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To (Name) See Attached Distribution List
Division
Location

Date April 12, 1967

Originating Dept. Research and Development Department

Answering letter date

Copy to

Subject Monthly Summary Report
March, 1967

Gentlemen:

Attached is the Monthly Summary Report of the Asbestos Research and Development activities for March, 1967.

In addition to the work reported here, other Research and Development Groups have been evaluating U.C. Asbestos in a variety of systems. The Structure, Performance, and Processing Division has reported some success in milling asbestos and Nylon with some dispersion problem with the asbestos. However, this appears solvable with the use of a stearic acid coupling agent. ABS-asbestos combination showed no strength improvements, which may be attributed to the orientation of the fiber during the injection step. The Wire and Cable Group reported that the addition of 0.5% R-G144 significantly lowers the density of cellular polyethylene on extruded wire. Also, reports from the Silicones Division have shown that Y-5299, an amine silicone-silicate copolymer, has imparted a marginal (10-20%), but consistent, flexural strength improvement when used with ABS filled with R-G144 asbestos.

Very truly yours,

RG Woolery

R. G. Woolery

RGW/bsn
Attach.

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APR. 14 1967
J. W. BIDDLE

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CHEMICALS AND PLASTICS
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P.O. BOX 579, NIAGARA FALLS, N.Y.

Monthly Summary Report
Asbestos Research & Development
March, 1967

TO: (See Attached Distribution List)

FROM: R. G. Woolery

DATE: April 10, 1967

Pulp and Paper

Laboratory studies were continued on Asbestos "T" which have indicated that the present ratio of 35% TiO_2-65% asbestos is optimum with respect to retention and light scattering performance. At the request of the P. H. Glatfelter Co., the performance and manufacture of a 50-50 "T" product is under investigation. This product will be for use in high titania grades where the 35-65 ratio results in an overly high asbestos content for complete replacement of the TiO_2. The King City mill will prepare 30 tons of this product for trial purposes at P. H. Glatfelter. Samples of this product will be examined in the laboratory for determination of light scattering and retention properties.

The retention of blends of High Purity Asbestos and titanium dioxide in papermaking systems has been studied over a large range of asbestos-to-TiO_2 ratios. Indications are that asbestos retention varies only slightly, but that TiO_2 retention decreases as the TiO_2-to-asbestos ratio is increased.

Recent laboratory work with pilot plant silica-treated and aluminum silicate-treated asbestos has indicated that these materials are suitable for papermaking purpose. Further work is necessary to determine the effect of these materials on several papermaking variables and to determine the optimum conditions for their production.

Laboratory work involving the addition of polyvinylpyrrolidone (PVP) and the copolymer of vinylmethylether and maleic anhydride (PVM/MA) combinations to asbestos/cellulose furnishes was continued. It is evidenced that cellulosic sheets containing 50-75% High Purity Asbestos or Asbestos "T" can be prepared when suitable amounts of these additives are present.

Technical Service personnel attended three Asbestos "T" mill trials of which two were inconclusive and one highly successful. The inconclusive trials will, in all probability, be tried again, as no problems were encountered. Brown Paper Co. (Kalamazoo, Michigan) realized savings of $3.50-$5.00 per hour and as a result purchased a 30-ton carload of "T" for continuing use in their board mill.

Assistance to Technical Sales was provided in the form of sample analyses and mill visitations. Samples from the following companies were received and reported on: Cartiera Italiana (Italy), Crown Zellerbach (Antioch, California), and MacSim Bar (Otsego, Michigan). Sales and Technical Service calls were made at Groveton Papers Company (Groveton, New Hampshire) and Domtar Pulp and Paper, Ltd., (Cornwall, Ontario) to discuss the possible applications of Asbestos "T" in the two mills.

G. L. Dickson

Plastics Applications

Reinforcement of a rigid vinyl pipe compound, QGPB-9311, with 15% R-G144 results in a 10% increase in tensile strength and a 50% increase in modulus with no significant loss of impact resistance. Heat resistance is dramatically improved as evidenced by the retention of these mechanical strength advantages, at useful levels, up to about 50-55°C.

Oven stability tests on High Purity Asbestos (HPO) filled polypropylene in inert gases indicate that some species in HPO (possibly adsorbed oxygen) causes decomposition in the absence of atmospheric oxygen. Modification of HPO with water-soluble chelating agents, ammonium hydroxide, ammonium polysulfide, lime, and TiO_2 does not increase its stability in polypropylene. The addition of sulfur to the asbestos improves stability somewhat, but not enough to produce a commercially acceptable product.

Reichhold Chemicals has ordered 100 lb. of R-G244 for a plant trial in a polyester boat resin. This product is to be sampled to their customers, and Reichhold expects initial orders to result in a requirement of 1 ton of R-G244 per month.

R. E. Byrne

Asbestos Fiber Research

Efforts are being made to determine the best conditions for preparation of R-G244. Laboratory studies have shown that the best polyester thickener is produced if the treatment level of the asbestos ranges from 8 to 10 parts of silica per one hundred parts of resin. The effectiveness of the product appears to be unaffected by order of addition of the sodium silicate and acetic acid as long as the final

pH is about 8.0. The most critical requirement is the liberation of the fibers prior to treatment. R-G244 asbestos, meeting minimum specifications, can always be made if the starting material is 97% by weight, less than 10 microns. No correlation was found between the Brookfield viscosity of asbestos suspensions in water and the degree of opening. Similarly, no relationship was found between Brookfield viscosity of aqueous suspensions of R-G244 and the effectiveness of the product in thickening polyester resins.

The role of polymerized silica in the silica treatment of asbestos was investigated. It was found that long silica polymers were less effective than short polymers. The best results were obtained when the sodium silicate solution (monomeric) was added directly to the asbestos suspension.

Asbestos suspensions become dispersed with sufficient CMC in the pH range 4 to 10. The asbestos surface is negatively charged under these conditions and so asbestos suspensions should be susceptible to flocculation by cations. It was found that monovalent cations do not effect the stability of the suspensions, but they do become increasingly sensitive to flocculation as divalent cations and trivalent cations are added to them. Mixtures of the CMC-treated asbestos with bentonite have similar rheological properties to those of mixtures of pure asbestos and bentonite. It appears that the charge on asbestos is not important in determining the flow properties of asbestos-bentonite mixtures.

It is desirable as a carrier for agricultural chemicals to reduce the alkaline nature of asbestos. Accordingly, asbestos was treated with the dilute sulfurous acid solution, filtered, and dried. When it was then reslurried with distilled water, the resulting suspension remained neutral in pH for over a week. A similar suspension made with untreated asbestos had a pH of about 9. Sulfuric acid was less effective for the washing treatment than was sulfurous acid.

The research work at Alfred University has reported increased modulus of rupture (10-15%) as well as some detrimental side effects. For economic reasons, however, it does not appear that High Purity Asbestos will be feasible in this application.

S. Chwastiak

Asbestos Development

The integrated batch R-G244 pilot plant was operated to establish a product inventory of 500 pounds and to develop reliable process techniques. Sources of product degradation have been evaluated at the plant and laboratory scale, indicating aqueous phase sensitivity of the treated slurry to shear and pressure. A proposed flowsheet has been worked out with King City personnel for R-G244 production to start in May at the plant site.

Modified Asbestos "T" products, containing rutile TiO_2 in several proportions, were prepared and shipped for outside evaluations. No problems in the manufacturing of the products were encountered.

Calcium carbonate plugged filter cloth from the King City Plant was leached with CO_2 by the recarbonation technique. A means of cleaning the cloths in place, using dryer stack gas, is shown to be feasible.

A paper mill trial of High Purity Asbestos addition to a filtration saveall did not demonstrate any improvement in effluent clarity. It did show the wire retention advantages of beater additions and schemes for modifying the mill system, for improved effluent clarity employing High Purity Asbestos, were proposed.

Esco Company (Portland, Oregon) reported encouraging laboratory results in using High Purity Asbestos in their mold washes, Discussion with their technical personnel also aroused interest in possible application for hot top mixes, recovery of off gas dust, foundry sands, etc.

J. E. Skvarla

RGW/bsn

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