

BUILDING + ASSEMBLING THE WALL

The Trash Wall project is focused on building an extra insulation layer that could be placed in the interior of a home to act as a barrier to heat loss or entry. This wall is to be easily manufactured, such that a low income individual or family could construct and install one with minimal expense and maximum benefit. Below are two proposed structures for the wall. The upper structure is made with cardboard and cardboard tubes, while the lower structure is made with cardboard and plastic bottles. Once the structure is built, it can be filled with either shredded paper or cellulose. From there, a front cardboard face can be attached to the structure (to hold the insulation in) and a front skin can be attached. The front skin is an exterior cover of the wall. This cover provides an aesthetically pleasing look and invites people to put their own personal twist on their Trash Wall. Below are several different skin options, but with a little creativity the possibilities are endless.

Construction time varies based on the different structures and skin types.

Insulation Values. Both the shredded paper and cellulose's insulation effectiveness has been tested. It was found that the shredded paper has an R-value of R-10 US and the cellulose has an R-value of R-12 US. These values meet the team's expectations. When testing a section of the trash wall filled with shredded paper, the R-value of the wall was found to be R-7 US.

Fire safety is extremely important when it comes to these walls. In order to be placed in a home, these walls should be fire resistant and meet the fire standards and codes. Fire testing has been done on several of the proposed skins.

Burn Test Data

Sampled were exposed to 400 W flame produced by a propane torch at a distance of 1 inch until the flame burned through the wall. The burn time and the burn area were obtained.

Material:
burn time (burn area in²)

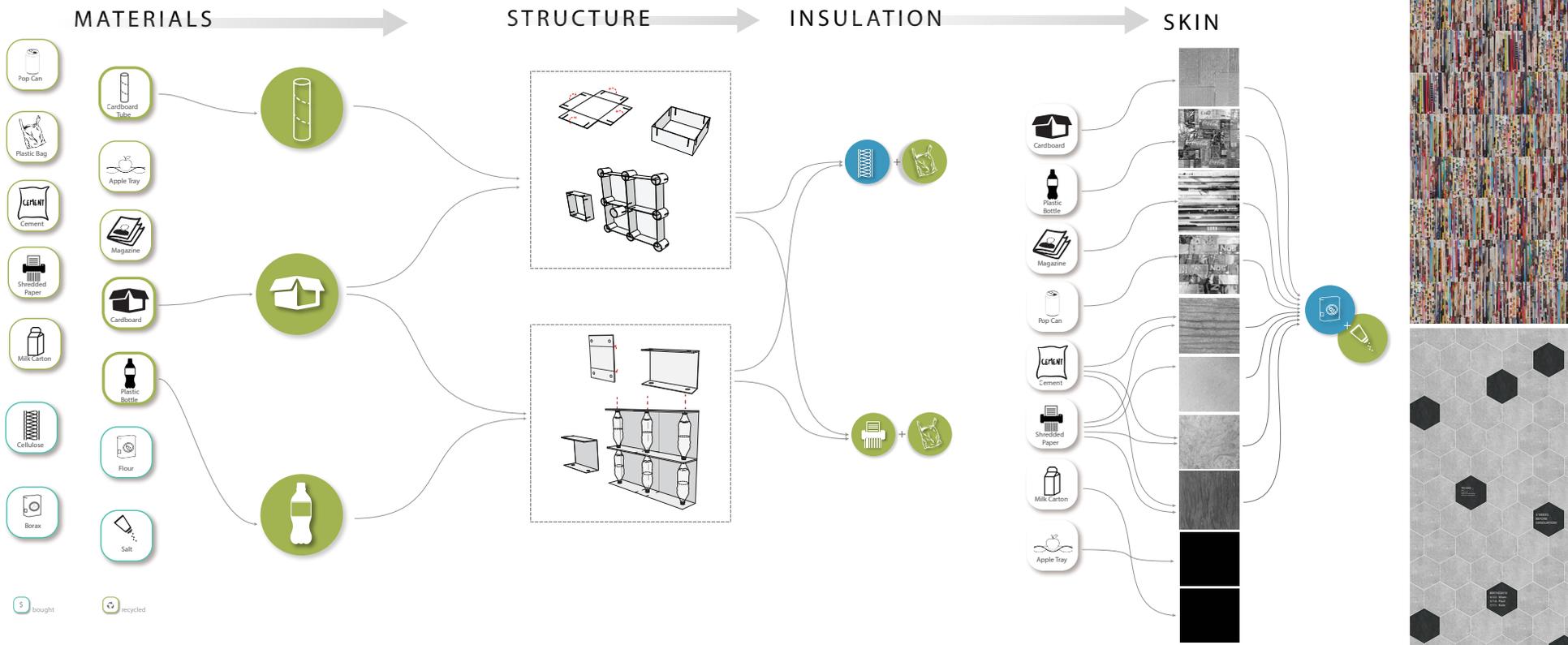
0.2" layer of papercrete:
30 seconds (9.6 in²)

Fabric treated with flour-borax-water mixture:
38 seconds, (7.0 in²)

0.2" layer of flour-borax-water mixture:
39 seconds, (5.9 in²)

One layer of aluminum cans:
40 seconds, (4.9 in²)

Rolled magazines treated with flour-borax-water mixture: 5.5 minutes, (17 in²)



WHAT IS THE TRASHWALL PROJECT?

This project is an effort to aid those living in energy efficient homes, through a cost effective and environmentally friendly engineering solution. Heating and cooling a home is expensive, especially in older or run down spaces. Unfortunately, it is often those with the lowest incomes who are forced in to in homes with poor insulation and lack of energy efficiency. For this population, the bills to heat or cool a home can be a majority if a household's income. This project aims to address this issue.

FUTURE WORK

The next steps in this project are to optimize the wall insulation and test the walls in people's homes. When it comes to wall insulation, there is an optimum thickness and density that will yield the highest R-value. More tests needs to be run in order to determine this thickness and density for both the shredded paper and cellulose insulation. From there, these walls will be placed in people's homes and their effectiveness documented. This will show us the areas of the wall that need improvements, as well as provide us feedback from the customers.

For more information, please visit:
<https://labs.wsu.edu/trashtalk/>



The Trash Wall Project

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