

Evaluating fiber-adhesive interactions in MDF processing: Implications for process improvement and resin development

Warren Grigsby
Senior Scientist
Scion
Rotorua, New Zealand

Armin Thumm
Research Technician

Medium density fiberboard (MDF) is arguably a mature wood panel product. However, there is still an opportunity to optimize MDF processing through a comprehensive understanding of panel board manufacture, be this broadly or tailored to a specific mill. We have undertaken several extensive laboratory, pilot- and mill-scale studies evaluating fundamental fiber-adhesive interactions between resin and MDF fiber throughout the MDF process. This has resulted in several key findings of how the resin becomes distributed on fiber, resin behaviors on fiber through the entire MDF process, and the understanding of MDF processing parameters and the influence these have on resin efficiency and board properties.

Discussed is a review of the highlights from these studies and how resin visualization can be employed to enhance panel performance and manufacturing efficiency. Furthermore, results will also demonstrate how fiber-adhesive interactions can be utilized to guide resin formulation developments. A discussion of outcomes will include:

- The influence of common MDF process parameters on how resin becomes distributed on fiber and the resulting impact on panel performance.
- The relative mobility of resin on and in the fiber cell wall throughout the MDF process.
- Fundamental differences between dry-fiber, or mechanical blending, with that of blowline resin addition.
- Interactions of wax with resin and the contrasting behaviors of differing resin types on fiber.
- Use of resin visualization as a screening tool for new resin developments.