



STORY AND PHOTOGRAPHY BY RICHARD BERKOW



The **BRIGHTENING** Factor

Above: Loading up the titanium ore inside a protected shed.

What do toothpaste, eye shadow, picnic forks, house paint, hospital gloves and the paper this article is printed on all have in common? The answer is they all contain titanium dioxide, the world's most popular whitening and brightening agent.

No other pigment can match its brilliance and tinting strength, yet ironically, it comes from an ore black in color. Mined in Australia, South Africa, India and the United States, the oxidation process used with the titanium ore's minerals, *rutile* and *ilmenite*, was first developed in 1916. Today, millions of tons of ore are converted yearly into titanium dioxide, the magic brightener.

At the Port of Baltimore, privately-owned Rukert

Terminals imports 50,000 tons of it annually. "It's a staple of our work menu," explains company President John Coulter. "We've been handling it for more than 20 years, and because it comes to us in a fine, powdery form, we ordered a custom-built scoop to handle it so there would be no loss due to spillage."

Transported from South Africa to the Port of Baltimore by FedNav, Canada's largest ocean-going dry bulk shipping group, the highly-valuable cargo requires a professional and experienced team to handle it properly. For as the ship's holds begin to empty — at the rate of 400 tons per hour — a bulldozer with an articulated blade is lowered down to pull, rather than push, the ore from the walls and corners.

Workmen with shovels and brooms work together to

Below: Custom-made watertight scoop used for handling titanium ore during the unloading process.

capture the last remaining ore and send it up for delivery to a holding shed. At nearby Hawkins Point, Millennium Chemicals, one of the world's largest manufacturers of titanium dioxide, then sends its trucks up to haul the black powder back for processing.

So how does a black ore become the most effective of whitening agents? The trick is in the chemical reactions.

First, it is mixed with chlorine to form *titanium tetrachloride*. Next, impurities are removed and then a high-temperature oxidation process begun, which when combined with various chemicals, produces the appropriate pigments for either plastics, paint or paper. The entire processing operation takes several days.

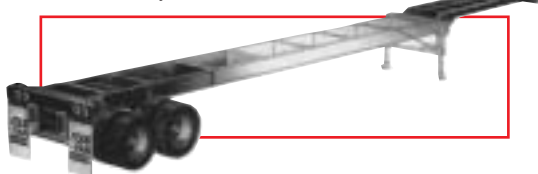
"We have the measuring and weighing and transporting methodology down to a science now," says Rukert Corporation's Coulter. "After the conversion process, virtually anywhere you look, you'll see titanium dioxide." 🌐



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