



The Effects of Motor Vehicle Fleet Daytime Running Lights (DRLs) on Motorcycle Conspicuity

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**HONDA/NHTSA RESEARCH STAFFS MEETING
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Introduction

- Motorcycles are often involved in crashes in which the other driver turns left in the motorcycle's path
- Two hypotheses for this crash configuration: poor motorcycle conspicuity, and poor speed-spacing judgment of other drivers
 - **Speed-spacing judgment: driver's accuracy at estimating closing rate of approaching vehicle**
 - **Conspicuity: "...the degree to which an object can be distinguished from an environmental display, that is its visual prominence due to its physical characteristics¹"**

1. Hancock, P.A., Wulf, G., Fasnacht, P., and Rahimi, M. (1991). Investigations into vehicle conspicuity: Car-driver behavior during differing driving maneuvers. *Accident Analysis and Prevention*, 22(3), 274-282.

Introduction

- This study included two evaluations of several types of motorcycle DRLs:
 - **Participant's judgments of last safe distance to turn left in front of an oncoming motorcycle on a test track**
 - **Gap size of unalerted driver's left turn in front of test motorcycle under different levels of fleet DRL use**

Test Track Evaluation

- Speed-spacing Judgment
- Goal: To investigate how conspicuity treatments affect drivers' perceptions of last safe gap to turn left in front of an oncoming motorcycle
- Test Set-up
 - **Test track: over 275 m of straight roadway**
 - **Twenty-five subjects, none were motorcycle riders**
 - **Subjects sat in stationary vehicle, pressed button at “last safe gap.” Subjects also subjectively ranked treatment conspicuity**

Test Track Evaluation



Test Track Evaluation

- Results: Gap Distance and Subjective Ranking

DRL Treatment	Distance (m)	Ranking
Reference Car	95.0*	1 st
Driving Lights with Lower Beam	84.4	2 nd
Lower Beam	83.9	7 th
Reduced Intensity Upper Beam	83.7	3 rd
Fork Lights with Lower Beam	81.4	8 th
Dual Lower Beams	81.4	4 th
Enhanced Parking Lamps with Lower Beam	81.2	5 th
Modulating Lower Beam	79.1*	6 th

Test Track Evaluation

- Results: no motorcycle treatment(s) was clearly better than others
 - It is expected that some of the treatments could be enhanced to show greater performance, e.g., brighter fork lights
- The following treatments were selected for on-road study based on practical considerations:
 - **Modulating Lower Beam**
 - **Driving Lights**
 - **Reduced Intensity Upper Beam**
 - **Lower Beam (baseline)**

On-road Evaluation



Lower Beam
(baseline)



Modulating
Lower Beam



Reduced
Intensity Upper
Beam



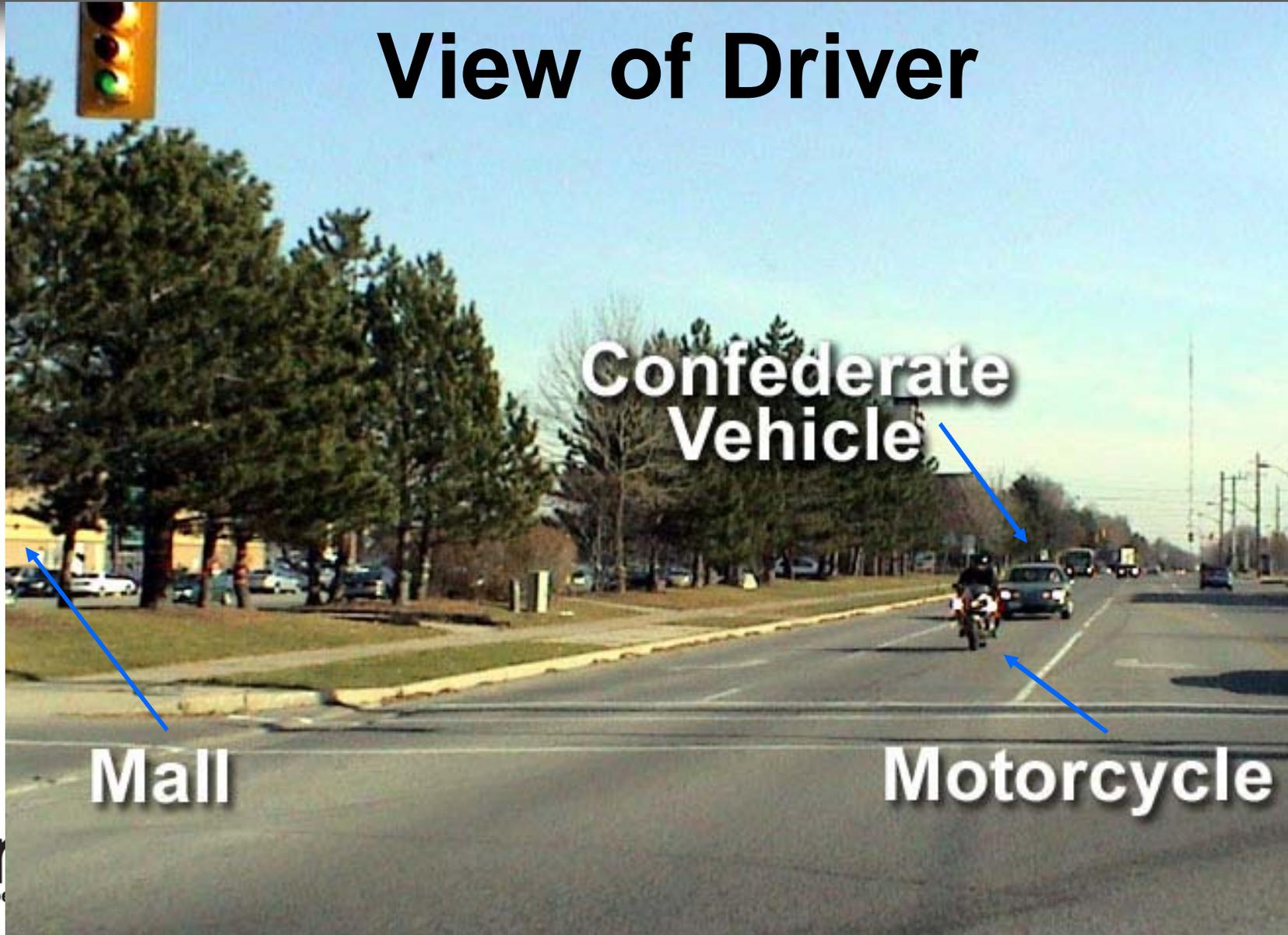
Driving Lights
with Single
Lower Beam

On-road Evaluation

- Goals: To determine whether the level of fleet DRL use affects motorcycle conspicuity, which treatments are most effective at each level
- Methodology
 - **Dual approach: measure gap spacing for unalerted drivers turning left across path of test motorcycle, then interview observed drivers**
 - 438 drivers in US, 448 drivers in Canada
 - Also recorded gap afforded to passenger fleet (baseline)
 - **Tests performed in US site (Buffalo, NY) and Canadian site (London, ON)**
 - Control background for turn with confederate vehicle (DRL, no DRL)

On-road Evaluation

View of Driver



On-road Evaluation

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Current Status

- We are currently conducting additional analyses of the data
- The full report will be available on the NHTSA website early 2006