MOTORWAY CRASH ANALYSIS USING GIS

A Case Study of St Marys Bay, Auckland

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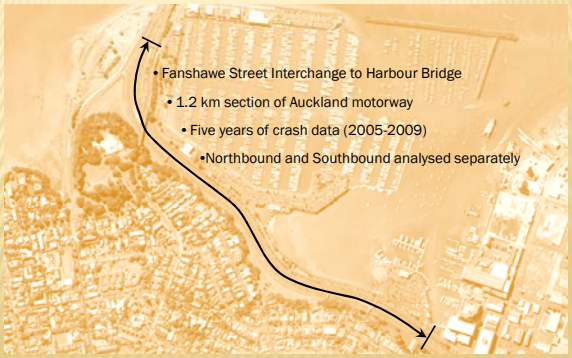
INTRODUCTION – WHY ST MARYS BAY?

- Crash rate is on average 33% higher than the Auckland motorway network.
- Three of the top five black spots on Auckland state highways
- Complex geometry – four small radii curves
- 368 reported crashes from 2005-2009
- No major changes during study period

INTRODUCTION – SCOPE OF STUDY

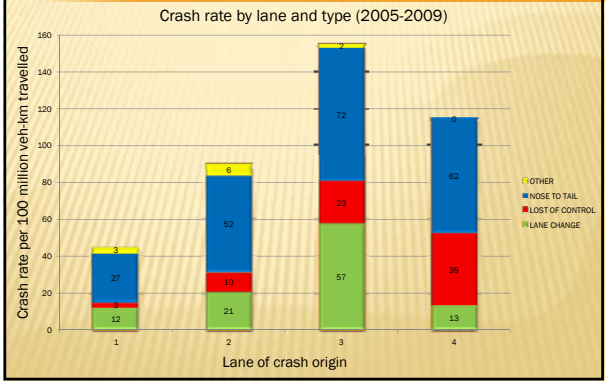


OBJECTIVES

- Identify crash rates on a lane by lane and movement type basis
- Investigate road and environment factors contributing to these crashes
- Investigate the potential for using a geographical information system to analyse crashes on multilane roads

METHODOLOGY

DATA ANALYSIS - NORTHBOUND

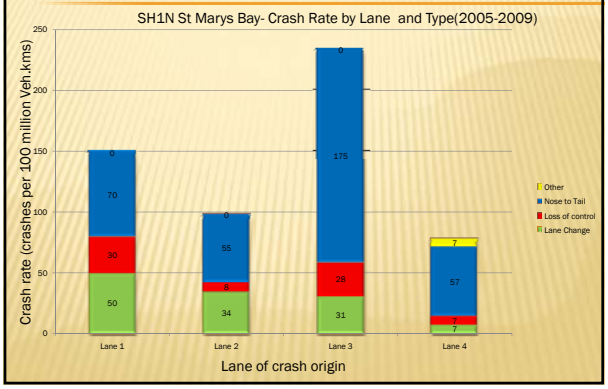


DATA ANALYSIS - NORTHBOUND

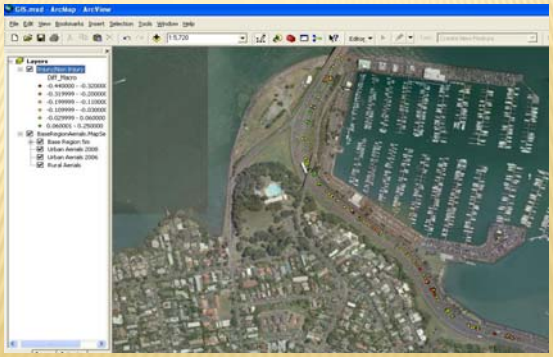
CONCLUSIONS – NORTHBOUND

- Crash rate in lane 3 was significantly higher than other lanes
- Nose to tail crashes are most common, driver inattention and congestion are the major contributing factors
- Crash type was dependant on location:
  - More lane change crashes near ramps,
  - More loss of control crashes on curves,
  - Loss of control crashes more common in faster lanes
- Data did not suggest any relationship between crashes and skid resistance

DATA ANALYSIS - SOUTHBOUND



SOUTHBOUND GIS SCREENSHOT



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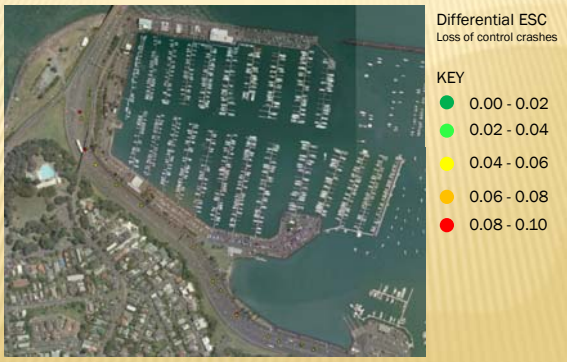

CONCLUSIONS - SOUTHBOUND

- Crash rate in lane 3 significantly higher than other lanes
- Crash rate in lane 1 is extrapolated due to lane under utilisation
- Mainly nose to tail type crashes
- There is a possible trend between loss of control type crashes and skid resistance
- Nose to tail and lane change type are usually caused by driver inattention/error

LINEAR GIS VS SPATIAL GIS

Existing CAS system (Vector)

GIS lane by lane system (Raster)

LINEAR GIS VS SPATIAL GIS

FEASIBILITY OF A SPATIAL GIS

Positive

- Aids visualisation of crash patterns
- Aids visualisation of RAMM data such as skid resistance
- Excellent for multilane roads and intersections

Negative

- Implementation can be costly and time consuming
- Accuracy of input data is crucial
- Does not offer any additional benefits for single lane roads

RECOMMENDATIONS

- Accuracy and completeness of data is important.
  - Traffic crash reports and CAS data entry
  - RAMM skid resistance data
  - RAMM geometry data
  - Traffic flow data
- All data collected must be accurately referenced to coordinates.
- This is better suited to raster GIS system rather than vector a system like CAS
- Greater accuracy from police is required to locate crash origin

ANY QUESTIONS?