Wire Abrasion

Wire abrasion testing and alkaline filler comparisons

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Alkaline papermaking has brought with it a renewed interest in the study of synthetic wire abrasion. Higher filler loadings as a result of filler-for-fiber substitution strategies have placed new demands on wires and stationary elements at the wet end. Various laboratory techniques have been developed over the years to study wire abrasion. However, most suffer from design flaws that make the method difficult to correlate with actual commercial wire life. A new instrument has been developed that will accurately evaluate filler effects in a controlled, reproducible manner.

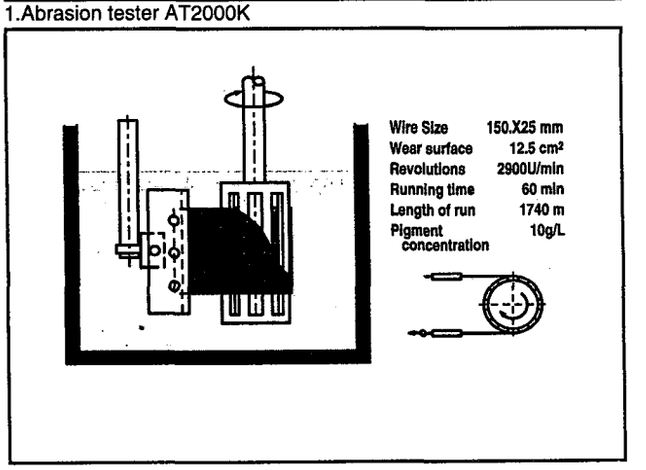
The Einlehner AT 2000K is an instrument that utilizes the latest technology in studying wire abrasion and is an improvement on the shortcomings of previous methods. A group of six companies recently completed design and procedural refinements of the instrument. The companies involved in this effort included wire and ceramic manufacturers, filler and pigment suppliers, and paper mills. A. Breunig of Haindl Papier recently presented the first data on the new instrument and procedures for its use.[1] The instrument has been shown to provide the best correlation with commercial machine wire life compared to other methods.[2]

Figure 1 shows a schematic diagram of the heart of the instrument. It uses a single-layer polyester fabric wrapped at 2 kg tension around a rotating cylindrical slotted ceramic abrading body. The ceramic is a medical grade aluminum oxide composition to ensure consistent quality for replacement. A typical filler test consists of measuring the wire caliper loss after a 17,400-m running length in a 1% solids concentration of the particular filler. Caliper is measured at specific locations along the wrap of the wire.

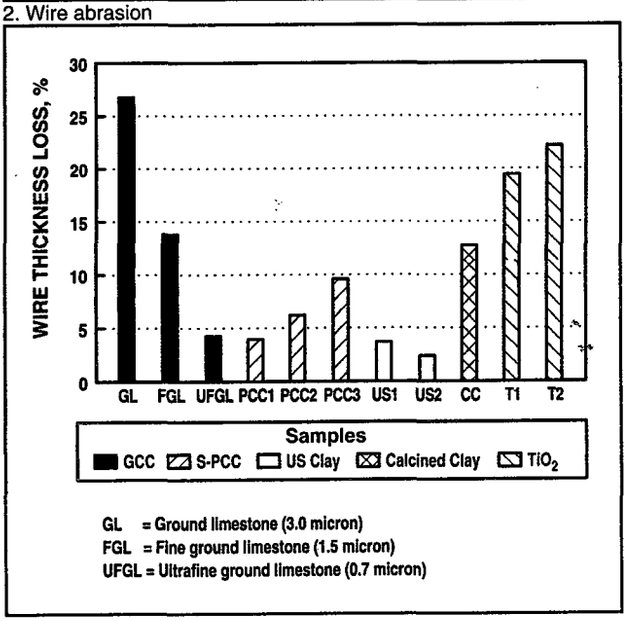
Figure 2 shows some wire abrasion data on typical alkaline fillers. The instrument supports current findings that ultrafine ground limestone will produce wire lives comparable to those obtained with typical filler clays and precipitated calcium carbonate.

With all its improvements over past attempts to study synthetic wire abrasion, it remains a simplistic look at a more complicated phenomenon. The effects of retention, vacuums, table design, temperatures, water chemistry, etc., are not part of the test and need to be kept in perspective when evaluating fillers and wire life problems on a particular machine. □

1.Abrasion tester AT2000K



2. Wire abrasion



[1]Breunig, A., "Determination of Plastic Wire Abrasion caused by Fillers and Pigments," 9th PTS CHT Symposium "Chemical Technology of Papermaking," Munich, Germany, 1990.

[2]Laufmann, M. and Rapp, H.-U., "Pigments and Synthetic Wire Abrasion," Machine Clothing Symposium, Munich, Germany, 1986.

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