Form 2

Dissertation Abstract

Report no.	(Course-based) No.1228	Name	RAHMAN ABDUR
Dissertation title	**Mechanism underlying bicycle conspicuity, visibility and distance: A new insight into bicyclists safety** **(自転車の目立ち度・視認性・距離感に内在するメカニズム：自転車の安全性に関する新たな知見)**		

Drivers are looking on the right direction but failing to see the bicycle before any collisions though bicycle is visible. Visibility of bicycle depends on sensory conspicuity, brightness of color and sizes of rear-end components. Dynamic components of bicycle such as tire and pedals generate the dynamic signal as self-signal of presence that may enhance on the improvements of perception of drivers towards bicyclists. Previous researchers were focused on enhance to increase the detection and recognition distance within 600 milliseconds but, a driver gets a few moments inside the saccadic masking. Late detection and recognition are a key problem for getting into collisions. So, perception time of dynamic signal is a major factor in a driver's ability for the earlier detection and recognition of a bicycle.

This study investigates how to enhance with low-cost approach, without prior concern of bicyclists, the level of visibility, sensory conspicuity, earlier detection and recognition and required perception time to detect during day-night conditions. Design a new approach as conspicuity treatment for the aiming to generate the self-signal of presence during riding that passively help to enhance on the cognitive ability and detection perception of drivers. The effectiveness of conspicuity treatments on the earlier detection and recognition at the straight-ahead and left-right turn approaches.

The experiment was conducted at a straight-ahead and left-right turn approach road for the measure of level of visibility according to Adrian's model, sensory conspicuity based on the respondents' perception of six rear-end components of bicycle. In addition, earlier detection and recognition and required perception time was measured of novelty approach as white stripes on red and other conspicuity treatments according to respondents' perception on the computer screen. The video surveillance was taken by using GoPro 6 camera (1080 p) during sunlight, twilight with and without car headlights and night with car headlights conditions. Later, the video was prepared during 250 milliseconds and 600 milliseconds exposure time for each targeted scene.

The level of visibility of rear fender is good with proper lighting conditions and it is directly affected by the brightness of color. Among the 6 rear-end components, the tire has a higher visible area with cyclic motion. Based on the results, the adhesive tape is applied for the aiming to generate the self-signal of presence and assess the mean detection distance of white stripes on red in sunlight was 138.67 m, 94.67 m in twilight without car headlights, 94 m in twilight with car headlights, and 53.67 m at night with car headlights. The detection and recognition distance are enhanced during the short perception time. In addition, the required perception time is also enhanced to reduce due to the presence of white stripes on red conspicuity treatment. All experiment supports that white stripes on red treatment itself or combination with high visibility jacket is most effective on the

earlier detection and recognition during day-night conditions.

White stripes on red treatment create the self-signal of presence that enhance to improve the perception of drivers towards bicyclists and thereby reducing the likelihood of drivers looking but failing to see bicycles on time. In sum, the study recommends that bicyclists install white stripes overlaid on red, in order to increase visibility, conspicuity, earlier detection and recognition, and minimum required perception time and thereby reducing the likelihood of cyclist-vehicle collisions. It is highly recommended that white stripes on red itself or combination with high visibility jacket be used to create a cost-effective self-signaling presence on bicycles during day-night conditions.