Average Collision Cost Methodology for Calculating B/C's

Local HSIP Projects

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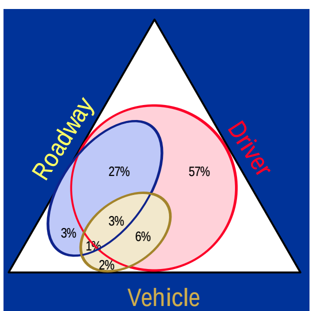
Collision Factors



Venn Diagram showing the causes by percentage, of road collisions in the United States

K. Rumar. "The Role of Perceptual and Cognitive Filters in Observed Behavior," *Human Behavior in Traffic Safety*, eds. L. Evans and R. Schwing, Plenum Press, 1985

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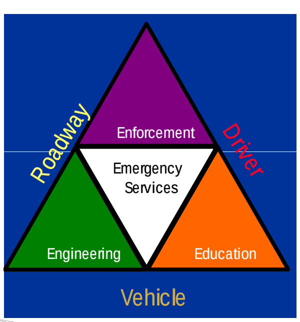
4 E's of Safety



Education and Enforcement play more of a role in preventing fatal collisions as the vast majority are caused by driver behavior.

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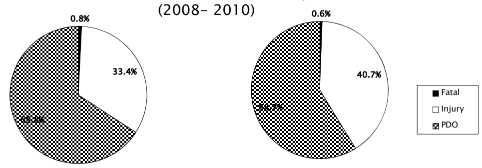
Comparing State Highway Crash Severity Percentages to Local Roadways

Percent Collision Severity
(2008– 2010)



State Highways | Local Roadways

Source: SWITRS for Local Roadways / TASAS

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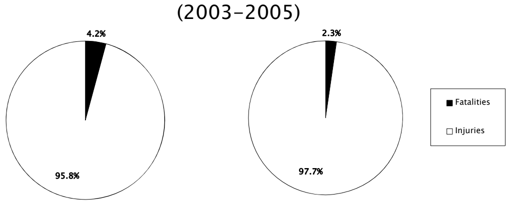
Comparing Crash Percentages State vs Local Rural Roadways

Percent Fatalities and Injuries
(2003–2005)



Rural State Highways | Rural Local Roadways

Source: SWITRS for Local Roadways / TASAS

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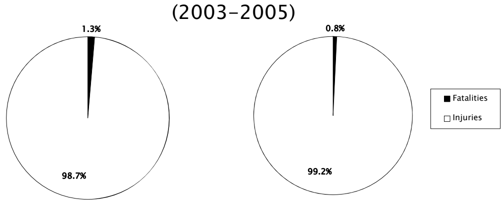
Comparing Crash Percentages State vs Local Urban Roadways

Percent Fatalities and Injuries
(2003–2005)



Urban State Highways | Urban Local Roadways

Source: SWITRS for Local Roadways / TASAS

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Comparing Crash Percentages State vs Local Roadways

- Lack of roadway inventory and exposure data (roadway features, traffic volumes, roadway miles, etc)
- It is not feasible to calculate average collisions costs
- The previous graphs show that percentages are very similar between state and local roadways
- Because of similarities, using state highway average collision costs can be a basis for using these costs on local roadways.

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State HSIP Program

- 1. Network Screening
  - Identifying Hotspot or Blackspot locations
    - Comparing similar facilities
    - Number of crashes over a time period
    - Traffic Volume
  - Corridor Improvements(Systemic Approach – Proactive)
- 2. Prioritization of Needs
  - State Average Cost Methodology – B/C tool is used to rank and prioritize projects for funding
    - Rural Highway Collisions Costs – Fatal: $10,279K, Injury: $204K, PDO: $11K
    - Average Costs for Rural Conventional Highway: $319K – $350K

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Local Roadway Existing B/C Methodology

- HEAVY emphasis on a fatal collisions and fatal collision cost (11.5 times higher than all others combined):
  - Fatal : $4,008 K
  - Severe/Disabling Injury(A) = $216 K
  - Evident Injury – Other Visible(B) = $79 K
  - Possible Injury – Complaint of Pain (C) = $44 K
  - Property Damage Only (O) = $7.4 K

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Local Roadway
Existing B/C Methodology

- Using the fatal cost in the B/C calculation can lead to the tendency to focus on collisions experiencing fatal collisions.
- Missed opportunities – A location could be the local agency's top priority but without a fatal collision, getting a qualifying B/C can be difficult.

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Local Roadway
Existing B/C Methodology

- Example of an Cycle 6 funded project:
  - Rural Roadway: Install High Friction Surface Treatment, Project Cost =$750,900
    - 5 years of collision data
      - 21 total collisions, – 2 fatals, 0 Incapacitating Injury, 9 Non-capacitating Injury, 10 Possible Injury, 0 PDO
      - Total Benefit for a 10 year life of project = $5.5 million
      - B/C = 7.3
  - Same project: Install High Friction Surface Treatment (no fatals but 2 were Incapacitating Injury collisions)
    - 5 years of collision data
    - 21 total collisions, 0 fatals, 2 Incapacitating Injury, 9 Non-capacitating Injury, 10 Possible Injury, 0 PDO's
    - Total Benefit for a 10 year life of project = $955,200
    - B/C = 1.3
- B/C difference of 6.0 – Without the fatal collisions, project would likely not have been submitted as an HSIP safety project

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Calculating Average Collision Cost for Local HSIP

Six Proposed Average Collision Costs Groups

1. Rural Roadway
2. Urban Roadway
3. Rural Intersection(no signal)
4. Urban Intersection(no signal)
5. Rural Signalized Intersection
6. Urban Signalized Intersection

Local Rural Roadway				
Severity	Average % Severity		Collision Cost	Total
Fatal	2.4 %	*	$10,279 K	$ 246.7 K
Injury	42.8 %	*	$204 K	$ 87.3 K
PDO	54.8 %	*	$11 K	$6.0 K
			Total	$340 K

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Average Collision Cost Groups				
Percent Fatal	Percent Injury	Percent PDO	Facility	Average Collision Costs
Roadway Segments				
2.4	42.8	54.8	Rural Roadway	$ 340 K
0.81	41.6	57.6	Urban Roadway	$ 162 K
Intersections				
1.4	35.5	63.1	Rural Non-signalized	$ 226.6 K
0.8	37.0	62.2	Urban Non-signalized	$ 143.3 K
0.7	38.5	60.8	Rural Signalized	$ 156 K
0.6	40.0	59.4	Urban Signalized	$ 121.6 K

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Applying Average Collision Cost Method to Cycle 6 Project

Rural Local Roadway Example

High Friction Surface Treatment, 21 collisions over 5 years, Project Cost =$750 K
B/C = 7.3

Same project: Shoulder Widening (without fatals)
B/C = 1.3

Using Average Collision Methodology, 21 collisions over 10 years, Project Cost = $750K, Average Collision Cost per collision = $340 K

B/C = 5.7

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Applying Average Collision Cost Method to Cycle 6 Project

Urban Local Intersection Example

Upgrade traffic signals at 5 intersections(convert to mast arm),
74 collisions over 10 years, Project Cost =~$770 K
B/C = 12.4

Same project: (without fatals)
B/C = 3.5

Using Average Collision Methodology, 74 collisions over 10 years, Project Cost = $770K, Average Collision Cost at Signalized Urban Intersection is $121.6 K

B/C = 7.0

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Questions?

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