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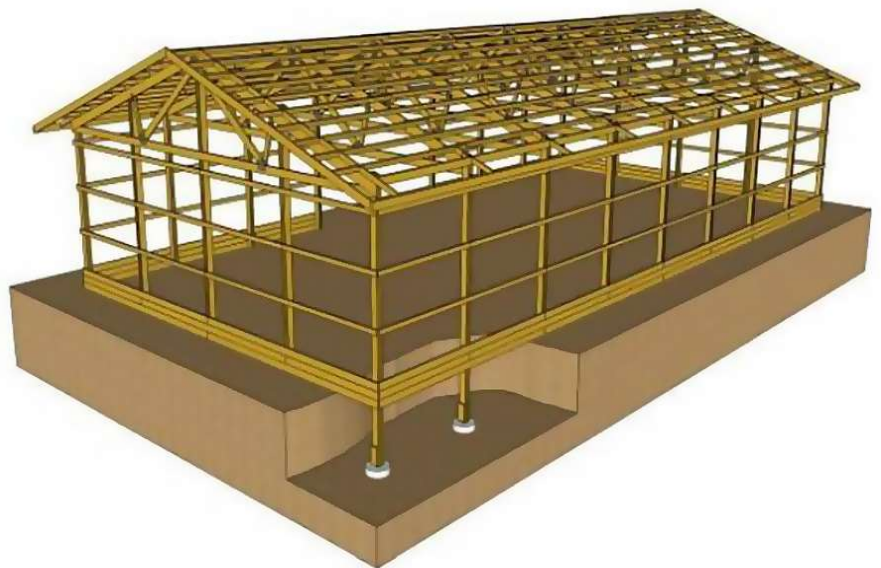
Post-Frame Construction

In this time of increasing building costs, stricter code requirements, and labor shortages, builders are searching for building systems that will help them stay price competitive in the current market without sacrificing quality. Past issues of this newsletter have explored building systems that can meet these goals, including Advanced Framing and [SIPS](#). In this issue, we will explore a system that originated in the agricultural world and has since been improved and adapted to both the commercial and residential markets—*post-frame construction*. Originally known as *pole buildings* because of its use of telephone poles, post-frame construction has advanced with new technologies and engineering to become an attractive alternative to traditional stick framing.

Post-frame construction is an engineered wood-frame building system that meets all Montana code requirements.

This construction method uses large, wooden posts or columns as the main structural support system, instead of traditional framing methods that use smaller, load-bearing walls.

The basic process of post-frame construction involves placing large, wooden posts or columns deep into the ground or securing them to a concrete foundation. These posts or columns are then connected by horizontal framing members, such as trusses, purlins, or girts, to create a strong and stable frame for the building. The posts or columns transfer loads to the ground or concrete pier or masonry foundation. A plastic



A post-frame building with trusses supported directly by embedded posts. Illustration by permission of the National Frame Builders Association from the Post Frame Design Manual. This manual can be found at nfba.org/aws/NFBA/pt/sp/tech-resources under the "Post Frame Building Design Manual" drop-down menu. Here is a link to the first chapter of the manual (free to everyone): nfba.org/aws/NFBA/asset_manager/get_file/803074?ver=0

barrier system may also be used for enhanced protection of wood and concrete posts or piers. The posts or columns can be solid timber, but most builders opt for either glued or nailed laminated timbers. Columns placed in the ground should be pressure-treated to UC4B or higher standards. This designation is found on a tag stapled to the columns at the point of sale.

Post-frame construction is commonly used for agricultural buildings, such as barns and storage sheds, but is becoming more common in residential and commercial structures. It is a cost-effective and efficient construction method, as it requires fewer materials and less labor compared to traditional framing methods and allows for larger open spaces and customizable designs.

In residential applications, post-frame construction also has additional advantages, such as better energy efficiency due to the reduced amount of thermal bridging, and faster construction times due to the simplified building process. Girts are often attached to the inside and outside of the posts, leaving ample room to run electric and even plumbing through exterior walls. Air sealing and insulating a post-frame construction residence is an important step to improve energy efficiency and reduce heating and cooling costs. Just like any other type of construction, you should seal any gaps or cracks in the building envelope, including around windows and doors, electrical and plumbing penetrations, and other openings. Use best practices in flashing windows and doors and use high-quality caulking material or spray foam insulation to seal gaps and prevent air leaks.



A post-frame home doesn't have to look different. Photo: [National Frame Builders Association](#)

Wall insulation: To insulate the walls, install a layer of insulation between the horizontal framing members, such as girts, and the exterior cladding. Batt insulation is commonly used for this purpose. You can insulate the wall assemblies as you would any other type of construction, except that the bays are much larger than conventional 16" or 24" on-center framing. Post-frame builders have recently found that rock wool insulation works well because its ridged structure allows for easy installation without sagging in larger wall bays. Builders also use the flash-and-batt method to effectively insulate and air seal post-frame homes. Flash-and-batt insulation is a method of insulating standard stud walls by augmenting fiberglass batts with 2 inches of closed-cell spray foam applied to the interior of the building sheathing. In the case of a post frame with steel siding as the exterior sheathing, a weather-resistant barrier (WRB), or house wrap, should be installed between the steel and the spray foam. This practice will allow the siding/sheathing to be removed without damage to insulation should the need occur and provides a weather-resistant barrier to allow quick drainage and removal of any water that may penetrate the siding. This method seems to be most popular with those who want an airtight structure but choose not to utilize an oriented strand board (OSB) or plywood-based sheathing. It's important to note that a properly installed WRB behind a home's exterior cladding is a requirement of 2021 International Residential Code (IRC) R703.

Ceiling insulation: For the ceiling, install insulation between the roof trusses or rafters. Blown-in insulation is a popular choice for this application. Additionally, raised-heel trusses should be used to allow full depth of insulation over exterior walls.

Vapor retarder: Install a vapor retarder, as per code, on the warm side of the wall to prevent moisture from entering the insulation and causing mold or other issues. If the flash-and-batt method described above is used, there may not be a need for an additional vapor retarder. The 2021 IRC 702.7 requires a vapor retarder on the interior of a framed wall,

with an exception for continuous exterior insulation. Properly installed and taped gypsum board, however, should suffice if flash-and-batt is used. Other wall assemblies with vapor-open insulation interiors may require a more robust vapor retarder, and a designer with good knowledge of the vapor qualities of different insulations will help design an effective wall assembly.

By following these guidelines, you can effectively air seal and insulate a post-frame construction residence, which will improve energy efficiency, reduce heating and cooling costs, and create a more comfortable indoor environment.

Foundation Types

Traditionally, post-frame foundations have consisted of treated posts placed directly into the ground and resting on a concrete pad at the bottom of a hole, or posts embedded into concrete placed in a hole that is dug out to below the frost line. However, concerns with the longevity of these installations led to different technologies that instead use concrete pillars in the ground, either cast in place or precast, with a steel bracket to receive the wooden posts. With the introduction of this steel bracket technology, post-frame homes can be built on any type of foundation, including basements and crawlspaces. Slab foundations, however, seem to be the predominant foundation used in post-frame construction.

As with any other type of construction, foundations should be insulated according to code. The confusion with post-frame buildings that utilize in-ground columns is that there are no stem walls to insulate. In this case, the slab floor in residential post-frame builds that will be heated to a monthly mean temperature of 64°F should be treated as [frost-protected shallow foundations](#) and insulated in accordance with R403.3 of the 2021 IRC.

Conclusion

In our modern building mindset, any building system that uses less materials and labor could be suspected of being substandard. This is not the case with post-frame construction, however. Post-frame residences are commonly known as *barndominiums* or *shouses* because most were built to combine a residence with a large shop, garage, or barn structure. Today's post-frame structures can look just like any other residence. With rising housing and materials costs, combined with current labor shortages, post-frame construction may just be a building system whose time has come.

References

2021 International Energy Conservation Code (IECC). International Code Council, Inc. [iccsafe.org](https://www.iccsafe.org)

2021 International Residential Code (IRC). International Code Council, Inc. [iccsafe.org](https://www.iccsafe.org)



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Residential Energy Code and Energy Efficiency Website:

<https://deq.mt.gov/energy/Programs/code>