

What we used and *why*

Material selections for our Woolsey Fire rebuild based on priority criteria

Contents

01 Foundation, Framing & Sheathing

02 Insulation, Air Barrier & Walls

03 Roof, Windows & Doors

04 Flooring for Living Spaces

05 Other Flooring & Interior Surfaces

06 Caulking, Adhesives & Fillers

07 Hardscape

08 Energy

09 Materials Considered but Not Selected – And Why Not

10 Recommended Vendors

Synopsis

The pages below list and briefly describe the main materials we used in our rebuild, and roughly rate how they hold up against the seven criteria – described below - that mattered most to us.

Our choices prioritized the following criteria:

- **feasibility** (getting the rebuild actually done)
- **disaster resilience** (reducing the risk that anyone would ever suffer the kind of loss we did)
- **health** (no second disaster of getting sick from unhealthy building materials)
- **long-term cost effectiveness** (total cost-benefit over time)
- **sustainability** (environmental footprint, reducing embodied carbon)
- **aesthetics** (beauty)
- **up-front affordability** (immediate cost)

Often we had to make trade-offs, such as choosing more durable materials to save money and increase value in the long run even though it meant spending more at the time of purchase, or sacrificing some of our sustainability to move forward on best feasible options.

We also discuss the materials we considered and why we did not choose them, followed by a list of recommended vendors.

How to read the ratings

- We roughly rated each material **HIGH / MODERATE / LOW** against the criteria that mattered most to us, and included brief explanations for the given rating.

- N/A describes criteria that were not applicable for a particular material.

01

Foundation Framing & Sheathing

The basic first layer

Foundation

Steel reinforced, CARB-compliant, regionally sourced concrete poured over the existing slab



Feasibility — HIGH

Reinforced concrete slab was highly feasible to design and permit. Laying it over our existing 55+ year old slab also allowed us to avoid a grading permit for the main house.

Sustainability — MODERATE

The steel and concrete were resource-intensive to make and ship, but on the positive side, also met strictest CARB emissions standards and should last generations.

Aesthetics

N/A

Long-term Cost Effectiveness — HIGH

Because the foundation was a prerequisite to rebuilding and regaining the property's value, and because of its durability and resilience, we anticipate the investment to be cost-effective over time.

Disaster Resilience — HIGH

Our highly experienced concrete contractor put it this way: the only way this foundation will ever fail is if the whole mountain slides away.

Health

N/A

Up-front Affordability — MODERATE

Pouring a new foundation is costly, but we saved on ripping out and disposing of the old one, and on the cost, time and complexity of a grading permit.

Framing

Wood stick-built with OSB shear walls and steel-beam reinforcement at large openings, anchored to the foundation, and designed to exceed code for life safety and seismic damage.



Feasibility — HIGH

We chose this common framing method largely because permits, materials, and labor were readily available, making it a highly feasible option

Sustainability — MODERATE

Wood was SFI-certified—the most sustainable local option—while steel was selected based on availability, with production and import impacts offset somewhat by durability and resilience benefits.

Aesthetics

N/A

Long-term Cost Effectiveness — HIGH

Tightly enclosed wood framing and steel are both highly durable, supporting long service life and long-term value.

Disaster Resilience — HIGH

Seismic resistance is high, while fire resistance becomes high with the rest of the wall system (see section 2).

Health — HIGH

Breathable wood framing helps prevent trapped moisture and mold. Untreated wood and steel minimize off-gassing. A few glulam beams off-gassed early in construction, before occupancy, and a vinegar-based wash was used to inhibit mold.

Up-front Affordability — HIGH

This was the most affordable building method we identified, short of the prefabricated Holz 100 / Thoma Holz and Triqbriq systems (see Section 9), which permitting constraints ruled out in LA County.

Sheathing

OSB and Plywood.



Feasibility — HIGH

Widely available from lumber yards and big-box stores, with no specialized installation skills required.

Sustainability — MODERATE–HIGH

SFI certified and CARB ultra-low-formaldehyde compliant, this was the most sustainable option we could feasibly source for our design. However, unlike options like strawbale or pure wood, plywood and OSB rely on chemical resins and adhesives.

Aesthetics

N/A

Long-term Cost Effectiveness — HIGH

Should last the building's lifetime (75–100+ years) if protected, though OSB adhesives haven't been proven over that span like pure wood.

Disaster Resilience — HIGH

OSB and plywood are seismically resistant, and while combustible if exposed, they are enclosed in a highly fire-resistant wall system.

Health — HIGH

While not as high rated as wood, straw, or clay, the fact that plywood and OSB in this application are breathable, CARB-compliant, and off-gas quickly, makes them healthy to live with.

Up-front Affordability — HIGH

Lumber costs have risen, but OSB and plywood are available at high-volume distributors and quick to install making them relatively economical.

02

Insulation, Air Barrier, & Walls

The layers between us and the weather

Three insulation layers



Ceiling: soy-based, low-Global Warming Potential (GWP) closed-cell spray foam (Huntsman Heatlok HFO EZ)



Ceiling & walls: Havelock R22 sheep wool batt



Walls: Gutex Multitherm 40mm / 1.57" wood-fiber board

Insulation

Ceiling: low GWP spray foam + wool batt. Walls: wool batt + Gutex wood fiber



Feasibility — HIGH

Easy to source overall, although limited to single manufacturers.

Sustainability — MODERATE–HIGH

Sheep wool (from New Zealand, no US source exists) and Gutex wood fiber (Germany) are highly sustainable, although import impacts reduce their sustainability. US wood fiber supplier Timber HP's distribution was not ready in time for our project, but we reasoned our Gutex use supported general market development. The foam is mostly petroleum-based, but with 20% soy, is the lowest GWP foam available, and we reduced it to the minimum required (1.5″) to achieve mold resistance.

Aesthetics — HIGH

While insulation is not visible, the wood fiber board let us thicken exterior walls by 1.5" without losing interior footprint, improving the overall aesthetics and functionality of the building.

Long-term Cost Effectiveness — MODERATE

Cheaper options that are as durable as wool exist like Rockwool, but it is non-biodegradable and may carry lung health risks.

Disaster Resilience — HIGH

Spray foam and sheep wool are Class A fire rated; Gutex wood fiber is less fire resistant, but all insulation materials are tightly covered by non-combustible materials, making their overall disaster resistance high.

Health — HIGH

Foam use, while hazardous to workers, was minimized to only 1.5 inches and well-ventilated during installation, and importantly helps prevent condensation and mold. Wool and wood fiber are nontoxic and breathable.

Up-front Affordability — MODERATE

These carried a moderate premium relative to other insulation options. The higher cost of sheep wool was a trade-off we accepted for air quality and environmental protection. Spray foam, which was needed for mold prevention in our climate zone, will help sustain a mold free building.

Air barrier

Pro Clima Adhero 3000, taped around every opening



Feasibility — MODERATE–HIGH

While suppliers are limited, we found one in northern CA, and workers loved applying it, sharing that they found it far superior to Tyvek.

Sustainability — MODERATE

Although it is a petrochemical plastic imported from Germany, it has a third-party Environmental Product Declaration and is durable.

Aesthetics

N/A

Long-term Cost Effectiveness — MODERATE

Superior mold prevention is anticipated to help offset the higher upfront costs.

Disaster Resilience

N/A

Health — HIGH

Its smart membrane keeps vapor out in cool wet weather and in during dry weather, supporting a healthy indoor climate.

Up-front Affordability — LOW

Costs significantly more than standard barriers like Tyvek, a trade off we made for its air quality protection. Ease of application may have saved on labor, but this is too uncertain to impact the rating.

The wall assembly



Living room window, with Adhero 3000 (over Gutex not visible in photo), then covered by MGO



Stone veneer applied with mortar and anchors over MGO is the final exterior layer.

Cutting & setting the stone



Salvaged stone, cut to fit on-site with water-cooled saws. We got a great deal on a local used saw on Facebook Marketplace!



Cut stone staged by pallet, ready for installation



Set by hand over wire lath by a master mason and crew

Exterior siding

2″ salvaged sandstone veneer, cut on-site from stones collected on-site and on the road after storms (85-90% of exterior); lime plaster (10–15% of the exterior). Both over ½″ magnesium oxide (MgO) board.



Testing limestone stucco samples with our salvaged stone veneer

Feasibility — MODERATE–HIGH

Sourcing MgO was challenging, but we found a great distribution contact who also helped with code compliance. Its higher weight compared to standard options like gypsum and its somewhat novel installation requirements added some labor and learning curve, but it was all doable. Stone was plentiful from our former home, and on and around our property. Skilled masonry and lime plaster application were both straightforward.

Sustainability — HIGH

Stone used minimal resources, being sourced from our salvaged house, property, and street after storms, and cut onsite. MgO is climate-negative to produce, and while currently imported from China, is expected to be manufactured in the US. Lime plaster absorbs carbon and was made locally.

Aesthetics — HIGH

Stone is strikingly beautiful, timeless, and complements the natural landscape from which it comes.

Long-term Cost Effectiveness — HIGH

We expect the aesthetic value and fire resistance of the siding choices to pay off in the long-term.

Disaster Resilience — HIGH

Stone and MgO are non-combustible; thin, anchored stone follows seismic best practice. Lime plaster is also non-combustible.

Health — HIGH

Stone applied with limestone mortar, MgO, and lime plaster are all non-toxic and breathable.

Up-front Affordability — LOW

Covering nearly the whole home in hand-set stone took months and was costly compared to stucco. MgO and lime plaster also cost more than standard options.

Interior wall base layer

Magnesium oxide (MgO) board





See previous page for details on MgO.

Interior wall finish

Lime Plaster



Feasibility HIGH

Lime plaster is made locally, and both material and skilled labor were readily available

Sustainability HIGH

Lime plaster is low in embodied-carbon, and ours was made locally, further reducing its cradle-to-cradle impact.

Aesthetics HIGH

High aesthetic value, especially installed by the expert artisans we were lucky to have.

Long-term Cost Effectiveness HIGH

Highly durable compared to drywall and paint, and raises the home's value through its aesthetics.

Disaster Resilience HIGH

Lime plaster is non-combustible.

Health HIGH

Nontoxic and breathable, lime plaster supports good indoor air quality.

Up-front Affordability LOW

Lime plaster costs more than drywall and paint due to installation time

03

Roof, windows & doors

Key defenses against letting fire in

The roof going on



Polystick XFR WUI underlayment on the non-vented roof



Mission clay roof tile being installed

Roofing

Mission clay tile over WUI-rated waterproofing underlayment on a non-vented roof; non-vented soffits.



Feasibility — HIGH

All materials and labor were readily accessible, though tiles need several weeks of lead time.

Sustainability — MODERATE–HIGH

Tiles were made locally from abundant material. The underlayment isn't recyclable, but its fire protection avoids far worse toxicity from a burned structure.

Aesthetics — HIGH

Beautiful and timeless.

Long-term Cost Effectiveness — MODERATE–HIGH

Longevity, permanence, and fire resilience help offset the relatively high upfront cost.

Disaster Resilience — HIGH

Tiles are Class A fire rated and non-combustible with clay bird stops to block embers. The underlayment and non-vented, closed-soffit design add to the fire resistance.

Health — HIGH

Neither product emits toxins or harms indoor air quality.

Up-front Affordability — MODERATE

Tiles cost far more than asphalt shingles, but less than metal or stone tile, and they last a very long time.

Fascia

Stainless steel sheet



Feasibility — HIGH

The material, fabricators, and installers were all easy to come by.

Sustainability — LOW–MODERATE

Extractive and energy-intensive to produce, the steel's environmental footprint is offset somewhat by durability and the small area used.

Aesthetics — HIGH

Once rusted and sealed, it complements the building's aesthetic, much like the more traditional wood option but without the fire hazard and maintenance.

Long-term Cost Effectiveness — HIGH

Requires no maintenance unlike wood, and its fire protection adds long-term value.

Disaster Resilience — HIGH

Steel is non-combustible and slower to melt in fire than aluminum.

Health — HIGH

Not toxic — we rusted it with a salt-vinegar solution and seal it with a non-toxic sealant.

Up-front Affordability — LOW

More expensive than wood fascia.

Downspouts & gutters

Stainless steel with steel mesh



Feasibility — HIGH

Material and fabrication are readily available.

Sustainability — LOW–MODERATE

Extractive and energy-intensive to produce, like other steel elements, but also durable and made up a relatively small piece of the overall construction.

Aesthetics — HIGH

We have received many compliments on the gutters. Once they rust, they will match the other steel elements and blend with the timeless look.

Long-term Cost Effectiveness — MODERATE–HIGH

More costly than aluminum but less than copper, and highly durable.

Disaster Resilience — HIGH

Steel is non-combustible, and the mesh prevents fire prone debris and embers from collecting.

Health — HIGH

Non-toxic.

Up-front Affordability — MODERATE

More costly than aluminum, but less than options like copper.

Windows

Hot-dipped galvanized steel frames with dual-pane, tempered, 99% UV-protective laminated glass, sealed with fire-resistant adhesive and Prosoco waterproofing



Feasibility — HIGH

Custom manufacturing meant a 4–6 month lead time, but they were made locally, and this window type is widely available.

Sustainability — MODERATE–HIGH

Steel and laminate are resource-intensive, but so are most other window options. Also, they were made within 25 miles of our site and are extremely durable. Waterproofing adds further durability. Multiple layered, low-e glass, high quality sealing, and our temperate climate most of the year help offset the thermal losses endemic to steel frames and large windows that we chose for our design to capture the outdoor beauty and natural light.

Aesthetics — HIGH

They add a very high amount of aesthetic value to the home.

Long-term Cost Effectiveness — MODERATE–HIGH

Likely to last a lifetime with little maintenance, while adding value and disaster protection.

Disaster Resilience — MODERATE–HIGH

Non-combustible steel frames with tempered, laminated glass and fire-resistant adhesive sealing make these a virtually non-breakable, fire resistant option. We could have made them even safer by making them smaller, but we accepted the aesthetic trade off, given our hardscape surroundings.

Health — HIGH

They create no health hazard to inhabitants or installers, though the waterproofing needs ventilation during install.

Up-front Affordability — LOW

One of the more costly window options — only bronze or highly custom designs cost more.

Doors

Same specification as the windows, except the front door, which is steel-clad reclaimed wood with steel hardware, and the interior doors, which are wood finished in lime paint with a wax sealer



French door out of the kitchen

Feasibility — HIGH

Not off-the-shelf given the tall size and aesthetic requirements, but all were made locally with several supplier options.

Sustainability — MODERATE–HIGH

Steel is energy-intensive to make and ship, but these doors are highly durable; the front door used reclaimed wood made in Southern California; interior doors used locally sourced wood, and the lime paint and sealer are locally sourced and low in environmental impact.

Aesthetics — HIGH

Significantly add beauty to the home.

Long-term Cost Effectiveness — MODERATE–HIGH

Durability, low maintenance, fire resistance (exterior doors), and aesthetics should pay off in home value over time.

Disaster Resilience — HIGH

See windows page for description of steel and glass doors; steel-clad front door is highly fire resistant; interior doors aren't rated for this criterion.

Health — HIGH

No health hazards to inhabitants or installers.

Up-front Affordability — LOW–MODERATE

The exterior French doors had high cost up front like the windows, although we found a reasonably priced maker near San Diego for the custom front door.

Raising the windows



A finished window unit, craned into its opening



A crane was needed to lift the window over the house



The first inspection, on four legs

04

Flooring for Living Spaces

Grown, burned, and brought back for a new purpose

Floors from our Fire-Destroyed Trees



Our fire-destroyed Aleppo pine, cut and staged, ready to be milled into planks on our portable mill



Living room: Aleppo pine flooring, lay out



The finished floor, sealed and sanded, lit by the afternoon sun

From planks milled onsite to flooring



Rough-cut Aleppo pine slabs get selected for milling into flooring at a local facility



These planks that have been drying for a few years will be made into our living-room, bedroom, hall and closet flooring

Flooring for living room, kitchen, bedroom, hall

Wood floor made from 50+ year old Aleppo pines that died and had to be cut down on our property as a result of the smoke and heat from the fire. Finished with Bona Traffic HD over Bonaseal (water-based poly). Moisture barrier (Bona Rollguard Heat) used on slab under wood.



Feasibility — MODERATE–HIGH

We milled planks onsite with a portable mill bought after the fire, then had a local mill finish them into tongue and groove flooring.

Sustainability — HIGH

Repurposing dead trees and milling locally is very low in embodied carbon and avoids decomposition emissions; water-based poly is more sustainable than oil-based.

Aesthetics — HIGH

Beautiful, unique, and their story is meaningful.

Long-term Cost Effectiveness — MODERATE–HIGH

Wood flooring can last generations. Although Aleppo pine is a soft wood, so they will scratch (we consider it patina), we milled them to 3/4 inches to enable refinishing.

Disaster Resilience

Wood is combustible, but as an interior material that's not a primary concern — and clearing the dead pines improved defensible space.

Health — HIGH

Non-toxic, maintaining healthy indoor air quality.

Up-front Affordability — MODERATE

Comparable to high-quality hardwood, but not the cheapest flooring option. We were able to save costs by handling much of the installation and all the finishing ourselves.

05

Other Flooring & Interior Surfaces

From earth to home

Counters & surrounds

Caliza Capri honed limestone slab used for all countertops and bath surround



Feasibility — HIGH

Readily available at a local stone yard, with many fabricators able to work it.

Sustainability — MODERATE

Highly durable but imported, not reclaimed. Reclaimed tile or wood would have been more sustainable but typically cost prohibitive, unavailable in the needed quantities, and/or the wrong aesthetic fit.

Aesthetics — HIGH

Beautiful and timeless.

Long-term Cost Effectiveness — MODERATE–HIGH

Its physical and aesthetic durability could reasonably last the home's lifetime.

Disaster Resilience — HIGH

Limestone is non-combustible.

Health — HIGH

Non-toxic; the fabricator's sealer off-gassed briefly, and we'll re-seal with a non-toxic product.

Up-front Affordability — LOW–MODERATE

Costly, especially the thick kitchen slab, partly offset by a reasonably priced fabricator.

Wall tiles

Zellige — hand-glazed Moroccan clay tile used in bathroom and for kitchen backsplash.



Feasibility — HIGH

Available at many vendors nationally; finding a qualified installer is the harder part, but we got very lucky.

Sustainability — MODERATE

Local clay, natural pigments, sun-dried and kiln-fired, zellige tiles are highly sustainable, but shipping from Morocco adds transport emissions that reduces the sustainability from high to moderate.

Aesthetics — HIGH

Beautiful, especially when installed by a skilled artisan like ours, and complements our natural surroundings.

Long-term Cost Effectiveness — MODERATE–HIGH

Timeless and durable enough to be a reasonably good long-term investment.

Disaster Resilience — HIGH

Non-combustible — the clay tile from our burned home were some of the only remnants that survived.

Health — HIGH

Non-toxic.

Up-front Affordability — MODERATE

About $19/sq ft — moderate next to other handmade tile, costly next to paint. We used it only as an accent to control cost.

Wood beams

Wood from the property's own dead trees, plus reclaimed wood from old barns, fabricated into beams.



Feasibility — HIGH

Plenty of wood from our dead trees, though not enough long beams — a Southern California fabricator supplied the rest. The two largest beams were a challenging but feasible install.

Sustainability — HIGH

Repurposing our own dead-tree wood is highly sustainable; the reclaimed beams came from Southern California, limiting shipping emissions.

Aesthetics — HIGH

Striking, adding significant beauty to the home's interior.

Long-term Cost Effectiveness — HIGH

These beams add great value to the home because of their beauty, they are highly durable and can last the lifetime of the home. Beams like this have been used for centuries, so will not go out of style.

Disaster Resilience — HIGH

Thick heavy timber, considered Class A fire resistant.

Health — HIGH

All products support healthy indoor air quality.

Up-front Affordability — MODERATE

The beam from our wood cost only the price to square the dead tree trunk into a beam and installation. The other beams were reasonably priced compared to competitors, although as a decorative detail, this was a luxury addition.

Beams - Detail



Kitchen: reclaimed beams on the ceiling



Beam we milled onsite from a coastal live oak that we lost in the fire, installed in the bathroom

06

Caulking, Adhesives, & Fillers

The fire and health protection subcontractors often overlook

Caulking & Adhesives

Safecoat Almighty Adhesive and Caulking Compound; Bona R851 Flooring Adhesive



Feasibility — HIGH

Easy to source online or at a local vendor.

Sustainability — HIGH

The AFM Safecoat products are very low-/zero-VOC, HAP-free, low-toxicity products, while Bona R581 is a zero-VOC, GREENGUARD-certified silane adhesive. Though they remain synthetic materials with associated manufacturing impacts, they are substantially more sustainable than alternatives.

Aesthetics

N/A

Long-term Cost Effectiveness — HIGH

N/A

Disaster Resilience

N/A

Health — HIGH

All products support healthy indoor air quality.

Up-front Affordability — HIGH

These products are comparable in price to more conventional products.

Fillers

Class A Fire Rated Foam covered in foil for HVAC pipe gaps



Feasibility — HIGH

Easy to obtain online or with local vendors. Easy to apply.

Sustainability — LOW–MODERATE

All materials used have a significant environmental footprint. However, they are durable and used in small amounts.

Aesthetics

N/A: This was used in the back of the house, so hardly visible.

Long-term Cost Effectiveness — HIGH

We expect this to be a one time expense without need for maintenance.

Disaster Resilience — HIGH

Methods used are fire resistant. There are more strongly fire rated sealants available, but because there are no combustible materials anywhere near the opening, and fire professionals advised embers reaching the area is a very low risk, the chosen methods seem sufficient.

Health

N/A: None of the materials are in the living space.

Up-front Affordability — HIGH

Materials used were not very expensive and applied in only small amounts.

07

Hardscape

Making defensible space and access easy and beautiful

Reclaimed brick driveways & patios

Reclaimed brick, largely already in place when we bought the property, surrounds the home and is used on the driveways.



Feasibility — HIGH

Most was already installed when we bought the property. We supplemented it to fill in gaps with identical brick purchased at a hardscape yard.

Sustainability — HIGH

Reusing our old brick had zero ecological footprint. The rest was reclaimed and originally made in LA County. Nearly all of it is laid in sand, making it permeable and supporting onsite groundwater retention.

Aesthetics — HIGH

The old brick is part of the unique charm of the property.

Long-term Cost Effectiveness — HIGH

Highly durable and easy to maintain, plus its charm sold us on the property. A sound investment next to concrete or asphalt, which crack and need far more repair over time.

Disaster Resilience — HIGH

Brick is made in fire, and survived the fire that destroyed our home very well.

Health — HIGH

A non-toxic material.

Up-front Affordability — MODERATE

Reusing our brick cost only the labor to relay it. The supplemental brick, at $0.95–1.44 each against up to $2 elsewhere, was a good deal for the limited section we needed.

08

Energy

Protecting the Home and the Climate

Renewable Electricity, Zero Emissions Storage + Transportation, Fuel in Emergencies

All electric, powered by solar, backed up by batteries and gas generator



All appliances are electric, with heat pumps for hot water and HVAC.



7.5 kW solar PV and 30 kWh battery, with bidirectional EV charging.

Feasibility — HIGH

Appliances, solar panels and batteries are readily available. Permitting our solar panels had to overcome initial challenges, but became possible.

Sustainability — HIGH

Compared to gas reliant appliances and relying solely on grid power and fossil fuel back up generation, the chosen options are highly sustainable. Batteries are toxic when burned, but this is offset by the operational environmental benefits.

Aesthetics — HIGH

The appliances are either invisible or nice looking. The solar and batteries are barely visible.

Long-term Cost Effectiveness — HIGH

We expect the return on investment of the solar and battery system to and the ability of the gas generator to ensure our fire suppression system and other key safety needs to run in all conditions to make the choices worth it in the long run.

Disaster Resilience — HIGH

The solar and batteries with redundant gas back up generation will help maintain critical loads during disaster.

Health — HIGH

Solar + batteries will emit less pollution than relying solely on back up gas generation during outages; induction cooking reduces some toxic emissions caused by gas ranges.

Up-front Affordability — LOW–MODERATE

High up front costs were offset by federal tax credits that were available at the time of purchase.

Power Pole

Fiberglass-reinforced polymer (FRP) utility poles.



Feasibility — HIGH

SCE referred us to their vendor, RS Technology, who processed and delivered our order.

Sustainability — MODERATE

This fiberglass composite pole has significant sustainability advantages over wood poles from its durability, long service life, and fire resistance. However, its petroleum-derived resin, energy-intensive manufacturing materials, and limited recyclability prevent it from being sustainable on environmental grounds alone.

Aesthetics — MODERATE

The brown paint sticks out more in our rural environment than wood, but it is not terrible.

Long-term Cost Effectiveness — HIGH

Unlike treated wood poles, which are prone to damage by animals and all of which had to be replaced in our canyon post-Woolsey Fire, the fiberglass composite pole requires no maintenance and likely no replacement for its 80-year lifespan.

Disaster Resilience — HIGH

These highly fire resistant, self-extinguishing poles are proven to be safe enough to be part of SCE's wildfire mitigation strategy.

Health — HIGH

Although manufacturing exposures to fiberglass dust and resins, as well as toxic exposure in petro-chemical extraction exist, the pole does not readily present health impacts to end users, as it does not off-gas and is highly unlikely to burn.

Up-front Affordability — LOW

These poles are more than twice the cost of treated wood poles (~$5k vs $2k).

09

Other Materials Considered

The roads not taken

Materials considered but not selected – and why not



Thoma Holz 100 CLT (dowels)

STRUCTURAL WALL, ROOF & FLOOR ASSEMBLY

Locally sourced softwood, sustainably harvested during the waning moon phase. One of the first prefabricated CLT systems — free of preservatives and glue, connected with dowels only, making it healthy, sustainable, low-carbon, and seismically safe.

Why not selected — Our first choice — simple, sustainable, fire/seismic resistant, healthy, cost-effective even with EU shipping. But permitting was the limiter: US code covers adhesive CLT only, LA County's alternative-material approval was too risky, and the manufacturer had no need to chase California approval given its European and Japanese workload.



CLT with adhesives

STRUCTURAL WALL, ROOF & FLOOR ASSEMBLY

Standard CLT sold in the US, using adhesives to glue the layers together.

Why not selected — Code approval was still young with few precedents and few willing architects. Adhesives also lower seismic resistance and indoor air quality, and the material was prohibitively expensive.



Triqbriq

STRUCTURAL WALL, ROOF & FLOOR ASSEMBLY

German brick system made of compressed waste wood, assembled with dowels.

Why not selected — Tested to code and highly fire resistant in Europe, but lacked seismic testing strong enough for California, and the company wasn't ready to invest in it.

Materials considered (Continued)

but not selected – and why not



Hempcrete INSULATION, STRUCTURAL WALL & ROOF

Hemp hurd and lime mixed into a concrete-like material — healthy, durable, and carbon negative.

We did use it for our restored chicken coop, pictured here.

Why not selected — Our design would have needed structural steel cross-beams for seismic safety, making it cost-prohibitive.



EcoCocon STRUCTURAL WALLS

European load-bearing twin-stud timber frame panels, insulated with straw infill.

Why not selected — We found one building that used it in Northern California, but permit records and familiar labor were scarce, and the young company's product was expensive.



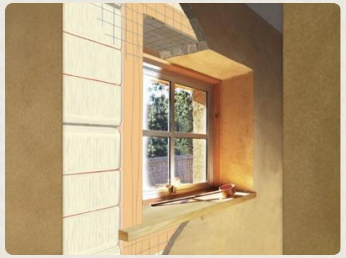
Rammed earth FOUNDATIONS, FLOORS & WALLS

Compressed damp earth, gravel, sand and clay inside formwork, built into dense, low-carbon, breathable, noncombustible walls.

Why not selected — Beautiful and time-tested, but labor- and space-intensive — walls must be thick, costing us square footage — and prone to water vulnerability.

Materials considered (Continued)

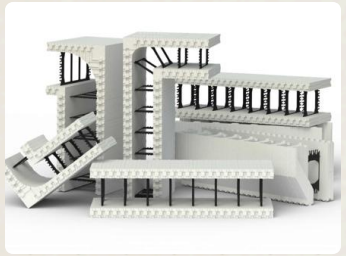
but not selected – and why not



Straw bale STRUCTURAL OR INSULATING WALLS

Stacked bales of dry grain-crop stalks.

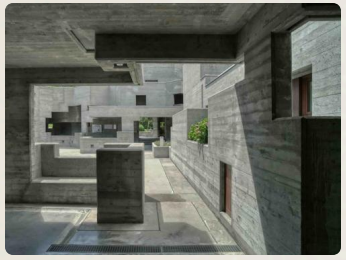
Why not selected — The wall thickness required would have cost us square footage in our small house.



Insulated concrete forms (ICF) STRUCTURAL WALLS

Rigid foam blocks that lock together like giant bricks, filled with steel-reinforced poured concrete.

Why not selected — ICF blocks are made with Expanded Polystyrene (EPS), which is derived from petroleum, making it a fossil fuel-based material. Matthias had lived in an ICF house and, despite his having always been healthy, experienced headaches there. The foam isn't environmentally sustainable, and while the concrete core doesn't burn, the foam melts and turns toxic in fire.



Poured concrete, steel-reinforced FOUNDATION, FLOORS & WALLS

Concrete poured into a form and reinforced with structural steel.

Why not selected — We used this for our foundation, but not the walls — it isn't breathable, is carbon-intensive, and expensive. We knew of concrete homes that failed in Malibu fires, so its fire resistance didn't offset the trade-offs when other materials met our goals just as well.

Materials considered (Continued)

but not selected – and why not



Hemp wool insulation INSULATION

Hemp wool is available and highly sustainable, but not very fire resistant.



Cellulose insulation INSULATION

It is highly available and reasonably sustainable in the short term, but tends to settle, so its integrity risk declining over time.



Denim insulation INSULATION

It is available, and reusing material keeps it out of a landfill, but it tends to settle, and mold treatment can diminish its positive attributes.



Rockwool insulation INSULATION

It is readily available at big box stores, highly fire resistant, provides good R-value per inch, and uses natural and recycled materials, but unlike sheep wool, does not filter toxic chemicals.



Plantd STRUCTURAL PANELS

Carbon-built structural panels made from fast-growing grass, designed as drop-in replacements for wood. They were not ready when we needed them, but we stayed in touch. This is a material to look out for. plantdmaterials.com

Recommended vendors

Viviano Construction FRAMING / CONCRETE / CONSTRUCTION CONTRACTOR

Camarillo · (805) 340-9980

Great, experienced contractor. A master of concrete and so many other trades, he brings 40 years of working for everyone from kings and highest-end designers to humble fire rebuilds like ours. High integrity, generosity, and loyalty — he has become family to us and other rebuilders. Recommend without reservation.

Vasari Plaster and Lime Paint PLASTER

Ventura · vasariplaster.com

Reasonable prices, excellent product, friendly service, locally made.

Casa Chromata PLASTER INSTALLER

Santa Monica · casachromata.com

Clint and Damien are wonderful artists, kind as can be, accommodating, generous and reasonable.

Cruz Metal Design METAL WORK

Oxnard · 805-341-9161

If you need a highly artistic metal design, Arturo can help. We had to expand our antique collector's item gate to meet fire code, and he did an outstanding job. Also one of the nicest people you can find.

MCA CLAY ROOF TILES

Corona · mca-tile.com

Good quality and color choices made in the region at a moderate price.

Daniel Martinez ROOFER

Oxnard · 805-824-6230

Daniel is unfailingly courteous, fair, and does good work.

Recommended vendors

Badia Design ZELLIGE TILE
North Hollywood · badiadesign.com
The best source for Moroccan materials. Mohammed is always helpful and fairly priced.

Ahmed TILE INSTALLER
Santa Barbara · 310-647-7501
One of the great artisans. Good enough for the King of Morocco, good enough for us. And a pure pleasure to be around.

Craftmaster Ltd. CABINETRY
Simi Valley · 805-304-5777
Enrique Rodriguez is kind, highly experienced, reasonably priced, and highly recommended.

Stonewest LIMESTONE SLAB
Ventura · stonewest.com
A fantastic team who bend over backwards to help and have a very large selection. Not the cheapest, but they offer market prices with outstanding customer service.

Southeast Construction Products RECLAIMED BRICK
S. El Monte · 626-443-9333
The best price in the region on used brick, family owned, make everything easy — totally recommend.

Tile and Mosaic Depot LIMESTONE FLOOR TILE
Anaheim, CA · tileandmosaicdepot.com
They beat everyone's price and got me a rush order that saved me so much time and money.

Recommended vendors

Vintage Timberworks VINTAGE BEAMS

Temecula · vintagetimberworks.com

Very reasonable for the phenomenal quality product they offer. Needs quite a bit of lead time, so be sure to order a couple months in advance of your need.

475 Supply / Mr. Insulation GUTEX PRODUCTS, PRO CLIMA PRODUCTS

Bay Area · 209-660-1297 (Mr. Insulation)

We bought from Mr. Insulation. They can be tough to reach, but hang in there — they are truly awesome and will go above and beyond to be helpful. Ian Nimmo is awesome, very helpful.

Taynr (James Roberts) MGO BOARD

916-524-4997

We searched the continent and spoke to numerous vendors. James was the only one who was truly helpful, and he went above and beyond to help us.

JC Plumbing PLUMBING FIXTURES

Thousand Oaks · jcshowroom.com

They consistently had the best stock, best prices, and best customer service.

Fireside Appliances and BBQ APPLIANCES

Woodland Hills · firesideappliance.com

Jake (818-421-4277) was outstanding time and time again. They consistently had the best stock, best prices, and best customer service.

Contact us:

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