eUpdate
BuildingOnline's free eMail & web based news service

STUDY SAYS WOOD BUILDINGS ARE "GREENER" THAN STEEL, CONCRETE

11/05/2004

Analyzing the 75-year life cycle of a typical home, a new study conducted by 15 U.S. universities and research institutes revealed that wood-framed homes are more environmentally friendly than those constructed of steel or concrete. Additionally, the researchers, known as the Consortium for Research on Renewable Industrial Materials (CORRIM), concluded that the bulk of energy required to build an average home is consumed during the manufacture of building materials - not during actual construction. "These are landmark findings," said Kelly McCloskey, president and CEO of the Wood Promotion Network. "This offers a first-ever snapshot into how building materials impact our environment."

Twenty-three independent researchers collaborated on the project that used a process called life cycle assessment to weigh the environmental impact of home construction. Life cycle assessment gauges the energy required to produce building materials, as well as construct, maintain and demolish a typical home over a period of 75 years. "Considering 1.7 million homes using wood, steel and concrete are constructed each year, choosing construction materials wisely is significant," said study participant Bruce Lippke, professor of forest resources, University of Washington. "The manufacture of these construction materials requires as much energy as heating and cooling 10 million or more homes annually." The CORRIM research evaluated the life cycle of a hypothetical wood and steel-frame home in Minneapolis, as well as a wood and concrete-frame home in Atlanta. The study determined that the construction of the Minneapolis steel-frame home used 17% more energy than the matching wood-frame home, and the Atlanta concrete-frame home used 16% more energy than a matching wood-frame house. The energy tallied for the study included everything in the life cycle of a home, including: electricity used by the homeowner, diesel and fuel oil to extract and haul materials, natural gas to generate steam in lumber mills and electricity for steel mills. "Everything kind of flows from energy consumption," Lippke says. "If you're using energy, you're polluting water, polluting air and kicking out carbon dioxide emissions."

The study also concluded that the carbon emissions associated with energy use represent one of the more important environmental impacts. The researchers considered, for example, carbon dioxide, methane and nitrous oxide emissions generated during the life cycles of the homes, as well as the length of time these greenhouse gases linger in the atmosphere to determine the global warming potential of different construction materials. They estimated the global-warming potential of the steel-frame home to be 26% higher than the wood-frame, and the concrete-frame home was 31% higher than the comparable wood-frame. "The use of wood products instead of steel or concrete can farther reduce the greenhouse emissions from fossil fuels wherever lumber mills generate power and heat using bark, sawdust and other byproducts of milling," said Lippke. "More than half the energy required by mills currently comes from these residuals, a renewable source of energy compared to fossil fuels like concrete and steel." The report offers additional

suggestions on how to help reduce the energy demands of home construction, including:

•Redesigning houses to use less fossil-fuel intensive products

•Changing building codes that result in excessive use of wood, steel and concrete

•Recycling demolition wastes

•Increasing durability of homes through improved products and construction practices
For more information

www.beconstructive.com or http://www.corrim.org

(Thanks to Rick Schumacher, Publisher of LBM Journal for sharing this story with us)

Environmental Properties

In June the Co-operative Research Centre (CRC) for Greenhouse Accounting released findings of a study into greenhouse emissions associated with manufacture of different building materials. The CRC found that the manufacture of a plantation pine frame for a standard 4-bedroom house (180 m²) generated 0.4 tonnes of carbon dioxide, compared to 2.7 tonnes to manufacture steel framing for the same house. The difference, 2.3 tonnes, equates roughly to the amount of carbon dioxide emitted by an average car travelling 8000 kilometres.

Greenhouse Emissions & Embodied Energy

Timber has been found to have lower levels of "embodied energy" other building materials (concrete, steel and aluminium, for example). Embodied energy is a measure used to assess the total energy input associated with a given material. This includes the energy required to manufacture, transport and install the material.

Material	Fossil fuel energy(MJ/kg)	Fossil fuel energy(MJ/m³)
Rough sawn Timber	1.5	750
Steel	35	288,000
Concrete	2	4,800
Aluminium	485	1,000,000

A research report "Environmental Properties of Timber", commissioned by the Forest & Wood Products Research & Development Corporation in 1996

Additional benefits

Much of the increasing area of land being dedicated to plantations is marginal land with limited potential for other agricultural use. Once established, new softwood plantations assist in rejuvenating their environs, easing soil erosion and salinity pressures.
Australia's State of the Forests Report 2003, released by the Bureau of Rural Sciences last August, indicates that commercial timber plantations have increased by an average 87,000 hectares each year for the past five years. Land area under commercial plantation in Australia currently stands at 1.6 million hectares, which the industry has committed to doubling within 15 years. Some 164 million hectares – 21% of Australia's land mass – is classified as forested land.

Common Misconceptions

Termites

Termites, which have long been a natural part of the Australian environment, are no greater a threat now than they were at the time of European settlement. ABS figures suggest that the economic loss associated with termite damage is minimal, and that it does not rate as a significant cause of structural damage. Moreover, the likelihood of termites encroaching on a dwelling has nothing to do with the type of frame – timber or steel - used in building the dwelling. By adhering to several simple design principles and basic maintenance, homebuilders can eliminate any risk of termite damage. Modern termite management systems that deter termites or reveal their presence readily are highly effective. If detected, termites can now be eradicated easily without the need for dangerous chemicals. Modern timber framing systems can also be treated with non-harmful organic deterrents to provide additional protection.

The PPFA recommends that homeowners arrange annual inspections by a recognised pest controller. Such tests are relatively inexpensive and ensure that any termite encroachment is detected and acted on promptly.

Bushfire safety

The key issues in designing homes in areas of high bushfire risk centre on exterior fittings and proximity of the site to vegetation, and not structural materials. Construction standards for residential dwellings in bushfire zones make no reference to framing material. Research into fires indicate that houses in intense bushfire succumb when embers, often propelled by high winds, penetrate the exterior of a house, igniting furnishings and interior fittings. At this point the fire will almost inevitably destroy the house, regardless of the structural material used. Far from providing additional protection in the event of a fire, as is often claimed, steel frames are prone to softening and buckling in extreme heat. By contrast, timber frames follows a more predictable burning pattern and tend to support structural loads for longer in a fire. Anecdotal evidence from firefighters suggests they are less comfortable entering a steel-framed home in a fire than a timber-framed home, because of this lack of predictability.

View this Site

Just click here

http://www.homebuildingpitfalls.com/

Various Links