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A Study of Bicycle Signal Compliance Employing Video Footage

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A Study of Bicycle Signal Compliance Employing Video Footage

Institute of Transportation Engineers – Western District Annual Meeting
Session 7A: Planning and Modeling Our Communities
Tuesday, July 16th

Presenter:

Sam R. Thompson, E.I.T

Graduate Research Assistant

Portland State University

Civil & Environmental Engineering



Data Collection

- Two data sources:
 - City of Portland
 - Archived from previous research
 - 3 intersections
 - Portland
 - Bicycle-specific Signals
 - Portland State
 - Project-specific
 - 4 intersections
 - Varying intersection characteristics/locations



City of Portland Footage



PSU Camera Setup



PSU Study-Specific Footage

Data Reduction

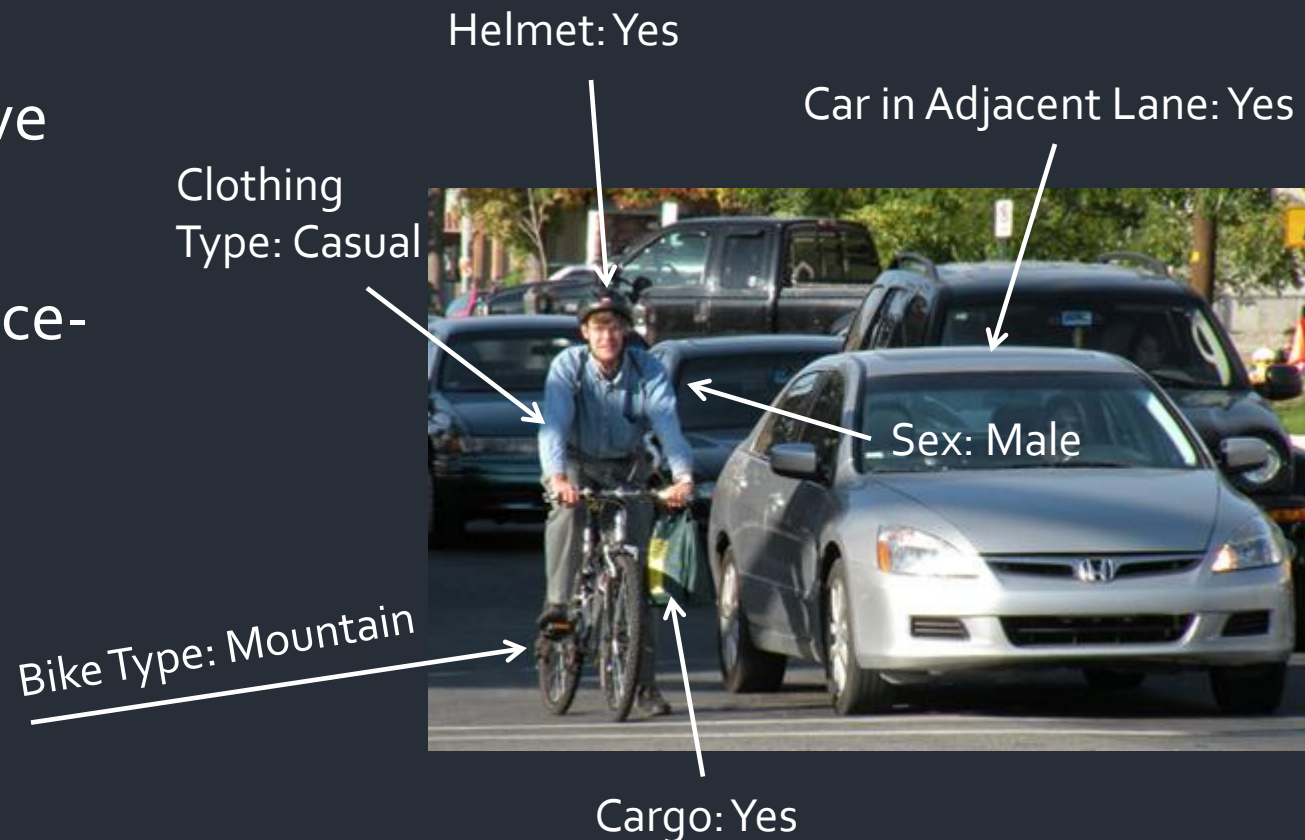
- Cyclists were eligible to become part of the study if they were observed to:
 - Arrive on the red indication
 - Utilize bicycle infrastructure (and bicycle signal where applicable) on both sides of the intersection



Data Reduction

- Three types of data collected:

- Descriptive
- Event
- Compliance-specific



Compliance Indicators

- Compliant
- Non-compliant
 1. Illegal right turn on red (RTOR)
 2. Gap Accepted
 3. Signal Jump

Compliance Indicators

Illegal Right Turn on Red: RTOR



Compliance Indicators

Gap Accepted



Compliance Indicators

Signal Jump

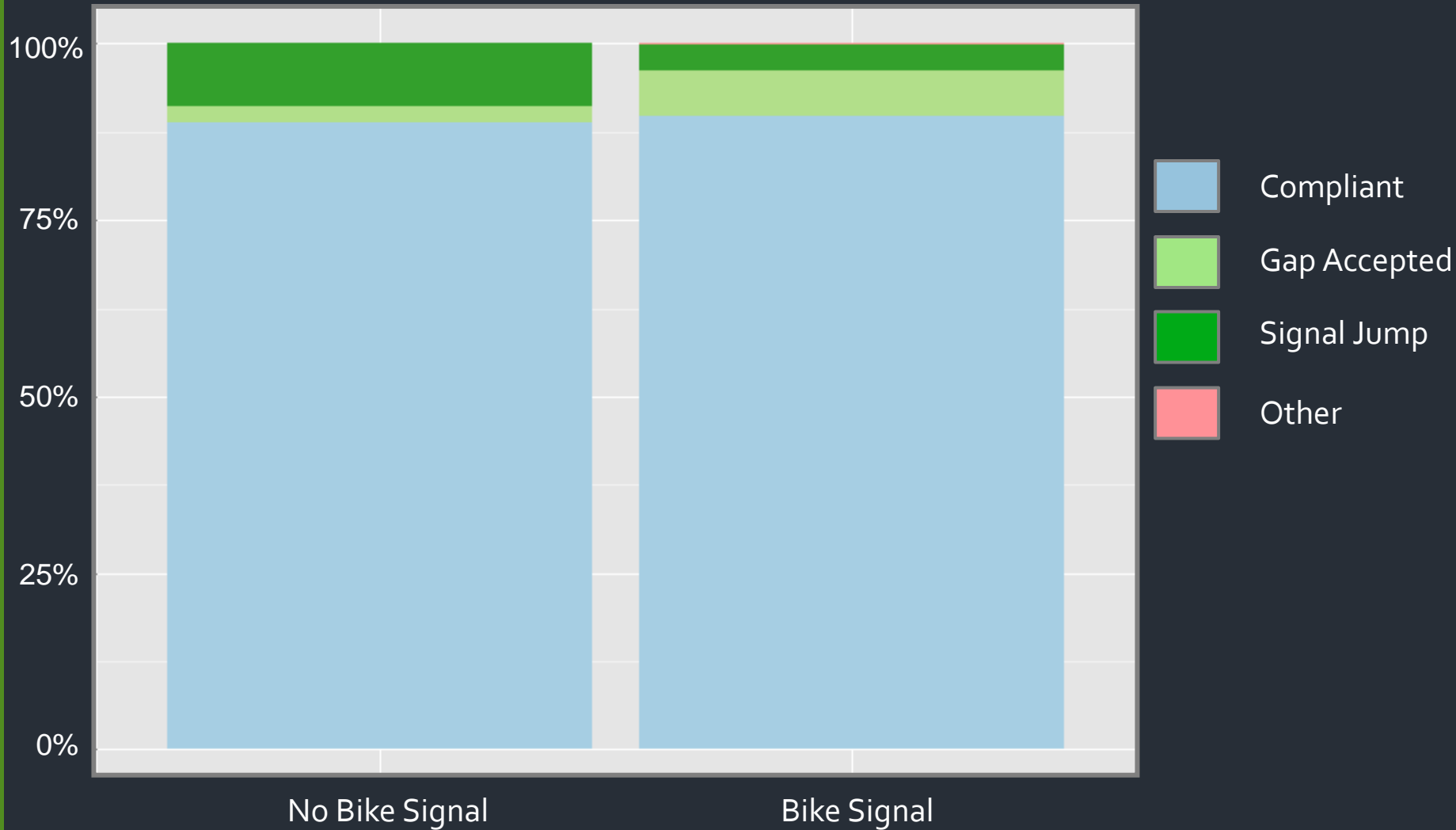


Results

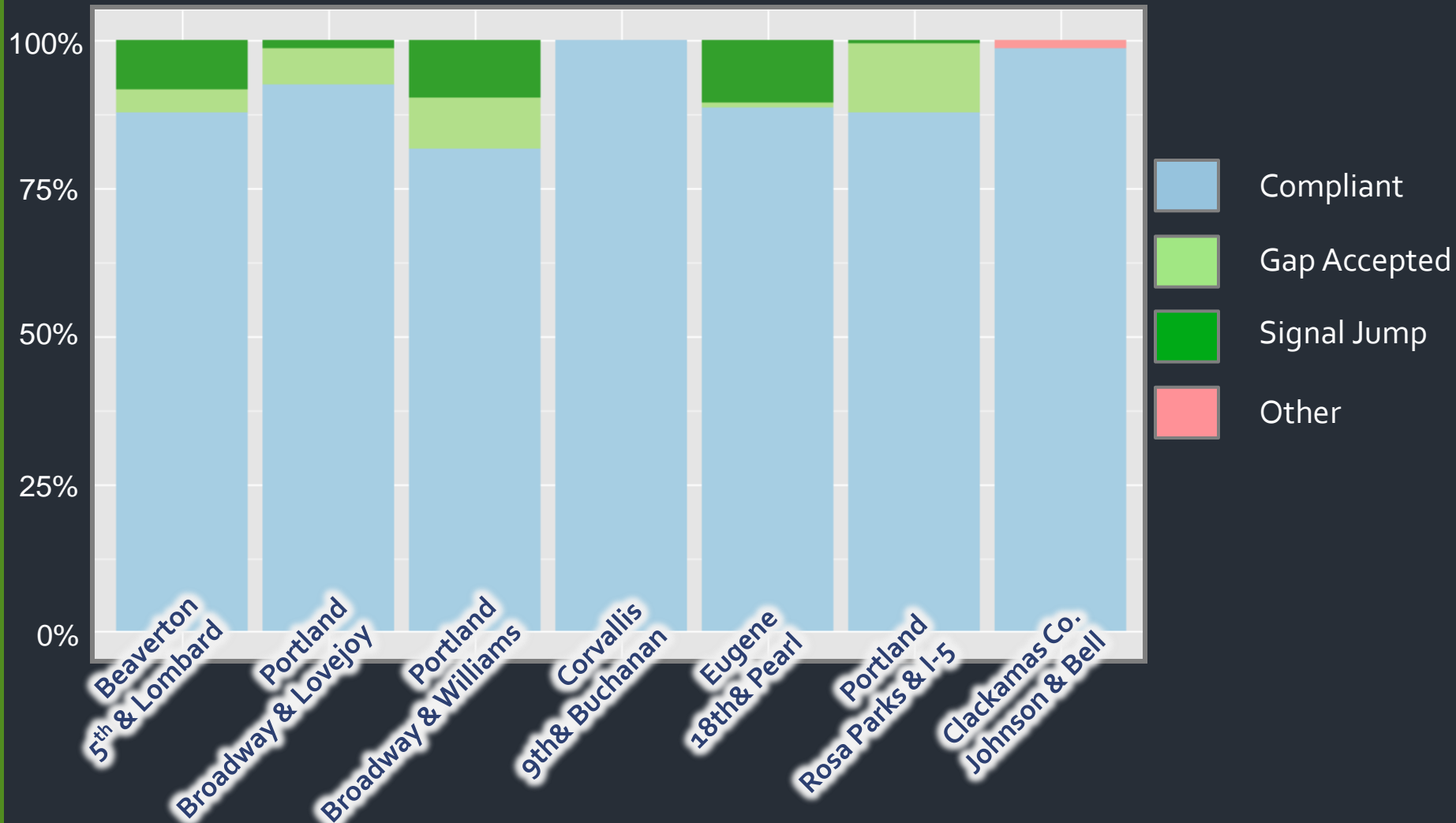
- Total of 2,617 cyclists
- Initial Compliance Rate of 69.1%
- Compliance Rate excluding RTOR: 89.7%

Compliance Indicator	Percent	Number of Observations
Compliant	89.7	1809
Gap Accepted	5.9	118
Signal Jump	4.3	87
Other	0.1	3

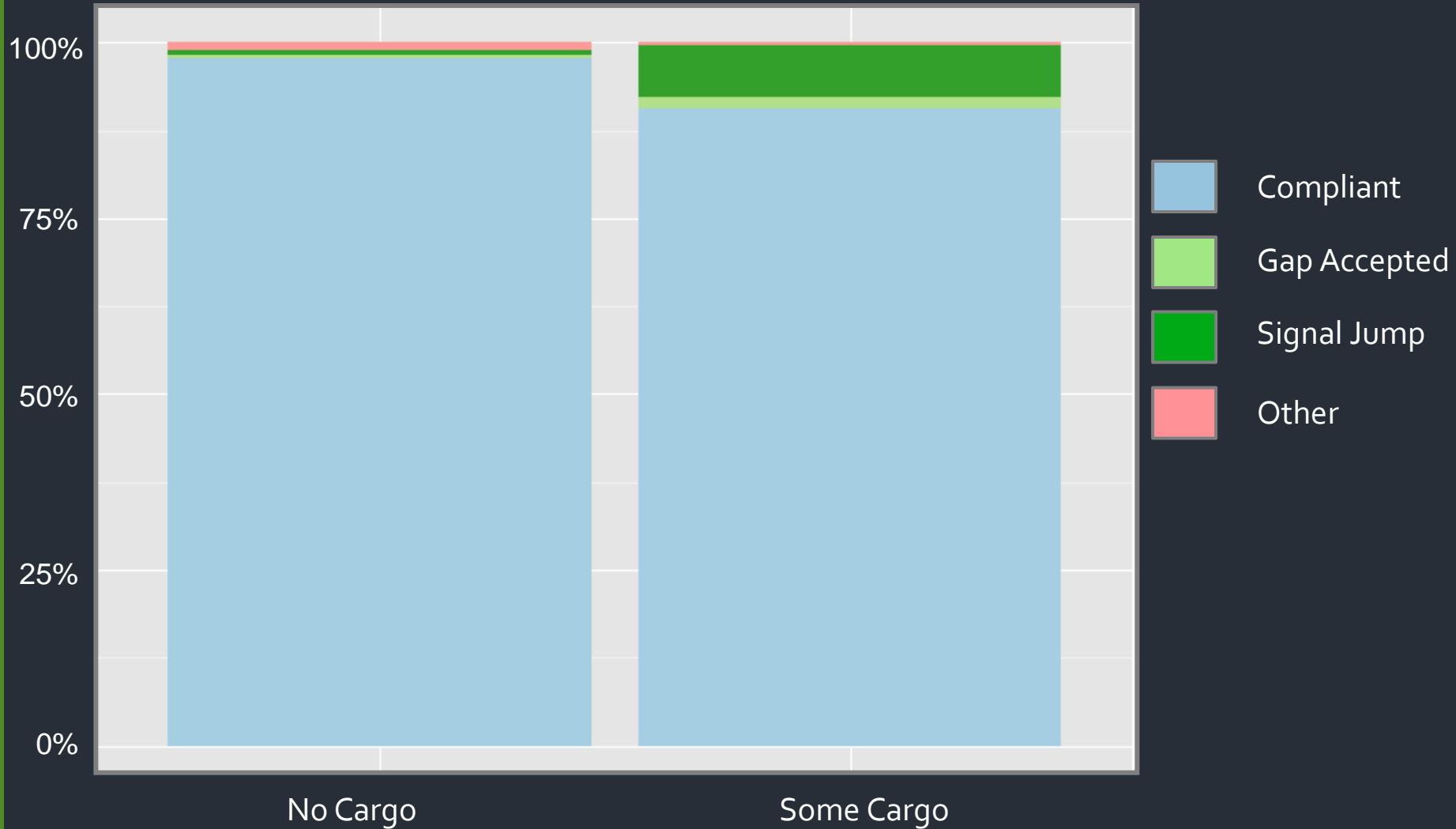
Compliance at Bike-Specific Signals



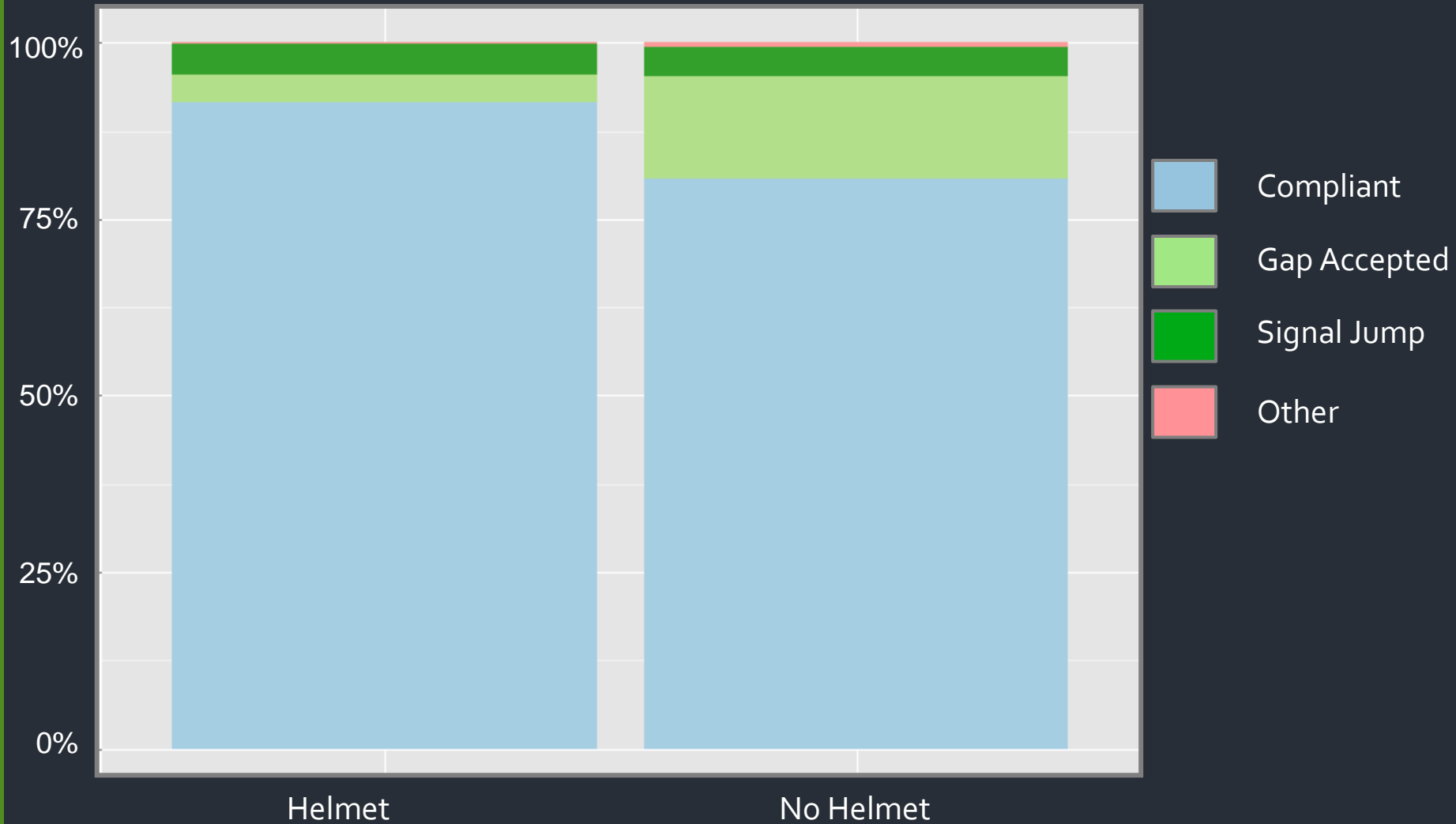
Compliance per Location



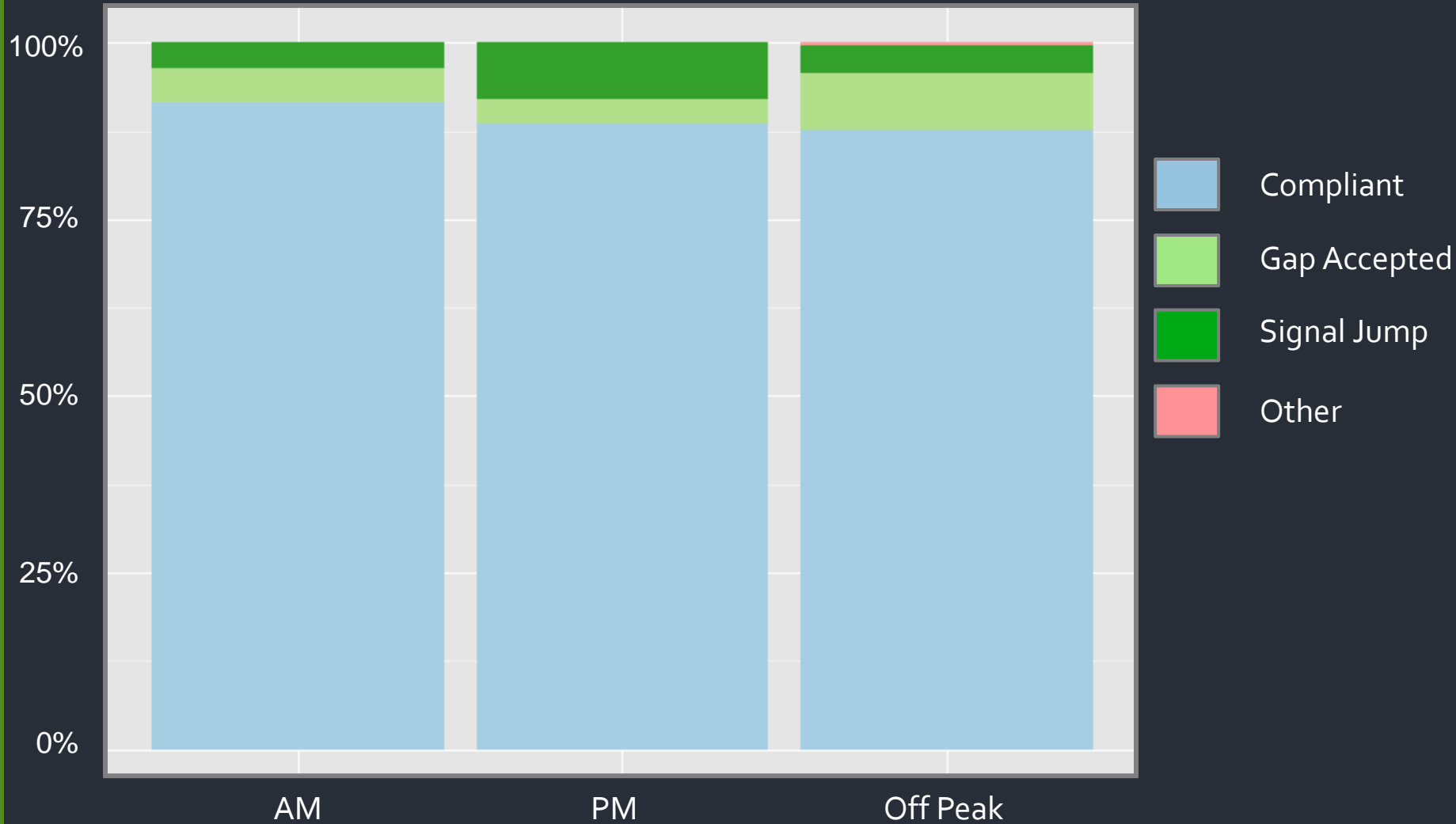
Compliance by Presence of Cargo



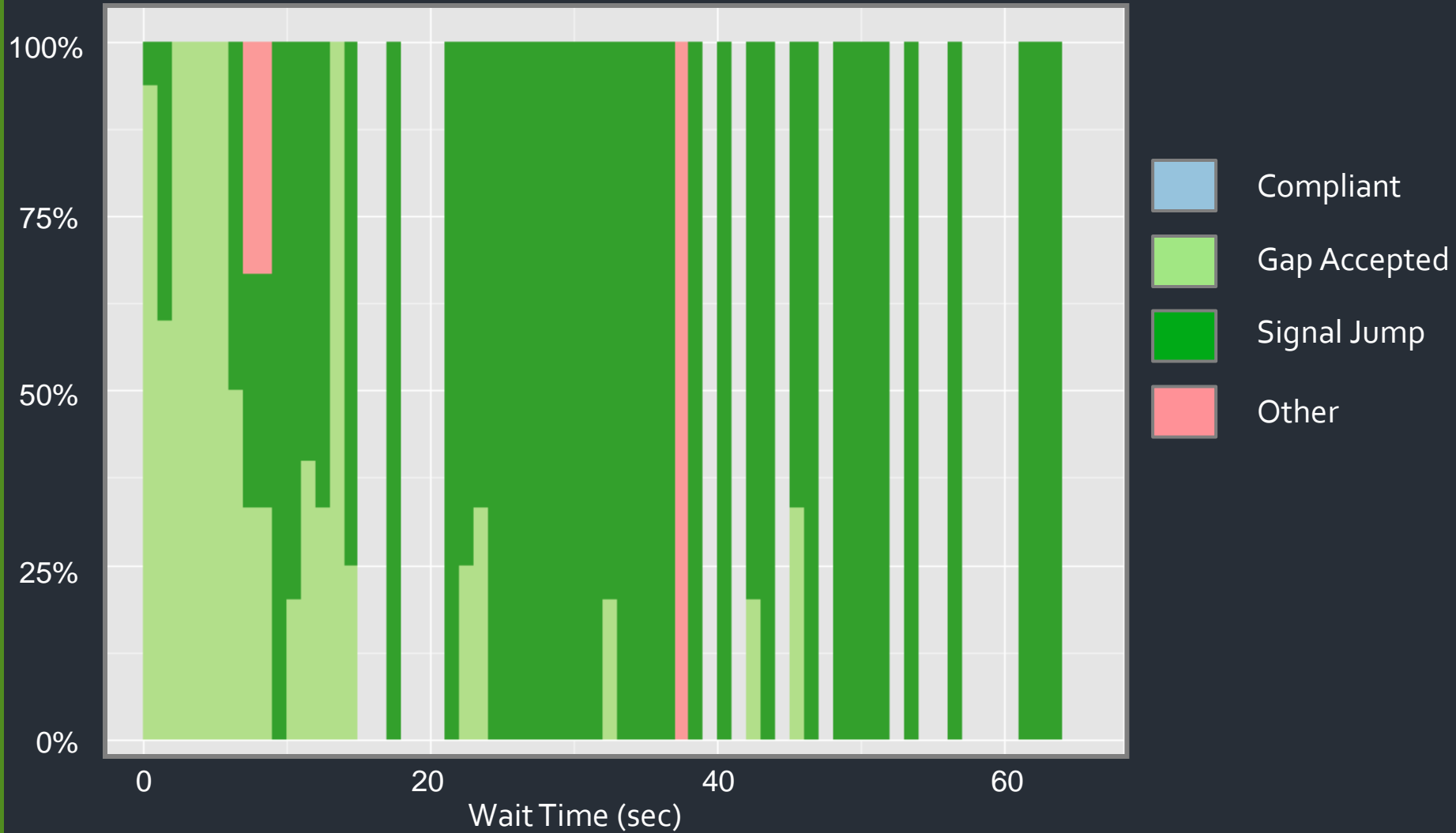
Compliance by Helmet Use



Compliance by Peak Period



Compliance by Wait Time



Introduction

Methodology

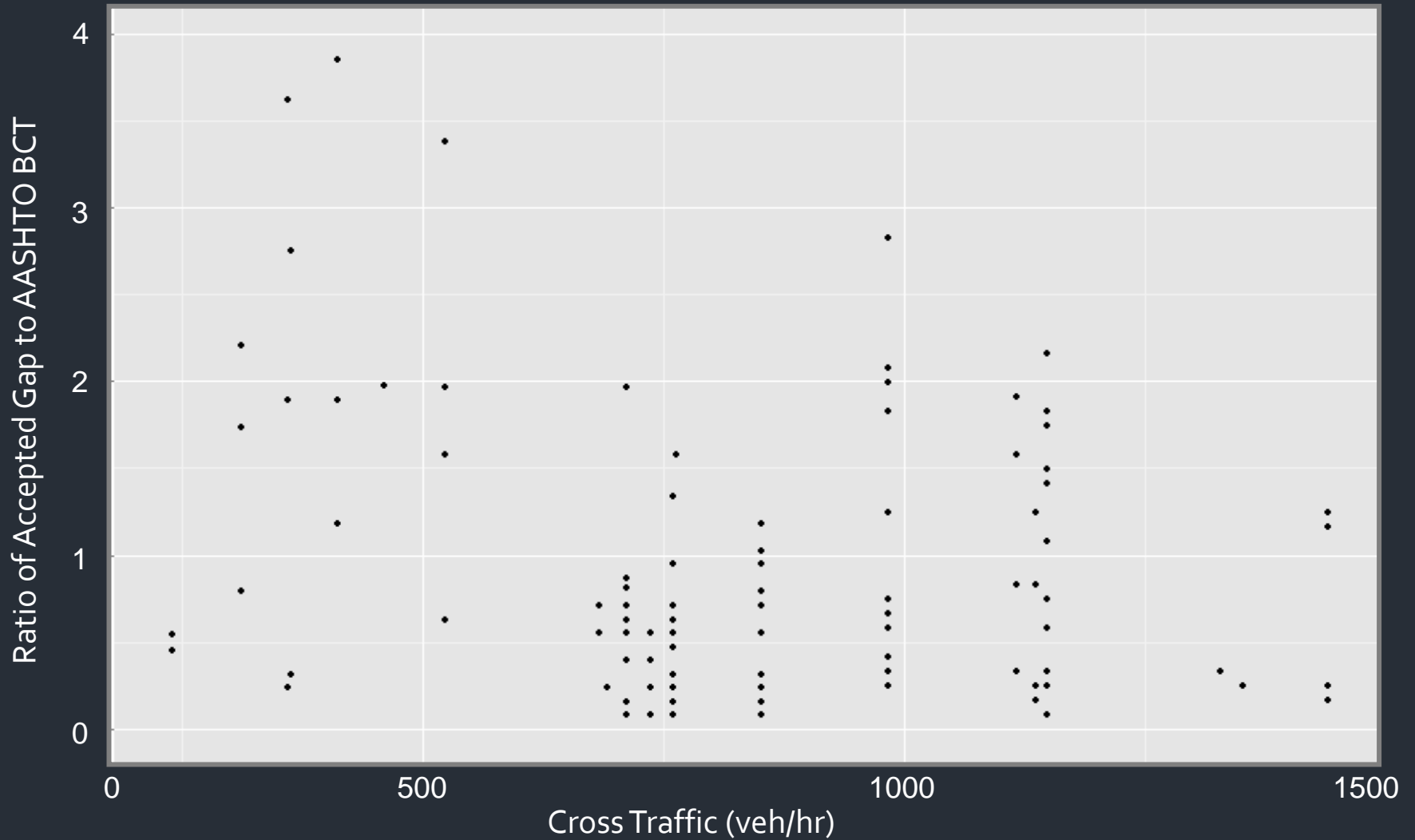
Results

Discussion

Conclusions

Acknowledgements

Gap Accepted by Cross Traffic



Comparison to Other Modes

- Motorists do not come to a complete stop before completing a right turn 56.9% of the time¹.
 - Cyclists in this study committed RTOR violations at a rate of 23%.
- The average non-compliance rate for pedestrians is 15.8%².
 - Cyclists in this study had combined violation rate for signal jumps and accepted gaps of 7.8%
- Motorists were found to run red indications at a rate of 1.3%³.
 - Cyclists in this study accepted gaps at a rate of 4.5%.

Conclusions

- Compliance at bicycle-specific signals is comparable to compliance at traditional signals
- Observed compliance nearly 90% excluding RTOR
- Risk-taking profile for non-compliant cyclists
 - More likely to not wear a helmet
 - Not influenced by wait time
 - Minimum gap accepted equal to or less than minimum crossing time (determined by AASHTO) for high volume intersections.

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- Dr. Christopher Monsere, Dr. Miguel Figliozzi, Kirk Paulsen



Questions?

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Find interim report, TRB papers, and presentations at
<http://bit.ly/SxRrZd>

References for Discussion

1. Zeeger, C. V., & Cynecki, M. J. (1985). Determination of Motorist Violations and Pedestrian-related Countermeasures Related to Right-Turn-On-Red. *Transportation Research Record: Journal of the Transportation Research Board*, (1010), 16–28.
2. Virkler, M. R. (1998). Pedestrian Compliance Effects on Signal Delay. *Transportation Research Record: Journal of the Transportation Research Board*, (1636), 88–91.
3. Retting, R. A., Williams, A. F., Farmer, C. M., & Feldman, A. F. (1999). Evaluation of Red Light Camera Enforcement in Oxnard, California. *Accident Prevention & Analysis*, 31, 169–174.