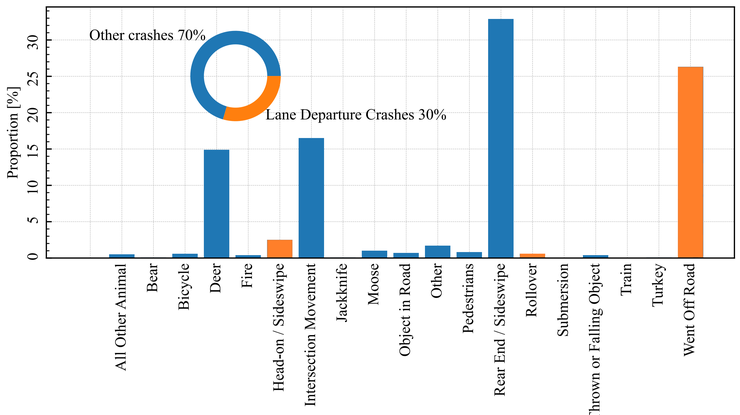
Examining the impact of rumble strip installation in prevention of lane departure crashes in Maine

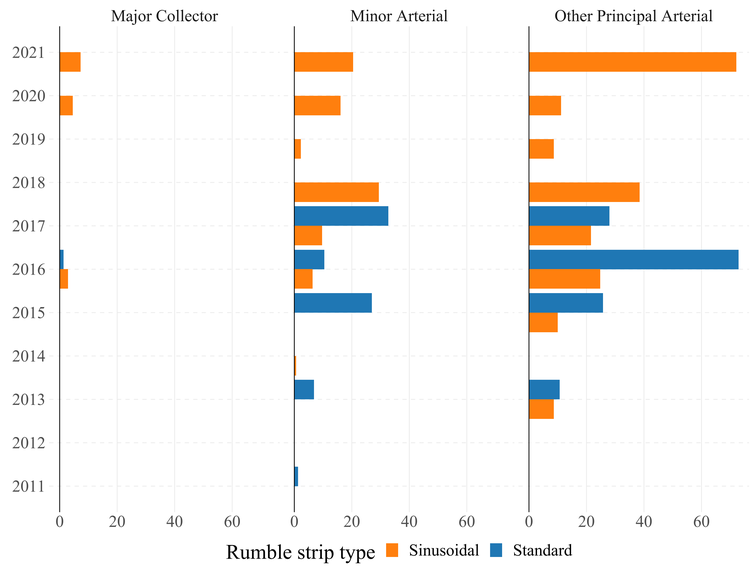
Jhan Kevin Gil-Marin, Department of Civil and Environmental Engineering, University of Maine. Advisor: Ali Shirazi, PhD.

Introduction

- Data was obtained from the Maine DOT Public Map Viewer online resource.



Type of crashes proportion of the total crashes in Maine.



Summary of installed centerline rumble strips in rural two-lane roadways.

Methodology

- Before-After studies were performed with the comparison group, empirical Bayes (EB), and EB comparison group methods.
- Road elements and crashes were aggregated by the element identifier, AADT, and speed limit.
- Safety Performance Functions (SPF) are developed using the Negative Binomial (NB) model.
- Crash modification factors for different types of facilities are calculated.

Results

- Because of data limitations, only the comparison group method produced results statistically significant.
- Treatment and comparison groups were selected based on geometric and traffic characteristics.
- A test to assess the suitability of the comparison group was performed.

Rumble Strips Type	Total Crashes				
	Year	CMF	SE	Change[1]	Z-Test
Minor Arterial					
Standard	**2017**	**0.53**	**0.17**	**-47%**	**2.82**
Sinusoidal	2016	0.70	0.39	-30%	0.75
Both	2016	0.70	0.27	-30%	1.14
Other Principal Arterial					
Standard	**2016**	**0.56**	**0.14**	**-44%**	**3.16**
Sinusoidal	2016	1.01	0.31	1%	0.04
Both	**2016**	**0.68**	**0.14**	**-32%**	**2.23**
Arterials					
Standard	**2017**	**0.58**	**0.13**	**-42%**	**3.26**
Sinusoidal	2016	0.86	0.23	-14%	0.62
Both	**2017**	**0.72**	**0.14**	**-28%**	**1.91**

[1]A negative change (-) shows a reduction. A positive change (+) shows an increase.
Note: CMF estimates that were computed using a suitable comparison group and showed evidence of being statistically significant at the 5% level are stated in bold.

Contacts
jhan.gil@maine.edu
shirazi@maine.edu

Rumble Strips Type	Fatal and Injury Crashes				
	Year	CMF	SE	Change[1]	Z-Test
Minor Arterial					
Standard	2017	0.46	0.38	-54%	3.01
Sinusoidal	2016	0.56	0.34	-44%	1.27
Both	**2016**	**0.56**	**0.24**	**-44%**	**1.81**
Other Principal Arterial					
Standard	**2016**	**0.52**	**0.17**	**-48%**	**2.84**
Sinusoidal	2016	1.29	0.57	29%	0.51
Both	2016	0.76	0.21	-24%	1.14
Arterials					
Standard	**2017**	**0.46**	**0.13**	**-54%**	**4.1**
Sinusoidal	2016	1.09	0.4	9%	0.22
Both	**2017**	**0.65**	**0.17**	**-35%**	**2.06**

[1]A negative change (-) shows a reduction. A positive change (+) shows an increase.
Note: CMF estimates that were computed using a suitable comparison group and showed evidence of being statistically significant at the 5% level are stated in bold.

Benefit-Cost Ratio

- Crash cists were estimated using the value of unit crash cost per severity for the state of Maine.
- Benefits are considered as the savings in crash cost computed with the CMFs.
- Rumble strips were assumed to have a service life of 7 years.

Total Crash Cost	Crash Cost per Mile per Year	Benefit	Rumble Strip Cost per Mile per Year	Benefit-Cost Ratio
Minor Arterial				
$219,544,000	$30,470	$14,321	$500	23.8
Other Principal Arterial				
$53,089,400	$16,348	$7,193	$500	11.8
Arterials				
$272,633,400	$26,082	$8,346	$500	15.1

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