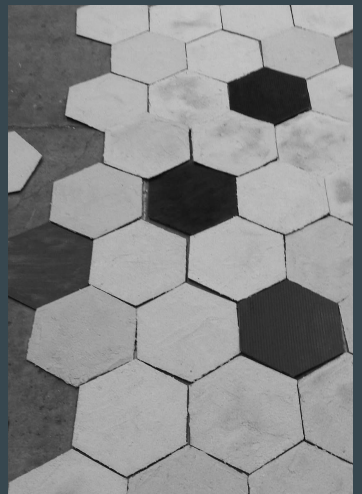
TrashWall

Prototype Design Presentation

February 25th, 2016



Trash Wall Collaborators

Engineering (Structure Development)

Advisory Professor
Robert Richards

Engineering Student 1
Engineering Student 2
Engineering Student 3
Engineering Student 4
Engineering Student 5

Architecture (Aesth

Architecture Student
Architecture Student
Architecture Student
Architecture Student
Architecture Student

Team 1

AS 1	Fernando Felix
AS 2	Nandita Rajakumar
ES 1	Jodie Bowe
ES 2	Estaban Mena
ES 3	Ahmed Al Saidi

Team 2

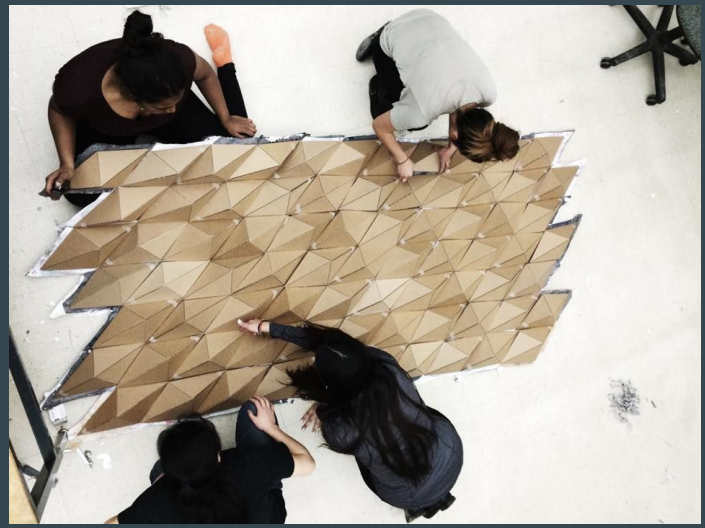
AS 3	Irene Arzaga
AS 4	Leah Engelhar
AS 5	Jannita Bolin
ES 4	Lauren Summ
ES 5	David Lopez

Background

- People with lower income typically live in the least energy efficient homes
- For some, heating and cooling their homes is a major burden
- As college students, we can relate to the struggling to pay bills
- We wanted to address this problem and began looking towards a solution that could help people living in energy inefficient homes.

Previous Work

- Over the past year and a half, groups of architecture and mechanical engineering students have worked on this project.
- Our idea has been to build an extra insulation layer to be placed in a home that will help keep the house warm or cool
- Areas of focus:
  - Low cost (goal of less than $0.10/square foot)
  - Good insulation ability
  - Easy to manufacture/install
  - Aesthetically appealing
  - Safe to use in a home



Current Work

- In the process of merging architectural and engineering designs together.
- Engineering designs focus mainly on structure, thermal resistivity, manufacturability, and fire safety.
- Architecture designs focus more on aesthetics and exploring different available recyclables uses.
- Architecture students have came up with a “skin” which is placed on the interior of the Trash Wall. This “skin” is the only visible part of the Trash Wall when installed in a home.

Our Vision

- To inspire people to build these walls in a way that suits their needs/wants
- To give people a good starting point on how to build a Trash Wall and different options for them to pursue.
- Change/transform people's thoughts about recyclables and trash
- Inform people of the possibilities of recycled materials to improve their lives and also reduce air pollution/greenhouse gases
- We hope that through this project, we not only provide practical solutions to a very real problem, but also that we inspire people to look at trash differently, and to feel empowered to engineer solutions.

Project Overview

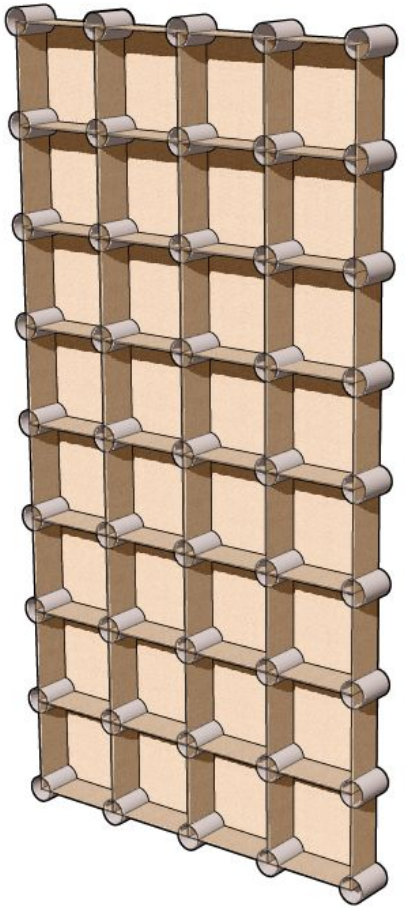
- The wall will be composed of two parts: Structure + Skin
- We've compiled several prototypes
- The goal is to give people ideas about how trash could be used, a recipe, etc.

Structure 1: Cardboard Tubes

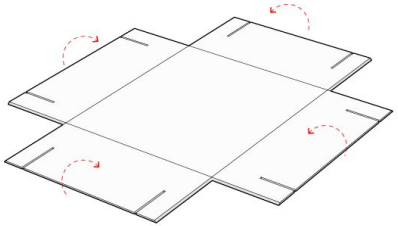
Size: 4’x8’
Time to Construct:
- Boxes: 5 mins each (32 total)
- Tubes: 3 mins each (45 total)

Pros: no glue required,
modular, ease of construction and assembly,
no toxic fume when ignited

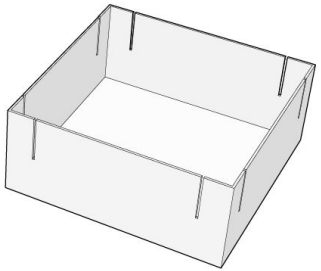
Cons: Prone to offset error, limited accessibility of
some material, flammable



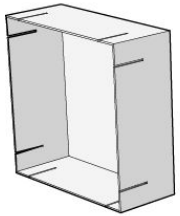
Structure Construction

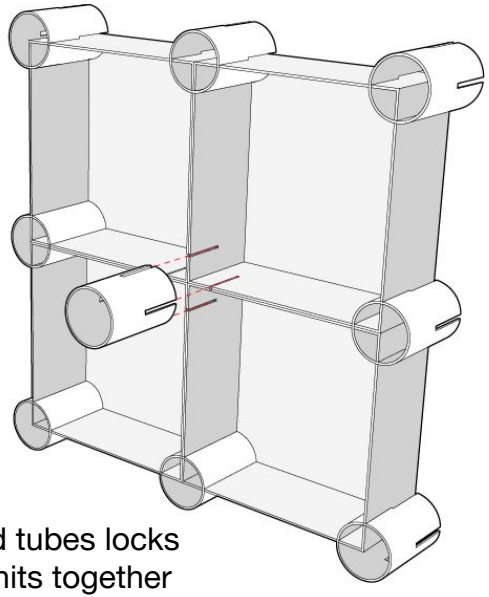


Crease + Fold box



Cut slits at the corners
for tube supports



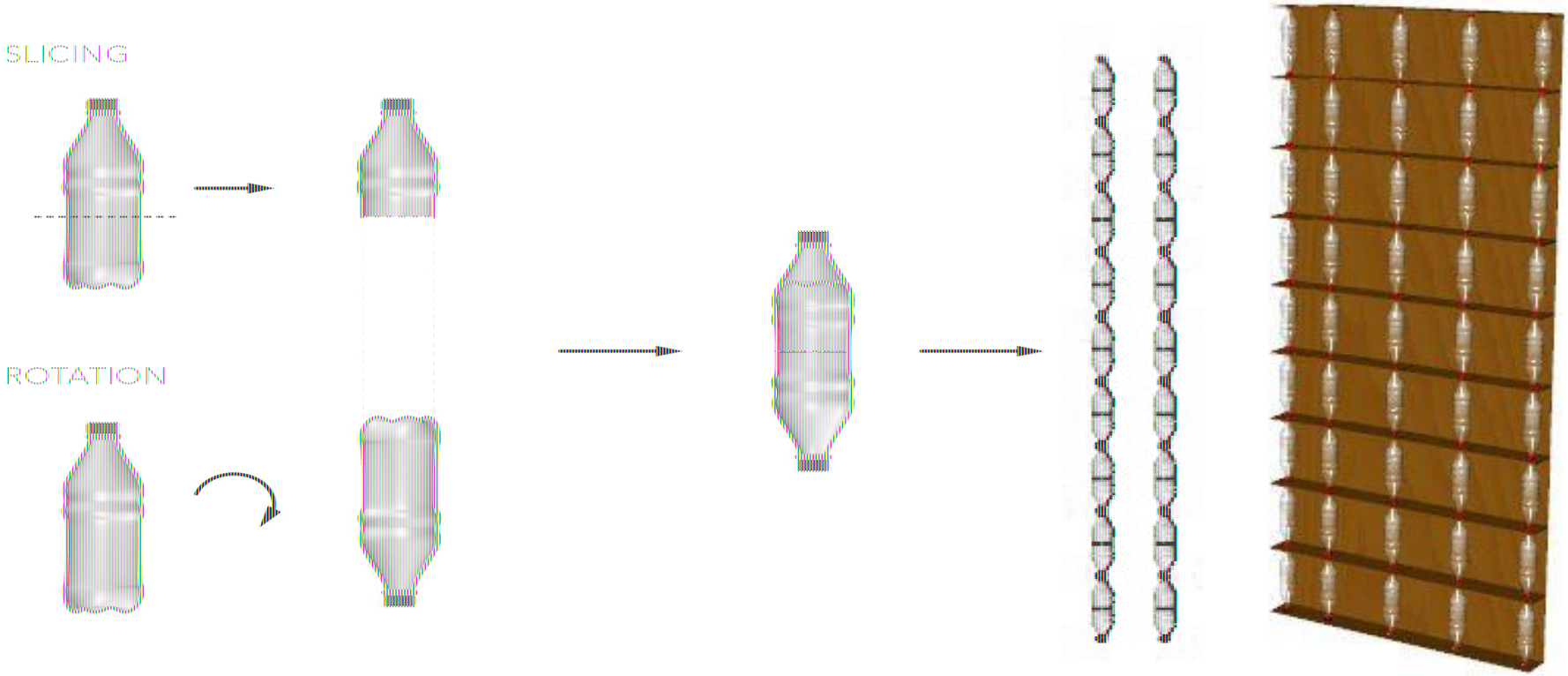


Cardboard tubes locks
multiple units together

Structure 2: Plastic Bottles

- Construction time
  - 3 hours and 56 minutes for 36 boxes
- Pros
  - Recycled materials
  - Sturdy
- Cons
  - Toxic fumes from burning plastic
  - Bottles should be lined up correctly to avoid bending

Bottle Connection



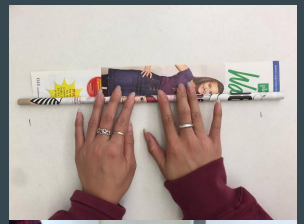
Skin Group 1

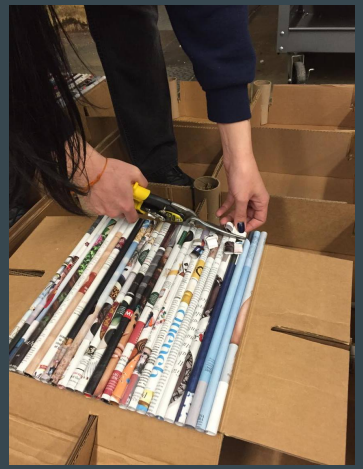
Pixlr Wall

Materiality

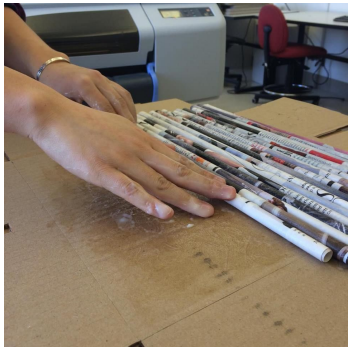
Components: Magazine Pages, Cardboard, Flour Glue.

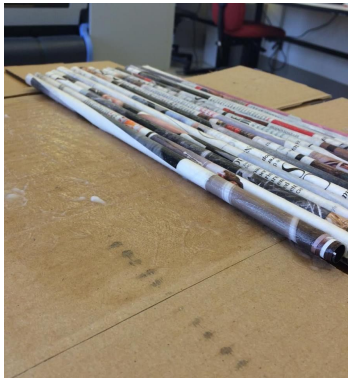
Application Method: Roll magazine pages (landscape direction), coat with glue, stick on cardboard

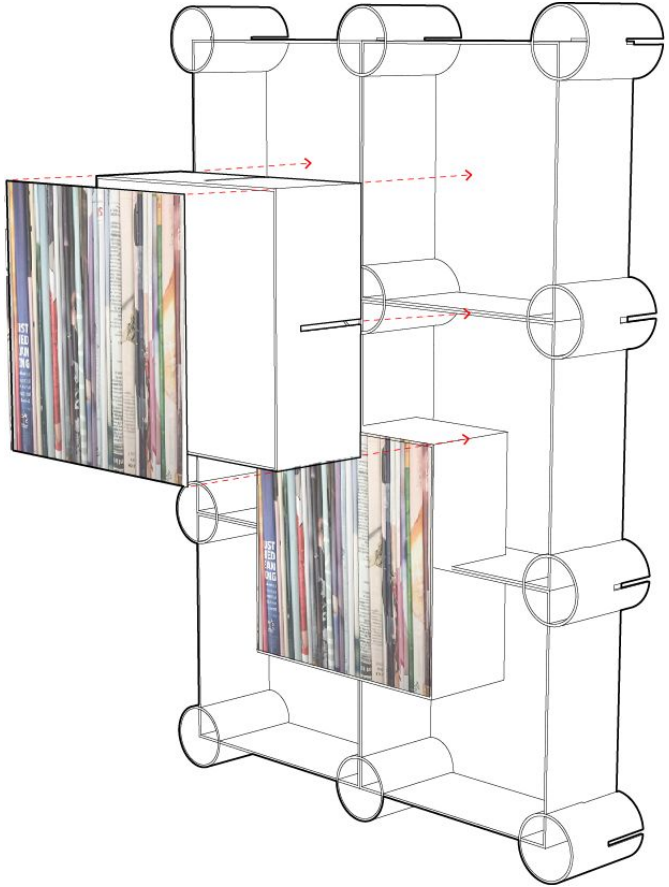




Skin Application



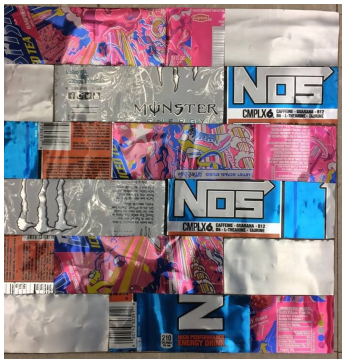




Prototypes

Panel Size 1'x1'

Aluminum Cans

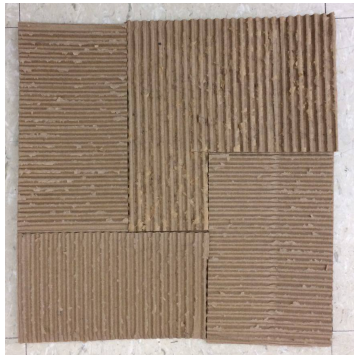


Vertical magazine pattern

Soda Labels

Bottle Caps

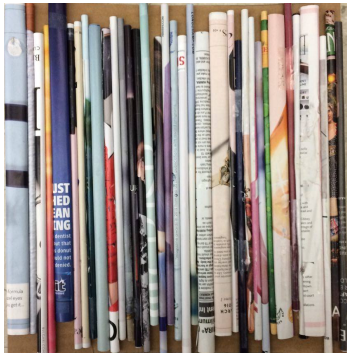
Cardboard pattern 1



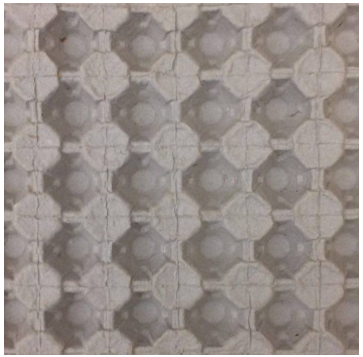
Cardboard pattern 2

Checkered magazine pattern

Rolled magazine pattern



Egg Carton



Group 1: Prototype Data

Material	*Manufacture Time (min. per panel)*	*Burn Time*	*Cost*	*Pros*	*Cons*
Magazine	10-12		$0.00	easily accessible material; lightweight, colorful material flexible patterns	Flammable
Corrugated Cardboard	15-20		$0.00	easily accessible abundant material; lightweight	Moderate warping flammable
Aluminum Cans	20		$0.00	fire resistant colorful material	Difficult to cut sharp edges
Plastic Bottle Labels	15		$0.00	easily accessible material; lightweight provides various patterns/colors	Toxic fumes
Plastic Bottle Caps	7		$0.00	easily accessible material; lightweight colorful material	Toxic fumes
Egg Carton	5		$0.00	easily accessible	Flammable one color

PIXLR WALL:

Affordable

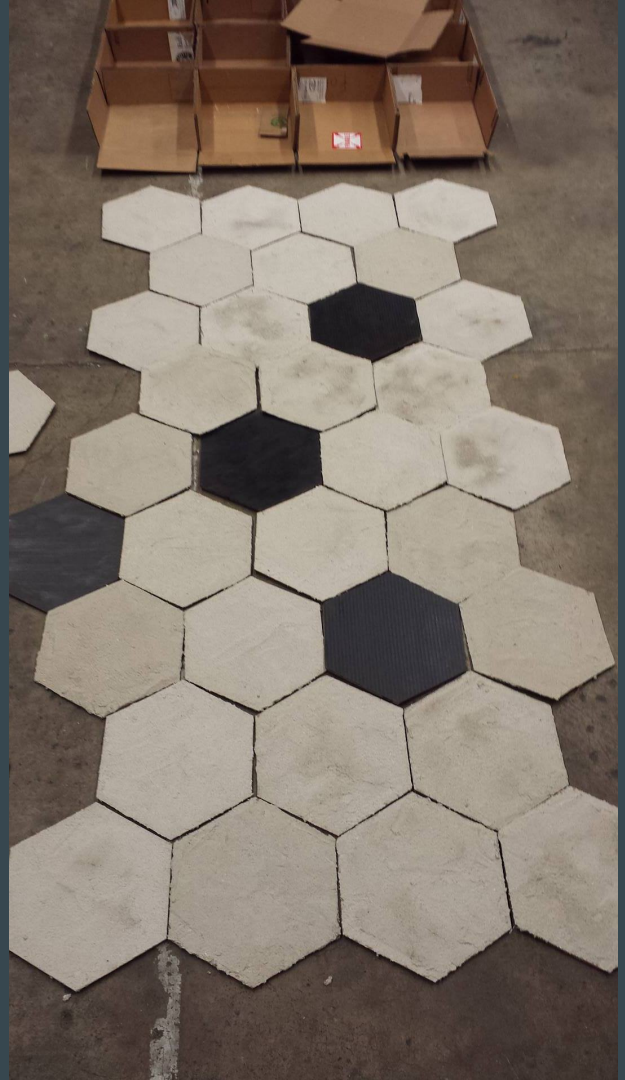
Personal

Meaningful

Deconstructable

Skin Group 2

Papercrete

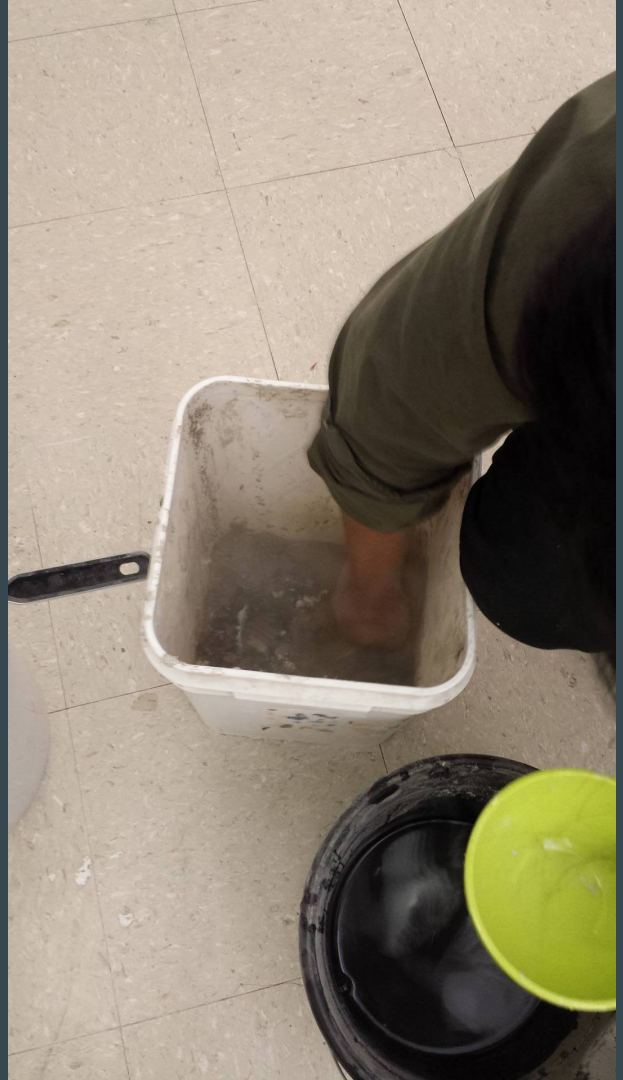


Materiality

Components: Papercrete mixture, Cardboard to apply paste to.

Ingredients: 60% paper pulp, 20% cement, 20% water (by weight)

Method of mixture and application: Mixing all ingredients into a container. Applies onto cardboard corrugation directly by spreading paste like mixture. thickness of mixture is thinner than 1/8”



Data

Mixture preparation time: 5 - 8 mins

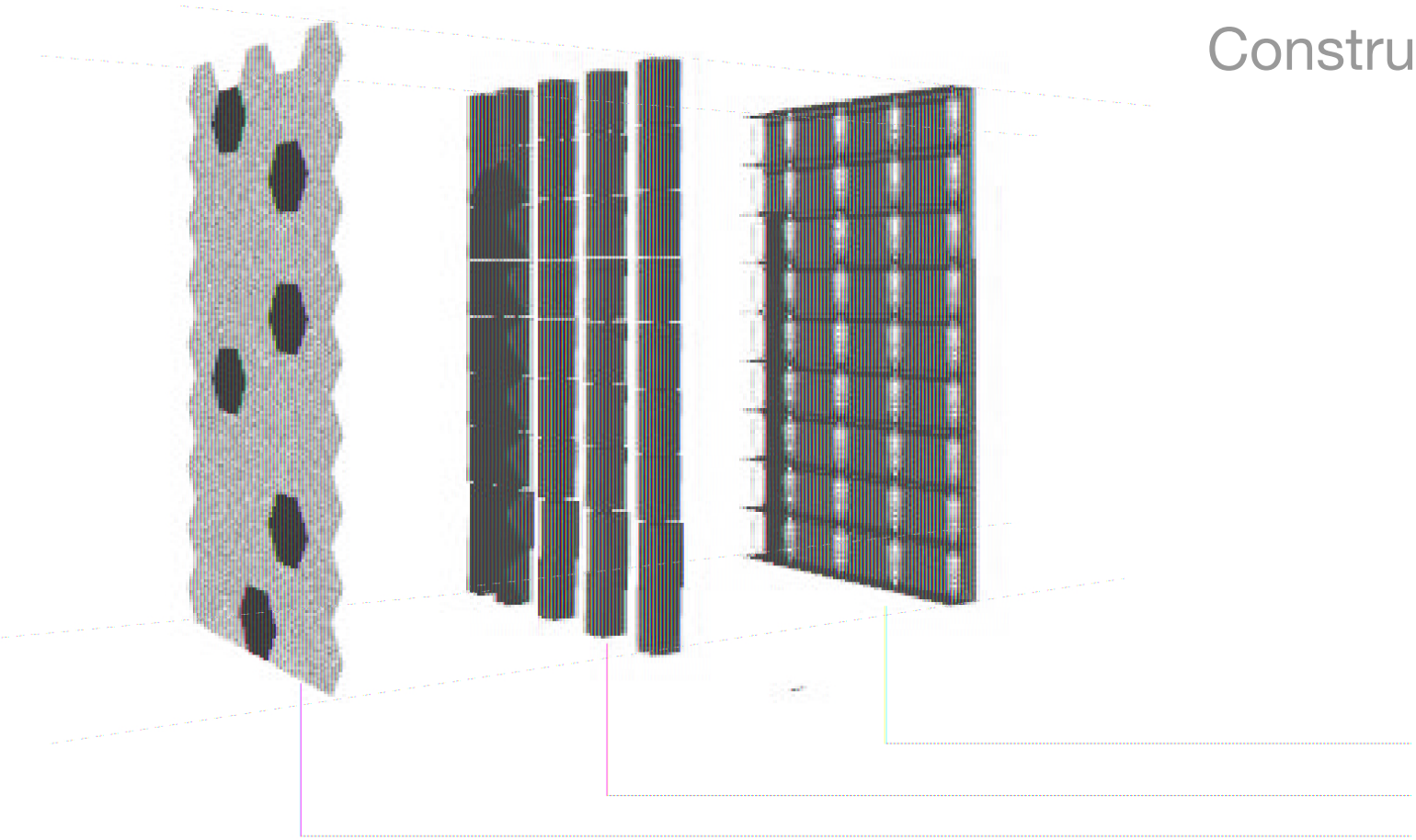
application of the mixture to surface: 8 - 10 mins

Drying time: 5 - 6 hours

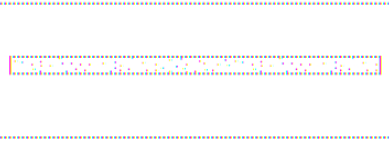
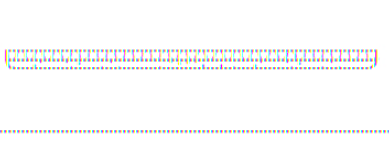
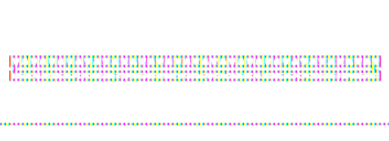
Flame resistance time : 15 - 20 mins

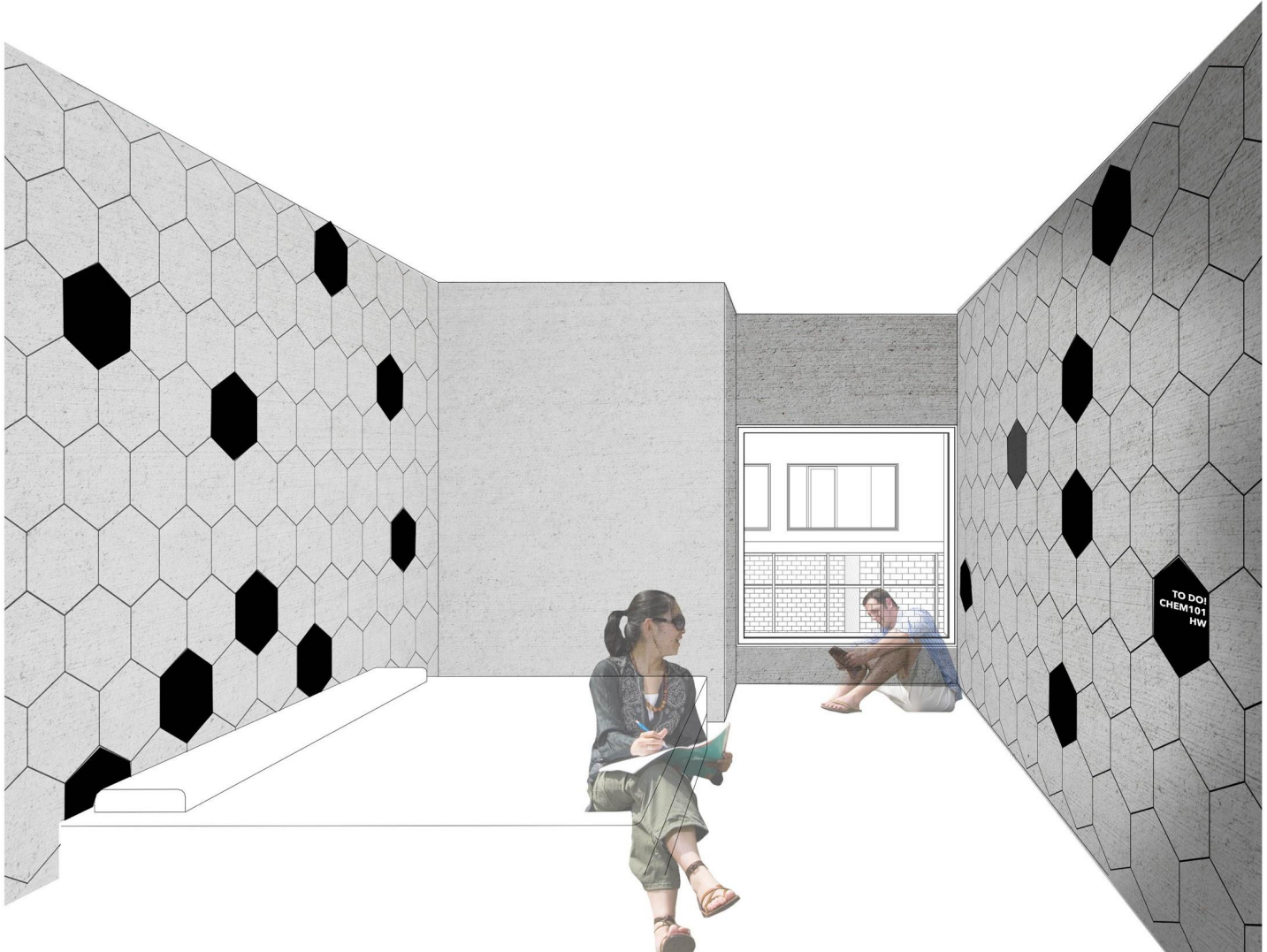
Cost (Skin) : $ 0 . 625 / sf

Construct Diagram

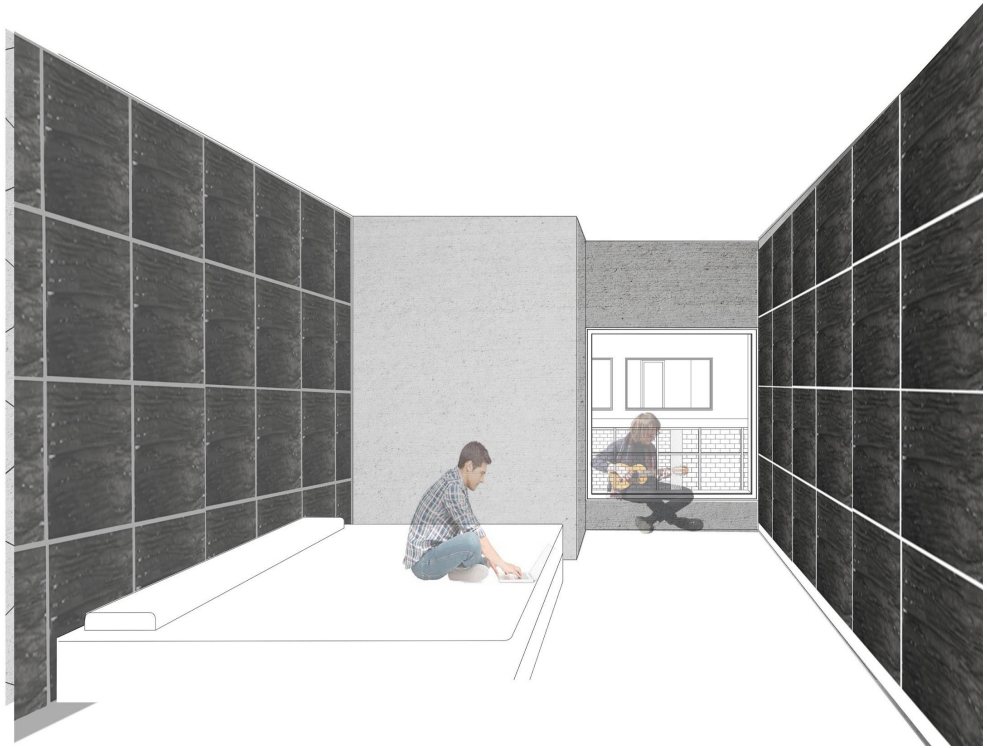


Prototype Variation

	Manufacture time	Plan View	Set
Papercrete Panel	15 - 17 hours		Brittle after to attach to
Cardboard with Papercrete mixture applied	7 - 8 hours		Warping iss papercrete
Papercrete panels + cardboard + flour glue	18 - 21 hours		Questionab glue betwee and panel


TO DO!
CHEM101
HW

Prototypes



Components: Papercrete mixture, Cardboard + recycled fabric

Papercrete

Durable

Easy to Install

Fire safe

Customizable

Future Work

- Keep researching and exploring fire safety
- Look for ways to reduce manufacturing time
- Test thermal resistivity of these walls
- Place a few walls into people’s home and document their effectiveness