

# Investigation on the Effects of Pathway Obstacles for the Bicycle Riders at Night: Special Emphasis on the University of Tsukuba Area

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## Motivation

The most prominent mode of transport in the university is bicycle riding. More than 80% of the university students use bicycles to fulfill their requirement of travel inside the university. Both in day and night, most of the university students in the university, use bicycles to fulfill their requirements especially, to and from lectures from the student dormitories. Most of the student's back dormitory from the university late night after the educational purposes. In this case study, pathway condition is very important because for the comfortable riding, particularly, along the main road and entering to the main road. These bicycle paths should be suitable enough for the safety of the cyclists. Therefore, pathway width and its vision clarity are an important factor to be considered to prevent accidents due to cracks bumps and natural obstacles.

## Introduction

The students of the university use the pathway mostly during early morning and late evening in and around the university. Also, their dormitories are located more than 500 m away from the lecture halls. The risk of damaged pathway influences more during nighttime specially in dark areas of the university between the lecture halls and the student's dormitories. Therefore, study on this matter is important phenomena.

## Objective

The main objective is to identify the pathway obstacles and propose possible remedies, to minimize the effects of the pathway obstacles in the university.

## Methodology

The first step of this study is to conduct the field survey to find the condition of the pathway obstacles using Survey 123 and other measuring instruments for example tape to measure the cracks. Survey 123 was used to mark the locations of the obstacles. The university map and its road map were used to do mapping process based on criteria of pathway obstacles. In this study the data were taken clockwise along the university boundary and inside university. Figure 1 shows spatial structure of the diagram according to the criteria.

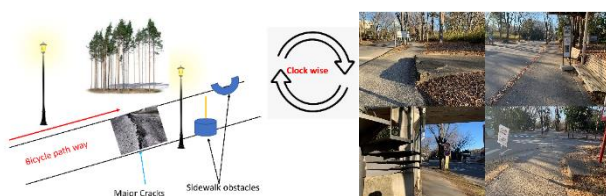


Figure. 1 Graphical illustration of the methodology

## Results and Discussion

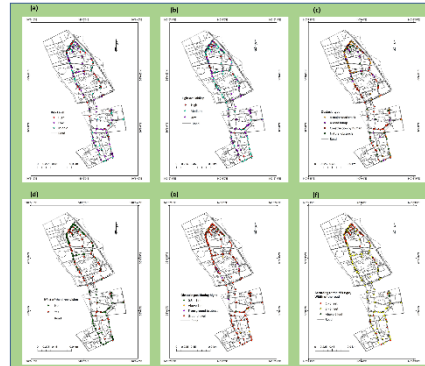


Figure. 2. (a) Risk Level; (b) Light availability; (c) Obstacle type; (d) Effect of the direct vision; (e) Obstacle positioning height.

Six criteria were selected for the study namely, roadside, obstacle type, light availability, risk level of the obstacle, according to the risk type width of the road effect of the direct vision (5 to 10m distance) and obstacle positioning height. Total number of obstacle locations identified was 182. The result of the study revealed that all the criteria selected for this study, the northern area of the university represent a considerably higher hotspot and also, Amakubo north and Amakubo south. The condition of these areas makes more critical deciduous leaves of the cedar buds and water puddles.

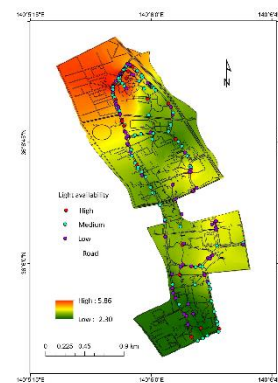


Figure.3. Pathway obstacle hot-spot map of the University of Tsukuba area.

Figure 3 shows that pathway obstacle hotspots of the university area. According to the figure north and south east regions records critical hotspot. This condition is more critical due to the plantations of autumn trees in these areas. This condition also influences. Also 34 of natural obstacles out of 182 were identified. Light availability in the northern area is low in condition especially due to the distribution of vegetation of around 2m height. Steps should be taken nighttime bicycle accidents due to bicycle path obstacles. It is better if natural obstacles be removed because these are grown quickly and can easily be removed.