




Building
Green with
Wood

MODULE 4

Resource
Conservation



Vancouver Materials Testing Lab.
Perkins+Will Canada Architects Co.:
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.

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.

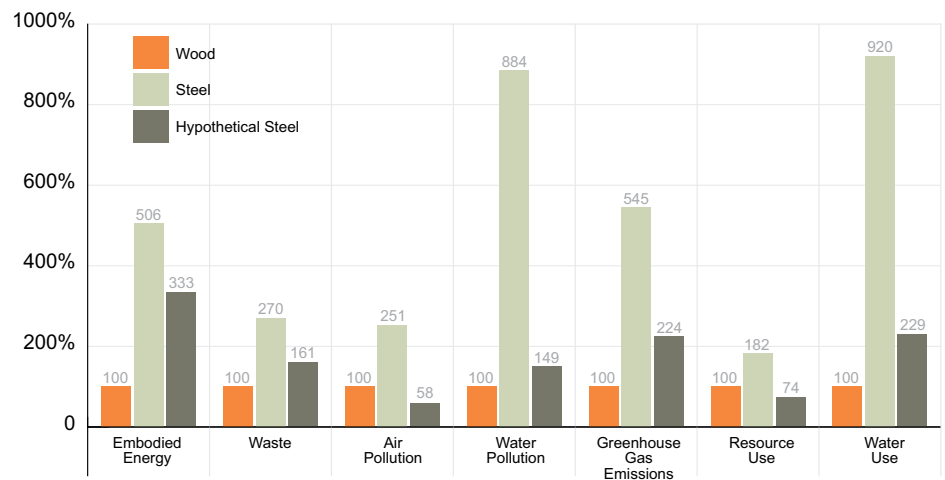
When it comes to building construction and renovation, this means identifying materials, manufacturing processes and design strategies that:

- minimize the use of 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.
- minimize the use of non-renewable resources
 - minimize waste during the extraction and manufacturing process

A Closer Look at Recycled Content

This bar chart compares life cycle assessment environmental profile 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. More than 90 per cent of every tree harvested in Canada is utilized.** The fibre is used for the highest-value products possible, and mill residues such as chips, cut-offs and sawdust are used to make high-value composite materials such as pulp, medium-density fibreboard and finger-jointed lumber.
- 3. Wood has the least embodied energy of all major building materials¹.** 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. Structural wood members can typically 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 Werner, Frank and Richter, Klaus, Scientific Journals April 2007: Wooden Building Products in Comparative LCA: A Literature Review.



Left image:
Richmond Olympic Oval
Architect: Cannon Design
The venue was built for the 2010 Olympic and Paralympic Winter Games in Vancouver, and is now a multi-sport and wellness facility for the local community. The unique roof system is made with wood affected by the mountain pine beetle infestation in British Columbia's interior, making it an important tool in mitigating the impacts of climate change by sequestering carbon.



On the cover:
Tillamook Forest Center, Oregon
Architect: The Miller/Hull Partnership, LLP

Green buildings

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

Wood Anchor, a Manitoba company, produces tables from 100 per cent recycled grain elevator beams – that come complete with cracks, nail holes, stains and other character marks associated with reclaimed wood.