PLAINTIFF'S EXHIBIT
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Asbestos beefs up plastics and adhesives to extend their use



Highway markers are bonded with inexpensive, asbestos-modified adhesives. Two components are mixed and dispensed from cart before applying reflectant.

The first single-crystal whiskers to be used by man were asbestos. Since the whiskers' high strength was first measured in a laboratory, scientists have been trying to find ways to harness the potential of asbestos in structural materials.

The tensile strength of single crystals of asbestos has been measured at more than 800,000 psi—as strong as the strongest glass filaments. But so far, strengths achieved in composites do not go beyond those achieved with glass-mat reinforcements.

The thorn to date. One of the chief drawbacks of asbestos has been the inability of researchers to incorporate homogeneously more than 10% to 20% asbestos with structural resins. With only 4% or 5%, resin mixtures become unmanageably viscous.

But this very deficiency is being turned to advantage by Union Carbide chemists, who have developed a number of thixotropic uses for their new resin-grade of chrysotile asbestos. The Union Carbide material, because of its high purity and fine particle size, is easier to incorporate in resinous compounds. Union Carbide's filler is cheaper than other thixotropic agents.

Opening new fields. Union Carbide mines an area in California. Asbestos was discovered there just a few years ago, and it is believed to be the largest source of high-purity asbestos ore in the world. The extra-high purity of this grade has opened up a whole new range of uses for asbestos.

An important difference in the California grade of asbestos is its random orientation, which permits the wet-processing system. Wet-processing breaks up individual fibers into easy-to-handle dust-free pellets. The separation of fibers yields a more efficient reinforcing effect in resin-based products.

Another application for asbestos is as a reinforcement for thermoplastics. Adding 20% asbestos to Nylon 6 doubles both the flexural and tensile strength of the unreinforced material. The increase matches the strength improvement obtained with chopped-glass fibers.

Saving money. Most other applications for the new grade of asbestos have been in viscosity-control uses such as with epoxy and polyester compounds. Of course, some reinforcing effect also results.

For example, traffic-marker adhesives based on epoxy resins have been made 60¢ to 70¢/lb. cheaper by using the asbestos thickener.

About 30 gm of adhesive are used by the State of California's Highway Dept. in putting down round-button pavement markers. About 3 million of these markers will be applied by the end of this year: The use of asbestos has added up to some important savings for the California tax payer. **(2.127)**

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