What’s in a Building?
Composition Analysis of C&D Debris

A critical concern of contractors is what to do with the waste generated on construction, demolition, and renovation projects. Building-related construction and demolition (C&D) debris totals more than 136 million tons/year or nearly 40% of the C&D and municipal solid wastewater stream (U.S. EPA). With landfill and transportation costs rising and new recycling requirements, waste disposal has become a major cost component of demolition and renovation bids. In order to minimize waste and the cost of disposal, it is important to have a clear understanding of what is being landfilled.

What can be reused or recycled and what must be disposed of? Having a general sense of the types and quantities of waste materials generated on your job sites is the starting place for any organized plan for achieving waste reduction. Although composition varies by season, location and project type, C&D debris generally consists of asphalt, concrete, brick, dirt, wood, metal, wallboard, roofing and insulation materials, plastics, cardboard, glass, and miscellaneous trash.

Typical Components of Building-Related C&D Debris

<table>
<thead>
<tr>
<th>Materials</th>
<th>Content Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>Forming and framing lumber, stumps, plywood, laminates, scraps</td>
</tr>
<tr>
<td>Drywall</td>
<td>Sheetrock, gypsum, plaster</td>
</tr>
<tr>
<td>Metals</td>
<td>Pipes, rebar, flashing, steel, aluminium, copper, brass, stainless steel</td>
</tr>
<tr>
<td>Plastics</td>
<td>Vinyl siding, doors, windows, floor tiles, pipes</td>
</tr>
<tr>
<td>Roofing</td>
<td>Asphalt and wood shingles, slate, tile, roofing felt</td>
</tr>
<tr>
<td>Rubble</td>
<td>Asphalt, concrete, cinder blocks, rock, earth</td>
</tr>
<tr>
<td>Brick</td>
<td>Bricks, decorative blocks</td>
</tr>
<tr>
<td>Glass</td>
<td>Windows, mirrors, lights</td>
</tr>
<tr>
<td>Misc.</td>
<td>Carpeting, fixtures, insulation, ceramic tile</td>
</tr>
</tbody>
</table>


C&D wastes are often bulked as a single wastewater stream. In reality, the types of debris generated through construction and demolition activities are vastly different, and differ considerably in ease of separation, recovery and recyclability. In many counties, recycling opportunities exist for most construction and demolition waste materials, including asphalt, concrete, drywall, metal, wood, brush, dirt, rocks, and cardboard.
What Can Be Reused?

With advance planning, many items can be reused on the jobsite. Additionally, if the project combines a demolition phase followed by new construction, many materials and items can be salvaged.

- Key to remove items include: doors, hardware, appliances, and fixtures. These can be salvaged for donation or use on the rebuild or on other jobs.
- Wood cut-offs can be used for cripples, lintels, and blocking to eliminate the need to cut full length lumber. Scrap wood can be chipped on site and used as mulch or groundcover.
- Gypsum drywall can be placed inside wall cavities to eliminate the need for transportation and landfill disposal. (Note: This method is really waste deferral rather than diversion).
- De-papered and crushed gypsum can be used, in moderate quantities, as soil amendment.
- Brick, concrete and masonry can be recycled on site as fill, subbase material or driveway bedding.
- Excess insulation from exterior walls can be used in interior walls as noise deadening material.
- Paint can be remixed and used in garage or storage areas, or as primer coat on other jobs.
- Packaging materials can be returned to suppliers for reuse.

What Must be Disposed of?

A certain portion of the waste from construction and demolition projects is toxic and/or classified as hazardous waste. Materials generated in new construction that require special handling include latex paints, chemical solvents, and asbestos, or paper, concrete, metal, and glass. Make a special effort not to purchase these materials in excess, and reuse them on other jobs where possible. Unused portions should be disposed of at a hazardous waste collection facility.

The age of structures on demolition projects ranges considerably, and many contain materials that are no longer allowed in new construction. Although asbestos abatement is required prior to demolition, there are sometimes remnants in subfloors or insulation that were not detected during abatement. Some older structures also contain significant quantities of lead-based paint. Handling and disposal of asbestos or lead-based paint that is removed from a structure varies according to volume and condition. For asbestos guidance, contact your local air pollution control district or call (415) 972-3989, and contact the National Lead Clearinghouse at (800) 424-LEAD for information about your responsibilities.

What Can Be Recycled?

With locally available recycling outlets, economics favor the recycling of heavy materials such as concrete and steel. The cost-effectiveness of recycling other materials depends on a variety of factors, but large quantities of any material will often make recycling competitive compared to the cost of landfill disposal.

- Wood wastes, along with mixed C&D debris, is accepted for a reduce tipping fee at MarBorg Industries and the Santa Barbara County South Coast Transfer Station.
- Clean drywall is also processed by local C&D materials processing facilities.
- Local industry accepts inert C&D debris for use as roadbase.
- Some suppliers will take back used or scrap material. Carpet remnants can be taken back to many suppliers. Also, it is sometimes possible to salvage and sell large scraps or find other uses for carpet on-site. Likewise, vinyl siding and ceiling tiles are sometimes taken back by manufacturers, when previously agreed upon.
- Some manufacturers will pickup used product or packaging when delivering a new order. Conversely, waste hauling costs can be absorbed by back-hauling new materials on the return trip.

- Demolition waste is often contaminated with paints, adhesives, and insulation, and the recyclability of wood may be hindered by nails and other fasteners. Large pieces of wood and dimensional lumber can be recovered through denailing and replaning and, because of the availability of local outlets, many demolition projects have been able to recycle as much as 80% of mixed debris.

Demolition waste originates from the construction, repair, and remodeling of residential and nonresidential structures. The waste generated is relatively clean, and can be readily separated on the jobsite. On residential construction and renovation projects, wood, drywall, and cardboard make up 60 - 80% of jobsite waste (NAHB). Metal, brick, block, vinyl, and asphalt waste are generated in relatively smaller quantities. "Truck-by" waste, unauthorized dumping during off hours, can be as high as 30% of the total waste volume. Commercial construction waste volume varies based upon the size and type of construction.