

Using a Rapid-Kothen paper machine to simulate the effect of system closure on the contamination load of whitewater

Devi Naicker and Bruce Sithole

ABSTRACT:

This study explores using a Rapid-Kothen sheet former to simulate system closure in a newsprint mill. Pulp samples were obtained from the paper machine of a newsprint mill that used recycled fibre and thermomechanical pulp. Various analytical parameters were measured after each cycle. The study also involved the determination of the accumulation factors (AF) and the release factors of the different contaminants. The results obtained indicate that the build-up of contaminants with increase in the number of times the water is recycled tends to exhibit a polynomial relationship except for wood extractives, UV280 and COD which exhibit a power relationship. The dissolved and colloidal solids increase more than twice the initial value after 10 cycles. Sulphates have a higher accumulation tendency to accumulate than potassium, sodium and iron. The ash content increased by almost 50%. The AF obtained for ash was much higher than that obtained for dissolved solids (DS). The concentration of most of the contaminants after 10 cycles exceeded standard limits for reuse of water hence treatment prior to reuse is vital in closed systems. The results demonstrate that a Rapid-Kothen sheet former can be successfully used to simulate system closure in a newsprint mill.