Building Green with Wood in B.C.

MODULE 4

Resource Conservation

City of Vancouver Materials Testing Lab. About three-quarters of the Materials Testing Lab's structure and fabric consists of salvaged and recycled materials, mostly from a warehouse that was dismantled on site.

Architect: Perkins+Will Canada Architects
Photo: Martin Tessler

Using Resources Wisely

Responsible resource management is essential if we are to reach the goal of true sustainable development. Sometimes this will mean using less, but it will always mean choosing products with the lightest carbon footprint possible.

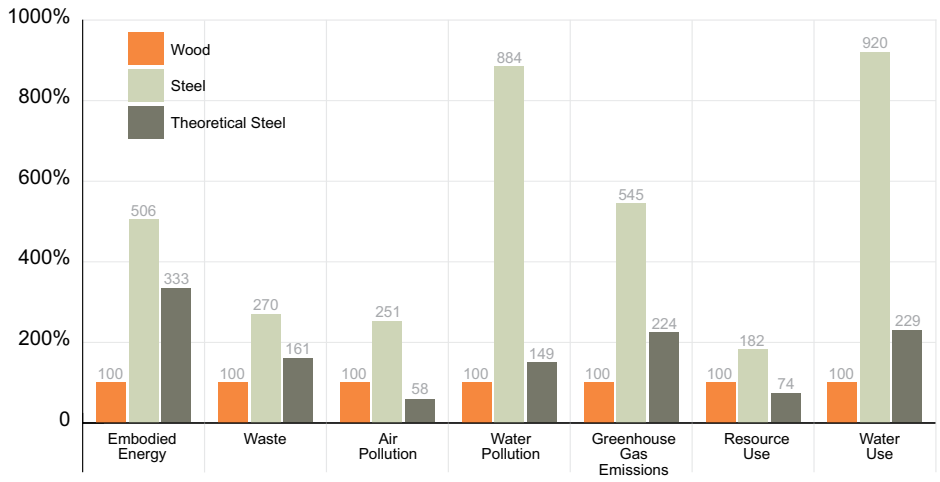
When it comes to building construction and renovation, this means identifying materials, manufacturing processes and design strategies that:

- minimize the use of non-renewable resources
- minimize waste during the extraction and manufacturing process
- minimize the use of fossil fuel energy during extraction and manufacturing
- use products that are flexible, adaptable and durable
- enable the reuse of materials and products from dismantled buildings
- recycle materials only when no longer fit for their original purpose

A Closer Look at Recycled Content

This bar chart compares a life cycle assessment of two standard structural post-and-beam systems, and one theoretical steel structure with 100 per cent recycled content.

Source: FPInnovations, calculated using the Athena Impact Estimator for Buildings.



Benefits of Wood

Selecting wood building products offers the following advantages related to resource conservation:

1. **Wood is 100 per cent renewable.** When grown and harvested according to internationally recognized sustainable forest management practices, it is the only major construction material that can be regenerated for the benefit of future generations.

2. **Wood is produced efficiently.** The portion of harvested wood volume entering primary processing mills in North America that is converted to marketable products, or converted to useful energy, is near 100 per cent. In other words, the wood waste at these mills is near 0 per cent; therefore, in terms of wood use, these are zero-waste facilities. Secondary processing plants are similarly diligent in utilization of raw materials.[1]

3. **Wood has low embodied energy.** Wood has the least embodied energy of all major building materials[2]. In other words, the energy consumed to grow, harvest, transport and manufacture wood products is less than for other products. Not only does wood require less energy to manufacture into products, half of that is generated from wood waste such as chips and sawdust. Burning wood waste for energy is considered carbon neutral because it only releases the carbon sequestered in the wood during the growing cycle.

4. **Wood is versatile and adaptable.** A building's structural design and spatial subdivision determines its ability to be flexible in use, and adaptable so it can meet new requirements. Separating these functions makes it easier to reconfigure the space. Wood lends itself to this design approach, especially through the use of post-and-beam structures (in solid sawn lumber or engineered wood) and non-load-bearing partitions made up of smaller members (either solid laminated or in stud frame construction).

5. **Wood lends itself to dismantling,** a fact borne out by the continued predominance of wood and wood products in the architectural salvage market. It can generally be reclaimed without diminishing its value or usefulness for future applications. This contrasts with materials like concrete, which is usually crushed for future use as aggregate or ballast, or brick, which can be easily damaged when cleaned for reuse, and which can rarely be reassembled with the original precision.

6. **Wood can be reclaimed and reused** for the same or similar purpose with only minor modifications or wastage. If desired, the same material can be remilled and fashioned into other products, such as window and door frames, curtain wall components and cladding. A recent celebrated example is the Materials Testing Facility in Vancouver, designed by Perkins+Will Canada Architects Co., which features reclaimed lumber from a demolished warehouse in each of these applications. Short lengths of lumber that may be a byproduct of the remilling process can typically be used for bracing and blocking elements. Wood components too small to reuse and leftover wood chips and sawdust can be processed into mulch for landscape use or to provide organic material to promote decomposition in landfills.

[1]Bowyer, J., Bratkovich, S., and Fernholz, K. 2012. Utilization of Harvested Wood by the North American Forest Products Industry. Dovetail Partners. 8 October 2012. Available at: www.dovetailinc.org

[2]Werner, Frank and Richter, Klaus, Scientific Journals April 2007: Wooden Building Products in Comparative LCA: A Literature Review.

Reclaimed wood: C.K. Choi Building, Institute of Asian Research, University of British Columbia, Vancouver, B.C.
Architect: Matsuzaki Wright Architects
Photo: Don Erhardt

Private residence with reclaimed douglas fir post and beams; reclaimed douglas fir fireplace mantle; reclaimed douglas fir ceiling decking; reclaimed douglas fir flooring (milled and stained to give appearance of antique wood).
Photo: Peter Powles

Green buildings

- Mitigate climate change
- Use less energy and water
- Use fewer materials
- Reduce waste
- Are healthy for people and the planet

On the cover:
WoodWave panel, Richmond Olympic Oval, Richmond, B.C.
Architect: Cannon Design
Photo: Martin Tessler

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