

Programming a Particulate Filtration System into Second Life®

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EXTENDED ABSTRACT

The purpose of this project is to develop a modular, configurable and real-time model of a cyclone in Second Life®. The end user will be able to define the parameters of operation using a control panel in order to explore and characterize the function of a cyclone as it pertains to particulate filtration. The user will be able to visually explore cyclones and their operation by entering design parameters and monitoring operational changes.

Description of Second Life

Second Life® is an online virtual world developed several years ago by Linden Lab. The user generates and customizes an avatar to represent them in this virtual world. Using this custom avatar, the user can fly or teleport to any destination in Second Life®. The Second Life® ‘world’ is user-configurable and programmable. Three-dimensional structures can be built and programmed so that users can interact with them via their avatar. The site of this project is the School of Engineering section on Mercer University’s island.

Description of a Cyclone

A cyclone, as it pertains to this project, is an air filtration system that uses vortex separation to remove dust and particles. The dirty air enters the conical body and is spun at a high speed to separate the particulates. The dirt leaves the cyclone at the base of the body and cleaner air exits from the top. Cyclone design specifications are based on ratios of body height, influent opening height/width, diameter of exit, length of vortex, length of body, length of cone, and diameter of dust outlet to the body diameter. Therefore, the user only needs to enter the body diameter and the other dimensions will be adjusted based on the design ratio specifications. Users will also be able to input the mass flow rate to the system and size composition of the influent particulate stream.

Engineering Disciplines Used

This project incorporates both the computer and the environmental disciplines. The physical model of the cyclone was built using a 3-D modeling package embedded in the package of tools available in Second Life®. Knowledge of programming was needed to develop the cyclone and control panel to correctly perform the desired design and operation calculations. This project also incorporated the environmental discipline in that the group needed to become familiar with particulate filtration and how cyclones are used, designed, and operated.