

Increasing environmental comfort using insect trap windows connected to DC high voltage source

A Syakur^{1*}, H Afrisal¹, A Jatmika¹, Y H Saragi¹

¹ Department of Electrical Engineering, Faculty of Engineering, Universitas Diponegoro, Semarang, Indonesia

syakur@elektro.undip.ac.id

Abstract. A healthy and comfortable habitation in coastal areas is one of the requirements for establishing a modern society in the increasing number of water and air pollutions. On the one hand, high humidity and temperature levels reduce the convenience of settlements in coastal areas. This condition is even worsened in many houses, which are built with poor air circulation. On the other hand, when the house's windows are opened to allow airflow, many insects such as mosquitoes will enter the room. Mosquitoes are carriers of many diseases in Indonesia, such as dengue fever, malaria, chikungunya and many more. For solving this problem, this paper proposes a solution by designing insect trap of windows connected to a DC high voltage source to exterminate mosquitoes. The source of electricity is obtained from *PLN* 220 Volt. The voltage from *PLN* is boosted to reach 3240 Volts. Our prototype has been demonstrated to exterminate a swarm of mosquitoes. When mosquitoes pass through the window trap, they will experience a short circuit, as their body is connected between negative and positive for a short period. The experiment results showed that the applied voltage of 14.6 kV was able to sting mosquitos to death. To prevent its high voltage impact and guarantee the safety of utilization, we provide a safety layer to prevent direct human contact. When it is not in use, the power source can be turned off by using wireless control.

1. Introduction

If a room is poorly ventilated, it can cause the space to become humid, hot, and increase micro-organisms [1,2]. Therefore, ventilation is needed, which will facilitate air movement from outside the room into the room, resulting in air change. With air movement, it is hoped that it can improve air quality and improve the room users' comfort and health. However, when ventilation is open without obstructions, it provides easy entry for insects from outside, such as mosquitoes. Mosquitoes are one of the organisms that live and breed in environments with hot and humid climates, especially in tropical countries such as Indonesia. Most mosquitoes are harmful because they can spread various diseases such as dengue hemorrhagic fever (DHF) and malaria. Therefore, much effort has been made to kill or avoid mosquito bites [3]. One of the dengue endemic areas with high cases in Semarang City is Tembalang District. There are 2 Health Center (Puskesmas) in Tembalang sub-district, namely Rowosari and Kedungmundu Health Centers. The incidence of DBD at the Kedungmundu Health Center was significantly higher than that of the Rowosari Health Center. DBD cases in the Kedungmundu Health Center working area during 2010-2014 were, respectively, IR 782.4/100,000 population in 2010, IR 114.63 in 2011, IR 100.97/100,000 in 2012, IR 259.39/100,000 population in 2013, IR 174.69/100,000 population in 2014 (*Dinkes Kota Semarang*, 2015) [4]. A study has been carried out to overcome the mosquito problem by



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