Helping Habitat for Humanity: Improving Air Flow in a Three-Bedroom Standard House Design

Jacob Kitts, Mark Malmquist, Keith Moulton, Aaron Rock, Nicholas Tabar, and Adam Wolf

Scholars of Excellence in Engineering and Computer Science (SEECS) Program
Gannon University
Erie, PA 16541

Abstract:
Through the structure of the SEECS program, our group of juniors have partnered with Habitat for Humanity in an engineering community-based service project. The focus of the project is to develop an improved air flow system for the three-bedroom standard house design used by Habitat for Humanity. Key parameters affecting airflow and air quality in the structure are studied. Ultimately understanding of these factors relative to the design will allow us to develop the necessary system to fulfill the projects goals.

Initially, the group knew very little about ventilation and air flow. After extensive research, knowledge about flow rates, standards of air flow, and methods of ventilation related to house structures was collected. An air exchange is one important measure of air flow in the home. Habitat for Humanity is looking for a way to increase the number of air exchanges as unobtrusively as possible to improve the air quality in the home.

Habitat for Humanity homes are generally a ranch-style home with three or four bedrooms, kitchen, crawlspace, bathroom, attic, and a living room. In any home, the airflow required changes based on space and any appliances in the home. In work teams, airflow patterns of an under-construction house were investigated to support our understanding of the ventilation systems. In similar teams we have also worked to develop possible solutions to the problem presented to us.

In the first year of this project we concentrated on research and collecting data relevant to our topic and the understanding of our goal. Through the second year of this project, we worked to develop and test an effective means of achieving our goal of increasing the number of air exchanges in the home. The poster focuses on the highlights of our project including research, field investigations, development, testing, and our final design.