

## RECENT RESEARCH ACTIVITIES

## Development of techniques for highly controlled chemical treatment in wood flow forming (Laboratory of Sustainable Materials, RISH, Kyoto University)

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Recently, chemical treatment techniques required for wood flow forming have been studied. In the wood flow forming process, the bulk wood is processed into the compact with a favorite form by being compressed and flowed into a mold. To obtain stable compact, the chemical substance is required to be introduced into cell walls in wood raw material before the forming process. The chemically treated compact, however, still had color change and roughness on surface, and its dimension was unstable (Figure 1). This may be caused by the presence of many cells that are not chemically treated (macroscopic irregularity) and of much unstable region in each cell wall (microscopic irregularity) in the compact. In my recent research, it has been noticed that fulfilling every cells with solution of chemical substance (Issue 1) and filling up unstable region in cell walls with chemical substance (Issue 2) are important for preventing macroscopic and microscopic irregularities, respectively.

Recent activity on Issue 1 is introduced here. One of the approach is to enhance the accessibility of solution to the inside of wood block. The representative method as such is to incise the block using edged tools, laser, *etc.* In the incising, however, the accessibility to the region except the wood surface is not so much enhanced. I noticed the wood block eaten by termites as a raw material of wood flow forming, because a lot of large holes are continued from the surface to the deep inside of the block, and because all the holes will disappear after flow forming process. The purpose of the study was to examine the effect of wood block eaten by termite on accessibility of chemical-substance-solution to the inside of the block. In the trial before the examination, the cup was flow-formed (Figure 2) using the block of pine eaten by Formosan subterranean termite (*Coptotermes formosanus*). Before the forming process, the eaten block was impregnated by a aqueous solution of phenol formaldehyde resin (50 wt%) and water was evaporated from it under an atmosphere at 20 °C and 32%RH. The compact was confirmed to be produced using termite-eaten-wood. As the next step, the amount of the chemical-substance-solution taken up by the wood block eaten by termite will be examined to confirm the feasibility of using this “termite-incising” technique as improving the accessibility of the solution to the inside of wood block.

### Acknowledgements

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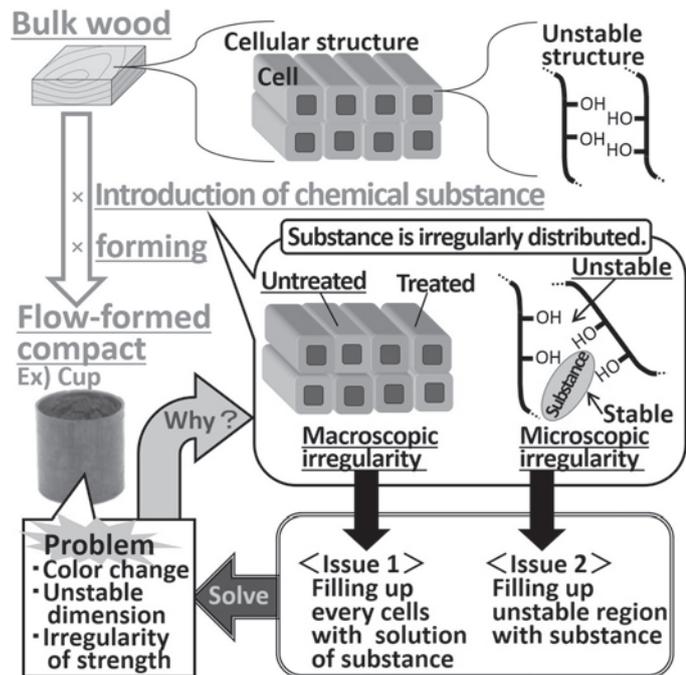


Figure 1. Issues in chemical treatment for wood flow forming.

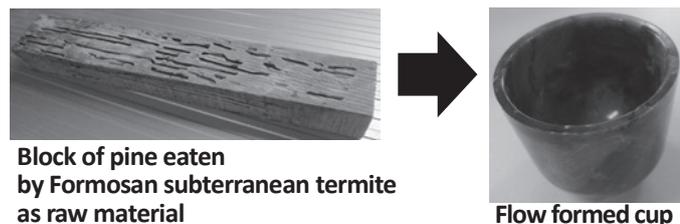


Figure 2. Raw material and flow formed compact.