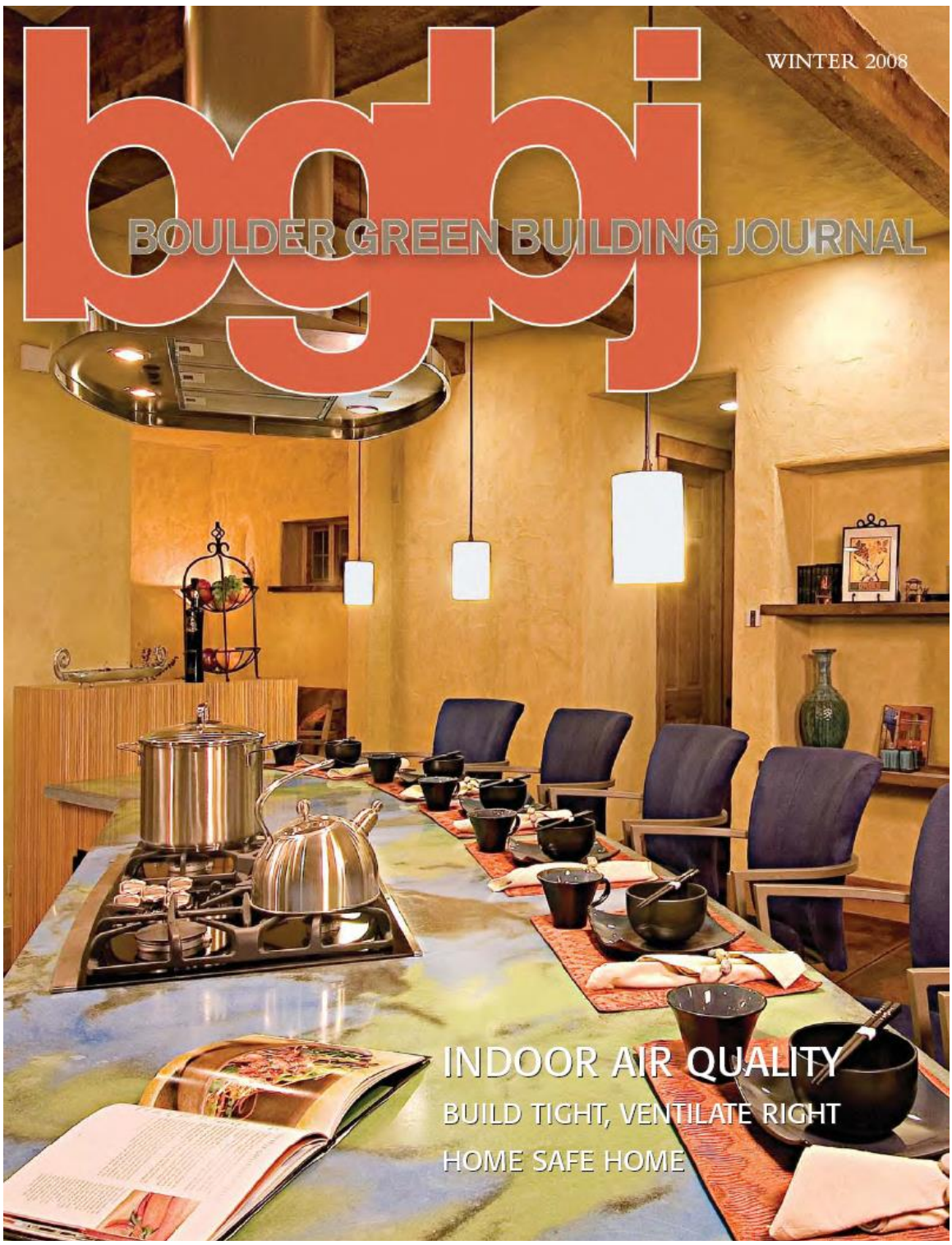


WINTER 2008

bgbj

BOULDER GREEN BUILDING JOURNAL



INDOOR AIR QUALITY
BUILD TIGHT, VENTILATE RIGHT
HOME SAFE HOME

Bringing It All Back Home

A deconstruction contractor describes the environmental and financial benefits of deconstructing rather than demolishing houses. **BY KURT BUSS**

Today's builders and consumers face a dizzying array of green products and services when they build or remodel a home. But if the project requires preparatory demolition for all or part of the building, there is really only one green option—deconstructing the structure and reclaiming the materials for reuse and recycling.

Nationwide, construction and demolition (C&D) debris constitutes anywhere from 25 to 40 percent of the material going into landfills. Because the volume is so huge, some jurisdictions are developing waste reduction plans that mandate the reuse and recycling of C&D materials. If these programs are effective, it will represent a big step toward diverting construction waste from landfills.

In Boulder, the city's Waste Reduction Master Plan (WRMP) has goals of 60 to 85 percent diversion for the years 2007 through 2017. Other components of the WRMP include an initial examination report that assesses the current local market and recommends increased reuse and recycling of building materials through the Green Points program, a C&D bond, and a recycling facility for C&D waste—primarily wood, metal, and masonry.

Deconstruction is just beginning to get some traction in the building industry, although hand demolition of structures and material salvage goes back to the Stone Age. Even a Neanderthal knew it was better to keep the mastodon tusk that served as a building material than to get a new one when remodeling the cave.

When project specifications call for the removal of a structure, mechanical demolition has been the most prominent practice for the past half-century or so. Increasingly, however, building professionals view structures slated for demolition as sources of materials rather than simply something that needs to "go away" before the project begins.

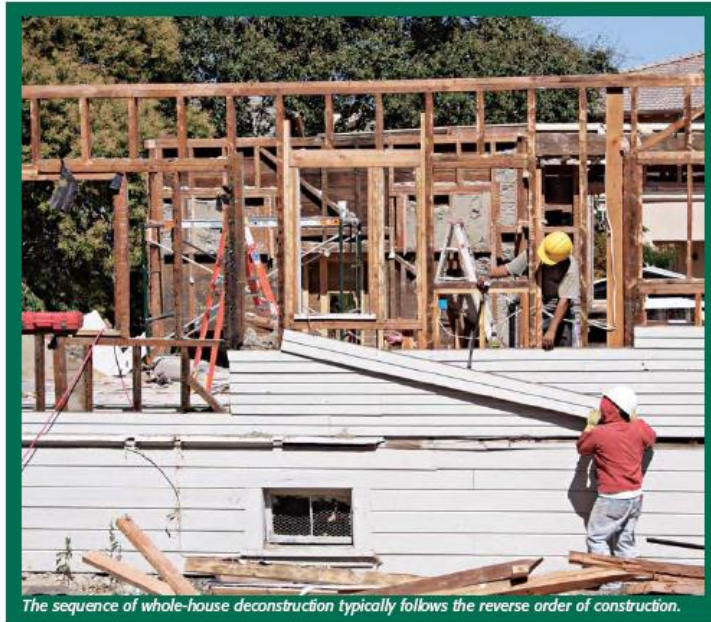
UNBUILDING A BUILDING

The best way to define deconstruction is to describe the process of construction in

reverse. Deconstruction is *unbuilding* a structure using many of the tools and techniques used to build it, with the intention of recovering all the reusable and recyclable materials that are cost- and time-effective to salvage. Generally, the last items to go into the building during construction are the first items to be removed during deconstruction.

Deconstruction contractors first remove reusable electrical and plumbing fixtures, along with cabinets, interior doors, and other non-structural items. Then they remove floor, wall, and ceiling coverings, usually salvaging wood floors and wall paneling for reuse if it's practical. Sometimes previous owners have sanded floorboards too many times or used adhesives that make it impossible to reuse or recycle the flooring materials. Thanks to a pilot program sponsored by the city of Boulder's Office of Environmental Affairs, Boulder residents can even recycle carpet.

At this point in the deconstruction process, deconstruction workers may bag the insulation. Next, they strip the outside layer of the building of its roofing and siding, and remove the windows and entry doors by cutting or prying the fasteners.



The sequence of whole-house deconstruction typically follows the reverse order of construction.

Reprinted with permission from *Unbuilding* by Bob Roth and David Gray published by The McGraw-Hill Companies. Photo by Steve Gray © The McGraw-Hill Companies, Inc.

Reprinted with permission from *Unbuilding* by Bob Falk and Brad Guy, published by The Taunton Press. Photo by Steve Cufappic, © The Taunton Press, Inc.

Reprinted with permission from *Unbuilding* by Bob Falk and Brad Guy, published by The Taunton Press. Photo by Brad Guy, © The Taunton Press, Inc.



(Top left) If wood flooring—in this case, Douglas fir—is in good condition, it is worth salvaging for resale.

(Top right) Tongue and groove wood flooring must be removed in the reverse direction of the installation.

(Bottom) When removing flooring, always start from the tongue side, pry close to the nail, and pry up and out to minimize damage.



Reprinted with permission from *Unbuilding* by Bob Falk and Brad Guy, published by The Taunton Press. Illustration by Chad Lockhart, © The Taunton Press, Inc.

Asphalt shingles cannot be recycled locally, but successful programs in other parts of the country are encouraging. Masonry roof tiles are easily removed and reused, although the process requires equipment to remove the pallets of tiles from the roof. Cedar shake shingles are also easily recyclable, as long as they are not contaminated with felt paper.

Wood siding is more difficult to recover for reuse, although redwood or cedar lap siding is often worth the extra effort. Even if it's painted or stained on one side, the backside is often undamaged and beautiful. Aluminum siding is certainly worth recycling, although vinyl is currently not. Asbestos siding, along with anything else containing asbestos, needs to be removed by professional hazardous waste handlers, because it is a known carcinogen and can cause severe respiratory problems if workers inhale the airborne particles. Cement siding hasn't been on the market long enough to be a noticeable part of the C&D waste stream, but will hopefully have places to go other than a landfill when it becomes more of an issue.

Workers then remove roof and wall sheathing, all of which should be reusable or recyclable. Once the building has been taken down to the framing, the deconstruction crew removes the mechanical systems and conduits for reuse or—more often—recycling. At this point, all that remains is the wooden structure.

The crew then removes partition walls and other non-load-bearing components before taking down rafters or trusses. At this point, they can cut exterior walls free and drop them onto the floor for relatively easy disassembly by knocking off top and bottom plates with a sledgehammer and picking up the studs like firewood. Subfloor removal is more difficult if it's been glued to the floor joists, although new tools

and techniques are making this process easier.

When the wood structure—nearly all of which should be reusable or recyclable—is completely dismantled, workers can reclaim any steel posts, beams, furnaces, boilers, or other large mechanical items left in the basement, usually with the help of a piece of equipment such as a skid steer loader or extension forklift.

The concrete foundation is now all that's left. It can either be used for the new construction, removed by an excavator for recycling, or sometimes simply knocked down and backfilled.

A BETTER WAY

In a traditional demolition, nearly everything above the foundation would be destroyed and hauled to a landfill. Demolition contractors will usually recycle concrete and steel if there are local recycling facilities.

Concrete and other masonry materials usually can be recycled at little or no cost. The rubble is pulverized in huge crushers that can magnetically remove rebar and other metal reinforcement. The runways at Stapleton Airport were recycled by a company in Arvada in what was described at the time as the world's largest recycling project. The finished product is typically used as road base or in other aggregate applications, reducing the need for gravel mining. Metal is the world's most recycled material, and currently enjoys record prices, thanks largely to the fact that China is purchasing all that it can for use in its massive hydroelectric and other infrastructure projects.

In a typical deconstruction, most of the material above the foundation would find its way to reuse and recycling facilities, with 80 to 90 percent going somewhere other than the dump. Items that were delicately dismantled and can be reused might find their way to the ReSource sales yard on 63rd Street, or one of the local Habitat for Humanity ReStores in the area, or the new reclaimed material yard operated by The ReUse People in Lafayette. Craigslist, eBay, and other web-based marketplaces are also very popular outlets for architectural salvage.

Mark Bowen, who has been selling reclaimed materials at the ReSource sales yard in Boulder since 1996, and has arguably seen and lifted more reclaimed materials than anyone in the area, has certainly noticed a change over the years.

"I remember when we first opened, nobody used the word 'deconstruction,' and we weren't very busy at the yard most of the time," he says. "Now, it seems more people are deconstructing, and the yard is *always* busy. I don't think the people who started this ever expected us to be around this long, or they would have called it ReSource 3000 instead of ReSource 2000."

COSTS AND BENEFITS

There are certain factors that make deconstruction difficult or cost-prohibitive, such as the time involved in hand dismantling as opposed to using heavy equipment. What a trackhoe operator and a dump truck driver can do in a couple of days would take a crew of six deconstructionists a couple of weeks.



A reciprocating saw is an essential tool on a deconstruction site for cutting nails and wood, especially in tight places.

With remodeling projects such as interior strip-outs, pop-tops, and add-ons, however, hand dismantling is usually required, because removing a roof or knocking down some walls while leaving others intact is not possible with heavy equipment. In these cases, deconstructionists would systematically unbuild the areas to be removed by cutting, prying, and unfastening reusable components, as opposed to smashing everything with a sledgehammer so that it fits in a trash container. Deconstruction is about leverage, not impact—it's Archimedes, not Hercules.

34 WINTER 2008

THE ECONOMICS OF DECONSTRUCTION

The example below is a composite based on actual jobs and is used here to make an economic comparison between deconstruction and demolition. This composite is a single story, 2200 square foot house plus garage, with 3 bedrooms, 2 baths, raised foundation, composite shingles, single-paned windows, carpeting, hardwood floors, and a 12 x 40 wood deck. The costs do not include removal of concrete slabs, sidewalks, foundations, or asphalt, but do include the site being left in a rake clean condition (no debris).

In the machine demolition scenario, the owner pays \$10,100, but in the ReUse People (TRP) deconstruction scenario, the homeowner receives \$4,702 in after tax benefits. In other words, the owner would be financially better off to the tune of \$14,802 (\$4,702 received in tax benefits vs. paying \$10,100 in demolition costs).

Now for the disclaimers: Figures vary depending on location, age, and condition of the home and materials, topography, type of siding and interior walls, distance from the closest TRP deconstruction contractor, landfill rates, etc. Still, the economics almost always favor TRP deconstruction over demolition.

	TRP Deconstruction	Demolition
Physical lowering of house	\$17,238	\$6,000
Disposal of trash and debris	\$4100	\$4100
Appraisal of salvaged materials	\$3000	\$0
TOTAL COSTS	\$24,338	\$10,100
Donation value*	\$88,000	\$0
Tax savings* (after-tax value of donated materials)	\$29,040	\$0
TOTAL COSTS	\$24,338	\$10,100
After-tax benefit	\$4702	\$0
Out-of-pocket cost	\$0	\$10,100

*Total materials (lumber, plywood, cabinets, plumbing and electrical fixtures, doors, windows, etc.) would generally appraise for \$77,000 to \$112,000 in good usable condition. Assuming a tax bracket of 33 percent (federal only—this will be larger in states with an additional income tax), the after-tax cash value, based on a typical appraisal value of \$88,000, is \$29,040. The after-tax difference between the two methods is \$14,802—not counting the "feel good" factor.

Deconstruction will almost always be more expensive than demolition. In a dollar per square foot analysis, demolition costs range from \$4 to \$6 per square foot and a full deconstruction costs about twice that.

This is where being able to donate the materials to a 501(c)(3) nonprofit company for a tax-deductible receipt comes into play (see The Economics of Deconstruction, this page). For homeowners in a higher tax bracket who are removing a perfectly good structure because they want to build their dream house in its place, the tax deduction can easily offset the additional costs of deconstruction, if not the total costs.

Here in Boulder, where quality of life is high but empty building lots are scarce, new homeowners often face the conundrum of buying the lot they want in the neighborhood they desire, but not wanting to keep the existing building for reasons of personal choice. This is an ideal scenario for

deconstruction, and it happens more often than you may think.

According to city of Boulder records, there are currently about 150 demolitions per year that could be candidates for whole or partial deconstruction. Of that number, about 25 to 30 of the projects did involve some level of deconstructing in 2006, from complete deconstruction of the building to “soft-stripping” of interior components to prepare for a remodel. Capturing a higher percentage of these tear-downs and major remodeling projects will be essential to meeting the city of Boulder’s waste management goals.

THE MULTIPLE BOTTOM LINE

What Eco-Cycle does with household recyclables, we can also do with our houses. It’s the same process—you just use bigger containers.

Deconstruction has many benefits beyond just keeping stuff out of the landfill. In this part of the country, we have plenty of potential landfill sites, and, as a result, the cheapest disposal fees in the country by far. Fortunately, the good reasons to choose deconstruction go beyond landfill fees.

Deconstruction creates jobs, helps small business development, teaches valuable trade skills, provides affordable materials for affordable housing, and preserves architectural history. Salvaged materials also have lower embodied energy and reduce a building project’s carbon footprint.

But that little bit of Neanderthal that we all carry in our DNA gives us sufficient insight into how we should go about redoing our dwellings. The notion of throwing something away just because it’s been used once is, after all, a bit silly.

As long as there are the local businesses, organizations, government agencies, and community values necessary to make deconstruction, reuse, and recycling practical and affordable, we shouldn’t be seeing all the good mastodon bones getting buried. And here in Boulder, we have all of those things.

Kurt Buss (kurtbuss@thereusepeople.org) is the Colorado regional manager for The ReUse People. For more information, visit www.thereusepeople.org or the Boulder Warehouse at 10500 Isabelle Road, Lafayette, Colorado, 303.666.8094, Thursday through Saturday, 10 am to 6 pm.

Reprinted with permission from *Unbuilding* by Bob Falk and Brad Guy, published by The Taunton Press. Photo by Steve Culpepper, © The Taunton Press, Inc.



Reprinted with permission from *Unbuilding* by Bob Falk and Brad Guy, published by The Taunton Press. Photo by Steve Culpepper, © The Taunton Press, Inc.



A small, thin prybar is indispensable for removing delicate trim from both the interior and exterior of a house during deconstruction.



Reprinted with permission from *Unbuilding* by Bob Falk and Brad Guy, published by The Taunton Press. Photo by Steve Culpepper, © The Taunton Press, Inc.

RESOURCES

Deconstruction Organizations

- Colorado Hauling
303.682.3024
Patrick@coloradohauling.com
www.coloradohauling.com
- Deconstruction Services
303.931.7398
russcallas@aol.com
www.haulawayrecycling.com
- ReSource
303.419.5427
decon@resourceyard.org
www.ResourceYard.org

- The ReUse People
720.226.5646
kurtbuss@thereusepeople.org
www.thereusepeople.org

Building Material Reuse Stores

- Habitat for Humanity ReStores
- Longmont:*
455 Weaver Park Road
303.776.3334
www.strainhth.org
- Broomfield:*
6900 West 117th
303.404.2008
www.flatironthrift.com
- ReSource Sales Yard
- Boulder:*
2665 63rd Street
303.419.5418
www.ResourceYard.org
- ReUse Home Improvement Center
- Lafayette:*
10500 Isabelle Road
303.666.8094
www.thereusepeople.org

Publications

- Design Books*
- The Resourceful Renovator: A Gallery of Ideas for Reusing Building Materials*, Jennifer Corson. Order online from www.renovators-resource.com. \$28.95 (Canadian dollars)
- New Old House: Designing with Reclaimed Materials*, Ed Knapp. Order online from www.oikos.com \$18.95 (US dollars)

Reference Books

- Unbuilding: Salvaging the Architectural Treasures of Unwanted Houses*, Bob Falk and Brad Guy. Order online from www.taunton.com \$30.00 (US) \$38.00 (Canadian)
- Directory of Wood-Framed Building Deconstruction and Reused Building Materials Companies, 2005*. USDA Forest Products Laboratory. Download PDF file from www.buildingreuse.org or go to http://www.fpl.fs.fed.us/documents/fplgr/fpl_gtr150.pdf
- 2007 Guide to Architectural Antiques and Antique Lumber Companies*. Order online from www.architecturalsalvagedirectory.com.
- Periodical**
- Architectural Salvage News*, www.architecturalsalvagenews.com.