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"Seeing the Lumber for the Trees" by Sean L. Goldie

With the popularity of wood products comes the understanding that wood is sawn from trees, but few have witnessed its transformation.

Lumber production begins in the bush where a tree is harvested using either the Tree-Length (TL) or Cut-to-Length (CTL) systems. While both systems delimb, TL delivers full-length logs to the sawmill whereas CTL pre-sections the stems. Trees are harvested by independent contractors compensated by the volume in cubic metres (m^3).

Logs are transported by trucks to the mill and are stored in the log yard where the volume on each truck is estimated. Scaling (periodic checks) confirm the volume. North American volume measurement rules date back more than 150 years (Scribner, Doyle, and International are most common). The log yard is also a process staging area where mills may log trade or species/size sort.

Typically, sawmills optimize lumber output ("Recovery") or maximize revenue ("Value"). Increasingly sophisticated technology controlled by computers help achieve these goals.

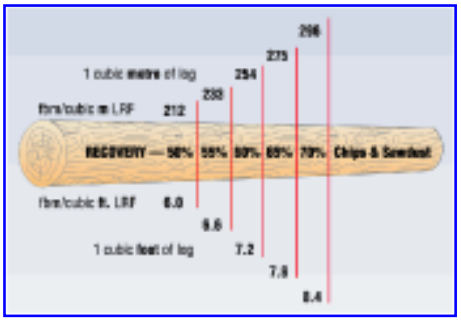
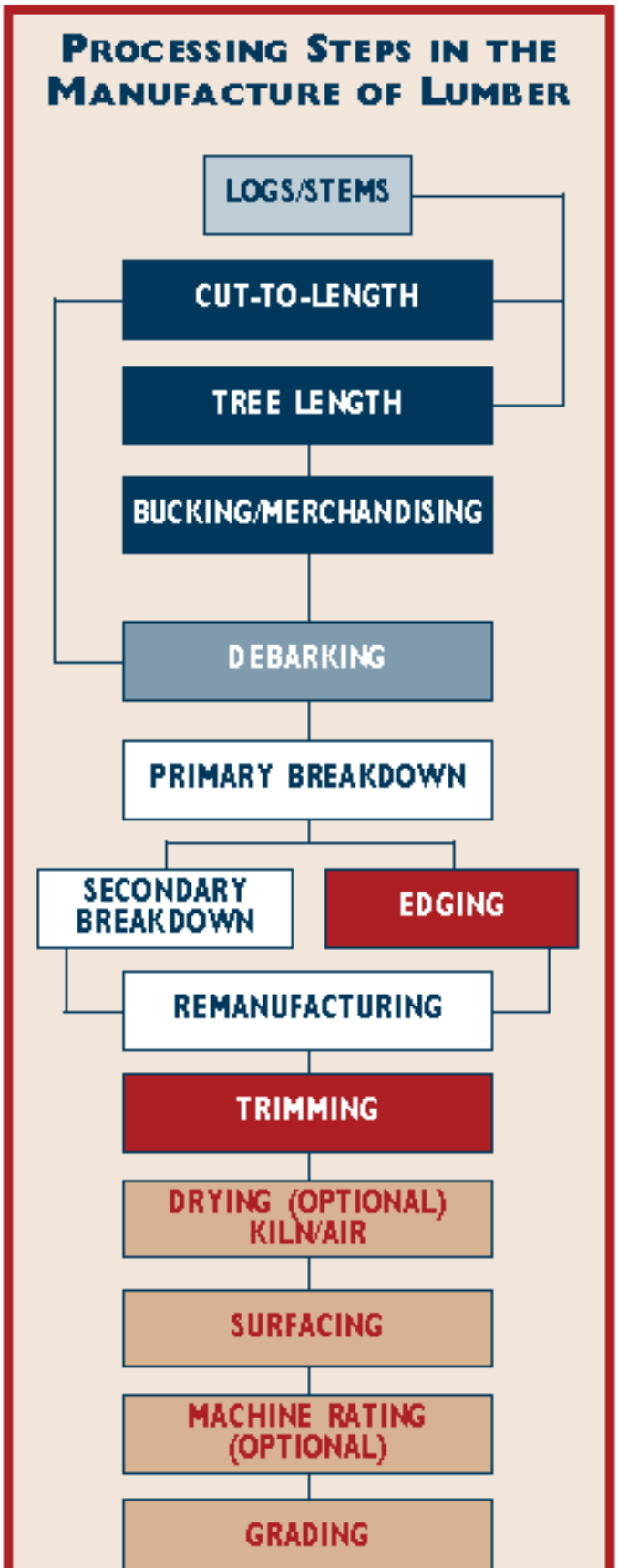
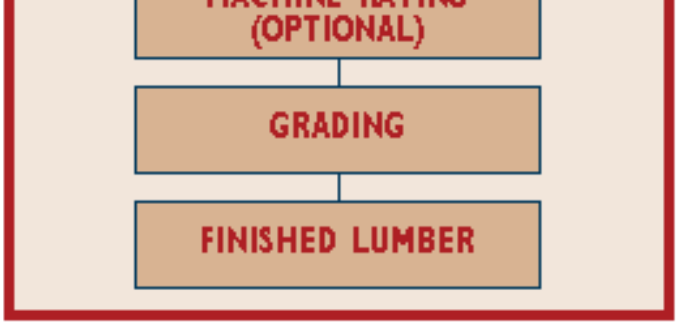


FIGURE 1. DIAGRAM COURTESY OF THE LOGGING & SAWMILLING JOURNAL CLICK ON IMAGE FOR LARGER VIEW

Mill productivity is standardized to the Lumber Recovery Factor ("LRF")—the volume of lumber produced from one





m3 of log input. (See Figure 1.) LRF is an important benchmark for measuring one's own performance (and that of the competition). Managers are measured and rewarded on these expectations.

TL logs first require “bucking,” sectioning stems into predetermined lengths. Once cut, the possible products from each log are irreversibly limited. This opportunity is also used to “defect” (remove) log irregularities. Here, integrated companies create inputs (merchandising) for associated plants (i.e., peeler bolts for plywood or LVL plants; or, small diameter tops for stud mills).

There are numerous “debarking” methods, including ring-style, whereby blades gently remove the bark at its inner most layer. “Butt flair” must be removed so the stem may fit the machine opening. Debarking also yields bark-free chips that are more valuable and readily marketable to pulp mills than “barky” chips.

One of many primary breakdown systems, a “bandmill” features a bandsaw configured with either “twin” blades or “quad” blades. The resulting “side boards” are routed to the “board edger” for improvements. Or, the “canter” may be two- or four-sided and will chip the outermost log surface. The cant (remaining log section) proceeds to “Secondary Breakdown,” generally through a gang arbor, to create a lumber “stack.”

Alternatively, the "chip 'n saw" combines the Primary and Secondary breakdown into one machine. Here, the log is scanned to map its geometry and to determine the best breakdown option. The log is then positioned for each cut. (See Figure 2.)

Further sawing refinements may include “curve sawing” with the “sawbox” (the location of the sawblades within the saw) able to follow the stem curvature while sawing. “Thin kerf” sawing refers to thin sawblades to create thin kerf (the amount of wood removed by the sawblade).

The trimmer next removes fiber at the board ends, as required.

Lumber is then sorted by width, thickness and length. Typical equipment styles may include a “J” bar sorter, possibly with 60+ sorts (i.e., by product size and/or species).

Each sawmill's unique “green target size” is based upon its equipment accuracy. The targeted size (thickness, width) of the rough green sawn lumber should yield, when dried and surfaced, a standardized size (e.g. 2x4 is actually 1-1/2 x 3-1/2 inches). This is determined by the finished size plus allowances for planing, shrinkage from kiln drying and sawing variation.

Kiln drying, an optional process, always follows the sawmill. Lumber used in truss applications is generally

kiln dried. The kiln can be an integral part of a Stress Rated Lumber manufacturing strategy, aiding in its recovery. Lumber stiffens slightly with drying. The moisture content (MC) for commodity lumber tends to average 17 percent (while stress rated lumber might read 14 percent to 16 percent). Lumber dried in like sizes or species help reduce overdrying damage—another advantage to log sorting.

Lastly, the lumber is planed or surfaced and then continues through the stress rating equipment. Each piece of finished lumber is visually graded by licensed graders for grade and trim. The lumber, once trimmed to its final length, is grade stamped, sorted, stacked and packaged—ready for shipping.

FIGURE 2. CHIP 'N SAW DIAGRAM COURTESY OF HEWSAW MACHINES INC.
CLICK ON IMAGE FOR LARGER VIEW

Graders of stress rated products know the value of each piece. From a value perspective a greater revenue may be realized through trimming 6 ft. (containing a defect) from an 18 ft piece of Standard-and-Better to produce a 12 ft piece of 1650-1.5E MSR.

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