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SIP #4

Brief Overview of Your Topic

The construction sector is responsible for approximately 40% of global carbon emissions and yet it is rarely ever mentioned in mainstream climate action initiatives. In fact, the industry is harmful in more ways than just carbon footprint. The full life cycle of buildings, from extraction and manufacturing of raw materials, to construction, operation, and eventual demolition, is responsible for massive amounts of water and air pollution, deforestation, habitat loss, and resource waste. This is why it is imperative that when addressing the role of construction in climate change, we start at the source.

It is well-documented that the conventional materials we use to build with are not only harmful to the planet, but also flawed in efficiency and longevity. In contrast, there are many alternative building methods that have been shown to out-perform modern building conventions, and do so with a significantly smaller carbon footprint. One of these alternatives is called earthbag building. This method can essentially be described as building structures out of stacked sandbags. The difference is, instead of just filling the bags with sand, it is a mixture of sand, clay, and a small amount of binder (cement or lime). This form of building requires minimal processing, and you can often source the earth directly from the build site. Additionally, earthbag structures have an extensive list of climate resiliency benefits as well; the walls of these structures are thick, dense, and extremely strong. This quality allows earthbag to passively regulate temperature extremes, and withstand a wide range of natural disasters like floods, fires, and earthquakes, that cyclically devastate conventional buildings.

Unfortunately, earthbags and other resilient natural building techniques face an uphill battle in adoption for more widespread use. First of all, a lot of people are totally unaware that they exist. This fact alone means that efforts in integrating earthbag into standardized codes and practice are slow and usually met with skepticism and resistance.

Myth/Misunderstanding

Myth 1: Earthbag/superadobe buildings are weak and unsafe.

People assume that because you are literally building with dirt-filled bags, that the shelter being constructed couldn't possibly be a safe or legitimate housing solution. The truth is that properly built earthbag buildings are extremely strong and far more durable than the standard tract homes that pervade the 'modern' landscape. Earthbag structures have passed California seismic tests, and survived Nepal's devastating 7.8 magnitude earthquake. In fact, after that earthquake, the Nepali government became the first country in the world to adopt earthbag into its building code and recommend it as a leading building method.

Myth 2: Earthbag buildings are temporary and not code approved.

There's this common misconception that earthbag building creates just an experimental, off-grid style shelter that can't be recognized as permanent housing. In reality, earthbag construction has already been adopted into some building codes, but the process is extremely slow, so it hasn't taken off everywhere yet. Petitioning for any new building material or method takes a lot of time, research, and money, which means that for more niche approaches, the process moves even slower. The issue isn't that earthbag can't meet modern building standards, it's that the industry hasn't fully caught on yet.

Myth 3: Natural building methods couldn't possibly out-perform modern technology.

As leading figures in the building sector continue to innovate, the spotlight tends to be pointed at high-tech solutions (automated systems/new synthetic products, etc.). Because of this, natural building is often dismissed as outdated and too simple to compete. Ironically, the basic principles of thermal comfort and energy efficiency are intrinsically embedded in the design and material logic of traditional building methods and developed variations like earthbag. The truth is that there is a lot we can learn and build upon from the building styles of our ancestors, who found ways to work with the climate and materials available to them to create remarkably efficient dwellings.

Ethical Implications

I find the myths and misconceptions of natural building so interesting because they reveal how deeply ingrained our ideas of what progress and modernity look like in how we build. The problem with this is that it reinforces so many unsustainable aspects of extraction and production and almost completely in vain, because down the road, the materials we invest so much energy into, aren't built to last and often end up perpetuating further climatic destruction. This cycle exposes a moral contradiction in the construction industry because we justify waste and pollution in the name of progress... even when more sustainable, proven alternatives already exist.

Debunking Sources

Source 1: Top answer in a Reddit thread: "How are earthbag homes considered strong?"

This was one of the top hits for the google search “are earthbag houses safe?”. This was one of very few hits that didn’t pop up from a website that directly advocates for earthbag and natural building technology.

1. Link

https://www.reddit.com/r/earthbagbuilding/comments/exz35h/how_are_earthbag_homes

considered strong/

2. Does the source use “fact sandwich format”?

No. The top answer is pretty jargon-heavy and reads more like a technical engineering explanation than an accessible mythbusting answer that an inquirer could easily grasp. The response eventually explains why earthbag structures could be strong, but I think the point is pretty buried in complex terminology and does not sandwich the answer with clear and memorable facts (though I think the latter half of the response is strong because it is grounded in real evidence). However, the second answer beneath this one does a much better job of the sandwich format. It is shorter and easier to follow, and opens with a linked reference to seismic testing in California. It closes with a point about domes being some of the longest standing architecture ever, and links more information on ancient Puebloan architecture that is still standing after over a thousand years- which I think is a very strong fact to end on.

3. Does the source use any sort of marketing or advertising techniques?

Nope, not specifically. While there isn't any direct marketing for earthbag building, there is some credibility-building through the commenter's personal experience during an earthquake in Taiwan and through references to CalEarth and Nader Khalili's publications (the founder of SuperAdobe).

4. Does the source leave any gaps in the content that really should be filled, or accidentally reinforce the myth they're trying to bust?

Yes. I think that the first line “The language here is too vague to answer easily” could subtly reinforce the thought that the safety of earthbag building is uncertain or subjective. I think the answer ends strong though, using the lawsuit anecdote to give a real life example of earthbag's legitimacy.

Source 2: Q&A on building codes with earthbag expert Kelly Hart

1. Link: <https://www.earthbagbuilding.com/faqs/codes.htm>

2. Does the source use “fact sandwich format”?

No. While the FAQ sheet does address myths and offer facts/clarifications, it doesn't use the fact→ myth→fallacy→fact structure.

3. Does the source use any sort of marketing or advertising techniques?

While not explicitly advertising, some of the answers lead towards persuasion to get others to join the movement.

4. Does the source leave any gaps in the content that really should be filled, or accidentally reinforce the myth they're trying to bust?

Yes. What stands out to me is that this Q&A doesn't have a date it was published, and a lot of the answers iterate how "new" and "not generally recognized" earthbag is. And, because it is the top hit when I searched "earthbag no code approval", it can still easily reinforce earthbag's newness and illegitimacy, even though there has likely been developments since this website was last updated.

Source 3: Pros and Cons of Living in an Earthbag House

1. **Link:** <https://earthbagstore.com/earthbag-house-the-pros-and-cons-of-living/>

2. **Does the source use "fact sandwich format"?**

Nope. This is another FAQ-style top Google hit for the search "are earthbags more energy efficient than green buildings?" The article's answers cut straight to the point, but they don't really follow the fact sandwich structure. Through my research on myths and misconceptions about earthbag building, I've noticed that there aren't many strong opposing claims to the technology, just scattered questions and curiosity about how it works. Unlike topics like anti-vax misinformation, there isn't a big crowd of people publicly arguing against earthbag building. It's more that the information bubble around it is small and niche.

3. **Does the source use any sort of marketing or advertising techniques?**

Yes. This site is literally called "The Earthbag Store" and is one of the top hits for information about the energy efficiency myth. Whether or not it's for direct personal gain, it's still clearly trying to win readers over to the idea that earthbag is a superior building method.

4. **Does the source leave any gaps in the content that really should be filled, or accidentally reinforce the myth they're trying to bust?**

It would be nice if these Q&As and FAQs included true sources. There's a lot of "take my word for it" energy out there on earthbags (if you're not looking at strictly scientific publications, which I purposely didn't for this assignment). Without cited studies or data, even accurate claims can sound like personal opinion rather than fact.

Fixes

Source 1: Truly I think a simple omission of the up-front technical jargon would help a lot (highlighted). [Reddit thread](#).

Current State:

The language here is too vague to answer easily. This is because there are many different ways to build with earthbags and one answer can't address every case.

First you have to split apart shell structures and hinge structures. Right angle architecture earthquake calculations are based on hinge strength models. So in the case of a hinged structure much of the strength is related to the width of the wall in relation to its height and the nature of the hinges.

In a shell situation, there are no hinge calculations because a masonry shell behaves as a unit where typically all points are in compression due to the topology of the curves. Think of an egg shell. It's quite fragile but when one part is deformed it doesn't instantly collapse. The deformation remains local and the stress is propagated along the entire shell surface due to the strength of masonry in compression.

So the way this question is being asked it is bringing in too many possible cases. You can certainly build an earthbag wall that will fall down. It's not magic. It depends how you're building. If you're making shells then the rules of shells apply. If you're making an arch then the rules of arches apply and if you're making a hinge then the rules of hinges apply.

Generally speaking though, the rule I follow is one that is mentioned by Khalili in a number of his publications which is to always build as strong as you can. That means using rock and cement in your mix. Stabilized earth with concrete mixed in that has subsequently been subjected to pressure by mechanical ramming is hardly weak. It's rock hard and no less than a foot thick. Why would we expect such a massive and strong structure to be weak compared to a wall made of 2X4 timber?

Getting back to your point about earthquake prone areas that use reinforced concrete --I live in Taiwan. The first earthbag homes I saw completed were here in Taiwan after the big quake in '99. It was precisely because the EcoDome model from Cal Earth is the safest design for an earthquake prone area that they were built following the earthquake. Now notice that this goes back to the earlier point about shell structures. The EcoDome model is not just based on earthbags, it is also based on masonry shell techniques. They're not the same thing. They can be combined but they are not identical.

Indeed, I'll tell you a little story: EcoDomes were built here in Taiwan following the big one that killed thousands (I was in Taipei in a five story building for that one) and some local builders who worked with steel reinforced concrete didn't like the idea much and they paid the police to allow them to bulldoze the Cal Earth inspired EcoDome houses that were built. This resulted in a lawsuit and that was why the place I watched get built was permitted; it was a direct result of the lawsuit against the groups that had attempted to keep them out and the whole story goes back to them being the most earthquake-safe structure that can be built quickly at low cost.

My Improvements: (just cutting the highlighted out)

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Source 2: Fact sandwich attempt for one question in [this FAQ](#)

Q: What do building codes say about this kind of building technique/material?

A: It depends on how liberal the local building officials are. Earthbag building is fairly new and therefore less known than other alternative building methods, so it may be more difficult to get through the red tape. Nader Khalili at Cal-Earth has been working for many years to have his techniques of "superadobe" (using earthbags filled with adobe) be adopted by the Uniform Building Code. He has convinced his local building dept., in Hesperia, CA, to allow this sort of building. I built my earthbag/papercrete house in a county of Colorado that has not yet adopted building codes, so that was fortunately not issue for me.

My Improvements: Properly engineered earthbag buildings *can* meet building code requirements and have been permitted in several U.S. jurisdictions. Many people believe that earthbag homes are unpermitted, temporary or experimental only because they're "non-standard." This assumption ignores documented (and easily found) instances where earthbag construction was approved, and discounts the fact that there are areas, like the author mentions, where building codes "haven't been adopted" so it is free game there, too. For example, the FAQ itself acknowledges that code-approved earthbag homes have been built in places such as California, Arizona, Utah and Hawaii.

Source 3: Rewriting a section from the [Earthbag Store's Pros and Cons Page](#) in a more Fact Sandwich style

Current State:

THEY ARE DURABLE AND RESISTANT TO NATURAL DISASTERS.

Another advantage of living in an earthbag house is their durability and resistance to natural disasters. Earthbag houses are incredibly strong and can withstand earthquakes, hurricanes, and other extreme weather events. This is because the materials used to construct them are flexible and can absorb the impact of these events without collapsing. Additionally, earthbag houses are fire-resistant, which can provide peace of mind for those living in areas prone to wildfires. However, it's important to note that proper construction techniques and materials must be used to ensure the durability and safety of the structure.

My Improvements: I think the word of caution sentence at the end pulls from the confidence in the claim, so I would rearrange these sentences so it ends on a more affirming note and add a fallacy acknowledgment:

Another advantage of living in an earthbag house is their durability and resistance to natural disasters. **However, some people assume that because they're made from bags of dirt, they couldn't possibly hold up to severe weather or seismic events. It's important to note that proper construction techniques must be used to ensure the durability and safety of the structure, but this is true for any building style.** Earthbag houses are incredibly strong and can withstand earthquakes, hurricanes, and other extreme weather events. This is because the materials used to construct them are flexible and can absorb the impact of these events without collapsing. Additionally, earthbag houses are fire-resistant, which can provide peace of mind for those living in areas prone to wildfires.