

EFFECTIVENESS OF THE PEDESTRIAN DETECTION STRATEGIES AND PAVEMENT MARKINGS: A DRIVING SIMULATOR STUDY

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Introduction

- Pedestrians are the most vulnerable group in the traffic and accounts for 40,000 deaths each year
- One of the reasons of these crashes is that drivers do not usually yield for pedestrians
- Pedestrians' illegal mid-block crossing behavior is usually observed in the state of Qatar^[1]
- In case of high-speed uncontrolled crosswalks, this problem becomes more serious



High-speed uncontrolled crosswalk in the city of Doha

Objectives

- To investigate the effectiveness of detection based strategies at midblock marked crosswalks

Apparatus

Driving simulator at QTTSC was used



- 135° horizontal view
- 5760 x 1080 pixels resolution

Participants

67 participants with a valid Qatari driving license

- 51 Male vs 16 Female
- 32 Arab vs 35 non-Arab
- Mean age: 28.93 (SD: 7.3)
- Mean experience: 8.61 (SD: 6.3)

[1] Shaaban, K., Muley, D., & Mohammed, A. (2018). Analysis of illegal pedestrian crossing behavior on a major divided arterial road. Transportation Research Part F: Traffic Psychology and Behaviour, 54, 124-137. doi:https://doi.org/10.1016/j.trf.2018.01.012

BACKGROUND

Main findings

Measure	Control	Markings	VMS	LED
1. Yielding rates	88.7%	91%	98.4%	98.4%
2. Conflicts	Higher number of serious/slight conflicts		Serious/slight conflicts reduced	
3. Speed	Higher speed		Early speed reduction	

Best Performance
LED & VMS

Recommendations

- LED and VMS are recommended as a potentially effective treatments to improve safety at uncontrolled crosswalks
 - By improving yielding rates
 - By reducing vehicle-pedestrian conflicts
 - By motivating drivers to reduce their speed

CONCLUSION

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STUDY DESIGN

4 scenarios

1 Control

- Typical stop/yield controlled crosswalk in Doha City
- Untreated – only with the default static signs

2 Pavement markings

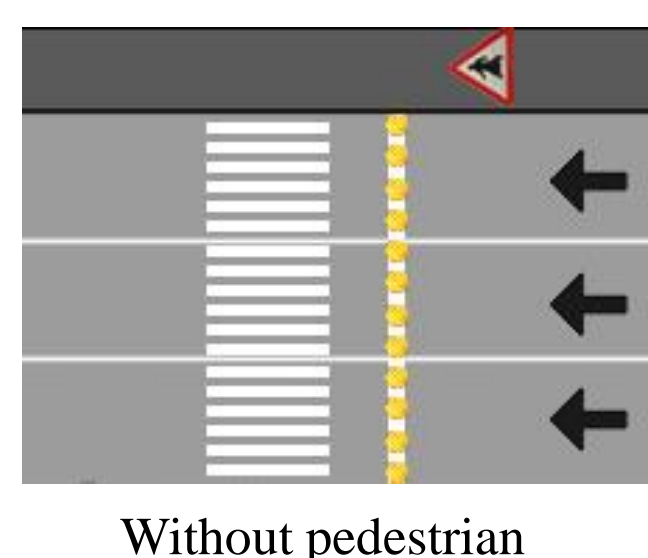
- Pedestrian encircled pavement markings
- Three times on each lane with 30 m of spacing



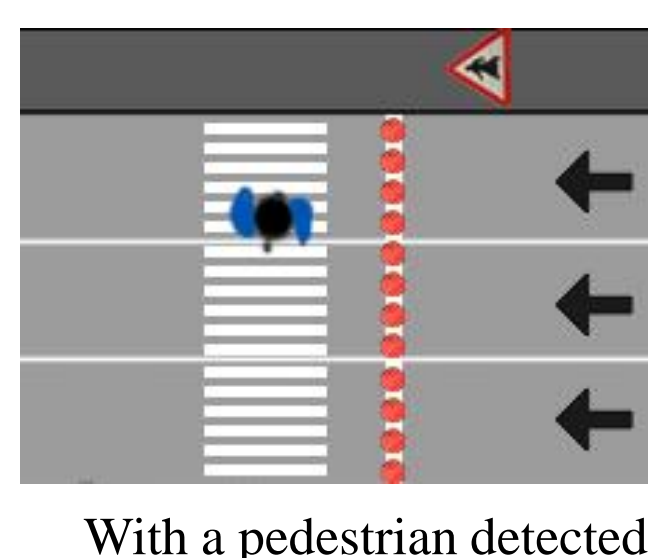
Condition with pavement markings

3 LED lights

- Flashing yellow LED lights in case of no pedestrian
- Flashing red LED lights upon the pedestrian detection



Without pedestrian



With a pedestrian detected

4 Variable message sign

- LOW DOWN message in case of no pedestrian
- Change to STOP message with animations upon the pedestrian detection



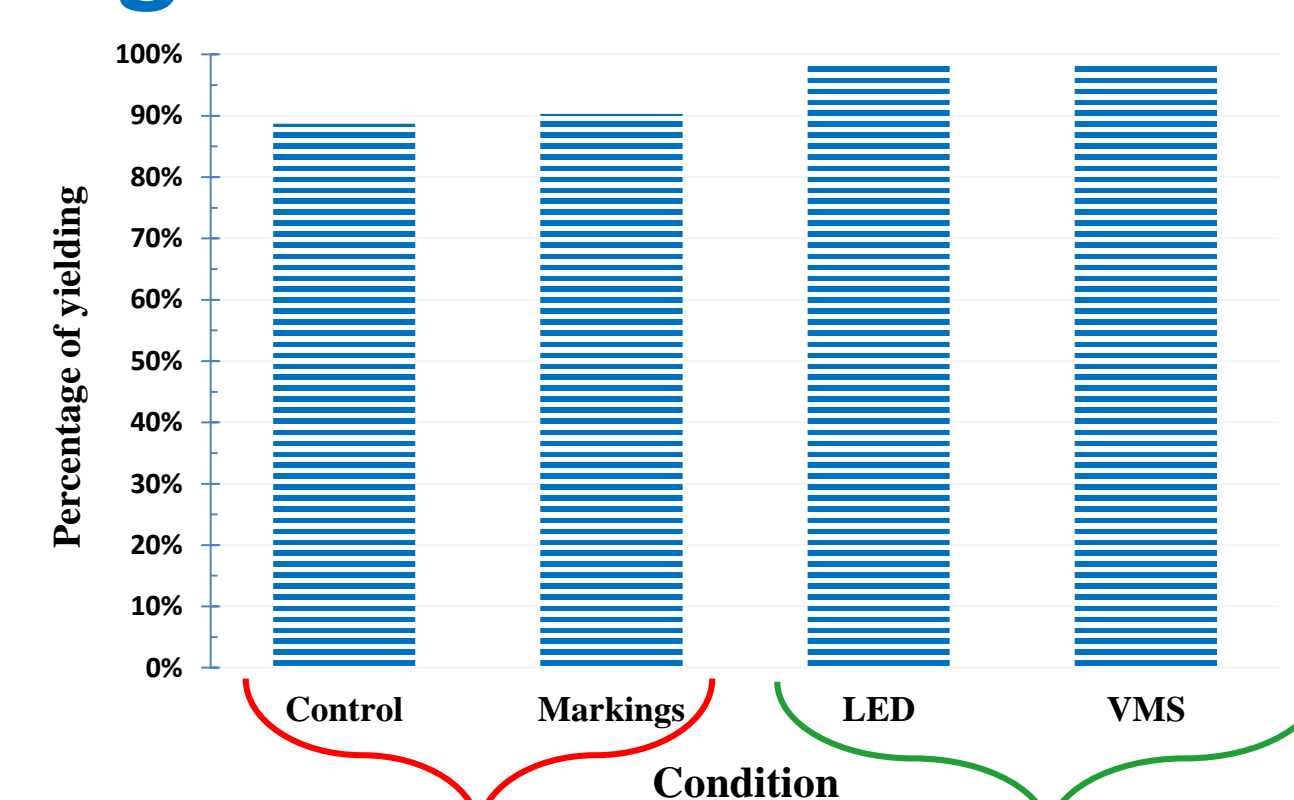
Without pedestrian



With a pedestrian detected

RESULTS

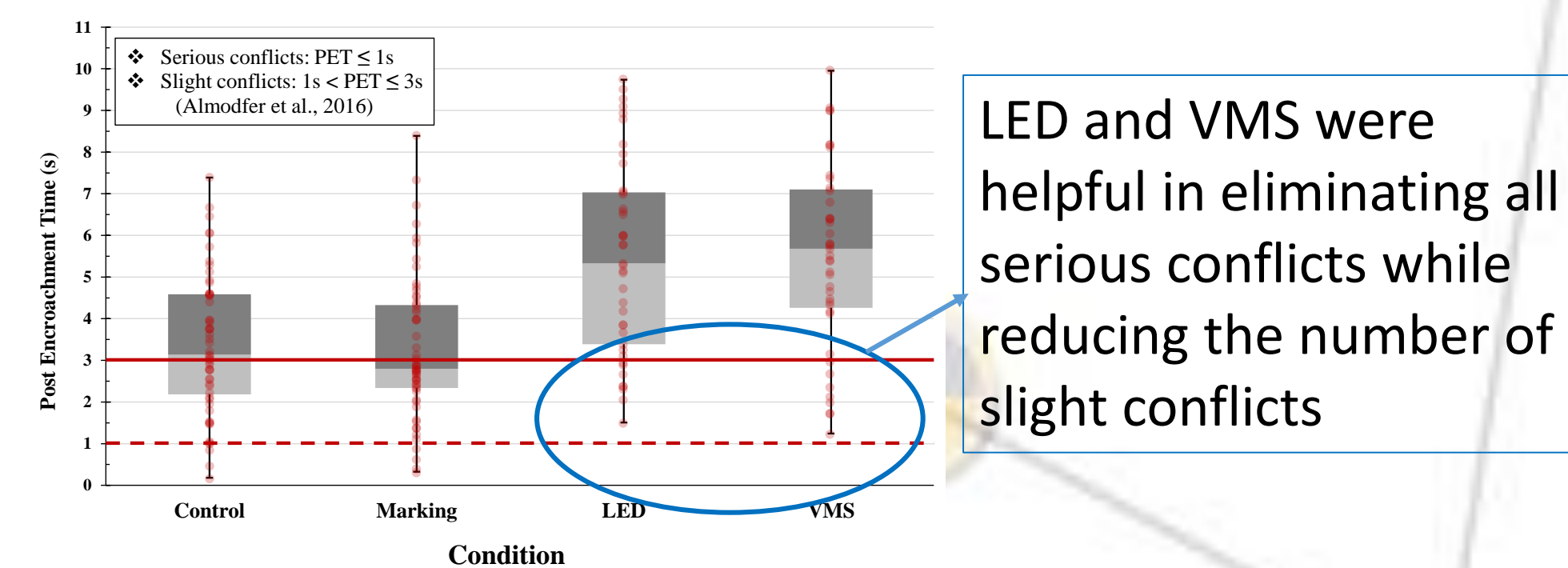
Yielding rates



Significantly lower yielding rates of 88.7% and 91%

98.4% drivers yielded in LED and VMS conditions

Vehicle-pedestrian conflicts



Mean speed

