



Review on Modified Shoe Sanitization Machine

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ABSTRACT

Recommended preventive measures include hand washing, covering one's mouth when coughing, maintaining distance from other people, wearing a face mask in public settings, and monitoring and self-isolation for people who suspect they are infected. Authorities worldwide have responded by implementing travel restrictions, lock-downs, workplace hazard controls, and facility closures. Many places have also worked to increase testing capacity and trace contacts of infected persons. The World Health Organization (WHO) advised us to wash hands, wear mask, maintain social distance, and disinfect personal belongings for preventing the spread of coronavirus. To prevent the spread of coronavirus, we are presenting a system for sanitizing shoes. Its help us to disinfect our shoes.

Key words: Power Quality, Pulse Voltage, Transmission System

INTRODUCTION

The novel Coronavirus disease (COVID-19) was first reported on 31 December 2019 in the Wuhan, Hubei Province, China. It started spreading rapidly across the world [1]. The cumulative incidence of the causative virus (SARS-CoV-2) is rapidly increasing and has affected 212 countries and territories with USA, Spain, Italy, U.K. France, Russia, India and Turkey being the most affected World Health Organization (WHO) has declared the coronavirus outbreak a pandemic, while the virus continues to spread as on 05 June 2020, a total of 3, 581, 884 confirmed positive cases have been reported leading to 248, 558 deaths. Researchers around the world are trying to invent a vaccine for Covid-19.

The virus is primarily spread between people during close contact, most often via small droplets produced by coughing, sneezing, and talking. The droplets usually fall to the ground or onto surfaces rather than travelling through air over long distances. Less commonly, people may become infected by touching a contaminated surface and then touching their face [2-5]. It is most contagious during the first three days after the onset of symptoms, although spread is possible before symptoms appear, and from people who do not show symptoms damage to organs has been observed. Multi-year studies are currently underway to further investigate the long-term effects of the disease.

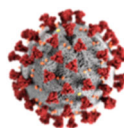


Fig. 1 The Novel Corona Virus

Transmission of COVID-19 occurs mainly when an infected person is in close contact with another person. Small droplets containing the virus can spread from an infected person's nose and mouth as they breathe, cough, sneeze, sing, or speak. Other people are infected if the virus gets into their mouth, nose or eyes. Airborne transmission is also sometimes

possible, as smaller infected droplets and particles can linger in the air for minutes to hours within enclosed spaces that have inadequate ventilation less commonly, the virus may spread via contaminated surfaces. People who are infected can transmit the virus to another person up to two days before they themselves show symptoms, as can people who do not experience symptoms. People remain infectious for up to ten days after the onset of symptoms in moderate cases and up to twenty days in severe cases

OBJECTIVES

The main objective of the system is to disinfect the shoes by throwing liquid sanitizer. The system looks like a shoe mat. We place sanitizer sprayer under the mat. The system sprays liquid fluid when it senses the shoes. An IR sensor array is used for sensing the presents of shoes or people. The micro-controller is responsible for coordinating whole system such as, ON/OFF the liquid flows, senses the shoes etc

WORKING PRINCIPLE

First we fabricate main frame from mild steel according to the measurements. Then we place the water pump with pipe and tank on it. A small hole is needed for placing the IR sensor. We need to fixing fine spraying nozzle both side of foot rest of platform for throwing the water. Those small holes works as a spraying nozzle. We need to check whether the spraying nozzles are working or not. For this purpose, we connect the water pipe with sanitizer pump and throw the sanitizer. When we want to need to start the sanitizing operation, The Circuit diagram is given in the figure. We need to connect all the components with me /Rsensor. We connect the IR sensor array with relay according to the circuit diagram, the IR sensors actually sense the presence of shoes. Here we use one IR sensor. The signal port is connected with power supply. The relay switch is used for triggering the water pump. An external power source is used for powering the water pump, since it requires more power. When we stand on base platform the I/R sensor since the presence of shoe and gives the command to the relay, by relay logic pump will start and fine spray sanitizer from nozzle will drop up on shoe and completely sanitization process carry out. When we take out the shoe from the main base platform whole system will closed automatically.

SYSTEMATIC ARRANGEMENT OF MODIFIED SHOE SANITIZATION SYSTEM.

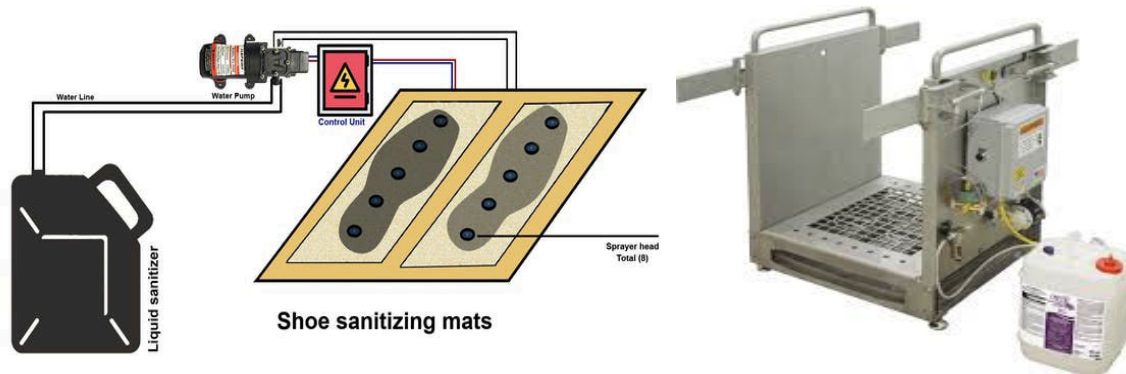


Fig. 2 Block Diagram of Modified shoe sanitization System

HISTORY

The World Health Organization (WHO) on January 30, 2020 publicly declared the COVID-19 pandemic as a “global emergency” because of the rapidity at which it had spread worldwide. The virus has shaken worldwide economies leading to a stock market crash in many countries. Since, the first bunch of cases identified in Wuhan City, China, in December 2019, the coronavirus pandemic has rapidly spread across China as well as over the borders, causing multiple incidents in nearly all countries of the world except Antarctica Despite the scarcity of publicly available data, scientists around the world have made progress in estimating the scale of the pandemic, the progression rate, and various transmission patterns of the disease. Recently, clinical data confirmed that a significant portion of the COVID-19 patients show diminutive symptoms for the first four days, which illustrates the stealthy transmission potential of this contagious disease. Scientists have deliberated that COVID-19 is far more transmittable and lethal than the ordinary flu. As coronavirus is an enveloped virus, any low-level disinfectant (e.g., 1% w/v sodium hypochlorite, isopropyl alcohol) will be able to destroy it. An ideal disinfectant for spraying and to be used in these tunnels should be nonvolatile, require less

contact time, be harmless to mucous membranes and skin, and have veridical and bactericidal activity. There are no guidelines and evidence supporting the efficacy of these disinfectants for human disinfection. These disinfectants can destroy the outer envelope of the virus, only if allowed for a recommended concentration with a contact period of more than 60 s. Reduced contact period and diluted concentration limit the efficacy of these disinfectants. Direct inhalation or spraying of these disinfectants on human skin can be toxic and corrosive to skin and lead to various allergic disorders. Even for once, if we may think that these DTs may deactivate the virus on contaminated surfaces (skin and clothes of the person), any asymptomatic patient would remain infective as the virus in the nasopharynx and respiratory tracts remains viable.

PURPOSE OF SHOE SANITIZATION

These types Disinfection and Sanitation of shoe are an extremely effective access control system. They are meant to be placed at the entry and exit points of common gathering areas like: Hospitals, Police Stations, Shopping Malls, stadiums, Government Offices, Courthouses, Movies Hall, Commercial Areas, and Temples etc. When a person or a group of persons wants to enter common areas, they have to go through these tunnels for sanitation and cleaning. When in the system, persons are sprayed with mists and vapors of disinfectant medicines. The spray is done using high-pressure pumps which turn the medicines to atomized micro droplets. The micro droplets of these atomized sprays can also easily penetrate regular clothing material thus ensuring deep sanitization.

SIGNIFICANCE AND SCOPE

More advanced Disinfection and shoe Sanitation models come equipped with special devices like SOLAR, traffic lights and motion detectors. Traffic lights work will work on simple red and green principle whereas motion detectors will automatically trigger the spray once the sensors detect any motion in the system.

LIMITATIONS

The following are the limitations:

It operates on dc supply need to maintained the battery in full charge condition. If voltage fluctuation observe system will be malfunctioning.

METHODOLOGY

- To achieve the work within a time period, this work categories into methodology, data collection procedure and its analysis in three sections.
- Design the shape and size of model of project.
- Selection of material and components utilized in fabrication of innovative project.
- Finding the requirement of equipment's for measuring the different parameters.
- Fabrication of different components for experimental set up according to design.
- Performance on the experimental set up.

COMPONENTS UTILISED IN PROJECT

Control Unit - Control the whole system. Maintains fluid flow intervals. Fluid flow based on sensor data (whether the shoes are Present or not). A micro-controller is used here as a control unit

Sensor (IR proximity) - used for sensing shoes or people's feet.

Water pump - flows liquids disinfection liquid from tank to mats.

Sanitizing tank - The reservoir of liquid fluids.

Water spring head - used for spraying the fluids.

Connecting pipe - used for supplying liquid sanitizer from sanitizing tank to shoes mats.

Frame - customized frame (made from mild steel) for mounting the disinfection mats.

a. I/R Sensor

An infrared (IR) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment. Infrared radiation was accidentally discovered by an astronomer named William Herschel in 1800. While measuring the temperature of each color of light (separated by a prism), he noticed that the temperature just beyond the red light was highest. IR is invisible to the human eye, as its wavelength is longer than that of visible light (though it is still on the same electromagnetic spectrum). Anything that emits heat (everything that has a temperature above around five degrees Kelvin) gives off infrared radiation.

b. Water Spraying Nozzle

Inside, there is a high-pressure pipeline with 4 4-Way Fogger which can be connected. The fog leaves no marks on clothes, while completely enveloping the incoming person and destroys the virus even in hard-to-reach folds of clothing and protects for some time after the exit.

c. 4 Way Fogger

Discharge Rate: 30 LPH/0.5 LPM (for 1 fogger)

Recommended Pressure: 45-60 psi

Average Droplet Size: 65 microns (at 55-60 psi)

Filtration required: 130 Micron (120 mesh)

Pump required: 40 to 45 meter Head

d. Sanitizing Tank

A plastic tank for 50 liters of solution and a pump for the high-pressure pipe system is located on the side of the tunnel which is connected with 4-Way Fogger Assembly.

e. DC Dry Battery

Brand: - POWERSAFE

Package Dimensions: -15.5 x 10.5 x 6.5 cm; 2 Kilograms

Voltage: - 12 Volts

Battery Power Rating: - 7500

Item Weight: - 2Kg

OVER ALL FABRICATION OF THE SYSTEM

Methodology to Fabrication of modified shoe sanitization system model:

- a. Analyzetheproblemsinthefabricationofshoe sanitization system
- b. Designingtherequiredcomponents.
- c. Selectionofrequiredmaterials.
- d. Purchasingthematerials.
- e. Fabricationoftheshoe sanitizer
- f. Preparationofreportandsubmit.

ANALYSIS OF THE SHOE SANITIZATION SYSTEM

To study and analyze about the system where by focusing on to the working principle and the fabrication materials and design required for the model to be done and even a study towards the functioning of the braking system according to the design planned.

PREPERATION OF DESIGN

In this step it is more concentrated on to the design part where looking on to several alternatives of designs according to the installation specifications as planned in the previous steps.

FABRICATION

In this step the process consists of working on to the chosen design and approach into the reality. The model is then fabricated as per the specifications given and check if all the mechanisms work perfectly.

TESTING

The model is tested to check if it meets all the objectives and the model is again made to test whether there has to be done any improvement or any modifications to it. After the test is done completely the model is then made to implement.

RESULT

The disinfection system works is reminiscent of the body scanner at the airport, and anywhere in place, the person enters and stops with outstretched legs. The disinfectant is sprayed through nozzles to form a fine mist of water which is deposited on all surfaces in the sanitization chamber- shoe will sanitization within time. The disinfection process is completed in 15- 20 seconds.

CONCLUSION

As per above discussion we conclude that the design and development of a fully automatic, modular, and portable that has single chambers and use to disinfect people with high neutralizing efficiency of the COVID-19 virus. In the chamber, the person shoe is disinfected by the spraying of the ionized mist of an approved disinfectant solution in some interval of time.

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