





Superadobe walls and floors

3+4

10_360° windows for aeration and views 11 rain water recuperation in burried water tanks around the structure 12_possible glass facade for greenhouses, workshops... 13_closed facade for housing, workshops...

4_INSULATION : hay insulation is filled between the panels and the structure 5_STRUCTURE : laminated wooden frames : 24 main structure + 13 rows of shading panels

6_PARTITION : Modular interior partition, can be built and remove depending the activity

7_WALLS : Superadobe walls : excavated soil is used to build thick walls using themral mass of the earth 8_FLOOR : stabilized earth floor with floor heating pipes 9_HEATING : geothermal heating system embedded in walls and floors to keep a tempered interior temperature all year long Modular Earth Domes.

what they could have accomplished acting individually" Buckminster Fuller "Don't fight the forces, use them" Buckminster Fuller

"Resources and energy are scarce, geometry is free"

Earth domes are a scalable, modular, collaborative construction principle for future buildings at Fly Ranch. More than a fixed design or plan for the development of activities at Fly Ranch, we propose a set of construction principles that can be tested, replicated, improved and upgraded by the community. These principles are based on our analysis of the forces and resources naturally available at Fly Ranch, trying to find the best suitable options for a sustainable development of future structures on site.

Earth domes are a combination of different self-construction techniques adapted to the singular Fly Ranch environment. Inspired by Pauite earth lodges, geodesic domes and superadobe construction.

1.Semi-buried superadobe walls and floors, geothermally tempered. Using the landscape and the thermal mass of the ground to improve the interior comfort of a building is one of the common sense building principles that our civilization lost on the way. To protect from the sun, wind and temperature variations (daily and seasonal), a semi-buried shelter is a good option. The first act of building would be to excavate the soil, creating both space and resources for construction! Superadobe is an earth construction technique developed by architect Nader Khalili that consists in filling bags with soil, stacking and tamping them layer by layer, forming free-form walls or domes. This technique seems very suitable in Fly Ranch because soil is the main available resource and because it can be done by anyone with no construction background, allowing the community to be radically included in the building process. We prefer this solution to clay 3D printing that seems to be less democratic and too technological.

2.Light wooden dome, naturally insulated. Dome is a recurrent and fascinating shape in nature, because it encloses the most space with the minimal surface area, optimizing the use of scarce resources thanks to geometry. We naturally choose this efficient structure to build shelters at Fly Ranch.

Since we want to give a maximum scalability and modularity to the constructions the domes need to be lightweight and allow big spanning. A metal structure would probably be the most efficient, but also would cause a big energy and carbon footprint that we want to avoid. That's why we designed a cross laminated wood dome that can allow sufficient span and

"When individuals join in a cooperative venture, the power generated far exceeds





trap carbon at the same time.

The dome structure can be prefabricated and assembled on site with light equipment.

The structure is then filled with wooden sandwich panels: two plates of wood filled with natural, local insulation, hay for instance. The structure can also be filled with transparent panels (glass, recycled plastic, ETFE...). Scalable combinations can be found according to the desired use of the building.

A final layer of soil covers the dome, enhancing the insulation and blending in the landscape.

Modular Earth Domes is a replicable design, with modular construction, scalable and adaptive dimensions and is self-buildable by the community. The design can also be shared for other communities worldwide. With this "recipe" a multitude of buildings with various usages and sizes can be built, largely including the community in the process: greenhouses, temporary shelters, workshops, housing, event buildings...

Prototype.

As a proof of concept, we can build a small scale shelter using the principles of Modular Earth Domes, built with the help of the community, celebrating the act of building something meaningful in common. This first shelter could be used by the community for short overnight stays at Fly Ranch. Later we could build different sizes of shelters improving the techniques according to the development of the site.

Material needs.

For a 20m diameter dome: cross laminated wood structure: 500m, surface of panels: 400m2 + 40m3 of insulation

Excavated soil: 600m3 Plastic bags: 600m of bags filled with 50m3 of soil Heating system: 700m of pipes

Material needed for a 5m diameter dome prototype would basically be 25% of this list.