

Risk-Based Roadway Departure Crash Assessment

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Partners





AGENCY OF TRANSPORTATION

Operations and Safety Bureau Data & Analysis



The Problem



- RWD = 70% of Fatal and Serious Injury Crashes
- The locations are random



The Solution: Systemic Safety



 Presence of Intersection in the Curve



• Nighttime

The Project: Crash Models

- 14 Focus Crash/Facility Type Combinations
- Local Curves
- State Curves & Tangents

	Segment Type			
Crash Type	Tangent	Curve	Interstate	
Head-On	Yes	Yes		
Run Off Road	Yes	Yes		
Overturn	Yes	Yes	Yes	
Fixed Object		Yes		
Nighttime Run Off Road		Yes		



The Project: Risk Factors

Segment Risk Score Calculation Example

1st Logit Regression Modeling

Risk Risk Risk Segment **Risk Factor** Factor Value Weight Score Value AADT 28200 Over 1 1 15000 vehicles per day Guardrail 1 (if not Right 0 None Guardrail present) Present Type A Warning 2 Present Present 2 Sign Total Risk Score (Sum) 3

Risk Category	Percentile Score Range	Color	
Primary Risk	95-100	Black	
High Risk	85-94	Red	
Medium Risk	60-84	Orange	
Low Risk	30-60	Yellow	
Minimal Risk	0-30	Green	
Not a Focus Facility	N/A	Gray	



AGENCY OF TRANSPORTATION RESEARCH PROGRAM

2nd

Scoring

Method

Risk Maps

• 14 Focus Risk Maps





Risk Route Logs

Stick Diagram				Grand Isle				
Stick Diagram	The Control of the Second Seco	by H Librard contrasts		Grand Isle	Antipological to a	The first of statement	00 (PMU) 100 (PMU) 1	10000000000000000000000000000000000000
Scale: 1 INCH = 2,000 FEET								
(1))	22	1111(4			6 1 1
Roadway	4 34 64 34			28				;
Road Widths Lane Count Base	4							-
Subbase	22							
Curves	6			3				
Grades								
Guardrails	3)			н				
Bumbloctring								
Kumblestrips					1			
Speed Zone			40	35	40			
Curves: Head-on, FTC6								
Curves: Overturn, FTC7								
Curves: Run-off Road, FTC8								
Curves: Fixed Object, FTC9								
Curves: Night Run-off Road, FTC10								
Interstate: Overturn, FTC11								
Tangents: Head-on, FTC12								
Tangents: Overturn, FTC13								
Tangents: Run-off Road, FTC14								



Vermont Impacts/Benefits of the Project

- Identified sites at the highest risk of lane departure crashes
- Ability to implement targeted measures
- Proactive







Why you should visit the poster





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Google Streetview: Click here

Medium Risk for head-on crashes on rural local road curves. Primary Risk for overturn crashes on rural local road curves. High Risk for run-off road crashes on rural local road curves. High Risk for fixed object crashes on rural local road curves. Primary Risk for night-time run-off road crashes on rural local road curves.

Not a Focus Facility for head-on crashes on rural state curves.

Overturn Crashes on Local Rural Curves Risk Level: Primary Risk | Risk Score: 3/9 | Percentile: 96 Segment ID: 311120 LRS ID: S02090411 Town MM Begin: 2.394 Town MM End: 2.401

Risk Score Details:

Average shoulder width over 1 foot: 0/1 Road is a minor or major collector: 2/2 Presence of an intersection in the segment: 0/2 Curve is not independent: 1/1

Primary Risk Mitigation Strategies		High Risk Mitigation Strategies Medium Risk Mitigation			litigation St
CM_Description 💠 …	RiskLevel	\$	CrashReduct	ion_1 🜲 •••	Cost
Dynamic Chevrons	Primary		44%, 60% (F/I)	N/A
Flashing Beacons on Curv	Primary		N/A		\$6000 sola
In-Pavement Curve Warnin	Primary		30.7% (K/I), 35	5.1% (nightti	\$18 per le
Removal of Trip Hazards	Primary		38% (remove/	/relocate fixe	\$1,000 pe
Roadside Barrier	Primary		48% (KABC), 5	57% (fatal + i	\$35 per LF
Slope Flattening	Primary		Flatten sideslo	ope 1V:3H to	\$10 yd3 ea



Why you should visit the poster



Intersection Crash Types

- Angle
- Left Turn
- Rear-End
- Pedestrian
- Bike
- Nighttime Pedestrian

