An investigation of various effects of sticky control in a Taiwan paper mill

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ABSTRACT

The domestic paper industry depends heavily on recovered fibers. After long periods of paper machine operation, large amounts of stickies tend to accumulate in the paper forming section and white water which in turn form deposits on paper machines, leading to web breakage and blocking of forming fabric pores. The resulting paper are often beset with stains, pores and other paper defects of decreased paper quality and indirectly affect production efficiency as well. In this study, an industrial paper mill at Erlin, Changhua was administered with a chemical control regime to suppress the stickies problem. The study was done in 2 phases, the first phase entailed taking pulp samples from the mill to the laboratory for simulated treatment efficacies. Four strategies were established to control stickies. These included fixation, passivation, dispersion, and detackification. Stickies control agents of varying characteristics were added at different proportions and the optimal dosage proportions determined. Wet end changes derived from the chemical addition and the resulting stickies quantification based on handsheets were determined. In the second phase, the chosen stickies deposit control agents were added to the paper machine of the mill. Then the changes in wet end and white water system were measured. Deposits present on the doctor blades of the dryer section were photographed to determine whether the chemical regimes were effective in abating the stickies deposits. The rates of paper web breakages were also recorded. These were interrelated with the modifications of the data of wet end parameters at the headbox and white water system to determine whether the expected results of the mill were achieved. The four stickies suppression strategies formulated in the laboratory were individually examined. The fixation route clearly showed that stickies were encased inside fibers, and its number reduced significantly. However, bumpy grains could be -vidiscerned. As for the passivation approach, the amounts of stickies showed no apparent decreases and the particle sizes of the stickies were the largest of the 4 approaches. As for the dispersion method, stickies were successfully emulsified and dispersed to become minute particles often encased in fibers. The handsheets prepared from this method could hardly discern the presence of stickies. The detackification approach tended to reduce the tack of the stickies, however, the diameters of the particles were not significantly altered, and the amounts of stickies were largely similar to the passivation method. From the on-site experimental results, we surmised that regardless of the paper grammage, the first pass retention with the chemical regimes were mostly showing an increasing trend, whereas the particle charge (PCD), turbidity, electrical conductivity tended to a decreasing trend. Furthermore, the photos of the mill doctor blades tended to show that the deposits on them changed from a sticky substance to a fluffy fiber deposits; and the number showed a decreasing trend. Finally, the paper web breakage frequency also showed marked decrease. The results indicated that the addition of alum on the site neutralized substantial amounts of anionic charges on the particle surfaces and provided enhanced benefit of retention aids. Subsequently, the addition of Percol 182 and Alcofix 159 helped to fix the anionic trashes unto fibers and also retained them on the forming wire thus successfully carried the stickies away from the papermaking system. The expected outcome of the mill was thus successfully achieved as well.

Keywords : stickies, deposits, dispersants, fixation agents, detackifiers, passivating agents

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