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ENERGYWISE Energy Saving Solutions from the UK Department of Biosystems and Agricultural Engineering

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ADVANCED WALL FRAMING

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ADVANCED FRAMING

Advanced framing refers to a variety of framing techniques designed to reduce the amount of lumber used and waste generated in the construction of a wood-framed house. These techniques include:

- Designing homes on 2-foot modules to make the best use of common sheet good sizes and reduce waste and labor.
- Spacing wall studs up to 24 inches on-center.
- Spacing floor joists and roof rafters up to 24 inches on-center.
- Using two-stud corner framing and inexpensive drywall clips or scrap lumber for drywall backing instead of studs.
- Eliminating headers in non-load-bearing walls.
- Using in-line framing in which floor, wall, and roof framing members are vertically in line with one another and loads are transferred directly downward.
- Using single lumber headers and top plates when appropriate.

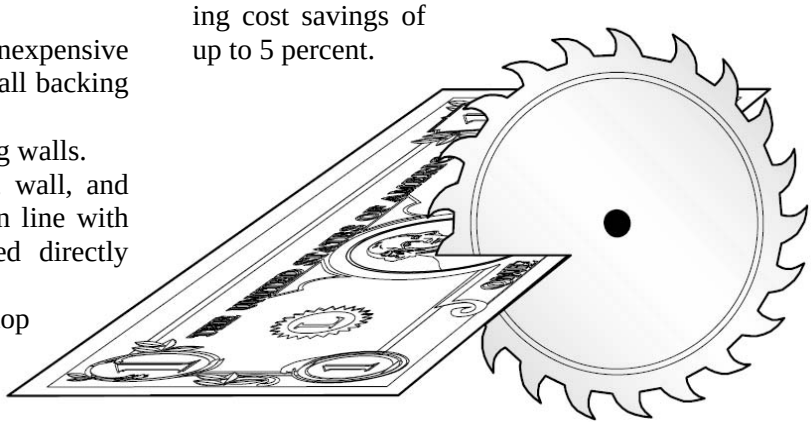
Advanced framing techniques, sometimes called Optimum Value Engineering (OVE), have been researched extensively and proven effective. However, some techniques may not be allowed under certain circumstances (i.e., high wind or seismic potential) or in some localities. Be certain to consult local building officials early in the design phase to verify or obtain acceptance of these techniques.

BENEFITS FROM ADVANCED FRAMING

Both builders and homeowners can benefit from advanced framing. Advanced framing techniques create a structurally sound home that has lower material and labor costs than a conventionally framed house. Additional construction cost savings result from the generation of less waste that needs to be disposed of, which also helps the environment.

Advanced framing improves energy efficiency by replacing lumber with insulation material. The whole-wall R-value is improved by reducing thermal bridging through the framing and maximizing the wall area that is insulated.

Advanced framing techniques can be implemented individually or as a complete package, depending on the builder. Fully implementing advanced framing techniques can result in materials cost savings of about $500 or $1000 (for a 1,200- and 2,400-square-foot house, respectively), labor cost savings of between 3 and 5 percent, and annual heating and cooling cost savings of up to 5 percent.



ADVANCED FRAMING TECHNIQUES

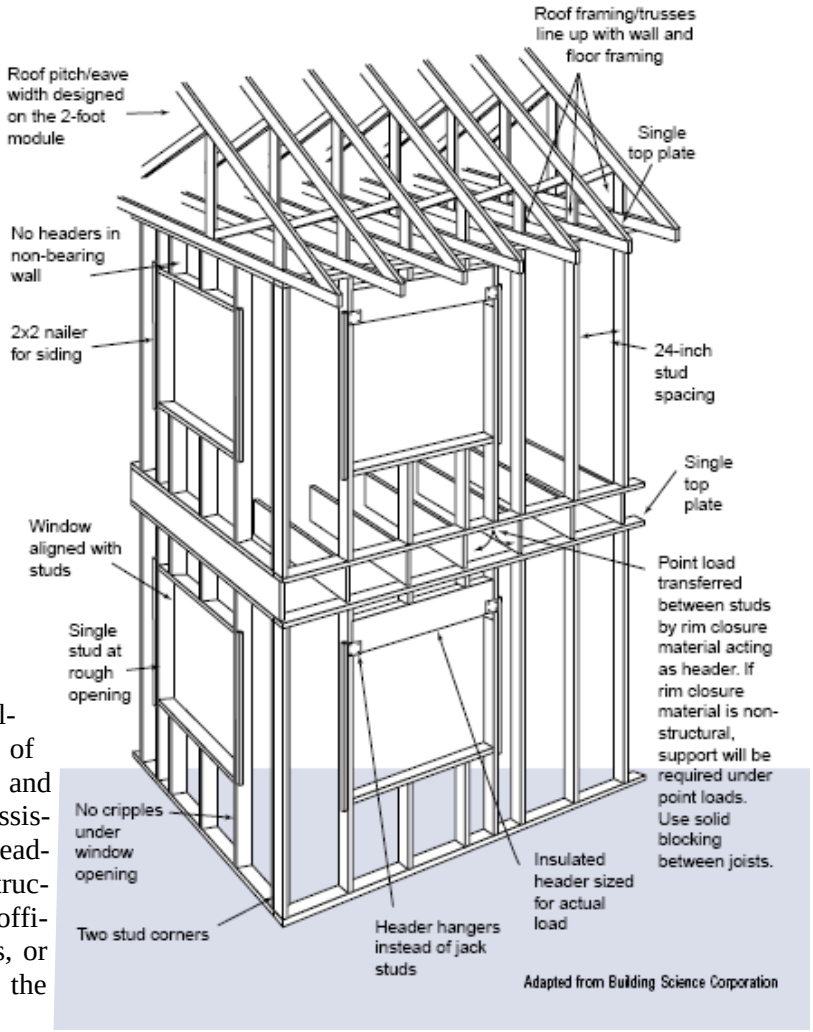
Stud Spacing - In many cases, it is acceptable by code to increase stud spacing from 16 inches to 24 inches on-center. The 1995 International Code Council's One- and Two-Family Dwelling Code allows studs up to 10 feet long to be spaced up to 24 inches on-center. In walls supporting only a roof and ceiling, 2x4 studs can be spaced up to 24 inches on-center, except for Utility grade (No. 3) studs. For walls supporting one floor, such as non-bearing gable endwalls on the first floor of a 2-story house, 2x4s can be spaced up to 24 inches on-center when Utility grade studs are not used. Studs in walls supporting a floor and roof above can be 2x6s spaced up to 24 inches on-center rather than 2x4s spaced up to 16 inches on-center.

Total cost (material and labor) for framing with 2x6

studs spaced 24 inches on-center is similar to that for framing with 2x4 studs spaced 16 inches on-center. The economics of 2x6 wall construction is especially favorable in areas with significant winters and in homes in which windows and doors occupy 10 percent or less of the total wall area. Walls with much more window and door area may require as much framing lumber as conventionally-framed walls because each additional opening can add extra studs. In addition, the added 2-inch wall thickness requires the use of extension jambs at windows unless drywall returns are used.

Headers - Structural headers are often oversized or installed where unnecessary, largely for convenience. Proper sizing of headers allows better insulation and saves wood. In some cases, single-ply (single 2x6, for example) headers can be used, allowing even better insulation around windows. Headers are not required in non-bearing walls, including most interior walls and gable endwalls with only non-bearing trusses directly above.

It is possible to insulate headers by using foam sheathing as a spacer in place of plywood or oriented strand board (OSB), either between or on one side (preferably the exterior side) of doubled headers. This technique is an excellent way to make use of scrap foam sheathing and reduce waste. For assistance in designing headers, consult local structural engineers, code officials, lumber suppliers, or organizations such as the Western Wood Products Association (www.wwpa.org).



Jacks (shoulder studs/cripples) - Jacks can be eliminated when structural headers are not used or when metal hangers support structural headers. However, elimination of jacks reduces the available nailing area for siding and trim if nailable sheathing (e.g., plywood, OSB) is not used, and may leave as little as 1½ inches of nailable width next to a window. If needed, construct a modified window opening by installing a 2x2 wood nailer behind the sheathing for siding attachment.

Outside and Inside Corners - Two-stud corners decrease lumber use and increase possible insulation levels compared with typical practice. However, if nailable sheathing is not used, attachment of exterior trim and siding at corners may be more difficult. For example, vinyl-siding corners require attachment at a point several inches from the corner. Therefore, if foam or other non-nailbase sheathing is used, it may be necessary to add a wood nailer behind the sheathing.

When drywall clips are used, they should be installed above the level of the interior trim so trim nails will not interfere. The non-coped trim piece should be installed first, against the drywall that bears on the clip, so that the final coped trim piece can be nailed to the stud.