Episode 6: Build Local

Background audio from of construction

Ava: We’re dropping into the world of hemp/lime building today.

Alie: That’s right we’re off the farms, the plants are out of the ground, and we’re going to see what it takes to build a house out of hemp.

Drew: Alright, guys, so you just want to get in there and mix it up.

Ava: That’s Drew Oberholtzer from CoExist, a hemp/lime building company. He’s working with students in a workshop we here at Parsons Healthy Materials Lab hosted in Brooklyn’s Industry City.

Jonsara: So guys, how does it feel?

Student: It’s heavy.

Jonsara: Heavy.

Student 2: Really thick.

Jonsara: Thick.

Alie: Before we get our hands too dirty, let’s back up and talk about how exactly we get hemp from a field to your wall. Welcome back to Trace Material.

Ava: Since the passage of the Farm Bills something that’s commonly called hempcrete, or hemp/lime, has been gaining traction here in the US. Simply put, it’s a building material that’s made of hemp, lime and water. That’s it. And like so many products that are made with hemp, it may feel new to us… but hemp/lime actually has quite a past.

Jonsara: Well hemp and lime has this very, very old history. It's been found in a bridge in France that was built 600 years ago. It uses the ingredients that are pretty simple to find.One's a plant, one's a stone, a mineral, and together with water and some processing, it becomes a building product.

Alie: That’s Jonsara Ruth, one of our co-directors here at Parsons Healthy Materials Lab. We’ve recently started to work with hemp/lime after years of searching for a truly healthy building material.

Jonsara: There's a lot of work in this field that's really saying how do we make something less bad, minimize the negative. But we kind of got impatient with that idea and thought, you know, isn't there a material out there that is solely positive?

Alison: If you look around you, whatever space you're in now, whether you're inside or outside of you on the subway or you're in your office, you're surrounded by products that are like PVC in that they're complicated, they're usually petrochemical based and they're not good for you.

Ava: That's Alison Mears, the other director of HML. If you haven't heard of PVC, it's a very common plastic in buildings. It can be found in your flooring, pipes, and shower curtains. It's often referred to as the poison plastic and it's just one of many toxic materials we're surrounded by everyday.

Jonsara: So there's PVC now without phthalates, which is removing one of the toxics that's in PVC and people are celebrating that advancement in technology. Isn't this a much better material for the environment, and we say it's one tiny step, but if we look at it systemically, it's still causing horrific trouble with human health and the environment.

Alie: Alison and Jonsara aren't all that interested in tiny steps. They want to make radical change in the building industry. But that means taking a look at the entire life cycle of the materials we're building with. Are they causing harm when they are grown or extracted? And what happens to them when they are disposed of? Could we build with something that's good for people and the environment throughout its lifecycle?

Alison: So mostly if you think about the way building products are manufactured, you imagine a factory where the smoke stacks and you imagine a bunch of ingredients going in there. You imagine a lot of energy being expended and at the end you get your PVC tile. For example, when we think about hemp and lime, you can imagine the field where the industrial hemp is growing. And you can imagine the quarry, which is where the limestone comes from. The limestone is processed with heat, with energy to create lime. The hemp is taken from the field and laid out to dry in the field and then goes through a process of breaking down the stalks and then it's ready for use in this product. And you add the hemp herd to the lime powder and you add water in a bucket. If you, you know, if you have a bucket and you can start to create a hemp lime mix that you could build with. So it's a very simple process. Very understandable.

Ava: That simple process is what you heard happening in the workshop earlier this episode. Alison and Jonsara took us through the process in a little more detail.

Alison: The lime is white and soft like talcum powder and the hemp herd it's softer than straw or hay and it has this great smell. It kind of smells planty and fresh.

Jonsara: This lime that's like powder gets mixed with water and that is mixed into a slurry. And that slurry is kind of like, it's kind of the consistency of pancake batter. It looks a lot like heavy cream. It's very, very white. And so when it's, it's mixed into this slurry, it's then poured into a bucket or into a mixer that has the hemp herd. So this lime and water mixture, imagine pancake batter is mixing into the hemp herd and then that whole thing, that whole mixture is mixed up. The hemp herd and the lime mixture has to be mixed really completely so that each of those pieces of hemp herd is coated in lime.

Alie: Okay, so I think we can agree...hemp herd, lime powder, and water in a bucket makes sense to us. But how do we move from the bucket to a wall? Much like concrete, hemp/lime goes from a thick, wet mixture to something solid over time. People often call this material “hempcrete” because it mixes like concrete. But it’s a bit confusing because it’s not structural like concrete. More on that later.

Jonsara: When that mixture is, is put into a wall cavity or into a mold of some kind and starts to dry that wet lime is absorbing carbon dioxide from the air in order to cure. And as it cures, it becomes hard. And people say that actually lime cures for really long time, like maybe even up to 80 years, it cures. And that whole time it's pulling carbon dioxide from the air. So this product is also a carbon sequester. Like the hemp plant in the field, it pulls carbon dioxide from the air.

Ava: Right. But hemp/lime doesn’t replace structural materials like concrete or limestone, it’s neither as hard nor as strong as those materials. It would be a better replacement for something like insulation.

Alison: But as hemp and lime dry, it becomes lighter and lighter and lighter and it becomes this kind of almost quite friable substance in the wall that is reasonably airy, right? So it's an unusual kind of building product. So when we think about using hemp and lime in construction, we're thinking about it typically between structure or on top of structure as an infill material.

Alie: Alison, Jonsara, and the Healthy Materials Lab team are in the beginning phases of research with hemp/lime. Drew Oberholtzer and Ana Konopitskaya from CoExist taught the workshop you heard at the top of the episode, and they invited HML down to their homebase to discuss all things hemp/lime.

Drew: We're in Blandon, Pennsylvania in Berks county, in the middle of Pennsylvania German country. Mennonites and horse and buggies.

Ava: Drew and Ana are both growing hemp and building with hemp/lime. When they first got started, they were intrigued by the hemp world, but thought that the CBD market might already be oversaturated.

Ana: We talked to a lot of people obviously, in this industry, there seems to be this understanding that the CBD market might fade over time, but the fiber is gonna once it takes off.

If we have a lot of end users and we can really use it, we can use it for so many different applications.

Alie: But deciding on fiber hemp instead of hemp grown for CBD really didn't narrow things down that much. Remember, people say this plant has over 25,000 uses.

Drew: You know, we were trying to figure out a way to sort of enter the world, even when we sort of discovered hempcrete. What sort of really worked for us was when we reached out to this woman in southern California and actually went to her space and smelled it, experienced it.

Ava: That one experience of walking into a house built out of hemp/lime was transformational for Drew and Ana. Currently, most houses are covered in plastic in one form or another. Although the materials in our homes are often toxic, we're also used to them. So walking into a house that has off-gassing VOCs from generic house paint might not be noticable. But perhaps we can imagine what it would be like to walk into a home that's absent of those smells and toxics by thinking about the difference we feel walking around a city versus the countryside. We here in New York rarely think about the smells we smell or the feelings in our lungs that we get from walking around breathing in air pollution all day. But suddenly, when we step off a train or get out of our cars and we're surrounded by grass and trees—we know we're missing something in everyday life. Ana described a similar feeling when she first walked into a hemp/lime home.

Ana: It felt very comfortable, I would say. So this was in California where it's usually very dry. As you know, they're are not many rains. The dryness in the air can really get to you at some point. It affects your skin and hair. In this space, it just kind of felt good. And we asked her do you have any kind of heating or cooling going on and she said, I turned it on for a couple of minutes and during the day and that's it. And it was just so comfortable. It wasn't hot, it wasn't dry, it smelled good. The acoustics were great. ~~H~~er friend, a musician, stayed there for a little bit and he played his guitar and he said, did you know how great it sounds here with just with the walls filled with hempcrete?

Drew: And she also shared this anecdote of, and this young woman who every time she goes into a building, she's very sensitive. She has allergies, asthma, what have you, and she said being in that house was the first time that she felt normal.

Alie: Hearing this story didn't surprise us. We know that interior air quality has a huge effect on health. Doctors who we work with at Mount Sinai suggest that families with asthmatic children should open windows for fresh air, since most interior environments are built with toxic materials. But what if families didn't just have a window as their only access to healthy air? Homes that are built with a consideration for human health from the beginning, like those built with hemp/lime, could change the way we feel inside.

Ana: And that was another thing that kinda got us thinking at that time because we know so many people with allergies, when I was growing up, I didn't know anyone, someone with an allergy was abnormality, almost, just so rare. And now it's so rare to meet someone without allergies. And when that person said that, yeah, I had no allergic reaction being in this building, I thought this is incredible. We have to make a difference here in this country because developers

just go and build miles and miles of these plastic buildings, these off-gasing buildings. And people have to know the difference.

Alie: Drew and Ana wanted to do more than just tell people about this experience they had. They believed that for hemp/lime building to really catch on, people had to feel what they felt. So they decided they would build a hemp house...on wheels.

Drew: So because of that experience and the inaccessibility of hemp houses to the general public, we felt, well, let's just make something that's mobile that we can take to people. So we bought a used trailer, started building it in our barn. Some people started in their garage, we started in our barn.

Ava: After long, cold nights building the hemp/lime trailer in their barn, the team at CoExist and their partner Cameron McIntosh at Americhanvre was ready to show the world what it's like to live inside a hemp house. They premiered their tiny, healthy house at the Cannabis World Congress and Business Expo, which was held in the Javits Center in New York City. That meant driving the hemp house on wheels all the way from Berks County, Pennsylvania.

Drew: At the time we weren't even sure if it would even make it. We took a lot of chances. There was a huge rainstorm or like, Oh my God, we've got to throw a tarp over it... and hailstorm too. And I'm like, oh my God, what, you know, can we get a break?

Ana: It's survived. It's a miracle. After 2,500 miles, it's still driving fine. It looks like it was just built like a month ago.

Alie: After a rocky trip to New York, Drew and Ana were finally able to share with the world what they had felt in California: there's just something different about building with hemp. But as you can tell from that story, the hemp/lime building industry is still in its infancy.

Ava: Alison and Jonsara over here at HML are working on our next steps, and are starting to frame out what the future of hemp/lime in construction could be in the United States.

Alie: Hemp/lime isn't a material that would be allowed in building codes in most American cities. The average homeowner wouldn't be able to find this product in a store. Right now, it's a niche product, but hopefully it won't stay that way.

Alison: We're interested in developing products that everybody has access to that just aren't available to a small percentage of the population or a small group of developers and architects. It's really developing something that's ubiquitous that is available to everyone.

Ava: It might feel impossible from where you're sitting right now to imagine that hemp houses would become commonplace, but there are some–excuse the pun–concrete reasons why people in the building industry might prefer them.

Jonsara: If you cut a wall, you know, in half and you just look at what's inside, you might find even up to seven different products that go into making a wall. When you build a plant based wall or a hemp lime wall, what you'll find is that there are only really three layers. Inside, in the core is, is hemp lime. On the inside is hemp lime plaster. On the outside is also a render of hemp lime. It's really reducing all of these other building materials.

Alison: I don't think you can underestimate how conservative the construction industry is. And so we could have gone down a pathway perhaps where we were exploring a product that was totally different to any kind of product that had been used in the construction industry in the past. We wouldn't have done that because it would have been really difficult for it to be adopted in the construction industry. So we're looking for products that actually seamlessly slide into the construction industry where you can use existing trades and practices that can be easily adopted, that will be, something that fits into a regular schedule of construction that makes it easy for people to, to transform products that they would have used in the past and adopt new products.

Alie: But still, even if it's seamlessly replacing 7 different materials in your wall, people build with those materials because they're cheap, they're easy to find and they know how to build with them. That's the benchmark hemp/lime has to meet to move into the mainstream. Those factories and smokestacks Alison mentioned earlier when she painted the picture of PVC production...they aren't set up to produce hemp/lime. But if we think about the current landscape of the United States, there are empty factories and people looking for products to produce.

Alison: So thr challenge with the affordability question would be if we needed new factories to make these products. And so if we think about underutilized factories that are across the country, often in communities where big industry has left where populations have started to decrease, there's a lot of underutilized infrastructure that we are looking at to start to develop these kind of products.

Ava: It's not just factories and agriculture that could be revitalized with hemp/lime. Lime itself is abundant in the US, as well. Limestone makes up 8% of the earth's crust.

Jonsara: Hemp and lime as a product can ignite local economies of agriculture and stone quarrying.

Alie: While Alison and Jonsara are interested in helping to develop a product that can seamlessly fit into the construction industry, they're not interested in helping to perpetuate the same kind of economic inequality that currently exists. Will hemp/lime be a product of big business? Or could small local businesses be the cornerstone of this new industry?

Alison: So I think that the equity piece of this comes from the creation of a new system. In contrast to something like big agricultural or big business for example, what we're proposing

because of the agricultural base and because the system of production, a smaller system that is locally, based in communities across the country where these products that are made from the hemp that is grown in the field are developed in the local family owned business and sold locally to help development in those communities. And that for us seems like a sustainable and equitable model of production that's quite different from the products that are typically made in the construction industry at the moment.

Ava: Here at HML, we often compare what we're trying to create to the "Eat Local" movement. Like the meals on our dinner tables, our homes, in an ideal world, would be made from local ingredients. If you lived in Maine, on top of large beds of granite, perhaps that would be the base of your home, but if you lived in New Mexico, you might have a home made of traditional adobe. Or if you lived near limestone quarries and hemp fields, you would have a home made of hemp/lime. Building with local ingredients could reduce carbon emissions dramatically.

Alison: I mean it's this overarching definition of sustainability that we're developing that is materials based that if you work local, if you produce products that have a limited life on the back of a truck if you have a factory that works in a local community and is a sustainable factory, if you have sustainable agricultural practices, you develop a whole new range of products in a way that's a kind of akin to organic that the organic food market that you create a product that is sustainable through its whole life cycle. And I think that for us is really important. We would think it would be a huge mistake to say at this point that we have a healthy material, but it's part of an unsustainable practice of production.

Alie: Although strides toward accessibility have been made in the 'Eat Local' movement, it's still out of reach for many. It's difficult to strike a balance between quality and affordability, but the HempLime industry Jonsara and Alison are envisioning certainly isn't a niche one. In our discussion, Alison mentioned that Walmart is now the largest organic food retailer in the US. And while we might not agree with all of their business practices, we can understand the power of that fact. If it's at Walmart, it's accessible. That's what we want for hemp/lime. We want healthy buildings to be accessible and affordable for all.

Alie: We've asked a lot of *what if?* questions in the past six episodes. And while things are starting to move forward in the hemp/lime building industry, there are still more questions than answers. We want to take you with us as we continue to develop new products and build new relationships with people who are driving this industry.

Ava: Join us next episode to hear from the people on the frontlines of this work.

Ava: Trace Material is a project of Parsons Healthy Materials Lab at the New School. It is produced by me Ava Robinson, Alie Kilts, Burgess Brown and the HML team. Thank you to Ana Konopitskaya, Drew Oberholtzer and our very own Alison Mears and Jonsara Ruth for lending their voices, thoughts and experiences to this episode. And special thanks to friends of healthier

materials, who help make this possible. Our theme music is “Rainbow Road” by Cardioid. Additional music provided by Blue Dot Sessions.