

Intersection Design and Traffic Signal Control - Impact of location of traffic lights on drivers' behavior

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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Location of traffic lights in Japan

One of the most important aspects of intersection design is signal placement. In Japan, primary traffic lights are located overhead on far-side. However, such an approach displays some constraints in comparison with near-side signal location.

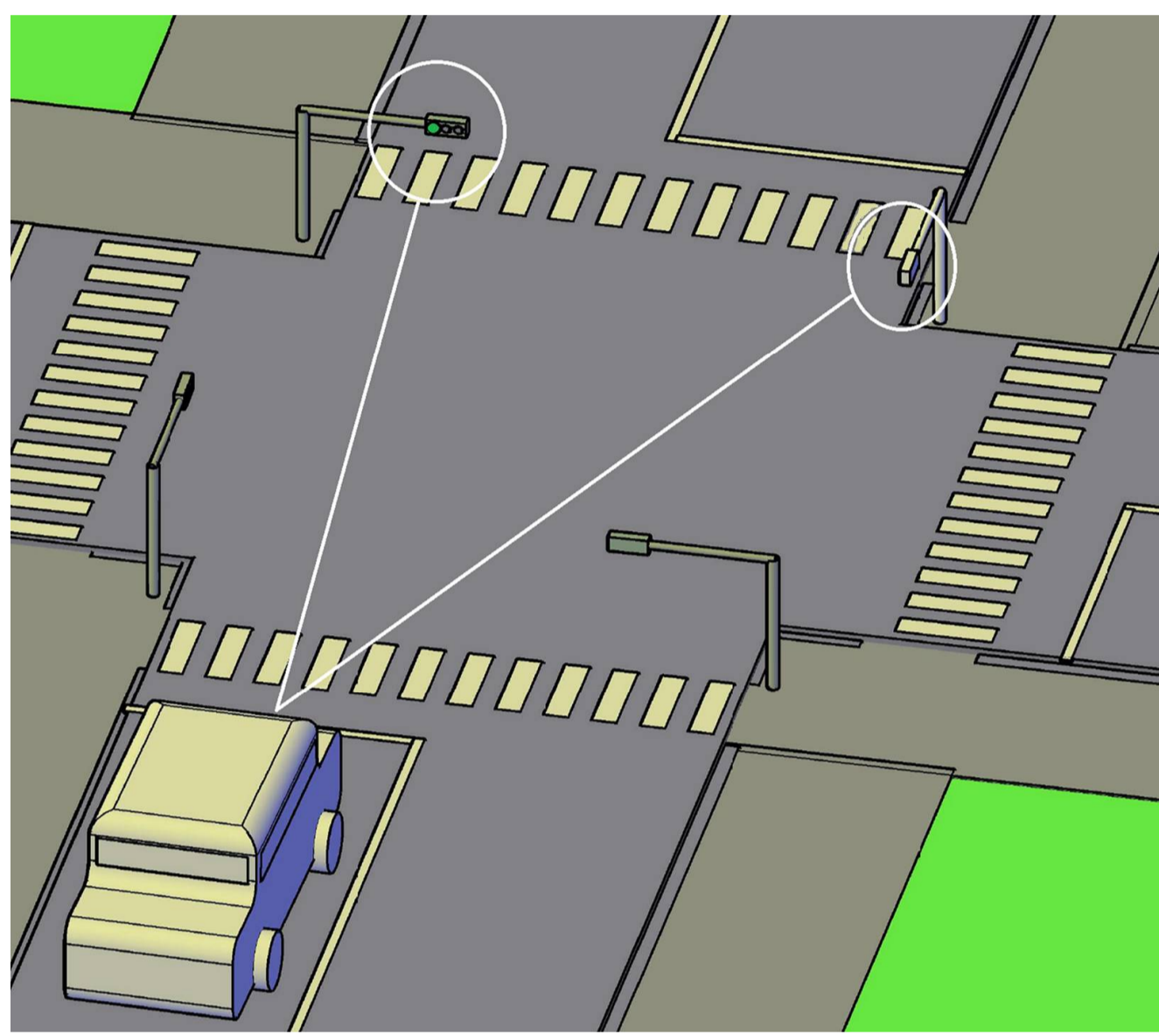


Figure 1. Far-side traffic lights

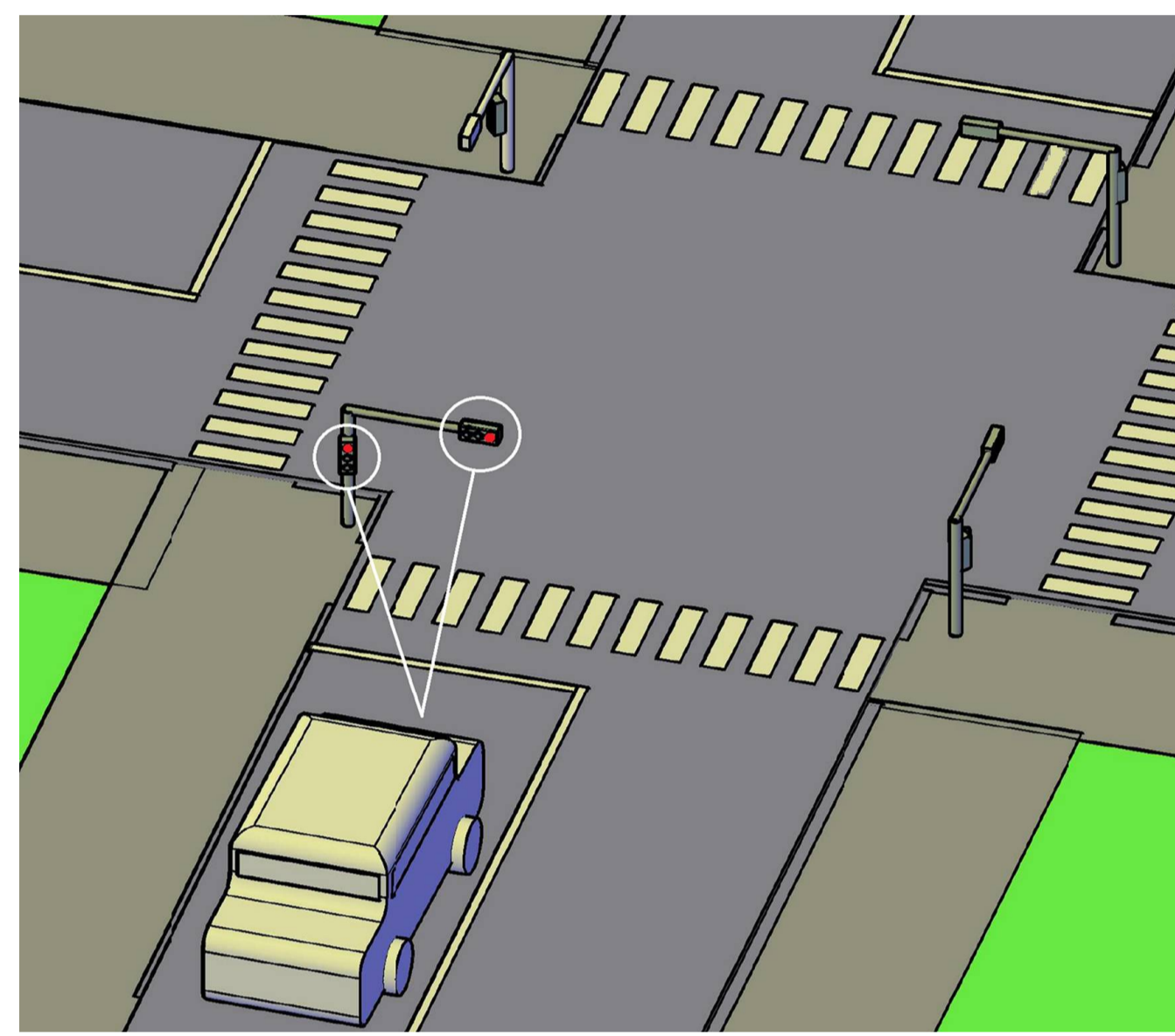


Figure 2. Near-side traffic lights

Far-side traffic lights

- May mislead right-turners in different phase duration of opposing traffic
- Complexity in stop line detection

Near-side traffic lights

- May lead to start up lost time
- Signal visibility decrease in close distance to intersection

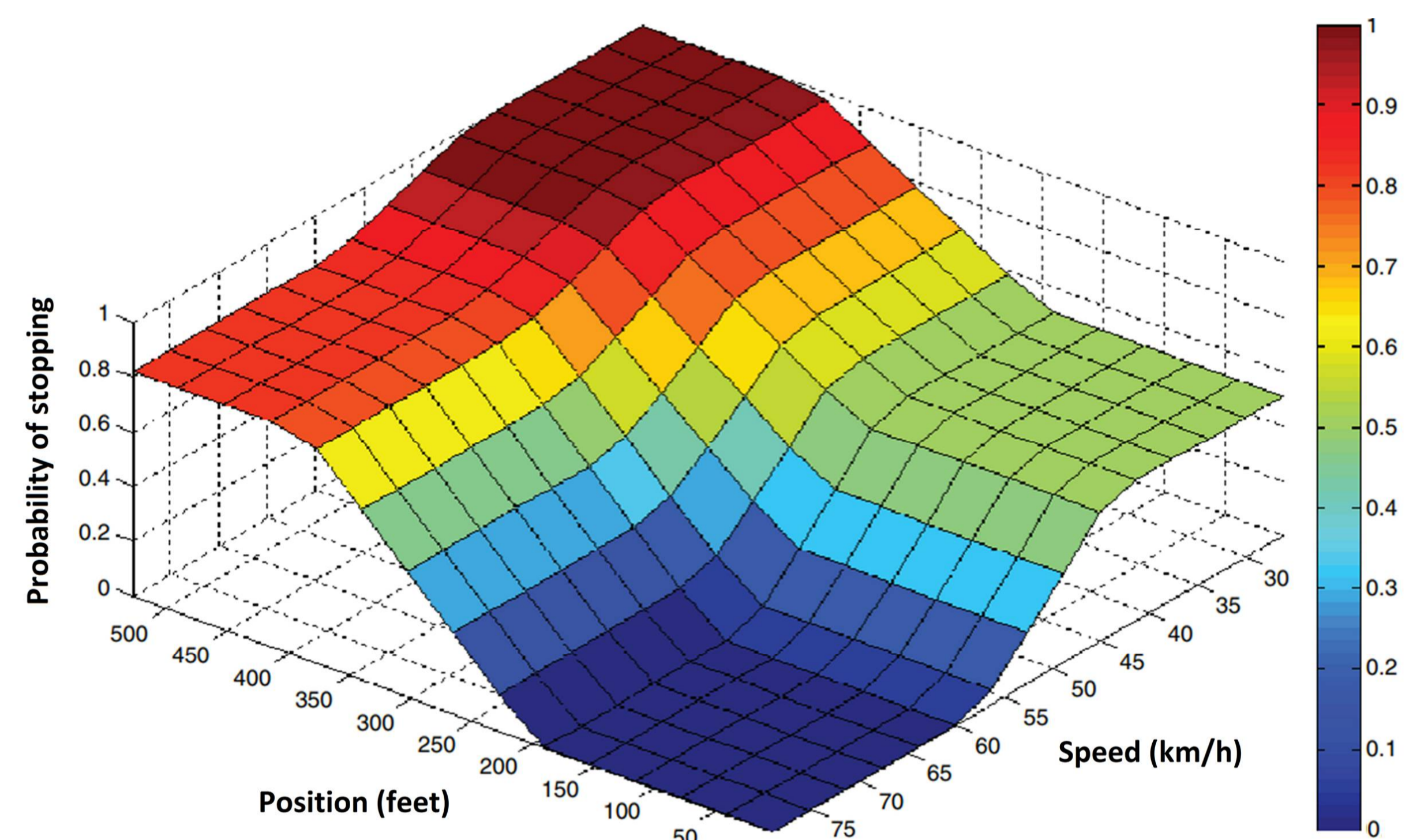
Motivation of this study

The main focus of the research will be related to an effect of traffic light location on drivers' behavior fluctuations.

Research problems:

- What is an influence of traffic light placement on safety of intersection?
- What is a relation to efficiency of intersection?
- What approach is better from ergonomics point of view?
- How does signal locating impacts on stop&go decision?

Example of drivers' behavior analysis



One of the studies of drivers' behavior analysis is stopping decision making process based on vehicle speed and distance to stop line at signalized intersection (Moore and Hurwitz, 2013).

Kashiwa Campus Experimental Field



Fully signalized intersection is located in Kashiwa Campus Experimental Field of the University of Tokyo, including both far-side and near-side overhead traffic lights. Several experiments are planned at the field intersection to evaluate a relation between traffic lights placement and drivers' behavior, reflected in vehicle speed, acceleration and deceleration rates, late yellow running and drivers' perception time.