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DESIGN AND ANALYSIS OF A HIGH-SPEED BLOWING SANITIZING MECHANISM UNIT FOR DISINFECTION CHAMBERS

W.G.K.P. Gamage* and I.P. Dharmathilaka

Department of Engineering Technology, Faculty of Technological Studies, Uva Wellassa University, Badulla, Sri Lanka
**kasun.prabhash@icloud.com*

The current study presents a design and analysis of an efficient and innovative mechanism to disinfect in controlling and preventing COVID-19. This mechanism is an alternative to the time-consuming and expensive disinfection process, and it can be focused on specific places on the body. The proposed device uses a high-speed airflow that passes through a venture. The high-pressure sprinkle will spread the sanitizing chemical in the middle of the venture. After spraying the chemical, the device will blow air to dry the chemicals on the skin. The study aims to assess the sparing speed of the sanitizing chamber. These whole simulations and analyses were done using SOLIDWORKS. The diffusion angle, contraction ratio, inlet-outlet pressure difference, and velocity characteristics were crucial parameters when choosing the best shape for the venture. After choosing and designing a better shape for the venture, the analysis part was done. Flow rates of air and water were applied to respective inlet sides and venture inlet. A venture inlet has been installed, and its needle has been attached at the most velocity point of the venture tube. In this study, an input flow velocity of air has been supplied at 100 m s^{-1}, and the output side has been set up as environment pressure. The validated computational fluid dynamic model was used to evaluate two scenarios; one is an increase in mass flow rate, and the second thing is to reduce turbulence and develop well flow at the end of the unit. At the end of the study, the well-analyzed mechanism could be invented with high speed and expected objectives. A higher flow rate is thought to increase the atomization quality and spray coverage of alcohol-based sanitizer liquid for sanitizing chamber and walkthrough gates applications.

Keywords: Automated Sanitizing, Computational Fluid Dynamic, Disinfection Chambers, Venture Mechanism, Quick-Drying Mechanism