

Study on the impact of signal head locations on drivers' behavior at signalized intersections

交差点の設計と信号制御に関する研究 ～信号灯器位置が車両挙動に与える影響～

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1. Introduction of signal head locations at signalized intersections

- One of the most important aspects of intersection design is signal head locations. However, its impact on drivers' behaviors is not fully understood due to research conditions complexity.
- The purpose of the research is to understand the nature of drivers' behavior due to signal head locations based on comparison of near-side and far-side designs as well as to correlate the results to safety, capacity and ergonomics perspectives.

Typical two types of signal head locations

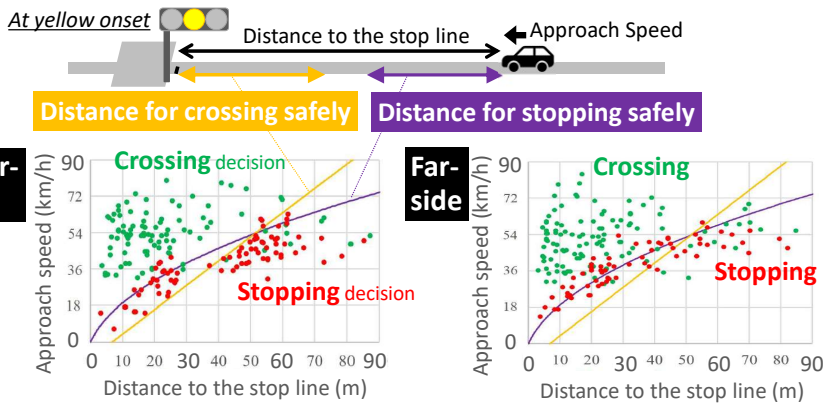


Research activities:

- Empirical analysis using the data collected in Tashkent, Uzbekistan (introduced in this poster)
- Relative geometrical comparison analysis based on international signal placement experience

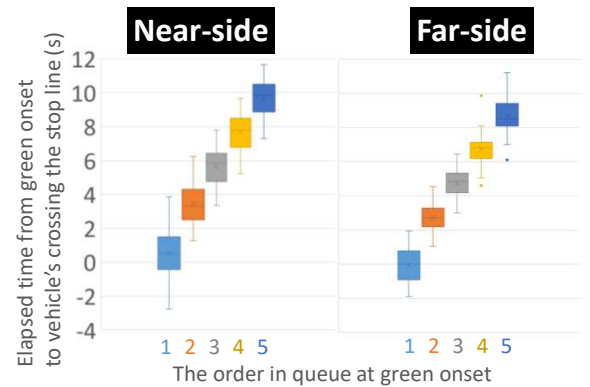
2. Yellow onset stopping and crossing behavior

- The yellow light dilemma zone analysis display that far more drivers tend to stop at the intersection being closer to the stop bar with relatively high speed in case of far side traffic lights design.



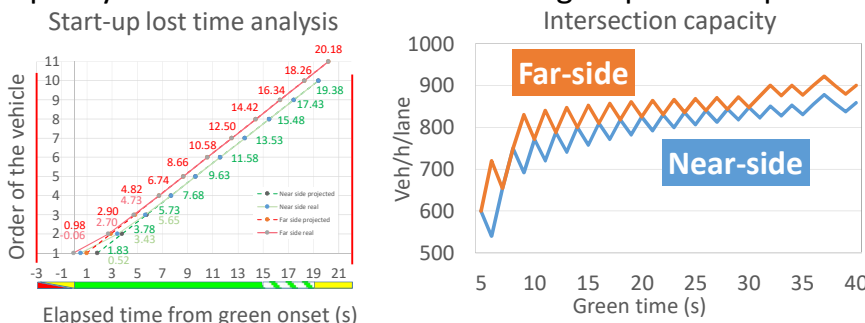
3. Start-up behaviour

Considering the distribution of 1st to 5th vehicle headways, it is observed that near side drivers display later response and larger variations of headways.



4. Intersection performance

Start up lost time with the green phase of 19 sec display that lost time is higher in case of near side design where 10 and 11 vehicles able to cross the intersection within one cycle in near and far side cases accordingly. It reduces the intersection capacity for 9.9 seconds with current signal phase map.



5. Conclusion

Far-side signal head locations

- Complexity in stop line detection
- Display improper decision behavior to stop at intersection being at higher speed and closer to stop line

Near-side signal head locations

- May lead to high start up lost time
- Countermeasures are needed because of the decrease of visibility at stop line
- Display less red-light crossings.