Wood Products and the Environment – An Overview

CREATIVE LEARNING ACADEMY FOR SENIOR SCHOLARS
VT CLASS
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PLUS HELP FROM SOME FRIENDS AT VT LIKE BOB SMITH, BOB BUSH, DAN HINDMAN, MATT WINN(FS), AND JUDY ARAMAN(ODU)
Wood products were our first exports

Inland and coastal waterways.

Wood ties connected our country!

Communication and electricity
The first cars were over 50% wood.
The first airplanes were wood.

- THE ORIGINAL WRIGHT BROTHERS AEROPLANE

FLOWN BY THEM AT KITTY HAWK, NORTH CAROLINA
DECEMBER 17, 1903
Wood Based Homes still exceed 90% of new home construction
Many options when using WOOD
WOOD is Important in home Building!

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Wood is used in Nonresidential Construction
Some local construction with wood at Smith’s Landing
Furniture, Cabinets, Windows and Flooring
Some more pictures
Paper, Pallets and Packaging
Musical instruments go way way back
<table>
<thead>
<tr>
<th>Toothpaste</th>
<th>Football helmet</th>
<th>Crayons</th>
<th>Coating for meds</th>
<th>Chewing Gum</th>
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</thead>
<tbody>
<tr>
<td>Laundry Detergent</td>
<td>Photo film</td>
<td>Cough syrup</td>
<td>Hair spray</td>
<td>Furniture polish</td>
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<tr>
<td>Aspirin</td>
<td>Fabric</td>
<td>Ice Cream</td>
<td>Spices &amp; Flavorings</td>
<td>Clean air</td>
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<tr>
<td>Dyes</td>
<td>Mayo</td>
<td>Glue</td>
<td>Mushrooms</td>
<td>Holiday decor</td>
</tr>
<tr>
<td>Shipping systems</td>
<td>Clean water</td>
<td>Lipstick</td>
<td>Skin Lotion</td>
<td>Paint</td>
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</tbody>
</table>
And the answer is...

- All the examples are forest products, either timber or non-timber
- Over 5000 products are made either directly from wood or from the by-products of processing wood products
Here are some of the products that are made either directly from wood or from the by-products of processing wood products.
Wood Products – the Big Picture in the South

State Comparisons Through Time

- Industry: Wood Products
- Unit: Value
- Year: 1988 to 2012

States compared: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia

Value ranges: 0B to 35B
Virginia Trends and other Southern States

Wood Related Industries Comparisons

Full Timeseries - Select Area Below

Year

Value

0M 500M 1000M 1500M 2000M 2500M 3000M

State
North Carolina
Georgia
Texas
Alabama
Tennessee
Mississippi
Florida
South Carolina
Virginia
Arkansas
Louisiana
Kentucky
Oklahoma

Unit

Employment
Income

Industry

Forestry and Logging
Furniture
Paper
Wood Products

State

(VT CLASS)
Wood Products and the environment - Trees and Wood are part of the Eco-Cycle
TREES need Carbon Dioxide

- Older trees are not as productive
- For every m$^3$ growth, a tree absorbs 1 tonne CO$_2$ creating .7 tonne O$_2$
Wood Products and the environment - Trees and Wood are part of the Eco-Cycle
Renewable trees have helped and continue to help build and supply this country with products.
Over the past 60 years (1950 thru 2010)

- **Renewable trees**
  - 847 billion cubic feet of wood was harvested (a football field 10,000 miles high)
  - 90 millions home built
  - But we have 50% more wood volume in our forests
  - Trees and wood are renewable!

- **Nonrenewable Oil**
  - 163 billion barrels of petroleum were extracted in the US
  - This consumption also released over 75 billion tons of Carbon dioxide to the atmosphere
Another plus is that **wood** can be reused and recycled when it finishes the original use.
Used pallets can be recovered – They should be reused or recycled and not landfilled.
What we like to see … Urban Wood Pallet Recovery, Reuse, and Recycling

(SAVES TREES ….. SAVES LANDFILL SPACE ….. AND PROVIDES NEEDED WOOD PRODUCTS)

The Urban Resources

Shouldn’t Do

LANDFILLING

Questions - Contact Phil Araman
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What is happening -- Most recovered pallets are reused

- 68% Used for repair
- 15% Un-nailed
- 10% Reused without repair
- 6% Ground or chipped
- <1% Landfilled
- 1% Other
And it is good for the environment ... Equivalent numbers of trees saved from being harvested for pallets because of reuse.

* Based on trees 12” in diameter (DBH) with 2.5 16 foot long logs. (Estimated to contain 100 board feet of lumber)
More can be done to achieve ZERO PALLET WASTE

- There could be up to 2 billion pallets in service
- 441 million new pallets / year
- 460 million pallets recovered / year
  - 357 million of those returned as pallets
  - The remaining 103 million were recycled to other products
- Millions still sent to landfills every year
  - About 1/4th recycled at landfills
- More Recovery, repair and recycling is needed
Used pallets collected in a trailer
Pallets going to repair and incoming trailers from pallet users
Separation area at large recycler
Recovered/Repaired Pallets
Some pallets and other wood go to chipping operations
Tub Grinder and Colored Mulch
Uses for Recycled Ground Wood Chips

**Landscape Mulch**

- **Screen Size:** 1” – 1 ½”
- **Buyer:** Can be sold retail or wholesale to park districts, golf courses, corps., playgrounds, homes.
- **Comments:** Can be sold retail/wholesale + bagged or bulk. Retail needs outlets. Colored mulch markets have grown significantly in recent years.

Source: Cresswood Recycling Systems
Uses for Recycled Ground Wood Chips

Animal Bedding

- **Screen Size:** 3/8” – 5/8”
- **Buyer:** Sawdust/wood chip brokers in Yellow Pages, land grant college animal science depts., stables, kennels, poultry/meat producers.
- **Comments:** Larger chips can be blended w/ sawdust for good absorbency. Small chips reduce grinder output. To add value, secondary grinders reduce size and increase consistency (require air).

Source: Cresswood Recycling Systems
Uses for Recycled Ground Wood Chips

**Boiler Fuel**

- **Screen Size**: 3/4” – 2”
- **Buyer**: Large wood fired boilers for heat kilns and cogeneration, paper mills.
- **Comments**: Chip size determined by boilers, material handling specifications. BTUs green - 3500, dry - 7000, particle board - 14,000

Source: Cresswood Recycling Systems
Uses for Recycled Ground Wood Chips

Composting

- **Screen Size:** 3/4” – 1”
- **Buyer:** There are 250-300 bio-solid composting centers in U.S. plus sewerage districts and nurseries.
- **Comments:** Provides carbon and bulking agent for organic material like food scraps, yard waste and sewerage. Note: Large food processors frequently have own composting center.

Source: Cresswood Recycling Systems
Uses for Recycled Ground Wood Chips

Wood Pellet Feed

- **Screen Size:** 1/8”
- **Buyer:** Wood pellet fuel manufacturers.
- **Comments:** Pellets typically have ash content less than .5%. Ground pallets and barked chips are not acceptable due to residue. Any species acceptable, though process needs volume in constant proportions.

Source: *Cresswood Recycling Systems*
Natural and Colored Mulch
“Green” flooring can be made from used pallet parts
Zero Wood Construction Waste is Possible in Homebuilding
Why because wood construction waste materials should be kept out of landfills

- At 500,000 homes per year around 2,500,000,000 pounds of new wood waste is generated
- At 2,000,000 homes per year around 10,000,000,000,000 pounds of new wood waste is generated
We are working at Mount Tabor Meadows

*Blacksburg, VA’s First “Green Development”*

- A housing development in Blacksburg, Virginia with Phase 1 currently under way.
- 49 lots with twelve different house plans to choose from.
- Homes will be certified *EarthCraft House* with a focus on environmental standards.
To determine much wood construction waste is generated in home building ...

From a little over a 2000 sq. ft. house
Total wood waste – 5,059 lbs.

- OSB waste – 1,419 lbs.
- Treated wood waste – 417 lbs.
- Spruce structural lumber waste – 3,134 lbs.

- LVL – 64 lbs.
- Paralam – 25 lbs.
The Waste ...
Waste OSB, LVL, SPF, and treated lumber material from home building
From the waste we make Products
Recycled Construction Waste OSB Sold at Habitat for Humanity Restore
We grind the other materials

- Tub grinder
- Small horizontal grinder
- Larger horizontal grinder
Grinding – SPF and OSB (OSB material is not accepted in some states)

- General mulch for landscaping
- Mulch berms – erosion control
- Temporary walkways and roads for crews
- Soil enhancer for lawns
Some more mulch examples
Wood for Energy is next and can be as simple as firewood from Kroger
Wood Pellets for Energy

- Uniform
- Easy to handle
- Easy to transport
- Burn efficiently
- Large market

Module 5: Utilization of Biomass
Sources of Woody Biomass for Energy – Logging Residue

- Unconsolidated
- Comminuted
- Bundled

Module 5: Utilization of Biomass
Wood Processing Residue for Energy

- Black Liquor
- Sawdust
- Bark

Module 5: Utilization of Biomass
Other Sources of Woody Biomass for Energy

- Energy plantations
- Construction waste

Module 5: Utilization of Biomass
Urban Waste for energy -- OSB, LVL and treated lumber material left over after house construction
More Urban Waste -- spruce(SPF) material left over after house construction
Don’t forget -- Used home deck wood
And -- Demolished homes and construction waste
US Energy Supply
(data for 2003)

Source: AEO 2004 tables (released in December 2003) based on US energy consumption. Overall breakdown Table A1 (Total Energy Supply and Disposition), and Renewable breakdown Table A18 (Renewable Energy, Consumption by Section and Source). Slide courtesy Mile Pacheco, NREL, US-DOE.

Module 5: Utilization of Biomass
Wood is an extraordinary material
Naturally renewable, it grows in ever-increasing abundance in North America
It is beautiful, light, and strong to build with
It is warm and welcoming to live with
Plus ... I did mention it is renewable
Properly used – wood can last a long time – 14th century structure in Lucerne, Switzerland
This cabin could be made from dead hemlock trees -- Any Questions?