

Algorithms for the ZIP-Code Program

Lebron Stinson
Middle Tennessee State University

Research Alliance in Math and Science
Engineering Science and Technology

Mentored by Therese Stovall

<http://www.csm.ornl.gov/Internships/abstracts/LebronStinson.pdf>

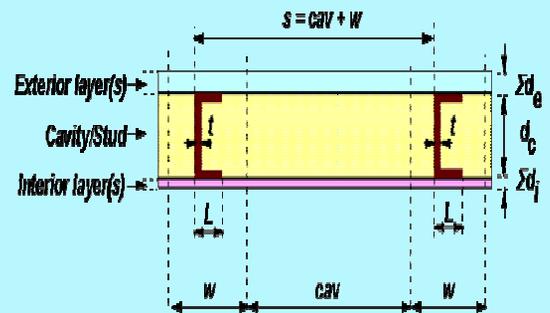
The ZIP-Code Program is an interactive, web-based, computer program developed in 1998 for DOE to help determine the optimal amount of insulation for homes.



Research to incorporate changes in new algorithms into the ZIP-Code program required an understanding of the energy-saving models, equations, and algorithms currently within the program as well as lab work and comparisons of methods of calculation.

Modified Zone Method

- used as benchmark during research



This program is used by the Department of Energy (DOE) and is available on the internet. The first three digits of your zip code are the only requirements to execute the program.

As part of the research conducted on this project, time was spent in the materials insulation lab, the building envelopes lab, and the moisture lab. Most of the work done in these labs consisted of preparing, testing, and measuring insulation samples. The tests performed were thermal expansion and moisture tests. These tests were performed to determine performance, quality and changes in insulation under certain circumstances. Preparation for these tests included exposure to controlled temperatures and epoxy coating.



Moisture testing is measuring the water intake of the insulation through specific areas.

LAB WORK



Thermal expansion measurements are taken after exposing insulation to controlled temperatures.



Insulation must be weighed before/after epoxy coating to prepare for moisture testing.



During moisture testing, a series of weighing must be done to obtain accurate water intake measurements.