FACILITIES & CAPABILITIES WOOD COMPOSITES

The UMaine Advanced Structures and Composites Center has a complete Wood Composites Pilot Line allowing the production of up to 4' x 8' oriented strand board (OSB), laminated veneer lumber (LVL), particleboard, Wood Fiber Insulation, and other cellulosic composites on a near-industrial scale.

Companies may opt for complete manufacturing – from log to panel – or select only certain unit operations, such as stranding, drying, and screening. Recent studies include the use of innovative bio-based resin systems, wax substitutes, fire retardants, and residuals to produce value-added products.

Conditioning

- Ten 5' x 12" diameter logs can be soaked and/or heated at a time to 150°F
- Log Soak Tank

Drying

- Koch Bros. in-line conveyor forced-air dryer
- 3' wide x 10' long
- Additional 4' of infeed and outfeed.
- Capable of evaporating up to 250 lbs. of water per hour
- Maximum temperature of 325°F
- Fan capacity of 7,500 cfm
- Used primarily to dry green strands down to ~10% +/- 5% in minutes

Stranding

- Carmanah 12/48 Lab Strander
- Converts logs into strands from 3" to 12" in length for OSB/LSL production.
- 48" ring holds two knives that protrude into the inner face of the ring. Strands are produced by advancing the log through the rotating ring at a specified rate. Projection of the knives in combination with ring speed determines the flake thickness, and width is achieved by selection of the appropriate counter knife angle, and strand length through the use of scoring knives.



Screening

- Acrowood Trillium & Diamond Roll combination screen
- Screens strands into three size classifications (overs, intermediates and fines)
- Trillium screen designed to strand green strands (as well as dried)

Nyle dehumidification dry kiln

- 5,000 board foot dry kiln
- Brings strands to within +/- 1% of the target moisture content within 24 hours













Resin Blending

- Large Coil Resin Blender
- 5' x 10 spinning disk atomizing resin blender
- Rotation up to 20 rpm
- Spinning disk atomizer up to 15,000 rpm
- Capacity of 120 lbs of (dry) strands
- The resins, normally pMDI or PF, and waxes are sent by peristaltic pump
- Wax emulsions introduced via Spraying Systems air atomizer

Small Coil Resin Blender

- 3' x 6' spinning disk atomizing resin blender
- Rotation up to 20 rpm
- Spinning disk atomizer rotates up to 15,000 rpm.
- Capacity of 30 lbs of (dry) strands
- The resins, normally pMDI or PF, and waxes are sent by peristaltic pump.
- Wax emulsions introduced via Spraying Systems air atomizer

Pressing

- Dieffenbacher hot oil and/or steam injection press
- 450 tons
- 34" x 34" (typ. trimmed to 30" x 30" after pressing)
- PressMan control system
- Mats can be pressed with oil heated platens up to 450°F or
- Steam injection up to ~50 psi steam pressure, which allows for the pressing of thick strand composites

4' x 8' Erie Mill & Press

- 1800 ton hydraulic press
- Provides 725 psi on a full-sized 52"x100" mat (typ. trimmed after pressing to 4'x8')
- PLC controlled, with complete data collection and reporting
- The press can be controlled in either position (to within 0.003") or pressure control within 2 psi
- Energy is provided by hot oil heated platens up to 500°F

Conditioning & Testing

Boards may be conditioned prior to testing in a walk-in environmental chamber.









composites.umaine.edu

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