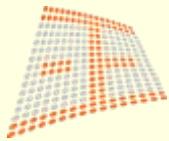


COST Action IE0601 - Tervuren Meeting
Brussels, Belgium, 8 & 9 June 2007

*Green gluing of wood: a new technology -
useful for the conservation of WCHOs?*



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COST Action E34 ‘**BONDING OF TIMBER**’



Working Group 2 **Green and wet wood gluing**

Website:

<http://www1.uni-hamburg.de/cost/e34/>

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COST Action E34 **BONDING OF TIMBER**



Aims of WG2: **Green and wet wood gluing**

- To review and promote green and wet gluing systems for wood products.
- To investigate the requirements for new standards.
- To reach an agreement for a basis for European harmonised testing procedure.
- To recommend the **way forward** in order to bring the new technology to the market place.

Green gluing of wood - The concept

Green gluing is defined as a method of gluing unseasoned, freshly sawn timber, which has **never** been dried.

The main concept of this process is to **remove defects from timber as soon as possible** in the production line and **produce tailor-made products with a better efficiency** or use short off-cuts to produce upgraded timber.

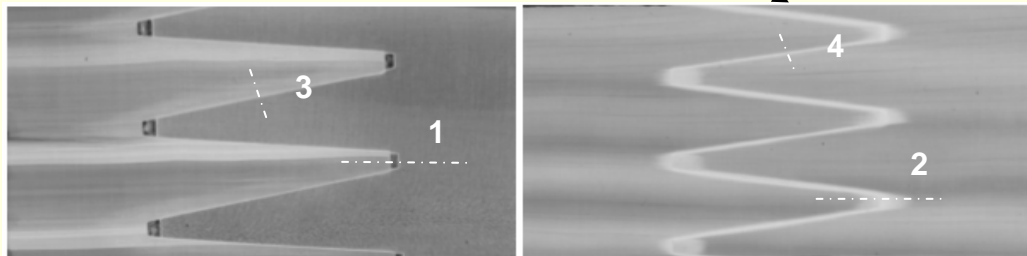
Green gluing of wood - The advantages

The **advantages** of *green gluing of wood* depend on specific production, but some general benefits can be:

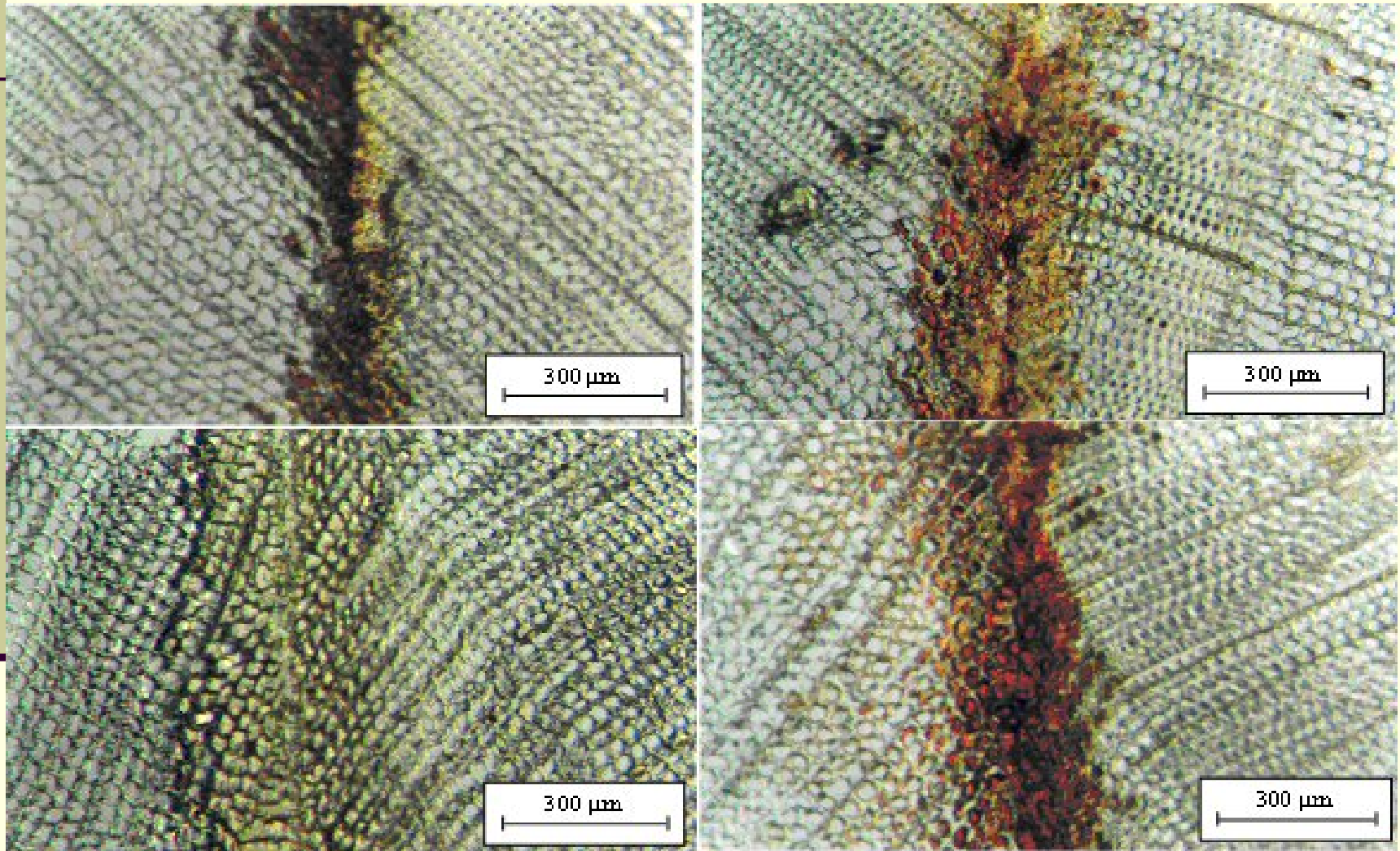
- ✓ It provides uniform lengths for kiln drying.
- ✓ Energy can be saved because **cold-setting adhesives** are used, no pre-heating is needed and defected timber (removed before gluing) is not dried.
- ✓ Green shorts with defects can be converted into pulp chips.
- ✓ Green shorts and fast-grown timber, which has the tendency to warp can be used to create upgraded wood products.

Brief information on *green gluing of wood*

- ❑ Research works in the USA, Australia, New Zealand and recently in Europe have proved that technically **wood can be efficiently bonded even at MC levels of 30 – 100%**
- ❑ Most successful experiments have been carried out by **finger – jointing** wood pieces.



Green gluing of wood at the microscopic level



Light microscope images of the glue lines (M. Sterley, 2006)

Green gluing of wood – Resin systems

Adhesive type and manufacturer	Adhesive parts	Moisture content level
Greenweld (GRN) Dyno (USA)	PRF mixed with powder hardener and ammonia as accelerator	Green (>30%)
One-component polyurethane (PUR) Collano Purbond Ebnöther AG (Switzerland)	PUR 100% solids	Green (>30%)
Soy/PRF Soybond-40 Archer Daniels USA PRF Casco Products (Sweden)	Soy/PRF consisted of ARPRO™, water and NaOH. PRF Cascosinol and hardener. Paraformaldehyde powder added to the hardener.	Green (>30%)

Green gluing of wood - Still unanswered!

- ❑ The *moisture durability of the adhesives* over long period of time and the effect of high temperatures.
- ❑ Possible *defects* after drying in the form of warps, e.g. bow, spring etc.
- ❑ *Different shrinkage properties* of wood in radial and tangential direction may lead to variations in final thickness and distortion of the cross section, after drying laminated green-glued products.

Green gluing of wood vs. **COST IE0601 scope**

- Do we need in the *conservation of WCHOs* this technology? Is it worthy?
- In which specific applications?
- Possibly *in the conservation & repair of old timber constructions* by applying on-site such resin systems, even when wood has a high MC!