The Rest of the Story: When timber becomes wood products

Brian Bond
Outline

• What comes off the property
• What they do with it
  – What does Virginia’s industry look like
• Changes and the future
What Comes Off the Land?

Approximately 66% hardwoods, 22% of pine, and 12% of the oak-pine type
What Comes Off the Land?

• Products point of view
  – Species?
  – Quality?
  – Volume?
Variation
Value Stream

- Trees
- Logs
- Lumber
- Millwork/Components
- Furniture
- Showroom
- Your home
What Comes Out of the Woods

- Merchandising - separating logs according to the products to be derived from the log.

1. Pulpwood - small, low-quality logs
2. Sawlogs - intermediate size, medium-quality logs
3. Ply bolts or veneer logs - large, high quality logs

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
</tr>
<tr>
<td>High</td>
</tr>
</tbody>
</table>
What Can Be Merchandised?

- Pulpwood
- OSB logs
- Pallet logs
- Poles
- Tie Logs
- Chip-n-saw
- Sawlogs
  - Export
  - Stud
  - Shop
  - Grade
  - Ties
- Plywood
- Veneer
  - High quality sliced
  - Rotary peeled
  - Engineered peeled
## Average Delivered Prices FOB Mill for Virginia

<table>
<thead>
<tr>
<th>Product</th>
<th>$/ Ton</th>
<th>$/per MBF (Doyle Scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pine Sawtimber</td>
<td>48.48</td>
<td>484</td>
</tr>
<tr>
<td>Oak Sawtimber</td>
<td>52.56</td>
<td>460</td>
</tr>
<tr>
<td>Mixed Hardwood Sawtimber</td>
<td>38.17</td>
<td>334</td>
</tr>
<tr>
<td>Pine Chip-n-saw</td>
<td>40.10</td>
<td>400</td>
</tr>
<tr>
<td>Pine Ply logs</td>
<td>61.00</td>
<td>608</td>
</tr>
<tr>
<td>Pine Power Poles</td>
<td>78.00</td>
<td>778</td>
</tr>
<tr>
<td>Pine Pulpwood</td>
<td>25.98</td>
<td>--</td>
</tr>
<tr>
<td>Hardwood Pulpwood</td>
<td>21.16</td>
<td>--</td>
</tr>
</tbody>
</table>
## Hardwood Veneer

<table>
<thead>
<tr>
<th>Specie</th>
<th>Common Value $/MBF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cherry</td>
<td>1,000-6,000</td>
</tr>
<tr>
<td>Hard maple</td>
<td>1,000-3,000</td>
</tr>
<tr>
<td>White Oak</td>
<td>600-1,800</td>
</tr>
<tr>
<td>Red Oak</td>
<td>700-2,000</td>
</tr>
<tr>
<td>Walnut</td>
<td>1,000-6,000</td>
</tr>
<tr>
<td>Yellow-poplar</td>
<td>400-1,500</td>
</tr>
</tbody>
</table>
Value of raw material

• The value of the raw material (logs) is dependent on the:
  • Quality
  • Volume
  • Cost of conversion
    • The cost of conversion is often dependant on log volume and grade
  – Potential Use/Market
Roundwood Production by Product

- **Softwood**
  - 454.4 million board feet, International 1/4-inch rule
  - 20% reduction from 2007

- **Hardwood**
  - 559.6 million board feet, International 1/4-inch rule
  - 35% reduction from 2007
Forest Products Industry

Primary wood-using mills:
- Sawmill (0–5 mmbf)
- Sawmill (5–20 mmbf)
- Sawmill (>20 mmbf)
- Composite panel
- Veneer
- Pulpmill
- Plywood
- Other mill
Virginia Forest Products Industry

• The forest products industry is a significant part of the economy of the Commonwealth.
  – The harvesting, processing and marketing of forest products generates over $23.4 billion annually to the Virginia economy.
• Landowners receive $350 million annually from the sale of their timber
Forest Products Industry

• Employment
  – An estimated 144,000 people are employed in the primary and secondary manufacturing, harvesting, transportation and marketing of forest products.
  – 4.1% of the state’s workforce.
Virginia Forest Products Industry

- Pulp & paper Mills - 6
- Paper Products - 100
- Particleboard, etc. - 10
- Veneer & Plywood - 4
- Sawmills - 140
- Treating Plants - 27
- Pallet Plants - 55
- Furniture Plants - 65
- Millwork Plants - 55
- Pellet Mills - 8
Pulp and Paper

- Six Mills in VA
  - Largest wood users in the state
  - Largest wood industry employers in VA
  - Use lowest quality of wood
OSB

- Raw Material
  - Logs – low quality
  - Specific species mix
  - Flakes, glue, wax
Veneer and Plywood

- Hardwood and Softwood
Veneer cutting to produce specific “grain patterns”

- **Rotary**
  - The entire log is cut or “peeled.” Can yield full sheets of veneer. Grain pattern is broad with no plain or quarter sliced appearance.

- **Quarter Sliced**
  - Produces a series of stripes—straight in some woods, varied in others. A flake pattern is produced when slicing through medullary rays in some species, principally oak. Other than oak, most species produce the same look as rift cut.

- **Plain Sliced**
  - Produces a cathedral grain pattern. Most logs will also yield some quarter appearance.

- **Rift Cut**
  - An angle of cut of 15° to the radius of the flitch is used to minimize the ray flake effect in oak.
### Annual Production
16 million acres of forestland

<table>
<thead>
<tr>
<th>Lumber Type</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardwood Lumber</td>
<td>740 million board feet</td>
</tr>
<tr>
<td>Softwood Lumber</td>
<td>488 million board feet</td>
</tr>
</tbody>
</table>

#### Hardwoods
- White Oak
- Red Oak
- Tulipwood: 54%
- Hickory: 9%
- Maple: 9%
- Other Hardwoods: 12%
- **TOTAL: 75%**

#### Softwoods
- Yellow Pines
- Eastern White Pine
- Eastern Hemlock
- Spruce, Fir, Cypress, Cedar
- **TOTAL: 25%**
Sawmill Industry Changes

• Loss of 26 mills
• 56 mills account for 83% of production
• 82 % retained in VA
Lumber Consumption - U.S.

Who uses all that lumber?

- 60% new housing
- 7% non-residential construction
- 12% manufacturing
- 10% pallets, containers, dunnage
- 11% other
Importance of Construction Ind.

– Construction
  • Average single-family home uses 14,400 board feet of lumber
  • 12,800 square feet of structural panels
  • 2,300 square feet of non-structural panels
Softwood Lumber

• Classified as:
  – Boards
    • Less than 2 inches nominal thickness
  – Dimension
    • 2 to 5 inches in nominal thickness
  – Timbers
    • 5 inches or thicker
Pine Lumber

- Southern Yellow Pine
  - Trusses
  - Treated wood
- White Pine
  - Log homes
Hardwood Lumber

• Principle Uses:
  – High grades
    • Furniture, flooring, millwork, cabinets, case goods.
  – Lower grades
    • Pallets
      – 30% of total hardwood lumber production!
    • Ties
      – 25 Million annually
The Output Problem

Red oak log, 14 inch diameter, 10 foot log.

80 bf International 1/4 inch rule

Lumber Volume by Grade

<table>
<thead>
<tr>
<th>Log Grade</th>
<th>FAS</th>
<th>1C</th>
<th>2C</th>
<th>3C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33.35</td>
<td>17.61</td>
<td>7.19</td>
<td>3.96</td>
<td>62.10</td>
</tr>
<tr>
<td>2</td>
<td>14.78</td>
<td>19.08</td>
<td>11.51</td>
<td>6.98</td>
<td>52.37</td>
</tr>
<tr>
<td>3</td>
<td>2.18</td>
<td>12.89</td>
<td>15.15</td>
<td>12.80</td>
<td>43.02</td>
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</table>
Hardwood Trends

**Graph 1.** Eastern Hardwood Lumber Production 1958 to 2009

**Table 2.** The Percent of Hardwood Lumber Consumed for Industrial and Appearance Applications

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>32</td>
<td>40</td>
<td>34</td>
<td>37</td>
<td>60</td>
</tr>
<tr>
<td>Appearance</td>
<td>68</td>
<td>60</td>
<td>66</td>
<td>63</td>
<td>40</td>
</tr>
</tbody>
</table>
Residue/Byproducts

- Forest products industry utilizes its own manufacturing "by-products"
- When a log is converted to lumber, sawdust, bark, chips and slabs are produced
  - nearly 100% utilized
Leader in Biomass Utilization

Mandatory renewable energy targets:
- US Federal Government: 7.5% by 2013
- European Union: 20% by 2020

Source: 2002 Manufacturing Energy Consumption Survey, Energy Information Administration
* Other includes net steam (sum of purchases, generation from renewables, and transfers), and others used to produce heat and power
Products from Residue
Particle Board
Wood Energy

Four wood pellet mills, and four wood-burning power plants
Exports

- Virginia has been exporting forest products since the early 1600s
  - Jamestown
Exports

- Saw logs
- Veneer logs
- Softwood lumber
- Hardwood lumber and veneers
- Hardwood flooring
- Hardwood furniture dimension
- Molding and other millwork
- Laminated lumber
- Preservative-treated lumber
- Plywood
- Furniture
- Pulp
- Specialty papers
- Newsprint and paperboard
- Wood chips
- Pellets
## VA Exports

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Wood</td>
<td>251,063,838</td>
<td>247,619,967</td>
<td>289,238,483</td>
<td>16.81</td>
</tr>
<tr>
<td>Lumber</td>
<td>110,548,892</td>
<td>121,213,619</td>
<td>145,693,899</td>
<td>20.2</td>
</tr>
<tr>
<td>Fuel In Log; Chips/Etc</td>
<td>873,707</td>
<td>3,819,813</td>
<td>34,691,069</td>
<td>808.19</td>
</tr>
<tr>
<td>Veneer Sheet</td>
<td>34,030,848</td>
<td>29,011,185</td>
<td>25,545,606</td>
<td>-11.95</td>
</tr>
<tr>
<td>Fibrbrd Of Wd/Ot Lign</td>
<td>5,554,210</td>
<td>8,465,089</td>
<td>9,682,136</td>
<td>14.38</td>
</tr>
<tr>
<td>Pack/Etc;Pallet/Collr</td>
<td>4,905,344</td>
<td>3,539,226</td>
<td>5,862,766</td>
<td>65.65</td>
</tr>
<tr>
<td>Particle+Simlr Board</td>
<td>1,030,818</td>
<td>775,448</td>
<td>3,224,478</td>
<td>315.82</td>
</tr>
<tr>
<td>Densfd Blk/Plt/Str/Pr</td>
<td>226,783</td>
<td>175,974</td>
<td>389,945</td>
<td>121.59</td>
</tr>
</tbody>
</table>
Future?

- Low quality small diameter
  - Pulp and paper
  - Energy
- Industrial wood
  - Pallets and Ties
- Lumber
  - Furniture, flooring, treated wood, etc.