a personal exploration into the physical process and experiential qualities of working with rammed earth.

meghan e. plichta
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purpose
throughout my architectural academic career i have been interested in alternative building materials, including straw bale, cob, and rammed earth. these materials, while considered ‘alternative’ compared to modern, standardized construction, are the very materials that were used for thousands of years and, it is estimated, are still implemented by 1/3 of the world’s population today.
my name is meghan, i am a 24-year-old architecture graduate student at the university of cincinnati in ohio. i was first subjected to natural building through a professor who built his own straw bale house in taos, new mexico. i did an internship a year later in taos and was able to see his house amongst other earth buildings, ranging in size and time, from the ancient cliff dwellings at mesa verde to the alternative earthships still being constructed.

while always ‘keeping an eye out’ for alternative and earth buildings, materials, and methods, in the meantime i’ve been developing my professional architecture skills and experience by working at several firms around the country, including cincinnati, washington dc, and currently san francisco.

upon graduation from my undergrad, i went to seattle, washington to learn about construction through volunteering with habitat for humanity, east king county through americorps. i assisted in building five single family and two duplex houses outside of the city, which was great exposure to standard u.s construction. this experience taught me a lot, including the value of social capital.

before returning to cincinnati to begin grad school in the fall 2010, i spent a month in sonora, california apprenticing with a natural builder. he taught me his ideology about natural building while introducing me to the culture and method of cob construction.

and now here i am, spending the rest of the summer in the bay area, looking to test out my skill and aspirations through a rammed earth prototype. exciting things to come.
In preparation for my thesis work in the fall, I will build a two-walled rammed earth structure, measuring 12' and 9’ long and 8’ tall. I will record the process of preparation and building in terms of the work as well as how I feel as the primary builder, designer, and user. I hope to find value in the subtleties of using this raw material during the process as well as the final result. I am also interested in, upon its completion, how others may interact with the structure.
what is rammed earth

you may ask? there are many traditional building methods termed ‘natural building,’ rammed earth being one of them.

Using rammed earth involves a process of compressing a mixture of damp earth that has suitable proportions of sand, gravel and clay (sometimes with an added stabiliser) into an externally supported frame that moulds the shape of a wall section creating a solid block of earth... A pneumatically powered backfill tamper - something like a hand-held pogo stick with a flat plate on the bottom (or alternatively a manual tamper) is then used to compact the material to around fifty percent of its original volume. Further layers of material are added and the process is repeated until the wall has reached the required height.

- Michael Thompson, *DIY Rammed Earth Manual*
prepare and dig foundation. the depth of the foundation depends on many factors, including climate, structure size, and material. for this project, especially because it is temporary, I have a 4” concrete slab as the foundation. Alternatives to concrete include tightly and strategically packed dry rockwork.
test on-site soil levels
it is important to have the right balance of each ‘earth’ component, including clay dirt and sand. clay helps the material’s resistance to rain, while sand adds compressive strength while dry. the common occurrence is having too much clay, which is easily fixed by adding outside sand. several tests can be performed to ensure a proper balance, including 1. hand compacted soil ball, 2. jar test (gravity soil separation), and 3. rope test, in which the mix can be rolled out without crumbling.
build formwork using 4x8’ plywood sheets, 2x4s, and metal reinforcement rods, I plan to build two pieces of formwork 4’ tall and use as progressive segments, creating an 8’ high wall.
build formwork
this is a good example of rammed earth formwork that I will model from Michael Thompson.
extract, mix soil
once the aggregate levels are decided from step two, it is necessary to extract the appropriate amount of subsoil and add any necessary sand to get the appropriate amount. this is best done with powered equipment and helping hands to minimize the time and effort needed. the subsoil can either come from onsite or an outside source, possibly extracted from a nearby construction site.
tamp dirt

Once the formwork is in place and stable upon the foundation, the earth mix can be added and tamped. Rammed earth is considered ‘man-made’ sedimentary rock, with our intervention taking the place of time. Each course starts as 12” and is tamped down to 8”. This will require about 12 courses with ample time to dry in between each.
remove formwork after the rammed earth dries, formwork should be removed in a responsible way that the form itself can be reused or the wood can be repurposed.
enjoy your very own rammed earth wall!

a built rammed earth project is unique to the builder and user in several ways.

1. the on-site earth used will be a direct representation of the place from which it derives and on which it sits, instantly connecting the user to the place.

2. just as it is unusual to know where our food comes from and how it is made, it is the same with construction. rammed earth makes the material used very apparent.

3. the process is energy-intensive but plausible by anyone.

4. in terms of an eco-footprint, especially when considering life-cycle analysis of manufactured materials, rammed earth is very appealing.
does this interest you?
if so, i would love your help and support. i am currently in need of a site on which to build this project. this will require the small parcel of land on which it will sit as well as subsoil to extract. i am also looking for some building equipment to borrow as well, as i will only be in california for a few more months and cannot invest in tools to take back to ohio.
also, just touching base and knowing you support such a project will be meaningful - feel free to send an email.
you can reach me at meghan.plichta@gmail.com
that you!
We are called to be architects of the future, not its victims.
- B. Fuller

thank you.