

**From Crash Causation to Prevention:
A Saskatchewan Perspective**

Ontario Road Safety Forum
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Outline

- Local Context
- Causation & Prevention
- New Countermeasures
- Enhanced Intersection Safety Program

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Local Context


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Local Context

- Mostly a 1 ml x 2 ml grid road system
 - More roads than any other province
 - 26,000 km of provincial highways
 - > 200,000 km of municipal roads
 - Enough to circle the equator 4 times
 - > 7,600 at-grade int's along provincial highways



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Local Context

- Distinct lines between urban & rural
 - Compact urban
 - Disperse rural
- Long-distant, low work load rural trips
 - ~10 B kms / yr on provincial system
 - Very high expectation for high-mobility
 - High percent trucks

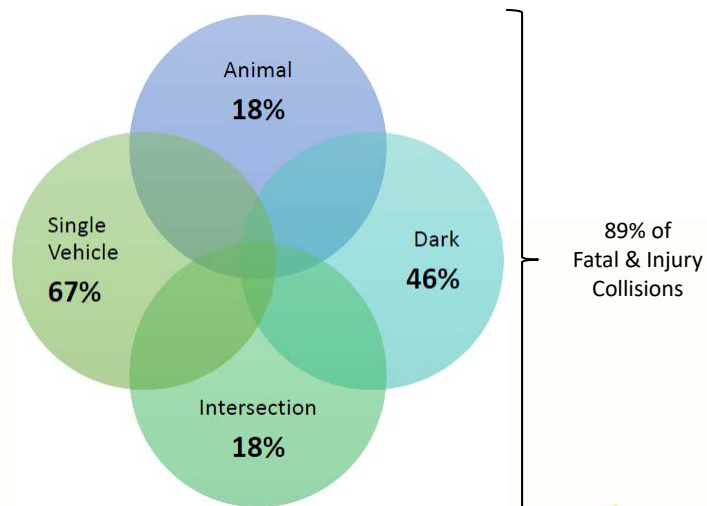
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Local Context



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Causation & Prevention, Why it is Important

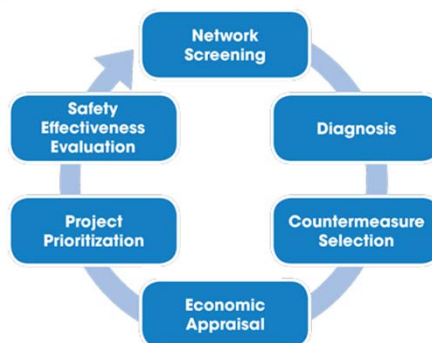
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Causation & Prevention

Highway Safety Manual:
Safety Management Process



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- Where are the problem locations?
- What is **causing** the problem?
- What are potential solutions to **prevent** it?
- What are the most appropriate solutions?
- Which should be funded first?
- Are the desired affects being achieved?
- Repeat.

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Causation

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Causation

- Macro level: Identify predominate patterns
 - Patterns: time of day, configuration, severity, events, **causation**, etc.
 - Additional data: volumes, as-builds, land use, etc.
 - Field investigation: road & side characteristics, traffic conditions, behaviours, signs of near-misses

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Causation

- Information:
 - Traffic Accident Information System (TAIS)
 - Via police
(collisions involving: injury, hit & run, impaired driver, vehicle to tow, etc.)
 - Other claim reporting processes
 - > 80 fields
 - When
 - Where
 - Severity
 - Type
 - Driving conditions
 - Pre and during events
 - **Major Contributing Factors** (MCFs) - up to 4 per collision

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Causation

- Information (continued)
 - MCFs:
 - Human Condition:
 - E.g.: Inattentive, impaired, inexperienced, etc.
 - Vehicle Condition:
 - E.g.: defective brakes, defective tires, etc.
 - Environmental Condition:
 - E.g.: animal, snow drift, weather condition, etc.
 - Human Action:
 - E.g.: traffic control disregarded, driving too fast, etc.

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Causation

- What is causing the predominate collisions?
 - MCFs:
 - Human: 31%
 - Vehicle: 3%
 - Environment: 66%
 - Non-Animal: 22%
 - Animal: 44%
 - Human factors (cars still driven by humans):
attention/info processing, vision,
perception/reaction, speed choice, etc.

Prevention

Prevention

- Countermeasure: solutions to break chain of events causing future collisions
- Currently > 40 countermeasures types being used



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New Countermeasures

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New Countermeasures

- Causation:
 - Minimal clues that approaching a stop condition
- Prevention: LED Actuated Stop Signs
 - Radar detects speed that vehicle not preparing to stop, tells LEDs on stop sign to flash
 - Currently testing out at 3 locations



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New Countermeasures

- Causation:
 - Minimal clues of the need to reduce speed
- Prevention: Peripheral Transverse Bars
 - Get accustomed to bar spacing (4 bar/sec), and reduce to match desired speed. Also, narrow lane uncomfortable
 - Currently testing at 3 locations



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New Countermeasures

- Causation:
 - Not detecting animals crossing the highway
- Prevention: Animal Detection System
 - Detects presence of large animals near highway, and activates warning light
 - In planning stages of pilot



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New Countermeasures

- Causation:
 - Choosing to disregard the speed limit
- Prevention: Photo Speed Enforcement
 - Pilot discovered decreased speeds, & decreased collisions
 - Pilot successful, and now program in the province



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New Countermeasures

- Causation:
 - Not properly judging gap on far side of intersection
- Prevention: Reduced Conflict Intersections (a.k.a.: RCUT, Michigan left, J-turn, etc.)
 - Eliminate lefts and thrus on intersecting road
 - In planning stage



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Enhanced Intersection Safety Program

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Enhanced Intersection Safety Program

- On April 6, 2018, a semi and bus collided at a two-way stop control intersection. 16 died and 13 were injured.
 - Collision investigated by RCMP
- Ministry of Highways & Infrastructure conducted road safety audit (RSA)
 - 13 recommendations made, including: improving sight lines and adding rumble strips

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Enhanced Intersection Safety Program



<https://www.620ckrm.com/2018/10/24/premier-scott-moe-outlines-provincial-governments-plans-during-fall-session/>

- 2018 Throne Speech:
 - Increase funding to improve intersection safety

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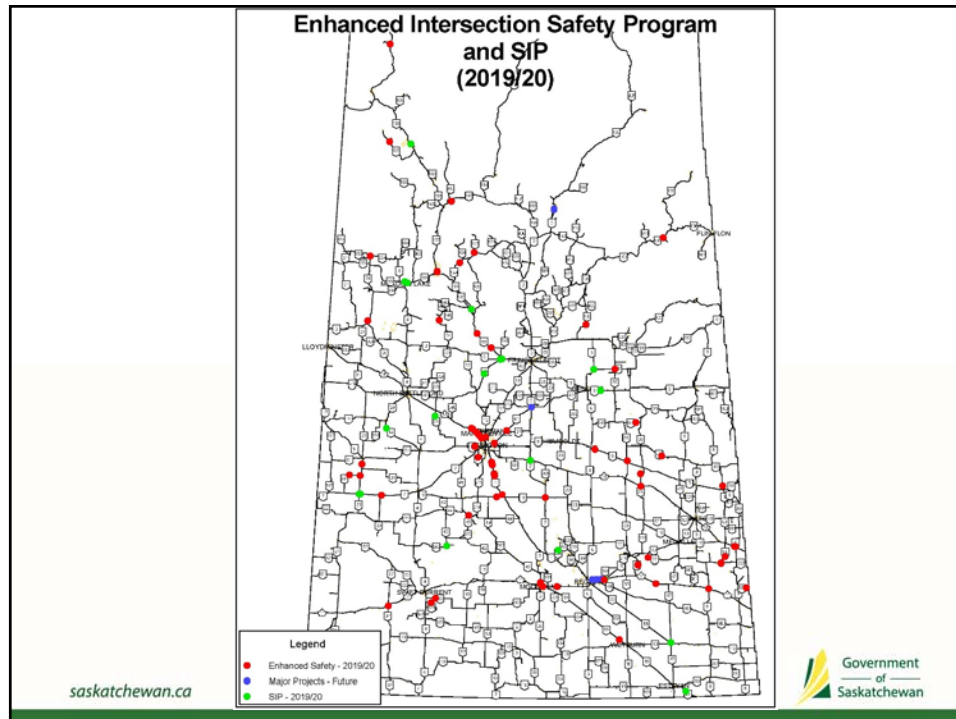
Enhanced Intersection Safety Program

- Ministry developed 5-yr program:

Enhanced Intersection Safety Investment	Total Cost	Annual Cost
Safety Improvement Program - Intersections	\$34.0M	\$6.8M
Significant Intersection Improvements	\$17.5M	\$3.5M
Integrated Safety Strategy - Intersections	\$6.0M	\$1.2M
Intersection Rumble Strips	\$5.0M	\$1.0M
Sight Triangles	\$2.5M	\$0.5M
Total	\$65.0M	\$13.0M

- Plus \$7.0M/yr continues for Safety Improvement Program

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