(T<=t) two-tail	0.031	< .05 so significant
t Critical two-tail	2.015	< t stat so significant

Two-Lane Highway Segments Calibration Results

- Central Region
  - CF = 1.25
- Northern Region
  - CF = 1.22
- Combined
  - CF = 1.25

Conclusions

- Recommend developing Alaska-specific SPFs
- Some regional differences are estimated to affect Calibration Factor results more than others
  - These include Average Annual Daily Traffic (AADT) and aggressive driving
- Minor regional differences that affect calibration results include:
  - Wildlife, weather, daylight hours

Recommendations

- For design use only, non enforcement
- Reference for analysis
- Update Calibration Factors every 4-6 years per the HSM
- New data set to use would be 2013-2017 crash data to compare different years

Stop-Controlled Intersections
Recommendations

Signalized Intersections Recommendations

Region	Recommended CF Value
Central	3.66
Northern	3.29
Southcoast	1.84

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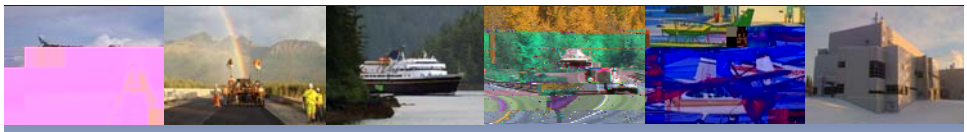

- Recommended to use a CF value of 1.25 A().q.4in92

Acknowledgments

We thank the AKDOT&PF, along with the Federal Highway Administration for providing funding for this project. Thank you to those who performed research, helped with data collection, and helped in writing the report. Thanks to those at the AKDOT&PF who provided us with the necessary information to complete this project.

Thank you for joining us today
Questions?