The Effect of Hot Dispersion on the Physical Properties of Deinked Pulp and its Application on Bleaching.

鍾武宏、彭元興

E-mail: 9607858@mail.dyu.edu.tw

ABSTRACT

The ever increasing pulp price in the global market causes paper mills to again focus on the deinking pulp. There are, however, numerous small specks and dirt present in the deinked pulps which detract from pulp quality. Thus steam and heat dispersion are often used in later stages to reduce specks to give a more uniform optical properties. In order to understand the effects of different pulp consistencies and temperatures on the disperser performance with regard to the pulp physical and optical properties, two reducing type bleaching agents, sodium hydrosulfite and formamidine sulfinic acid (FAS) were added to the disperser stage and post-dispersion bleaching stage and their effects at different pulp consistency and temperatures on the pulp brightness and dirt speck count were examined. The study was based on 100% deinked computer form pulp. The post-dispersion physical properties examined the effect of a front stage screw press exerting different pressure to produce consistencies of 19, 32, 35 and 36%, and using steam temperatures of 90, 100, 110 and 115°Cfor the treatments. The results indicate that the tensile and stiffness properties were most optimal at 100°C; while the bursting and tear factors were most optimal at 90°C.The attempted wax-picking test for measuring surface strength was foiled due to low values less than no. 4 wax sticks. The suggested operational temperature of 95°C by the mill was in the right range. As for pulp consistencies, a 32% consistency was found to work well, which is akin to the 25-30% consistency suggested by the mill. The post-dispersion bleaching experiment was conducted at 40, 60, and 85°C with different concentrations of sodium hydrosulfite and FAS. The results indicate that the optimal dosage for sodium hydro- sulfite was 0.8%. At 40°C, the brightness gain of the resulting pulp by the sodium hydrosulfite was superior to that of FAS; at 60°C, the gains of the 2 bleaching agents were roughly equal; whereas at 85°C, the unbleached pulp had a brightness of 83.5% GE, while 0.8% of sodium hydrosulfite viiproduced a brightness of 88.5% GE, and 0.8% FAS dosage produced a pulp brightness of 90.5%. The results indicate that FAS performed better under higher temperatures. The on-disperser bleaching experimental results indicate that with a unbleached pulp brightness of 84% GE, a 0.1% dosage of sodium hydrosulfite produced a pulp brightness comparable to the post- disperser bleaching dosage of 0.8%, reaching 87% GE. At dosages of 0.8% sodium hydrosulfite and FAS, respectively, both boosted pulp brightness to 90% GE, a gain of 6% GE. The results of the post-disperser bleaching study indicate that the pulp dirt counts decreased with increasing bleaching agent dosages from 0.1-1.2%, regardless of the bleaching temperature. At the same dosages, the dirt counts of FAS bleached pulp tended to be fewer than the sodium hydrosulfite bleached pulp. The on-disperser bleaching study results indicate that the average dirt counts of the sodium hydrosulfite bleached pulps was 65 ppm, whereas the FAS bleached pulps had an average dirt count of 41 ppm. There was a tendency of dirt counts to increase with the increasing operational temperature of the disperser. Cost analysis of the reducing bleaching chemicals on the deinking pulp suggest that the pulp had a cost of ca. NT$ 13000 -15000/ton. If using the optimal post-disperser bleaching temperature of 85°C and the best brightness gain of 6% GE as a basis for calculation, then 1% dosage of sodium hydrosulfite cost NT$ 240/ton pulp, or equal to 1.6-1.8% of the pulp cost. When FAS was used at 0.42% dosage, then the cost was NT$ 218/ton pulp , or equal to 1.45-1.68% of the pulp cost.

Keywords : bleaching of deinked pulp; heat dispersion, sodium hydrosulfite, formamidine sulfinic acid

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