**Vintorg, a new modified wood product**

The Cooperative Research Centre (CRC) for Wood Innovations is a collaborative Australian research network, which provides the timber and wood products industries with applied technologies and training programmes.

We research, develop and deliver applied microwave technologies aimed at streamlining timber processing and adding value to wood products. Our research is conducted in collaboration with industry partners and directed at meeting the needs of industry.

**Vintorg: A modified wood composite**

A key CRC research program involves a new type of wood-based composite product, Vintorg.

CRC Wood Innovations has developed proprietary technology to impregnate resin into microwave expanded wood (Torgvin) which, after pressing and resin curing, results in an engineered wood-resin composite product, Vintorg. Modification of the intensity of microwave treatment and the careful selection of resins will make it possible to produce “made to order” composite timber products that tailor performance to application requirements.

Vintorg looks like the original timber, but potentially has greater strength, increased durability, increased performance uniformity, greater dimensional stability and resistance to attack by termites and fungi. It provides more efficient use of our timber resources by adding value to low value timbers.

<table>
<thead>
<tr>
<th>Timber Treatment</th>
<th>Average Density kg/m³</th>
<th>Average MOE (GPa)</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Un-treated</td>
<td>470.77</td>
<td>6.77</td>
<td></td>
</tr>
<tr>
<td>Vintorg MUF</td>
<td>499.77</td>
<td>7.42</td>
<td>6.16%</td>
</tr>
<tr>
<td>Vintorg Isocyanate</td>
<td>500.84</td>
<td>7.74</td>
<td>6.39%</td>
</tr>
</tbody>
</table>

Table 1. Short-term test results from end-matched radiata pine and Vintorg samples.

Initial experiment results with Vintorg made from radiata pine show that the composite material has a marked increase in creep resistance compared to untreated timber.

**What happens when we microwave wood?**

High intensity microwave treatment creates changes in wood structure. Inside the wood, microwave energy is converted to heat, creating steam pressure in the wood cells. Ray cells have thinner walls in comparison with the main structural tissues of wood (tracheids, libriform fibres and vessels). Under high internal pressure the thin-walled ray cells rupture to create micro-voids in the radial-longitudinal planes of the wood. These micro-voids form pathways for easy transportation of liquids and vapours.

Microwave treatment produces a several thousand fold increase in wood permeability in the radial and longitudinal directions. Our research applications involve adjusting the intensity of microwave energy supplied to control the number of micro-voids, their dimensions and distribution. In this way we create selective microwave modification protocols to suit different applications. We research microwave conditioning for relaxation of growth stresses in logs, speeding up hardwood drying, facilitating uptake of preservatives, and generation of wood-resin composite products.

**Other CRC Research**

Our technologies offer processing efficiencies and economic benefits in the areas of wood drying, wood preservation, and wood bending. We also research improved surface coatings for wood products and new engineering and design concepts for furniture.

We investigate processing of softwoods as well as Australia’s unique hardwood timbers. Our research focus emphasizes utilisation of young, fast growing plantation timbers.

Our objective is to successfully transfer our technologies to the wood processing and furniture industries by generating and licensing on-line processes. Our technologies are protected by international patents.