Creative Cost Cuts

by Steve Carlson

Rising prices have made the American dream of homeownership increasingly elusive. For growing numbers of people, cost cutting is a prerequisite to a decent place to live. Over the past four years, my wife and I have tested several cost-cutting techniques on a very small scale, by building or renovating six single-family homes—five affordable rentals plus our own house. Total costs for each, including site acquisition, labor, and materials, have ranged from $35,000 to $75,000. By comparison, the average sales price for a house in our county, in northern Vermont, is over $100,000.

Other have studied and reported on these issues on a much larger scale. There are two reports that I find particularly useful. One is The Cost Cuts Manual published by the Enterprise Foundation's Rehab Work Group (RWG). The other is Home Building Cost Cuts published by the U.S. Department of Housing and Urban Development (HUD).

This article surveys sticks-and-bricks issues. Site acquisition, a huge component of affordability, is another story entirely.

General Design

The most cost-efficient design is a square structure, two stories high, with 71/2-foot ceilings. That provides the most living area with the smallest foundation, roof, and exterior wall area. Dimensions should be in 2-foot increments, or even better, 4-foot increments, to minimize cutting and waste of standard building materials.

It's helpful to include ample unfinished, unheated storage space. Finished space can be more compact if bicycles and lawn mowers don't need to be stored in it.

Simplicity of design is essential. Every extra corner adds to the cost. Built-ins, extensive cabinetry, and hardwood molding are incompatible with affordability.

The costs of carrying a property must be considered as well. Features that reduce energy and maintenance costs deserve high priority. Features that arbitrarily add to property-tax assessments should be avoided.

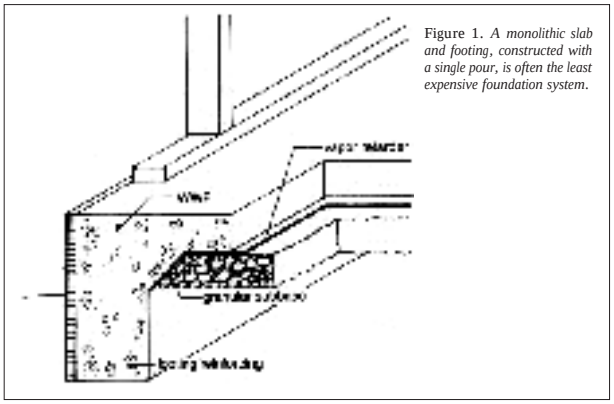

Figure 1. *A monolithic slab and footing, constructed with a single pour, is often the least expensive foundation system.*

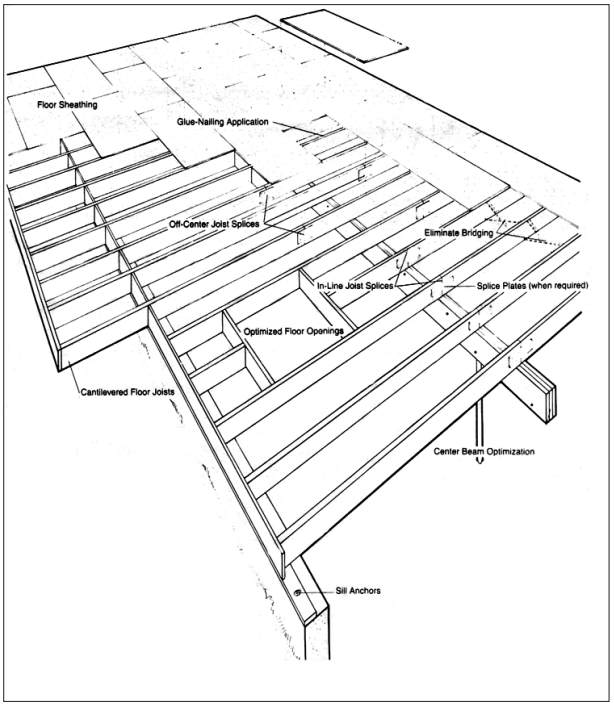

Figure 2. *Cost-cutting techniques for floor systems recommended by HUD include glued subfloors, cantilevered joists, 2x4 sills, and joist splices to minimize lumber waste.*

In renovation, existing components should be saved when feasible. Total gut jobs for hopelessly deteriorated buildings are for wealthy clients only.

Foundations

When the terrain is reasonably level, the lowest-cost foundation is a slab on grade. RWG recommends a monolithic slab and footing, which requires only a single pour (see Figure 1). According to HUD, there is almost never a need to pour a slab thicker than 4 inches. A full basement is not an economical investment unless it doubles as actual living space. On a hillside, a basement can serve effectively as a first floor—with one side a walk-out, preferably facing a southerly view. With exterior insulation, the concrete walls can be skim-coated on the interior with joint compound to resemble a plaster finish. The thermal mass of the interior concrete walls can help you take advantage of solar or wood-stove heat.

Floor Systems

With a slab on grade, the cheapest floor finish is a dyed concrete surface. The occupants may want to scatter rugs, but there is no need for carpeting. The dyed concrete also provides thermal mass. The cost is generally well under $1 per square foot of floor area.

For wood floor systems, HUD suggests framing 24-inches on-center, with a single-layered glued system developed by the American Plywood Association (APA, Box 11700, Tacoma, WA 98477). By bonding the joists to the subfloor with elastomeric adhesives, joist spans can be increased and lumber grades reduced without sacrificing the deflection rating.

Other cost-saving suggestions from HUD include 2x4 sill plates; fastening sill plates with strap anchors or powder-driven fasteners rather than anchor bolts; and cantilevering joists to increase the house width without increasing the foundation dimensions (see Figure 2).

From preliminary design to finish trim, cost-efficient decisions can make the American Dream more accessible

For finish floors, RWG suggests asphalt tile ($1.11 per square foot installed) and, in rooms where wood flooring is more appropriate, 1x6 pine tongue-and-groove boards.

Softwood flooring is less costly than cheap carpet with padding, and it lasts about eight times longer. In my experience, even greater savings can be achieved by using ordinary pine boards without tongues and grooves.

By virtually all accounts, 2x4 framing on 16-inch centers provides more structural support than is needed for a standard one- or two-story dwelling. RWG suggests 2x3s on 16-inch centers for an 8-foot load-bearing wall.

Wall Systems

By virtually all accounts, 2x4 (let alone 2x6) framing on 16-inch centers provides more structural support than is needed for a standard one- or two-story dwelling. RWG suggests 2x3s on 16-inch centers for an 8-foot load-bearing wall. HUD suggests 2x4s on 24-inch centers.

The R-value of a 2x4 wall, of course, is lower than that of a 2x6 wall. You can make up for this loss by sheathing with rigid foam rather than plywood. The nominal R-value of the 2x4 wall with foam will be a little less, but the effective R-value is arguably better, because the rigid foam is continuous. The material cost will be about the same as plywood sheathing, although diagonal bracing may be needed, raising labor costs slightly.

Other cost-cutting suggestions include use of a single top plate (with roof trusses aligned over studs), and two-stud corners.

Structural sandwich panels are a fairly new alternative that merit consideration. The panels consist of expanded polystyrene or polyisocyanurate sandwiched between two sheets of waferboard. Prices and designs vary greatly depending on the manufacturer. I recently built an addition using open panels from Foam Laminates of Vermont. Their panels come in many sizes, and their largest, 8 x 28 feet, retails for about $450. For my project, it took only one hour to close in the addition (see Figure 3). Further labor savings were made possible by the continuous nailing surfaces on both sides, and the ability to "frame" window and door openings with a chain saw.

For siding, I've had good results, particularly in rural areas, with locally milled vertical shiplap, applied rough-side-out and protected by penetrating stain. The material cost is a little over 50 cents per square foot of coverage, and installation is fast and easy. In urban or suburban areas, vinyl siding may be more appropriate. Economical siding options listed by RWG, with average installed costs per square foot of coverage, are:

1. Fiberglass shingles, 74 cents;
2. Textured plywood (for example, 5/8-inch T1-11 applied without separate sheathing), $1.32 plus the cost of stain;
3. Vinyl siding, $1.66 plus 28 cents per square foot for insulation board, and some additional cost for trim.

If drywall is used for interior finish, RWG suggests a variety of labor-saving techniques. These include floating (unnailed) corners; use of screws rather than nails; hanging the drywall horizontally; using self-adhesive fiberglass tape; and caulking rather than taping tight-fitting corner joints. In rehab work, RWG says repairing up to half of the surface of old plaster walls is almost always less expensive than tearing down all of the plaster and replacing it with drywall.

If drywall is used, float the corners, use screws rather than nails, hang the drywall horizontally, use self-adhesive fiberglass tape, and caulk rather than tape tight-fitting corner joints.

Doors and Windows

For front entrance doors, RWG suggests pre-hung insulated metal doors (cost installed: about $229). However, in a remodeling job where the old jamb is intact, a flush solid-core wood door may be the best buy. For interior doors, RWG says the installed cost of a pre-hung hollow-core lauan door is often less than that of a used door. Bargain-priced used doors are harder to find than they used to be, as architectural antiques are now in great demand. But when they're available, snatch them up! On one recent building project, we used nine paneled doors salvaged from a nearby apartment house: total cost was $50. In another recent project, we used three hollow-core doors obtained free when a nearby airport was remodeled.

RWG recommends that in remodeling projects, consideration be given to eliminating windows that are not needed. When replacement windows are needed, the best buys are usually thermal-break aluminum sliders. Another viable option listed by RWG is double-hung wood windows, single-glazed with aluminum storms.

Fixed glazing is ideal for windows used solely for light or solar gain. If a room has more windows than are needed for ventilation, some of them should be fixed.

The best buys I've found are in the cull bins in back of glass shops. There's usually a good variety of custom-ordered windows and double-glazed panes that didn't quite fit the intended openings, available for about half the normal price (see Figure 4).

Flexibility in design is necessary in order to take advantage of bargain windows and doors. They should be bought ahead of time, then stored until the openings are framed.

Roof Systems

According to HUD, gables are generally the most cost-efficient roof type. Keep the design simple, so that it won't be necessary to order different truss types or sizes. The common 2x4 Fink

Figure 3. *Structural foam panels can reduce labor costs without substantially increasing materials costs. It took one hour to close in the well-insulated exterior walls of this addition. Later, window-and-door openings were cut with a chain saw, and locally milled shiplap was applied as an economical siding.*

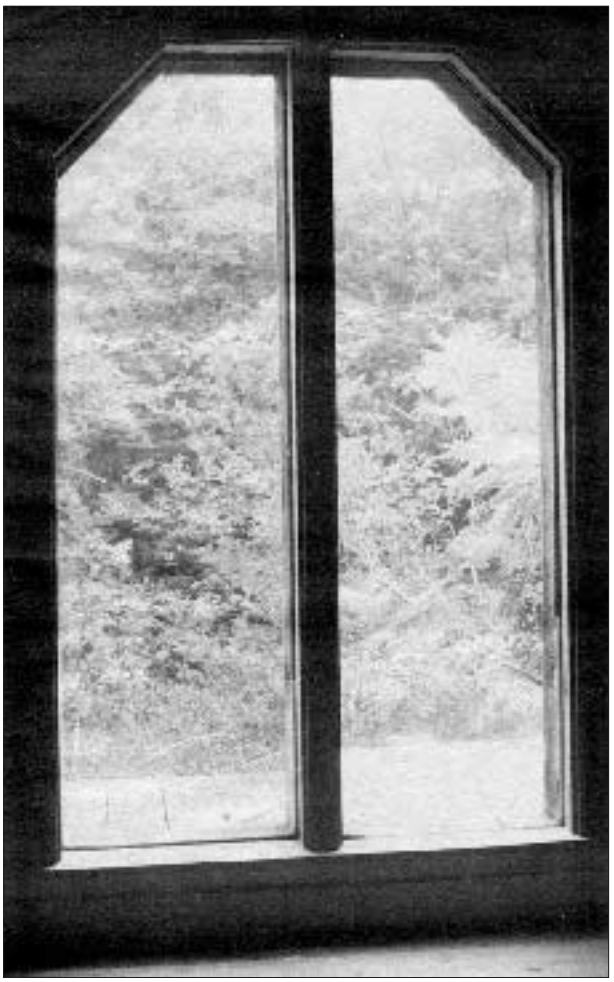

Figure 4. *These wall-height, double-glazed windows cost $20 apiece in the cull bin of a local glass store. They apparently didn't suit the needs of the people who originally ordered them, but they were perfect for the building project I was working on.*

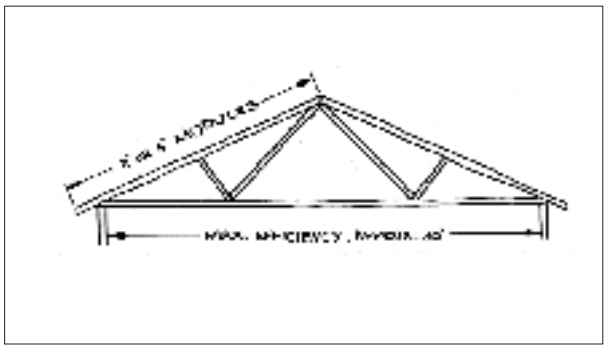

Figure 5. *The Fink truss, pictured above, is the most widely used and often the most economical roof truss. For maximum savings, design should make use of a single truss size.*

truss is the most economical type, HUD says. Its maximum span is 30 feet, so longer spans should be avoided when possible (see Figure 5).

HUD recommends 24-inch on-center roof framing. Half-inch plywood sheathing may save labor, as less sturdy materials require use of aluminum H-clips along unsupported edges.

As with all other design steps, roof layout should ideally be planned in 4-foot modules to make efficient use of 4x8-foot sheathing materials. Further savings can be achieved by reducing or eliminating soffits, overhangs, fascias, and rake ladders.

RWG also suggests that gutters and downspouts, routinely installed on most structures, are not always needed. If the building is one or two stories tall, the ground below the roof is unpaved, and the ground slopes away from the structure, a complete gutter and downspout system may be a waste of money.

The best buys in materials, according to RWG, are double-coverage asphalt roll roofing or, if shingles are preferred, 210- to 215-pound fiberglass. Metric-size shingles save labor, as they are larger than standard size and use the same number of fasteners. For further savings, use pneumatic fasteners and, when appropriate, eliminate the felt underlayment. I've also found that galvanized metal is economical in areas where it's aesthetically acceptable, as it goes up quickly and doesn't require full sheathing.

Electrical Systems

In most single-family homes, a 100-amp service panel with 10 to 20 breaker slots is ample. If more capacity is needed in the future, a sub panel can be added at that time.

An optimal electrical system uses low-cost UL-rated fixtures and no more outlets or switches than needed. RWG suggests plastic boxes (because they're cheaper) and metal cover plates (because they don't break and do provide extra support).

But the biggest electrical savings, RWG notes, can come from efficient use of expensive labor. The group's two rules are (1) Don't let a $15 person do $5 jobs, and (2) Don't let $5 people keep $15 people from their jobs. Low-cost workers can drill holes, hang boxes, stretch cable, strip ends, and hang fixtures. If all the electrician has to do is make connections, install the panel and devices, and check out the system, savings of up to 80 percent can be achieved, RWG says.

Plumbing

The "wet" part of the house—including baths, kitchen, and laundry room—should be confined to a single area (see Figure 6).

Figure 6. *The "wet" portion of a house should be confined to as small an area as possible. The above diagram shows one possible way to cluster the kitchen, bath, and laundry area.*

Close proximity may allow stack venting (with lines from each fixture running to the main stack, and sometimes wet vents (with one pipe serving as the drain for one fixture and the vent for another).

Piping requirements in many plumbing codes have been downsized in recent years. Meeting the old requirements by force of habit adds unnecessary expense.

RWG rates various plastic piping materials as best buys: PB gray for supply pipe, PVC for waste pipe, ABS for underground waste pipe, and PP for fittings.

Finish Carpentry

Pine 1x4s, sometimes ripped with a table saw, are adequate for most window and door casing, baseboards, and miscellaneous trim work.

An alternative for window and door trim is to use drywall and corner bead instead of conventional casing.

The most expensive finish work in most modern homes is in the kitchen. RWG suggests use of open shelving, with an installed cost 73 percent cheaper than vinyl-faced particleboard cabinets.

When cabinet doors are required, louvered wooden shutters, or pine boards with Z bracing, are cheap alternatives to factory-made doors.

The modern desire to close doors on kitchen clutter can be met economically with an old design idea—a simple pantry. Everything in the pantry can be kept on open shelves, and with the door closed the guests need not see the clutter. A well-designed pantry can be a classy feature, built at a fraction of the cost of extensive cabinets.

Heating and Cooling

Huge savings can be achieved if central heating and central air conditioning can be avoided. In northern climates, central heat is assumed in most new houses. But my own Vermont house, with over 2,000 square feet of living area, is easily heated by a single wood stove. Four other houses we have built or renovated in recent years are each heated comfortably with a single gas or kerosene wall furnace. The secret is good insulation, ample thermal mass, and a relatively open design.

If, for any reason, one wall furnace isn't adequate, you can install a second, or even a third, for less than the cost of a central system.

Likewise, individual window air conditioners are less expensive to install and operate than central systems.

If the need for air conditioning is marginal, HUD recommends a whole-house fan. These fans are far cheaper to install than air conditioning and research by the National Bureau of Standards shows that in some climates they can reduce annual cooling costs significantly. An even lower-tech way to exhaust hot indoor air is with clerestory windows. But in places where the outside remains unbearably hot for extended periods, window air conditioning may be more comfortable.

Owner Involvement

The greatest cost savings can be achieved if the owner is involved in some aspect of the building or remodeling project.

Most people in the construction industry groan at the thought of working with a do-it-yourselfer. But if the homeowner undertakes one aspect of construction, and hires you for another, you won't have to assume responsibility for the homeowner's work.

In any event, a willing owner can perform some useful tasks, like cleaning up the work site every day and being available to run to the hardware store to pick up needed items. If that kind of assistance reduces your time at the site, it should also reduce the price.

It's a joy to work on high-end housing, with no compromises in design or craftsmanship. But there are many lower-end customers who are prepared to do whatever it takes to obtain a nice place to live.

Most of them need professional help. By working with them, you may be able to underbid competitors and help to keep alive the American dream of homeownership.

For More Information . . .

This article is a quick survey, which doesn't do justice to the source material. RWG's Cost Costs Manual may be purchased for $45 from Rehab Work Group, P.O. Box 1490, Alexandria, VA 22313. To obtain HUD's *Home Building Cost Costs*, call HUD User at 800/245-2691. ■

Steve Carlson is an associate editor of The Journal. His book, The Low-Tax House Book: Building and Remodeling the Affordable Dream House, *will be published this spring by Upper Access Book Publishers, Hinesburg, VT 05461.*