

by Jane Martinsons

Post Frame Advantage,
a program of the National Frame Builders Assn.

Revisiting Post-Frame Construction

In this era of eco-friendliness and economic thriftiness, it is no wonder that post-frame building and its primary material—wood—are back in favor in construction, including in the light-commercial market.

What is post frame? It's helpful to start with what it is not: simply heavy timber framing or post-and-beam construction—that's old school. Increasingly, post-frame building is becoming the application of choice for low-rise, light-commercial buildings because of its energy efficiency, versatility and durability. Today, post frame is also considered the economical wood-framed alternative to the low-rise steel building system used in community, municipal, and religious building projects. "What's fueling interest is the goal of trying to find the best value for clients in a competitive building market, while also providing outstanding energy efficiency for ongoing building use," says Cheryl Ciecko, ALA AIA LEED AP CSI GGP, a technical director with WoodWorks, a nonprofit initiative of the Wood Products Council.

Regarding its cost effectiveness, Dean Johnson, AIA, of TKDA in St. Paul, Minn., says post frame is a very economical method to provide an enclosure at a reasonable cost, while offering the versatility in configuration, clear span and finish materials with limited wall- and roof-framing materials and minimal footing and foundation materials.

According to Harvey Manbeck, P.E., PhD, professor emeritus at Penn State University and technical advisor for NFBA, time of construction, from site preparation to project completion, is relatively short. "Many commercial post-frame building projects, from the time ground is broken at the site until owner occupancy, are completed within 90 to 120 days," says Manbeck.

"Prefabricated wood components, which are widely available, add to its affordability," says Ciecko. "Obviously, if you are able to build and enclose your structure quickly with inexpensive, available, and easy-to-work-with materials, you save on construction costs and get clients occupying their space and generating revenue quickly."

She points to U.S. Dept. of Labor statistics which show that, with a dependency on fossil fuels, steel and concrete prices have been on a "roller coaster ride" or increasing for the last 6 years, whereas the price of lumber has been on a general decline over the same period.

ENERGY EFFICIENT

Wood is also an excellent insulator, Ciecko states. Unlike steel and concrete, which are thermal bridges that readily transfer heat, wood provides considerable thermal resistance at insulation breaks, reducing thermal bridging. Thermal breaks insulating value are necessary in construction, she says, because without them, moisture from condensation can accumulate on cold building surfaces in

contact with warm, moist air. The result can be moisture accumulation, mold, and even decay. With prolonged moisture contact and dust as a food source, no material is immune to mold. Steel rusts and concrete and masonry spall due to moisture.

Moreover, wider bay spacings allow for continuous insulation between structural elements and, subsequently, less chance of thermal leakage. "Every place where you have disruption, you have potential for air and energy leaks," Ciecko says. "Taking steps to avoid that is always a good thing."

Newer energy codes also require high levels of insulation, which, according to Manbeck, is an advantage for post-frame system walls and roofs that are exceptionally easy to insulate. "This is due to the 4 to 10 ft. post spacing and the large 6 to 10 in. wall cavity thickness inherently built into post-frame construction," he says. "Even where framing members occur, the thermal bridging effect is minimized by the thermal resistance of the relatively thick wood sidewall column."

The other green aspect of post-frame construction is that wood is a recyclable and renewable resource. "When post foundations are properly installed, the durability of post-frame building systems equals that of any other well-engineered wood-framed building system," Manbeck says. "The key to post-frame durability, however, is to either specify appropriate wood preservative treatment systems for all wood in contact with the ground or use a post-foundation option that eliminates ground contact for any wood structural elements."

As far as lifetime, In her AIA-approved courses for architects, Ciecko emphasizes that wood structures have been demonstrating durability for centuries. She cites examples of numerous Norwegian Stave churches built of wood on stone foundations in the 1100s, which still survive today. Wood is strong and she says innovations in engineered wood products are allowing it to be used for even longer spans and taller structures than ever before. "Wood can withstand huge forces of nature with ease, including high winds, snow loads, and earthquakes," Ciecko says.

Speaking of code compliance, the unique features of post-frame structural systems, embedded post foundations and incorporation of the in-plane strength and stiffness of metal-clad wood framed walls and roofs, have been included in recent editions of the International Building Code (IBC). Post-frame foundations are included in Chapter 1800 of IBC 2006 and 2009 for both lateral soil resistance and wood preservative treatment requirements. Key post-frame diaphragm design and other post-frame design practices are cited in Sections 2306.1 of IBC 2006 and 2009.

VERSATILE

Post-frame buildings incorporate a wide range of exterior

finishes and architectural details using stone, wood panel products, asphalt roofing, and metal panel products. "With so many structural framing options, building functions, and architectural finishes, post-frame building systems are limited only by the architect's imagination and creativity," Manbeck says.

Don Tippet of Allied Design says that wood-frame construction, especially post-frame construction with its long spans and wide-open spaces, maximizes wood's advantages. "It maximizes the frame potential and it allows designers to provide the best value for their clients," he says. "We have that greater span capability, depending on what type of product you have. We can go 72-, 81- or 100-ft. clear span. Wider spans appeal to architects." □



ABOVE: The McIntosh project, in Watertown, Minn., is a post-frame construction by Lester Buildings.



ABOVE: Danzinger Vineyard, in Alma Wisc., is a post-frame construction by Wick Buildings.