

PLANNING OF SPECIAL LIGHTS FOR ROAD CROSSING SAFETY ON THE UIKA CAMPUS

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Abstract

Traffic lights for pedestrians are necessary to provide security and comfort for pedestrians and vehicle drivers in order to avoid accidents and traffic jams. During the design of the circuit, component selection analysis was performed for assembling the controller. The analysis showed that the industrial timer has the ease of setting intervals and ease of maintenance controller in the case of damage. The testing on the design showed that, after crossing demand button was pressed, the traffic lights worked well in one cycle to allow pedestrians and further provides the opportunity for passing vehicles until the crossing demand button was pressed again by a pedestrian.

Keywords: Traffic Light, Timer, Crossing Button

INTRODUCTION

People crossing on certain roads, especially in office areas and industrial areas during entry, break, and after work hours, busy shopping areas/markets in the morning, campuses facing the highway and other public places, will always be crowded with people who go back and forth to cross. This situation can cause vehicle congestion on the road, more than that there are often accidents caused by sudden road crossings so that drivers cannot avoid the crossers as often encountered in Jakarta today.

One way to reduce congestion and accidents due to people crossing at any time is to install traffic lights for crossers, waiting for vehicles to stop first before crossing the road.

The installation of traffic lights for road crossers who operate throughout the day and those who operate during the day has been carried out on several roads, but now many have been stopped from operating and replaced by flashing yellow lights, because it is considered inefficient for passing vehicles that must stop even though no one is passing to cross.

Therefore, traffic lights are needed for road crossers that are adjusted to the busyness of the crossers, so that when there are no crossers, vehicles can pass continuously.

RESEARCH METHODS

The design method that has been carried out previously, if applied directly to traffic lights for road crossers, will always provide the same opportunity for road crossers, so that crossers get continuous opportunities to cross the road. If it occurs when there are no crossers, it will interfere with the smooth flow of vehicle traffic passing through the road.

Overview

This article is a follow-up research by the author in designing a system for crossing light control, which is a development of a general discussion of design methods with various components at various intersections and using microcontrollers so that they have traffic lights that indicate time on each road section. As for these two previous articles, the author did not discuss the need for road crossers.

Design Methodology

In general, the way traffic lights work is a sequence of times that will repeat continuously, resulting in red, yellow and green lights that will be turned on repeatedly. In the case of traffic lights crossing the road, if this continuous recurring condition is applied, it will make the vehicle stop periodically even though no one is crossing. Therefore, to increase the use of the road so that vehicles can continue to pass if no one crosses, the cycle of turning on traffic lights must be stopped so that the green light for vehicles continues to be on. The cycle will start if there are people who will cross the road and during the busy making of a prototype with many crossers, then the cycle of turning on traffic lights will be continuously repeated. To guarantee that the traffic lights are continuously turned on repeatedly as long as there are crossers, it can be done by using detectors to detect the presence / absence of people who will cross, so that the cycle can run automatically.

The installation of detectors for people who will cross the road can be done if the roadside is not used as a place to gather by people who will not cross the road, but are around the detector.

For the situation of roads in Indonesia, especially in Jakarta and other big cities, the side of the road is usually used as a trading place or as a motorcycle taxi base. Therefore, instead of the detector of the person who will cross is replaced by the crossing request button that must be pressed by the prospective crosser, so that it can be ensured that there are people who will cross the road.

Research Framework

The preparation of this research framework is used as a reference in the implementation of research that starts from the beginning to the final results of the research to be achieved. The existence of this research framework is expected to facilitate the implementation of research and errors in carrying out research so as to achieve the expected goals. The following is a chart of the frame of reference used.

Designing Cycle Sequence of Lighting Road Crossing Traffic Lights

The cycle of the traffic light ignition sequence for road crossers can be described in the ignition time diagram as shown in Figure 1 on the following page.

In the design of the time chart of road crossing traffic lights as shown in Figure 1, it can be seen the road conditions outside the crossing cycle and the road conditions when the crossing cycle

takes place. In the state of the road outside the crossing cycle it can be seen that the green light for the vehicle is on, while the red light on the crossing is on for an indefinite period of time, when the crossing request button is pressed, then the crossing cycle begins. In the design, designed in one crossing cycle, the crossing request button does not function to increase the length of the crossing time or to ask the next cycle to run immediately after one cycle is completed. The crossing request button will serve as the crossing request button, if the keystroke is outside of the crossing cycle.

RESULTS

The results of the research on Jalan KH. Sholeh Iskandar

Data was obtained on the number of vehicles passing and also how many people crossed on Jalan KH. Sholeh Iskandar from every hour.



Image. Research location

Vehicle Type	
Kend. Ringan (LV)	1.595
Motorcycle (MC)	3.176
Kend Berat (HV)	25

Vehicle Volume Table

Number of People Crossing	
08.00 - 09.00	15
12.00 - 13.00	11
16.00 - 17.00	18

Designing Cycle Sequence of Lighting Road Crossing Traffic Lights

The cycle of the traffic light switching sequence for road crossers can be described in the ignition time diagram on the following page.

In the design of the time diagram of the traffic lights of road crossings, it can be seen that the road conditions outside the crossing cycle and the road conditions during the crossing cycle take place. In the state of the road outside the crossing cycle it can be seen that the green light for the vehicle is on, the duration is determined, when the crossing request button is pressed, then the

crossing cycle begins. In the design, designed within a single crossing cycle, the crossing request button does not function to increase the length of the crossing time.

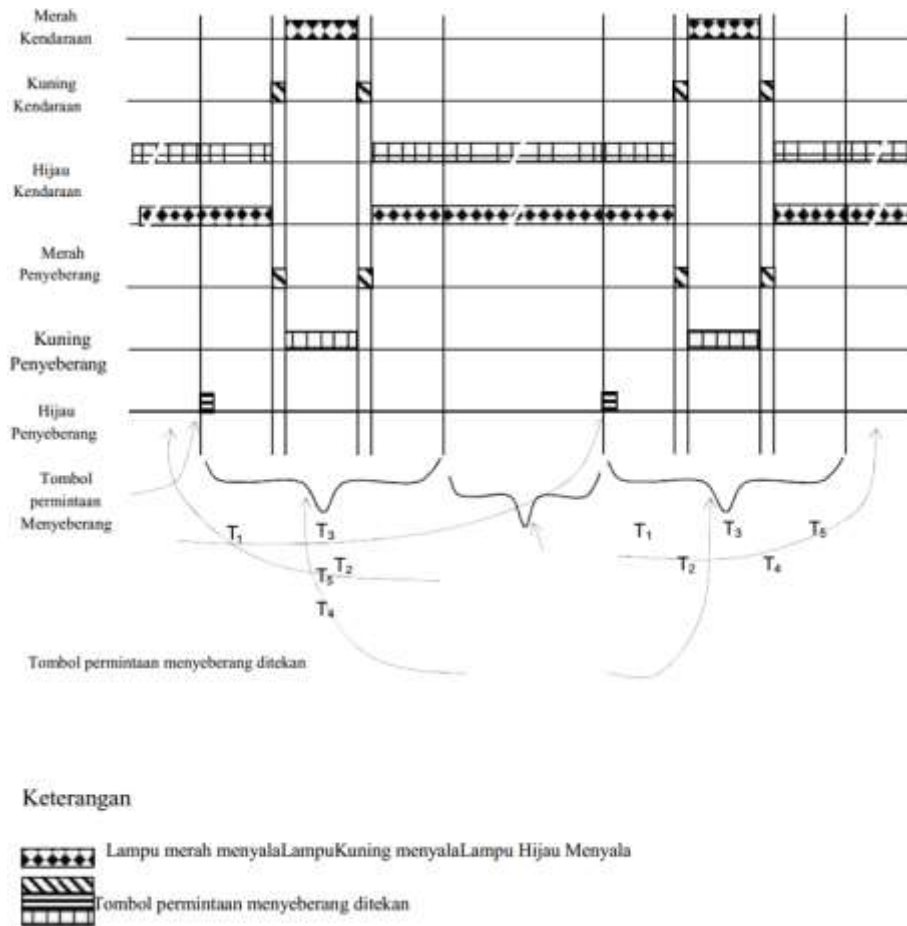


Image. Time chart of crosswalk traffic lights

If the crossing request button is pressed continuously, then the crossing cycle will always run repeatedly, so that it can interfere with the flow of vehicle traffic. Therefore, it must be prevented from being connected continuously or disconnected when pressed. With the state of the road during this design crossing cycle, it is stated in the introduction that it is not appropriate to use a detector of people who will cross because the roadside is generally used as a place for people to gather in groups.

In the crossing cycle, at the beginning of the T1 period the length of which can be determined as needed, the green light of the vehicle remains on as well as the red light of the crosser remains on, prepared to gather people who will be crossers so that the number of crossers is more, so that the use of the road is more effective. Furthermore, enter the T2 period as preparation for crossing by turning on the Yellow light for vehicles and crossers, followed by entering the T3 period whose length of time is adjusted to the width of the road to be crossed, namely the Red light for the vehicle is lit and the Green light for the crosser is on. After the crossing period is over, it enters the T4 period, namely the yellow light for the crosser and the vehicle is turned on as a sign that the vehicle is getting ready to drive again. In the T5 period, the road section for vehicles is given time so that the

vehicle can drive so that it does not cause congestion. After the T5 period, the crosser can press the request button to cross the next one.

Design of T1 to T5 Time Cycle Slices of Road Crossing Traffic Lights

In accordance with the design of the controller circuit on the traffic light, that the switching on cycle of the traffic light corresponds to the number of time slices contained in a cycle, which in this case the sequence of the time slices starting from the moment of pressing the crossing request button will consist of 5 time slices starting from T1 to T5, as can be seen in Figure 2 on the following page. The effect of pressing the crossing request button does not affect the length of the crossing time, as well as the effect that occurs due to continuous pressing.

Component Selection Analysis

To obtain this time sequence, it is necessary to conduct an analysis to select the right use of digital components in the assembly of the crosswalk traffic light controller circuit. Various types of components that can be used, including:

1. IC Timer 555
2. Counters assembled from IC, TTL/CMOS.
3. Microcontroller
4. Programmable Logic Controllerer (PLC)
5. Hours industry.

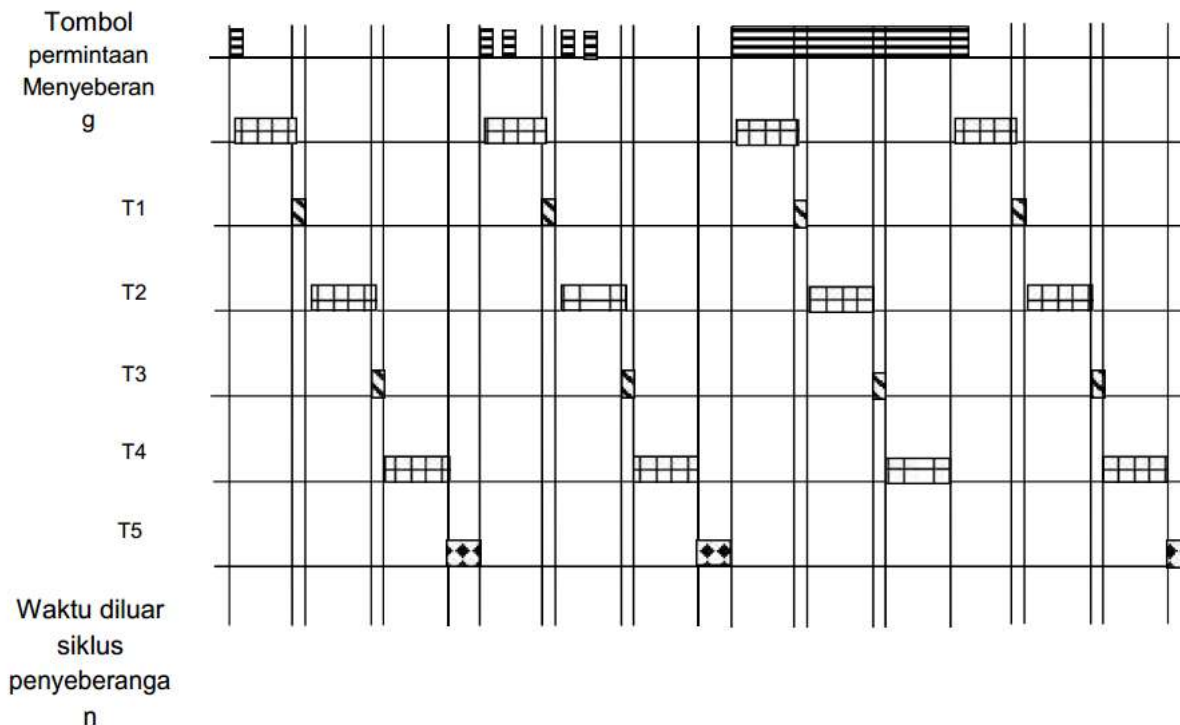
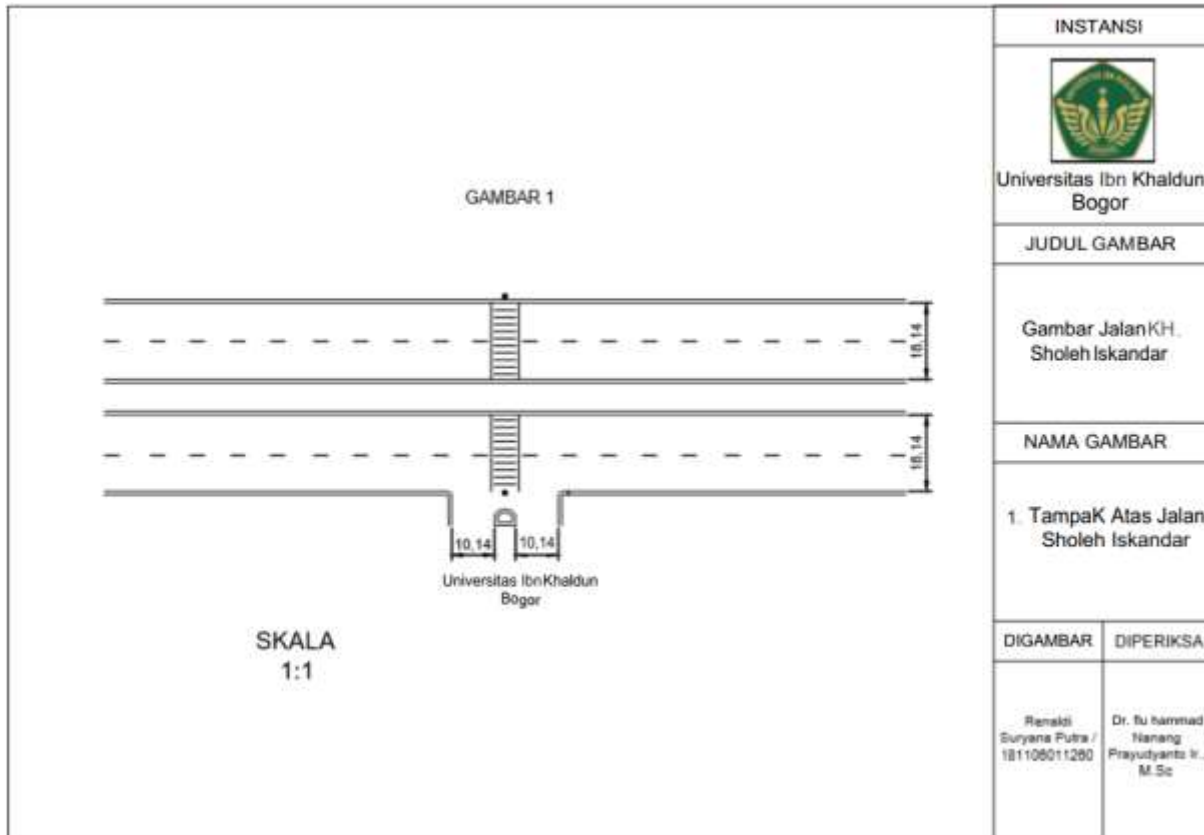


Image. The time cycle T1 to T5 of the crossing traffic light ignition controller starts from the pressing of the crossing request button



CONCLUSIONS

The range of Road Crossing Traffic Light controllers, functions according to the design purpose, by providing an opportunity for vehicles to keep passing if no one is crossing.

The use of Relay R^2 causes the switching to start to be slower, causing a flashing of the green light for vehicles and a red light for the crosser when there is a switch from $T5$ to R^2 .

It takes a crossing request indicator light, which is turned on in 1 cycle so as not to disappoint the crosser because they have pressed the button but did not get a chance to cross.

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