Removal of Wax and Stickies from OCC by Flotation

Greater Recycling of OCC Will Depend on Solving the “Wax and Stickies” Problem

The recycling of old corrugated containers (OCC) will become easier when an effective method is available to remove wax and sticky contaminants during remanufacture of the containers. The demand for OCC requires that the percentage of containers that are recycled must rise 10 percent to a total of 75 percent. Removal of adhesives (“stickies”) from labels and “Post-It” notes, and of glue, wax, tapes, and staples that are used in assembling the OCC will ensure high-quality fiber for the next generation of containers.

The screens and cleaners currently used in recycling mills are not very effective in removing these contaminants. While small quantities of wax can be tolerated in OCC systems, wax in fiber reduces interfiber bonding, hinders the adhesion of coatings, and impairs the appearance as well as the gluing and printing of the product. Stickies can deposit on components of the paper machine and interfere with its operation. They can also affect fiber bonding, sheet appearance, and printing and converting operations.

A new separation method is needed to handle the particle size, shape, and density of wax and stickies without incurring excessive fiber losses. A flotation deinking system appears to have the potential for removing wax and stickies if certain principles of surface chemistry and fluid dynamics are taken into account. The improvements to OCC feedstock will translate into a better appearing product, greater adhesion of coatings, enhanced fiber bonding, and fewer problems with operating the mill machinery.

Benefits for Our Industry and Our Nation

- Improved competitiveness of the U.S. pulp and paper industry
- Greater use of the fiber obtained from recycled OCC
- Elimination of the dispersion/kneading step during repulping operations
- Reduced downtime of mill machinery
- Enhanced quality of remanufactured OCC
- Elimination of cost penalty to the industry from the cumulative effects of wax and stickies

Applications in Our Nation’s Industry

The results of the mill trials will be used to simulate the flotation stage in an OCC system for eventual commercialization of the technology.
Goal: To develop methods for the effective removal of wax and stickies from OCC feedstock.

Phase I and II of this two-year study took place in the laboratories of Voith Sulzer Paper Technology of Appleton, Wisconsin. The objective of the laboratory studies was to identify repulping conditions that promoted favorable flotation characteristics for wax and stickies, including temperature, pH, and the presence (or absence) of chemicals.

Two mill trials were conducted. One trial was carried out at Green Bay Packaging, Green Bay, WI, and a second trial was conducted at Menasha Corporation, Otsego, MI. A 250-liter Voith Sulzer Ecocell was used to evaluate the removal of wax and stickies from the OCC processing systems.

Results

• Laboratory research indicated that wax is amenable to removal by froth flotation provided it is free or detached from the fiber. The only effective method of maximizing detachment of wax is through the use of low consistency pulping at temperatures above the melting point of wax. Wax removal from WCC through washing, flotation, or a combination of both was approximately 90% in these laboratory studies, indicating that not all of the wax is detached from fibers.

• The inclusion of flotation in the OCC stock preparation system significantly improved the removal of wax spots from the furnish. The data indicate that flotation was more effective in removing wax and stickies than reverse cleaners.

• The mill trials demonstrated that flotation can replace existing reverse cleaning systems and, in some cases, it can replace dispersion systems. In this manner, the use of flotation can provide significant energy savings when compared to reverse cleaning or dispersion.

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