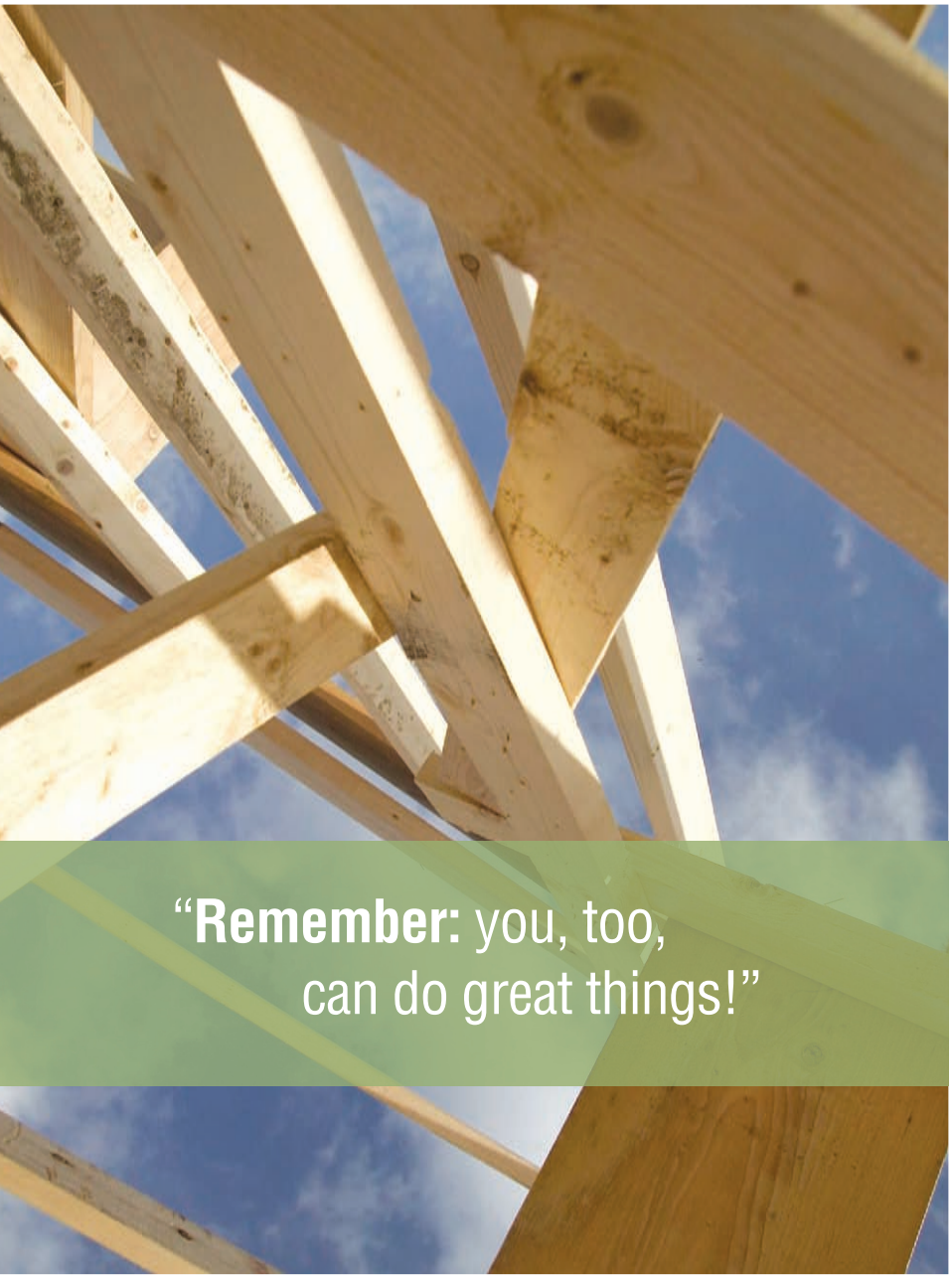
Reuse and Recycling Options

for Construction and Demolition Debris



"Remember: you, too, can do great things!"

by Brian Yeoman
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Last fall, we discussed deconstruction as more cost-effective and environmentally friendly than carting to the landfill and suggested how campus Purchasing could facilitate the process. Below, we'll examine common construction "waste" materials and viable options for disposal.

Wood

Wood waste (dimensional lumber, sheathing, trim) constitutes 40 percent to 50 percent of the volume of the residential new construction waste stream and 15 percent to 25 percent of the commercial. The most common reuse option for construction and demolition (C&D) wood is as fuel in industrial boilers. Most wood used for fuel is chipped. Wood treated with preservatives such as copper chromated arsenate (CCA), creosote, or chlorophenol should not be included. The ash of treated wood is likely to contain high-enough concentrations of heavy metals such as arsenic and chromium to render the ash "hazardous" and require its disposal under the guidelines of the Resource Conservation and Recovery Act (RCRA). Efforts should focus on reuse. One alternative is as a material in cement. Proper sorting and disposal practices are a must (Solo-Gabriele, et al., 1998).

Wood can be reduced in volume and downcycled to make products such as plywood and oriented strand board (OSB). Unfortunately, the adhesive content of engineered wood products can limit future recycling. The economics of using wood chip waste for engineered wood products is highly dependent upon local waste wood markets.

Many building materials such as lumber can be reused in their original form. Clean C&D wood can be laminated with plastic to make a decking material. However, this complicates future recycling.

Wood chips can also be used in the making of compost and animal bedding. Natural debris can be ground up and used as mulch. The amount of wood waste that ends up in the landfill is considerably less than might be expected in part because municipalities have gone into the mulch business to mitigate the rapid loss in landfill capacity. This "waste equals food" approach allows many of the waste removal contractors to earn a respectable profit by disposing of the material at a mulching operation rather than paying a landfill tipping fee. For some, this can be a substantial source of net income.

In summary, C&D wood waste can be used in the following applications:

- An industrial fuel source
- Mulch
- Composting operations
- Animal bedding
- Landfill cover
- Some building products

Cardboard

Cardboard typically represents 11 percent to 30 percent of the C&D waste stream by volume. Corrugated cardboard, the most common packaging for building materials, is a key component of the C&D waste stream. Dry cardboard can be readily recycled, which is usually cost-effective for contractors because it reduces space in waste containers. For most campuses, a cardboard bailer is a cost-effective investment.

Gypsum Drywall

Gypsum drywall, by volume, comprises between 8 percent and 15 percent of jobsite waste. In 2003, U.S. manufacturers produced 31.5 billion square feet. Many landfills prohibit gypsum drywall because of the hydrogen sulfide released as the product deteriorates. Clean gypsum board can be ground up and used in applications such as:

- A soil amendment to break up heavy clay soils
- A raw ingredient in the manufacture of Portland cement
- Animal bedding
- A bulking agent in composting
- Recycled drywall

On-Site Disposal

Wood, cardboard, and gypsum can also be ground on-site and applied to the construction site soil before it is landscaped. This can keep as much as 65 percent of jobsite waste out of landfills. Because most authorities require evidence that this approach does not harm the soil or water, solid waste specialists must be consulted.

Asphalt Shingles

Asphalt shingles are nearly 60 percent of the shingle market in the United States and comprise approximately 6 percent of the C&D waste stream by volume. They can be recycled, crushed as aggregate for hot mix asphalt, or used as primary material for rural roads. They can also be ground on-site for base material in concrete flatwork such as driveways and sidewalks.

Bricks

Bricks are a highly desirable product in the recycled stream. They are a source of crushed material to create high-quality fill and base. Used bricks serve as architectural elements. Brick structures fuel an underground market in most urban areas. Brick's value remains high regardless of age or condition.

Concrete

Concrete is one of the most successfully recycled materials in the world. The primary market is for base product in buildings and roads. Crushed concrete can also be used as primary surface material on rural roads and driveways, in drainage applications, and as fill. Local markets depend on the vitality of construction and road-building, and on the availability of substitutes such as lime rock. Recycling concrete is a dirty business. The crushing equipment is expensive, and it produces large amounts of fine particulate. Some communities have stringent zoning requirements.

Metals

Metal in the form of wiring (copper), siding (aluminum), fasteners (zinc, steel), HVAC equipment (copper, aluminum, gold), plumbing (copper), studs (steel), soft drink cans (aluminum) and roof flashing (tin, copper, aluminum) account for a relatively small percentage of construction debris. Rarely is it landfilled, but more likely stolen. Copper and aluminum are routinely recycled by the tradesperson(s) performing the work. Even modest amounts of low-value metal can be readily recycled in the scrap metal market.

Screened Materials

Dirt and other materials screened from the C&D stream may contain fragments of wood, rock, paper, drywall, and plastic. Screened material can be used for construction fill or as daily cover for landfills. However, when large amounts of gypsum are present, hydrogen sulfide gas can create unpleasant odors for nearby neighborhoods.

Miscellaneous

Lavatories, commodes, windows, light fixtures, mineral fiber ceiling tile, and flooring such as tile (ceramic, vinyl) are part of the waste stream. Habitat for Humanity has a number of outlets ("ReStores") that serve as nonprofit recycling and discount home improvement centers. They provide local markets for salvaged C&D materials. Both purchases and donations are handled at these stores. There are also private-sector stores that serve a similar need.

Bottom Line

There you have it. In your hands are many reduction and reuse opportunities. Think about including a specification in your construction projects, requiring diversion of 75 percent of the C&D waste stream. Reduce harmful gas emissions in the process and promote cleaner air. "Remember: you, too, can do great things!" And this is yet another to consider. NAEP

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