

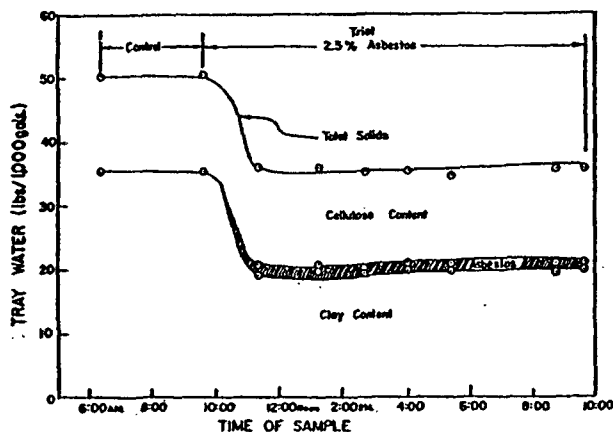


Figure 3. Tray water analysis on 39 lb. magazine grade.

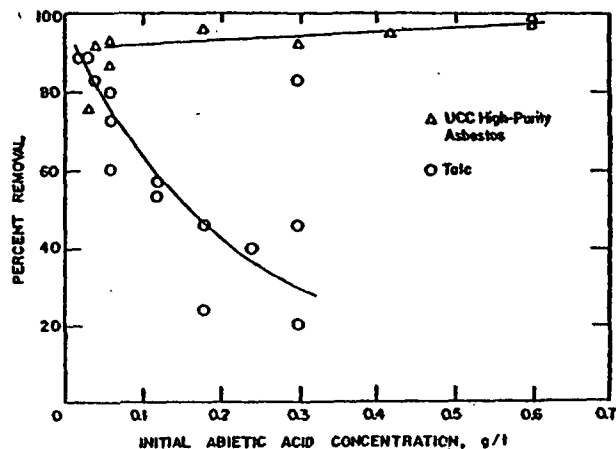


Figure 4. Effect of asbestos and talc on abietic acid removal from water solutions.

it has frequently proved to be significantly more effective than talc. This would indicate that some other property is also important. Tentatively, this has been attributed, in part, to the high surface area and, in part, to the cationic surface charge of asbestos.

Laboratory tests have been made in an attempt to compare the relative effectiveness of asbestos and talc in removing pitch. Since abietic acid is the most common of the resin acids, it was used to simulate pitch in the laboratory study. The abietic acid solution was adjusted to a pH of 4.0 ± 0.2 , the level where many papermaking circuits operate. Because abietic acid is quite insoluble in acid solutions, a visible precipitate could be seen.

Additions of four grams per liter of high-purity asbestos and talc were then made to different solutions. The suspensions were allowed to stand until a supernate free of asbestos or talc flocs could be withdrawn. The floc-free solutions were then analyzed with spectrophotometer at a wavelength of 250 m μ to determine the abietic acid concentration.

As shown in Figure 4, asbestos removed abietic acid effectively at all concentrations. Talc was effective at low levels but became less effective and gave more erratic results as the abietic acid concentration increased. Thus, to the extent that the abietic acid simulates pitch, the effectiveness of asbestos for pitch control is largely due to its ability to flocculate and remove suspended solids and to a lesser degree by adsorption of dissolved matter.

As yet, no one has developed a satisfactory method of analyzing for pitch and, therefore, in the mill the only criterion has been performance. In most of the mills now employing

asbestos it has been used because their problem has been sufficiently severe that no other product has worked satisfactorily. In many instances, the asbestos is performing a dual role. In addition to controlling pitch, it has contributed to improved filler retention, sheet formation and printability.

Because of its success in pitch control, its use has been extended to areas such as control of organic matter in waste pulps. Only recently, it was tried in a board mill that had been experiencing problems of asphalt agglomerates in the final product. It was reasoned that the same properties that make asbestos effective in pitch control should be applicable to the problems encountered in asphalt dispersion and control.

It was first tried at 1.25 per cent asbestos level in a 21-lb./1000 ft.² chip board consisting of printed news and corrugated boxes. Little or no improvement was observed during the first 8-10 hours; however, after it had been on the machine for 18 hours, marked improvements were noted both in the number and size of the asphalt agglomerates. This type of response would indicate that the asbestos can do little once the agglomerates have formed, and its function is one of adsorption or co-flocculation of dispersed asphalt before it has an opportunity to coagulate. As is customary with retention and pitch control applications, the asbestos was added with the pulp at the hydropulpers. As of the time of this writing, the asbestos is still being used in this grade and doing a satisfactory job.

In a subsequent trial on a light-weight kraft grade, 1.25 per cent asbestos was employed for pitch control. This particular grade was also plagued with a polyethylene prob-

lem. Agglomerates would form in the sheet; which resulted in breaks on the rewind. It was observed in this grade that the asbestos not only improved the asphalt condition but reduced the problem attributed to the polyethylene.

Modified asbestos products

The very fact that chrysotile asbestos has a positive surface charge as well as a somewhat reactive surface makes it a prime candidate for modification. With high-purity asbestos as a base product, it is relatively simple to affect the physical properties by either physical or chemical means. For some uses, it has been advantageous to use a combination of treatments.

The most successful modified asbestos product is currently marketed under the name asbestos "T." During the course of refining the asbestos, a highly-dispersed stream of titanium dioxide is blended with the purified asbestos and manufactured in such a way that the TiO₂ becomes an intimate part of the product. Once this has been accomplished, the material resembles a fibrous titania. The result is a single product that combines the properties of both constituents. The retention capabilities of the "T" are comparable to the natural product, and its opacifying power is greatly enhanced by the titania. In the mill trials completed, it has been used to replace titanium dioxide on a pound-for-pound basis in quantities up to five per cent of the total furnish. This is possible due to the high optical efficiency achieved and to the improved retention of the furnish components.

In one mill trial asbestos "T" was substituted on a pound-for-pound basis for titanium dioxide in a 50-lb.