Dream Team CalEarth

Abstract Presentation



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HACKADAY PRIZE 2020

Mission

Increase the demand for sustainable construction by creating a global trend for “Superadobe” homes by flag shipping in the US and Europe.

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Different Personas

Refugee/Emergency Housing

Cal-Earth Institute, Hesperia, CA

Remote/Low-Resource Housing

Cal-Earth Institute, Hesperia, CA

Target

Premium / First-world / Sustainable

Cal-Earth Institute, Hesperia, CA

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Target Personas - Objectives

Key Point:

- **Developed countries set the trend for building and lifestyle**

Goals:

- Increase market share and mind share of SuperAdobe
- Make SuperAdobe “A thing” in developed countries
- Propagate SuperAdobe outword

Strategy:

- Make construction less labor-intensive for well-resourced deployment scenarios in developed countries.

Target

Premium / First-world / Sustainable

New Ruins - Oaxaca, Mexico

Research interviews

Davide Frasca

MSc in Sustainable architecture, founder of VideTerra, wants to make sustainable construction more reachable
Torino, Italy

Paul Kreiner

Sustainable builder wants to innovate new techniques
Germany & Vienna

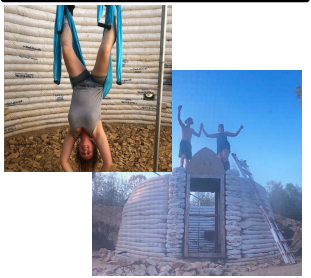
Nico- New Ruins

Sustainable farmer, landowner wants to create sustainable eco-tourism.
Oaxaca, Mexico

Omid Rahmani

Afghan architect, wants to build schools in Afghanistan.
Mashhad(Iran) and Herat(Afghanistan)

Ashley Phillips



Young couple, building their own home , enjoy sustainable living.
Willow springs, Missouri, United States

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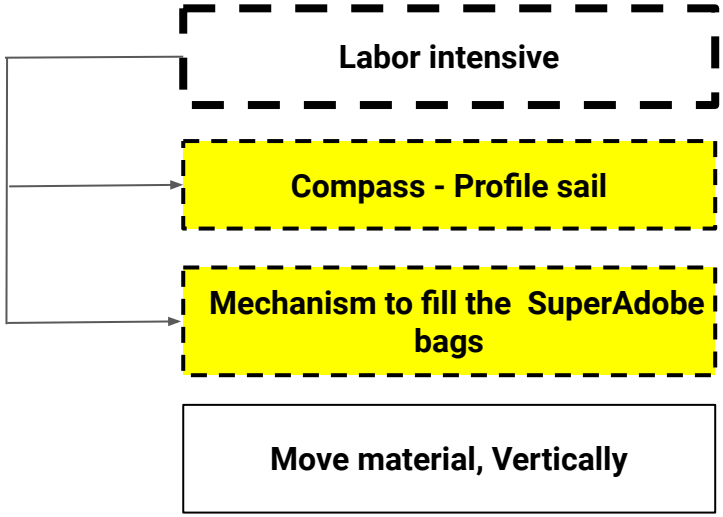
Pain-point Highlights

- Labor intensive
- Compass - Profile sail
- Mechanism to fill the bags
- Ability to mix soil and control humidity
- Plastering
- Burlup bags Vs Plastic bags
- Move material, Vertically
- Safety during construction

Targeted Pain-points



Plastering

Burlup bags Vs Plastic bags

Ability to mix soil and control humidity

Safety during construction

Pain Point: Filling the SuperAdobe bags

Labour intensive, awkward and creates a bottleneck

- The structures are made by filling bags, known as “SuperAdobe” bags with earth
- The bags are layered on top of each other to form a self supporting dome or arch structure
- The process is done entirely by hand and requires a minimum of two people.
- At least one of the two people needs to have a medium to high skill level

Pain Point: Filling the SuperAdobe bags

Labour intensive, awkward and creates a bottleneck

- The bags are folded back and held open manually by one person which requires two hands,
- A second person loads buckets of pre prepared earth in to the bags, one at a time
- The process is repeated 100s of times for each layer which can be intense for builders
- This is repeated from the bottom to the top of the dome meaning these tasks have to be performed at height

Mechanism to fill the SuperAdobe bags

Earth Funnell

- A funnel for holding the SuperAdobe bags open whilst you load them.
- Hand held
- Funnel makes it easier to pour earth in to the SuperAdobe bags
- Would have the capacity to pre-load an entire layers worth of SuperAdobe bag on to the tool
- Works like a *Christmas tree netting* machine

< 100 $

Mechanism to fill the SuperAdobe bags

Earth Funnell

- A funnel for holding the SuperAdobe bags open whilst you load them.
- Hand held
- Funnel makes it easier to pour earth in to the SuperAdobe bags
- Would have the capacity to pre-load an entire layer worth of SuperAdobe bag
- Works like a *Christmas tree netting* machine
- Fit all sizes of SuperAdobe bag

< 100 $

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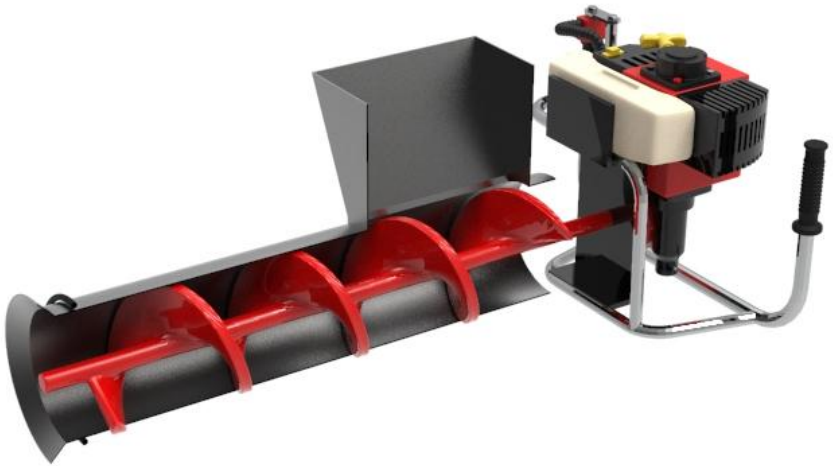
Mechanism to fill the SuperAdobe bags

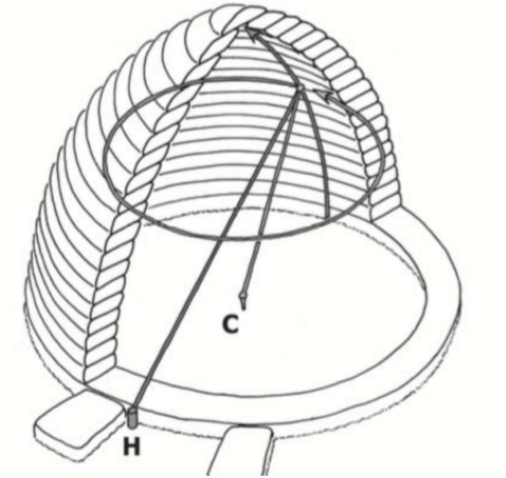
Earth Extruder



- A mechanized version of the previous idea
- Uses an *earth auger* to extrude earth in to the SuperAdobe bags
- Earth vertically loaded in hopper
- Load consistent ratio of earth and liquid using buckets in to the hopper
- Additionally addresses the issue of mixing the earth

< 400 $

Pain Point: Compass

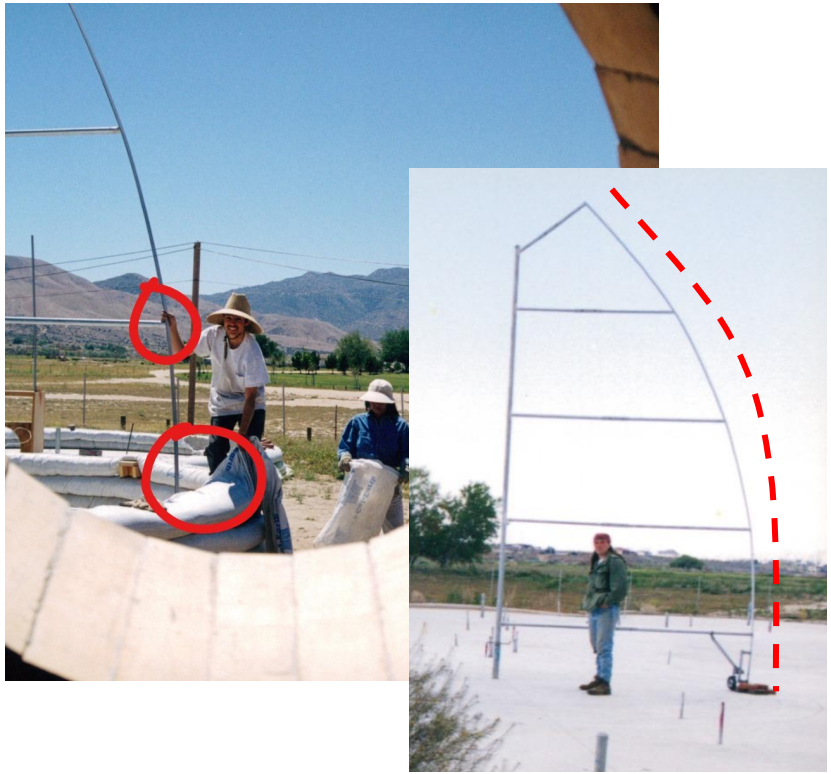


The “compass” is a system of chains or ropes used to measure the next bag placement during dome construction.

- Cheap
- Requires a fair bit of skill to operate
  - Build crew may waste time waiting for compass operator.
- Prone to integrated errors (a small mistake may invalidate an entire layer or more).

Pain Point: Compass

Time consuming and requires skill creates a bottleneck

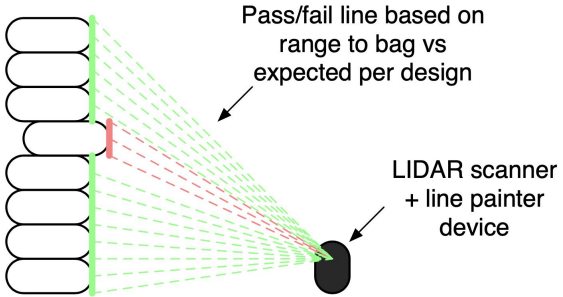


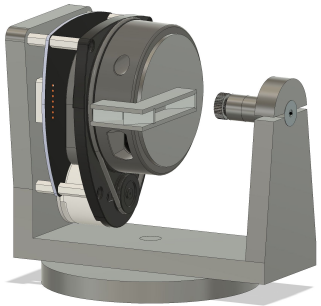
The current CalEarth alternative is called the “Sail,” which is a template instead of an ongoing measurement.

- Dome-specific construction (only applies to one size/shape)
- Obstructed by some structural elements (forms for windows/vents, integrated furniture, etc.)

Compass Alternative: Medium tech

LIDAR Compass



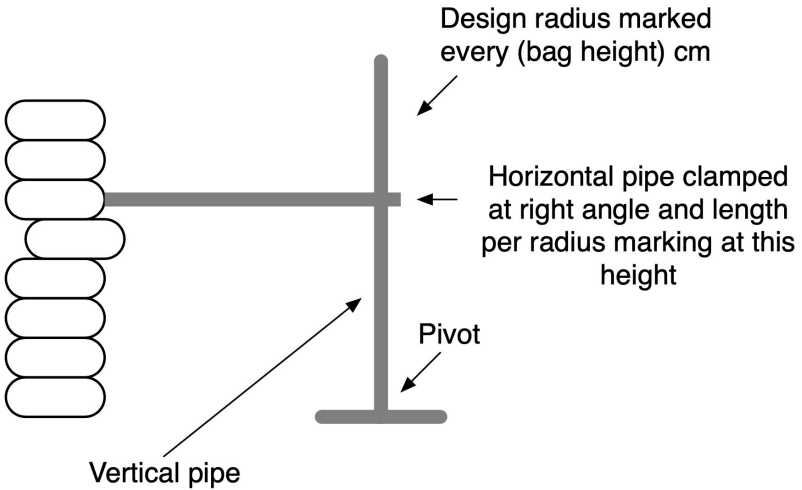


- A laser profilometer sits on the ground at the focus of a dome or vault
- It measures the range to every point on the dome in a vertical cross-section
- A second visible laser paints a “pass/fail” indication along the same line, highlighting where the measured distance is correct within acceptable limits.
- Device can be manually or automatically rotated while placing a layer.

< 350 $

Compass Alternative: Low tech

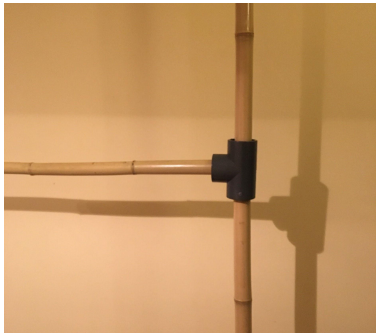
Pipe Sail



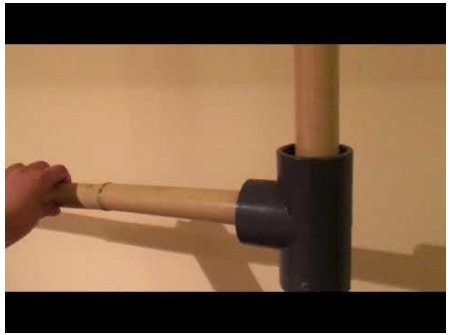
- Mark out radius measurements along the length of a vertical member
- Lash/clamp/affix a horizontal member at the “current layer height,” with a length equal to the marked radius measurement
- Using quick-release clamps or prusiks, can easily move radius pipe to pass obstructions etc.

< 35 $

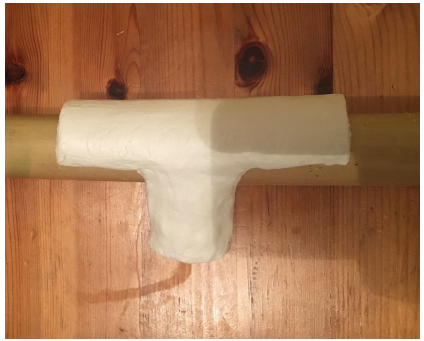
Compass Alternative: Low tech



Prototyping the first pipe sail idea. Currently made of bamboo to use less plastic in the prototyping phase.



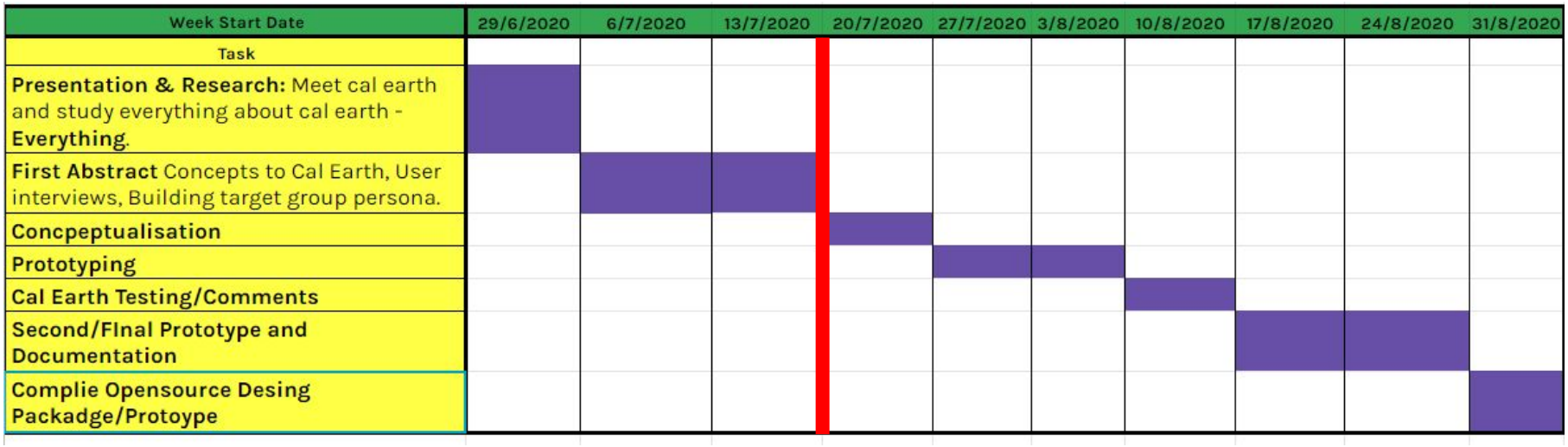
Ideally PVC pipes will be used to create the same configuration to give the bag placement point location.



Prototyping some press fit joint samples using Fast setting clay.

Prototyping some press fit joint samples using Fast setting clay.

Timeline


Week Start Date
29/6/2020
6/7/2020
13/7/2020
20/7/2020
27/7/2020
3/8/2020
10/8/2020
17/8/2020
24/8/2020
31/8/2020
Task
Presentation & Research: Meet cal earth and study everything about cal earth - Everything.
First Abstract Concepts to Cal Earth, User interviews, Building target group persona.
Concpeptualisation
Prototyping
Cal Earth Testing/Comments
Second/FInal Prototype and Documentation
Complie Opensource Desing Packadge/Protoype

CalEarth Product Store

amazon

All

Hello, Sign in
Account & Lists

Returns
& Orders

0
Cart

Deliver to
Spain

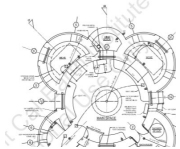
Today's Deals | Customer Service | Gift Cards | Registry | Sell

Amazon's response to COVID-19

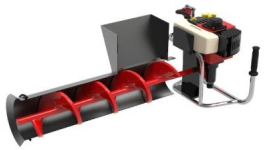
CalEarth

CalEarth Store Share this page

CalEarth



Eco-Dome Educational Blueprint PDF
500 $

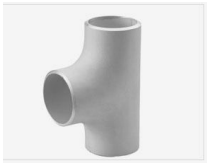


Earth Extruder
Rent/buy

CalEarth Bag roll 250 yard
243$

Earth Funnell
100 $

Lidar Compass
Rent/ Buy



Press Fit - PVC compass
35 $

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Q & A

Thank you

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