

# ■ Recycling in Cyberspace



## Making buildings unbuildable

by Roger Guttentag

The title for this month's column appears oxymoronic or even paradoxical. However, what it refers to is the concept of Design for Deconstruction (DfD) or, to put this another way, creating buildings that can be easily taken apart at the end of their useful lives for recycling or reuse purposes. DfD exists at the intersection of two different but complementary emerging disciplines — Design for Recycling and Sustainable Architecture. DfD addresses the need to develop environmentally sensible buildings and how to manage them when they no longer serve a valid economic or social purpose. This month's column will serve as Web-based primer on this important topic.

### What you need to know first

In order to fully appreciate what DfD can and cannot do, you need to have some familiarity with the essential issues connected with managing construction and demolition waste (CDW) and the basic ideas underlying deconstruction as a method for minimizing landfilled CDW. There are two sites that I would recommend consulting for this important background information.

The first is the Construction and Demolition Materials Management section of the Connecticut Department of Environmental Protection's Recycling Web site. It is an excellent resource that provides brief overviews within nine informational categories such as asphalt shingles, waste composition and beneficial uses along with numerous links, many of them annotated, to other relevant resources. It is a site definitely worth bookmarking for future reference.

The other site that should be reviewed as part of your background research on this subject is the Deconstruction Institute.

This site, developed by Charlotte County, Florida through an innovation grant from the Florida Department of Environmental Protection, provides an on-line introduction and general reference library on the technical, economic and environmental aspects of building deconstruction. The information resources that are available include manuals, articles, case studies, photo galleries and online calculators. There is also a page where you can sign up to join an email discussion list on deconstruction.

### DfD basic principles

The next step is to start developing an understanding of the basic principles underlying DfD. Fortunately; there are several sites that provide this important introduction. Design4Deconstruction, for example, has a nice 10 point overview that can be found by clicking on the link to Common Principles. These principles cover a number of important design approaches such as the need to use mechanical connectors, reducing the complexity of the building design and minimizing the number of components and materials used by this design. A more fleshed-out discussion of these principles can be found by following the link to the Design for Deconstruction PDF on the ecoMOD site, which is a University of Virginia program for developing environmentally sound affordable housing. This document is part of their description of the design approach utilized by the one of their projects and also identifies 10 key concepts that underlie successful deconstruction practices. Many are similar to those espoused by Design4Deconstruction, but they also specify some very commonsensical ideas. My favorite is to make sure that it is easy for the workers on the deconstruction site to figure out how the building should be taken apart.

Finally, you should read carefully the City of Seattle's terrific Design for Disassembly guide that can be downloaded from the Construction and Demolition Recycling section of King County's (WA) Solid Waste Division Web site. Anticipating wisely that not everyone will take the time to read this guide, they present a separate listing of the 14 principal questions that are addressed by it. Most of these questions are eminently simple and sensible, such as how long will the building last, who is expected to use it, what materials will be used, and so forth. However, it is absolutely worth the time and effort to read the guide's responses to these questions within the first three chapters. Interestingly, this guide also articulates 10 DfD principles in its second chapter and then proceeds in its third chapter to show how they are realized through the building design process. One notable feature of this chapter is its articulation of a "Hierarchy of Building Resource Management Goals" that places adaptive reuse as number one, and the landfilling of materials as the 10<sup>th</sup>, and least preferred materials management method.

### Getting deeper into DfD

After you have acquired some basic knowledge of DfD principles and design methods, you can then see how they are brought to fruition through a review of case studies. Most of the sites listed at the end of this column have case study sections. I will highlight two of them. The DfD Guide discussed above has an extensive case studies section to demonstrate how the theory discussed earlier in the guide is actually put into practice. The case study narrative is organized with respect to Structure, Skin (the building's exterior), Systems, Services and Space Plan. This narrative is supported

by architectural diagrams and photos.

Another good source of case studies is the Lifecycle Building Challenge which is a competition for encouraging the development of building design, construction and management practices that include maximizing the reuse or recovery of materials through disassembly at the end of a building's economic life. The past winners and entries of previous Lifecycle Building Challenges can be accessed through links on this site. Each link leads to a short and longer discussion of the project, especially on how it promotes Lifecycle Building goals, along with illustrating photos. I also recommend following the Resources link and downloading "The Lifecycle Construction Resource Guide" and "Design for Deconstruction: The Chartwell School Case Study."

Finally, you should download and read the Design for Reuse Primer that was developed through funding provided by the U.S. Green Building Council. This guide documents through 15 case studies drawn from a variety of building sectors (e.g. housing, commercial, cultural) how materials reuse can be incorporated into new construction or renovation projects. The authors argue quite persuasively that

## Web Address Directory

Connecticut Department of Environmental Protection – Construction and

Demolition Materials Management

<http://tinyurl.com/CtCDMgmt>

Deconstruction Institute

<http://www.deconstructioninstitute.com/>

Design For Reuse Primer

<http://tinyurl.com/DesignforReuse>

Design4Deconstruction

<http://tinyurl.com/DesignforDecon>

ecoMOD – Design for Deconstruction

<http://tinyurl.com/ecomodVA>

King County Solid Waste Division –

Design for Disassembly

<http://tinyurl.com/KingCODEcon>

Lifecycle Building Challenge

<http://www.lifecyclebuilding.org/>

repurposing building components and materials in the end has more environmentally beneficial results (such as saving energy) than recycling.

## Final Thoughts

Dfd illustrates quite well our need to evolve from reactive materials management strategies into ones that are more proactive. In other words, we truly can't maximize reuse and recycling in our society unless

they are incorporated from the very beginning into the basic fabric of our technical and economic practices. Let us hope that the DfD examples presented through these sites show that it quite feasible and reasonable to do that.

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