Construction Waste Management Strategies

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SUMMARY

The American Institute of Architects (AIA) 50to50 initiative is a how-to resource intended to assist architects and the construction industry in moving toward the AIA public goal of a minimum 50 percent reduction of fossil fuel consumption in buildings by 2010 and carbon neutrality by 2030. The 50to50 is a product of the Institute's Sustainability Discussion Group (SDiG), a task group of the AIA Board of Directors that was formed early in 2007 to seek action on the critical, focused, measurable, and achievable priority of carbon reduction.

Construction waste management (CWM) is one of the 50 steps listed to reduce carbon emissions; here it is excerpted and adapted as an AIA Best Practice.

BACKGROUND- WHAT IS CONSTRUCTION WASTE MANAGEMENT?

Today, most of our building waste ends up in landfills increasing the burden on landfill loading and operation. The practice of minimizing and diverting construction waste, demolition debris, and land-clearing debris from disposal and redirecting recyclable resources back into the construction process is commonly referred to as construction waste management (CWM). Waste management affects carbon reduction efforts by impacting one or more of the following:

- Energy consumption (specifically, combustion of fossil fuels) associated with manufacturing, transporting, using, and disposing the product or material that becomes a waste.
- Non-energy-related manufacturing emissions, such as the release of carbon dioxide when limestone is converted to lime (which is needed for aluminum and steel manufacturing).
- Methane emission from landfills.

It is estimated that anywhere from 25 to 40 percent of the national solid waste stream is building-related waste and only 20 percent of construction waste or demolition debris (C&D) is actually recycled. In 1998, the U.S. Environmental Protection Agency estimated that 136 million tons of building-related waste is generated in the United States annually. A 2003 update shows an increase to 164 million tons, of which 9 percent is construction waste, 38 percent is renovation waste, and 53 percent is demolition debris.

Image of comingled construction debris

BENEFITS OF CWM

Integrating CWM in the construction process is a win-win situation; it benefits the environment and the bottom line. An architect can promote successful waste management by, first, developing a construction waste management plan, and next, incorporating it in the construction specifications. By reducing the creation of waste on site a project can better meet its sustainability goals.

A CWM PLAN

A comprehensive CWM plan should include:

- A list of materials targeted for reuse, salvage, or recycle
- Landfill information (including tipping fees)
- Description of the proposed means of sorting and transporting the recyclable materials
- An estimate of the packaging materials generated, noting whether the supplier can eliminate or recycle packaging
- A provision for addressing noncompliance of the CWM, including a stop-work order or provisions to rectify noncompliant conditions

- Recycling facility information (including how materials will be recycled)
- Other project specific information relevant to the scope and intent of the project

Some of the more common C&D wastes are lumber, drywall, metals, masonry (brick, concrete), carpet, plastic, pipe, rocks, dirt, paper, cardboard, or green waste related to land development together these materials make up 95 percent of buildings. Of these materials, metals are the most commonly recycled while lumber makes up the majority of debris that goes to a landfill. It is possible to divert close to 90 percent of job site waste and more than 80 percent of demolition debris with a thorough CWM plan.

Common ways to prevent waste from entering the waste stream are:

- Reduce packaging waste; purchase available items in bulk
- Reuse/recycle nonreturnable packaging and containers on site
- Purchase materials in returnable packaging/containers
- Donate nonreturnable/recyclable packaging/containers to local organizations
- Build material-efficient buildings
- Examine demolition techniques and creative salvage methods

A successful CWM plan involves all the principal parties of a project: owner, architect, engineer, contractor, and subcontractor. By involving each of the vested parties early on in the design process it is easier to achieve established goals. The CWM plan should require the contractor to minimize waste, develop ways to reuse existing materials, which may be included in the new design or elsewhere. The architect should be familiar with the regional waste management infrastructure and establish a waste management goal for the contractor.

Due to the recent interest in CWM companies are emerging that provide the necessary services of sorting, removing, and recycling. The Construction Waste Management Database contains information on companies that haul, collect, and process recyclable debris from construction projects. Created in 2002 by the U.S. General Services Administration's Environmental Strategies and Safety Division to promote responsible waste disposal, the database is a free online service for those seeking companies that recycle construction debris in their area.

RESOURCES

More Best Practices

The following AIA Best Practices provide additional information related to this topic:

16.01.11 The Living Building Challenge

16.02.08 Steps Toward LEED Certification

For More Information on This Topic

See also "Sustainable Design" by Henry Siegel, FAIA; Larry Strain, FAIA; and Nancy Malone, AIA, LEED AP, in *The Architect's Handbook of Professional Practice*, 14th edition, Chapter 12, page 602. *The Handbook* can be ordered from the AIA Bookstore by calling 800-242-3837 (option 4) or by sending an e-mail to bookstore@aia.org.

Feedback

The AIA welcomes member feedback on Best Practice articles. To provide feedback on this article, please contact bestpractices@aia.org.

Key Terms

- Building performance
- Sustainability
- Construction debris
- Project management