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Automatic Shoe Sanitization Machine

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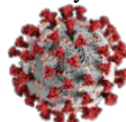
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ABSTRACT: This project aims to create an electromagnetic braking system model capable of applying brakes without any friction loss and without losing the energy supplied. Recommended preventive measures include hand washing, covering one's mouth when 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, 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. COVID-19 has caused severe disruption across the world. In general, Europe, Asia and U.S have abided the effect of the infection, while Asian countries have been comparatively less death rate so far. The World Health Organization (WHO) has declared a pandemic over a new coronavirus which causes an illness known as COVID-19 that has spread to nearly every country. The disease has exterminated some 168,500 people and diseased more than 2.4 million, according to data compiled by Johns Hopkins University. Nearly 643,000 people have well again since February 2020. COVID-19 Community spread chain breaking is the ultimate motto of this work also it is the only way to prevent the COVID-19 spread till the invention of vaccination.

I. INTRODUCTION

Coronavirus disease 2019 (COVID-19), also known as the coronavirus or COVID, is a contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first known case was identified in Wuhan, China, in December 2019. The disease has since spread worldwide, leading to an ongoing pandemic. Symptoms of COVID-19 are variable, but often include fever, cough, headache, fatigue, breathing difficulties, and loss of smell and taste. Symptoms may begin one to fourteen days after exposure to the virus. At least a third of people who are infected do not develop noticeable symptoms. Of those people who develop noticeable symptoms enough to be classed as patients, most (81%) develop mild to moderate symptoms (up to mild pneumonia), while 14% develop severe symptoms (dyspnea, hypoxia, or more than 50% lung involvement on imaging), and 5% suffer critical symptoms (respiratory failure, shock, or multiorgan dysfunction). Older people are at a higher risk of developing severe symptoms. Some people continue to experience a range of effects (long COVID) for months after recovery, and damage to organs has been observed. Multi-year studies are currently underway to further investigate the long-term effects of the disease.



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

1.1 OBJECTIVES

□□ The main objective of the system is to disinfect the shoes by throwing liquid sanitizer. The system look like a shoe mat. we place sanitizer sprayer under the mat. The system sprays liquid fluid when it senses the shoes. A 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.

1.2 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 fix fine spraying nozzle both side of foot rest of platform for throwing the water. Those small holes work 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 I/R sensor.

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.

A 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 sense 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 sanitisation process carry out. When we taken out the shoe from the main base platform whole system will closed automatically.

1.3 Systematic arrangement of Automatic shoe sanitization System.

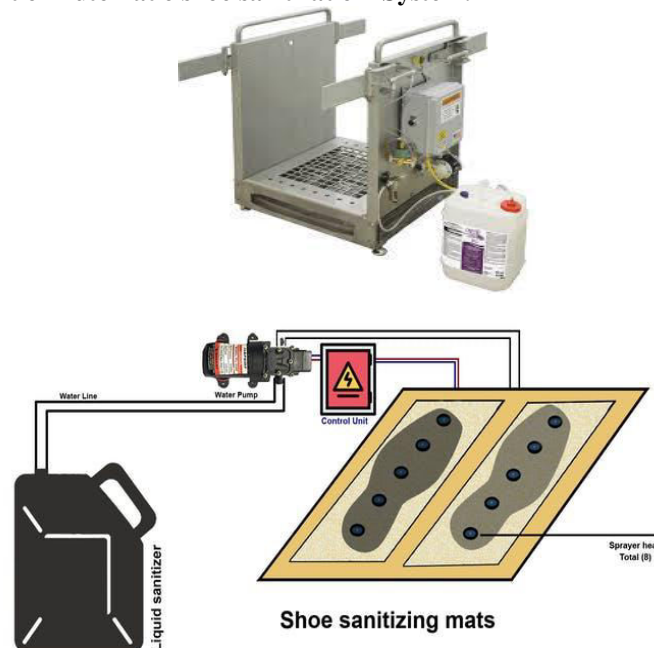


Fig.1.3.1 Block Diagram of Automatic shoe sanitization System.

1.4 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 virucidal 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.

1.4 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, 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 microdroplets. The microdroplets of these atomized sprays can also easily penetrate regular clothing material thus ensuring deep sanitization.

1.5 SIGNIFICANCE AND SCOPE

More advanced Disinfection and shoe Sanitation models come equipped with special devices like SOLAR, traffic lights and motion detectors. Traffic lights 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.

1.6 Limitations

The following are the limitations:

It operates on dc supply and needs to maintain the battery in full charge condition. If voltage fluctuation occurs, the system will malfunction.

1.7 METHODOLOGY

To achieve the work within a time period, this work is categorized 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 utilised in fabrication of innovative project.
- Finding the requirement of equipments for measuring the different parameters.
- Fabrication of different components for experimental set up according to design.
- Performance on the experimental set up.

1.9 COMPONENTS UTILISED IN PROJECT

1.9.1 Mechanical Frame

The mechanical structure is formed using square pipe of 1.5 inches and thickness of 16 gauge. It is designed to support all the components of the braking system. The material used is mild steel.

1.9.2 Dc booster pump

A **booster pump** is a machine which will increase the pressure of a fluid. They may be used with liquids or gases, but the construction details will vary depending on the fluid. A gas booster is similar to a gas compressor, but generally a simpler mechanism which often has only a single stage of compression, and is used to increase pressure of a gas already above ambient pressure. Two-stage boosters are also made. Boosters may be used for increasing gas pressure, transferring high pressure gas, charging gas cylinders and scavenging.

1.9.3 Fogging nozzle

- 2 Inside, there is a high-pressure pipeline with one-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.
- 3 One-Way Fogger
- 4 Discharge Rate : 30 LPH/0.5 LPM (for 1 fogger)
- 5 Recommended Pressure: 45-60 psi
- 6 Average Droplet Size: 65 microns (at 55-60 psi)
- 7 Filtration Required: 130 Micron (120 mesh)
- 8 Pump required: 40 to 45 meter Head

1.9.4 Relays

Two electromechanical relays Brake relay and motor relay are used in the system. Relays are connected to microcontroller. When signal is passed from the microcontroller both the relays get activated. Motor relay cuts the AC power supply to the motor and the then brake relay passes the current from the battery to the electromagnet.

1.9.5 Infrared Sensor

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called a passive IR sensor.

II. FABRICATION

2.1 Overall Fabrication of the System

Methodology to Fabrication of automatic shoe sanitisation system model:

- a. Analyse the problems in the fabrication of shoe sanitisation system
- b. Designing the required components.
- c. Selection of required materials.
- d. Purchasing the materials.
- e. Fabrication of the shoe sanitiser
- f. Preparation of report and submit.

2.2 ANALYSIS OF THE SHOE SANITISATION 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 consist 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 weather 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:

2. 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

2.1 CONCLUSION

As per above discussion we conclude that the design and development of a fully automatic, modular, and portable tunnel that has two chambers and use to disinfect people with high neutralizing efficiency of the COVID-19 virus. In the chamber, the person is disinfected by the spraying of the ionized mist of an approved disinfectant solution for 20 s.

2.2 ACKNOWLEDGEMENT

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