



TINA LARKIN/JOURNAL

Passers-by check out a 600-square-foot straw-bale chapel being built near Indian School and Rio Grande.

People in straw houses . . .

Can save cash on energy because they used nontoxic, natural insulation

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Straw-bale home construction may seem like a design and permitting nightmare to the average homeowner/builder.

It involves building exterior walls with bales of straw. Mass from the bales provides more insulation than conventional stick-frame construction, typically making the homes more energy efficient. And the material is renewable and nontoxic.

But according to local building experts and homeowners, straw-bale construction is not only doable for owners and builders, but it also can be a lot of fun.

Extra planning is involved, and costs may be higher than conventional construction. But the state has clear straw-bale permitting standards, architectural design isn't much different from what is used in conventional homes, and it's possible to do some of the straw-bale installation yourself.

"I think it's much more interesting and hands-on than conventional construction," says Chase Morrison, a homeowner in Cerrillos who's building an 800-square-foot casita from the material.

Here are a few facts that may help demystify straw-bale construction.

State code requires all straw-bale homes have a frame structure. In other words, the bales can't be load-bearing.

"Generally, straw-bale home design (in New Mexico) is not radically different than conventional," says Jan Wisniewski, an architect with Lorn Tryk Architects in Santa Fe. "Straw is only the in-fill."

Structural design is typically post-and-beam. For example, 4x4 timber posts may be spaced every nine or 10 feet to allow



Above, Eric Basinger of Paja Construction Inc. stuffs straw behind metal mesh. The mesh eventually will hold the home's plaster or stucco. Below, Cadmon Whitty, owner of Paja Construction Inc., believes parts of straw-bale construction are doable by the homeowner/builder.



room for the bales. In comparison, conventional stick-frame construction spaces 2x4 or 2x10 studs every 16 to 24 inches. The "green" benefit is that post-and-beam typically requires less lumber than conventional.

Houses can be built on a standard cement foundation. Rebar is inserted on the

perimeter of the foundation to hold the bales. Many homeowners use adobe or stick-frame for interior walls and use common metal roofing.

Electrical wiring is done after the straw-bale is installed. Wire is run between the layers of bales. The only difference, compared to conventional construction, is the state

For more information

The New Mexico Strawbale Association: strawbalecentral.com

The Last Straw Quarterly Journal: thelaststraw.org

"The Straw Bale House," by A. Swentzell Steen, B. Steen, D. Bainbridge, D. Eisenberg

"The New Strawbale Home" by Catherine Wanek

requires electricians to use a higher-grade cable.

Because the state considers straw-bale an alternative building method, a licensed architect or engineer needs to give his or her professional stamp for plans to be permitted, according to Wisniewski.

Retrofitting an existing home is another option. It involves literally wrapping the home with bales and re-stuccoing. Design elements to keep in mind include: pouring a stemwall around the perimeter of the home; extending roof overhangs to accommodate the bales; and rebuilding door and window frames.

Incorporating south-facing windows, highly insulative doors and windows and efficient roof insulation, and sealing air leaks are key to making any straw-bale home energy efficient, says Wisniewski.

"Just having straw walls does not make a home hugely more energy efficient," he says. "If you want energy efficiency, you have to think more globally."

Bring it on

Once the frame and roof are up, straw-bale installation begins.

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People in straw houses save energy

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Construction-grade bales are lightweight and packed tight. Code requires bales contain no more than 15 percent moisture and can be picked up and transported by hand for 25 feet without falling apart.

Impaled on rebar, the bales are stacked like bricks and sized to fit. Sizing involves cutting off the excess straw and retying the bales. Metal mesh is installed to support stucco or plaster.

"It's always low-tech," says Cadmon Whitty, owner of Paja Construction Inc., which specializes in straw-bale construction. "Stacking bales lends itself well to owner involvement."

Installing the bales can be one of the least time-consuming parts of construction, according to Catherine Wanek, author of the "New Strawbale Home" and longtime straw-bale builder. She recommends hosting a wall-raising party.

"Having friends and family over to stack bales is probably the most fun and rewarding part of the whole house," she says. "It's not rocket science and the results are apparent so quickly."

Morrison performs much of the contracting work on her Cerrillos casita but hired Paja to do most of the construction. She learned about straw bales and plastering techniques by attending alternative building workshops, reading books and watching educational videos before beginning the project.

"You have to go into it understanding there's more physical work involved," says Morrison. "But people are fascinated and say, 'Let me know when you're going to put up the straw-bales.'"

Once the bales and mesh are in place, the home is stuccoed like any other adobe or conventional house. A heavy first coat is often required to compensate for the organic hape of the walls. Sometimes as much as three or four times a stucco is used, according to

Whitty.

Wanek says that while some elements of building with straw-bale are owner/builder friendly, you also need to be realistic.

"Any owner/builder has his work cut out for him," she says, adding that knowing state and local codes is one of the most complex parts of the process.

Labor intensive

Cost varies depending on how much work the owner does and how elaborate you make the home.

"I think it should be no more expensive than conventional construction. But education is a big thing. And you need to choose people that know straw-bale and are not charging exorbitant fees just for the name," Whitty says.

The national average cost for conventional new home construction is about \$93 per square foot, he says.

In fact, the straw-bale component is no more than 25 percent of the total cost. Labor accounts for the majority. You also may pay more because few contractors in New Mexico are knowledgeable of straw bale construction, he says.

Morrison estimates her casita will cost \$75 to \$100 per square foot. But she has been on the construction site daily, available to pick up materials for subcontractors, aggressively price shop and gather salvage materials for the interior of the house.

"Being available to run into town has saved me a lot of money," she says, adding you also can save money by speaking up when changes need to be made.

Wisniewski says many straw-bale homeowners are the hands-on type. While the final cost may be equal or more than conventional construction, there's an emotional benefit to doing the homes.

"Straw feels good, smells good, and building with it feels like you're doing something good."