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Design and Development of an All-Around Air Controller for a Cost-Efficient Ventilation System and Structure

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Abstract

The study aims to design and develop an all-around air controller. Different design options were considered in order to give consumers the best possible design in terms of functionality, safety, economic and sustainability. Four design combinations were made by the proponents that include the skin, skeletal support and filter. The design for functionality was made of Polyethylene tarpaulin, round plastic and hepatitis virus (HEPA) air filter. Next, the design for safety includes Polyethylene tarpaulin, round stainless steel and HEPA air filter. Another design is for economic which uses canvas, round plastic and carbon air filter. The last design is for sustainability that uses waterproof fabric, round plastic and HEPA air filter.

The proponents used various tools to determine the best design option. In the trade-off analysis, analytical hierarchy process (AHP) was used to determine the best material to be used. It was then determined that the best materials are Polyethylene tarpaulin, round plastic and HEPA air filter which is the design for functionality. International standards were considered as the top priority in the design project. The proponents made sure that the final design project conforms to applicable codes and standards to ensure the safety of its end users. Results of the study suggested that the optimal design combination that satisfied all the specified criteria under different constraints and trade-off is the Design for Safety. This design uses Polyethylene Tarpaulin for its tube as it can withstand hot and cold temperatures. The design uses round plastic for its skeletal support since the material is light though its durability is in question since plastics are flimsy. Lastly, HEPA filter will be used for the filter of the product since it is the most effective among the three to filter-out pollutants in air.

Keywords
Air Controller System, Design for Safety, Design and Development, Design Project, Design Options